

**TECHNICAL MANUAL
DIRECT SUPPORT AND GENERAL
SUPPORT MAINTENANCE MANUAL**

DIRECT SUPPORT TROUBLESHOOTING	PAGE 2-3	
---	-----------------	---

**ARMAMENT AND
TURRET COMPONENTS
HOWITZER, HEAVY,
SELF-PROPELLED:
8-INCH, M110A2**

DIRECT SUPPORT MAINTENANCE PROCEDURES	PAGE 2-29	
--	------------------	---

■ **(2350-01-041-4590)(EIC:3E3)**

<u>DISTRIBUTION STATEMENT A.</u> Approved for public release; distribution is unlimited.

CHANGE
No. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC 26 November 1993

TECHNICAL MANUAL
DIRECT SUPPORT AND GENERAL
SUPPORT, MAINTENANCE MANUAL
FOR
ARMAMENT AND
TURRET COMPONENTS
HOWITZER, HEAVY,
8-INCH, M110A
(2350-01-041-4590) (EIC: 3E3)

TM 9-2350-304-34-2, dated, 1 February 1991 is changed as follows:

1. The purpose of this change notice is to provide notification under Section 326 of Public Law 102-484, FY 93 National Defense Authorization Act, that Ozone Depleting Chemicals may no longer be used on Army equipment.
2. Throughout this publication the following items should be substituted for Ozone Depleting Chemicals used on your equipment:

FOR:

SUBSTITUTE:

Page B-2, (3 places)
MIL-C-22750

MIL-C-22750, Type 1

Page B-3
MIL-P-23377

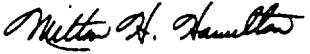
MIL-P-23377, Type 1

3. File this change notice in the front of the publication for reference purposes.

By Order of the Secretary of the Army:

GORDON R. SULLIVAN
General, United States Army
Chief of Staff

Official:


MILTON H. HAMILTON
Administrative Assistant to the
Secretary of the Army
05542

DISTRIBUTION:

To be distributed in accordance with DA Form 12-37-E, block 1643 requirements for TM 9-2350-304-34-2.

*U.S. G.P.O.:1993-546-042:80087

PIN:044289-002

CHANGE

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC 28 May 1993

No. 1

DIRECT SUPPORT AND GENERAL SUPPORT
MAINTENANCE MANUAL

HOWITZER, HEAVY, SELF-PROPELLED
8-INCH, M110A2
(2350-01-041-4590) (EIC:3E3)

TM 9-2350-304-34-2, February 1991, is changed as follows:

1. Remove old pages and insert new pages as indicated below.
2. New or changed material is indicated by a vertical bar in the margin of the page
3. Added or revised illustrations are indicated by a miniature pointing hand, or vertical bar adjacent to the illustration identification number.

Remove Pages

i and ii
1-1 and 1-2
2-5 and 2-6
2-9 and 2-10
None
2-15 and 2-16
2-19 and 2-20
2-23 and 2-24
2-29 and 2-30
2-37 through 2-44
2-57 through 2-60
2-69 through 2-72
2-83 and 2-84
2-87 and 2-88
2-91 and 2-92
2-95 and 2-96
2-99 through 2-102
2-109 through 2-112

2-113 through 2-118
2-153 and 2-154
2-159 and 2-160
2-203 and 2-204
2-243 and 2-244
2-253 and 2-254
2-273 and 2-274
2-343 and 2-344
2-357 and 2-358
2-373 and 2-374
2-379 and 2-380
None
2-389 and 2-390
2-393 and 2-394
2-433 and 2-434
2-445 and 2-446

Insert Pages

i and ii
1-1 and 1-2
2-5 and 2-6
2-9 and 2-10
2-10.1/(2-10.2 blank)
2-15 and 2-16
2-19 and 2-20
2-23 and 2-24
2-29 and 2-30
2-37 through 2-44
2-57 through 2-60
2-69 through 2-72
2-83 and 2-84
2-87 and 2-88
2-91 and 2-92
2-95 and 2-96
2-99 through 2-102
2-109 through 2-112
2-112.1 and 2-112.2
2-113 through 2-118
2-153 and 2-154
2-159 and 2-160
2-203 and 2-204
2-243 and 2-244
2-253 and 2-254
2-273 and 2-274
2-343 and 2-344
2-357 and 2-358
2-373 and 2-374
2-379 and 2-380
2-380.1/(2-380.2 blank)
2-389 and 2-390
2-393 and 2-394
2-433 and 2-434
2-445 and 2-446

File this change sheet in front of the publication for reference purposes.

Remove Pages
2-463 and 2-464
2-469 and 2-470
2-475 and 2-476
A-1 and A-2
B-1 through B-4
Index-3 through Index-6
Front Cover

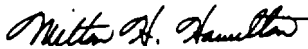
Insert Pages
2-463 and 2-464
2-469 and 2-470
2-475 and 2-476
A-1 and A-2
B-1 through B-4
Index-3 through Index-6
Front Cover

File this change sheet in front of the publication for reference purposes.

By Order of the Secretary of the Army:

GORDON R. SULLIVAN
General, United States Army
Chief of Staff

Official:



MILTON H. HAMILTON
Administrative Assistant to the
Secretary of the Army
04171

DISTRIBUTION:

To be distributed in accordance with DA Form 12-37-E, Block 1643,
requirements for TM 9-2350-304-34-2.

WARNING**RADIATION HAZARD****TRITIUM (H₃)****Rules and Regulations**

Copies of the following rules and regulations are maintained at HQ, AMCCOM Rock Island, IL 61299-6000. Copies may be requested or information obtained by contacting the AMCCOM Radiological Protection Officer (RPO), AUTOVON 793-2964, Commercial (309) 782-2964.

10CFR Part 19—Notices, Instructions, and Reports to Workers; Inspections.

10CFR Part 20—Standards for Protection Against Radiation.

NRC license, license condition, and license application.

Safety Precautions

The radioactive material used in these instruments is tritium gas (H₃) sealed in pyrex tubes. It poses no significant hazard to the repair person when intact. These sources illuminate the instrumentation for night operations. Tampering with or removal of the sources in the field is prohibited by Federal law. In the event there is no illumination, notify the local RPO. Do not attempt to repair or replace the instrument in the field. If skin contact is made with any area contaminated with tritium, immediately wash with nonabrasive soap and water.

Identification

Radioactive self-luminous sources are identified by means of radioactive warning labels (as above). These labels should not be defaced or removed and should be replaced immediately when necessary. Refer to the local RPO or the AMCCOM RPO for instructions on handling, storage, or disposal.

Storage and Shipping

All radioactively illuminated instruments or modules which are defective will be evacuated to a depot maintenance activity. These items must be placed in a plastic bag and packaged in the shipping container from which the replacement was taken before evacuation to a higher echelon is made. Spare equipment must be stored in the shipping container, as received, until installed on the weapon. Storage of these items is recommended to be in an outdoor shed-type storage or unoccupied building.

Radioactive material is used in the M140 alinement device. Radiation leakage may occur if M140 alinement device is broken or damaged. If exposed to a broken or damaged M140 alinement device, see medical personnel.

Radioactive material is used in M1A1 collimator. Radiation leakage may occur if M1A1 collimator is broken or damaged. If exposed to a broken or damaged M1A1 collimator, flush with water and see medical personnel.

Radioactive material is used in M1A2 gunner's quadrant. Radiation leakage may occur if level vial is broken or damaged. If exposed to a broken or damaged vial on the M1A2 quadrant, flush with water and see medical personnel.

WARNING (CONT)

GENERAL

Dry cleaning solvent (SD2) is toxic and flammable. Wear protective goggles and gloves and use only in well-ventilated areas.

Unusable CARC mixtures may be considered hazardous waste and may require disposal in accordance with Federal, state, DOD, and DA hazardous waste regulations. Consult the installation environmental office for proper disposal guidance. Mixed CARC has a flashpoint of approximately 38°F (3°C) due to the incorporation of solvents and is highly flammable.

CARC paint contains isocyanate, a constituent that can cause respiratory effects during and after the application of the material. During the application of CARC paint, coughing, shortness of breath, pain on respiration, increased sputum, and chest tightness may occur. CARC paint also produces itching and reddening of the skin, a burning sensation of the throat and nose, and watering of the eyes. An allergic reaction may occur after initial exposure (ranging from a few days to a few months later), producing asthmatic symptoms including coughing, wheezing, tightness in the chest, or shortness of breath. The following precautions must be observed to insure the safety of personnel when CARC paint is applied.

- For brush/roller painting in confined spaces, an airline respirator is required, unless an air sampling shows exposure to be below standards. If the air sampling is below standards, either chemical cartridge or airline respirators are required.
- Spot painters applying CARC paint by brush or roller must wear clothing and gloves affording full coverage.
- Do not use water, alcohol, or amine based solvents to thin or remove CARC paints. Use of these solvents with CARC paints can produce chemical reactions resulting in nausea, disease, burns, or severe illness to personnel.
- Do not use paint solvents to remove paint/coating from your skin.
- Mix paint/coating in a well-ventilated mixing room or spraying area away from open flames. Personnel mixing paint/coating should wear eye protection.
- Use paint/coating with adequate ventilation.

HYDRAULICS

Hydraulic fluid is under high pressure. Relieve pressure and drain system before removing connections or components.

Hydraulic system is under high pressure. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as level ground as possible. This will stop the cannon from sliding out of battery.

LINEAR ACTUATING HEAD ASSEMBLY

Linear actuating head assembly contains spring under high tension. Use caution during removal or installation.

WARNING (CONT)

ACTUATING CYLINDER

Actuating cylinder contains high pressure nitrogen that can cause severe injury. Relieve all gas pressure before removing bottle.

M174 GUN MOUNT

Before removing M174 gun mount and trunnion caps with equilibrators installed, equilibrator nitrogen pressure must be to zero to prevent injury. Refer to TM 9-2350-304-20-2.

BREECH MECHANISM

Breech components are heavy. Exercise care when disassembling to prevent injury to personnel.

COUNTERBALANCE ASSEMBLY

Counterbalance assembly contains springs under high tension. Use caution during removal or installation.

PNEUMATIC EQUILIBRATOR ASSEMBLY

High pressure nitrogen gas is used in this equipment. Keep face and body clear of release valves. Failure to observe safety precautions may result in injury or death.

Keep hands clear of equilibrator during removal of shaft. Failure to observe this warning may result in injury to personnel.

Ensure nitrogen gas is removed or pressure is relieved. Failure to do so will cause the equilibrator to retract, causing injury or death to personnel.

MANUAL CONTROL LEVER

Manual control lever is under spring tension. Use caution during removal.

VALVE

Closing valve opener more than 3 turns may disengage valve opener from tube assembly causing injury to personnel.

M201A1 CANNON ASSEMBLY

Ensure slings are safely secured before removing wood blocks. Failure to do so may result in damage to equipment or injury to personnel.

MASTER SWITCH

Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.

BATTERIES

Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

POWER LOADER-RAMMER

Rammer trough contains parts under spring tension. Use caution during removal.

Hold upper flat washer firmly against spring tension before removing retaining ring.

FIRST AID

Refer to FM 21-11, First Aid for Soldiers.

TECHNICAL MANUAL

No. 9-2350-304-34-2

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC. 1 February 1991

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL

ARMAMENT AND TURRET COMPONENTS
HOWITZER, HEAVY, SELF-PROPELLED:
8-INCH, M110A2
(2350-01-041-4590)(EIC:3E3)

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS
You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to Commander, U.S. Army Armament, Munitions and Chemical Command, ATTN: AMSMC-MAS, Rock Island, IL 61299-6000. A reply will be furnished to you.

Table of Contents

	Page
HOW TO USE THIS MANUAL	ii
CHAPTER 1. INTRODUCTION	
Section I. General Information	1-1
Section II. Equipment Description and Data.	1-3
CHAPTER 2. DIRECT SUPPORT MAINTENANCE INSTRUCTIONS	
Section I. Repair Parts, Special Tools, TMDE, and Support Equipment.	2-3
Section II. Direct Support Troubleshooting	2-3
Section III. Maintenance of Hydraulic Lines and Fittings	2-27
Section IV. Direct Support Maintenance Procedures	2-29
Section V. Preparation for Storage or Shipment	2-476
CHAPTER 3. GENERAL SUPPORT MAINTENANCE INSTRUCTIONS	3-1
APPENDIX A. REFERENCES	A-1
APPENDIX B. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST	B-1
APPENDIX C. ILLUSTRATED LIST OF MANUFACTURED ITEMS	C-1
APPENDIX D. TORQUE VALUES	D-1
APPENDIX E. SPECIAL TOOLS AND EQUIPMENT	E-1
ALPHABETICAL INDEX	Index-1

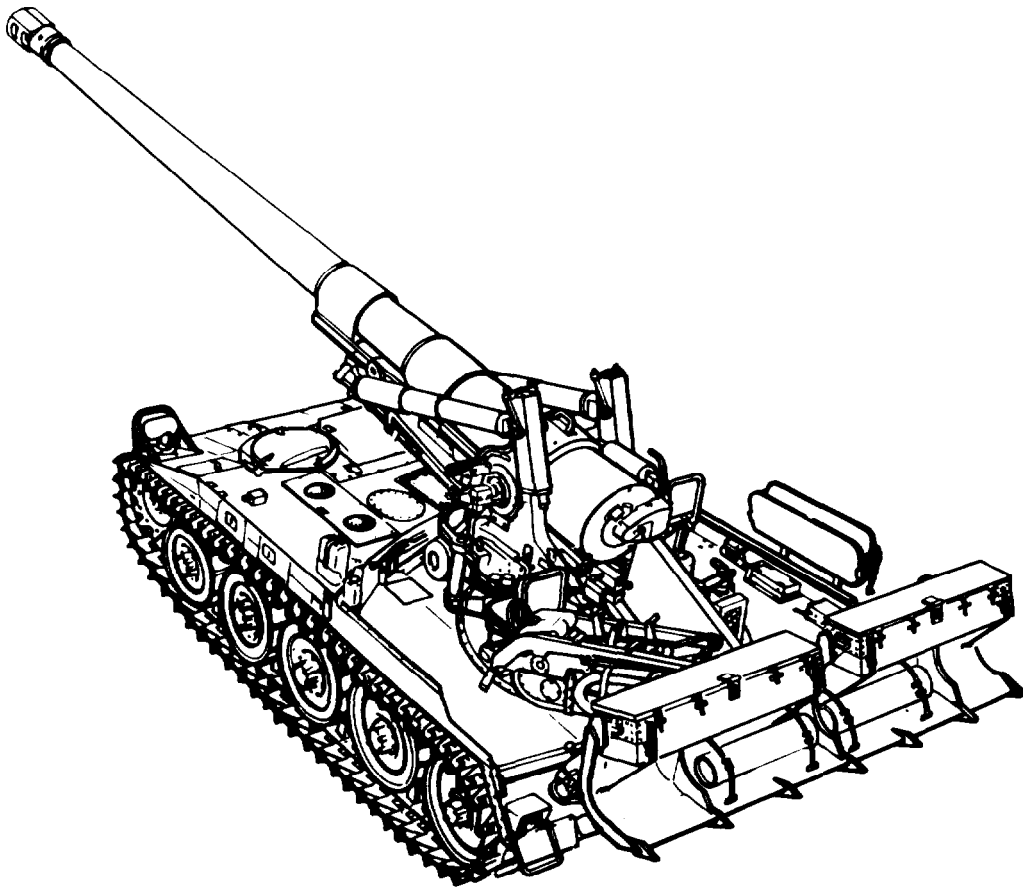
*This manual supersedes TM 9-2350-304-34-2, dated 20 December 1979, including all changes.

HOW TO USE THIS MANUAL

This manual (TM 9-2350-304-34-2) contains direct support maintenance procedures for the armament and turret components of the M110A Self-Propelled Howitzer. This manual is to be used in conjunction with TM 9-2350-304-20-2 and TM 9-2350-304-24P-2. Chapter 1 contains general information and equipment description and data. Chapter 2 contains information concerning repair parts, special tools, TMDE, and support equipment; direct support troubleshooting, direct support maintenance procedures, and information concerning preparation for storage or shipment.

Be sure to read and understand maintenance instructions before beginning any maintenance task. Also, read and understand information in Chapter 1 and general maintenance procedures on page 2-29 before beginning any maintenance task.

M110A SELF-PROPELLED HEAVY HOWITZER



CHAPTER 1 INTRODUCTION

CHAPTER INDEX

	Page
Corrosion Prevention and Control	1-2
Destruction of Army Materiel to Prevent Enemy Use	1-1
Equipment Characteristics, Capabilities, and Features	1-3
Equipment Data	1-3
Location and Description of Major Components	1-3
Maintenance Forms, Records, and Reports	1-1
Official Nomenclature, Names, and Designations	1-2
Preparation for Storage or Shipment	1-2
Reporting Equipment Improvement Recommendations (EIR)	1-2
Scope	1-1

Section I. GENERAL INFORMATION

1-1. SCOPE.

- a. *Type of Manual:* Direct support and general support maintenance.

- b. *Model Number and Equipment Name:* M110A2, 8-inch, heavy, self-propelled howitzer.

- c. *Purpose of Equipment:* M110A2, 8-inch, heavy, self-propelled howitzer transports a long-barrel howitzer and its crew and travels at convoy speed for artillery support in both offensive and defensive combat operations.

1-2. MAINTENANCE FORMS, RECORDS, AND REPORTS. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 738-750, The Army Maintenance Management System (TAMMS).

1-3. DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE.

- a. *Tactical Situations.* Situations may arise in which it is necessary to abandon equipment

in the combat zone. All abandoned equipment must be destroyed to prevent its use by the enemy. The destruction of equipment subject to capture or abandonment in the combat zone will be undertaken only upon authority delegated by a division or higher commander.

b. *Plans.*

(1) Plans for destruction of equipment must be adequate, uniform, and easily carried out in the field.

(2) Destruction must be as complete as the available time, equipment, and personnel will permit. Since complete destruction requires considerable time, priorities must be established so the more essential parts are destroyed first.

(3) The same essential parts must be destroyed on all like units to prevent the enemy from constructing a complete unit from undamaged parts.

(4) Spare parts and accessories must be given the same priority as parts installed on the equipment.

1-3. DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE (CONT).

c. Methods. To destroy equipment adequately and uniformly, all personnel of the unit must know the plan and priority of destruction and be trained in the methods of destruction.

d. References. Read TM 750-244-6 for information on destruction of mechanical equipment. Read TM 750-244-5-1 for information on destruction of ammunition.

1-4. PREPARATION FOR STORAGE OR SHIPMENT. Administrative storage is restricted to 90 days and must not be extended. Refer to TM 9-2350-304-20-2 for detailed instructions on administrative storage.

1-5. OFFICIAL NOMENCLATURE, NAMES, AND DESIGNATIONS.

Nomenclature Cross-Reference List.

<i>Common Name</i>	<i>Official Nomenclature</i>
Differential gear	Helical power input gear
Differential gear shaft	Helical gear shaft
Drive assembly	Elevating final drive assembly
Gear housing	Internal sun gear shaft
Handle	Nonelectrical wire
LOADER control handle	Loader and traversing valve control handle
Lockwire	Nonelectrical wire
Pinion gear shaft	Elevating pinion spur gear
RAMMER control handle	Manual control handle

Slotted nut	Recoil nut
Slotted nut	Counterrecoil nut
SWING control handle	Loader and traversing valve control handle

1-6. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR). If your M110A howitzer needs improvement, let us know. Send us an EIR. 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. Put it on an SF 368 (Product Quality Deficiency Report). Mail it to us at Commander, U.S. Army Armament, Munitions and Chemical Command, ATTN: AMSMC-QAD, Rock Island, IL 61299-6000. We will send you a reply.

1-7. CORROSION PREVENTION AND CONTROL (CPC).

a. General. Corrosion Prevention and Control (CPC) of Army materiel is a continuing concern. It is important that any corrosion problems with this item be reported so that the problem can be corrected and improvements can be made to prevent the problem in the future.

b. Corrosion. While corrosion is typically associated with rusting of metals, it can also include deterioration of other materials such as rubber and plastic. Unusual cracking, softening, swelling, or breaking of these materials may be a corrosion problem.

c. Reporting. If a corrosion problem is identified, it can be reported using SF 368 Product Quality Deficiency Report. Use of key words such as "corrosion," "rust," "deterioration," or "cracking" will assure that the information is identified as a CPC problem.

d. Forms. The form should be submitted to: Commander, U.S. Army Armament, Munitions and Chemical Command, ATTN: AMSMC-QAS/Customer Feedback Center, -Rock Island, IL 61299-6000.

Section II. EQUIPMENT DESCRIPTION AND DATA

1-8. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES.

a. *Purpose.* The M110A2 howitzer is a weapon that defends against close-in or long-range ground targets.

b. *Capabilities and Features.*



Do not ford water which exceeds 42 in. (106.7 cm) in depth. Check for soft mud or sandy bottoms.

(1) The M110A howitzer is an unarmored, full-tracked, heavy, self-propelled, 8-inch (203-mm) howitzer. This diesel-powered artillery piece is highly mobile, maneuverable, and transportable by air. The vehicle is capable of long-range, high-speed operation on improved roads. It can traverse rough terrain, muddy or marshy ground, sand, and snow or ice. The M110A howitzer can ford streams up to 42 in. (106.7 cm) deep.

(2) A hydraulic suspension lockout system and spade assembly help provide a stable platform for firing the cannon. The cannon elevating and traversing mechanisms and the projectile loader and rammer are also hydraulically powered. However, they may be manually operated in case of a power failure.

(3) The turret can traverse 30 degrees (533 mils) right or left of vehicle centerline and the cannon can elevate to 65 degrees (1156 mils) above horizontal position.

1-9. **LOCATION AND DESCRIPTION OF MAJOR COMPONENTS.** Refer to TM 9-2350-304-20-2.

1-10. **EQUIPMENT DATA.** Necessary equipment data not furnished in this manual can be found in TM 9-2350-304-10 or TM 9-2350-304-20-2.

a. *Cannon M201A1.*

Shipping without muzzle brake

- (1) Weight 16,395 lb (7437 kg)
- (2) Cube 248.6 cu ft (7.0 cu m)

b. *Gun Mount M174.*

- (1) Weight with Equilibrator 4806 lb (2180) kg
- (2) Recuperator gas pressure
(70°F, 21°C). 2300 psi (15,859 kPa)
- (3) Equilibrator gas pressure
(70°F, 21°C). 2850 psi (19,651 kPa)

c. *Traversing Drive Assembly.*

- (1) Weight 156 lb (71 kg)
- (2) Dimensions 37.75 x 26.50 x 15.00 in. (95.89 x 67.31 x 38.10 cm)
- (3) Minimum time for traverse of turret
 - (a) 60° (1068 mi) 10 sec
 - (b) Slip clutch
 - 1 Slipping torque (minimum) 150 in.-lb (16.95 N-m)
 - 2 Static torque (maximum) 250 in.-lb (28.25 N-m)

1-10. EQUIPMENT DATA (CONT).

- d. *Traversing Final Drive.*
 - (1) Dimensions 16.00 x 11.75 x 7.50 in. (40.64 x 29.85 x 19.05 cm)
 - (2) Weight 76 lb (34 kg)

- e. *Elevating Drive Assembly.*
 - (1) Weight with motor 119 lb (54 kg)
 - (2) Dimensions 30.0 x 11.6 x 11.6 in. (76.2 x 29.5 x 29.5 cm)
 - (3) Minimum time for power elevation 12 sec
 - (4) Slip clutch
 - (a) Slipping torque (minimum) 650 in.-lb (73.44 N-m)
 - (b) Static torque (maximum) 950 in.-lb (107.34 N-m)

- f. *Elevating Final Drive.*
 - Weight (right and left components) 1411 lb (640 kg)

- g. *Traversing Cylinder Assembly.*
 - (1) Weight 41 lb (19 kg)
 - (2) Diameter 4.25 in. (10.80 cm)
 - (3) Length 15.25 in. (38.74 cm)

- h. *Pivot Arm.*
 - (1) Dimensions 15.4 x 11.0 x 6.0 in. (39.1 x 27.9 x 15.2 cm)
 - (2) Weight 48.50 lb (22.00 kg)

- i. *Motor and Pump Assembly.*
 - (1) Dimensions 22.00 x 12.50 x 10.75 in. (55.88 x 31.75 x 27.31 cm)
 - (2) Electric motor - Rated speed (full load) 3800 rpm
 - (a) Rated power 5 hp (3.73 kW)
 - (b) Rotation Clockwise
 - (3) Pump
 - (a) Weight 20.61 lb (9.35 kg)
 - (b) Type Piston
 - (c) Working pressure 1600 to 2400 psi (11,032 to 16,548 kPa)

- j. *Accumulator.*
 - (1) Hydraulic pressure 1600 to 2400 psi (11,032 to 16,548 kPa)
 - (2) Nitrogen pressure 1215 to 2400 psi (8377 to 16,548 kPa)
 - (3) Dimensions:
 - (a) Length 30.12 in. (76.50 cm)
 - (b) Diameter 10.25 in. (26.04 cm)
 - (4) Weight 188 lb (85 kg)

k. *Reservoir and Hydraulic System.*

- (1) Reservoir Integral with turret weldment
- (2) Reservoir working capacity. 20 gal (76 l)
- (3) Hydraulic system capacity, excluding recoil, counterrecoil,
and retracting systems 40 gal (151 l)
- (4) Nitrogen Bottle:
 - (a) Length 38.52 in. (97.84 cm)
 - (b) Diameter 6.75 in. (17.1 cm)
 - (c) Weight 77.25 lb (35.04 kg)
 - (d) Gas charge, hydraulic fluid side relieved 1215 psi (8377 kPa)
 - (e) Gas used Nitrogen

l. *Turret.*

- (1) Height 49.70 in. (126.24 cm)
- (2) Outside diameter 77.375 in. (196.533 cm)
- (3) Weight, turret with rammer and drive assemblies 6650 lb (3016 kg)
- (4) Weight, turret with rammer and drive assemblies
and gun mount 11,450 lb (5194 kg)

m. *Turret Bearing.*

- (1) Outside diameter 76 in. (193 cm)
- (2) Weight 2250 lb (1021 kg)
- (3) Ring gear teeth. 300
- (4) Roller race surface Flame hardened
- (5) Type Ball bearing with integral spur gear
- (6) Number of balls 103
- (7) Number of spacers 103

CHAPTER 2

DIRECT SUPPORT MAINTENANCE INSTRUCTIONS

CHAPTER INDEX

	Page
Cleaning	2-29
Common Tools and Equipment	2-3
General	2-27
Lubrication..	2-29
Lubrication..	2-30
Maintenance of Breech Mechanism Assembly, Hinge Pin, Breechblock Assembly, Carrier Assembly, and Breech Ring Assembly	2-46
Maintenance of Check Valve Multiple Connector	2-389
Maintenance of Counterbalance Assembly	2-53
Maintenance of Counterrecoil Piston Assembly	2-141
Maintenance of Electrical Installation -Utility Outlet Electrical Lead	2-460
Maintenance of Elevating Final Drive Assembly and Speed Gear Assembly	2-276
Maintenance of Elevating Hydraulic Drive Unit	2-254
Maintenance of Equilibrator Valve Assembly	2-81
Maintenance of Gun Mount-Equilibrator Adjusting Parts	2-63
Maintenance of Gun Mount-Left and Right Trunnion Caps and Bearings	2-70
Maintenance of Hand Grenade Box Assembly	2-162
Maintenance of Hydraulic Accumulator	2-433
Maintenance of Hydraulic Manifold	2-419
Maintenance of Hydraulic Motor and Pump Assembly	2-452
Maintenance of Hydraulic Reservoir and Hand Pump	2-447
Maintenance of Hydraulic System- Elevating Control Valves, Mechanical Drive Guard, Check Valve Multiple Connector, and Elevating Solenoid Valve	2-395
Maintenance of Hydraulic System- Traversing Valves and Check Valve.	2-379
Maintenance of Lift Cylinder Assembly	2-364
Maintenance of Linear Actuating Head Assembly	2-137
Maintenance of Loader-Rammer Installation- Pivot Arm and Related Parts	2-300
Maintenance of Modified Recuperator Cylinder Front Head Assembly	2-143
Maintenance of Muzzle Brake	2-32
Maintenance of M140 Alinement Device Mount.	2-89
Maintenance of M174 Gun Mount.	2-57
Maintenance of M174 Gun Mount Assembly-Cover, Control Cam, and Related Items	2-92
Maintenance of M174 Gun Mount Assembly-Gun Sight Adapters.	2-84
Maintenance of M174 Gun Mount Assembly- Retracting Valve	2-103
Maintenance of M174 Gun Mount Assembly-Travel Lock Group.	2-100
Maintenance of M201A1 Cannon Assembly, Cannon Assembly, and Tube Assembly	2-37
Maintenance of Plain Bearing Unit and Outer Race Assembly	2-463
Maintenance of Pneumatic Equilibrator Assembly	2-77
Maintenance of Power Loader-Rammer-Guard, Slide, Trough, Cylinder, and Related Items	2-337
Maintenance of Power Loader-Rammer-Headlink and Chain Assembly, Gear Case Group, and Head Shaft Group	2-342

CHAPTER INDEX (CONT)

	Page
Maintenance of Power Loader-Rammer-Loader Arm, Cylinder Assembly, and Related Items	2-325
Maintenance of Power System Lines and Fittings-Oil Pressure Switch and Safety Relief Valve	2-427
Maintenance of Rammer Multiple Connector, Regulator Flow Valve, Rammer Pressure Sensitive Cable Assembly, and Solenoid Valve	2-404
Maintenance of Rammer Traversing Cylinder Assembly	2-309
Maintenance of Ramming Cylinder	2-371
Maintenance of Recoil Connecting Link	2-151
Maintenance of Recoil Stroke Control Cam	2-124
Maintenance of Recuperator Cylinder Rear Head Assembly	2-146
Maintenance of Replenisher Assembly	2-110
Maintenance of Replenisher Assembly (Alternate) and Actuating Cylinder	2-117
Maintenance of Rim Latch Set	2-318
Maintenance of Rim Lock Set	2-322
Maintenance of Roller Chain and Headlink Assembly	2-360
Maintenance of Traversing and Elevating Differential	2-236
Maintenance of Traversing and Elevating Drive Hydraulic Motors	2-210
Maintenance of Traversing and Elevating Drive Torque Locks and Remote Control Levers	2-204
Maintenance of Traversing and Elevating Hydraulic Motors	2-216
Maintenance of Traversing Constant Speed Drive and Speed Gear Assembly	2-164
Maintenance of Traversing Final Drive	2-244
Maintenance of Turret Assembly	2-153
Nonskid Areas	2-30
Painting Instructions	2-30
Painting Load Marks	2-32
Painting Retract Mark	2-32
Repair Methods	2-29
Repair Parts	2-3
Restenciling Vehicle Markings	2-32
Special Tools, TMDE, and Support Equipment	2-3
Straight Adapter to Tube Fitting	2-29
Torque Values	2-29
Touchup and Recoating	2-31
Troubleshooting Information	2-3
Tube Elbow to Tube Fitting	2-27
Tube Nipple to Tube Fitting	2-28
Tube Reducer to Tube Fitting	2-28
Tube Tee to Tube Fitting	2-28

Section I. REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

2-1. COMMON TOOLS AND EQUIPMENT. For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

TM 9-2350-304-24P-2 and appendix B of TM 9-2350-304-20-2. For an illustrated list of special tools and equipment, refer to appendix E of this manual.

2-2. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT. Tools, special tools, and test equipment necessary to maintain the M110A2 self-propelled howitzer are listed in

2-3. REPAIR PARTS. Repair parts are listed and illustrated in TM 9-2350-304-24P-2 covering unit, direct support, general support, and depot maintenance for this equipment.

Section II. DIRECT SUPPORT TROUBLESHOOTING

2-4. TROUBLESHOOTING INFORMATION.

a. The symptom index can be used as a quick guide to troubleshooting. Common malfunctions are listed in alphabetical order under each major assembly, which appear in MAC order, with a page number reference to the troubleshooting table where a test or inspection and corrective action are provided.

b. The direct support troubleshooting table lists the malfunction, the test or inspection

indicating the malfunction, and the necessary corrective action.

c. If the malfunction still exists after all listed direct support maintenance corrective actions have been performed, notify general support maintenance.

d. 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 your supervisor.

DIRECT SUPPORT SYMPTOM INDEX

Troubleshooting Procedure Page

CANNON M201A1

Breech does not open	2-8
Breech mechanism does not operate freely	2-8
Breech opens and closes hard when cannon is at loading elevation	2-8
Cannon does not retract to travel position	2-7
Cannon does not return to battery position	2-7
Cannon has jerky or uneven recoil action	2-6
Cannon overrecoils	2-5
Cannon returns to battery with too much shock	2-8
Cannon seems slow to return to battery when oil indication is normal	2-7
Cannon underrecoils	2-6
M35 firing mechanism binds in housing	2-8

2-4. TROUBLESHOOTING INFORMATION (CONT).

DIRECT SUPPORT SYMPTOM INDEX (CONT)

Troubleshooting
Procedure
Page

GUN MOUNT

Air does not escape from relief valve in linear actuating head assembly	2-11
Hydraulic pressure in recoil mechanism is low	2-9
Oil leaks around counterrecoil rod	2-10
Oil leaks around oil index on recuperator	2-10
Oil leaks at rear of replenisher assembly	2-10
Oil leaks from recuperator front head assembly	2-10
Recoil cylinder has too much hydraulic pressure	2-9
Replenisher piston is stuck	2-10
Travel lock latches and releases improperly when mount is in travel position	2-9

ELEVATING AND TRAVERSING MECHANISMS

Cannon does not elevate or depress automatically	2-16
Cannon does not elevate or depress manually	2-15
Cannon does not elevate when fully depressed	2-16
Cannon elevates but does not depress or depresses but does not elevate	2-19
Cannon elevates or depresses with jerky or uneven movement.	2-18
Slip clutch does not adjust to proper torque for elevating manually.	2-16
Slip clutch does not adjust to proper torque for traversing manually	2-12
Turret bearing does not operate	2-15
Turret bearing rotation is noisy	2-15
Turret does not slow down prior to full left or right traverse	2-14
Turret does not traverse automatically	2-12
Turret does not traverse manually	2-11
Turret traverses in only one direction	2-14
Turret traverses with jerky or uneven movement	2-13

LOADER/RAMMER

Hydraulic pressure is too low	2-19
Loader arms do not operate	2-20
Loader/rammer does not traverse	2-21
One or both lift cylinders operate with jerky action	2-20
Rammer chain binds	2-23
Rammer chain extends with jerky action	2-23
Rammer does not operate	2-22
Rammer position lock does not operate	2-24
Rammer stow position lock does not operate.	2-24

DIRECT SUPPORT SYMPTOM INDEX (CONT)

**Troubleshooting
Procedure
Page**

HYDRAULIC SYSTEM

Hydraulic pressure is too low	2-24
Pump motor cuts in and out	2-26
Pump motor does not run	2-25
Pump motor runs constantly during operation	2-26

Table 2-1. DIRECT SUPPORT TROUBLESHOOTING

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
CANNON M201A1
<p>1. CANNON OVERRECOILS.</p> <p style="padding-left: 40px;"><i>Step 1.</i> Check for low fluid supply in recoil mechanism.</p> <p style="padding-left: 80px;">Restore fluid reserve in replenisher. Refer to TM 9-2350-304-10.</p> <p style="padding-left: 40px;"><i>Step 2.</i> Check nitrogen supply pressure in recuperator.</p> <p style="padding-left: 80px;">Pressurize recuperator. Refer to TM 9-2350-304-20-2.</p> <p style="padding-left: 40px;"><i>Step 3.</i> Check for leaking retracting valve.</p> <p style="padding-left: 80px;">Repair or replace leaking retracting valve. Refer to page 2-103.</p> <p style="padding-left: 40px;"><i>Step 4.</i> Check for bent recoil connecting link.</p> <p style="padding-left: 80px;">Straighten or replace bent recoil connecting link. Refer to page 2-151.</p> <p style="padding-left: 40px;"><i>Step 5.</i> Check alinement of recoil stroke control cam.</p> <p style="padding-left: 80px;">Aline index marks on cylinder sector gear and control sector gear. Refer to page 2-124.</p>

2-4. TROUBLESHOOTING INFORMATION (CONT).

Table 2-1. DIRECT SUPPORT TROUBLESHOOTING (CONT)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
CANNON M201A1 (CONT)		
2. CANNON UNDERRECOILS.		
	<i>Step 1.</i> Check for scores and burrs on gun slide rails.	<ul style="list-style-type: none"> a. Remove scores and burrs from cradle guide strips with smooth file and polish with crocus cloth (item 7, appx B). b. Clean and lubricate. Refer to TM 9-2350-304-10.
	<i>Step 2.</i> Check for damaged cannon rails.	Repair damaged cannon rails. Refer to page 2-37.
	<i>Step 3.</i> Check for damaged recoil connecting link.	Repair or replace damaged recoil connecting link. Refer to page 2-151.
	<i>Step 4.</i> Check alinement of recoil stroke control cam.	Aline recoil stroke control cam. Refer to page 2-124.
	<i>Step 5.</i> Check for too much reserve fluid in recuperator cylinder.	Reduce reserve fluid by operating retracting valve. Refer to TM 9-2350-304-10.
	<i>Step 6.</i> Check for damaged recoil cylinder piston rod.	Replace M174 gun mount assembly. Refer to page 2-57.
3. CANNON HAS JERKY OR UNEVEN RECOIL ACTION.		
	Check for scores or burrs on cradle guide strips.	<ul style="list-style-type: none"> a. Remove scores and burrs from cradle guide strips with smooth file and polish with crocus cloth (item 7, appx B). b. Clean and lubricate. Refer to TM 9-2350-304-10.

Table 2-1. DIRECT SUPPORT TROUBLESHOOTING (CONT)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
4. CANNON DOES NOT RETRACT TO TRAVEL POSITION.	<p><i>Step 1.</i> Check for leaking retracting valve.</p>	<p>Repair or replace leaking retracting valve. Refer to page 2-103.</p>
	<p><i>Step 2.</i> Check for leaks and damaged or clogged tubes and hoses in armament hydraulic system.</p>	<p>a. Tighten all loose connections. b. Replace damaged tubes and hoses. Refer to page 2-27.</p>
5. CANNON DOES NOT RETURN TO BATTERY POSITION.	<p><i>Step 1.</i> Check for leaking retracting valve.</p>	<p>Repair or replace leaking retracting valve. Refer to page 2-103.</p>
	<p><i>Step 2.</i> Check for damaged relief valve in linear actuating head assembly.</p>	<p>Remove, disassemble, and clean damaged relief valve. Refer to page 2-137.</p>
	<p><i>Step 3.</i> Check for leaks and damaged or clogged tubes and hoses in armament hydraulic system.</p>	<p>a. Tighten all loose connections. b. Replace damaged tubes and hoses. Refer to page 2-27.</p>
	<p><i>Step 4.</i> Check for low fluid supply in recoil mechanism.</p>	<p>Restore fluid reserve replenisher. Refer to TM 9-2350-304-10.</p>
	<p><i>Step 5.</i> Check nitrogen pressure in recuperator. Refer to TM 9-2350-304-20-2.</p>	<p>Pressurize recuperator. Refer to TM 9-2350-304-20-2.</p>
6. CANNON SEEMS SLOW TO RETURN TO BATTERY WHEN OIL INDICATION IS NORMAL.	<p>Check nitrogen pressure in recuperator. Refer to TM 9-2350-304-20-2.</p>	<p>Pressurize recuperator. Refer to TM 9-2350-304-20-2.</p>

2-4. TROUBLESHOOTING INFORMATION (CONT).

Table 2-1. DIRECT SUPPORT TROUBLESHOOTING (CONT)

MALFUNCTION TEST OR INSPECTION	CORRECTIVE ACTION
CANNON M201A1 (CONT)	
7. CANNON RETURNS TO BATTERY WITH TOO MUCH SHOCK.	
Check nitrogen pressure in recuperator. Refer to TM 9-2350-304-20-2.	
Pressurize recuperator. Refer to TM 9-2350-304-20-2.	
8. BREECH MECHANISM DOES NOT OPERATE FREELY.	
<i>Step 1.</i> Check for scored or rusted breech threads.	
File or clean scored or rusted breech threads.	
<i>Step 2.</i> Check for worn or damaged parts in breech mechanism.	
Repair or replace worn or damaged parts. Refer to page 2-46.	
<i>Step 3.</i> Check for oversized obturator pad.	
Replace pad. Refer to TM 9-2350-304-10.	
9. BREECH OPENS AND CLOSSES HARD WHEN CANNON IS AT LOADING ELEVATION.	
Check for damaged counterbalance assembly.	
Repair damaged counterbalance assembly. Refer to page 2-53.	
10. M35 FIRING MECHANISM BINDS IN HOUSING.	
Repair or replace damaged parts. Refer to TM 9-2350-304-20-2.	
11. BREECH DOES NOT OPEN.	
Check for broken or damaged parts.	
Repair or replace damaged parts. Refer to TM 9-2350-304-20-2 or page 2-46.	

Table 2-1. DIRECT SUPPORT TROUBLESHOOTING (CONT)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
GUN MOUNT		
12.	TRAVEL LOCK LATCHES AND RELEASES IMPROPERLY WHEN MOUNT IS IN TRAVEL POSITION.	<p><i>Step 1.</i> Check travel lock adjustment.</p> <p style="padding-left: 40px;">Adjust travel lock. Refer to TM 9-2350-304-10.</p> <p><i>Step 2.</i> Check for worn and damaged parts in travel lock.</p> <p style="padding-left: 40px;">Repair or replace damaged parts. Refer to page 2-100.</p>
13.	HYDRAULIC PRESSURE IN RECOIL MECHANISM IS LOW.	<p><i>Step 1.</i> Check for leaking retracting valve.</p> <p style="padding-left: 40px;">Repair or replace leaking retracting valve. Refer to page 2-103.</p> <p><i>Step 2.</i> Check for leaks and damaged or clogged tubes, hoses, and purge plugs in armament hydraulic system.</p> <p style="padding-left: 40px;">a. Tighten all loose connections.</p> <p style="padding-left: 40px;">b. Replace damaged tubes, hoses, and purge plugs. Refer to page 2-27.</p> <p style="padding-left: 40px;">c. Replace gaskets. Refer to page 2-92.</p> <p><i>Step 3.</i> Check for damaged recoil mechanism.</p> <p style="padding-left: 40px;">If recoil mechanism is damaged, replace M174 gun mount. Refer to page 2-57.</p>
14.	RECOIL CYLINDER HAS TOO MUCH HYDRAULIC PRESSURE.	<p><i>Step 1.</i> Check for leaking retracting valve.</p> <p style="padding-left: 40px;">Repair or replace leaking retracting valve. Refer to page 2-103.</p> <p><i>Step 2.</i> Check nitrogen pressure in recuperator. Refer to TM 9-2350-304-20-2.</p> <p style="padding-left: 40px;">Pressurize recuperator. Refer to TM 9-2350-304-20-2.</p>

2-4. TROUBLESHOOTING INFORMATION (CONT).

Table 2-1. DIRECT SUPPORT TROUBLESHOOTING (CONT)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
GUN MOUNT (CONT)		
15. OIL LEAKS FROM RECUPERATOR FRONT HEAD ASSEMBLY.	Check for worn or scored cylinder walls.	If cylinder walls are worn or scored, replace linear actuating head assembly. Refer to page 2-137.
16. OIL LEAKS AROUND COUNTERRECOIL ROD.	Check for worn or damaged oil seals.	If oil seals are worn or damaged, replace mount. Refer to page 2-137.
17. OIL LEAKS AROUND OIL INDEX ON RECUPERATOR.	Check for worn or damaged oil index filler and packing.	Replace worn or damaged oil index filler and packing. Refer to page 2-146.
18. OIL LEAKS AT REAR OF REPLENISHER ASSEMBLY.	<i>Step 1.</i> Inspect check valve for blockage. Refer to page 2-110.	<ul style="list-style-type: none"> a. If blockage of dirt, grease, or grime is present, clean as necessary. b. If blockage of rubber is present, clean as necessary and replace two hose assemblies. Refer to page 2-57.
	<i>Step 2.</i> Check for damaged preformed packing on piston.	Replace damaged preformed packing. Refer to page 2-110 or 2-117.
	<i>Step 3.</i> Check for worn or pitted surface on replenisher cylinder walls.	If replenisher cylinder walls are worn or pitted, clean or replace replenisher assembly. Refer to page 2-110 or 2-117.

Table 2-1. DIRECT SUPPORT TROUBLESHOOTING (CONT)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
19. REPLENISHER PISTON IS STUCK.	<i>Step 1.</i> Check for rust on piston assembly.	If piston assembly is rusty, replace piston and preformed packing. Refer to page 2-110 or 2-117.
	<i>Step 2.</i> Check for damaged or seized replenisher spring.	Repair or replace damaged or seized replenisher spring. Refer to page 2-110 or 2-117.

Table 2-1. DIRECT SUPPORT TROUBLESHOOTING (CONT)

HALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
20.	AIR DOES NOT ESCAPE FROM RELIEF VALVE IN LINEAR ACTUATING HEAD ASSEMBLY.	<p><i>Step 1.</i> Check for rusted or seized relief valve.</p> <p style="padding-left: 40px;">Remove, disassemble, and clean relief valve. Refer to page 2-137.</p> <p><i>Step 2.</i> Check for dirt under relief valve seat.</p> <p style="padding-left: 40px;">If dirty, remove, disassemble, and clean relief valve seat and housing. Refer to page 2-137.</p> <p><i>Step 3.</i> Check for damaged or seized relief valve spring.</p> <p style="padding-left: 40px;">Clean or replace damaged relief valve spring. Refer to page 2-137.</p>
ELEVATING AND TRAVERSING MECHANISMS		
21	TURRET DOES NOT TRAVERSE MANUALLY.	<p style="text-align: center;">NOTE</p> <p>Turret traversing is limited to 30 degrees left or right by the turret stop.</p> <p><i>Step 1.</i> Check slip clutch for proper torque.</p> <p style="padding-left: 40px;">Adjust slip clutch to proper torque. Refer to page 2-164.</p> <p><i>Step 2.</i> Check for seized gear or bearing in traversing drive assembly.</p> <p style="padding-left: 40px;">If gear or bearing is seized, repair or replace traversing drive assembly. Refer to page 2-164.</p> <p><i>Step 3.</i> Check for seized gear or bearing in traversing final drive.</p> <p style="padding-left: 40px;">If gear or bearing is seized, repair or replace traversing final drive assembly. Refer to page 2-244.</p> <p><i>Step 4.</i> Check for damaged or seized ring in turret bearing.</p> <p style="padding-left: 40px;">If ring is seized or damaged, repair or replace turret bearing. Refer to page 2-463.</p>

2-4. TROUBLESHOOTING INFORMATION (CONT).

Table 2-1. DIRECT SUPPORT TROUBLESHOOTING (CONT)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
ELEVATING AND TRAVERSING MECHANISMS (CONT)		
22. SLIP CLUTCH DOES NOT ADJUST TO PROPER TORQUE FOR TRAVERSING MANUALLY.	<i>Step 1.</i> Check for proper installation of clutch.	Properly install clutch. Refer to page 2-164.
	<i>Step 2.</i> Check for weak clutch spring.	Replace weak clutch spring. Refer to page 2-164.
23. TURRET DOES NOT TRAVERSE AUTOMATICALLY.	NOTE	
	Turret traversing is limited to 30 degrees left or right by the turret stop.	
	<i>Step 1.</i> Check for leaks and damaged or clogged tubes, fittings, or parts.	a. Tighten all loose connections. b. Replace all damaged or clogged tubes, fittings, or parts. Refer to page 2-27.
	<i>Step 2.</i> Check hydraulic pressure.	If hydraulic pressure is too low. Refer to malfunction 44.
	<i>Step 3.</i> Check for damaged control handle.	Replace damaged control handle. Refer to TM 9-2350-304-20-2.
	<i>Step 4.</i> Check for damaged traversing solenoid valve.	Replace damaged traversing solenoid valve. Refer to page 2-379.

Table 2-1. DIRECT SUPPORT TROUBLESHOOTING (CONT)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
	<i>Step 5.</i> Check for damaged wiring harness.	Replace damaged wiring harness. Refer to TM 9-2350-304-20-2.
	<i>Step 6.</i> Check for damaged control valve.	Replace damaged control valve. Refer to page 2-379.
	<i>Step 7.</i> Check for air in motor and brake tube.	Bleed air from motor brake and tube. Refer to page 2-210.
	<i>Step 8.</i> Check releasing action of hydraulic motor brake.	If not releasing, repair or replace hydraulic motor brake. Refer to page 2-210.
	<i>Step 9.</i> Check for damaged hydraulic motor.	Repair or replace damaged hydraulic motor. Refer to page 2-210 or 2-216.
24. TURRET TRAVERSES WITH JERKY OR UNEVEN MOVEMENT.	<i>Step 1.</i> Check for leaks and damaged or clogged tubes, fittings, or parts.	<ul style="list-style-type: none"> a. Tighten all loose connections. b. Replace damaged tubes, fittings, or parts. Refer to page 2-27.
	<i>Step 2.</i> Check hydraulic pressure.	If hydraulic pressure is too low, refer to malfunction 44.
	<i>Step 3.</i> Check for damaged control handle.	Replace damaged control handle. Refer to TM 9-2350-304-20-2.

2-4. TROUBLESHOOTING INFORMATION (CONT).

Table 2-1. DIRECT SUPPORT TROUBLESHOOTING (CONT)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
ELEVATING AND TRAVERSING MECHANISMS (CONT)		
24. TURRET TRAVERSES WITH JERKY OR UNEVEN MOVEMENT (CONT).		
	<p><i>Step 4.</i> Check for damaged traversing solenoid valve.</p>	<p>Replace damaged traversing solenoid valve. Refer to page 2-210.</p>
	<p><i>Step 5.</i> Check for damaged wiring harness.</p>	<p>Replace damaged wiring harness. Refer to TM 9-2350-304-20-2.</p>
	<p><i>Step 6.</i> Check for damaged control valve.</p>	<p>Replace damaged control valve. Refer to page 2-379.</p>
	<p><i>Step 7.</i> Check for proper stroke adjustment on the hydraulic motor.</p>	<p>Adjust stroke on the hydraulic motor. Refer to page 2-210 or 2-216.</p>
25. TURRET TRAVERSES IN ONLY ONE DIRECTION.		
	<p><i>Step 1.</i> Check for leaks and damaged or clogged tubes, fittings, or parts.</p>	
	<p>a. Tighten all loose connections.</p>	
	<p>b. Replace damaged tubes, fittings, or parts.</p>	<p>Refer to page 2-27.</p>
	<p><i>Step 2.</i> Check for damaged control valve.</p>	<p>Replace damaged control valve. Refer to page 2-210.</p>
26. TURRET DOES NOT SLOW DOWN PRIOR TO FULL LEFT OR RIGHT TRAVERSE.		
	<p><i>Step 1.</i> Check for damaged traversing deceleration switch.</p>	<p>Adjust or replace damaged traversing deceleration switch. Refer to TM 9-2350-304-20-2.</p>

Table 2-1. DIRECT SUPPORT TROUBLESHOOTING (CONT)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
	<i>Step 2.</i> Check for damaged deceleration solenoid valve.	Replace damaged deceleration solenoid valve. Refer to page 2-210.
	<i>Step 3.</i> Check for damaged wiring harness.	Replace damaged wiring harness. Refer to TM 9-2350-304-20-2.
27. TURRET BEARING DOES NOT OPERATE.	<i>Step 1.</i> Check for dirt in bearing races.	If dirty, clean and lubricate turret bearing. Refer to TM 9-2350-304-20-2.
	<i>Step 2.</i> Check for warped or damaged turret bearing parts.	Repair warped or damaged turret bearing parts. Refer to page 2-463.
28. TURRET BEARING ROTATION IS NOISY.	<i>Step 1.</i> Check lubrication of turret bearing.	Lubricate turret bearing. Refer to TM 9-2350-304-20-2.
	<i>Step 2.</i> Check for damaged or out-of-round balls and spacers.	Replace damaged or out-of-round balls and spacers. Refer to page 2-463.
	<i>Step 3.</i> Check for scored or cracked turret bearing races.	If bearing races are scored or cracked, replace turret bearing. Refer to page 2-463.
29. CANNON DOES NOT ELEVATE OR DEPRESS MANUALLY.		NOTE
		If manual system elevates and depresses cannon, but power system does not, refer to malfunction 32.
	<i>Step 1.</i> Check adjustment of slip clutch for proper torque.	Adjust slip clutch for proper torque. Refer to page 2-254.

2-4. TROUBLESHOOTING INFORMATION (CONT).

Table 2-1. DIRECT SUPPORT TROUBLESHOOTING (CONT)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
ELEVATING AND TRAVERSING MECHANISMS (CONT)		
29. CANNON DOES NOT ELEVATE OR DEPRESS MANUALLY (CONT)	<i>Step 2.</i> Check for seized gear or bearing in elevating hydraulic drive unit.	If gear or bearing is seized, repair or replace elevating hydraulic drive unit. Refer to page 2-254
	<i>Step 3.</i> Check for seized gear or bearing in elevating final drive.	If gear or bearing is seized, replace elevating final drive. Refer to page 2-276.
	<i>Step 4.</i> Check for worn or damaged trunnion bearing.	Replace worn or damaged trunnion bearing. Refer to page 2-70.
30. SLIP CLUTCH DOES NOT ADJUST TO PROPER TORQUE FOR ELEVATING MANUALLY	<i>Step 1.</i> Check for proper installation of clutch.	Properly install clutch. Refer to page 2-254.
	<i>Step 2.</i> Check for broken clutch spring.	Replace broken clutch spring. Refer to page 2-254.
31. CANNON DOES NOT ELEVATE WHEN FULLY DEPRESSED.	Check for damaged equilibrators.	Replace damaged equilibrators. Refer to page 2-77.
32. CANNON DOES NOT ELEVATE OR DEPRESS AUTOMATICALLY.	NOTE	
	If the power system does not elevate or depress the cannon, refer to malfunction 29.	
	<i>Step 1.</i> Check for leaks and damaged or clogged tubes, fittings, or parts.	

Table 2-1. DIRECT SUPPORT TROUBLESHOOTING (CONT)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
		<ul style="list-style-type: none"> a. Tighten all loose connections. b. Replace damaged tubes, fittings, or parts. Refer to page 2-27.
	<i>Step 2.</i> Check hydraulic pressure.	If hydraulic pressure is too low, refer to malfunction 44.
	<i>Step 3.</i> Check for damaged control handle.	Replace damaged control handle. Refer to TM 9-2350-304-20-2.
	<i>Step 4.</i> Check for damaged rammer tray interlock switch.	Replace damaged rammer tray interlock switch. Refer to TM 9-2350-304-20-2.
	<i>Step 5.</i> Check for damaged elevating solenoid valve.	Replace damaged elevating solenoid valve. Refer to page 2-395.
	<i>Step 6.</i> Check for damaged wiring harness.	Replace damaged wiring harness. Refer to TM 9-2350-304-20-2.
	<i>Step 7.</i> Check for damaged control valve.	Replace damaged control valve. Refer to page 2-395.
	<i>Step 8.</i> Check for air in motor brake and tube.	Bleed air from motor brake and tube. Refer to TM 9-2350-304-20-2.
	<i>Step 9.</i> Check releasing action of hydraulic motor brake.	If not releasing, repair or replace hydraulic motor brake. Refer to page 2-210.
	<i>Step 10.</i> Check for damaged hydraulic motor.	Repair or replace damaged hydraulic motor. Refer to page 2-216.

2-4. TROUBLESHOOTING INFORMATION (CONT).

Table 2-1. DIRECT SUPPORT TROUBLESHOOTING (CONT)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
ELEVATING AND TRAVERSING MECHANISMS (CONT)		
33. CANNON ELEVATES OR DEPRESSES WITH JERKY OR UNEVEN MOVEMENT.	<i>Step 1.</i> Check for leaks and damaged or clogged tubes, fittings, or parts.	a. Tighten all loose connections. b. Replace damaged tubes, fittings, or parts. Refer to page 2-27.
	<i>Step 2.</i> Check hydraulic pressure.	If hydraulic pressure is too low, refer to malfunction 44.
	<i>Step 3.</i> Check for damaged control handle.	Replace damaged control handle. Refer to TM 9-2350-304-20-2.
	<i>Step 4.</i> Check for damaged rammer tray interlock switch.	Replace damaged rammer tray interlock switch. Refer to TM 9-2350-304-20-2.
	<i>Step 5.</i> Check for damaged elevating solenoid valve.	Replace damaged elevating solenoid valve. Refer to page 2-395.
	<i>Step 6.</i> Check for damaged wiring harness.	Replace damaged wiring harness. Refer to TM 9-2350-304-20-2.
	<i>Step 7.</i> Check for damaged control valve.	Replace damaged control valve. Refer to page 2-395.
	<i>Step 8.</i> Check for proper stroke adjustment on hydraulic motor.	Adjust stroke on hydraulic motor. Refer to page 2-216.

Table 2-1. DIRECT SUPPORT TROUBLESHOOTING (CONT)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>34. CANNON ELEVATES BUT DOES NOT DEPRESS OR DEPRESSES BUT DOES NOT ELEVATE.</p>	<p>Check for damaged valve in check valve multiple connector.</p>	<p>Repair or replace damaged check valve multiple connector. Refer to page 2-389.</p>
<p>LOADER/RAMMER</p>		
<p>35. HYDRAULIC PRESSURE IS TOO LOW.</p>	<p><i>Step 1.</i> Check fluid level in hydraulic reservoir.</p>	<p>Restore fluid level in hydraulic reservoir. Refer to TM 9-2350-304-10.</p>
	<p><i>Step 2.</i> Check for damaged hydraulic pressure switch.</p>	<p>Replace damaged hydraulic pressure switch. Refer to TM 9-2350-304-20-2.</p>
	<p><i>Step 3.</i> Check for leaks and damaged or clogged tubes, fittings, or parts.</p>	<p>a. Tighten all loose connections.</p> <p>b. Replace damaged or clogged tubes, fittings, or parts. Refer to page 2-27.</p>
	<p><i>Step 4.</i> Check for damaged hydraulic pump motor, hydraulic pump, or hydraulic parts.</p>	<p>a. Repair or replace damaged hydraulic pump motor. Refer to page 2-452.</p> <p>b. Repair or replace damaged hydraulic parts. Refer to page 2-27.</p>

2-4. TROUBLESHOOTING INFORMATION (CONT).

Table 2-1. DIRECT SUPPORT TROUBLESHOOTING (CONT)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
LOADER/RAMMER (CONT)		
36. ONE OR BOTH LIFT CYLINDERS OPERATE WITH JERKY ACTION.	<i>Step 1.</i> Check for leaks and damaged or clogged tubes, fittings, or parts.	a. Tighten all loose connections. b. Replace damaged or clogged tubes, fittings, or parts. Refer to page 2-27.
	<i>Step 2.</i> Check hydraulic pressure.	If hydraulic pressure is too low, refer to malfunction 44.
	<i>Step 3.</i> Check for binding or internal leaking of lift cylinders.	Repair or replace binding or damaged lift cylinder. Refer to page 2-364.
	<i>Step 4.</i> Check for seized sleeve bearings.	Repair or replace seized sleeve bearings. Refer to page 2-364.
37. LOADER ARMS DO NOT OPERATE.	<i>Step 1.</i> Check for leaks and damaged or clogged tubes, fittings, or parts.	a. Tighten all loose connections. b. Replace damaged or clogged tubes, fittings, or parts. Refer to page 2-27.
	<i>Step 2.</i> Check for damaged loader control valve.	Replace damaged loader control valve. Refer to page 2-404.
	<i>Step 3.</i> Check for blocked or leaking lift cylinder.	Repair or replace blocked or leaking lift cylinder. Refer to page 2-364.

Table 2-1. DIRECT SUPPORT TROUBLESHOOTING (CONT)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
	<p><i>Step 4.</i> Check for damaged hydraulic manifold.</p>	<p>Repair or replace damaged hydraulic manifold. Refer to page 2-419.</p>
	<p><i>Step 5.</i> Check for seized or binding loader arm or pivot arm.</p>	<p>Repair or replace seized or binding loader arm or pivot arm. Refer to page 2-300.</p>
<p>38. LOADER/RAMMER DOES NOT TRAVERSE.</p>		
	<p><i>Step 1.</i> Check for leaks and damaged or clogged tubes, fittings, or parts.</p>	<p>a. Tighten all loose connections.</p> <p>b. Replace damaged or clogged tubes, fittings, or parts. Refer to page 2-27.</p>
	<p><i>Step 2.</i> Check for damaged loader and rammer traversing control valve.</p>	<p>Replace damaged loader and rammer traversing control valve. Refer to page 2-404.</p>
	<p><i>Step 3.</i> Check for damaged or binding rammer traversing cylinder.</p>	<p>a. Repair damaged or binding rammer traversing cylinder. Refer to page 2-309.</p> <p>b. Replace damaged or binding rammer traversing cylinder. Refer to TM 9-2350-304-20-2.</p>
	<p><i>Step 4.</i> Check for seized pivot arm actuator spur gear or pivot arm bushing.</p>	<p>Replace seized pivot arm actuator spur gear or pivot arm bushing. Refer to page 2-300.</p>

2-4. TROUBLESHOOTING INFORMATION (CONT).

Table 2-1. DIRECT SUPPORT TROUBLESHOOTING (CONT)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
LOADER/RAMMER (CONT)		
39. RAMMER DOES NOT OPERATE.	<p><i>Step 1.</i> Check for leaks and damaged or clogged tubes, fittings, or parts.</p> <p style="padding-left: 40px;">a. Tighten all loose connections.</p> <p style="padding-left: 40px;">b. Replace damaged or clogged tubes, fittings, or parts. Refer to page 2-27.</p> <p><i>Step 2.</i> Check for damaged rammer control valve or hydraulic manifold.</p> <p style="padding-left: 40px;">a. Replace damaged rammer control valve. Refer to page 2-404.</p> <p style="padding-left: 40px;">b. Repair damaged hydraulic manifold. Refer to page 2-419.</p> <p><i>Step 3.</i> Check for damaged pivot interlock switch.</p> <p style="padding-left: 80px;">Replace damaged pivot interlock switch. Refer to TM 9-2350-304-20-2.</p> <p><i>Step 4.</i> Check for damaged tray interlock switch.</p> <p style="padding-left: 80px;">Replace damaged tray interlock switch. Refer to TM 9-2350-304-20-2.</p> <p><i>Step 5.</i> Check for damaged wiring harness.</p> <p style="padding-left: 80px;">Replace damaged wiring harness. Refer to TM 9-2350-304-20-2.</p> <p><i>Step 6.</i> Check for damage and leaks on ramming cylinder.</p> <p style="padding-left: 80px;">Repair or replace damaged or leaking rammer cylinder. Refer to page 2-371.</p> <p><i>Step 7.</i> Check for seized drive shaft, gears, sliding clutch gear or head shaft, and sprocket assembly in rammer gear case.</p> <p style="padding-left: 80px;">Repair or replace seized drive shaft, gears, sliding gear or head shaft, and sprocket assembly in rammer gear case. Refer to page 2-342.</p>	

Table 2-1. DIRECT SUPPORT TROUBLESHOOTING (CONT)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
	<i>Step 8.</i> Check for loose, damaged, or worn cam follower on rammer rack.	If loose, damaged, or worn, tighten or replace cam follower. Refer to page 2-342.
	<i>Step 9.</i> Check for warped rammer trough causing tray interlock switch to not operate.	Repair or replace warped rammer trough. Refer to page 2-337.
	<i>Step 10.</i> Check oil pressure of hydraulic system. Refer to TM 9-2350-304-20-2.	
40. RAMMER CHAIN BINDS.	<i>Step 1.</i> Check for dirty chain guide.	Clean dirt out of chain guide.
	<i>Step 2.</i> Check for warped rammer trough.	Repair or replace warped rammer trough. Refer to page 2-337.
	<i>Step 3.</i> Check to see if rear mounting screws on slide interfere with rammer chain.	Add shims to mounting screws. Refer to page 2-337.
	<i>Step 4.</i> Check for worn chain links.	Replace worn chain links. Refer to page 2-360.
41. RAMMER CHAIN EXTENDS WITH JERKY ACTION.	Check for damaged chain, chain case, drive sprocket, or chain guides.	Repair or replace damaged chain, chain case, drive sprocket, or chain guides. Refer to page 2-342 or 2-360.

2-4. TROUBLESHOOTING INFORMATION (CONT).

Table 2-1. DIRECT SUPPORT TROUBLESHOOTING (CONT)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
LOADER/RAMMER (CONT)		
42. RAMMER POSITION LOCK DOES NOT OPERATE.	<p><i>Step 1.</i> Check adjustment of rammer catch.</p>	<p>Adjust rammer catch. Refer to TM 9-2350-304-20-2.</p>
	<p><i>Step 2.</i> Check for damaged lever spring or bar spring.</p>	<p>Replace damaged lever spring or bar spring. Refer to page 2-318.</p>
43. RAMMER STOW POSITION LOCK DOES NOT OPERATE.	<p><i>Step 1.</i> Check adjustment of rammer position lock.</p>	<p>Adjust rammer position lock. Refer to TM 9-2350-304-20-2.</p>
	<p><i>Step 2.</i> Check for missing or damaged spring pin.</p>	<p>Replace missing or damaged spring pin. Refer to TM 9-2350-304-20-2.</p>
	<p><i>Step 3.</i> Check for damaged spring.</p>	<p>Replace damaged spring. Refer to TM 9-2350-304-20-2.</p>
HYDRAULIC SYSTEM		
44. HYDRAULIC PRESSURE IS TOO LOW.	<p><i>Step 1.</i> Check fluid level of hydraulic reservoir.</p>	<p>a. Fill hydraulic reservoir. Refer to TM 9-2350-304-10.</p> <p>b. Use transfer pump to perform oil filtering process. Refer to TM 9-4940-468-14.</p>
	<p><i>Step 2.</i> Check for leaks and damaged or clogged tubes, fittings, or parts.</p>	<p>a. Tighten all loose connections.</p> <p>b. Replace damaged or clogged tubes, fittings, or parts. Refer to page 2-27.</p>

Table 2-1. DIRECT SUPPORT TROUBLESHOOTING (CONT)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
	<p><i>Step 3.</i> Check for leaks and damaged or clogged tubes, fittings, or parts in cannon recoil or retracting system.</p>	<p>a. Tighten loose connections.</p> <p>b. Replace damaged tubes, fittings, or parts. Refer to page 2-27.</p>
	<p><i>Step 4.</i> Check for damaged oil pressure switch.</p>	<p>Replace damaged oil pressure switch. Refer to TM 9-2350-304-34-1.</p>
	<p><i>Step 5.</i> Check for damaged hydraulic pump.</p>	<p>Replace damaged hydraulic pump. Refer to page 2-447.</p>
	<p><i>Step 6.</i> Check for damaged pressure relief valve.</p>	<p>Replace damaged pressure relief valve. Refer to page 2-427.</p>
	<p><i>Step 7.</i> Check for clogged cannon recoil hydraulic filter.</p>	<p>If filter is clogged, replace element. Refer to TM 9-2350-304-20-2.</p>
<p>45. PUMP MOTOR DOES NOT RUN.</p>	<p><i>Step 1.</i> Check for damaged pressure switch or oil pump motor switch.</p>	<p>Replace damaged pressure switch or oil pump motor switch. Refer to page 2-427.</p>
	<p><i>Step 2.</i> Check for damaged wiring harness in pressure switch, pump motor switch, or pump motor circuit.</p>	<p>Replace damaged wiring harness. Refer to TM 9-2350-304-20-2.</p>
	<p><i>Step 3.</i> Check for damaged motor.</p>	<p>Repair or replace damaged motor. Refer to page 2-452.</p>

2-4. TROUBLESHOOTING INFORMATION (CONT).

Table 2-1. DIRECT SUPPORT TROUBLESHOOTING (CONT)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
HYDRAULIC SYSTEM (CONT)		
46. PUMP MOTOR CUTS IN AND OUT.		<div style="text-align: center; border: 2px solid black; padding: 5px; width: fit-content; margin: 0 auto;">WARNING</div> <p>Do not tighten or replace fittings or nitrogen gas lines without relieving pressure in gas bottle.</p> <p><i>Step 1.</i> Check pressure in hydraulic accumulator. Refer to TM 9-2350-304-20-2.</p> <p style="padding-left: 40px;">Recharge hydraulic accumulator. Refer to TM 9-2350-304-20-2.</p> <p><i>Step 2.</i> Check for damaged pressure switch.</p> <p style="padding-left: 40px;">Replace damaged pressure switch. Refer to page 2-427.</p> <p><i>Step 3.</i> Check for leaking nitrogen gas tube or fitting between nitrogen gas bottle and hydraulic accumulator.</p> <p style="padding-left: 40px;">Tighten loose connections or replace damaged tube or fitting. Refer to page 2-27.</p>
47. PUMP MOTOR RUNS CONSTANTLY DURING OPERATION.		<p><i>Step 1.</i> Check for damaged pressure switch.</p> <p style="padding-left: 40px;">Replace damaged pressure switch. Refer to page 2-427.</p> <p><i>Step 2.</i> Check for damaged pressure relief valve.</p> <p style="padding-left: 40px;">Replace damaged pressure relief valve. Refer to page 2-427.</p> <p><i>Step 3.</i> Check for damaged pump motor switch.</p> <p style="padding-left: 40px;">Replace damaged pump motor switch. Refer to page 2-452.</p> <p><i>Step 4.</i> Check for damaged wiring harness leading to pressure switch or pump motor.</p> <p style="padding-left: 40px;">Replace damaged wiring harness. Refer to TM 9-2350-304-20-2.</p> <p><i>Step 5.</i> Check for broken shaft in hydraulic pump.</p> <p style="padding-left: 40px;">Replace broken shaft in hydraulic pump. Refer to page 2-452.</p>

SECTION III. MAINTENANCE OF HYDRAULIC LINES AND FITTINGS

2-5. GENERAL.

a. This section contains instructions on repair of hydraulic lines and fittings. Repair of hydraulic lines and fittings consists of replacement of preformed packings, tube fitting locknuts, lockwashers, and defective sleeve spacers and washers. Page 2-27 thru 2-29 show exploded views of typical hydraulic lines and fittings used on the vehicle and give procedures for disassembly and reassembly of fittings. For complete inspection procedures, refer to b. and c. below. Refer to TM 9-2350-304-24P-2 for ordering of authorized parts. Ensure hydraulic pressure is relieved before performing any disassembly of hydraulic lines and fittings.

b. Inspect all unions, nipples, tees, reducers, plugs, elbows, and parts on which end fittings are used for thread damage, fractures, corrosion, distortion, slivers, restrictions, sealing surface scratches, or mutilation. Hex corners shall not be rounded.

c. Inspect tube assemblies for kinks, fractures, cracks, thread damage, restrictions, corrosion, or mutilation. Tube ends shall be squared, deburred inside and out, and unprimed or unpainted from sleeve flange to tube end. Tubes, 1/4 to 3/8 in. (6.35 to 9.53 mm) in diameter, shall show no deformation of sleeves as a result of over application of torque. Repair is by replacement of authorized parts (TM 9-2350-304-24P-2) which do not meet inspection criteria.

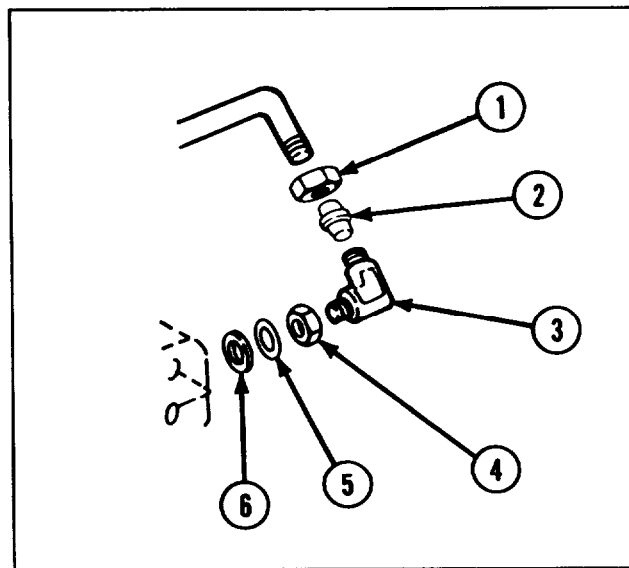
2-6. TUBE ELBOW TO TUBE FITTING.

DISASSEMBLY

Remove tube fitting locknut (1), sleeve spacer (2), tube elbow (3), tube fitting locknut (4), flat washer (5), and preformed packing (6).

REASSEMBLY

Install new preformed packing (6), flat washer (5), new tube fitting locknut (4), tube elbow (3), sleeve spacer (2), and new tube fitting locknut (1).



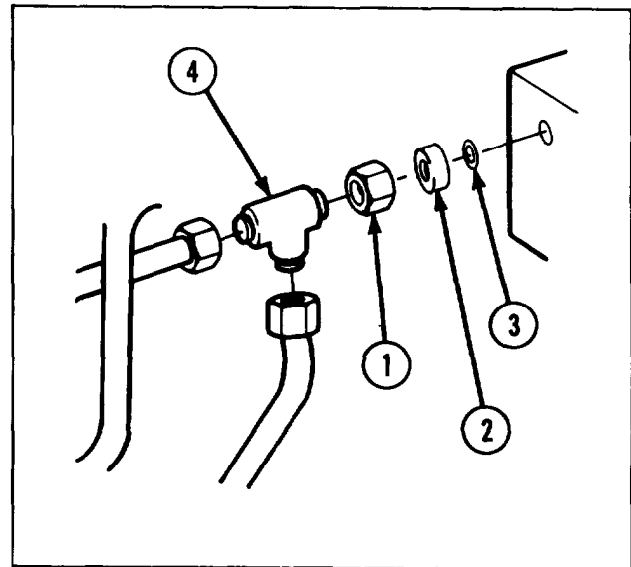
2-7. TUBE TEE TO TUBE FITTING.

DISASSEMBLY

- 1 Remove tube fitting locknut (1), flat washer (2), and preformed packing (3).
- 2 Disconnect tube assemblies from tube tee (4) and remove tube tee.

REASSEMBLY

Install tube tee (4), new preformed packing (3), flat washer (2), and new tube fitting locknut (1).



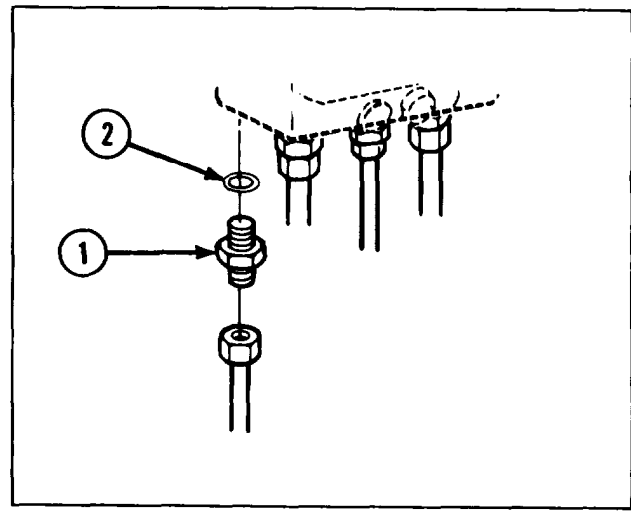
2-8. TUBE REDUCER TO TUBE FITTING.

DISASSEMBLY

Disconnect tube assembly, and remove tube reducer (1) and preformed packing (2).

REASSEMBLY

Install new preformed packing (2) and tube reducer (1), and connect tube assembly.



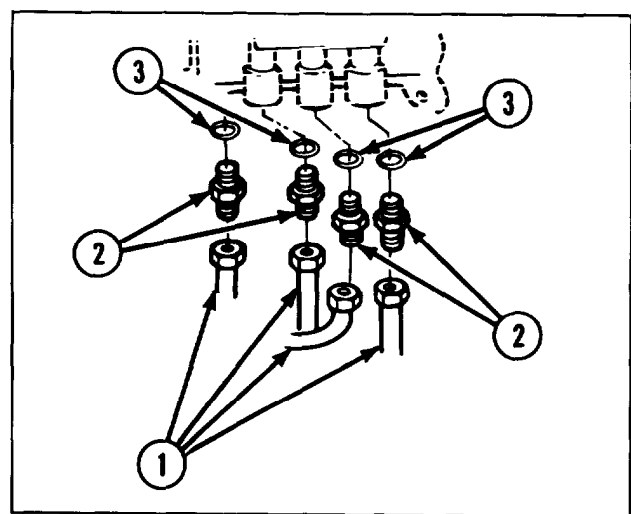
2-9. TUBE NIPPLE TO TUBE FITTING.

DISASSEMBLY

Disconnect tube fitting (1), and remove tube nipple (2) and preformed packing (3).

REASSEMBLY

Install new preformed packing (3) and tube nipple (2) and connect tube fitting (1).

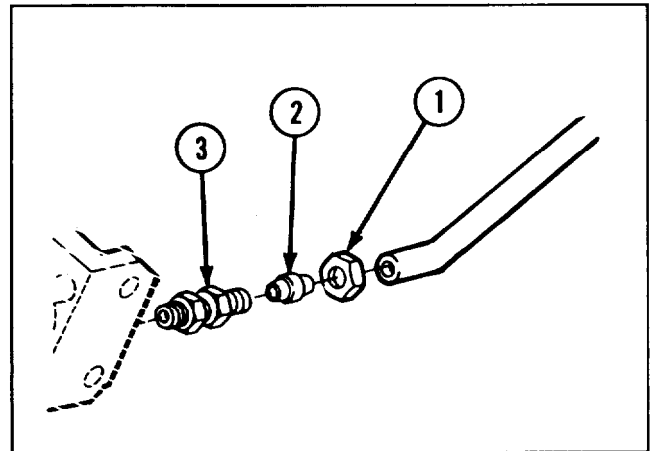


2-10. STRAIGHT ADAPTER TO TUBE FITTINGS.*DISASSEMBLY*

Remove tube fitting locknut (1), sleeve spacer (2) and straight adapter (3).

REASSEMBLY

install straight adapter (3), sleeve spacer (2), and new tube fitting locknut (1).

**Section IV. DIRECT SUPPORT MAINTENANCE PROCEDURES**

2-11. GENERAL. This section contains general repair methods and cleaning procedures. Special repair and cleaning procedures are provided, as required, in the individual maintenance instructions.

2-12. REPAIR METHODS.

- 1 Complete disassembly is not always necessary to make a repair. Exercise good judgment to keep disassembly and assembly to a minimum.
- 2 Repair or replace unserviceable parts and hardware. Always replace preformed packings, gaskets, seals, and cotter pins with new parts.
- 3 Remove burrs with a stone or file. Remove burrs on closely fitted mating surfaces by lapping the surfaces with lapping grinding compound (item 14, appx B).
- 4 Remove corrosion or rust with sand-blasting, vapor blast cleaning, or crocus cloth (item 7, appx B). Use the method that will not damage the surface being

cleaned. Crocus cloth should be used to remove corrosion and rust from polished surfaces. Make sure that critical dimensions are not changed when using crocus cloth.

- 5 Repair damaged threads with a thread chaser, or by chasing in a lathe or die.
- 6 When welding is authorized, procedures in TM 9-237 must be followed. Welds must be inspected for cracks.
- 7 Bearings should be inspected and maintained per TM 9-214.

2-13. TORQUE VALUES. Follow torque values given throughout this manual. When no torque value is given, follow the torque limits guide, provided in appendix D of this manual, to prevent damaged parts. The guide is based on using clean, dry threads.

2-14. CLEANING.

- 1 Wire brush metal parts to remove rust and corrosion.

WARNING

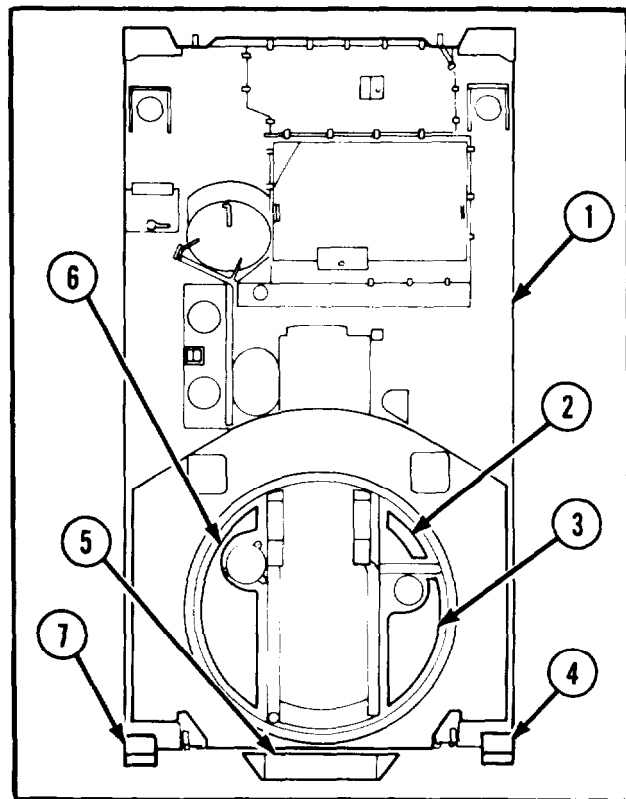
Dry cleaning solvent (SD2) is toxic and flammable. Wear protective goggles and gloves and use only in well ventilated areas.

- 2 Clean metal parts with dry cleaning solvent (item 8, appx B). Metal or fiber brushes may be used to apply cleaning solvent and to remove softened or dissolved material. Hand scraping with metal scrapers may be used to remove soft coatings or deposits.
- 3 Soak very oily or greasy metal parts in a tank containing dry cleaning solvent (item 8, appx B). The time parts must be in solvent varies with the type and amount of material to be removed.
- 4 Do not use solvent to clean electrical insulation, wires, cables, or wiring harnesses. Clean these parts by wiping with a damp cloth. Use a mild soap solution if necessary. Dry immediately with clean, dry cloths. Clean contact points with flint abrasive paper (item 1, appx B) and dust thoroughly after cleaning.
- 5 Do not use solvent to clean rubber parts. Clean rubber parts by washing with mild solution of soap and water.
- 6 Dry parts by blowing with low-pressure compressed air or wiping with clean lint-free cloths (item 6, appx B).
- 7 Bearings should be cleaned according to procedures in TM 9-214.
- 8 Paint metal surfaces after repair as required. Sand and paint damaged areas. Apply one coat of rust inhibitor primer (item 20, appx B). Allow primer to dry for 30 minutes minimum before applying enamel. Paint with enamel to match existing color; use white enamel (item 10, appx B) or olive drab enamel (item 9, appx B).

2-15. LUBRICATION. Keep a light coat of lubricating oil (item 18, appx B) on parts during repair procedures to prevent rusting. Lubricate parts during repair and assembly as required by applicable technical manual.

When notified by unit maintenance, perform 18 month trunnion bearing service (refer to page 2-70), 18 month hydraulic fluid service (refer to page 2-379), or 18 month turret bearing service (refer to page 2-463) as applicable.

2-16. PAINTING INSTRUCTIONS. Complete painting is authorized for and done by general support maintenance personnel or higher. Spot painting and restenciling vehicle markings is done by unit maintenance personnel. Instructions for materiel preparation, priming, and finish are given in TM 43-0139.



2-17. NONSKID AREAS. Non-slip paint (item 19, appx B) will be used to coat deck areas where personnel walk. The seven areas to be coated with non-slip paint are shown in the figure above.

2-18. TOUCHUP AND RECOATING.

WARNING

- Chemical Agent Resistant Coating (CARC) Paint: CARC paint contains isocyanate, a constituent that can cause respiratory effects during and after the application of the material. During the application of CARC paint, coughing, shortness of breath, pain on respiration, increased sputum, and chest tightness may occur. CARC paint also produces itching and reddening of the skin, a burning sensation of the throat and nose, and watering of the eyes.
- An allergic reaction may occur after initial exposure (ranging from a few days to a few months later), producing asthmatic symptoms including coughing, wheezing, tightness in the chest, or shortness of breath.
- The following precautions must be observed to insure the safety of personnel when CARC paint is applied.
- For brush/roller painting in confined spaces, an airline respirator is required, unless an air sampling shows exposure to be below standards. If the air sampling is below standards, either chemical cartridge or airline respirators are required.
- Spot painters applying CARC paint by brush or roller must wear clothing and gloves affording full coverage.
- Do not use water, alcohol, or amine based solvents to thin or

remove CARC paints. Use of these solvents with CARC paints can produce chemical reactions resulting in nausea, disease, burns, or severe illness to personnel.

- Do not use paint solvents to remove paint/coating from your skin.
- Mix paint/coating in a well-ventilated mixing room or spraying area away from open flames. Personnel mixing paint/coating should wear eye protection.
- Use paint/coating with adequate ventilation.
- Unusable CARC mixtures may be considered hazardous waste and may require disposal IAW Federal, state, DOD, and DA hazardous waste regulations. Consult the installation environmental office for proper disposal guidance. Mixed CARC has a flashpoint of approximately 38°F (3°C) due to the incorporation of solvents and is highly flammable.

When touching up damaged areas, the procedure should be as similar to the original method of finishing as possible; a clean surface is imperative where general disintegration of the surface is evident, or the under surface is corroded, the coating must be stripped clean from the part. Corrosion must be removed or neutralized by mechanical or chemical treatment, or both, and the surface metal must be pretreated, primed, and then topcoated.

2-19. RESTENCILING VEHICLE MARKINGS. Refer to TM 9-2350-304-20-2.

2-21. PAINTING LOAD MARKS. Refer to TM 9-2350-304-20-2.

2-20. PAINTING RETRACT MARK. Refer to TM 9-2350-304-20-2.

2-22. MAINTENANCE OF MUZZLE BRAKE.

This task covers: a. *Removal* b. *Inspection/Repair* c. *Installation*

INITIAL SETUP

Tools and Special Tools

- Artillery maintenance shop equipment (SC 4933-95-CL-A12)
- 7/8-9 NC tap
- Muzzle adapter (11579530)
- Muzzle brake fixture (11576380)
- Ordnance artillery and turret mechanic's tool kit (SC-5180-95-CL-A12)
- Spanner wrench (figure 12, appx C)
- 2-1/2 Ton truck

Materials/Parts

- Dry cleaning solvent (item 8, appx B)
- Grease (item 12, appx B)

Personnel Required

Three

References

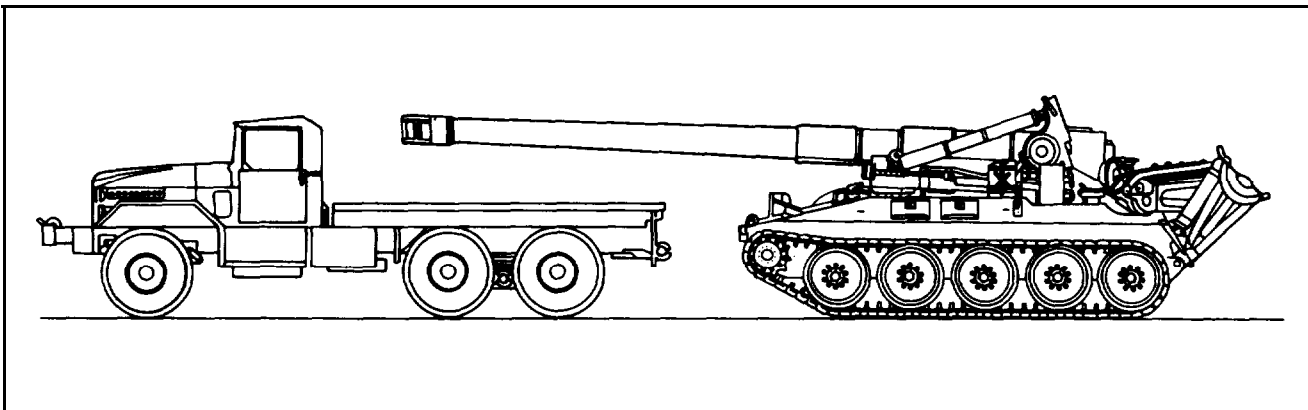
TM 9-2350-304-24P-2

General Safety Instructions

WARNING

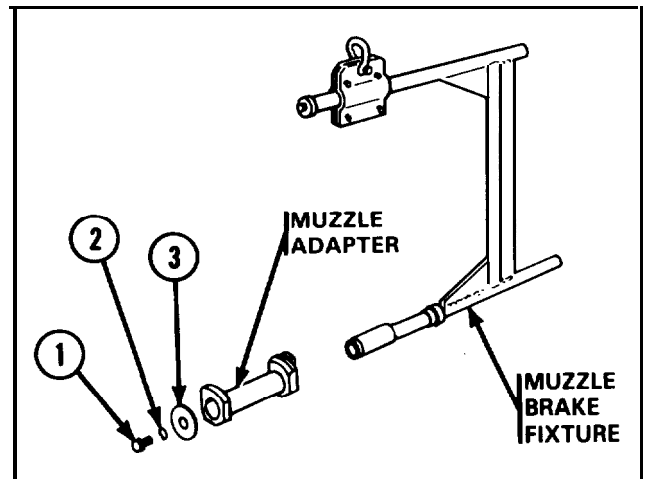
Dry cleaning solvent is toxic and flammable. Wear protective goggles and gloves and use only in well-ventilated areas.

REMOVAL



- 1 Position vehicle on level ground. Set parking brake.
- 2 Position truck in front of vehicle under tube.
- 3 Release travel lock and lower tube to zero elevation.

- 4 Remove screw (1), lockwasher (2) and washer (3) from muzzle brake fixture.
- 5 Install muzzle adapter on muzzle brake fixture with washer (3), lockwasher (2), and screw (1).

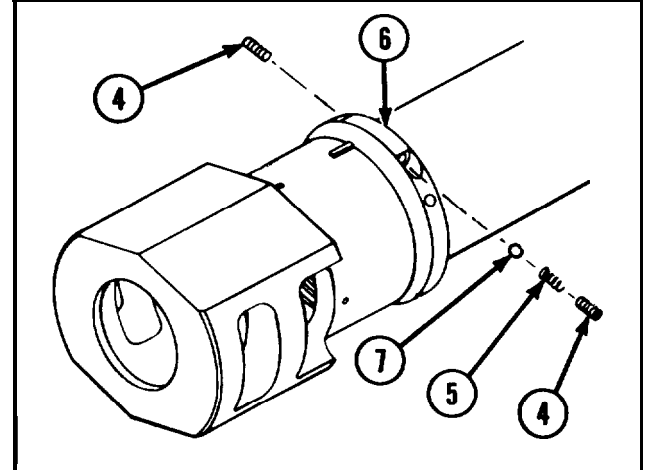


- 6 Remove two setscrews (4) and spring (5) from ring spacer (6).

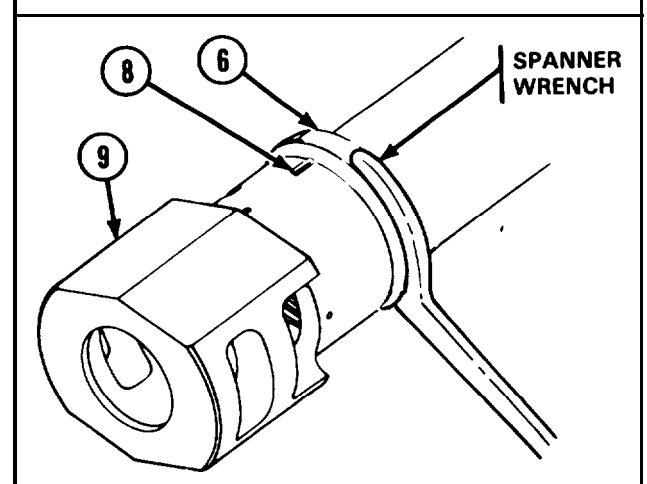
CAUTION

Bearing ball must be removed from access hole in ring spacer to prevent damage to threads.

- 7 Using brass drift, remove bearing ball (7) from ring spacer (6).



- 8 Loosen ring spacer (6) by inserting spanner wrench in spacer holes and backing off ring spacer until machine key (8) can be removed.
- 9 Using punch, tap machine key (8) to rear of muzzle brake (9). Remove machine key from muzzle brake.



2-22. MAINTENANCE OF MUZZLE BRAKE (CONT).

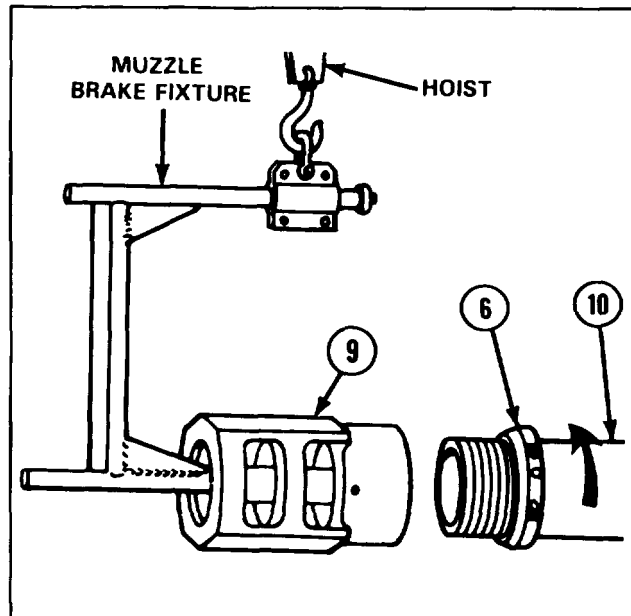
REMOVAL (CONT)

- 10 Attach muzzle brake fixture to hoist and position muzzle brake fixture in end of muzzle brake (9).

NOTE

For ease in removal, use a crow bar inserted in collar holes.

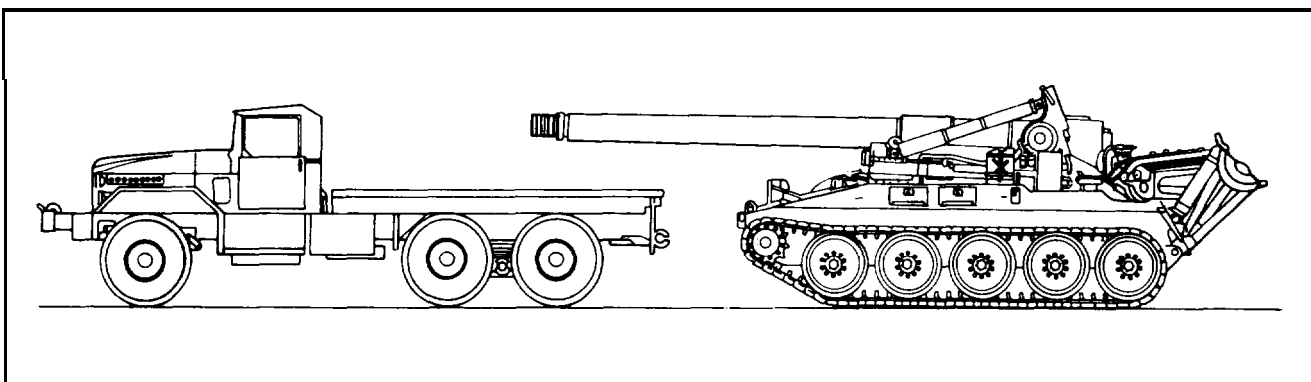
- 11 With one man on each side of muzzle brake (9), unscrew muzzle brake from tube (10) and remove. Remove muzzle brake fixture from muzzle brake.
- 12 Remove ring spacer (6) from tube (10).



INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 If any crack 1.0 in. (2.5 cm) or longer is observed in muzzle brake, muzzle brake must be replaced.
- 3 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2) which do not meet inspection criteria.

INSTALLATION



- 1 Position vehicle on level ground. Set parking brake.
- 2 Position truck in front of vehicle under tube.
- 3 Release travel lock and lower tube to zero elevation.

WARNING

Dry cleaning solvent is toxic and flammable. Wear protective goggles and gloves and use only in well ventilated areas.

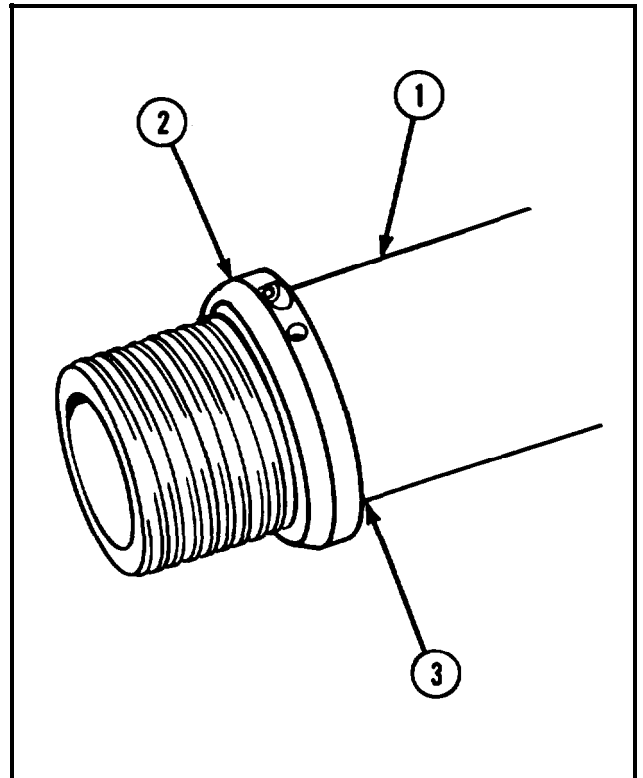
- 4 Clean threads using dry cleaning solvent (item 8, appx B) and let dry. Apply grease (item 12, appx B) to threads of tube assembly (1).
- 5 If existing ring spacer (2) is being reinstalled, check threads in access holes for damage. If damaged, use a 7/8-9 NC tap and clean threads.

CAUTION

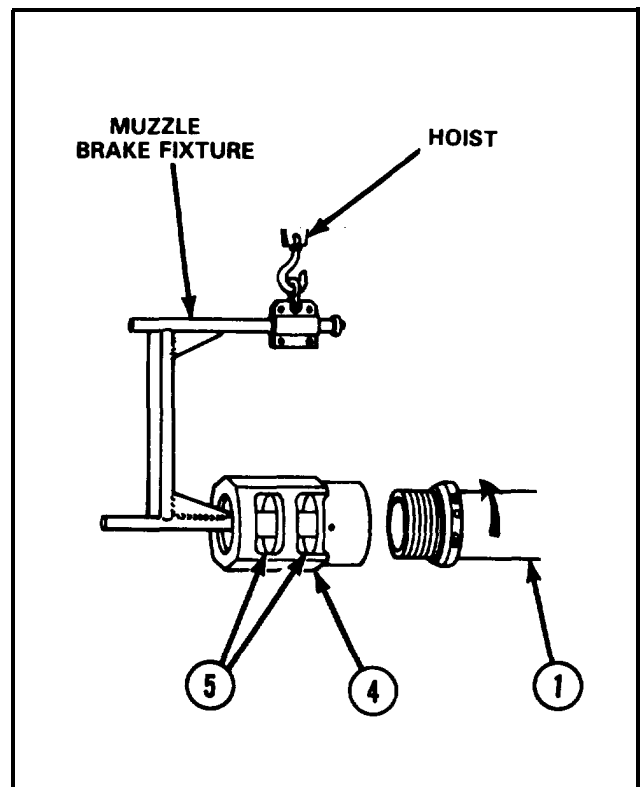
Do not spin or screw ring spacer tightly against tube assembly shoulder. A tight ring spacer will make adjustment difficult.

NOTE

If setscrews, spring, and bearing ball are installed in ring spacer, remove them before installing ring spacer on tube assembly.



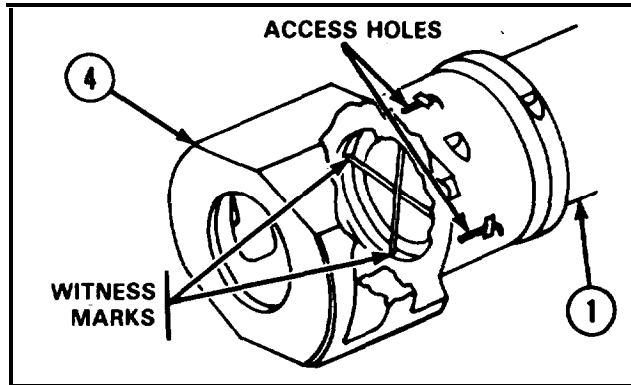
- 6 Place ring spacer (2) on tube assembly (1) with beveled side of ring spacer facing muzzle end of tube assembly.
- 7 Slowly screw ring spacer (2) on tube assembly (1) until ring spacer rests lightly against tube assembly shoulder (3).
- 8 Install muzzle brake fixture on hoist and lift muzzle brake (4) into position for installing on tube assembly (1).
- 9 Screw muzzle brake (4) onto tube assembly (1) until bore site witness marks on muzzle end of tube assembly appear in the bore site access holes on muzzle brake. Continue to rotate muzzle brake until blast deflectors (5) are at side of muzzle brake (maximum 1/2 turn).



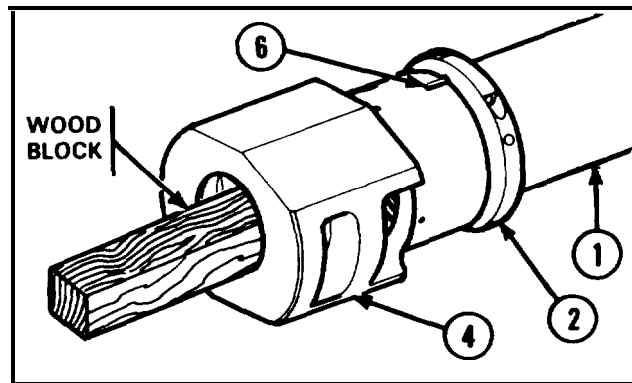
2-22. MAINTENANCE OF MUZZLE BRAKE (CONT).

INSTALLATION (CONT)

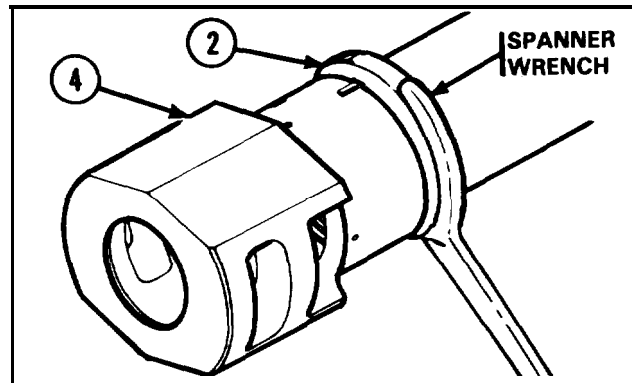
- 10 Remove muzzle brake fixture from muzzle brake (4).
- 11 Insert string through boresight access holes of muzzle brake (4).
- 12 Turn muzzle brake (4) until string aligns with bore site witness marks on end of tube assembly (1).



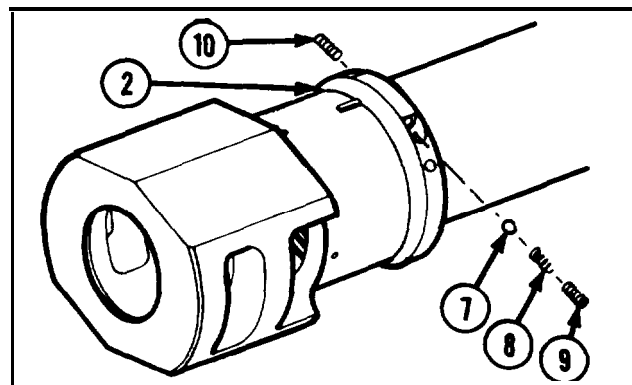
- 13 Install machine key (6) in muzzle brake (4) with beveled side facing muzzle end of tube assembly (1).
- 14 Place a piece of wood, 4 in. x 4 in. x 6 ft (10 cm x 10 cm x 2 m), in muzzle brake (4). Using the wood block for leverage, move the muzzle brake (4) up and down and tighten ring spacer (2) against muzzle brake (4). Remove wood.



- 15 Tighten ring spacer (2) against muzzle brake (4) as tight as possible using spanner wrench.
- 16 Check for proper muzzle brake alignment, see steps 11 and 12.
- 17 Install bearing ball (7), spring (8), and setscrew (9) in one of the holes in ring spacer (2).



- 18 Torque setscrew (9) 35 to 40 ft-lb (47 to 54 N-m).
- 19 Install setscrew (10) in remaining hole on ring spacer (2) flush.
- 20 Check for proper muzzle brake alignment, see steps 11 and 12.
- 21 Stake setscrews (9 and 10) in three places.



2-23. MAINTENANCE OF M201A1 CANNON ASSEMBLY, CANNON ASSEMBLY, AND TUBE ASSEMBLY.

This task covers:	a. <i>Removal</i>	d. <i>Reassembly</i>
	b. <i>Disassembly</i>	e. <i>Installation</i>
	c. <i>Inspection/Repair</i>	

INITIAL SETUP

Tools and Special Tools

Ordnance artillery and turret mechanic's tool kit (SC 5180-95-CL-A12)
 Recoil rod nut wrench (5569223)
 Sling (2) (8735440)
 Socket wrench (6105331)
 5-ton wrecker (2)

Materials/Parts

Cotter pin (MS24665-567)
 Cotter pin (MS24665-633)
 Crocus cloth (item 7, appx 6)
 Grease (item 12, appx B)

Personnel Required

Three

References

TM 9-1000-202-14
 TM 9-2350-304-10
 TM 9-2350-304-20-2
 TM 9-2350-304-24P-2

Equipment Conditions

Cannon is in low travel lock position (TM 9-2350-304-10)
 Cannon assembly partially disassembled (TM 9-2350-304-20-2)
 Equilibrators are drained of nitrogen (TM 9-2350-304-20-2)
 Fire control equipment is removed (TM 9-2350-304-20-2)
 Gun sight adapters removed (TM 9-2350-304-20-2)
 M140 alinement device mounts removed (TM 9-2350-304-20-2)

General Safety Instructions

WARNING

- High pressure nitrogen gas is used in this equipment. Keep face and body clear of release valves and filing plugs. Failure to observe safety precautions may result in injury or death.
- Ensure nitrogen gas is removed or pressure is relieved. Failure to do so will cause the equilibrator to retract, causing injury or death to personnel.
- Ensure that both slings are safely secured before removing 4 x 4 in. (10 x 10 cm) wood block. Failure to do so may result in damage to equipment or injury to personnel.

2-23. MAINTENANCE OF M201A1 CANNON ASSEMBLY, CANNON ASSEMBLY, AND TUBE ASSEMBLY (CONT).

REMOVAL

WARNING

- High pressure nitrogen gas is used in this equipment. Keep face and body clear of release valves and filling plugs. Failure to observe safety precautions may result in injury or death.
- Ensure nitrogen gas is removed or pressure is relieved. Failure to do so will ease the equilibrators to retract, causing injury or death to personnel.

