

TM 9-2320-279-10-2

OPERATOR'S MANUAL

M977 SERIES, 8 x 8 HEAVY EXPANDED MOBILITY TACTICAL TRUCKS (HEMTT)

MODEL	NSN
TRUCK, CARGO, WITH WINCH, M977	2320-01-097-0260
TRUCK, CARGO, WITHOUT WINCH, M977	2320-01-099-6426
TRUCK, TANK, FUEL, WITH WINCH, M978	2320-01-097-0249
TRUCK, TANK, FUEL, WITHOUT WINCH, M978	2320-01-100-7672
TRUCK, TRACTOR, WITH WINCH, WITHOUT CRANE, M983	2320-01-097-0247
TRUCK, TRACTOR, WITH WINCH, WITH CRANE, M983	2320-01-099-6421
TRUCK, WRECKER-RECOVERY, M984	2320-01-097-0248
TRUCK, WRECKER-RECOVERY, M984E1	2320-01-195-7641
TRUCK, CARGO, WITH WINCH, M985	2320-01-097-0261
TRUCK, CARGO, WITHOUT WINCH, M985	2320-01-100-7673
TRUCK, CARGO, WITH WINCH, M985E1	2320-01-194-7032
TRUCK, CARGO, WITHOUT WINCH, M985E1	2320-01-194-7031

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HEADQUARTERS,
DEPARTMENT OF THE ARMY
15 JUNE 1987

CHANGE 3 DECEMBER 1998

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WARNING

CARBON MONOXIDE (EXHAUST GAS) CAN CAUSE DEATH.

Carbon monoxide does not have color or smell, but can cause death. Breathing air with carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, a sleepy feeling, and coma. Brain damage or death can result from heavy exposure. Carbon monoxide is in exhaust fumes of fuel-burning heaters and internal combustion engines. Carbon monoxide can become dangerously concentrated under conditions of no ventilation. Precautions must be followed to ensure crew safety when the personnel heater or engine of any vehicle is operated for any purpose.

1. DO NOT operate personnel heater or vehicle engine in a closed place unless the place has a lot of ventilation.
2. DO NOT drive any vehicle with inspection plates, cover plates, or engine compartment covers removed unless necessary for maintenance purposes.
3. BE ALERT at all times during vehicle operation for exhaust odors and exposure symptoms. If either are present, IMMEDIATELY VENTILATE personnel compartments. If symptoms continue, remove affected crew to fresh air and keep warm. DO NOT PERMIT PHYSICAL EXERCISE. If necessary, give artificial respiration and get immediate medical attention. For artificial respiration, refer to FM 21-11.
4. BE AWARE that the gas particulate filter unit or the field protection mask for nuclear-biological-chemical protection WILL NOT offer safety from carbon monoxide poisoning.

THE BEST DEFENSE AGAINST CARBON MONOXIDE POISONING IS GOOD VENTILATION.

WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

WARNING

Never use parking brake for normal braking or wheels will lock up causing severe skid. Skidding vehicle could result in serious personal injury or death.

WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET OF VEHICLE.

WARNING

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around the vehicle. Jewelry can catch on equipment and cause injury, or may short across an electrical circuit and cause severe burns or electrical shock.

WARNING

The radiator is very hot and pressurized during vehicle operation. Let radiator cool before removing cap. Failure to do so can result in serious burns.

WARNING

The exhaust pipe and muffler can become very hot during vehicle operation. Be careful not to touch these parts with bare hands, or allow body to come in contact with exhaust pipe or muffler. Exhaust system parts can become hot enough to cause serious burns.

WARNING

Do not use trailer brakes as a parking brake. Trailer brakes may not hold loaded vehicle and trailer on a grade. A runaway vehicle may cause severe personal injury or death.

WARNING

Always use seatbelts when operating vehicle. Failure to use seatbelt can result in serious injury or death in case of accident.

WARNING

Avoid quick, jerking, winch operation. Keep other personnel well away from vehicles involved in winching operations. A snapped cable or shifting load can cause serious injury or death.

WARNING

Always wear heavy gloves when handling winch cables. Never let cable run through hands. Frayed cables can cut. Never operate winch with less than five wraps of cable on winch drum.

WARNING

When using crane on any vehicle, park vehicle clear of all overhead powerlines. Do not operate crane near overhead powerlines. If crane comes in contact with powerlines, serious injury or death can result.

WARNING

Be careful when working on or with electrical equipment. Do not be misled by the term "low voltage". Voltages as low as 50 volts can cause death. For artificial respiration, refer to FM 21-11.

WARNING

Be careful not to short out battery terminals. Do not smoke or use open flame near batteries. Batteries may explode from a spark. Battery acid is harmful to skin and eyes.

WARNING

If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal procedures.

WARNING

Operation at speeds over 15 mph (24 kph) on paved roads can be achieved when the operator determines that the vehicle being towed and the terrain allow safe operation. Under no condition can speeds over 35 mph (55 kph) on paved road and 15 mph (24 kph) off-road be allowed. Loss of control can cause serious injury or death. Excessive speed can cause damage to vehicle being towed.

WARNING

Excessive noise levels are present any time the heavy-duty winch or crane is operating. Wear single hearing protection (earplugs or equivalent) while working around equipment while it is running. Failure to do so could result in damage to your hearing. Seek medical aid should you suspect a hearing problem.

WARNING

Tire air pressure must be checked properly or serious injury or death may result.

WARNING

Speed limits posted on curves reflect speeds that are considered safe for automobiles. Heavy trucks with a high center of gravity can roll over at these speed limits. Use caution and reduce your speed below the posted limit before entering a curve. Failure to comply may result in vehicle crash and injury to personnel.

LIST OF EFFECTIVE PAGES/WORK PACKAGES

NOTE: The portion of text affected by the updates is indicated by a vertical line in the outer margins of the page. Updates to illustrations are indicated by miniature pointing hands. Updates to wiring diagrams are indicated by shaded areas.

Dates of issue for original and updated pages/work packages are:

Original 0 June 1987	Change 3 15 December 1998
Change 1 10 April 1989	Change 4 15 December 2000
Change 2 15 April 1996	Change 5 15 February 2002

**TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 822
CONSISTING OF THE FOLLOWING:**

Page/WP No.	*Change No.	Page/WP No.	*Change No.	Page/WP No.	*Change No.
Cover	3	2-12 - 2-13	0	2-71 - 2-74	0
Blank	0	2-14 - 2-16	3	2-75 - 2-76	3
a - b	0	2-17	0	2-77 - 2-81	0
c	3	2-18 - 2-19	1	2-82	3
d	5	2-20	0	2-82.1 Blank	3
i	5	2-21 - 2-23	3	2-82.2	3
ii	0	2-24	0	2-83 - 2-84	3
1-1 - 1-2	0	2-25	3	2-85 - 2-88	0
1-3	3	2-26 - 2-29	0	2-89 - 2-91	3
1-4 - 1-8	0	2-30	3	2-92 - 2-100	0
1-9	4	2-31 - 2-33	0	2-101	3
1-10	0	2-34	3	2-102 - 2-105	0
1-11	3	2-35 - 2-36	0	2-106	3
1-12	5	2-37	3	2-106.1	3
1-12.1	5	2-38	0	2-106.2 Blank	3
1-12.2 Blank	5	2-38.1 - 2-38.2	3	2-107	0
1-13	3	2-39	3	2-108	1
1-14	0	2-40 - 2-42	0	2-109 - 2-112	0
1-15	3	2-43	3	2-112.1	3
1-16 - 1-18	0	2-44 - 2-51	0	2-112.2 Blank	3
2-1	3	2-52	3	2-113	3
2-2 - 2-10	0	2-53 - 2-69	0	2-114 - 2-118	0
2-11	3	2-70	3	2-119	0

* Zero in this column indicates an original page.

TM 9-2320-279-10-2

INSERT LATEST UPDATED PAGES/WORK PACKAGES, DESTROY SUPERSEDED DATE

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2-120	0	2-421	3	2-628 - 2-639	0
2-121 - 2-130	0	2-422 - 2-434	0	2-640 - 2-641	1
2-131 - 2-132	3	2-435	3	2-642 - 2-644	0
2-132.1	3	2-436 - 2-458	0	2-645	3
2-132.2 Blank	3	2-459	3	2-646 - 2-656	0
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2-144.1	3	2-461 - 2-475	0	2-658 - 2-668	0
2-144.2 Blank	3	2-476	3	3-1 - 3-2	0
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2-186.81	3	2-546 - 2-551	0	E-1	0
2-186.82 Blank	3	2-552	1	E-2	3
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2-238	3	2-564	1	F-1	5
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2-296 - 2-420	0	2-627	1	Index 9	0
				Index 10 Blank	0

* Zero in this column indicates an original page.

B

TM 9-2320-279-10-2

C5

CHANGE

HEADQUARTERS
DEPARTMENT OF THE ARMY

NO. 5

Washington, D.C., 15 February, 2002

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TRUCK, CARGO, WITHOUT WINCH, M985E1	2320-01-194-7031

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Remove Pages

c - d
i - ii
1-11 - 1-12
1-12.1/(1-12.2 blank)
F-1 - F-4

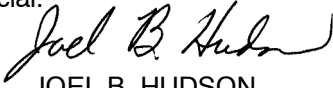
Insert Pages

c - d
i - ii
1-11 - 1-12
1-12.1/(1-12.2 blank)
F-1 - F-4

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By Order of the Secretary of the Army:

Official:



JOEL B. HUDSON
*Administrative Assistant to the
Secretary of the Army*

0115505

ERIC K. SHINSEKI
*General, United States Army
Chief of Staff*

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NO. 4

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Remove Pages

1-9 and 1-10

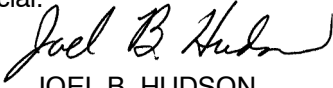
Insert Pages

1-9 and 1-10

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*Administrative Assistant to the
Secretary of the Army*

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ERIC K. SHINSEKI
*General, United States Army
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Washington D. C., 15 December 1998

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5. Changes on cover are: Removed VOLUME NO. 2.

Remove Pages	Insert Pages
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1-3 and 1-4	1-3 and 1-4
1-11 and 1-12	1-11 and 1-12
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F-1 thru F-4
Index 7 and Index 8
DA 2028 sample F & B
DA 2028 F & B
DA 2028 F & B
DA 2028 F & B
Cover

Insert Pages

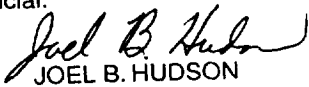
2-37 and 2-38
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2-113 and 2-114
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2-132.1/(2-132.2 blank)
2-144.1/(2-144.2 blank)
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2-435 and 2-436
2-459 and 2-460
2-475 and 2-476
2-497 and 2-498
2-501 and 2-502
2-568/(2-605 blank) and 2-606
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DA 2028 sample F & B
DA 2028 F & B
DA 2028 F & B
DA 2028 F & B
Cover

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General, United States Army
Chief of Staff

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Administrative Assistant to the
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NO. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D. C. 15 April 1996

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Remove Pages

2-1 and 2-2
None
None
2-83 and 2-84
2-91 and 2-92
2-145 and 2-146
None
Index 7 and Index 8

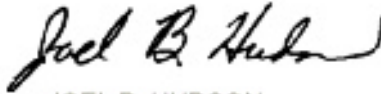
Insert Pages

2-1 and 2-2
2-38.1/(2-38.2 blank)
(2-82.1 blank)/2-82.2
2-83 and 2-84
2-91 and 2-92
2-145 and 2-146
2-186.1 thru 2-186.42
Index 7 and Index 8

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*Administrative Assistant to the
Secretary of the Army*
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DENNIS J. REIMER
*General, United States Army
Chief of Staff*

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CHANGE

NO. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., 10 April 1989

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2-107 and 2-108	2-107 and 2-108
2-281 and 2-282	2-281 and 2-282
2-295 and 2-296	2-295 and 2-296
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2-627 and 2-628	2-627 and 2-628
2-639 thru 2-642	2-639 thru 2-642

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By Order of the Secretary of the Army:

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General, United States Army

Chief of Staff

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The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-38, Operator maintenance requirements for Truck, Cargo, 10-Ton, 8X8, Heavy Expanded Mobility Tactical Truck, HEMTT, M977, M978, M983, M984, M985.

TECHNICAL MANUAL

HEADQUARTERS
DEPARTMENT OF THE ARMY

No. 9-2320-279-10

Washington, DC, 15 June 1987

OPERATOR'S MANUAL

M977 SERIES, 8 X 8 HEAVY EXPANDED MOBILITY TACTICAL TRUCKS (HEMTT)

MODEL	NSN
TRUCK, CARGO, WITH WINCH, M977	2320-01-097-0260
TRUCK, CARGO, WITHOUT WINCH, M977	2320-01-099-6426
TRUCK, TANK, FUEL, WITH WINCH, M978	2320-01-097-0249
TRUCK, TANK, FUEL, WITHOUT WINCH, M978	2320-01-100-7672
TRUCK, TRACTOR, WITH WINCH, WITHOUT CRANE, M983	2320-01-097-0247
TRUCK, TRACTOR, WITH WINCH, WITH CRANE, M983	2320-01-099-6421
TRUCK, WRECKER-RECOVERY, M984	2320-01-097-0248
TRUCK, WRECKER-RECOVERY, M984E1	2320-01-195-7641
TRUCK, CARGO, WITH WINCH, M985	2320-01-097-0261
TRUCK, CARGO, WITHOUT WINCH, M985	2320-01-100-7673
TRUCK, CARGO, WITH WINCH, M985E1	2320-01-194-7032
TRUCK, CARGO, WITHOUT WINCH, M985E1	2320-01-194-7031

Approved for public release; distribution is unlimited.

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this publication. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Submit your DA Form 2028 (Recommended Changes to Equipment Technical Publications), through the Internet, on the Army Electronic Product Support (AEPS) Web site. The Internet address is <http://aeprs.ria.army.mil>. If you need a password, scroll down and click on "ACCESS REQUEST FORM." The DA Form 2028 is located in the ONLINE FORMS PROCESSING section of the AEPS. Fill out the form and click on SUBMIT. Using this form on the AEPS will enable us to respond quicker to your comments and better manage the DA Form 2028 program. You may also mail, fax, or e-mail your letter or DA Form 2028 direct to: AMSTA-LC-CI/TECH PUBS, TACOM-RI, 1 Rock Island Arsenal, Rock Island, IL 61299-7630. The email address is TACOM-TECH-PUBS@ria.army.mil. The fax number is DSN 793-0126 or Commercial (309) 782-0726.

M983 with crane and M985E1 without winch are no longer in the fleet. Ignore all references to these vehicles. The M984E1 and M984A1 are the same vehicle. All references to M984E1 shall be interpreted as the M984A1 model.

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***: Refer to Volume No. 1 (TM 9-2320-279-10-1) for the List of References, the Components of End Item and Basic Issue Items Lists, the Additional Authorization List, and the Expendable Supplies and Materials List for the M984A1 truck.

HOW TO USE THIS MANUAL

This manual is designed to help operate and maintain the M977 series vehicles, Volume 1 of this manual contains instructions that are common to the M984A1 and other M977 series vehicles. Volume 2 contains unique operator instructions for the M984E1 Wrecker-Recovery vehicle. In addition to this manual, TM 9-2320-355-10 provides unique operator instructions for the M985E1 Guided Missile Transporter (GMT) and TM 9-2320-354-10 provides unique operator instructions for the M984 wrecker vehicle. Listed below are some of the special features which have been included to help locate and use the needed information.

- A front cover Table of Contents is provided for quick reference to chapters and sections that will be used often.
- Each chapter begins with a Table of Contents listing all paragraph headings in the chapter.
- Warning, caution, and note headings, subject headings, and certain other essential information are printed in bold type to make them easier to see.

FOLLOW THESE GUIDELINES WHEN USING THIS MANUAL:

- The driver must read through this manual and become familiar with the content before attempting to operate the vehicle.
- Read all WARNINGS and CAUTIONS before performing any procedures.

CHAPTER 1 INTRODUCTION (CONT)

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Hand Receipt (HR) Manuals.	1-22	1-3
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Section I. GENERAL INFORMATION

Vehicle Model

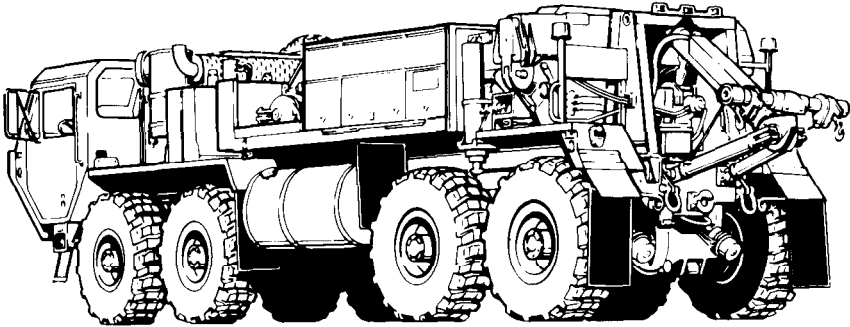
1-19. SCOPE. This volume is used for operation and operator-performed maintenance of the 95,000-lb (43 000 kg) GVWR, 8x8, M984E1 wrecker-recovery vehicle. Refer to Volume 1 of this manual for description of all other models of the M977 series vehicles.

Model Description

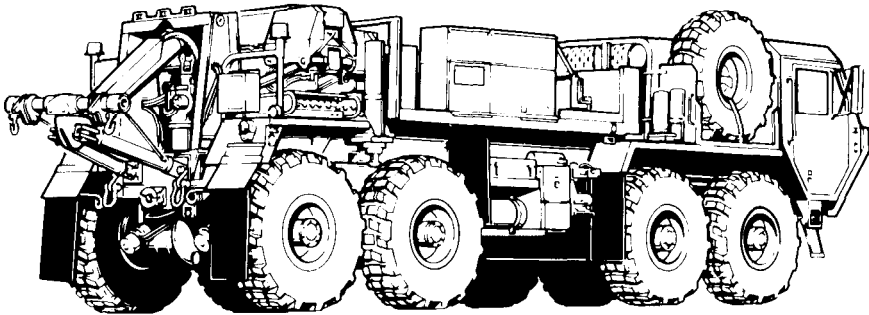
M984E1 Wrecker vehicle with 95,000-lb (43 000 kg) GVWR and 114,000-lb (51 700 kg) GCWR that can be increased to 155,000-lb (70 370 kg) GCWR under certain conditions. Vehicle is equipped with material handling crane with 6,000-lb (2 722 kg) load capacity at 18.2 ft (5.5 m) boom radius 60,000-lb (27 240 kg) recovery winch, and equipment body with 10 stowage compartments (fig. 1-21).

Vehicle Model (Cont)

1-19. SCOPE (CONT).



LEFT REAR VIEW



RIGHT REAR VIEW

TA475463

Figure 1-21. M984E1 Wrecker-Recovery Vehicle.

Equipment and Maintenance Reports

1-20. MAINTENANCE FORMS AND RECORDS. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by PAM 738-750, The Army Maintenance Management System (TAMMS).

1-21. EQUIPMENT IMPROVEMENT REPORT AND MAINTENANCE DIGEST (EIR MD) AND EQUIPMENT IMPROVEMENT REPORT AND MAINTENANCE SUMMARY (EIR MS). The quarterly Equipment Improvement Report and Maintenance Digest, TB 43-0001-39 series contains valuable field information on equipment covered in this manual. Information in the TB 43-0001-39 series is compiled from some of the Equipment Improvement Reports that have been prepared on vehicles covered in this manual. Many of these articles result from comments, suggestions, and improvement recommendations that were submitted to the EIR program. The TB 43-0001-39 series contains information on equipment improvements, minor alterations,

Equipment and Maintenance Reports (Cont)

proposed Modification Work Orders (MWO's), warranties (if applicable), actions taken on some of the DA Form 2028's (Recommended Changes to Publications), and advance information on proposed changes that may affect this manual. Significant maintenance articles, including minor alterations and field-fixes, are republished in the Equipment Improvement Report and Maintenance Summary (EIR MS) for TACOM Equipment (TM 43-0143). Refer to the TB 43-0001-39 series and TM 43-0143 periodically for the most current and authoritative information on the equipment. The information will help to do a better job and will advise of the latest changes to this manual. Also refer to DA Pam 25-30, Consolidated Index of Army Publications and Blank Forms, and Appendix A, References, of this manual.

1-22. HAND RECEIPT (HR) MANUALS. This manual has a companion document with a TM number followed by "-HR" (Hand Receipt). The TM 9-2320-279-10-HR consists of preprinted hand receipts (DA Form 2062) that list end item related equipment (COEI, BII, and AAL) which must be accounted for. As an aid to property accountability, additional -HR manuals may be requisitioned from the following source in accordance with procedures in Chapter 12, AR 25-30:

Commander
US Army Adjutant General Publications Center
ATTN: AGDM-OD
2800 Eastern Blvd.
Baltimore, MD 21220

1-23. SUBMITTING QUALITY DEFICIENCY REPORTS (QDR). If your vehicle needs improvement, let us know. Send us a QDR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF368 (Quality Deficiency Report). Mail it to Commander, U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-AC-NML, Rock Island, IL 61299-7630. You can also provide information to TACOM via datafax or e-mail. TACOM's datafax number is: DSN 793-0726 or (309) 782-0726. E-mail address: amsta-ac-nml@ria-emhl.army.mil

1-24 WARRANTY INFORMATION. The M977 series vehicles are warranted by Oshkosh Truck Corporation for 12 months or 12,000 miles (19 308 km), whichever comes first. The warranty starts on the date found in block 23, DA Form 2408-9, in the logbook. Report all defects in material or workmanship to the supervisor, who will take appropriate action through the organizational maintenance shop. Refer to TB 9-2320-279-14 for more information on the warranty procedures for the M977 series vehicles.

1-25. METRIC SYSTEM. The equipment described in Volume 1 contains metric components and requires metric, common, and special tools. Therefore, metric units and English units will be used throughout this publication. An English-to-metric conversion table is included as the last page of this manual inside the back cover.

Abbreviation References

1-26. REFERENCE INFORMATION. This listing includes the nomenclature cross-reference list and a list of abbreviations used in this manual.

a. Nomenclature Cross-Reference List.

Common Name	Official Nomenclature
Engine Coolant	- Antifreeze, ethylene glycol mixture
Cold Start System	- Either quick-start system
Cable	- Wire rope
Jacobs® Brake	- Engine retarder
Glad Hand	- Quick disconnect coupling

b. Abbreviations.

AAL	Additional Authorization List
BII	Basic Issue Items
C	Celsius
CID	Cubic Inch Displacement
COEI	Components of End Item
EIR's	Equipment Improvement Recommendations
F	Fahrenheit
GCWR	Gross Combination Weight Rating
GPFU	Gas Particulate Filter Unit
GVWR	Gross Vehicle Weight Rating
kg	Kilogram
kPa	Kilopascals
Kmh	Kilometer per hour
KW	Kilowatt
L	Liter
mm	Millimeter
N•m	Newton meter
PMCS	Preventive Maintenance Checks and Services

Section II. EQUIPMENT DESCRIPTION

Features and Capabilities

27. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES.

a. Characteristics. The M984E1 vehicle is used as a multipurpose vehicle capable of recovering and towing a full spectrum of loaded, wheeled vehicles. Lift and reach capability to perform maintenance assistance associated with removing and replacing powerpacks and heavy components from a wide range of wheeled and tracked vehicles.

b. Capabilities.

(1) Operates in temperatures from -25° to 120° F (-32° to 49° C) and to -50° F (-46° C) with arctic kit installed.

(2) Can ford water up to 48-in. (1 219 mm) deep for 5 minutes without damage or without requiring maintenance before operation can continue.

(3) Normal operating range is 300 miles (483 km), based upon 154 gallons (583 L) of fuel and 100,000-lb (45 400 kg) GCWR, traveling over mixed terrain. Varying loads, prolonged idle, use of power takeoff (PTO), offroad driving, and climatic conditions affect operating range.

(4) Tiedown points located so vehicles can be restrained in all directions during air transport in C-130, C-141, and C-5A type aircraft. Capable of being transported by highway, rail, and sea.

c. Features.

(1) Eight-cylinder, V-type, 2-cycle, turbocharged diesel engine.

(2) Automatic transmission with one reverse speed and four forward speeds.

(3) Operator controlled 4-wheel/8-wheel drive and high and low range transfer case for positive traction in areas of unimproved road surfaces.

(4) Power steering system consists of basic manual steering system with hydraulic boost. Mechanical linkage also provides operator control in event of hydraulic oil pressure loss.

(5) Fuel system includes one fuel tank, fuel lines, fuel-water separator, fuel pump, secondary filter, fuel pipes, and fuel injectors.

(6) Two front and two rear towing eyes.

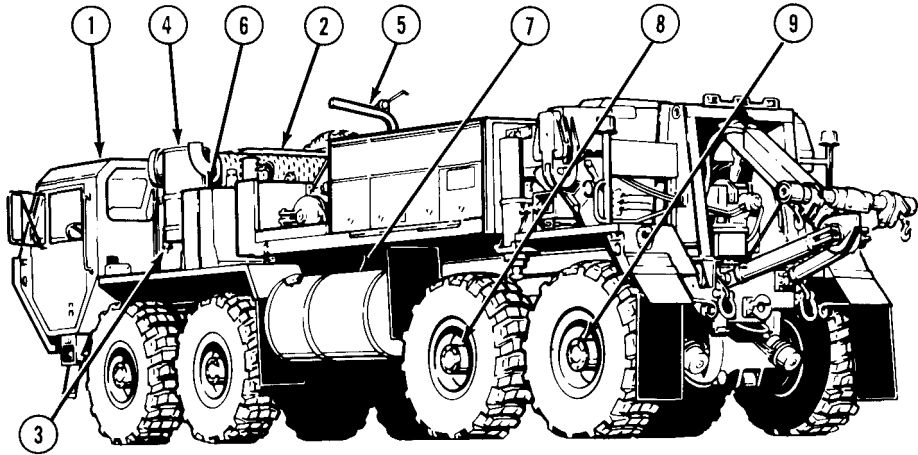
(7) Manual-release-type rear pintle hook which will allow towing of a trailer.

(8) Radio frequency interference suppression to permit voice radio communications during all phases of operation.

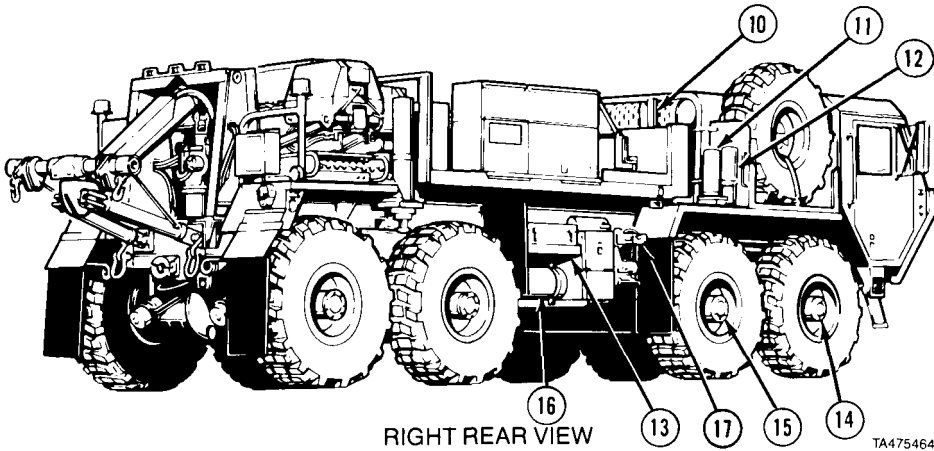
Component Locations

-28. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS.

Figures 1-22 and 1-23 illustrate major components of the M984E1.



LEFT REAR VIEW



RIGHT REAR VIEW

TA475464

Figure 1-22. M984E1 Wrecker-Recovery Vehicle.

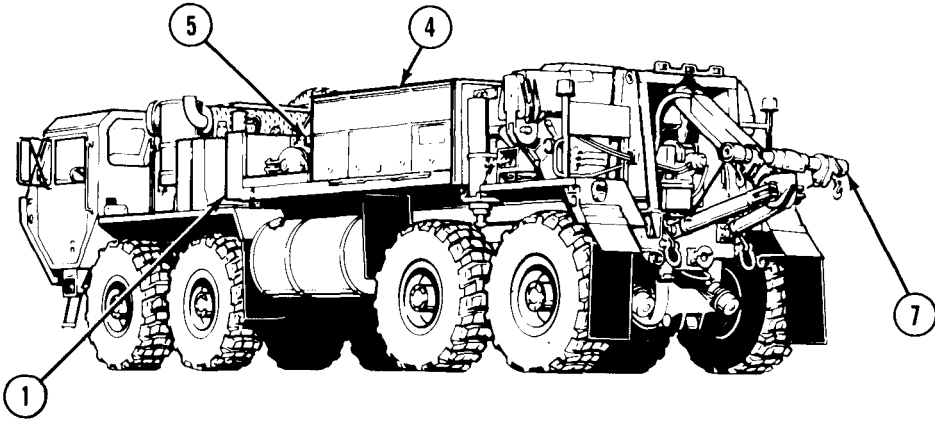
Component Locations (Cont)

Legend for Figure 1-22. M984E1 Components Location.

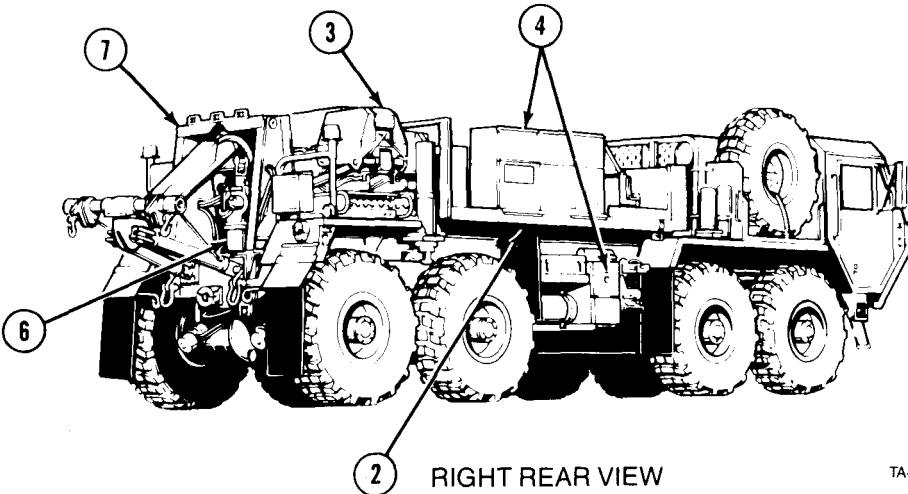
1. **PERSONNEL CAB.** Provides protection from weather for crew and vehicle controls, gages, and indicators.
2. **ENGINE COMPARTMENT.** Engine supplies power to move vehicle and operate equipment and accessories.
3. **ETHER CANISTER.** Contains ether for use as cold weather starting aid.
4. **AIR CLEANER.** Filters out dust and debris from air entering air induction system.
5. **TIRE DAVIT (shown assembled).** Used to raise and lower spare tire.
6. **HYDRAULIC RESERVOIR.** Stores, cools, and filters oil used in hydraulic and power steering systems.
7. **FUEL TANK.** Stores fuel used to operate engine. Receives excess fuel not used by engine's fuel injection system.
8. **NO. 3 DRIVING AXLE.** Supports weight of vehicle and transmits power to hubs to turn rear wheels.
9. **NO. 4 DRIVING AXLE.** Supports weight of vehicle and transmits power to hubs to turn rear wheels.
10. **TIRE DAVIT (shown in stowed position).** Used to raise and lower spare tire.
11. **AIR DRYER.** Used to remove dirt and moisture from compressed air before air enters air reservoirs.
12. **FUEL-WATER SEPARATOR.** Acts as primary fuel filter and removes any water from fuel before entering engine.
13. **BATTERY BOX.** Houses and protects four storage batteries.
14. **NO. 1 DRIVING AXLE.** Controls direction of vehicle when in motion. When needed, transmits power to hubs to turn wheels.
15. **NO. 2 DRIVING AXLE.** Controls direction of vehicle when in motion. When needed, transmits power to hubs to turn wheels.
16. **AIR RESERVOIRS.** Used to store air system air.
17. **SELF-RECOVERY WINCH.** Used to help vehicle pull itself free of obstructions.

Component Locations (Cont)

1-28. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (CONT).



LEFT REAR VIEW



RIGHT REAR VIEW

TA475465

Figure 1-23. M984E1 Wrecker-Recovery Vehicle Components Location.

1. **EQUIPMENT BODY.** Used to carry AAL, BII, COEI, and repair parts.
2. **ACCESS LADDER.** Used by crew to clean windows, check oil, or perform other tasks requiring access to parts of vehicle out of normal reach.
3. **MATERIAL HANDLING CRANE.** Used to load and unload equipment and cargo.
4. **STORAGE BOXES.** Used to stow AAL, BII, and COEI.
5. **HEAVY-DUTY WINCH.** Used to pull vehicles out of ditches, mud, and other areas as needed.
6. **FAIRLEAD TENSIONER.** Used to help guide and feed heavy-duty winch cable out with hydraulic motor. Used also to keep tension on cable when reeling cable back in as needed.
7. **RETRIEVAL SYSTEM.** Used for lifting and towing disabled vehicles.

Equipment Differences and Technical Data (Cont)

1-29. DIFFERENCES BETWEEN MODELS. Refer to Volume 1 for differences between the M984E1 and other models of the M977 series.

1-30. EQUIPMENT DATA. Refer to Table 1-4 for M984E1 equipment data.

Table 1-4. M984E1 Equipment Data

Model	Item
M984E1	<p>DIMENSIONS</p> <p>Width (overall): 96 in. (2 440 mm)</p> <p>Height (overall): 112 in. (2 840 mm)</p> <p>Height (reduced for shipping): 102 in. (2 590 mm)</p> <p>Length (overall): 392 in. (9 960 mm)</p> <p>Wheelbase: 191 in. (4 850 mm)</p> <p>Turning Circle (wall-to-wall): 100 ft (30.5 m)</p> <p>Ground Clearance: 24 in. (609.6 mm)</p> <p>Center of Gravity (See shipping data plate on left rear outside of cab.): 207 in. (5 258 mm)</p>
M984E1	<p>WEIGHT</p> <p>Curb Weight: 50,900 (23 100 kg)</p> <p>Gross Vehicle Weight Rating: 95,000 lb (43 000 kg)</p> <p>Gross Combination Weight Rating:</p> <p>114,000 lb (51 700 kg) (Off-road, LO range, 30% maximum grade)</p> <p>114,000 lb (51 700 kg) (Primary or Secondary road, LO or HI range, 7% maximum grade)</p> <p>155,000 lb (70 370 kg) (Primary road, LO range)</p>
M984E1	<p>WEIGHT DISTRIBUTION</p> <p>Front Tandem Axles - Curb: 23,900 lb (10 800 kg)</p> <p>Front Tandem Axles - Loaded: 30,000 lb (13 600 kg)</p> <p>Rear Tandem Axles - Curb: 27,000 lb (12 300 kg)</p> <p>Rear Tandem Axles - Loaded: 65,000 lb (29 500 kg)</p>
M984E1	<p>PERFORMANCE</p> <p>CRUISING RANGE AT GCWR: 300 mi (483 km)</p> <p>Maximum Sustained Forward Speed (at 2100 rpm) - 4th Gear: 57 mph (92 kmh)</p> <p>Maximum Sustained Forward Speed (at 2100 rpm) -3rd Gear: 41 mph (66 kmh)</p>

Equipment Differences and Technical Data (Cont)

1-30. EQUIPMENT DATA (CONT).

Table 1-4. M984E1 Equipment Data (Cont)

Model	Item
M984E1	<p>PERFORMANCE (CONT)</p> <p>Maximum Sustained Forward Speed (at 2100 rpm) - 2nd Gear: 28 mph (45 kmh)</p> <p>Maximum Sustained Forward Speed (at 2100 rpm) - 1st Gear: 15 mph (24 kmh)</p> <p>Speed on 3% Grade at GCWR: 25 mph (40 kmh)</p> <p>Speed on 3% Grade at GVWR: 40 mph (64 kmh)</p> <p>Speed on 30% Grade at GCWR: 3 mph (5 kmh)</p> <p>Speed on 30% Grade at GVWR: 5 mph (8 kmh)</p> <p>Maximum Grade at GCWR: 30 percent</p> <p>Maximum Grade at GVWR: 60 percent</p> <p>Maximum Side Slope w/Adequate Traction Surface: 30 percent</p> <p>Maximum Towed Speed (Reference FM 20-22): 15 mph (24 kmh)</p> <p>Maximum Ford Depth: 48 in. (1 219 mm)</p> <p>Approach Angle: 41 degrees</p> <p>Departure Angle: 45 degrees</p> <p>Limp Home Speed: 10 mph (16 kmh) for up to 30 miles (48 km)</p>
M984E1	<p>CAPACITIES</p> <p>Engine Oil w/o Filters: 28 qt (26.5 L)</p> <p>Engine Oil w/Filters: 30 qt (28.4 L)</p> <p>Cooling System: 80 qt (76 L)</p> <p>Transmission w/o Filter: 37 qt (35 L)</p> <p>Transmission w/Filter: 38 qt (36 L)</p> <p>Front Tandem - Front Axle (No. 1): 17.5 qt (16.5 L)</p> <p>Front Tandem - Rear Axle (No. 2): 21.5 qt (20.3 L)</p> <p>Rear Tandem - Front Axle (No. 3): 22 qt (20.8 L)</p> <p>Rear Tandem - Rear Axle (No. 4): 17.5 qt (16.6 L)</p> <p>Hydraulic Reservoir w/Filters: 120 qt (114 L)</p> <p>Fuel Tank: 154 gal (583 L)</p> <p>Transfer Case: 6.5 qt (6.15 L)</p> <p>Windshield Washer Fluid: 2 qt (1.9 L)</p> <p>Operating Modes: On & off road</p>

Equipment Differences and Technical Data (Cont)

Table 1-4. M984E1 Equipment Data (Cont)

Model	Item
M984E1	<p>CAPACITIES (CONT) Operating Temperature w/o Arctic Kit: -25° to 120°F (-32° to 49°C) Operating Temperature w/Arctic Kit: -50° to 120°F (-46° to 49°C)</p>
M984E1	<p>ENGINE Make: Detroit Diesel Corporation Model: 8V92TA Type: P-Stroke, V-type Diesel Cylinders: 8 Bore: 4.84 in. (123 mm) Stroke: 5 in. (127 mm) Displacement: 736 cid (12 L) Torque (at 2100 rpm): <ul style="list-style-type: none"> • Model No. 8087-7899: 1250 lb-ft (1 695 N•m) at 1300 rpm • Model No. 8083-7493: 1330 lb-ft (1803 N•m) at 1200 rpm Maximum Brake Horsepower (at 2100 rpm): <ul style="list-style-type: none"> • Model No. 8087-7899: 445 BHP (332 kw) • Model No. 8083-7493: 450 BHP (336 kw) Maximum Governed Engine Speed - Loaded: 2050 - 2150 rpm Maximum Governed Engine Speed - No Load: 2225 - 2275 rpm Oil Filter Type: Full flow, replaceable element Oil Filter Quantity: 1</p>
M984E1	<p>FUEL SYSTEM Type: Diesel Injection Tank Quantity: 1 Air Cleaner Type: Dry element Element Quantity: (1 primary, 1 secondary)</p>
M984E1	<p>COOLING SYSTEM Radiator Working Pressure: 7 psi (48 kPa)</p>
M984E1	<p>ELECTRICAL SYSTEM Voltage: 24 Alternator (amps): 65 RFI Suppression Ability: Yes Number of Batteries: 4 Battery Voltage (each): 12 volts Battery Connection: Series - parallel Battery Capacity (at 20 hour rate): 900 amp</p>

Equipment Differences and Technical Data (Cont)

1-30. EQUIPMENT DATA (CONT).

Table 1-4. M984E1 Equipment Data (Cont)

Model	Item
M984E1	<p>ELECTRICAL SYSTEM (CONT)</p> <p>Battery Reserve Capacity (each, at 80°F, 27°C): 180 minutes</p> <p>Battery Cold Cranking Amps (each, at 0°F, -18°C): 575 CCA</p> <p>Battery Amp Hours (each, at 20 hour rate): 100 amp</p>
M984E1	<p>TRANSMISSION</p> <p>Make: Allison</p> <p>Model: ME003468</p> <p>Type: Automatic</p> <p>Number of Forward Speeds: 4</p> <p>Number of Reverse Speeds: 1</p>
M984E1	<p>TRANSFER CASE</p> <p>Make: Oshkosh</p> <p>Model: 55000</p> <p>Type: Air operated front tandem disconnect</p> <p>Ratios: 98:1 and 2.66:1</p>
M984E1	<p>AXLES</p> <p>Front Tandem</p> <p>Make: Oshkosh/Eaton</p> <p>Differential Carrier Model Nos.: No. 1 axle-RS480 No. 2 axle-DS480-P</p> <p>Maximum Load Capacity: 30,000 lb (13 600 kg)</p> <p>Maximum Steering Angle: 32 degrees</p> <p>Rear Tandem</p> <p>Make: Eaton</p> <p>Differential Carrier Model Nos.: No. 3 axle-DS650-P No. 4 axle-RS650</p> <p>Maximum Load Capacity: 65,000 lb (29 500 kg)</p>
M984E1	<p>BRAKE SYSTEM</p> <p>Actuation: Air</p> <p>Number of Brake Chambers: 8</p> <p>Pressure Range: 60 - 120 psi (314 - 827 kPa)</p>

Equipment Differences and Technical Data (Cont)

Table 1-4. M984E1 Equipment Data (Cont)

Model	Item																																											
M984E1	WHEELS Type: Disk Quantity: 8 Vehicle Spare Wheel Quantity: 1 Rim Size: 20 x 10 Stud Quantity Per Wheel: 10																																											
	TIRES Type: Radial w/tube Quantity: 8 Spare Quantity: 1 Tread Type: Radial traction, nondirectional Size: 16.00R x 20 in. Load Range: M																																											
M984E1	TIRE PRESSURES <table border="1" data-bbox="509 940 1226 1591"> <thead> <tr> <th data-bbox="509 940 695 993"></th> <th data-bbox="695 940 880 993"><u>Highway</u></th> <th data-bbox="880 940 1065 993"><u>Cross Country-Dry</u></th> <th data-bbox="1065 940 1250 993"><u>Cross Country-Wet</u></th> <th data-bbox="1250 940 1435 993"><u>Sandy Terrain</u></th> </tr> </thead> <tbody> <tr> <td data-bbox="509 993 695 1098">Front Standard or XZL Tire</td> <td data-bbox="695 993 880 1098">60 psi (414 kPa)</td> <td data-bbox="880 993 1065 1098">35 psi (241 kPa)</td> <td data-bbox="1065 993 1250 1098">20 psi (138 kPa)</td> <td data-bbox="1250 993 1435 1098">30 psi (207 kPa)</td> </tr> <tr> <td data-bbox="509 1098 695 1161">Sand Tire</td> <td data-bbox="695 1098 880 1161">60 psi (414 kPa)</td> <td data-bbox="880 1098 1065 1161">NA</td> <td data-bbox="1065 1098 1250 1161">NA</td> <td data-bbox="1250 1098 1435 1161">25 psi (172 kPa)</td> </tr> <tr> <td data-bbox="509 1161 695 1266">Rear Standard or XZL Tire</td> <td data-bbox="695 1161 880 1266">100 psi (690 kPa)</td> <td data-bbox="880 1161 1065 1266">100 psi (690 kPa)</td> <td data-bbox="1065 1161 1250 1266">100 psi (690 kPa)</td> <td data-bbox="1250 1161 1435 1266">30 psi (207 kPa)</td> </tr> <tr> <td data-bbox="509 1266 695 1329">Sand Tire</td> <td data-bbox="695 1266 880 1329">100 psi (690 kPa)</td> <td data-bbox="880 1266 1065 1329">NA</td> <td data-bbox="1065 1266 1250 1329">NA</td> <td data-bbox="1250 1266 1435 1329">25 psi (172 kPa)</td> </tr> <tr> <td data-bbox="509 1329 695 1434">Rear (when towing another vehicle) Standard or XZL Tire</td> <td data-bbox="695 1329 880 1434">100 psi (690 kPa)</td> <td data-bbox="880 1329 1065 1434">100 psi (690 kPa)</td> <td data-bbox="1065 1329 1250 1434">100 psi (690 kPa)</td> <td data-bbox="1250 1329 1435 1434">80 psi (552 kPa)</td> </tr> <tr> <td data-bbox="509 1434 695 1497">Sand Tire</td> <td data-bbox="695 1434 880 1497">100 psi (690 kPa)</td> <td data-bbox="880 1434 1065 1497">NA</td> <td data-bbox="1065 1434 1250 1497">NA</td> <td data-bbox="1250 1434 1435 1497">80 psi (552 kPa)</td> </tr> <tr> <td data-bbox="509 1497 695 1591">Spare Tire (Standard, XZL, or Sand)</td> <td data-bbox="695 1497 880 1591">100 psi (690 kPa)</td> <td data-bbox="880 1497 1065 1591">NA</td> <td data-bbox="1065 1497 1250 1591">NA</td> <td data-bbox="1250 1497 1435 1591">100 psi (690 kPa)</td> </tr> </tbody> </table>					<u>Highway</u>	<u>Cross Country-Dry</u>	<u>Cross Country-Wet</u>	<u>Sandy Terrain</u>	Front Standard or XZL Tire	60 psi (414 kPa)	35 psi (241 kPa)	20 psi (138 kPa)	30 psi (207 kPa)	Sand Tire	60 psi (414 kPa)	NA	NA	25 psi (172 kPa)	Rear Standard or XZL Tire	100 psi (690 kPa)	100 psi (690 kPa)	100 psi (690 kPa)	30 psi (207 kPa)	Sand Tire	100 psi (690 kPa)	NA	NA	25 psi (172 kPa)	Rear (when towing another vehicle) Standard or XZL Tire	100 psi (690 kPa)	100 psi (690 kPa)	100 psi (690 kPa)	80 psi (552 kPa)	Sand Tire	100 psi (690 kPa)	NA	NA	80 psi (552 kPa)	Spare Tire (Standard, XZL, or Sand)	100 psi (690 kPa)	NA	NA	100 psi (690 kPa)
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Spare Tire (Standard, XZL, or Sand)	100 psi (690 kPa)	NA	NA	100 psi (690 kPa)																																								

Equipment Differences and Technical Data (Cont)

Table 1-4. M984E1 Equipment Data (Cont)

Model	Item				
M984E1	OPERATING SPEEDS				
		<u>Highway</u>	<u>Cross Country-Dry</u>	<u>Cross Country-Wet</u>	<u>Sandy Terrain</u>
	Maximum Speed				
	Standard Tire	55 mph (88 kmh)	40 mph (64 kmh)	20 mph (32 kmh)	20 mph (32 kmh)
	Sand Tire	55 mph (88 kmh)	NA	NA	20 mph (32 kmh)
	(When towing another vehicle)				
	Standard Tire	15 mph (24 kmh)*	15 mph (24 kmh)	15 mph (24 kmh)	15 mph (24 kmh)
	Sand Tire	15 mph (24 kmh)*	NA	NA	15 mph (24 kmh)
	* The M984E1 should not be operated at speeds over 15 mph except on paved roads when the operator determines that the vehicle being towed and the terrain allow safe operation. Engine brake switch must be "On" for all towing operations. The following are maximum safe speeds.				
		Terrain Condition	Maximum speed, towed load up to 50,000 lbs	Maximum speed, towed load above 50,000 lbs	
	on road-level				
	Standard Tire	35 mph (56 kmh)	30 mph (48 kmh)		
	Sand Tire	15 mph (24 kmh)	15 mph (24 kmh)		
	on road-hilly				
	Standard Tire	30 mph (48 kmh)	20 mph (32 kmh)		
	Sand Tire	15 mph (24 kmh)	15 mph (24 kmh)		
	off road				
	Standard Tire	15 mph (24 kmh)	15 mph (24 kmh)		
	Sand Tire	15 mph (24 kmh)	15 mph (24 kmh)		
Speeds in excess of the above can result in loss of control, serious injury or death.					

Equipment Differences and Technical Data (Cont)

1-30. EQUIPMENT DATA (CONT).

Table 1-4. M984E1 Equipment Data (Cont)

Model	Item
M984E1	STEERING SYSTEM Type: Dual gear with integrated hydraulic power assist
M984E1	PINTLE Type: Manual Release Maximum Load Capacity - Pulling: 100,000 lb (45 400 kg) Maximum Load Capacity - Vertical: 20,000 lb (9 080 kg)
M984E1	TOWING EYES Quantity: 4 (2 front, 2 rear) Maximum Load Capacity Each: 60,000 lb (27 240 kg)
M984E1	CAB Windshield: Tinted, 2 piece, safety glass Personnel Capacity: 2
M984E1	MATERIAL HANDLING CRANE Make: Grove Model: MHC984 Maximum Capacity at Boom Length of 18.2 ft (5.5 m): 6,000 lb (2 722 kg)
M984E1	SELF-RECOVERY WINCH Make: DP Manufacturing Model: 20K-HEMTT Wire Rope Diameter: 9 16 in. (14.3 mm) Wire Rope Length: 200 ft (61 m) Line Pull - 1st Layer (Five Wraps Minimum): 20,000 lb (9 080 kg) Line Pull - 2nd Layer: 18,173 lb (8 251 kg) Line Pull - 3rd Layer: 16,663 lb (7 565 kg) Line Pull - 4th Layer: 15,361 lb (6 974 kg) Line Pull - 5th Layer: 14,254 lb (6 471 kg)
M984E1	RECOVERY WINCH Make: DP Manufacturing Model: 51022 60K Type: Automatic Two Speed Wire Rope Diameter: 1 in. (25 mm) Wire Rope Length: 220 ft (67 m) Line Pull - First Layer (with five wraps): 60,000 lb (27 240 kg) Line Pull - Third Layer: 45,000 lb (20 430 kg)

Equipment Differences and Technical Data (Cont)

Table 1-4. M954E1 Equipment Data (Cont)

Model	Item
M984E1*	<p>AUXILIARY EQUIPMENT</p> <p>Arctic Kit - Engine Deleted Chemical Alarm Decontamination Unit Gas Particulate Filter Unit Machine Gun Ring Radio Installation Kit Rifle Mounting Kit Retrieval Device - Lifting capacity 25,000 lb</p> <p>* Vehicle may or may not be equipped with any of these items depending on mission, climate, or other factors.</p>

Table 1-5. M994E1 Load Classification

Model	Unloaded (ton)	With Loaded Trailer (ton)
M984E1	19	C-48 (towing loaded M985)

Section III. TECHNICAL PRINCIPLES OF OPERATION
Vehicle Operation Systems

1-31. SYSTEMS INTRODUCTION. All M984E1 vehicles contain three functional systems. They are the electrical system, air system, and hydraulic system. Refer to Volume 1 for explanation of the overall operation of the functional systems.

1-32. ELECTRICAL SYSTEM. The electrical system is a 24 Vdc system. Refer to Volume 1 for explanation of the overall operation of the electrical system.

1-33. AIR SYSTEM. The air system (fig. 1-24) consists of an engine driven air compressor (1) and four air reservoirs (2, 3, 4, and 5).

The air system includes the necessary valves and air lines to control the vehicle's air operated parts. Pressurized air from the air compressor is passed through the air dryer (6) to the quick buildup reservoir (2). The air dryer removes dirt and moisture from the pressurized air. Air from reservoir goes to the throttle treadle (7). Depending on how far the throttle treadle is depressed, 0 to 60 psi (0 to 414 kPa) is supplied to the engine throttle air cylinder (8) and to the transmission modulator (9). This air pressure controls the vehicle speed.

Vehicle Operation Systems (Cont)

1-33. AIR SYSTEM (CONT).

Once air pressure in reservoir (2) rises above 75 psi (517 kPa), a valve opens and allows reservoirs (3, 4, and 5) to be pressurized up to 120 psi (827 kPa). Air from reservoir (4) goes to the brake treadle valve (10). This air controls the rear axle service parking brakes (11). Air pressure in this system is shown by the red needle on the AIR PRESS gage (12). Air from reservoir (3) goes to the brake treadle valve. This air controls the front axle service brakes (13). Air pressure in this system is shown by the green needle on the AIR PRESS gage.

The PARKING BRAKE valve (14) controls air from reservoirs (3 and 5) and applies or releases the rear axle service (parking) brakes. Reservoirs (3, 4, and 5) are interconnected so that if one reservoir fails, air is supplied to release the rear axle service (parking) brakes from whichever reservoir is functioning. If air pressure falls below 60 to 75 psi (414 kPa to 517 kPa), a buzzer will sound and the AIR indicator (15) will light.

On the M984E1 the front brake actuator valve (16) is used to apply the front axle service brakes when using heavy-duty winch.

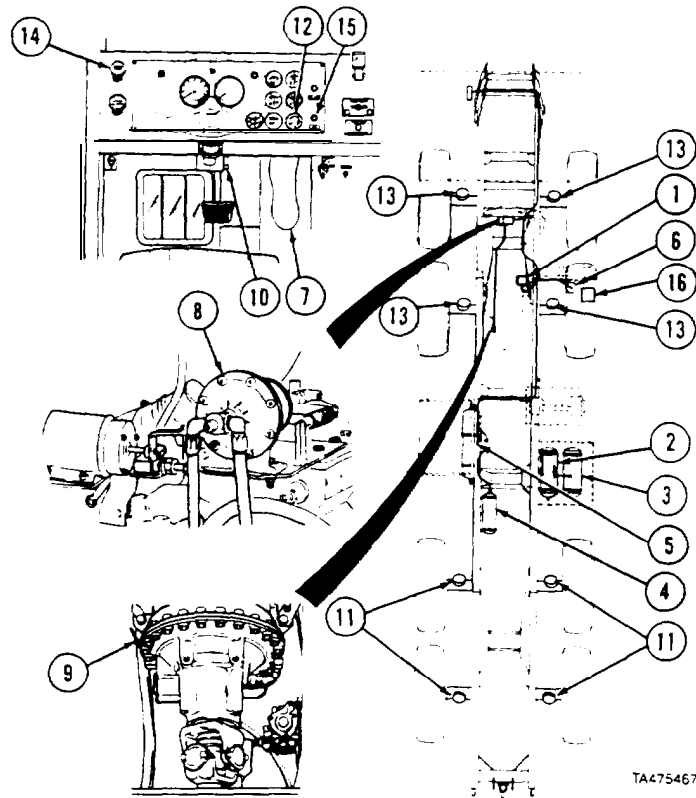
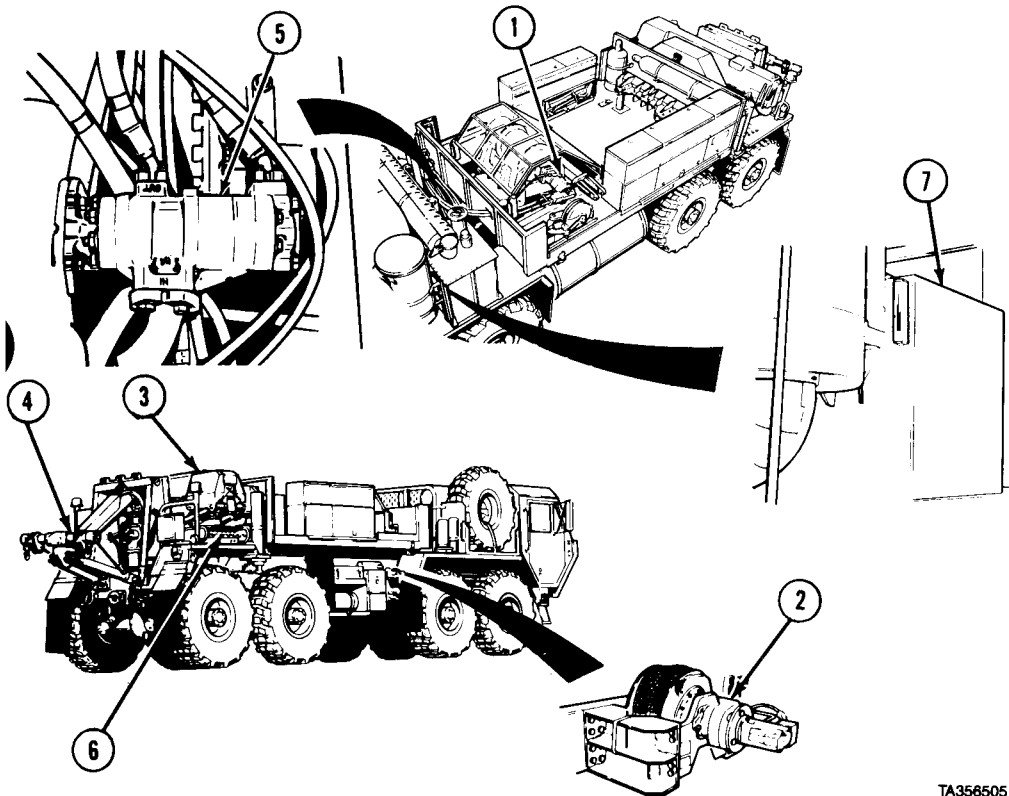


Figure 1-24. Air System Components location.

Vehicle Operation Systems (Cont)

1-34. MAIN HYDRAULIC SYSTEM (M984E1). Fluid power for operating the heavy-duty winch (1), self-recovery winch (2), crane (3), and retrieval system (4) (fig. 1-25) is provided by a hydraulic pump (5) mounted on the power takeoff (PTO) on the transmission.

Auxiliary equipment operation by the PTO driven pump is selected from the crane control panel (6) at rear of vehicle. Both hydraulic pumps share the same reservoir (7).

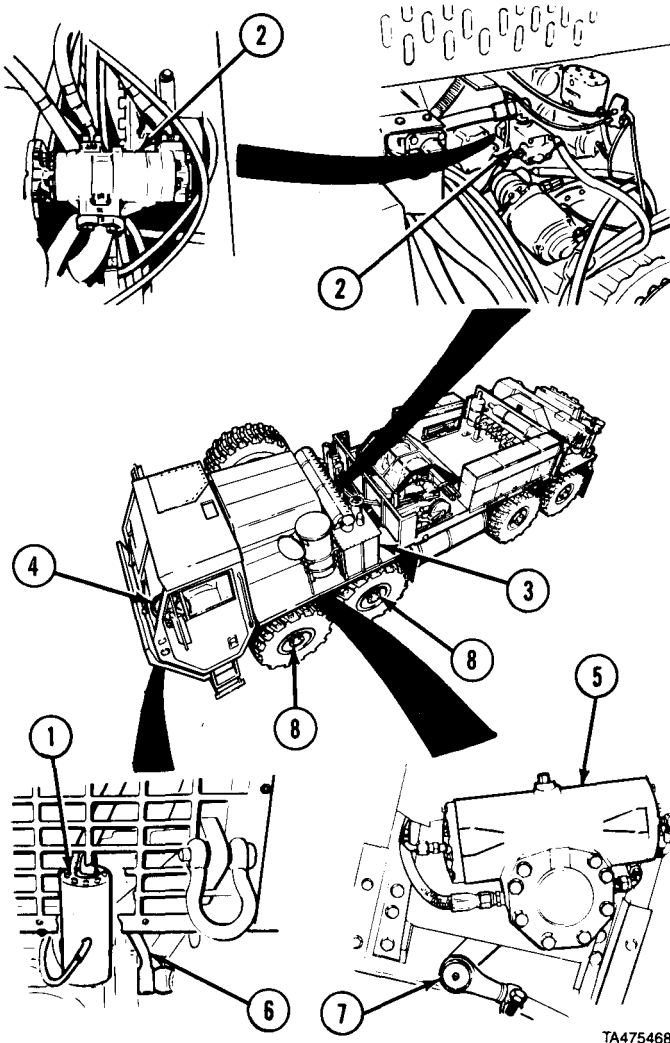


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Figure 1-25. Main Hydraulic System (M984E1).

Vehicle Operation Systems (Cont)

1-35. POWER STEERING HYDRAULIC SYSTEM. Figure 1-26 shows how power is supplied to the main steering gear (1) by an engine driven steering/tensioner pump (2). The fluid reservoir (3) is shared with the main hydraulic system. The steering wheel (4) is mechanically linked to the main steering gear. The steering wheel rotates a gear that positions a spool in the main steering gear. This motion is hydraulically sent to a piston in the slave gear (5) causing it to follow the rotation of the main steering gear. The main gear pitman arm (6) is mechanically connected to the slave gear pitman arm (7). These pitman arms move the steering mechanism on the front axles (8) left or right causing the vehicle to steer left or right.



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Figure 1-26. Power Steering Hydraulic System Components Location.

CHAPTER 2 OPERATING INSTRUCTIONS

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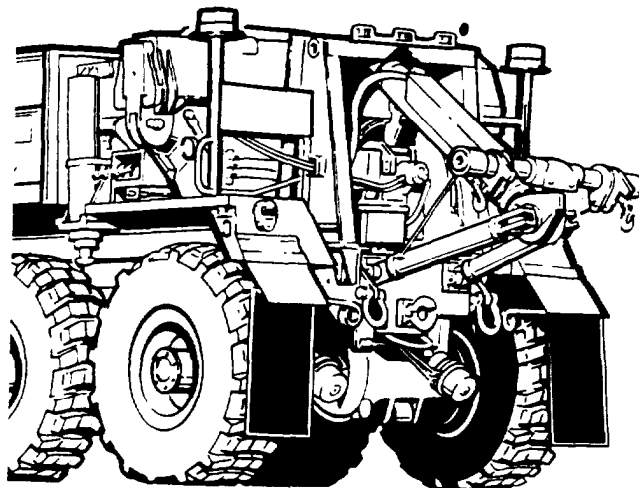
**Section V. DESCRIPTION AND USE OF
WRECKER-RECOVERY SYSTEM OPERATOR'S
CONTROLS AND INDICATORS**

Controls and Indicators

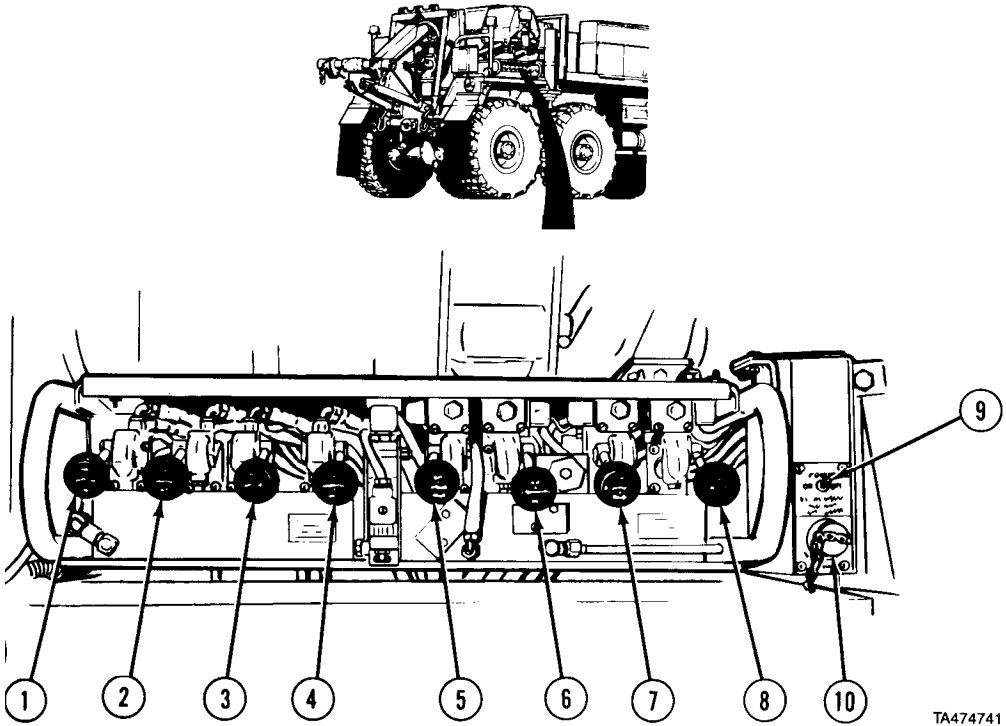
2-50. WRECKER-RECOVERY SYSTEM CONTROLS AND INDICATORS INTRODUCTION. This section shows the location and describes the use of controls and indicators used to operate the M984E1 wrecker-recovery systems. Refer to Volume 1 for all other controls and indicators.

2-51. LOCATION AND USE OF WRECKER-RECOVERY SYSTEM CONTROLS AND INDICATORS. Know the location and proper use of every control and indicator before operating the vehicle. Use this section to learn about each control and indicator to be used in wrecker-recovery operations. Separate illustrations with keys are provided for the following groups of controls and indicators:

Controls/Indicators	Figure
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Controls and Indicators (Cont)



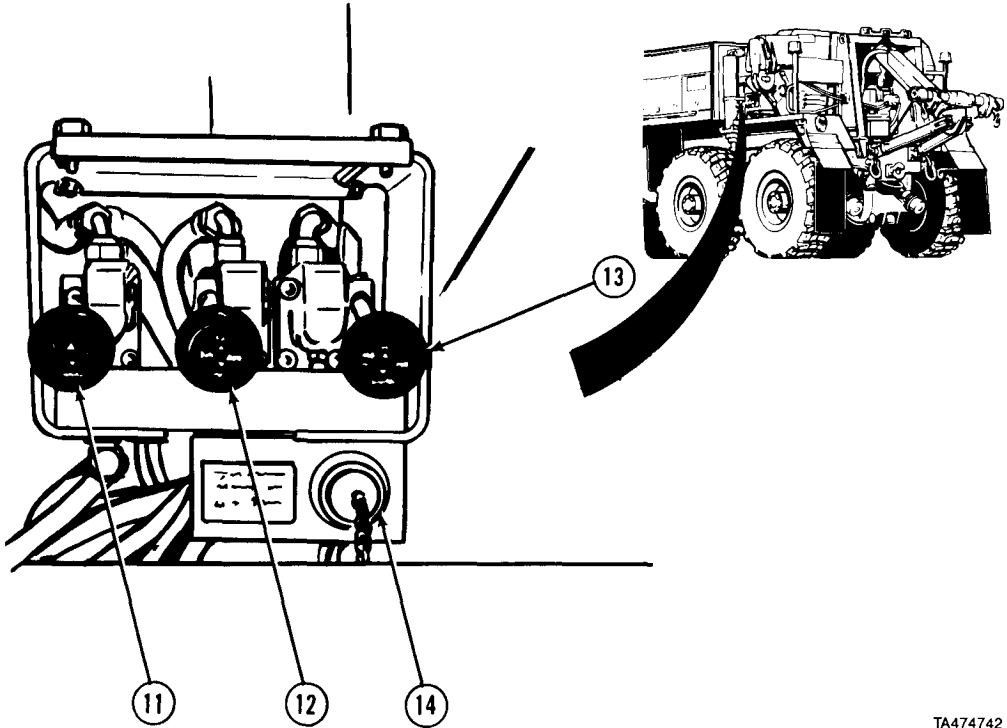
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Figure 2-26. M984E1 Crane Controls.

Key	Control or Indicator	Function
1	LH O/R JACK Control Lever	Lowers and raises left outrigger jack.
2	MAST Control Lever	Raises mast to operating position and lowers mast to stowed position.
3	O/R EXT. Control Lever	Lets out and pulls in outrigger beams.
4	RH O/R JACK Control Lever	Lowers and raises right outrigger jack.
5	SWING Control Lever	Moves crane clockwise (CW) and counterclockwise (CCW).
6	TELESCOPE Control Lever	Lets out and pulls in first and second stages of boom.
7	BOOM Control Lever	Raises and lowers boom.
8	HOIST Control Lever	Reels in and pays out hoist cable.
9	ON/OFF POWER Switch	Supplies and shuts off electrical power to crane.
10	R.H. REMOTE CONTROL HOOK-UP	Supplies electrical power to REMOTE CONTROL UNIT for crane.

Controls and Indicators (Cont)

2-51. LOCATION AND USE OF WRECKER-RECOVERY SYSTEM CONTROLS AND INDICATORS (CONT).

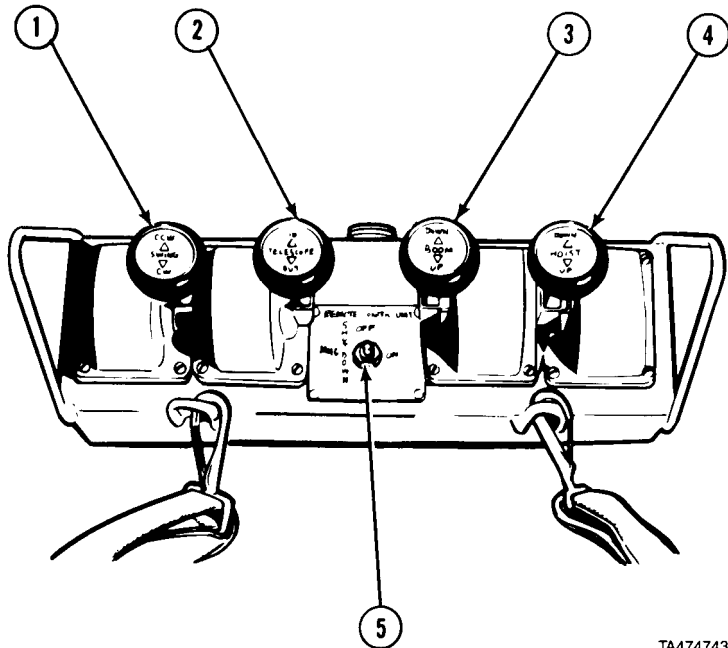


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Figure 2-26. M984E1 Crane Controls (Cont).

Key	Control or Indicator	Function
11	LH O/R JACK Control Lever (Left side of vehicle)	Lowers and raises left outrigger jack.
12	O/R EXT. Control Lever (Left side of vehicle)	Lets out and pulls in outrigger beams.
13	RH O/R JACK Control Lever (Left side of vehicle)	Lowers and raises right outrigger jack.
14	L.H. REMOTE CONTROL HOOK-UP	Supplies electrical power to REMOTE CONTROL UNIT for crane.

Controls and Indicators (Cont)



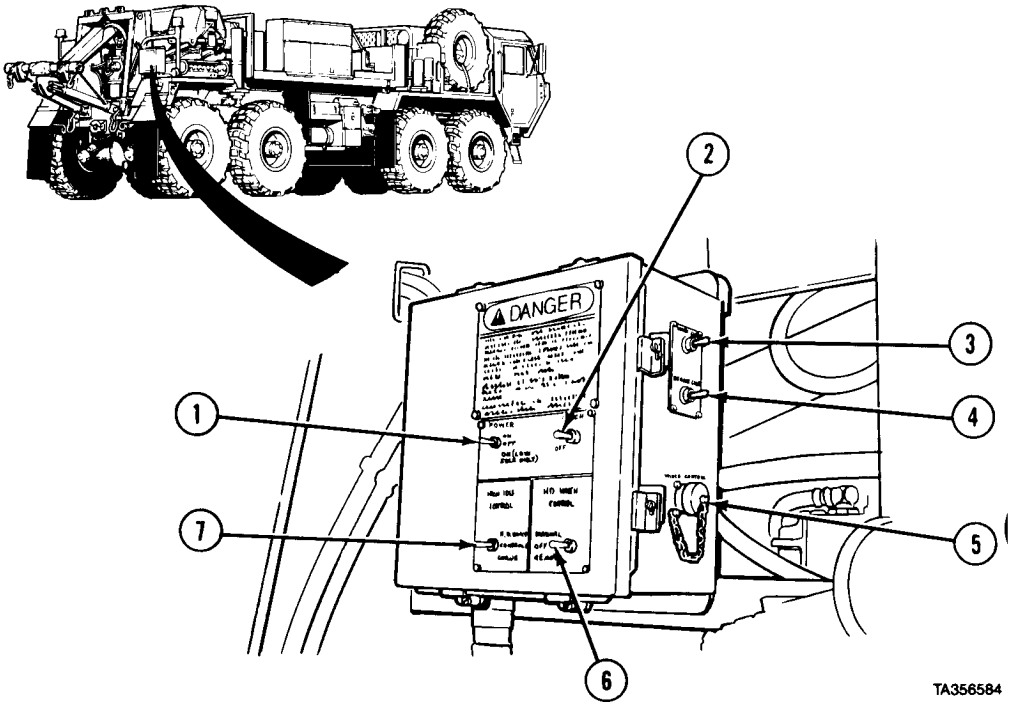
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Figure 2-27. M984E1 Crane Remote Control Unit.

Key	Control or Indicator	Function
1	SWING Control Lever	Moves crane clockwise (CW) and counterclockwise (CCW).
2	TELESCOPE Control Lever	Lets out and pulls in first and second stages of boom.
3	BOOM Control Lever	Raises and lowers boom.
4	HOIST Control Lever	Reels in and pays out cable.
5	REMOTE CONTROL UNIT ON/OFF Switch	Supplies and shuts off electrical power to REMOTE CONTROL UNIT for crane.

Controls and Indicators (Cont)

2-51. LOCATION AND USE OF WRECKER-RECOVERY SYSTEM CONTROLS AND INDICATORS (CONT).

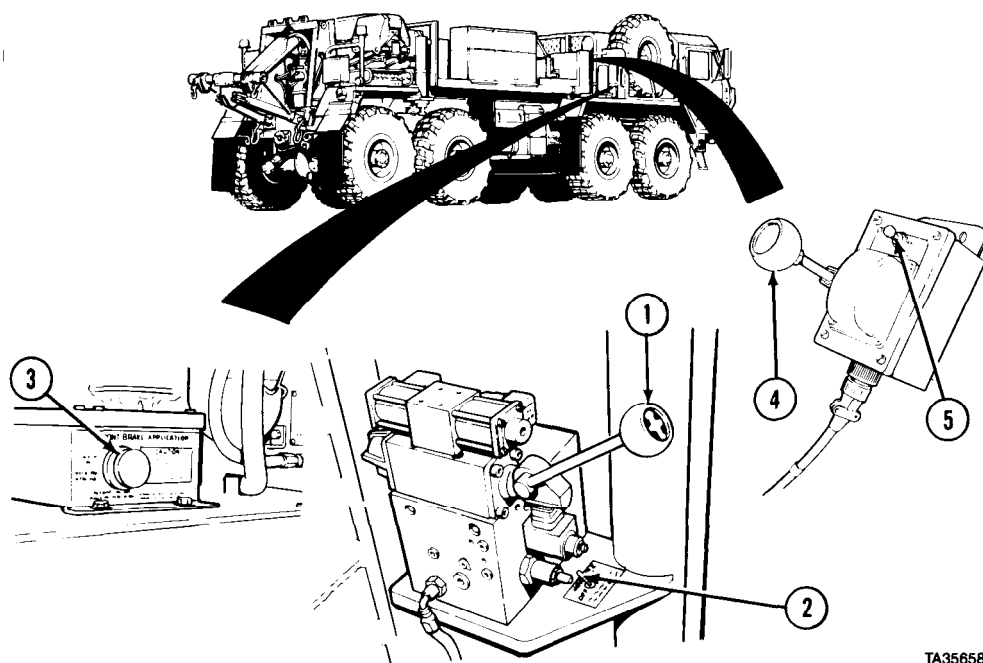


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Figure 2-28. M984E1 Power Distribution Box.

Key	Control or Indicator	Function
1	POWER Switch	Supplies and shuts off electrical power to power distribution box.
2	LATCH Switch	Locks in power switch circuits for operation.
3	WORK LIGHTS Switch	Up position (ON) turns work lights on. Down position (OFF) turns work lights off.
4	BEACON LIGHTS Switch	Up position (ON) turns beacon lights on. Down position (OFF) turns beacon lights off.
5	WINCH CONTROL Remote Outlet	Supplies electrical power to HEAVY-DUTY WINCH remote control.
6	H.D. WINCH CONTROL Switch	Supplies and shuts off power for manual control or remote control for winch.
7	HIGH IDLE CONTROL Switch	Turns HIGH IDLE CONTROL to crane remote control, winch remote control, or continuous operation.

Controls and Indicators (Cont)



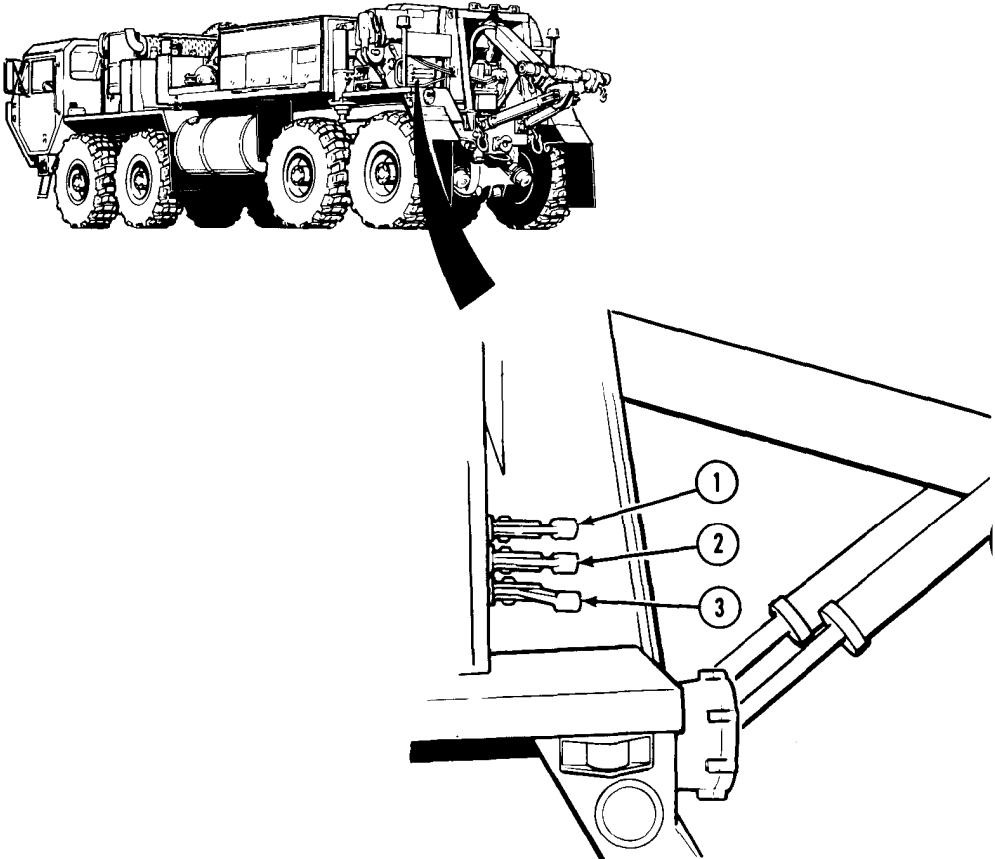
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Figure 2-29. Heavy-Duty Winch Controls (M984E1)

Key	Control or Indicator	Function
1	WINCH Control Lever	When HIGH IDLE CONTROL is in H.D. WINCH position and H.D. WINCH CONTROL is in MANUAL position, WINCH control lever pays out and reels in heavy-duty winch cable.
2	HIGH IDLE ON/OFF Switch	When HIGH IDLE CONTROL is in H.D. WINCH position and H.D. WINCH CONTROL is in MANUAL position, engine speed will increase to high idle (1500 RPM) in ON position.
3	FRONT BRAKE APPLICATION Knob	Sets front brakes for better traction during heavy-duty winch operation.
4	WINCH Control Lever (Remote Control)	When HIGH IDLE CONTROL is in H.D. WINCH position and H.D. WINCH CONTROL is in REMOTE position, WINCH control lever pays out and reels in heavy-duty winch cable.
5	HEAVY-DUTY WINCH ON/OFF Switch (Remote Control)	When HIGH IDLE CONTROL is in H.D. WINCH position and H.D. WINCH CONTROL is in REMOTE position, engine speed will increase to high idle (1500 RPM) in ON position.

Controls and Indicators (Cont)

2-51. LOCATION AND USE OF WRECKER-RECOVERY SYSTEM CONTROLS AND INDICATORS (CONT).



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Figure 2-30. Retrieval System Controls.

Key	Control or Indicator	Function
1	RIGHT TOW CYLINDER control lever	Lets out and pulls in right tow cylinder to aline tow adapters.
2	LEFT TOW CYLINDER control lever	Lets out and pulls in left tow cylinder to aline tow adapters.
3	LIFT CYLINDER control lever	Lets out and pulls in lift cylinder to raise and lower crosstube.

Section VI. M984E1 PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

PMCS Tables

2-52. M984E1 PMCS INTRODUCTION. This section contains PMCS requirements for M984E1 wrecker-recovery systems. The PMCS tables contain checks and services necessary to ensure that the vehicle is ready for operation. Using the PMCS table, perform maintenance at specified intervals.

2-53. MAINTENANCE FORMS AND RECORDS (M984E1). Every mission begins and ends with paperwork. There is not much of it, but it must be kept up. The filled out forms and records have several uses. They are a permanent record of services, repairs, and modifications made on the vehicle. They are reports to organizational maintenance and to your Commander. They are a checklist to know what was wrong with the vehicle after its last use, and whether those faults have been fixed. For the information needed on forms and records, refer to DA PAM 738-750.

2-54. M984E1 PREVENTIVE MAINTENANCE CHECKS AND SERVICES (TABLES 2-6 AND 2-7).

a. Do the before (B) PREVENTIVE MAINTENANCE just before operating vehicle. Pay attention to the CAUTIONS and WARNINGS.

b. Do the during (D) PREVENTIVE MAINTENANCE while vehicle and/or its component systems are in operation. Pay attention to the CAUTIONS and WARNINGS.

c. Do the after (A) PREVENTIVE MAINTENANCE right after operating vehicle. Pay attention to the CAUTIONS and WARNINGS.

d. Do the (W) PREVENTIVE MAINTENANCE weekly. Pay attention to the CAUTIONS and WARNINGS.

e. Do the (M) PREVENTIVE MAINTENANCE once a month. Pay attention to the CAUTIONS and WARNINGS.

f. If something does not work, troubleshoot with instructions in Chapter 3 and notify the supervisor.

g. Always do PREVENTIVE MAINTENANCE in the same order until it gets to be habit. Once practiced, problems can be spotted in a hurry.

h. If something looks wrong and cannot be fixed right then, write it on DA Form 2404. If something seems seriously wrong, report it to organizational maintenance RIGHT NOW.

i. When doing PREVENTIVE MAINTENANCE, take along the tools needed and a rag or two to make all the checks.

PMCS Tables (Cont)

2-55. M984E1 GENERAL MAINTENANCE PROCEDURES.WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

a. Cleanliness. Dirt, grease, oil, and debris only get in the way and may cover up a serious problem. Use dry cleaning solvent Appendix D, Item 13 on all metal surfaces.

b. Bolts, Nuts, and Screws. Check bolts, nuts, and screws for obvious looseness, missing, bent, or broken condition. Look for chipped paint, bare metal, or rust around boltheads. If any part seems loose, tighten it, or report it to organizational maintenance.

c. Welds. Look for loose or chipped paint, rust, or gaps where parts are welded together. If a bad weld is found, report it to organizational maintenance.

d. Electric Wires and Connectors. Look for cracked or broken insulation, bare wires, and loose or broken connectors. Tighten loose connectors and make sure wires are in good shape. If a bad wire or connector is found, report it to organizational maintenance.

e. Hydraulic Lines and Fittings. Look for wear, damage, and leaks, and make sure clamps and fittings are tight. Wet spots show leaks, and a stain around a fitting or connector can mean a leak. If a leak comes from a loose fitting or connector, tighten it. If something is broken or worn out, report it to organizational maintenance.

f. Damage is defined as: Any conditions that affect safety or would render the vehicle unserviceable for mission requirements.

2-56. FLUID LEAKAGE (M984E1). It is necessary to know how fluid leakage affects the status of fuel, oil, coolant, and the hydraulic systems. The following are definitions of the different types/classes of leakage that determine the status of the vehicle. Learn, then be familiar with them and REMEMBER – WHEN IN DOUBT, NOTIFY THE SUPERVISOR!

CAUTION

Equipment operation is allowable with minor leakage (Class I or II). Consideration must be given to the fluid capacity in the item/system being checked/inspected. When in doubt, notify the supervisor. When operating with Class I or II leaks, continue to check fluid levels as required in the PMCS. Class III leaks should be reported to the supervisor or to organizational maintenance.

a. Class I. Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.

PMCS Tables (Cont)

b. Class II. Leakage of fluid great enough to form drops but not enough to cause drops to drip from item being checked/inspected.

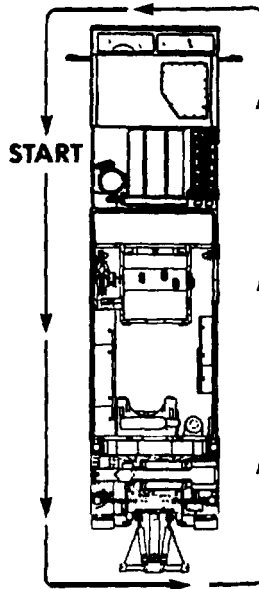
c. Class III. Leakage of fluid great enough to form drops that fall from the item being checked/inspected.

2-57. M954E1 OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES TABLES. Refer to Table 2-5, TM 9-2320-279-10-1, for operator/crew Preventive Maintenance Checks and Services (PMCS) for M984E1 wrecker-recovery vehicle.

NOTE

Refer to Volume 1 for coverage on auxiliary equipment which may be installed on M984E1 vehicles.

a. Daily "Walk Around" PMCS Routing Diagram, Table 2-6. This routing diagram will be of help to complete the B, D, or A PMCS. It shows the vehicle PMCS routing track which matches the sequence of PMCS to be performed.



PMCS Tables (Cont)

2-57. M984E1 OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES TABLES (CONT).

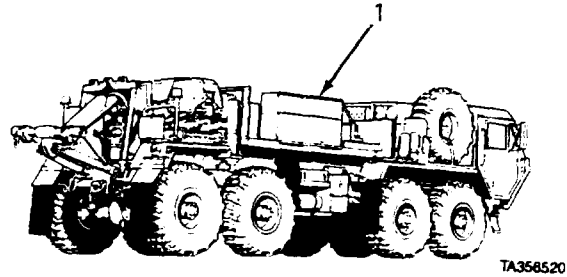


Table 2-6. M984E1 Operator/Crew Preventive Maintenance Checks and Services

NOTE: Within designated interval, these checks are to be performed in the order listed
 B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

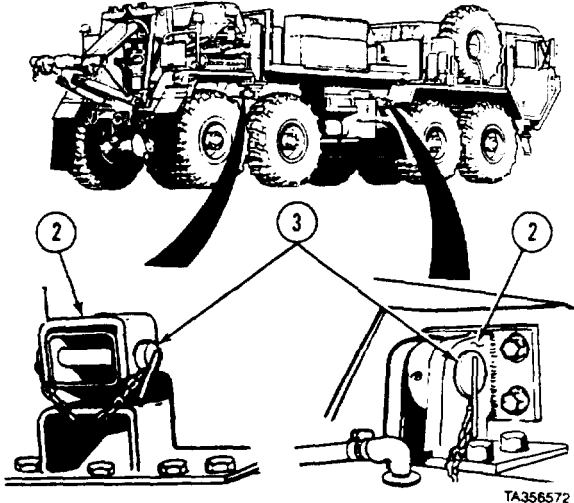
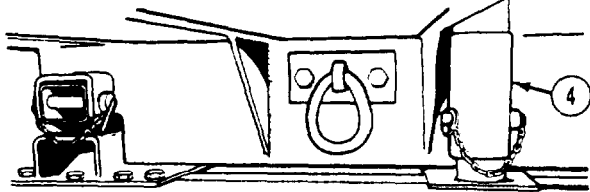
Item No.	Interval					Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/ available if:
	B	D	A	W	M		
1						<p>NOTE</p> <ul style="list-style-type: none"> Perform basic HEMTT PMCS Table 2-1. Volume 1 prior to performing PMCS in this table. Perform Weekly (W) as well as Before (B) PMCS if: <ol style="list-style-type: none"> Assigned as the operator hut have not operated vehicle since last weekly inspection. Operating vehicle for the first time. <p>EQUIPMENT BODY</p> <p>TA356521</p> <p>a. Check all stowage boxes and door seals (1) for obvious damage. Check for water in bottom of box.</p>	

PMCS Tables (Cont)

**Table 2-6. M984E1 Operator/Crew
Preventive Maintenance Checks and Services (Cont)**

NOTE: Within designated interval, these checks are to be performed in the order listed.

B-Before Operation D-During Operation A-After Operation W-Week M-Monthly

Item No.	Interval					Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/available if:
	B	D	A	W	M		
						<p>EQUIPMENT BODY (CONT)</p>  <p style="text-align: right;">TA356572</p> <p style="text-align: center;">NOTE</p> <p>Tow mounts are located on each side of the vehicle.</p> <p>b. Check equipment body mounts (2) and pins (3) for broken chains, missing pins, or other obvious damage.</p>  <p style="text-align: right;">TA356573</p> <p>c. Check leg extensions (4) for obvious damage, missing lock pins, and damaged chain.</p>	<p>One or more pins broken or missing.</p>

PMCS Tables (Cont)

2-57. OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES TABLES (CONT).

Table 2-6. M984E1 Operator/Crew Preventive Maintenance Checks and Services (Cont)

NOTE: Within designated interval, these checks are to be performed in the order listed.

B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

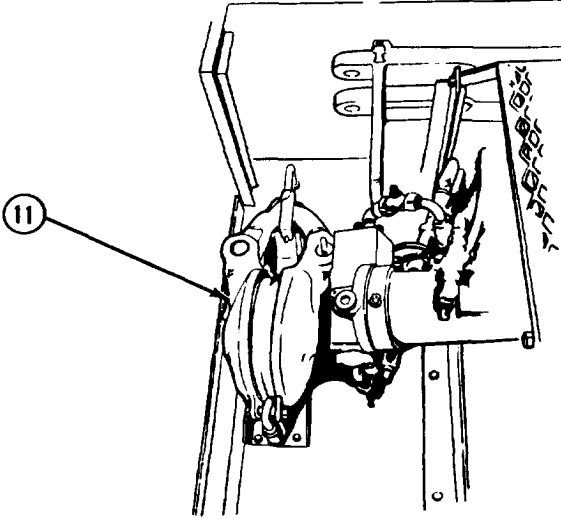
Item No.	Interval					Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/available if:
	B	D	A	W	M		
						<p>EQUIPMENT BODY (CONT)</p> <p>d. Check that towing adapters (5), tow spades (6), and tow spade extensions (7) are properly secured and have no obvious damage.</p> <p>e. Check that width of rubber belt (8) is not cut more than two inches (50 mm) or belt is not worn more than two of the four plies across the entire width of belt.</p> <p>f. Check that oxygen tank (9) and acetylene tank (10) are properly mounted and securely fastened.</p>	Towing adapters, spades are worn or broken.

PMCS Tables (Cont)

Table 2-6. M984E1 Operator/Crew
Preventive Maintenance Checks and Services (Cont)

NOTE: Within designated interval, these checks are to be performed in the order listed.

B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

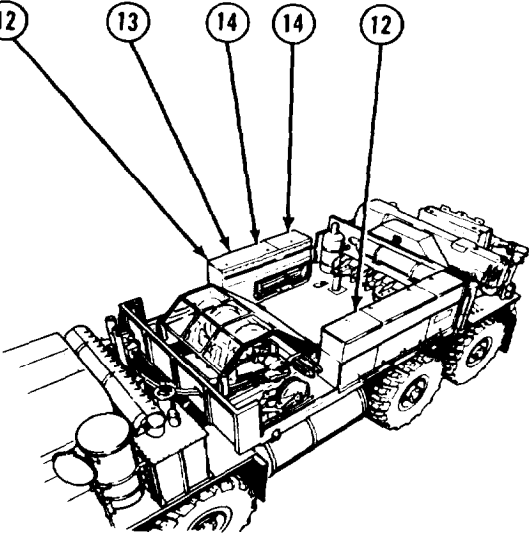
Item No.	Interval					Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/available if:
	B	D	A	W	M		
						<p>EQUIPMENT BODY (CONT)</p>  <p>g. Check 60-ton tackle block (11) for any obvious damage.</p>	60-ton tackle block is broken or missing.

PMCS Tables (Cont)

2-57. OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES TABLES (CONT).

Table 2-6. M984E1 Operator/Crew Preventive Maintenance Checks and Services (Cont)

NOTE: Within designated interval, these checks are to be performed in the order listed
B-Before Operation **D**-During Operation **A**-After Operation **W**-Weekly **M**-Monthly

Item No.	Interval					Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/ available if:
	B	D	A	W	M		
						<p>EQUIPMENT BODY (CONT)</p>  <p>h. Check utility chains and pallet sling (12) and (13) for any obvious damage.</p> <p>j. Check safety chains (14) for any obvious damage.</p>	Chain links, shackles, or hooks cracked or broken.

PMCS Tables (Cont)

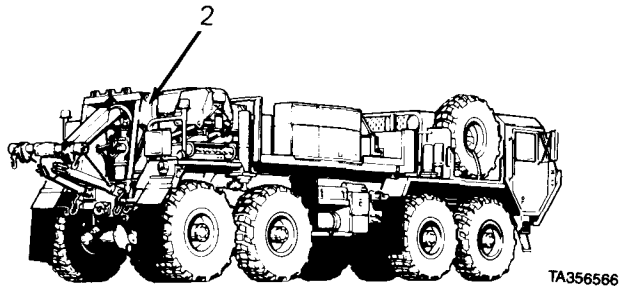


Table 2-6. M984E1 Operator/Crew Preventive Maintenance Checks and Services (Cont)

NOTE: Within designated interval, these checks are to be performed in the order listed.

B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

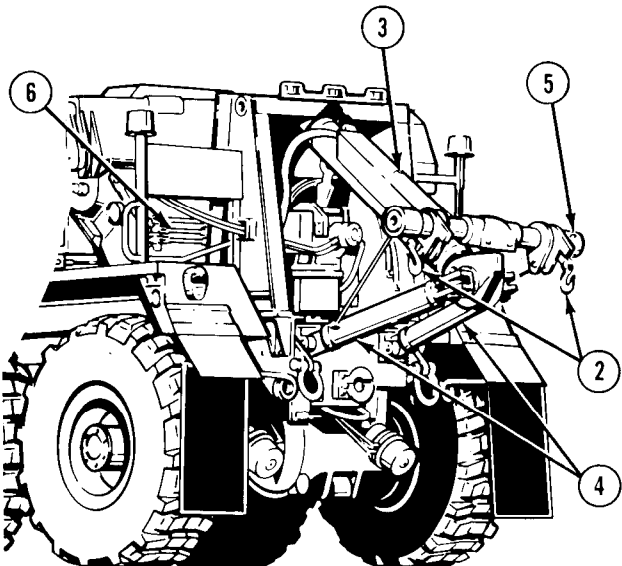
Item No.	Interval					Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/available if:
	B	D	A	W	M		
2						<p>RETRIEVAL SYSTEM</p> <p>TA356567</p> <p>NOTE</p> <p>PMCS for retrieval system should only be performed when retrieval system is required for mission.</p> <p>a. Check support assembly (1) for secure mounting or obvious damage.</p>	

2-57. OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES TABLES (CONT).

Table 2-6. M984E1 Operator/Crew Preventive Maintenance Checks and Services (Cont)

NOTE: Within designated interval, these checks are to be performed in the order listed.

B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

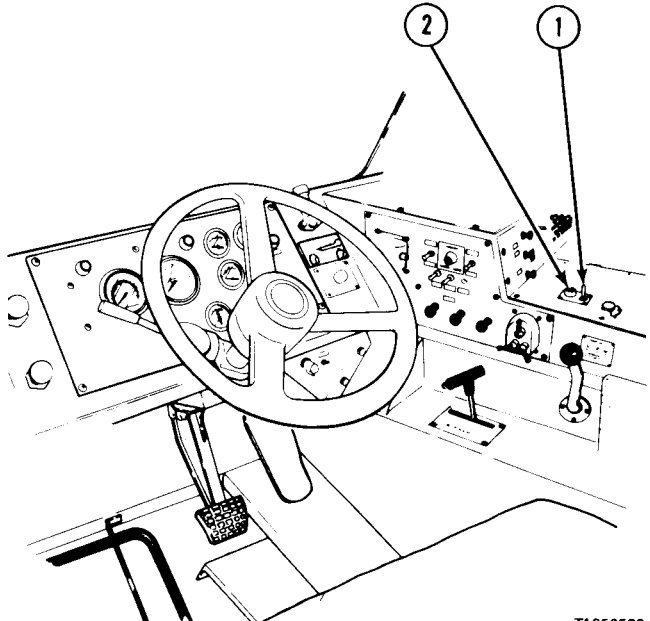
Item No.	Interval				Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/available if:
	B	D	A	W		
					<p>RETRIEVAL SYSTEM (CONT)</p>  <p style="text-align: right;">TA500267</p> <p style="text-align: center;">NOTE</p> <p>When properly installed, cotter pins should be towards outside of vehicle.</p> <p>b. Check grab hooks (2) for damaged or missing cotter pins.</p> <p style="text-align: center;">NOTE</p> <p>Retrieval cylinder thermal relief valves (located on crosstube end of cylinders) can discharge small amounts of oil as part of normal operation.</p> <p>c. Check lift cylinder and hoses (3), right and left tow cylinders and hoses (4), crosstube (5), and control valves (6) for leaks and/or obvious damage.</p>	Any class III leaks are found.

PMCS Tables (Cont)

Table 2-6. M984E1 Operator/Crew
Preventive Maintenance Checks and Services (Cont)

NOTE: Within designated interval, these checks are to be performed in the order listed.

B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

Item No.	Interval					Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/available if:
	B	D	A	W	M		
						<p>RETRIEVAL SYSTEM (CONT)</p> <ul style="list-style-type: none"> d. Check operation of retrieval system as follows: <ul style="list-style-type: none"> (1) Start engine (para 2-11a or 2-11b).  <p style="text-align: right;">TA356526</p> <ul style="list-style-type: none"> (2) Put PTO ENGAGE switch (1) in ON position. Indicator light (2) should come on. 	

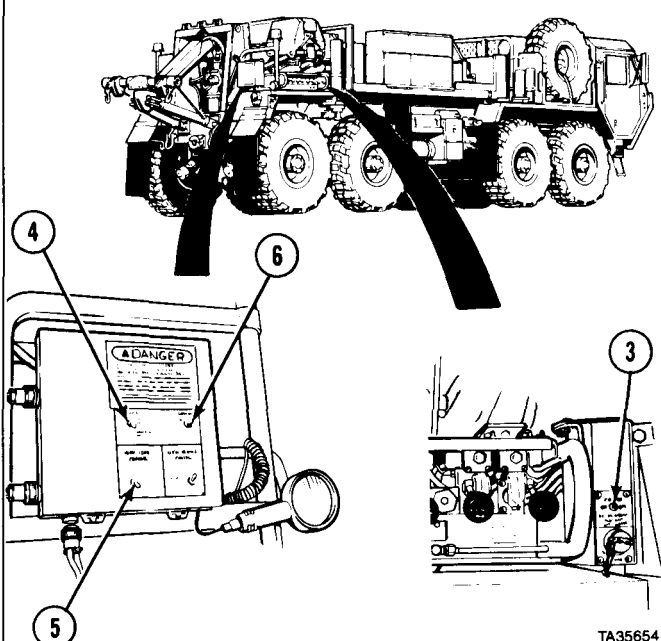
PMCS Tables (Cont)

2-57. OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES TABLES (CONT).

Table 2-6. M984E1 Operator/Crew Preventive Maintenance Checks and Services (Cont)

NOTE: Within designated interval, these checks are to be performed in the order listed.

B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

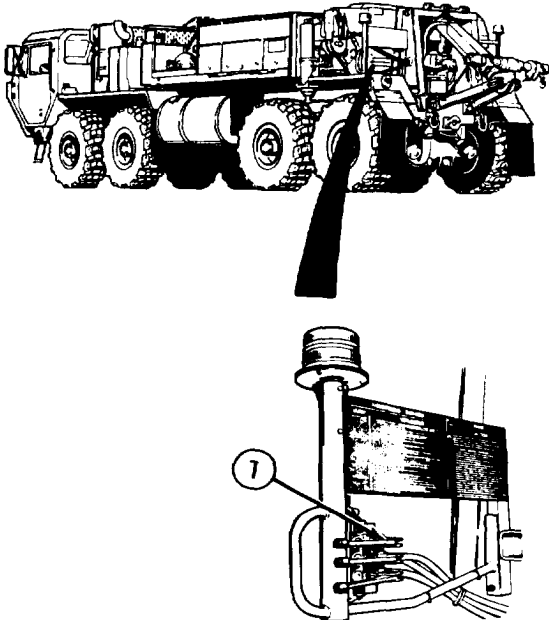
Item No.	Interval					Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/available if:
	B	D	A	W	M		
						<p>RETRIEVAL SYSTEM (CONT)</p>  <p>TA356541</p> <p>(3) Set ON/OFF POWER switch (3) to ON position. (4) Set POWER switch (4) to ON position. (5) Set HIGH IDLE CONTROL switch (5) to CONTINUOUS. (6) Push and release LATCH switch (6). Engine speed should increase to approximately 1500 rpm.</p>	Engine speed does not increase to 1500 rpm.

PMCS Tables (Cont)

**Table 2-6. M984E1 Operator/Crew
Preventive Maintenance Checks and Services (Cont)**

NOTE: Within designated interval, these checks are to be performed in the order listed.

B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

Item No.	Interval				Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/available if:
	B	D	A	W M		
					<p>RETRIEVAL SYSTEM (CONT)</p>  <p>(7) Operate retrieval control levers (7). Check for proper operation of levers and cylinders.</p>	<p>Retrieval hydraulic system does not operate.</p>

PMCS Tables (Cont)

2-57. OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES TABLES (CONT).

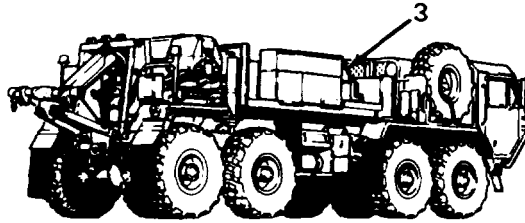


Table 2-6. M984E1 Operator/Crew Preventive Maintenance Checks and Services (Cont)

NOTE: Within designated interval, these checks are to be performed in the order listed.

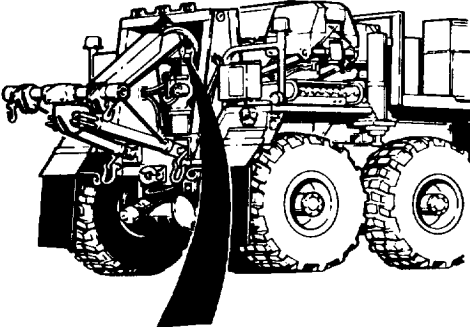
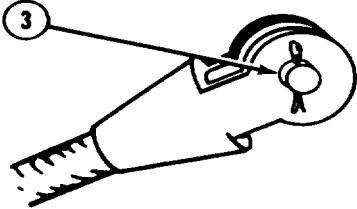
B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

Item No.	Interval					Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/available if:
	B	D	A	W	M		
3						<p>HEAVY-DUTY WINCH</p> <p>WARNING</p> <ul style="list-style-type: none"> Keep hands clear of heavy-duty winch cable. Hands can get caught and cause serious injury or death. Always wear heavy gloves when handling winch cables. Never let cables run through hands; frayed cables can cut. Never operate winch with less than five wraps of cable on winch drum. <p>a. Check cable (1) of winch (2) for kinks, frays or breaks.</p>	Evidence of kinks, frays or breaks.

PMCS Tables (Cont)

**Table 2-6. M984E1 Operator/Crew
Preventive Maintenance Checks and Services (Cont)**

NOTE: Within designated interval, these checks are to be performed in the order listed.
B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

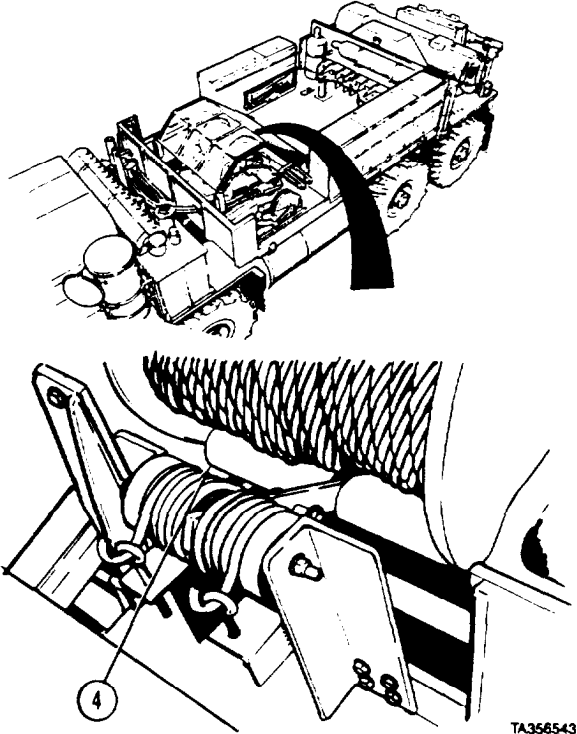
Item No.	Interval					Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/available if:
	B	D	A	W	M		
						<p>HEAVY-DUTY WINCH (CONT)</p> <p>b. Check for evidence of bent or crushed hydraulic lines or leakage at any threaded coupling or quick disconnect fitting.</p> 	<p>Lines or fittings are damaged. Class III leakage is evident.</p>
						<p>c. Check that winch cable clevis pin (3) is secure and in place.</p> 	<p>Clevis pin missing.</p>

PMCS Tables (Cont)

**Table 2-6. M984E1 Operator/Crew
Preventive Maintenance Checks and Services (Cont)**

NOTE: Within designated interval, these checks are to be performed in the order listed.

B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

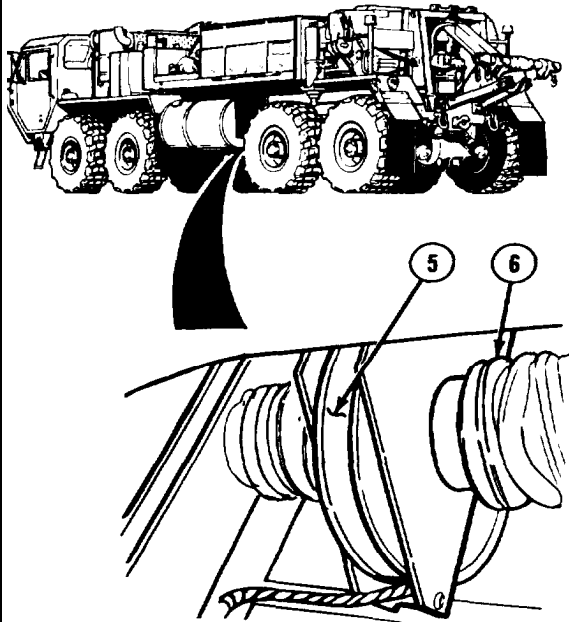
Item No.	Interval					Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/ available if:
	B	D	A	W	M		
						<p>HEAVY-DUTY WINCH (CONT)</p>  <p>d.. Check pressure roller (4) for obvious damage.</p> <p>TA356543</p>	

PMCS Tables (Cont)

**Table 2-6. M984E1 Operator/Crew
Preventive Maintenance Checks and Services (Cont)**

NOTE: Within designated interval, these checks are to be performed in the order listed.

B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

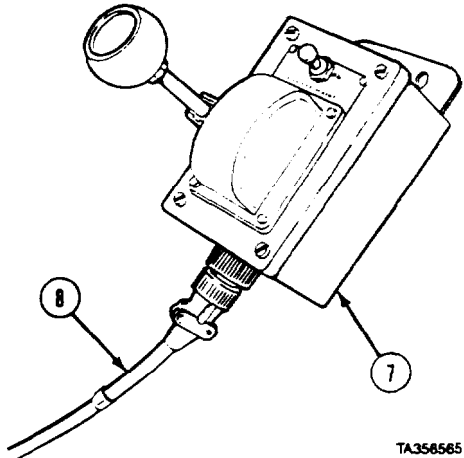
Item No.	Interval					Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/available if:
	B	D	A	W	M		
						<p>HEAVY-DUTY WINCH (CONT)</p>  <p>WARNING</p> <ul style="list-style-type: none"> • Keep hands clear of heavy-duty winch cable. Hands can get caught and cause serious injury or death. • Always wear heavy gloves when handling winch cables. Never let cables run through hands; frayed cables can cut. Never operate winch with less than five wraps of cable on winch drum. e. Check cable guide (5) for obvious damage. Check bellows (6) for cuts or tears. 	

PMCS Tables (Cont)

2-57. OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES TABLES (CONT).

Table 2-6. M984E1 Operator/Crew Preventive Maintenance Checks and Services (Cont)

NOTE: Within designated interval, these checks are to be performed in the order listed
 B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

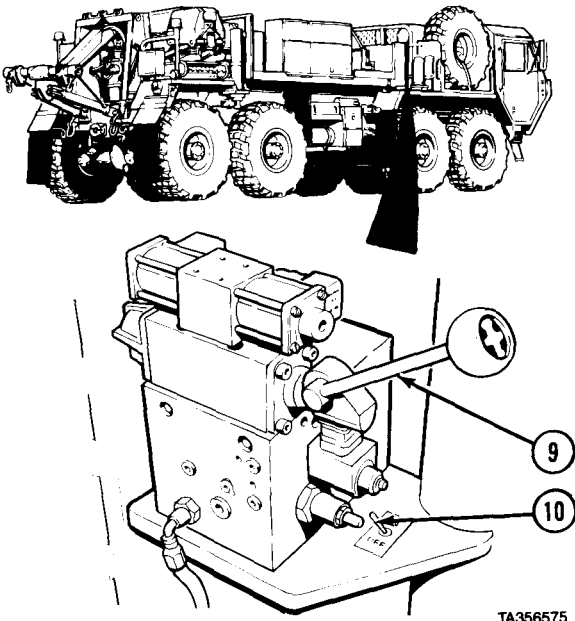
Item No.	Interval					Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/ available if:
	B	D	A	W	M		
						<p>HEAVY-DUTY WINCH (CONT)</p>  <p>TA356565</p> <p>f. Check heavy-duty winch remote control (7) and cable (8) for proper operation, obvious damage, missing parts, binding, and excessive looseness.</p>	<p>Controls malfunction, bind or do not respond.</p>

PMCS Tables (Cont)

Table 2-6. M984E1 Operator/Crew Preventive Maintenance Checks and Services (Cont)

NOTE: Within designated interval, these checks are to be performed in the order listed.

B-Before Operation **D**-During Operation **A**-After Operation **W**-Weekly **M**-Monthly

Item No.	Interval				Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/available if:
	B	D	A	W		
					<p>HEAVY-DUTY WINCH (CONT)</p>  <p style="text-align: right;">TA356575</p> <p>g. Check forward winch control (9) and high idle switch (10) for proper operation, obvious damage, missing parts, binding, and excessive looseness.</p>	Controls malfunction, bind or do not respond.

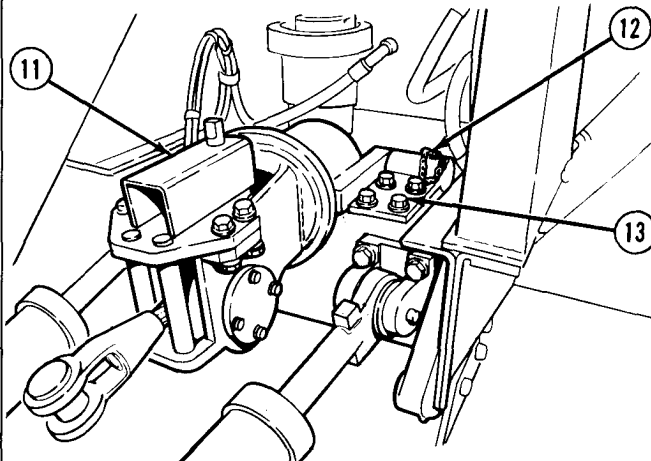
PMCS Tables (Cont)

2-57. OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES TABLES (CONT).

Table 2-6. M984E1 Operator/Crew Preventive Maintenance Checks and Services (Cont)

NOTE: Within designated interval, these checks are to be performed in the order listed.

B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

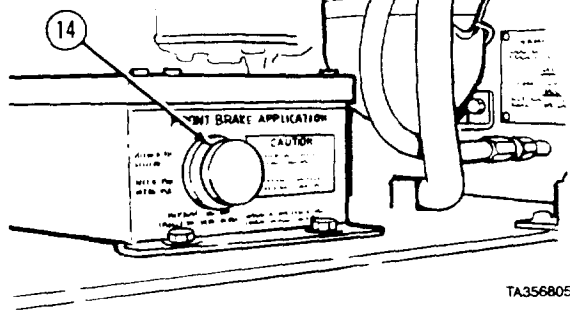
Item No.	Interval					Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/available if:
	B	D	A	W	M		
						<p>HEAVY-DUTY WINCH (CONT)</p>  <p style="text-align: right;">TA356544</p> <p>h. Check fairlead/tensioner (11) for obvious damage. Check that fairlead/tensioner can be swiveled and placed in both stowed and operational positions. Check for missing or damaged lock pin and attaching chain (12). Check that mounting screws (13) are secure.</p>	<p>Fairlead tensioner will not swivel, cannot be raised or lowered, or has one missing or broken lock pin.</p>

PMCS Tables (Cont)

**Table 2-6. M984E1 Operator/Crew
Preventive Maintenance Checks and Services (Cont)**

NOTE: Within designated interval, these checks are to be performed in the order listed.

B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

Item No.	Interval					Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted OS needed	Equipment is not ready/available if:
	B	D	A	W	M		
						<p>HEAVY-DUTY WINCH (CONT)</p>  <p>i. Push in FRONT BRAKES APPLICATION knob (14) anti check operation. Check housing for looseness and damage.</p>	

PMCS Tables (Cont)

2-57. OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES TABLES (CONT).

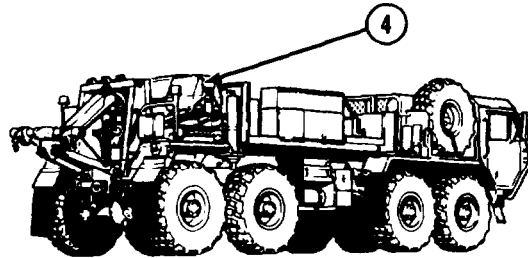
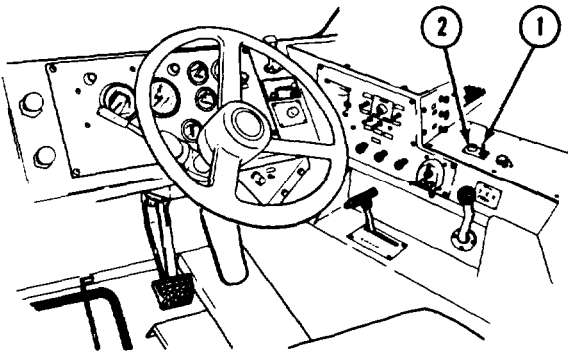


Table 2-6. M984E1 Operator/Crew Preventive Maintenance Checks and Services (Cont)

NOTE: Within designated interval, these checks are to be performed in the order listed.

B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

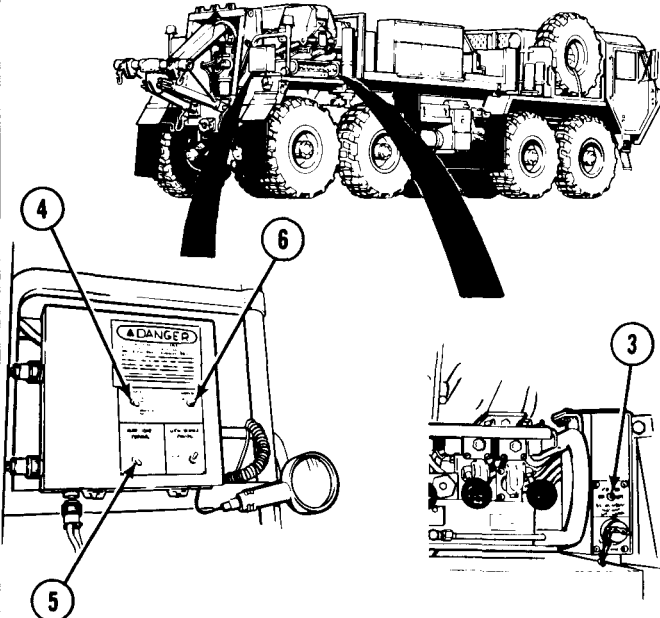
Item No.	Interval					Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/available if:
	B	D	A	W	M		
4						<p>MATERIAL HANDLING CRANE</p> <p>a. Inspect crane for loose nuts and bolts, hydraulic leaks, damage to hydraulic hoses and lines, and obvious damage.</p> <p>b. Check that crane hydraulic system is operable as follows:</p> <p>(1) Start engine (para 2-11a or para 2-11b).</p>  <p>(2) Put PTO ENGAGE switch (1) in ON position. Indicator light (2) should come on.</p>	Class III leakage or damaged hoses, lines, or fittings are found.

PMCS Tables (Cont)

Table 2-6. M984E1 Operator/Crew
Preventive Maintenance Checks and Services (Cont)

NOTE: Within designated interval, these checks are to be performed in the order listed.

B-Before Operation **D**-During Operation **A**-After Operation **W**-Weekly **M**-Monthly

Item No.	Interval					Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/ available if:
	B	D	A	W	M		
						<p>MATERIAL HANDLING CRANE (CONT)</p>  <p style="text-align: right;">TA356541</p> <ul style="list-style-type: none"> • (3) Set ON/OFF POWER switch (3) to ON position. • (4) Set POWER switch (4) to ON position. • (5) Set HIGH IDLE CONTROL switch (5) to CRANE position. • (6) Push and release LATCH switch (6). Engine speed should increase to approximately 1500 rpm. 	Engine speed does not increase to 1500 rpm.

PMCS Tables (Cont)

2-57. OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES TABLES (CONT).

Table 2-6. M984E1 Operator/Crew Preventive Maintenance Checks and Services (Cont)

NOTE: Within designated interval, these checks are to be performed in the order listed.

B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

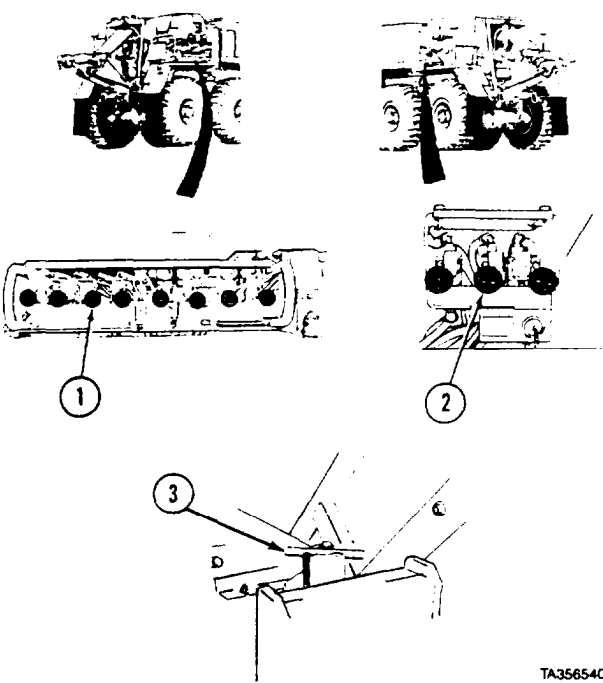
Item No.	Interval					Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/available if:
	B	D	A	W	M		
		•				<p>MATERIAL HANDLING CRANE (CONT)</p> <p>c. Check crane manual control levers as follows:</p> <p style="text-align: center;"><u>WARNING</u></p> <ul style="list-style-type: none"> • Stand clear of outrigger beams while operating levers or injury could result when beams come out. • Do not operate crane unless outriggers are firmly in place or serious injury or death could result. • Keep boom clear of all electrical lines and other obstacles while operating crane. Serious injury or death could result upon contact. <p style="text-align: center;">NOTE</p> <ul style="list-style-type: none"> • Operate control levers with light, even pressure. Moving lever slightly will cause slow movement of crane. Moving lever to full travel will cause faster movement of crane. • Outrigger beams will come out slower with light pressure on lever. Pushing lever to full travel will cause faster movement. 	

PMCS Tables (Cont)

**Table 2-6. M984E1 Operator/Crew
Preventive Maintenance Checks and Services (Cont)**

NOTE: Within designated interval, these checks are to be performed in the order listed.

B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

Item No.	Interval					Item to be inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/available if:
	B	D	A	W	M		
						<p>MATERIAL HANDLING CRANE (CONT)</p>  <p style="text-align: right;">TA356540</p> <ol style="list-style-type: none"> (1) Move O R EXT lever (1) to IN position briefly. Move O R EXT lever (2) to IN position briefly. (2) Place both outrigger lock pins (3) in unlock position. (3) Check each control separately for malfunction, proper response, obvious damage, missing parts, binding, and extreme looseness. 	<p>Controls malfunction, hind or do not respond.</p>

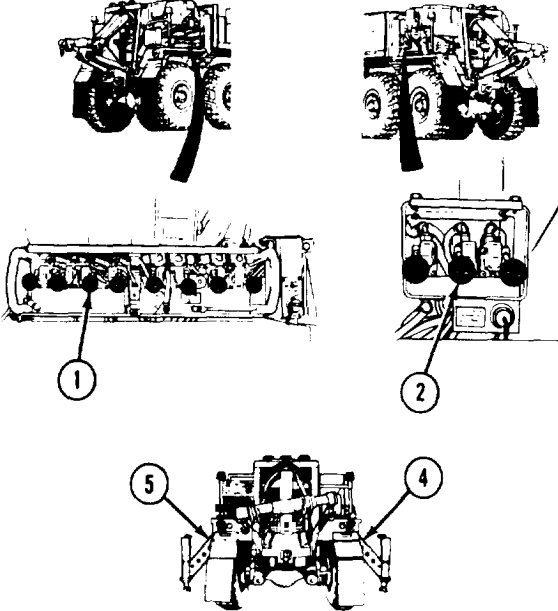
PMCS Tables (Cont)

2-57. OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES TABLES (CONT).

Table 2-6. M964E1 Operator/Crew Preventive Maintenance Checks and Services (Cont)

NOTE: Within designated interval, these checks are to be performed in the order listed.

B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

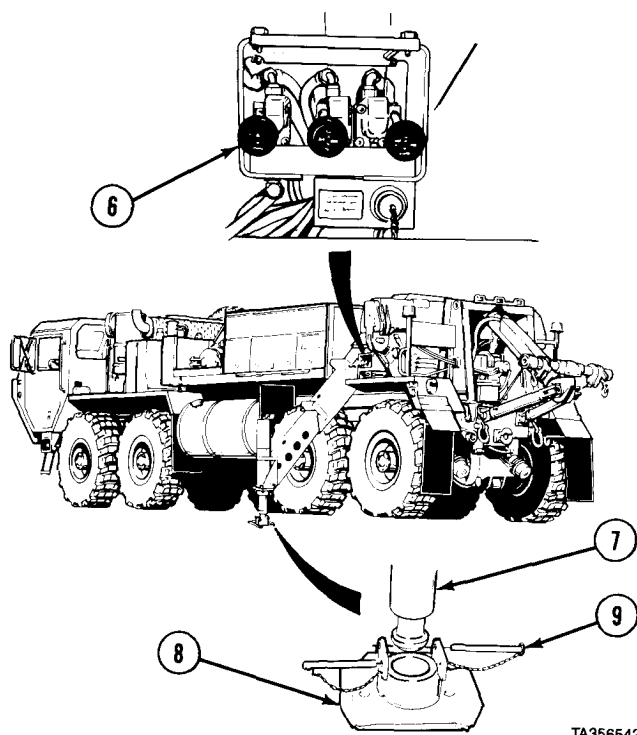
Item No.	Interval					Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/available if:
	B	D	A	W	M		
						<p>MATERIAL HANDLING CRANE (CONT)</p>  <p>(4) Move O/R EXT lever (1) to OUT position until right outrigger beam (4) is completely out.</p> <p>(5) Move O/R EXT lever (2) to OUT position until left outrigger beam (5) is completely out.</p> <p>(6) Set up outrigger pads (para 2-63b). Check that two retaining pins are attached to each outrigger pad.</p>	<p>Outrigger beam does not come out.</p> <p>Outrigger beam does not come out.</p> <p>One retaining pin missing from either pad.</p>

PMCS Tables (Cont)

Table 2-6. M984E1 Operator/Crew
Preventive Maintenance Checks and Services (Cont)

NOTE: Within designated interval, these checks are to be performed in the order listed.

B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

Item No.	Interval					Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/available if:
	B	D	A	W	M		
						<p>MATERIAL HANDLING CRANE (CONT)</p>  <p style="text-align: right;">TA356542</p> <p style="text-align: center;">WARNING</p> <p>Keep hands and feet clear of outrigger jack cylinders to avoid injury.</p> <p style="text-align: center;">NOTE</p> <p>Adjust outrigger pad position as required so rod end will lower into pad socket.</p> <p>(7) Move LH O/R JACK control lever (6) to DOWN position and lower outrigger jack cylinder (7) until rod end is firmly seated in outrigger pad (8). Install retaining pins (9).</p>	Outrigger jack cylinder will not come out or will not lower completely into pad.

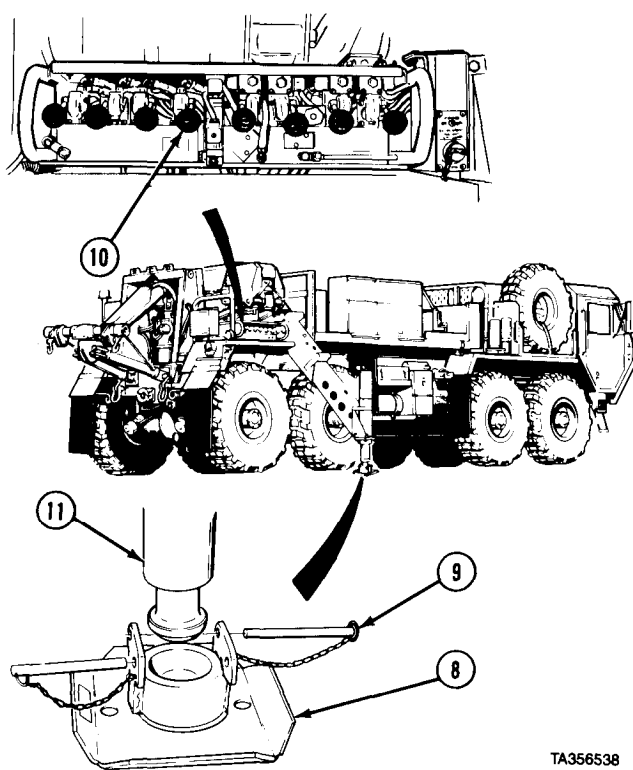
PMCS Tables (Cont)

2-57. OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES TABLES (CONT).

Table 2-6. M984E1 Operator/Crew Preventive Maintenance Checks and Services (Cont)

NOTE: Within designated interval, these checks are to be performed in the order listed.

B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

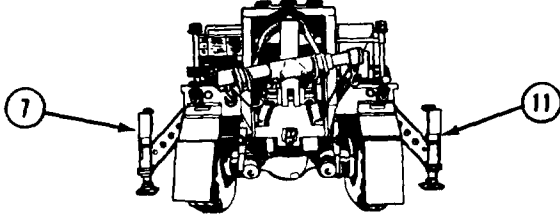
Item No.	Interval					Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/available if:
	B	D	A	W	M		
						<p>MATERIAL HANDLING CRANE (CONT)</p>  <p>TA356538</p> <p>(8) Move RH O/R JACK control lever (10) to DOWN position and lower outrigger jack cylinder (11) until rod end is firmly seated in outrigger pad (8). Install retaining pins (9).</p>	Outrigger jack cylinder will not come out or will not lower completely into pad.

PMCS Tables (Cont)

**Table 2-6. M984E1 Operator/Crew
Preventive Maintenance Checks and Services (Cont)**

NOTE: Within designated interval, these checks are to be performed in the order listed.

B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

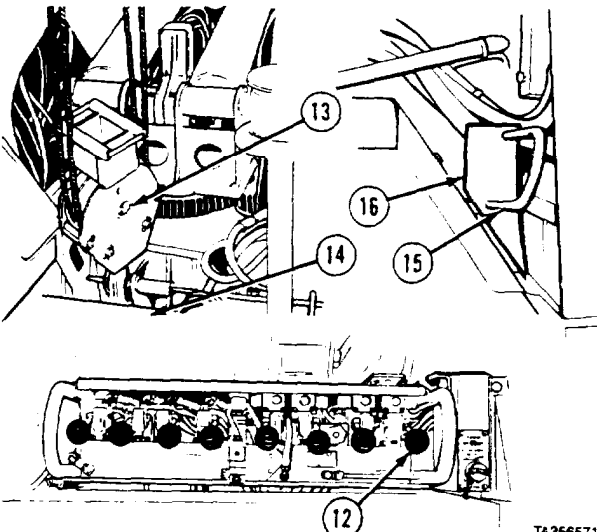
Item No.	Interval					Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/available if:
	B	D	A	W	M		
						<p>MATERIAL HANDLING CRANE (CONT)</p>  <p>(9) Check that outrigger jack cylinder (7 and 11) on each side of vehicle is out and down.</p> <p>(10) Seat outriggers (para 2-63b).</p> <p>(11) Raise boom to operating position.</p>	Crane hydraulic system does not operate.

PMCS Tables (Cont)

**Table 2-6. M984E1 Operator/Crew
Preventive Maintenance Checks and Services (Cont)**

NOTE: Within designated interval, these checks are to be performed in the order listed.

B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

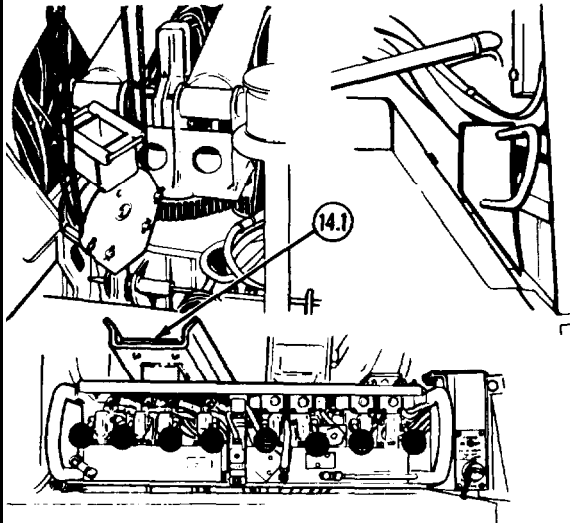
Item No.	Interval				Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/ available if:
	B	D	A	W		
					<p>MATERIAL HANDLING CRANE (CONT)</p>  <p style="text-align: right; font-size: small;">TA356571</p> <p style="text-align: center;"><u>WARNING</u></p> <p>Do not operate crane unless outriggers are set up. Vehicle could turn over causing serious injury or death.</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>Do not let cable unwind and become slack or cable may get tangled on drum.</p> <p>(a) Move HOIST control lever (12) to DOWN position until hook block (13) rests on fender (14).</p> <p>(b) Pull and turn lockpin handle (15) so handle end rests on bracket (16) to unstow hook block.</p> <p>(c) Check hook block (13) for cracks.</p>	Hook is cracked.

PMCS Tables (Cont)

**Table 2-6. M934E1 Operator/Crew
Preventive Maintenance Checks and Services (Cont)**

NOTE: Within designated interval, these checks are to be performed in the order listed.

B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

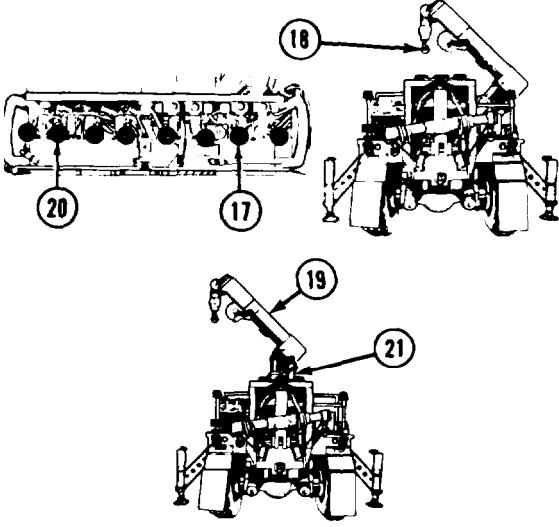
Item No.	Interval					Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/ available if:
	B	D	A	W	M		
						<p>MATERIAL HANDLING CRANE (CONT)</p>  <p>(d) Check hook block stowage guide wear plate (14.1) for excessive wear.</p>	

PMCS Tables (Cont)

**Table 2-6. M964E1 Operator/Crew
Preventive Maintenance Checks and Services (Cont)**

NOTE: Within designated interval, these checks are to be performed in the order listed.

B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

Item No.	Interval					Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/available if:
	B	D	A	W	M		
						<p>MATERIAL HANDLING CRANE (CONT)</p>  <p>WARNING Keep boom clear of all electrical lines and other obstacles while operating crane. Serious injury or death could result upon contact.</p> <p>CAUTION Do not hit outrigger leg with hook block.</p> <p>(e) Move BOOM control lever (17) to UP position until hook (18) is 5 to 6 feet (1.5 to 1.8 m) above left rear fender, and boom (19) is approximately 45° above horizontal.</p>	Boom does not raise.

PMCS Tables (Cont)

**Table 2-6. M984E1 Operator/Crew
Preventive Maintenance Checks and Services (Cont)**

NOTE: Within designated interval, these checks are to be performed in the order listed.

B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

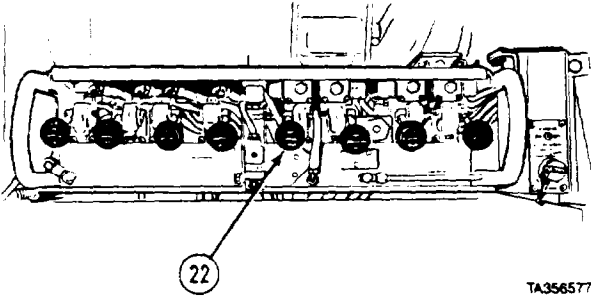
Item No.	Interval					Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/available if:
	B	D	A	W	M		
		•				<p>MATERIAL HANDLING CRANE (CONT)</p> <p>(f) Move MAST control lever (20) to UP position until the mast (21) is fully erect and the cylinders are fully extended. Use BOOM control lever (17) UP simultaneously as required to maintain the boom (19) at approximately 45° above horizontal until the mast is fully erect. Hold the mast control lever to UP position for 2-3 seconds after mast is fully erect to ensure Cylinders are fully filled with oil.</p>	<p>Mast cylinder does not raise completely before stopping.</p>

PMCS Tables (Cont)

2-57. OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES TABLES (CONT).

Table 2-6. M984E1 Operator/Crew Preventive Maintenance Checks and Services (Cont)

NOTE: Within designated interval, these checks are to be performed in the order listed
 B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

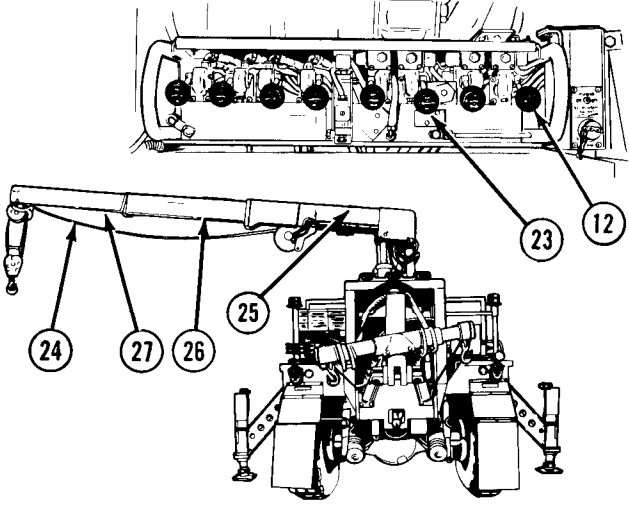
Item No.	Interval				Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/available if:
	B	D	A	W		
					<p>MATERIAL HANDLING CRANE (CONT)</p>  <p>(12) Rotate and telescope boom.</p> <p><u>WARNING</u></p> <ul style="list-style-type: none"> • Keep boom clear of all electrical lines and other obstacles while operating crane. Serious injury or death could result upon contact. • Be sure area is clear of personnel before moving SWING lever. Room should be swung slow enough so crane operator has complete control. Boom moving out of control could cause serious injury or death. <p><u>CAUTION</u></p> <p>Boom must be above vehicle sides for clearance.</p> <p>(a) Move SWING control lever (22) to CW position to move boom clockwise.</p> <p>(b) Move SWING control lever (22) to CCW position to move boom counterclockwise.</p>	<p>Boom does not turn clockwise.</p> <p>Boom does not turn counterclockwise.</p>

PMCS Tables (Cont)

Table 2-6. M984E1 Operator/Crew
Preventive Maintenance Checks and Services (Cont)

NOTE: Within designated interval, these checks are to be performed in the order listed.

B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

Item No.	Interval					Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/available if:
	B	D	A	W	M		
						<p>MATERIAL HANDLING CRANE (CONT)</p>  <p style="text-align: right;">TA356602</p> <p>CAUTION</p> <p>Keep hook block at least 1 ft (30 cm) from end of boom. If hook block hits end of boom it may damage cable or hook block and crane will lose power. Wait 6 seconds for power to return and check crane for damage.</p> <p>NOTE</p> <ul style="list-style-type: none"> • TELESCOPE and HOIST levers should be operated at same time. • Crane movement from one lever may be slower than other when operating two levers together. <p>(c) Move TELESCOPE control lever (23) to OUT position to extend boom while moving HOIST control lever (12) to DOWN position to pay out cable (24).</p> <p>(d) Check first (25), second (26), and third (27) stages of boom for broken welds or obvious damage.</p>	<p>Extensions do not come out.</p> <p>There are any broken welds or obvious damage of boom.</p>

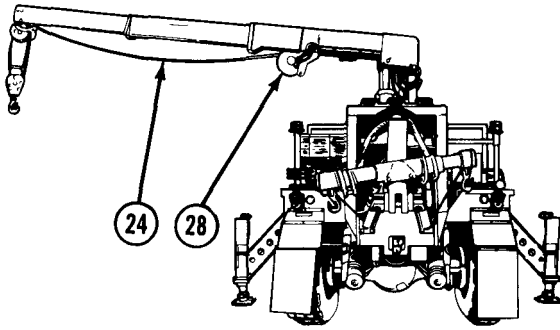
PMCS Tables (Cont)

2-57. OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES TABLES (CONT).

Table 2-6. M984E1 Operator/Crew Preventive Maintenance Checks and Services (Cont)

NOTE: Within designated interval, these checks are to be performed in the order listed.

B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

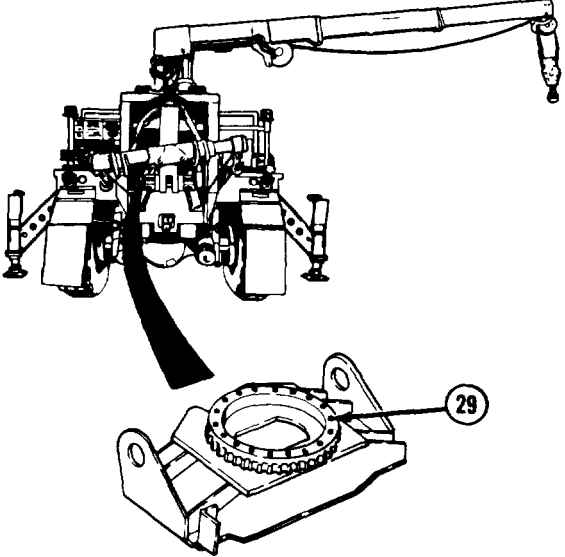
Item No.	Interval				Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/available if:
	B	D	A	W		
					<p>MATERIAL HANDLING CRANE (CONT)</p>  <p style="text-align: right;">TA356598</p> <p style="text-align: center;">WARNING</p> <p>Use leather gloves when checking hoist cable or injury to hands could result.</p> <p>(e) Check cable (24) on hoist (28) for kinks, frays, or breaks.</p>	Evidence of kinks, frays, or breaks.

PMCS Tables (Cont)

**Table 2-6. M984E1 Operator/Crew
Preventive Maintenance Checks and Services (Cont)**

NOTE: Within designated interval, these checks are to be performed in the order listed.

B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

Item No.	Interval					Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/available if:
	B	D	A	W	M		
						<p>MATERIAL HANDLING CRANE (CONT)</p>  <p>(f) Check all hoses, fittings, valves, and cylinders for signs of leaks.</p> <p>(g) Check for cracked or broken welds.</p> <p>(h) Inspect turntable bearing bolts (29) for obvious looseness.</p>	<p>Class III leakage is evident.</p> <p>Cracked or broken welds.</p> <p>One turntable bearing bolt is loose.</p>

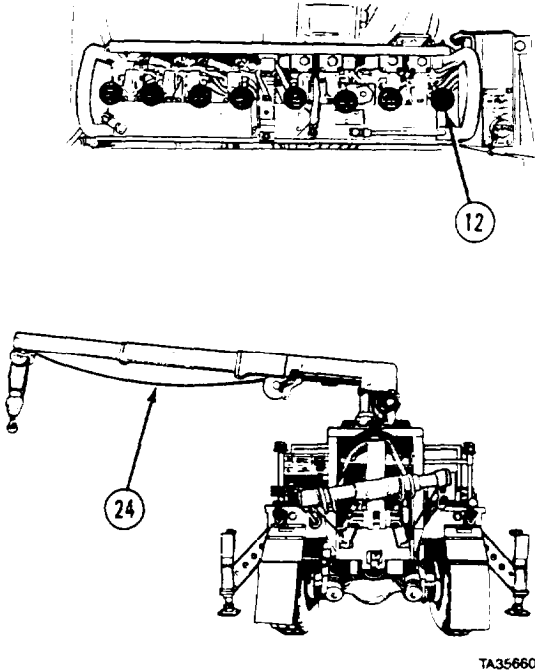
PMCS Tables (Cont)

2-57. OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES TABLES (CONT).

Table 2-6. M984E1 Operator/Crew Preventive Maintenance Checks and Services (Cont)

NOTE: Within designated interval, these checks are to be performed in the order listed.

B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

Item No.	Interval					Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/available if:
	B	D	A	W	M		
						<p>MATERIAL HANDLING CRANE (CONT)</p>  <p style="text-align: right;">TA356601</p> <p style="text-align: center;">CAUTION</p> <p>Do not let cable become slack or cable may get tangled on drum.</p> <p>(i) Move HOIST control lever (12) in UP position to reel in cable (24).</p> <p>(j) Move HOIST control lever (12) in DOWN position to pay out cable (24).</p>	Cable does not reel in or out.

PMCS Tables (Cont)

Table 2-6. M984E1 Operator/Crew
Preventive Maintenance Checks and Services (Cont)

NOTE: Within designated interval, these checks are to be performed in the order listed.

B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

Item No.	Interval					Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/available if:
	B	D	A	W	M		
						<p>MATERIAL HANDLING CRANE (CONT)</p> <p>d. Check crane remote control levers.</p> <p>(1) Set up REMOTE CONTROL UNIT right side (para 2-64b).</p> <p style="text-align: center;"><u>WARNING</u></p> <ul style="list-style-type: none"> • Keep boom clear of electrical lines and other obstacles while operating crane. Serious injury or death could result upon contact. • Be sure area is clear of personnel before moving SWING lever. Boom should be swung slow enough so crane operator has complete control. Boom moving out of control could cause serious injury or death. • If electrical power fails during crane operation, move switch on remote control unit to SHUTDOWN position. Serious injury could result from uncontrolled crane movement. <p style="text-align: center;"><u>CAUTION</u></p> <p>Boom must be above vehicle sides for clearance.</p> <p style="text-align: center;"><u>NOTE</u></p> <p>Operate control levers with light, even pressure. Moving lever slightly will cause slow movement of crane. Moving lever to full travel will cause faster movement of crane.</p> <p>(2) Check control levers for malfunction, proper response, obvious damage, missing parts, binding, and extreme looseness.</p>	<p>Controls malfunction, bind, or do not respond.</p>

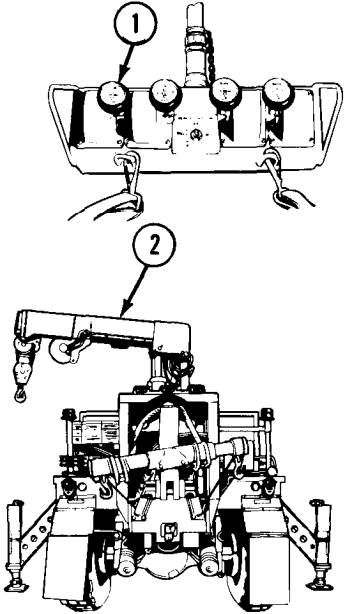
PMCS Tables (Cont)

2-57. OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES TABLES (CONT).

Table 2-6. M984E1 Operator/Crew Preventive Maintenance Checks and Services (Cont)

NOTE: Within designated interval, these checks are to be performed in the order listed.

B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

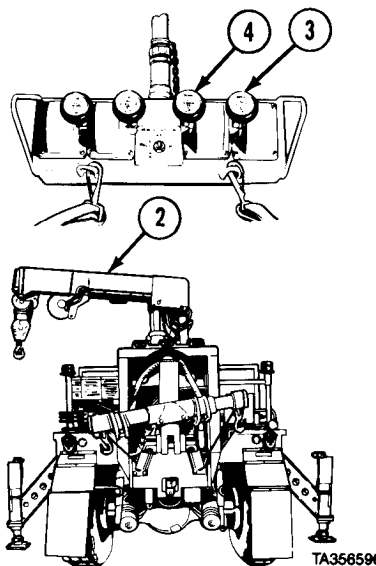
Item No.	Interval					Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/available if:
	B	D	A	W	M		
						<p>MATERIAL HANDLING CRANE (CONT)</p>  <p style="text-align: right;">TA356595</p> <p>(3) Rotate and telescope boom.</p> <p style="text-align: center;"><u>WARNING</u></p> <p>Be sure area is clear of personnel before moving SWING lever. Boom should be swung slow enough so crane operator has complete control. Boom moving out of control could cause serious injury or death.</p> <p>(a) Move SWING control lever (1) to CW position to turn boom (2) clockwise.</p> <p>(b) Move SWING control lever (1) to CCW position to turn boom (2) counterclockwise.</p>	<p>Boom does not turn clockwise.</p> <p>Boom does not turn counter-clockwise.</p>

PMCS Tables (Cont)

Table 2-6. M984E1 Operator/Crew
Preventive Maintenance Checks and Services (Cont)

NOTE: Within designated interval, these checks are to be performed in the order listed.

B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

Item No.	Interval					Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/available if:
	B	D	A	W	M		
						<p>MATERIAL HANDLING CRANE (CONT)</p>  <p style="text-align: right;">TA356596</p> <p style="text-align: center;"><u>WARNING</u></p> <p>Keep boom clear of all electrical lines and obstacles overhead. Serious injury or death could result upon contact.</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>Do not let cable become slack or cable may get tangled on drum.</p> <ul style="list-style-type: none"> • (c) Move HOIST control lever (3) to UP position to take up cable. Move BOOM control lever (4) to UP position to raise boom (2). • (d) Move HOIST control lever (3) to DOWN position to pay out cable. Move BOOM control lever (4) to DOWN position to lower boom (2) to horizontal position. 	<p>Cable does not reel in or out, or boom will not raise or lower.</p>

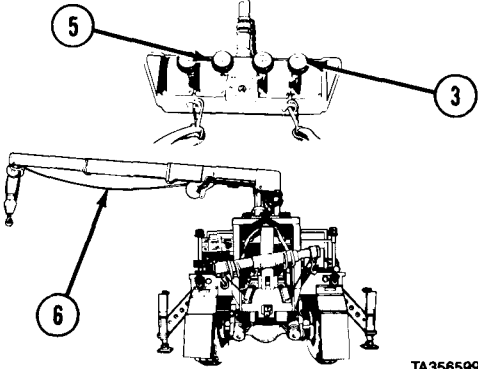
PMCS Tables (Cont)

2-57. OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES TABLES (CONT).

Table 2-6. M984E1 Operator/Crew Preventive Maintenance Checks and Services (Cont)

NOTE: Within designated interval, these checks are to be performed in the order listed.

B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

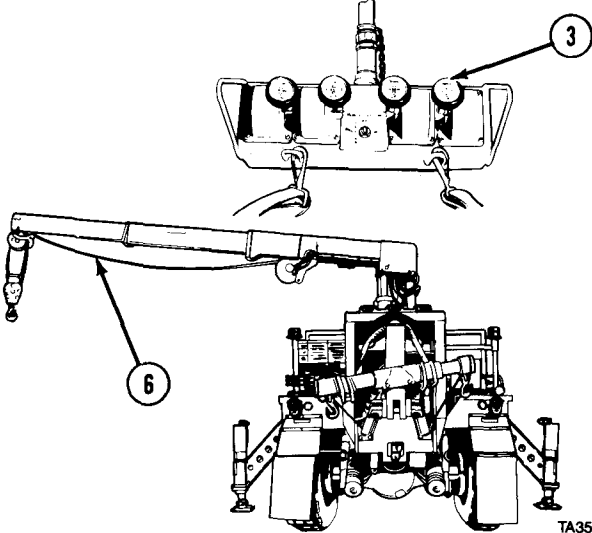
Item No.	Interval					Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/available if:
	B	D	A	W	M		
						<p>MATERIAL HANDLING CRANE (CONT)</p>  <p style="text-align: right;">TA356599</p> <p style="text-align: center;">CAUTION</p> <ul style="list-style-type: none"> • Keep hook block at least 1 ft (30 cm) from end of boom. If hook block hits end of boom it may damage cable or hook block and crane will lose power. Wait 6 seconds for power and check crane for damage. • Do not let cable become slack or cable may get tangled on drum. <p style="text-align: center;">NOTE</p> <ul style="list-style-type: none"> • TELESCOPE and HOIST levers should be operated at same time. • Crane movement from one lever may be slower than other when operating two levers together. <p>(e) Move TELESCOPE control lever (5) to out position while moving HOIST control lever (3) to DOWN position to pay out cable (6).</p>	Extensions will not come out or cable will not reel out.

PMCS Tables (Cont)

Table 2-6. M984E1 Operator/Crew
Preventive Maintenance Checks and Services (Cont)

NOTE: Within designated interval, these checks are to be performed in the order listed.

B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

Item No.	Interval					Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/available if:
	B	D	A	W	M		
						<p>MATERIAL HANDLING CRANE (CONT)</p>  <p style="text-align: right;">TA356600</p> <p>(f) Move HOIST control lever (3) in UP position to reel in cable (6).</p> <p>(g) Check that crane and ENGINE HIGH IDLE does not operate when REMOTE CONTROL UNIT is in MHC-SHUTDOWN position. Notify organizational maintenance if crane and ENGINE HIGH IDLE operates when in MHC-SHUTDOWN position.</p> <p>(4) Shut off switches (para 2-64f).</p> <p>(5) Disconnect remote control, right side (para 2-64g).</p> <p>(6) Check operation of left remote control stations.</p> <p>(a) Connect remote control to left remote control station (para 2-64c).</p> <p>(b) Check operation of crane remote control levers.</p> <p>(c) Shut off switches (para 2-64f).</p> <p>(d) Disconnect and stow REMOTE CONTROL UNIT (para 2-64h).</p> <p>(e) Shut down crane (para 2-63f).</p>	<p>Cable will not reel in.</p> <p>Crane will operate and engine speed will increase to 1500 rpm.</p>

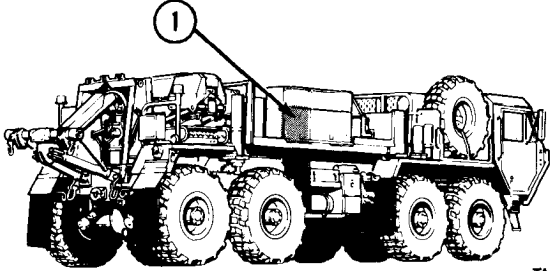
PMCS Tables (Cont)

2-57. OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES TABLES (CONT).

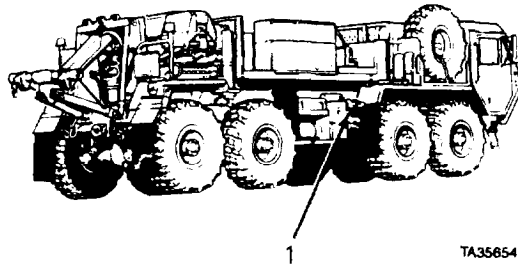
Table 2-6. M984E1 Operator/Crew Preventive Maintenance Checks and Services (Cont)

NOTE: Within designated interval, these checks are to be performed in the order listed.

B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

Item No.	Interval					Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/available if:
	B	D	A	W	M		
5						<p>STOWAGE BOX</p>  <p style="text-align: right;">TA356578</p> <ul style="list-style-type: none"> • a. Check stowage box (1) for missing hardware and other obvious damage. • b. Check inside stowage box (1) for missing REMOTE CONTROL unit or cable, torn or damaged seal, water in bottom of stowage box, or other obvious damage. If water is found in stowage box, notify the supervisor. 	

PMCS Tables (Cont)



TA356545

Table 2-7. M984E1 Auxiliary Equipment Operator/Crew Preventive Maintenance Checks and Services

NOTE: Within designated interval, these checks are to be performed in the order listed.

B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

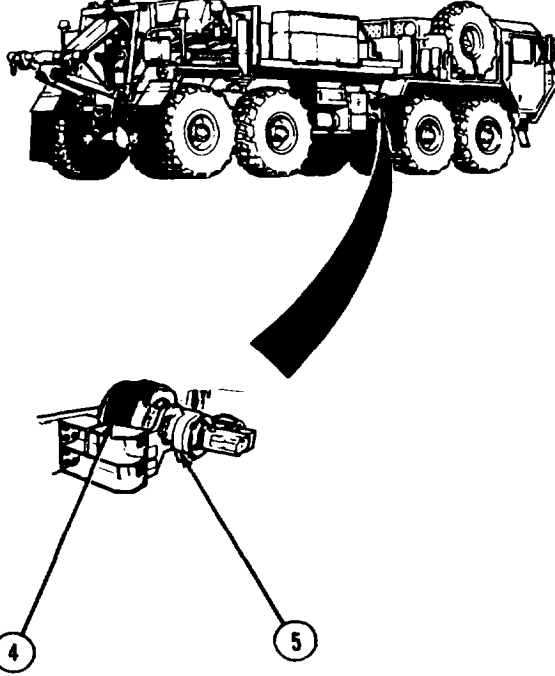
Item No.	Interval				Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/available if:
	B	D	A	W		
					<p>SELF-RECOVERY WINCH</p> <p>TA356547</p> <p>a. Inspect cable guides (1 and 2) and tensioners (3) for loose or missing parts and any obvious damage.</p>	

PMCS Tables (Cont)

Table 2-7. M984E1 Auxiliary Equipment Operator/Crew
Preventive Maintenance Checks and Services (Cont)

NOTE: Within designated interval, these checks are to be performed in the order listed.

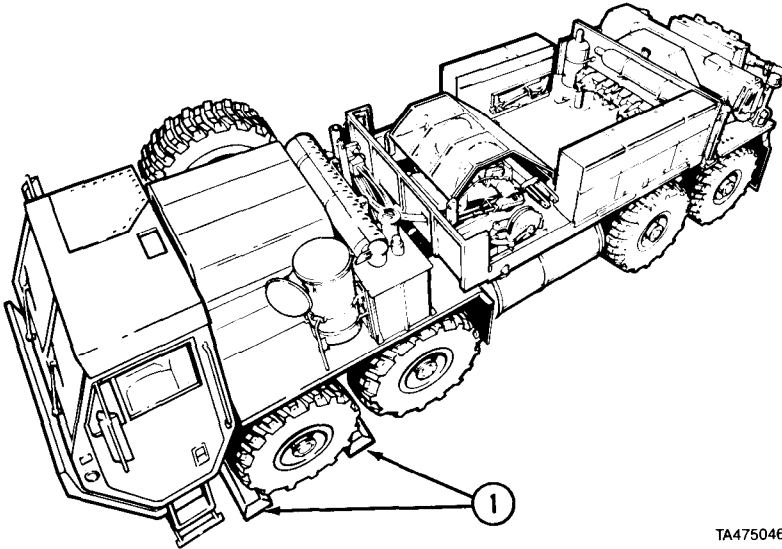
B-Before Operation D-During Operation A-After Operation W-Weekly M-Monthly

Item No.	Interval					Item to be Inspected Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is tot ready/ available if:
	B	D	A	W	M		
						<p>SELF-RECOVERY WINCH (CONT)</p>  <p>WARNING</p> <p>Always wear heavy gloves when handling winch cables. Never let cables run through hands; frayed cables can cut. Never operate winch with less than five wraps of cable on winch drum.</p> <ul style="list-style-type: none"> b. Check winch cable (4) for kinks, frays, and breaks. c. Inspect winch (5) for loose parts, hydraulic leaks, and obvious external damage. d. Check winch control for proper operation. 	

M984E1 General Operating Procedures

Section VII. OPERATION UNDER USUAL CONDITIONS**2-58. DRIVE M984E1.**

a. Drive M984E1 Forward.



TA475046

NOTE

- If vehicle has less than 500 miles (805 km), check controls and indicators often during operation and listen for unusual noises or vibrations. Notify organizational maintenance of any problems.
- Refer to TM 9-2320-279-10 Volume 1 for additional operating instructions.

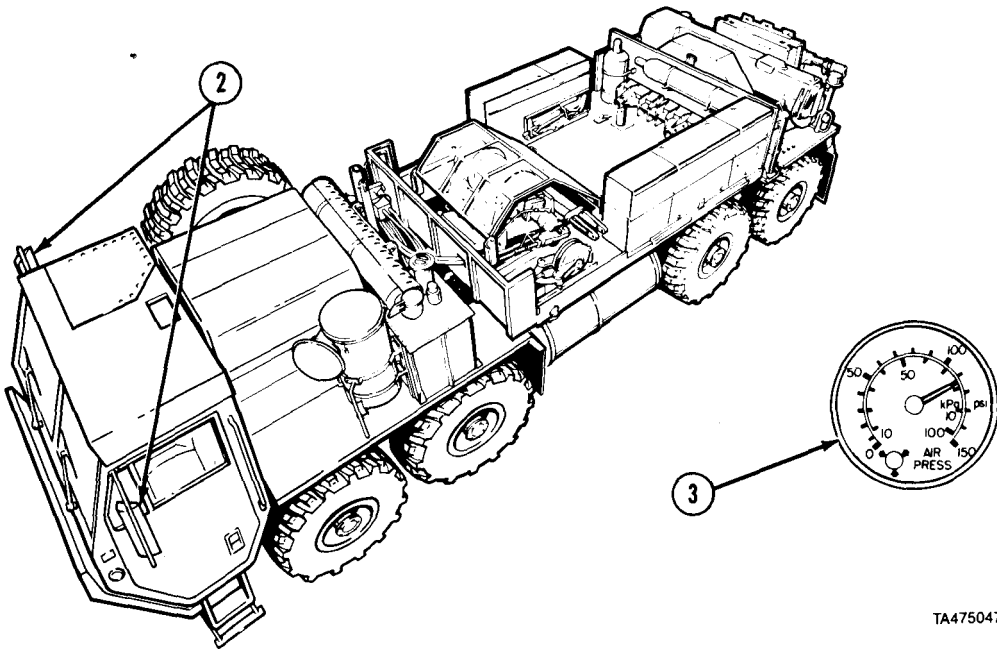
(1) Remove and stow wheel chocks (1).

(2) Before driving:

- Make sure crane, outriggers, and outrigger pads are secured in stowed position (para 2-63g).
- Make sure heavy-duty winch cable clevis is retracted to fairlead/tensioner (para 2-65c).
- Make sure fairlead/tensioner is in stowed position (para 2-65c).
- Make sure retrieval cylinders are fully retracted (para 2-72b).
- Make sure equipment body doors are closed.
- Make sure vise is returned to stowed position (para 2-68b).
- Make sure all equipment in equipment body is securely stowed.

M984E1 General Operating Procedures (Cont)

2-58. DRIVE M984E1 (CONT).



TA475047

- (3) Turn each rearview mirror (2) so back of vehicle and view of road can be seen.
- (4) Install footrest if required (para 2-9b).
- (5) Adjust seat as needed (para 2-9d).
- (6) Adjust seatbelt as needed (para 2-9e).
- (7) Start engine (para 2-11a or 2-11b).
- (8) Turn on lights as needed (para 2-10).

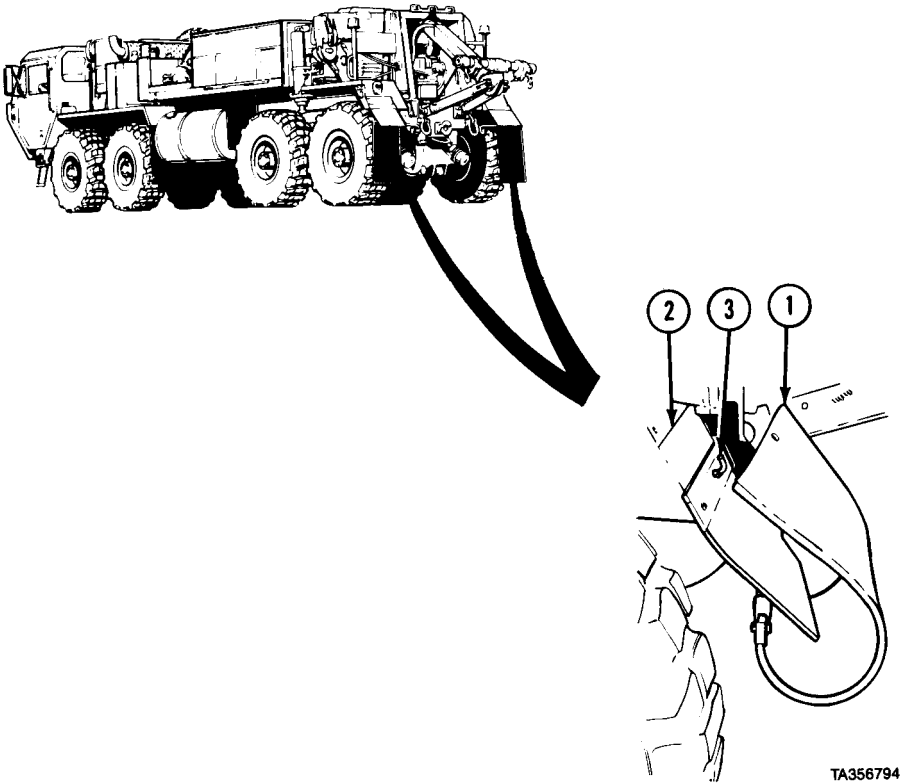
WARNING

Do not press service brake treadle hard three or four times in a row. Air supply will be used up and brakes will not work until air pressure is built up again. Loss of braking ability can result in serious personal injury or death.

- (9) Make sure AIR PRESS gage (3) reads at least 100 psi (690 kPa) before driving vehicle.

M984E1 General Operating Procedures (Cont)

b. Drive M984E1 In Off-Road Conditions.

CAUTION

Raise and hook mud flaps before operating vehicle off-road. Rear mud flaps can be torn off when working in off-road conditions.

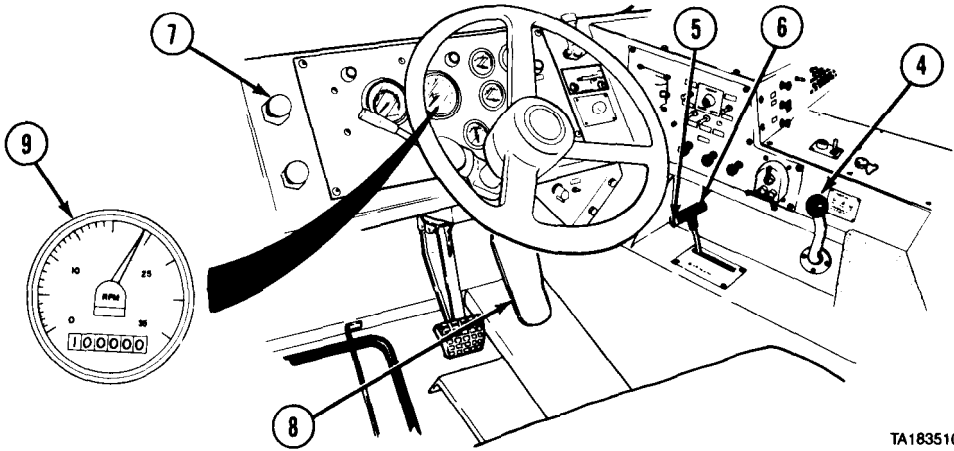
NOTE

- Right and left mud flaps are raised the same.
- Remove dirt from hole in mud flap before installing to off road position.

- (1) Lift up mud flap (1) and turn toward fender (2).
- (2) Install mud flap (1) on hook (3).

M984E1 General Operating Procedures (Cont)

2-58. DRIVE M984E1 (CONT).



TA183510

CAUTION

Do not move TRANSFER CASE shift lever when vehicle is moving or when transmission is in gear. Severe damage to drive line will result.

- (3) Set TRANSFER CASE shift lever (4) to L (LO).
- (4) Push in button (5) and move transmission range selector (6) to 2 or 1, depending on ground condition (para 2-11e).
- (5) Push in PARKING BRAKE control (7).

CAUTION

Maximum no-load governed engine speed is approximately 2250 rpm. Never allow engine speed to go over this figure. Under full load, governed speed is approximately 2100 rpm. If engine is allowed to go over governed speeds, serious engine damage can result.

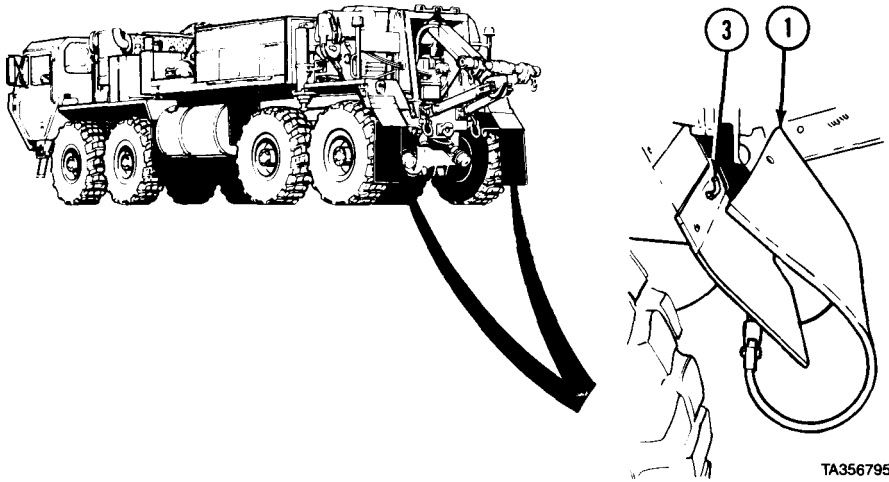
- (6) Slowly press down throttle treadle (8) until vehicle reaches desired speed. Tachometer (9) should read between 1650 and 2100 rpm.

CAUTION

Do not hold steering wheel at full left or full right position for longer than 10 seconds. Power steering oil overheating and pump damage can result.

- (7) Accelerate, brake, and steer as required.

M984E1 General Operating Procedures (Cont)



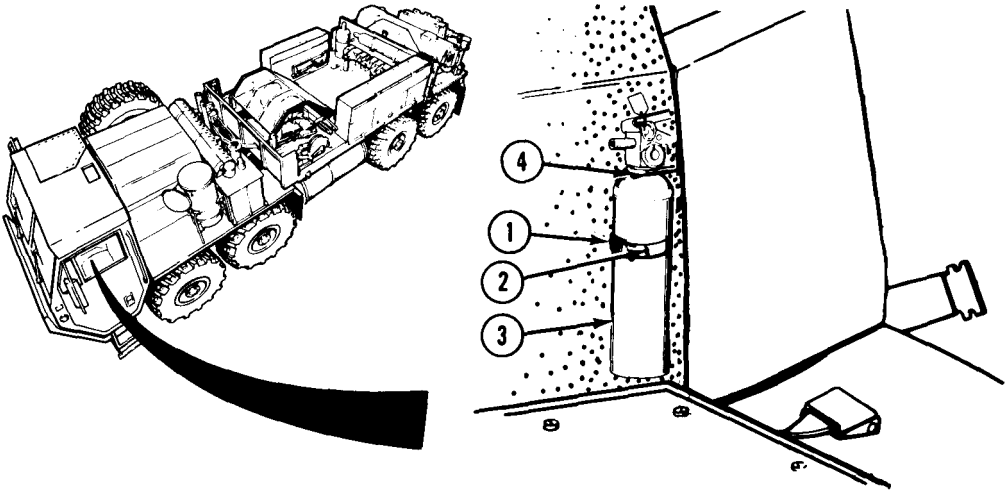
NOTE

- When off-road driving is completed, do step (8).
 - Right and left mud flaps are removed the same.
- (8) Remove mud flap (1) from hook (3).

M984E1 General Operating Procedures (Cont)

2-59. OPERATE M984E1 FIRE EXTINGUISHER.

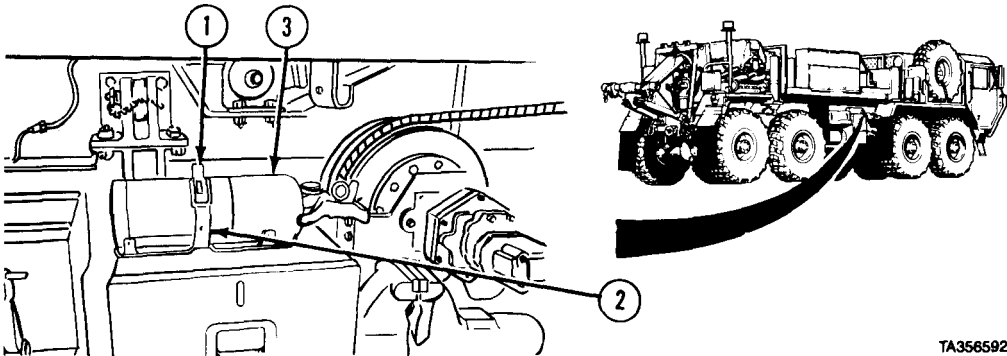
a. Remove Fire Extinguisher From Cab.



TA475048

- (1) Pull up clamp (1) and open strap (2).
- (2) Pull fire extinguisher (3) straight out and off bracket (4).
- (3) Remove fire extinguisher (3).

b. Remove Fire Extinguisher From Stowage Box.



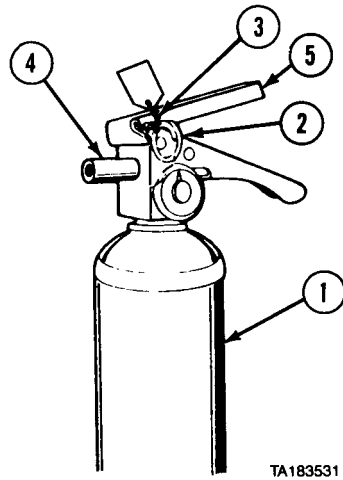
TA356592

- (1) Pull up clamp (1) and open strap (2).
- (2) Remove fire extinguisher (3).

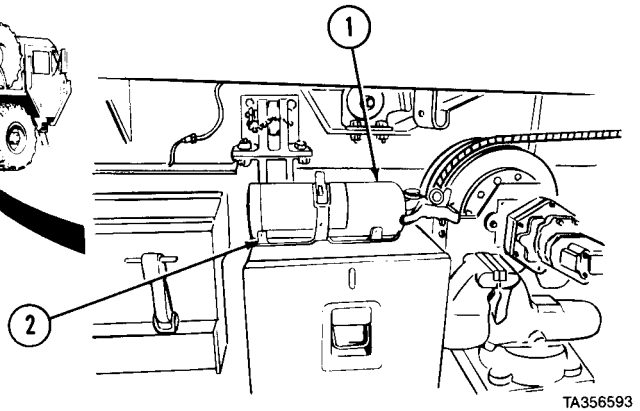
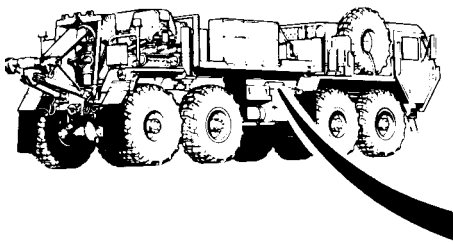
M984E1 General Operating Procedures (Cont)

c. Extinguish Fire.

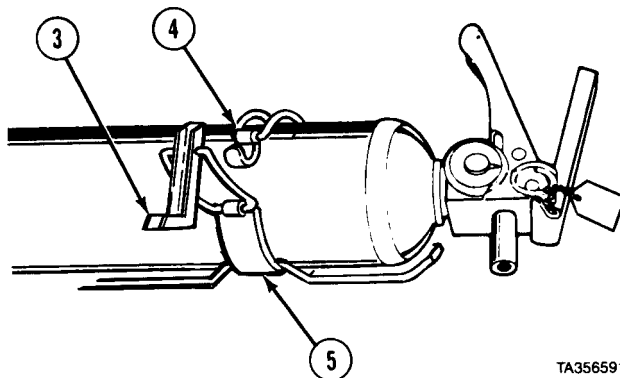
- (1) Hold fire extinguisher (1) upright and pull safety pin (2) to break plastic tie (3).
- (2) Point nozzle (4) at base of fire.
- (3) Press down on stop lever (5) and spray discharge in a side-to-side motion at base of fire.
- (4) Let go of stop lever (5) when fire is out.
- (5) Notify organizational maintenance to replace fire extinguisher.



d. Install Fire Extinguisher On Stowage Box.



- (1) Put fire extinguisher (1) on bracket (2).

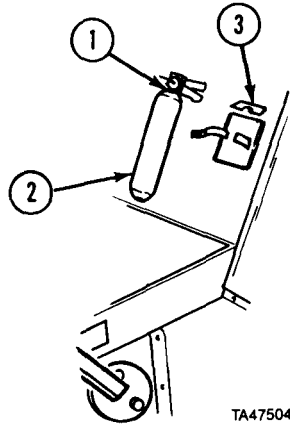
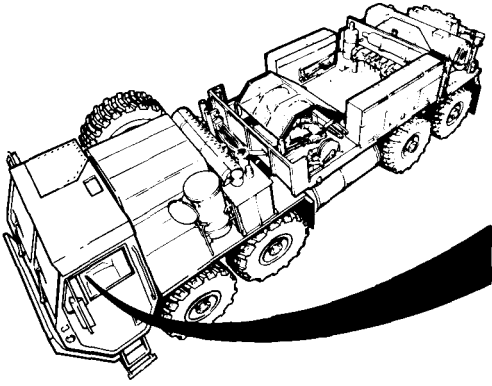


- (2) Put latch (3) on hook (4).
- (3) Push down on latch (3) to secure strap (5).

M984E1 General Operating Procedures (Cont)

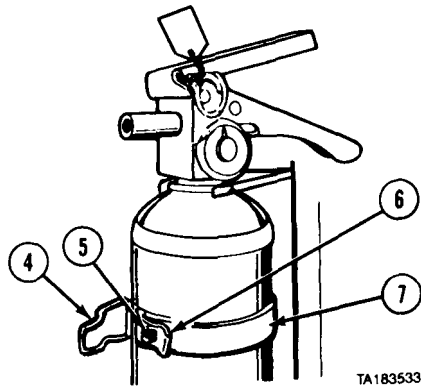
2-59. OPERATE M984E1 FIRE EXTINGUISHER (CONT).

e. Install Fire Extinguisher In Cab.



(1) Put neck (1) of fire extinguisher (2) on bracket (3).

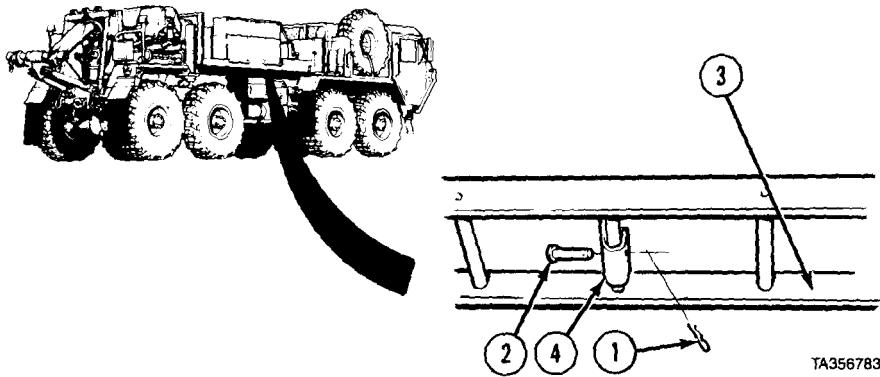
(2) Put latch (4) on hook (5).
(3) Push down on clamp (6) to secure strap (7).



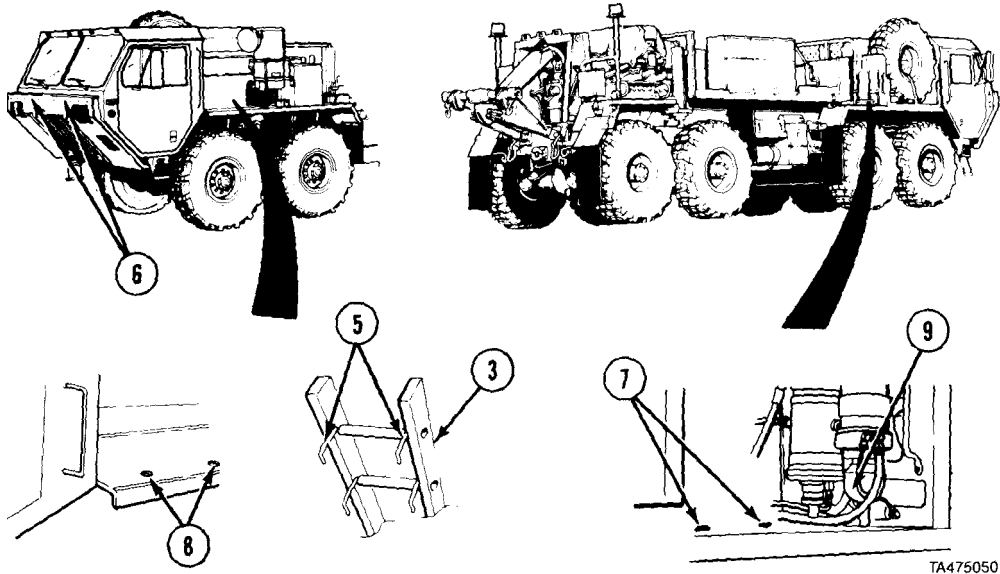
M984E1 General Operating Procedures (Cont)

2-60. USE M984E1 ACCESS LADDER.

a. Install Access Ladder.



- (1) Remove quick pin (1), pin (2), and access ladder (3) from bracket (4),
- (2) Install pin (2) and quick pin (1) in bracket (4).



CAUTION

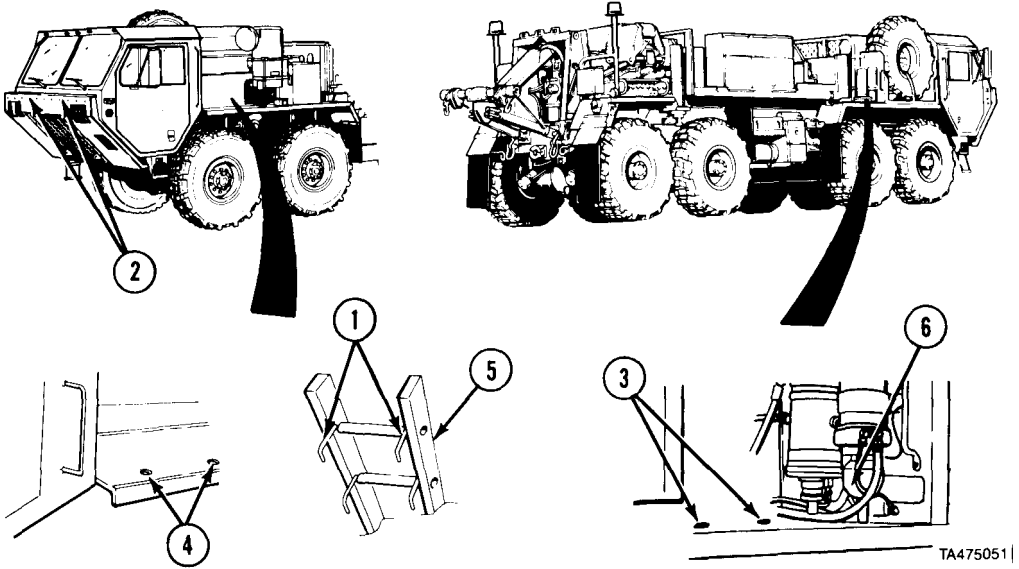
Do not hit fuel-water separator when installing access ladder on right front fender. If access ladder hooks hit fuel-water separator, glass will break.

- (3) Install access ladder hooks (5) in front skid plate holes (6), right front fender holes (7), or left front fender holes (8), as required. Keep access ladder (3) clear of fuel-water separator (9).

M984E1 General Operating Procedures (Cont)

2-60. USE M984E1 ACCESS LADDER (CONT).

b. Stow Access Ladder.

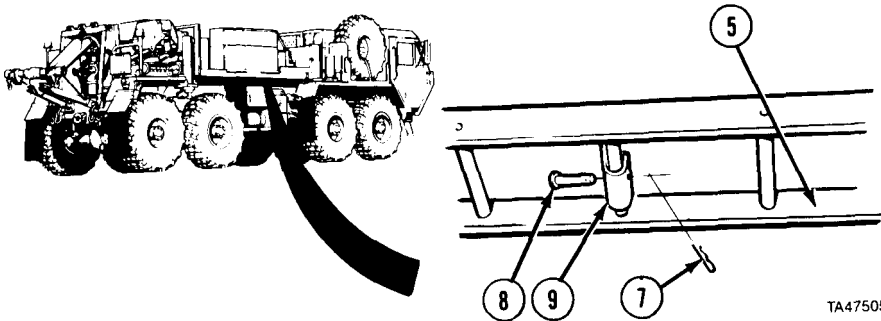


TA475051

CAUTION

Do not hit fuel-water separator when removing access ladder from right front fender holes. If access ladder hooks hit fuel-water separator, glass will break.

(1) Remove access ladder hooks (1) from front skid plate holes (2), right front fender holes (3), or left front fender holes (4). Keep access ladder (5) clear of fuel-water separator (6).



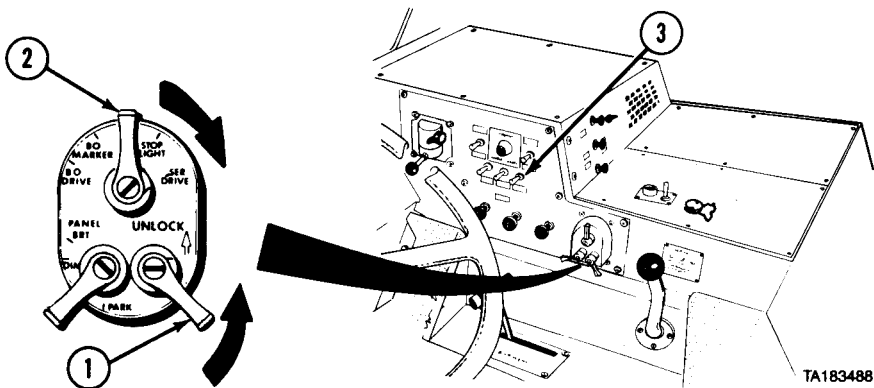
TA475052

(2) Remove quick pin (7) and pin (8) from bracket (9).
 (3) Put access ladder (5) in bracket (9) and install pin (8) and quick pin (7).

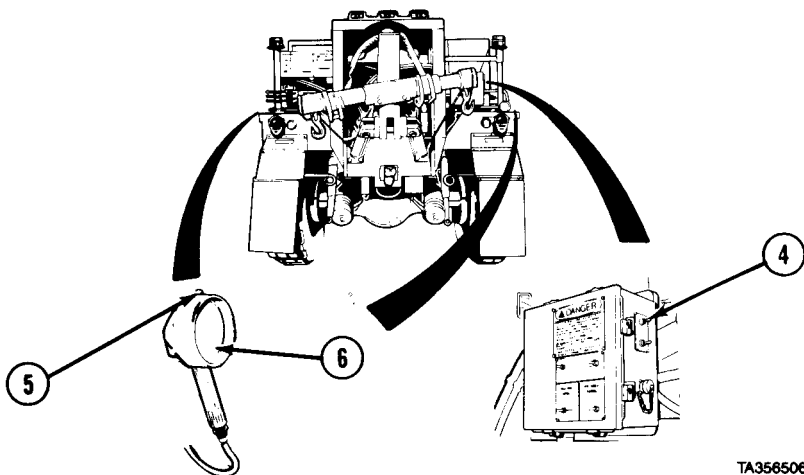
M984E1 General Operating Procedures (Cont)

2-61 . M984E1 WORK LIGHT OPERATION.

a. Turn On Work Lights.



- (1) Lift up and hold UNLOCK lever (1).
- (2) Set lighting control lever (2) to STOP LIGHT or SER DRIVE position.
- (3) Let go of UNLOCK lever (1).
- (4) Set WORK LIGHT switch (3) to up position.



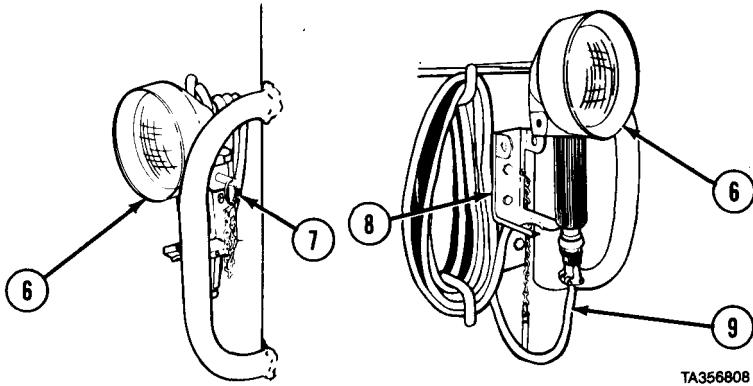
NOTE

When work light switch is in ON position, stationary work lights located on retrieval assembly will come on.

- (5) Set WORK LIGHTS switch (4) to ON position.
- (6) Set switch (5) on work light (6) to ON position. Work light will come on.

M984E1 General Operating Procedures (Cont)

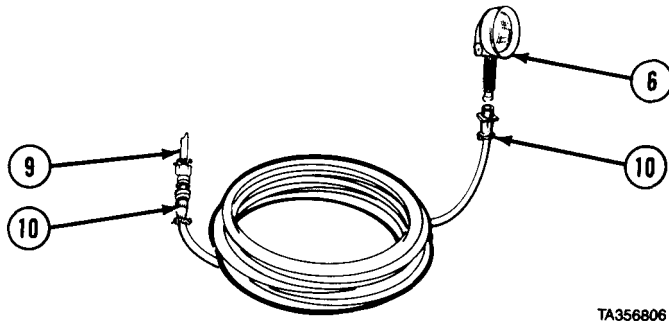
2-61. M984E1 WORK LIGHT OPERATION (CONT).



NOTE

- If longer cord is needed for work lights, do steps (7) through (11).
- Both work lights are removed in the same way.

- (7) Remove worklamp harness from stowage.
- (8) Pull quick pin (7) from work light (6).
- (9) Lift work light (6) out of bracket (8) and disconnect cord (9) from work light.
- (10) Unwrap cord (9) from hooks.



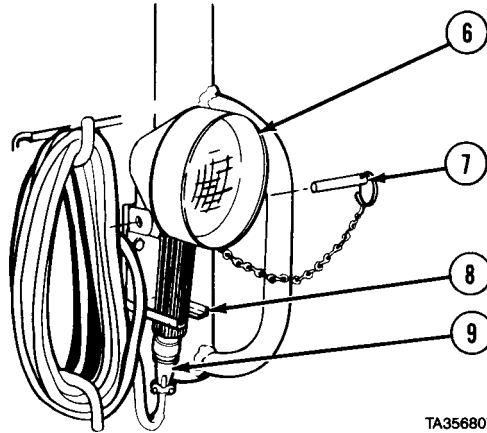
- (11) Connect worklamp harness connectors (10) to work light (6) and cord (9).

NOTE

- Do steps (12) through (15) if worklamp harness is no longer needed.
- Both work lights are installed the same way.

- (12) Disconnect worklamp harness connectors (10) from work light (6) and cord (9).

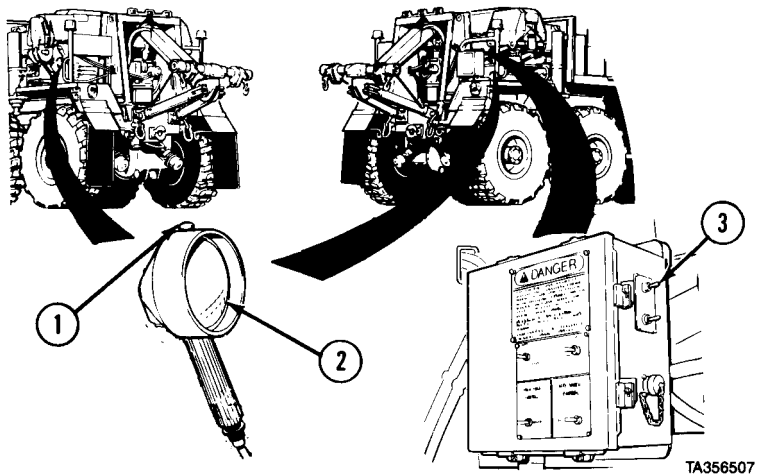
M984E1 General Operating Procedures (Cont)



TA356807

- (13) Connect work light (6) to cord (9) and wrap cord on hooks.
- (14) Install work light (6) in bracket (8) and install quick pin (7) through bracket and work light.
- (15) Return worklamp harness to stowage.

b. Turn Off Work Lights.

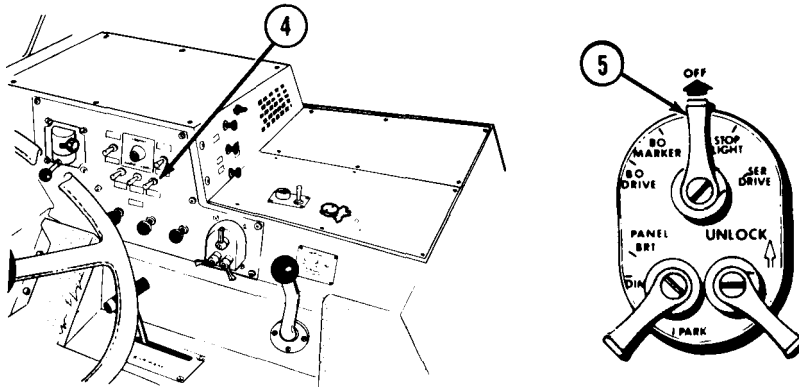


TA356507

- (1) Set switch (1) on work light (2) to OFF position.
- (2) Set WORK LIGHTS switch (3) to OFF position.

M984E1 General Operating Procedures (Cont)

2-61. M984E1 WORK LIGHT OPERATION (CONT).

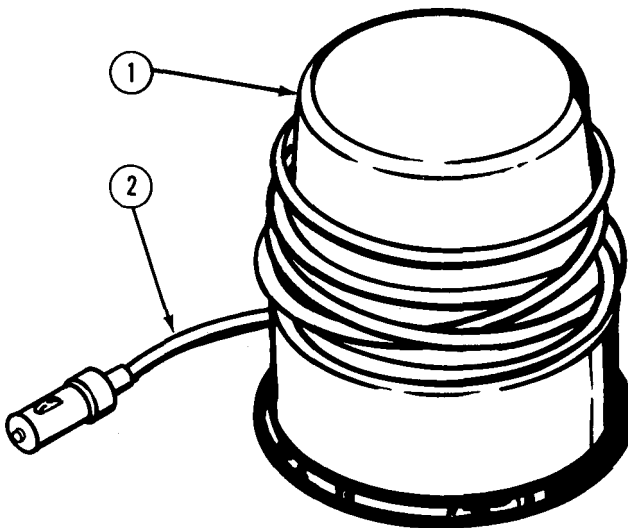


TA358508

- (3) Set WORK LIGHT switch (4) to center (off) position.
- (4) Set lighting control lever (5) to OFF position.

2-62. M984E1 BEACON LIGHT OPERATION.

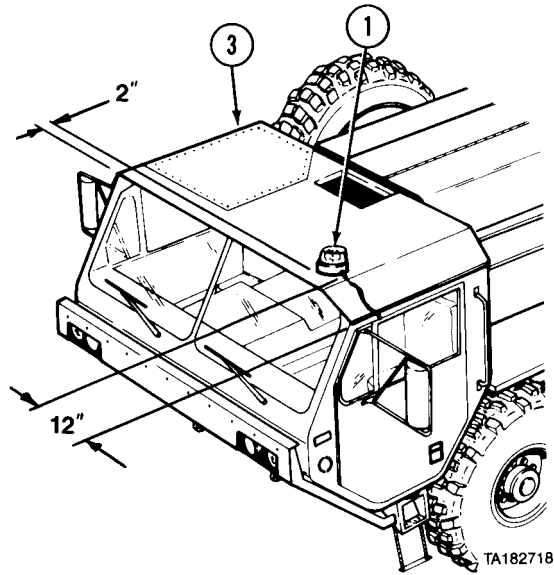
a. Install Beacon Light.



TA182748

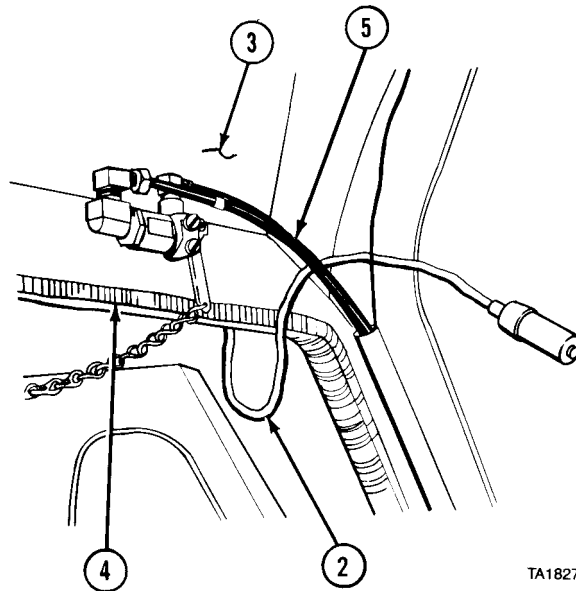
- (1) Remove beacon light (1) from stowage and unwind cord (2).

M984E1 General Operating Procedures (Cont)



TA182718

(2) Place beacon light (1) on left front corner of cab roof (3) approximately 12 in. (305 mm) from left side of cab and approximately 2 in. (51 mm) from front edge of cab roof.

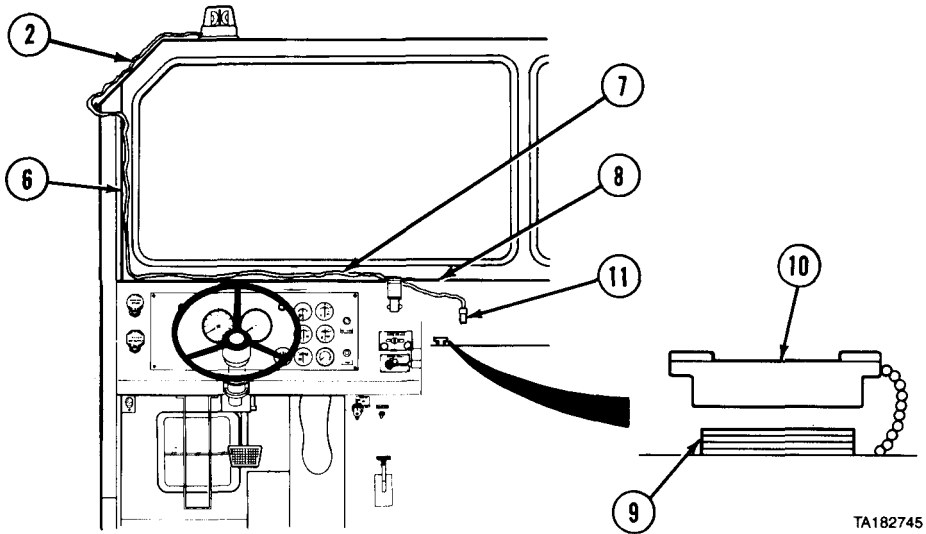


TA182749

(3) Route cord (2) through left door opening (4) and between inside of cab roof (3) and air horn valve hoses (5).

M984E1 General Operating Procedures (Cont)

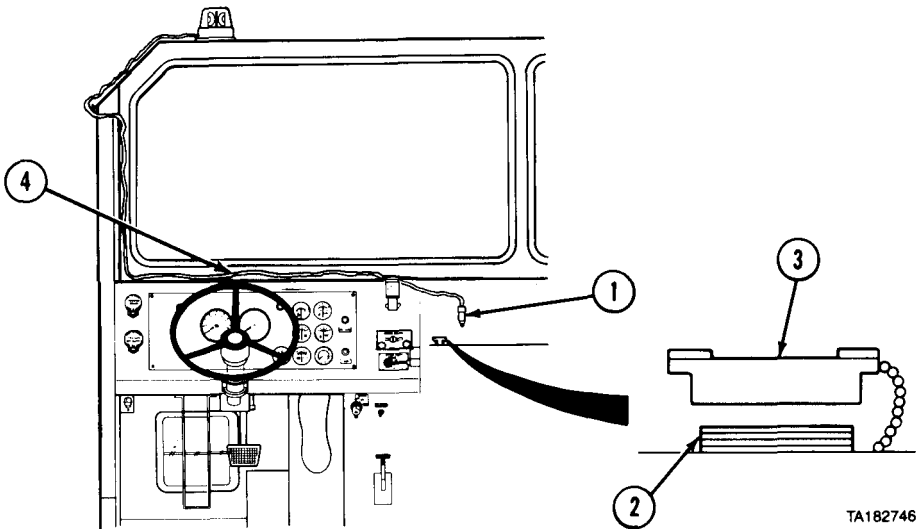
2-62. M984E1 BEACON LIGHT OPERATION (CONT.)



(4) Route cord (2) down left side of windshield (6), across driver side defroster (7), and across center console (8) to utility outlet (9).

(5) Remove cover (10). Insert light plug (11) into utility outlet (9).

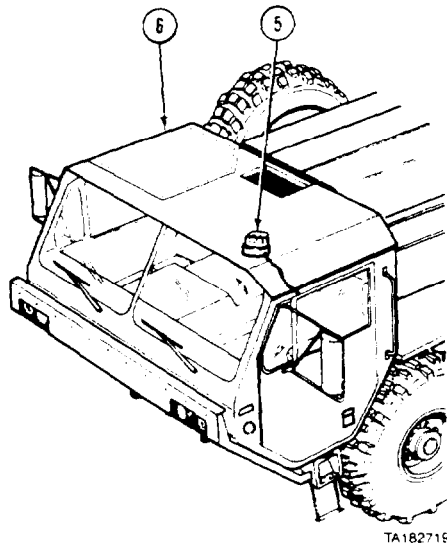
b. Remove Beacon Light.



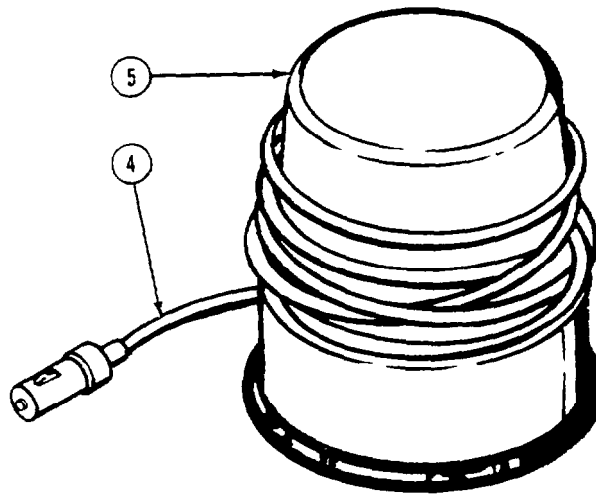
(1) Remove light plug (1) from utility outlet (2). Install cover (3) on utility outlet.

(2) Unstring light cord (4).

M984E1 General Operating Procedures (Cont)



(3) Remove beacon light (5) from cab roof (6).



(4) Wrap cord (4) around beacon light (5) and stow.

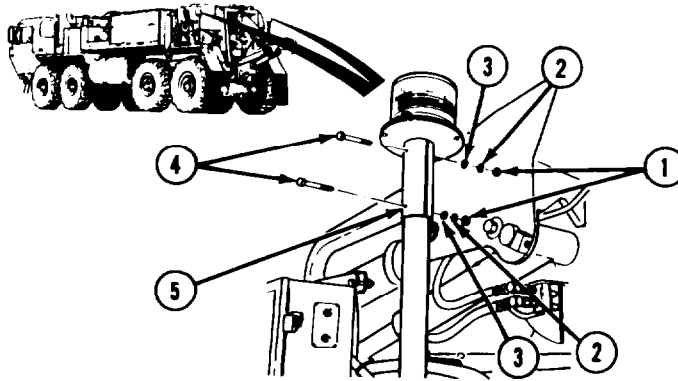
M984E1 General Operating Procedures (Cont)

2-62. M984E1 BEACON LIGHT OPERATION (CONT).

NOTE

Beacon lights should remain in raised position except for crane operations.

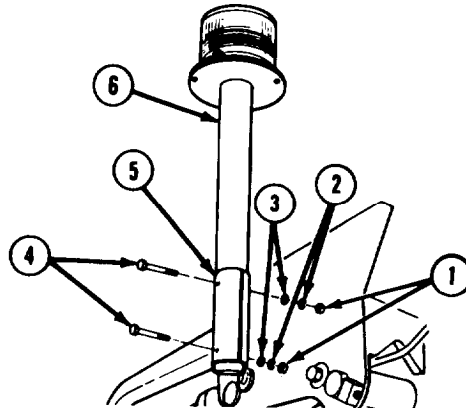
c. Set Up Rear Beacon Lights.



NOTE

Right and left beacon lights are set up in the same way.

- (1) Remove two nuts (1), lockwashers (2), washers (3), and screws (4) from support bracket (5).



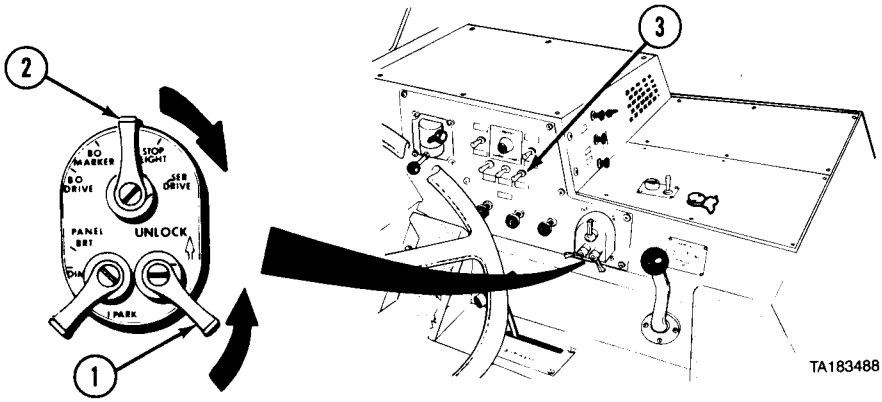
CAUTION

Do not let beacon drop when raising to operating position. Damage to beacon can result.

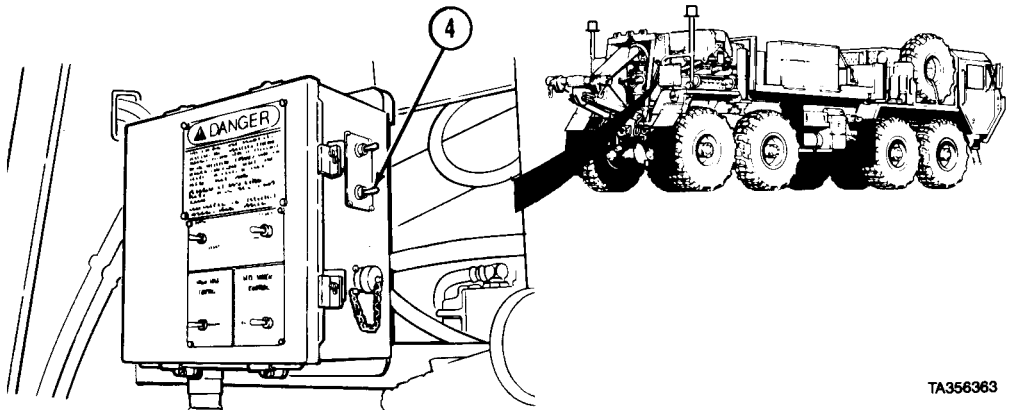
- (2) Raise beacon support tube (6) until lower set of holes in beacon support tube align with holes in support bracket (5).
- (3) Install two screws (4) through holes in support bracket (5) and beacon support tube (6).
- (4) Install two washers (3), lockwashers (2), and nuts (1).

M984E1 General Operating Procedures (Cont)

d. Turn Rear Beacon Lights On.



- (1) Lift up and hold UNLOCK lever (1).
- (2) Set LIGHTING CONTROL lever (2) to STOP LIGHT or SER DRIVE position.
- (3) Let go of UNLOCK lever (1).
- (4) Set WORK LIGHT switch (3) to ON position.

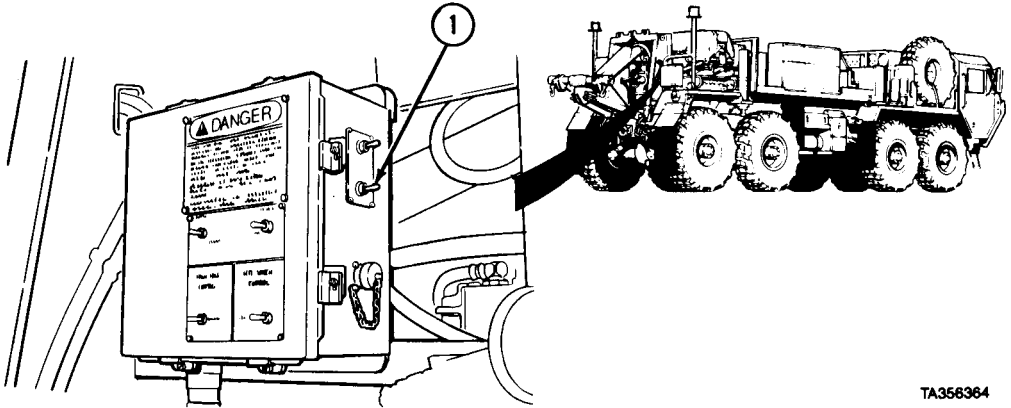


- (5) Move BEACON LIGHT switch (4) to ON position.

M984E1 General Operating Procedures (Cont)

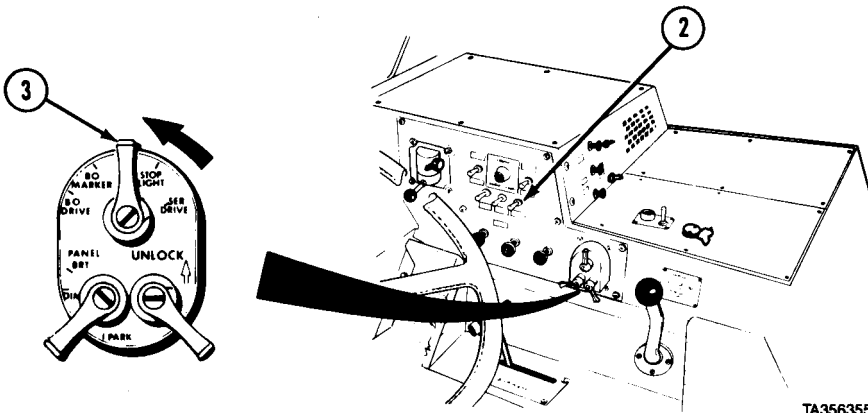
2-62. M984E1 BEACON LIGHT OPERATION (CONT.)

e. Turn Rear Beacon Lights Off.



TA356364

(1) Set BEACON LIGHT switch (1) to OFF position.

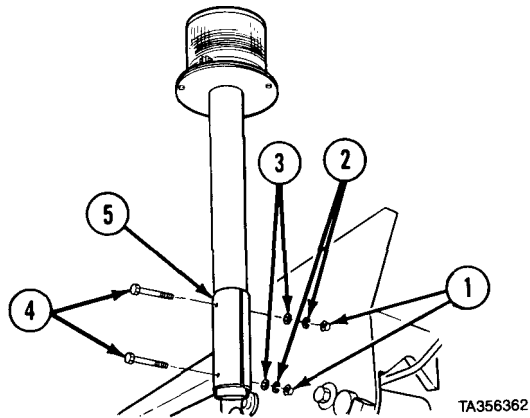


TA356355

(2) Set WORK LIGHT switch (2) to OFF position.
(3) Set LIGHTING CONTROL lever (3) to OFF position.

M984E1 General Operating Procedures (Cont)

f. Stow Rear Beacon Lights.



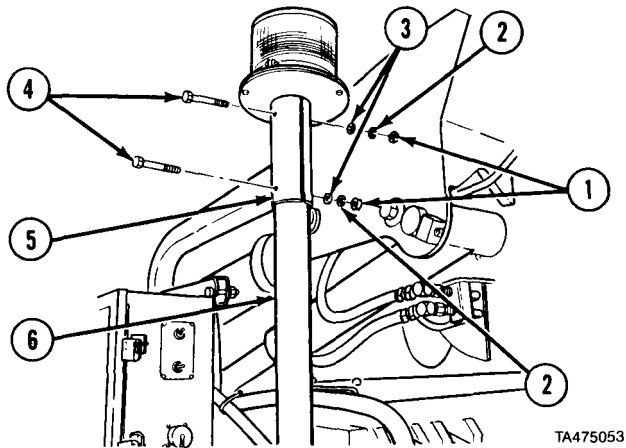
CAUTION

Do not let beacon drop when removing screws. Damage to beacon can result.

NOTE

Right and left beacon lights are stowed in the same way.

- (1) Remove two nuts (1), lockwashers (2), washers (3), and screws (4) from support bracket (5).



- (2) Lower beacon support tube (6) until upper set of holes in beacon support tube align with holes in support bracket (5).
- (3) Install two screws (4) through holes in support bracket (5) and beacon support tube (6).
- (4) Install two washers (3), lockwashers (2), and nuts (1).

M984E1 General Operating Procedures (Cont)

2-63. M984E1 CRANE OPERATION (MANUAL CONTROLS).

a. Prepare Crane For Use.

WARNING

- Do not operate crane unless outriggers are set up. Vehicle could turn over causing serious injury or death.
- Operate crane from left or right remote control station if operator will not be able to see load at all times during crane operation. Boom and load moving out of control could cause serious injury or death.
- Keep boom clear of all electrical lines and other obstacles while operating crane. Serious injury or death can result upon contact.
- Excessive noise levels are present any time the heavy-duty winch or crane is operating. Wear single hearing protection (earplugs or equivalent) while working around equipment while it is running. Failure to do so could result in damage to your hearing. Seek medical aid should you suspect a hearing problem.

CAUTION

Beacon lights must be in lower (stowed) position before operating crane. Damage to lights may result.

NOTE

- Failure of hydraulic system will stop crane operation and lock crane in place. If hydraulic system fails during crane operation, refer to paragraph 2-48c.
- If electrical system fails during crane operation, refer to paragraph 2-88d for emergency shutdown procedure.

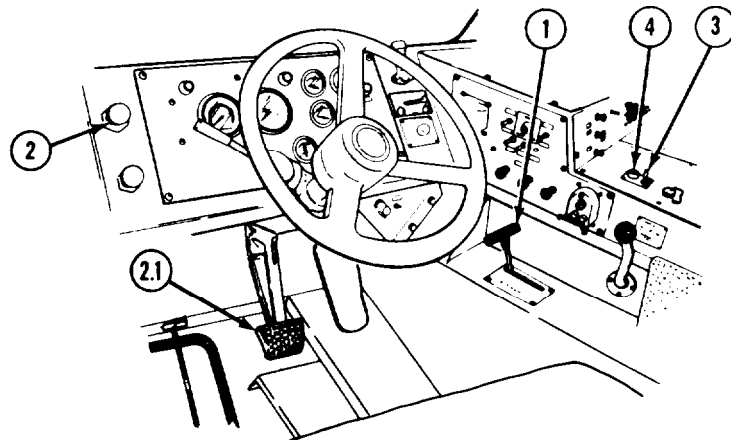
- (1) Lower beacon lights to stowed position (para 2-62f).
- (2) Start engine (para 2-11a or para 2-11b).

NOTE

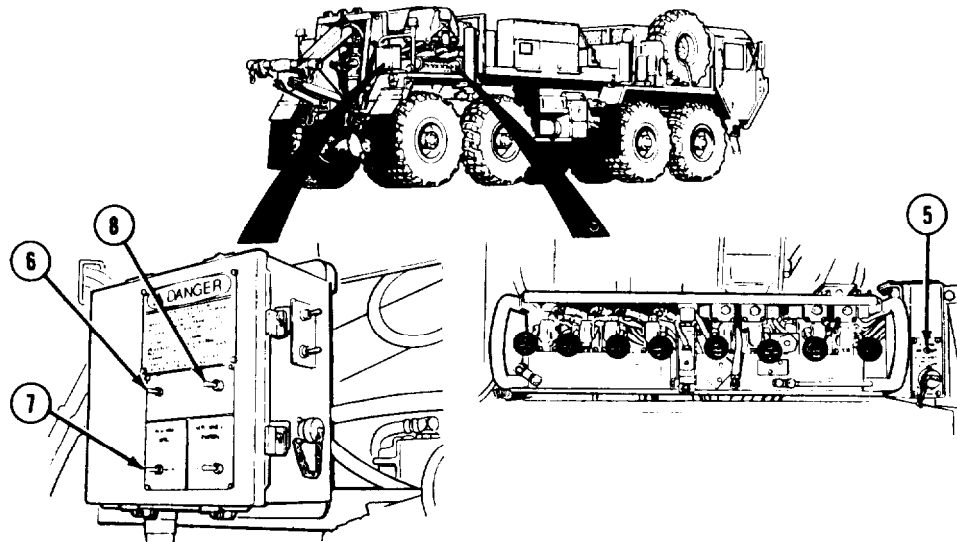
Crane can operate on up to 5-degree side slope.

- (3) Position vehicle on level ground so all loading and unloading can be done from one position.

M984E1 General Operating Procedures (Cont)



- (4) Put transmission range selector (1) in N (neutral) position and pull PARKING BRAKE control knob (2) out.
- (4.1) Apply front brakes (2.1).
- (5) Put PTO ENGAGE switch (3) in ON position. Indicator light (4) should come on.

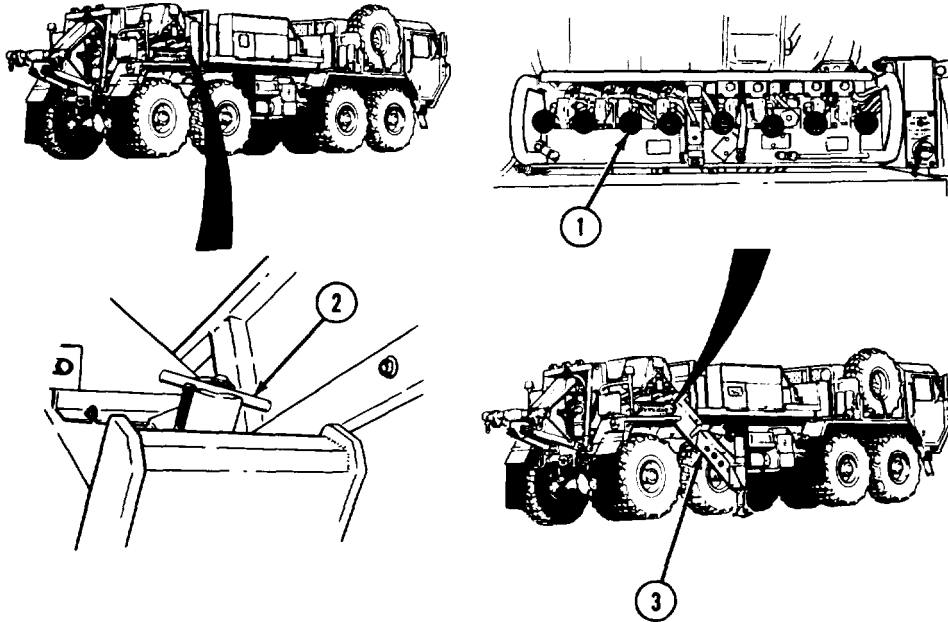


- (6) Set ON/OFF POWER switch (5) to ON position.
- (7) Set POWER switch (6) to ON position.
- (8) Set HIGH IDLE CONTROL switch (7) to CRANE position.
- (9) Push and release LATCH switch (8). Engine speed will increase to approximately 1500 rpm.

M984E1 General Operating Procedures (Cont)

2-63. M984E1 CRANE OPERATION (MANUAL CONTROLS) (CONT).

b. Set Up Outrigger



WARNING

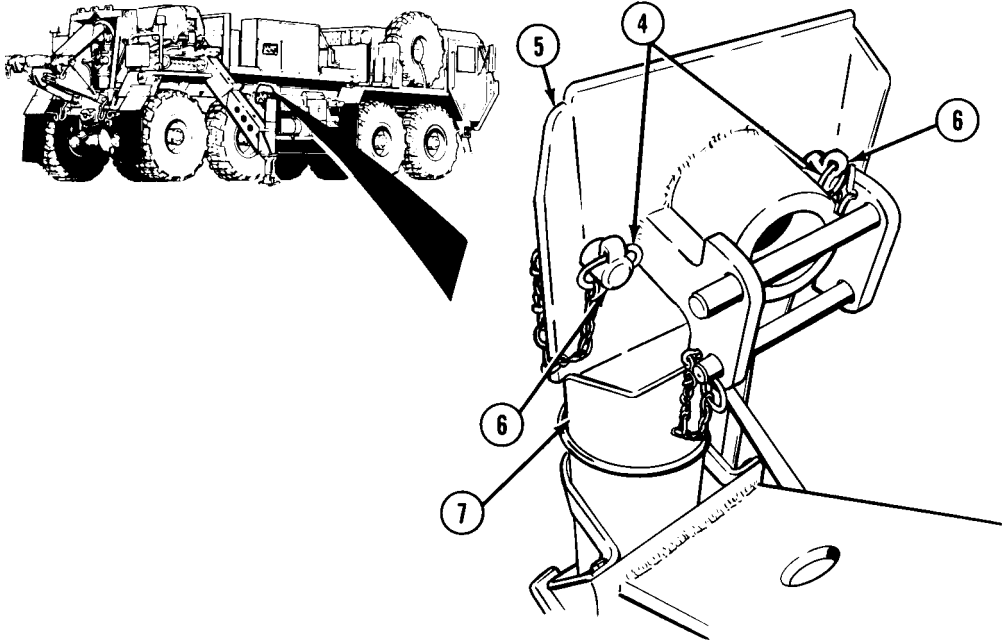
- Chock front wheels when using outriggers to prevent vehicle from rolling.
- Stand clear of outrigger beams while operating lever or injury could result when beams come out.

NOTE

- Always operate control levers with light, even pressure.
- Outrigger beams will come out slower with light pressure on lever. Pushing lever to full travel will cause faster movement.

- (1) Move O/R EXT lever (1) to IN position briefly and lift and turn right outrigger lockpin (2) to unlock position.
- (2) Move O/R EXT lever (1) to OUT position until right outrigger beam (3) is fully extended.

M984E1 General Operating Procedures (Cont)

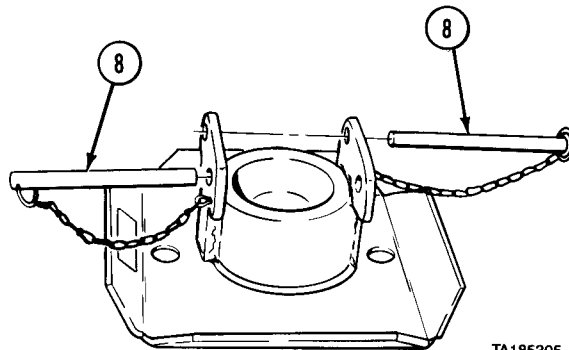


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WARNING

Be careful when removing outrigger pads from stowed position. Sharp edges may injure hands.

- (3) Remove two safety pins (4) and remove outrigger pad (5) from studs (6) on outrigger jack cylinder (7).

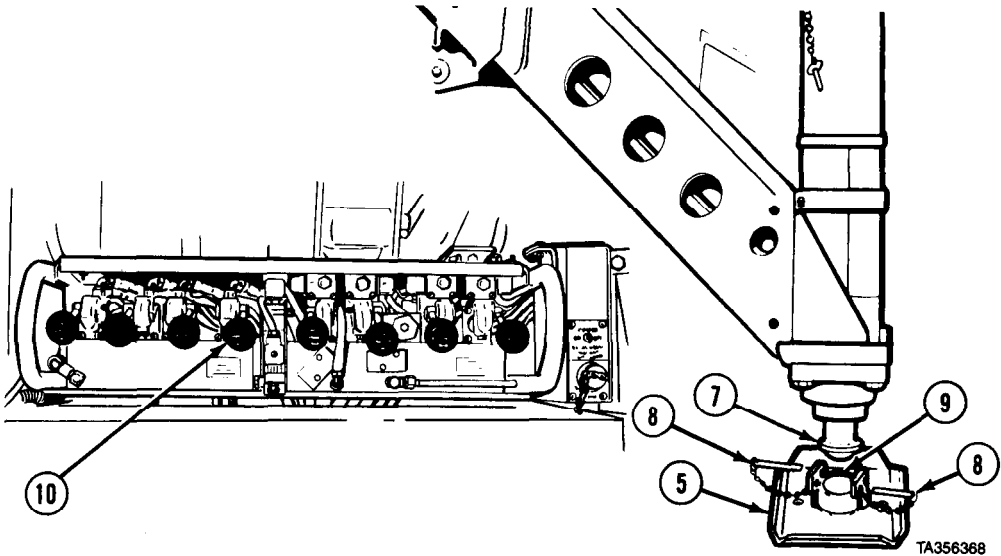


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- (4) Remove two retaining pins (8).

M984E1 General Operating Procedures (Cont)

2-63. M984E1 CRANE OPERATION (MANUAL CONTROLS) (CONT).



- (5) Clean all foreign material from socket (9) in outrigger pad (5) and from rod end of outrigger jack cylinder (7).

NOTE

It may be necessary to retract outrigger slightly to fit pad under jack cylinder.

- (6) Position outrigger pad (5) directly below outrigger jack cylinder (7).

WARNING

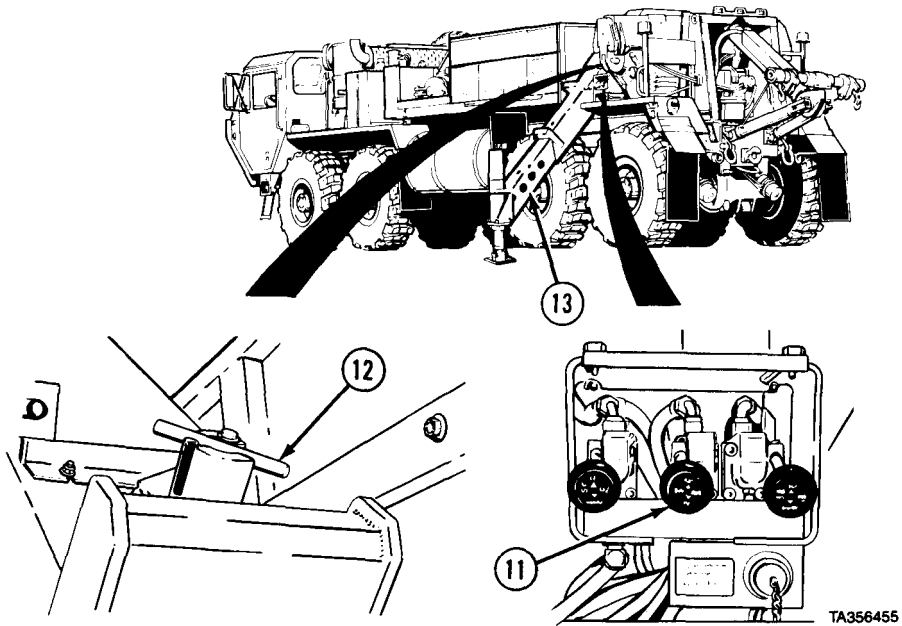
Keep hands and feet clear of outrigger jack cylinders to avoid injury.

NOTE

Adjust outrigger pad position as required so rod end will lower into pad socket.

- (7) Move right outrigger jack (RH O/R JACK) control lever (10) to DOWN position and lower outrigger jack cylinder (7) until rod end is seated in outrigger pad (5).
- (8) Install retaining pins (8).

M984E1 General Operating Procedures (Cont)



WARNING

Stand clear of outrigger beams while operating lever or injury could result when beams come out.

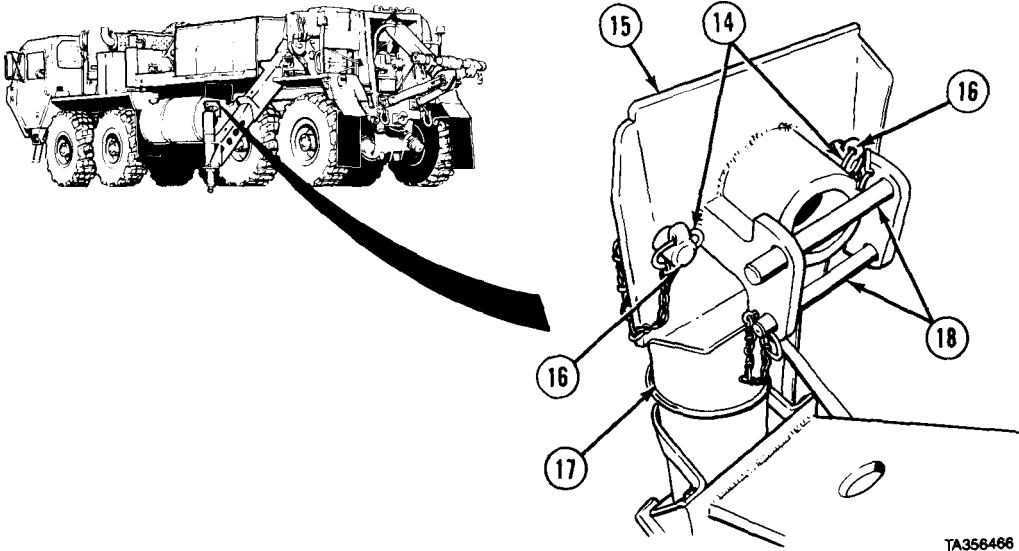
NOTE

- Always operate control levers with light, even pressure.
- Outrigger beams will come out slower with light pressure on lever. Pushing lever to full travel will cause faster movement.

- (9) Move O/R EXT lever (11) to IN position briefly and lift and turn left outrigger lockpin (12) to unlock position.
- (10) Move O/R EXT lever (11) to OUT position until left outrigger beam (13) is fully extended.

M984E1 General Operating Procedures (Cont)

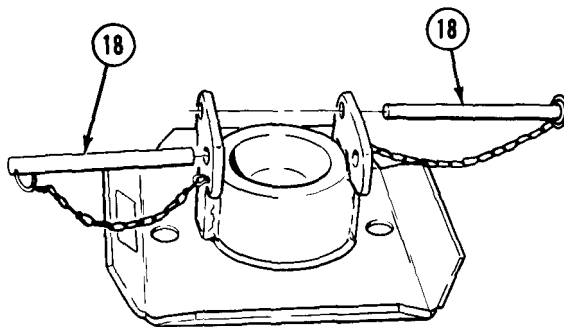
2-63. M984E1. CRANE OPERATION (MANUAL CONTROLS) (CONT).



WARNING

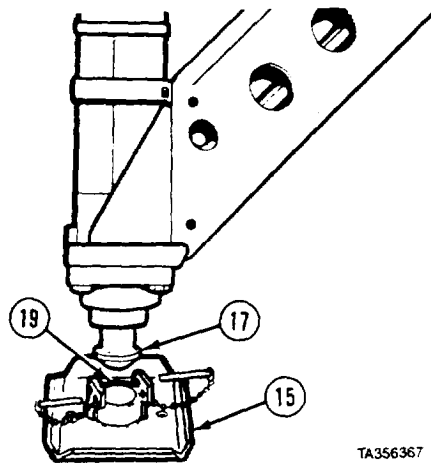
Be careful when removing outrigger pads from stowed position. Sharp edges may injure hands.

- (11) Remove two safety pins (14) and remove outrigger pad (15) from studs (16) on outrigger jack cylinder (17).



- (12) Remove two retaining pins (18).

M984E1 General Operating Procedures (Cont)

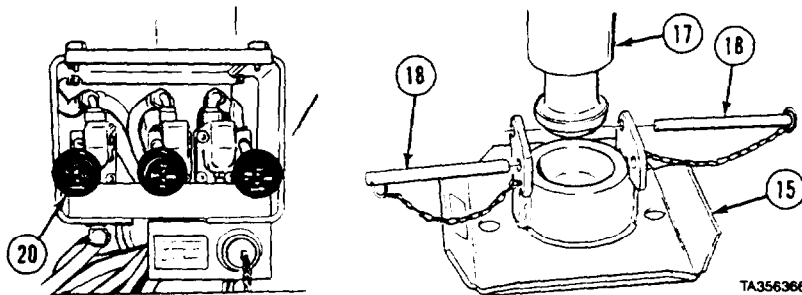


- (13) Clean all foreign material from socket (19) in outrigger (15) and from rod end of outrigger jack cylinder (17).

NOTE

It may be necessary to retract outrigger slightly to fit pad under jack cylinder

- (14) Position outrigger pad (15) directly below outrigger jack cylinder (17).



WARNING

Keep hands and feet clear of outrigger jack cylinders to avoid injury.

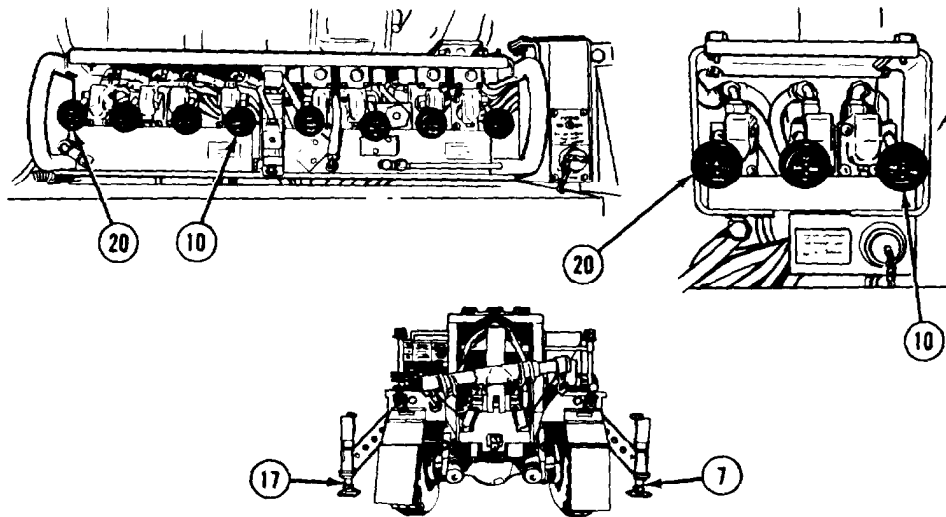
NOTE

Adjust outrigger pad position as required so rod end will lower into pad socket

- (15) Move left outrigger jack (LH O/ R JACK) control lever (20) to DOWN position and lower outrigger jack cylinder (17) until rod end is seated in outrigger pad (15).
- (16) Install retaining pins (18).

M984E1 General Operating Procedures (Cont)

12-63. M984E1 CRANE OPERATION (MANUAL CONTROLS) (CONT).



WARNING

- Do not raise vehicle tires off ground with outrigger jack cylinders. Vehicle could roll causing serious injury or death.
- Chock front wheels when using outriggers to prevent vehicle from rolling.
- Crane must be level from side to side. Use of crane in unlevel position can cause vehicle to tip over causing serious injury or death.

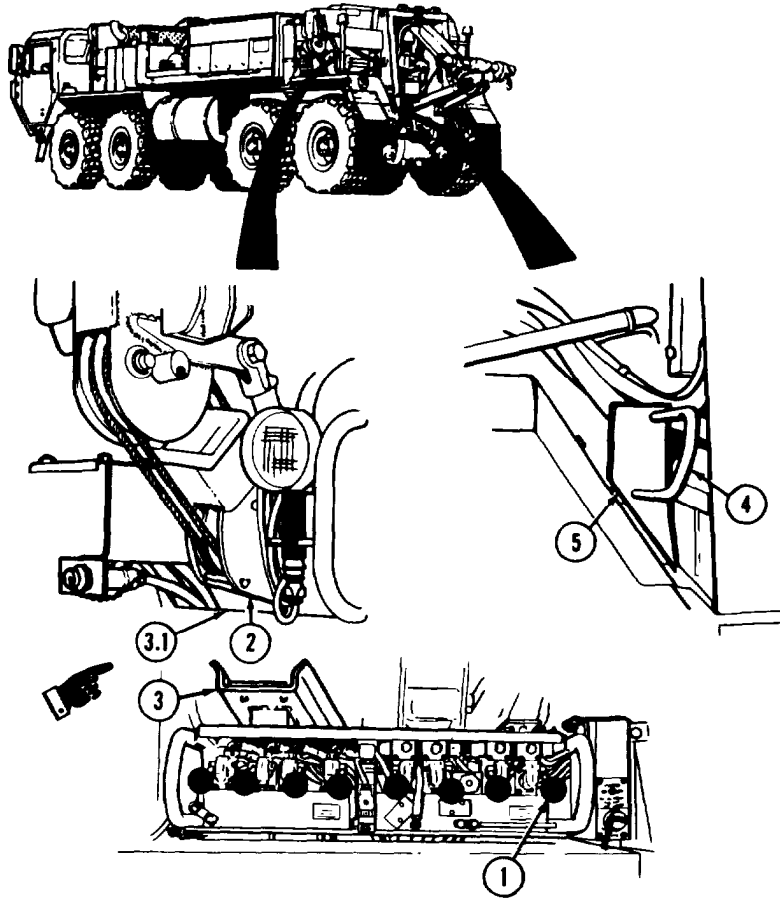
NOTE

- Left and right outrigger jacks can be operated from left or right side control panels.
 - Operate left and right outrigger jack (LH O/R JACK and RH O/R JACK) control levers at the same time.
 - Crane movement from one lever may be slower than the other when operating two levers together.
 - Vehicle weight should be off rear axle just enough so tires still have firm contact with ground but do not bulge from weight.
- (17) Move left outrigger jack (LH O/R JACK) and right outrigger jack (RH O/R JACK) control levers (20 and 10) to DOWN position. Lower left and right outrigger jack cylinders (17 and 7) until vehicle weight is off rear tires.

M984E1 General Operating Procedures (Cont)

2-63. M984E1 CRANE OPERATION (MANUAL CONTROLS) (CONT).

c. *Raise Boom To Operating Position.*



M984E1 General Operating Procedures (Cont)**WARNING**

- Do not operate crane unless both outriggers are set up. Vehicle could turn over causing serious injury or death.
- Put chock blocks under front wheels to prevent truck overturning.

CAUTION

- Do not let cable unwind and become slack or cable may get tangled on drum.
- Do not operate crane with lockpin in lock position, damage to equipment may result.
- Use caution when removing slack from cable. Ensure that hook block does not catch on hook block stowage guide or damage to fender or hook block stowage guide may result.

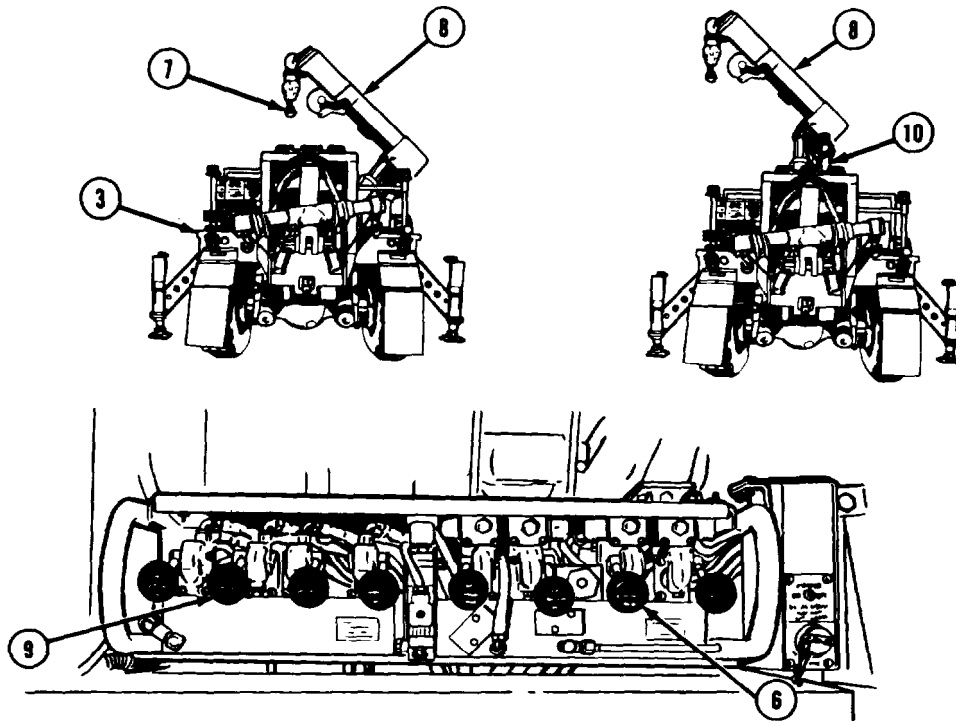
NOTE

trucks with hook block stowage guide, perform steps (1) and (2) through (7). Trucks without hook block stowage guide, perform steps (1.1) through (7).

- (1) Move HOIST control lever (1) to DOWN position to relieve tension on cable.
- (1.1) Move HOIST control lever (1) to DOWN position until hook block (2) rests on fender (3.1).
- (2) Pull and turn lockpin handle (4) so handle end rests on bracket (5).

M984E1 General Operating Procedures (Cont)

2-63. M984E1 CRANE OPERATION (MANUAL CONTROLS) (CONT).



WARNING

Keep boom clear of all electrical lines and other obstacles while operating crane. Serious injury or death could result upon contact.

- (3) Move BOOM control lever (6) to UP position until hook (7) is 5 to 6 feet (1.5 to 1.8 m) above left rear fender (3), and boom (8) is approximately 45° above horizontal.
- (4) Move MAST control lever (9) to UP position until the mast (10) is fully erect and the cylinders are fully extended. Move BOOM control lever (6) UP simultaneously as required to maintain the boom (8) at approximately 45° above horizontal until the mast is fully erect. Hold the mast control lever to UP position for 2-3 seconds after mast is fully erect to ensure cylinders are fully filled with oil.
- (5) Operate crane with manual controls (para 2-63d and e) or remote controls (para 2-64d and e).

M984E1 General Operating Procedures (Cont)

*d. Rotate and Telescope Boom.*WARNING

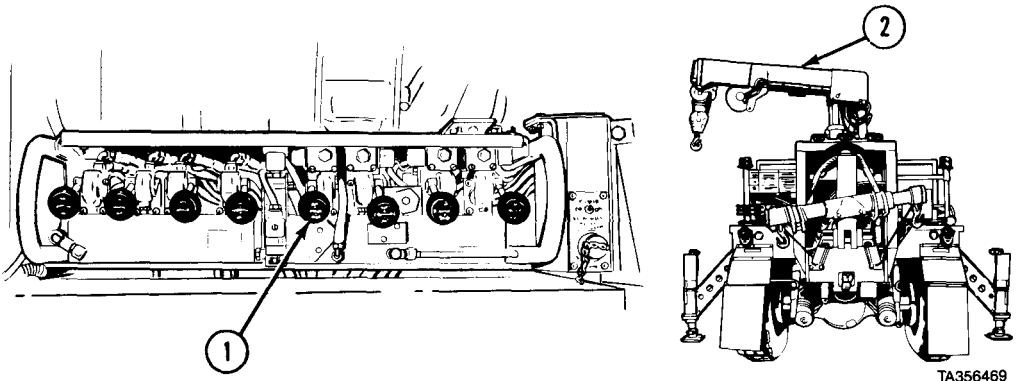
- Keep boom clear of all electrical lines and other obstacles while operating crane. Serious injury or death could result upon contact.
- Be sure that area is clear of personnel before moving SWING control lever. Boom should be swung slow enough so crane operator has complete control. If operator cannot see load during operation, operate crane from REMOTE CONTROL UNIT (para 2-64). Boom moving out of control could cause serious injury or death.
- Operator must keep control of load at all times. Load moving out of control could cause serious injury or death.

CAUTION

Boom must be above vehicle sides for clearance. Hitting side of vehicle with boom may cause damage to boom or vehicle. Material handling crane/boom will strike outrigger framework and tow A-frame during crane operations if the boom is depressed below horizontal.

NOTE

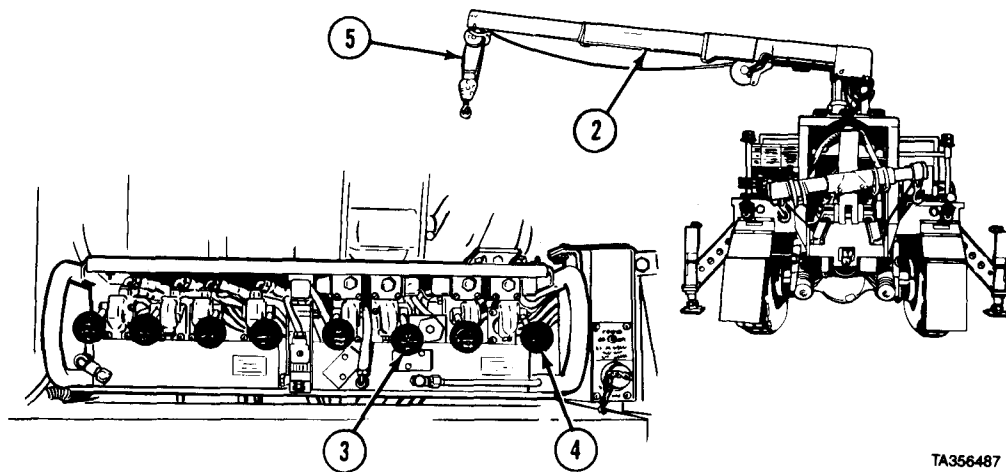
Operate control levers with light, even pressure. Moving lever slightly will cause slow movement of crane. Moving lever to full travel will cause faster movement of crane.



- (1) Move SWING control lever (1) to CW position to move boom (2) clockwise.
- (2) Move SWING control lever (1) to CCW position to move boom (2) counterclockwise.

M984E1 General Operating Procedures (Cont)

2-63. M984E1 CRANE OPERATION (MANUAL CONTROLS) (CONT).



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CAUTION

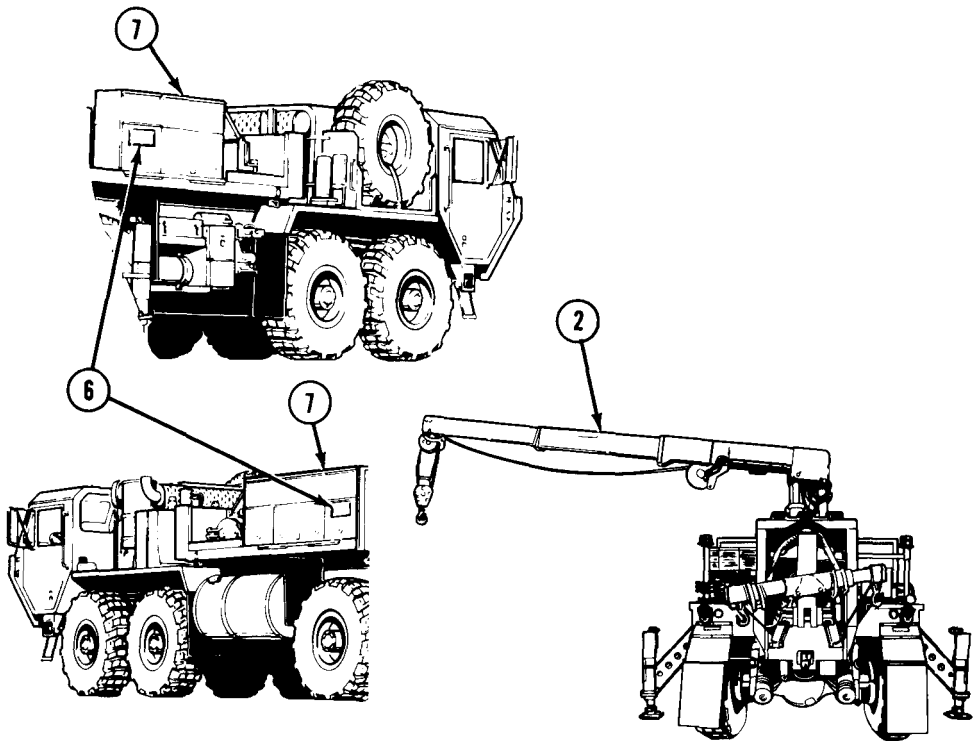
Keep hook block at least 1 ft (30 cm) from end of boom. If hook block hits end of boom it may damage cable or hook block and crane will lose power. Wait six seconds for power to return and check crane for damage.