- 1 Position two 5-ton wreckers side by side on level ground.
- 2 Position vehicle behind wreckers so that cranes are over turret as shown.
- 3 Lower spade to a few inches above the ground.
- 4 Position cannon in battery position and set travel lock in shipping position.

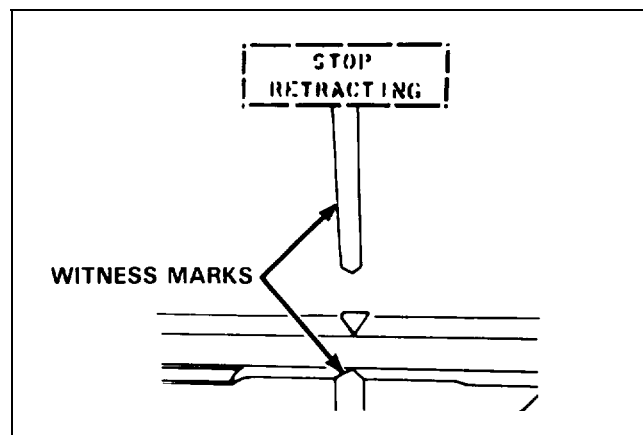
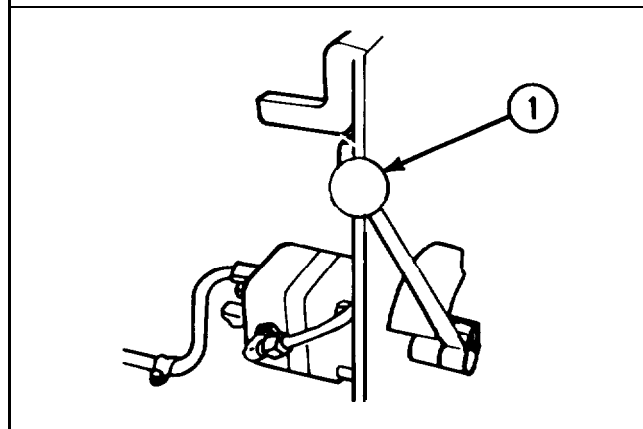
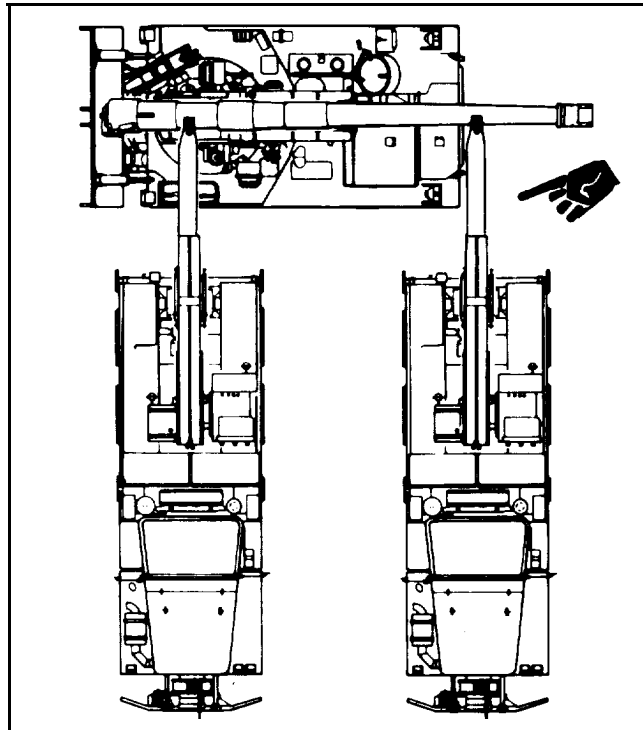
NOTE

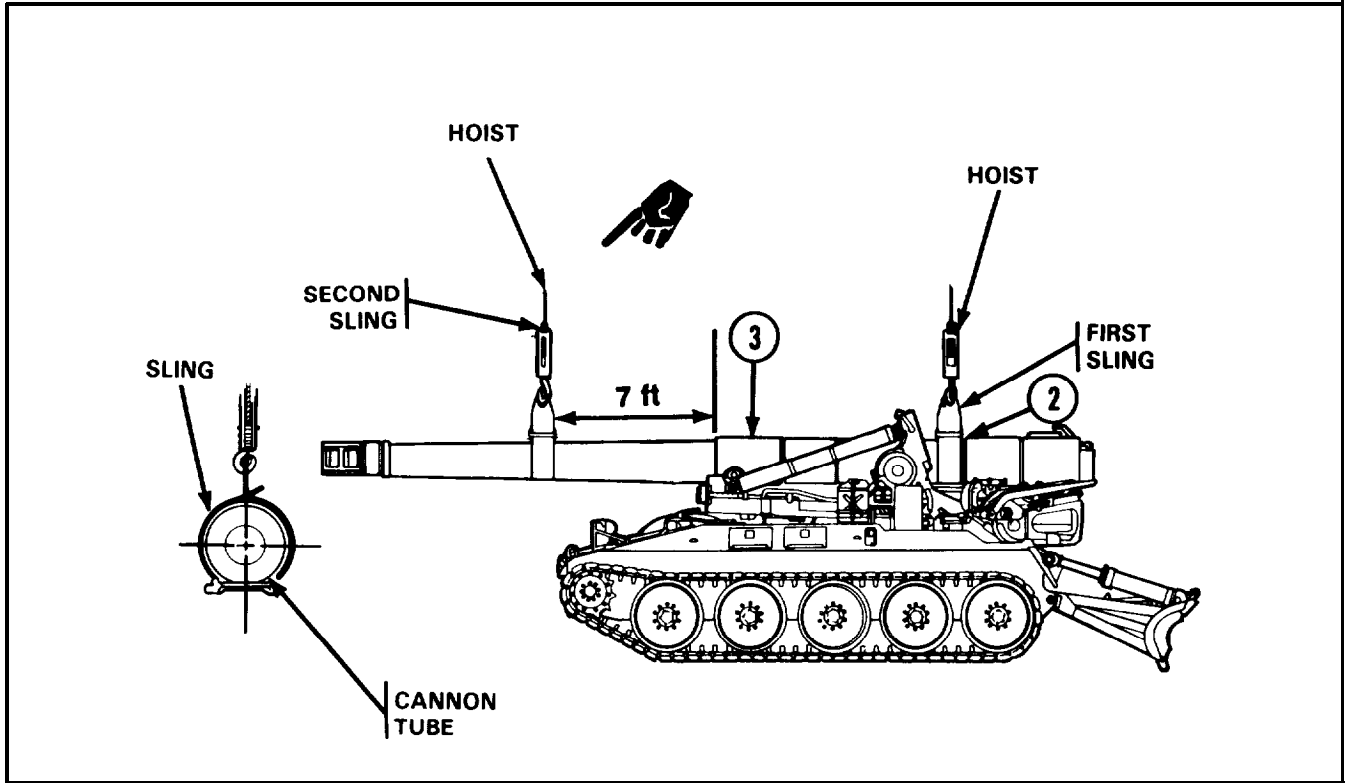
If cannon and slide do not have witness marks, retract cannon 54.25 in. (137.80 cm).

- 5 Set retracting control valve handle (1) to RETRACT position and hold until witness marks on cannon and slide aline.

NOTE

Do not remove muzzle brake when removing cannon to perform gun mount or turret maintenance.



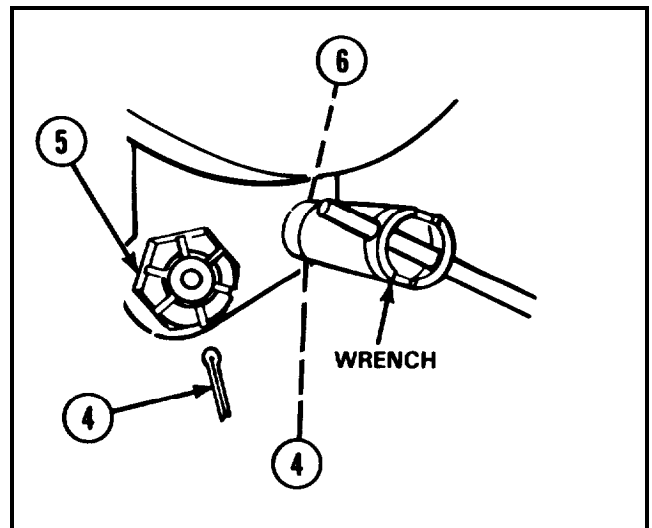


- 6 Install first 7-ton (6.4-metric ton) minimum capacity sling to tube against rear hoop (2) as shown. Fit first sling between tube and rails. Make sure first sling is not under piston rods.

NOTE

Be sure slings are centered on cannon tube.

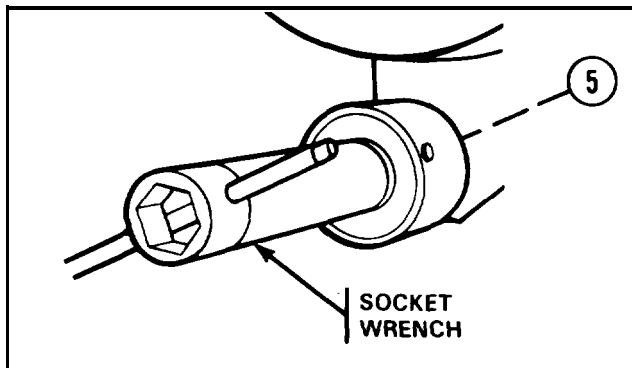
- 7 Attach second sling approximately 7 ft (2.1 m) in front of forward hoop (3).
- 8 Attach slings to hoists.
- 9 Remove two cotter pins (4) from recoil nut (5) and counterrecoil nut (6).
- 10 Using socket wrench, remove counter-recoil nut (6).



2-23. MAINTENANCE OF M201A1 CANNON ASSEMBLY, CANNON ASSEMBLY, AND TUBE ASSEMBLY (CONT).

REMOVAL (CONT)

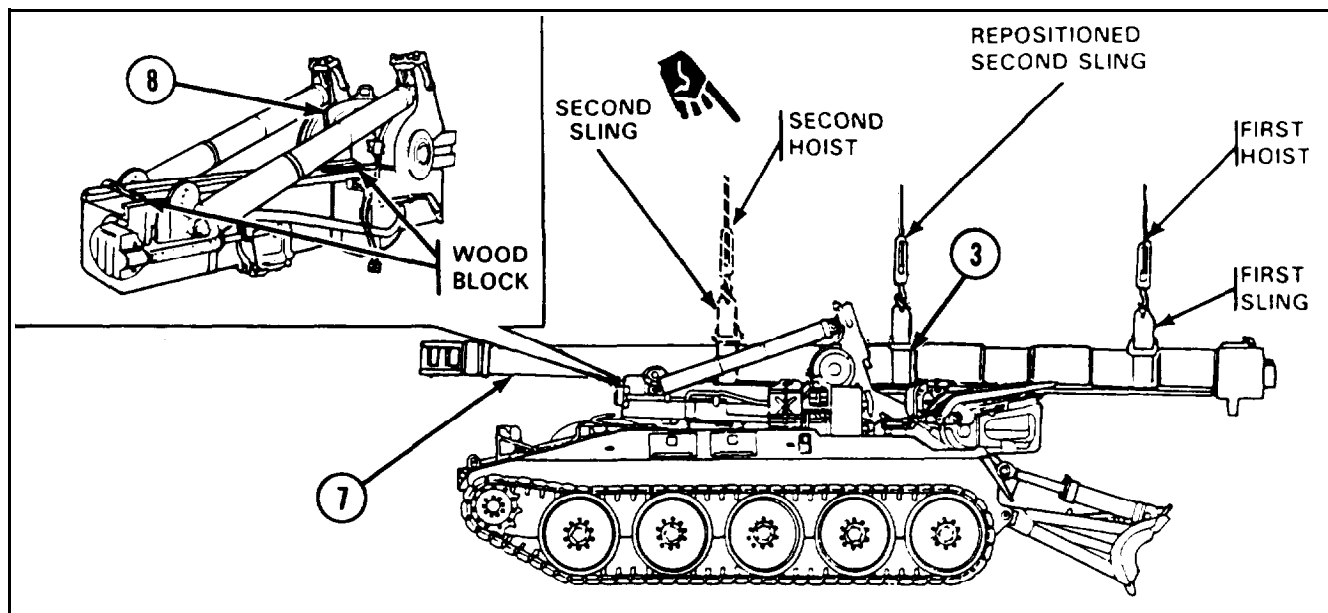
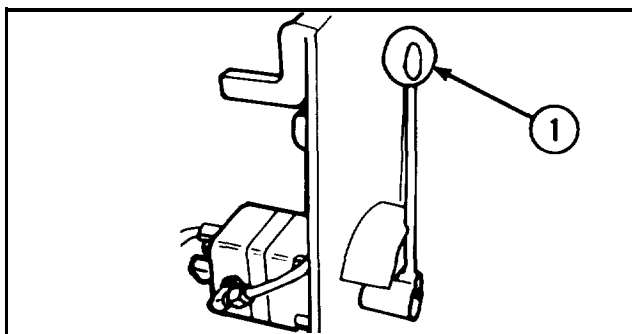
- 11 Using socket wrench and recoil rod nut wrench, remove recoil nut (5).



NOTE

Be sure rods are retracted in M174 gun mount.

- 12 Set retracting control valve handle (1) to RETURN position.



- 13 Partly lift recoil spade.

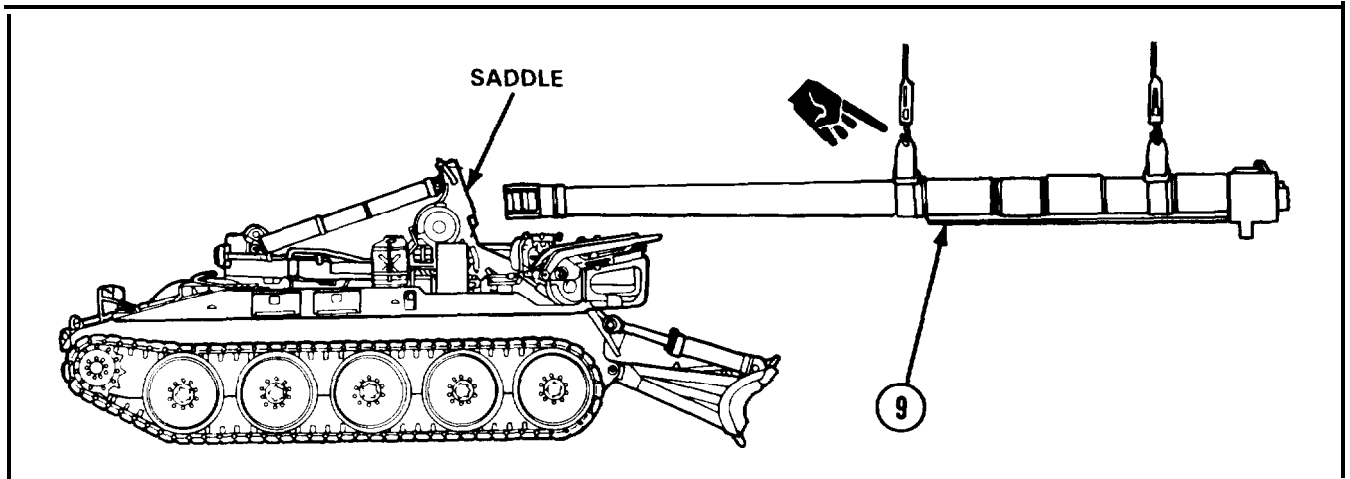
- 14 Raise hoists and drive vehicle forward to allow cannon assembly to slide back until forward hoop (3) of tube (7) is approximately 1 ft (0.3 m) to the rear of the gun mount saddle (8).

- 15 Place two 4 x 4 in. (10 x 10 cm) wood blocks between cannon rails and gun mount slides.

NOTE

The cannon rails are still engaged with the gun mount slides.

- 16 Reposition second sling against the front of the forward hoop as shown.

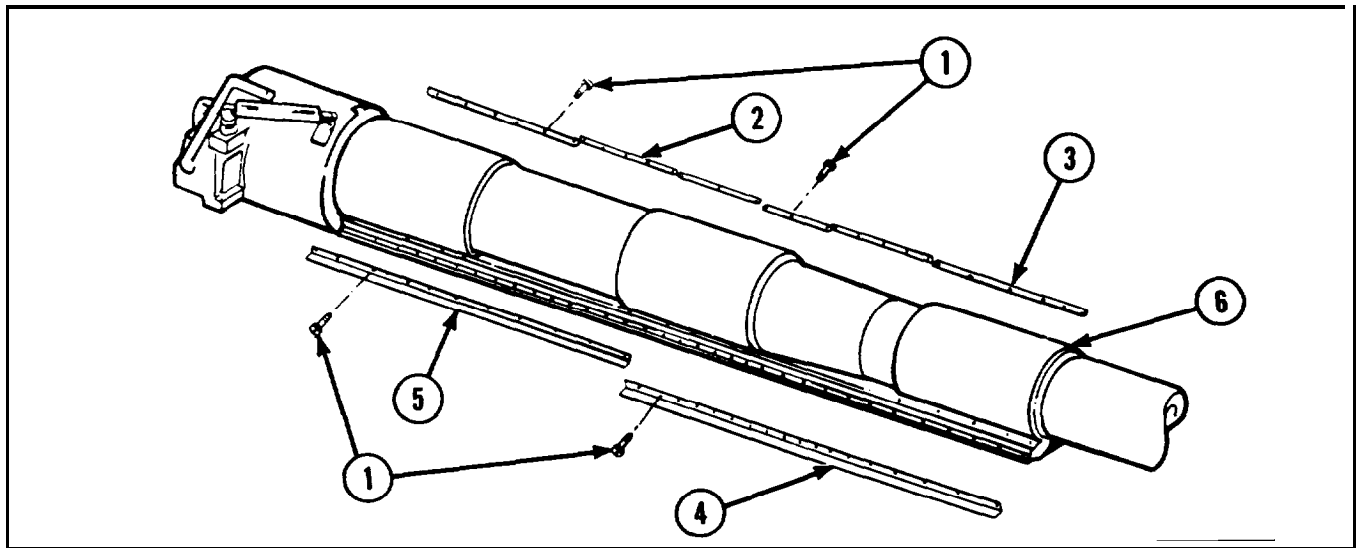


17 Drive vehicle clear of cannon assembly (9).

18 Lower cannon assembly (9) and support on dollies or blocks.

19 Remove slings and wood blocks.

DISASSEMBLY



NOTE

- Strips can be removed with tube assembly installed on the howitzer.
- Tube assembly is shown removed for clarity.

1 Remove 48 tapping screws (1).

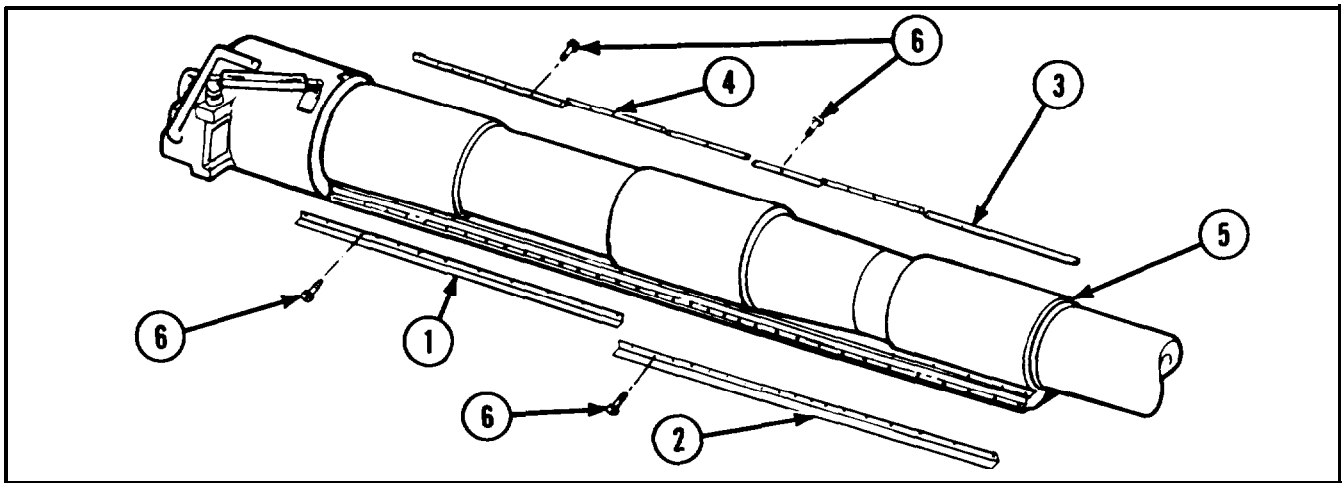
2 Remove left hand rear strip (2), left hand front strip (3), right hand front strip (4), and right hand rear strip (5) from tube assembly (6).

2-23. MAINTENANCE OF M201A1 CANNON ASSEMBLY, CANNON ASSEMBLY, AND TUBE ASSEMBLY (CONT).

INSPECTION/REPAIR

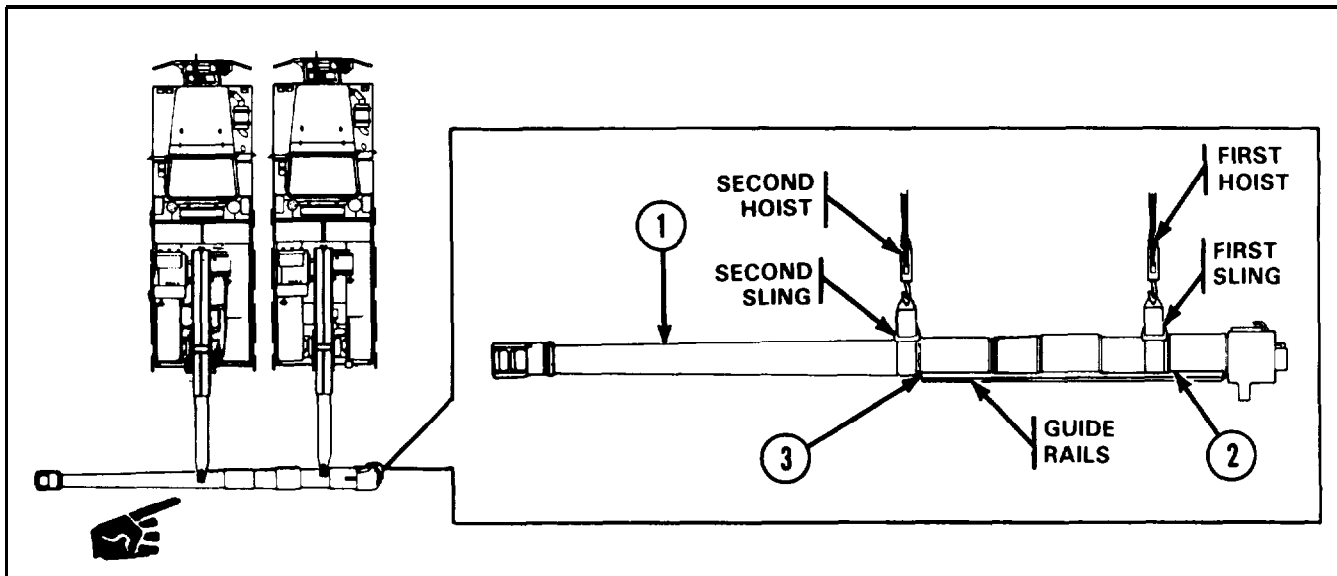
- 1 Inspect for broken, damaged, or missing parts.
- 2 For complete inspection procedures, refer to TM 9-1000-202-14.
- 3 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

REASSEMBLY



Install right hand rear strip (1), right hand front strip (2), left hand front strip (3), and left hand rear strip (4) onto tube assembly (5), and secure using 48 tapping screws (6).

INSTALLATION

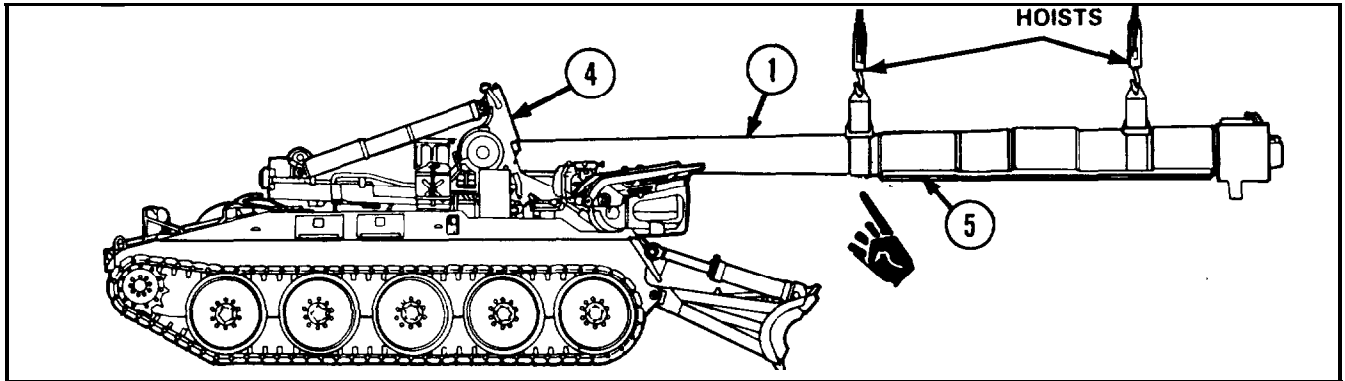


- 1 Position two 5-ton wreckers side by side on level ground beside tube assembly.
- 2 install two 7-ton (6.4 metric ton) minimum capacity slings on tube assembly (1). Install first sling on tube assembly (1) against rear hoop (2) as shown. Install second sling on tube assembly against the front of the forward hoop (3) as shown.

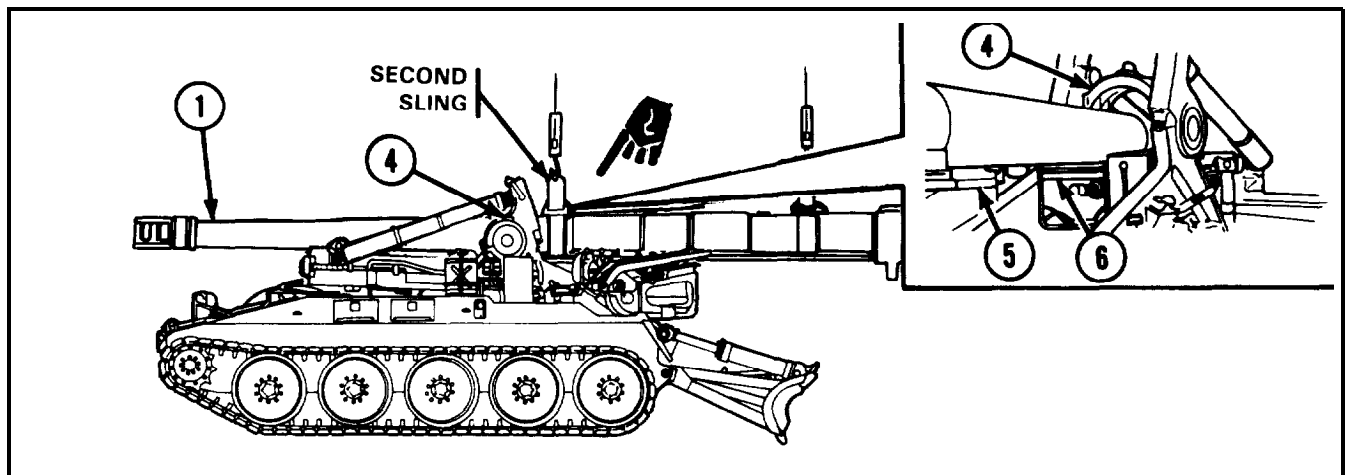
NOTE

Make sure slings are installed between tube assembly and guide rails and are centered. Tube assembly must be level before installation to gun mount.

- 3 Attach slings to hoists.



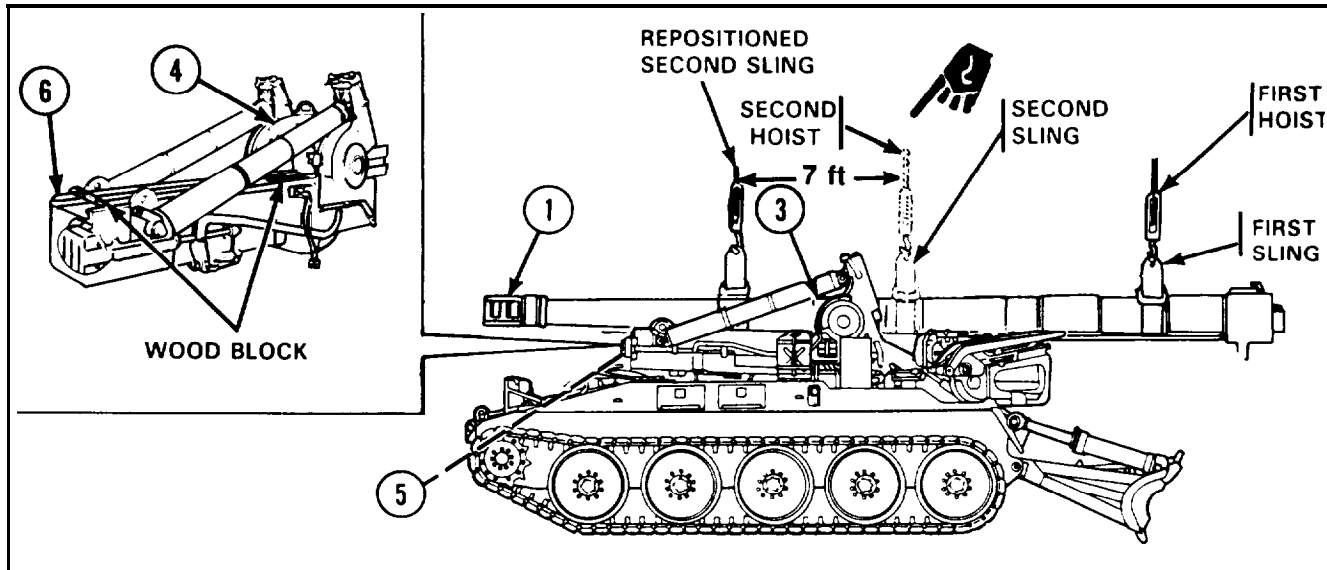
- 4 Using both hoists, raise tube assembly (1) into position to be guided through gun mount saddle (4).
- 5 Inspect cannon rails (5) for burrs. Remove burrs with a fine file and crocus cloth (item 7, appx B).
- 6 Lubricate cannon rails (5) with grease (item 12, appx B). Refer to TM 9-2350-304-10.
- 7 Lower spade to a few inches above ground.



- 8 Slowly back vehicle while guiding tube assembly (1) through gun mount saddle (4).
- 9 Continue backing vehicle slowly until cannon rails (5) engage gun mount slides (6) and second sling reaches gun mount saddle (4).

2-23. MAINTENANCE OF M201A1 CANNON ASSEMBLY, CANNON ASSEMBLY, AND TUBE ASSEMBLY (CONT).

INSTALLATION (CONT)



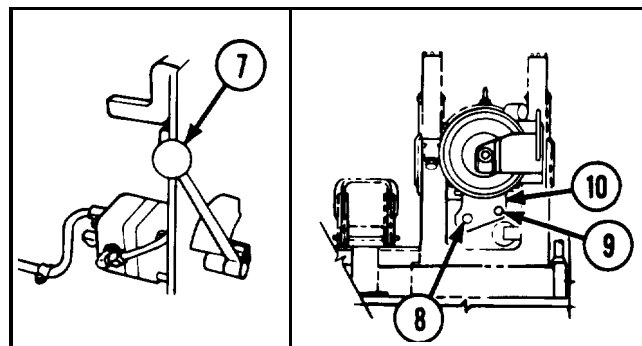
- 10 Place a 4 x 4 in. (10 x 10 cm) wood block between cannon rails (5) and gun mount slides (6).
- 11 Lower hoist of second sling to allow tube assembly (1) to rest on wood block in gun mount slides (6).
- 12 Reposition second sling on tube assembly (1) forward of gun mount saddle (4) approximately 7 ft (2.1 m) in front of forward hoop (3).

WARNING

Ensure that both slings are safely secured before removing 4 x 4 in. (10 x 10 cm) wood block. Failure to do so may result in damage to equipment or injury to personnel.

- 13 Attach second sling to hoist and raise second sling to support forward weight of tube assembly (1). Remove wood blocks.
- 14 Again slowly back vehicle until first sling reaches gun mount saddle (4).

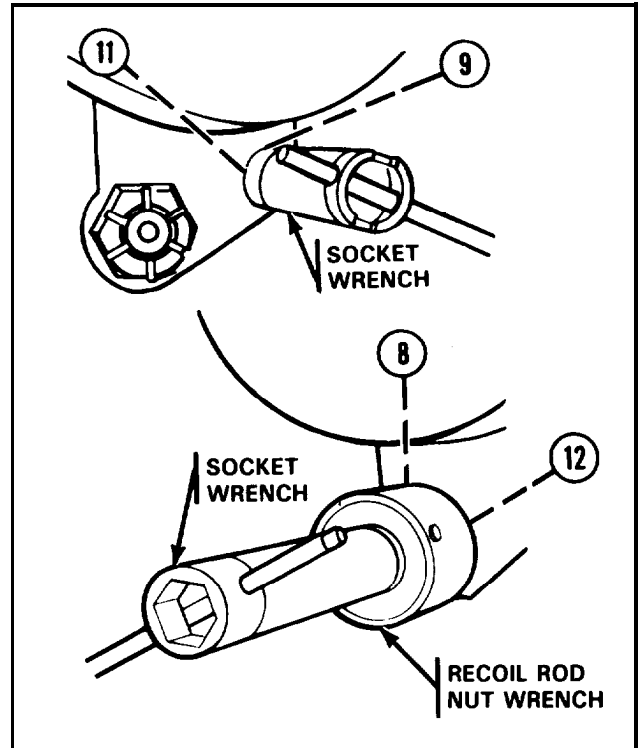
- 15 Set retracting control valve handle (7) to RETRACT position and hold until recoil rod (8) and counterrecoil rod (9) move through holes in breech lug (10).



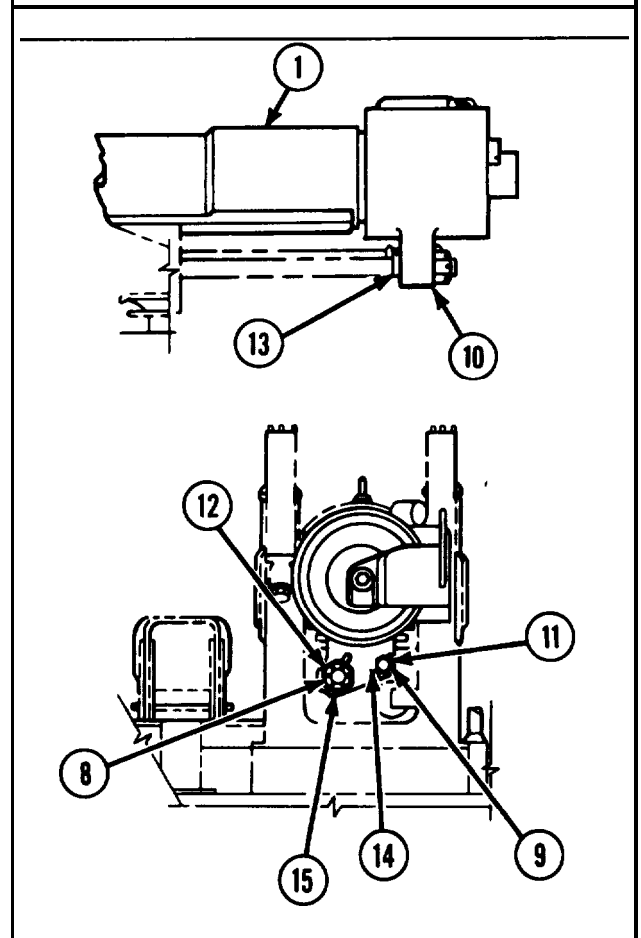
NOTE

Install counterrecoil nut first to prevent side loading.

- 16 Using socket wrench, install counterrecoil nut (11) on counterrecoil rod (9).
- 17 Using socket wrench and recoil rod nut wrench, install recoil plain nut (12) on recoil rod (8).



- 18 Tighten counterrecoil nut (11) and recoil nut (12) until breech lug (10) and rod yoke (13) are seated against each other.
- 19 Back off counterrecoil nut (11) until cotter pin hole in counterrecoil rod (9) is aligned with nearest slot of counterrecoil nut, and install new cotter pin (14).
- 20 Back off recoil nut (12) until cotter pin hole in recoil rod (8) is aligned with nearest slot of recoil nut, and install new cotter pin (15).
- 21 Remove slings and return tube assembly (1) to battery. For final inspection of cannon tube, refer to TM 9-1000-202-14.

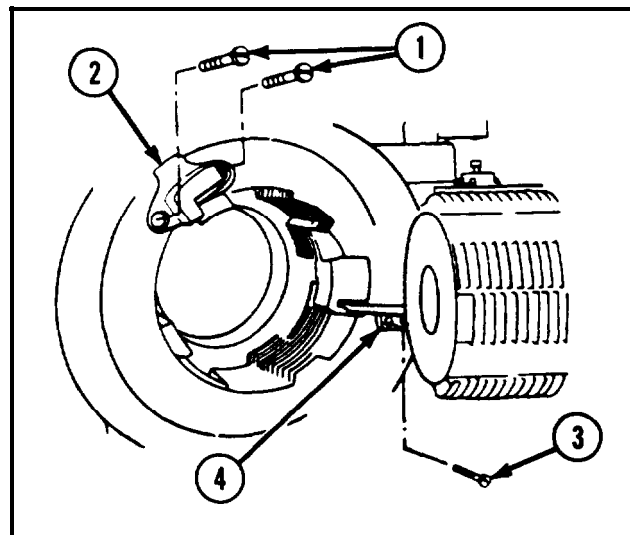


2-24. MAINTENANCE OF BREECH MECHANISM ASSEMBLY, HINGE PIN, BREECHBLOCK ASSEMBLY, CARRIER ASSEMBLY, AND BREECH RING ASSEMBLY.

This task covers:		
<i>a. Disassembly</i>	<i>b. Inspection/Repair</i>	<i>c. Reassembly</i>
INITIAL SETUP		
<i>Tools and Special Tools</i> Ordnance artillery and turret mechanic's tool kit (SC 5180-95-CL-A12)	<i>Equipment Conditions</i> Breechblock crosshead removed (TM 9-2350-304-20-2) Breechblock lever, spring pin, and crank removed (TM 9-2350-304-20-2)	
<i>Materials/Parts</i> Cotter pin (MS24665-427) Dowel Headed shoulder pin (73064541) Sealing compound (item 21, appx B) Spring pin (MS161562-136)	<i>General Safety Instructions</i> <div style="border: 1px solid black; padding: 5px; text-align: center;">WARNING</div> Breech components are heavy. Exercise care during repair to prevent injury to personnel.	
<i>Personnel Required</i> Two		
<i>References</i> TM 9-2350-304-24P-2		

DISASSEMBLY

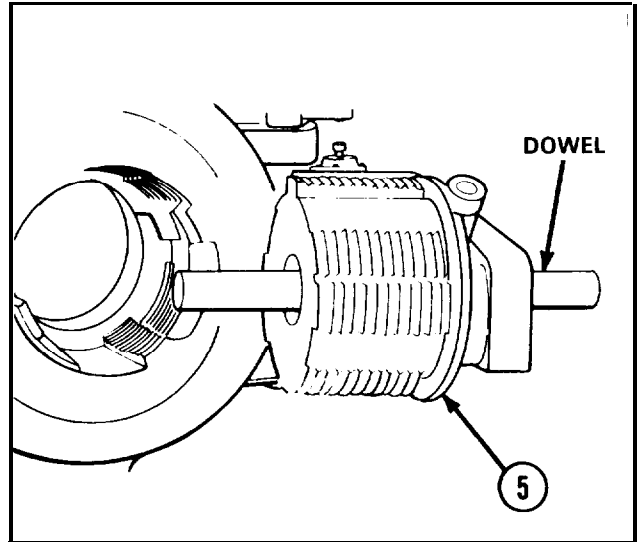
- 1 Remove two machine screws (1) and breechblock rotating cam (2).
- 2 Remove two machine screws (3) and control cam (4).



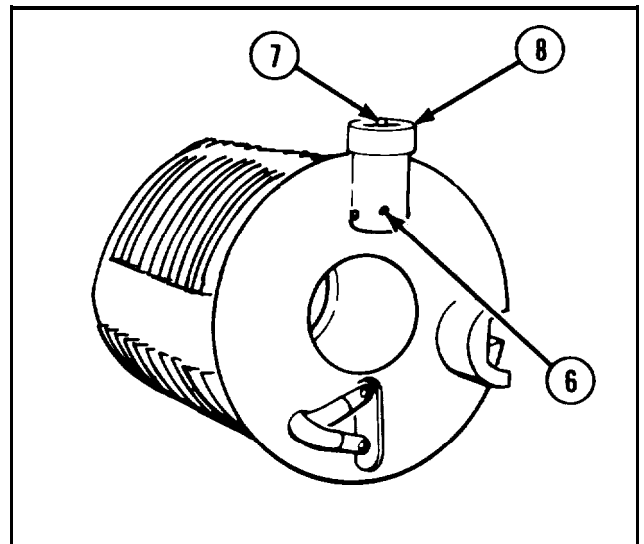
WARNING

Breech components are heavy. Exercise care during repair to prevent injury to personnel.

- 3 Insert dowel to support breechblock assembly (5) and remove breechblock assembly.



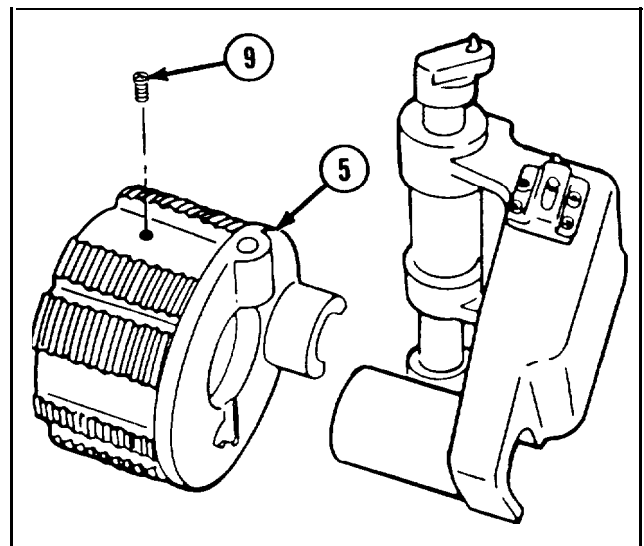
- 4 Drill out spring pin (6), and remove oil lubricating breechblock roller cup (7) and linear breechblock roller (8).



WARNING

Breech components are heavy. Exercise care during repair to prevent injury to personnel.

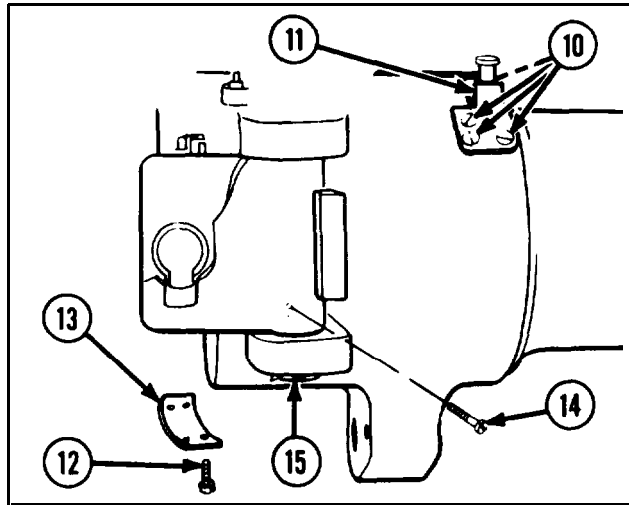
- 5 Remove lubricating oil cup (9) from breechblock assembly (5).



2-24. MAINTENANCE OF BREECH MECHANISM ASSEMBLY, HINGE PIN, BREECHBLOCK ASSEMBLY, CARRIER ASSEMBLY, AND BREECH RING ASSEMBLY (CONT).

DISASSEMBLY (CONT)

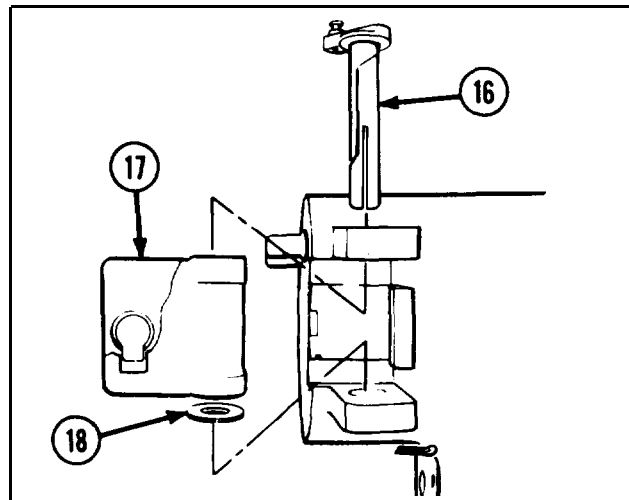
- 6 Remove four machine screws (10) and counterbalance bracket (11).
- 7 Remove four drive screw (12) and instruction plate (13).
- 8 Remove socket head capscrew (14) and cotter pin (15).



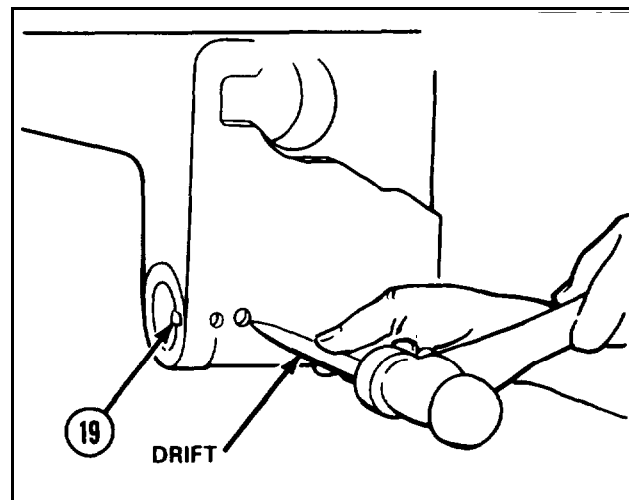
WARNING

Breech components are heavy. Exercise care during repair to prevent injury to personnel.

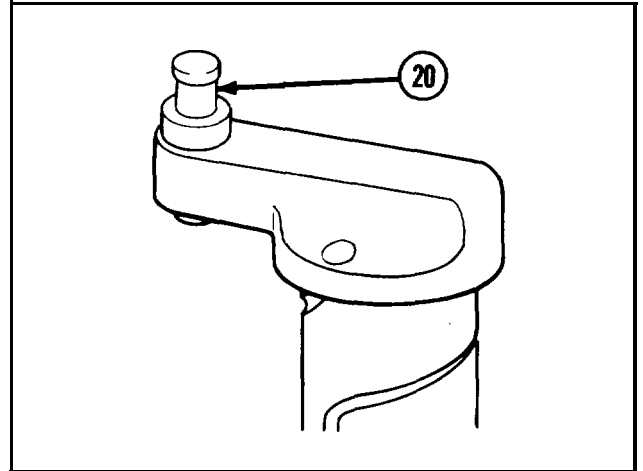
- 9 Remove hinge pin (16), breechblock carrier (17), and flat washer (18).



- 10 Use drift through access hole to remove machine key (19).

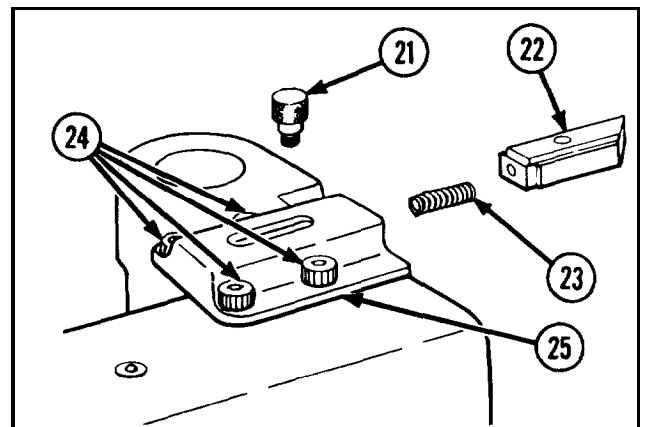


- 11 If headed shoulder pin (20) is damaged, grind or drill flattened end to remove.



- 12 Remove carrier latch knob (21), bar latch assembly (22), and helical compression spring (23).

- 13 Remove four socket head capscrews (24) and catch strike latch (25).



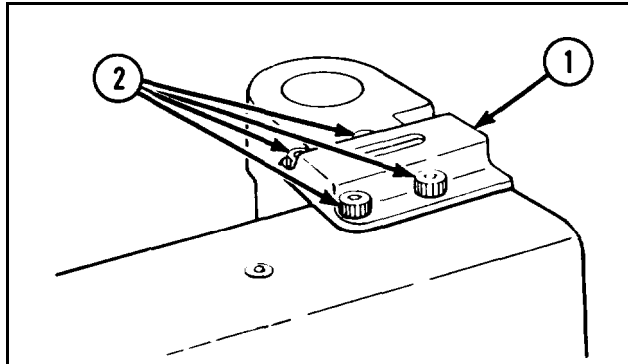
INSPECTION/REPAIR

- | | |
|---|--|
| <ol style="list-style-type: none"> 1 Inspect for broken, damaged, or missing parts. 2 Inspect leveling surfaces for gouges, nicks, and scratches. 3 If hinge pin body is damaged, repair is by replacement of next higher assembly. 4 If breechblock body is damaged, repair is by replacement of next higher assembly. | <ol style="list-style-type: none"> 5 If breechblock carrier is damaged, repair is by replacement of next higher assembly. 6 If breech ring assembly is damaged, notify next higher maintenance level. 7 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2). |
|---|--|

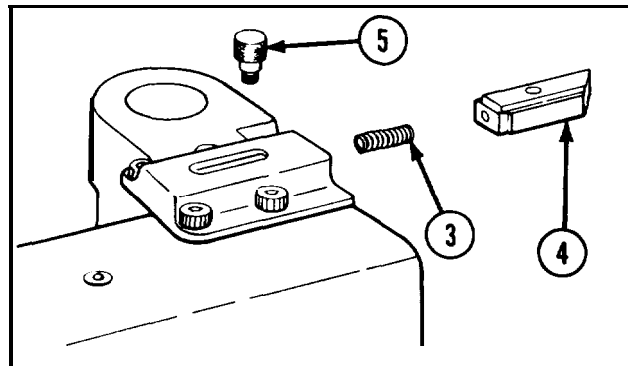
2-24. MAINTENANCE OF BREECH MECHANISM ASSEMBLY, HINGE PIN, BREECHBLOCK ASSEMBLY, CARRIER ASSEMBLY, AND BREECH RING ASSEMBLY (CONT).

REASSEMBLY

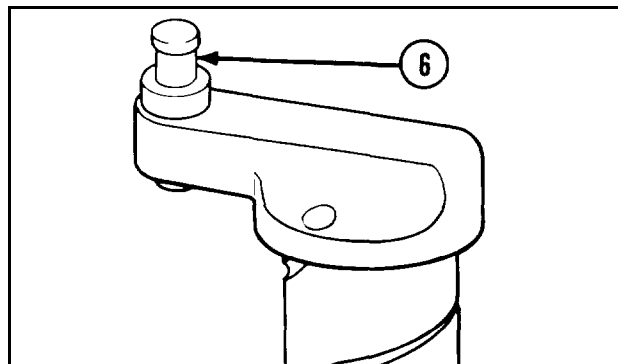
- 1 Install catch strike latch (1) and four socket head capscrews (2).



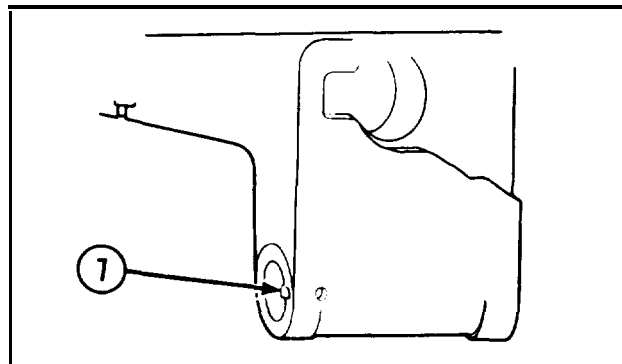
- 2 Install helical compression spring (3), bar latch assembly (4), and carrier latch knob (5).



- 3 If necessary, install new headed shoulder pin (6) and flatten end to secure.



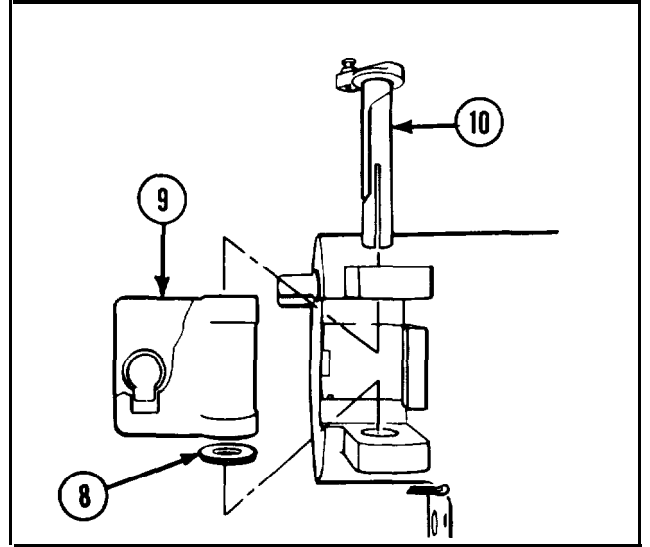
- 4 Install machine key (7).



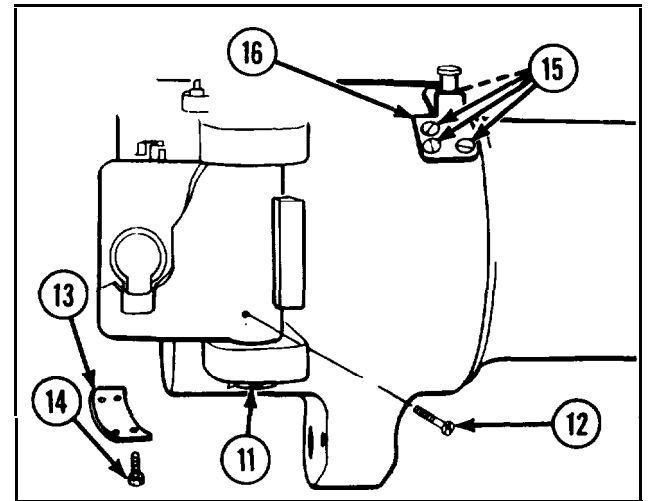
WARNING

Breech components are heavy. Exercise care during repair to prevent injury to personnel.

- 5 Install flat washer (8), breechblock carrier (9), and hinge pin (10).



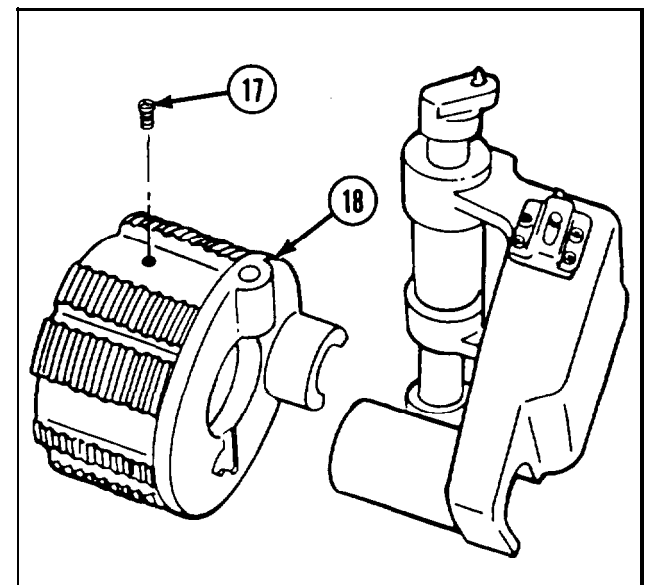
- 6 Install new cotter pin (11) and socket head capscrew (12).
- 7 Install instruction plate (13) and four drive screws (14).
- 8 Apply sealing compound (item 21, appx B) to four machine screws (15) and install counterbalance bracket (16). Install and stake machine screws (15).



WARNING

Breech components are heavy. Exercise care during repair to prevent injury to personnel.

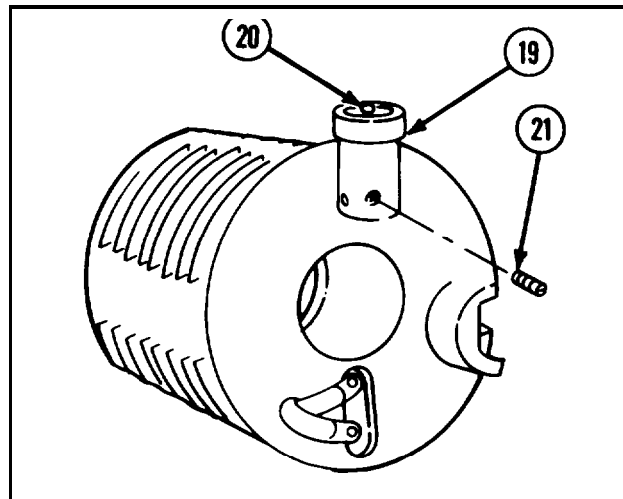
- 9 Install lubricating oil cup (17) into breechblock body (18).



2-24. MAINTENANCE OF BREECH MECHANISM ASSEMBLY, HINGE PIN, BREECHBLOCK ASSEMBLY, CARRIER ASSEMBLY, AND BREECH RING ASSEMBLY (CONT).

REASSEMBLY (CONT)

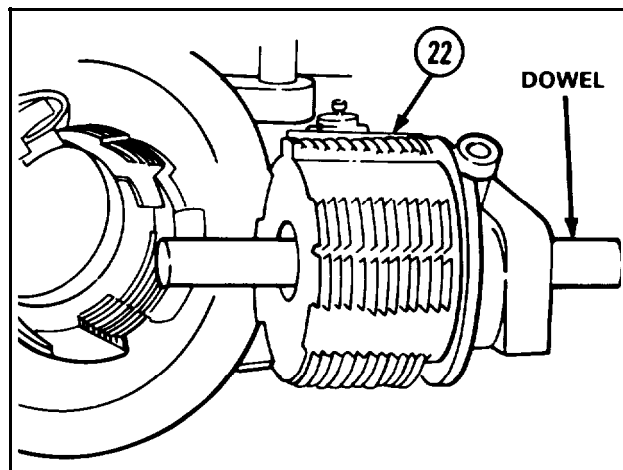
- 10 Install linear breechblock roller (19) and oil lubricating breechblock roller cup (20), and using brass drift, install new spring pin (21).



WARNING

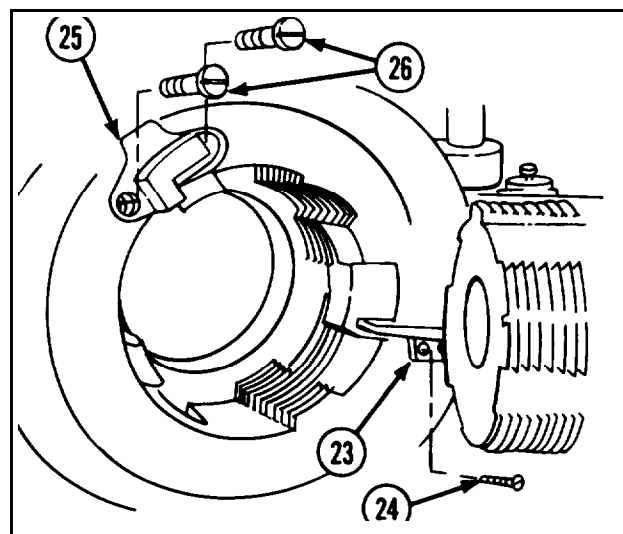
Breech components are heavy. Exercise care during repair to prevent injury to personnel.

- 11 Install breechblock assembly (22) using dowel for support.



- 12 install control cam (23) and two machine screws (24).

- 13 Install breechblock rotating cam (25) and two machine screws (26).



2-25. MAINTENANCE OF COUNTERBALANCE ASSEMBLY.

This task covers: *a. Disassembly* *b. Inspection/Repair* *c. Reassembly*

INITIAL SETUP

Tools and Special Tools

- Counterbalance assembly extractor (figure 10, appx C)
- Ordnance artillery and turret mechanic's tool kit (SC 5180-95-CL-A12)
- Spanner wrench (7309882)

References

- TM 9-2350-304-20-2
- TM 9-2350-304-24P-2

Equipment Conditions

Counterbalance assembly removed (TM 9-2350-304-20-2)

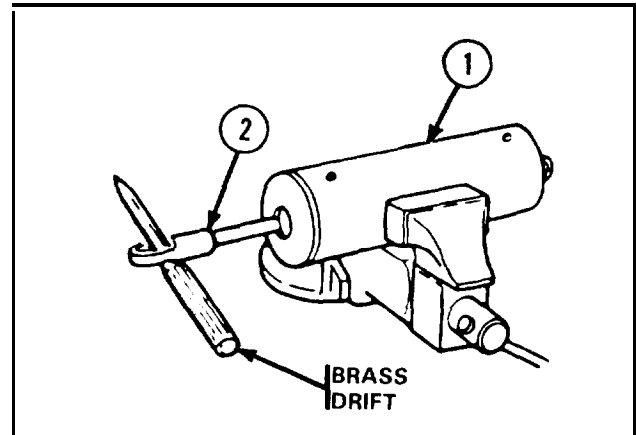
General Safety Instructions

WARNING

Assembly contains springs under high tension. Use caution during removal or installation.

DISASSEMBLY

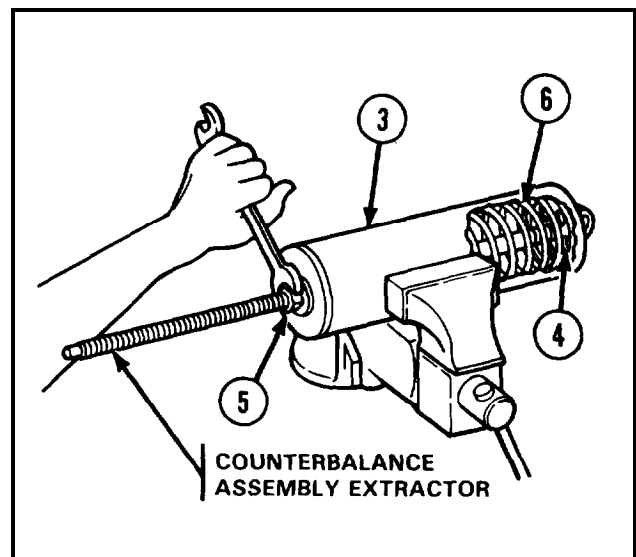
- 1 Secure counterbalance assembly (1) in suitable vise.
- 2 Using brass drift, unscrew and remove piston rod assembly (2).



WARNING

Assembly contains springs under high tension. Use caution during removal or installation.

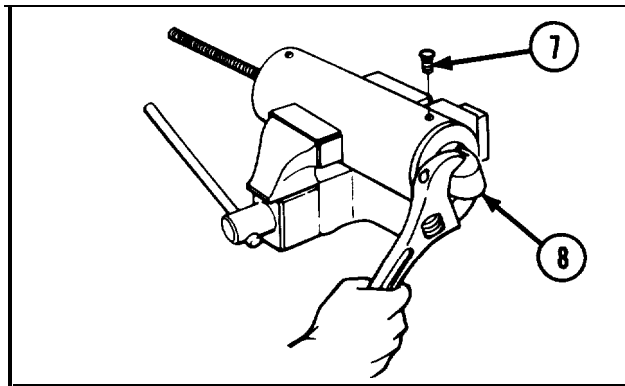
- 3 Insert counterbalance assembly extractor into counterbalance cylinder (3) until threaded end can be screwed into equilibrator counterbalance piston (4).
- 4 With counterbalance assembly extractor screwed securely into equilibrator counterbalance piston (4), tighten counterbalance assembly extractor nut (5) to compress spring (6) inside counterbalance cylinder (3).



2-25. MAINTENANCE OF COUNTERBALANCE ASSEMBLY (CONT).

DISASSEMBLY (CONT)

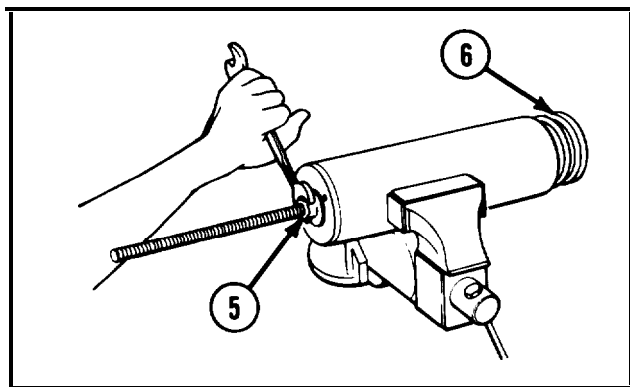
- 5 Remove setscrew (7) and cylinder head (8).



WARNING

Assembly contains springs under high tension. Use caution during removal or installation.

- 6 Loosen counterbalance assembly extractor nut (5) to remove tension from spring (6).

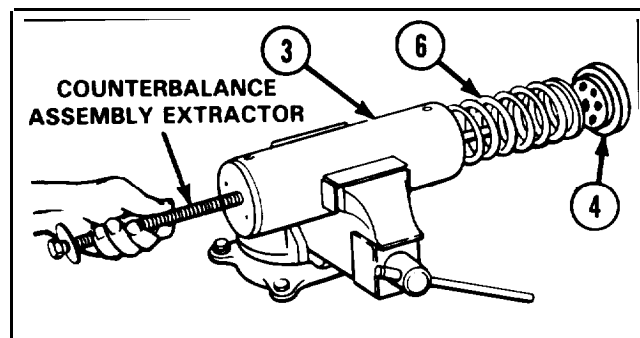


- 7 Unscrew and remove counterbalance assembly extractor.

WARNING

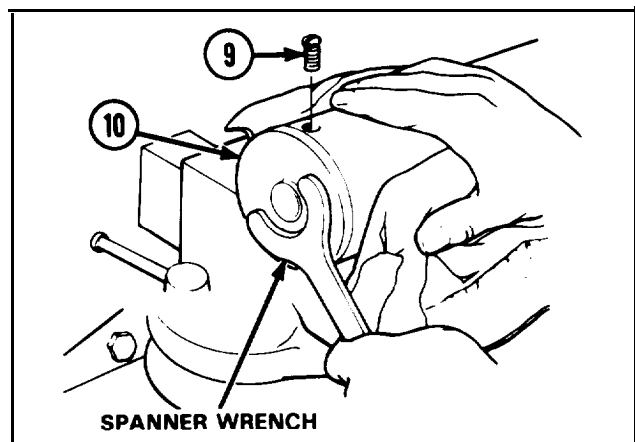
Assembly contains springs under high tension. Use caution during removal or installation.

- 8 Remove spring (6) and equilibrator counterbalance piston (4) from counterbalance cylinder (3).



- 9 Remove setscrew (9).

- 10 Using spanner wrench, remove linear actuating cylinder head (10).

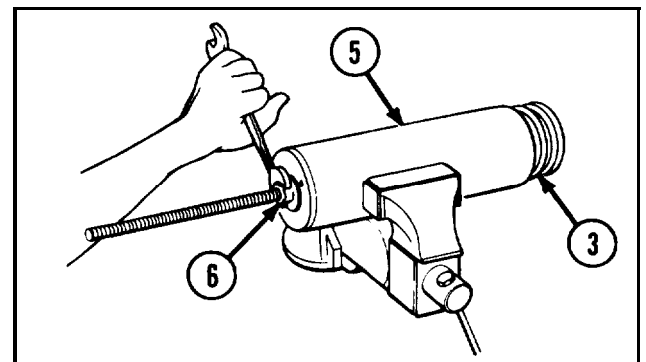
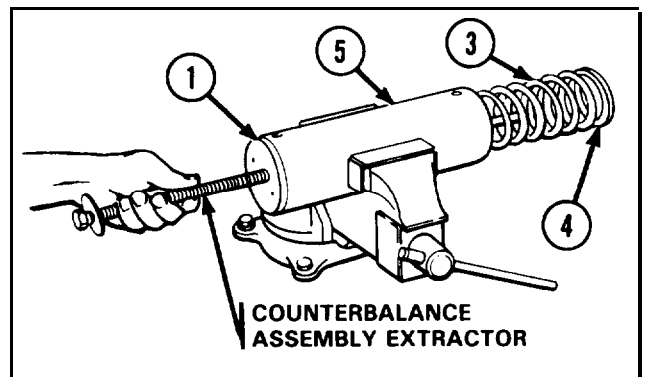
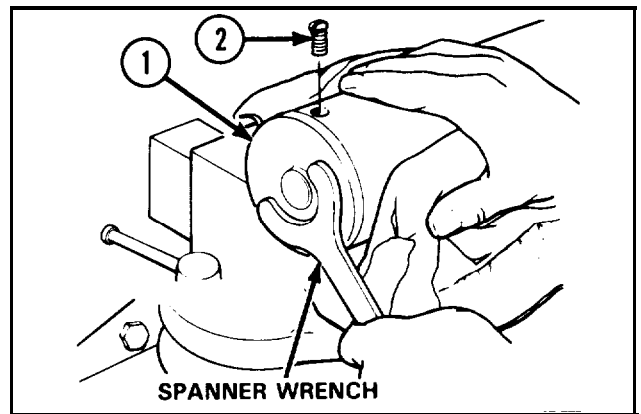


INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 If linear actuating cylinder head is damaged, repair is by replacement of next higher assembly.
- 3 If counterbalance cylinder is damaged, repair is by replacement of next higher assembly.
- 4 If cylinder head is damaged, repair is by replacement of next higher assembly.
- 5 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

REASSEMBLY

- 1 Using spanner wrench, install linear actuating cylinder head (1) and install setscrew (2).
- 2 Position spring (3) and equilibrator counterbalance piston (4) in counterbalance cylinder (5).
- 3 Install counterbalance assembly extractor through linear actuating cylinder head (1) and into equilibrator counterbalance piston (4).



WARNING

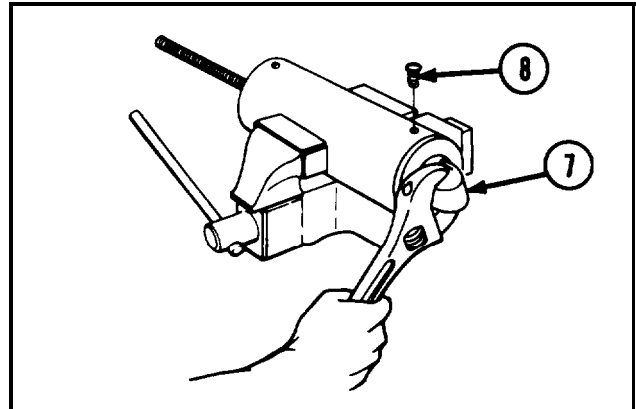
Assembly contains springs under high tension. Use caution during removal or installation.

- 4 Tighten counterbalance assembly extractor nut (6) to compress spring (3) into counterbalance cylinder (5).

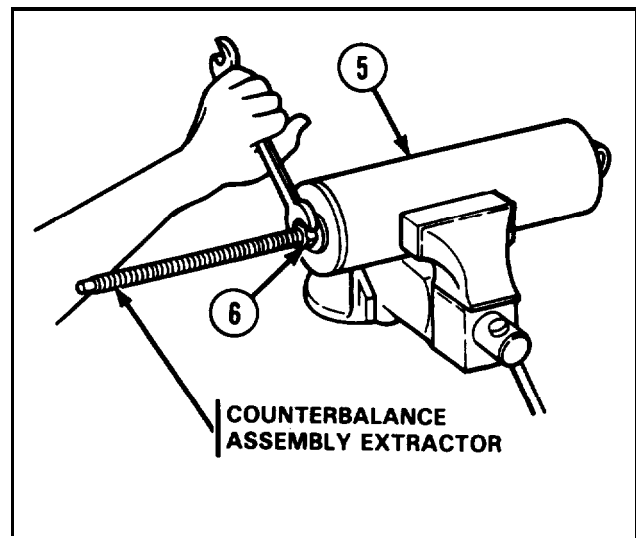
2-25. MAINTENANCE OF COUNTERBALANCE ASSEMBLY (CONT).

REASSEMBLY (CONT)

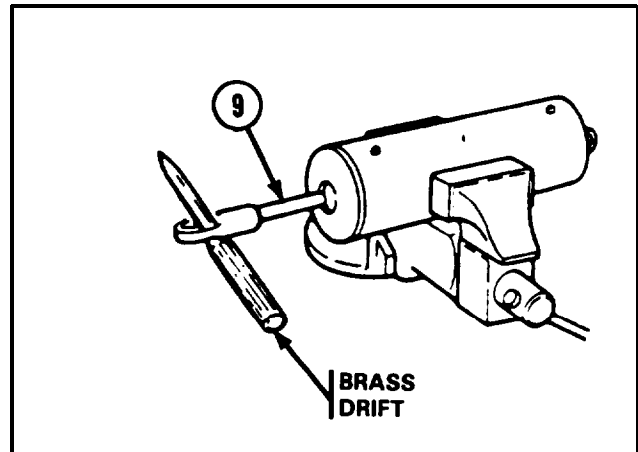
5 Install cylinder head (7) and setscrew (8).



6 Loosen counterbalance assembly extractor nut (6) to relieve spring tension inside counterbalance cylinder (5) and remove counterbalance assembly extractor.



7 Install piston rod assembly (9) using brass drift.



2-26. MAINTENANCE OF M174 GUN MOUNT.

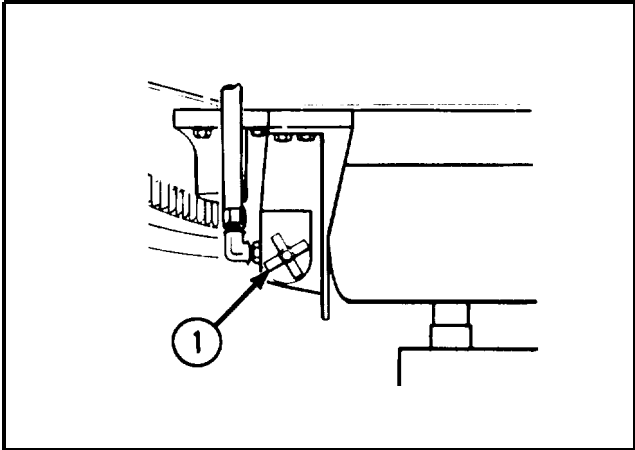
<p>This task covers:</p>	<p>a. <i>Relieving Hydraulic Pressure</i> b. <i>Removal</i> c. <i>Inspection/Repair</i></p>	<p>d. <i>Installation</i> e. <i>Applying Hydraulic Pressure</i></p>
<p>INITIAL SETUP</p>		
<p><i>Tools and Special Tools</i></p> <p>Artillery maintenance shop equipment (SC 4933-95-CL-A12) Breaker bar Sling (3 point) 3/4" Drive 1-7/8" socket 6" Extension</p> <p>Blocks Ordnance artillery and turret mechanic's tool kit (SC 5180-CL-95-A12) Steel horses Torque wrench (A-A-2411) (0 to 1000 lb)</p> <p><i>Materials/Parts</i></p> <p>Cotter pin (MS24665-372) Lockwasher (2) (MS35338-44) Lockwasher (2) (MS35338-46) Lockwasher (4) (MS35338-55) Nut (2) (MS51968-35)</p> <p><i>References</i></p> <p>TM 9-2350-304-20-2 TM 9-2350-304-24P-2</p> <p><i>Equipment Conditions</i></p> <p>Fire control items and related parts removed (TM 9-2350-304-20-2)</p>	<p>Nitrogen pressure reduced to zero (TM 9-2350-304-20-2) 2-37 M201A1 cannon assembly removed</p> <p><i>General Safety Instructions</i></p>	
		<div style="border: 2px solid black; padding: 5px; width: fit-content; margin: 0 auto;">WARNING</div> <ul style="list-style-type: none"> ● Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as level ground as possible. This will stop the cannon from sliding out of battery. ● Hydraulic system is under high pressure. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid. ● Before removing M174 gun mount and trunnion caps with equilibrator installed, equilibrator nitrogen pressure must be reduced to zero to prevent injury.

RELIEVING HYDRAULIC PRESSURE

WARNING

Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as level ground as possible. This will stop the cannon from sliding out of battery.

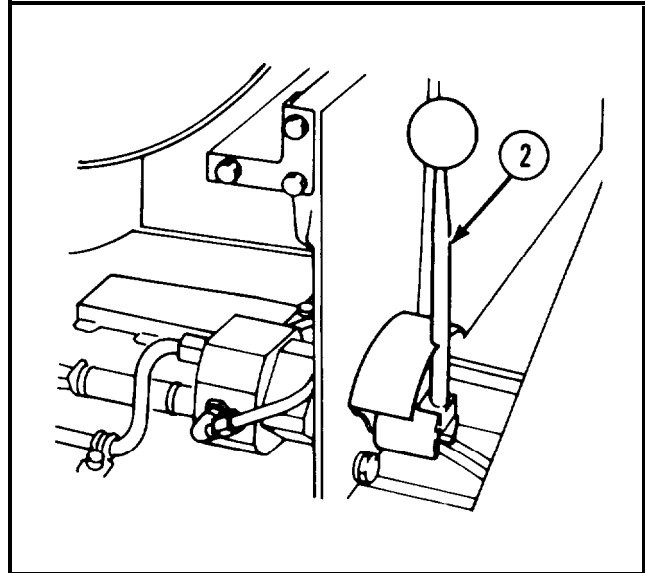
- 1 Set MASTER switch to OFF and open globe angle valve (1).



2-26. MAINTENANCE OF M174 GUN MOUNT (CONT).

RELIEVING HYDRUALIC PRESSURE (CONT)

- 2 Hold manual control lever (2) in RETURN for 1 minute, then in RETRACT for 1 minute.



REMOVAL

WARNING

Hydraulic system is under high pressure. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

NOTE

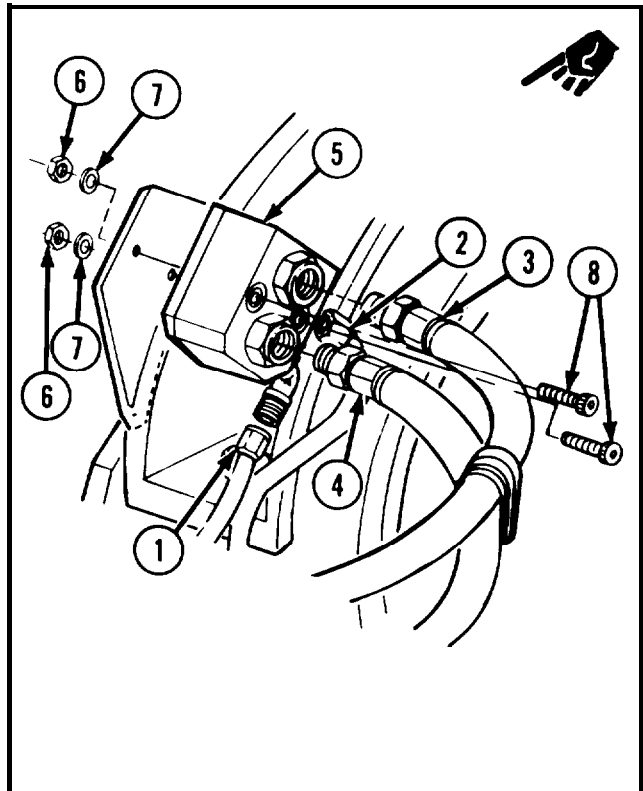
Ends of hydraulic lines must be capped after disconnection or removal.

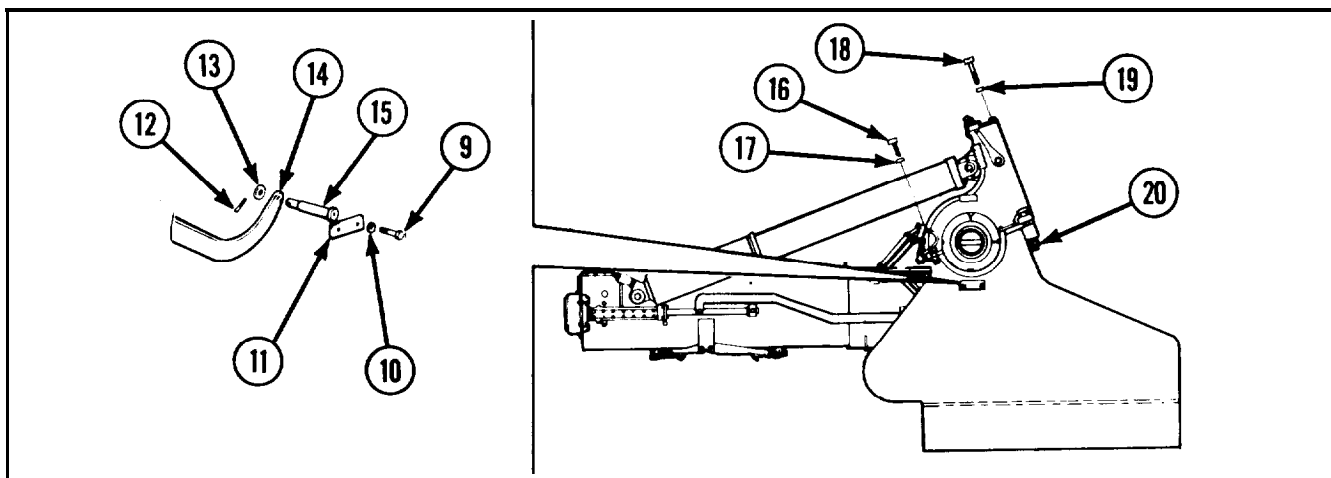
- 1 Remove two tube assemblies (1 and 2)
For complete disassembly of hydraulic lines and fittings, refer to page 2-27.
- 2 Disconnect two hose assemblies (3 and 4) from multiple connector (5) on left trunnion cap.

NOTE

Removal of hose assemblies is not necessary for removal of M174 gun mount.

- 3 If damaged, remove hose assemblies (3 and 4). For complete disassembly of hydraulic lines and fittings, refer to page 2-27.
- 4 Remove two hex nuts (6), two lockwashers (7), two capscrews (8), and multiple connector 5).





WARNING

Before removing M174 gun mount and trunnion caps with equilibrator installed, equilibrator nitrogen pressure must be reduced to zero to prevent injury.

NOTE

M174 gun mount must be out of travel lock.

- 5 Remove two capscrews (9), two lockwashers (10), and link pin retaining plate (11).
- 6 Remove cotter pin (12), flat washer (13), and disconnect recoil connecting link (14) from headed link shoulder pin (15).
- 7 Using 3/4" drive 1-7/8" socket, 6" extension, and breaker bar, remove capscrew (16) and lockwasher (17) from each trunnion cap.

CAUTION

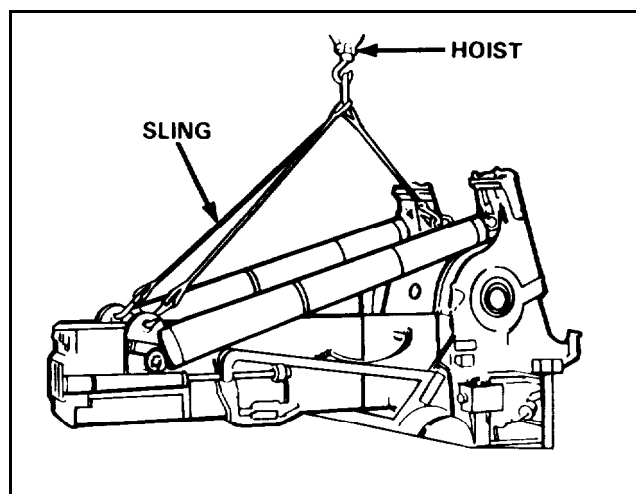
Be sure all previous steps have been followed before proceeding to step 8.

- 8 Using 3/4" drive 1-7/8" socket, 6" extension, and breaker bar, remove machine bolt (18), lockwasher (19), and nut (20) from each trunnion cap.

CAUTION

- When removing M174 gun mount, be sure M174 gun mount clears elevating final drive gears and arc.
- Make sure recoil connecting link is fastened against M174 gun mount to prevent damage to recoil connecting link.

- 9 Install sling using a hoist of at least 6000 lb (2722 kg) capacity.



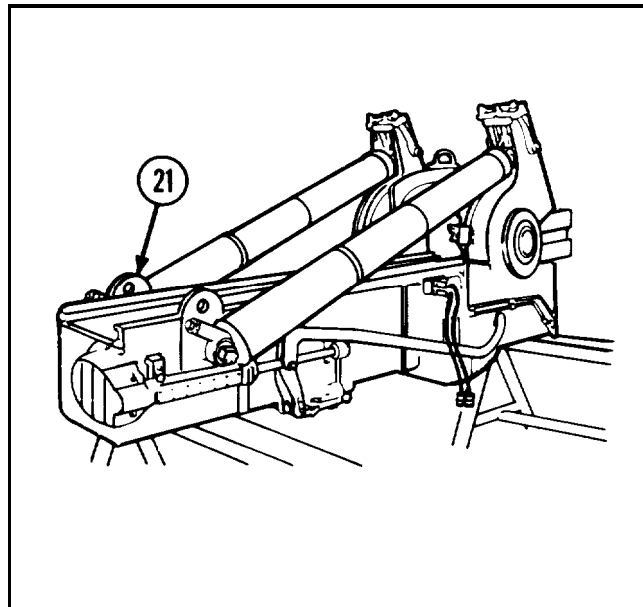
2-26. MAINTENANCE OF M174 GUN MOUNT (CONT).

REMOVAL (CONT)

NOTE

It may be necessary to use elevating handle to elevate weapon to disengage gears.

- 10 Lift M174 gun mount (21) from turret and position on blocks or heavy steel horses (6000 lb (2722 kg) minimum capacity).
- 11 Remove sling.
- 12 Clean and service gun ways.

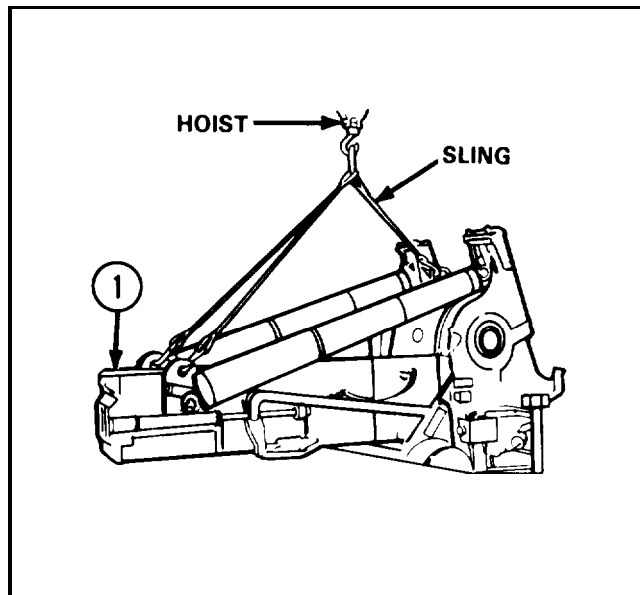


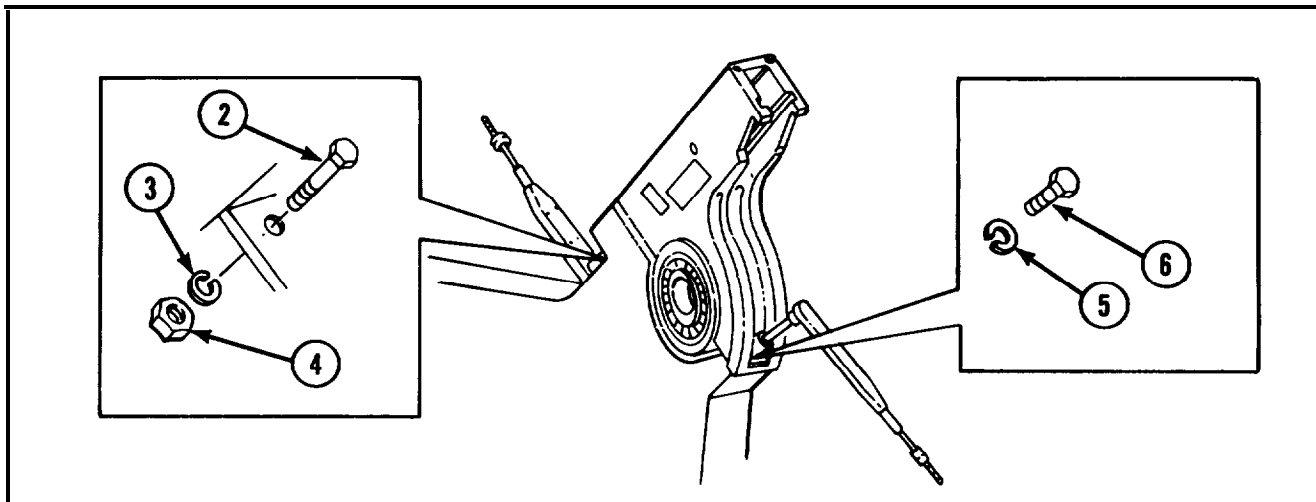
INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 M174 gun mount is a repairable assembly, refer to pages 2-57 thru 2-109.
- 3 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

INSTALLATION

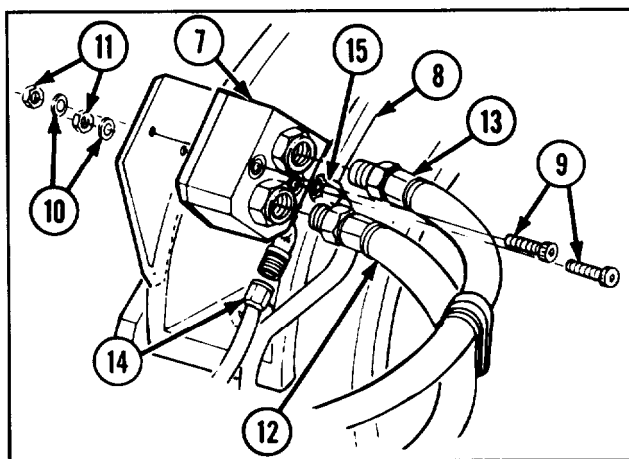
- 1 Install sling using a hoist with at least 6000 lb (2722 kg) capacity.
- 2 Lift M174 gun mount (1) onto turret.





- 3 Install machine bolt (2), new lockwasher (3), and new nut (4) in each trunnion cap. Torque nuts to 900 to 930 ft-lb (1220 to 1261 N-m).
- 4 Install new lockwasher (5) and capscrew (6) in each trunnion cap. Torque capscrews to 900 to 930 ft-lb (1220 to 1261 N-m).

- 5 Install multiple connector (7) on left trunnion cap (8), and secure using two capscrews (9), two new lockwashers (10), and two hex nuts (11).

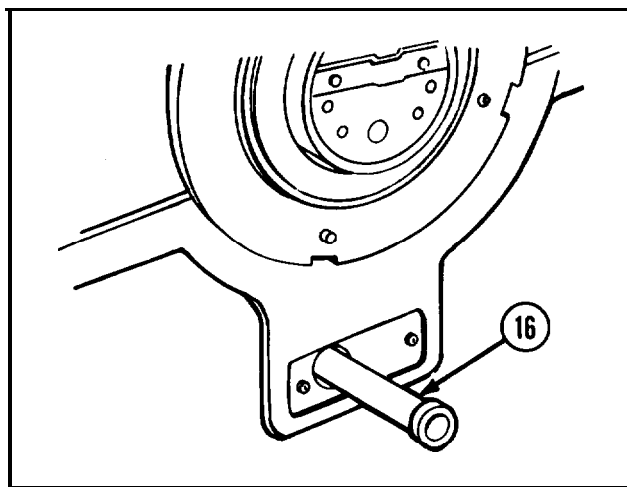


- 6 If removed, install new hose assemblies (12 and 13). For complete reassembly of hydraulic lines and fittings, refer to page 2-27.

- 7 Connect two hose assemblies (12 and 13) to multiple connector (7) on left trunnion cap.

- 8 Install tube assemblies (14 and 15). Refer to page 2-27 for complete reassembly of hydraulic lines and fittings.

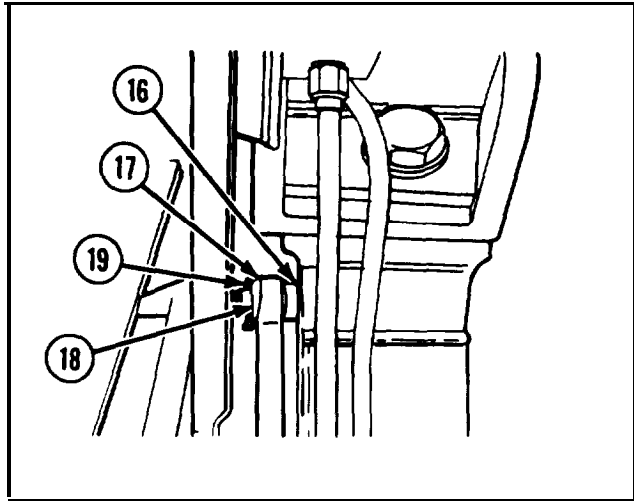
- 9 Install headed link shoulder pin (16) in left side of turret below trunnion cap.



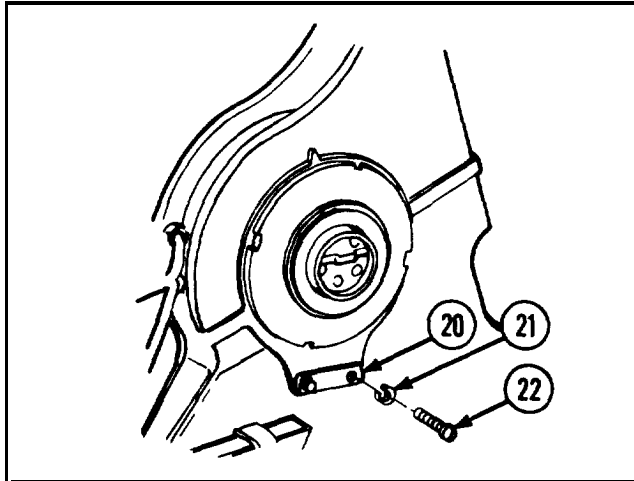
2-26. MAINTENANCE OF M174 GUN MOUNT (CONT).

INSTALLATION (CONT)

- 10 Install recoil connecting link (17) on headed link shoulder pin (16).
- 11 Install flat washer (18) and new cotter pin (19).

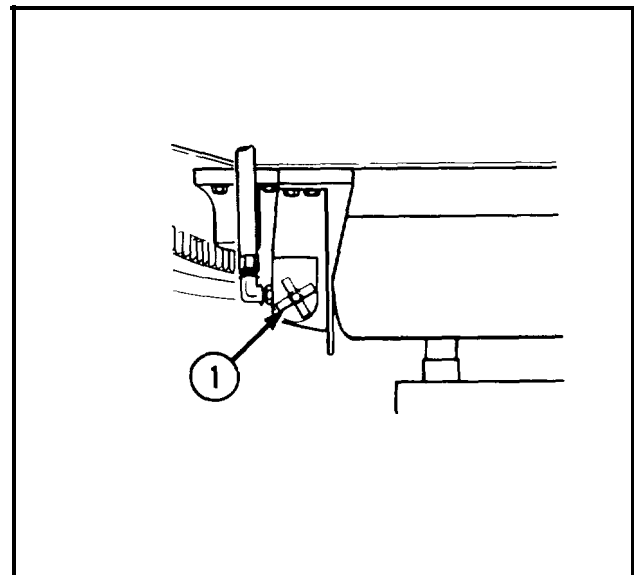


- 12 Install retaining plate (20), two new lockwashers (21), and two capscrews (22).
- 13 If new M174 gun mount is installed, install and align new gun sight adapters (page 2-84) and align M140 mounts (refer to TM 9-2350-238-20-2).



APPLYING HYDRAULIC PRESSURE

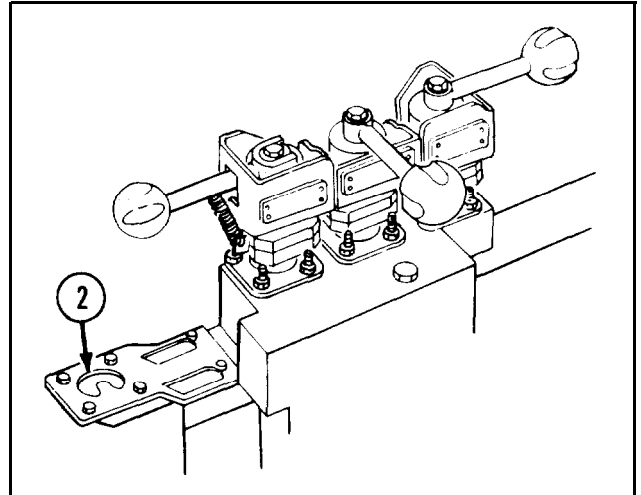
- 1 Close globe angle valve (1).
- 2 Start engine.



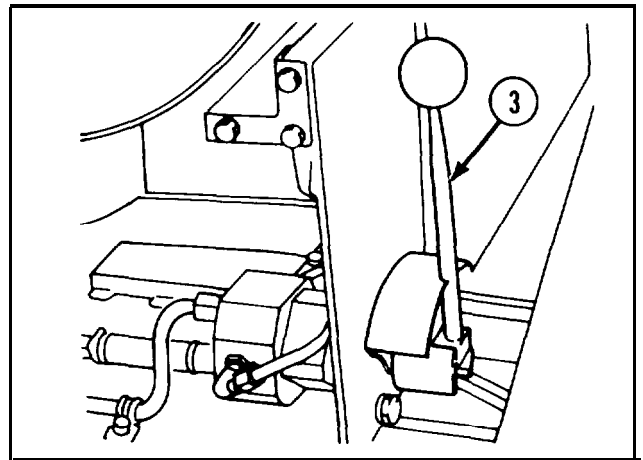
NOTE

Hydraulic motor and pump may be used to apply pressure to hydraulic system without starting engine by setting MASTER switch and OIL PUMP MOTOR Switch ON.

- 3 Set HYD PUMP/PTO CLUTCH switch to ON.
- 4 Check dial assembly pressure gage (2) indication. Normal pressure is 1600 to 2400 psi (11,032 to 16,548 kPa).
- 5 Stop engine.



- 6 Move manual control lever (3) to RETRACT, then to RETURN, then back to RETRACT several times to bleed air from system.



2-27. MAINTENANCE OF GUN MOUNT-EQUILIBRATOR ADJUSTING PARTS.

This task covers:	<ul style="list-style-type: none"> a. Removal b. Disassembly c. Inspection/Repair 	<ul style="list-style-type: none"> d. Reassembly e. Installation
INITIAL SETUP		
<i>Tools and Special Tools</i>		
Eye bearing replacer (10904217)		Lockwasher (2) (MS35338-48)
Ordnance artillery and turret mechanic's tool kit (SC 5180-95-CL-A12)		Lockwasher (MS35338-53)
<i>Materials/Parts</i>		
Cotter pin (MS24665-359)		<i>References</i>
Dowel		TM 9-2350-304-24P-2
Felt washer (2) (5019809)		<i>Equipment Conditions</i>
Grease (Item 12, appx B)		2-77 Pneumatic equilibrator assemblies removed
		Travel lock is engaged

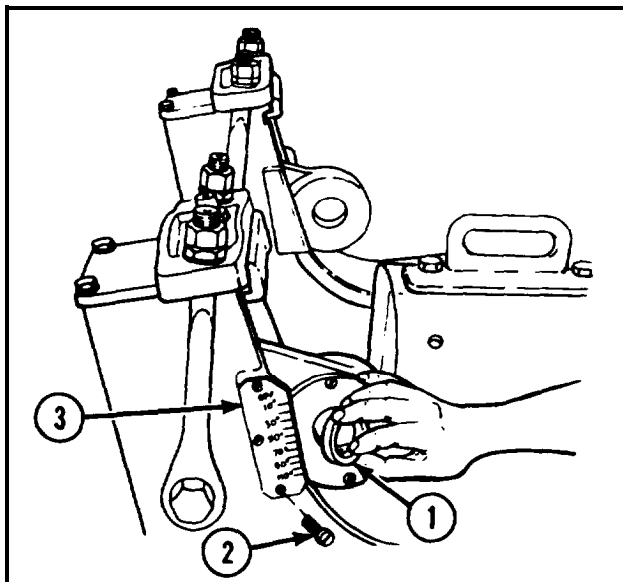
2-27. MAINTENANCE OF GUN MOUNT-EQUILIBRATOR ADJUSTING PARTS (CONT).

REMOVAL

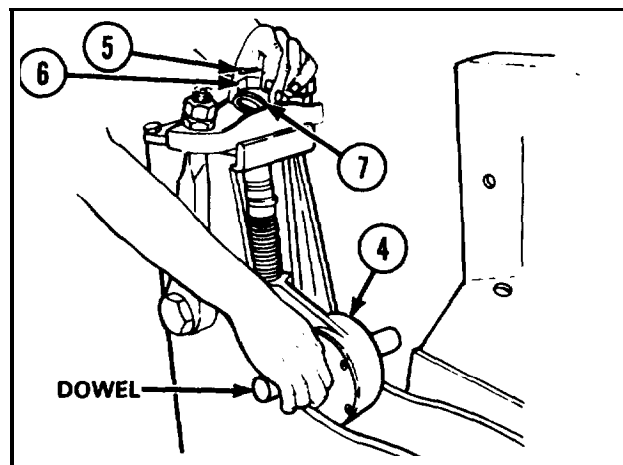
NOTE

The gun mount does not need to be removed to perform the following procedures.

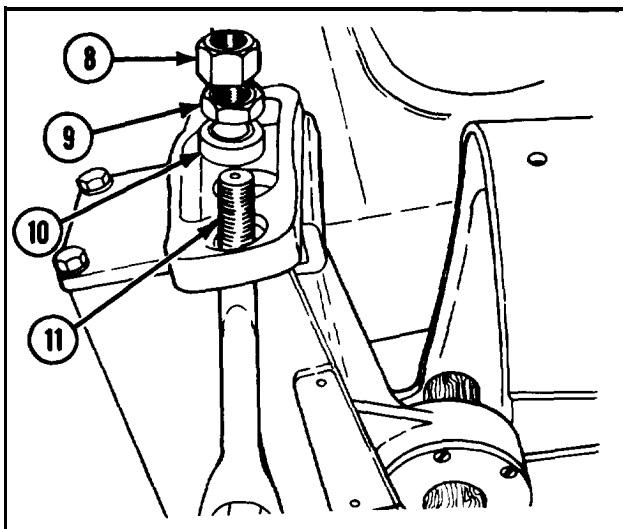
- 1 Remove ring spacer (1).
- 2 Remove three machine screws (2) and temperature scale dial (3).



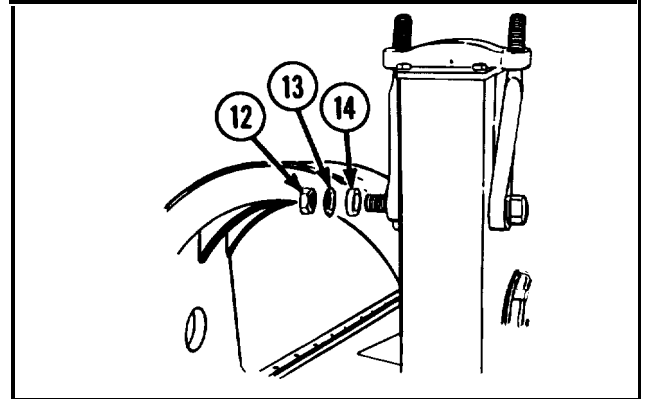
- 3 Insert dowel through shaft to support guide (4).
- 4 Remove cotter pin (5), castellated nut (6), and flat washer (7).



- 5 Remove two hex nuts (8), two hex nuts (9), and two sleeve spacers (10) from two eyebolts (11).



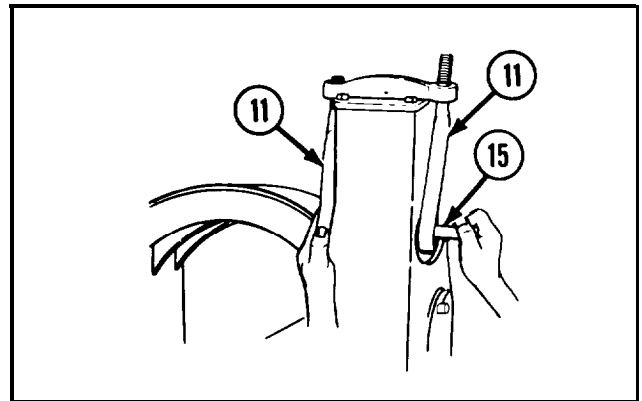
- 6 Remove hex nut (12), lockwasher (13), and sleeve spacer (14).



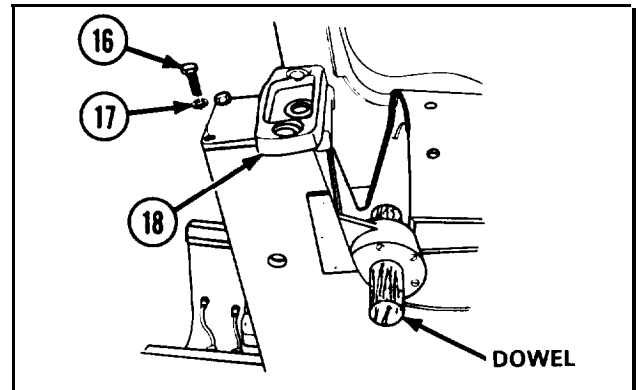
NOTE

Support two eyebolts as you remove machine bolt.

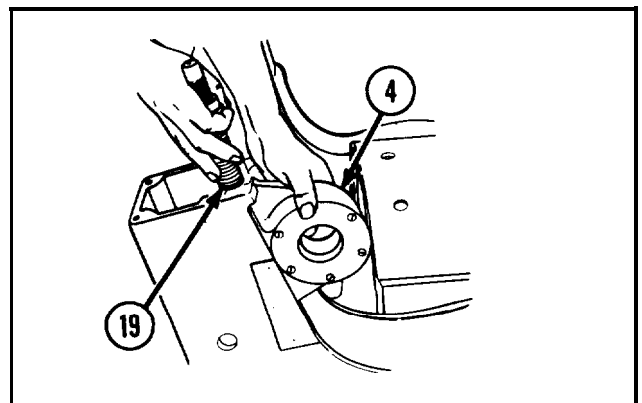
- 7 Remove machine bolt (15) and two eyebolts (11).