NOTE

- When crane is overloaded, M984E1 overload system will automatically shut off power to telescope boom out, raise or lower boom, or hoist load any higher. Overload condition can be corrected by lowering load to ground or other supporting surface. All crane functions will be restored in approximately six seconds.
- TELESCOPE and HOIST control levers should be operated at same time.
- Crane movement from one lever may be slower than other when operating two levers together.

(3) Move TELESCOPE control lever (3) to OUT position to extend boom (2) and move HOIST control lever (4) to DOWN position to pay out cable (5).

M984E1 General Operating Procedures (Cont)



TA356488

CAUTION

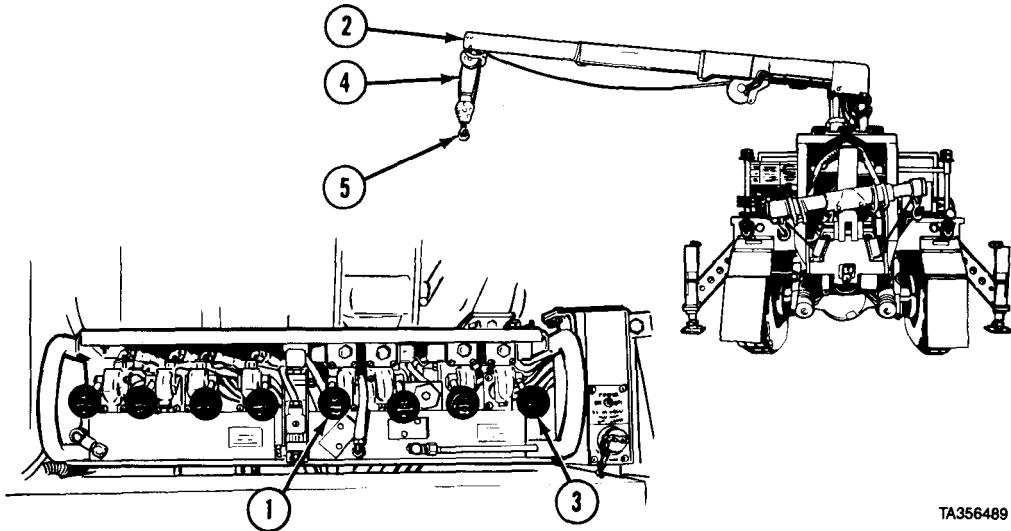
Do not go over maximum load rating as shown on RANGE DIAGRAM. Going over load ratings will cause damage to equipment.

- (4) Refer to RANGE DIAGRAMS (6) on equipment body (7) to raise boom (2) to correct angle before connecting to load.

M984E1 General Operating Procedures (Cont)

2-63. M984E1 CRANE OPERATION (MANUAL CONTROLS) (CONT).

e. *Raise and Lower Load.*



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WARNING

Be sure that area is clear of personnel before moving SWING control lever. Boom should be swung slow enough so crane operator has complete control. Boom moving out of control could cause serious injury or death.

CAUTION

- Do not let cable become slack or cable may get tangled on drum.
- Do not drag load sideways on ground or damage to crane may result.

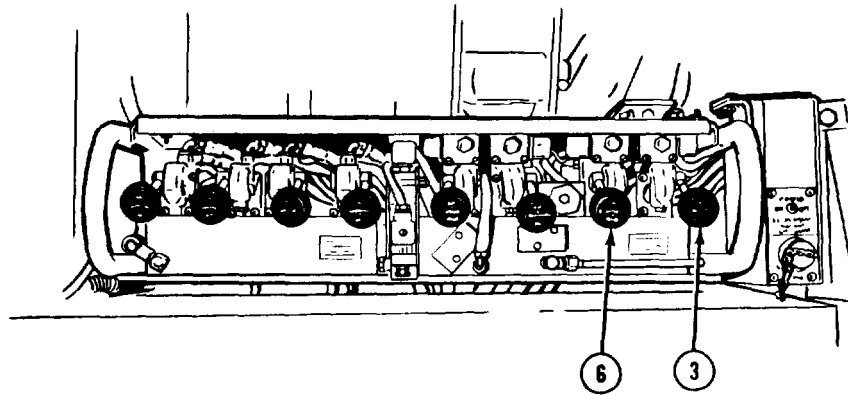
(1) Operate SWING control lever (1) and center end of boom (2) directly over load.

CAUTION

Release hook lock before connecting to load to avoid damage to hook lock.

(2) Operate HOIST control lever (3) to raise or lower cable (4) and connect load hook (5) to load.

M984E1 General Operating Procedures (Cont)

**WARNING**

Be sure there are at least two wraps of cable on hoist drum at all times. Serious injury or death could result if cable comes off hoist drum while lifting load.

CAUTION

- Do not jerk HOIST control lever or load will bounce causing possible damage to crane or load.
- Do not operate crane with boom below horizontal when there is a load on hook.
- For M984E1 maximum load limit is:
 - 6,000 lb at 18 ft 2 in. Radius (2700 kg at 5.5 m)
 - 8,000 lb at 16 ft 5 in. Radius (3600 kg at 5.0 m)
 - 12,000 lb at 11 ft 10 in. Radius (5400 kg at 3.6 m)
 - 14,000 lb at 9 ft 0 in. Radius (6300 kg at 2.7 m)

NOTE

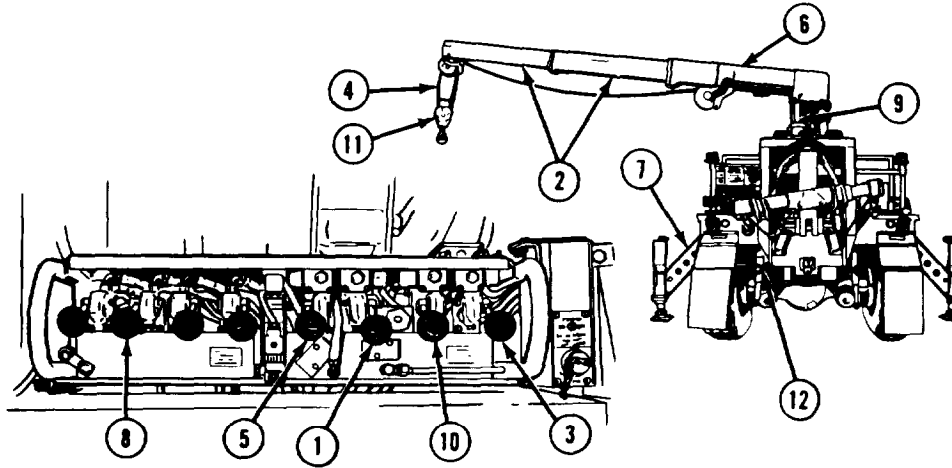
When crane is overloaded, M984E1 overload system will automatically shut off power to telescope boom out, raise or lower boom, or hoist load any higher. Overload condition can be corrected by lowering load to ground or other supporting surface. All crane functions will be restored in approximately six seconds.

- (3) Move HOIST control lever (3) in UP position to lift load. Move BOOM control lever (6) in UP position to raise load higher.
- (4) Move HOIST control lever (3) in DOWN position to lower load. Move BOOM control lever (6) in DOWN position to lower load further.
- (5) Shut down crane (para 2-630).

M994E1 General Operating Procedures (Cont)

2-63. M984E1 CRANE OPERATION (MANUAL CONTROLS) (CONT).

f. *Shut Down Crane.*



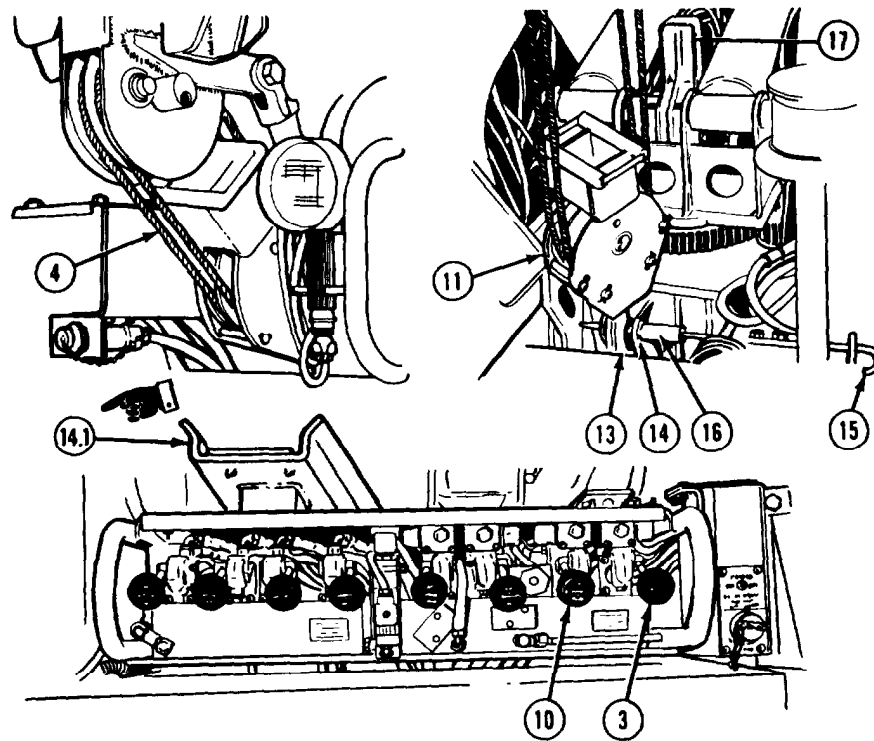
CAUTION

- Leave about 1 ft (30 cm) of cable between boom sheave and hook block when reeling in cable or damage to equipment could result.
- Do not let cable unwind and become slack or cable may get tangled on drum.
- Crane should be stowed using remote control to allow operator visibility during stowing or damage to equipment may result.

NOTE

- Operate control levers with light, even pressure.
 - TELESCOPE and HOIST control levers should be operated at same time.
 - Crane movement from one lever may be slower than the other when operating two levers together.
- (1) Move TELESCOPE control lever (1) to IN position to pull boom extensions (2) in and move HOIST control lever (3) to UP position to reel in cable (4) until boom extensions are fully retracted.
 - (2) Operate SWING control lever (5) to position boom (6) parallel with outrigger beam (7) on left side of vehicle.
 - (3) Move MAST control lever (8) to DOWN position to lower mast (9) until mast is completely folded down. Use BOOM control lever (10) simultaneously as required to maintain boom (6) at approximately 45° above horizontal until mast is completely folded down.
 - (4) Move BOOM control lever (10) to DOWN position until hook block (11) is directly above vehicle left frame rail (12).

M984E1 General Operating Procedures (Cont)

**NOTE**

Trucks with hook block stowage guide, perform step (5).
Trucks without hook block stowage guide, perform step (5.1).

- (5) Move HOIST control lever (3) to DOWN position to lower hook block (11) until load hook (13) fits into hook block stowage guide (14.1).
- (5.1) Move HOIST control lever (3) to DOWN position to lower hook block (11) until load hook (13) fits into stowage bracket (14).

NOTE

Be sure lockpin is fully engaged in hook and stowage bracket.

- (6) Pull lockpin handle (15), turn and release handle so lockpin (16) slides through load hook (13).

NOTE

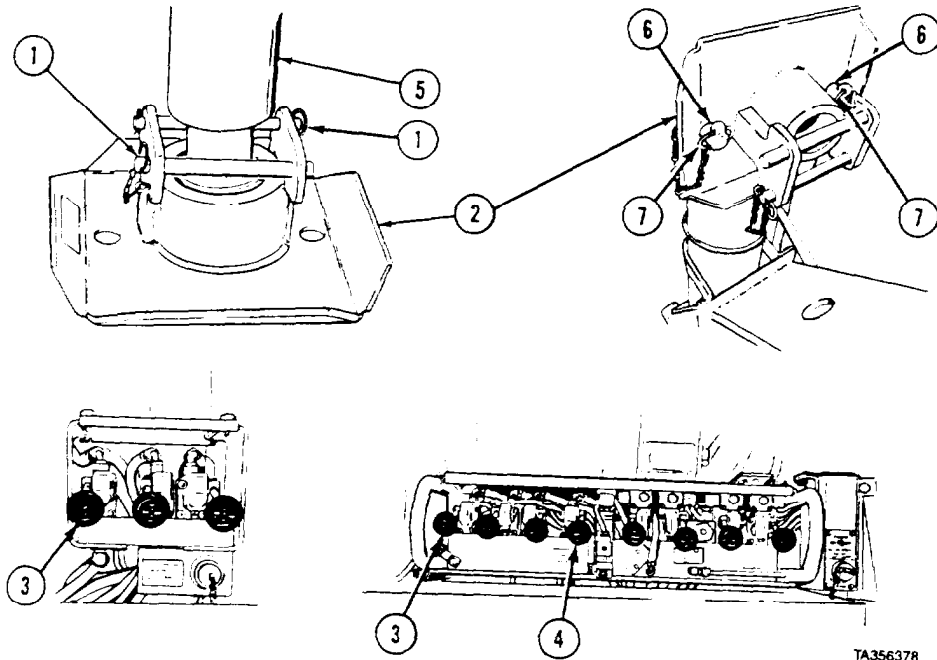
- Operate BOOM and HOIST control levers at the same time.
- Crane movement from one lever may be slower than the other when operating two levers together.

- (7) Move BOOM control lever (10) to DOWN position until boom rests on mast pad (17) and move HOIST control lever (3) to UP position to remove slack from cable (4).

M984E1 General Operating Procedures (Cont)

2-63. M984E1 CRANE OPERATION MANUAL CONTROLS (CONT).

g. Stow Outriggers.



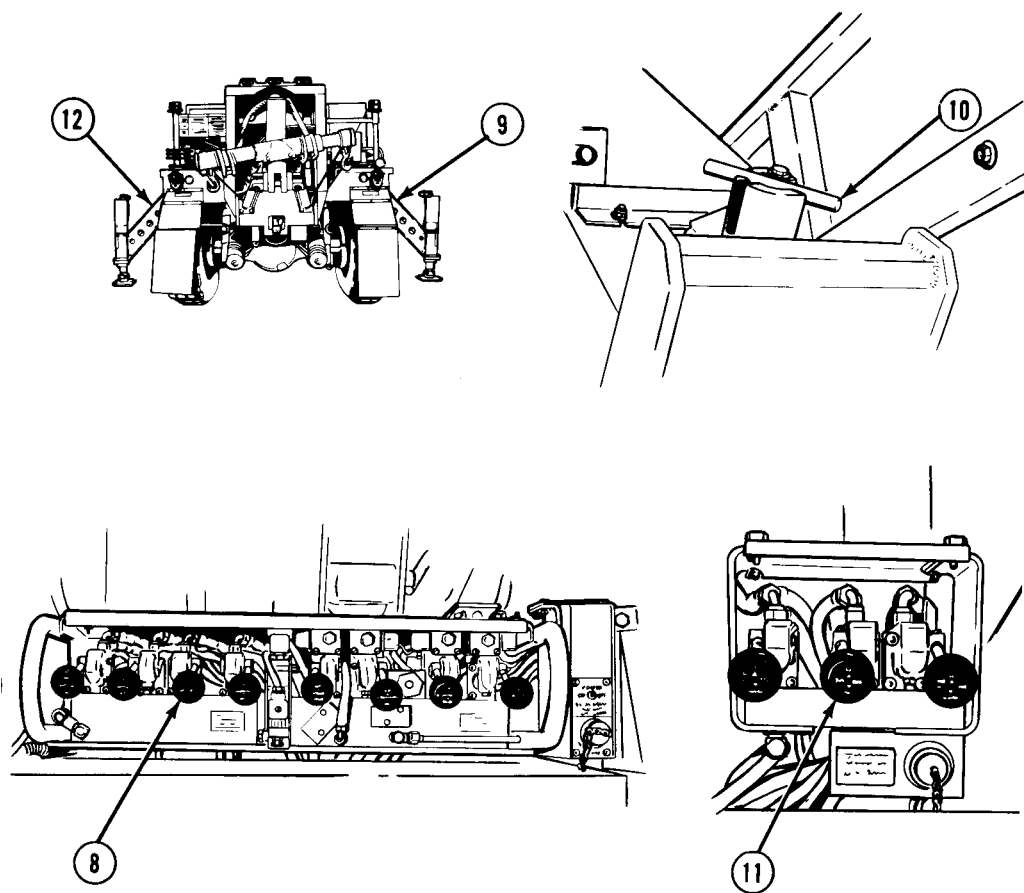
(1) Remove two retaining pins (1) from each outrigger pad (2).

NOTE

Operate left and right outrigger jack (LH O/R JACK and RH O/R JACK) levers at the time until both outrigger jack cylinders are out pads.

- (2) Move left outrigger jack (LH O/R JACK) and right outrigger jack (RH O/R JACK) control levers (3 and 4) to UP position to retract outrigger jack cylinder (5) completely.
- (3) Install two retaining pins (1) outrigger pads
- (4) Stow outrigger pads (2) on studs (6).
- (5) Install safety pins (7) through stud (6).

M984E1 General Operating Procedures (Cont)



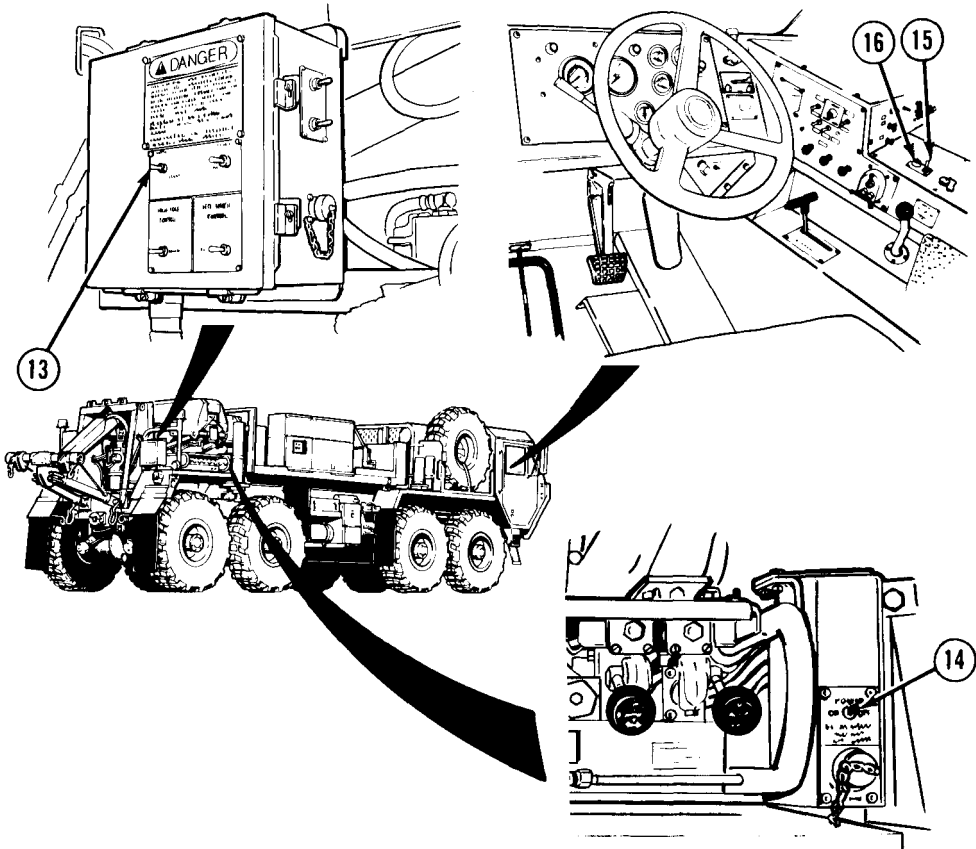
WARNING

Keep hands and body away from outrigger beams while operating lever to avoid injury.

- (6) Move right outrigger extension (O/R EXT) control lever (8) to IN position to retract outrigger beam (9) completely.
- (7) Turn and push down outrigger lockpin (10) until lockpin is seated in outrigger beam.
- (8) Move left outrigger extension (O/R EXT) control lever (11) to IN position to retract outrigger beam (12) completely.
- (9) Turn and push down outrigger lockpin (10) until lockpin is seated in outrigger beam.

M984E1 General Operating Procedures (Cont)

2-63. M984E1 CRANE OPERATION (MANUAL CONTROLS) (CONT).



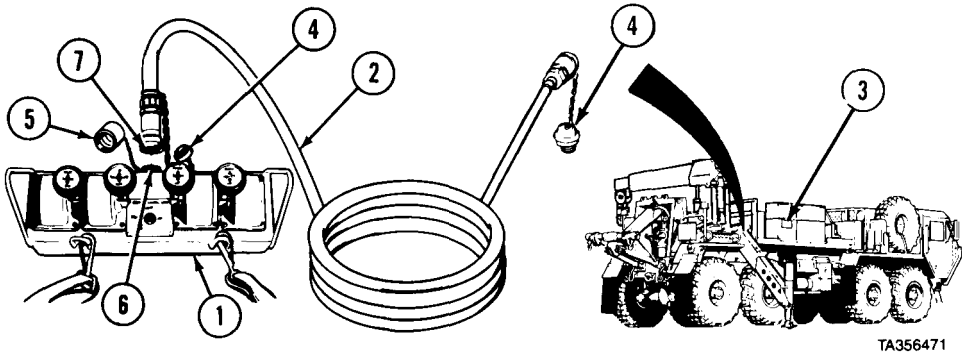
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- (10) Push POWER switch (13) to OFF position.
- (11) Push ON/OFF POWER switch (14) to OFF position.
- (12) Push PTO ENGAGE switch (15) to OFF position. Indicator light (16) should go out.
- (13) Shut off engine (para 2-11p).

M984E1 General Operating Procedures (Cont)

2-64. M984E1 CRANE OPERATION (REMOTE CONTROLS).

a. Set Up REMOTE CONTROL UNIT.

WARNING

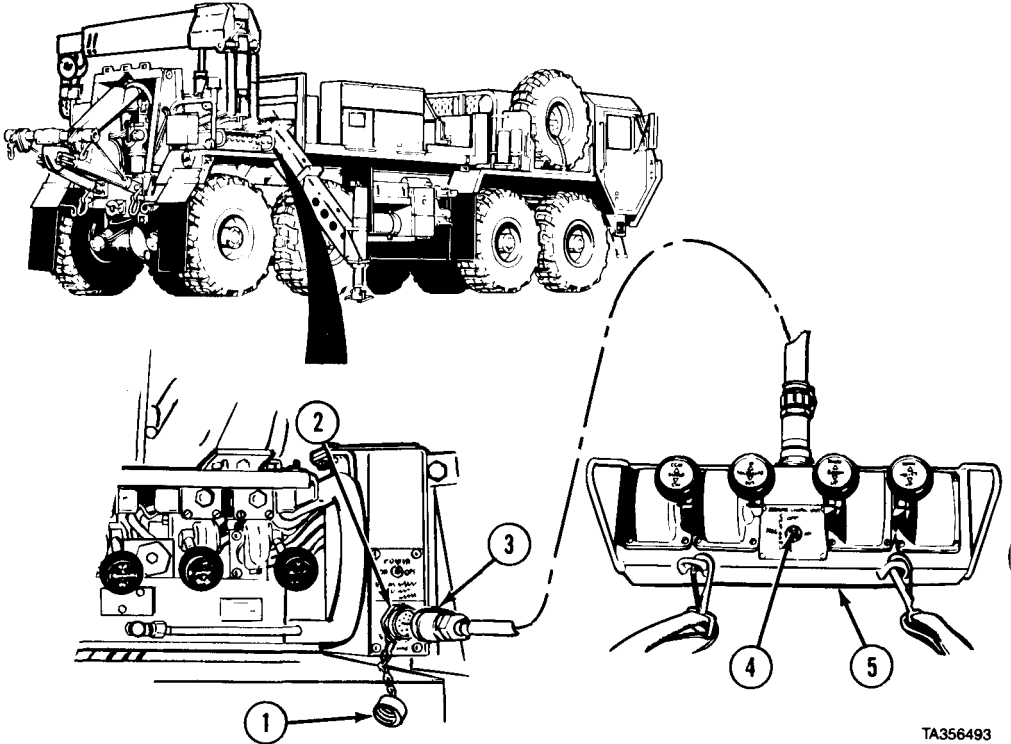
- Operate crane from left or right remote control station if operator will not be able to see load at all times during crane operation. Boom and load moving out of control could cause serious injury or death.
- Excessive noise levels are present any time the heavy-duty winch or crane is operating. Wear single hearing protection (earplugs or equivalent) while working around equipment while it is running. Failure to do so could result in damage to your hearing. Seek medical aid should you suspect a hearing problem.

- (1) Prepare crane for use (para 2-63a).
- (2) Set up outriggers (para 2-63b).
- (3) Raise boom and mast to operating position (para 2-63c).
- (4) Remove REMOTE CONTROL UNIT (1) and cable (2) from stowage box (3).
- (5) Remove covers (4) from cable (2) and cover (5) from REMOTE CONTROL UNIT receptacle (6). Clean any dirt or water from receptacle.
- (6) Clean any dirt or water from cable connector (7).
- (7) Connect cable connector (7) to REMOTE CONTROL UNIT receptacle (6).

M984E1 General Operating Procedures (Cont)

2-64. M984E1 CRANE OPERATION (REMOTE CONTROLS) (CONT).

b. Connect Remote Control Unit to Right Outlet.



- (1) Remove cover (1) from REMOTE CONTROL CONNECTOR outlet (2) and clean any dirt or water from outlet.

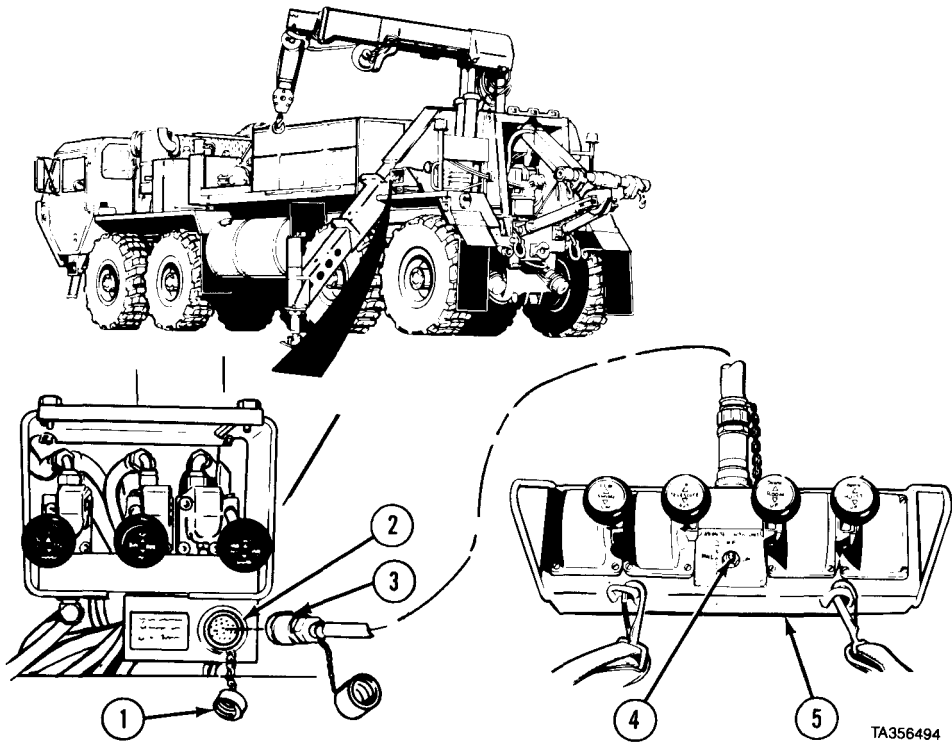
WARNING

Make sure ON/OFF/MHC-SHUTDOWN power switch is in OFF position before connecting REMOTE CONTROL UNIT. Crane moving out of control could cause serious injury or death.

- (2) Clean any dirt or water from remote control cable connector (3) and connect connector to REMOTE CONTROL CONNECTOR outlet (2).
(3) Turn ON/OFF/MHC-SHUTDOWN power switch (4) on REMOTE CONTROL UNIT (5) to ON position.
(4) Operate crane (para 2-64d and e).

M984E1 General Operating Procedures (Cont)

c. Connect Remote Control Unit to Left Outlet.



- (1) Remove cover (1) from REMOTE CONTROL CONNECTOR outlet (2) and clean any dirt or water from outlet.

WARNING

Make sure ON/OFF/MHC-SHUTDOWN power switch is in OFF position before connecting REMOTE CONTROL UNIT. Crane moving out of control could cause serious injury or death.

- (2) Clean any dirt or water from cable connector (3) and connect connector to REMOTE CONTROL CONNECTOR outlet (2).
 (3) Turn ON/OFF/MHC-SHUTDOWN power switch (4) on REMOTE CONTROL UNIT (5) to ON position.
 (4) Operate crane (para 2-64d and e).

M984E1 General Operating Procedures (Cont)

2-64. M984E1 CRANE OPERATION (REMOTE CONTROLS) (CONT).

d. *Rotate and Telescope Boom.*

WARNING

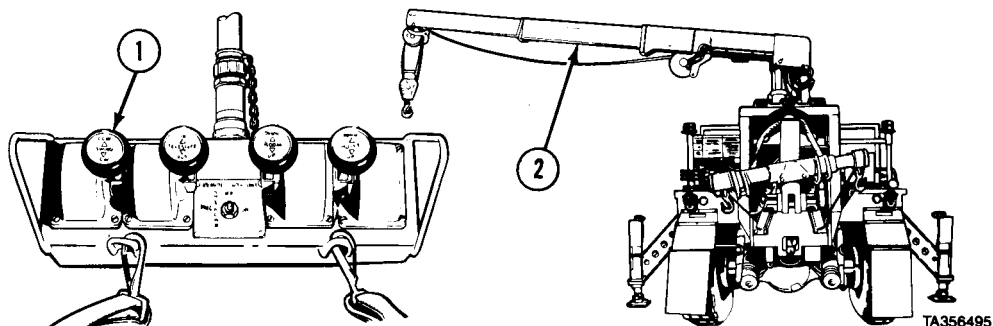
- Keep boom clear of electrical lines and other obstacles while operating crane. Serious injury or death could result upon contact.
- Be sure that area is clear of personnel before moving SWING control lever. Boom should be swung slow enough so crane operator has complete control. If operator cannot see load during operation, operate crane from REMOTE CONTROL UNIT (para 2-64). Boom moving out of control could cause serious injury or death.
- Operator must keep control of load at all times. Load moving out of control could cause serious injury or death.
- If electrical power fails during crane operation, move switch on REMOTE CONTROL UNIT to SHUTDOWN position. Serious injury could result from uncontrolled crane movement.

CAUTION

Boom must be above vehicle sides for clearance. Hitting side of vehicle with boom may cause damage to boom or vehicle. Material handling crane/boom will strike outrigger framework and tow A-frame during crane operations if the boom is depressed below horizontal.

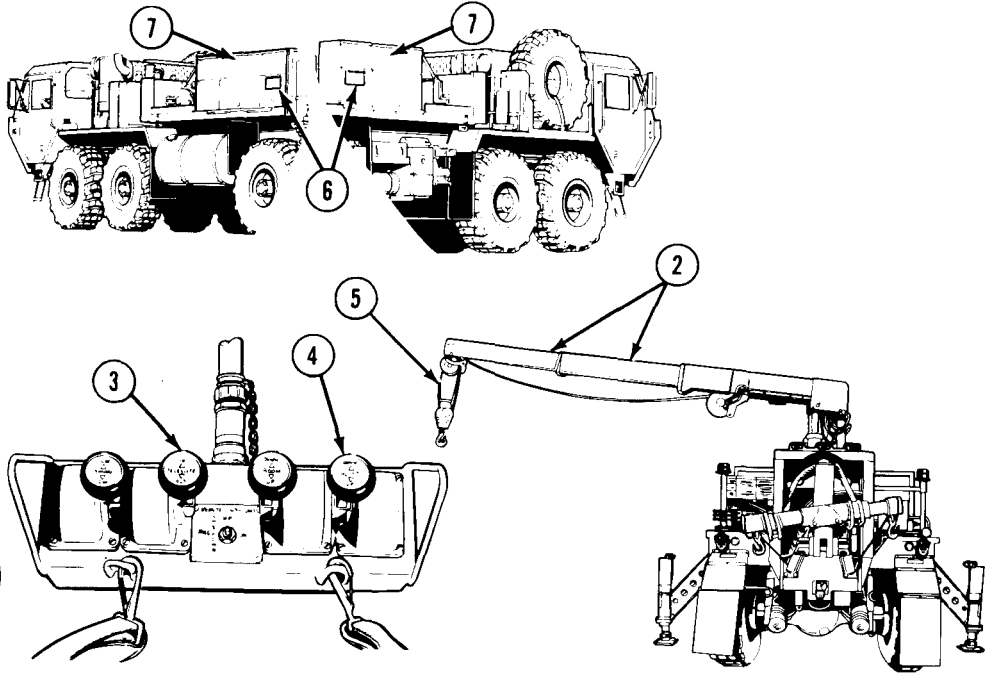
NOTE

Operate control levers with light, even pressure. Moving lever slightly will cause slow movement of crane. Moving lever to full travel will cause faster movement of crane.



M984E1 General Operating Procedures (Cont)

- (1) Move SWING control lever (1) to CW position to move boom (2) clockwise.
- (2) Move SWING control lever (1) to CCW position to move boom (2) counterclockwise.



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CAUTION

Keep hook block at least 1 ft (30 cm) from end of boom. If hook block hits end of boom it may damage cable or hook block and crane will lose power. Wait six seconds for power to return and check crane for damage.

NOTE

- TELESCOPE and HOIST control levers should be operated at same time.
 - Crane movement from one lever may be slower than other when operating two levers together.
- (3) Move TELESCOPE control lever (3) to OUT position to extend boom (2) and move HOIST control lever (4) to DOWN position to pay out cable (5).

CAUTION

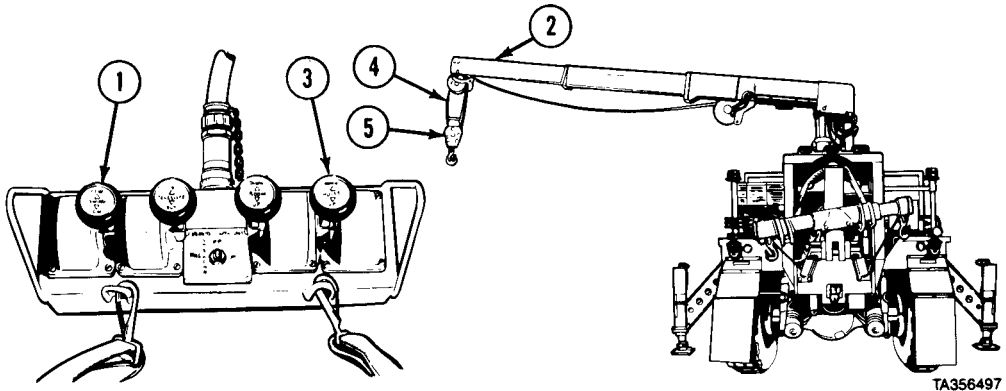
Do not go over maximum load rating as shown on RANGE DIAGRAM. Going over load ratings could cause damage to equipment.

- (4) Refer to RANGE DIAGRAM (6) on equipment body (7) to raise boom (2) to correct angle before connecting to load.

M984E1 General Operating Procedures (Cont)

2-64. M984E1 CRANE OPERATION (REMOTE CONTROLS) (CONT)

e. Rake and Lower Load.



WARNING

Be sure that area is clear of personnel before moving SWING control lever. Boom should be swung slow enough so crane operator has complete control. Boom moving out of control could cause serious injury or death.

CAUTION

- Do not let cable become slack. Cable may get tangled on drum and damage cable.
- Do not drag load sideways on ground. Dragging load could cause damage to crane.

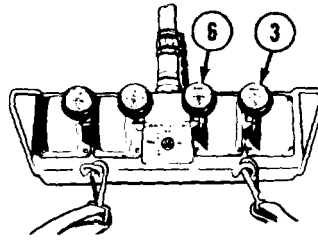
- (1) Operate SWING control lever (1) and center end of boom (2) directly over load.

CAUTION

Release hook lock before connecting load to avoid damage to hook lock.

- (2) Operate HOIST control lever (3) to raise or lower cable (4) and connect load hook (5) to load.

M984E1 General Operating Procedures (Cont)



WARNING

Be sure there are at least two wraps of cable on hoist drum at all times. Serious injury or death could result if cable comes off hoist drum while lifting load.

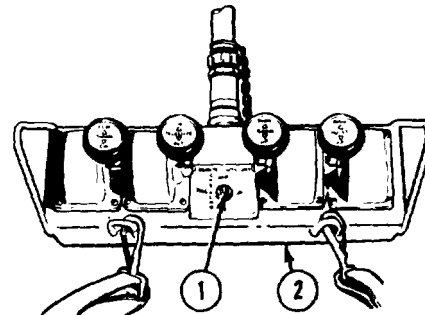
CAUTION

- Do not jerk HOIST control lever or load will bounce causing possible damage to crane or load.
- Do not operate crane with boom below horizontal when there is a load on hook.
- For M984E1 maximum load limit is:
 - 6,000 lb at 18 ft 2 in. Radius (2700 kg at 5.5 m)
 - 8,000 lb at 16 ft 5 in. Radius (3600 kg at 5.0 m)
 - 12,000 lb at 11 ft 10 in. Radius (5400 kg at 3.6 m)
 - 14,000 lb at 9 ft 0 in. Radius (6300 kg at 2.7 m)
- Do not go over maximum load limit. Going over maximum load limit will cause electrical shutdown for six seconds or until load is lowered.

- (3) Move HOIST control lever (3) to UP position to lift load. Move BOOM control lever (6) to UP position to raise load higher.
- (4) Move HOIST control lever (3) to DOWN position to lower load. Move BOOM control lever (6) to DOWN position to lower load further.

f. **Shut Off Switches.**

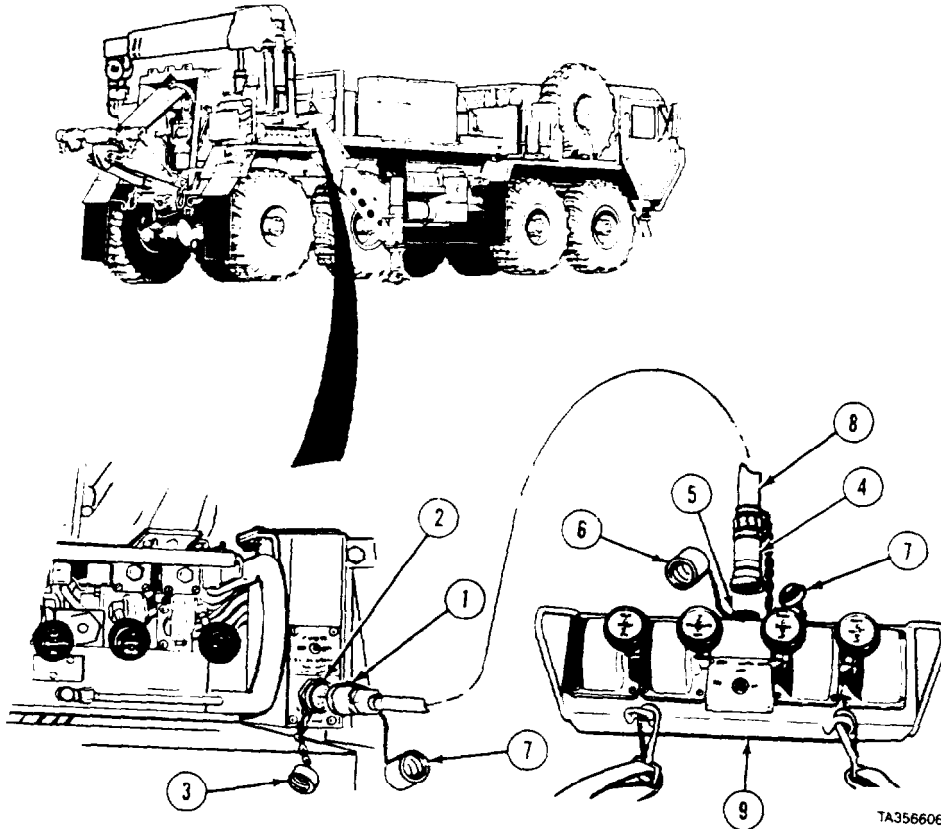
- (1) Put ON/OFF/MHC-SHUTDOWN power switch (1) on REMOTE CONTROL UNIT (2) in OFF position.
- (2) Disconnect REMOTE CONTROL UNIT (2) from right remote control station (para 2-64g) or from left remote control station (para 2-64h).



M984E1 General Operating Procedures (Cont)

2-64. M984E1 CRANE OPERATION (REMOTE CONTROLS) (CONT)

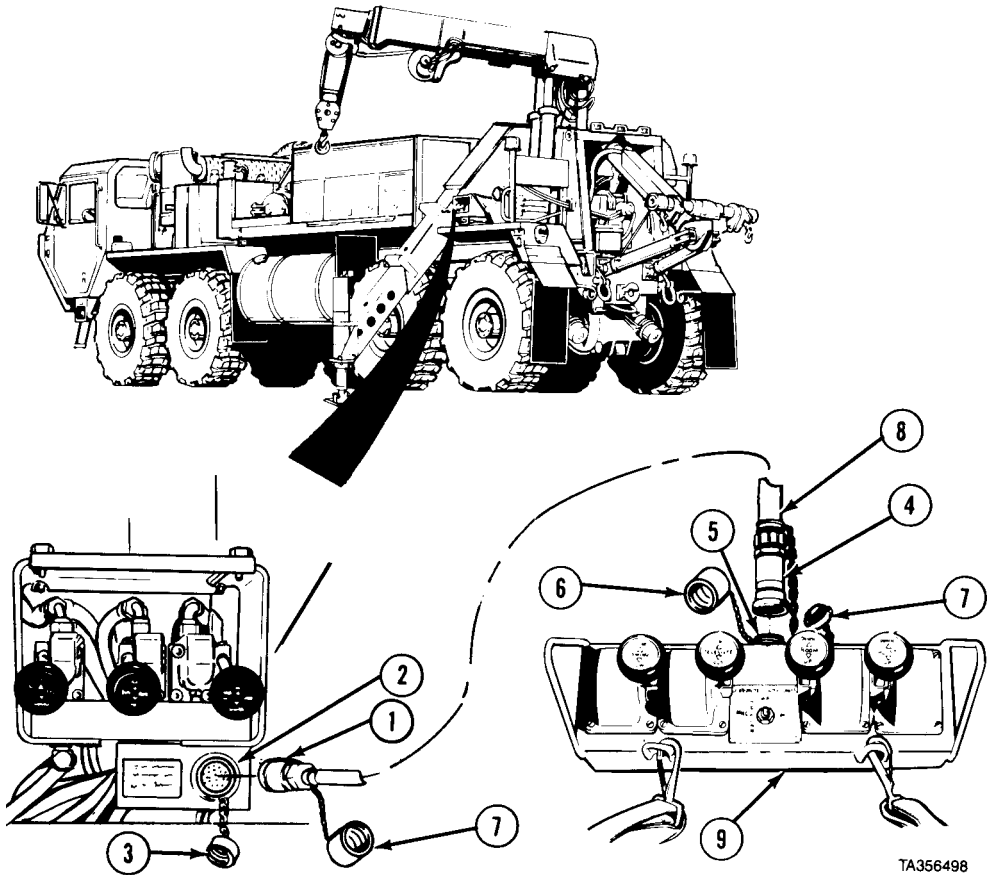
9. *Disconnect Remote Control Unit from Right Out/et.*



- (1) Disconnect cable connector (1) from REMOTE CONTROL CONNECTOR outlet (2) and install cover (3) on REMOTE CONTROL CONECTOR outlet.
- (2) **Disconnect Cable** connector (4) from REMOTE CONTROL UNIT receptacle (5) and install cover (6) on REMOTE (CONTROL UNIT receptacle.
- (3) Install covers (7) on cable (8) and coil cable.
- (4) Put REMOTE CONTROL UNIT (9) and cable (8) in stowage.
- (5) Shut down crane (para 2-63f).
- (6) Stow outriggers (para 2-63g).

M984E1 General Operating Procedures (Cont)

h. Disconnect Remote Control Unit From Left Outlet.



TA356498

- (1) Disconnect cable connector (1) from left REMOTE CONTROL CONNECTOR outlet (2). Install cover (3) on REMOTE CONTROL CONNECTOR outlet.
- (2) Disconnect cable connector (4) from REMOTE CONTROL UNIT receptacle (5) and install cover (6) on REMOTE CONTROL UNIT receptacle.
- (3) Install covers (7) on cable (8) and coil cable.
- (4) Put REMOTE CONTROL UNIT (9) and cable (8) in stowage.
- (5) Shut down crane (para 2-63f).
- (6) Stow outriggers (para 2-63g).

M984E1 General Operating Procedures (Cont)

2-65. HEAVY-DUTY WINCH OPERATION (M984E1).

a. Prepare to Operate Heavy-duty Winch.

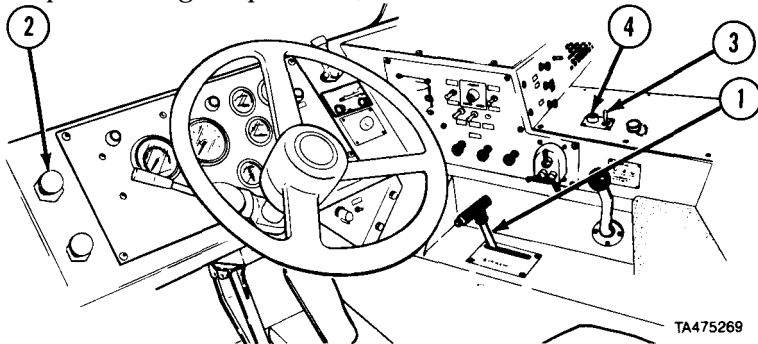
WARNING

Excessive noise levels are present any time the heavy-duty winch or crane is operating. Wear single hearing protection (earplugs or equivalent) while working around equipment while it is running. Failure to do so could result in damage to your hearing. Seek medical aid should you suspect a hearing problem.

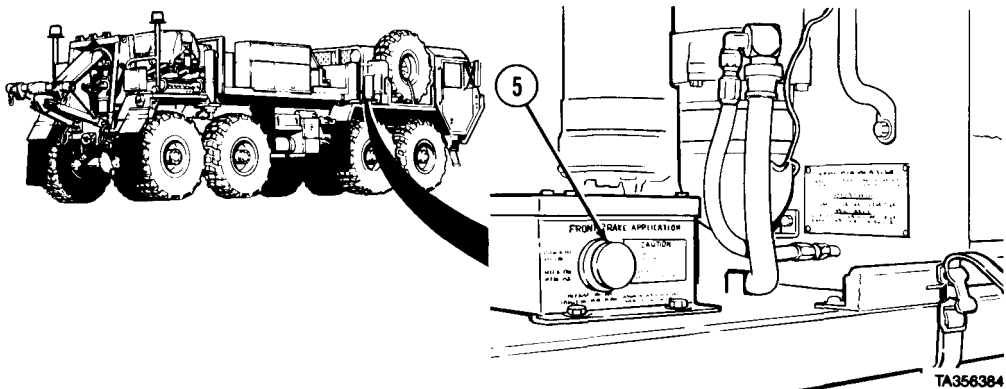
NOTE

Operation of heavy-duty winch is a two-soldier task.

- (1) Start engine (para 2-11a or 2-11b).
- (2) Position vehicle on solid ground so tires have good traction. Position vehicle for straight pull if possible.
- (3) Put transmission range selector (1) in N (neutral) position and pull PARKING BRAKE control knob (2).
- (4) Set up beacon lights (para 2-62).

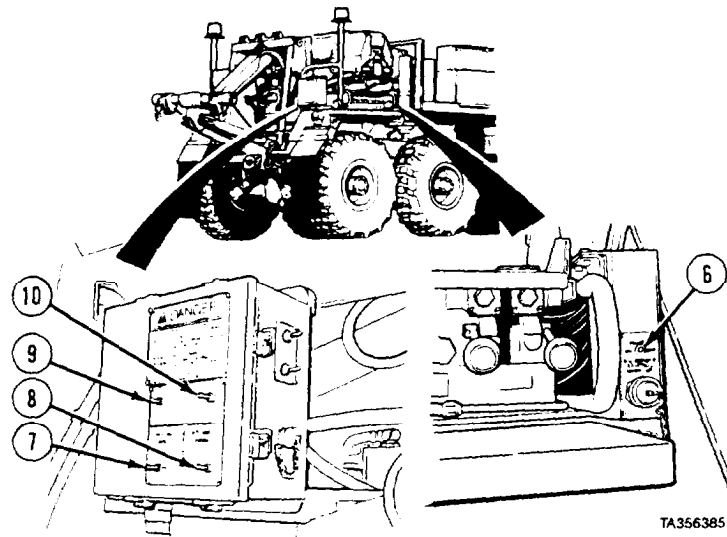


- (5) Set PTO ENGAGE switch (3) to ON. Indicator light (4) should come on.

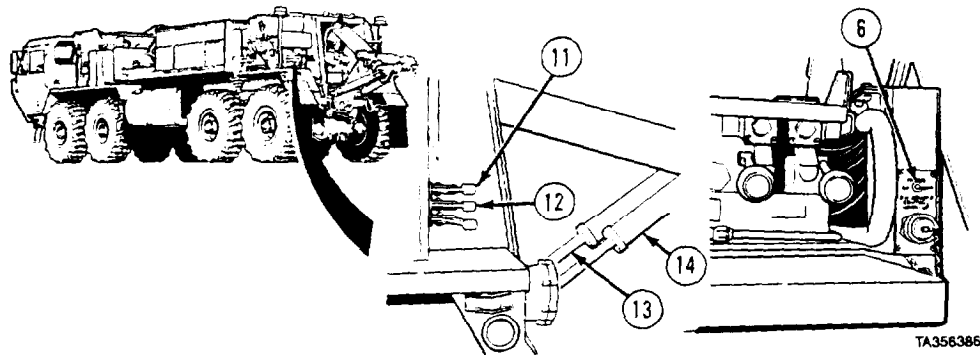


- (6) Push FRONT BRAKE APPLICATION knob (5).

M984E1 General Operating Procedures (Cont)



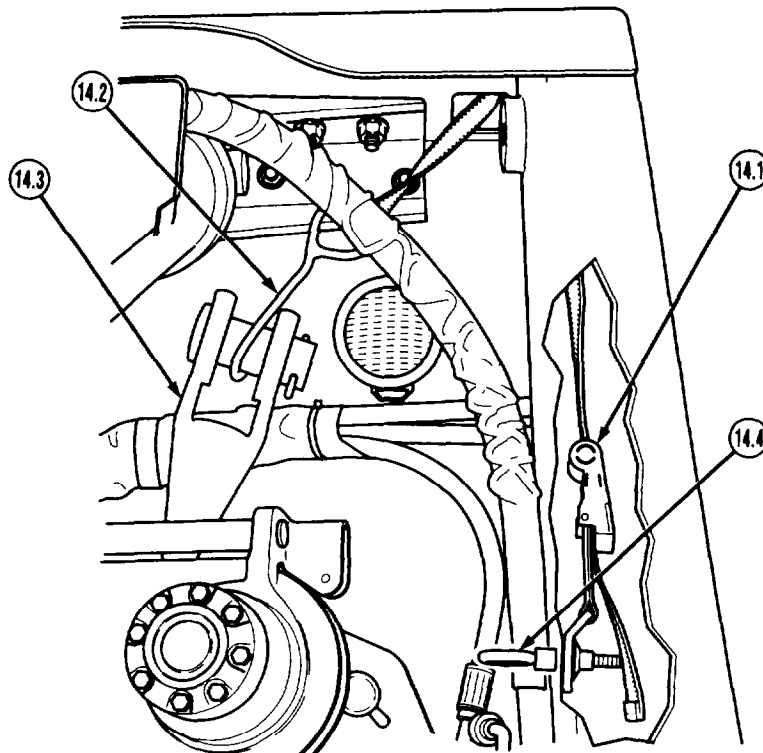
- (7) Set ON/OFF POKER switch (6) to US.
- (8) Set HIGH IDLE CONTROL switch (7) to CONTINOUS.
- (9) Set H.D. WINCH CONTROL switch (8) to OFF.
- (10) Set POWER switch (9) to ON.
- (11) Push LATCH switch (10) to ON and release. Engine idle should increase to approximately 1500 rpm.



- (12) Pull RIGHT TOW CYLINDER control lever (11) and LEFT TOW CYLINDER control Lever (12) to fully extend right tow cylinder (13) and left tow cylinder (14).
- (13) Set ON /OFF POWER switch (6) to OFF.

M994E1 General Operating Procedures (Cont)

2-65. HEAVY-DUTY WINCH OPERATION (M984E1) (CONT).



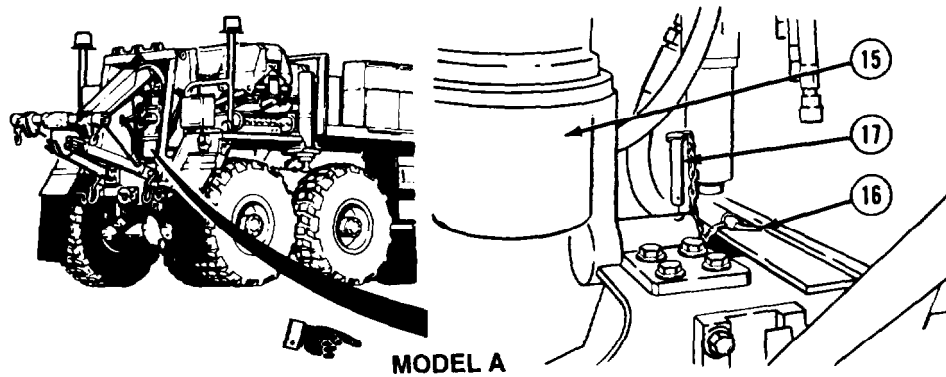
NOTE

- Model A and Model B cables contain a winch clevis.
- Model B has a winch clevis tiedown. Do steps (13.1) and (13.2) for Model B.

- (13.1) Loosen ratchet (14.1) and remove hook (14.2) from winch clevis (14.3).
(13.2) Stow tiedown by inserting hook (14.2) in eyebolt (14.4) and tightening ratchet (14.1).

M994E1 General Operating Procedures (Cont)

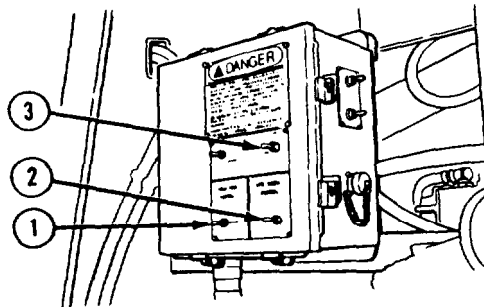
b. Payout Cable, Connect, and Recovery.



WARNING

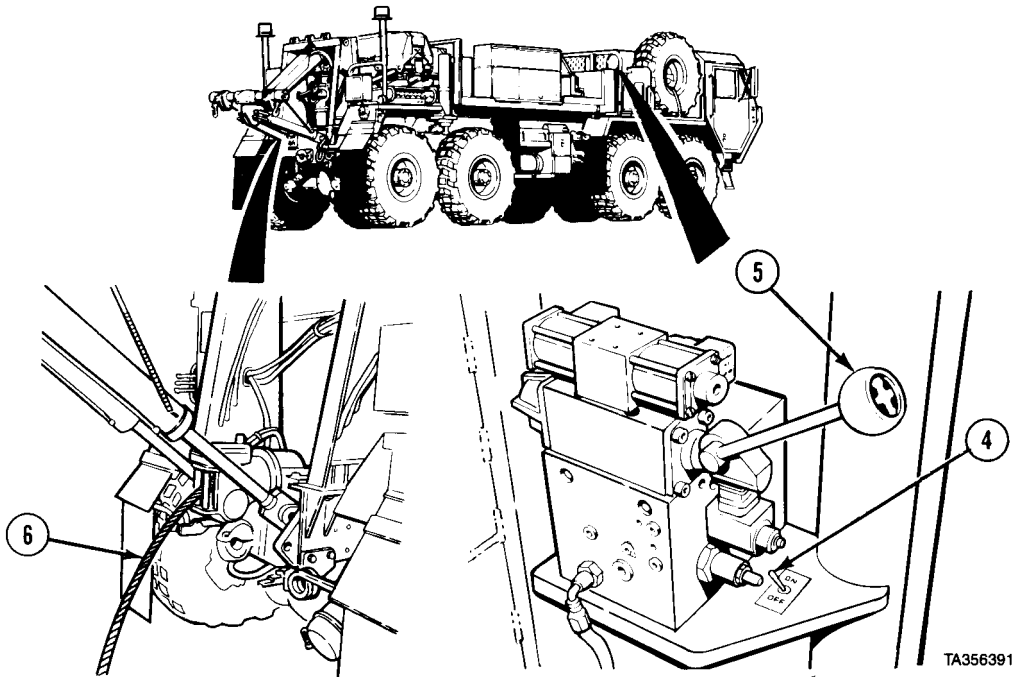
Fairlead/tensioner is very heavy and rotates. Hold tight while lowering. Do not stand in path of fairlead/tensioner while lowering. Falling fairlead/tensioner could cause serious injury or death.

- (14) Soldier A holds fairlead/tensioner (15) in place while Soldier B removes two quick pins (16) and pins (17).
- (15) Soldier A and Soldier B lower fairlead/tensioner (15).
- (16) Install two pins (17) and quick pins (16).



- (1) Set HIGH IDLE CONTROL switch (1) to H.D. WINCH.
- (2) Set H.D. WINCH CONTROL switch (2) to MANUAL.
- (3) Push LATCH switch (3) to ON and release.

M984E1 General Operating Procedures (Cont)



- (4) Set HIGH IDLE switch (4) to ON. Engine idle should increase to approximately 1500 rpm.

WARNING

- Always wear heavy gloves when handling winch cable. Never let cable run through hands. Frayed cable can cut severely.
- Do not operate winch with heavy-duty winch drum guard open.
- Do not place hands or feet near heavy-duty winch drum or fairlead/tensioner sheave during heavy-duty winch operation.

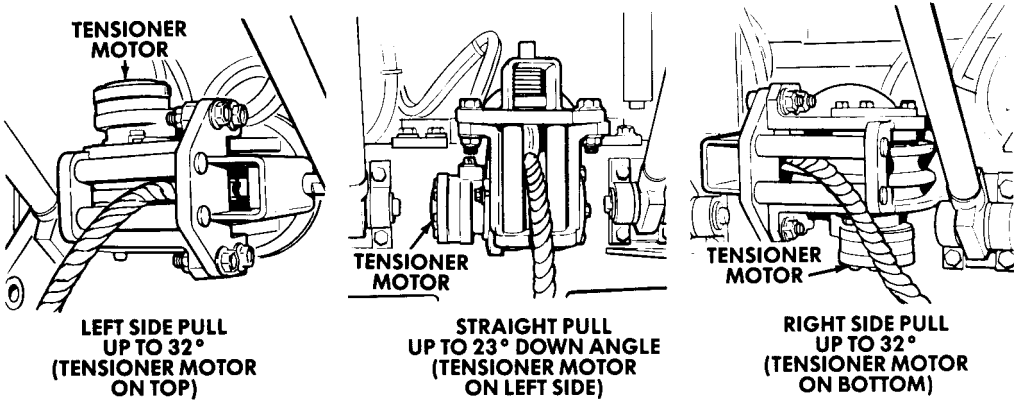
CAUTION

Do not allow other vehicles to run over heavy-duty winch cable. Heavy-duty winch cable may be damaged.

- (5) Soldier A moves WINCH control lever (5) to OUT and pays out winch cable (6) while Soldier B routes cable to mired vehicle.
 (6) Set HIGH IDLE switch (4) to OFF.

M984E1 General Operating Procedures (Cont)

2-65. HEAVY-DUTY WINCH OPERATION (M984E1) (CONT).



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Position fairlead/tensioner for type of pull being made.

CAUTION

Always be sure there are at least seven wraps of cable on winch drum. If there are less than seven wraps of cable on winch drum, cable may come loose and damage equipment.

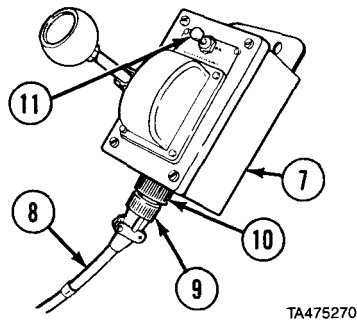
- (8) Check that there are at least seven wraps of winch cable on winch. If there are not at least seven wraps of winch cable left on winch, move recovery vehicle closer to mired vehicle and continue recovery or shut down winch (para 2-65c).

Table 2-8. Heavy-Duty Winch Pull Capacity

Winch Type	Cable Layer	Cable on Drum (ft)	Capacity (lb)
60,000 lb	1	0-48	60,000
	2	49-105	49,780
	3	106-172	42,545
	4	173-250	37,140

- (9) Make sure weight of mired vehicle and amount of winch cable left on winch does not go over pull capacity (FM 20-22 and Table 2-8).
- (10) If 60-ton tackle block must be used for recovery, attach 60-ton tackle block to disabled vehicle and winch cable (para 2-67). Connect end of winch cable to rear tow eye of M984E1, another vehicle, or other heavy object (FM 20-22).
- (11) Connect winch cable to mired vehicle.

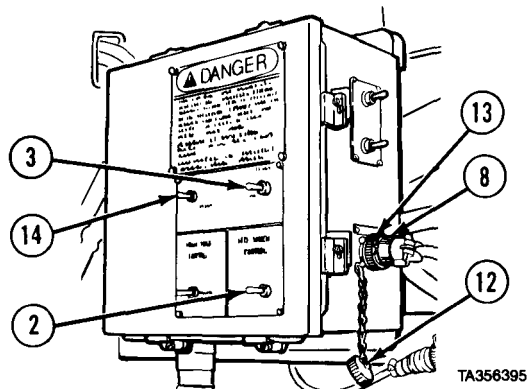
M984E1 General Operating Procedures (Cont)



NOTE

Determine if winch will be operated with manual or remote control. For manual control operation go to step (17). For remote control operation continue with step (12).

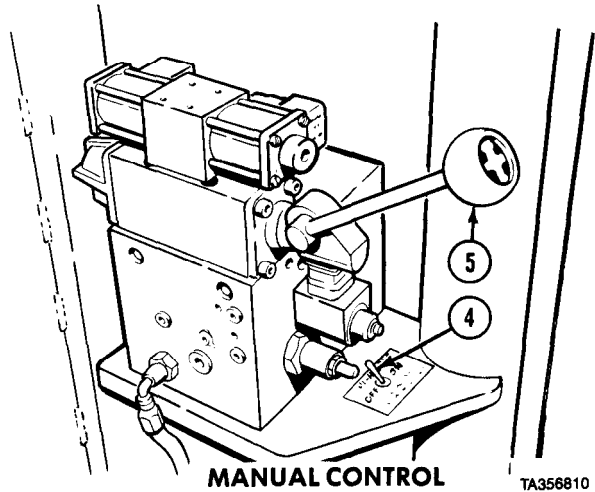
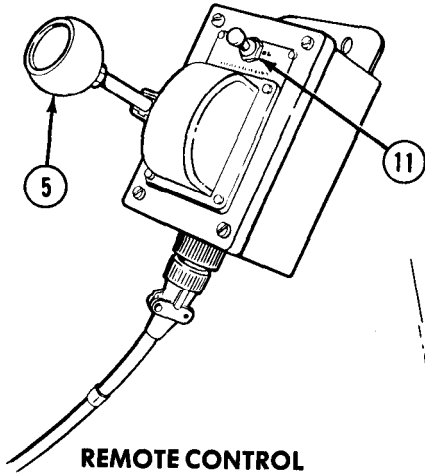
- (12) Remove HEAVY DUTY WINCH REMOTE CONTROL (7) and remote control cable (8) from stowage.
- (13) Clean any dirt and water from cable ends (9) and receptacle (10).
- (14) Connect remote control cable (8) to HEAVY DUTY WINCH REMOTE CONTROL (7). Check that HEAVY DUTY WINCH switch (11) is set to OFF.



- (15) Remove cover (12) from receptacle (13). Clean any dirt or water from receptacle.
- (16) Connect remote control cable (8) to receptacle (13).
- (17) Set POWER switch (14) to ON (LOW IDLE ONLY).
- (18) Push and release LATCH switch (3) to ON.
- (19) When using remote control, set H.D. WINCH CONTROL switch (2) to REMOTE. When using manual control, set H.D. WINCH CONTROL switch to MANUAL.

M984E1 General Operating Procedures (Cont)

2-65. HEAVY-DUTY WINCH OPERATION (M984E1) (CONT)



- (20) When using remote control, set HEAVY DUTY WINCH switch (11) to ON. When using manual control, set HIGH IDLE switch (4) to ON.

WARNING

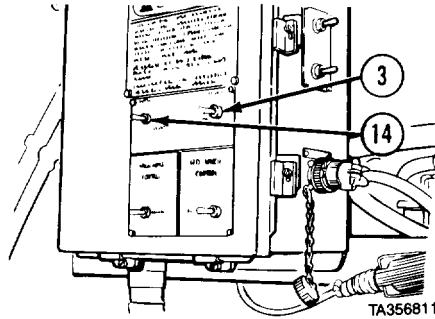
- Keep all personnel clear of area when tension is on winch cable. If winch cable comes loose or breaks, winch cable can cause serious injury or death.
- Keep recovery vehicle in stable position at all times. Do not allow any tire to raise off ground. Vehicle could turn over causing serious injury or death.

CAUTION

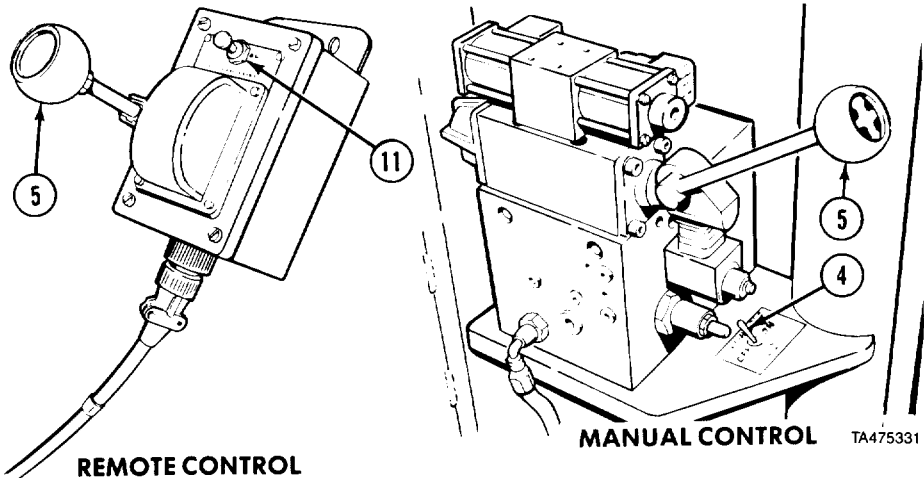
Apply power gradually to avoid high impact loading of winch cable.

- (21) Move WINCH control lever (5) to IN and slowly tighten winch cable.
(22) When using remote control, set HEAVY DUTY WINCH switch (11) to OFF. When using manual control, set HIGH IDLE switch (4) to OFF.

M984E1 General Operating Procedures (Cont)



- (23) Set POWER switch (14) to ON.
- (24) Push LATCH switch (3) to ON and release.



- (25) Make sure recovery area is clear of personnel.

NOTE

Recheck your rigging.

- (26) When using remote control, set HEAVY DUTY WINCH switch (11) to ON. When using manual control, set HIGH IDLE switch (4) to ON. Engine idle should increase to approximately 1500 rpm.

NOTE

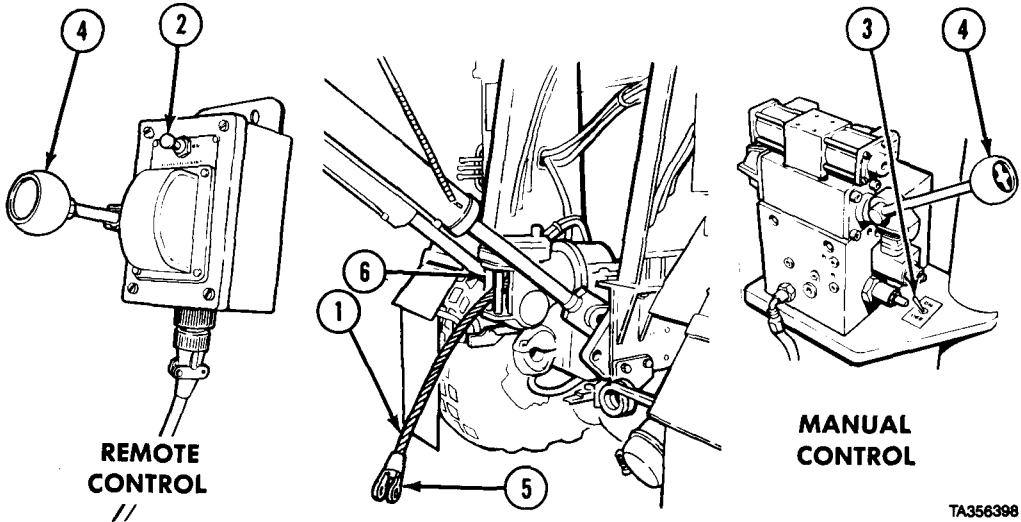
If M984E1 tires do not provide enough traction to recover mired vehicle, use tow spades (para 2-66).

- (27) Move WINCH control lever (5) to IN and recover mired vehicle.
- (28) When mired vehicle is fully recovered, move WINCH control lever (5) to OUT to allow enough slack in winch cable to disconnect.
- (29) When using remote control, set HEAVY DUTY WINCH switch (11) to OFF. When using manual control, set HIGH IDLE switch (4) to OFF.
- (30) If tow spades were used, remove and stow tow spades (para 2-66b).

M984E1 General Operating Procedures (Cont)

2-65. HEAVY-DUTY WINCH OPERATION (M984E1) (CONT)

c. Disconnect and Stow.



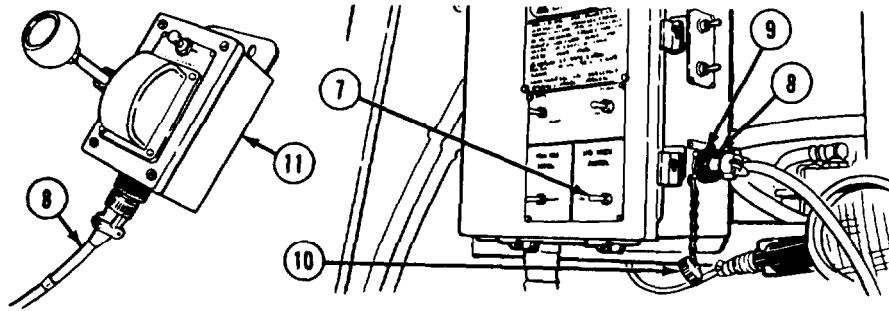
- (1) Disconnect winch cable (1) from M984E1, another vehicle, or other heavy object (FM 20-22).
- (2) Disconnect 60-ton tackle block from winch cable (1) (para 2-67b) and disabled vehicle.
- (3) When using remote control, set HEAVY DUTY WINCH switch (2) to ON. When using manual control, set HIGH IDLE switch (3) to ON. Engine idle should increase to approximately 1500 rpm.

CAUTION

Do not dead-end winch cable into fairlead/tensioner.
Damage to fairlead/tensioner can result.

- (4) Move WINCH control lever (4) to IN and reel in winch cable (1).
- (5) Allow approximately 2 in. (50 mm) between clevis (5) and rollers (6).
- (6) When using remote control, set HEAVY DUTY WINCH switch (2) to OFF. When using manual control, set HIGH IDLE switch (3) to OFF.

M984E1 General Operating Procedures (Cont)

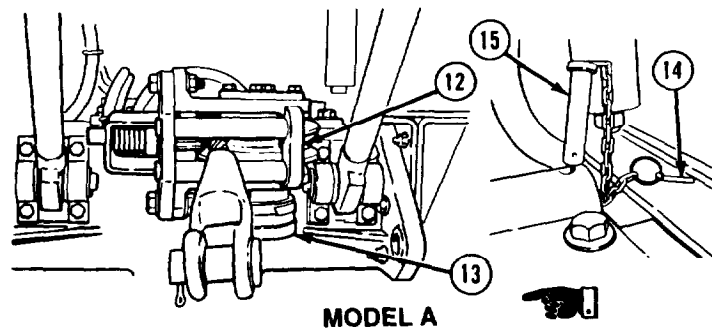


- (7) Set H.D. WINCH CONTROL switch (7) to OFF.

NOTE

Do steps (8) through (10) if remote control was used for operation.

- (8) Disconnect remote control cable (8) from receptacle (9). Install cover (10) on receptacle.
- (9) Disconnect remote control cable (8) from HEAVY DUTY WINCH REMOTE CONTROL (11).
- (10) Put remote control cable (8) and HEAVY DUTY WINCH REMOTE CONTROL (11) in stowage.

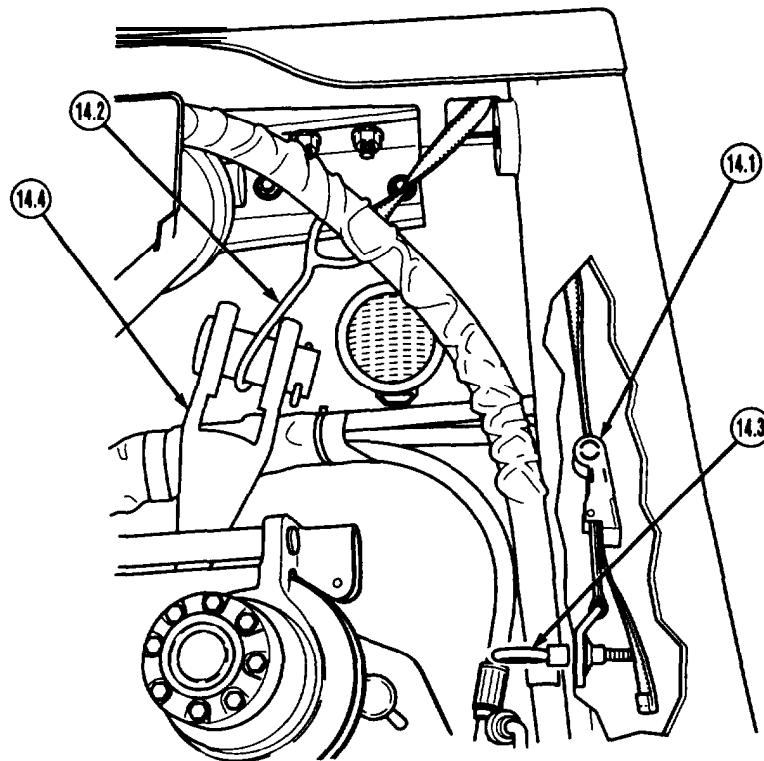


- (11) Position fairlead/tensioner (12) with tensioner motor (13) on bottom.
- (12) Remove two quick pins (14) and pins (15).

M984E1 General Operating Procedures (Cont)**WARNING**

Fairlead/tensioner is very heavy and rotates, Hold tight while raising to stowed position. Falling fairlead/tensioner could cause serious injury or death.

- (13) Soldier A and Soldier B raise fairlead/tensioner (12) to stowed position.
- (14) Soldier A holds fairlead/tensioner (12) in place while Soldier B installs two pins (15) and quick pins (14).

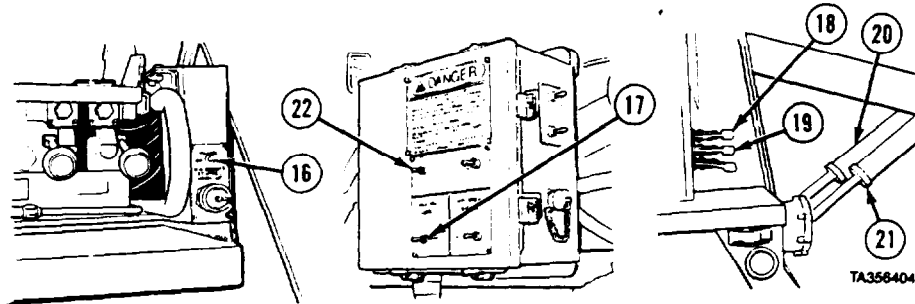
**NOTE**

- Model A and Model B cables contain a winch clevis.
- Model B has a winch clevis tiedown. Do steps (14.1) and (14.2) for Model B.

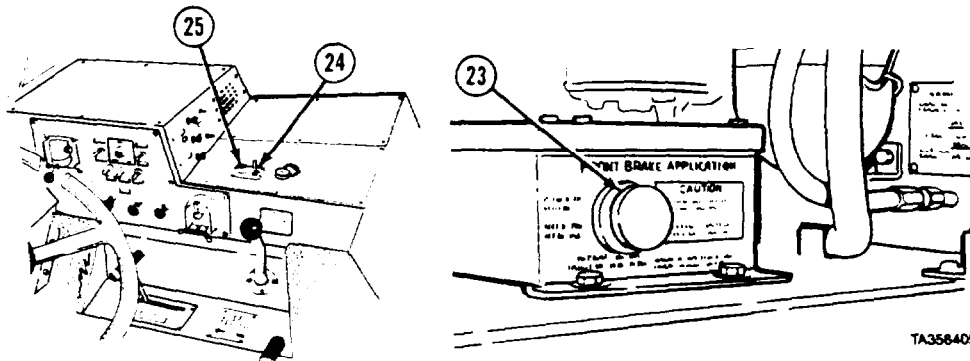
- (14.1) Loosen ratchet (14.1) and remove hook (14.2) from eyebolt (14.3).
- (14.2) Attach hook (14.2) to winch clevis (14.4) and tighten ratchet (14.1) to secure winch clevis in place.

M984E1 General Operating Procedures (Cont)

2-65. HEAVY-DUTY WINCH OPERATION M984E1 (CONT).



- (15) Set OK/OFF POWER switch (16) to ON.
- (16) Set HIGH IDLE CONTROL switch (17) to CONTINUOUS. Engine idle should increase to approximately 1500 rpm.
- (17) Push RIGHT TOW CYLLINDER control lever (18) and LEFT TOW CYLINDER control lever (19) and fully retract right tow cylinder (20) and left tow cylinder (21).
- (18) Set ON/OFF POWER switch (16) to OFF.
- (19) Set POWER switch (22) to OFF.



- (20) Pull FRONT BRAKE APPLICATION knob (23) to release front brakes.
- (21) Set PM ENGAGE switch (24) to OFF. Indicator light (25) should go out.
- (22) Shut off beacon lights (para 2-62).
- (23) Shut off engine (para 2-11p).

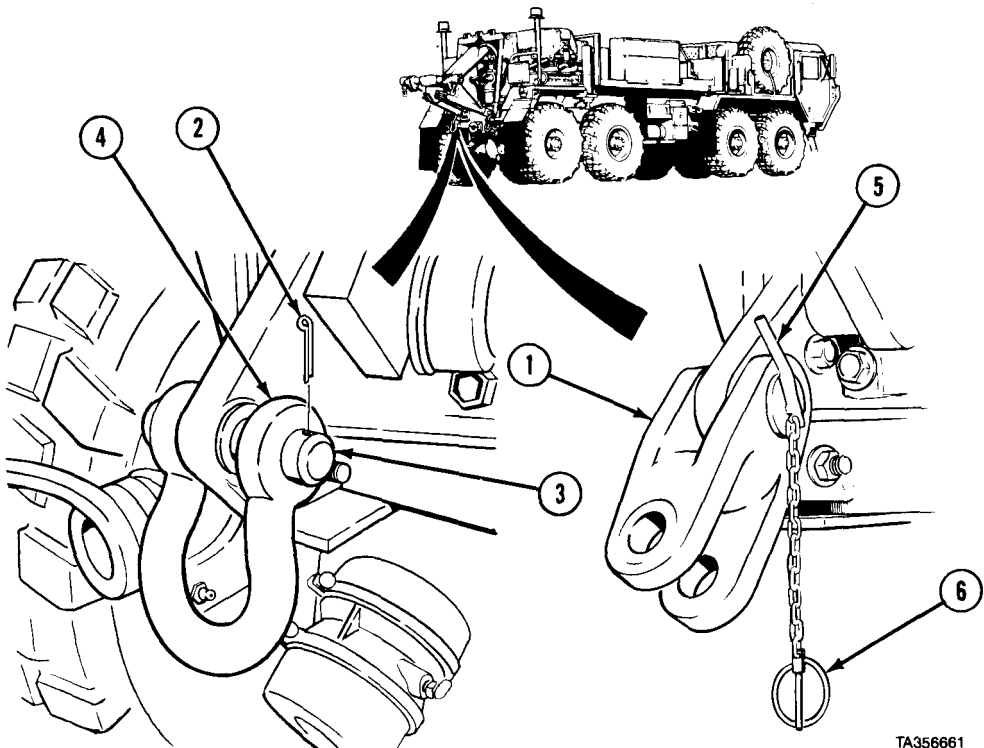
M984E1 General Operating Procedures (Cont)

2-66. TOW SPADE INSTALLATION/REMOVAL.

a. Set Up Tow Spades.

NOTE

Installation and removal of tow spades is a two-soldier task.



TA356661

(1) Prepare to operate crane with remote controls (para 2-64a).

(2) Remove two extension adapters (1) from stowage.

NOTE

Left and right towing shackles are removed the same way.

(3) Remove cotter pin (2), pin (3), and towing shackle (4).

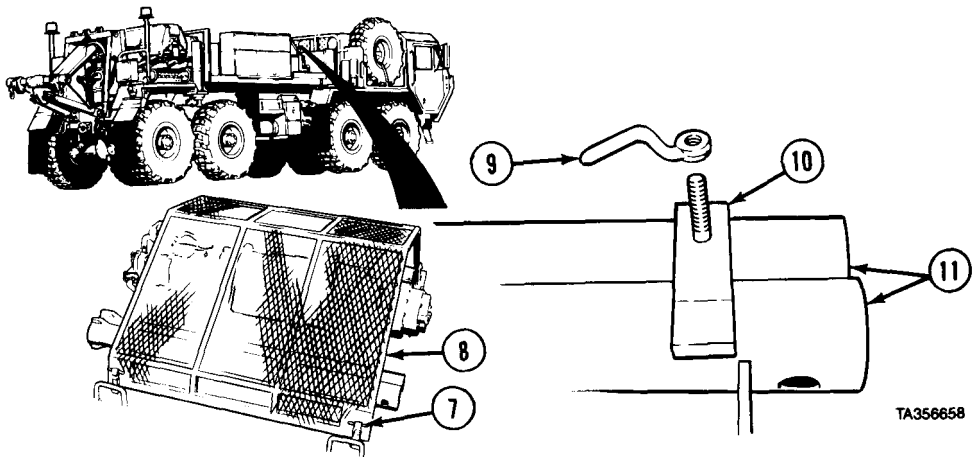
NOTE

Left and right extension adapters are installed the same way.

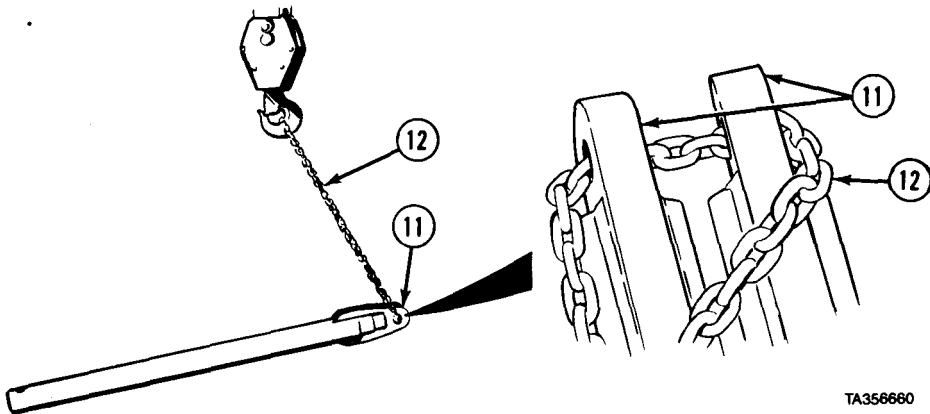
(4) Install extension adapters (1) with pins (5) and quick pins (6).

M984E1 General Operating Procedures (Cont)

2-66. TOW SPADE INSTALLATION/REMOVAL (CONT).



- (5) Release two holddowns (7) on heavy-duty winch protective screen (8) and raise heavy-duty winch protective screen.
- (6) Remove two handle locks (9) and lock plates (10) from extension bars (11).



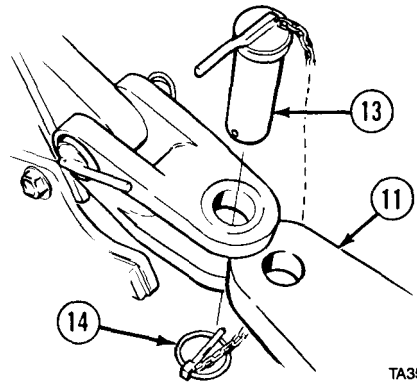
- (7) Remove 8-ft (2.5 m) chain (12) from stowage.
- (8) Thread chain (12) through eyelets on flat end of extension bars (11).
- (9) Using crane, remove extension bars (11) and lower extension bars behind vehicle.
- (10) Remove chain (12) from extension bars (11).
- (11) Lower heavy-duty winch protective screen (8) and secure with two holddowns (7).

M984E1 General Operating Procedures (Cont)

NOTE

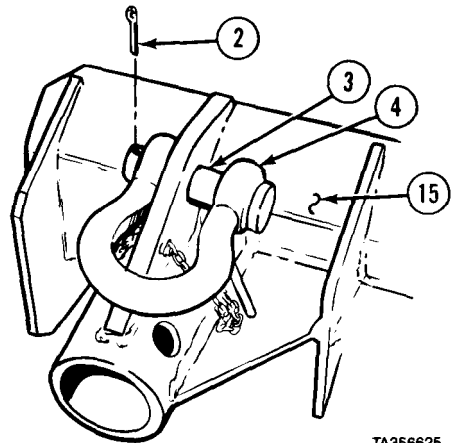
Both right and left-side extension bars are installed the same way.

- (12) Soldier A lifts and holds extension bar (11) in place while Soldier B installs pin (13) and quick pin (14).

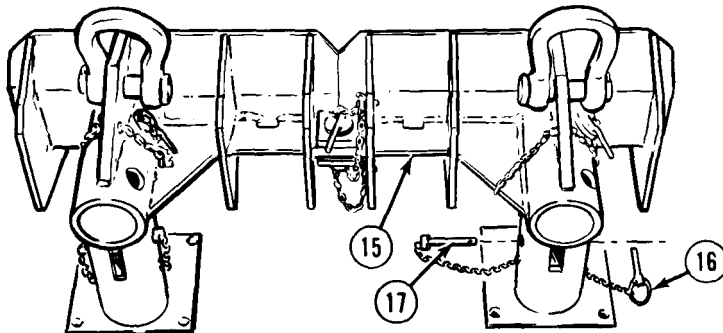


TA356624

- (13) Install two towing shackles (4) on tow spades (15) with pins (3) and cotter pins (2).



TA356625

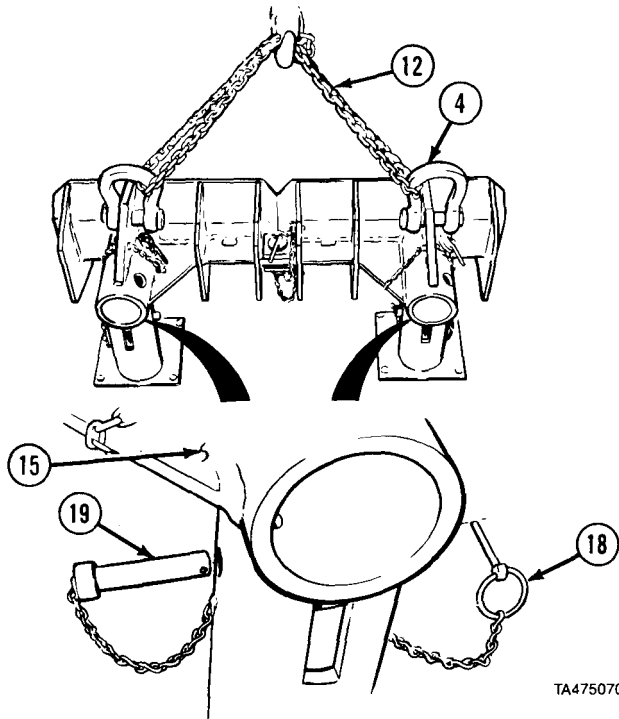


TA356626

- (14) Remove two quick pins (16) and pins (17) from tow spades (15).

M984E1 General Operating Procedures (Cont)

2-66. TOW SPADE INSTALLATION/REMOVAL (CONT.)



(15) Install 8-ft (2.5 m) chain (12) through two towing shackles (4).

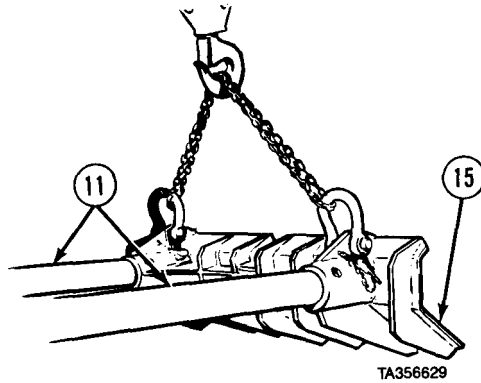
WARNING

Do not hit oxygen tank when lifting tow spades.
Oxygen tank may explode causing serious injury or death.

(16) Using crane, remove tow spades (15) and lower tow spades behind vehicle.

(17) Remove two quick pins (18) and pins (19) from tow spades (15).

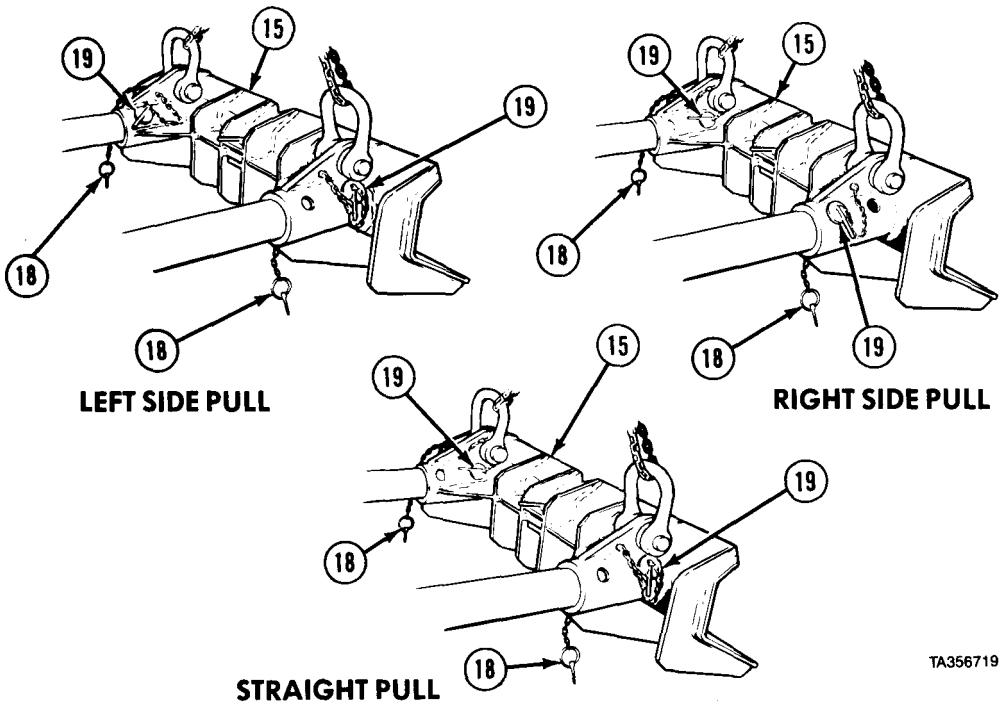
M984E1 General Operating Procedures (Cont)



NOTE

Use pry bar to help position tow spades.

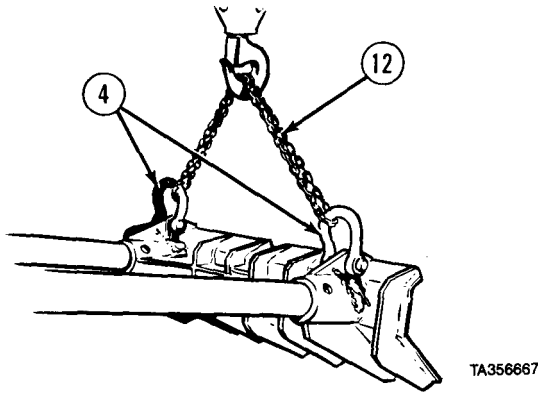
(18) Soldier A operates crane while Soldier B installs tow spades (15) on extension bars (11).



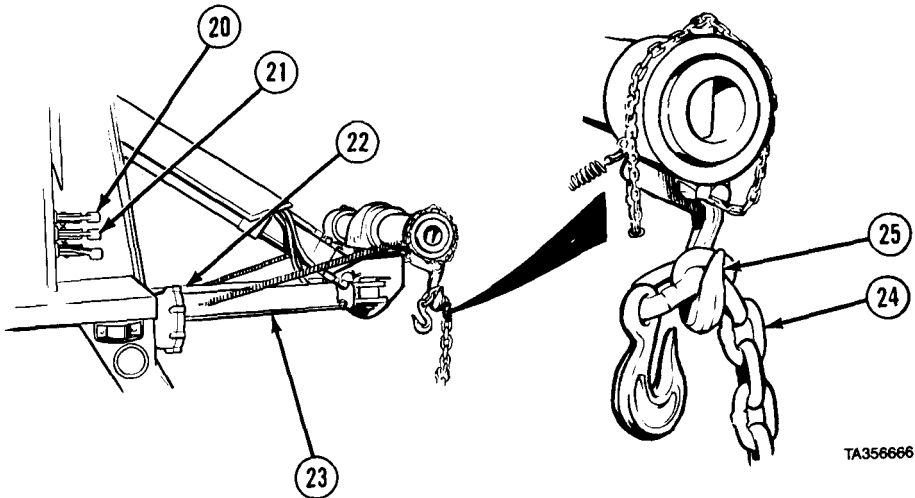
(19) Position tow spades (15) for type of pull being made and install pins (19) and quick pins (18).

M984E1 General Operating Procedures (Cont)

2-66. TOW SPADE INSTALLATION/REMOVAL (CONT.)

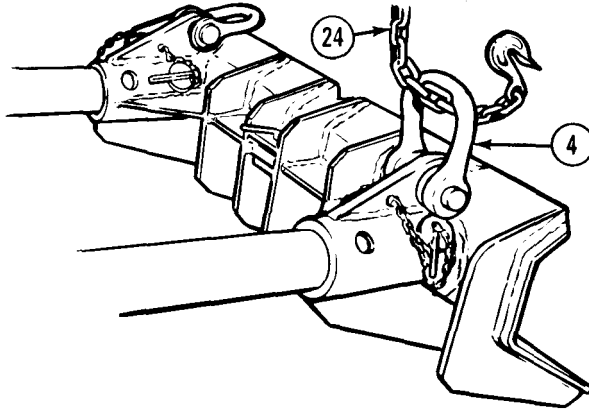


- (20) Remove 8-ft (2.5 m) chain (12) from two towing shackles (4).
- (21) Return crane to stowed position (para 2-64).



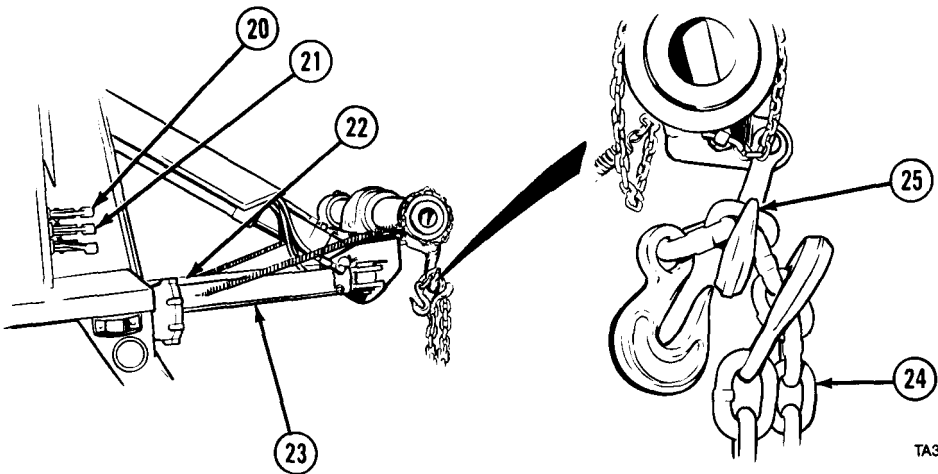
- (22) Push RIGHT TOW CYLINDER control lever (20) and LEFT TOW CYLINDER control lever (21) to retract right tow cylinder (22) and left tow cylinder (23).
- (23) Remove two 16-ft (5 m) safety chains (24) from stowage.
- (24) Hook one end of safety chain (24) on crosstube hook (25) with one link showing.

M984E1 General Operating Procedures (Cont)



TA356662

(25) Thread end of safety chain (24) through towing shackle (4).

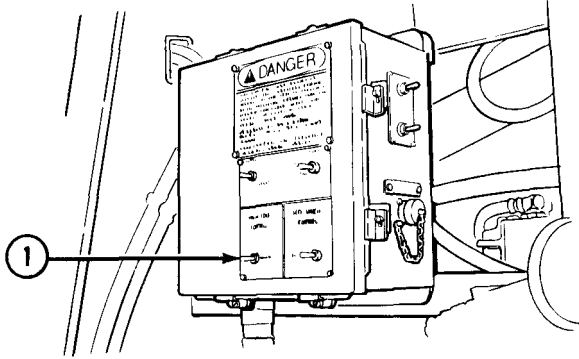


TA356668

- (26) Hook safety chain (24) together below crosstube hook (25).
- (27) Repeat steps (24 through 26) for other side.
- (28) Pull RIGHT TOW CYLINDER control lever (20) and LEFT TOW CYLINDER control lever (21) to extend right tow cylinder (22) and left tow cylinder (23).
- (29) Continue operation of heavy-duty winch (para 2-65).

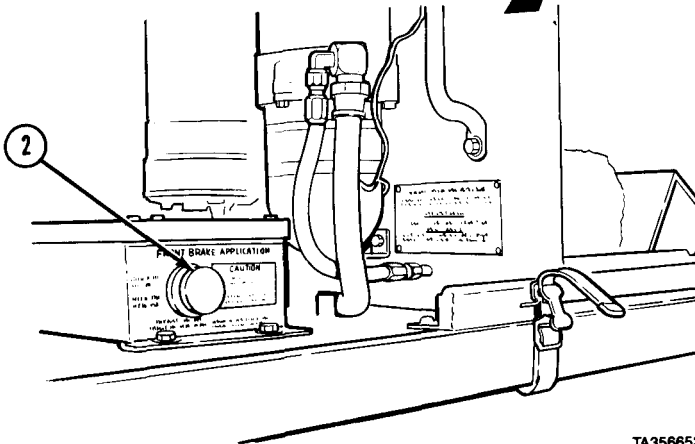
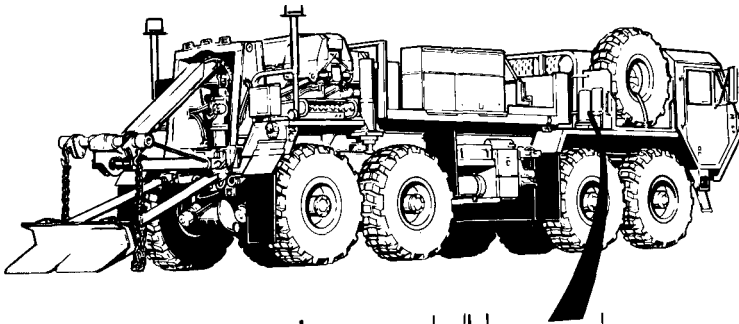
2-66. TOW SPADE INSTALLATION/REMOVAL (CONT).

b. Remove and Stow Tow Spades.



TA356654

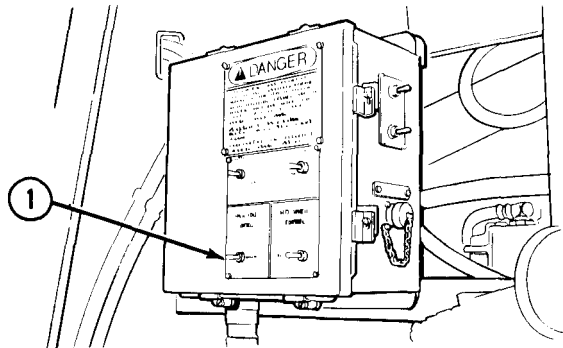
(1) Set HIGH IDLE CONTROL switch (1) to OFF.



TA356653

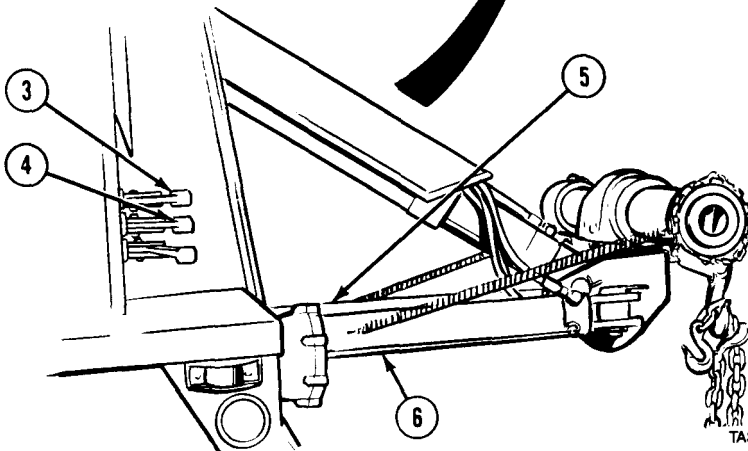
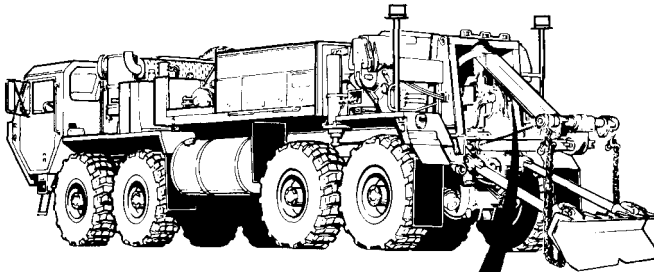
(2) Pull FRONT BRAKE APPLICATION knob (2) to release front brakes.
(3) Drive vehicle forward approximately 10 ft (3 m) (para 2-11g).

M984E1 General Operating Procedures (Cont)



TA356669

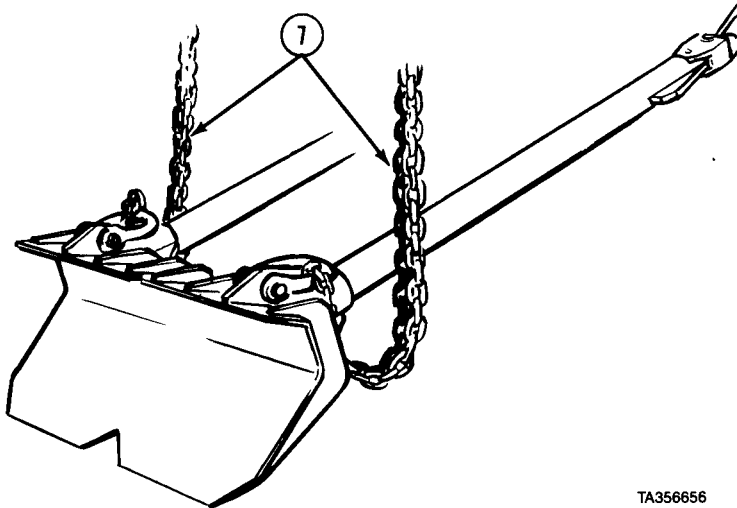
(4) Set HIGH IDLE CONTROL switch (1) to CONTINUOUS.



TA356675

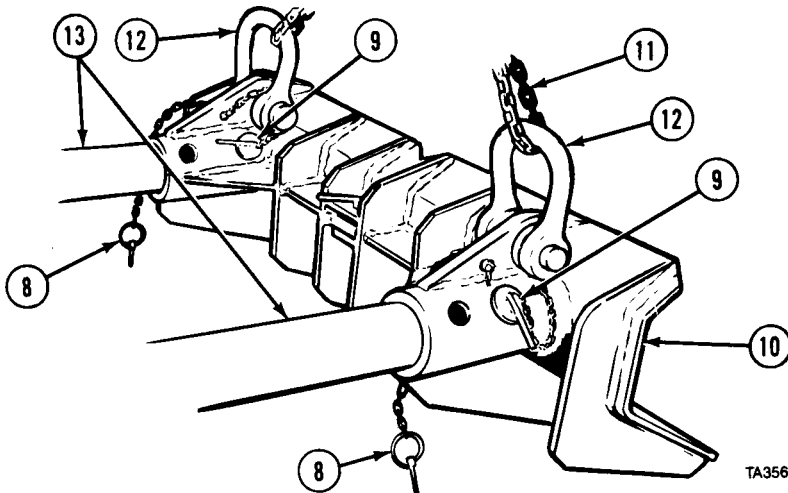
(5) Push RIGHT TOW CYLINDER control lever (3) and LEFT TOW CYLINDER control lever (4) to retract right tow cylinder (5) and left tow cylinder (6).

2-66. TOW SPADE INSTALLATION/REMOVAL (CONT).



TA356656

(6) Remove two 16-ft (5 m) safety chains (7) and put safety chains in stowage.



TA356652

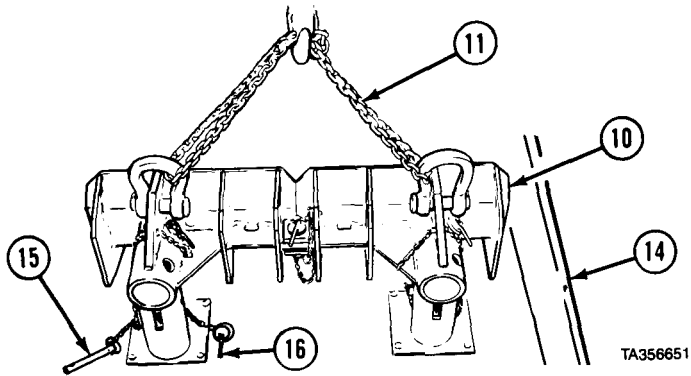
- (7) Remove two quick pins (8) and pins (9) from tow spades (10).
- (8) Install 8-ft (2.5 m) chain (11) on two towing shackles (12).
- (9) Set up crane for remote operation (para 2-64).

NOTE

Use pry bar to help remove tow spades.

- (10) Soldier A holds left and right extension bars (13) while Soldier B removes tow spades (10) from extension bars.
- (11) Install two pins (9) and quick pins (8) in tow spades (10).

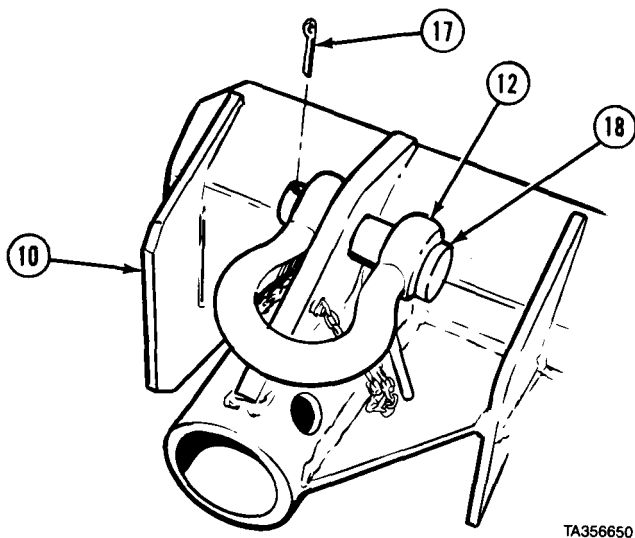
M984E1 General Operating Procedures (Cont)



WARNING

Do not hit oxygen tank when lowering tow spades into equipment body. Oxygen tank may explode causing serious injury or death.

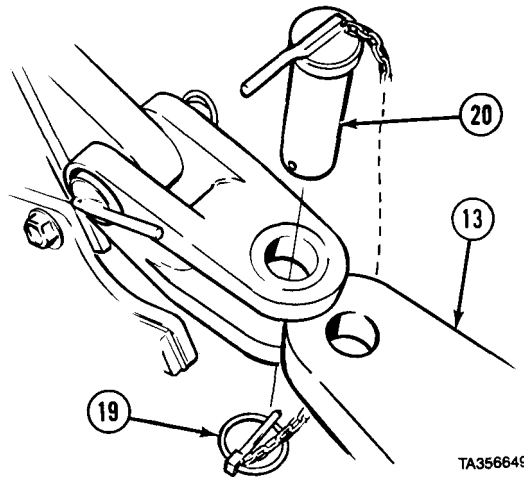
- (12) Using crane, install tow spades (10) into equipment body (14) and install pins (15) and quick pins (16).
- (13) Disconnect crane from 8-ft (2.5 m) chain (11) and remove chain from tow spades (10).



- (14) Remove two cotter pins (17), pins (18), and towing shackles (12) from tow spades (10).

M984E1 General Operating Procedures (Cont)

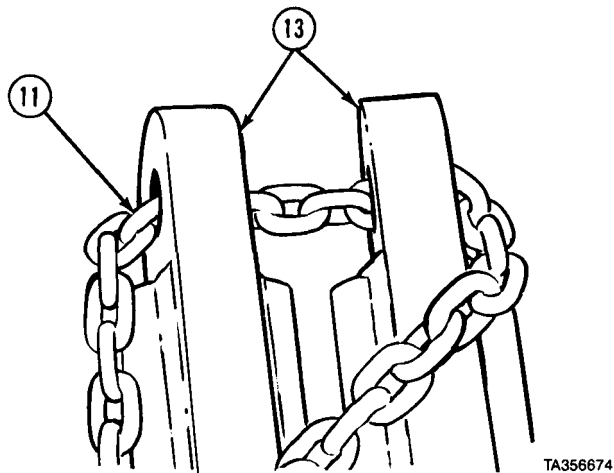
2-66. TOW SPADE INSTALLATION/REMOVAL (CONT).



NOTE

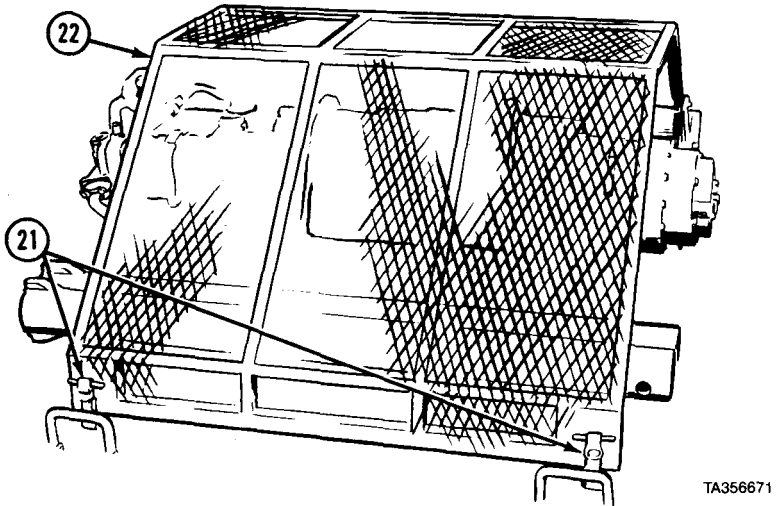
Both right and left-side extension bars are removed the same way.

(15) Soldier A holds extension bar (13) in place while Soldier B removes quick pin (19) and pin (20).

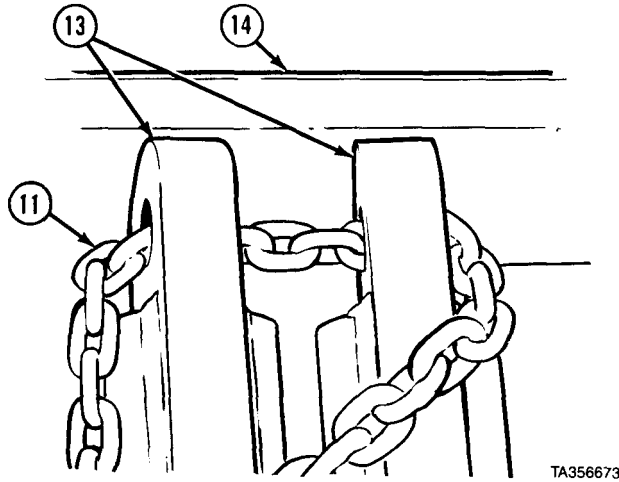


(16) Thread 8-ft (2.5 m) chain (11) through flat end of extension bars (13).

M984E1 General Operating Procedures (Cont)

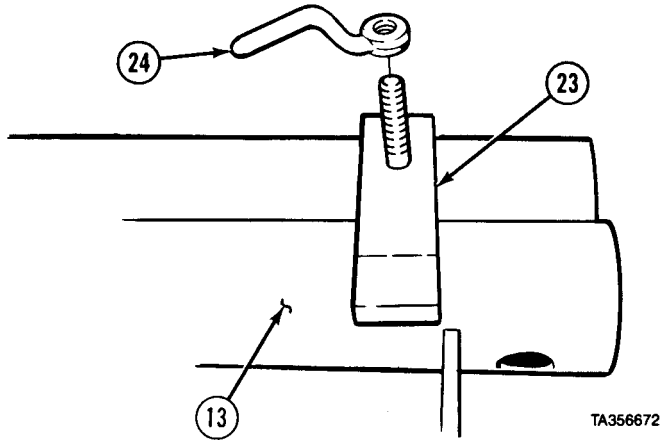


- (17) Release two holddowns (21) on heavy-duty winch protective screen (22) and raise heavy-duty winch protective screen.

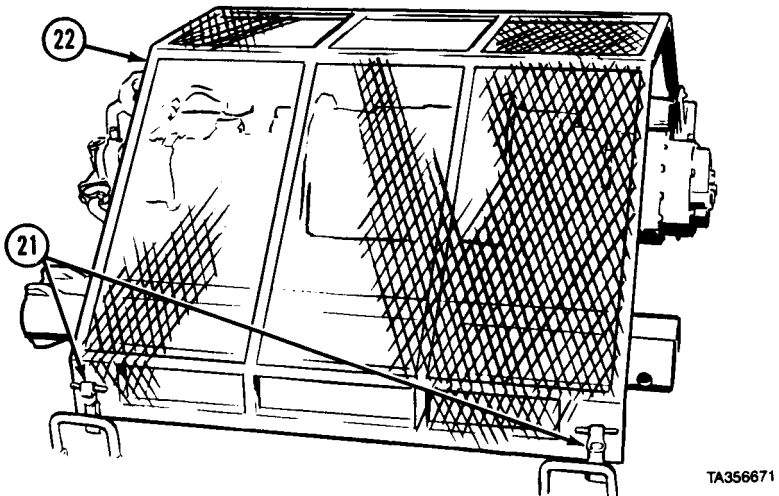


- (18) Using crane, install extension bars (13) into equipment body (14).
 (19) Remove 8-ft (2.5 m) chain (11) from extension bars (13) and put chain in stowage.
 (20) Return crane to stowed position (para 2-64).

2-66. TOW SPADE INSTALLATION/REMOVAL (CONT).

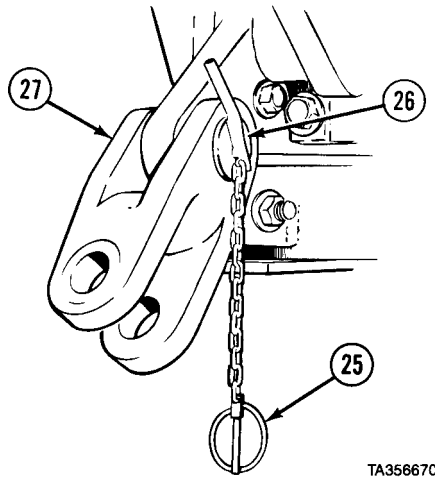


(21) Install two lock plates (23) and lock handles (24) onto extension bars (13).



(22) Close heavy-duty winch protective screen (22) and latch holddowns (21).

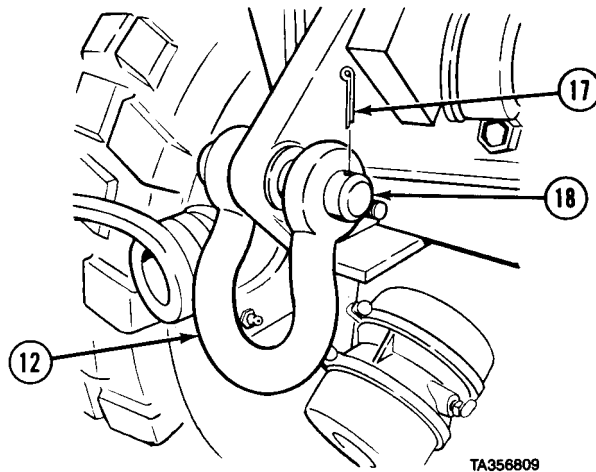
M984E1 General Operating Procedures (Cont)



NOTE

Both right and left-side extension adapters are removed the same way.

- (23) Remove quick pin (25), pin (26), and extension adapter (27).
- (24) Put extension adapters (27) in stowage:
- (25) Continue stowage of heavy-duty winch (para 2-65).

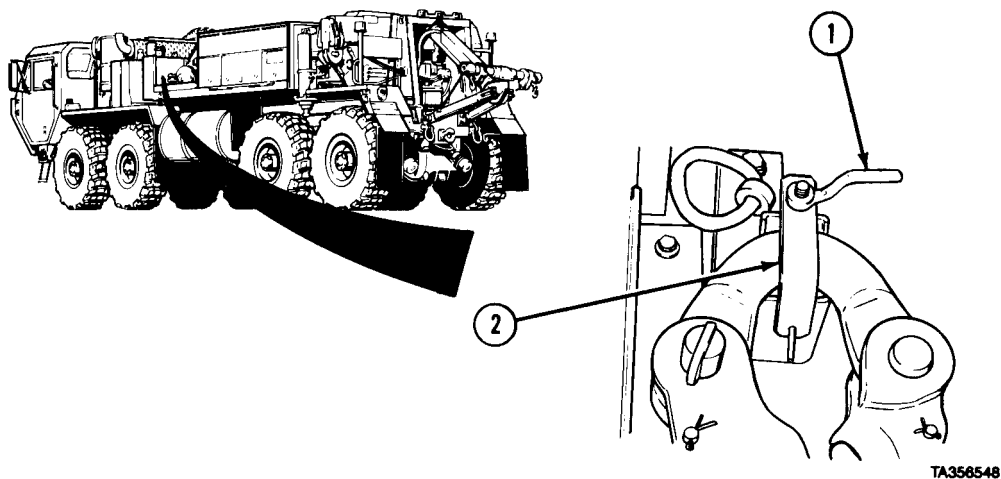


- (26) Install two towing shackles (12) with pins (18) and cotter pins (17).

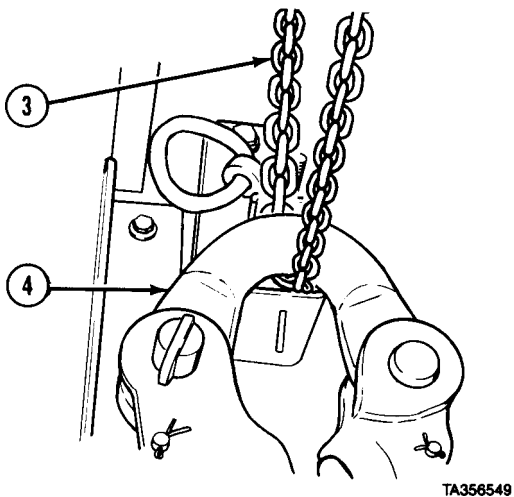
M984E1 General Operating Procedures (Cont)

2-67. 60-TON TACKLE BLOCK INSTALLATION/REMOVAL (M984E1).

a. Set Up 60-Ton Tackle Block.

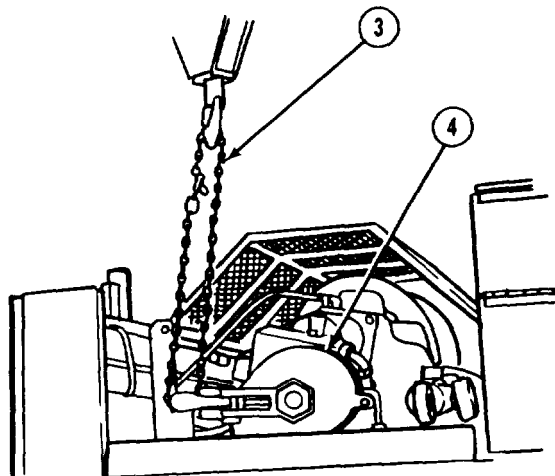


(1) Remove handle lock (1) and lock bracket (2).

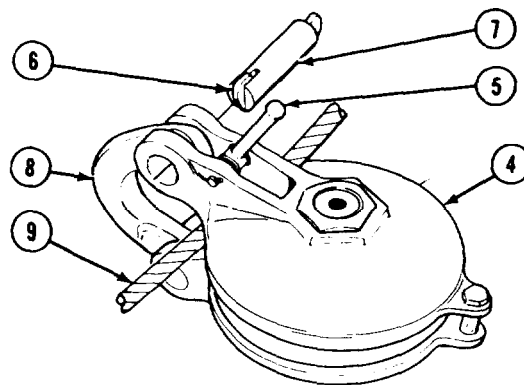


(2) Remove 8-foot (2.5 m) chain (3) from stowage and attach chain to 60-ton tackle block (4).

M984E1 General Operating Procedures (Cont)



- (3) Set up crane for remote operation (para 2-64).
- (4) Using crane, remove 60-ton tackle block (4) from vehicle.
- (5) Remove 8-foot (2.5 m) chain (3) from 60-ton tackle block (4).
- (6) Return crane to stowed position (para 2-64).



- (7) Soldier A and Soldier B carry 60-ton tackle block (4) by handles (5) to mired vehicle.
- (8) Turn keyway (6) on pin (7) and remove pin from 60-ton tackle block (4).

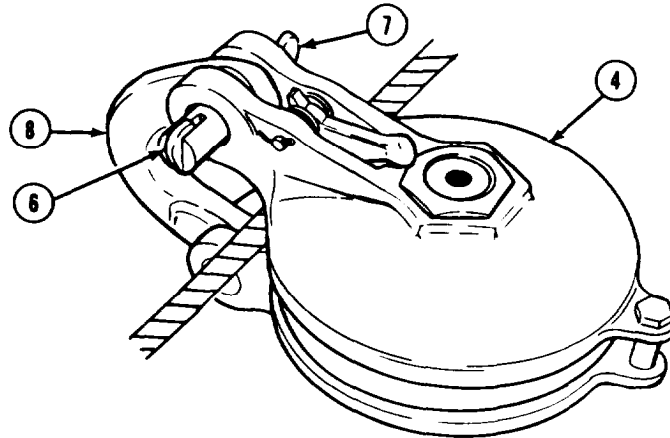
WARNING

Always wear heavy gloves when handling winch cables. Never let cables run through hands; frayed cables can cut. Never operate winch with less than five wraps of cable on winch drum.

- (9) Open hook (8) and place winch cable (9) in 60-ton tackle block (4).

M984E1 General Operating Procedures (Cont)

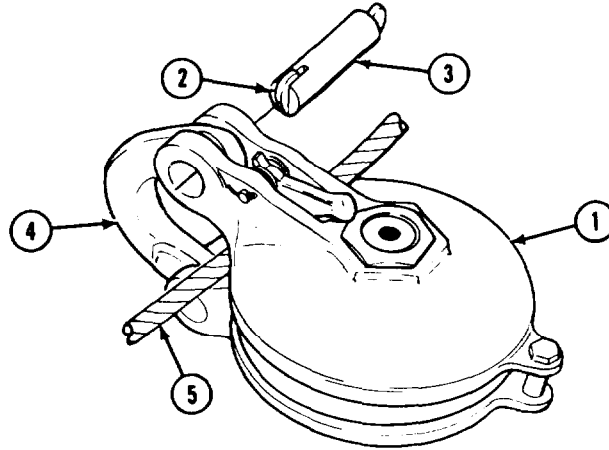
2-67. 60-TON TACKLE BLOCK INSTALLATION/REMOVAL (M984E1) (CONT).



- (10) Close hook (8) and install pin (7) in 60-ton tackle block (4). Turn keyway (6) to secure pin.
- (11) Attach 60-ton tackle block (4) to mired vehicle (FM 20-22).
- (12) Continue with heavy-duty winch operation (para 2-65).

M984E1 General Operating Procedures (Cont)

b. Remove and Stow 60-Ton Tackle Block.

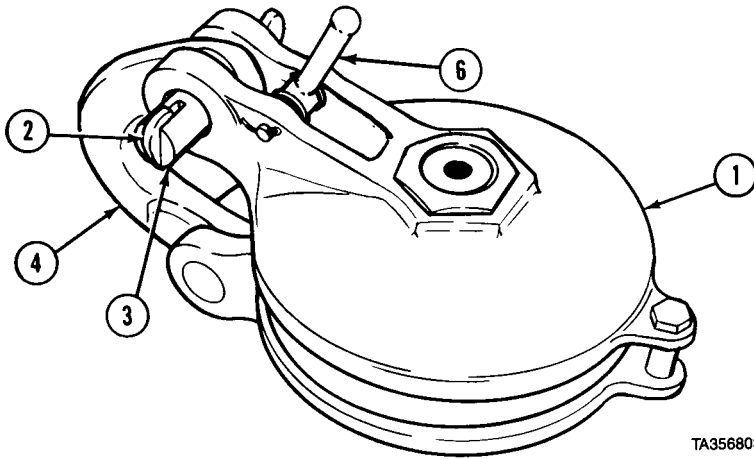


WARNING

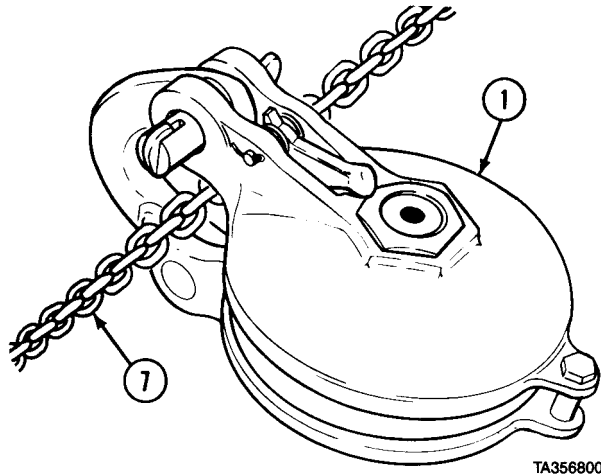
Always wear heavy gloves when handling winch cables. Never let cables run through hands; frayed cables can cut. Never operate winch with less than five wraps of cable on winch drum.

- (1) Detach 60-ton tackle block (1) from mired vehicle.
- (2) Turn keyway (2) on pin (3) and remove pin from 60-ton tackle block (1).
- (3) Open hook (4) and remove winch cable (5) from 60-ton tackle block (1).

M984E1 General Operating Procedures (Cont)



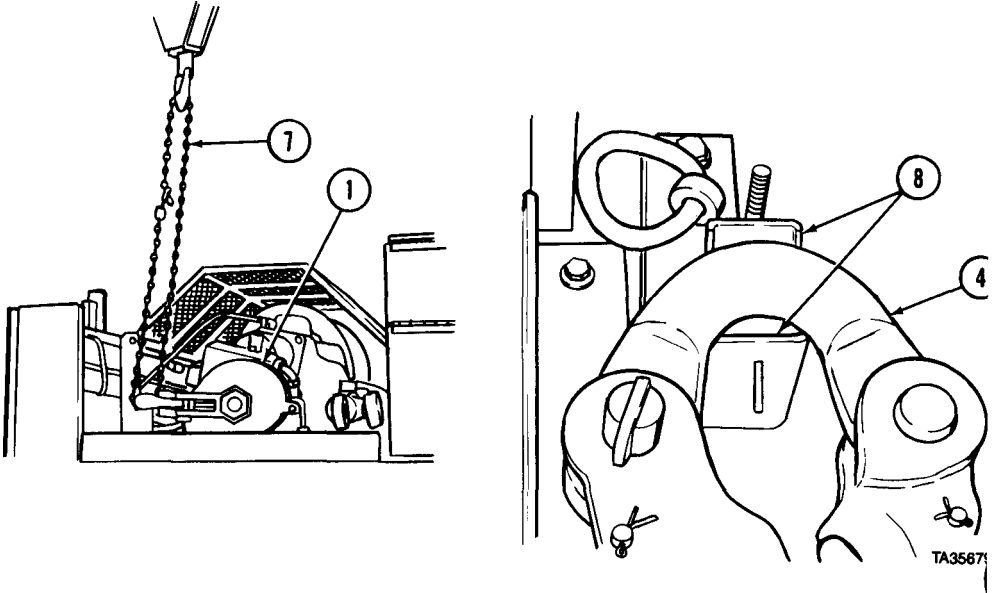
- (4) Close hook (4) and install pin (3) in 60-ton tackle block (1). Turn keyway (2) to secure pin.
- (5) Soldier A and Soldier B lift 60-ton tackle block (1) by handles (6) and move within reach of crane.



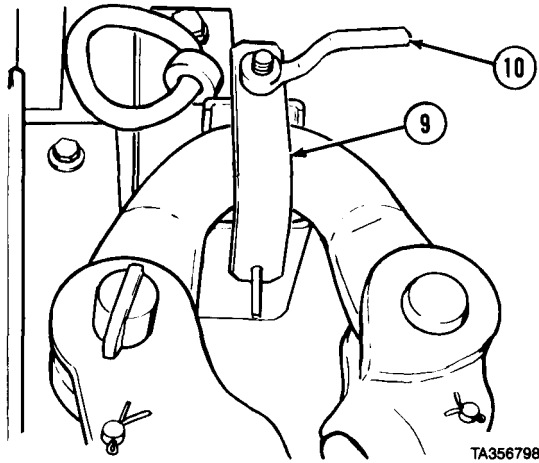
- (6) Attach 8-foot (2.5 m) chain (7) to 60-ton tackle block (1).
- (7) Set up crane for remote operation (para 2-64).

M984E1 General Operating Procedures (Cont)

2-67. 60-TON TACKLE BLOCK INSTALLATION/REMOVAL (M984E1)
(CONT).

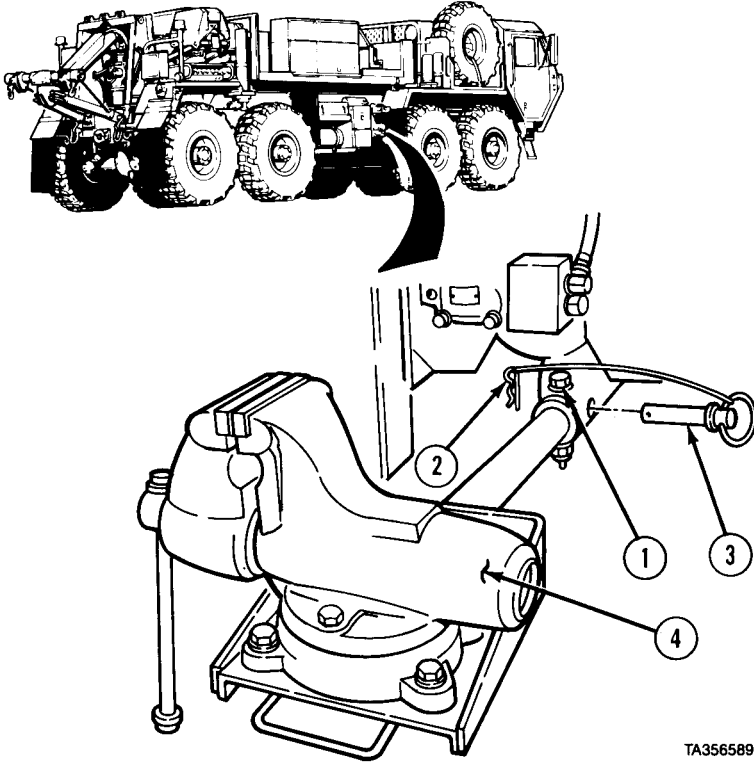


- (8) Using crane, place 60-ton tackle block (1) on vehicle so that hook (4) rests in mounting bracket (8).
- (9) Remove 8-foot (2.5 m) chain (7) and return chain to stowage.
- (10) Return crane to stowed position (para 2-64).



- (11) Install lock bracket (9) and handle lock (10).
- (12) Continue stowing heavy-duty winch (para 2-65).

M984E1 General Operating Procedures (Cont)

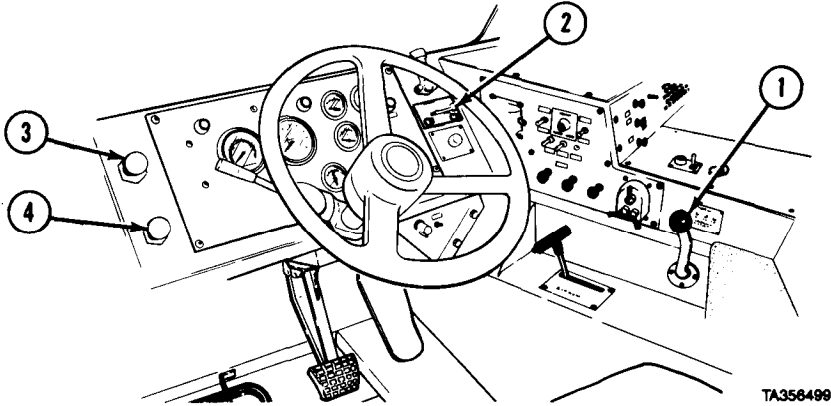
2-68. VISE OPERATION.*a. Prepare Vise for Operation.*

TA356589

- (1) Loosen lock screw (1).
 - (2) Remove quick pin (2) and pin (3).
 - (3) Pull vise (4) out fully, and align hole.
 - (4) Install pin (3) and quick pin (2).
- b. Return Vise to Stowed Position.*
- (1) Remove quick pin (2) and pin (3).
 - (2) Push vise (4) into stowed position.
 - (3) Align hole and install pin (3) and quick pin (2).
 - (4) Tighten lock screw (1).

M984E1 General Operating Procedures (Cont)

2-69. TOW DISABLED VEHICLE.



WARNING

Operation at speeds of over 15 mph (24 kmh) on paved road can be achieved when the operator determines that the vehicle being towed and the terrain allow safe operation. Under no condition can speeds over 35 mph (55 kmh) on paved road and 15 mph (24 kmh) off-road be allowed. Loss of control can cause serious injury or death. Excessive speed can cause damage to vehicle being towed.

CAUTION

- When towing another vehicle do not go over GCVWR (Gross Combination Vehicle Weight Rating) given in Table 1-2. Going over GCVWR may cause damage to towed and towing vehicle.
- Propeller shaft between transmission and transfer case or drive axle must be removed before towing disabled vehicle or equipment maybe damaged.

NOTE

Disabled vehicles must be prepared and moved in accordance with FM 20-22 and FM 21-305. If instructed to do so, manually release spring brakes as part of preparing disabled vehicle for towing.

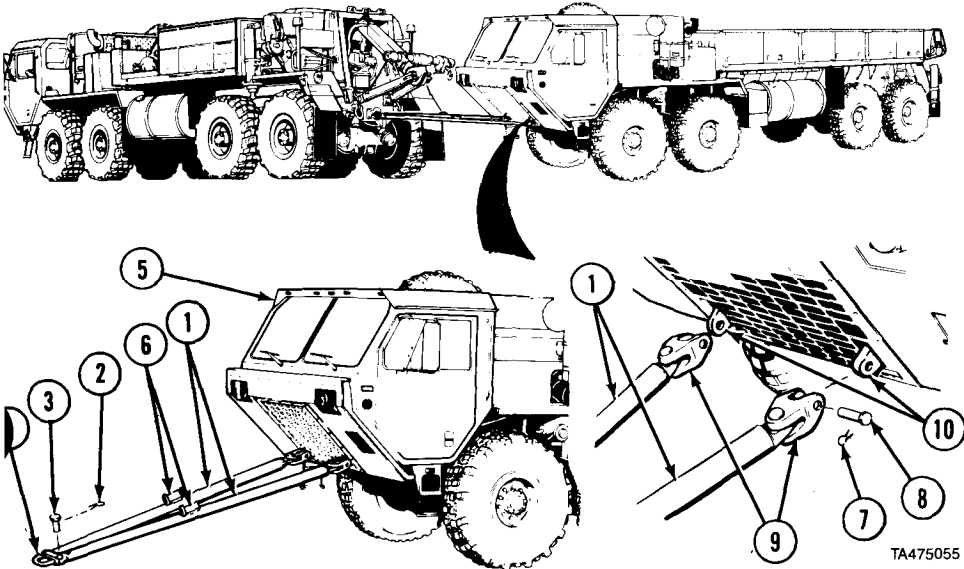
- (1) Install and operate beacon lights (para 2-62).
- (2) Place TRANSFER CASE shift lever (1) in NEUTRAL position.
- (3) Place traction control switch (2) to OFF.
- (4) Push in PARKING BRAKE control (3) on disabled vehicle.
- (5) Push in TRAILER AIR SUPPLY control (4) on recovery vehicle.
- (6) Transport disabled vehicle.

M984E1 General Operating Procedures (Cont)

2-70. TOW BAR CONNECT/DISCONNECT.*a. Connect Tow Bar.*

NOTE

Position rear of M984E1 wrecker near front of disabled vehicle.

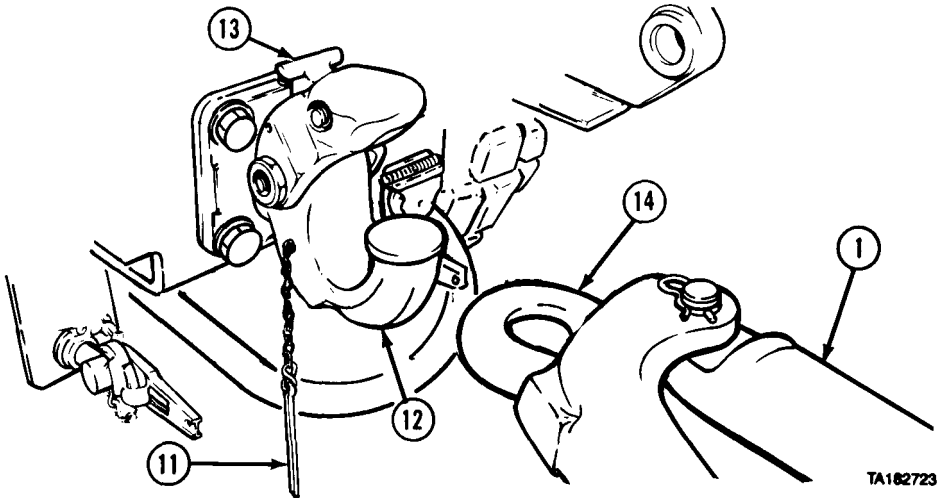
**WARNING**

Tow bar is very heavy and requires three soldiers to carry. Do not drop tow bar. Injury to personnel can result.

- (1) Remove tow bar (1) from stowage.
- (2) Remove cotter hairpin (2) and pin (3) from tow bar (1).
- (3) Separate tow bar (1) at pivot point (4).
- (4) Position legs of tow bar (1) in front of disabled vehicle (5) with spare pins (6) facing up.
- (5) Remove two cotter hairpins (7) and pins (8) from tow bar shackles (9).
- (6) Soldier A and Soldier B hold one leg of tow bar (1) and align shackle (9) with towing eye (10) while Soldier C installs pin (8) and cotter hairpin (7).
- (7) Soldier A and Soldier B hold other leg of tow bar (1) and align shackle (9) with other towing eye (10) while Soldier C installs pin (8) and cotter hairpin (7).
- (8) Align legs of tow bar (1) at pivot point (4) and install pin (3) and cotter hairpin (2).

M984E1 General Operating Procedures (Cont)

2-70. TOW BAR CONNECT/DISCONNECT (CONT).



NOTE

Position towing vehicle so pintle hook is aligned with tow bar lunette eye.

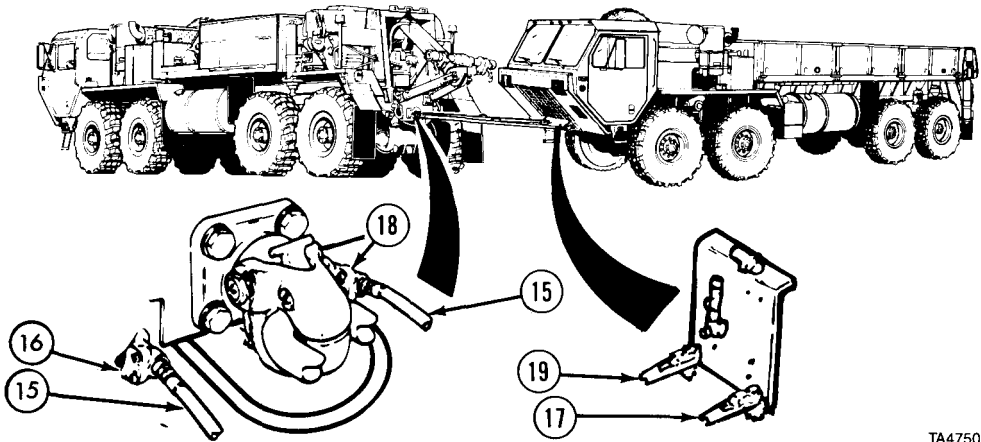
- (9) Remove cotter pin (11) from pintle hook (12).
- (10) Pull latch (13) away from vehicle and hold.
- (11) Lift top of pintle hook (12) and let go of latch (13). Pintle hook will be locked open.

WARNING

Do not put hands near pintle hook while aligning lunette eye with pintle hook. If wrecker moves suddenly serious injury to personnel may be caused.

- (12) Soldier A and Soldier B lift tow bar (1) while Soldier C slowly backs up wrecker.
- (13) Connect tow bar lunette eye (14) to pintle hook (12).
- (14) Pull latch (13) and close top half of pintle hook (12).
- (15) Install cotter pin (11) in pintle hook (12).

M984E1 General Operating Procedures (Cont)

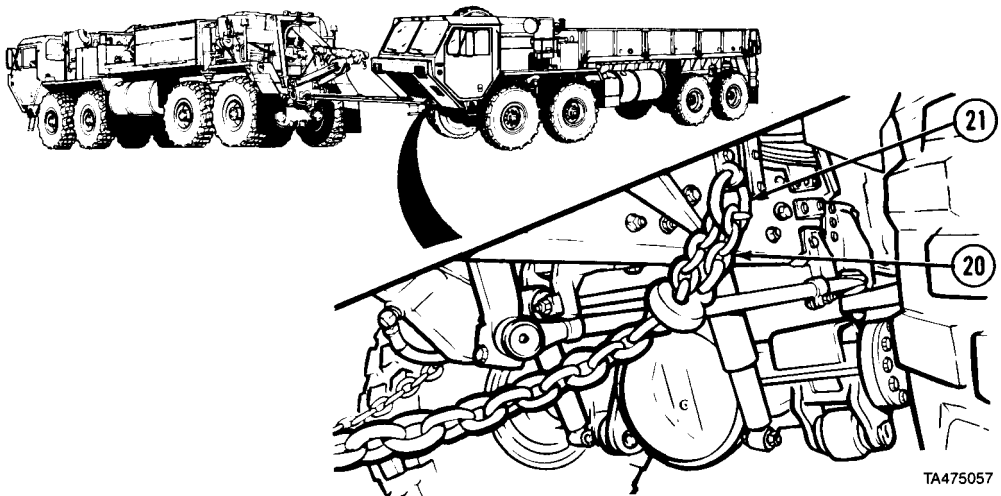


TA475056

NOTE

If air system of disabled vehicle is damaged, manually release spring brakes (para 2-47) and go to step (19).

- (16) Remove two intervehicular air hoses (15) from stowage.
- (17) Connect air hose (15) to left rear glad hand (16) of wrecker and left front glad hand (17) of disabled vehicle.
- (18) Connect air hose (15) to right rear glad hand (18) of wrecker to right front glad hand (19) of disabled vehicle.

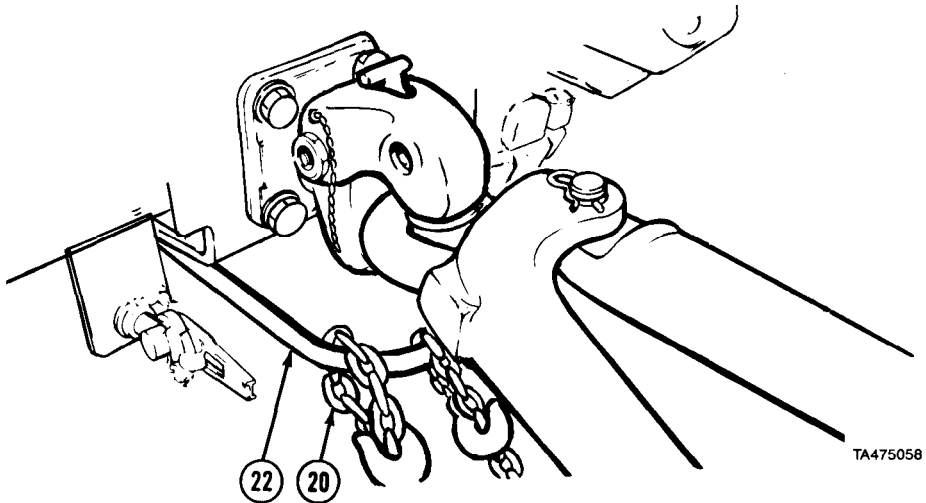


TA475057

- (19) Remove utility chain (20) from stowage.
- (20) Attach one end of utility chain (20) to left and right front tiedown rings (21) on disabled vehicle.

M984E1 General Operating Procedures (Cont)

2-70. TOW BAR CONNECT/DISCONNECT (CONT).



NOTE

Utility chain may be attached to safety chain loop or towing shackles.

- (21) Attach one end of utility chain (20) to safety chain loop (22) on wrecker.

WARNING

The M984E1 should not be operated at speeds over 15 mph except on paved roads when the operator determines that the vehicle being towed and the terrain allow safe operation. Engine brake switch must be "ON" for all towing operations. The following are maximum safe speeds:

Terrain Condition	Maximum speed, towed load up to 50,000 lbs	Maximum speed, towed load above 50,000 lbs
on road-level	35	30
on road-hilly	30	20
off road	15	15

Speeds in excess of the above can result in loss of control, serious injury or death.

- (22) Transport vehicle (para 2-69).

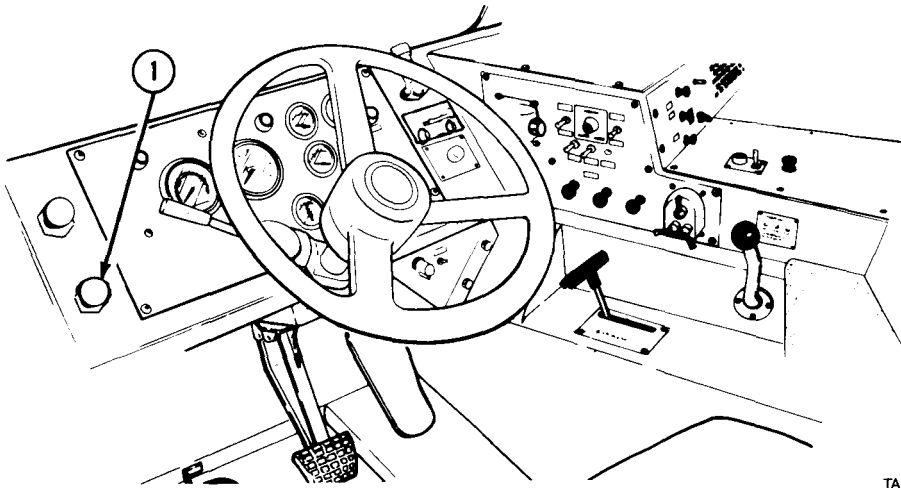
b. Disconnect Tow Bar.

NOTE

Vehicles should be parked and disconnected on level ground.

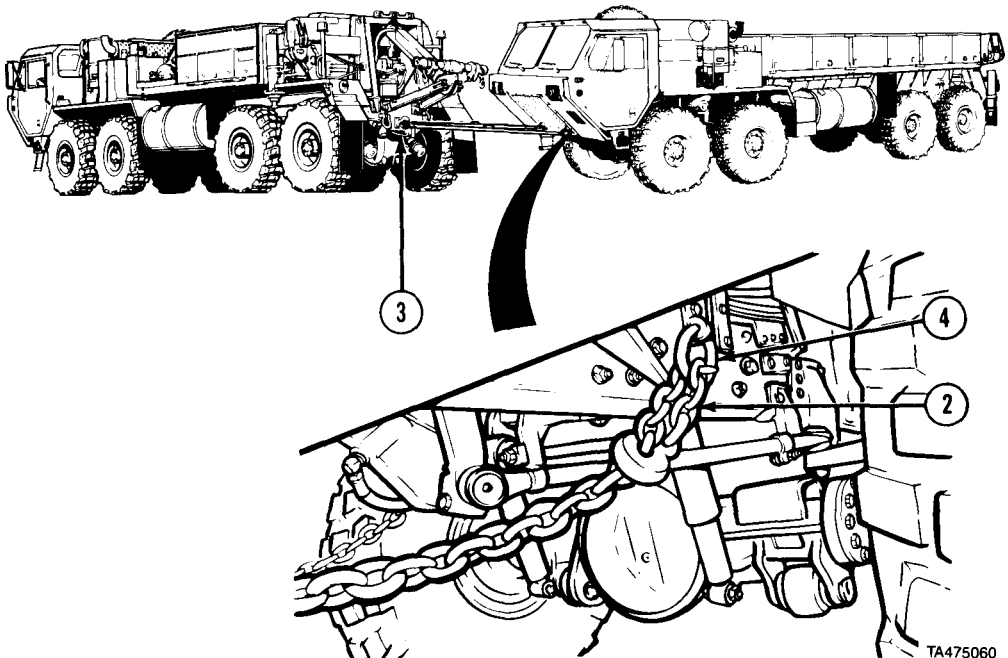
- (1) Park wrecker (2-110).

M984E1 General Operating Procedures (Cont)



TA475059

- (2) Pull out TRAILER AIR SUPPLY control (1) on wrecker.
- (3) Set parking brake on disabled vehicle.

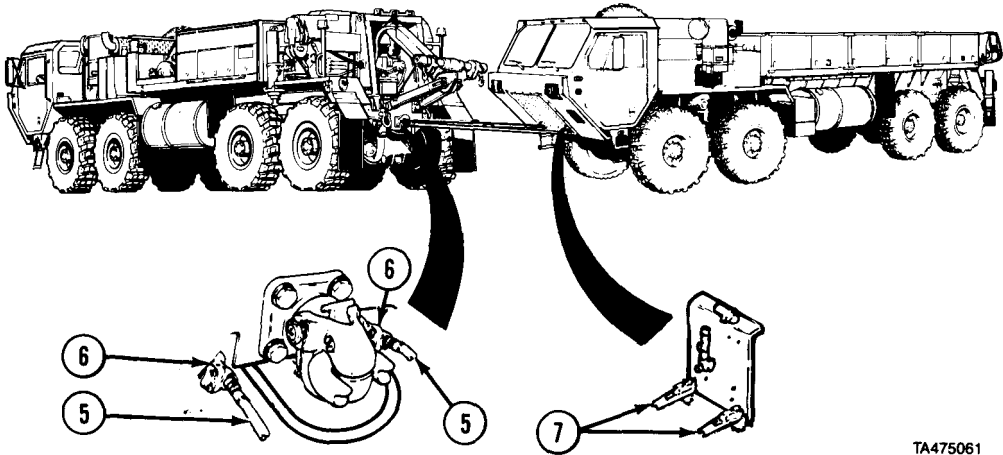


TA475060

- (4) Disconnect two utility chains (2) from rear of wrecker (3) and front tie down rings (4) of disabled vehicle and stow utility chains.

M984E1 General Operating Procedures (Cont)

2-70. TOW BAR CONNECT/DISCONNECT (CONT).

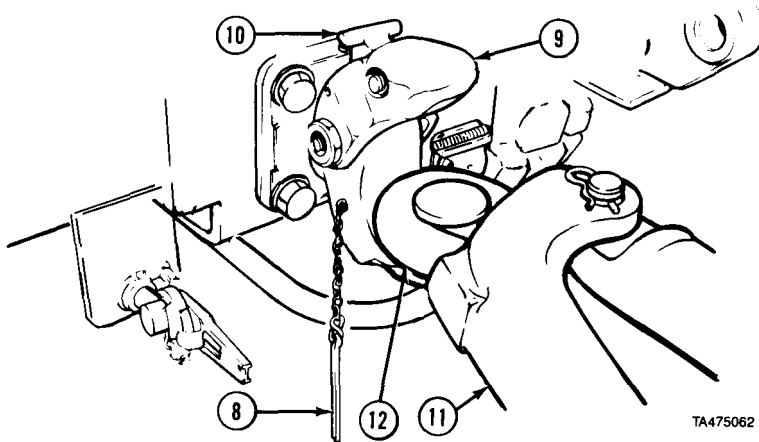


TA475061

NOTE

If spring brakes on disabled vehicle were manually released before towing, chock wheels and go to step (6).

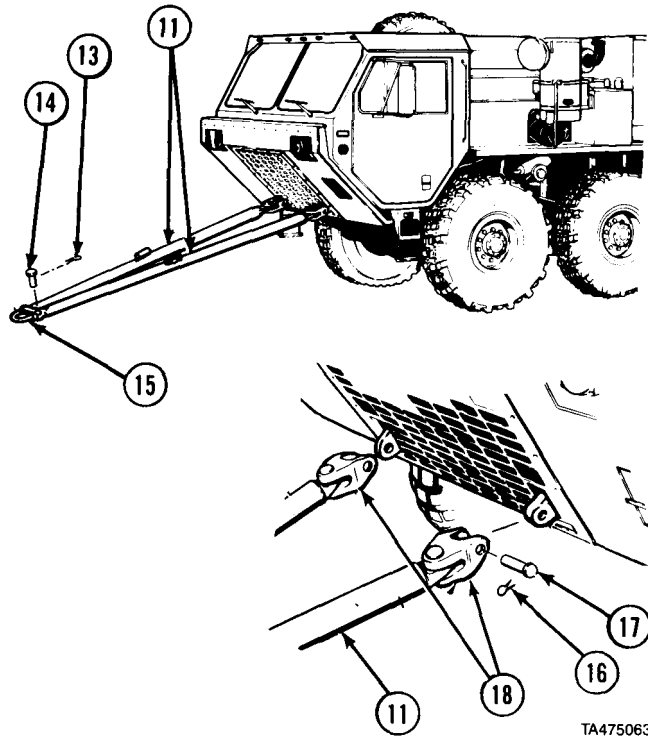
- (5) Disconnect two intervehicular air hoses (5) from rear glad hands (6) of wrecker and from front glad hands (7) on disabled vehicle and stow air hoses.



TA475062

- (6) Remove cotter pin (8) from pintle hook (9).
- (7) Pull latch (10) away from vehicle and hold.
- (8) Lift top of pintle hook (9) and let go of latch (10). Pintle hook will be locked open.
- (9) Soldier A and Soldier B lift tow bar (11) until lunette eye (12) is clear of pintle hook (9).
- (10) As Soldier C drives wrecker forward, Soldier A and Soldier B lower tow bar (11) to the ground.
- (11) Pull latch (10) close to pintle hook (9) and install cotter pin (8) in pintle hook.

M984E1 General Operating Procedures (Cont)



TA475063

- (12) Remove cotter hairpin (13) and pin (14) and separate tow bar (11) at pivot point (15).
- (13) Soldier A and Soldier B hold one leg of tow bar (11) while Soldier C removes cotter hairpin (16) and pin (17) from shackle (18).
- (14) Soldier A and Soldier B hold other leg of tow bar (11) while Soldier C removes cotter hairpin (16) and pin (17) from shackle (18).
- (15) Install two pins (17) and cotter hairpins (16) in shackles (18).
- (16) Aline legs of tow bar (11) at pivot point (15) and install pin (14) and cotter hairpin (13).
- (17) Stow tow bar (11).

M984E1 General Operating Procedures (Cont)

2-71. RETRIEVAL TOWING SYSTEM.

a. Introduction. The M984E1 wrecker is capable of towing a wide range of vehicles. The towing cylinders and crosstube attach to the disabled vehicle by means of adapters that mount on the crosstube. The lift and tow cylinders are used to position the adapters, raise/lower and tow the disabled vehicle. Chains are attached between the wrecker and disabled vehicle for safety purposes.

WARNING

The M984E1 should not be operated at speeds over 15 mph except on paved roads when the operator determines that the vehicle being towed and the terrain allow safe operation. Engine brake switch must be "ON" for all towing operations. The following are maximum safe speeds:

Terrain Condition	Maximum speed, towed load up to 50,000 lbs	Maximum speed, towed load above 50,000 lbs
on road-level	35	30
on road-hilly	30	20
off road	15	15

Speeds in excess of the above can result in loss of control, serious injury or death.

CAUTION

- Extreme care must be used when towing the disabled vehicle to prevent further damage to disabled vehicle.
- Both tow cylinders must be fully retracted before towing the disabled vehicle, or damage to tow cylinders may result.
- Shackles must be removed from rear tow eyes on M984E1 wrecker before performing retrieval operations or damage to tow cylinders may result.

NOTE

- When possible, front towing is preferred for larger vehicles, because braking can be controlled to the rear of most vehicles with the towing air lines.
- The disabled vehicle's operator manual must be checked for towing preparation before the vehicle is towed. See VOL 1 for additional towing info on HEMTT.
- For detailed instructions on towing procedures refer to FM 20-22.
- Because of M984E1 wrecker rigid retrieval system all OFF-ROAD TOWING must be performed with towed vehicles front or rear lifted off ground.

M984E1 General Operating Procedures (Cont)

b. Towing Categories. The M984E1 wrecker will perform two types of towing.

(1) Lift and Tow (OFF ROAD).

With the retrieval system attached to one end (front or rear) of the disabled vehicle, it is raised as high as possible, but (lifted tires) not more than 12 in. (30 cm) above the ground.

(2) Tow (HIGHWAY).

With the retrieval system attached (same as lift and tow) to the front of the disabled vehicle, it is towed with all tires on the ground, however if required, front or rear may also be lifted off ground (FM 20-22).

c. Vehicles and Vehicle Series the M984E1 will Tow.

- | | | |
|----------|----------|-----------|
| 1. M977 | 7. M520 | 13. M1001 |
| 2. M1074 | 8. M880 | 14. M1008 |
| 3. M1070 | 9. M911 | |
| 4. M35 | 10. M915 | |
| 5. M123 | 11. M939 | |
| 6. M151 | 12. M966 | |

M954E1 General Operating Procedures (Cont)

d. Disabled Vehicle Adapters.

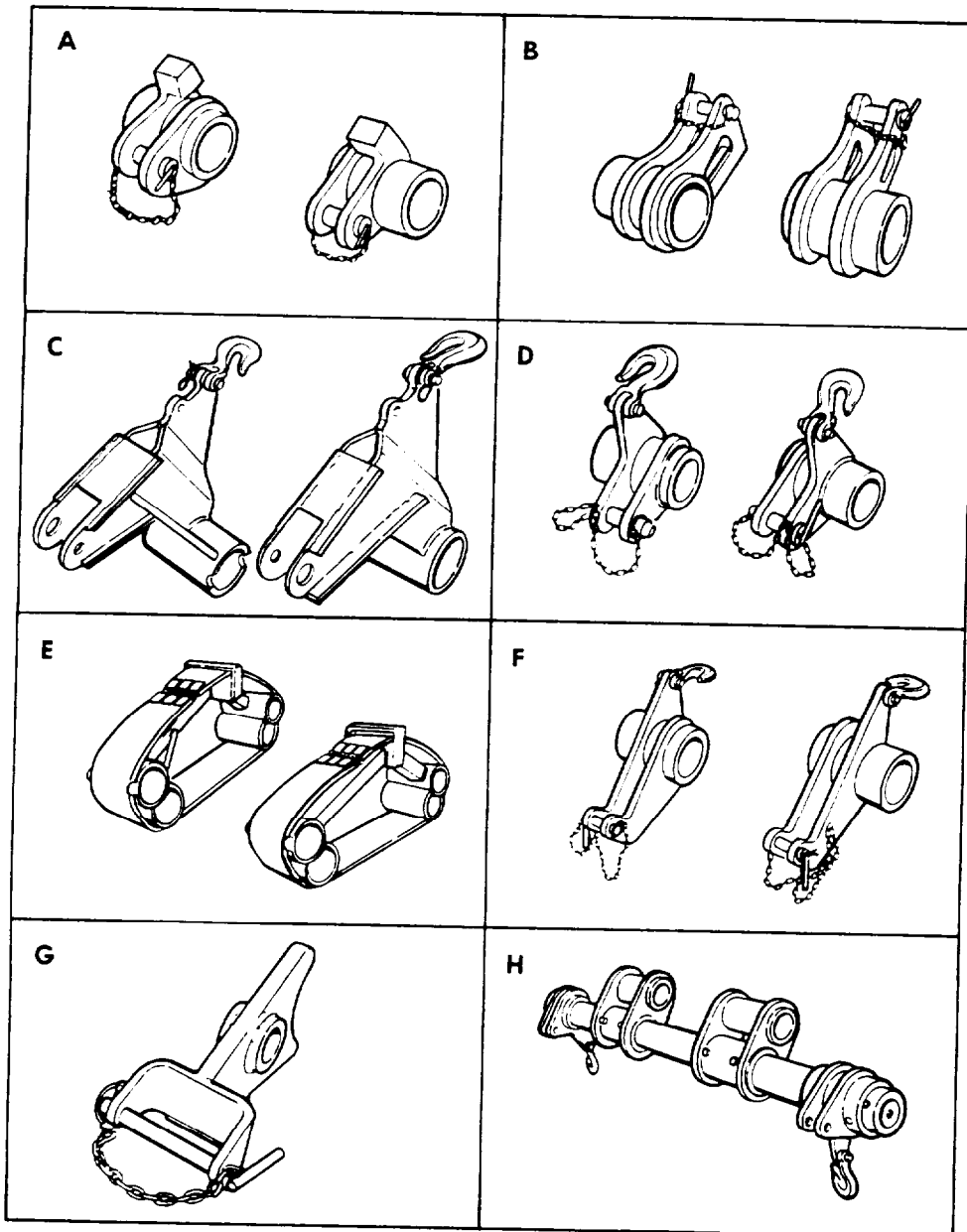
NOTE

Refer to Figure 2-31 and Appendix B for Adapters.

Vehicle	Towing Attachment	Adapter	Adapter Stowage Location
M977	Front	A	Crosstube
	Rear	B	Equipment Body
M1074	Front	A	Crosstube
	Rear	B	Equipment Body
M1070	Front	D	Equipment Body
	Rear	B	
M35	Front	F	Equipment Body
	Rear	C	
M911	Front	D	Equipment Body
	Rear	C	
M915	Front	D	Equipment Body
	Rear	C	
M939	Front	F	Equipment Body
	Rear	C	
M966	Front	D and G	Equipment Body
	Rear	D and G	
M1008	Front	F	Equipment Body
	Rear	E	

M984E1 General Operating Procedures (Cont)

2-71. RETRIEVAL TOWING SYSTEM (CONT.)



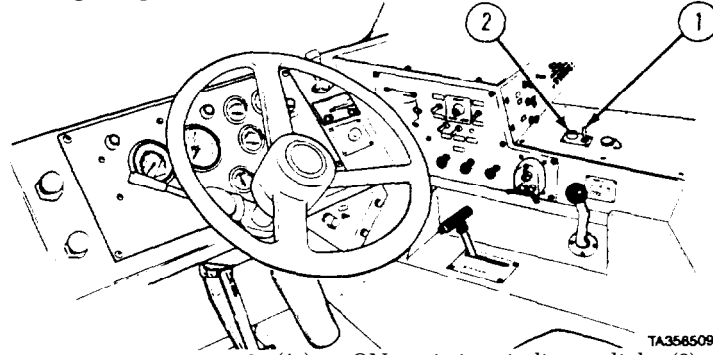
TA475064

Figure 2-31. Towing Adapters and Extensions

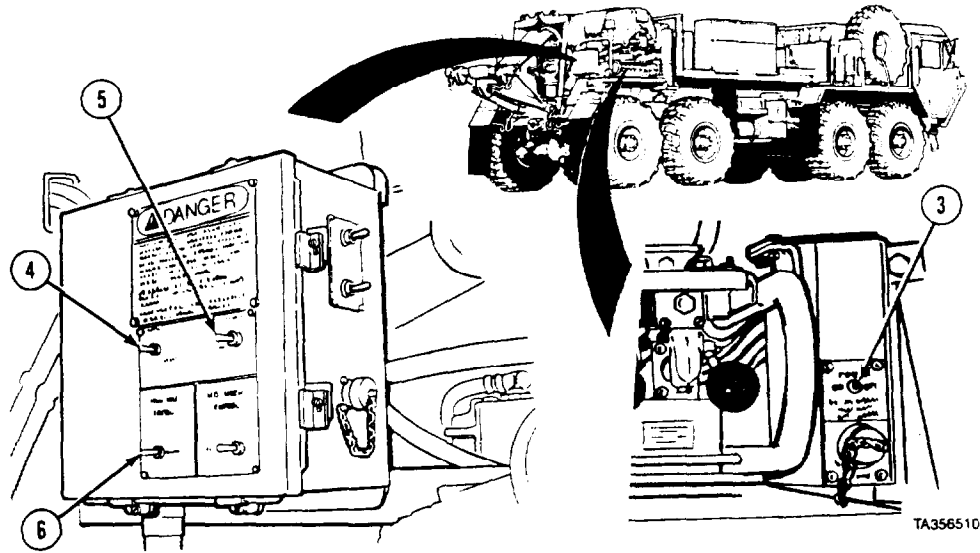
M984E1 General Operating Procedures (Cont)

2-72. RETRIEVAL OPERATION.

- a. Prepare Retrieval System for Operation.
 (1) Set up beacon lights (para 2-62).
 (2) Start engine (para 2-11a or 1-lb).



- (3) Set PTO ENGAGE switch (1) to ON position. indicator light (2) should come on.

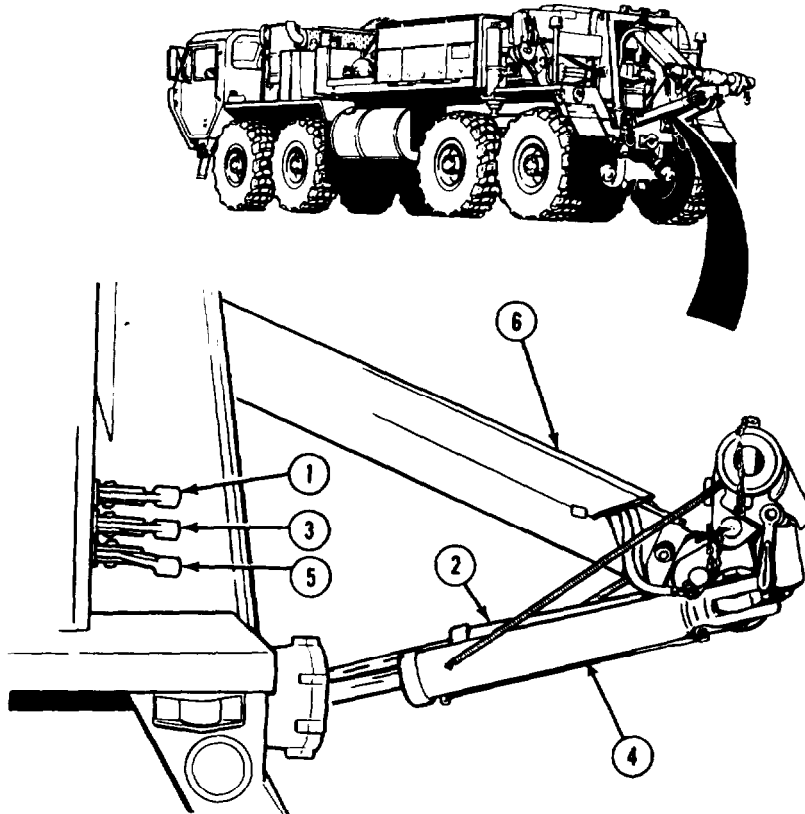


- (4) Position M984E1 wrecker in front of disabled vehicle as required
 (5) Set POWER switch (3) to ON.
 (6) Set POWER switch (1) to ON (**LOW IDLE ONLY**).
 (7) Push and release LATCH switch (5).
 (8) Set HIGH IDLE switch (6) to CONTINUOUS.

M984E1 General Operating Procedures (Cont)

2-72. RETRIEVAL OPERATION (CONT).

b. Position Retrieval System.



- (1) To operate right tow cylinder, push RIGHT TOW CYLINDER control lever (1) in to retract right tow cylinder (2), and pull RIGHT TOW CYLINDER control lever out to extend right tow cylinder.
- (2) To operate left tow cylinder, push LEFT TOW CYLINDER control lever (3) in to retract left tow cylinder (4), and pull LEFT TOW CYLINDER control lever out to extend left tow cylinder.
- (3) To operate lift cylinder, push LIFT CYLINDER control lever (5) in to retract lift cylinder (6) and pull LIFT CYLINDER control lever out to extend lift cylinder.

c. Stow Lift Cylinder.

- (1) Fully retract lift cylinder (6), then operate LIFT CYLINDER CONTROL lever (5) forward just enough to relieve pressure.

M984E1 General Operating Procedures (Cont)

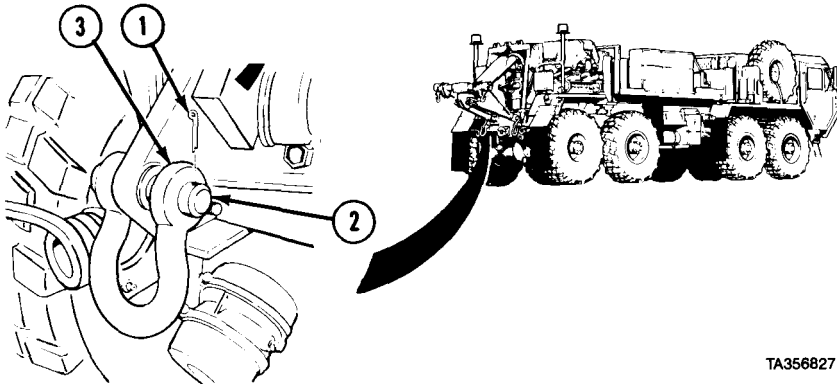
2-73. TOW M977.

a. Front Hookup.

NOTE

This is a two-soldier task.

- (1) Prepare retrieval system for operation (para 2-72).

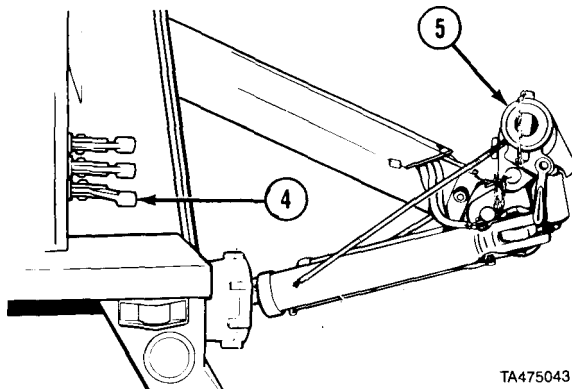


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NOTE

Right and left towing shackles are removed the same way.

- (2) Remove crotter pin (1), pin (2), and towing shackle (3).

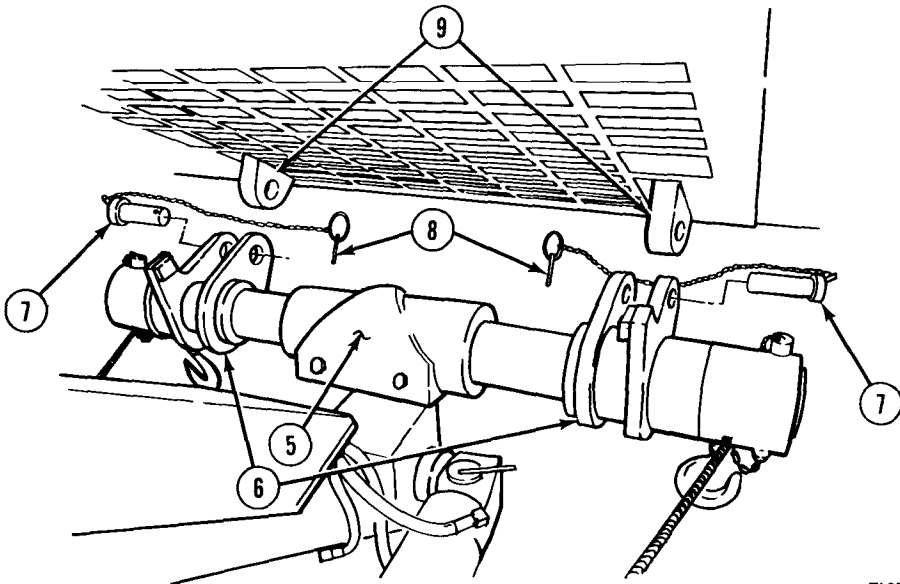


TA475043

- (3) Pull LIFT CYLINDER control lever (4) to lower crosstube (5) to approximately 3 ft (1 m) above ground.
 (4) Position wrecker so that crosstube (5) is approximately 1 ft (30 cm) from tow eyes of disabled vehicle and centered on disabled vehicle.

M984E1 General Operating Procedures (Cont)

2-73. TOW M977 (CONT).



TA356676

- (5) Turn adapters (6) so pins (7) are on top. Remove two quick pins (8) and pins from adapters.

WARNING

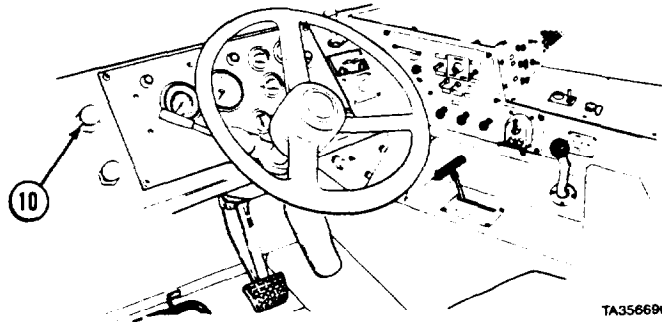
Keep hands and fingers away from adapters and tow eyes when operating retriever controls. Personal injury could result.

NOTE

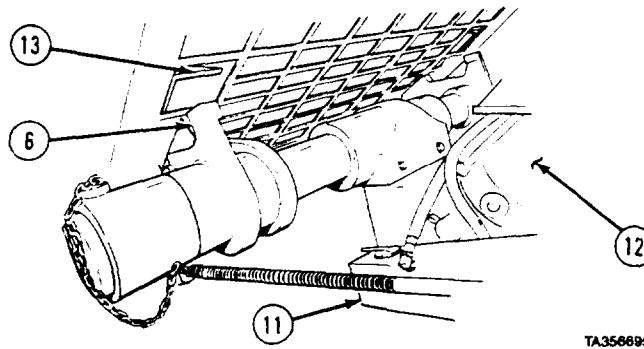
If disabled vehicle has towing shackles installed, remove shackles and stow in disabled vehicle.

- (6) Soldier A operates retrieval controls (para 2-72b) while Soldier A and B position crosscube (5) so holes in adapters (6) align with front tow eyes (9).
(7) Insert two pins (7) through adapters (6) and front tow eyes (9). Install quick pins (8) in pins.

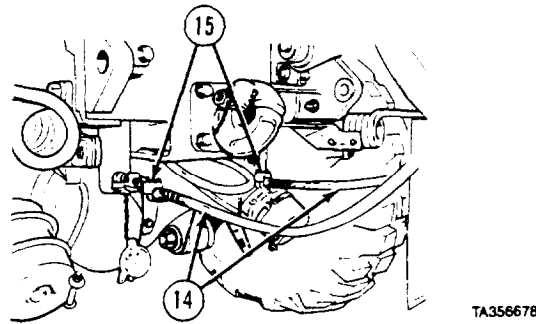
M984E1 General Operating Procedures (Cont)



- (8) Push in PARKING BRAKE control (10) on disabled vehicle. If air system is inoperative, manually release spring brakes (para 2-47).



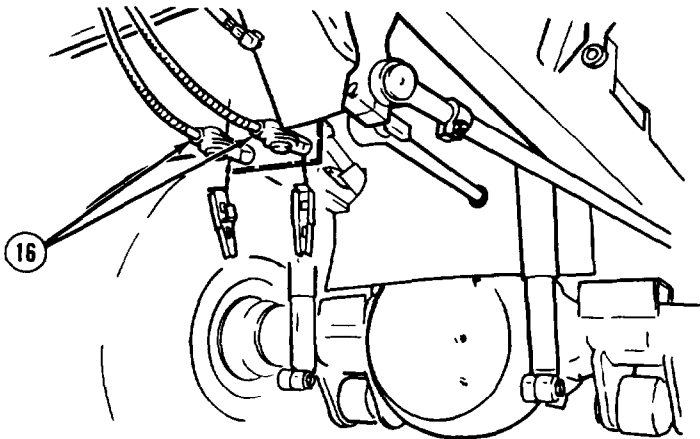
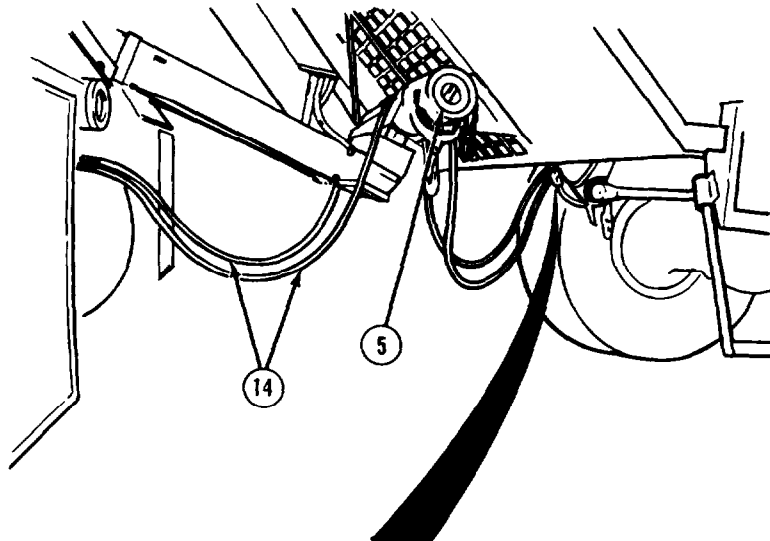
- (9) Alternately push in LIFT and TOW CYLINDER control levers until tow cylinders (11) are fully retracted.
(10) Push in LIFT CYLINDER control lever to retract lift cylinder (12) until adapters (6) contact frame (13).



- (11) Remove two airhoses (14) from stowage and attach to rear glad hands (15) on wrecker.

M994E1 General Operating Procedures (Cont)

2-73. TOW M977 (CONT).



CAUTION

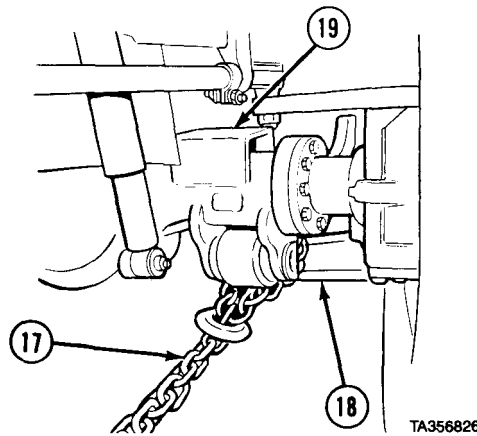
Do not route airhoses between retrieval cylinders or damage to airhoses may result.

NOTE

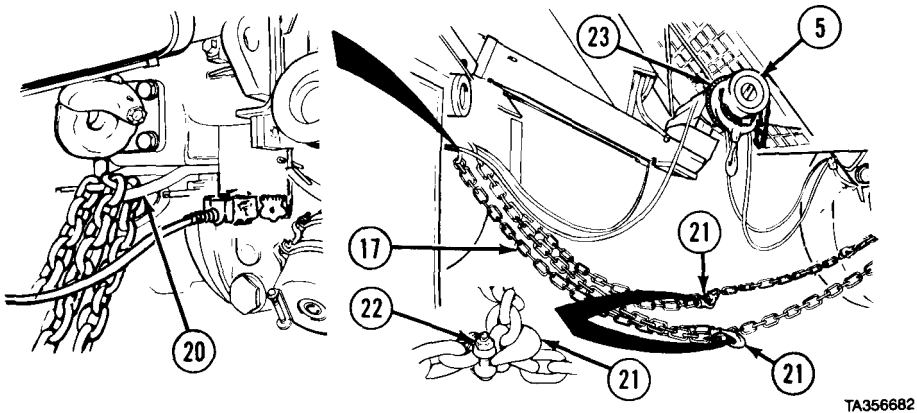
Rear emergency airhose from wrecker must be connected to front emergency glad hand on disabled vehicle. Rear service airhose from wrecker must be connected to front service glad hand on disabled vehicle.

- (12) Route airhoses (14) over cross-tube (5) and attach to front glad hands (16) on disabled vehicle.

M984E1 General Operating Procedures (Cont)



- (13) Remove two 16-foot (5 m) safety chains (17) from stowage. Route chain over walking beam (18) behind No. 1 axle (19) on disabled vehicle.
- (14) Hook safety chain (17) together under walking beam (18).
- (15) Repeat steps (13) and (14) for other side of disabled vehicle.

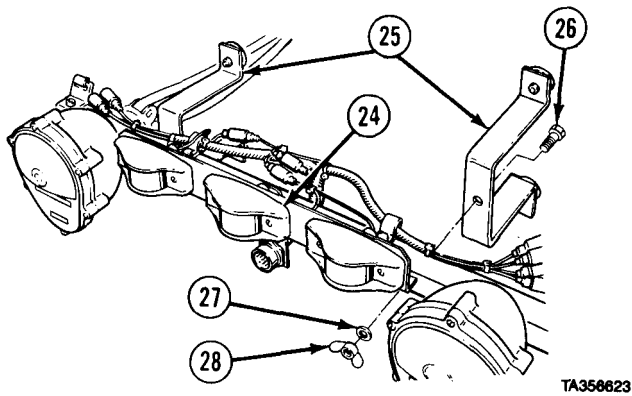


NOTE

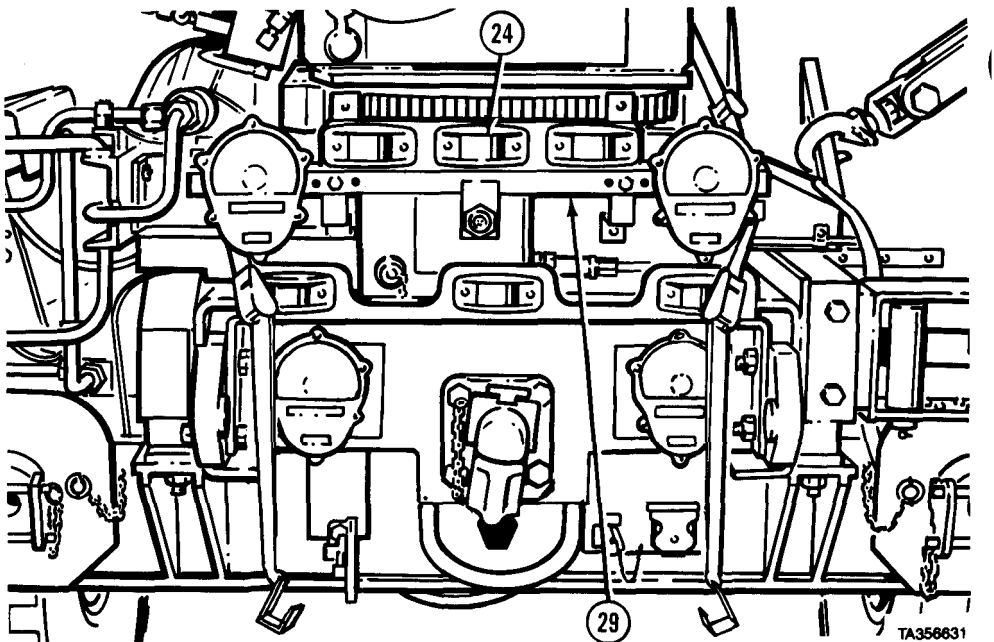
- Safety chains can be connected to rear tow shackles or safety chain hoop. Tow shackles can be used only after tow cylinders are extended.
 - Adjust chain slack so chains are approximately 6 in. (150 mm) above the ground.
- (16) Route two safety chains (17) through safety chain hoop (20) on wrecker and secure grab hook (21) with safety shackle (22).
 - (17) Wrap two springs (23) around crosstube (5) and secure.

M984E1 General Operating Procedures (Cont)

2-73. TOW M977 (CONT).



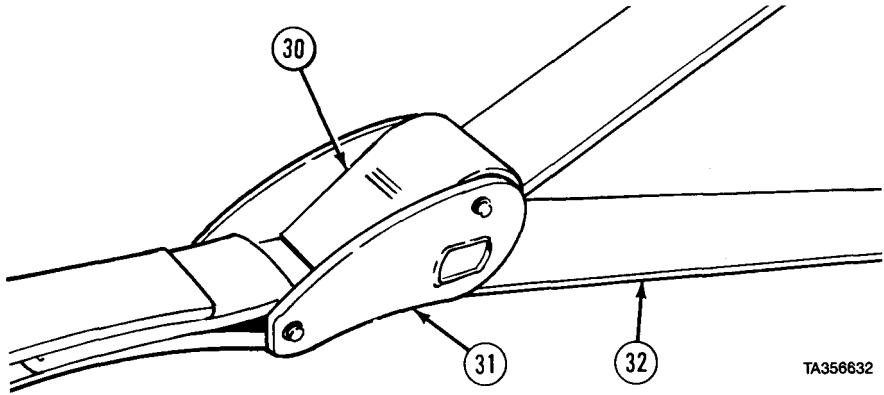
- (18) Prepare disabled vehicle for towing (para 2-69).
- (19) Remove emergency tow lights (24) and two brackets (25) from storage.
- (20) Install two brackets (25) in center holes of emergency tow lights (24) with two screws (26), washers (27), and nuts (28).



M977 SHOWN

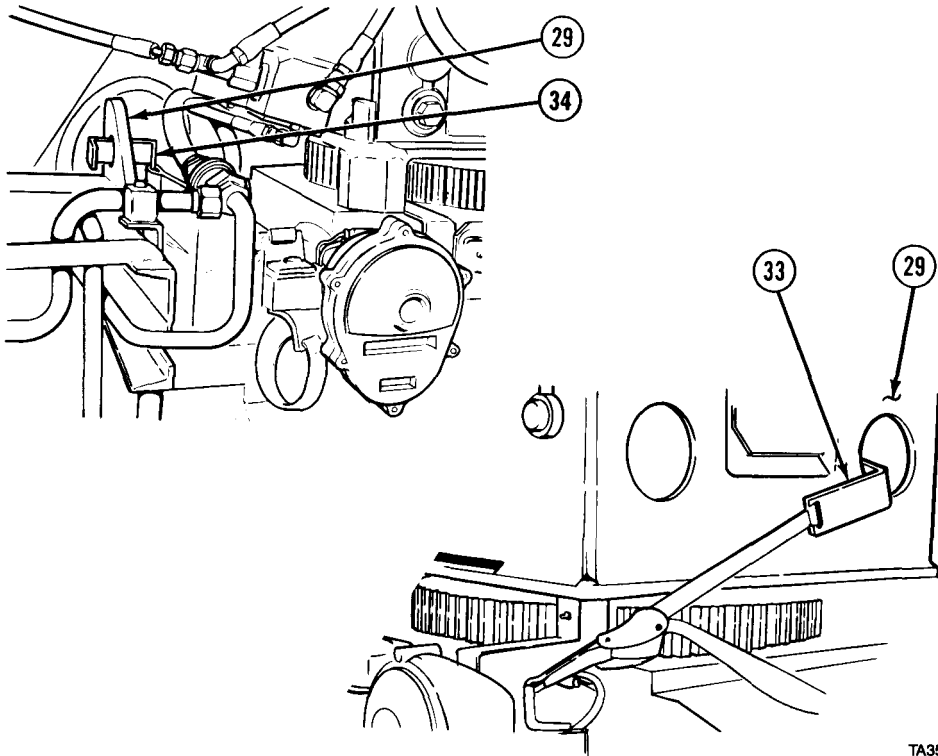
- (21) Position emergency tow lights (24) against crane base (29).

M984E1 General Operating Procedures (Cont)



TA356632

(22) Press in handle (30) on strap clamp (31) and pull strap (32) to lengthen.

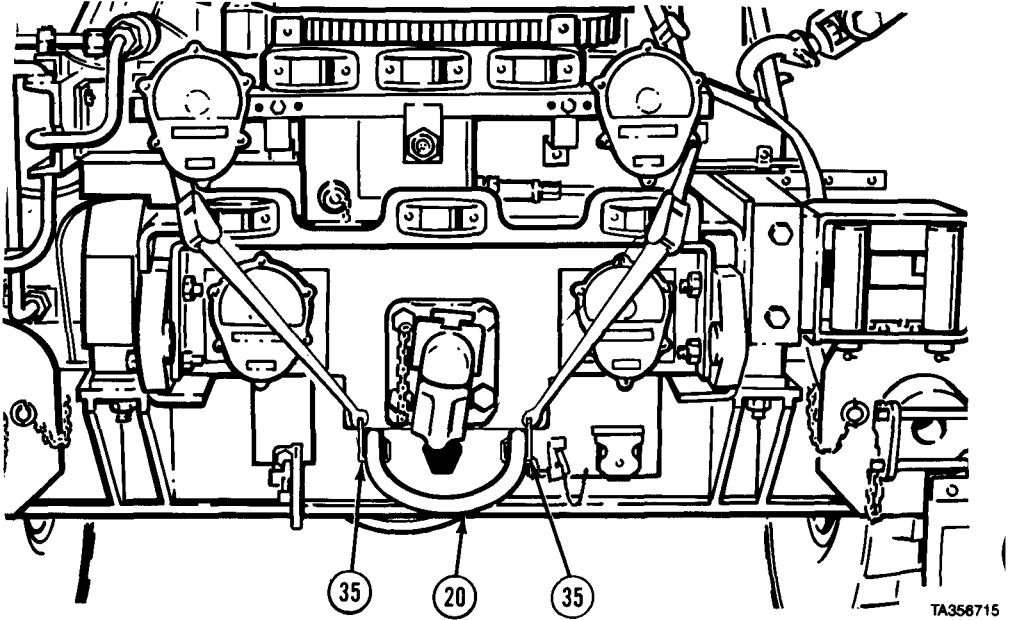


TA356716

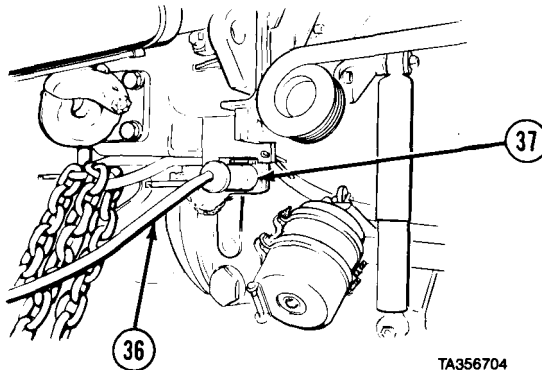
(23) Install top right strap hook (33) on crane base (29).
 (24) Install top left strap hook (34) on crane base (29).

M984E1 General Operating Procedures (Cent)

2-73. TOW M977 (CONT.)

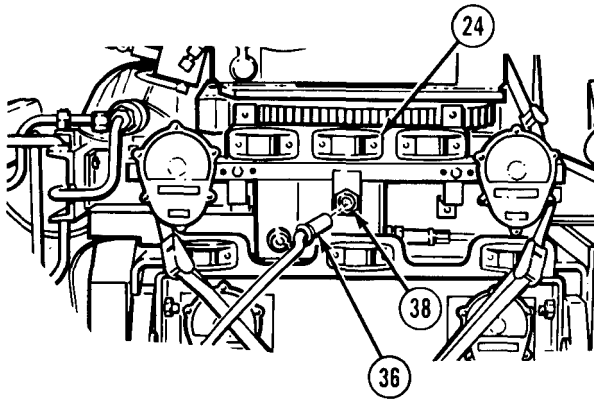


- (25) Install lower left and lower right strap hooks (35) to safety chain hoop (20). Tighten straps.



- (26) Remove tow light cable (36) from stowage and connect to rear electrical connector (37) on wrecker.

M984E1 General Operating Procedures (Cont)



TA356705

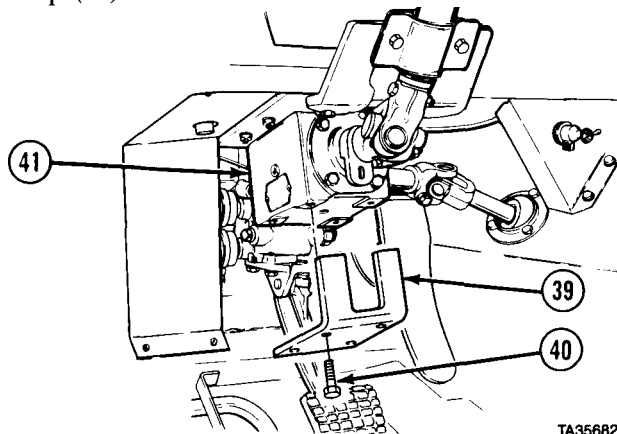
CAUTION

Route cable so it does not drag on ground or interfere with turning tires.

- (27) Route other end of tow light cable (36) to emergency tow lights (24) on disabled vehicle and plug in at connector (38).

NOTE

- If disabled vehicle will be lifted and towed, continue with step (28).
- If disabled vehicle will be towed with all tires on paved roads only, raise crosstube enough to partially unload disabled vehicle's front suspension. Keep front tires in firm contact with ground and proceed to step (34).

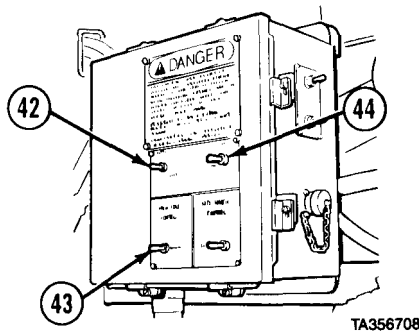


TA356828

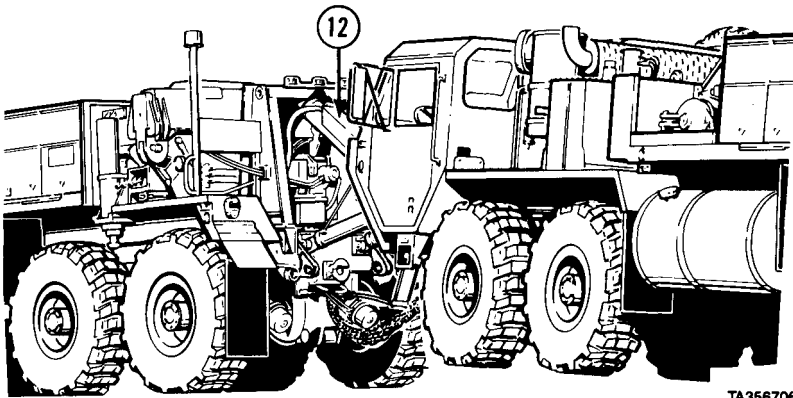
- (28) Remove steering lock bracket (39) and four screws (40) from stowage.
 (29) Install steering lock bracket (39) on 90° gearbox (41) with four screws (40).

M984E1 General Operating Procedures (Cont)

2-73. TOW M977 (CONT).



- (30) Set POWER switch (42) to ON position.
- (31) Set HIGH IDLE switch (43) to CONTINUOUS.
- (32) Push and release LATCH switch (44). Engine speed will increase to approximately 1500 rpm.



WARNING

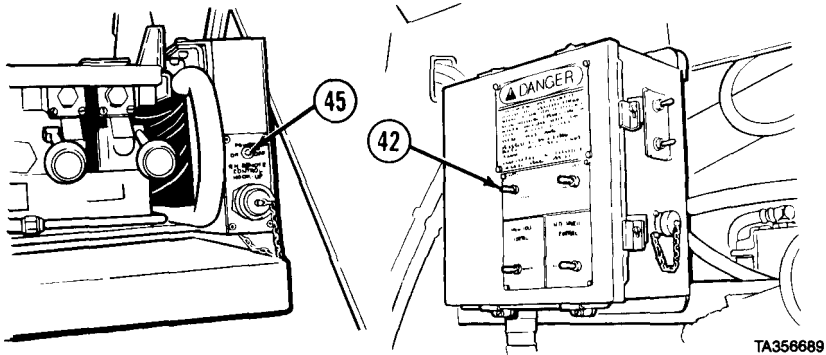
Keep out from under retrieval system and disabled vehicle when raised off ground or personal injury or death may result.

CAUTION

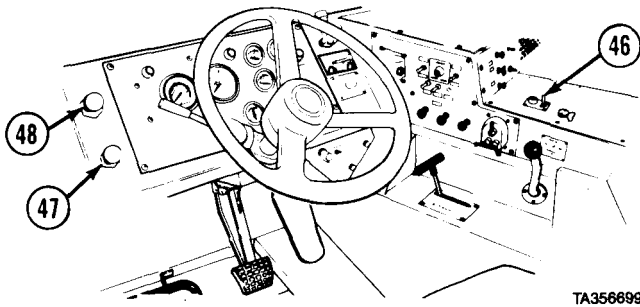
- Fully retract both tow cylinders before lifting disabled vehicle or equipment damage may result.
- Make sure all rigging is secure. Loose rigging can become entangled and cause damage to equipment.

- (33) Push LIFT CYLINDER control lever to retract lift cylinder (12) and raise disabled vehicle approximately 1.5 ft (45 cm) off ground.

M984E1 General Operating Procedures (Cont)



- (34) Set POWER switch (42) to OFF position.
- (35) Set POWER switch (45) to OFF position.



- (36) Set PTO ENGAGE switch (46) to OFF position.
- (37) Push in TRAILER AIR SUPPLY control (47).
- (38) Turn on service drive lights (para 2-10d).
- (39) Turn on emergency flashers on M984E1 vehicle (para 2-44a) and disabled vehicle.
- (40) Push in PARKING BRAKE control (48) and select desired gear (para 2-11e).

WARNING

The M984E1 should not be operated at speeds over 15 mph except on paved roads when the operator determines that the vehicle being towed and the terrain allow safe operation. Engine brake switch must be "ON" for all towing operations. The following are maximum safe speeds:

Terrain Condition	Maximum speed, towed load up to 50,000 lbs	Maximum speed, towed load above 50,000 lbs
on road-level	35	30
on road-hilly	30	20
off road	15	15

Speeds in excess of the above can result in loss of control, serious injury or death.

- (41) Transport disabled vehicle.

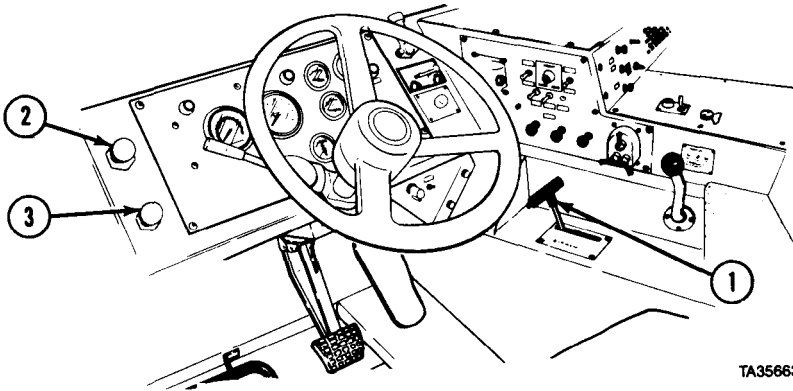
M984E1 General Operating Procedures (Cent)

2-73. TOW M977 (CONT).

b. Front Disconnect.

NOTE

This is a two-soldier task.



- (1) Set transmission range selector (1) to N.
- (2) Pull PARKING BRAKE control (2).
- (3) Pull TRAILER AIR SUPPLY control (3).

WARNING

Do not stand between vehicles while disabled vehicle is raised off ground. Falling vehicle can cause serious injury or death.

NOTE

After lowering disabled vehicle, extend lift and tow cylinders approximately 2 to 4 inches (50 to 100 mm) to allow for adjustment when removing adapters.

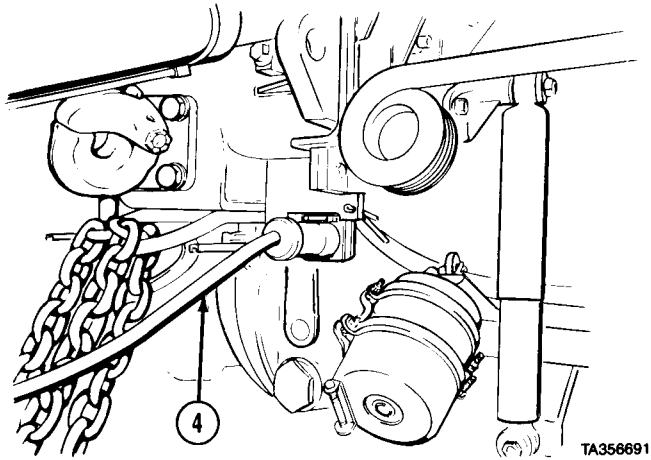
- (4) Prepare retrieval system for operation (para 2-72) and pull LIFT CYLINDER control lever to extend lift cylinder and lower towed vehicle to ground.

WARNING

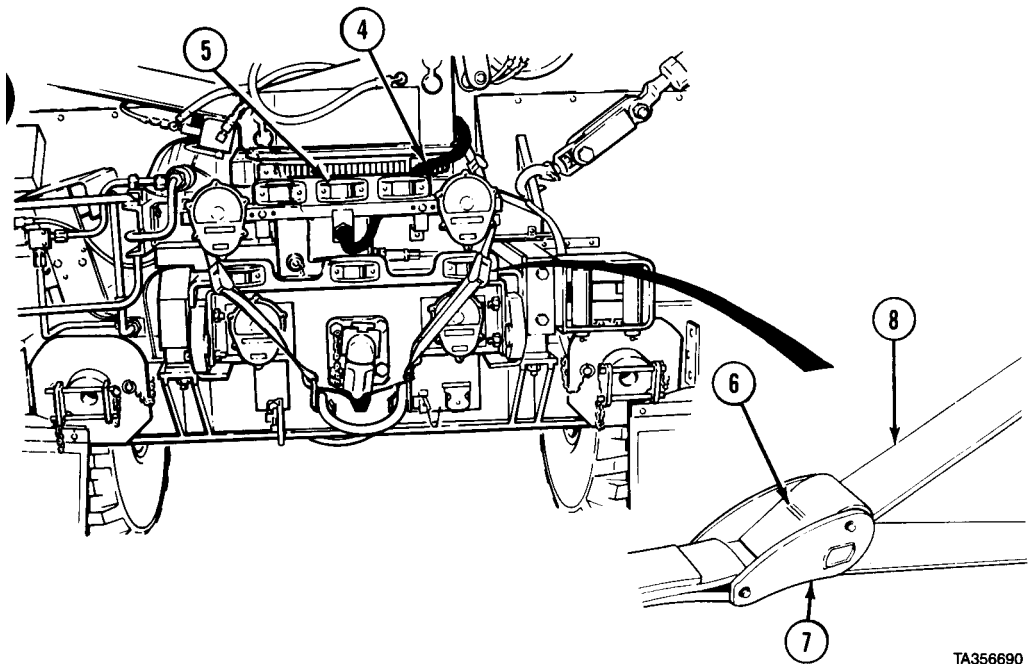
If disabled vehicle's air system is inoperative, chock wheels of disabled vehicle. Failure to chock wheels may result in personal injury.

- (5) Pull PARKING BRAKE control (2) on disabled vehicle. If parking brake is inoperable chock wheels on disabled vehicle.

M984E1 General Operating Procedures (Cont)



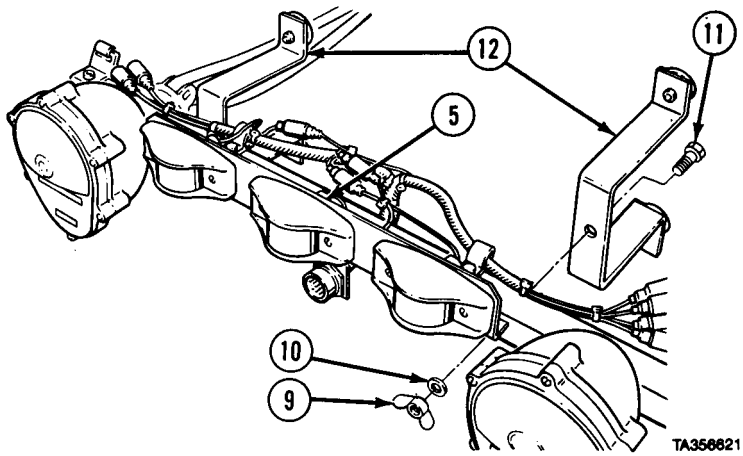
(6) Remove tow light cable (4) from wrecker.



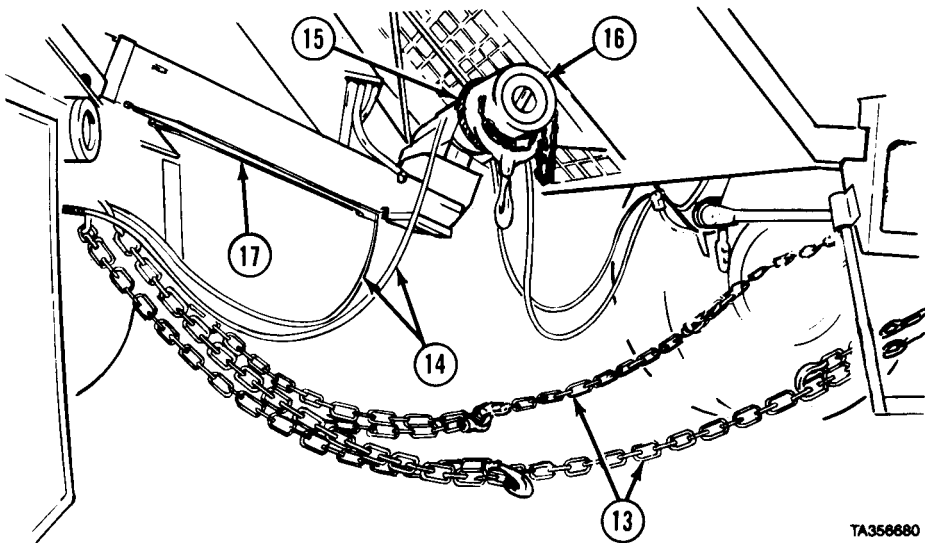
- (7) Remove tow light cable (4) from emergency tow lights (5) and stow.
- (8) Press in handle (6) on strap clamp (7). Pull strap (8) to loosen straps on emergency tow lights (5).
- (9) Remove emergency tow lights (5) from disabled vehicle.

M984E1 General Operating Procedures (Cont)

2-73. TOW M977 (CONT).

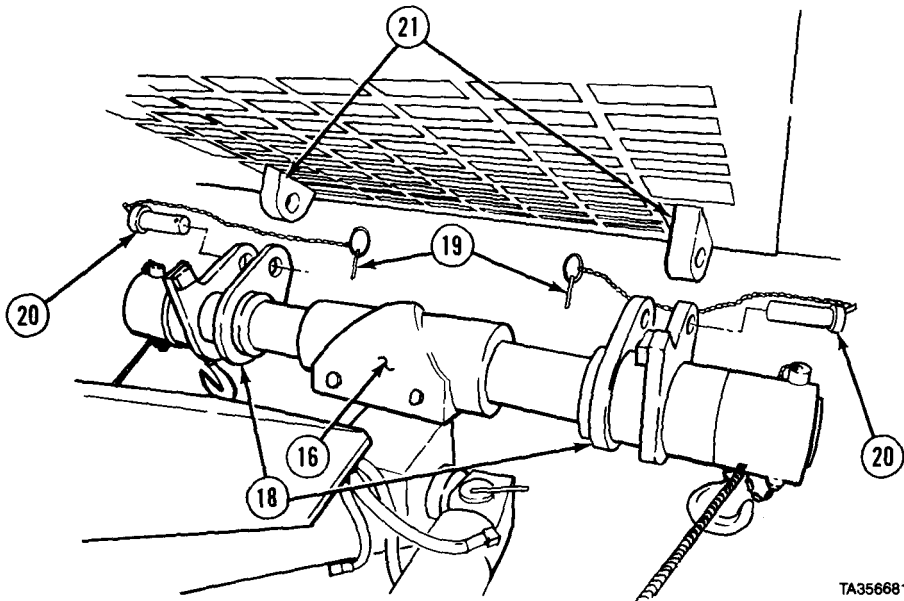


- (10) Remove two nuts (9), washers (10), screws (11), and brackets (12) from emergency tow lights (5). Stow emergency tow lights and brackets.

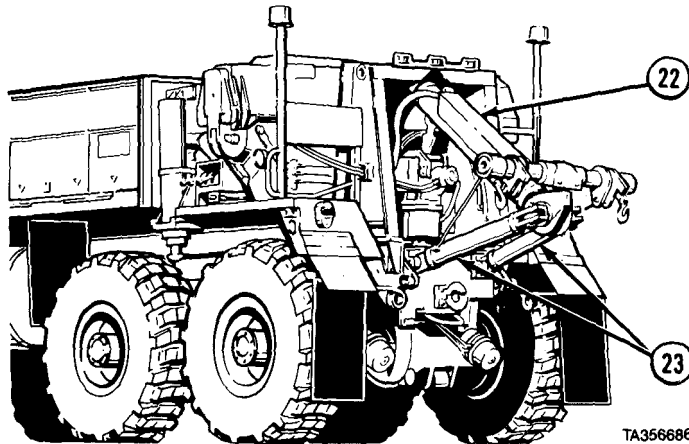


- (11) Remove and stow safety chains (13) and air hoses (14).
- (12) Unwrap two springs (15) from crosstube (16).
- (13) Connect two springs (15) to tow cylinders (17).

M984E1 General Operating Procedures (Cont)

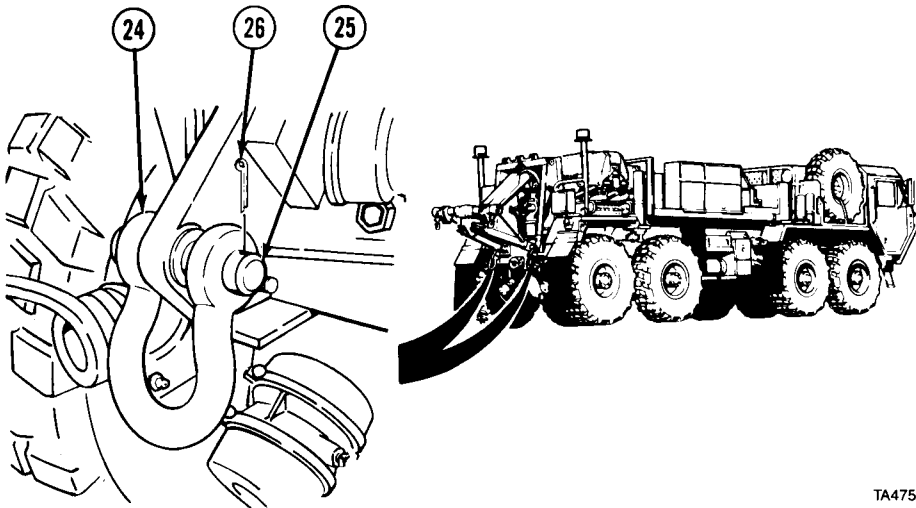


- (14) Operate retrieval controls (para 2-72b) and position crosstube (16) to relieve tension from adapters (18).
- (15) Remove two quick pins (19) and pins (20) from adapters (18).
- (16) Remove two adapters (18) from tow eyes (21) on disabled vehicle.
- (17) Install pins (20) in adapters (18).
- (18) Install quick pins (19) in pins (20).



- (19) Drive wrecker forward several feet and park (para 2-11o).
- (20) Operate retrieval controls and fully retract lift cylinders (22) and tow cylinders (23).

M984E1 General Operating Procedures (Cont)

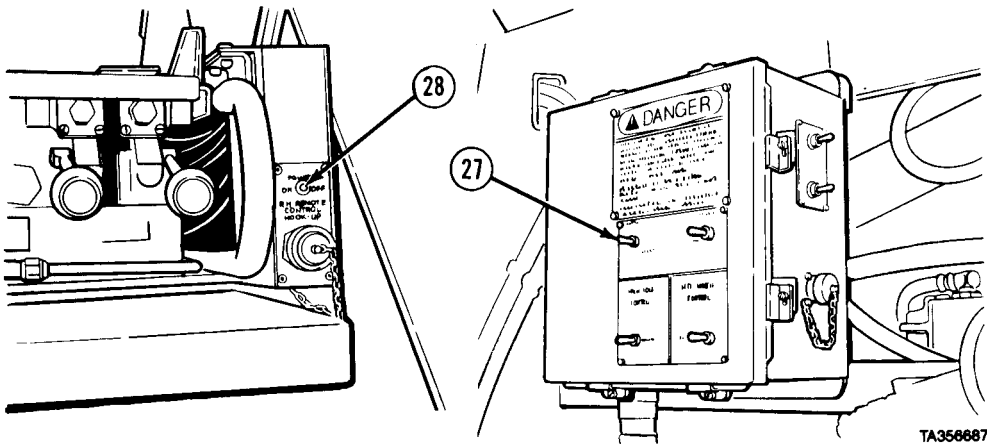


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NOTE

Right and left towing shackles are installed the same way.

(21) Install two towing shackles (24), pins (25) and cotter pins (26).

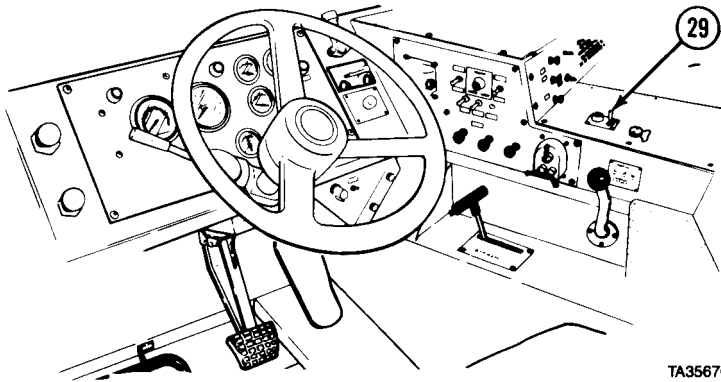


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(22) Set POWER switch (27) to OFF position.

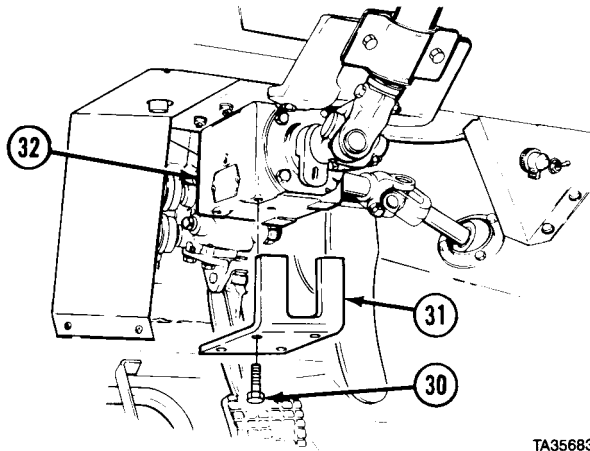
(23) Set POWER switch (28) to OFF position.

M984E1 General Operating Procedures (Cont)



TA356700

- (24) Turn off emergency flashers on wrecker (para 2-44f) and disabled vehicle.
- (25) Turn off service drive lights (para 2-10d).
- (26) Set PTO ENGAGE switch (29) to OFF position.
- (27) Remove and stow beacon lights (para 2-62).
- (28) Shut off engine (para 2-11p).



TA356831

- (29) Remove four screws (30) and steering lock bracket (31) from 900 gearbox (32) and stow.

M984E1 General Operating Procedures (Cont)

2-73. TOW M977 (CONT).

c. Rear Hookup.

NOTE

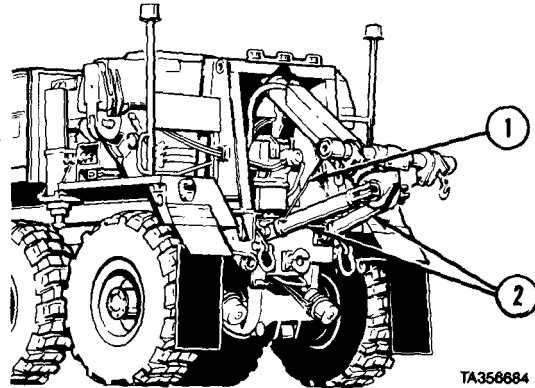
This is a two-soldier task.

- (1) Prepare retrieval system for operation (para 2-72).

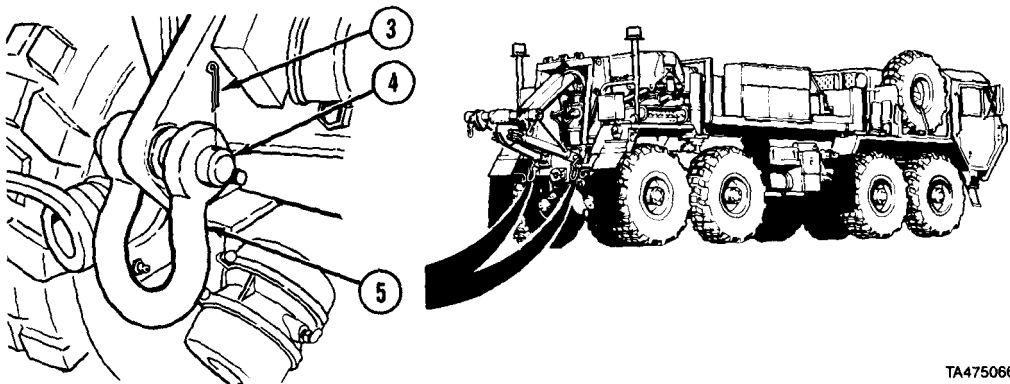
WARNING

- Hold crosstube when removing springs. Cross tube may swing or cause adapter to slide resulting in personal injury.
- Intervehicular air lines are not connected when towing from rear. Disabled vehicle will not have braking. Use extreme caution when transporting disabled vehicle using rear hookup. Vehicle traveling out of control can cause serious injury or death.

- (2) Disconnect two springs (1) from tow cylinders (2).



TA356684



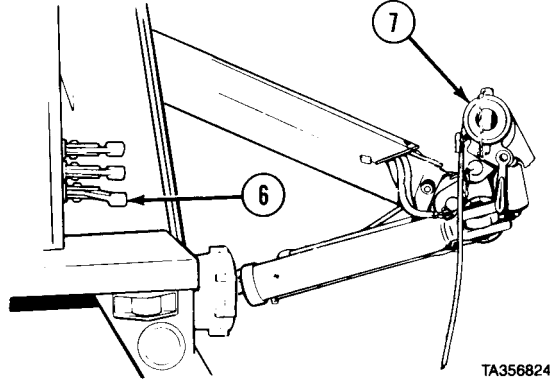
TA47506f

NOTE

Right and left towing shackles are removed the same way.

- (3) Remove two cotter pins (3), pins (4) and towing shackles (5) and stow on equipment body floor.

M984E1 General Operating Procedures (Cont)

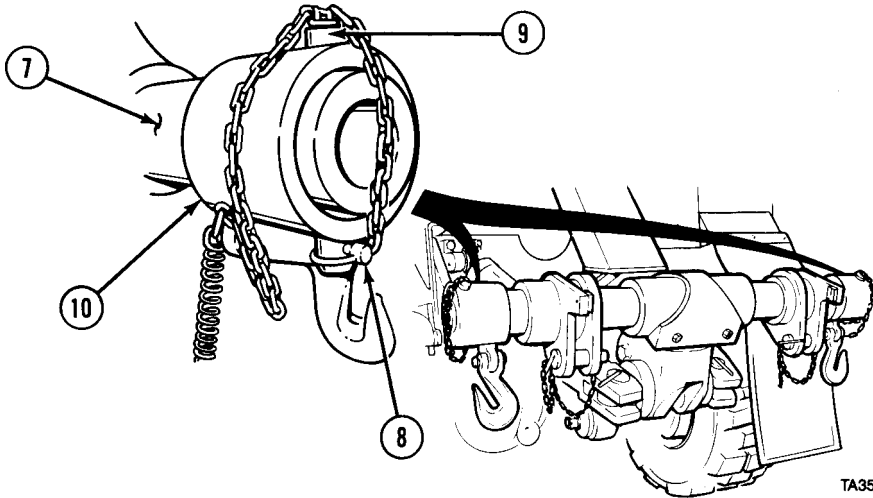


- (4) Pull LIFT CYLINDER control lever (6) to lower crosstube (7) to approximately 3 ft (1 m) above ground.

NOTE

For disabled M984E1 position wrecker so crosstube (7) is approximately 4 inches (100 mm) from disabled vehicle's crosstube.

- (5) Position wrecker so that crosstube (7) is approximately 1 ft (30 cm) from tow eyes of disabled vehicle and centered on disabled vehicle.



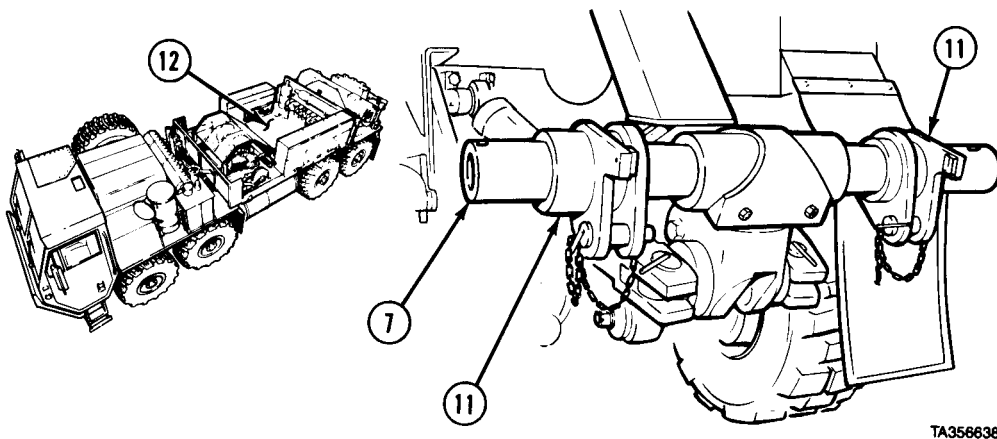
WARNING

When end caps are removed from crosstube, adapters may slide off causing personal injury.

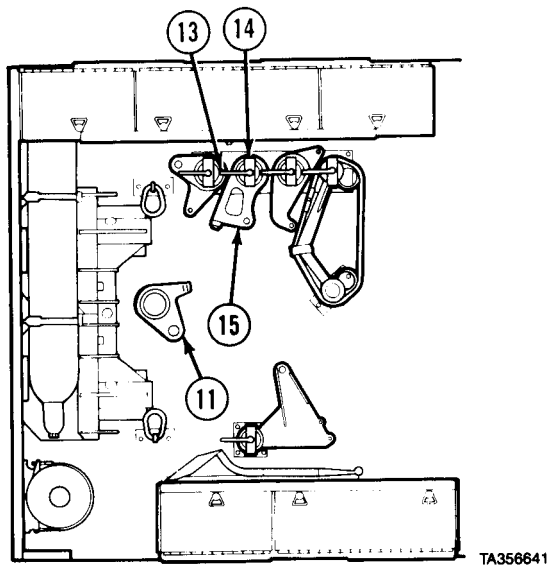
- (6) Remove two quick pins (8) and pins (9) from end caps (10).
 (7) Remove end caps (10) from crosstube (7).

M984E1 General Operating Procedures (Cont)

2-73. TOW M977 (CONT).

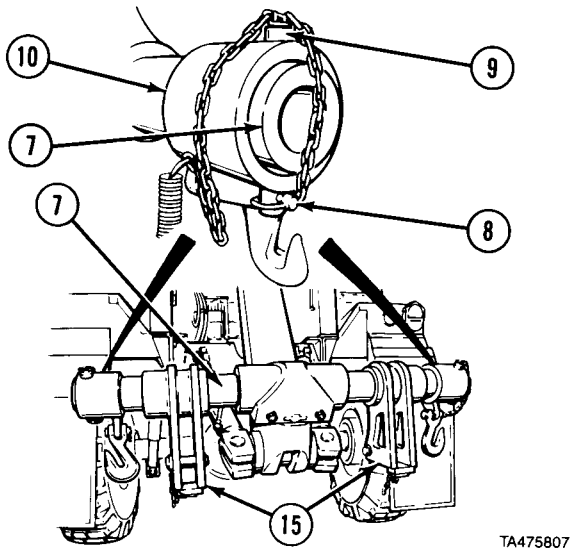


- (8) Remove two M977 front adapters (11) from crosstube (7) and place on equipment body floor (12).



- (9) Remove lock handle (13), lock plate (14), and two M977 rear tow adapters (15).
(10) Install two M977 front adapters (11) removed from crosstube with lock plate (14), and lock handle (13).

M984E1 General Operating Procedures (Cont)



WARNING

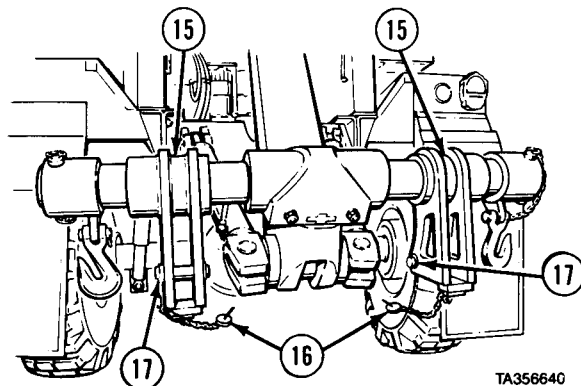
Adapters and end caps may slide off when installing and may cause personal injury.

- (11) Install two M977 rear tow adapters (15) on crosstube (7).
- (12) Install end caps (10) on crosstube (7).
- (13) Install pins (9) and quick pins (8).

NOTE

For M984E1 perform (14), for all others models go to step (15).

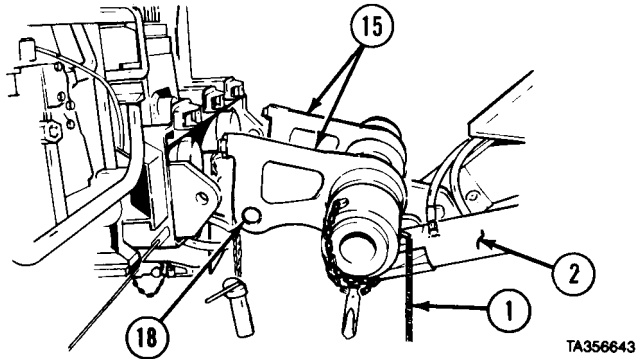
- (14) For M984E1 rear tow refer to para 2-74.



- (15) Remove two quick pins (16) and pins (17) from adapters (15).

M984E1 General Operating Procedures (Cont)

2-73. TOW M977 (CONT).



NOTE

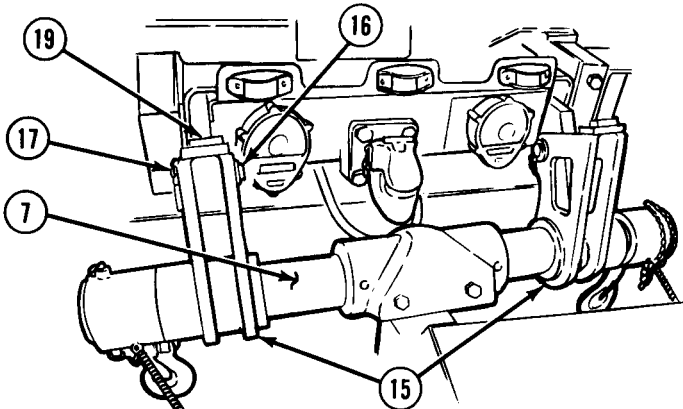
If disabled vehicle has towing shackles installed, remove shackles and stow in disabled vehicle.

- (16) Attach two springs (1) on tow cylinders (2).

WARNING

Adapters may have to be held in the upright position while moving the crosstube. Falling adapters may cause personal injury.

- (17) Rotate adapters (15) so mounting holes (18) are on top.

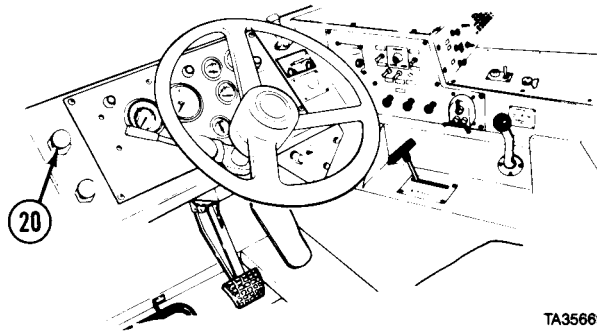


WARNING

Keep hands and fingers away from adapters and tow eyes when operating retriever controls. Personal injury could result.

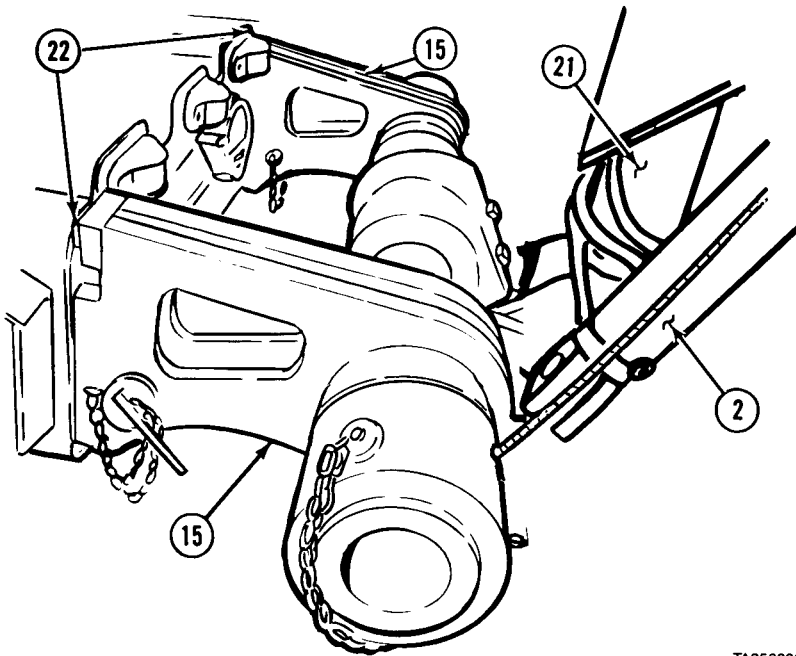
- (18) Soldier A operates retrieval system (para 2-72) while Soldiers A and B position crosstube (7) so holes in adapters (15) align with rear tow eyes (19).
- (19) Insert pins (17) through adapters (15) and rear tow eyes (19). Install quick pins (16).

M984E1 General Operating Procedures (Cont)



TA356693

- (20) Push in PARKING BRAKE control (20) on disabled vehicle. If air system is inoperative, manually release spring brakes (para 2-47).



TA356692

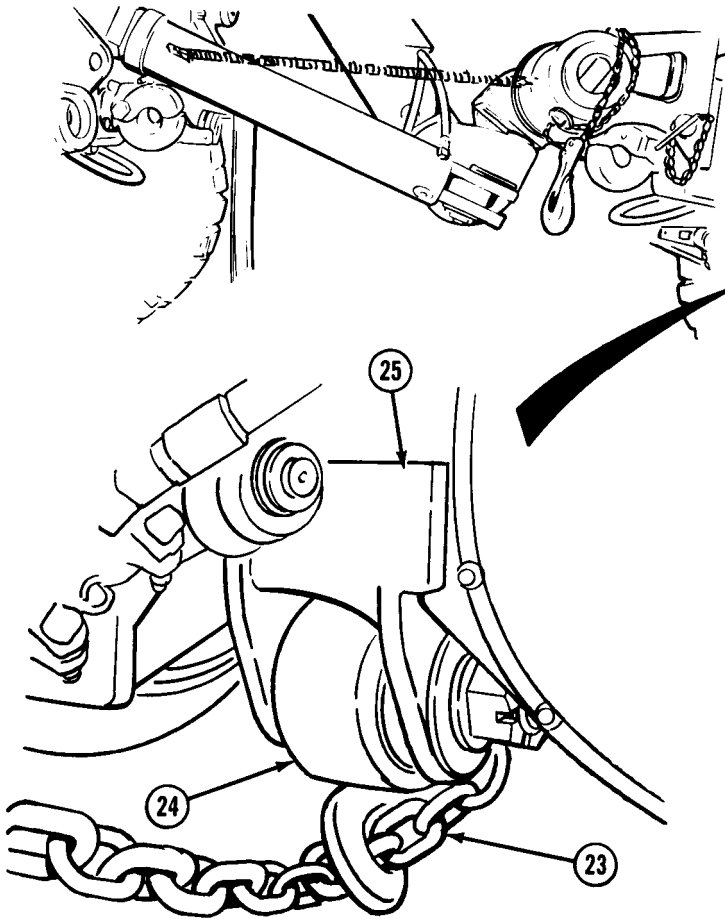
NOTE

Adapters must be resting against frame.

- (21) Alternately push in LIFT and TOW CYLINDER control levers until tow cylinders (2) are fully retracted.
 (22) Push in LIFT CYLINDER control lever to retract lift cylinder (21) until adapters (15) contact frame (22).

M984E1 General Operating Procedures (Cont)

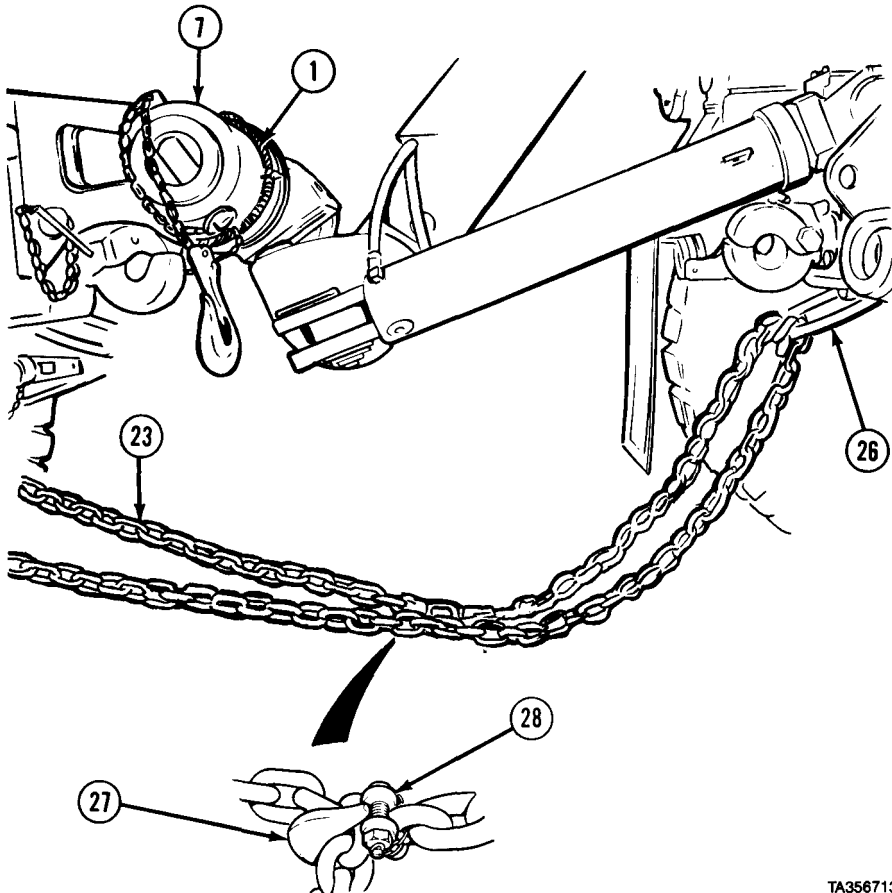
2-73. TOW M977 (CONT).



TA356825

- (23) Remove two 16-foot (5 m) safety chains (23) from stowage.
- (24) Route one safety chain (23) over walking beam (24) in front of No. 4 axle (25) on disabled vehicle.
- (25) Hook safety chain (23) together under walking beam (24).
- (26) Repeat steps (24) and (25) for other side of disabled vehicle.

M984E1 General Operating Procedures (Cont)



TA356713

NOTE

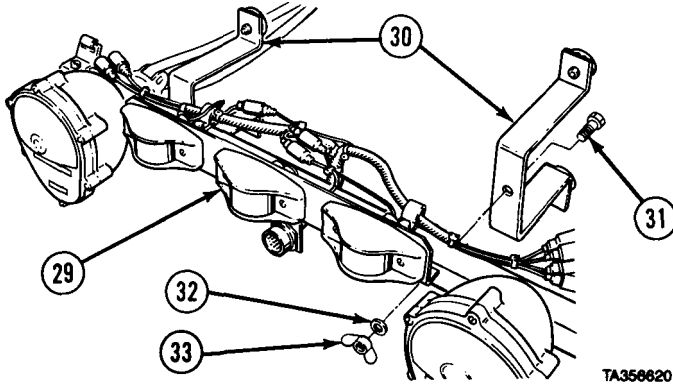
- Safety chains can be routed to towing shackles or safety chain hoop. Towing shackles can be used only after tow cylinders are extended.
- Adjust chain slack so chains are approximately 6 in. (150 mm) above ground.

(27) Route two safety chains (23) through safety chain hoop (26) on wrecker and secure grab hook (27) with safety shackles (28).

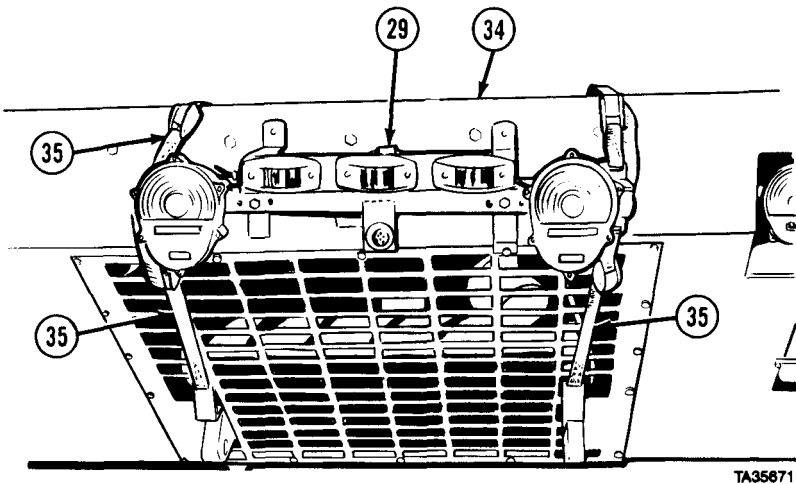
(28) Wrap two springs (1) around crosstube (7) and secure.

M984E1 General Operating Procedures (Cont)

2-73. TOW M977 (CONT).

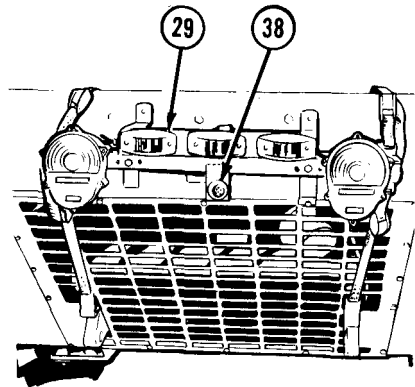
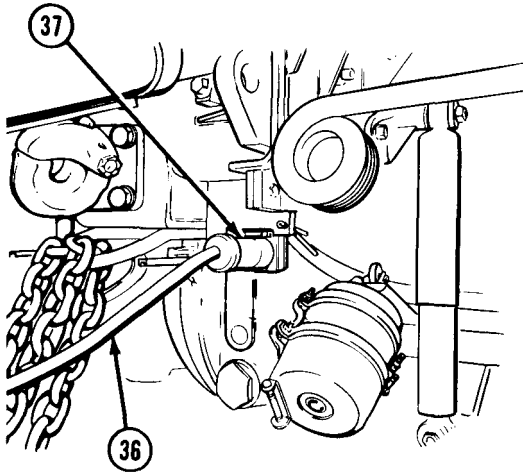


- (29) Prepare disabled vehicle for towing (para 2-69).
- (30) Remove emergency tow lights (29) and two brackets (30) from stowage.
- (31) Install two brackets (30) in center holes of emergency tow lights (27) with two screws (31), washers (32), and nuts (33).



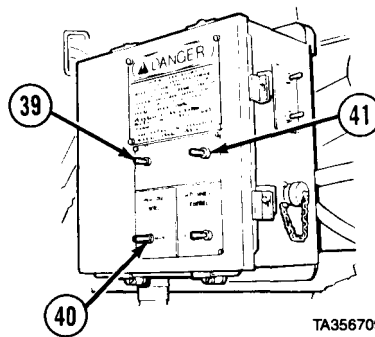
- (32) Position emergency tow lights (29) on skid plate (34). Fasten straps (35) to skid plate. Tighten straps.

M984E1 General Operating Procedures (Cont)



TA356712

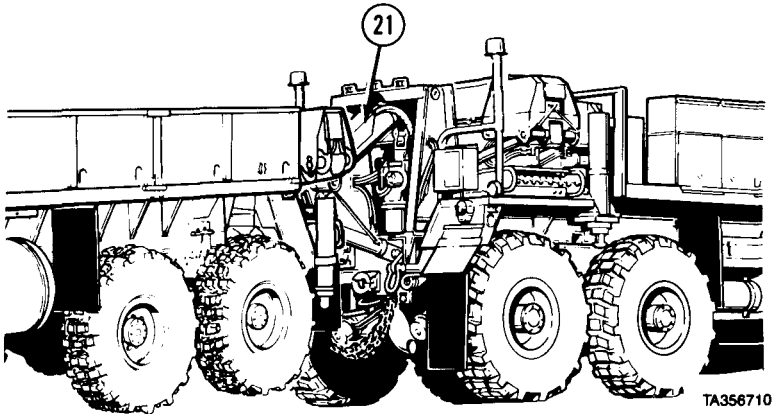
- (33) Remove tow lights cable (36) from stowage and connect to rear electrical connector (37) on wrecker.
- (34) Route other end of tow light cable (36) to emergency tow lights (29) on disabled vehicle and plug in at connector (38).



TA356709

- (35) Set POWER switch (39) to ON position.
- (36) Set HIGH IDLE switch (40) to CONTINUOUS.
- (37) Push and release LATCH switch (41). Engine speed will increase to approximately 1500 rpm.

2-73. TOW M977 (CONT).



WARNING

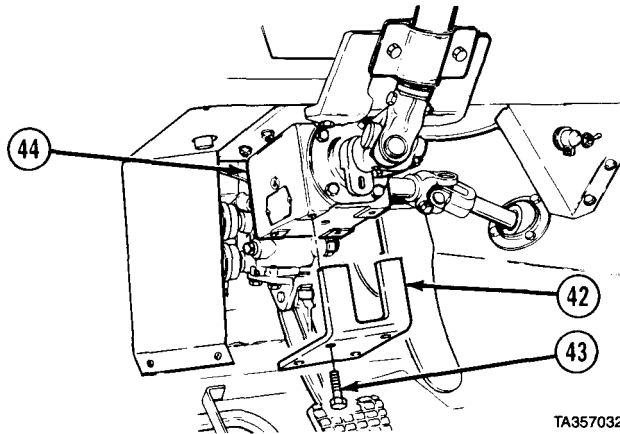
Keep out from under retrieval system and disabled vehicle when raised off ground or personal injury or death may result.

CAUTION

- Fully retract both tow cylinders before lifting disabled vehicle or equipment damage may result.
- Make sure all rigging is secure. Loose rigging can become entangled and cause damage to equipment.

(38) Push in LIFT CYLINDER control lever to retract lift cylinder (21) and raise disabled vehicle approximately 1.5 ft (45 cm) off ground.

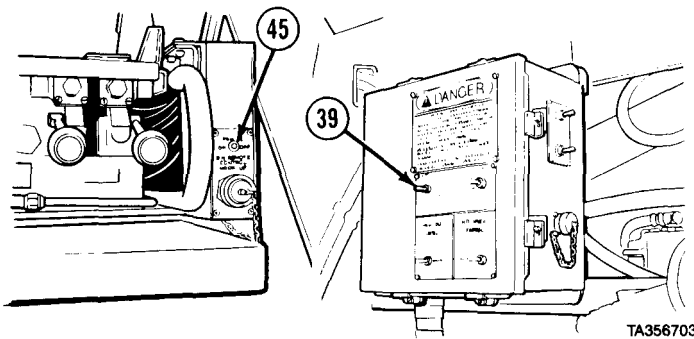
M984E1 General Operating Procedures (Cont)



NOTE

If tires of disabled vehicle have to be straightened out manually, Soldier A can drive wrecker forward 20 to 30 feet (6 to 10 m) while Soldier B straightens out tires on disabled vehicle.

- (39) Straighten front wheels on disabled vehicle.
- (40) Remove steering lock bracket (42) and four screws (43) from stowage,
- (41) Install steering lock bracket (42) on 90° gear box (44) with four screws (43).



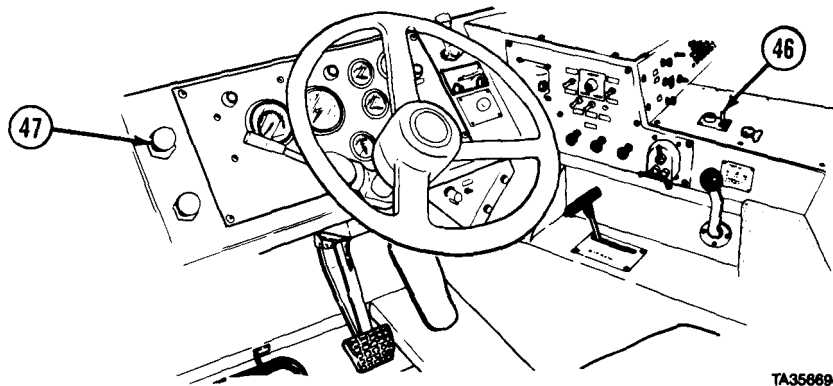
NOTE

Make sure all rigging is secure.

- (42) Set POWER switch (39) to OFF position.
- (43) Set POWER switch (45) to OFF position.

M984E1 General Operating Procedures (Cont)

2-73. TOW M977 (CONT).



TA356698

- (44) Set PTO ENGAGE switch (46) to OFF position.
- (45) Turn on service drive lights (para 2-10d).
- (46) Turn on emergency flashers on wrecker (para 2-44a) and on disabled vehicle.
- (47) Push in PARKING BRAKE control (47) and select desired gear (para 2-11e).

WARNING

The M984E1 should not be operated at speeds over 15 mph except on paved roads when the operator determines that the vehicle being towed and the terrain allow safe operation. Engine brake switch must be "ON" for all towing operations. The following are maximum safe speeds:

Terrain Condition	Maximum speed, towed load up to 50,000 lbs	Maximum speed, towed load above 50,000 lbs
on road-level	35	30
on road-hilly	30	20
off road	15	15

Speeds in excess of the above can result in loss of control, serious injury or death.

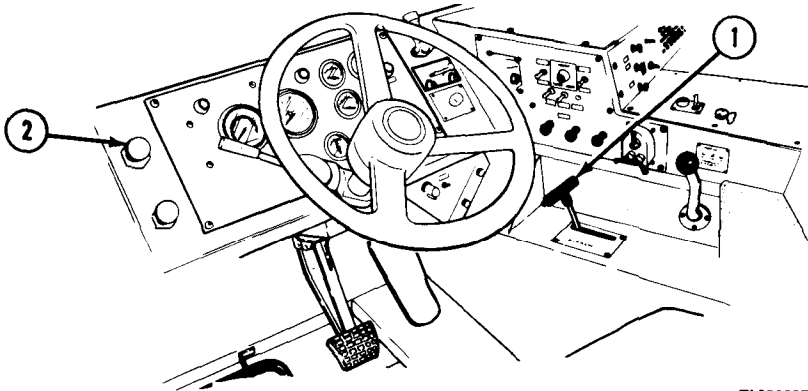
- (48) Transport disabled vehicle.

M984E1 General Operating Procedures (Cont)

d. Rear Disconnect.

NOTE

This is a two-soldier task.



TA356697

- (1) Set transmission range selector (1) to N.
- (2) Pull out PARKING BRAKE control (2).

WARNING

Do not stand between vehicles while disabled vehicle is raised off ground. Falling vehicle can cause serious injury or death.

NOTE

After lowering disabled vehicle, extend lift and tow cylinders approximately 2 to 4 inches (50 to 100 mm) to allow for adjustment when removing adapters.

- (3) Prepare retrieval system for operation (para 2-72) and pull LIFT CYLINDER control lever to extend lift cylinder and lower towed vehicle to ground.

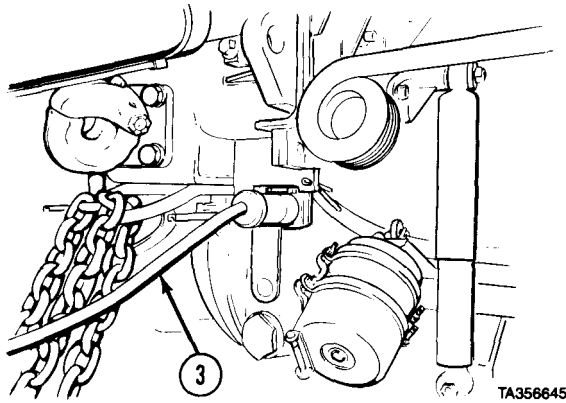
WARNING

If disabled vehicle's air system is inoperative, chock wheels of disabled vehicle. Failure to chock wheels may result in personal injury.

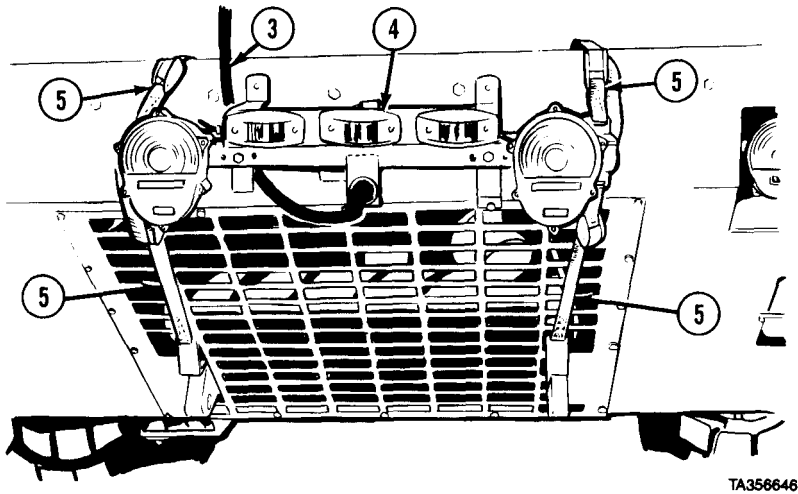
- (4) Pull out PARKING BRAKE control (2) on disabled vehicle. If parking brake is inoperable chock wheels on disabled vehicle.

M984E1 General Operating Procedures (Cont)

2-73. TOW M977 (CONT).

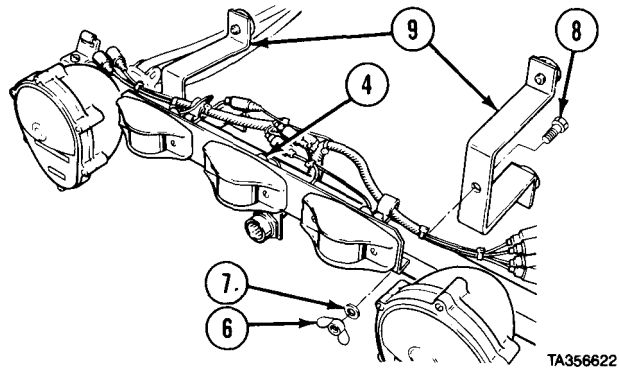


(5) Remove tow light cable (3) from wrecker.

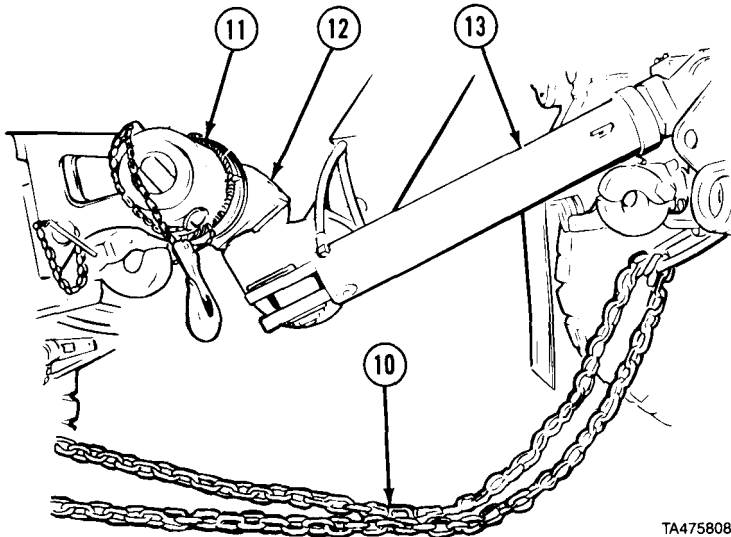


(6) Remove tow light cable (3) from emergency tow lights (4) and stow.
(7) Loosen straps (5) and remove emergency tow lights (4) from disabled vehicle.

M984E1 General Operating Procedures (Cont)



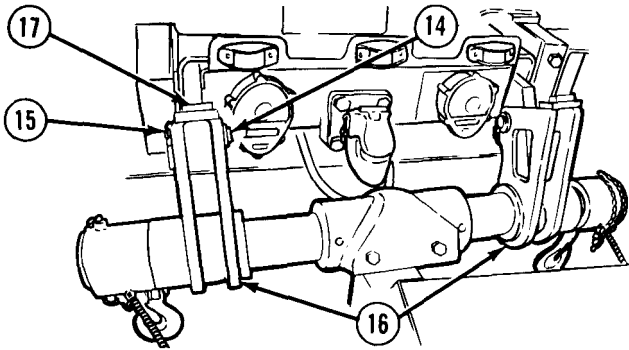
- (8) Remove two nuts (6), washers (7), screws (8), and brackets (9) from emergency tow lights (4). Stow emergency tow lights and brackets.



- (9) Remove and stow safety chains (10).
 (10) Unwrap two springs (11) from crosstube (12) and connect two springs to tow cylinders (13).

M984E1 General Operating Procedures (Cont)

2-73. TOW M977 (CONT).



TA356714

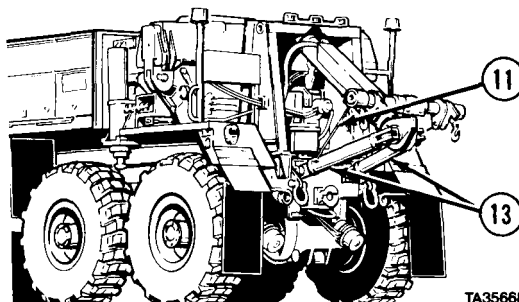
WARNING

- Do not stand behind adapters when pins are being removed. Adapters may swing down resulting in personal injury.
- Keep hands and fingers away from adapter and tow eyes when operating retrieval controls. Personal injury could result.

NOTE

Use retrieval controls to position crosstube to relieve tension from adapters.

- (11) Remove two quick pins (14) and pins (15) from adapters (16).
- (12) Remove two adapters (16) from tow eyes (17) on disabled vehicle.
- (13) Install two pins (15) through adapters (16). Install quick pins (14).



TA356685

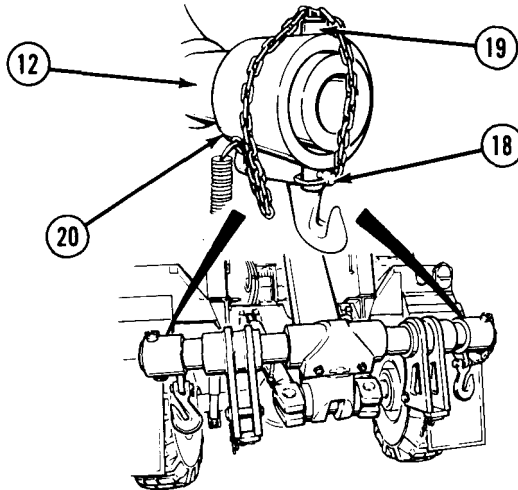
- (14) Drive wrecker forward several feet and park (para 2-11o).

M984E1 General Operating Procedures (Cont)

WARNING

When springs are removed, crosstube can swing in all directions and can cause personal injury.

(15) Remove two springs (11) from tow cylinders (13).

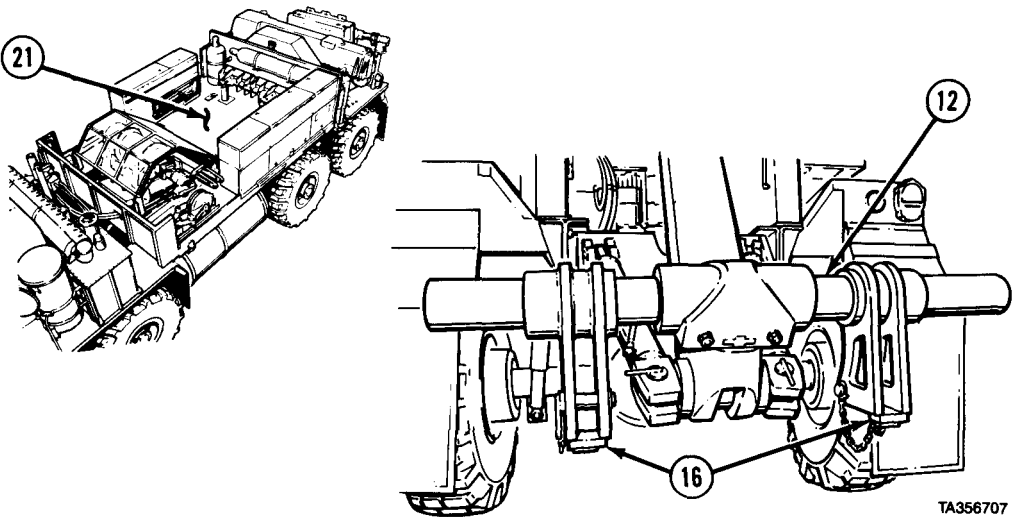


WARNING

When end caps are removed from crosstube, adapters may slide off causing personal injury.

(16) Remove quick pins (18) and pins (19) from end caps (20).

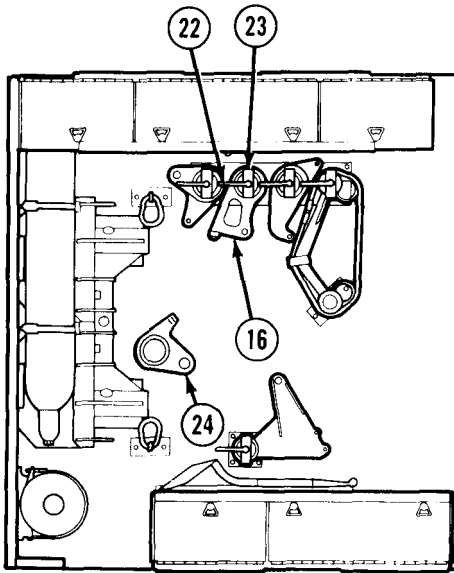
(17) Remove end caps (20) from crosstube (12).



(18) Remove adapters (16) from crosstube (12) and place on equipment body floor (21).

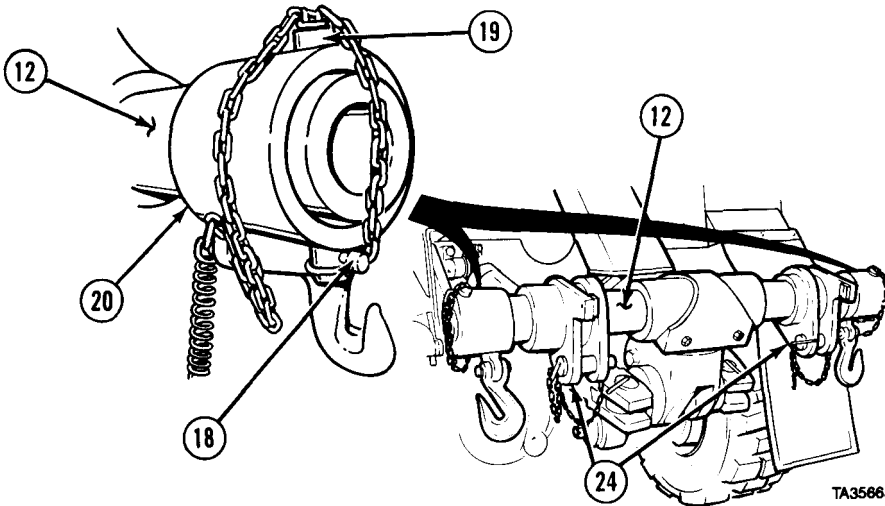
M984E1 General Operating Procedures (Cont)

2-73. TOW M977 (CONT).



TA356642

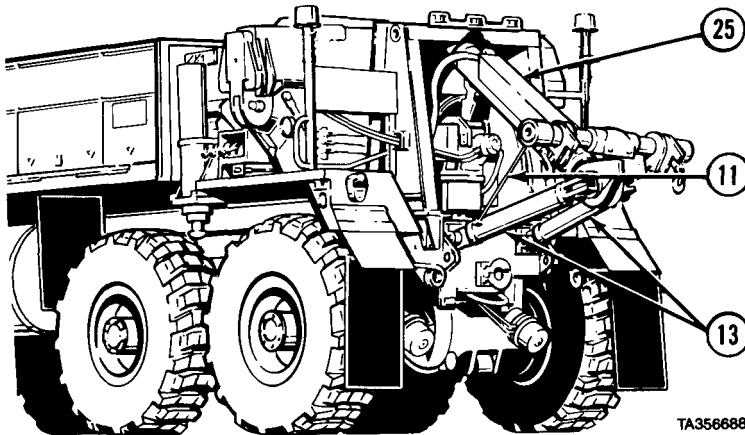
- (19) Remove lock handle (22), lock plate (23), and two M977 front adapters (24).
- (20) Install two M977 rear adapters (16) with lock plate (23) and lock handle (22).



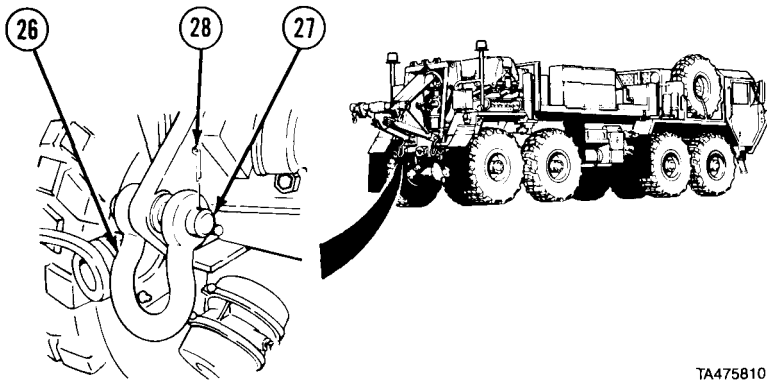
TA356637

- (21) Install two M977 front adapters (24) on crosstube (12).
- (22) Install end caps (20) on crosstube (12). Install pins (19) and quick pins (18).

M984E1 General Operating Procedures (Cont)



- (23) Install two springs (11) on tow cylinders (13).
- (24) Operate retrieval controls and fully retract lift cylinder (25) and tow cylinders (13).



NOTE

Right and left towing shackles are installed the same way.

- (25) Install two towing shackles (26), pins (27) and cotter pins (28).

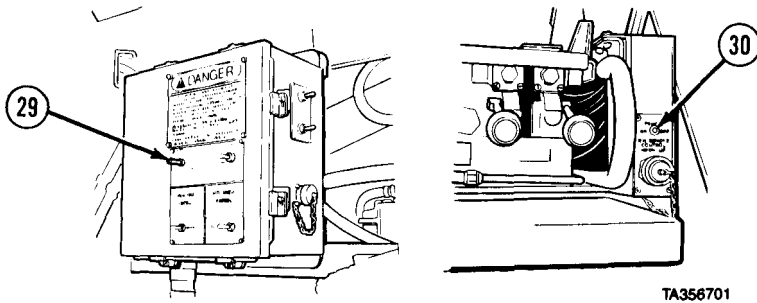
NOTE

For M984E1 perform step (26), for all other models go to step (27).

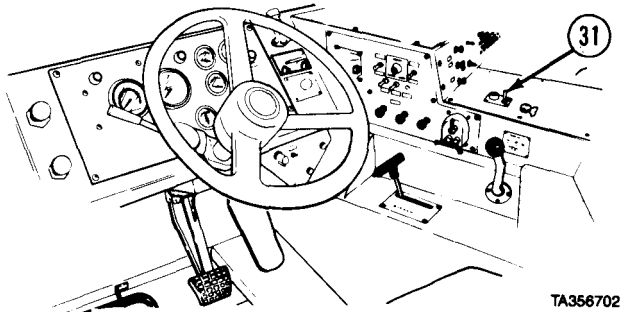
- (26) Return retrieval system to operating condition (para 2-74b).

M984E1 General Operating Procedures (Cont)

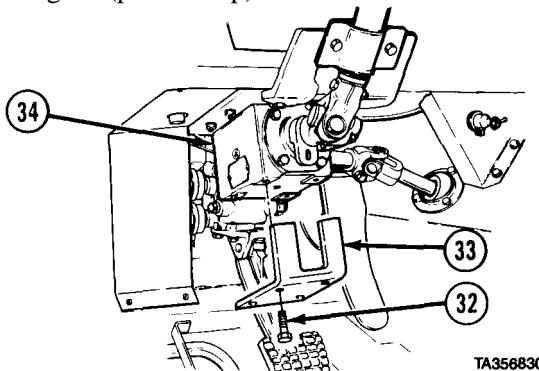
2-73. TOW M977 (CONT).



- (27) Set POWER switch (29) to OFF position.
- (28) Set POWER switch (30) to OFF position.



- (29) Turn off emergency flashers on wrecker (para 2-44f) and disabled vehicle.
- (30) Turn off service drive lights (para 2-10d).
- (31) Set PTO ENGAGE switch (31) to OFF position.
- (32) Remove and stow beacon lights (para 2-62).
- (33) Shut off engine (para 2-11p).



- (34) Remove four screws (32) and steering lock bracket (33) from 90° gearbox (34) and stow.

M984E1 General Operating Procedures (Cont)

2-73A. TOW M1074/M1075.

a. Front Hookup

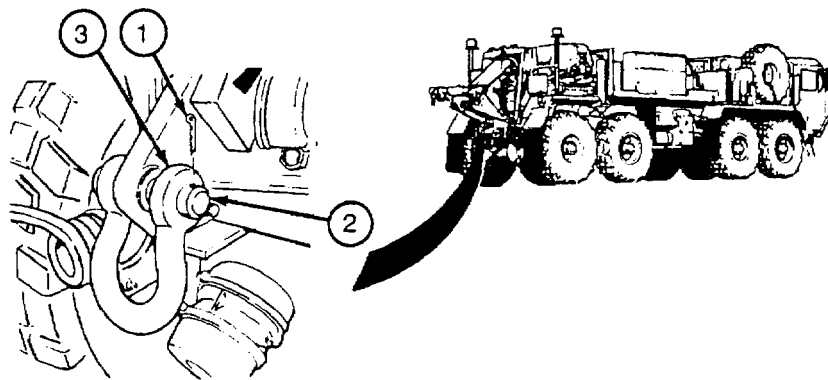
CAUTION

- When lifting and towing a PLS (Palletized Load System) with an M1077 flatrack, the flatrack must be empty, or if stacked, no more than three high or damage to equipment may result.
- When lifting and towing a PLS with an M1 flatrack, the flatrack must be empty with both end walls folded, or if stacked, no more than three high or damage to equipment may result.

NOTE

This is a two-soldier task.

- (1) Prepare retrieval system for operation (para 2-72).

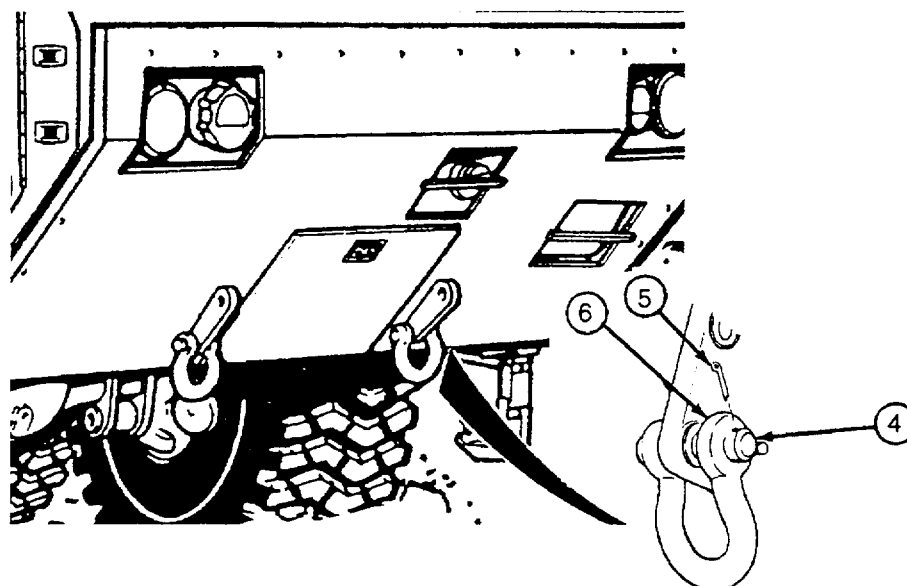
**NOTE**

Right and left towing shackles are removed the same way.

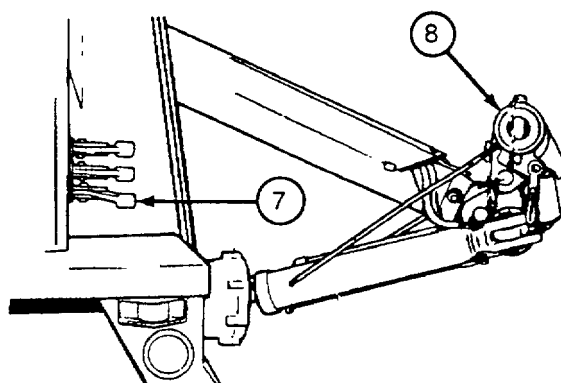
- (2) Remove cotter pin (1), pin (2), and towing shackle (3).

M984E1 General Operating Procedures (Cont)

2-73A. TOW M1074/M1075 (CONT).

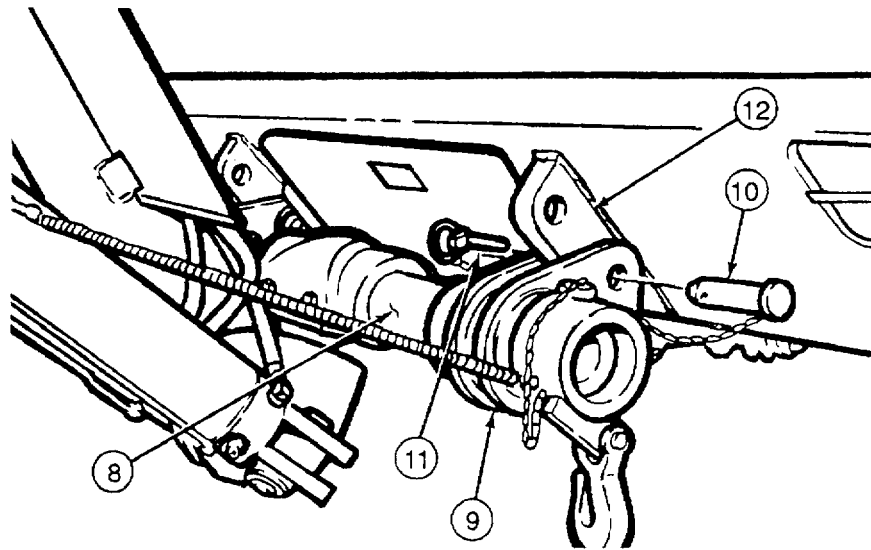


- (3) Remove two cotter pins (4), pins (5), and towing shackles (6) from disabled vehicle and stow.



- (4) Pull LIFT CYLINDER control lever (7) to lower crosstube (8) to approximately 3 ft (1 m) above ground.
- (5) Position wrecker so that crosstube (8) is approximately 1 ft (30 cm) from tow eyes of disabled vehicle and centered on disabled vehicle.

M984E1 General Operating Procedures (Cont)



(6) Turn adapters (9) so pins (10) are on top. Remove two quick pins (11) and pins from adapters.

WARNING

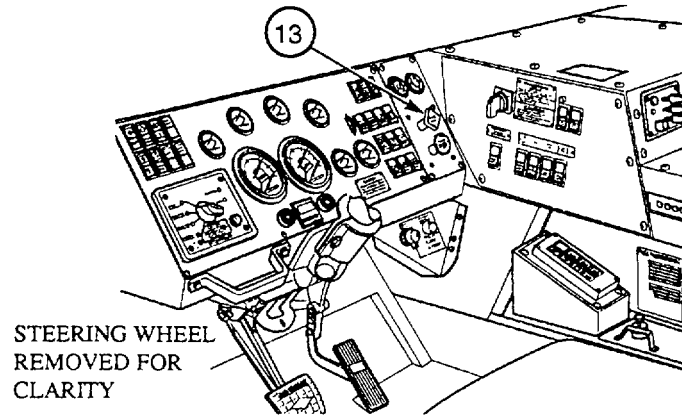
- Keep hands and fingers away from adapters and tow eyes when operating retriever controls. Personal injury could result.
- Adapters must be connected to lower holes of front tow eyes or disabled vehicle may contact M984E1 during towing causing injury to personal or damage to equipment.

(7) Soldier A operates retrieval controls (para 2-72b) while Soldier A and B position crosstube (8) so holes in adapters (9) align with lower holes of front tow eyes (12).

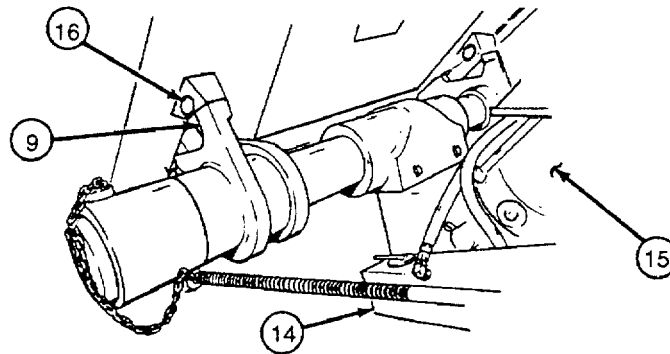
(8) Insert two pins (10) through adapters (9) and lower holes of front tow eyes (12). Install quick pins (11) in pins.

M984E1 General Operating Procedures (Cont)

2-73A. TOW M1074/M1075 (CONT).

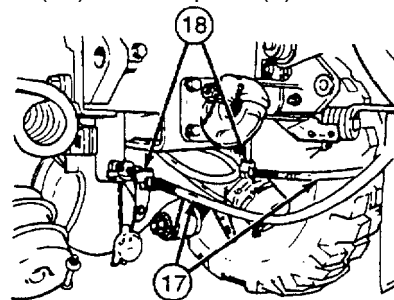


- (9) Push in PARKING BRAKE control (13) on disabled vehicle. If air system is inoperative, manually release spring brakes (TM 9-2320-364-10).

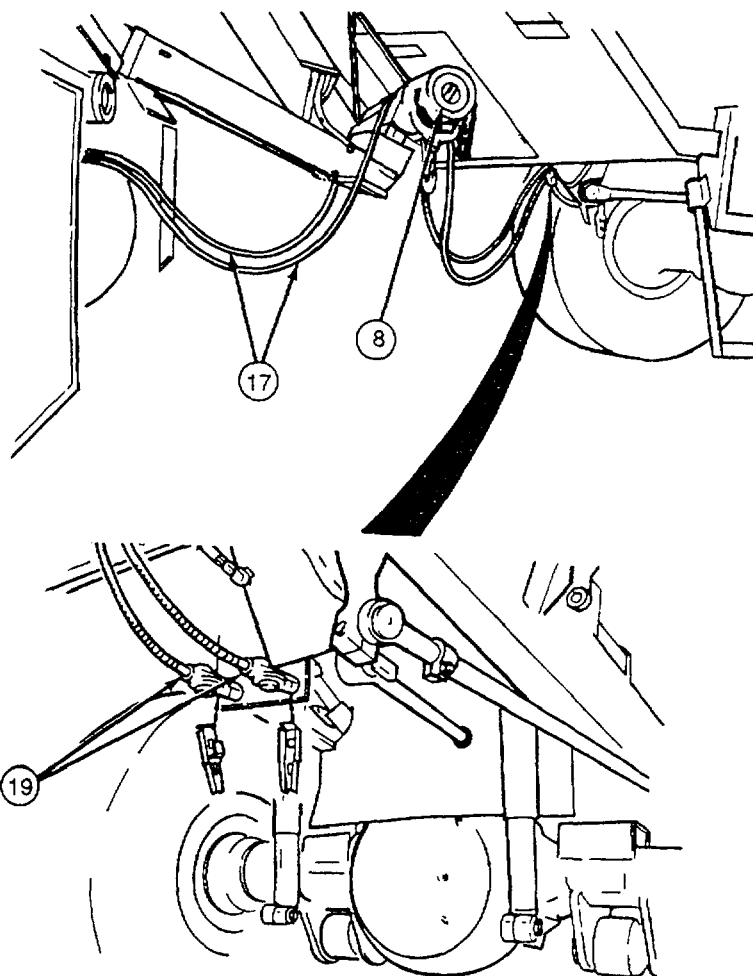


- (10) Alternately push in LIFT and TOW CYLINDER control levers until tow cylinders (14) are fully retracted.
 (11) Push in LIFT CYLINDER control lever to retract lift cylinder (15) until adapters (9) contact tow eyes (16).

- (12) Remove two airhoses (17) from stowage and attach to rear glad hands (18) on wrecker.



M984E1 General Operating Procedures (Cont)



CAUTION

Do not route airhoses between retrieval cylinders or damage to airhoses may result.

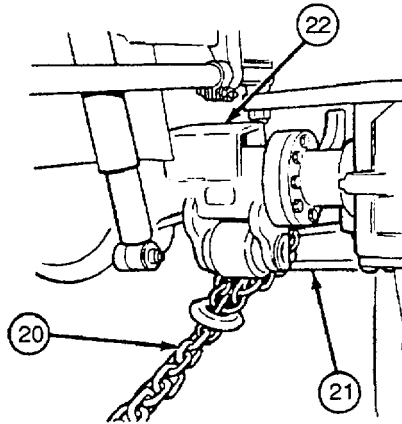
NOTE

Left rear airhose from wrecker must be connected to left front glad hand on disabled vehicle. Right rear airhose from wrecker must be connected to right front glad hand on disabled vehicle.

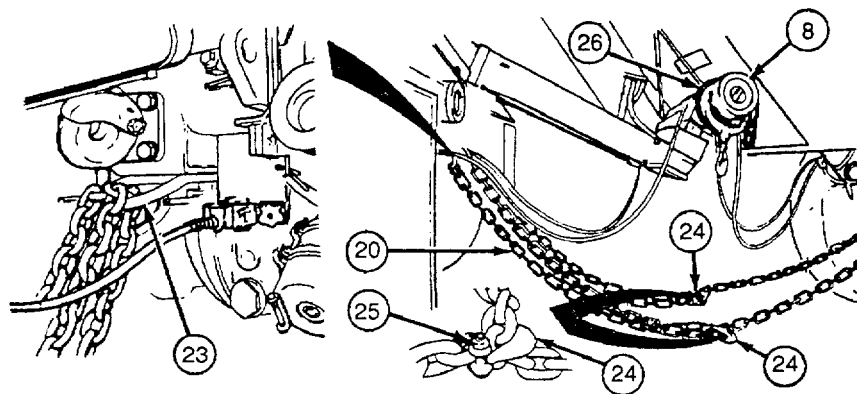
(13) Route airhoses (17) over crosstube (8) and attach to front glad hands (19) on disabled vehicle.

M984E1 General Operating Procedures (Cont)

2-73A. TOW M1074/M1075 (CONT).



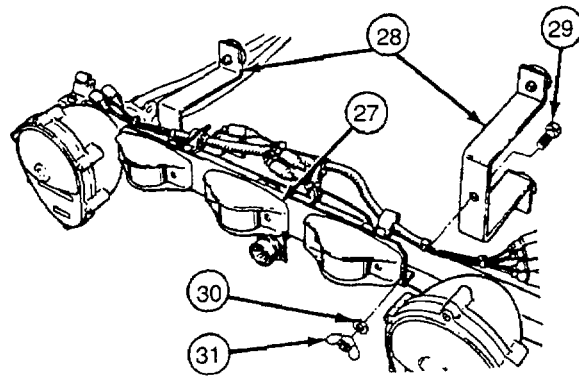
- (14) Remove two 16-foot (5 m) safety chains (20) from stowage. Route chain end without shackle, over walking beam (21) behind No. 1 axle (22) on disabled vehicle.
- (15) Hook safety chain (20) together under walking beam (21).
- (16) Repeat steps (14) and (15) for other side of disabled vehicle.

**NOTE**

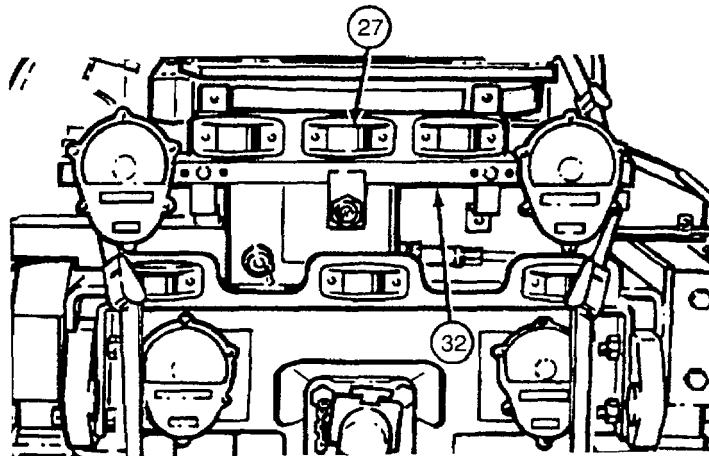
- Safety chains can be connected to rear tow shackles or safety chain hoop. Tow shackles can be used only after tow cylinders are extended.
- Adjust chain slack so chains are approximately 6 in. (150 mm) above the ground.

- (17) Route two safety chains (20) through safety chain hoop (23) on wrecker and secure grab hook (24) with safety shackle (25).
- (18) Wrap two springs (26) around cross-tube (8) and secure.

M984E1 General Operating Procedures (Cont)



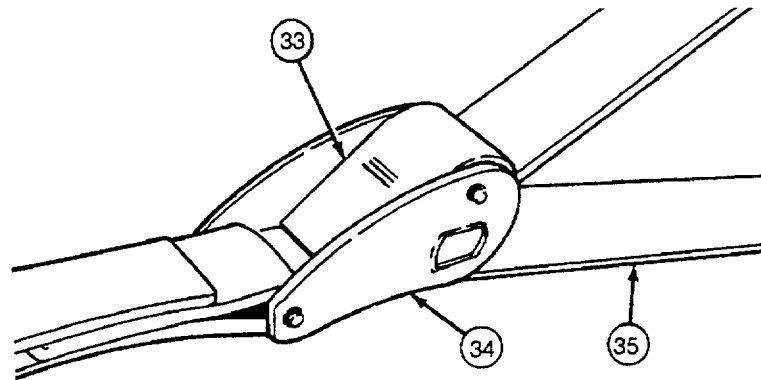
- (19) Prepare disabled vehicle for towing (TM 9-2320-364-10).
- (20) Remove emergency tow lights (27) and two brackets (28) from wrecker stowage.
- (21) Install two brackets (28) in inside holes of emergency tow lights (27) with two screws (29), washers (30), and nuts (31).



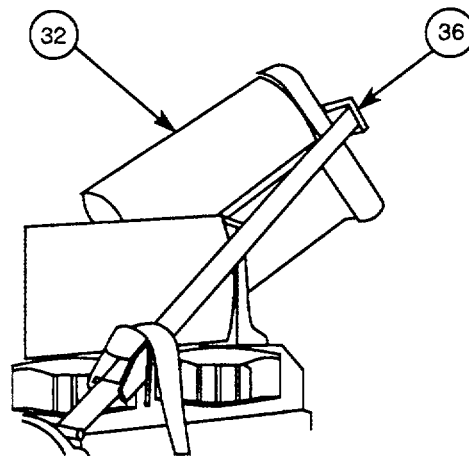
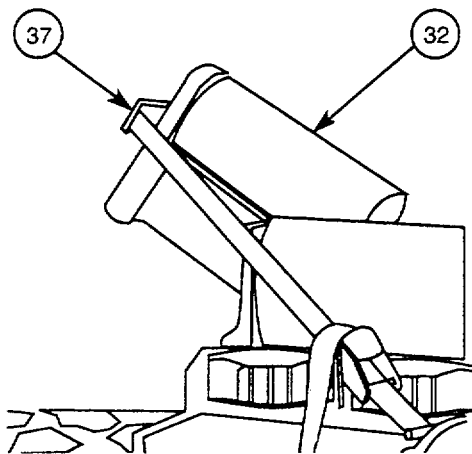
- (22) Position emergency tow lights (27) securely on disabled vehicle (32).

M984E1 General Operating Procedures (Cont)

2-73A. TOW M1074/M1075 (CONT).

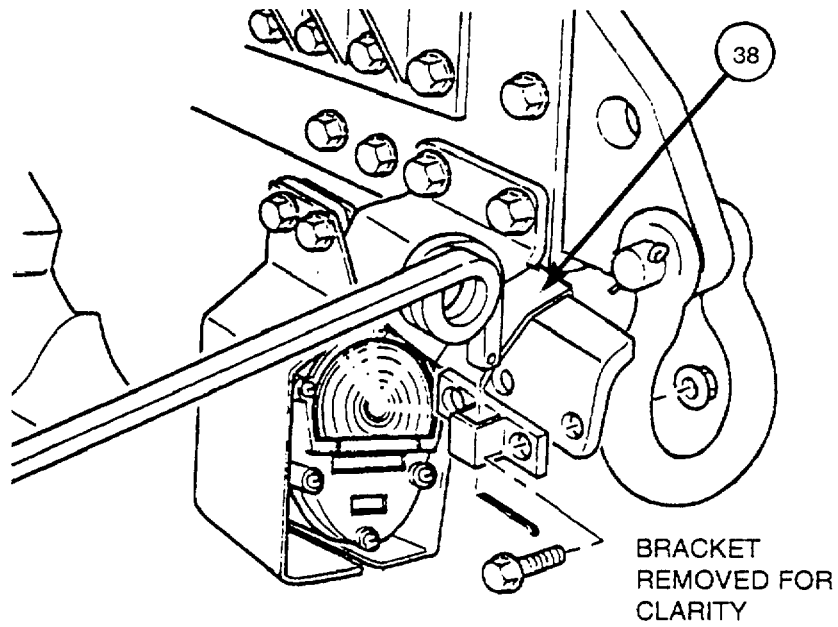


(23) Press in handle (33) on strap clamp (34) and pull strap (35) to lengthen.

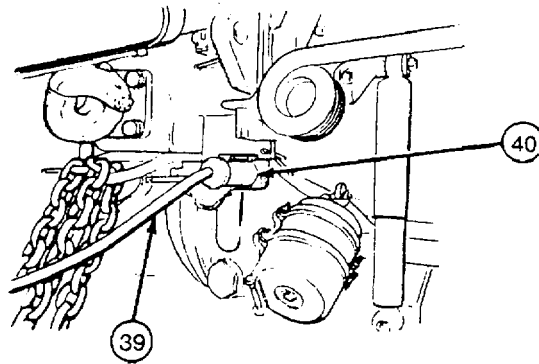


(24) Install top right strap hook (36) on right angled roller assembly (32) of disabled vehicle.
 (25) Install top left strap hook (37) on left angled roller assembly (32) of disabled vehicle.

M984E1 General Operating Procedures (Cont)



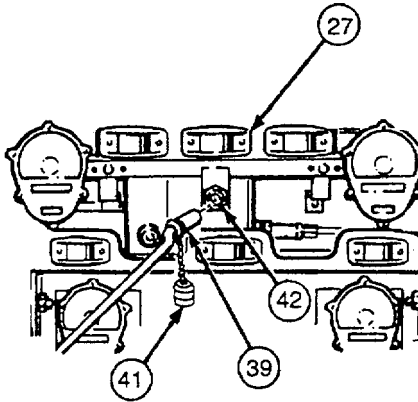
(26) Install lower left and lower right strap hooks (38) to left and right mud flap mounting brackets. Tighten straps.



(27) Remove tow light cable (39) from stowage and connect to rear electrical connector (40) on wrecker.

M984E1 General Operating Procedures (Cont)

2-73A. TOW M1074/M1075 (CONT).

**CAUTION**

Route cable so it does not drag on ground or interfere with turning tires.

(28) Route other end of tow light cable (39) to emergency tow lights (27) on disabled vehicle, remove dust cap (41), and plug in at connector (42).

NOTE

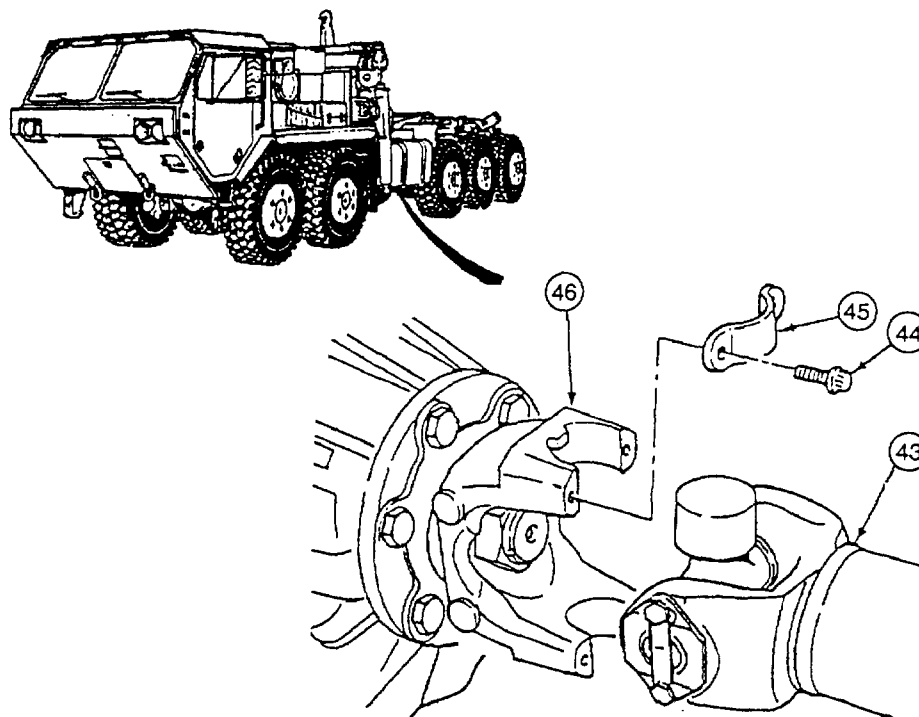
- If disabled vehicle will be lifted and towed, continue with step (29).
- If disabled vehicle will be towed with all tires on paved roads only, raise crosstube enough to partially unload disabled vehicle's front suspension. Keep front tires in firm contact with ground and proceed to step (36).

WARNING

Steering axles must be turned straight forward or disabled vehicle will not track properly, causing vehicle damage or injury to personnel.

(29) Turn steering axles straight forward and install lock on steering column. (TM 9-2320-364-10).

M984E1 General Operating Procedures (Cont)

**WARNING**

Driveshafts can weigh up to 100 lb (45 kg). Properly support driveshafts when removing screws. After screws and brackets are removed, driveshaft can fall and cause serious injury to personnel.

NOTE

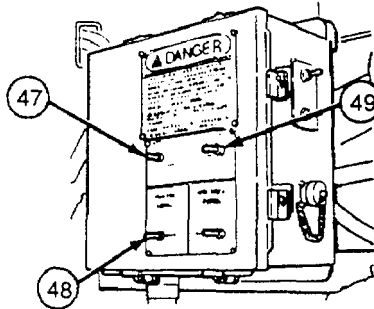
- To remove driveshaft screw, use wrench located in PLS BII storage box.
- Driveshaft ends at No. 3 axle and transfer case are removed the same way.

(30) Soldier A supports No. 3 axle driveshaft (43) while Soldier B removes four screws (44) and two brackets (45).

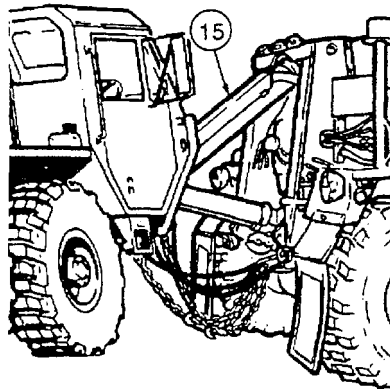
(31) Remove No. 3 axle driveshaft (43) from flange (46).

M984E1 General Operating Procedures (Cont)

2-73A. TOW M1074/M1075 (CONT).



- (32) Set POWER switch (47) to ON position.
 (33) Set HIGH IDLE switch (48) to CONTINUOUS.
 (34) Push and release LATCH switch (49). Engine speed will increase to approximately 1500 rpm.

**WARNING**

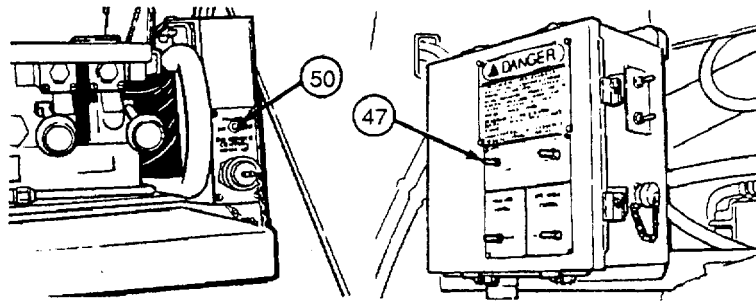
Keep out from under retrieval system and disabled vehicle when raised off ground or personal injury or death may result.

CAUTION

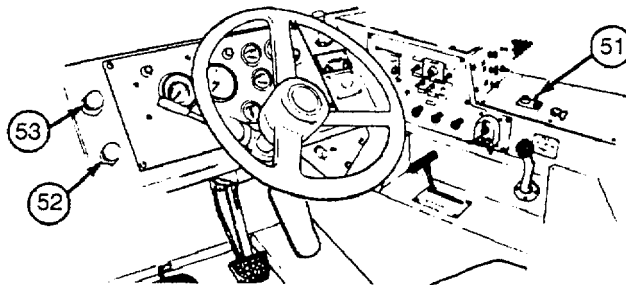
- Fully retract both tow cylinders before lifting disabled vehicle or equipment damage may result.
- Make sure all rigging is secure. Loose rigging can become entangled and cause damage to equipment.

- (35) Push LIFT CYLINDER control lever to retract lift cylinder (15) and raise disabled vehicle approximately 1.5 ft (45 cm) off ground.

M984E1 General Operating Procedures (Cont)



- (36) Set POWER switch (47) to OFF position.
- (37) Set POWER switch (50) to OFF position.



- (38) Set PTO ENGAGE switch (51) to OFF position.
- (39) Push in TRAILER AIR SUPPLY control (52).
- (40) Turn on service drive lights (para 2-10d).
- (41) Turn on emergency flashers on M984E1 vehicle (para 2-44a) and disabled vehicle.
- (42) Push in PARKING BRAKE control (53) and select desired gear (para 2-1 lie).

WARNING

- The M984E1 should not be operated at speeds over 15 mph except on paved roads when the operator determines that the vehicle being towed and the terrain allow safe operation. Engine brake switch must be 'ON' for all towing operations.

The following are maximum safe speeds:

Terrain Condition	Maximum speed, towed load above 50, 000 lb
on road-level	30
on road-hilly	20
off road	15

- Speeds in excess of the above can result in loss of control, serious injury or death.

(43) Transport disabled vehicle.

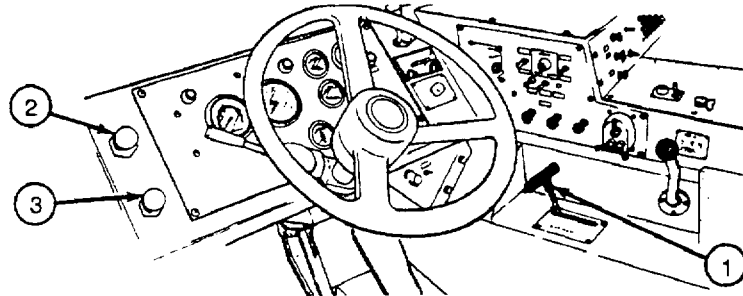
M984E1 General Operating Procedures (Cont)

2-73A. TOW M1074/M1075 (CONT).

b. Front Disconnect.

NOTE

This is a two-soldier task.



- (1) Set transmission range selector (1) to N.
- (2) Pull PARKING BRAKE control (2)
- (3) Pull TRAILER AIR SUPPLY control (3).

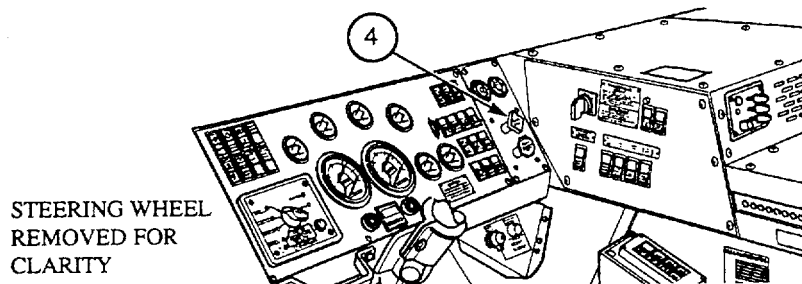
WARNING

Do not stand between vehicles while disabled vehicle is raised off ground. Falling vehicle can cause serious injury or death.

NOTE

After lowering disabled vehicle, extend lift and tow cylinders approximately 2 to 4 inches (50 to 100 mm) to allow for adjustment when removing adapters.

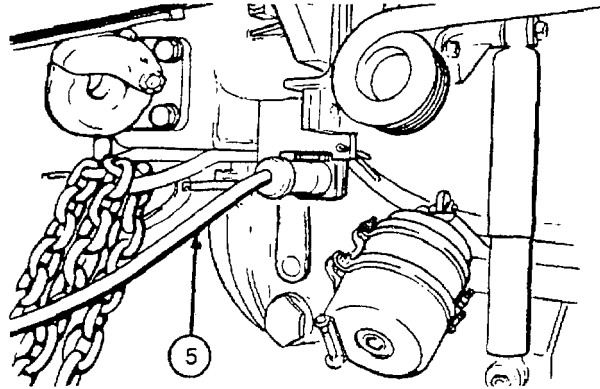
- (4) Prepare retrieval system for operation (para 2-72) and pull LIFT CYLINDER control lever to extend lift cylinder and lower towed vehicle to ground.

**WARNING**

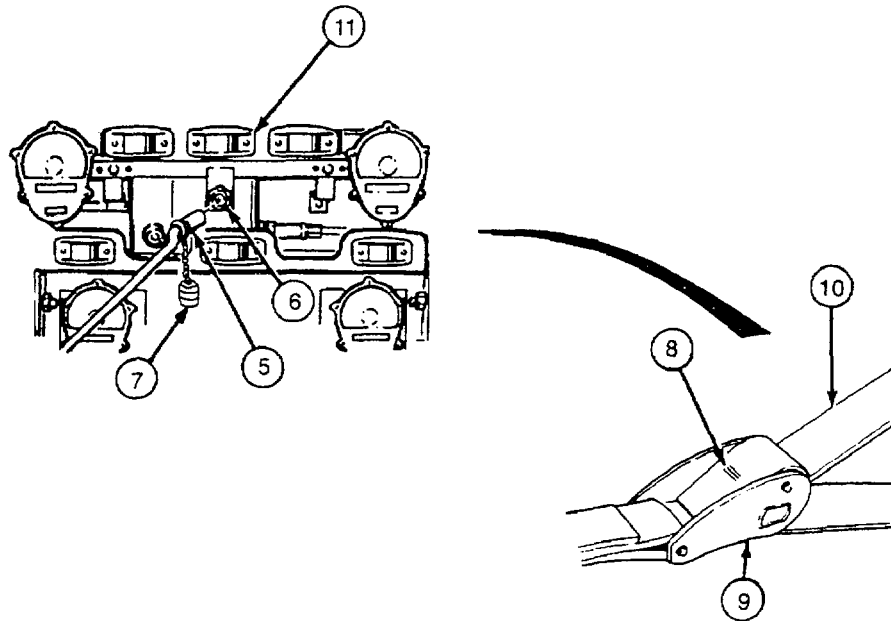
If disabled vehicle's air system is inoperative, chock wheels of disabled vehicle. Failure to chock wheels may result in personal injury.

- (5) Pull PARKING BRAKE control (4) on disabled vehicle. If parking brake is inoperable chock wheels on disabled vehicle.

M984E1 General Operating Procedures (Cont)



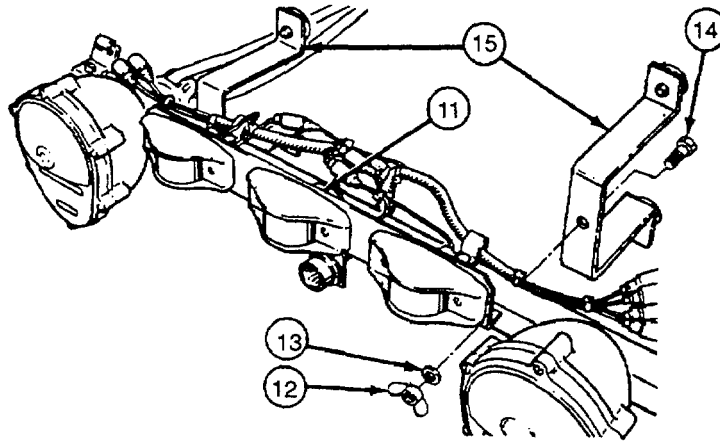
(6) Remove tow light cable (5) from wrecker.



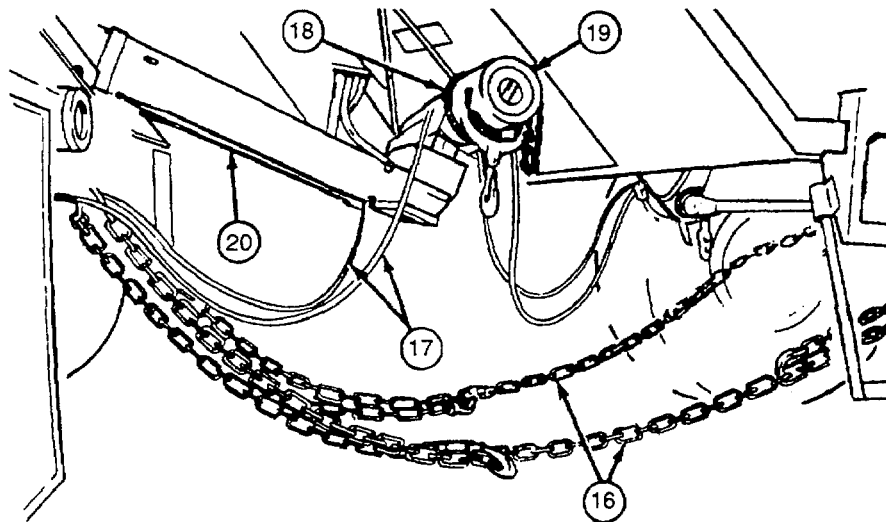
- (7) Remove tow light cable (5) from connector (6) and stow.
- (8) Install dust cap (7) on tow light cable (5).
- (9) Press in handle (8) on strap clamp (9). Pull strap (10) to loosen straps on emergency tow lights (11).
- (10) Remove emergency tow lights (11) from disabled vehicle.

M984E1 General Operating Procedures (Cont)

2-73A. TOW M1074/M1075 (CONT).

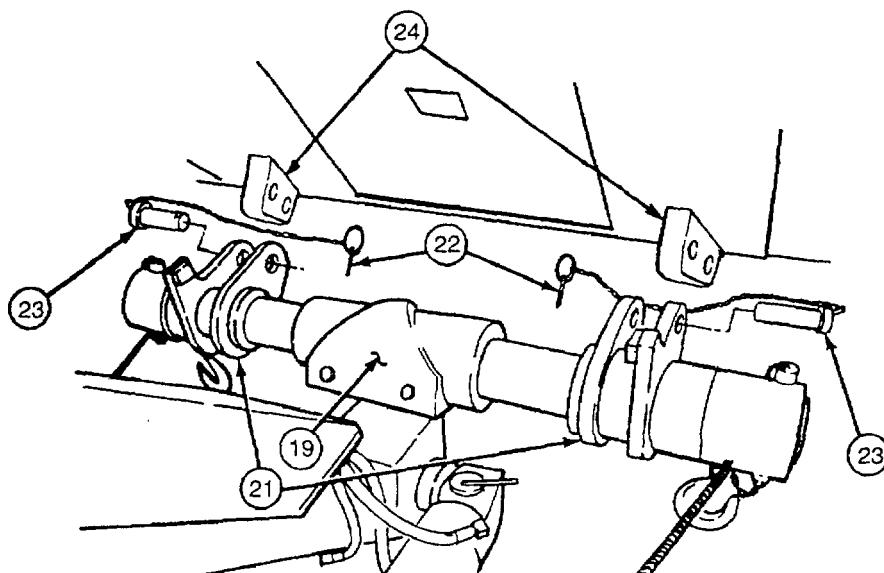


- (11) Remove two nuts (12), washers (13), screws (14), and brackets (15) from emergency tow lights (11). Stow emergency tow lights and brackets.

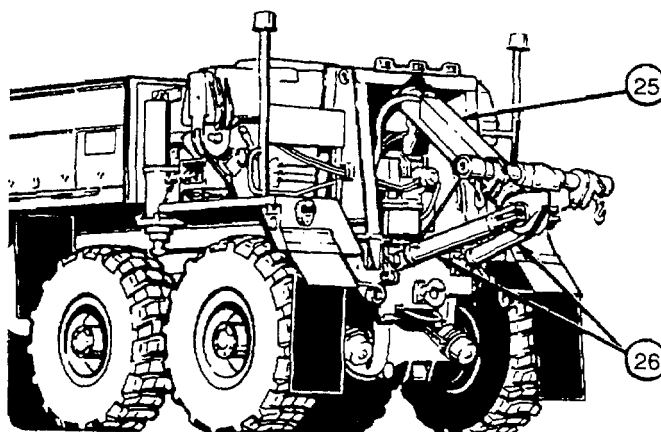


- (12) Remove and stow safety chains (16) and airhoses (17).
 (13) Unwrap two springs (18) from crosstube (19).
 (14) Connect two springs (18) to tow cylinders (20).

M984E1 General Operating Procedures (Cont)



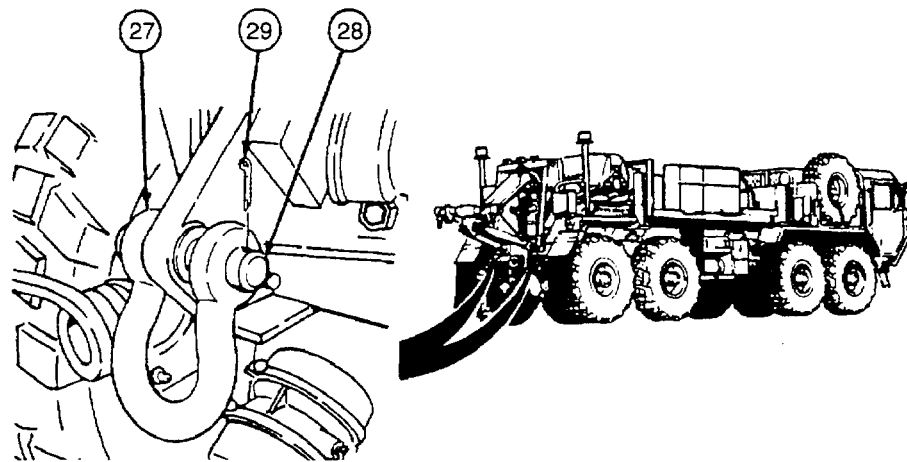
- (15) Operate retrieval controls (para 2-72b) and position crosstube (19) to relieve tension from adapters (21).
- (16) Remove two quick pins (22) and pins (23) from adapters (21).
- (17) Remove two adapters (21) from tow eyes (24) on disabled vehicle.
- (18) Install pins (23) in adapters (21).
- (19) Install quick pins (22) in pins (23).



- (20) Drive wrecker forward several feet and park (para 2-11o).
- (21) Operate retrieval controls and fully retract lift cylinders (25) and tow cylinders (26).

M984E1 General Operating Procedures (Cont)

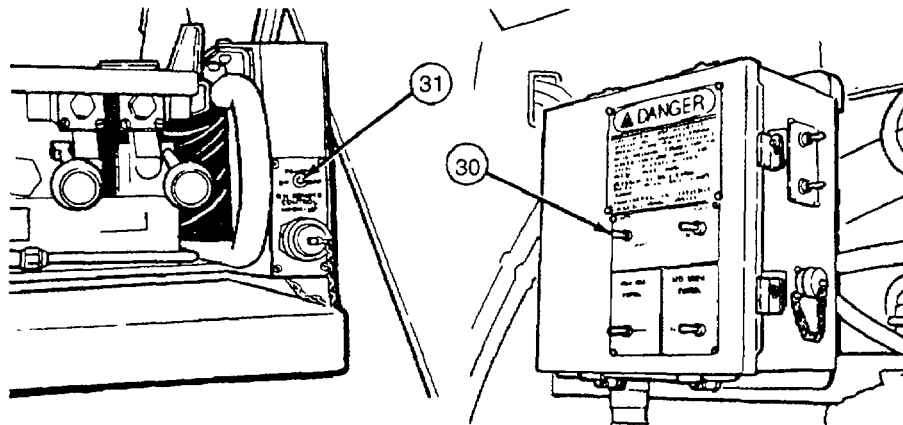
2-73A. TOW M1074/M1075 (CONT).



NOTE

Right and left towing shackles are installed the same way.

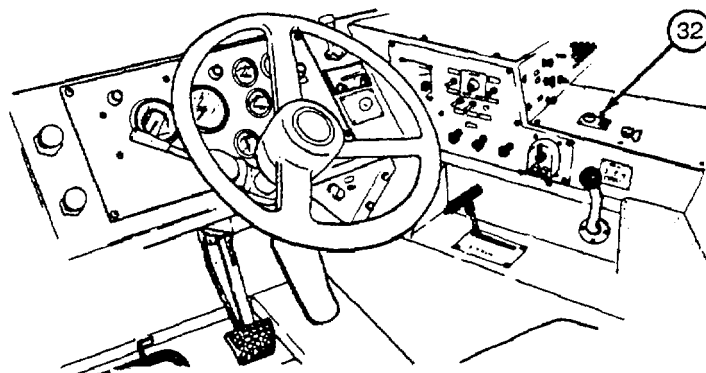
(22) Install two towing shackles (27), pins (28) and cotter pins (29).



(23) Set POWER switch (30) to OFF position.

(24) Set POWER switch (31) to OFF position.

M984E1 General Operating Procedures (Cont)



- (25) Turn off emergency flashers on wrecker (para 2-44f) and disabled vehicle (TM 9-2320-364-10).
- (26) Turn off service drive lights (para 2-10d).
- (27) Set PTO ENGAGE switch (32) to OFF position.
- (28) Remove and stow beacon lights (para 2-62).
- (29) Shut off engine (para 2-lip).
- (30) Remove lock from steering column (TM 9-2320-364-10).

M984E1 General Operating Procedures (Cont)

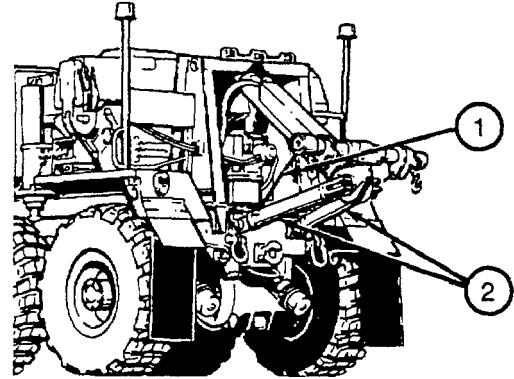
2-73A. TOW M1074/M1075 (CONT).

c. Rear Hookup.

NOTE

This is a two-soldier task.

- (1) Prepare retrieval system for operation (para 2-72).

**WARNING**

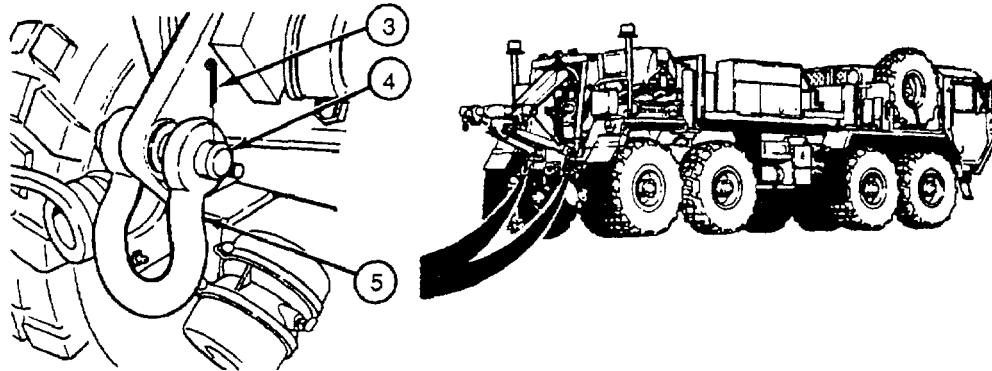
- Hold crosstube when removing springs. Crosstube may swing or cause adapter to slide resulting in personal injury.
- Intervehicular air lines are not connected when towing from rear. Disabled vehicle will not have braking. Use extreme caution when transporting disabled vehicle using rear hookup. Vehicle traveling out of control can cause serious injury or death.

CAUTION

- When lifting and towing a PLS (Palletized Load System) with an M1077 flatrack, the flatrack must be empty, or if stacked, no more than three high or damage to equipment may result.
- When lifting and towing a PLS with an M1 flatrack, the flatrack must be empty with both end walls folded, or if stacked, no more than three high or damage to equipment may result.

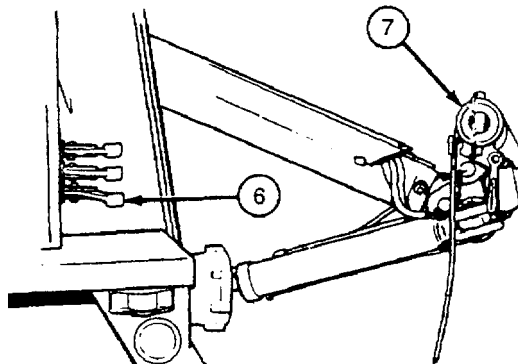
- (2) Disconnect two springs (1) from tow cylinders (2).

M984E1 General Operating Procedures (Cont)

**NOTE**

Right and left towing shackles are removed the same way.

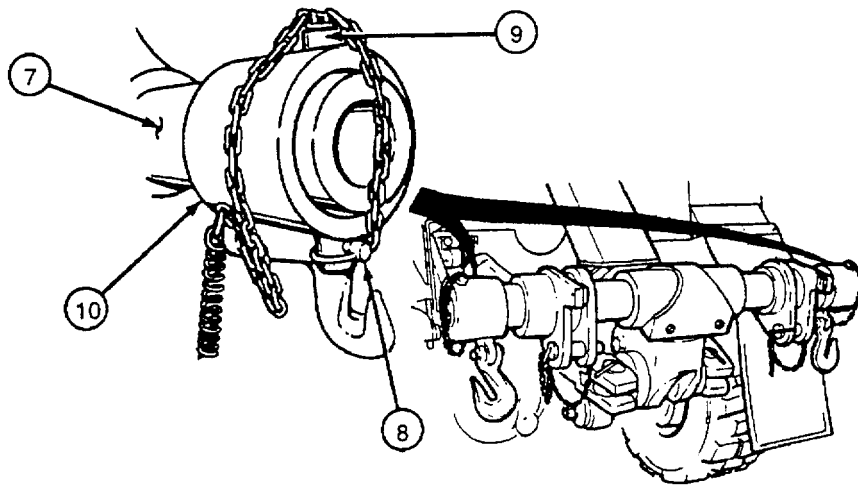
- (3) Remove two cotter pins (3), pins (4) and towing shackles (5) and stow on equipment body floor.



- (4) Pull LIFT CYLINDER control lever (6) to lower crosstube (7) to approximately 3 ft (1 m) above ground.
- (5) Position wrecker so that crosstube (7) is approximately 1 ft (30 cm) from tow eyes of disabled vehicle and centered on disabled vehicle.

M984E1 General Operating Procedures (Cont)

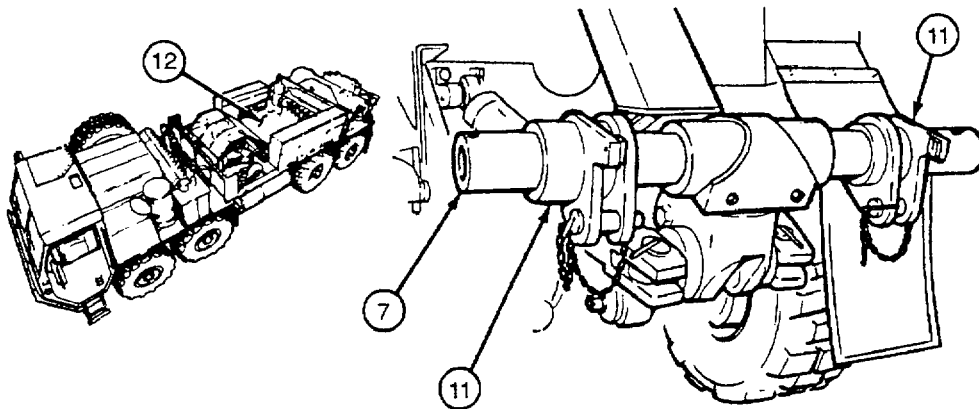
2-73A. TOW M1074/M1075 (CONT).



WARNING

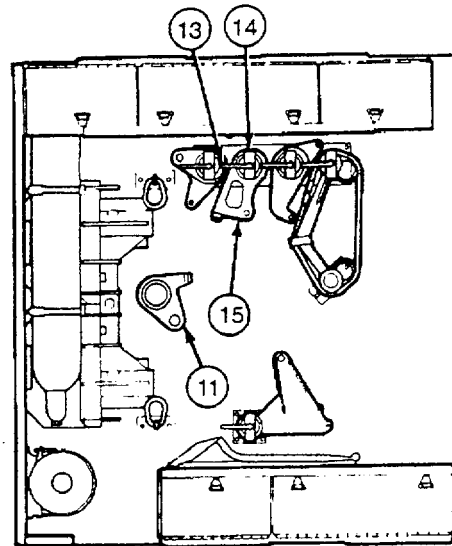
When end caps are removed from crosstube, adapters may slide off causing personal injury.

- (6) Remove two quick pins (8) and pins (9) from end caps (10).
- (7) Remove end caps (10) from crosstube (7).



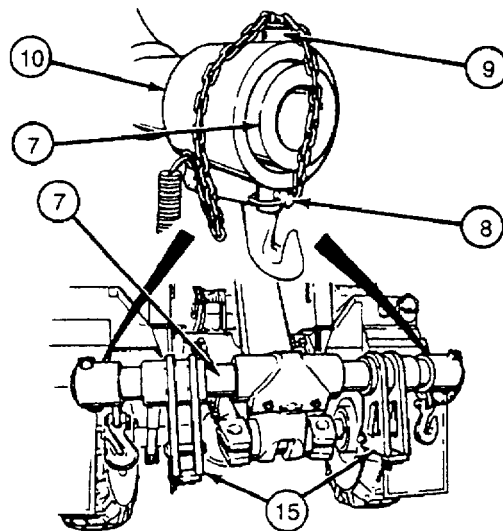
- (8) Remove two front adapters (11) from crosstube (7) and place on equipment body floor (12).

M984E1 General Operating Procedures (Cont)



(9) Remove lock handle (13), lock plate (14), and two rear tow adapters (15).

(10) Install two front adapters (11) removed from crosstube with lock plate (14), and lock handle (13).



WARNING

Adapters and end caps may slide off when installing and may cause personal injury.

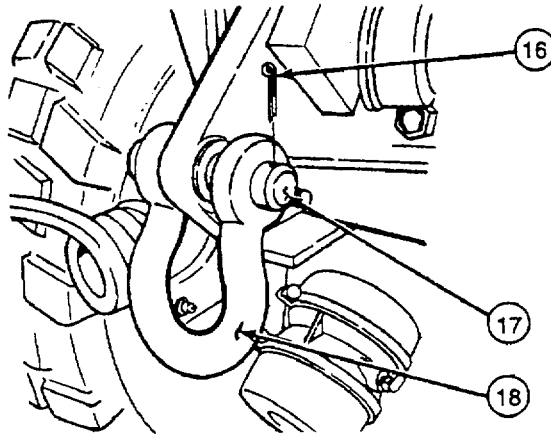
(11) Install two rear tow adapters (15) on crosstube (7).

(12) Install end caps (10) on crosstube (7).

(13) Install pins (9) and quick pins (8).

M984E1 General Operating Procedures (Cont)

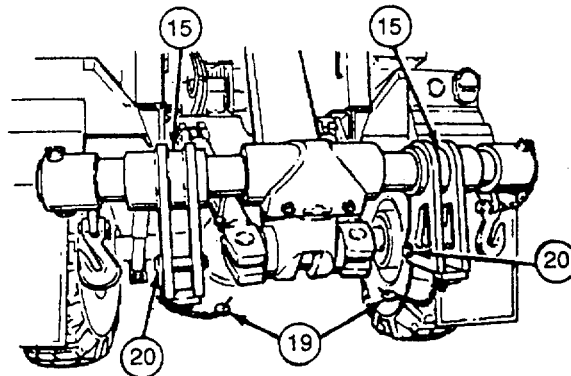
2-73A. TOW M1074/M1075 (CONT).



NOTE

Right and left towing shackles are removed the same way.

- (14) Remove two cotter pins (16), pins (17), and two towing shackles (18) from disabled vehicle. Stow shackles (18) on vehicle.



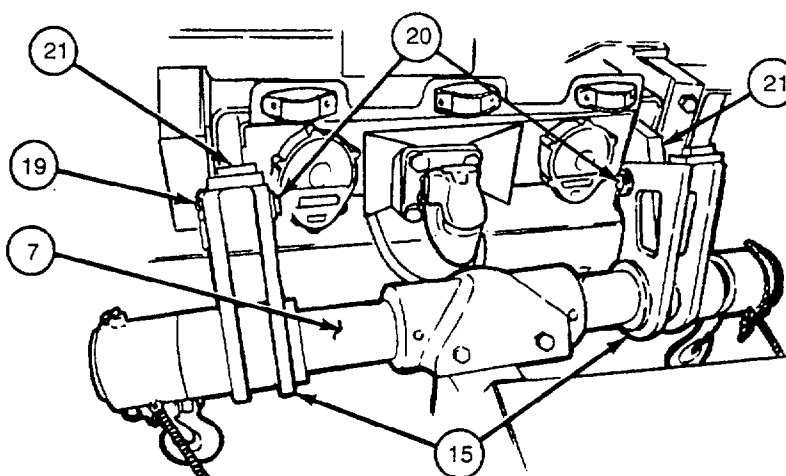
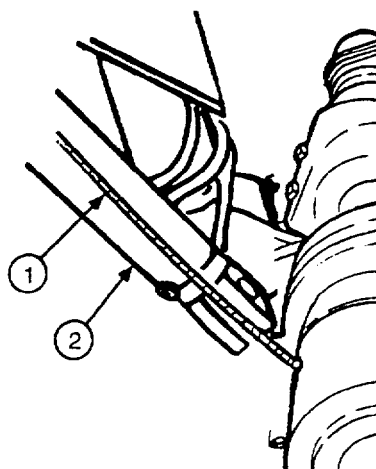
- (15) Remove two quick pins (19) and pins (20) from adapters (15).

M984E1 General Operating Procedures (Cont)

- (16) Attach two springs (1) on tow cylinders (2).

WARNING

Adapters may have to be held in the upright position while moving the crosstube. Falling adapters may cause personal injury.

**WARNING**

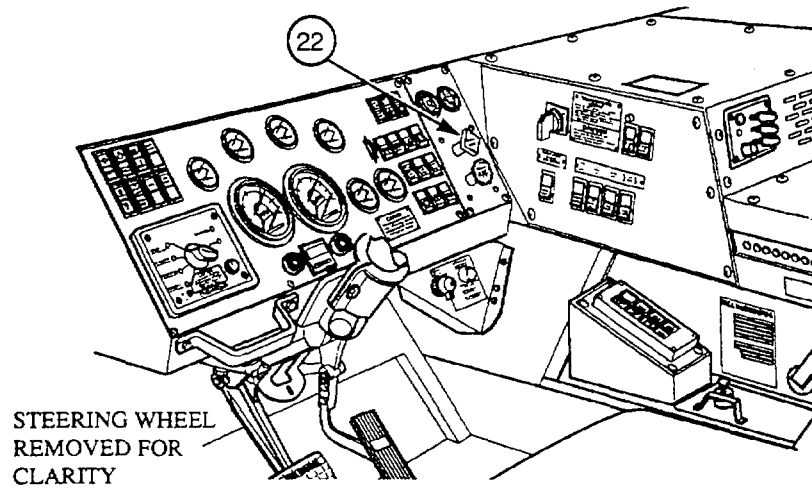
- Keep hands and fingers away from adapters and tow eyes when operating retriever controls. Personal injury could result
- Adapters must be connected to lower holes of rear tow eyes or disabled vehicle may contact M984E1 during towing operations, causing injury to personal and damage to equipment.

- (17) Soldier A operates retrieval system (para 2-72) while Soldiers A and B position crosstube (7) so holes in adapters (15) align with lower holes of rear tow eyes (21).

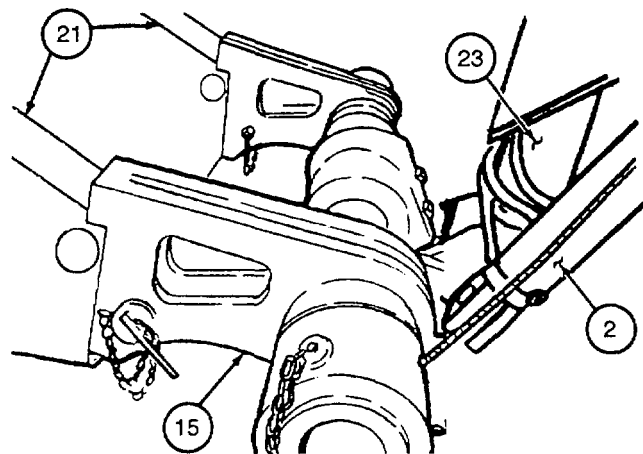
- (18) Insert pins (20) through adapters (15) and lower holes of rear tow eyes (21). Install quick pins (19).

M984E1 General Operating Procedures (Cont)

2-73A. TOW M1074/M1075 (CONT).



- (19) Push in PARKING BRAKE control (22) on disabled vehicle. If air system is inoperative, manually release spring brakes (TM 9-2320-364-10).

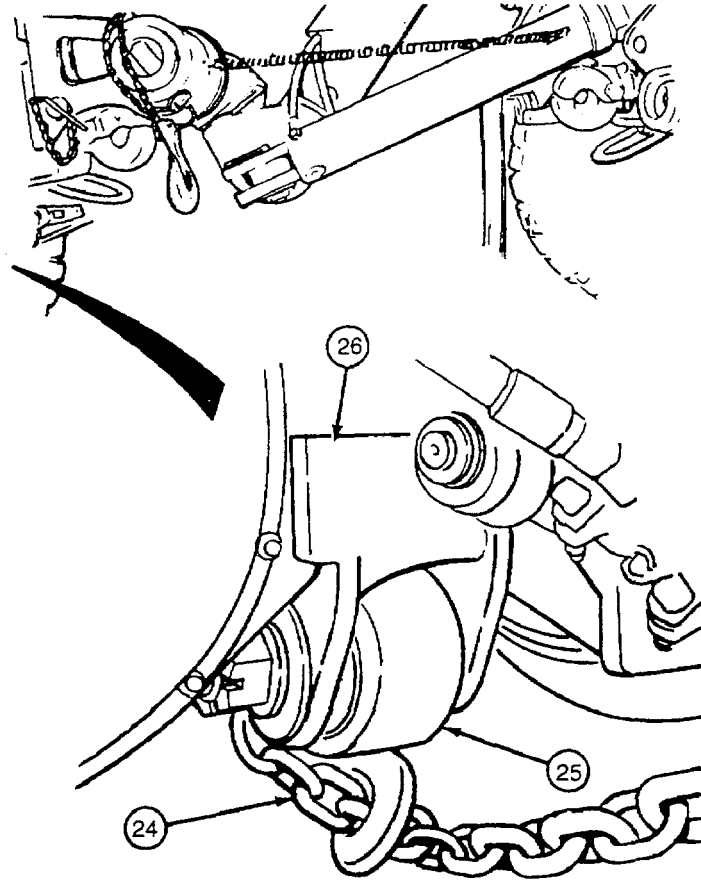


NOTE

Adapters must be resting against frame.

- (20) Alternately push in LIFT and TOW CYLINDER control levers until tow cylinders (2) are fully retracted.
- (21) Push in LIFT CYLINDER control lever to retract lift cylinder (23) until adapters (15) contact tow eyes (21).

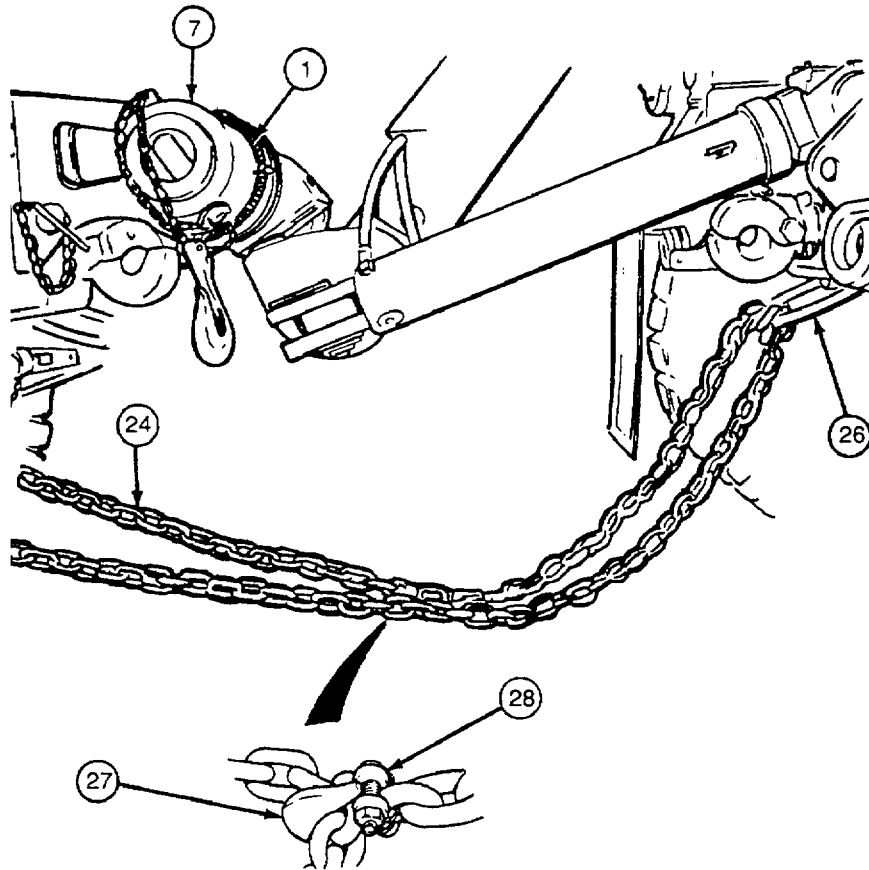
M984E1 General Operating Procedures (Cont)



- (22) Remove two 16-foot (5 m) safety chains (24) from stowage.
- (23) Route one safety chain end without shackle (24) over walking beam (25) in front of No. 5 axle (26) on disabled vehicle.
- (24) Hook safety chain (24) together under walking beam (25).
- (25) Repeat steps (23) and (24) for other side of disabled vehicle.

M984E1 General Operating Procedures (Cont)

2-73A. TOW M1074/M1075 (CONT).

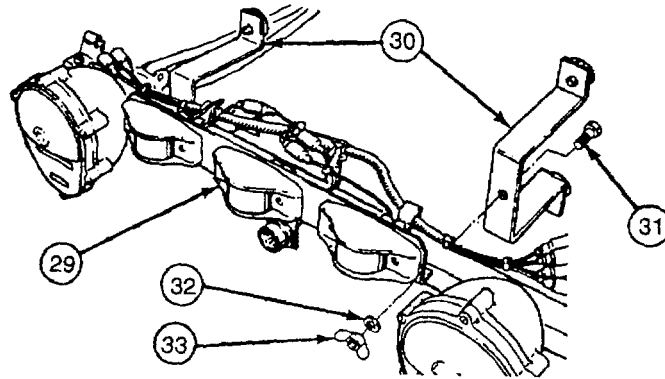
**NOTE**

- Safety chains can be routed to towing shackles or safety chain hoop.
- Towing shackles can be used only after tow cylinders are extended.
- Adjust chain slack so chains are approximately 6 in. (150 mm) above ground.

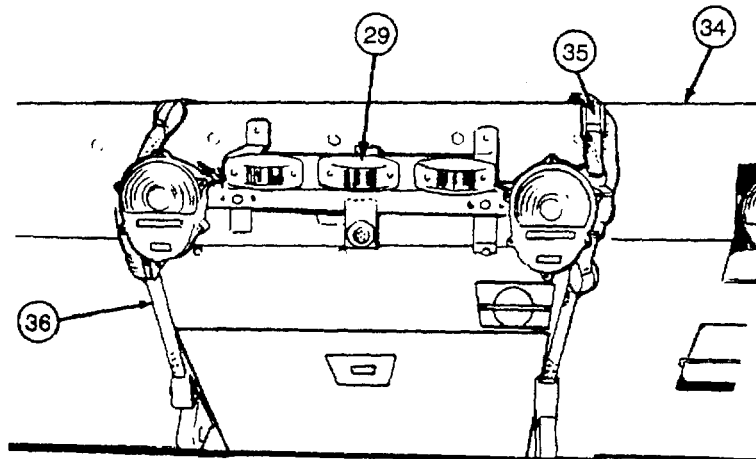
(26) Route two safety chains (24) through safety chain hoop (26) on wrecker and secure grab hook (27) with safety shackles (28).

(27) Wrap two springs (1) around crosstube (7) and secure.

M984E1 General Operating Procedures (Cont)



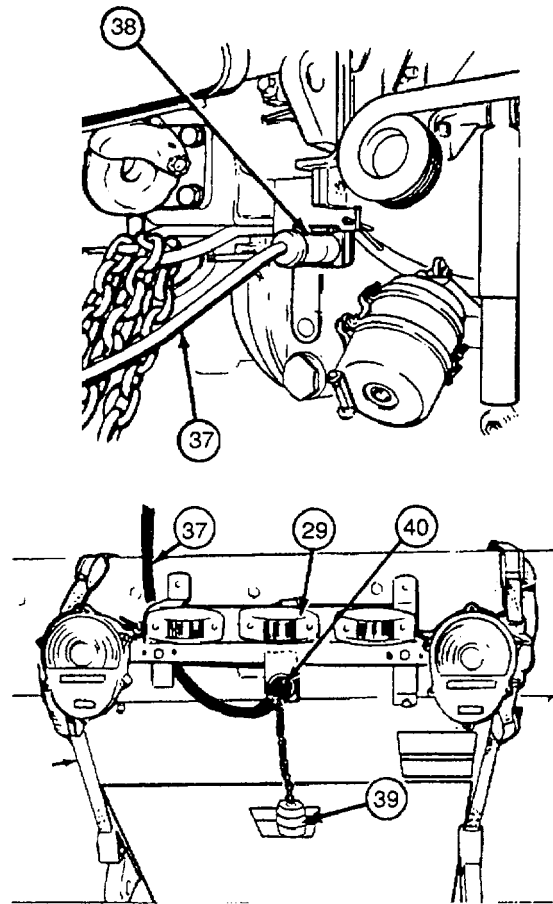
- (28) Prepare disabled vehicle for towing (TM 9-2320-364-10).
- (29) Remove emergency tow lights (29) and two brackets (30) from stowage.
- (30) Install two brackets (30) in outside holes of emergency tow lights (29) with two screws (31), washers (32), and nuts (33).



- (31) Position emergency tow lights (29) on skid plate (34). Fasten top straps (35) to top of skid plate (34). Fasten bottom straps (36) to bottom of skid plate (34).

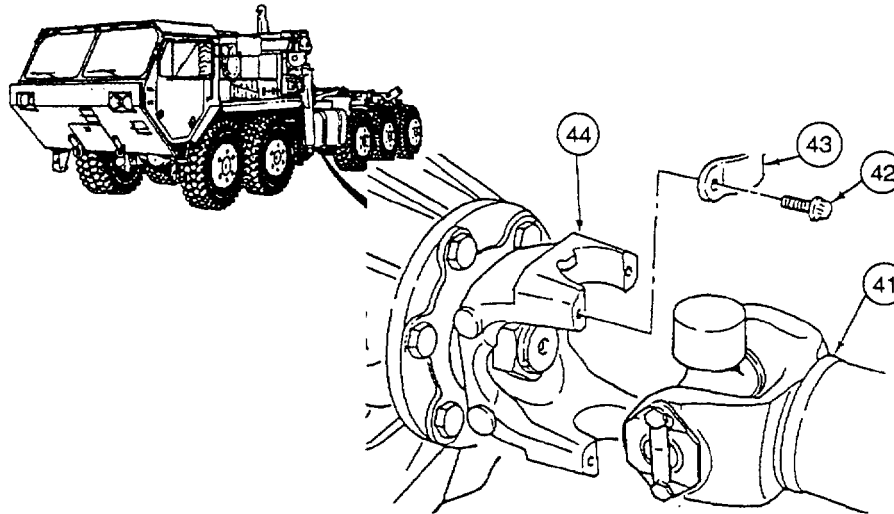
M984E1 General Operating Procedures (Cont)

2-73A. TOW M1074/M1075 (CONT).



- (32) Remove tow lights cable (37) from stowage and connect to rear electrical connector (38) on wrecker.
- (33) Route other end of tow lights cable (37) to emergency tow lights (29) on disabled vehicle, remove dust cover (39), and plug in at connector (40).

M984E1 General Operating Procedures (Cont)

**WARNING**

Driveshafts can weigh up to 100 lb (45 kg). Properly support driveshafts when removing screws. After screws and brackets are removed, driveshaft can fall and cause serious injury to personnel.

NOTE

- To remove driveshaft screws, use wrench located in PLS BII stowage box.
- Driveshaft ends at No. 2 axle and transfer case are removed the same way.

- (34) Soldier A supports No. 2 axle driveshaft (41), while Soldier B removes four screws (42) and two brackets (43).
- (35) Remove No. 2 axle driveshaft (41) from flange (44).

WARNING

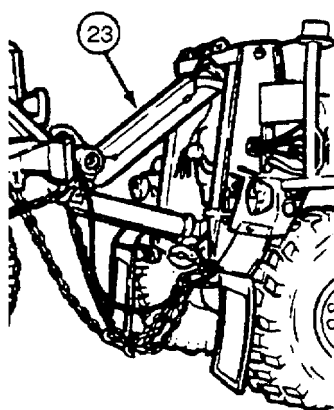
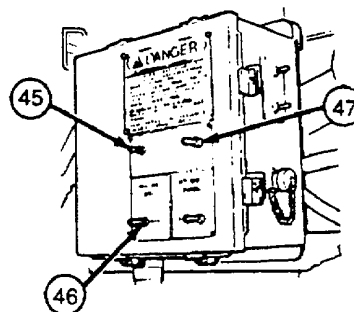
Steering axles must be turned straight forward or disabled vehicle will not track properly, causing vehicle damage or injury to personnel.

- (36) Turn steering axles straight forward and install lock on steering column (TM 9-2320-364-10).

M984E1 General Operating Procedures (Cont)

2-73A. TOW M1074/M1075 (CONT).

- (37) Set POWER switch (45) to ON position.
 (38) Set HIGH IDLE switch (46) to CONTINUOUS.
 (39) Push and release LATCH switch (47). Engine speed will increase to approximately 1500 rpm.

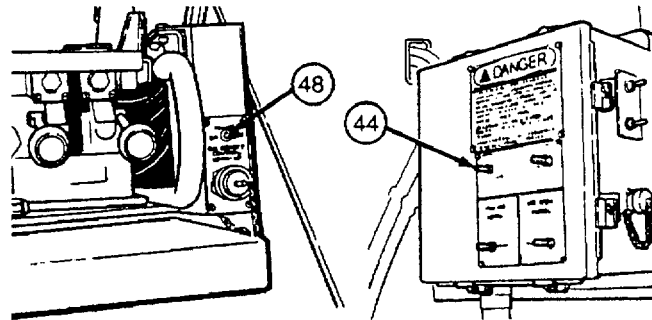
**WARNING**

Keep out from under retrieval system and disabled vehicle when raised off ground or personal injury or death may result.

CAUTION

- Fully retract both tow cylinders before lifting disabled vehicle or equipment damage may result.
 - Make sure all rigging is secure. Loose rigging can become entangled and cause damage to equipment
- (40) Push in LIFT CYLINDER control lever to retract lift cylinder (23) and raise disabled vehicle approximately 1.5 ft (45 cm) off ground.

M984E1 General Operating Procedures (Cont)



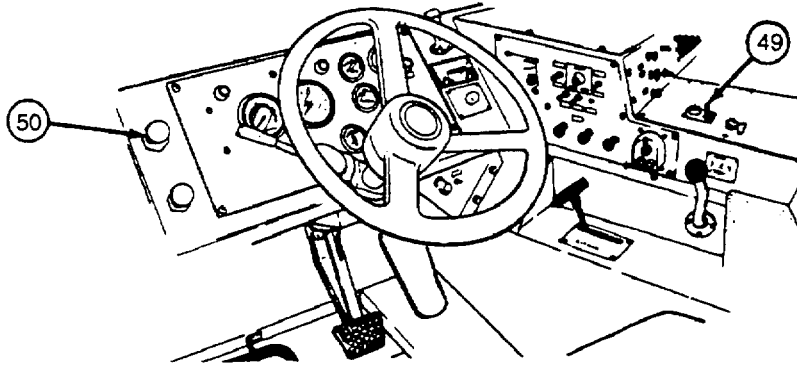
NOTE

Make sure all rigging is secure.

- (41) Set POWER switch (44) to OFF position.
- (42) Set POWER switch (48) to OFF position.

M984E1 General Operating Procedures (Cont)

2-73A. TOW M1074/M1075 (CONT).



- (43) Set PTO ENGAGE switch (49) to OFF position.
- (44) Turn on service drive lights (para 2-10d).
- (45) Turn on emergency flashers on wrecker (para 2-44a) and on disabled vehicle (TM 9-2320-364-10).
- (46) Push in PARKING BRAKE control (50) and select desired gear (para 2-11e).

WARNING

- The M984E1 should not be operated at speeds over 15 mph except on paved roads when the operator determines that the vehicle being towed and the terrain allow safe operation. Engine brake switch must be "ON" for all towing operations.

The following are maximum safe speeds:

Terrain Condition	Maximum speed, towed load above 50,000 lb
no road-level	30
on road-hilly	20
off road	15

- Speeds in excess of the above can result in loss of control, serious injury or death.

- (47) Transport disabled vehicle.

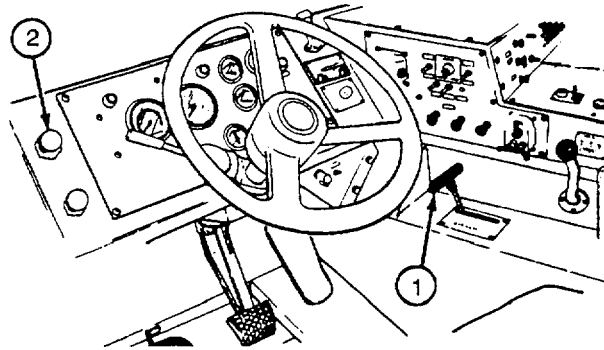
M984E1 General Operating Procedures (Cont)

d. Rear Disconnect

NOTE

This is a two-soldier task.

- (1) Set transmission range selector (1) to N.
- (2) Pull out PARKING BRAKE control (2).

**WARNING**

Do not stand between vehicles while disabled vehicle is raised off ground. Falling vehicle can cause serious injury or death.

NOTE

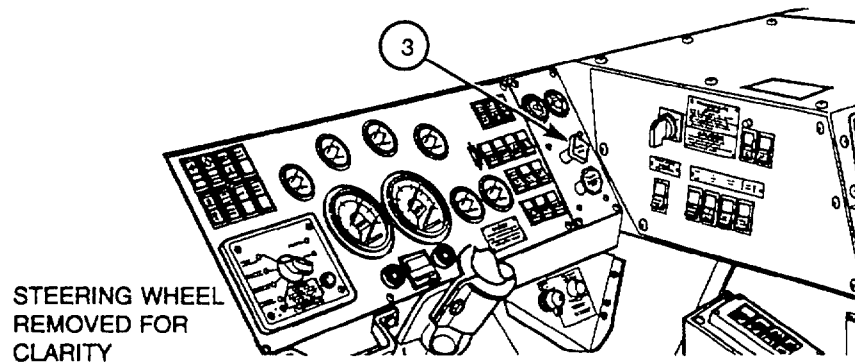
After lowering disabled vehicle, extend lift and tow cylinders approximately 2 to 4 inches (50 to 100 mm) to allow for adjustment when removing adapters.

- (3) Prepare retrieval system for operation (para 2-72) and pull LIFT CYLINDER control lever to extend lift cylinder and lower towed vehicle to ground.

WARNING

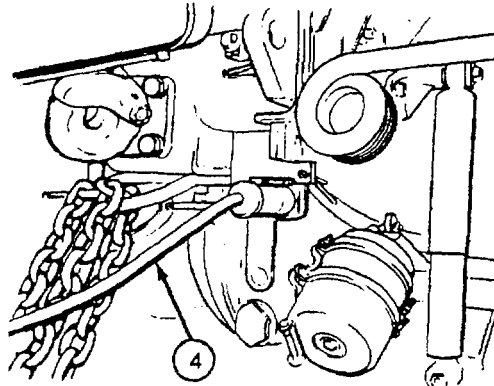
If disabled vehicle's air system is inoperative, chock wheels of disabled vehicle. Failure to chock wheels may result in personal injury.

- (4) Pull out PARKING BRAKE control (3) on disabled vehicle. If parking brake is inoperable, chock wheels on disabled vehicle.

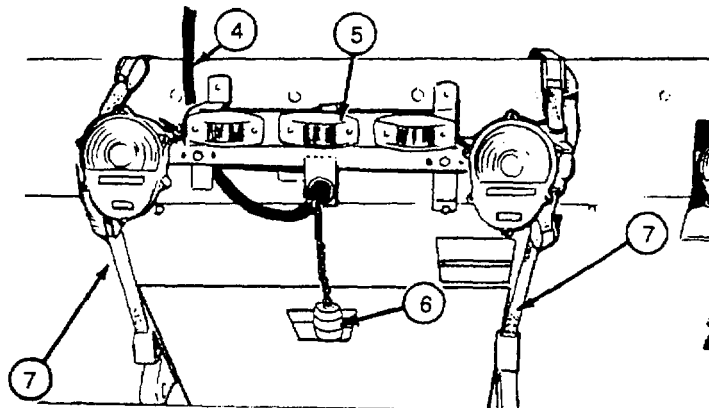


M984E1 General Operating Procedures (Cont)

2-73A. TOW M1074/M1075 (CONT).

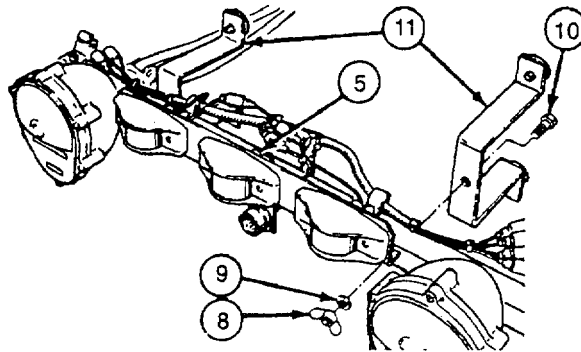


- (5) Remove tow light cable (4) from wrecker.

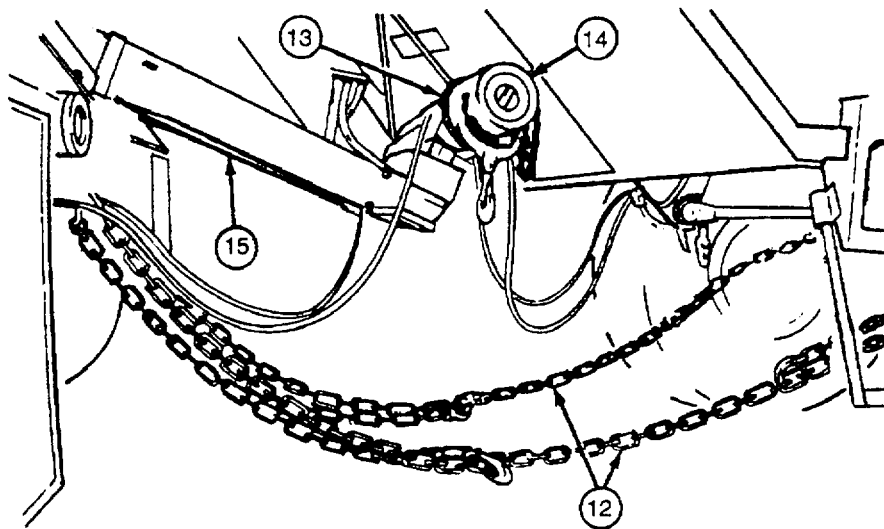


- (6) Remove tow light cable (4) from emergency tow lights (5).
- (7) Install dust cap (6) on tow light cable (4) and stow.
- (8) Loosen straps (7) and remove emergency tow lights (5) from disabled vehicle.

M984E1 General Operating Procedures (Cont)



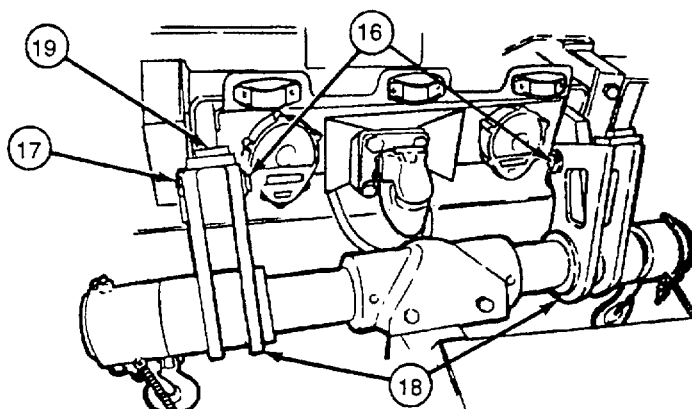
- (9) Remove two nuts (8), washers (9), screws (10), and brackets (11) from emergency tow lights (5). Stow emergency tow lights and brackets.



- (10) Remove and stow safety chains (12).
- (11) Unwrap two springs (13) from crosstube (14) and connect two springs to tow cylinders (15).

M984E1 General Operating Procedures (Cont)

2-73A. TOW M1074/M1075 (CONT).

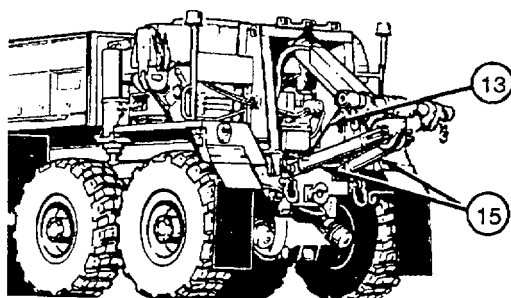
**WARNING**

- Do not stand behind adapters when pins are being removed. Adapters may swing down resulting in personal injury.
- Keep hands and fingers away from adapters and tow eyes when operating retrieval controls. Personal injury could result

NOTE

Use retrieval controls to position crosstube to relieve tension from adapters.

- (12) Remove two quick pins (16) and pins (17) from adapters (18).
 (13) Remove two adapters (18) from tow eyes (19) on disabled vehicle.
 (14) Install two pins (17) through adapters (18). Install quick pins (16).



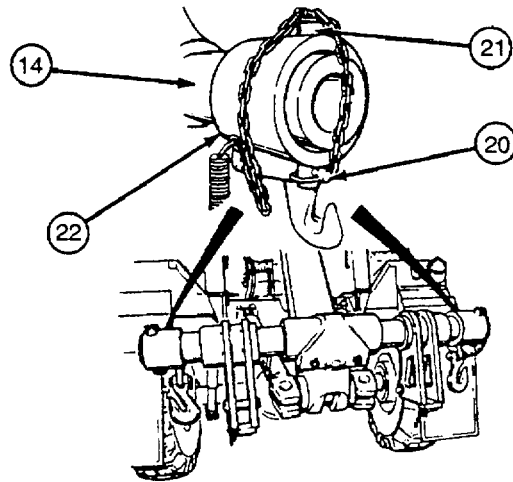
- (15) Drive wrecker forward several feet and park (para 2-110).

WARNING

When springs are removed, crosstube can swing in all directions and can cause personal injury.

- (16) Remove two springs (13) from tow cylinders (15).

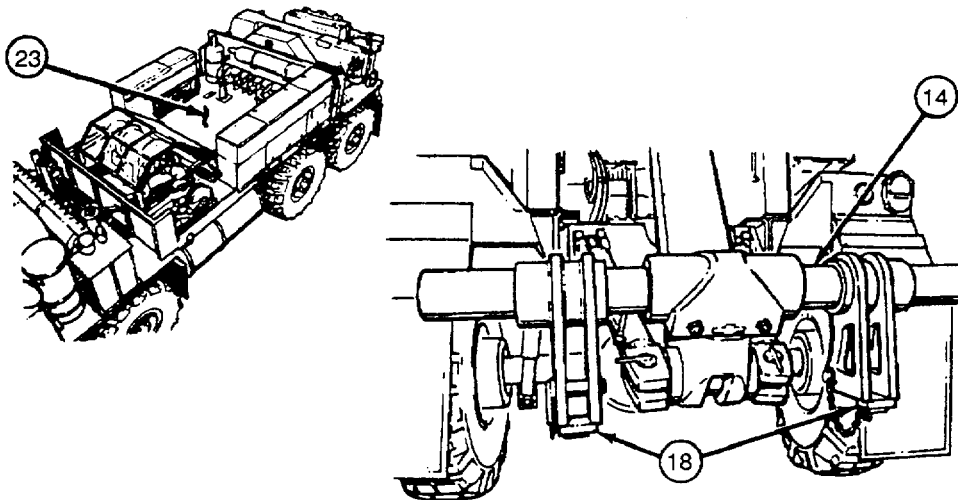
M984E1 General Operating Procedures (Cont)



WARNING

When end caps are removed from crosstube, adapters may slide off causing personal injury.

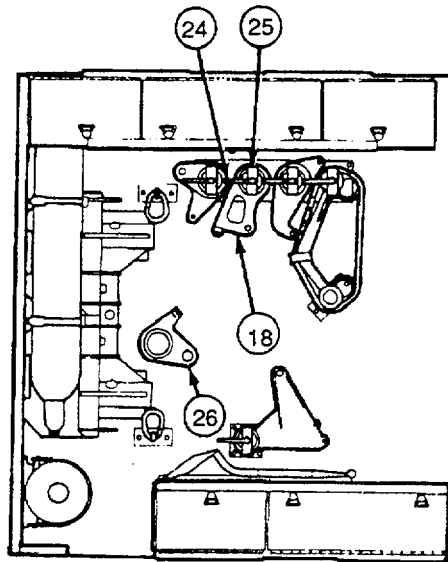
- (17) Remove quick pins (20) and pins (21) from end caps (22).
- (18) Remove end caps (22) from crosstube (14).



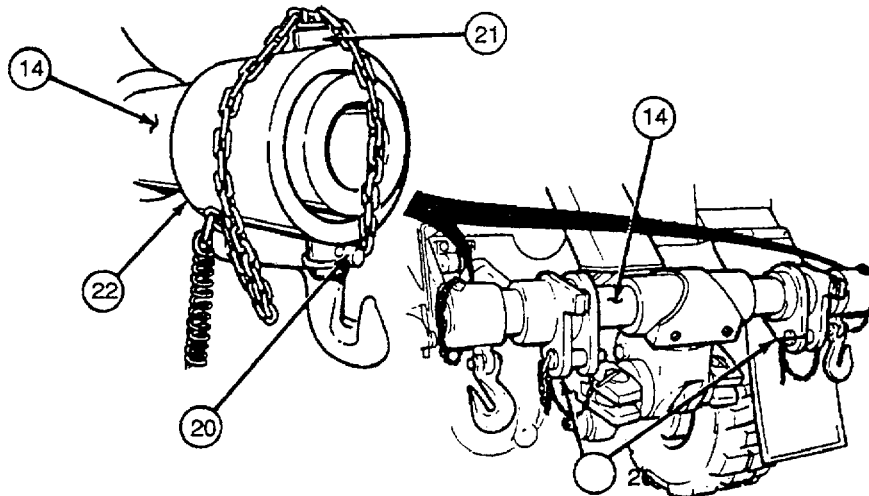
- (19) Remove adapters (18) from crosstube (14) and place on equipment body floor (23).

M984E1 General Operating Procedures (Cont)

2-73A. TOW M1074/M1075 (CONT).

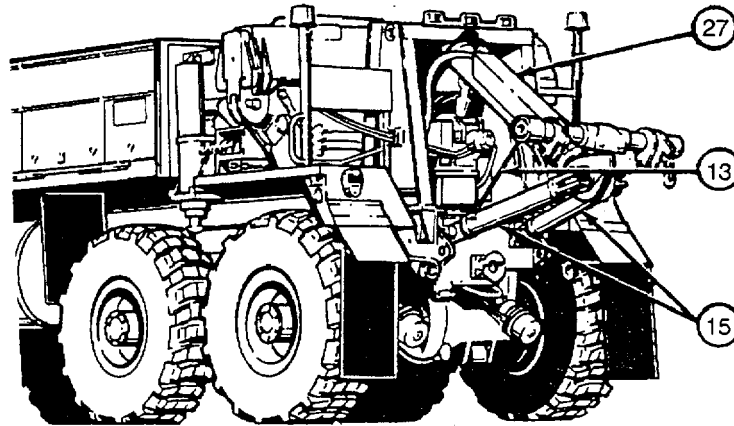


- (20) Remove lock handle (24), lock plate (25), and two front adapters (26).
- (21) Install two rear adapters (18) with lock plate (25) and lock handle (24).

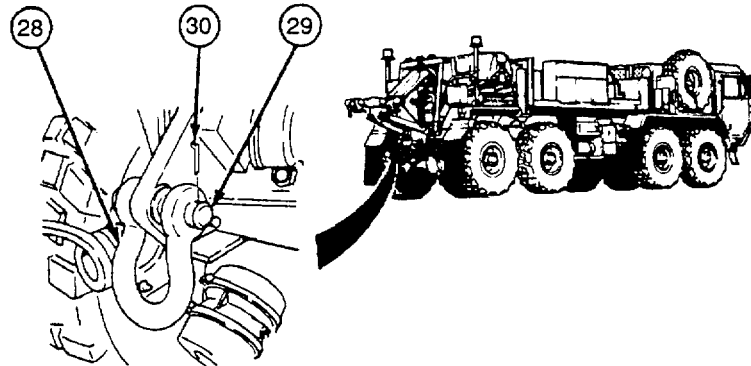


- (22) Install two front adapters (26) on crosstube (14).
- (23) Install end caps (22) on crosstube (14). Install pins (21) and quick pins (20).

M984E1 General Operating Procedures (Cont)



- (24) Install two springs (13) on tow cylinders (15).
- (25) Operate retrieval controls and fully retract lift cylinder (27) and tow cylinders (15).



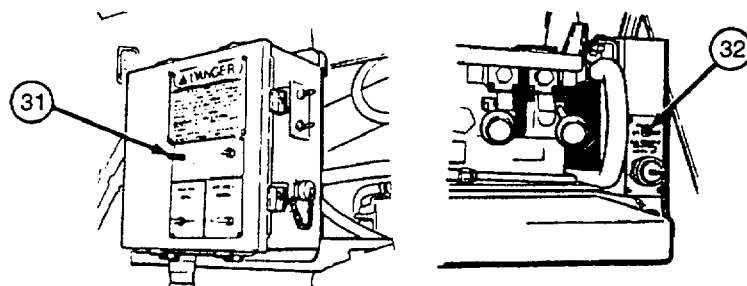
NOTE

Right and left towing shackles are installed the same way.

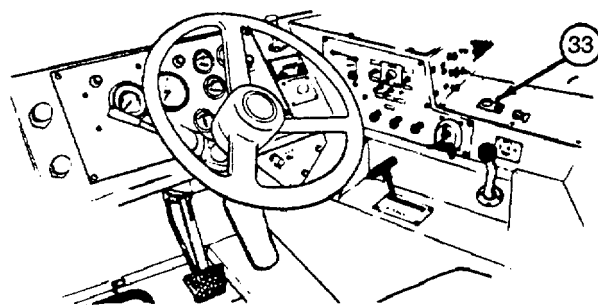
- (26) Install two towing shackles (28), pins (29), and cotter pins (30).

M984E1 General Operating Procedures (Cont)

2-73A. TOW M1074/M1075 (CONT).



- (27) Set POWER switch (31) to OFF position.
- (28) Set POWER switch (32) to OFF position.



- (29) Turn off emergency flashers on wrecker (para 2-44f) and disabled vehicle (TM 9-2320-364-10).
- (30) Turn off service drive lights (para 2-10d).
- (31) Set PTO ENGAGE switch (33) to OFF position.
- (32) Remove and stow beacon lights (para 2-62).
- (33) Shut off engine (para 2-11p).
- (34) Remove lock from steering column (TM 9-2320-364-10).

M984E1 General Operating Procedures (Cont)

2-73B. TOW MI070.

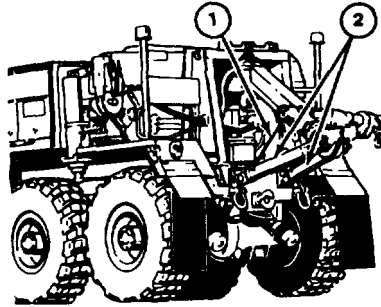
a. **Front Hookup.**

WARNING

Lift and tow operations should not be conducted on side slopes in excess of 25%. Failure to comply may result in vehicle roll-over and injury or death to personnel.

NOTE

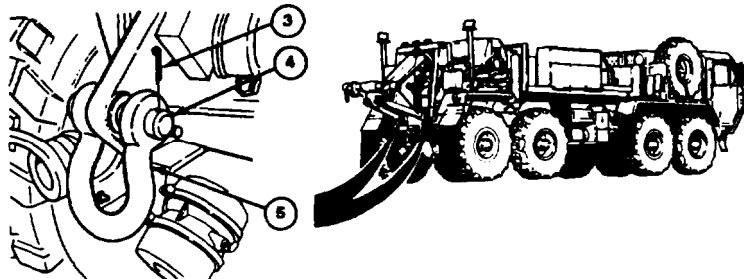
- Each recovery situation is unique and requires assessment to determine if the driveline is suitable for transporting. When in doubt, consult with unit level maintenance.
 - This is a two-soldier task.
- (1) Apply PARKING BRAKE and chock wheels on disabled vehicle TM-9-2320-360-10).
 - (2) Prepare retrieval system for operation (para 2-72).



WARNING

Hold crosstube when removing springs. Crosstube may swing or cause adapter to slide resulting in personal injury.

- (3) Disconnect two springs (1) from tow cylinders (2).



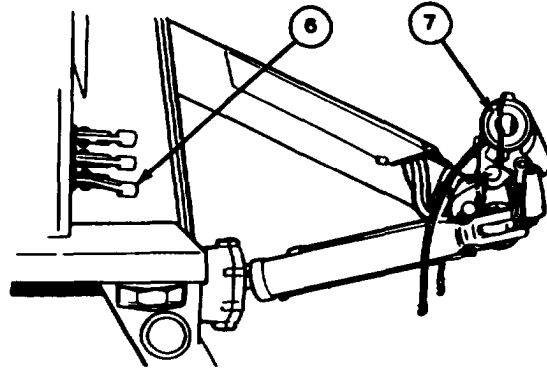
NOTE

Right and left towing shackles are removed the same way.

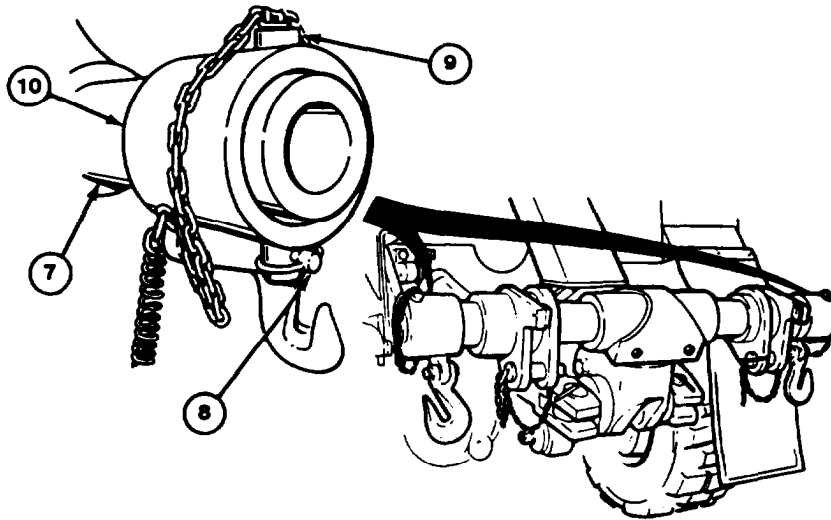
- (4) Remove two cotter pins (3), pins (4), and towing shackles (5) from wrecker.

M984E1 General Operating Procedures (Cont)

2-73B. TOW MI070 (CONT).



- (5) Pull LIFT CYLINDER control lever (6) to lower cross-tube (7) to approximately 3 ft (1 m) above the ground.
- (6) Position wrecker so that cross-tube (7) is approximately 1 ft (30 cm) from tow eyes of disabled vehicle and centered on disabled vehicle.

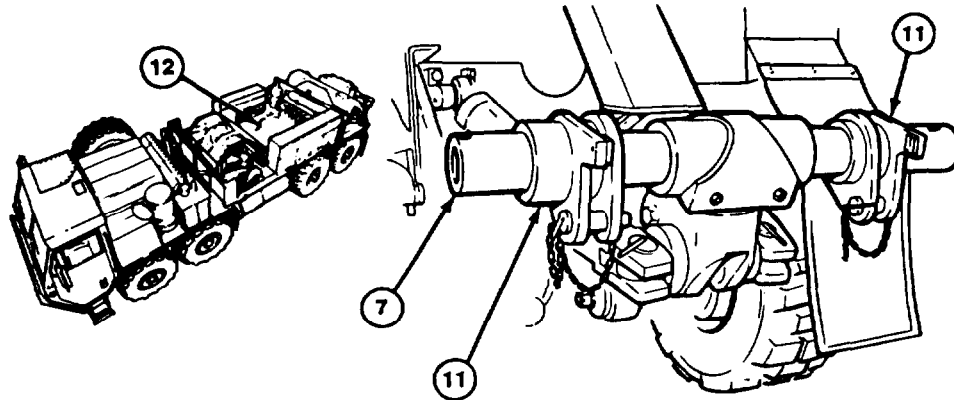


WARNING

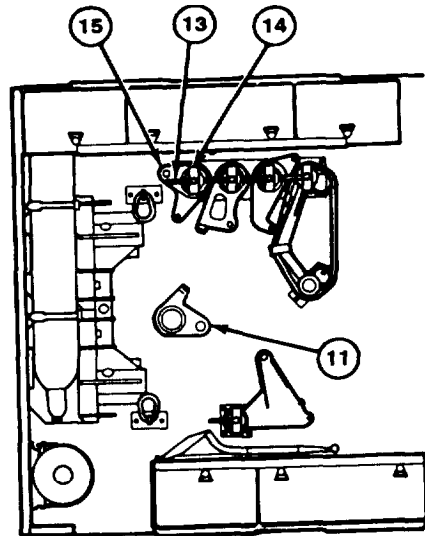
When end caps are removed from cross-tube, adapters may slide off causing personal injury.

- (7) Remove two quick pins (8) and pins (9) from end caps (10).
- (8) Remove two end caps (10) from cross-tube (7).

M984E1 General Operating Procedures (Cont)



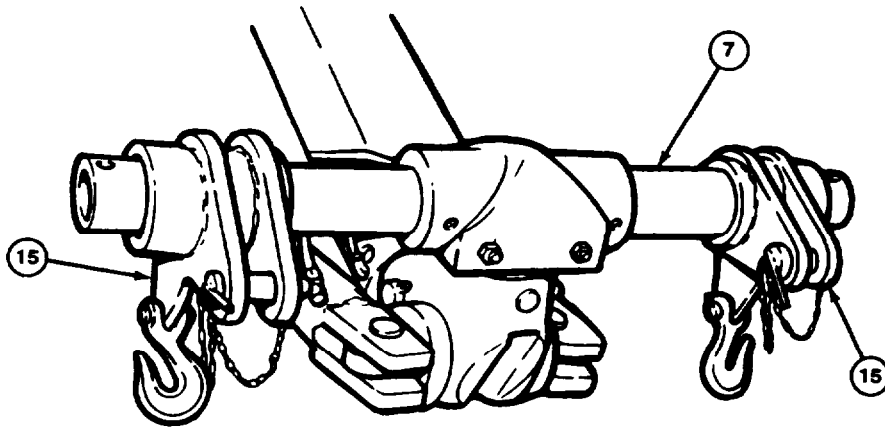
- (9) Remove two M977 front adapters (11) from crosstube (7) and place on equipment body floor (12).



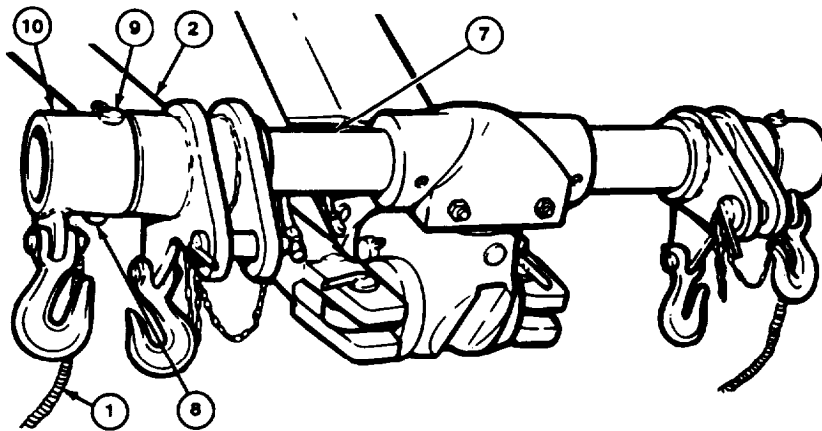
- (10) Remove lock handle (13), lock plate (14), and two M1070 front tow adapters (1481840W and 1481830W) (15) from equipment body floor (12).
- (11) Install two M977 front adapters (11) on equipment body floor (12) with lock plate (14) and lock handle (13).

M984E1 General Operating Procedures (Cont)

2-73B. TOW M1070 (CONT).



- (12) Install two M1070 front tow adapters (15) on crosstube (7).

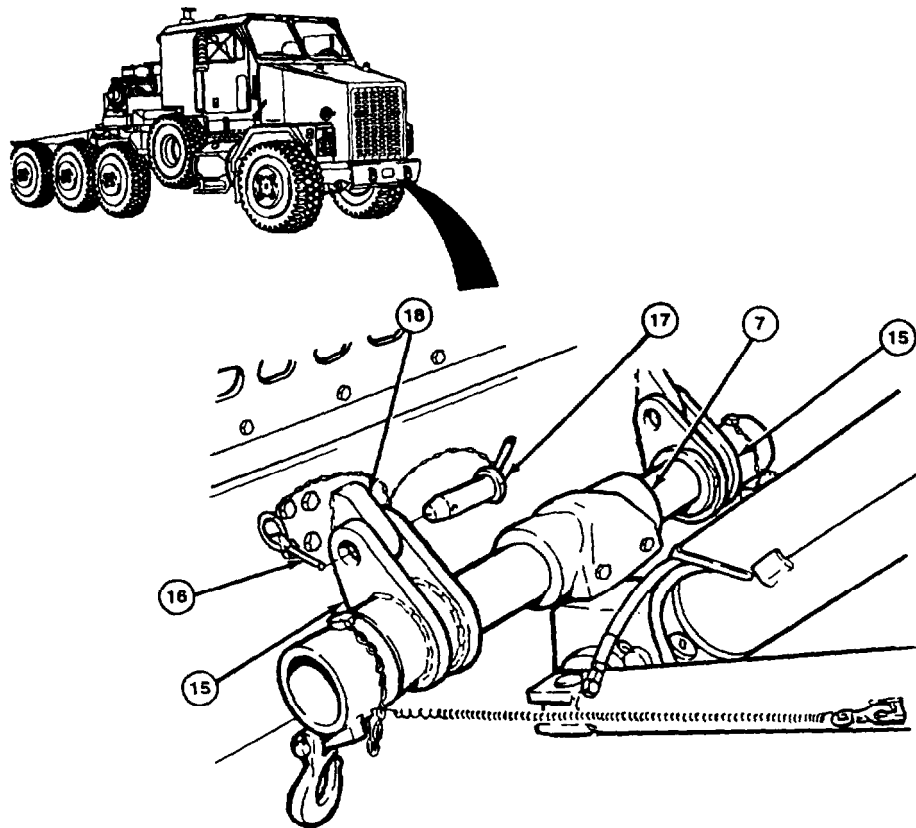


NOTE

End caps will hang over end of crosstube for M1070 adapters.

- (13) Install two end caps (10) on crosstube (7) with two pins (9) and quick pins (8).
(14) Attach two springs (1) on tow cylinders (2).

M964E1 General Operating Procedures (Cont)



- (15) Remove two quick pins (16) and pins (17) from adapters (15).

WARNING

Keep hands and fingers away from adapters and tow eyes when operating retriever controls. Failure to comply may result in serious injury to personnel.

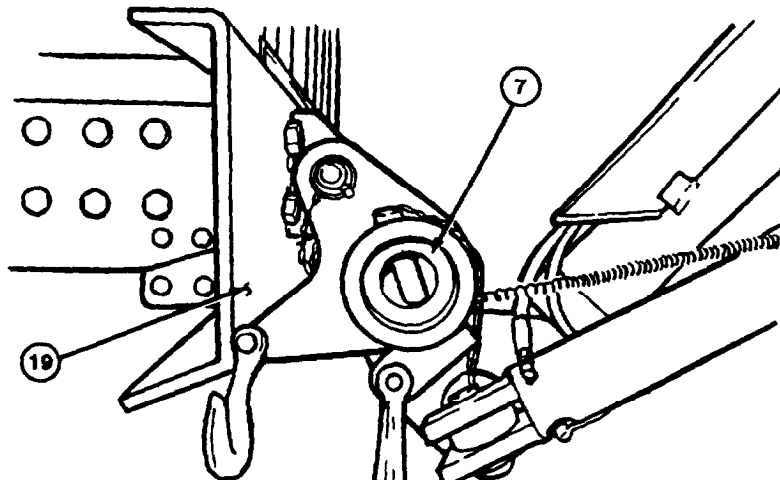
NOTE

If disabled vehicle has towing shackles installed, remove shackles and stow in disabled vehicle.

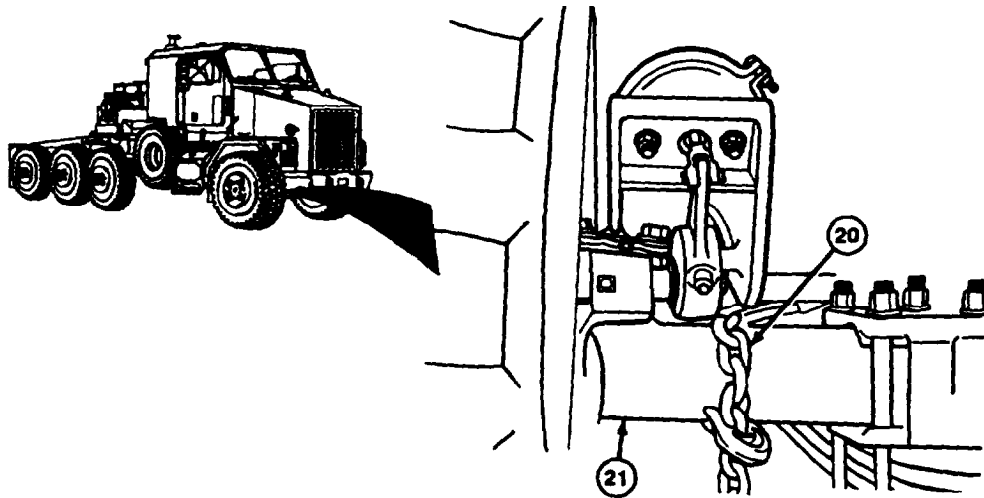
- (16) Soldier A operates retrieval system (para 2-72) while Soldier A and Soldier B position crosstube (7) so holes in adapters (15) align with holes in front tow eyes (18).
- (17) Install two pins (17) thru adapters (15) and front tow eyes (18) with two quick pins (16).

M984E1 General Operating Procedures (Cont)

2-73B. TOW M1070 (CONT).

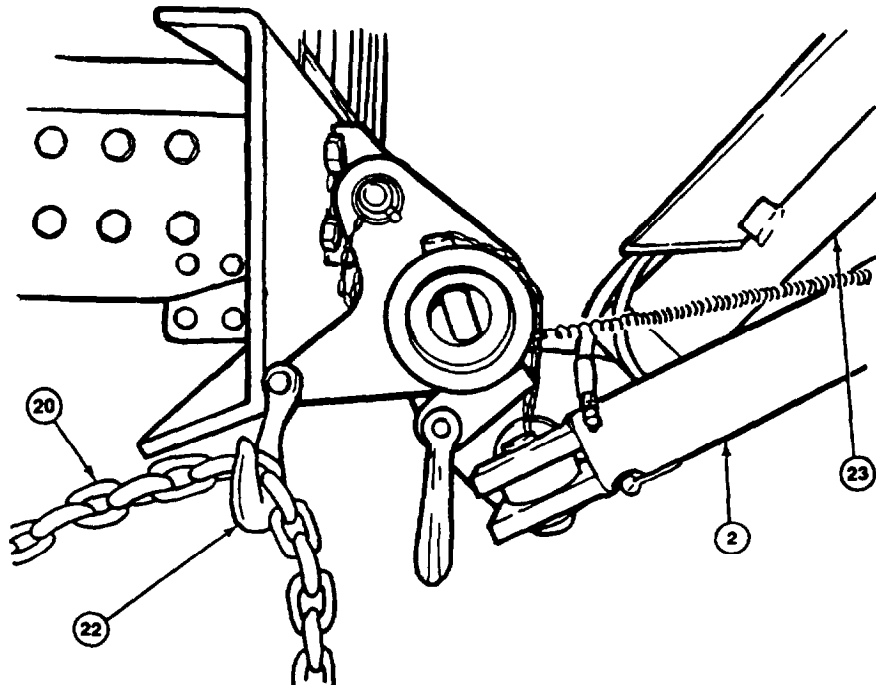


- (18) Reposition crosstube (7) so that adapter bottom is tight to front bumper (19).



- (19) Remove two 16 ft (5 m) safety chains (20) from stowage.
- (20) Route one safety chain (20) over axle No. 1 (21) of disabled vehicle.
- (21) Hook safety chain (20) together in front of axle No. 1 (21).
- (22) Repeat steps (20) and (21) for other side of axle No. 1 (21).

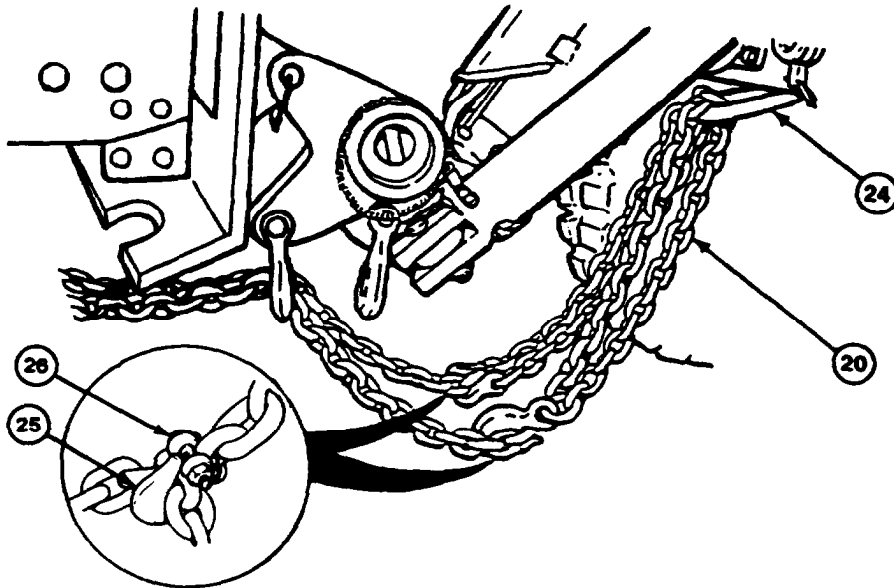
M984E1 General Operating Procedures (Cont)



- (23) Pull safety chain (20) tight and install on adapter grab hook (22).
- (24) Repeat step (23) for other safety chain (20).
- (25) Prepare disabled vehicle for towing (TM-9-2320-360-10).
- (26) Operate TOW and LIFT CYLINDER control levers until tow cylinders (2) are fully retracted.
- (27) Push in LIFT CYLINDER control lever to retract lift cylinder (23) until slack is removed from safety chains (20).

M984E1 General Operating Procedures (Cont)

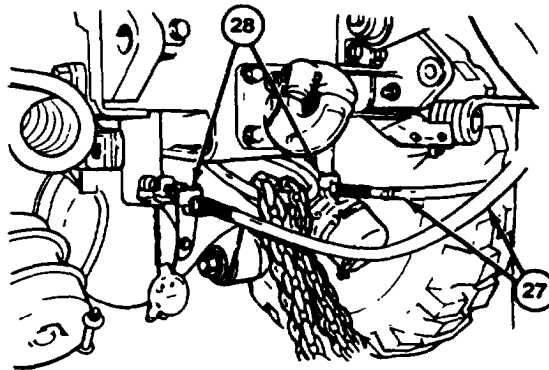
2-73B. TOW M1070 (CONT).



NOTE

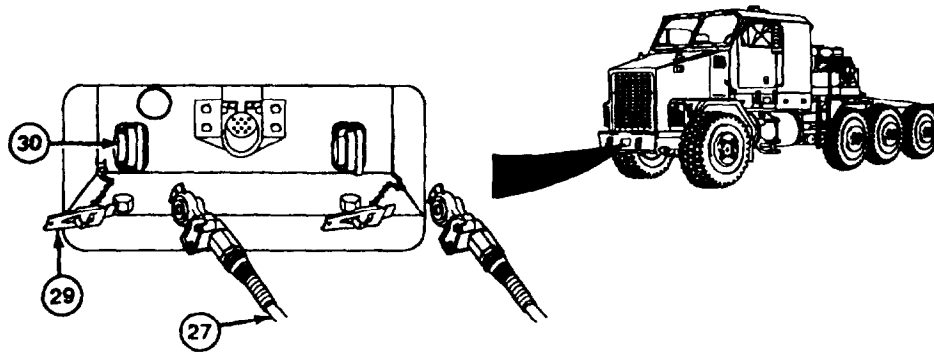
Safety chains should just touch ground when secured.

- (28) Route two safety chains (20) thru safety chain hoop (24) on wrecker and secure grab hook (25) with safety shackle (26).



- (29) Remove two air hoses (27) from stowage and attach to rear glad hands (28) on wrecker.

M934E1 General Operating Procedures (Cont)



- (30) Remove dummy couplings (29) from front glad hands (30) of disabled vehicle.

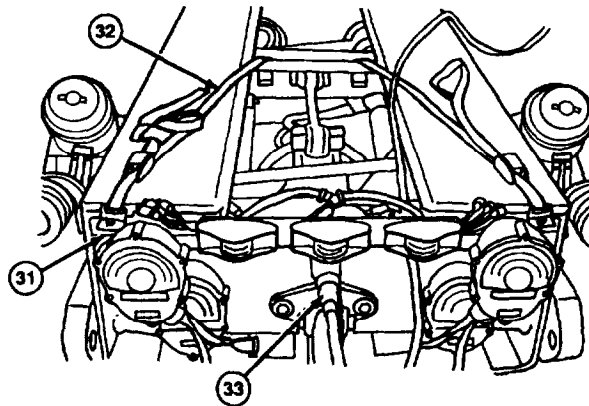
CAUTION

Air hoses should not be routed thru retrieval cylinders or damage to air hoses may result.

NOTE

Left rear air hose from wrecker must be connected to left front glad hand on disabled vehicle. Right rear air hose from wrecker must be connected to right front glad hand on disabled vehicle.

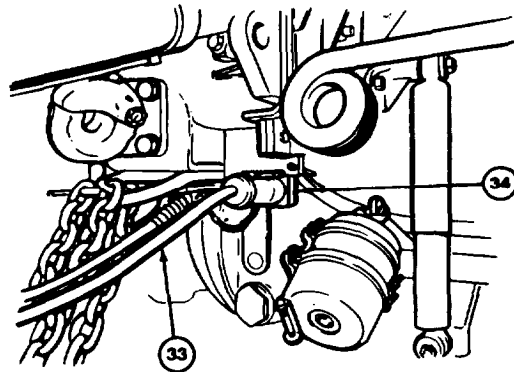
- (31) Install two air hoses (27) on front glad hands (30) of disabled vehicle.



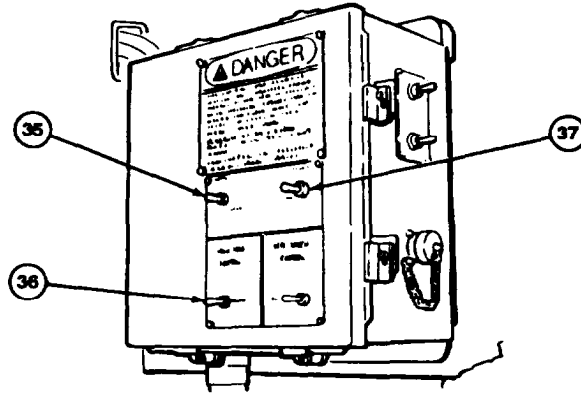
- (32) Remove emergency tow lights (31) from stowage.
- (33) Install tow lights (31) on rear of disabled vehicle and fasten securely with straps (32).
- (34) Remove tow light cable (33) from stowage and connect to emergency tow lights (31).

M994E1 General Operating Procedures (Cont)

2-73B. TOW M1070 (CONT).



- (35) Route other end of tow light cable (33) along disabled vehicle and connect to rear electrical connector (34) on wrecker.

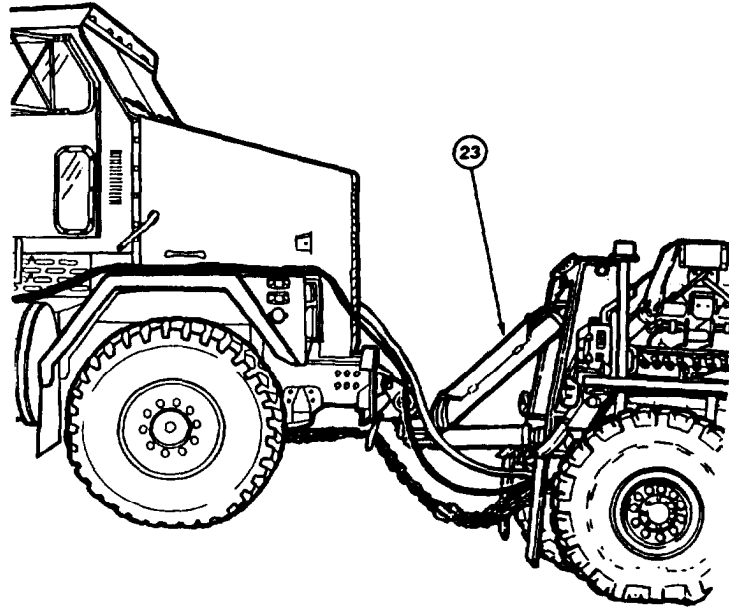


NOTE

- If disabled vehicle will be lifted and towed, continue with step (36).
- If disabled vehicle will be towed with all tires on paved roads only, raise crosstube enough to partially unload disabled vehicle's front suspension. Keep front tires in firm contact with ground and proceed to step (41).

- (3) Lock disabled vehicle's steering (TM 9-2320-360-10).
- (7) Set POWER switch (35) to ON position.
- (3) Set HIGH IDLE switch (36) to CONTINUOUS.
- (9) Push and release LATCH switch (37). Engine speed will increase to approximately 1500 rpm.

M964E1 General Operating Procedures (Cont)

**WARNING**

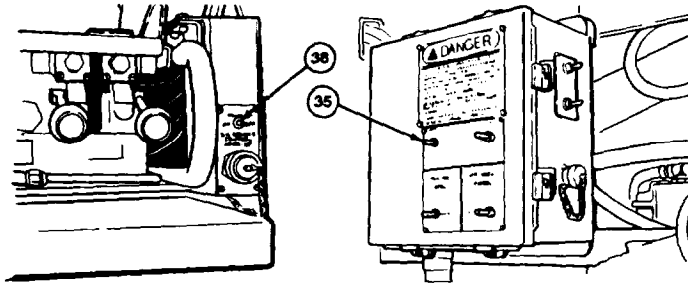
Keep out from under disabled vehicle and retrieval system when raised. Failure to comply may result in serious injury or death to personnel.

CAUTION

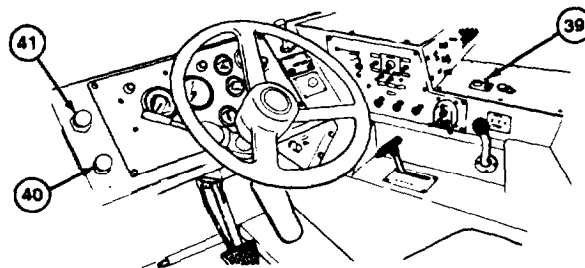
- Fully retract both cylinders before lifting disabled vehicle. Failure to comply may result in damage to equipment.
 - Make sure all rigging is secure. Loose rigging can become entangled and cause damage to equipment.
 - When M1070 is lifted from the front it is approximately 12' 9" (3.9 m) high. Do not transport M1070 under anything that does not have this clearance. Use caution when approaching low bridges to avoid contact with structures below 12'9" (3.9 m). Failure to comply will result in damage to equipment.
- (40) Push LIFT CYLINDER control lever to retract lift cylinder (23) and raise disabled vehicle approximately 1 ft (30 cm) off ground.

M964E1 General Operating Procedures (Cont)

2-73B. TOW M1070 (CONT).



- (42) Set POWER switch (35) to OFF position.
- (42) Set POWER switch (38) to OFF position.



- (43) Set PTO ENGAGE switch (39) to OFF position.
- (44) Push in TRAILER AIR SUPPLY control (40).
- (45) Turn on service lights para 2-10d).
- (46) Turn on emergency flashers on wrecker (para 2-44a) and disabled vehicle (TM-9-2320-360-10).
- (47) Push in PARKING BRAKE control (41) and select desired gear (para 2-11e).

WARNING

The M984E1 should not be operated at speeds over 15 mph except on paved roads when the operator determines that the vehicle being towed and the terrain allow safe operation. Engine brake switch must be ON for all towing operations. The following are maximum safe speeds:

Terrain Condition	Maximum Speed, towed load up to 50,000 lbs (22,661 kg)	Maximum Speed, towed load above 60,000 lbs (22,661 kg)
On Road - Level	35	30
On Road - Hilly	30	20
Off Road	15	15

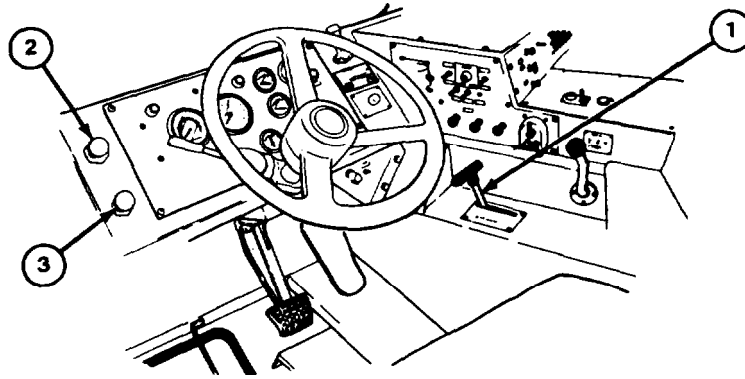
Speeds in excess of the above can result in loss of control, serious injury, or death to personnel.

- (48) Transport disabled vehicle.

M964E1 General Operating Procedures (Cont)

b. Front Disconnect**NOTE**

This is a two-soldier task.



- (1) Set transmission range selector (1) to N (neutral).
- (2) Pull out PARKING BRAKE control (2).
- (3) Pull out TRAILER AIR SUPPLY control (3).

WARNING

Keep out from under disabled vehicle and retrieval system when raised. Failure to comply may result in serious injury or death to personnel.

NOTE

After lowering disabled vehicle, extend lift and tow cylinders approximately 2 to 4 in (50 to 100 mm) to allow for adjustment when removing adapters.

- (4) Prepare retrieval system for operation (para 2-72) and pull LIFT CYLINDER control lever to extend lift cylinder and lower disabled vehicle to ground until safety chains at front axle are slack.

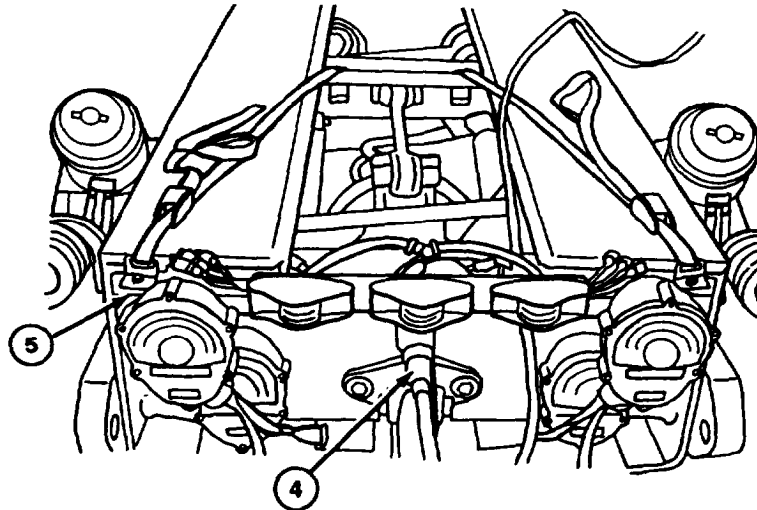
WARNING

If disabled vehicle's air system is inoperative, chock wheels of disabled vehicle. Failure to comply may result in serious injury or death to personnel.

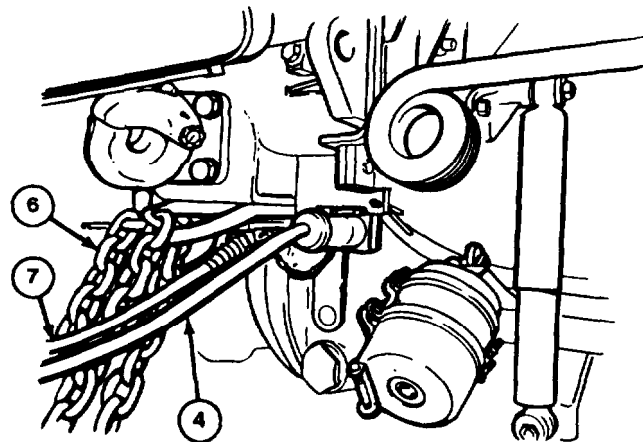
- (5) Apply PARKING BRAKE on disabled vehicle (TM 9-2320-360-10). If parking brake is inoperative, chock wheels on disabled vehicle.

M994E1 General Operating Procedures (Cont)

2-73B. TOW M1070 (CONT).

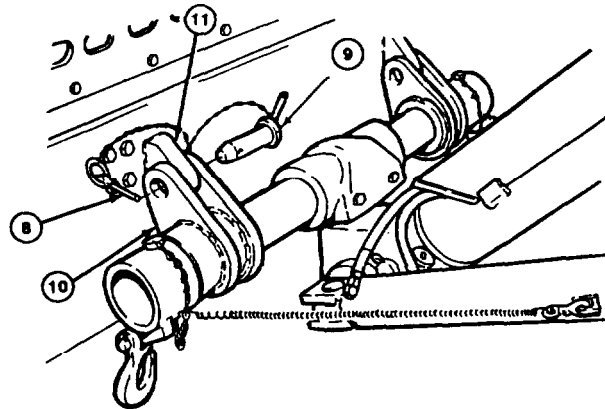


- (6) Remove tow light cable (4) from emergency tow lights (5).
- (7) Remove emergency tow lights (5) from disabled vehicle.

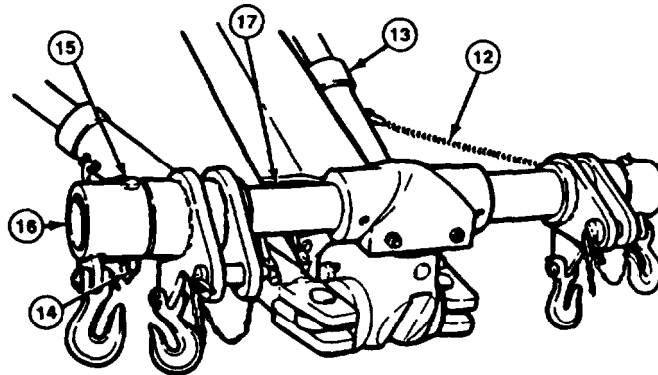


- (8) Remove tow light cable (4) from rear electrical connector of wrecker. Stow emergency tow lights and tow light cable.
- (9) Remove and stow two safety chains (6) and air hoses (7).

M964E1 General Operating Procedures (Cont)



- (10) Remove two quick pins (8) and pins (9) from adapters (10).
- (11) Remove two adapters (10) from tow eyes (11).
- (12) Install two pins (9) in adapters (10).
- (13) Install two quick pins (8) in pins (9).



- (14) Drive wrecker forward several feet and park (para 2-11o).

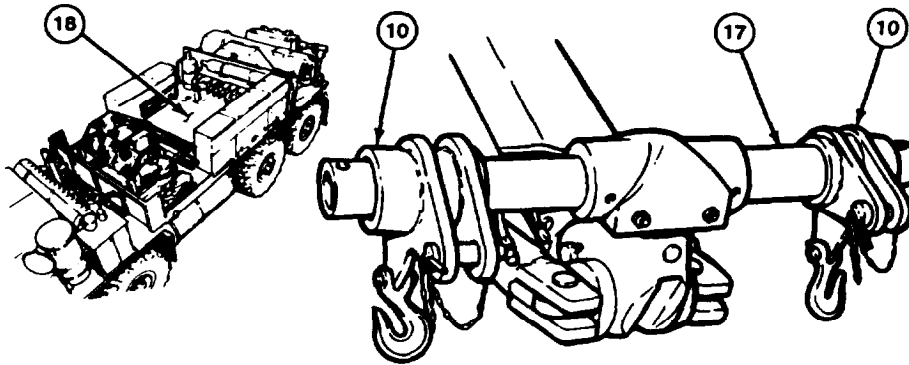
WARNING

As springs and end caps are removed, crosstube can swing in all directions, adapters may slide off, and can cause injury to personnel.

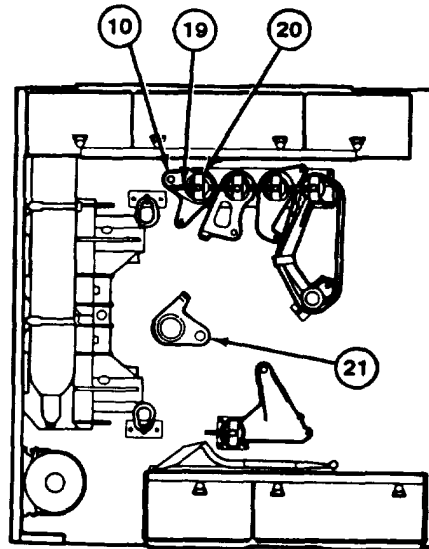
- (15) Remove two springs (12) from tow cylinders (13).
- (16) Remove two quick pins (14) and pins (15) from end caps (16).
- (17) Remove end caps (16) from crosstube (17).

M984E1 General Operating Procedures (Cont)

2-73B. TOW M1070 (CONT).

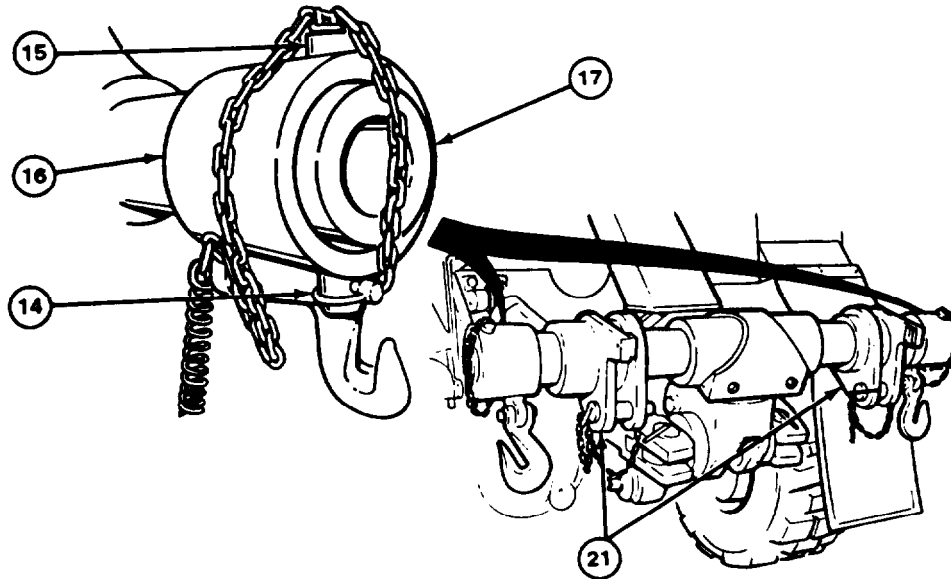


- (18) Remove two adapters (10) from crosstube (17) and place on equipment body floor (18).

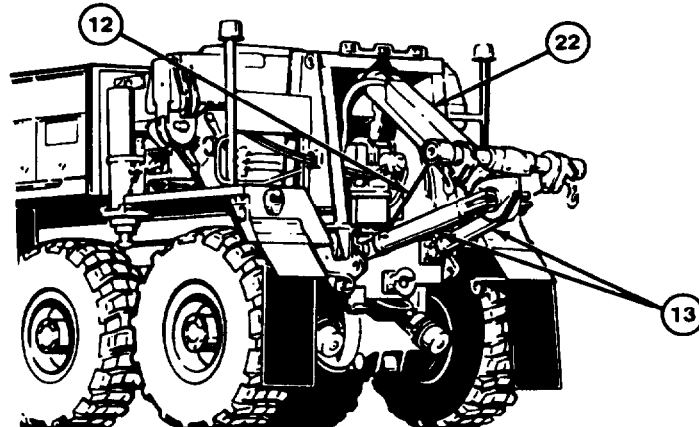


- (19) Remove lock handle (19), lock plate (20), and two M977 front tow adapters (21).
- (20) Install two M1070 adapters (10) on body floor with lockplate (20) and lock handle (19).

M984E1 General Operating Procedures (Cont)



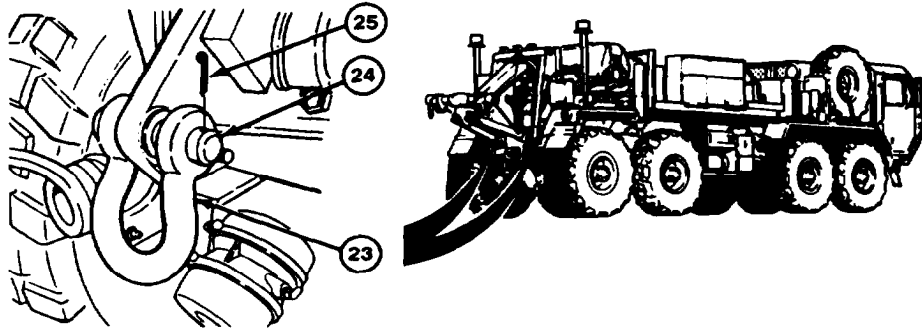
- (21) Install two M977 adapters (21) on crosstube (17).
- (22) Install tow end caps (16) on crosstube (17) with two pins (15) and two quick pins (14).



- (23) Install two springs (12) on tow cylinders (13).
- (24) Operate retrieval system to fully retract lift cylinder (22) and tow cylinders (13).

M984E1 General Operating Procedures (Cont)

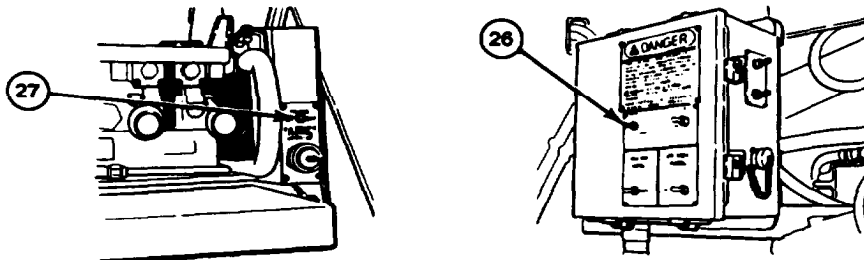
2-73B. TOW MI070 (CONT.)



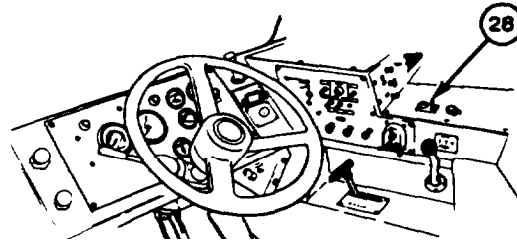
NOTE

Right and left towing shackles are installed the same way.

- (25) Install two towing shackles (23) with two pins (24) and cotter pins (25).



- (26) Set POWER switch (26) to OFF position.
- (27) Set POWER switch (27) to OFF position.



- (28) Turn off emergency flashers on wrecker (para 2-44f) and disabled vehicle (TM 9-2320-360-10).
- (29) Turn off service drive lights (para 2-10d).
- (30) Set PTO ENGAGE switch (28) to OFF position.
- (31) Remove and stow beacon lights (para 2-62).
- (32) Shut off engine (para 2-11p).
- (33) Unlock disabled vehicles steering (TM 9-2320-360-10).

M984E1 General Operating Procedures (Cont)**c. Rear Hookup.****WARNING**

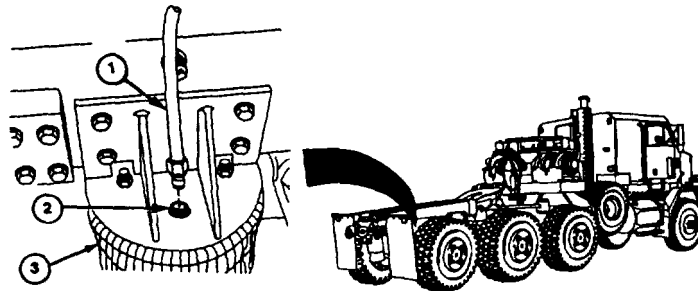
- Lift and tow operations should not be conducted on side slopes in excess of 25%. Failure to comply may result in vehicle roll-over and injury or death to personnel.
- Air suspension system may still be pressurized even though air pressure gage reads 0 psi. Air suspension will drop when air line is removed. Remove air line slowly to allow air to escape. Stay clear of suspension. Failure to comply may result in injury to personnel.

CAUTION

All three rear axles must be secured with chains to prevent distortion of suspension air springs. Failure to comply may result in damage to equipment.

NOTE

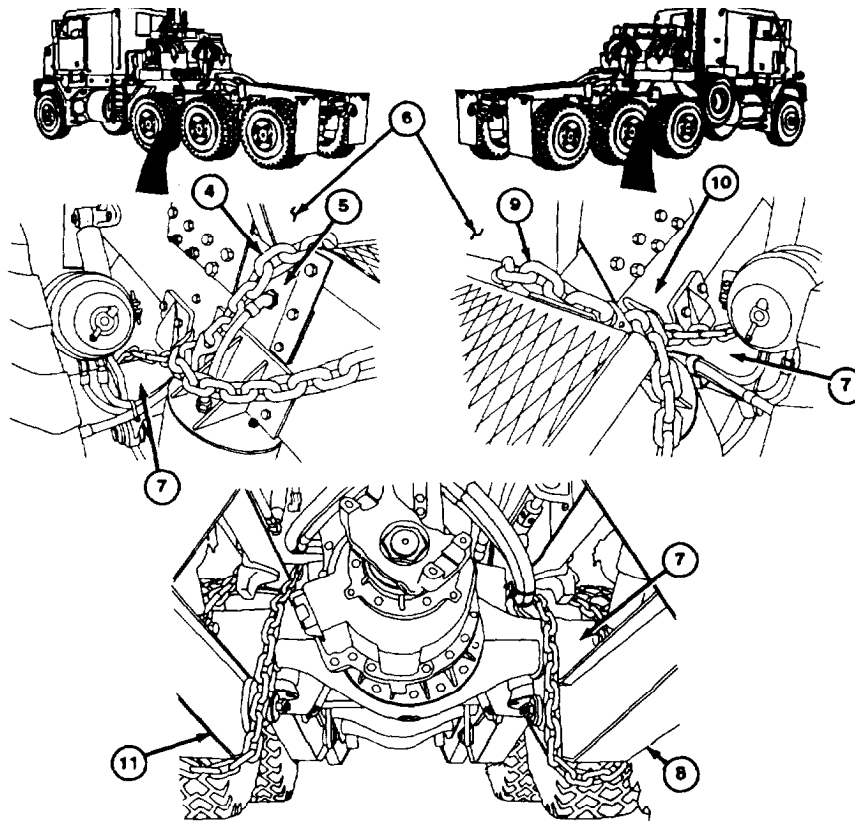
- Each recovery situation is unique and requires assessment to determine if the driveline is suitable for transporting. When in doubt, consult with unit level maintenance.
 - This is two-soldier task.
- (1) Apply PARKING BRAKE and chock wheels on disabled vehicle (TM 9-2320-360-10).

**NOTE**

- Air suspension is drained and lowered to gain extra axle to ground clearance when rear of vehicle is lifted.
 - Any one of the six rear air bag air lines may be removed to drain air system.
- (2) Remove air line (1) from fitting (2) on air spring (3).
 (3) Install air line (1) on fitting (2) after air suspension has settled.

M984E1 General Operating Procedures (Cont)

2-73B. TOW MI070 (CONT)



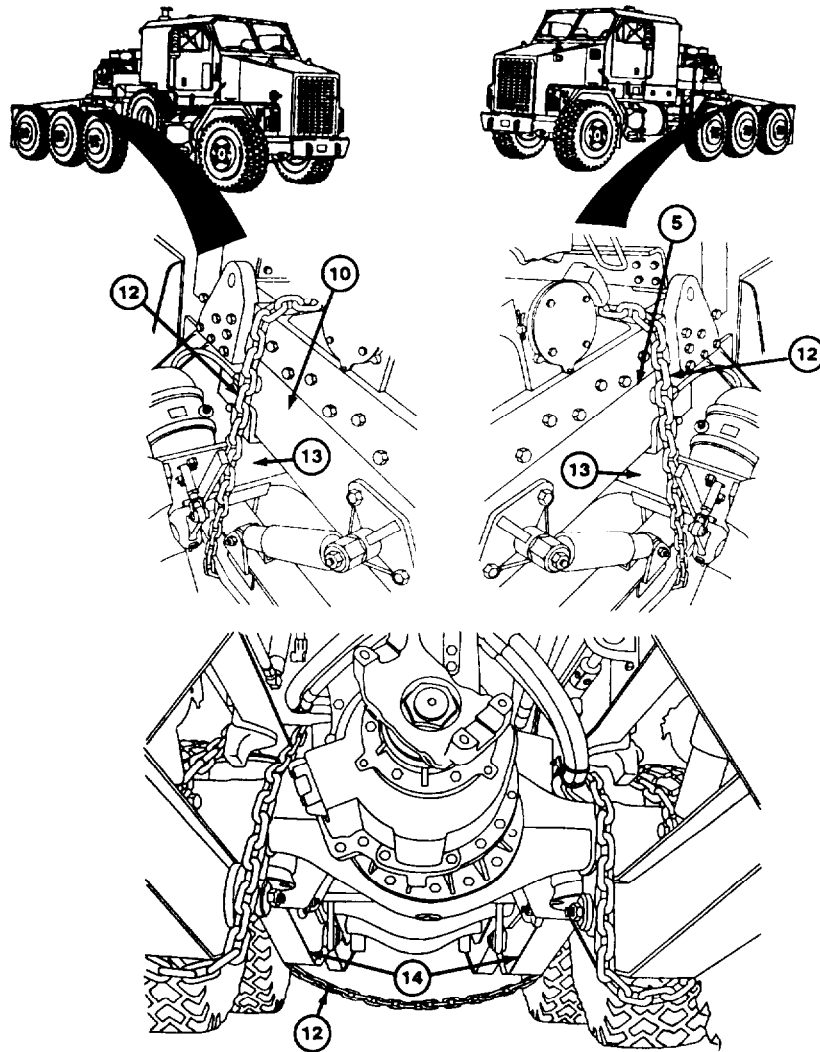
CAUTION

Use caution when routing chains near air lines, wiring, steering components, etc. Failure to comply may result in damage to equipment.

NOTE

- Two 12 ft. chains (item 21, appendix B) are used to secure axle No. 2. One 16 ft chain (item 20, appendix B) is used to secure axle No.3 and another 16 foot chain secures axle No. 4.
 - For maximum ground clearance, chains should be installed as tight as possible.
- (4) Route and secure chain (4) over left frame rail (5) behind winch platform (6), in front of axle No. 2 (7), and under suspension arm (8).
- (5) Route and secure chain (9) over right frame rail (10) behind winch platform (6), in front of axle No. 2 (7), and under suspension arm (11).

M984E1 General Operating Procedures (Cont)



NOTE

Both axles No. 3 and No. 4 are secured in a similar manner. Axle No. 3. is shown.

- (6) Route and secure chain (12) over both frame rails (5 and 10), in front of axle No. 3 (13) and under suspension arms (14).
- (7) Repeat step (6) for axle No. 4.

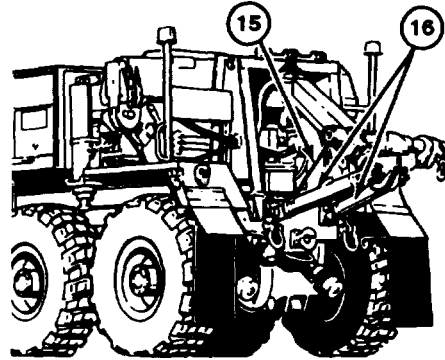
M984E1 General Operating Procedures (Cont)

2-73B. TOW M1070 (CONT)

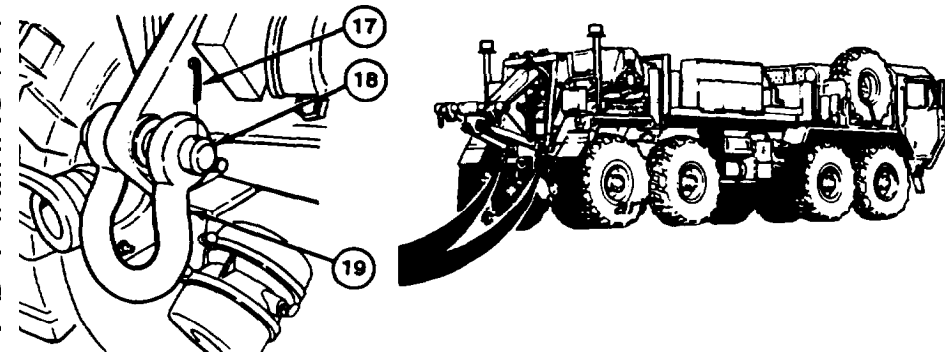
- (8) Prepare retrieval system for operation (para 2-72).

WARNING

- Hold crosstube when removing springs. Crosstube may swing or cause adapter to slide resulting in personal injury.
- Inter-vehicular air lines are not connected when towing from rear. Disabled vehicle will not have braking. Use extreme caution when transporting disabled vehicle using rear hookup. Failure to comply may cause severe injury or death.



- (9) Disconnect two springs (15) from tow cylinders (16).

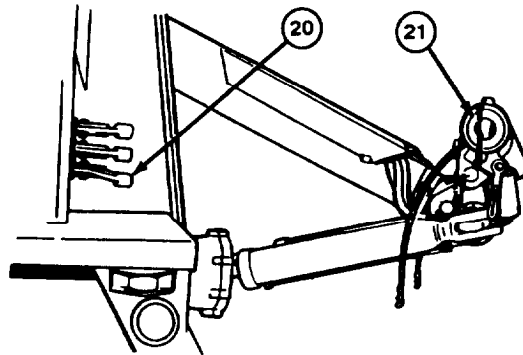


NOTE

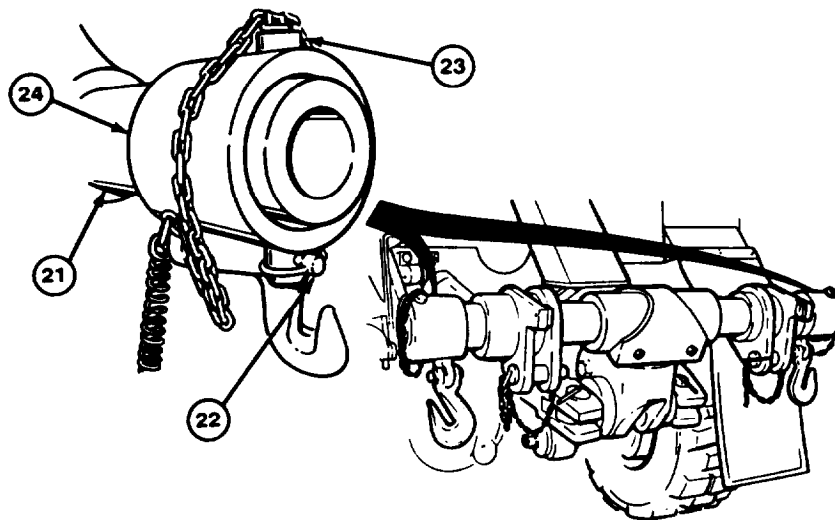
Right and left towing shackles are removed the same way.

- (10) Remove two cotter pins (17), pins (18), and towing shackles (19) from wrecker.

M984E1 General Operating Procedures (Cont)



- (11) Pull LIFT CYLINDER control lever (20) to lower crosstube (21) to approximately 3 ft (1 m) above the ground.
- (12) Position wrecker so that crosstube (21) is approximately 1 ft (30 cm) from tow eyes of disabled vehicle and centered on disabled vehicle.



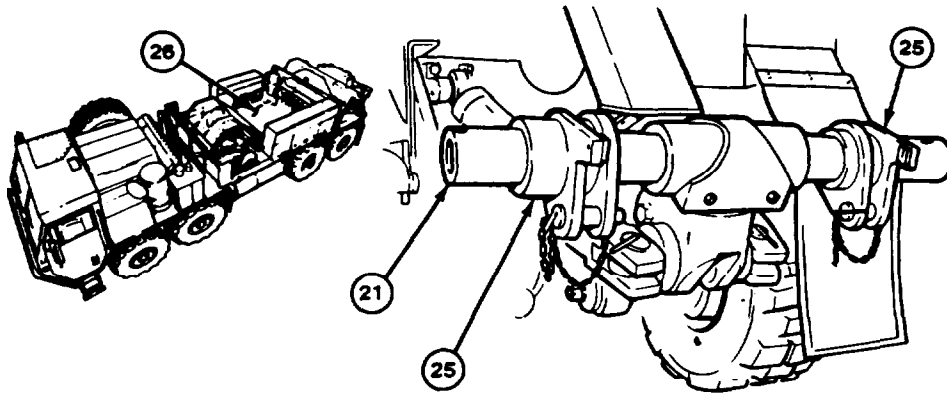
WARNING

When end caps are removed from crosstube, adapters may slide off causing personal injury.

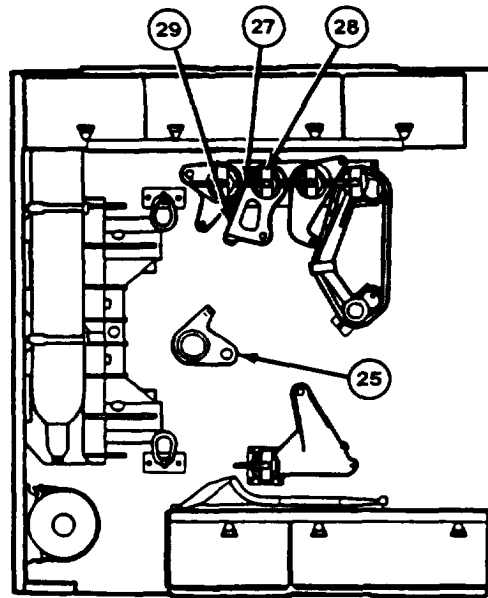
- (13) Remove two quick pins (22) and pins (23) from end caps (24).
- (14) Remove two end caps (24) from crosstube (21).

M984E1 General Operating Procedures (Cont)

2-73B. TOW M1070 (CONT).

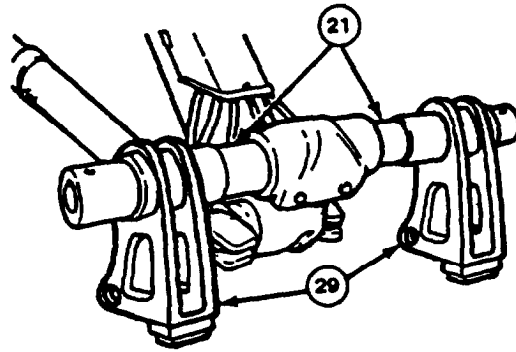


- (15) Remove two M977 front adapters (25) from crosstube (21) and place on equipment body floor (26).

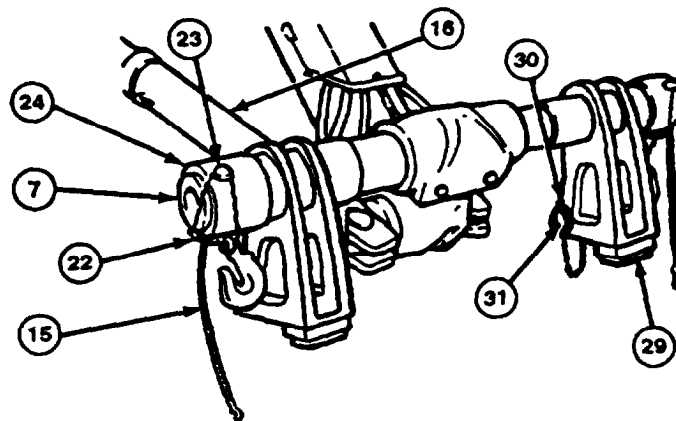


- (16) Remove lock handle (27), lock plate (28), and two M1070 rear tow adapters (1497260W and 1497250W) (29) from equipment body floor (26).
- (17) Install two M977 front adapters (25) on equipment body floor (26) with lockplate (28) and lock handle (27).

M984E1 General Operating Procedures (Cont)



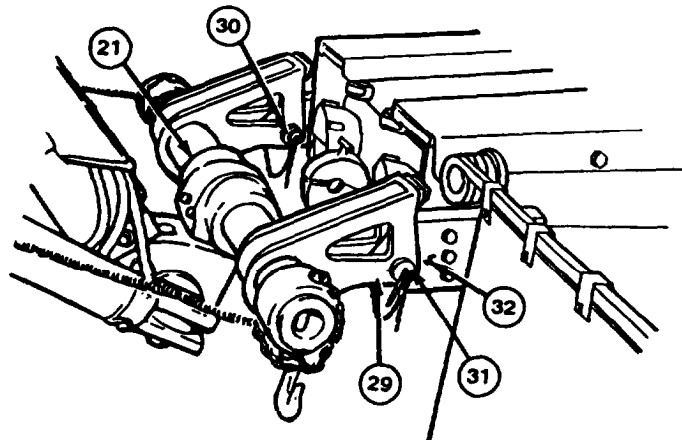
- (18) Install two M1070 rear tow adapters (29) on crosstube (21).



- (19) Install two end caps (24) on crosstube (21) with two pins (23) and quick pins (22).
- (20) Attach two springs (15) on tow cylinders (16).
- (21) Remove two quick pins (30) and pins (31) from adapters (29).

M984E1 General Operating Procedures (Cont)

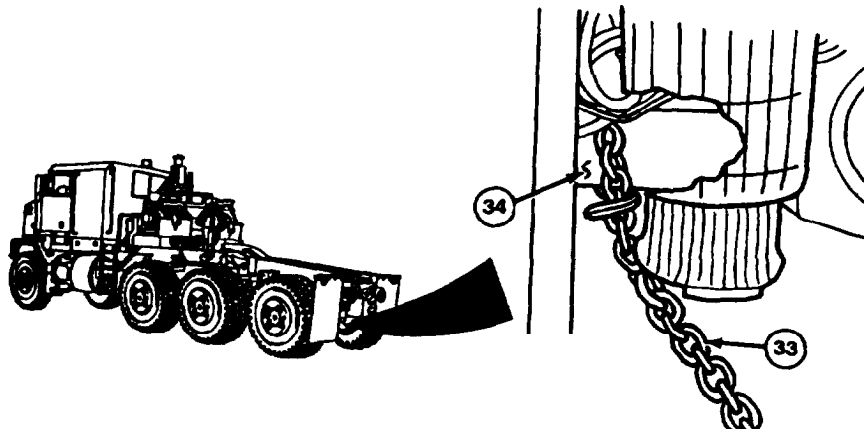
12-73B. TOW M1070 (CONT).



WARNING

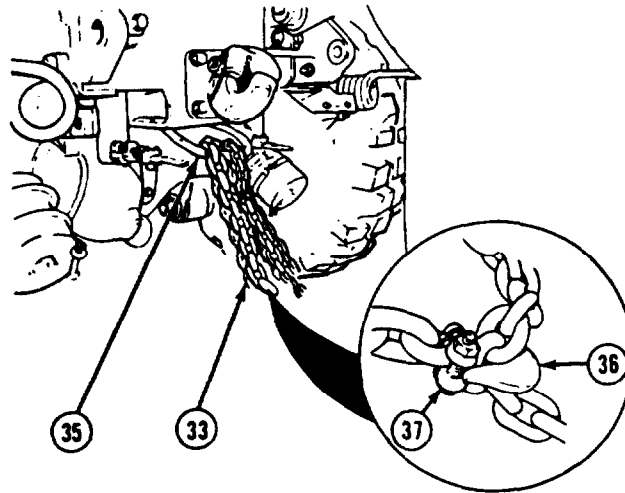
Keep hands and fingers away from adapters and tow eyes when operating retriever controls. Failure to comply may result in serious injury to personnel.

- (22) Soldier A operates retrieval system (para 2-72) while Soldier A and Soldier B position cross-tube (21) so holes in adapters (29) align with holes in rear tow eyes (32).
- (23) Install two pins (31) through adapters (29) and rear tow eyes (32) with two quick pins (30).

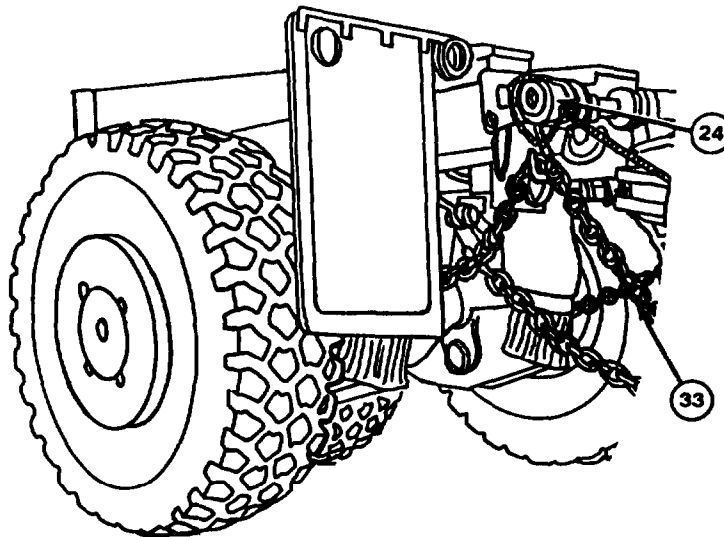


- (24) Remove two 16 ft (5 m) safety chains (33) from stowage.
- (25) Route one safety chain (33) over axle No. 4 (34) on disabled vehicle,
- (26) Hook safety chain (33) together toward rear of disabled vehicle.
- (27) Repeat steps (25) and (26) for other side of axle No. 4 (34).

M984E1 General Operating Procedures (Cont)



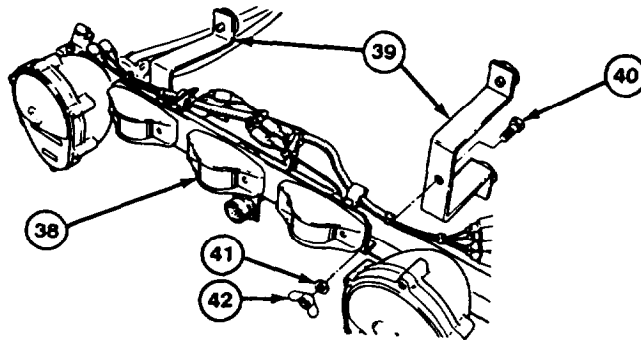
- (28) Route two safety chains (33) thru safety chain hoop (35) on wrecker and secure grab hook (36) with safety shackle (37).



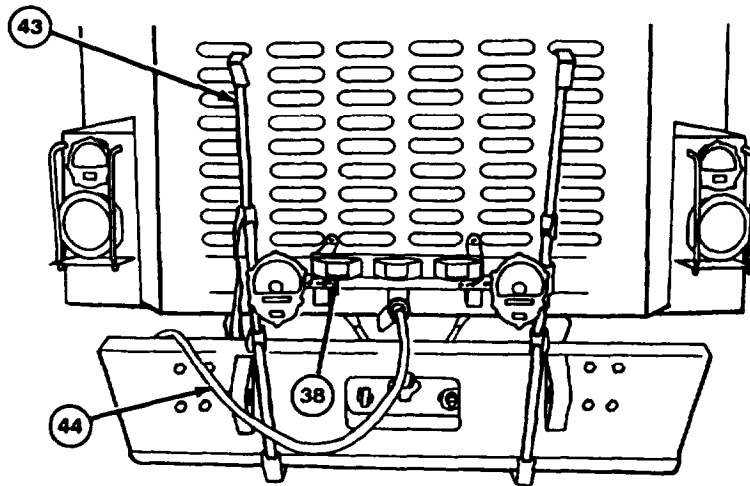
- (29) Position safety chains (33) on grab hooks of end caps (24).

M984E1 General Operating Procedures (Cont)

2-73B. TOW M1070 (CONT).

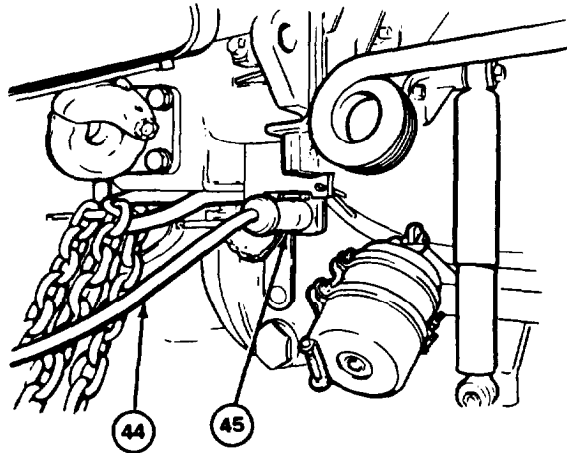


- (30) Prepare disabled vehicle for towing (TM 9-2320-360-10).
- (31) Remove emergency tow lights (38) and two brackets (39) from stowage.
- (32) Install two brackets (39) on emergency tow lights (38) with two screws (40), washers (41), and nuts (42).

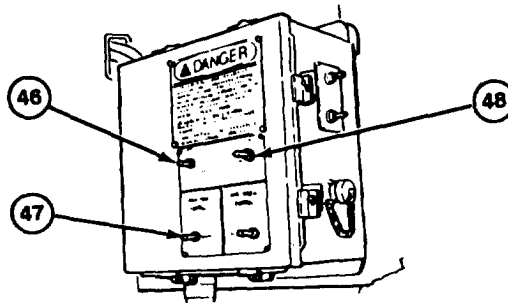


- (33) Install emergency tow lights (38) on front of disabled vehicle and fasten securely with straps (43).
- (34) Remove tow light cable (44) from stowage and connect to emergency tow lights (38).

M984E1 General Operating Procedures (Cont)



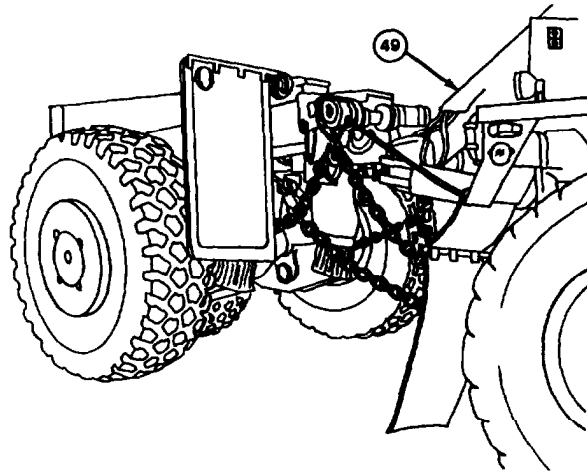
- (35) Route other end of tow light cable (44) along disabled vehicle and connect to rear electrical connector (45) on wrecker.
- (36) Lock disabled vehicle's steering (TM 9-2320-360-10).



- (37) Set POWER switch (46) to ON position.
- (38) Set HIGH IDLE switch (47) to CONTINUOUS.
- (39) Push and release LATCH switch (48). Engine speed will increase to approximately 1500 rpm.

M984E1 General Operating Procedures (Cont)

2-73B. TOW M1070 (CONT).



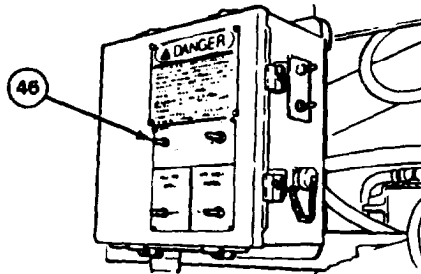
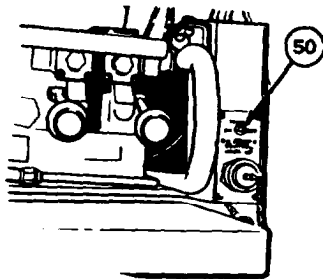
WARNING

Keep out from under disabled vehicle and retrieval system when raised. Failure to comply may result in serious injury or death to personnel.

CAUTION

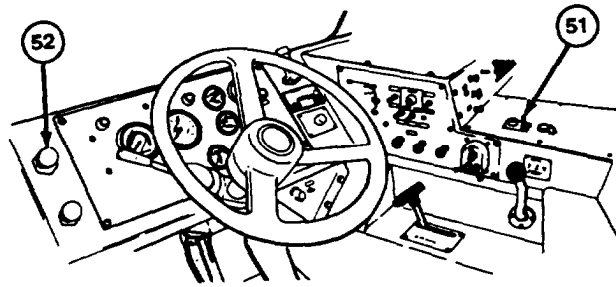
- Fully retract both cylinders before lifting disabled vehicle. Failure to comply may result in damage to equipment.
- Make sure all rigging is secure; loose rigging can become entangled and cause damage to equipment.

(40) Retract LIFT CYLINDER control lever to retract lift cylinder (49) and raise disabled vehicle approximately 1.5 ft (45 cm) off ground,



- (41) Set POWER switch (46) to OFF position.
(42) Set POWER switch (50) to OFF position.

M984E1 General Operating Procedures (Cont)



- (43) Set PTO ENGAGE switch (51) to OFF position.
- (44) Turn on service lights (para 2-10d).
- (45) Turn on emergency flashers on wrecker (para 2-44aJ and disabled vehicle (TM 9-2320-360-10).
- (46) Push in PARKING BRAKE control (52) and select desired gear (para 2-11e).

WARNING

The M984E1 should not be operated at speeds over 15 mph except on paved roads when the operator determines that the vehicle being towed and the terrain allow safe operation. Engine brake switch must be ON for all towing operations. The following are maximum safe speeds.

Terrain Conditions	Maximum speed, towed load up to 50,000 lbs (22,681 kg)	Maximum speed, towed load above 50,000 lbs (22,681 kg)
On Road - Level	35	30
On Road - Hilly	30	20
Off Road	15	15

Speeds in excess of the above can result in loss of control, serious injury, or death to personnel.

- (47) Transport disabled vehicle.

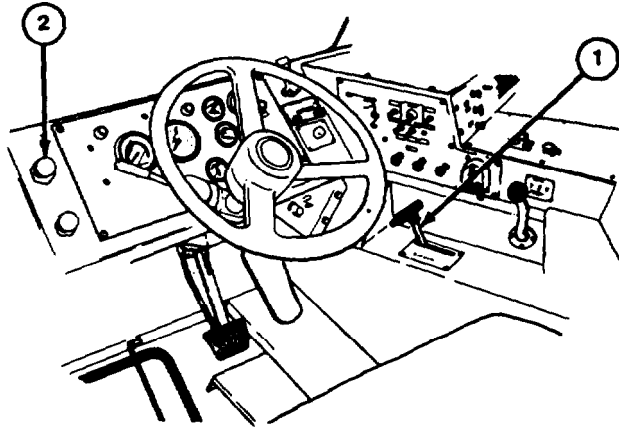
M984E1 General Operating Procedures (Cont)

2-73B TOW MI070 (CONT).

d. Rear Disconnect.

NOTE

This is a two-soldier task



- (1) Set transmission range selector (1) to N (neutral).
- (2) Pull out PARKING BRAKE control (2).

WARNING

Keep out from under disabled vehicle and retrieval system when raised. Failure to comply may result in serious injury or death to personnel.

NOTE

After lowering disabled vehicle, extend lift and tow cylinders approximately 2 to 4 in (50 to 100 mm) to allow for adjustment when removing adapters.

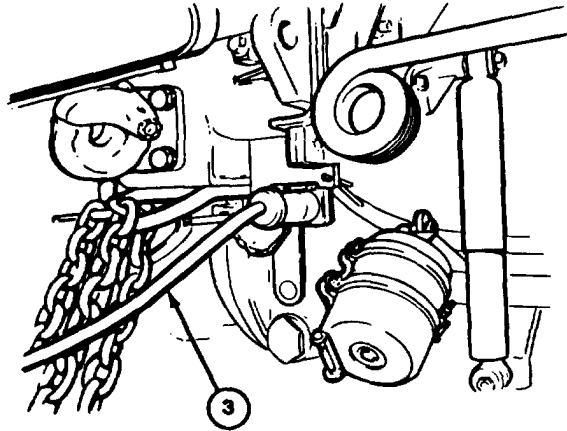
- (3) Prepare retrieval system for operation (para 2-72) and pull LIFT CYLINDER control lever to extend lift cylinder and lower disabled vehicle to ground.

WARNING

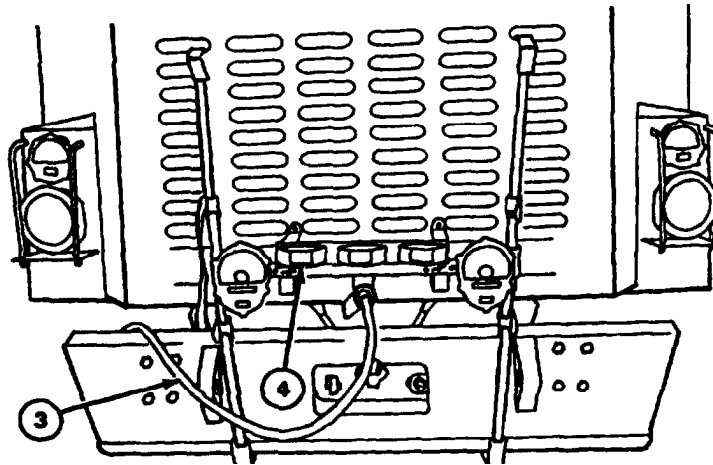
If disabled vehicle's air system is inoperative, chock wheels of disabled vehicle. Failure to comply may result in serious injury or death to personnel.

- (4) Apply PARKING BRAKE on disabled vehicle (TM 9-2320-360-10). If parking brake is inoperative, chock wheels on disabled vehicle.

M984E1 General Operating Procedures (Cont)



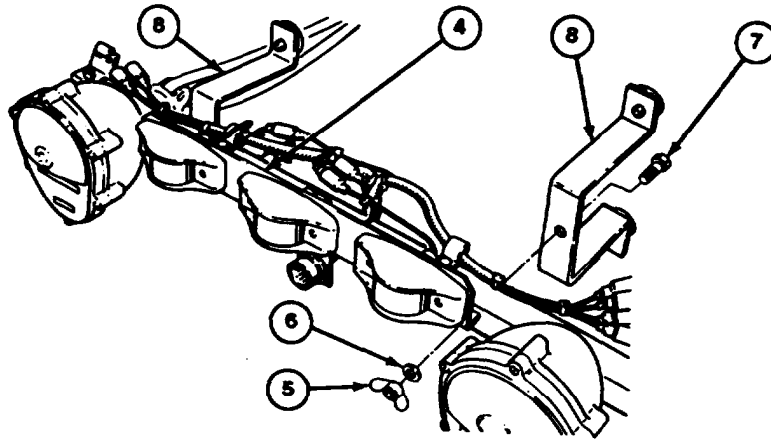
- (5) Remove tow light cable (3) from rear electrical connector of wrecker.



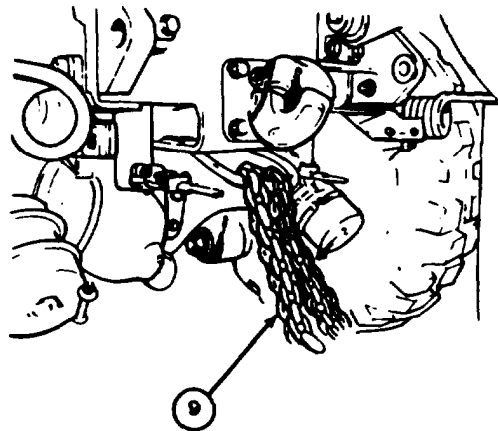
- (6) Remove tow light cable (3) from emergency tow lights (4) and stow.
- (7) Remove emergency tow lights (4) from disabled vehicle.

M984E1 General Operating Procedures (Cont)

2-73B. TOW M1070 (CONT).

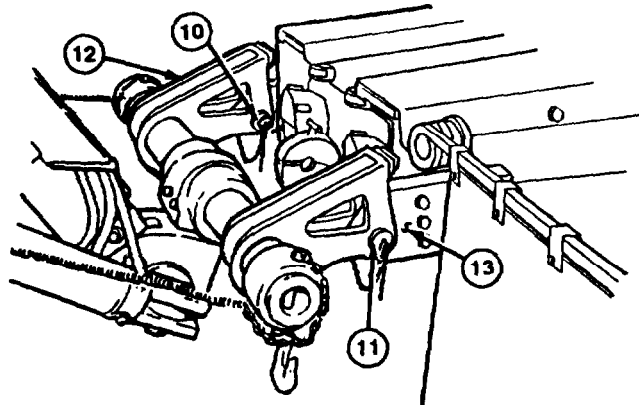


- (6) Remove two nuts (5), washers (6), screws (7), and brackets (8) from emergency tow lights (4). Stow emergency tow lights and brackets.

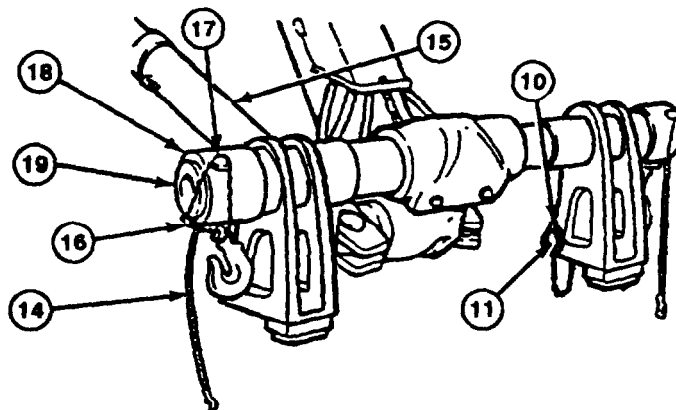


- (9) Remove and stow two safety chains (9).

M984E1 General Operating Procedures (Cont)



- (10) Remove two quick pins (10) and pins (11) from adapters (12).
- (11) Remove two adapters (12) from tow eyes (13).
- (12) Install two pins (11) in adapters (12).
- (13) Install two quick pins (10) in pins (11).



- (14) Drive wrecker forward several feet and park (para 2-11o).

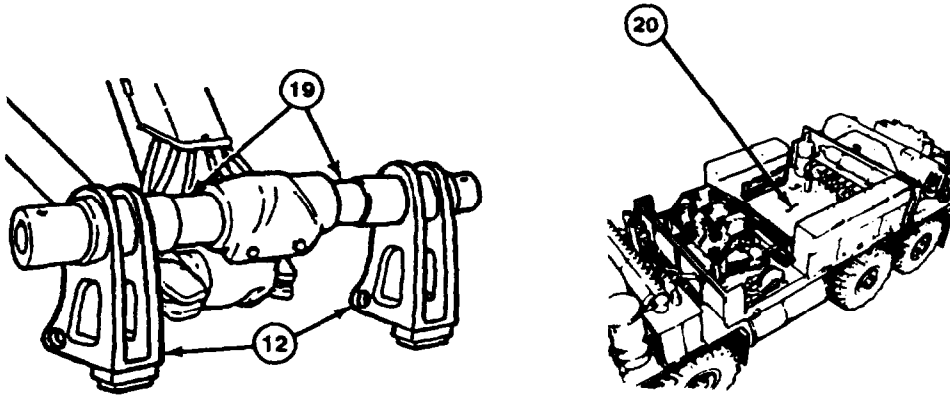
WARNING

As springs and end caps are removed, crosstube can swing in all directions, adapters may slide off, and can cause injury to personnel.

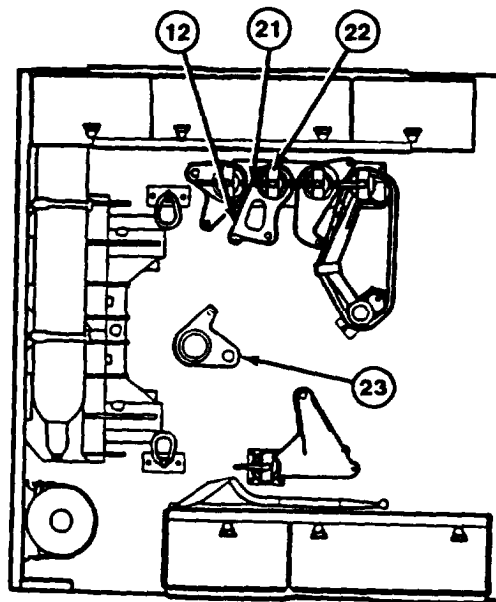
- (15) Remove two springs (14) from tow cylinders (15).
- (16) Remove two quick pins (16) and pins (17) from end caps (18).
- (17) Remove end caps (18) from crosstube (19).

M984E1 General Operating Procedures (Cont)

2-73B. TOW M1070 (CONT).

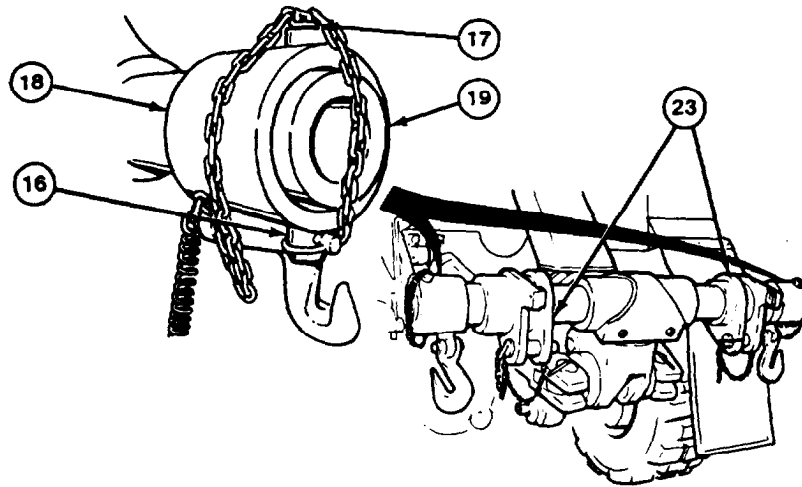


- (18) Remove two adapters (12) from crosstube (19) and place on equipment body floor (20).

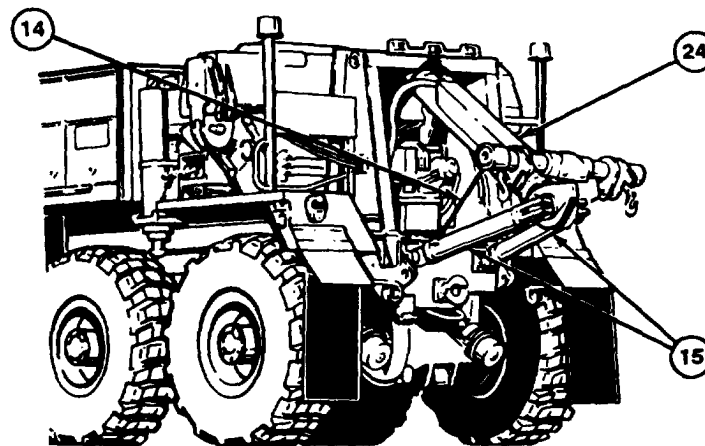


- (19) Remove lock handle (21), lock plate (22), and two M977 front tow adapters (23).
- (20) Install two M1070 adapters (12) on body floor with lock plate (22) and lock handle (21).

M984E1 General Operating Procedures (Cont)



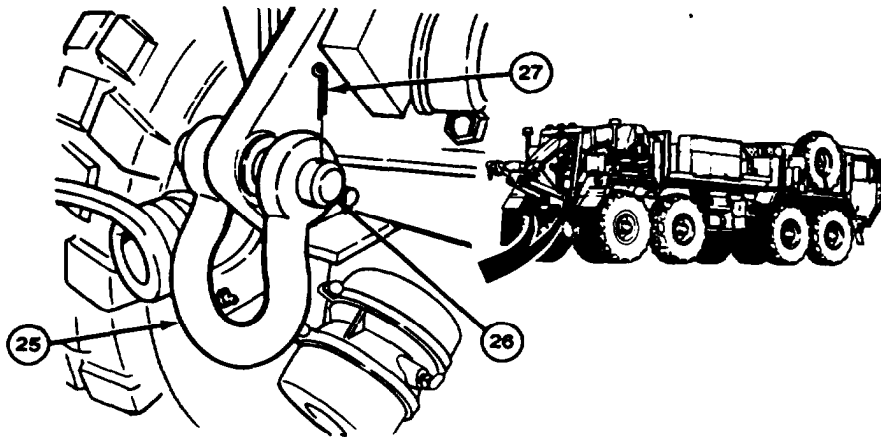
- (21) Install two M977 adapters on crosstube (19).
- (22) Install two end caps (18) on crosstube (19) with two pins (17) and two quick pins (16).



- (23) Install two springs (14) on tow cylinders (15).
- (24) Operate retrieval system to fully retract lift cylinder (24) and tow cylinders (15).

M984E1 General Operating Procedures (Cont)

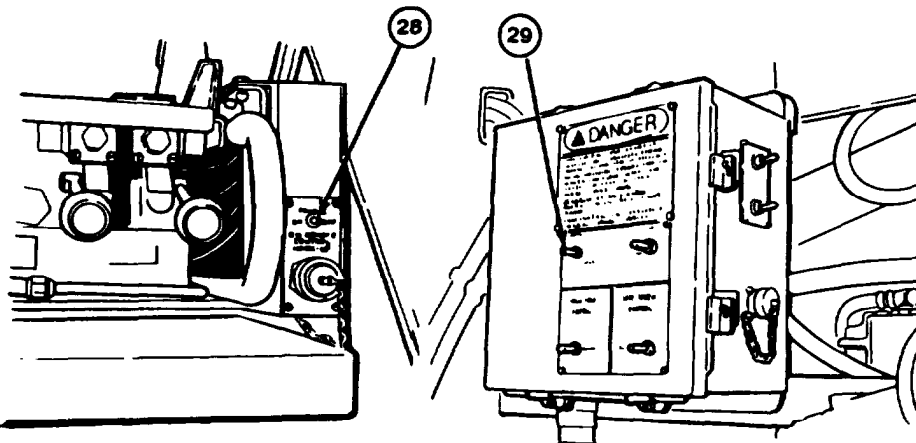
2-73B. TOW M1070 (CONT)



NOTE

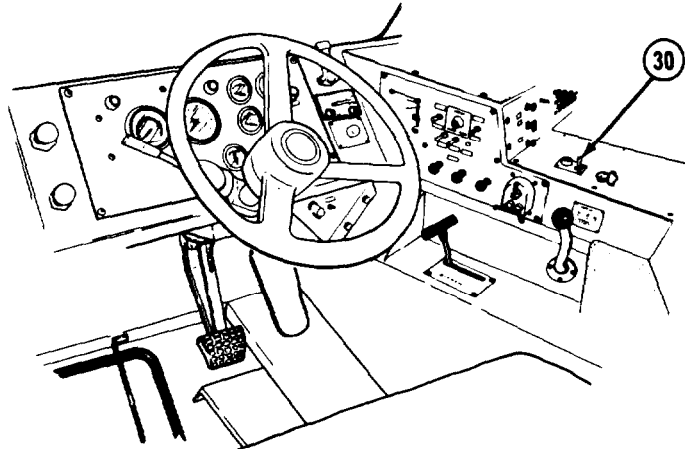
Right and left towing shackles are installed the same way.

- (25) Install two towing shackles (25) with two pins (26) and cotter pins (27).



- (26) Set POWER switch (28) to OFF position.
- (27) Set POWER switch (29) to OFF position.

M984E1 General Operating Procedures (Cont)

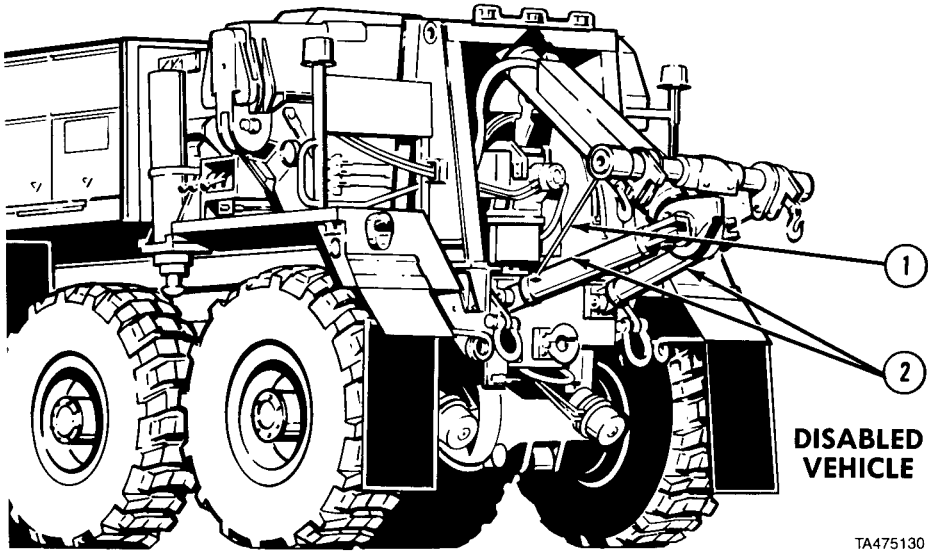


- (28) Turn off emergency flashers on wrecker (para 2-44f) and disabled vehicle (TM 9-2320-360-10).
- (29) Turn off service drive lights (para 2-10d).
- (30) Set PTO ENGAGE switch (30) to OFF position.
- (31) Remove and stow beacon lights (para 2-62).
- (32) Shut off engine (para 2-11p).
- (33) Unlock disabled vehicles steering (TM 9-2320-360-10).
- (34) Remove and stow four chains from disabled vehicle.

M984E1 General Operating Procedures (Cont)

2-74. TOW M984E1.

- a. *Front Hookup.* Refer to paragraph 2-73a.
- b. *Set Up Retrieval System for Rear Towing.*
 (1) Set up recovery vehicle for rear hookup (para 2-73c).

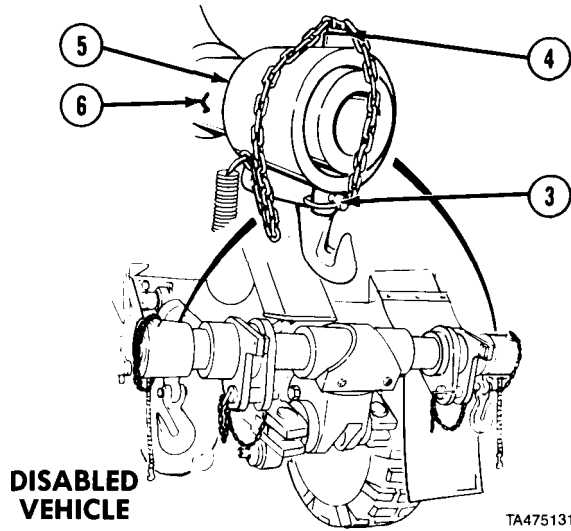
**WARNING**

Hold crosstube when removing springs. Crosstube may swing or cause adapters to slide resulting in personal injury.

- (2) Disconnect two springs (1) from tow cylinders (2) on disabled vehicle.

M984E1 General Operating Procedures (Cont)

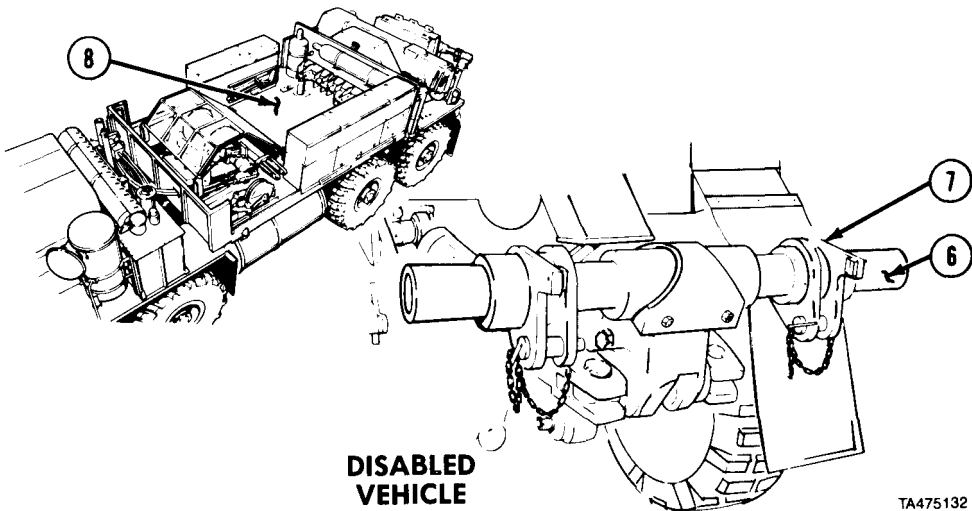
2-74. TOW M984E1 (CONT.)



WARNING

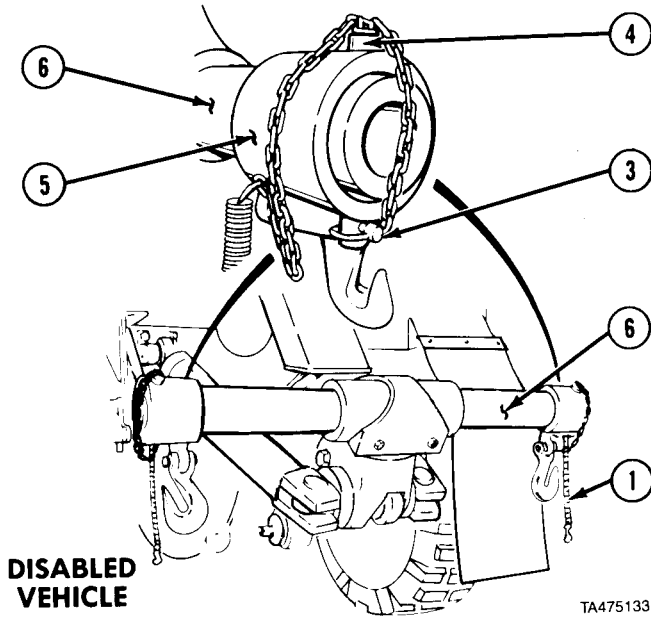
When end caps are removed from crosstube, adapters may slide off causing personal injury.

- (3) Remove two quick pins (3) and pins (4) from end caps (5) on disabled vehicle.
- (4) Remove two end caps (5) from crosstube (6).

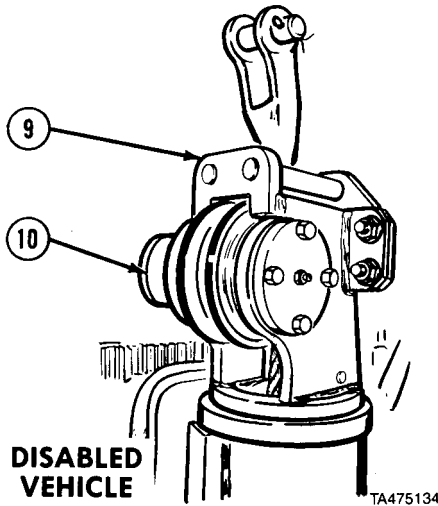


- (5) Remove two M977 front adapters (7) from crosstube (6) and place on equipment body floor (8).

M984E1 General Operating Procedures (Cont)

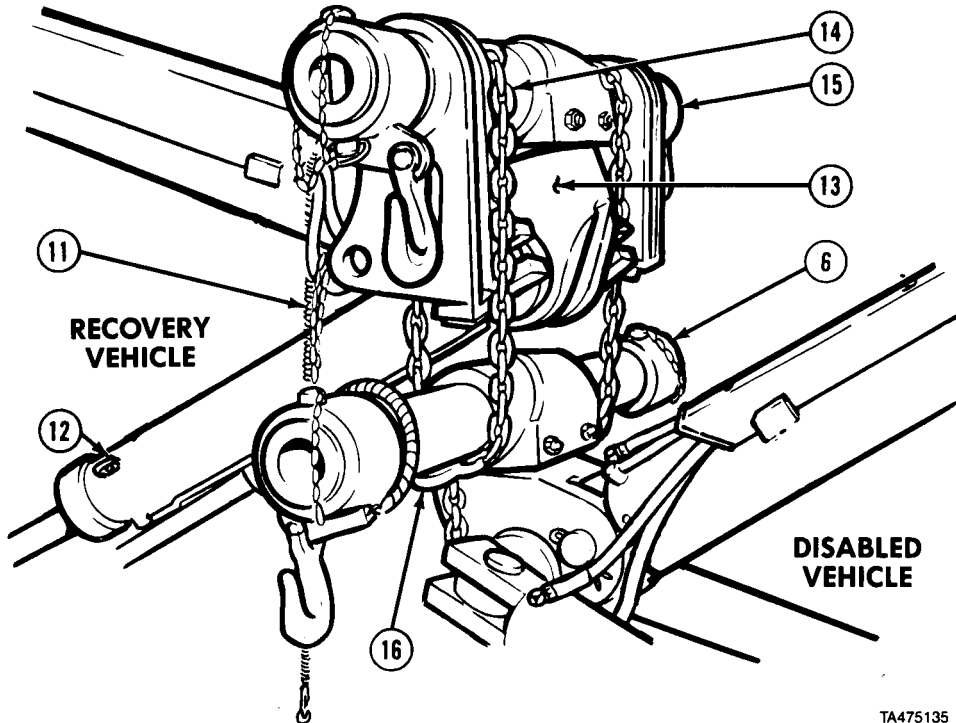


- (6) Install end caps (5) on crosstube (6) on disabled vehicle.
- (7) Install pins (4) and quick pins (3).
- (8) Wrap springs (1) around crosstube (6) and secure.



- (9) Turn fairlead tensioner (9) on disabled vehicle so hydraulic motor (10) is facing toward crane.

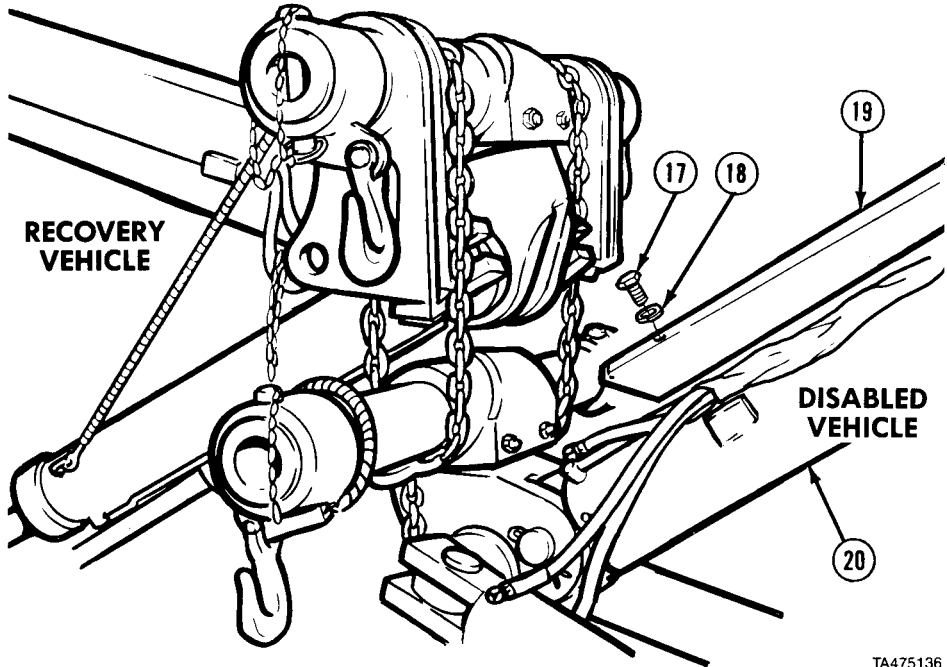
2-74. TOW M984E1 (CONT).



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- (10) Attach two springs (11) on tow cylinders (12) of recovery vehicle.
- (11) Operate retrieval system of recovery vehicle (para 2-72) so center assembly (13) is approximately 1 in. (25 mm) above and centered directly over disabled vehicle's crosstube (6).
- (12) Remove one 12-foot (3.5 m) chain (14) from stowage and route one end of chain around crosstube (15), and around crosstube (6). Attach grab hook (16) to chain.
- (13) Repeat step (12) with other end of 12-foot (3.5 m) chain (14) for other side of crosstube (6) and crosstube (15).
- (14) Operate retrieval system (para 2-72) to lift crosstube (15) until chain (14) is tight.

M984E1 General Operating Procedures (Cont)



TA475136

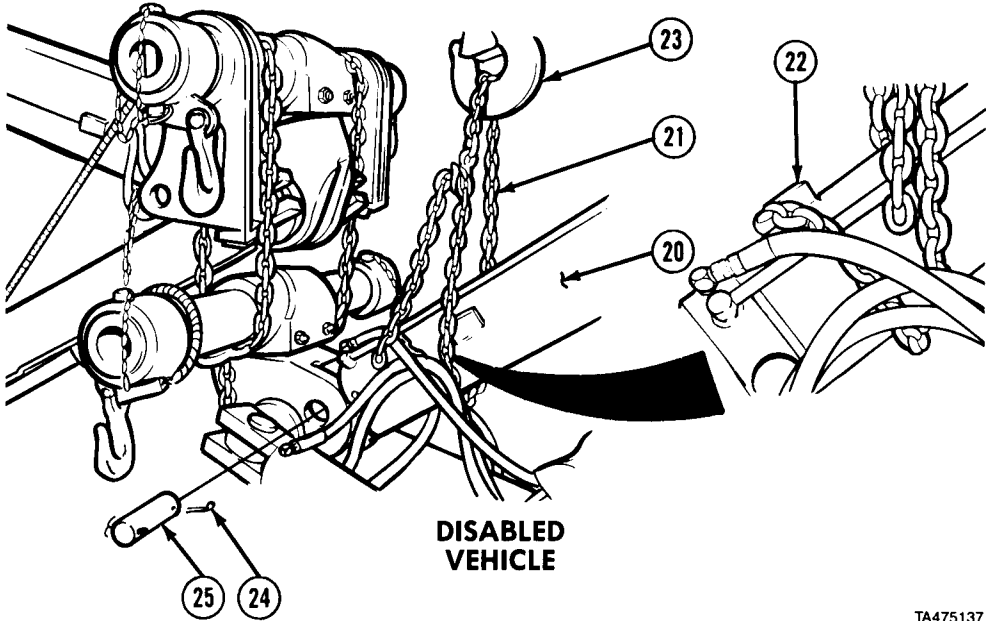
NOTE

Use onboard vehicle ladder to reach upper screw.

- (15) Remove two screws (17), lockwasher (18), and lift cylinder hose guard (19) from lift cylinder (20) of disabled vehicle and stow on disabled vehicle.

M984E1 General Operating Procedures (Cont)

2-74. TOW M984E1 (CONT).



TA475137

- (16) Prepare recovery vehicle crane for operation (para 2-63).

CAUTION

Do not route chains over hydraulic hoses. Equipment damage will occur.

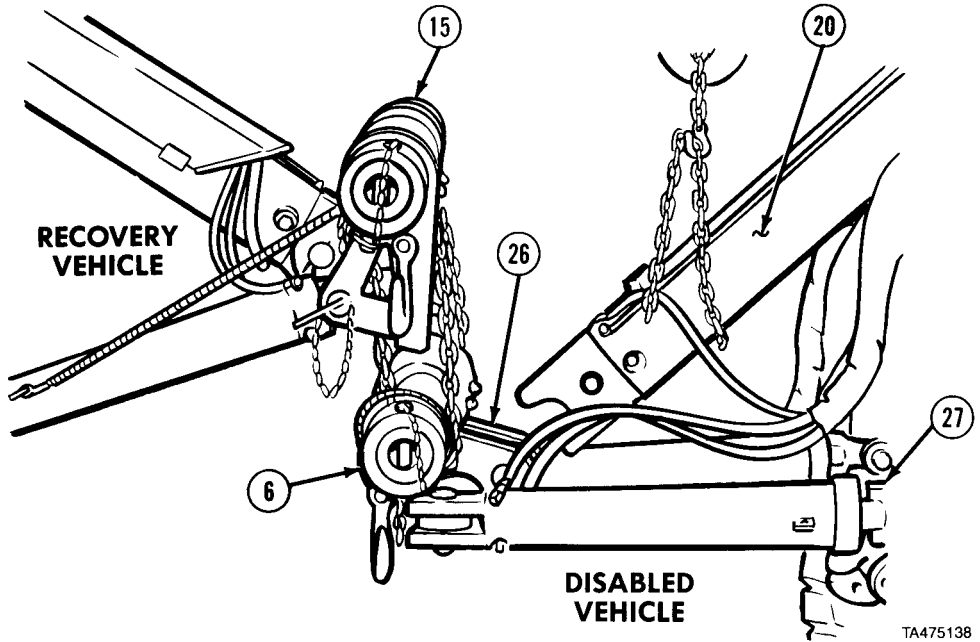
- (17) Remove 8-ft (2.5 m) utility chain (21) from stowage. Route utility chain around lift cylinder (20) below hose guard mounting bracket (22) of disabled vehicle.
- (18) Operate crane controls to lower crane load hook (23) until approximately 1 ft (30 cm) above 8-ft (2.5 m) utility chain (21).
- (19) Attach 8-ft (2.5 m) utility chain (21) to crane load hook (23).
- (20) Operate crane controls until slack is removed from 8-ft (2.5 m) utility chain (21).

WARNING

When cylinder mounting pin is removed retrieval system may suddenly move up or down. Keep hands away from retrieval system or personal injury may result.

- (21) Remove cotter pin (24) and lift cylinder mounting pin (25) and stow on disabled vehicle.

M984E1 General Operating Procedures (Cont)



- (22) Soldier A operates retrieval system (para 2-72) while Soldier B operates crane controls (para 2-63) to lower both crosstubes (6 and 15) and lift cylinder (20) until lift cylinder separates from center assembly (26).

WARNING

Keep hands away from tow cylinders when lowering lift cylinder and hydraulic lines. Personal injury may result.

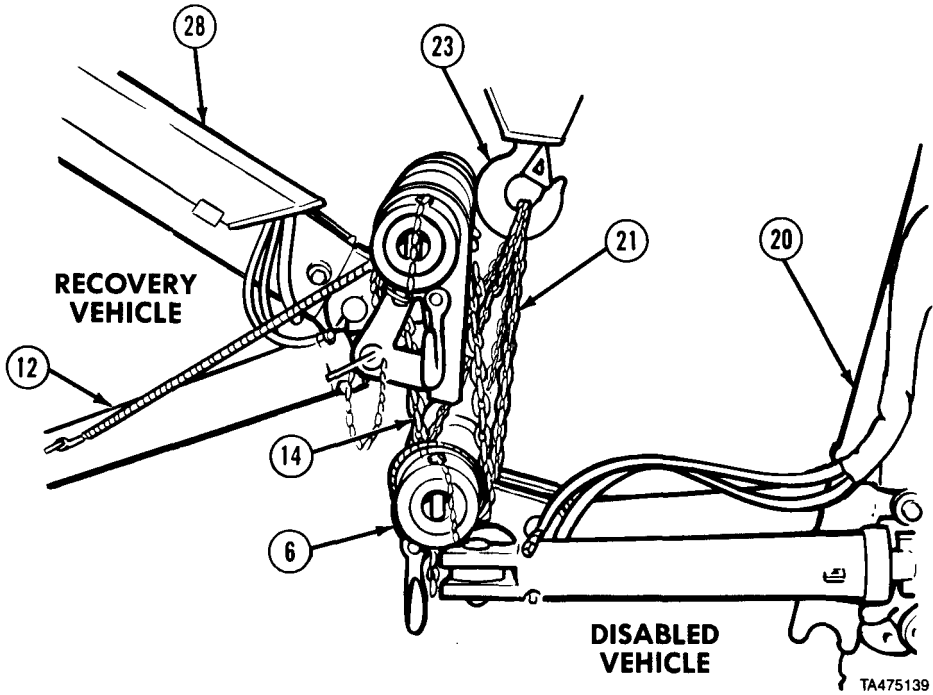
CAUTION

Make sure hydraulic hoses are clear of lift cylinder or equipment may be damaged.

- (23) Soldier B operates crane controls (para 2-63) to lower lift cylinder (20) against rear crossmember (27) while Soldier A guides lift cylinder and hydraulic hoses.

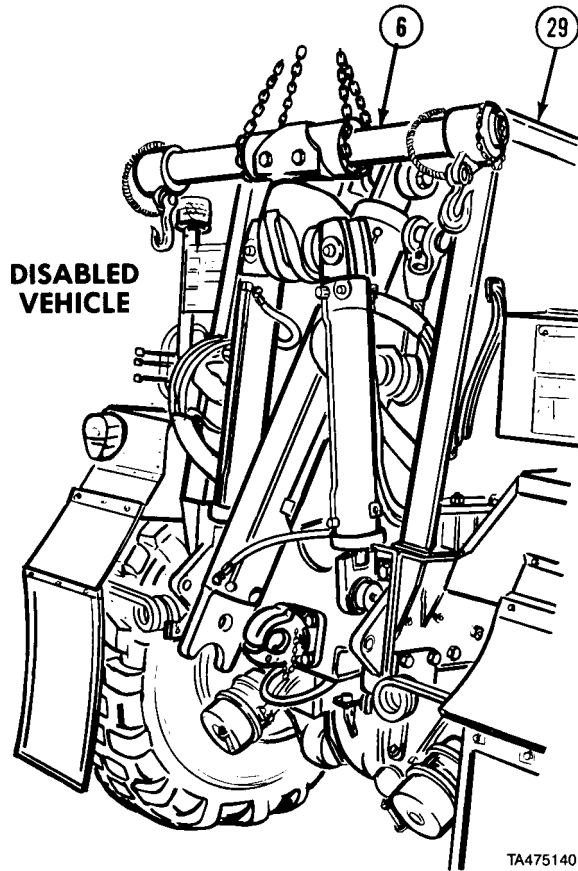
M984E1 General Operating Procedures (Cont)

2-74. TOW M984E1 (CONT).



- (24) Remove 8-ft (2.5 m) utility chain (21) from lift cylinder (20) and crane load hook (23). Route 8-ft (2.5 m) chain around crosstube (6) and attach to crane load hook (23).
- (25) Operate crane controls (para 2-63) to raise load hook (23) until there is slack in the 12-ft (3.5 m) chain (14).
- (26) Remove and stow 12-ft (3.5 m) chain (14).
- (27) Operate retrieval controls (para 2-71) to fully retract lift cylinder (28) and tow cylinders (12) of recovery vehicle.

M984E1 General Operating Procedures (Cont)



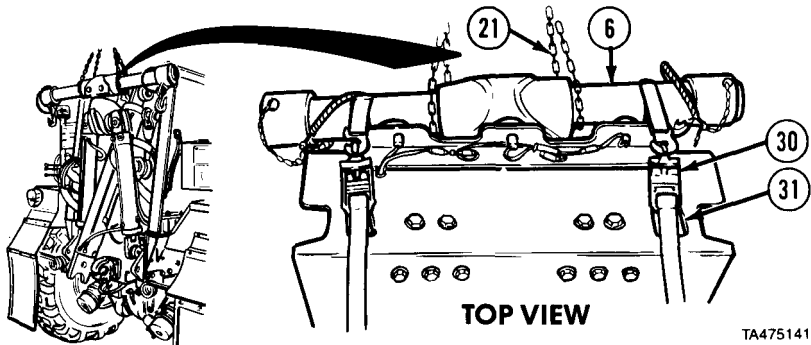
CAUTION

Make sure hydraulic hoses are clear of tow and lift cylinders or equipment may be damaged.

- (28) Operate crane controls (para 2-63) to raise cross-tube (6) to top of tow support assembly (29).

M984E1 General Operating Procedures (Cont)

2-74. TOW M984E1 (CONT).



TA475141

WARNING

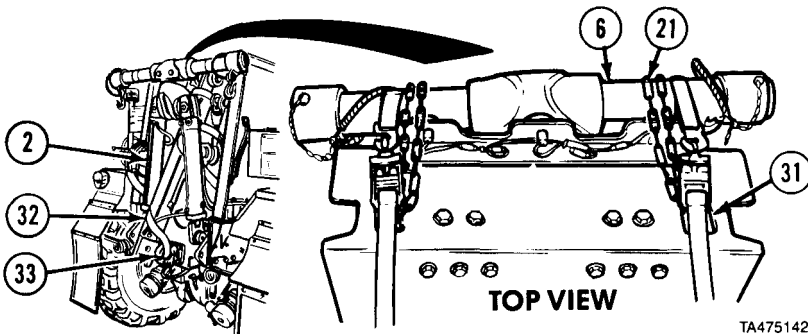
Be careful when climbing on vehicle, surface may be slippery and personal injury may result.

- (29) Remove two straps (30) from stowage and route straps around crosstube (6) and through tow support assembly shackle hole (31).
- (30) Repeat step (29) for other side of crosstube (6).
- (31) Pull straps (30) tight.
- (32) Operate crane controls (para 2-63) until 8-ft (2.5 m) utility chain (21) is slack.

NOTE

Loosen straps if required to remove chain.

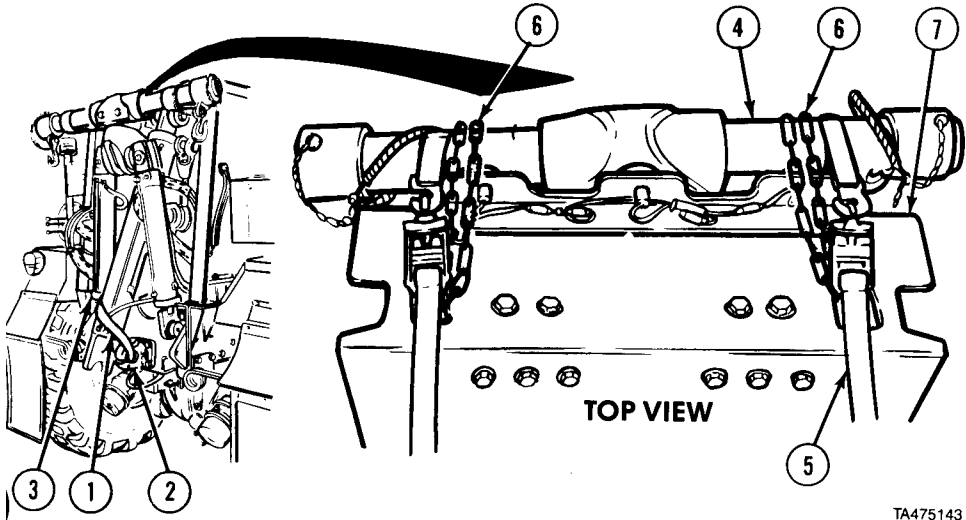
- (33) Remove 8-ft (2.5 m) utility chain (21), tighten straps (30) if loosened.



TA475142

- (34) Install two 8-ft (2.5 m) utility chains (21) around crosstube (6) and through tow support assembly shackle hole (31) two times and attach grab hook to chain.
- (35) Stow crane (para 2-63).
- (36) Route strap (32) from towing pintle hook (33), around left tow cylinder (2), and tighten.
- (37) Position recovery vehicle 1 ft (30 cm) from tow eyes of disabled vehicle.
- (38) Continue rear towing hook up (para 2-73c, step (15)).

M984E1 General Operating Procedures (Cont)

c. Retrieval System to Operating Condition.

TA475143

- (1) Remove strap (1) from towing pintle (2) and left tow cylinder (3).
- (2) Support retrieval crosstube (4) with lifting device.

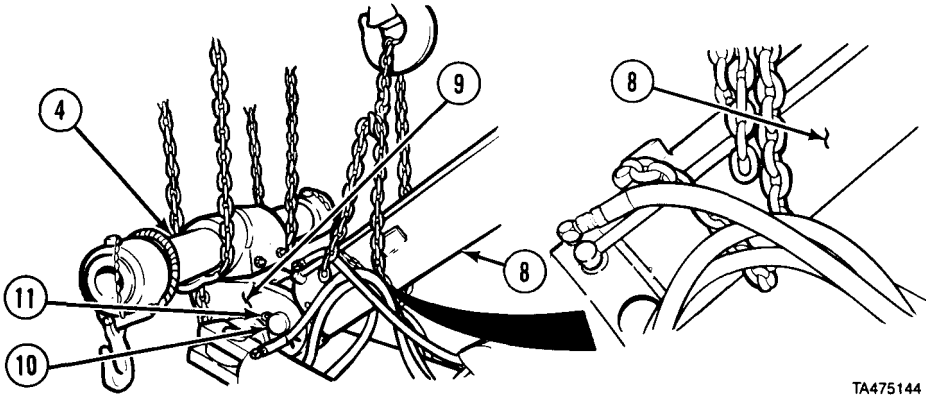
WARNING

Keep out from under crosstube and tow cylinders after removing strap. Crosstube and cylinders can fall and cause serious injury or death.

- (3) Remove two straps (5) and 8-ft (2.5 m) chains (6) securing crosstube (4) to tow support assembly (7).

M984E1 General Operating Procedures (Cont)

2-74. TOW M984E1 (CONT).



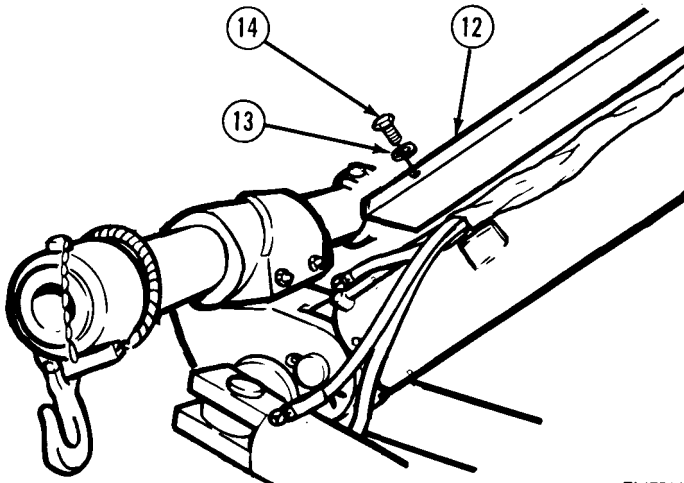
TA475144

- (4) Lower crosstube (4).
- (5) Support crosstube with 12-ft (3.5 m) chain and retrieval system of recovery vehicle.

CAUTION

Make sure chain or sling of lifting device is clear of hydraulic line or equipment may be damaged.

- (6) Attach lifting device to lift cylinder (8).
- (7) Aline lift cylinder (8) with center assembly (9).
- (8) Install pin (10) with cotter pin (11).
- (9) Remove lifting device from crosstube (4) and lift cylinder (8).



TA475145

- (10) Install cylinder hose guard (12) with two lockwashers (13) and screws (14).

M984E1 General Operating Procedures (Cont)

2-75. TOW M35.

a. Front Hookup.

NOTE

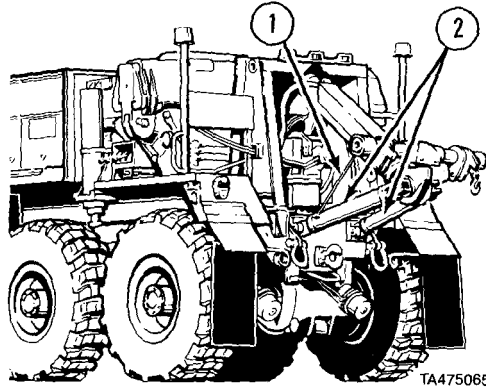
This is a two-soldier task.

- (1) Prepare retrieval system for operation (para 2-72).

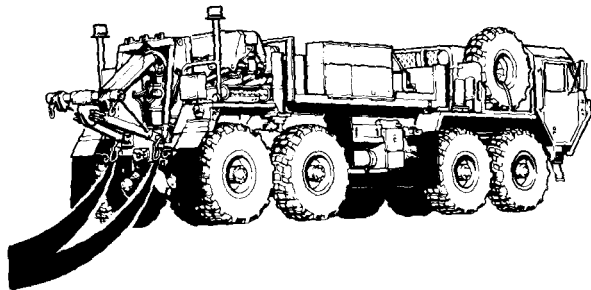
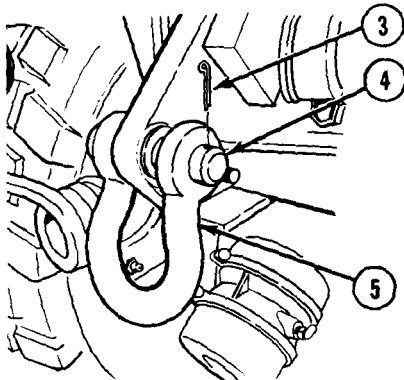
WARNING

Hold crosstube when removing springs. Crosstube may swing and cause adapters to slide resulting in personal injury.