- 8 Remove two capscrews (16), two lockwashers (17), and trunnion bearing cover (18).



- 9 Remove dowel from guide (4) and adjusting plug (19).



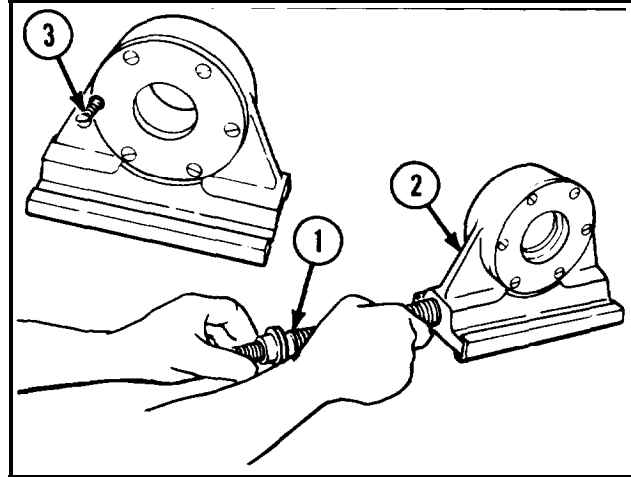
2-27. MAINTENANCE OF GUN MOUNT-EQUILIBRATOR ADJUSTING PARTS (CONT).

DISASSEMBLY

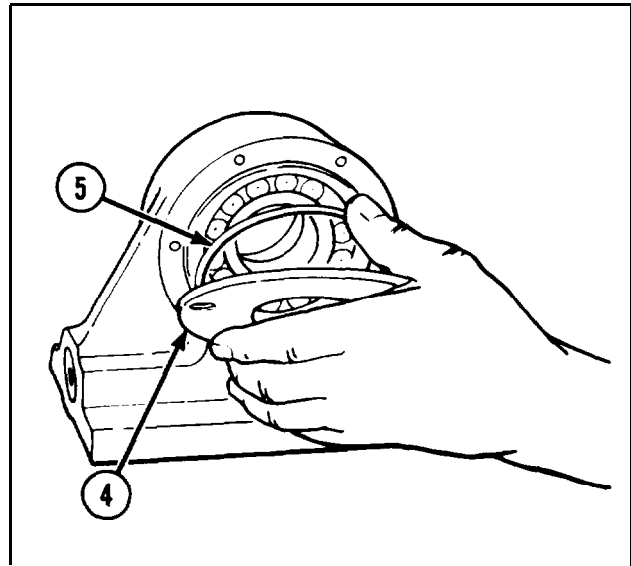
NOTE

Steps 1 thru 5 are written and illustrated for one guide but apply to both.

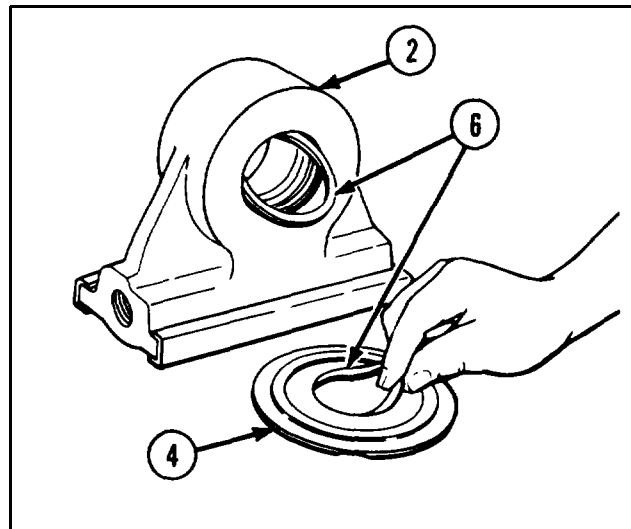
- 1 Unscrew and remove adjusting plug (1) from guide (2).
- 2 Remove six machine screws (3).



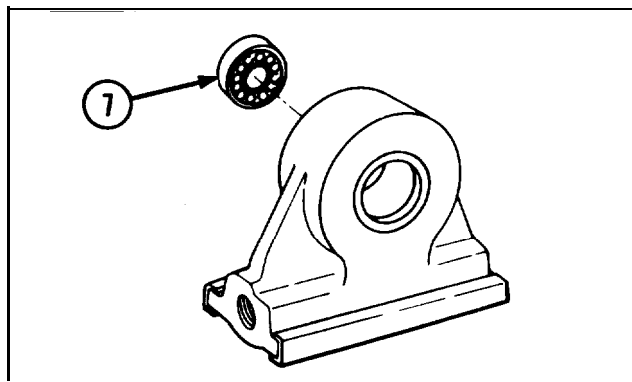
- 3 Remove equilibrator trunnion retainer (4) and ring spacer (5).



- 4 Remove two mechanical felt washers (6) from equilibrator trunnion retainer (4) and guide (2).



5 Using drift, remove roller bearing (7).



INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

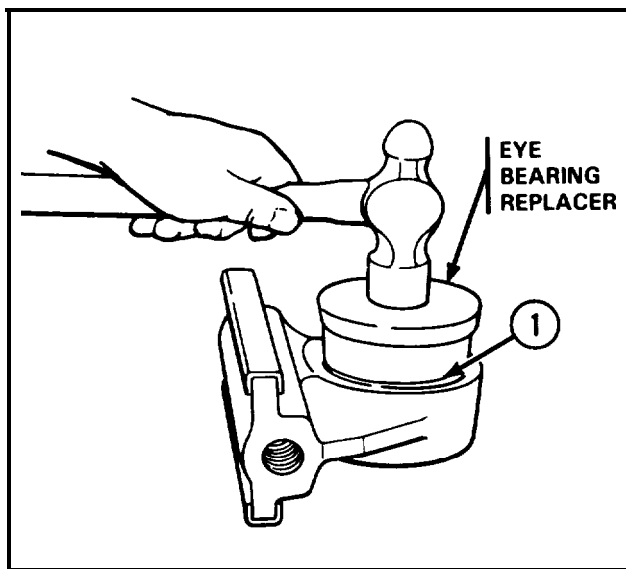
REASSEMBLY

NOTE

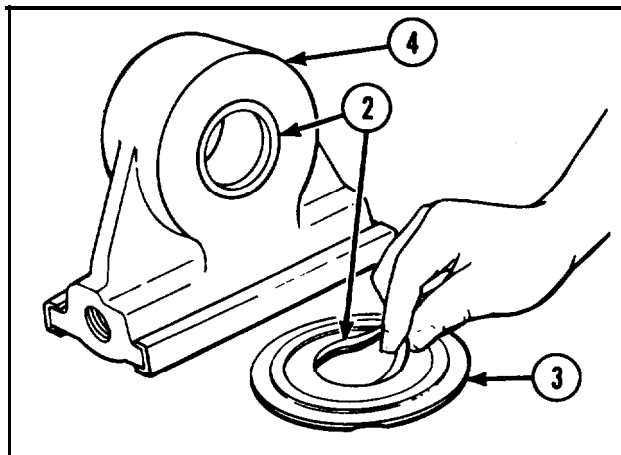
Steps 1 thru 5 are written and illustrated for one guide but apply to both.

Roller bearing must be packed with grease (item 12, appx B) before installation.

- 1 Using eye bearing replacer, install roller bearing (1).



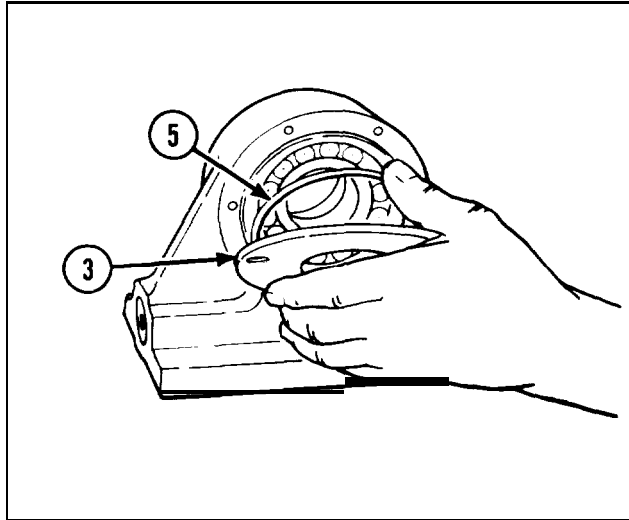
- 2 Install two new mechanical felt washers (2) in equilibrator trunnion retainer (3) and guide (4).



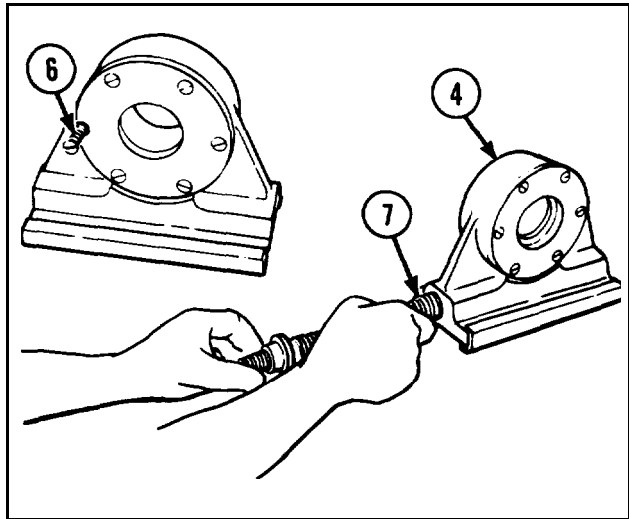
2-27. MAINTENANCE OF GUN MOUNT-EQUILIBRATOR ADJUSTING PARTS (CONT).

REASSEMBLY (CONT)

- 3 Install ring spacer (5) and equilibrator trunnion retainer (3).



- 4 Install six machine screws (6).
5 Install adjusting plug (7) in guide (4).

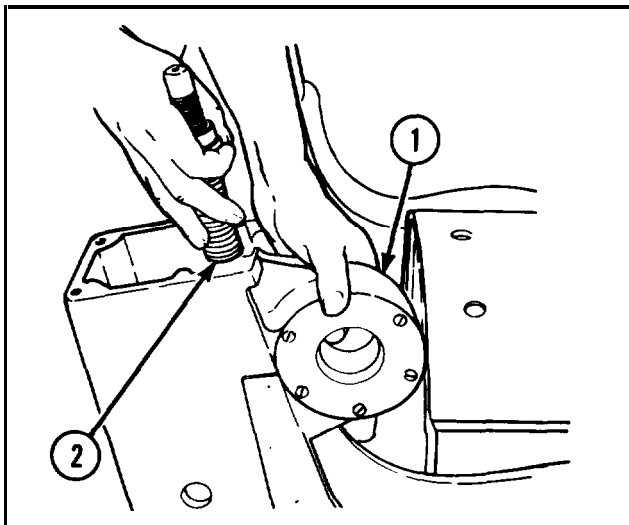


INSTALLATION

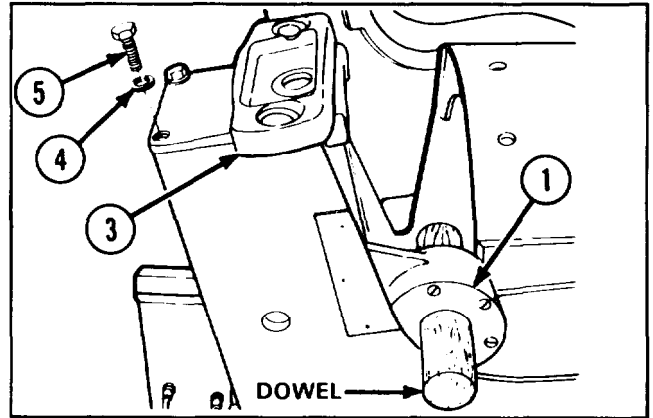
NOTE

The following steps are written and illustrated for one trunnion but apply to both.

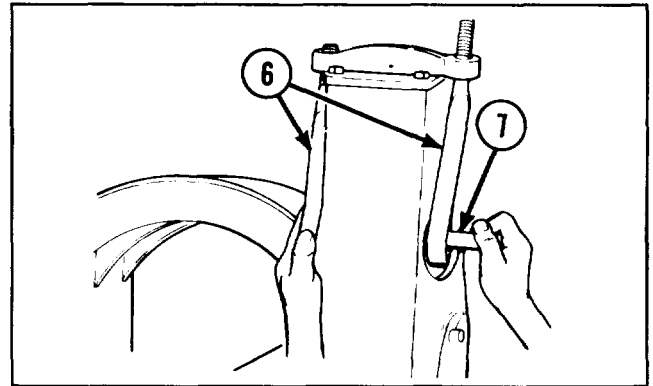
- 1 Install guide (1) with adjusting plug (2).



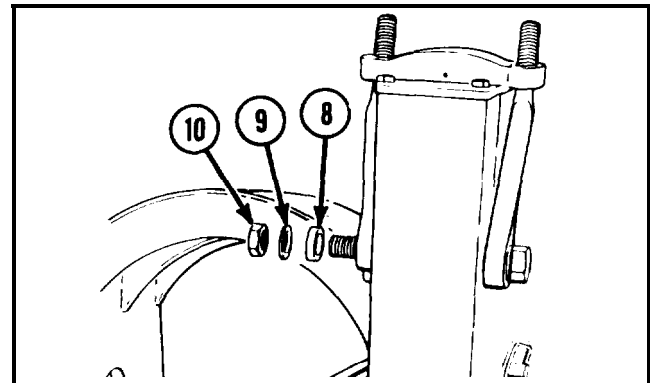
- 2 Insert dowel through shaft hole to support guide (1).
- 3 Install trunnion cover (3), two new lockwashers (4), and two capscrews (5).



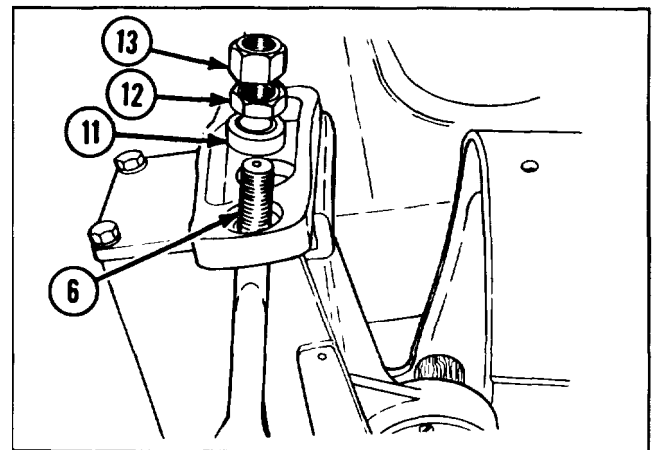
- 4 Install two eyebolts (6) and machine bolt (7).



- 5 Install sleeve spacer (8), new lockwasher (9), and hex nut (10).



- 6 Install two sleeve spacers (11), two hex nuts (12), and two hex nuts (13) on two eyebolts (6).

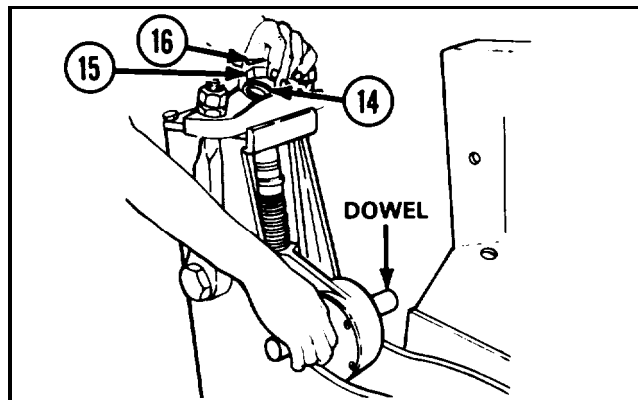


2-27. MAINTENANCE OF GUN MOUNT-EQUILIBRATOR ADJUSTING PARTS (CONT).

INSTALLATION (CONT)

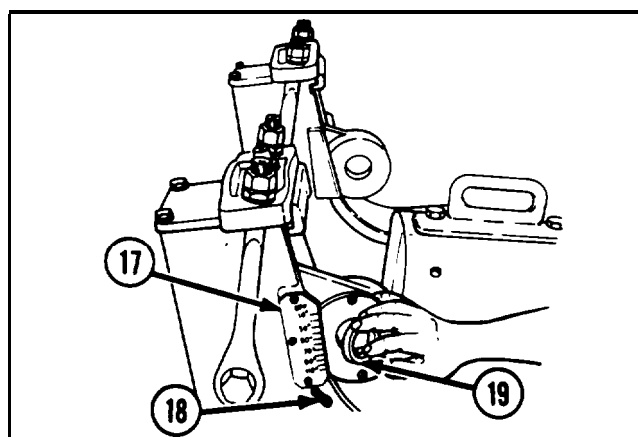
7 Install flat washer (14), castellated nut (15), and new cotter pin (16).

8 Remove dowel.



9 Install temperature scale dial (17) and three machine screws (18).

10 Install ring spacer (19).



2-28. MAINTENANCE OF GUN MOUNT-LEFT AND RIGHT TRUNNION CAPS AND BEARINGS.

This task covers:

- | | |
|-----------------------|-----------------------------|
| <i>a. Service</i> | <i>d. Inspection/Repair</i> |
| <i>b. Removal</i> | <i>e. Reassembly</i> |
| <i>c. Disassembly</i> | <i>f. Installation</i> |

INITIAL SETUP

Tools and Special Tools

- Cinch rope
- Hoist, 2000 lb (907 kg) lifting capability
- Ordnance artillery and turret mechanic's tool kit (SC 5180-95-CL-A12)
- Sling
- Spanner wrench (5507360)
- Spanner wrench (10919860)

- Lockwasher (2) (MS35338-55)
- Seal (MS51000-180-2)
- Seal (6171105)
- Wood block

References

TM 9-2350-304-24P-2

Equipment Conditions

- 2-77 Pneumatic equilibrator assemblies removed
- 2-57 Gun mount removed

Materials/Parts

- Dry cleaning solvent (item 8, appx B)
- Grease (Item 12, appx B)

SERVICE

WARNING

Dry cleaning solvent (SD21 is toxic and flammable. Wear protective goggles and gloves and use only in well-ventilated areas.

When notified by unit maintenance to perform 18 month trunnion bearing service, remove, disassemble, clean, and lubricate the left and right trunnion caps and bearings. Clean the trunnion caps and bearings with dry cleaning solvent (item 8, appx B). Repack bearing with grease (item 12, appx B) and reinstall. Replace oil seal.

REMOVAL

NOTE

The following procedures are written for the right trunnion cap, but also apply to the left trunnion cap.

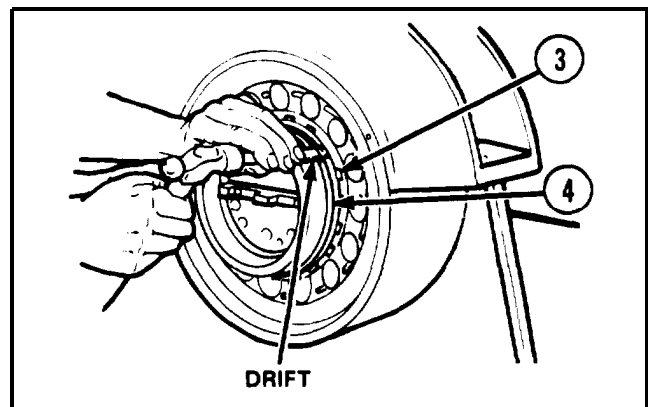
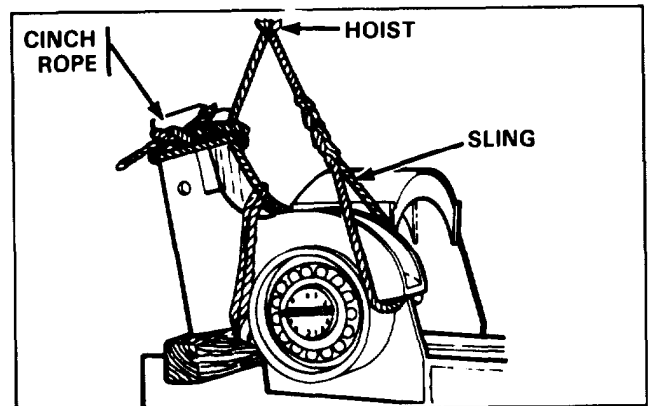
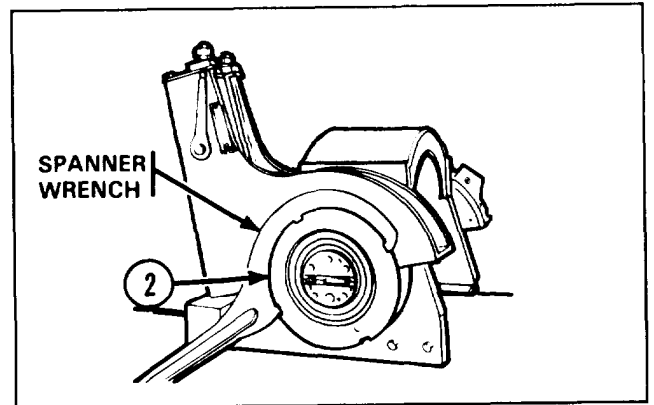
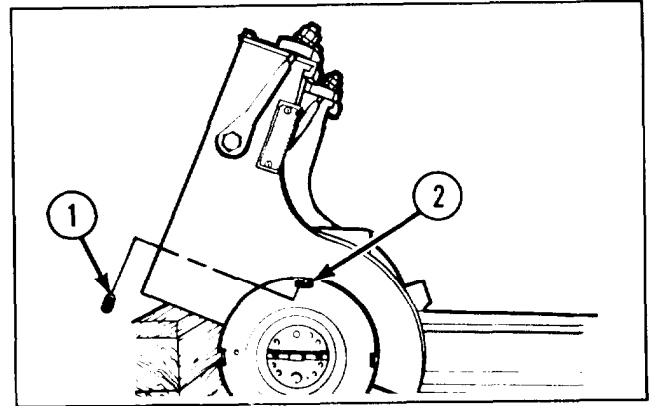
- 1 Remove setscrew (1) from bearing cap (2).

NOTE

Right hand bearing cap has longer threaded body than left hand bearing cap. Caps are not interchangeable.

- 2 Remove bearing cap (2) using spanner wrench.
- 3 Install sling and cinch rope using hoist with 2000 lb (907 kg) lifting capability.

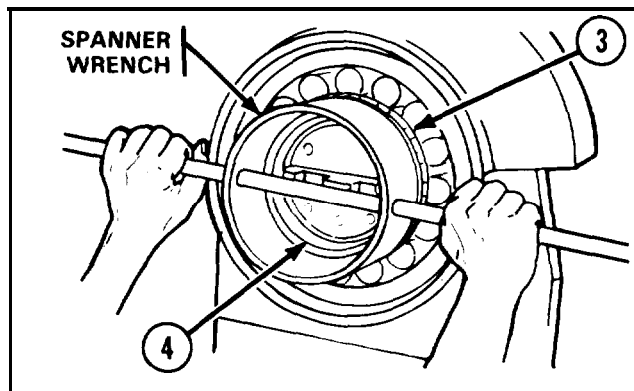
- 4 Bend tab stop on key washer (3) to release nut (4).



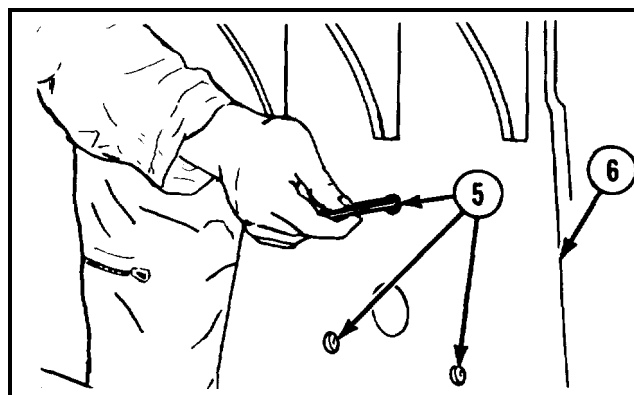
2-28. MAINTENANCE OF GUN MOUNT-LEFT AND RIGHT TRUNNION CAPS AND BEARINGS (CONT).

REMOVAL (CONT)

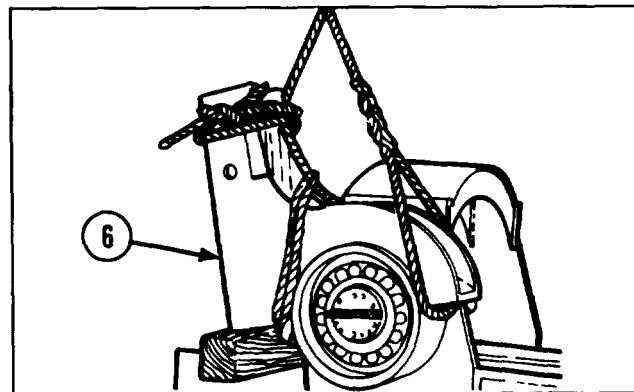
5 Remove nut (4) and key washer (3) using spanner wrench.



6 Turn three setscrews (5) clockwise equal turns to break trunnion cap (6) loose from cradle mount assembly.



7 Remove trunnion cap (6).

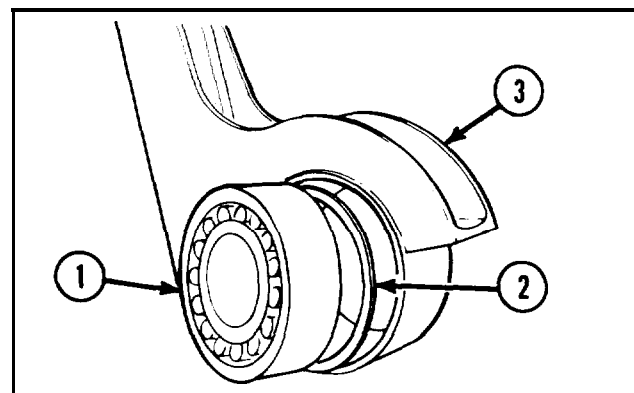


DISASSEMBLY

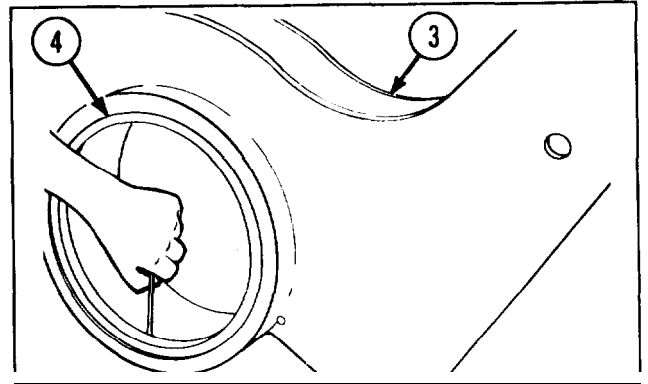
NOTE

Ring spacer is used only on the right trunnion cap.

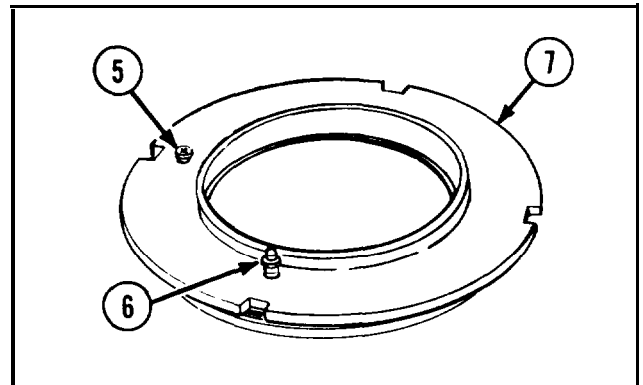
1 Remove roller bearing (1) and ring spacer (2) from trunnion cap (3).



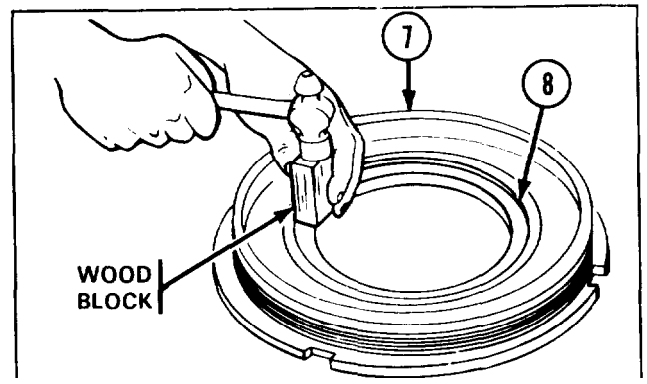
2 Remove seal (4) from trunnion cap (3).



3 Remove safety relief valve (5) and lubrication fitting (6) from bearing cap (7).



4 Using wood block, remove seal (8) from bearing cap (7).



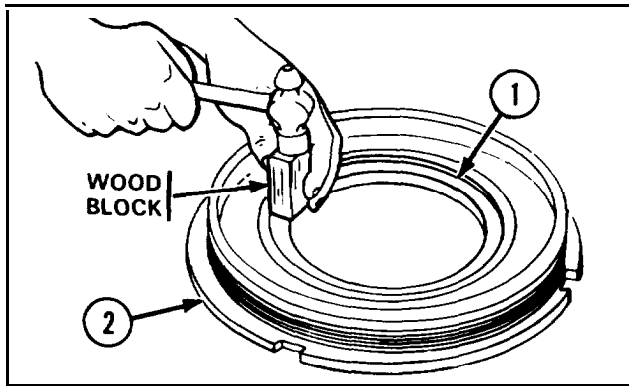
INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

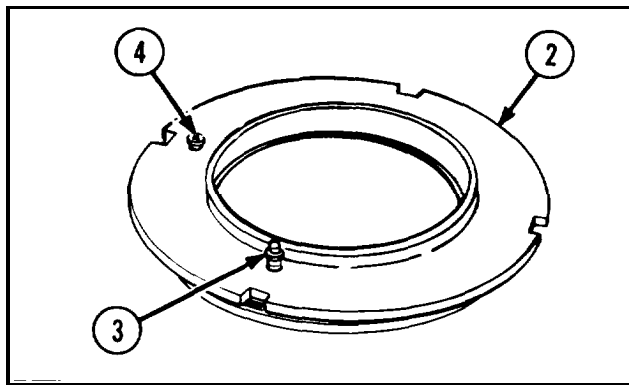
2-28. MAINTENANCE OF GUN MOUNT-LEFT AND RIGHT TRUNNION CAPS AND BEARINGS (CONT).

REASSEMBLY

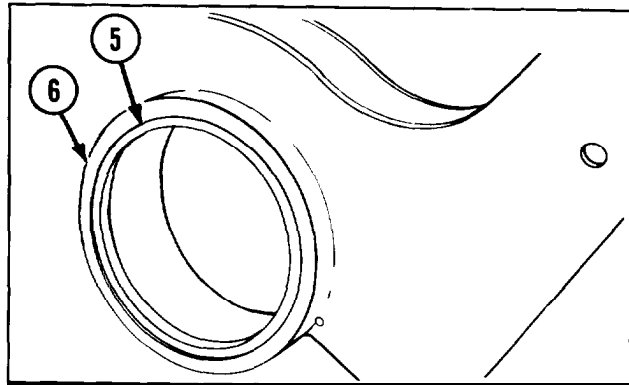
1 Using wood block, install new seal (1) in bearing cap (2).



2 Install lubrication fitting (3) and safety relief valve (4) to bearing cap (2).



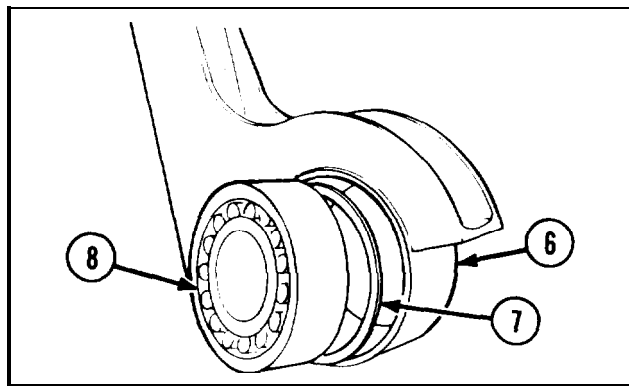
3 Install new seal (5) in trunnion cap (6).



NOTE

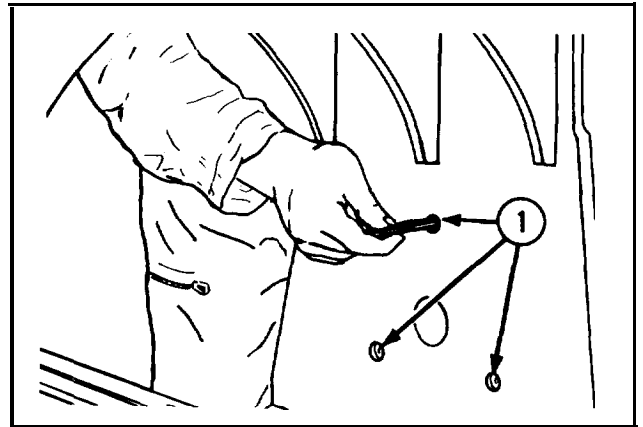
- Roller bearing must be packed with grease (Item 12, appx B) before installation.
- Ring spacer is used only on the right trunnion cap.

4 Install ring spacer (7) and roller bearing (8) in trunnion cap (6).

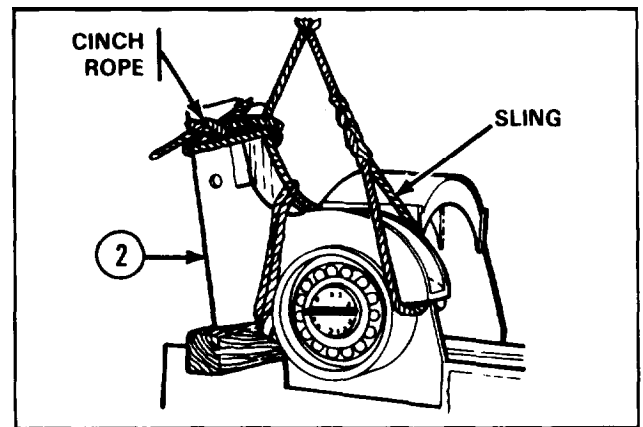


INSTALLATION

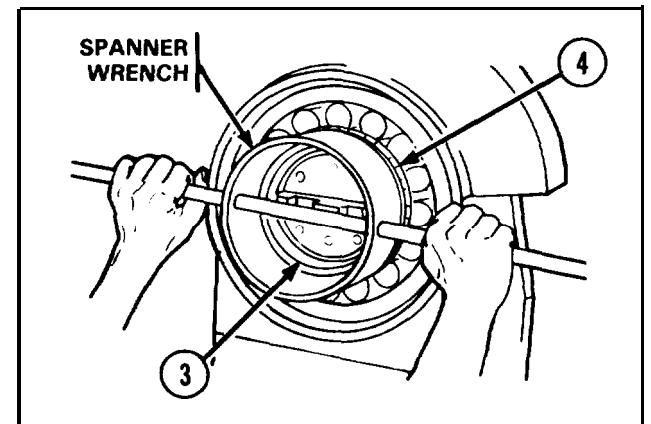
- 1 Turn three setscrews (1) counterclockwise to make them flush with outside of cradle mount assembly or receded inside their holes.



- 2 Install sling and cinch rope using hoist with 2000 lb (907 kg) lifting capability.
- 3 Lift and position trunnion cap (2) on gun mount.



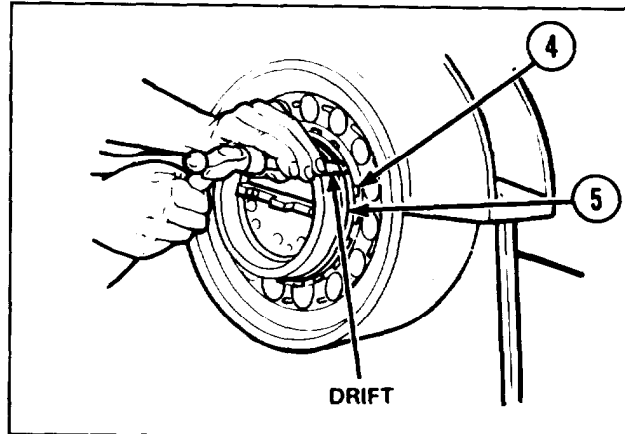
- 4 Install nut (3) and key washer (4) using spanner wrench.



2-28. MAINTENANCE OF GUN MOUNT -LEFT AND RIGHT TRUNNION CAPS AND BEARINGS (CONT).

INSTALLATION (CONT)

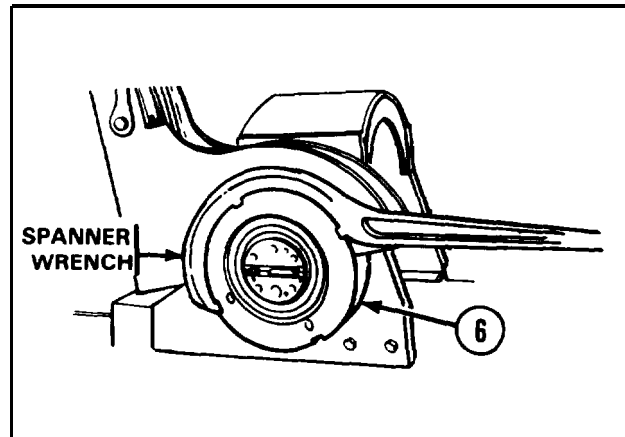
- 5 Bend tab stop on key washer (4) to lock nut (5) in place.



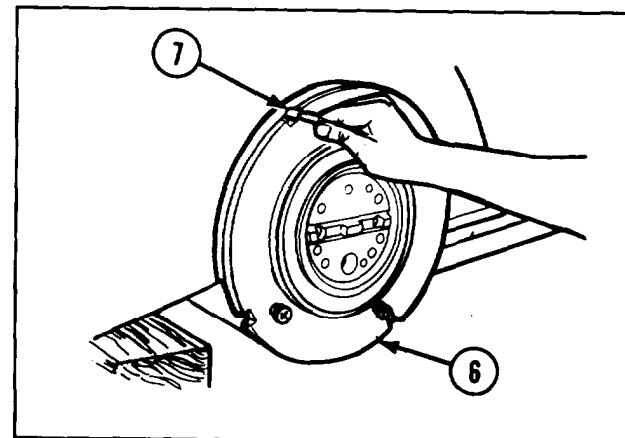
NOTE

Caps are not interchangeable. Right bearing cap has longer threaded body than left bearing cap.

- 6 Install bearing cap (6) using spanner wrench.



- 7 Install setscrew (7) in bearing cap (6).



2-29. MAINTENANCE OF PNEUMATIC EQUILIBRATOR ASSEMBLY.

This task covers:

- a. Removal
- b. Disassembly
- c. Inspection/Repair

- d. Reassembly
- e. Installation

INITIAL SETUP

Tools and Special Tools

Hoist, 2000 lb (907 kg) lifting capability
 Ordnance artillery and turret mechanic's
 tool kit (SC 5180-95-CL-A12)
 Sling
 Torque wrench (A-A-2411)

Materials/Parts

Cotter pin (2) (MSMS24665 628)
 Grease (item 12, appx B)
 Leak detector (item 15, appx B)
 Lockwasher (2) (MS35338-55)

References

TM 9-2350-304-20-2
 TM 9-2350-304-24P-2

Equipment Conditions

Gun mount is installed

General Safety Instructions

WARNING

- Ensure nitrogen gas is removed or pressure is relieved. Failure to do so will cause the equilibrator to retract, causing injury or death to personnel.
- Keep hands clear of equilibrator during removal of shaft. Failure to observe this warning may result in injury to personnel.
- High-pressure nitrogen gas is used in this equipment. Keep face and body clear of release valves. Failure to observe safety precautions may result in injury or death.

REMOVAL

NOTE

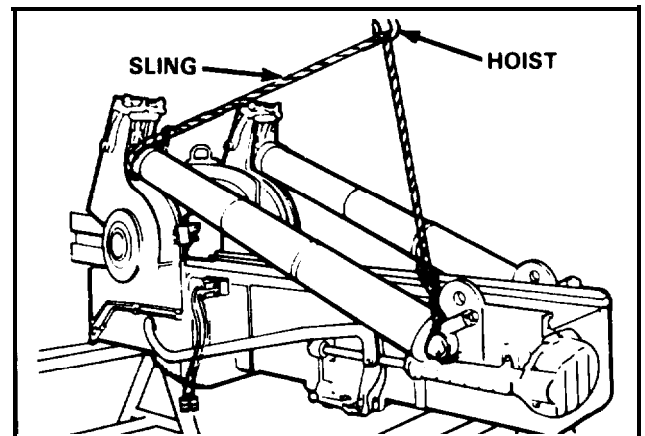
Steps 1 thru 6 are written for one pneumatic equilibrator, but apply to both pneumatic equilibrators.

- 1 Reduce nitrogen pressure to zero. Refer to TM 9-2350-304-20-2.

CAUTION

Exercise care installing sling to avoid damage to pressure relief valve.

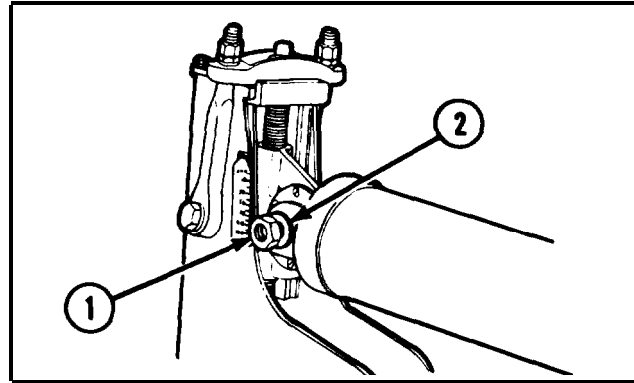
- 2 Install sling using hoist with 2000 lb (907 kg) lifting capability.



2-29. MAINTENANCE OF PNEUMATIC EQUILIBRATOR ASSEMBLY (CONT).

REMOVAL (CONT)

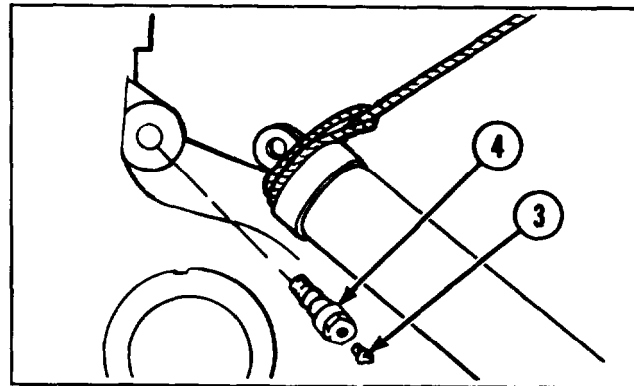
3 Remove hex nut (1) and lockwasher (2).



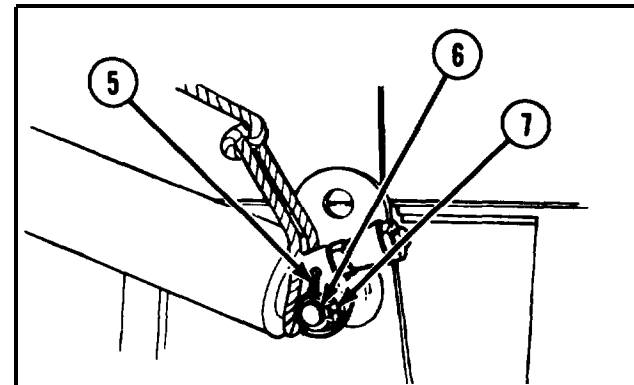
WARNING

- Ensure nitrogen gas is **removed** or pressure is relieved. Failure to do so will cause the equilibrator to retract, causing injury or death to personnel.
- Keep hands clear of equilibrator during removal of shaft. Failure to observe this warning may result in injury to personnel.

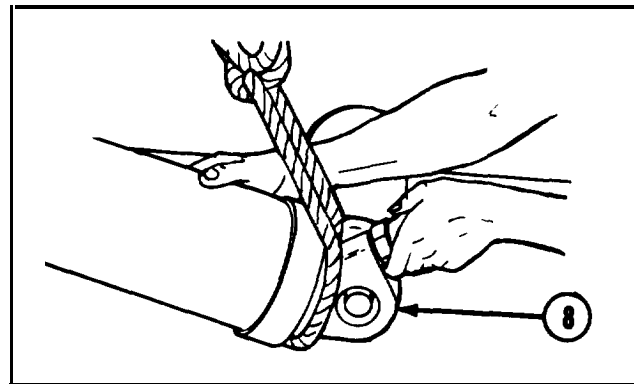
4 Remove lubrication fitting (3) from shouldered shaft (4) and remove shouldered shaft.



5 Remove cotter pin (5), slotted nut (6), and flat washer (7).

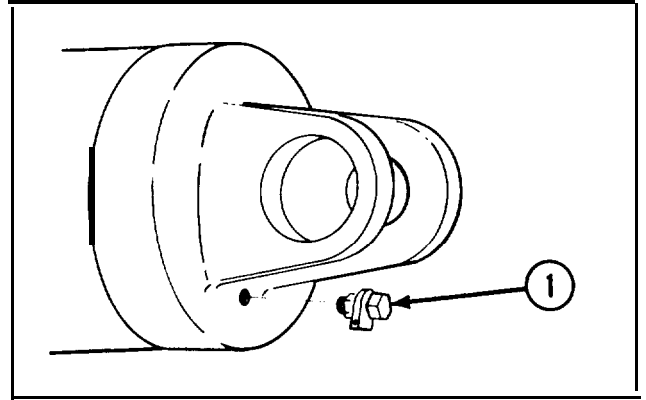


6 Remove pneumatic equilibrator assembly (8).



DISASSEMBLY

Unscrew and remove pressure relief valve (1).

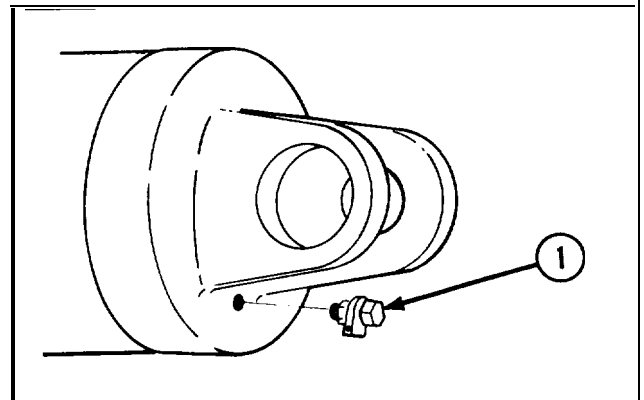


INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

REASSEMBLY

Install pressure relief valve (1).

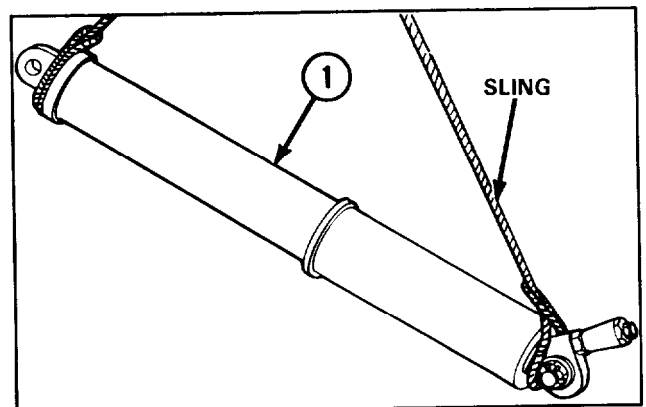


INSTALLATION

CAUTION

Exercise care installing sling to avoid damage to pressure relief valve.

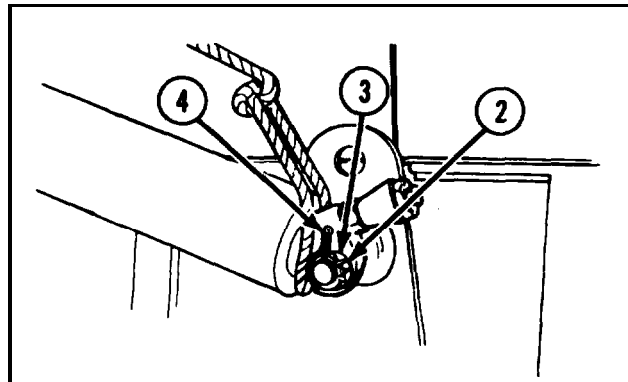
- 1 Install sling using a hoist with 2000 lb (907 kg) lifting capability.
- 2 Raise pneumatic equilibrator assembly (1) into position for installation.



2-29. MAINTENANCE OF PNEUMATIC EQUILIBRATOR ASSEMBLY (CONT).

INSTALLATION (CONT)

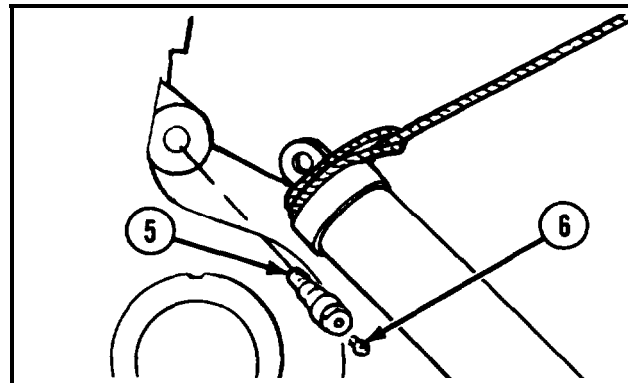
- 3 Install washer (2), slotted nut (3), and new cotter pin (4). Torque slotted nut to 700 to 1300 ft-lb (949 +3 1762 N-m).



NOTE

Lubricate shouldered shaft with grease (item 12, appx B) before installation.

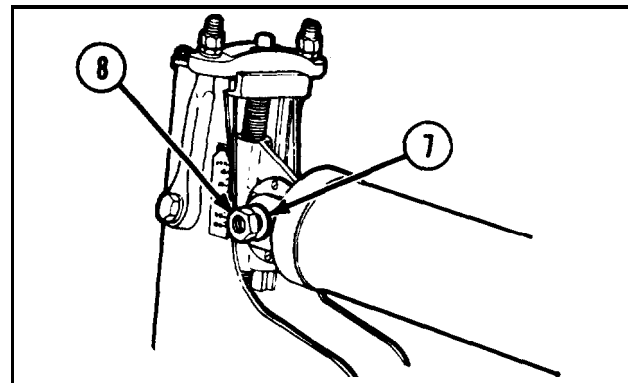
- 4 Install shouldered shaft (5) and lubrication fitting (6). Refer to LO 9-2350-304-12.
- 5 install new lockwasher (7) and nut (8). Torque nut to 580 to 620 ft-lb (786 to 840 N-m).



WARNING

High-pressure nitrogen gas is used in this equipment. Keep face and body clear of release valves. Failure to observe safety precautions may result in injury or death.

- 6 Charge equilibrator to proper nitrogen pressure. Refer to TM 9-2350-304-20-2.
- 7 Apply leak detector (item 15, appx B) around valve and check for leaks.



2-30. MAINTENANCE OF EQUILIBRATOR VALVE ASSEMBLY.

<p>This task covers:</p>	<p>a. <i>Removal</i> b. <i>Disassembly</i> c. <i>Inspection/Repair</i></p>	<p>d. <i>Reassembly</i> e. <i>Installation</i></p>
<p>INITIAL SETUP</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p><i>Tools and Special Tools</i></p> <p>Artillery maintenance shop equipment (SC 4933-95-CL-A12)</p> <p>Torque wrench</p> <p>Gasket remover (figure 14, appx C)</p> <p>Ordnance artillery turret mechanic's tool kit (SC 5180-95-CL-A12)</p> <p><i>Materials/Parts</i></p> <p>Gasket (5021032)</p> <p>Self-locking screw (2) (MS21262-14)</p> <p><i>References</i></p> <p>TM 9-2350-304-20-2</p> <p>TM 9-2350-204-24P-2</p> </div> <div style="width: 45%;"> <p><i>Equipment Conditions</i></p> <p>Pneumatic equilibrator assemblies are installed (TM 9-2350-304-20-2)</p> <p><i>General Safety Instructions</i></p> <div style="border: 2px solid black; padding: 5px; text-align: center; margin: 10px 0;">WARNING</div> <p>High pressure nitrogen gas is used in this equipment. Keep face and body clear of release valves. Failure to observe safety precautions may result in injury or death.</p> </div> </div>		

REMOVAL

WARNING

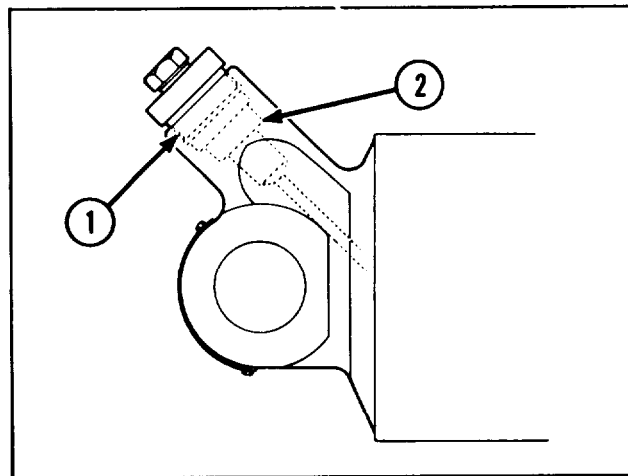
High pressure nitrogen gas is used in this equipment. Keep face and body clear of release valves. Failure to observe safety precautions may result in injury or death.

- 1 Reduce equilibrator nitrogen pressure to zero. Refer to TM 9-2350-304-20-2.

NOTE

Steps 2 thru 7 apply to the unmodified weapon.

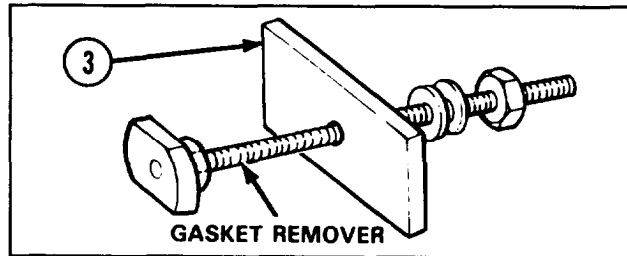
- 2 Unscrew and remove equilibrator valve assembly (1) and gasket (2). If gasket does not come out with equilibrator valve assembly, perform steps 3 thru 7.



2-30. MAINTENANCE OF EQUILIBRATOR VALVE ASSEMBLY (CONT).

REMOVAL (CONT)

- 3 Remove backing (3) from gasket remover.

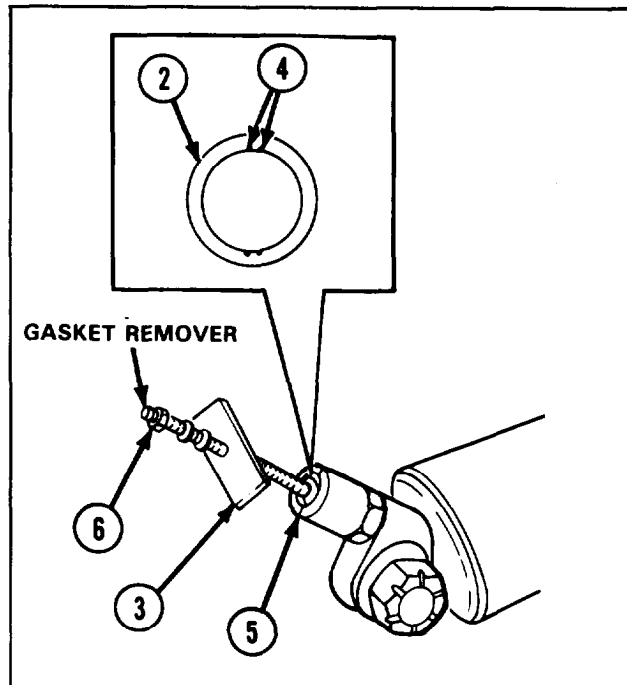


- 4 Insert gasket remover inside gasket (2).

CAUTION

Do not score gasket seat with center punch.

- 5 Use ball peen hammer and center punch to make two indentations (4) inside rim of gasket (2) and two more indentations on opposite side of inside rim. Rotate rounded plate (5) until it is under indentations.

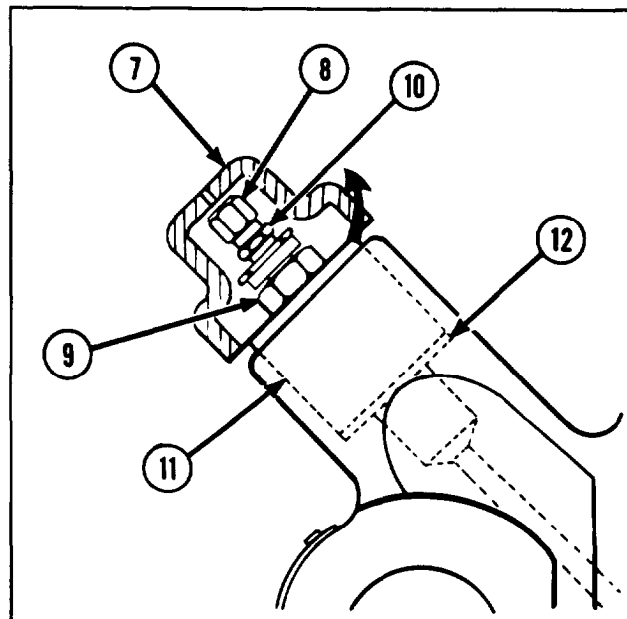


- 6 Reinstall backing (3) of gasket remover.
- 7 Tighten hex nut (6) until gasket (2) is unseated.

NOTE

Steps 8 thru 10 apply to the modified weapon.

- 8 Remove protective cap (7) and valve cap (8).
- 9 While holding inside nut (9), slowly turn outside nut (10) counterclockwise to reduce equilibrator nitrogen pressure to zero. Refer to TM 9-2350-304-20-2.
- 10 Unscrew and remove equilibrator valve assembly (11) and gasket (12). If gasket does not come out with equilibrator valve assembly, perform steps 3 thru 7.



DISASSEMBLY**NOTE**

- Steps 1 and 2 apply to the modified weapon.
- Disassembly of unmodified weapon is not authorized.

- 1 Remove two self-locking screws (1) and valve assembly lock (2) from adapter (3).
- 2 Remove air relay valve (4) and adapter (3).

INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 If adapter is broken, damaged, or missing, repair is by replacement of next higher assembly.
- 3 If any component of unmodified equilibrator valve assembly is broken, damaged, or missing, replace entire equilibrator valve assembly.
- 4 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

REASSEMBLY**NOTE**

Steps 1 and 2 apply to the modified weapon.

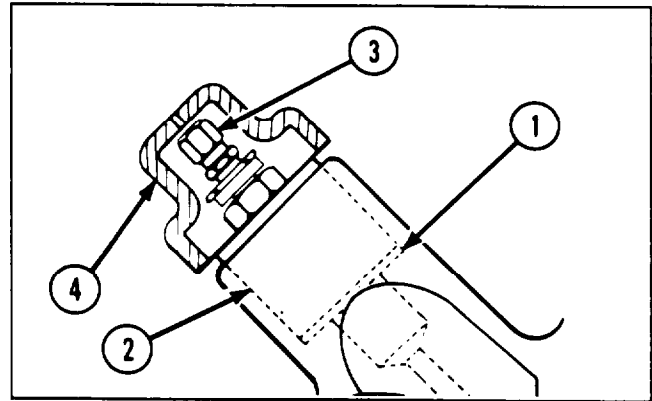
- 1 Install air relay valve (1) in adapter (2).
- 2 Install valve assembly lock (3) and two new self-locking screws (4) on adapter (2).

2-30. MAINTENANCE OF EQUILIBRATOR VALVE ASSEMBLY (CONT).

NOTE

Unmodified equilibrator valve assembly must be replaced with modified equilibrator valve assembly.

- 1 Install new gasket (1).
- 2 Install valve assembly (2). Torque to 500 ft-lb (675 N-m).
- 3 Charge pneumatic equilibrator to proper nitrogen pressure. Refer to TM 9-2350-304-20-2.
- 4 Install valve cap (3) and protective valve (4) on valve assembly (2).



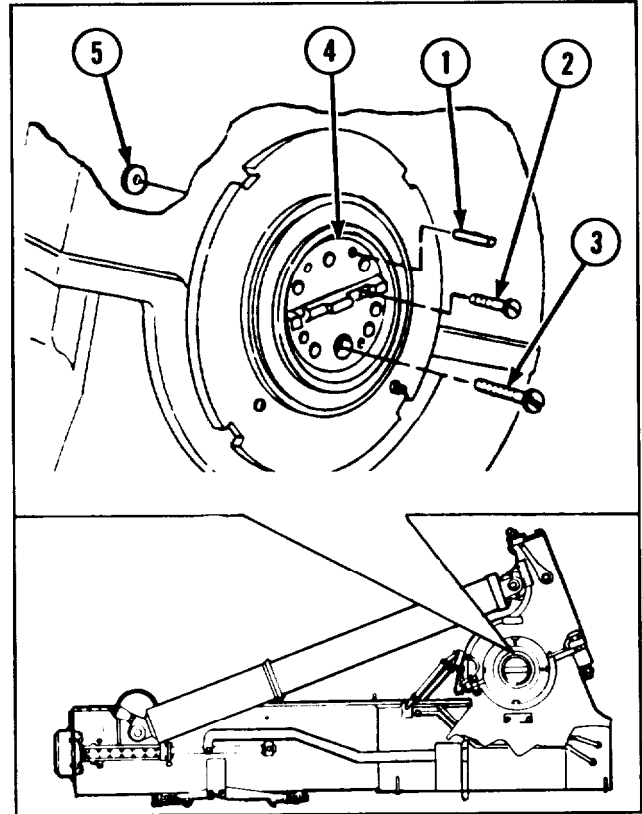
2-31. MAINTENANCE OF M174 GUN MOUNT ASSEMBLY -GUN SIGHT ADAPTERS.

This task covers:	a. <i>Removal</i>	c. <i>Installation</i>
	b. <i>Inspection/Repair</i>	d. <i>Alinement</i>
INITIAL SETUP		
<i>Tools and Special Tools</i>	<i>Materials/Parts</i>	
Artillery maintenance shop equipment (SC 4933-95-CL-A12)	Cotter pin (MS24665-567)	
23/64" diameter drill bit	Headless straight pin (4) (MS 16555-62)	
3/8" diameter drill bit	Sealing compound (item 21, appx B)	
End plate check gage (8213259)	Shim sets (10934603)	
M1A1/M1A2 gunner's quadrant (7197156)	<i>References</i>	
Ordnance artillery and turret mechanic's tool kit (SC 5180-95-CL-A12)	TM 9-2350-304-10	
Parallel bar	TM 9-2350-304-24P-2	
Torque wrench (A-A-2411)	<i>Equipment Conditions</i>	
3/8" diameter reamer (GGG-R-180)	Gun mount is installed	

REMOVAL**NOTE**

- If new gun sight adapters are being installed, perform steps 1 thru 3.
- Steps 1 thru 3 are written for one gun sight adapter but apply to both.

- 1 Drill out two headless straight pins (1).
- 2 Remove three capscrews (2) and two capscrews (3).
- 3 Remove gun sight adapter (4) and four shim sets (5).

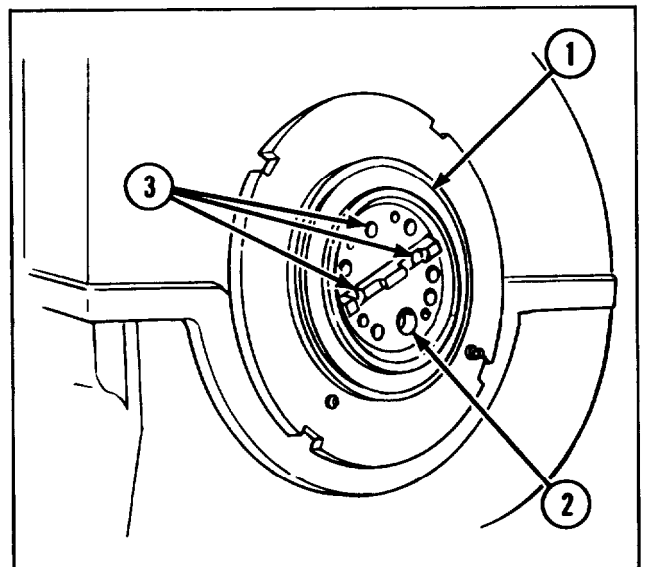
**INSPECTION/REPAIR**

- 1 Inspect for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

INSTALLATION**NOTE**

- If a new gun mount was installed on vehicle, new gun sight adapters must be installed and aligned on each trunnion.
- The following procedure is written for the installation of the gun sight adapter on the right trunnion, but also applies to the left trunnion.

- 1 Park vehicle on level ground.
- 2 Level trunnions. Refer to TM 9-2350-304-10.
- 3 Install gun sight adapter (1) on right trunnion with capscrew (2) and three capscrews (3).



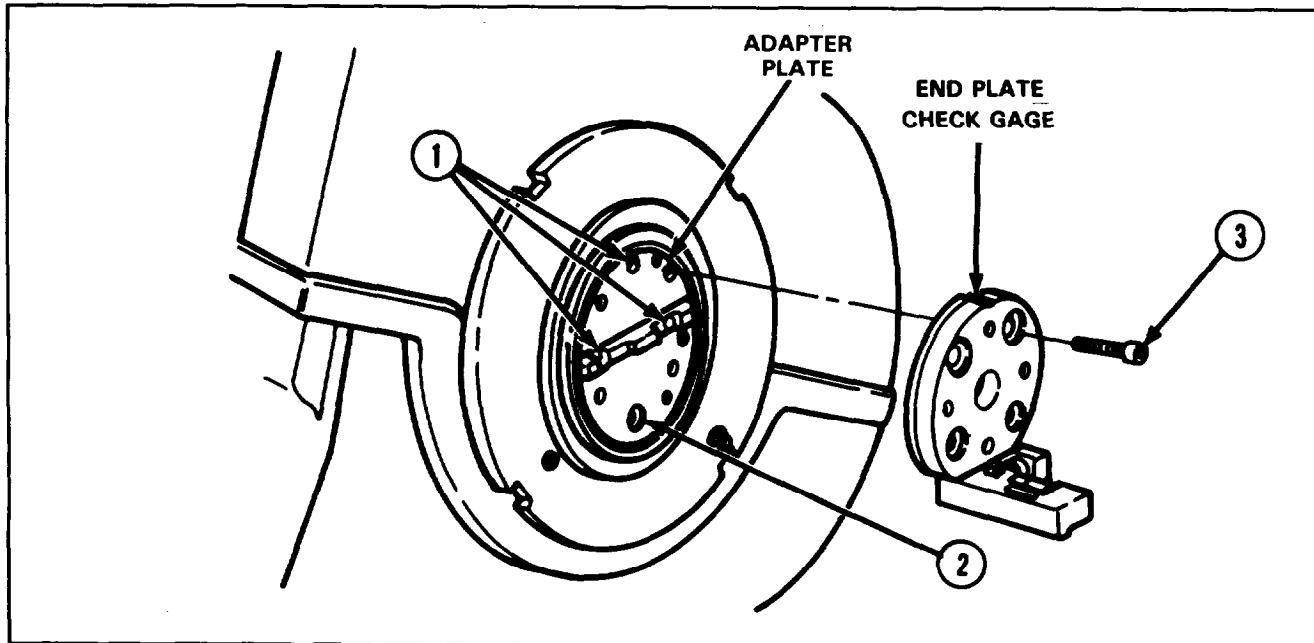
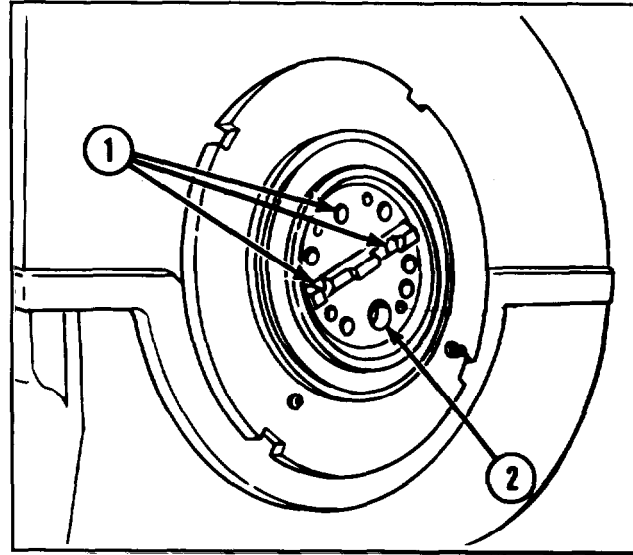
2-31. MAINTENANCE OF M174 GUN MOUNT ASSEMBLY -GUN SIGHT ADAPTERS (CONT).

ALINEMENT

NOTE

The following procedure is written for the alinement of one gun sight adapter but applies to both gun sight adapters.

- 1 Lower gun tube to zero elevation. Refer to TM 9-2350-304-10.
- 2 Loosen three capscrews (1) and cap-screw (2) one-half turn.



- 3 Install end plate check gage on trunnion adapter plate using four screws (3). Torque screws to 20 ft-lb (27 N-m).

NOTE

Ensure the end plate check gage has been adjusted so the level vial for the zero degree elevation is set at zero degree \pm one graduation and the level vial for 1100 mils \pm one graduation line.

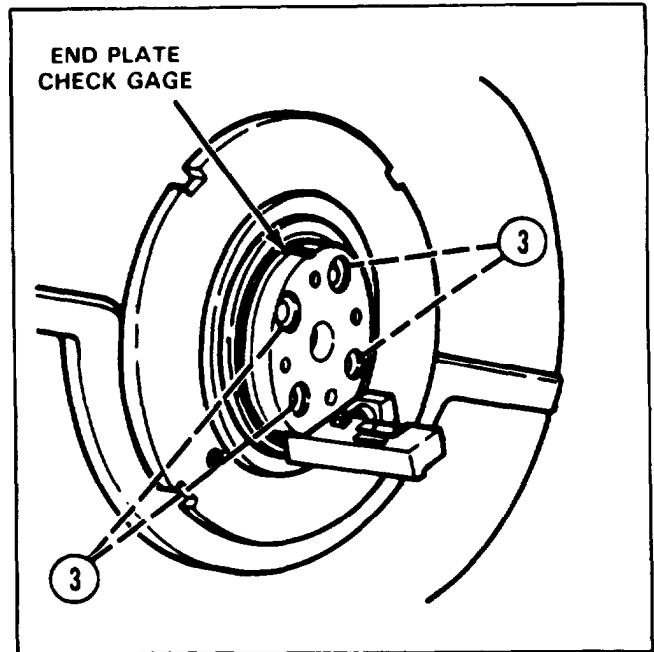
- 4 At zero degree elevation, check alinement of the trunnion end plate, using the end plate check gage.
- 5 Elevate the gun tube to 1100 mils and observe the cross-level bubble (1100 mil vial) while elevating gun tube. The cross-level bubble must remain centered within 0.5 mil (1/4 vial graduation).

NOTE

Toe-in and Toe-out of the trunnion end plate shall not exceed 0.5 mil (1/4 vial graduation). Use shims (as required) under the adapter plate to ensure that the trunnion end plate and the trunnion axis are perpendicular. Insert shims in the form of washers on the trunnion end plate fastening screw(s) between trunnion shaft and trunnion end plate.

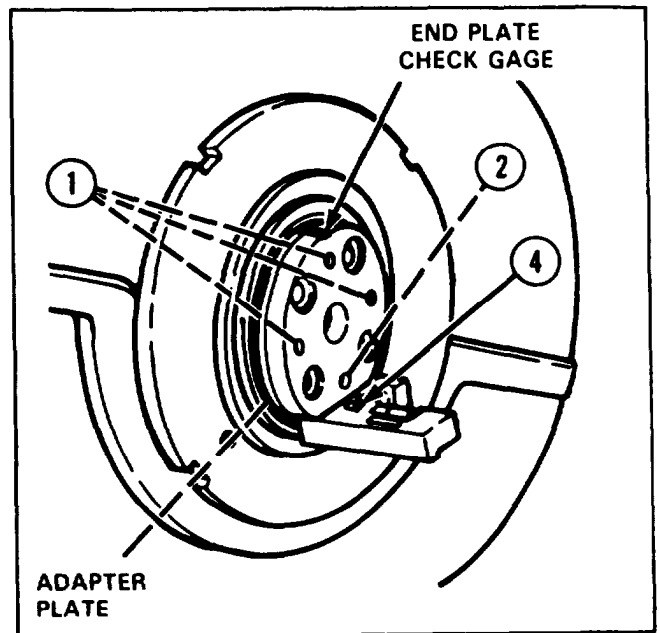
6 Depress weapon to zero degrees elevation.

7 Loosen four screws (3) securing end plate check gage.



8 Loosen three capscrews (1) and capscrew (2) one-half turn through access holes in end plate check gage.

9 Rotate adapter plate until end plate check gage level vial (4) is level. Remove end plate check gage.



2-31. MAINTENANCE OF M174 GUN MOUNT ASSEMBLY-GUN SIGHT ADAPTERS (CONT).

ALINEMENT (CONT)

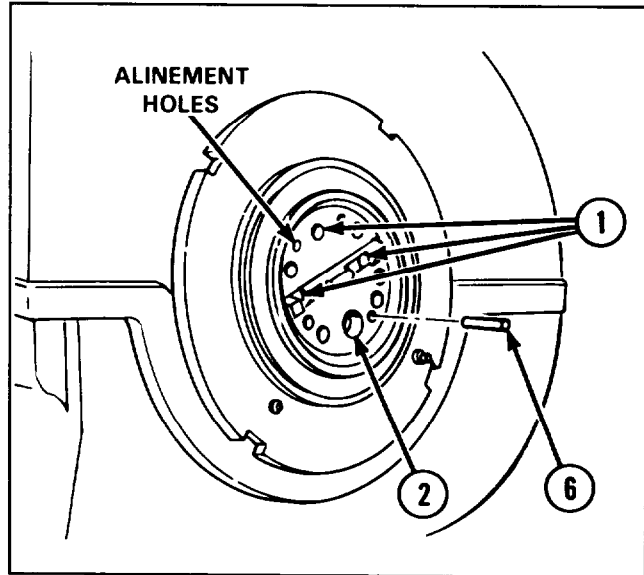
- 10** Torque three capscrews (1) and cap-screw (2) to 30 ft-lb (41 N-m).

NOTE

- Drill straight in, keeping drill bit at a 90 degree angle to face of the adapter.
- Alinement plates are not pre-drilled.

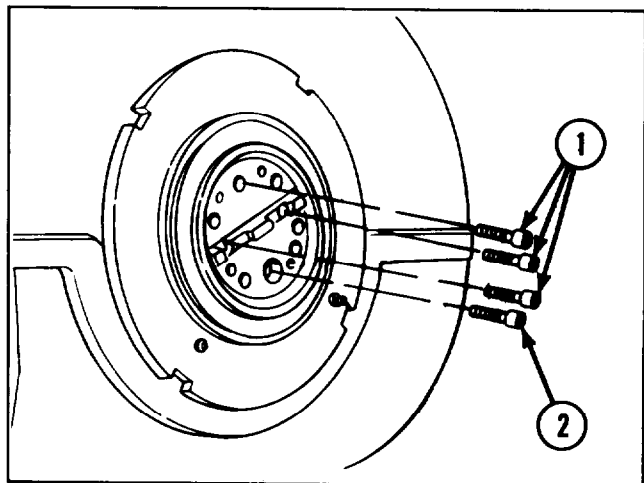
- 11** Pre-drill two alinement holes. Switch to a 23/64-inch diameter drill bit. Finish with a 3/8-inch diameter drill bit, and drill holes to a total depth of 1.25 in. (3.18 cm).

- 12** Ream two alinement holes using 3/8-inch diameter reamer, and install two alinement pins (6).



- 13** Remove one capscrew at a time, securing the trunnion end plate to trunnion and coat capscrews (1 and 2) with sealing compound (item 21, appx B).

- 14** Replace and torque three capscrews (1) to 15 ± 10 ft-lb (20 ± 14 N-m) and capscrew (2) to 65 ± 10 ft-lb (88 ± 14 N-m).



2-32. MAINTENANCE OF M140 ALINEMENT DEVICE MOUNT.

This task covers: Realinement

INITIAL SETUP

Tools and Special Tools

- Drill press
- M1A1/M1A2 gunner's quadrant (71971561)
- Ordnance artillery and turret mechanic's tool kit (SC 5180-95-CL-A12)
- Torque wrench (A-A-2411)

Materials/Parts

Epoxy coating kit (item 11, appx B)

References

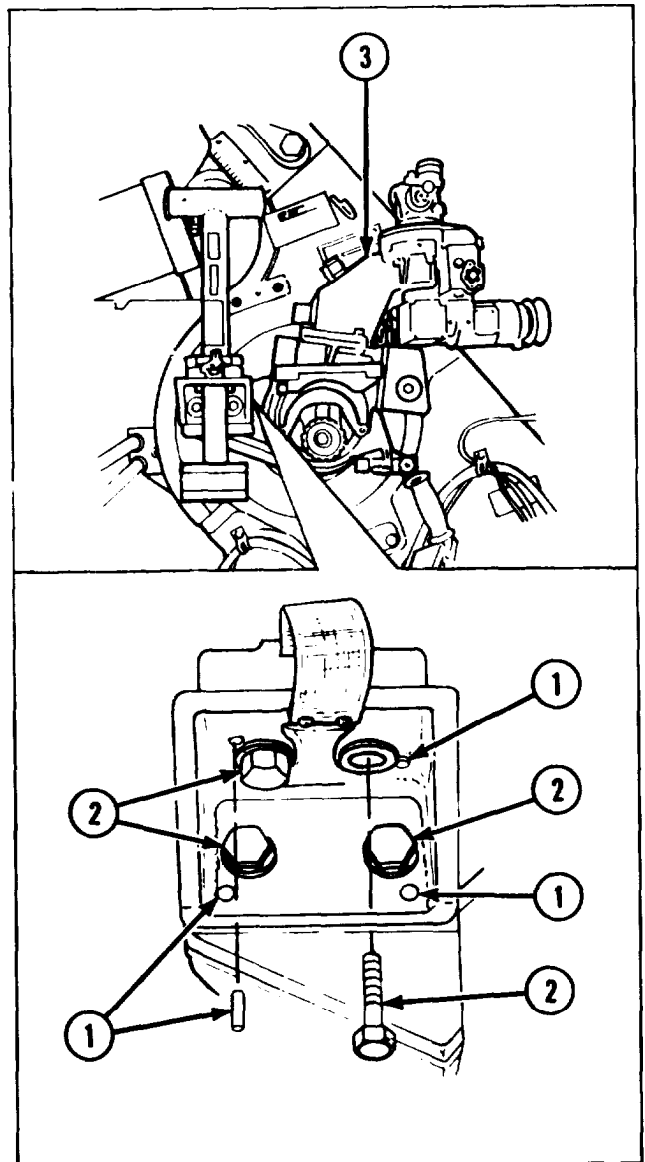
- MIL-C-22750
- TM 9-2350-304-10

REALINEMENT

NOTE

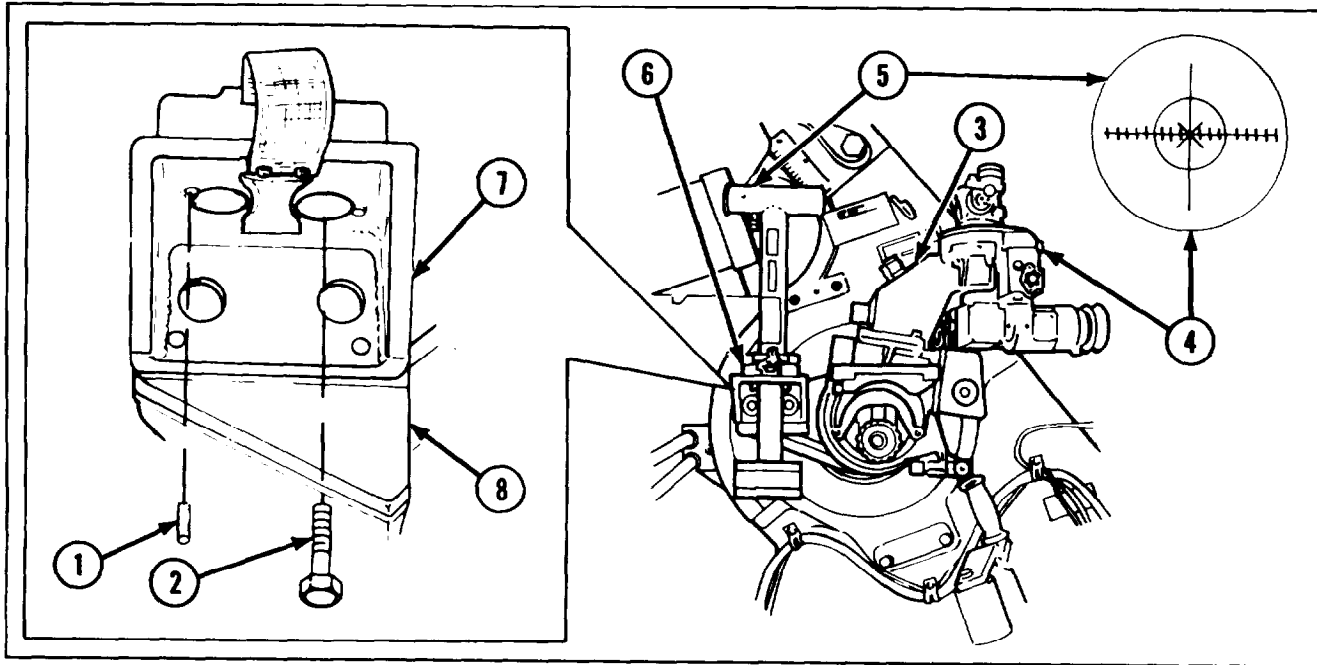
- If a new gun mount or gun sight adapter is installed on the howitzer, the M140 alinement device mounts must be realined.
- The following procedures apply to the M140 alinement device on left side of howitzer.

- 1 Using hammer and punch, remove four headless straight pins (1) and loosen four capscrews (2).
- 2 Level trunnion using plumbline. Refer to TM 9-2350-304-10.
- 3 Level tube using pretested M1A1/M1A2 gunner's quadrant. Refer to TM 9-2350-304-10.
- 4 Center all level bubbles (pitch, cant, and elevation) within the width of one graduation line on M137 telescope mount (3). Set correction counter to zero. Elevation counter should now read 0 ± 0.5 mil. Adjust bubbles as required.



2-32. MAINTENANCE OF M140 ALINEMENT DEVICE MOUNT (CONT).

REALINEMENT (CONT)



- 5 Install a pretested M115 panoramic telescope (4) and boresight the M115 panoramic telescope. Refer to TM 9-2350-304-10. Reset azimuth knob from boresight position until upper counter readout is zero.
- 6 Scribe lines on M137 telescope mount (3) and M115 panoramic telescope (4). Refer to TM 9-2350-304-10.
- 7 Install M140 alinement device (5) on dovetail wedge (6). Coincide reticles of M140 alinement device and M115 panoramic telescope (4).
- 8 When reticles aline, torque four capscrows (2) to 45 to 50 ft-lb (61 to 68 N-m).

NOTE

Remove M140 alinement device from dovetail wedge when drilling and pinning mount.

- 9 After dovetail wedge (6) is secured to blank panel (7), remove blank panel from bracket assembly (8).

NOTE

Dovetail wedge and blank panel may be drilled and pinned a total of three times before replacement is required.

- 10 Using a drill press, drill dovetail wedge (6) and blank panel (7) in two new places. Drill all the way through using 0.242 in. (0.615 cm) drill bit.
- 11 Install dovetail wedge (6) and blank panel (7) to bracket assembly (8) and install M140 alinement device (5). Coincide reticles of M140 alinement device and M115 panoramic telescope (4).
- 12 Remove M140 alinement device (5) and ream two holes as necessary to drive two headless straight pins (1) into dovetail wedge (6) and blank panel (7) with hammer and punch.
- 13 Drill two new holes in blank panel (7) and bracket assembly (8). Drill all the way through using 0.242 in. (0.615 cm) drill bit.

- 14 Ream holes as necessary to drive two headless straight pins (1) in blank panel (7) and bracket assembly (8) using hammer and punch.
- 15 Reinstall M140 alinement device (5) and check reticle setting which must be within 0.50 mil.
- 16 Remove and stow M140 alinement device (5).

- 17 Open breech and place loader-rammer assembly in ramming position with trough retracted. Elevate the cannon tube until trough can slide into breech. Measure elevating angle on breech pads with M1A1/M1A2 gunner's quadrant (approximately 145 mils).

NOTE

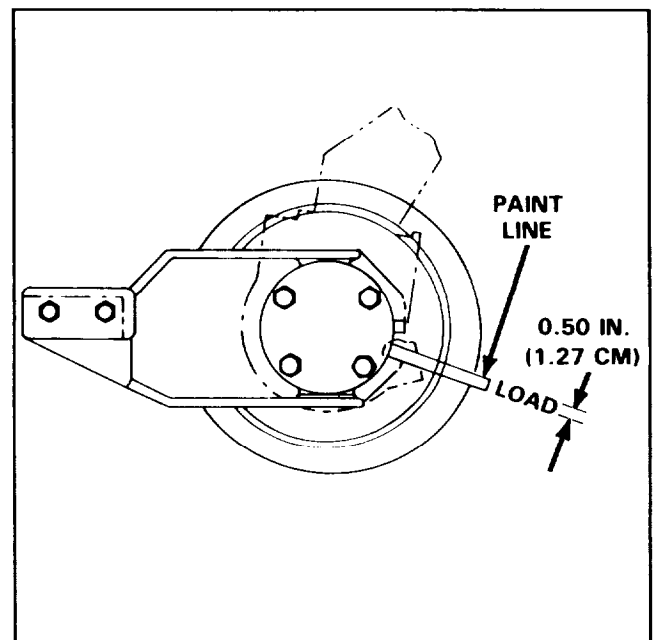
Ensure surfaces to be painted are free of grease, oil, and dirt.

WARNING

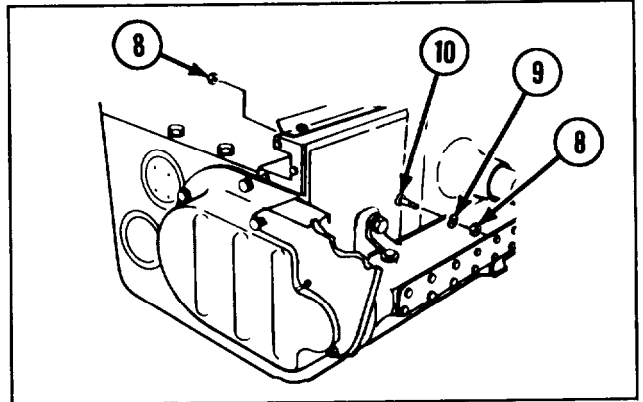
Unusable CARC mixtures may be considered hazardous waste and may require disposal IAW Federal, state, DOD, and DA hazardous waste regulations. Consult the installation environment office for proper disposal guidance. Mixed CARC has a flashpoint of approximately 38°F (3°C) due to the incorporation of solvents and is highly flammable,

- 18 Paint a line 0.50 in. (1.27 cm) wide using epoxy coating kit (item 11, appx B). Apply paint IAW MIL-C-22750. Apply a minimum of two coats radially from center line of trunnion parallel to line of bracket assembly. Stencil the word LOAD in 0.50 in. (1.27 cm) high letters on trunnion as indicated.

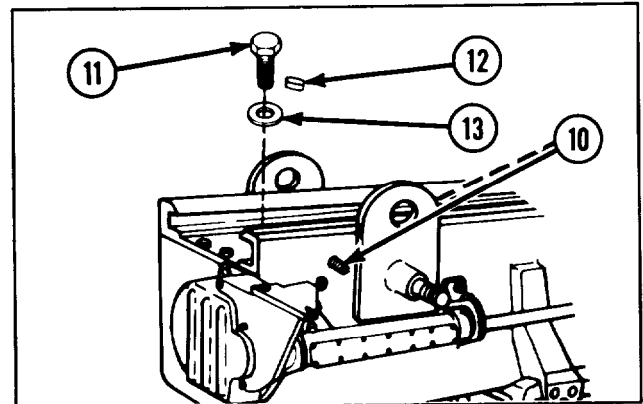
- 19 Repeat steps 2 thru 18 for M140 alinement device on right side of howitzer.



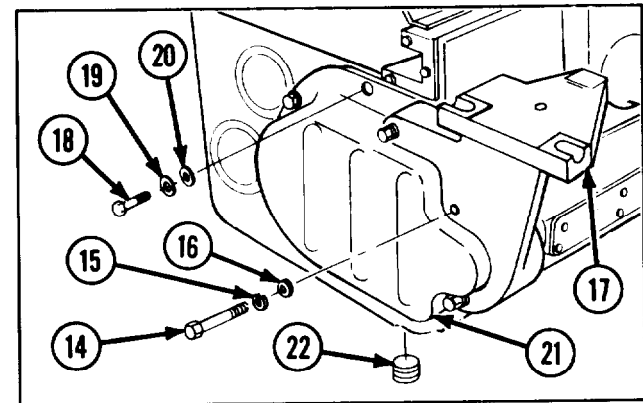
- 3 Remove two hex nuts (8) and lockwasher (9) from torque connecting link (10).



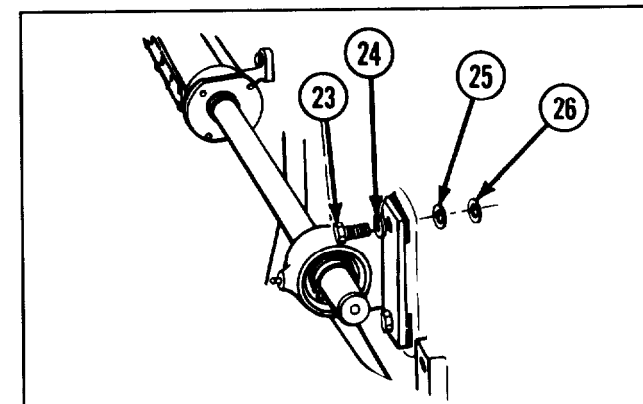
- 4 Remove machine plug (11), plug (12), and preformed packing (13) from torque connecting link (10).



- 5 Remove three machine bolts (14), three lockwashers (15), three flat washers (16), antenna mast plate (17), five capscrews (18), five lockwashers (19), five flat washers (20), and recoil gear cover (21).



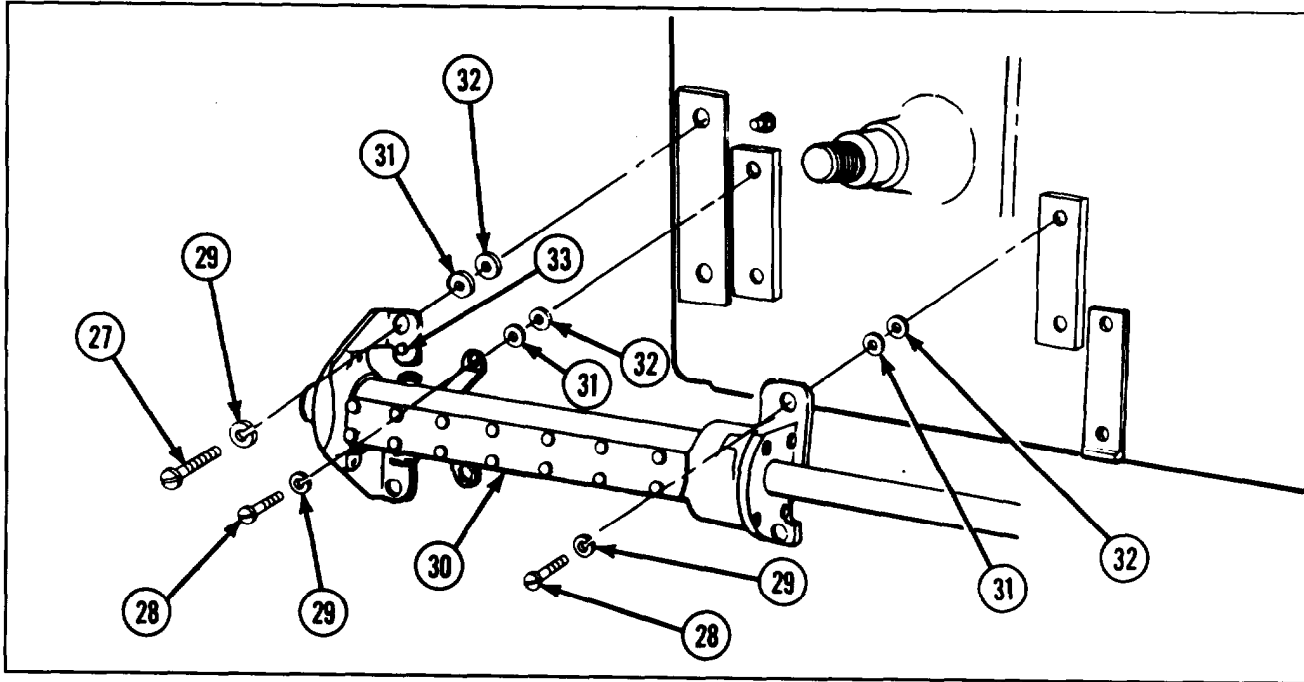
- 6 Remove pipe plug (22) from recoil gear cover (21).



- 7 Remove two capscrews (23), two lockwashers (24), two shims (25), and two shims (26).

2-33. MAINTENANCE OF M174 GUN MOUNT ASSEMBLY-COVER, CONTROL CAM, AND RELATED ITEMS (CONT).

REMOVAL/DIASSEMBLY (CONT)

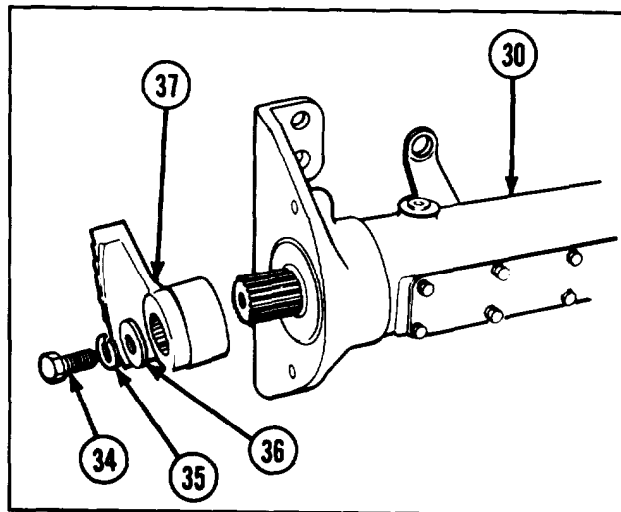


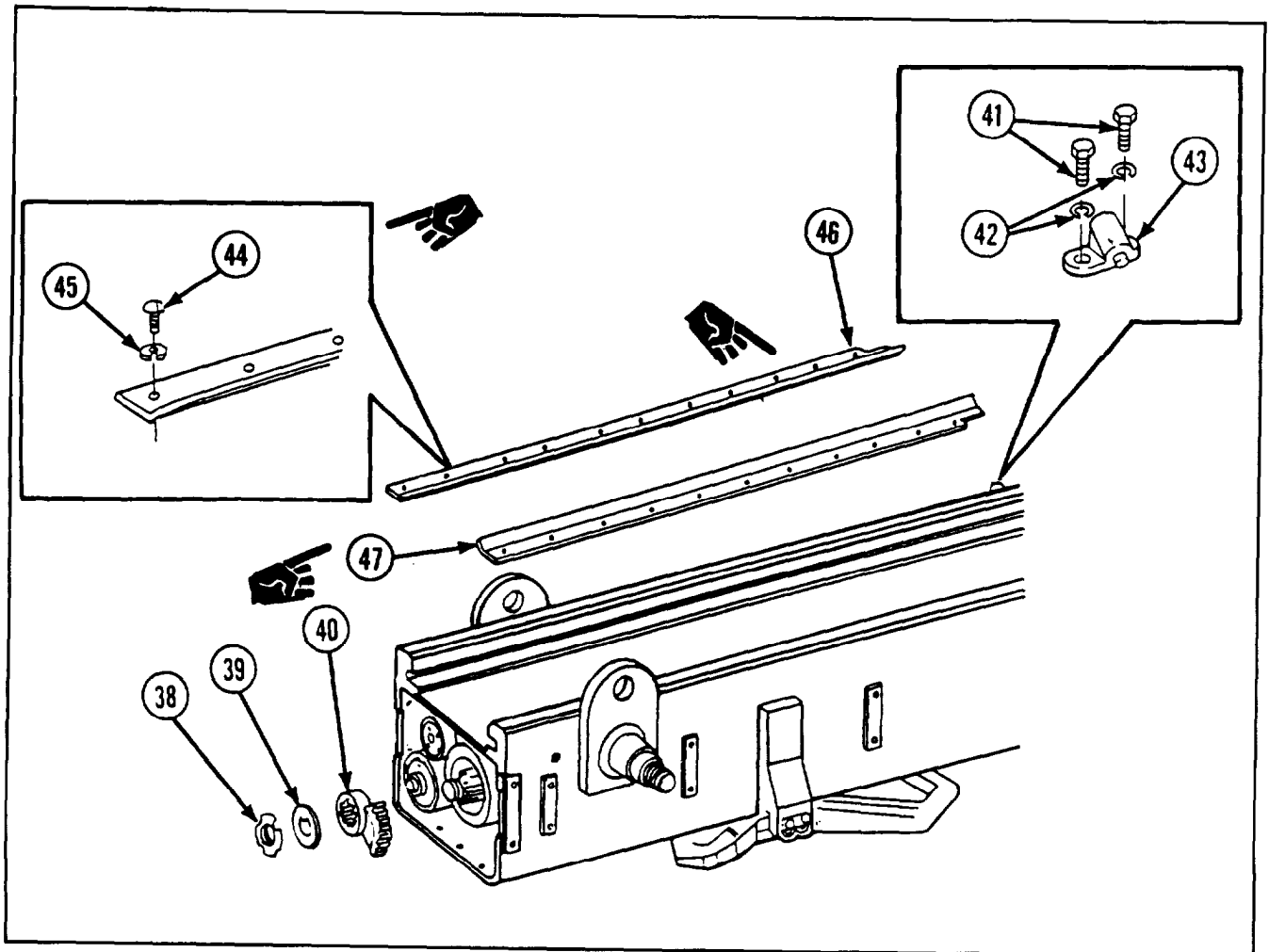
8 Remove two capscrews (27), four capscrews (28), and six lockwashers (29).

9 Remove recoil stroke control cam (30), six shims (31), and six shims (32).

10 If damaged, remove two straight pins (33).

11 Remove capscrew (34), lockwasher (35), flat washer (36), and spur gear sector (37) from recoil stroke control cam (30).





12 Remove nut (38), key washer (39), and spur gear sector (40).

13 Remove two machine screws (41), two lockwashers (42), and recoil assembly indicator (43).

14 Remove 32 machine screws (44), 32 lockwashers (45), right cradle guide strip (46), and left cradle guide strap (47).

INSPECTION/REPAIR

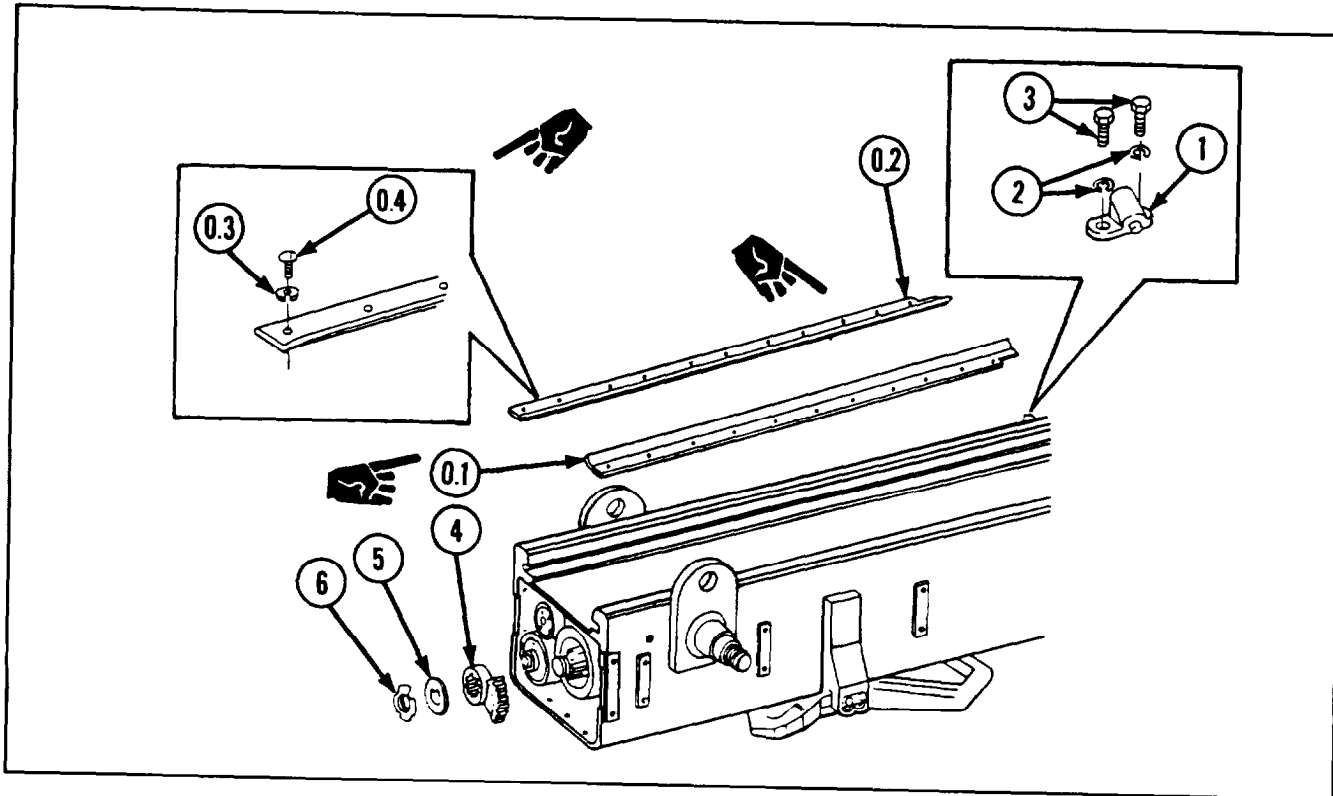
1 Inspect for broken, damaged, or missing parts.

2 Recoil stroke control cam is a repairable assembly. Refer to page 2-124.

3 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

2-33. MAINTENANCE OF M174 GUN MOUNT ASSEMBLY-COVER, CONTROL CAM, AND RELATED ITEMS (CONT).

REASSEMBLY/INSTALLATION



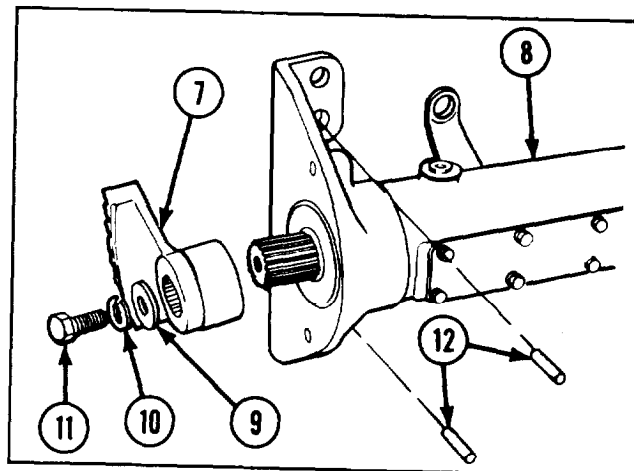
0.1 Install left cradle guide strip (0.1), right cradle guide strip (0.2), 32 new lockwashers (0.3), and 32 machine screws (0.4).

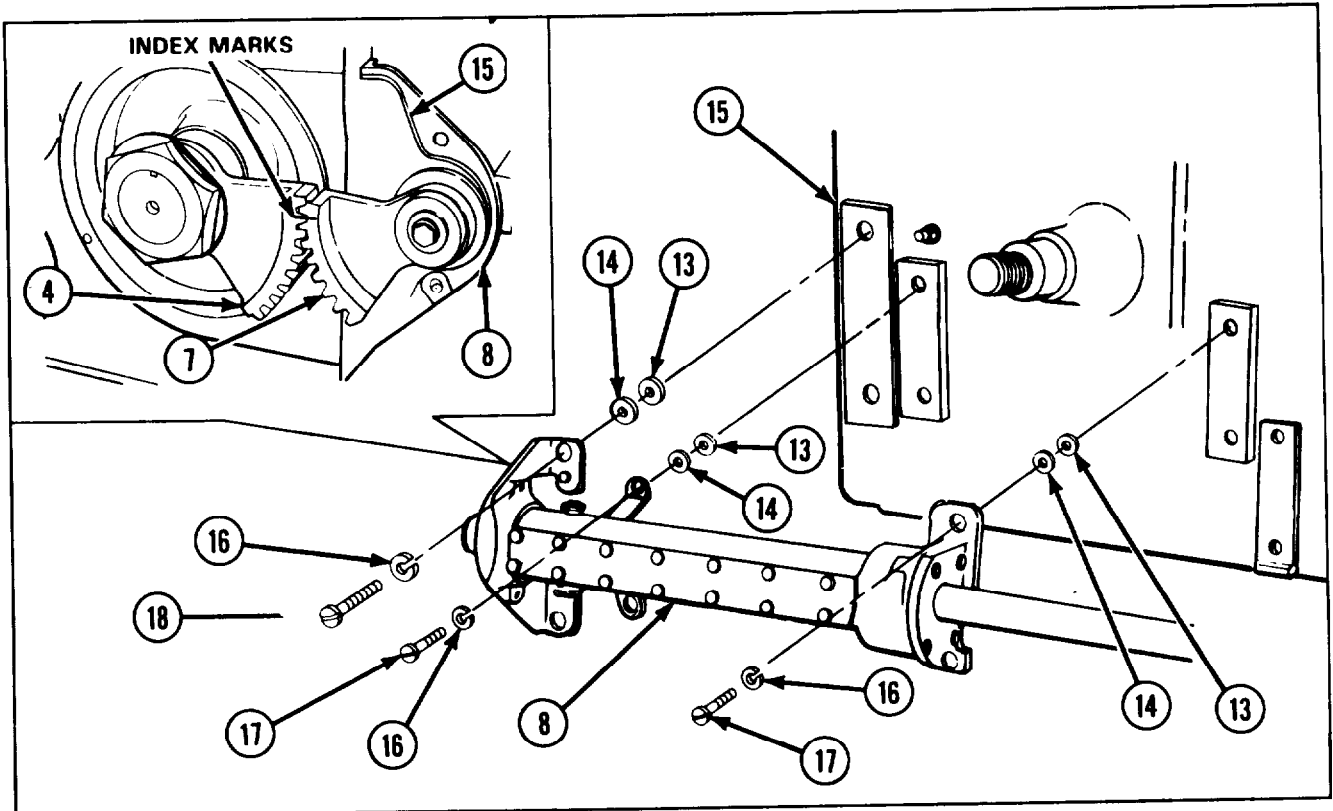
1 Install recoil assembly indicator (1) and secure with two new lockwashers (2) and two machine screws (3).