- (2) Disconnect two springs (1) from tow cylinders (2).



TA475065



TA475066

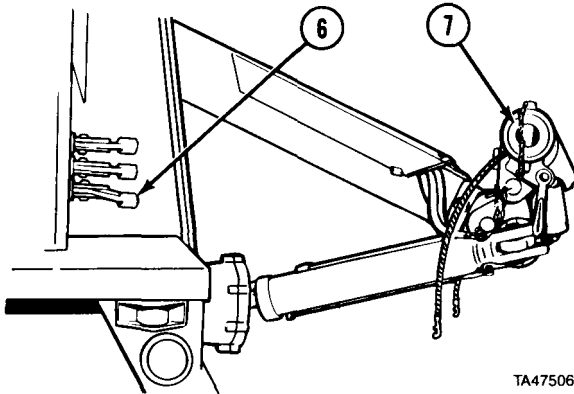
NOTE

Right and left towing shackles are removed the same way.

- (3) Remove cotter pin (3), pin (4), and towing shackle (5).

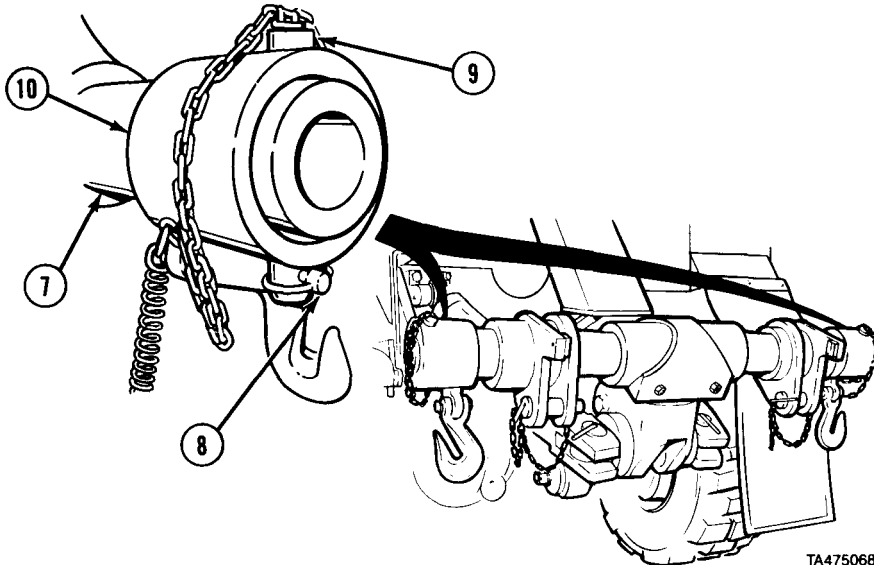
M984E1 General Operating Procedures (Cont)

2-75. TOW M35 (CONT).



TA475067

- (4) Pull LIFT CYLINDER control lever (6) to lower crosstube (7) to approximately 3 ft (1 m) above ground.
- (5) Position wrecker so that crosstube (7) is approximately 1 ft (30 cm) from tow eyes of disabled vehicle and centered on disabled vehicle.



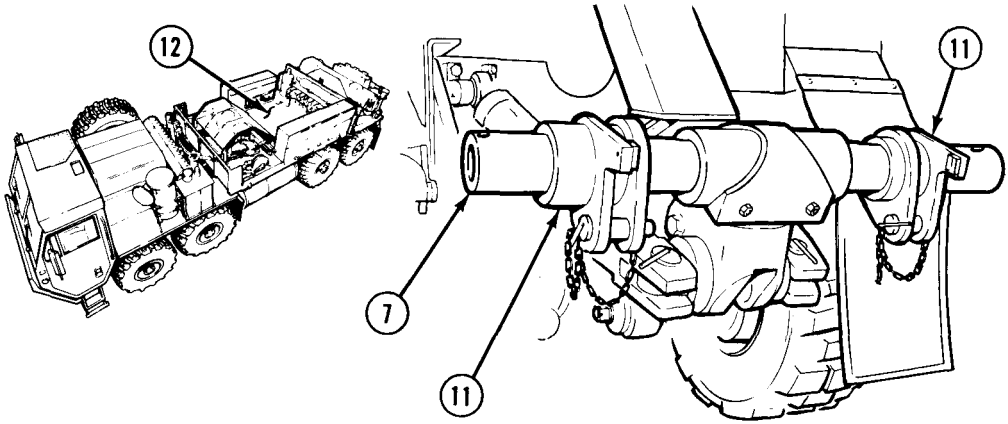
TA475068

WARNING

When end caps are removed from crosstube, adapters may slide off causing personal injury.

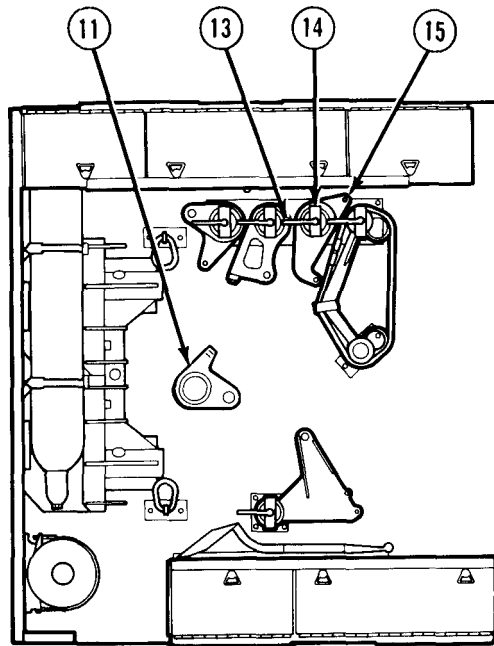
- (6) Remove two quick pins (8) and pins (9) from end caps (10).
- (7) Remove two end caps (10) from crosstube (7).

M984E1 General Operating Procedures (Cont)



TA475069

- (8) Remove two M977 front adapters (11) from crosstube (7) and place on equipment body floor (12).

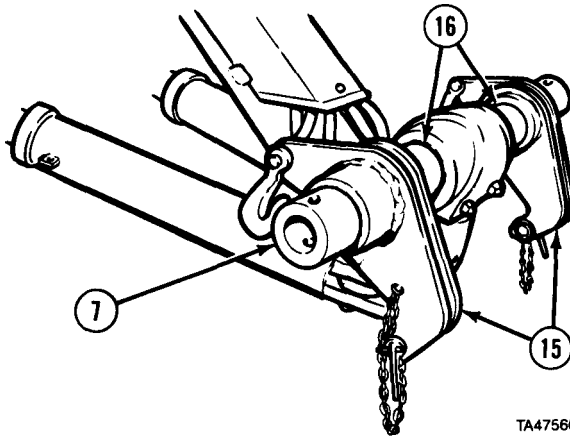


TA475667

- (9) Remove lock handle (13), lock plate (14), and two M35 front tow adapters (15).
 (10) Install two M977 front adapters (11) removed from crosstube, lock plate (14), and lock handle (13).
 (11) Remove two 5-in. (127 mm) spacers from stowage.

M984E1 General Operating Procedures (Cont)

2-75. TOW M35 (CONT).

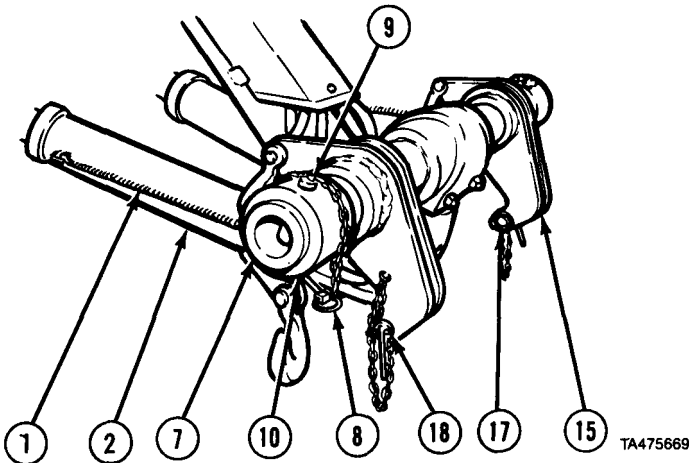


(12) Install two 5-in. (127 mm) spacers (16) on crosstube (7).

WARNING

Adapters and end caps may slide off when installing and may cause personal injury.

(13) Install two M35 front tow adapters (15) on crosstube (7).



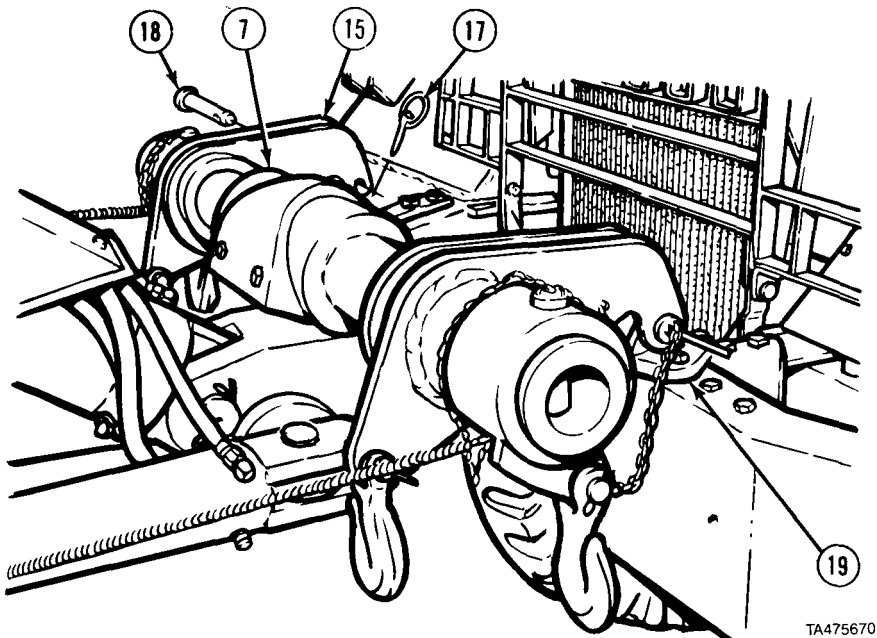
(14) Install two end caps (10) on crosstube (7).

(15) Install two pins (9) and quick pins (8).

(16) Attach two springs (1) on tow cylinders (2).

(17) Remove two quick pins (17) and pins (18) from adapters (15).

M984E1 General Operating Procedures (Cont)

**WARNING**

- Keep hands and fingers away from adapters and tow eyes when operating retriever controls. Personal injury could result.
- If disabled vehicle has towing shackles installed, remove shackles and stow in disabled vehicle.

(18) Soldier A operates retrieval system (para 2-72) while Soldier A and Soldier B position cross-tube (7) so holes in adapters (15) align with front tow eyes (19).

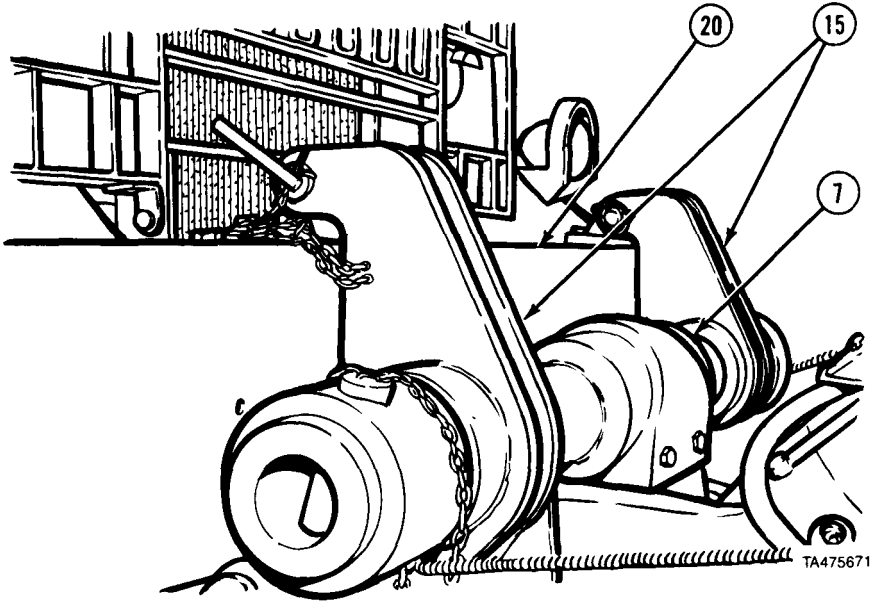
CAUTION

Do not route pin chains between adapters and front bumper or damage to chains may result.

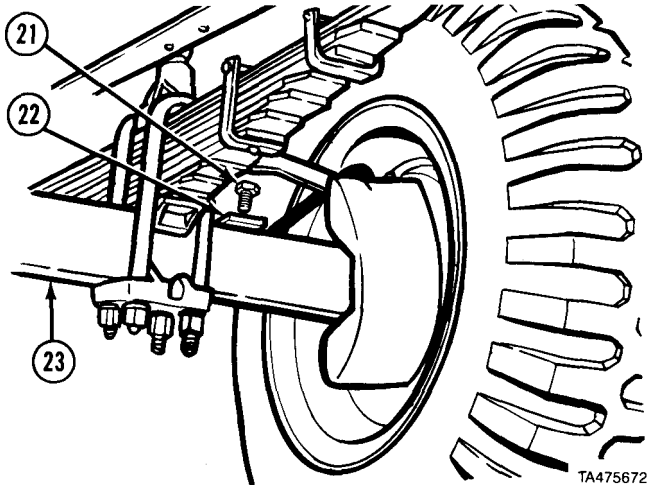
(19) Insert two pins (18) through adapters (15) and front tow eyes (19). Install quick pins (17) in pins (18).

M984E1 General Operating Procedures (Cont)

2-75. TOW M35 (CONT.)



(20) Alternately operate lift and tow cylinders to lower crossbar (7) until adapters (15) contact front bumper (20).



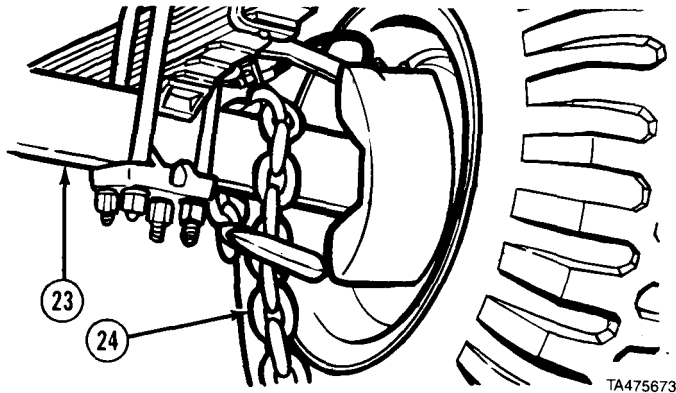
NOTE

- Left side shown.
- Brake line bracket is located on top rear of axle.

(21) Remove screw (21), move brake line bracket (22) away from axle (23) and replace screw in axle.

(22) Repeat step (21) for other side of disabled vehicle.

M984E1 General Operating Procedures (Cont)

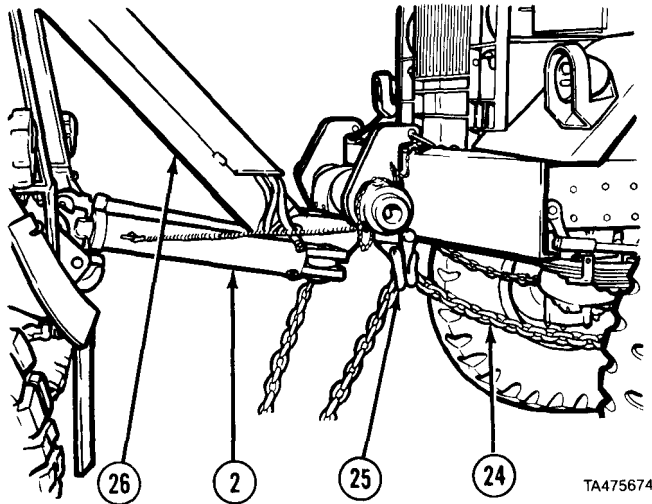


- (23) Remove two 16-ft (5 m) safety chains (24) from stowage.

CAUTION

Route chain between brake line and axle or damage to brake line will result.

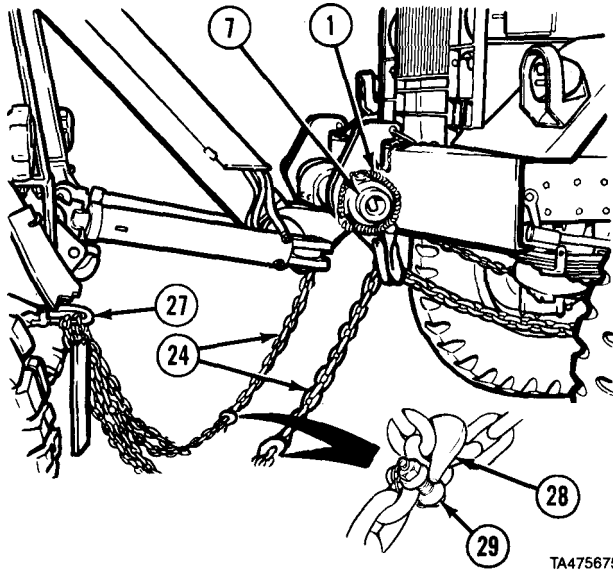
- (24) Route one safety chain (24) over front axle (23) on disabled vehicle.
 (25) Hook safety chain (24) together in front of axle (23).
 (26) Repeat steps (24) and (25) for other side of disabled vehicle.



- (27) Pull safety chain (24) tight and install chain on adapter grab hook (25).
 (28) Repeat step (27) for other side of disabled vehicle.
 (29) Release PARKING BRAKE on disabled vehicle (refer to M35 operator's manual).
 (30) Alternately push in TOW and LIFT CYLINDER control levers until tow cylinders (2) are fully retracted.
 (31) Push in LIFT CYLINDER control lever to retract lift cylinder (26) until slack is removed from safety chains (24).

M984E1 General Operating Procedures (Cont)

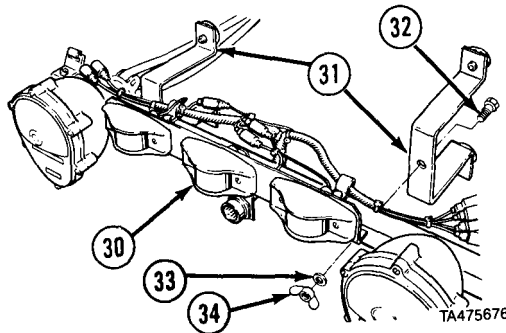
2-75. TOW M35 (CONT).



NOTE

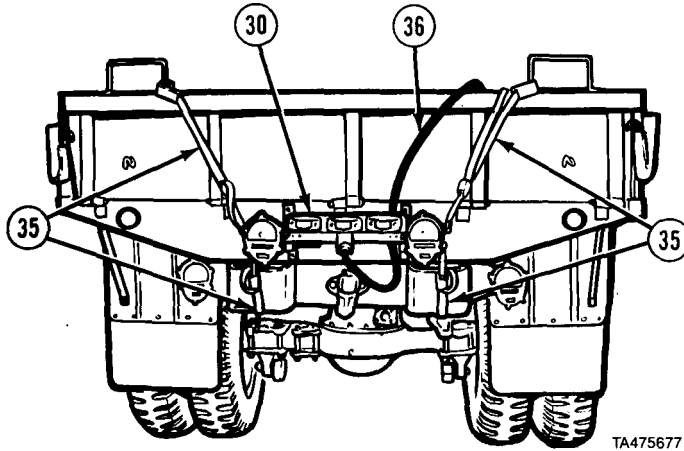
- Safety chains can be routed to safety chain hoop or towing shackles. Towing shackles can be used only after tow cylinders are extended.
- Adjust chain slack so safety chains do not touch the ground.

- (32) Route two safety chains (24) through safety chain hoop (27) on wrecker and secure grab hook (28) with safety shackle (29).
- (33) Wrap two springs (1) around crosstube (7) and secure.



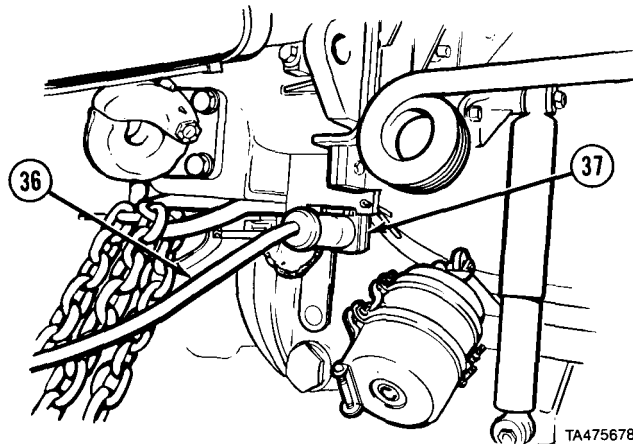
- (34) Prepare disabled vehicle for towing (refer to M35 operator's manual).
- (35) Remove emergency tow lights (30) and two brackets (31) from stowage.
- (36) Install two brackets (31) in center holes of emergency tow lights with two screws (32), washers (33), and nuts (34).

M984E1 General Operating Procedures (Cont)



TA475677

- (37) Install emergency tow lights (30) on rear of M35 and fasten securely with straps (35).
- (38) Remove tow light cable (36) from stowage and connect to emergency tow lights (30).



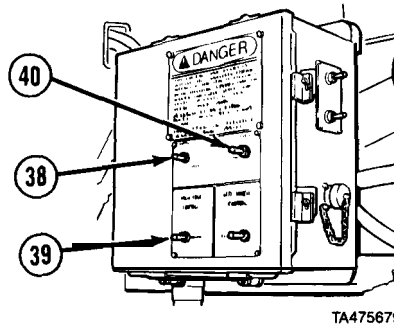
TA475678

- (39) Route other end of tow light cable (36) along disabled vehicle and connect to rear electrical connector (37) on wrecker.
- (40) Lock disabled vehicle's steering (refer to M35 operator's manual).

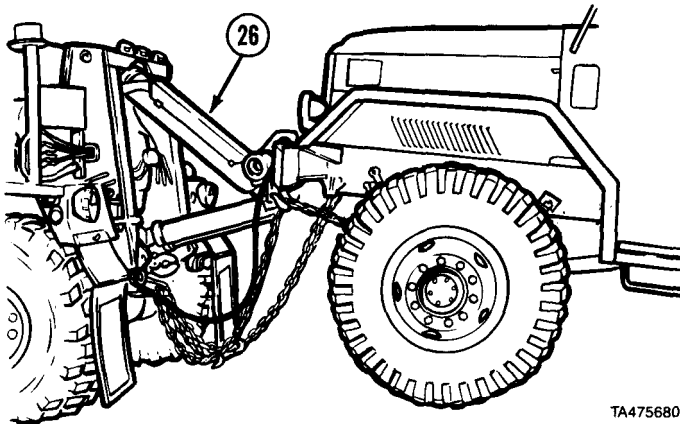
NOTE

- If disabled vehicle will be lifted and towed, continue with step (41).
- If disabled vehicle will be towed with all tires on paved roads only, raise crosstube enough to partially unload disabled vehicle's front suspension. Keep front tires in firm contact with ground and proceed with step (45).

2-75. TOW M35 (CONT).



- (41) Set POWER switch (38) to ON position.
- (42) Set HIGH IDLE switch (39) to CONTINUOUS.
- (43) Push and release LATCH switch (40). Engine speed will increase to approximately 1500 rpm.



WARNING

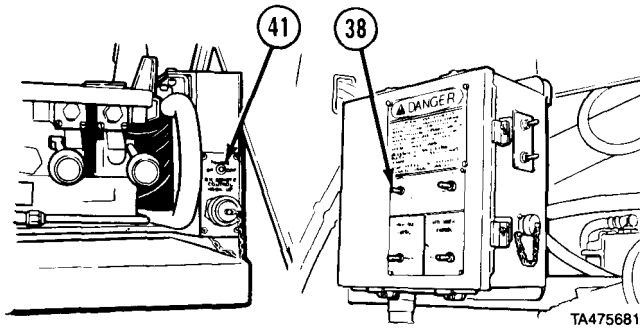
Keep out from under retrieval system and disabled vehicle when raised off ground or personal injury or death may result.

CAUTION

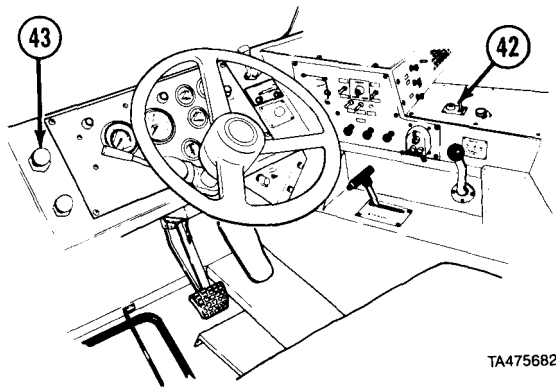
- Fully retract both tow cylinders before lifting disabled vehicle or equipment damage may result.
- Make sure all rigging is secure. Loose rigging can become entangled and cause equipment damage.

- (44) Push in LIFT CYLINDER control lever to retract lift cylinder (26) to raise disabled vehicle approximately 1 ft (30 cm) off ground.

M984E1 General Operating Procedures (Cont)



- (45) Set POWER switch (38) to OFF position.
- (46) Set POWER switch (41) to OFF position.



- (47) Set PTO ENGAGE switch (42) to OFF position.
- (48) Turn on service drive lights (para 2-10d).
- (49) Turn on emergency flashers on wrecker (para 2-44a) and disabled vehicle.
- (50) Push in PARKING BRAKE control (43) and select desired gear (para 2-11e).

WARNING

The M984E1 should not be operated at speeds over 15 mph except on paved roads when the operator determines that the vehicle being towed and the terrain allow safe operation. Engine brake switch must be "ON" for all towing operations. The following are maximum safe speeds:

Terrain Condition	Maximum speed, towed load up to 50,000 lbs	Maximum speed, towed load above 50,000 lbs
on road-level	35	30
on road-hilly	30	20
off road	15	15

Speeds in excess of the above can result in loss of control, serious injury or death.

- (51) Transport disabled vehicle.

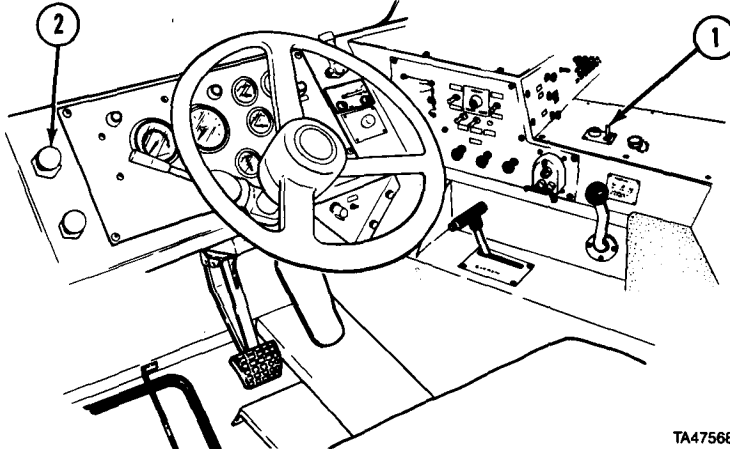
M984E1 General Operating Procedures (Cont)

2-75. TOW M35 (CONT).

b. Front Disconnect.

NOTE

This is a two-soldier task.



TA475683

- (1) Set transmission range selector (1) to N.
- (2) Pull PARKING BRAKE control (2).

WARNING

Do not stand between vehicles while disabled vehicle is raised off ground. Falling vehicle can cause serious injury or death.

NOTE

After lowering disabled vehicle, extend lift and tow cylinders approximately 2 to 4 in. (50 to 100 mm) to allow for adjustment when removing adapters.

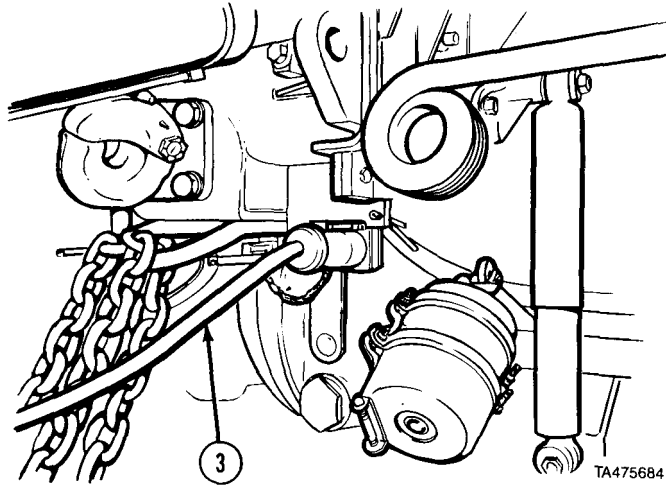
- (3) Prepare retrieval system for operation (para 2-72) and pull LIFT CYLINDER control lever to extend lift cylinder and lower towed vehicle to ground until safety chain at front axle is slack.

WARNING

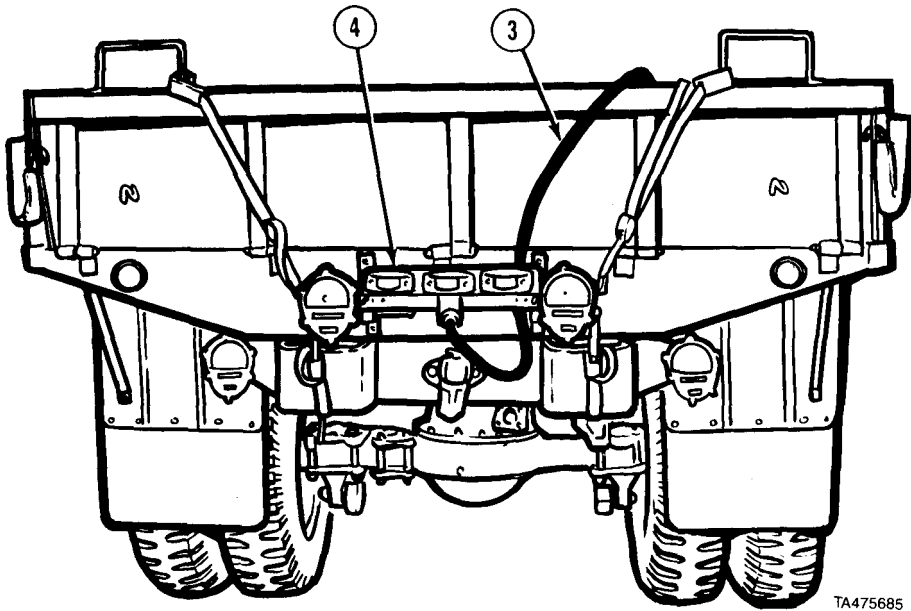
If disabled vehicle's parking brake is inoperable, chock wheels of disabled vehicle. Failure to chock wheels may result in personal injury.

- (4) Apply PARKING BRAKE on disabled vehicle (refer to M35 operator's manual). If parking brake is inoperative, chock wheels on disabled vehicle.

M984E1 General Operating Procedures (Cont)



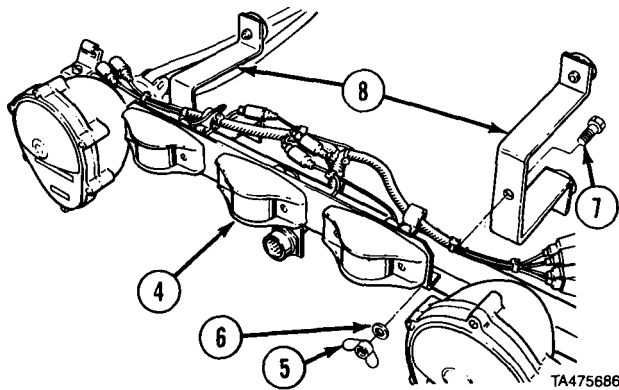
(5) Remove tow light cable (3) from wrecker.



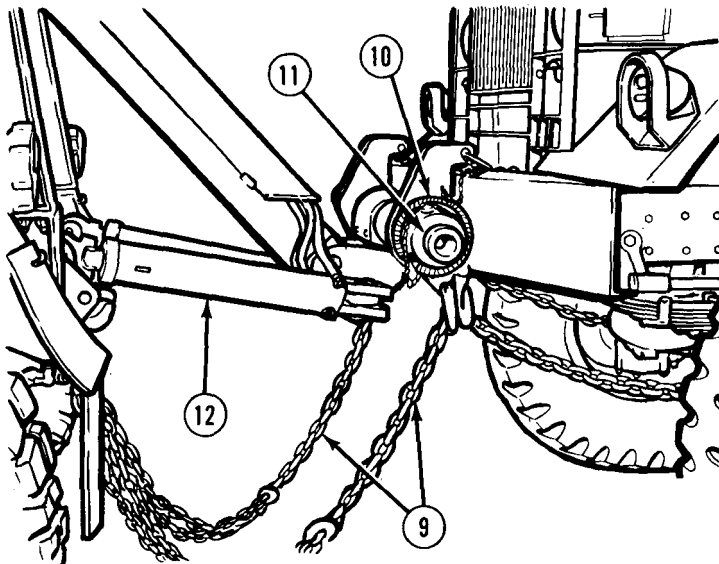
(6) Remove tow light cable (3) from emergency tow lights (4) and stow.
 (7) Remove emergency tow lights (4) from disabled vehicle.

M984E1 General Operating Procedures (Cont)

2-75. TOW M35 (CONT).



- (8) Remove two nuts (5), washers (6), screws (7), and brackets (8) from emergency tow lights (4). Stow emergency tow lights and brackets.

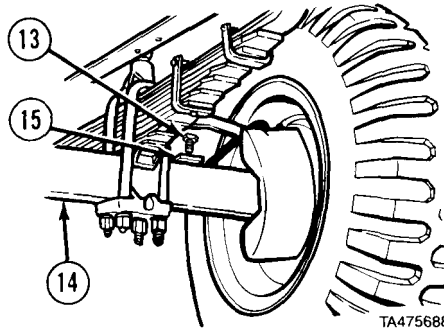


CAUTION

When removing chains, make sure grab hooks do not catch on brake lines. Equipment damage may result.

- (9) Remove and stow two safety chains (9).
- (10) Unwrap two springs (10) from crosstube (11) and connect to tow cylinders (12).

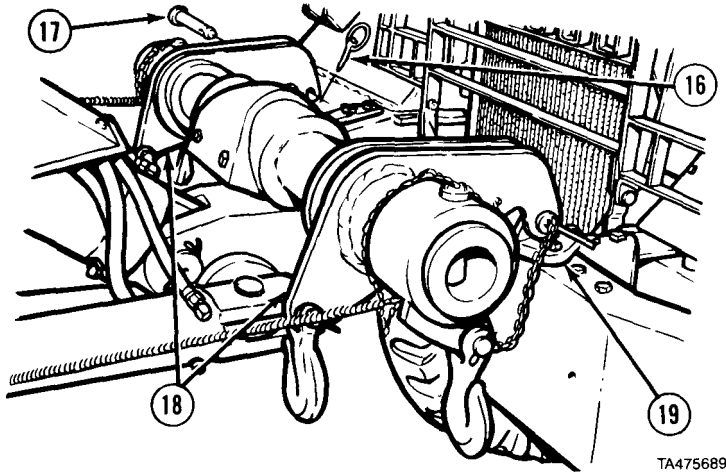
M984E1 General Operating Procedures (Cont)



NOTE

- Left side shown.
- Brake line bracket is located on top rear of axle.

- (11) Remove screw (13) from axle (14).
- (12) Install brake line bracket (15) with screw (13).
- (13) Repeat step (12) for other side of disabled vehicle.



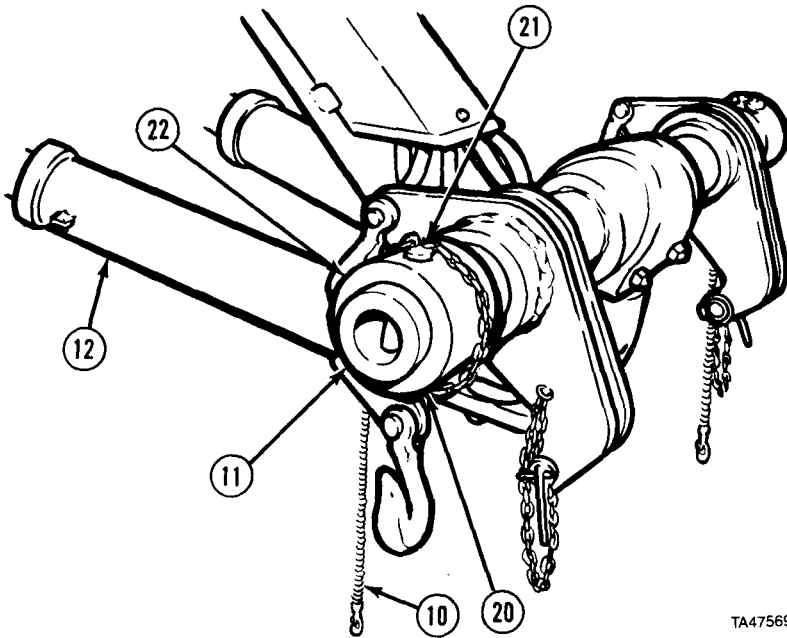
NOTE

Use retrieval controls to position crosstube to relieve tension from adapters.

- (14) Remove two quick pins (16) and pins (17) from adapters (18).
- (15) Remove two adapters (18) from tow eyes (19) on disabled vehicle.
- (16) Install two pins (17) in adapters (18).
- (17) Install two quick pins (16) in pins (17).

M984E1 General Operating Procedures (Cont)

2-75. TOW M35. (CONT.)



TA475690

(18) Drive wrecker forward several feet and park (para 2-110).

WARNING

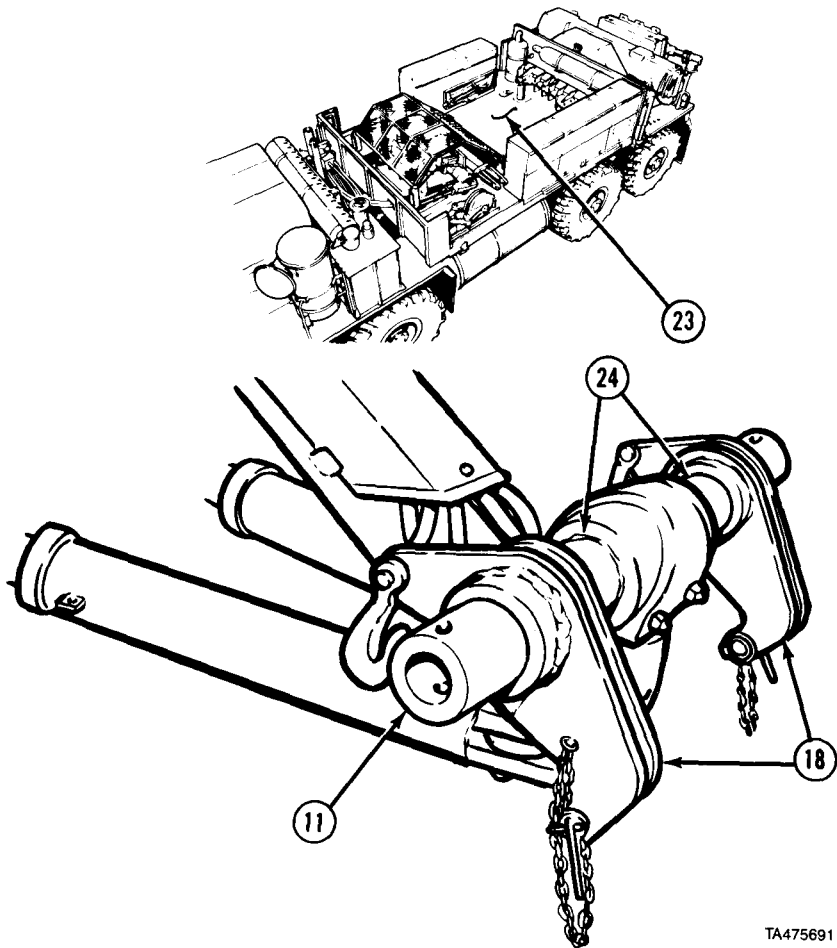
As springs and end caps are removed, crosstube can swing in all directions and adapters may slide off and can cause personal injury.

(19) Remove two springs (10) from tow cylinders (12).

(20) Remove two quick pins (20) and pins (21) from end caps (22).

(21) Remove two end caps (22) from crosstube (11).

M984E1 General Operating Procedures (Cont)

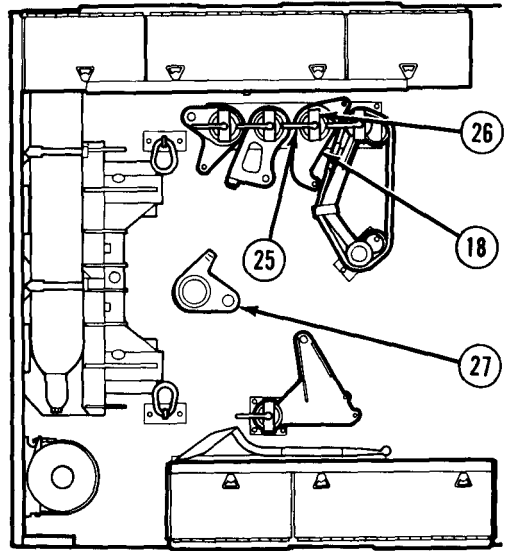


TA475691

- (22) Remove two adapters (18) from crosstube (11) and place on equipment body floor (23).
- (23) Remove two 5-in. (127 mm) spacers (24) from crosstube (11) and stow.

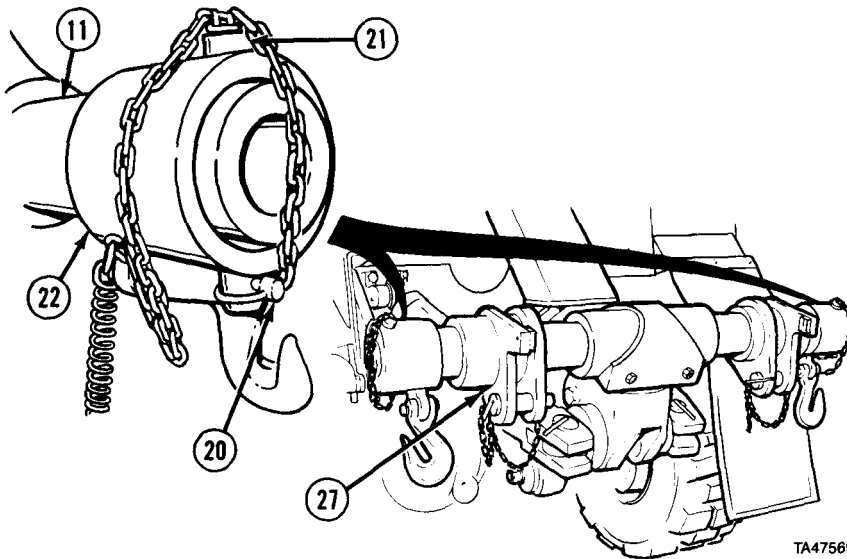
M984E1 General Operating Procedures (Cont)

2-75. TOW M35 (CONT).



TA475692

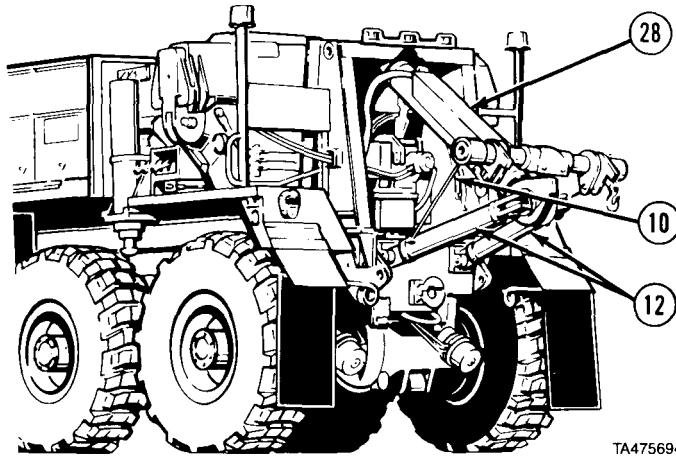
- (24) Remove lock handle (25), lock plate (26), and M977 front adapters (27).
- (25) Install two M35 front adapters (18) removed from crosstube, lock plate (26), and lock handle (25).



TA475693

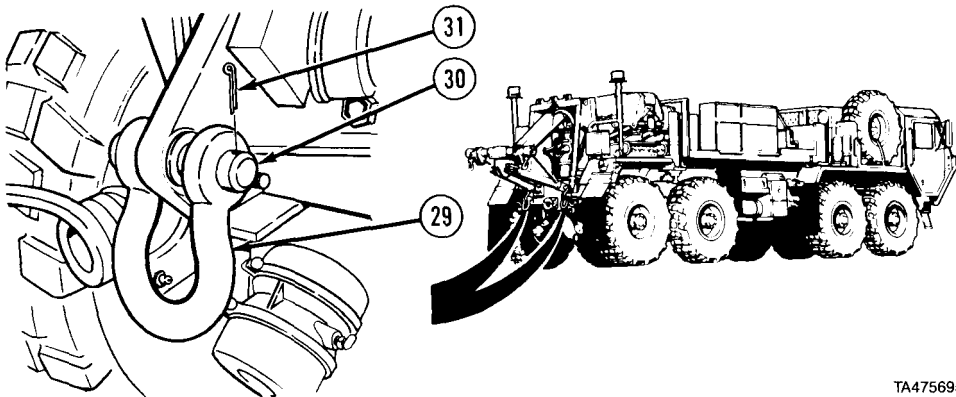
- (26) Install two M977 front adapters (27) on crosstube (11).
- (27) Install two end caps (22) on crosstube (11). Install two pins (21) and quick pins (20).

M984E1 General Operating Procedures (Cont)



TA475694

- (28) Install two springs (10) on tow cylinders (12).
- (29) Operate retrieval controls to fully retract lift cylinder (28) and tow cylinders (12).



TA475695

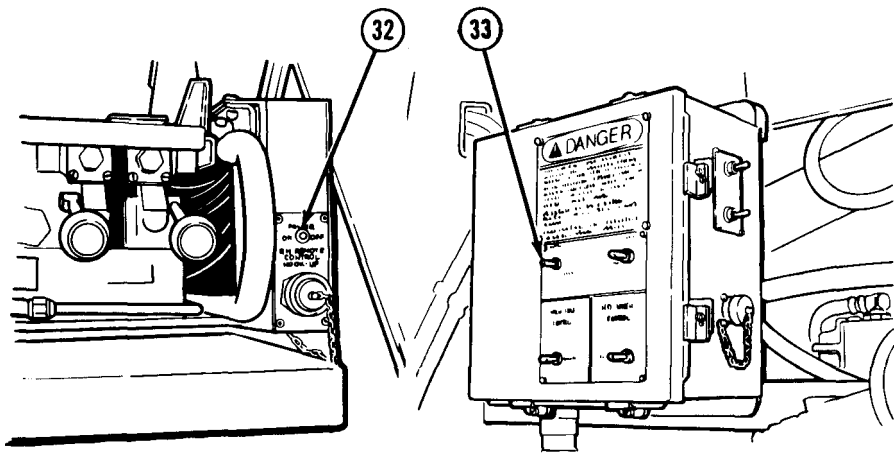
NOTE

Right and left towing shackles are installed the same way.

- (30) Install two towing shackles (29), pins (30), and cotter pin (31).

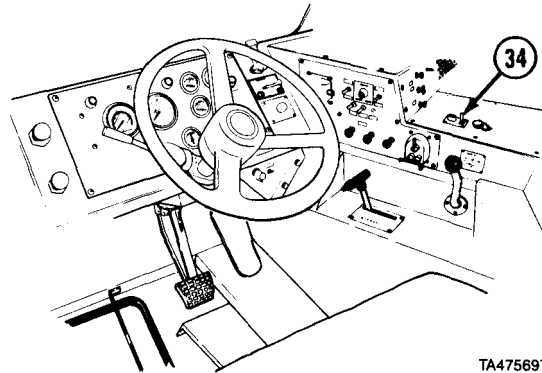
M984E1 General Operating Procedures (Cont)

2-75. TOW M35 (CONT).



TA475696

- (31) Set POWER switch (32) to OFF position.
- (32) Set POWER switch (33) to OFF position.



TA475697

- (33) Turn off emergency flashers on wrecker (para 2-44f) and disabled vehicle.
- (34) Turn off service drive lights (para 2-10d).
- (35) Set PTO ENGAGE switch (34) to OFF position.
- (36) Remove and stow beacon lights (para 2-62).
- (37) Shut off engine (para 2-11p).
- (38) Unlock disabled vehicle's steering (refer to M35 operator's manual).

M984E1 General Operating Procedures (Cont)

c. Rear Hookup.

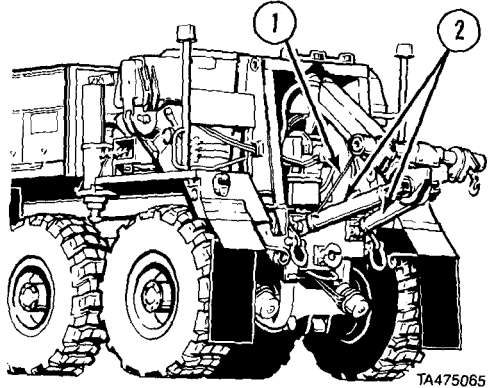
NOTE

This is a two-soldier task.

- (1) Prepare retrieval system for operation (para 2-72).

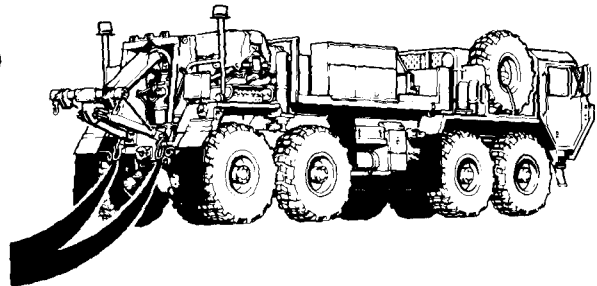
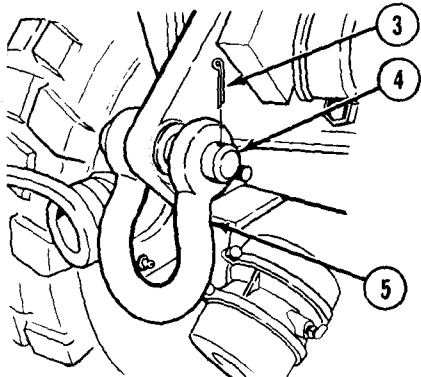
WARNING

- Hold crosstube when removing springs. Crosstube may swing or cause adapter to slide resulting in personal injury.
- Intervehicular air lines are not connected when towing from rear. Disabled vehicle will not have braking. Use extreme caution when transporting disabled vehicle using rear hookup. Vehicle traveling out of control can cause serious injury or death.



TA475065

- (2) Disconnect two springs (1) from tow cylinders (2).



TA475066

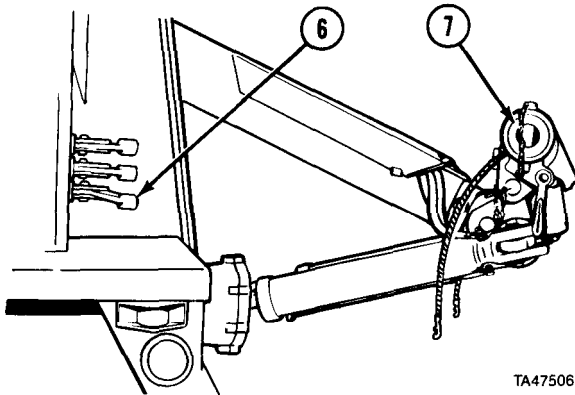
NOTE

Right and left towing shackles are removed the same way.

- (3) Remove cotter pin (3), pin (4), and towing shackle (5) and stow.

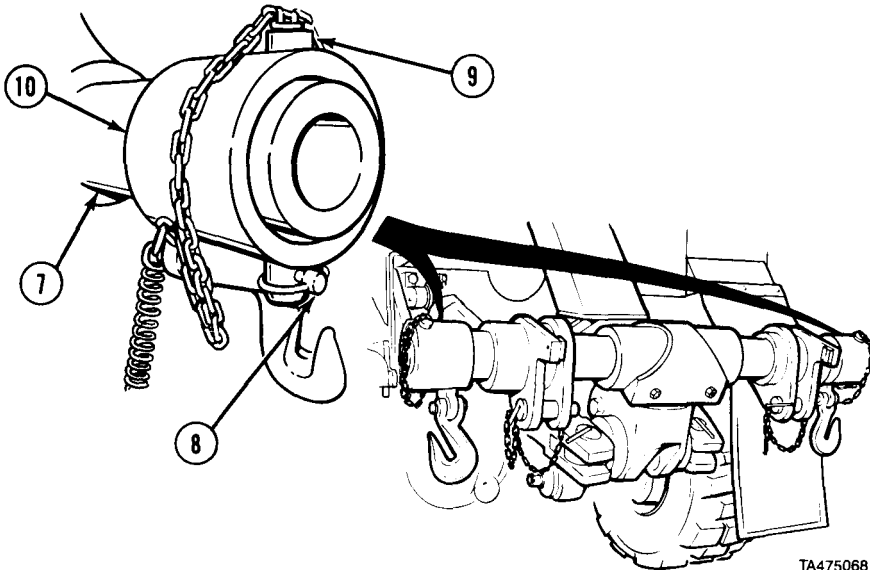
M984E1 General Operating Procedures (Cont)

2-75. TOW M35 (CONT).



TA475067

- (4) Pull LIFT CYLINDER control lever (6) to lower crosstube (7) to approximately 3 ft (1 m) above ground.
- (5) Position wrecker so that crosstube (7) is approximately 1 ft (30 cm) from tow eyes of disabled vehicle and centered on disabled vehicle.



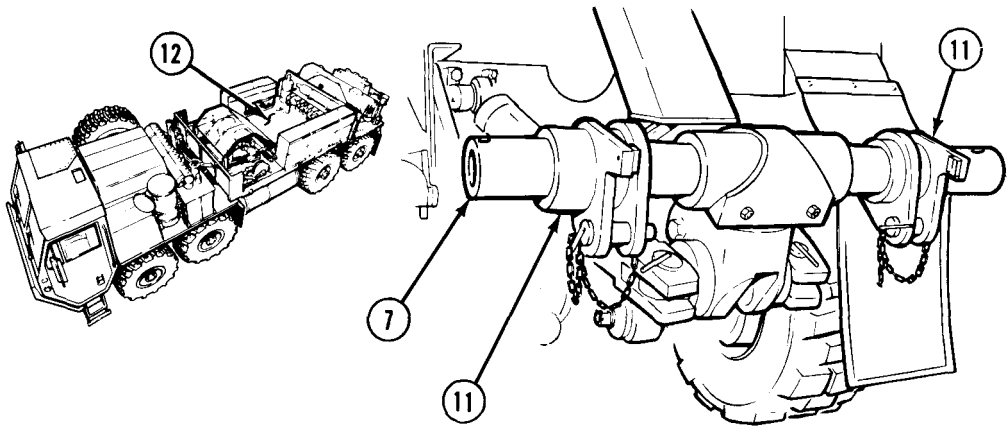
TA475068

WARNING

When end caps are removed from crosstube, adapters may slide off causing personal injury.

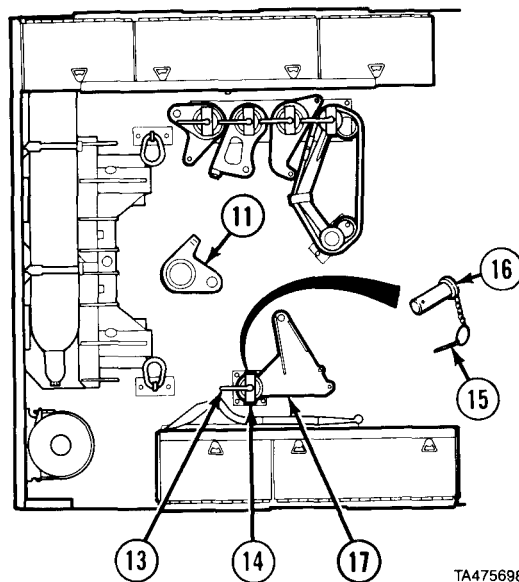
- (6) Remove quick pins (8) and pins (9) from end caps (10).
- (7) Remove end caps (10) from crosstube (7).

M984E1 General Operating Procedures (Cont)



TA475069

- (8) Remove two M977 adapters (11) from crosstube (7) and place on equipment body floor (12).

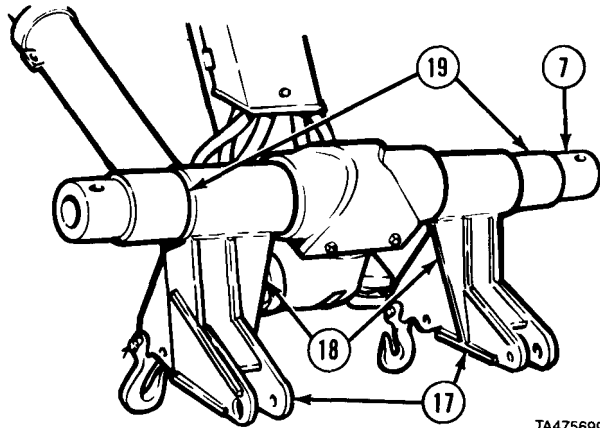


TA475698

- (9) Remove lock handle (13), lock plate (14), quick pin (15), pin (16), and two M35 rear tow adapters (17).
- (10) Install two M977 front adapters (11) removed from crosstube, lock plate (14), lock handle (13), pin (16), and quick pin (15).
- (11) Remove two 7/8-in. (22 mm) pins and two 5-in. (127 mm) spacers from stowage.

M984E1 General Operating Procedures (Cont)

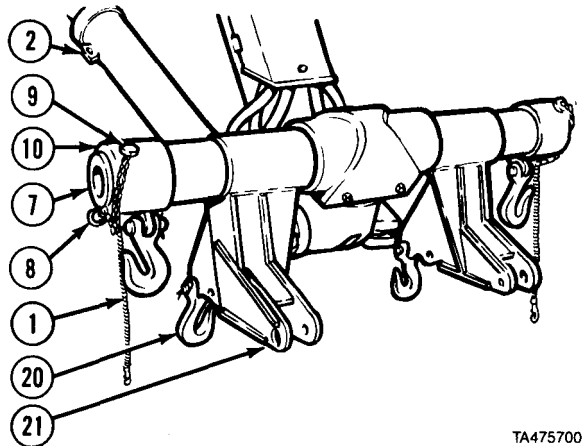
2-75. TOW M35 (CONT).



WARNING

Adapters and end caps may slide off when installing and may cause personal injury.

- (12) Install two M35 rear tow adapters (17) on crosstube (7) with support brace (18) to inside.
- (13) Install two 5-in. (127 mm) spacers (19) on crosstube (7).



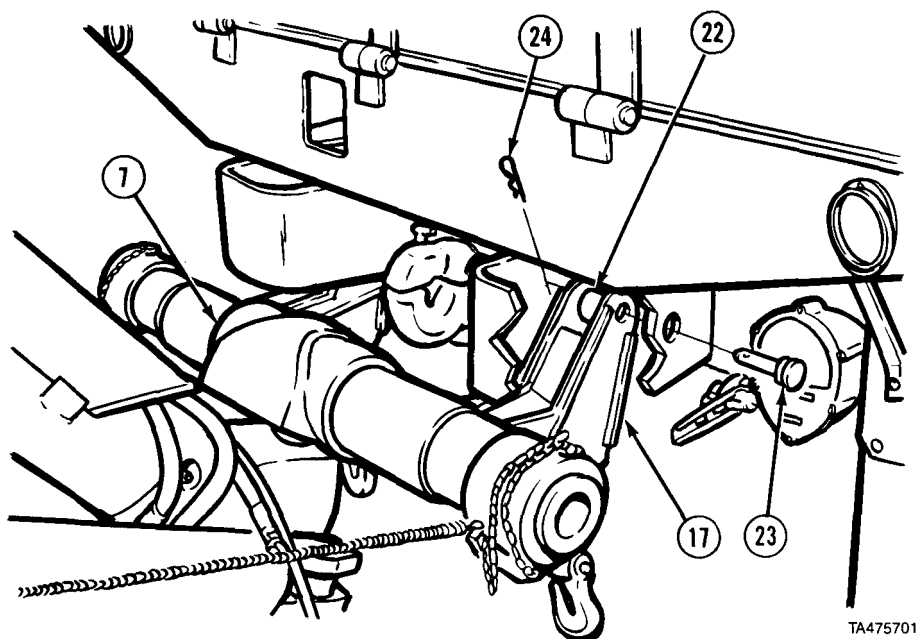
- (14) Install two end caps (10) on crosstube (7).
- (15) Install two pins (9) and quick pins (8).

NOTE

Adapter grab hook may be installed in either hole. For M35 install grab hooks in hole farthest from towing pin holes.

- (16) Position adapter grab hooks (20) in hole farthest from pin holes (21).
- (17) Attach two springs (1) on tow cylinders (2).

M984E1 General Operating Procedures (Cont)



NOTE

If disabled vehicle has towing shackles installed, remove shackles and stow in disabled vehicle.

- (18) Soldier A operates retrieval system (para 2-72) while Soldier A and Soldier B position crosstube (7) so holes in adapters (17) aline with rear tow eyes (22).

WARNING

Keep hands and fingers away from adapters and tow eyes when operating retriever controls. Personal injury could result.

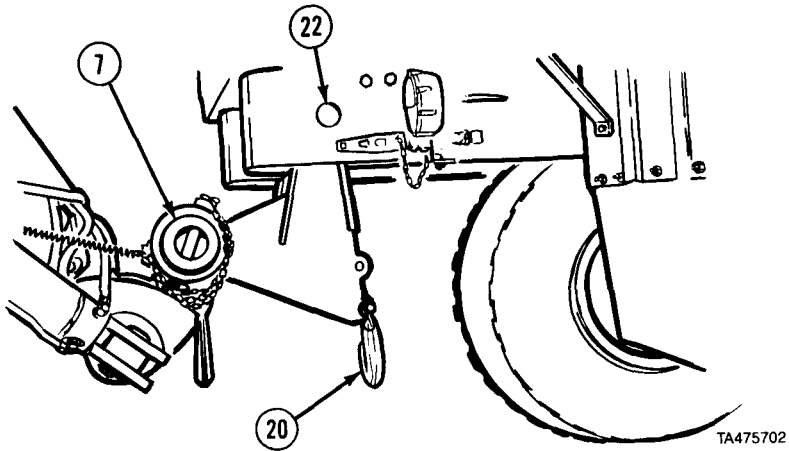
NOTE

When installing pins, turn pin hole vertical to allow for easier cotter hairpin installation.

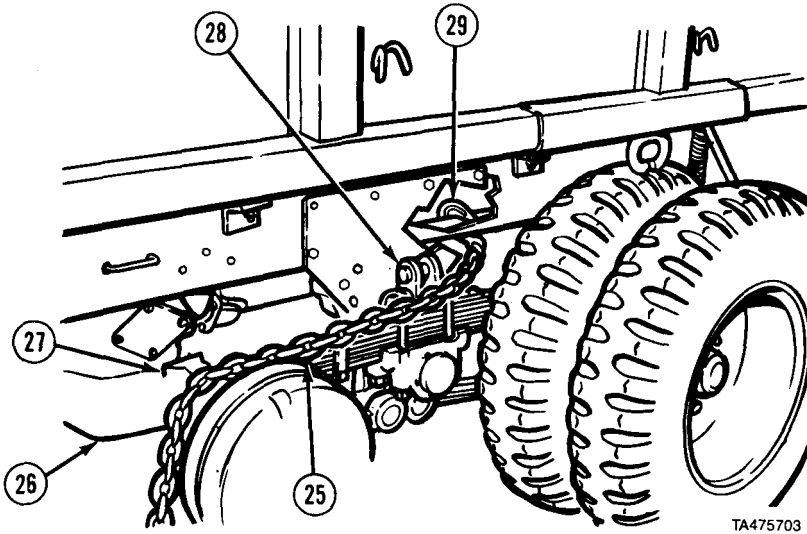
- (19) Insert two 7/8-in. (22 mm) pins (23) through adapters (17) and rear tow eyes (22). Install two cotter hairpins (24) in pins.

M984E1 General Operating Procedures (Cont)

2-75. TOW M35 (CONT).

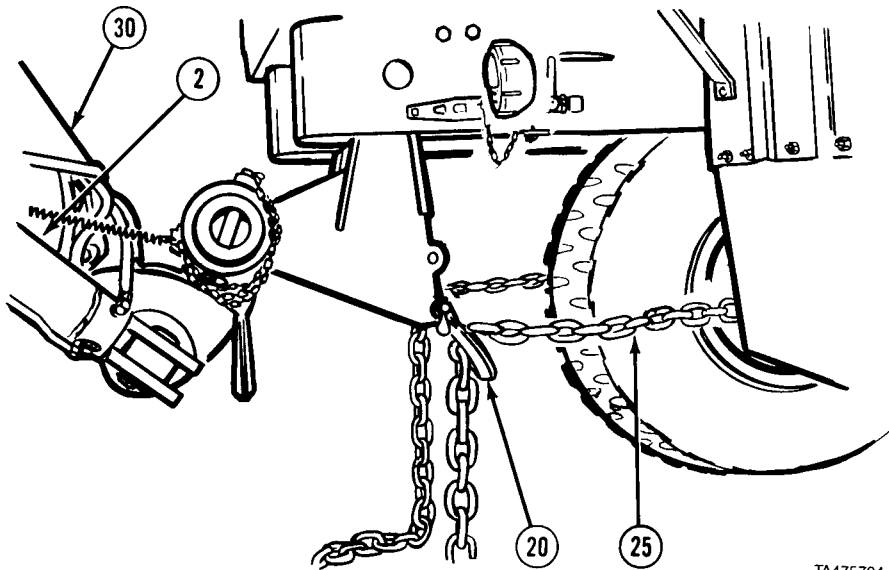


- (20) Lower crosscube (7) until adapter grab hooks (20) are under rear tow eyes (22).



- (21) Remove two 16-ft (5 m) safety chains (25) from stowage.
(22) Route one safety chain (25) over rear axle (26) and outside axle stop (27).
(23) Route safety chain (25) around sling point (28) and attach grab hook (29) to bottom flange of frame rail.
(24) Repeat steps (22) and (23) for other side of disabled vehicle.

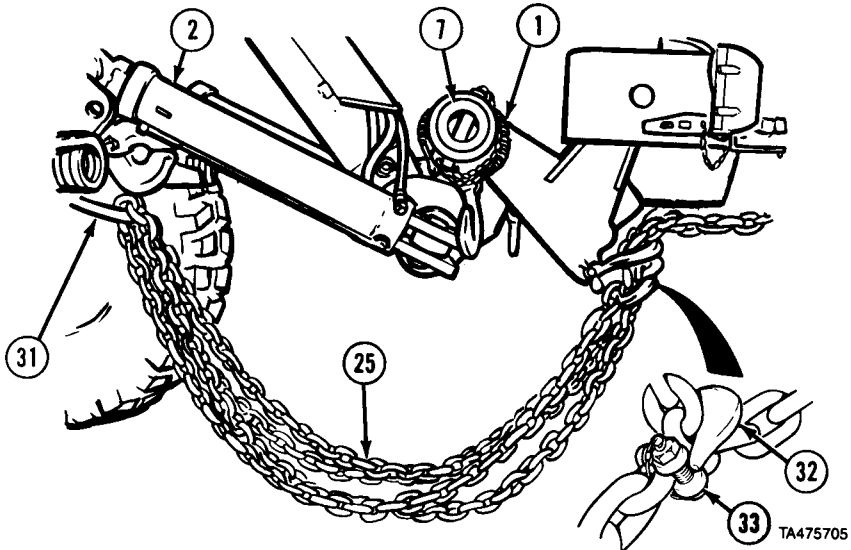
M984E1 General Operating Procedures (Cont)



TA475704

- (25) Pull safety chain (25) tight and install chain on adapter grab hook (20).
- (26) Repeat step (25) for other side of disabled vehicle.
- (27) Release PARKING BRAKE on disabled vehicle (refer to M35 operator's manual).
- (28) Alternately push in TOW and LIFT CYLINDER control levers until tow cylinders (2) are fully retracted.
- (29) Push in LIFT CYLINDER control lever to retract lift cylinder (30) until slack is removed from safety chains (25).

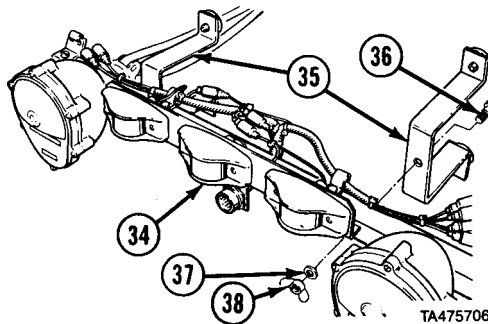
2-75. TOW M35 (CONT).



NOTE

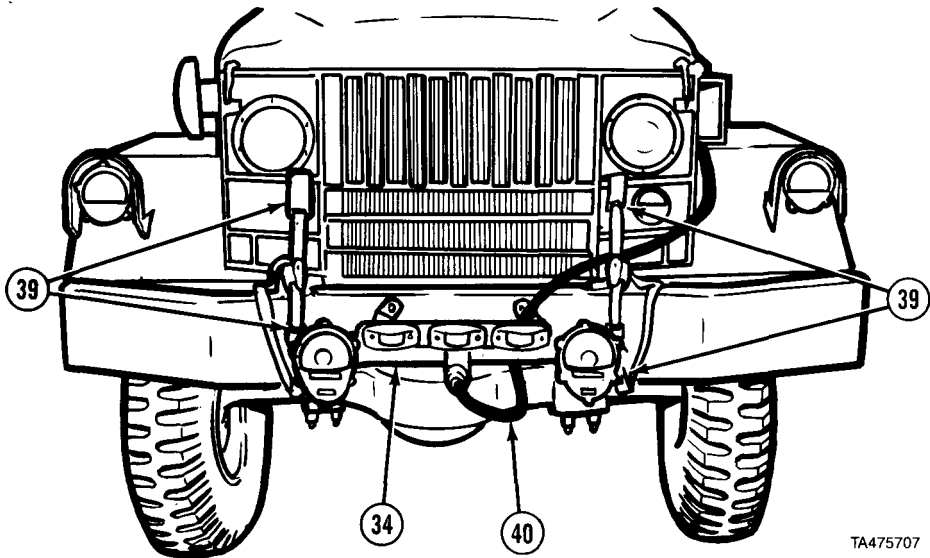
- Safety chains can be routed to safety chain hoop, or towing shackles. Towing shackles can be used only after tow cylinders are extended.
- Adjust chain slack so safety chains do not touch ground.

- (30) Route two safety chains (25) through safety chain hoop (31) on wrecker and secure grab hook (32) with safety shackle (33).
- (31) Disconnect two springs (1) from tow cylinders (2), wrap around cross-tube (7) and secure.



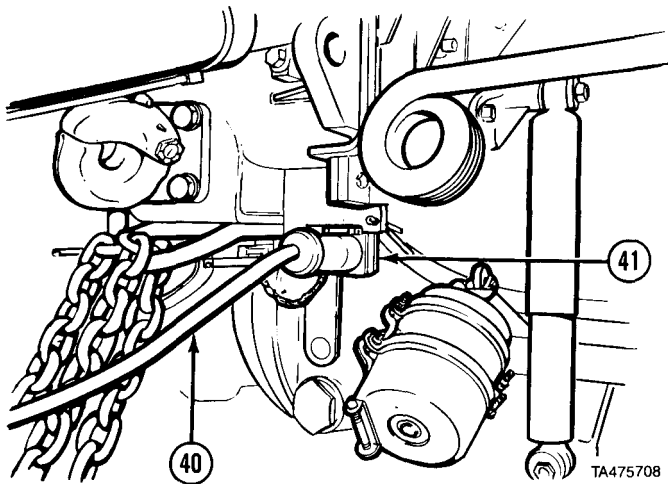
- (32) Prepare disabled vehicle for towing (refer to M35 operator's manual).
- (33) Remove emergency tow lights (34) and two brackets (35) from stowage.
- (34) Install two brackets (35) in outside holes of emergency tow lights with two screws (36), washers (37), and nuts (38).

M984E1 General Operating Procedures (Cont)



TA475707

- (35) Install emergency tow lights (34) on front of M35 and fasten securely with straps (39).
- (36) Remove tow light cable (40) from stowage and connect to emergency tow light (34).



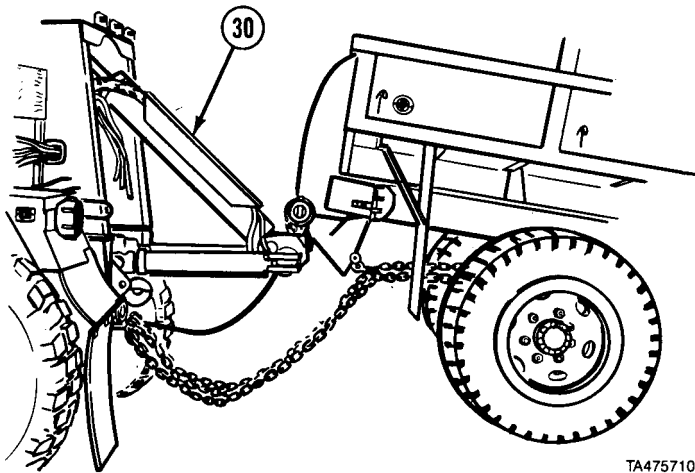
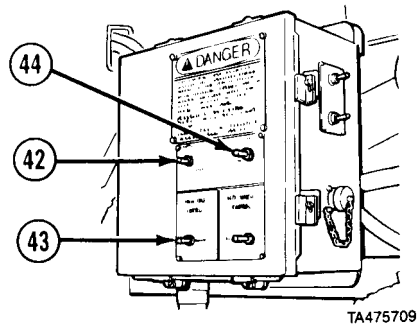
TA475708

- (37) Route other end of tow light cable (40) along disabled vehicle and connect to rear electrical connector (41) on wrecker.
- (38) Lock disabled vehicle's steering (refer to M35 operator's manual).

M984E1 General Operating Procedures (Cont)

2-75. TOW M35 (CONT).

- (39) Set POWER switch (42) to ON position.
- (40) Set HIGH IDLE switch (43) to CONTINUOUS.
- (41) Push and release LATCH switch (44). Engine speed will increase to approximately 1500 rpm.



WARNING

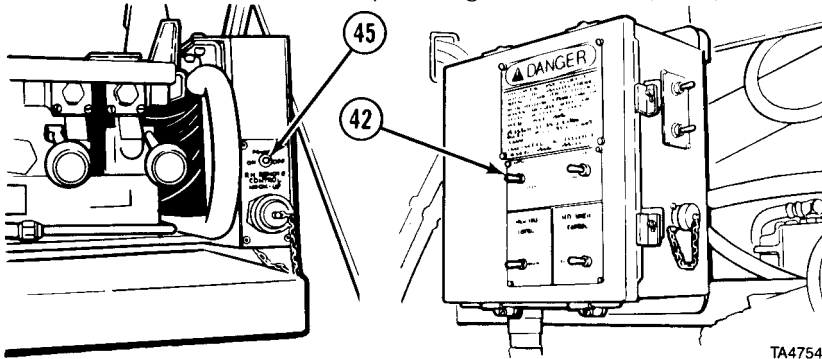
Keep out from under retrieval system and disabled vehicle when raised off ground or personal injury or death may result.

CAUTION

- Fully retract both tow cylinders before lifting disabled vehicle or equipment damage may result.
- Make sure all rigging is secure. Loose rigging can become entangled and cause equipment damage.

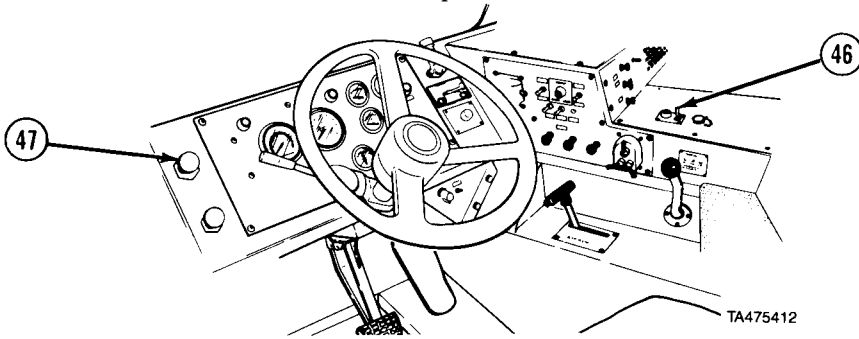
- (42) Retract lift cylinder (30) to raise disabled vehicle approximately 1.5 ft (45 cm) off ground.

M984E1 General Operating Procedures (Cont)



TA475411

- (43) Set POWER switch (42) to OFF position.
- (44) Set POWER switch (45) to OFF position.



TA475412

- (45) Set PTO ENGAGE switch (46) to OFF position.
- (46) Turn on service drive lights (para 2-10d).
- (47) Turn on emergency flashers on M984E1 vehicle (para 2-44a) and disabled vehicle.
- (48) Push in PARKING BRAKE control (47) and select desired gear (para 2-11e).

WARNING

The M984E1 should not be operated at speeds over 15 mph except on paved roads when the operator determines that the vehicle being towed and the terrain allow safe operation. Engine brake switch must be "ON" for all towing operations. The following are maximum safe speeds:

Terrain Condition	Maximum speed, towed load up to 50,000 lbs	Maximum speed, towed load above 50,000 lbs
on road-level	35	30
on road-hilly	30	20
off road	15	15

Speeds in excess of the above can result in loss of control, serious injury or death.

- (49) Transport disabled vehicle.

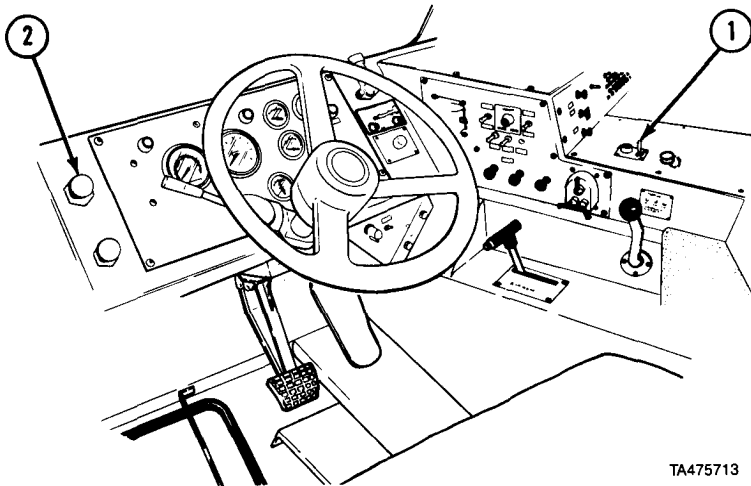
M984E1 General Operating Procedures (Cont)

2-75. TOW M35 (CONT).

d. Rear Disconnect.

NOTE

This is a two-soldier task.



TA475713

- (1) Set transmission range selector (1) to N.
- (2) Pull PARKING BRAKE control (2).

WARNING

Do not stand between vehicles while disabled vehicle is raised off ground. Falling vehicle can cause serious injury or death.

NOTE

After lowering disabled vehicle, extend lift and tow cylinder approximately 2 to 4 in. (50 to 100 mm) to allow for adjustment when removing adapters.

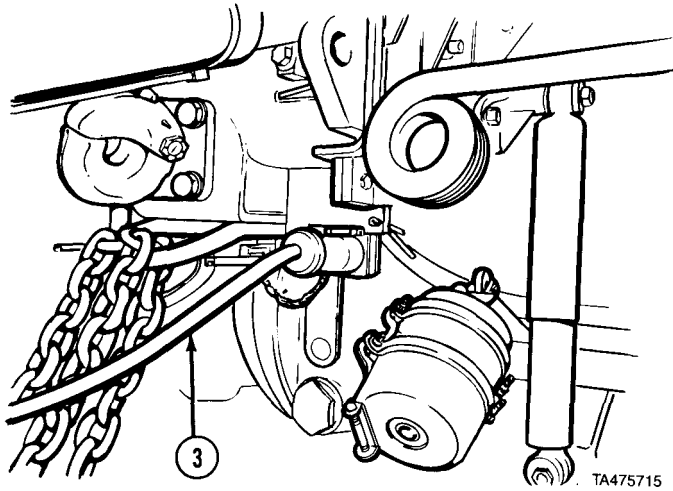
- (3) Prepare retrieval system for operation (para 2-72) and pull LIFT CYLINDER control lever to extend lift cylinder and lower towed vehicle to ground until safety chain at rear axle is slack.

WARNING

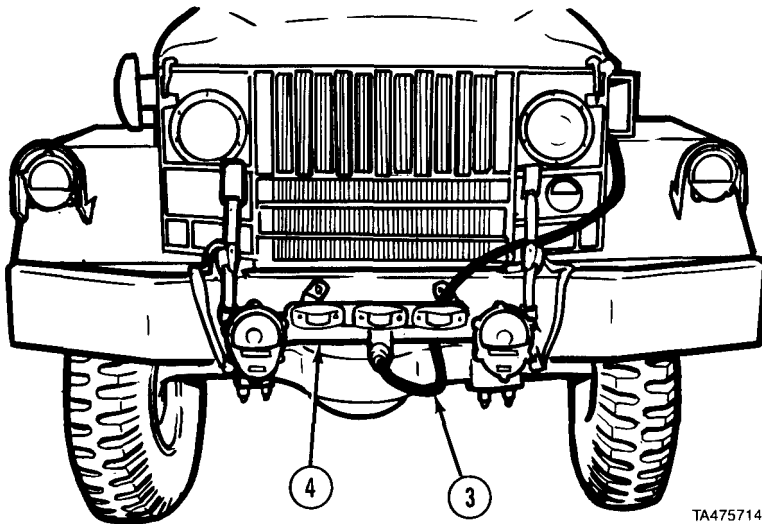
If disabled vehicle's parking brake is inoperative, chock wheels of disabled vehicle. Failure to chock wheels may result in personal injury.

- (4) Apply PARKING BRAKE on disabled vehicle (refer to M35 operator's manual). If parking brake is inoperative, chock wheels on disabled vehicle.

M984E1 General Operating Procedures (Cont)



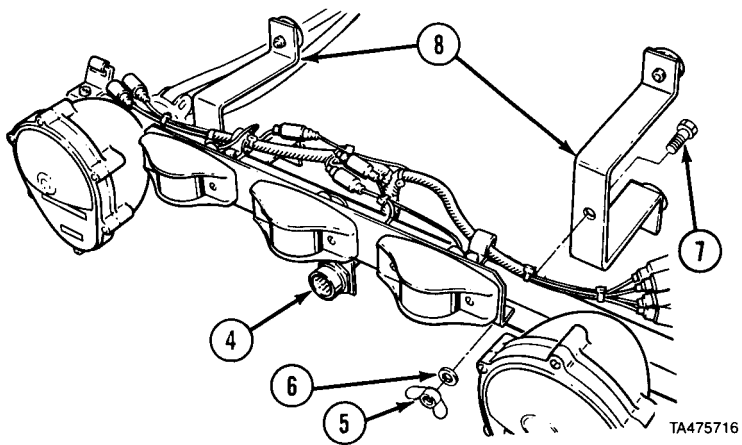
(5) Remove tow light cable (3) from wrecker.



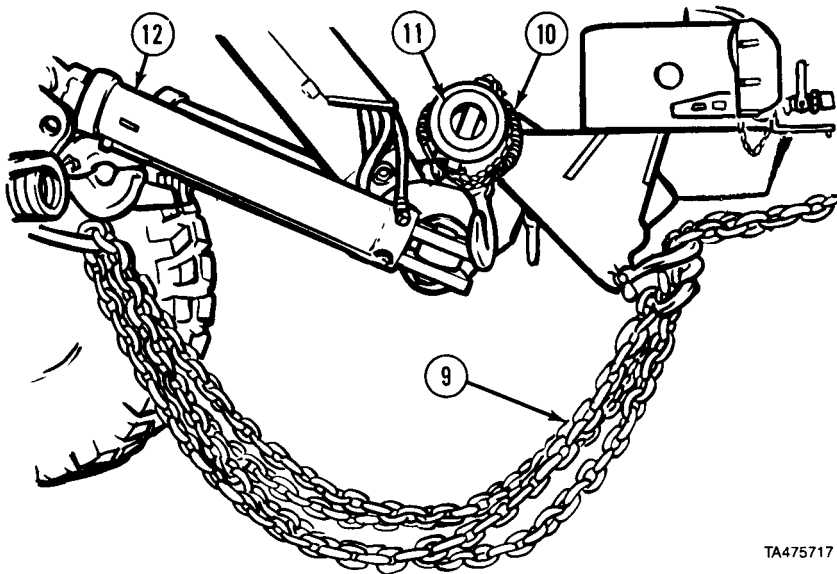
(6) Remove tow light cable (3) from emergency tow lights (4) and stow.
(7) Remove emergency tow lights (4) from disabled vehicle.

M984E1 General Operating Procedures (Cont)

2-75. TOW M35 (CONT).

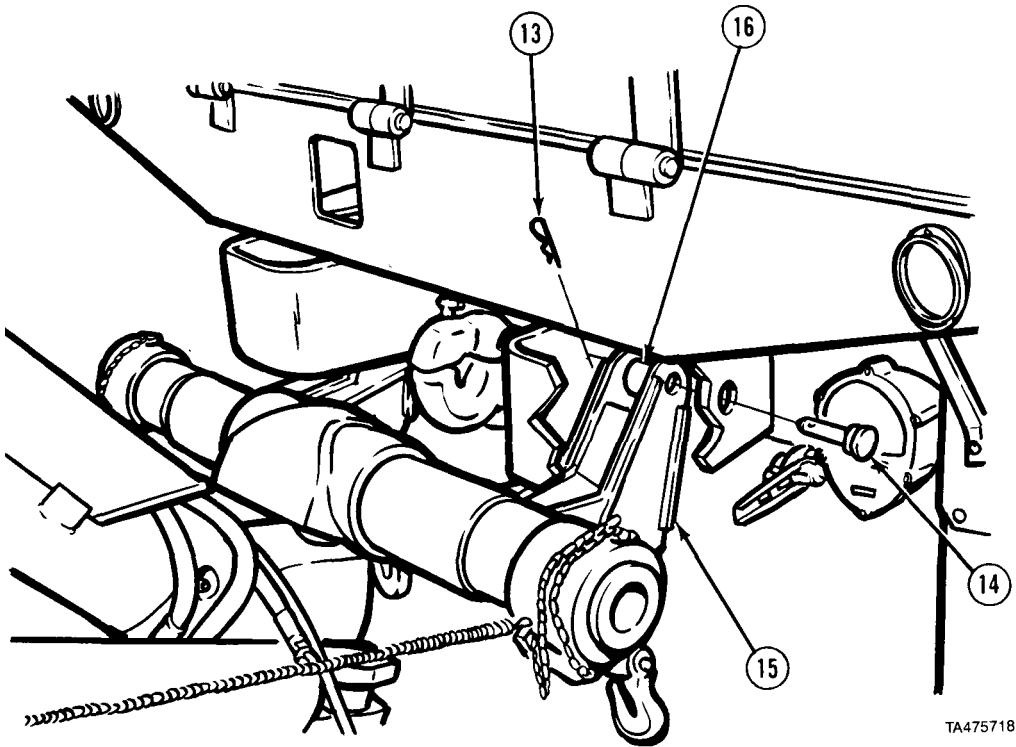


- (8) Remove two nuts (5), washers (6), screws (7), and brackets (8) from emergency tow lights (4). Stow emergency tow lights and brackets.



- (9) Remove and stow safety chains (9).
- (10) Unwrap two springs (10) from crosstube (11) and connect to tow cylinders (12).

M984E1 General Operating Procedures (Cont)



TA475718

WARNING

- Do not stand behind adapters when pins are being removed. Adapters may swing down resulting in personal injury.
- Keep hands and fingers away from adapter and tow eyes when operating retrieval controls. Personal injury could result.

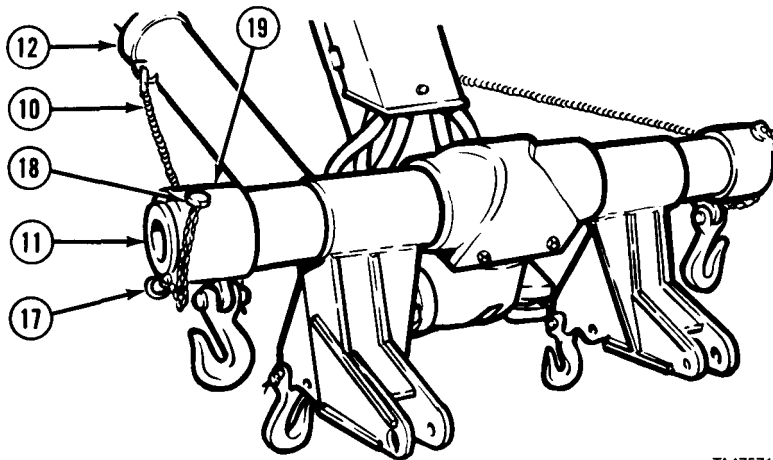
NOTE

Use retrieval controls to position crosstube to relieve tension from adapters.

- (11) Remove two hairpins (13) and 7/8-in. (22 mm) pins (14) from adapters (15).
- (12) Remove adapters (15) from tow eyes (16) on disabled vehicle.
- (13) Install two hairpins (13) in 7/8 in. (22 mm) pins (14) and stow.

M984E1 General Operating Procedures (Cont)

2-75. TOW M35 (CONT).



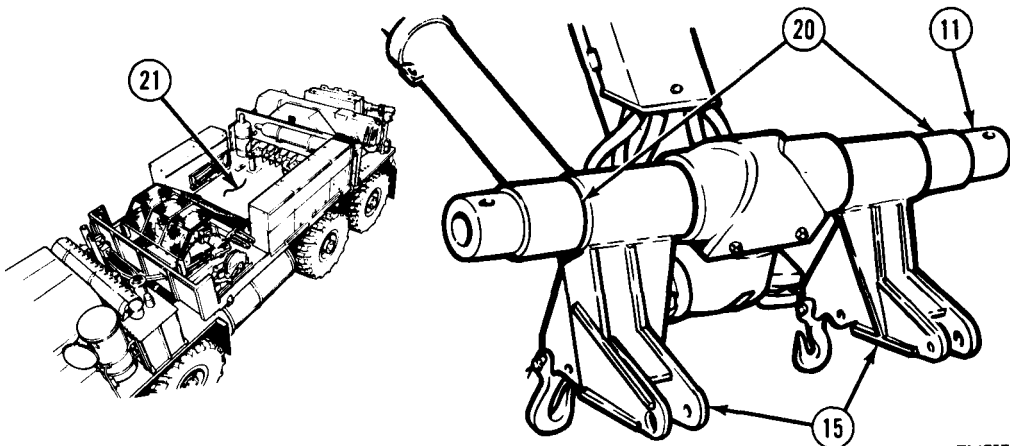
TA475719

(14) Drive wrecker forward several feet and park (para 2-110).

WARNING

As springs and end caps are removed, crosstube can swing in all directions, adapters may slide off, causing personal injury.

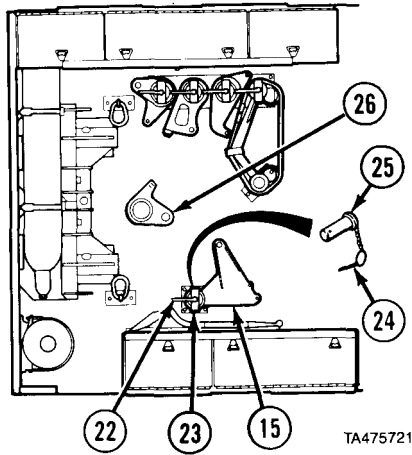
- (15) Remove two springs (10) from tow cylinders (12).
- (16) Remove quick pins (17) and pins (18) from end caps (19).
- (17) Remove end caps (19) from crosstube (11).



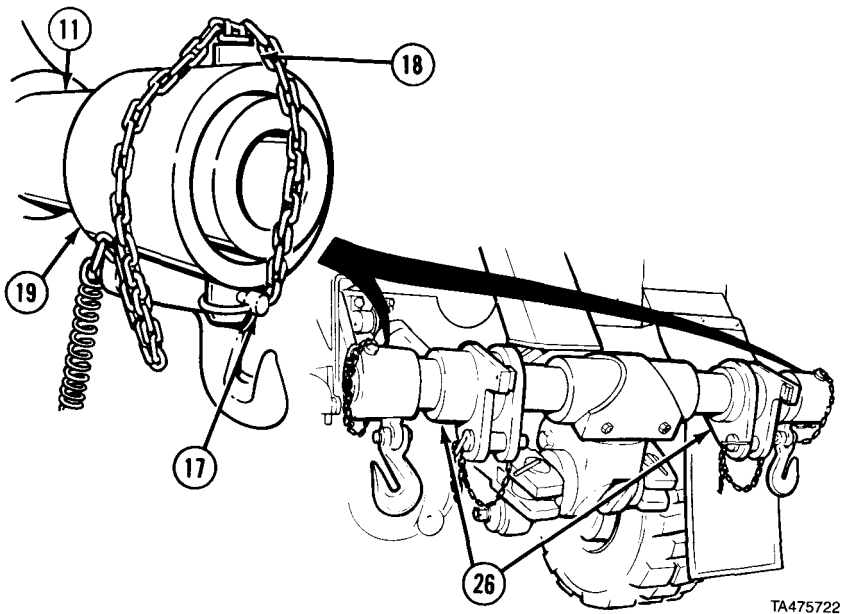
TA475720

- (18) Remove two 5-in. (127 mm) spacers (20) from crosstube (11) and stow.
- (19) Remove two adapters (15) from crosstube (11) and place on equipment body floor (21).

M984E1 General Operating Procedures (Cont)



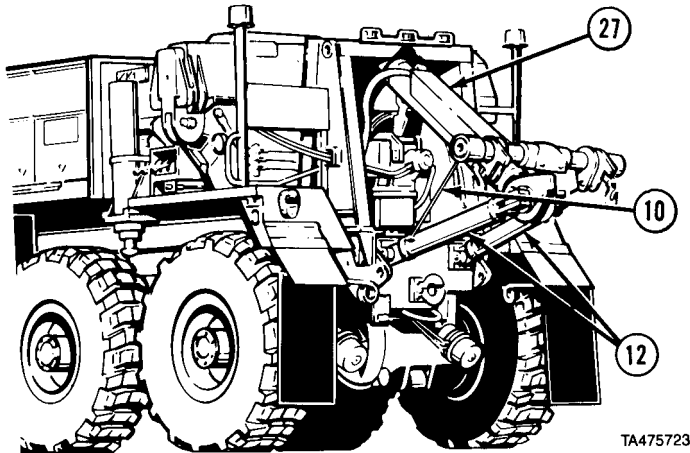
- (20) Remove lock handle (22), lock plate (23), quick pin (24), pin (25), and two M977 front adapters (26).
- (21) Install two M35 adapters (15) removed from crosstube, pin (25), quick pin (24), lock plate (23), and lock handle (22).



- (22) Install two M977 front adapters (26) on crosstube (11).
- (23) Install two end caps (19) on crosstube (11). Install pins (18) and quick pins (17).

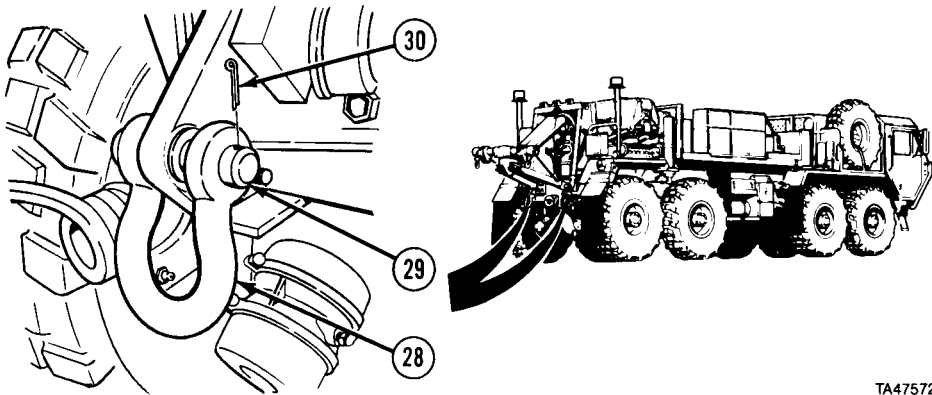
M984E1 General Operating Procedures (Cont)

2-75. TOW M35 (CONT).



TA475723

- (24) Install two springs (10) on tow cylinders (12).
- (25) Operate retrieval controls and fully retract lift cylinder (27) and tow cylinders (12).



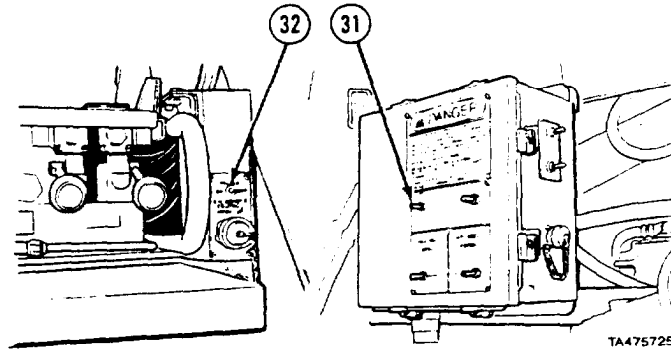
TA475724

NOTE

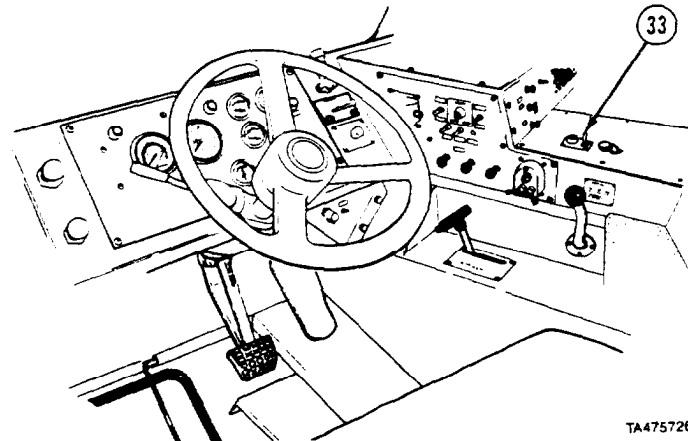
Right and left towing shackles are installed the same way.

- (26) Install towing shackle (28), pin (29), and cotter pin (30).

M984E1 General Operating Procedures (Cont)



- (27) Set POWER switch (31) to OFF position.
- (28) Set POWER switch (32) to OFF position.

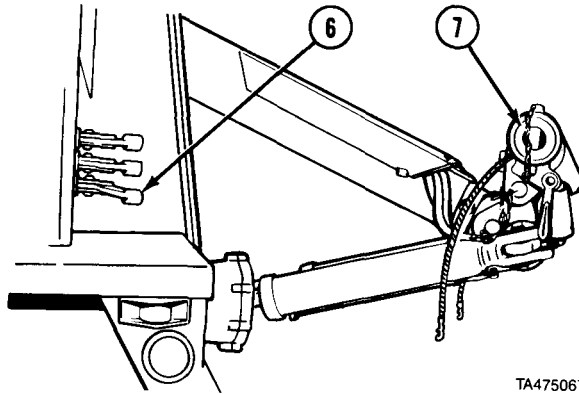


- (29) Turn off emergency flashers on wrecker (para 2-44f) and disabled vehicle.
- (30) Turn off service drive lights (para 2- 10d).
- (31) Set PTO ENGAGE switch (33) to OFF position.
- (32) Remove and stow beacon lights (para 3-62).
- (33) Shut off engine (para 2-11p).
- (34) Unlock disabled vehicle's steering (refer to M35 operator's manual).

2-76. DELETED

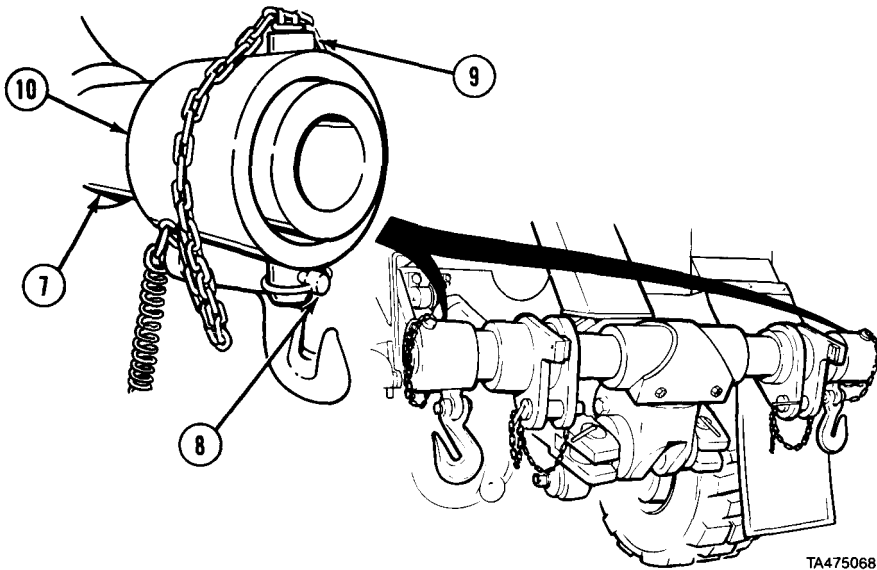
Pages 2-238 through 2-412 deleted.

M984E1 General Operating Procedures (Cont)



TA475067

- (4) Pull LIFT CYLINDER control lever (6) to lower crosstube (7) to approximately 4 ft (1.2 m) above ground.
- (5) Position wrecker so that crosstube (7) is approximately 1 ft (30 cm) from tow eyes of disabled vehicle and centered on disabled vehicle.



TA475068

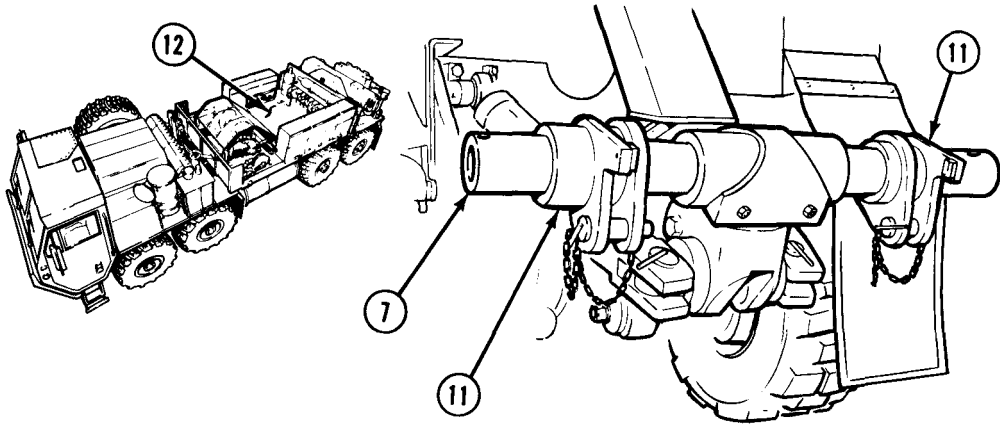
WARNING

When end caps are removed from crosstube, adapters may slide off causing personal injury.

- (6) Remove quick pin (8) and pin (9) from end cap (10).
- (7) Remove end cap (10) from crosstube (7).

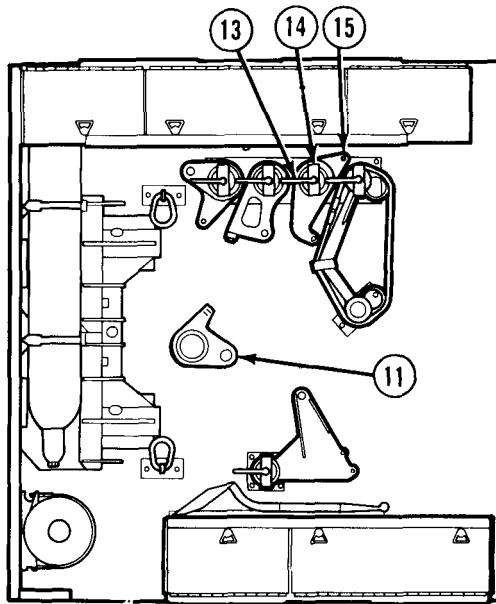
M984E1 General Operating Procedures (Cont)

2-76. TOW M123 (CONT).



TA475069

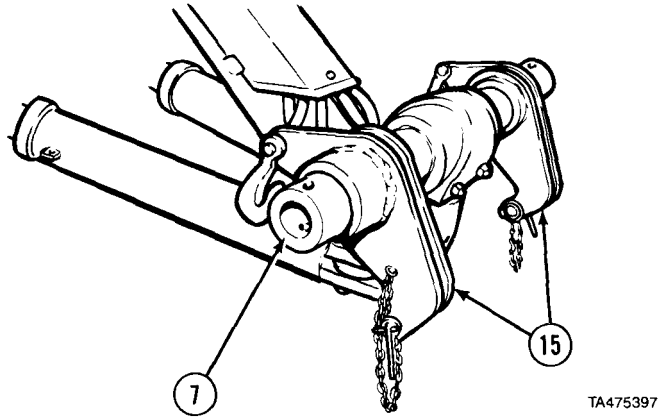
- (8) Remove two M977 front adapters (11) from crosstube (7) and place on equipment body floor (12).



TA475811

- (9) Remove lock handle (13), lock plate (14), and two M123 front tow adapters (15).
(10) Install two M977 front adapters (11) removed from crosstube, lock plate (14), and lock handle (13).

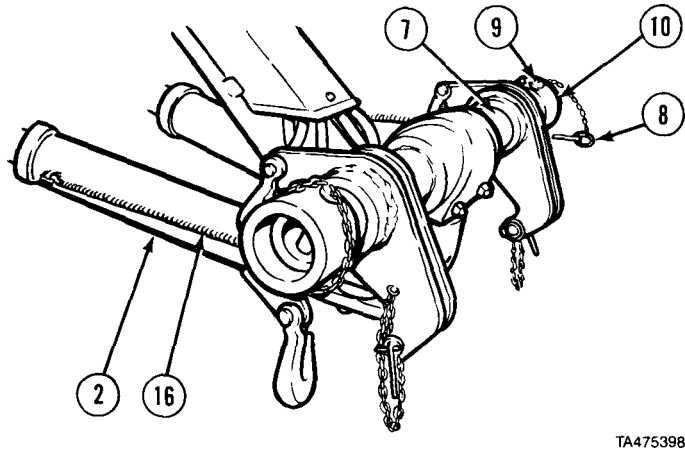
M984E1 General Operating Procedures (Cont)



WARNING

Adapters and end caps may slide off when installing and cause personal injury.

(11) Install two M123 front tow adapters (15) on crosstube (7).



NOTE

End caps will hang over end of crosstube for M123 adapters.

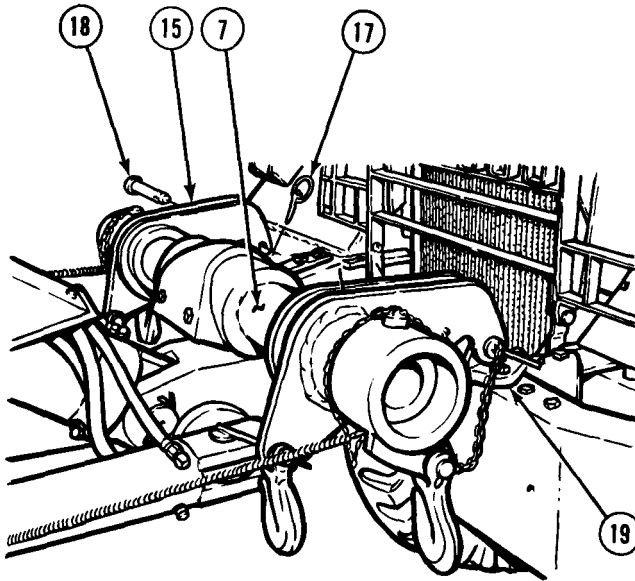
(12) Install two end caps (10) on crosstube (7).

(13) Install pins (9) and quick pins (8).

(14) Attach two springs (16) on tow cylinders (2).

M984E1 General Operating Procedures (Cont)

2-76. TOW M123 (CONT).



TA475399

(15) Remove two quick pins (17) and pins (18) from adapters (15).

WARNING

Keep hands and fingers away from adapters and tow eyes when operating retriever controls. Personal injury could result.

NOTE

If disabled vehicle has towing shackles installed, remove shackles and stow in disabled vehicle.

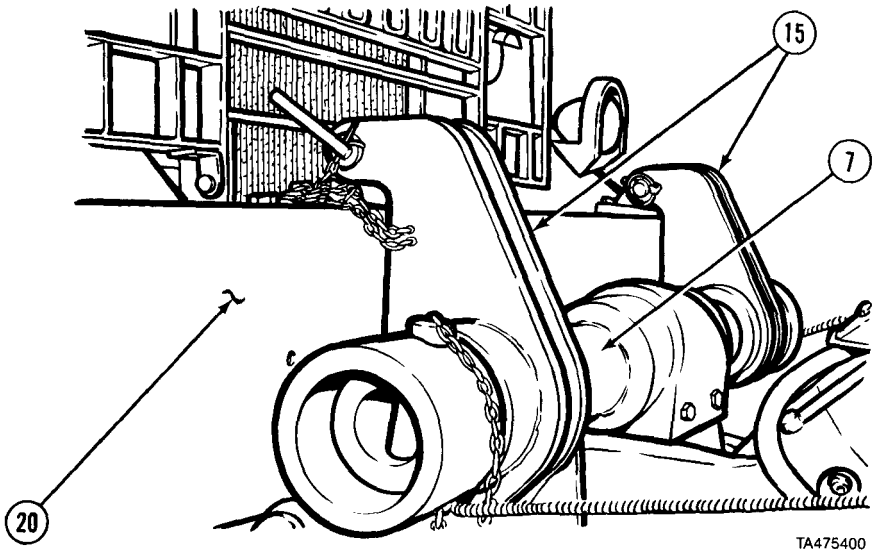
(16) Soldier A operates retrieval system (para 2-72) while Soldier A and Soldier B position crosstube (7) so holes in adapters (15) align with front tow eyes (19).

CAUTION

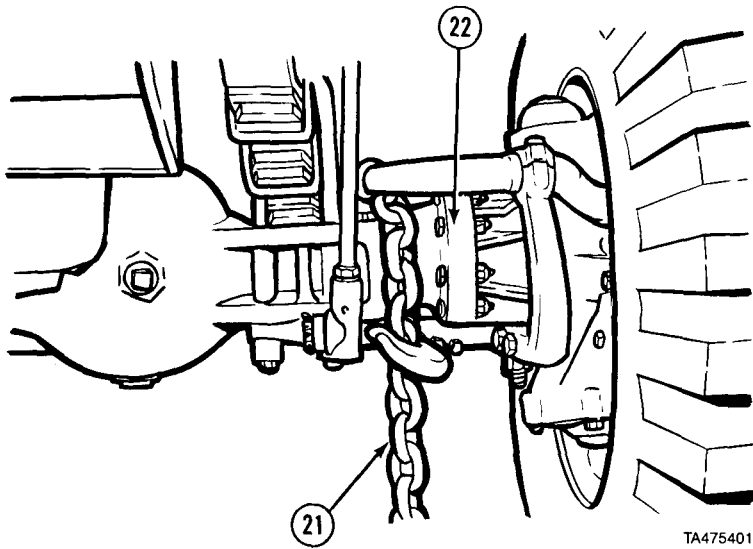
Do not route pin chains between adapters and front bumper, or damage to chains may result.

(17) Insert two pins (18) through adapters (15) and front tow eyes (19). Install quick pins (17) in pins (18).

M984E1 General Operating Procedures (Cont)



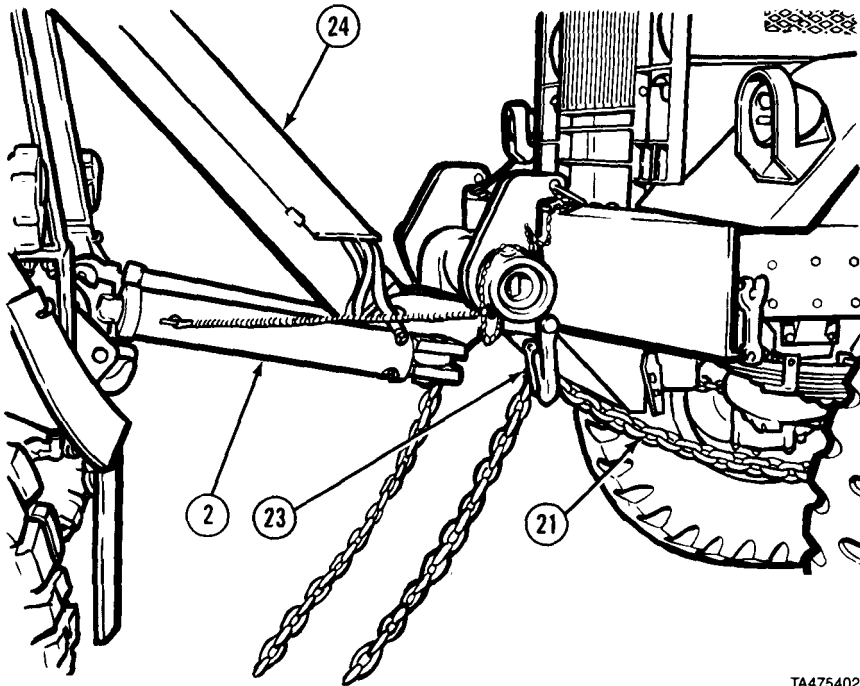
- (18) Alternately operate lift and tow cylinders to lower cross-tube (7) until adapters (15) contact front bumper (20).



- (19) Remove two 16-ft (5 m) safety chains (21) from stowage.
 (20) Route one safety chain (21) over front axle (22) on disabled vehicle.
 (21) Hook safety chain (21) together in front of axle (22).
 (22) Repeat steps (20) and (21) for other side of disabled vehicle.

M984E1 General Operating Procedures (Cont)

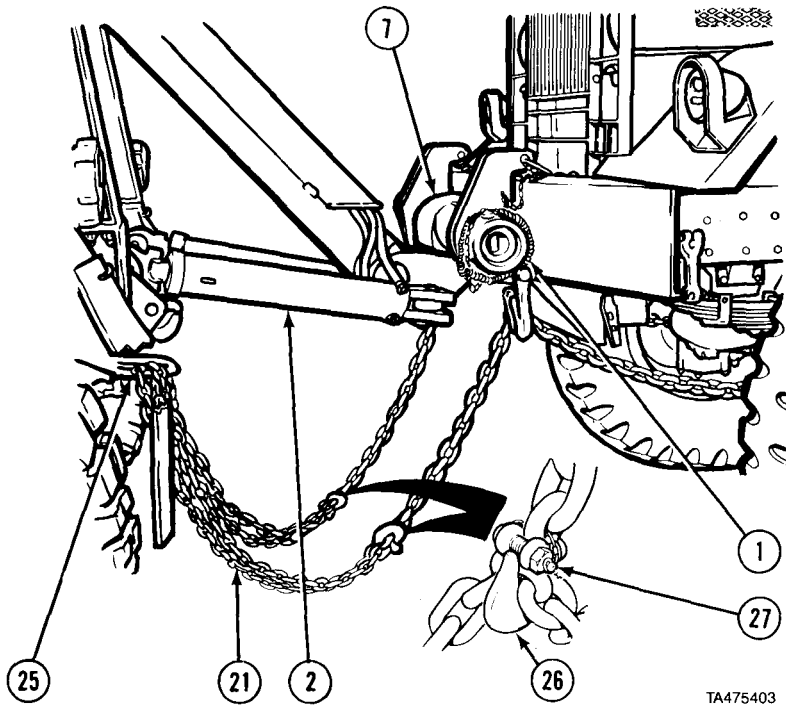
2-76. TOW M123 (CONT).



TA475402

- (23) Pull safety chain (21) tight and install chain on adapter grab hook (23).
- (24) Repeat step (23) for other side of disabled vehicle.
- (25) Release PARKING BRAKE on disabled vehicle (refer to M123 operator's manual).
- (26) Alternately, push in TOW and LIFT CYLINDER control levers until tow cylinders (2) are fully retracted.
- (27) Push in LIFT CYLINDER control lever to retract lift cylinder (24) until slack is removed from safety chains (21).

M984E1 General Operating Procedures (Cont)



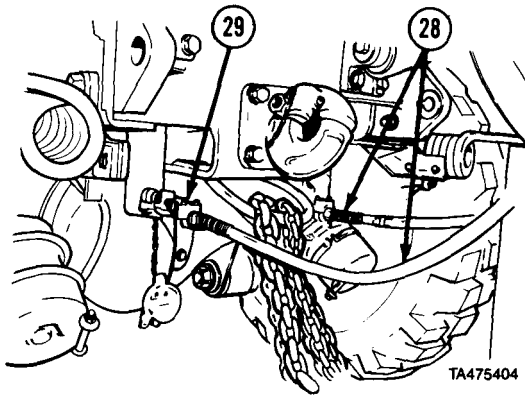
TA475403

NOTE

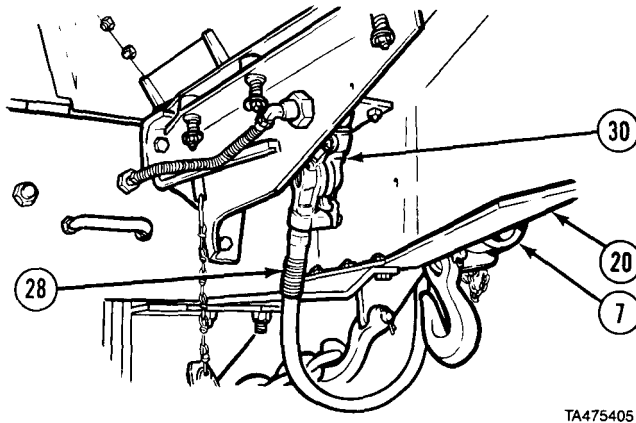
- Safety chains can be routed to towing shackles or safety chain hoop.
 - Adjust chain slack so safety chains just touch the ground.
- (28) Route two safety chains (21) through safety chain hoop (25) or towing shackles on wrecker and secure grab hook (26) with safety shackle (27).
- (29) Wrap two springs (1) around crosstube (7) and secure.

M984E1 General Operating Procedures (Cont)

2-76. TOW M123 (CONT).



- (30) Remove two airhoses (28) from stowage and attach to rear glad hands (29) on wrecker.



CAUTION

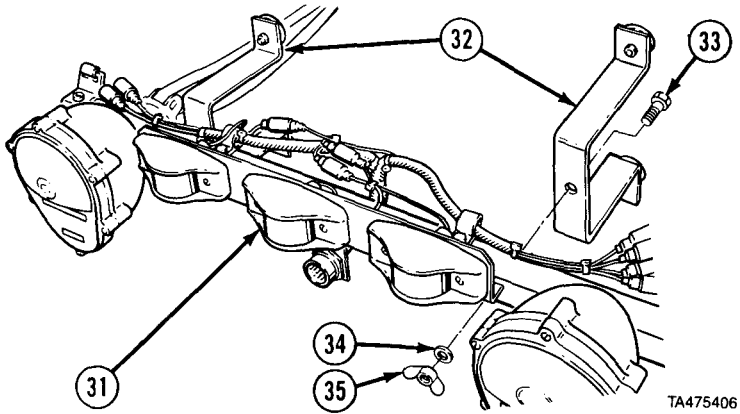
Do not route airhoses between retrieval cylinders or damage to airhoses may result.

NOTE

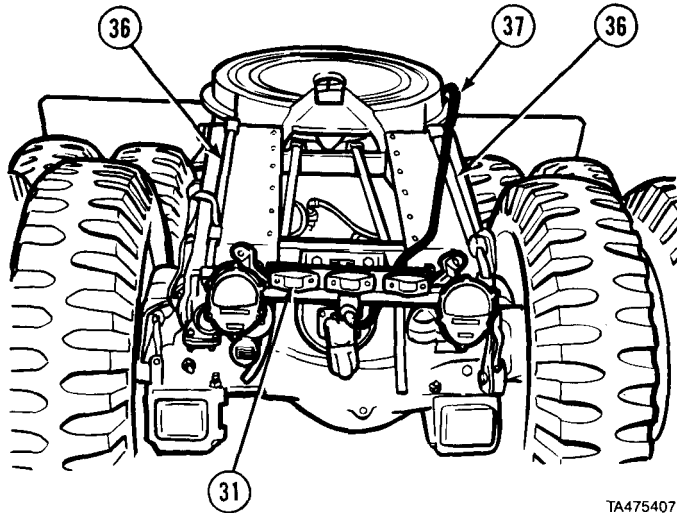
Left rear airhose from wrecker must be connected to left front glad hand on disabled vehicle. Right rear airhose from wrecker must be connected to right front glad hand on disabled vehicle.

- (31) Route two airhoses (28) over cross-tube (7) and over front bumper (20). Attach to front glad hands (30) on disabled vehicle.

M984E1 General Operating Procedures (Cont)



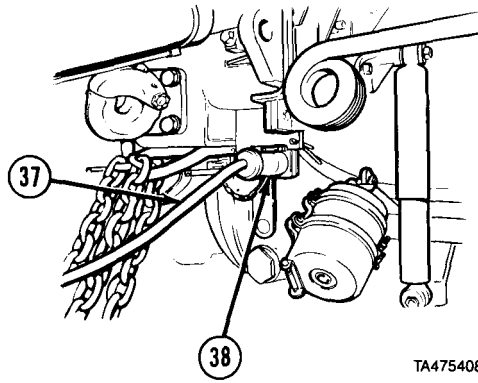
- (32) Prepare disabled vehicle for towing (refer to M123 operator's manual).
- (33) Remove emergency tow lights (31) and two brackets (32) from stowage.
- (34) Install two brackets (32) in center holes of emergency tow lights with two screws (33), washers (34), and nuts (35).



- (35) Install emergency tow lights (31) on rear of M123 and fasten securely with straps (36).
- (36) Remove tow light cable (37) from stowage and connect to emergency tow lights (31).

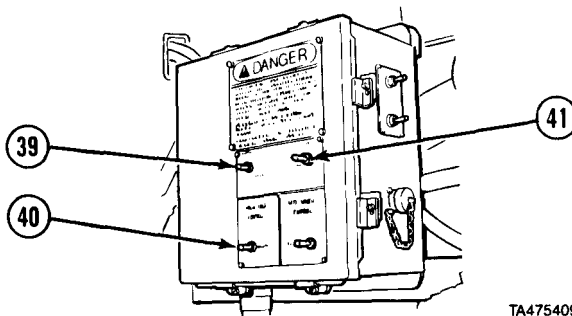
M984E1 General Operating Procedures (Cont)

2-76. TOW M123 (CONT).



TA475408

(37) Route other end of tow light cable (37) along disabled vehicle and connect to rear electrical connector (38) on wrecker.



TA475409

NOTE

- If disabled vehicle will be lifted and towed, continue with step (38).
- If disabled vehicle will be towed with all tires on paved roads only, raise crosstube enough to partially unload disabled vehicle's front suspension. Keep front tires in firm contact with ground and proceed to step (43).

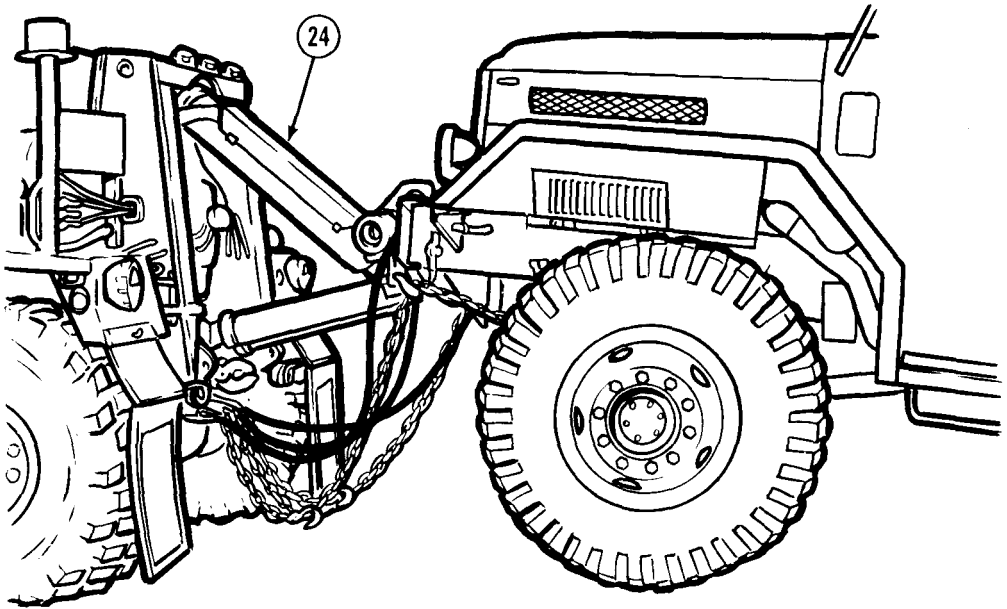
(38) Lock disabled vehicle's steering (refer to M123 operator's manual).

(39) Set POWER switch (39) to ON position.

(40) Set HIGH IDLE switch (40) to CONTINUOUS.

(41) Push and release LATCH switch (41). Engine speed will increase to approximately 1500 rpm.

M984E1 General Operating Procedures (Cont)



TA475410

WARNING

Keep out from under retrieval system and disabled vehicle when raised off ground or personal injury or death may result.

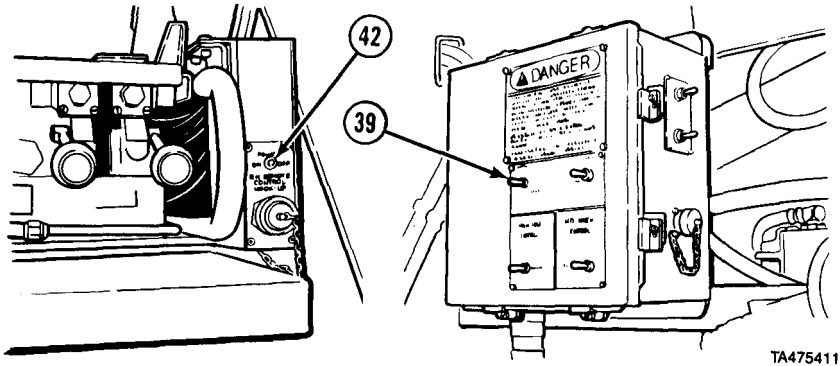
CAUTION

- Fully retract both tow cylinders before lifting disabled vehicle or equipment damage may result.
- Make sure all rigging is secure. Loose rigging can become entangled and cause damage to equipment.

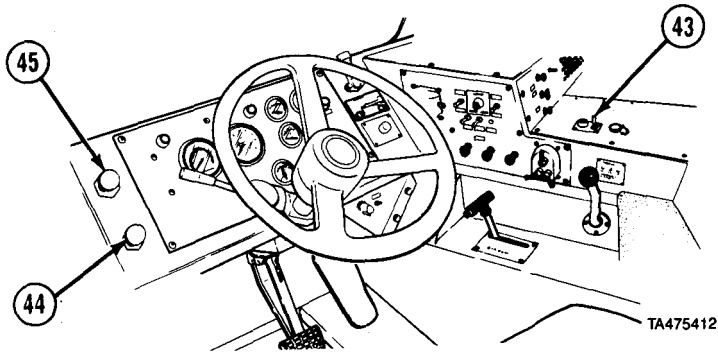
(42) Push LIFT CYLINDER control lever to fully retract lift cylinder (24).

M984E1 General Operating Procedures (Cont)

2-76. TOW M123 (CONT).



- (43) Set POWER switch (39) to OFF position.
- (44) Set POWER switch (42) to OFF position.



- (45) Set PTO ENGAGE switch (43) to OFF position.
- (46) Push in TRAILER AIR SUPPLY control (44).
- (47) Turn on service drive lights (para 2-10d).
- (48) Turn on emergency flashers on wrecker (para 2-44a) and disabled vehicle.
- (49) Push in PARKING BRAKE control (45) and select desired gear (para 2-11e).

WARNING

The M984E1 should not be operated at speeds over 15 mph except on paved roads when the operator determines that the vehicle being towed and the terrain allow safe operation. Engine brake switch must be "ON" for all towing operations. The following are maximum safe speeds:

Terrain Condition	Maximum speed, towed load up to 50,000 lbs	Maximum speed, towed load above 50,000 lbs
on road-level	35	30
on road-hilly	30	20
off road	15	15

Speeds in excess of the above can result in loss of control, serious injury or death.

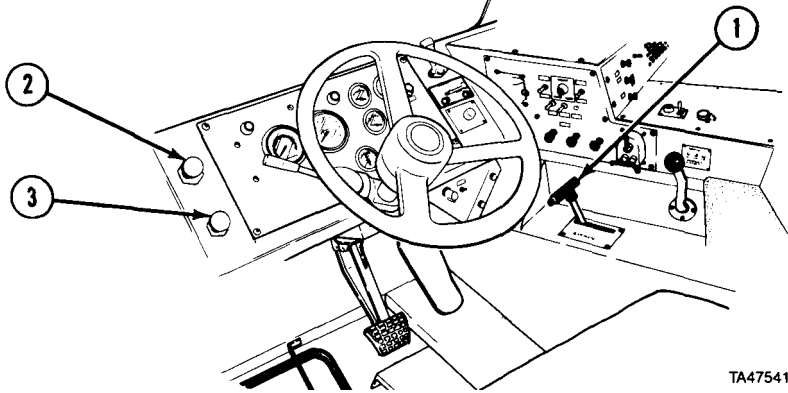
- (50) Transport disabled vehicle.

M984E1 General Operating Procedures (Cont)

b. *Front Disconnect.*

NOTE

This is a two-soldier task.



- (1) Set transmission range selector (1) to N.
- (2) Pull PARKING BRAKE control (2).
- (3) Pull TRAILER AIR SUPPLY control (3).

WARNING

Do not stand between vehicles while disabled vehicle is raised off ground. Falling vehicle can cause serious injury or death.

NOTE

After lowering disabled vehicle, extend lift and tow cylinders approximately 2 to 4 in. (50 to 100 mm) to allow for adjustment when removing adapters.

- (4) Prepare retrieval system for operation (para 2-72) and pull LIFT CYLINDER control lever to extend lift cylinder and lower towed vehicle to ground until safety chains at front axle are slack.

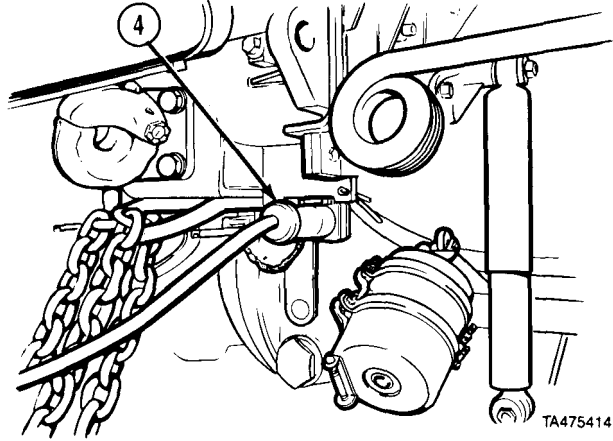
WARNING

If disabled vehicle's air system is inoperative, chock wheels of disabled vehicle. Failure to chock wheels may result in personal injury.

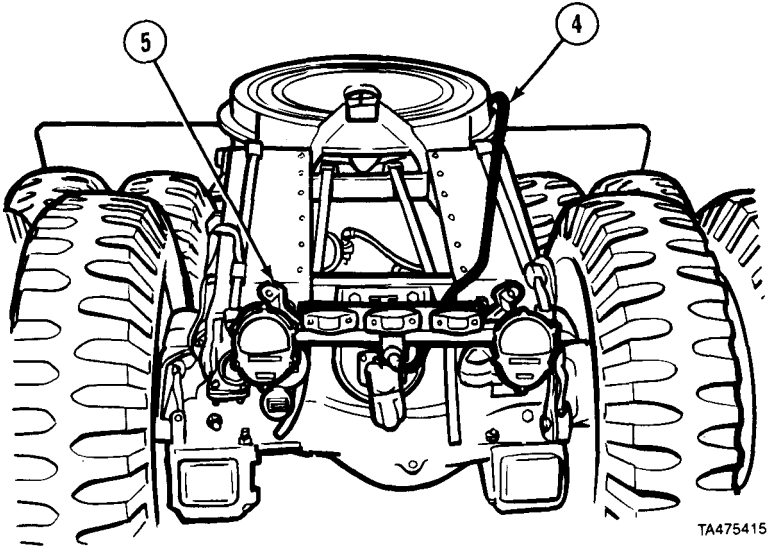
- (5) Apply PARKING BRAKE on disabled vehicle (refer to M123 operator's manual). If parking brake is inoperative, chock wheels on disabled vehicle.

M984E1 General Operating Procedures (Cont)

2-76. TOW M123 (CONT).

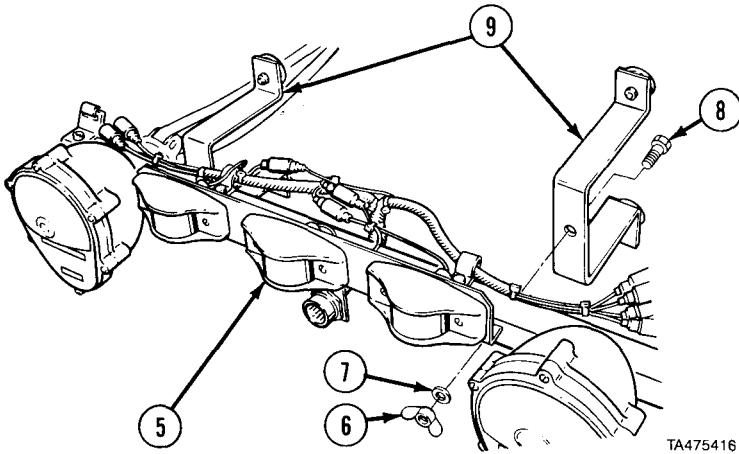


(6) Remove tow light cable (4) from wrecker.



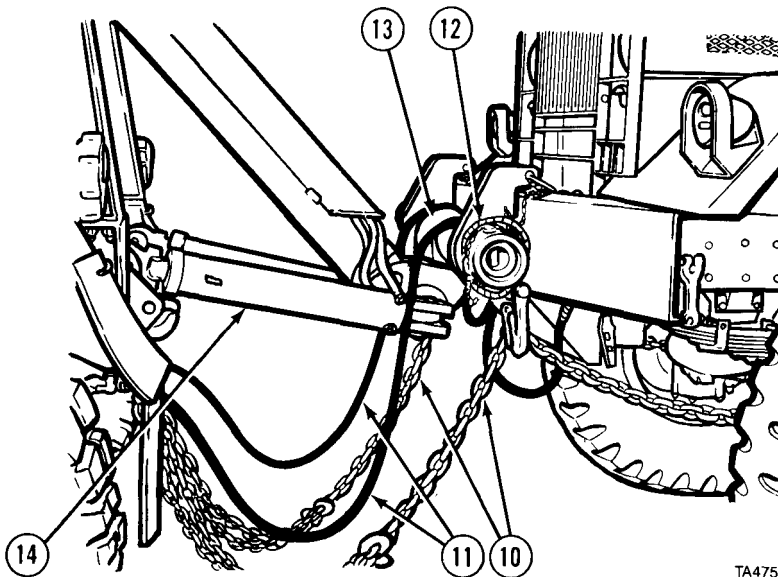
(7) Remove tow light cable (4) from emergency tow lights (5) and stow.
(8) Remove emergency tow lights (5) from disabled vehicle.

M984E1 General Operating Procedures (Cont)



TA475416

- (9) Remove two nuts (6), washers (7), screws (8), and brackets (9) from emergency tow lights (5). Stow emergency tow lights and brackets.

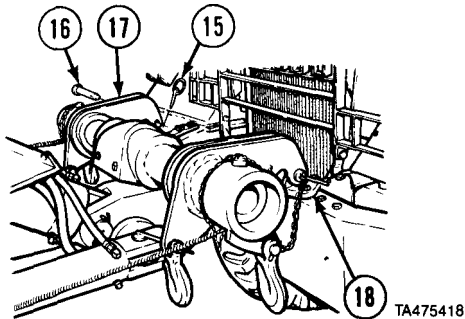


TA475417

- (10) Remove and stow safety chains (10) and air hoses (11).
 (11) Unwrap two springs (12) from crosstube (13) and connect to tow cylinders (14).

M984E1 General Operating Procedures (Cont)

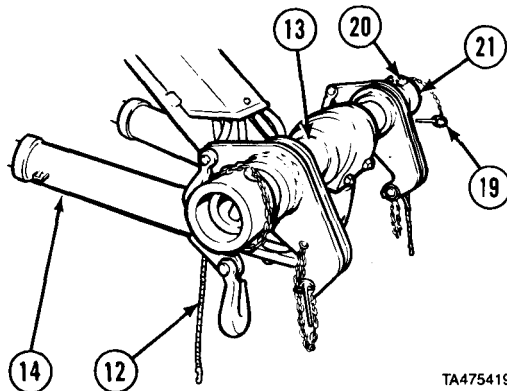
2-76. TOW M123 (CONT).



NOTE

Use retrieval controls to position crosstube to relieve tension from adapters.

- (12) Remove two quick pins (15) and pins (16) from adapters (17).
- (13) Remove two adapters (17) from tow eyes (18) on disabled vehicle.
- (14) Install two pins (16) in adapters (17).
- (15) Install two quick pins (15) in pins (16).



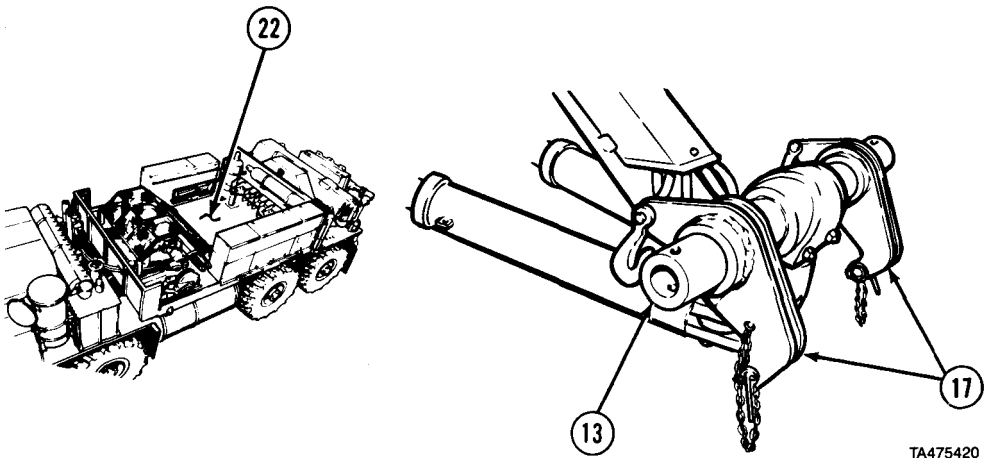
- (16) Drive wrecker forward several feet and park (para 2-110).

WARNING

When springs and end caps are removed, crosstube can swing in all directions, adapters can slide off, and can cause personal injury.

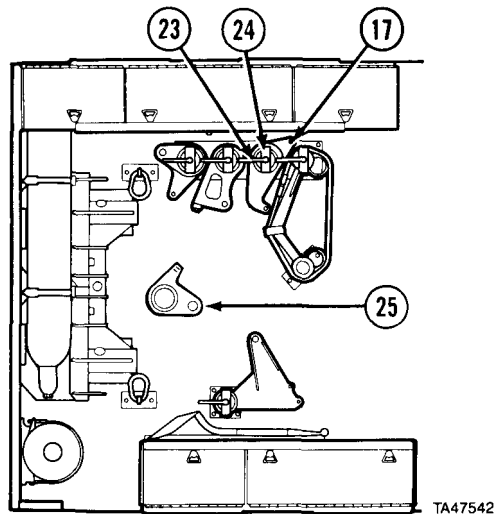
- (17) Remove two springs (12) from tow cylinders (14).
- (18) Remove two quick pins (19) and pins (20) from end caps (21).
- (19) Remove two end caps (21) from crosstube (13).

M984E1 General Operating Procedures (Cont)



TA475420

- (20) Remove two adapters (17) from crosstube (13) and place on equipment body floor (22).

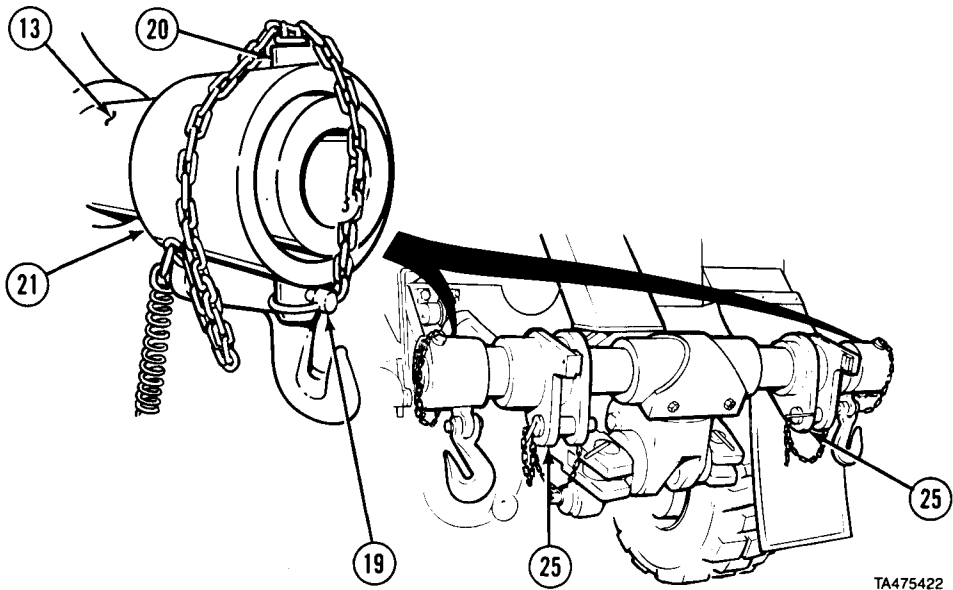


TA475421

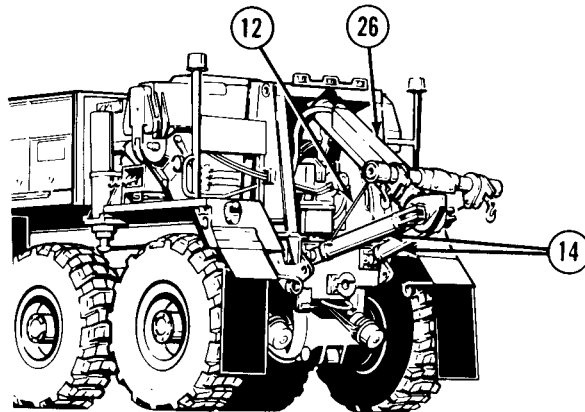
- (21) Remove lock handle (23), lock plate (24), and two M977 front tow adapters (25).
 (22) Install two M123 front adapters (17) removed from crosstube, lock plate (24), and lock handle (23).

M984E1 General Operating Procedures (Cont)

2-76. TOW M123 (CONT).

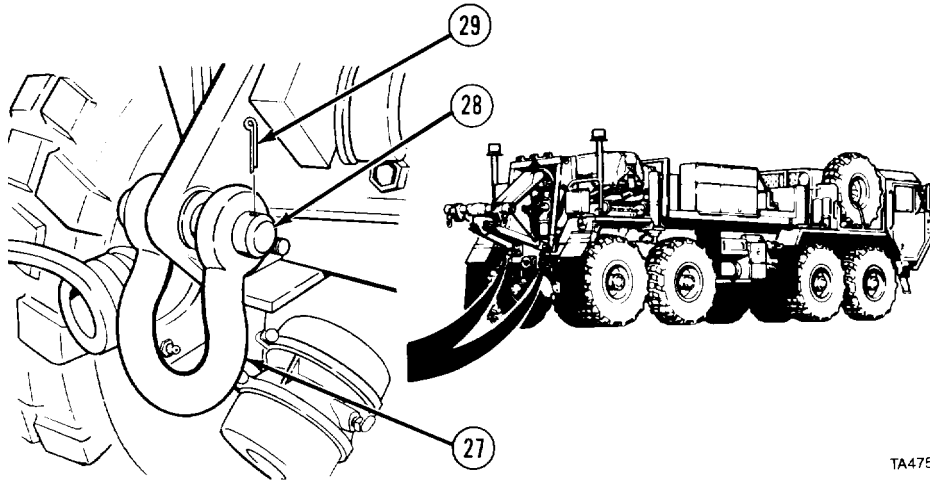


- (23) Install two M977 front adapters (25) on crosstube (13).
- (24) Install two end caps (21) on crosstube (13). Install two pins (20) and quick pins (19).



- (25) Install two springs (12) on tow cylinders (14).
- (26) Operate retrieval controls to fully retract lift cylinder (26) and tow cylinders (14).

M984E1 General Operating Procedures (Cont)

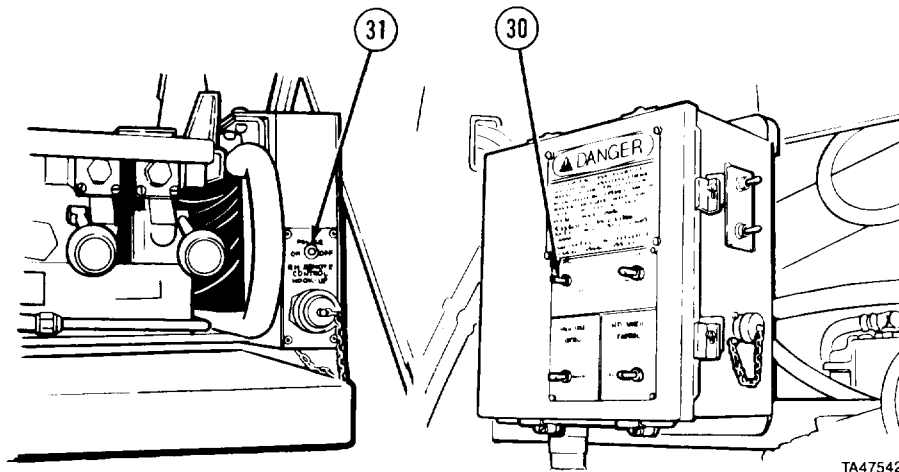


TA475424

NOTE

Right and left towing shackles are installed the same way.

(27) Install two towing shackles (27), pins (28), and cotter pins (29).



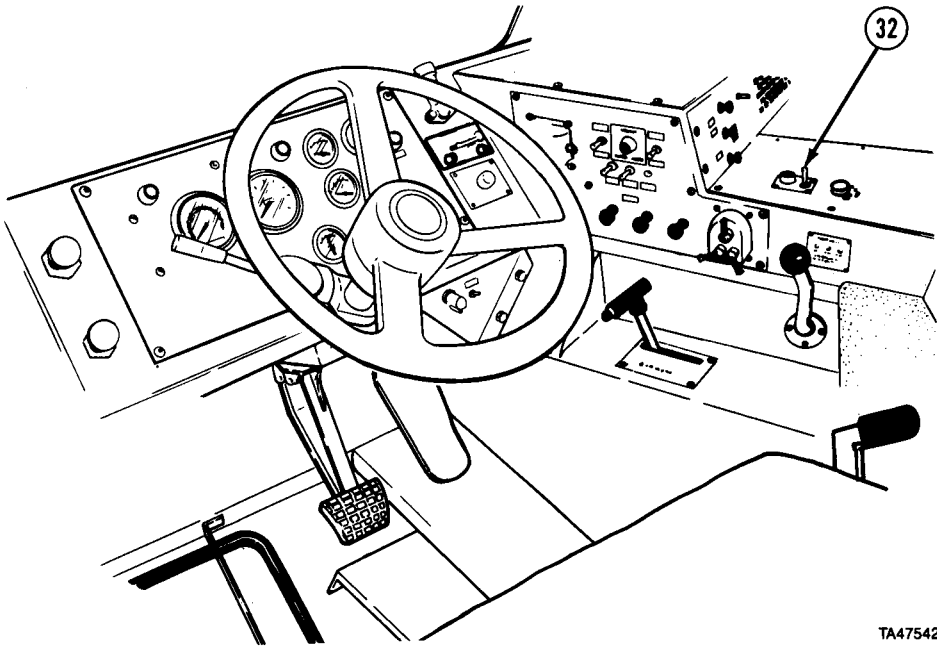
TA475425

(28) Set POWER switch (30) to OFF position.

(29) Set POWER switch (31) to OFF position.

MA984E1 General Operating Procedures (Cont)

2-76. TOW M123 (CONT).



TA475426

- (30) Turn off emergency flashers on wrecker and disabled vehicle (para 2-44f).
- (31) Turn off service drive lights (para 2-10d).
- (32) Set PTO ENGAGE switch (32) to OFF position.
- (33) Remove and stow beacon lights (para 2-62).
- (34) Shut off engine (para 2-11p).
- (35) Unlock disabled vehicle's steering (refer to M123 operator's manual).

M984E1 General Operating Procedures (Cont)

c. Rear Hookup.

NOTE

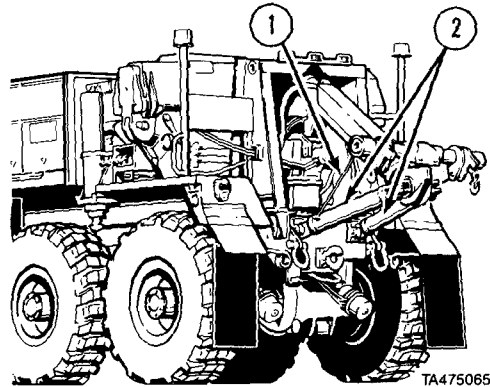
This is a two-soldier task.

(1) Prepare retrieval system for operation (para 2-72).

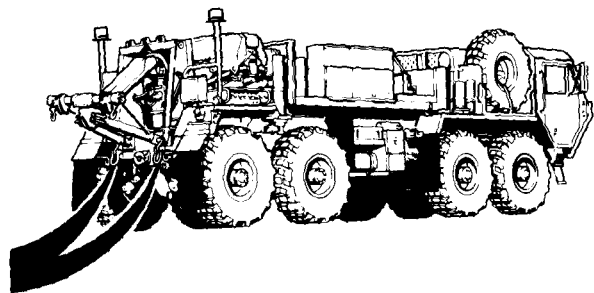
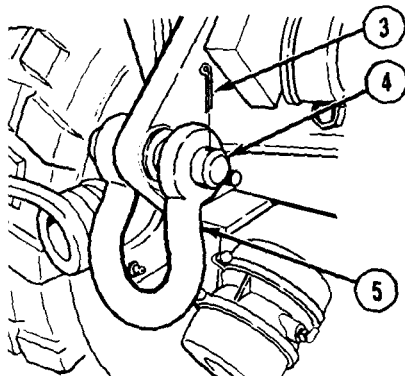
WARNING

- Hold crosstube when removing springs. Crosstube may swing or cause adapter to slide resulting in personal injury.
- Intervehicular air lines are not connected when towing from rear. Disabled vehicle will not have braking. Use extreme caution when transporting disabled vehicle using rear hookup. Vehicle traveling out of control can cause serious injury or death.

(2) Disconnect two springs (1) from tow cylinders (2).



TA475065



TA475066

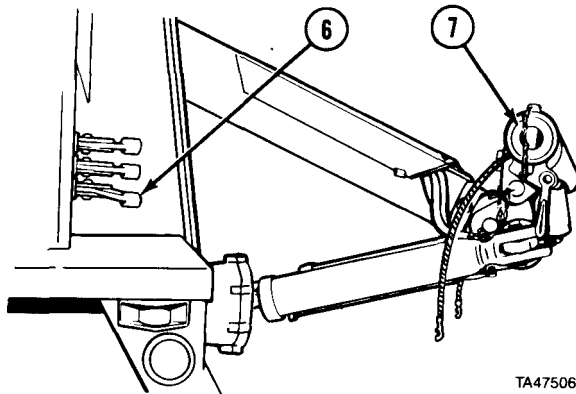
NOTE

Right and left towing shackles are removed the same way.

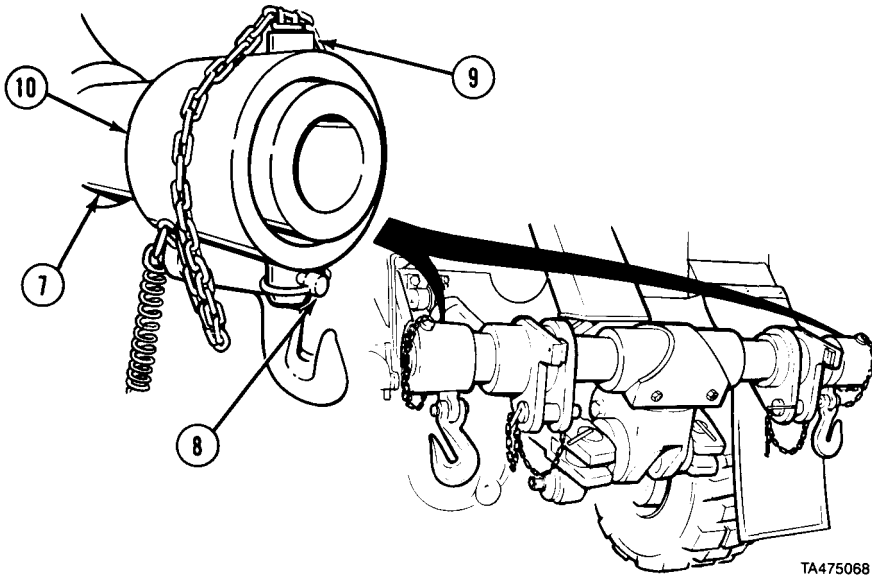
(3) Remove cotter pin (3), pin (4), and towing shackle (5) and stow.

M984E1 General Operating Procedures (Cont)

2-76. TOW M123 (CONT).



- (4) Pull LIFT CYLINDER control lever (6) to lower crosstube (7) to approximately 4 ft (1.2 m) above ground.
- (5) Position wrecker so that crosstube (7) is approximately 1 ft (30 cm) from tow eyes of disabled vehicle and centered on disabled vehicle.

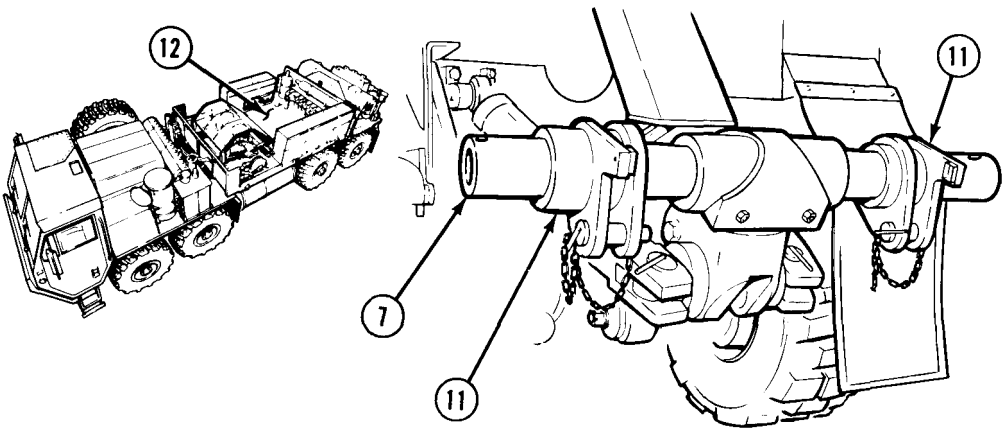


WARNING

When end caps are removed from crosstube, adapters may slide off causing personal injury.

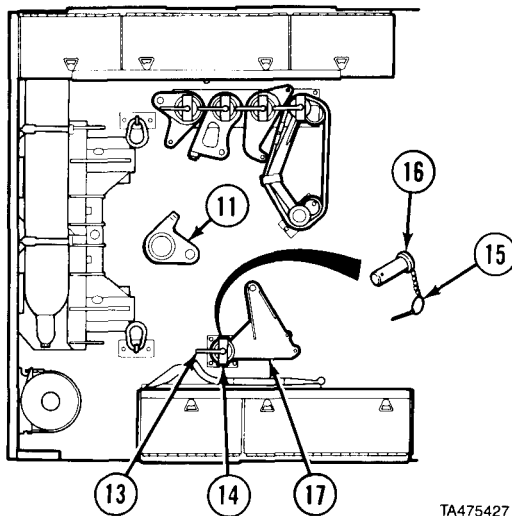
- (6) Remove quick pins (8) and pins (9) from end caps (10).
- (7) Remove end caps (10) from crosstube (7).

M984E1 General Operating Procedures (Cont)



TA475069

- (8) Remove two M977 front adapters (11) from crosstube (7) and place on equipment body floor (12).

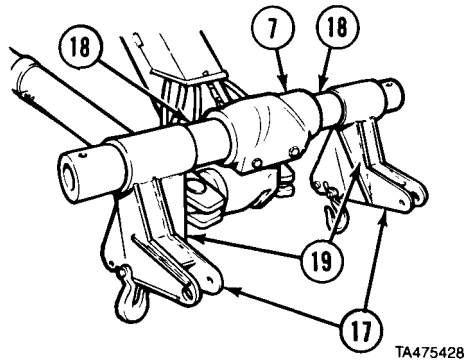


TA475427

- (9) Remove lock handle (13), lock plate (14), quick pin (15), pin (16), and two M123 rear tow adapters (17).
 (10) Remove two 7/8-in. (22 mm) pins and two 5-in. (127 mm) spacer tubes from stowage.
 (11) Install two M977 front adapters (11) removed from crosstube, pin (16), quick pin (15), lock plate (14), and lock handle (13).

M984E1 General Operating Procedures (Cont)

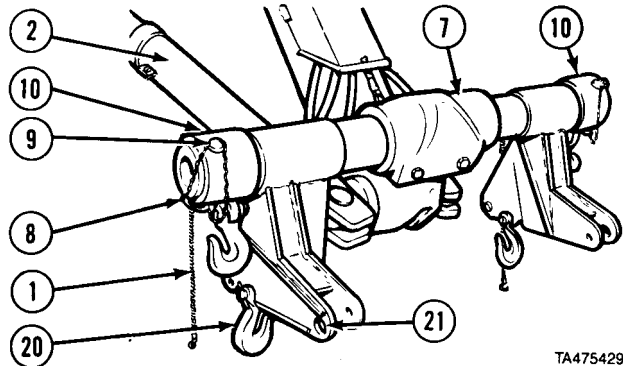
2-76. TOW M123 (CONT).



WARNING

Adapters and end caps may slide off when installing and may cause personal injury.

- (12) Install two 5-in. (127 mm) spacers (18) on crosstube (7).
- (13) Install two M123 rear tow adapters (17) on crosstube (7) with support brace (19) facing inward.



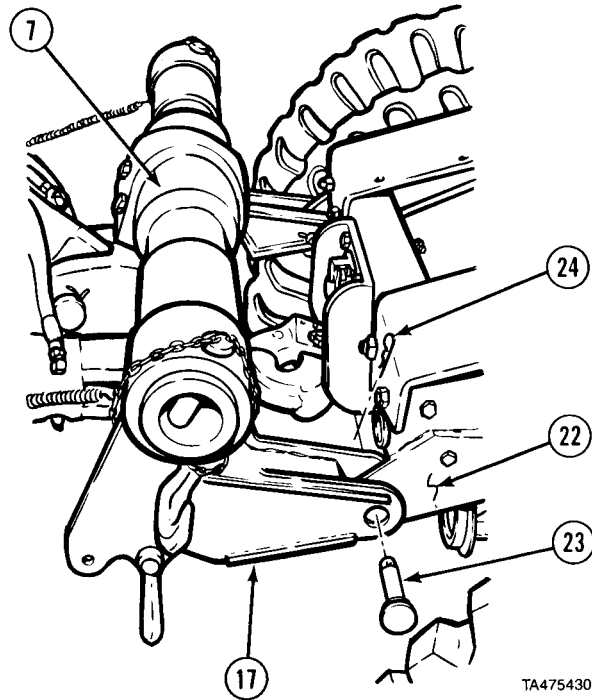
- (14) Install two end caps (10) on crosstube (7).
- (15) Install two pins (9) and quick pins (8).

NOTE

Adapter grab hook may be installed in either hole. For M123 install grab hooks in hole next to towing pin holes.

- (16) Position adapter grab hooks (20) in hole next to pin holes (21).
- (17) Attach two springs (1) on tow cylinders (2).

M984E1 General Operating Procedures (Cont)



NOTE

If disabled vehicle has towing shackles installed, remove shackles and stow in disabled vehicle.

- (18) Soldier A operates retrieval system (para 2-72) while Soldier A and Soldier B position cross-tube (7) so holes in adapters (17) align with rear tow eyes (22).

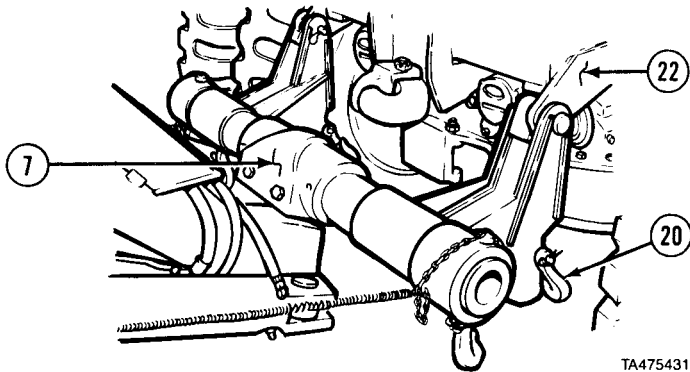
WARNING

Keep hands and fingers away from adapters and tow eyes when operating retriever controls. Personal injury could result.

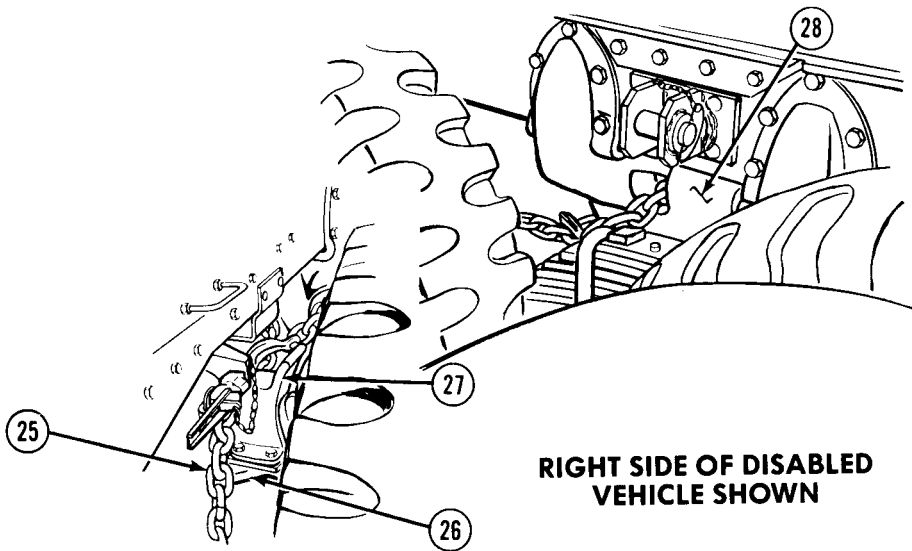
- (19) Insert two 7/8-in. (22 mm) pins (23) through adapters (17) and rear tow eyes (22). Install two hairpins (24) in pins (23).

M984E1 General Operating Procedures (Cont)

2-76. TOW M123 (CONT).



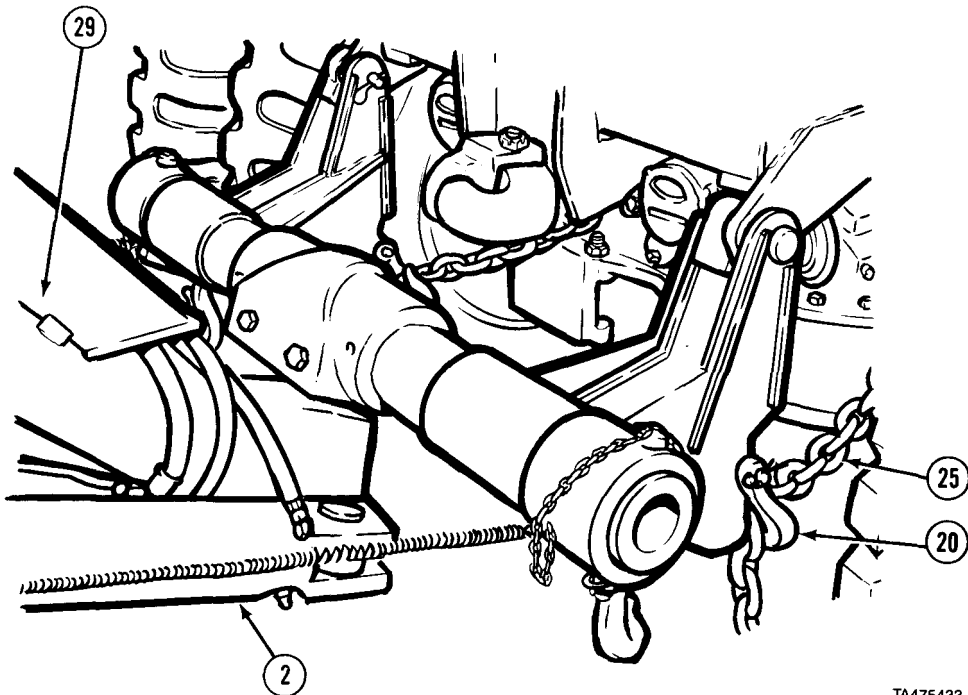
- (20) Lower crosstube (7) until adapter grab hooks (20) are under rear tow eyes (22).



RIGHT SIDE OF DISABLED VEHICLE SHOWN

- (21) Remove two 16-ft (5 m) safety chains (25) from stowage.
 (22) Route one safety chain (25) over rear axle (26) and inside axle stop (27).
 (23) Route safety chain (25) through rear hole in trunnion casting (28).
 (24) Hook safety chain (25) together between trunnion casting (28) and axle stop (27).
 (25) Repeat steps (22), (23), and (24) for other side of disabled vehicle.

M984E1 General Operating Procedures (Cont)

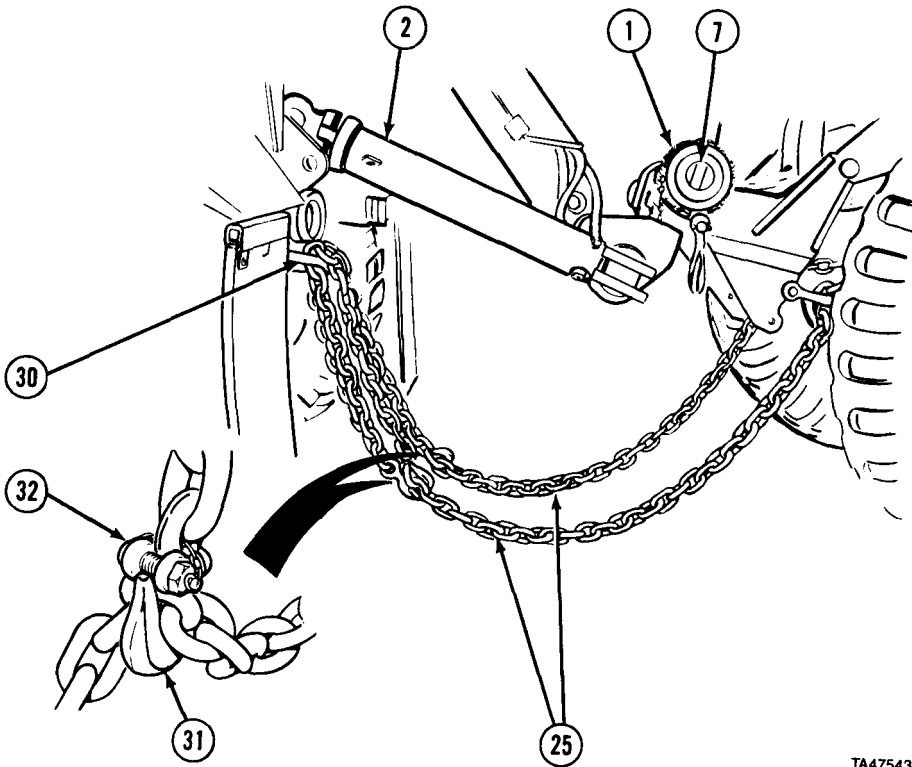


TA475433

- (26) Pull safety chain (25) tight and install chain on adapter grab hook (20).
- (27) Repeat step (26) for other side of disabled vehicle.
- (28) Release PARKING BRAKE on disabled vehicle (refer to MI23 operator's manual).
- (29) Alternately push in TOW and LIFT CYLINDER control levers until tow cylinders (2) are fully retracted.
- (30) Push in LIFT CYLINDER control lever to retract lift cylinder (29) until slack is removed from safety chains (25).

M984E1 General Operating Procedures (Cont)

2-76. TOW M123 (CONT).



TA475434

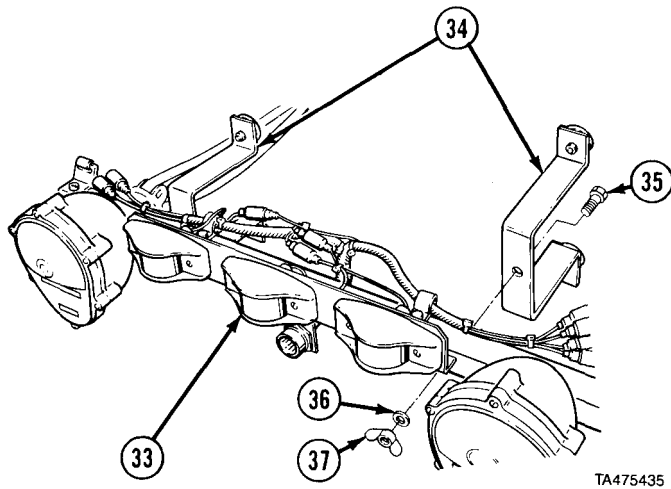
NOTE

- Safety chains can be routed to towing shackles or safety chain hoop. Towing shackles can be used only when tow cylinders are extended.
- Adjust chain slack so safety chains do not touch the ground.

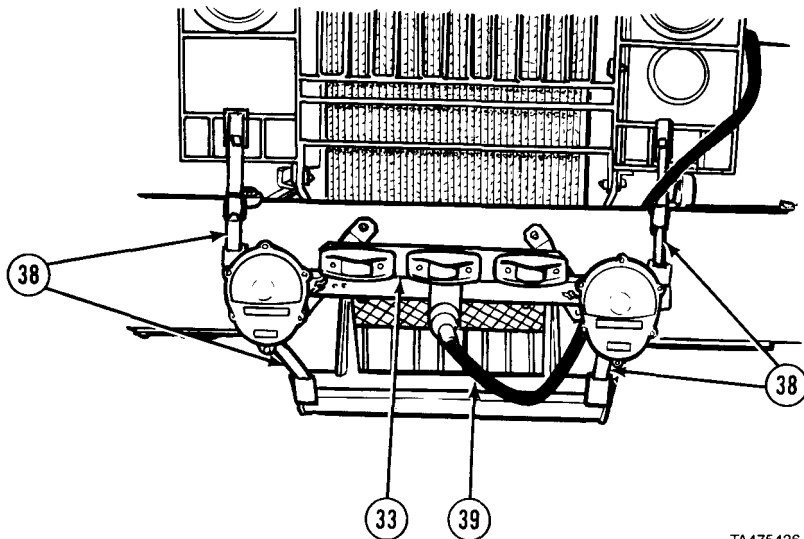
(31) Route two safety chains (25) through safety chain hoop (30) on wrecker and secure grab hooks (31) with safety shackle (32).

(32) Disconnect two springs (1) from tow cylinders (2), wrap around cross-tube (7) and secure.

M984E1 General Operating Procedures (Cont)



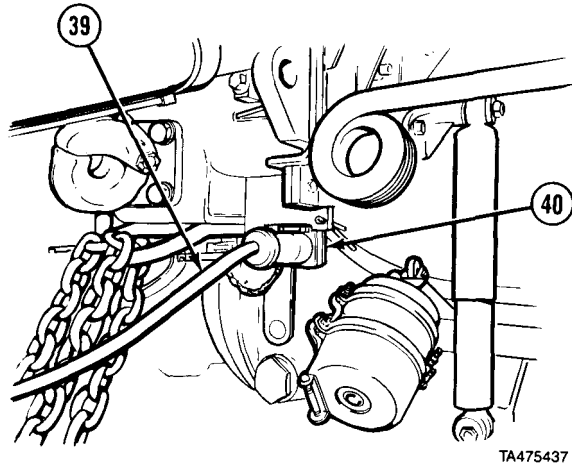
- (33) Prepare disabled vehicle for towing (refer to M123 operator's manual).
- (34) Remove emergency tow lights (33) and two brackets (34) from stowage.
- (35) Install two brackets (34) in outer holes of emergency tow lights with two screws (35), washers (36), and nuts (37).



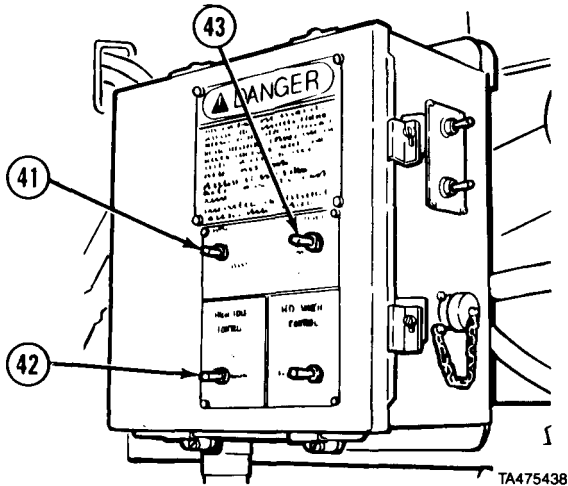
- (36) Install emergency tow lights (33) on front of M123 and fasten securely with straps (38).
- (37) Remove tow light cable (39) from stowage and connect to emergency tow lights (33).

M984E1 General Operating Procedures (Cont)

2-76. TOW M123 (CONT.)

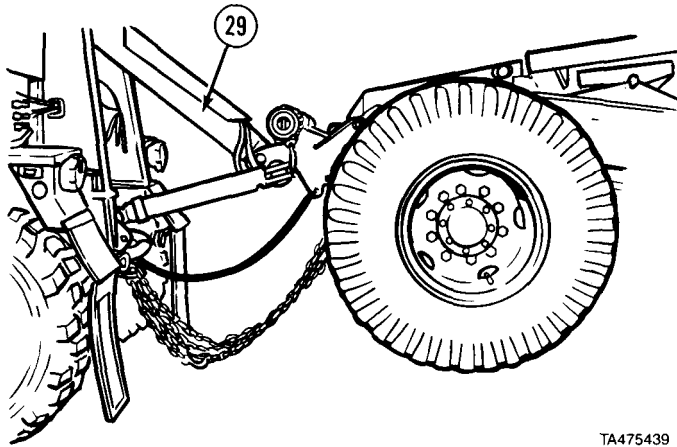


- (38) Route other end of tow light cable (39) along disabled vehicle and connect to rear electrical connector (40) on wrecker.
- (39) Lock disabled vehicle's steering (refer to M123 operator's manual).



- (40) Set POWER switch (41) to ON position.
- (41) Set HIGH IDLE switch (42) to CONTINUOUS.
- (42) Push and release LATCH switch (43). Engine speed will increase to approximately 1500 rpm.

M984E1 General Operating Procedures (Cont)



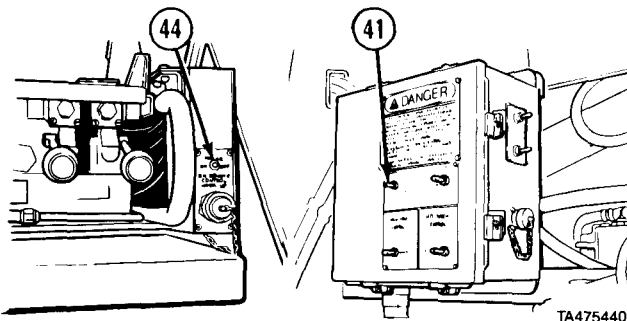
TA475439

WARNING

Keep out from under retrieval system and disabled vehicle when raised off ground or personal injury or death may result.

CAUTION

- ⚠ Fully retract both tow cylinders before lifting disabled vehicle or equipment damage may result.
 - Make sure all rigging is secure. Loose rigging can become entangled and cause damage to equipment.
- (43) Retract lift cylinder (29) to raise disabled vehicle approximately 1.5 ft (45 cm) off ground.

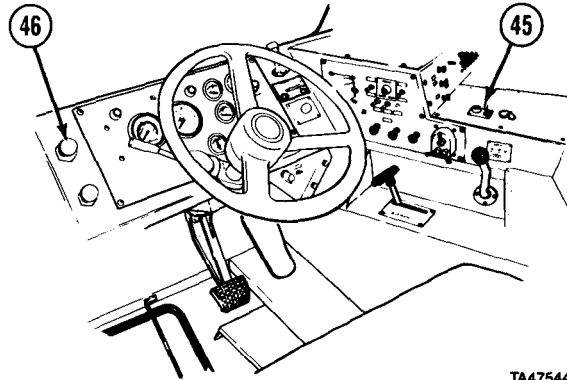


TA475440

- (44) Set POWER switch (41) to OFF position.
 (45) Set POWER switch (44) to OFF position.

M984E1 General Operating Procedures (Cont)

2-76. TOW M123 (CONT).



TA475441

- (46) Set PTO ENGAGE switch (45) to OFF position.
- (47) Turn on service drive lights (para 2-10d).
- (48) Turn on emergency flashers on wrecker (para 2-44a) and disabled vehicle.
- (49) Push in PARKING BRAKE control (46) and select desired gear (para 2-11e).

WARNING

The M984E1 should not be operated at speeds over 15 mph except on paved roads when the operator determines that the vehicle being towed and the terrain allow safe operation. Engine brake switch must be "ON" for all towing operations. The following are maximum safe speeds:

Terrain Condition	Maximum speed, towed load up to 50,000 lbs	Maximum speed, towed load above 50,000 lbs
on road-level	35	30
on road-hilly	30	20
off road	15	15

Speeds in excess of the above can result in loss of control, serious injury or death.

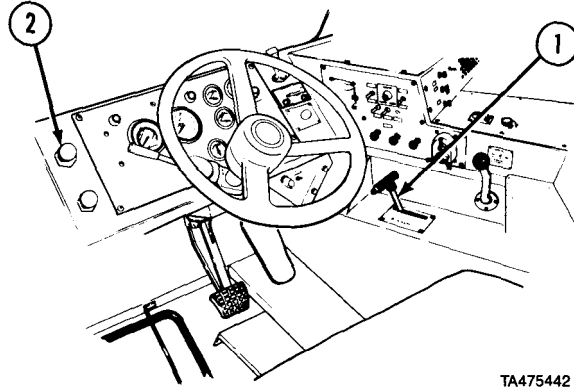
- (50) Transport disabled vehicle.

M984E1 General Operating Procedures (Cont)

d. Rear Disconnect.

NOTE

This is a two-soldier task.



TA475442

- (1) Set transmission range selector (1) to N.
- (2) Pull PARKING BRAKE control (2).

WARNING

Do not stand between vehicles while disabled vehicle is raised off ground. Falling vehicle can cause serious injury or death.

NOTE

After lowering disabled vehicle, extend lift and tow cylinders approximately 2 to 4 in. (50 to 100 mm) to allow for adjustment when removing adapters.

- (3) Prepare retrieval system for operation (para 2-72) and pull LIFT CYLINDER control lever to extend lift cylinder and lower towed vehicle to ground until safety chain at rear of disabled vehicle is slack.

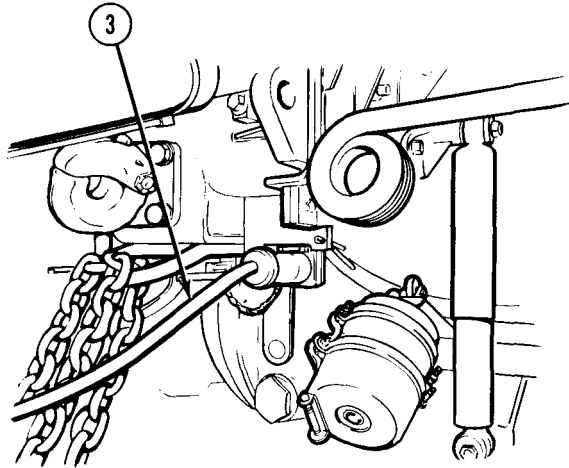
WARNING

If disabled vehicle's air system is inoperative, chock wheels of disabled vehicle. Failure to chock wheels may result in personal injury.

- (4) Apply PARKING BRAKE on disabled vehicle (refer to M123 operator's manual). If parking brake is inoperative, chock wheels on disabled vehicle.

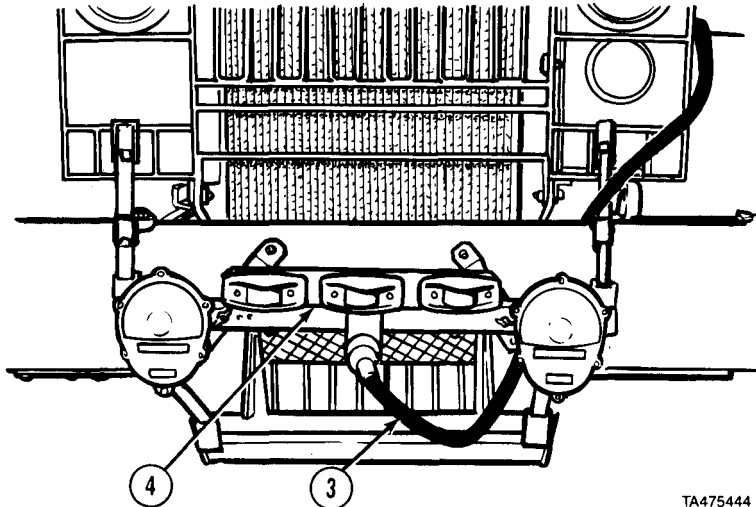
M984E1 General Operating Procedures (Cont)

2-76. TOW M123 (CONT).



TA475443

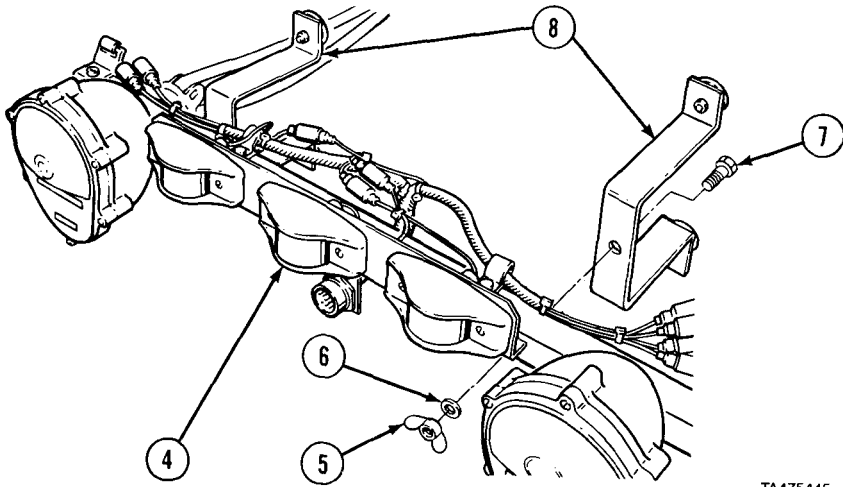
(5) Remove tow light cable (3) from wrecker.



TA475444

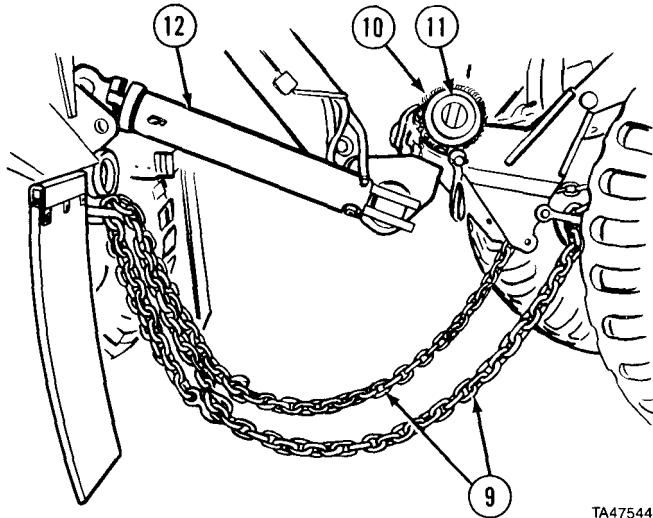
(6) Remove tow light cable (3) from emergency tow lights (4) and stow.
(7) Remove emergency tow lights (4) from disabled vehicle.

M984E1 General Operating Procedures (Cont)



TA475445

- (8) Remove two nuts (5), washers (6), screws (7), and brackets (8) from emergency tow lights (4). Stow emergency tow lights and brackets.

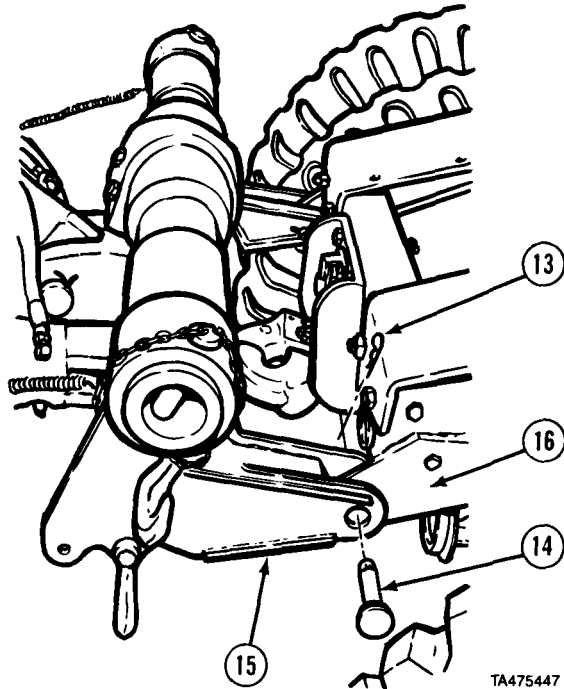


TA475446

- (9) Remove and stow safety chains (9).
 (10) Unwrap two springs (10) from crosstube (11) and connect to tow cylinders (12).

M984E1 General Operating Procedures (Cont)

2-76. TOW M123 (CONT.)



WARNING

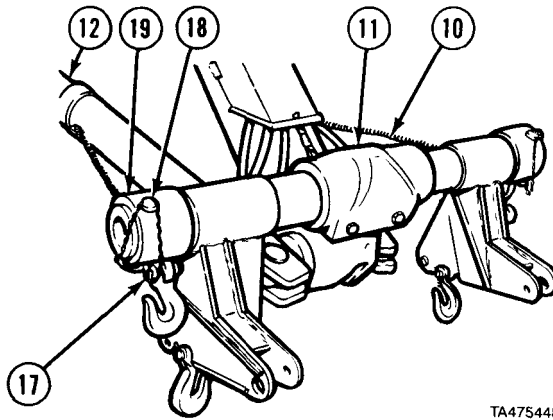
- Do not stand behind adapters when pins are being removed. Adapters may swing down resulting in personal injury.
- Keep hands and fingers away from adapter and tow eyes when operating retrieval controls. Personal injury could result.

NOTE

Use retrieval controls to position crosstube to relieve tension from adapters.

- (11) Remove two hairpins (13) and pins (14) from adapters (15).
- (12) Remove two adapters (15) from tow eyes (16) on-disabled vehicle.
- (13) Install two hairpins (13) in pins (14) and tow.

M984E1 General Operating Procedures (Cont)



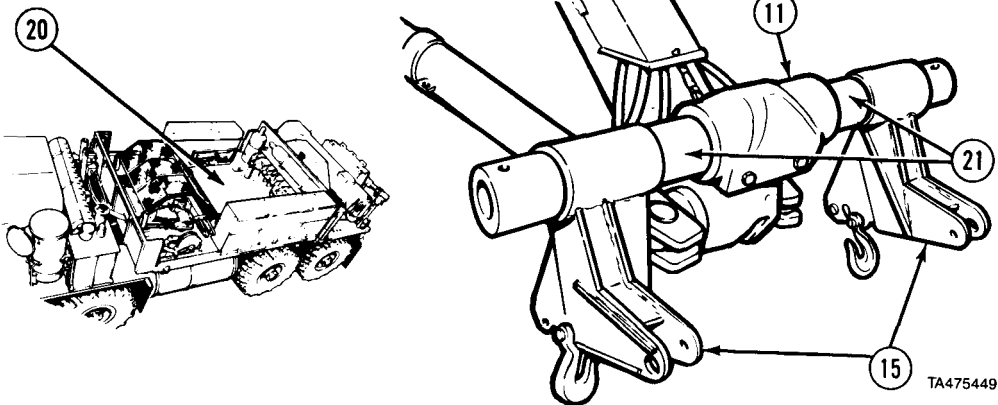
TA475448

(14) Drive wrecker forward several feet and park (para 2-11o).

WARNING

When springs and end caps are removed, crosstube can swing in all directions, adapters can slide off, and can cause personal injury.

- (15) Remove two springs (10) from tow cylinders (12).
- (16) Remove quick pins (17) and pins (18) from end caps (19).
- (17) Remove end caps (19) from crosstube (11).

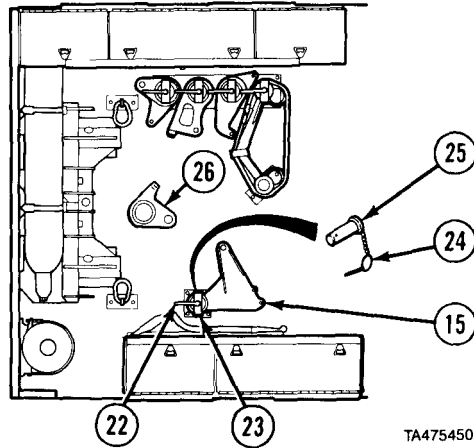


TA475449

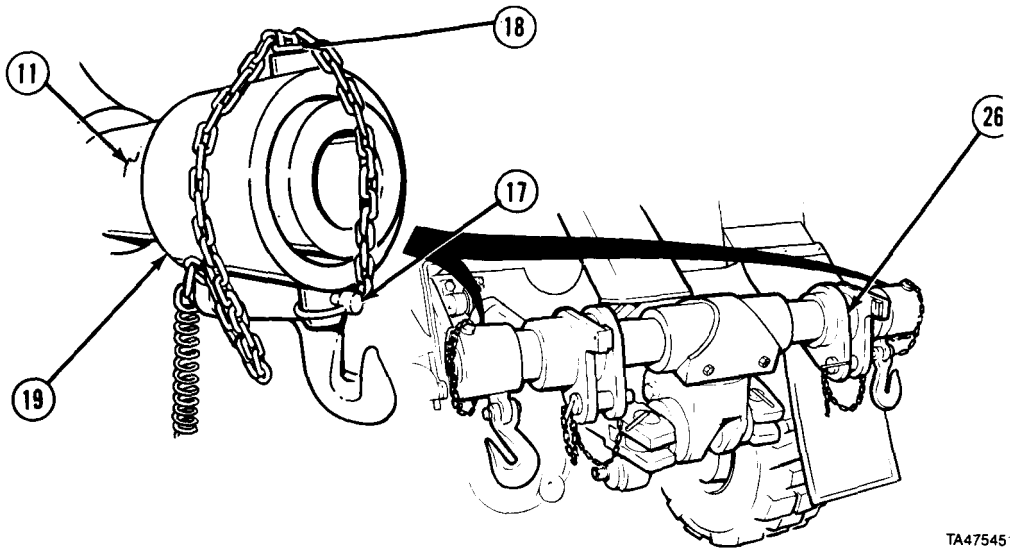
- (18) Remove adapters (15) from crosstube (11) and place on equipment body floor (20).
- (19) Remove 5-in. (127 mm) spacer tubes (21) from crosstube (11) and stow.

M984E1 General Operating Procedures (Cont)

2-76. TOW M123 (CONT)

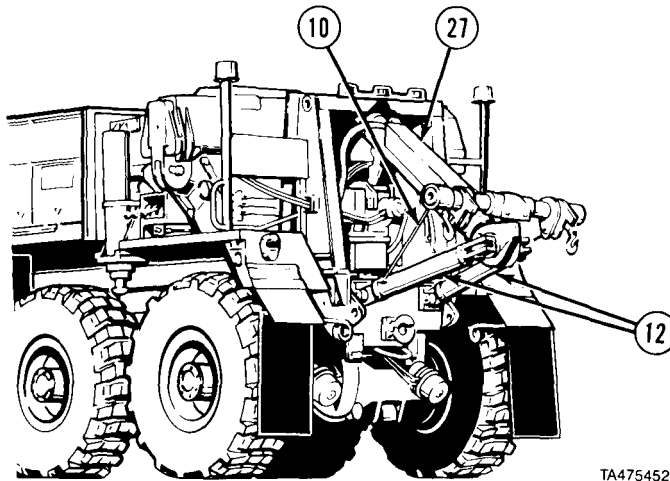


- (20) Remove lock handle (22), lock plate (23), quick pin (24), pin (25), and two M977 front adapters (26).
- (21) Install two M123 adapters (15) removed from crosstube, pin (25), quick pin (24), lock plate (23), and lock handle (22).



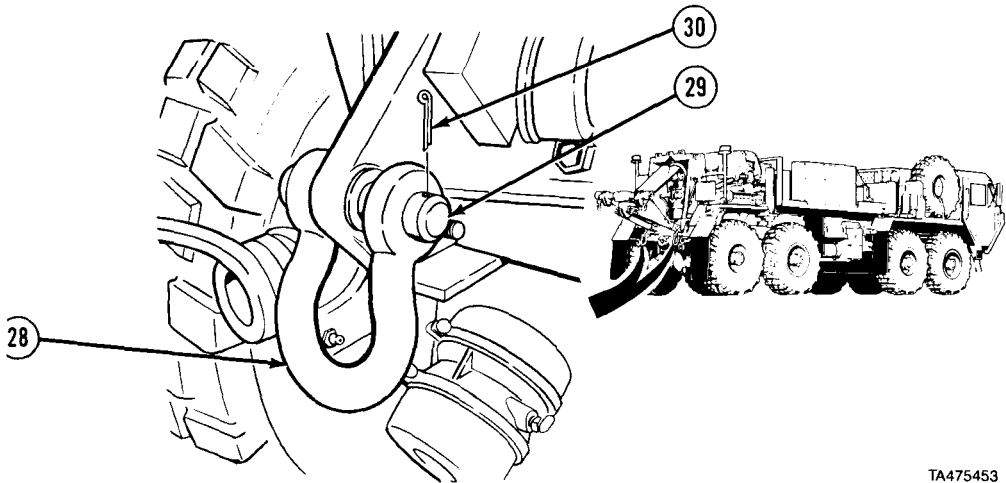
- (22) Install two M977 front adapters (26) on crosstube(11).
- (23) Install end caps (19) on crosstube (11). Install pins (18) and quick pins (17).

M984E1 General Operating Procedures (Cont)



TA475452

- (24) Install two springs (10) on tow cylinders (12).
- (25) Operate retrieval controls and fully retract lift cylinder (27) and tow cylinders (12).



TA475453

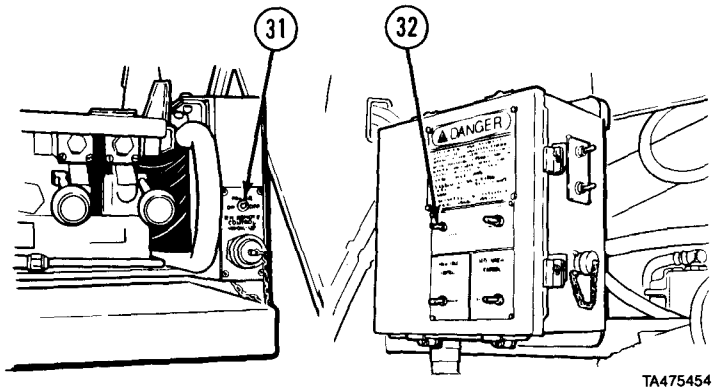
NOTE

Right and left towing shackles are installed the same way.

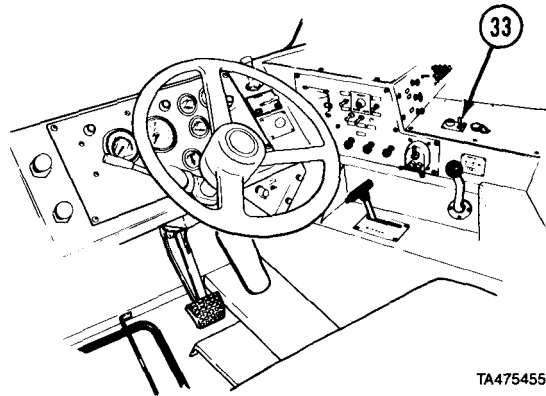
- (26) Install towing shackle (28), pin (29), and cotter pin (30).

M984E1 General Operating Procedures (Cont)

2-76. TOW M123. CONT.)



- (27) Set POWER switch (31) to OFF position.
- (28) Set POWER switch (32) to OFF position.



- (29) Turn off emergency flashers on wrecker (para 2-44f) and disabled vehicle.
- (30) Turn off service drive lights (para 2-10d).
- (31) Set PTO ENGAGE switch (33) to OFF position.
- (32) Remove and stow beacon lights (para 2-62).
- (33) Shut off engine (para 2-11p).
- (34) Unlock disabled vehicle's steering (refer to M123 operator's manual).

M984E1 General Operating Procedures (Cont)

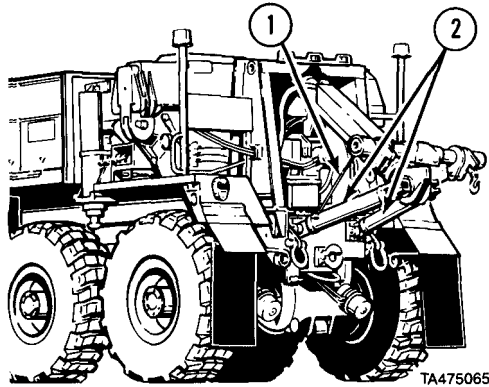
2-77. TOW M151.

a. Front Hookup.

NOTE

This is a two-soldier task.

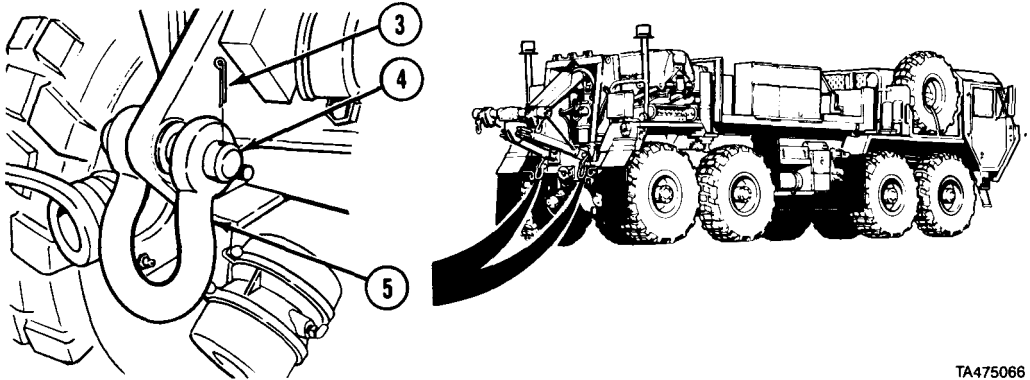
- (1) Prepare retrieval system for operation (para 2-72).



WARNING

Hold crosstube when removing springs. Crosstube may swing or cause adapter to slide resulting in personal injury.

- (2) Disconnect two springs (1) from tow cylinders (2).



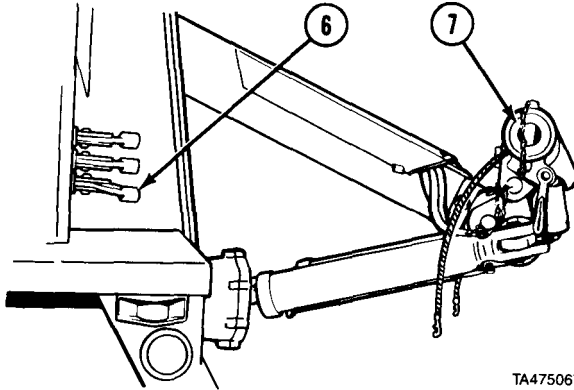
NOTE

Right and left towing shackles are removed the same way.

- (3) Remove two cotter pins (3), pins (4), and towing shackles (5).

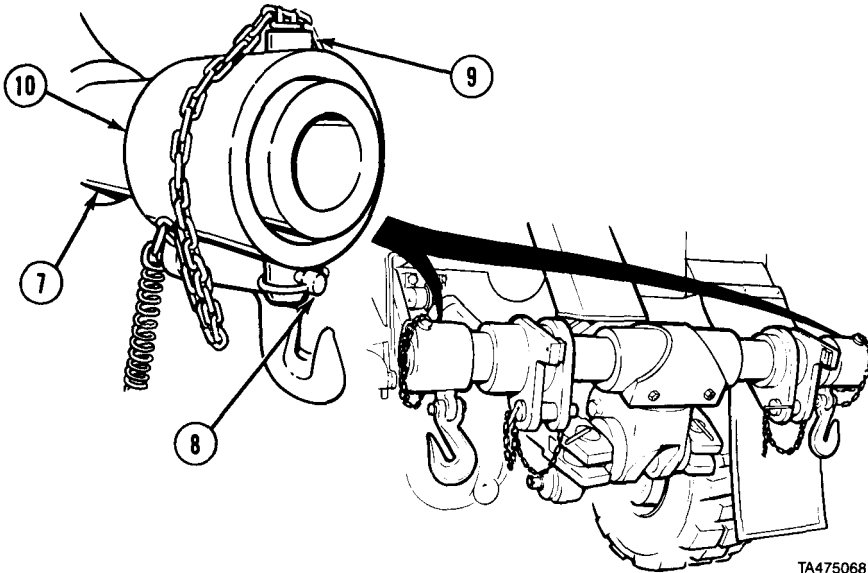
M984E1 General Operating Procedures (Cont)

2-77. TOW M151 (CONT.)



TA475067

- (4) Pull LIFT CYLINDER control lever (6) to lower crosstube (7) to approximately 3 ft (1 m) above ground.
- (5) Position wrecker so that crosstube (7) is approximately 1 ft (30 cm) from disabled vehicle and centered on disabled vehicle.



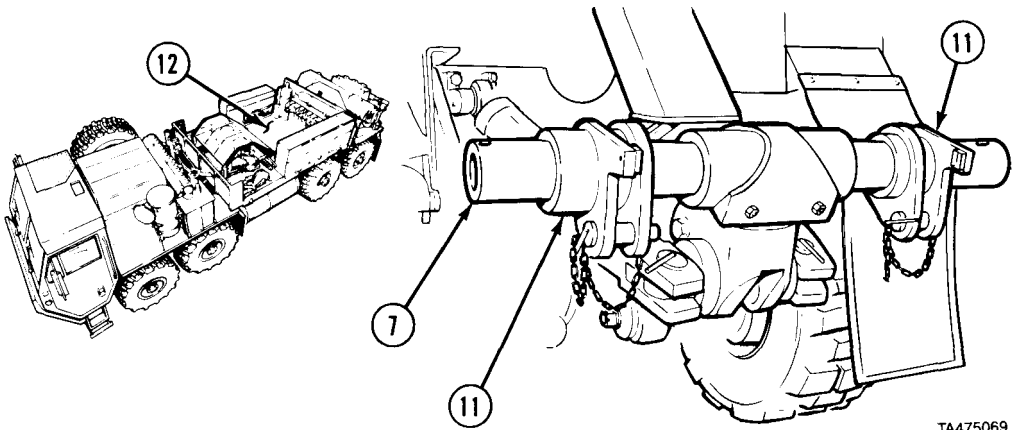
TA475068

WARNING

When end caps are removed from crosstube, adapters may slide off causing personal injury.

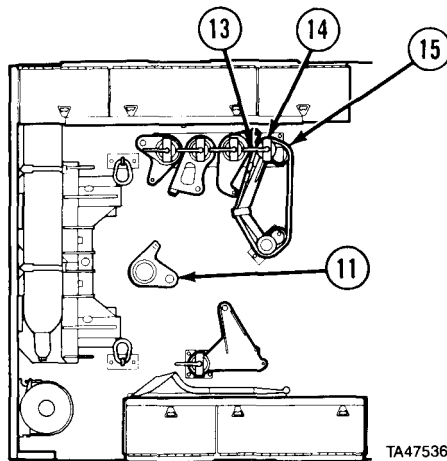
- (6) Remove two quick pins (8) and pins (9) from end caps (10).
- (7) Remove two end caps (10) from crosstube (7).

M984E1 General Operating Procedures (Cont)



TA475069

- (8) Remove two M977 front adapters (11) from crosstube (7) and place on equipment body floor (12).



TA475368

- (9) Remove lock handle (13), lock plate (14), and two M151 adapters (15).

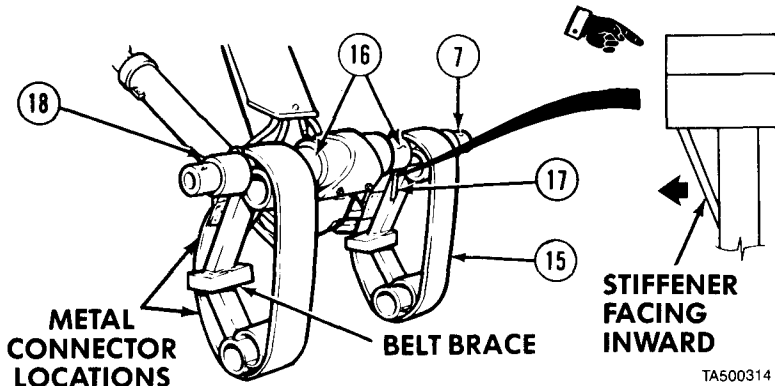
NOTE

All four 12-ft (3.5 m) chains are the same.

- (10) Remove four 12-ft (3.5 m) chains from stowage.
 (11) Remove two 4-in. (102 mm) spacers and two 5-in. (127 mm) spacers from stowage.
 (12) Install two M977 front adapters (11) removed from crosstube, lock plate (14), and lock handle (13).

M984E1 General Operating Procedures (Cont)

2-77. TOW M151 (CONT).

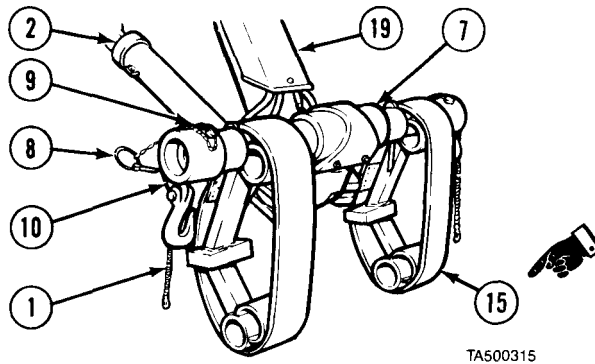


- (13) Install two 4-in. (102 mm) spacers (16) on crosstube (7).

NOTE

Make sure metal connector is located on either side of belt brace and does not touch metal parts of adapters.

- (14) Install two M151 adapters (15) on crosstube (7) with stiffener (17) facing inside.
- (15) Install two 5-in. (127 mm) spacers (18) on crosstube (7).

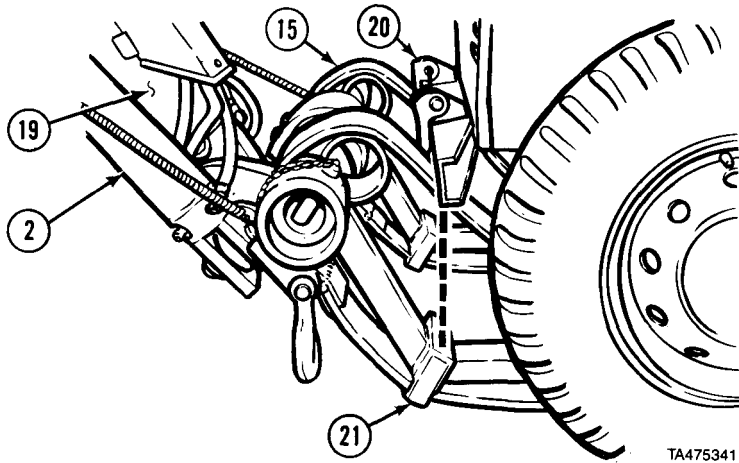


NOTE

End caps will hang over end of crosstube for M151 adapters.

- (16) Install two end caps (10) on crosstube (7).
- (17) Install two pins (9) and quick pins (8).
- (18) Attach two springs (1) on tow cylinders (2).
- (19) Extend both tow cylinders (2) 2 in. (50 mm) and lower lift cylinder (19) until M 151 adapters (15) are approximately 6 in. (152 mm) from ground.

M984E1 General Operating Procedures (Cont)

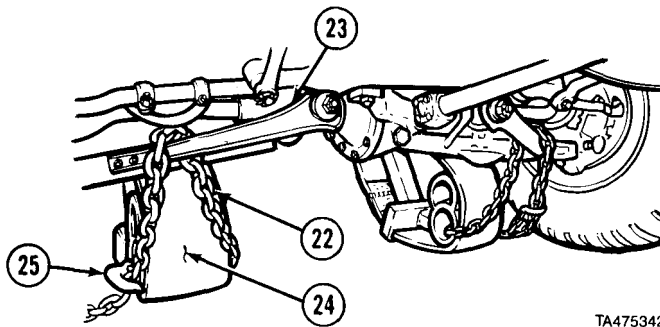


- (20) Position wrecker so adapters (15) contact front bumper (20) of disabled vehicle and are centered.

CAUTION

Do not contact pintle hook with lift cylinder or equipment damage could occur.

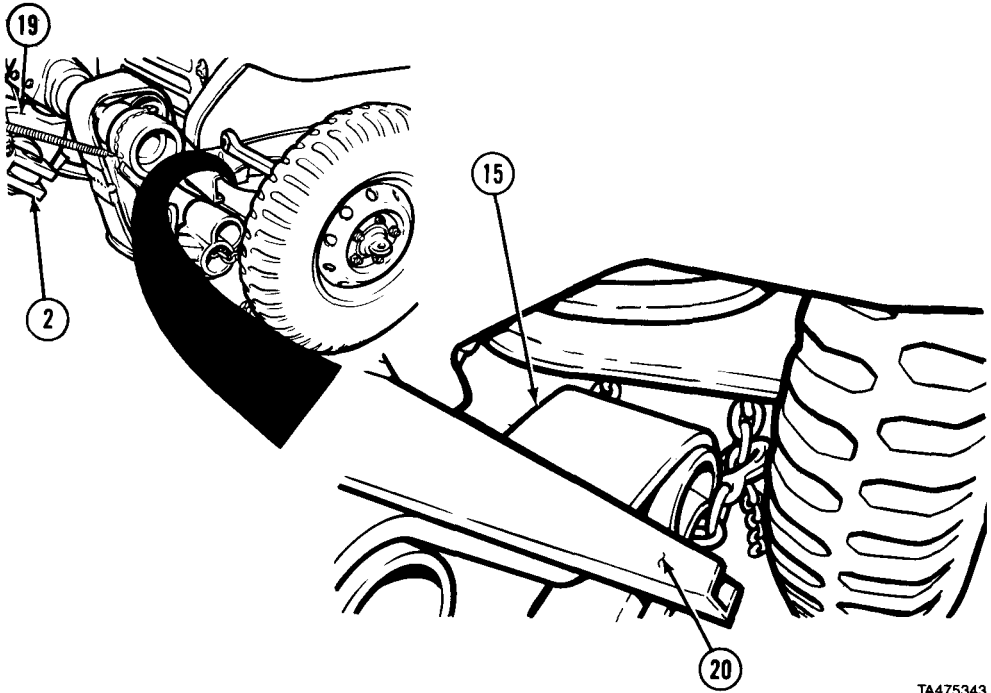
- (21) Soldier A operates retrieval controls while Soldier A and Soldier B guide adapters (15) down and under disabled vehicle front bumper (20) until belt brace (21) is even with front edge of front bumper.



- (22) Route 12-ft (3.5 m) tow chain (22) over A-frame rear member (23).
 (23) Route 12-ft (3.5 m) tow chain (22) through lower adapter tube (24). Pull chain tight and attach grab hook (25) to chain.
 (24) Repeat steps (22) and (23) for other side of disabled vehicle.
 (25) Release PARKING BRAKE on disabled vehicle (refer to M 151 operator's manual).

M984E1 General Operating Procedures (Cont)

2-77. TOW M151 (CONT)



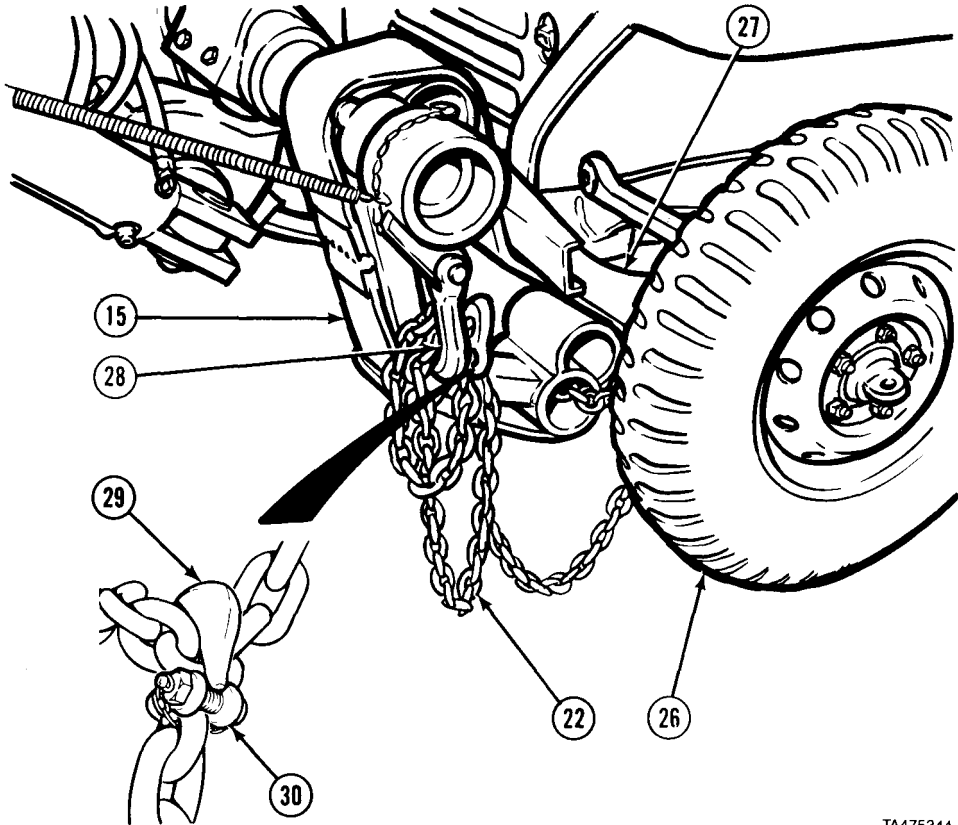
TA475343

CAUTION

M151 adapters must not hit A-frame of disabled vehicle. Adjust chain length to allow at least 1/2-in. (13 mm) clearance. Failure to provide clearance could result in damage to equipment.

- (26) Using retrieval controls, retract tow cylinders (2) and lift cylinder (19) until adapters (15) are positioned tight against front bumper (20) and tow cylinders are fully retracted.

M984E1 General Operating Procedures (Cont)



TA475344

NOTE

- 12-ft (3.5 m) tow chains can be adjusted to allow adapters to lift evenly.
- Left side shown.

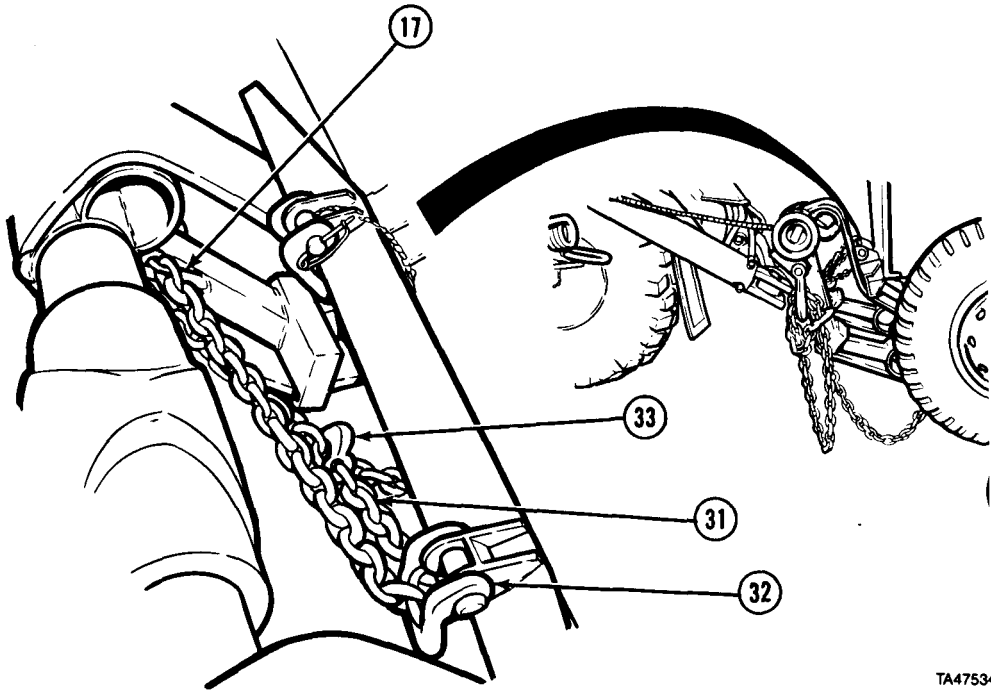
- (27) Raise disabled vehicle until front tires (26) are approximately 6 in. (150 mm) above ground, and adapter (15) is approximately 1/2-in. (13 mm) from front A-frame (27).
- (28) Lower disabled vehicle until front tires (26) contact ground while 12-ft (3.5 m) tow chains (22) remain tight.

NOTE

- Position tow chains to just touch ground.
 - Wrap excess chain through end cap grab hooks.
- (29) Route 12-ft (3.5 m) tow chains (22) through end cap grab hooks (28). Attach grab hooks (29) to chains and secure with safety shackles (30).

M984E1 General Operating Procedures (Cont)

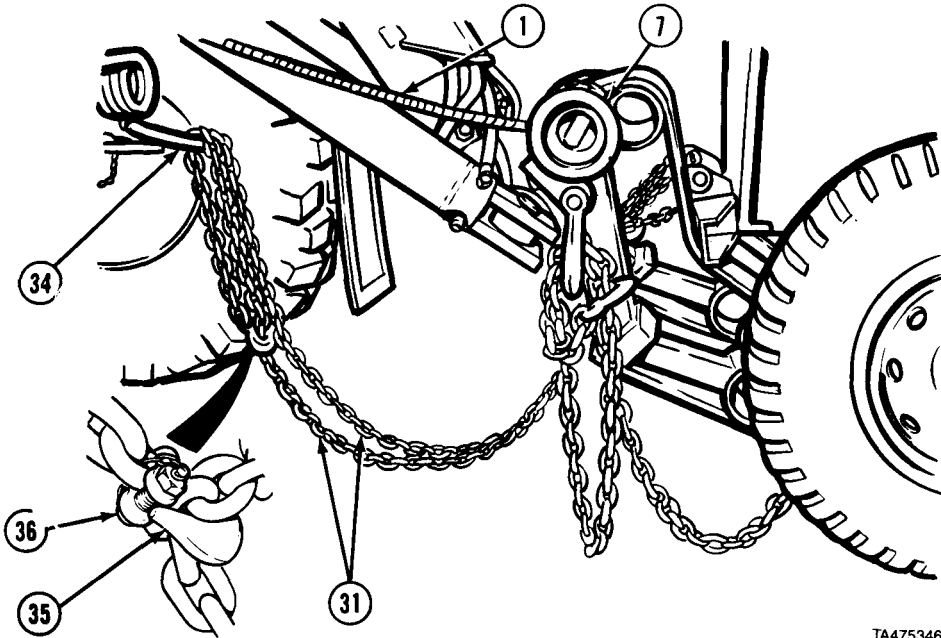
2-77. TOW M151 (CONT).



TA4753

- (30) Route 12-ft (3.5 m) cross chain (31) through right adapter brace (17) and left front tow shackle (32) on disabled vehicle.
- (31) Pull 12-ft (3.5 m) cross chain (31) tight and attach grab hook (33) to chain.
- (32) Repeat steps (30) and (31) for other side of disabled vehicle.

M984E1 General Operating Procedures (Cont)



TA475346

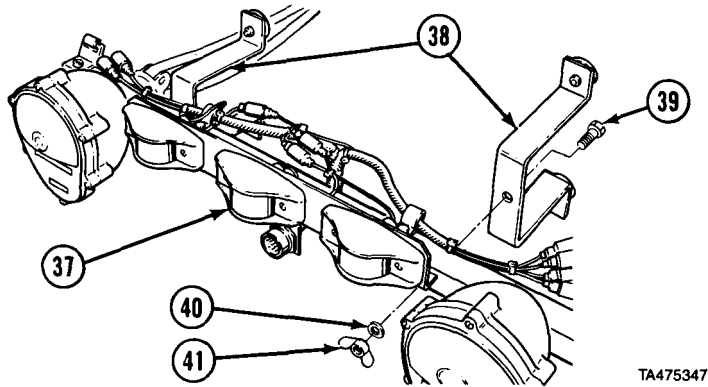
NOTE

- Adjust chain slack so cross chains just touch the ground.
- Cross chains can be routed to towing shackles or safety chain hoop. Towing shackles can be used only when tow cylinders are extended.
- Cross chains will act as safety chains when connected to safety chain hoop.

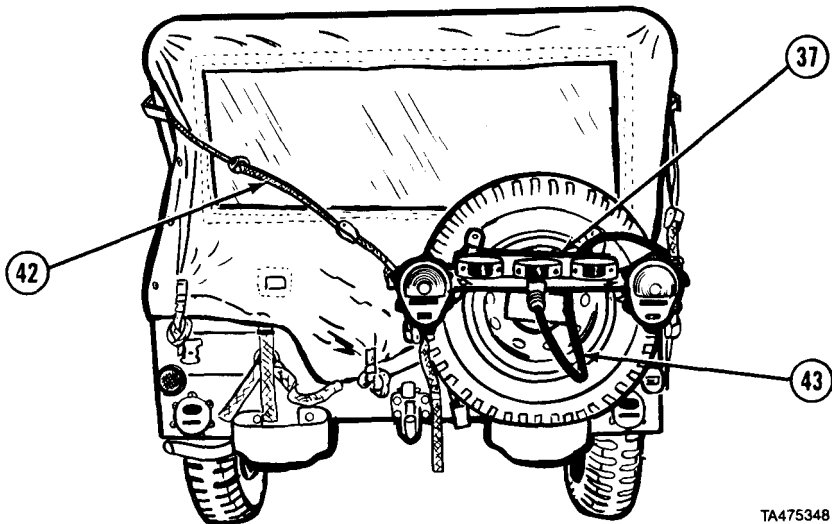
- (33) Route two 12-ft (3.5 m) cross chains (31) through safety chain hoop (34) on wrecker and secure grab hook (35) with safety shackle (36).
 (34) Wrap two springs (1) around crosstube (7) and secure.

M984E1 General Operating Procedures (Cont)

2-77. TOW M151 (CONT).

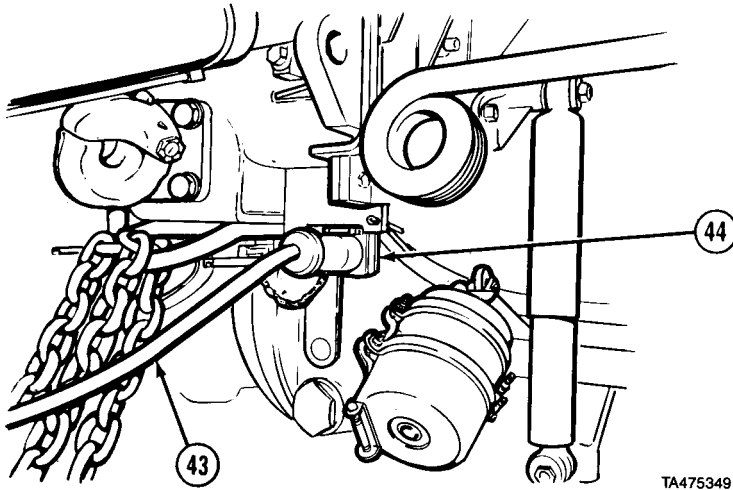


- (35) Prepare disabled vehicle for towing (refer to M151 operator's manual).
- (36) Remove emergency tow lights (37) and two brackets (38) from stowage.
- (37) Install two brackets (38) in center holes of emergency tow lights with two screws (39), washers (40), and nuts (41).



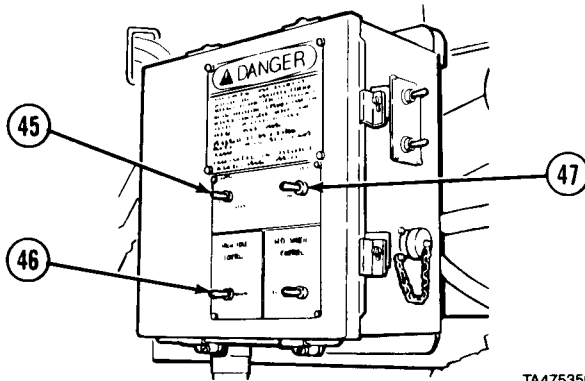
- (38) Install emergency tow lights (37) on rear of M151 and fasten securely with straps (42).
- (39) Remove tow light cable (43) from stowage and connect to emergency tow lights (37).

M984E1 General Operating Procedures (Cont)



TA475349

Route other end of tow light cable (43) along disabled vehicle and connect to rear electrical connector (44) on wrecker.

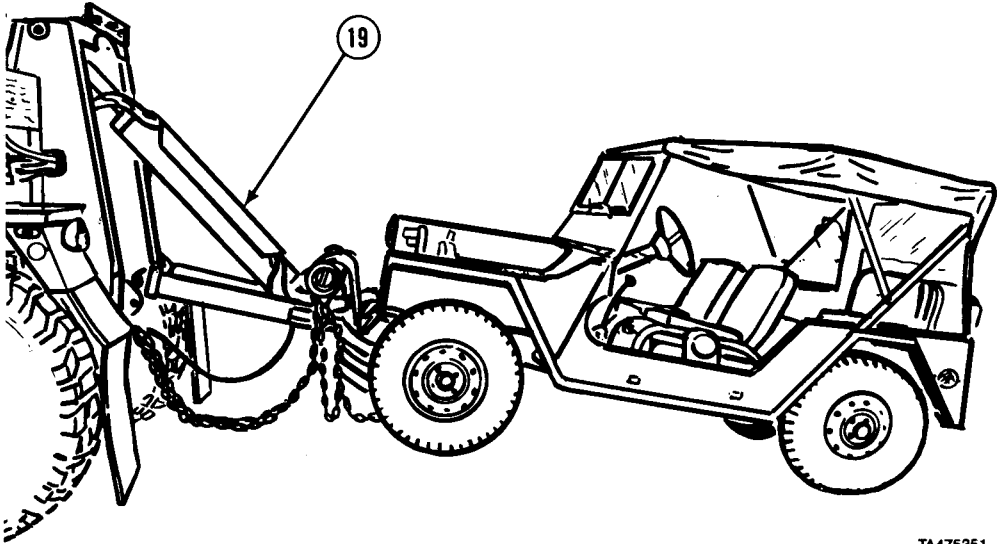


TA475350

- (41) Lock disabled vehicle's steering (refer to M151 operator's manual).
- (42) Set POWER switch (45) to ON position.
- (43) Set HIGH IDLE switch (46) to CONTINUOUS.
- (44) Push and release LATCH switch (47). Engine speed will increase to approximately 1500 rpm.

M984E1 General Operating Procedures (Cont)

2-77. TOW M151 (CONT).



TA475351

WARNING

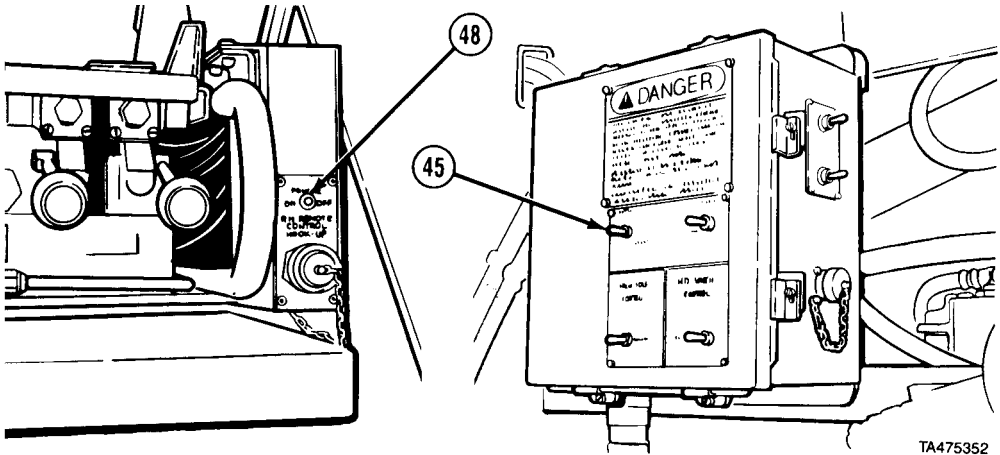
Keep out from under retrieval system and disabled vehicle when raised off ground or personal injury or death may result.

CAUTION

- Fully retract both tow cylinders before lifting disabled vehicle or equipment damage may result.
- Make sure all rigging is secure. Loose rigging can become entangled and cause damage to equipment.

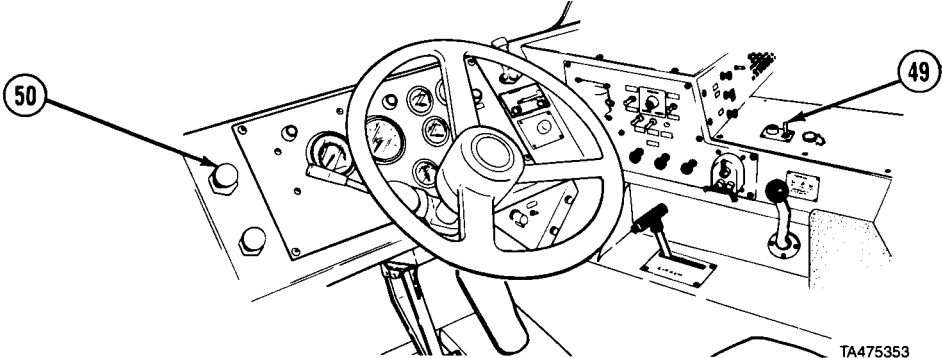
(45) Push LIFT CYLINDER control lever to retract lift cylinder (19) and raise disabled vehicle approximately 1 ft (30 cm) off ground.

M984E1 General Operating Procedures (Cont)



TA475352

- (46) Set POWER switch (45) to OFF position.
- (47) Set POWER switch (48) to OFF position.



TA475353

- (48) Set PTO ENGAGE switch (49) to OFF position.
- (49) Turn on service drive lights (para 2-10d).
- (50) Turn on emergency flashers on wrecker (para 2-44a) and disabled vehicle.
- (51) Push in PARKING BRAKE control (50) and select desired gear (para 2-11e).

WARNING

The M984E1 should not be operated at speeds over 15 mph except on paved roads when the operator determines that the vehicle being towed and the terrain allow safe operation. Engine brake switch must be "ON" for all towing operations. The following are maximum safe speeds:

Terrain Condition	Maximum speed, towed load up to 50,000 lbs	Maximum speed, towed load above 50,000 lbs
on road-level	35	30
on road-hilly	30	20
off road	15	15

Speeds in excess of the above can result in loss of control, serious injury or death.

- (52) Transport disabled vehicle.

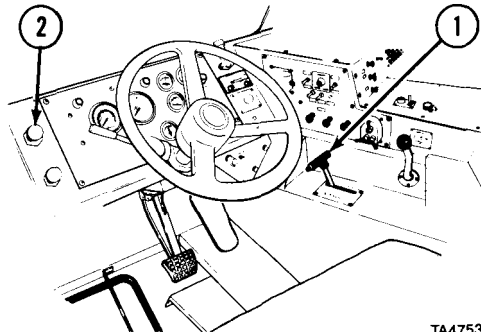
M984E1 General Operating Procedures (Cont)

2-77. TOW M151 (CONT).

b. Front Disconnect.

NOTE

This is a two-soldier task.



TA475384

- (1) Set transmission range selector (1) to N.
- (2) Pull PARKING BRAKE control (2).

WARNING

Do not stand between vehicles while disabled vehicle is raised off ground. Falling vehicle can cause serious injury or death.

NOTE

After lowering disabled vehicle, extend lift and tow cylinders approximately 6 to 12 in. (150 to 305 mm) to allow for adjustment when removing adapters.

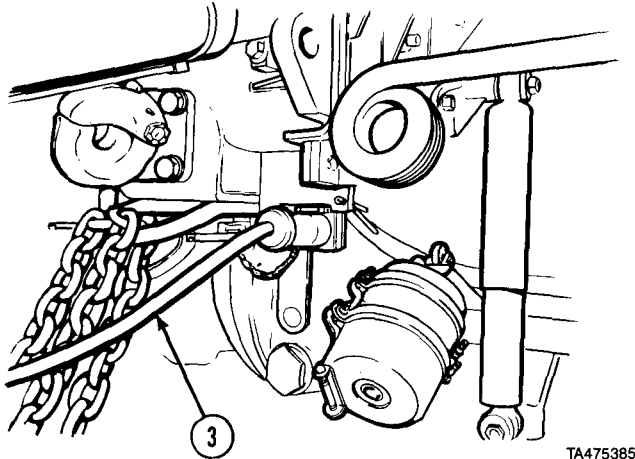
- (3) Prepare retrieval system for operation (para 2-72). Alternately pull TOW and LIFT CYLINDER control levers to extend lift cylinder and tow cylinder to lower towed vehicle to ground until tow chains at front A-frame are slack and adapters rest on ground.

WARNING

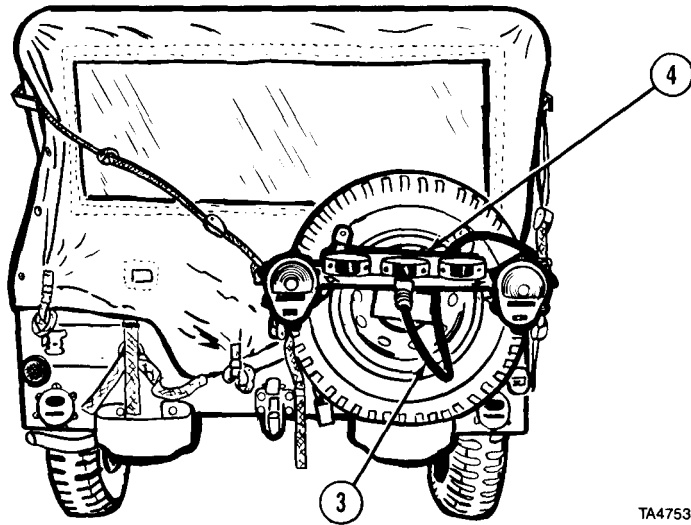
If disabled vehicle's parking brake is inoperative, chock wheels of disabled vehicle. Failure to chock wheels may result in personal injury.

- (4) Apply PARKING BRAKE on disabled vehicle (refer to M151 operator's manual). If parking brake is inoperative, chock wheels on disabled vehicle.

M984E1 General Operating Procedures (Cont)



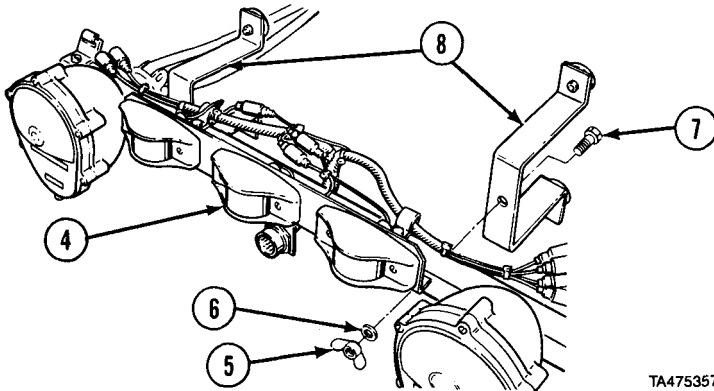
(5) Remove tow light cable (3) from wrecker.



(6) Remove tow light cable (3) from emergency tow lights (4).
(7) Remove emergency tow lights (4) from disabled vehicle.

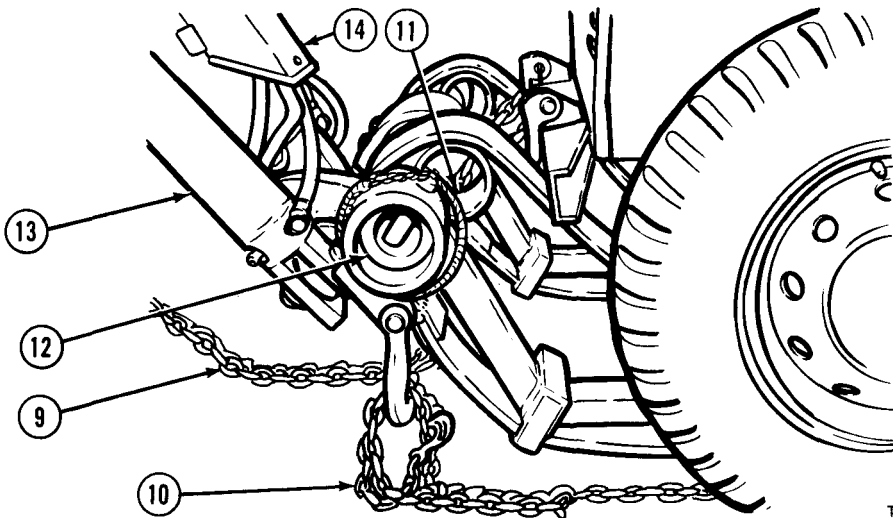
M984E1 General Operating Procedures (Cont)

2-77. TOW M151 (CONT).



TA475357

- (8) Remove two nuts (5), washers (6), screws (7), and brackets (8) from emergency tow lights (4). Stow emergency tow lights and brackets.



TA475358

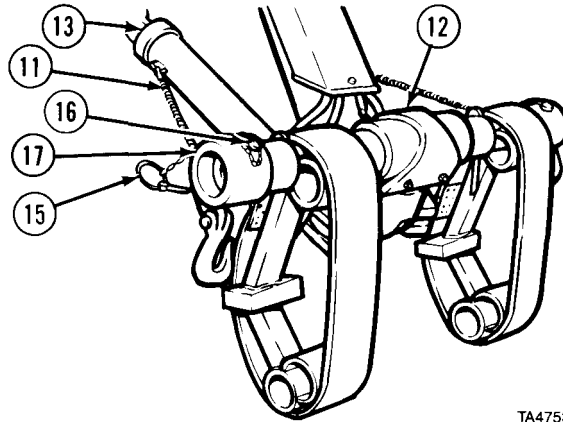
- (9) Remove and stow two cross chains (9) and two tow chains (10).
(10) Unwrap two springs (11) from crosstube (12) and connect to tow cylinders (13).

CAUTION

Do not contact pintle hook with lift cylinder or damage to equipment could occur.

- (11) Using retrieval controls, fully retract tow cylinders (13) and retract lift cylinder (14) to raise crosstube (12) approximately 3 ft (1 m) from ground.

M984E1 General Operating Procedures (Cont)



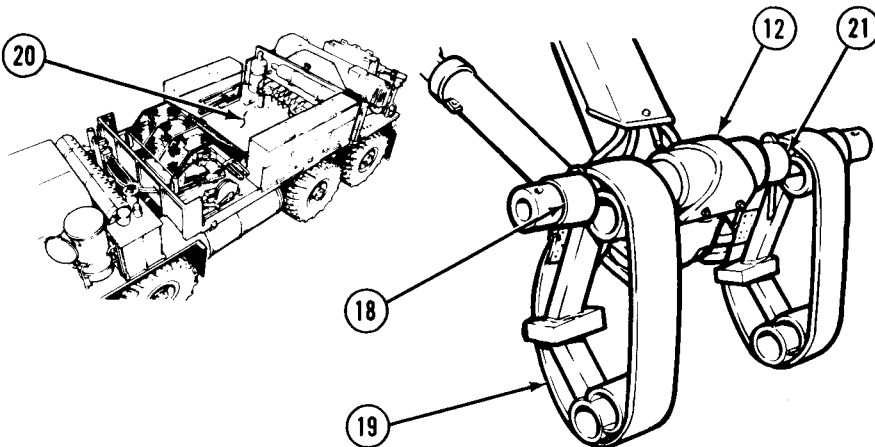
TA475359

Drive wrecker forward several feet and park (para 2-11o).

WARNING

As springs and end caps are removed, crosstube can swing in all directions, adapters may slide off and can cause personal injury.

- (13) Remove two springs (11) from tow cylinders (13).
- (14) Remove two quick pins (15) and pins (16) from end caps (17).
- (15) Remove two end caps (17) from crosstube (12).

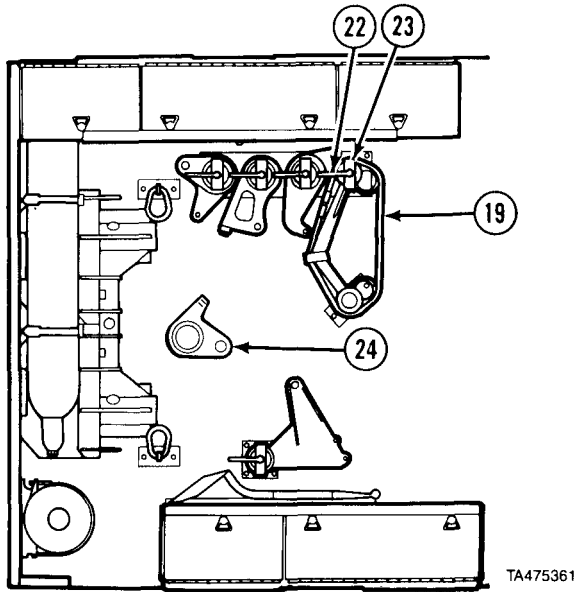


TA475360

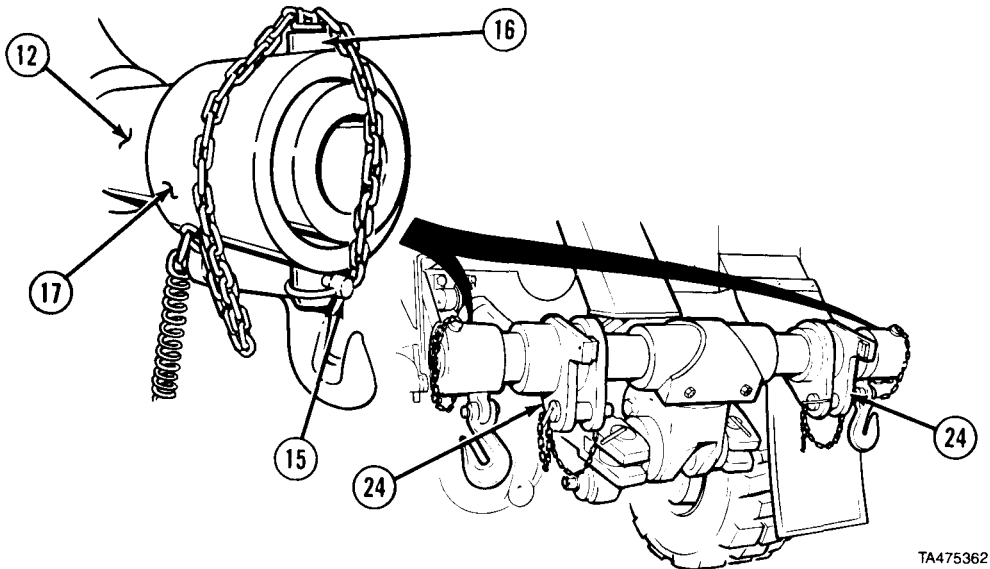
- (16) Remove and stow two 5-in. (127 mm) spacers (18).
- (17) Remove two M151 adapters (19) from crosstube (12) and place on equipment body floor (20).
- (18) Remove and stow two 4-in. (102 mm) spacers (21).

M984E1 General Operating Procedures (Cont)

2-77. TOW M151 (CONT).

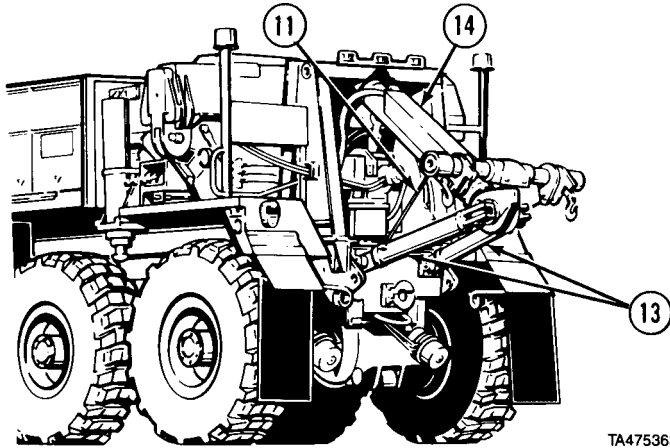


- (19) Remove lock handle (22), lock plate (23), and two M977 front adapters (24).
- (20) Install two M151 adapters (19) removed from crosstube, lock plate (23), and lock handle (22).

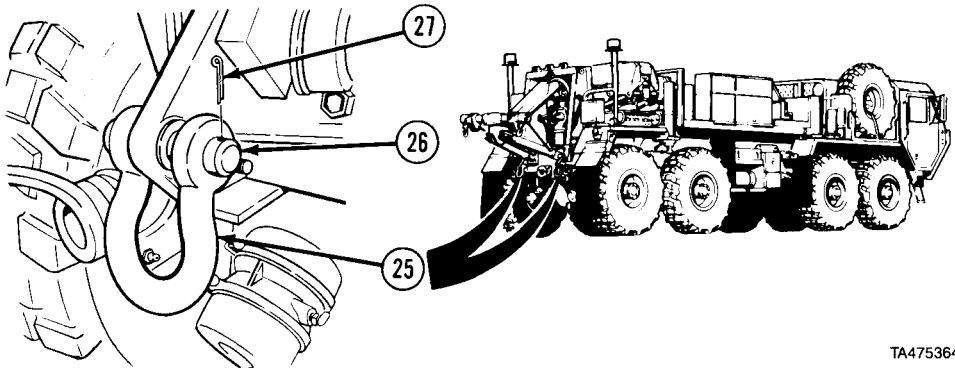


- (21) Install two M977 front adapters (24) on crosstube (12).
- (22) Install two end caps (17) on crosstube (12). Install two pins (16) and quick pins (15).

M984E1 General Operating Procedures (Cont)



- (23) Install two springs (11) on tow cylinders (13).
- (24) Operate retrieval controls to fully retract lift cylinder (14) and tow cylinders (13).



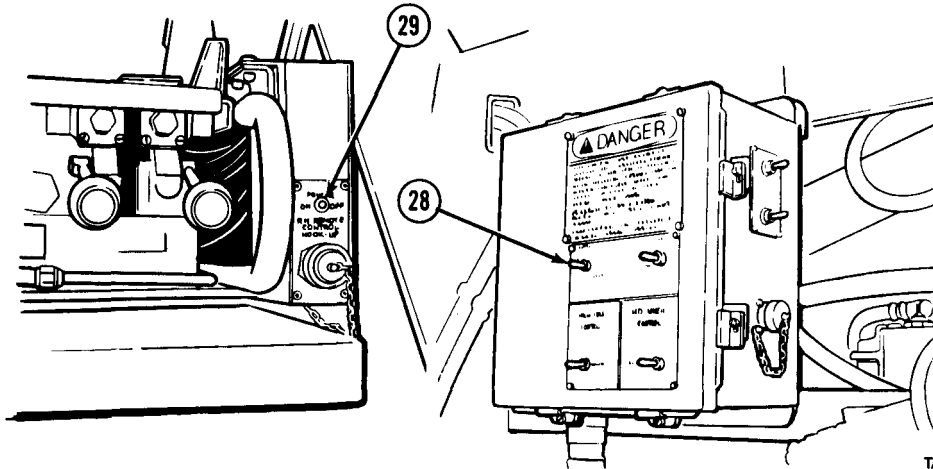
NOTE

Right and left towing shackles are installed the same way.

- (25) Install two towing shackles (25), pins (26), and cotter pins (27).

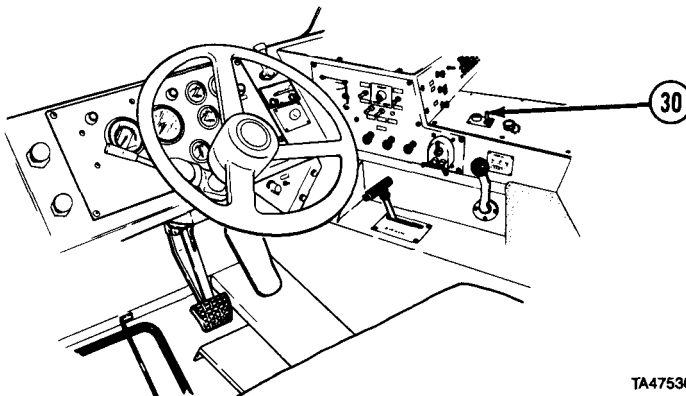
M984E1 General Operating Procedures (Cont)

2-77. TOW M151 (CONT).



TA475365

- (26) Set POWER switch (28) to OFF position.
- (27) Set POWER switch (29) to OFF position.



TA475366

- (28) Turn off emergency flashers on wrecker (para 2-44f) and disabled vehicle.
- (29) Turn off service drive lights (para 2-10d).
- (30) Set PTO ENGAGE switch (30) to OFF position.
- (31) Remove and stow beacon lights (para 2-62).
- (32) Shut off engine (para 2-11p).
- (33) Unlock disabled vehicle's steering (refer to M151 operator's manual).

M984E1 General Operating Procedures (Cont)

c. Rear Hookup.

NOTE

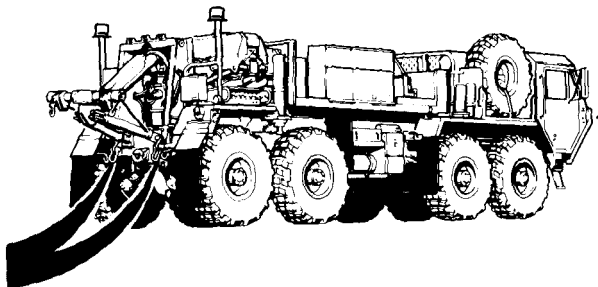
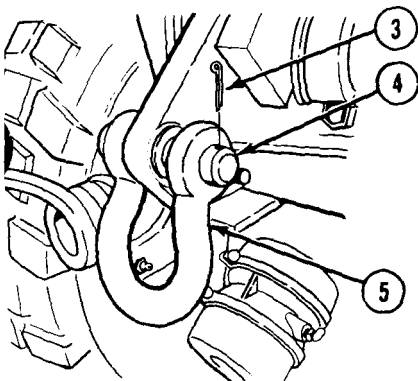
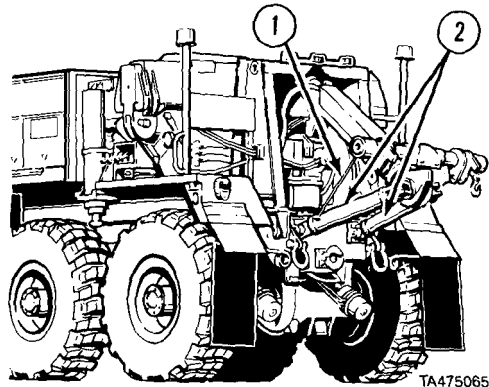
This is a two-soldier task.

- (1) Prepare retrieval system for operation (para 2-72).

WARNING

Hold crosstube when removing springs. Crosstube may swing or cause adapter to slide resulting in personal injury.

- (2) Disconnect two springs (1) from tow cylinders (2).



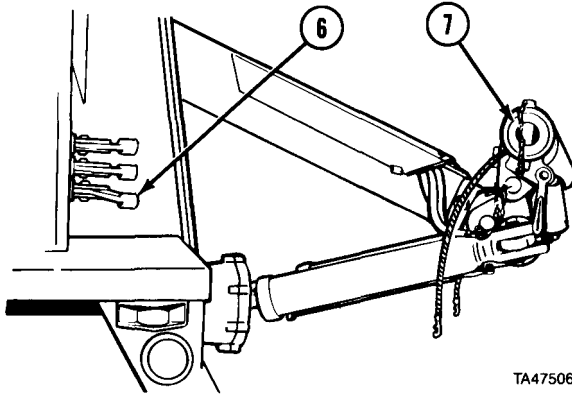
NOTE

Right and left towing shackles are removed the same way.

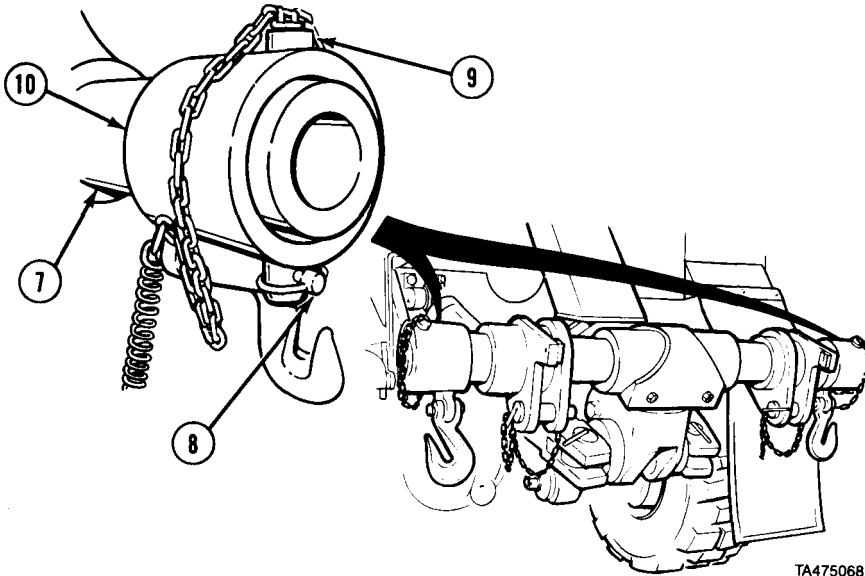
- (3) Remove two cotter pins (3), pins (4), and towing shackles (5) and stow on equipment body floor.

M984E1 General Operating Procedures (Cont)

2-77. TOW M151 (CONT).



- (4) Pull LIFT CYLINDER control lever (6) to lower crosstube (7) to approximately 3 ft (1 m) above ground.
- (5) Position wrecker so that crosstube (7) is approximately 1 ft (30 cm) from tow eyes of disabled vehicle and centered on disabled vehicle.

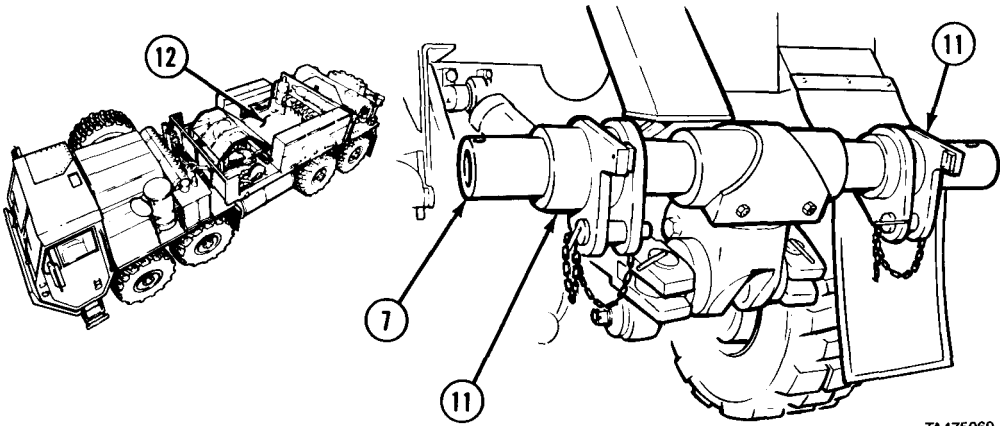


WARNING

When end caps are removed from crosstube, adapters may slide off causing personal injury.

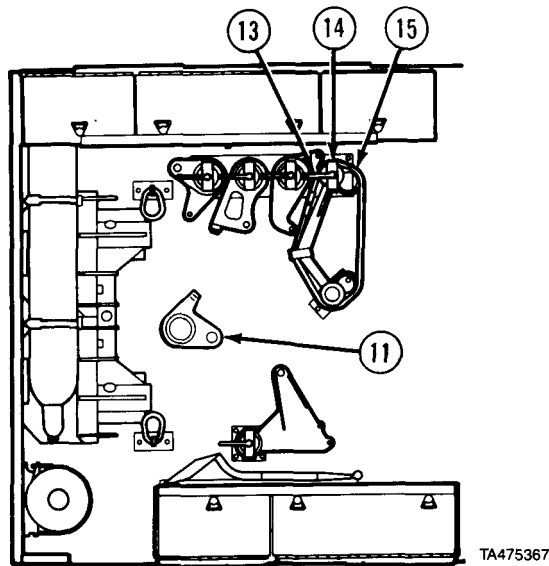
- (6) Remove two quick pins (8) and pins (9) from end caps (10).
- (7) Remove two end caps (10) from crosstube (7).

M984E1 General Operating Procedures (Cont)



TA475069

- (8) Remove two M977 front adapters (11) from crosstube (7) and place on equipment body floor (12).



TA475367

- (9) Remove lock handle (13), lock plate (14), and two M151 adapters (15).

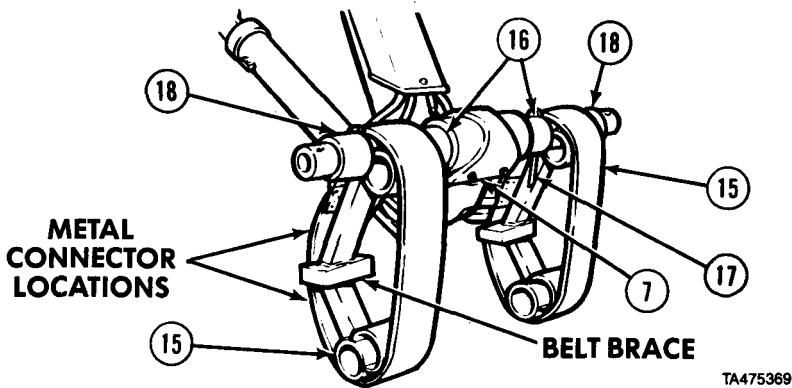
NOTE

All four 12-ft (3.5 m) chains are the same.

- (10) Remove four 12-ft (3.5 m) chains from stowage.
 (11) Remove two 4-in. (102 mm) spacers and two 5-in. (127 mm) spacers from stowage.
 (12) Install two M977 front adapters (11) removed from crosstube, lock plate (14), and lock handle (13).

M984E1 General Operating Procedures (Cont)

2-77. TOW M151 (CONT.)

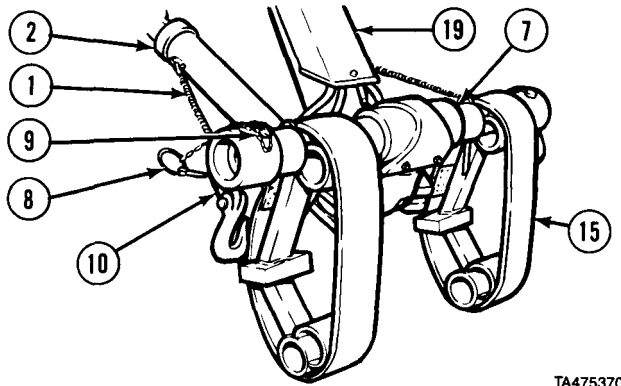


- (13) Install two 5-in. (127 mm) spacers (16) on crosstube (7).

NOTE

Make sure metal connector is located on either side of belt brace and does not touch metal parts of adapters.

- (14) Install two M151 adapters (15) on crosstube (7) with brace (17) facing inside.
- (15) Install two 4-in. (102 mm) spacers (18) on crosstube (7).

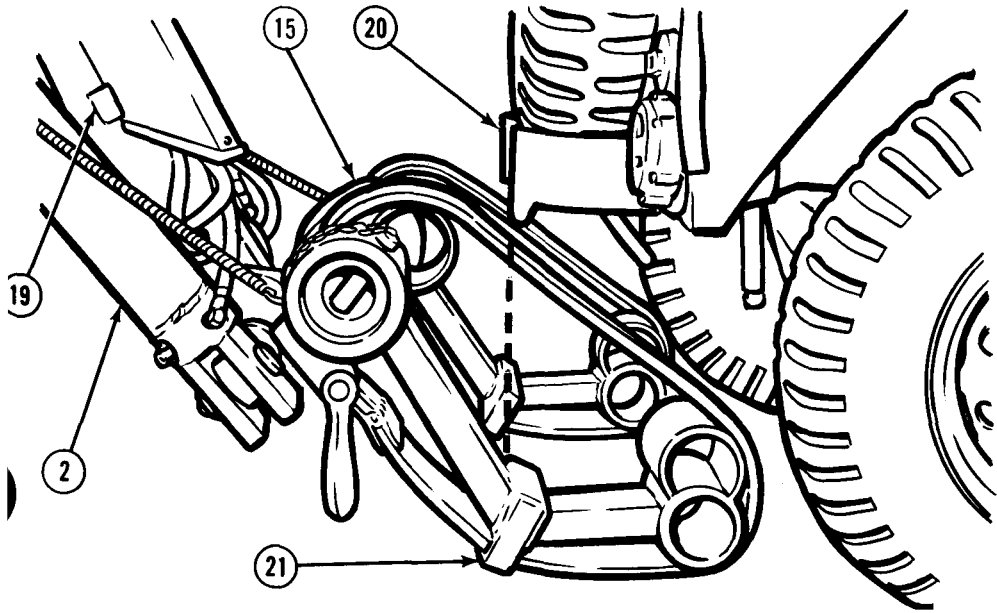


NOTE

End caps will hang over end of crosstube for M151 adapters.

- (16) Install two end caps (10) on crosstube (7).
- (17) Install two pins (9) and quick pins (8).
- (18) Attach two springs (1) on tow cylinders (2).
- (19) Extend both tow cylinders (2) 2 in. (50 mm) and lower lift cylinder (19) until M151 adapters (15) are approximately 6 in. (152 mm) from ground.

M984E1 General Operating Procedures (Cont)



TA475371

- (20) Position wrecker so adapters (15) contact bumperettes (20) of disabled vehicle and are centered.

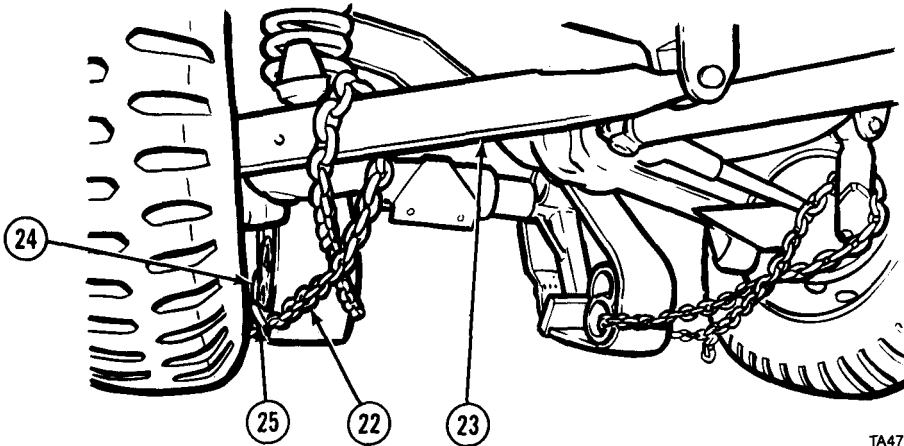
CAUTION

Do not contact pintle hook with lift cylinder or equipment damage could occur.

- (21) Soldier A operates retrieval controls while Soldier A and Soldier B guide adapters (15) down and under disabled vehicle bumperettes (20) until belt brace (21) is even with rear edge of bumperettes.

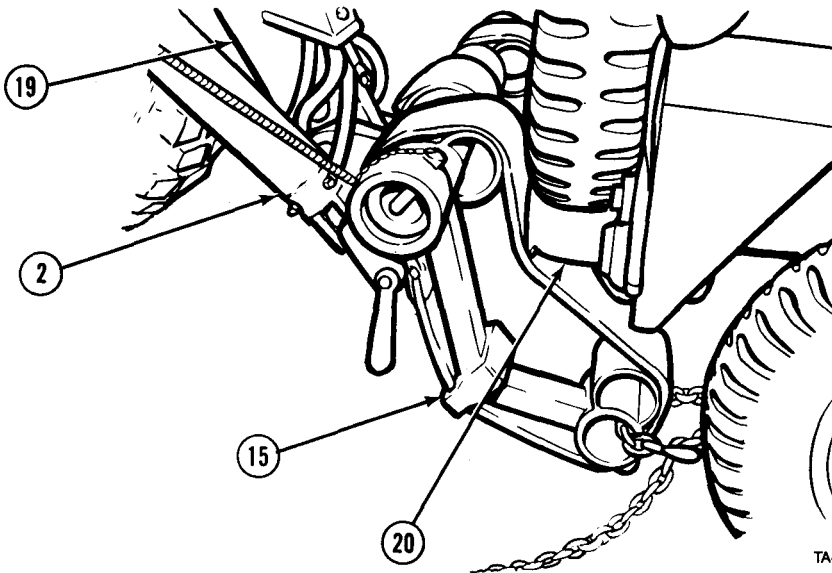
M984E1 General Operating Procedures (Cont)

2-77. TOW M151 (CONT).



TA475372

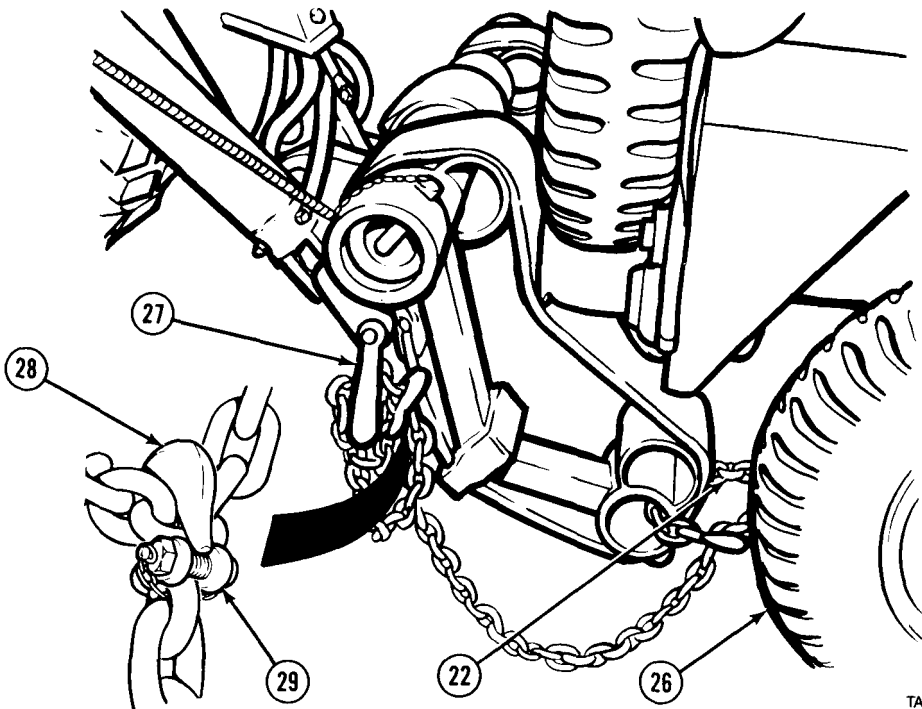
- (22) Route 12-ft (3.5 m) tow chain (22) over forward rear A-frame member (23).
- (23) Route 12-ft (3.5 m) tow chain (22) through lower adapter tube (24). Pull chain tight and attach grab hook (25) to chain.
- (24) Repeat steps (22) and (23) for other side of disabled vehicle.
- (25) Release PARKING BRAKE on disabled vehicle (refer to M151 operator's manual).



TA475373

- (26) Using retrieval controls, alternately retract tow cylinders (2) and lift cylinder (19) until adapters (15) are positioned tight against rear bumperettes (20) and tow cylinders are fully retracted.

M984E1 General Operating Procedures (Cont)



TA475374

NOTE

12-ft (3.5 m) tow chains can be adjusted to allow adapters to lift evenly.

- (27) Raise disabled vehicle until rear tires (26) are approximately 6 in. (152 mm) above ground.
- (28) Lower disabled vehicle until rear tires (26) contact ground while 12-ft (3.5 m) tow chains (22) remain tight.

NOTE

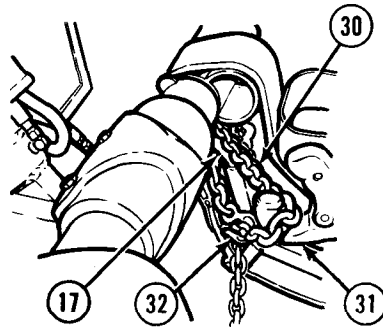
1 Position tow chains to just touch ground.

1 Wrap excess chain through end cap grab hooks

- (29) Route 12-ft (3.5 m) tow chains (22) through end cap grab hooks (27) and secure grab hook (28) to chain with safety shackle (29).

M984E1 General Operating Procedures (Cont)

2-77. TOW M151 (CONT).

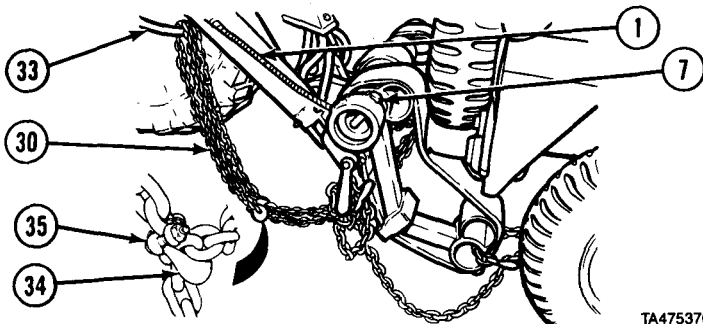


TA475375

NOTE

Open pintle hook on disabled vehicle before performing step (30) and close pintle hook after performing step (32).

- (30) Route 12-ft (3.5 m) cross chain (30) through right strap adapter brace (17) and pintle hook (31) on disabled vehicle.
- (31) Pull 12-ft (3.5 m) cross chain (30) tight and attach grab hook (32) to chain.
- (32) Repeat steps (30) and (31) for other side of disabled vehicle.



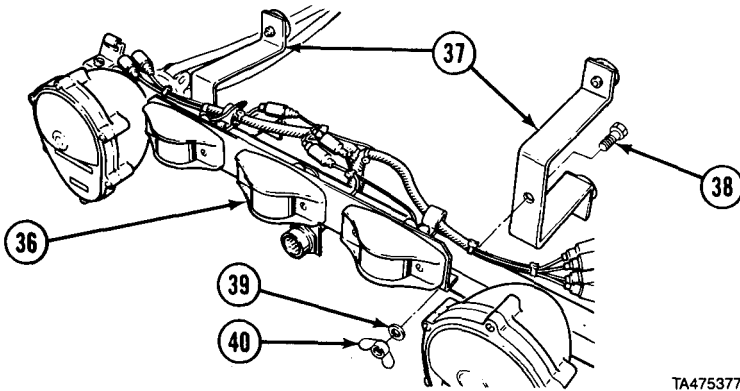
TA475376

NOTE

- Adjust chain slack so cross chains just touch the ground.
- Cross chains can be routed to towing shackles or safety chain hoop. Lifting shackles can be used only when tow cylinders are extended.
- Cross chains will act as safety chains when connected to wrecker.

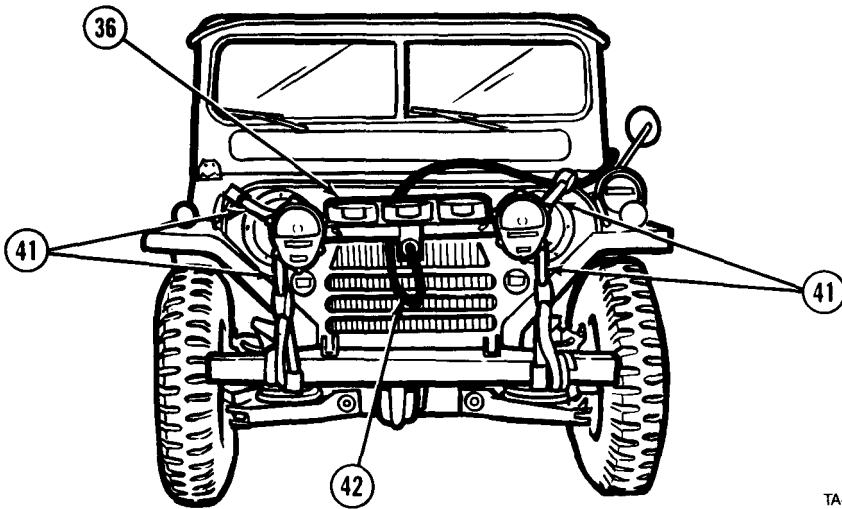
- (33) Route two 12-ft (3.5 m) cross chains (30) through safety chain hoop (33) on wrecker and secure grab hooks (34) with safety shackles (35).
- (34) Wrap two straps (1) around crosstube (7) and secure.

M984E1 General Operating Procedures (Cont)



TA475377

- (35) Prepare disabled vehicle for towing (refer to M151 operator's manual).
- (36) Remove emergency tow lights (36) and two brackets (37) from stowage.
- (37) Install two brackets (37) in center holes of emergency tow lights with two screws (38), washers (39), and nuts (40).

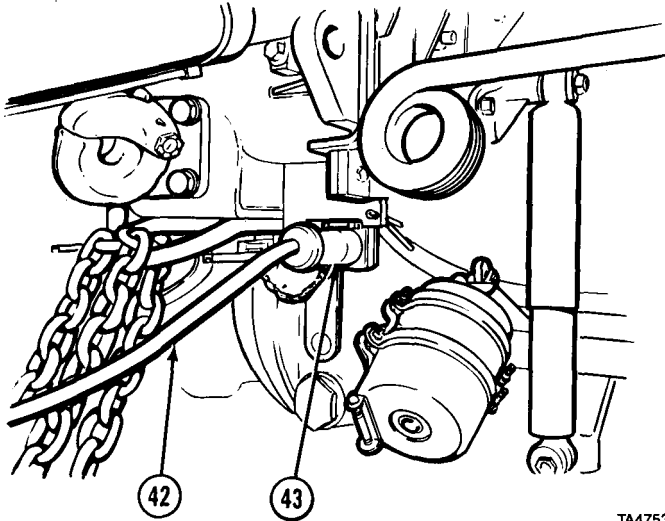


TA475378

- (38) Install emergency tow lights (36) on front of M151 and fasten securely with straps (41).
- (39) Remove tow light cable (42) from stowage and connect to emergency tow lights (36).

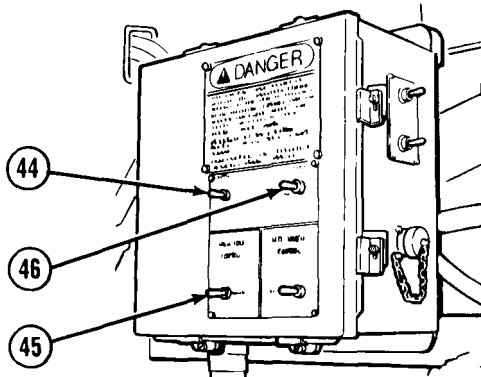
M984E1 General Operating Procedures (Cont)

2-77. TOW M151 (CONT).



TA475379

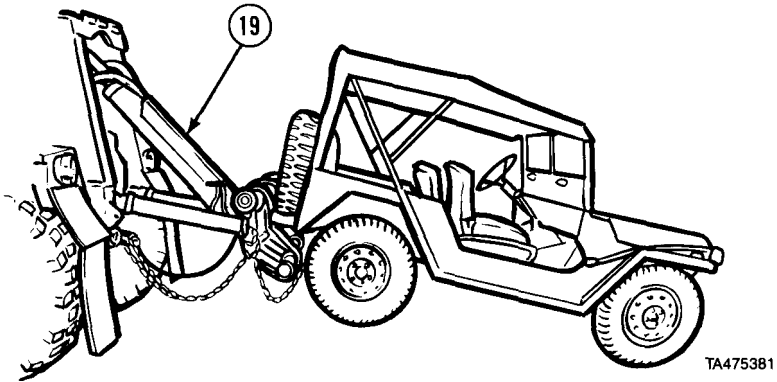
- (40) Route other end of tow light cable (42) along disabled vehicle and connect to rear electrical connector (43) on wrecker.
- (41) Lock disabled vehicle's steering (refer to M151 operator's manual).



TA475380

- (42) Set POWER switch (44) to ON position.
- (43) Set HIGH IDLE switch (45) to CONTINUOUS.
- (44) Push and release LATCH switch (46). Engine speed will increase to approximately 1500 rpm.

M984E1 General Operating Procedures (Cont)



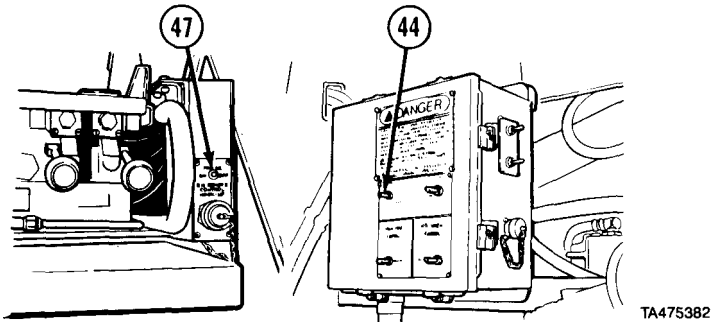
WARNING

Keep out from under retrieval system and disabled vehicle when raised off ground or personal injury or death may result.

CAUTION

- Fully retract both tow cylinders before lifting disabled vehicle or equipment damage may result.
- Make sure all rigging is secure. Loose rigging can become entangled and cause damage to equipment.

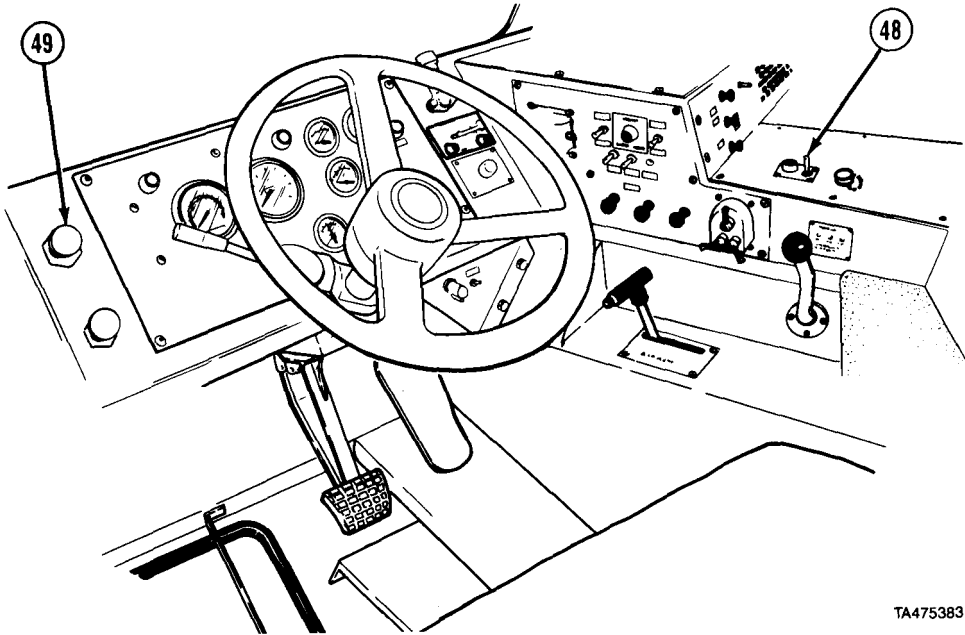
(45) Push LIFT CYLINDER control lever to retract lift cylinder (19) and raise disabled vehicle approximately 1 ft (30 cm) off ground.



- (46) Set POWER switch (44) to OFF position.
 (47) Set POWER switch (47) to OFF position.

M984E1 General Operating Procedures (Cont)

2-77. TOW M151 (CONT)



TA475383

- (48) Set PTO ENGAGE switch (48) to OFF position.
- (49) Turn on service drive lights (para 2-10d).
- (50) Turn on emergency flashers on wrecker (para 2-44a) and disabled vehicle.
- (51) Push in PARKING BRAKE control (49) and select desired gear (para 2-11e).

WARNING

The M984E1 should not be operated at speeds over 15 mph except on paved roads when the operator determines that the vehicle being towed and the terrain allow safe operation. Engine brake switch must be "ON" for all towing operations. The following are maximum safe speeds:

Terrain Condition	Maximum speed, towed load up to 50,000 lbs	Maximum speed, towed load above 50,000 lbs
on road-level	35	30
on road-hilly	30	20
off road	15	15

Speeds in excess of the above can result in loss of control, serious injury or death.

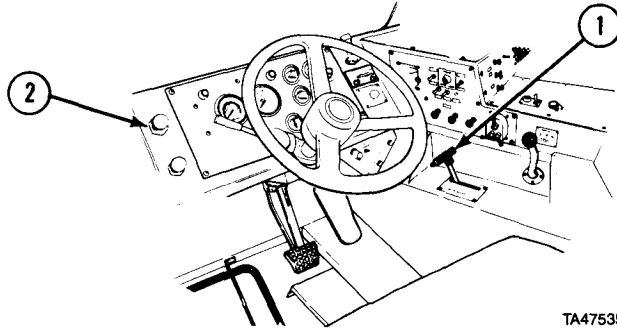
- (52) Transport disabled vehicle.

M984E1 General Operating Procedures (Cont)

d. Rear Disconnect.

NOTE

This is a two-soldier task.



TA475354

- (1) Set transmission range selector (1) to N.
- (2) Pull PARKING BRAKE control (2).

WARNING

Do not stand between vehicles while disabled vehicle is raised off ground. Falling vehicle can cause serious injury or death.

CAUTION

Do not contact lift cylinder with pintle hook or equipment damage could occur.

NOTE

After lowering disabled vehicle, extend lift and tow cylinders approximately 6 to 12-in. (150 to 305 mm) to allow for adjustment when removing adapters.

- (3) Prepare retrieval system for operation (para 2-72). Alternately pull TOW and LIFT CYLINDER control levers to extend lift cylinder and tow cylinders to lower towed vehicle to ground until tow chains at rear A-frame are slack and adapters rest on ground.

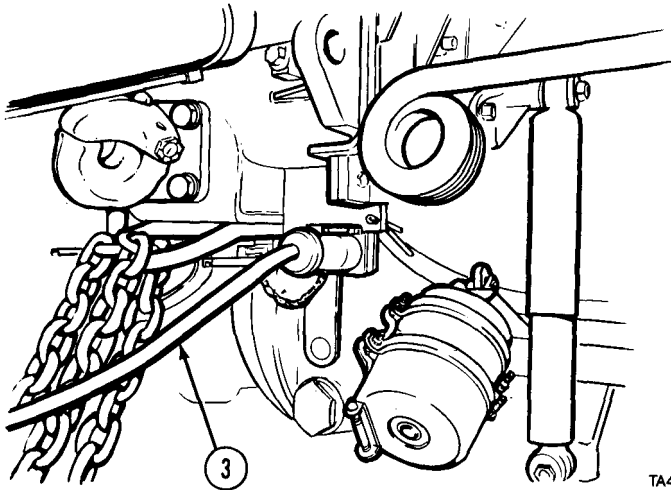
WARNING

If disabled vehicle's parking brake is inoperative, chock wheels of disabled vehicle. Failure to chock wheels may result in personal injury.

- (4) Apply PARKING BRAKE on disabled vehicle (refer to M151 operator's manual). If parking brake is inoperative, chock wheels on disabled vehicle.

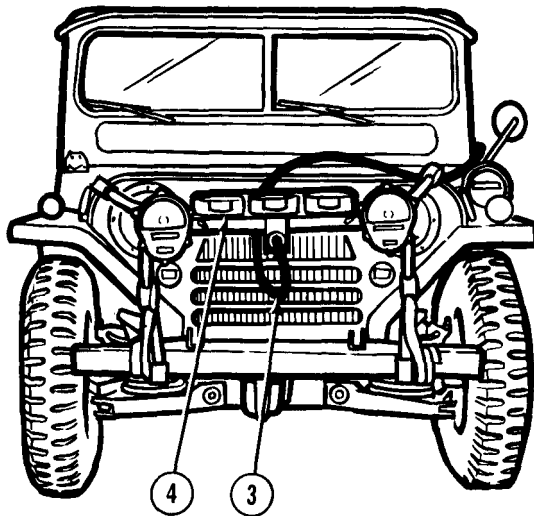
M984E1 General Operating Procedures (Cont)

2-77. TOW M151 (CONT).



TA475355

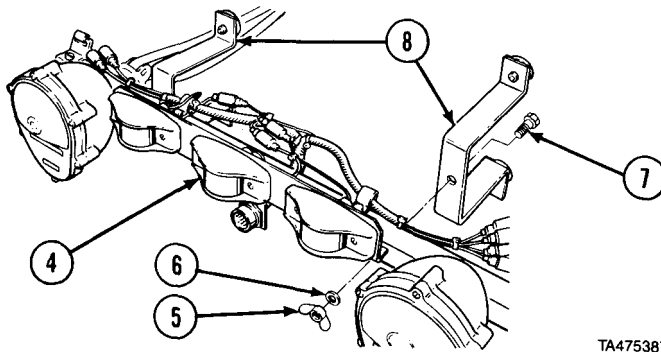
(5) Remove tow light cable (3) from wrecker.



TA475386

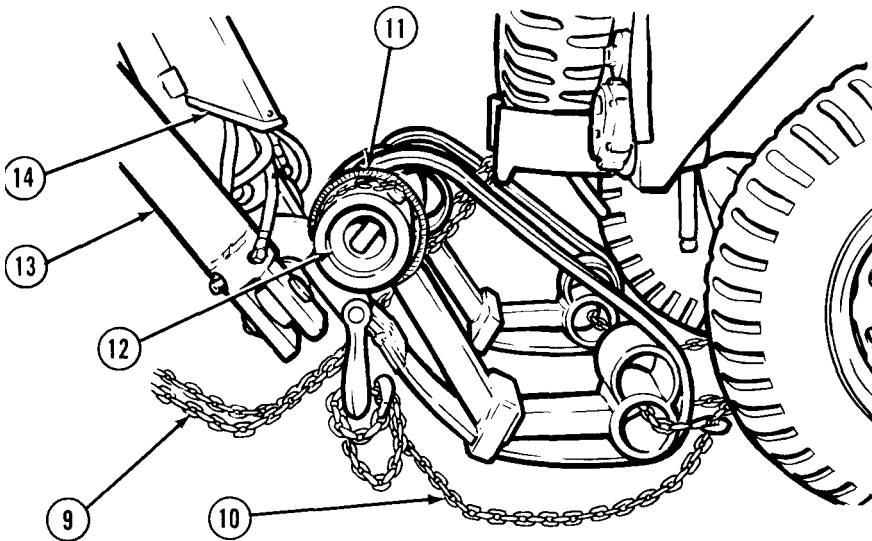
(6) Remove tow light cable (3) from emergency tow lights (4).
(7) Remove emergency tow lights (4) from disabled vehicle.

M984E1 General Operating Procedures (Cont)



TA475387

- (8) Remove two nuts (5), washers (6), screws (7), and brackets (8) from emergency tow lights (4). Stow emergency tow lights and brackets.



TA475388

- (9) Remove and stow two 12-ft (3.5 m) cross chains (9) and two 12-ft (3.5 m) tow chains (10).
 (10) Unwrap two springs (11) from crosstube (12) and connect to tow cylinders (13).

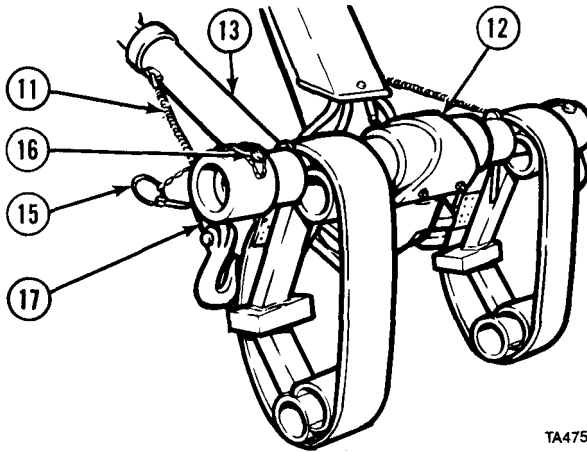
CAUTION

Do not contact pintle hook with lift cylinder or damage to equipment could occur.

- (11) Using retrieval controls, fully retract tow cylinders (13) and retract lift cylinder (14) to raise crosstube (12) approximately 3 ft (1 m) from ground.

M984E1 General Operating Procedures (Cont)

2-77. TOW M151 (CONT).



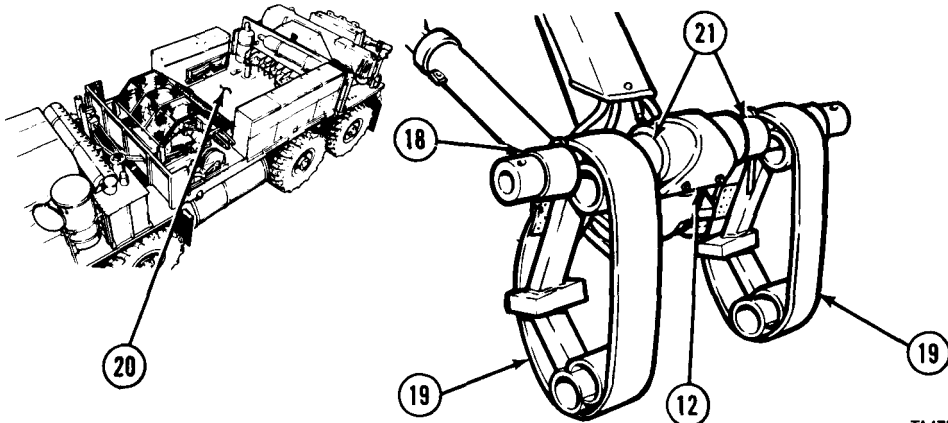
TA475389

- (12) Drive wrecker forward several feet and park (para 2-110).

WARNING

As springs and end caps are removed, crosstube can swing in all directions, adapters may slide off and can cause personal injury.

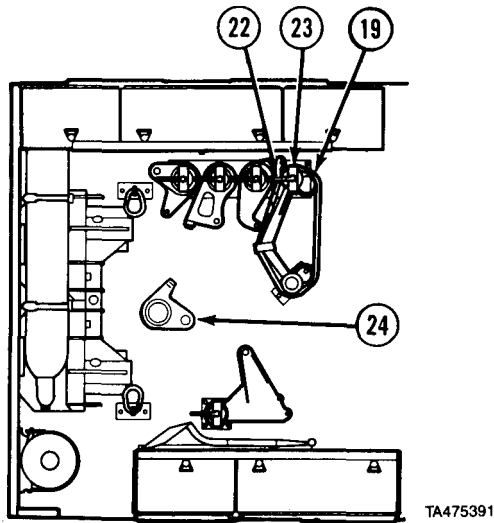
- (13) Remove two springs (11) from tow cylinders (13).
- (14) Remove two quick pins (15) and pins (16) from end caps (17).
- (15) Remove two end caps (17) from crosstube (12).



TA475390

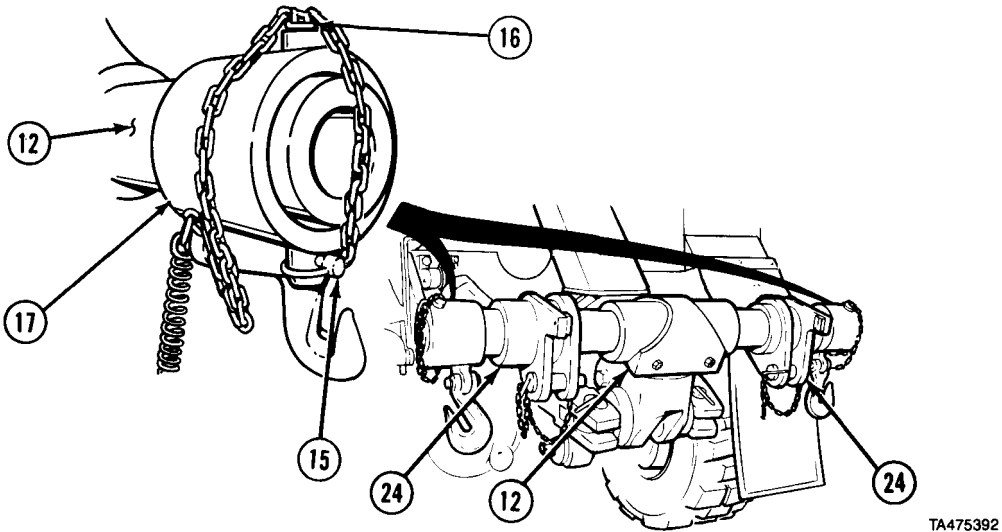
- (16) Remove and stow two 4-in. (102 mm) spacers (18).
- (17) Remove two M151 adapters (19) from crosstube (12) and place on equipment body floor (20).
- (18) Remove and stow two 5-in. (127 mm) spacers (21).

M984E1 General Operating Procedures (Cont)



(19) Remove lock handle (22), lock plate (23), and two M977 front adapters (24).

(20) Install two M151 adapters (19) removed from crosstube, lock plate (23), and lock handle (22).

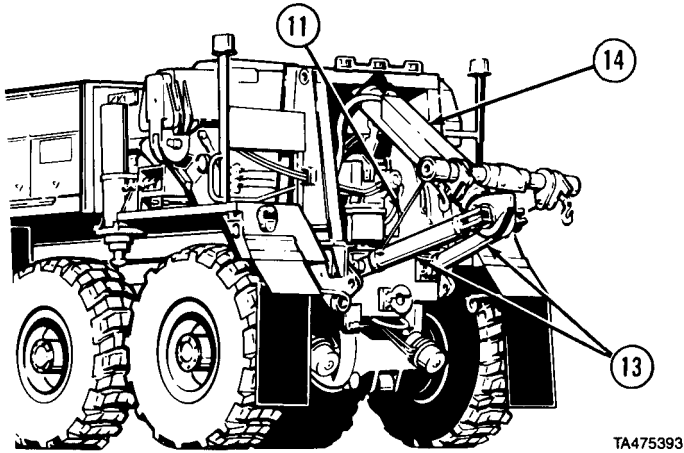


(21) Install two M977 front adapters (24) on crosstube (12).

(22) Install two end caps (17) on crosstube (12). Install two pins (16) and quick pins (15).

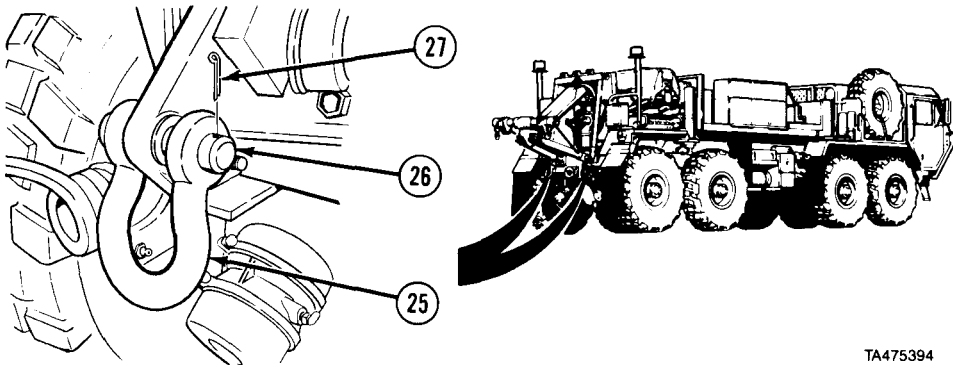
M984E1 General Operating Procedures (Cont)

2-77. TOW M151 (CONT).



TA475393

- (23) Install two springs (11) on tow cylinders (13).
- (24) Operate retrieval controls and fully retract lift cylinder (14) and tow cylinders (13).



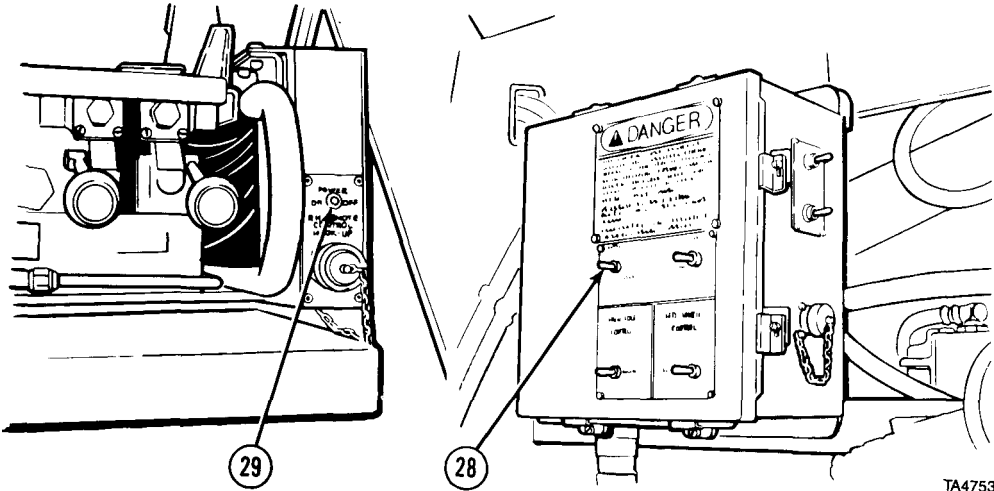
TA475394

NOTE

Right and left towing shackles are installed the same way.

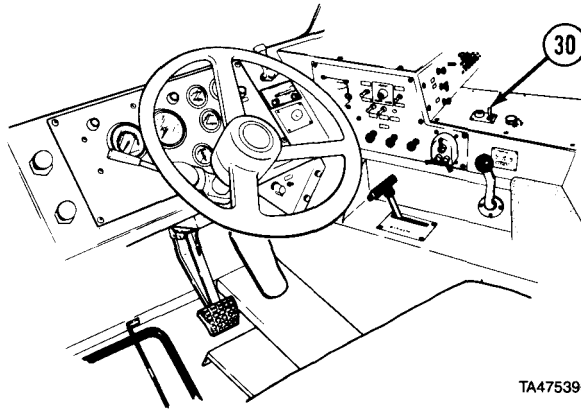
- (25) Install two towing shackles (25), pins (26), and cotter pins (27).

M984E1 General Operating Procedures (Cont)



TA475395

- (26) Set POWER switch (28) to OFF position.
- (27) Set POWER switch (29) to OFF position.



TA475396

- (28) Turn off emergency flashers on wrecker (para 2-44f) and disabled vehicle.
- (29) Turn off service drive lights (para 2-10d).
- (30) Set PTO ENGAGE switch (30) to OFF position.
- (31) Remove and stow beacon lights (para 2-62).
- (32) Shut off engine (para 2-11p).
- (33) Unlock disabled vehicle's steering (refer to M151 operator's manual).

M984E1 General Operating Procedures (Cont)

2-78. TOW M520.

NOTE

Get M520 recovery equipment (para 2-71d and Appendix C) before starting recovery mission.

a. Front Hookup.

NOTE

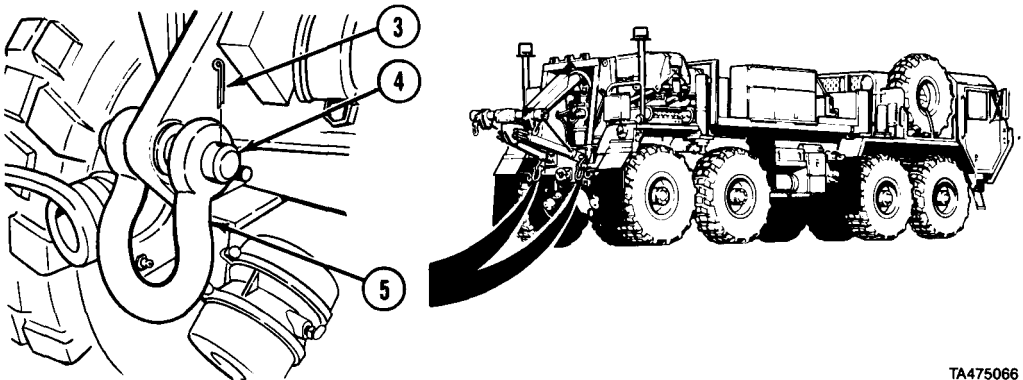
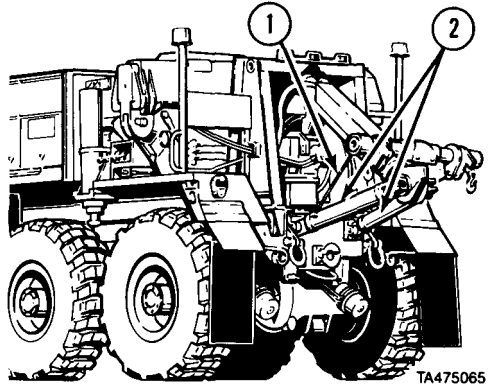
This is a two-soldier task.

(1) Prepare retrieval system for operation (para 2-72).

WARNING

Hold crosstube when removing springs. Crosstube may swing or cause adapters to slide resulting in personal injury.

(2) Disconnect two springs (1) from tow cylinders (2).

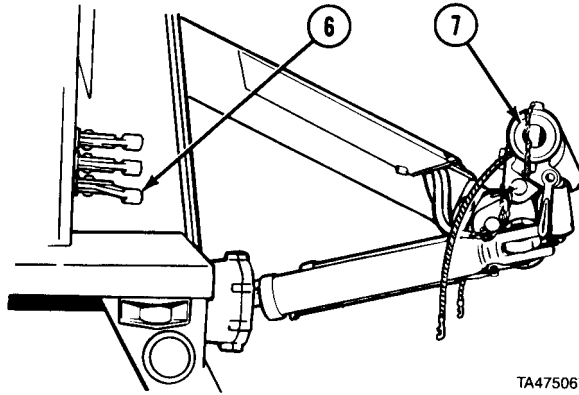


NOTE

Right and left towing shackles are removed the same way.

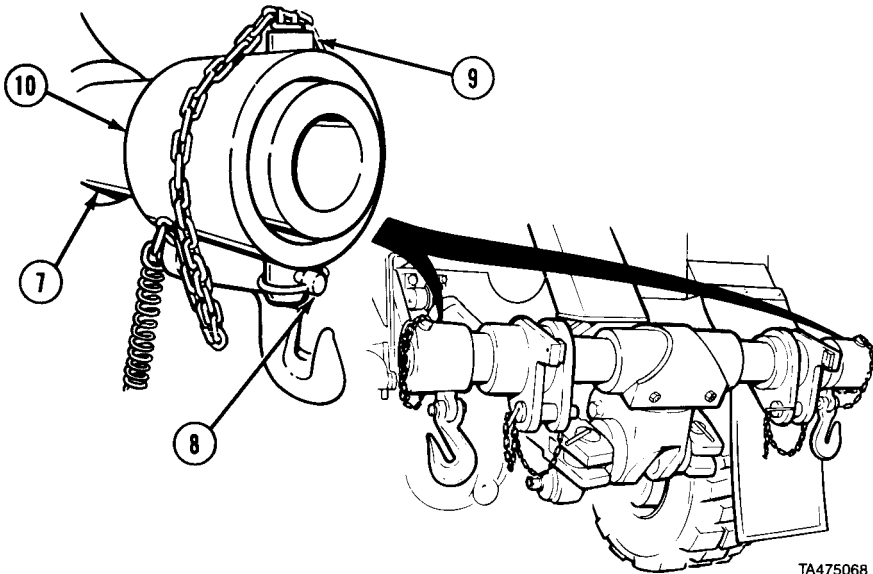
(3) Remove cotter pin (3), pin (4), and towing shackles (5).

M984E1 General Operating Procedures (Cont)



TA475067

- (4) Pull LIFT CYLINDER control lever (6) to lower crosstube (7) to approximately 3 ft (1 m) above ground.
- (5) Position wrecker so that crosstube (7) is approximately 1 ft (30 cm) from tow eyes of disabled vehicle and centered on disabled vehicle.



TA475068

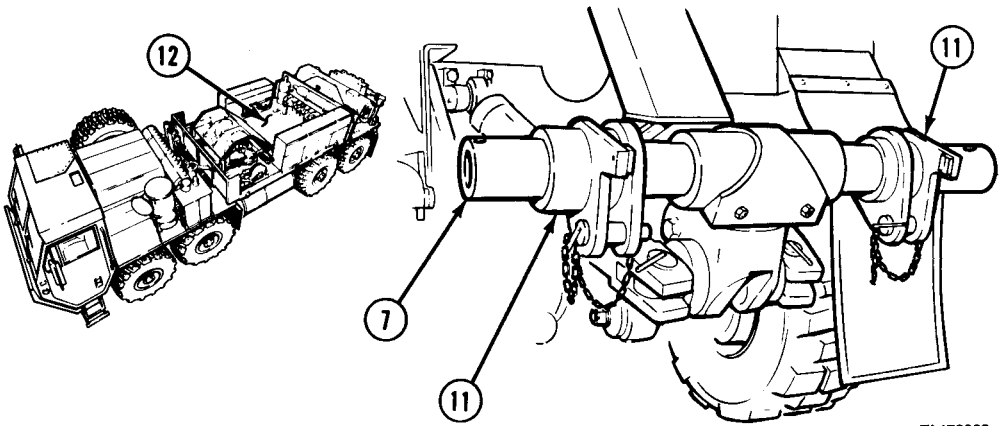
WARNING

When end caps are removed from crosstube, adapters may slide off causing personal injury.

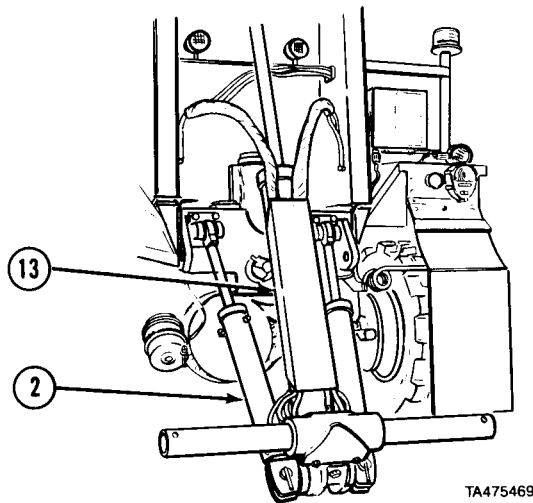
- (6) Remove two quick pins (8) and pins (9) from end caps (10).
- (7) Remove two end caps (10) from crosstube (7).

M984E1 General Operating Procedures (Cont)

2-78. TOW M520 (CONT)



- (8) Remove two M977 front adapters (11) from crosstube (7) and place on equipment body floor (12).
- (9) Remove M520 towing adapters from equipment body floor (12).

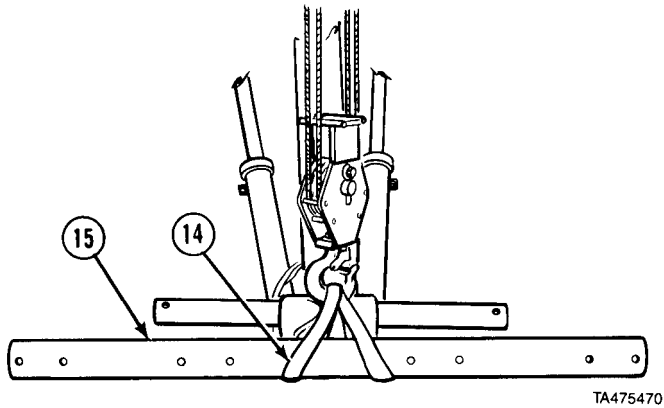


CAUTION

Do not contact pintle hook with lift cylinder. Equipment damage may result.

- (10) Extend both tow cylinders (2) approximately 12 in. (30 cm). Extend lift cylinder (13) until bottom of retrieval assembly is approximately 2 in. (51 mm) above ground.

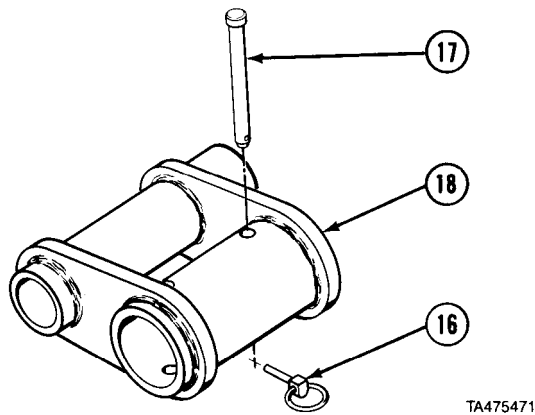
M984E1 General Operating Procedures (Cont)



WARNING

Keep boom clear of electrical lines and other obstacles while operating crane. Serious injury or death could result upon contact.

- (11) Remove cargo tiedown strap (14) from stowage and attach to center of lift tube (15). Operate crane (para 2-63) and position lift tube on ground. Remove and stow cargo tiedown strap.



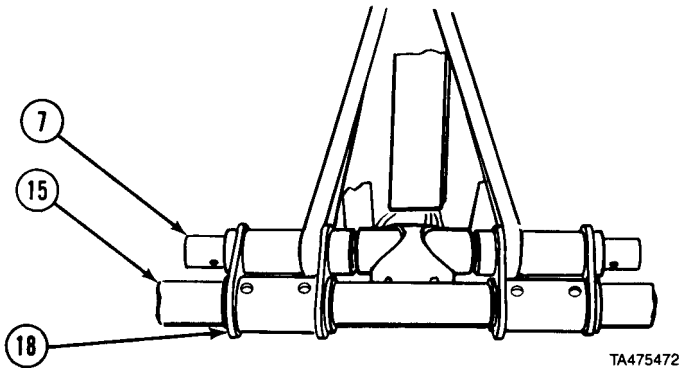
NOTE

Both tube supports are the same. One tube support shown.

- (12) Remove two quick pins (16) and pins (17) from tube supports (18).

M984E1 General Operating Procedures (Cont)

2-78. TOW M520 (CONT).



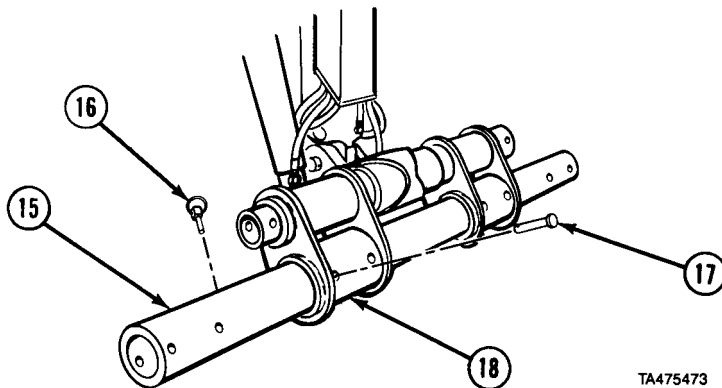
WARNING

Tube connectors are heavy. Do not drop or personal injury could result.

NOTE

Tube connectors and crosstube may have to be repositioned several times to aid installation.

- (13) Aline and install two tube supports (18) on lift tube (15) and crosstube (7).

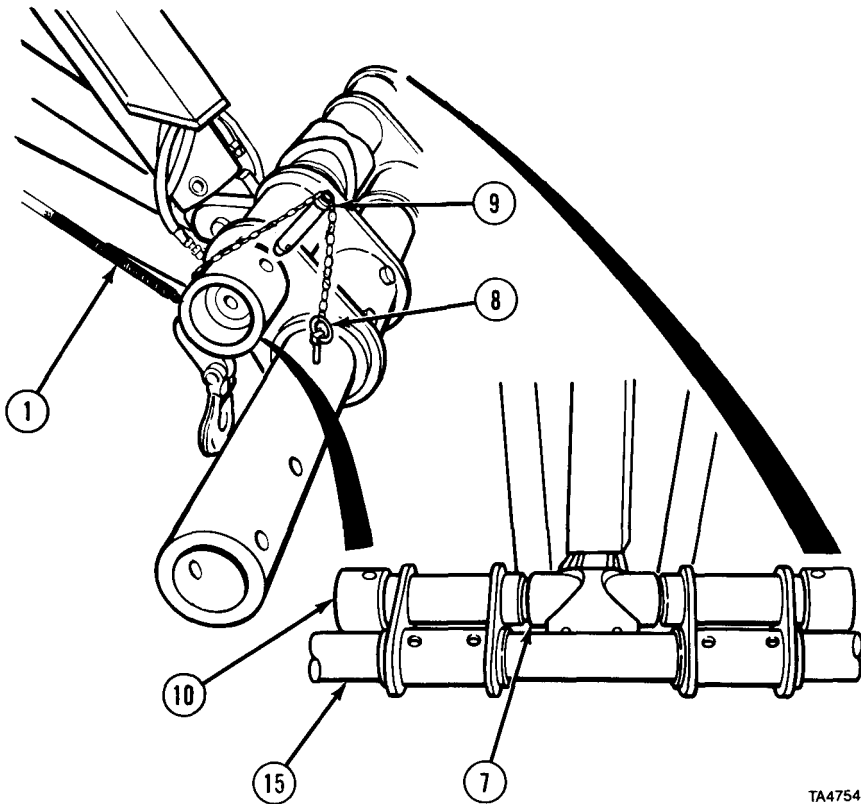


NOTE

Lift tube may have to be rotated to aline holes in lift tube with holes in tube supports.

- (14) Aline holes in lift tube (15) with holes in tube supports (18) and install pins (17) and quick pins (16).
- (15) Stow crane (para 2-63).

M984E1 General Operating Procedures (Cont)



TA475474

NOTE

Tow cylinders must be extended 12 in. (30 cm) to allow for adjustment.

- (16) Using LIFT CYLINDER control lever raise lift tube (15) approximately 4 ft (1.2 m) off the ground.

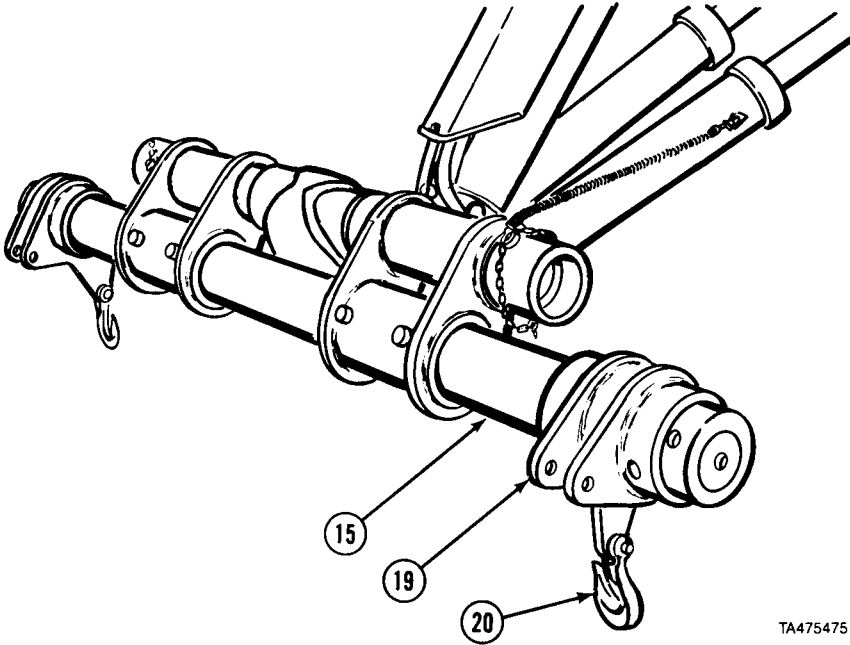
NOTE

End caps will hang over end of crosstube for M520 adapters.

- (17) Install two end caps (10) on crosstube (7) and install pin's (9), quick pins (8), and springs (1).
 (18) Back up wrecker until lift tube (15) is approximately 12 in. (30 cm) from front tow eyes on disabled vehicle.

M984E1 General Operating Procedures (Cont)

2-78. TOW M520 (CONT).



TA475475

WARNING

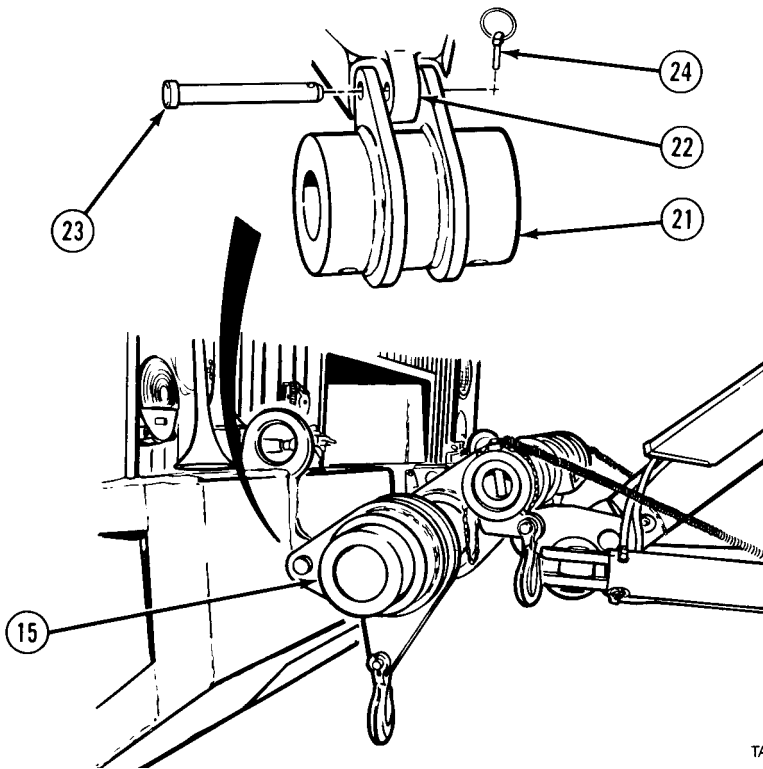
Adapters may slide off when installing and may cause personal injury.

NOTE

- Do not pin adapters to lift tube.
- Pins and quick pins must be removed from adapters before they are installed on lift tube.

(19) Install two adapters (19) on lift tube (15) with grab hooks (20) facing in.

M984E1 General Operating Procedures (Cont)



TA475476

WARNING

Keep hands and fingers away from adapters and tow eyes when operating retriever controls. Personal injury could result.

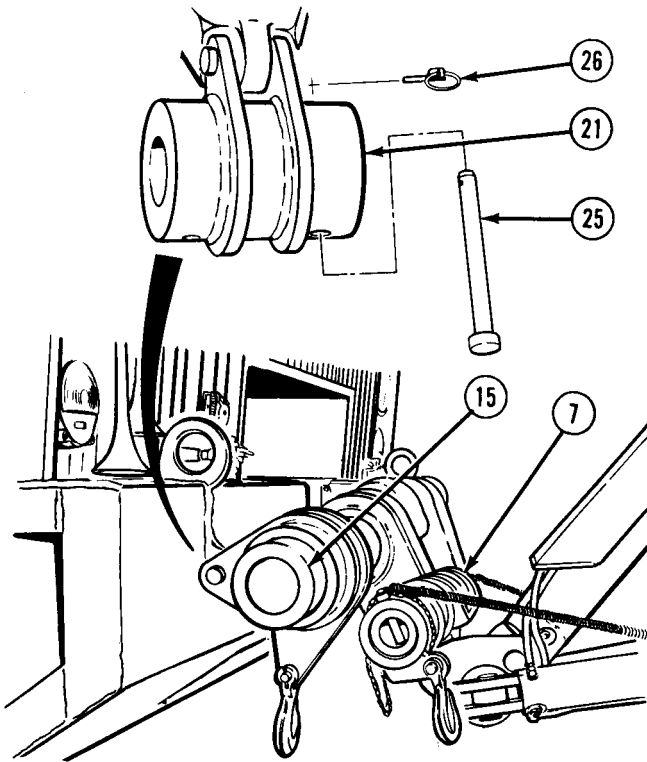
NOTE

- If disabled vehicle has towing shackles installed, remove shackles and stow in disabled vehicle.
- Right and left adapters are pinned the same way. Right side shown .

- (20)** Soldier A operates retrieval system (para 2-72) while Soldier A and Soldier B position lift tube (15) so holes in adapters (21) align with front tow eyes (22).
- (21)** Insert pin (23) through adapter (21) and tow eye (22) and install quick pin (24) in pin.

M984E1 General Operating Procedures (Cont)

2-78. TOW M520 (CONT).



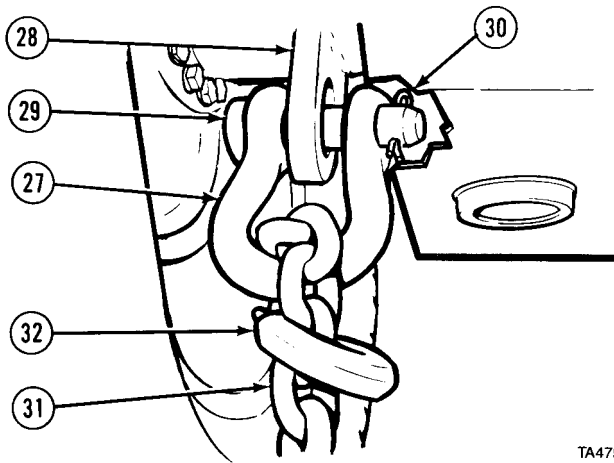
TA475477

NOTE

Right and left adapters are installed the same way.
Right side shown.

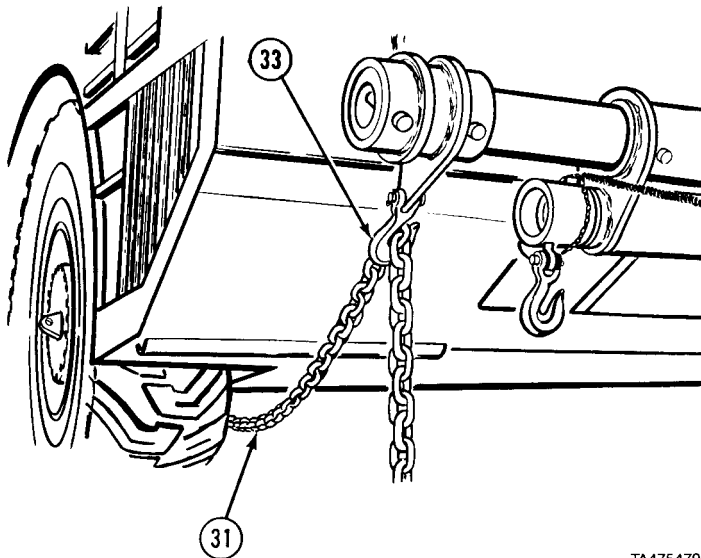
- (22) Soldier A operates retrieval system (para 2-72) and moves crosstube (7) down and under lift tube (15) until adapter (21) and lift tube holes aline.
- (23) Soldier A continues to operate retrieval system while Soldier A and Soldier B insert two pins (25) through adapter (21), lift tube (15), and install quick pins (26) in pins.

M984E1 General Operating Procedures (Cont)



TA475478

- (24) Install M977 towing shackle (27) on axle tiedown (28) with pin (29) and cotter pin (30).
- (25) Remove two 16-ft (5 m) safety chains (31) from stowage. Route safety chain through shackle (27). Attach grab hook (32) to chain.
- (26) Repeat steps (24) and (25) for other side of disabled vehicle.

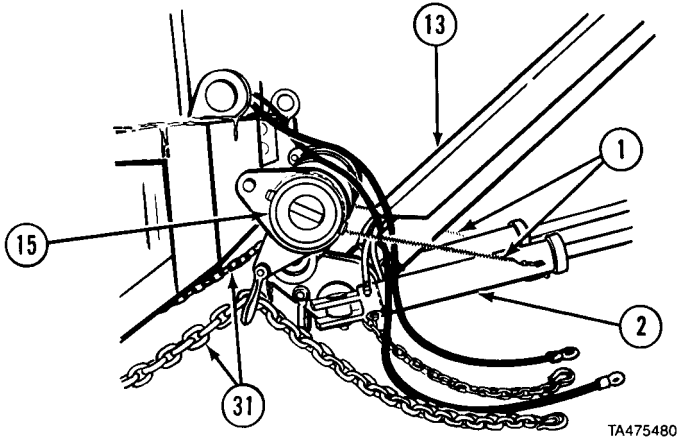


TA475479

- (27) Pull safety chain (31) tight and install on adapter grab hook (33).
- (28) Repeat step (27) for other side of disabled vehicle.
- (29) Release disabled vehicle parking brakes (refer to M520 operator's manual).

M984E1 General Operating Procedures (Cont)

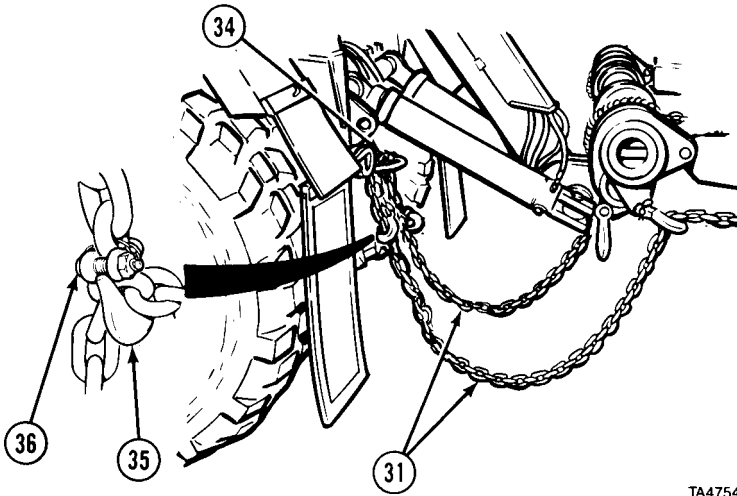
2-78. TOW M520 (CONT).



(30) Alternately, push in TOW and LIFT CYLINDER control levers until tow cylinders (2) are fully retracted.

(31) Push in LIFT CYLINDER control lever to retract lift cylinder (13) until slack is removed from safety chains (31).

(32) Disconnect two springs (1) from tow cylinders (2). Wrap two springs around lift tube (15) and secure.

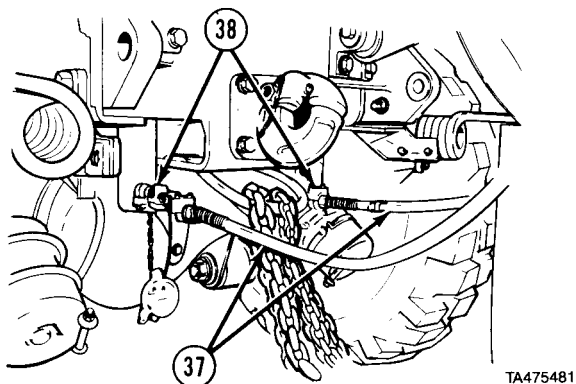


NOTE

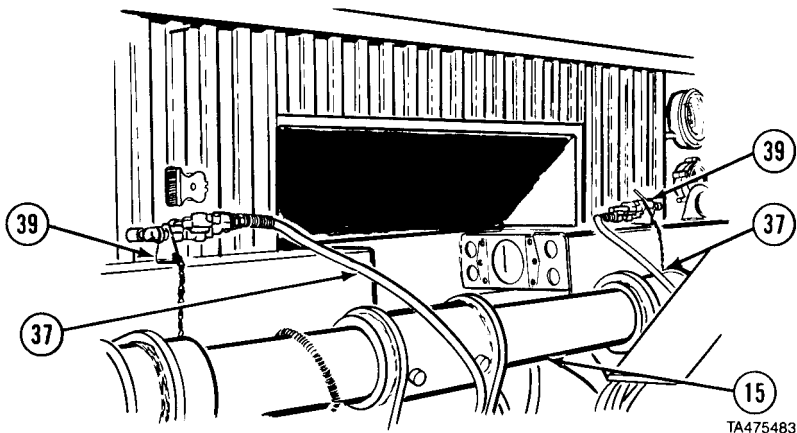
- Safety chains can be routed to towing shackles or safety chain hoop. Towing shackles can be used only when tow cylinders are extended.
- Adjust chain slack so safety chains just touch the ground.

(33) Route two safety chains (31) through safety chain hoop (34) on wrecker and secure grab hooks (35) with safety shackle (36).

M984E1 General Operating Procedures (Cont)



(34) Remove two airhoses (37) from stowage and attach to rear glad hands (38) on wrecker.



CAUTION

Do not route airhoses between retrieval cylinders or damage to airhoses may result.

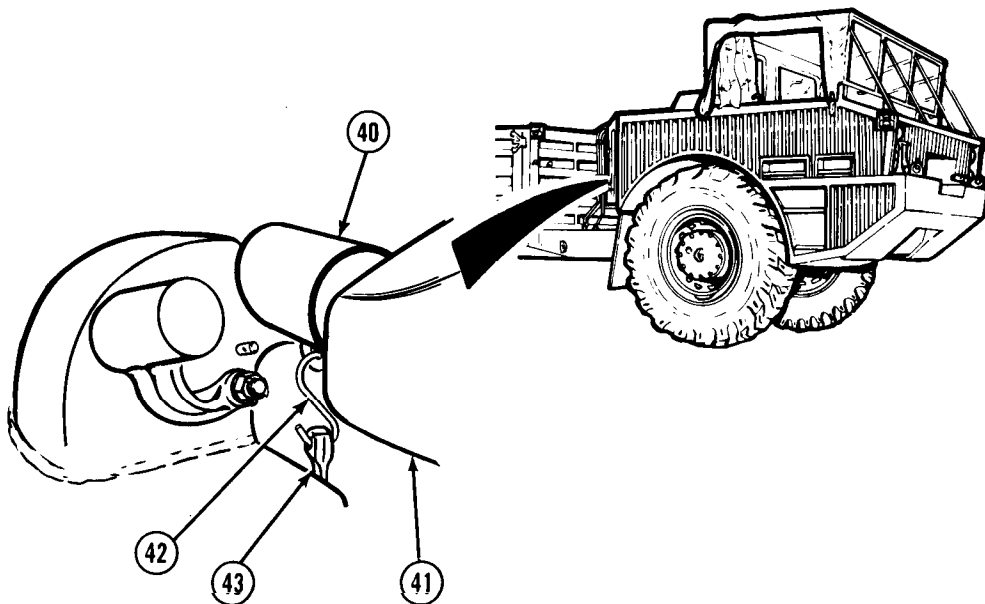
NOTE

Left rear airhose from wrecker must be connected to left front glad hand on disabled vehicle. Right rear airhose from wrecker must be connected to right front glad hand on disabled vehicle.

(35) Route two airhoses (37) over lift tube (15) and attach to front glad hands (39) on disabled vehicle.

M984E1 General Operating Procedures (Cont)

2-78. TOW M520 (CONT).



TA475484

WARNING

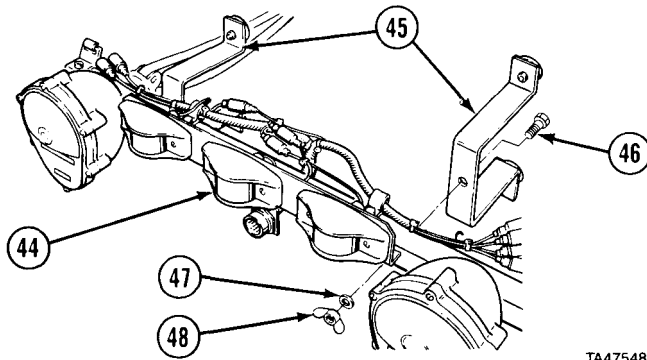
Front and rear sections pivot. Use extreme care when placing roll stops in roll joint. Hands could become pinched in roll joint causing serious injury.

NOTE

- Disabled vehicle roll stops must be in unlocked position before installing towing roll stops.
- Right side shown.

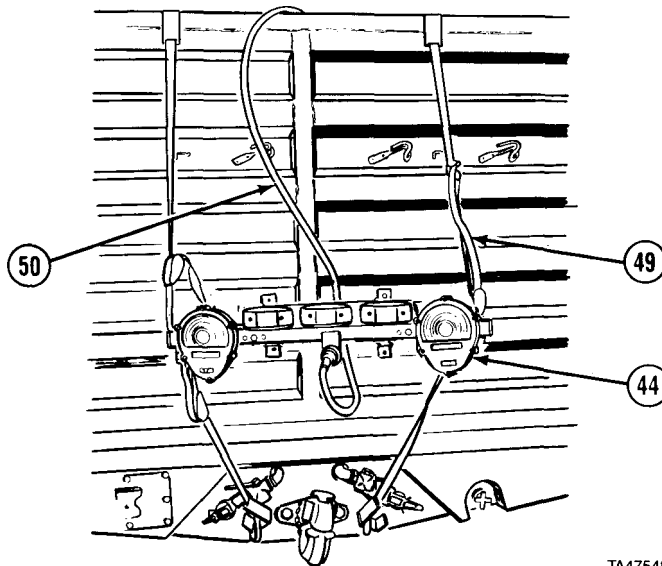
- (36) Position towing roll stop (40) in roll joint (41) flat side out.
- (37) Attach grab hook (42) to ear on towing roll stop (40).
- (38) Pull strap (43) under roll joint (41) and attach to other towing roll stop (40).
- (39) Prepare disabled vehicle for towing (refer to M520 operator's manual).

M984E1 General Operating Procedures (Cont)



TA475485

- (40) Remove emergency tow lights (44) and two brackets (45) from stowage.
- (41) Install two brackets (45) in center holes of emergency tow lights (44) with two screws (46), washers (47), and nut (48).

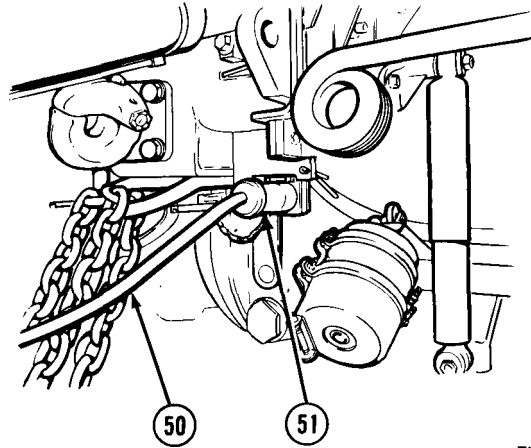


TA475486

- (42) Install emergency tow lights (44) on rear of disabled vehicle and fasten securely with straps (49).
- (43) Remove tow light cable (50) from stowage and connect to emergency tow lights (44).

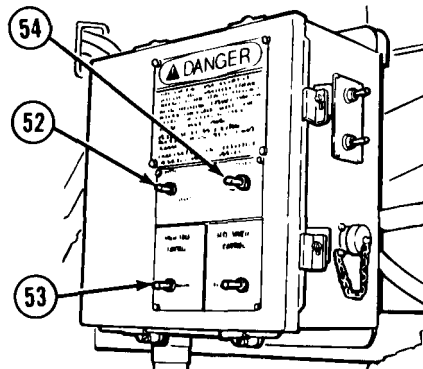
M984E1 General Operating Procedures (Cont)

2-78. TOW M520 (CONT).



TA475487

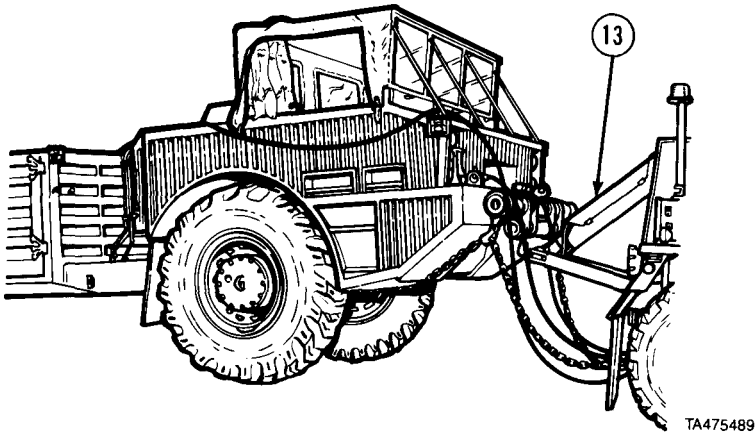
- (44) Route other end of tow light cable (50) to rear electrical connector (51) on wrecker.



TA475488

- (45) Set POWER switch (52) to ON position.
- (46) Set HIGH IDLE switch (53) to CONTINUOUS.
- (47) Push and release LATCH switch (54). Engine speed will increase to approximately 1500 rpm.

M984E1 General Operating Procedures (Cont)

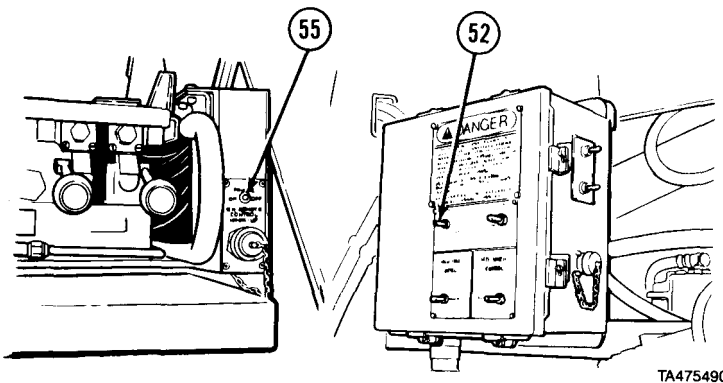
WARNING

Keep out from under retrieval system and disabled vehicle when raised off ground or personal injury or death may result.

CAUTION

- Fully retract both tow cylinders before lifting disabled vehicle or equipment damage may result.
- Make sure all rigging is secure. Loose rigging can become entangled and cause damage to equipment.

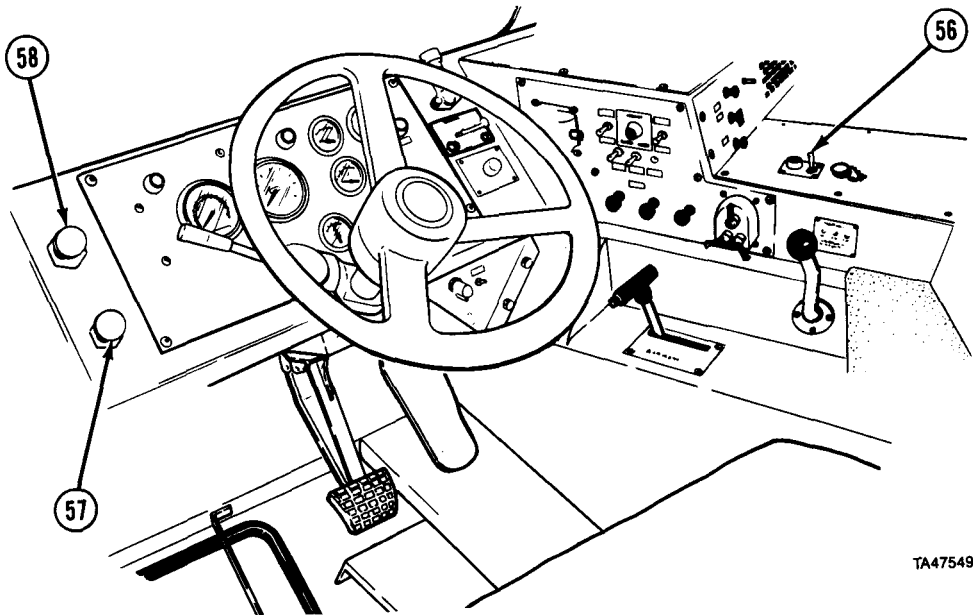
(48) Retract lift cylinder (13) fully to raise disabled vehicle off ground.



- (49) Set POWER switch (52) to OFF position.
 (50) Set POWER switch (55) to OFF position.

M984E1 General Operating Procedures (Cont)

2-78. TOW M520 (CONT.)



TA475491

- (51) Set PTO ENGAGE switch (56) to OFF position.
- (52) Push in TRAILER AIR SUPPLY control (57).
- (53) Turn on service drive lights (para 2-10d).
- (54) Turn on emergency flashers on wrecker (para 2-44a) and disabled vehicle.
- (55) Push in PARKING BRAKE control (58) and select desired gear (para 2-11e).

WARNING

The M984E1 should not be operated at speeds over 15 mph except on paved roads when the operator determines that the vehicle being towed and the terrain allow safe operation. Engine brake stich must be "ON" for all towing operations. The following are maximum safe speeds

Terrain Condition	Maximum speed, towed	
	load up to 50,000 lbs	load above 50,000 lbs
on road-level	35	30
on road-hilly	30	20
off road	15	15

Speeds in excess of the above can result in loss of control, serious injury or death.

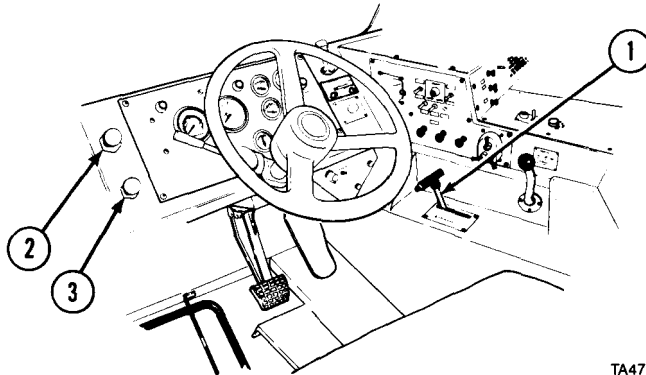
- (56) Transport disabled vehicle.

M984E1 General Operating Procedures (Cont)

b. Front Disconnect.

NOTE

This is a two-soldier task.



TA475492

- (1) Set transmission range selector (1) to N.
- (2) Pull PARKING BRAKE control (2).
- (3) Pull TRAILER AIR SUPPLY control (3).

WARNING

Do not stand between vehicles while disabled vehicle is raised off ground. Falling vehicle can cause serious injury or death.

NOTE

After lowering disabled vehicle, extend lift and tow cylinders approximately 12 in. (30 cm) to allow for adjustment when removing adapters.

- (4) Prepare retrieval system for operation (para 2-72) and pull LIFT CYLINDER control lever to extend lift cylinder and lower towed vehicle to ground until safety chain at front axle is slack.

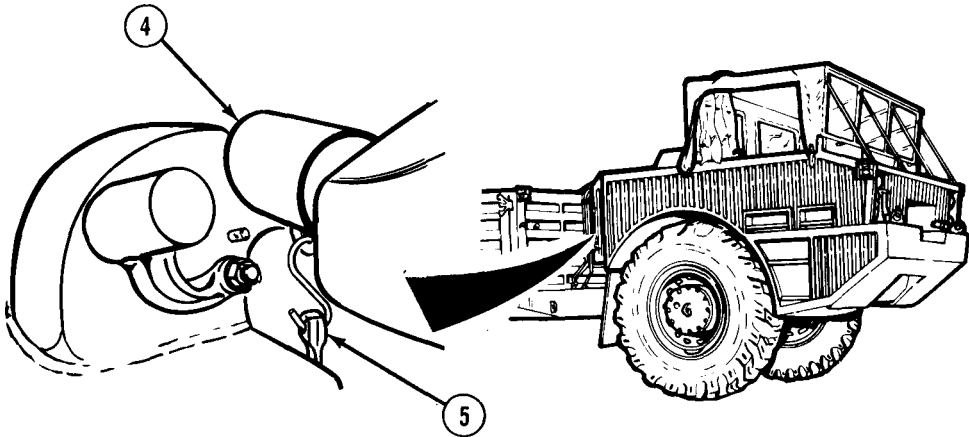
WARNING

If disabled vehicle's parking brake is inoperative, chock wheels of disabled vehicle. Failure to chock wheels may result in personal injury.

- (5) Apply PARKING BRAKE on disabled vehicle. If parking brake is inoperative, chock wheels on disabled vehicle.

M984E1 General Operating Procedures (Cont)

2-78. TOW M520 (CONT).



TA475493

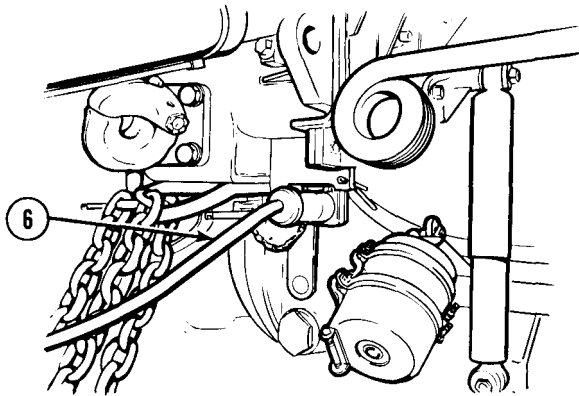
WARNING

Front and rear sections pivot. Use extreme care when removing roll stops from roll joints. Hands could become pinched in roll joint causing serious injury.

NOTE

Right side shown.

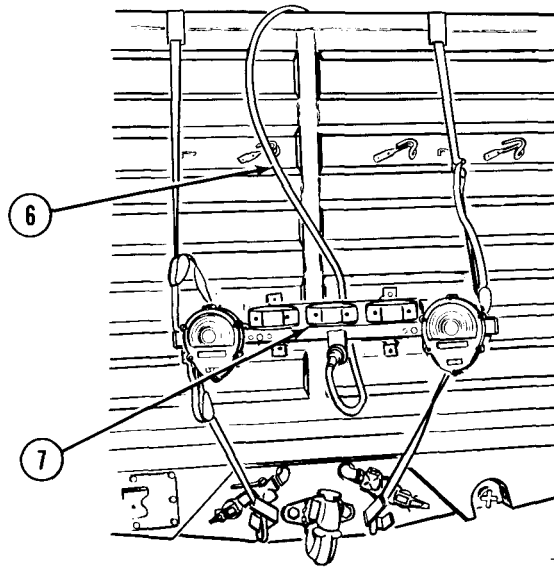
- (6) Remove and stow towing roll stops (4) and strap (5).



TA475494

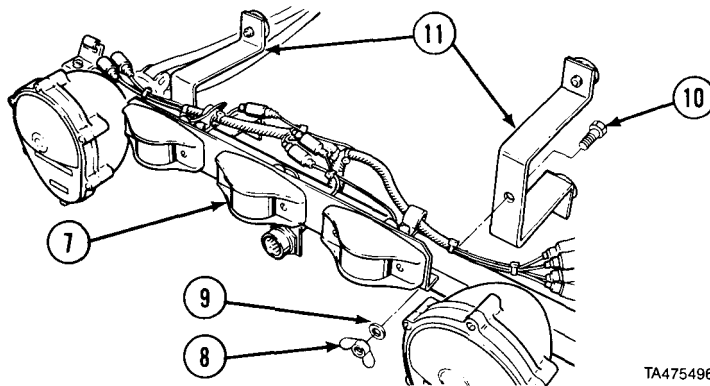
- (7) Remove tow light cable (6) from wrecker.

M984E1 General Operating Procedures (Cont)



TA475495

- (8) Remove tow light cable (6) from emergency tow lights (7) and stow.
- (9) Remove emergency tow lights (7).

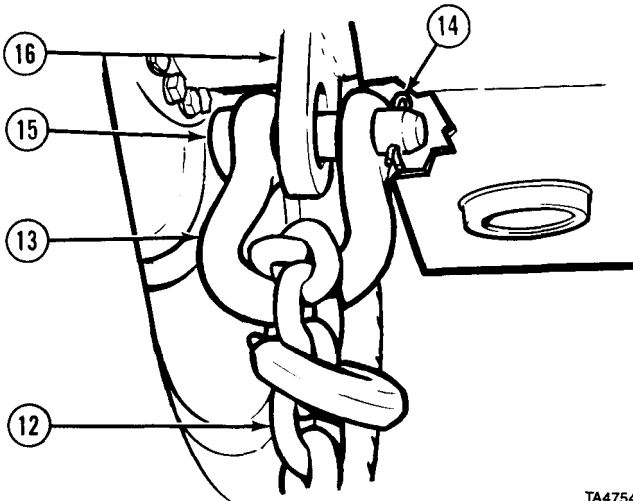


TA475496

- (10) Remove two nuts (8), washers (9), screws (10), and brackets (11) from emergency tow lights (7). Stow emergency tow lights and brackets.

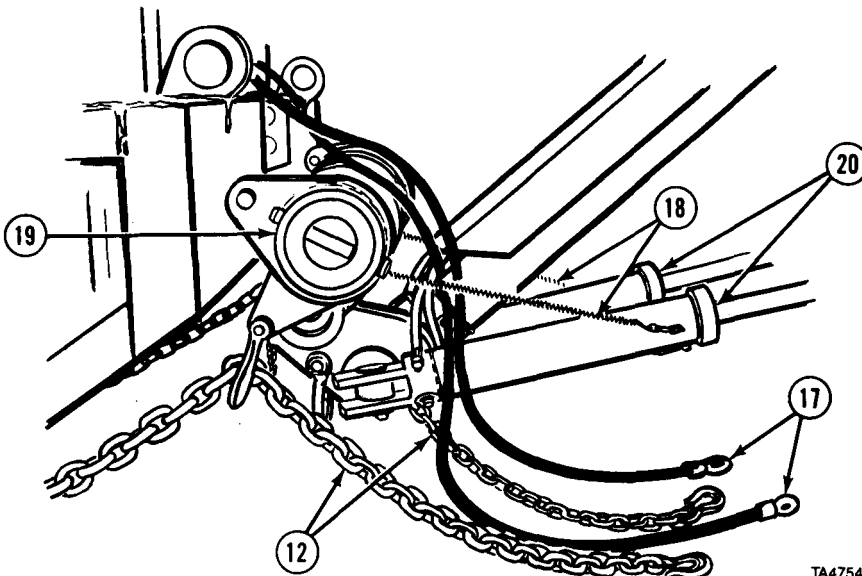
M984E1 General Operating Procedures (Cont)

2-78. TOW M520 (CONT).



TA475497

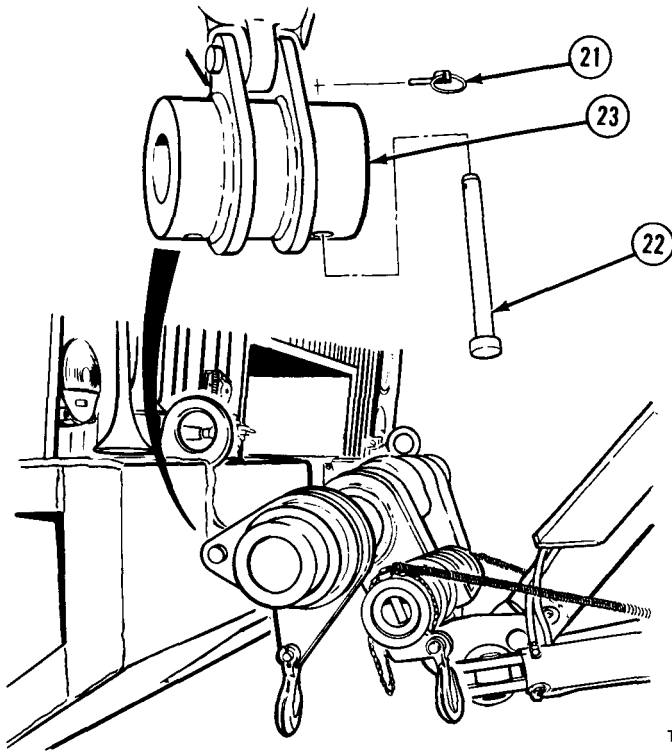
- (11) Disconnect safety chain (12) from shackle (13).
- (12) Remove cotter pin (14), pin (15), and shackle (13) from axle tiedown (16).
- (13) Repeat steps (11) and (12) for other side of disabled vehicle.



TA475499

- (14) Remove and stow two safety chains (12) and airhoses (17).
- (15) Unwrap two springs (18) from lift tube (19).
- (16) Connect two springs (18) to tow cylinders (20).

M984E1 General Operating Procedures (Cont)



TA475498

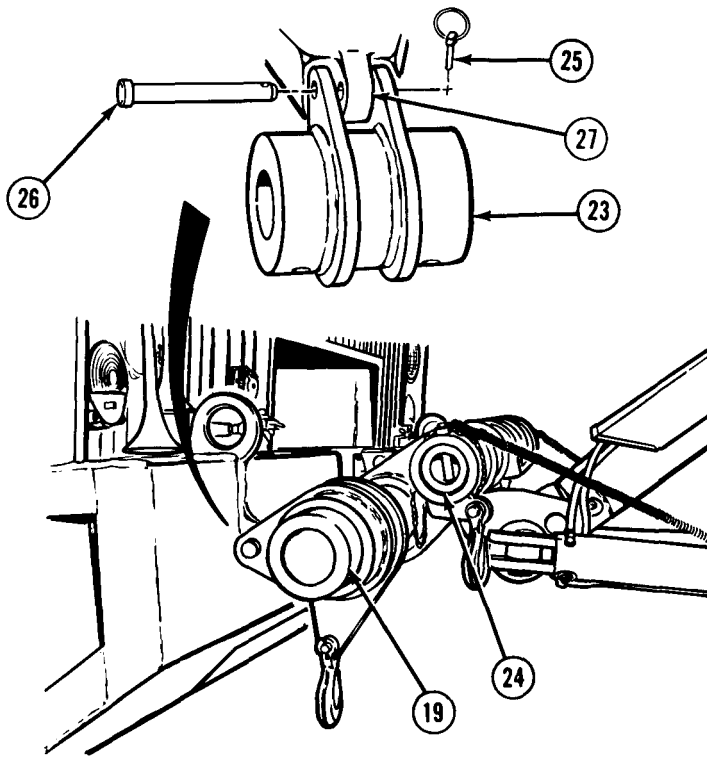
NOTE

- Use retrieval controls to position lift tube to relieve tension from adapters.
- Right and left adapter pins are removed the same way. Right side shown.

(17) Remove two quick pins (21) and pins (22) from tow adapters (23).

M984E1 General Operating Procedures (Cont)

2-78. TOW M520 (CONT).



TA475500

(18) Operate retrieval controls (para 2-72b) and move crosstube (24) up and over lift tube (19).

WARNING

Tow assembly is very heavy. When pins are removed, tow assembly could swing causing personal injury.

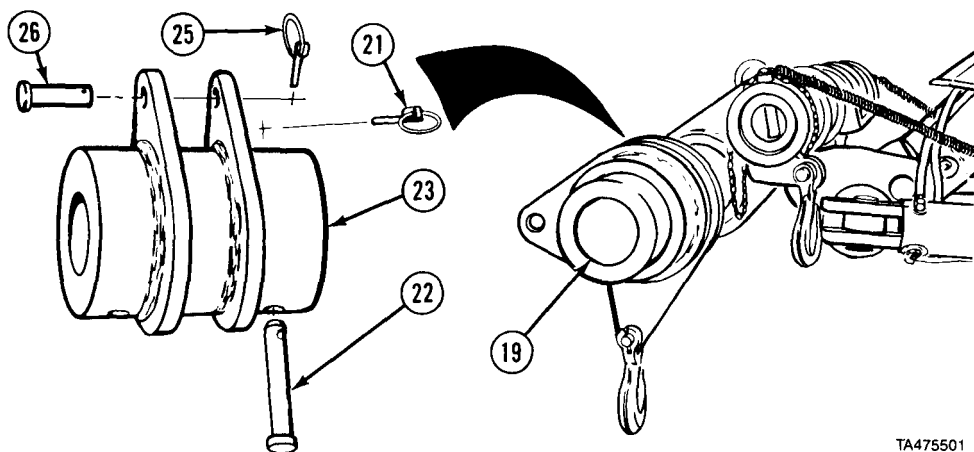
NOTE

- Use retrieval controls to position lift tube to relieve tension from adapters.
- Right and left adapter pins are removed the same way. Right side shown.

(19) Remove quick pin (25) and pin (26) from adapter (23) and tow eye (27).

(20) Remove two adapters (23) from lift tube (19).

M984E1 General Operating Procedures (Cont)

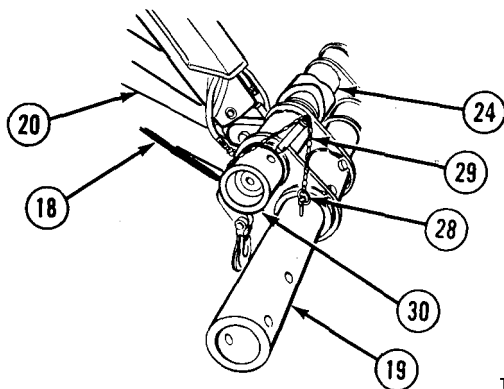


TA475501

NOTE

Right and left adapters are removed the same way.
Right side shown.

- (21) Drive wrecker forward several feet and park (para 2-11o).
- (22) Install two pins (22) and quick pins (21) in two adapters (23). Install pins (26) and quick pins (25) in two adapters and stow.



TA475502

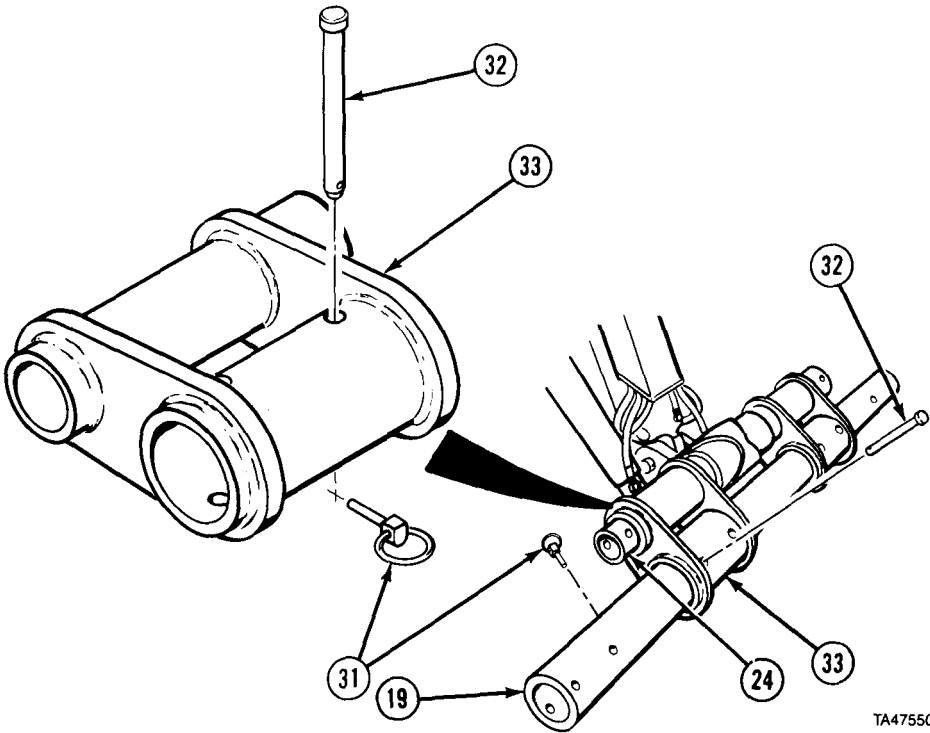
CAUTION

Do not contact pintle hook with lift cylinder.
Equipment damage could result.

- (23) Lower lift tube (19) to ground.
- (24) Disconnect two springs (18) from tow cylinders (20).
- (25) Remove two quick pins (28), pins (29), and end caps (30) from crosstube (24).

M984E1 General Operating Procedures (Cont)

2-78. TOW M520 (CONT).



TA475503

WARNING

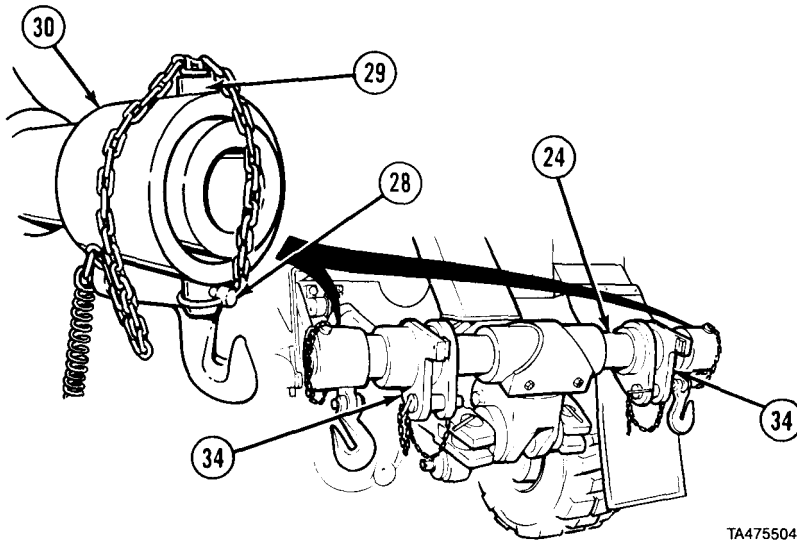
Tube connectors are heavy. Do not drop or personal injury could result.

NOTE

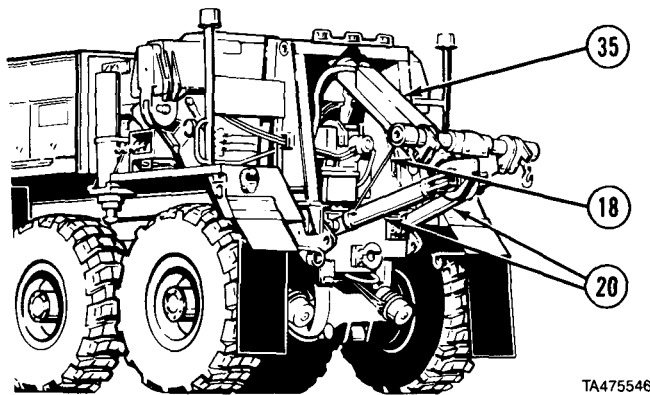
Both tube connectors removed same way. Left side shown.

- (26) Remove two quick pins (31), pins (32), and two tube connectors (33) from crosstube (24) and lift tube (19).
- (27) Install two pins (32) and quick pins (31) in two tube connectors (33) and stow.
- (28) Use cargo tiedown strap and crane to return lift tube (19) to stowage.

M984E1 General Operating Procedures (Cont)



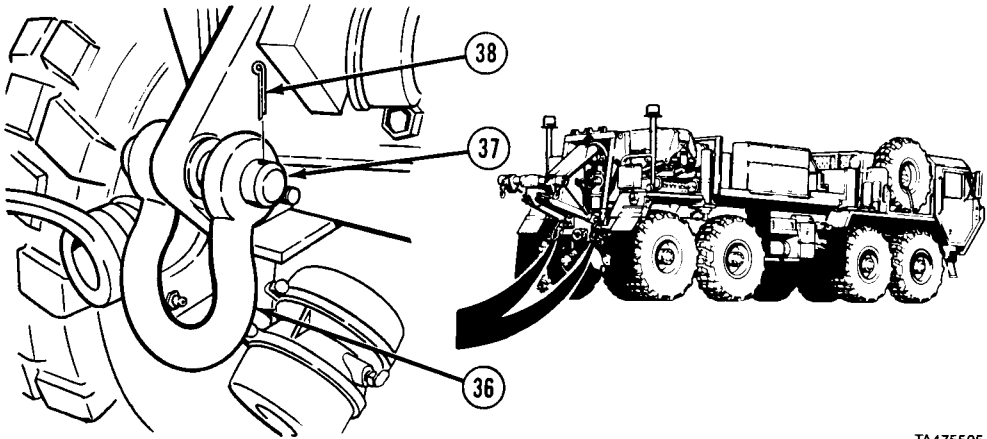
- (29) Install two M977 front adapters (34) on crosstube (24). Install two end caps (30) on crosstube (24). Install two pins (29) and quick pins (28).



- (30) Install two springs (18) on tow cylinders (20).
 (31) Operate retrieval controls and fully retract lift cylinder (35) and tow cylinder (20).

M984E1 General Operating Procedures (Cont)

2-78. TOW M520 (CONT).

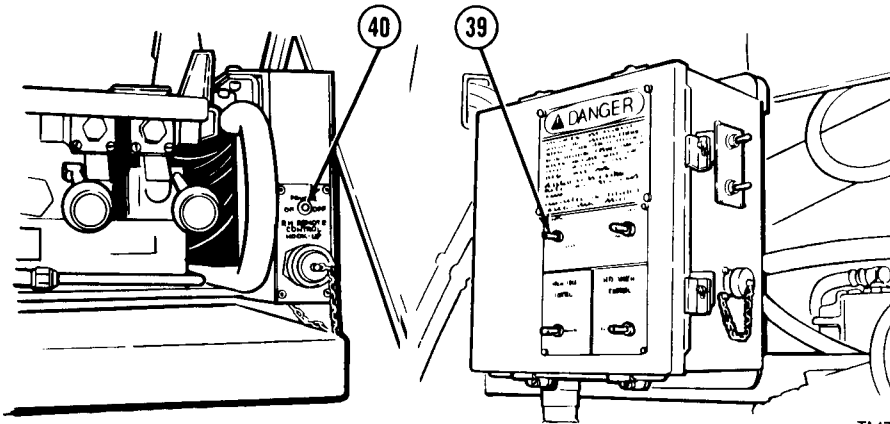


TA475505

NOTE

Right and left towing shackles are installed the same way.

(32) Install two towing shackles (36), pins (37), and cotter pins (38).

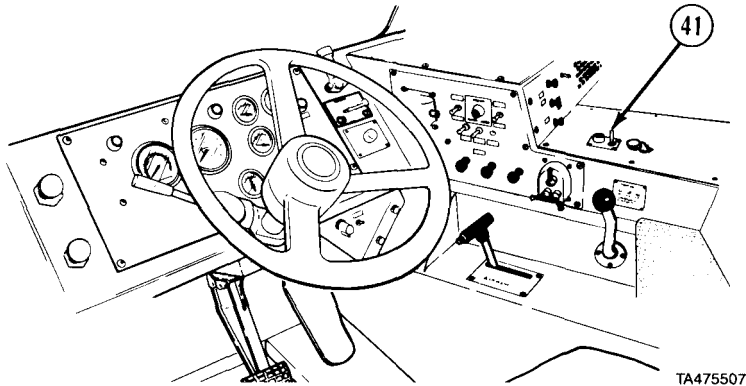


TA475506

(33) Set POWER switch (39) to OFF position.

(34) Set POWER switch (40) to OFF position.

M984E1 General Operating Procedures (Cont)



- (35) Turn off emergency flashers on wrecker and disabled vehicle (para 2-44f).
- (36) Turn off service drive lights (para 2-10d).
- (37) Set PTO ENGAGE switch (41) to OFF position.
- (38) Remove and stow beacon lights (para 2-62).
- (39) Shut off engine (para 2-11P).
- (40) Return crane to stowage (para 2-63).

c. Rear Hookup.

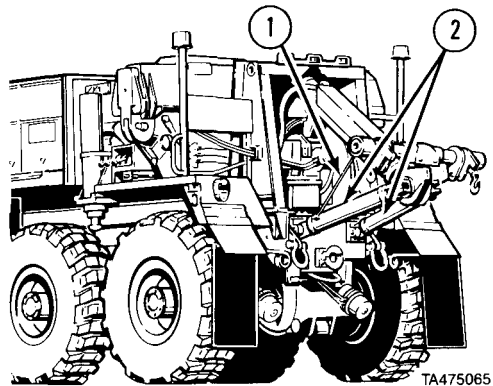
NOTE

This is a two-soldier task.

- (1) Prepare retrieval system for operation (para 2-72).

WARNING

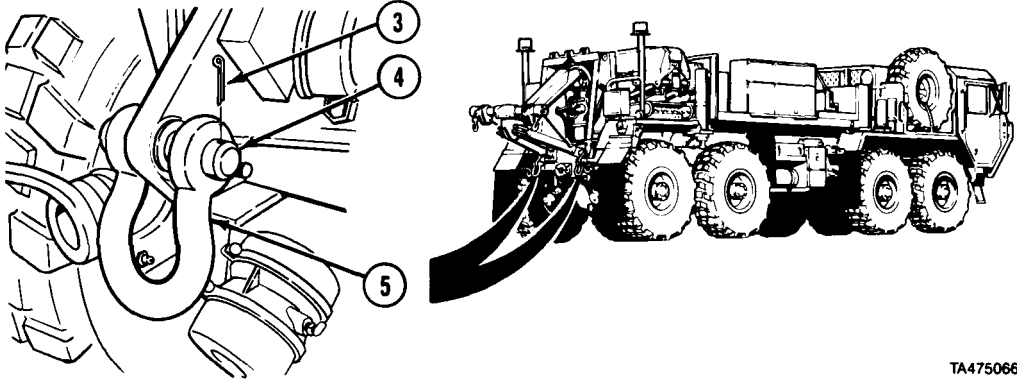
- Hold crosstube when removing springs. Crosstube may swing or cause adapters to slide resulting in personal injury.
- InterVehicular air lines are not connected when towing from rear. Disabled vehicle will not have braking. Use extreme caution when transporting disabled vehicle using rear hookup. Vehicle traveling out of control can cause serious injury or death.



- (2) Disconnect two springs (1) from tow cylinders (2).

M984E1 General Operating Procedures (Cont)

2-78. TOW M520 (CONT).

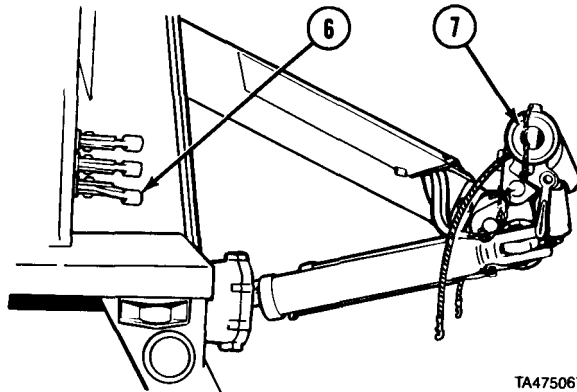


TA475066

NOTE

Right and left towing shackles are removed the same way.

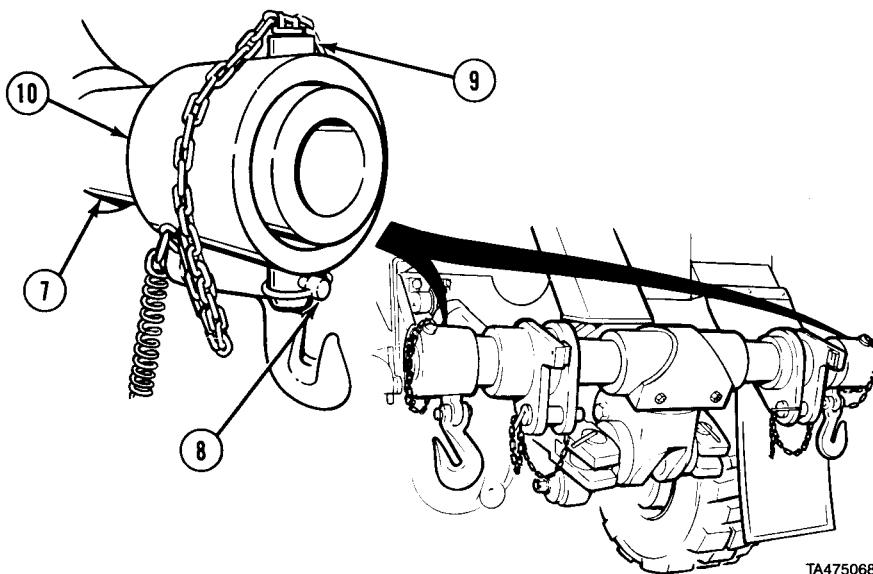
- (3) Remove two cotter pins (3), pins (4), and towing shackles (5). Stow on equipment body floor.



TA475067

- (4) Pull LIFT CYLINDER control lever (6) to lower crosstube (7) to approximately 3 ft (1 m) above ground.
- (5) Position wrecker so that crosstube (7) is approximately 1 ft (30 cm) from tow eyes of disabled vehicle and centered on disabled vehicle.

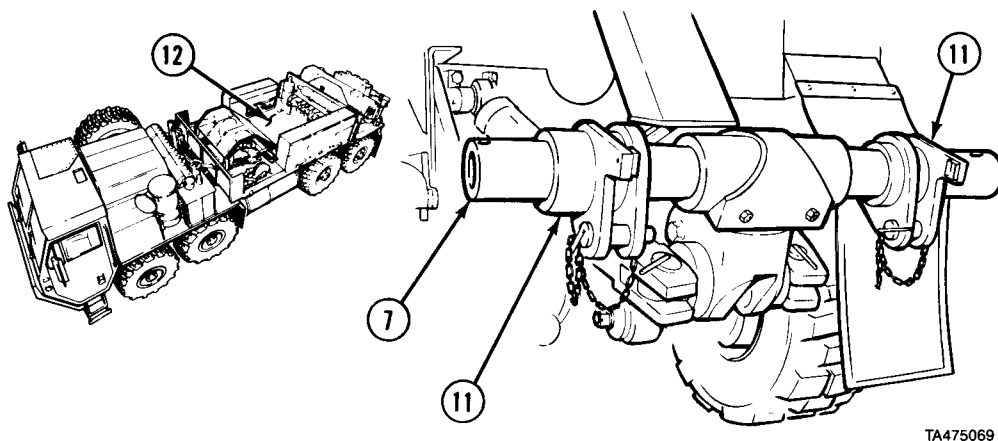
M984E1 General Operating Procedures (Cont)



WARNING

When end caps are removed from crosstube, adapters may slide off causing personal injury.

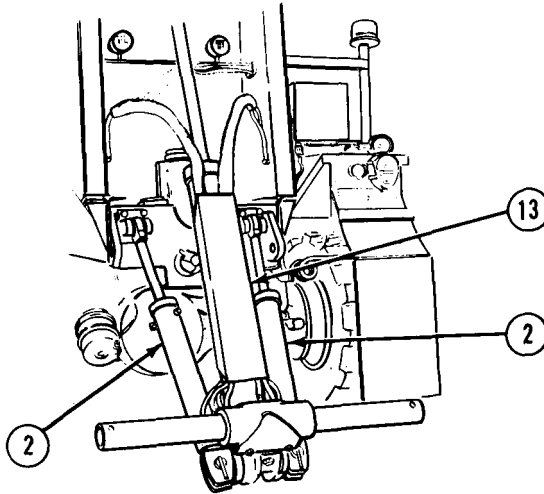
- (6) Remove two quick pins (8) and pins (9) from end caps (10).
- (7) Remove two end caps (10) from crosstube (7).



- (8) Remove two M977 front adapters (11) from crosstube (7) and place on equipment body floor (12).
- (9) Remove M520 towing adapters from equipment body floor (12).

M984E1 General Operating Procedures (Cont)

2-78. TOW M520 (CONT).

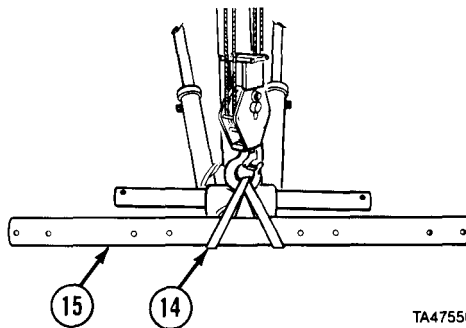


TA475508

CAUTION

Do not contact pintle hook with lift cylinder. Equipment damage may result.

- (10) Extend both tow cylinders (2) approximately 1 ft (30 cm). Extend lift cylinder (13) until bottom of retrieval assembly is approximately 2 in. (51 mm) above ground.



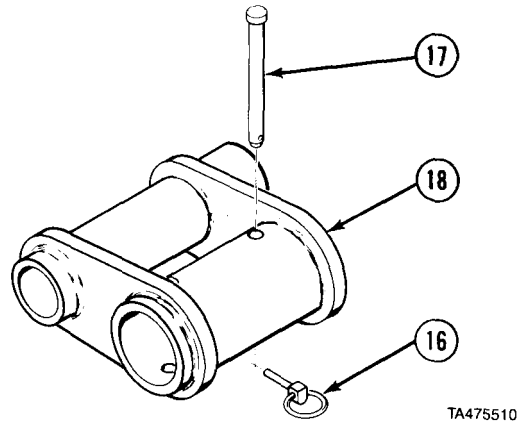
TA475509

WARNING

Keep boom clear of electrical lines and other obstacles while operating crane. Serious injury or death could result upon contact.

- (11) Remove cargo tiedown strap (14) from stowage and attach to center of lift tube (15). Operate crane (para 2-63) and position lift tube on ground. Remove and stow cargo tiedown strap.

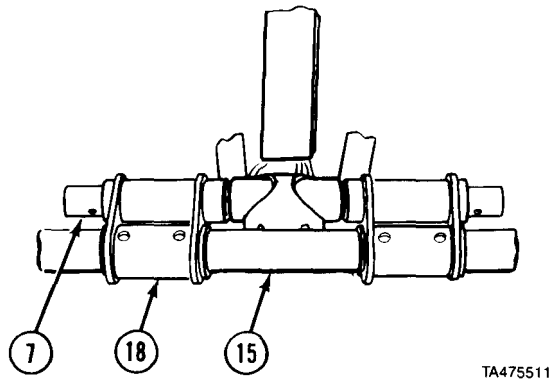
M984E1 General Operating Procedures (Cont)



NOTE

Both tube supports are the same. One tube support shown .

(12) Remove two quick pins (16) and pins (17) from tube supports (18).



WARNING

Tube connectors are heavy. Do not drop or personal injury could result.

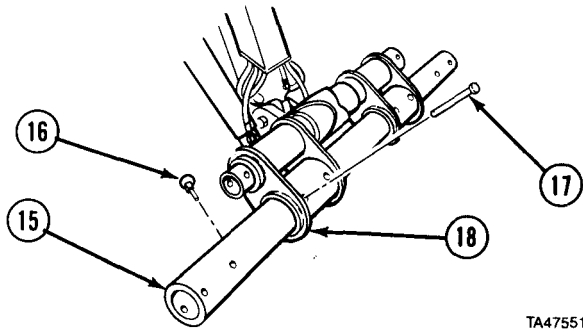
NOTE

Tube connectors and crosstube may have to be repositioned several times to aid installation.

(13) Aline and install two tube supports (18) on lift tube (15) and crosstube (7).

M984E1 General Operating Procedures (Cont)

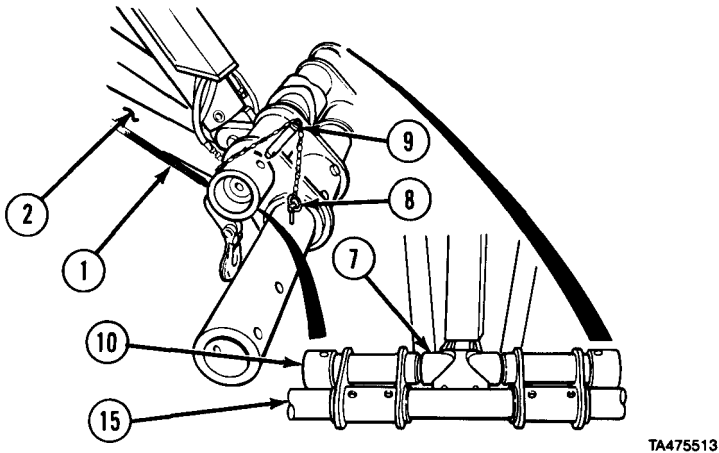
2-78. TOW M520 (CONT).



NOTE

Lift tube may have to be rotated to aline holes in lift tube with holes in tube supports.

- (14) Aline holes in lift tube (15) with holes in two tube supports (18) and install pins (17) and quick pins (16).
- (15) Stow crane (para 2-63).



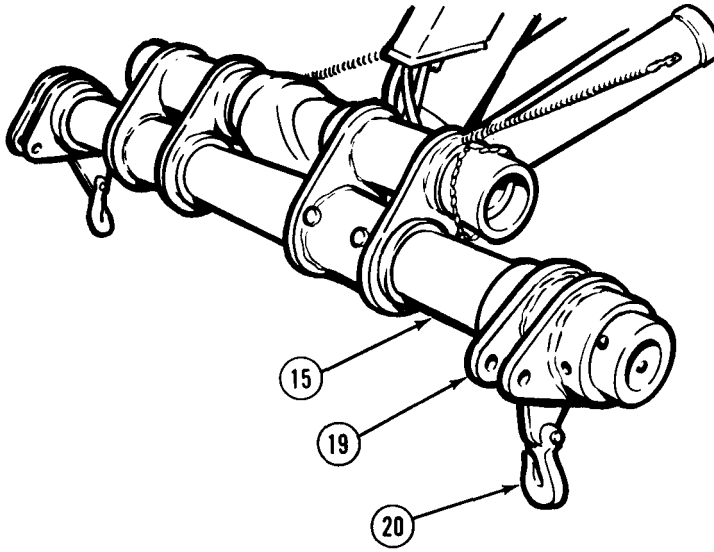
- (16) Using retrieval controls retract tow cylinders (2) fully and raise lift tube (15) approximately 4 ft (1.2 m) off ground.

NOTE

End caps will hang over end of crosstube for M520 adapters.

- (17) Install two end caps (10) on crosstube (7) and install pins (9), quick pins (8), and springs (1).
- (18) Back up wrecker until lift tube (15) is approximately 1 ft (30 cm) from rear tow eyes on disabled vehicle.

M984E1 General Operating Procedures (Cont)



TA475514

WARNING

Adapters may slide off when installing and may cause personal injury.

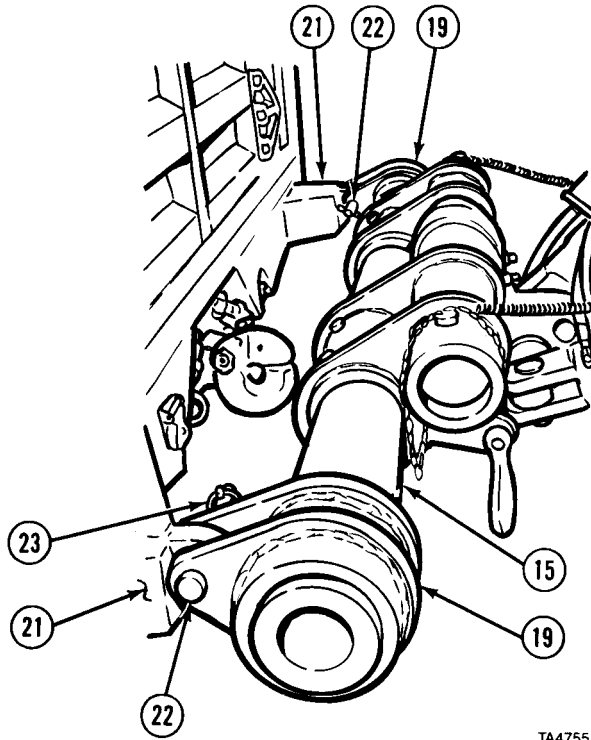
NOTE

- Do not pin adapters to lift tube.
- Pins and quick pins must be removed from adapters before they are installed on lift tube.

(19) Install two adapters (19) on lift tube (15) with grab hooks (20) facing in.

M984E1 General Operating Procedures (Cont)

2-78. TOW M520 (CONT).



TA475515

WARNING

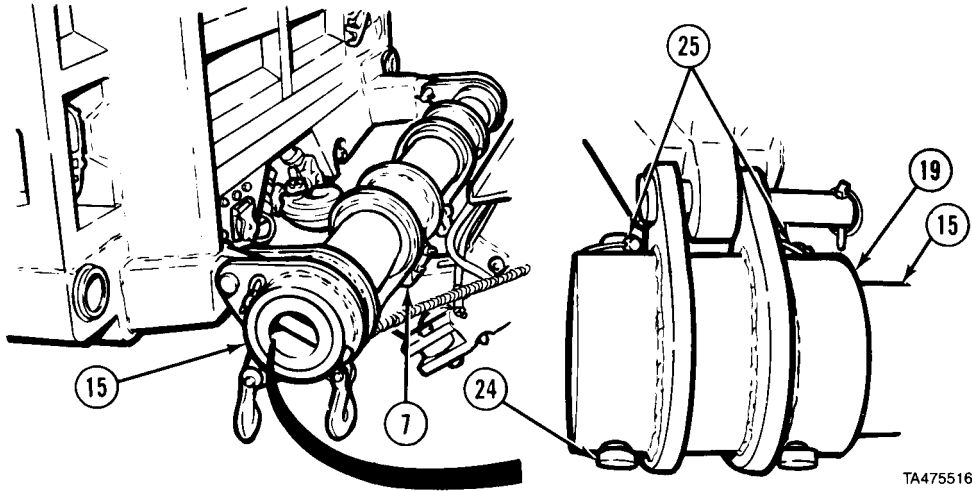
Keep hands and fingers away from adapters when operating retriever controls. Personal injury could result.

NOTE

If disabled vehicle has towing shackles installed, remove shackles and stow in disabled vehicle,

- (20) Soldier A operates retrieval system (para 2-72) while Soldier A and Soldier B position lift tube (15) so holes in adapters (19) align with rear tow eyes (21).
- (21) Insert two pins (22) through adapters (19) and tow eyes (21) and install quick pins (23) in pins.

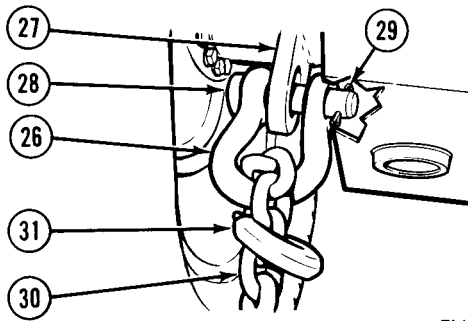
M984E1 General Operating Procedures (Cont)



NOTE

Right and left adapters are installed the same way.
Right side shown.

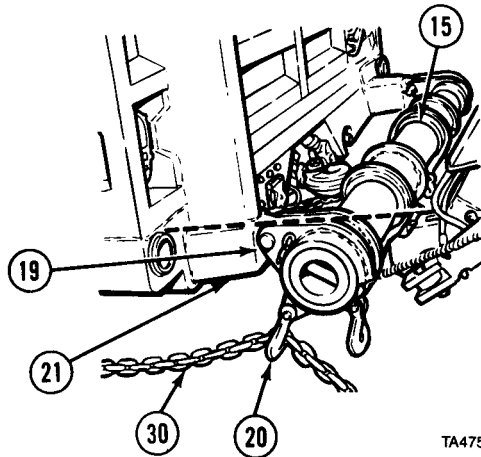
- (22) Soldier A operates retrieval system (para 2-72) and moves crosstube (7) down and under lift tube (15) until adapter (19) and lift tube holes align.
- (23) Soldier A continues to operate retrieval system while Soldier A and Soldier B insert two pins (24) through adapter (19), lift tube (15), and install quick pins (25) in pins.



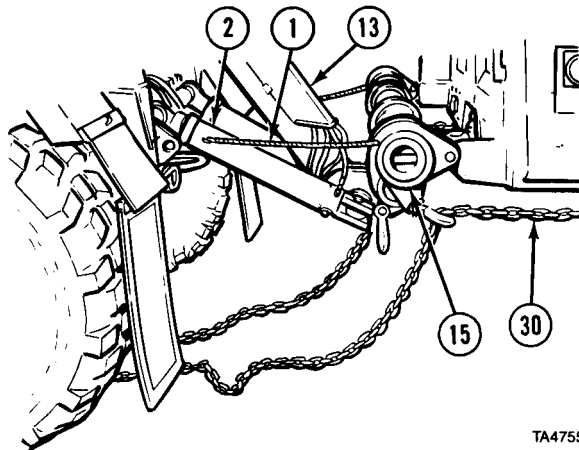
- (24) Install towing shackle (26) on axle tiedown (27) with pin (28) and cotter pin (29).
- (25) Remove two 16-ft (5 m) safety chains (30) from stowage. Route safety chain through shackle (26). Attach grab hook (31) to chain.
- (26) Repeat steps (24) and (25) for other side of disabled vehicle.

M984E1 General Operating Procedures (Cont)

2-78. TOW M520 (CONT).

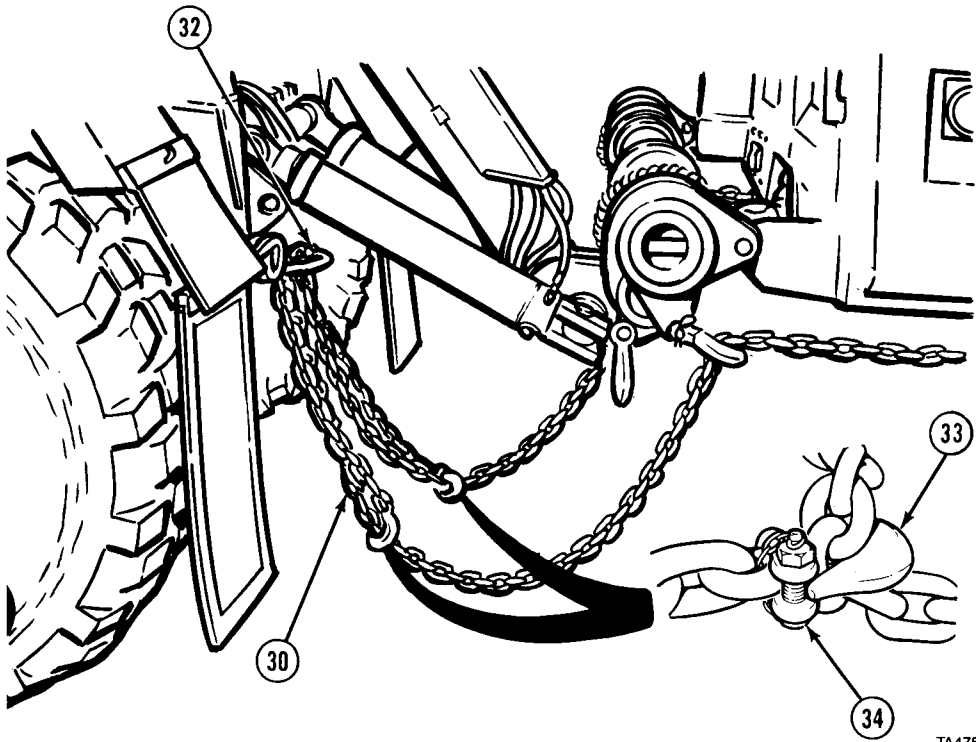


- (27) Using retrieval controls, raise lift tube (15) until adapter (19) is even with top of tow eye (21).
- (28) Pull safety chain (30) tight and install on adapter grab hook (20).
- (29) Repeat step (28) for other side of disabled vehicle.
- (30) Release disabled vehicle parking brake (refer to M520 operator's manual).



- (31) Alternately, push in TOW and LIFT CYLINDER control levers until tow cylinders (2) are fully retracted.
- (32) Push in LIFT CYLINDER control lever to retract lift cylinder (13) until slack is removed from safety chains (30).
- (33) Disconnect two springs (1) from tow cylinder (2). Wrap springs around lift tube (15) and secure.

M984E1 General Operating Procedures (Cont)



TA475520

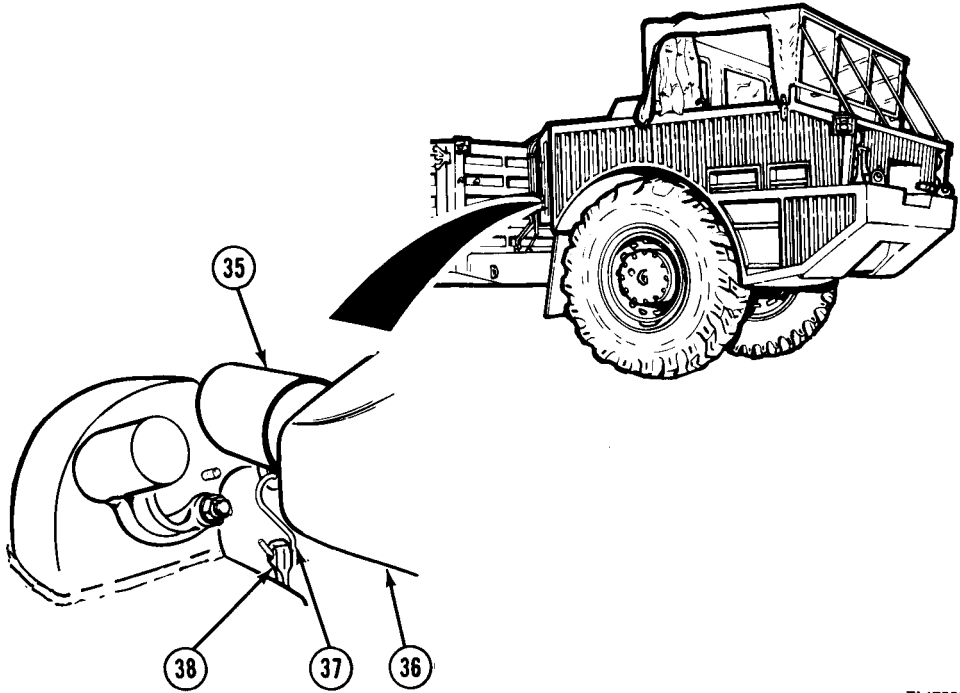
NOTE

- Safety chains can be routed to towing shackles or safety chain hoop. Towing shackles can be used only when tow cylinders are extended.
- Adjust chain slack so chains are approximately 1 in. (25 mm) above ground.

(34) Route two safety chains (30) through safety chain hoop (32) on wrecker and secure grab hooks (33) with safety shackle (34).

M984E1 General Operating Procedures (Cont)

2-78. TOW M520 (CONT).



TA475521

WARNING

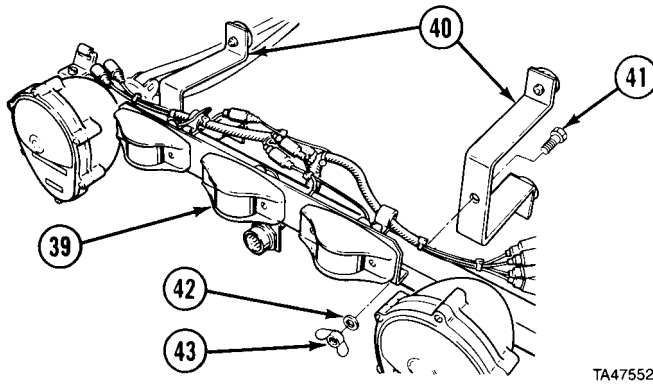
Front and rear sections pivot. Use extreme care when placing roll stops in roll joint. Hands could become pinched in roll joint causing serious injury.

NOTE

Disabled vehicle roll stops must be in unlocked position before installing towing roll stops.

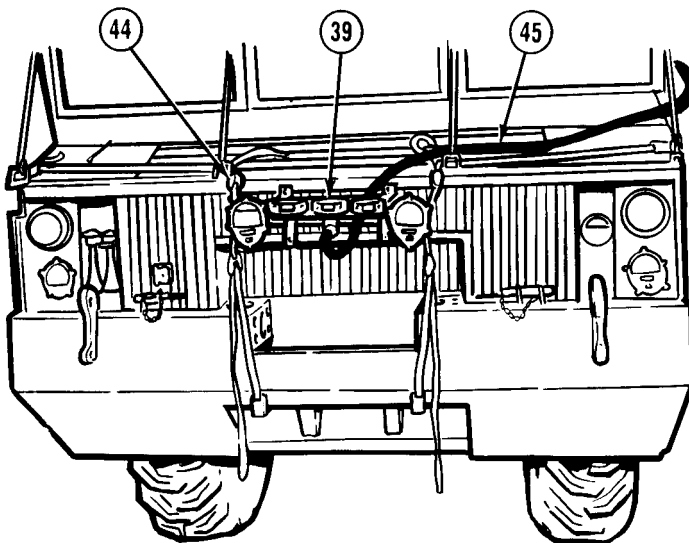
- (35) Position two towing roll stops (35) in roll joint (36) flat side out.
- (36) Attach grab hook (37) to ear on towing roll stop (35).
- (37) Pull strap (38) under roll joint (36) and attach to other towing roll stop (35).
- (38) Prepare disabled vehicle for towing (refer to M520 vehicle operator's manual).

M984E1 General Operating Procedures (Cont)



TA475522

- (39) Remove emergency tow lights (39) and two brackets (40) from stowage.
- (40) Install two brackets (40) in center holes of emergency tow lights (39) with two screws (41), washers (42), and nuts (43).

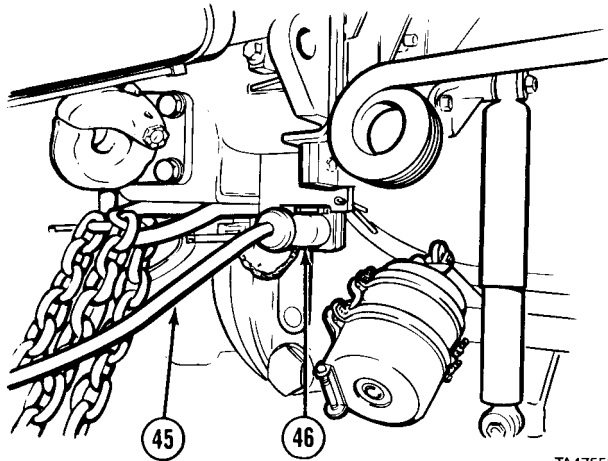


TA475523

- (41) Install emergency tow lights (39) on front of disabled vehicle and fasten securely with straps (44).
- (42) Remove tow light cable (45) from stowage and connect to emergency tow lights (39).

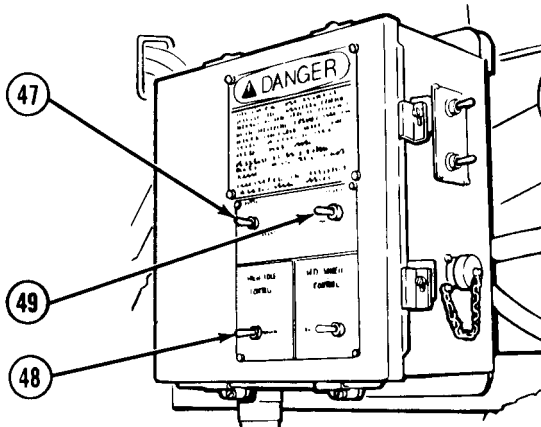
M984E1 General Operating Procedures (Cont)

2-78. TOW M520 (CONT).



TA475524

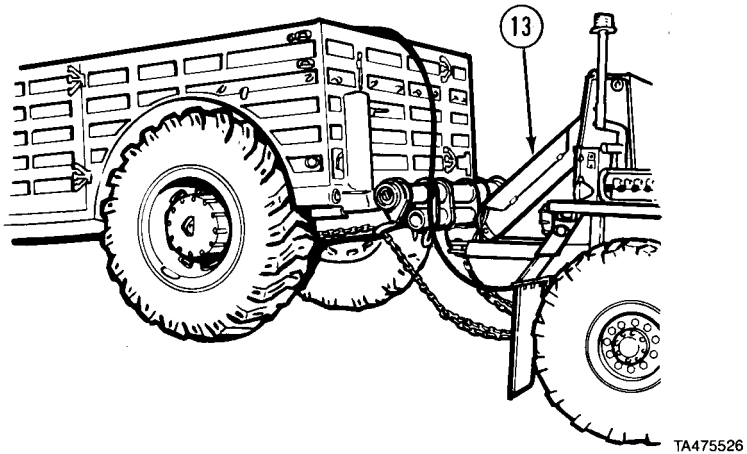
- (43) Route other end of tow light cable (45) to rear electrical connector (46) on wrecker.



TA475525

- (44) Set POWER switch (47) to ON position.
- (45) Set HIGH IDLE switch (48) to CONTINUOUS.
- (46) Push and release LATCH switch (49). Engine speed will increase to approximately 1500 rpm.

M984E1 General Operating Procedures (Cont)



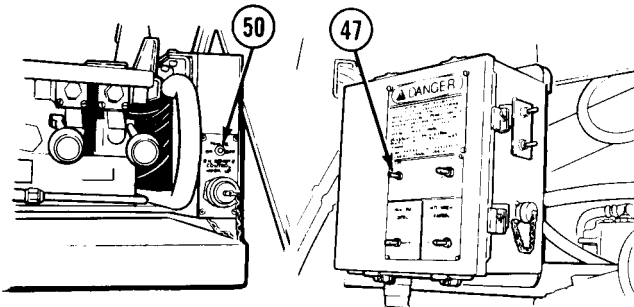
WARNING

Keep out from under retrieval system and disabled vehicle when raised off ground or personal injury or death may result.

CAUTION

- Fully retract both tow cylinders before lifting disabled vehicle or equipment damage may result.
- Make sure all rigging is secure. Loose rigging can become entangled and cause damage to equipment.

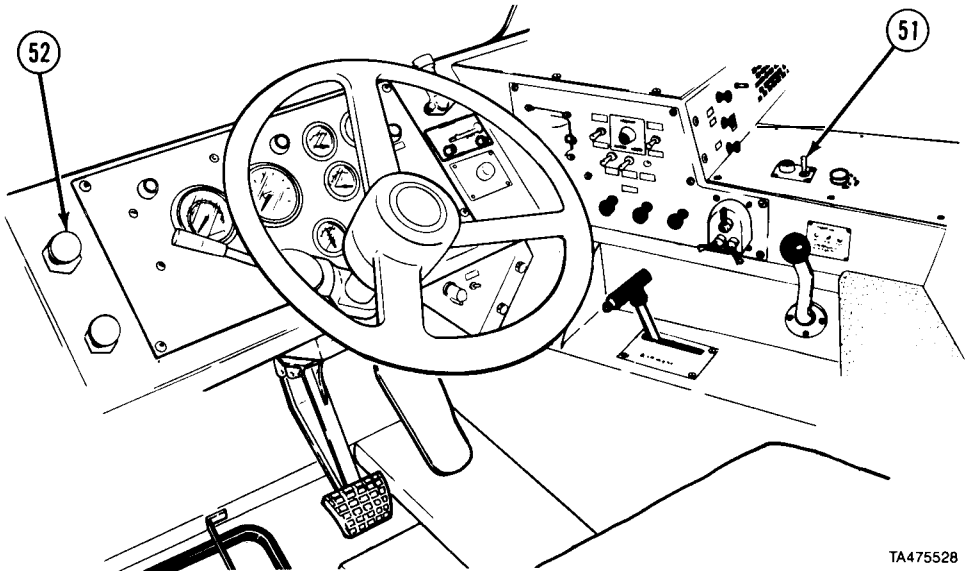
(47) Push in LIFT CYLINDER control lever to retract lift cylinder (13) to raise disabled vehicle approximately 1.5 ft (45 cm) off ground.



- (48) Set POWER switch (47) to OFF position.
 (49) Set POWER switch (50) to OFF position.

M984E1 General Operating Procedures (Cont)

2-78. TOW M520 (CONT).



TA475528

- (50) Set PTO ENGAGE switch (51) to OFF position.
- (51) Turn on service drive lights (para 2-10d).
- (52) Turn on emergency flashers on wrecker (para 2-44a) and disabled vehicle.
- (53) Push in PARKING BRAKE control (52) and select desired gear (para 2-11e).

WARNING

The M984E1 should not be operated at speeds over 15 mph except on paved roads when the operator determines that the vehicle being towed and the terrain allow safe operation. Engine brake switch must be "ON" for all towing operations. The following are maximum safe speeds

Terrain Condition	Maximum speed, towed	
	load up to 50,000 lbs	load above 50,000 lbs
on road-level	35	30
on road-hilly	30	20
off road	15	15

Speeds in excess of the above can result in loss of control, serious injury or death.

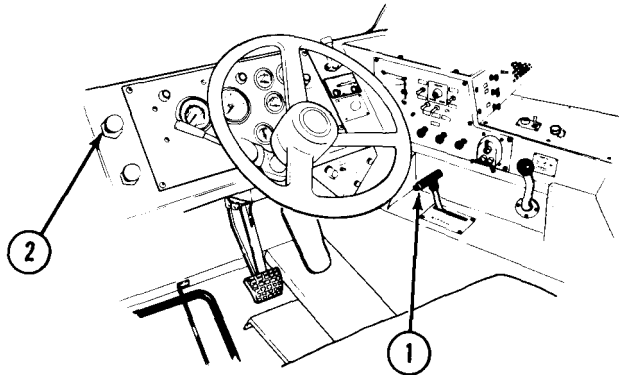
- (54) Transport disabled vehicle.

M984E1 General Operating Procedures (Cont)

d. Rear Disconnect.

NOTE

This is a two-soldier task.



TA475529

- (1) Set transmission range selector (1) to N.
- (2) Pull PARKING BRAKE control (2).

WARNING

Do not stand between vehicles while disabled vehicle is raised off ground. Falling vehicle can cause serious injury or death.

NOTE

After lowering disabled vehicle, extend lift and tow cylinders approximately 1 ft (30 cm) to allow for adjustment when removing adapters.

- (3) Prepare retrieval system for operation (para 2-72) and pull LIFT CYLINDER control lever to extend lift cylinder and lower towed vehicle to ground until safety chain at rear axle is slack.

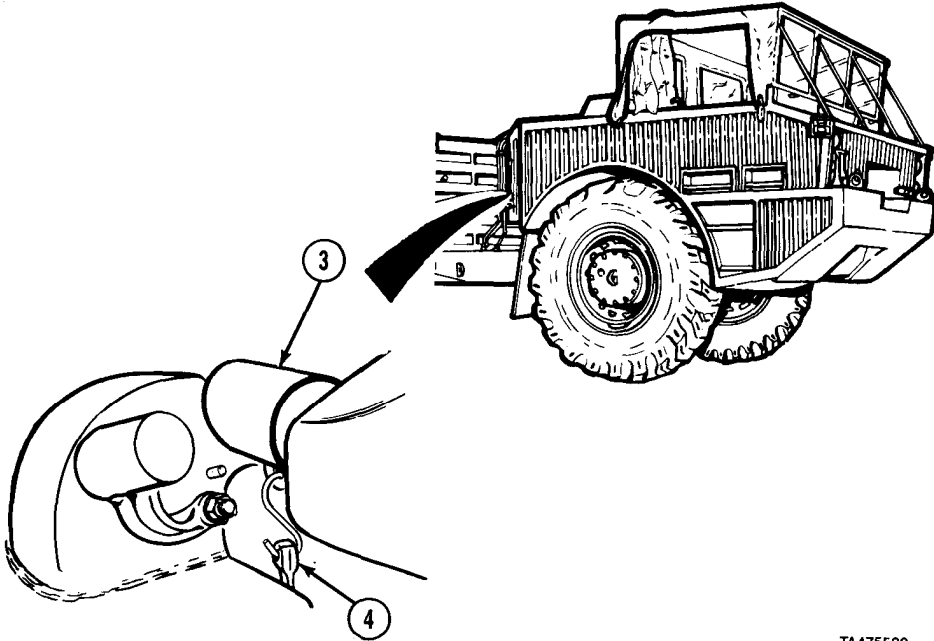
M984E1 General Operating Procedures (Cont)

2-78. TOW M520 (CONT).

WARNING

If disabled vehicle's parking brake is inoperative, chock wheels of disabled vehicle. Failure to chock wheels may result in personal injury.

- (4) Apply PARKING BRAKE on disabled vehicle. If parking brake is inoperative, chock wheels on disabled vehicle.



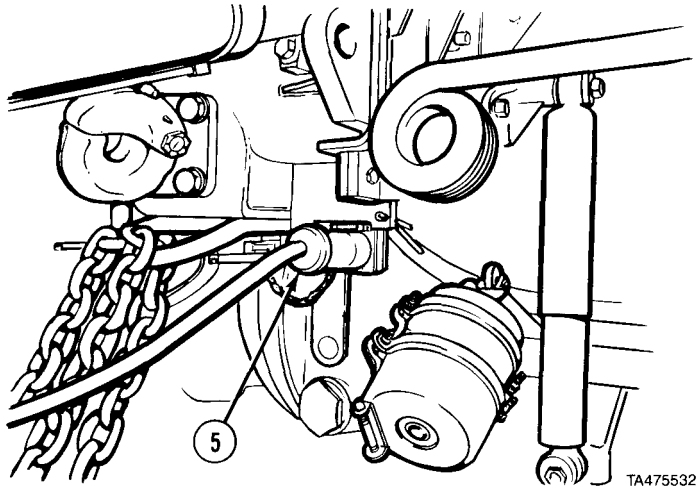
TA475530

WARNING

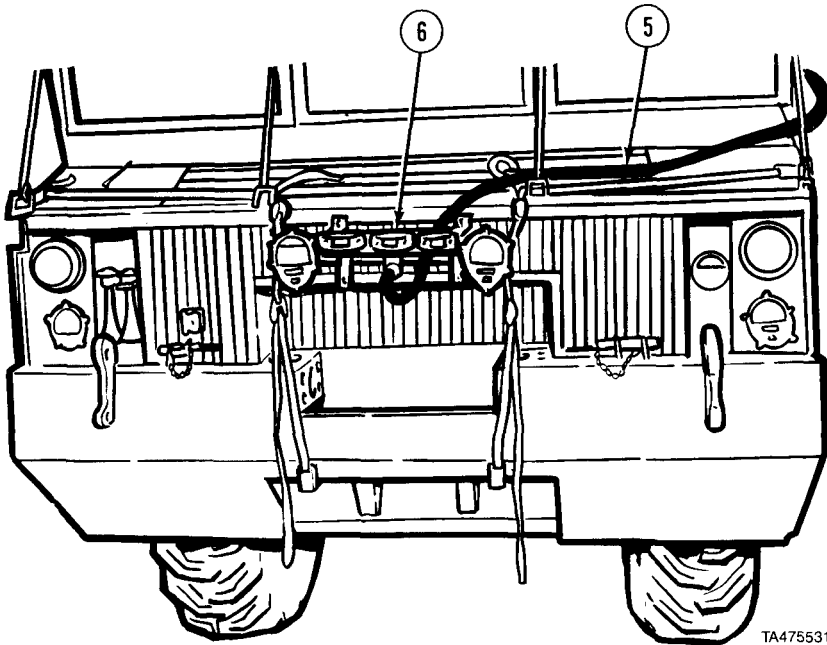
Front and rear sections pivot. Use extreme care when removing towing roll stops from roll joint. Hands could become pinched in roll joint causing serious injury.

- (5) Remove and stow towing roll stops (3) and strap (4).

M984E1 General Operating Procedures (Cont)



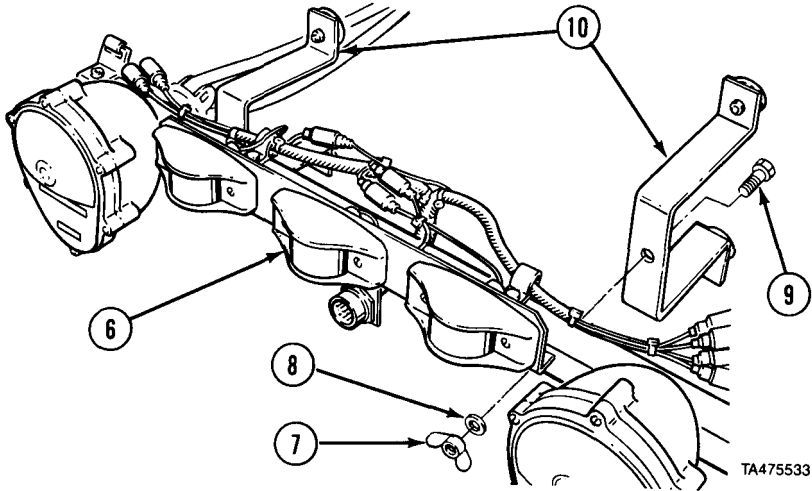
(6) Remove tow light cable (5) from wrecker.



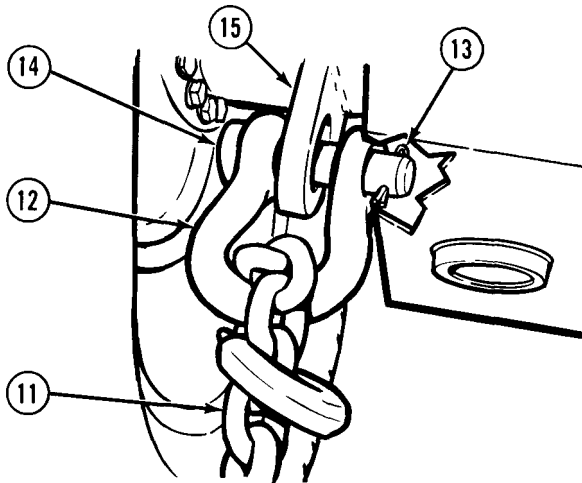
(7) Remove tow light cable (5) from emergency tow lights (6) and stow.
(8) Remove emergency tow lights (6).

M984E1 General Operating Procedures (Cont)

2-78. TOW M520 (CONT).

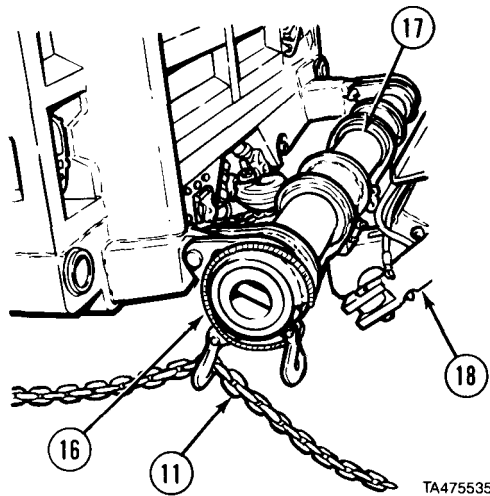


- (9) Remove two nuts (7), washers (8), screws (9), and brackets (10) and emergency tow lights (6). Stow emergency tow lights and brackets.



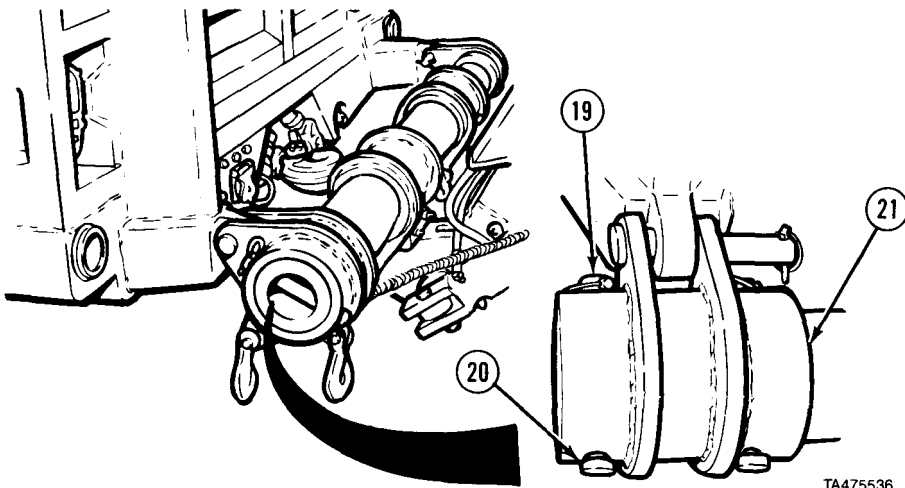
- (10) Disconnect safety chain (11) from shackle (12).
- (11) Remove cotter pin (13), pin (14), and shackle (12) from axle tiedown (15).
- (12) Repeat steps (10) and (11) for other side of disabled vehicle.

M984E1 General Operating Procedures (Cont)



TA475535

- (13) Remove and stow two safety chains (11).
- (14) Unwrap two springs (16) from lift tube (17).
- (15) Connect two springs (16) to tow cylinders (18).



TA475536

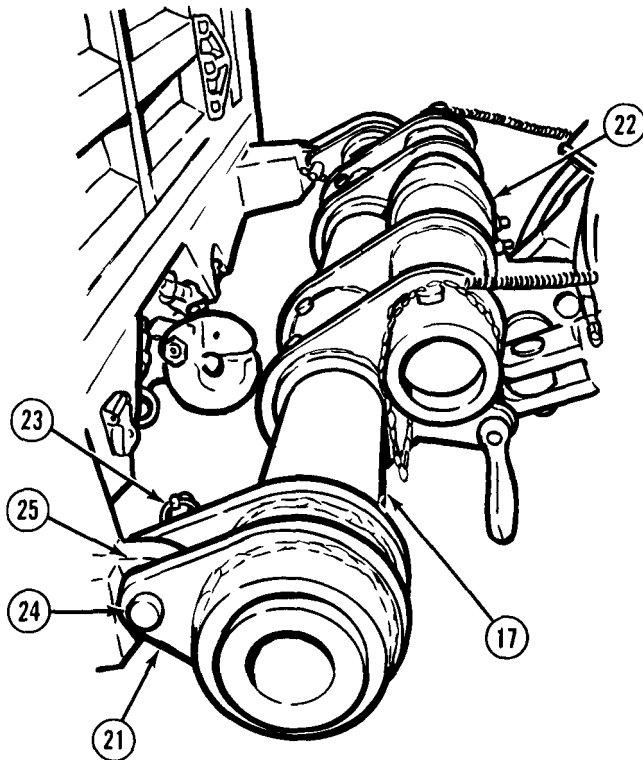
NOTE

- Use retrieval controls to position lift tube to relieve tension from adapters.
- Right and left adapter pins are removed the same way. Right side shown.

- (16) Remove two quick pins (19) and pins (20) from adapters (21).

M984E1 General Operating Procedures (Cont)

2-78. TOW M520 (CONT).



TA475537

(17) Operate retrieval controls (para 2-72b) and move crosstube (22) up and over lift tube (17).

WARNING

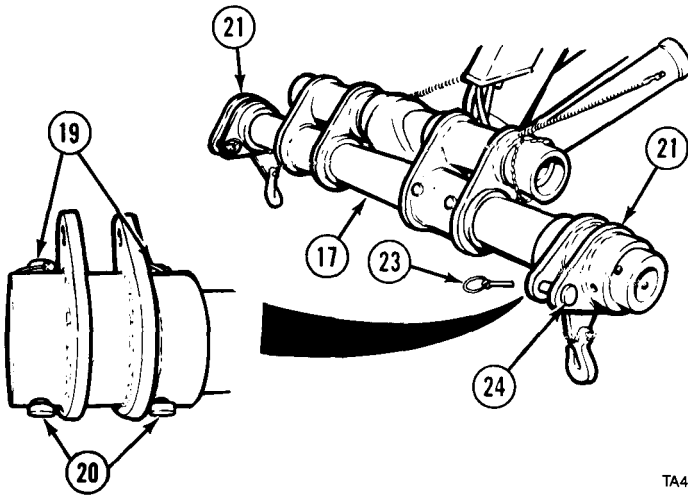
Tow assembly is very heavy. When pins are removed tow assembly could swing causing personal injury.

NOTE

- Use retrieval controls to position lift tube to relieve tension from adapters.
- Right and left adapter pins are removed the same way. Right side shown.

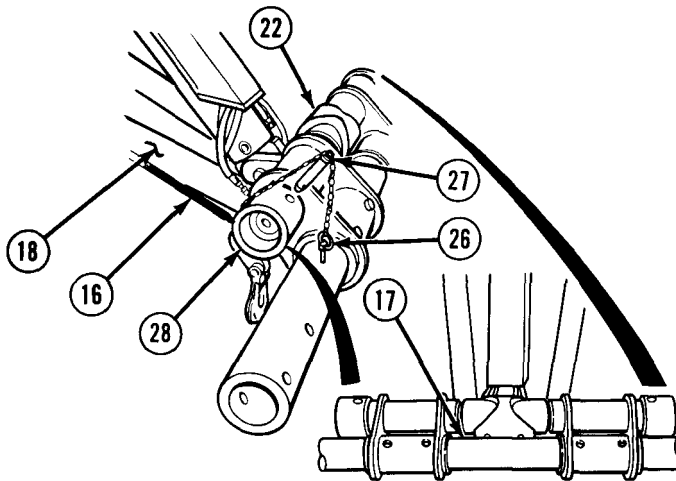
(18) Remove quick pin (23) and pin (24) from adapter (21) and tow eye (25).

M984E1 General Operating Procedures (Cont)



TA475538

- (19) Drive wrecker forward several feet and park (para 2-110).
- (20) Remove two adapters (21) from lift tube (17).
- (21) Install pins (20) and (24) and quick pins (19) and (23) in two adapters (21) and stow.



TA475539

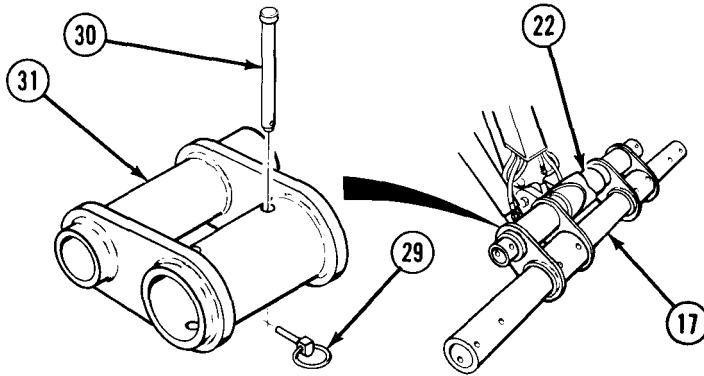
CAUTION

Do not contact pintle hook with lift cylinder.
Equipment damage could result.

- (22) Lower lift tube (17) to ground.
- (23) Disconnect springs (16) from tow cylinders (18).
- (24) Remove quick pins (26), pins (27), and end caps (28) from crosstube (22).

M984E1 General Operating Procedures (Cont)

2-78. TOW M520 (CONT).



TA475540

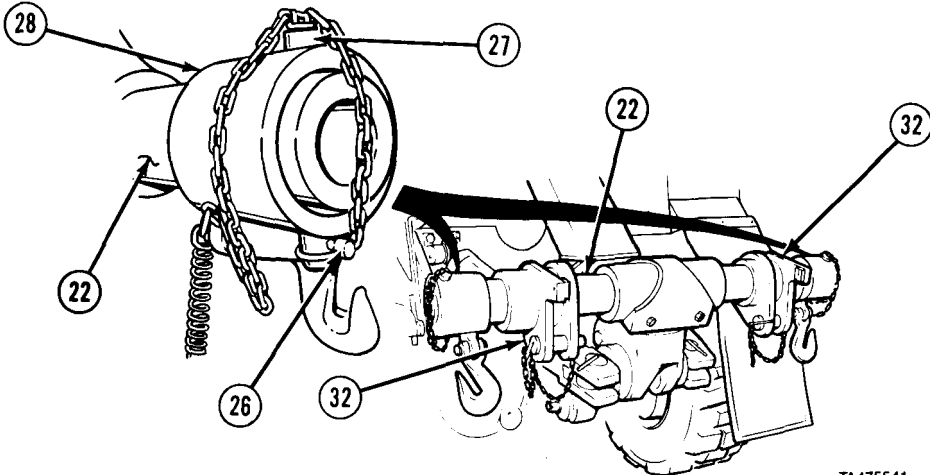
WARNING

Tube connectors are heavy. Do not drop or personal injury could result.

NOTE

Both tube connectors removed same way. Left side shown.

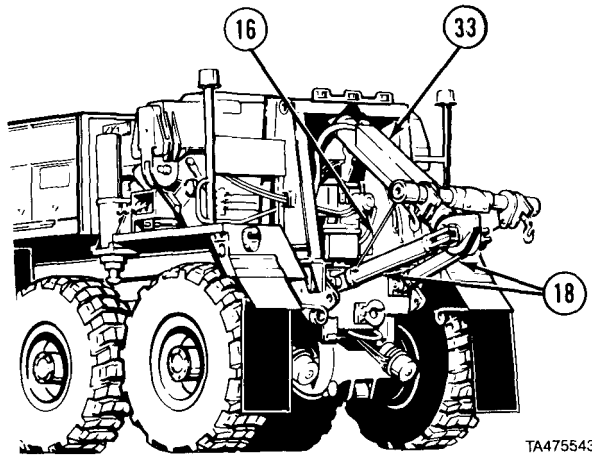
- (25) Remove quick pins (29), pins (30), and tube connectors (31) from crosstube (22) and lift tube (17).
- (26) Install pins (30) and quick pins (29) in tube connectors (31) and stow.
- (27) Use cargo tiedown strap and crane to return lift tube (17) to stowage.



TA475541

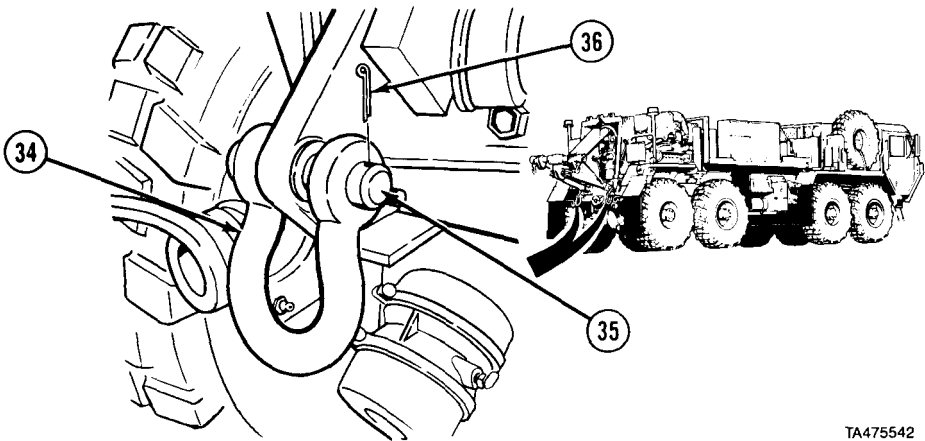
- (28) Install two M977 front adapters (32) on crosstube (22). Install end caps (28) on crosstube (22), Install pins (27) and quick pins (26).

M984E1 General Operating Procedures (Cont)



TA475543

- (29) Install two springs (16) on tow cylinders (18).
- (30) Operate retrieval controls and fully retract lift cylinder (33) and tow cylinders (18).



TA475542

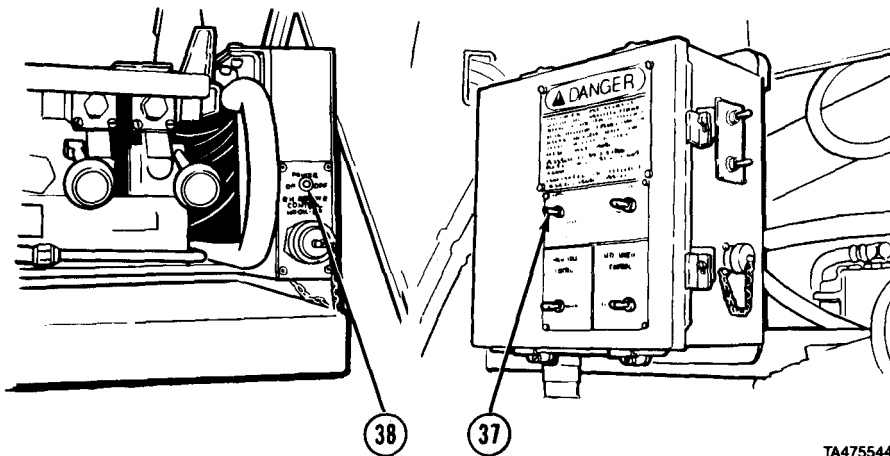
NOTE

Right and left towing shackles are installed the same way.

- (31) Install towing shackle (34), pin (35), and cotter pin (36).

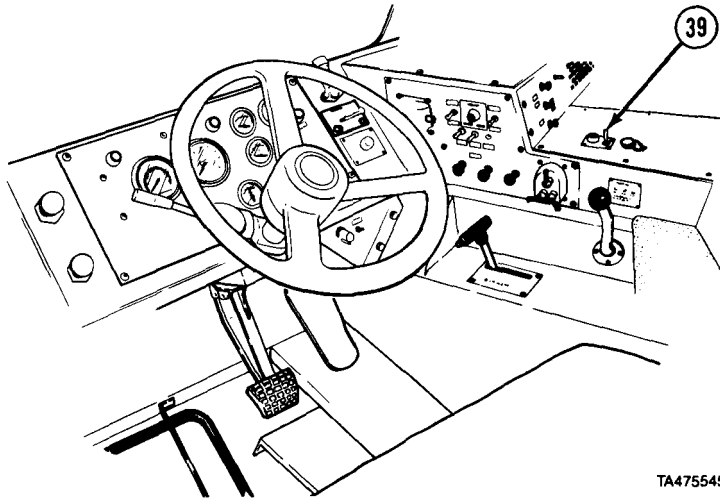
M984E1 General Operating Procedures (Cont)

2-78. TOW M520 (CONT).



TA475544

- (32) Set POWER switch (37) to OFF position.
- (33) Set POWER switch (38) to OFF position.



TA475545

- (34) Turn off emergency flashers on wrecker and disabled vehicle (para 2-44f).
- (35) Turn off service drive lights (para 2-10d).
- (36) Set PTO ENGAGE switch (39) to OFF position.
- (37) Remove and stow beacon lights (para 2-62).
- (38) Shut off engine (para 2-11p).

M984E1 General Operating Procedures (Cont)

2-79. TOW M880.

a. Front Hookup.

NOTE

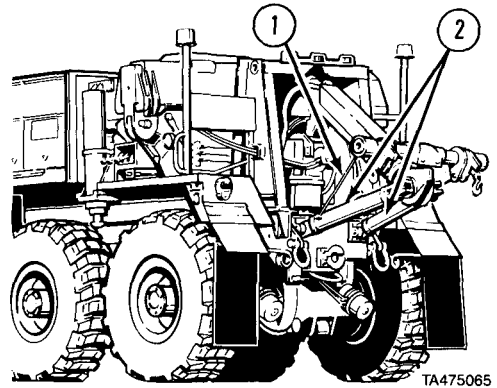
This is a two-soldier task.

(1) Prepare retrieval system for operation (para 2-72).

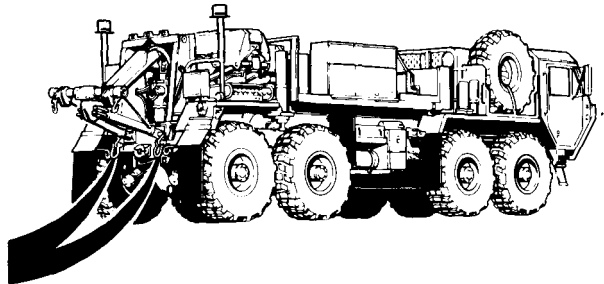
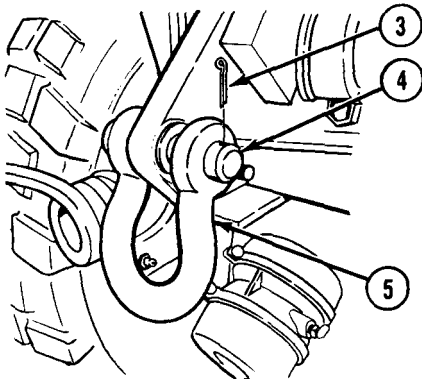
WARNING

Hold crosstube when removing springs. Crosstube may swing or cause adapter to slide resulting in personal injury.

(2) Disconnect two springs (1) from tow cylinders (2).



TA475065



TA475066

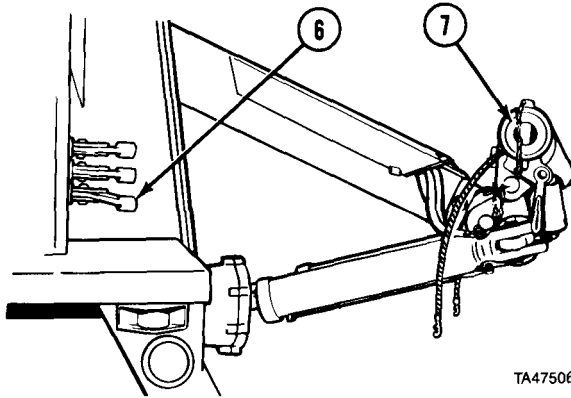
NOTE

Right and left towing shackles are removed the same way.

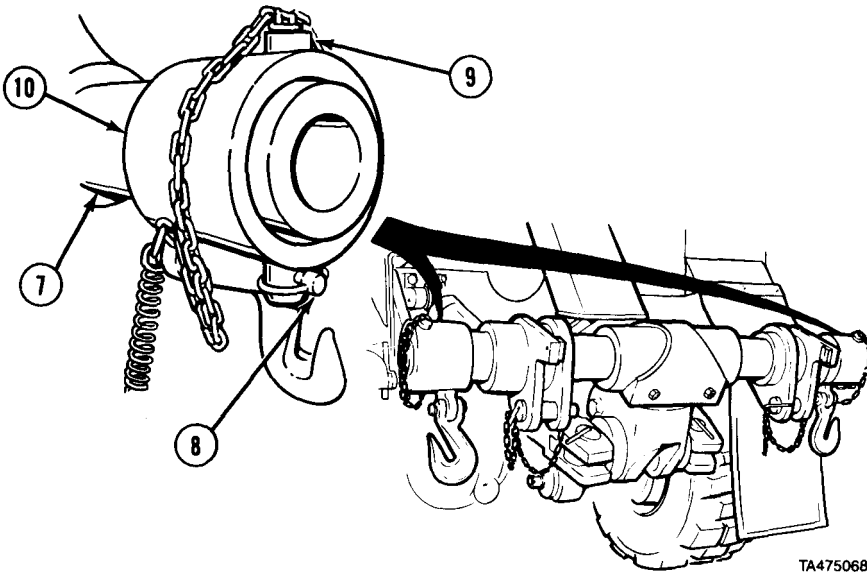
(3) Remove two cotter pins (3), pins (4), and towing shackles (5).

M984E1 General Operating Procedures (Cont)

2-79. TOW M880 (CONT).



- (4) Pull LIFT CYLINDER control lever (6) to lower crosstube (7) to approximately 3 ft (1 m) above ground.
- (5) Position wrecker so that crosstube (7) is approximately 1 ft (30 cm) from disabled vehicle and centered on disabled vehicle.

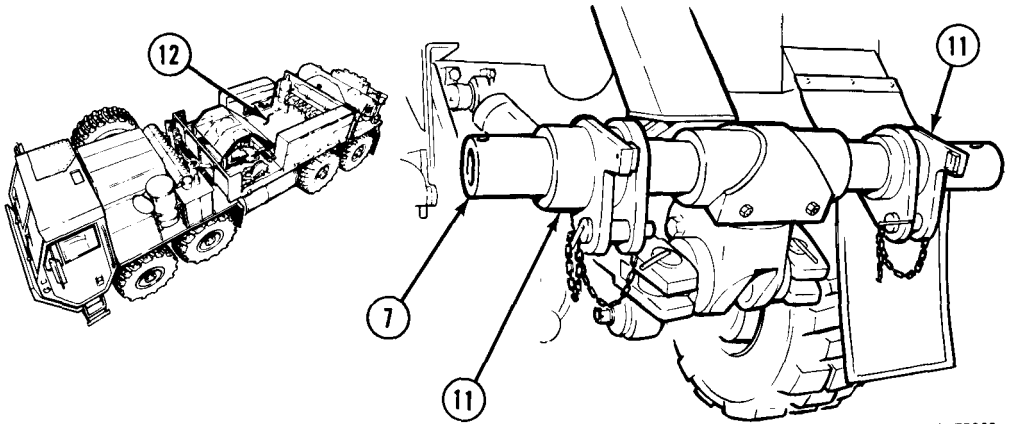


WARNING

When end caps are removed from crosstube, adapters may slide off causing personal injury.

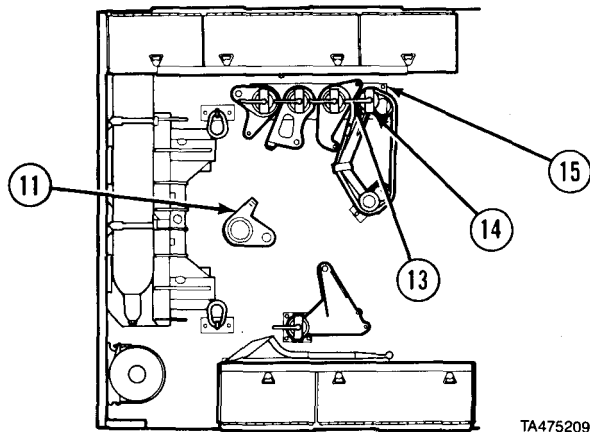
- (6) Remove two quick pins (8) and pins (9) from end caps (10).
- (7) Remove two end caps (10) from crosstube (7).

M984E1 General Operating Procedures (Cont)



TA475069

- (8) Remove two M977 front adapters (11) from crosstube (7) and place on equipment body floor (12).



TA475209

- (9) Remove lock handle (13), lock plate (14), and two M880 adapters (15).

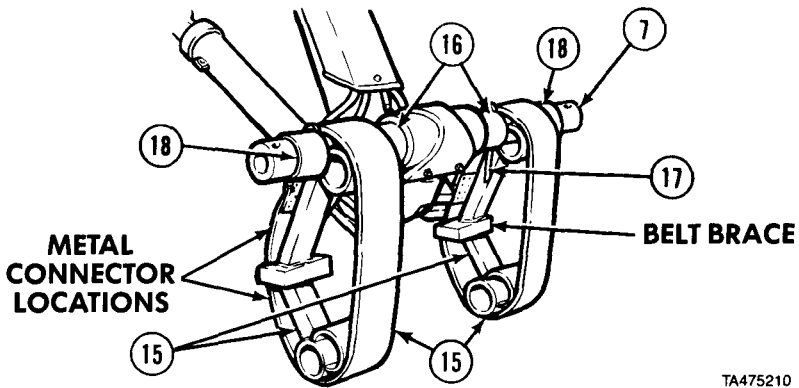
NOTE

All four 12-ft (3.5 m) chains are the same.

- (10) Remove four 12-ft (3.5 m) chains from stowage.
 (11) Remove two 4-in. (102 mm) spacers and two 5-in. (127 mm) spacers from stowage.
 (12) Install two M977 front adapters (11) removed from crosstube, lock plate (14), and lock handle (13).

M984E1 General Operating Procedures (Cont)

2-79. TOW M880 (CONT).

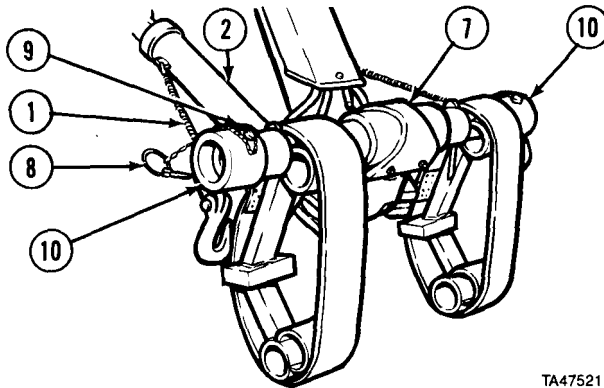


- (13) Install two 5-in. (127 mm) spacers (16) on crosstube (7).

NOTE

Make sure metal connector is located on either side of belt brace and does not touch metal parts of adapters.

- (14) Install two M880 adapters (15) on crosstube (7) with brace (17) facing inside.
- (15) Install two 4-in. (102 mm) spacers (18) on crosstube (7).

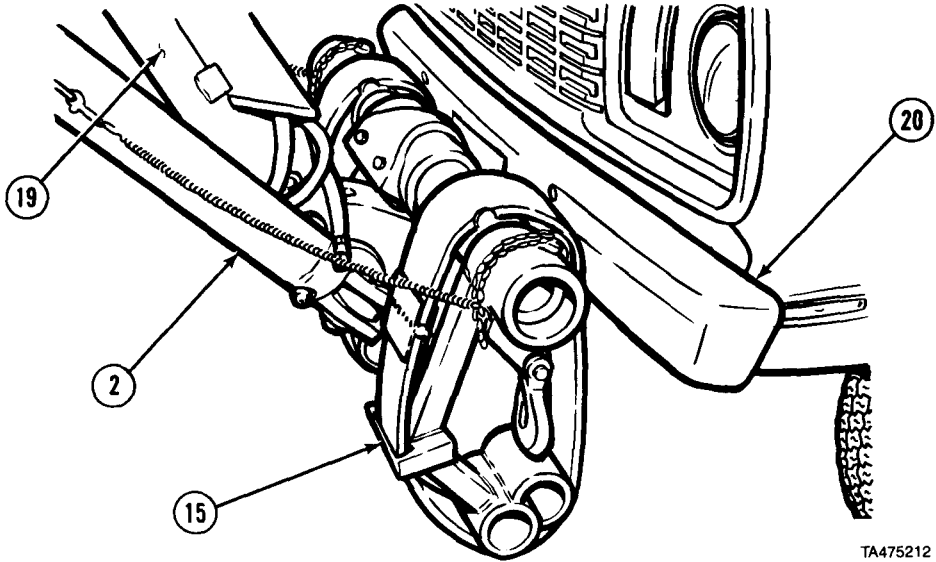


NOTE

End caps will hang over end of crosstube for M880 adapters.

- (16) Install two end caps (10) on crosstube (7).
- (17) Install two pins (9) and quick pins (8).
- (18) Attach two springs (1) on tow cylinders (2).

M984E1 General Operating Procedures (Cont)



TA475212

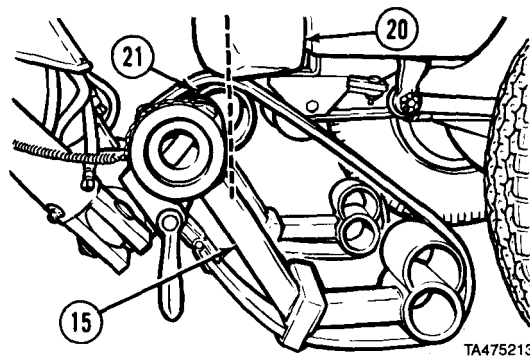
- (19)** Extend both tow cylinders (2) 2 in. (50 mm) and lower lift cylinder (19) until M880 adapters (15) are approximately 6 in. (150 mm) from ground.

NOTE

If disabled vehicle has towing adapters installed, remove adapters and stow in disabled vehicle.

- (20)** Position wrecker so adapters (15) contact front bumper (20) of disabled vehicle and are centered.

2-79. TOW M880 (CONT).



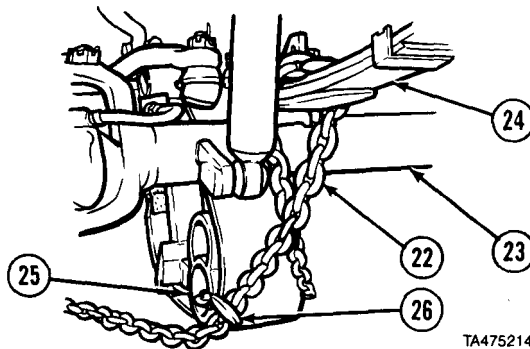
WARNING

Keep hands and fingers away from adapters when operating retriever controls. Personal injury could result.

CAUTION

Do not contact pintle hook with lift cylinder or equipment damage could occur.

- (21) Soldier A operates retrieval controls while Soldier A and Soldier B guide adapters (15) down and under disabled vehicle front bumper (20) until top of adapter tube (21) is centered under and contacts bottom edge of front bumper.

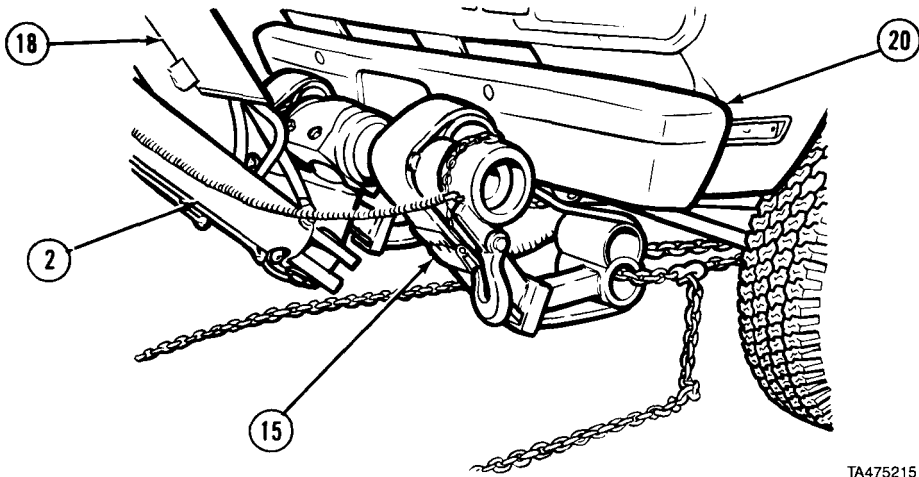


NOTE

Tow chains should be crossed under front axle.

- (22) Route 12-ft (3.5 m) tow chain (22) behind front axle (23), and loop over leaf spring (24) on disabled vehicle.
- (23) Route 12-ft (3.5 m) tow chain (22) through lower adapter tube (25). Pull chain tight and attach grab hook (26) to chain.
- (24) Repeat steps (22) and (23) for other side of disabled vehicle.

M984E1 General Operating Procedures (Cont)



- (25) Release disabled vehicle parking brakes and place transmission in neutral (refer to M880 operator's manual).

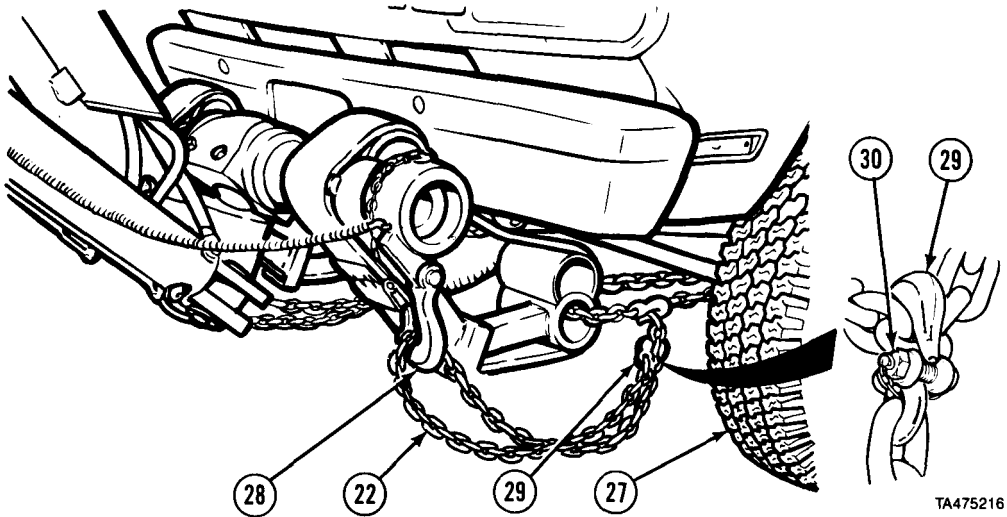
CAUTION

Do not contact pintle hook with lift cylinder or equipment damage could occur.

- (26) Alternately push in TOW and LIFT CYLINDER control levers until adapters (15) are positioned tight against front bumper (20) and tow cylinders (2) are fully retracted.

M984E1 General Operating Procedures (Cont)

2-79. TOW M880 (CONT).



NOTE

- 12 ft (3.5 m) tow chains can be shortened to allow adapters to lift evenly.
- Left side shown.

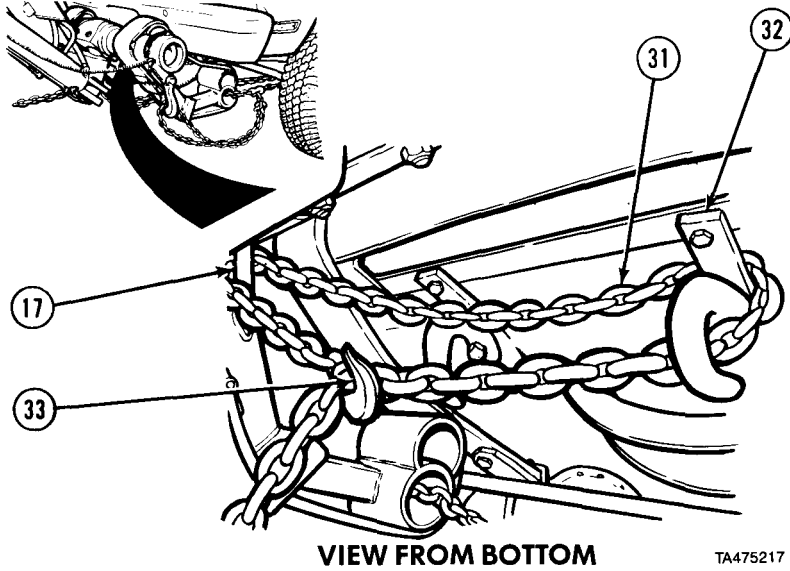
- (27) Raise disabled vehicle until front tires (27) are approximately 6 in. (150 mm) above ground.
- (28) Lower disabled vehicle until front tires (27) contact ground and 12-ft (3.5 m) tow chains (22) remain tight.

NOTE

Position tow chains to just touch ground.

- (29) Route 12-ft (3.5 m) tow chain ends (22) through end cap grab hooks (28). Attach grab hooks (29) to chains and secure with safety shackles (30).

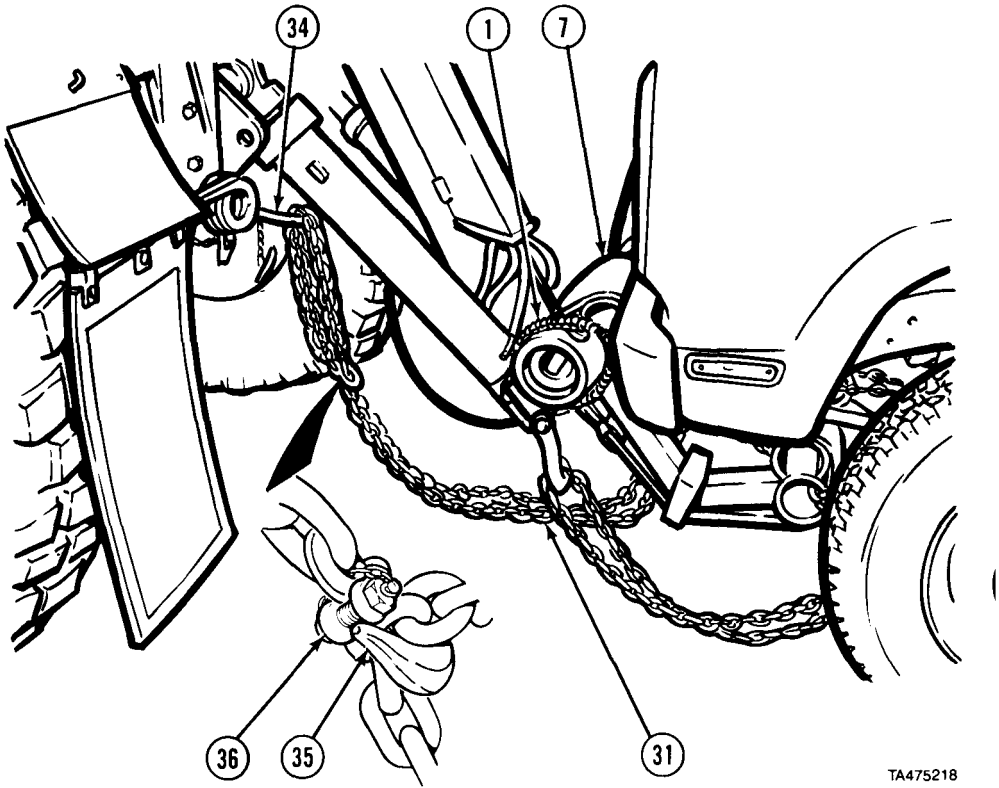
M984E1 General Operating Procedures (Cont)



- (30) Route 12-ft (3.5 m) cross chain (31) over left tow hook bracket (32) on disabled vehicle and through right adapter (17).
- (31) Pull 12-ft (3.5 m) cross chain (31) tight and attach grab hook (33) to chain.
- (32) Repeat steps (29) and (30) for other side of disabled vehicle.

M984E1 General Operating Procedures (Cont)

2-79. TOW M880 (CONT).



TA475218

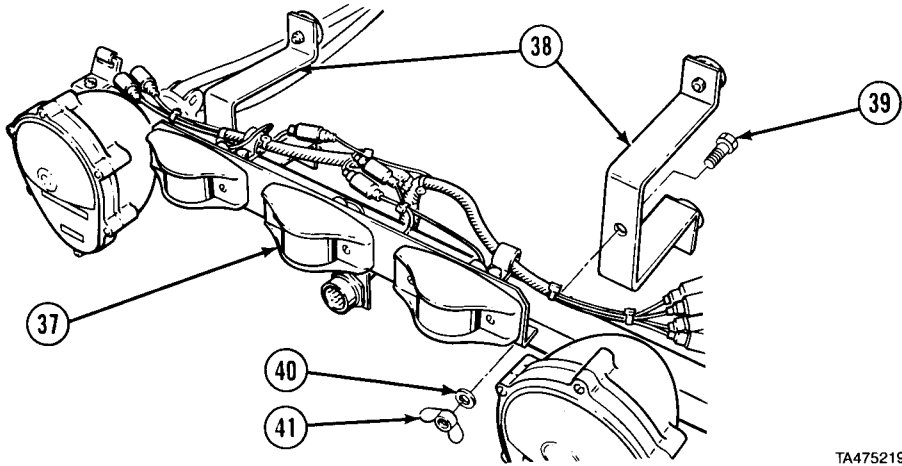
NOTE

- Adjust chain slack so cross chains just touch ground.
- Cross chains can be routed to towing shackles or safety chain hoop. Towing shackles can be used only when tow cylinders are extended.
- Cross chains will act as safety chains when connected to safety chain hoop.

(33) Route two 12-ft (3.5 m) cross chains (31) through safety chain hoop (34) on wrecker and secure grab hook (35) with safety shackle (36).

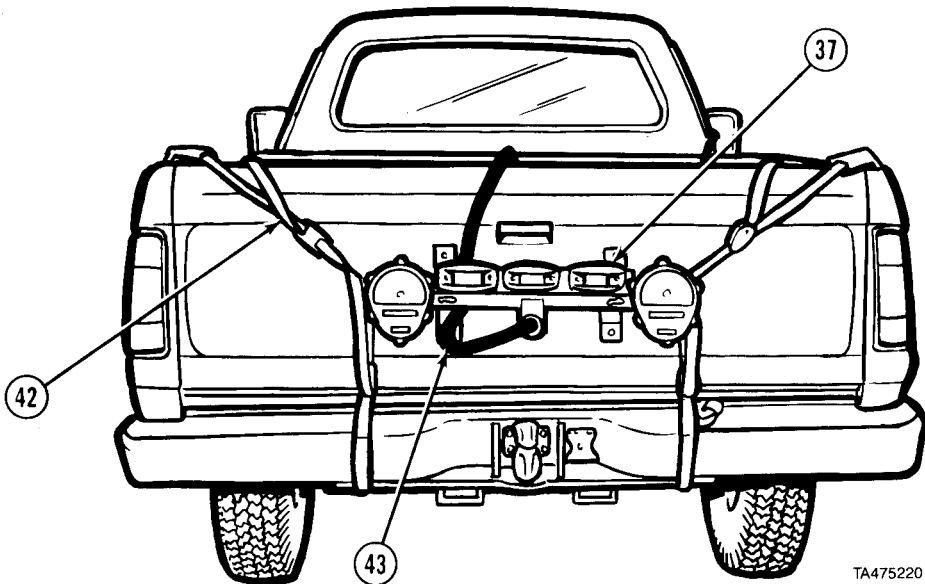
(34) Wrap two springs (1) around crosstube (7) and secure.

M984E1 General Operating Procedures (Cont)



TA475219

- (35) Prepare disabled vehicle for towing (refer to M880 operator's manual).
- (36) Remove emergency tow lights (37) and two brackets (38) from stowage.
- (37) Install two brackets (38) in center holes of emergency tow lights with two screws (39), washers (40), and nuts (41).

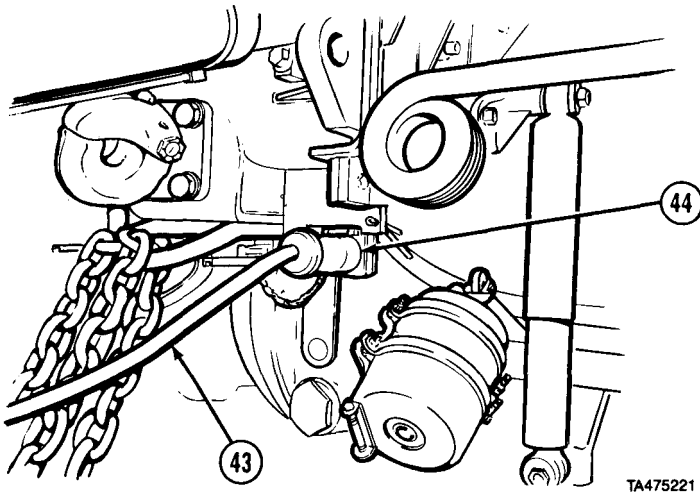


TA475220

- (38) Install emergency tow lights (37) on rear of M880 and fasten securely with straps (42).
- (39) Remove tow light cable (43) from stowage and connect to emergency tow lights (37).

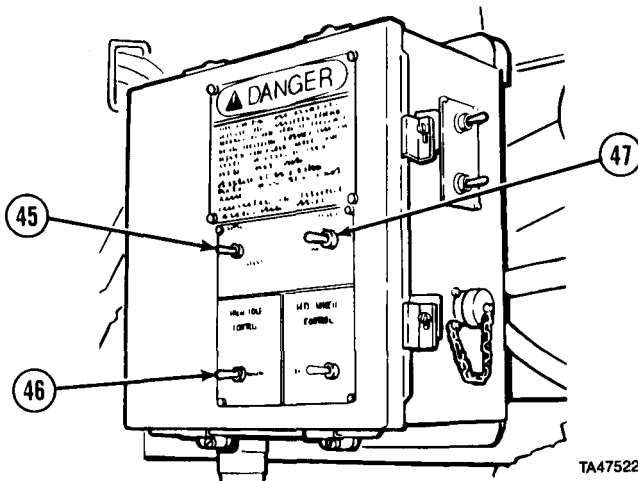
M984E1 General Operating Procedures (Cont)

2-79. TOW M880 (CONT.)



TA475221

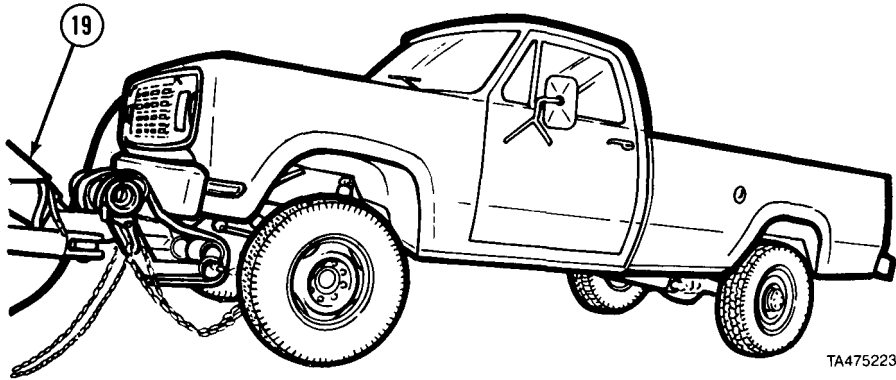
- (40) Route other end of tow light cable (43) along disabled vehicle and connect to rear electrical connector (44) on wrecker.



TA475222

- (41) Lock disabled vehicle's steering (refer to M880 operator's manual).
(42) Set POWER switch (45) to ON position.
(43) Set HIGH IDLE switch (46) to CONTINUOUS.
Push and release LATCH switch (47). Engine speed will increase to approximately 1500 rpm.

M984E1 General Operating Procedures (Cont)



TA475223

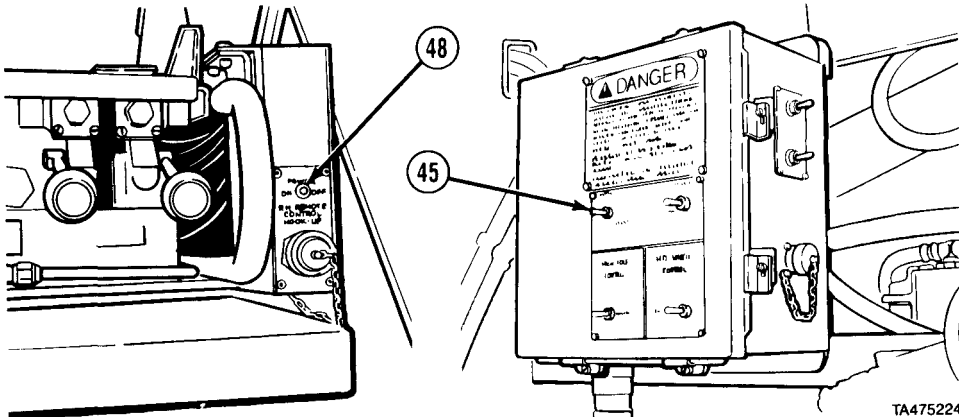
WARNING

Keep out from under retrieval system and disabled vehicle when raised off ground or personal injury or death may result.

CAUTION

- Fully retract both tow cylinders before lifting disabled vehicle or equipment damage may result.
- Make sure all rigging is secure. Loose rigging can become entangled and cause damage to equipment.

(45) Push LIFT CYLINDER control lever to retract lift cylinder (19) and raise disabled vehicle approximately 1 ft (30 cm) off ground.

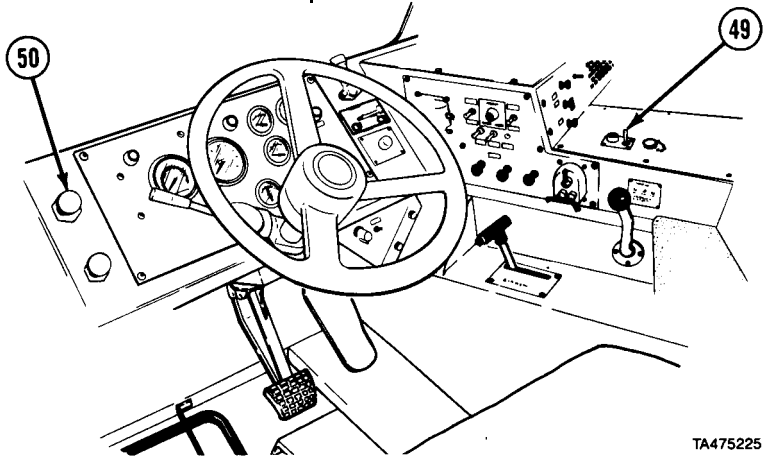


TA475224

- (46) Set POWER switch (45) to OFF position.
 (47) Set POWER switch (48) to OFF position.

M984E1 General Operating Procedures (Cont)

2-79. TOW M880 (CONT).



Set PTO ENGAGE switch (49) to OFF position.

- (49) Turn on service drive lights (para 2-10d).
- (50) Turn on emergency flashers on wrecker (para 2-44a) and disabled vehicle.
- (51) Push in PARKING BRAKE control (50) and select desired gear (para 2-11e).

WARNING

The M984E1 should not be operated at speeds over 15 mph except on paved roads when the operator determines that the vehicle being towed and the terrain allow safe operation. Engine brake switch must be "ON" for all towing operations. The following are maximum safe speeds

Terrain Condition	Maximum speed, towed load up to 50,000 lbs	Maximum speed, towed load above 50,000 lbs
on road-level	35	30
on road-hilly	30	20
off road	15	15

Speeds in excess of the above can result in loss of control, serious injury or death.

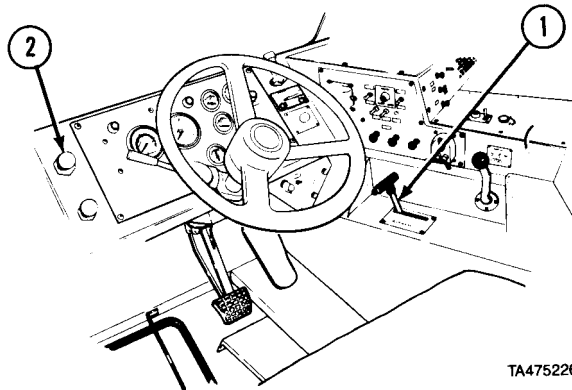
- (52) Transport disabled vehicle.

M984E1 General Operating Procedures (Cont)

b. Front Disconnect.

NOTE

This is a two-soldier task.



- (1) Set transmission range selector (1) to N.
- (2) Pull PARKING BRAKE control (2).

WARNING

Do not stand between vehicles while disabled vehicle is raised off ground. Falling vehicle can cause serious injury or death.

CAUTION

Do not contact pintle hook with lift cylinder or equipment damage could occur.

- (3) Prepare retrieval system for operation (para 2-72). Alternately pull TOW and LIFT CYLINDER control levers to lower towed vehicle to ground until tow chain at front axle is slack and adapters rest on ground.

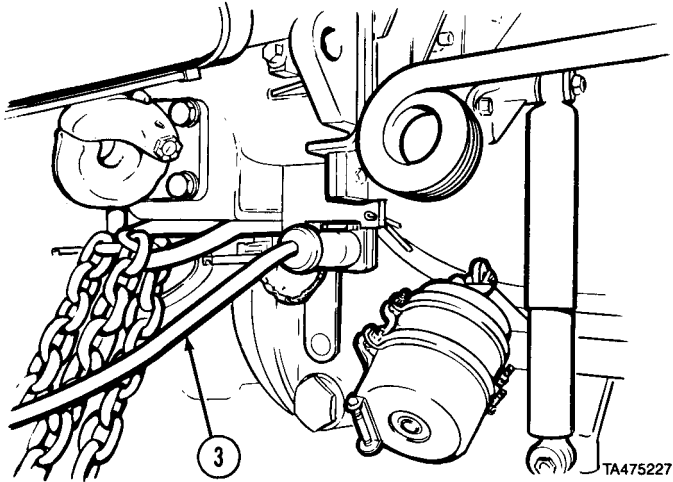
WARNING

If disabled vehicle's parking brake is inoperative, chock wheels of disabled vehicle. Failure to chock wheels may result in personal injury.

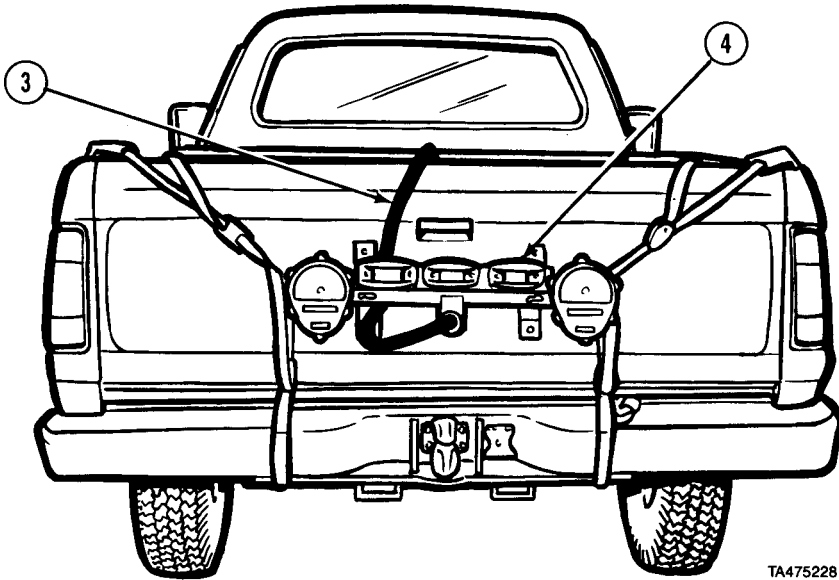
- (4) Apply PARKING BRAKE and place transmission in PARK on disabled vehicle (refer to M880 operator's manual). If parking brake is inoperative, chock wheels on disabled vehicle.

M984E1 General Operating Procedures (Cont)

2-79. TOW M880 (CONT)

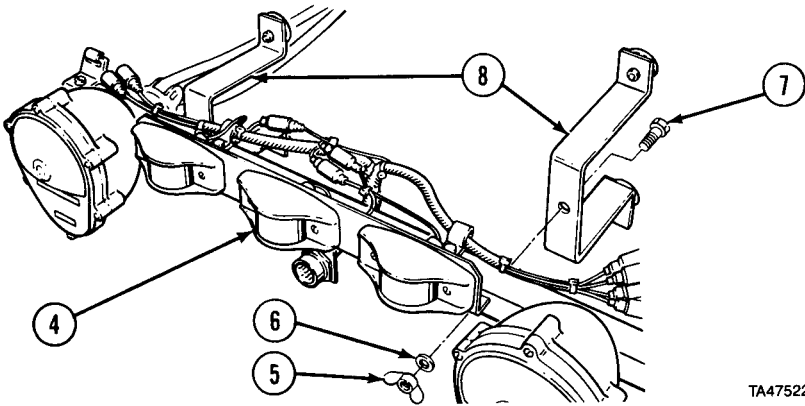


(5) Remove tow light cable (3) from wrecker.



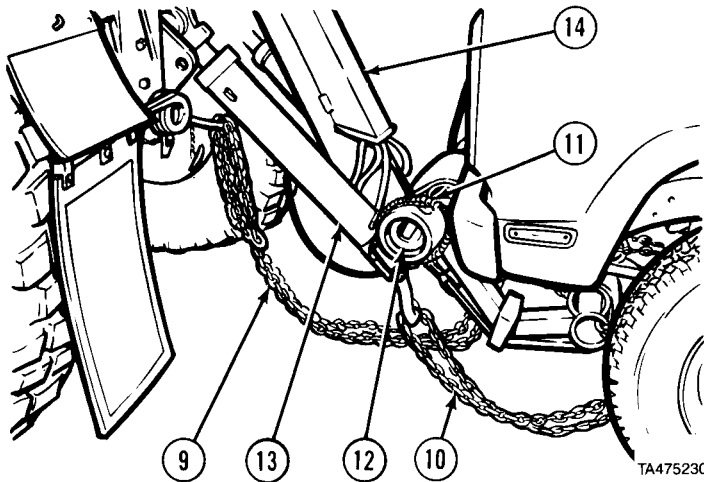
(6) Remove tow light cable (3) from emergency tow lights (4) and stow.
(7) Remove emergency tow lights (4) from disabled vehicle.

M984E1 General Operating Procedures (Cont)



TA475229

- (8) Remove two nuts (5), washers (6), screws (7), and brackets (8) from emergency tow lights (4). Stow emergency tow lights and brackets.



TA475230

- (9) Remove and stow two cross chains (9) and two tow chains (10).
 (10) Unwrap two springs (11) from crosstube (12) and connect to tow cylinders (13).

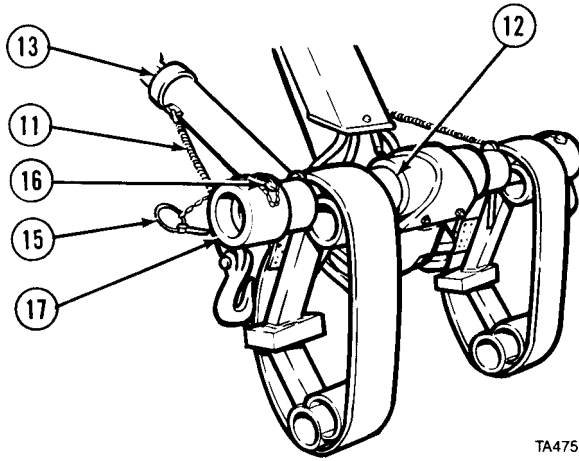
CAUTION

Do not contact pintle hook with lift cylinder or damage to equipment could occur.

- (11) Using retrieval controls, fully retract tow cylinders (13) and retract lift cylinder (14) to raise crosstube (12) approximately 2 ft (60 cm) from ground.

M984E1 General Operating Procedures (Cont)

2-79. TOW M880 (CONT).



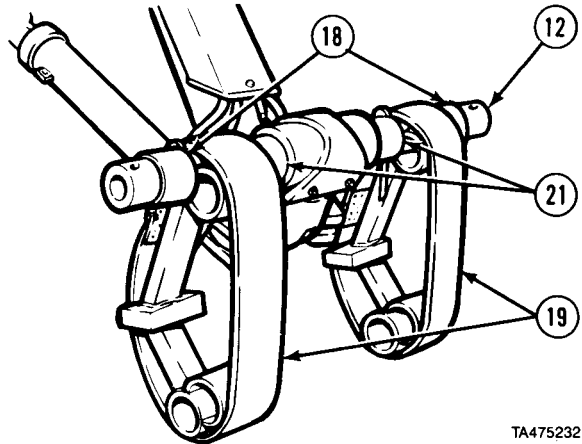
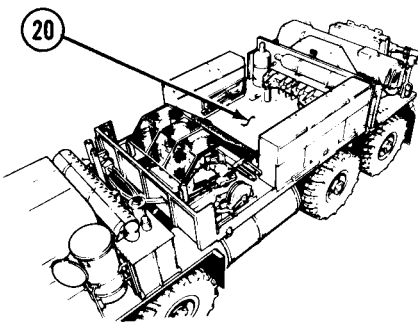
TA475231

(12) Drive wrecker forward several feet and park (para 2-110).

WARNING

As springs and end caps are removed, crosstube can swing in all directions, adapters may slide off and can cause personal injury.

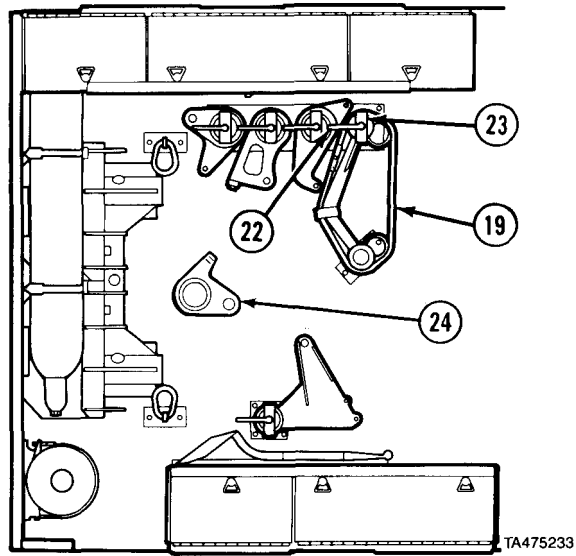
- (13) Remove two springs (11) from tow cylinders (13).
- (14) Remove two quick pins (15) and pins (16) from end caps (17).
- (15) Remove two end caps (17) from crosstube (12).



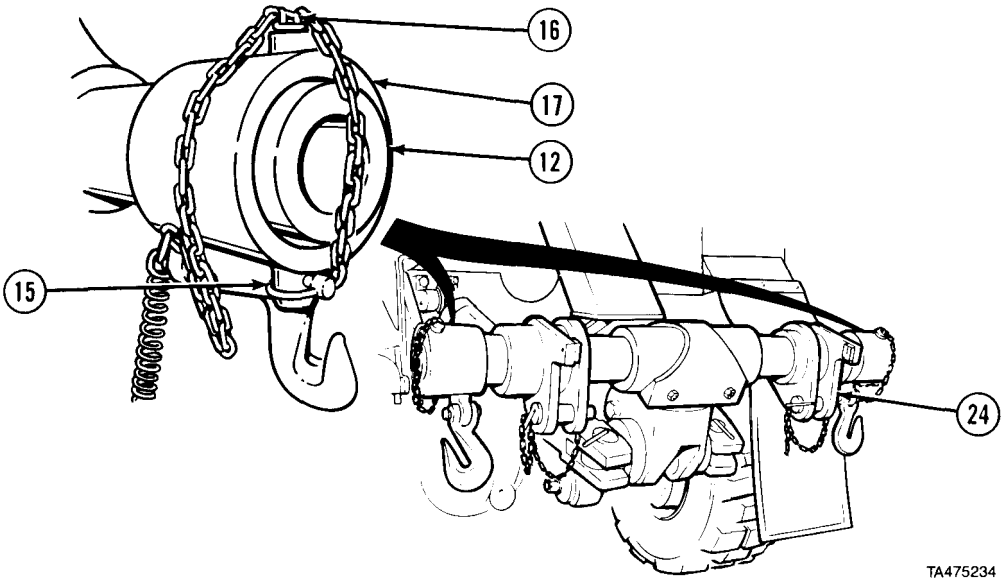
TA475232

- (16) Remove and stow two 4-in. (102 mm) spacers (18).
- (17) Remove two M880 adapters (19) from crosstube (12) and place on equipment body floor (20).
- (18) Remove and stow two 5-in. (127 mm) spacers (21).

M984E1 General Operating Procedures (Cont)



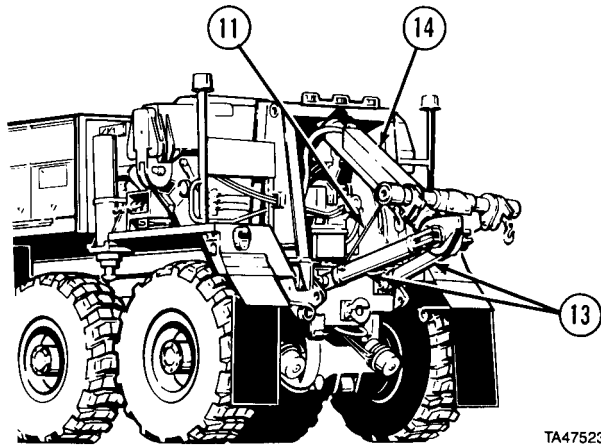
- (19) Remove lock handle (22), lock plate (23), and two M977 front adapters (24).
- (20) Install two M880 adapters (19) removed from crosstube, lock plate (23), and lock handles (22).



- (21) Install two M977 front adapters (24) on crosstube (12).
- (22) Install two end caps (17) on crosstube (12). Install two pins (16) and quick pins (15).

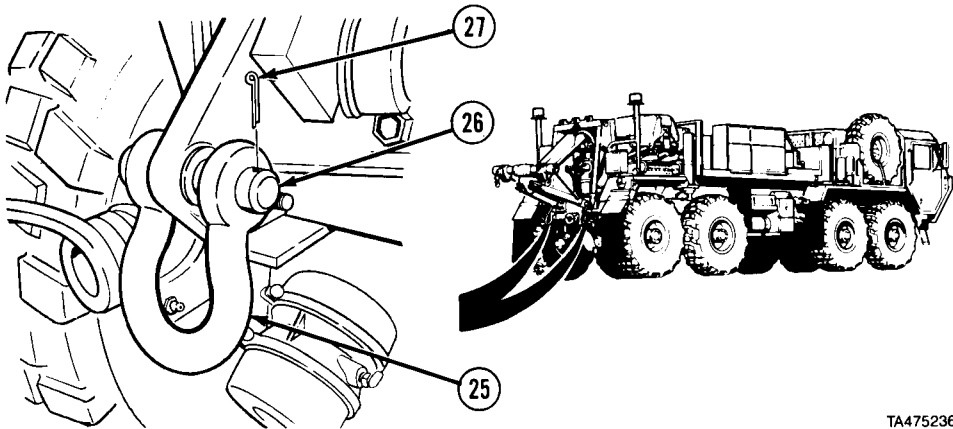
M984E1 General Operating Procedures (Cont)

2-79. TOW M880 (CONT).



TA475235

- (23) Install two springs (11) on tow cylinders (13).
- (24) Operate retrieval controls and fully retract lift cylinder (14).



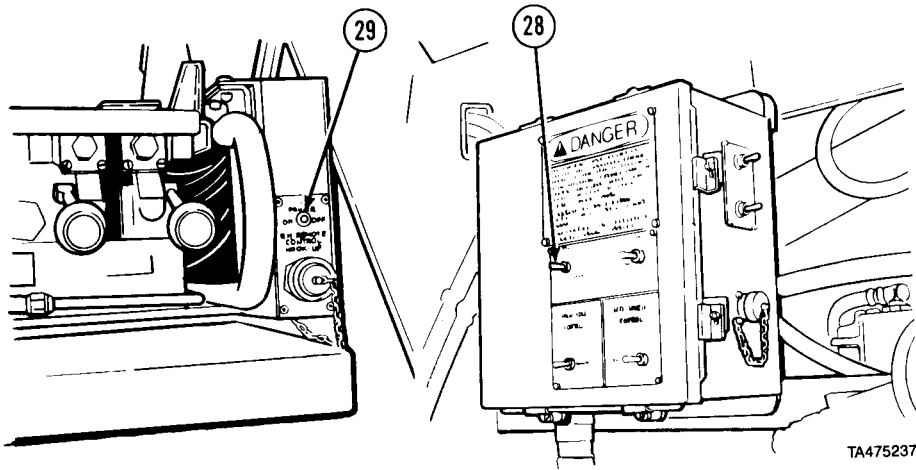
TA475236

NOTE

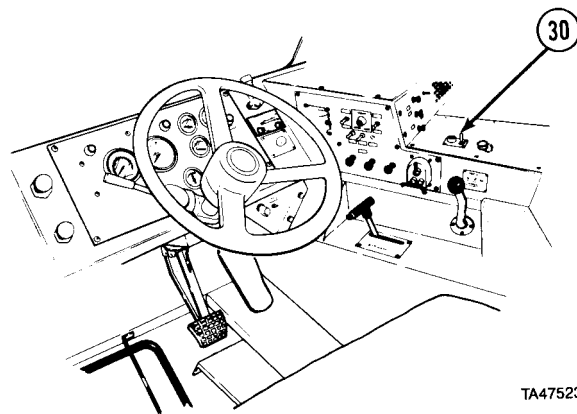
Right and left towing shackles are installed the same way.

- (25) Install two towing shackles (25), pins (26), and cotter pins (27).

M984E1 General Operating Procedures (Cont)



- (26) Set POWER switch (28) to OFF position.
- (27) Set POWER switch (29) to OFF position.



- (28) Turn off emergency flashers on wrecker (para 2-44f) and disabled vehicle.
- (29) Turn off service drive lights (para 2-10d).
- (30) Set PTO ENGAGE switch (30) to OFF position.
- (31) Remove and stow beacon lights (para 2-62).
- (32) Shut off engine (para 2-11P).
- (33) Unlock disabled vehicle's steering (refer to M880 operator's manual).

M984E1 General Operating Procedures (Cont)

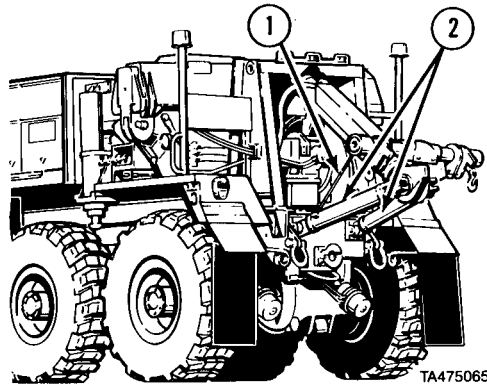
2-79. TOW M880 (CONT).

c. Rear Hookup.

NOTE

This is a two-soldier task.

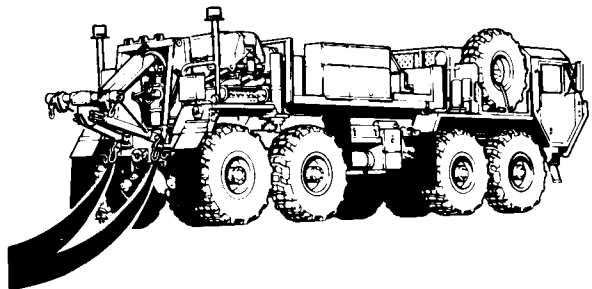
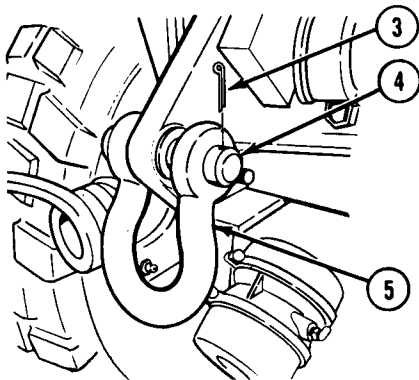
(1) Prepare retrieval system for operation (para 2-72).



WARNING

Hold crosstube when removing springs. Crosstube may swing or cause adapter to slide resulting in personal injury.

(2) Disconnect two springs (1) from tow cylinders (2).

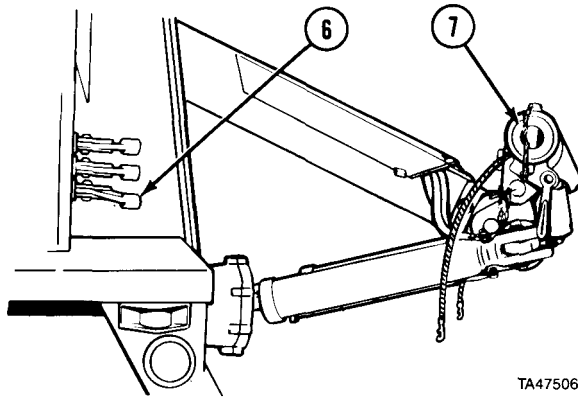


NOTE

Right and left towing shackles are removed the same way.

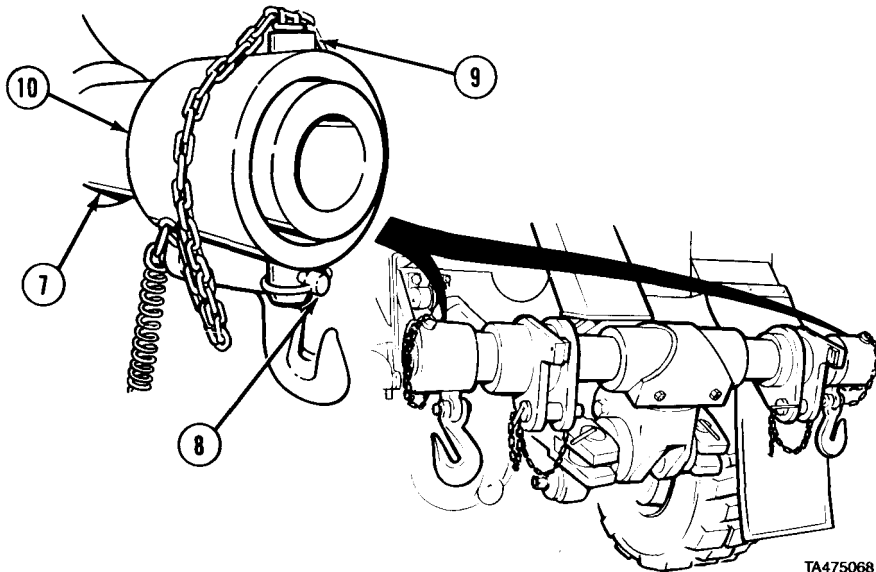
(3) Remove two cotter pins (3), pins (4), and towing shackles (5) and stow.

M984E1 General Operating Procedures (Cont)



TA475067

- (4) Pull LIFT CYLINDER control lever (6) to lower crosstube (7) to approximately 3 ft (1 m) above ground.
- (5) Position wrecker so that crosstube (7) is approximately 1 ft (30 cm) from tow eyes of disabled vehicle and centered on disabled vehicle.



TA475068

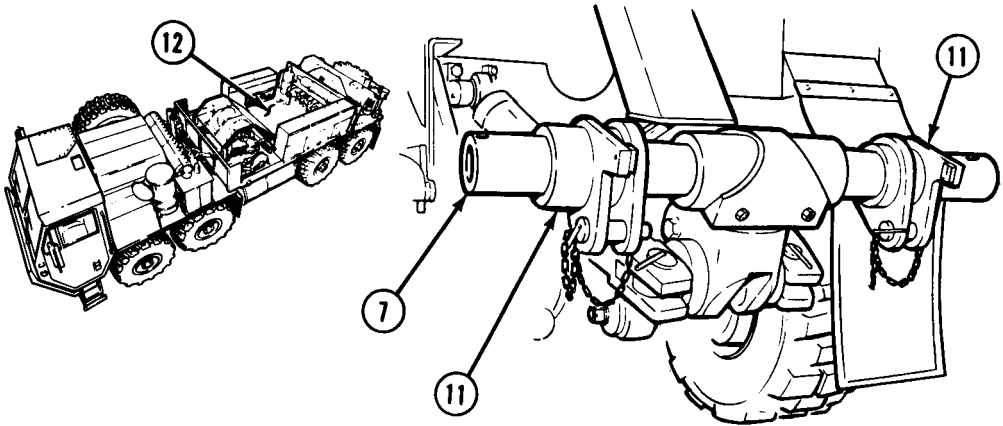
WARNING

When end caps are removed from crosstube, adapters may slide off causing personal injury.

- (6) Remove two quick pins (8) and pins (9) from end caps (10).
- (7) Remove two end caps (10) from crosstube (7).