2 Install spur gear sector (4) and secure with key washer (5) and nut (6).

3 Install spur gear sector (7) on recoil stroke control cam (8) and secure with flat washer (9), new lockwasher (10), and capscrew (11).

4 If necessary, install two straight pins (12).



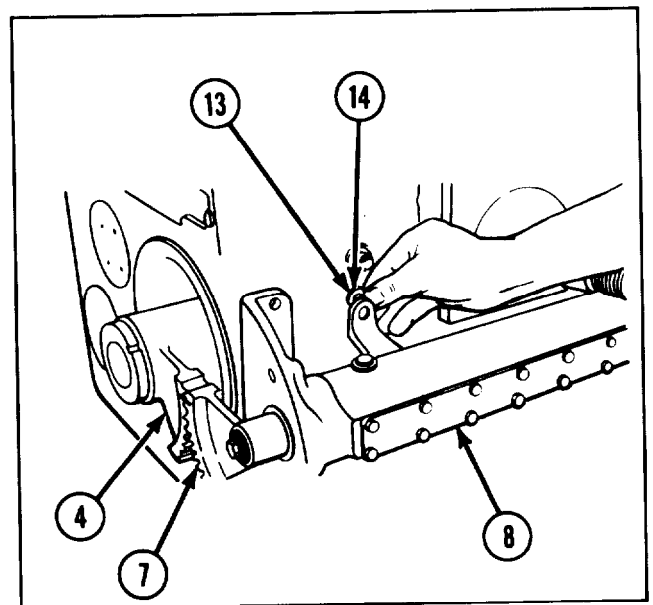


5 position six shims (13), six shims (14), and recoil stroke control cam (8) on mount (15) and align index marks on spur gear sector (4) and spur gear sector (7).

6 Install six new lockwashers (16), four cap screws (17), and two cap screws (18).

7 Using feeler gage, measure play between spur gear sectors (4 and 7) at index marks. Measurement must be 0.000 to 0.005 in. (0.000 to 0.013 cm).

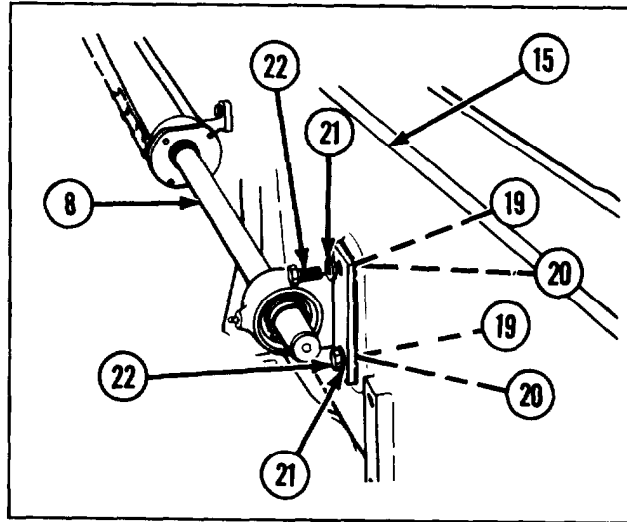
8 If adjustment is necessary, remove or add shims (13 or 14) under brackets of recoil stroke control cam (8) to obtain correct measurement.



2-33. MAINTENANCE OF M174 GUN MOUNT ASSEMBLY -COVER, CONTROL CAM, AND RELATED ITEMS (CONT).

REASSEMBLY/INSTALLATION (CONT)

- 9 Install two shims (19), two shims (20), two new lockwashers (21), and two capscrews (22) securing end of recoil stroke control cam (8) to mount (15).

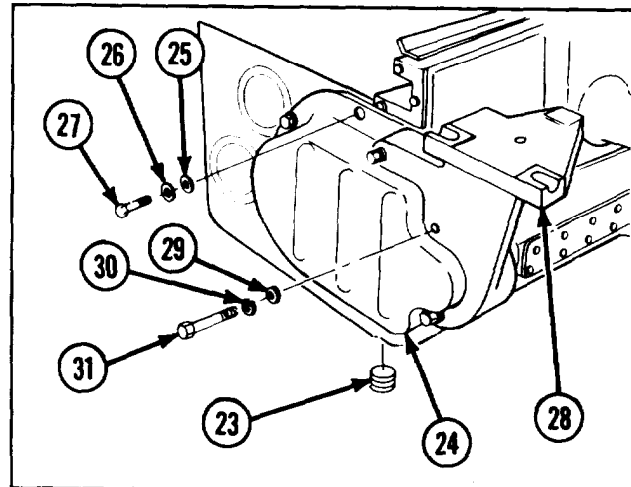


- 10 Install pipe plug (23) in recoil gear cover (24).

NOTE

If antenna mount bracket is not being installed, use three capscrews in place of three machine bolts.

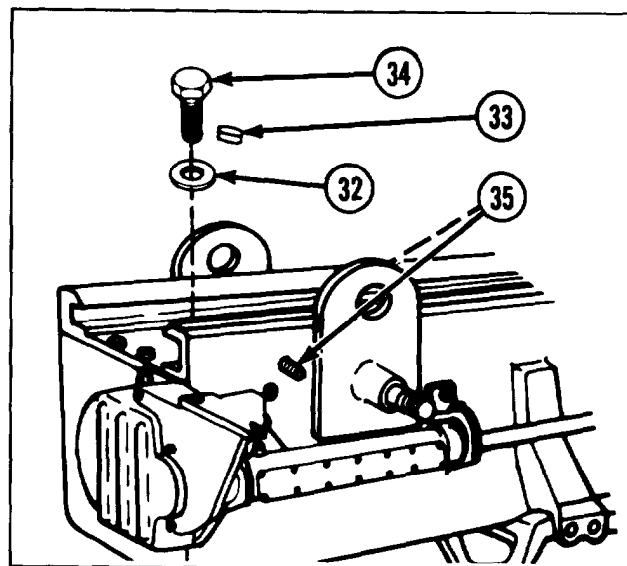
- 11 Install recoil gear cover (24) and secure with five flat washers (25), five new lockwashers (26), five capscrews (27), antenna mast plate (28), three flat washers (29), three new lockwashers (30), and three machine bolts (31).



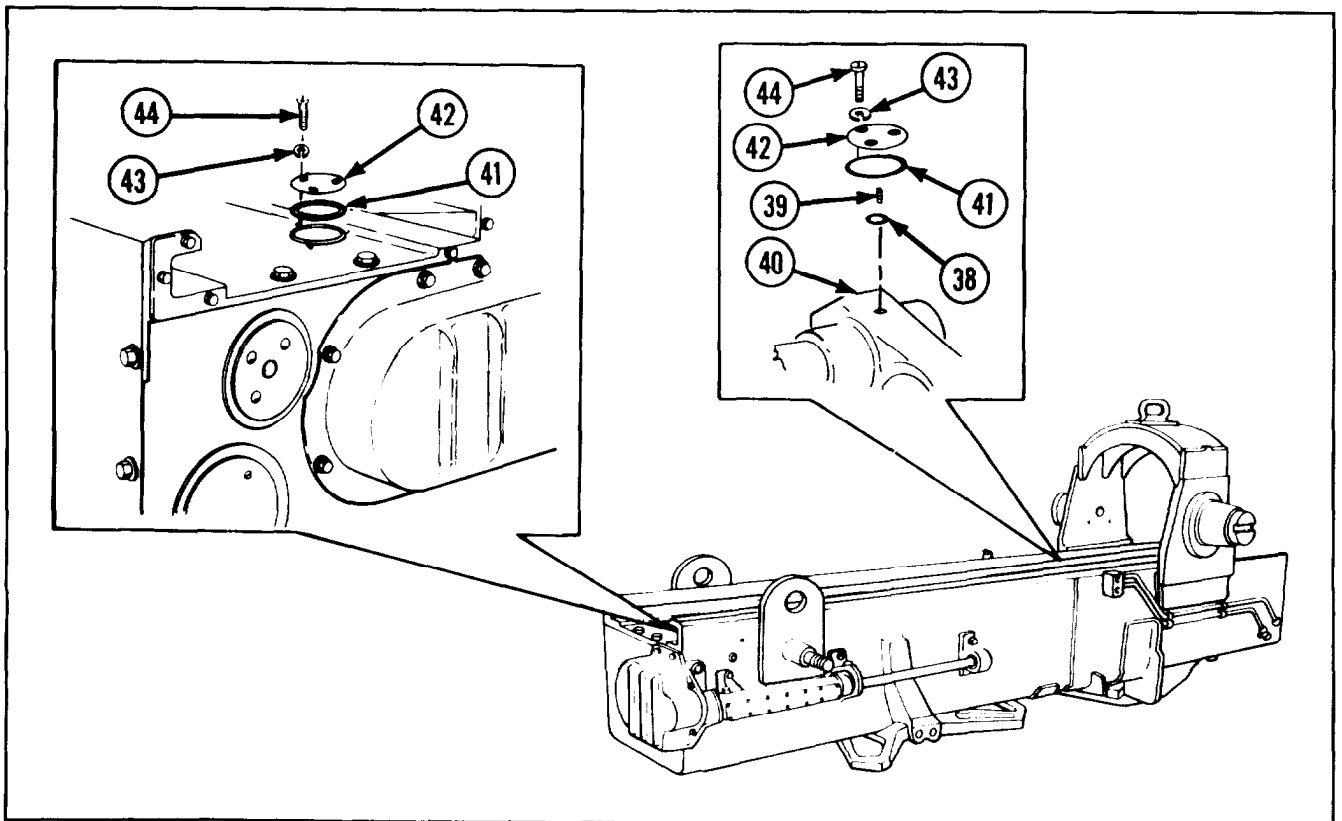
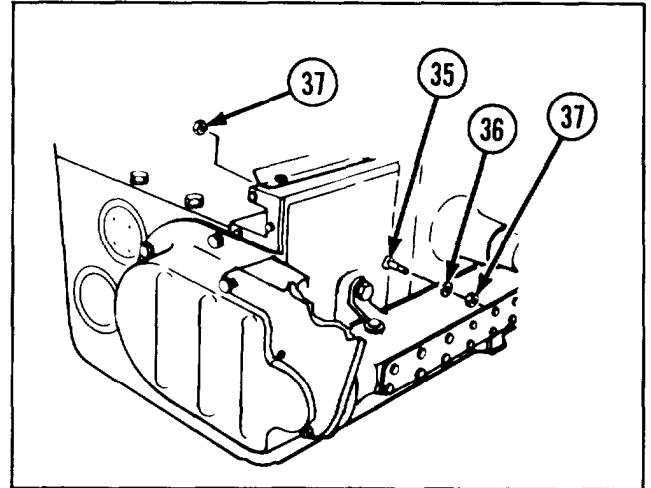
NOTE

Position recoil cylinder and torque connecting link so there will be no binding of machine plug during installation.

- 12 Install new preformed packing (32), plug (33), and machine plug (34) on torque connecting link (35).



13 Install new lockwasher (36) and two hex nuts (37) on torque connecting link (35).



14 Install new gasket (38) and setscrew (39) to counterrecoil cylinder (40).

15 Install three new gaskets (41), three covers (42), nine new lockwashers (43), and nine machine screws (44).

2-34. MAINTENANCE OF M174 GUN MOUNT ASSEMBLY -TRAVEL LOCK GROUP.

This task covers:		
a. <i>Disassembly</i>	b. <i>Inspection/Repair</i>	c. <i>Reassembly</i>
INITIAL SETUP		
<i>Tools and Special Tools</i>		<i>References</i>
Ordnance artillery and turret mechanic's tool kit (SC 5180-95-CL-A12)		TM 9-2350-304-10
		TM 9-2350-304-20-2
		TM 9-2350-304-24P-2
<i>Materials/Parts</i>		
Cotter pin (2) (MS24665-132)		
Cotter pin (2) (MS24665-285)		
Grease (item 12, appx B)		
Lockwasher (4) (MS35338-46)		

DISASSEMBLY

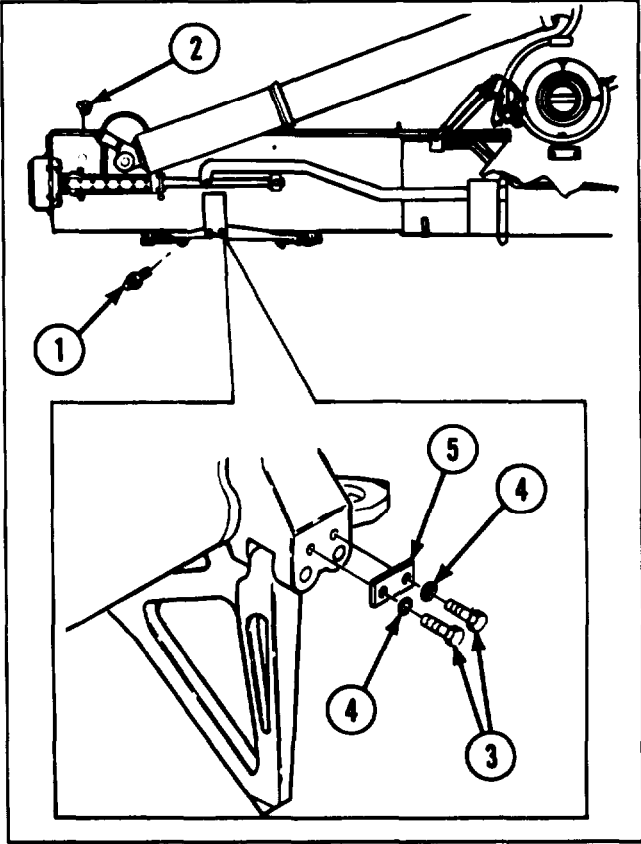
CAUTION

If performing the following procedures with the M174 gun mount installed on the vehicle, establish hydraulic pressure prior to step 1. Refer to TM 9-2350-304-10.

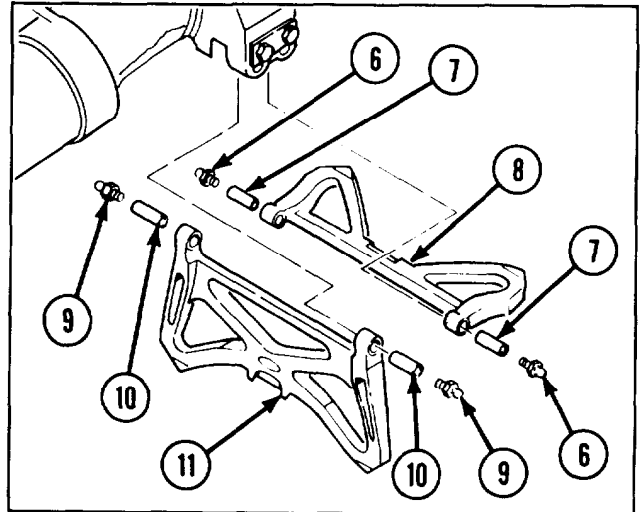
NOTE

The following procedures can be performed with the M174 gun mount removed from, or installed on, the vehicle.

- 1 Remove six lubrication fittings (1) and eight lubricating oil cups (2) from M174 gun mount.
- 2 Remove four capscrews (3), four lock-washers (4), and two retaining plates (5) from M174 gun mount.



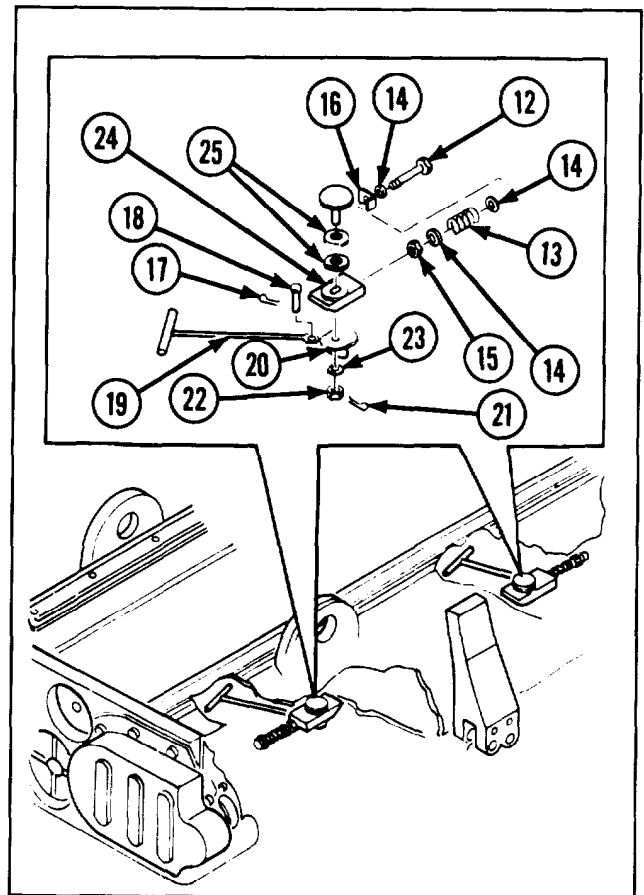
- 3 Remove two lubrication fittings (6), two straight pins (7), and shipping support (8).
- 4 Remove two lubrication fittings (9), two straight pins (10), and travel support (11) from M174 gun mount.



NOTE

Steps 5 thru 8 are written for one support stowing catch, but apply to both support stowing catches.

- 5 Remove capscrew (12), helical spring (13), three flat washers (14), and nut (15) from bracket (16) on M174 gun mount.
- 6 Remove cotter pin (17), straight pin (18), and catch travel handle (19) from hand stow support crank (20).
- 7 Remove cotter pin (21), nut (22), and flat washer (23).
- 8 Remove hand stow support crank (20), bolt stow support catch (24), and two shims (25).



INSPECTION/REPAIR

1 Inspect for broken, damaged, or missing parts.

2 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

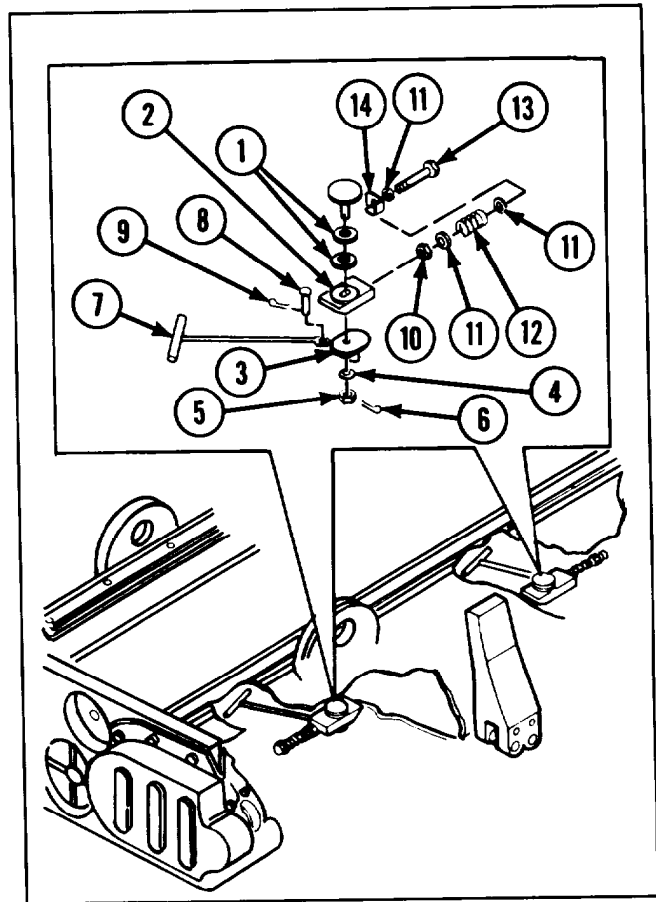
2-34. MAINTENANCE OF M174 GUN MOUNT ASSEMBLY -TRAVEL LOCK GROUP (CONT).

REASSEMBLY

NOTE

Steps 1 thru 3 are written for one support stowing catch, but apply to both support stowing catches.

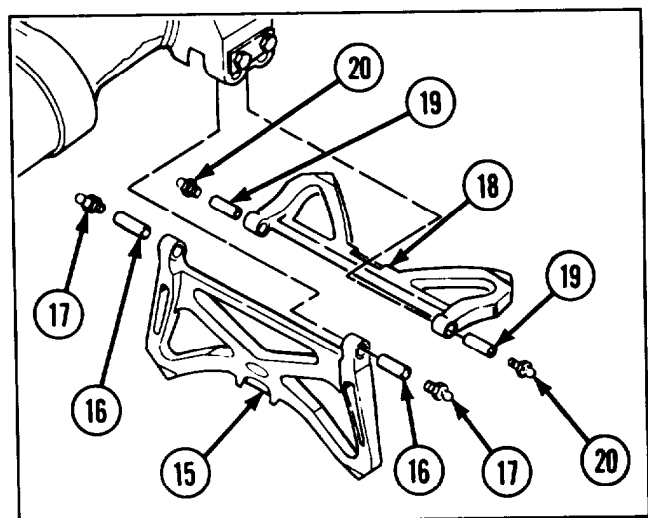
- 1 Install two shims (1), bolt stow support catch (2), hand stow support crank (3), flat washer (4), nut (5), and new cotter pin (6).
- 2 Install catch travel handle (7), straight pin (8), and new cotter pin (9) on hand stow support crank (3).
- 3 Install nut (10), three flat washers (11), helical spring (12), and capscrew (13) on bracket (14).

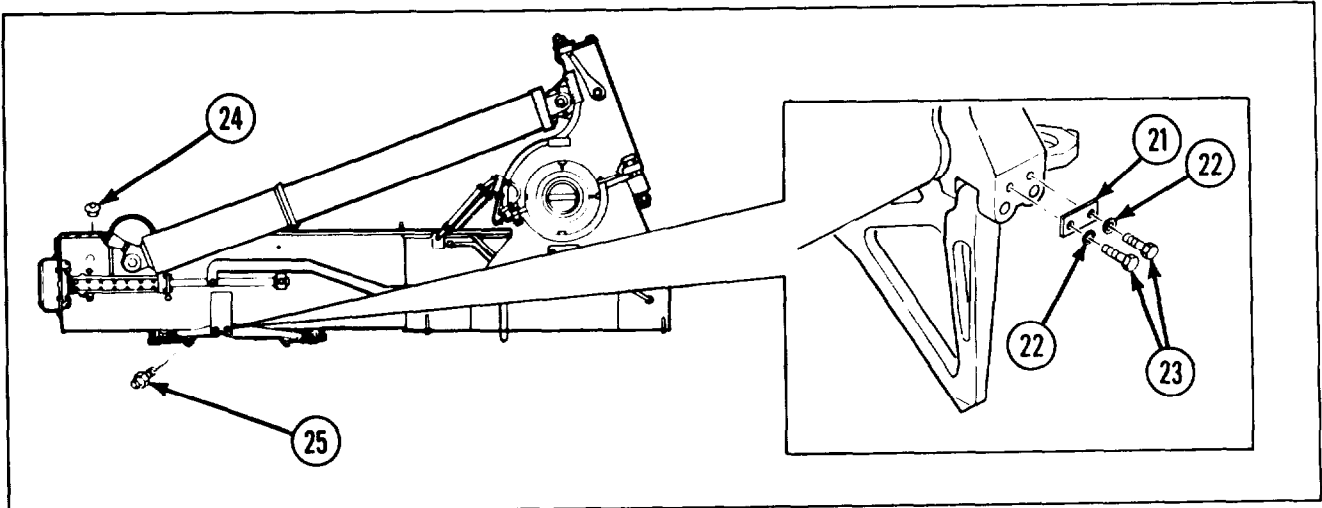


NOTE

Prior to installation, lubricate straight pins with grease (item 12, appx B). Refer to TM 9-2350-304-20-2.

- 4 Position travel support (15) on M174 gun mount and secure with two straight pins (16) and two lubrication fittings (17).
- 5 Position shipping support (18) on M174 gun mount and secure with two straight pins (19) and two lubrication fittings (20).





6 Install two retaining plates (21), four new lockwashers (22), and four screws (23) on M174 gun mount.

7 Install eight lubricating oil caps (24) and six lubrication fittings (25).

2-35. MAINTENANCE OF M174 GUN MOUNT ASSEMBLY -RETRACTING VALVE.

This task covers:

- a. *Relieving Hydraulic Pressure*
- b. *Disassembly*
- c. *Inspection/Repair*
- d. *Reassembly*
- e. *Applying Hydraulic Pressure*

INITIAL SETUP

Tools and Special Tools

Ordnance artillery and turret mechanic's tool kit (SC 5180-95-CL-A12)

Materials/Parts

- Locknut (2) (AN6289-6)
- Locknut (7528659)
- Lockwasher (2) (MS35338-44)
- Lockwasher (5) (MS35338-46)
- Prefomed packing (2) (MS28778-6)
- Prefomed packing (2) (MS28778-8)

References

TM 9-2350-304-24P-2

General Safety Instructions

WARNING

- Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as level ground as possible. This will stop the cannon from sliding out of battery.
- Manual control lever is under spring tension. Use caution during removal.
- Hydraulic system is under high pressure. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

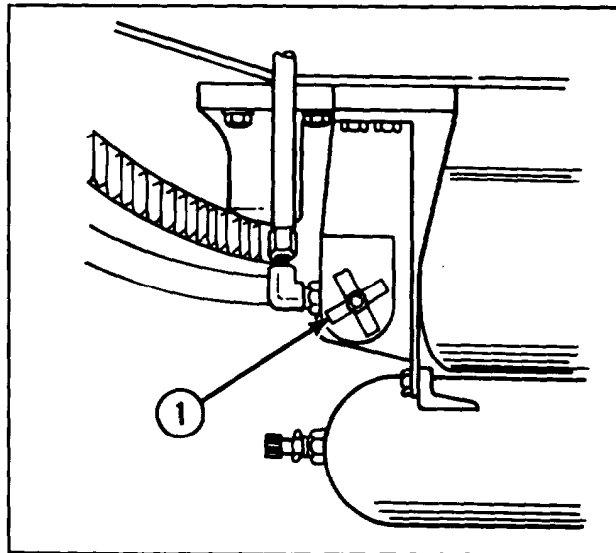
2-35. MAINTENANCE OF M174 GUN MOUNT ASSEMBLY -RETRACTING VALVE (CONT).

RELIEVING HYDRAULIC PRESSURE

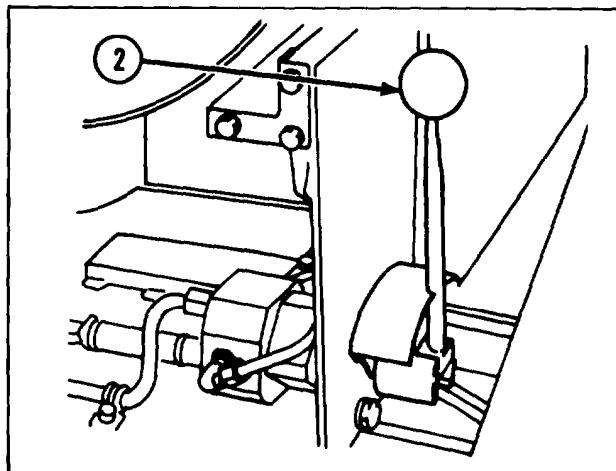
WARNING

Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as level ground as possible. This will stop the cannon from sliding out of battery.

- 1 Set MASTER switch to OFF.
- 2 Open globe angle valve (1).



- 3 Hold control handle (2) in RETURN for 1 minute, then in RETRACT for 1 minute to relieve hydraulic system pressure.

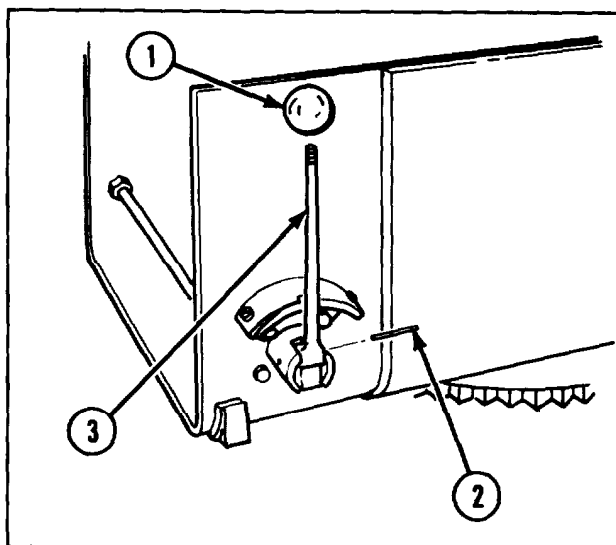


DISASSEMBLY

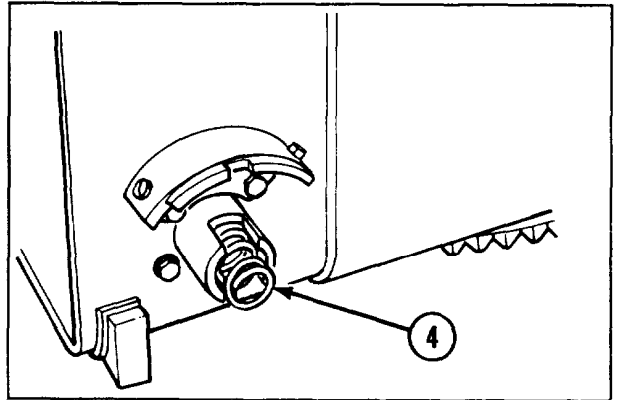
WARNING

Manual control lever is under spring tension. Use caution during removal.

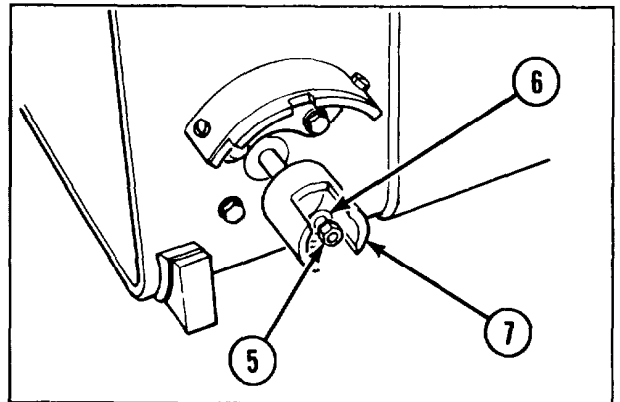
- 1 Remove shift knob (1), spring pin (2), and manual control lever (3).



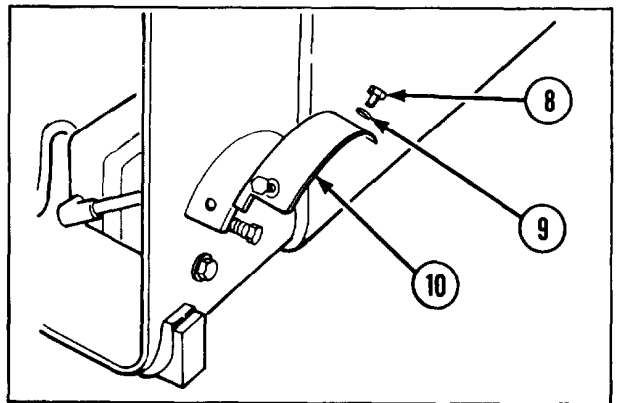
2 Remove helical spring (4).



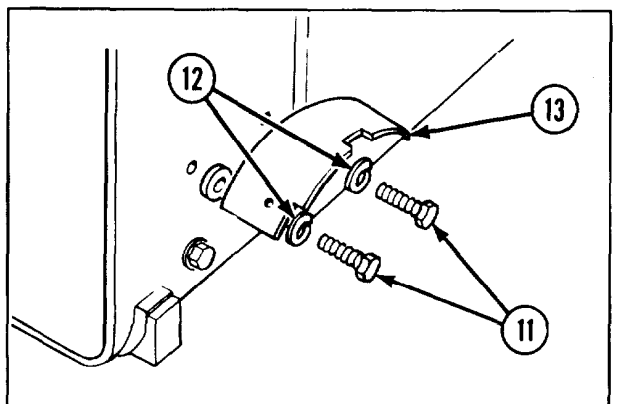
3 Remove hex nut (5), lockwasher (6), and valve stem extension (7).



4 Remove two capscrews (8), two lockwashers (9), and instruction plate (10).



5 Remove two capscrews (11), two lockwashers (12), and valve handle detent (13).



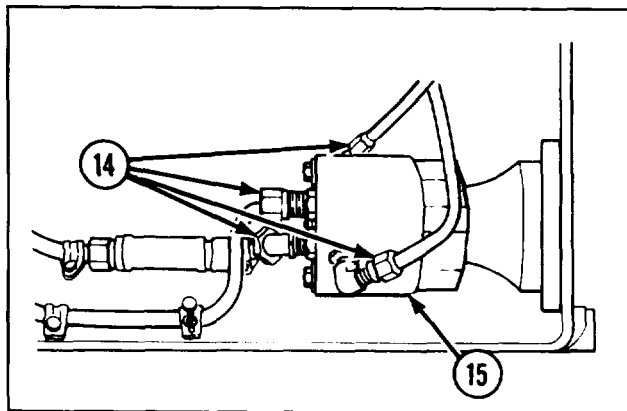
2-35. MAINTENANCE OF M174 GUN MOUNT ASSEMBLY-RETRACTING VALVE (CONT).

DISASSEMBLY (CONT)

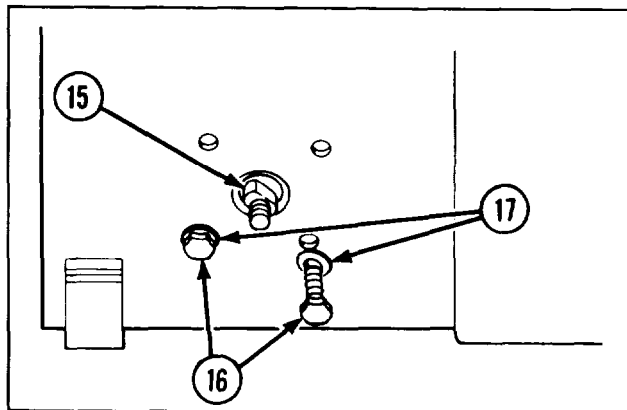
WARNING

Hydraulic system is under high pressure. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

6 From inside gun mount, disconnect four hydraulic tubes (14) from rotary valve (15) and cover tube openings. For complete disassembly of hydraulic lines and fittings, refer to page 2-27.

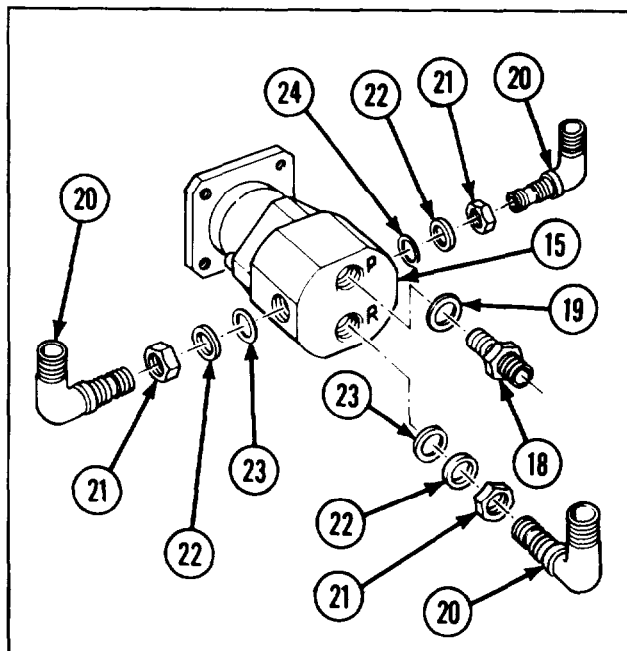


7 Remove two capscrews (16) and two lockwashers (17), and remove rotary valve (15) from inside gun mount.



8 Remove tube nipple (18) and preformed packing (19) from port "P" in rotary valve (15).

9 Remove three elbows (20), three lock-nuts (21), three flat washers (22), two preformed packings (23), and preformed packing (24).

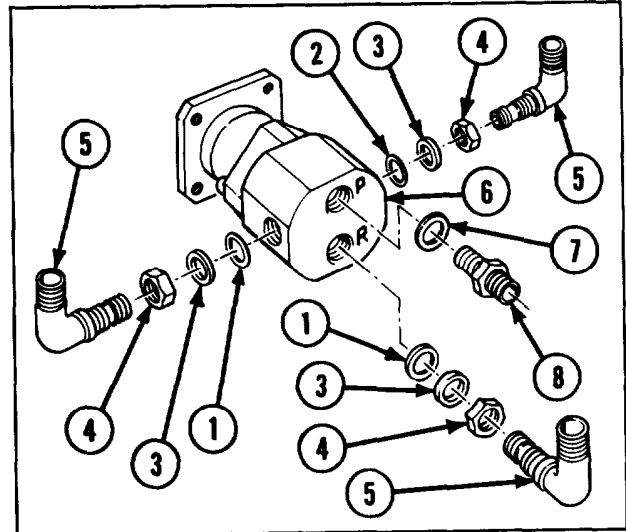


- 1 Inspect for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

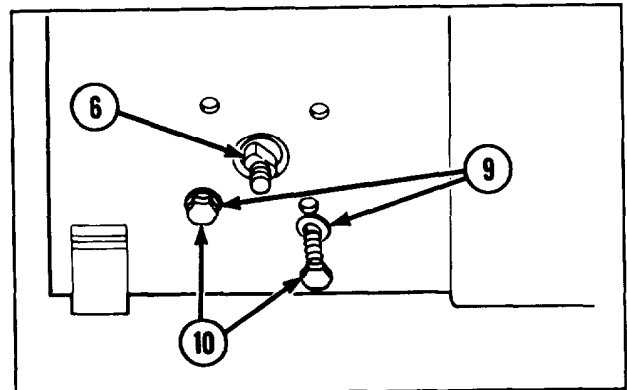
NOTE

Make sure port "P" is in upper position when installing rotary valve.

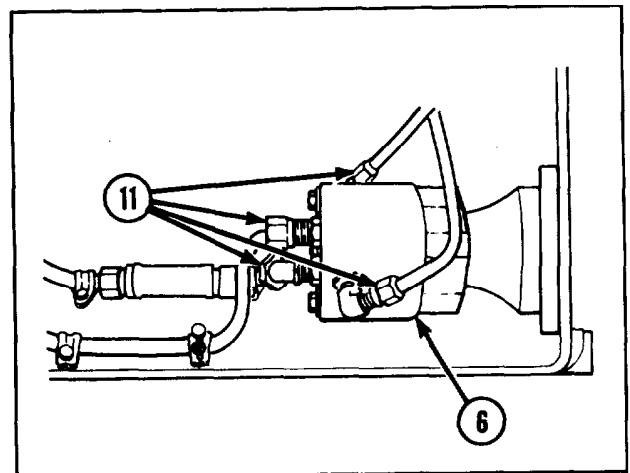
- 1 Install two new preformed packings (1), new preformed packing (2), three flat washers (3), three new locknuts (4), and three elbows (5) in rotary valve (6).
- 2 Install new preformed packing (7) and tube nipple (8) in port "P" of rotary valve (6).



- 3 Install rotary valve (6), two new lockwashers (9), and two capscrews (10).



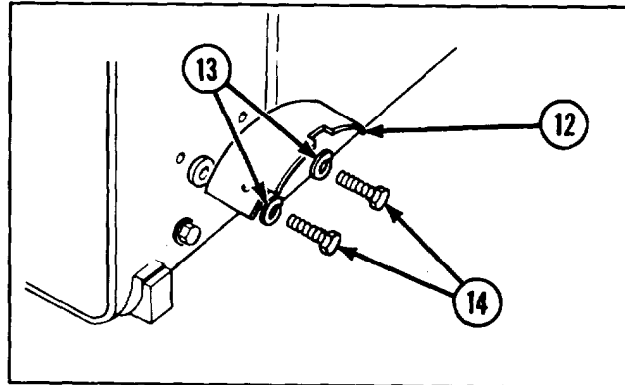
- 4 Remove covers on tube openings and connect four hydraulic tubes (11) to rotary valve (6). For complete reassembly of hydraulic lines and fittings, refer to page 2-27.



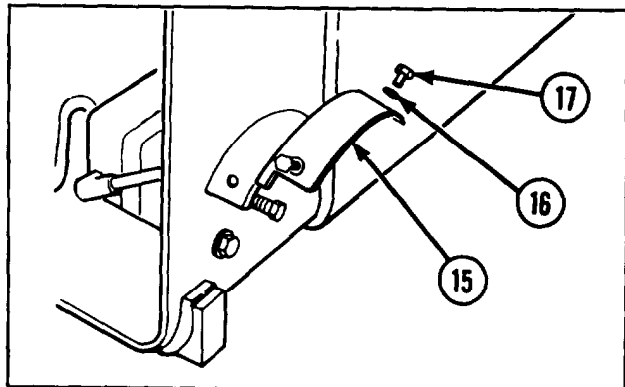
2-35. MAINTENANCE OF M174 GUN MOUNT ASSEMBLY -RETRACTING VALVE (CONT).

REASSEMBLY (CONT)

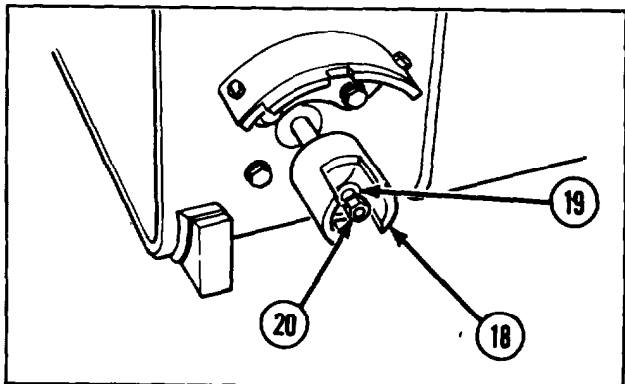
- 5 Install valve handle detent (12), two new lockwashers (13), and two capscrews (14).



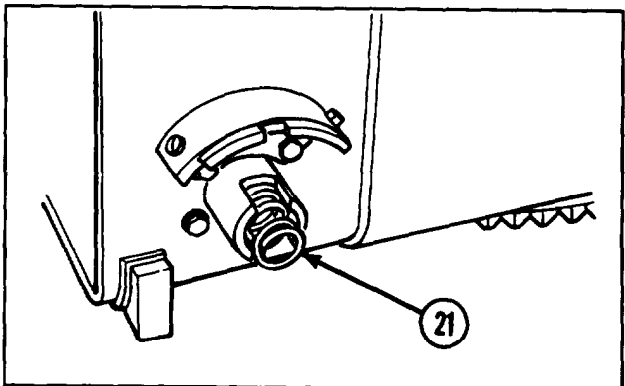
- 6 Install instruction plate (15), two new lockwashers (16), and two capscrews (17).



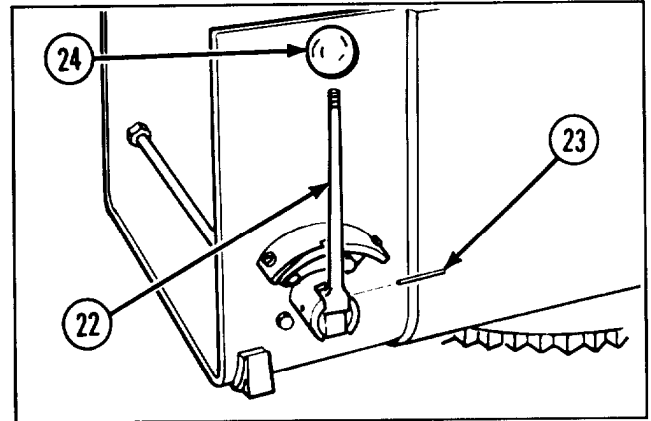
- 7 Install valve stem extension (18), new lockwasher (19), and hex nut (20).



- 8 Install helical spring (21).



- 9 Install manual control lever (22), spring pin (23), and knob (24).



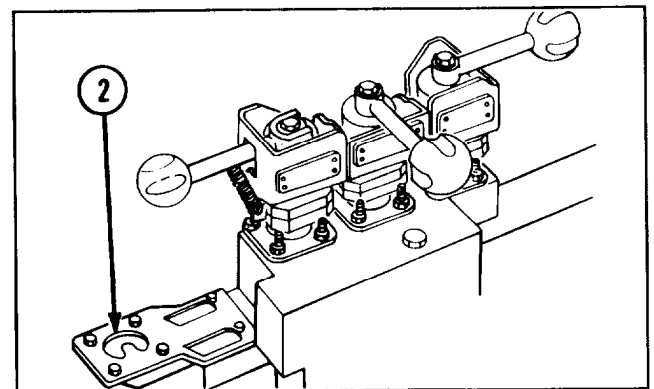
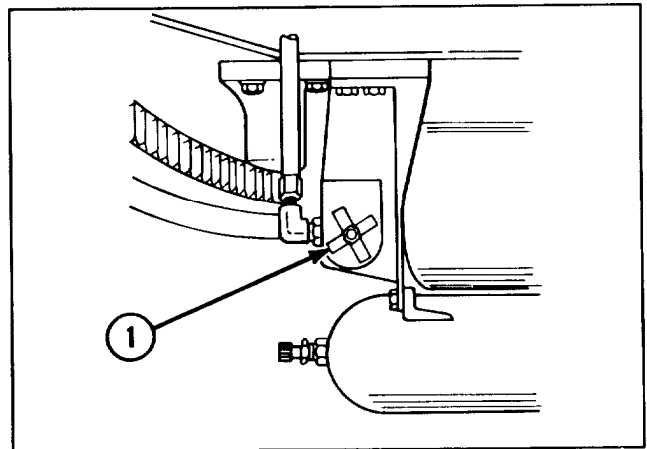
APPLYING HYDRAULIC PRESSURE

- 1 Close globe angle valve (1).
- 2 Start engine.

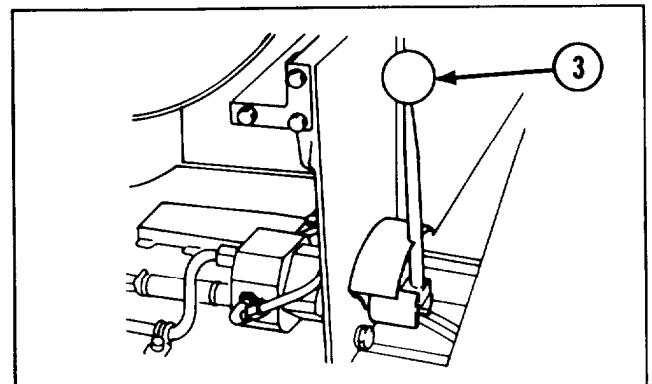
NOTE

Hydraulic motor and pump may be used to apply pressure to hydraulic system without starting engine by setting MASTER switch and OIL PUMP MOTOR SWITCH ON.

- 3 Set HYD PUMP/PTO CLUTCH switch to ON.
- 4 Check dial pressure gage (2) indication. Normal pressure is 1600 to 2400 psi (11,032 to 16,548 kPa).
- 5 Stop engine.



- 6 Move control handle (3) to RETRACT, then to RETURN, then back to RETRACT several times to bleed air from system.



2-36. MAINTENANCE OF REPLENISHER ASSEMBLY.

This task covers:

a. <i>Relieving Hydraulic Pressure</i>	e. <i>Reassembly</i>
b. <i>Removal</i>	f. <i>Testing</i>
c. <i>Disassembly</i>	g. <i>Installation</i>
d. <i>Inspection/Repair</i>	h. <i>Applying Hydraulic Pressure</i>

INITIAL SETUP

Tools and Special Tools

- Ordnance artillery and turret mechanic's tool kit (SC 5180-95-CL-A12)
- Piston replenisher extractor assembly (7114815)
- Spanner wrench (7124975)

Materials/Parts

- Lockwasher (4) (MS35338-50)
- Packing retainer (9328464)
- Preformed packing (MS28775-246)
- Preformed packing (MS28778-6)
- Preformed packing (M83461/1-341)
- Tube fitting locknut (AN6289-6)

References

- TM 9-2350-304-24P-2
- TM 9-4940-468-14

Equipment Conditions

This procedure pertains to the new style (mod kit #6) replenisher only, which is illustrated on page 2-111. The old and new configurations are not interchangeable.

General Safety Instructions



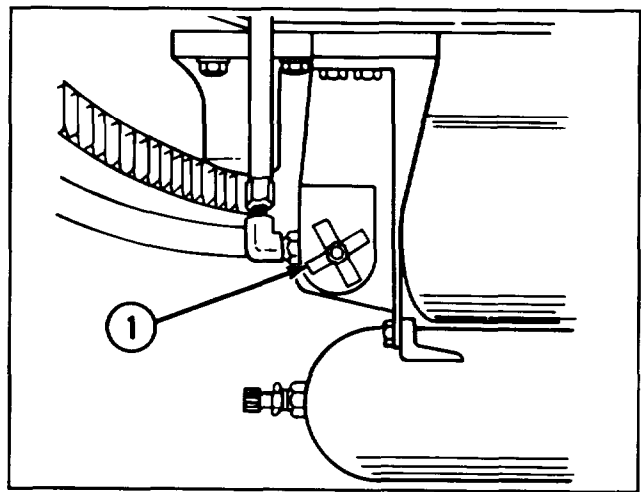
- Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as level ground as possible. This will stop the cannon from sliding out of battery.
- Hydraulic system is under high pressure. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.
- Use caution when performing step 6. Assembly contains springs under high tension.

RELIEVING HYDRAULIC PRESSURE

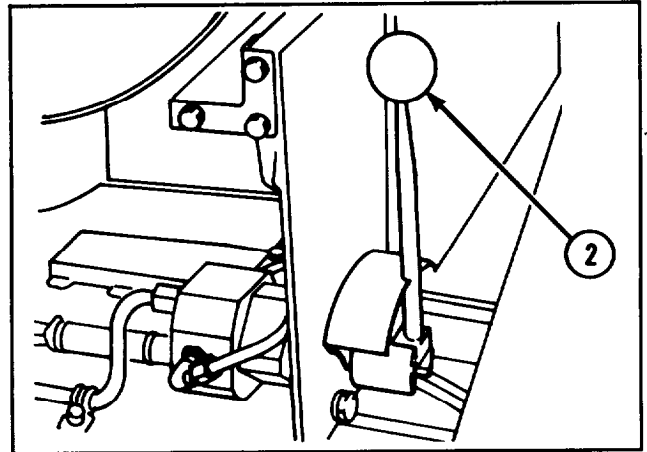


Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as level ground as possible. This will stop the cannon from sliding out of battery.

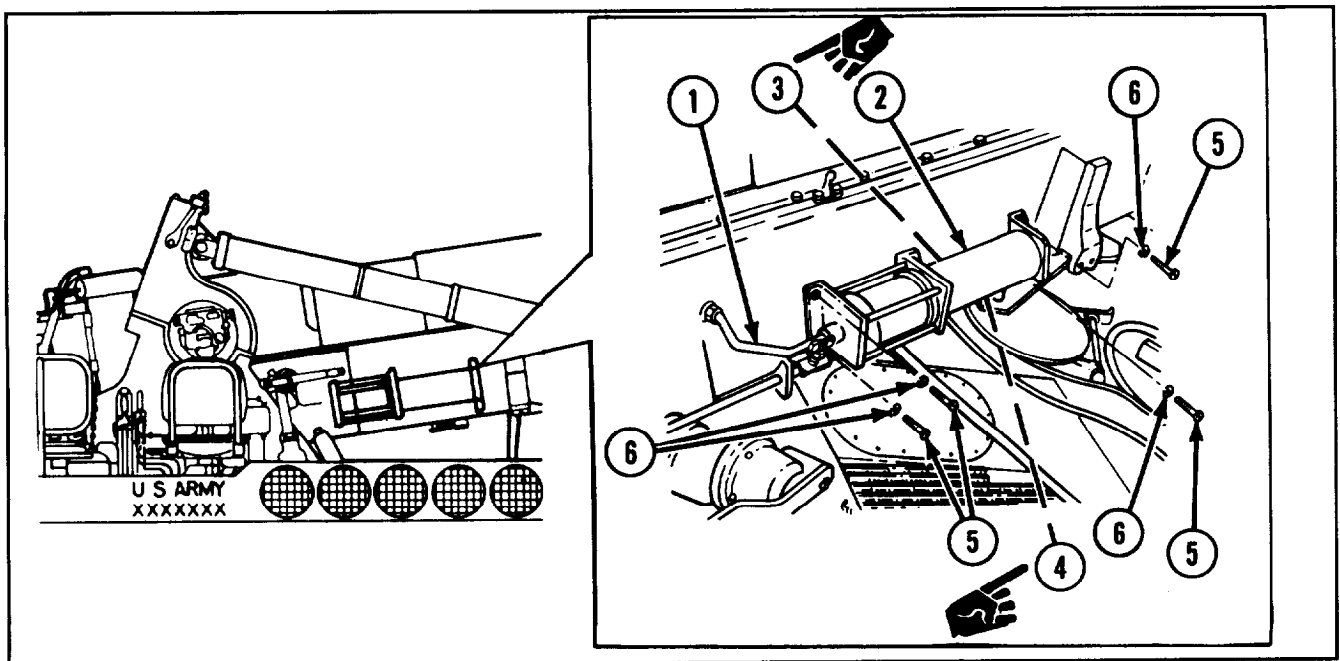
- 1 Set MASTER switch to OFF.
- 2 Open globe angle valve (1).



- 3 Hold control handle (2) in RETURN for 1 minute, then in RETRACT for 1 minute to relieve hydraulic system pressure.



REMOVAL



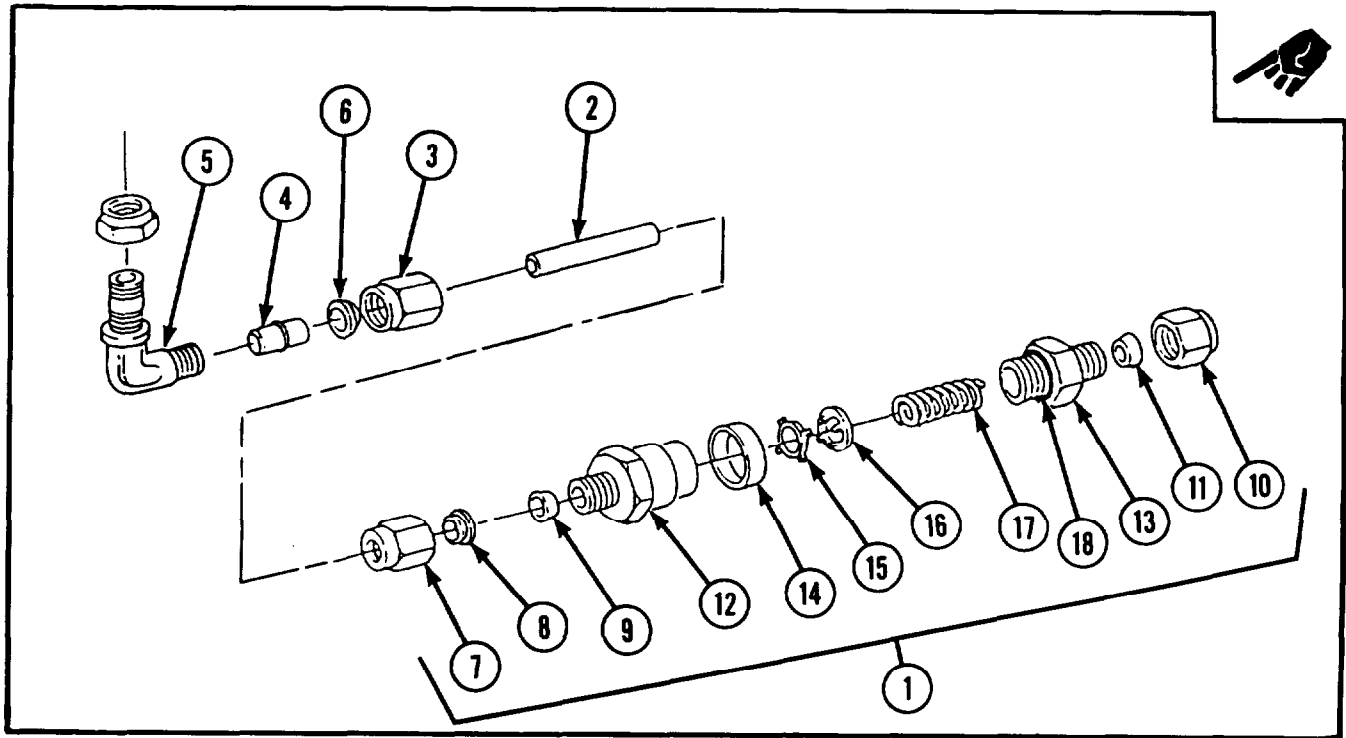
WARNING

Hydraulic system is under high pressure. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

- 1 Disconnect tube (1) from replenisher assembly (2) and cover tube opening. For complete disassembly of hydraulic lines and fittings, refer to page 2-27.
- 2 Disconnect tube (3) from tube elbow (4) and cover tube opening. For complete disassembly of hydraulic lines and fittings, refer to page 2-27.
- 3 Remove four capscrews (5), four lockwashers (6), and replenisher assembly (4).

2-36. MAINTENANCE OF REPLENISHER ASSEMBLY (CONT).

DISASSEMBLY



NOTE

If replenisher assembly is leaking through front vent holes, perform steps 1 thru 7 and inspect check valve for blockage (refer to page 2-4) prior to disassembly of replenisher assembly.

- 1 Remove check valve assembly (1), metallic tube (2), tube coupling nut (3), and tube sleeve (4) from tube elbow (5).
- 2 Remove ring spacer (6) from tube coupling nut (3).

NOTE

Check valve is not a repairable assembly. Use care not to lose or damage parts during disassembly procedures. Perform steps 3 thru 7 only if necessary to disassemble check valve.

- 3 Remove tube fitting locknut (7), ring spacer (8), and sleeve (9).

- 4 Remove tube fitting locknut (10) and sleeve (11).

WARNING

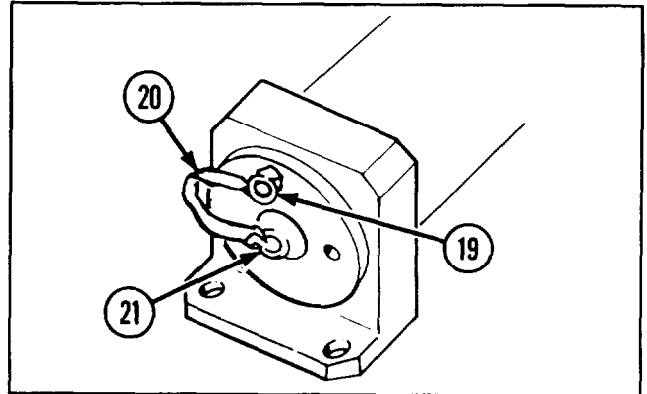
Check valve is under spring pressure. Use care when disassembling check valve to prevent injury to personnel and to prevent losing parts.

- 5 Unscrew check valve assembly (1) and separate inlet end (12) from outlet end (13).
- 6 Remove label (14), poppet (15), poppet stop (16), and spring (17) from inlet end (12) of check valve assembly (1).
- 7 If damaged, remove O-ring body seal (18) from outlet end (13) of check valve assembly (1).

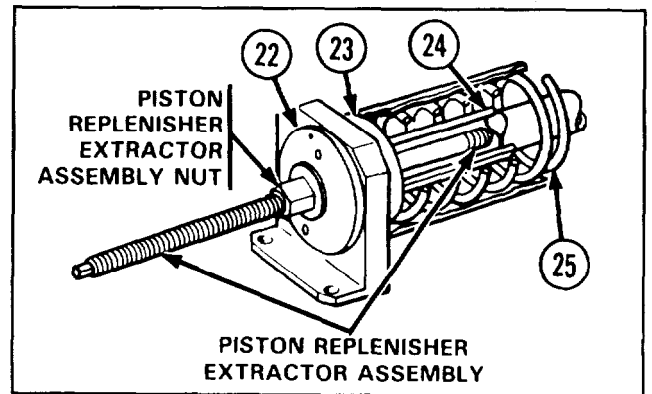
2-36. MAINTENANCE OF REPLENISHER ASSEMBLY (CONT).

DISASSEMBLY

8 Remove eyebolt (19), leather strap (20), and plug (21).

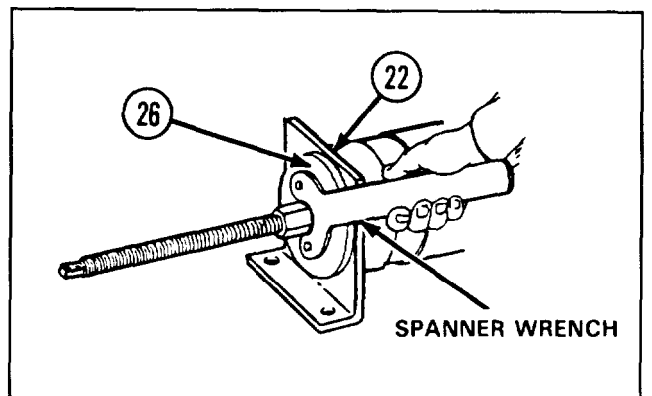


9 Install piston replenisher extractor assembly through guide (22) and cylinder (23), and screw threaded end into linear actuating piston (24).



10 Tighten piston replenisher extractor assembly nut to compress helical spring (25) inside cylinder (23).

11 Remove setscrew (26).

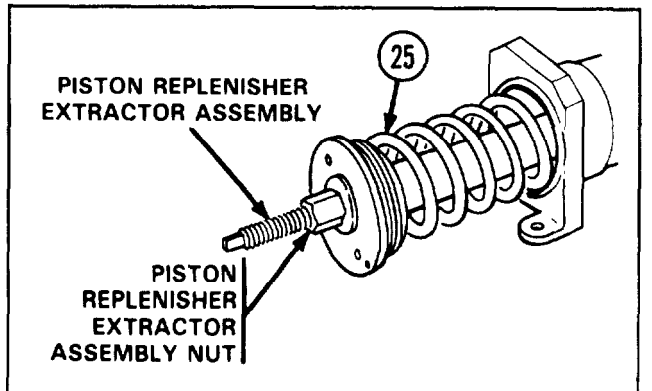


12 Using spanner wrench, unscrew and remove guide (22).

WARNING

Use caution when performing step 13. Assembly contains spring under high tension.

13 Hold piston replenisher extractor assembly and loosen piston replenisher extractor assembly nut to remove tension from helical spring (25).



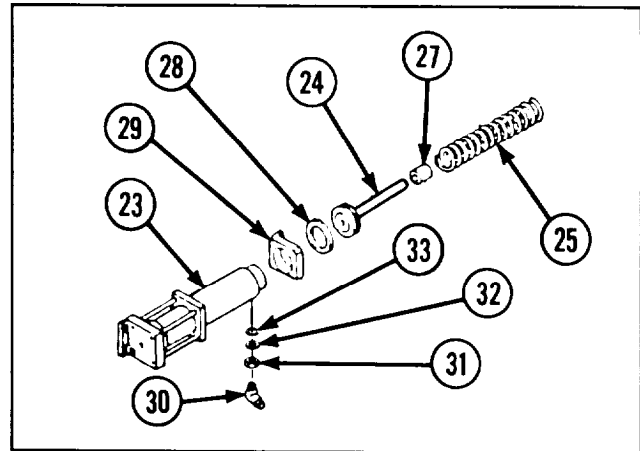
14 Unscrew and remove piston replenisher extractor assembly.

2-36. MAINTENANCE OF REPLENISHER ASSEMBLY (CONT)

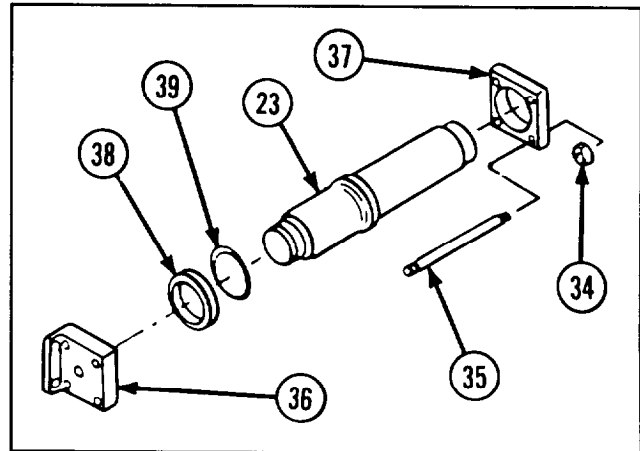
DISASSEMBLY (CONT)

15 Remove helical spring (25), sleeve bushing (27), linear actuating piston (24), preformed packing (28), and angle bracket (29) from cylinder (23).

16 Remove tube to boss bulkhead elbow (30), tube fitting locknut (31), flat washer (32), and preformed packing (33).



17 Remove four hex nuts (34), four studs (35), linear actuating cap (36), plate spacer (37), preformed packing (38), and packing retainer (39) from cylinder (23).



1 Inspect for broken, damaged, or missing parts.

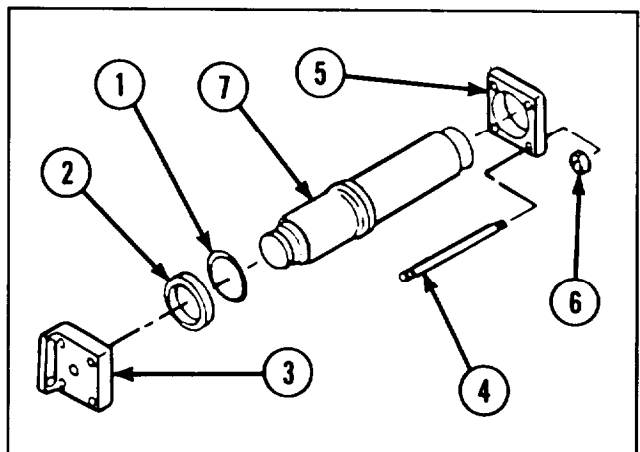
2 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

REASSEMBLY

NOTE

Measure inner diameter of cylinder. Measure machine linear actuating piston to measure 0.0015 to 0.0025 in. (0.0038 to 0.0064 cm) less than cylinder inside diameter.

1 Install packing retainer (1), new preformed packing (2), linear actuating cap (3), four studs (4), plate spacer (5), and four hex nuts (6) on cylinder (7).

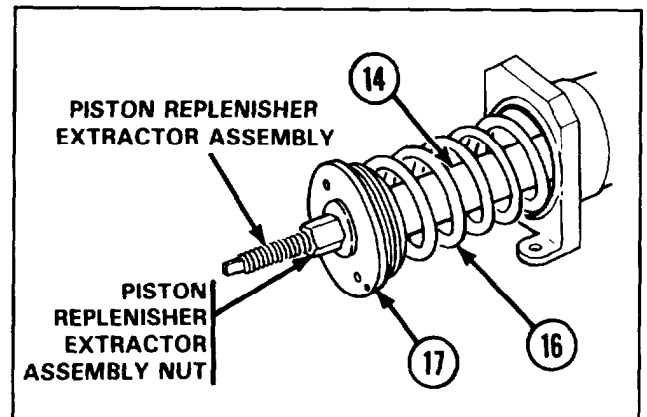
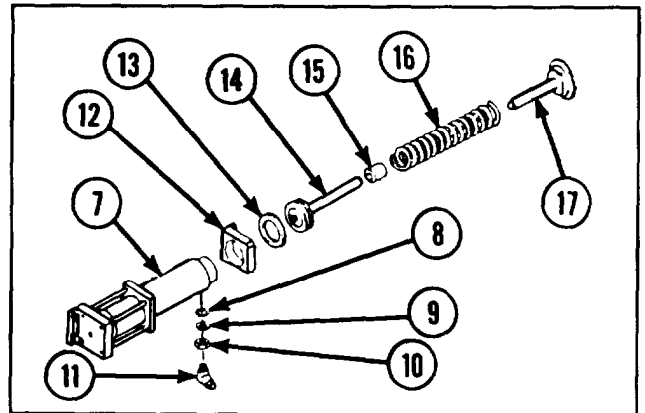


- 2 Install new preformed packing (8), flat washer (9), new tube fitting locknut (10) and tube to boss bulkhead elbow (11).
- 3 Position angle bracket (12), new preformed packing (13), linear actuating piston (14), sleeve bushing (15), helical spring (16), and guide (17) in cylinder (7).

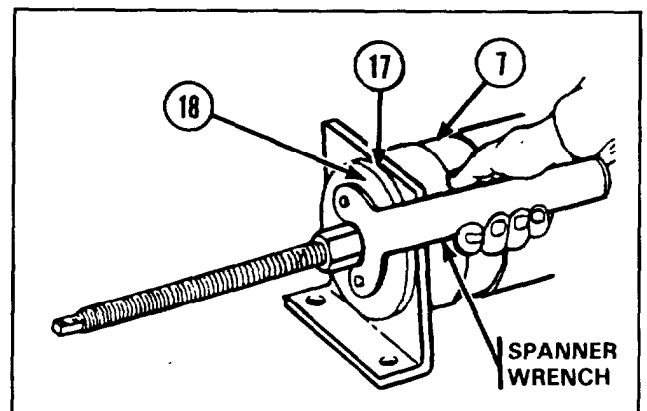
NOTE

If replacing piston, new linear actuating piston must be cut to size. Width of piston must be 0.0015 to 0.0025 in. (0.0038 to 0.0064 cm) less than inside diameter of cylinder.

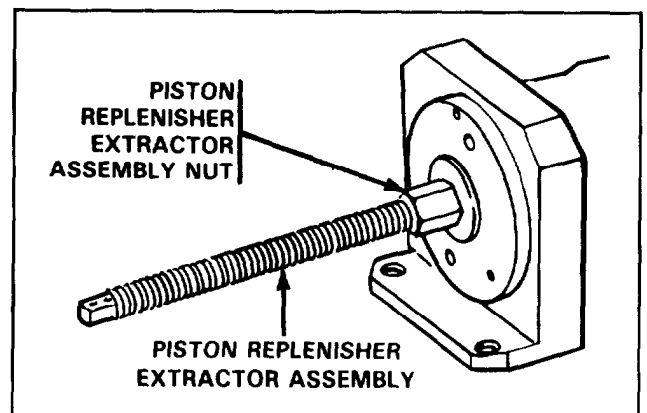
- 4 Install piston replenisher extractor assembly through guide (17) and screw threaded end into linear actuating piston (14).
- 5 Tighten piston replenisher extractor assembly nut to compress helical spring (16).



- 6 Using spanner wrench, install guide (17) in cylinder (7).
- 7 Install setscrew (18).



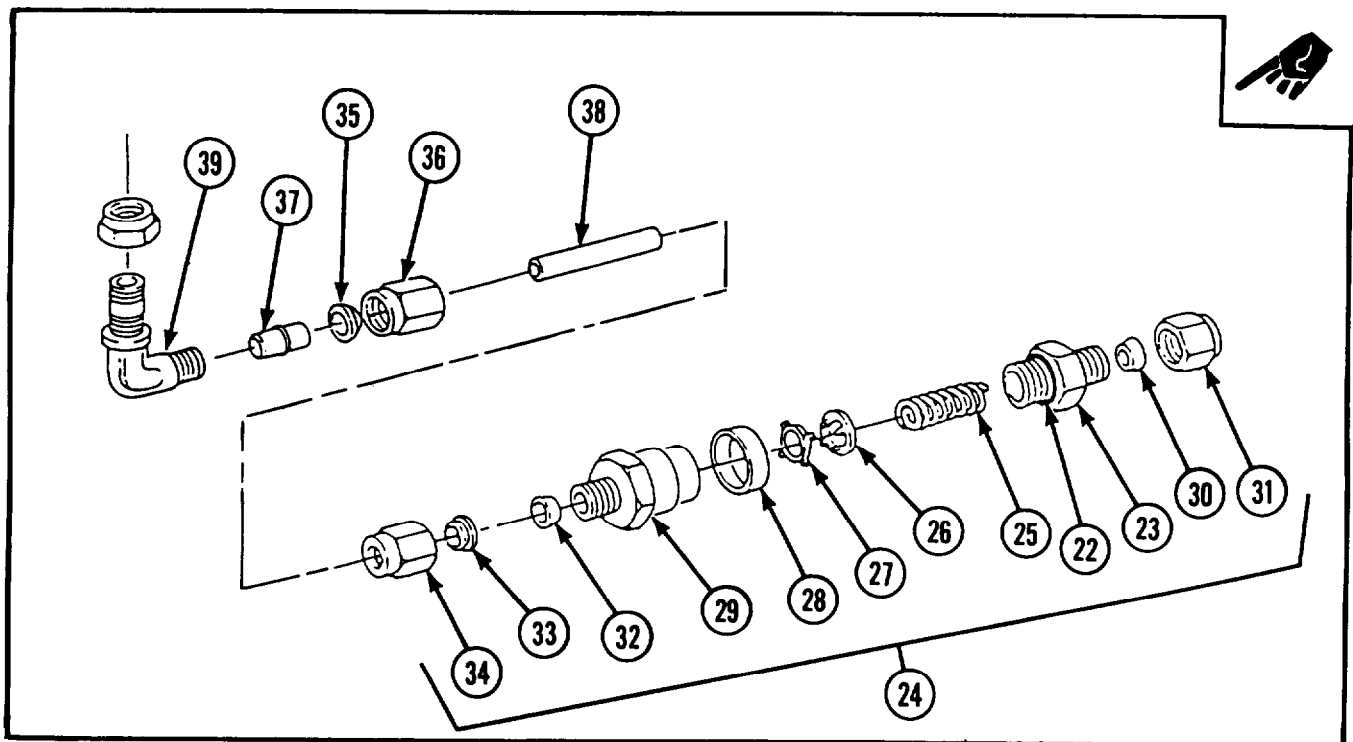
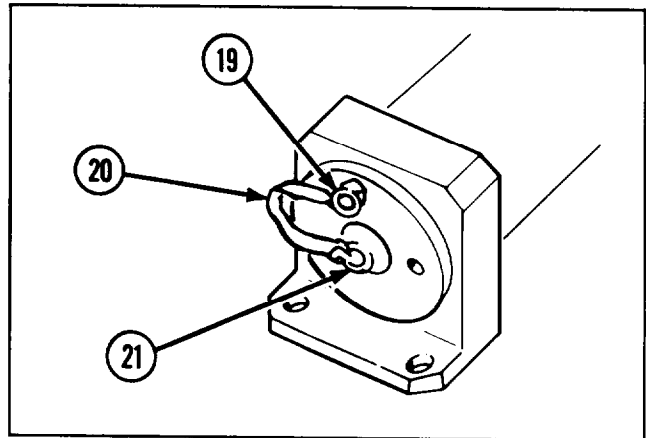
- 8 Loosen piston replenisher extractor assembly nut to relieve spring tension.
- 9 Remove piston replenisher extractor assembly.



2-36. MAINTENANCE OF REPLENISHER ASSEMBLY (CONT).

REASSEMBLY (CONT)

10 Install eyebolt (19), leather strap (20), and plug (21).



11 If removed, install new O-ring body seal (22) on outlet end (23) of check valve assembly (24).

12 Install spring (25), poppet stop (26), poppet (27) and label (28) on inlet end (29) of check valve assembly (24).

13 Screw inlet end (29) of check valve assembly (24) into outlet end (23) of check valve assembly.

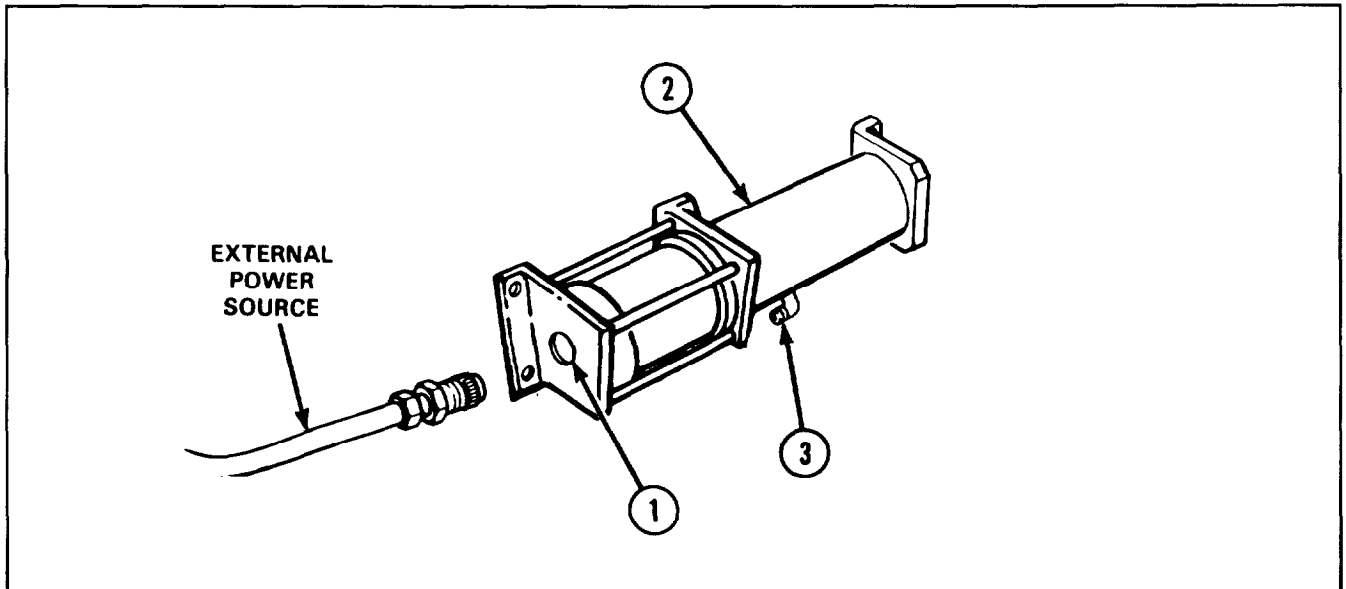
14 Install sleeve (30) and tube fitting locknut (31).

15 Install sleeve (32), ring spacer (33), and tube fitting locknut (34).

16 Install ring spacer (35) on tube coupling nut (36).

17 Install tube sleeve (37), tube coupling nut (36), metallic tube (38) and check valve assembly (24) on tube elbow (39).

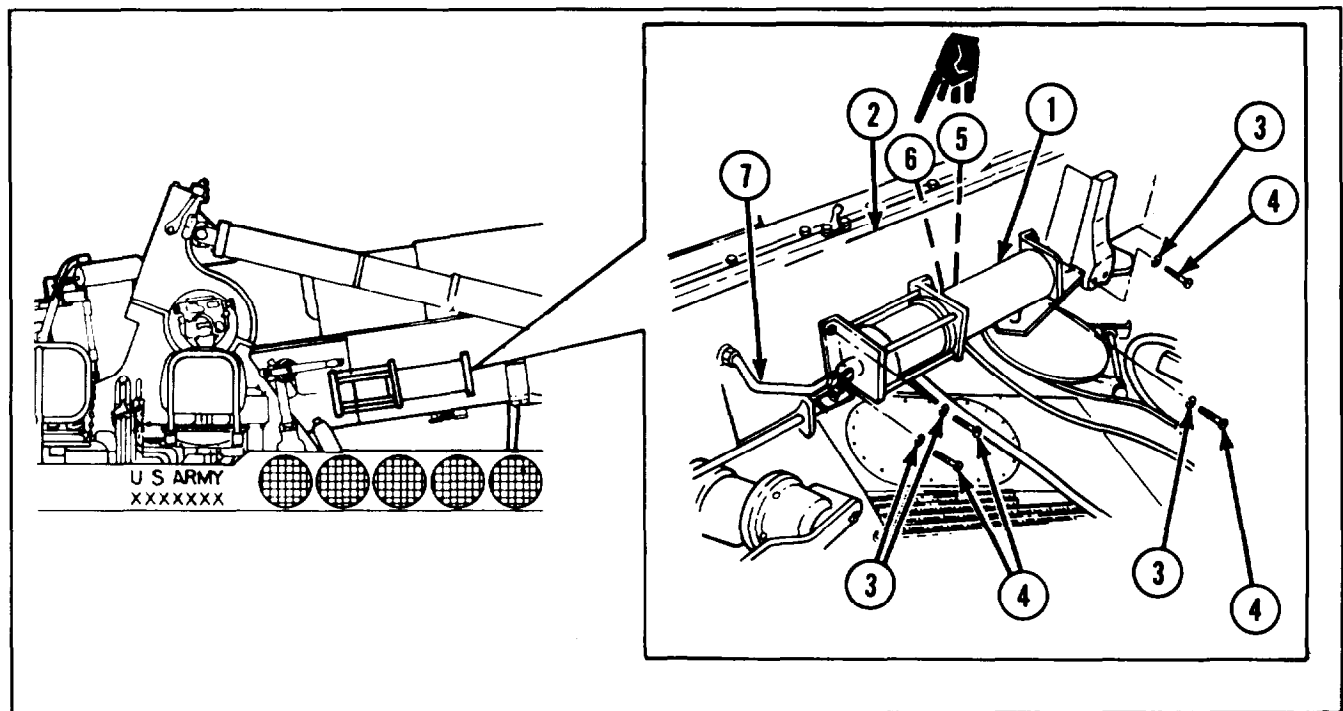
TESTING



- 1 Refer to TM 9-4940-468-14 for test set-up and testing procedures.
- 2 Connect supply line of external power source to port A (1) of replenisher assembly (2).
- 3 Cap elbow (3) of replenisher assembly (2).
- 4 Using external power source, apply 3000 psi (20,685 kPa) to replenisher assembly (2). Maintain pressure for 5 minutes and inspect for leaks.
- 5 If leaks occur, inspect packing retainers or preformed packings.
- 6 If packing retainers or preformed packings are damaged, replace packing retainers or preformed packings.
- 7 Repeat steps 2 thru 4.
- 8 If leaks continue to occur, replace replenisher assembly (2).

2-36. MAINTENANCE OF REPLENISHER ASSEMBLY (CONT).

INSTALLATION



1 Position replenisher assembly (1) on M174 gun mount (2) and secure with four new lockwashers (3) and four capscrews (4).

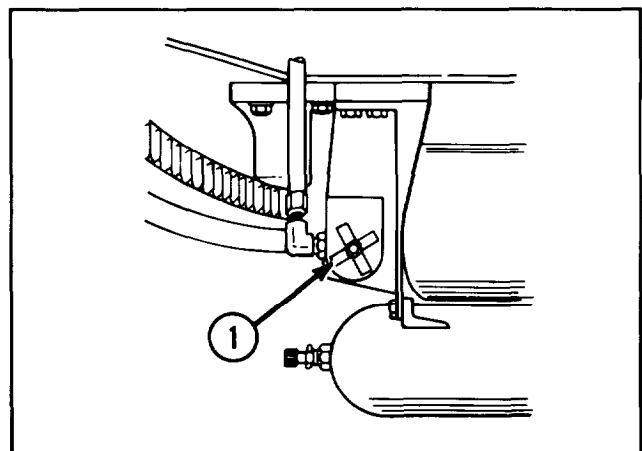
2 Remove tube opening cover and connect tube (5) to tube elbow (6). For complete reassembly of hydraulic lines and fittings, refer to page 2-27.

3 Remove tube opening cover and connect tube (7) to replenisher assembly (1). For complete reassembly of hydraulic lines and fittings, refer to page 2-27.

APPLYING HYDRAULIC PRESSURE

1 Close globe angle valve (1).

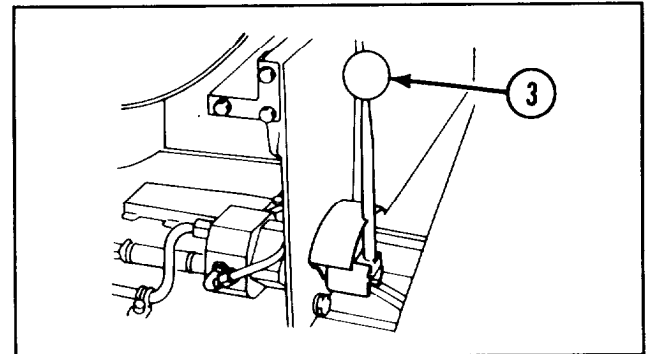
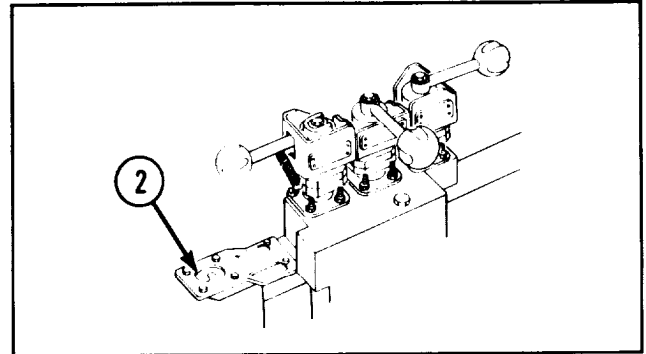
2 Start engine.



NOTE

Hydraulic motor and pump may be used to apply pressure to hydraulic system without starting engine by setting MASTER switch and OIL PUMP MOTOR SWitch ON.

- 3 Set HYD PUMP/PTO CLUTCH switch to ON.
- 4 Check dial pressure gage (2) indication. Normal pressure is 1600 to 2400 psi (11,032 to 16,548 kPa).
- 5 Stop engine.
- 6 Move control handle (3) to RETRACT, then to RETURN, then back to RETRACT several times to bleed air from system.



2-37. MAINTENANCE OF REPLENISHER ASSEMBLY (ALTERNATE) AND ACTUATING CYLINDER.

This task covers:

- | | |
|--|---------------------------------------|
| a. <i>Relieving Hydraulic Pressure</i> | e. <i>Reassembly</i> |
| b. <i>Removal</i> | f. <i>Installation</i> |
| c. <i>Disassembly</i> | g. <i>Applying Hydraulic Pressure</i> |
| d. <i>Inspection/Repair</i> | |

INITIAL SETUP

Tools and Special Tools

Ordnance artillery and turret mechanic's tool kit (SC 5180-95-CL-A121)
 Piston replenisher extractor assembly (7114815)
 Spanner wrench (7124975)

Materials/Parts

Lockwasher (4) (MS35338-50)
 Preformed packing (M83461/1-341)

References

TM 9-2350-304-24P-2

Equipment Conditions

This procedure pertains to the old style replenisher assembly only, as illustrated below. The old and new configurations are not interchangeable.

General Safety Instructions

WARNING

- Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as level ground as possible. This will stop the cannon from sliding out of battery.
- Hydraulic system is under high pressure. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.
- Use caution when performing step 6. Assembly contains spring under high tension.

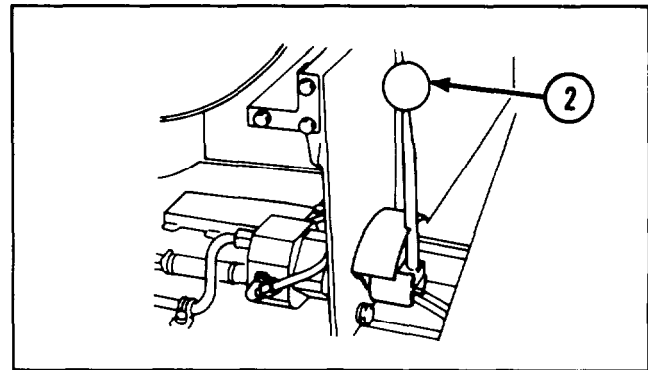
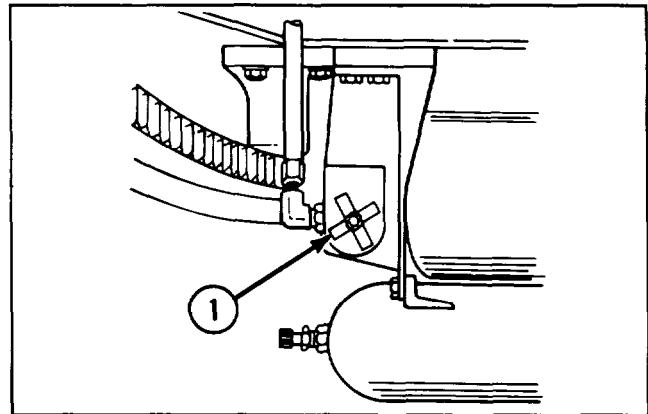
2-37. MAINTENANCE OF REPLENISHER ASSEMBLY (ALTERNATE) AND ACTUATING CYLINDER (CONT).

RELIEVING HYDRAULIC PRESSURE

WARNING

Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as level ground as possible. This will stop the cannon from sliding out of battery.

- 1 Set MASTER switch to OFF.
- 2 Open globe angle valve (1).
- 3 Hold control handle (2) in RETURN for 1 minute, then in RETRACT for 1 minute to relieve hydraulic system pressure.

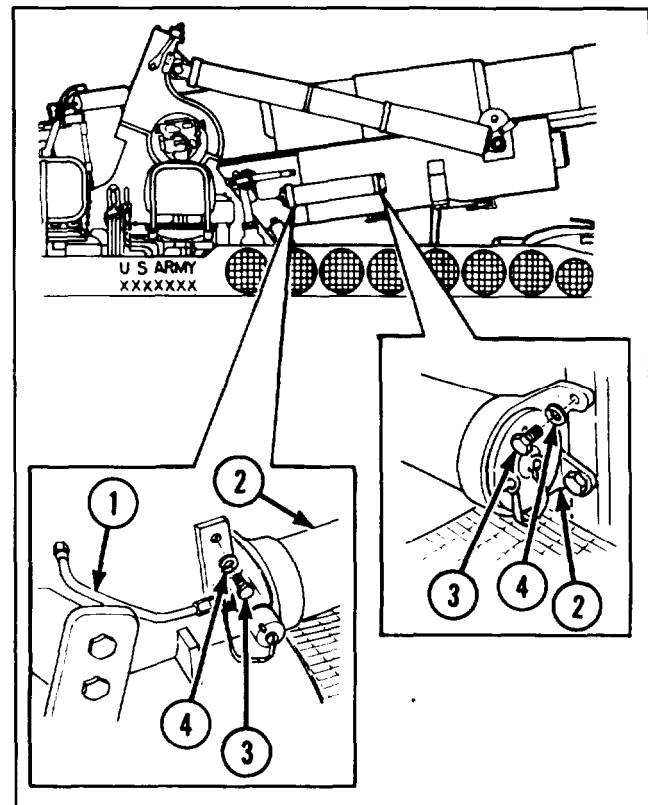


REMOVAL

WARNING

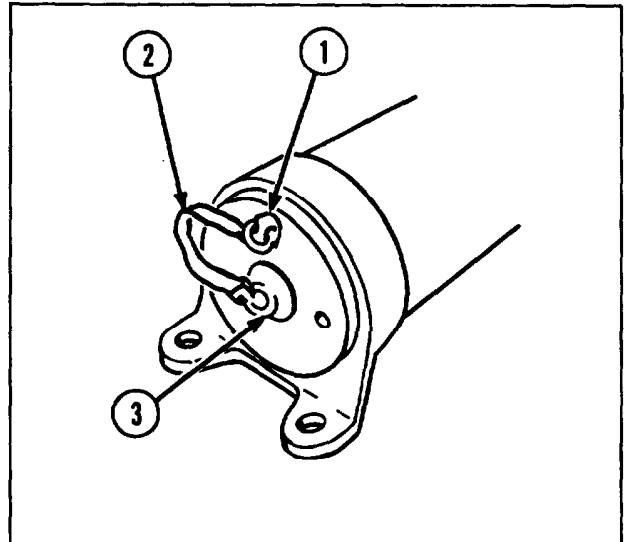
Hydraulic system is under high pressure. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

- 1 Disconnect tube (1) from replenisher assembly (2) and cover tube opening. For complete disassembly of hydraulic lines and fittings, refer to page 2-27.
- 2 Remove four capscrews (3), four lock-washers (4), and replenisher assembly (2).

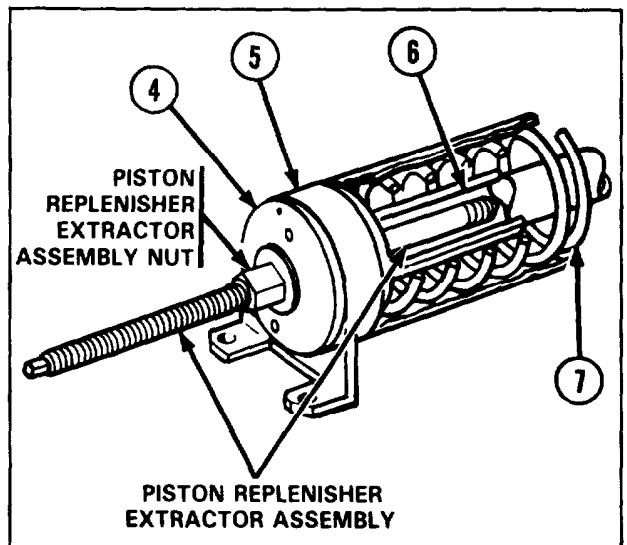


DISASSEMBLY

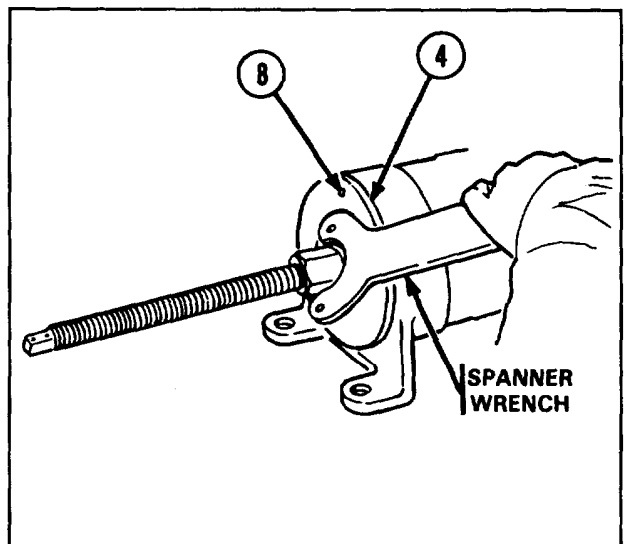
- 1 Remove eyebolt (1), leather strap (2), and plug (3).



- 2 Install piston replenisher extractor assembly through guide (4) and actuating cylinder (5), and screw threaded end into linear actuating piston (6).
- 3 Tighten piston replenisher extractor assembly nut to compress helical spring (7), inside actuating cylinder (5).



- 4 Remove setscrew (8).
- 5 Using spanner wrench, unscrew and remove guide (4).



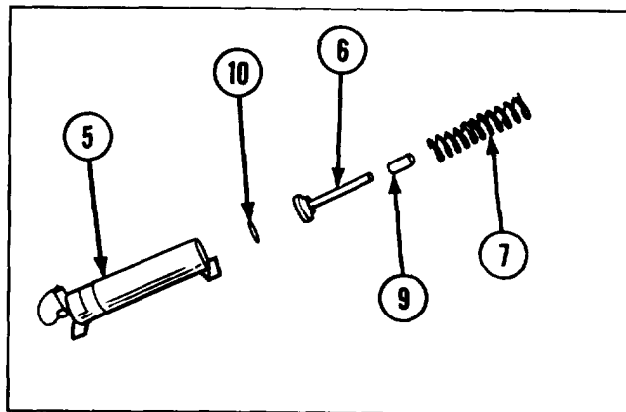
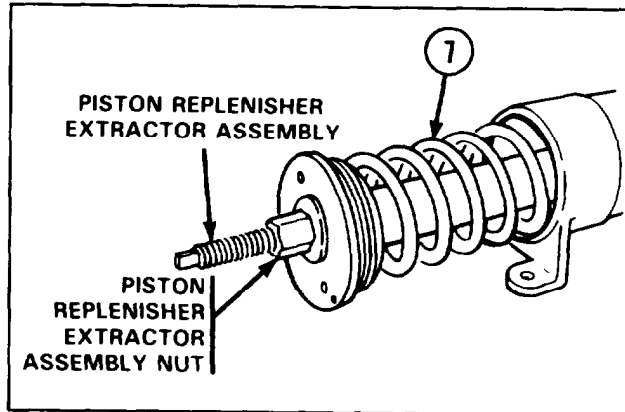
2-37. MAINTENANCE OF REPLENISHER ASSEMBLY (ALTERNATE) AND ACTUATING CYLINDER (CONT).

DISASSEMBLY (CONT)

WARNING

Use caution when performing step 6. Assembly contains spring under high tension.

- 6 Hold piston replenisher extractor assembly and loosen piston replenisher extractor assembly nut to remove tension from helical spring (7).
- 7 Unscrew and remove piston replenisher extractor assembly.
- 8 Remove helical spring (7), sleeve bushing (9), linear actuating piston (6), preformed packing (10), and actuating cylinder (5).

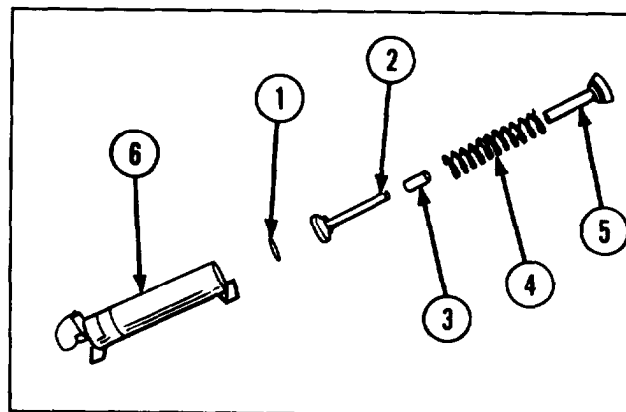


INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 Actuating cylinder is not repairable at this maintenance level. If damaged, notify depot maintenance.
- 3 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

REASSEMBLY

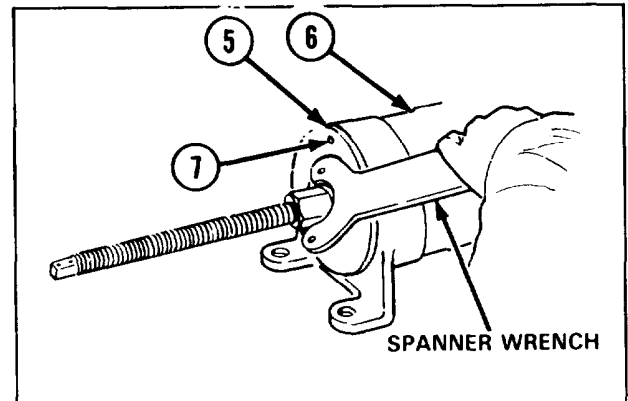
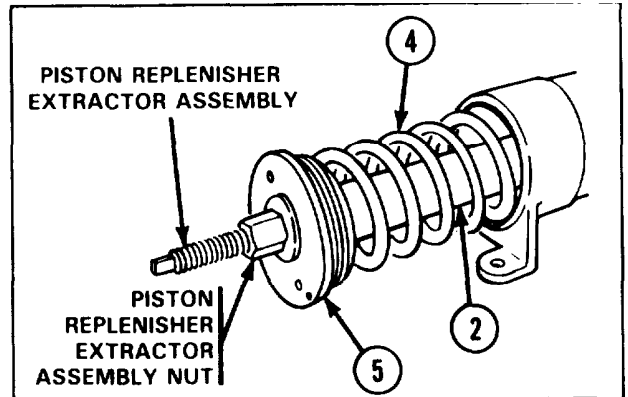
- 1 Position new preformed packing (1), linear actuating piston (2), sleeve bushing (3), helical spring (4), and guide (5) in actuating cylinder (6).



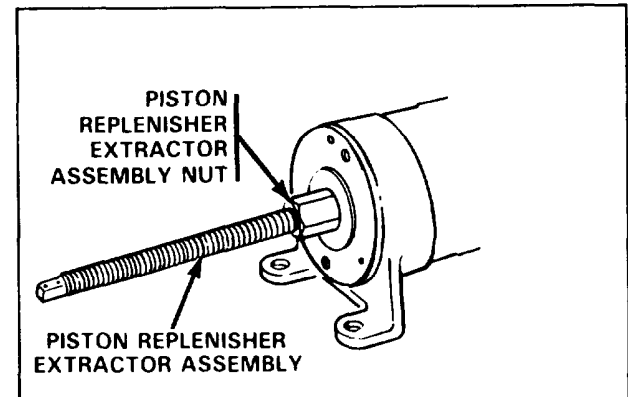
NOTE

If replacing piston, new linear actuating piston must be cut to size. Width of piston rod must be 0.0015 to 0.0025 in. (0.0038 to 0.0064 cm) less than inside diameter of cylinder.

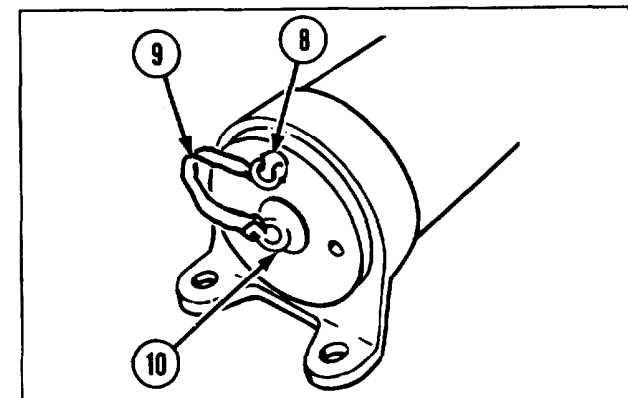
- 2 Install piston replenisher extractor assembly through guide (5) and screw threaded end into linear actuating piston (2).
- 3 Tighten piston replenisher extractor assembly nut to compress helical spring (4).
- 4 Using spanner wrench, install guide (5) in actuating cylinder (6).
- 5 Install setscrew (7).



- 6 Loosen piston replenisher extractor assembly nut to relieve spring tension.
- 7 Remove piston replenisher extractor assembly.

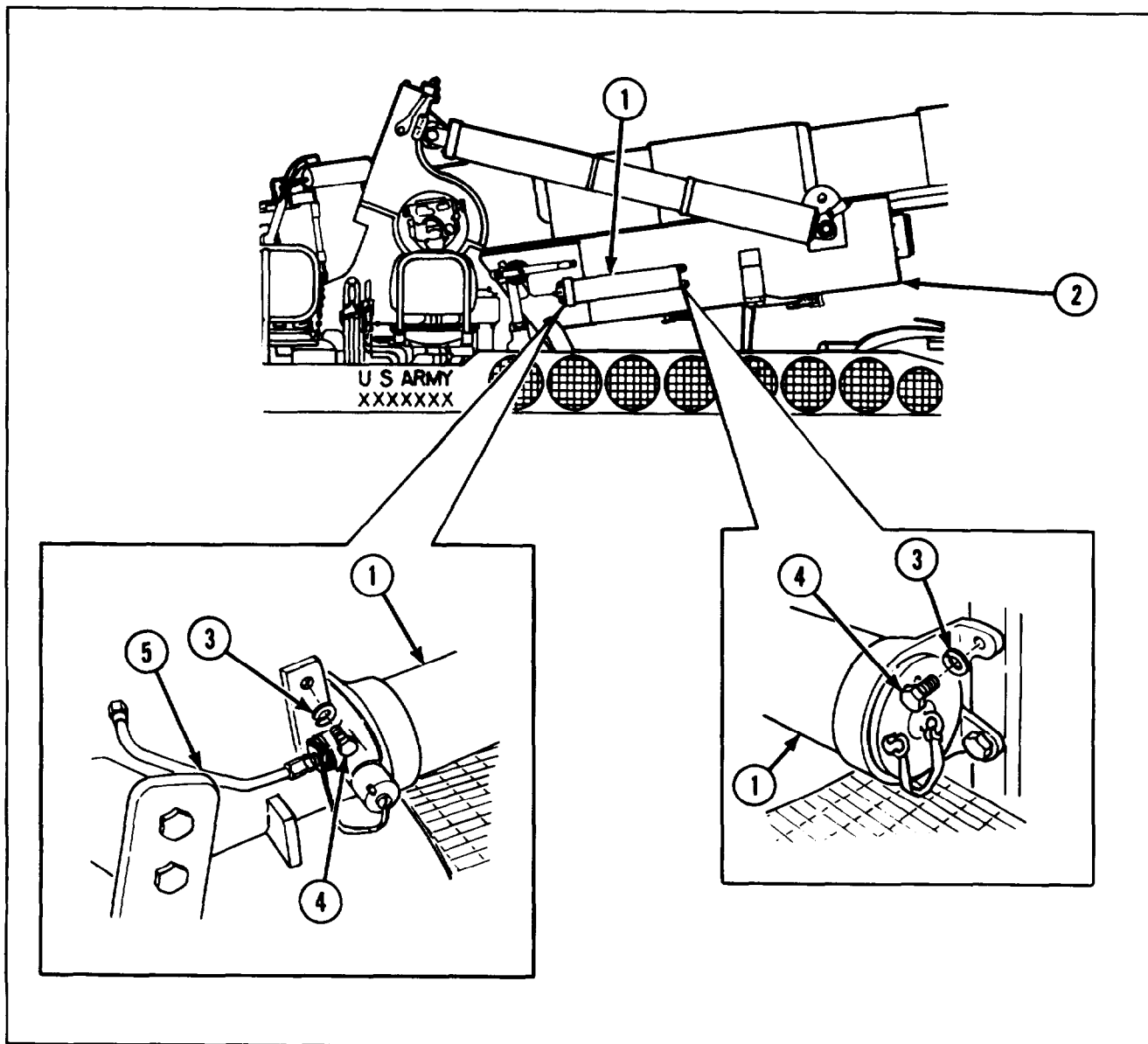


- 8 Install eyebolt (8), leather strap (9), and plug (10).



2-37. MAINTENANCE OF REPLENISHER ASSEMBLY (ALTERNATE) AND ACTUATING CYLINDER (CONT).