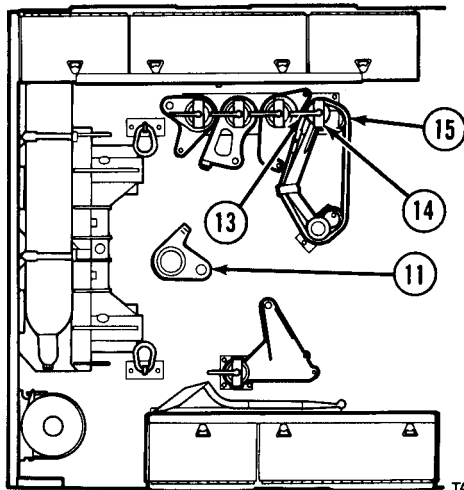
M984E1 General Operating Procedures (Cont)

2-79. TOW M880 (CONT.)



TA475069

- (8) Remove two M977 front adapters (11) from crosstube (7) and place on equipment body floor (12).



TA475239

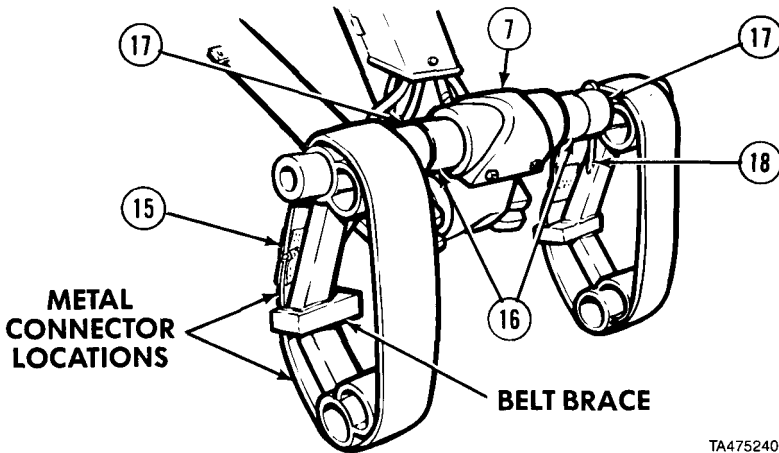
- (9) Remove lock handle (13), lock plate (14), and two M880 adapters (15).

NOTE

All four chains are the same.

- (10) Remove four 12-ft (3.5 m) chains from stowage.
 (11) Remove two 4-in. (102 mm) spacers and two 5-in. (127 mm) spacers from stowage.
 (12) Install two M977 front adapters (11) removed from crosstube, lock plate (14), and lock handle (13).

M984E1 General Operating Procedures (Cont)

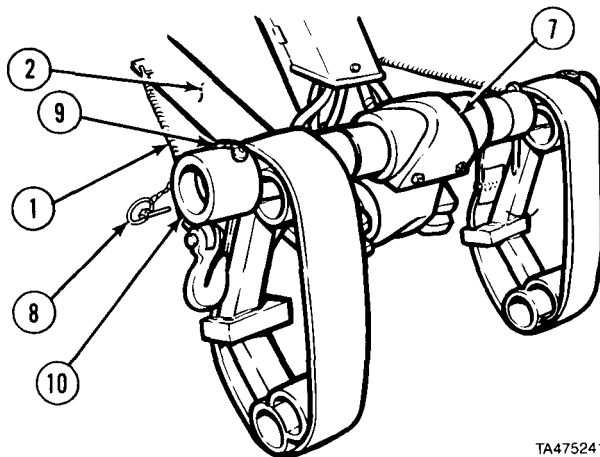


- (13) Install two 5-in. (127 mm) spacers (16) and two 4-in. (102 mm) spacers (17) on crosstube (7).

NOTE

Make sure metal connector is located on either side of belt brace and does not touch metal parts of adapters.

- (14) Install two M880 adapters (15) on crosstube (7) with brace (18) facing inside.



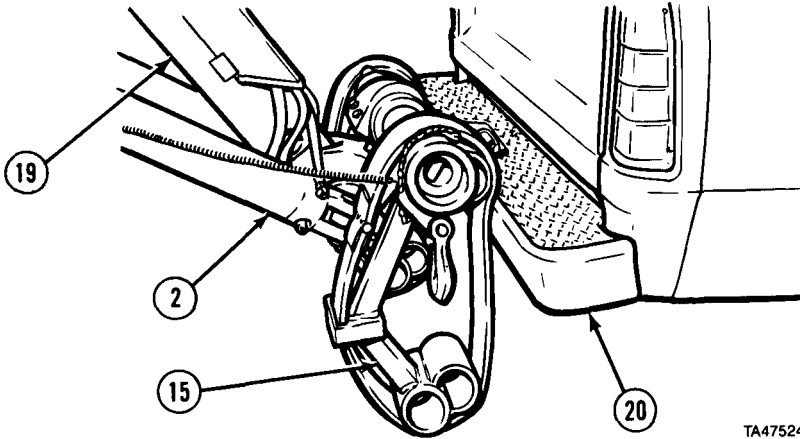
NOTE

End caps will hang over end of crosstube for M880 adapters.

- (15) Install two end caps (10) on crosstube (7).
 (16) Install two pins (9) and quick pins (8).
 (17) Attach two springs (1) on tow cylinders (2).

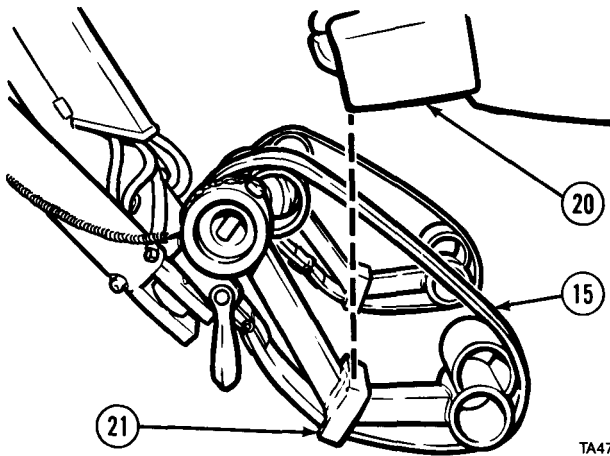
M984E1 General Operating Procedures (Cont)

2-79. TOW M880 (CONT.)



TA475242

- (18) Extend both tow cylinders (2) 2 in. (50 mm) and lower lift cylinder (19) until M880 adapters (15) are approximately 6 in. (152 mm) from ground.
- (19) Position wrecker so adapters (15) contact rear bumper (20) of disabled vehicle and are centered.



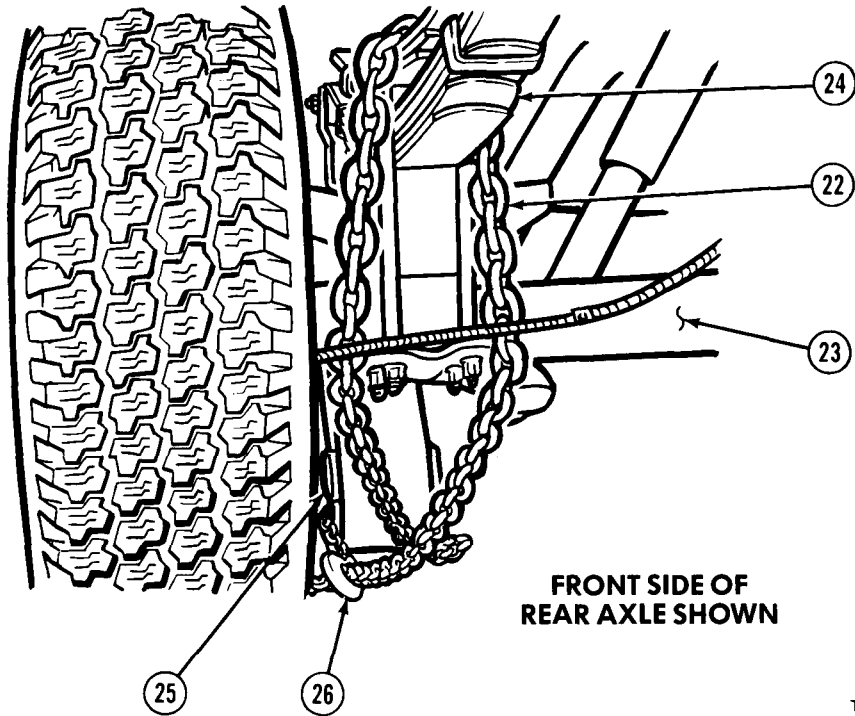
TA475243

CAUTION

Do not contact pintle hook with lift cylinder or equipment damage could occur.

- (20) Soldier A operates retrieval controls while Soldier A and Soldier B guide adapters (15) down and under disabled vehicle's rear bumper (20) until belt brace (21) aligns with rear edge of bumper.

M984E1 General Operating Procedures (Cont)



TA475244

CAUTION

Do not allow brake cable to become pinched by tow chains or equipment damage could occur.

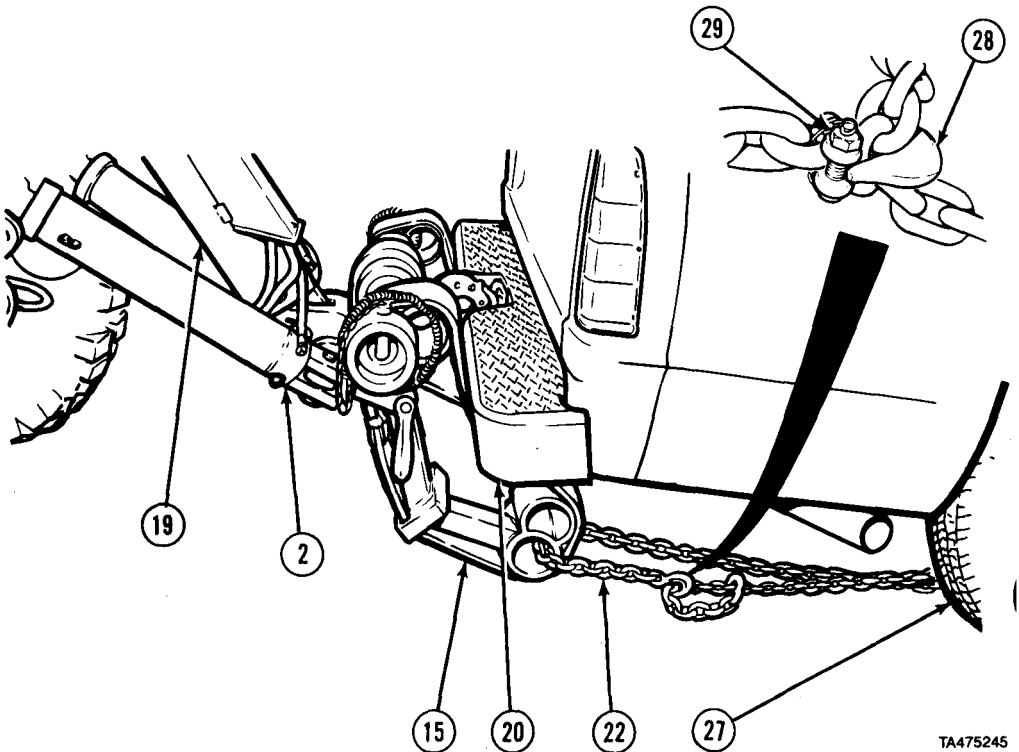
NOTE

Tow chains should be crossed and routed around rear leaf spring shackle bolts.

- (21) Route 12-ft (3.5 m) tow chain (22) in front of rear axle (23) and loop over leaf spring (24) on disabled vehicle.
- (22) Route 12-ft (3.5 m) tow chain (22) through lower adapter tube (25). Pull chain tight and attach grab hook (26) to chain.
- (23) Repeat steps (21) and (22) for other side of disabled vehicle.

M984E1 General Operating Procedures (Cont)

2-79. TOW M880 (CONT).



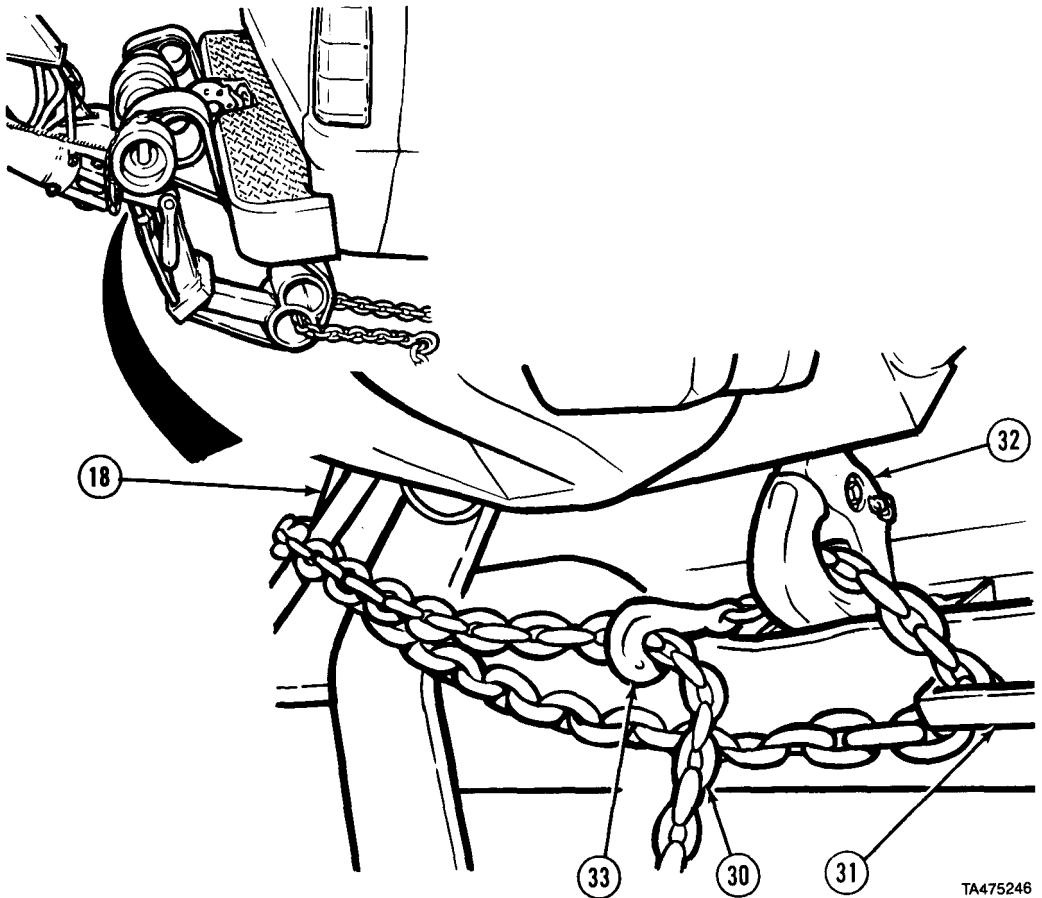
TA475245

- (24) Release disabled vehicle parking brake and place transmission in neutral (refer to M880 operator's manual).
- (25) Using retrieval controls, alternately retract tow cylinders (2) and lift cylinder (19) until M880 adapters (15) are positioned tight against rear bumper (20) and tow cylinders are fully retracted.

NOTE

- 12-ft (3.5 m) tow chains can be adjusted to allow M880 adapters to lift evenly.
 - Right side of disabled vehicle shown.
- (26) Raise disabled vehicle until rear tires (27) are approximately 6 in. (150 mm) above ground.
 - (27) Lower disabled vehicle until rear tires (27) contact ground, but 12-ft (3.5 m) tow chains (22) remain tight.
 - (28) Attach grab hooks (28) to 12-ft (3.5 m) tow chains (22) and secure with safety shackle (29).

M984E1 General Operating Procedures (Cont)



TA475246

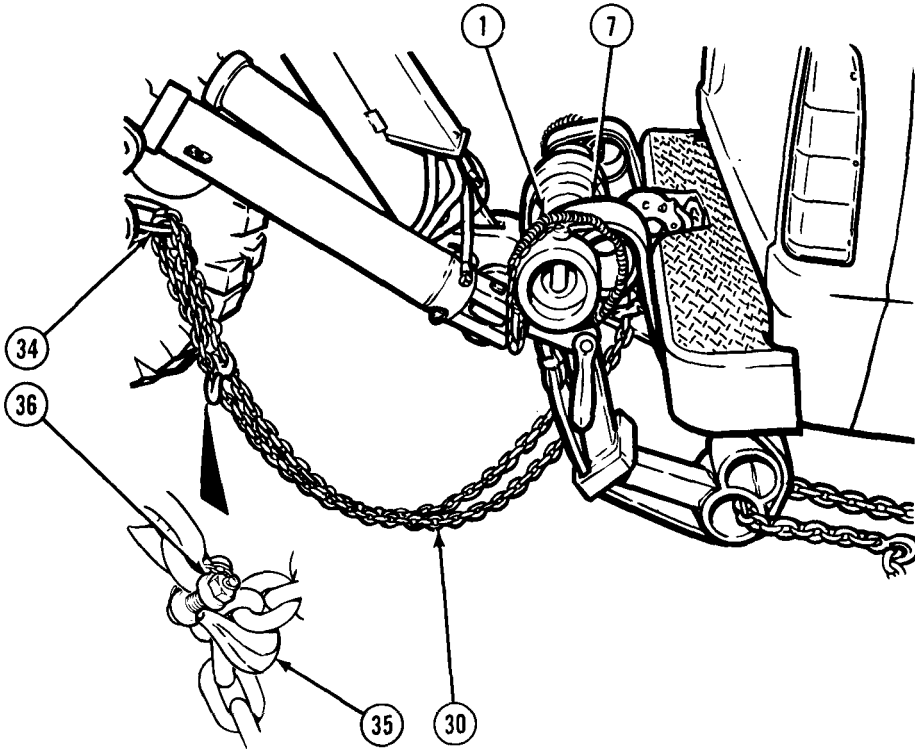
NOTE

Right side of disabled vehicle is opposite from right side of wrecker.

- (29) Route 12-ft (3.5 m) cross chain (30) through right adapter brace (18) and through right chain hoop (31) and pintle hook (32) on disabled vehicle.
- (30) Pull 12-ft (3.5 m) cross chain (30) tight and attach grab hook (33) to chain.
- (31) Repeat steps (29) and (30) for other side of disabled vehicle.

M984E1 General Operating Procedures (Cont)

2-79. TOW M880 (CONT).



TA475247

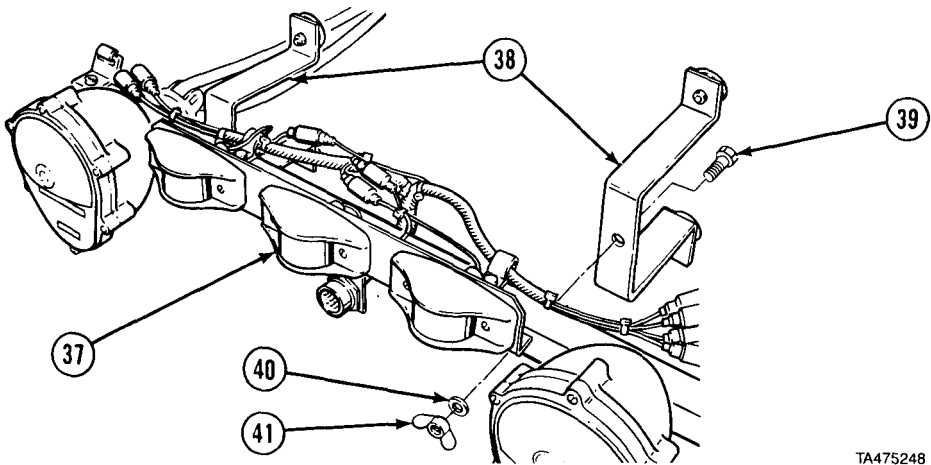
NOTE

- Adjust chain so cross chains just touch the ground.
- Cross chains can be routed to towing shackles or safety chain hoop. Towing shackles can be used only when tow cylinders are extended.
- Cross chains will act as safety chains when connected to wrecker.

(32) Route two 12-ft (3.5 m) cross chains (30) through safety chain hoop (34) on wrecker and secure grab hooks (35) with safety shackles (36).

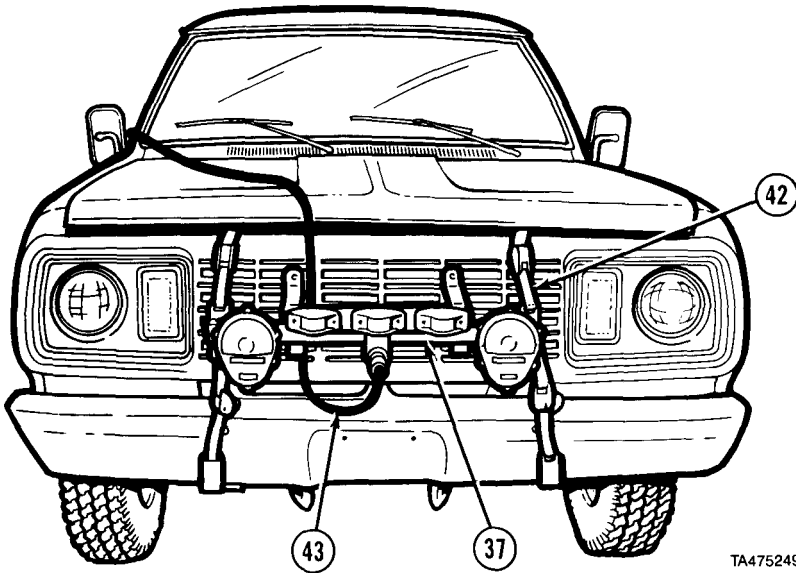
(33) Wrap two springs (1) around crosstube (7) and secure.

M984E1 General Operating Procedures (Cont)



TA475248

- (34) Prepare disabled vehicle for towing (refer to M880 operator's manual).
- (35) Remove emergency tow lights (37) and two brackets (38) from stowage.
- (36) Install two brackets (38) in center holes of emergency tow lights with two screws (39), washers (40), and nuts (41).

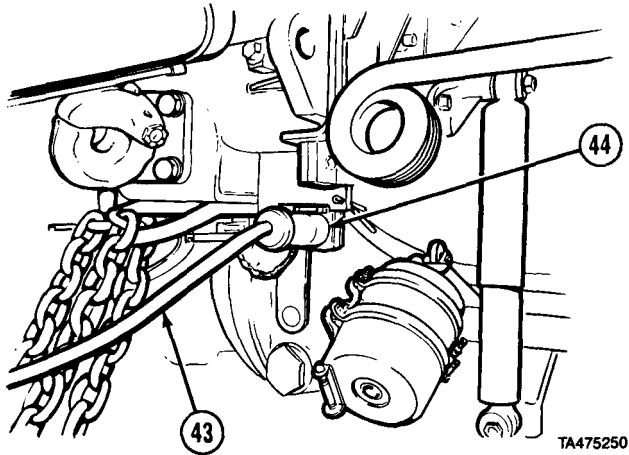


TA475249

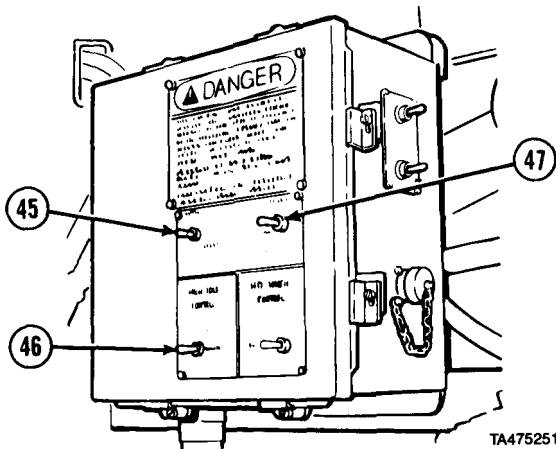
- (37) Install emergency tow lights (37) on front of M880 and fasten securely with straps (42).
- (38) Remove tow light cable (43) from stowage and connect to emergency tow lights (37).

M984E1 General Operating Procedures (Cont)

2-79. TOW M880 (CONT).

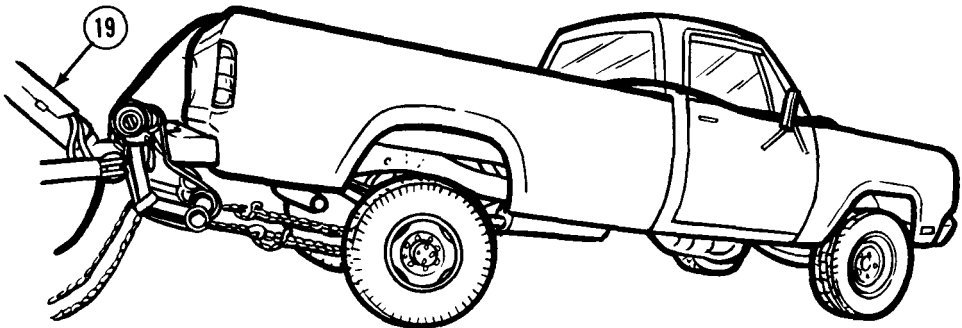


- (39) Route other end of tow light cable (43) along disabled vehicle and connect to rear electrical connector (44) on wrecker.



- (40) Lock disabled vehicle's steering (refer to M880 operator's manual).
(41) Set POWER switch (45) to ON position.
(42) Set HIGH IDLE switch (46) to CONTINUOUS.
(43) Push and release LATCH switch (47). Engine speed will increase to approximately 1500 rpm.

M984E1 General Operating Procedures (Cont)



TA475252

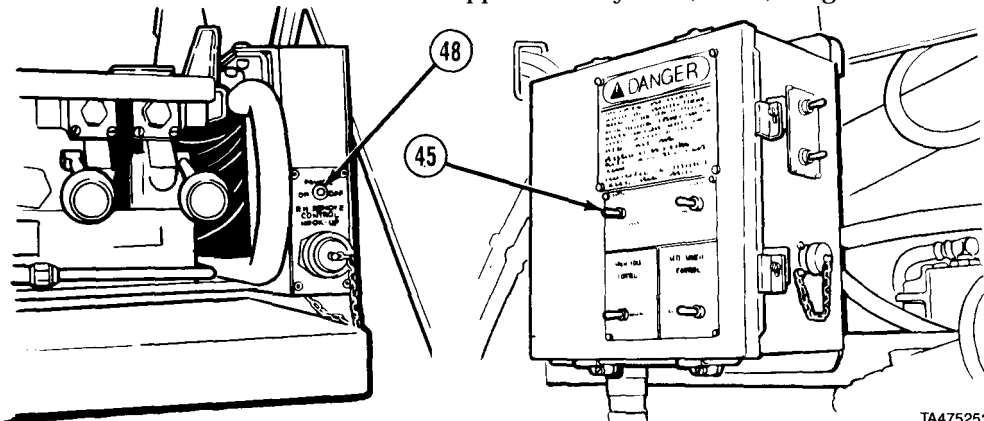
WARNING

Keep out from under retrieval system and disabled vehicle when raised off ground or personal injury or death may result.

CAUTION

- Fully retract both tow cylinders before lifting disabled vehicle or equipment damage may result.
- Make sure all rigging is secure. Loose rigging can become entangled and cause damage to equipment.

(44) Push LIFT CYLINDER control lever to retract lift cylinder (19) and raise disabled vehicle approximately 1 ft (30 cm) off ground.

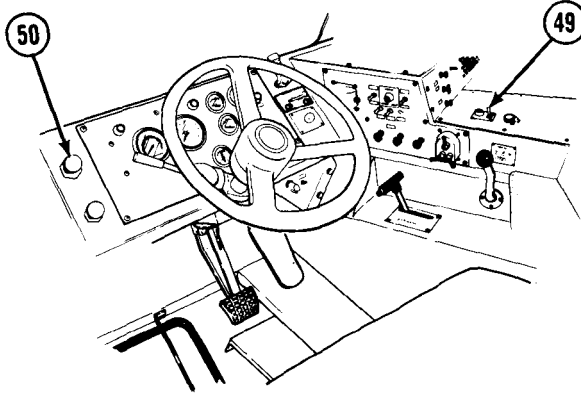


TA475253

- (45) Set POWER switch (45) to OFF position.
 (46) Set POWER switch (48) to OFF position.

M984E1 General Operating Procedures (Cont)

2-79. TOW M880 (CONT).



TA475254

- Set PTO ENGAGE switch (49) to OFF position.
- Turn on service drive lights (para 2-10d).
- (49) Turn on emergency flashers on wrecker (para 2-44a) and disabled vehicle.
- (50) Push in PARKING BRAKE control (50) and select desired gear (para 2-11e).

WARNING

The M984E1 should not be operated at speeds over 15 mph except on paved roads when the operator determines that the vehicle being towed and the terrain allow safe operation. Engine brake switch must be "ON" for all towing operations. The following are maximum safe speeds:

Terrain Condition	Maximum speed, towed load up to 50,000 lbs	Maximum speed, towed load above 50,000 lbs
on road-level	35	30
on road-hilly	30	20
off road	15	15

Speeds in excess of the above can result in loss of control, serious injury or death.

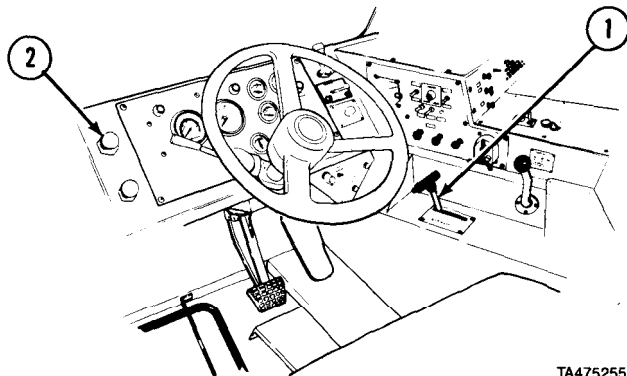
Transport disabled vehicle.

M984E1 General Operating Procedures (Cont)

d. Rear Disconnect.

NOTE

This is a two-soldier task.



TA475255

- (1) Set transmission range selector (1) to N.
Pull PARKING BRAKE control (2).

WARNING

Do not stand between vehicles while disabled vehicle is raised off ground. Falling vehicle can cause serious injury or death.

Prepare retrieval system for operation (para 2-72). Alternately pull TOW and LIFT CYLINDER control levers to extend lift cylinder and tow cylinders to lower towed vehicle to ground but allow tow chains to remain tight.

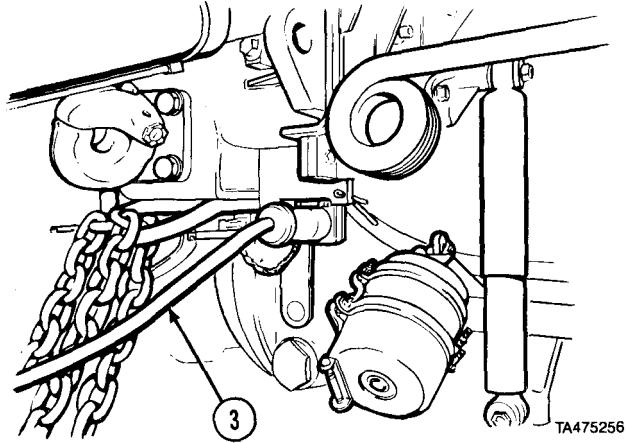
WARNING

If disabled vehicle's parking brake is inoperative, chock wheels of disabled vehicle. Failure to chock wheels may result in personal injury.

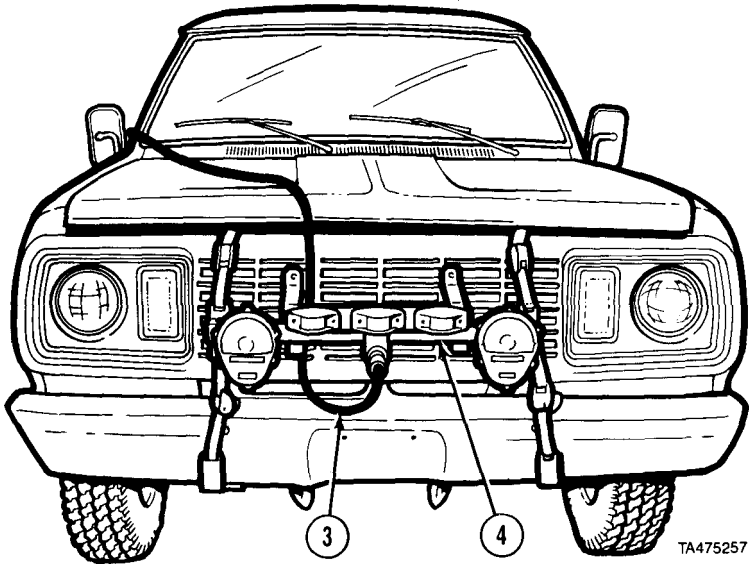
- (4) Apply PARKING BRAKE and place transmission in PARK on disabled vehicle (refer to M880 operator's manual). If parking brake is inoperative, chock wheels on disabled vehicle.

M984E1 General Operating Procedures (Cont)

2-79. TOW M880 (CONT).



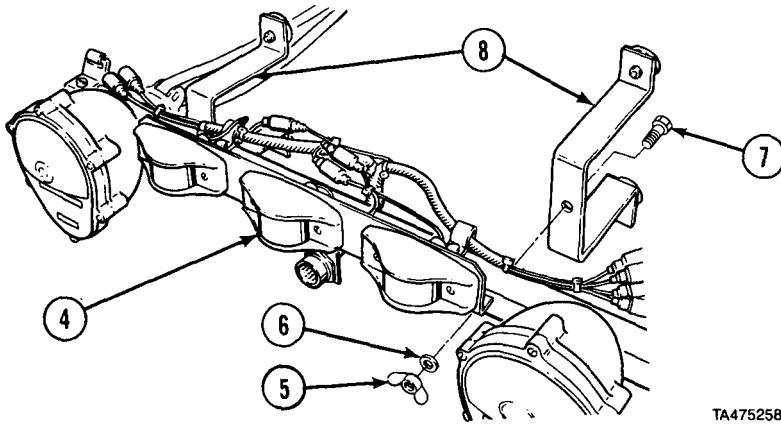
(5) Remove tow light cable (3) from wrecker.



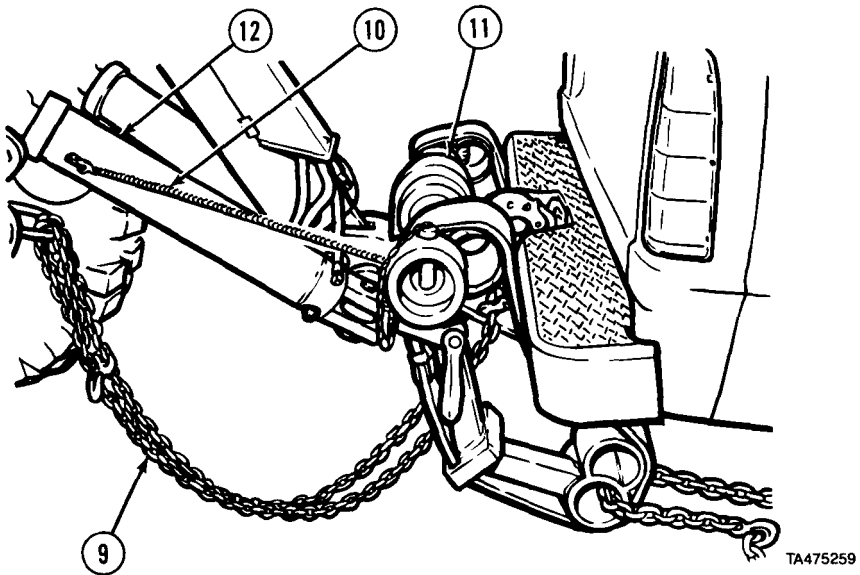
(6) Remove tow light cable (3) from emergency tow lights (4).

(7) Remove and stow emergency tow lights (4) from disabled vehicle.

M984E1 General Operating Procedures (Cont)

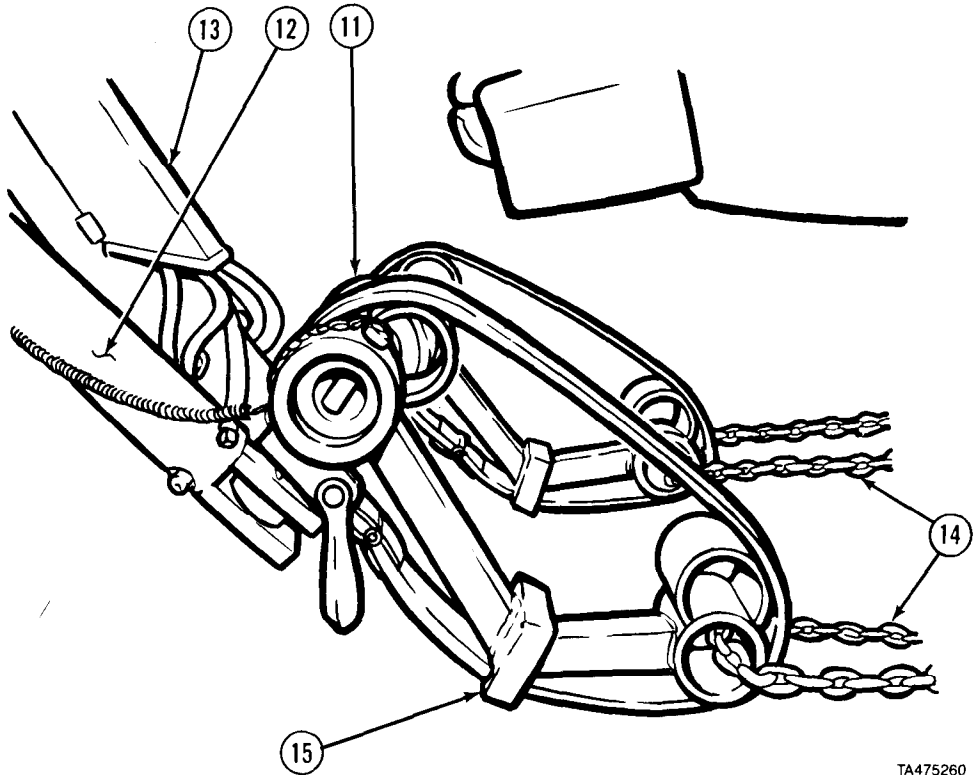


- (8) Remove two nuts (5), washers (6), screws (7), and brackets (8) from emergency tow lights (4). Stow emergency tow lights and brackets.



- (9) Remove and stow two 12-ft (3.5 m) cross chains (9).
 (10) Unwrap two springs (10) from crosstube (11) and connect to tow cylinders (12).

2-79. TOW M880 (CONT).



TA475260

CAUTION

Do not contact pintle hook with lift cylinder or damage to equipment could result.

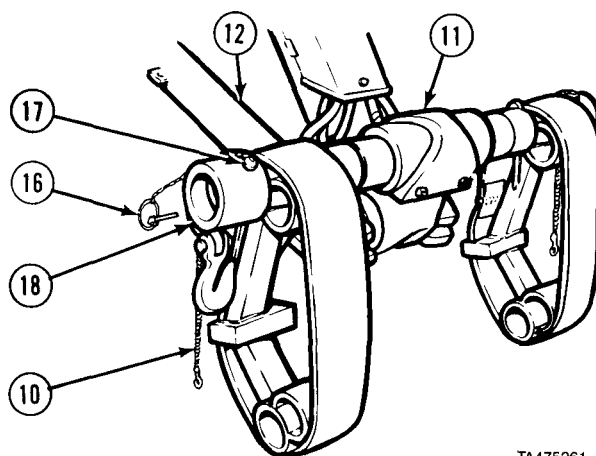
- (11) Pull TOW CYLINDER control levers and LIFT CYLINDER control lever to extend tow cylinders (12) and lift cylinder (13) until 12-ft (3.5 m) tow chain (14) is slack and adapters (15) rest on ground.
- (12) Remove and stow two 12-ft (3.5 m) tow chains (14).

CAUTION

Do not contact pintle hook with lift cylinder or damage to equipment could occur.

- (13) Using retrieval controls, fully retract tow cylinders (12) and retract lift cylinder (13) to raise crosstube (11) approximately 2 ft (60 cm) from ground.

M984E1 General Operating Procedures (Cont)



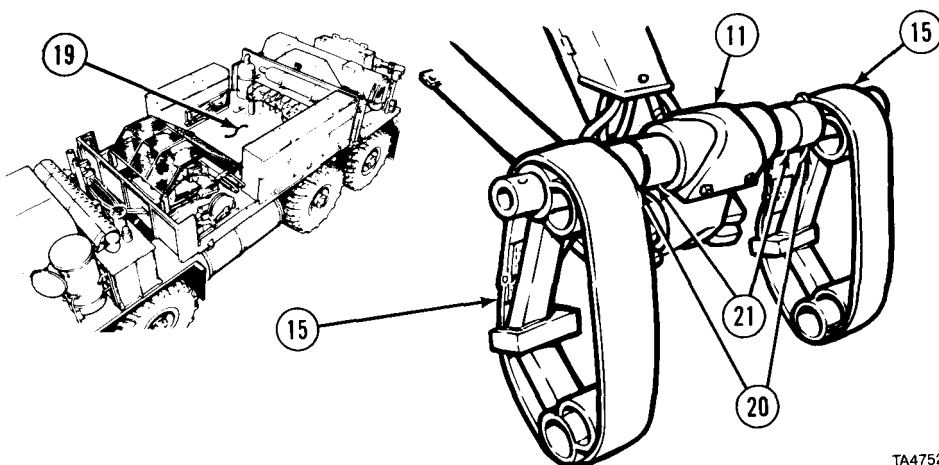
TA475261

(14) Drive wrecker forward several feet and

WARNING

As springs and end caps are removed, crosstube can swing in all directions, adapters may slide off and can cause personal injury.

- (15) Remove two springs (10) from tow cylinders (12).
 (16) Remove quick pins (16) and pins (17) from end caps (18).
 (17) Remove two end caps (18) from crosstube (11).

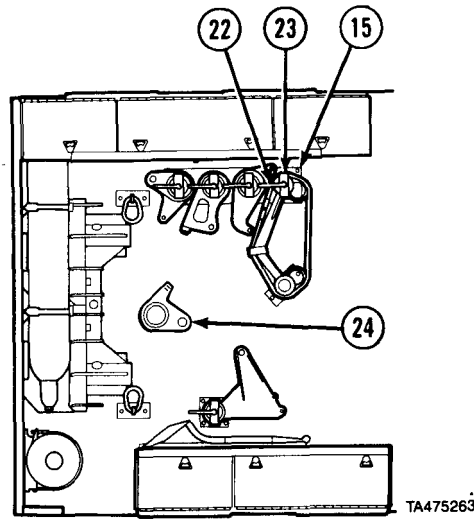


TA475262

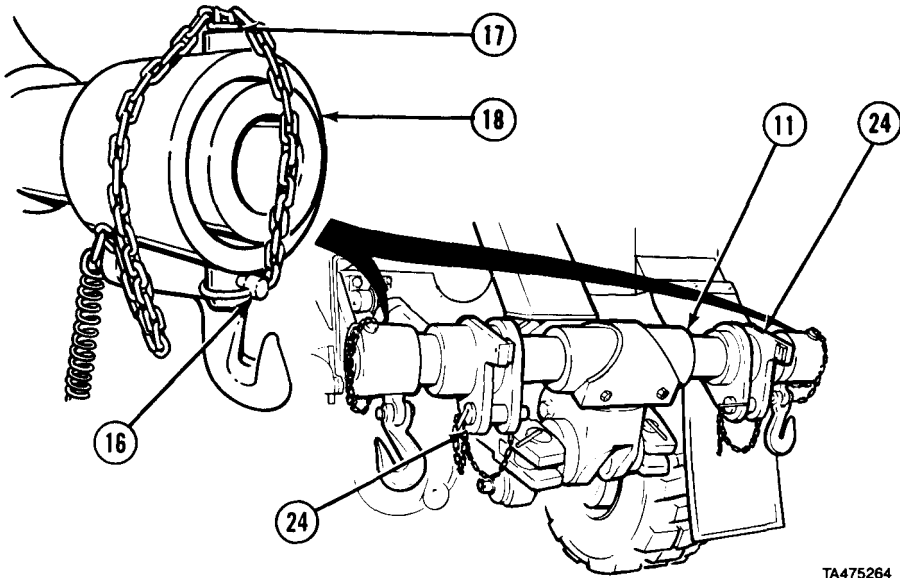
- (18) Remove two adapters (15) from crosstube (11) and place on equipment body floor (19).
 (19) Remove and stow two 4-in. (102 mm) spacers (20) and two 5-in. (127 mm) spacers (21).

M984E1 General Operating Procedures (Cont)

2-79. TOW M880(CONT)

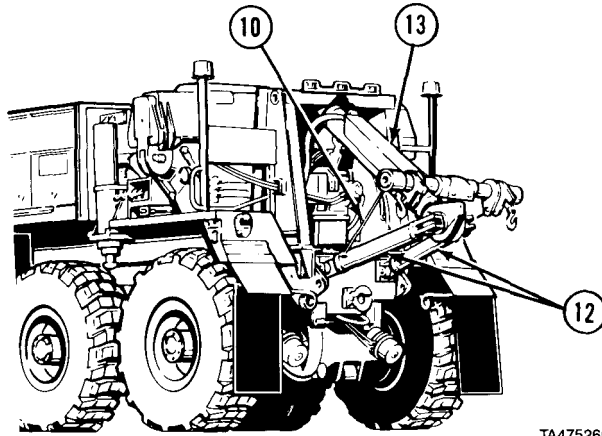


- (20) Remove lock handle (22), lock plate (23), and two M977 front adapters (24).
- (21) Install two M880 adapters (15) removed from crosstube, lock plate (23), and lock handle (22).

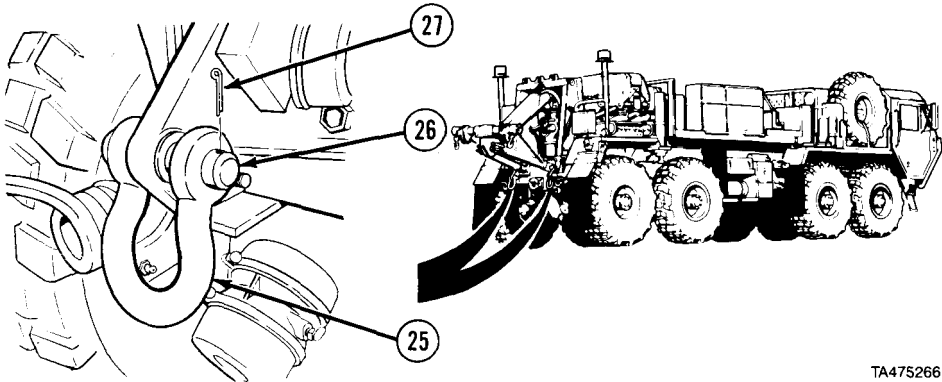


- (22) Install two M977 front adapters (24) on crosstube (11).
- (23) Install two end caps (18) on crosstube (11). Install two pins (17) and quick pins (16).

M984E1 General Operating Procedures (Cont)



- (24) Install two springs (10) on tow cylinders (12).
- (25) Operate retrieval controls and fully retract lift cylinder (13).



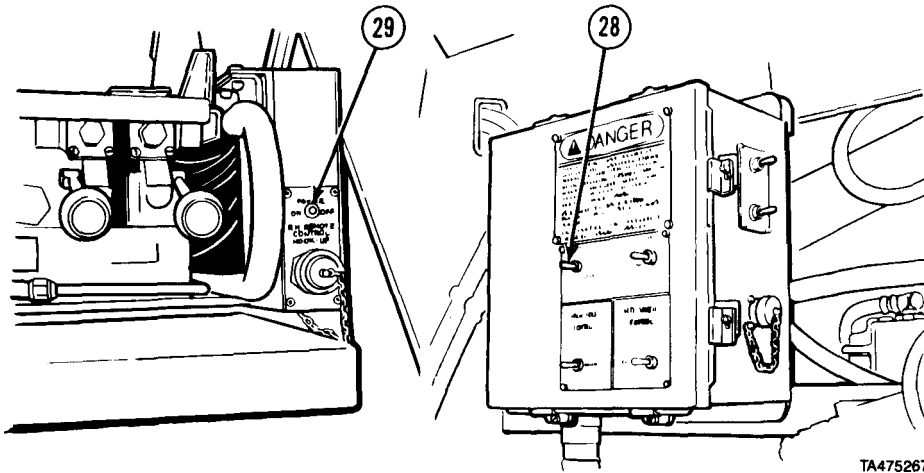
NOTE

Right and left towing shackles are installed the same way.

- (26) Install two towing shackles (25), pins (26), and cotter pins (27).

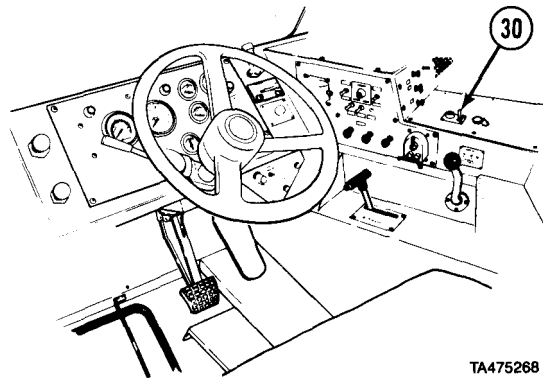
M984E1 General Operating Procedures (Cont)

2-79. TOW M880 (CONT).



TA475267

- (27) Set POWER switch (28) to OFF position.
- (28) Set POWER switch (29) to OFF position.



TA475268

- (29) Turn off emergency flashers on wrecker (para 2-44f) and disabled vehicle.
Turn off service drive lights (para 2-10d).
- (31) Set PTO ENGAGE switch (30) to OFF position.
- (32) Remove and stow beacon lights (para 2-62).
- (33) Shut off engine (para 2-11p).
- (34) Unlock disabled vehicle's steering (refer to M880 operator's manual).

M984E1 General Operating Procedures (Cont)

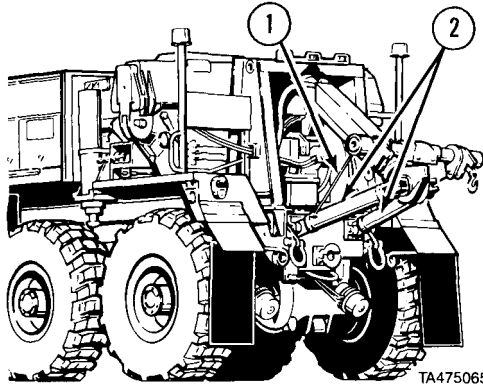
2-80. TOW M911.

a. Front Hookup.

NOTE

This is a two-soldier task.

(1) Prepare retrieval system for operation (para 2-72).

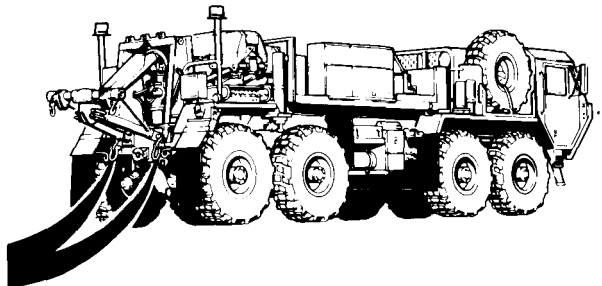
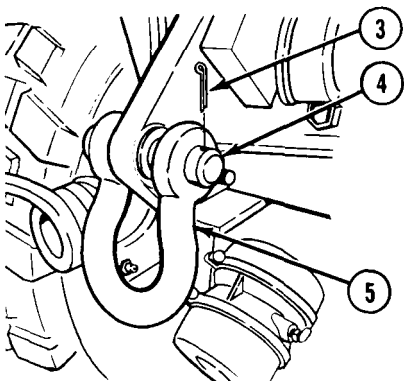


TA475065

WARNING

Hold crosstube when removing springs. Crosstube may swing or cause adapter to slide resulting in personal injury.

(2) Disconnect two springs (1) from tow cylinders (2).



TA475066

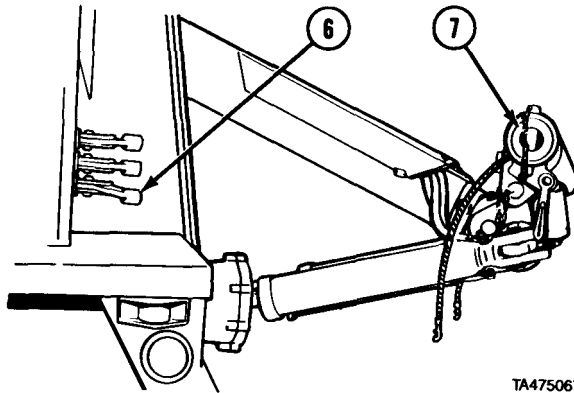
NOTE

Right and left towing shackles are removed the same way.

(3) Remove two cotter pins (3), pins (4), and towing shackles (5).

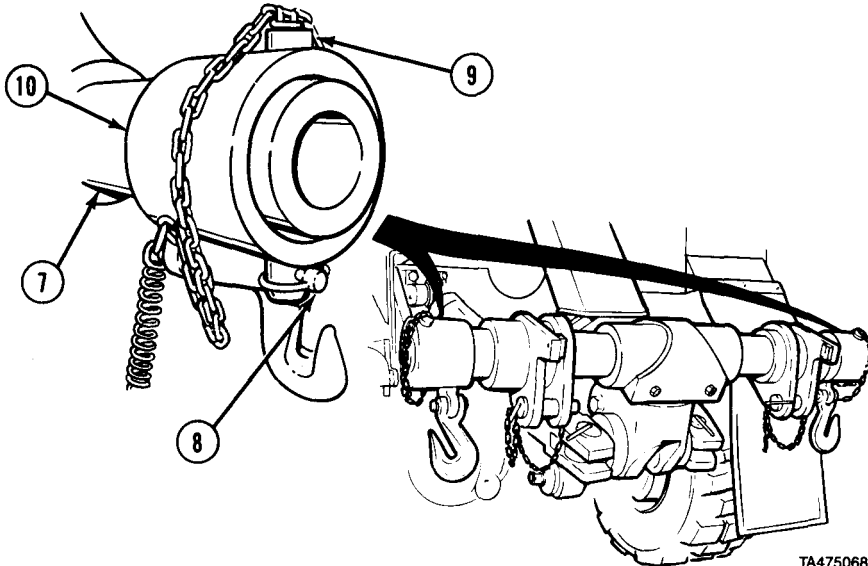
M984E1 General Operating Procedures (Cont)

2-80. TOW M911 (CONT).



TA475067

- (4) Pull LIFT CYLINDER control lever (6) to lower crosstube (7) to approximately 3 ft (1 m) above ground.
- (5) Position wrecker so that crosstube (7) is approximately 1 ft (30 cm) from tow eyes of disabled vehicle and centered on disabled vehicle.



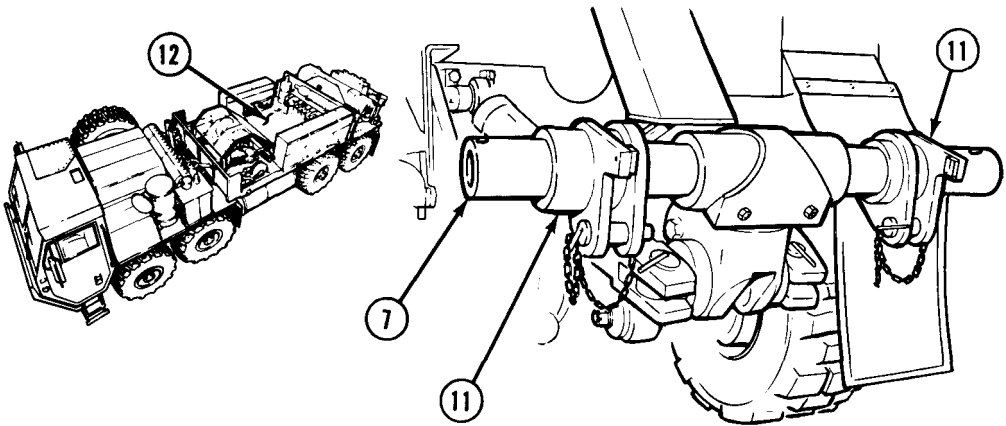
TA475068

WARNING

When end caps are removed from crosstube, adapters may slide off causing personal injury.

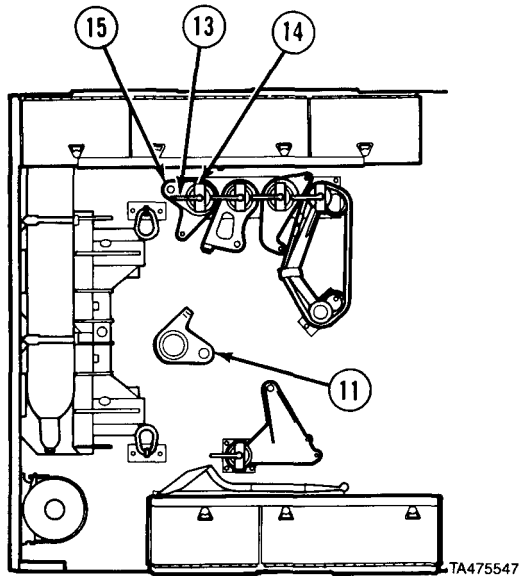
- (6) Remove two quick pins (8) and pins (9) from end caps (10).
- (7) Remove two end caps (10) from crosstube (7).

M984E1 General Operating Procedures (Cont)



TA475069

- (8) Remove two M977 front adapters (11) from crosstube (7) and place on equipment body floor (12).

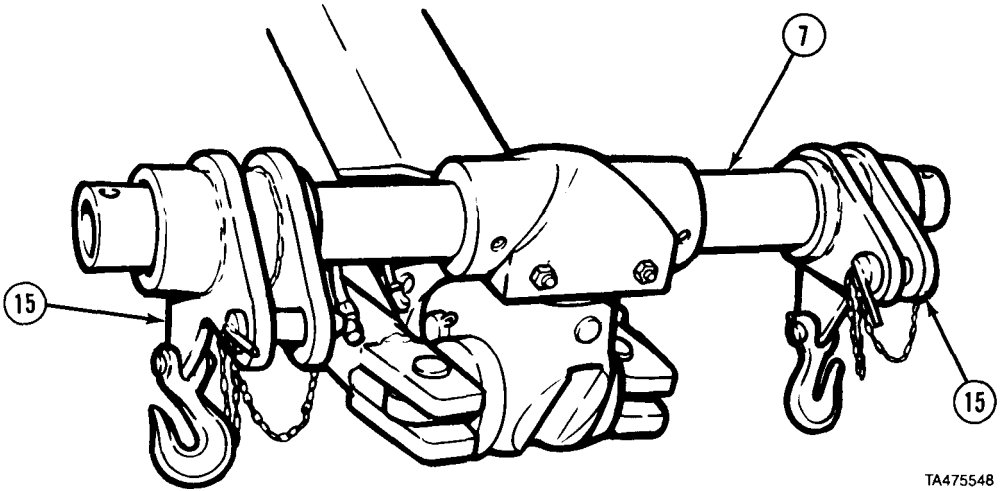


TA475547

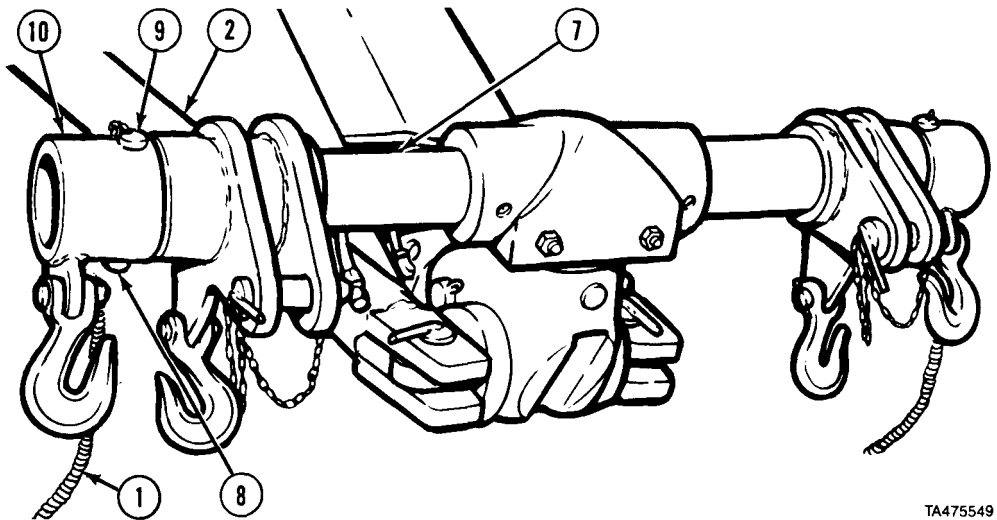
- (9) Remove lock handle (13), lock plate (14), and two M911 front tow adapters (15).
- (10) Install two M977 front adapters (11) removed from crosstube, lock plate (14), and lock handle (13).

M984E1 General Operating Procedures (Cont)

2-80. TOW M911 (CONT).



(11) Install two M911 front tow adapters (15) on crosstube (7).

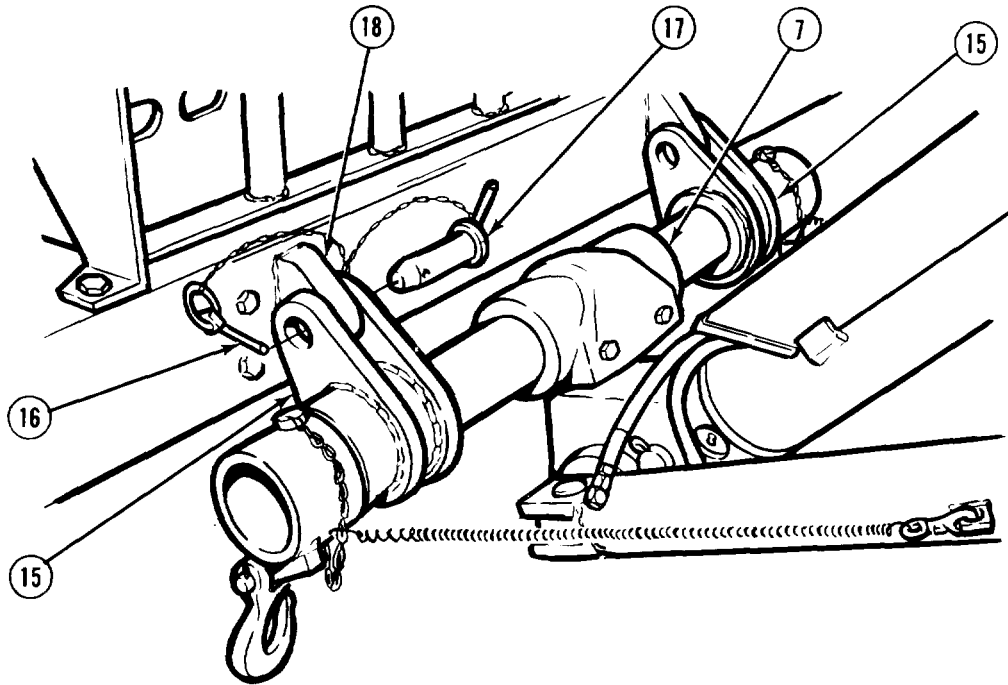


NOTE

End caps will hang over end of crosstube for M911 adapters.

- (12) Install two end caps (10) on crosstube (7).
- (13) Install two pins (9) and quick pins (8).
- (14) Attach two springs (1) on tow cylinders (2).

M984E1 General Operating Procedures (Cont)



TA475550

(15) Remove two quick pins (16) and pins (17) from adapters (15).

WARNING

Keep hands and fingers away from adapters and tow eyes when operating retriever controls. Personal injury could result.

NOTE

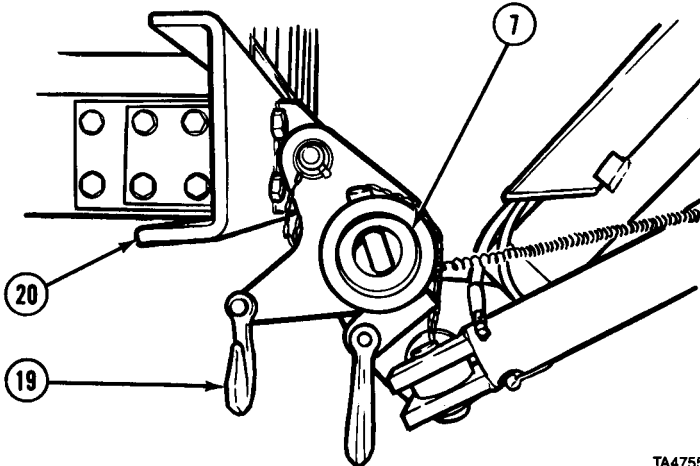
If disabled vehicle has towing shackles installed, remove shackles and stow in disabled vehicle.

(16) Soldier A operates retrieval system (para 2-72) while Soldier A and Soldier B position cross-tube (7) so holes in adapters (15) align with front tow eyes (18).

(17) Insert two pins (17) through adapters (15) and front tow eyes (18). Install quick pins (16) in pins (17).

M984E1 General Operating Procedures (Cont)

2-80. TOW M911 (CONT).

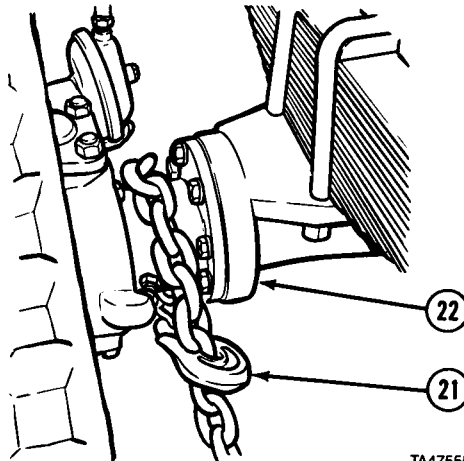


TA475551

NOTE

Right side grab hook is shown.

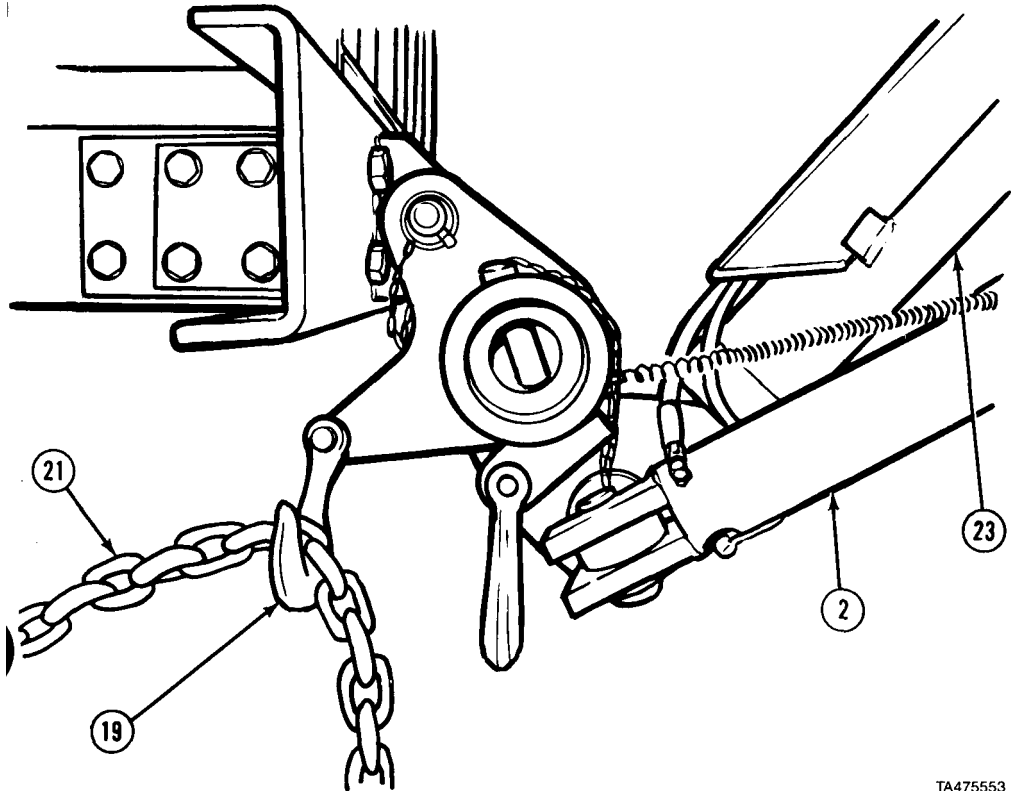
(18) Alternately operate lift and tow cylinders to lower crosstube (7) until adapter grab hooks (19) are under front bumper (20).



TA475552

- (19) Remove two 16-ft (5 m) safety chains (21) from stowage.
- (20) Route one safety chain (21) over front axle (22) on disabled vehicle.
- (21) Hook safety chain (21) together in front of axle (22).
- (22) Repeat steps (20) and (21) for other side of disabled vehicle.

M984E1 General Operating Procedures (Cont)

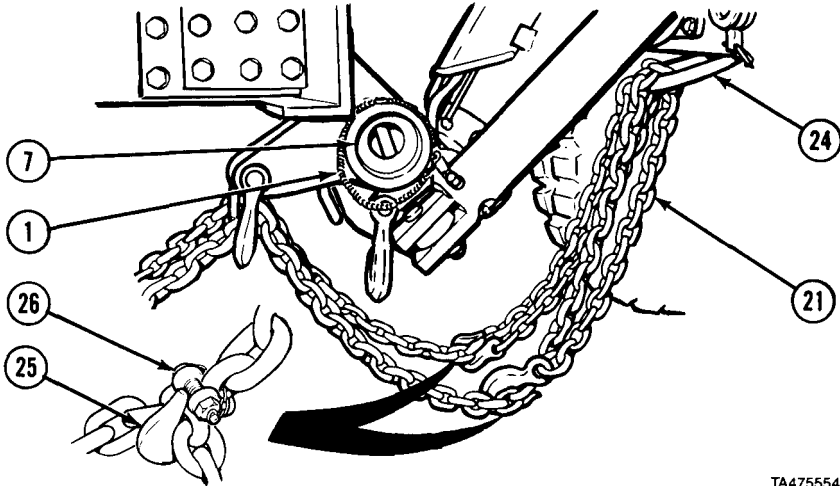


TA475553

- (23) Pull safety chain (21) tight and install chain on adapter grab hook (19).
- (24) Repeat step (23) for other side of disabled vehicle.
- (25) Release PARKING BRAKE on disabled vehicle (refer to M911 operator's manual).
- (26) Alternately, push in TOW and LIFT CYLINDER control levers until tow cylinders (2) are fully retracted.
- (27) Push in LIFT CYLINDER control lever to retract lift cylinder (23) until slack is removed from safety chains (21).

M984E1 General Operating Procedures (Cont)

2-80. TOW M911 (CONT).

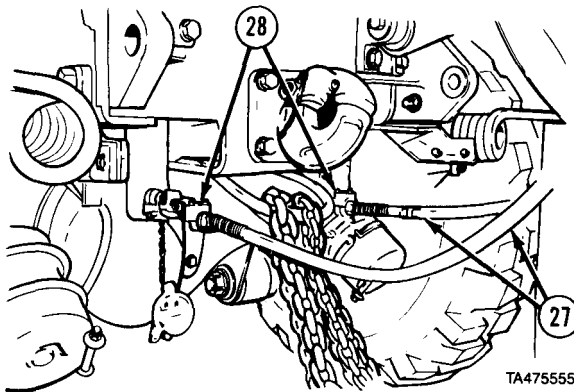


NOTE

- Safety chains can be routed to towing shackles or safety chain hoop. Towing shackles can be used only after tow cylinders are extended.
- Adjust chain slack so safety chains just touch the ground.

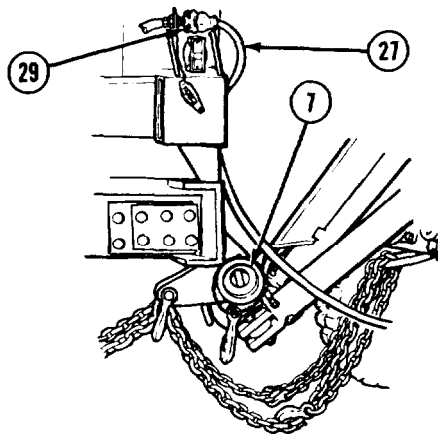
(28) Route two safety chains (21) through safety chain hoop (24) on wrecker and secure grab hook (25) with safety shackle (26).

(29) Wrap two springs (1) around crosstube (7) and secure.



(30) Remove two airhoses (27) from stowage and attach to rear glad hands (28) on wrecker.

M984E1 General Operating Procedures (Cont)



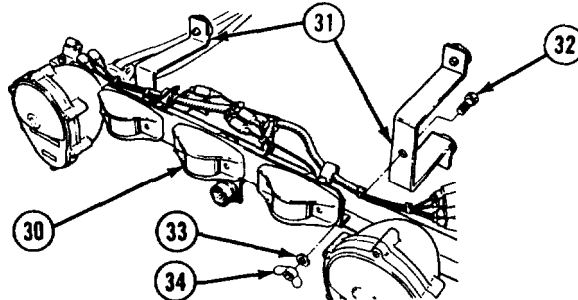
CAUTION

Do not route airhoses between retrieval cylinders or damage to airhoses may result.

NOTE

Rear emergency airhose from wrecker must be connected to front emergency glad hand on disabled vehicle. Rear service airhose from wrecker must be connected to front service glad hand on disabled vehicle.

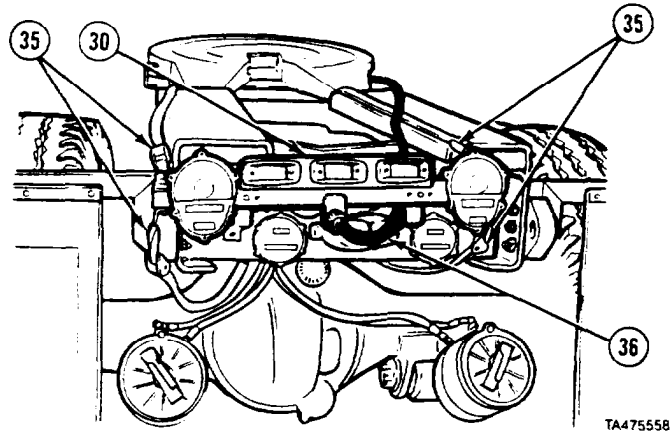
- (31) Route two airhoses (27) over crosstube (7) up through M911 grille, and attach to front glad hands (29) on disabled vehicle.



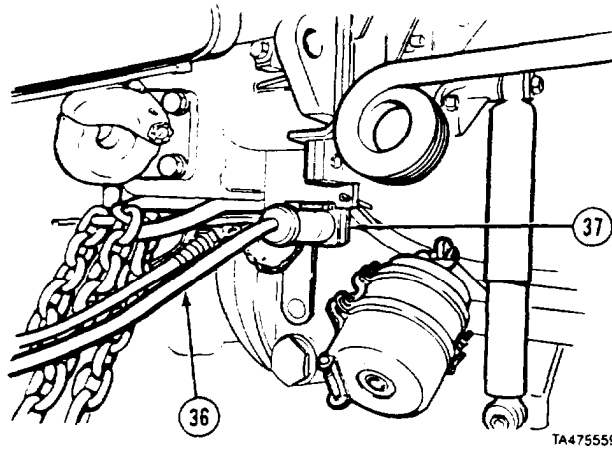
- (32) Prepare disabled vehicle for towing (refer to M911 operator's manual).
- (33) Remove emergency tow lights (30) and tow brackets (31) from stowage.
- (34) Install two brackets (31) in center holes of emergency tow lights with two screws (32), washers (33), and nuts (34).

M984E1 General Operating Procedures (Cont)

2-80. TOW M911 (CONT).

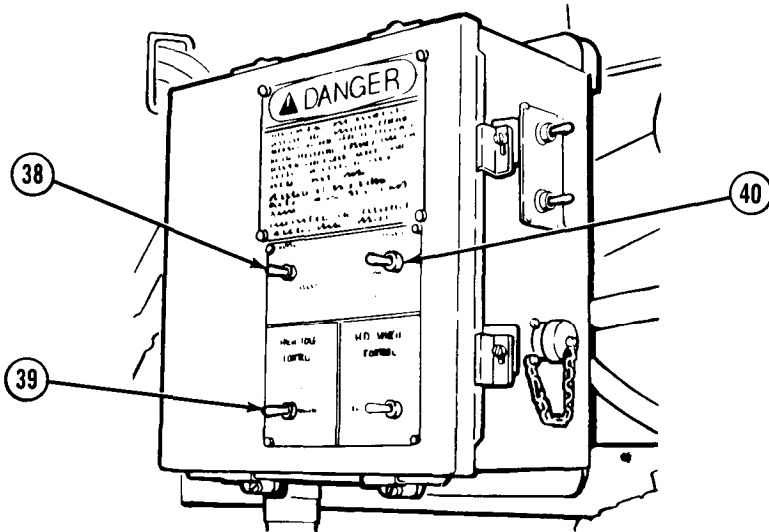


(36) Remove low. light cable (36) from stowage and connect to emergency tow lights (.30).



(37) Route other end of tow light cable (36) along disabled vehicle and connect to rear electrical connector (37) on wrecker.

M984E1 General Operating Procedures (Cont)



TA475560

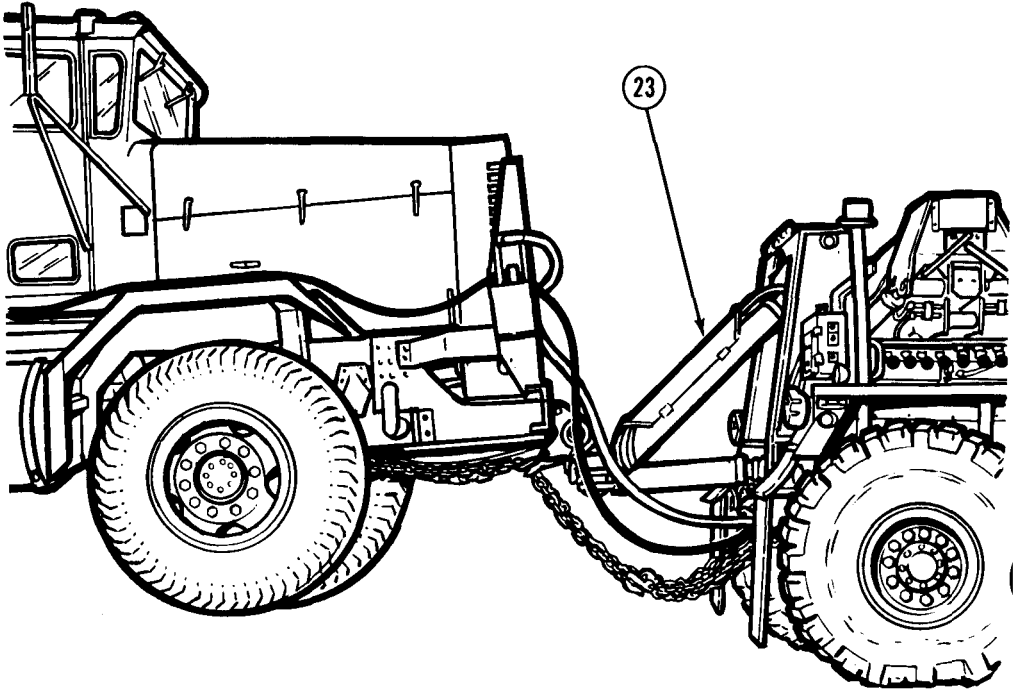
NOTE

- . If disabled vehicle will be lifted and towed, continue with step (38).
- . If disabled vehicle will be towed with all tires on paved roads only, raise crosstube enough to partially unload disabled vehicle's front suspension. Keep front tires in firm contact with ground and proceed to step (43).

- (38) Lock disabled vehicle's steering (refer to M911 operator's manual.)
- (39) Set POWER switch (38) to ON position.
- (40) Set HIGH IDLE switch (39) to CONTINUOUS.
- (41) Push and release LATCH switch (40). Engine speed will increase to approximately 1500 rpm.

M984E1 General Operating Procedures (Cont)

2-80. TOW M911 (CONT).



TA475561

WARNING

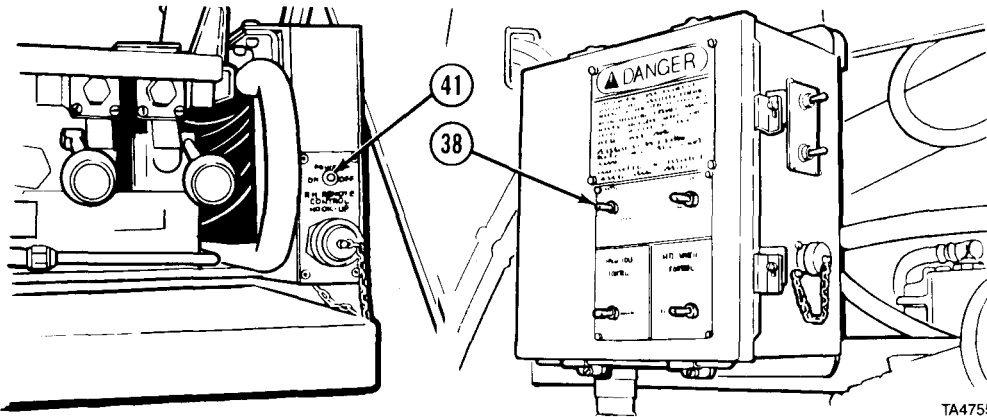
Keep out from under retrieval system and disabled vehicle when raised off ground or personal injury or death may result.

CAUTION

- . Fully retract both tow cylinders before lifting disabled vehicle or equipment damage may result.
- . Make sure all rigging is secure. Loose rigging can become entangled and cause damage to equipment.

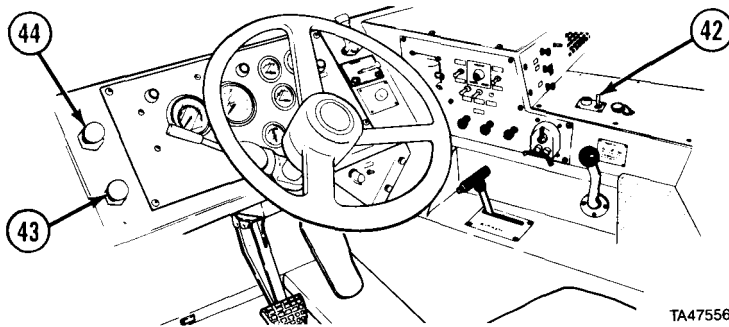
(42) Push LIFT CYLINDER control lever to retract lift cylinder (23) and raise disabled vehicle approximately 1 ft (30 cm) off ground.

M984E1 General Operating Procedures (Cont)



TA475562

- (43) Set POWER switch (38) to OFF position.
- (44) Set POWER switch (41) to OFF position.



TA475563

- (45) Set PTO ENGAGE switch (42) to OFF position.
- (46) Push in TRAILER AIR SUPPLY control (43).
- (47) Turn on service drive lights (para 2-10d).
- (48) Turn on emergency flashers on wrecker (para 2-44a) and disabled vehicle.
- (49) Push in PARKING BRAKE control (44) and select desired gear (para 2-11e).

WARNING

The M984E1 should not be operated at speeds over 15 mph except on paved roads when the operator determines that the vehicle being towed and the terrain allow safe operation. Engine brake switch must be "ON" for all towing operations. The following are maximum safe speeds:

Terrain Condition	Maximum speed, towed load up to 50,000 lbs	Maximum speed, towed load above 50,000 lbs
on road-level	35	30
on road-hilly	30	20
off road	15	15

Speeds in excess of the above can result in loss of control, serious injury or death.

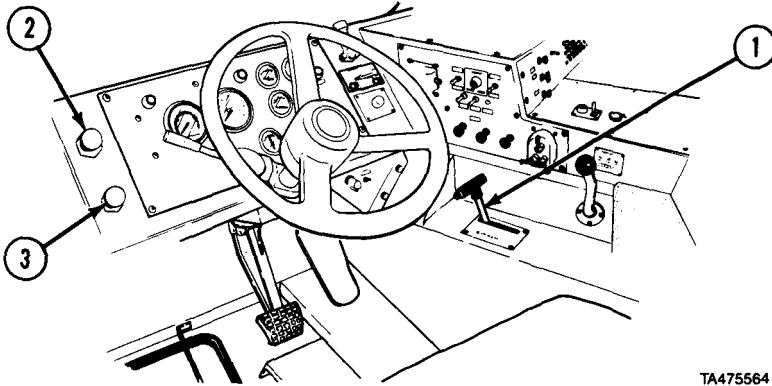
- (50) Transport disabled vehicle

2-80. TOW M911 (CONT).

b. Front Disconnect.

NOTE

This is a two-soldier task.



TA475664

- (1) Set transmission range selector (1) to N.
- (2) Pull PARKING BRAKE control (2).
- (3) Pull TRAILER AIR SUPPLY control (3).

WARNING

Do not stand between vehicles while disabled vehicle is raised off ground. Falling vehicle can cause serious injury or death.

NOTE

After lowering disabled vehicle, extend lift and tow cylinders approximately 2 to 4 in. (50 to 100 mm) to allow for adjustment when removing adapters.

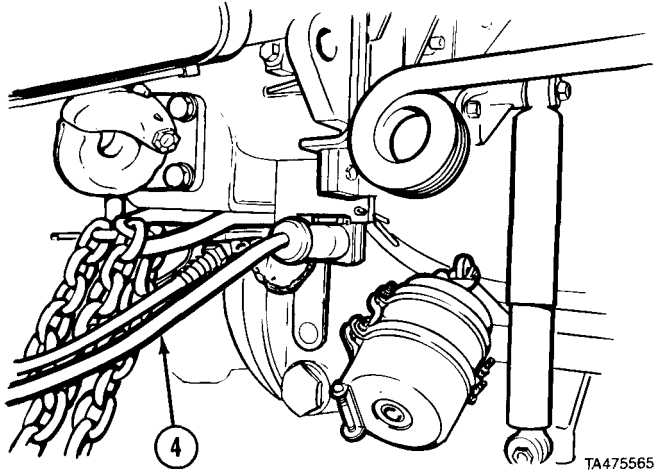
- (4) Prepare retrieval system for operation (para 2-72) and pull LIFT CYLINDER control lever to extend lift cylinder and lower towed vehicle to ground until safety chain at front axle is slack.

WARNING

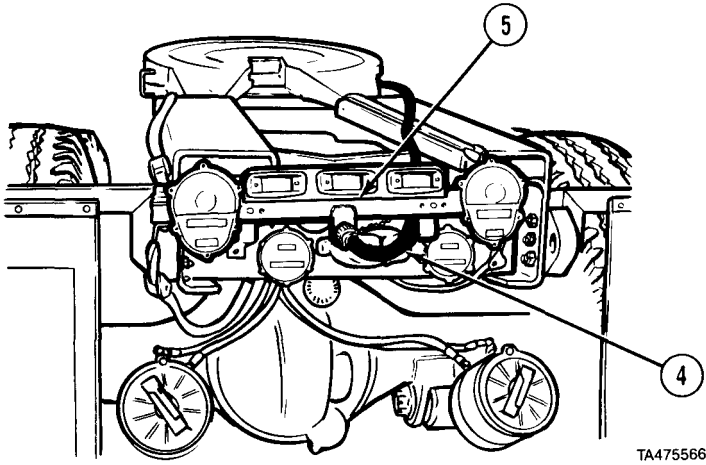
If disabled vehicle's air system is inoperative, chock wheels of disabled vehicle. Failure to chock wheels may result in personal injury.

- (5) Apply PARKING BRAKE on disabled vehicle (refer to M911 operator's manual.) If parking brake is inoperative, check wheels on disabled vehicle.

M984E1 General Operating Procedures (Cont)

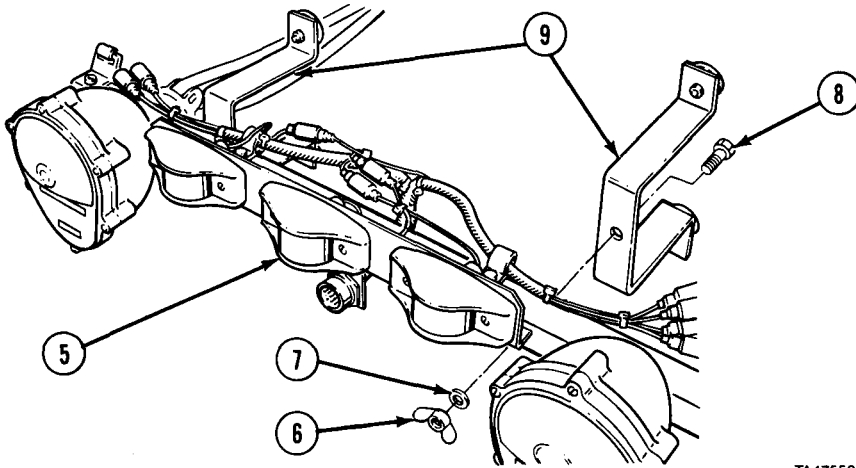


(6) Remove tow light cable (4) from wrecker.



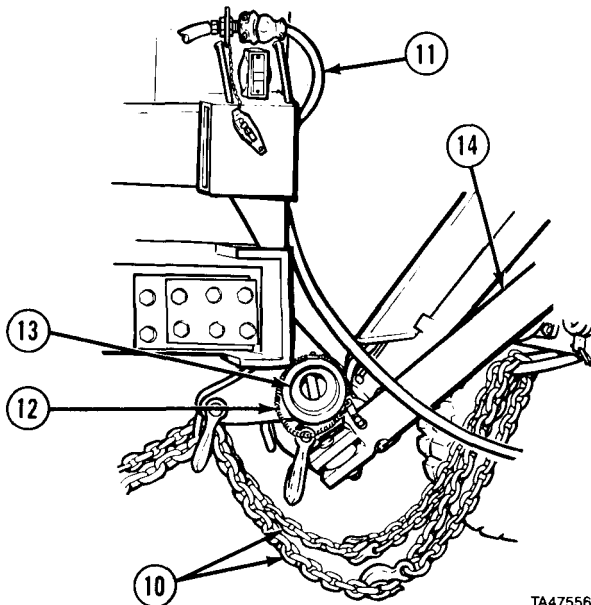
(7) Remove tow light cable (4) from emergency tow lights (5).
(8) Remove emergency tow lights (5) from disabled vehicle.

2-80. TOW M911 (CONT).



TA475567

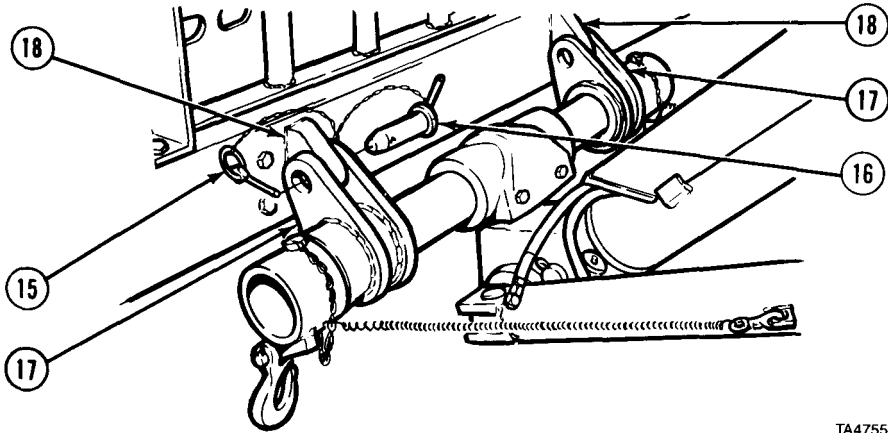
- (9) Remove two nuts (6), washers (7), screws (8), and brackets (9) from emergency tow lights (5). Stow emergency tow lights and brackets.



TA475568

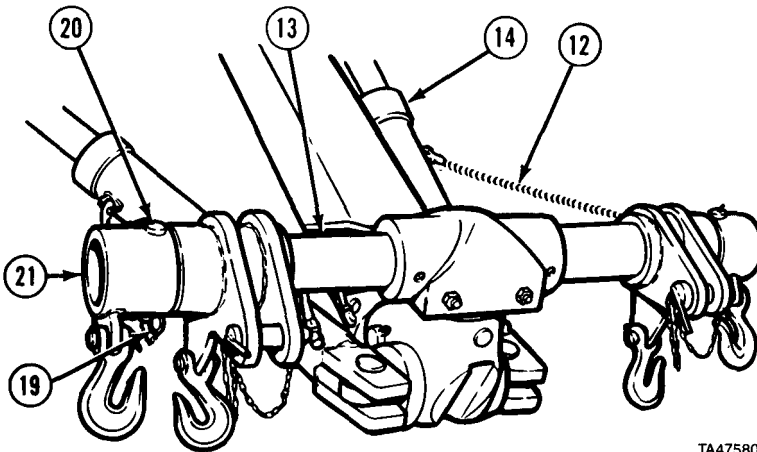
- (10) Remove and stow two safety chains (10) and air hoses (11).
(11) Unwrap two springs (12) from crosstube (13) and connect to tow cylinders (14).

M984E1 General Operating Procedures (Cont)



TA475569

- (12) Remove two quick pins (15) and pins (16) from adapters (17).
- (13) Remove two adapters (17) from tow eyes (18) on disabled vehicle.
- (14) Install two pins (16) in adapters (17).
- (15) Install two quick pins (15) in pins (16).



TA475802

- (16) Drive wrecker forward several feet and park (para 2-110).

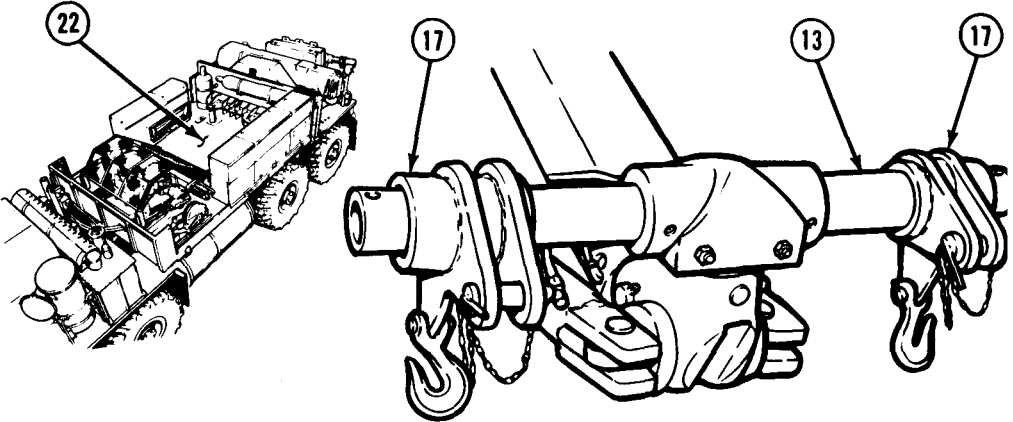
WARNING

As springs and end caps are removed, crosstube can swing in all directions, adapters may slide off, and can cause personal injury.

- (17) Remove two springs (12) from tow cylinders (14).
- (18) Remove two quick pins (19) and pins (20) from end caps (21).
- (19) Remove two end caps (21) from crosstube (13).

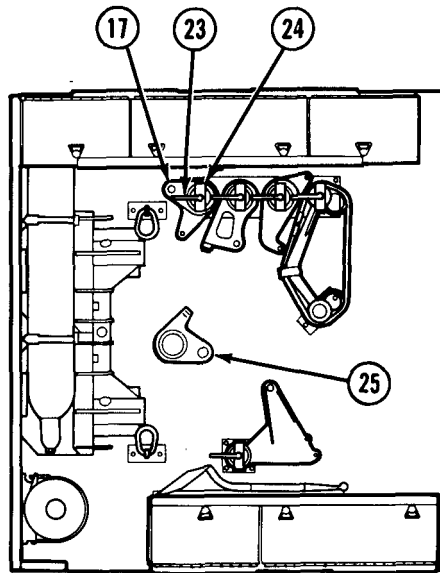
M984E1 General Operating Procedures (Cont)

2-80. TOW M911 (CONT).



TA475571

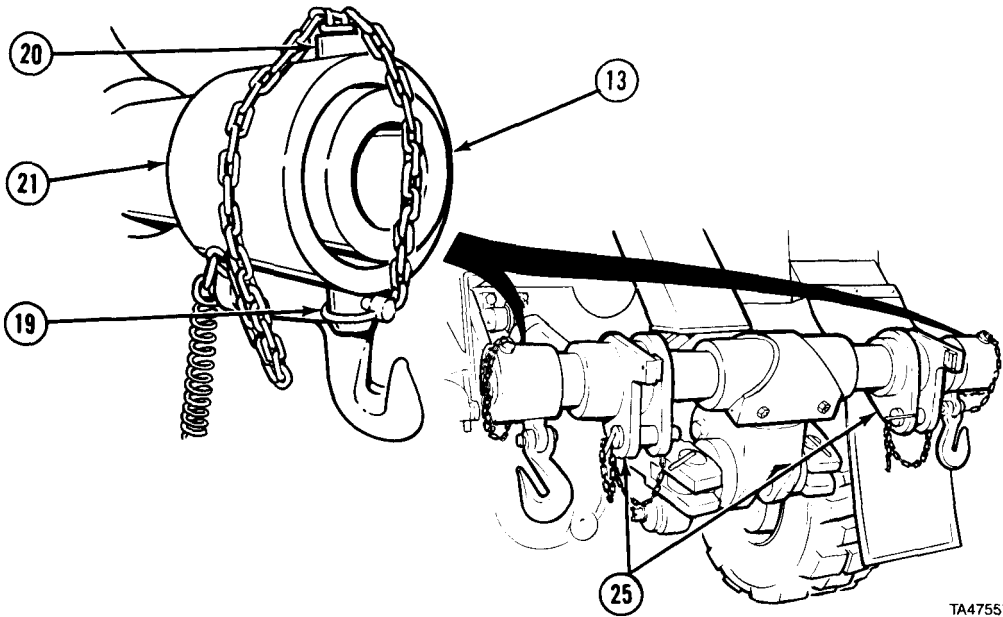
- (20) Remove two adapters (17) from crosstube (13) and place on equipment body floor (22).



TA475571

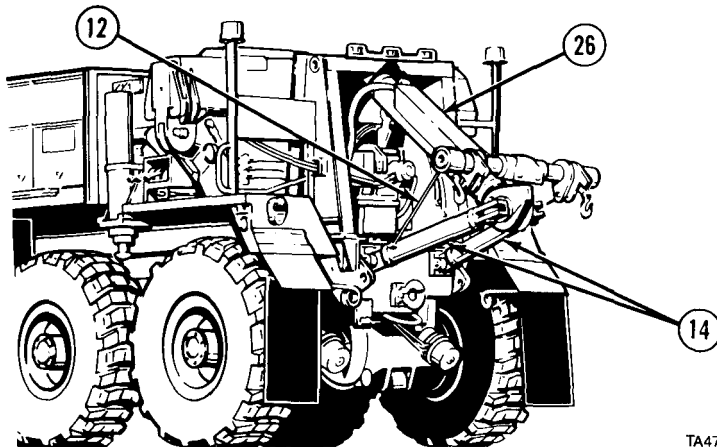
- (21) Remove lock handle (23), lock plate (24), and two M977 front tow adapters (25).
(22) Install two M911 adapters (17) removed from crosstube, lock plate (24), and lock handle (23).

M984E1 General Operating Procedures (Cont)



TA475572

- (23) Install two M977 front adapters (25) on crosstube (13).
- (24) Install two end caps (21) on crosstube (13). Install two pins (20) and two quick pins (19).

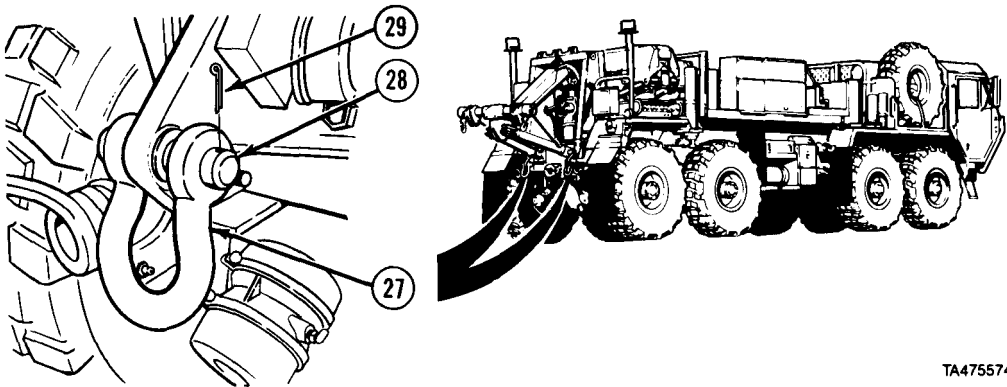


TA475573

- (25) Install two springs (12) on tow cylinders (14).
- (26) Operate retrieval controls to fully retract lift cylinder (26) and tow cylinders (14).

M984E1 General Operating Procedures (Cont)

2-80. TOW M911 (CONT).

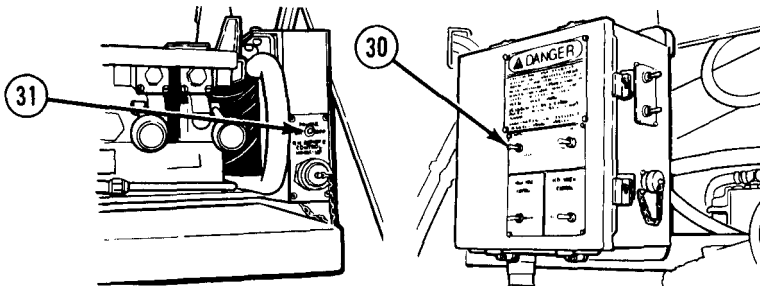


TA475574

NOTE

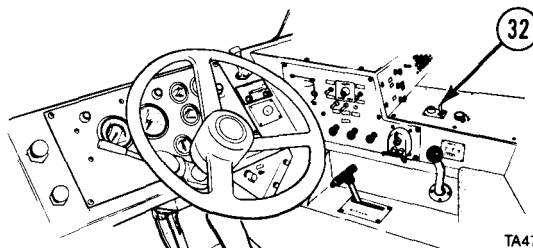
Right and left towing shackles are installed the same way.

- (27) Install two towing shackles (27), pins (28), and cotter pins (29).



TA475575

- (28) Set POWER switch (30) to OFF position.
 (29) Set POWER switch (31) to OFF position.



TA475576

- (30) Turn off emergency flashers on wrecker (para 2-44f) and disabled vehicle.
 (31) Turn off service drive lights (para 2-10d).
 (32) Set PTO ENGAGE switch (32) to OFF position.
 (33) Remove and stow beacon lights (para 2-62).
 (34) Shut off engine (para 2-11p).
 (35) Unlock disabled vehicle's steering (refer to M911 operator's manual.)

M984E1 General Operating Procedures (Cont)

c. Rear Hookup.

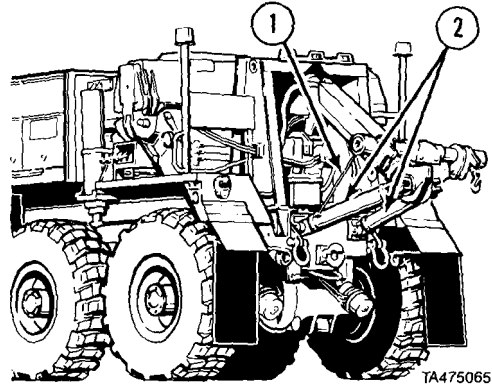
NOTE

This is a two-soldier task.

(1) Prepare retrieval system for operation (para 2-72).

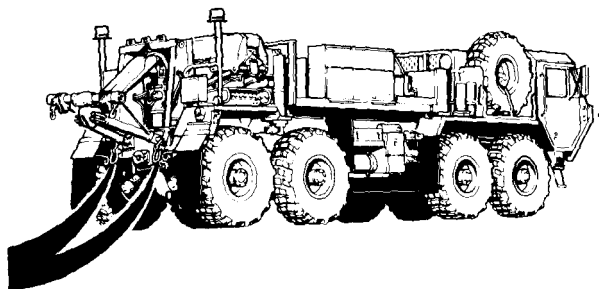
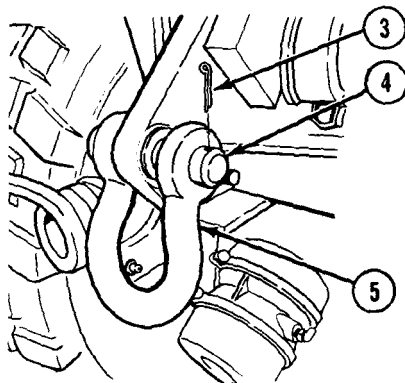
WARNING

- Hold crosstube when removing springs. Crosstube may swing or cause adapter to slide resulting in personal injury.
- Intervehicular air lines are not connected when towing from rear. Disabled vehicle will not have braking. Use extreme caution when transporting disabled vehicle using rear hookup. Vehicle traveling out of control can cause serious injury or death.



TA475065

(2) Disconnect two springs (1) from tow cylinders (2).



TA475066

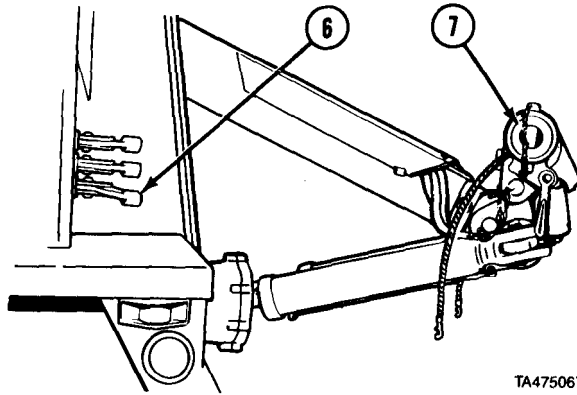
NOTE

Right and left towing shackles are removed the same way.

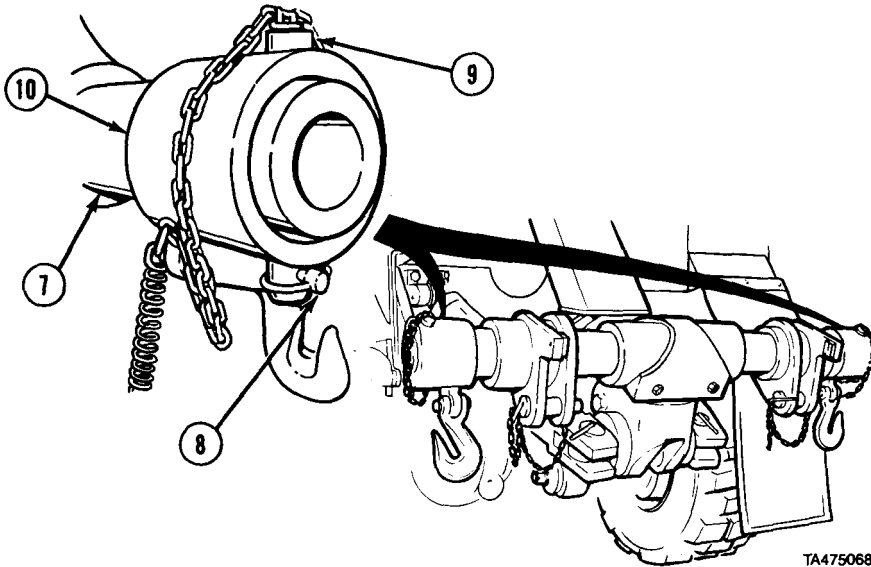
(3) Remove cotter pin (3), pin (4), and towing shackle (5) and stow.

M984E1 General Operating Procedures (Cont)

2-80. TOW M911 (CONT).



- (4) Pull LIFT CYLINDER control lever (6) to lower crosstube (7) to approximately 3 ft (1 m) above ground.
- (5) Position wrecker so that crosstube (7) is approximately 1 ft (30 cm) from tow eyes of disabled vehicle and centered on disabled vehicle.

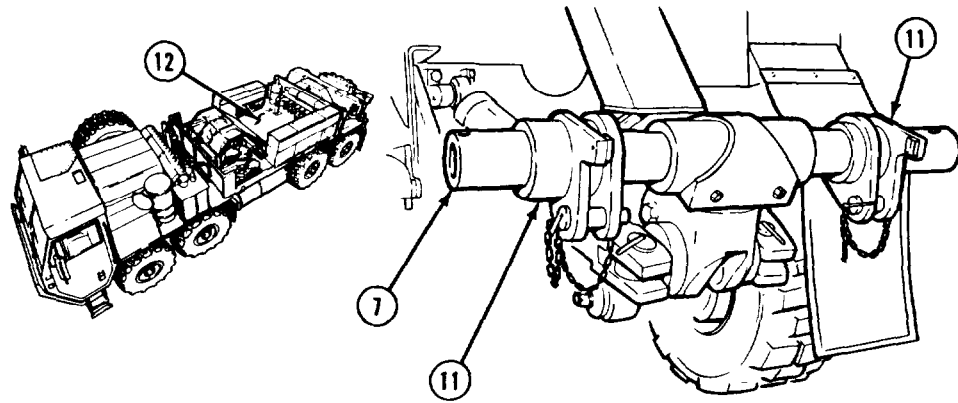


WARNING

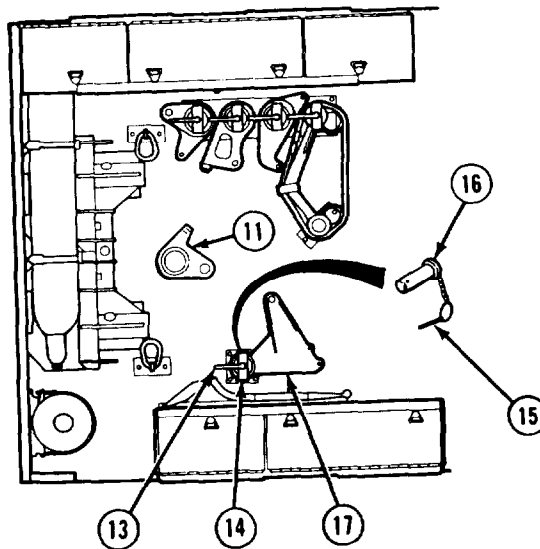
When end caps are removed from crosstube, adapters may slide off causing personal injury.

- (6) Remove quick pins (8) and pins (9) from end caps (10).
- (7) Remove end caps (10) from crosstube (7).

M984E1 General Operating Procedures (Cont)



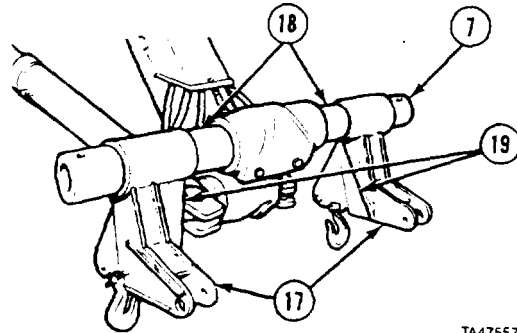
- (8) Remove two M977 front adapters (11) from crosstube (7) and Place on equipment body floor (12).



- (9) Remove lock handle (13), lock plate (14), quick Pin (15), Pin (16), and two M911 rear tow adapters (17).
- (10) Install two M977 front adapters (11) removed from crosstube, Pin (16), quick pin (15), lock plate (14), and lock handle (13).
- (11) Install two 1-7/16-in. (37 mm) pins and two 5-in. (127 mm) spacer tubes from stowage.

M984E1 General Operating Procedures (Cont)

2-80. TOW M911 (CONT.)

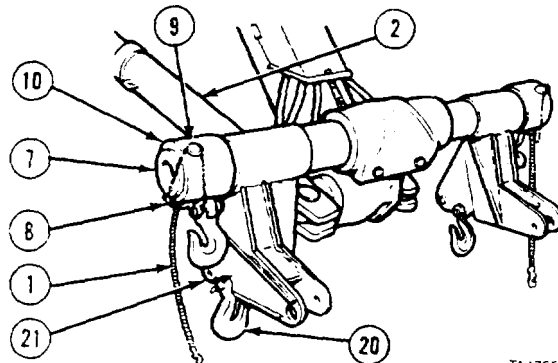


TA475578

WARNING

Adapters and end caps may slide off when installing and may cause personal injury.

- (12) install two 5 -in. (127 mm) spacer tubes (18) on crosstube (7).
- (13) Install two M911 rear tow adapters (17) on crosstube (7) with support brace (19) to inside.



TA475579

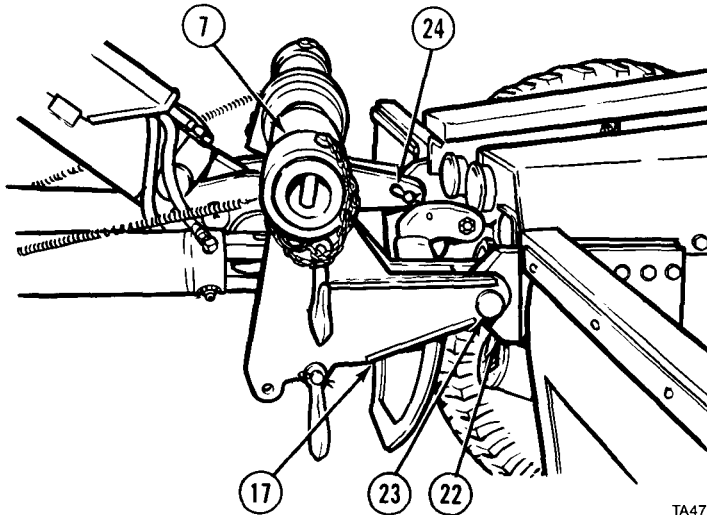
- (14) Install two end caps (10) on crosstube (7).
- (15) Install two pins (9) and quick pins (8).

NOTE

Adapter grab hook may be installed in either hole. For M911 install grab hooks in hole closest to towing pin holes.

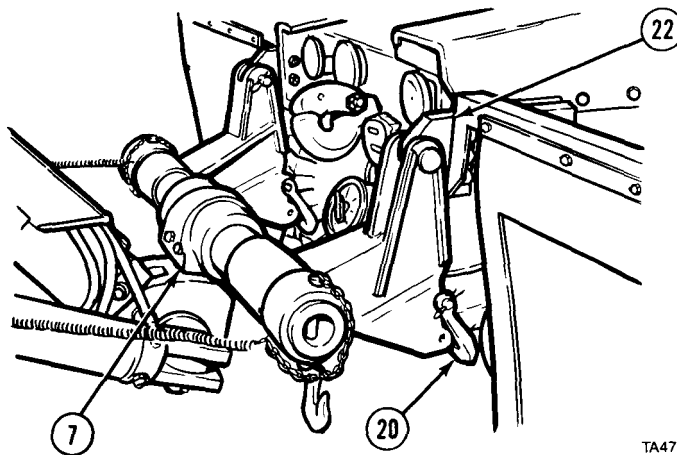
- (16) Position adapter grab hooks (20) in hole neat to pin holes (21)
- (17) Attach two springs (1) on tow cylinders (2).

M984E1 General Operating Procedures (Cont)



TA475580

- (18) Soldier A operates retrieval system (para 2-72) while Soldier A and Soldier B position crosstube (7) so holes in adapters (17) align with rear tow eyes (22).
- (19) Insert two 1-7/16-in. (36 mm) pins (23) through adapters (17) and rear tow eyes (22). Install two cotter hairpins (24) in pins (23).

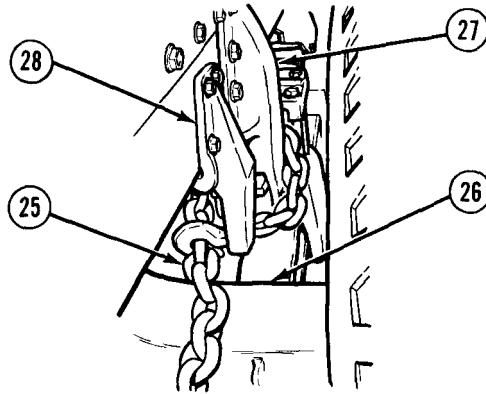


TA475581

- (20) Lower crosstube (7) until adapter grab hooks (20) are under rear tow eyes (22).

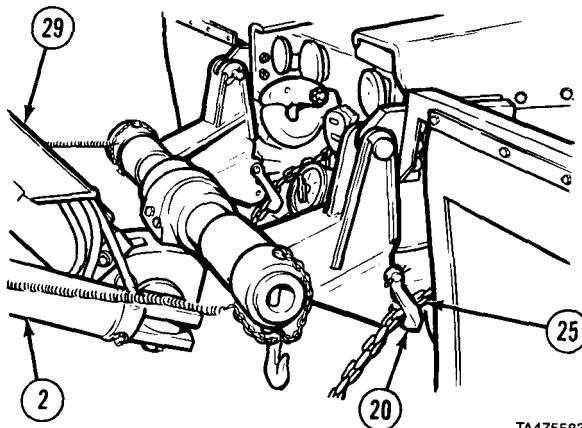
M984E1 General Operating Procedures (Cont)

2-80. TOW M911 (CONT).



TA475582

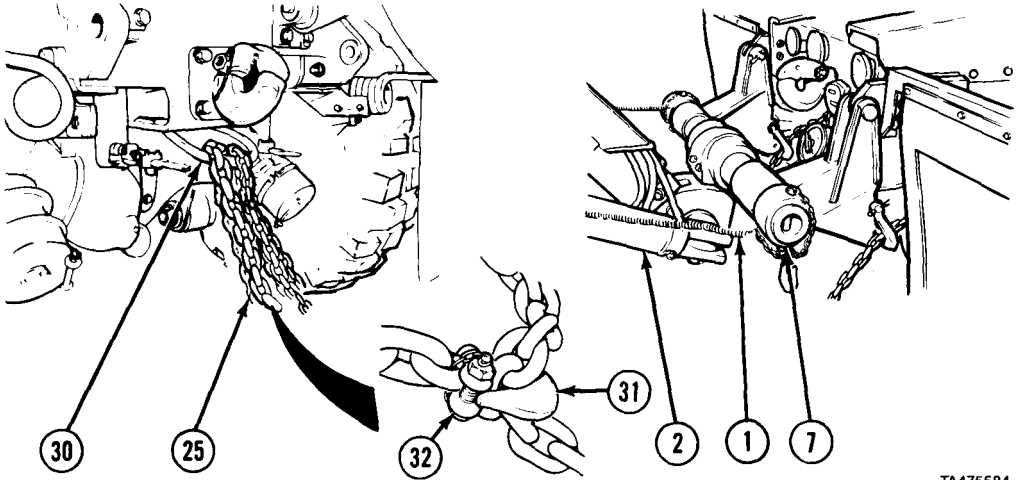
- (21) Remove two 16-ft (5 m) safety chains (25) from stowage.
- (22) Route one safety chain (25) over rear axle (26) on disabled vehicle.
- (23) Route safety chain (25) around rear leaf spring shackle (27).
- (24) Hook safety chain (25) together between rear leaf spring shackle (27) and axle stop (28).
- (25) Repeat steps (22), (23), and (24) for other side of disabled vehicle.



TA475583

- (26) Pull safety chain (25) tight and install chain on adapter grab hook (20).
- (27) Repeat step (26) for other side of disabled vehicle.
- (28) Release PARKING BRAKE on disabled vehicle (refer to M911 operator's manual).
- (29) Alternately, push in TOW and LIFT CYLINDER control levers until tow cylinders (2) are fully retracted.
- (30) Push in LIFT CYLINDER control lever to retract lift cylinder (29) until slack is removed from safety chains (25).

M984E1 General Operating Procedures (Cont)

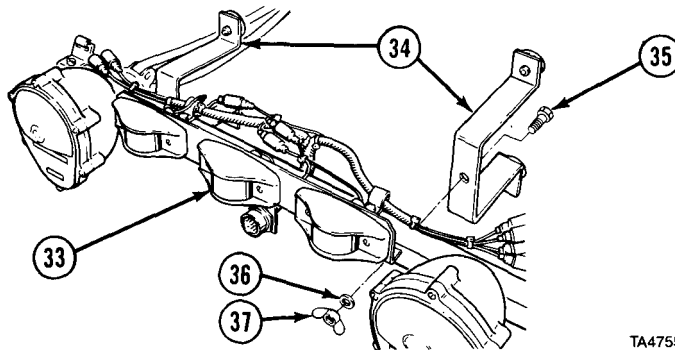


TA475584

NOTE

- Safety chains can be routed to towing shackles or safety chain hoop. Towing shackles can be used only after tow cylinders are extended.
- Adjust chain slack so safety chains do not touch the ground.

- (31) Route two safety chains (25) through safety chain hoop (30) on wrecker and secure grab hook (31) with safety shackle (32).
- (32) Disconnect two springs (1) from tow cylinders (2), wrap around cross-tube (7) and secure.

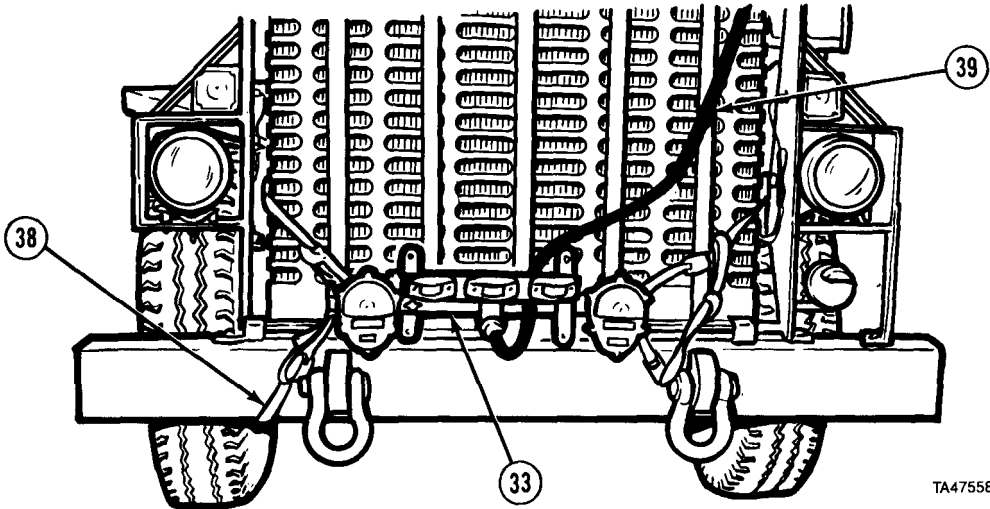


TA475585

- (33) Prepare disabled vehicle for towing (refer to M911 operator's manual).
- (34) Remove emergency tow lights (33) and two brackets (34) from stowage.
- (35) Install two brackets (34) in outer holes of emergency tow lights with two screws (35), washers (36), and nuts (37).

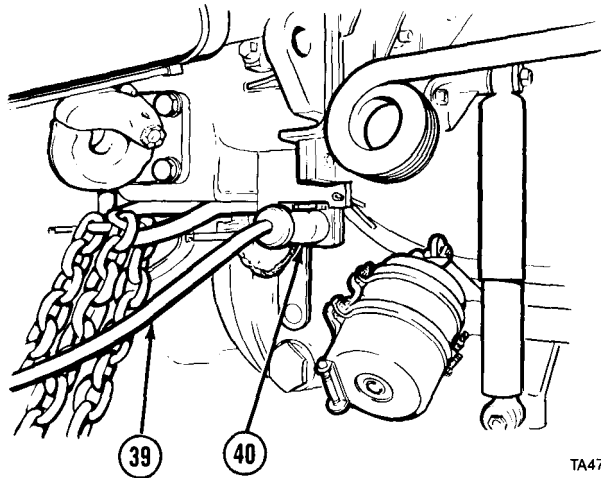
M984E1 General Operating Procedures (Cont)T

2-80. TOW M911 (CONT).



TA475586

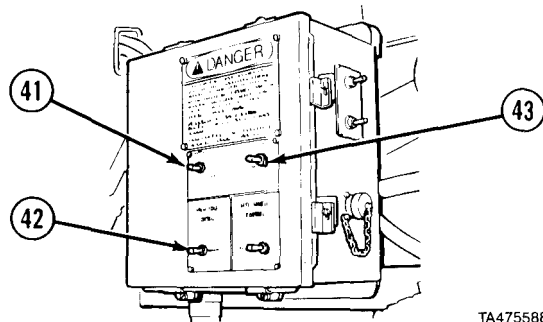
- (36) Install emergency tow lights (33) on front of M911 and fasten securely with straps (38).
- (37) Remove tow light cable (39) from stowage and connect to emergency tow lights (33).



TA475587

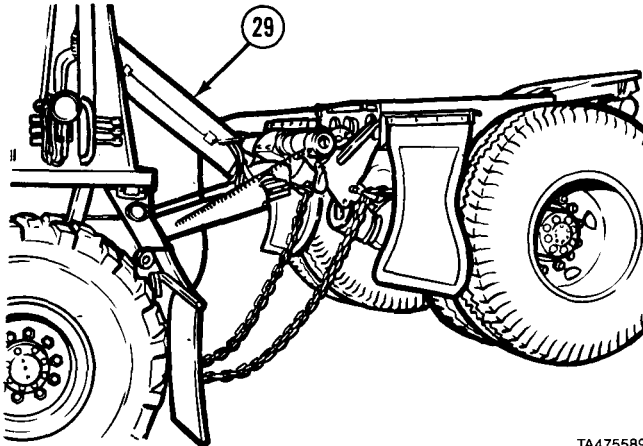
- (38) Route other end of tow light cable (39) along disabled vehicle and connect to rear electrical connector (40) on wrecker.
- (39) Lock disabled vehicle's steering (refer to M911 operator's manual).

M984E1 General Operating Procedures (Cont)



TA475588

- (40) Set POWER switch (41) to ON position.
 (41) Set HIGH IDLE switch (42) to CONTINUOUS.
 (42) Push and release LATCH switch (43). Engine speed will increase to approximately 1500 rpm.



TA475589

WARNING

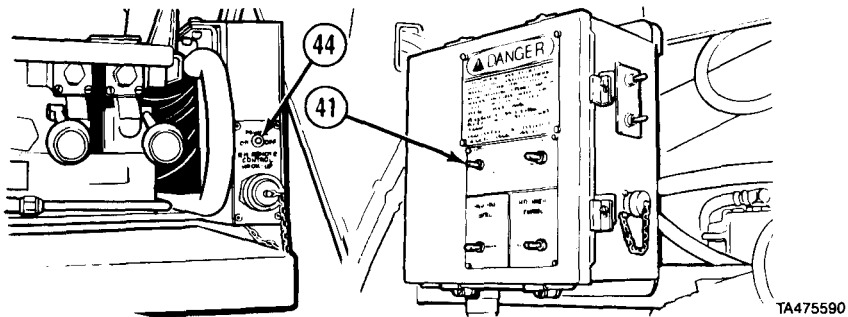
Keep out from under retrieval system and disabled vehicle when raised off ground or personal injury or death may result.

CAUTION

- Fully retract both tow cylinders before lifting disabled vehicle or equipment damage may result.
 - Make sure all rigging is secure. Loose rigging can become entangled and cause damage to equipment.
- (43) Retract lift cylinder (29) to raise disabled vehicle approximately 1.5 ft (45 cm) off ground.

M984E1 General Operating Procedures (Cont)

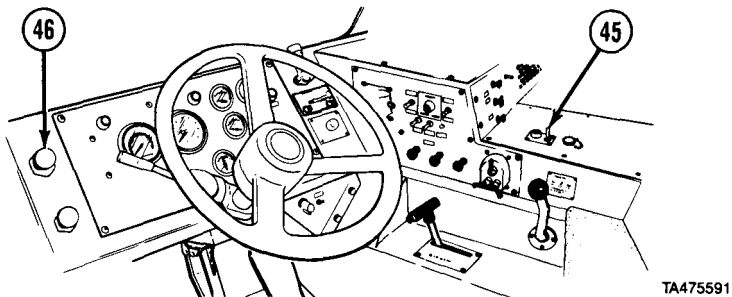
2-80. TOW M911 (CONT).



NOTE

Make sure there is sufficient clearance between tires of pusher axle and ground (refer to M911 operator's manual).

- (44) Set POWER switch (41) to OFF position.
- (45) Set POWER switch (44) to OFF position.



- (46) Set PTO ENGAGE switch (45) to OFF position.
- (47) Turn on service drive lights (para 2-10d).
- (48) Turn on emergency flashers on wrecker and disabled vehicle (para 2-44a).
- (49) Push in PARKING BRAKE control (46) and select desired gear (para 2-11e).

WARNING

The M984E1 should not be operated at speeds over 15 mph except on paved roads when the operator determines that the vehicle being towed and the terrain allow safe operation. Engine brake switch must be "ON" for all towing operations. The following are maximum safe speeds

Terrain Condition	Maximum speed, towed load up to 50,000 lbs	Maximum speed, towed load above 50,000 lbs
on road-level	35	30
on road-hilly	30	20
off road	15	15

Speeds in excess of the above can result in loss of control, serious injury or death.

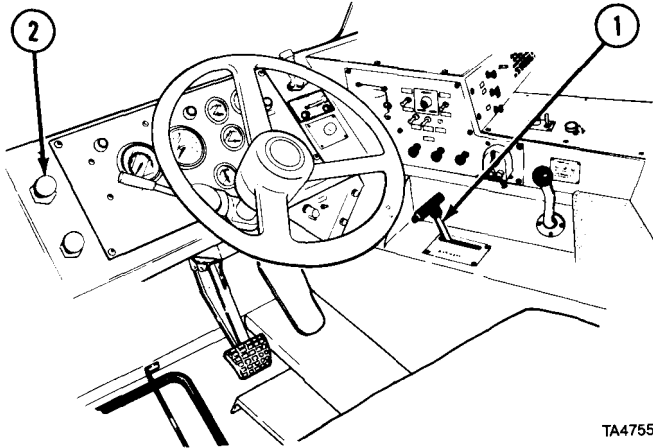
- (50) Transport disabled vehicle.

M984E1 General Operating Procedures (Cont)

d. Rear Disconnect.

NOTE

This is a two-soldier task.



TA475593

- (1) Set transmission range selector (1) to N.
- (2) Pull PARKING BRAKE control (2).

WARNING

Do not stand between vehicles while disabled vehicle is raised off ground. Falling vehicle can cause serious injury or death.

NOTE

After lowering disabled vehicle, extend lift and tow cylinders approximately 2 in. (50 mm) to allow for adjustment when removing adapters.

- (3) Prepare retrieval system for operation (para 2-72) and pull LIFT CYLINDER control lever to extend lift cylinder and lower towed vehicle to ground until safety chain at rear of disabled vehicle is slack.

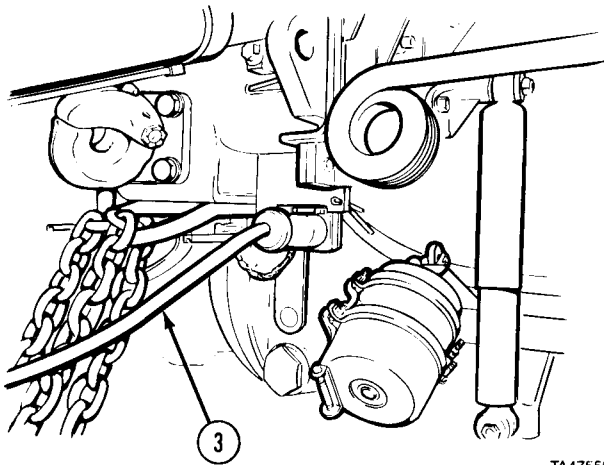
WARNING

If disabled vehicle's air system is inoperative, chock wheels of disabled vehicle. Failure to chock wheels may result in personal injury.

- (4) Apply PARKING BRAKE on disabled vehicle (refer to M911 operator's manual). If parking brake is inoperative, chock wheels on disabled vehicle.

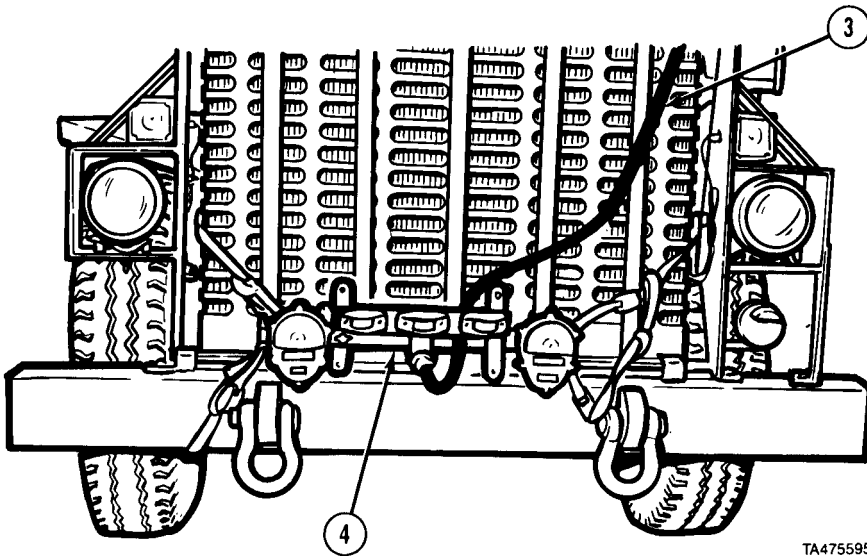
M984E1 General Operating Procedures (Cont)

2-80. TOW M911 (CONT).



TA475594

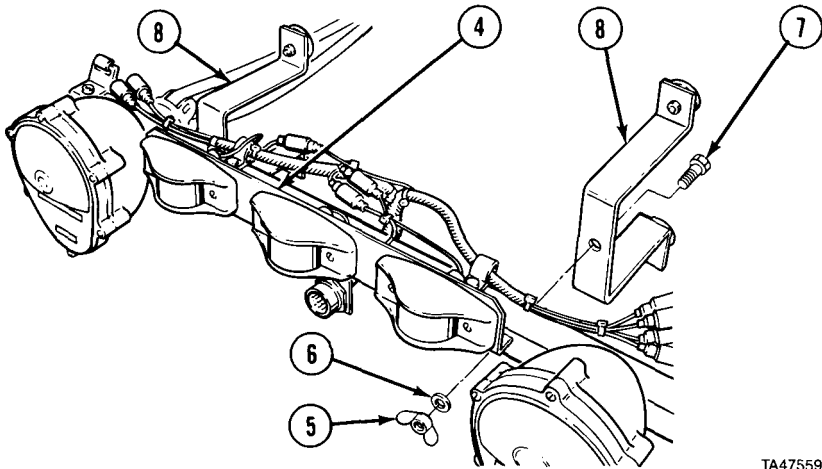
(5) Remove tow light cable (3) from wrecker.



TA475595

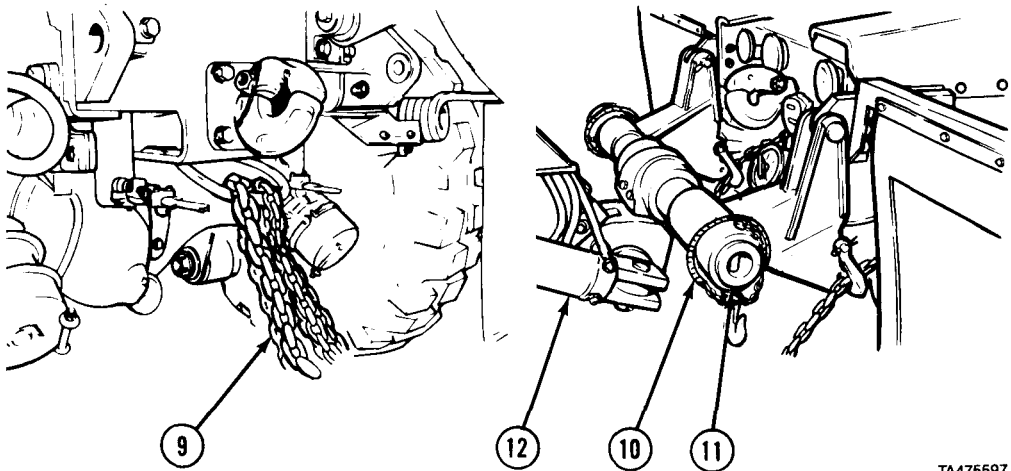
(6) Remove tow light cable (3) from emergency tow lights (4) and stow.
(7) Remove emergency tow lights (4) from disabled vehicle.

M984E1 General Operating Procedures (Cont)



TA475596

- (8) Remove two nuts (5), washers (6), screws (7), and brackets (8) from emergency tow lights (4). Stow emergency tow lights and brackets.

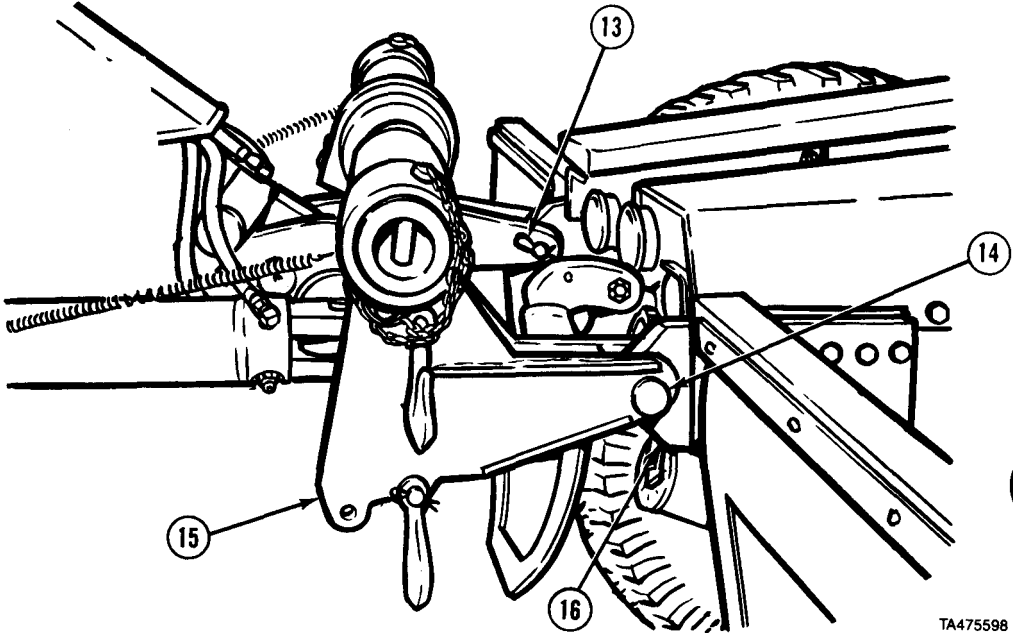


TA475597

- (9) Remove and stow two safety chains (9).
 (10) Unwrap two springs (10) from crosstube (11) and connect to tow cylinders (12).

M984E1 General Operating Procedures (Cont)

2-80. TOW M911 (CONT).



TA475598

WARNING

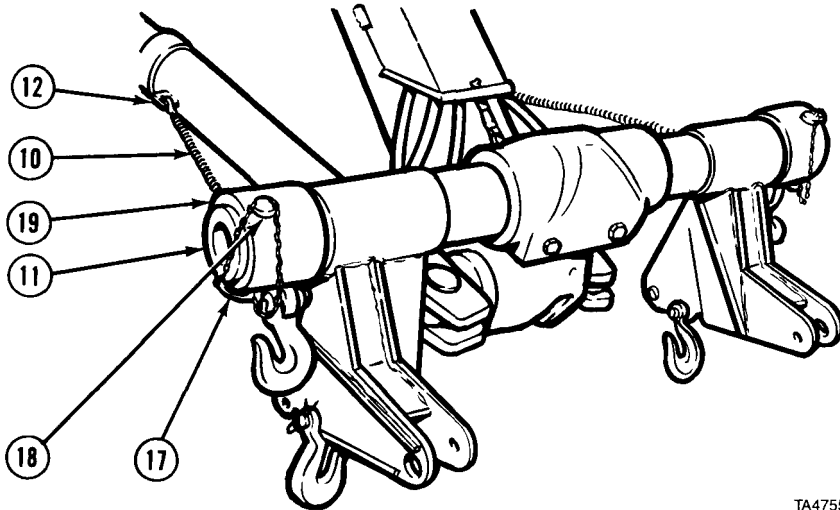
- Do not stand behind adapters when pins are being removed. Adapters may swing down resulting in personal injury.
- Keep hands and fingers away from adapter and tow eyes when operating retrieval controls. Personal injury could result.

NOTE

Use retrieval controls to position crosstube to relieve tension from adapters.

- (11) Remove two cotter hairpins (13) and 1-7/16-in. (36 mm) pins (14) from adapters (15).
- (12) Remove two adapters (15) from tow eyes (16) on disabled vehicle.
- (13) Install two cotter hairpins (13) in 1-7/16-in. (36 mm) pins (14) and stow.

M984E1 General Operating Procedures (Cont)



TA475599

(14) Drive wrecker forward several feet and park (para2-110).

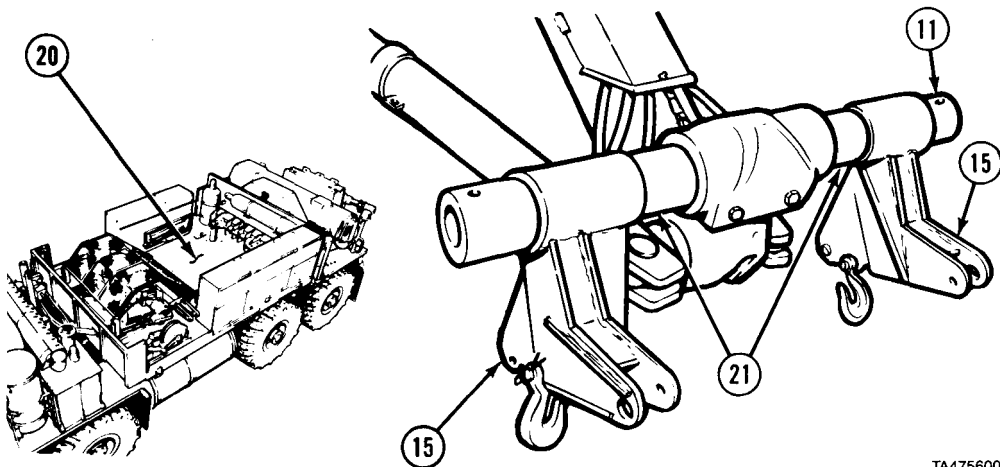
WARNING

As springs and end caps are removed, crosstube can swing in all directions, adapters may slide off, and can cause personal injury.

(15) Remove two springs (10) from tow cylinders (12).

(16) Remove quick pins (17) and pins (18) from end caps (19)

(17) Remove end caps (19) from crosstube (11).

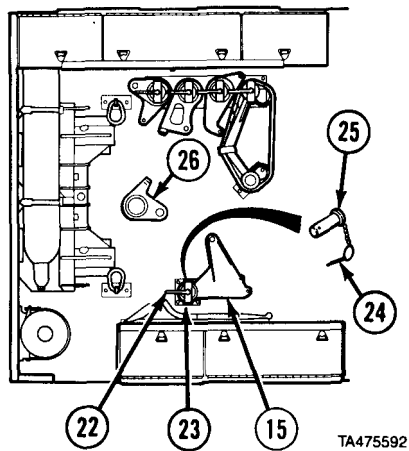


TA475600

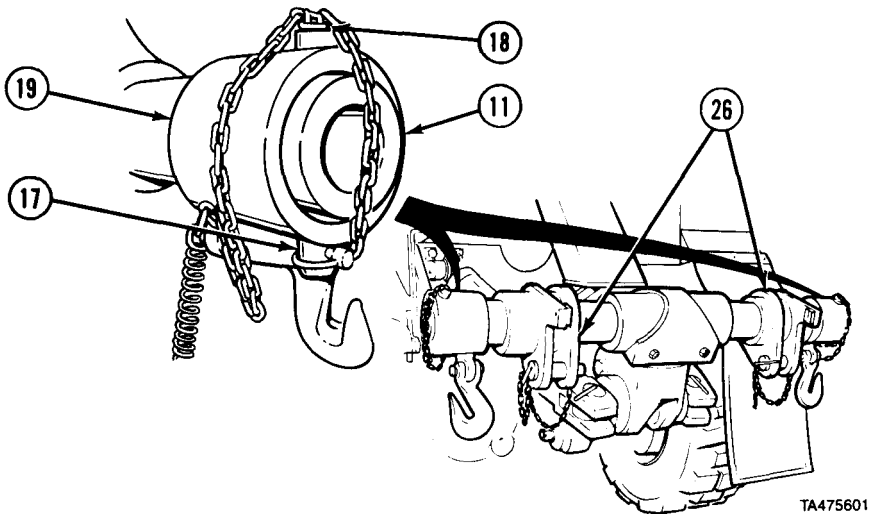
(18) Remove two adapters (15) from crosstube (11) and place on equipment body floor (20).

(19) Remove two 5-in. (127 mm) spacer tubes (21) from crosstube (11) and stow.

2-80. TOW M911 (CONT).

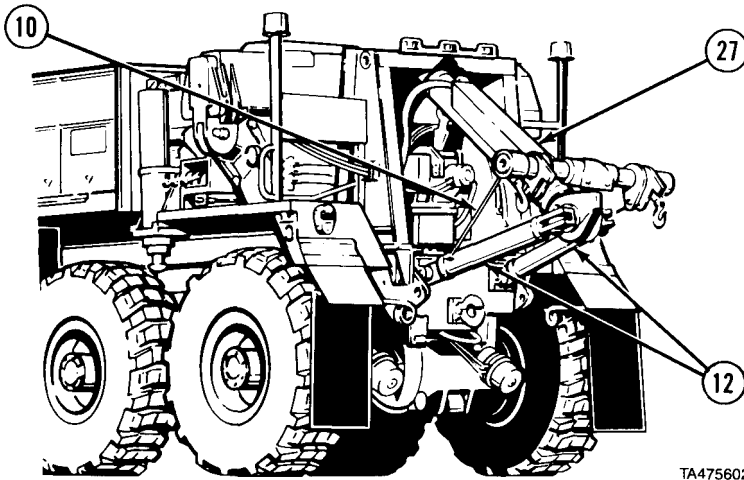


- (20) Remove lock handle (22), lock plate (23), quick pin (24), pin (25), and two M977 front adapters (26).
- (21) Install two M911 adapters (15) removed from crosstube, pin (25), quick pin (24), lock plate (23), and lock handle (22).



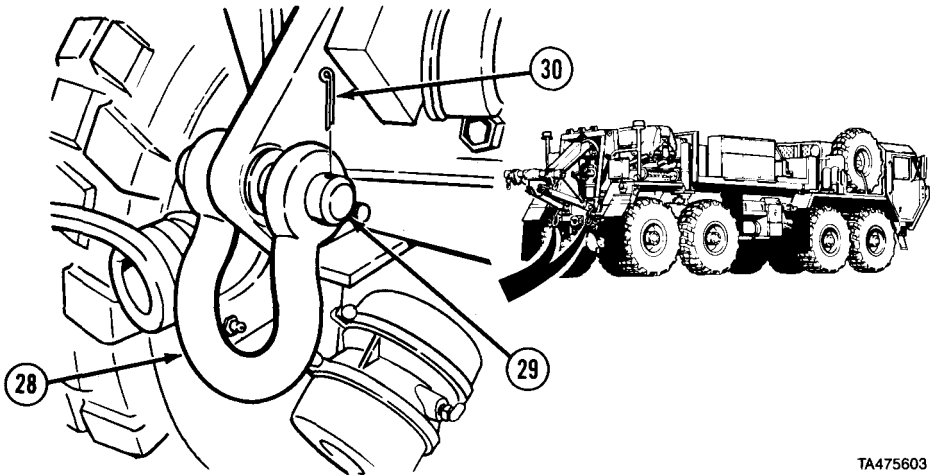
- (22) Install two M977 front adapters (26) on crosstube (11).
- (23) Install two end caps (19) on crosstube (11). Install pins (18) and quick pins (17).

M984E1 General Operating Procedures (Cont)



TA475602

- (24) Install two springs (10) on tow cylinders (12).
- (25) Operate retrieval controls and fully retract lift cylinder (27) and tow cylinders (12).



TA475603

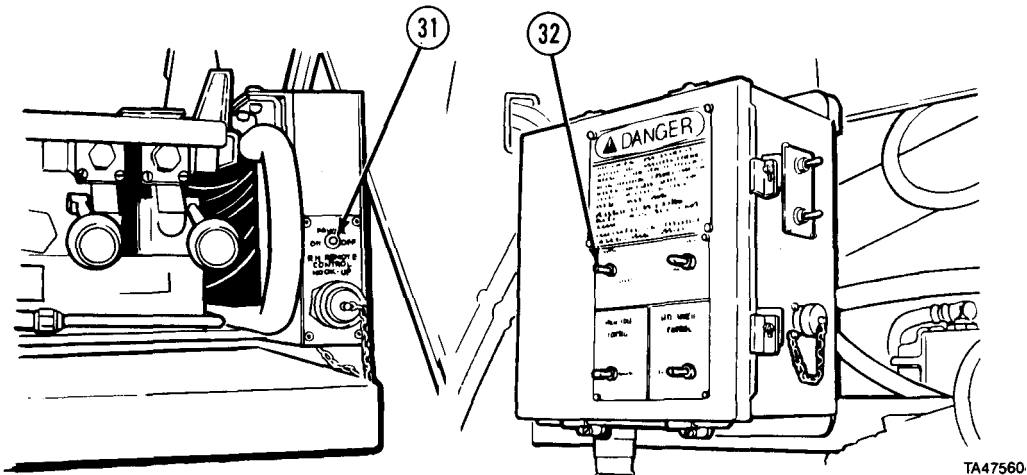
NOTE

Right and left towing shackles are installed the same way.

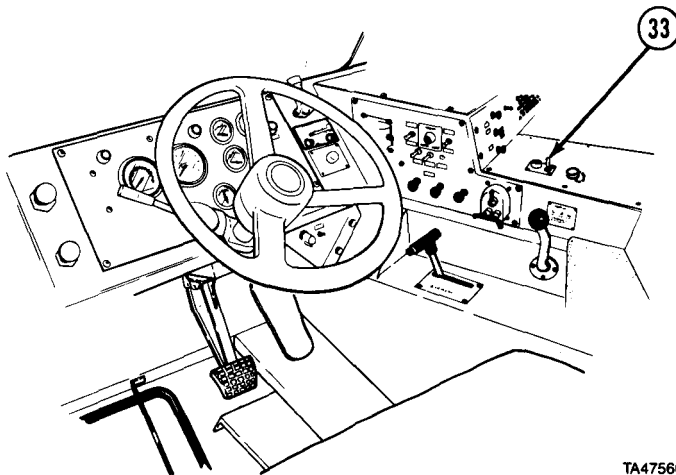
- (26) Install two towing shackles (28), pins (29), and cotter pins (30).

M984E1 General Operating Procedures (Cont)

2-80. TOW M911 (CONT).



- (27) Set POWER switch (31) to OFF position.
- (28) Set POWER switch (32) to OFF position.



- (29) Turn off emergency flashers on wrecker and disabled vehicle (para 2-44f).
- (30) Turn off service drive lights (para 2-10d).
- (31) Set (31) ENGAGE switch (33) to OFF position.
- (32) Remove and stow beacon lights (para 2-62).
- (33) Shut off engine (para 2-11p).
- (34) Unlock disabled vehicle's steering (refer to M911 operator's manual).

M984E1 General Operation Procedures (Cont)

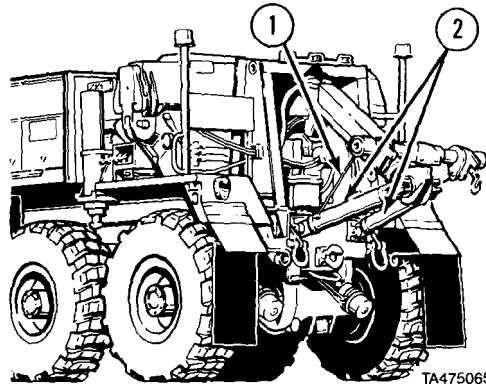
2-81. TOW M915.

a. Front Hookup.

NOTE

This is a two-soldier task.

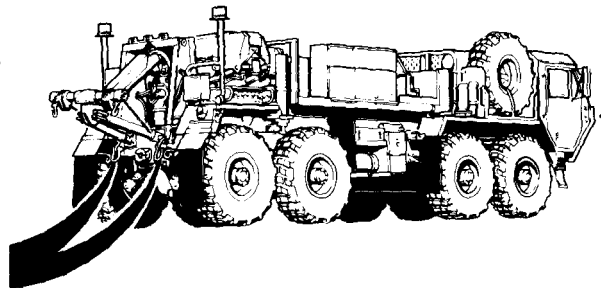
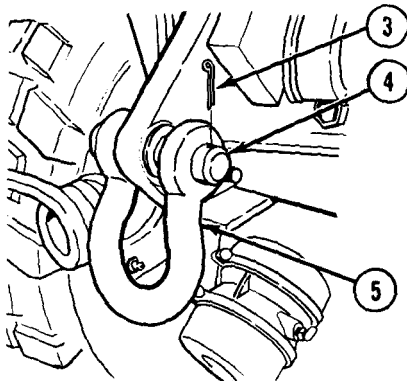
(1) Prepare retrieval system for operation (para 2-72).



WARNING

Hold crosstube when removing springs. Crosstube may swing or cause adapter to slide resulting in personal injury.

(2) Disconnect two springs (1) from tow cylinders (2).



TA475066

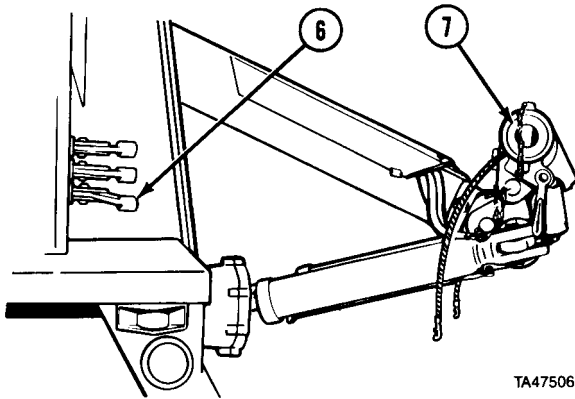
NOTE

Right and left towing shackles are removed the same way.

(3) Remove two cotter pins (3), pins (4), and towing shackle (5).

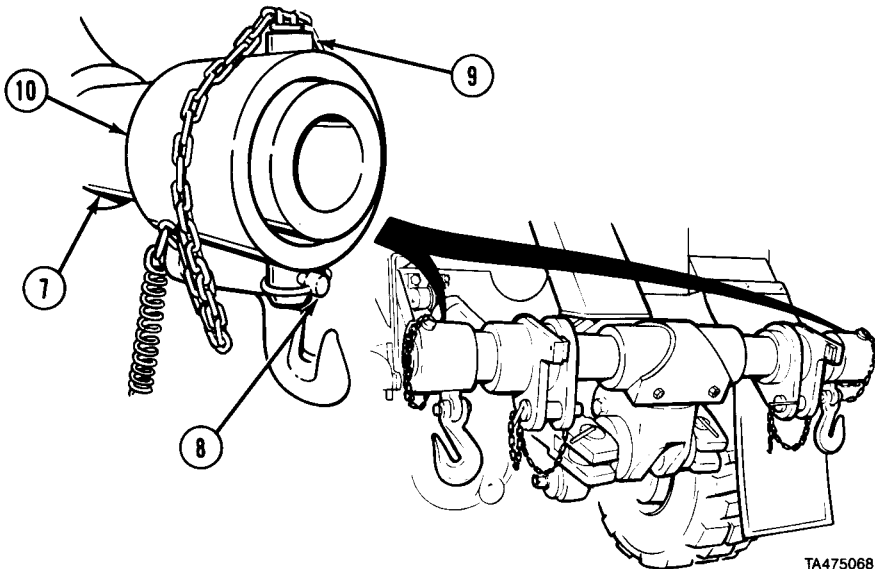
M984E1 General Operation Procedures (Cont)

2-81. TOW M915 (CONT).



TA475067

- (4) Pull LIFT CYLINDER control lever (6) to lower crosstube (7) to approximately 3 ft (1 m) above ground.
- (5) Position wrecker so that crosstube (7) is approximately 1 ft (30 cm) from tow eyes of disabled vehicle and centered on disabled vehicle.



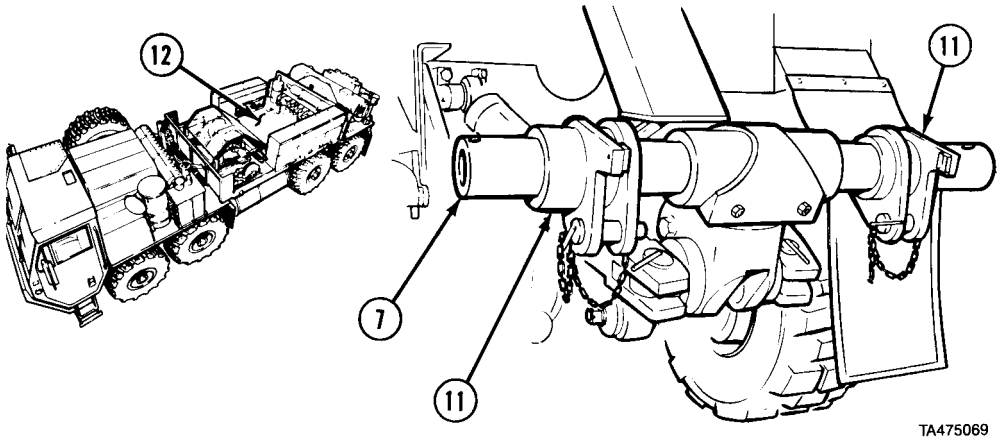
TA475068

WARNING

When end caps are removed from crosstube, adapters may slide off causing personal injury.

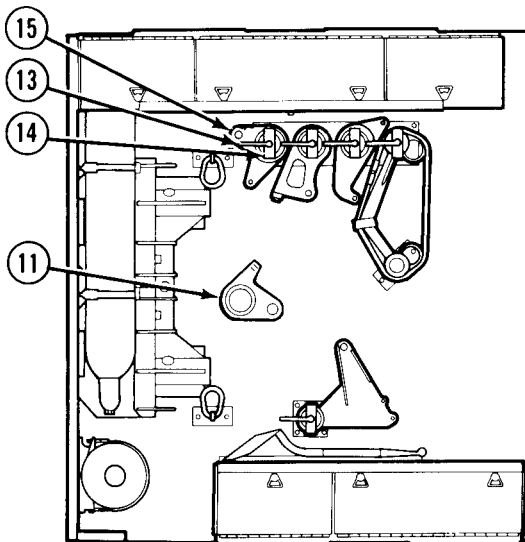
- (6) Remove two quick pins (8) and pins (9) from two end caps (10).
- (7) Remove two end caps (10) from crosstube (7).

M984E1 General Operation Procedures (Cont)



TA475069

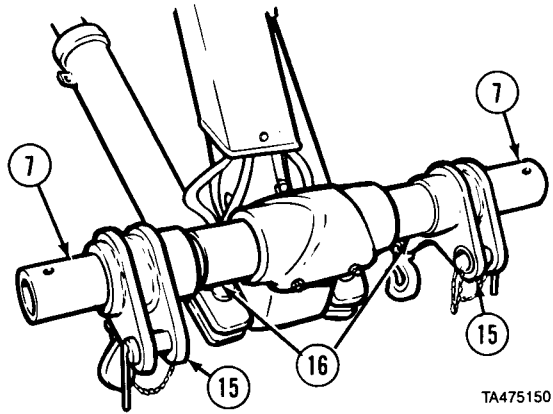
- (8) Remove two M977 front adapters (11) from crosstube (7) and place on equipment body floor (12).



TA475149

- (9) Remove lock handle (13), lock plate (14), and two M915 front tow adapters (15).
 (10) Install two M977 front adapters (11) removed from crosstube, lock plate (14), and lock handle (13).
 (11) Remove two 5-in. (127 mm) spacers from stowage.

2-81. TOW M915 (CONT.)

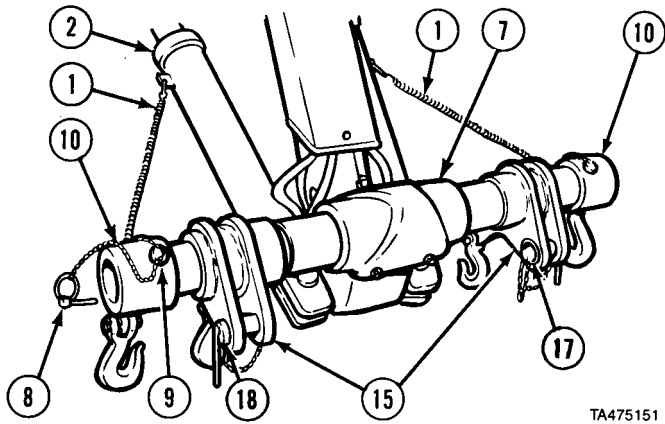


(12) Install two 5-in. (127 mm) spacers (16) on crosstube (7).

WARNING

Adapters and end caps may slide off when installing and cause personal injury.

(13) Install two M915 front tow adapters (15) on crosstube (7).



NOTE

End caps will hang over end of crosstube for M915 adapters.

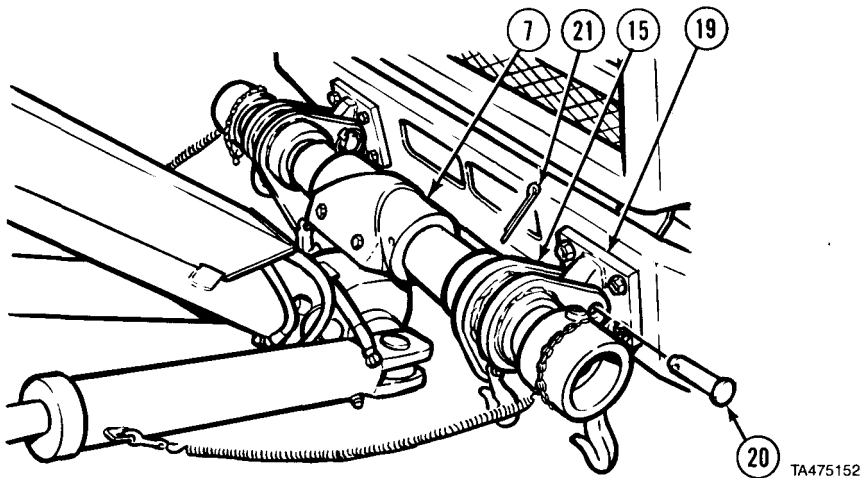
(14) Install two end caps (10) on crosstube (7).

(15) Install pins (9) and quick pins (8).

(16) Install two springs (1) on tow cylinders (2).

(17) Remove two quick pins (17) and pins (18) from adapters (15).

M984E1 General Operation Procedures (Cont)

WARNING

Keep hands and fingers away from adapters and tow eyes when operating retriever controls. Personal injury could result.

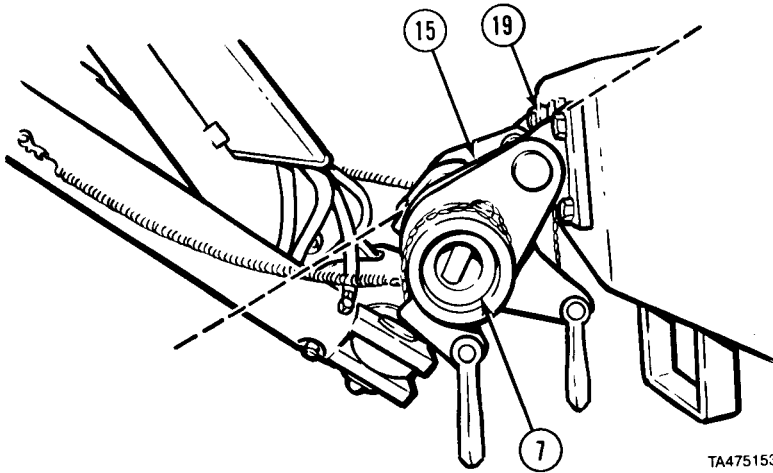
NOTE

If disabled vehicle has towing shackles installed, remove shackles and stow in disabled vehicle. Keep pins to connect adapters to tow eyes.

- (18) Soldier A operates retrieval system (para 2-72) while Soldier A and Soldier B position cross-tube (7) so holes in adapters (15) align with front tow eyes (19).
- (19) Insert two shackle pins (20) through adapters (15) and front tow eyes (19). Install cotter pins (21) in pins (20).

M984E1 General Operation Procedures (Cont)

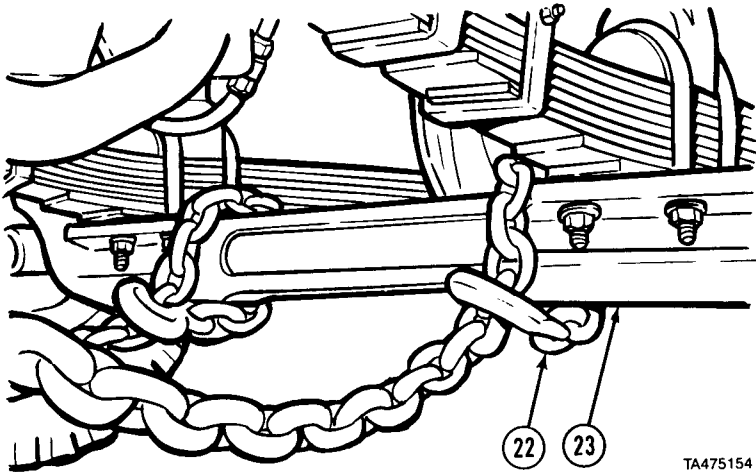
2-81. TOW M915 (CONT).



NOTE

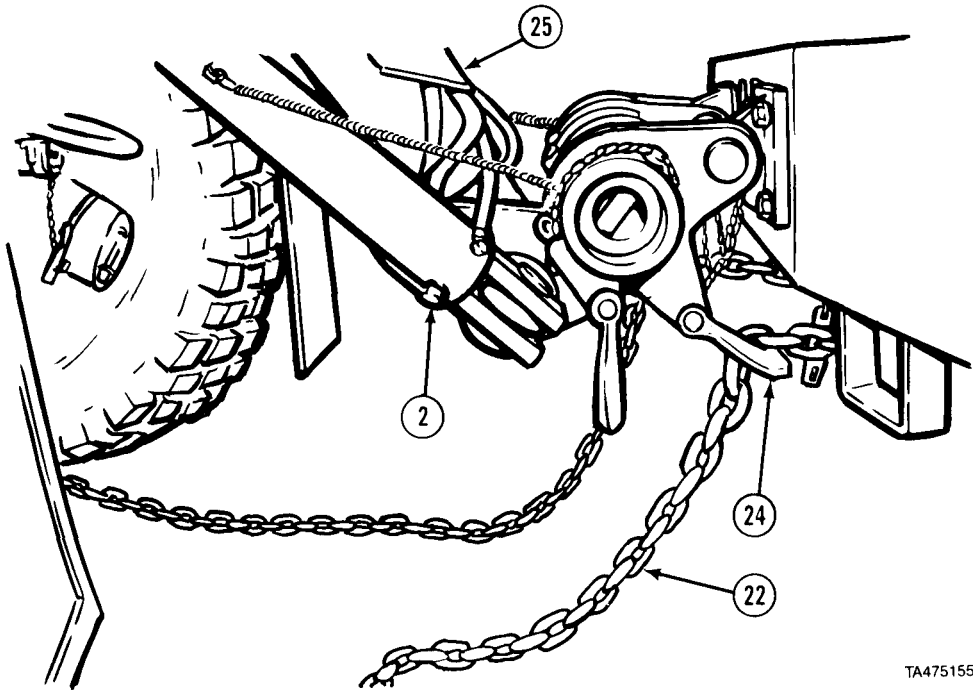
Refer to illustration for correct angle of adapters.

- (20) Alternately operate lift and tow cylinder controls to lower crosstube (7) until top edge of adapters (15) are even with top edge of front tow eyes (19).



- (21) Remove two 16-ft (5 m) safety chains (22) from stowage.
- (22) Route one safety chain (22) over front axle (23) on disabled vehicle.
- (23) Hook safety chain (22) together in front of axle (23).
- (24) Repeat steps (22) and (23) for other side of disabled vehicle.

M984E1 General Operation Procedures (Cont)



TA475155

- (25) Pull safety chain (22) tight and install chain on adapter grab hook (24).
- (26) Repeat step (25) for other side of disabled vehicle.
- (27) Release PARKING BRAKE on disabled vehicle (refer to M915 operator's manual).

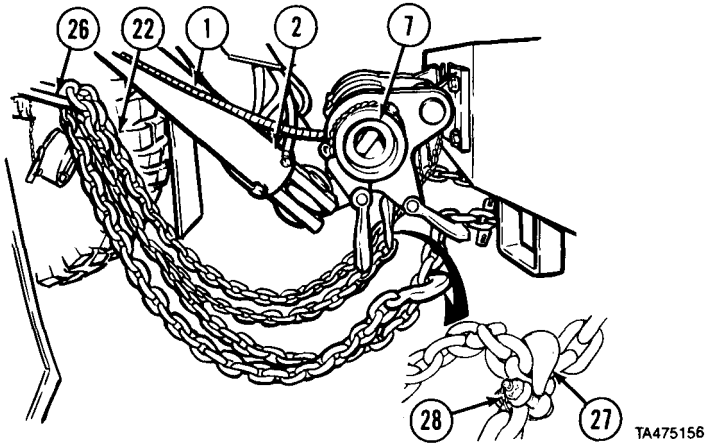
CAUTION

Do not let lift cylinder contact pintle hook, or damage to cylinder may result.

- (28) Alternately, push in TOW and LIFT CYLINDER control levers until tow cylinders (2) are fully retracted.
- (29) Push in LIFT CYLINDER control lever to retract lift cylinder (25) until slack is removed from safety chains (22).

M984E1 General Operation Procedures (Cont)

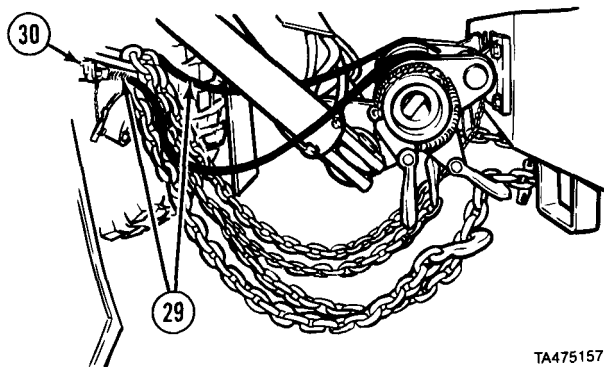
2-81. TOW M915 (CONT).



NOTE

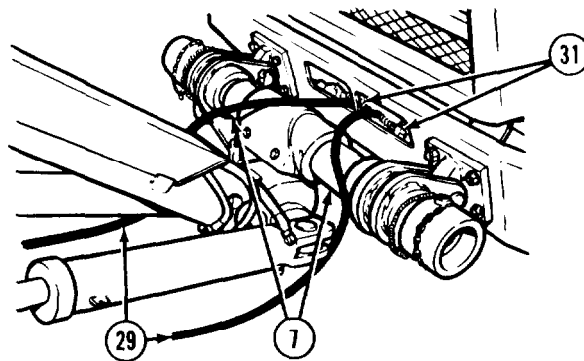
- Safety chains can be routed to towing shackles or safety chain hoop. Towing shackles can be used only when tow cylinders are extended.
- Adjust chain slack so safety chains do not touch ground.

- (30) Route two safety chains (22) through safety chain hoop (26) on wrecker and secure grab hook (27) with safety shackle (28).
- (31) Disconnect two springs (1) from tow cylinders (2) and wrap around crosstube (7).



- (32) Remove two airhoses (29) from stowage and attach to rear glad hands (30) on wrecker.

M984E1 General Operating Procedures (Cont)



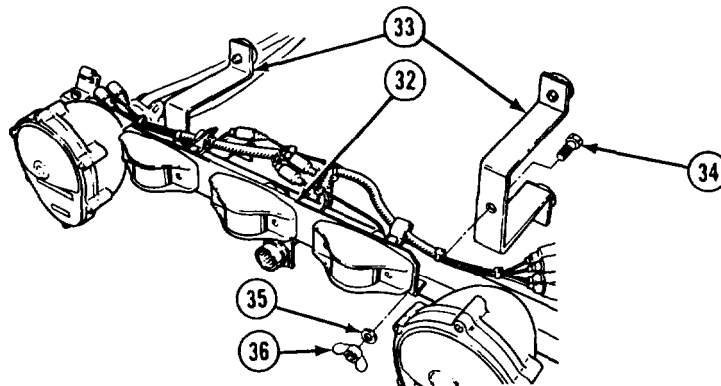
CAUTION

Do not route air-hoses between retrieval cylinders or damage to airhoses may result.

NOTE

Rear emergency airhose from wrecker must be connected to front emergency glad hand on disabled vehicle. Rear service airhose from wrecker must be connected to front service glad hand on disabled vehicle.

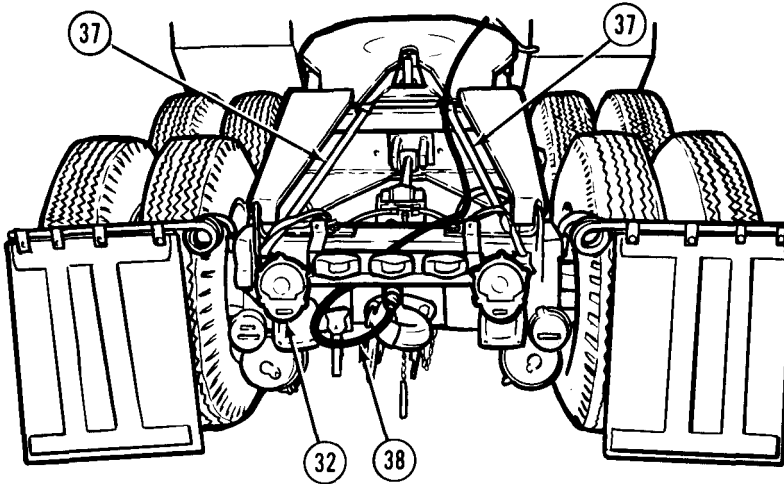
- (33) Remove two airhoses (29) over cross-tube (7) and attach to front glad hands (31) on disabled vehicle.



- (34) Prepare disabled vehicle for towing (refer to M915 operator's manual).
- (35) Remove emergency tow lights (32) and two brackets (33) from stowage.
- (36) Install two brackets (33) in outer holes of emergency tow lights with two screws (34), washers (35), and nuts (36).

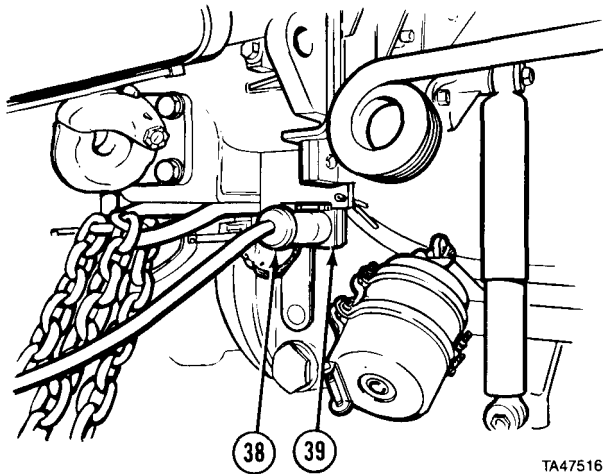
M984E1 General Operation Procedures (Cont)

2-81. TOW M915 (CONT).



TA475160

- (37) Install emergency tow lights (32) on rear of M915 and fasten securely with straps (37).
- (38) Remove tow light cable (38) from stowage and connect to emergency tow lights (32).

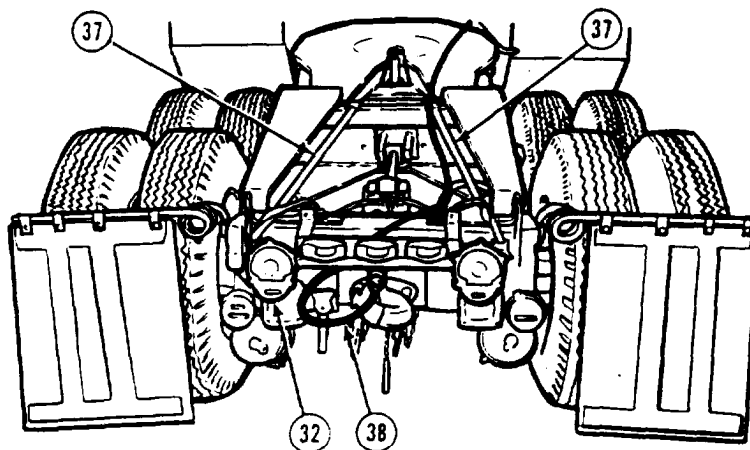


TA475161

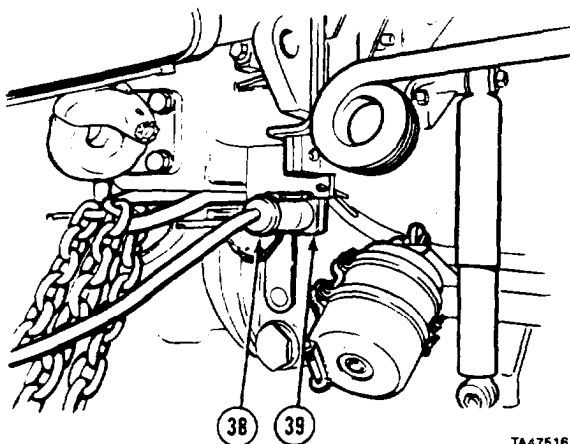
- (39) Route other end of tow light cable (38) along disabled vehicle and connect to rear electrical connector (39) on wrecker.

M984E1 General Operation Procedures (Cont)

2-81. TOW M915 (CONT)

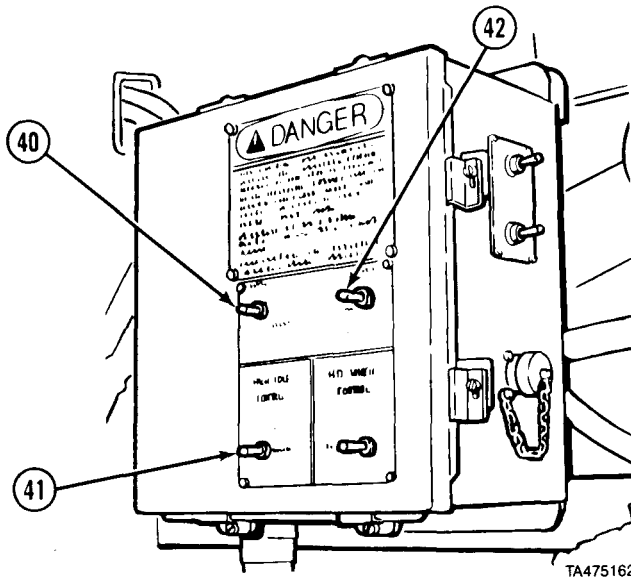


- (37) Install emergency tow lights (32) on rear of M915 and fasten securely with straps (37).
- (38) Remove tow light cable (38) from stowage and connect to emergency tow lights (32).



- (39) Route other end of tow light cable (38) along disabled vehicle and connect to rear electrical connector (39) on wrecker.

M984E1 General Operation Procedures (Cont)

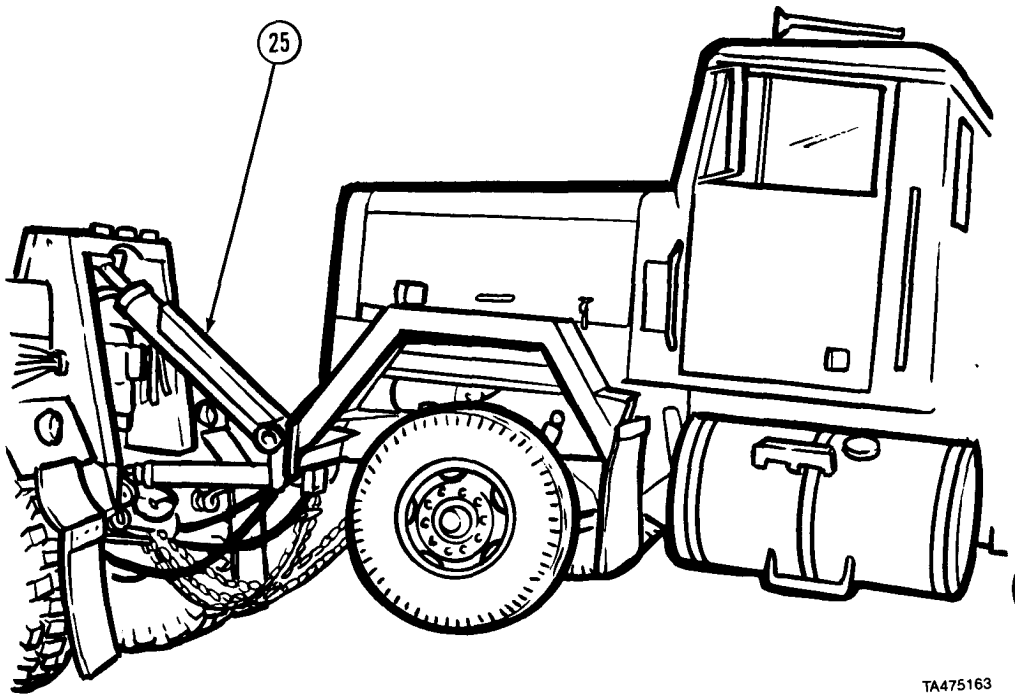


NOTE

- If disabled vehicle will be lifted and towed, continue with step (40).
- If disabled vehicle will be towed with all tires on paved roads only, raise crosstube enough to partially unload disabled vehicle's front suspension. Keep front tires in firm contact with ground and proceed to step (45).

- (40) Lock disabled vehicle's steering (refer to M915 operator's manual).
 (41) Set POWER switch (40) to ON position.
 (42) Set HIGH IDLE switch (41) to CONTINUOUS.
 (43) Push and release LATCH switch (42). Engine speed will increase to approximately 1500 rpm.

2-81. TOW M915 (CONT).



TA475163

W A R N I N G

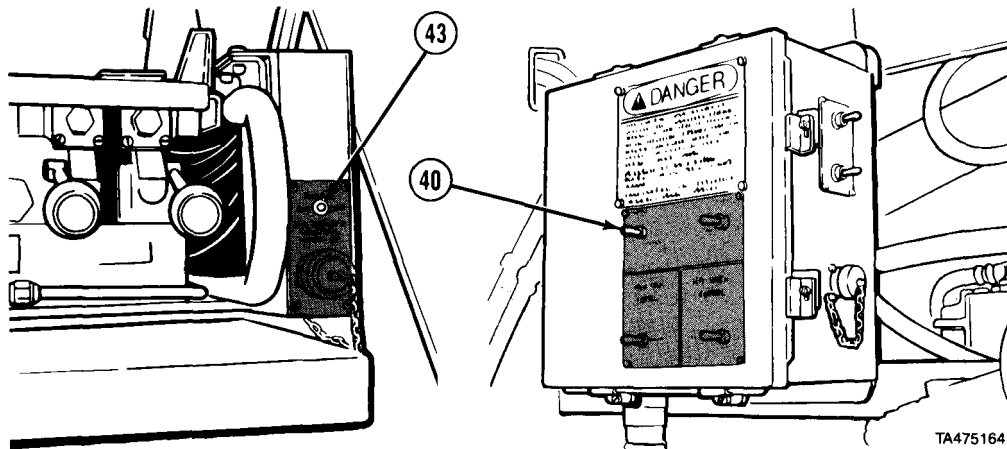
Keep out from under retrieval system and disabled vehicle when raised off ground or personal injury or death may result.

C A U T I O N

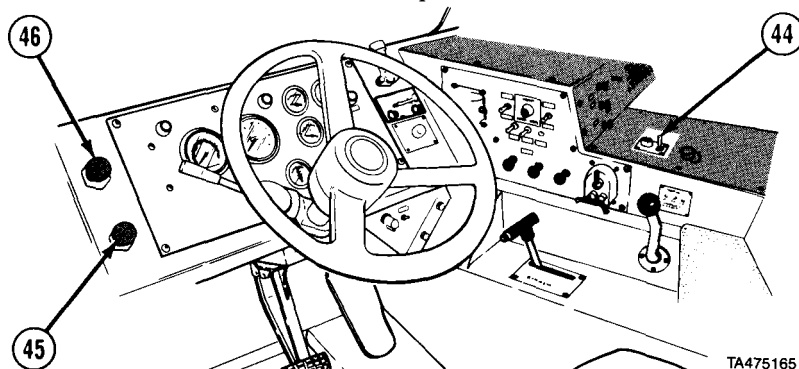
- Fully retract both tow cylinders before lifting disabled vehicle or equipment damage may result.
- Make sure all rigging is secure. Loose rigging can become entangled and cause damage to equipment.

(44) Push LIFT CYLINDER control lever to retract lift cylinder (25) and raise disabled vehicle approximately 1 ft (30 cm) off ground.

M984E1 General Operation Procedures (Cont)



- (45) Set POWER switch (40) to OFF position.
 (46) Set POWER switch (43) to OFF position.



- (47) Set PTO ENGAGE switch (44) to OFF position.
 (48) Push in TRAILER AIR SUPPLY control (45).
 (49) Turn on service drive lights (para 2-10d).
 (50) Turn on emergency flashers on wrecker (para 2-44a) and disabled vehicle.
 (51) Push in PARKING BRAKE control (46) and select desired gear (para 2-11e).

WARNING

The M984E1 should not be operated at speeds over 15 mph except on paved roads when the operator determines that the vehicle being towed and the terrain allow safe operation. Engine brake switch must be "ON" for all towing operations. The following are maximum safe speeds

Terrain Condition	Maximum speed, towed load up to 50,000 lbs	Maximum speed, towed load above 50,000 lbs
on road-level	35	30
on road-billy	30	20
off road	15	15

Speeds in excess of the above can result in loss of control, serious injury or death.

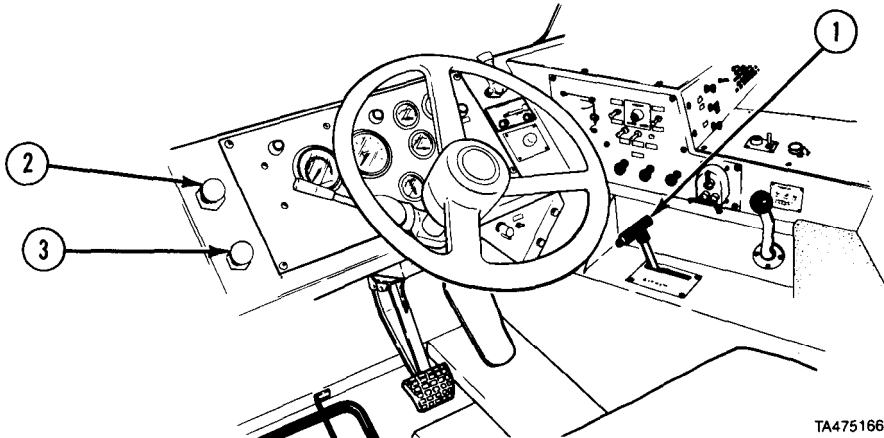
- (52) Transport disabled vehicle.

2-81. TOW M915 (CONT).

b. Front Disconnect

NOTE

This is a two-soldier task.



TA475166

- (1) Set transmission range selector (1) to N.
- (2) Pull PARKING BRAKE control (2).
- (3) Pull TRAILER AIR SUPPLY control (3).

WARNING

Do not stand between vehicles while disabled vehicle is raised off ground. Falling vehicle can cause serious injury or death.

NOTE

After lowering disabled vehicle, extend lift and tow cylinders approximately 2 to 4 in. (50 to 100 mm) to allow for adjustment when removing adapters.

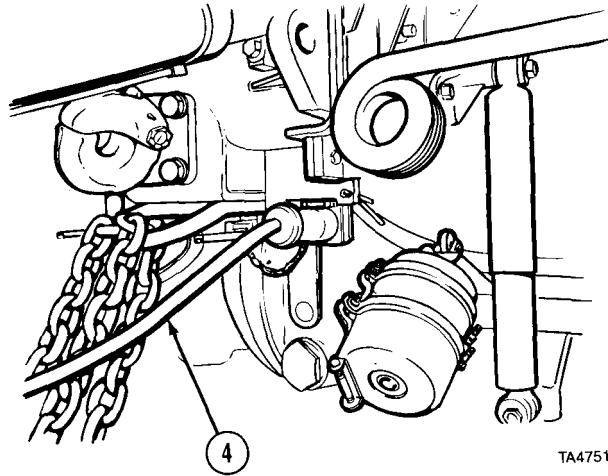
- (4) Prepare retrieval system for operation (para 2-72) and pull LIFT CYLINDER control lever to extend lift cylinder and lower towed vehicle to ground until safety chain at front axle is slack.

WARNING

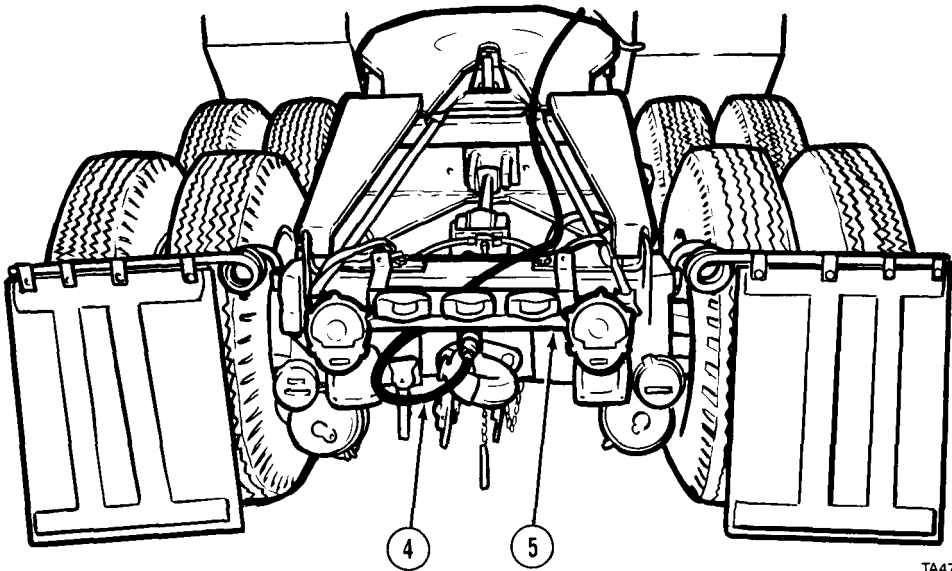
If disabled vehicle's air system is inoperative, chock wheels of disabled vehicle. Failure to chock wheels may result in personal injury.

- (5) Apply PARKING BRAKE on disabled vehicle (refer to M915 operator's manual.) If parking brake is inoperative, chock wheels on disabled vehicle.

M984E1 General Operation Procedures (Cont)



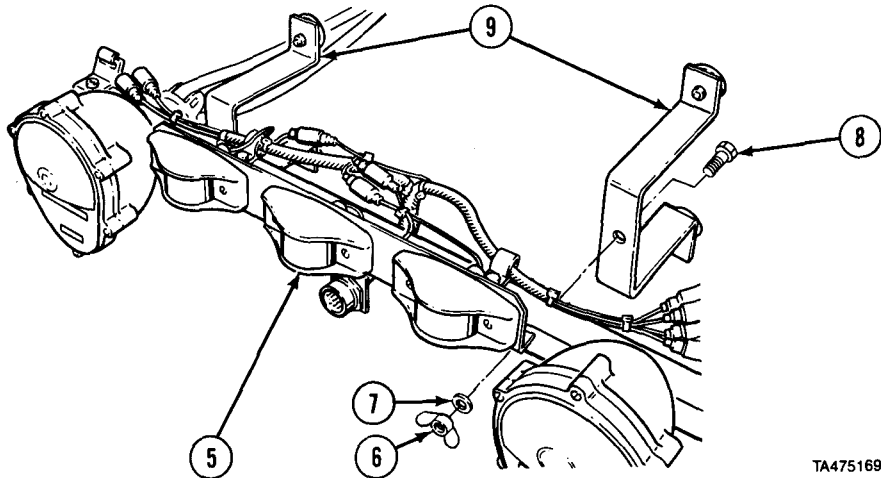
(6) Remove tow light cable (4) from wrecker.



(7) Remove tow light cable (4) from emergency tow lights (5) and stow.
(8) Remove emergency tow lights (5) from disabled vehicle.

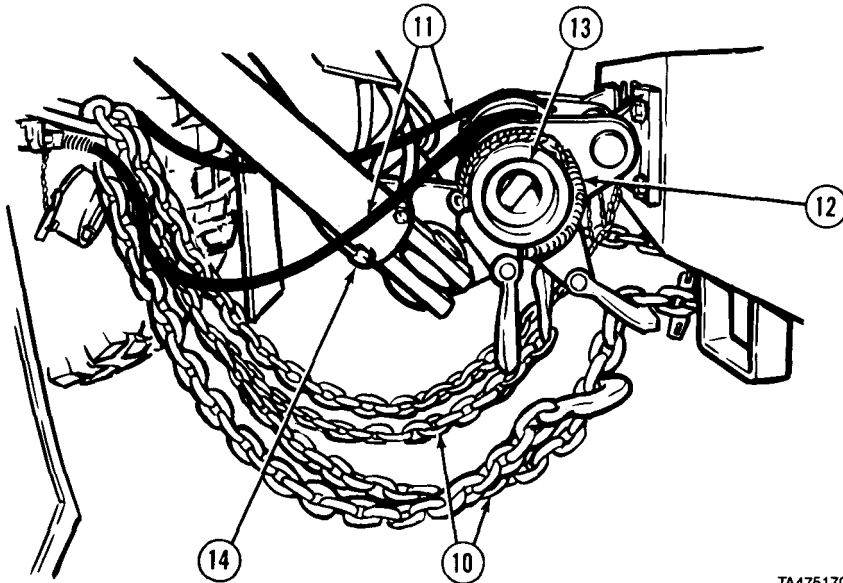
M984E1 General Operation Procedures (Cont)

2-81. TOW M915 (CONT).



TA475169

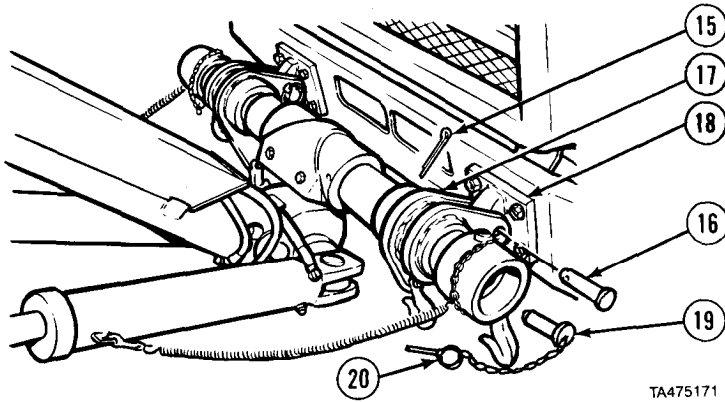
- (9) Remove two nuts (6), washers (7), screws (8), and brackets (9) from emergency tow lights (5). Stow emergency tow lights and brackets.



TA475170

- (10) Remove and stow safety chains (10) and air hoses (11).
- (11) Unwrap two springs (12) from crosstube (13) and connect to tow cylinders (4).

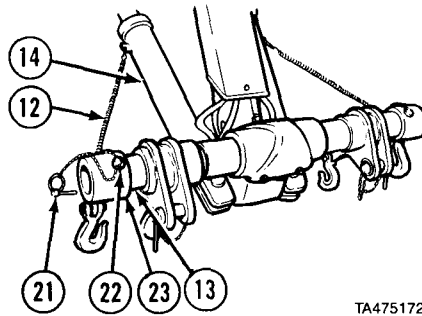
M984E1 General Operation Procedures (Cont)



NOTE

Use retrieval controls to position crosstube to relieve tension from adapters.

- (12) Remove two cotter pins (15) and shackle pins (16) from M915 front adapters (17) and stow with shackles removed from disabled vehicle tow eyes.
- (13) Remove two M915 front adapters (17) from tow eyes (18) on disabled vehicle.
- (14) Install two pins (19) in M915 front adapters (17).
- (15) Install two quick pins (20) in adapter pins (19).



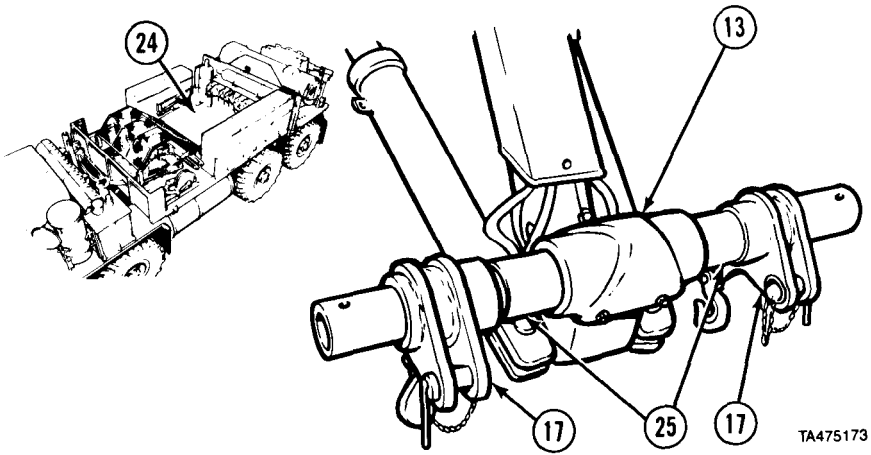
- (16) Drive wrecker forward several feet and park (para 2-11b).

WARNING

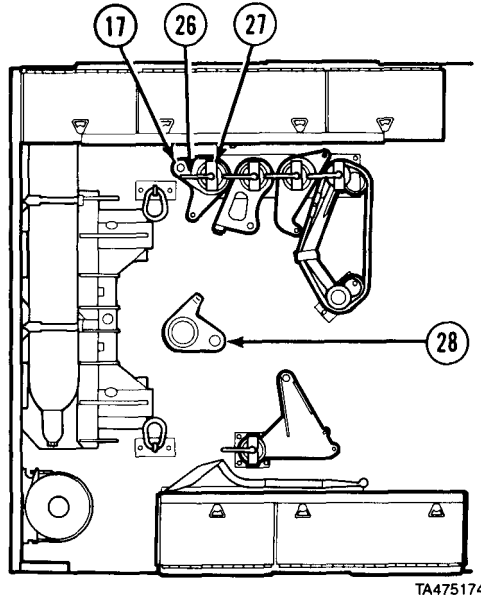
As springs and end caps are removed, crosstube can swing in all directions, adapters may slide off, and can cause personal injury.

- (17) Remove two springs (12) from tow cylinders (14).
- (18) Remove two quick pins (21) and pins (22) from end caps (23).
- (19) Remove two end caps (23) from crosstube (13).

2-81. TOW M915 (CONT).

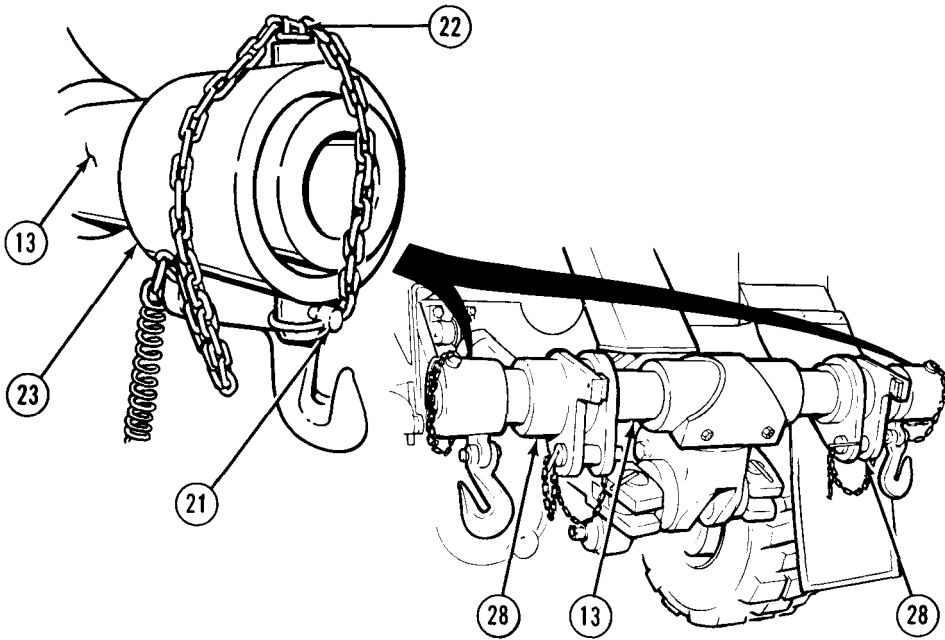


- (20) Remove two M915 front adapters (17) from crosstube (13) and place on equipment body floor (24).
- (21) Remove and stow two 5-in. (127 mm) spacers (25).



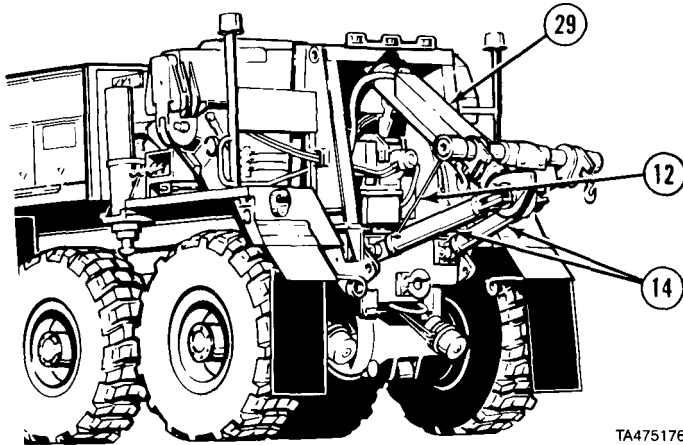
- (22) Remove lock handle (26), lock plate (27), and two M977 front adapters (28).
- (23) Install two M915 front adapters (17) removed from crosstube, lock plate (27), and lock handle (26).

M984E1 General Operation Procedures (Cont)



TA475175

- (24) Install two M977 front adapters (28) on crosstube (13).
- (25) Install two end caps (23) on crosstube (13). Install two pins (22) and quick pins (21).

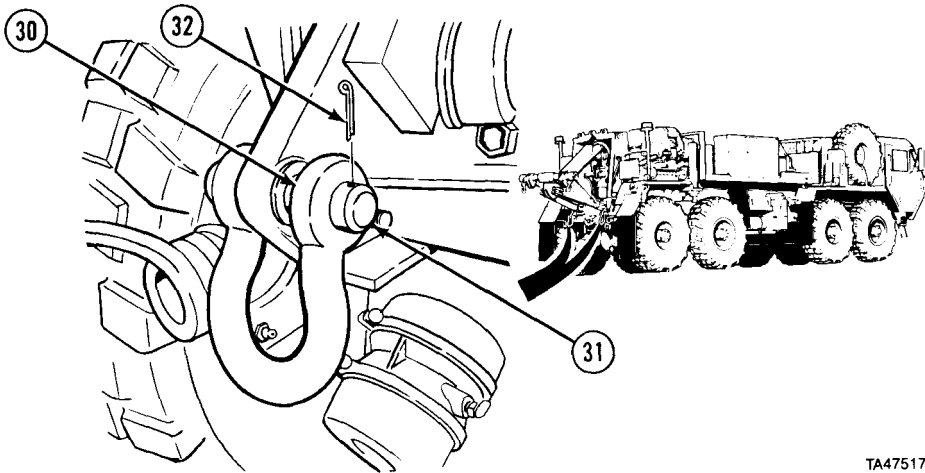


TA475176

- (26) Install two springs (12) on tow cylinders (14).
- (27) Operate retrieval controls to fully retract lift cylinder (29) and tow cylinders (14).

M984E1 General Operation Procedures (Cont)

2-81. TOW M915 (CONT).

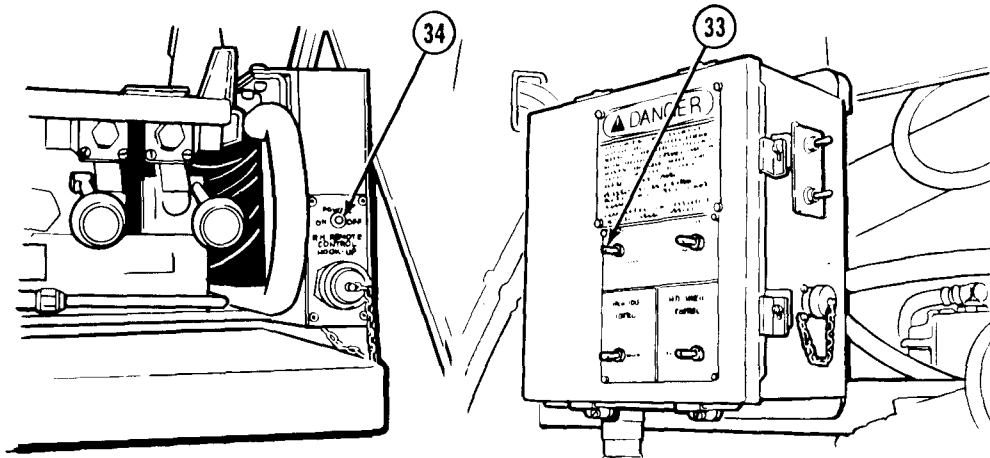


TA475177

NOTE

Right and left towing shackles are installed the same way. Left side shown.

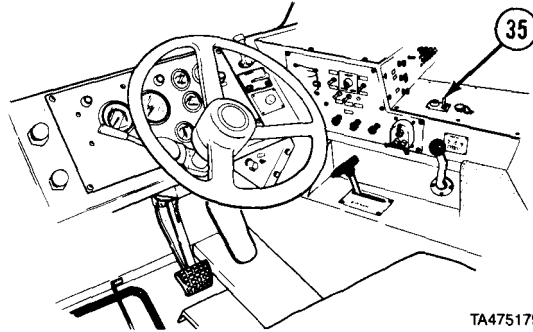
(28) Install towing shackle (30), pin (31), and cotter pin (32).



TA475178

(29) Set POWER switch (33) to OFF position.
(30) Set POWER switch (34) to OFF position.

M984E1 General Operation Procedures (Cont)



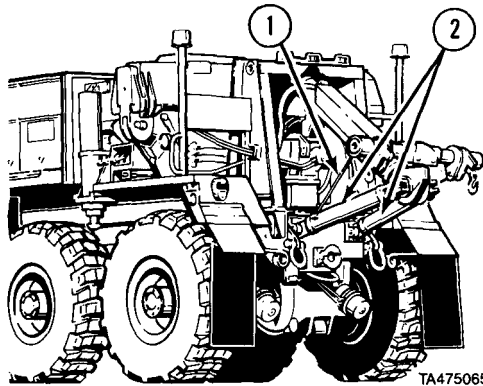
- (31) Turn off emergency flashers on wrecker (para 2-44f) and disabled vehicle.
- (32) Turn off service drive lights (para 2-10d).
- (33) Set PTO ENGAGE switch (35) to OFF position.
- (34) Remove and stow beacon lights (para 2-62).
- (35) Shut off engine (para 2-11p).
- (36) Unlock disabled vehicle's steering (refer to M915 operator's manual).

c. Rear Hookup.

NOTE

This is a two-soldier task.

- (1) Prepare retrieval system for operation (para 2-72).

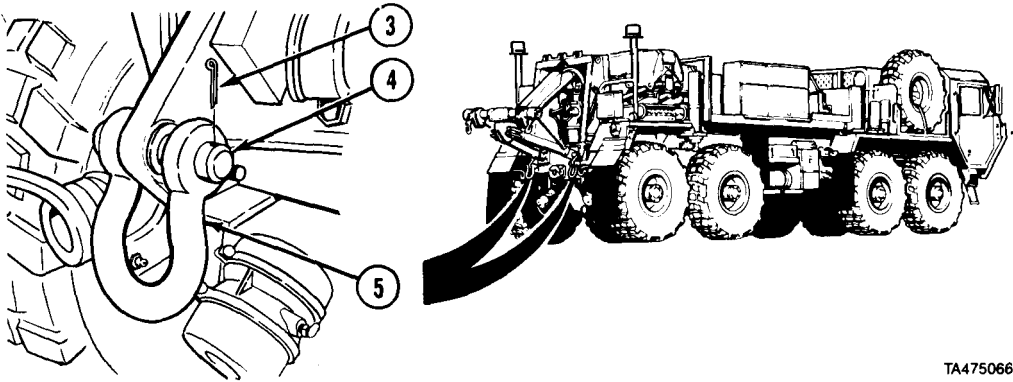


WARNING

- Hold crosstube when removing springs. Crosstube may swing or cause adapter to slide resulting in personal injury.
- InterVehicular air lines are not connected when towing from rear. Disabled vehicle will not have braking. Use extreme caution when transporting disabled vehicle using rear hookup. Vehicle traveling out of control can cause serious injury or death.

- (2) Disconnect two springs (1) from tow cylinders (2).

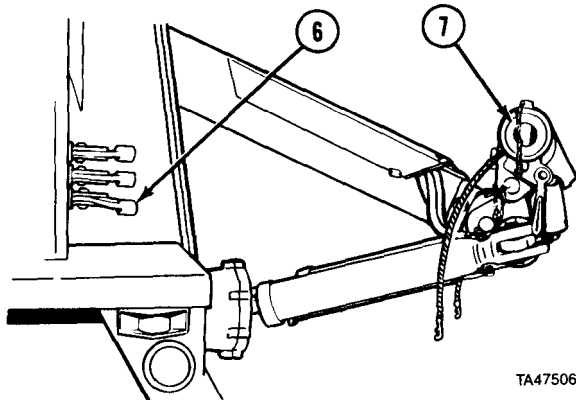
2-81. TOW M915 (CONT).



NOTE

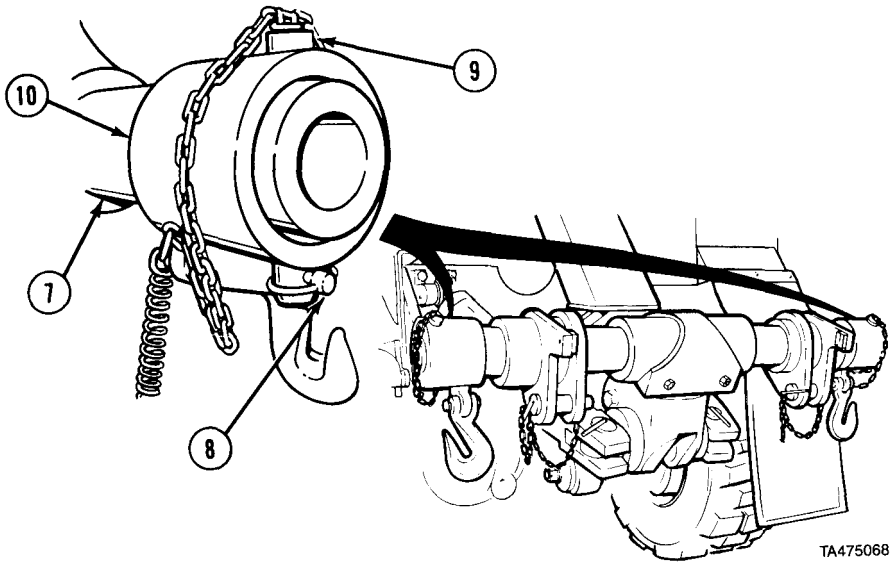
Right and left towing shackles are removed the same way.

- (3) Remove cotter pin (3), pin (4), and towing shackle (5) and stow.



- (4) Pull LIFT CYLINDER control lever (6) to lower crosstube (7) to approximately 3 ft (1 m) above ground.
- (5) Position wrecker so that crosstube (7) is approximately 1 ft (30 cm) from tow eyes of disabled vehicle and centered on disabled vehicle.

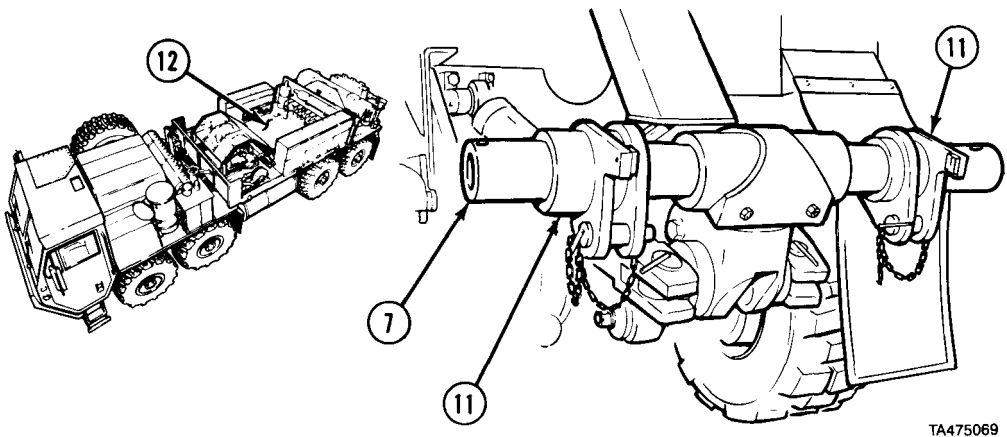
M984E1 General Operation Procedures (Cont)



WARNING

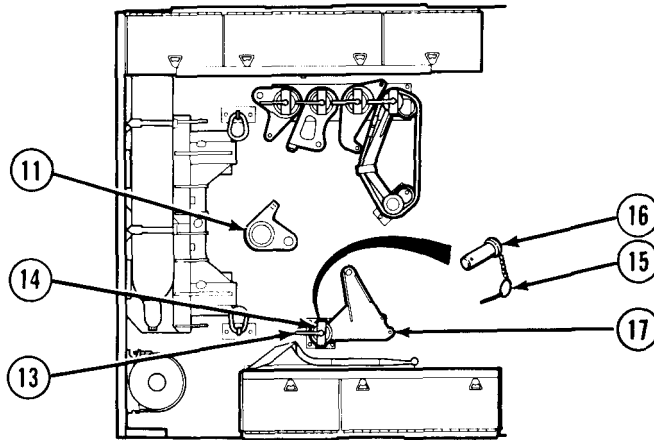
When end caps are removed from crosstube, adapters may slide off causing personal injury.

- (6) Remove quick pins (8) and pins (9) from end caps (10).
- (7) Remove end caps (10) from crosstube (7).



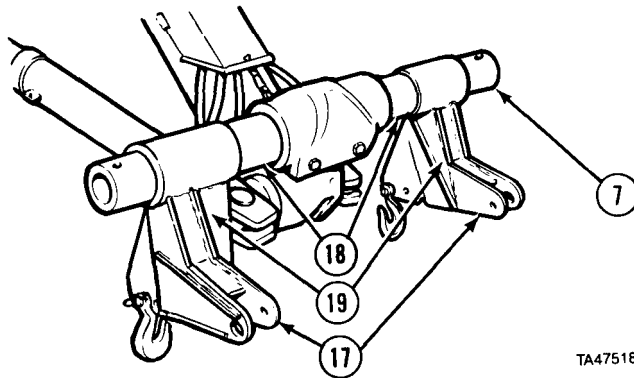
- (8) Remove two M977 front adapters (11) from crosstube (7) and place on equipment body floor (12).

2-81. TOW M915 (CONT).



TA475180

- (9) Remove lock handle (13), lock plate (14), quick pin (15), pin (16), and two M915 rear tow adapters (17).
- (10) Install two M977 front adapters (11) removed from crosstube, pin (16), and quick pin (15), lock plate (14), and lock handle (13).
- (11) Install two 1-7/16-in. (38 mm) pins and two 5-in. (127 mm) spacers from stowage.



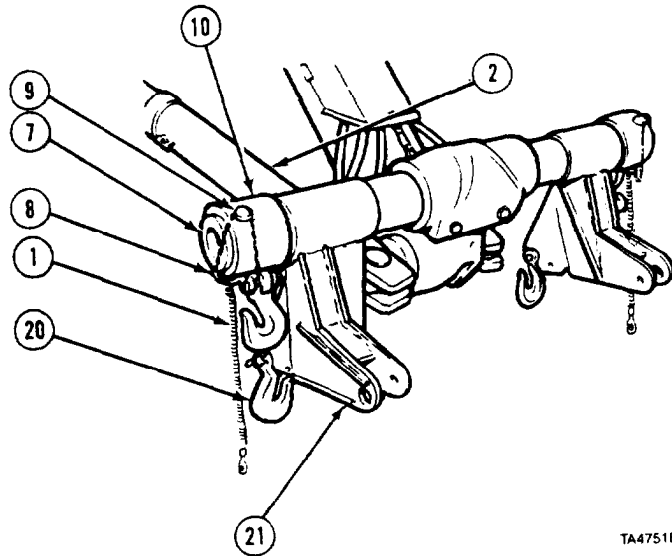
TA475181

WARNING

Adapters and end caps may slide off when installing and may cause personal injury.

- (12) Install two 5-in. (127 mm) spacers (18) on crosstube (7).
- (13) Install two M915 rear tow adapters (17) on crosstube (7) with support brace (19) to inside.

M984E1 General Operation Procedures (Cont)



- (14) Install two end caps (10) on crosstube (7).
- (15) Install two pins (9) and quick pins (8).

NOTE

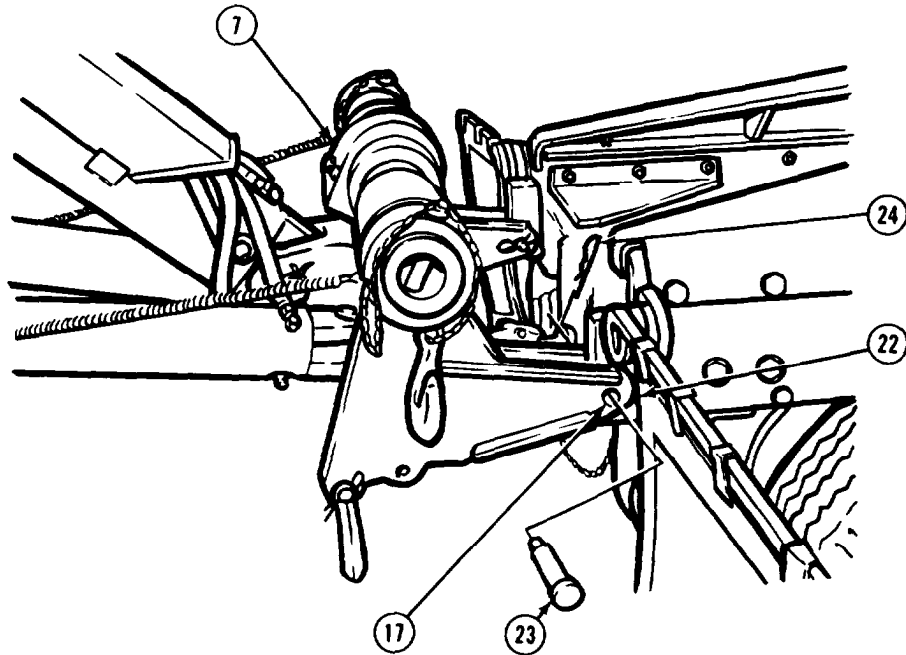
Adapter grab hook must be installed in either hole. For M915 install grab hooks in hole farthest away from towing eye pin holes.

- (16) Position adapter grab hooks (20) in hole farthest away from towing eye pin holes (21).
- (17) Attach two springs (1) on tow cylinders (2).



M984E1 General Operating Procedures (Cont)

2-81. TOW M915 (CONT)



WARNING

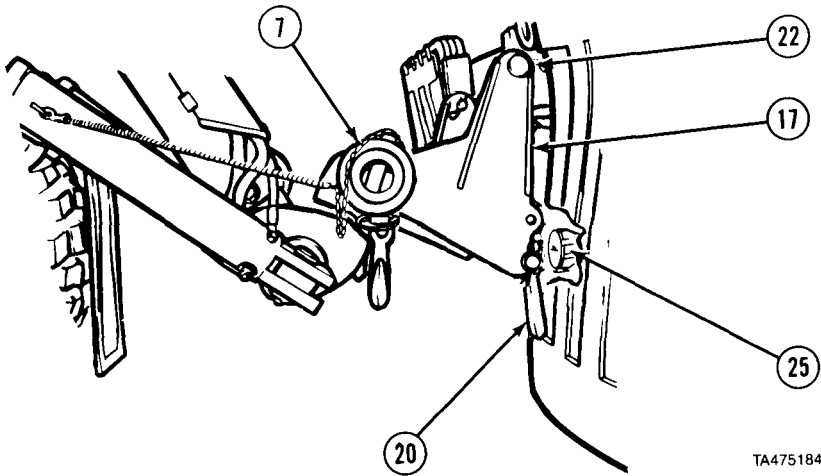
Keep hands and fingers away from adapters and tow eyes when operating retriever controls. Personal injury could result.

NOTE

If disabled vehicle has towing shackles installed, remove shackles and stow in disabled vehicle.

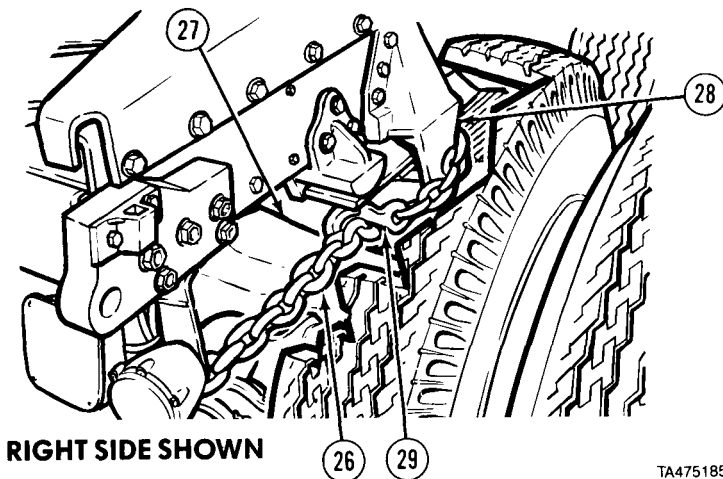
- (18) Soldier A operates retrieval system (para 2-72) while Soldier A and Soldier B position cross-tube (7) so holes in adapters (17) align with rear tow eyes (22).
- (19) Insert two 1-7/16-in. (37 mm) pins (23) through adapters (17) and rear tow eyes (22). Install two hairpins (24) in pins.

M984E1 General Operation Procedures (Cont)

**CAUTION**

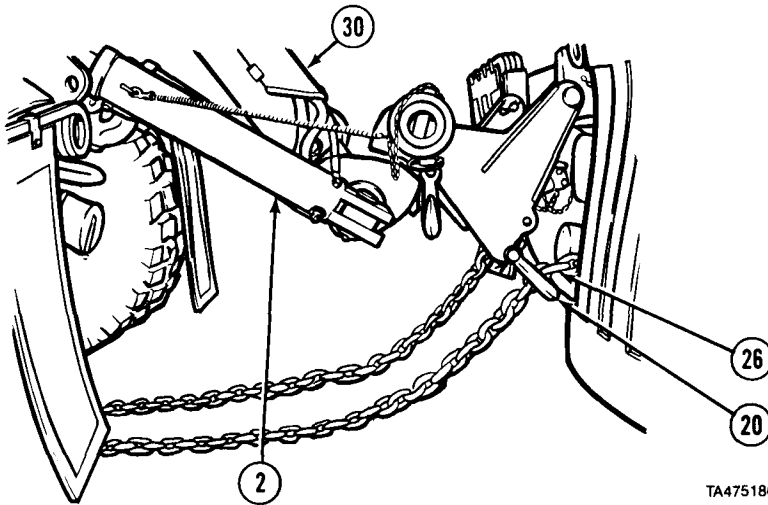
Do not allow adapters to come in contact with blackout lights. Lights could be damaged.

- (20) Lower crosstube (7) until adapter grab hooks (20) are under rear tow eyes (22) and adapter (17) is approximately 1 in. (25 mm) from blackout lights (25).



- (21) Remove two 16-ft (5 m) safety chains (26) from stowage.
 (22) Route safety chain (26) over rear axle (27) and around rear leaf spring shackle (28) of disabled vehicle.
 (23) Hook safety chain (26) together so grab hook (29) is just touching rear axle (27).
 (24) Repeat steps (22) and (23) for other side of disabled vehicle.

2-81. TOW M915 (CONT).



CAUTION

After attaching chain to grab hook, remove chain from grab hook and increase chain slack between grab hook and rear leaf spring shackle by two links. This will prevent damage to air brake chambers of disabled vehicle.

- (25) Pull safety chain (26) tight and install chain on adapter grab hook (20).
- (26) Repeat step (25) for other side of disabled vehicle.
- (27) Release PARKING BRAKE on disabled vehicle (refer to M915 operator's manual).

CAUTION

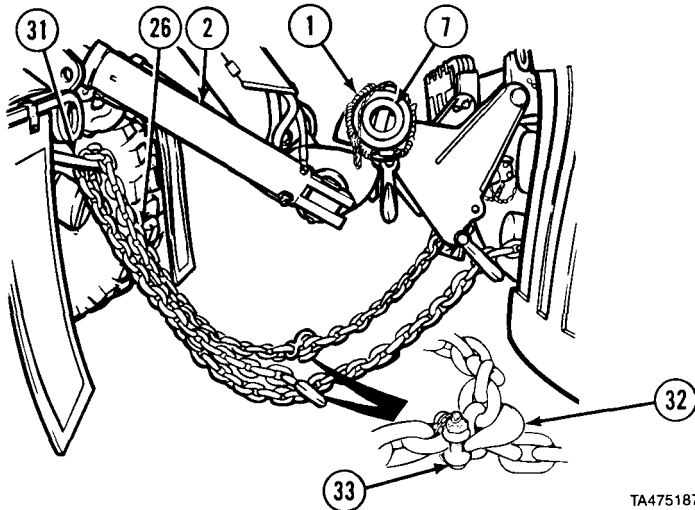
Do not allow adapters to come in contact with blackout lights. Lights may be damaged.

- (28) Alternately push in TOW and LIFT CYLINDER control levers until tow cylinders (2) are fully retracted.

CAUTION

Safety chains must not hit rear brake chambers or blackout lights. Adjust position of adapters if needed to center safety chains between blackout lights and rear brake chambers. Failure to provide clearance could result in damage to equipment.

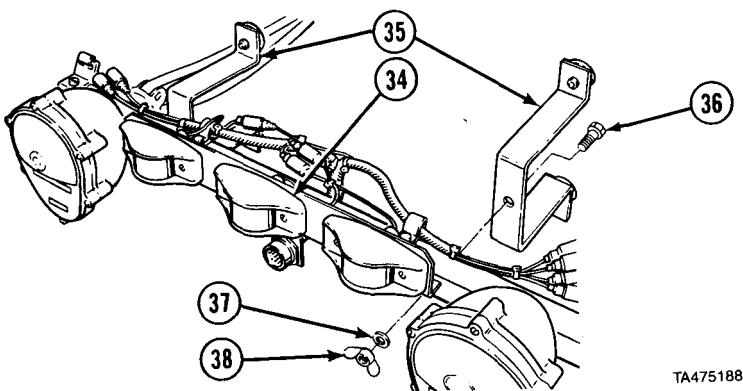
- (29) Push in LIFT CYLINDER control lever to retract lift cylinder (30) until slack is removed from safety chains (26).



NOTE

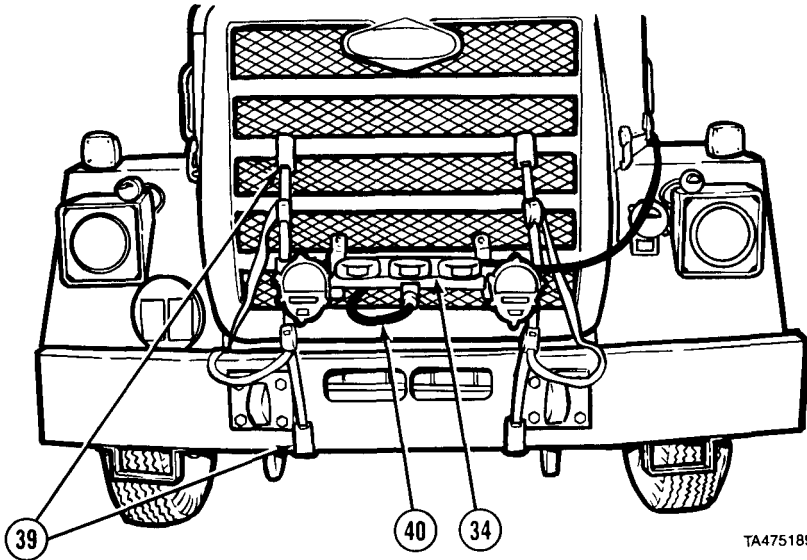
- Safety chains can be routed to towing shackles or safety chain hoop. Towing shackles can be used only when tow cylinders are extended.
- Adjust chain slack so safety chains just touch the ground.

- (30) Route two safety chains (26) through safety chain hoop (31) on wrecker and secure grab hooks (32) with safety shackles (33).
- (31) Disconnect two springs (1) from tow cylinders (2), wrap springs around crosstube (7) and secure.

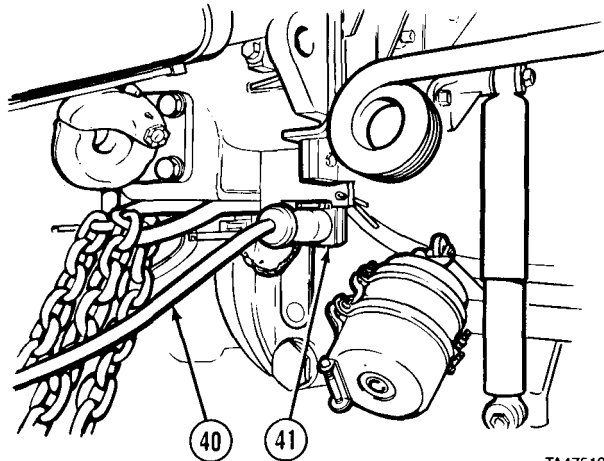


- (32) Prepare disabled vehicle for towing (refer to M915 operator's manual).
- (33) Remove emergency tow lights (34) and two brackets (35) from stowage.
- (34) Install two brackets (35) in center holes of emergency tow lights with two screws (36), washers (37), and nuts (38).

2-81. TOW M915 (CONT).

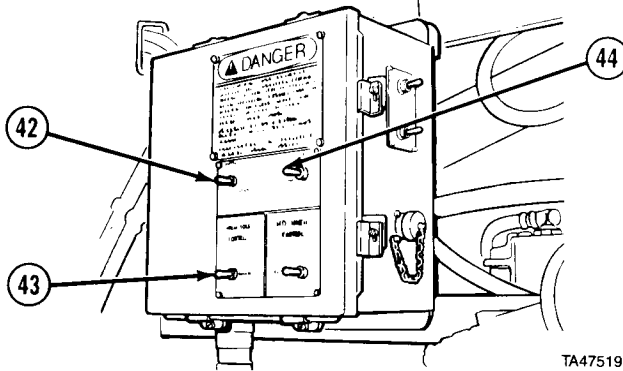


- (35) Install emergency tow lights (34) on front of M915 and fasten securely with straps (39).
- (36) Remove tow light cable (40) from stowage and connect to emergency tow lights (34).



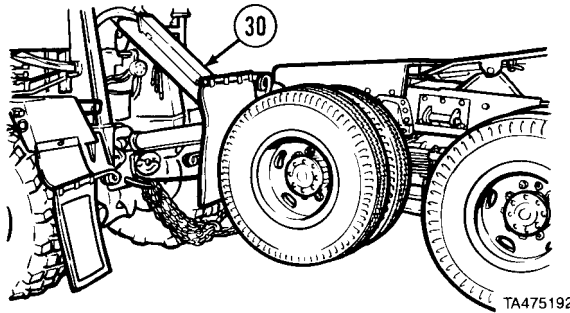
- (37) Route other end of tow light cable (40) along disabled vehicle and connect to rear electrical connector (41) on wrecker.
- (38) Lock disabled vehicle's steering (refer to M915 operator's manual).

M984E1 General Operation Procedures (Cont)



TA475191

- (39) Set POWER switch (42) to ON position.
- (40) Set HIGH IDLE switch (43) to CONTINUOUS.
- (41) Push and release LATCH switch (44). Engine speed will increase to approximately 1500 rpm.



TA475192

WARNING

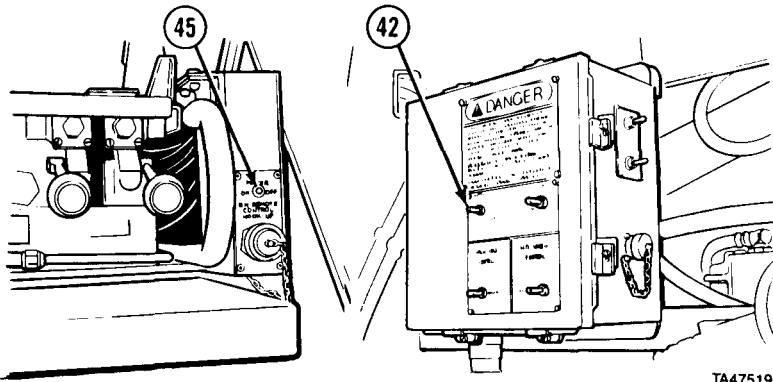
Keep out from under retrieval system and disabled vehicle when raised off ground or personal injury or death may result.

CAUTION

- Fully retract both tow cylinders before lifting disabled vehicle or equipment damage may result
 - Ž Safety chains must not hit rear brake chambers or composite taillights or equipment damage may result,
 - Ž Make sure all rigging is secure. Loose rigging can become entangled and cause damage to equipment.
- (42) Push in LIFT CYLINDER control lever to retract lift cylinder (30) and raise disabled vehicle approximately 1.5 ft (45 cm) off ground.

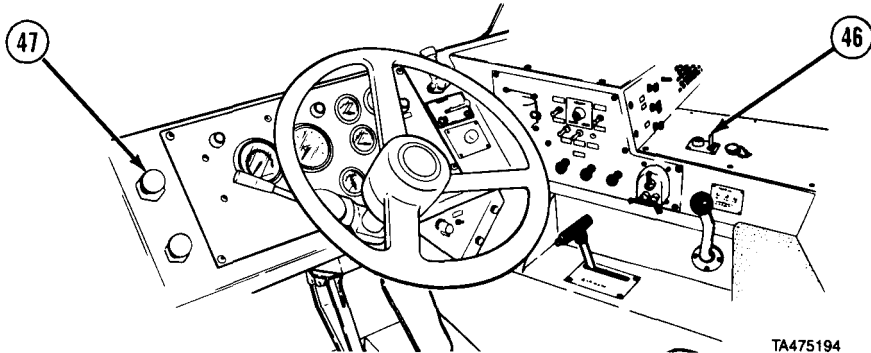
M984E1 General Operation Procedures (Cont)

2-81. TOW M915 (CONT).



TA475193

- (43) Set POWER switch (42) to OFF position.
- (44) Set POWER switch (45) to OFF position.



TA475194

- (45) Set PTO ENGAGE switch (46) to OFF position.
- (46) Turn on service drive lights (para 2-10d).
- (47) Turn on emergency flashers on wrecker (para 2-44a) and disabled vehicle.
- (48) Push in PARKING BRAKE control (47) and select desired gear (para 2-11e).

WARNING

The M984E1 should not be operated at speeds over 15 mph except on paved roads when the operator determines that the vehicle being towed and the terrain allow safe operation. Engine brake switch must be "ON" for all towing operations. The following are maximum safe speeds:

Terrain Condition	Maximum speed, towed load up to 50,000 lbs	Maximum speed, towed load above 50,000 lbs
on road-level	35	30
on road-hilly	30	20
off road	15	15

Speeds in excess of the above can result in loss of control, serious injury or death.

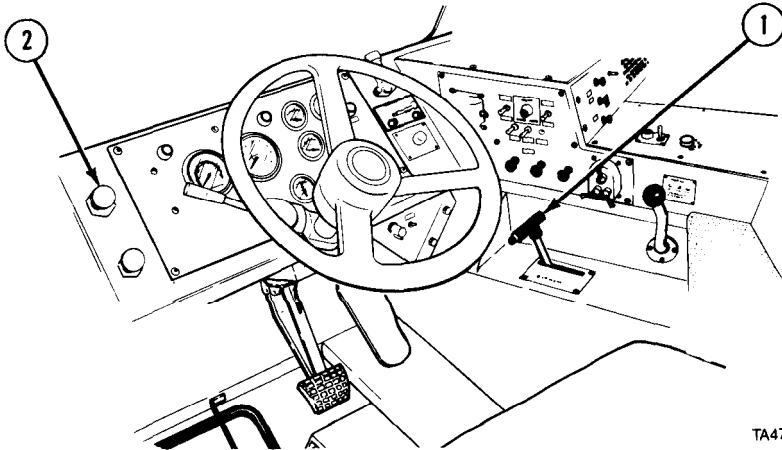
- (49) Transport disabled vehicle.

M984E1 General Operation Procedures (Cont)

d. Rear Disconnect.

NOTE

This is a two-soldier task.



TA475195

- (1) Set transmission range selector (1) to N.
- (2) Pull PARKING BRAKE control (2).

WARNING

Do not stand between vehicles while disabled vehicle is raised off ground. Falling vehicle can cause serious injury or death.

CAUTION

When lowering vehicle and positioning crosstube, do not allow adapters to contact blackout lights or damage to lights may result.

NOTE

After lowering disabled vehicle, extend lift and tow cylinders approximately 2 to 4 in. (50 to 100 mm) to allow for adjustment when removing adapters.

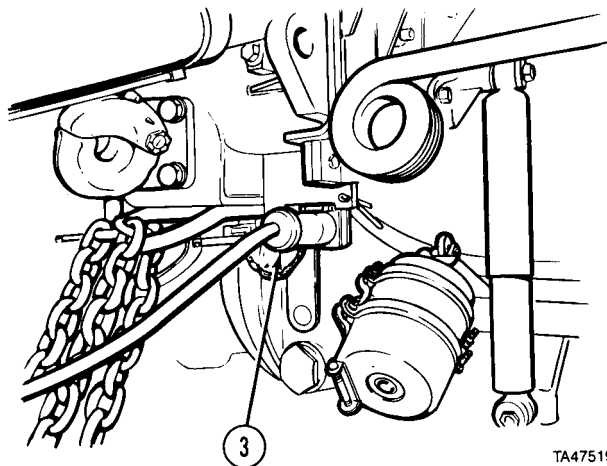
- (3) Prepare retrieval system for operation (para 2-72) and pull LIFT CYLINDER control lever to extend lift cylinder and lower towed vehicle to ground until safety chain at rear axle is slack.

WARNING

If disabled vehicle's air system is inoperative, chock wheels of disabled vehicle. Failure to chock wheels may result in personal injury.

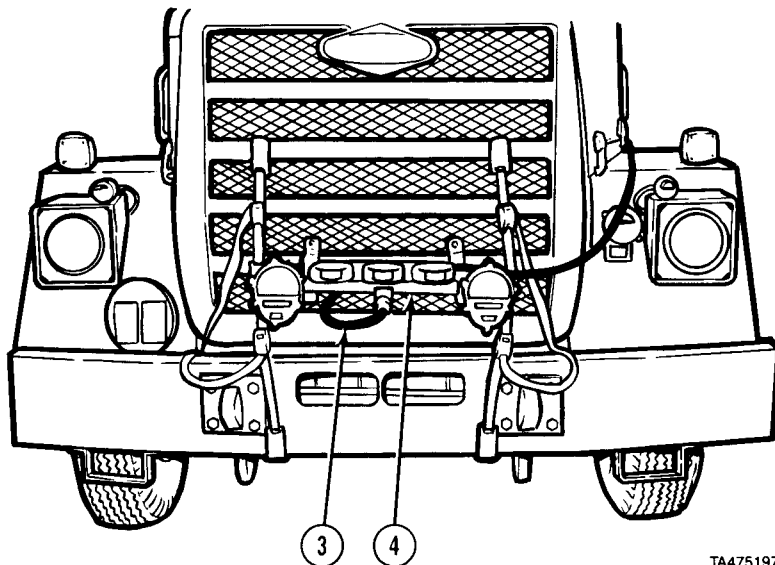
- (4) Apply PARKING BRAKE on disabled vehicle (refer to M915 operator's manual). If parking brake is inoperative, chock wheels on disabled vehicle.

2-81. TOW M915 (CONT).



TA475196

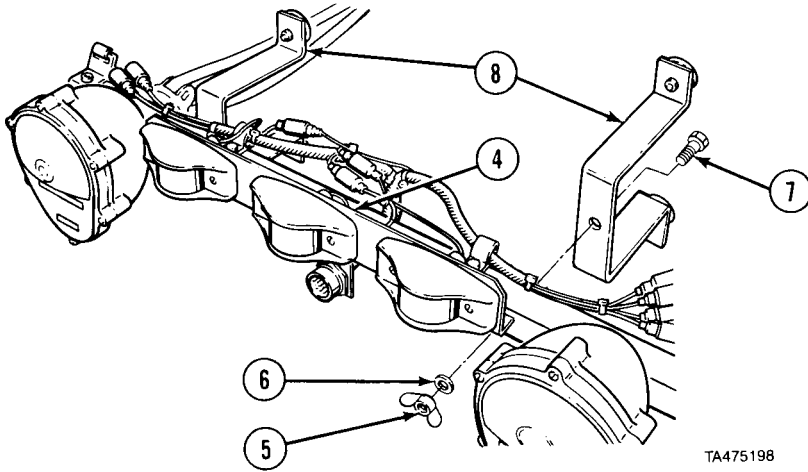
(5) Remove tow light cable (3) from wrecker.



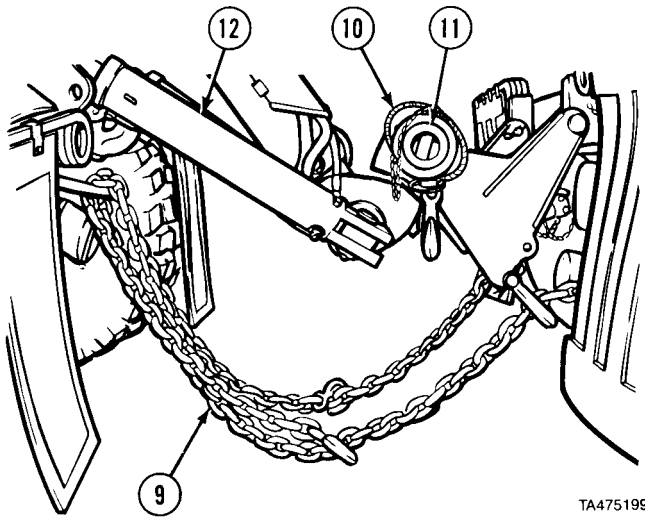
TA475197

(6) Remove tow light cable (3) from emergency tow lights (4) and stow.
(7) Remove emergency tow lights (4) from disabled vehicle.

M984E1 General Operation Procedures (Cont)

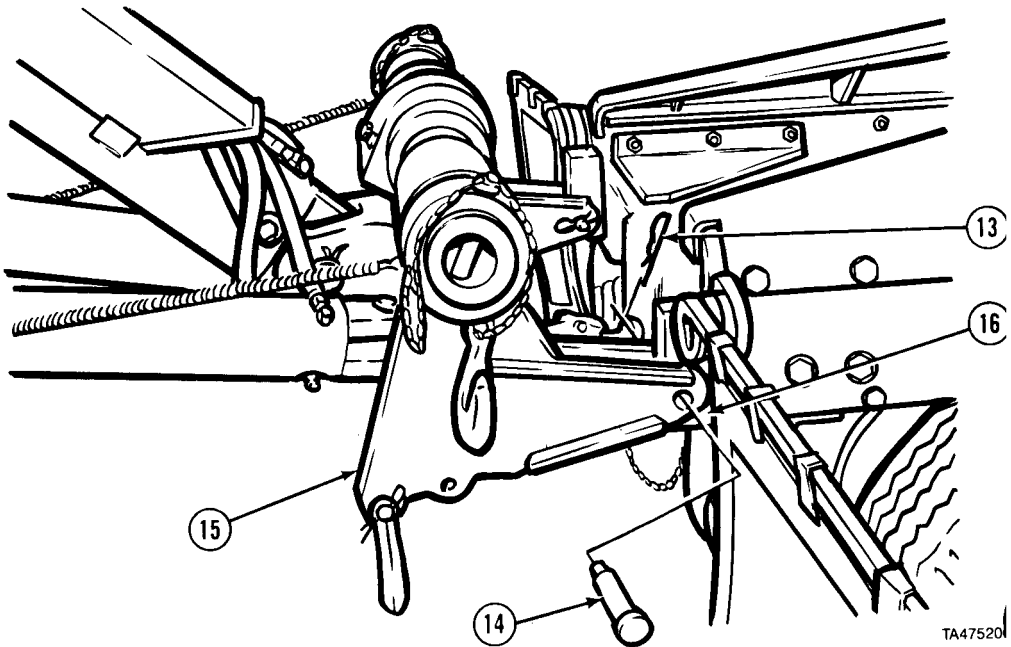


- (8) Remove two nuts (5), washers (6), screws (7), and brackets (8) from emergency tow lights (4). Stow emergency tow lights and brackets.