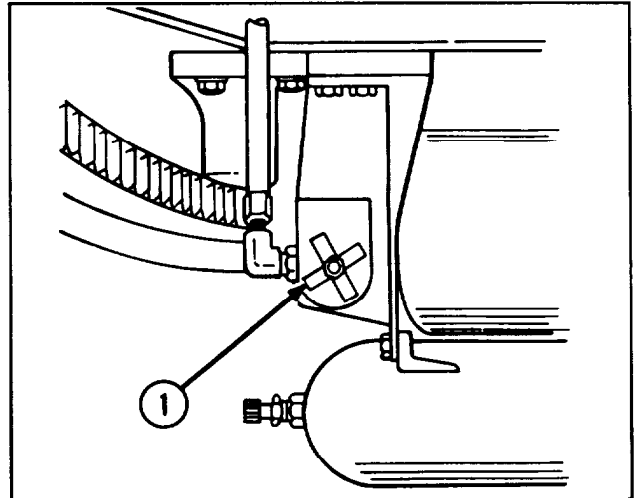
INSTALLATION



- 1 Position replenisher assembly (1) on M174 gun mount (2) and secure with four new lockwashers (3) and four capscrews (4).
- 2 Remove tube opening cover and connect tube (5) to replenisher assembly (1). For complete reassembly of hydraulic lines and fittings, refer to page 2-27.

APPLYING HYDRAULIC PRESSURE

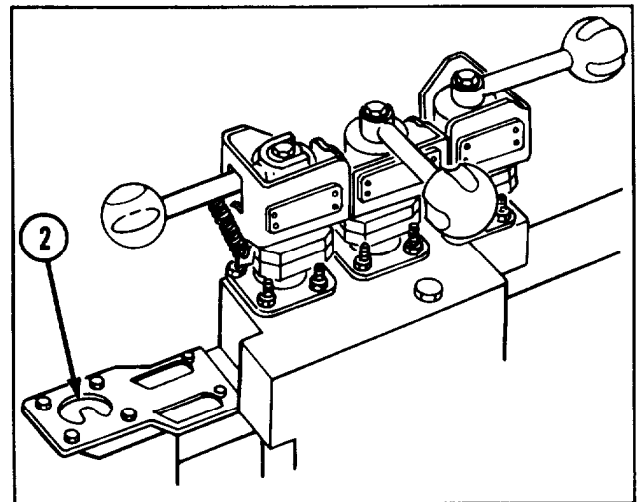
- 1 Close globe angle valve (1).
- 2 Start engine.



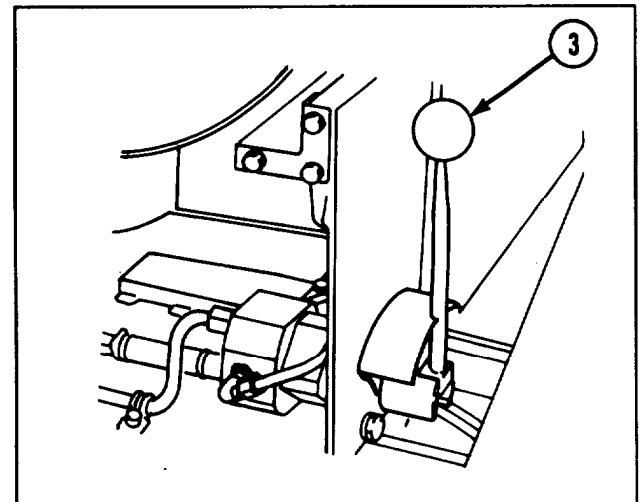
NOTE

Hydraulic motor and pump may be used to apply pressure to hydraulic system without starting engine by setting MASTER switch and OIL PUMP MOTOR Switch ON.

- 3 Set HYD PUMP/PTO CLUTCH switch to ON.
- 4 Check dial pressure gage (2) indication. Normal pressure is 1600 to 2400, (11,032 to 16,548 kPa).
- 5 Stop engine.



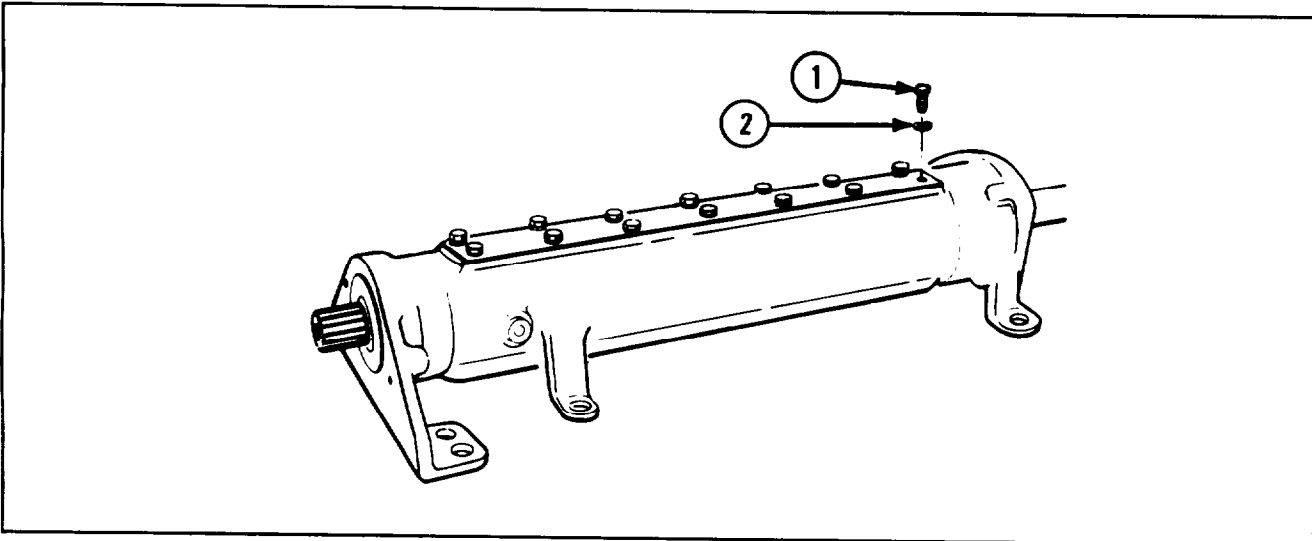
- 6 Move control handle (3) to RETRACT, then to RETURN, then back to RETRACT several times to bleed air from system.



2-38. MAINTENANCE OF RECOIL STROKE CONTROL CAM.

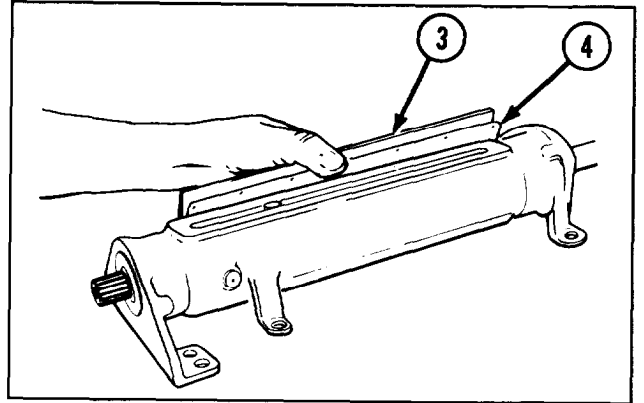
This task covers:		
a. <i>Disassembly</i>	b. <i>Inspection/Repair</i>	c. <i>Reassembly</i>
INITIAL SETUP		
Tools and Special Tools Artillery maintenance shop equipment (SC 4933-95-CL-A12) Press Puller Retaining ring pliers Ordnance artillery and turret mechanic's tool kit (SC 5180-95-CL-A12)	References TM 9-2350-304-24P-2	Equipment Conditions 2-92 Recoil stroke control cam removed
Materials/Parts Gasket (10892034) Grease (item 12, appx B) Lockwasher (18) (MS35338-44) Lockwasher (MS35338-46) Prefomed packing (M8346/1-333)		

DISASSEMBLY

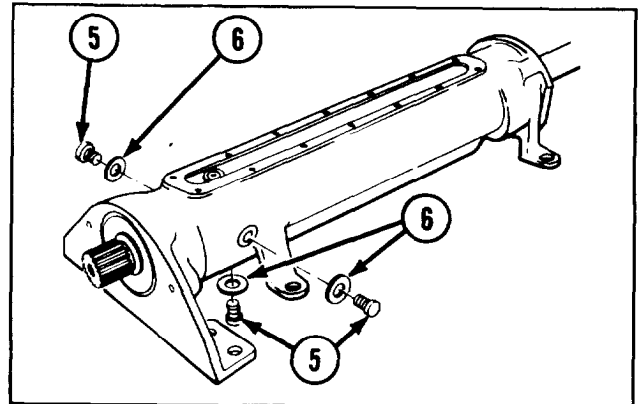


1 Remove fourteen capscrews (1) and fourteen lockwashers (2).

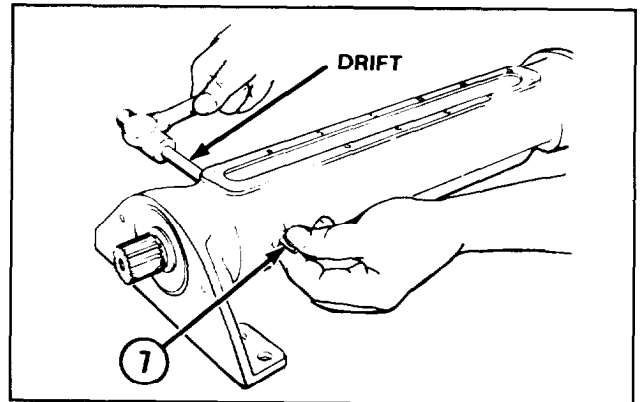
2 Remove access cover (3) and gasket (4).



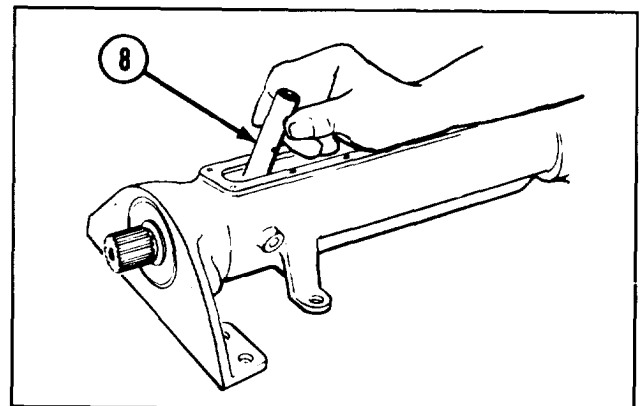
3 Remove three machine plugs (5) and three flat washers (6).



4 Using drift, remove spring pin (7).

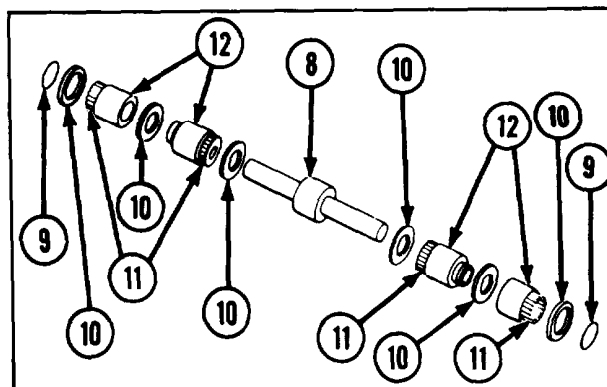


5 Remove cam control shaft (8).

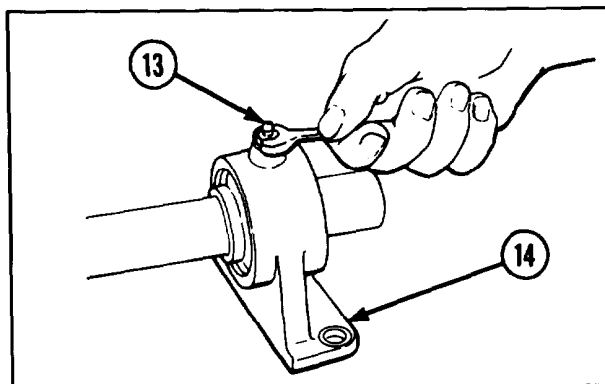


2-38. MAINTENANCE OF RECOIL STROKE CONTROL CAM (CONT).

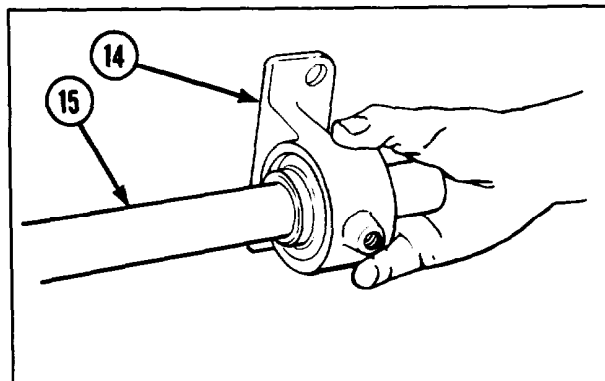
- 6 Remove two retaining rings (9), six flat washers (10), 128 needle bearing rollers (11), and four outer bearing rings (12) from cam control shaft (8).



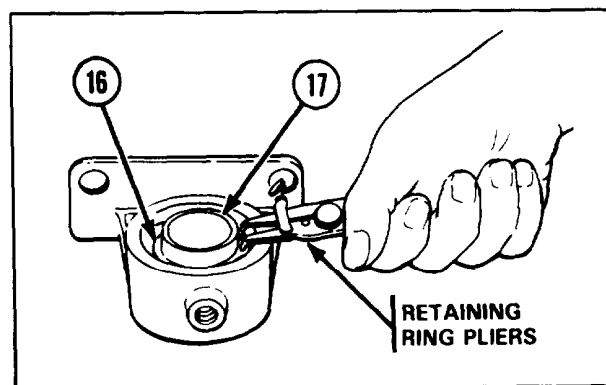
- 7 Remove lubrication fitting (13) from eye bracket (14).



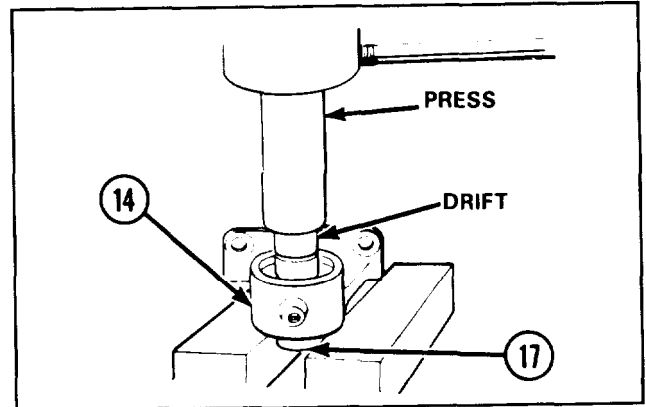
- 8 Remove eye bracket (14) from shouldered shaft (15).



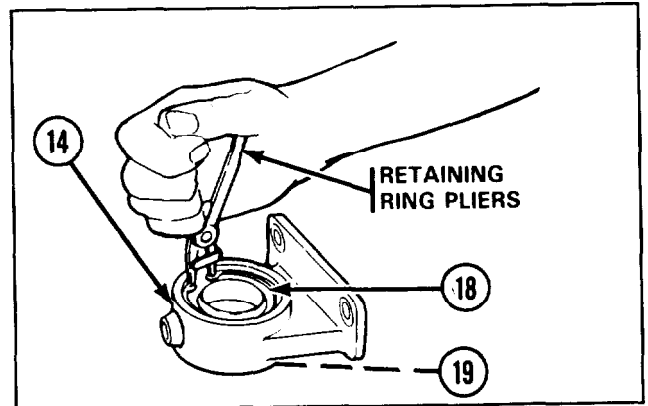
- 9 Using retaining ring pliers, remove retaining ring (16) from plain bearing (17).



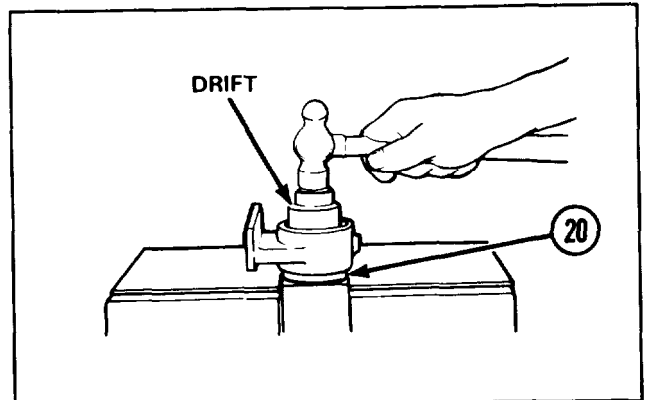
- 10 Using press and drift, remove plain bearing (17) from eye bracket (14).



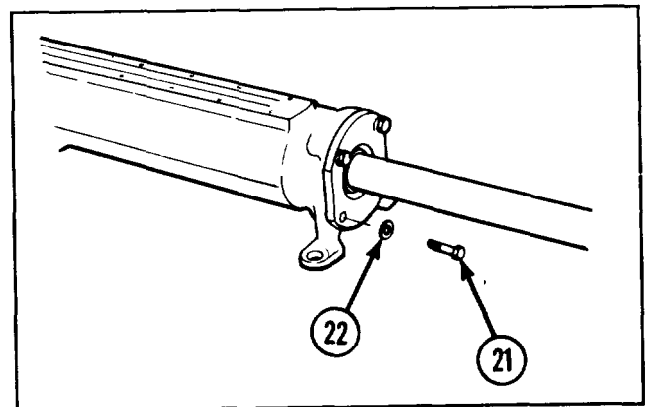
- 11 Using retaining ring pliers, remove retaining ring (18) and retaining ring (19) from grooves on each side of eye bracket (14).



- 12 Using drift, remove sleeve bearing (20).



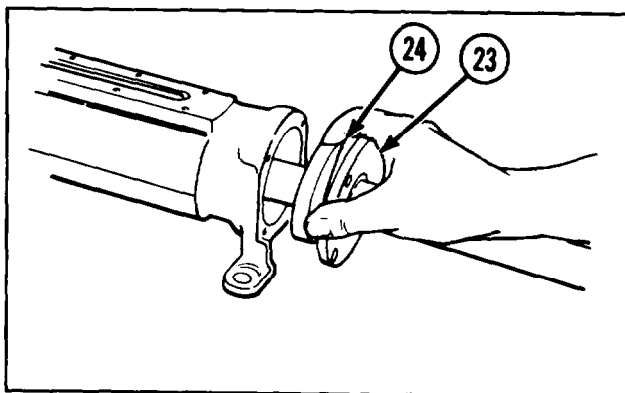
- 13 Remove four capscrews (21) and four lockwashers (22).



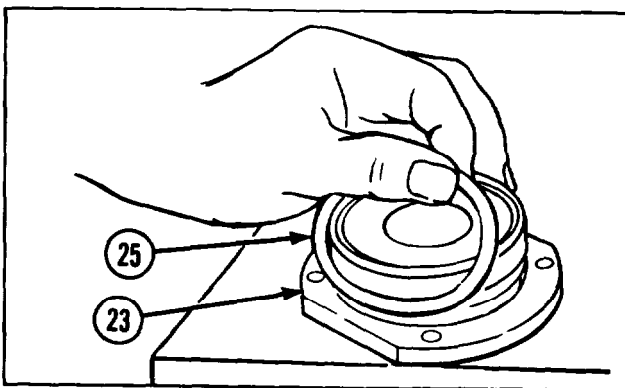
2-38. MAINTENANCE OF RECOIL STROKE CONTROL CAM (CONT).

DISASSEMBLY (CONT)

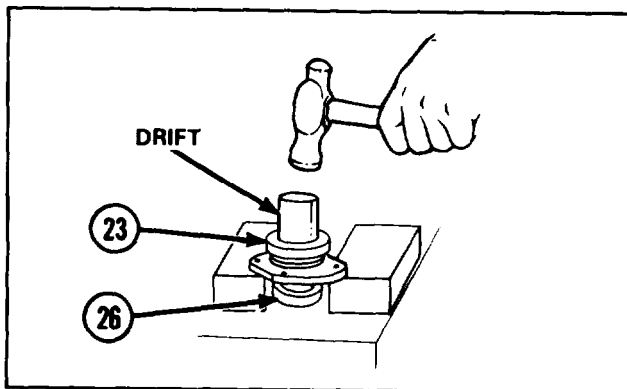
14 Remove retaining plate (23) and shim (24).



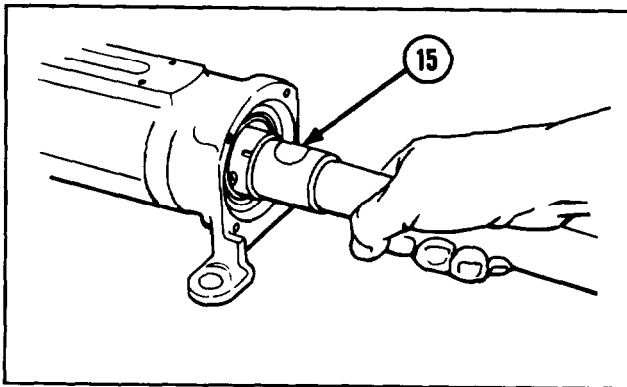
15 Remove preformed packing (25) from retaining plate (23).



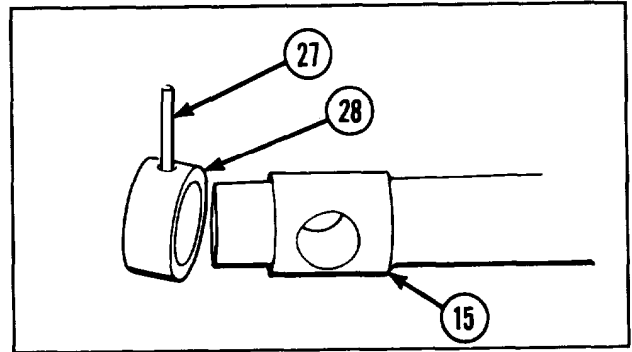
16 Using drift, remove seal (26) from retaining plate (23).



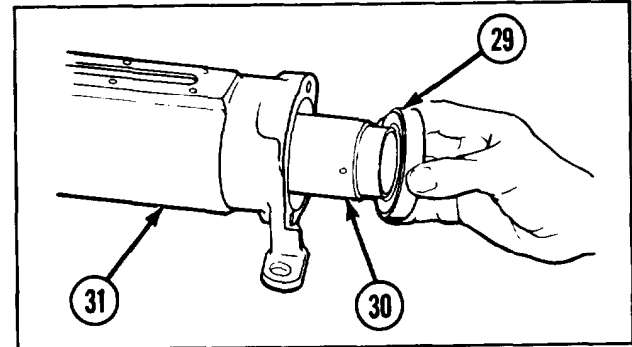
17 Remove shouldered shaft (15).



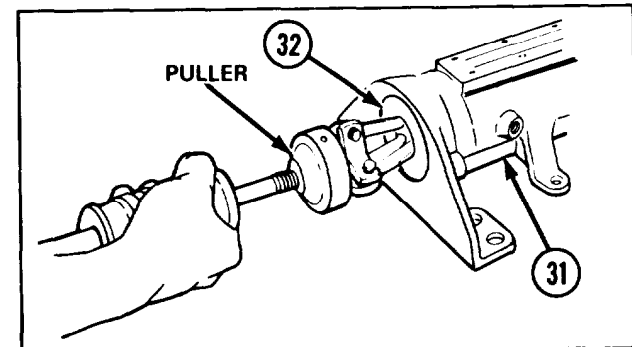
- 18 Remove spring pin (27) and sleeve bearing (28) from shouldered shaft (151).



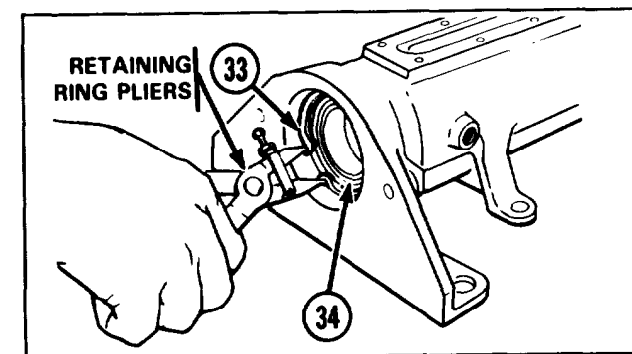
- 19 Remove ball bearing (29) and variable recoil cam (30) from variable recoil cam housing (31).



- 20 Using puller, remove seal (32) from variable recoil cam housing (31).



- 21 Using retaining ring pliers, remove retaining ring (33) and ball bearing (34).



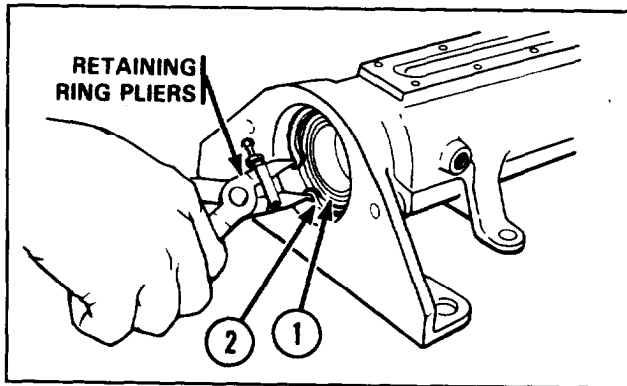
INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

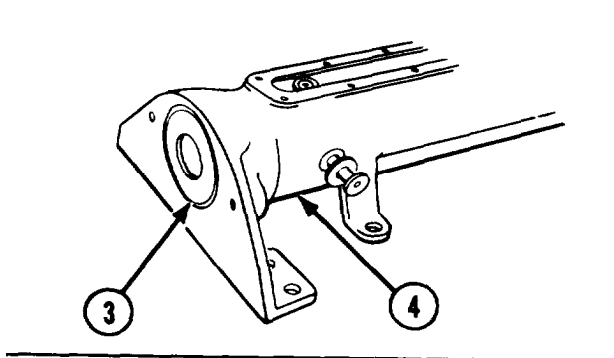
2-38. MAINTENANCE OF RECOIL STROKE CONTROL CAM (CONT).

REASSEMBLY

- 1 Pack bearings and coat all internal parts with grease (item 12, appx B).
- 2 Install ball bearing (1) and, using retaining ring pliers, install retaining ring (2).



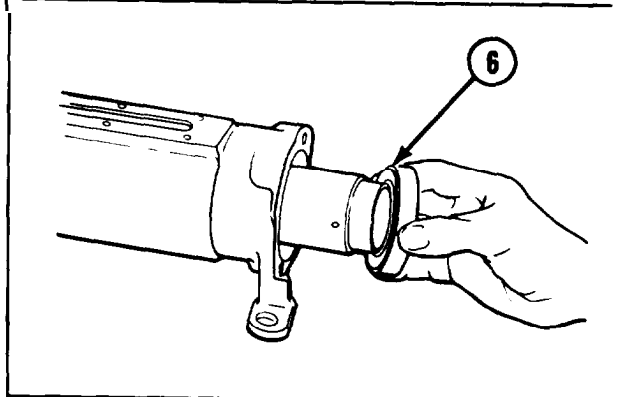
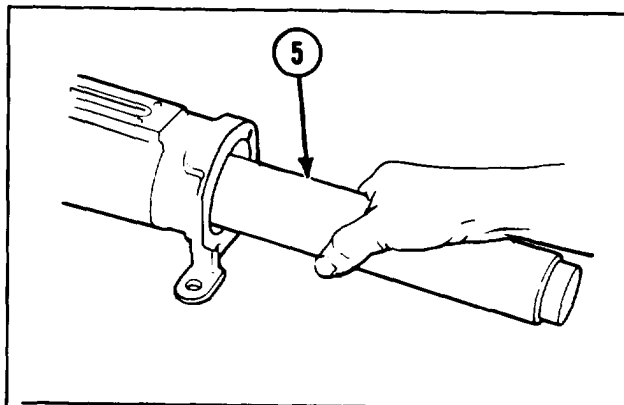
- 3 Using drift, install seal (3) in variable recoil cam housing (4).



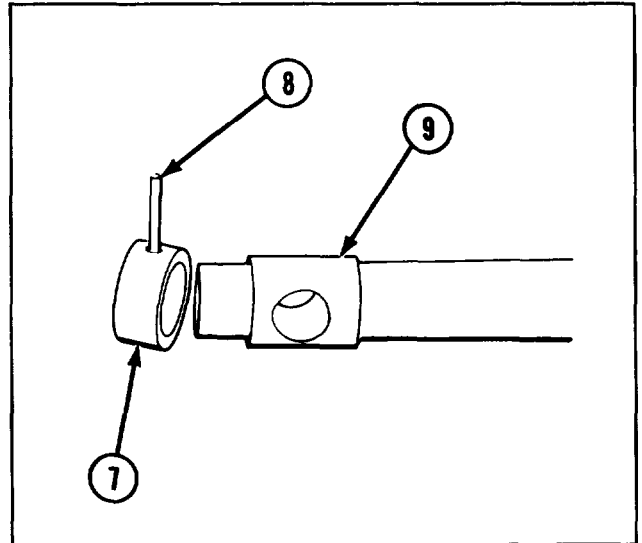
NOTE

Prior to installation, pack bearings in grease (item 12, appx B).

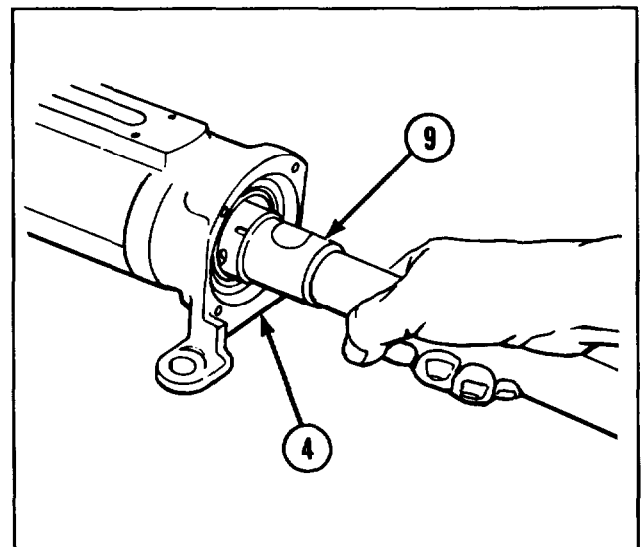
- 4 Install variable recoil cam (5) and ball bearing (6).



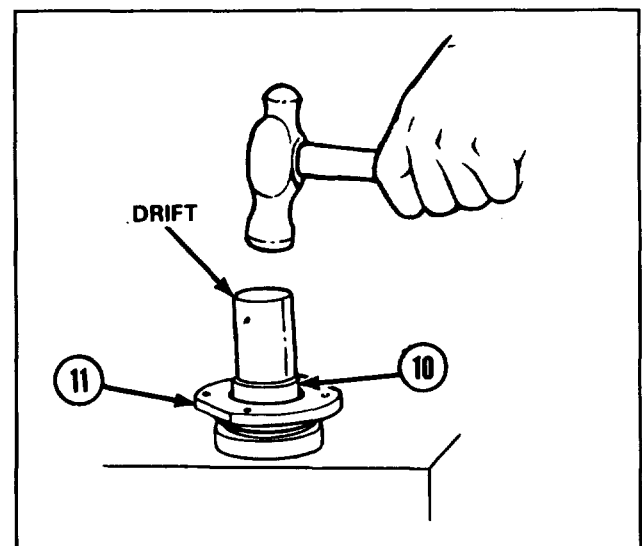
5 Install sleeve bearing (7) and spring pin (8) on shouldered shaft (9).



6 Install shouldered shaft (9) in variable recoil cam housing (4).



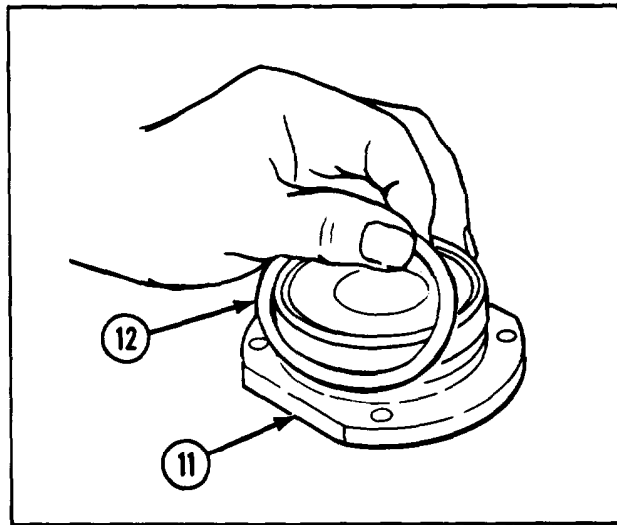
7 Using drift, install seal (10) in retaining plate (11).



2-38. MAINTENANCE OF RECOIL STROKE CONTROL CAM (CONT),

REASSEMBLY (CONT)

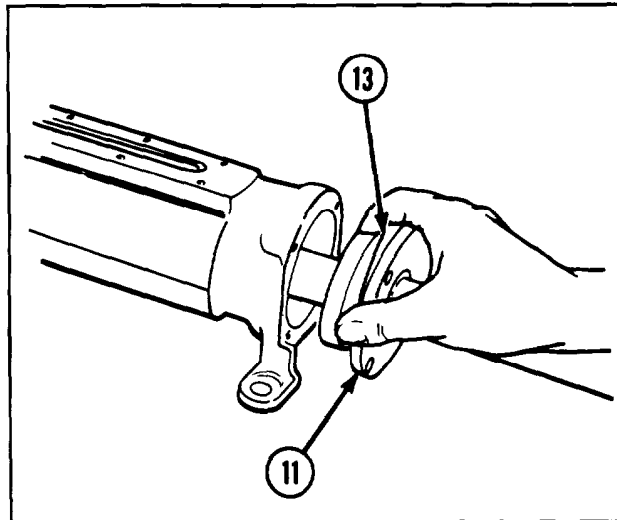
8 Install new preformed packing (12) on retaining plate (11).



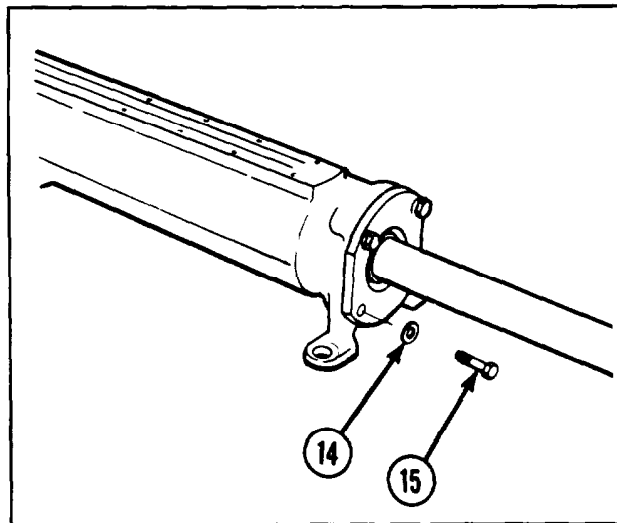
NOTE

Shim bushing to remove all end play in variable recoil cam.

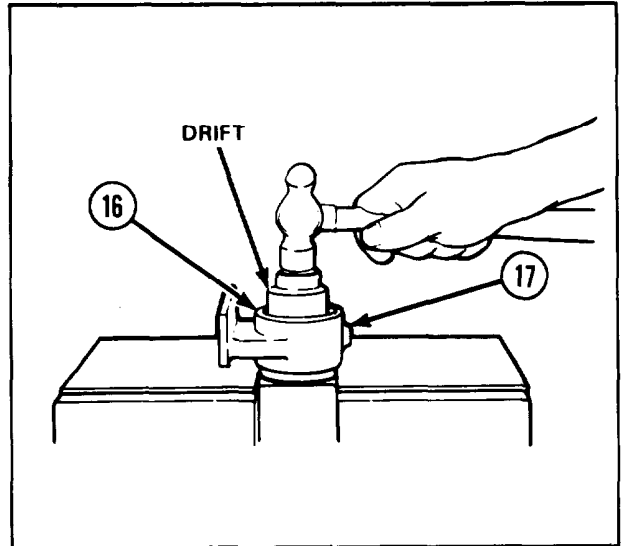
9 Install retaining plate (11) and shim (13).



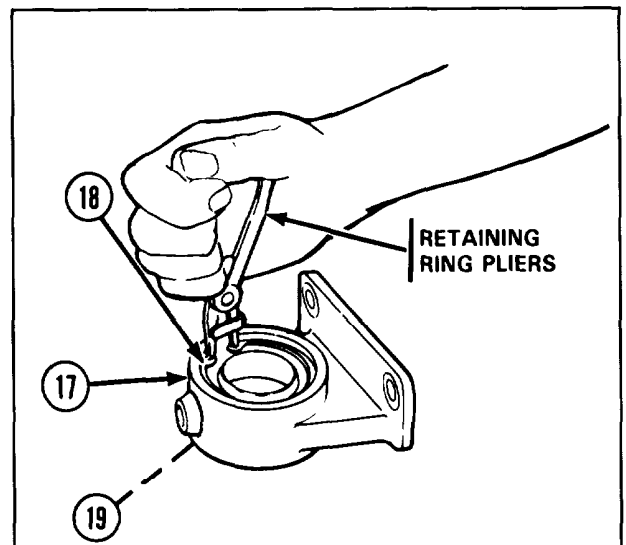
10 Install four new lockwashers (14) and four capscrews (15).



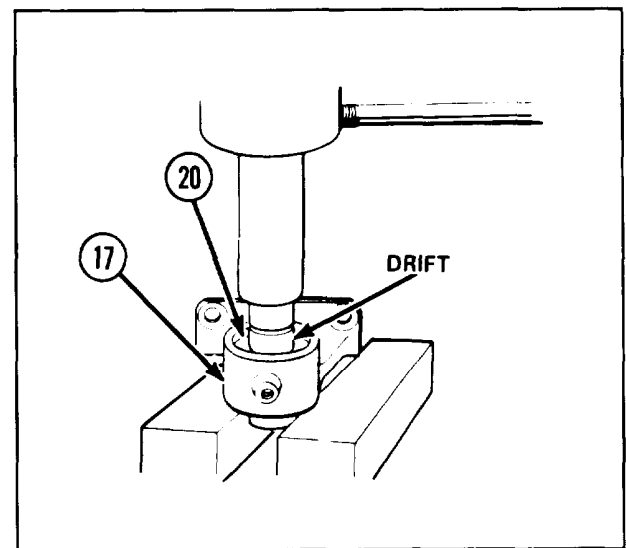
- 11 Using drift, install sleeve bearing (16) in eye bracket (17).



- 12 Using retaining ring pliers, install retaining ring (18) and retaining ring (19) in grooves in each side of eye bracket (17).



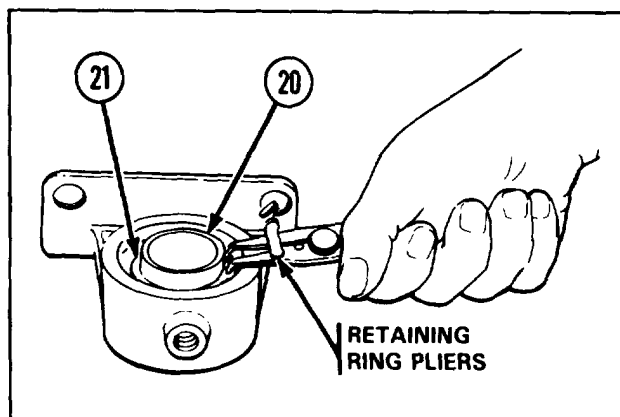
- 13 Using press and drift, install plain bearing (20) in eye bracket (17).



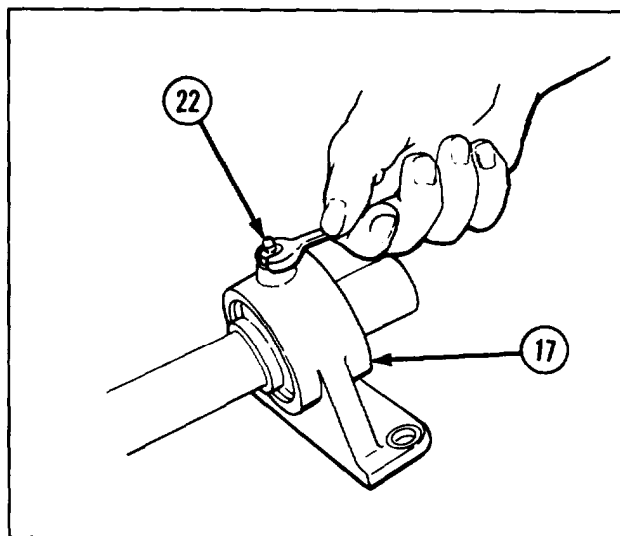
2-38. MAINTENANCE OF RECOIL STROKE CONTROL CAM (CONT).

REASSEMBLY (CONT)

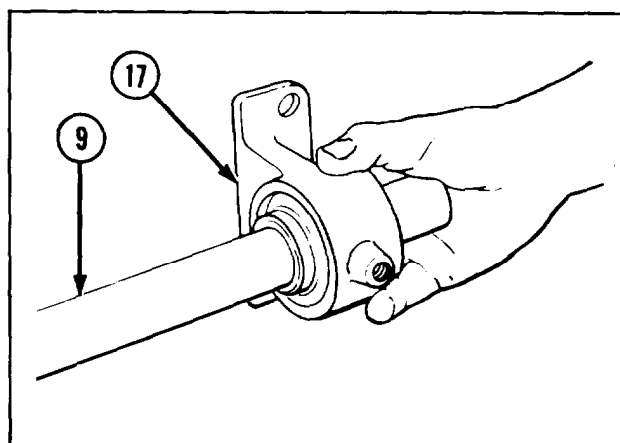
14 Using retaining ring pliers, install retaining ring (21) on plain bearing (20).

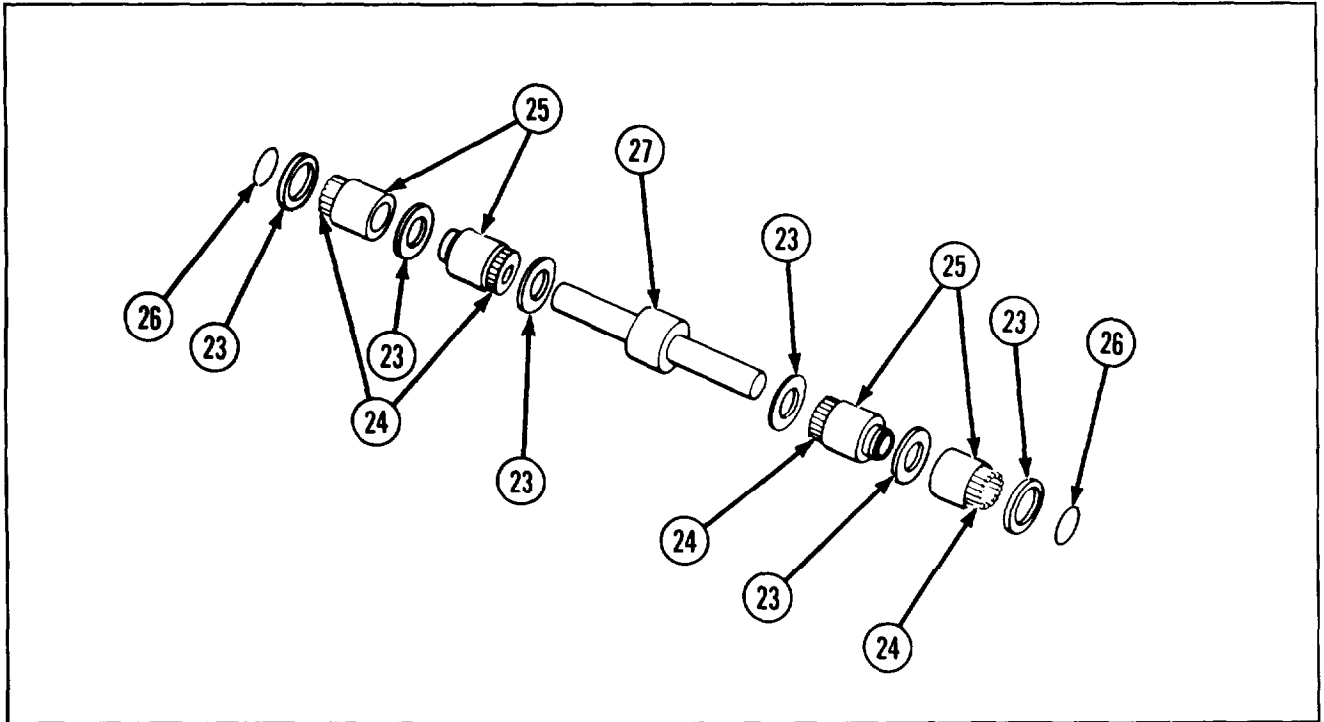


15 Install lubrication fitting (22) on eye bracket (17).



16 Install eye bracket (17) on shouldered shaft (9).



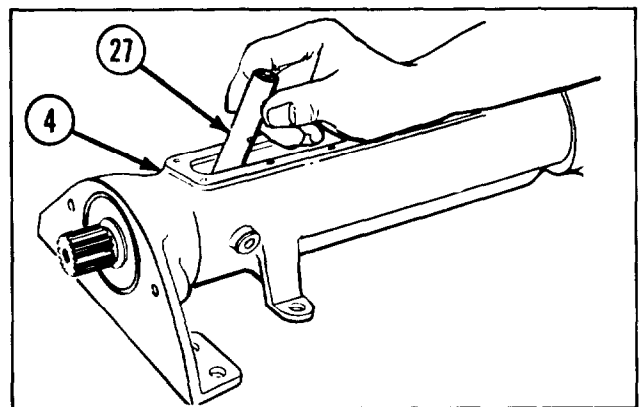


- 17 Install six flat washers (23), 128 needle bearing rollers (24), four outer bearing rings (25), and two retaining rings (26) on each end of cam control shaft (27).

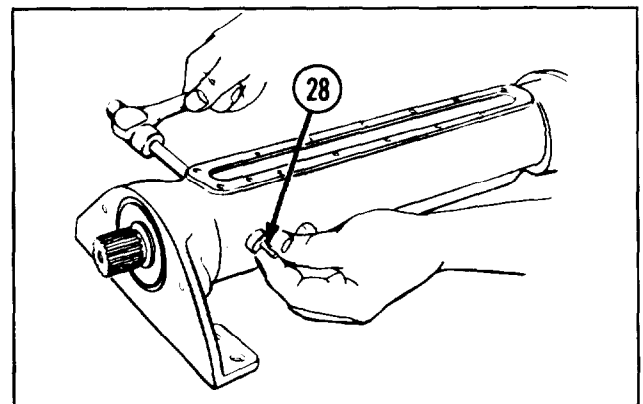
NOTE

Prior to installation, pack bearing rollers with grease (item 12, appx B).

- 18 Install cam control shaft (27) in variable recoil cam housing (4).



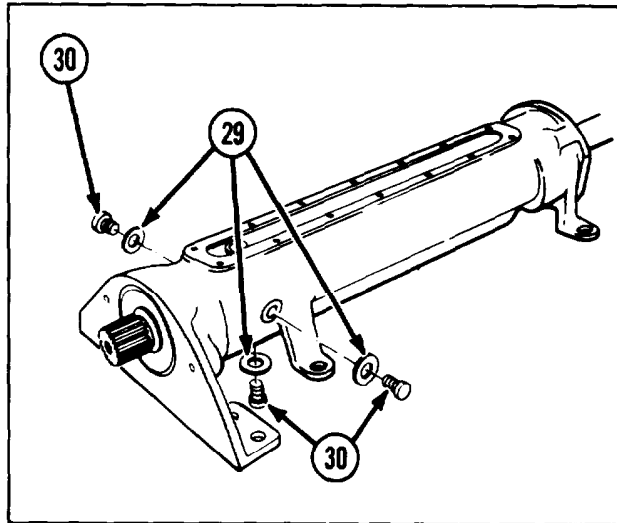
- 19 Install spring pin (28), and tap in securely with hammer.



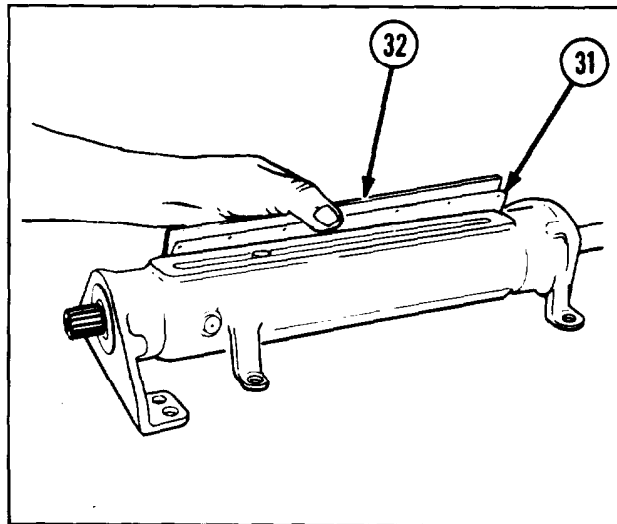
2-38. MAINTENANCE OF RECOIL STROKE CONTROL CAM (CONT).

REASSEMBLY (CONT)

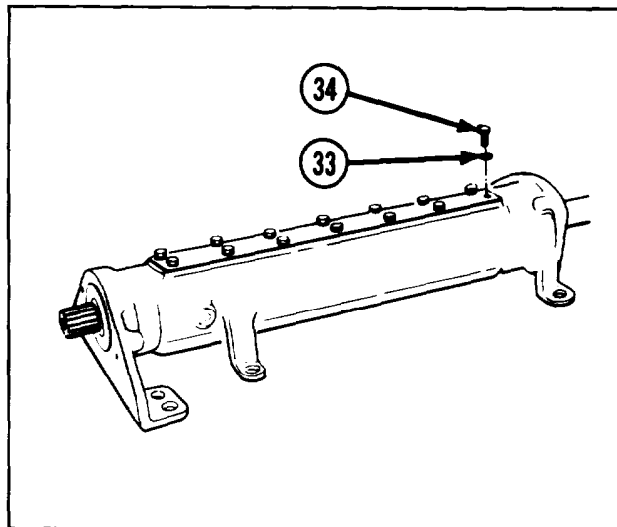
20 Install three flat washers (29) and three machine plugs (30).



21 Install new gasket (31) and access cover (32).



22 Install fourteen new lockwashers (33) and fourteen capscrews (34).



2-39. MAINTENANCE OF LINEAR ACTUATING HEAD ASSEMBLY.

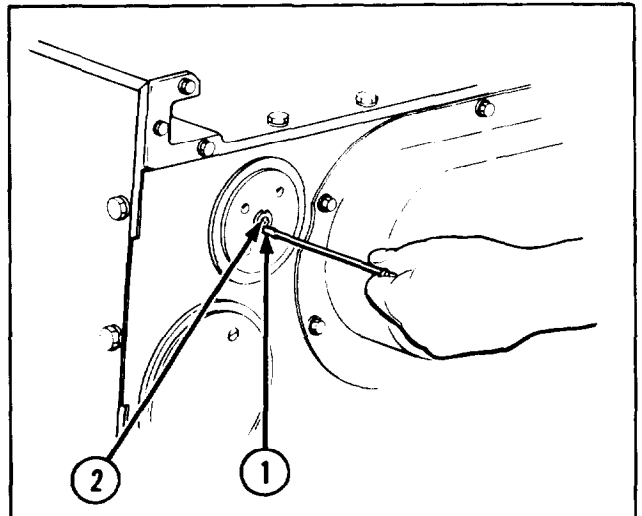
This task covers:	a. Removal/Disassembly b. Inspection/Repair	c. Reassembly/Installation
INITIAL SETUP		
<p><i>Tools and Special Tools</i></p> <p>Air check valve guide wrench (6193630)</p> <p>Air check valve housing wrench (6193825)</p> <p>Ordnance artillery and turret mechanic's tool kit (SC 5180-95-CL-A12)</p> <p>Spanner wrench (7079082)</p>		<p><i>References</i></p> <p>TM 9-254</p> <p>TM 9-2350-304-24P-2</p>
		<div style="border: 1px solid black; padding: 5px; display: inline-block;">WARNING</div>
		<p>Linear actuating head assembly contains spring under high tension. Use caution during removal or installation</p>

REMOVAL/DISASSEMBLY

NOTE

Oil may be present when counter-recoil cylinder head is removed.

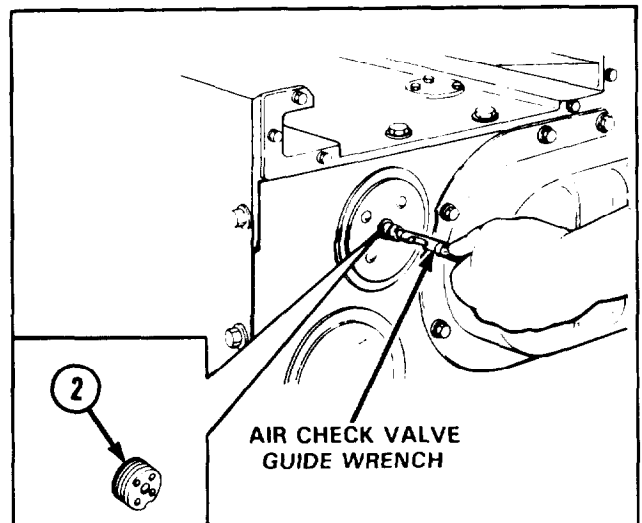
- 1 Remove setscrew (1) from worm relief valve gear (2).



WARNING

Linear actuating head assembly contains spring under high tension. Use caution during removal or installation.

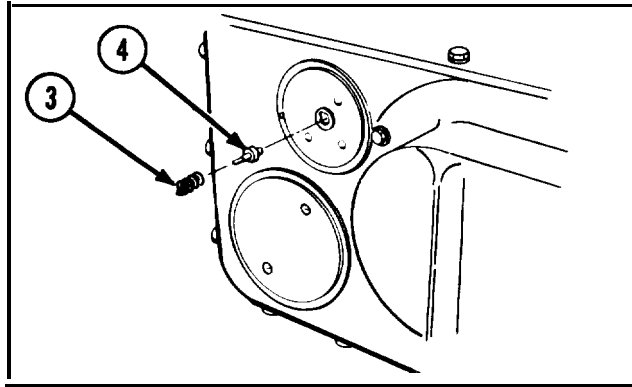
- 2 Using air check valve guide wrench, remove worm relief valve gear (2).



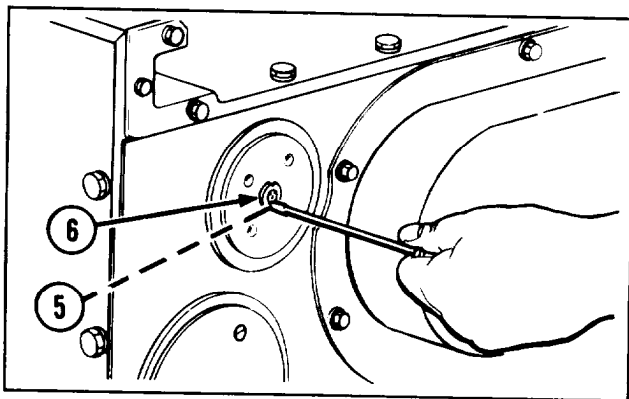
2-39. MAINTENANCE OF LINEAR ACTUATING HEAD ASSEMBLY (CONT).

REMOVAL/DISASSEMBLY (CONT)

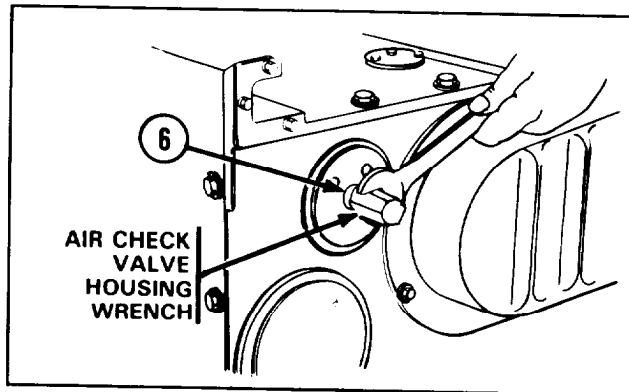
3 Remove helical spring (3) and relief valve (4).



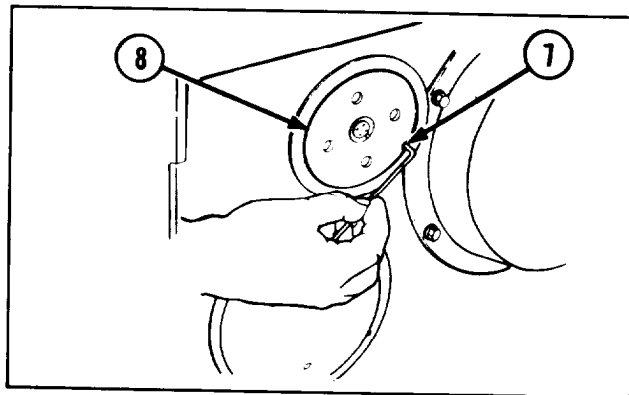
4 Remove setscrew (5) from relief valve body (6).



5 Using air check valve housing wrench, remove relief valve body (6).



6 Remove setscrew (7) from counterrecoil cylinder head (8).



- Using spanner wrench, remove counter-recoil cylinder head (8).

INSPECTION/REPAIR

- Inspect for broken, damaged, or missing parts.
- Clean valve parts.
- Repair is by replacement of authorized parts (TM 9-2350-304-24P-23).

REASSEMBLY/INSTALLATION

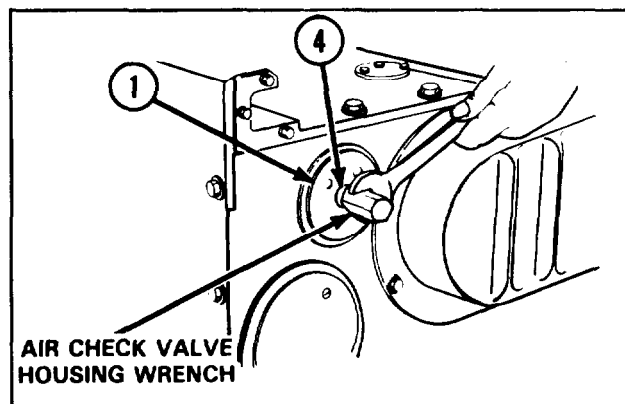
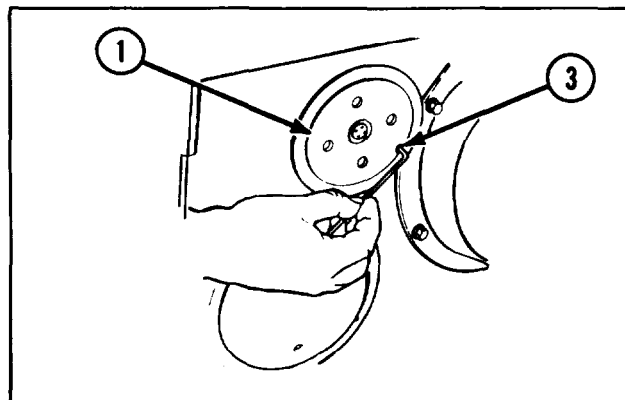
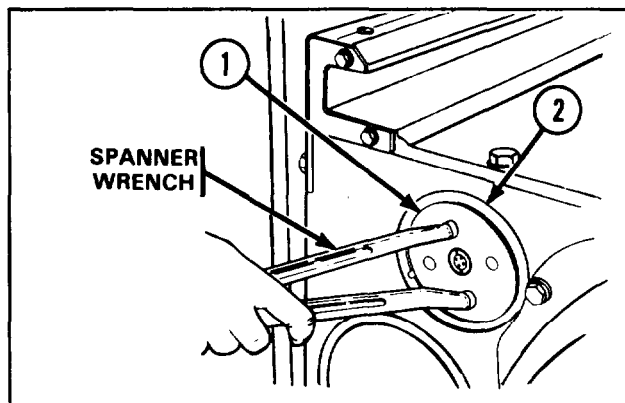
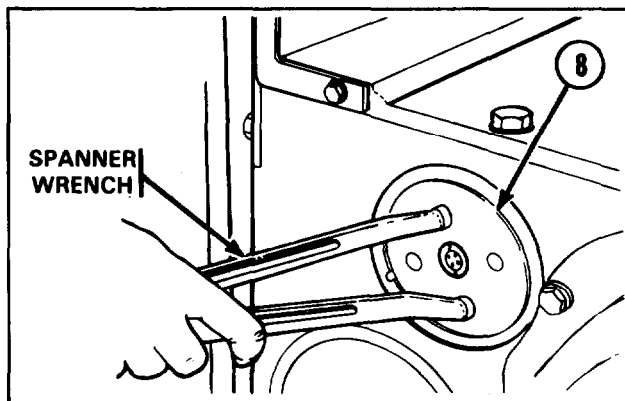
- Using spanner wrench, install counter-recoil cylinder head (1). Counterrecoil cylinder head (1) must be flush with counterrecoil cylinder (2).

NOTE

If counterrecoil cylinder head has been replaced, stake in two places instead of replacing setscrew; refer to TM 9-254.

- Install setscrew (3) on counterrecoil cylinder head (1).

- Using air check valve housing wrench, install relief valve body (4) flush with counterrecoil cylinder head (1).



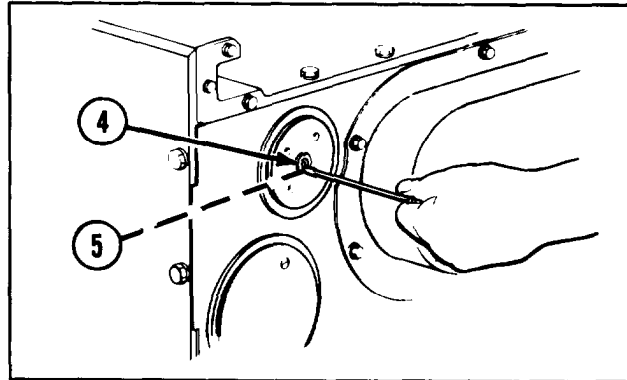
2-39. MAINTENANCE OF LINEAR ACTUATING HEAD ASSEMBLY (CONT).

REASSEMBLY/INSTALLATION (CONT)

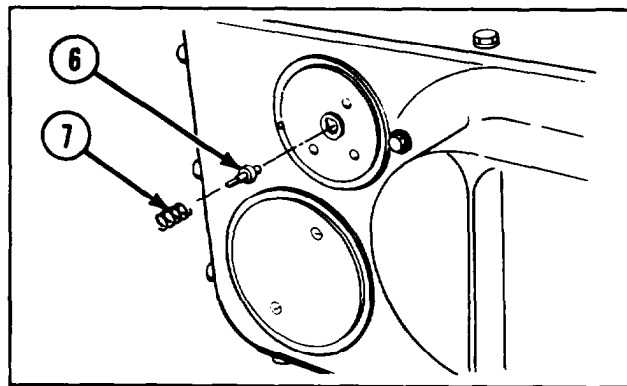
NOTE

If counterrecoil cylinder head or relief valve body has been replaced, stake in two places instead of installing setscrew; refer to TM 9-254.

- 4 Install setscrew (5) in relief valve body (4).



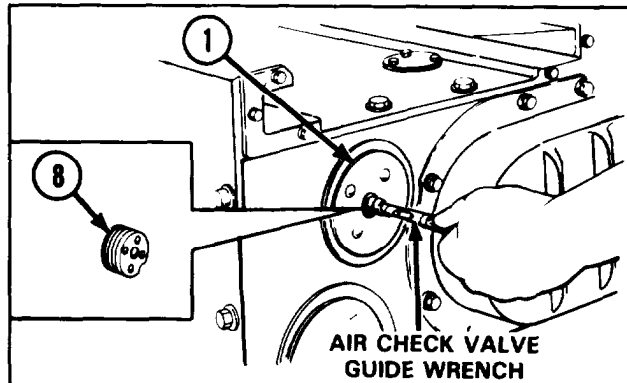
- 5 Install relief valve (6) and helical spring (7).



WARNING

Linear actuating head assembly contains spring under high tension. Use caution during removal or installation.

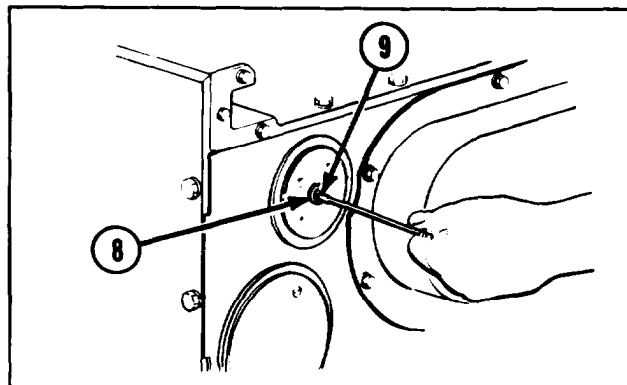
- 6 Using air check valve guide wrench, install relief valve guide (8) flush with counterrecoil cylinder head (1).



NOTE

If relief valve guide or relief valve body has been replaced, stake in two places instead of installing setscrew; refer to TM 9-254.

- 7 Install setscrew (9) in relief valve guide (8).



2-40. MAINTENANCE OF COUNTERRECOIL PISTON ASSEMBLY.

This task covers: a. *Removal* b. *Inspection/Repair* c. *Installation*

INITIAL SETUP

Tools and Special Tools

Ordnance artillery and turret mechanic's
tool kit (SC 5180-95-CL-A12)

Equipment Condition

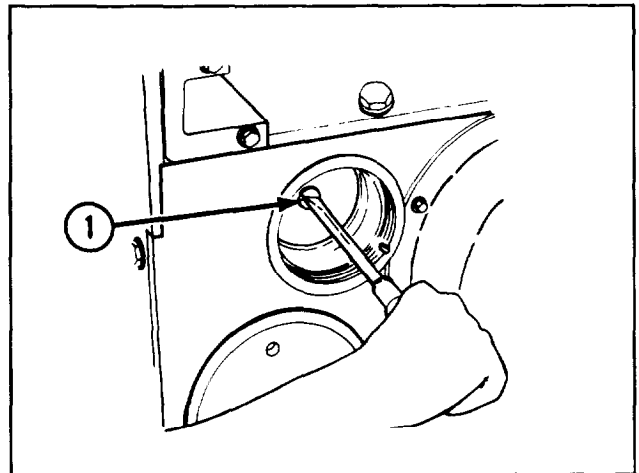
2-137 Linear actuating head assembly
removed

References

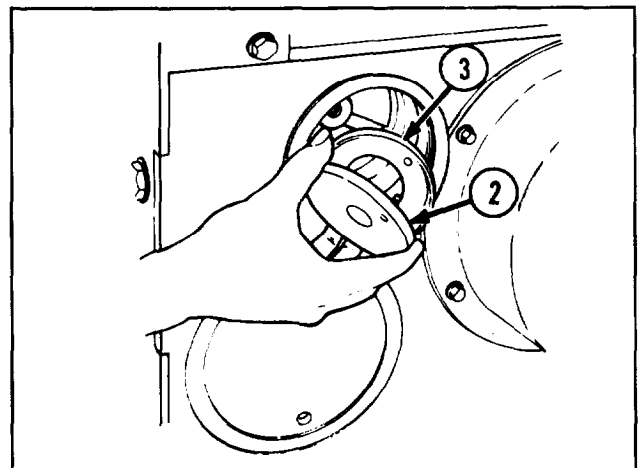
TM 9-2350-304-24P-2

REMOVAL

1 Remove machine screw (1).



2 Remove wiper assembly retainer with pin (2) and leather packing (3).



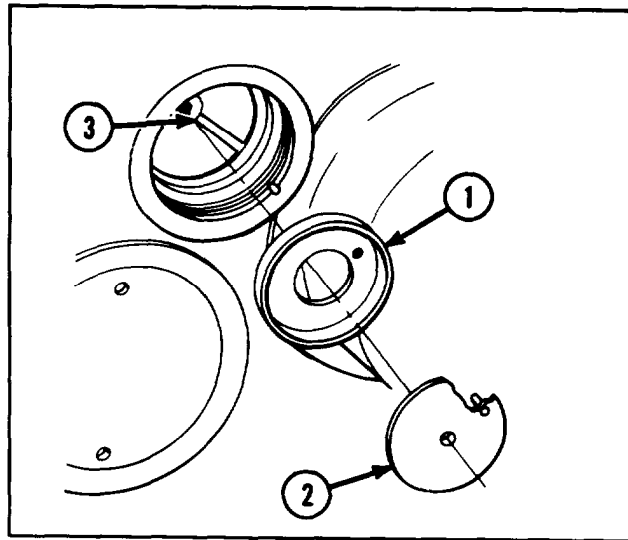
2-40. MAINTENANCE OF COUNTERRECOIL PISTON ASSEMBLY (CONT).

INSPECTION/REPAIR

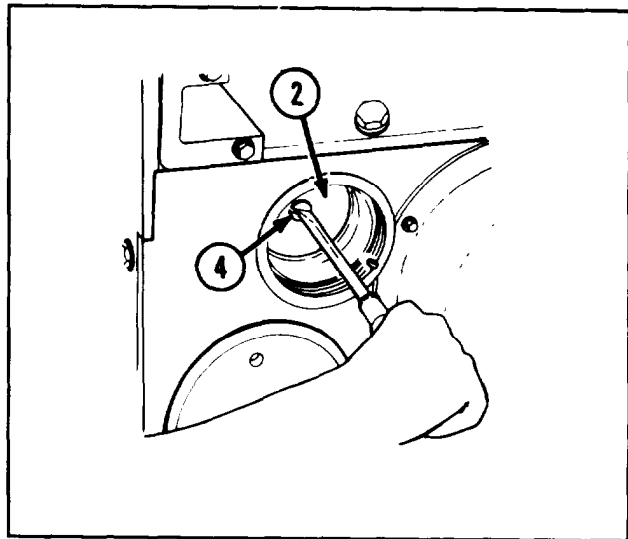
- 1 Inspect for broken, damaged, or missing parts.
- 2 Inspect leather packing for wear, cracks, and pliability.
- 3 Clean and service outer head assembly.
- 4 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

INSTALLATION

- 1 Install leather packing (1) and wiper assembly retainer with pin (2). Position pin through hole in leather packing and into follower notch (3).



- 2 Install machine screw (4) and stake to wiper assembly retainer with pin (2).



2-41. MAINTENANCE OF MODIFIED RECUPERATOR CYLINDER FRONT HEAD ASSEMBLY.

<p>This task covers:</p>	<p>a. <i>Relieving Hydraulic Pressure</i> b. <i>Disassembly</i> c. <i>Inspection/Repair</i></p>	<p>d. <i>Reassembly</i> e. <i>Applying Hydraulic Pressure</i></p>
<p>INITIAL SETUP</p>		
<p><i>Tools and Special Tools</i> Ordnance artillery and turret mechanic's tool kit (SC 5180-95-CL-A12)</p> <p><i>References</i> TM 9-2350-304-20-2 TM 9-2350-304-24P-2</p>	<p><i>General/ Safety instructions</i></p> <div style="border: 1px solid black; padding: 5px; text-align: center; margin-bottom: 10px;">WARNING</div> <ul style="list-style-type: none"> ● Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as level ground as possible. This will stop the cannon from sliding out of battery. ● Hydraulic system is under high pressure. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid. 	

RELIEVING HYDRAULIC PRESSURE

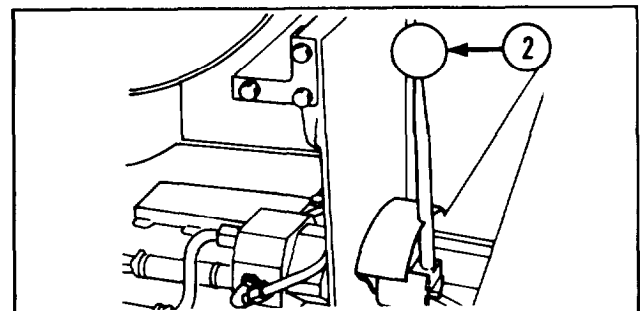
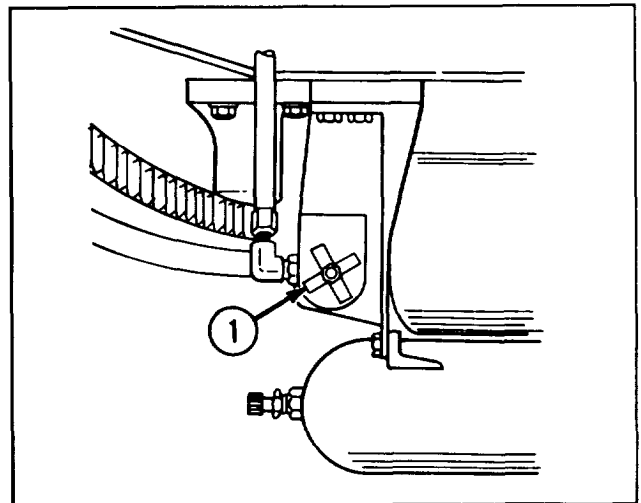
WARNING

Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as level ground as possible. This will stop the cannon from sliding out of battery.

NOTE

If gun mount is installed, place cannon in battery and secure travel lock in stow position.

- 1 Set MASTER switch to OFF.
- 2 Open globe angle valve (1).
- 3 Hold control handle (2) in RETURN for 1 minute, then in RETRACT for 1 minute to relieve hydraulic system pressure.



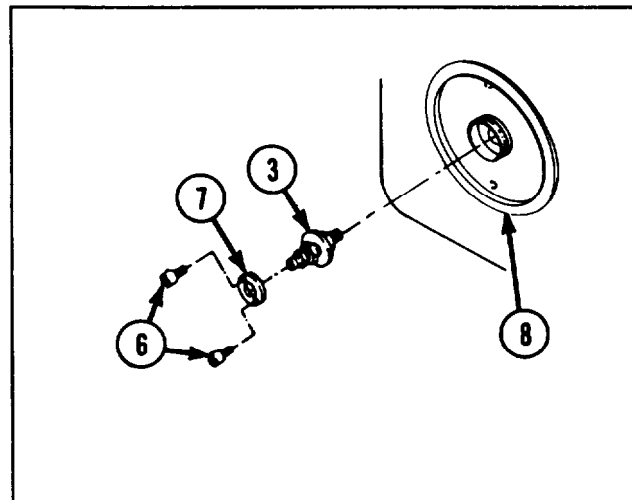
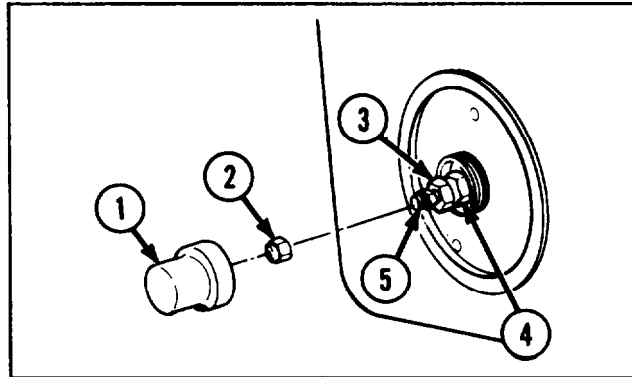
2-41. MAINTENANCE OF MODIFIED RECUPERATOR CYLINDER FRONT HEAD ASSEMBLY (CONT).

DISASSEMBLY

WARNING

Hydraulic system is under high pressure. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

- 1 Remove protective cap (1) and valve cap (2) from relay valve (3).
- 2 While holding inside nut (4), slowly turn nut (5) counterclockwise to reduce recuperator nitrogen pressure to zero. Refer to TM 9-2350-304-20-2.
- 3 Remove two self-locking screws (6) and retainer (7) from recuperator front head (8).
- 4 Remove relay valve (3).

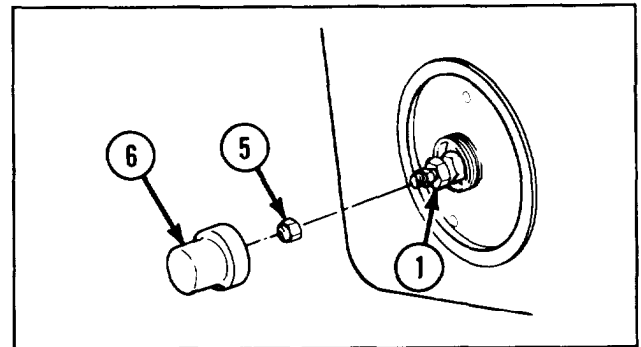
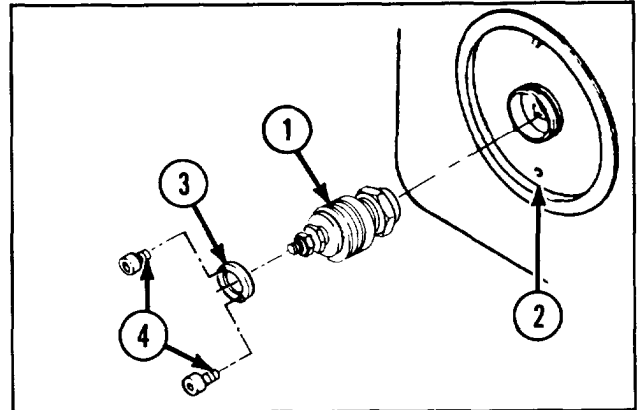


INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

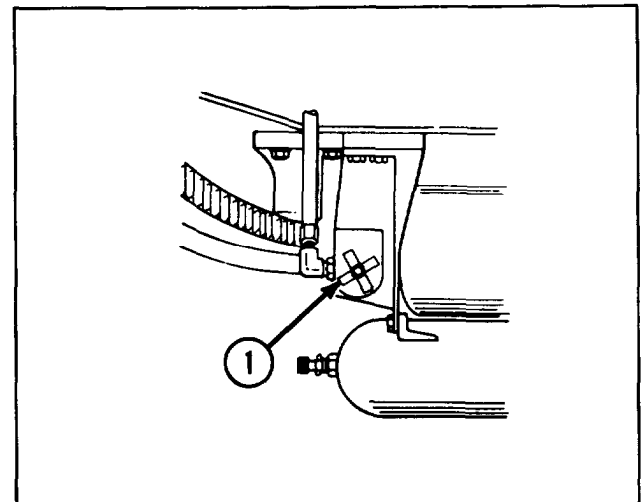
REASSEMBLY

- 1 Install relay valve (1) in recuperator front head (2). Torque relay valve to 100 to 110 in.-lb (11 to 12 N-m).
- 2 Install retainer (3) on recuperator front head (2). Further tighten relay valve (1) until two holes in retainer line up with two holes in recuperator front head.
- 3 Install two new self-locking screws (4).
- 4 Charge recuperator to proper nitrogen pressure and check for leaks. Refer to TM 9-2350-304-20-2.
- 5 Install valve cap (5) on relay valve (1) and install protective cap (6) over relay valve.



APPLYING HYDRAULIC PRESSURE

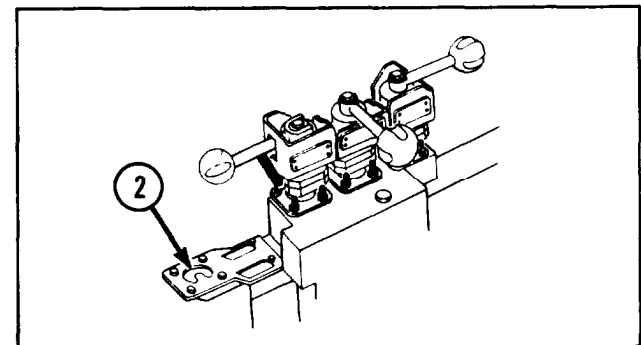
- 1 Close globe angle valve (1).
- 2 Start engine.



NOTE

Hydraulic motor and pump may be used to apply pressure to hydraulic system without starting engine by setting MASTER switch and OIL PUMP MOTOR Switch to ON.

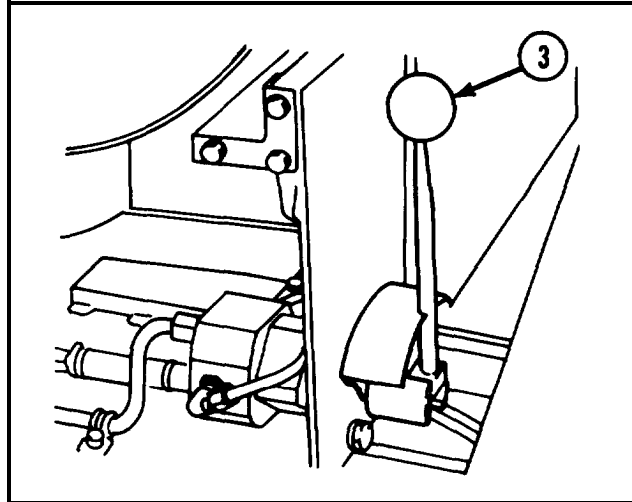
- 3 Set HYD PUMP/PTO CLUTCH switch to ON.
- 4 Check dial pressure gage (2) indication. Normal pressure is 1600 to 2400 psi (11,032 to 16,548 kPa).



2-41. MAINTENANCE OF MODIFIED RECUPERATOR CYLINDER FRONT HEAD ASSEMBLY (CONT).

APPLYING HYDRAULIC PRESSURE (CONT)

- 5 Stop engine.
- 6 Move control handle (3) to RETRACT, then to RETURN, then to RETRACT several times to bleed air from system.



2-42. MAINTENANCE OF RECUPERATOR CYLINDER REAR HEAD ASSEMBLY.

- This task covers:
- | | |
|--|---------------------------------------|
| a. <i>Relieving Hydraulic Pressure</i> | e. <i>Reassembly</i> |
| b. <i>Removal</i> | f. <i>Installation</i> |
| c. <i>Disassembly</i> | g. <i>Applying Hydraulic Pressure</i> |
| d. <i>Inspection/Repair</i> | |

INITIAL SETUP

Tools and Special Tools

- Handle (figure 1, appx C)
- Ordnance artillery and turret mechanic's tool kit (SC 5 180-95-CL-A12)
- Spanner wrench (5007488)

Material/Parts

- Filler and packing (8410650)
- Preformed packing (6104682)

References

- TM 9-2350-304-20-2
- TM 9-2350-304-24P-2

Equipment Conditions

- Nitrogen pressure in recuperator is zero (TM 9-2350-304-20-2)

General Safety Instructions

WARNING

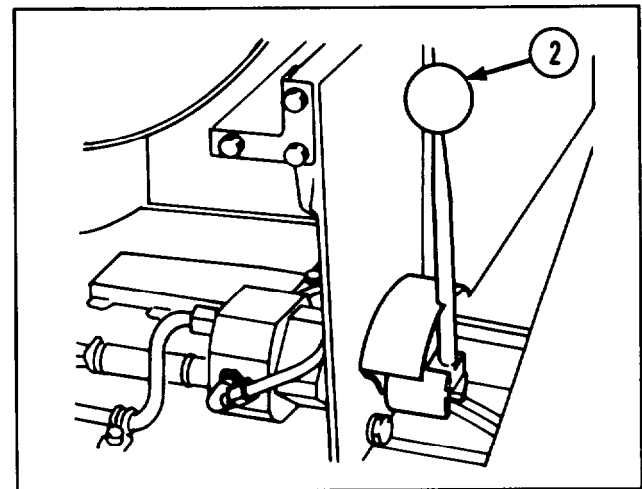
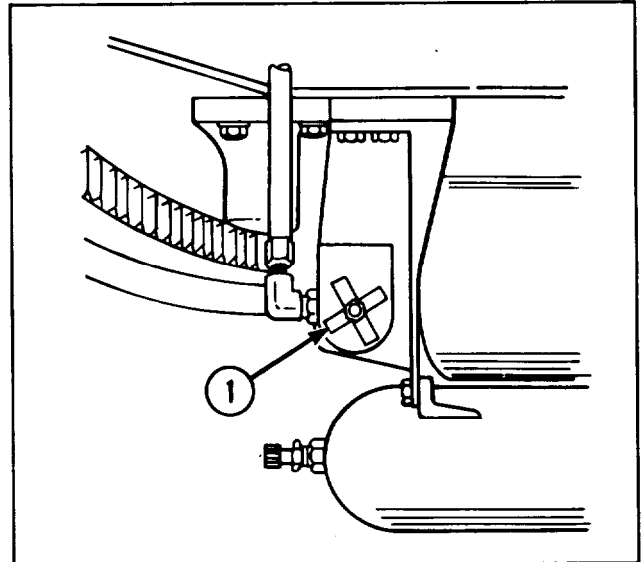
- Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as level ground as possible. This will stop the cannon from sliding out of battery.
- Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

RELIEVING HYDRAULIC PRESSURE

WARNING

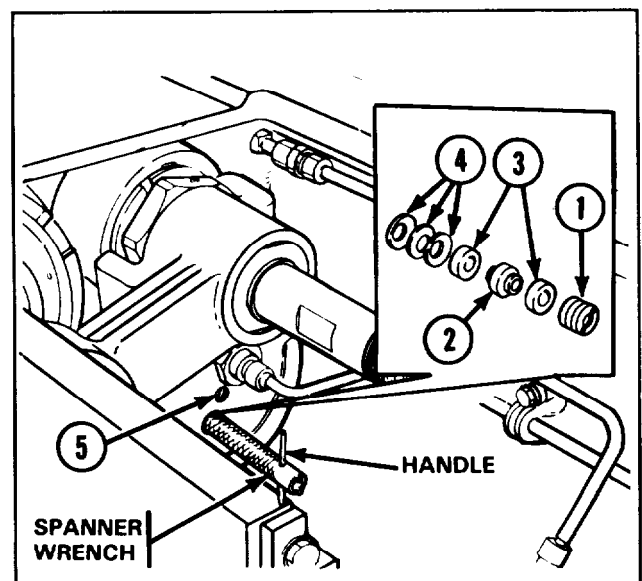
- Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as level ground as possible. This will stop the cannon from sliding out of battery.
- Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

- 1 Set MASTER switch to OFF.
- 2 Open globe angle valve (1).
- 3 Hold control handle (2) in RETURN for 1 minute, then in RETRACT for 1 minute to relieve hydraulic pressure.



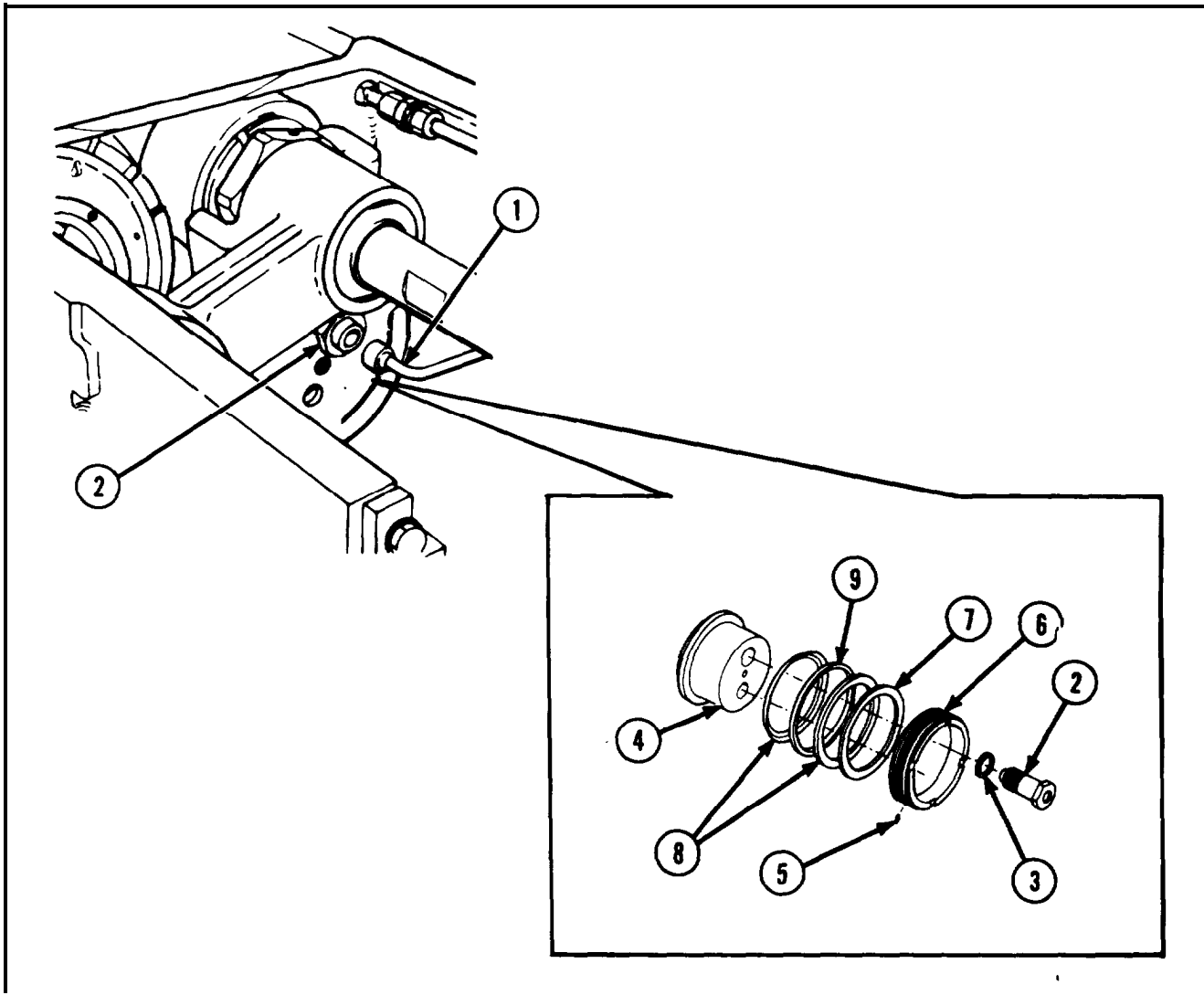
REMOVAL

- 1 Using spanner wrench and handle, remove externally threaded ring (1).
- 2 Provide container to catch fluid and filler and packing (2).
- 3 Pressurize hydraulic system (see Applying Hydraulic Pressure procedure) until two packing retainers (31, filler and packing (21, and three spring tension washers (4) are forced out of housing (5).
- 4 Relieve hydraulic system pressure; see Relieving Hydraulic Pressure procedure.



2-42. MAINTENANCE OF RECUPERATOR CYLINDER REAR HEAD ASSEMBLY (CONT).

DISASSEMBLY



WARNING

Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

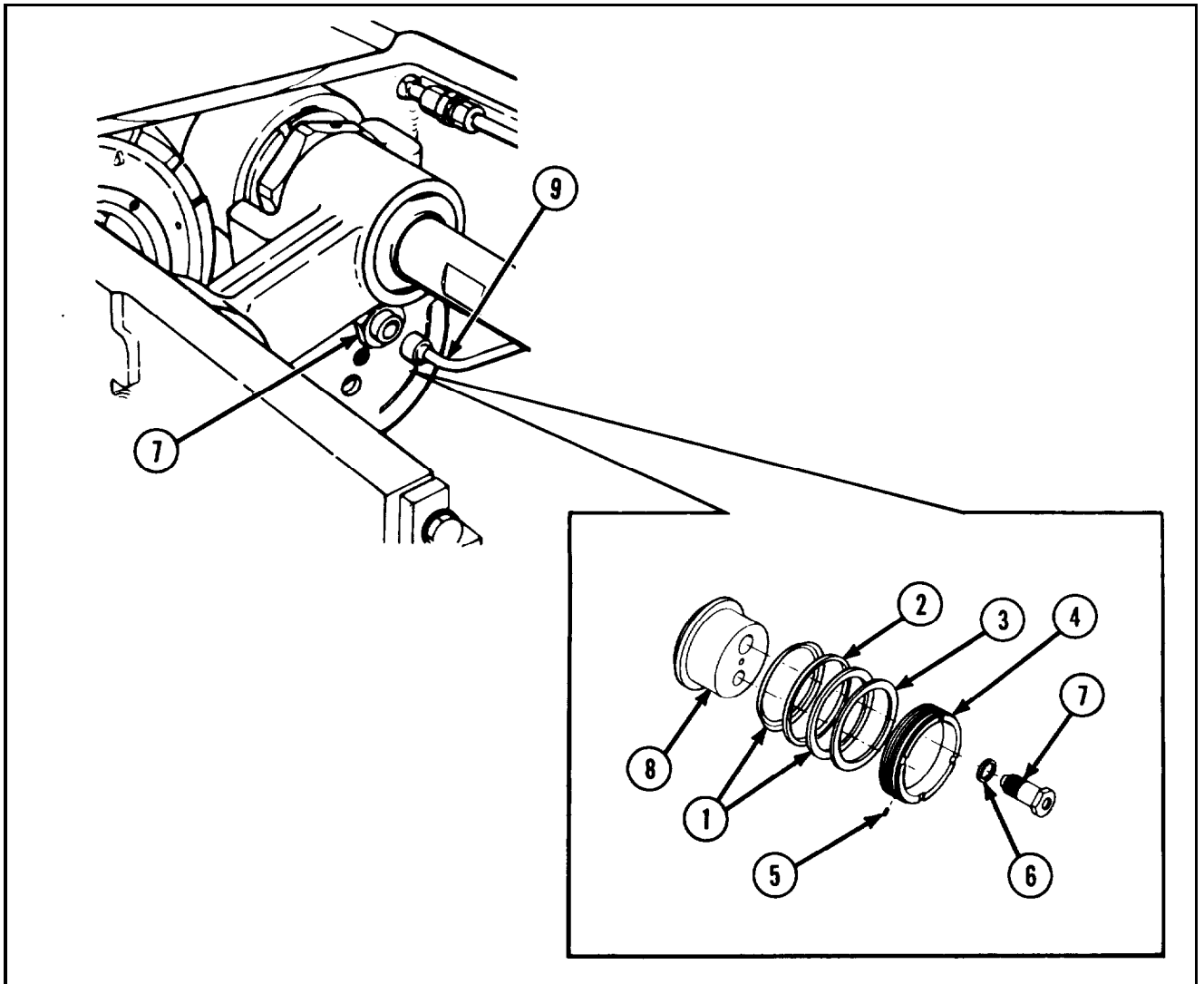
- 1 Disconnect hydraulic tube assembly (1) from recuperator head adapter (2). For complete disassembly of hydraulic lines and fittings, refer to page 2-27.

- 2 Remove recuperator head adapter (2) and packing retainer (3) from recuperator cylinder rear head assembly (4).
- 3 Remove setscrew (5), externally threaded ring (6), packing retainer (7), two packing retainers (8), and preformed packing (9) from recuperator cylinder rear head assembly (4).

INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

REASSEMBLY



- 1 install two packing retainers (1), new preformed packing (2), packing retainer (3), externally threaded ring (4), and setscrew (5).
- 2 Install packing retainer (6) and recuperator head adapter (7) in recuperator cylinder rear head assembly (8).
- 3 Reconnect hydraulic tube assembly (9) to recuperator head adapter (7). For complete reassembly of hydraulic lines and fittings, refer to page 2-27.

2-42. MAINTENANCE OF RECUPERATOR CYLINDER REAR HEAD ASSEMBLY (CONT).

INSTALLATION

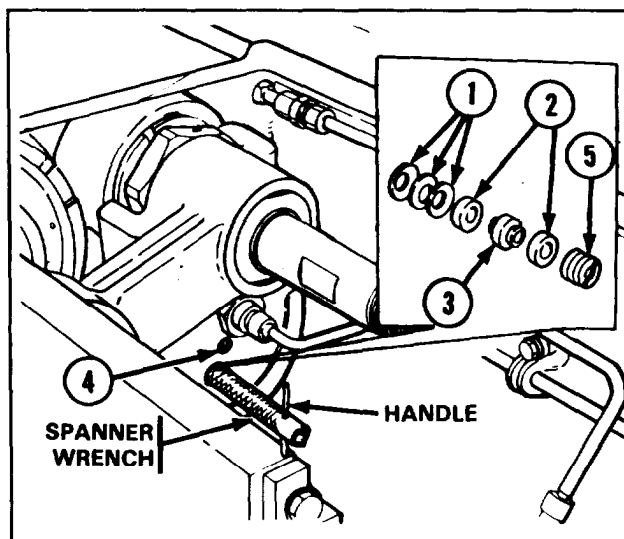
CAUTION

Do not overtighten retainer.

NOTE

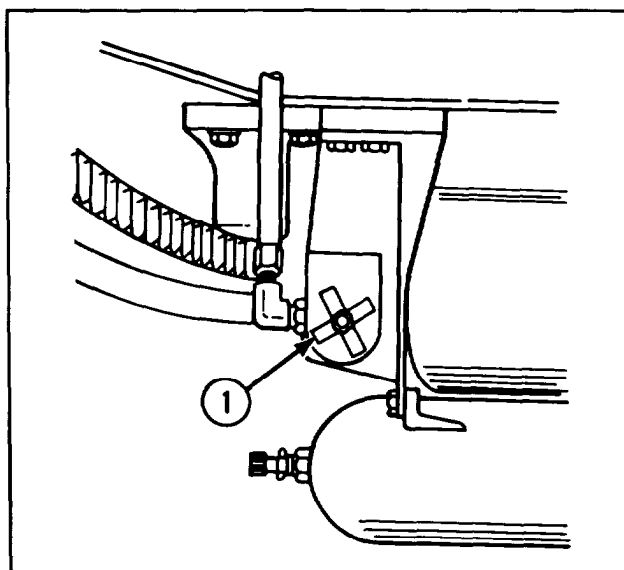
To obtain a good seal, make sure spring tension washers have inside curved surfaces against inside curved surfaces. Make sure packing retainers have hollow surfaces against filler and packing.

- 1 Install three spring tension washers (1), two packing retainers (2), and new filler and packing (3) inside housing (4).
- 2 Use spanner wrench and handle to install externally threaded ring (5).



APPLYING HYRAULIC PRESSURE

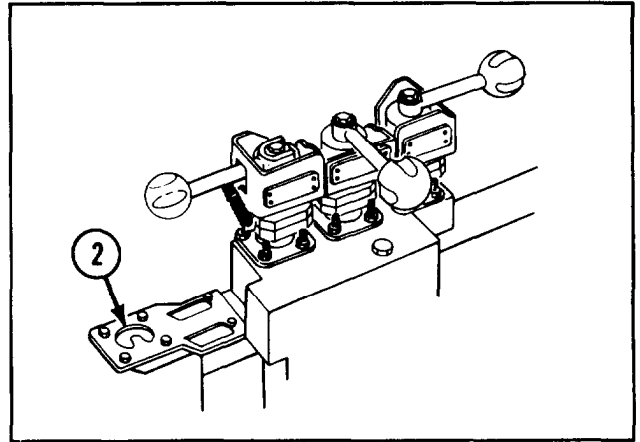
- 1 Close globe angle valve (1).
- 2 Start engine.



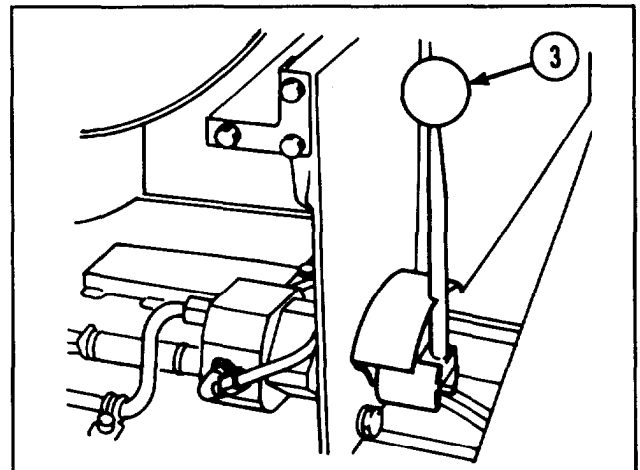
NOTE

Hydraulic motor and pump may be used to apply pressure to hydraulic system without starting engine by setting MASTER switch and OIL PUMP MOTOR Switch to ON.

- 3 Set HYD PUMP/PTO CLUTCH switch to ON.
- 4 Check dial pressure gage (2) indication. Normal pressure is 1600 to 2400 psi (11,032 to 16,548 kPa).
- 5 Stop engine.



- 6 Move control handle (3) to RETRACT, then to RETURN, then back to RETRACT several times to bleed air from system.

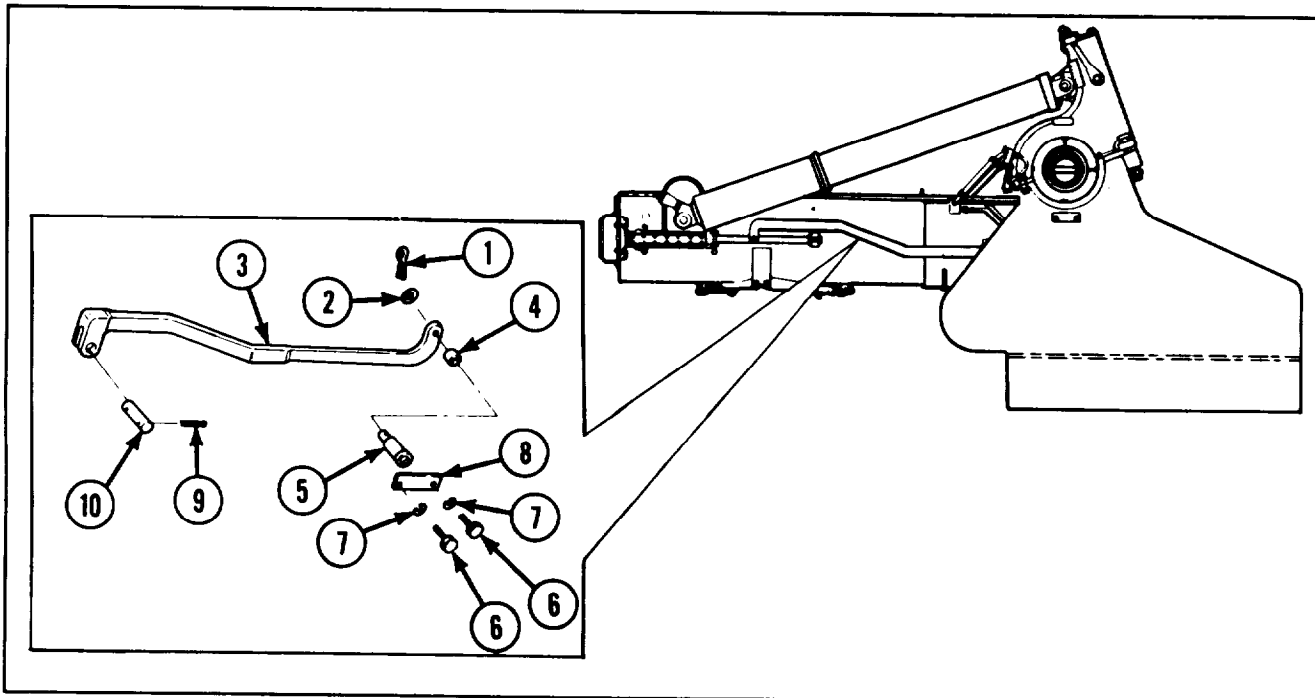


2-43. MAINTENANCE OF RECOIL CONNECTING LINK.

This task covers:		
<i>a. Removal/Disassembly</i>	<i>b. Inspection/Repair</i>	<i>c. Reassembly/Installation</i>
INITIAL SETUP		
<i>Tools and Special Tools</i>		<i>References</i>
Ordinance artillery and turret mechanic's tool kit (SC 5180-95-CL-A12)		TM 9-2350-304-24P-2
<i>Materials/Parts</i>		
Cotter pin (2) (MS24665-355)		
Cotter pin (MS24665-372)		
Lockwasher (2) (MS35338-48)		

2-43. MAINTENANCE OF RECOIL CONNECTING LINK (CONT).

REMOVAL/DISASSEMBLY



NOTE

The following procedures can be performed with the M174 gun mount removed from, or installed on, the vehicle.

- 1 Remove cotter pin (1), flat washer (2), control recoil link (3), and sleeve bearing (4) from shoulder pin (5).
- 2 Remove two capscrews (6), two lockwashers (7), and retaining plate (8).
- 3 Remove shoulder pin (5) from turret wall.
- 4 Remove two cotter pins (9), straight pin (10), and control recoil link (3).

- 2 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

REASSEMBLY/INSTALLATION

- 1 Install control recoil link (3) and straight pin (10); secure with two new cotter pins (9).
- 2 Install shoulder pin (5) in turret wall.
- 3 Install retaining plate (8), two new lockwashers (7), and two capscrews (6).
- 4 Install sleeve bearing (4) in control recoil link (3).
- 5 Position control recoil link (3) on shoulder pin (5), and secure with flat washer (2) and new cotter pin (1).

INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.

2-44. MAINTENANCE OF TURRET ASSEMBLY.

This task covers:	a. <i>Relieving Hydraulic Pressure</i> b. <i>Removal</i> c. <i>Inspection/Repair</i>	d. <i>Installation</i> e. <i>Applying Hydraulic Pressure</i>
-------------------	--	---

INITIAL SETUP

Tools and Special Tools

- Artillery maintenance shop equipment (SC 4933-95-CL-A12)
- Geared-head multiplier
- Drain hose (figure 5, appx C)
- Hoist, 10-ton lifting capability
- Jack stands, 5-ton (4)
- Ordnance artillery and turret mechanic's tool kit (SC 5180-95-CL-A12)
- Sling
- Torque wrench (A-A-2411)

Materials/Parts

- Alinement pin (2) (figure 8, appx C)
- Hydraulic fluid (item 13, appx B)
- Lockwasher (28) (MS35338-53)
- Lockwasher (3) (MS35333-40)

Personnel Required

Two

References

- TM 9-2350-304-20-2
- TM 9-2350-304-24P-2

Equipment Conditions

- 2-37 Cannon assembly removed
- 2-57 M174 Gun mount removed

General Safety Instructions



- Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as level ground as possible. This will stop the cannon from sliding out of battery.
- Hydraulic fluid is under high pressure. Relieve pressure and drain system before removing connections or components. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.
- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

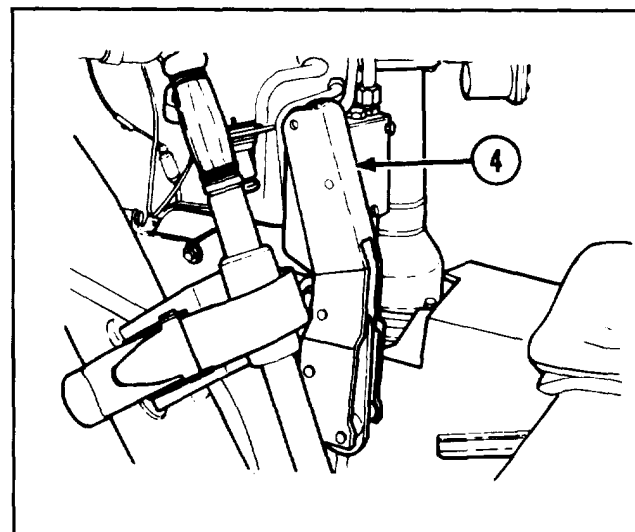
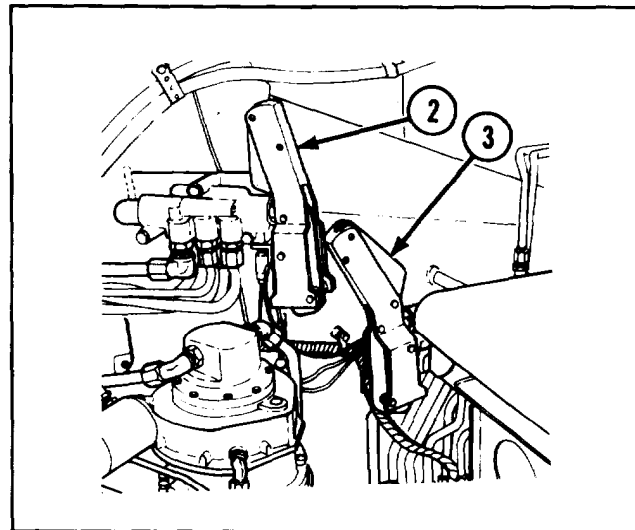
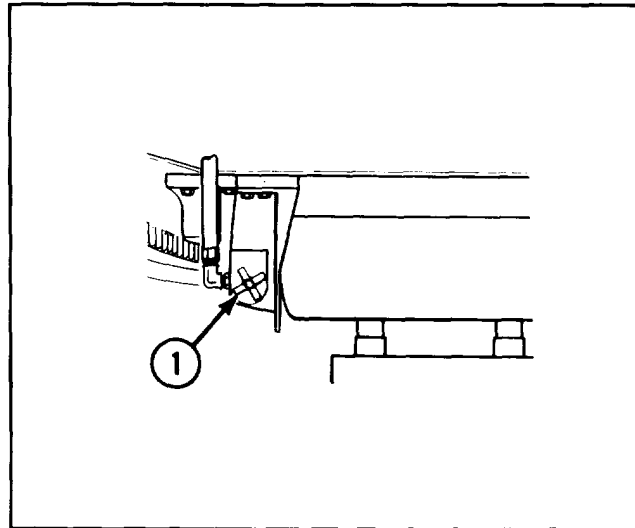
2-44. MAINTENANCE OF TURRET ASSEMBLY (CONT).

RELIEVING HYDRAULIC PRESSURE

WARNING

Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as level ground as possible. This will stop the cannon from sliding out of battery.

- 1 Set MASTER switch to OFF.
- 2 Open globe angle valve (1).
- 3 Move manual traversing control handle (2) to full RIGHT.
- 4 Move manual traversing control handle (2) to full LEFT.
- 5 Move traversing control grip assembly (3) to full RAISE.
- 6 Move traversing control grip assembly (3) to full LOWER.
- 7 Repeat steps 5 and 6 for manual control handle (4).

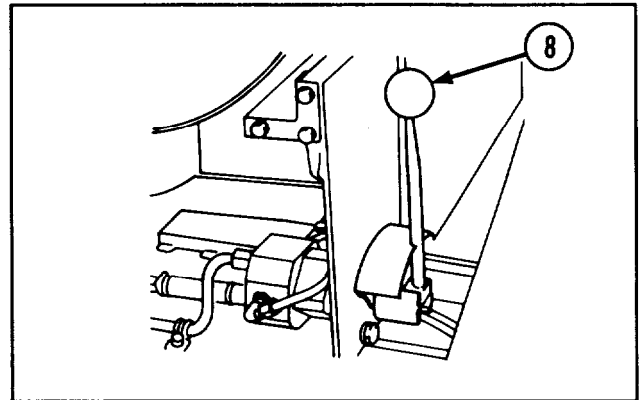
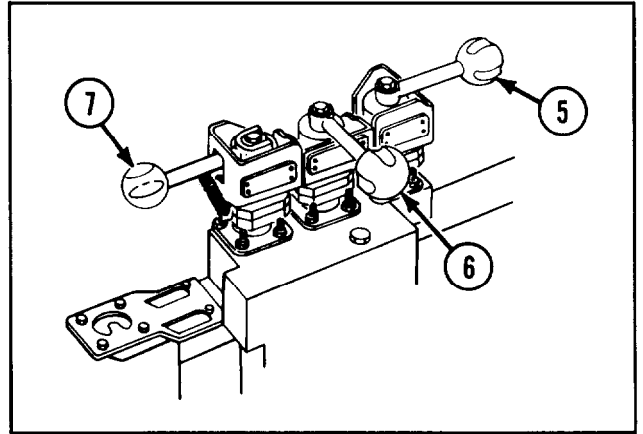


- 8 Move loader and traversing valve control handle (5) to full LOAD.
- 9 Move loader and traversing valve control handle (5) to full STOW.
- 10 Move loader and traversing valve control handle (6) to full IN.
- 11 Move loader and traversing valve control handle (6) to full OUT.

CAUTION

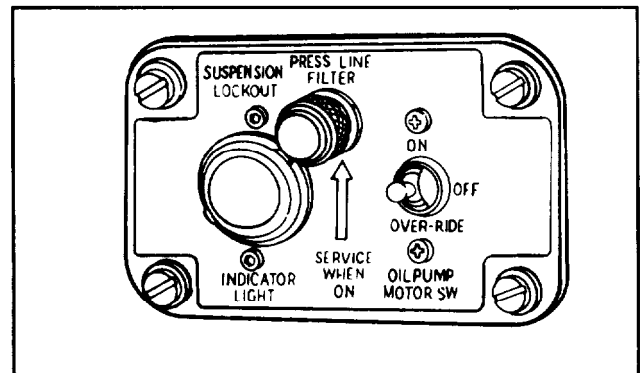
Do not operate manual control handle without a projectile in the trough.

- 12 Move manual control handle (7) to RAM several times.
- 13 Repeat steps 3 thru 12 to relieve pressure.
- 14 Hold manual control lever (8) in RETURN for 1 minute, then in RETRACT for 1 minute.



REMOVAL

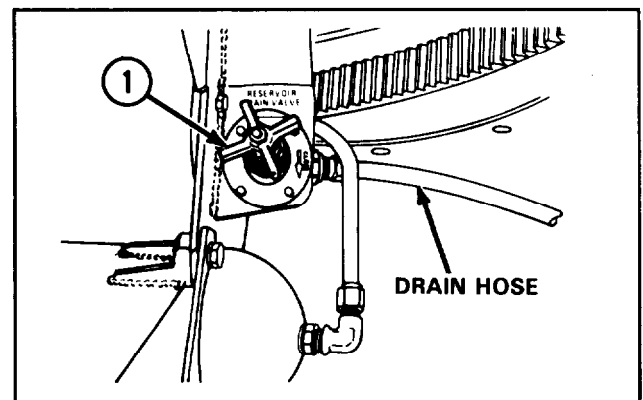
- 1 Set OIL PUMP MOTOR Switch to OFF.



NOTE

Oil will drain slowly.

- 2 Connect drain hose to reservoir drain valve (1).
- 3 Pass drain hose through hull door below reservoir and into a clean container with 30 gal. (114 l) capacity.
- 4 Open reservoir drain valve (1) and drain fluid from reservoir.

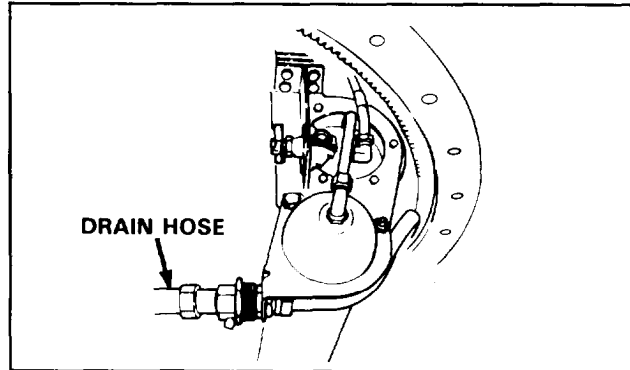


2-44. MAINTENANCE OF TURRET ASSEMBLY (CONT).

REMOVAL (CONT)

WARNING

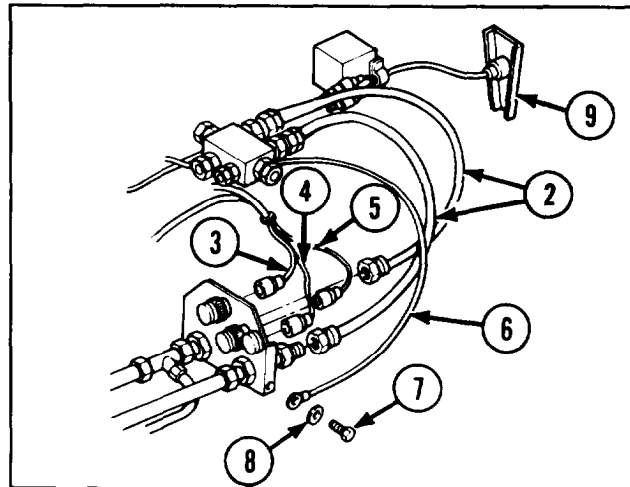
Hydraulic fluid is under high pressure. Relieve pressure and drain system before removing connections or components. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.



5 Disconnect main drain hose from reservoir (quick-disconnect).

WARNING

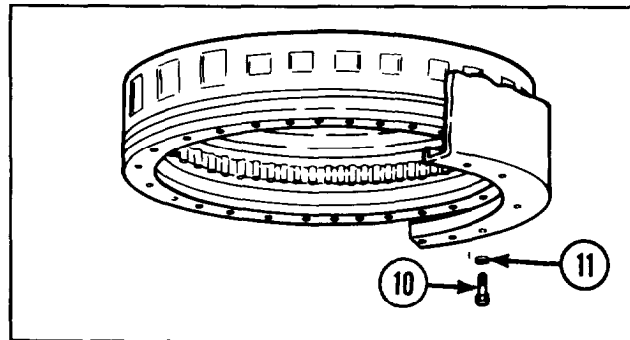
Hydraulic fluid is under high pressure. Relieve pressure and drain system before removing connections or components. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.



6 Disconnect two quick-disconnect hoses (2) on floor.

WARNING

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.



7 Disconnect three electrical leads (3, 4, and 5).

8 Disconnect ground wire (6) by removing screw (7) and washer (8).

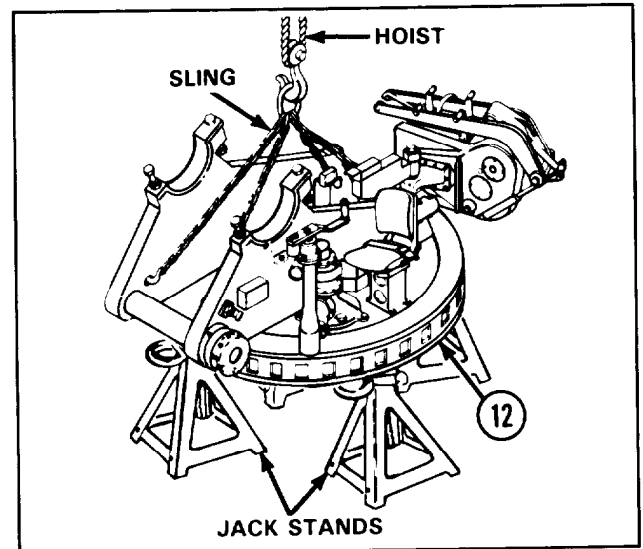
9 Remove turret deceleration switch (9). Refer to TM 9-2350-304-20-2.

CAUTION

Use hoist and chain slings of 10-ton (g-metric ton) minimum lifting capacity with eye and hook attached.

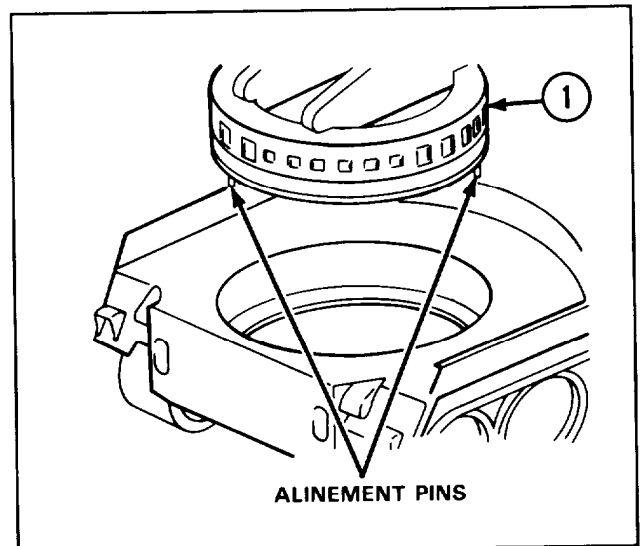
10 Remove 28 capscrews (10) and 28 lockwashers (11).

- 11 Attach sling. Make sure chains have no slack and lift is equal at all four points.
- 12 Lift turret assembly (12) free of hull and position on four 5-ton jack stands.



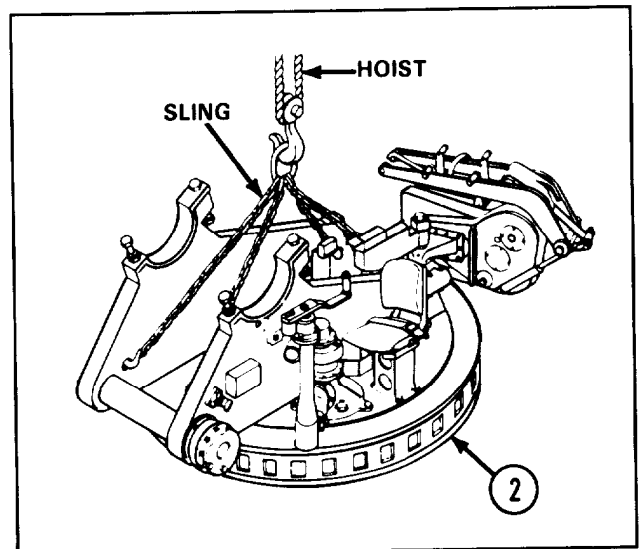
INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 Turret assembly has no further disassembly authorized.
- 3 If turret assembly is broken, damaged, or missing, notify next higher maintenance level.
- 4 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).



INSTALLATION

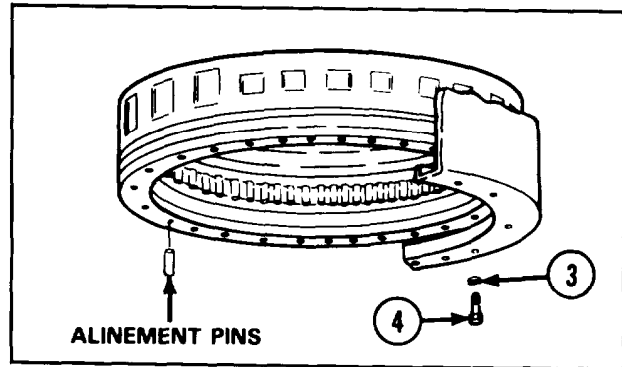
- 1 Install two fabricated alinement pins in threaded holes in outer race (1) of bearing unit. Alinement pins should be 180 degrees apart.
- 2 If removed, reattach sling. Make sure chains have no slack and lift is equal at all four points.
- 3 Lift and position turret assembly (2) on hull. Be sure to set FRONT marking on bearing toward front centerline of hull.



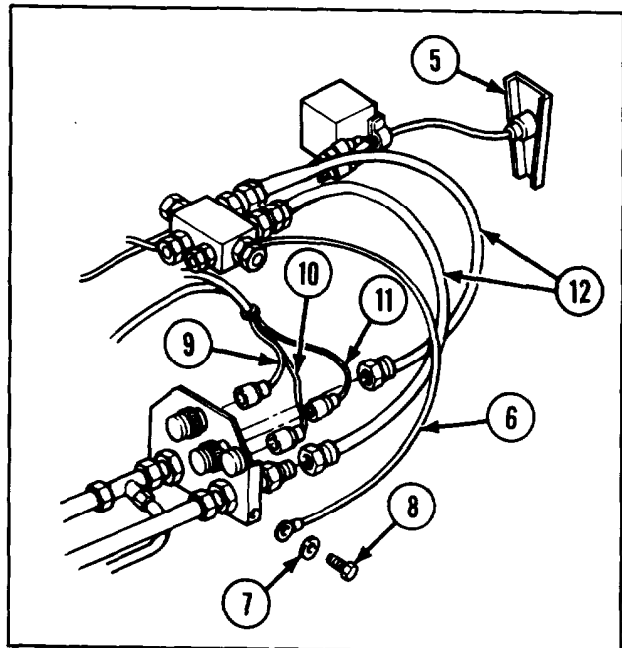
2-44. MAINTENANCE OF TURRET ASSEMBLY (CONT).

INSTALLATION (CONT)

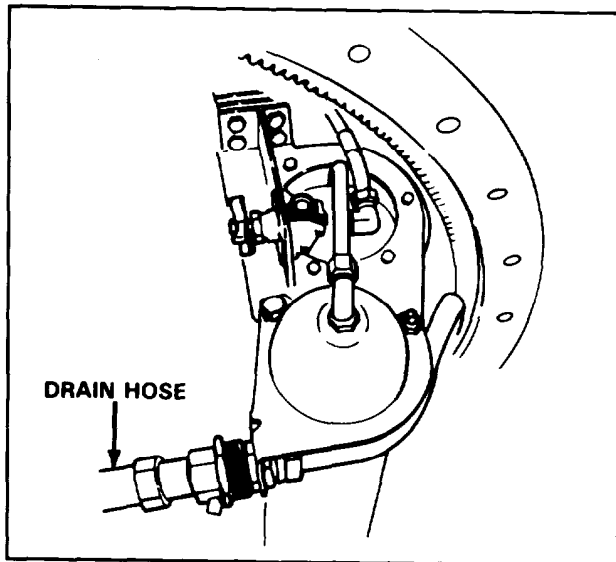
- 4 Remove two alignment pins and install 28 new lockwashers (3) and 28 capscrews (4). Torque capscrews to 200 to 215 ft-lb (271 to 292 N-m).



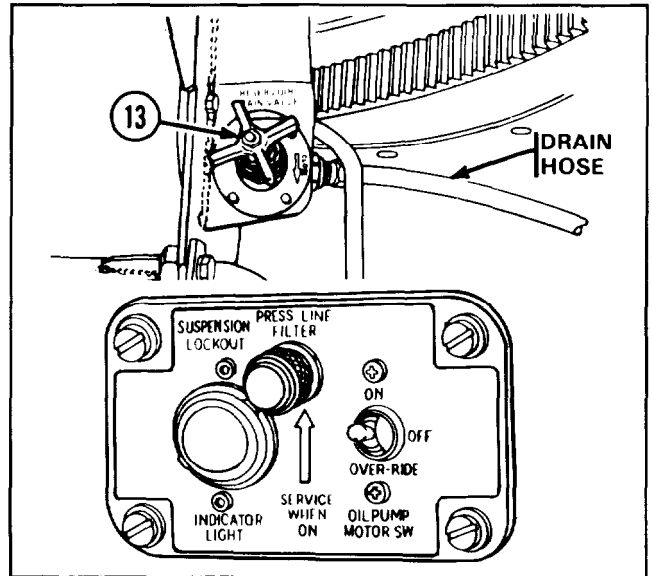
- 5 Install turret deceleration switch (5). Refer to TM 9-2350-304-20-2.
- 6 Connect ground wire (6) by installing washer (7) and screw (8).
- 7 Connect three electrical leads (9, 10, and 11).
- 8 Connect two quick-disconnect hoses (12) on floor.



- 9 Connect main drain hose to reservoir (quick-disconnect).



- 10 Close reservoir drain valve (13) and remove drain hose. Fill reservoir with hydraulic fluid (item 13, appx B). Refer to TM 9-2350-304-10.
- 11 Set OIL PUMP MOTOR Switch to ON.



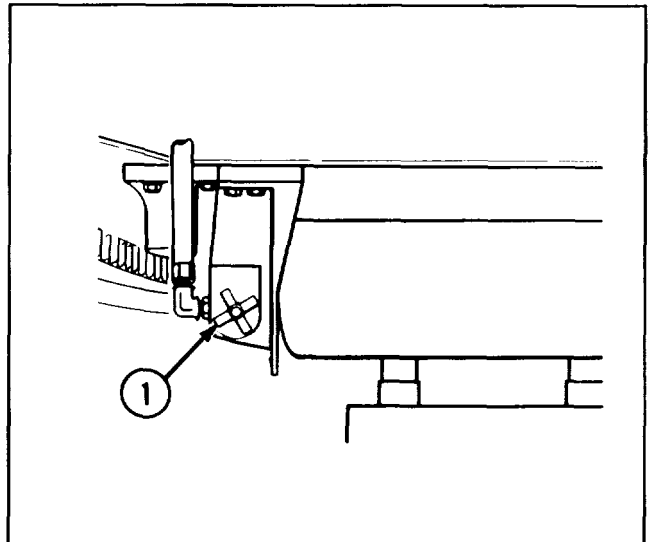
APPLYING HYDRAULIC PRESSURE

- 1 Close globe angle valve (1).
- 2 Start engine

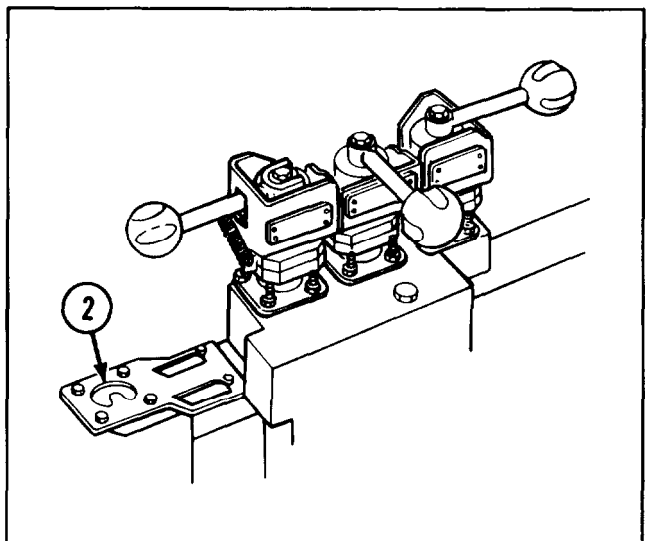
NOTE

Hydraulic motor and pump may be used to apply pressure to hydraulic system without starting engine by, setting MASTER switch and OIL PUMP MOTOR Switch to ON.

- 3 Set HYD PUMP/PTO CLUTCH switch to ON.



- 4 Check pressure gage dial assembly (2) indication. Normal pressure is 1600 to 2400 psi (11,032 to 16,548 kPa).
- 5 Stop engine.

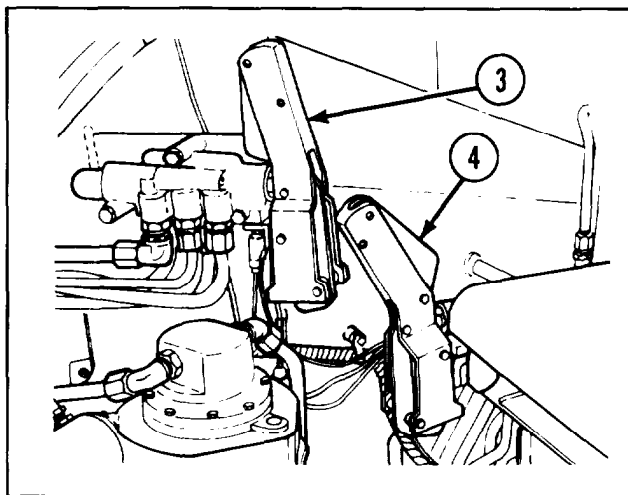


2-44. MAINTENANCE OF TURRET ASSEMBLY (CONT).

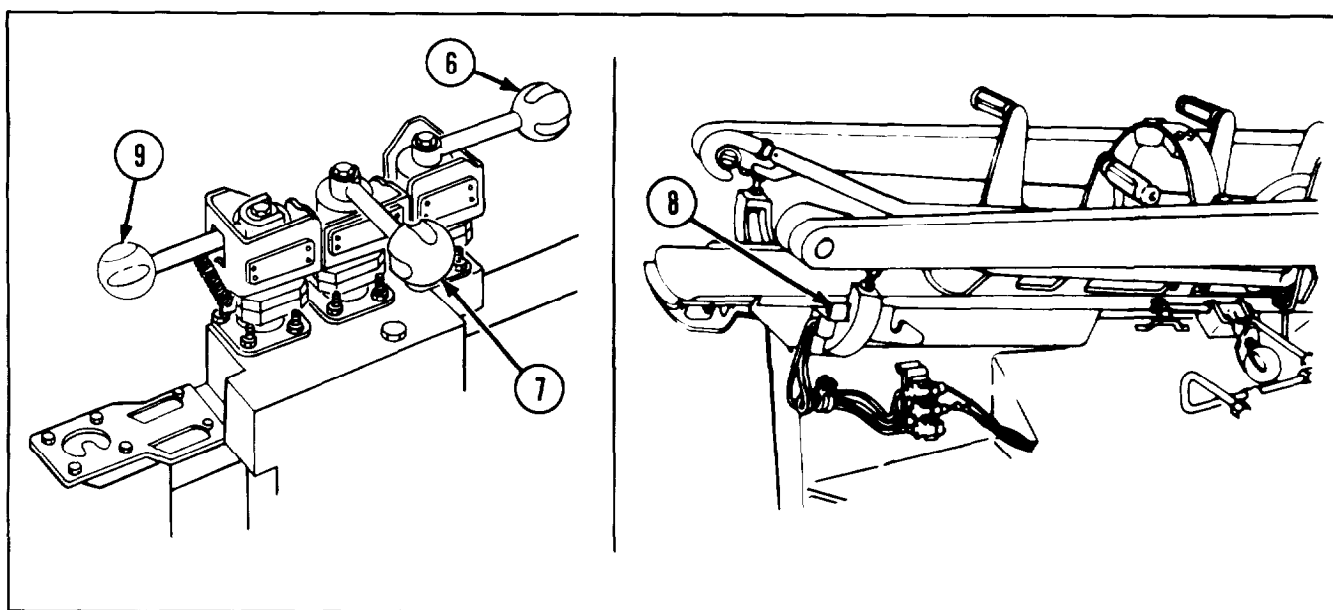
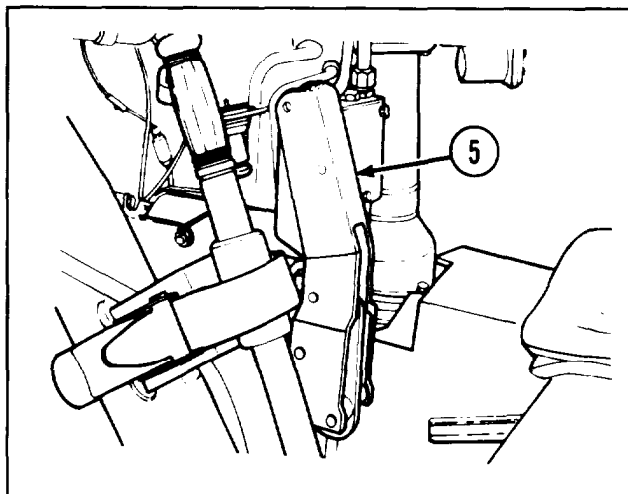
APPLYING HYDRAULIC PRESSURE (CONT)

6 Traverse turret full right and full left several times using traversing control handle (3) to bleed air from system.

7 Raise and lower cannon several times using traversing control grip assembly (4) to bleed air from system.



8 Repeat step 7 using manual control handle (5).



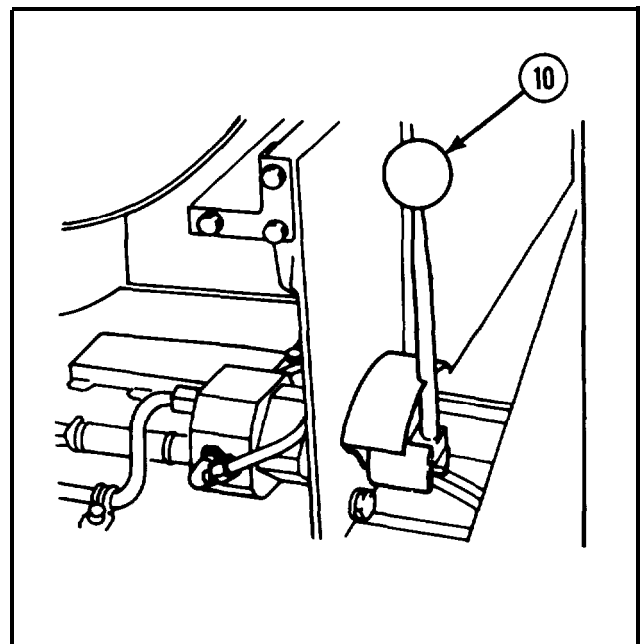
- 9 Traverse loader-rammer in and out of loading position several times using traversing valve control handle (6).
- 10 Stop with loader-rammer in loading position.
- 11 Operate loader arms in and out several times, using traversing valve control handle (7), to bleed air from system.
- 12 Stop with loader arms on tray.
- 13 Traverse loader-rammer to ram position using traversing valve control handle (6).
- 14 Extend tray into breech, making sure to engage tray interlock switch (8).

CAUTION

Do not operate rammer control valve handle without a projectile in the trough.

- 15 Extend and retract rammer several times using manual control handle (9) to bleed air from system.
- 16 Stop with rammer chain in stowed position.
- 17 Place loader-rammer in stowed position.

- 18 Move manual control lever (10) to RETRACT, then to RETURN, then back to RETRACT several times to bleed air from system.

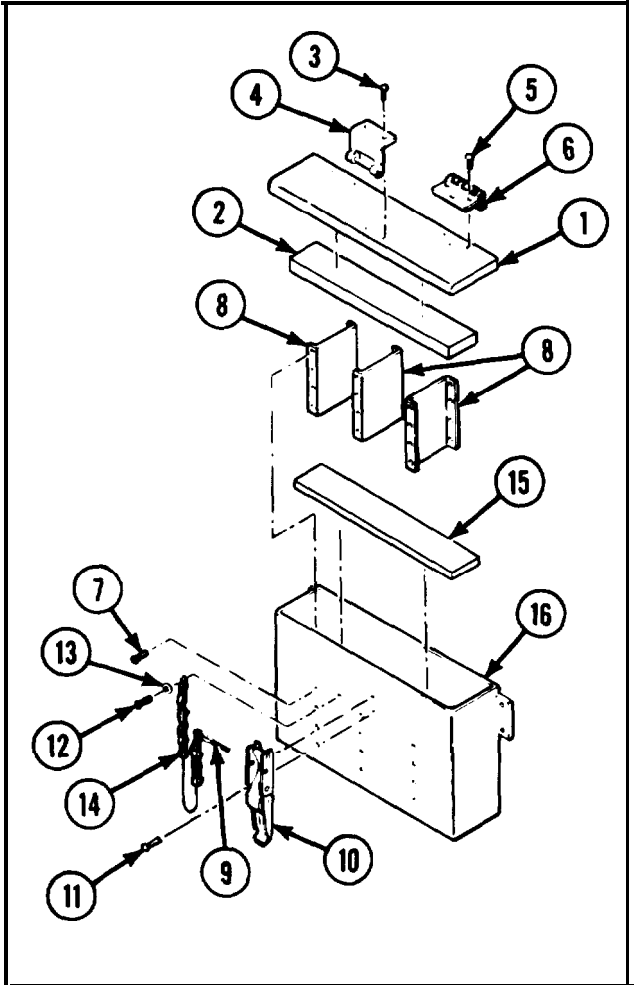


2-45. MAINTENANCE OF HAND GRENADE BOX ASSEMBLY.

This task covers:		
<i>a. Disassembly</i>	<i>b. Inspection/Repair</i>	<i>c. Reassembly</i>
INITIAL SETUP		
<p><i>Tools and Special Tools</i> Ordnance artillery and turret mechanic's tool kit (SC 5180-95-CL-A12)</p> <p><i>Materials/Parts</i> Cotter pin (8700137) Mechanical felt (5266229) Mechanical felt (5293693) Rivet (MS20470AD3-6) Rivet (12) (MS20470AD4-7) Rivet (24) (MS20470AD5-8) Rivet (4) (MS20470AD6-9)</p>	<p>Rubber adhesive (item 3, appx B) Safety chain (RRC271TYPE11CL6) (figure 7, appx C)</p> <p><i>References</i> TM 9-2350-304-24P-2</p> <p><i>Equipment Conditions</i> Hand grenade box assembly removed (TM 9-2350-304-20-21)</p>	

DISASSEMBLY

- 1 Raise hand grenade box cover (1) and remove mechanical felt (2).
- 2 Drill out two solid rivets (3) and remove bracket assembly (4).
- 3 Drill out 12 solid rivets (5) and remove two butt hinges (6) and hand grenade box cover (1).
- 4 Drill out 24 solid rivets (7) and remove three partitions (8).
- 5 Pull cotter pin (9) out of stow clamp assembly (10). Drill out two solid rivets (11) and remove stow clamp assembly (10).
- 6 Drill out solid rivet (12) and remove flat washer (13) and safety chain (14).
- 7 Remove cotter pin (9) from safety chain (14).
- 8 Remove mechanical felt (15) from body (16).

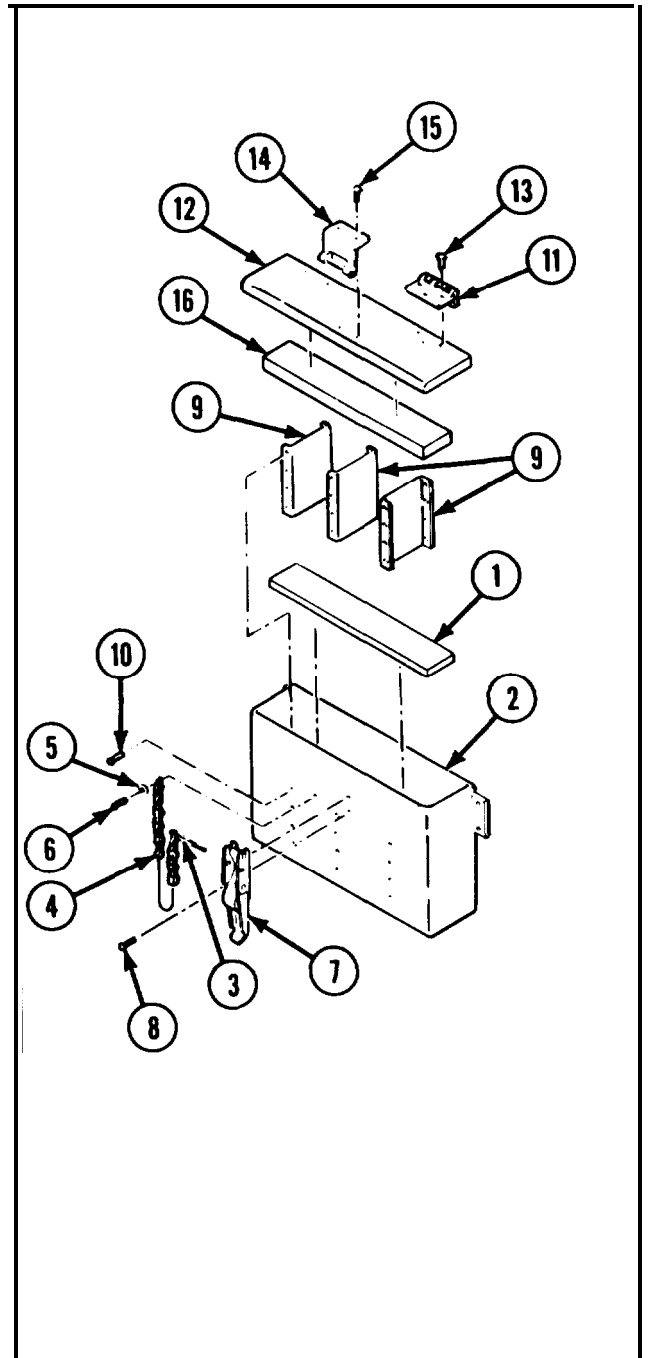


INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 If hand grenade box cover is damaged, repair is by replacement of next higher assembly.
- 3 If body is damaged, repair is by replacement of next higher assembly.
- 4 If partition is damaged, repair is by replacement of next higher assembly.
- 5 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

REASSEMBLY

- 1 Using rubber adhesive (item 3, appx B), install new mechanical felt (1) into body (2).
- 2 Install new cotter pin (3) on new safety chain (4).
- 3 Install new safety chain (4) and flat washer (5) and secure using new solid rivet (6).
- 4 Install stow clamp assembly (7) and secure using two new solid rivets (8). Install new cotter pin (3).
- 5 Install three partitions (9) and secure using 24 new solid rivets (10).
- 6 Install two butt hinges (11) and hand grenade box cover (12) and secure using 12 new solid rivets (13).
- 7 Install bracket assembly (14) and secure using two new solid rivets (15).
- 8 Using rubber adhesive (item 3, appx B), install new mechanical felt (16) into hand grenade box cover (12).



2-46. MAINTENANCE OF TRAVERSING CONSTANT SPEED DRIVE AND SPEED GEAR ASSEMBLY.

This task covers:	<ul style="list-style-type: none"> a. <i>Relieving Hydraulic Pressure</i> b. <i>Removal</i> c. <i>Disassembly</i> d. <i>Inspection/Repair</i> 	<ul style="list-style-type: none"> e. <i>Reassembly</i> f. <i>Installation</i> g. <i>Applying Hydraulic Pressure</i>
-------------------	---	---

INITIAL SETUP

Tools and Special Tools

Air seal wrench (10904215)
 Artillery maintenance shop equipment (SC 4933-95-CL-A12)
 Dial indicator and holder
 Press
 Puller
 Retaining ring pliers
 Bearing replacer (8350230)
 Bearing replacer (10904 194)
 Dial indicator and magnetic base holder (MILG8348)
 Jacking screw (2) (10904195)
 Oil seal replacer (8375152)
 Ordnance artillery and turret mechanic's tool kit (SC 5180-95-CL-A12)
 Remover and replacer (10902750)
 Remover and replacer (10904175)
 Remover and replacer handle (7950864)
 Replacer (10904181)
 Replacer handle (7083883)
 Sling
 Spanner wrench (MS16147-2)
 Torque wrench (A-A-2411)

Materials/Parts

Clutch housing shim (10892333)
 Cotter pin (MS24665-283)
 Drive differential shim (10892329)
 Dry cleaning solvent (item 8, appx B)
 Gasket (2) (10892462)
 Gasket (1 1592814)
 Grease (item 12, appx B)
 Laminated shim (as required)
 Lockwasher (10) (MS35335-35)
 Lockwasher (5) (MS35338-44)
 Lockwasher (4) (MS35338-46)
 Lockwasher (3) (MS35338-51)
 Lockwire (item 16, appx B)
 Packing (NAS1523-2OY)
 Preformed packing (MS28775-228)

Preformed packing (MS28778-6)
 Preformed packing (MS28778-8)
 Self-locking nut (MS21083N6)
 Slip clutch housing shim (10892536)
 Solder (item 22, appx B)
 Wood block

References

TM 9-2350-304-20-2
 TM 9-2350-304-24P-2

General Safety Instructions

WARNING

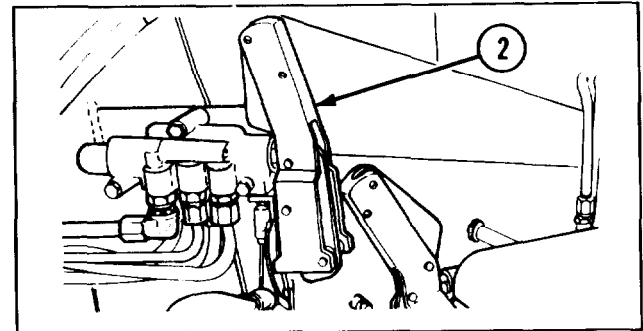
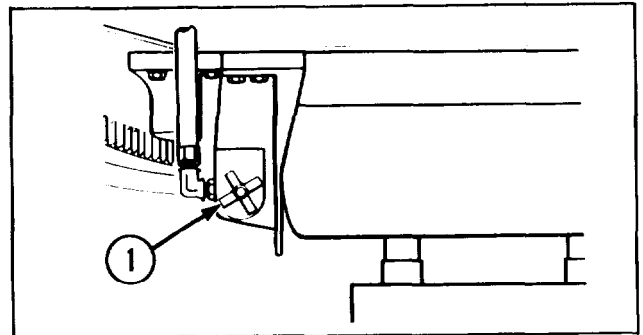
- Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as level ground as possible. This will stop the cannon from sliding out of battery.
- Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.
- Dry cleaning solvent (SD2) is toxic and flammable. Wear protective goggles and gloves and use only in well-ventilated areas.
- Clutch assembly must be wiped dry. Failure to do so may cause damaged equipment or injury to personnel.

RELIEVING HYDRAULIC PRESSURE

WARNING

Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as level ground as possible. This will stop the cannon from sliding out of battery.

- 1 Set MASTER switch to OFF.
- 2 Open globe angle valve (1).
- 3 Move traversing control handle assembly (21 to full RIGHT.
- 4 Move traversing control handle assembly (2) to full LEFT.
- 5 Repeat steps 3 and 4 several times to relieve pressure from system.



REMOVAL

- 1 Place container at lower end of metal drain tube assembly (1).

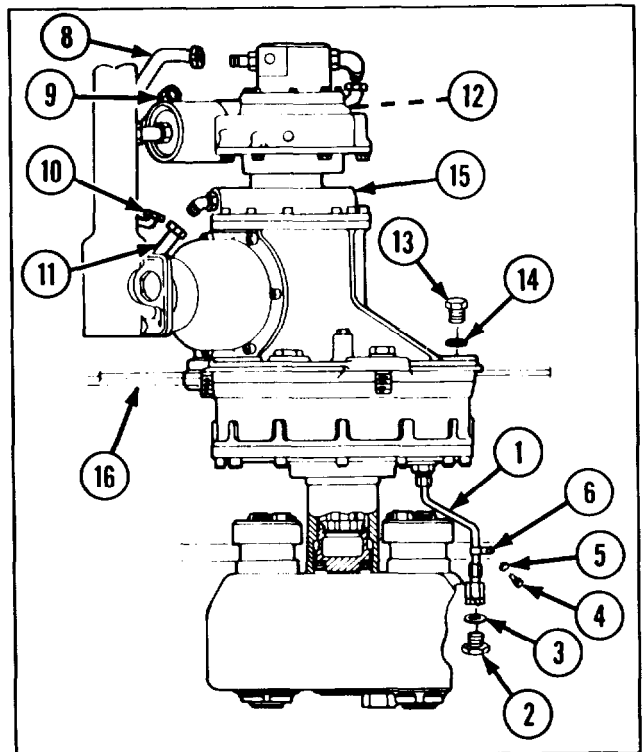
NOTE

Traversing constant speed drive holds 3 qt (2.8 l) of oil.

- 2 Remove machine thread plug (2), pre-formed packing (3), and drain fluid into container.
- 3 Remove capscrew (4), lockwasher (5), and loop clamp (6) holding metal drain tube assembly (1).

WARNING

Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.



- 4 Disconnect six tube assemblies (7, 8, 9, 10, 11, and 12) and cover tube openings. For complete disassembly of hydraulic lines and fittings, refer to page 2-27.

- 5 Remove three capscrews (13) and three lockwashers (14) holding traversing constant speed drive assembly (15) to deck (16).

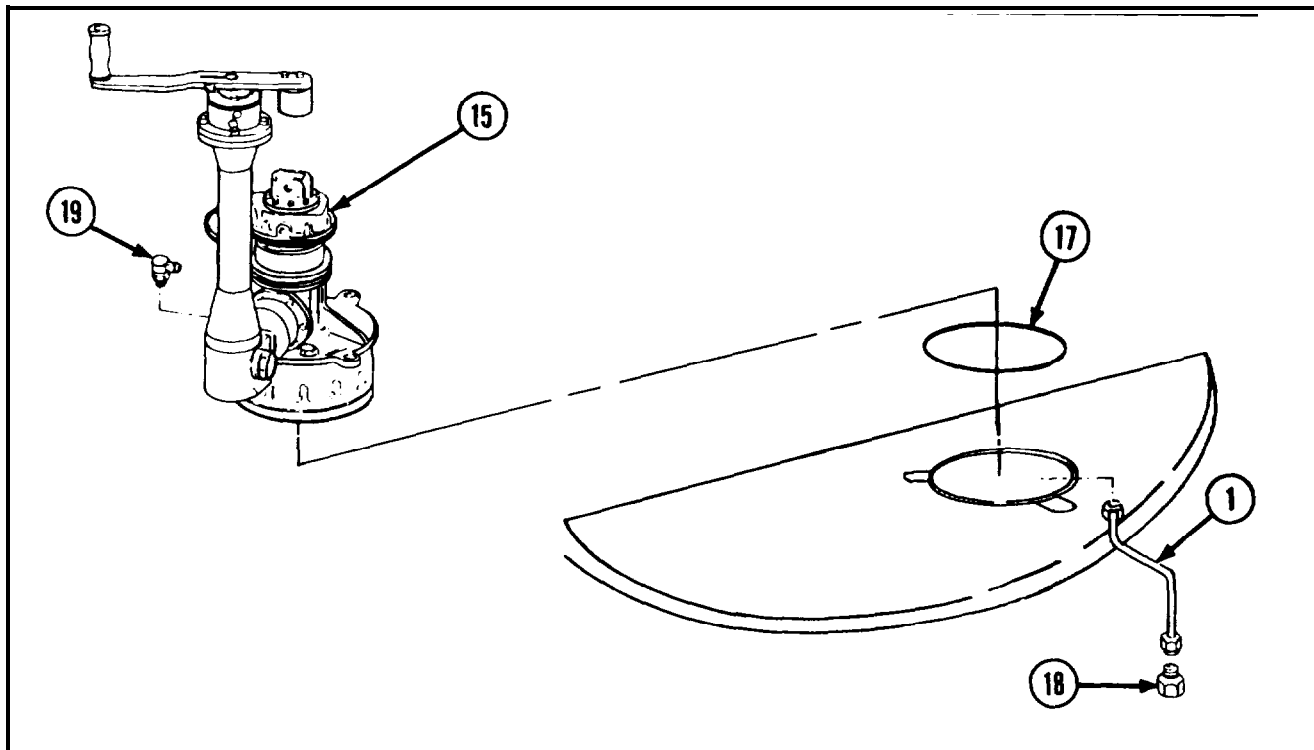
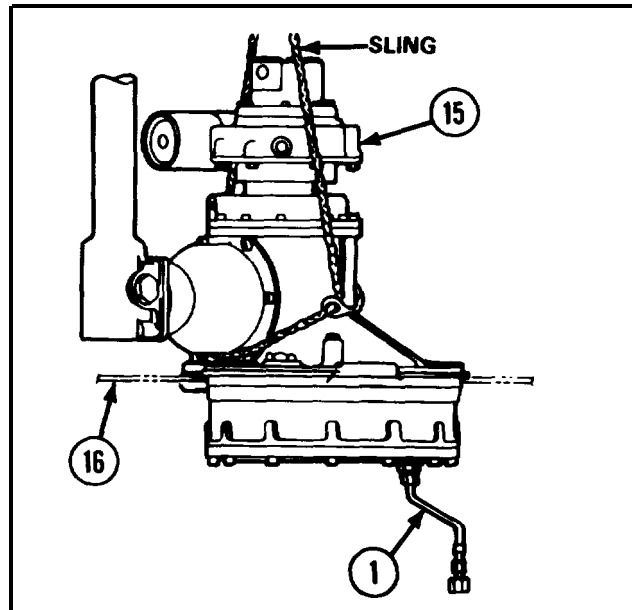
2-46. MAINTENANCE OF TRAVERSING CONSTANT SPEED DRIVE AND SPEED GEAR ASSEMBLY (CONT).

REMOVAL (CONT)

CAUTION

Traversing constant speed drive weighs about 150 lb (68 kg).

- 6 Install sling and hoist.
- 7 Lift traversing constant speed drive assembly (15) from deck (16). Take care to avoid damaging metal drain tube assembly (1).



- 8 Remove nonmetallic seal (17).
- 9 Remove straight adapter (18) and metal drain tube assembly (1).
- 10 Remove lubrication fitting (19) from traversing constant speed drive (15).

DISASSEMBLY

NOTE

Traversing drive torque handle can be removed with traversing constant speed drive installed on the howitzer.

- 1 Loosen capscrew (1), lockwasher (2), and nut (3).
- 2 Tap underside of traversing drive torque handle (4) and remove.
- 3 Remove machine key (5).

NOTE

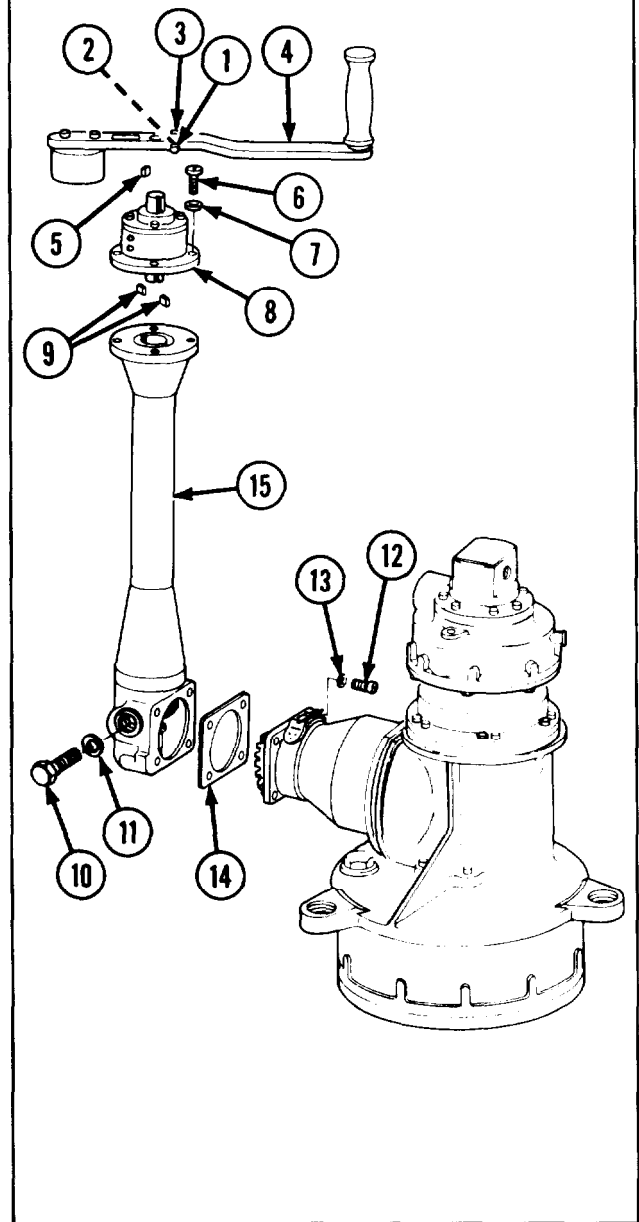
Torque lock can be removed with traversing constant speed drive installed on the howitzer.

- 4 Remove four capscrew (6), four lockwashers (7), and torque lock (8).
- 5 Remove two machine keys (9).

NOTE

Handwheel drive column can be removed and disassembled with traversing constant speed drive installed on howitzer.

- 6 Remove machine thread plug (10) and packing (11).
- 7 Remove four capscrews (12), four lockwashers (13), slip clutch housing shim (14), and handwheel drive column (15).

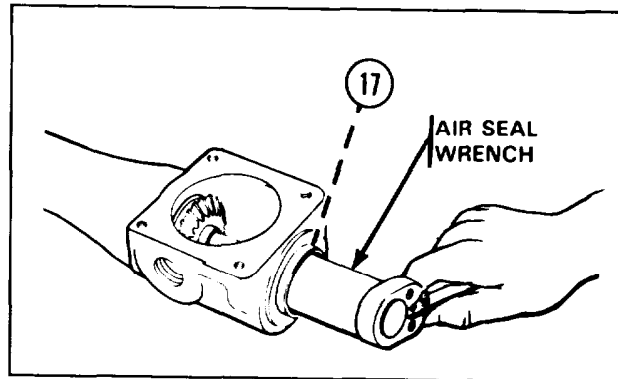


- 8 Bend tabs of key washer (16) out of slots in nut (17).

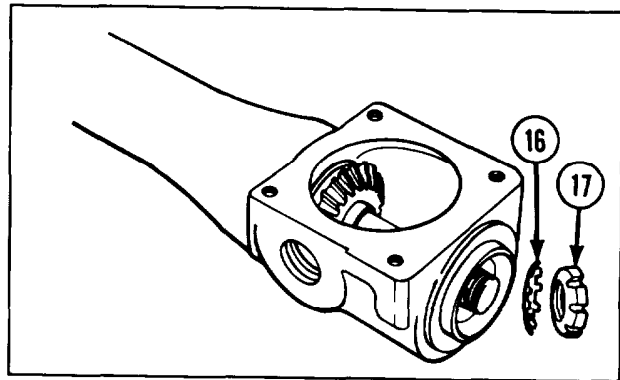
2-46. MAINTENANCE OF TRAVERSING CONSTANT SPEED DRIVE AND SPEED GEAR ASSEMBLY (CONT).

DISASSEMBLY (CONT)

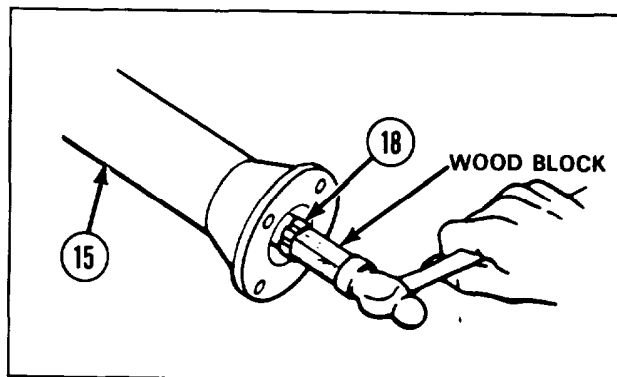
9 Using air seal wrench, loosen nut (17) while holding nut on opposite end.



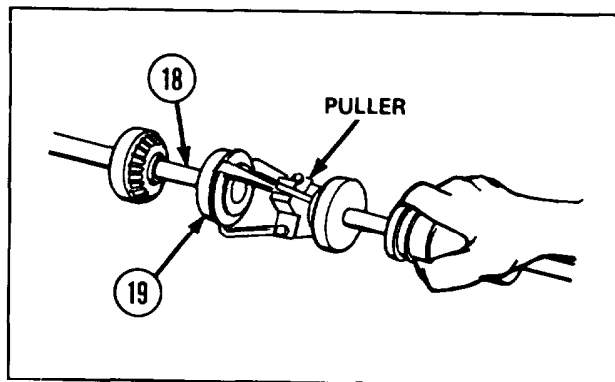
10 Remove nut (17) and key washer (16).



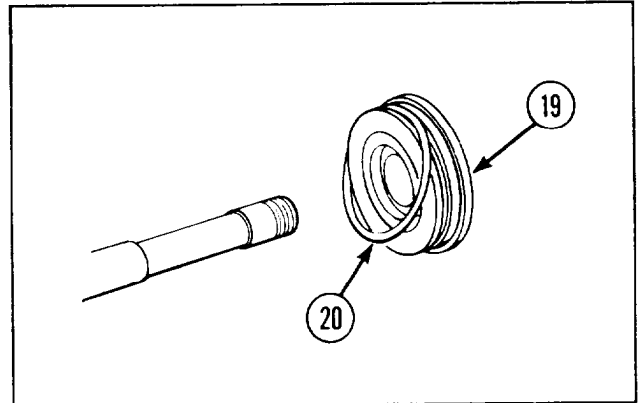
11 Using wood block on lower end of shouldered shaft (18), drive shouldered shaft out of upper end of handwheel drive column (15).



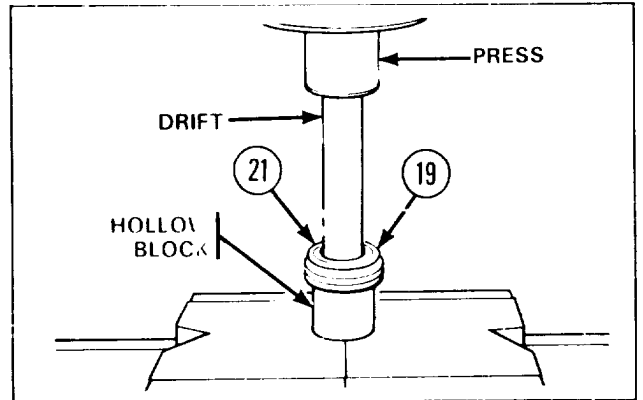
12 Using puller, remove drive column shaft wearing ring (19) from shouldered shaft (18).



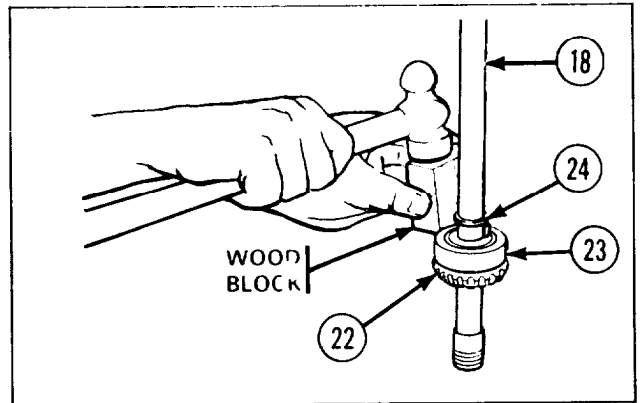
- 13 Remove preformed packing (20) from drive column shaft wearing ring (19).



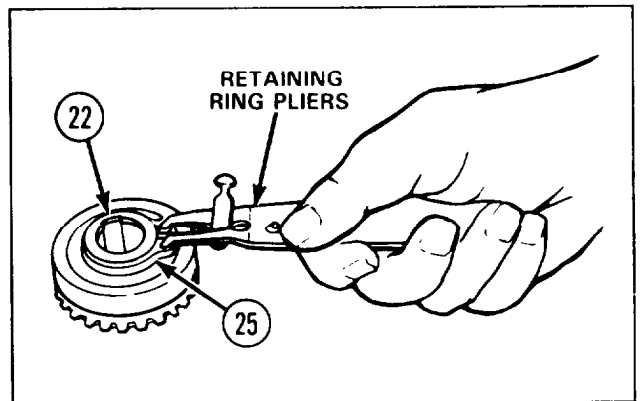
- 14 Using press and drift, remove ball bearing (21) from drive column shaft wearing ring (19). Drive column shaft wearing ring must be resting on hollow block



- 15 Using wood block, drive bevel miter gear (22) and ball bearing (23) from shouldered shaft (18). Remove woodruff Key (24).



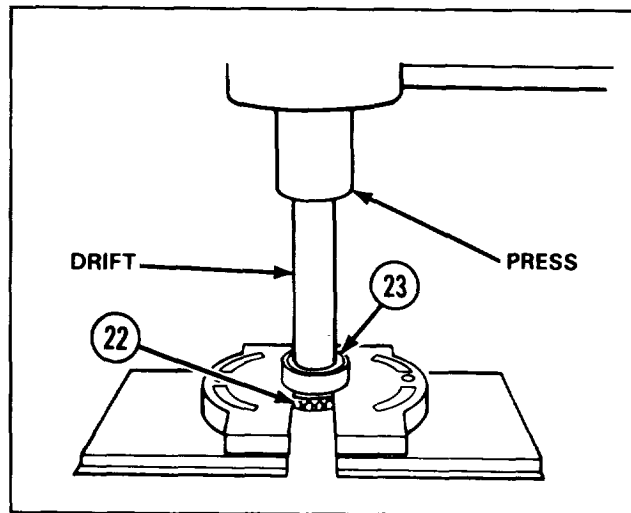
- 16 Using retaining ring pliers, remove retaining ring (25) from bevel miter gear (22).



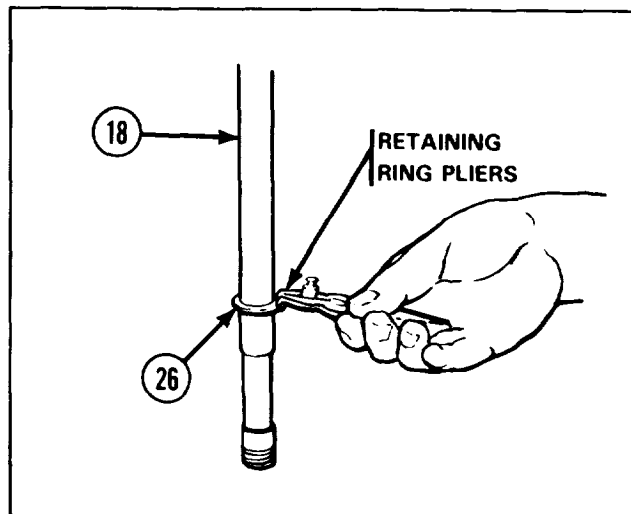
2-46. MAINTENANCE OF TRAVERSING CONSTANT SPEED DRIVE AND SPEED GEAR ASSEMBLY (CONT).

DISASSEMBLY (CONT)

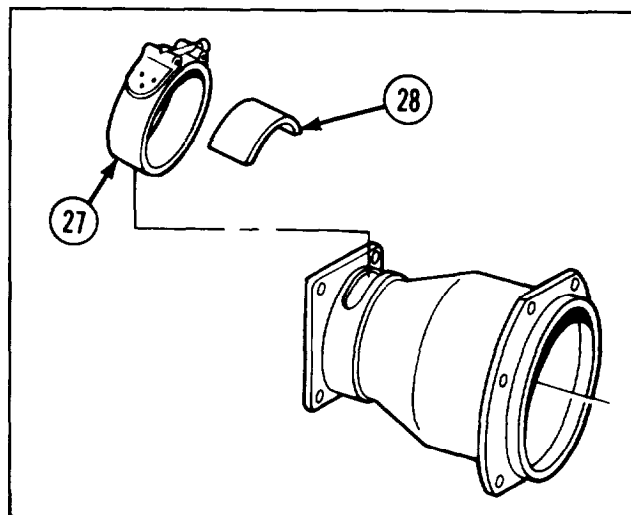
17 Using press and drift, remove ball bearing (23) from bevel miter gear (22).



18 Using retaining ring pliers, remove retaining ring (26) from shouldered shaft (18).



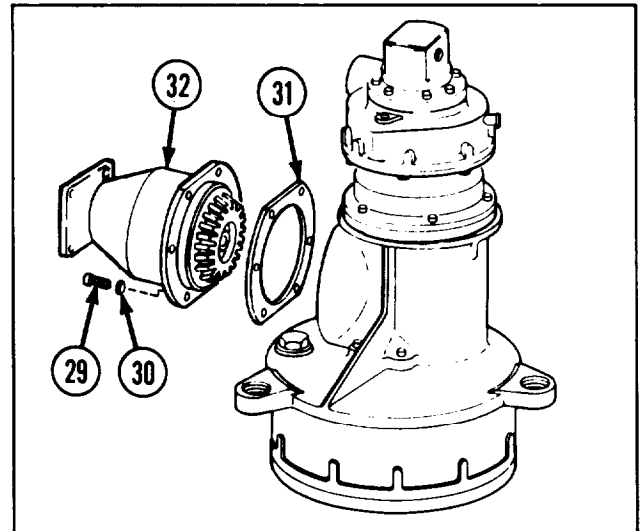
19 Remove access hole hose clamp (27) and access hole clamp gasket (281).



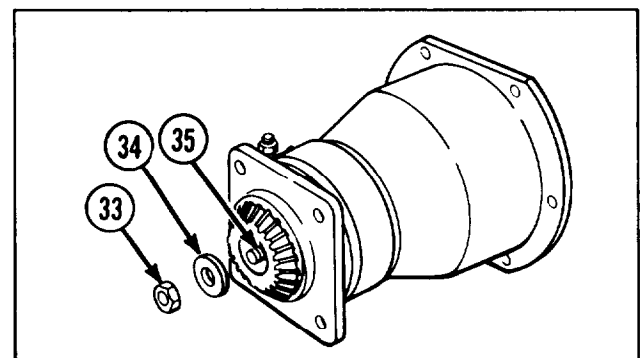
NOTE

Mechanical clutch shaft housing can be removed and disassembled with traversing constant speed drive installed on howitzer.

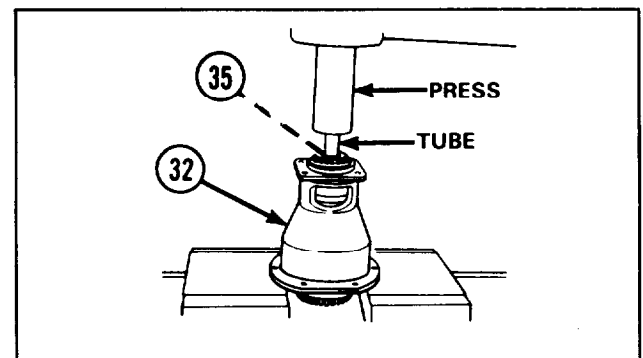
- 20 Remove six capscrews (29), six lock-washers (30), clutch housing shim (31), and mechanical clutch shaft housing (32).



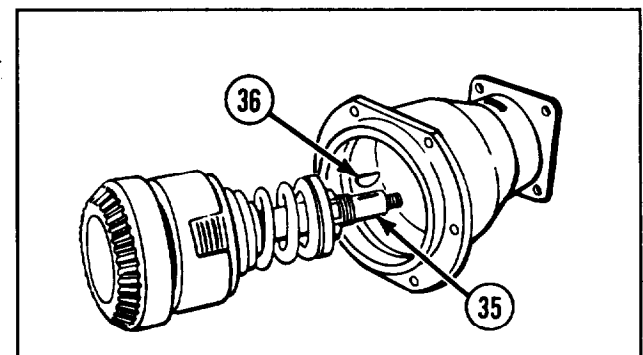
- 21 Remove self-locking nut (33) and flat washer (34) from shouldered shaft (35).



- 22 Using press and tube, press shouldered shaft (35) and attached parts from mechanical housing (32).



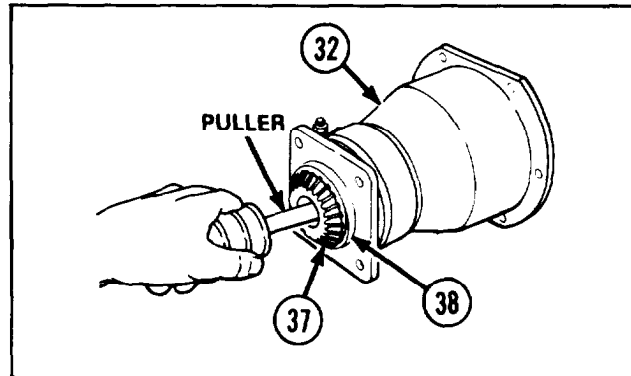
- 23 Remove woodruff key (36) from shouldered shaft (35).



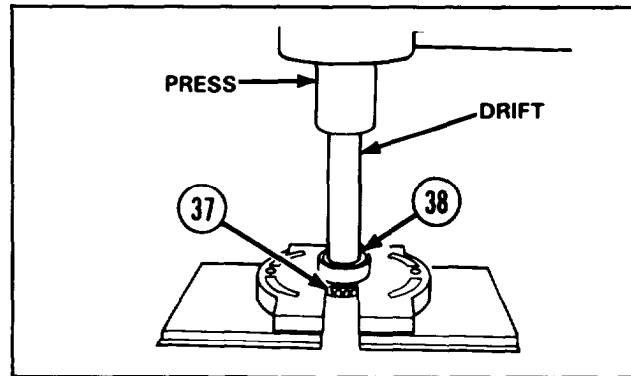
2-46. MAINTENANCE OF TRAVERSING CONSTANT SPEED DRIVE AND SPEED GEAR ASSEMBLY (CONT).

DISASSEMBLY (CONT)

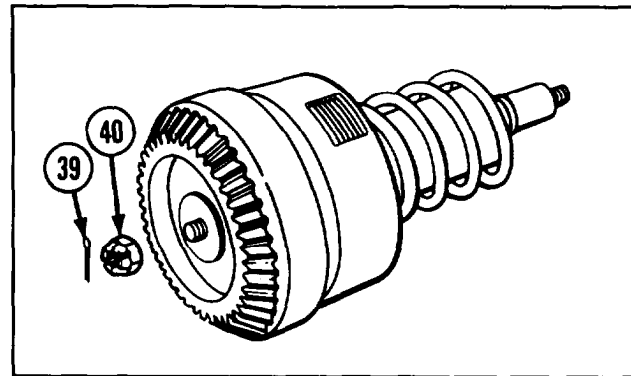
24 Using puller, remove bevel miter gear (37) and ball bearing (38) from mechanical housing (32).



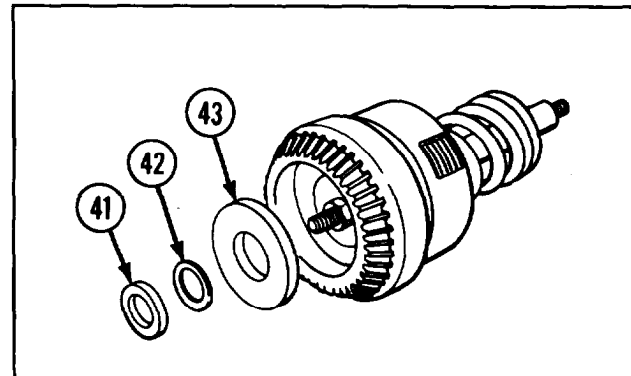
25 Using press and drift, remove ball bearing (38) from bevel miter gear (37).



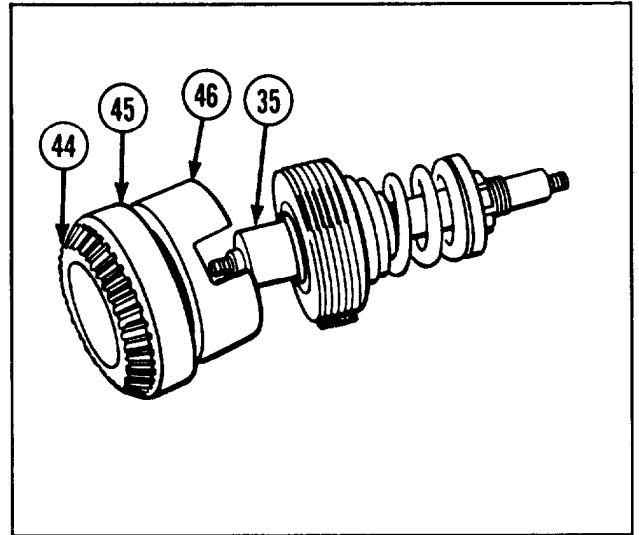
26 Remove cotter pin (39) and nut (40).



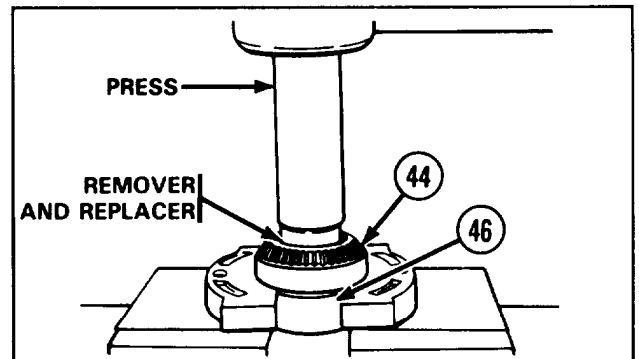
27 Remove pinion bearing flat washer (41), roller bearing (42), and recessed pinion gear washer (43).



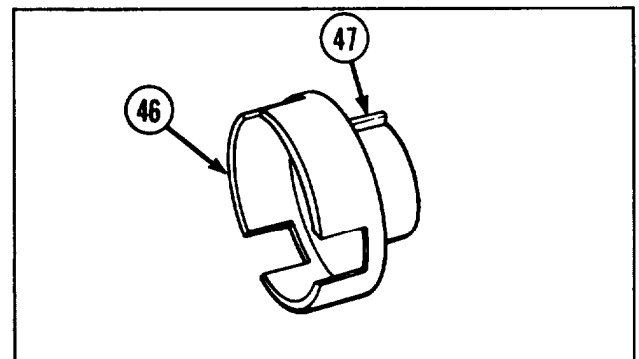
- 28 Remove bevel gear (44), slip clutch ball bearing (45), and cup and bearing assembly clutch (46) as a unit from shouldered shaft (35).



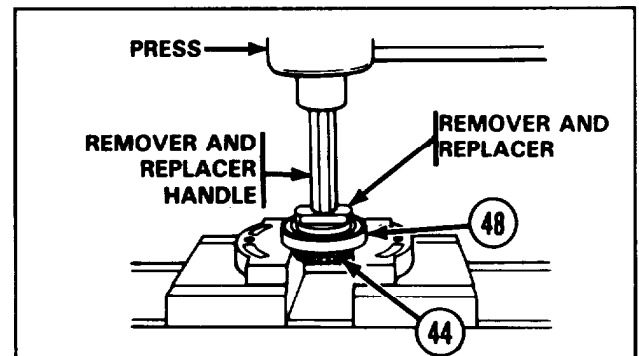
- 29 Using remover and replacer and press, press cup and bearing assembly clutch (46) from bevel gear (44).



- 30 Remove woodruff key (47) from cup and bearing assembly clutch (46).



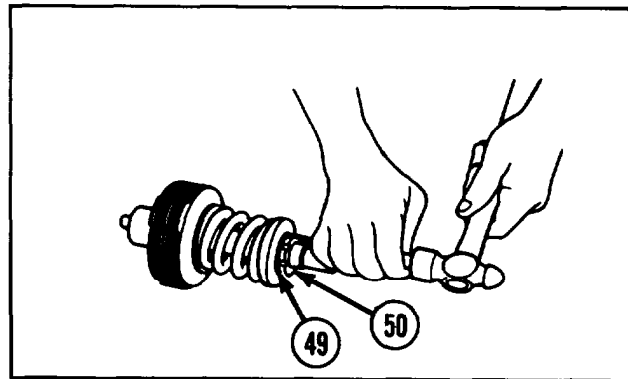
- 31 Using press, remover and replacer handle, and remover and replacer, remove slip clutch ball bearing (48) from bevel gear (44).



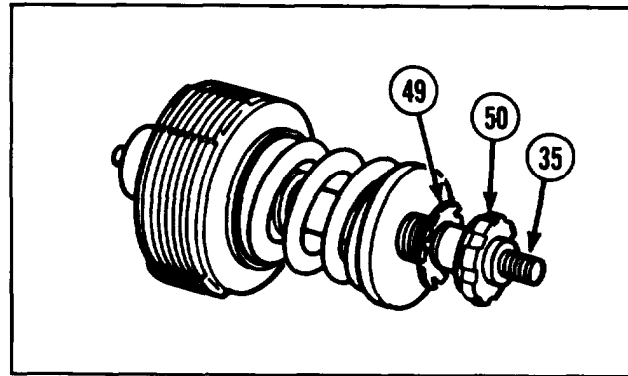
2-46. MAINTENANCE OF TRAVERSING CONSTANT SPEED DRIVE AND SPEED GEAR ASSEMBLY (CONT).

DISASSEMBLY (CONT)

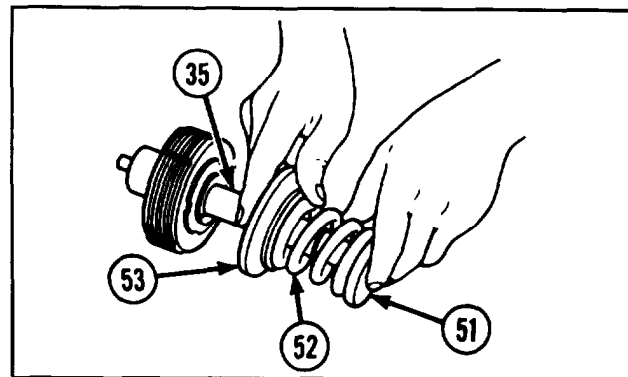
32 Bend tabs of key washer (49) out of slots in nut (50).



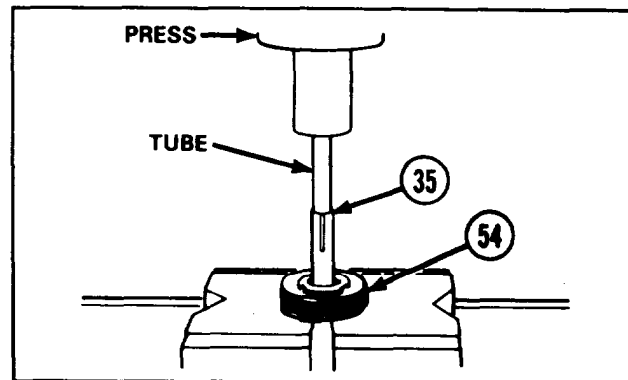
33 Remove nut (50) and key washer (49) from shouldered shaft (35).



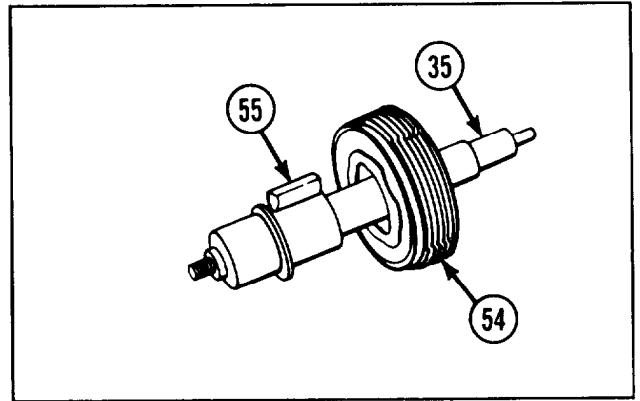
34 Remove helical compression clutch seat (51), helical compression clutch spring (52), and pressure plate (53) from shouldered shaft (35).



35 Using press and tube, press shouldered shaft (35) from clutch assembly (54).



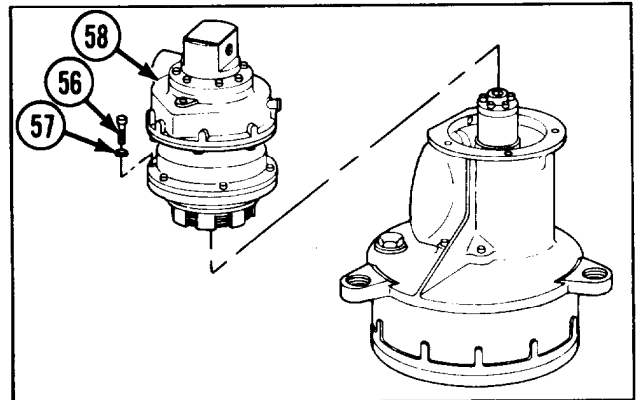
- 36 Remove clutch assembly (54) and machine key (55) from shouldered shaft (35).



NOTE

Hydraulic motor and motor brake can be removed with traversing constant speed drive installed on the howitzer.

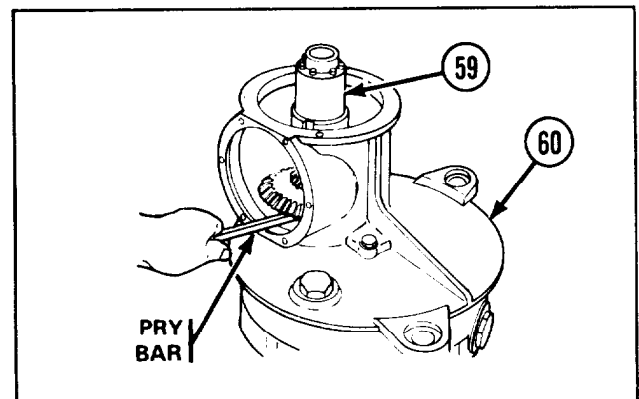
- 37 Remove four capscrews (56), four lockwashers (57), and hydraulic motor (58).



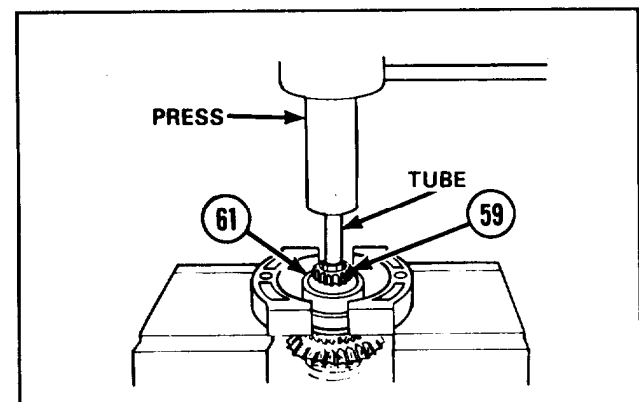
NOTE

Differential can be removed with traversing constant speed drive installed on howitzer.

- 38 Using pry bar, pry differential (59) loose from mechanical housing (60).



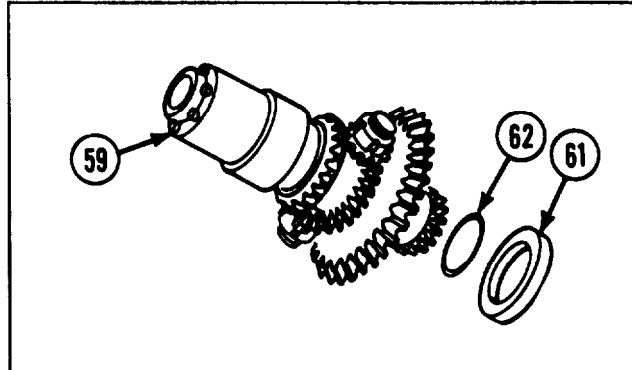
- 39 Using press and tube, press ball bearing (61) loose from differential (59).



2-46. MAINTENANCE OF TRAVERSING CONSTANT SPEED DRIVE AND SPEED GEAR ASSEMBLY (CONT).

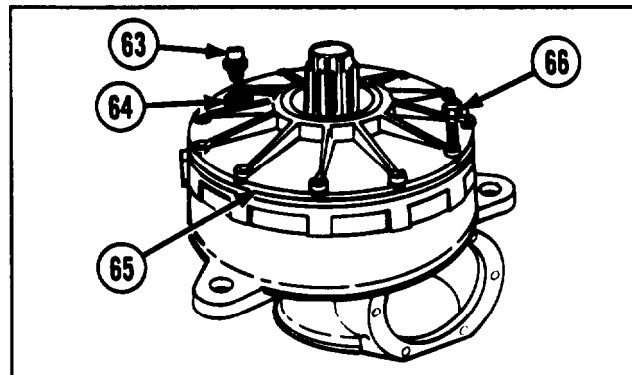
DISASSEMBLY (CONT)

40 Remove ball bearing (61) and drive differential shim (62) from differential (59).

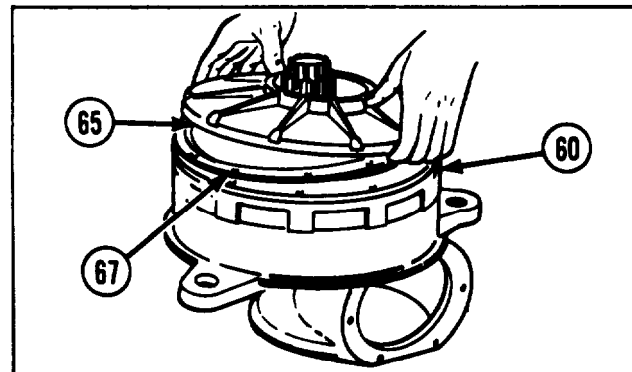


41 Remove tube reducer (63) and preformed packing (64) from oil seal retainer (65).

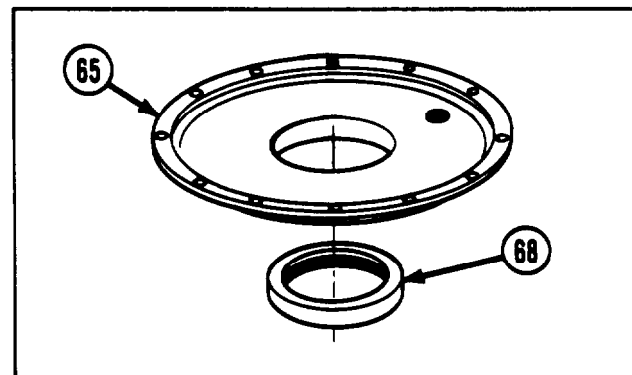
42 Remove twelve capscrews (66) from oil seal retainer (65).



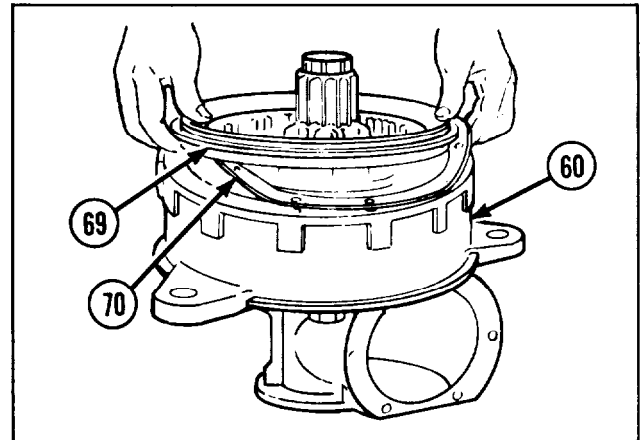
43 Remove oil seal retainer (65) and gasket (67) from mechanical housing (60).



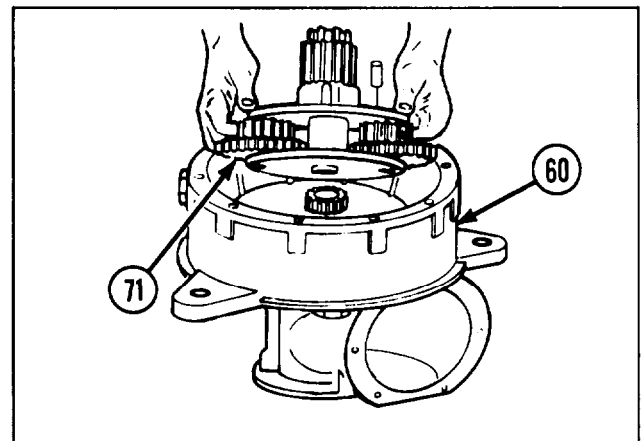
44 Using drift, remove encased oil seal (68) from oil seal retainer (65).



- 45 Remove internal drive ring gear (69) and gasket (70) from mechanical housing (60).



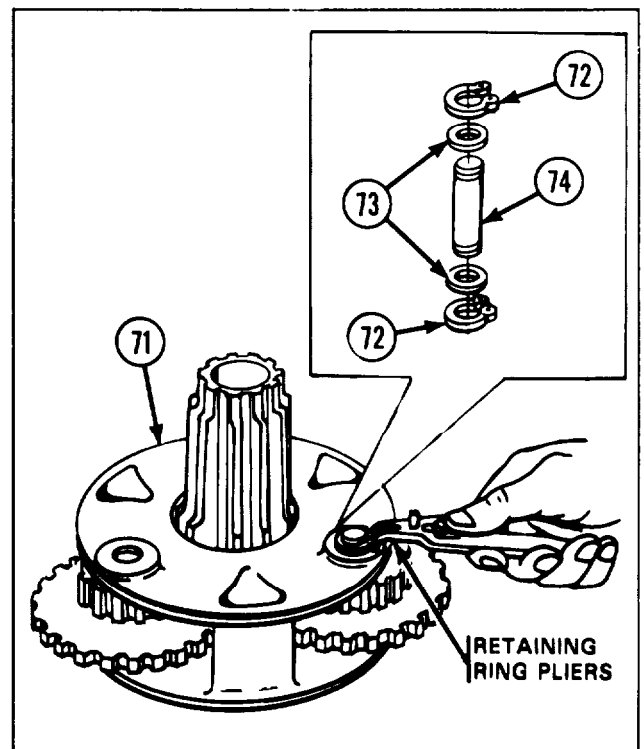
- 46 Remove speed gear assembly (71) from mechanical housing (60).



NOTE

Steps 47 thru 52 refer to the disassembly of the speed gear assembly.

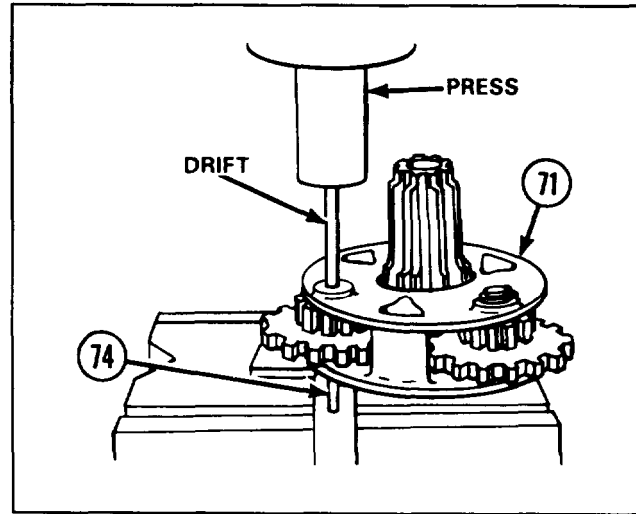
- 47 Using retaining ring pliers, remove two retaining rings (72) and two thrust washer bearings (73) from ends of three headless grooved pins (74) in speed gear assembly (71).



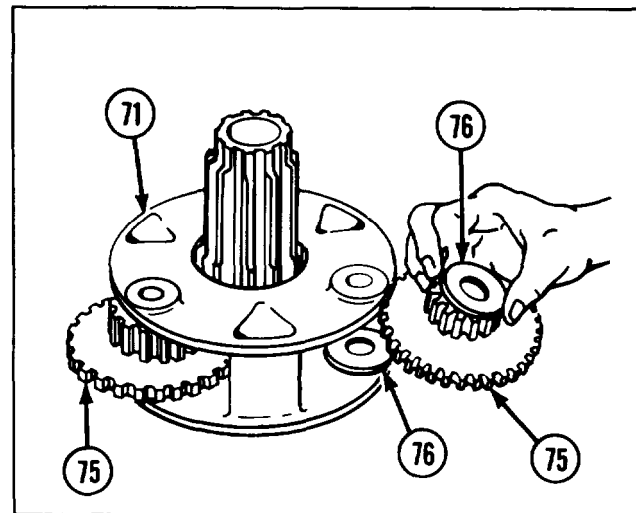
2-46. MAINTENANCE OF TRAVERSING CONSTANT SPEED DRIVE AND SPEED GEAR ASSEMBLY (CONT).

DISASSEMBLY (CONT)

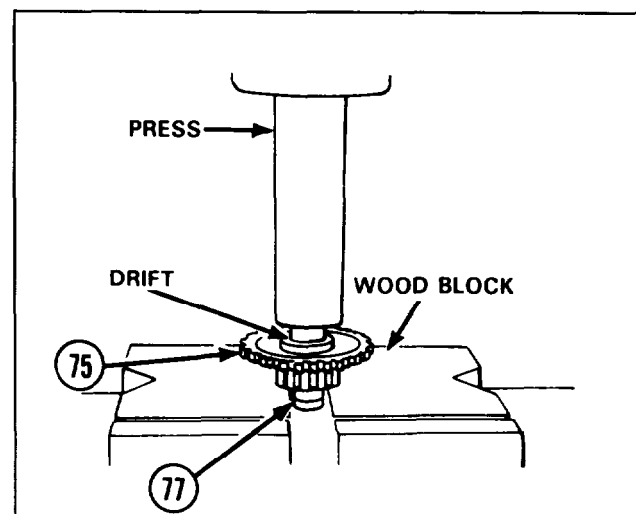
48 Using press and drift, remove three headless grooved pins (74) from speed gear assembly (71).



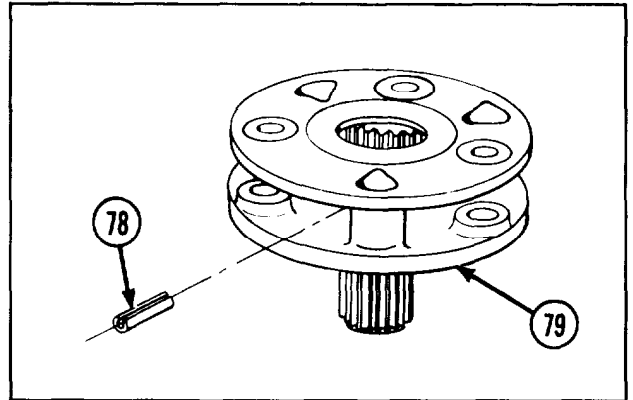
49 Remove three traversing cluster gears (75) and six washer bearings (76) from speed gear assembly (71).



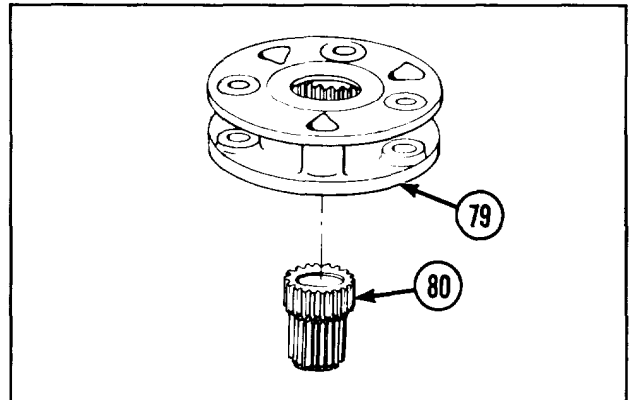
50 Using press, drift, and wood block, remove two roller bearings (77) from each of three traversing cluster gears (75).



- 51 Using drift, remove spring pin (78) from internal gear (79).



- 52 Remove shouldered shaft (80) from internal gear (79).

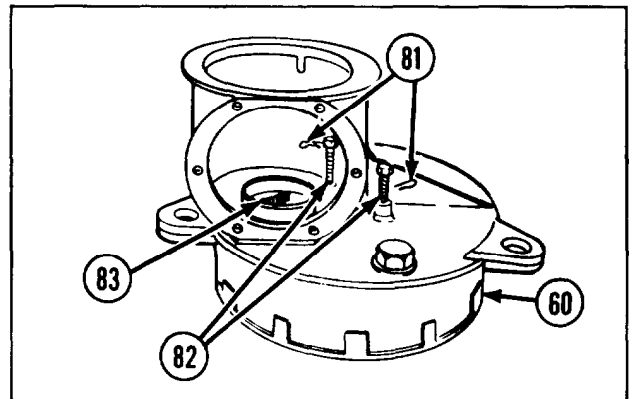


- 53 Remove lockwire (81) from four machine bolts (82) in mechanical housing (60).

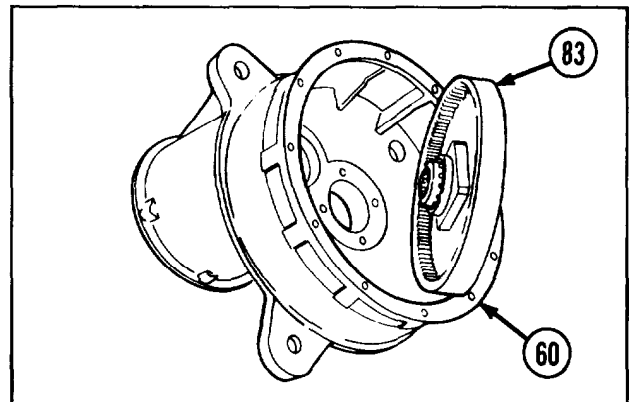
- 54 Loosen each machine bolt (82) 0.50 in. (1.27 cm).

- 55 Tap machine bolts (82) to loosen internal drive gear (83) and related parts from mechanical housing (60).

- 56 Remove four machine bolts (82) from mechanical housing (60).



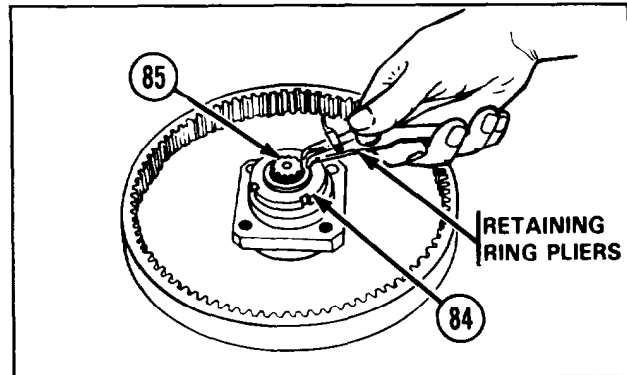
- 57 Remove internal drive gear (83) and related parts from mechanical housing (60).



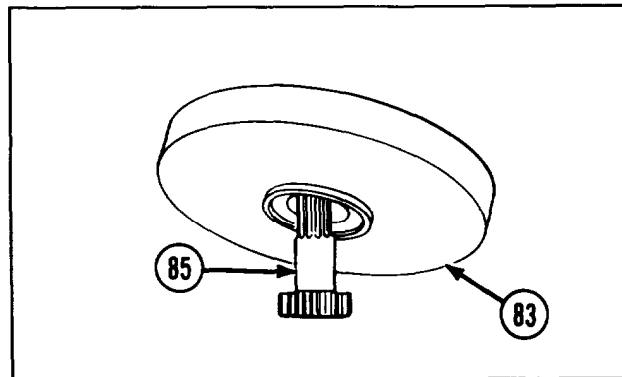
2-46. MAINTENANCE OF TRAVERSING CONSTANT SPEED DRIVE AND SPEED GEAR ASSEMBLY (CONT).

DISASSEMBLY (CONT)

58 Using retaining ring pliers, remove retaining ring (84) from spur sun gear (85).

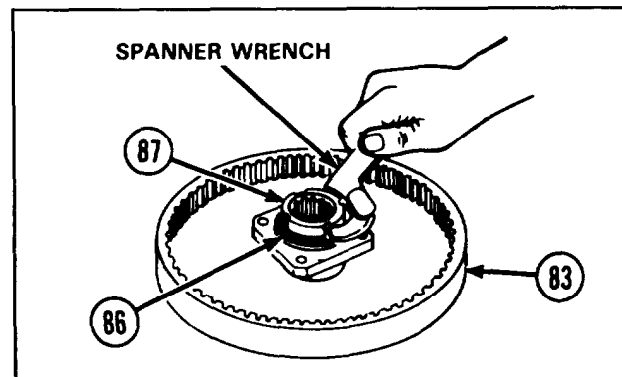


59 Remove spur sun gear (85) from internal drive gear (83).

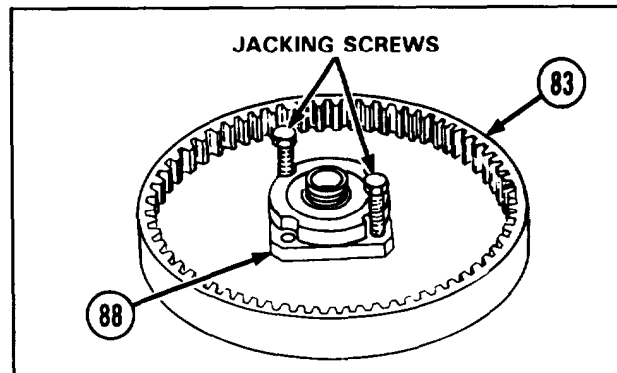


60 Bend tabs of key washer (86) out of slots in nut (87).

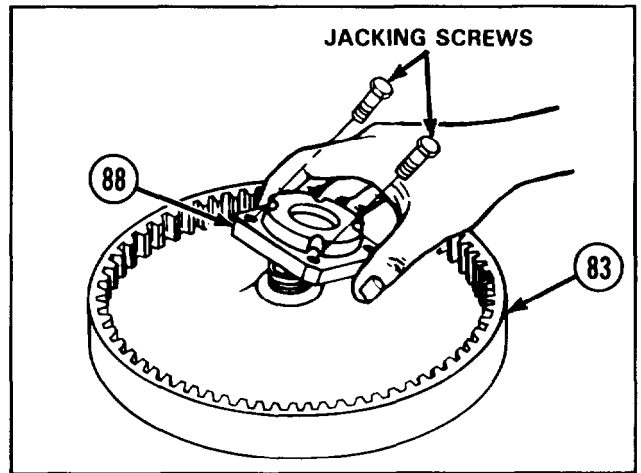
61 Using spanner wrench, remove nut (87) and key washer (86) from internal drive gear (83).



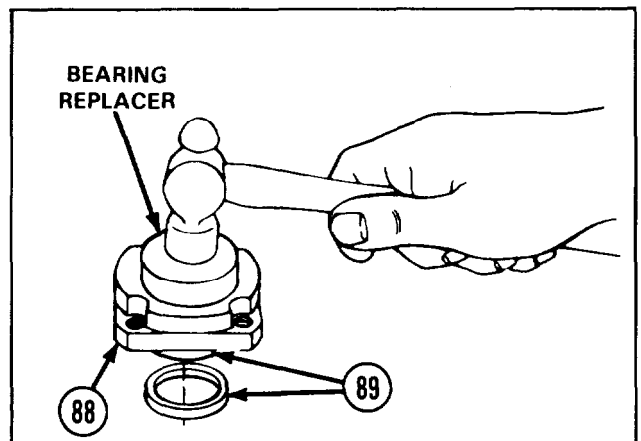
62 Install two jacking screws in internal bearing carrier (88) and tighten two jacking screws to separate internal bearing carrier from internal drive gear (83).



- 63 Remove internal bearing carrier (88) from internal drive gear (83) and remove jacking screws from internal bearing carrier.



- 64 Using bearing replacer, remove two internal gear ball bearings (89) from internal bearing carrier (88).

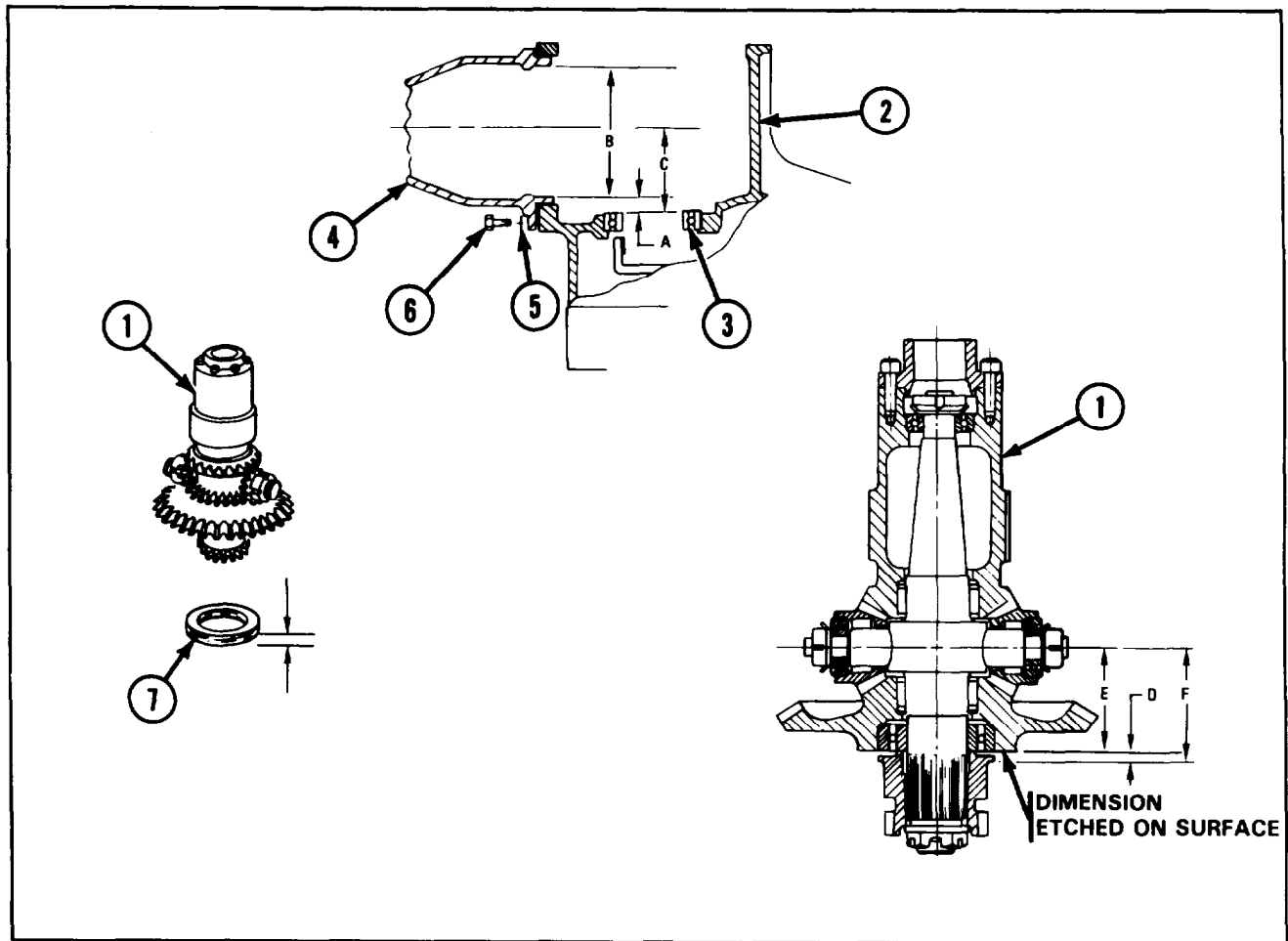


INSPECTION/REPAIR

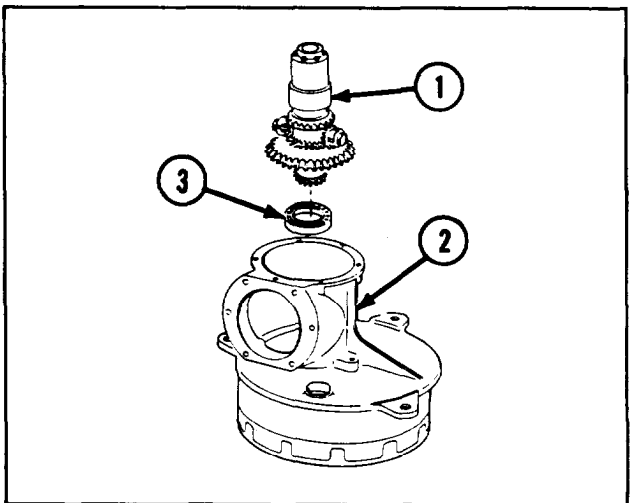
- 1 Inspect for broken, damaged, or missing parts.
- 2 Traversing drive torque handle is a repairable assembly. Refer to TM 9-2350-304-20-2.
- 3 Torque lock (11675354) is a repairable assembly. Refer to page 2-204.
- 4 Hydraulic motor is a repairable assembly. Refer to page 2-210 and 2-216.
- 5 Differential is a repairable assembly. Refer to page 2-236.
- 6 If internal gear is broken, damaged, or missing, repair is by replacement of next higher assembly.
- 7 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

2-46. MAINTENANCE OF TRAVERSING CONSTANT SPEED DRIVE AND SPEED GEAR ASSEMBLY (CONT).