- (9) Remove and stow safety chains (9).
- (10) Unwrap two springs (10) from cross-tube (11) and connect to tow cylinders (12).

2-81. TOW M915 (CONT).



WARNING

- Do not stand behind adapters when pins are being removed. Adapters may swing down resulting in personal injury.
- Keep hands and fingers away from adapter and tow eyes when operating retrieval controls. Personal injury could result.

CAUTION

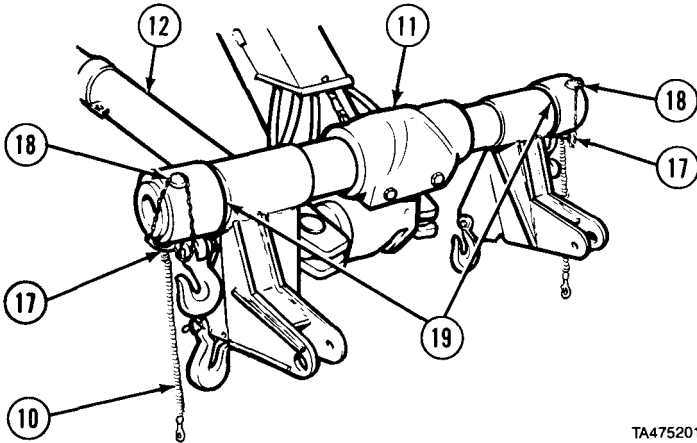
Adapters will swing down and can hit blackout lights causing equipment damage.

NOTE

Use retrieval controls to position crosstube to relieve tension from adapters.

- (11) Remove two hairpins (13) and 1-7/16 in. (38 mm) pins (14) from adapters (15).
- (12) Remove adapters (15) from tow eyes (16) on disabled vehicle.
- (13) Install hairpins (13) in 1-7/16-in. (38 mm) pins (14) and stow.

M984E1 General Operation Procedures (Cont)



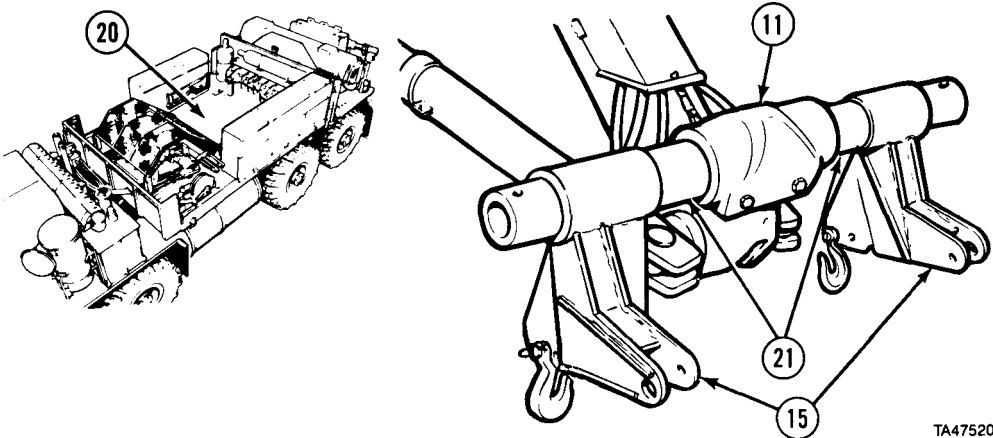
TA475201

(14) Drive wrecker forward several feet and park (para 2-110).

WARNING

As springs and end caps are removed, crosstube can swing in all directions, adapters may slide off, and can cause personal injury.

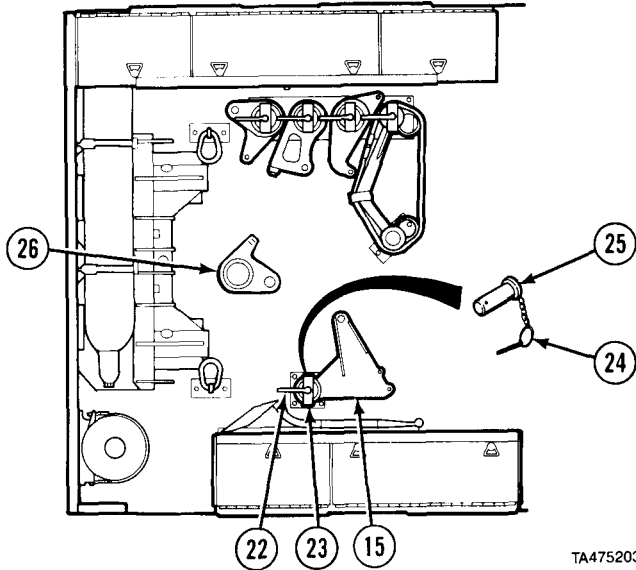
- (15) Remove two springs (10) from tow cylinders (12).
- (16) Remove quick pins (17) and pins (18) from end caps (19).
- (17) Remove end caps (19) from crosstube (11).



TA475202

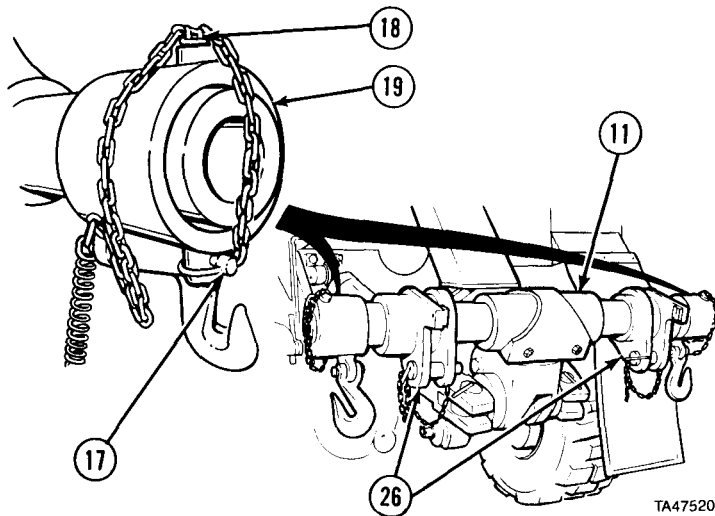
- (18) Remove adapters (15) from crosstube (11) and place on equipment body floor (20).
- (19) Remove two 5-in. (127 mm) spacers (21) from crosstube (11) and stow.

2-81. TOW M915 (CONT).



TA475203

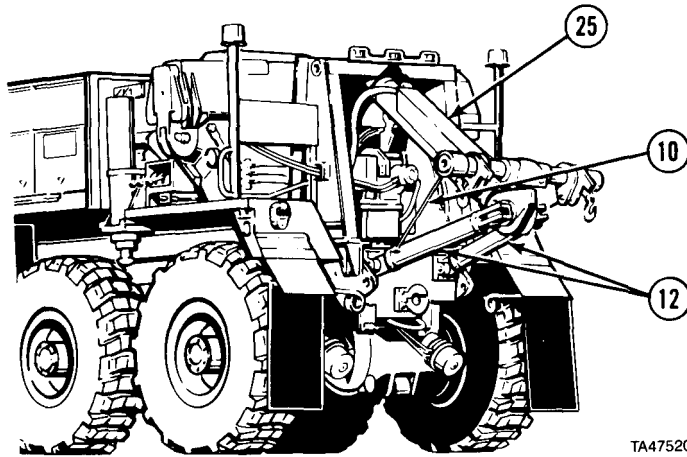
- (20) Remove lock handle (22), lock plate (23), quick pin (24), pin (25), and two M977 front adapters (26).
- (21) Install two M915 adapters (15) removed from crosstube, pin (25), quick pin (24), lock plate (23), and lock handle (22).



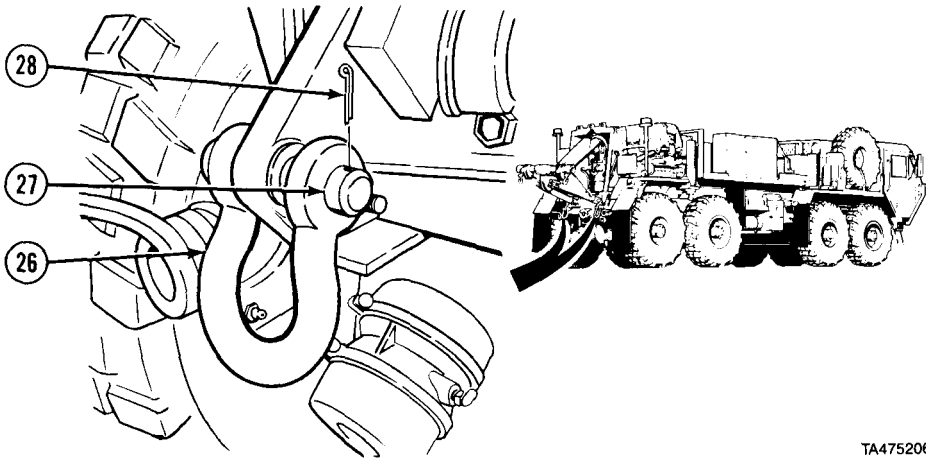
TA475204

- (22) Install M977 front adapters (26) on crosstube (11).
- (23) Install end caps (19) on crosstube (11). Install pins (18) and quick pins (17).

M984E1 General Operation Procedures (Cont)



- (24) Install two springs (10) on tow cylinders (12).
- (25) Operate retrieval controls and fully retract lift cylinder (25) and tow cylinders (12).



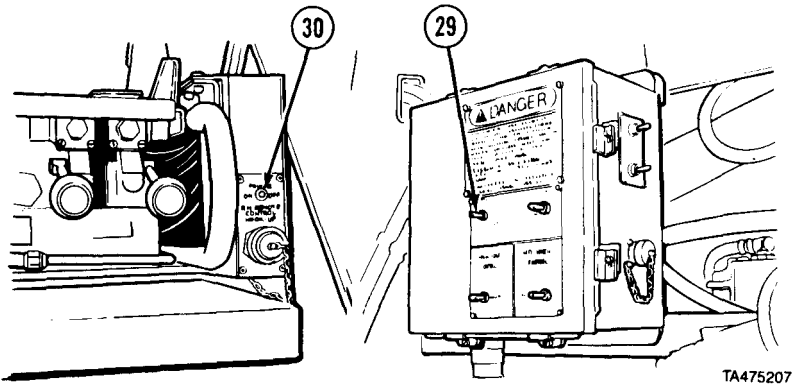
NOTE

Right and left towing shackles are installed the same way.

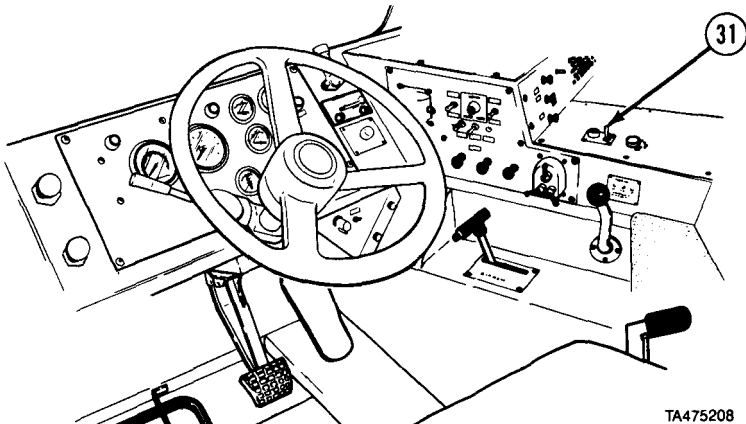
- (26) Install towing shackle (26), pin (27), and cotter pin (28).

M984E1 General Operation Procedures (Cont)

2-81. TOW M915 (CONT).



- (27) Set POWER switch (29) to OFF position.
- (28) Set POWER switch (30) to OFF position.



- (29) Turn off emergency flashers on wrecker (para 2-44f) and disabled vehicle.
- (30) Turn off service drive lights (para 2-10d).
- (31) Set PTO ENGAGE switch (31) to OFF position.
- (32) Remove and stow beacon lights (para 2-62).
- (33) Shut off engine (para 2-11p).
- (34) Unlock disabled vehicle's steering (refer to M915 operator's manual).

M984E1 General Operating Procedures (Cont)

2-82. TOW M939.

a. Front Hookup.

NOTE

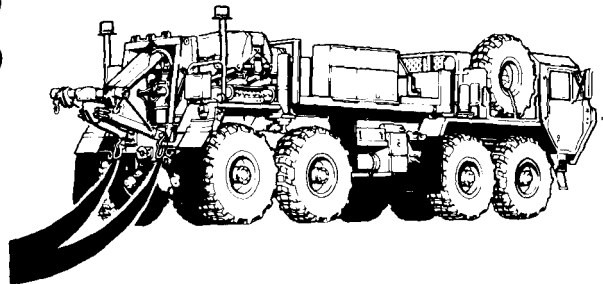
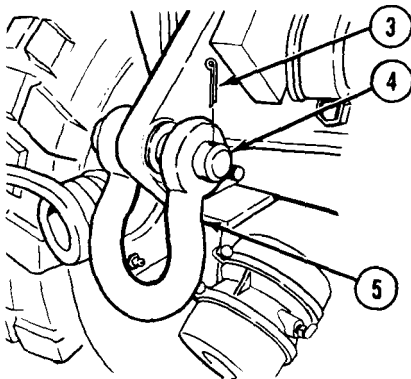
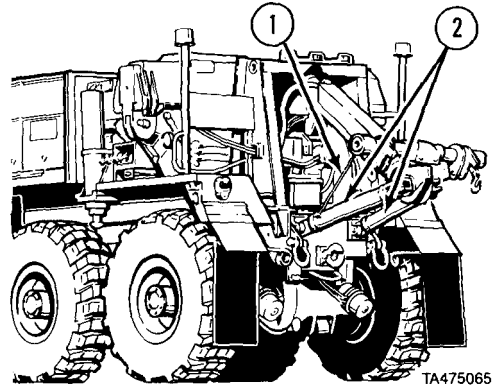
This is a two-soldier task.

(1) Prepare retrieval system for operation (para 2-72).

WARNING

Hold crosstube when removing springs. Crosstube may swing or cause adapter to slide resulting in personal injury.

(2) Disconnect two springs from tow cylinders (2).



TA475066

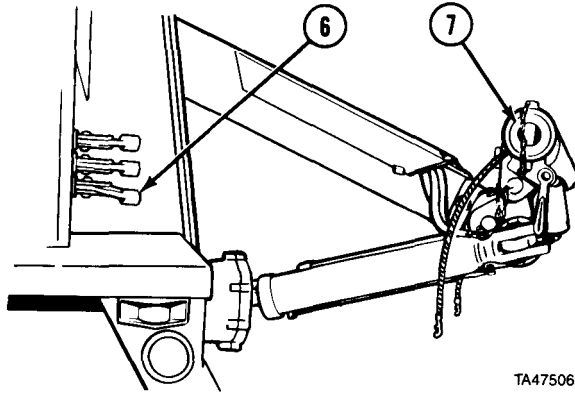
NOTE

Right and left towing shackles are removed the same way.

(3) Remove two cotter pins (3), pins (4), and towing shackles (5) and stow on equipment body floor.

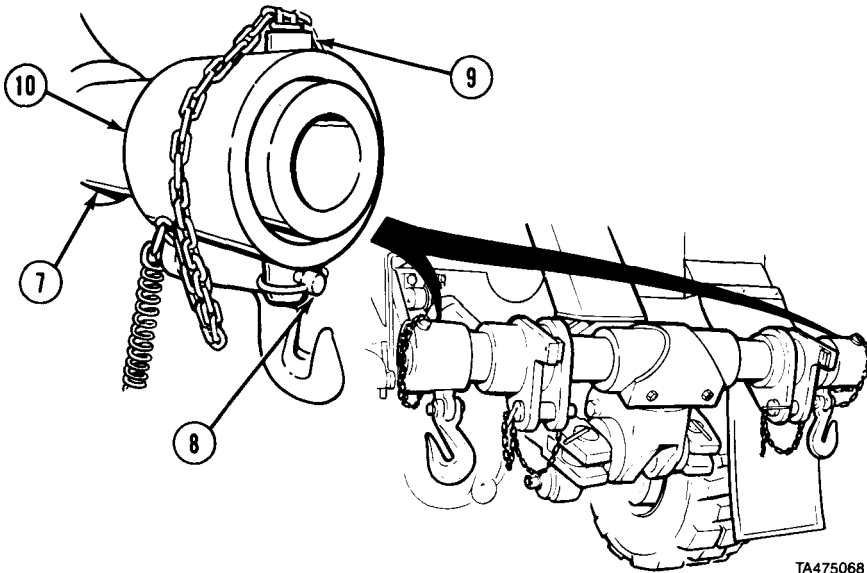
M984E1 General Operating Procedures (Cont)

2-82. TOW M939 (CONT).



TA475067

- (4) Pull LIFT CYLINDER control lever (6) to lower crosstube (7) to approximately 4 ft (1.2 m) above ground.
- (5) Position wrecker so that crosstube (7) is approximately 1 ft (30 cm) from tow eyes of disabled vehicle and centered on disabled vehicle.



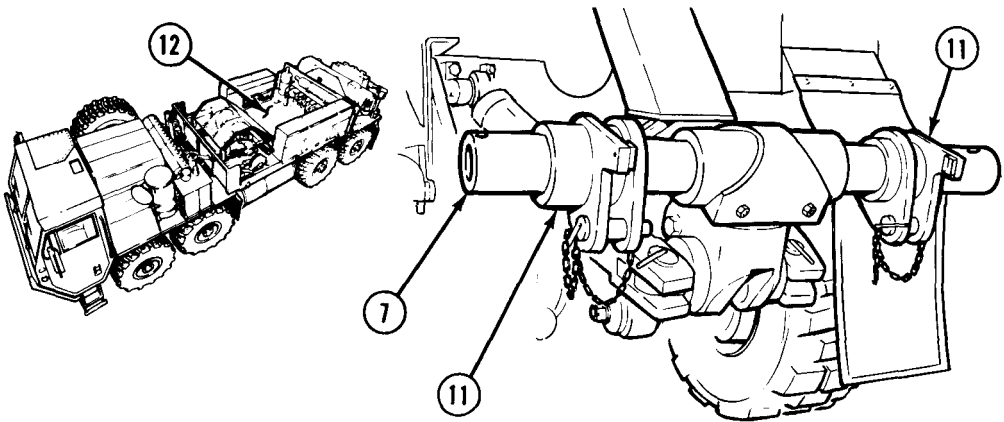
TA475068

WARNING

When end caps are removed from crosstube, adapters may slide off causing personal injury.

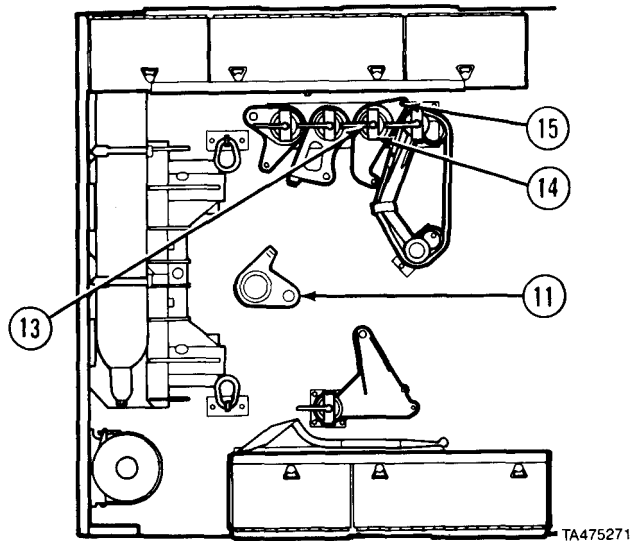
- (6) Remove two quick pins (8) and pins (9) from end caps (10).
- (7) Remove two end caps (10) from crosstube (7).

M984E1 General Operating Procedures (Cont)



TA475069

- (8) Remove two M977 front adapters (11) from crosstube (7) and place on equipment body floor (12).

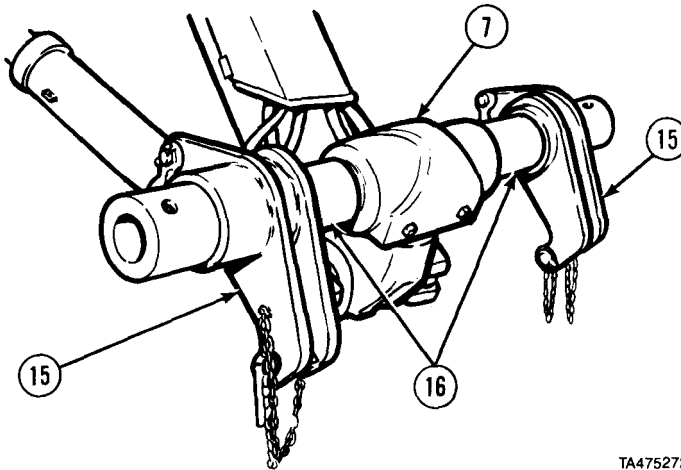


TA475271

- (9) Remove lock handle (13), lock plate (14), and two M939 front tow adapters (15).
 (10) Remove two 5-in. (127 mm) spacers from stowage.
 (11) Install M977 front adapters (11) removed from crosstube, lock plate (14), and lock handle (13).

M984E1 General Operating Procedures (Cont)

2-82. TOW M939 (CONT).



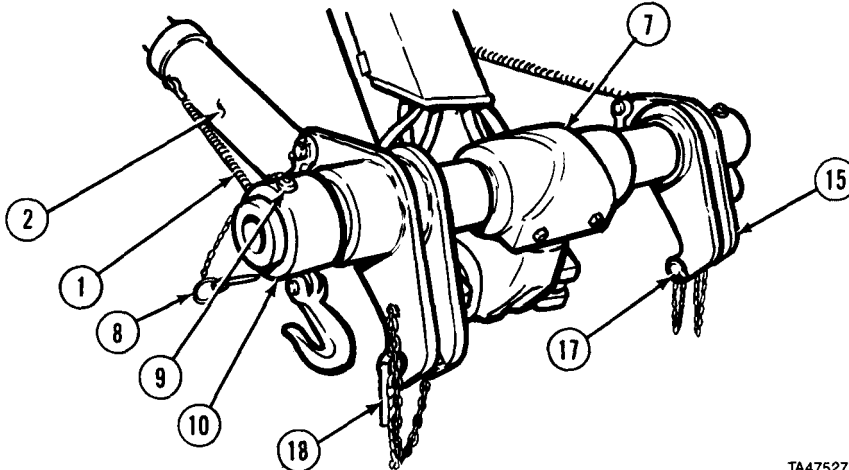
TA475272

(12) Install two 5-in. (127 mm) spacers (16) on crosstube (7).

WARNING

Adapters and end caps may slide off when installing and may cause personal injury.

(13) Install two M939 front tow adapters (15) on crosstube (7).



TA475273

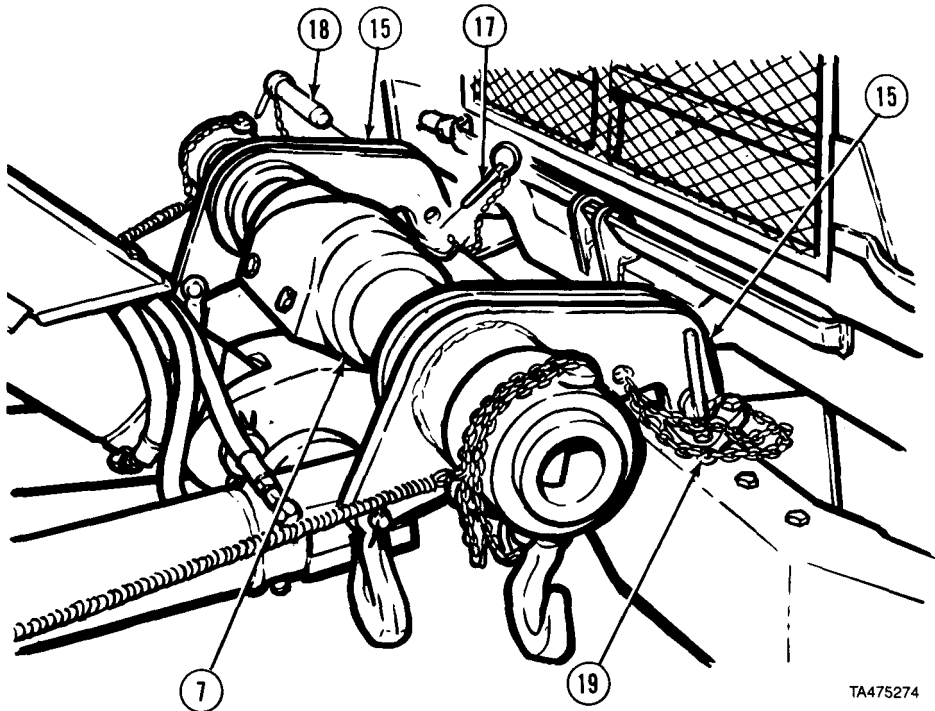
(14) Install two end caps (10) on crosstube (7).

(15) Install two pins (9) and quick pins (8).

(16) Attach two springs (1) on tow cylinders (2).

(17) Remove two quick pins (17) and pins (18) from adapters (15).

M984E1 General Operating Procedures (Cont)



TA475274

WARNING

Keep hands and fingers away from adapters and tow eyes when operating retriever controls. Personal injury could result.

NOTE

If disabled vehicle has towing shackles installed, remove shackles and stow in disabled vehicle.

- (18)** Soldier A operates retrieval system (para 2-72) while Soldier A and Soldier B position cross-tube (7) so holes in adapters (15) align with front tow eyes (19).

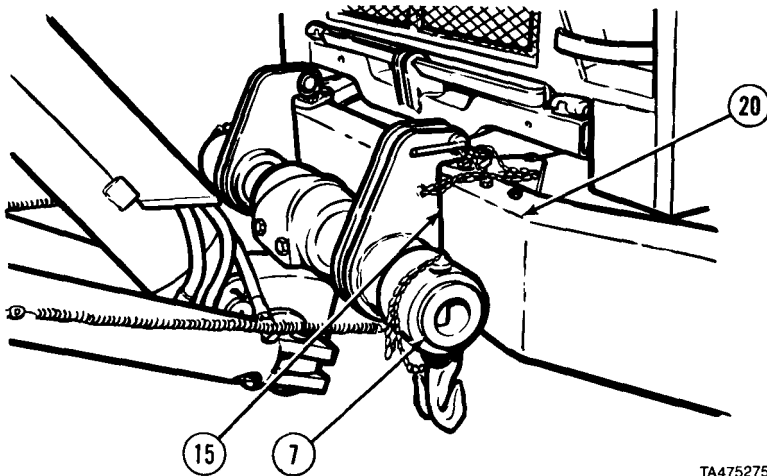
CAUTION

Do not route pin chains between adapters and front bumper, or damage to chains may result.

- (19)** Insert two pins (18) through adapters (15) and front tow eyes (19). Install quick pins (17) in pins (18).

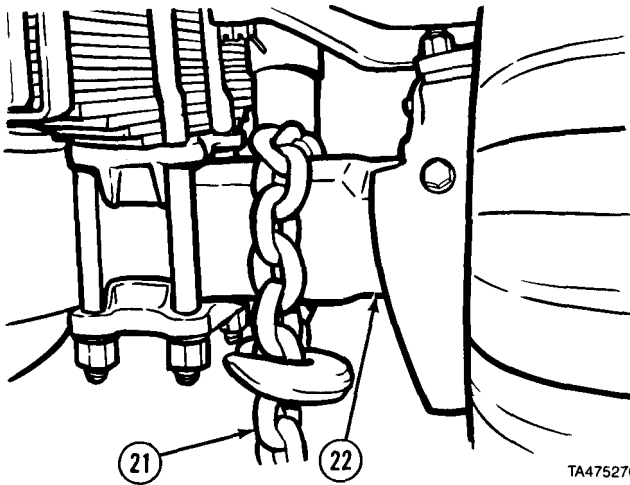
M984E1 General Operating Procedures (Cont)

2-82. TOW M939 (CONT).



TA475275

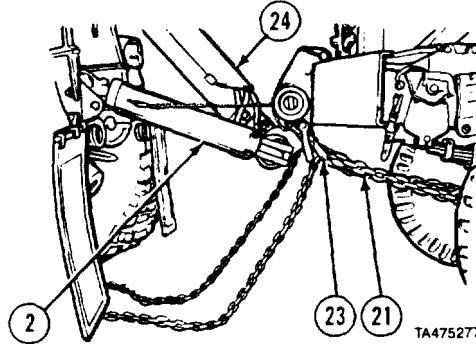
(20) Lower crosstube (7) until adapters (15) contact front bumper (20).



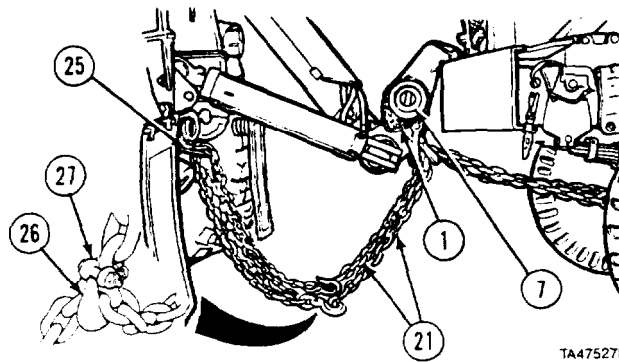
TA475276

- (21) Remove two 16-ft (5 m) safety chains (21) from stowage.
- (22) Route one safety chain (21) over front axle (22) on disabled vehicle.
- (23) Hook safety chain (21) together in front of axle (22).
- (24) Repeat steps (22) and (23) for other side of disabled vehicle.

M984E1 General Operating Procedures (Cont)



- (25) Pull safety chain (21) tight and install chain on adapter grab hook (23).
- (26) Repeat step (25) for other side of disabled vehicle.
- (27) Release PARKING BRAKE on disabled vehicle (refer to M939 operator's manual).
- (28) Alternately push in TOW and LIFT CYLINDER control levers until tow cylinders (2) are fully retracted.
- (29) Push in LIFT CYLINDER control lever to retract lift cylinder (34) until slack is removed from safety chains (21).



NOTE

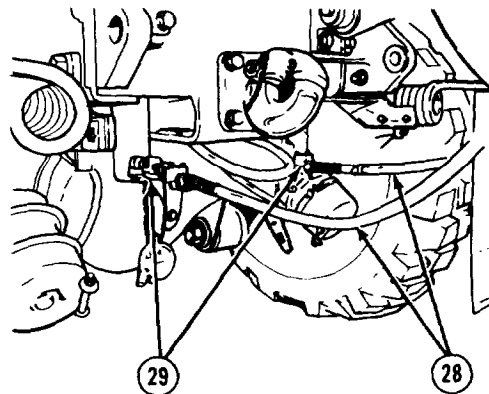
Safety chains can be routed to towing shackles or safety chain hoop. Towing shackles can be used only after tow cylinders are extended.

Adjust chain slack so safety chains just touch the ground.

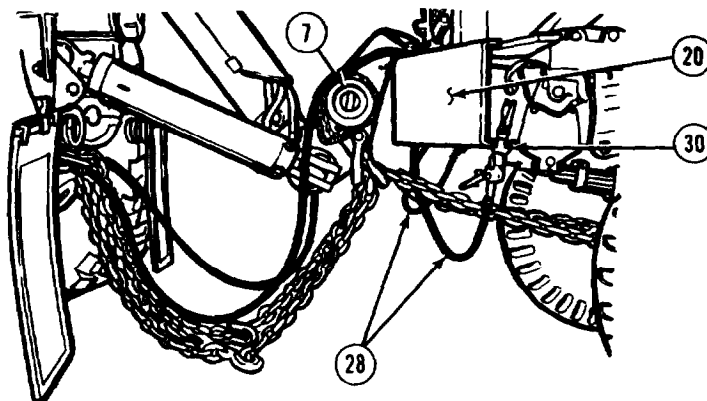
- (30) Route two safety chains (11) through safety chain hoop (25) on wrecker and secure grab hook (26) with safety shackle (27).
- (31) Wrap two springs (1) around cross-tube (7) and secure.

M984E1 General Operating Procedures (Cont)

2-82. TOW M939 (CONT).



- (32) Remove two airhoses (28) from stowage and attach to rear glad hands (29) on wrecker.



CAUTION

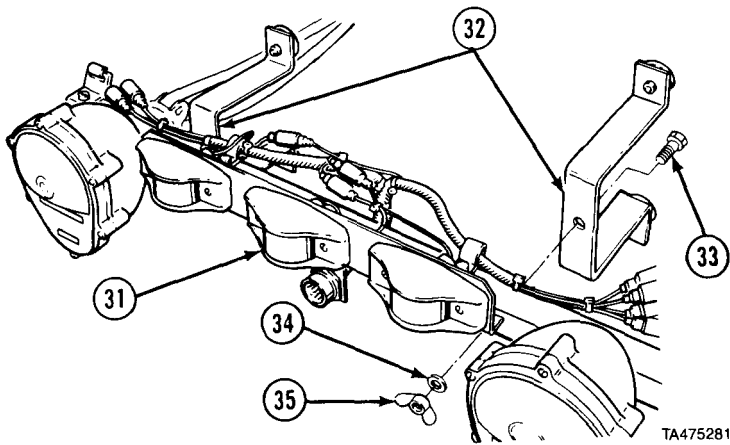
Do not route airhoses between retrieval cylinders or damage to airhoses may result.

NOTE

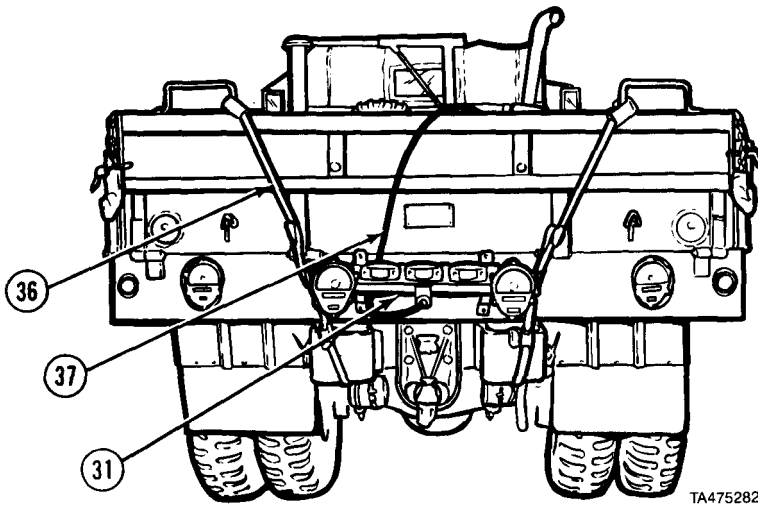
Rear emergency air hose from wrecker must be connected to front emergency glad hand on disabled vehicle. Rear service air hose from wrecker must be connected to front service glad hand on disabled vehicle.

- (33) Route two airhoses (28) over crosstube (7) and front bumper (20). Attach to front glad hands (30) on disabled vehicle.

M984E1 General Operating Procedures (Cont)



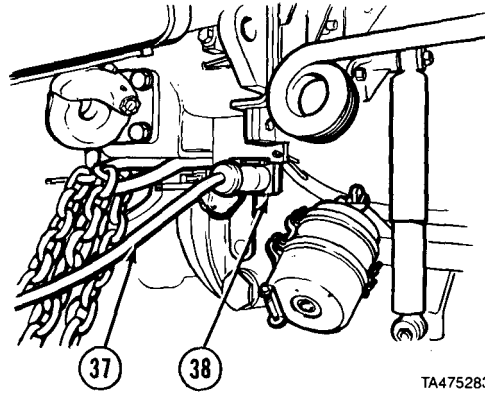
- (34) Prepare disabled vehicle for towing (refer to M939 operator's manual).
- (35) Remove emergency tow lights (31) and two brackets (32) from stowage.
- (36) Install two brackets (32) in center holes of emergency tow lights with two screws (33), washers (34), and nuts (35).



- (39) Install emergency tow lights (31) on rear of M939 and fasten securely with straps (36).
- (38) Remove tow light cable (37) from stowage and connect to emergency tow lights (31).

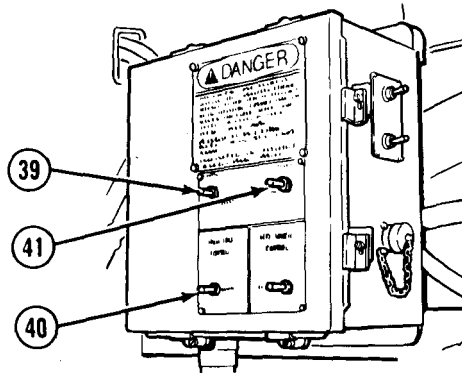
M984E1 General Operating Procedures (Cont)

2-82. TOW M939 (CONT).



TA475283

(39) Route other end of tow light cable (37) along disabled vehicle and connect to rear electrical connector (38) on wrecker.



TA475284

NOTE

- If disabled vehicle will be lifted and towed, continue with step (40).
- If disabled vehicle will be towed with all tires on paved roads only, raise crosstube enough to partially unload disabled vehicle's front suspension. Keep front tires in firm contact with ground and proceed to step (45).

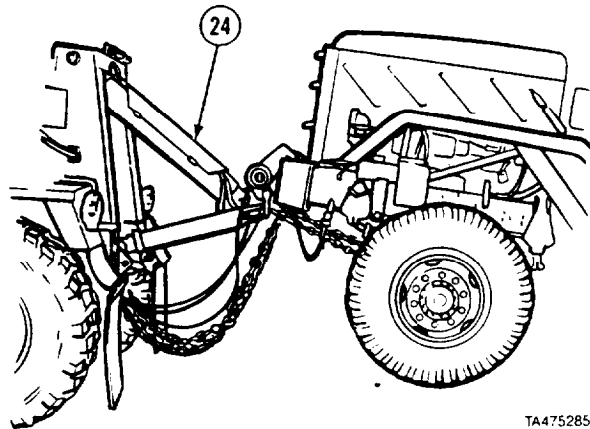
(40) Lock disabled vehicle's steering (refer to M939 operator's manual).

(41) Set POWER switch (39) to ON position.

(42) Set HIGH IDLE switch (40) to CONTINUOUS,

(43) Push and release LATCH switch (41). Engine speed will increase to approximately 1500 rpm.

M984E1 General Operating Procedures (Cont)



TA475285

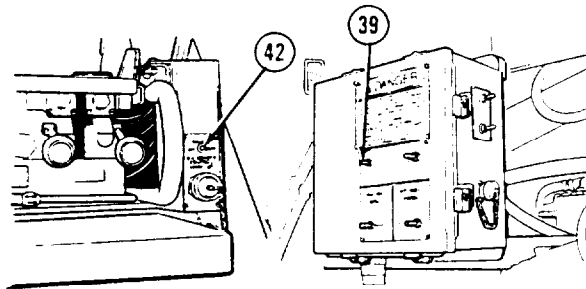
WARNING

Keep out from under retrieval system and disabled vehicle when raised off ground or personal injury or death may result.

CAUTION

- Fully retract both tow cylinders before lifting disabled vehicle or equipment damage may result.
- Make sure all rigging is secure. Loose rigging can become entangled and cause damage to equipment.

(44) Retract lift cylinder (24) to raise disabled vehicle approximately 1 ft (30 cm) off ground.

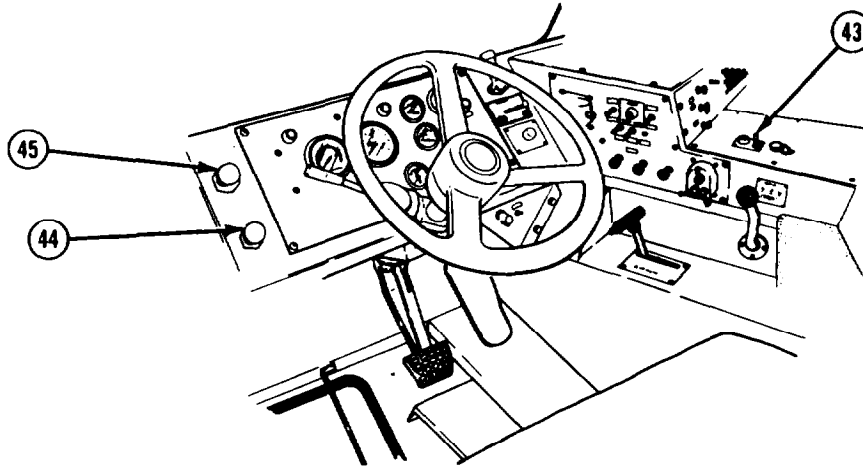


TA475286

- (45) Set POWER switch (39) to OFF position.
(46) Set POWER switch (42) to OFF position.

M984E1 General Operating Procedures (Cont)

2-82. TOW M939 (CONT).



- (47) Set PTO ENGAGE switch (43) to OFF position.
- (48) Push in TRAILER AIR SUPPLY control (44).
- (49) Turn on service drive lights (para 2-10d).
- (50) Turn on emergency flashers on wrecker (para 2-44a) and disabled

- (51) Push in PARKING BRAKE control (45) and select desired gear (para 2-11e).

WARNING

The M984E1 should not be operated at speeds over 15 mph except on paved roads when the operator determines that the vehicle being towed and the terrain allow safe operation. Engine brake switch must be "On" for all towing operations. The following are maximum safe speeds.

Terrain Conditions	Maximum speed, towed load up to 50,000 lbs (22,681 kg)	Maximum speed, towed load above 50,000 lbs (22,681 kg)
On Road - Level Standard Tire Sand Tire	35 mph (56 kmh) 15 mph (24 kmh)	30 mph (48 kmh) 15 mph (24 kmh)
On Road - Hilly Standard Tire Sand Tire	30 mph (48 kmh) 15 mph (24 kmh)	20 mph (32 kmh) 15 mph (24 kmh)
Off Road Standard Tire Sand Tire	15 mph (24 kmh) 15 mph (24 kmh)	15 mph (24 kmh) 15 mph (24 kmh)

Speeds in excess of the above can result in loss of control, serious injury or death.

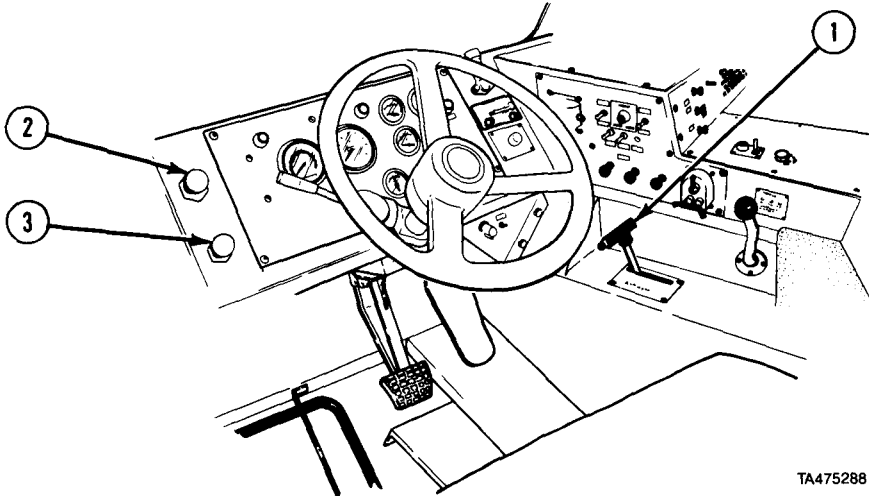
- (52) Transport disabled vehicle.

M984E1 General Operating Procedures (Cont)

b. Front Disconnect.

NOTE

This is a two-soldier task.



TA475288

- (1) Set transmission range selector (1) to N.
- (2) Pull PARKING BRAKE control (2).
- (3) Pull TRAILER AIR SUPPLY control (3).

WARNING

Do not stand between vehicles while disabled vehicle is raised off ground. Falling vehicle can cause serious injury or death.

NOTE

After lowering disabled vehicle, extend lift and tow cylinders approximately 2 to 4 in. (50 to 100 mm) to allow for adjustment when removing adapters.

- (4) Prepare retrieval system for operation (para 2-72) and pull LIFT CYLINDER control lever to extend lift cylinder and lower towed vehicle to ground until safety chain at front axle is slack.

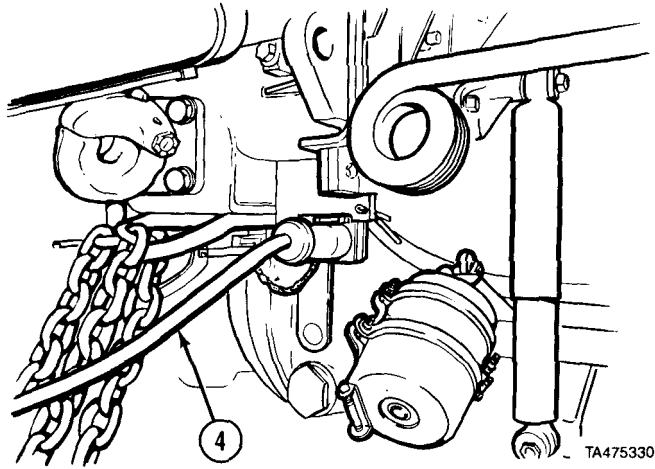
WARNING

If disabled vehicle's air system is inoperative, chock wheels of disabled vehicle. Failure to chock wheels may result in personal injury.

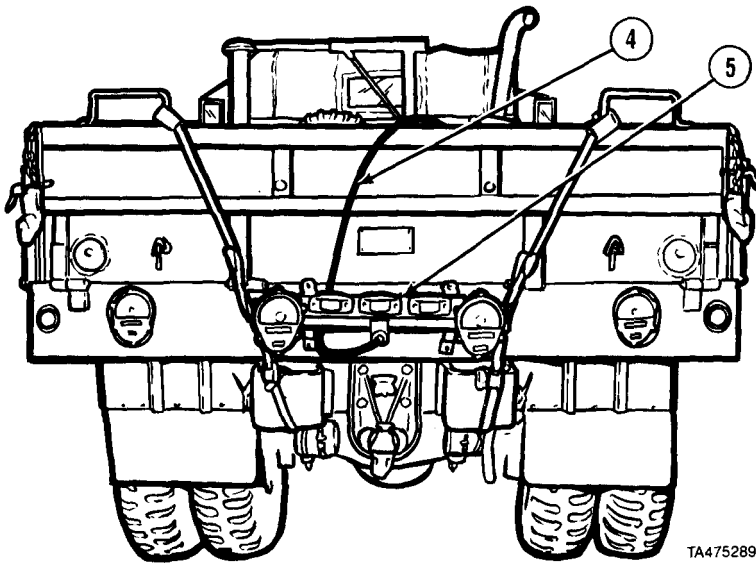
- (5) Apply PARKING BRAKE on disabled vehicle (refer to M939 operator's manual). If parking brake is inoperative, chock wheels on disabled vehicle.

M984E1 General Operating Procedures (Cont)

2-82. TOW M939 (CONT).

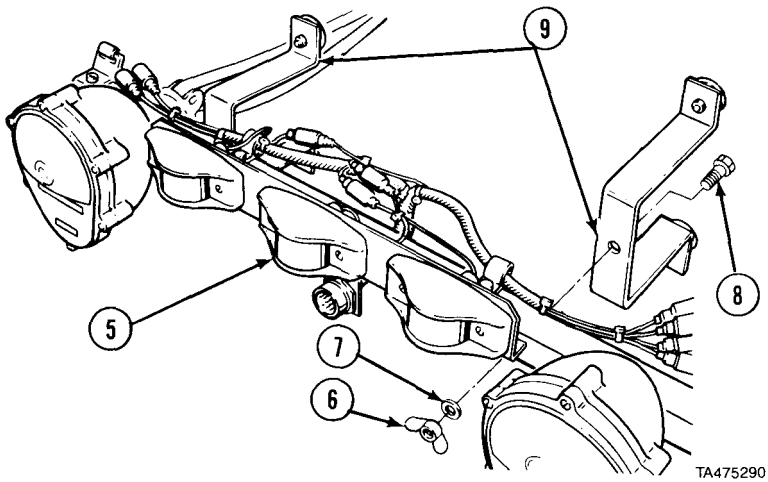


(6) Remove tow light cable (4) from wrecker.

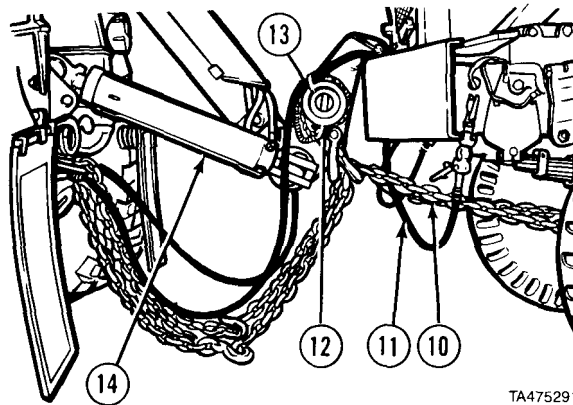


(7) Remove tow light cable (4) from emergency tow lights (5) and stow.
(8) Remove emergency tow lights (5) from disabled vehicle.

M984E1 General Operating Procedures (Cont)



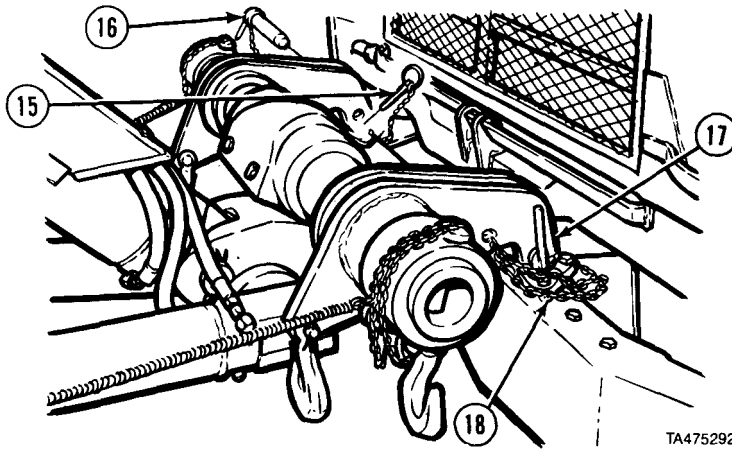
- (9) Remove and stow two nuts (6), washers (7), screws (8), and brackets (9) from emergency tow lights (5). Stow emergency tow lights.



- (10) Remove and stow two safety chains (10) and air hoses (11).
 (11) Unwrap two springs (12) from crosstube (13) and connect to tow cylinders (14).

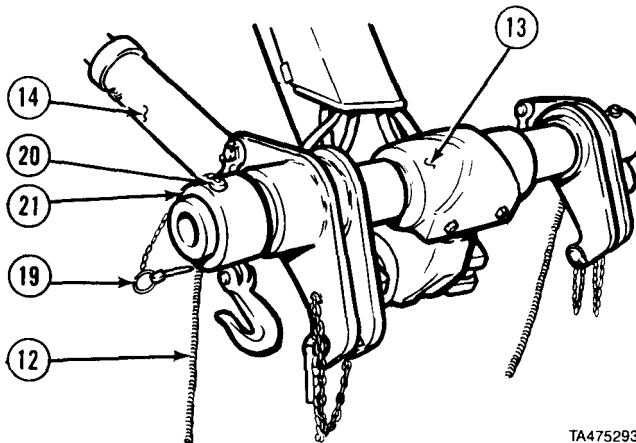
M984E1 General Operating Procedures (Cont)

2-82. TOW M939 (CONT).



TA475292

- (12) Remove two quick pins (15) and pins (16) from adapters (17).
- (13) Remove two adapters (17) from tow eyes (18) on disabled vehicle.
- (14) Install two pins (16) in adapters (17).
- (15) Install two quick pins (15) in pins (16).



TA475293

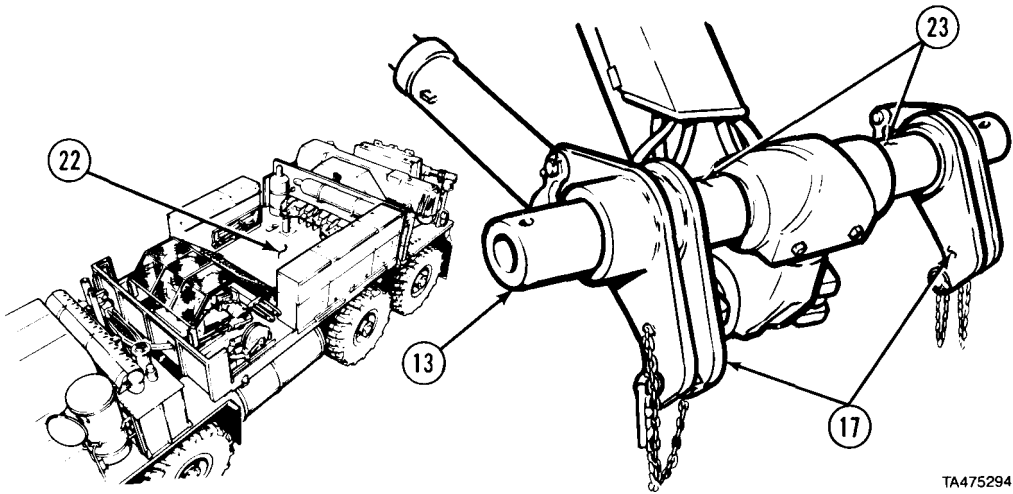
- (16) Drive wrecker forward several feet and park (para 2-110).

WARNING

As springs and end caps are removed, crosstube can swing in all directions, adapters may slide off, and can cause personal injury.

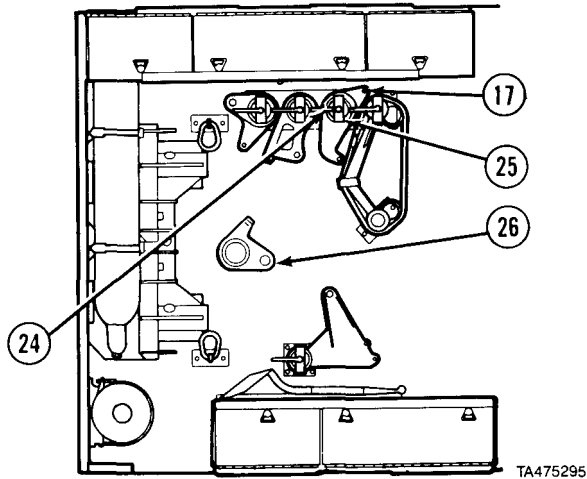
- (17) Remove two springs (12) from tow cylinders (14).
- (18) Remove two quick pins (19) and pins (20) from end caps (21).
- (19) Remove two end caps (21) from crosstube (13).

M984E1 General Operating Procedures (Cont)



TA475294

- (20) Remove two adapters (17) from crosstube (13) and place on equipment body floor (22).
- (21) Remove and stow two 5 in. (127 mm) spacers (23).

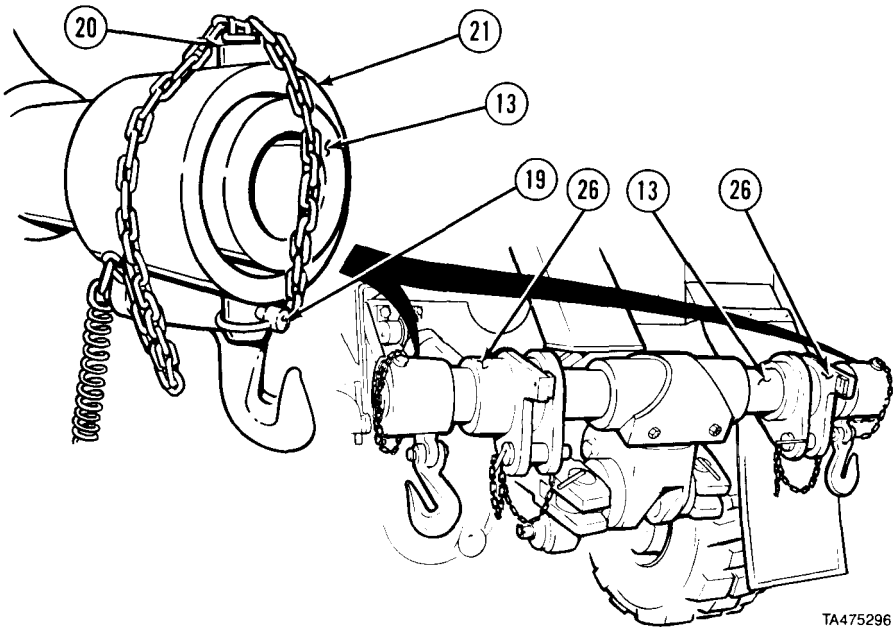


TA475295

- (22) Remove lock handle (24), lock plate (25), and two M977 front adapters (26).
- (23) Install two M939 front adapters (17) removed from crosstube, lock plate (25), and lock handle (24).

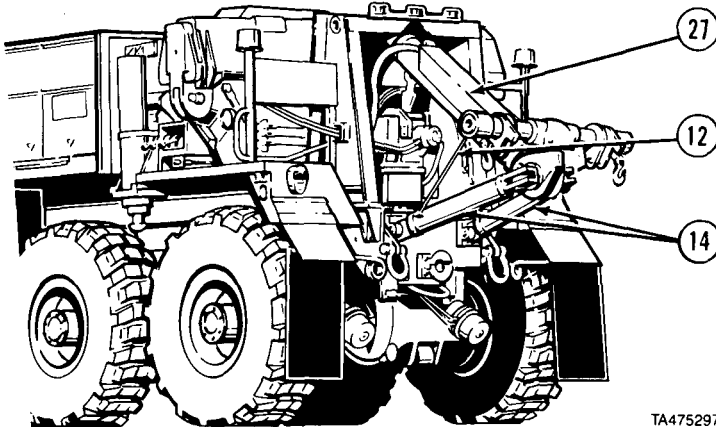
M984E1 General Operating Procedures (Cont)

2-82. TOW M939 (CONT).



TA475296

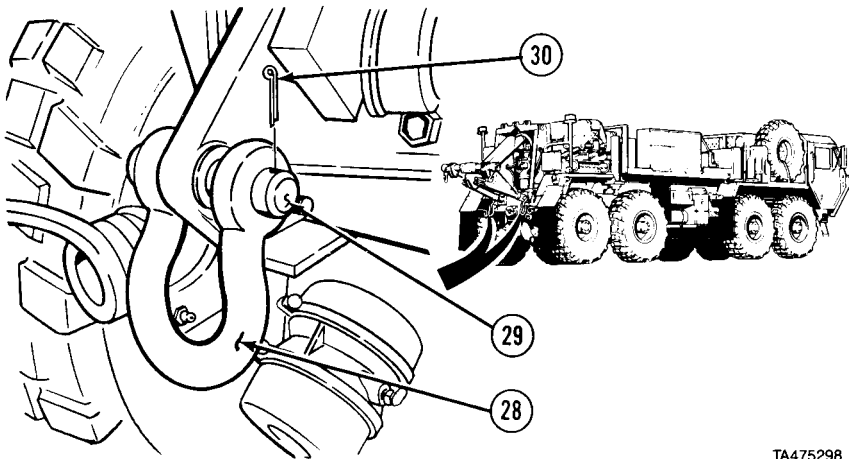
- (24) Install two M977 front adapters (26) on cross-tube (13).
- (25) Install two end caps (21) on cross-tube (13). Install two pins (20) and quick pins (19).



TA475297

- (26) Install two springs (12) on tow cylinders (14).
- (27) Operate retrieval controls to fully retract lift cylinder (27) and tow cylinders (14).

M984E1 General Operating Procedures (Cont)

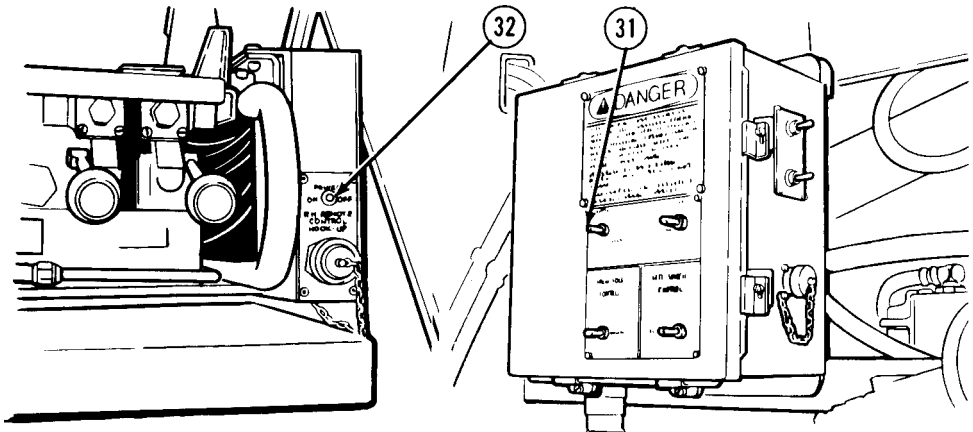


TA475298

NOTE

Right and left towing shackles are installed the same way.

(28) Install two towing shackles (28), pins (29), and cotter pins (30).



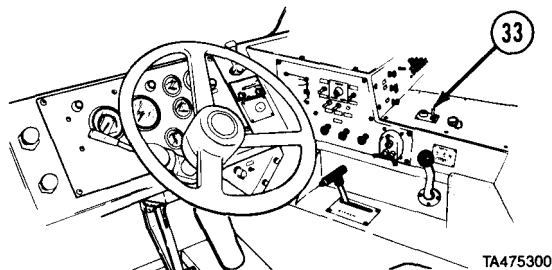
TA475299

(29) Set POWER switch (31) to OFF position.

(30) Set POWER switch (32) to OFF position.

M984E1 General Operating Procedures (Cont)

2-82. TOW M939 (CONT).



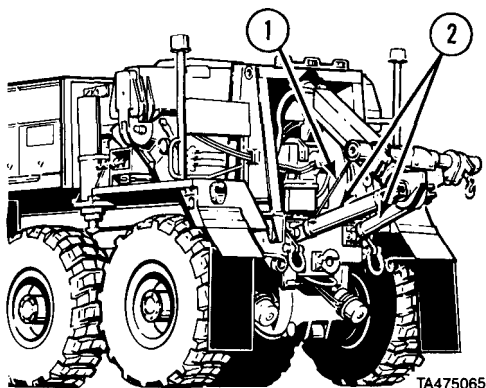
- (31) Turn off emergency flashers on wrecker (para 2-44f) and disabled vehicle.
- (32) Turn off service drive lights (para 2-10d).
- (33) Set PTO ENGAGE switch (33) to OFF position.
- (34) Remove and stow beacon lights (para 2-62).
- (35) Shut off engine (para 2-11p).
- (36) Unlock disabled vehicle's steering (refer to M939 operator's manual.)

c. Rear Hookup.

NOTE

This is a two-soldier task.

- (1) Prepare retrieval system for operation (para 2-72).

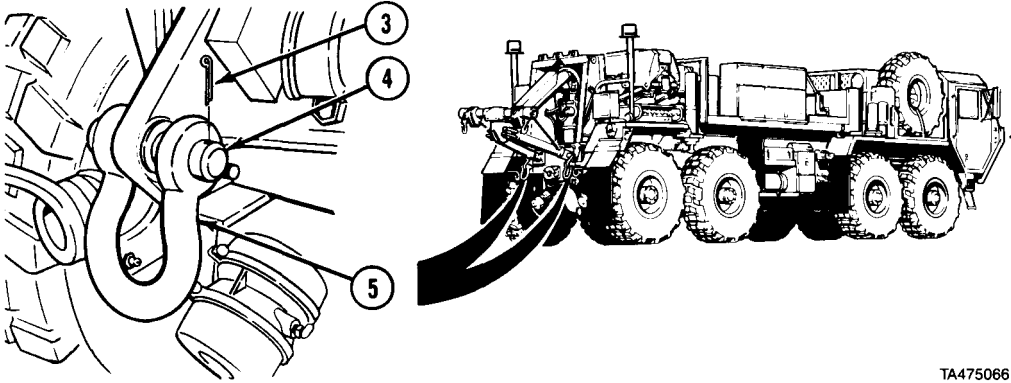


WARNING

- Hold crosstube when removing springs. Crosstube may swing or cause adapter to slide resulting in personal injury.
- Intervehicular air lines are not connected when towing from rear. Disabled vehicle will not have braking. Use extreme caution when transporting disabled vehicle using rear hookup. Vehicle traveling out of control can cause serious injury or death.

- (2) Disconnect two springs (1) from tow cylinders (2).

M984E1 General Operating Procedures (Cont)

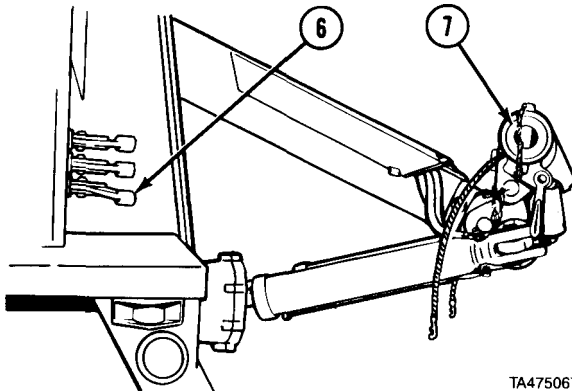


TA475066

NOTE

Right and left towing shackles are removed the same way.

- (3) Remove two cotter pins (3), pins (4), and towing shackles (5) and stow on equipment body floor.

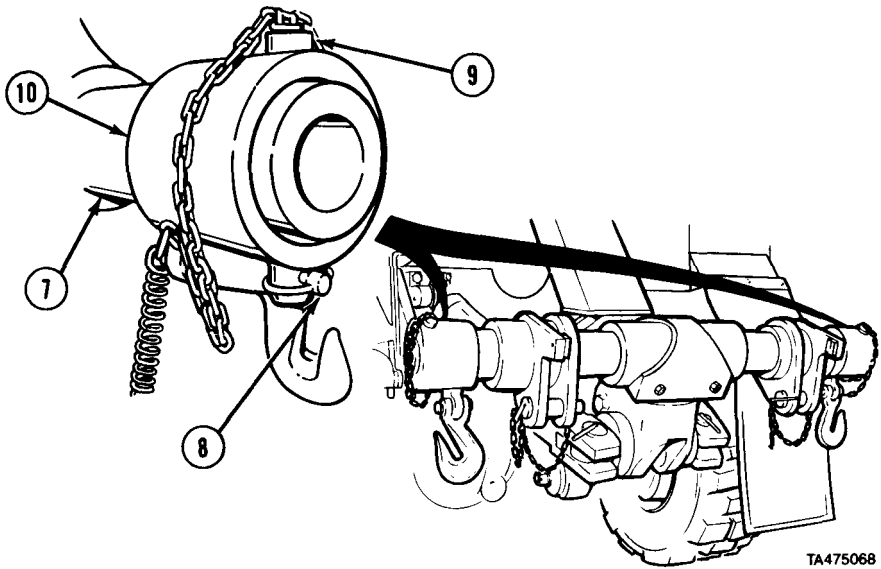


TA475067

- (4) Pull LIFT CYLINDER control lever (6) to lower cross-tube (7) to approximately 4 ft (1.2 m) above ground.
- (5) Position wrecker so that cross-tube (7) is approximately 1 ft (30 cm) from tow eyes of disabled vehicle and centered on disabled vehicle.

M984E1 General Operating Procedures (Cont)

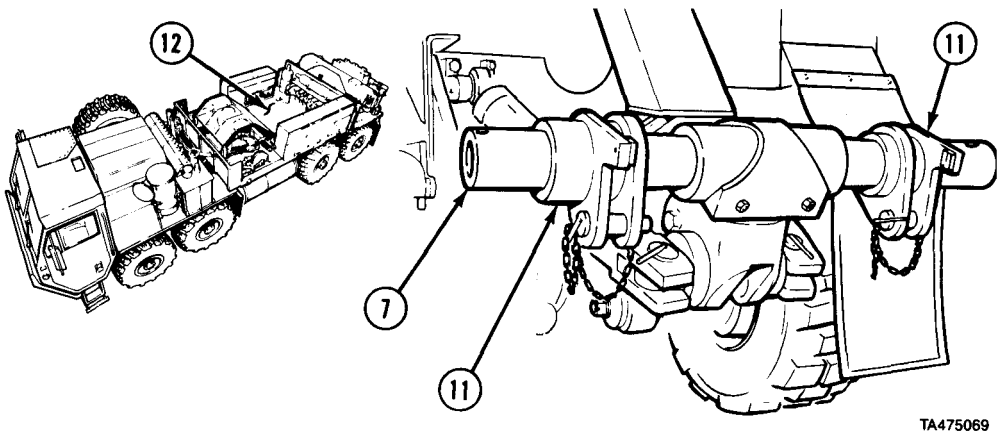
2-82. TOW M939 (CONT).



WARNING

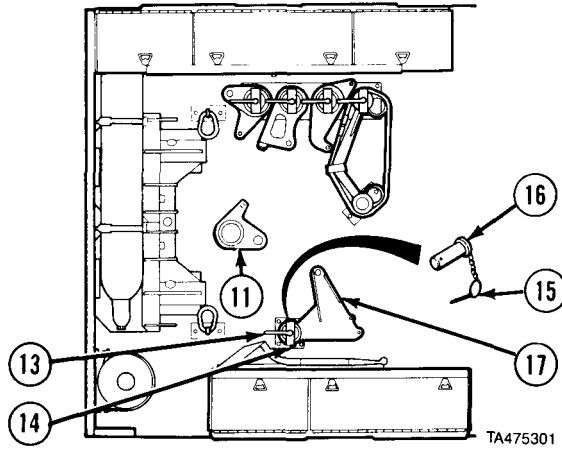
When end caps are removed from crosstube, adapters may slide off causing personal injury.

- (6) Remove quick pins (8) and pins (9) from end caps (10).
- (7) Remove end caps (10) from crosstube (7).

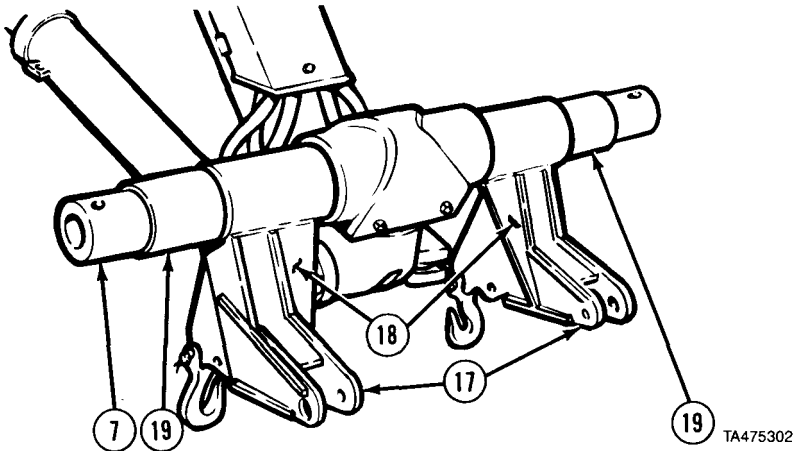


- (8) Remove two M977 front adapters (11) from crosstube (7) and place on equipment body floor (12).

M984E1 General Operating Procedures (Cont)



- (9) Remove lock handle (13), lock plate (14), quick pin (15), pin (16), and two M939 rear tow adapters (17).
- (10) Install two M977 front adapters (11) removed from crosstube, lock plate (14), lock handle (13), pin (16), and quick pin (15).
- (11) Remove two 7/8-in. (22 mm) pins and two 5-in. (127 mm) spacer tubes from stowage.



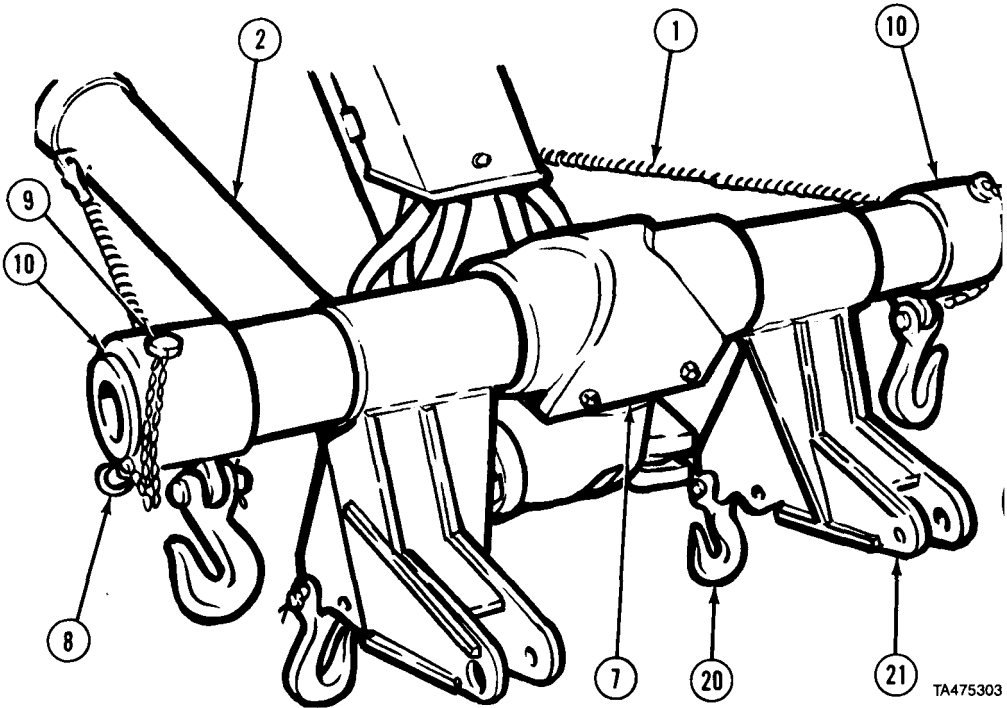
WARNING

Adapters and end caps may slide off when installing and may cause personal injury.

- (12) Install two M939 rear tow adapters (17) on crosstube (7) with support brace (18) to inside.
- (13) Install two 5-in. (127 mm) spacers (19) on crosstube (7).

M984E1 General Operating Procedures (Cont)

2-82. TOW M939 (CONT).



TA475303

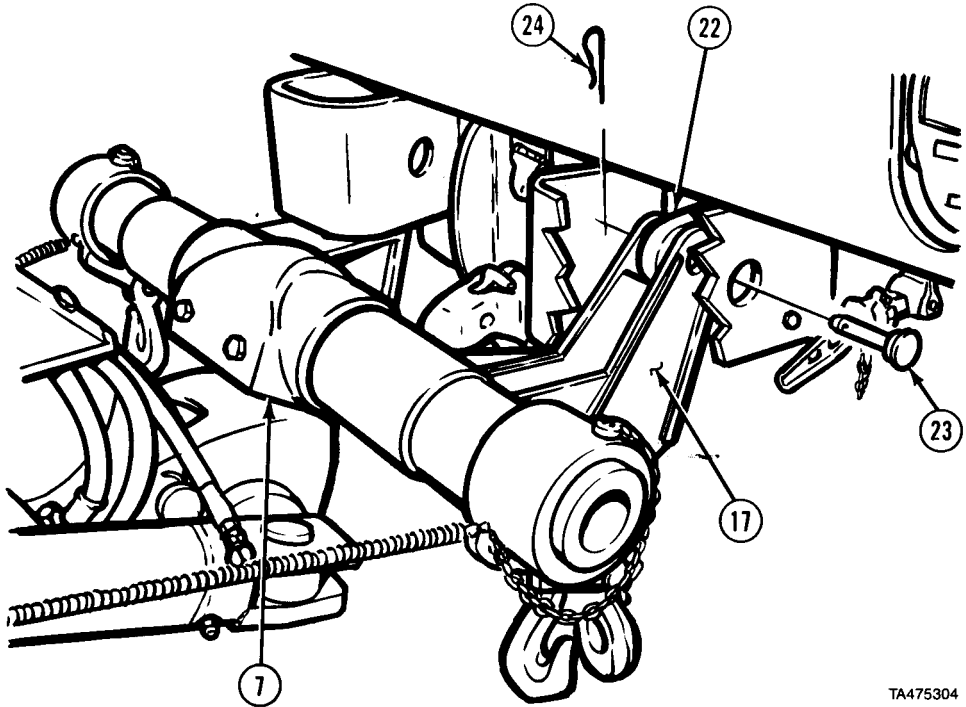
- (14) Install two end caps (10) on crosstube (7).
- (15) Install two pins (9) and quick pins (8).

NOTE

Adapter grab hook may be installed in either hole. For M939 install grab hooks in hole farthest from towing pin holes.

- (16) Position adapter grab hooks (20) in hole farthest from towing pin holes (21).
- (17) Attach two springs (1) on tow cylinders (2).

M984E1 General Operating Procedures (Cont)



TA475304

NOTE

If disabled vehicle has towing shackles installed, remove shackles and stow in disabled vehicle.

- (18) Soldier A operates retrieval system (para 2-72) while Soldier A and Soldier B position cross-tube (7) so holes in adapters (17) align with rear tow eyes (22).

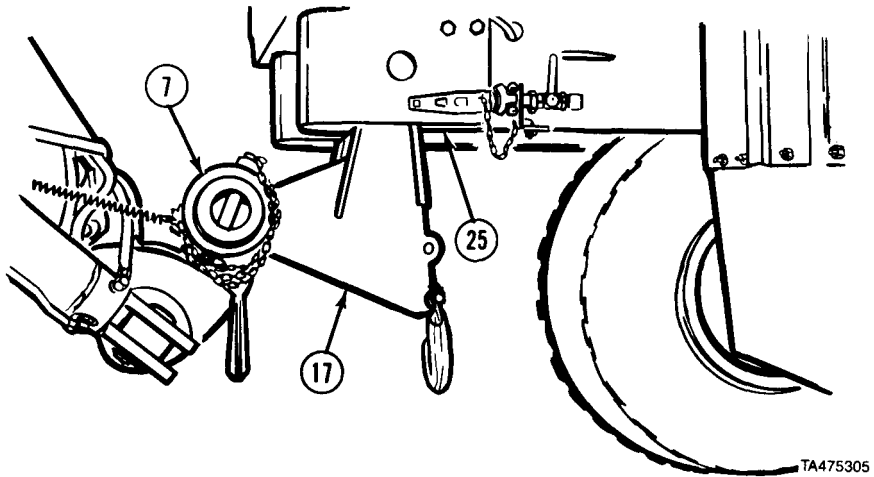
WARNING

Keep hands and fingers away from adapters and tow eyes when operating retriever controls. Personal injury could result.

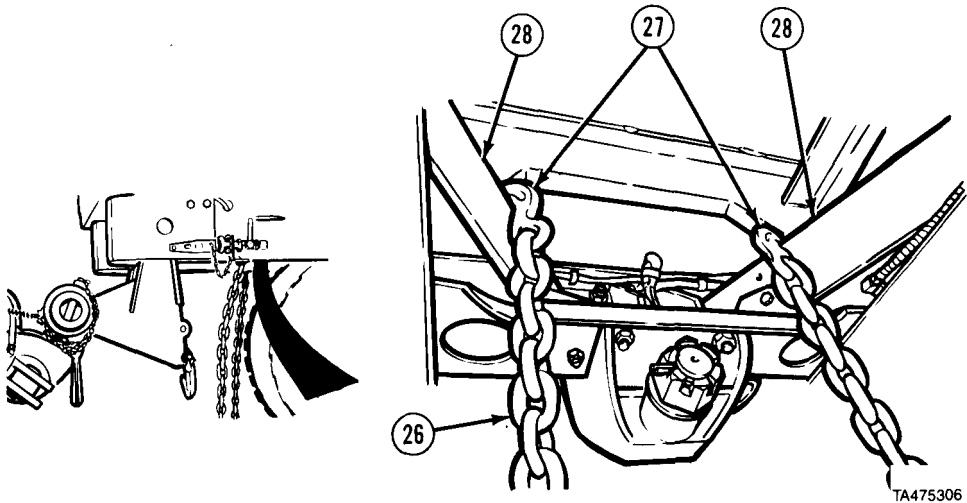
- (19) Insert two 7/8-in. (22 mm) stepped pins (23) through adapters (17) and rear tow eyes (22). Install two hairpins (24) in 7/8-in. (22 mm) pins (23).

M984E1 General Operating Procedures (Cont)

2-82. TOW M939 (CONT).

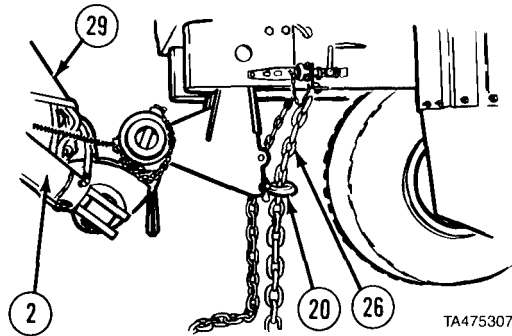


(20) Lower crosstube (7) until adapters (17) contact rear crossmember (25).

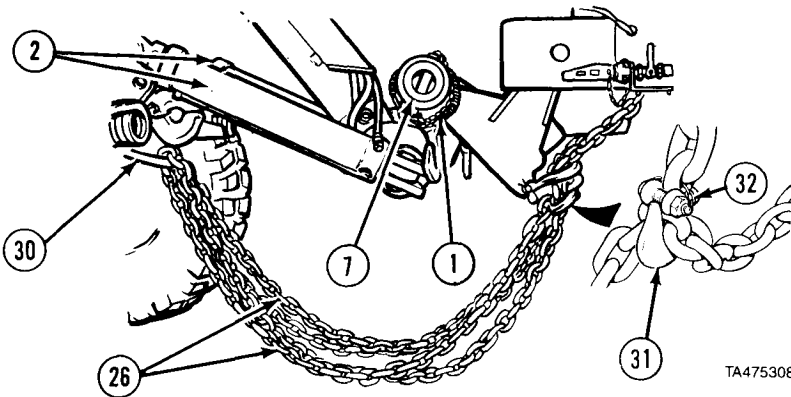


- (21) Remove two 16-ft (5 m) safety chains (26) from stowage.
- (22) Attach one safety chain grab hook (27) to support brace (28).
- (23) Repeat step (22) for other side of disabled vehicle.

M984E1 General Operating Procedures (Cont)



- (24) Pull safety chain (26) tight and install chain on adapter grab hook (20).
- (25) Repeat step (24) for other side of disabled vehicle.
- (26) Release PARKING BRAKE on disabled vehicle (refer to M939 operator's manual).
- (27) Alternately push in TOW and LIFT CYLINDER control levers until tow cylinders (2) are fully retracted.
- (28) Push in LIFT CYLINDER control lever to retract lift cylinder (29) until slack is removed from safety chains (26).



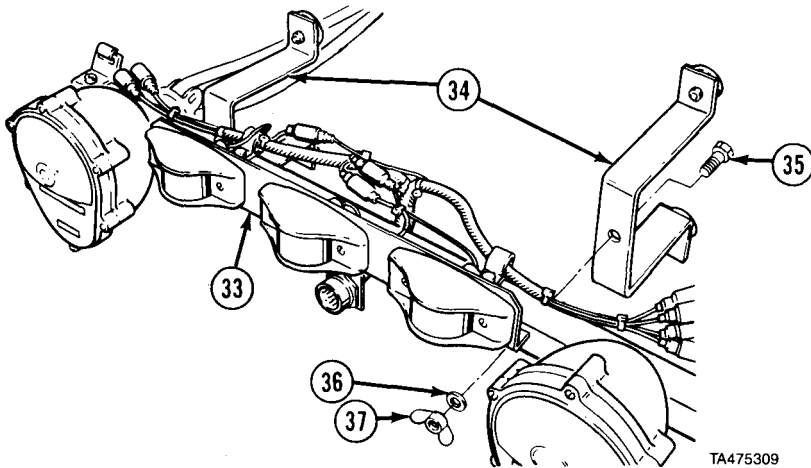
NOTE

- Safety chains can be routed to towing shackles or safety chain hoop. Towing shackles can be used only after tow cylinders are extended.
- Adjust chain slack so safety chains do not touch the ground.

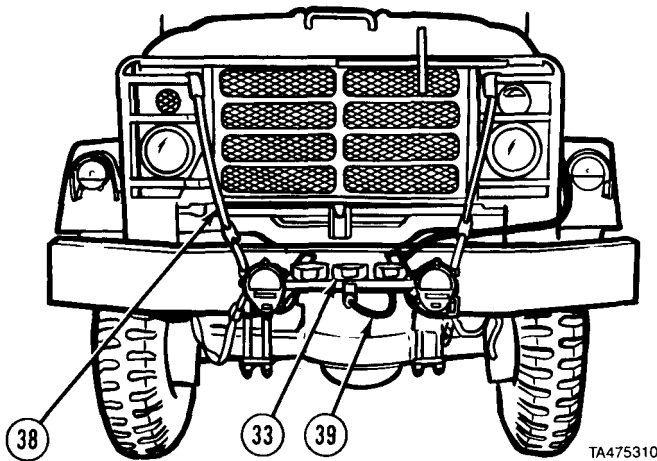
- (29) Route two safety chains (26) through safety chain hoop (30) on wrecker and secure grab hook (31) with safety shackle (32).
- (30) Disconnect two springs (1) from tow cylinders (2), wrap around crosstube (7) and secure.

M984E1 General Operating Procedures (Cont)

2-82. TOW M939 (CONT).

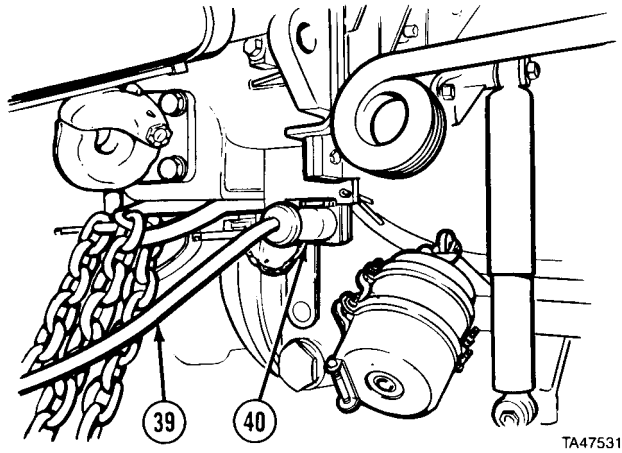


- (31) Prepare disabled vehicle for towing (refer to M939 operator's manual).
- (32) Remove emergency tow lights (33) and two brackets' from stowage.
- (33) Install two brackets (34) in center holes of emergency tow lights with two screws (35), washers (36), and nuts (37).



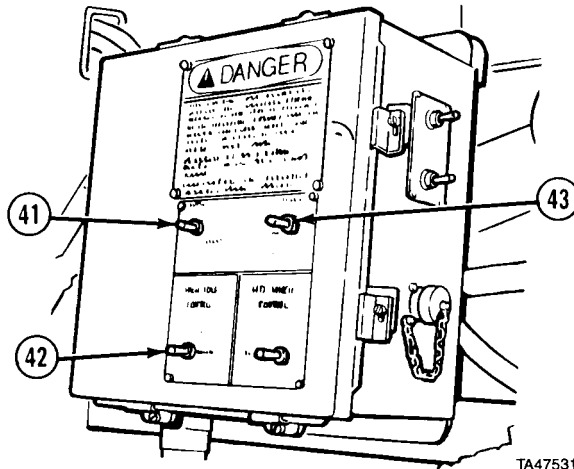
- (34) Install emergency tow lights (33) on front of M939 and fasten securely with straps (38).
- (35) Remove tow light cable (39) from stowage and connect to emergency tow lights (33).

M984E1 General Operating Procedures (Cont)



TA475311

- (36) Route other end of tow light cable (39) along disabled vehicle and connect to rear electrical connector (40) on wrecker.
- (37) Lock disabled vehicle's steering (refer to M939 operator's manual).

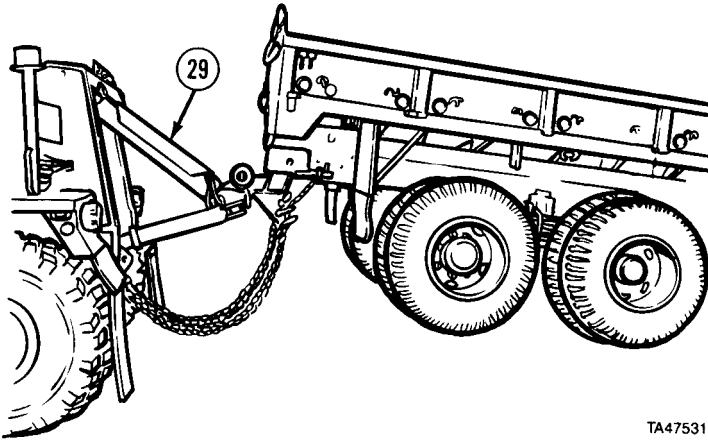


TA475312

- (38) Set POWER switch (41) to ON position.
- (39) Set HIGH IDLE switch (42) to CONTINUOUS.
- (40) Push and release LATCH switch (43). Engine speed will increase to approximately 1500 rpm.

M984E1 General Operating Procedures (Cont)

2-82. TOW M939 (CONT).



TA475313

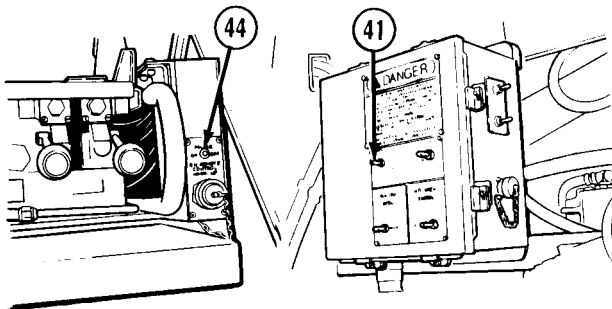
WARNING

Keep out from under retrieval system and disabled vehicle when raised off ground or personal injury or death may result.

CAUTION

- Fully retract both tow cylinders before lifting disabled vehicle or equipment damage may result.
- Make sure all rigging is secure. Loose rigging can become entangled and cause damage to equipment.

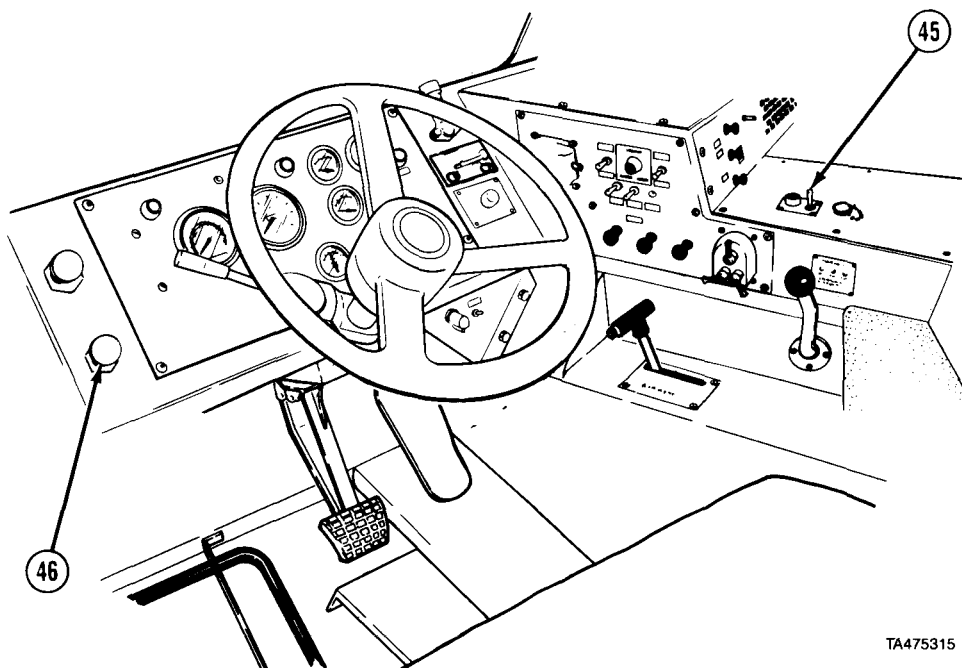
(41) Retract lift cylinder (29) to raise disabled vehicle approximately 1.5 ft (45 cm) off ground.



TA475314

- (42) Set POWER switch (41) to OFF position.
(43) Set POWER switch (44) to OFF position.

M984E1 General Operating Procedures (Cont)



TA475315

- (44) Set PTO ENGAGE switch (45) to OFF position.
- (45) Turn on service drive lights (para 2-10d).
- (46) Turn on emergency flashers on wrecker (para 2-44a) and disabled vehicle.
- (47) Push in PARKING BRAKE control (46) and select desired gear (para 2-11e).

WARNING

The M984E1 should not be operated at speeds over 15 mph except on paved roads when the operator determines that the vehicle being towed and the terrain allow safe operation. Engine brake switch must be "ON" for all towing operations. The following are maximum safe speeds:

Terrain Condition	Maximum speed, towed load up to 50,000 lbs	Maximum speed, towed load above 50,000 lbs
on road-level	35	30
on road-hilly	30	20
off road	15	15

Speeds in excess of the above can result in loss of control, serious injury or death.

- (48) Transport disabled vehicle.

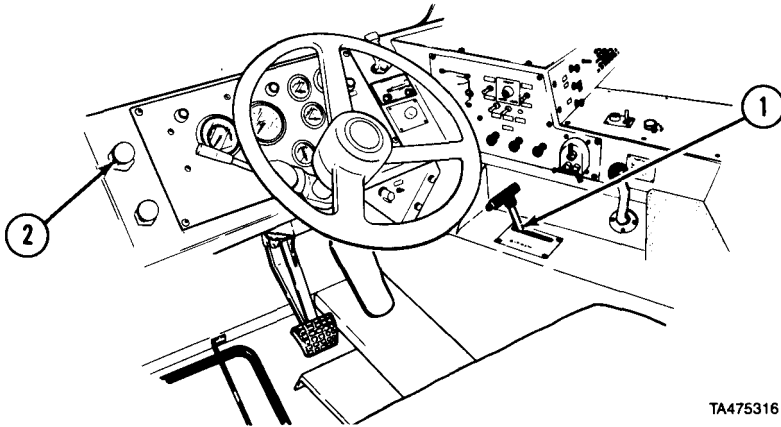
M984E1 General Operating Procedures (Cont)

2-82. TOW M939 (CONT).

d. Rear Disconnect.

NOTE

This is a two-soldier task.



TA475316

- (1) Set transmission range selector (1) to N.
- (2) Pull PARKING BRAKE control (2).

WARNING

Do not stand between vehicles while disabled vehicle is raised off ground. Falling vehicle can cause serious injury or death.

NOTE

After lowering disabled vehicle, extend lift and tow cylinder approximately 2 to 4 in. (50 to 100 mm) to allow for adjustment when removing adapters.

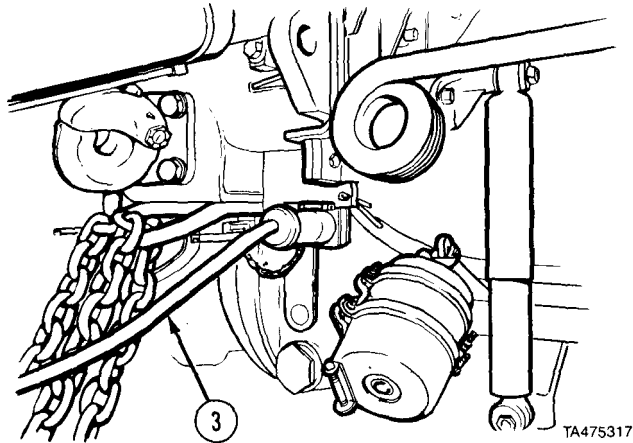
- (3) Prepare retrieval system for operation (para 2-72) and pull LIFT CYLINDER control lever to extend lift cylinder and lower towed vehicle to ground until safety chain at rear of disabled vehicle is slack.

WARNING

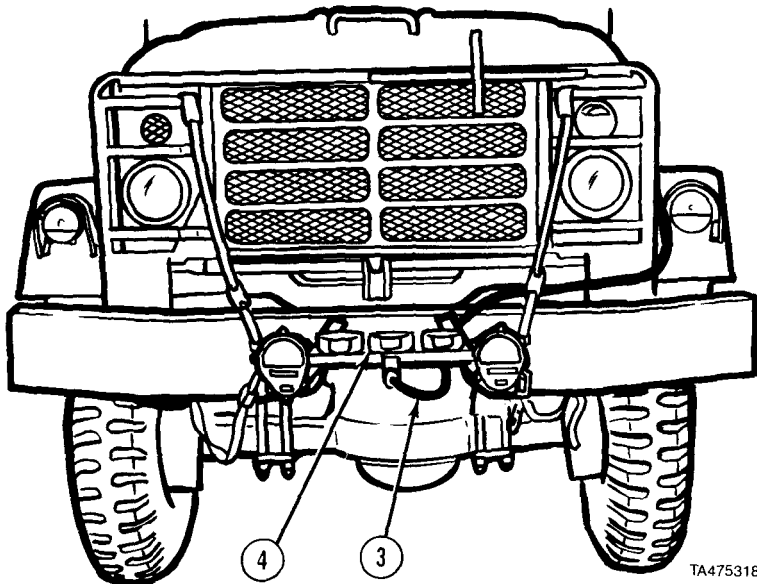
If disabled vehicle's air system is inoperative, chock wheels of disabled vehicle. Failure to chock wheels may result in personal injury.

- (4) Apply PARKING BRAKE on disabled vehicle (refer to M939 operator's manual). If parking brake is inoperative, chock wheels on disabled vehicle.

M984E1 General Operating Procedures (Cont)



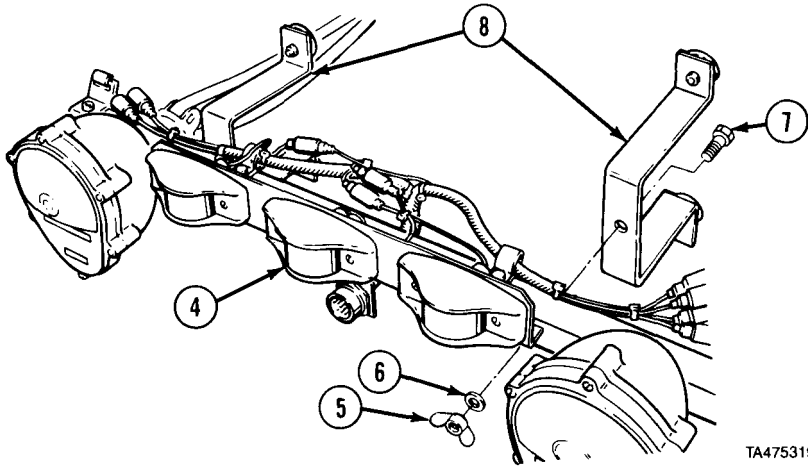
(5) Remove tow light cable (3) from wrecker.



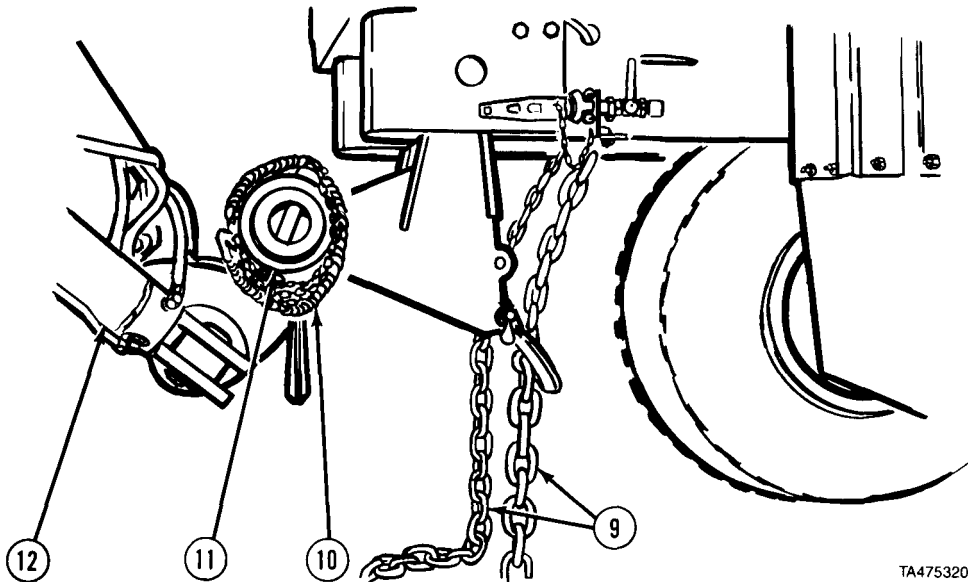
(6) Remove tow light cable (3) from emergency tow lights (4) and stow.
(7) Remove emergency tow lights (4) from disabled vehicle.

M984E1 General Operating Procedures (Cont)

2-82. TOW M939 (CONT).

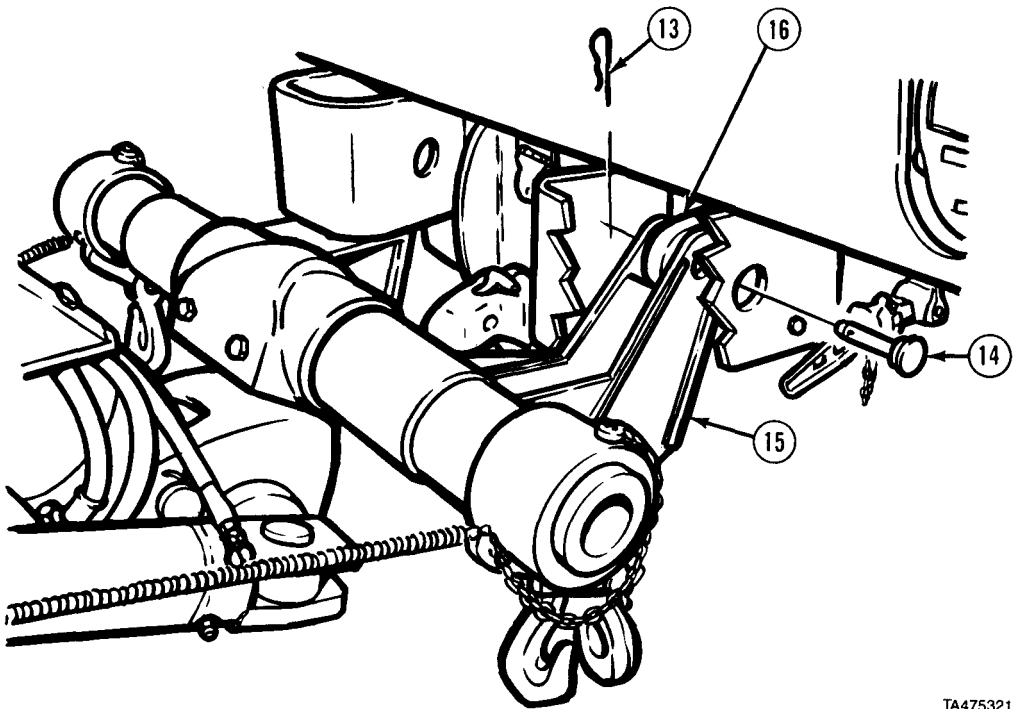


(8) Remove two nuts (5), washers (6), screws (7), and brackets (8) from emergency tow lights (4). Stow emergency tow lights and brackets.



(9) Remove and stow safety chains (9).
(10) Unwrap two springs (10) from crosstube (11) and connect to tow cylinders (12).

M984E1 General Operating Procedures (Cont)



TA475321

WARNING

- Do not stand behind adapters when pins are being removed. Adapters may swing down resulting in personal injury.
- Keep hands and fingers away from adapter and tow eyes when operating retrieval controls. Personal injury could result.

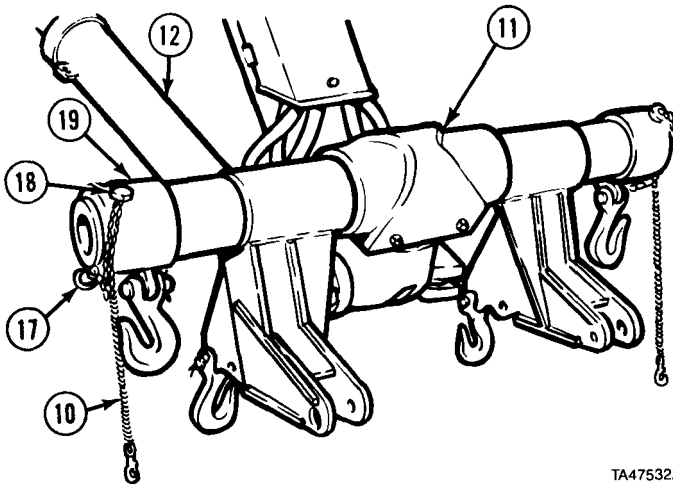
NOTE

Use retrieval controls to position crosstube to relieve tension from adapters.

- (11) Remove two hairpins (13) and 7/8-in. (22 mm) pins (14) from adapters (15).
- (12) Remove two M939 adapters (15) from tow eyes (16) on disabled vehicle.
- (13) Install two hairpins (13) in 7/8-in. (22 mm) pins (14) and stow.

M984E1 General Operating Procedures (Cont)

2-82. TOW M939 (CONT).



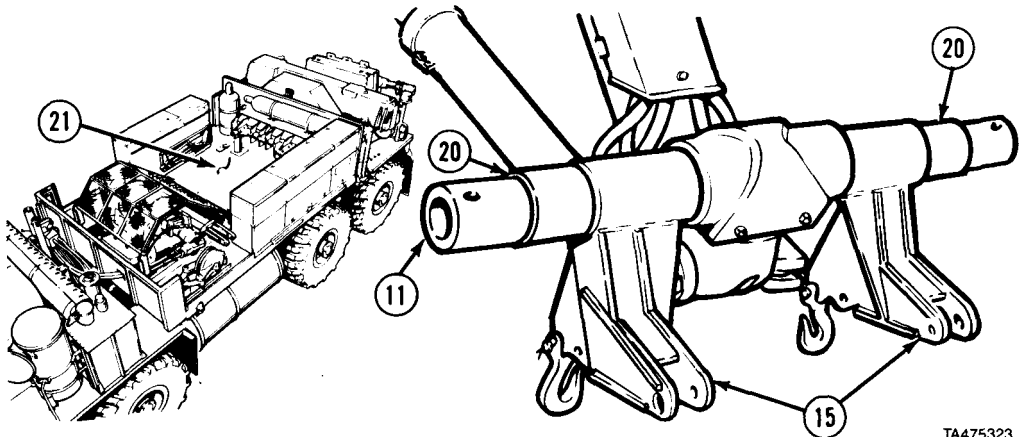
TA475322

(14) Drive wrecker forward several feet and park (para 2-110).

WARNING

As springs and end caps are removed, crosstube can swing in all directions, adapters may slide off, and can cause personal injury.

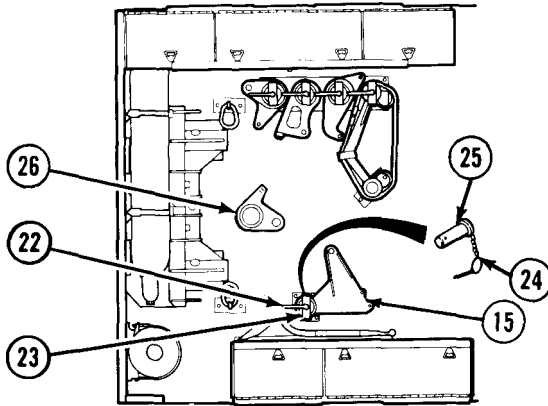
- (15) Remove two springs (10) from tow cylinders (12).
- (16) Remove quick pins (17) and pins (18) from end caps (19).
- (17) Remove end caps (19) from crosstube (11).



TA475323

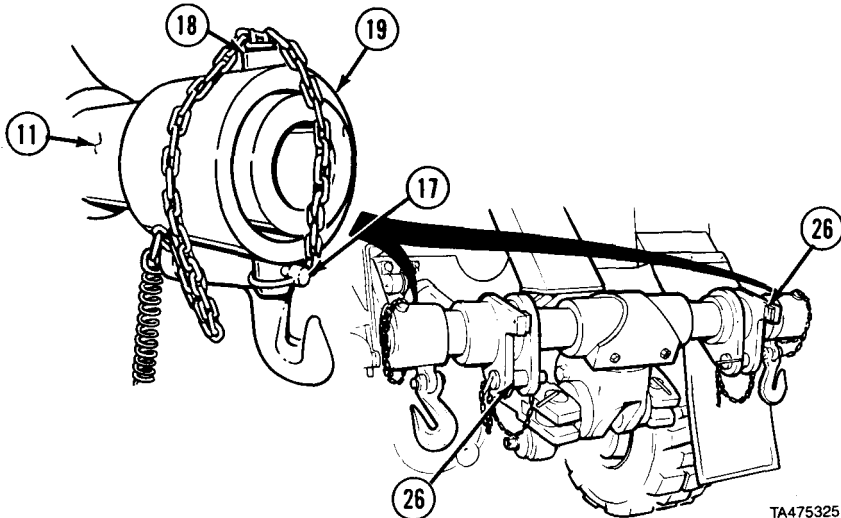
- (18) Remove two 5-in. (127 mm) spacers (20) from crosstube (11) and stow.
- (19) Remove two M939 adapters (15) from crosstube (11) and place on equipment body floor (21).

M984E1 General Operating Procedures (Cont)



TA475324

- (20) Remove lock handle (22), lock plate (23), quick pin (24), pin (25), and two M977 front adapters (26).
- (21) Install two M939 adapters (15) removed from crosstube, pin (25), and quick pin (24), lock plate (23), and lock handle (22).

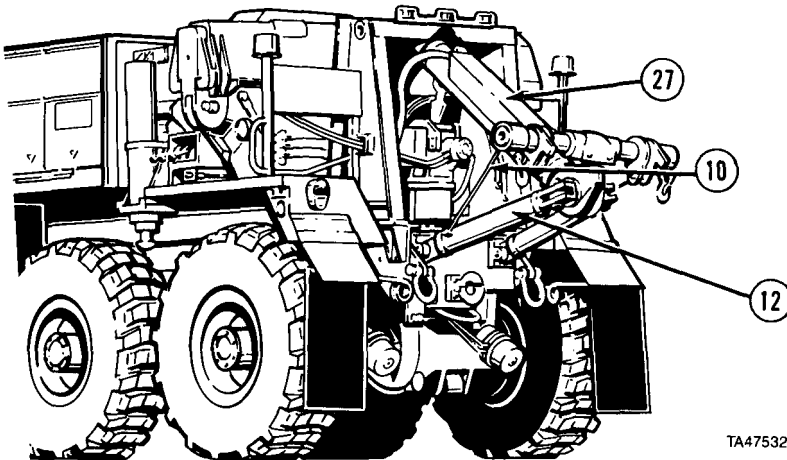


TA475325

- (22) Install two M977 front adapters (26) on crosstube (11).
- (23) Install two end caps (19) on crosstube (11). Install two pins (18) and quick pins (17).

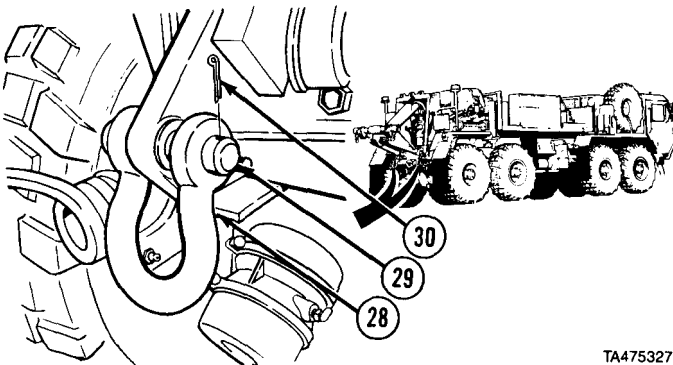
M984E1 General Operating Procedures (Cont)

2-82. TOW M939 (CONT).



TA475326

- (24) Install two springs (10) on tow cylinders (12).
- (25) Operate retrieval controls and fully retract lift cylinder (27) and tow cylinders (12).



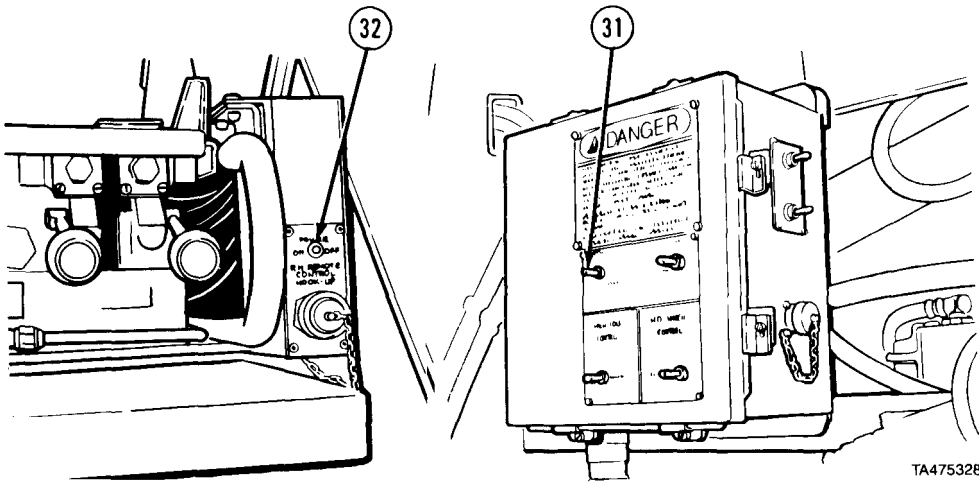
TA475327

NOTE

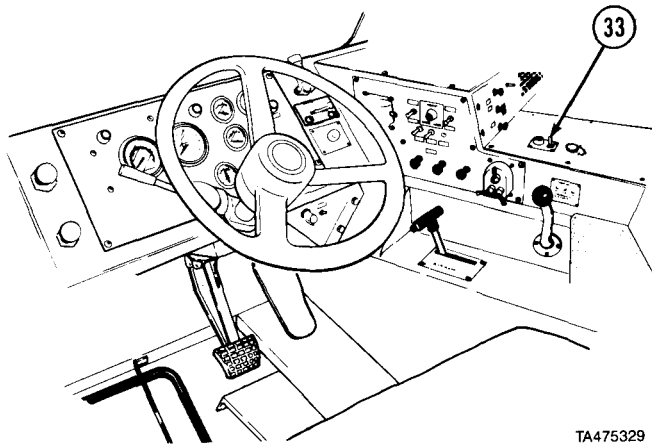
Right and left towing shackles are installed the same way.

- (26) Install two towing shackles (28), pins (29), and cotter pins (30).

M984E1 General Operating Procedures (Cont)



- (27) Set POWER switch (31) to OFF position.
- (28) Set POWER switch (32) to OFF position.



- (29) Turn off emergency flashers on wrecker (para 2-44f) and disabled vehicle.
- (30) Turn off service drive lights (para 2-10d).
- (31) Set PTO ENGAGE switch (33) to OFF position.
- (32) Remove and stow beacon lights (para 2-62).
- (33) Shut off engine (para 2-11p).
- (34) Unlock disabled vehicle's steering (refer to M939 operator's manual).

M98E1 General Operating Procedures (Cont)

2-83. TOW M966.

a. Front Hookup.

NOTE

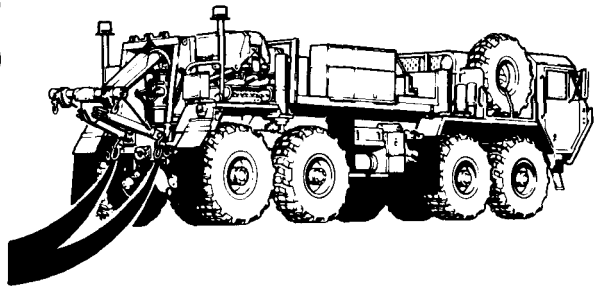
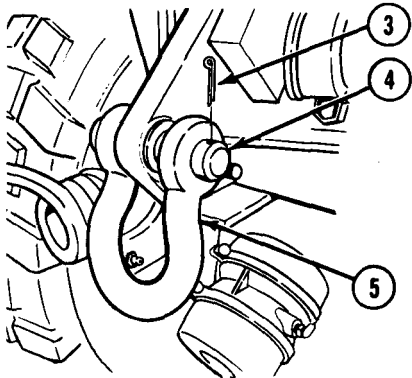
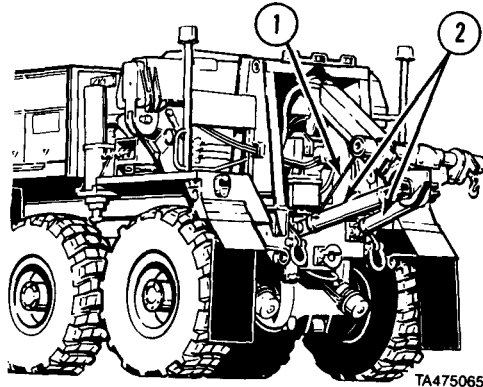
This is a two-soldier task.

(1) Prepare retrieval system for operation (para 2-72).

WARNING

Hold crosstube when removing springs. Crosstube may swing or cause adapter to slide resulting in personal injury.

(2) Disconnect two springs (1) from tow cylinders (2).

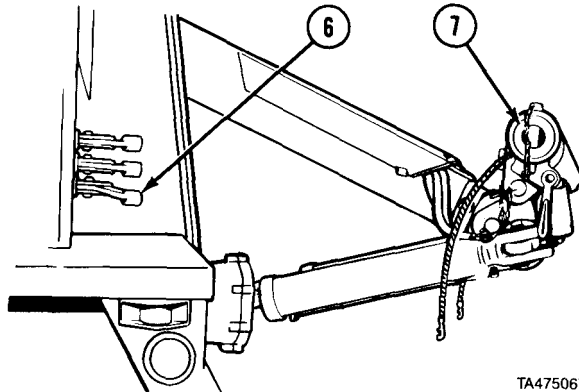


NOTE

Right and left towing shackles are removed the same way.

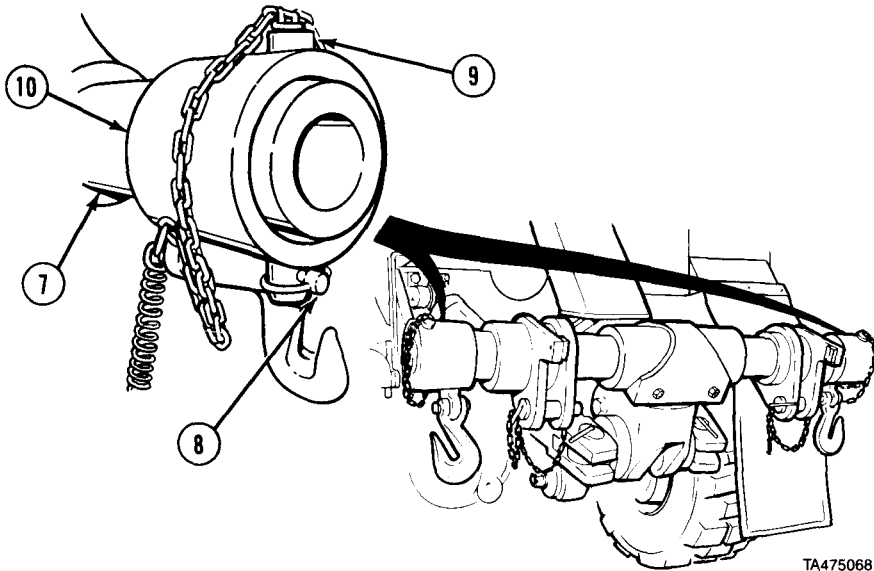
(3) Remove two cotter pins (3), pins (4), and towing shackles (5).

M98E1 General Operating Procedures (Cont)



TA475067

- (4) Pull LIFT CYLINDER control lever (6) to lower crosstube (7) to approximately 3 ft (1 m) above ground.
- (5) Position wrecker so that crosstube (7) is approximately 1 ft (30 cm) from tow eyes of disabled vehicle and centered on disabled vehicle.



TA475068

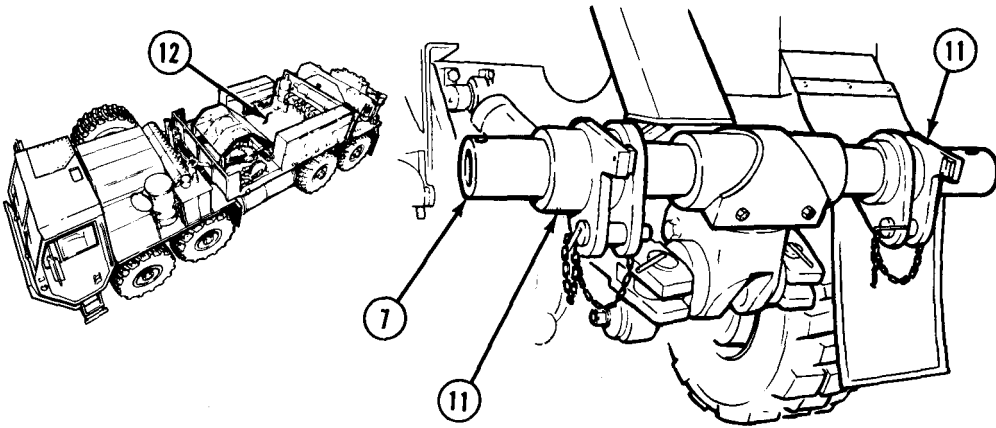
WARNING

When end caps are removed from crosstube, adapters may slide off causing personal injury.

- (6) Remove two quick pins (8) and pins (9) from end caps (10).
- (7) Remove two end caps (10) from crosstube (7).

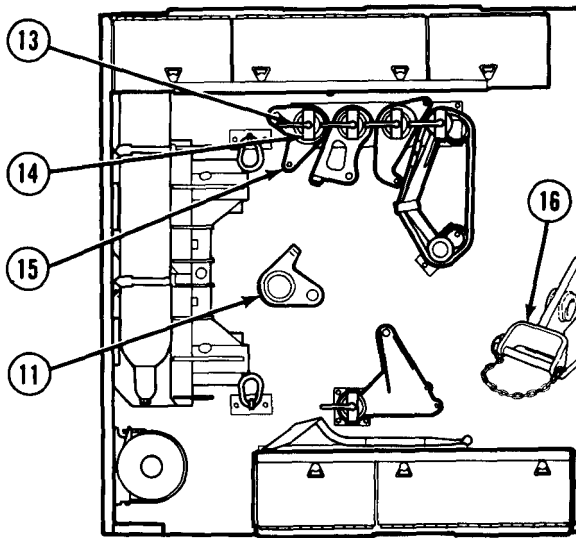
M98E1 General Operating Procedures (Cont)

2-83. TOW M966 (CONT).



TA475069

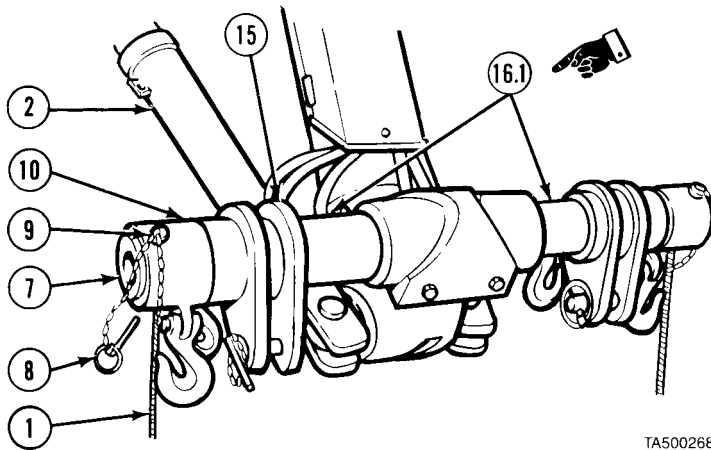
- (8) Remove two M977 front adapters (11) from crosstube (7) and place on equipment body floor (12).



TA475728

- (9) Remove lock handle (13), lock plate (14), and two M966 front tow adapters (15).
(10) Install two M977 adapters(11) removed from crosstube, lock plate (14), and lock handle (13).
(11) Remove two M966 extensions (16) from stowage.
(12) Remove two 12-ft (3.5 m) chains from stowage.

M984E1 General Operating Procedures (Cont)

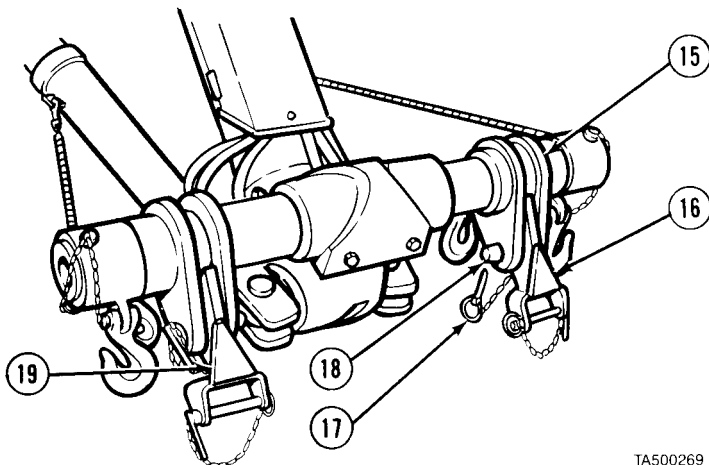


TA500268

WARNING

Adapters and end caps may slide off when installing and may cause personal injury.

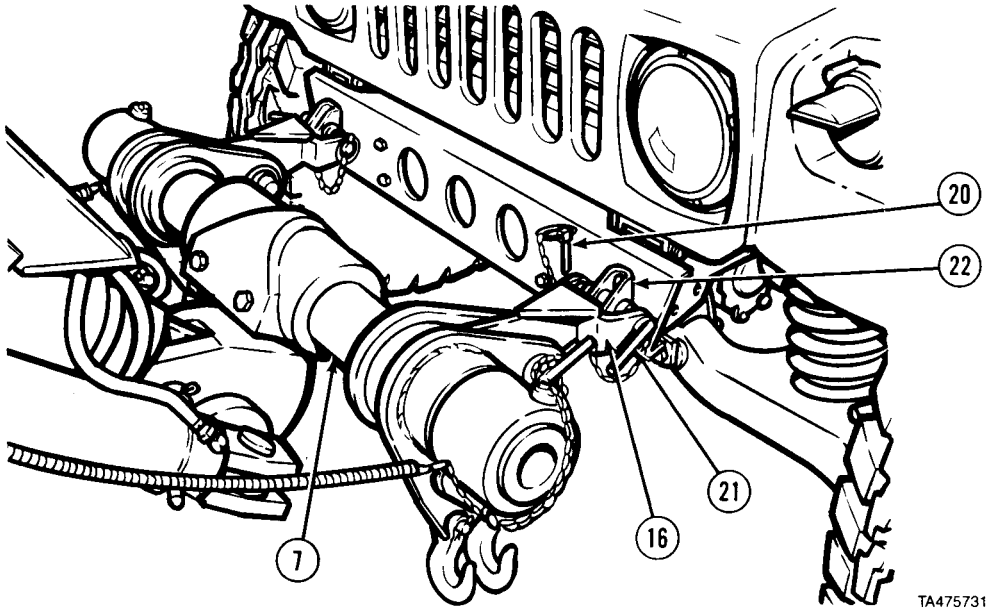
- (12.1) Install two 5-in (127 mm) spacers (16.1) on crosstube (7).
- (13) Install two M966 front tow adapters (15) on crosstube (7).
- (14) Install two end caps (10) on crosstube (7)
- (15) Install two pins (9) and quick pins (8).
- (16) Install two springs (1) on tow cylinders (2).



TA500269

- (17) Remove two quick pins (17) and pins (18) from adapters (15).
- (18) Install two M966 extensions (16) so holes in adapter (15) align with holes in extension and triangular brace (19) is on top.
- (19) Insert two pins (18) through adapters (15) and extensions (16). Install two quick pins (17) in pins (18).

2-83. TOW M966 (CONT).



(20) Remove two quick pins (20) and pins (21) from extensions (16).

WARNING

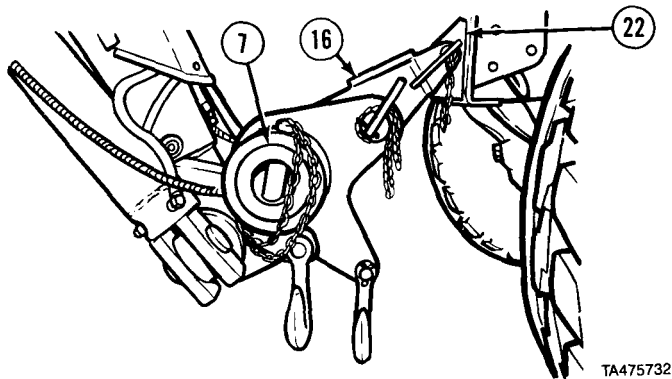
Keep hands and fingers away from adapters and tow eyes when operating retriever controls. Personal injury could result.

CAUTION

If disabled vehicle has towing shackles installed, remove shackles and stow in disabled vehicle.

- (21) Soldier A operates retrieval system (para 2-72) while Soldier A and Soldier B position crosstube (7) so holes in extensions (16) align with front tow eyes (22).
- (22) Insert two pins (21) through extensions (16) and front tow eyes (22). Install two quick pins (20) in pins (21).

M98E1 General Operating Procedures (Cont)



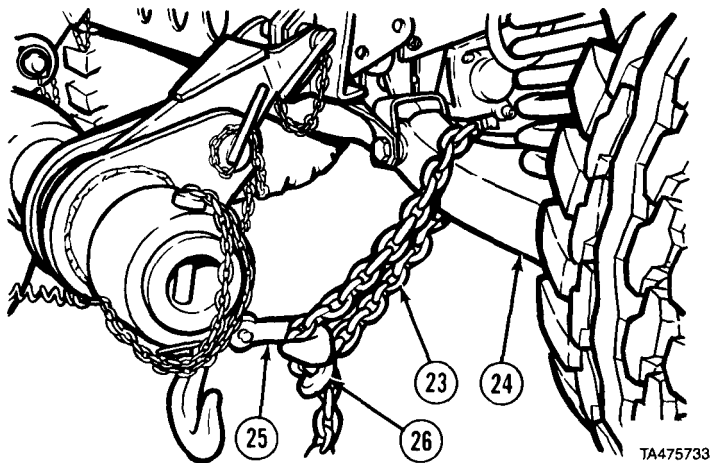
CAUTION

Do not contact pintle hook with lift cylinder.
Equipment damage could occur.

NOTE

Right side extension is shown.

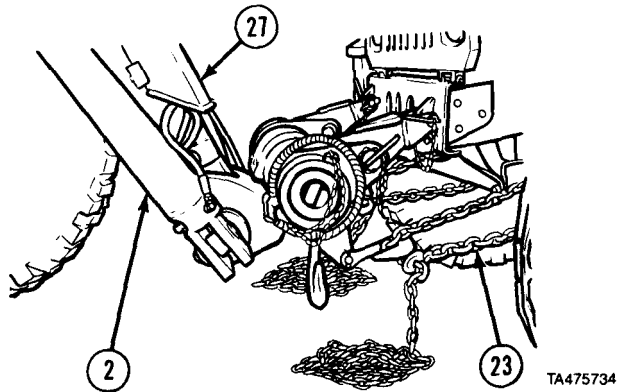
- (23) Lower crosstube (7) until extensions (16) contact bottom edge of front tow eye (22).



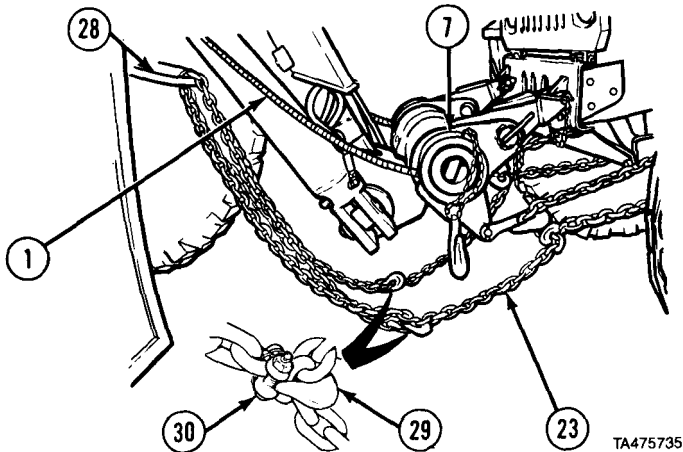
- (24) Route one 12-ft (3.5 m) safety chain (23) over front arm of A-frame (24) on disabled vehicle.
 (25) Route 12-ft (3.5 m) safety chain (23) through adapter grab hook (25). Pull chain tight and attach grab hook (26) to chain.
 (26) Repeat steps (24) and (25) for other side of disabled vehicle.

M98E1 General Operating Procedures (Cont)

2-83. TOW M966 (CONT).



- (27) Release PARKING BRAKE on disabled vehicle (refer to M966 operator's manual.)
- (28) Alternately push in TOW and LIFT CYLINDER control levers until tow cylinders (2) are fully retracted.
- (29) Push in LIFT CYLINDER control lever to retract lift cylinder (27) until slack is removed from safety chains (23).

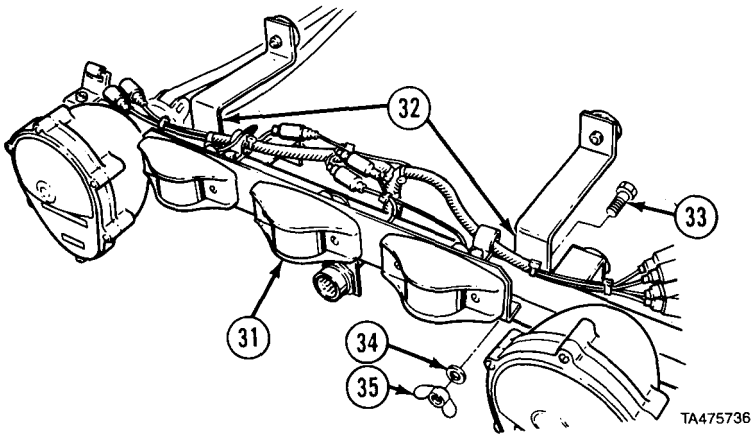


NOTE

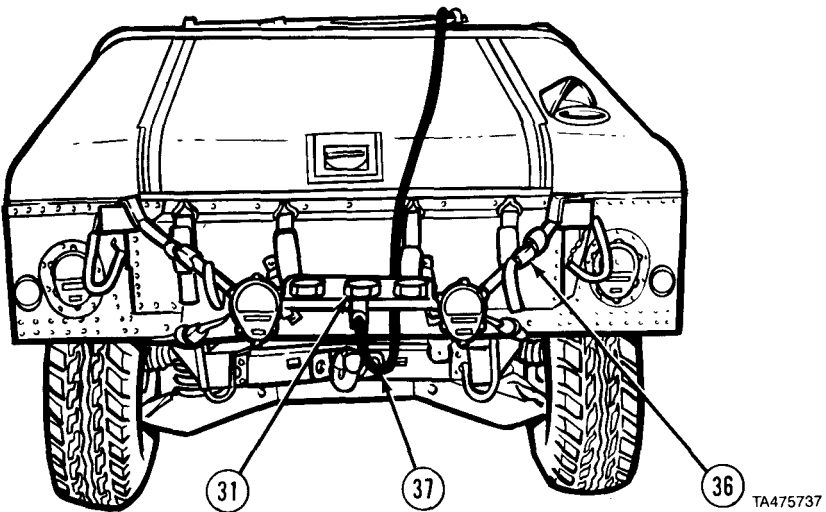
- Safety chains can be routed to towing shackles or safety chain hoop. Towing shackles can be used only after tow cylinders are extended.
- Adjust chain slack so safety chains just touch the ground.

- (30) Route two safety chains (23) through safety chain hoop (28) on wrecker and secure grab hooks (29) with safety shackles (30).
- (31) Wrap two springs (1) around crosstube (7) and secure.

M98E1 General Operating Procedures (Cont)



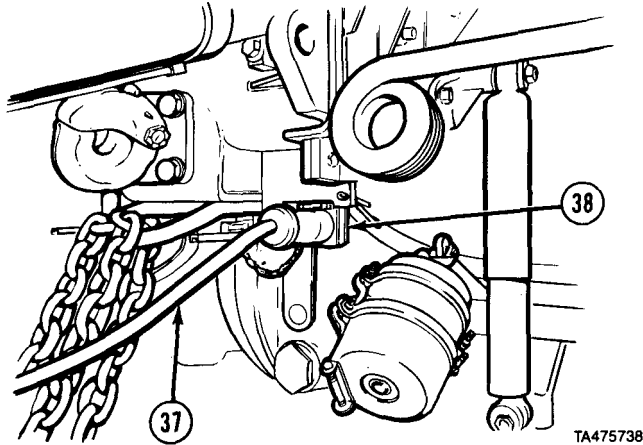
- (32) Prepare disabled vehicle for towing (refer to M966 operator's manual.)
- (33) Remove emergency tow lights (31) and two brackets (32) from stowage.
- (34) Install two brackets (32) in center holes of emergency tow lights with two screws (33), washers (34), and nuts (35).



- (35) Install emergency tow lights (31) on rear of M966 and fasten securely with straps (36).
- (36) Remove tow light cable (37) from stowage and connect to emergency tow lights (31).

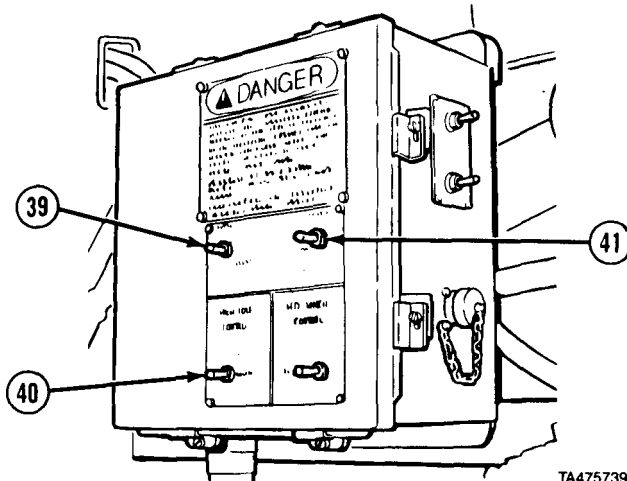
M98E1 General Operating Procedures (Cont)

2-83. TOW M966 (CONT).



TA475738

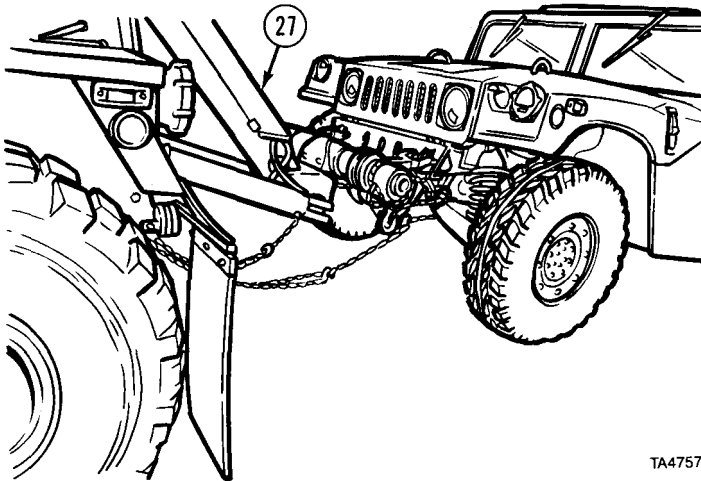
- (37) Route other end of tow light cable (37) along disabled vehicle and connect to rear electrical connector (38) on wrecker.



TA475739

- (38) Set POWER switch (39) to ON position.
(39) Set HIGH IDLE switch (40) to CONTINUOUS.
(40) Push and release LATCH switch (41). Engine speed will increase to approximately 1500 rpm.

M98E1 General Operating Procedures (Cont)



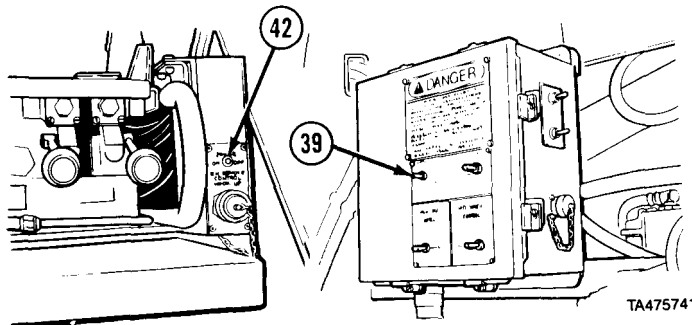
WARNING

Keep out from under retrieval system and disabled vehicle when raised off ground or personal injury or death may result.

CAUTION

- Fully retract both tow cylinders before lifting disabled vehicle or equipment damage may result.
- Make sure all rigging is secure. Loose rigging can become entangled and cause damage to equipment.

(41) Push LIFT CYLINDER control lever to retract lift cylinder (27).

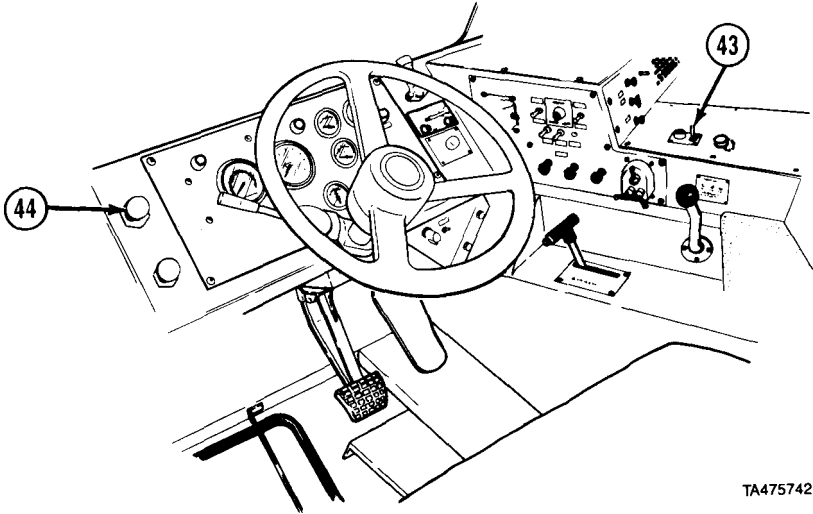


(42) Set POWER switch (39) to OFF position.

(43) Set POWER switch (42) to OFF position.

M98E1 General Operating Procedures (Cont)

2-83. TOW M966 (CONT).



- (44) Set PTO ENGAGE switch (43) to OFF position.
- (45) Turn on service drive lights (para 2-10d),
- (46) Turn on emergency flashers on wrecker (para 2-44a) and disabled vehicle.
- (47) Push in PARKING BRAKE control (44) and select desired gear (para 2-11e).

WARNING

The M984E1 should not be operated at speeds over 15 mph except on paved roads when the operator determines that the vehicle being towed and the terrain allow safe operation. Engine brake switch must be "ON" for all towing operations. The following are maximum safe speeds

Terrain Condition	Maximum speed, towed load up to 50,000 lbs	Maximum speed, towed load above 50,000 lbs
on road-level	35	30
on road-hilly	30	20
off road	15	15

Speeds in excess of the above can result in loss of control, serious injury or death.

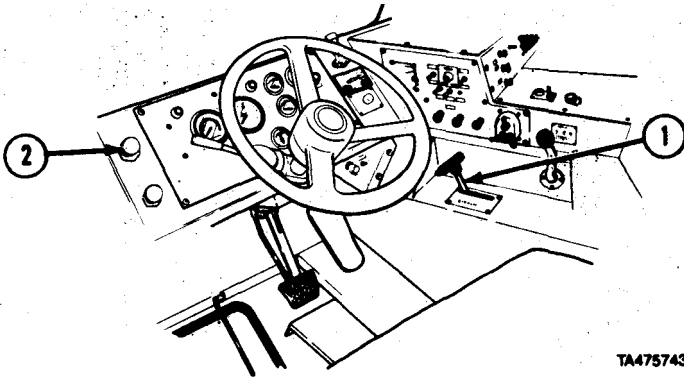
- (48) Transport disabled vehicle.

M98E1 General Operating Procedures (Cont)

b. Front Disconnect.

NOTE

This is a two-soldier task.



- (1) Set transmission range selector (1) to N.
- (2) Pull PARKING BRAKE control (2).

WARNING

Do not stand between vehicles while disabled vehicle is raised off ground. Falling vehicle can cause serious injury or death.

CAUTION

Do not contact pintle hook with lift cylinder or equipment damage could occur.

NOTE

After lowering disabled vehicle, extend lift and tow cylinders approximately 2 to 4 in. (50 to 100 mm) to allow for adjustment when removing adapters.

- (3) Prepare retrieval system for operation (para 2-72). Alternately pull TOW and LIFT CYLINDER control levers to extend lift cylinder and tow cylinders to lower towed vehicle to ground until safety chains at front A-frames are slack.

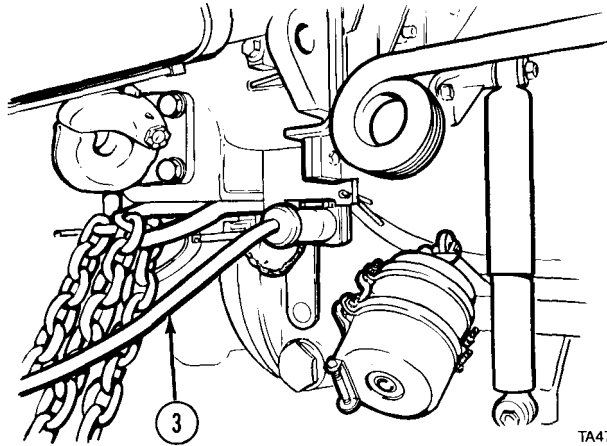
WARNING

If disabled vehicle's parking brake is inoperative, chock wheels of disabled vehicle. Failure to chock wheels may result in personal injury.

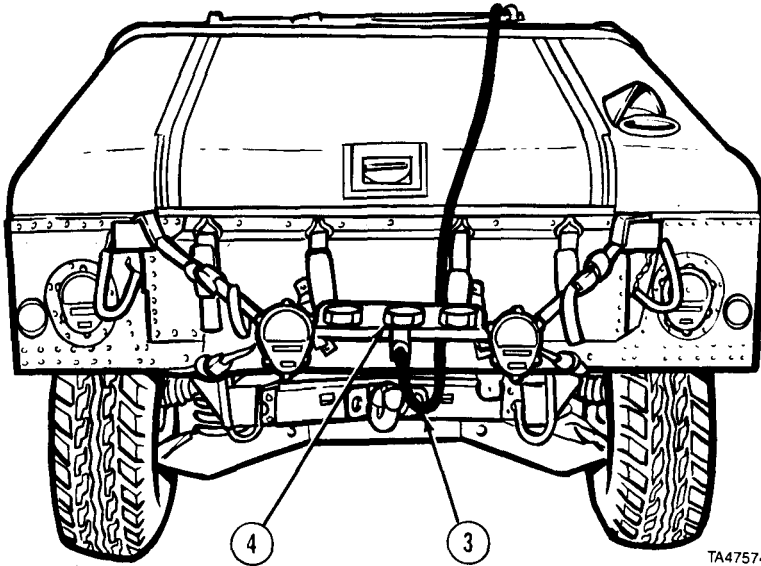
- (4) Apply PARKING BRAKE on disabled vehicle (refer to M966 operator's manual.) If parking brake is inoperative, chock wheels on disabled vehicle.

M98E1 General Operating Procedures (Cont)

2-83. TOW M966 (CONT)

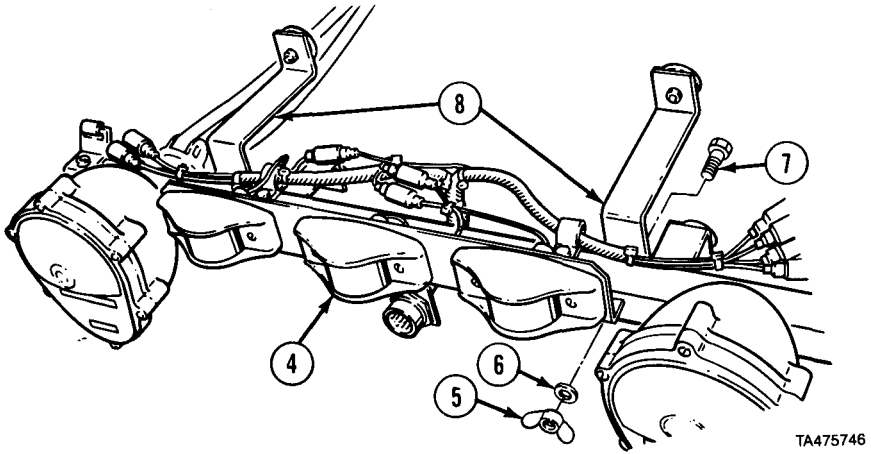


(5) Remove tow light cable (3) from wrecker.

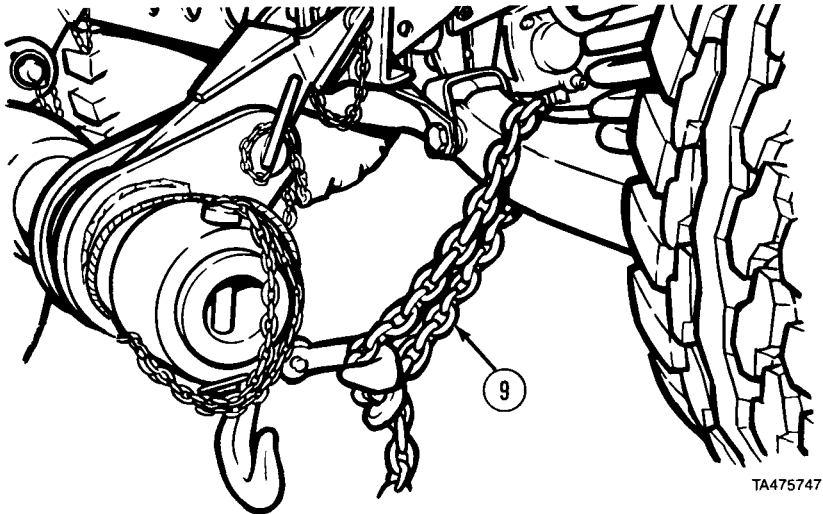


(6) Remove tow light cable (3) from emergency tow lights (4).
(7) Remove emergency tow lights (4) from disabled vehicle.

M98E1 General Operating Procedures (Cont)



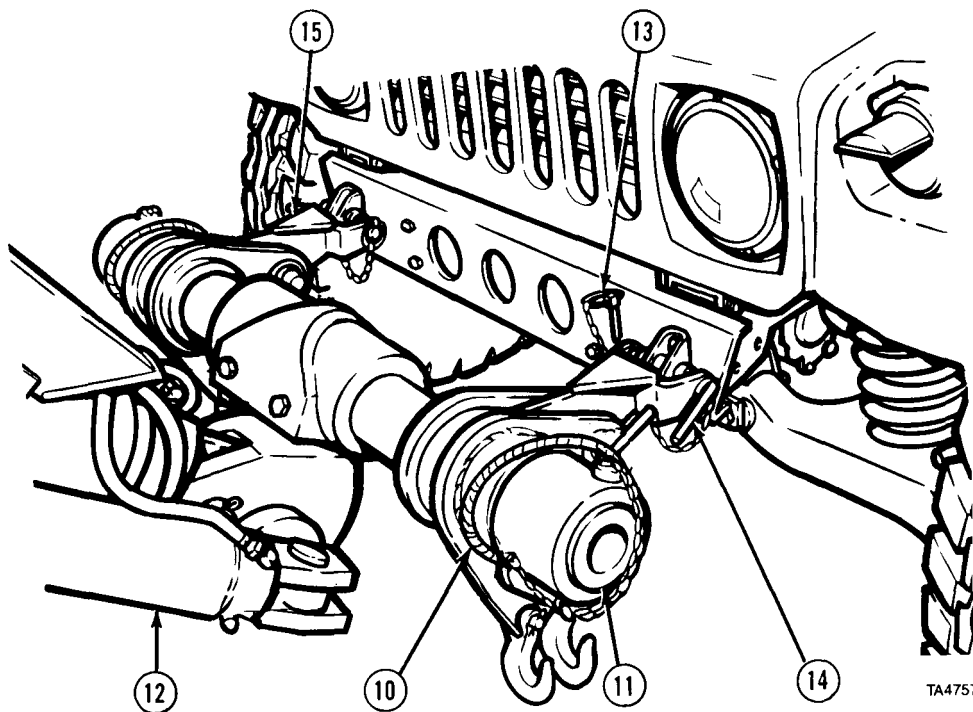
(8) Remove two nuts (5), washers (6), screws (7), and brackets (8) from emergency tow lights (4). Stow emergency tow lights and brackets.



(9) Remove and stow two safety chains (9).

M98E1 General Operating Procedures (Cont)

2-83. TOW M966 (CONT.)



(10) Unwrap two springs (10) from crosstube (11) and connect to tow cylinders (12).

WARNING

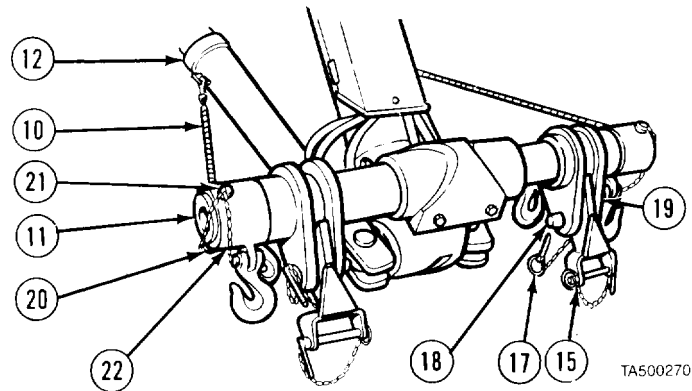
- Do not stand behind adapters when pins are being removed. Adapters may swing down resulting in personal injury.
- Keep hands and fingers away from adapter and tow eyes when operating retrieval controls. Personal injury could result.

NOTE

Use retrieval controls to position crosstube to relieve tension from adapters.

- (11) Remove two quick pins (13) and pins (14) from extensions (15).
- (12) Remove two extensions (15) from tow eyes (16) on disabled vehicle.
- (13) Install two pins (14) in extensions (15).
- (14) Install two quick pins (13) in pins (14).

M984E1 General Operating Procedures (Cont)

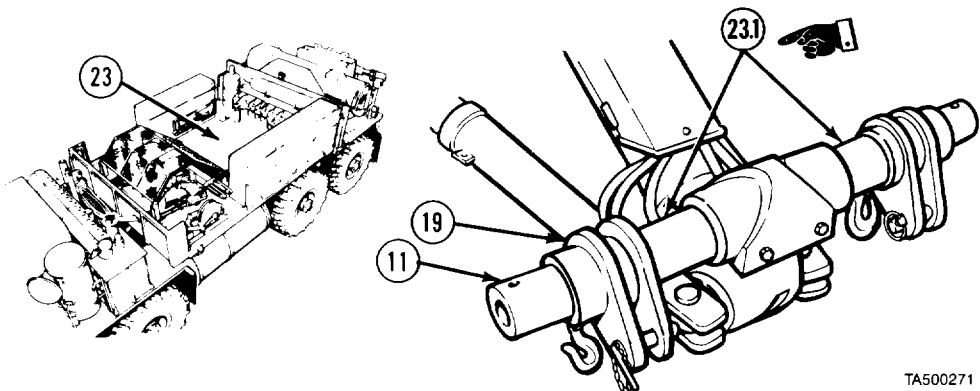


- (15) Drive wrecker forward several feet and park (para 2-110).
- (16) Remove two quick pins (17) and pin (18) from M966 adapter (19).
- (17) Remove extensions (15) from M966 adapters (19) and stow.
- (18) Install two pins (18) in M966 adapters (19).
- (19) Install two quick pins (17) in pins (18).

WARNING

As springs and end caps are removed, crosstube can swing in all directions, adapters may slide off, and can cause personal injury.

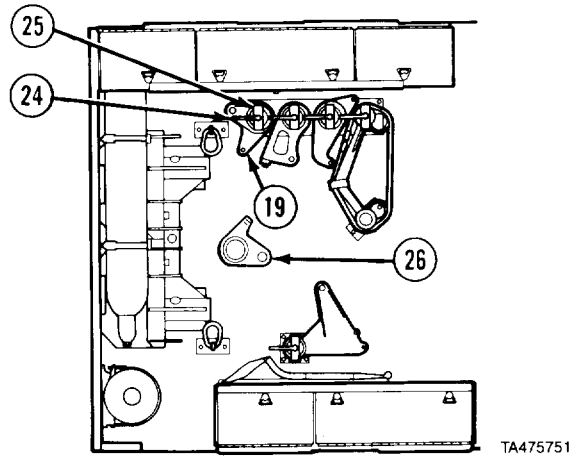
- (20) Remove two springs (10) from tow cylinders (12).
- (21) Remove two quick pins (20) and pins (21) from end caps (22).
- (22) Remove two end caps (22) from crosstube (11).



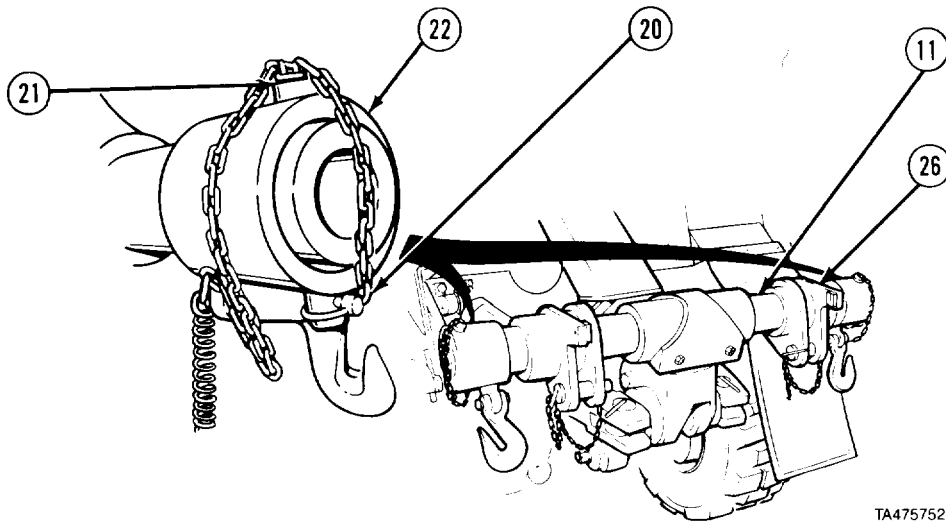
- (23) Remove two M966 adapters (19) from crosstube (11) and place on equipment body floor (23).
- (23.1) Remove and stow two 5-in (127 mm) spacers (23.1) from crosstube (11).

M984E1 General Operating Procedures (Cont)

2-83. TOW M966 (CONT).

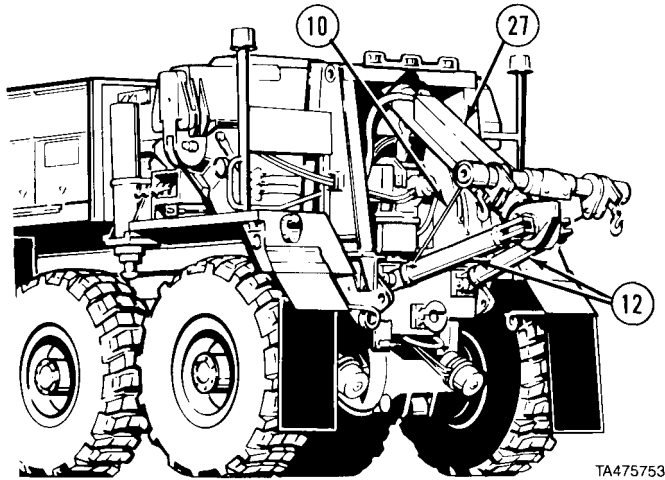


- (24) Remove lock handle (24), lock plate (25), and M977 front adapters (26).
- (25) Install two M966 adapters (19) removed from crosstube, lock plate (25), and lock handles (24).



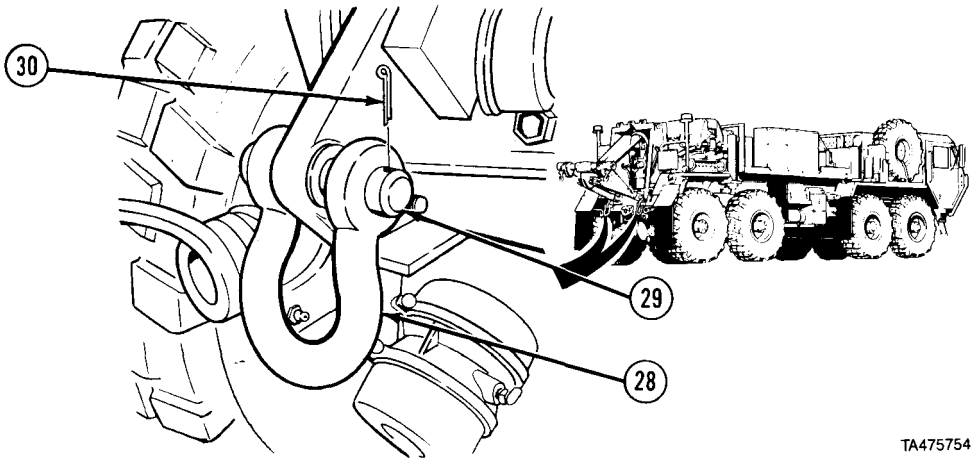
- (26) Install two M977 front adapters (26) on crosstube (11).
- (27) Install two end caps (22) on crosstube (11). Install two pins (21) and quick pins (20).

M98E1 General Operating Procedures (Cont)



TA475753

- (28) Install two springs (10) on tow cylinders (12).
- (29) Operate retrieval controls and fully retract lift cylinder (27) and tow cylinder (12).



TA475754

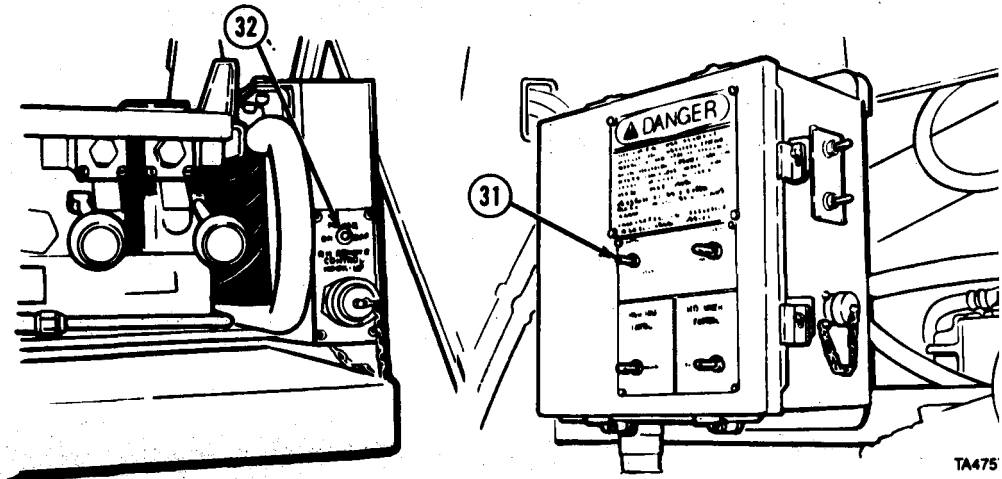
NOTE

Right and left towing shackles are installed the same way.

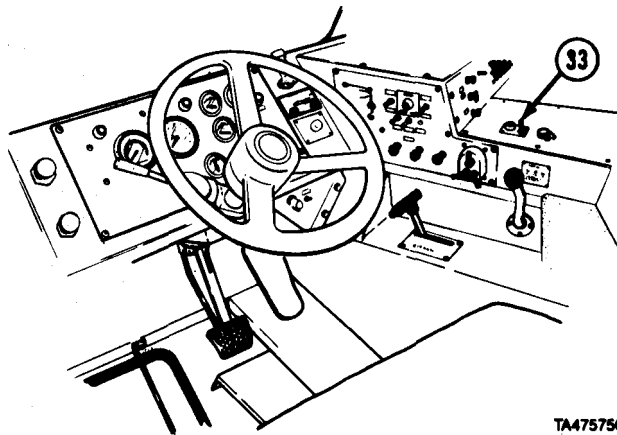
- (30) Install two towing shackles (28), pins (29), and cotter pins (30).

M98E1 General Operating Procedures (Cont)

2-83. TOW M966 (CONT).



- (31) Set POWER switch (31) to OFF position.
- (32) Set POWER switch (32) to OFF position.



- (33) Turn off emergency flashers on wrecker (para 2-44f) and disabled vehicle.
- (34) Turn off service drive lights (para 2-10d).
- (35) Set PTO ENGAGE switch (33) to OFF position.
- (36) Remove and stow beacon lights (para 2-62).
- (37) Shut off engine (para 2-11p).
- (38) Unlock disabled vehicle's steering (refer to M966 operator's manual).

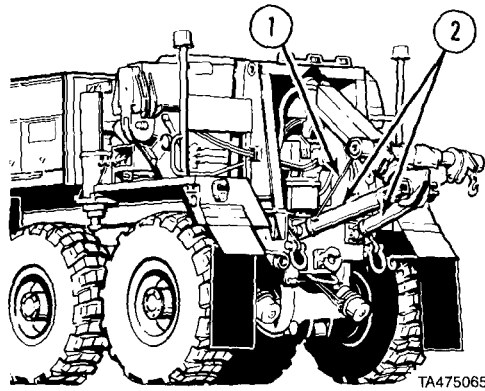
M98E1 General Operating Procedures (Cont)

c. Rear Hookup.

NOTE

This is a two-soldier task.

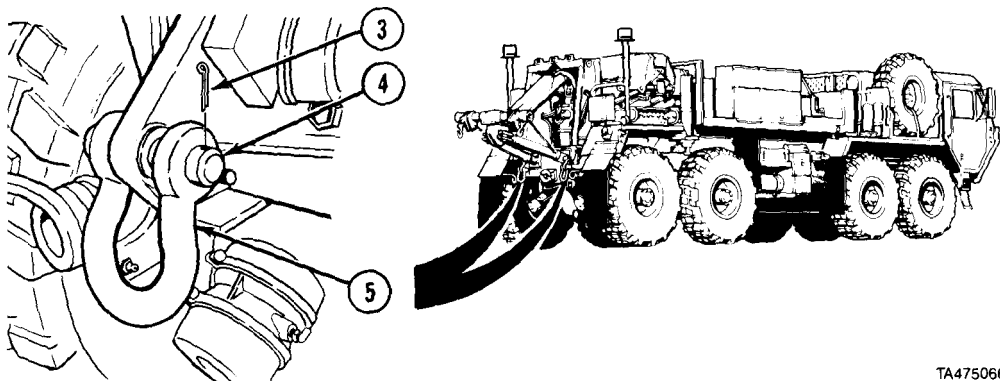
(1) Prepare retrieval system for operation (para 2-72).



WARNING

Hold crosstube when removing springs. Crosstube may swing or cause adapter to slide resulting in personal injury.

(2) Disconnect two springs (1) from tow cylinders (2).



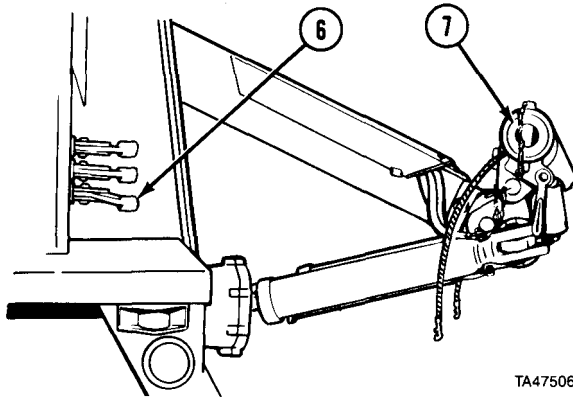
NOTE

Right and left towing shackles are removed the same way.

(3) Remove two cotter pins (3), pins (4), and towing shackles (5).

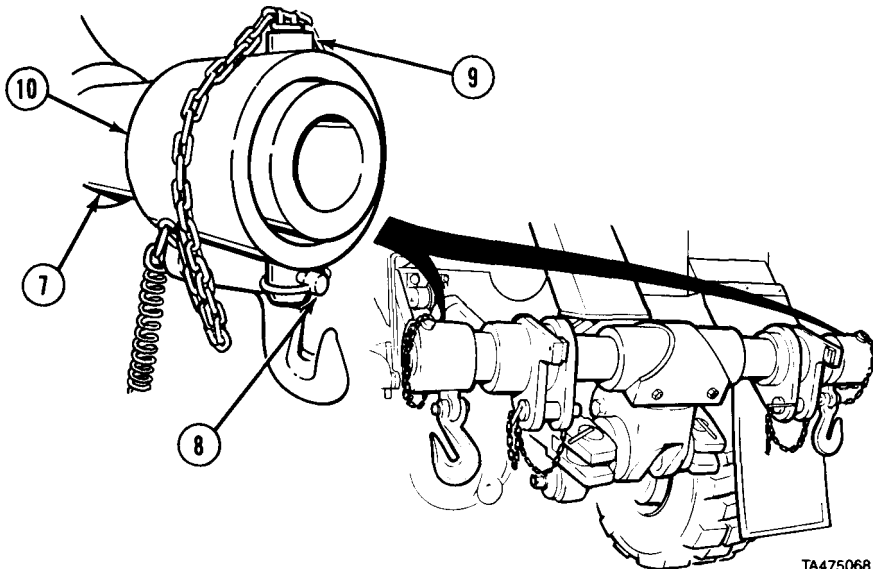
M98E1 General Operating Procedures (Cont)

2-83. TOW M966 (CONT).



TA475067

- (4) Pull LIFT CYLINDER control lever (6) to lower crosstube (7) to approximately 3 ft (1 m) above ground.
- (5) Position wrecker so that crosstube (7) is approximately 1 ft (30 cm) from tow eyes of disabled vehicle and centered on disabled vehicle.



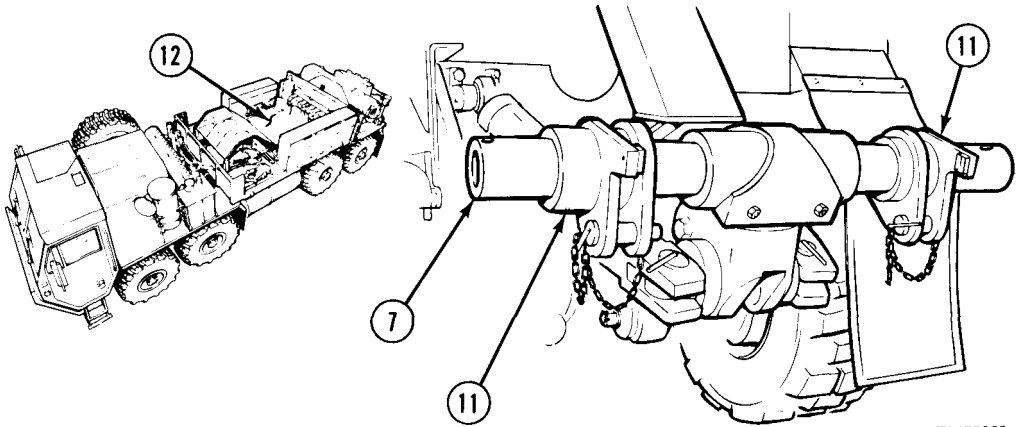
TA475068

WARNING

When end caps are removed from crosstube, adapters may slide off causing personal injury.

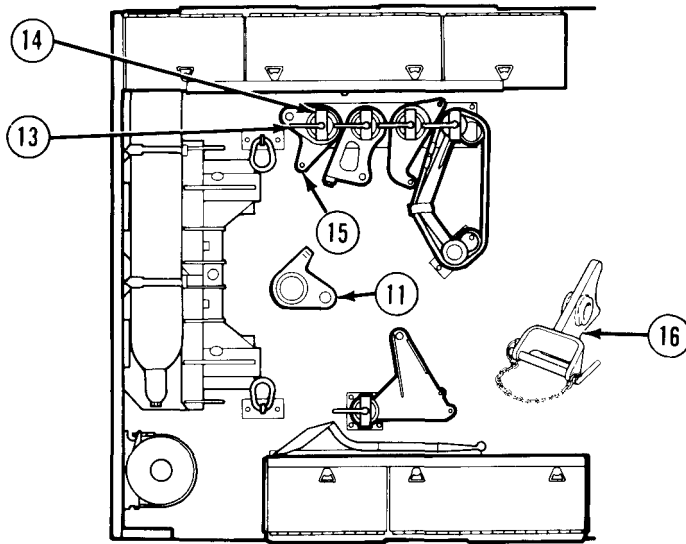
- (6) Remove two quick pins (8) and pins (9) from end caps (10).
- (7) Remove two end caps (10) from crosstube (7).

M984E1 General Operating Procedures (Cont)



TA475069

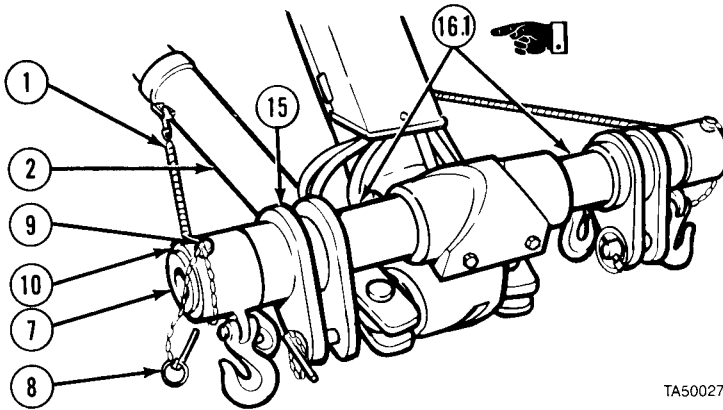
- (8) Remove two M977 front adapters (11) from crosstube (7) and place on equipment body floor (12).



TA475757

- (9) Remove lock handle (13), lock plate (14), and two M966 rear tow adapters (15).
 (10) Install two M977 front adapters (11) removed from crosstube, lock plate (14), and lock handle (13).
 (11) Remove two M966 extensions (16) from stowage.
 (12) Remove two 12-ft (3.5 m) chains from stowage.

2-83. TOW M966 (CONT).

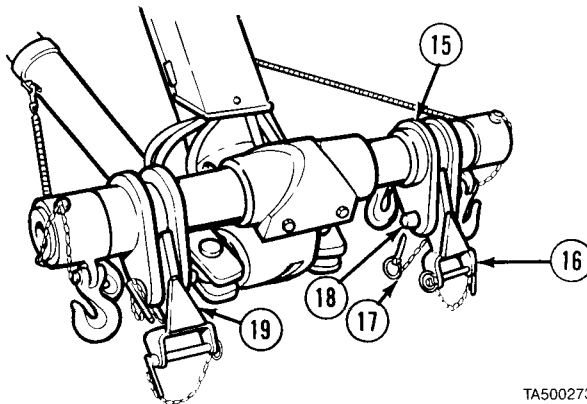


TA500272

WARNING

Adapters and end caps may slide off when installing and may cause personal injury.

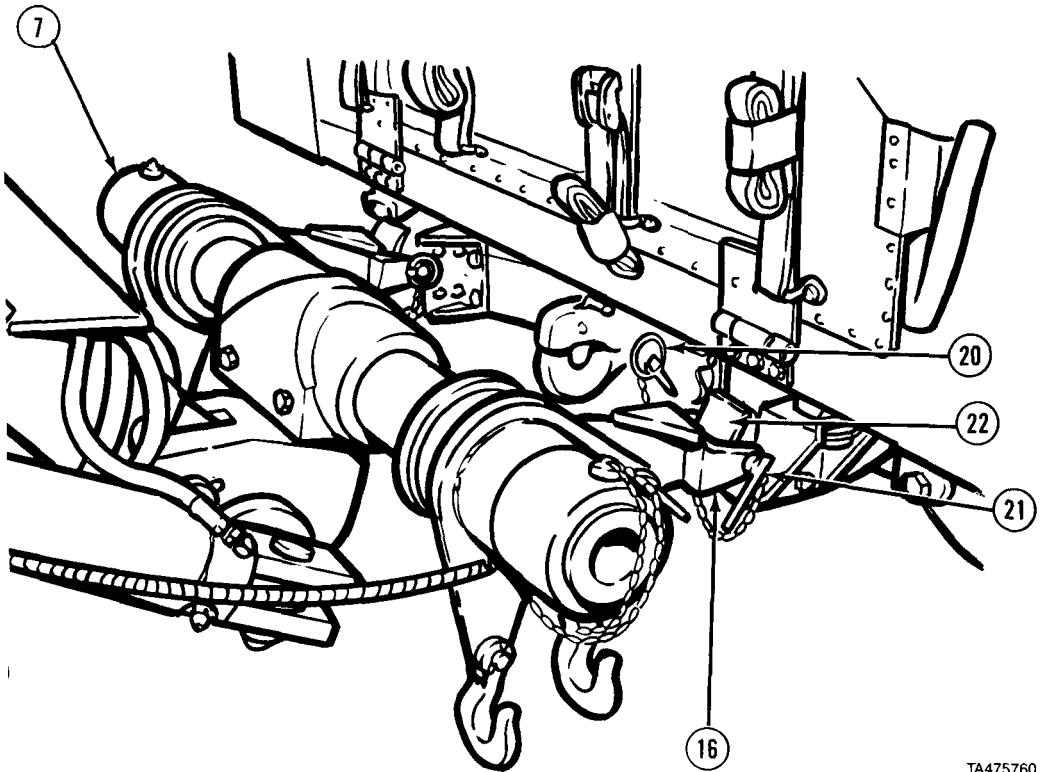
- (12.1) Install two 5-in (127 mm) spacers (16.1) on crosstube (7).
- (13) Install two M966 rear tow adapters (15) on crosstube (7).
- (14) Install two end caps (10) on crosstube (7).
- (15) Install two pins (9) and quick pins (8).
- (16) Attach two springs (1) on tow cylinders (2).



TA500273

- (17) Remove two quick pins (17) and pins (18) from adapters (15).
- (18) Install extensions (16) so holes in adapter (15) align with holes in extension and triangular brace (19) is on top.
- (19) Insert two pins (18) through adapters (15) and extensions (16). Install two quick pins (17) in pins (18).

M98E1 General Operating Procedures (Cont)



TA475760

(20) Remove two quick pins (20) and pins (21) from extensions (16).

WARNING

Keep hands and fingers away from adapters and tow eyes when operating retriever controls. Personal injury could result.

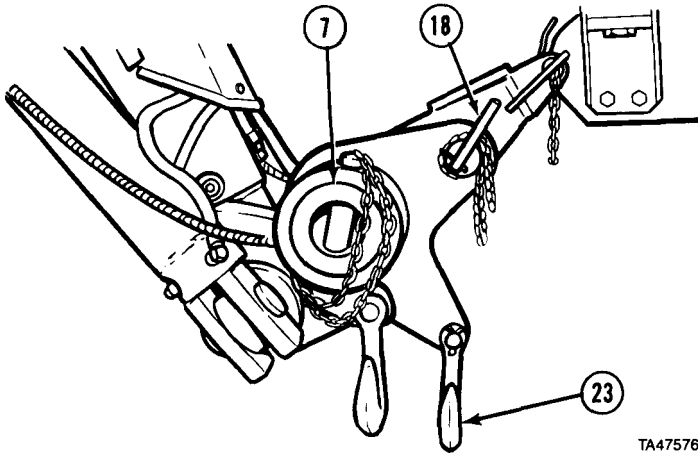
NOTE

If disabled vehicle has towing shackles installed, remove shackles and stow in disabled vehicle.

- (21) Soldier A operates retrieval system (para 2-72) while Soldier A and Soldier B position cross-tube (7) so holes in extensions (16) align with rear tow eyes (22).
- (22) Insert two pins (21) through extensions (16) and rear tow eyes (22). Install two quick pins (20) in pins (21).

M98E1 General Operating Procedures (Cont)

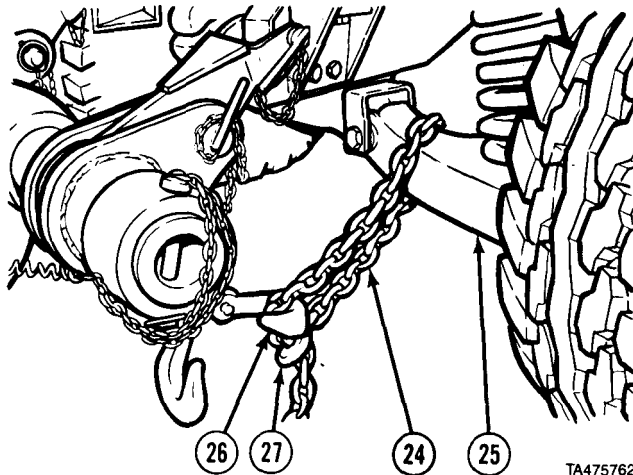
2-83. TOW M966 (CONT).



NOTE

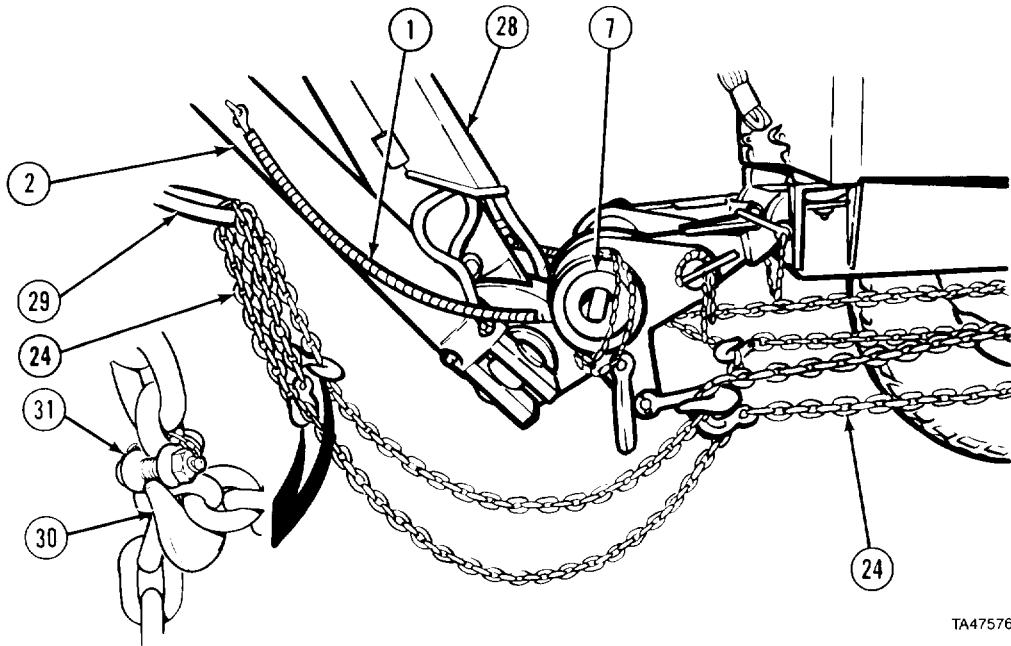
Right side extension is shown.

- (23) Lower crosstube (7) until adapter grab hooks (23) are directly underneath adapter pins (18).



- (24) Route one 12-ft (3.5 m) safety chain (24) over rear arm of A-frame (25) on disabled vehicle.
- (25) Route 12-ft (3.5 m) safety chain (24) through adapter grab hook (26). Pull chain tight and attach grab hook (27) to chain.
- (26) Repeat steps (24) and (25) for other side of disabled vehicle.

M98E1 General Operating Procedures (Cont)



TA475763

(27) Release PARKING BRAKE on disabled vehicle (refer to M966 operator's manual.)

CAUTION

Do not allow lift cylinder to touch pintle hook.
Equipment may be damaged.

(28) Alternately push in TOW and LIFT CYLINDER control levers until tow cylinders (2) are fully retracted.

(29) Push in LIFT CYLINDER control lever to retract lift cylinder (28) until slack is removed from safety chains (24).

NOTE

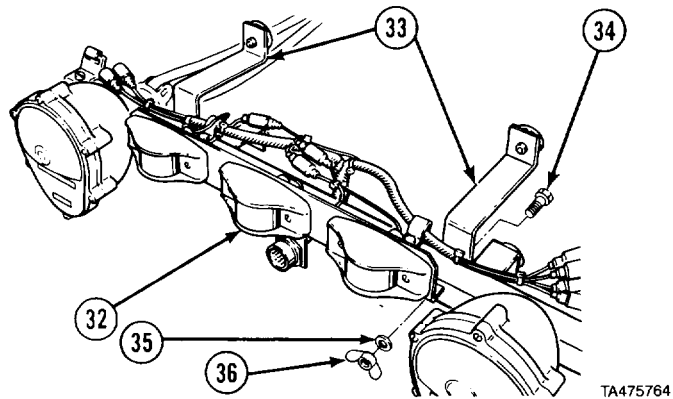
- Safety chains can be routed to towing shackles or safety chain hoop. Towing shackles can be used only after tow cylinders are extended.
- Adjust chain slack so safety chains just touch the ground.

(30) Route two safety chains (24) through safety chain hoop (29) on wrecker and secure grab hooks (30) with safety shackle (31).

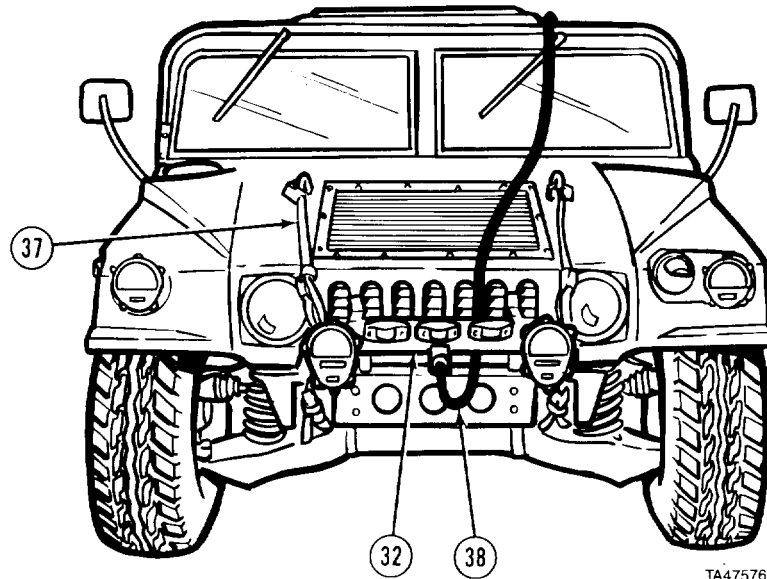
(31) Wrap two springs (1) around crosstube (7) and secure.

M98E1 General Operating Procedures (Cont)

2-83. TOW M966 (CONT).

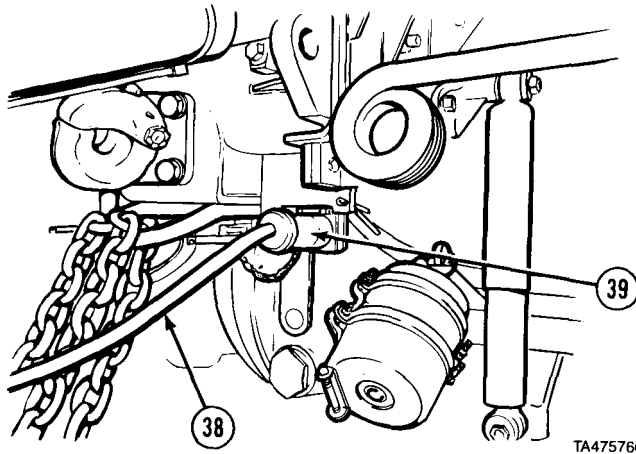


- (32) Prepare disabled vehicle for towing (refer to M966 operator's manual).
- (33) Remove emergency tow lights (32) and two brackets (33) from stowage.
- (34) Install two brackets (33) in center holes of emergency tow lights with two screws (34), washers (35), and nuts (36).

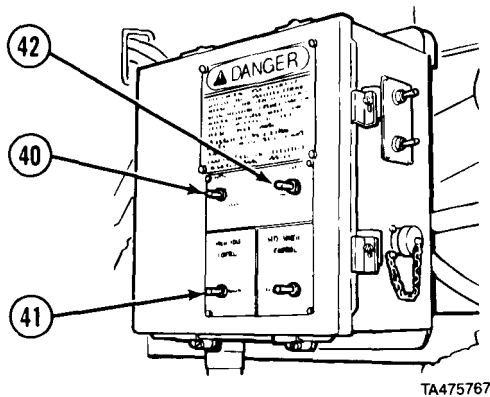


- (35) Install emergency tow lights (32) on front of M966 and fasten securely with straps (37).
- (36) Remove tow light cable (38) from stowage and connect to emergency tow lights (32).

M98E1 General Operating Procedures (Cont)



- (37) Route other end of tow light cable (38) along disabled vehicle and connect to rear electrical connector (39) on wrecker.



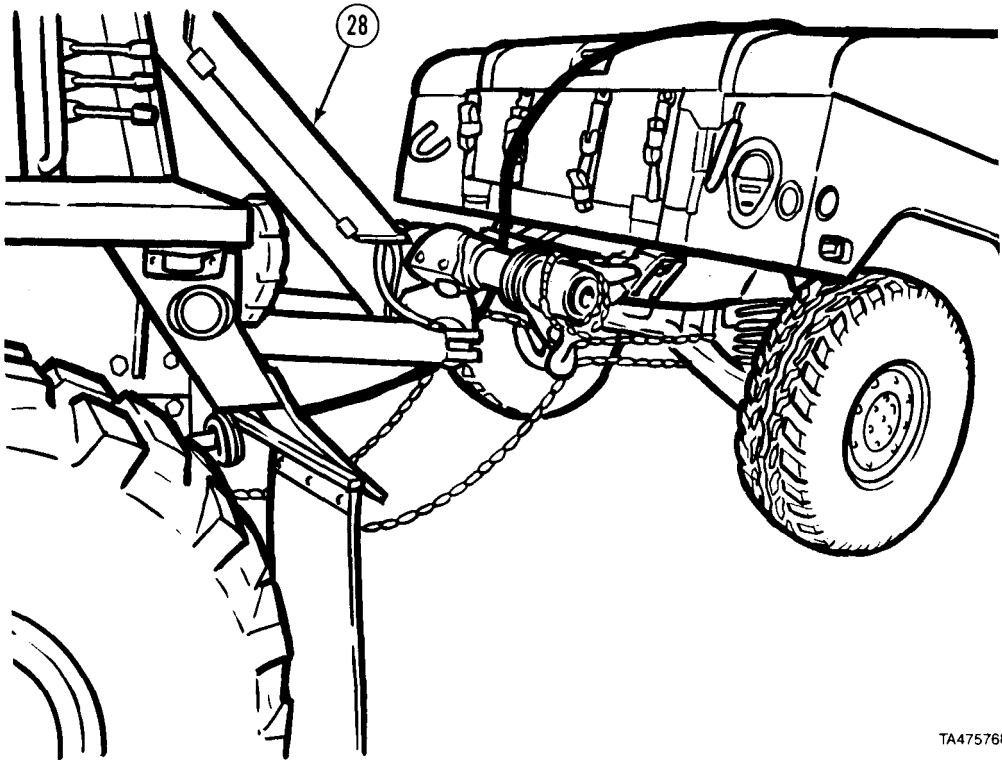
NOTE

If disabled vehicle is equipped with built-in steering lock assembly, lock disabled vehicle's steering (refer to M966 operator's manual).

- (38) Set POWER switch (40) to ON position.
 (39) Set HIGH IDLE switch (41) to CONTINUOUS.
 (40) Push and release LATCH switch (42). Engine speed will increase to approximately 1500 rpm.

M98E1 General Operating Procedures (Cont)

2-83. TOW M966 (CONT).



TA47576f

WARNING

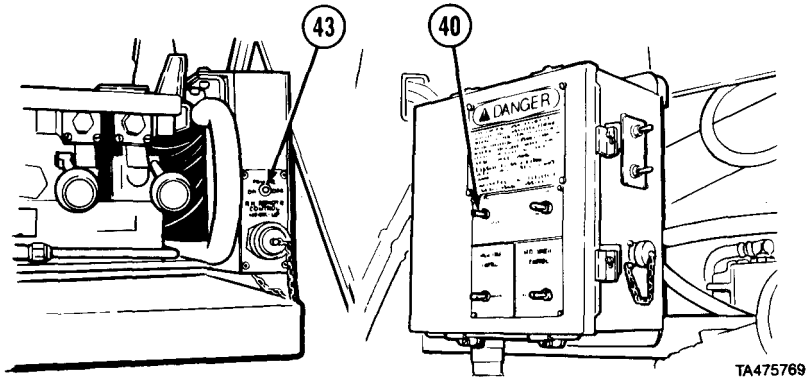
Keep out from under retrieval system and disabled vehicle when raised off ground or personal injury or death may result.

CAUTION

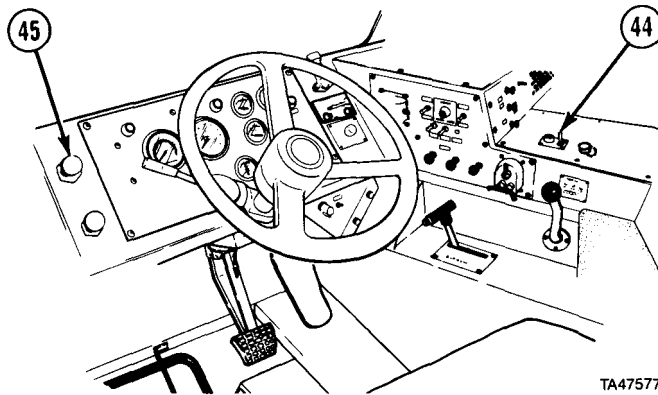
- Fully retract both tow cylinders before lifting disabled vehicle or equipment damage may result.
- Make sure all rigging is secure. Loose rigging can become entangled and cause damage to equipment.

(41) Retract lift cylinder (28) to raise disabled vehicle approximately 1 ft (30 cm) off ground.

M98E1 General Operating Procedures (Cont)



- (42) Set POWER switch (40) to OFF position.
- (43) Set POWER switch (43) to OFF position.



- (44) Set PTO ENGAGE switch (44) to OFF position.
- (45) Turn on service drive lights (para 2-10d).
- (46) Turn on emergency flashers on wrecker (para 2-44a) and disabled vehicle.
- (47) Push in PARKING BRAKE control (45) and select desired gear (para 2-11e).

WARNING

The M984E1 should not be operated at speeds over 15 mph except on paved roads when the operator determines that the vehicle being towed and the terrain allow safe operation, Engine brake switch must be "ON" for all towing operations. The following are maximum safe speeds

Terrain Condition	Maximum speed, towed load up to 50,000 lbs	Maximum speed, towed load above 50,000 lbs
on road-level	35	30
on road-hilly	30	20
off road	15	15

Speeds in excess of the above can result in loss of control, serious injury or death.

- (48) Transport disabled vehicle.

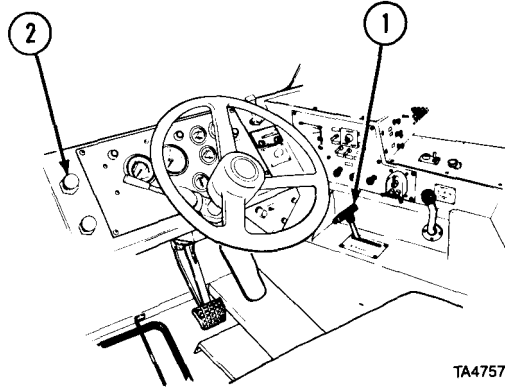
M98E1 General Operating Procedures (Cont)

2-83. TOW M966 (CONT).

d. Rear Disconnect.

NOTE

This is a two-soldier task.



- (1) Set transmission range selector (1) to N.
- (2) Pull PARKING BRAKE control (2).

WARNING

Do not stand between vehicles while disabled vehicle is raised off ground. Falling vehicle can cause serious injury or death.

CAUTION

Do not contact pintle hook with lift cylinder. Equipment damage could result.

NOTE

After lowering disabled vehicle, extend lift and tow cylinders approximately 2 to 4 in. (50 to 100 mm) to allow for adjustment when removing adapters.

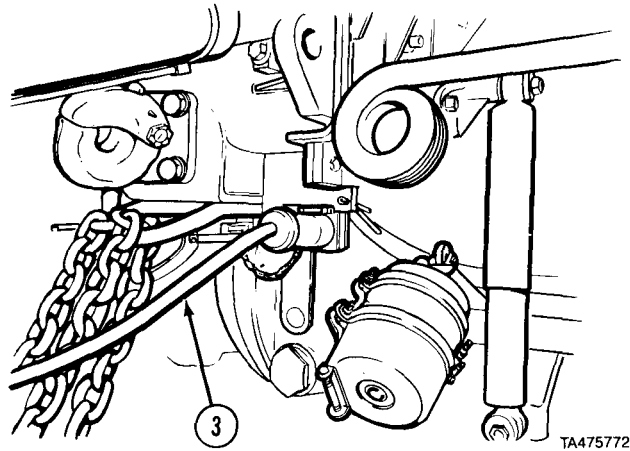
- (3) Prepare retrieval system for operation (para 2-72) and alternately pull LIFT CYLINDER control lever and TOW CYLINDER control levers to extend lift cylinder and tow cylinders to lower towed vehicle to ground until safety chains at front A-frames are slack.

WARNING

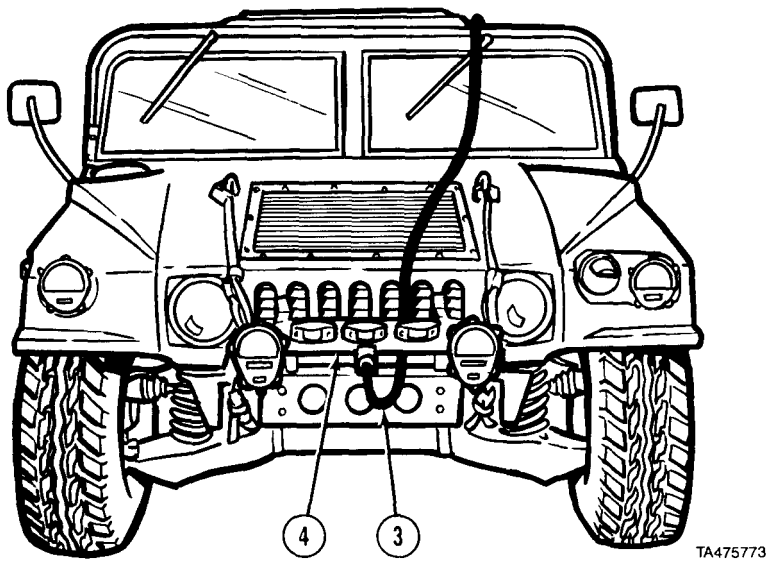
If disabled vehicle's parking brake is inoperative, chock wheels of disabled vehicle. Failure to chock wheels may result in personal injury.

- (4) Apply PARKING BRAKE on disabled vehicle (refer to M966 operator's manual.) If parking brake is inoperative, chock wheels on disabled vehicle.

M98E1 General Operating Procedures (Cont)



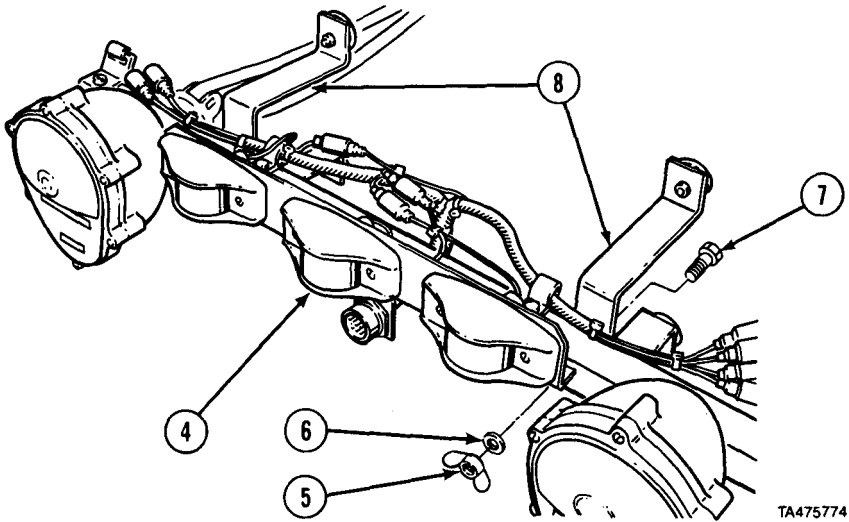
(5) Remove tow light cable (3) from wrecker.



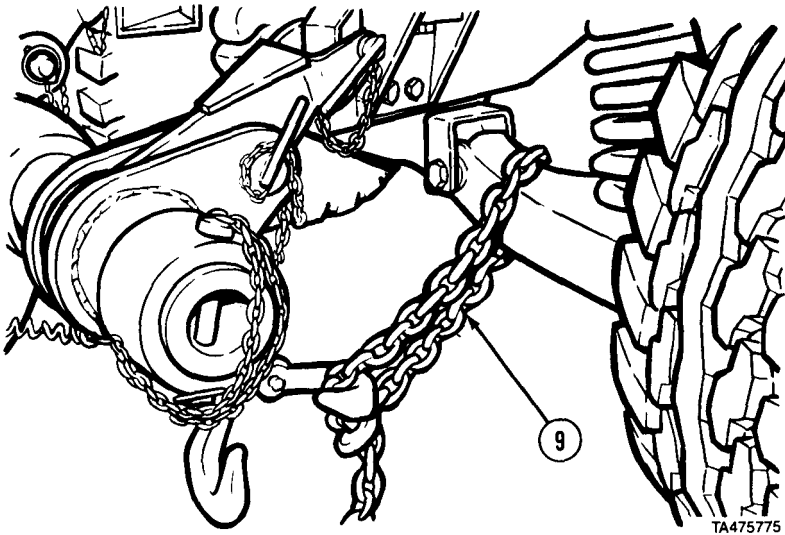
(6) Remove tow light cable (3) from emergency tow lights (4) and stow.
(7) Remove emergency tow lights (4) from disabled vehicle.

M98E1 General Operating Procedures (Cont)

2-83. TOW M966 (CONT).

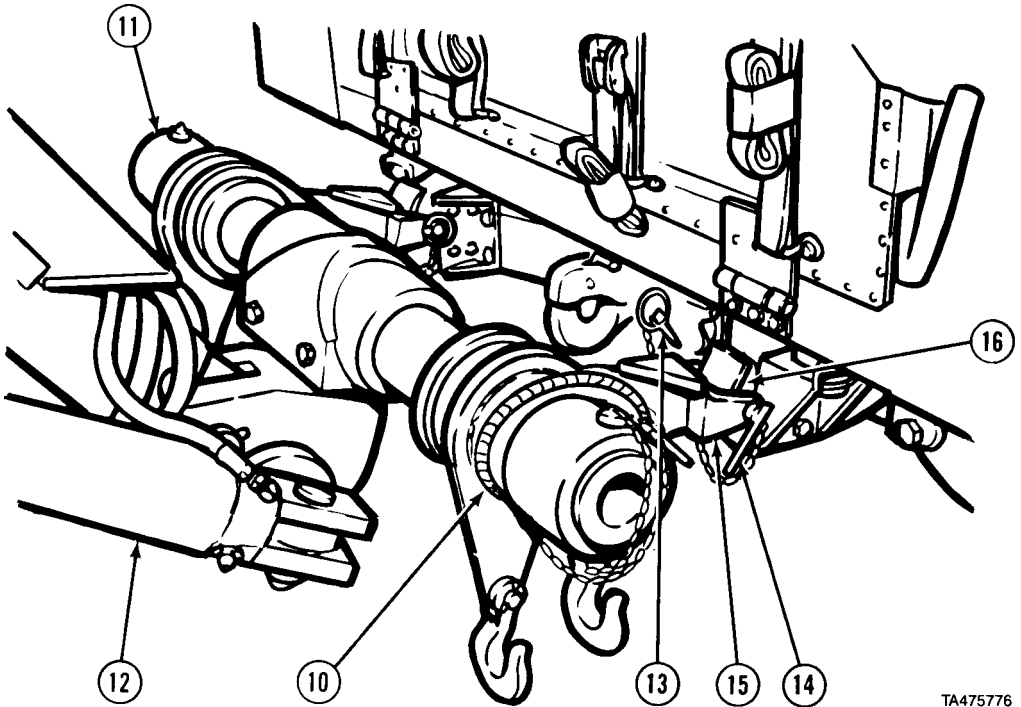


(8) Remove two nuts (5), washers (6), screws (7), and brackets (8) from emergency tow lights (4). Stow emergency tow lights and brackets.



(9) Remove and stow two safety chains (9).

M984E1 General Operating Procedures (Cont)



TA475776

- (10) Unwrap two springs (10) from crosstube (11) and connect to tow cylinders (12).

WARNING

- Do not stand behind adapters when pins are being removed. Adapters may swing down resulting in personal injury.
- Keep hands and fingers away from adapter and tow eyes when operating retrieval controls. Personal injury could result.

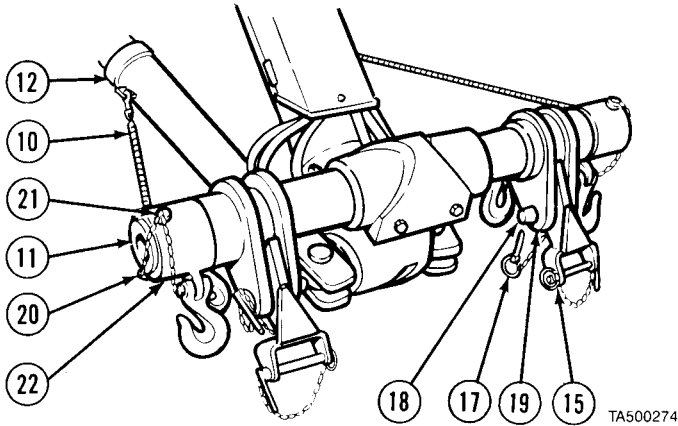
NOTE

Use retrieval controls to position crosstube to relieve tension from adapters.

- (11) Remove two quick pins (13) and pins (14) from extensions (15).
 (12) Remove two extensions (15) from tow eyes (16) on disabled vehicle.
 (13) Install two pins (14) in extensions (15).
 (14) Install two quick pins (13) in pins (14).

M984E1 General Operating Procedures (Cont)

2-83. TOW M966 (CONT).

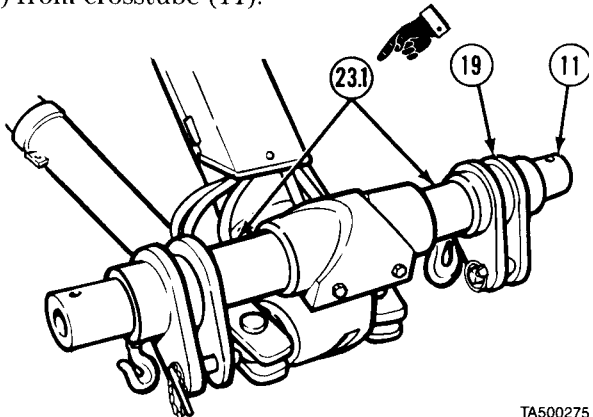
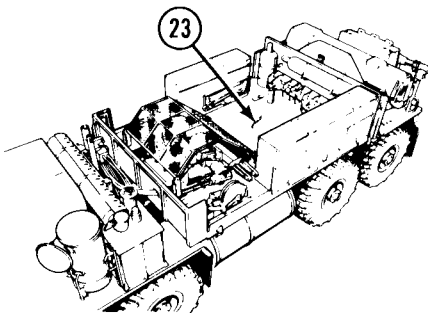


- (15) Drive wrecker forward several feet and park (para 2-11o).
- (16) Remove two quick pins (17) and pins (18) from M966 adapters (19).
- (17) Remove extensions (15) from M966 adapters (19) and stow.
- (18) Install two pins (18) in M966 adapters (19).
- (19) Install two quick pins (17) in pins (18).

WARNING

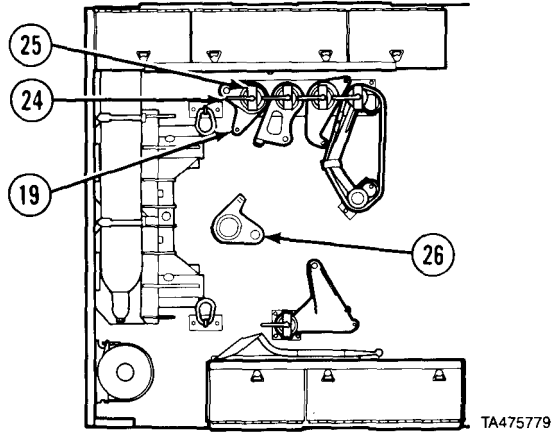
As springs and end caps are removed, crosstube can swing in all directions, adapters may slide off, and can cause personal injury.

- (20) Remove two springs (10) from tow cylinders (12).
- (21) Remove quick pins (20) and pins (21) from end caps (22).
- (22) Remove two end caps (22) from crosstube (11).

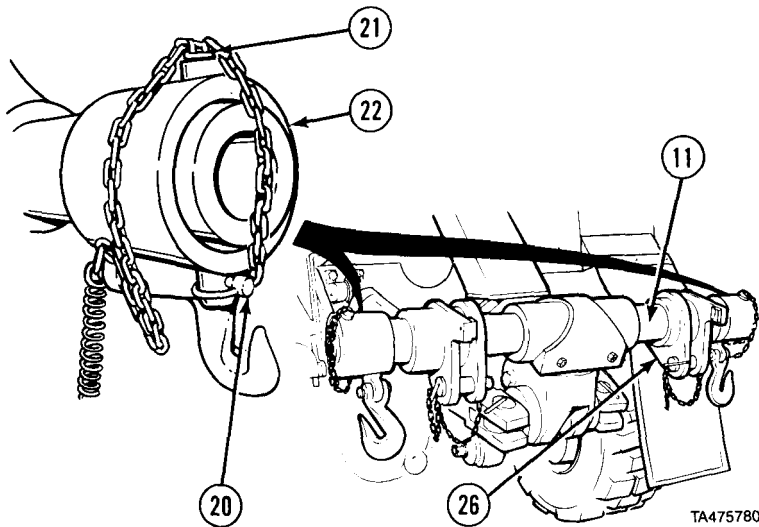


- (23) Remove two M966 adapters (19) from crosstube (11) and place on equipment body floor (23).
- (23.1) Remove and stow two 5-in spacers (23.1) from crosstube (11).

M98E1 General Operating Procedures (Cont)



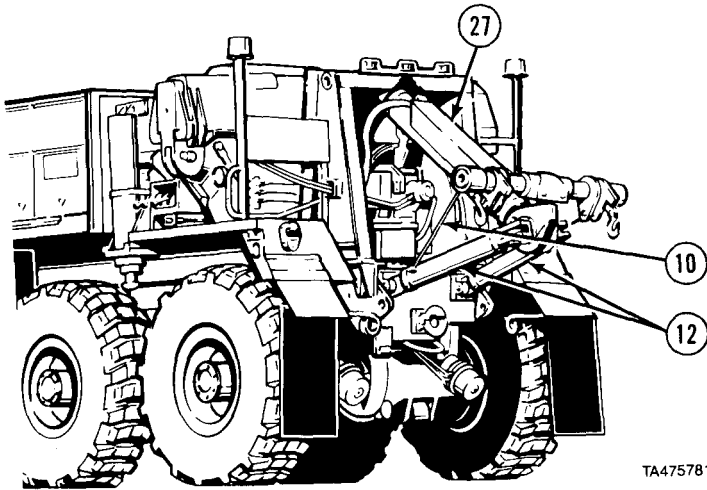
- (24) Remove lock handle (24), lock plate (25), and two M977 front adapters (26).
- (25) Install two M966 adapters (19) removed from crosstube, lock plate (25), and lock handle (24).



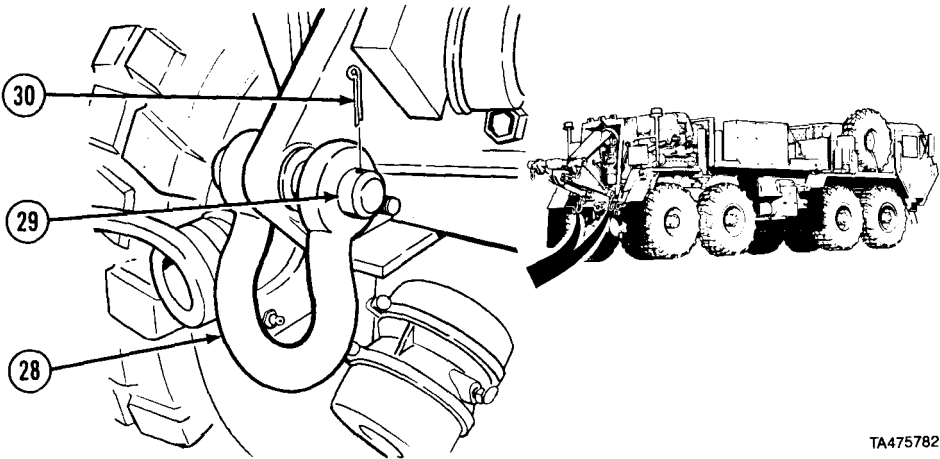
- (26) Install two M977 front adapters (26) on crosstube (11).
- (27) Install two end caps (22) on crosstube (11). Install two pins (21) and quick pins (20).

M98E1 General Operating Procedures (Cont)

2-83. TOW M966 (CONT).



- (28) Install two springs (10) on tow cylinders (12).
- (29) Operate retrieval controls and fully retract lift cylinder (27) and tow cylinders (12).

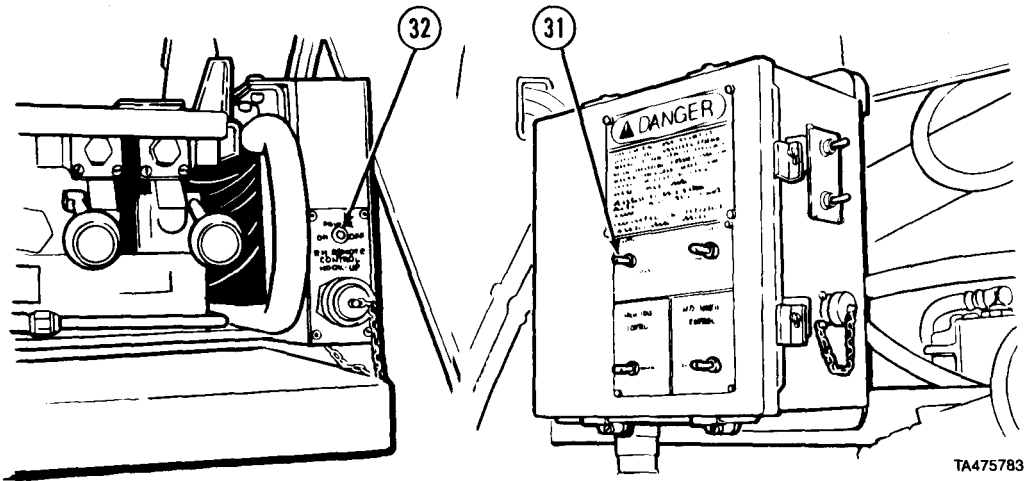


NOTE

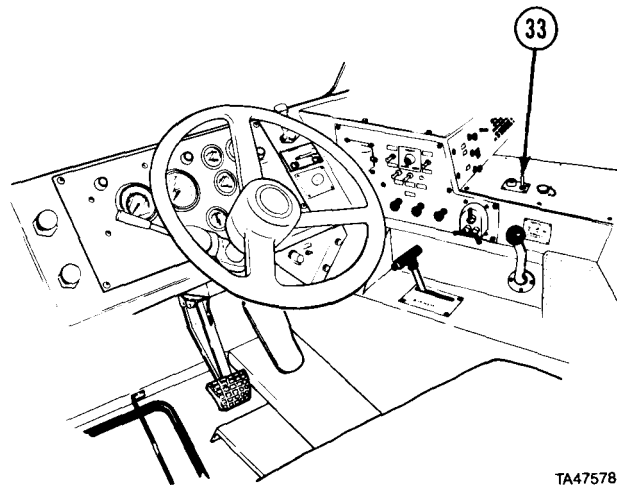
Right and left towing shackles are installed the same way.

- (30) Install two towing shackles (28), pins (29), and cotter pins (30).

M98E1 General Operating Procedures (Cont)



- (31) Set POWER switch (31) to OFF position.
- (32) Set POWER switch (32) to OFF position.



- (33) Turn off emergency flashers on wrecker (para 2-44f) and disabled vehicle.
- (34) Turn off service drive lights (para 2-10d).
- (35) Set PTO ENGAGE switch (33) to OFF position.
- (36) Remove and stow beacon lights (para 2-62).
- (37) Shut off engine (para 2-11P).
- (38) Unlock disabled vehicle's steering (refer to M966 operator's manual).

TM9-2320-279-10-2

M984E1 General Operating Procedures (Cont)

2-84. DELETED.

Pages 2-568 through 2-605 deleted.

2-568/(2-605 blank)

Change 3

M984E1 General Operating Procedures (Cont)

2-85. TOW M1008.

a. Front Hookup.

NOTE

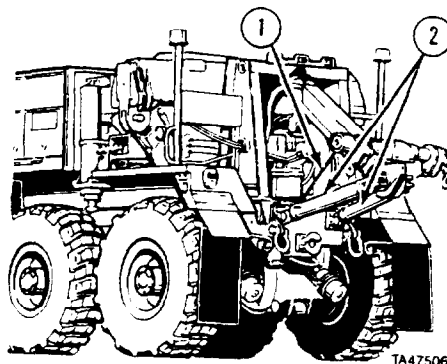
This is a two-soldier task.

- (1) Prepare retrieval system for operation (para 2-72).

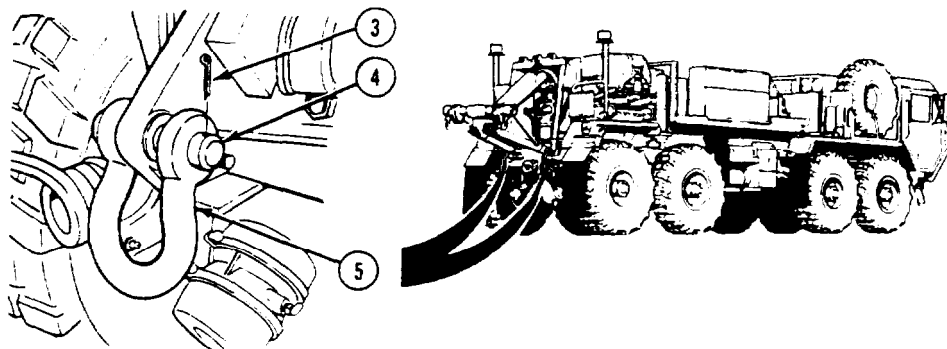
WARNING

Hold crosstube when removing springs. Crosstube may swing or cause adapter to slide resulting in personal injury.

- (2) Disconnect two springs (1) from tow cylinders (2).



TA475065



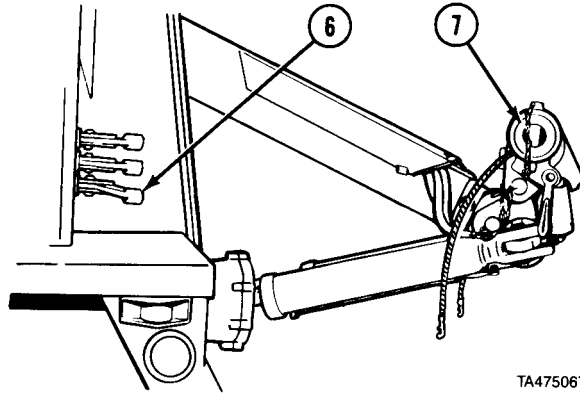
TA475066

NOTE

Right and left towing shackles are removed the same way.

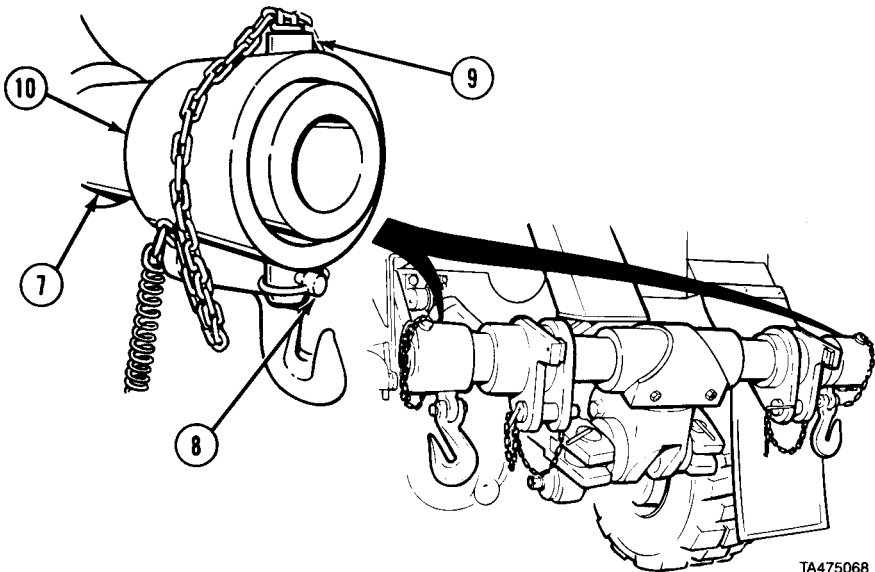
- (3) Remove cotter pin (3), (4), and towing shackles (5).

M984E1 General Operating Procedures (Cont)



TA475067

- (4) Pull LIFT CYLINDER control lever (6) to lower crosstube (7) to approximately 3 ft (1 m) above ground.
- (5) Position wrecker so that crosstube (7) is approximately 1 ft (30 cm) from tow eyes of disabled vehicle and centered on disabled vehicle.



TA475068

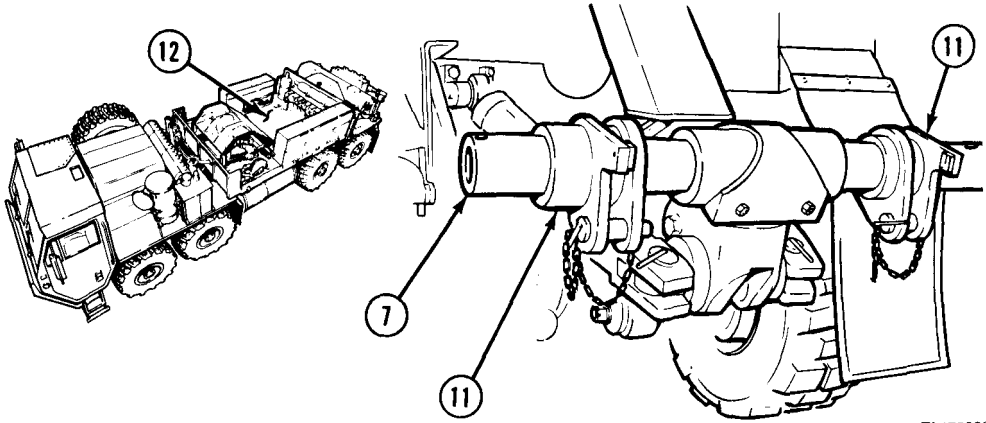
WARNING

When end caps are removed from crosstube, adapters may slide off causing personal injury.

- (6) Remove two quick pins (8) and pins (9) from end caps (10).
- (7) Remove two end caps (10) from crosstube (7).

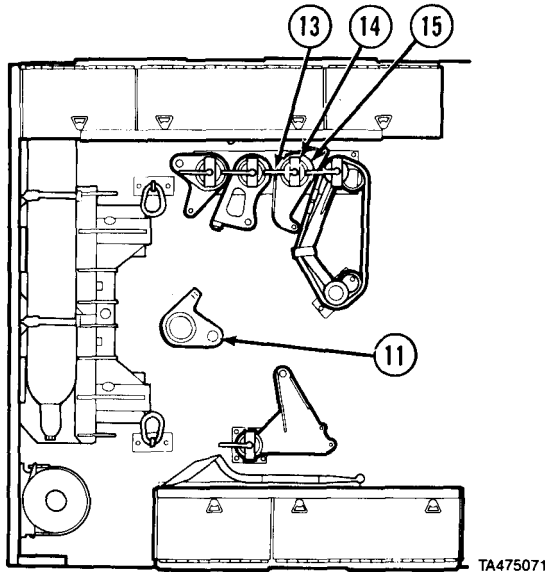
M984E1 General Operating Procedures (Cont)

2-85. TOW M1008 (CONT).



TA475065

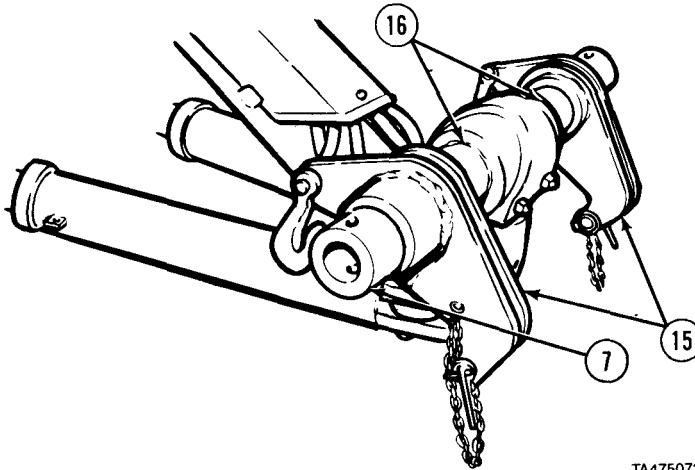
- (8) Remove two adapters (11) from crosstube (7) and body floor (12).



TA475071

- (9) Remove lock handle (13), lock plate (14), and two M1008 front tow adapters (15).
(10) Install two M977 front adapters (11) removed from crosstube, lock plate (14), and lock handle (13).
(11) Remove two 5-in. (127 mm) spacers and two 12-ft (3.5 m) tow chains from stowage.

M984E1 General Operating Procedures (Cont)



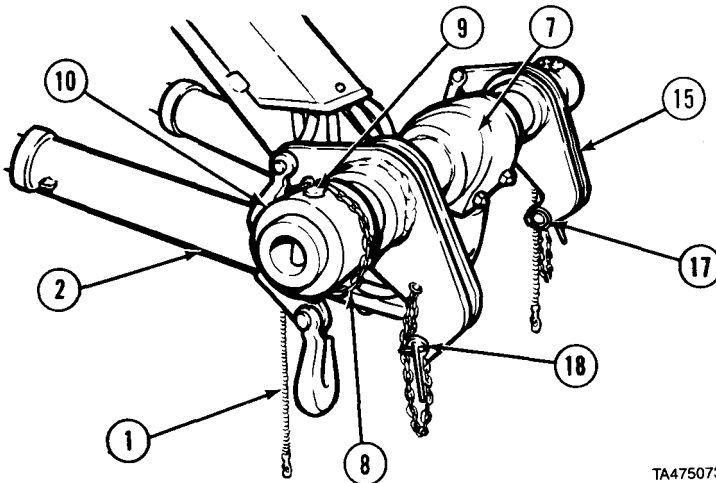
TA475072

- (12) Install two 5-in. (127 mm) spacers (16) on crosstube (7).

WARNING

Adapters and end caps may slide off when installing and may cause personal injury.

- (13) Install two M1008 front tow adapters (15) on crosstube (7).

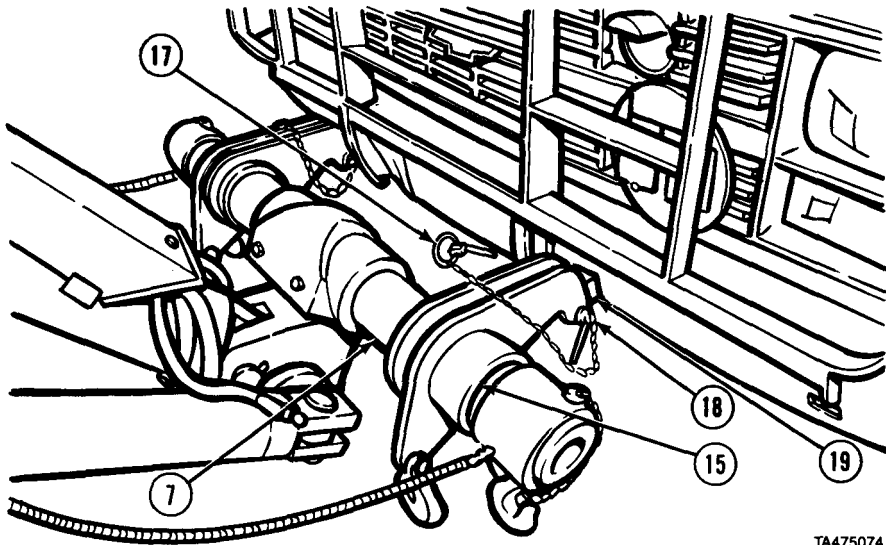


TA475073

- (14) Install two end caps (10) on crosstube (7)
 (15) Install two pins (9) and quick pins (8).
 (16) Attach two springs (1) on tow cylinders (2).
 (17) Remove two quick pins (17) and pin (18) from adapters (15).

M984E1 General Operating Procedures (Cont)

2-85. TOW M1008 (CONT).



TA475074

WARNING

Keep hands and fingers away from adapters and tow eyes when operating retriever controls. Personal injury could result.

CAUTION

If disabled vehicle has towing shackles installed, remove shackles and stow in disabled vehicle.

- (18) Soldier A operates retrieval system (para 2-72) while Soldier A and Soldier B position crosstube (7) so holes in adapters (15) align with front tow eyes (19).

CAUTION

Do not route pin chains between adapters and front bumper or damage to chains may result.

- (19) Insert two pins (13) through adapters (15) and front tow eyes (19). Install two quick pins (17) in pins (18).

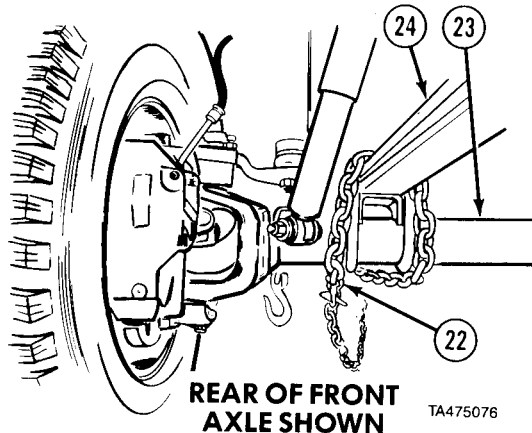
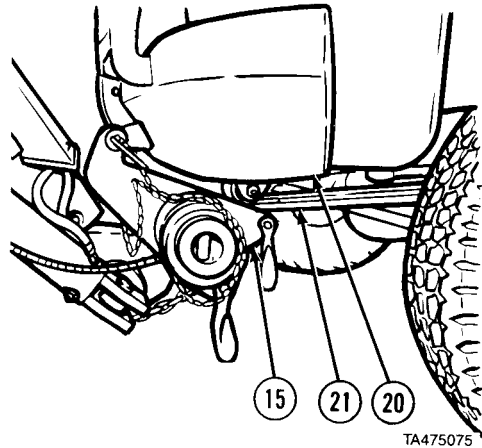
M984E1 General Operating Procedures (Cont)

- (20) Release PARKING BRAKE and place transmission in neutral on disabled vehicle (refer to M1008 operator's manual).

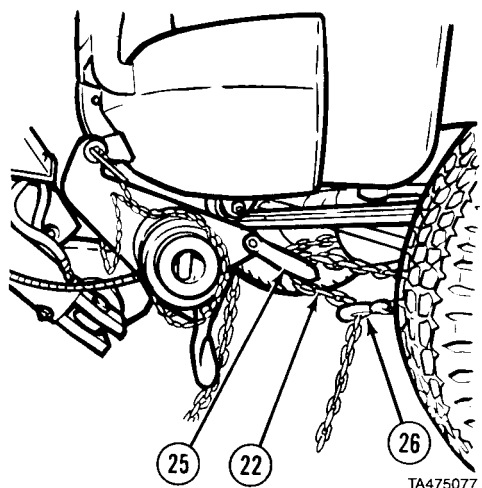
CAUTION

Do not contact pintle hook with lift cylinder. Equipment damage could occur.

- (21) Operate retriever controls to lower adapters (15) under front bumper (20) and up against front springs (21).
- (22) Apply PARKING BRAKE and place transmission in PARK on disabled vehicle (refer to M1008 operator's manual).
- (23) Route one 12-ft (3.5 m) tow chain (22) behind front axle (23) and loop over leaf spring (24) on disabled vehicle.

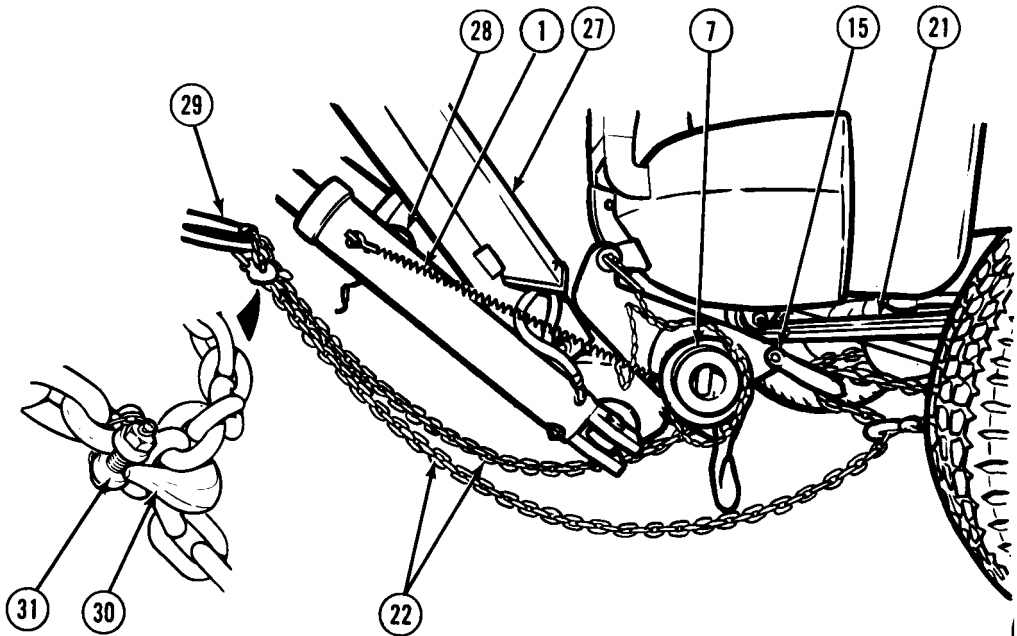


- (24) Route 12-ft (3.5 m) tow chain (22) through adapter grab hook (25).
- (25) Pull chain tight and attach grab hook (26) to chain near adapter grab hook (25).
- (26) Repeat steps (23), (24), and (25) for other side.



M984E1 General Operating Procedures (Cont)

2-85. TOW M1008 (CONT).



TA475078

(27) Release PARKING BRAKE and place transmission in neutral on disabled vehicle (refer to M1008 operator's manual).

CAUTION

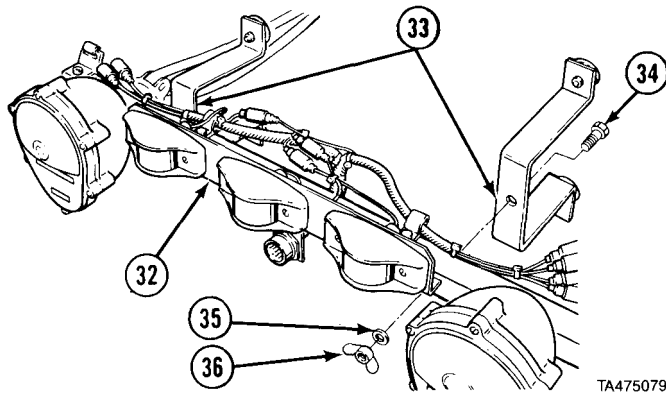
Do not contact pintle hook with lift cylinder.
Equipment damage could result.

- (28) Alternately push in TOW and LIFT CYLINDER control levers until lift cylinder (27) is approximately 1 in. (25 mm) from pintle hook (28).
(29) Push in LIFT CYLINDER control lever to retract lift cylinder (27) until adapters (15) are against front springs (21).

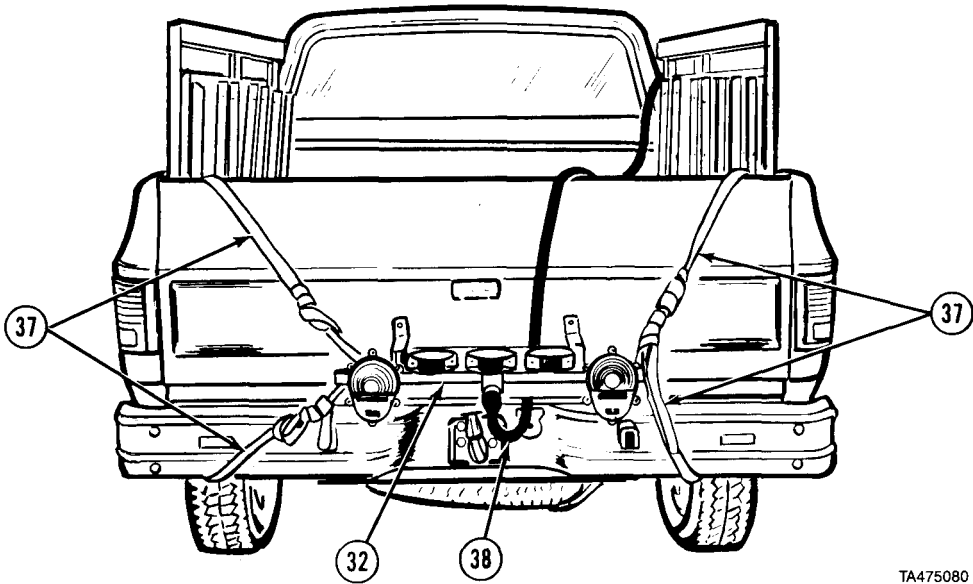
NOTE

- Safety chains can be routed to towing shackles or safety chain hoop. Towing shackles can be used only after tow cylinders are extended.
 - Adjust chain slack so safety chains just touch the ground.
 - Tow chains will act as safety chains when connected to wrecker.
- (30) Route two safety chains (22) through safety chain hoop (29) and secure grab hooks (30) with safety shackle (31).
(31) Wrap two springs (1) around crosstube (7) and secure.

M984E1 General Operating Procedures (Cont)



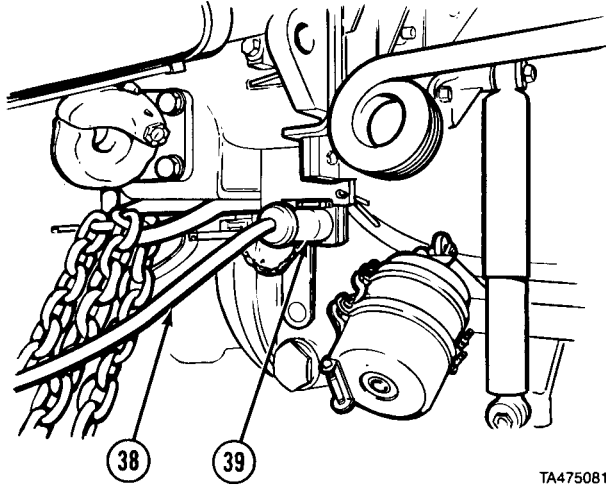
- (32) Prepare disabled vehicle for towing (refer to M1008 operator's manual).
- (33) Remove emergency tow lights (32) and two brackets (33) from stowage.
- (34) Install two brackets (33) in center holes of emergency tow lights with two screws (34), washers (35), and nuts (36).



- (35) Install emergency tow lights (32) on rear of M 1008 and fasten securely with straps (37).
- (36) Remove tow light cable (38) from stowage and connect to emergency tow lights (32).

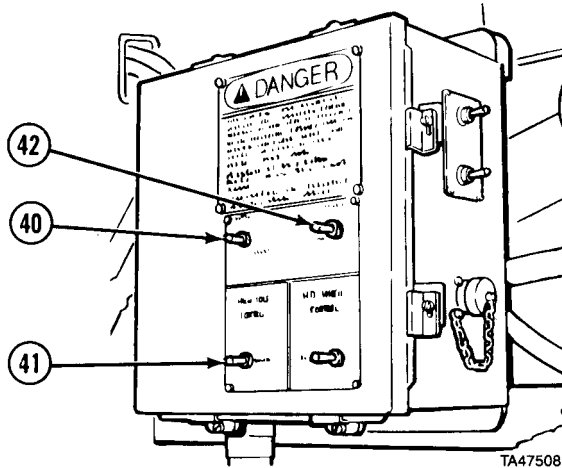
M984E1 General Operating Procedures (Cont)

2-85. TOW M1008 (CONT).



TA475081

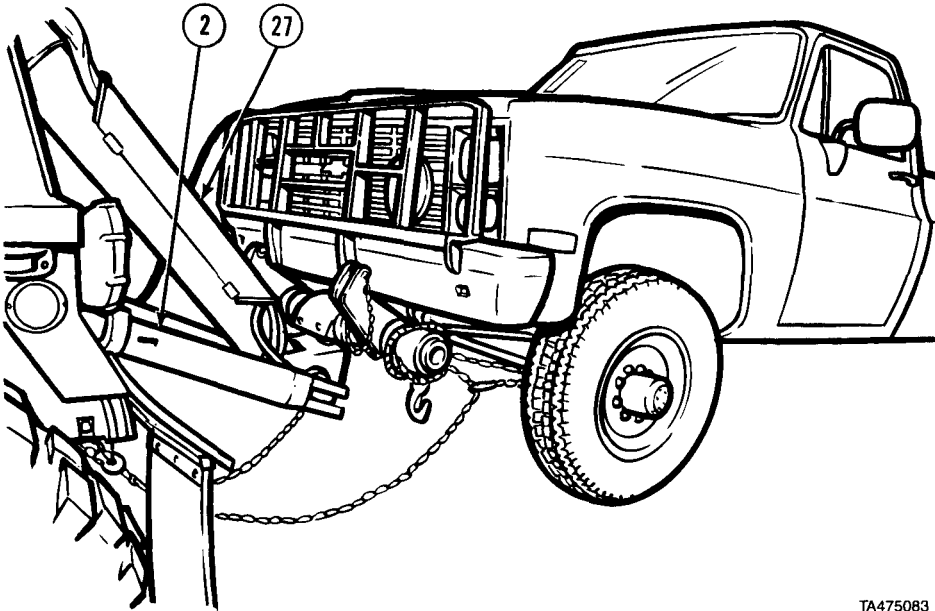
- (37) Route other end of tow light cable (38) along disabled vehicle and connect to rear electrical connector (39) on wrecker.



TA475082

- (38) Lock disabled vehicle's steering (refer to M1008 operator's manual).
(39) Set POWER switch (40) to ON position.
(40) Set HIGH IDLE switch (41) to CONTINUOUS.
(41) Push and release LATCH switch (42). Engine speed will increase to approximately 1500 rpm.

M984E1 General Operating Procedures (Cont)



TA475083

WARNING

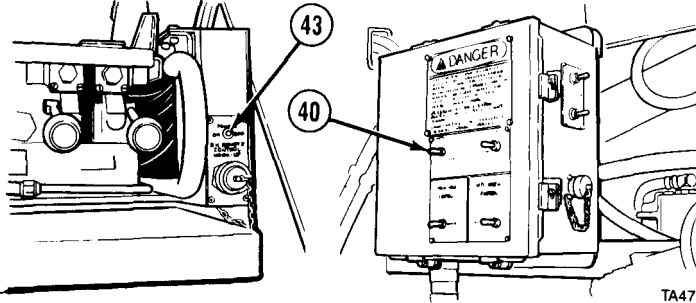
Keep out from under retrieval system and disabled vehicle when raised off ground or personal injury or death may result.

CAUTION

- Fully retract both tow cylinders before towing disabled vehicle or equipment damage may result.
 - Make sure all rigging is secure. Loose rigging can become entangled and cause damage to equipment.
- (42) Push in LIFT CYLINDER control lever to retract lift cylinder (27) until disabled vehicle is approximately 1 ft (30 cm) above ground.
- (43) Alternately push in TOW and LIFT CYLINDER control levers to retract lift cylinder (27) and until tow cylinders (2) are fully retracted and vehicle is approximately 1 ft (30 cm) above ground.

M984E1 General Operating Procedures (Cont)

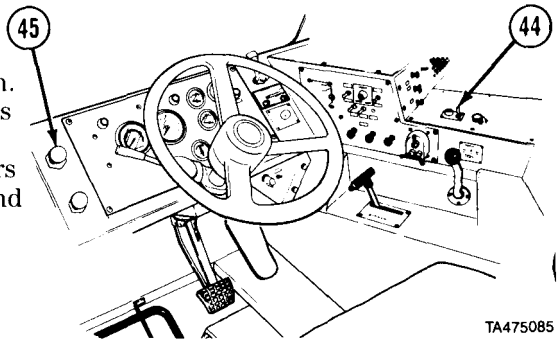
2-85. TOW M1008 (CONT).