REASSEMBLY



- 1 Coat all uncovered machined surfaces of traversing constant speed drive and speed gear assembly with grease (item 12, appx B).
- 2 Adjust shim thickness for proper installation of differential (1) in mechanical housing (2) as follows:
 - a. Insert ball bearing (3) into bore of mechanical housing (2).

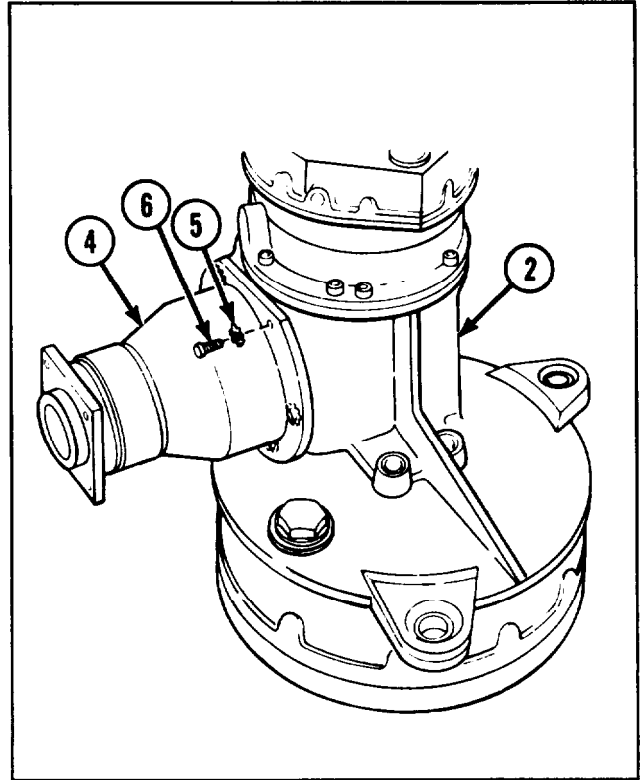


- b. Install empty mechanical housing (4) to mechanical housing (2) and secure using six new lockwashers (5) and six capscrews (6).

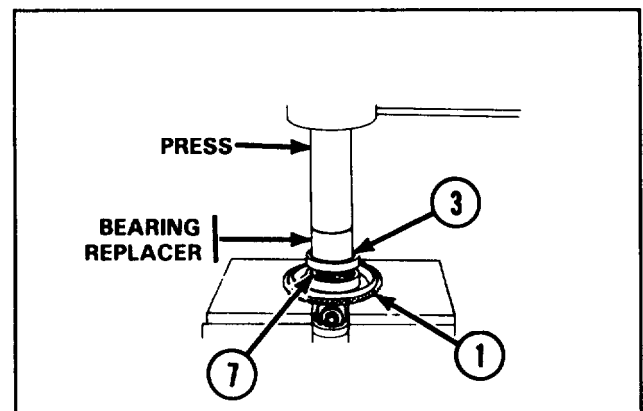
NOTE

Steps c thru I refer to illustration on opposite page.

- c. Measure and record dimension A.
- d. Measure and record dimension B.
- e. Divide dimension B in half.
- f. Add dimension A and one half of dimension B to get dimension C.
- g. Measure and record dimension D on differential (1). Dimension must be etched on surface of differential as shown.
- h. Record dimension E. Dimension must be etched on surface of differential (1).
- i. Add dimension D and dimension E to get dimension F.
- j. Subtract dimension F from dimension C to get correct shim thickness.
- k. Install drive differential shims (7) to differential (1) from shim pack as needed to obtain correct shim thickness.
- l. Remove ball bearing (3), six capscrews (6), six lockwashers (5), and empty mechanical housing (4) from mechanical housing (2).



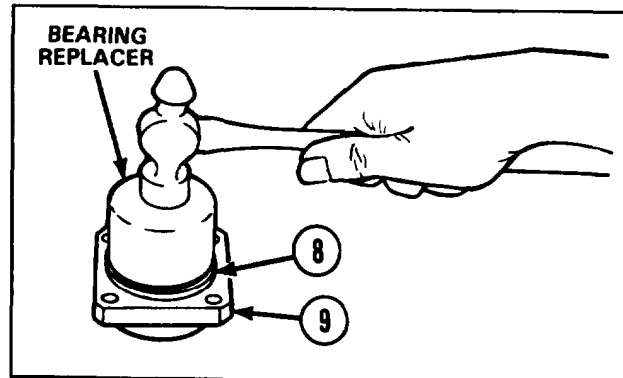
- 3 Using press and bearing replacer (8350230), install ball bearing (3) against adjusted drive differential shim(s) (7) on differential (1).



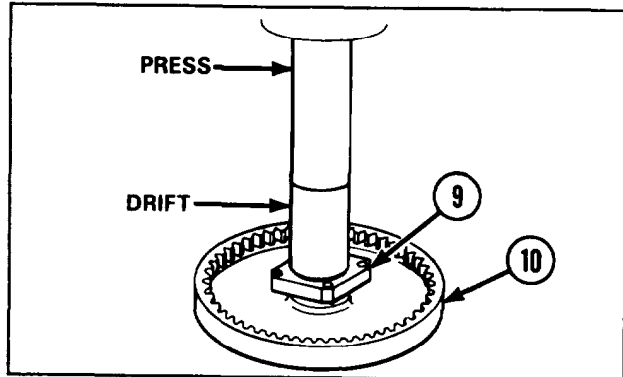
2-46. MAINTENANCE OF TRAVERSING CONSTANT SPEED DRIVE AND SPEED GEAR ASSEMBLY (CONT).

REASSEMBLY (CONT)

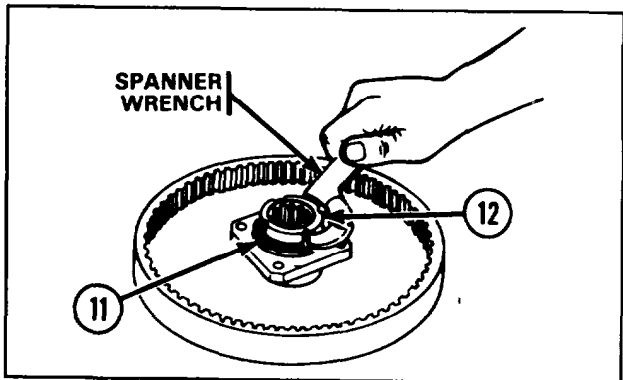
- 4 Using bearing replacer (10904194), install two internal gear ball bearings (8) in internal bearing carrier (9).



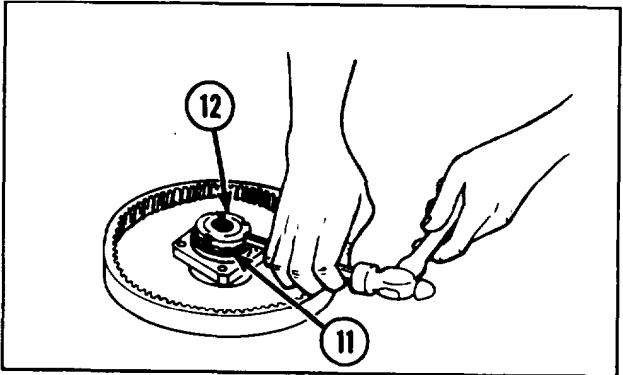
- 5 Using press and drift, install internal bearing carrier (9) on internal drive gear (10).



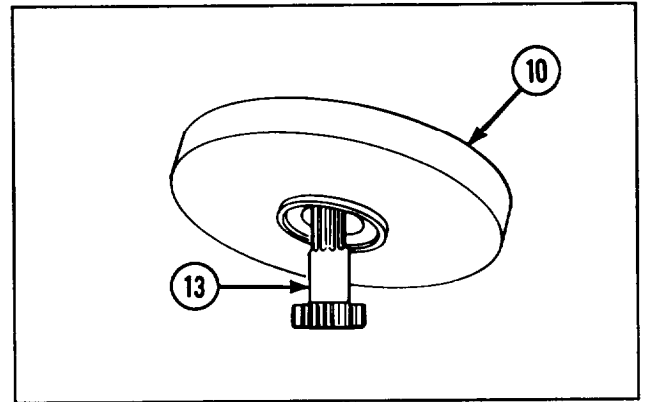
- 6 Using spanner wrench, install key washer (11) and nut (12).



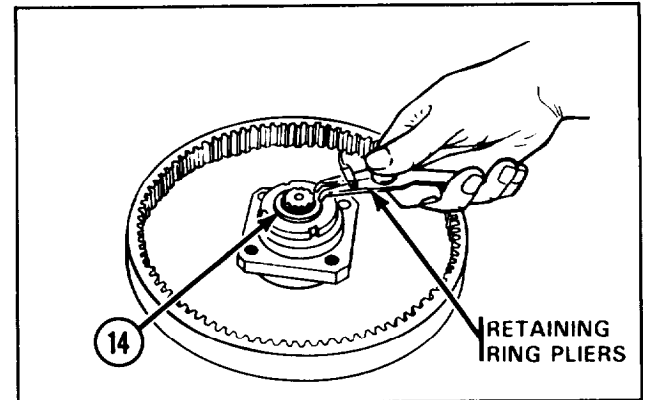
- 7 Bend tabs of key washer (11) into slots of nut (12).



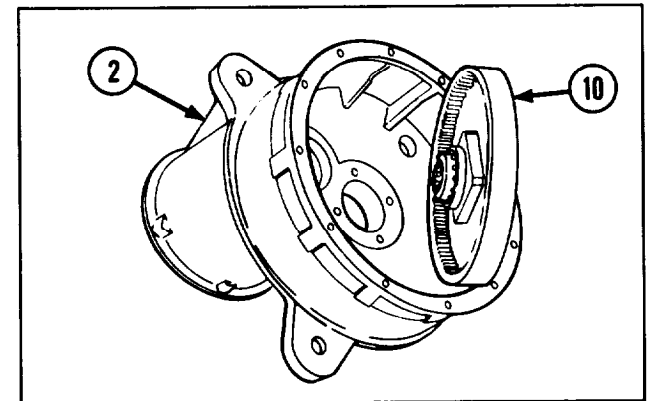
- 8 Install spur sun gear (13) in internal drive gear (10).



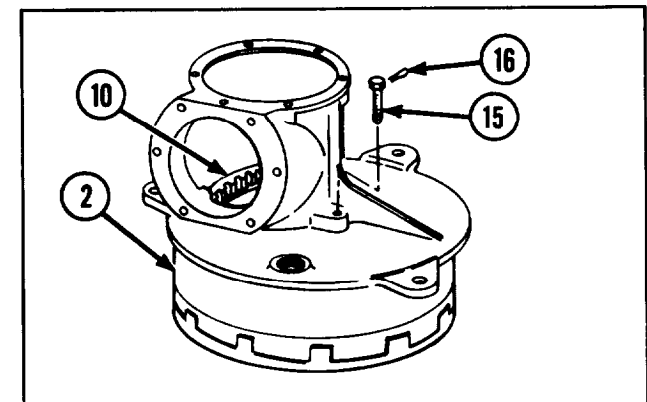
- 9 Using retaining ring pliers, install retaining ring (14).



- 10 Install internal drive gear (10) in mechanical housing (2).



- 11 Install four machine bolts (15) in mechanical housing (2) and tighten machine bolts (15) slowly to pull internal drive gear (10) into place in bore of mechanical housing (2).



- 12 Install new lockwire (16) (item 16, appx B).

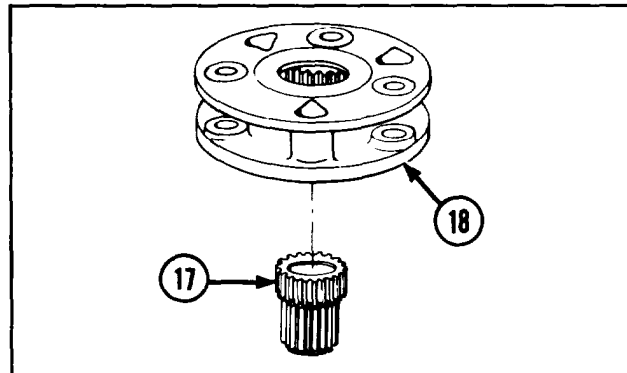
2-46. MAINTENANCE OF TRAVERSING CONSTANT SPEED DRIVE AND SPEED GEAR ASSEMBLY (CONT).

REASSEMBLY (CONT)

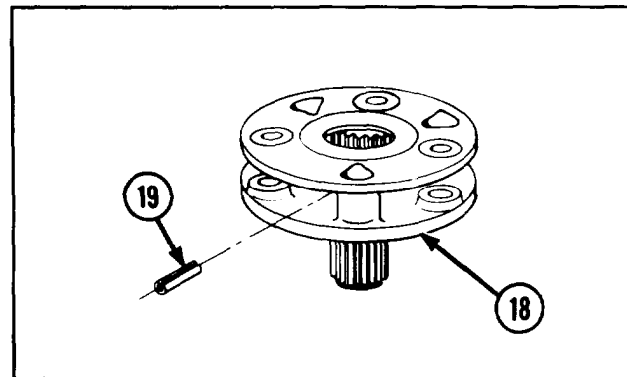
NOTE

Steps 13 thru 19 refer to the reassembly of the speed gear assembly.

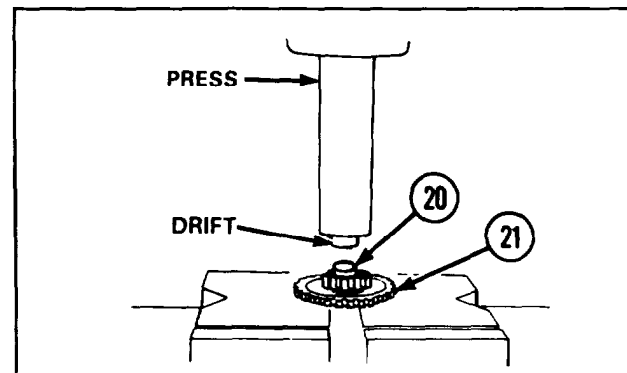
13 Install shouldered shaft (17) in internal gear (18).



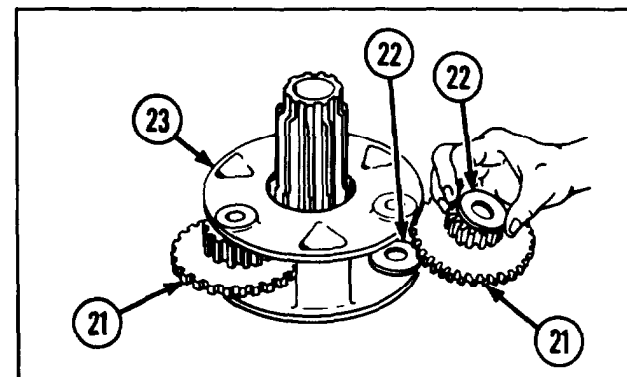
14 Using drift, install spring pin (19) in internal gear (18).



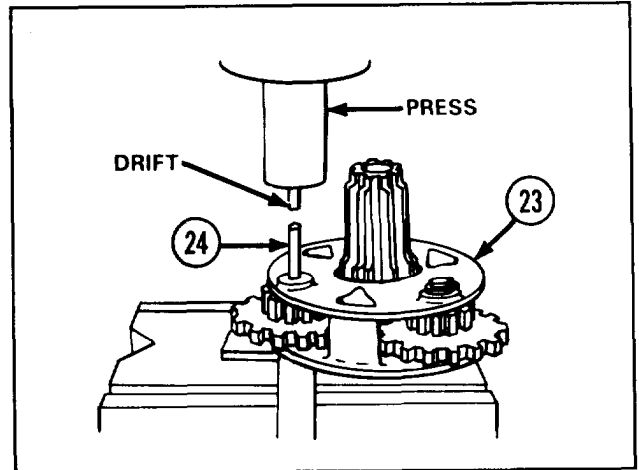
15 Using drift and press, install two roller bearings (20) on each of three traversing cluster gears (21).



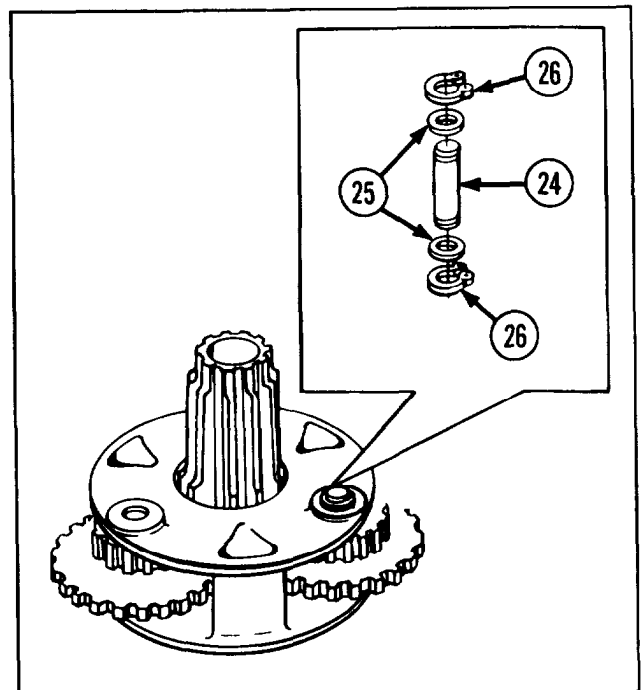
16 Install three traversing cluster gears (21) and six washer bearings (22) in speed gear assembly (23).



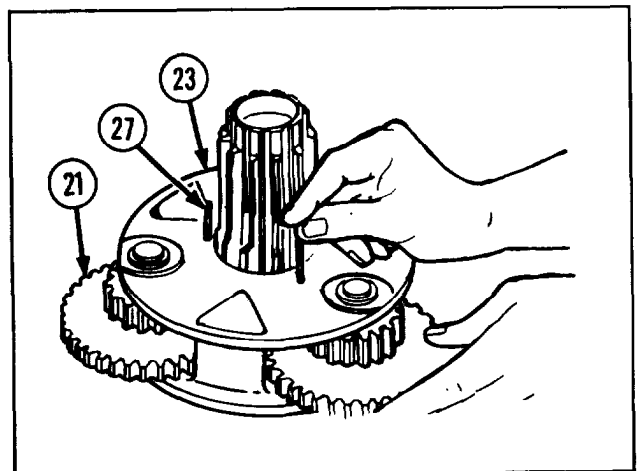
- 17 Using press and drift, install three headless grooved pins (24) into speed gear assembly (23).



- 18 Install two thrust washer bearings (25) and, using retaining ring pliers, install two retaining rings (26) on ends of three headless grooved pins (24).



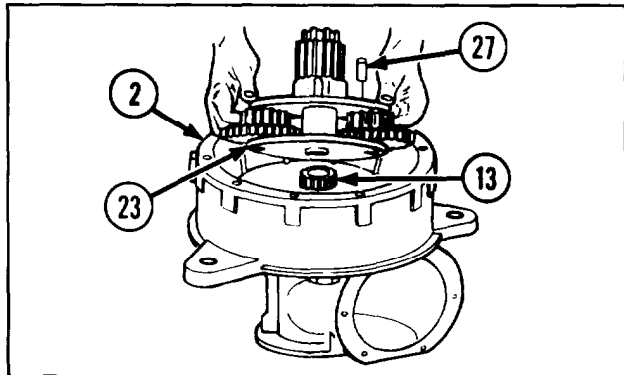
- 19 Install three pins (27), 0.125 in. (0.317 cm) wide and 3.00 in. (7.62 cm) long, in holes through speed gear assembly (23) and three traversing cluster gears (21) to align assembly for installation.



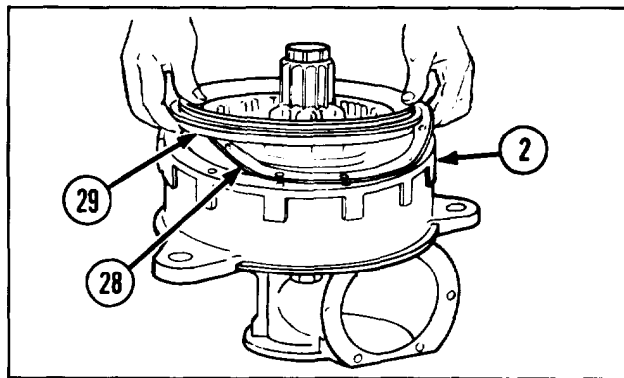
2-46. MAINTENANCE OF TRAVERSING CONSTANT SPEED DRIVE AND SPEED GEAR ASSEMBLY (CONT).

REASSEMBLY (CONT)

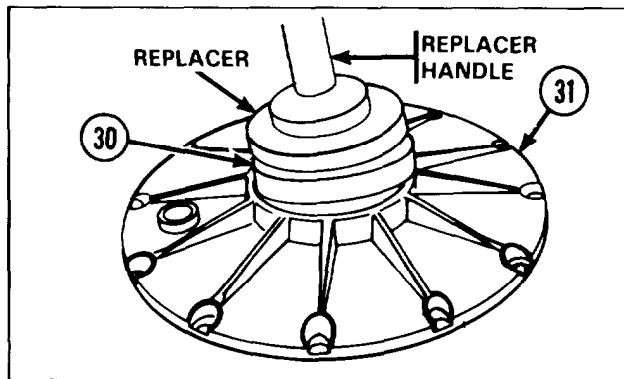
20 Install speed gear assembly (23) in mechanical housing (2) and align speed gear assembly (23) with spur sun gear (13). Remove three pins (27).



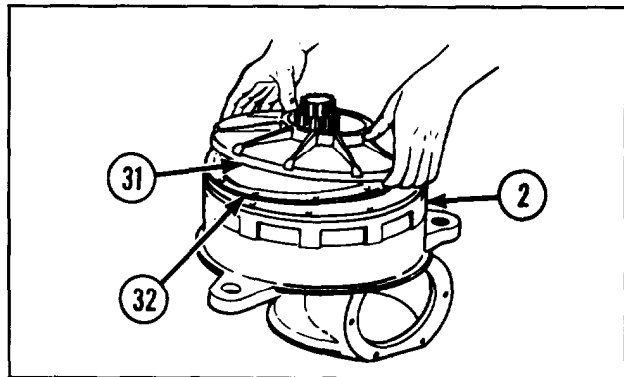
21 Install new gasket (28) and internal drive ring gear (29) in mechanical housing (2).



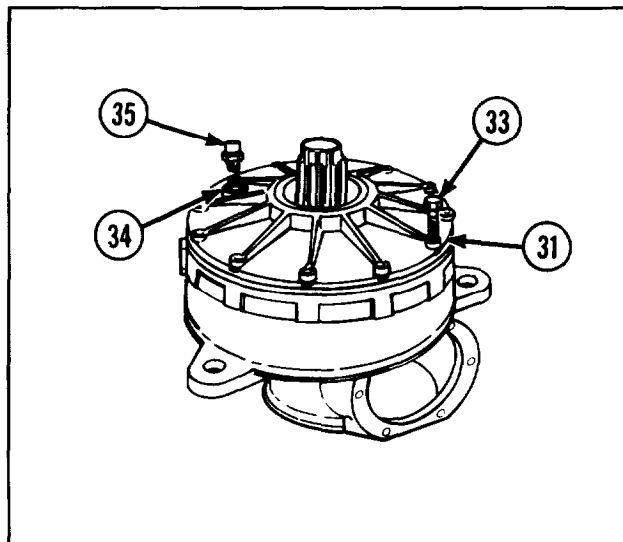
22 Using replacer and replacer handle, install encased oil seal (30) in oil seal retainer (31).



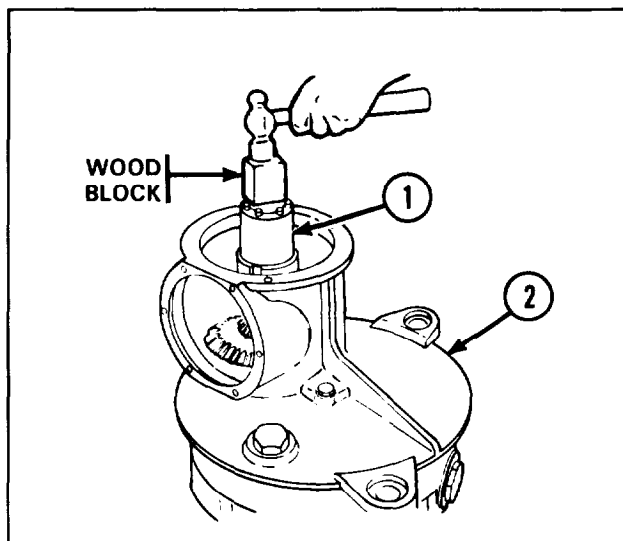
23 Install new gasket (32) and oil seal retainer (31) on mechanical housing (2).



- 24 Install twelve capscrews (33) in oil seal retainer (31).
- 25 Install new preformed packing (34) and tube reducer (35) in oil seal retainer (31).



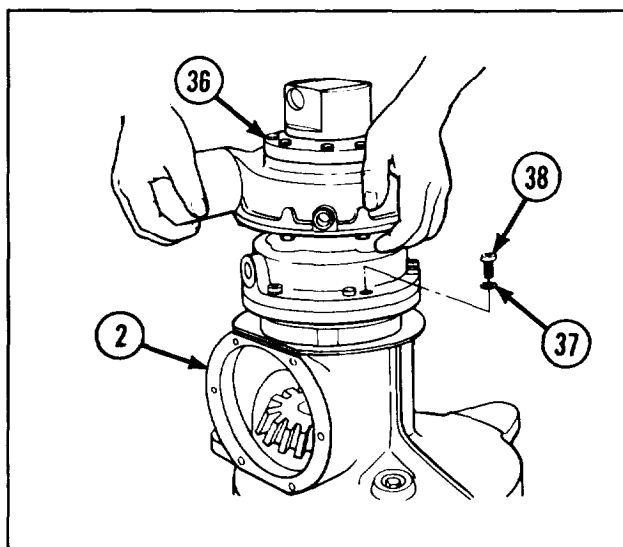
- 26 Using wood block, install differential (1) in mechanical housing (2).



NOTE

Hydraulic motor and motor brake can be installed with traversing constant speed drive installed on howitzer.

- 27 Position hydraulic motor (36) on mechanical housing (2) and secure using four new lockwashers (37) and four capscrews (38). Torque capscrews to 40 to 45 ft-lb (54 to 61 N-m).



2-46. MAINTENANCE OF TRAVERSING CONSTANT SPEED DRIVE AND SPEED GEAR ASSEMBLY (CONT).

REASSEMBLY (CONT)

NOTE

Mechanical clutch housing can be assembled and installed with traversing constant speed drive installed on howitzer.

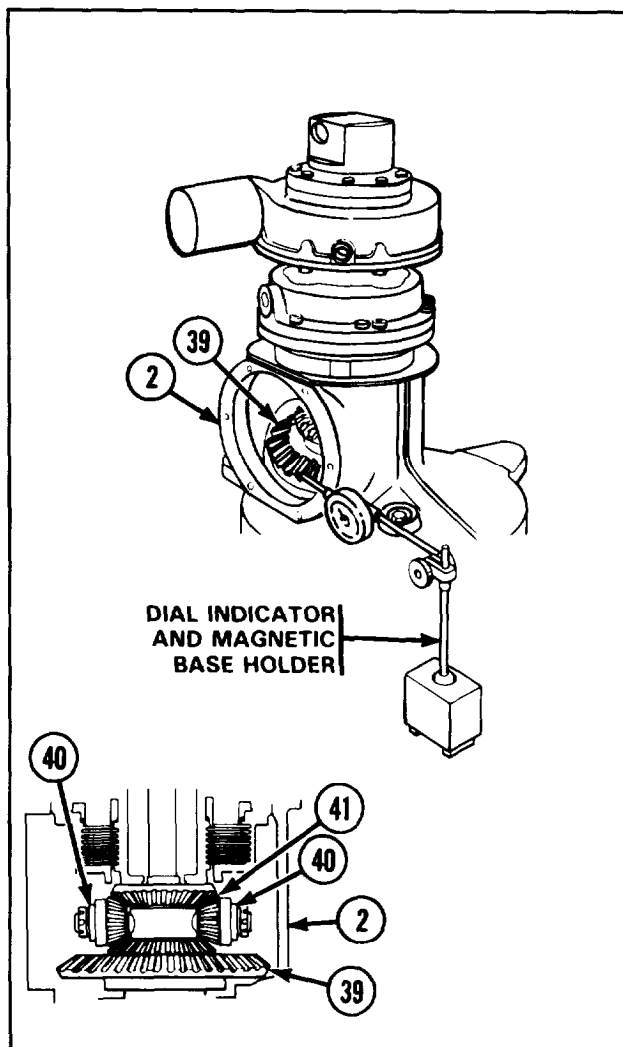
28 Insert wedges of laminated shim between teeth of input gear cluster (39) and teeth of two bevel gears (40) and insert wedges of laminated shim between upper teeth of two bevel gears (40) and teeth of helical power input gear (41) to prevent gear movement inside mechanical housing (2).

29 Obtain dial indicator and magnetic base holder. Dial indicator must read in units of 0.001 in. (0.002 cm).

30 Position dial indicator so that indicator button contacts outer tooth flank of input gear cluster (39).

NOTE

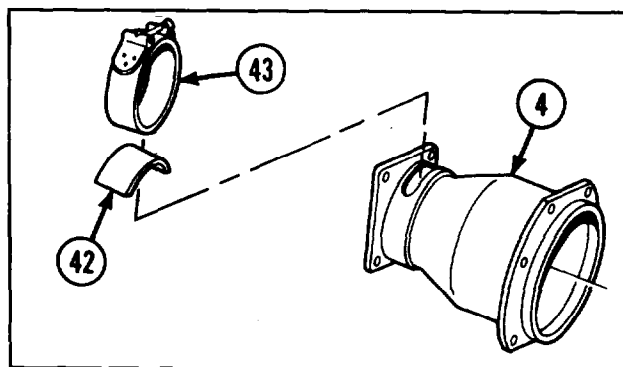
Measurement recorded in step 31 will be added to measurement in step 50 to determine correct tolerance. Total measurement must be between 0.002 and 0.004 in. (0.005 and 0.010 cm).



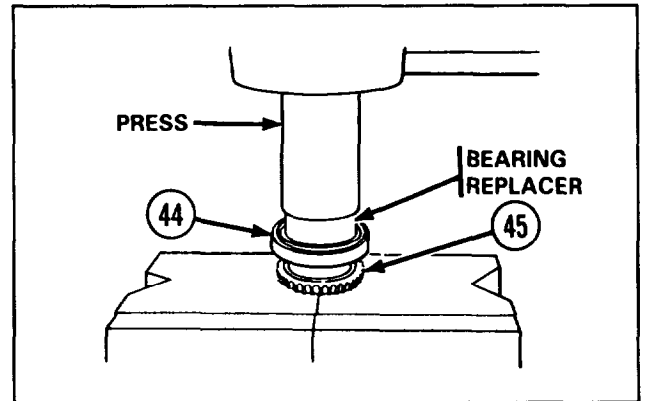
31 Attempt to turn input gear cluster (39) by hand and read dial indicator. Record measurement.

32 Remove dial indicator and magnetic base holder.

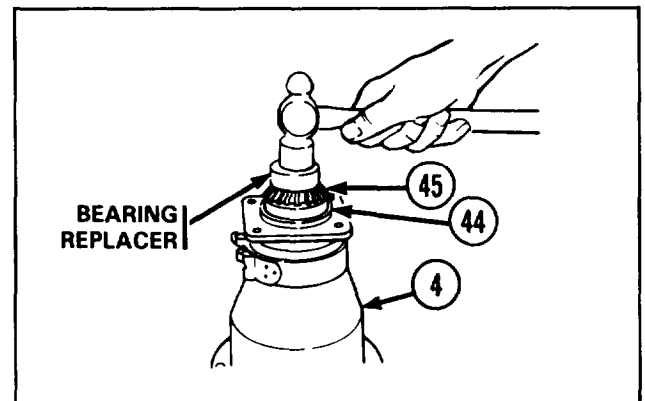
33 Install access hole clamp gasket (42) and hose clamp (43) on mechanical housing (4).



- 34 Using press and bearing replacer, install ball bearing (44) on bevel miter gear (45).



- 35 Using bearing replacer, install bevel miter gear (45) with ball bearing (44) in mechanical housing (4).



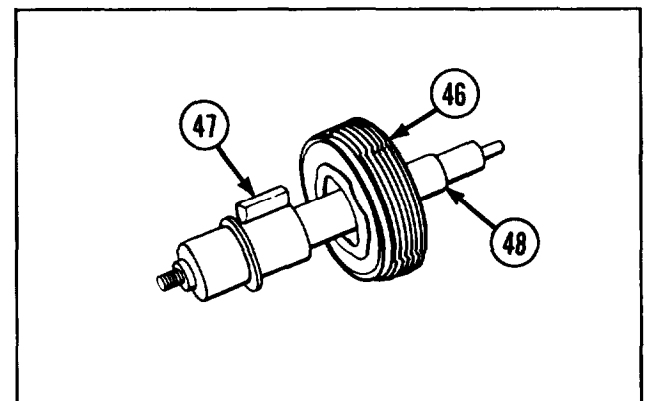
WARNING

- Dry cleaning solvent (SD2) is toxic and flammable. Wear protective goggles and gloves and use only in well-ventilated areas.
- Clutch assembly must be wiped dry. Failure to do so may cause damaged equipment or injury to personnel.

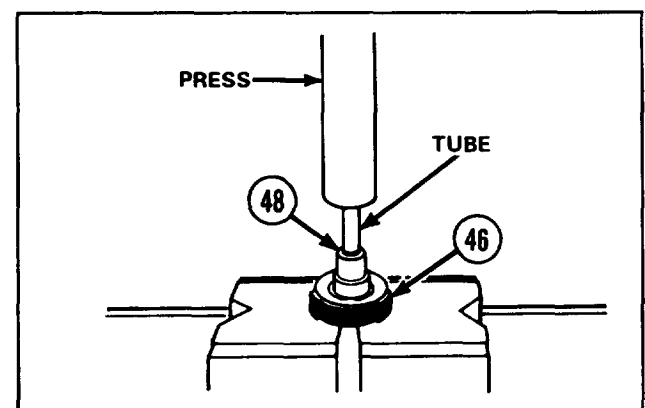
CAUTION

Install clutch assembly with thick plate toward differential end of shouldered shaft.

- 36 Clean clutch assembly (46) with dry cleaning solvent (item 8, appx B), wipe dry, and install machine key (47) and clutch assembly on shouldered shaft (48).



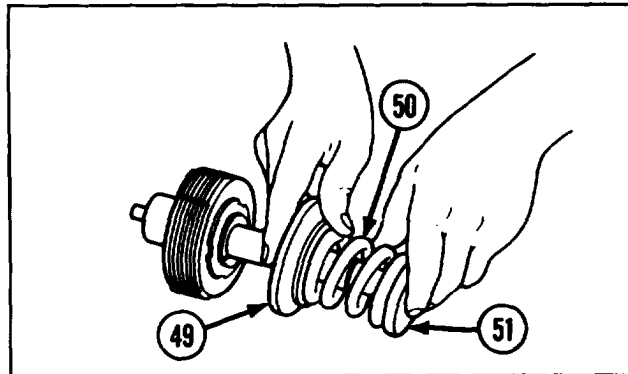
- 37 Using press and tube, press clutch assembly (46) on shouldered shaft (48).



2-46. MAINTENANCE OF TRAVERSING CONSTANT SPEED DRIVE AND SPEED GEAR ASSEMBLY (CONT).

REASSEMBLY (CONT)

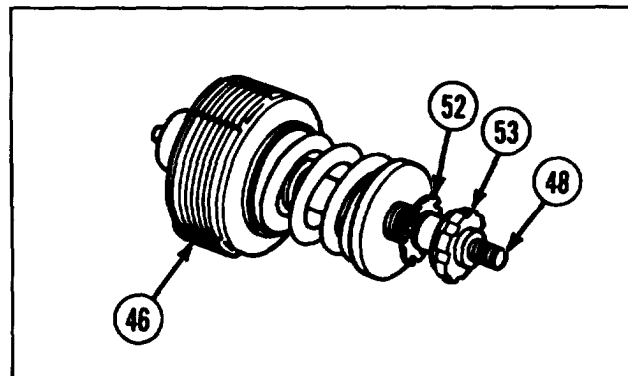
- 38.** Install pressure plate (49), clutch helical compression spring (50), and clutch helical compression seat (51).



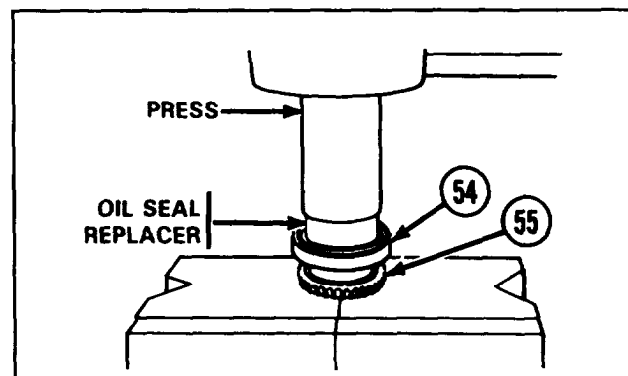
NOTE

If key washer is damaged, new key washer must be installed.

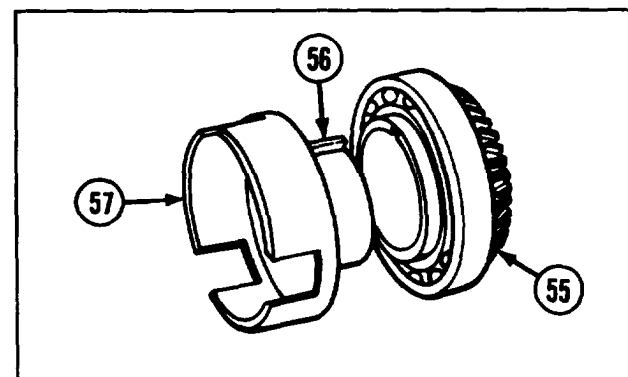
- 39** Install key washer (52) and nut (53) on shouldered shaft (48). Tighten nut (53), but do not bend tabs of key washer (52) until clutch assembly (46) has been adjusted.



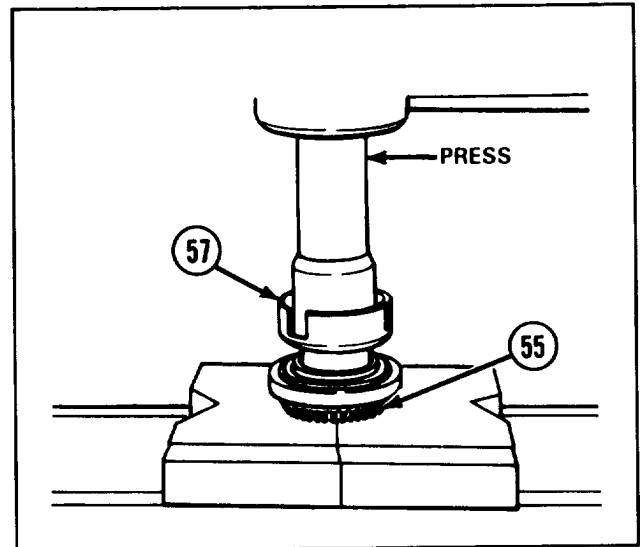
- 40** Using press and oil seal replacer, press slip clutch ball bearing (54) on slip clutch pinion bevel gear (55).



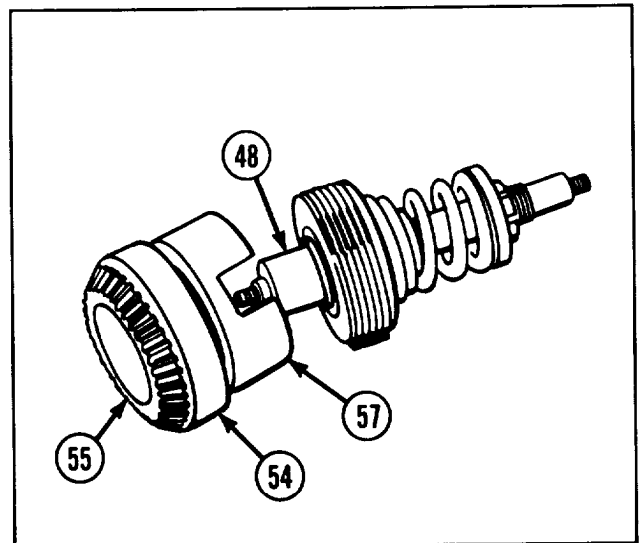
- 41** Install woodruff key (56) in cup and bearing assembly clutch (57) and position cup and bearing assembly clutch (57) in bore of slip clutch pinion bevel gear (55).



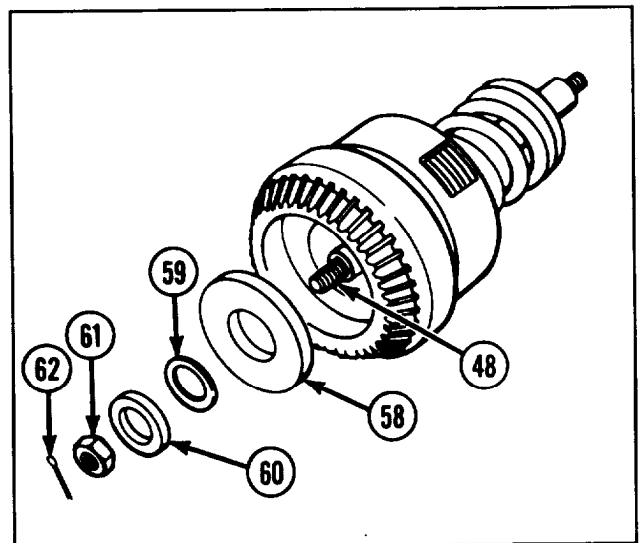
- 42 Using press, install cup and bearing assembly clutch (57) in slip clutch pinion bevel gear (55).



- 43 Install cup and bearing assembly clutch (57), slip clutch pinion bevel gear (55), and ball bearing (54) on shouldered shaft (48).



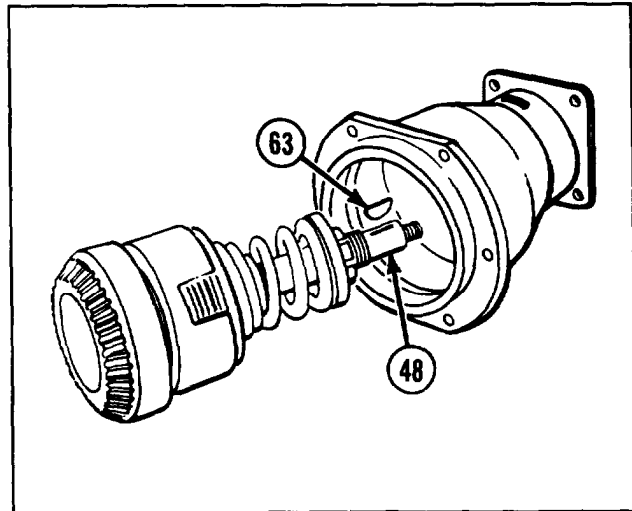
- 44 Install recessed pinion gear washer (58), roller bearing (59), flat pinion bearing washer (60), nut (61), and new cotter pin (62).



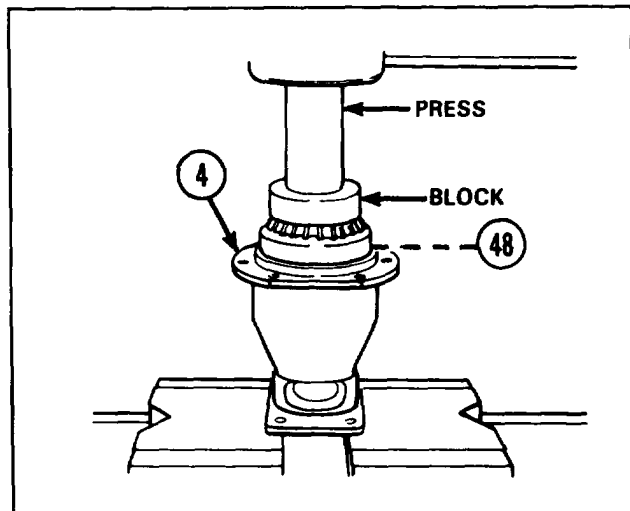
2-46. MAINTENANCE OF TRAVERSING CONSTANT SPEED DRIVE AND SPEED GEAR ASSEMBLY (CONT).

REASSEMBLY (CONT)

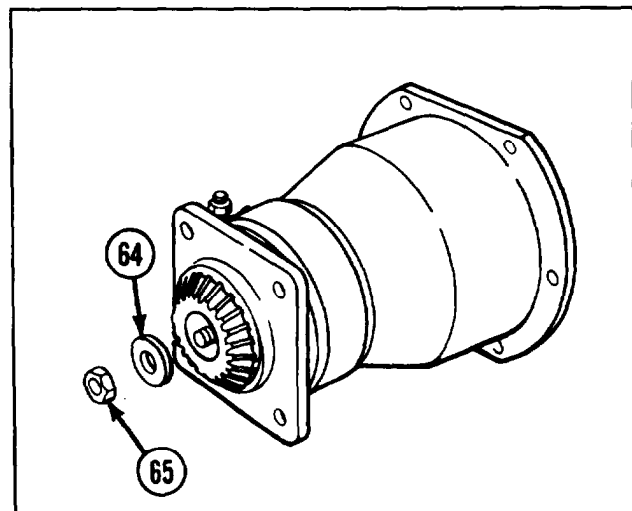
45 Install woodruff key (63) on shouldered shaft (48).

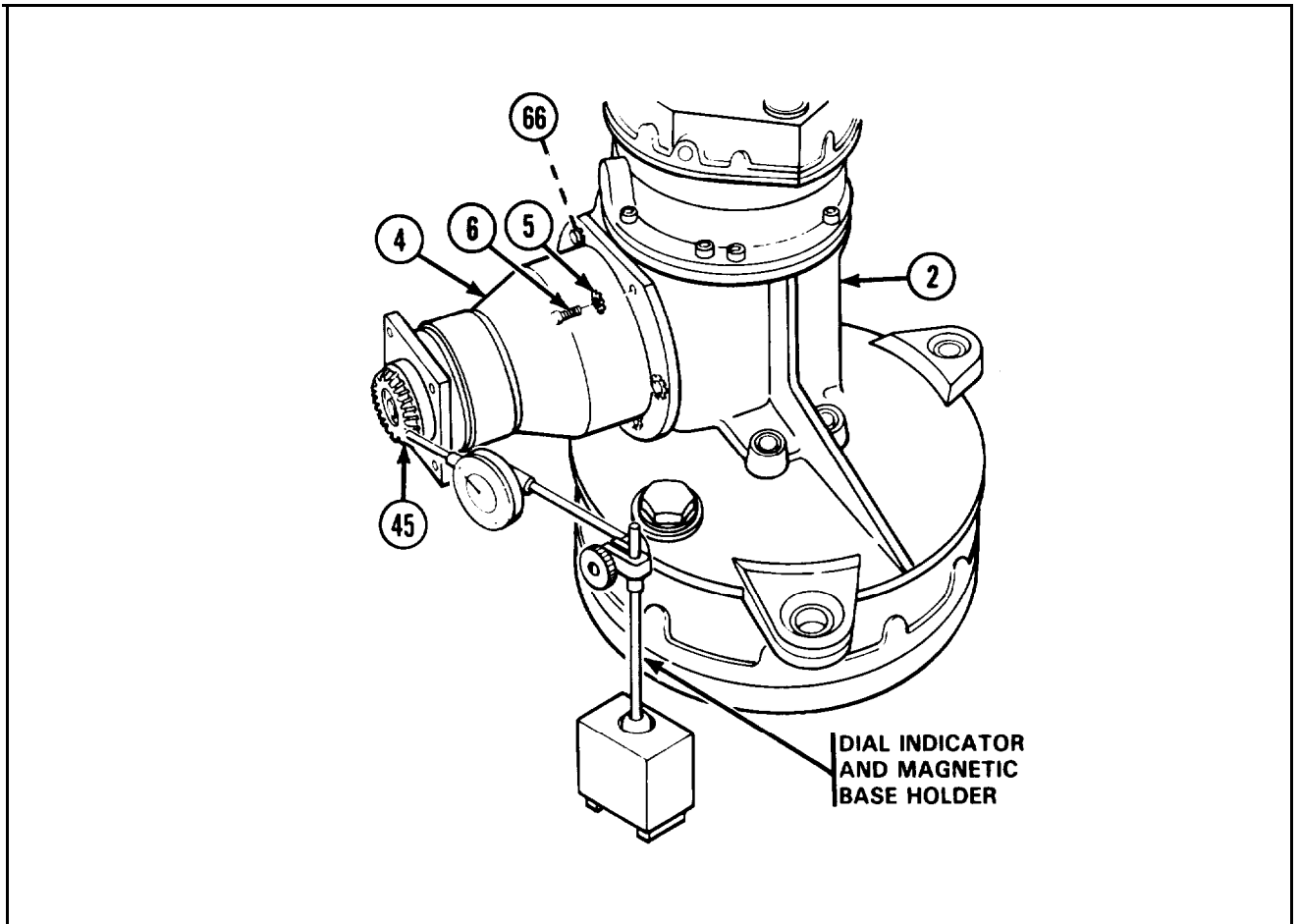


46 Using press and block, press shouldered shaft (48) and attached parts into mechanical housing (4).



47 Install flat washer (64) and new self-locking nut (65).





- 48** Position new clutch housing shim(s) (66) and mechanical housing (4) on mechanical housing (2) using six new lockwashers (5) and six capscrews (6).
- 49** Position dial indicator and holder so that indicator button contacts tooth flank of bevel miter gear (45).
- 50** Turn bevel miter gear (45) by hand until all play is removed, and read dial indicator. Record measurement.
- 51** Add measurements from step 31 to measurements from step 50. Total measurement must be between 0.002 and 0.004 in. (0.005 and 0.010 cm).
- 52** To adjust gear play, remove mechanical housing (4). Add new clutch housing shims (66) to increase gear play. Remove clutch housing shims (66) to decrease gear play.
- 53** Repeat steps 48 thru 52 until required gear play is obtained.
- 54** Remove wedges of laminated shim from gears inside mechanical housing (2).
- 55** Position adjusted number of new clutch housing shims (66) and mechanical housing (4) and secure using six new lockwashers (5) and six capscrews (6). Torque capscrews to 40 to 45 ft-lb (54 to 61 N-m). Refer to appendix D.

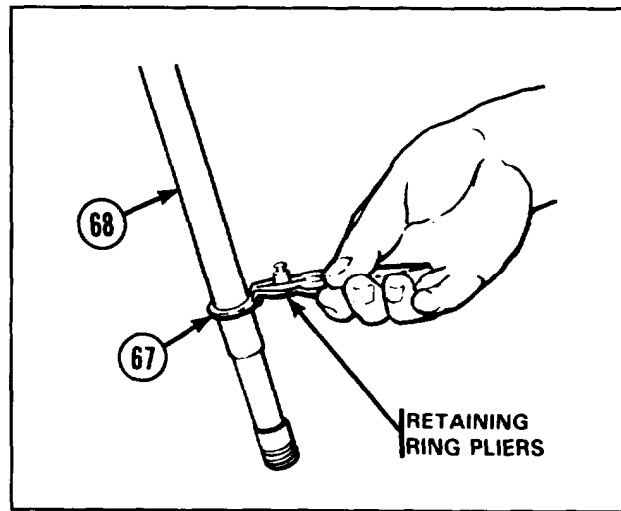
2-46. MAINTENANCE OF TRAVERSING CONSTANT SPEED DRIVE AND SPEED GEAR ASSEMBLY (CONT).

REASSEMBLY (CONT)

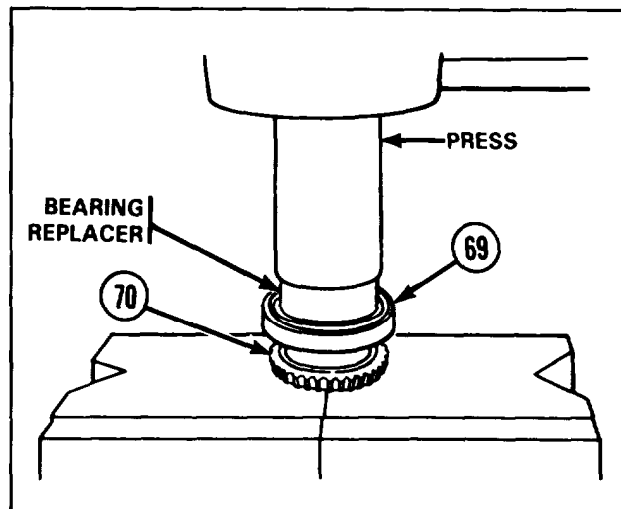
NOTE

Handwheel drive column can be assembled and installed with traversing constant speed drive installed on howitzer.

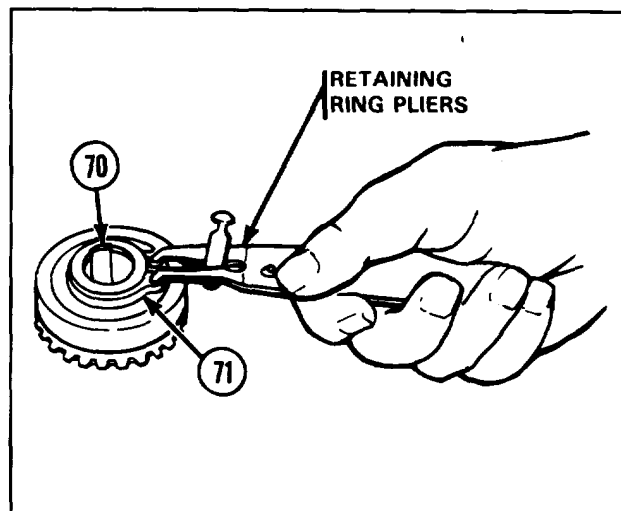
56 Using retaining ring pliers, install retaining ring (67) on shouldered shaft (68).



57 Using press and bearing replacer, install ball bearing (69) on bevel miter gear (70).

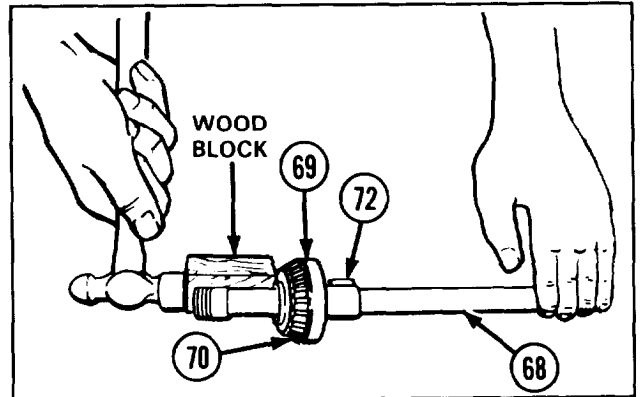


58 Using retaining ring pliers, install retaining ring (71) on bevel miter gear (70).

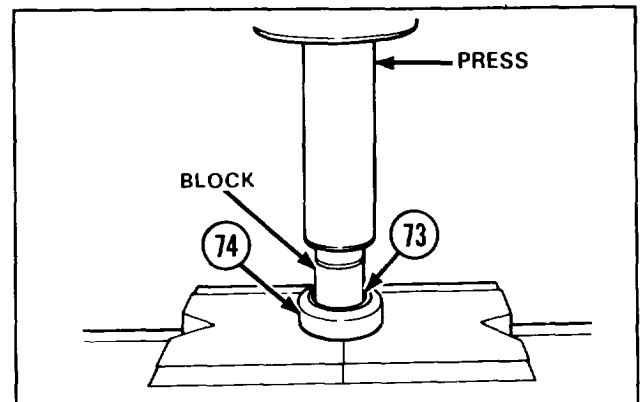


59 Install woodruff key (72) in shouldered shaft (68).

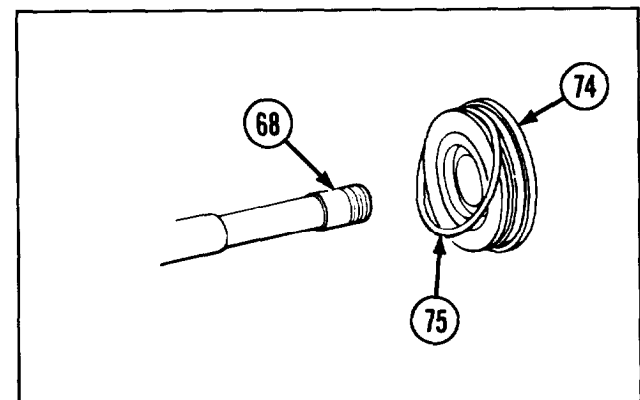
60 Using wood block, install bevel miter gear (70) and ball bearing (69) on shouldered shaft (68).



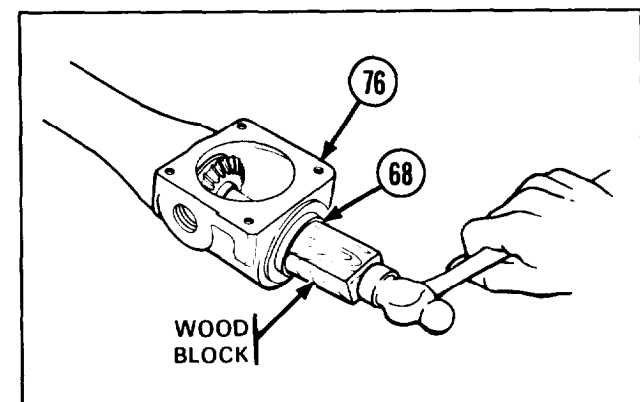
61 Using press and block, install ball bearing (73) in wearing drive column shaft ring (74).



62 Install new preformed packing (75) on wearing drive column shaft ring (74) and install ring on shouldered shaft (68).



63 Using wood block on lower end of shouldered shaft (68), drive shouldered shaft into place through bottom of hand-wheel drive column (76).



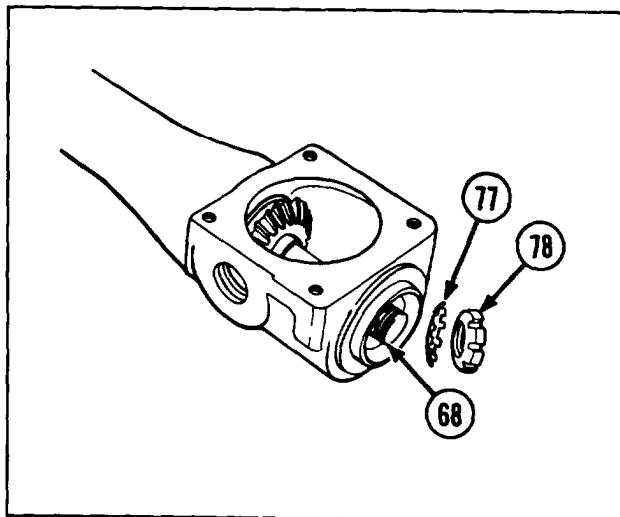
2-46. MAINTENANCE OF TRAVERSING CONSTANT SPEED DRIVE AND SPEED GEAR ASSEMBLY (CONT).

REASSEMBLY (CONT)

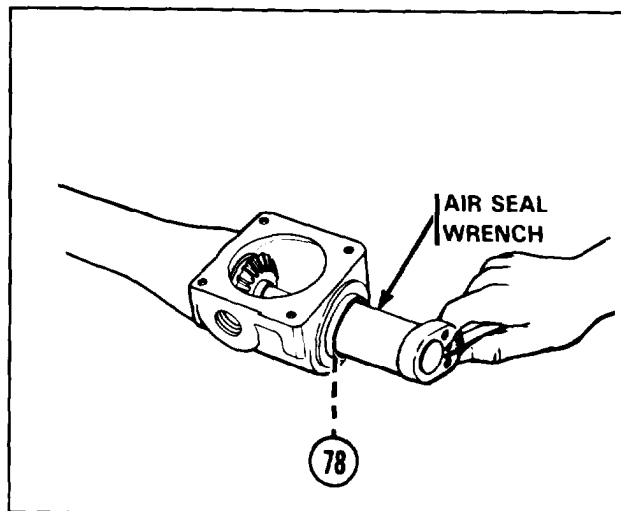
NOTE

If key washer is damaged, new key washer must be installed.

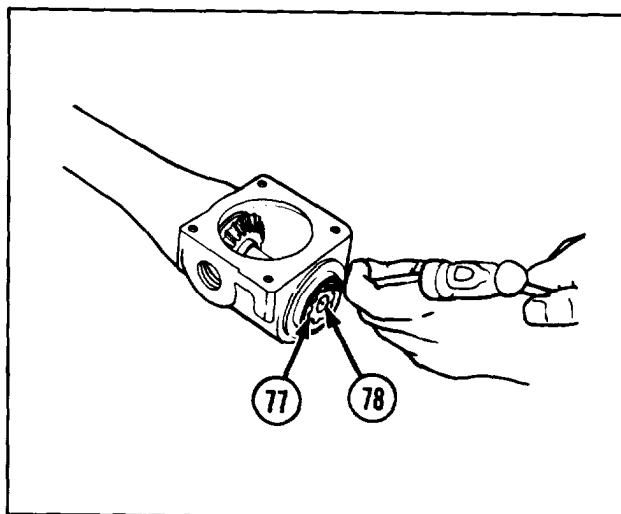
64 Install key washer (77) and nut (78) on shouldered shaft (68).

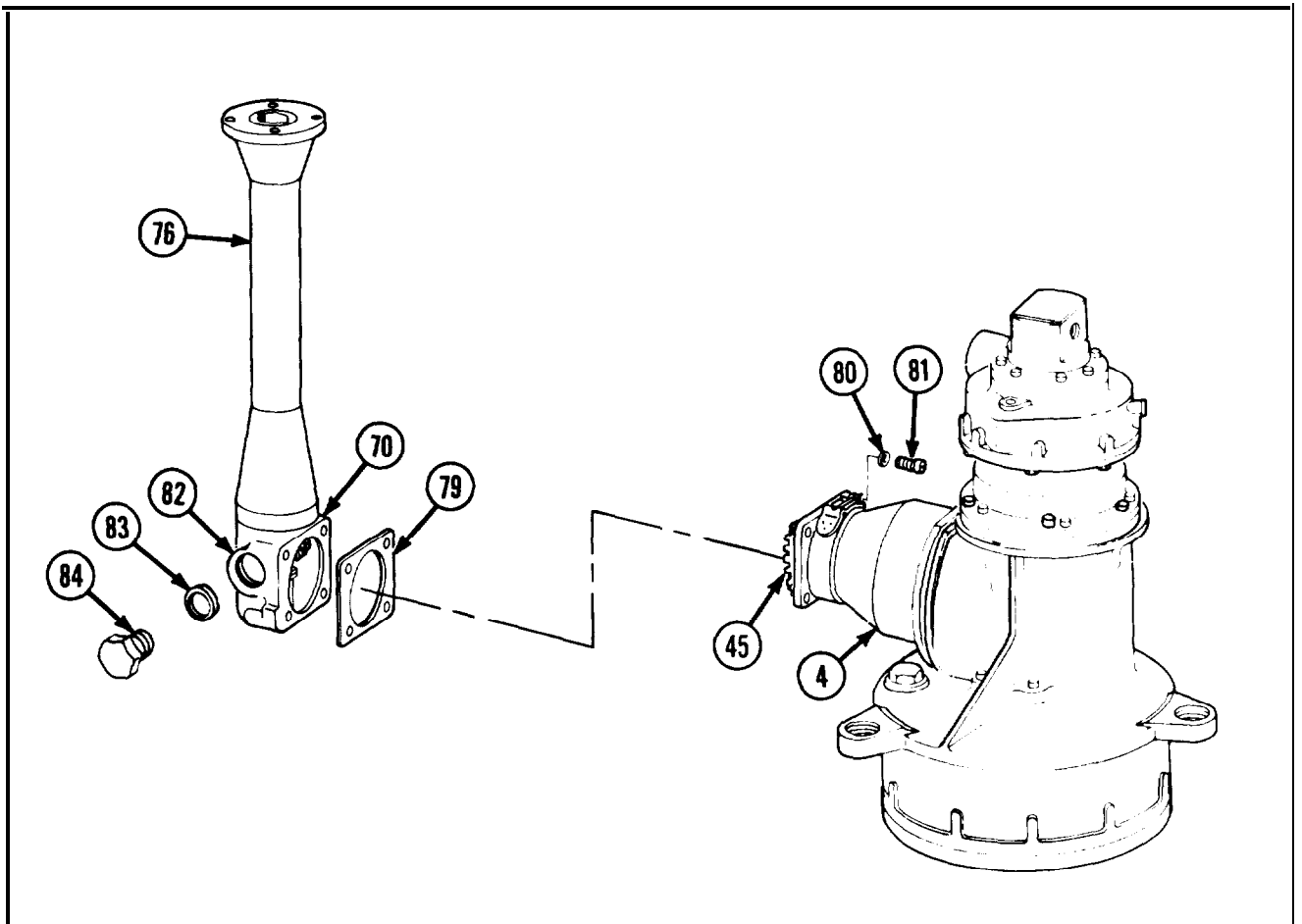


65 Using air seal wrench, tighten nut (78).



66 Bend tabs of key washer (77) into slots of nut (78).





- 67** Position new slip clutch housing shim (79) and handwheel drive column (76) on mechanical housing (4) and secure using four new lockwashers (80) and four capscrews (81).
- 68** Insert solder (item 22, appx 8) through column access hole (82) between bevel miter gear (70) and bevel miter gear (45). Rotate gears one tooth. Using micrometer, measure flattened end of solder. Solder should measure between 0.002 and 0.004 in. (0.005 and 0.010 cm) for proper gear play.
- 69** To adjust gear play, remove handwheel drive column (76). Add new slip clutch housing shims (79) to increase gear play. Remove slip clutch housing shims to decrease gear play.
- 70** When required adjustment is obtained, secure handwheel drive column (76) and new slip clutch housing shims (79) to mechanical housing (4) using four new lockwashers (80) and four capscrews (81). Torque capscrews to 40 to 45 ft-lb (54 to 61 N-m).
- 71** Install new packing (83) and machine thread plug (84).

2-46. MAINTENANCE OF TRAVERSING CONSTANT SPEED DRIVE AND SPEED GEAR ASSEMBLY (CONT).

REASSEMBLY (CONT)

NOTE

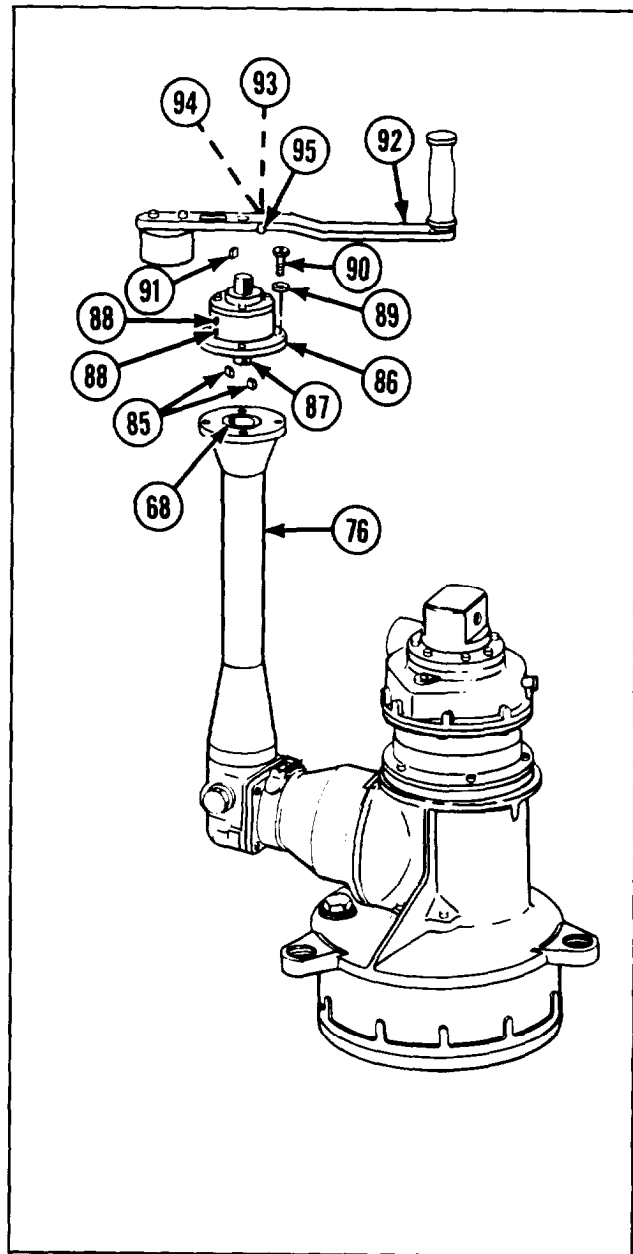
Torque lock can be installed with traversing drive assembly installed on howitzer.

- 72 Install two machine keys (85) in shouldered shaft (68).
- 73 Install torque lock (86), matching keyways in straight shaft (87) to two machine keys (85). Make sure capscrews (88) are positioned as shown.
- 74 Secure torque lock (86) to handwheel drive column (76) using four new lockwashers (89) and four capscrews (90). Torque capscrews to 40 to 45 ft-lb (54 to 61 N-m).
- 75 Install machine key (91).

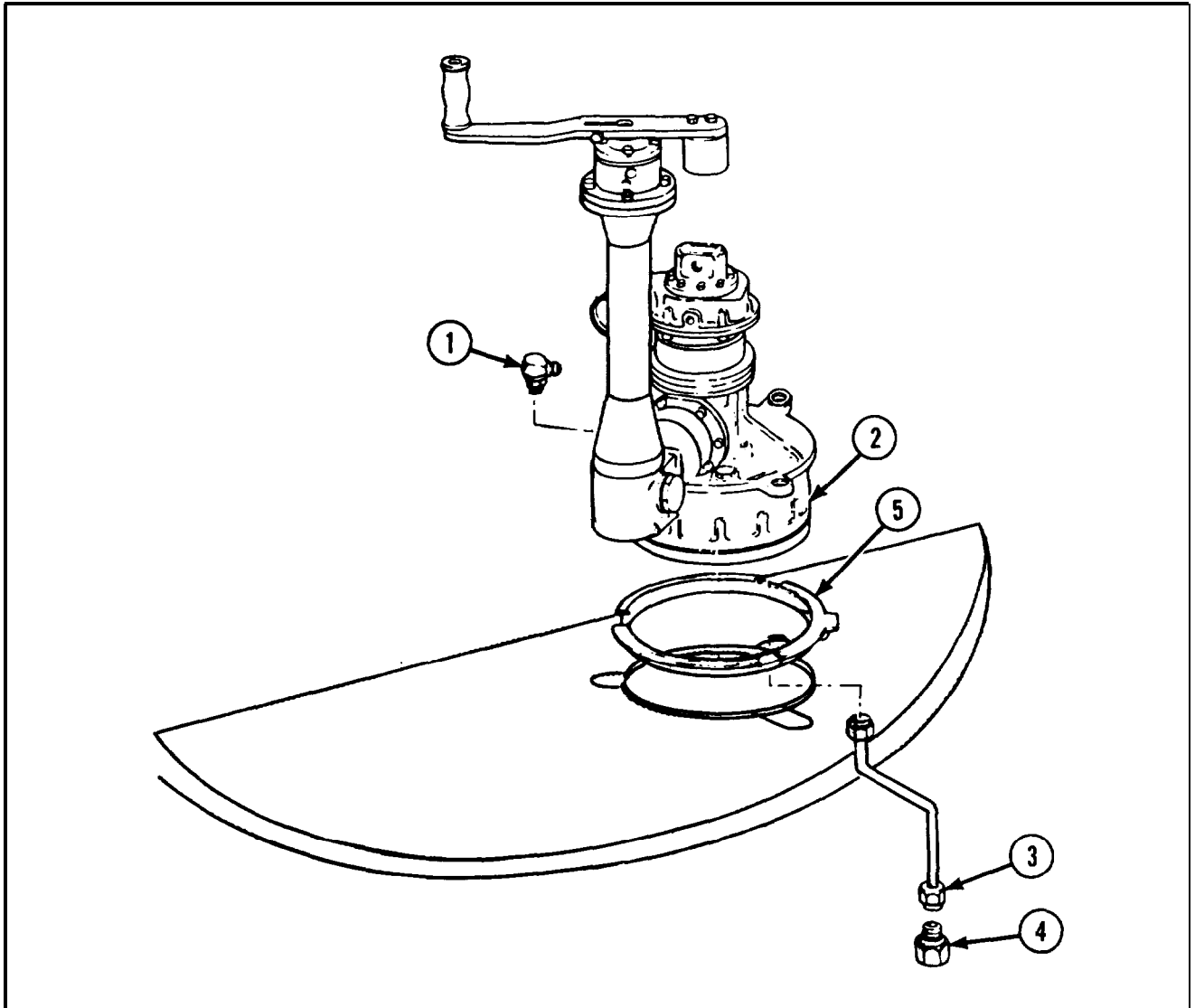
NOTE

Handle can be installed with traversing constant speed drive installed on howitzer.

- 76 Install handle (92) on torque lock (86).
- 77 Tighten nut (93), lockwasher (94), and capscrew (95). Torque capscrew to 10 to 12 ft-lb (13 to 17 N-m).



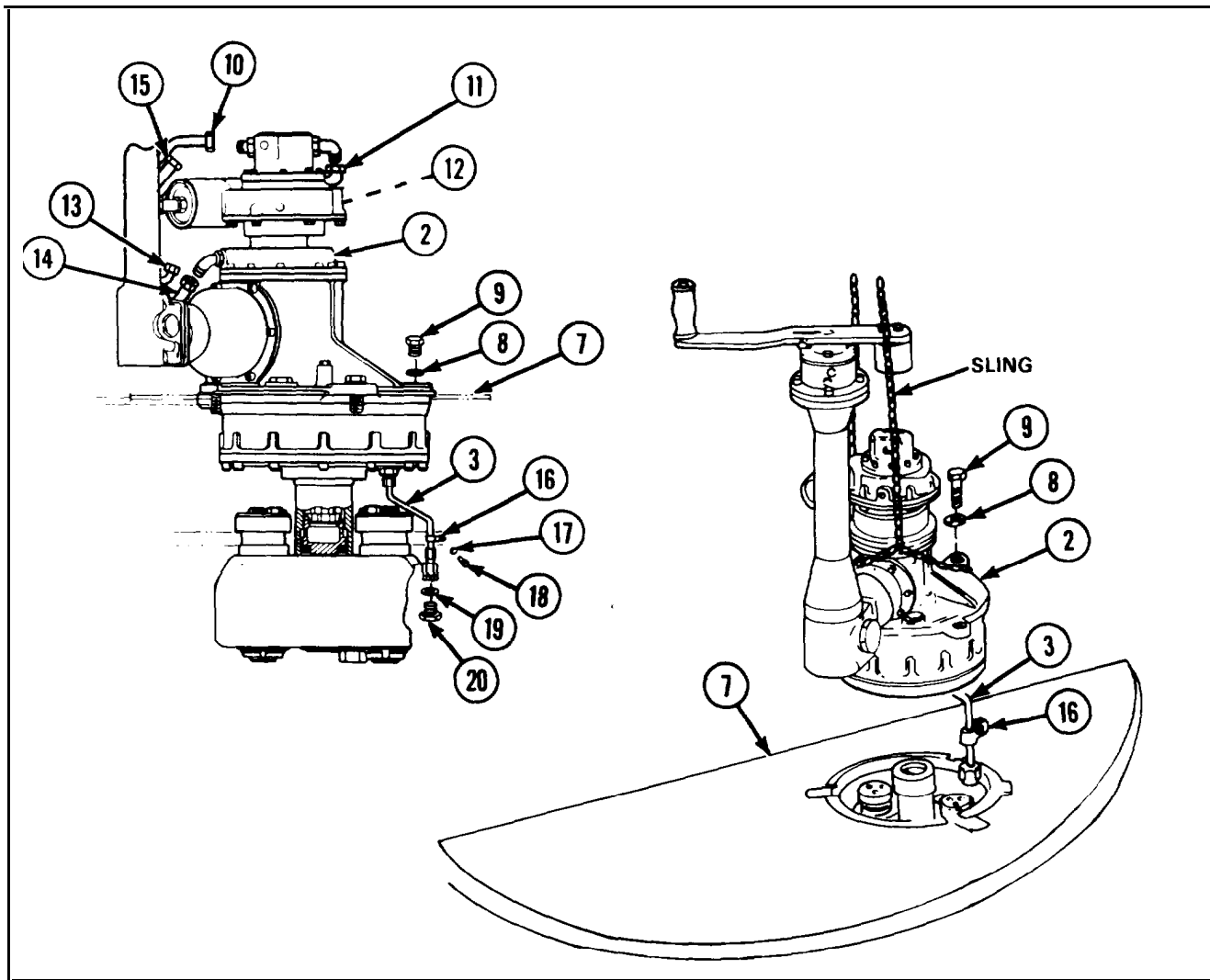
INSTALLATION



- 1 Install lubrication fitting (1) on traversing drive assembly (2).
- 2 Install metal drain tube assembly (3) and adapter (4).
- 3 Install new nonmetallic seal (5).

2-46. MAINTENANCE OF TRAVERSING CONSTANT SPEED DRIVE AND SPEED GEAR ASSEMBLY (CONT).

INSTALLATION (CONT)



- 4 Install sling and hoist, and lift traversing drive assembly (2) and position on deck (7). Take care not to damage metal drain tube assembly (3).
- 5 Secure traversing drive assembly (2) to deck (7) using three new lockwashers (8) and three capscrews (9).
- 6 Uncover tube openings and connect six tube assemblies (10, 11, 12, 13, 14, and 15). For complete reassembly of

hydraulic lines and fittings, refer to page 2-27.

- 7 Install loop clamp (16), new lockwasher (17), and capscrew (18) holding metal drain tube assembly (3).
- 8 Install new preformed packing (19) and machine threaded plug (20).
- 9 For adjustment procedures, refer to TM 9-2350-304-20-2.

APPLYING HYDRAULIC PRESSURE

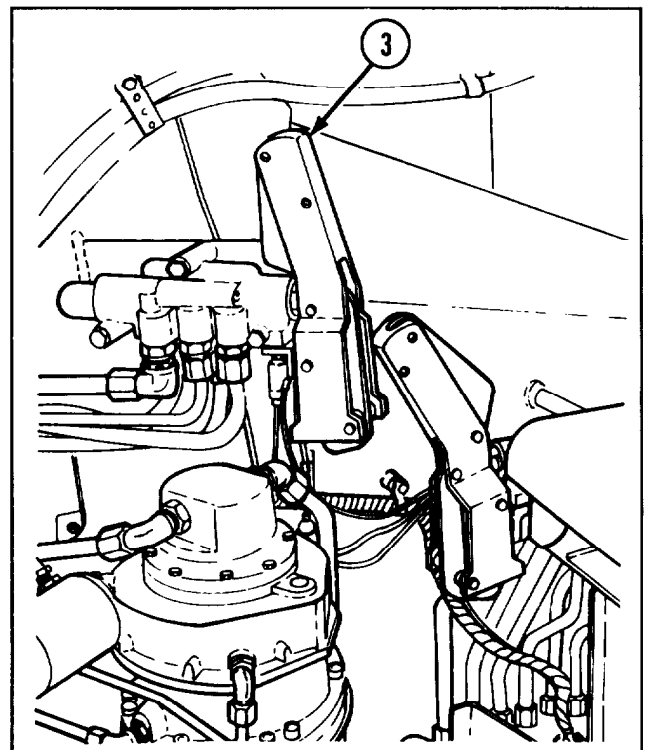
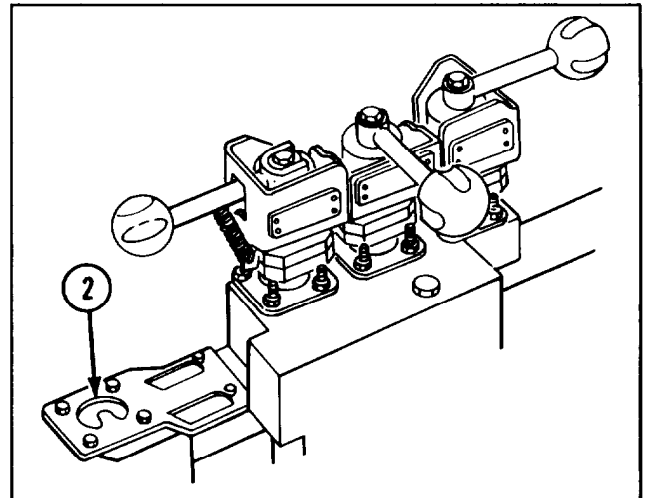
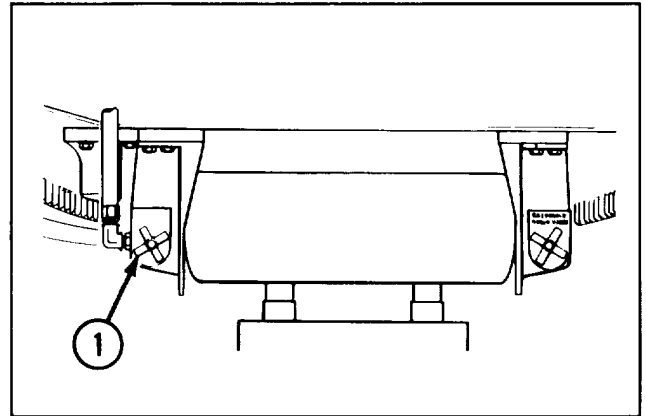
- 1 Close globe angle valve (1).
- 2 Start engine.

NOTE

Hydraulic motor and pump may be used to apply pressure to hydraulic system without starting by setting MASTER switch and OIL PUMP MOTOR Switch to ON.

- 3 Set HYD PUMP/PTO CLUTCH switch to ON.
- 4 Check dial pressure gage assembly (2) indication. Normal pressure is 1600 to 2400 psi (11,032 to 16,548 kPa).
- 5 Stop engine.

- 6 Traverse turret full right and left several times using traversing control handle assembly (3) to bleed air from system.



2-47. MAINTENANCE OF TRAVERSING AND ELEVATING DRIVE TORQUE LOCKS AND REMOTE CONTROL LEVERS.

This task covers: a. Service b. Disassembly c. Inspection/Repair d. Reassembly

INITIAL SETUP

Tools and Special Tools

Artillery maintenance shop equipment (SC 4933-95-CL-A12)
 Arbor press
 Ordnance artillery and turret mechanic's tool kit (SC 5180-95-CL-A12)

Materials/Parts

Antipilferage seal (10934769)
 Epoxy adhesive (item 2, appx B)
 Housing flange gasket (10956467)
 Hydraulic fluid (item 13, appx B)
 Lockwasher (4) (MS35338-43)
 Masking tape (item 23, appx B)
 Packing (2) (NAS1523-4Y)

Plain seal (MS51001-21-2)
 Plain seal (11675360)
 Sealing compound (item 21, appx B)
 Sleeve output shaft bearing (2) (10956478)

References

TM 9-2350-304-20-2
 TM 9-2350-304-24P-2

Equipment Conditions

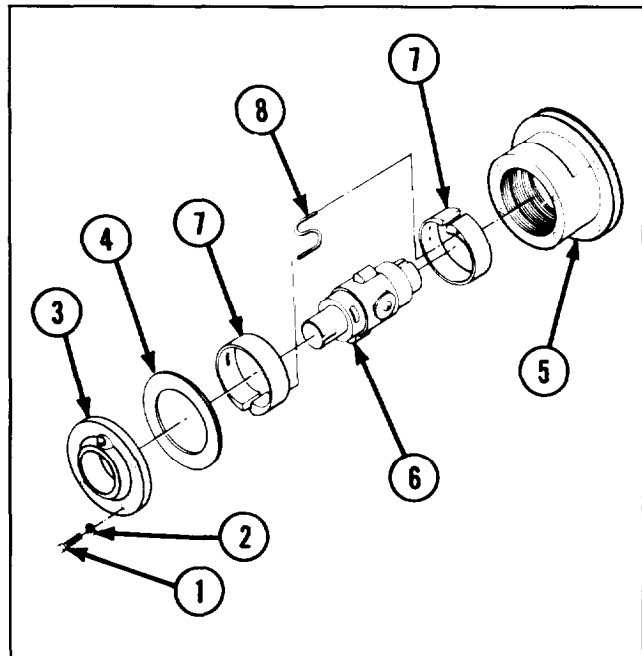
2-164 Torque lock removed (traversing)
 2-254 Torque lock removed (elevating)

SERVICE

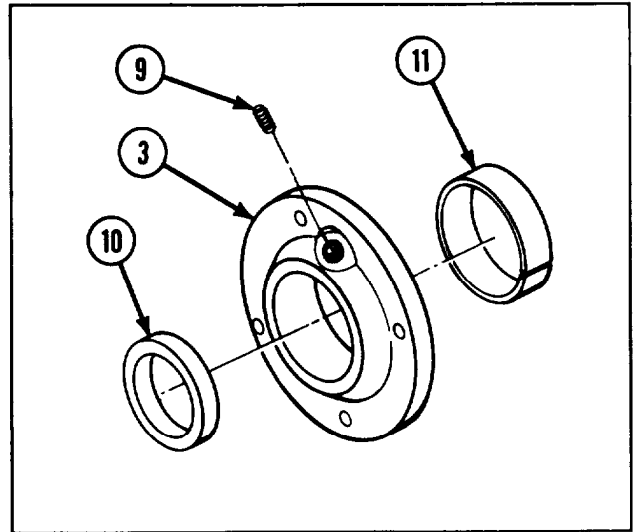
When notified by unit maintenance to perform 18 month hydraulic fluid service, drain and fill hydraulic reservoir with hydraulic fluid (item 13, appx B) to applicable full mark (spade raised or spade extended) on level gage. Capacity 27 gal. (102.2).

DISASSEMBLY

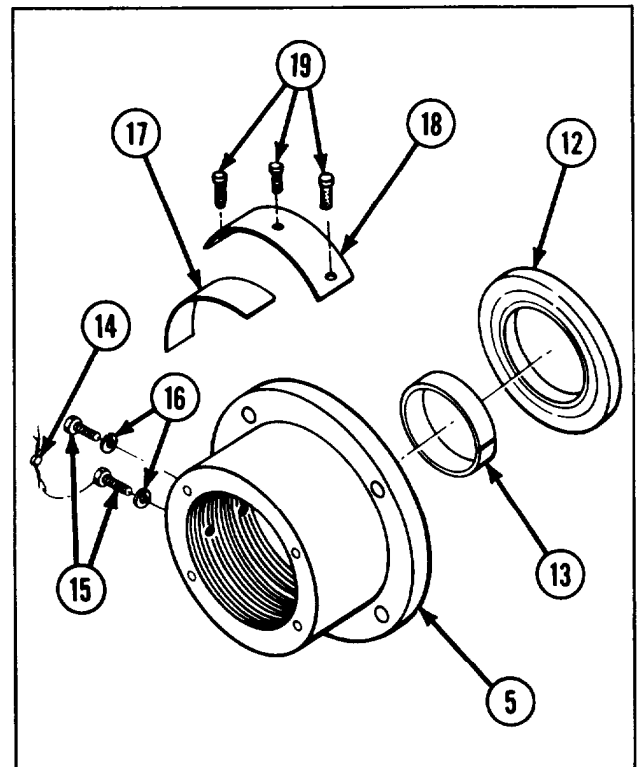
- 1 Remove four capscrews (1) and four lockwashers (2).
- 2 Remove body housing hub (3) and housing flange gasket (4) from drive housing (5).
- 3 Remove straight shaft (6) with two torque lock bands (7) and retaining screw tension spring (8) from drive housing (5).
- 4 Remove two torque lock bands (7) and retaining screw tension spring (8) from straight shaft (6).



- 5 Remove pipe plug (9) from body housing hub (3).
- 6 Using drift, remove plain seal (10) from body housing hub (3).
- 7 Using drift, remove sleeve output shaft bearing (11) from body housing hub (3).

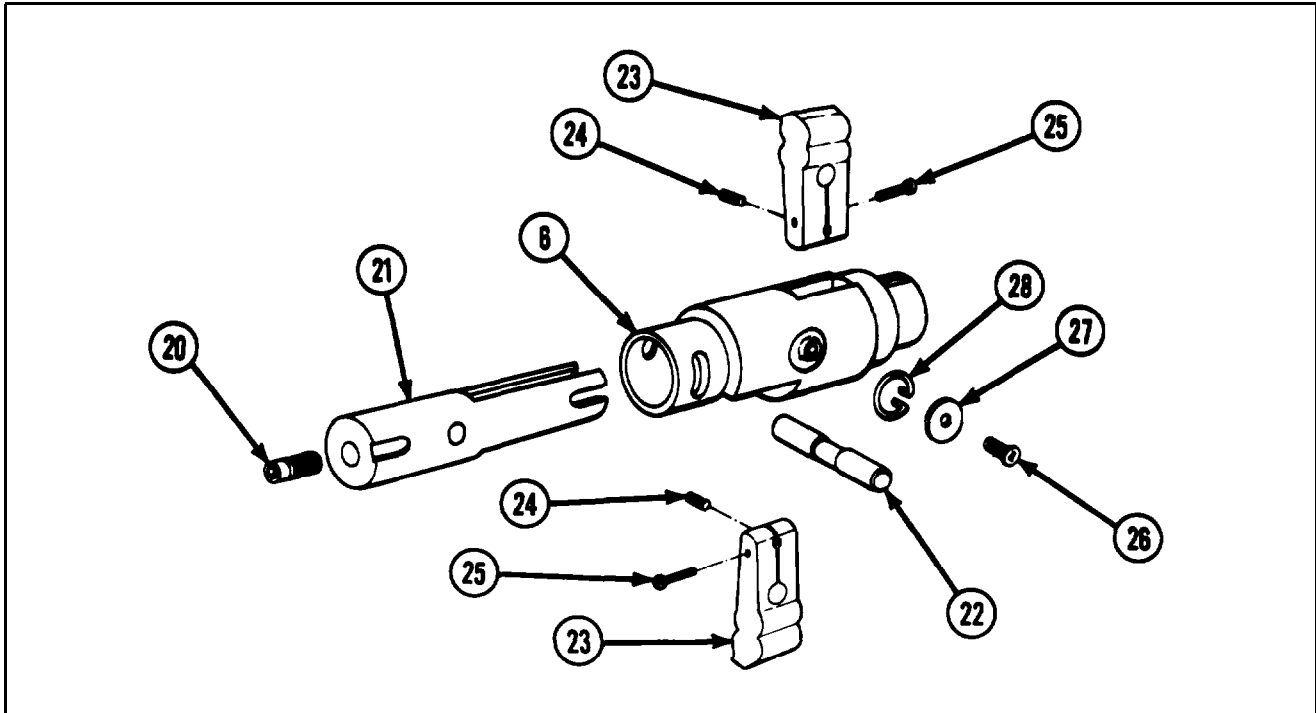


- 8 Using drift, remove plain seal (12) from drive housing (5).
- 9 Using drift, remove sleeve output shaft bearing (13) from drive housing (5).
- 10 Remove antipilferage seal (14), two capscrews (15), and two packings (16).
- 11 If damaged, scrape instruction plate (17) from drive housing (5).
- 12 If damaged, remove identification plate (18) by removing three drive screws (19).



2-47. MAINTENANCE OF TRAVERSING AND ELEVATING DRIVE TORQUE LOCKS AND REMOTE CONTROL LEVERS (CONT).

DISASSEMBLY (CONT)



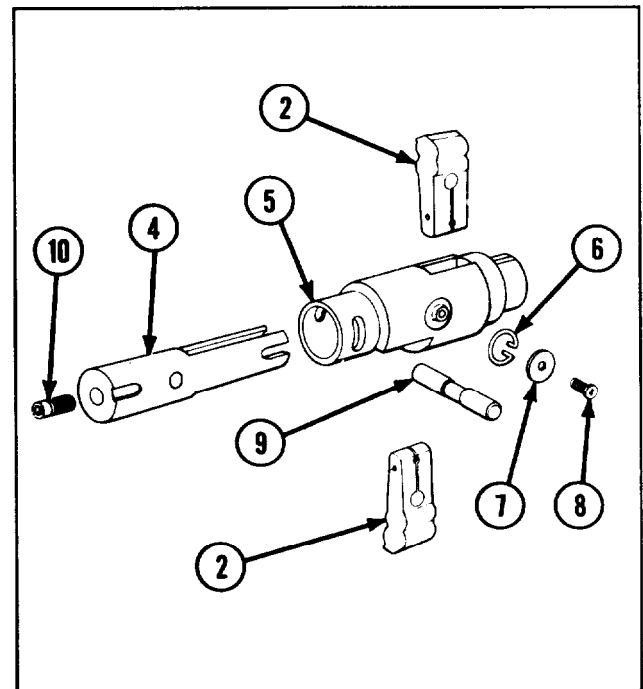
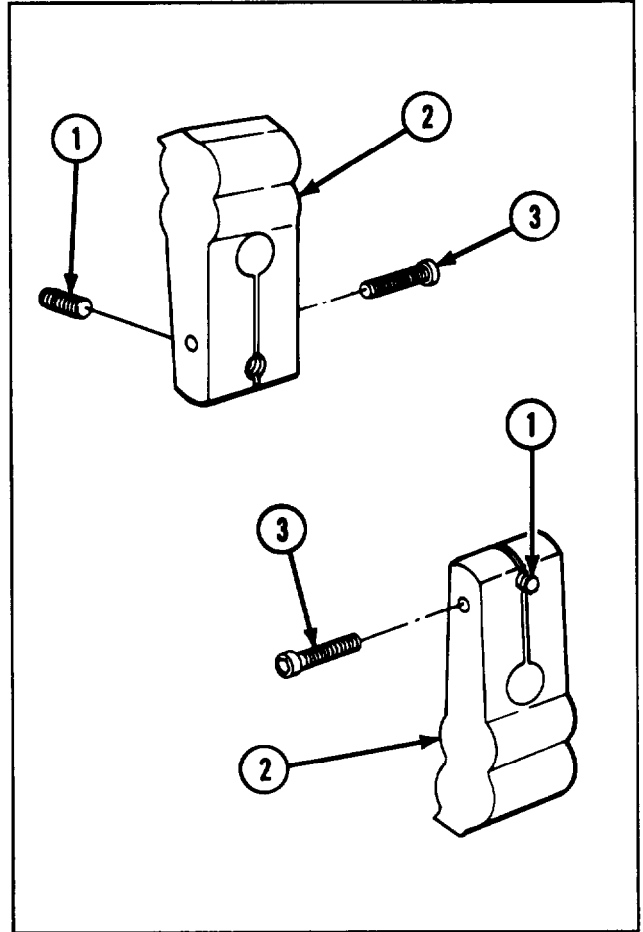
- 13 Remove setscrew (20) from straight control shaft (21).
- 14 Remove shaft retaining pin (22).
- 15 Remove straight control shaft (21) from straight shaft (6).
- 16 Remove two remote control lever assemblies (23) from straight shaft (6).
- 17 Remove two setscrews (24) and two capscrews (25) from two lever assemblies (23).
- 18 Remove machine Screw (26), flat washer (27), and shaft tension spring (28) from straight shaft (6).

INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 If drive housing is broken, damaged, or missing, repair is by replacement of next higher assembly.
- 3 If lever assemblies are broken, damaged, or missing, repair is by replacement of next higher assembly.
- 4 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

REASSEMBLY

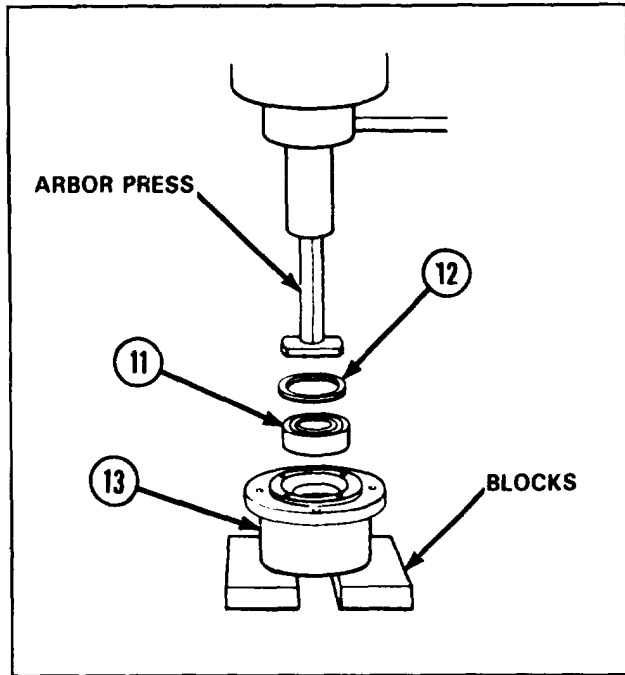
- 1 Coat threads of two setscrews (1) lightly with hydraulic fluid (item 13, appx B).
- 2 Install two setscrews (1) into two lever assemblies (2). Make sure two setscrews (1) are positioned evenly on either side of two lever assemblies (2).
- 3 Apply sealing compound (item 21, appx B) to threads of two capscrews (3),
- 4 Install two capscrews (3) into two lever assemblies (2).
- 5 Adjust torque required to turn two setscrews (1) to 7 to 9 in.-lb (0.8 to 1.0 N-m); tighten capscrews (3) to increase torque, loosen capscrews (3) to decrease torque.
- 6 Turn setscrews (1) two turns counter-clockwise and two turns clockwise. Re-check torque required to turn each set-screw (1). If necessary, adjust torque by repeating step 5.
- 7 Install straight control shaft (4) in straight shaft (5).
- 8 Install two remote control lever assemblies (2).
- 9 Install shaft tension spring (6), flat washer (7), and machine screw (8).
- 10 Install shaft retaining pin (9).
- 11 Coat threads of setscrew (10) with sealing compound (item 21, appx B).
- 12 Install setscrew (10) in straight control shaft (4).



2-47. MAINTENANCE OF TRAVERSING AND ELEVATING DRIVE TORQUE LOCKS AND REMOTE CONTROL LEVERS (CONT).

REASSEMBLY (CONT)

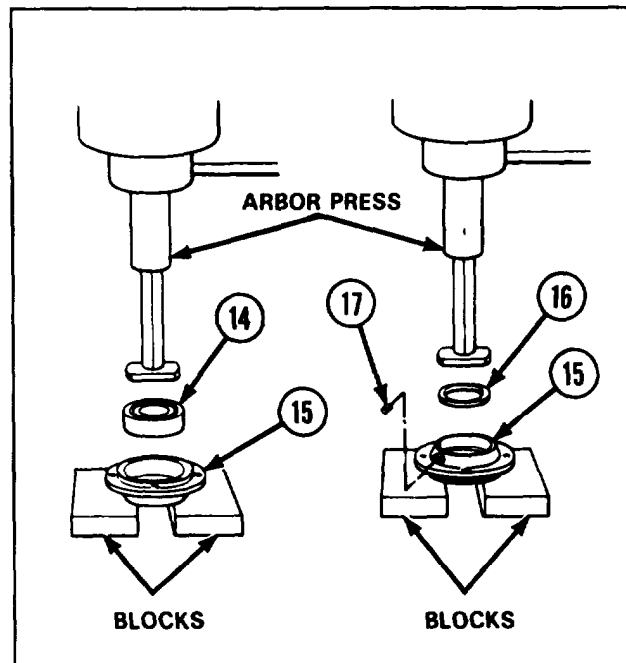
- 13 Using arbor press, install new sleeve output shaft bearing (11) and new plain seal (12) in drive housing (13). Drive housing must be set on blocks.



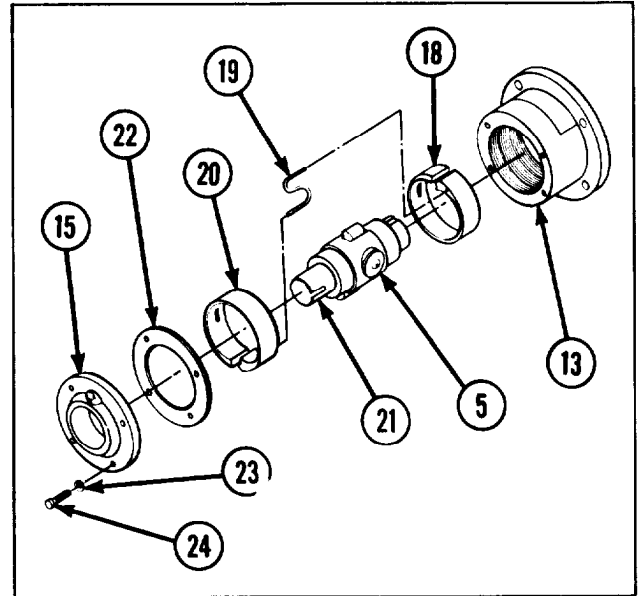
- 14 Using arbor press, install new sleeve output shaft bearing (14) in body housing hub (15). Body housing hub must be set on blocks.

- 15 Using arbor press, install new plain seal (16) in body housing hub (15). Body housing hub must be set on blocks.

- 16 Install pipe plug (17) in body housing hub (15).



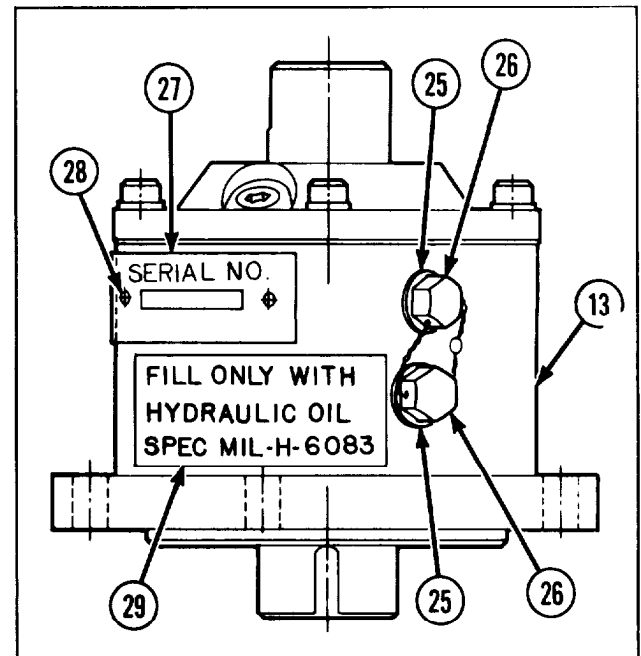
- 17 Install torque lock band (18) in drive housing (13).
- 18 Install straight shaft (5) in drive housing (13).
- 19 Insert screw retaining tension spring (19) into hole in torque lock band (20).
- 20 Install screw retaining tension spring (19) and torque lock band (20) in drive housing (13). Fit torque lock band over lever in straight shaft (5) and fit screw retaining tension spring into hole in torque lock band.
- 21 Cover keyway (21) in straight shaft (5) with masking tape (item 23, appx B) to prevent damage to plain seal in body housing hub (15).
- 22 Install new housing flange gasket (22) and body housing hub (15) over straight shaft (5) and secure to drive housing (13) with four new lockwashers (23) and four capscrews (24).
- 23 Install two new packings (25) and two capscrews (26) in drive housing (13).



NOTE

Do not install antipilferage seal on capscrews. install antipilferage seal after adjusting torque lock drive assembly.

- 24 If necessary, install new identification plate (27) using three drive screws (28). Stamp serial number on new identification plate.
- 25 If necessary, install new instruction plate (29) to drive housing (13) with epoxy adhesive (item 2, appx B).
- 26 For adjustment of torque lock, refer to TM 9-2350-304-20-2.

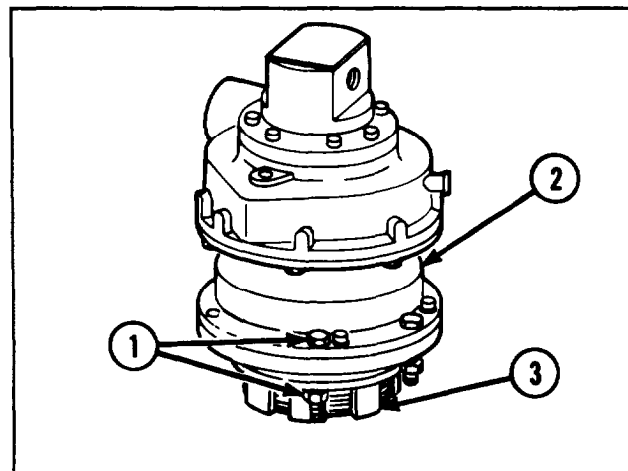


2-48. MAINTENANCE OF TRAVERSING AND ELEVATING DRIVE HYDRAULIC MOTORS.

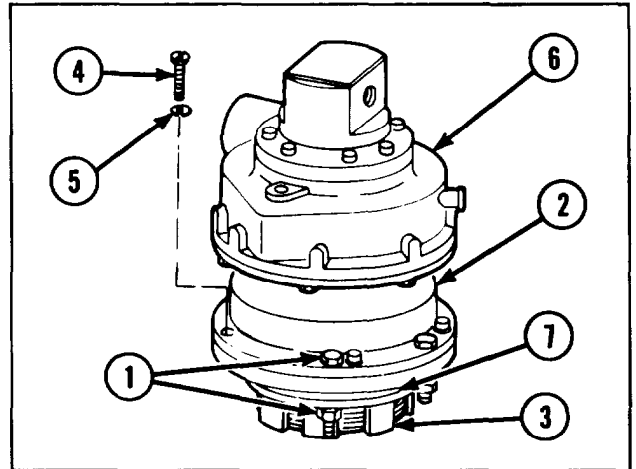
This task covers:	a. Disassembly b. Inspection/Repair	c. Reassembly d. Testing
INITIAL SETUP		
<p><i>Tools and Special Tools</i> Ordnance artillery turret mechanic's tool kit (SC 5180-95-CL-A12)</p> <p><i>Materials/Parts</i> Brake cylinder gasket (10892308) Gasket (2) (MS35803-429) Hydraulic fluid (item 13, appx B) Lockwasher (10) (MS35338-46) Preformed brake adapter packing (2) (MS28775-258) Preformed packing (2) (M83461/1-429)</p> <p><i>References</i> TM 9-2350-304-24P-2 TM 9-4940-468-14</p>		
<p><i>Equipment Conditions</i> 2-164 Traversing hydraulic motor removed 2-254 Elevating hydraulic motor removed</p> <p><i>General Safety Instructions</i></p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>WARNING</p> </div> <p>Hydraulic fluid is under high pressure. Use caution to prevent injury. Wipe up all spilled hydraulic fluid.</p>		

DISASSEMBLY

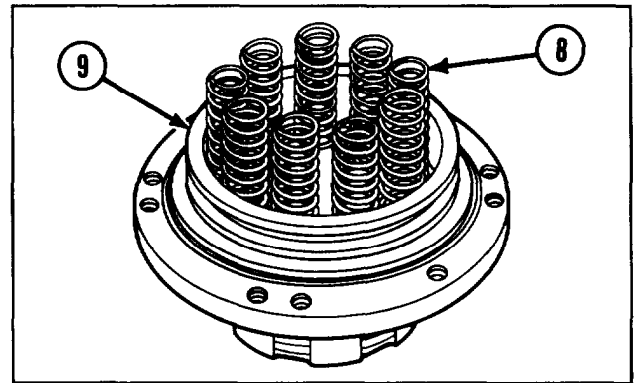
- 1 Install four 3/8 x 2 in. (0.95 x 5.08 cm) 3/4-in. bolts and four nuts (1) in holes through hydraulic motor brake cylinder (2) and motor and brake hydraulic adapter (3).
- 2 Tighten four bolts and four nuts (1) to hold spring tension inside hydraulic motor brake cylinder (2).