TA475084

- (44) Set POWER switch (40) to OFF position.
- (45) Set POWER switch (43) to OFF position.

- (46) Set PTO ENGAGE switch (44) to OFF position.
- (47) Turn on service drive lights (para 2-10d).
- (48) Turn on emergency flashers on wrecker (para 2-44a) and disabled vehicle.
- (49) Push in PARKING BRAKE control (45) and select desired gear (para 2-11e).



TA475085

WARNING

The M984E1 should not be operated at speeds over 15 mph except on paved roads when the operator determines that the vehicle being towed and the terrain allow safe operation. Engine brake switch must be "ON" for all towing operations. The following are maximum safe speeds:

Terrain Condition	Maximum speed, towed load Up to 50,000 lbs	Maximum speed, towed load above 50,000 lbs
	on road-level	35
on road-hilly	30	20
off road	15	15

Speeds in excess of the above can result in loss of control, serious injury or death.

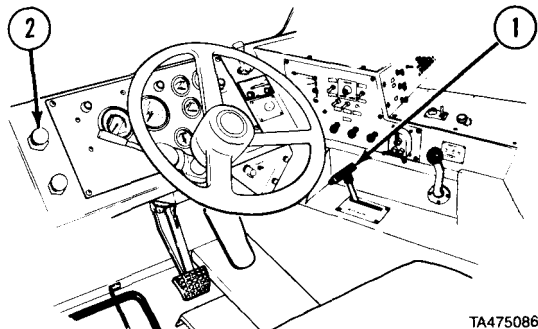
- (50) Transport disabled vehicle.

b. Front Disconnect.

NOTE

This is a two-soldier task.

- (1) Set transmission range selector (1) to N.
- (2) Pull PARKING BRAKE control (2).



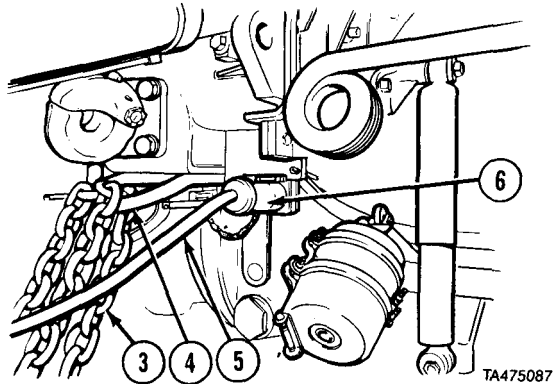
TA475086

M984E1 General Operating Procedures (Cont)

WARNING

Do not go underneath disabled vehicle while it is raised off ground. Falling vehicle could cause serious injury or death.

- (3) Remove safety chains (3) from safety chain hoop (4) or towing shackles.
- (4) Remove tow light cable (5) from electrical connector (6).



CAUTION

Any cargo in cargo bed must be tied down before doing steps (5) through (7), or cargo may be damaged.

NOTE

High idle must be engaged when lowering disabled vehicle.

- (5) Prepare retrieval system for operation (para 2-72) and push LIFT CYLINDER control lever to retract lift cylinder until tow cylinders are even with ground.

NOTE

Tow cylinders should remain even with ground during step (6).

- (6) Alternately extend lift and tow cylinders until tow cylinders are extended approximately 10 in. (25 cm).

CAUTION

Do not contact pintle hook with lift cylinder or equipment damage could occur.

- (7) Pull LIFT CYLINDER control lever to lower disabled vehicle to ground allowing safety chain at front axle to remain slack.

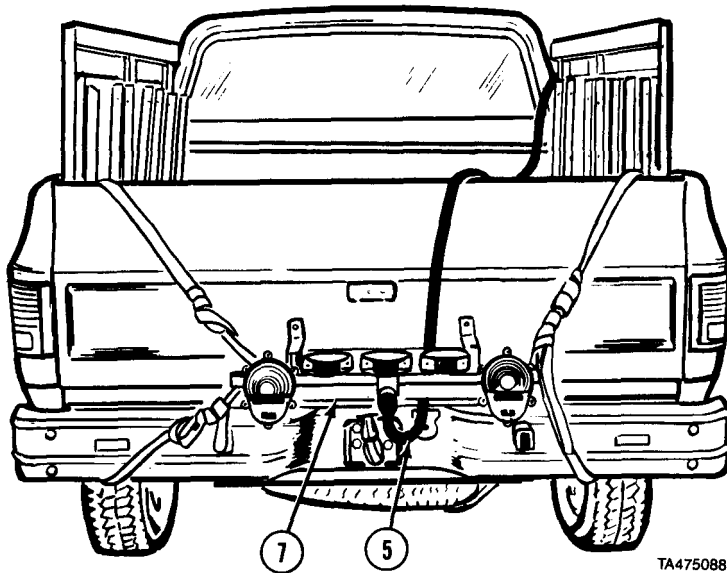
WARNING

If disabled vehicle's parking brake is inoperative, chock wheels of disabled vehicle. Failure to chock wheels may result in personal injury.

- (8) Apply PARKING BRAKE and place transmission in PARK on disabled vehicle (refer to M1008 operator's manual). If parking brake is inoperative, chock wheels on disabled vehicle.

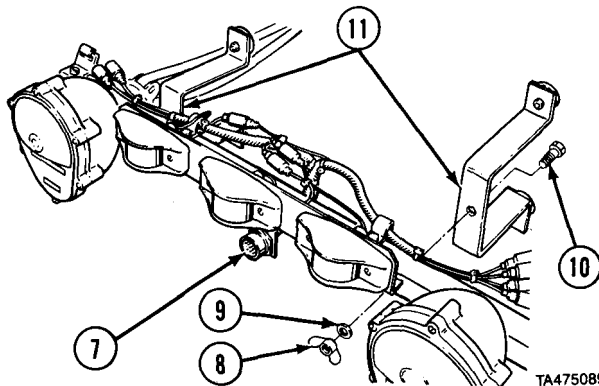
M984E1 General Operating Procedures (Cont)

2-85. TOW M1008 (CONT).



TA475088

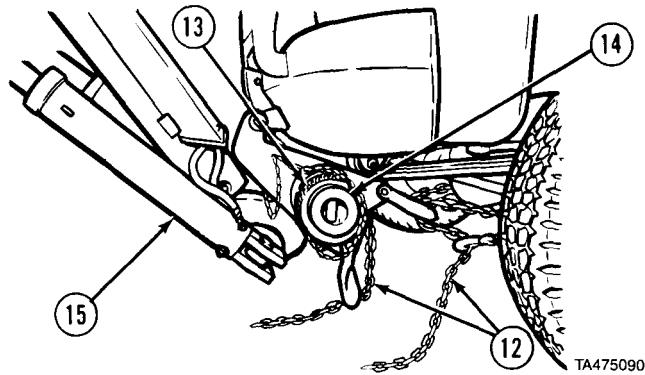
- (9) Remove tow light cable (5) from emergency tow lights (7). Stow tow light cable.
- (10) Remove emergency tow lights (7) from disabled vehicle.



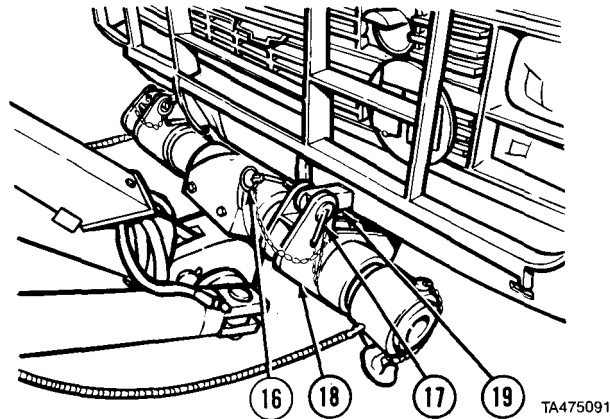
TA475089

- (11) Remove two nuts (8), washers (9), screws (10), and brackets (11) from emergency tow lights (7). Stow emergency tow lights and brackets.

M984E1 General Operating Procedures (Cont)



- (12) Remove and stow two safety chains (12).
- (13) Unwrap two springs (13) from crosstube (14) and connect to tow cylinders (15).



WARNING

Do not allow adapters to swing around. Injury to personnel may occur.

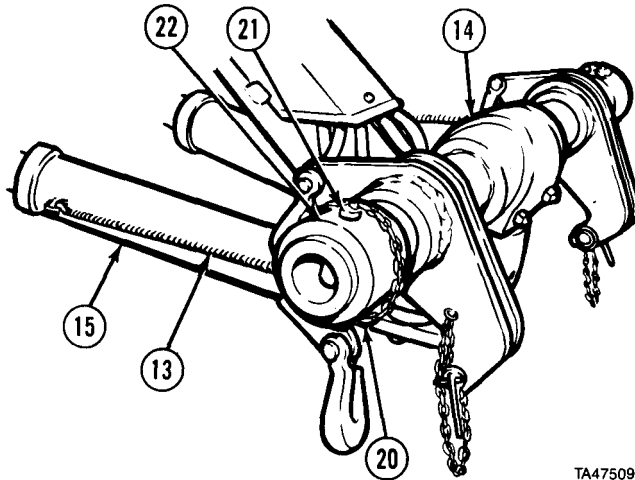
NOTE

Use retrieval controls to position crosstube to relieve tension from adapters.

- (14) Remove two quick pins (16) and pins (17) from adapters (18).
- (15) Remove two adapters (18) from tow eyes (19) on disabled vehicle.
- (16) Install two pins (17) in adapters (18).
- (17) Install two quick pins (16) in pins (1 7).

M984E1 General Operating Procedures (Cont)

2-85. TOW M1008 (CONT).



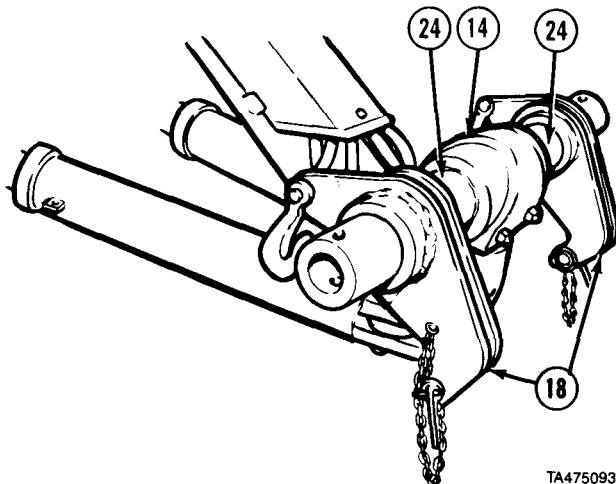
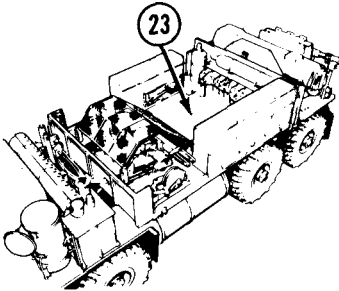
TA475092

(18) Drive wrecker forward several feet and park (para 2-110).

WARNING

As springs and end caps are removed, crosstube can swing in all directions, adapters may slide off and can cause personal injury.

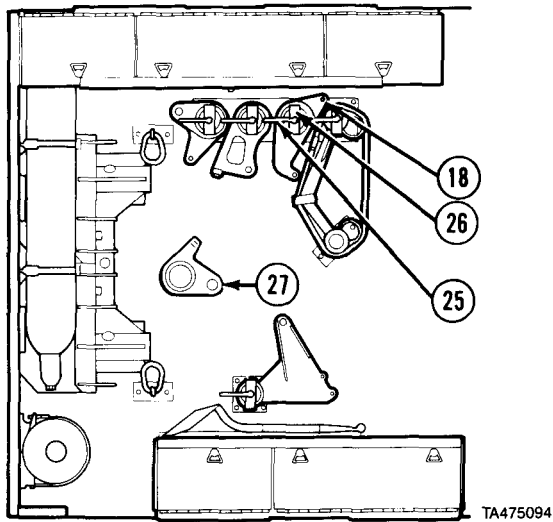
- (19) Remove two springs (13) from tow cylinders (15).
- (20) Remove two quick pins (20) and pin (21) from end caps (22).
- (21.) Remove two end caps (22) from crosstube (14).



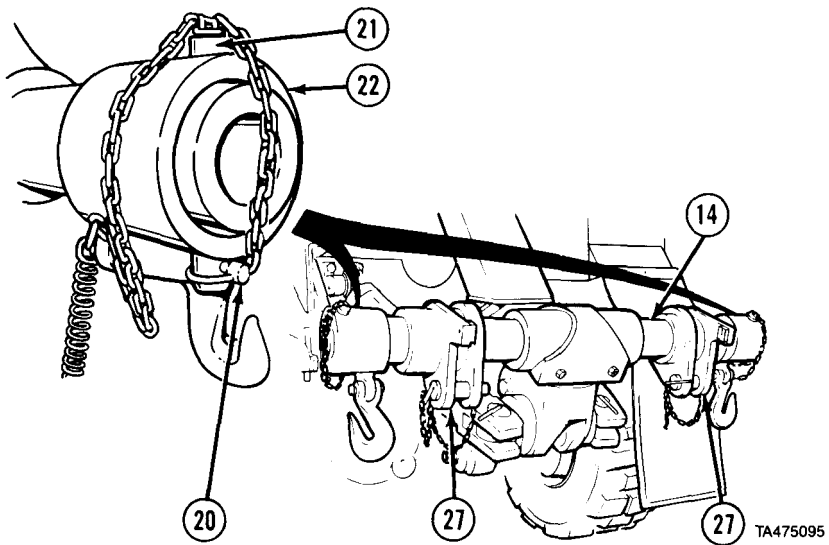
TA475093

- (22) Remove two adapters (18) from crosstube (14) and place on equipment body floor (23).
- (23) Remove two 5-in. (127 mm) spacers (24) from crosstube (14) and stow.

M984E1 General Operating Procedures (Cont)



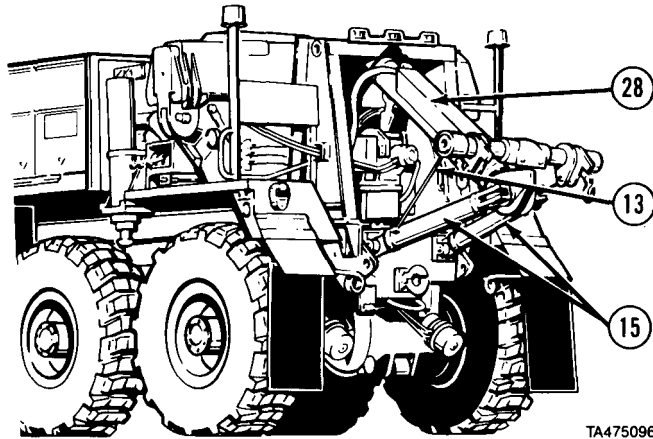
- (24) Remove lock handle (25), lock plate (26), and two M977 front adapters (27).
- (25) Install two adapters (18) removed from crosstube, lock plate (26), and lock handles (25).



- (26) Install two M977 front adapters (27) on crosstube (14).
- (27) Install two end caps (22) on crosstube (14). Install two pins (21) and quick pins (20).

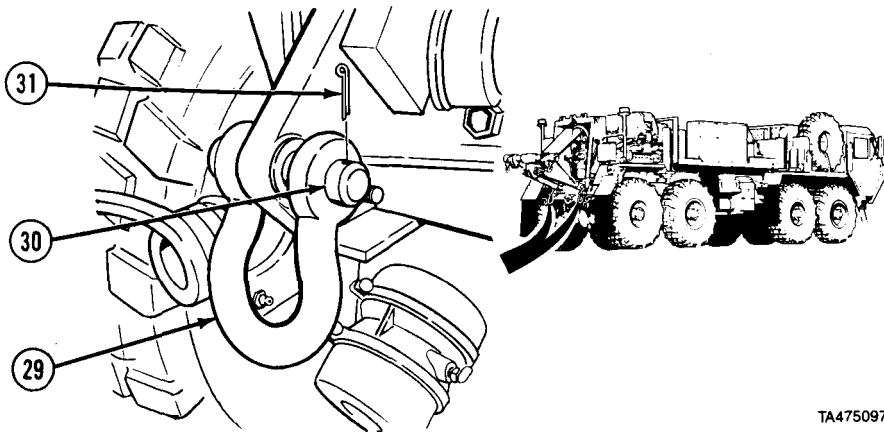
M984E1 General Operating Procedures (Cont)

2-85. TOW M1008 (CONT).



TA475096

- (28) Install two springs (13) on tow cylinders (15).
- (29) Operate retrieval controls and fully retract lift cylinder (28) and tow cylinder (15).



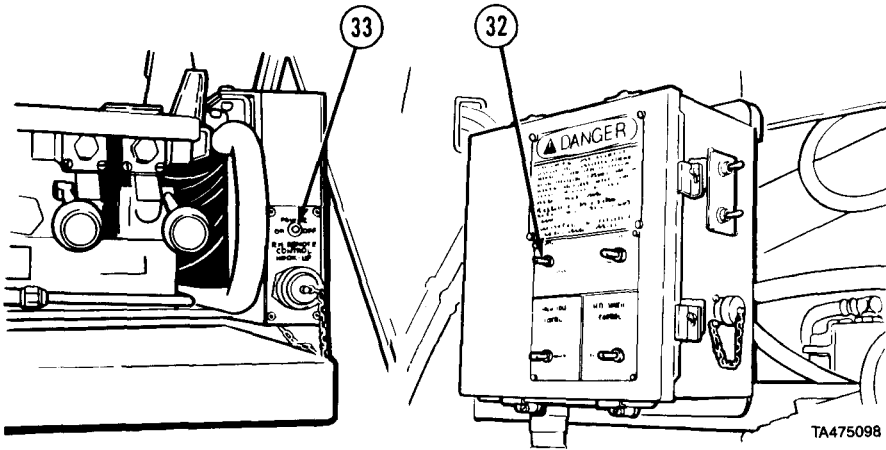
TA475097

NOTE

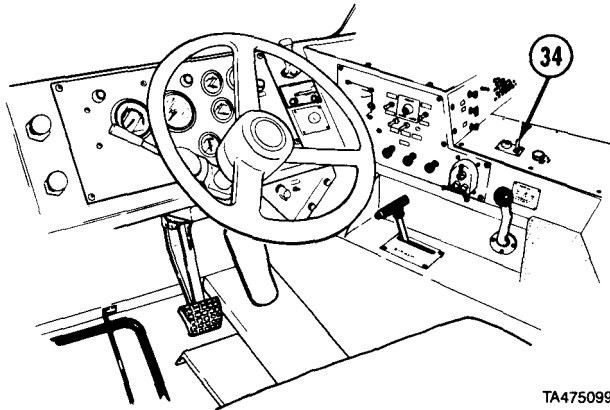
Right and left towing shackles are installed the same way.

- (30) Install two towing shackles (29), pins (30), and cotter pins (31).

M984E1 General Operating Procedures (Cont)



- (31) Set POWER switch (32) to OFF position.
- (32) Set POWER switch (33) to OFF position.



- (33) Turn off emergency flashers on wrecker (para 2-44f) and disabled vehicle.
- (34) Turn off service drive lights (para 2-10d).
- (35) Set PTO ENGAGE switch (34) to OFF position.
- (36) Remove and stow beacon lights (para 2-62).
- (37) Shut off engine (para 2-11p).
- (38) Unlock disabled vehicle's steering (refer to M1008 operator's manual).

M984E1 General Operating Procedures (Cont)

2-85. TOW M1008 (CONT).

C. Rear Hookup.

NOTE

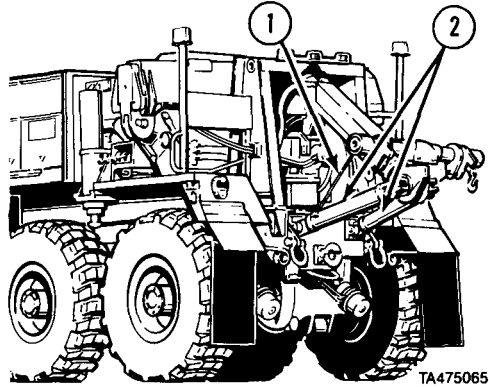
This is a two-soldier task.

(1) Prepare retrieval system for operation (para 2-72).

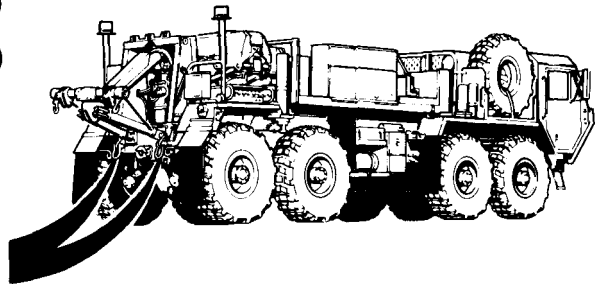
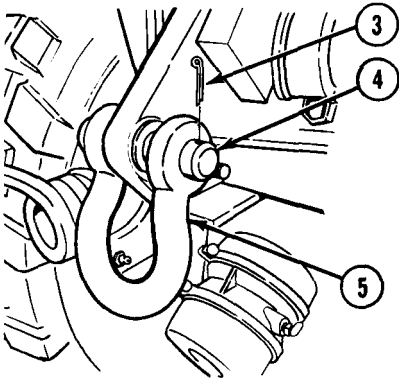
WARNING

Hold crosstube when removing springs. Crosstube may swing or cause adapter to slide resulting in personal injury.

(2) Disconnect two springs (1) from tow cylinders (2).



TA475065



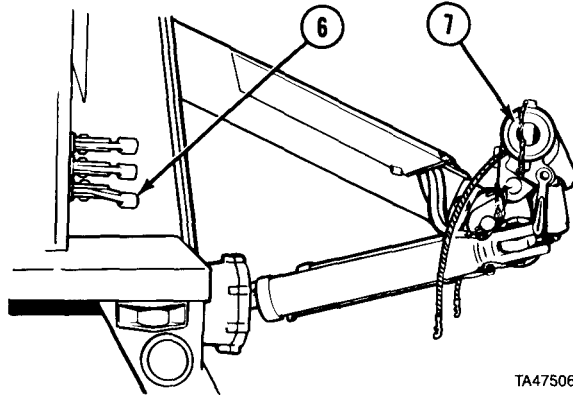
TA475066

NOTE

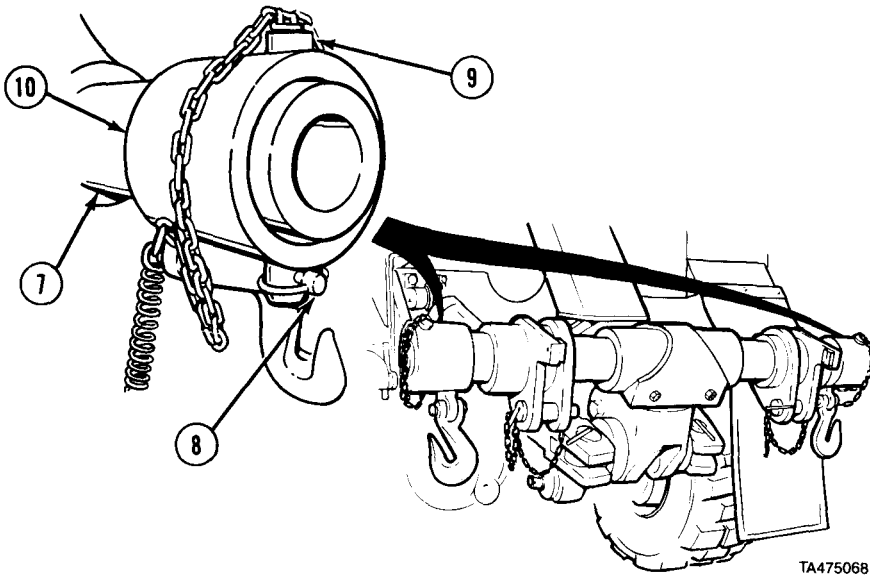
Right and left towing shackles are removed the same way.

(3) Remove two cotter pins (3), pins (4), and towing shackles (5) and stow.

M984E1 General Operating Procedures (Cont)



- (4) Pull LIFT CYLINDER control lever (6) to lower crosstube (7) to approximately 3 ft (1 m) above ground.
- (5) Position wrecker so that crosstube (7) is approximately 1 ft (30 cm) from tow eyes of disabled vehicle and centered on disabled vehicle.



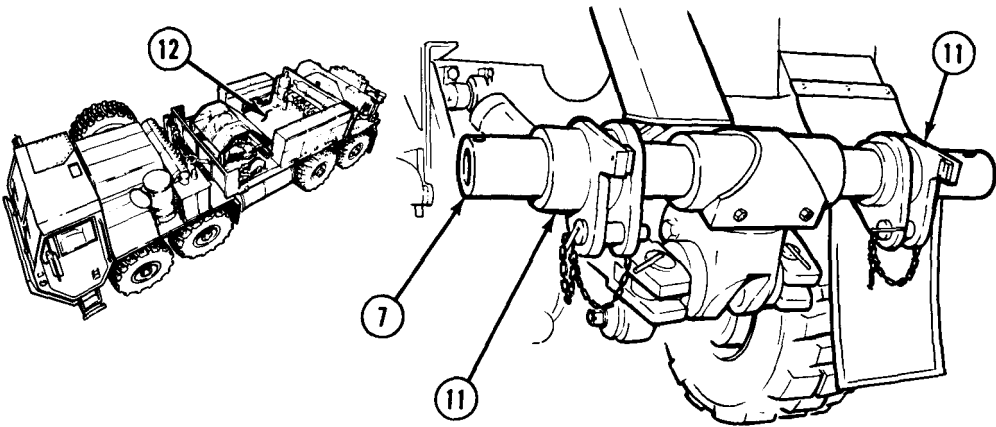
WARNING

When end caps are removed from crosstube, adapters may slide off, causing personal injury.

- (6) Remove two quick pins (8) and pins (9) from end caps (10).
- (7) Remove two end caps (10) from crosstube (7).

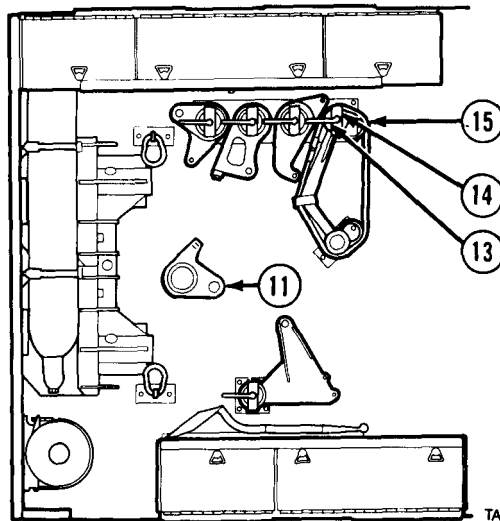
M984E1 General Operating Procedures (Cont)

2-85. TOW M1008 (CONT).



TA475069

- (8) Remove two M977 front adapters (11) from crosstube (7) and place on equipment body floor (12).



TA475100

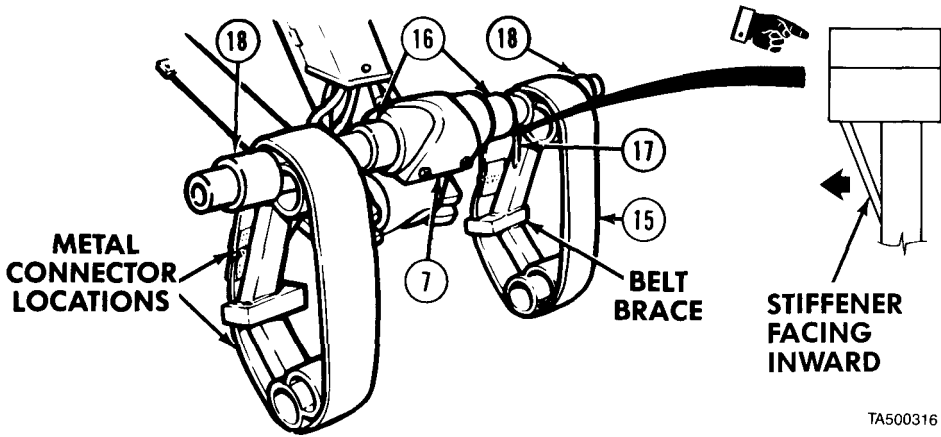
- (9) Remove lock handle (13), lock plate (14), and two M1008 strap adapters (15).

NOTE

All four chains are the same.

- (10) Remove four 12-ft (3.5 m) chains from stowage.
 (11) Remove two 4-in. (100 mm) spacers and two 5-in. (127 mm) spacers from stowage.
 (12) Install two M977 front adapters (11) removed from crosstube, with lock plate (14), and lock handle (13).

M984E1 General Operating Procedures (Cont)



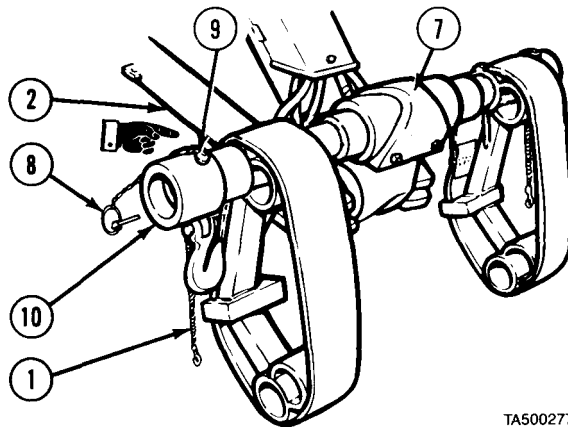
(13) Install two 4-in. (102 mm) spacers (16) on crosstube (7).

NOTE

Make sure metal connection is located on either side of belt brace and does not touch metal parts of adapters.

(14) Install two M1008 adapters (15) on crosstube (7) with stiffener (17) facing inward.

(14.1) Install two 5-in. (127 mm) spacers (18) on crosstube (7).



NOTE

End caps will hang over end of crosstube for M1008 strap adapters.

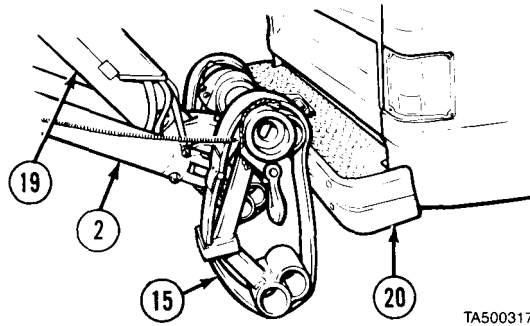
(15) Install two end caps (10) on crosstube (7).

(16) Install two pins (9) and quick pins (8).

(17) Attach two springs (1) on tow cylinders (2).

M984E1 General Operating Procedures (Cont)

2-85. TOW M1008 (CONT).

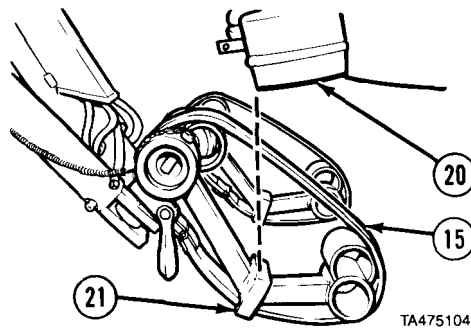


- (18) Extend both tow cylinders (2) 2 in. (50 mm) and lower lift cylinder (19) until M1008 adapters (15) are approximately 6 in. (150 mm) from ground.

NOTE

If disabled vehicle has towing shackles installed, remove shackles and stow in disabled vehicle.

- (19) Position wrecker so adapters (15) contact rear bumper (20) of disabled vehicle and are centered.



WARNING

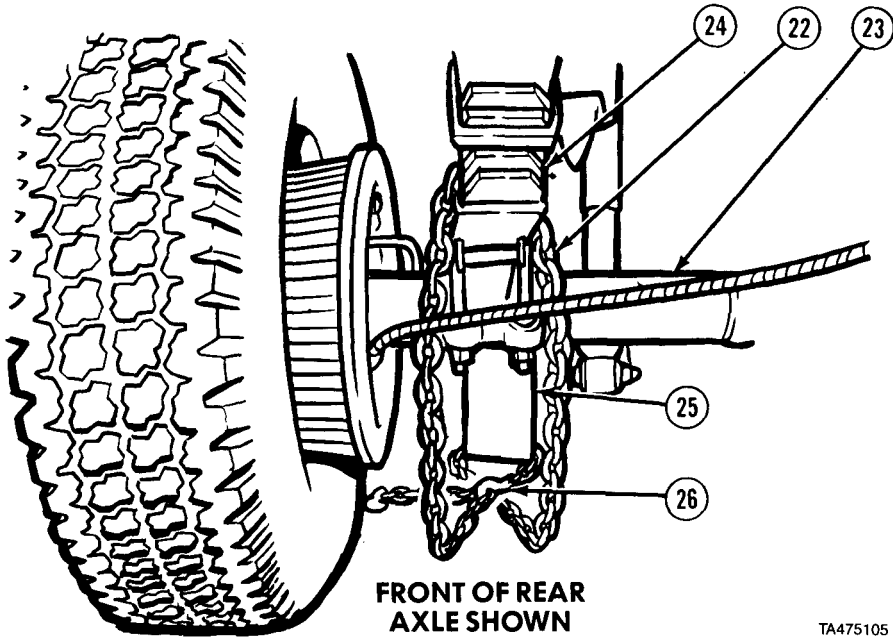
Keep hands and fingers away from adapters when operating retriever controls. Personal injury could result.

CAUTION

Do not contact pintle hook with lift cylinders. Equipment damage could result.

- (20) Soldier A operates retrieval controls while Soldier A and Soldier B guide adapters (15) down and under disabled vehicle's rear bumper (20) until belt brace (21) aligns with rear edge of bumper.

M984E1 General Operating Procedures (Cont)



TA475105

CAUTION

Do not allow brake cable to become pinched by tow chains or equipment damage could occur.

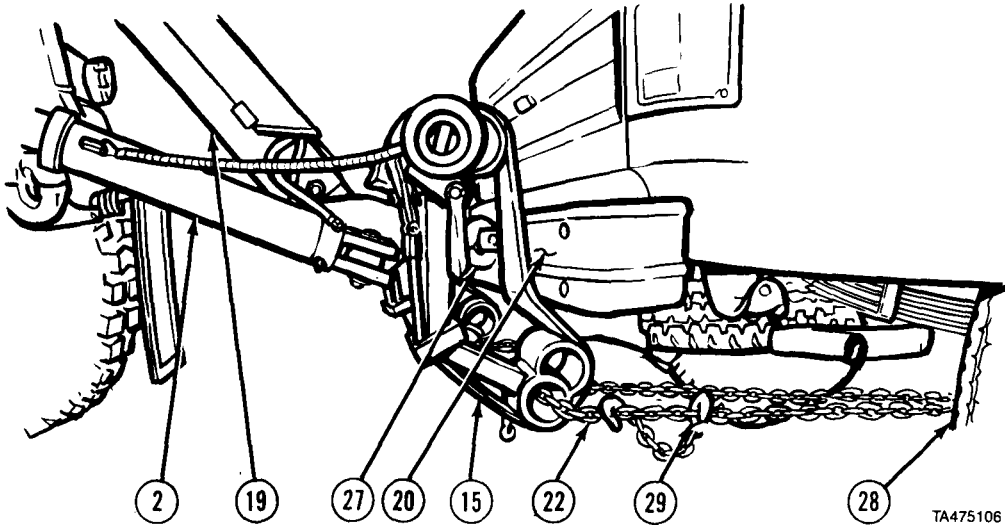
NOTE

Tow chains should be crossed and looped around rear leaf spring shackle bolts.

- (21) Route 12-ft (3.5 m) tow chain (22) in front of rear axle (23) and loop over leaf spring (24) on disabled vehicle.
- (22) Route 12-ft (3.5 m) tow chain (22) through lower adapter tube (25). Attach grab hook (26) to chain approximately 9 links from grab hook on other end of chain.
- (23) Repeat steps (21) and (22) for other side of disabled vehicle.

M984E1 General Operating Procedures (Cont)

2-85. TOW M1008 (CONT).



- (24) Release disabled vehicle's parking brake and place transmission in neutral (refer to M1008 operator's manual).
- (25) Using retrieval controls, retract tow cylinders (2) and lift cylinder (19) until adapters (15) are positioned tight against rear bumper (20) with tow eyes (27) between adapters and tow cylinders fully retracted.

CAUTION

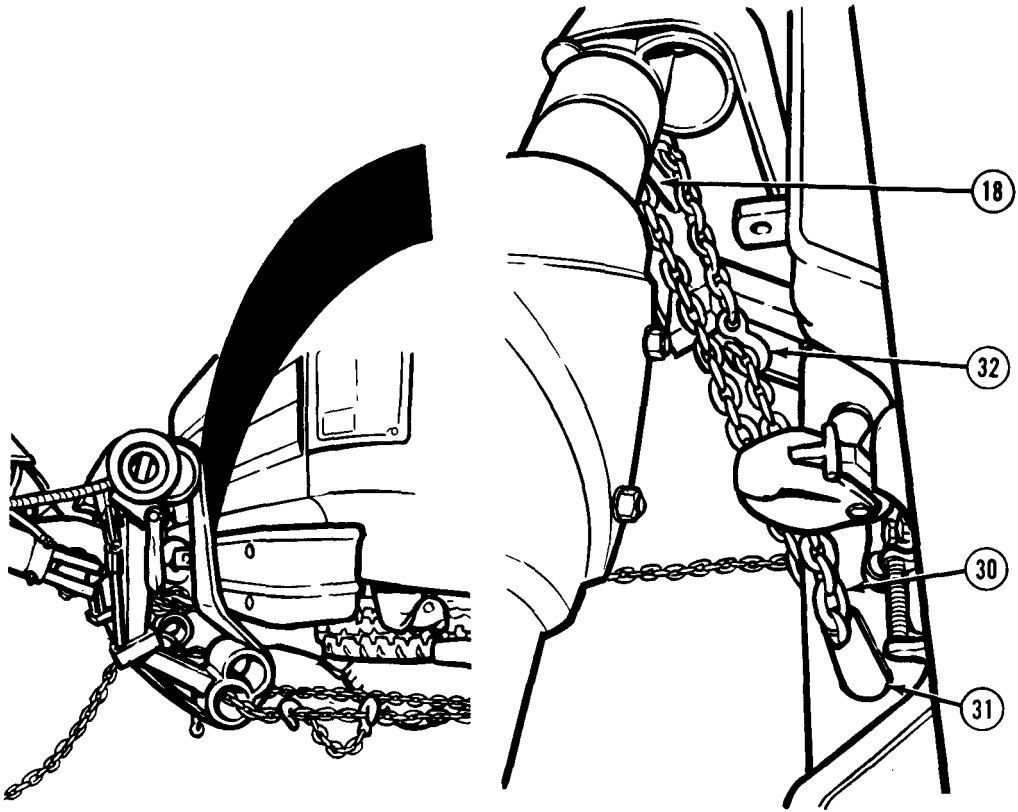
Make sure tow chain does not contact rear leaf spring shackle bolts or damage to equipment may result.

NOTE

12 ft (3.5 m) tow chain can be adjusted to allow strap adapters to lift evenly.

- (26) Raise disabled vehicle until rear tires (28) are approximately 6 in. (150 mm) above ground.
- (27) Lower disabled vehicle until rear tires (28) contact ground, but 12-ft (3.5 m) tow chains (22) remain tight,
- (28) Attach grab hooks (29) to 12-ft (3.5 m) tow chains (22).

M984E1 General Operating Procedures (Cont)

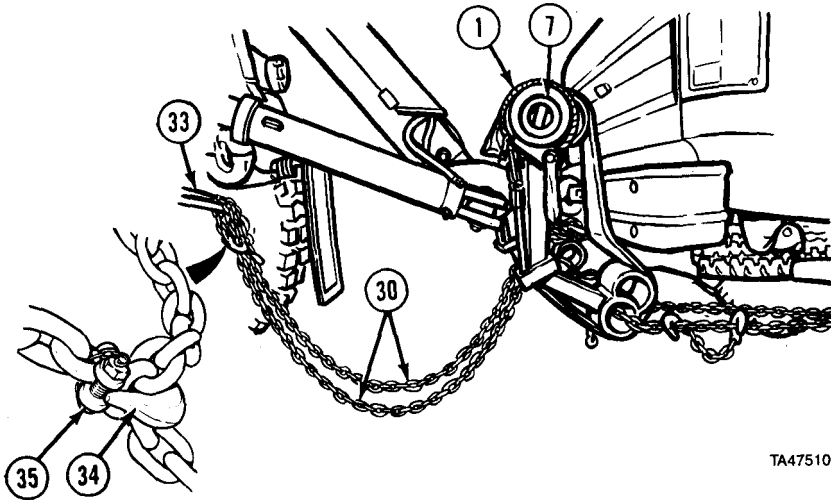
**NOTE**

Right side of disabled vehicle is opposite from right side of wrecker.

- (29) Route 12-ft (3.5 m) tow chain (30) through right adapter brace (18) and through right chain hole (31) on disabled vehicle.
- (30) Pull 12-ft (3.5 m) tow chain (30) tight and attach grab hook (32) to chain.
- (31) Repeat steps (29) and (30) for other side of disabled vehicle.

M984E1 General Operating Procedures (Cont)

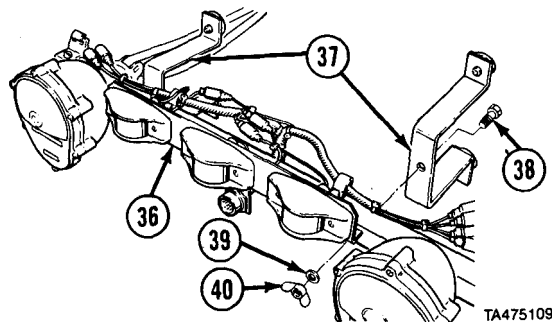
2-85. TOW M1008 (CONT).



NOTE

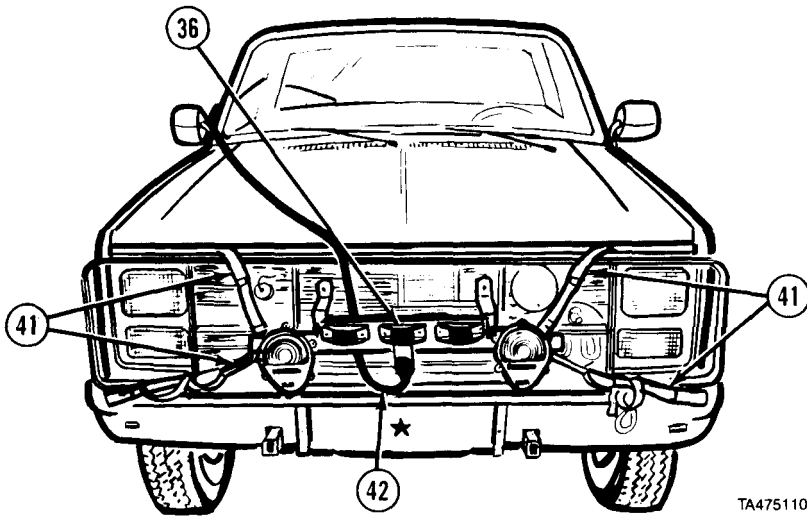
- Adjust chain slack so cross chains just touch the ground.
- Cross chains can be routed to towing shackles or safety chain hoop. Towing shackles can be used only when tow cylinders are extended.
- Cross chains will act as safety chains when connected to wrecker.

- (32) Route two 12-ft (3.5 m) cross chains (30) through safety chain hoop (33) on wrecker and secure grab hooks (34) with safety shackle (35).
- (33) Wrap two springs (1) around crosstube (7) and secure.



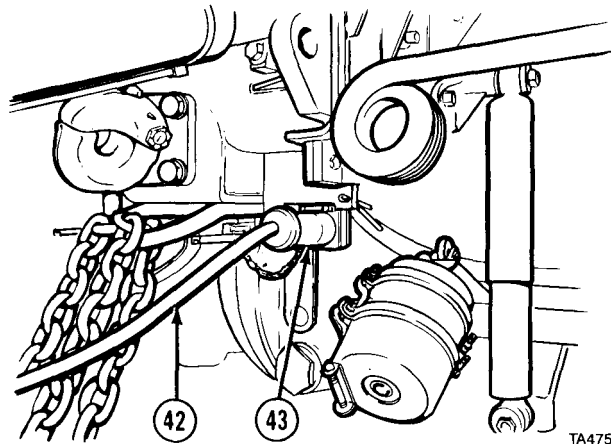
- (34) Prepare disabled vehicle for towing (refer to M1008 operator's manual).
- (35) Remove emergency tow lights (36) and two brackets (37) from stowage.
- (36) Install two brackets (37) in center holes of emergency tow lights with two screws (38), washers (39), and nuts (40).

M984E1 General Operating Procedures (Cont)



TA475110

- (37) Install emergency tow lights (36) on front of M 1008 and fasten securely with straps (41).
- (38) Remove tow light cable (42) from stowage and connect to emergency tow lights (36).

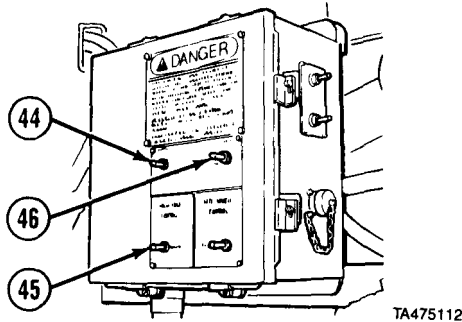


TA475111

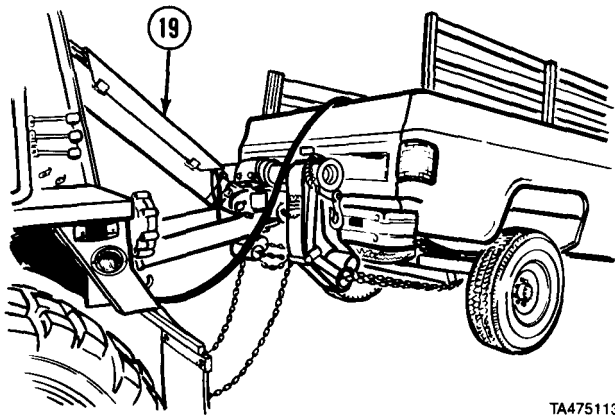
- (39) Route other end of tow light cable (42) along disabled vehicle and connect to rear electrical connector (43) on wrecker.

M984E1 General Operating Procedures (Cont)

2-85. TOW M1008 (CONT).



- (40) Set POWER switch (44) to ON position.
- (41) Set HIGH IDLE switch (45) to CONTINUOUS.
- (42) Push and release LATCH switch (46). Engine speed will increase to approximately 1500 rpm.



WARNING

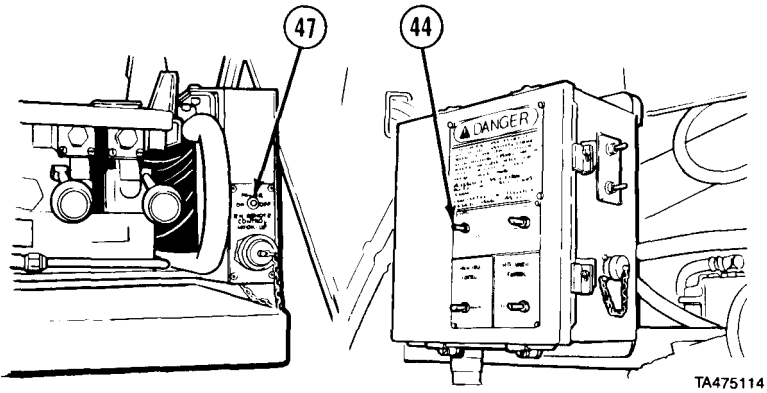
Keep out from under retrieval system and disabled vehicle when raised off ground or personal injury or death may result.

CAUTION

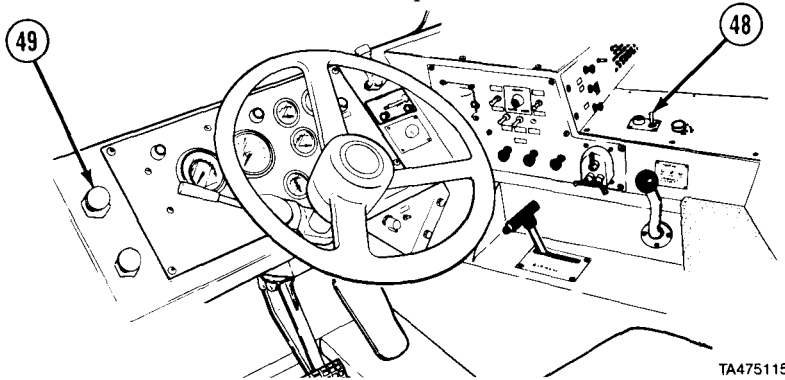
- Fully retract both tow cylinders before lifting disabled vehicle or equipment damage may result.
- Make sure all rigging is secure. Loose rigging can become entangled and cause damage to equipment.

- (43) Retract lift cylinder (19) to raise disabled vehicle 1 ft (30 cm) off ground.

M984E1 General Operating Procedures (Cont)



- (44) Set POWER switch (44) to OFF position.
- (45) Set POWER switch (47) to OFF position.



- (46) Set PTO ENGAGE switch (48) to OFF position.
- (47) Turn on service drive lights (para 2-10d).
- (48) Turn on emergency flashers on wrecker (para 2-44a) and disabled vehicle.
- (49) Push in PARKING BRAKE control (49) and select desired gear (para 2-11e).

WARNING

The M984E1 should not be operated at speeds over 15 mph except on paved roads when the operator determines that the vehicle being towed and the terrain allow safe operation. Engine brake switch must be "ON" for all towing operations. The following are maximum safe speeds:

Terrain Condition	Maximum speed, towed load up to 50,000 lbs	Maximum speed, towed load above 50,000 lbs
on road-level	35	30
on road-hilly	30	20
off road	15	15

Speeds in excess of the above can result in loss of control, serious injury or death.

- (50) Transport disabled vehicle.

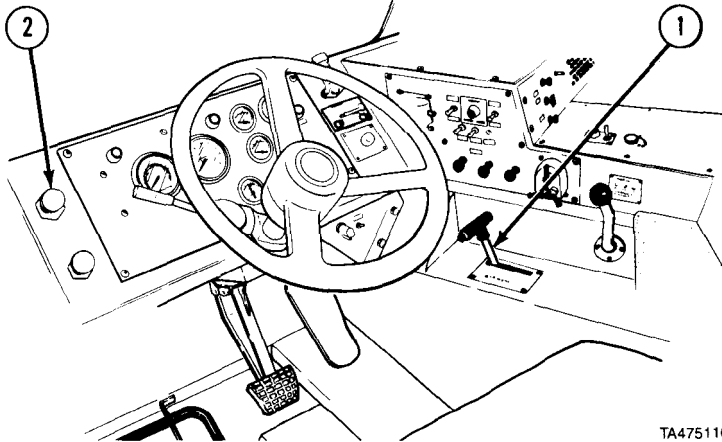
M984E1 General Operating Procedures (Cont)

2-85. TOW M1008 (CONT).

d. Rear Disconnect.

NOTE

This is a two-soldier task.



- (1) Set transmission range selector (1) to N.
- (2) Pull PARKING BRAKE control (2).

WARNING

Do not stand between vehicles while disabled vehicle is raised off ground. Falling vehicle can cause serious injury or death.

NOTE

After lowering disabled vehicle, extend lift and tow cylinders approximately 2 to 4 in. (50 to 100 mm) to allow for adjustment when removing adapters.

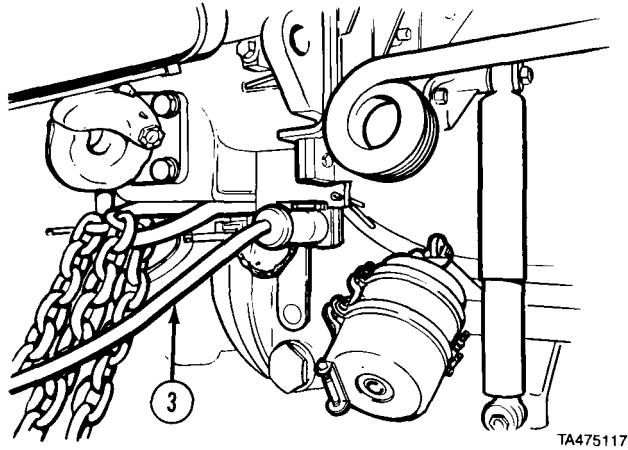
- (3) Prepare retrieval system for operation (para 2-72) by alternately pulling TOW and LIFT CYLINDER control levers to extend lift cylinder and tow cylinders to lower towed vehicle to ground but allowing tow chains to remain tight.

WARNING

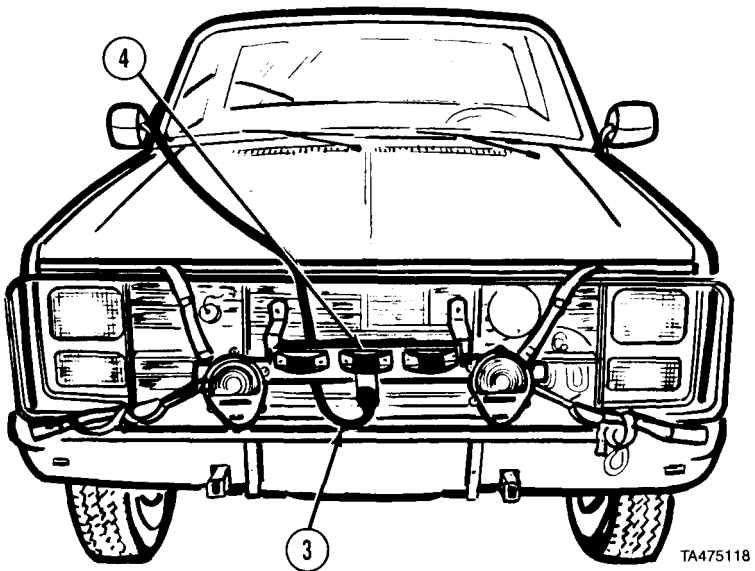
If disabled vehicle's parking brake is inoperative, chock wheels of disabled vehicle. Failure to chock wheels may result in personal injury.

- (4) Apply PARKING BRAKE and place transmission in PARK on disabled vehicle (refer to M1008 operator's manual). If parking brake is inoperative, chock wheels on disabled vehicle.

M984E1 General Operating Procedures (Cont)



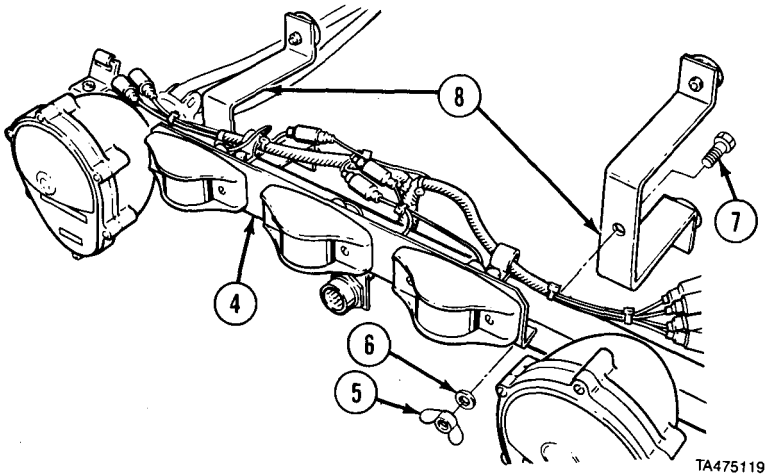
(5) Remove tow light cable (3) from wrecker.



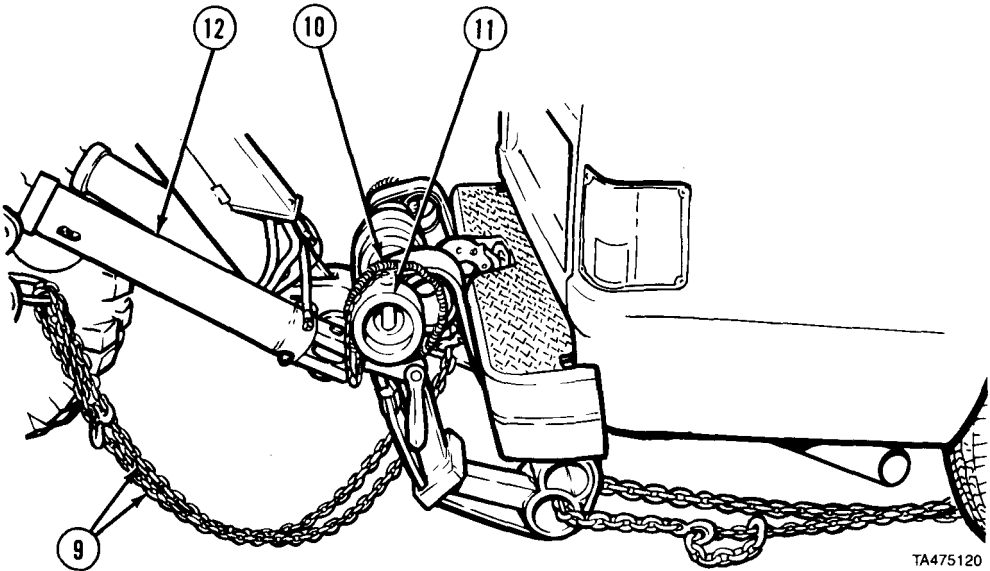
(6) Remove tow light cable (3) from emergency tow lights (4) and stow.
(7) Remove emergency tow lights (4) from disabled vehicle.

M984E1 General Operating Procedures (Cont)

2-85. TOW M1008 (CONT).

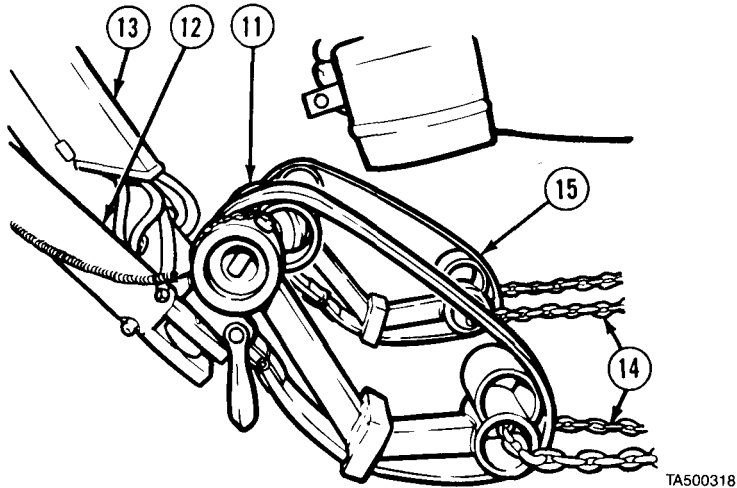


- (8) Remove two nuts (5), washers (6), screws (7), and brackets (8) from emergency tow lights (4). Stow emergency tow lights and brackets.



- (9) Remove and stow two 12-ft (3.5 m) tow chains (9).
- (10) Unwrap two springs (10) from crosstube (11) and connect to tow cylinders (12).

M984E1 General Operating Procedures (Cont)

**CAUTION**

Do not contact pintle hook with lift cylinder or damage to equipment could result.

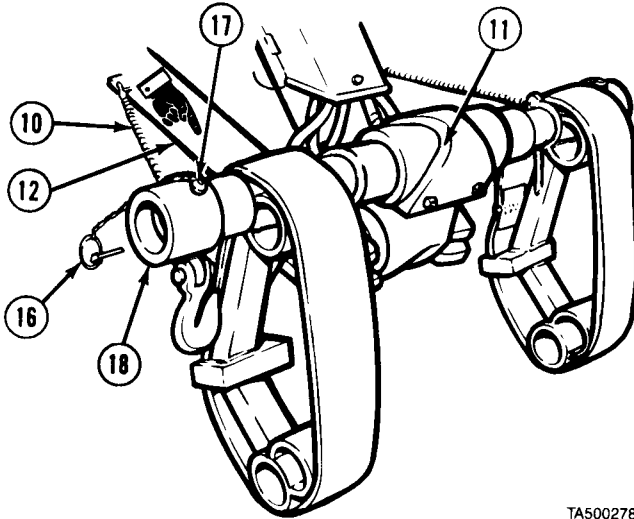
- (11) Pull TOW CYLINDER control levers and LIFT CYLINDER control lever to extend tow cylinders (12) and lift cylinder (13) until 12-ft (3.5 m) tow chains (14) are slack and adapters (15) rest on ground.
- (12) Remove and stow two 12-ft (3.5 m) tow chains (14)

CAUTION

Do not contact pintle hook with lift cylinder or damage to equipment could occur.

- (13) Using retrieval controls, fully retract tow cylinders (12) and retract lift cylinder (13) to raise cross-tube (11) approximately 3 ft (1 m) from ground.

2-85. TOW M1008 (CONT).



TA500278

(14) Drive wrecker forward several feet and park (para 2-110).

WARNING

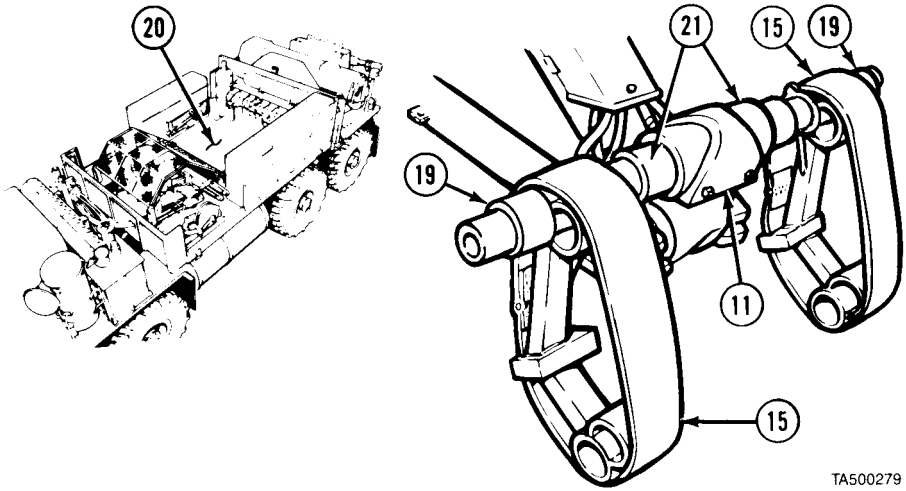
As springs and end caps are removed, crosstube can swing in all directions, adapters may slide off and can cause personal injury.

(15) Remove two springs (10) from tow cylinders (12).

(16) Remove two quick pins (16) and pins (17) from end caps (18).

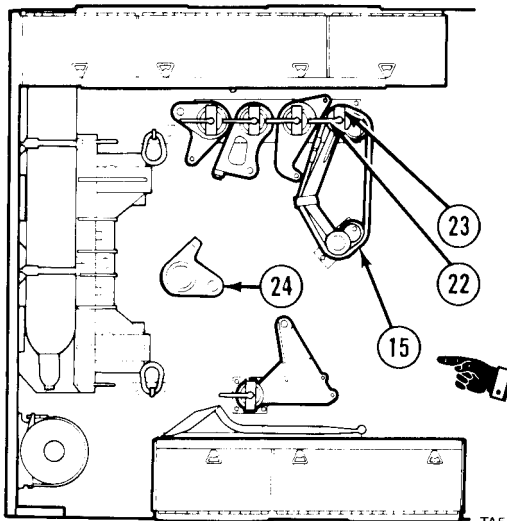
(17) Remove two end caps (18) from crosstube (11).

M984E1 General Operating Procedures (Cont)



TA500279

- (17.1) Remove and stow two 5-in. (127 mm) spacers (19) from crosstube (11).
- (18) Remove two adapters (15) from crosstube (11) and place on equipment body floor (20).
- (19) Remove and stow two 4-in. (102 mm) spacers (21) from crosstube (1 1).

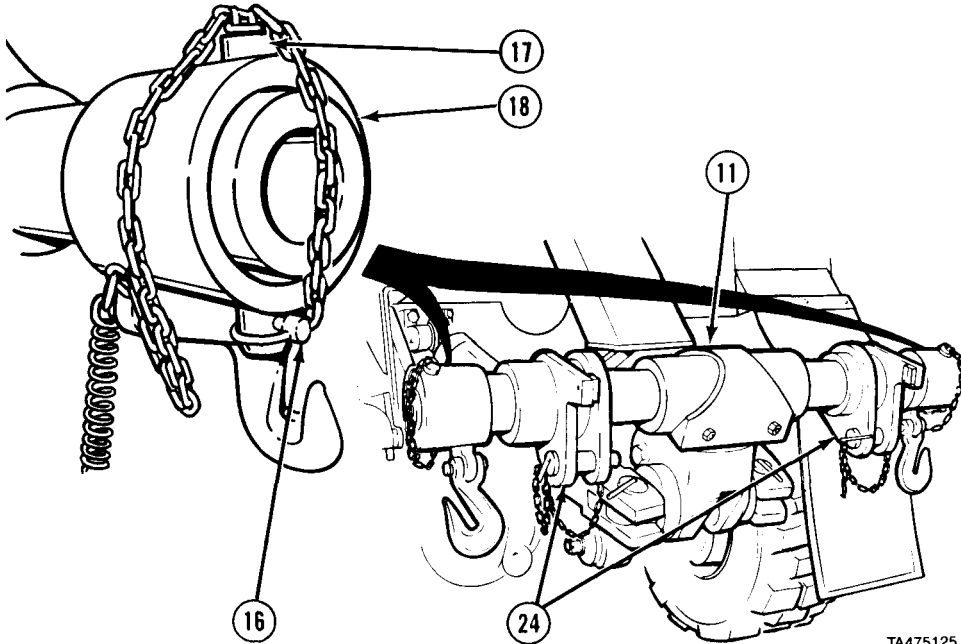


TA500319

- (20) Remove lock handle (22), lock plate (23), and two M977 front adapters (24).
- (21) Install two M1008 adapters (15), removed from crosstube, lock plate (23), and lock handle (22).

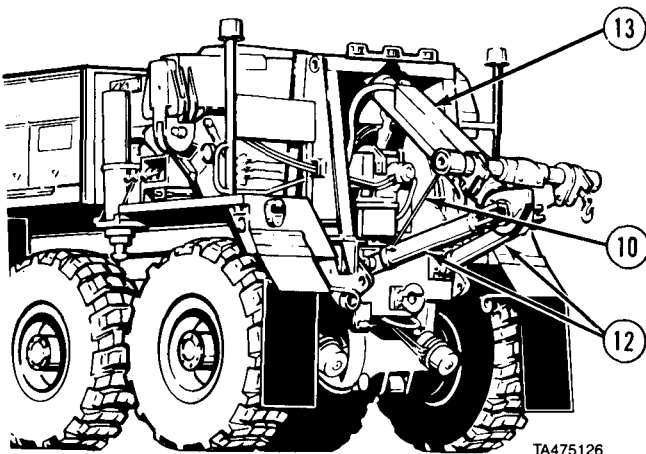
M984E1 General Operating Procedures (Cont)

2-85. TOW M1008 (CONT).



TA475125

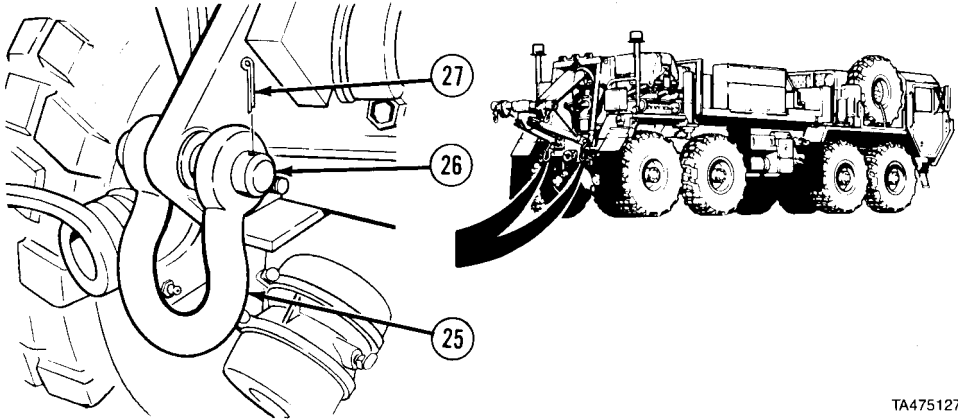
- (22) Install two M977 front adapters (24) on crosstube (11).
- (23) Install two end caps (18) on crosstube (11). Install two pins (17) and quick pins (16).



TA475126

- (24) Install two springs (10) on tow cylinders (12).
- (25) Operate retrieval controls and fully retract lift cylinder (13).

M984E1 General Operating Procedures (Cont)

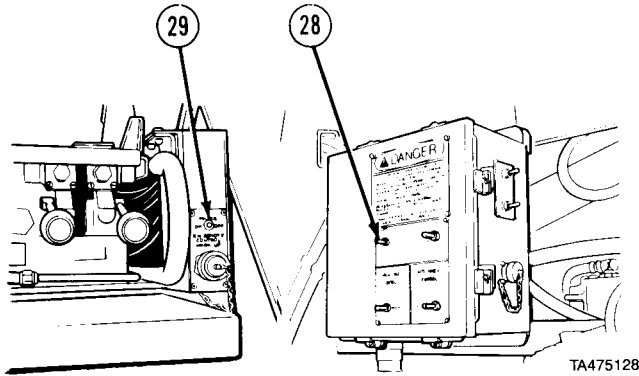


TA475127

NOTE

Right and left towing shackles are installed the same way.

(26) Install two towing shackles (25), pins (26), and cotter pins (27).



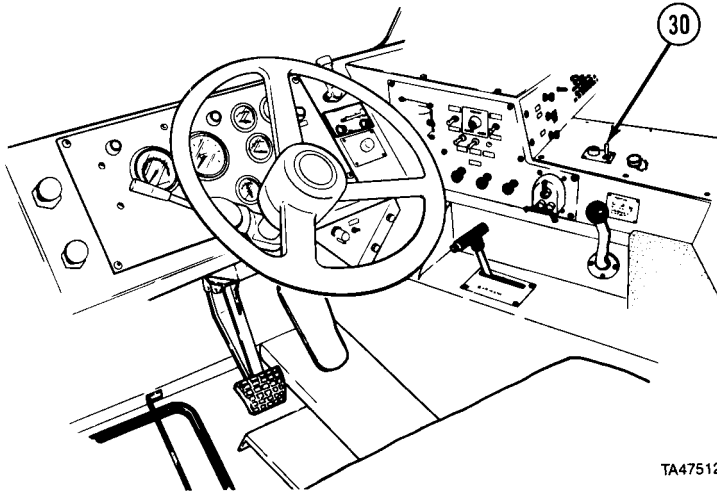
TA475128

(27) Set POWER switch (28) to OFF position.

(28) Set POWER switch (29) to OFF position.

M984E1 General Operating Procedures (Cont)

2-85. TOW M1008 (CONT).



TA475129

- (29) Turn off emergency flashers on wrecker (para 2-44f) and disabled vehicle.
- (30) Turn off service drive lights (para 2-10d).
- (31) Set PTO ENGAGE switch (30) to OFF position.
- (32) Remove and stow beacon lights (para 2-62).
- (33) Shut off engine (para 2-11p).
- (34) Unlock disabled vehicle's steering (refer to M1008 operator's manual).

M984E1 General Operating Procedures (Cont)

2-86. POWER PLANT REMOVAL/INSTALLATION.

a. *Vehicle/Technical manual List.*

- (1) The M984E1 wrecker can be used to remove and install power plants for various tracked and wheeled vehicles and vehicle series.
- (2) Refer to the following list of vehicles and corresponding Technical Manuals when removing and installing power plants:

M1	TM 9-2350-255-20
M2/M3	TM 9-2350-252-20
M35	TM 9-2320-209-34
M60A3	TM 9-2350-253-20
M88A1	TM 9-2350-256-20
M109	TM 9-2350-217-20
M123	TM 9-2320-206-34
M151	TM 9-2320-218-34
M880	TM 9-2320-266-34
M911	TM 9-2320-270-34
M915	TM 9-2320-273-34
M939	TM 9-2320-272-34
M998	TM 9-2320-280-34
M977	TM 9-2320-279-34
M1001	TM 9-2320-282-34
M1008	TM 9-2320-283-34

b. *Remove Power Plant.*

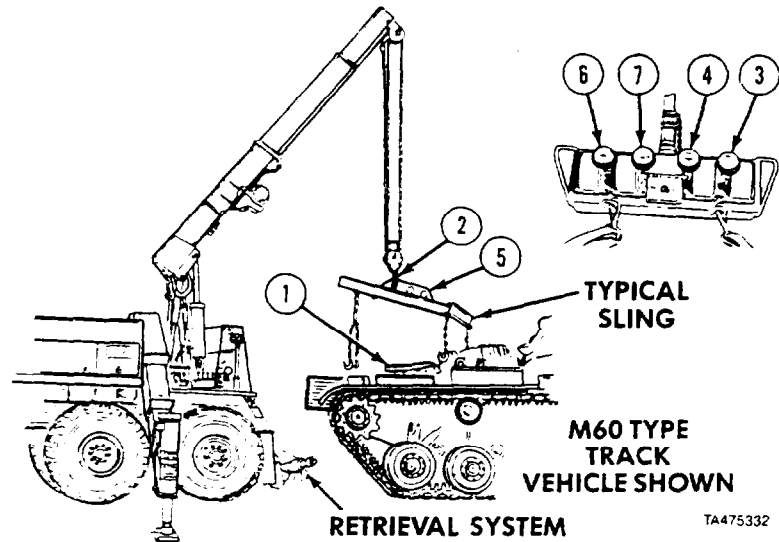
WARNING

Wrecker must be on level ground when removing power plant. If ground is not level wrecker can tip and damage vehicle.

- (1) See applicable TM for sling or special tool required for power plant removal.

M984E1 General Operating Procedures (Cont)

2-86. POWER PLANT REMOVAL/INSTAUA.TION (CONT).



WARNING

Attach guide rope to sling to prevent uncontrolled movement while positioning crane. Personal injury or equipment damage may result.

NOTE

- Retrieval system may be lowered to assist in getting closer to vehicle.
 - Position wrecker for best access to power plant and as close as possible,
 - Refer to applicable vehicle Technical Manual to connect lifting sling to power plant.
- (2) Position rear of wrecker directly in line with power plant (1) and as close to vehicle as possible without making contact.
 - (3) Set up wrecker crane for operation in remote control (para 2-64).
 - (4) Attach sling or special tool to crane load hook (2).
 - (5) Move HOIST control lever (3) and BOOM control lever (4) to UP position to lift sling (5) and operate SWING control lever (6) and TELESCOPE control lever (7) to position sling over power plant (1).
 - (6) Operate HOIST Control (3) to lower sling (5) to allow sling chains to be connected to to power plant.

M984E1 General Operating Procedures (Cont)**WARNING**

Be sure there are at least two wraps of cable on hoist drum at all times. Serious injury or death could result if cable comes off hoist drum while lifting load.

CAUTION

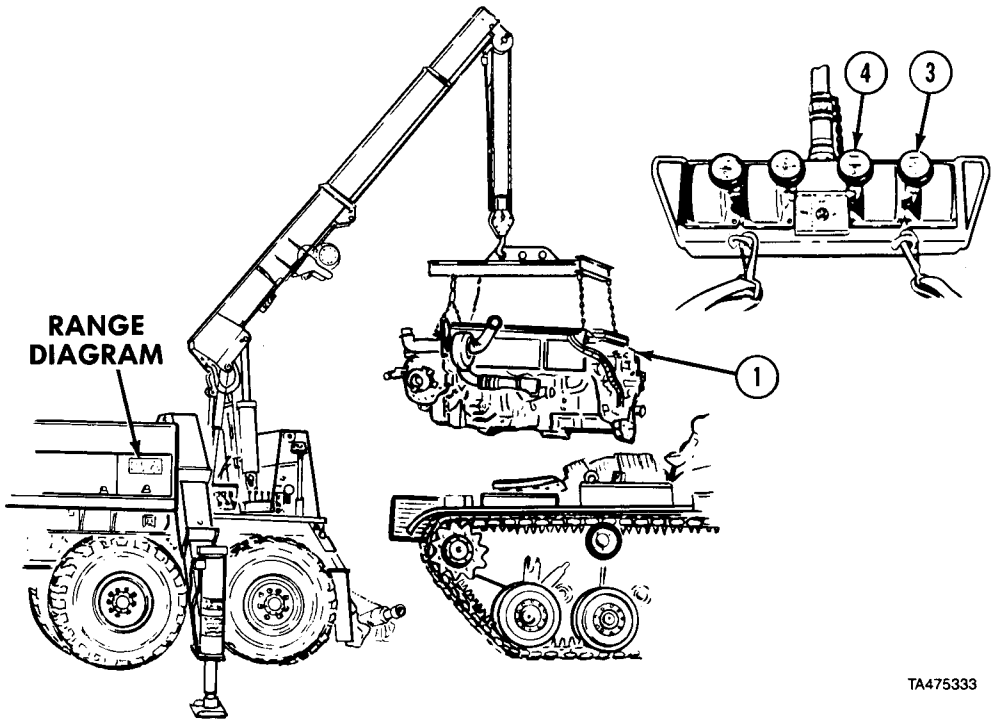
- Refer to applicable vehicle TM to prepare vehicle for power plant removal to prevent equipment damage.
- Do not jerk HOIST control lever or load will bounce, possibly causing damage to crane or load.
- For M984E 1 maximum load limit and radius swing is:
 - 6,000 lb at 18 ft 2 in. Radius (2700 kg at 5.5 m)
 - 8,000 lb at 16 ft 5 in. Radius (3600 kg at 5.0 m)
 - 12,000 lb at 11 ft 10 in. Radius (5400 kg at 3.6 m)
 - 14,000 lb at 9 ft 0 in. Radius (6300 kg at 2.7 m)
- . Make sure you refer to RANGE DIAGRAM M984E1 located on either side of equipment body to prevent equipment damage.
- Do not go over maximum load limit. Going over maximum load limit will cause electrical shutdown for six seconds or until load is lowered.
- Do not allow power plant to swing and come in contact with vehicle. Power plant may be damaged.

NOTE

Chains are available on the M984E1 which can be used to guide the power plant during removal.

M984E1 General Operating Procedures (Cont)

2-86. POWER PLANT REMOVAL/INSTALLATION (CONT).



TA475333

WARNING

Keep out from under power plant. Power plant can slip or fall and cause injury or death.

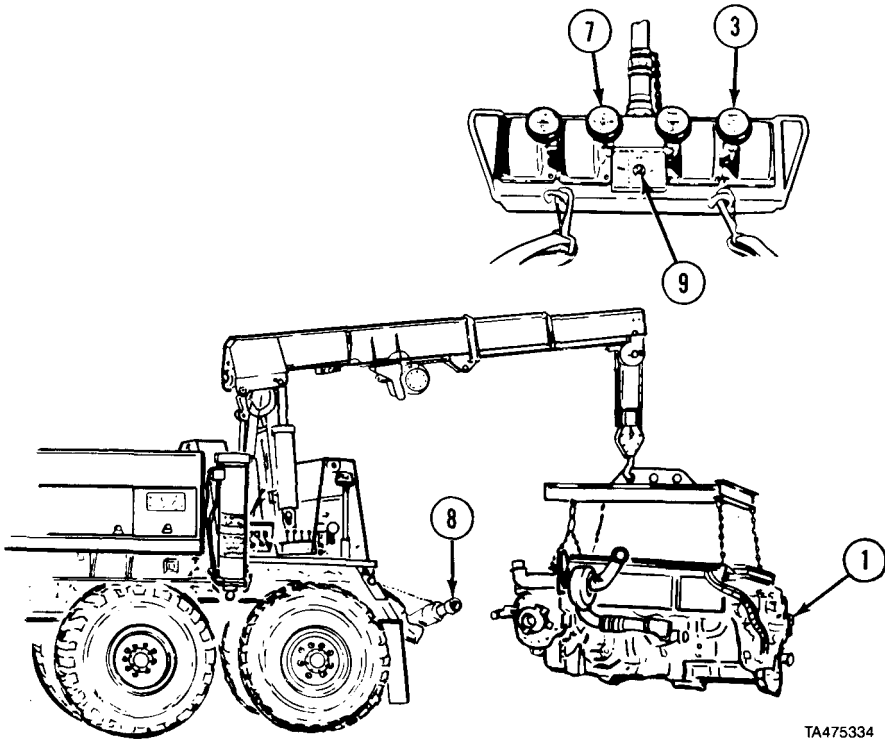
- (7) Operate HOIST control lever (3) and BOOM control lever (4) to lift power plant (1) free of vehicle.
- (8) Position power plant (1) directly behind wrecker.
- (9) Stow outriggers (para 2-63g).

CAUTION

Drive wrecker forward at walking speed (less than 5 mph). If driven faster and power plant starts to swing, equipment can be damaged.

- (10) Drive vehicle forward (less than 5 mph) until power plant is clear of vehicle.

M984E1 General Operating Procedures (Cont)

**NOTE**

- If retrieval system was lowered to assist in power plant removal, raise retrieval system to stowed position.
- Chains may be attached to shackles on rear of wrecker and power plant to prevent power plant from swinging.

- (11) Operate TELESCOPE control lever (7) and HOIST control lever (3) to position power plant (1) approximately 3 ft (1 m) behind crosstube (8) and 2 ft (60 cm) above ground.
- (12) Shut off REMOTE CONTROL UNIT switch (9).
- (13) Stow REMOTE CONTROL UNIT on vehicle.

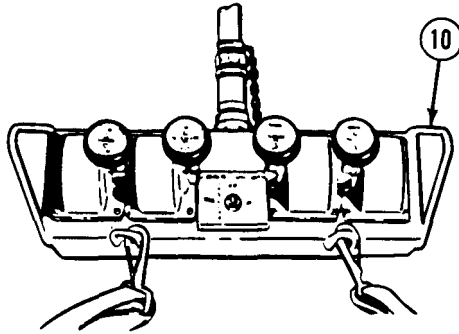
CAUTION

Drive wrecker forward at walking speed (less than 5 mph). If driven faster and power plant starts to swing, equipment can be damaged.

- (14) Transport power plant to required destination.

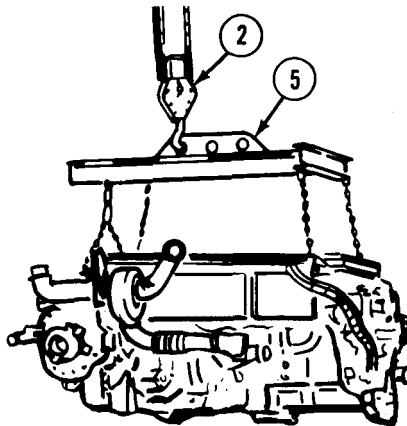
M984E1 General Operating Procedures (Cont)

2-86. POWER PLANT REMOVAL/INSTALLATION (CONT).



TA475335

- (15) Set up crane for operation in remote control (para 2-64).
- (16) Operate remote control (10) to position power plant on supports (refer to applicable vehicle TM for power plant supports).



TA475336

- (17) Remove sling (5) from power plant.

NOTE

If sling is not to be used for further operation use crane to stow sling.

- (18) Remove load hook (2) from sling (5).
- (19) Shut down crane (para 2-63f).

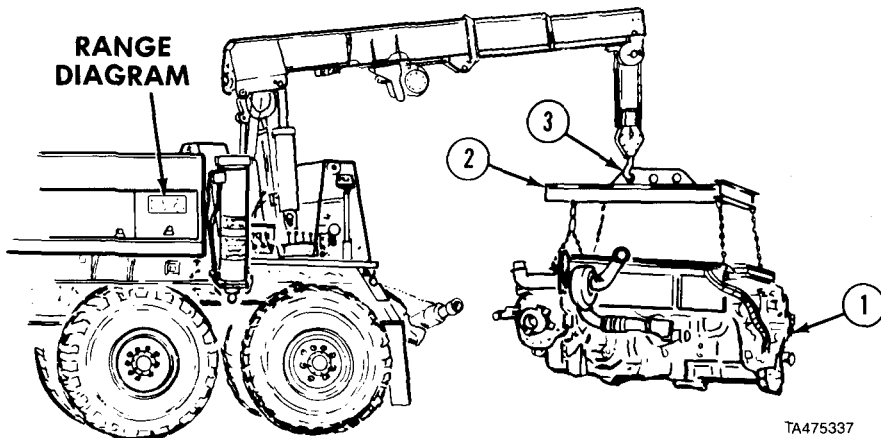
M984E1 General Operating Procedures (Cont)

c. Install Power Plant.

WARNING

Wrecker must be on level ground when installing power plant. If ground is not level wrecker can tip and damage vehicle.

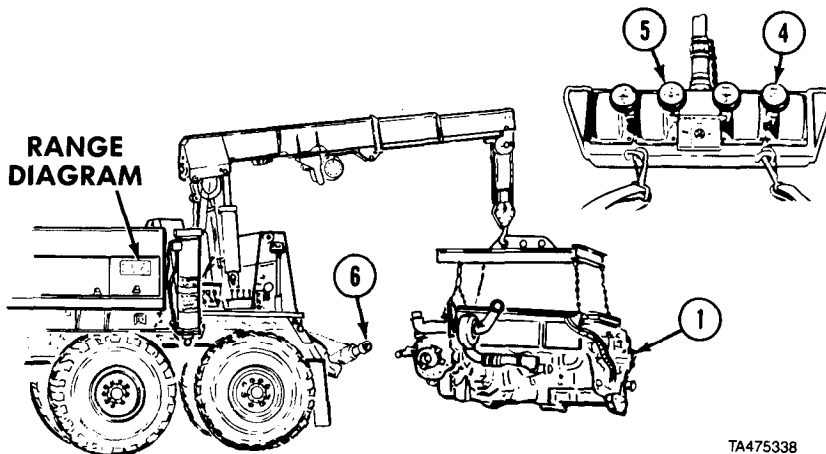
- (1) See applicable vehicle TM for sling or special tool required for power plant installation.



- (2) Position wrecker as close to power plant (1) as possible.
 (3) Set up wrecker crane for operation in remote control (para 2-64).
 (4) Operate crane and attach sling (2) to crane hook block (3).
 (5) Attach sling (2) to power plant (1) (refer to applicable vehicle TM to connect lifting sling to power plant).

M984E1 General Operating Procedures (Cont)

2-86. POWER PLANT REMOVAL/INSTALLATION (CONT).



WARNING

Be sure there are at least two wraps of cable on hoist drum at all times. Serious injury or death could result if cable comes off hoist drum while lifting load.

CAUTION

- Do not jerk HOIST control lever or load will bounce causing possible damage to crane or load.
- For M984E1 maximum load limit and radius swing is:
 - 6,000 lb at 18 ft 2 in. Radius (2700 kg at 5.5 m)
 - 8,000 lb at 16 ft 5 in. Radius (3600 kg at 5.0 m)
 - 12,000 lb at 11 ft 10 in. Radius (5400 kg at 3.6 m)
 - 14,000 lb at 9 ft 0 in. Radius (6300 kg at 2.7 m)
- Make sure you refer to RANGE DIAGRAM M984E1 located on either side of equipment body to prevent equipment damage.
- Do not go over maximum load limit. Going over maximum load limit will cause electrical shutdown for six seconds or until load is lowered.
- Do not allow power plant to swing and come in contact with vehicle. Power plant may be damaged.

NOTE

Chains are available on the M984E1 which can be used to guide the power plant during removal.

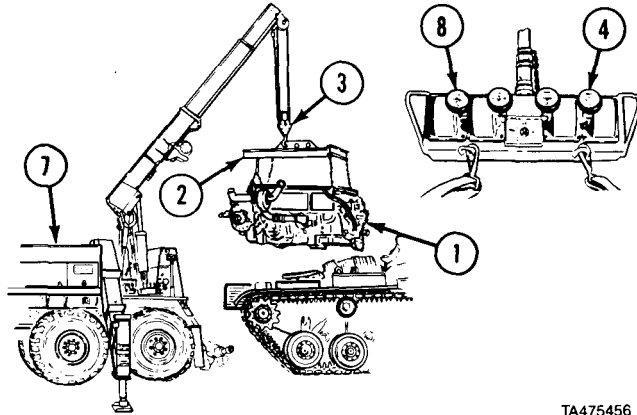
- (6) Operate HOIST control lever (4) and TELESCOPE control lever (5) to position power plant (1) approximately 2 ft (60 cm) above ground and 3 ft (1 m) directly behind crosstube (6).
- (7) Stow outriggers (para 2-63g).
- (8) Place REMOTE CONTROL UNIT safely on wrecker.

M984E1 General Operating Procedures (Cont)

CAUTION

Drive wrecker forward at walking speed (less than 5 mph). If driven faster and power plant starts to swing, equipment can be damaged.

- (9) Drive vehicle forward (less than 5 mph) and transport power plant to vehicle for installation.

CAUTION

- Refer to applicable TM to prepare vehicle for power plant installation to prevent equipment damage.
- Do not allow power plant to swing and come in contact with vehicle. Power plant or vehicle may be damaged.

NOTE

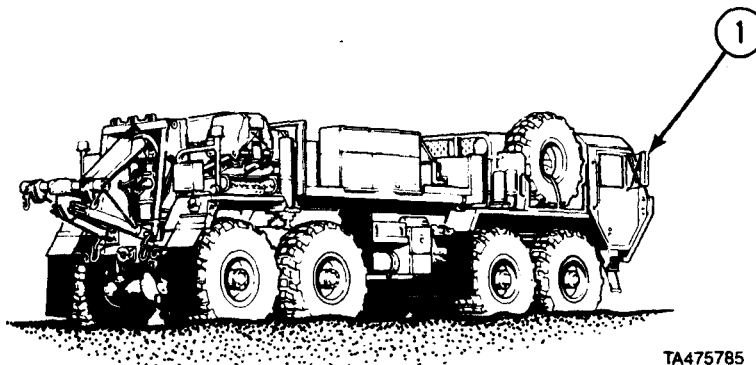
- Position wrecker for best access to install power plant.
 - Retrieval system on wrecker may be lowered to assist in getting closer to vehicle.
- (10) Position rear of wrecker (7) in line with vehicle.
 (11) Operate HOIST control lever (4) and raise power plant high enough to clear vehicle for installation.
 (12) Drive wrecker slowly backward as close to vehicle without making contact to position power plant for installation.
 (13) Operate HOIST control lever (4) and SWING control lever (8) to position power plant for installation.
 (14) Setup outriggers (para 2-63b).
 (15) Install power plant (refer to applicable vehicle TM).
 (16) Remove sling (2) from power plant (1).
 (17) Remove sling (2) from load hook (3).
 (18) Shut down crane (para 2-63f).
 (19) Stow outriggers (para 2-63g).

M984E1 General Operating Procedures (Cont)

Section VIII. OPERATION UNDER UNUSUAL CONDITIONS

2-87. SELF-RECOVER VEHICLE USING SELF-RECOVERY WINCH.

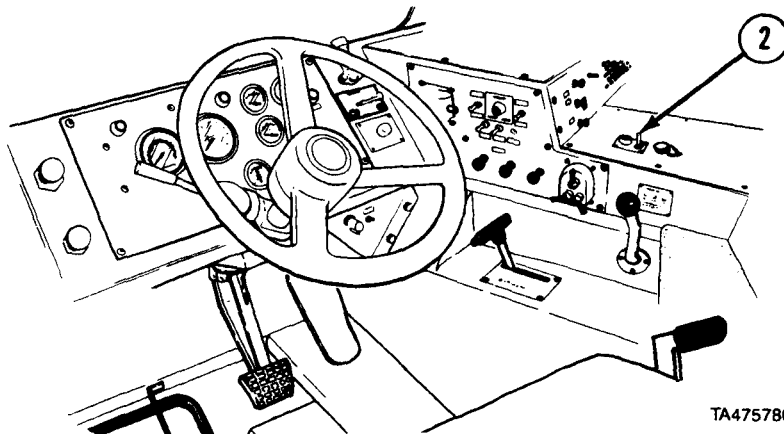
a. Winch Mired Vehicle Forward.



NOTE

- For additional information on vehicle self-recovery, refer to FM 20-22.
- Vehicle self-recovery is a two soldier task. Soldiers must communicate by hand signals.

- (1) Shut off engine (para 2-11p).
- (2) Soldier A adjusts mirror (1) so Soldier B can be clearly seen during procedure.

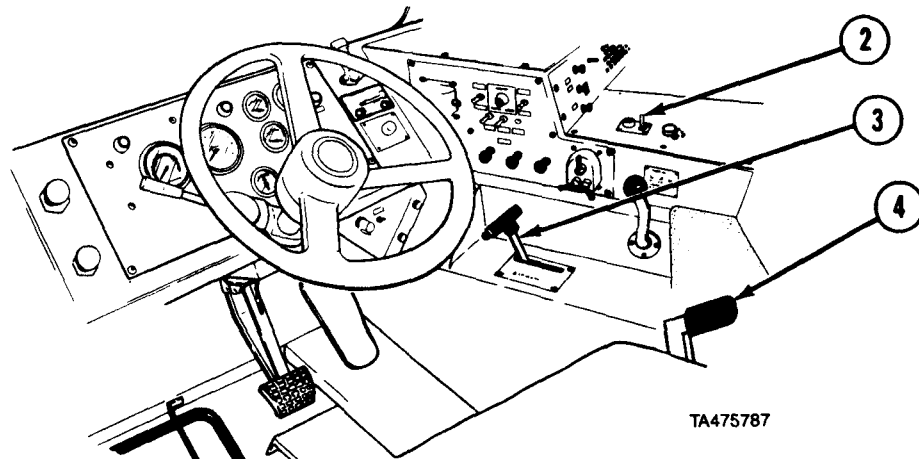


CAUTION

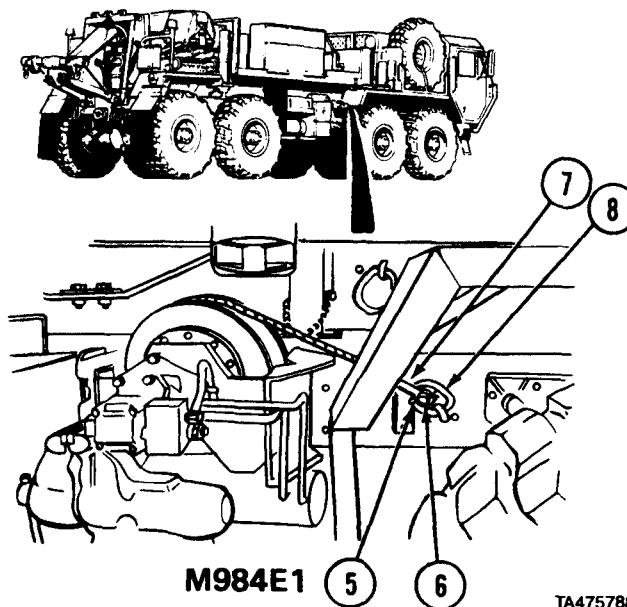
PTO ENGAGE switch must be in OFF position before moving selector valve to prevent equipment damage.

- (3) Make sure PTO ENGAGE switch (2) is in OFF position.

M984E1 General Operating Procedures (Cont)



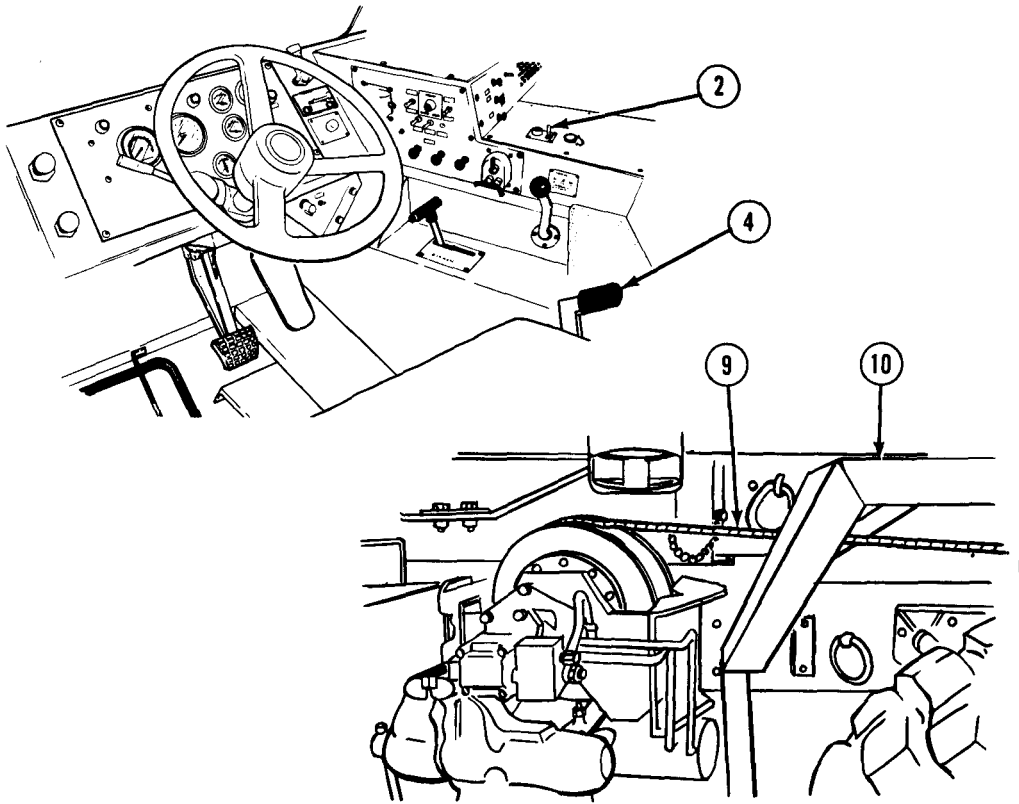
- (4) Start engine (para 2-11b).
- (5) Check that transmission range selector (3) is set to N (neutral).
- (6) Set PTO ENGAGE switch (2) to ON.
- (7) Move winch shift lever (4) to OUT position to pay out small amount of cable.
- (8) Set winch shift lever (4) to center position.
- (9) Set PTO ENGAGE switch (2) to OFF.



- (10) Remove cotter pin (5) from pin (6).
- (11) Remove pin (6) from clevis (7) and disconnect clevis from tiedown ring (8).
- (12) Install pin (6) in clevis (7) with cotter pin (5).

M984E1 General Operating Procedures (Cont)

2-87. SELF RECOVER VEHICLE USING SELF-RECOVERY WINCH (CONT).



M984E1

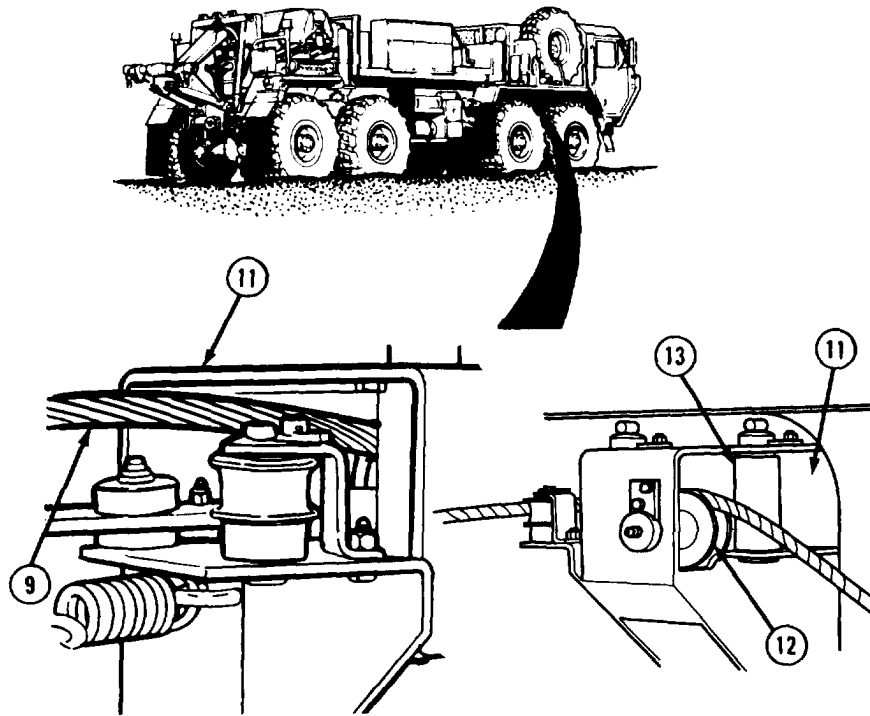
TA475789

WARNING

Always wear heavy work gloves when handling winch cable. Never let cable run through hands. Frayed cable may cut severely.

- (13) Set PTO ENGAGE switch (2) to ON.
- (14) Soldier A moves winch shift lever (4) to OUT and pays out winch cable (9), while Soldier B pulls cable through notch in fender (10) from front of vehicle.

M984E1 General Operating Procedures (Cont)



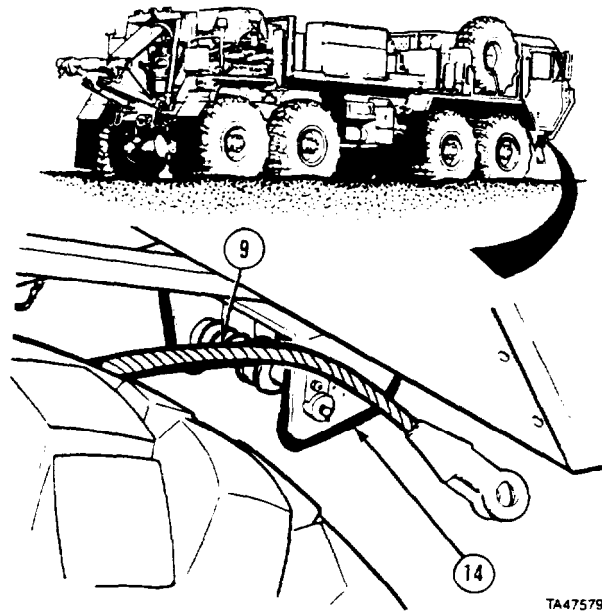
NOTE

Do not place cable between tensioning device pulleys.

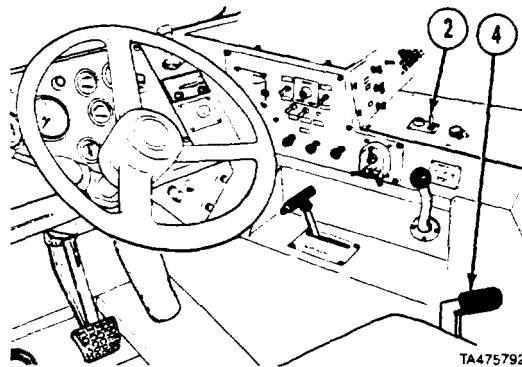
- (15) While Soldier A continues to pay out winch cable (9), Soldier B routes cable through cable guide (11), over sheave (12), between roller (13), and side of cable guide.

M984E1 General Operating Procedures (Cont)

2-87. SELF RECOVER VEHICLE USING SELF-RECOVERY WINCH (CONT).

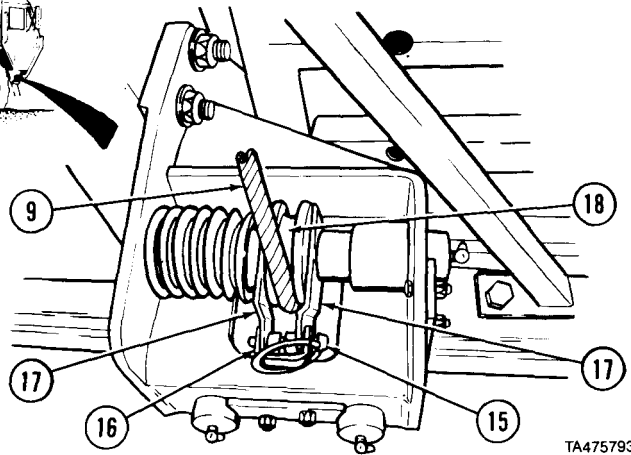
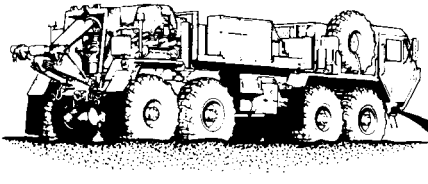


- (16) While Soldier A continues to pay out winch cable (9), Soldier B routes cable over first axle and 1 ft (30 cm) past roller guide assembly (14).



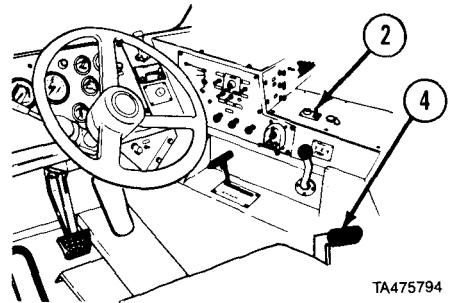
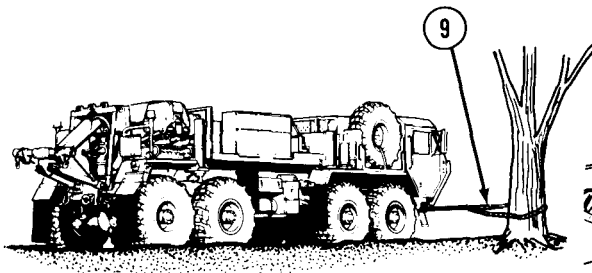
- (17) Set winch shift lever (4) to center position
- (18) Set PTO ENGAGE switch (2) to OFF.

M984E1 General Operating Procedures (Cont)



TA475793

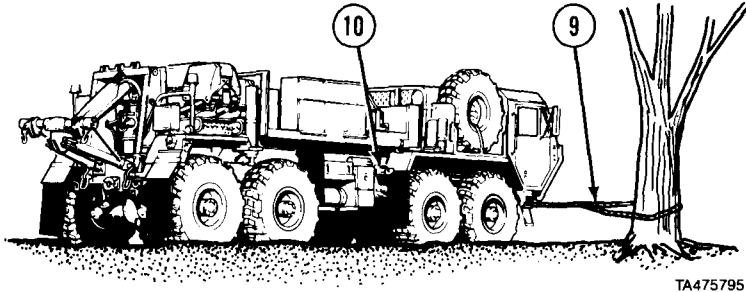
- (19) Remove quick release pin (15) and guide bracket (16). Move cable guide brackets (17) apart so cable (9) can be placed against bottom of sheave (18).
- (20) Move cable guide brackets (17) together. Install guide bracket (16) and quick release pin (15).



TA475794

- (21) Set PTO ENGAGE switch (2) to ON.
- (22) Soldier A moves winch shift lever (4) to OUT and pays out winch cable (9) while Soldier B pulls cable to tree, another heavy vehicle (para 2-43a), or heavy object (FM 20-22).
- (23) When winch cable (9) is let out to heavy object, set winch shift lever (4) to center position.
- (24) Set PTO ENGAGE switch (2) to OFF.

2-87. SELF RECOVER VEHICLE USING SELF-RECOVERY WINCH (CONT).



- (25) If snatch block must be used for self-recovery operation, attach self-recovery winch cable (9) to snatch block (para 2-42a) and connect end of self-recovery winch cable to mired vehicle left front towing eye (para 2-43a). Attach snatch block to tree, another vehicle, or heavy object (FM 20-22).

CAUTION

There must always be at least five wraps of cable on winch. If load is applied with less than five wraps of cable on winch, cable may come loose on drum.

- (26) Check that there are at least five wraps of winch cable (9) left on winch (10). If there are not at least five wraps of winch cable left on winch, stop using self-recovery winch and continue with step (53) of this procedure.

CAUTION

Do not go over winch pull capacity or winch may be damaged.

- (27) Make sure weight of mired vehicle and amount of winch cable (9) left on winch (10) does not go over pull capacity (FM 20-22 and Table 2-7). If pull will go over capacity, stop using self-recovery winch and continue with step (53) of this procedure.

Table 2-7. Self-Recovery Winch Pull Capacity

Cable Layer	Maximum Line Pull
1st layer (five wraps)	20,000 lb (9 080 kg)
2nd layer	18,173 lb (8 251 kg)
3rd layer	16,663 lb (7 565 kg)
4th layer	15,361 lb (6 974 kg)
5th layer	14,254 lb (6 471 kg)

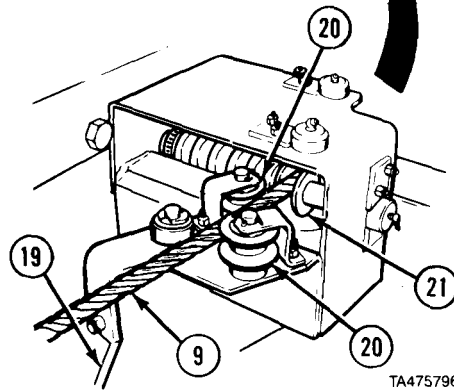
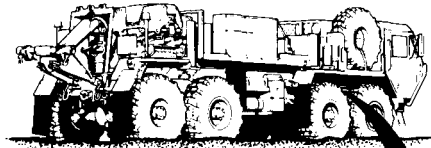
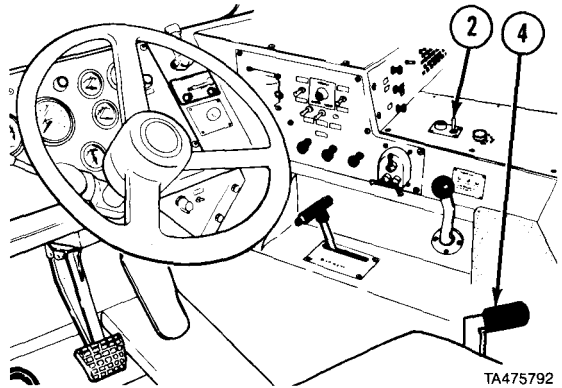
NOTE

If winch cable will be connected to another vehicle acting as a stationary anchor refer to FM 20-22 or (para 2-43a) for connecting procedures.

- (28) Connect winch cable (9) to heavy object, if using self-recovery winch (10) will not go over winch pull capacity.

M984E1 General Operating Procedures (Cont)

- (29) Make sure winch shift lever (4) is at center position.
- (30) Make sure PTO ENGAGE switch (2) is set to OFF.



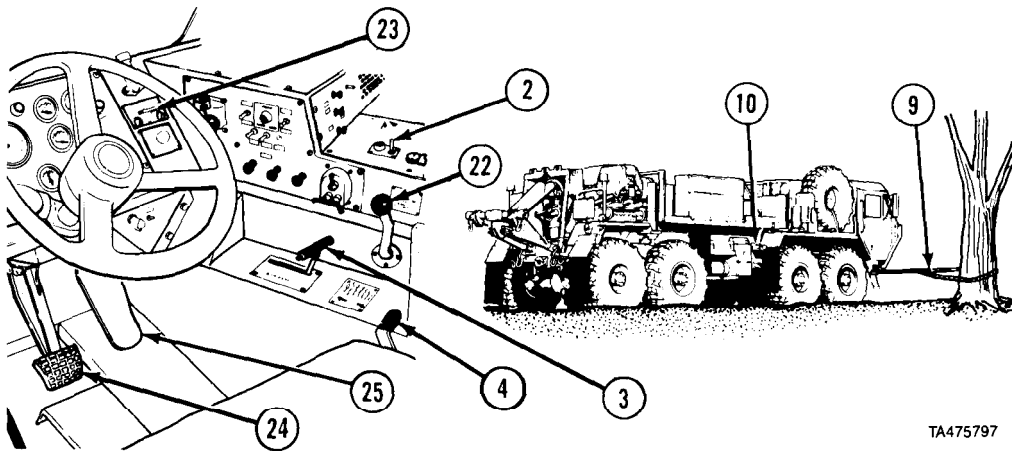
WARNING

Do not operate winch while personnel are working on or around tensioning device. Severe injury to arms, hands, and fingers may result if cable moves while working with cable and tensioning device.

- (31) Pull back and hold tension pulley lever (19).
- (32) Put winch cable (9) between tensioning device pulleys (20).
- (33) Release tension pulley lever (19).
- (34) Check that winch cable rests inside grooves of both tensioning device pulleys (20) and sheave (21).

M984E1 General Operating Procedures (Cont)

2-87. SELF RECOVER VEHICLE USING SELF-RECOVERY WINCH (CONT).



TA475797

- (35) Check that winch cable (9) is not caught on vehicle or any other objects.

WARNING

Keep all personnel clear of area near winch cable when tension is on cable. If winch cable breaks, it can cause severe injury or death.

- (36) When Soldier A operates winch controls, Soldier B takes cover in protected area away from winch (10) and winch cable (9).
- (37) Make sure all personnel are clear of winch (10) and winch cable (9).

CAUTION

If winch does not move vehicle, stop using winch. Overheat damage may result.

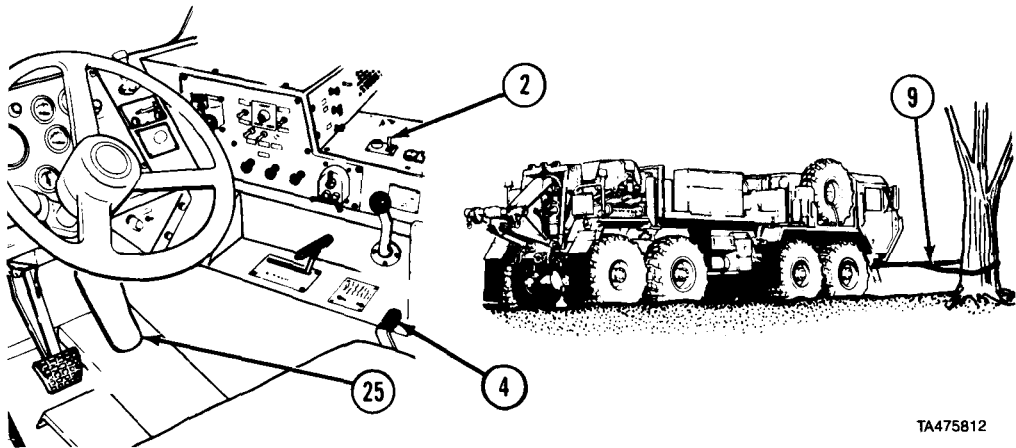
- (38) Set PTO ENGAGE switch (2) to ON.
- (39) Move winch shift lever (4) to IN until slack is out of cable.
- (40) Move winch shift lever (4) to center position.

CAUTION

Self-recovery winch is not designed to winch mired vehicle by itself. Vehicle drive system power must always be used with winch to self-recover vehicle, or damage to equipment can result.

- (41) Make sure TRANSFER CASE shift lever (22) is set to LO.
- (42) Make sure TRACTION CONTROL lever (23) is set to INTER-AXLE DIFF LOCK.
- (43) Press brake treadle (24).
- (44) Set transmission range selector (3) to 1.
- (45) Release brake treadle (24).
- (46) Move winch shift lever (4) to IN and apply slight pressure to throttle treadle (25).

M984E1 General Operating Procedures (Cont)



TA475812

NOTE

Keep winch cable tight at all times so cable does not get tangled with vehicle.

Adjust position of throttle treadle (25) to change engine speed as needed to keep winch cable (9) tight and vehicle moving. When vehicle is on solid ground, set winch shift lever (4) to center position.

Park vehicle (para 2-11o).

Set winch shift lever (4) to OUT and pay out winch cable (9) until all tension is off cable.

When all tension is off winch cable (9), set winch shift lever (4) to center position.

Set PTO ENGAGE switch (2) to OFF.

NOTE

If winch cable is connected to another vehicle, refer to paragraph 2-43b for disconnecting procedures.

Disconnect winch cable (9) from heavy object.

If snatch block was used, disconnect end of winch cable (9) from vehicle (para 2-43b) and remove snatch block from winch cable (para 2-42b) and from tree, vehicle, or heavy object (FM 20-22).

CAUTION

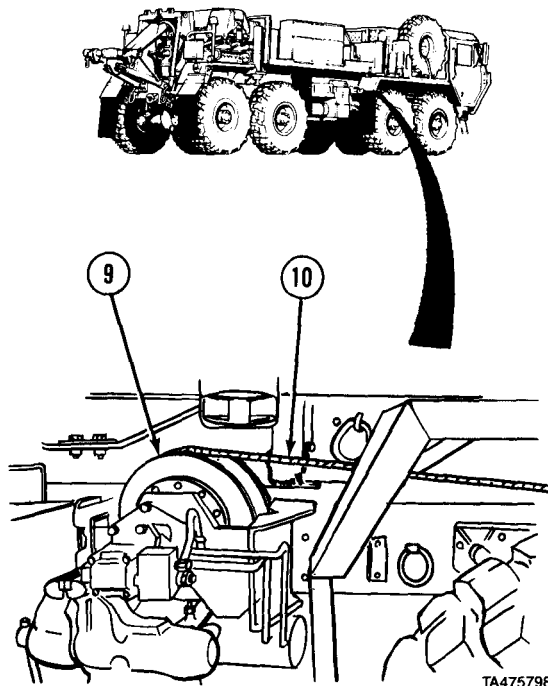
Do not reel clevis end of winch cable through roller guides. Clevis may catch on roller guide and cause cable or roller guide to break.

Set PTO ENGAGE switch (2) to ON.

Set winch shift lever (4) to IN.

M984E1 General Operating Procedures (Cont)

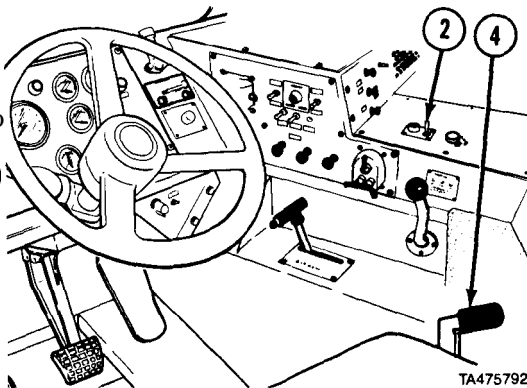
2-87. SELF RECOVER VEHICLE USING SELF-RECOVERY WINCH (CONT).



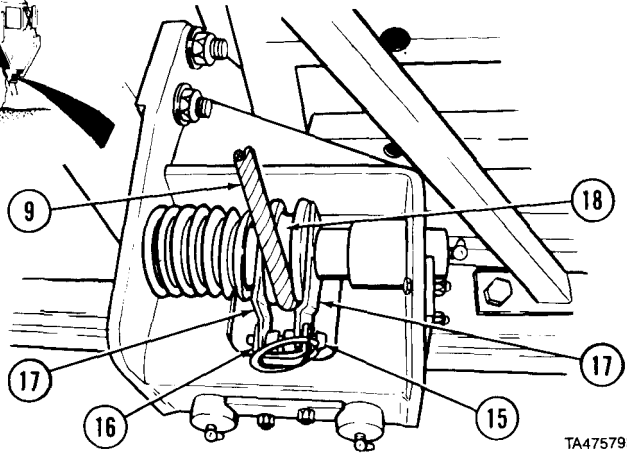
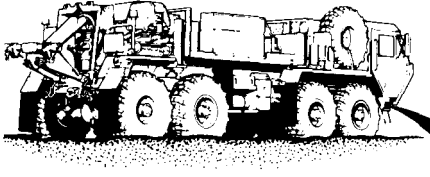
WARNING

Always wear heavy work gloves when handling winch cable. Never let cable run through hands. Frayed cable may cut severely.

- (57) While Soldier A reels in winch cable (9), Soldier B uses tire iron extension handle to guide cable onto winch (10) so cable wraps are level across face of winch.
- (58) When end of cable is near front of vehicle, move winch shift lever (4) to center position.
- (59) Set PTO ENGAGE switch (2) to OFF.

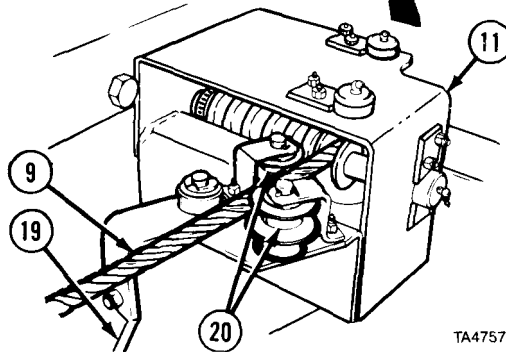
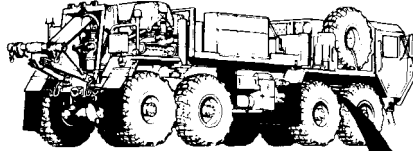


M984E1 General Operating Procedures (Cont)



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- (60) Remove quick release pin (15) and guide bracket (16). Move cable guide brackets (17) apart so winch cable (9) can be removed from sheave (18).
- (61) Move cable guide bracket (17) together. Install guide bracket (16) and quick release pin (15).

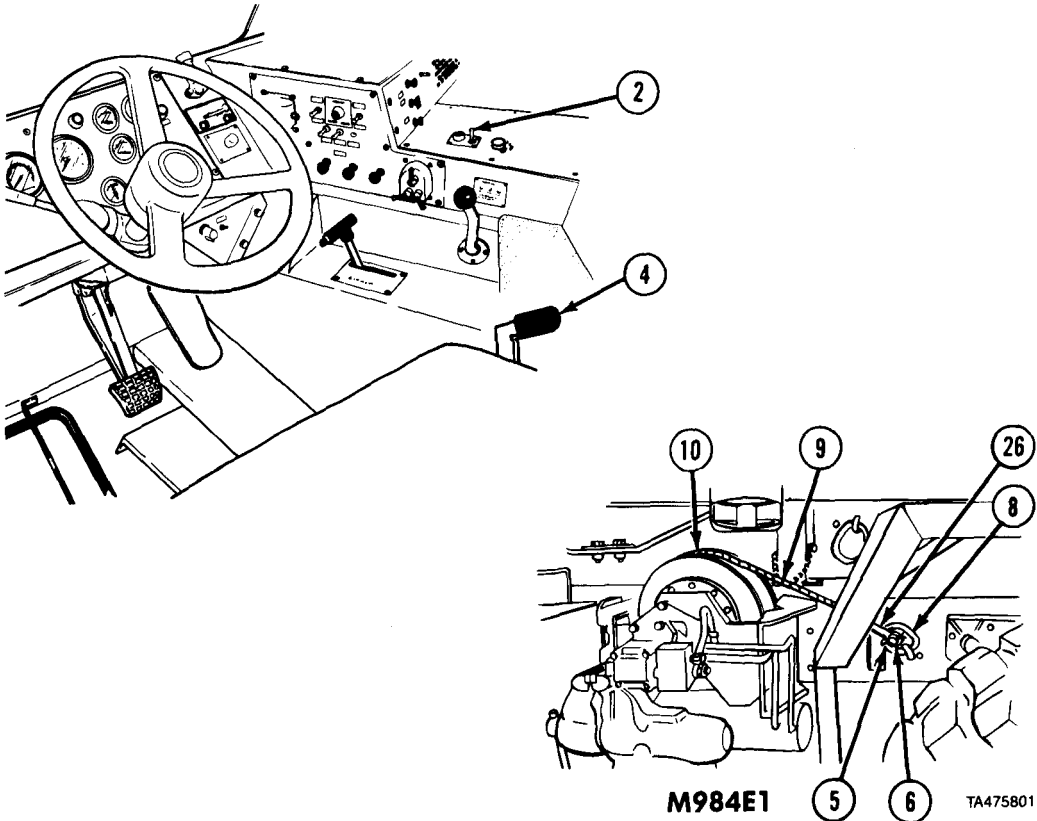


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- (62) Pull back and hold tension pulley lever (19).
- (63) Lift winch cable (9) out of tensioning device pulleys (20).
- (64) Release tension pulley lever (19).
- (65) Pull winch cable (9) back and out of cable guide (11).

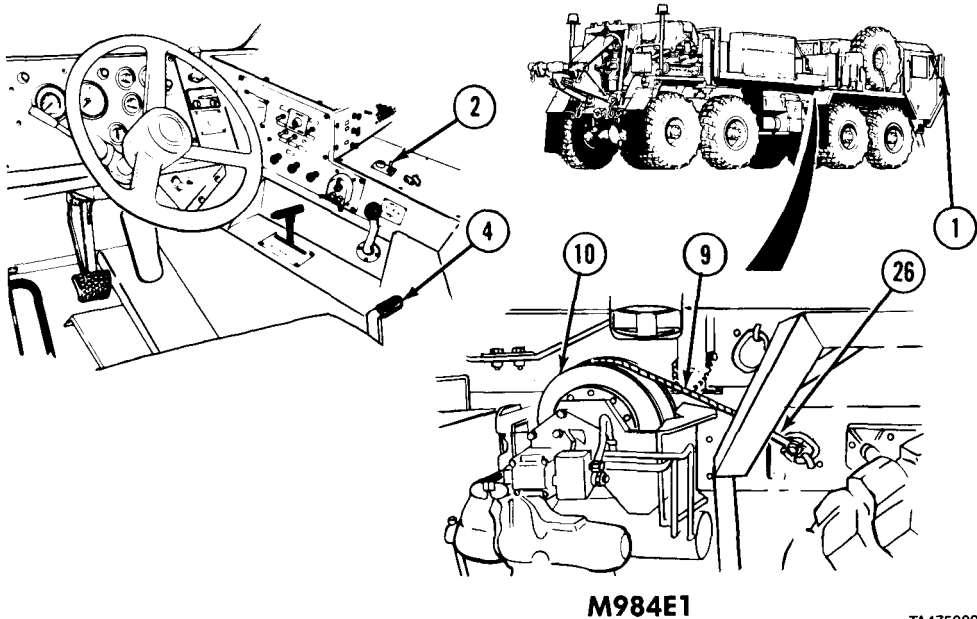
M984E1 General Operating Procedures (Cont)

2-87. SELF RECOVER VEHICLE USING SELF-RECOVERY WINCH (CONT).



- (66) Set PTU ENGAGE switch (2) to ON.
- (67) Soldier A moves winch shift lever (4) to IN and reels in winch cable (9) while Soldier B guides winch cable.
- (68) When clevis (26) is approximately 2 ft (60 cm) from winch (10) move winch shift lever (4) to center position.
- (69) Set PTO ENGAGE switch (2) to OFF.
- (70) Connect clevis (26) to tiedown ring (8) with pin (6) and cotter pin (5).

M984E1 General Operating Procedures (Cont)



(71) Set PTO ENGAGE switch (2) to ON.

WARNING

Keep all personnel clear of winch area when winch is reeling in cable. If hands are caught in winch or cable, or if cable breaks under tension, severe injury or death could result.

(72) Stand clear of area near winch (10).

CAUTION

Do not reel in winch cable too tightly. If too much tension is applied, cable or tiedown ring can break, or winch may be damaged.

(73) When Soldier B is clear of area, Soldier A sets winch shift lever (4) to IN and takes all slack out of winch cable (9).

(74) When cable is tight, move winch shift lever (4) to center position.

(75) Set PTO ENGAGE switch (2) to OFF.

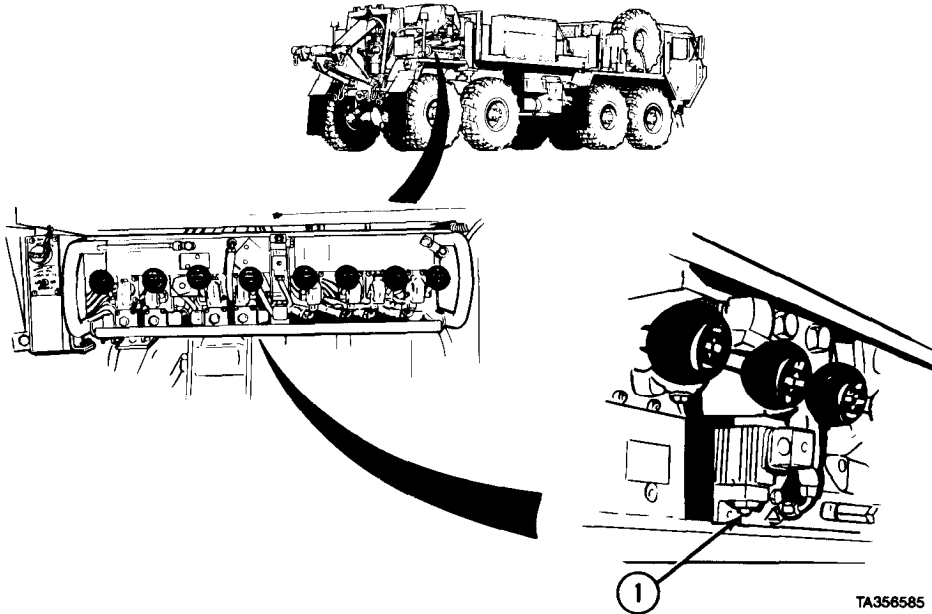
(76) Shut off engine (para 2-11p).

(77) Adjust mirror (1) for driving.

2-88. EMERGENCY PROCEDURES.

a. Perform Emergency Hydraulic Operation When Crane Electrical Power Fails.

- (1) If crane electrical power system fails during crane operation, crane will be locked in position it was in at time of failure.
- (2) Do not try to operate any electrical equipment on vehicle or crane.
- (3) Do not try to repair electrical system.



NOTE

- This procedure will provide emergency hydraulic power to lower crane and load when electrical power has failed.
- Screwdriver can be put in slot in front of solenoid valve button to hold button in while operating controls.

- (4) Push up and hold solenoid valve button (1).
- (5) Shut down crane (para 2-63).
- (6) Notify organizational maintenance.

CHAPTER 3 MAINTENANCE INSTRUCTIONS (CONT)

Contents	Para	Page
M984E1 Troubleshooting Introduction	3-12	3-1
M984E1 Troubleshooting Symptoms.	3-13	3-1

Section IV. M984E1 TROUBLESHOOTING PROCEDURES

Troubleshooting Index

3-12. M984E1 TROUBLESHOOTING INTRODUCTION. To quickly find the required troubleshooting procedure, use the fault Symptom Index, Table 3-3. Components and symptoms are listed alphabetically. Common malfunctions are listed alphabetically under those components or system headings.

3-13. M984E1 TROUBLESHOOTING SYMPTOMS. Table 3-4 lists the most common malfunctions found during operation or maintenance of the M984E1 wrecker-recovery vehicle steering, heavy-duty winch, material handling crane, or retrieval system. Tests or inspections and corrective actions should be performed in the order listed. Troubleshooting for all other vehicle systems is found in Volume 1 of this manual.

This manual cannot list all malfunctions that may occur, nor all tests or inspections, and corrective actions. If a malfunction is not listed, or is not corrected by listed corrective actions, notify the supervisor.

Table 3-3. M984E1 Symptom Index

	Troubleshooting Procedure Page
HEAVY-DUTY WINCH	
Controls (remote or manual) sticking in engaged position	3-9
Heavy-duty winch will not operate in manual control.	3-8
Heavy-duty winch will not operate in remote control	3-6
Winch cable will not reel out or in or operates slowly in manual control.	3-8
Winch cable will not reel out or in or operates slowly in remote control.	3-7
MATERIAL HANDLING CRANE	
Boom operation abnormal when telescoping in or out	3-11
Boom raises or lowers slowly.	3-12
Boom will not raise or lower.	3-13
Boom will not telescope in or out.	3-14
Crane controls sticking in engaged position.	3-15

Troubleshooting Index (Cont)

3-13. M984E1 TROUBLESHOOTING SYMPTOMS (CONT).

Table 3-3. M984E1 Symptom Index (Cont)

	Troubleshooting Procedure Page
MATERIAL HANDLING CRANE (CONT)	
Crane will not operate or operates abnormally.	3-16
Hoist operation slow or abnormal when lifting or lowering load.	3-17
Hoist will not lift load	3-18
Mast raises or lowers abnormally.	3-19
Mast raises or lowers slowly	3-19
Outrigger operation slow or abnormal	3-20
Swing operation abnormal in both directions	3-21
Swing operation abnormal in one direction only	3-23
RETRIEVAL SYSTEM	
Controls sticking in engaged position.	3-24
Retrieval cylinders raise or lower slowly.	3-25
Retrieval system will not operate.	3-26
STEERING	
Vehicle is hard to steer, shimmies, or wanders	3-3
Vehicle steering slow to respond or intermittent	3-3

Troubleshooting Malfunctions

Table 3-4. Troubleshooting

Malfunction	Test or Inspection	Corrective Action
STEERING (M984E1)		
1. VEHICLE IS HARD TO STEER, SHIMMIES, WANDERS, OR PULLS TO ONE SIDE.		<p style="text-align: center;"><u>WARNING</u></p> <p>Tire air pressure must be checked properly or serious injury or death may result.</p> <p style="text-align: center;">NOTE</p> <ul style="list-style-type: none"> • Inflate tires only when they are cool. Inflate tires to proper pressure for road condition. • Tire tread is nondirectional. Vehicle operation is not affected by direction of traction bars. <p>Step 1. Check tires for proper inflation.</p> <p style="padding-left: 40px;">Inflate or deflate tires to proper pressure (Table 3-2.1).</p> <p>Step 2. Check wheels for loose, missing, or broken lugnuts.</p> <p style="padding-left: 40px;">Tighten loose lugnuts and notify organizational maintenance to have lugnuts tightened to torque requirements.</p> <p>2. VEHICLE STEERING SLOW TO RESPOND OR INTERMITTENT.</p> <p>Step 1. Check for low hydraulic fluid level (Table 2-1, Item No. 37).</p> <p style="padding-left: 40px;">If fluid level is low, notify organizational maintenance.</p>

Troubleshooting Malfunctions (Cont)

3-13 M984E1 TROUBLESHOOTING SYMPTOMS CONT.)

Table 3-4. Troubleshooting (Cont)

Malfunction	Test or Inspection	Corrective Action
STEERING M984E1 (CONT)		
2. VEHICLE STEERING SLOW TO RESPOND OR INTERMITTENT (CONT).		
<p>Step 2. Check for loose or leaking hydraulic connections and damaged hydraulic lines.</p>		
<p>Tighten loose connections. If leak does not stop, notify organizational maintenance. If lines are damaged, notify organizational maintenance. If vehicle still steers slow notify organizational maintenance.</p>		

Troubleshooting Malfunctions (Cont)

Table 3-4. Troubleshooting (Cont)

Malfunction	Test or Inspection	Corrective Action
<p>HEAVY-DUTY WINCH (M984E1)</p> <p>NOTE</p> <ul style="list-style-type: none"> • Common problems with heavy-duty winch that may be found are: <ol style="list-style-type: none"> 1. Slow or abnormal operation. 2. Winch will not pull required load. • Common causes of the problems are: <ol style="list-style-type: none"> 1. Cold hydraulic oil (slow operation). 2. Low engine speed (slow or abnormal operation). 3. Controls malfunction (remote and manual). • Report all problems to organizational maintenance. 		



Troubleshooting Malfunctions (Cont)

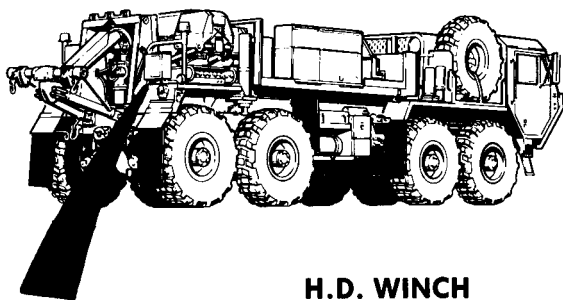
3-13. M984E1 TROUBLESHOOTING SYMPTOMS (CONT).

Table 3-4. Troubleshooting (Cont)

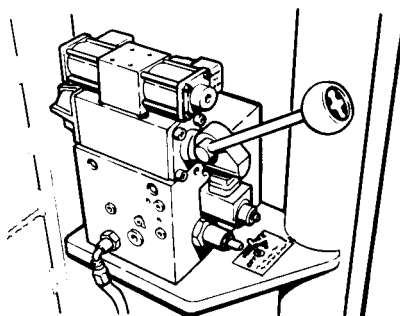
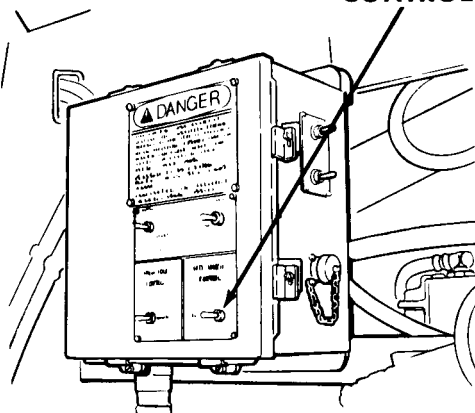
Malfunction	Test or Inspection	Corrective Action
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HEAVY-DUTY WINCH (M984E1) (CONT)

1. HEAVY-DUTY WINCH WILL NOT OPERATE IN REMOTE CONTROL.



H.D. WINCH CONTROL SWITCH



MANUAL CONTROL STATION

TA356533

Step 1. Check that all electrical switches are set in correct position (para 2-65).

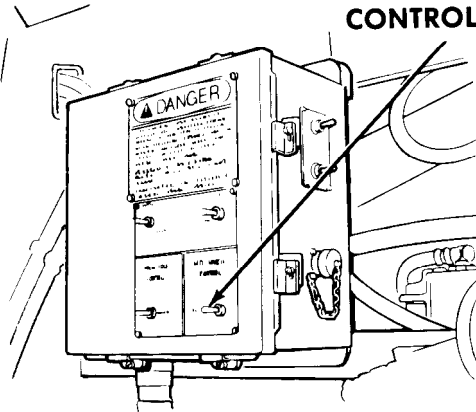
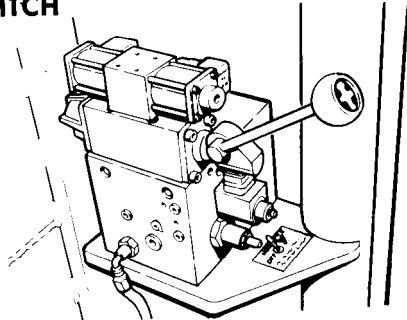
Step 2. Set H.D. WINCH CONTROL switch to MANUAL.

Operate winch OUT and IN from manual control station.

If cable will reel OUT and IN, notify organizational maintenance.

Troubleshooting Malfunctions (Cont)

Table 3-4. Troubleshooting (Cont)

Malfunction Test or Inspection	Corrective Action
<p>HEAVY-DUTY WINCH (M984E1) (CONT)</p>	
<p>2. WINCH CABLE WILL NOT REEL OUT OR IN OR OPERATES SLOWLY IN REMOTE CONTROL.</p>	
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>H.D. WINCH CONTROL SWITCH</p>  </div> <div style="text-align: center;">  <p>MANUAL CONTROL STATION</p> </div> </div> <p style="text-align: right; font-size: small;">TA356534</p>	
<p>Step 1. Set H.D. WINCH CONTROL switch to MANUAL.</p> <p style="padding-left: 40px;">Operate winch OUT and IN from manual control station.</p> <p style="padding-left: 40px;">If cable will reel OUT and IN, notify organizational maintenance.</p> <p>Step 2. Check outside temperature. If temperature is less than 0°F (-17 °C), hydraulic oil may not flow easily.</p> <p style="padding-left: 40px;">Operate engine for 20 minutes with PTO ENGAGE switch set to ON to bring oil to operating temperature.</p> <p style="padding-left: 40px;">If oil is still not warmed, with crane in stowed position, push MAST control lever down. Hold MAST control down for approximately 30 seconds, then return to neutral position. Repeat procedure several times until oil is warmed.</p> <p style="padding-left: 40px;">If problem remains, notify organizational maintenance.</p>	

Troubleshooting Malfunctions (Cont)

3-13. M984E1 TROUBLESHOOTING SYMPTOMS (CONT).

Table 3-4. Troubleshooting (Cont)

Malfunction	Test or Inspection	Corrective Action
HEAVY-DUTY WINCH (M984E1) (CONT)		
3.	HEAVY-DUTY WINCH WILL NOT OPERATE IN MANUAL CONTROL.	<p>Step 1. Check that all electrical switches are set in correct position (para 2-65).</p> <p>Step 2. Prepare to operate heavy-duty winch with remote control (para 2-65).</p> <p style="padding-left: 40px;">Operate winch OUT and IN with remote control.</p> <p style="padding-left: 40px;">If cable will reel out, notify organizational maintenance.</p>
4.	WINCH CABLE WILL NOT REEL OUT OR IN OR OPERATES SLOWLY IN MANUAL CONTROL.	<p>Step 1. Prepare to operate heavy-duty winch with remote control (para 2-65).</p> <p style="padding-left: 40px;">Operate winch OUT and IN with remote control.</p> <p style="padding-left: 40px;">If cable will reel out, notify organizational maintenance.</p> <p>Step 2. Check outside temperature. If temperature is less than 0 °F (-17 °C), hydraulic oil may not flow easily.</p> <p style="padding-left: 40px;">Operate engine for 20 minutes with PTO ENGAGE switch set to ON to bring oil to operating temperature.</p> <p style="padding-left: 40px;">If oil is still not warmed, with crane in stowed position, push MAST control lever down. Hold MAST control down for approximately 30 seconds, then return to neutral position. Repeat procedure several times until oil is warmed.</p> <p style="padding-left: 40px;">If problem remains, notify organizational maintenance.</p>

Troubleshooting Malfunctions (Cont)
Table 3-4. Troubleshooting (Cont)

Malfunction	Test or Inspection	Corrective Action
HEAVY-DUTY WINCH (M984E1) (CONT)		
5. CONTROLS (REMOTE OR MANUAL) STICKING IN ENGAGED POSITION.		
<u>WARNING</u>		
Reservoir may become very hot. Be careful when placing hand near reservoir. Reservoir can become hot enough to cause serious burn.		
Step 1. Check for overheated hydraulic oil by carefully placing hand near hydraulic reservoir.		
If reservoir is very hot, set PTO ENGAGE switch to OFF, shut off engine, let oil cool, then continue operation.		
Step 2. Check outside temperature. If temperature is less than 0°F (-17°C), hydraulic oil may not flow easily.		
Operate engine for 20 minutes with PTO ENGAGE switch set to ON to bring oil to operating temperature.		
If oil is still not warmed, with crane in stowed position, push MAST control lever down. Hold MAST control down for approximately 30 seconds, then return to neutral position. Repeat procedure several times until oil is warmed.		
If problem remains, notify organizational maintenance.		

Troubleshooting Malfunctions (Cont)

3-13. M984E1 TROUBLESHOOTING SYMPTOMS (CONT).

Table 3-4. Troubleshooting (Cont)

Malfunction Test or Inspection	Corrective Action
<p style="text-align: center;">MATERIAL HANDLING CRANE (M984E1)</p> <p style="text-align: center;">NOTE</p> <ul style="list-style-type: none">• Common problems that crane operators may see are:<ol style="list-style-type: none">1. Slow or abnormal operation.2. Crane will not pickup load.• Common causes of the problem are:<ol style="list-style-type: none">1. Cold hydraulic oil (slow operation).2. Low engine speed (slow or abnormal operation).3. Operating two crane functions at same time (slow operation).4. Load too heavy (will not pick up load).5. Air in cylinders or hoist motor (abnormal operation).• Report all problems to organizational maintenance.	

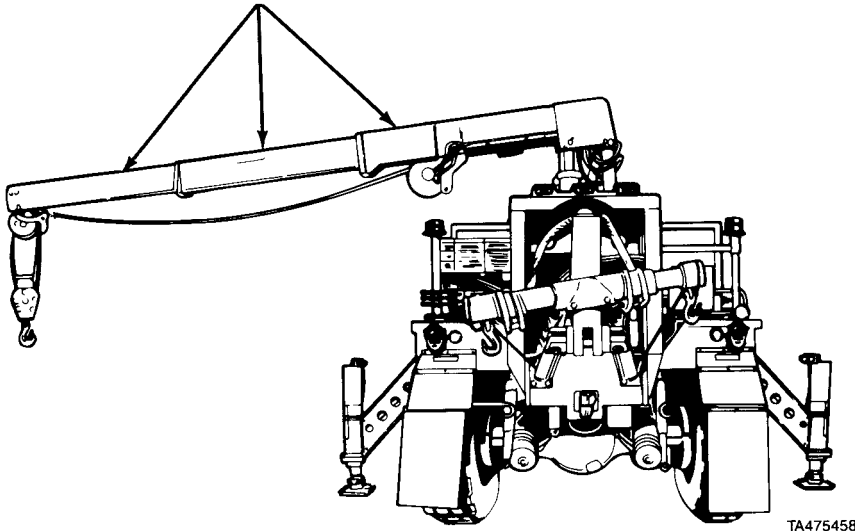
Troubleshooting Malfunctions (Cont)

Table 3-4. Troubleshooting (Cont)

Malfunction**Test or Inspection****Corrective Action**

MATERIAL HANDLING CRANE (M984E1) (CONT)

1. BOOM OPERATION ABNORMAL WHEN TELESCOPING IN OR OUT.

BOOM SECTIONS

TA475458

Step 1. Check that POWER ON/OFF Switch is in ON position (para 2-63).

Step 2. Check that boom sections are lubricated (LO 9-2320-279-12).

If there are dry sections, notify organizational maintenance.

Step 3. If boom operation is still abnormal, there may be air in cylinders.

Lower boom below horizontal position.

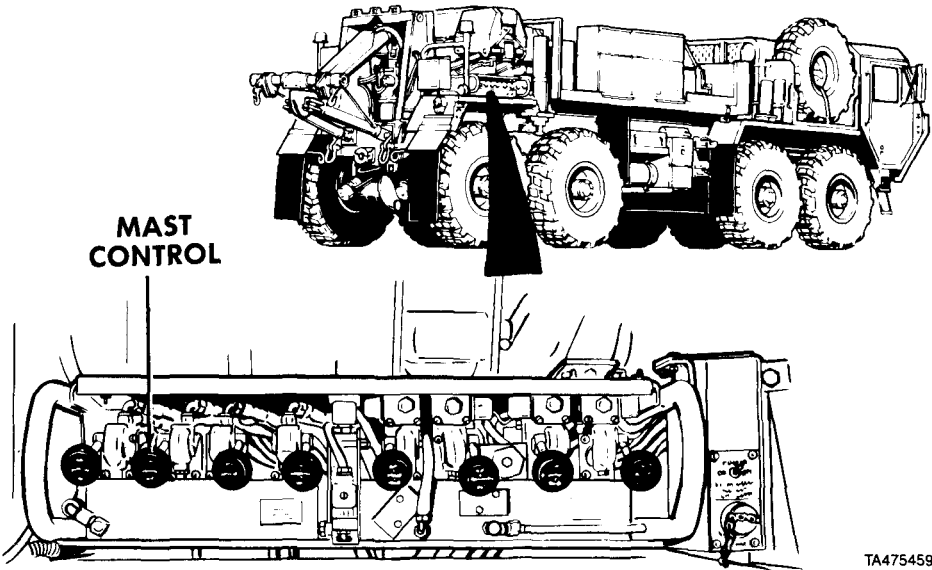
Fully TELESCOPE boom IN and OUT several times to remove air from cylinders.

Step 4. If problem remains, notify organizational maintenance.

Troubleshooting Malfunctions (Cont)

3-13. M984E1 TROUBLESHOOTING SYMPTOMS (CONT).

Table 3-4. Troubleshooting (Cont)

Malfunction	Test or Inspection	Corrective Action
<p>MATERIAL HANDLING CRANE (M984E1) (CONT)</p>		
<p>2. BOOM RAISES OR LOWERS SLOWLY.</p>		
 <p style="text-align: right; font-size: small;">TA475459</p>		
<p>Step 1. Check outside temperature. If temperature is less than 0 °F (-17 °C), hydraulic oil may not flow easily.</p>		
<p style="padding-left: 40px;">Operate engine for 20 minutes with PTO ENGAGE switch set to ON to bring oil to operating temperature.</p>		
<p style="padding-left: 40px;">If oil is still not warmed, lower crane to stowed position. Operate MAST control DOWN. Hold MAST control DOWN for approximately 30 seconds, then return control to neutral position. Repeat procedure several times until oil is warmed.</p>		
<p>Step 2. If problem remains, notify organizational maintenance.</p>		

Troubleshooting Malfunctions (Cont)

Table 3-4. Troubleshooting (Cont)

Malfunction	Test or Inspection	Corrective Action
MATERIAL HANDLING CRANE (M984E1) (CONT)		
3. BOOM WILL NOT RAISE OR LOWER.		
RANGE DIAGRAM M984E1		
<p>The range diagram shows a grid with horizontal axes from 20.00 to 0.00 and 0.00 to 5.00, and vertical axes from 0.00 to 30.00. Four boom configurations are plotted:</p> <ul style="list-style-type: none"> 12'-0" BOOM, 14000 LBS. REF, 9'-0" RADIUS, 370° 14'-0" BOOM, 12000 LBS. REF, 11'-10" RADIUS, 370° 18'-5" BOOM, 8000 LBS. REF, 16'-5" RADIUS, 370° 18'-5" BOOM, 6000 LBS. REF, 18'-2" RADIUS, 370° <p>A silhouette of the crane is shown at the bottom of the grid. A hand icon points to the 18'-5" boom configuration. Below the grid is a circular diagram of the 370° lifting area with 5° overlaps for swing.</p>		
<p>ALL DIMENSIONS ARE IN FEET UNLESS OTHERWISE SPECIFIED</p>		
<p>Step 1. Check that load is not over load limit shown on range diagram. Reduce load to correct weight.</p> <p>Step 2. If problem remains, notify organizational maintenance.</p>		

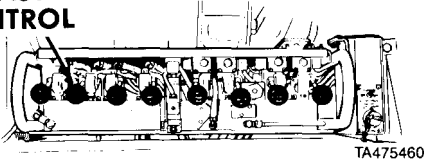
Troubleshooting Malfunctions (Cont)

3-13. M984E1 TROUBLESHOOTING SYMPTOMS (CONT).

Table 3-4. Troubleshooting (Cont)

Malfunction	Test or inspection	Corrective Action
MATERIAL HANDLING CRANE (M984E1) (CONT)		
4. BOOM WILL NOT TELESCOPE IN OR OUT.		
RANGE DIAGRAM M984E1		
<p>The range diagram shows a grid with horizontal axis (radius) from 20.00 to 0.00 and 5.00, and vertical axis (height) from 0.00 to 30.00. Four boom configurations are plotted:</p> <ul style="list-style-type: none"> 12'-0" BOOM, 14000 LBS. REF, 9'-0" RADIUS, 370° 14'-0" BOOM, 12000 LBS. REF, 11'-10" RADIUS, 370° 18'-5" BOOM, 8000 LBS. REF, 16'-5" RADIUS, 370° 18'-5" BOOM, 6000 LBS. REF, 18'-2" RADIUS, 370° <p>A side view of the crane shows the boom extending from the truck. A circular diagram below shows the 370° lifting area with 5° overlaps for the swing.</p>		
<p>ALL DIMENSIONS ARE IN FEET UNLESS OTHERWISE SPECIFIED</p>		
<p>Step 1. Check that load is not over load limit shown on range diagram. Reduce load to correct weight.</p>		

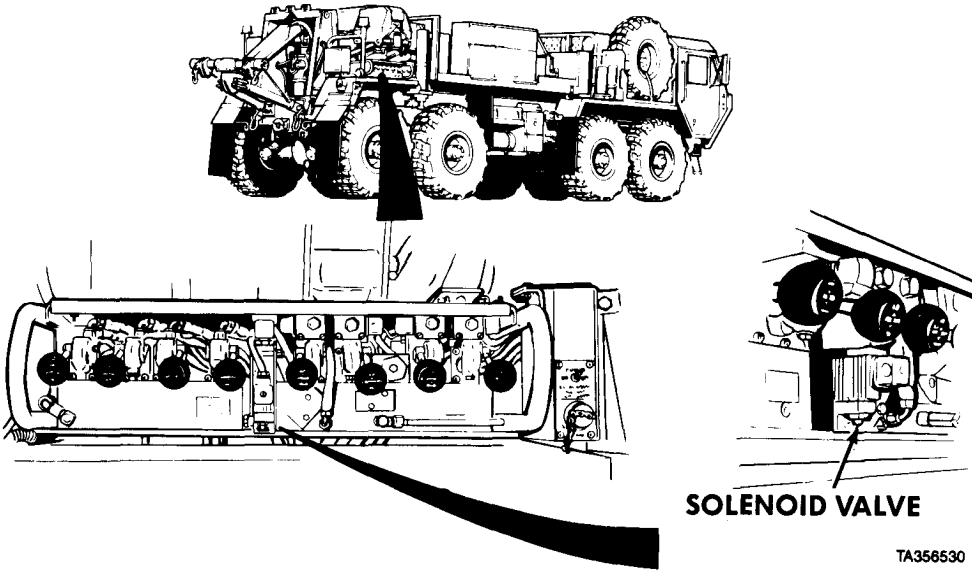
Troubleshooting Malfunctions (Cont)
 Table 3-4. Troubleshooting (Cont)

Malfunction	Test or Inspection	Corrective Action
<p>MATERIAL HANDLING CRANE (M984E1) (CONT)</p>		
<p>4. BOOM WILL NOT TELESCOPE IN OR OUT (CONT)</p>		
<p>Step 2. Refer to MALFUNCTION 1 BOOM OPERATION ABNORMAL WHEN TELESCOPING IN OR OUT.</p>		
<p>Step 3. If problem remains, notify organizational maintenance.</p>		
<p>5. CRANE CONTROLS STICKING IN ENGAGED POSITION.</p>		
<p><u>WARNING</u></p>		
<p>Reservoir may become very hot. Be careful when placing hand near reservoir. Reservoir can become hot enough to cause serious burns.</p>		
<p>Step 1. Check for overheated hydraulic oil by carefully placing hand near hydraulic reservoir.</p>		
<p style="padding-left: 100px;">If reservoir is very hot, shut off engine, let oil cool, then continue operation.</p>		
<p>MAST CONTROL</p>		
 <p style="text-align: right; font-size: small;">TA475460</p>		
<p>Step 2. Check outside temperature. If temperature is less than 0°F (-17°C), hydraulic oil may not flow easily and controls may move slowly.</p>		
<p style="padding-left: 100px;">Operate engine with PTO ENGAGE switch set to ON for 20 minutes to bring oil to operating temperature.</p>		
<p style="padding-left: 100px;">If oil is still not warmed, lower crane to stowed position. Push MAST control lever DOWN. Hold MAST control down for approximately 30 seconds, then return control to neutral position. Repeat procedure several times until oil is warmed.</p>		
<p>Step 3. If controls continue sticking, notify organizational maintenance.</p>		

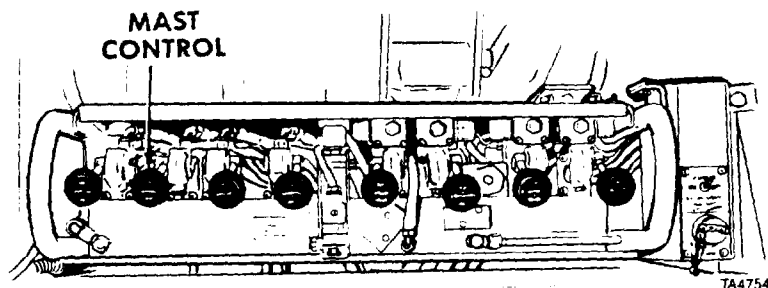
Troubleshooting Malfunctions (Cont)

3-13. M984E1 TROUBLESHOOTING SYMPTOMS (CONT).

Table 3-4 Troubleshooting (Cont)

Malfunction	Test or Inspection	Corrective Action
<p>MATERIAL HANDLING CRANE (M984E1) (CONT)</p>		
<p>CRANE WILL NOT OPERATE OR OPERATES ABNORMALLY.</p>		
 <p style="text-align: right;">SOLENOID VALVE</p> <p style="text-align: right;"><small>TA356530</small></p>		
<p>Step 1. Check solenoid valve to be sure electrical connector is not unplugged.</p>		
<p>Plug electrical connector back in, if unplugged.</p>		
<p>Report problem to organizational maintenance.</p>		
<p>NOTE</p>		
<p>If solenoid does not operate properly, place screwdriver in slot in front of solenoid to hold solenoid closed until mission can be completed. Report problem to organizational maintenance.</p>		
<p>Step 2. If crane electrical power has failed, perform crane emergency hydraulic procedure (para 2-88).</p>		

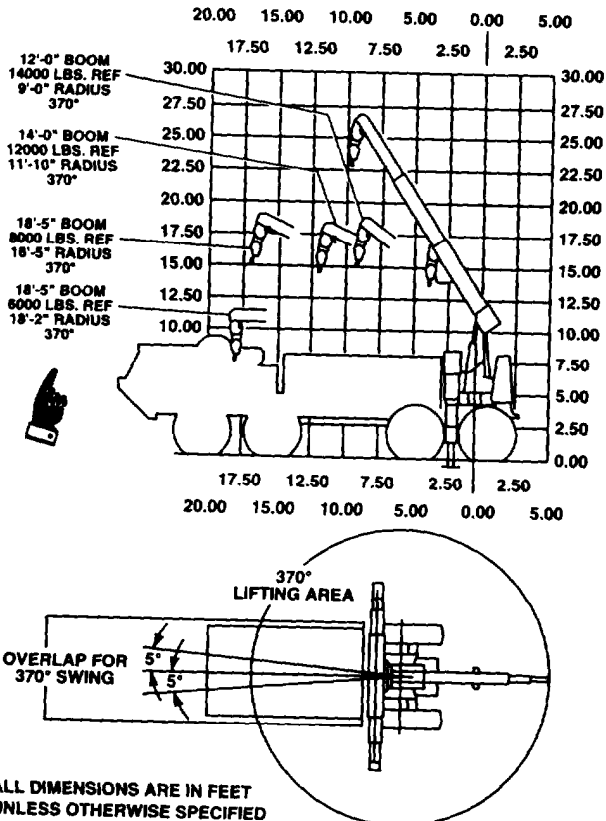
Troubleshooting Malfunctions (Cont)
Table 3-4. Troubleshooting (Cont)

Malfunction	Test or Inspection	Corrective Action
MATERIAL HANDLING CRANE (M984E1) (CONT)		
7. HOIST OPERATION SLOW OR ABNORMAL WHEN LIFTING OR LOWERING LOAD.		
<u>CAUTION</u>		
<ul style="list-style-type: none"> • Be sure to keep tension on cable so that cable does not get tangled on drum. • Set load down and disconnect load hook. Reel cable in and out several times to remove air from hoist motor. 		
Step 1. Check for air in motor.		
 <p style="text-align: center;">MAST CONTROL</p> <p style="text-align: right; font-size: small;">TA475461</p>		
Step 2. Check outside temperature. If temperature is less than 0°F (- 17°C), hydraulic oil may not flow easily.		
Operate engine for 20 minutes with PM ENGAGE switch set to ON to bring oil to operating temperature.		
If oil is still not warmed, lower crane to stowed position. Push MAST control down. Hold MAST control down for approximately 30 seconds, then return control to neutral position. Repeat procedure several times until oil is warmed.		
Step 3. If operation is still slow or abnormal, notify organizational maintenance.		

Troubleshooting Malfunctions (Cont)

3-13. M984E1 TROUBLESHOOTING SYMPTOMS (CONT).

Table 34. Troubleshooting (Cont)

Malfunction	Test or Inspection	Corrective Action
MATERIAL HANDLING CRANE (M984E1) (CONT)		
8. HOIST WILL NOT LIFT LOAD.	<p style="text-align: center;">RANGE DIAGRAM M984E1</p>  <p style="text-align: center;">ALL DIMENSIONS ARE IN FEET UNLESS OTHERWISE SPECIFIED</p> <p>Step 1. Check that load is not over load limit shown on range diagram. Reduce load to correct weight.</p> <p>Step 2. If problem remains, notify organizational maintenance.</p>	

Troubleshooting Malfunctions (Cont)

Table 3-4. Troubleshooting (Cont)

Malfunction	Test or Inspection	Corrective Action
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MATERIAL HANDLING CRANE (M984E1) (CONT)

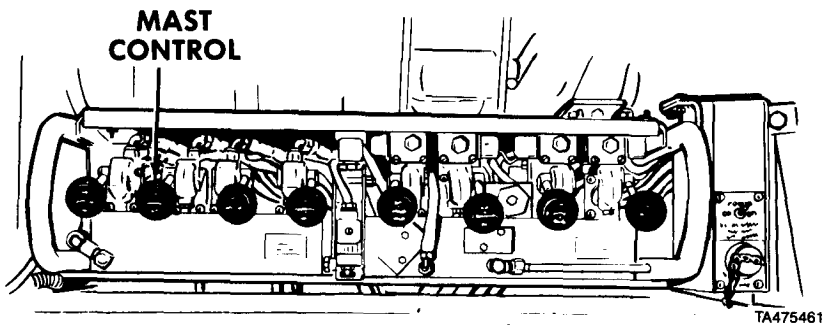
9. MAST RAISES OR LOWERS ABNORMALLY.

Step 1. If mast operation is abnormal, there may be air in cylinders.

Fully raise and lower mast several times to remove air from cylinders.

Step 2. If problem remains, notify organizational maintenance.

10. MAST RAISES OR LOWERS SLOWLY.



Step 1. Check outside temperature. If temperature is less than 0°F (-17°C), hydraulic oil may not flow easily.

Operate engine for 20 minutes with PTO ENGAGE switch set to ON to bring oil to operating temperature.

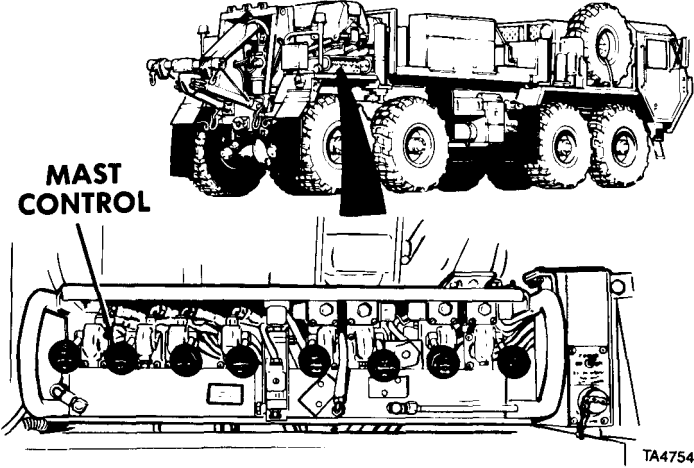
If oil is still not warmed, lower crane to stowed position. Push MAST control lever down. Hold MAST control down for approximately 30 seconds, then return control to neutral position. Repeat procedure several times until oil is warmed.

Step 2. If problem remains, notify organizational maintenance.

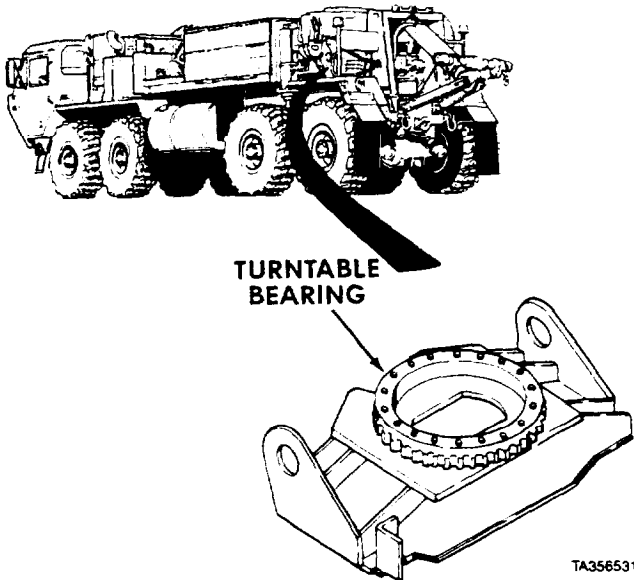
Troubleshooting Malfunctions (Cont)

3-13. M984E1 TROUBLESHOOTING SYMPTOMS (CONT).

Table 3-4. Troubleshooting (Cont)

Malfunction	Test or Inspection	Corrective Action
<p>MATERIAL HANDLING CRANE (M984E1) (CONT)</p>		
<p>11. OUTRIGGER OPERATION SLOW OR ABNORMAL.</p>		
 <p style="text-align: right; font-size: small;">TA475462</p>		
<p>Step 1. Check outside temperature. If temperature is less than 0 °F (-17 °C), hydraulic oil may not flow easily.</p>		
<p style="padding-left: 40px;">Operate engine for 20 minutes with PTO ENGAGE switch set to ON to bring oil to operating temperature.</p>		
<p style="padding-left: 40px;">If oil is still not warmed, lower crane to stowed position. Push MAST control lever down. Hold MAST control down for approximately 30 seconds, then return control to neutral position. Repeat procedure several times until oil is warmed.</p>		
<p>Step 2. If outrigger operation is still abnormal, there may be air in cylinders.</p>		
<p style="padding-left: 40px;">Fully let out and draw back outriggers several times to remove air from cylinders.</p>		
<p>Step 3. If problem remains, notify organizational maintenance.</p>		

Troubleshooting Malfunctions (Cont)
Table 3-4. Troubleshooting (Cont)

Malfunction	Test or Inspection	Corrective Action
MATERIAL HANDLING CRANE (M984E1) (CONT)		
12. SWING OPERATION ABNORMAL IN BOTH DIRECTIONS.		
Step 1.	Check that abnormal operation is not caused by sharp movement of controls to neutral.	Feather control lever to neutral to maintain smooth stopping action.
Step 2.	Check if vehicle is level.	Level vehicle.
		
Step 3.	Check for dried out or damaged turntable bearing by slowly rotating boom back and forth without load. Grating noises and/or erratic movement indicate dried out or damaged bearings.	Rotate turntable 360 degrees in both directions several times and lubricate turntable bearing (LO 9-2320-279-12)

Troubleshooting Malfunctions (Cont)

3-13. M984E1 TROUBLESHOOTING SYMPTOMS (CONT).

Table 34. Troubleshooting (Cont)

Malfunction	Test or Inspection	Corrective Action
MATERIAL HANDLING CRANE (M984E1) (CONT)		
12. SWING OPERATION ABNORMAL IN BOTH DIRECTIONS (CONT).		
RANGE DIAGRAM M984E1		
<p>The range diagram shows a grid with horizontal axes from 20.00 to 0.00 and 0.00 to 5.00, and vertical axes from 0.00 to 30.00. Four boom configurations are plotted:</p> <ul style="list-style-type: none"> 12'-0" BOOM, 14000 LBS. REF, 9'-0" RADIUS, 370° 14'-0" BOOM, 12000 LBS. REF, 11'-10" RADIUS, 370° 18'-5" BOOM, 8000 LBS. REF, 16'-5" RADIUS, 370° 18'-5" BOOM, 6000 LBS. REF, 18'-2" RADIUS, 370° <p>A silhouette of the crane is shown at the bottom of the grid. A hand icon points to the 18'-5" boom configuration.</p>		
<p>The diagram shows a circular lifting area of 370°. Two overlapping rectangular regions are shown, each with a 5-degree angle. The text indicates: "OVERLAP FOR 370° SWING" and "370° LIFTING AREA".</p>		
<p>ALL DIMENSIONS ARE IN FEET UNLESS OTHERWISE SPECIFIED</p>		
<p>Step 4. Check that load is not over load limit shown on range diagram. Reduce load to correct weight.</p> <p>Step 5. If problem remains, notify organizational maintenance.</p>		

Troubleshooting Malfunctions (Cont)
 Table 3-4. Troubleshooting (Cont)

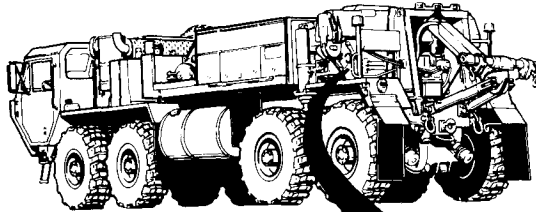
Malfunction	Test or Inspection	Corrective Action
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MATERIAL HANDLING CRANE (M984E1) (CONT)

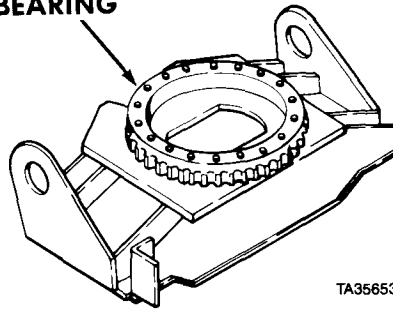
3. SWING OPERATION ABNORMAL IN ONE DIRECTION ONLY.

Step 1. Check if vehicle is level.

Level vehicle.



**TURNTABLE
 BEARING**



TA356531

Step 2. Check for dried out or damaged turntable bearing by slowly rotating boom back and forth without load. Grating noises and/or erratic movement indicate dried out or damaged bearings.

Rotate turntable 360 degrees in both directions several times and lubricate turntable bearing (LO 9-2320-279-12).

Step 3. Notify organizational maintenance if problem remains.

Troubleshooting Malfunctions (Cont)

3-13. M984E1 TROUBLESHOOTING SYMPTOMS (CONT).

Table 3-4. Troubleshooting (Cont)

Malfunction	Test or Inspection	Corrective Action
<p>RETRIEVAL SYSTEM (M984E1)</p>		
<p>NOTE</p>		
<p>• Common problems in the retrieval system that may be found are:</p>		
<ol style="list-style-type: none"> 1. Slow or abnormal operation. 2. Will not lift disabled vehicle. 3. Will not hold disabled vehicle in raised position. 		
<p>• Common causes of the problem are:</p>		
<ol style="list-style-type: none"> 1. Cold hydraulic oil (slow operation). 2. Low engine speed (slow or abnormal operation). 3. Operating two retrieval functions at same time (slow operation). 4. Low hydraulic oil. 		
<p>• Report all problems to organizational maintenance.</p>		
<p>1. CONTROLS STICKING IN ENGAGED POSITION.</p>		
<p><u>WARNING</u></p>		
<p>Reservoir may become very hot. Be careful when placing hand near reservoir. Reservoir can become hot enough to cause serious burns.</p>		
<p>Step 1. Check for overheated hydraulic oil by carefully placing hand near hydraulic reservoir.</p>		
<p>If reservoir is very hot, shut off engine. Let oil cool, then continue operation.</p>		

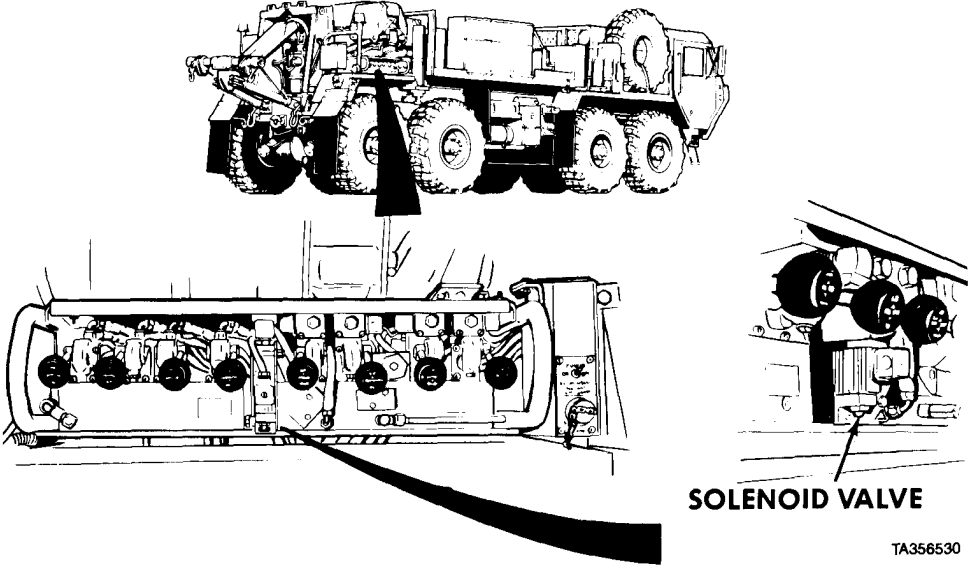
Troubleshooting Malfunctions (Cont)
 Table 3-4. Troubleshooting (Cont)

Malfunction	Test or Inspection	Corrective Action
<p>RETRIEVAL SYSTEM (M984E1)</p>		
<p>1. CONTROLS STICKING IN ENGAGED POSITION (CONT).</p>		
<p>Step 2. Check outside temperature. If temperature is less than 0°F (-17 °C), hydraulic oil may not flow easily and controls may stick or move slowly.</p>		
<p style="padding-left: 40px;">Operate engine with PTO ENGAGE switch ON for 20 minutes to bring oil to operating temperature.</p>		
<p style="padding-left: 40px;">If oil is still not warmed, push LIFT CYLINDER control IN and hold for approximately 30 seconds, then return control to neutral position. Repeat procedure several times until oil is warmed.</p>		
<p>Step 3. If controls continue sticking, notify organizational maintenance.</p>		
<p>2. RETRIEVAL CYLINDERS RAISE OR LOWER SLOWLY.</p>		
<p>Step 1. Check outside temperature. If temperature is less than 0°F (-17°C), hydraulic oil may not flow easily.</p>		
<p style="padding-left: 40px;">Operate engine for 20 minutes with PTO ENGAGE switch set to ON to bring oil to operating temperature.</p>		
<p style="padding-left: 40px;">If oil is still not warmed, push LIFT CYLINDER control IN and hold for approximately 30 seconds, then return control to neutral position. Repeat procedure several times until oil is warmed.</p>		
<p style="padding-left: 40px;">If problem remains, notify organizational maintenance.</p>		

Troubleshooting Malfunctions (Cont)

3-13. M984E1 TROUBLESHOOTING SYMPTOMS (CONT).

Table 3-4. Troubleshooting (Cont)

Malfunction	Test or Inspection	Corrective Action
RETRIEVAL SYSTEM (M984E1)		
3. RETRIEVAL SYSTEM WILL NOT OPERATE.		
 <p data-bbox="821 1079 1061 1110">SOLENOID VALVE</p> <p data-bbox="1025 1132 1098 1153">TA356530</p>		
Step 1. Check solenoid valve to be sure electrical connector is not unplugged.		
Plug electrical connector back in, if unplugged. Report problem to organizational maintenance.		
Step 2. Check solenoid valve to be sure solenoid operates when all electrical switches are set in the correct position (para 2-63).		
If solenoid does not operate properly, place screwdriver in slot in front of solenoid to hold solenoid closed until mission can be completed. Report problem to organizational maintenance.		

APPENDIX E
PREPARATION FOR TRANSPORT
AND OPERATION (CONT)

Section I. INTRODUCTION

E-9. SCOPE. This appendix lists tasks which are to be done by the operator/crew of the M984E1 wrecker-recovery vehicle in preparation for movement by, ship, train, or aircraft, and tasks which must be done to prepare the vehicle for operation.

E-10. GENERAL. Tasks to be done to prepare vehicle for transport and for operation are divided into the the following sections:

a. Section II. Preparation for Transport Task List. This table lists tasks To be done before transporting vehicle.

b. Section III. Preparation for Operation Task list. This table lists tasks to be done after transport before operating vehicle.

E-11 EXPLANATION OF COLUMNS

a. Model. This is the vehicle model to which tasks listed in the second column apply.

b. Task. This column describes the task to be completed.

c. Reference/Paragraph. The paragraph reference given is for the procedure in this manual to be used to perform the listed task.

Contents	Para	Page
Position Side Mirrors for Transport.....	E-12a	E-2
Position Side Mirrors for Operation.....	E-12b	E-2
Remove Equipment Body.....	E-13a	E-3
Install Equipment Body.....	E-13b	E-13

Section II. PREPARATION FOR TRANSPORT TASK LIST

(1) MODEL	(2) TASK	(3) REFERENCE/PARAGRAPH
All	Position both side mirrors for transport.	E-12a
All	Remove spare tire from carrier.	3-6b (Vol. 1)
M984E1	Remove equipment body.	E-13a

Preparation for Transport and Operation (Cont)

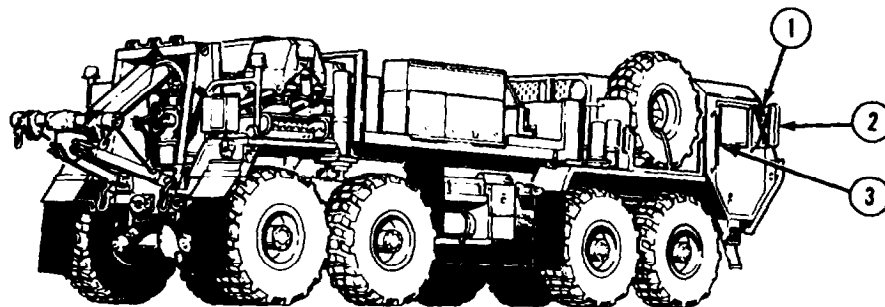
Section III. PREPARATION FOR OPERATION TASK LIST

(1) MODEL	(2) TASK	(3) REFERENCE/PARAGRAPH
All	Position both side mirrors for operation.	E-12b
All	Stow spare tire on carrier.	3-6 (Vol. 1)
M984E1	Install equipment body.	E-13b

Section IV. PROCEDURES TO PREPARE VEHICLE FOR TRANSPORT

E-12. POSITION SIDE MIRRORS FOR TRANSPORT/OPERATION.

a. Position Side Mirrors for Transport.



NOTE

Before folding back mirror frame, mirror must be rotated until it is flat with mirror frame with reflective part of mirror facing cab.

- (1) Hold mirror frame (1).
- (2) Push backward until mirror (2) is against side of cab (3).
- (3) Position mirror on other side of vehicle by repeating steps (1) and (2).

b. Position Side Mirrors for Operation.

- (1) Hold mirror frame (1).
- (2) Pull out until mirror (2) is in position for driving.
- (3) Adjust position of mirror (2) as needed.
- (4) Position mirror on other side of vehicle by repeating steps (1) through (3).

Preparation for Transport and Operation (Cont)

E-13. EQUIPMENT BODY REMOVAL/INSTALLATION.

a. Removal.

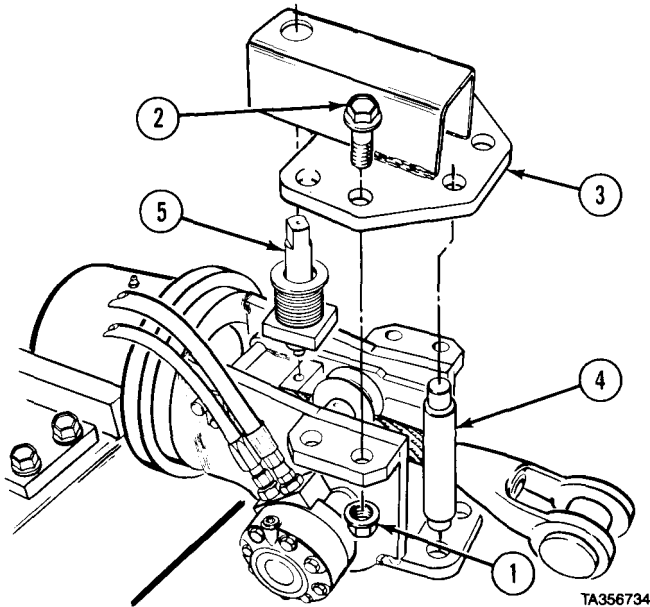
CAUTION

Proper procedures must be followed closely when removing the equipment body or damage to vehicle may occur.

NOTE

- Removal of equipment body is a two-soldier task.
- During removal of equipment body, store all hardware removed in stowage compartments.
- Rotate fairlead/tensioner as required to gain access to nuts and screws.

(1) Lower tensioner to operating position (para 2-65a).



- (2) Remove four nuts (1), screws (2), and plate (3).
 (3) Remove two rollers (4).

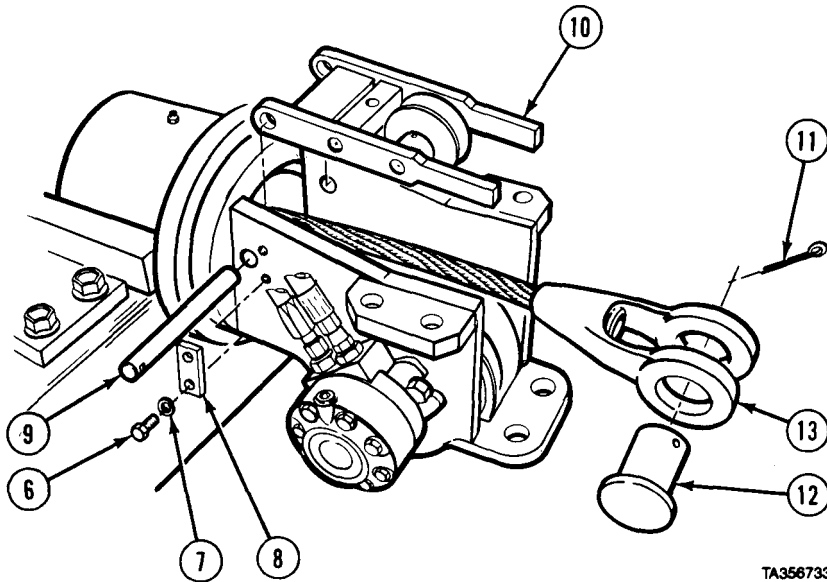
CAUTION

When removing shaft and block, keep upright to prevent loosening or losing order of flatwashers on shaft. Mixup of flatwashers during assembly will cause damage to equipment.

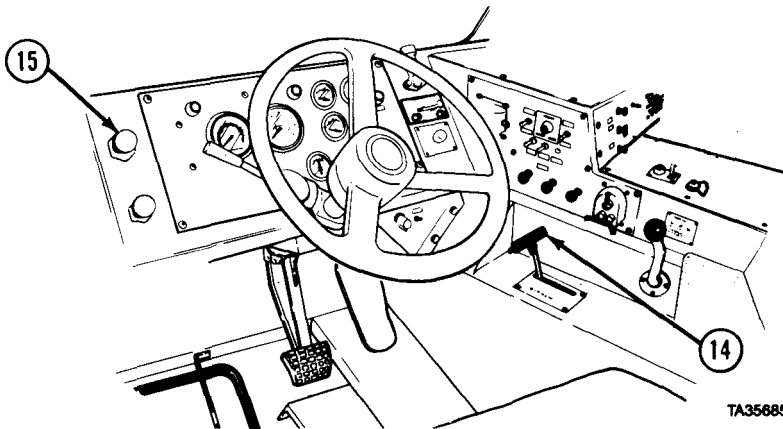
- (4) Remove shaft and block (5).

Preparation for Transport and Operation (Cont)

E-13. EQUIPMENT BODY REMOVAL/INSTALLATION (CONT).

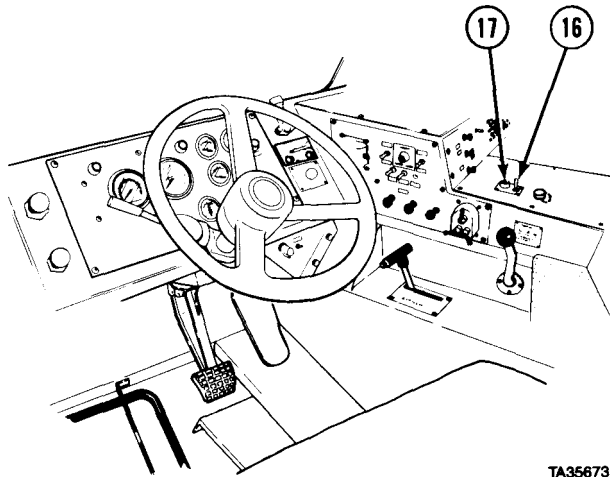


- (5) Remove two screws (6), lockwashers (7), and plate (8).
- (6) Remove pin (9) and pivot arm (10).
- (7) Remove cotter pin (11) and pin (12) from clevis (13).
- (8) Start engine (para 2-11a or 2-11b).



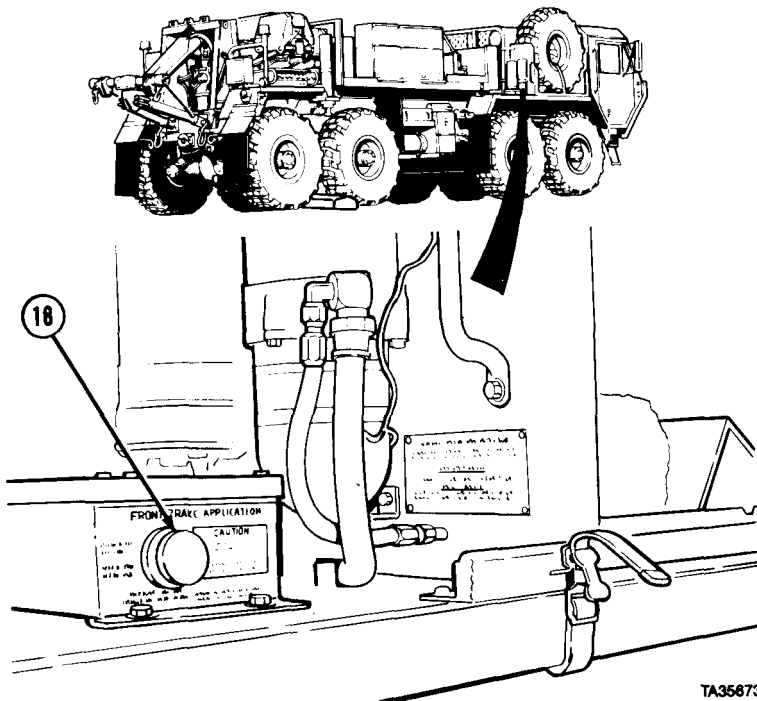
- (9) Put transmission range selector (14) in N (neutral) position and pull PARKING BRAKE control knob (15).

Preparation for Transport and Operation (Cont)



TA356731

(10) Set PTO ENGAGE switch (16) to ON. Indicator light (17) should come on.

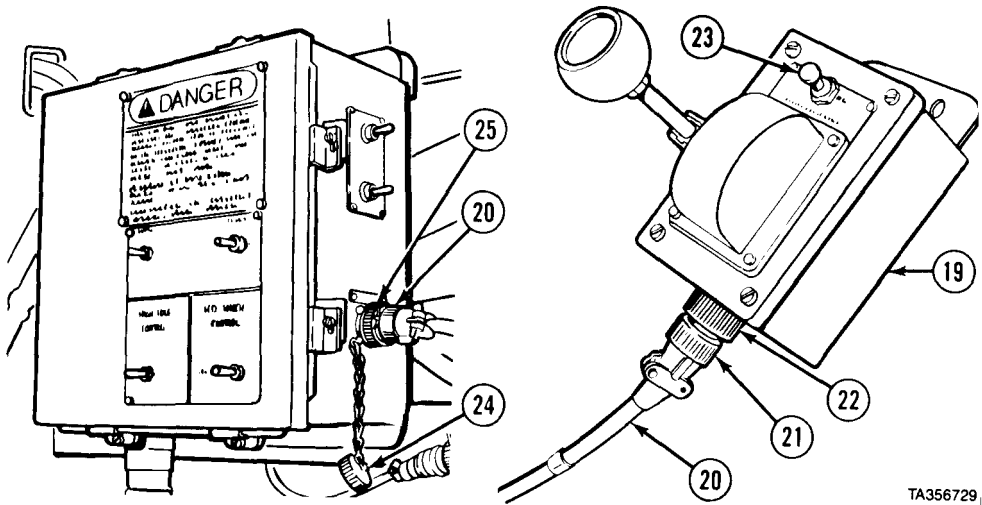


TA356730

(11) Push FRONT BRAKE APPLICATION knob (18).
 (12) Place wheel chocks in front and rear of No. 3 axle.

Preparation for Transport and Operation (Cont)

E-13. EQUIPMENT BODY REMOVAL/INSTALLATION (CONT).



TA356729

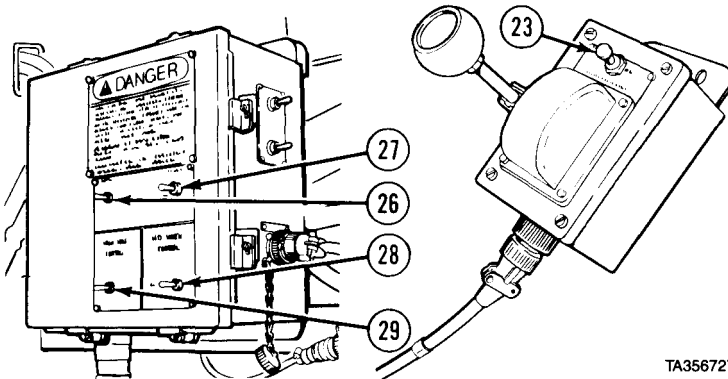
- (13) Remove HEAVY-DUTY WINCH REMOTE CONTROL (19) and remote control cable (20) from stowage.
- (14) Clean dirt and water from cable ends (21) and receptacle (22).

CAUTION

Do not activate HEAVY-DUTY WINCH switch. If activated it may cause winch to move and cause damage to equipment.

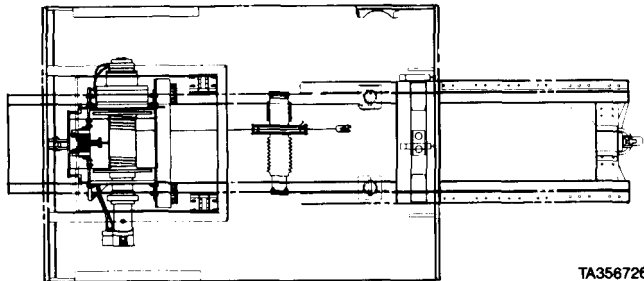
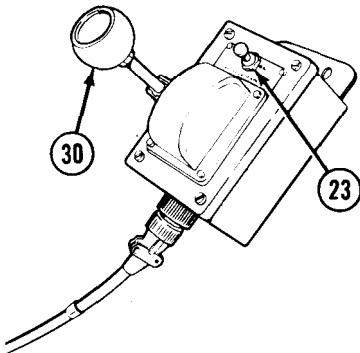
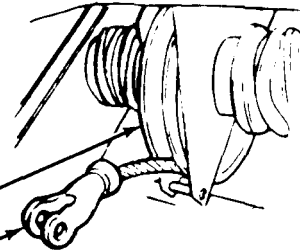
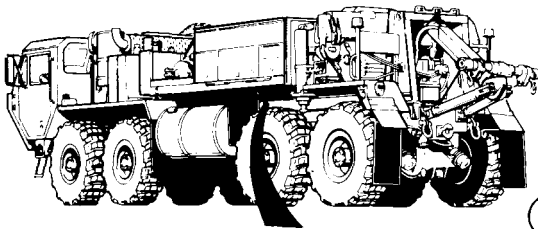
- (15) Connect remote control cable (20) to HEAVY-DUTY WINCH REMOTE CONTROL (19). Check that HEAVY-DUTY WINCH switch (23) is set to OFF.
- (16) Remove cover (24) from receptacle (25). Clean any dirt or water from receptacle.
- (17) Connect remote control cable (20) to receptacle (25).

Preparation for Transport and Operation (Cont)



TA356727

- (18) Set POWER switch (26) to ON (LOW IDLE ONLY).
- (19) Push and release LATCH switch (27) to ON.
- (20) Set H.D. WINCH CONTROL switch (28) to REMOTE.
- (21) Set HIGH IDLE CONTROL switch (29) to HEAVY-DUTY WINCH.
- (22) Set HEAVY-DUTY WINCH switch (23) to ON.



TA356726

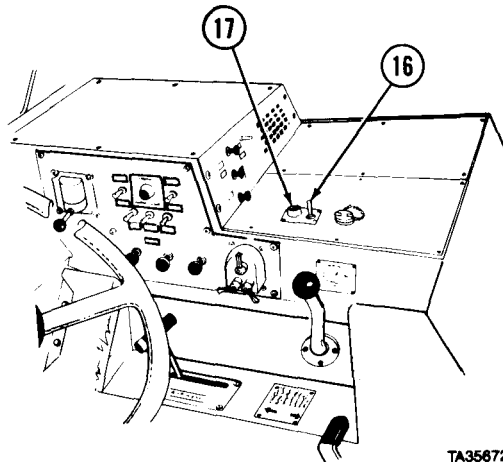
CAUTION

Keep cable end under observation at all times. Watch carefully as cable is reeled in through fairlead and underneath vehicle. Stop reeling immediately if cable catches or hangs; damage to equipment may occur.

- (23) Move WINCH control lever (30) to IN and slowly wind up winch cable until clevis (13) just touches cable guide sheave (31).
- (24) Set HEAVY-DUTY WINCH switch (23) to OFF.

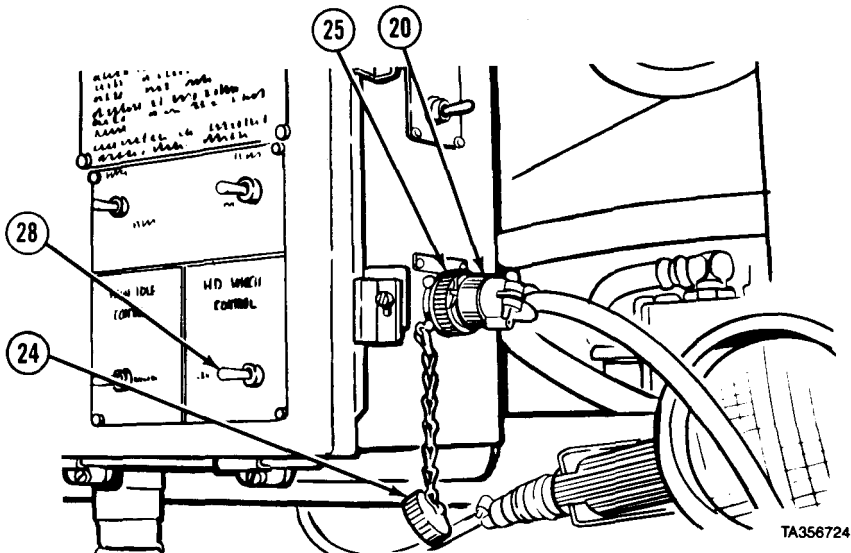
Preparation for Transport and Operation (Cont)

E-13. EQUIPMENT BODY REMOVAL/INSTALLATION (CONT).



TA356725

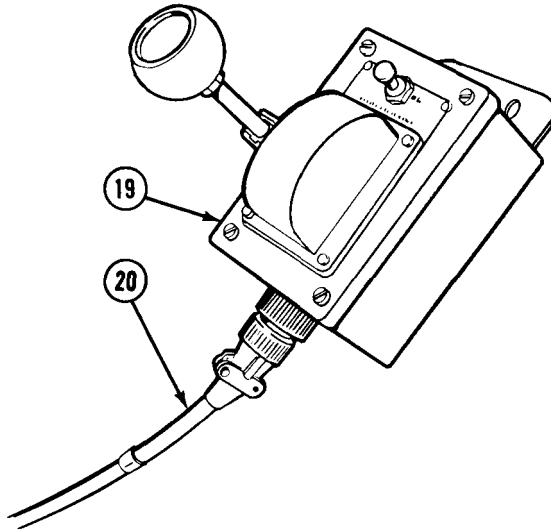
- (25) Set PTO ENGAGE switch (16) to OFF. Indicator light (17) should go out.
- (26) Shut down engine (para 2-11p).



TA356724

- (27) Set H.D. WINCH CONTROL switch (28) to OFF.
- (28) Disconnect remote control cable (20) from receptacle (25). Install cover (24) on receptacle.

Preparation for Transport and Operation (Cont)



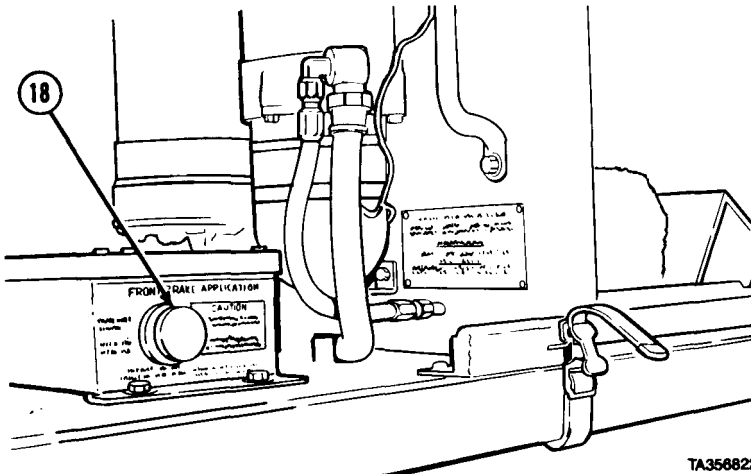
TA356723

- (29) Disconnect remote control cable (20) from HEAVY-DUTY WINCH REMOTE CONTROL (19).
- (30) Put remote control cable (20) and HEAVY-DUTY WINCH REMOTE CONTROL (19) in stowage.

WARNING

Fairlead/tensioner is very heavy and rotates. Hold tight while raising to stowed position. Falling fairlead/tensioner could cause serious injury or death.

- (31) Return fairlead/tensioner to stowed position (para 2-65c).
- (32) Return retrieval system to stowed position (para 2-72).

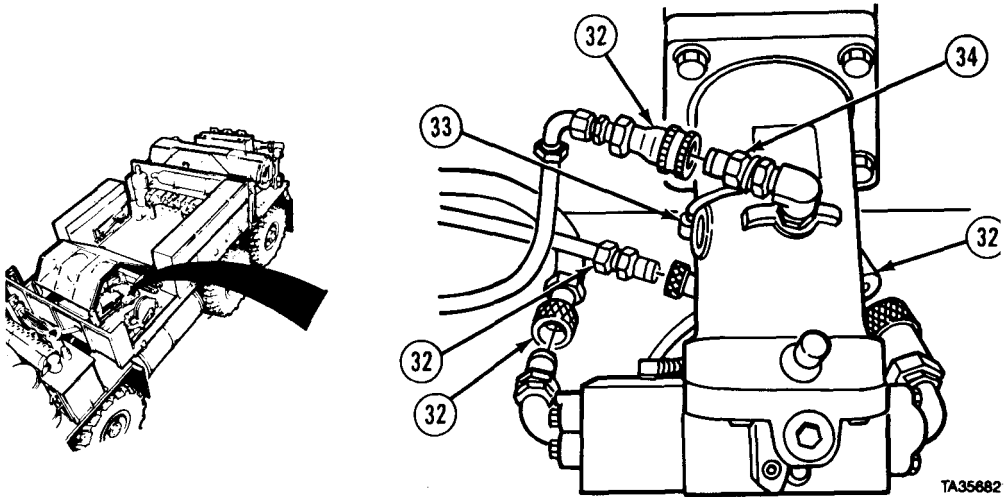


TA356822

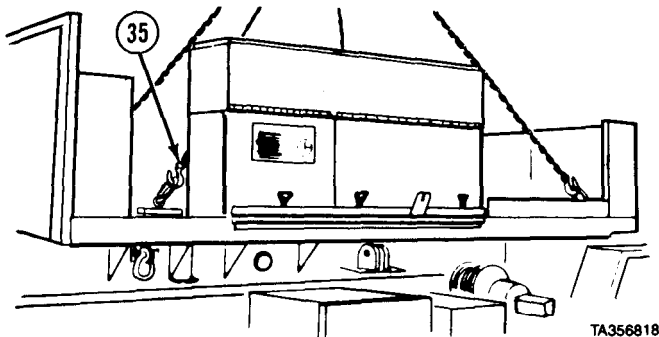
- (33) Pull FRONT BRAKE APPLICATION knob (18) to release front brake.

Preparation for Transport and Operation (Cont)

E-13. EQUIPMENT BODY REMOVAL/INSTALLATION (CONT.)



- (34) Disconnect four heavy-duty winch hydraulic hoses (32) and pull toward vehicle engine through hole in equipment body.
- (35) Connect hydraulic hoses (32) together.
- (36) Install dust cap (33) on fitting (34).



CAUTION

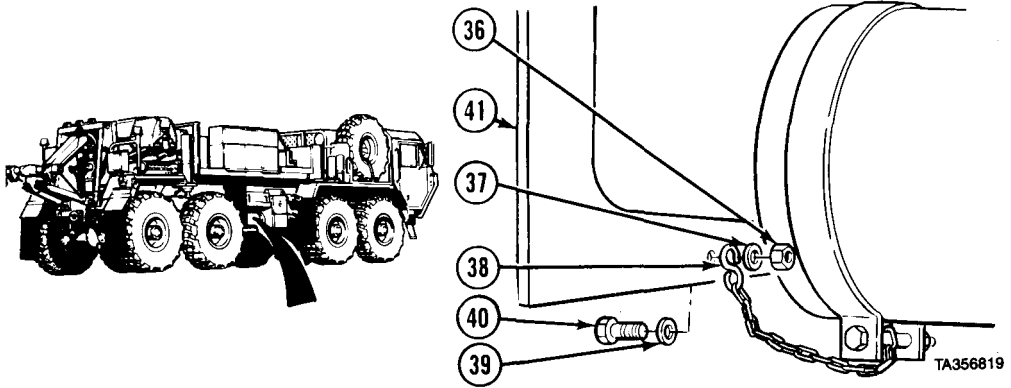
Make sure lifting device does not interfere with winch motor or hydraulic hoses. If lifting device catches on motor or hoses it may damage equipment.

NOTE

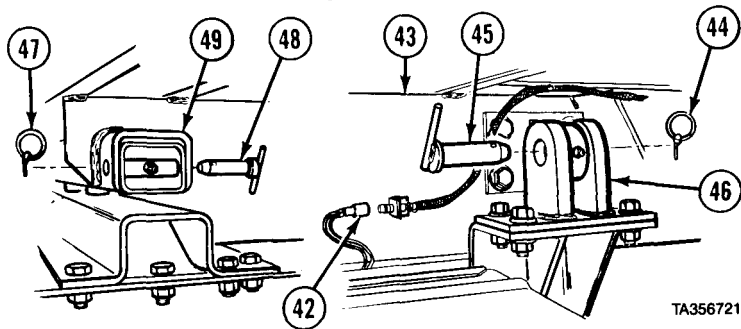
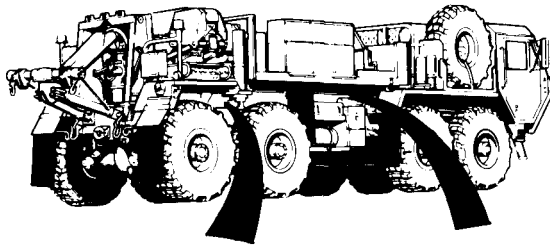
- 16-foot (5m) safety chain and pallet sling from stowage should be used for lifting.
- Vehicle onboard crane may be used to remove equipment body. If other than onboard crane is used, skip step (37) and start with step (38).

- (37) Prepare onboard crane for operation with remote control (para 2-64a).
- (38) Attach suitable lifting device to four corner lifting eyes (35).

Preparation for Transport and Operation (Cont)



- (39) Remove locknut (36), washer (37), S-hook and chain assembly (38), washer (39), and screw (40) from right center mud flap (41).



- (40) Disconnect connector (42) on frame rail (43).

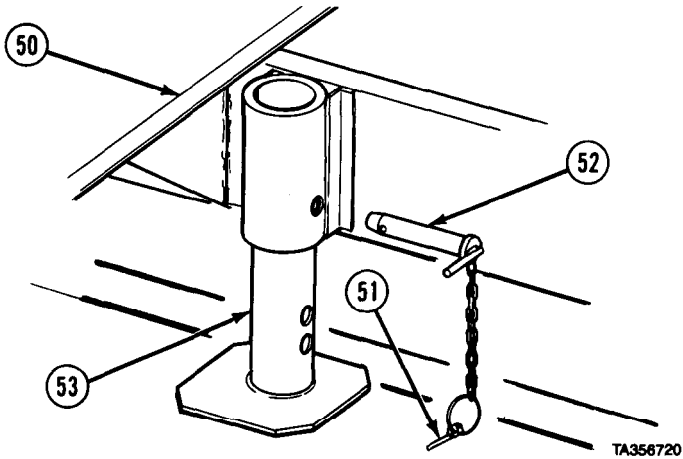
NOTE

- The following removal steps apply to both left and right mounting brackets. Right side shown.
- Heavy-duty winch protective screen may be raised for easy access to front mounting bracket.

- (41) Soldier A operates lifting device while Soldier B removes quick pin (44) and pin (45) from mounting bracket (46). Put pin (45) in stowage.
- (42) Soldier A operates lifting device while Soldier B removes quick pin (47) and pin (48) from rear mounting bracket (49). Put pin (48) in stowage.

Preparation for Transport and Operation (Cont)

E-13. EQUIPMENT BODY REMOVAL/INSTALLATION (CONT.)



WARNING

- Keep out from under heavy equipment. Falling equipment may cause serious injury or death.
- Use wood blocks or other suitable means to support equipment body during lowering of legs. Equipment body can fall and cause serious injury or death.

CAUTION

Be sure that equipment body does not contact other vehicle components during removal or damage to other vehicle components may occur. Adjust lifting device as needed to allow even lift.

- (43) Soldier A operates lifting device and lifts equipment body (50) off vehicle approximately 1 ft. (30 cm). Soldier B then inserts wood blocks between frame rail and the underside of the equipment body on each side of vehicle. Soldier A lowers equipment body until it makes contact with wood blocks. Soldier B removes four quick pins (51), pins (52), and lowers legs (53) then installs pins and quick pins in legs.

CAUTION

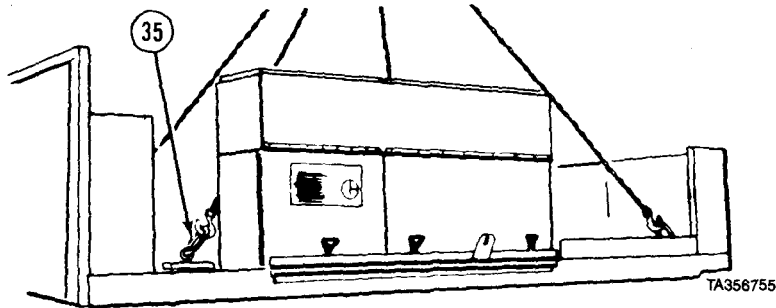
Make sure mud flaps are bent away from legs to prevent damage to mud flaps.

NOTE

Use tiedown straps as needed to guide equipment body during removal.

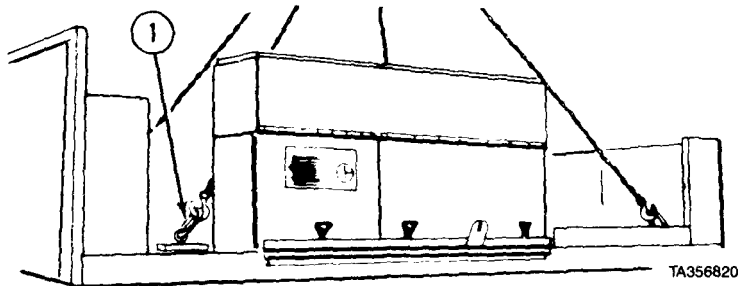
- (44) Soldier A lifts equipment body (50) off vehicle while Soldier B guides equipment body.

Preparation for Transport and Operation (Cont)



(45) Remove lifting device from four corner lifting eyes (35) and stow. If onboard crane was used, return crane to transport position (para 2-64f).

b. *Installation.*



WARNING

Keep out from under heavy equipment. Falling equipment may cause serious injury or death.

CAUTION

Make sure lifting device does not interfere with winch motor or hydraulic hoses. If lifting device catches on motor or hoses it may damage equipment.

NOTE

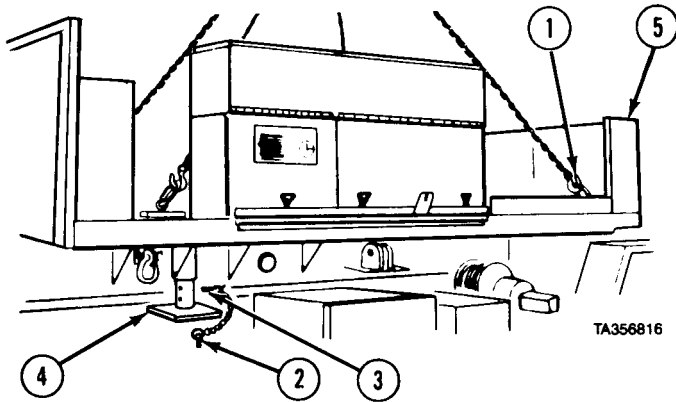
- Vehicle onboard crane may be used to install equipment body. If other than onboard crane is used, skip step (1) and start with step (2).
- 16-foot (5 m) safety chain and pallet sling from stowage should be used for lifting.
- Installation of vehicle body is a two-soldier task.

(1) Prepare onboard crane for operation with remote control (para 2-58a).

(2) Attach lifting device to four corner lifting eyes (1).

Preparation for Transport and Operation (Cont)

E-13. EQUIPMENT BODY REMOVAL/INSTALLATION (CONT.)



WARNING

Use wood blocks or other suitable means to support equipment body during raising of legs. Equipment body can fall and cause serious injury or death.

NOTE

Legs must be raised fully before installing pins with wide side of plate pointing out.

- (3) Soldier A places wood blocks on frame rail to support equipment body. Soldier B lowers equipment body to make contact with wood blocks. Soldier A removes four quick pins (2), pins (3), raises legs (4) and installs pins and quick pins in legs. Soldier A removes wood blocks. Soldier B lowers equipment body (5) onto vehicle.

CAUTION

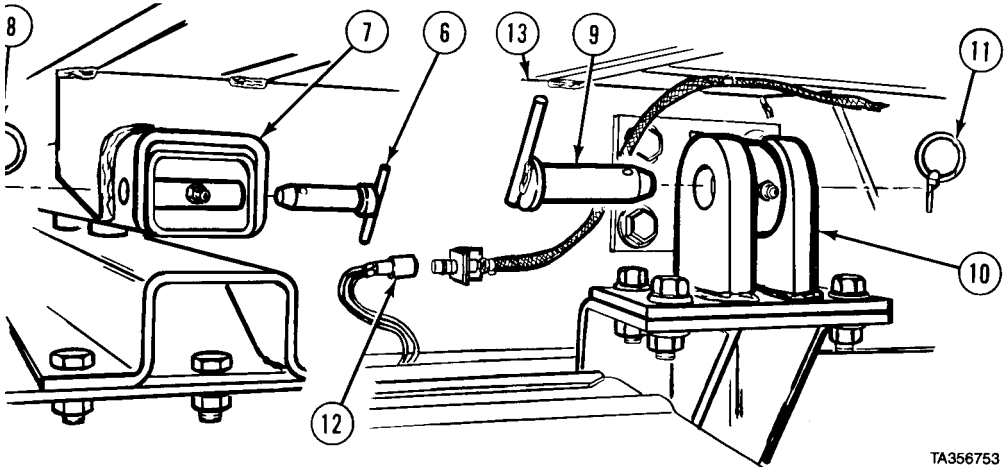
Be sure that equipment body does not contact other vehicle components during installation or damage to other vehicle components may occur. Adjust lifting device as needed to allow even lift.

NOTE

Use tiedown straps as needed to guide equipment body during installation.

- (4) Soldier A operates lifting device and positions and lowers equipment body (5) on vehicle while Soldier B guides equipment body into place.

Preparation for Transport and Operation (Cont)

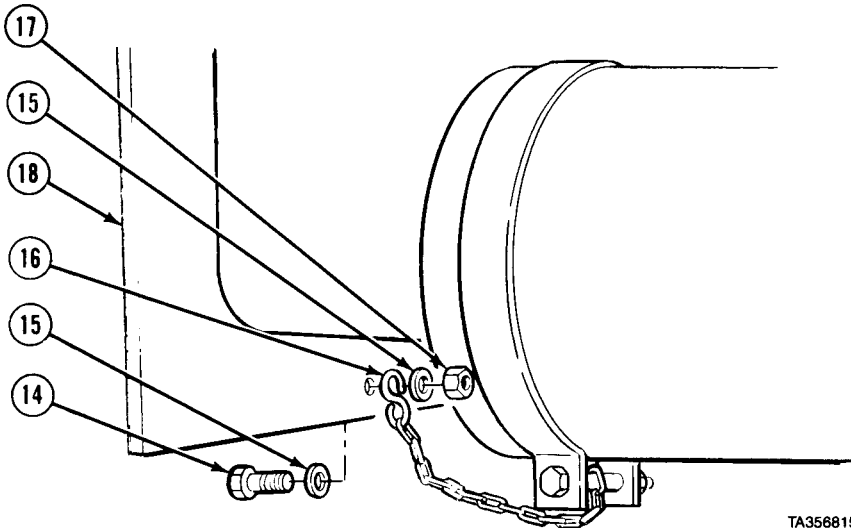


TA356753

NOTE

- Steps (5) and (6) apply to both left and right mounting brackets. Right side shown.
- Heavy-duty winch protective screen may be raised for easy access to front mounting bracket.

- (5) Remove pin (6) from stowage and install pin in rear mounting bracket (7) with quick pin (8).
- (6) Remove pin (9) from stowage and install pin in front mounting bracket (10) with quick pin (11).
- (7) Connect connector (12) on frame rail (13).

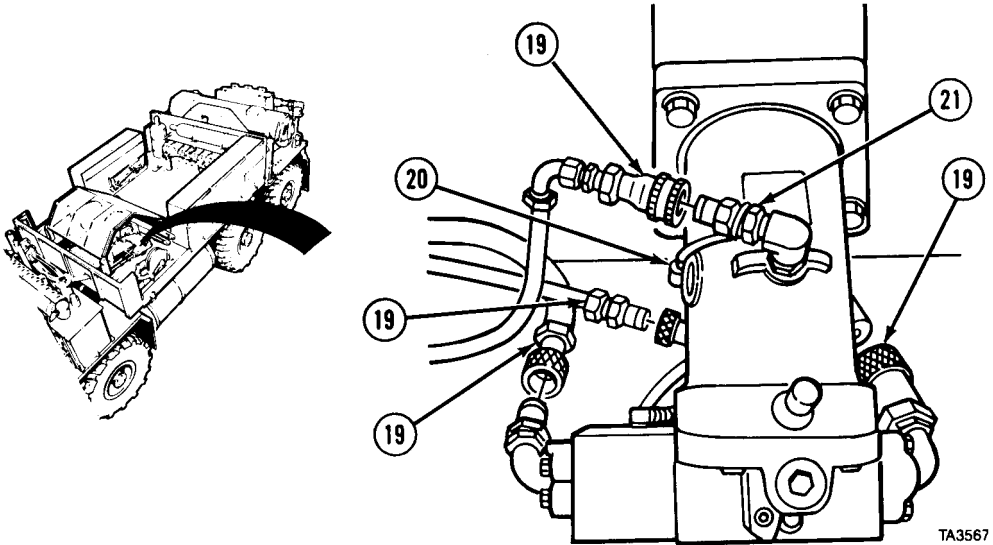


TA356815

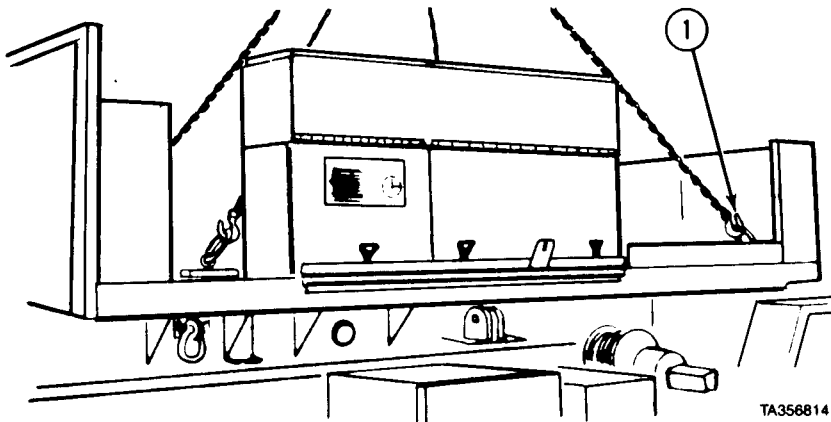
- (8) Install screw (14), washer (15), S-hook and chain assembly (16), washer (15), and locknut (17) on mud flap (18).

Preparation for Transport and Operation (Cont)

E-13. EQUIPMENT BODY REMOVAL/INSTALLATION (CONT.)

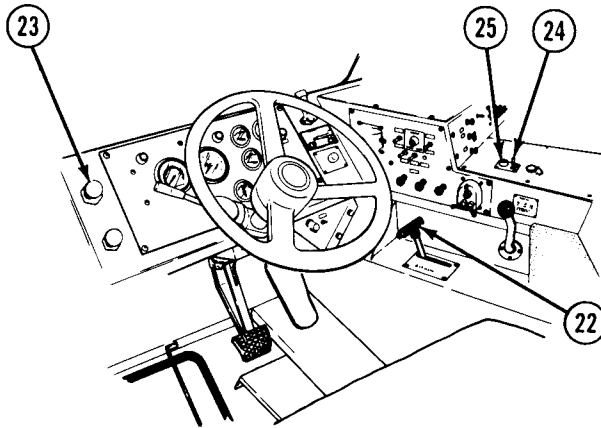


- (9) Disconnect four heavy-duty winch hydraulic hoses (19) from each other and pull through hole in equipment body.
- (10) Remove dust cap (20) from fitting (21).
- (11) Connect four heavy-duty winch hydraulic hoses (19).



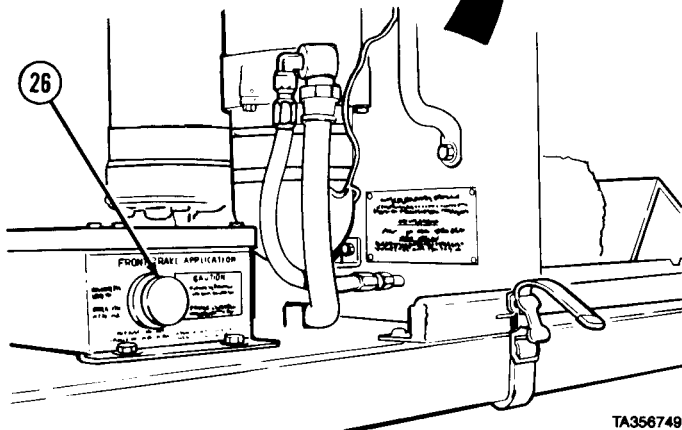
- (12) Remove lifting device from four corner lifting eyes (1) and stow. If onboard crane was used, return to transport position (para 2-64).

Preparation for Transport and Operation (Cont)



TA475804

- (13) Place chock blocks to front and rear of axle No. 3.
- (14) Start engine (para 2-11a or 2-11b).
- (15) Put transmission range selector (22) in N (neutral) position and pull PARKING BRAKE control knob (23).
- (16) Set PTO ENGAGE switch (24) to ON. Indicator light (25) should come on.

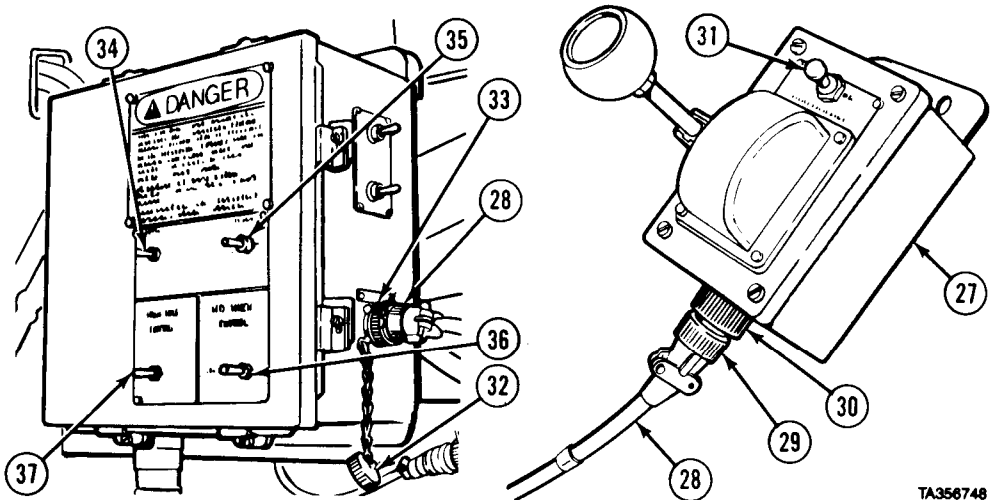


TA356749

- (17) Push FRONT BRAKE APPLICATION knob (26).

Preparation for Transport and Operation (Cont)

E-13. EQUIPMENT BODY REMOVAL/INSTALLATION (CONT.)



TA356748

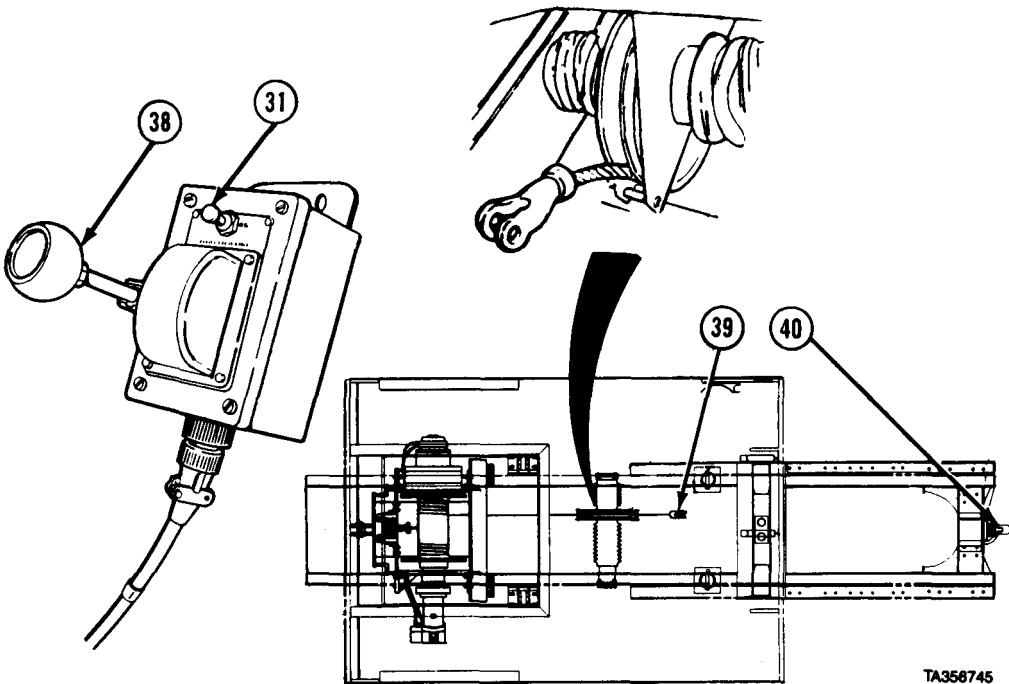
- (18) Remove HEAVY-DUTY WINCH REMOTE CONTROL (27) and remote control cable (28) from stowage.
- (19) Clean any dirt and water from cable ends (29) and receptacle (30).

CAUTION

Do not activate HEAVY-DUTY WINCH switch. If activated, winch may move and cause damage to equipment.

- (20) Connect remote control cable (28) to HEAVY-DUTY WINCH REMOTE CONTROL (27). Check that HEAVY-DUTY WINCH switch (31) is set to OFF.
- (21) Remove cover (32) from receptacle (33). Clean dirt and water from receptacle.
- (22) Connect remote control cable (28) to receptacle (33).
- (23) Set POWER switch (34) to ON (LOW IDLE ONLY).
- (24) Push and release LATCH switch (35) to ON.
- (25) Set H.D. WINCH CONTROL switch (36) to REMOTE.
- (26) Set HIGH IDLE CONTROL switch (37) to HEAVY-DUTY WINCH.
- (27) Set HEAVY-DUTY WINCH switch (31) to ON.

Preparation for Transport and Operation (Cont)

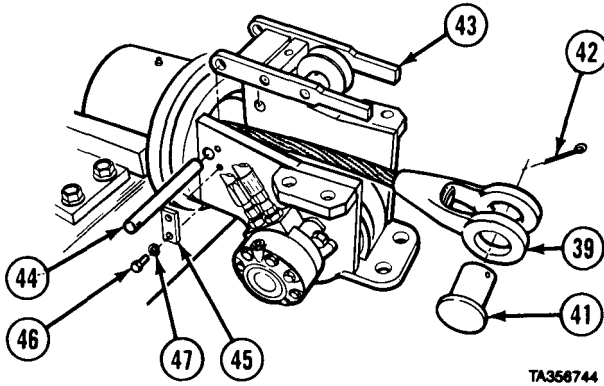
**WARNING**

Always wear heavy gloves when handling cable to prevent injury to hands.

- (28) Soldier A operates WINCH control lever (38) OUT to slowly pay out cable, while soldier B routes clevis (39) to fairlead/tensioner (40).
- (29) Soldier A and Soldier B route cable through and 6 inches (150 mm) past fairlead/tensioner.
- (30) Set HEAVY-DUTY WINCH switch (31) to OFF.

Preparation for Transport and Operation (Cont).

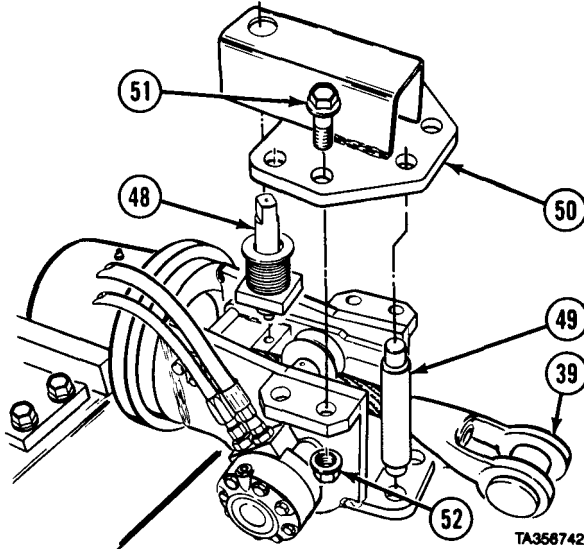
E-13. EQUIPMENT BODY REMOVAL/INSTALLATION (CONT).



NOTE

Rotate fairlead/tensioner as required to gain access to nuts and screws.

- (31) Install pin (41) and cotter pin (42) in clevis (39).
- (32) Install pivot arm (43) and pin (44).
- (33) Install plate (45) with two screws (46) and lockwashers (47).

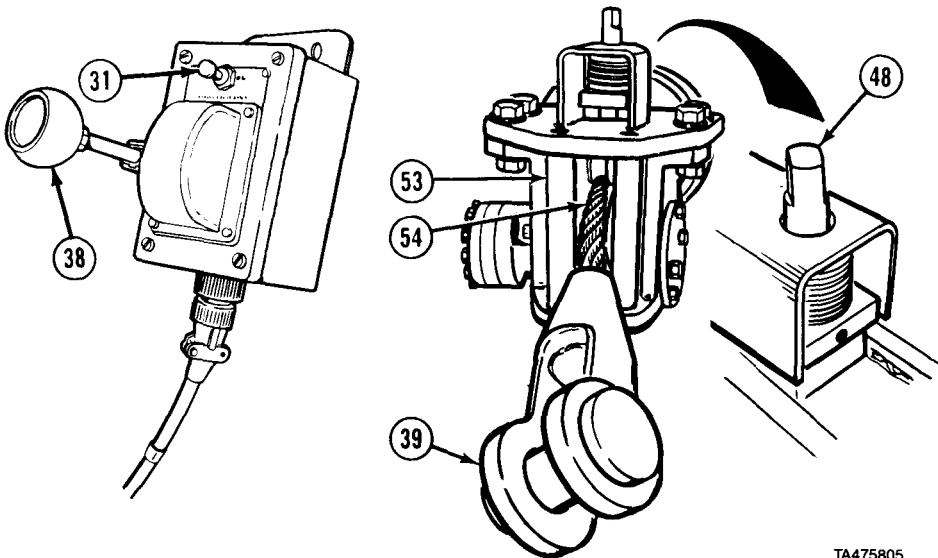


- (34) Install shaft and block (48).
- (35) Install two rollers (49).
- (36) Install plate (50) with four screws (51) and nuts (52).

NOTE

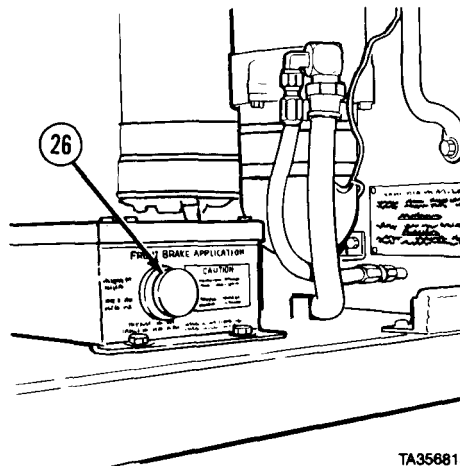
Have organizational level maintenance torque screws and nuts.

Preparation for Transport and Operation (Cont)



TA475805

- (37) Turn shaft (48) counterclockwise until roller (53) does not contact cable (54).
- (38) Turn shaft (48) clockwise until roller (53) just contacts cable (54) then turn stud clockwise eight more turns.
- (39) Set HEAVY-DUTY WINCH switch (31) to ON.
- (40) Move WINCH control lever (38) IN or OUT so clevis (39) is approximately 2 in. (50 mm) from rollers (53).
- (41) Set HEAVY-DUTY WINCH switch (31) to OFF.

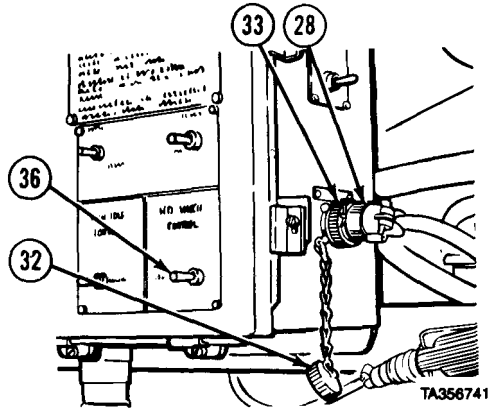


TA356813

- (42) Pull FRONT BRAKE APPLICATION knob (26) to release front brakes.

Preparation for Transport and Operation (Cont)

E-13. EQUIPMENT BODY REMOVAL/INSTALLATION (CONT).



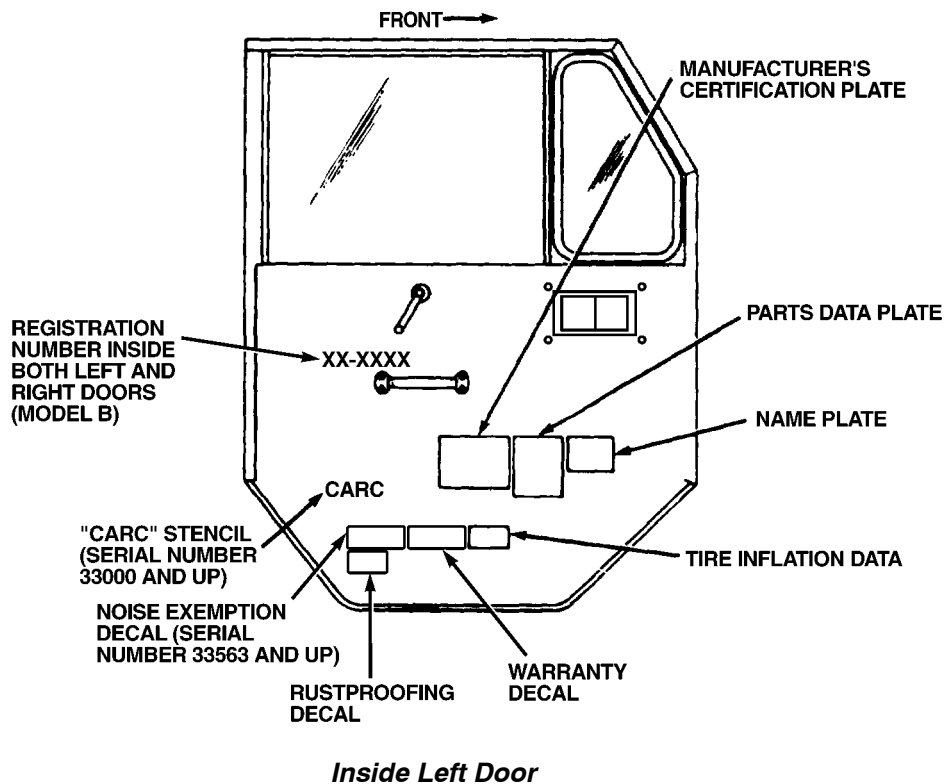
- (43) Set H.D. WINCH CONTROL switch (36) to OFF.
- (44) Disconnect remote control cable (28) from receptacle (33). Install cover (32) on receptacle.

APPENDIX F STOWAGE AND SIGN GUIDE (CONT)

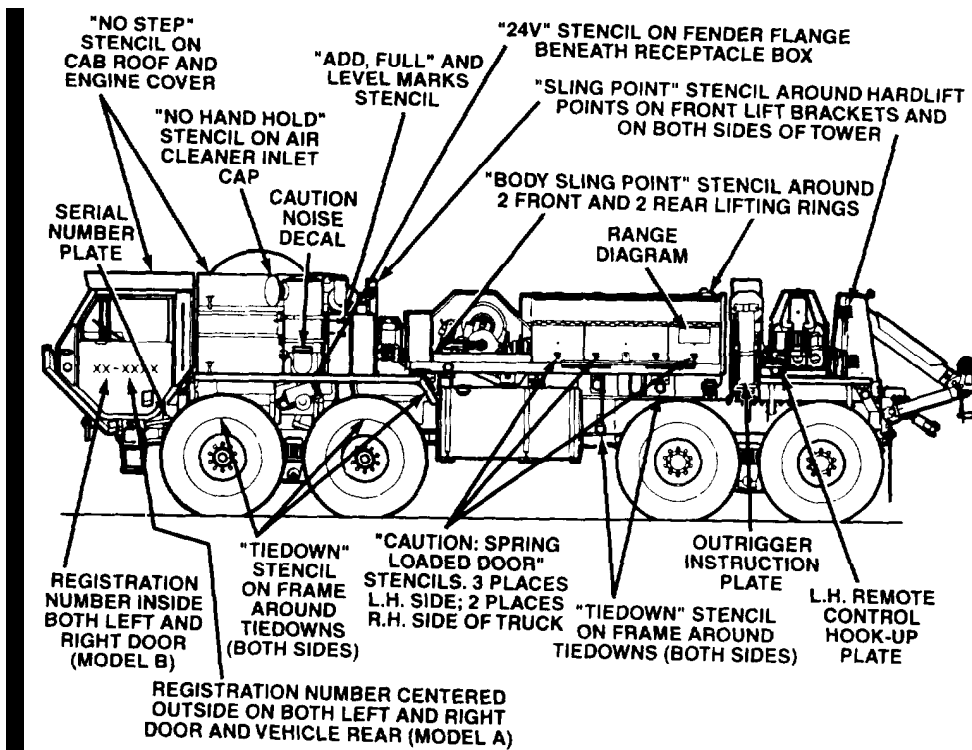
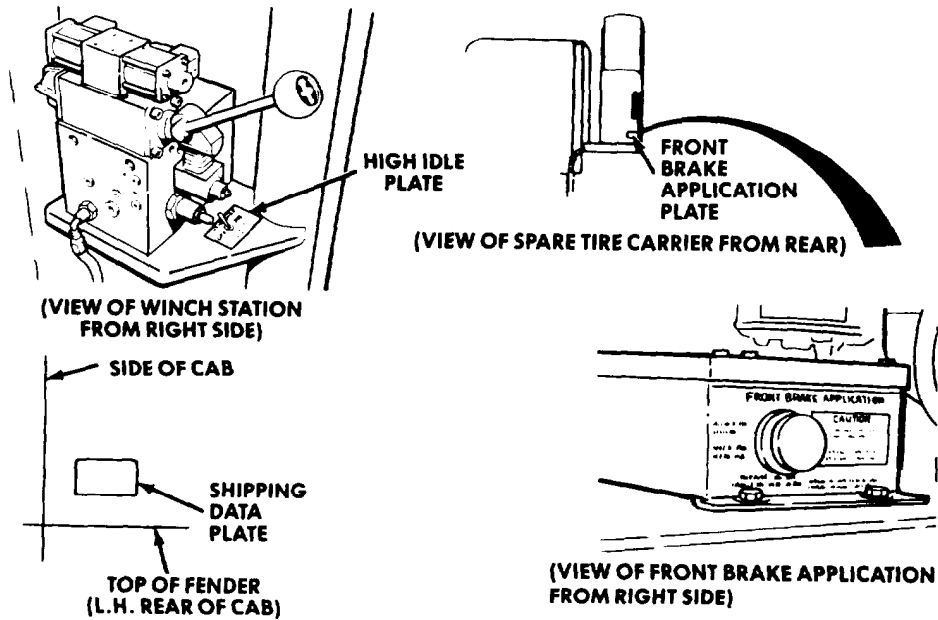
F-3. SCOPE. This appendix shows locations for data plates, decals, and stencils that are required to be in place on the M984E1 wrecker-recovery vehicles.

F-4. GENERAL. The figures on the next pages show the location of metal signs, decals, and stencils used on the vehicle. Most of these signs and stencils contain cautions or information needed to operate the vehicle safely. For stowage locations of Components of End Items (COEI) and Basic Issue Items (BII), refer to Appendix B.

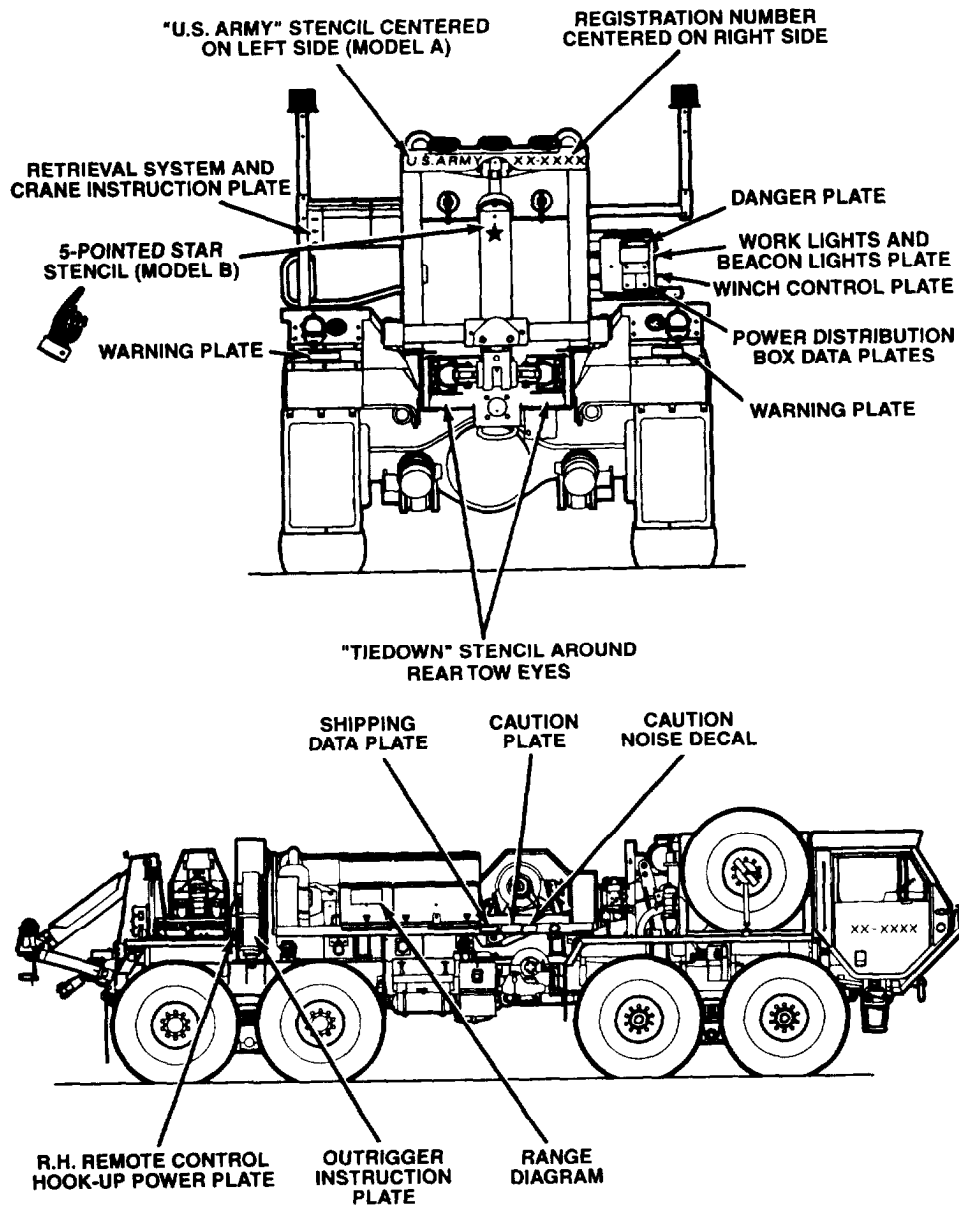
The differences between Model A and Model B as depicted here were implemented at various times during the HEMTT production cycle. Therefore, any individual HEMTT may have some markings depicted as Model A and some as Model B.



Stowage and Sign Guide (Cont)

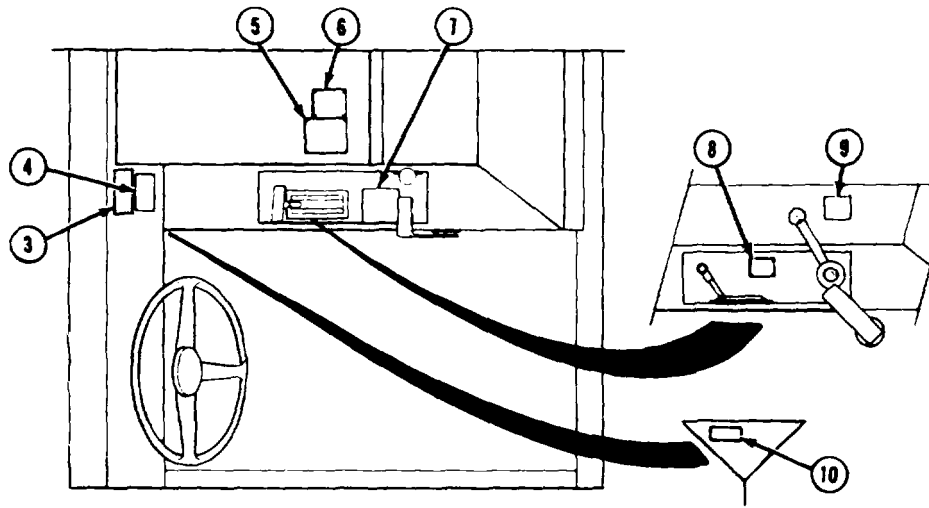


Stowage and Sign Guide (Cont)



M984E1 Wrecker-Recovery Vehicle (Cont)

Stowage and Sign Guide (Cont)



Index Number	M984E1
Deleted	
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Deleted	
3	TRACTION CONTROL
4	ETHER START
5	CRANE DATA
6	HEAVY DUTY WINCH DATA
7	SELF-RECOVERY WINCH DATA
8	VEHICLE DATA PLATE
9	TRANSFER CASE DATA
10	ENGINE ON-OFF DECAL

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THE METRIC SYSTEM AND EQUIVALENTS

WEIGHT MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
 1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
 1 Kilometer = 1000 Meters = 0.621 Miles

WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
 1 Kilogram = 1000 Grams = 2.2 lb.
 1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
 1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq. Centimeter = 100 Sq. Millimeters = 0.155 Sq. Inches
 1 Sq. Meter = 10,000 Sq. Centimeters = 10.76 Sq. Feet
 1 Sq. Kilometer = 1,000,000 Sq. Meters = 0.386 Sq. Miles

CUBIC MEASURE

1 Cu. Centimeter = 1000 Cu. Millimeters = 0.06 Cu. Inches
 1 Cu. Meter = 1,000,000 Cu. Centimeters = 35.31 Cu. Feet

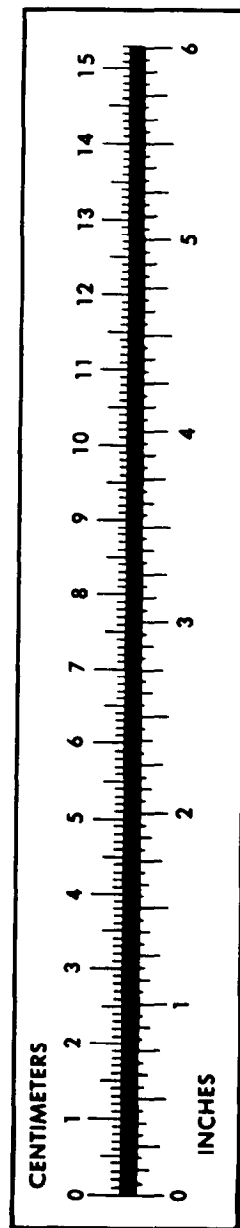
TEMPERATURE

$5/9(^{\circ}\text{F} - 32) = ^{\circ}\text{C}$
 212° Fahrenheit is equivalent to 100° Celsius
 90° Fahrenheit is equivalent to 32.2° Celsius
 32° Fahrenheit is equivalent to 0° Celsius
 $9/5^{\circ}\text{C} + 32 = ^{\circ}\text{F}$

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
its	Liters	0.473
arts	Liters	0.946
allons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
ers	Gallons	0.264
ms	Ounces	0.035
ograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pounds-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
ometers per Liter	Miles per Gallon	2.354
ometers per Hour	Miles per Hour	0.621



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