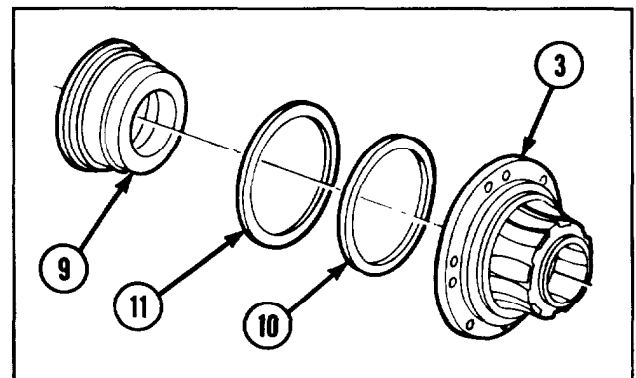
- 3 Remove six capscrews (4) and six lockwashers (5).
- 4 Slowly loosen four bolts and four nuts (1) until spring tension inside hydraulic motor brake cylinder (2) is released.
- 5 Remove four bolts and four nuts (1).
- 6 Remove hydraulic motor brake cylinder (2), hydraulic motor (6), and preformed brake adapter packing (7) from motor and brake hydraulic adapter (3).



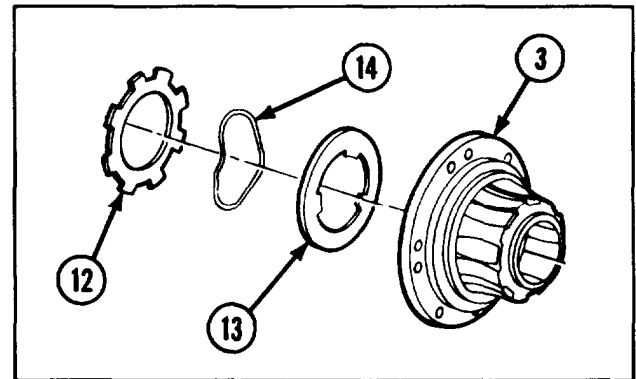
- 7 Remove nine helical compression springs (8) from pump brake piston (9).



- 8 Remove pump brake piston (9) from motor and brake hydraulic adapter (3).
- 9 Remove preformed packing (10) and gasket (11) from pump brake piston (9).



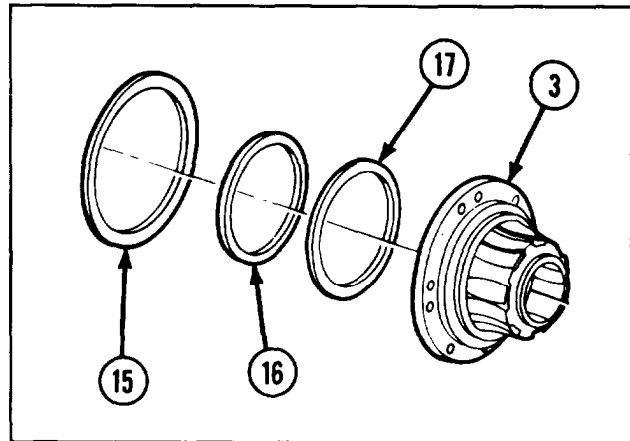
- 10 Remove six outer clutch disks (12), six inner clutch disks (13), and five spring tension clutch separator washers (14) from inside motor and brake hydraulic adapter (3).



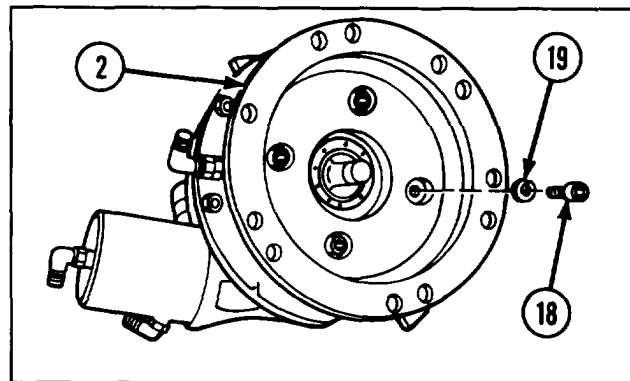
2-48. MAINTENANCE OF TRAVERSING AND ELEVATING DRIVE HYDRAULIC MOTORS (CONT).

DISASSEMBLY (CONT)

- 11** Remove preformed brake adapter packing (15), gasket (16), and preformed packing (17) from motor and brake hydraulic adapter (3).



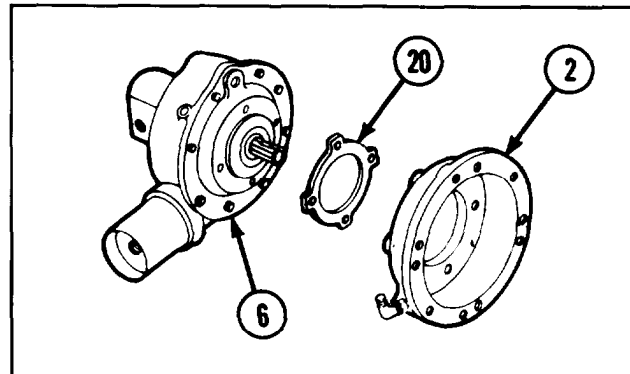
- 12** Remove four capscrews (18) and four lockwashers (19) from hydraulic motor brake cylinder (2).



NOTE

Ensure position of elbow is identified prior to removal of hydraulic motor brake cylinder to ensure proper reassembly.

- 13** Remove hydraulic motor (6) and brake cylinder gasket (20) from hydraulic motor brake cylinder (2).



INSPECTION/REPAIR

- 1 Check for broken, damaged, or missing parts.
- 2 Inspect disks for heat damage.
- 3 Traversing and elevating hydraulic motors are repairable assemblies. Refer to page 2-216.
- 4 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

REASSEMBLY

- 1 Aline hydraulic motor brake cylinder (1) with hydraulic motor (2).

NOTE

Ensure elbow is in same position as at time of removal.

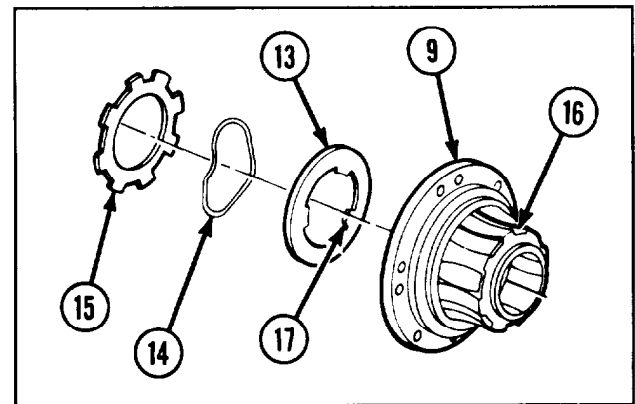
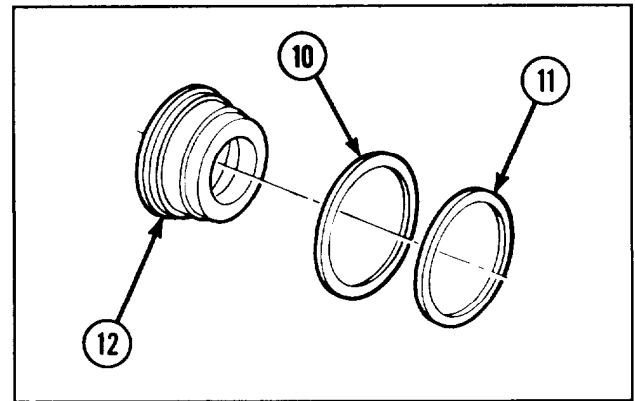
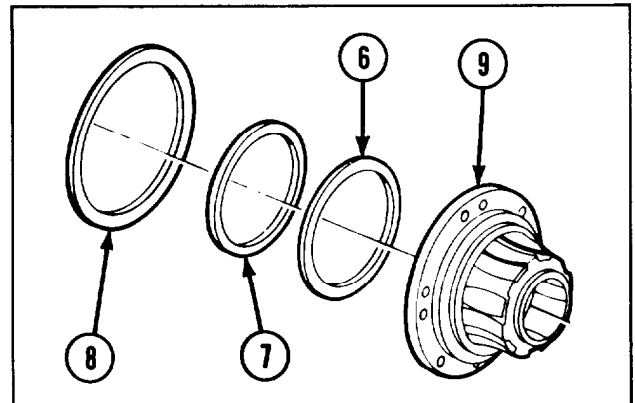
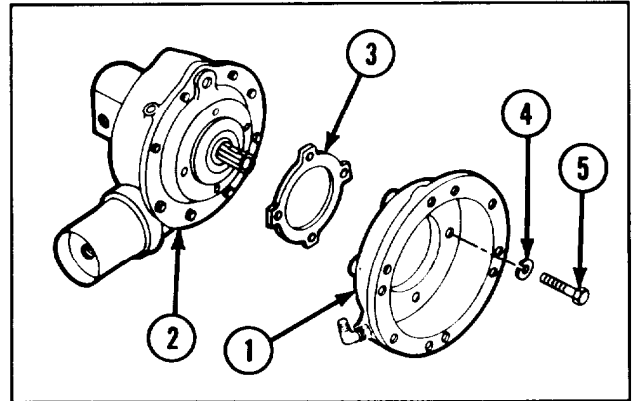
- 2 Install hydraulic motor (2) and new brake cylinder gasket (3) on hydraulic motor brake cylinder (1) with four new lock-washers (4) and four capscrews (5). For torque requirements, refer to appendix D.

- 3 Install new gasket (6), new preformed packing (7), and new preformed brake adapter packing (8) in motor and brake hydraulic adapter (9).

- 4 Install new gasket (10) and new preformed packing (11) on pump brake piston (12).

- 5 Install six inner clutch disks (13), five spring tension clutch separator washers (14), and six outer clutch disks (15) in motor and brake hydraulic adapter (9) as follows:

- a. Install one inner clutch disk (13), one spring tension clutch separator washer (14), and one outer clutch disk (15), one after another, until all disks and washers are installed.
- b. Fit outer clutch disks (15) into slots (16) in motor and brake hydraulic adapter (9).
- c. Aline tabs (17) on inner clutch disks (13).



2-48. MAINTENANCE OF TRAVERSING AND ELEVATING DRIVE HYDRAULIC MOTORS (CONT).

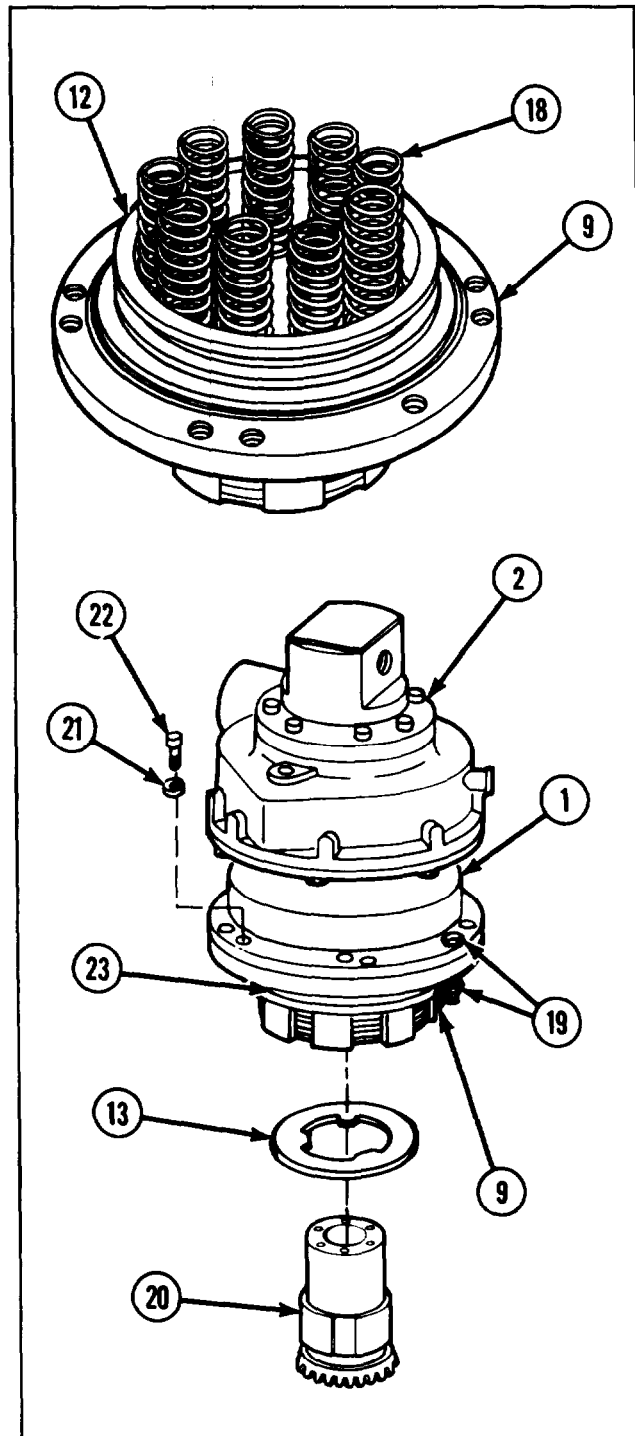
REASSEMBLY (CONT)

- 6 Install pump brake piston (12) in motor and brake hydraulic adapter (9).
- 7 Install nine helical compression springs (18) in pump brake piston (12).
- 8 Install hydraulic motor (2) and hydraulic motor brake cylinder (1) on motor and brake hydraulic adapter (9).
- 9 Install four 3/8 x 2 in. (0.95 x 5.08 cm) 3/4-in. bolts and nuts (19) in untapped holes through hydraulic motor brake cylinder (1) on motor and brake hydraulic adapter (9). For torque requirements, refer to appendix D.

NOTE

Do not tighten bolts and nuts until after inner disks are aligned.

- 10 Install differential gear (20) in motor and brake hydraulic adapter (9) to align inner disks (13). Tabs on inner disks (13) must fit into slots in differential gear (20).
- 11 With differential gear (20) installed in motor and brake hydraulic adapter (9), tighten four bolts and nuts (19) to compress springs (18) inside hydraulic motor brake cylinder (1).
- 12 Install six new lockwashers (21) and six capscrews (22).
- 13 Remove differential gear (20) and four bolts and nuts (19).
- 14 Install new preformed brake adapter packing (23) on motor and brake hydraulic adapter (9).



TESTING

WARNING

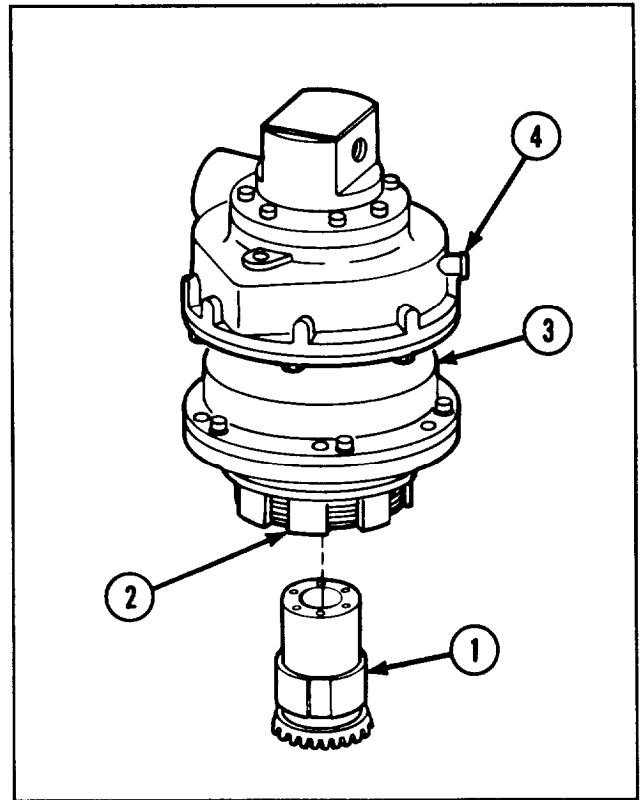
Hydraulic fluid is under high pressure. Use caution to prevent injury. Wipe up all spilled hydraulic fluid.

- 1 For complete setup for hydraulic testing procedures, refer to TM 9-4940-468-14
- 2 Install differential gear (1) in motor and brake hydraulic adapter (2) to keep disks in alignment during test.
- 3 Fill hydraulic motor brake cylinder (3) with new hydraulic fluid (item 13, appx B).

NOTE

All ports except hydraulic motor brake cylinder port must be plugged before applying hydraulic pressure.

- 4 Obtain a filtered hydraulic power source and apply 1600 psi (11,032 kPa) hydraulic pressure to hydraulic motor brake cylinder port (4).
- 5 Check to see that brake releases by turning differential gear (1). Differential gear (1) must turn freely.
- 6 Apply 2400 psi (16,548 kPa) to hydraulic motor brake cylinder port (4) and hold for 1 minute.



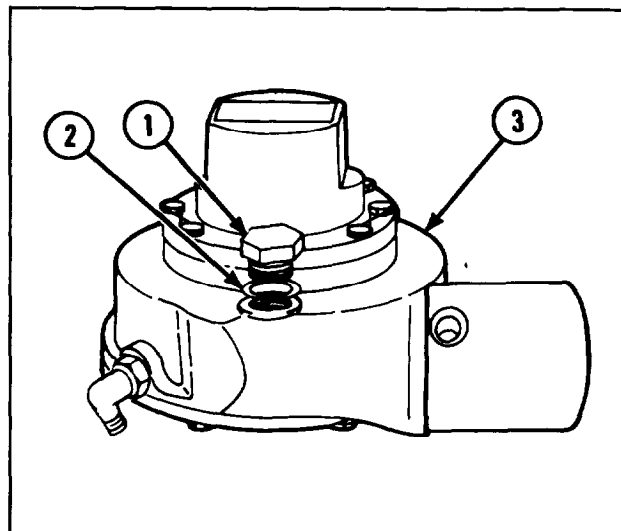
- 7 Check for leaks, and again check brake release.
- 8 If leakage occurs, or brake fails to release, disassemble hydraulic motor brake. Check for damaged parts and correct assembly.
- 9 Release hydraulic pressure and disconnect power source.
- 10 Drain hydraulic fluid from hydraulic motor brake cylinder.

2-49. MAINTENANCE OF TRAVERSING AND ELEVATING HYDRAULIC MOTORS.

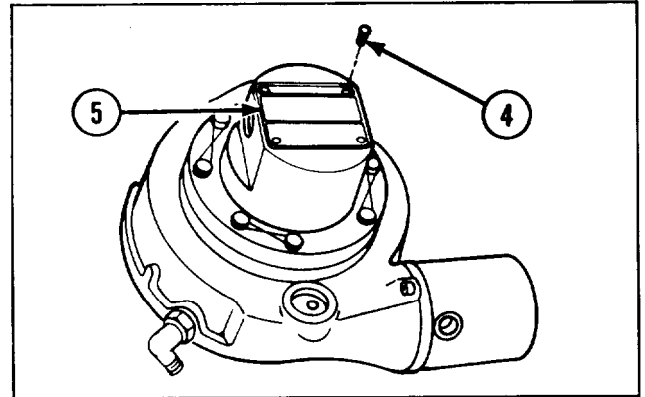
This task covers:		
a. <i>Disassembly</i>		c. <i>Reassembly</i>
b. <i>Inspection/Repair</i>		d. <i>Testing</i>
INITIAL SETUP		
<i>Tools and Special Tools</i>		
Artillery maintenance shop equipment (SC 4933-95-CL-A12)		Packing (8) (10917224-1)
Press		Preformed packing (MS28778-10)
Puller		Retaining ring (2) (MS16624-5018-1)
Tube		Sealing compound (item 21, appx B)
Bearing replacer (10904194)		<i>References</i>
Block		MIL-STD-130
Eye bearing replacer (10904217)		TM 9-2350-304-24P-2
Oil seal replacer (8375152)		<i>Equipment Conditions</i>
Ordnance artillery and turret mechanic's tool kit (SC-5180-95-CL-A12)		2-254 Elevating hydraulic motor removed
6-40 Removing screw		2-164 Traversing hydraulic motor removed
<i>Materials/Parts</i>		
Hydraulic motor parts kit (5704447)		
Lockwire (item 16, appx B)		

DISASSEMBLY

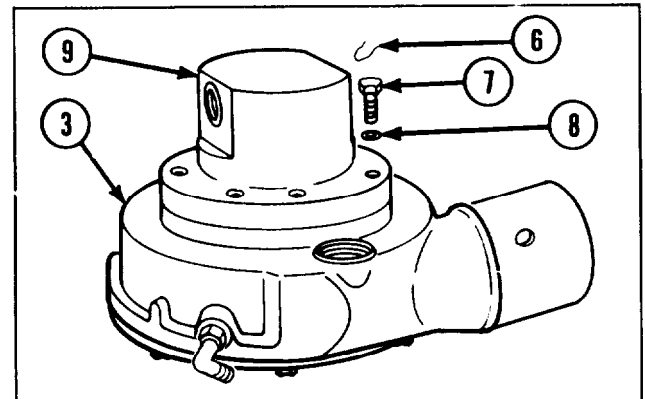
- 1 Remove machine thread plug (1) and preformed packing (2) from center housing (3).



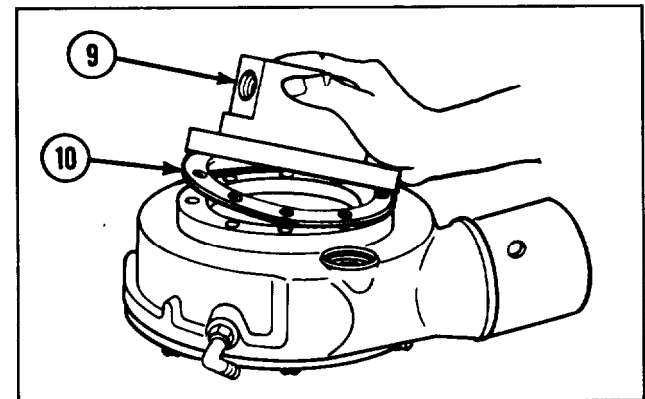
- 2 If damaged, remove four drive screws (4) and hydraulic motor identification plate (5).



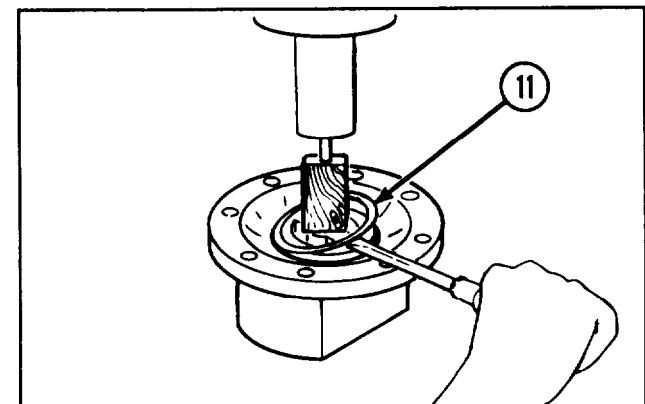
- 3 Remove lockwire (6), eight capscrews (7), and eight packings (8) securing hydraulic valve head (9) to center housing (3).



- 4 Remove hydraulic valve head (9) and head gasket (10).



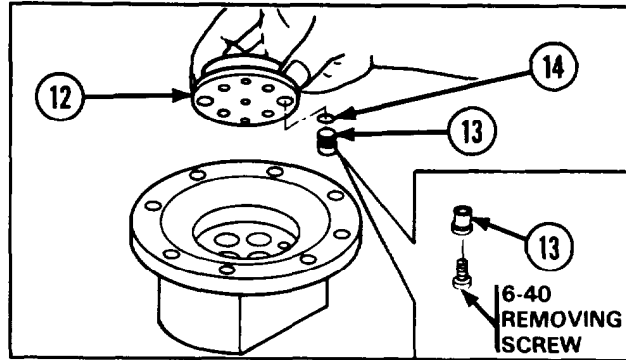
- 5 Using screwdriver, press, and wood block, remove valve pin ring (11).



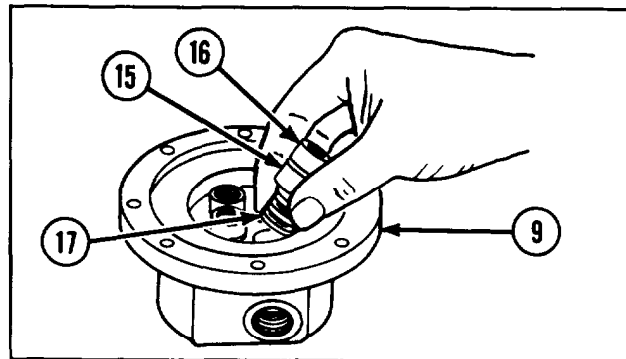
2-49. MAINTENANCE OF TRAVERSING AND ELEVATING HYDRAULIC MOTORS (CONT).

DISASSEMBLY (CONT)

- 6 Remove flat valve (12). Using 6-40 removing screw, remove two valve pistons (13) and two preformed packings (14).



- 7 Remove four preformed packings (15), four linear pistons (16), and four piston springs (17) from hydraulic valve head (9).



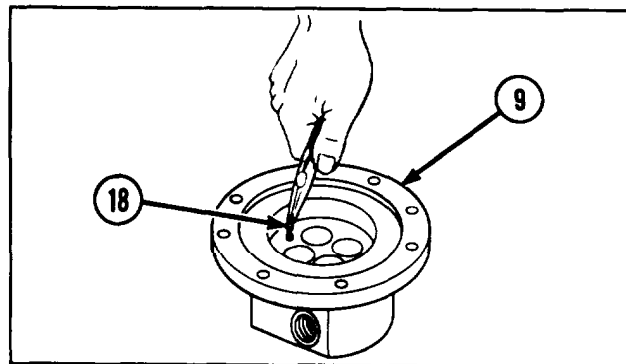
- 8 Using pliers, remove two flat valve pins (18) from hydraulic valve head (9).

CAUTION

Ensure stroke control is aligned in neutral position before removing rotor assembly.

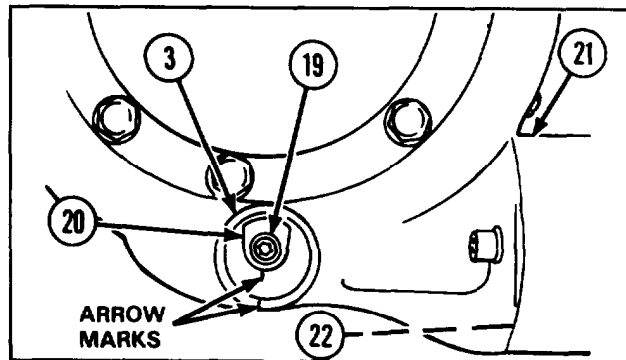
NOTE

Step 9 thru 17 apply to alinement of stroke control.

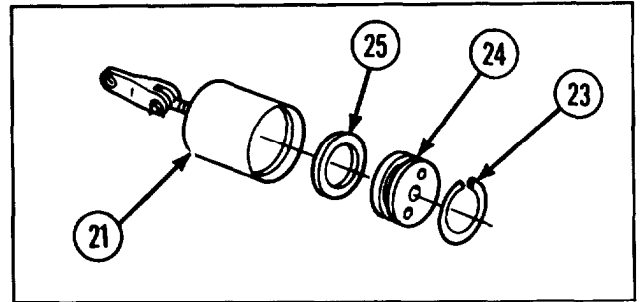


- 9 With rod plain bearing (19) in ball bearing (20), and linear actuating piston firmly against linear elevating cylinder head, check to see that arrow marks on center housing (3) and ball bearing are alined. If marks aline, go to step 18.

- 10 If marks do not aline, remove linear actuating stroke control head (21) and stroke control cylinder gasket (22) and go to step 11.

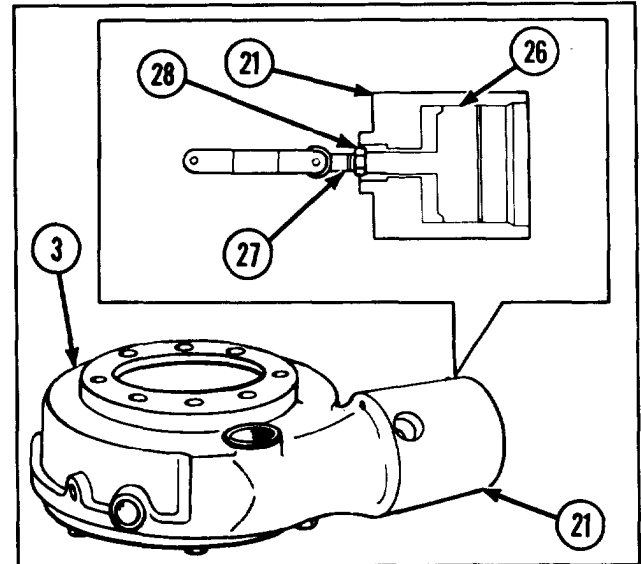


- 11 Remove retaining ring (23), linear elevating cylinder head (24), and spacer (25) from linear actuating stroke control head (21).



- 12 Move linear actuating piston (26) inside linear actuating stroke control head (21) so that it rests firmly against bottom of head.

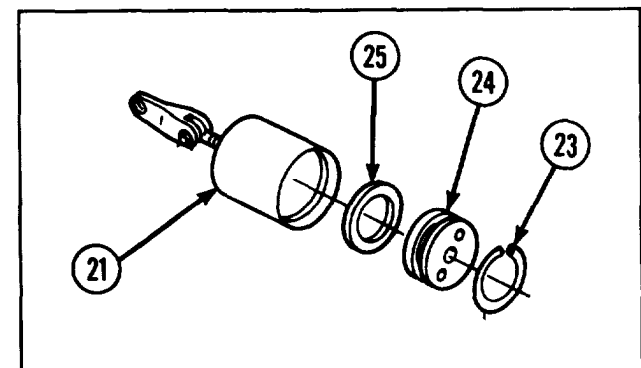
- 13 Press linear actuating stroke control head (21) firmly into place against center housing (3). Linear actuating piston (26) must remain at bottom of head.



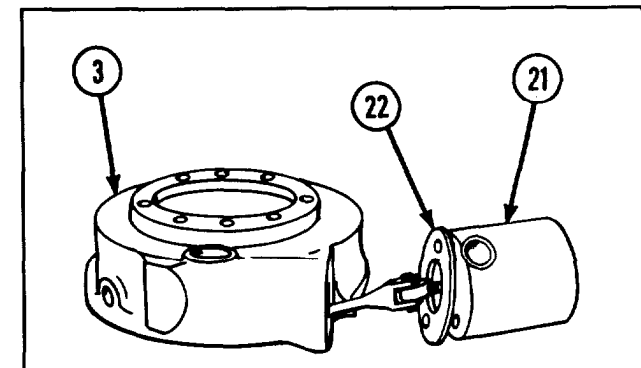
- 14 If linear actuating piston (26) is pushed out in linear actuating stroke control head (21), perform steps 18 thru 20 of reassembly, adjusting rod end ball bearing (27) enough to permit linear actuating piston to rest at bottom of linear actuating stroke control head during installation.

- 15 Prevent linear actuating piston (26) from turning and torque hex nut (28) to 46 to 54 in.-lb (5.2 to 6.1 N-m).

- 16 Install new spacer (25), linear elevating cylinder head (24), and new retaining ring (23) in linear actuating stroke control head (21).



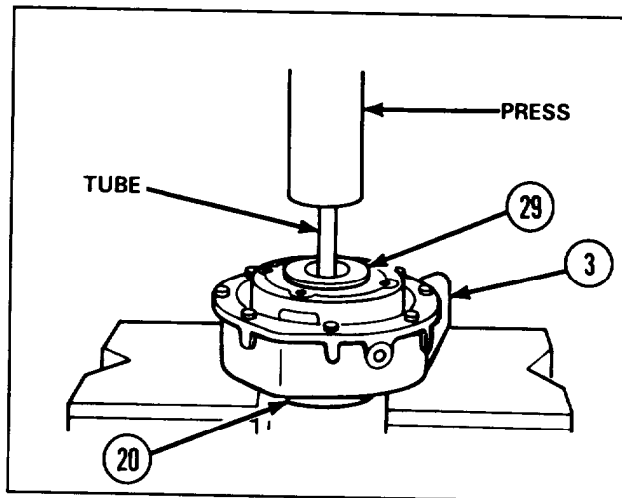
- 17 Install new stroke control cylinder gasket (22) and linear actuating stroke control head (21) on center housing (3).



2-49. MAINTENANCE OF TRAVERSING AND ELEVATING HYDRAULIC MOTORS (CONT).

DISASSEMBLY (CONT)

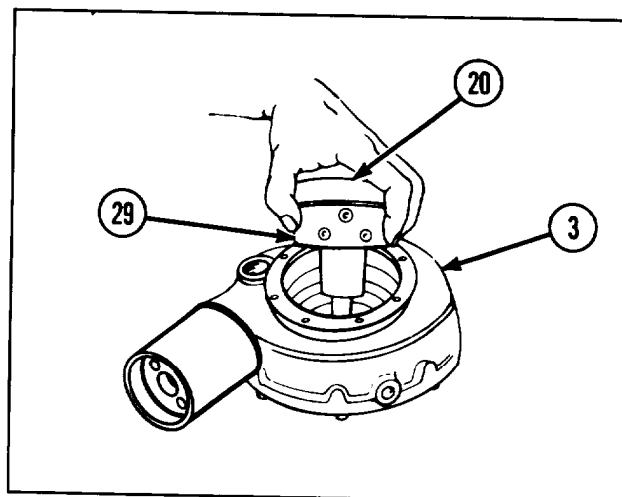
- 18 Using press and tube, press hydraulic rotor assembly (29) and ball bearing (20) out of center housing (3).



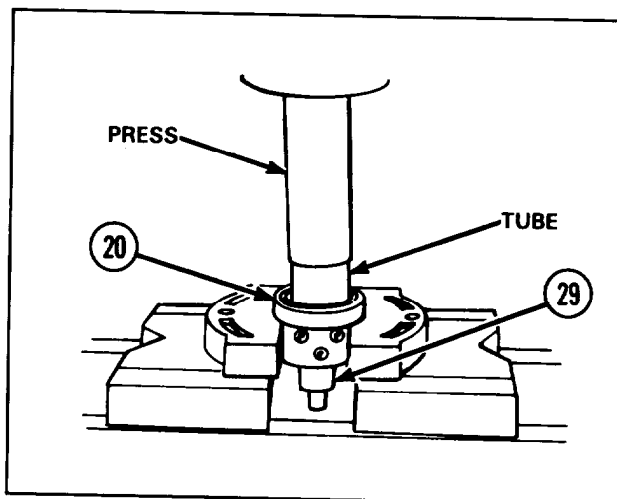
CAUTION

Do not attempt to remove pistons from hydraulic rotor assembly. Pistons are matched to rotor cylinders and cannot be replaced or repaired.

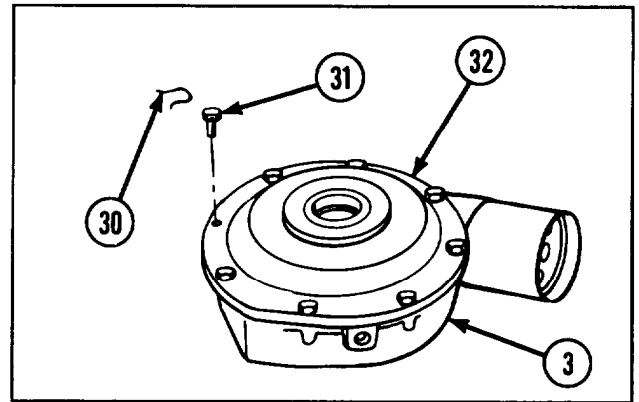
- 19 Remove hydraulic rotor assembly (29) and ball bearing (20) from center housing (3).



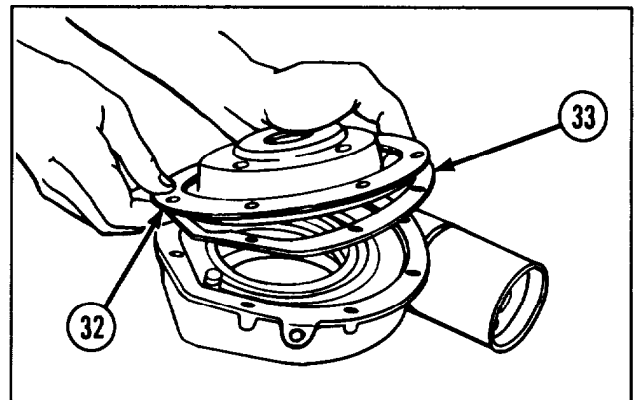
- 20 Using press and tube, remove ball bearing (20) from hydraulic rotor assembly (29).



- 21 Remove lockwire (30) and eight cap-screws (31) securing front housing (32) to center housing (3).

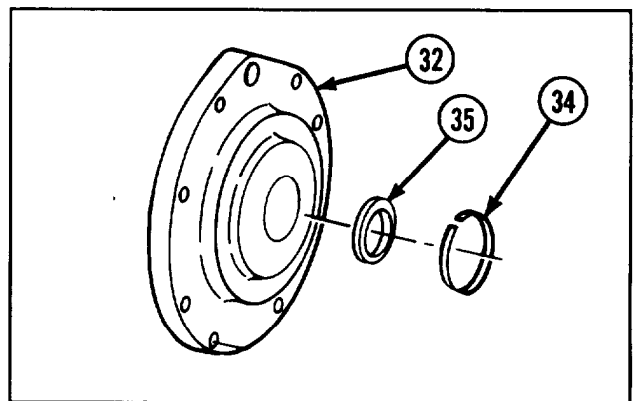


- 22 Remove front housing (32) and housing gasket (33).

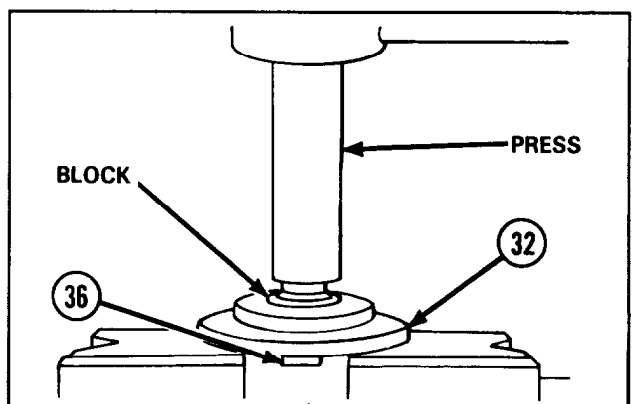


- 23 Remove retaining ring (34) from front housing (32).

- 24 Using puller, remove rotor seat (35) from front housing (32).



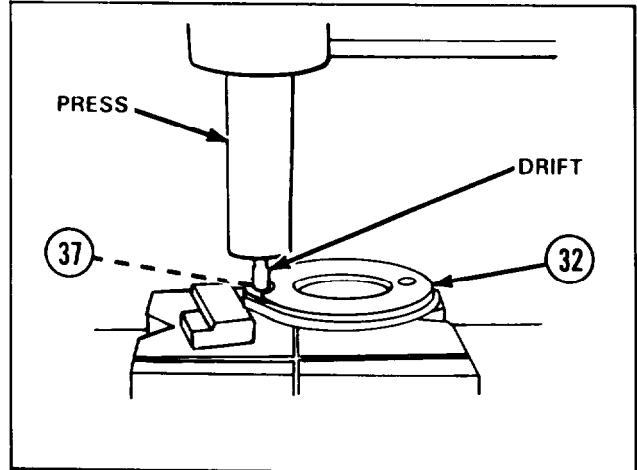
- 25 Using press and block, remove ball bearing (36) from front housing (32).



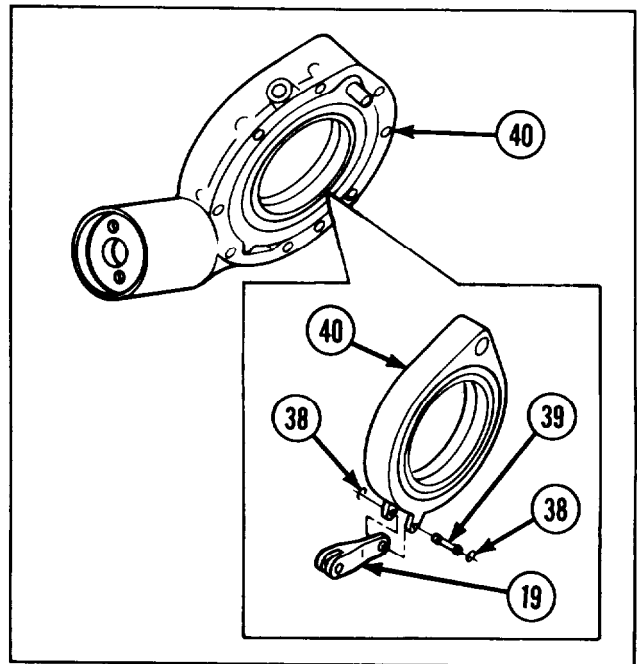
2-49. MAINTENANCE OF TRAVERSING AND ELEVATING HYDRAULIC MOTORS
(CONT).

DISASSEMBLY (CONT)

- 26 Using press and drift, remove roller needle bearing (37) from front housing (32).

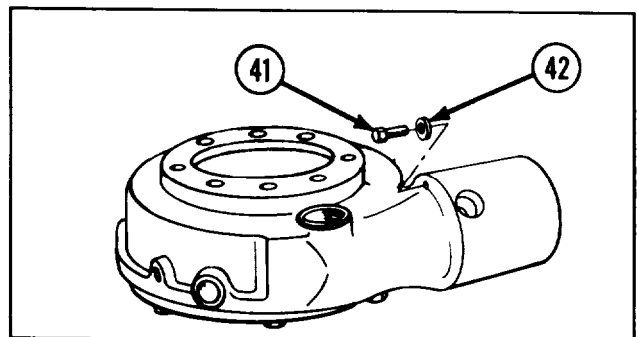


- 27 Remove two retaining rings (38) from grooved headless pin (39) securing rod plain bearing (19) to ball bearing (40).

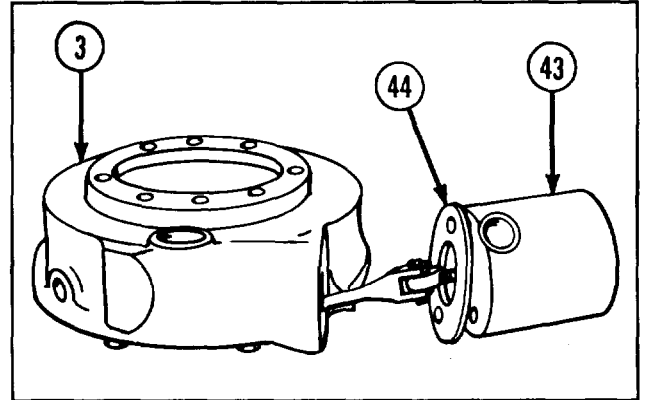


- 28 Using drift, remove grooved headless pin (39).

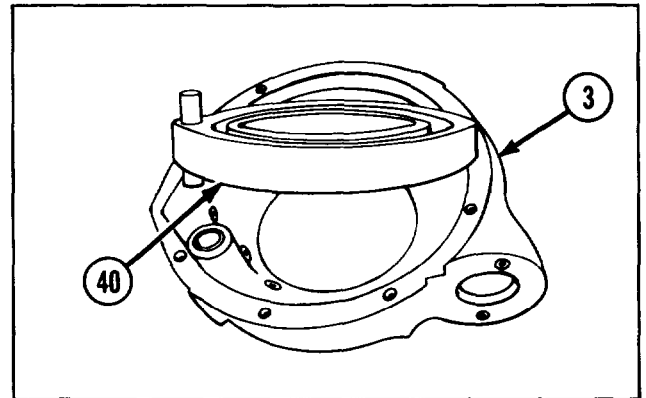
- 29 Remove two capscrews (41) and two cylinder head washers (42).



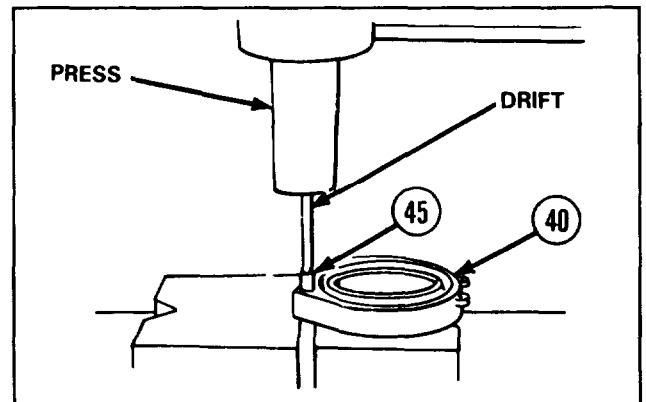
- 30 Remove linear actuating stroke control head (43) and stroke control cylinder gasket (44) from center housing (3).



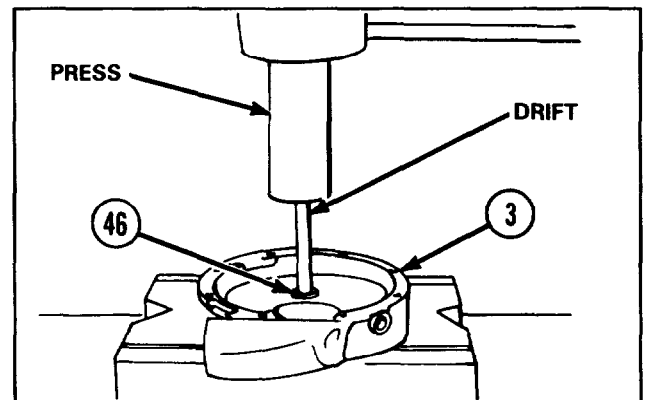
- 31 Remove ball bearing (40) from center housing (3).



- 32 Using press and drift, remove straight headless pin (45) from ball bearing (40).



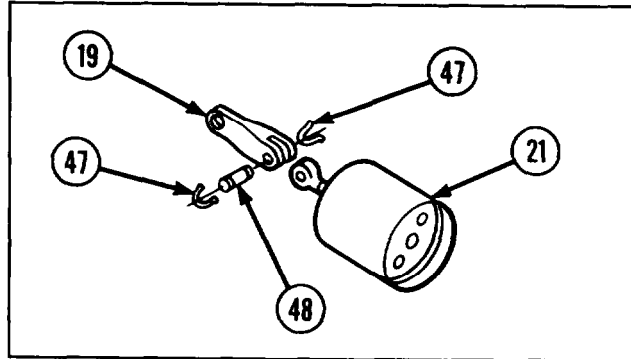
- 33 Using press and drift, remove roller needle bearing (46) from center housing (3).



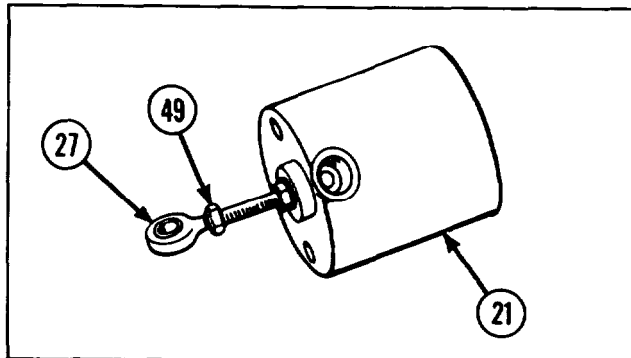
2-49. MAINTENANCE OF TRAVERSING AND ELEVATING HYDRAULIC MOTORS (CONT).

DISASSEMBLY (CONT)

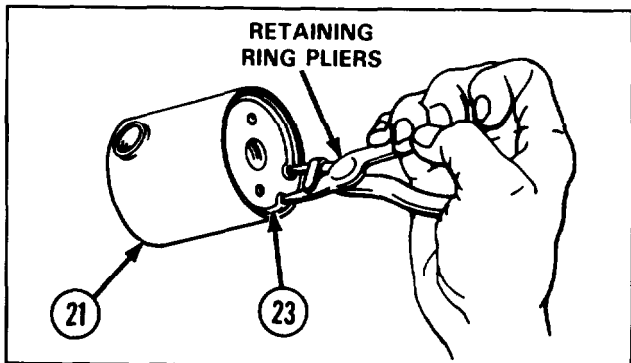
34 Remove two retaining rings (47), grooved headless pin (48), and rod plain bearing (19) of linear actuating stroke control head (21).



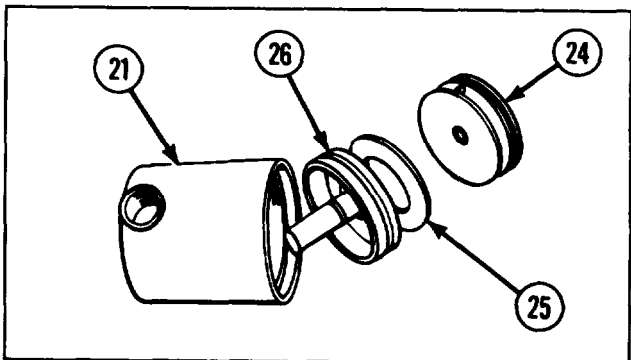
35 Loosen hex nut (49) on rod end ball bearing (27), and remove rod end ball bearing from linear actuating stroke control head (21). Remove hex nut.



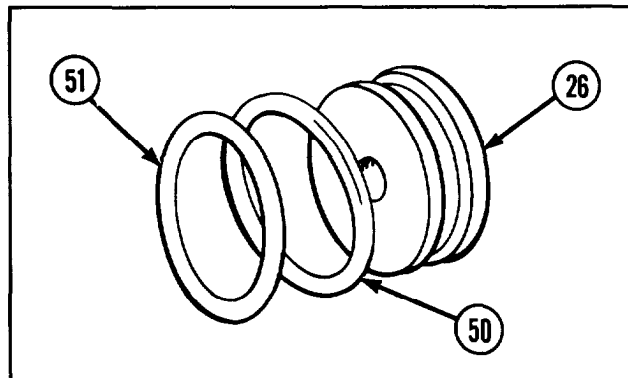
36 Using retaining ring pliers, remove retaining ring (23) from linear actuating stroke control head (21).



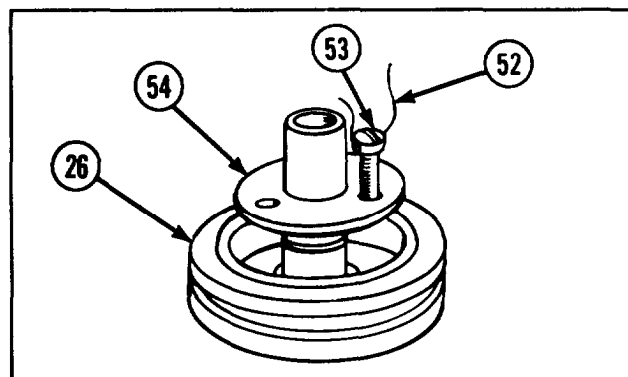
37 Remove linear elevating cylinder head (24), spacer (25), and linear actuating piston (26) from linear actuating stroke control head (21).



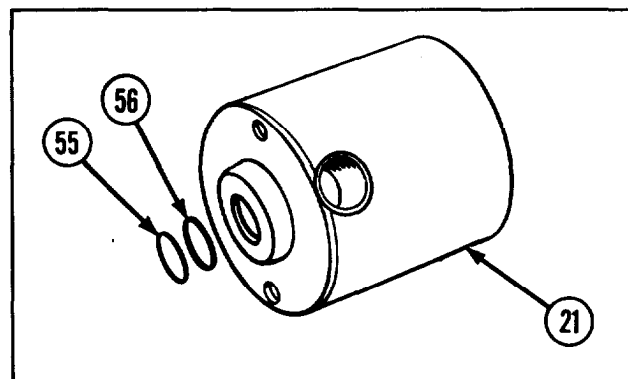
- 38** Remove gasket (50) and preformed packing (51) from linear elevating cylinder head (26).



- 39** Remove lockwire (52), two machine screws (53), and filter element (54) from linear actuating piston (26).



- 40** Remove gasket (55) and preformed packing (56) from linear actuating stroke control head (21).



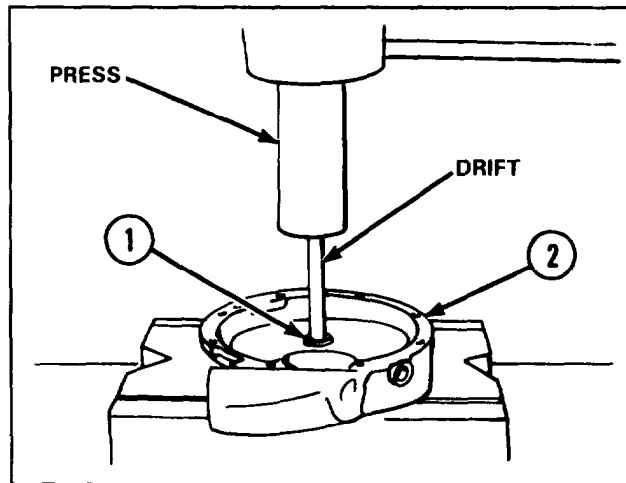
INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 If center housing is broken, damaged, or missing, repair is by replacement of next higher assembly.
- 3 If front housing is broken, damaged, or missing, repair is by replacement of next higher assembly.
- 4 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

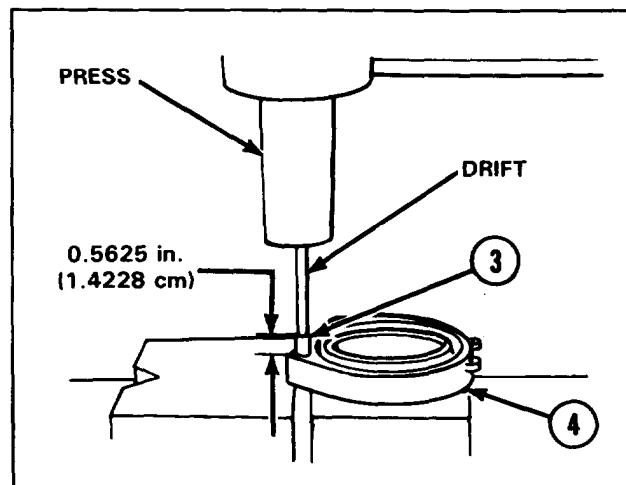
2-49. MAINTENANCE OF TRAVERSING AND ELEVATING HYDRAULIC MOTORS
(CONT).

REASSEMBLY

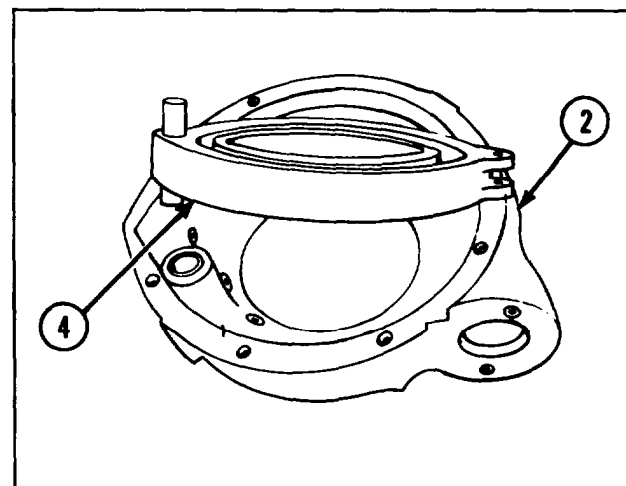
- 1 Using drift and press, install needle roller bearing (1) in center housing (2).



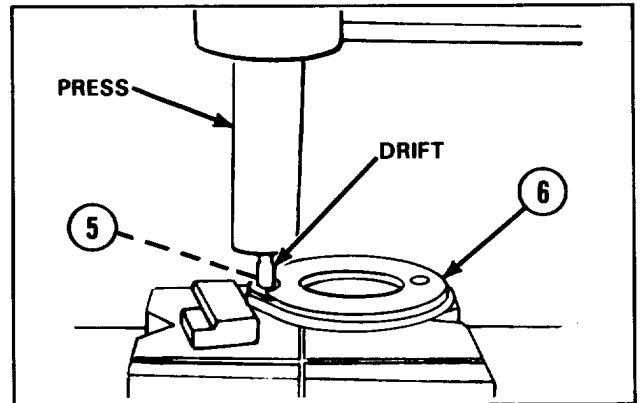
- 2 Using drift and press, install straight headless pin (3) so that 0.5625 in. (1.4228 cm) of straight headless pin (3) extends out of either side of ball bearing (4).



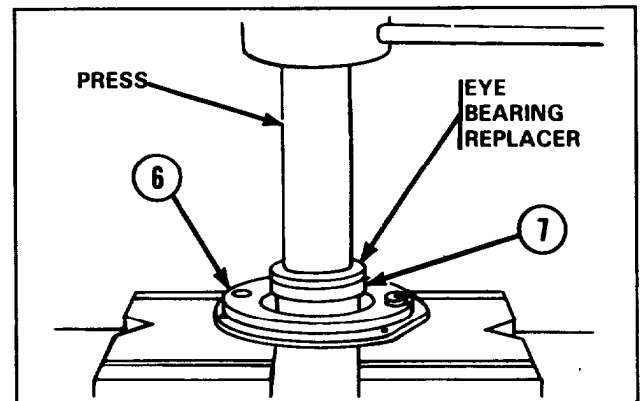
- 3 Install ball bearing (4) in center housing (2).



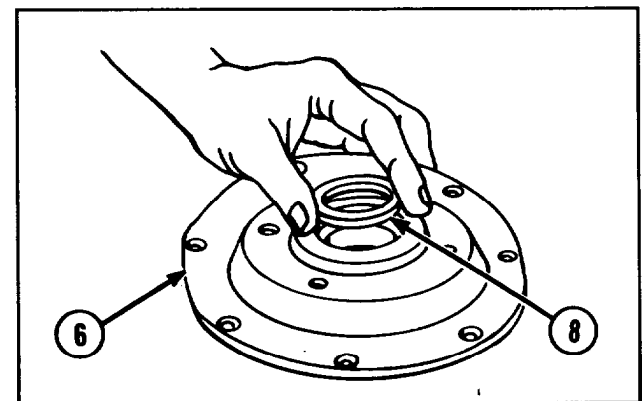
- 4 Using drift and press, install needle roller bearing (5) in front housing (6).



- 5 Using press and eye bearing replacer, install ball bearing (7) in front housing (6).

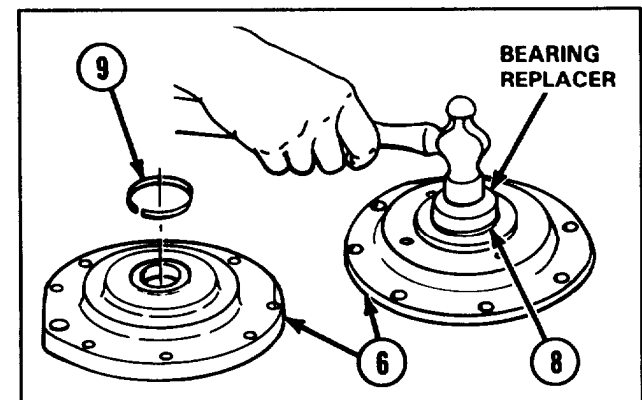


- 6 Place new rotor seal (8) in front housing (6) with lip facing into front housing.



- 7 Using bearing replacer, install new rotor seal (8) in front housing (6).

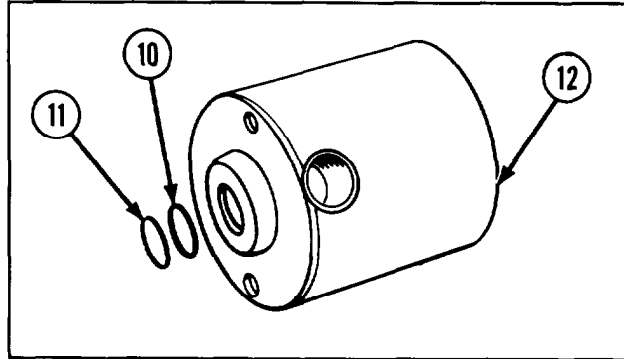
- 8 Install new retaining ring (9) in front housing (6).



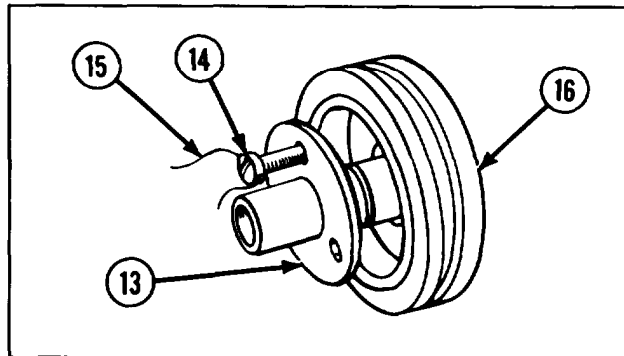
2-49. MAINTENANCE OF TRAVERSING AND ELEVATING HYDRAULIC MOTORS
(CONT).

REASSEMBLY (CONT)

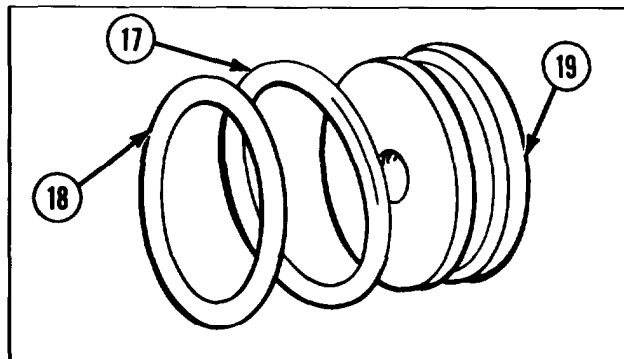
- 9 Install new preformed packing (10) and new gasket (11) in linear actuating stroke control head (12).



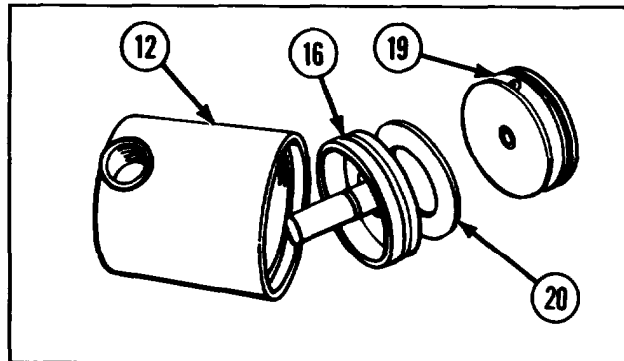
- 10 Install new filter element (13), two new machine screws (14), and new lockwire (15) (item 16, appx B) on linear actuating piston (16).



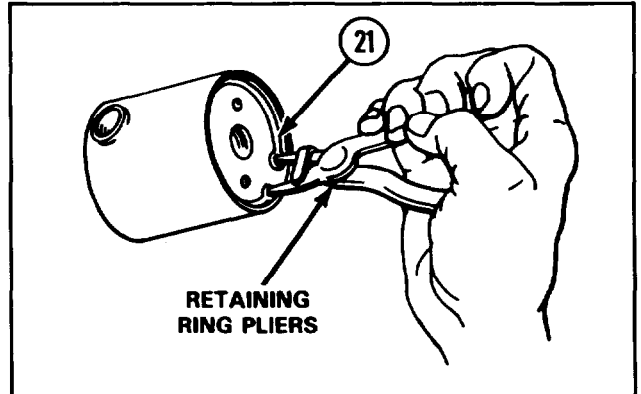
- 11 Install new gasket (17) and new preformed packing (18) on linear elevating cylinder head (19).



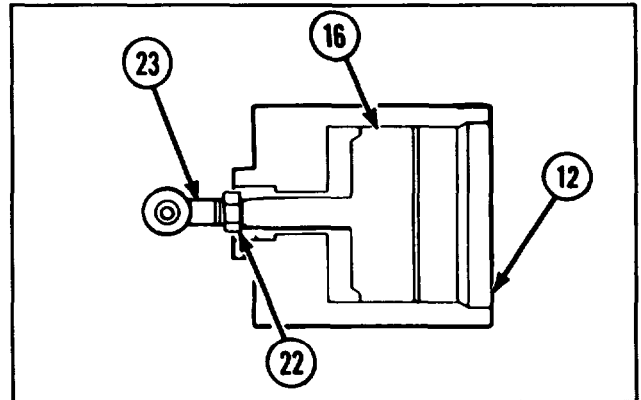
- 12 Install linear actuating piston (16), new spacer (20), and linear elevating cylinder head (19) in linear actuating stroke control head (12).



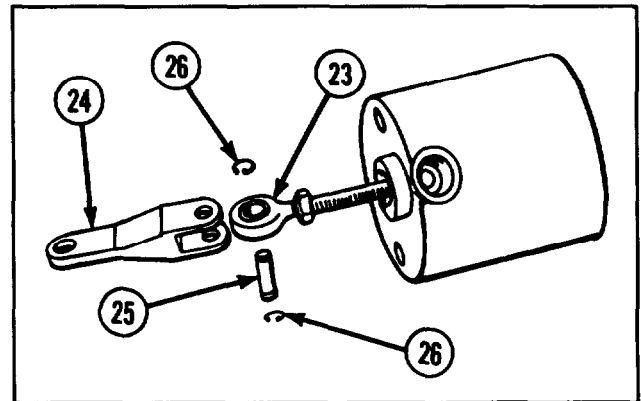
- 13 Using retaining ring pliers, install new retaining ring (21).



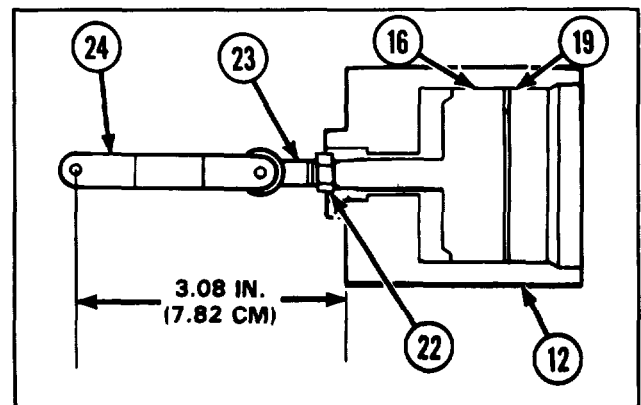
- 14 Install new hex nut (22) on rod end ball bearing (23).
- 15 Install rod end ball bearing (23) in linear actuating piston (16) inside linear actuating stroke control head (12).



- 16 Install rod plain bearing (24) on rod end ball bearing (23) and secure with new grooved headless pin (25) and two new retaining rings (26).
- 17 Push linear actuating piston (16) in linear actuating stroke control head (12) until it rests snugly against linear elevating cylinder head (19).



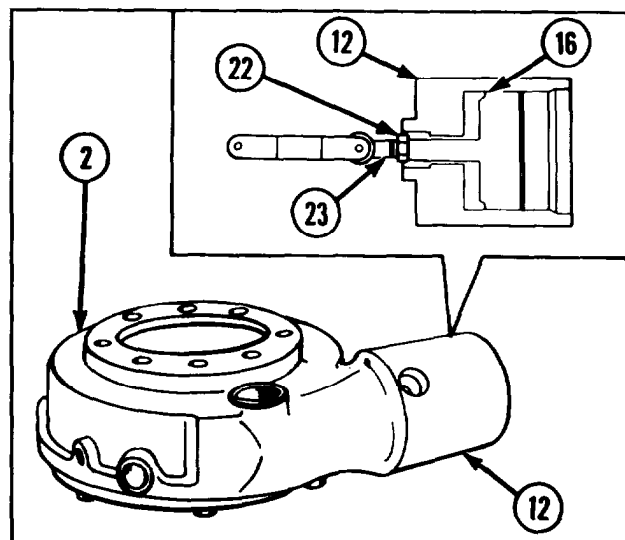
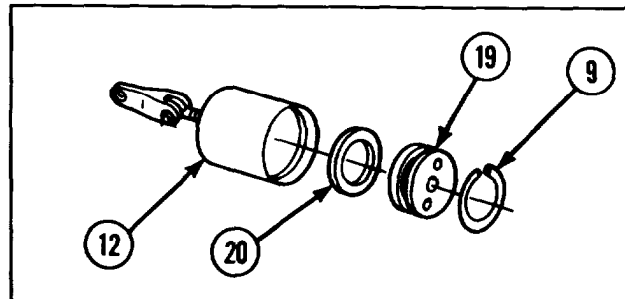
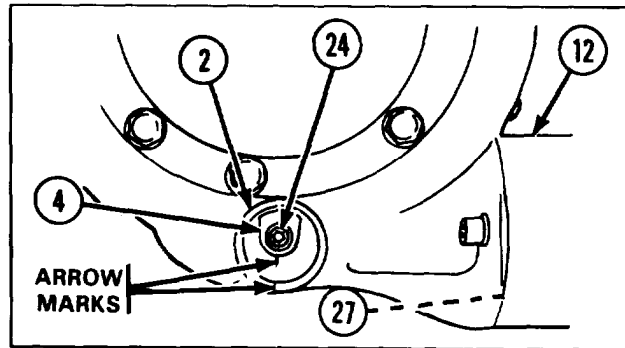
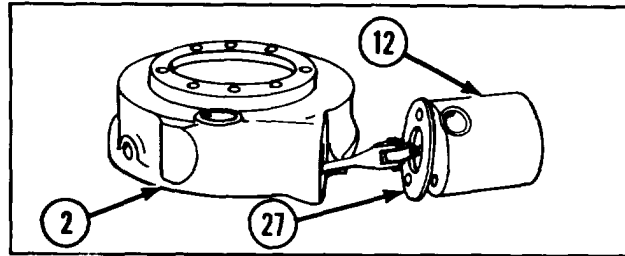
- 18 Loosen hex nut (22).
- 19 Screw rod end ball bearing (23) in or out of linear actuating piston (16) to obtain a measurement of 3.08 in. (7.82 cm) between face of linear actuating stroke control head (12) and center of rod plain bearing (24).
- 20 Pull linear actuating piston (16) toward rod end and tighten hex nut (22).



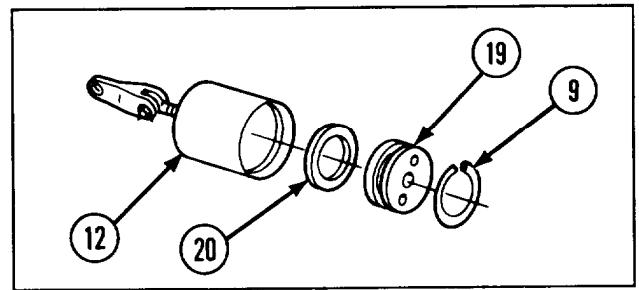
2-49. MAINTENANCE OF TRAVERSING AND ELEVATING HYDRAULIC MOTORS (CONT).

REASSEMBLY (CONT)

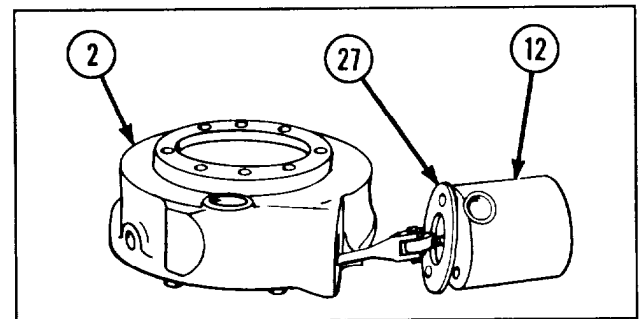
- 21 Install linear stroke actuating control head (12) and new stroke control cylinder gasket (27) on center housing (2).
- 22 With rod plain bearing (24) in ball bearing (4), and linear actuating piston firmly against linear elevating cylinder head, check to see that arrow marks on center housing (2) and ball bearing (4) are alined. If marks aline, go to step 31.
- 23 If marks do not aline, remove linear actuating stroke control head (12) and stroke control cylinder gasket (27) and go to step 24.
- 24 Remove retaining ring (9), linear elevating cylinder head (19), and spacer (20) from linear actuating stroke control head (12).
- 25 Move linear actuating piston (16) inside linear actuating stroke control head (12) so that it rests firmly against bottom of head (12).
- 26 Press linear actuating stroke control head (12) firmly into place against center housing (2). Linear actuating piston (16) must remain at bottom of head (12).
- 27 If linear actuating piston (16) is pushed out in linear actuating stroke control head (12), repeat steps 18 thru 20, adjusting rod end ball bearing (23) enough to permit linear actuating piston (16) to rest at bottom of linear actuating stroke control head (12) during installation.
- 28 Prevent linear actuating piston (16) from turning and torque hex nut (22) to 46 to 54 in.-lb (5.2 to 6.1 N-m).



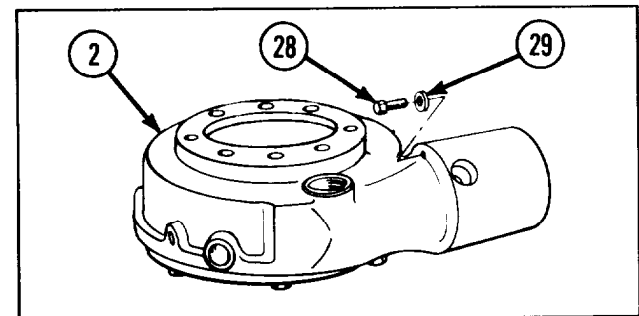
- 29 Install new spacer (20), linear elevating cylinder head (19), and new retaining ring (9) in linear actuating stroke control head (12).



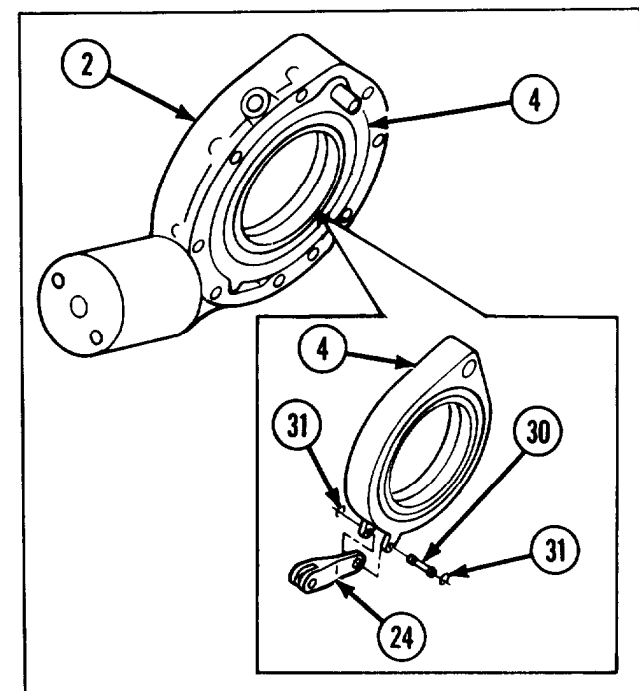
- 30 Install new stroke control cylinder gasket (27) and linear actuating stroke control head (12) on center housing (2).



- 31 Apply sealing compound (item 21, appx B) on two new capscrews (28), and install two new capscrews (28) and two new cylinder head washers (29) in center housing (2).



- 32 Install headless grooved pin (30) through ball bearing (4) and rod plain bearing (24) inside center housing (2).

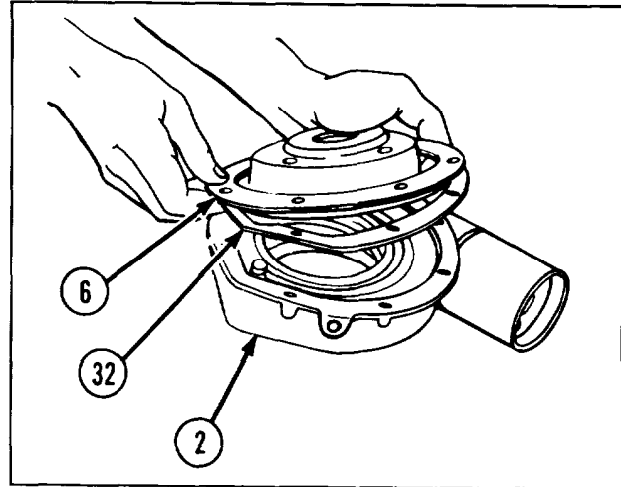


- 33 Install two new retaining rings (31) on headless grooved pin (30).

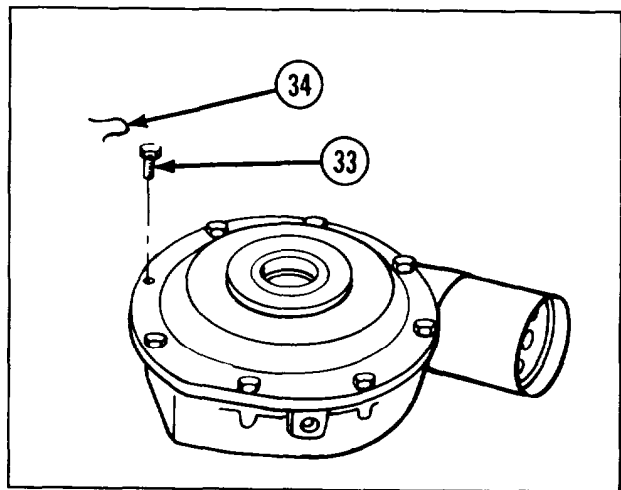
2-49. MAINTENANCE OF TRAVERSING AND ELEVATING HYDRAULIC MOTORS (CONT).

REASSEMBLY (CONT)

34 Install new housing gasket (32) and front housing (6) on center housing (2).



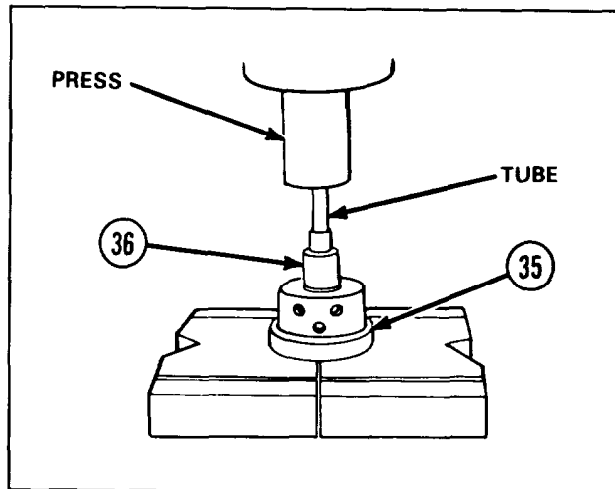
35 Install eight capscrews (33) and secure with new lockwire (34) (item 16, appx B).



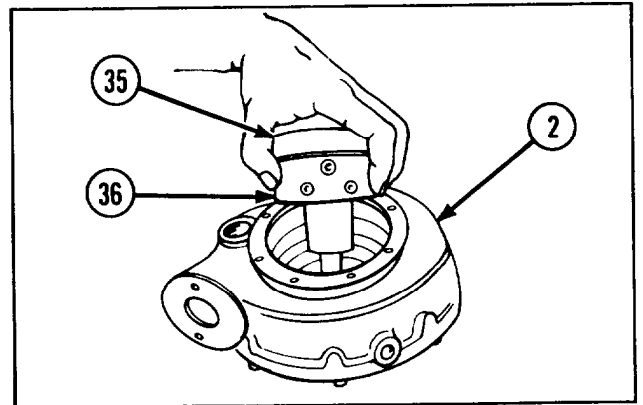
NOTE

On hydraulic motor assembly, the pistons are not interchangeable.

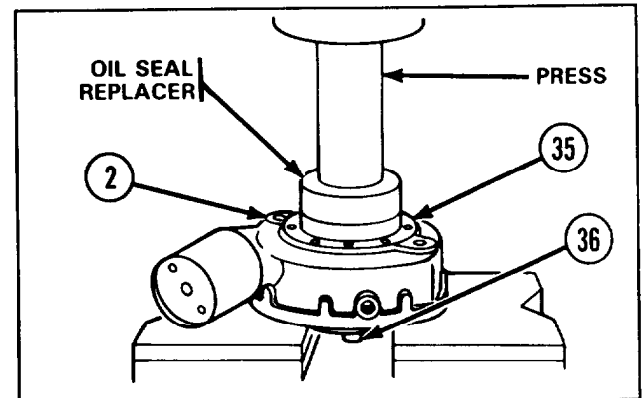
36 Using press and tube, install ball bearing (35) on hydraulic rotor assembly (36).



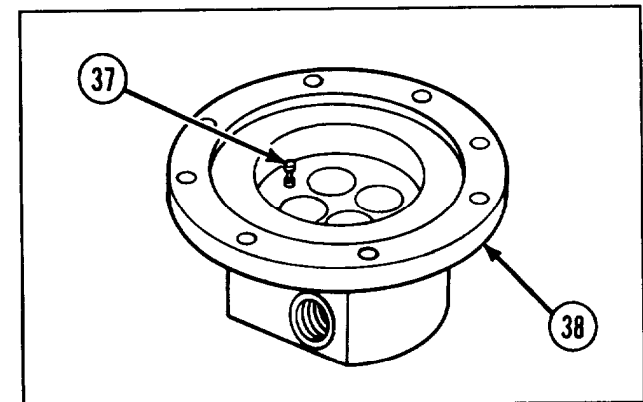
- 37 Install ball bearing (35) and hydraulic rotor assembly (36) in center housing (2).



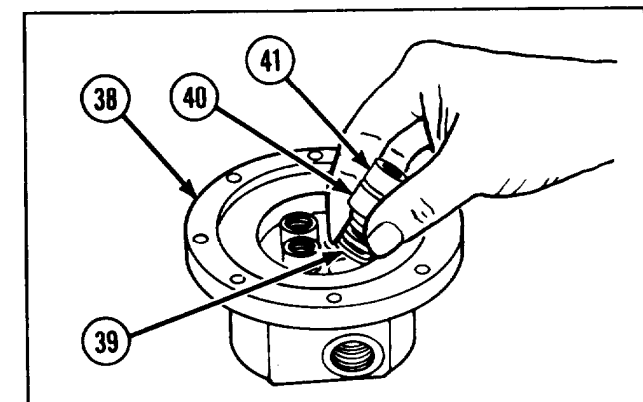
- 38 Using press and oil seal replacer, press ball bearing (35) and hydraulic rotor assembly (36) into center housing (2).



- 39 Install two new flat valve pins (37) in hydraulic valve head (38).



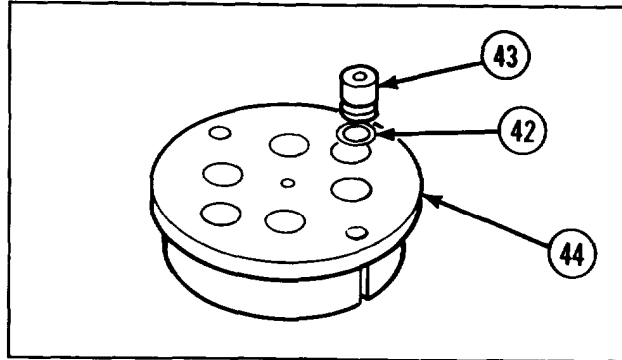
- 40 Install four new piston springs (39), four linear pistons (40); and four new pre-formed packings (41) in hydraulic valve head (38).



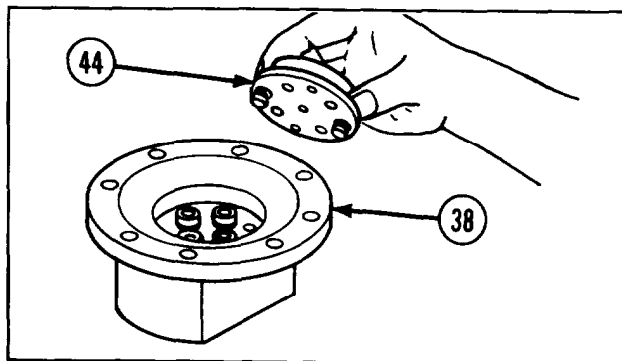
2-49. MAINTENANCE OF TRAVERSING AND ELEVATING HYDRAULIC MOTORS (CONT).

REASSEMBLY (CONT)

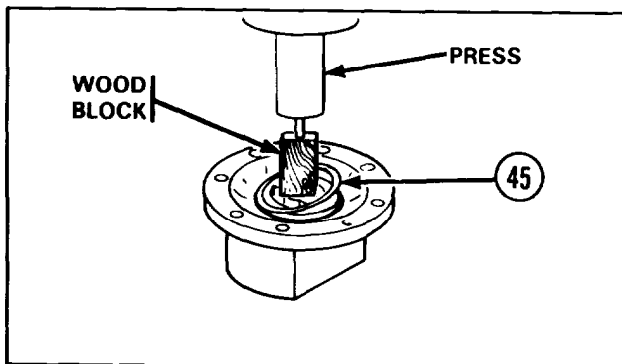
41 Install two new preformed packings (42) and two valve pistons (43) in new flat valve (44).



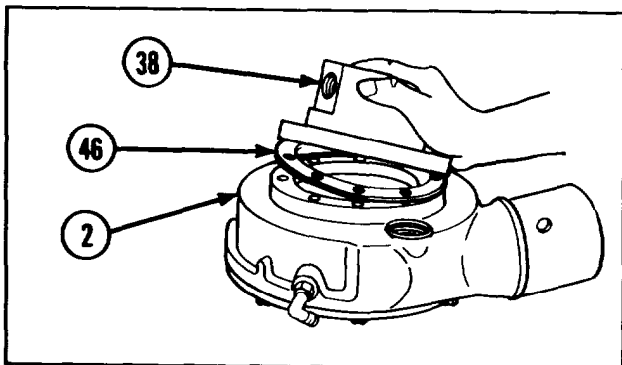
42 Install new flat valve (44) in hydraulic valve head (38).



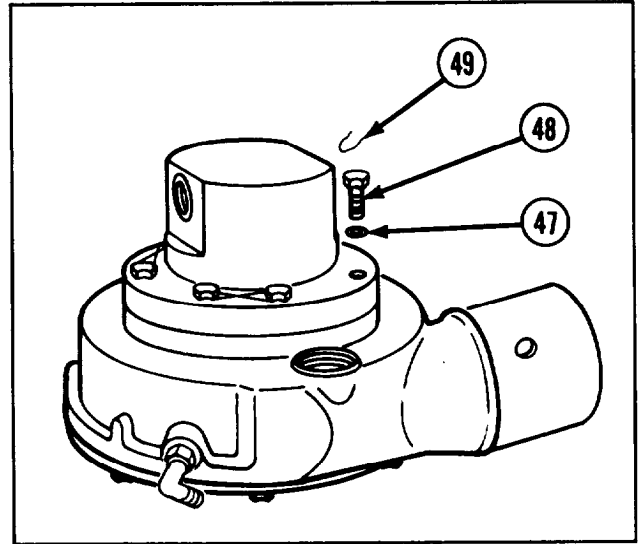
43 Using press and wood block, install new valve pin ring (45).



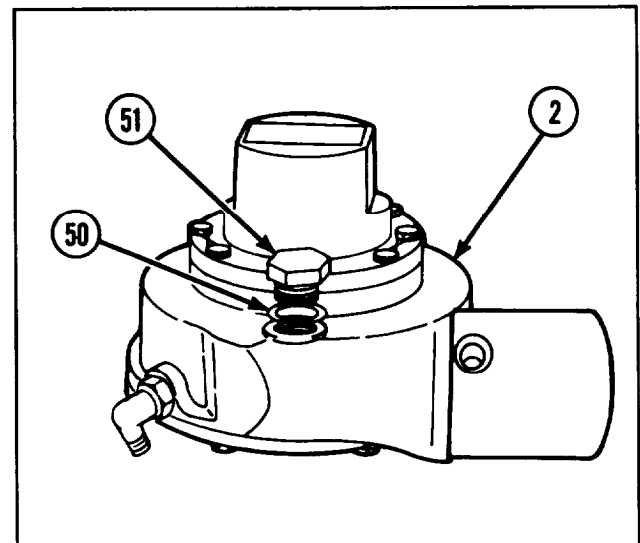
44 Install new head gasket (46) and hydraulic valve head (38) on center housing (2).



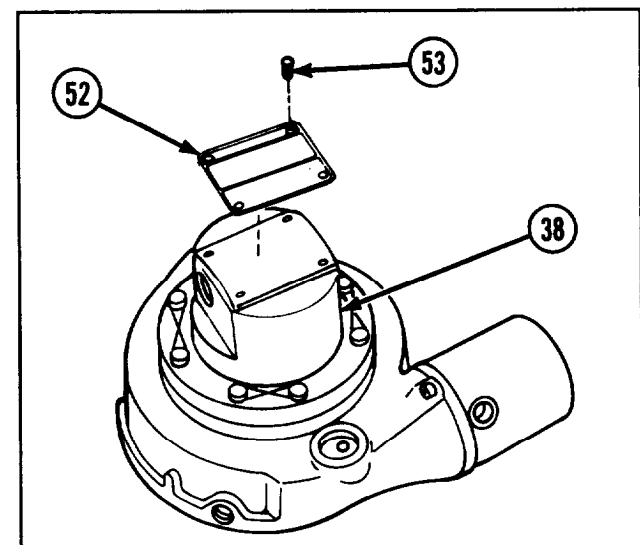
45 Install eight new packings (47) and eight capscrews (48), and secure with new lockwire (49) (item 16, appx B).



46 Install new preformed packing (50) and machine thread plug (51) in center housing (2).



47 If necessary, install new hydraulic motor identification plate (52) on hydraulic valve head (38) and secure using four drive screws (53). Stamp serial number and part number on identification plate, refer to MIL-STD-130.



TESTING

For complete test procedure, refer to page 2-210.

2-50. MAINTENANCE OF TRAVERSING AND ELEVATING DIFFERENTIAL.

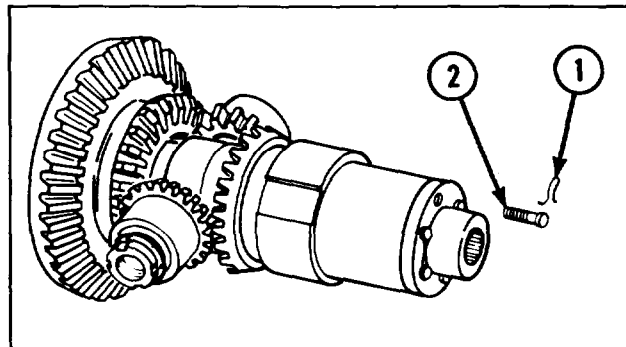
<p>This task covers:</p>	<p>a. <i>Disassembly</i> b. <i>Inspection/Repair</i></p>	<p>c. <i>Reassembly</i> d. <i>Adjustment</i></p>		
<p>INITIAL SETUP</p> <table border="0" style="width: 100%;"> <tr> <td style="vertical-align: top; width: 50%;"> <p><i>Tools and Special Tools</i></p> <p>Artillery maintenance shop equipment (SC 4933-95-CL-A12) Dial indicator and holder Puller Vise Vise caps Ordnance artillery and turret mechanic's tool kit (SC-5180-95-CL-A12) Torque wrench (A-A-2411)</p> </td> <td style="vertical-align: top; width: 50%;"> <p><i>Materials/Parts</i></p> <p>Cotter pin (MS24665-287) Key washer (2) (MS19070-012) Key washer (MS 19070-022) Lockwire (item 16, appx B)</p> <p><i>References</i></p> <p>TM 9-2350-304-20-2 TM 9-2350-304-24P-2</p> <p><i>Equipment Conditions</i></p> <p>2-164 Differential removed (traversing) 2-254 Differential removed (elevating)</p> </td> </tr> </table>			<p><i>Tools and Special Tools</i></p> <p>Artillery maintenance shop equipment (SC 4933-95-CL-A12) Dial indicator and holder Puller Vise Vise caps Ordnance artillery and turret mechanic's tool kit (SC-5180-95-CL-A12) Torque wrench (A-A-2411)</p>	<p><i>Materials/Parts</i></p> <p>Cotter pin (MS24665-287) Key washer (2) (MS19070-012) Key washer (MS 19070-022) Lockwire (item 16, appx B)</p> <p><i>References</i></p> <p>TM 9-2350-304-20-2 TM 9-2350-304-24P-2</p> <p><i>Equipment Conditions</i></p> <p>2-164 Differential removed (traversing) 2-254 Differential removed (elevating)</p>
<p><i>Tools and Special Tools</i></p> <p>Artillery maintenance shop equipment (SC 4933-95-CL-A12) Dial indicator and holder Puller Vise Vise caps Ordnance artillery and turret mechanic's tool kit (SC-5180-95-CL-A12) Torque wrench (A-A-2411)</p>	<p><i>Materials/Parts</i></p> <p>Cotter pin (MS24665-287) Key washer (2) (MS19070-012) Key washer (MS 19070-022) Lockwire (item 16, appx B)</p> <p><i>References</i></p> <p>TM 9-2350-304-20-2 TM 9-2350-304-24P-2</p> <p><i>Equipment Conditions</i></p> <p>2-164 Differential removed (traversing) 2-254 Differential removed (elevating)</p>			

DISASSEMBLY

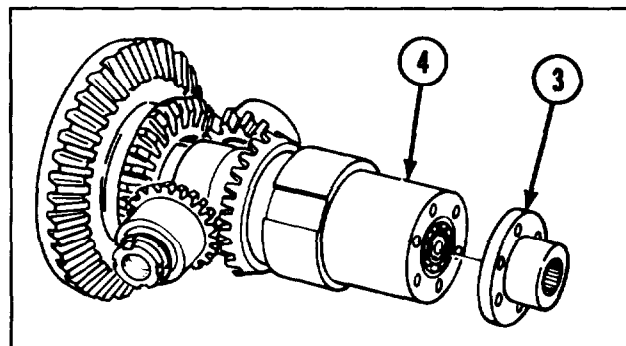
NOTE

The following procedures are written for one differential but apply to both

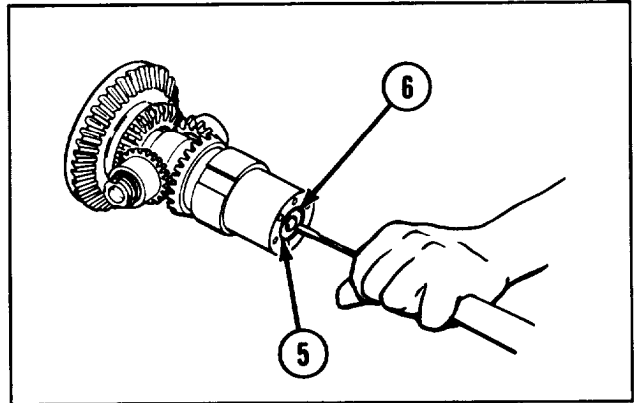
1 Remove lockwire (1) and six capscrews (2).



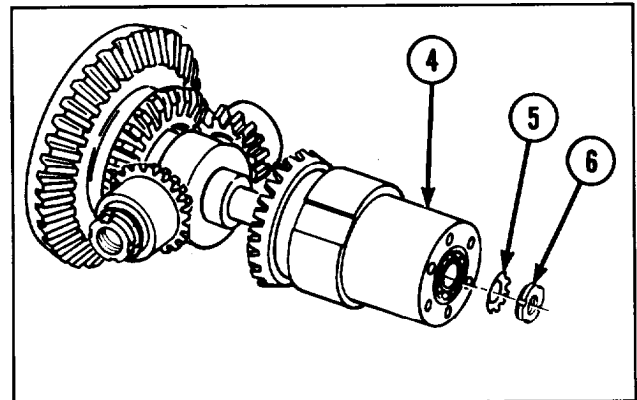
2 Remove input gear retaining plate (3) from differential gear (4).



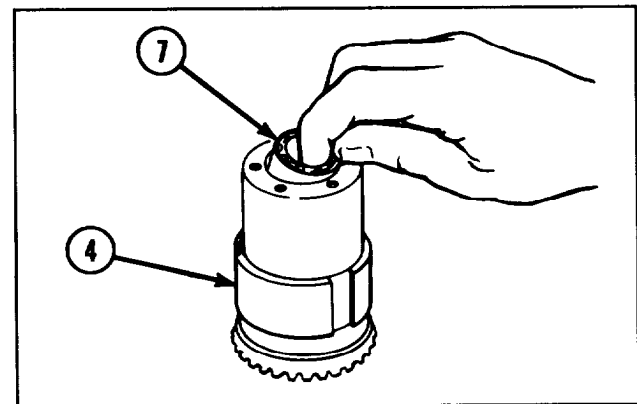
- 3 Bend tabs of key washer (5) out of slots in nut (6).



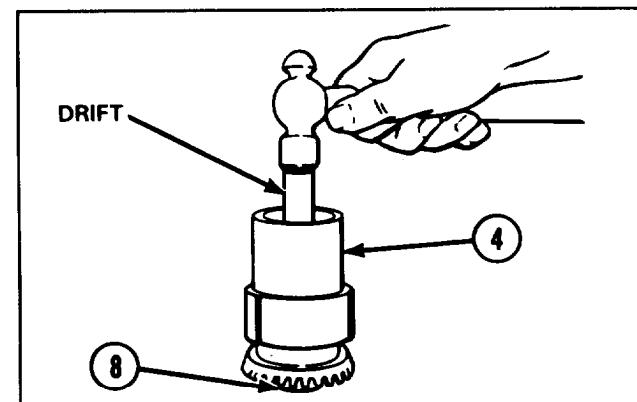
- 4 Remove nut (6), key washer (5), and differential gear (4).



- 5 Remove power input gear ball bearing (7) from differential gear (4).



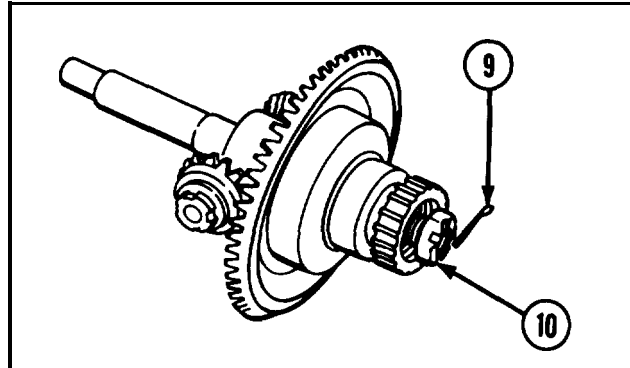
- 6 Using drift, remove needle roller ball bearing (8) from differential gear (4).



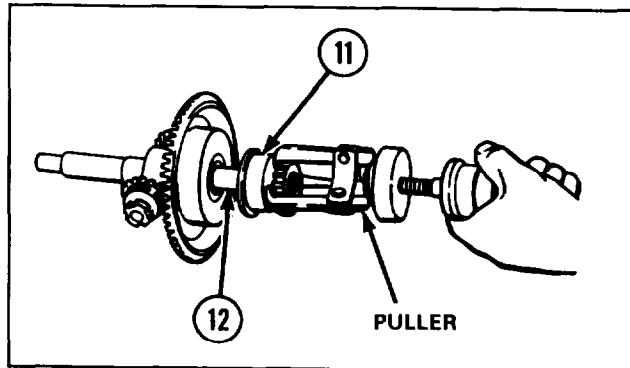
2-50. MAINTENANCE OF TRAVERSING AND ELEVATING DIFFERENTIAL (CONT).

DISASSEMBLY (CONT)

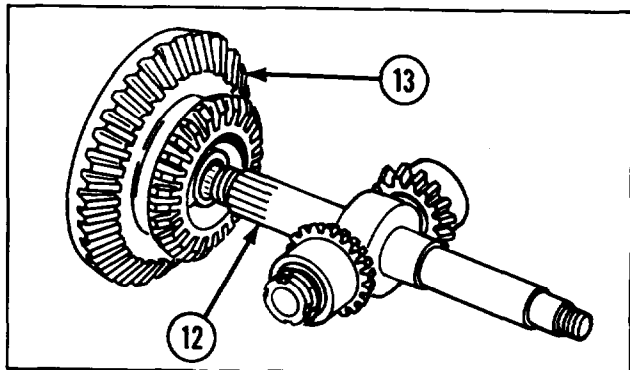
7 Remove cotter pin (9) and nut (10)



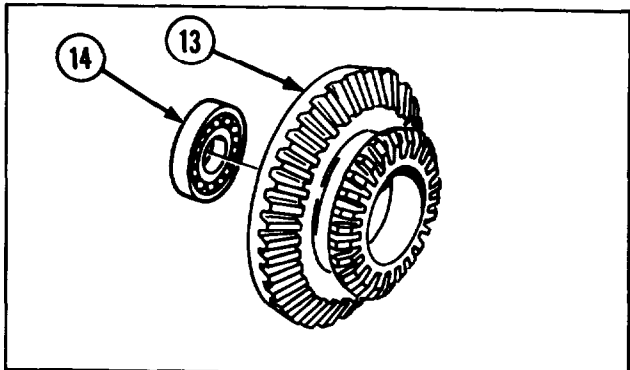
8 Using puller, remove output spur gear (11) from differential gear shaft (12).



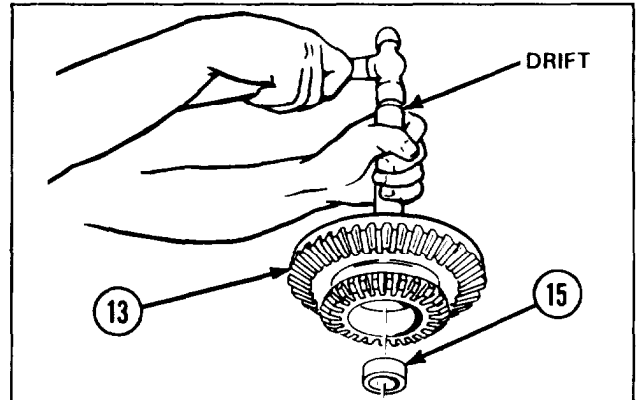
9 Remove input cluster gear (13) from differential gear shaft (12).



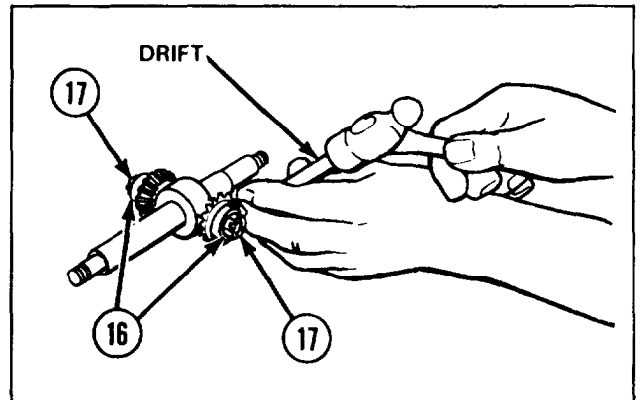
10 Remove output gear ball bearing (14) from input cluster gear (13).



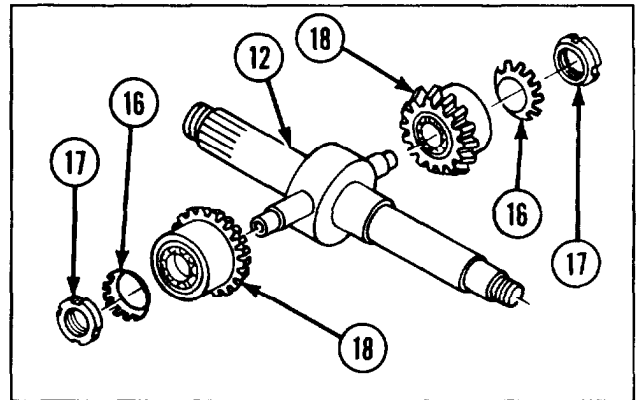
- 11 Using drift, remove needle roller bearing (15) from input cluster gear (13).



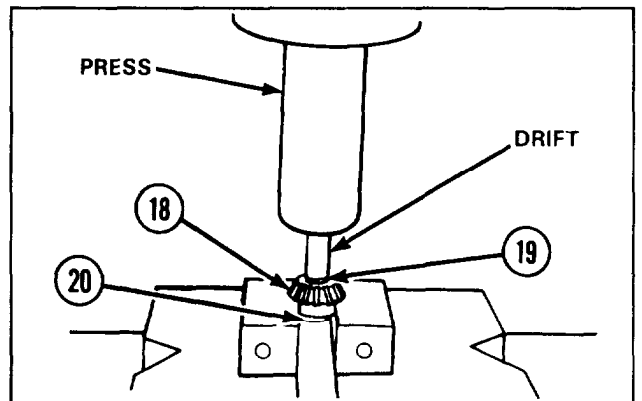
- 12 Using drift, bend tabs of two key washers (16) out of slots of two nuts (17).



- 13 Remove two nuts (17), two key washers (16), and two spur gears (18) from differential gear shaft (12).



- 14 Using press and drift, remove ball bearing (19) and roller needle bearing (20) from each spur gear (18).



2-50. MAINTENANCE OF TRAVERSING AND ELEVATING DIFFERENTIAL (CONT).

INSPECTION/REPAIR

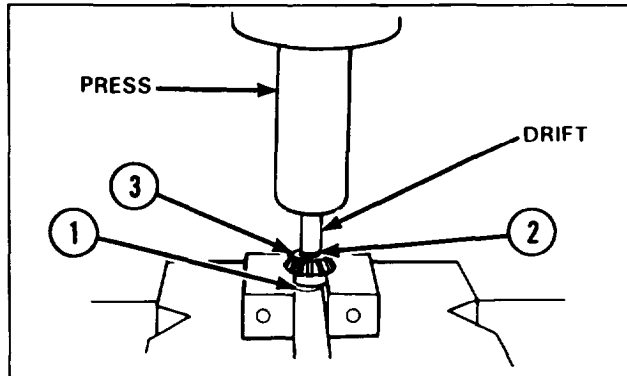
- 1 Inspect for broken, damaged, or missing parts.
- 2 If input cluster gear is broken, damaged, or missing, repair is by replacement of next higher assembly
- 3 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

REASSEMBLY

NOTE

The following procedures are written for one differential but apply to both.

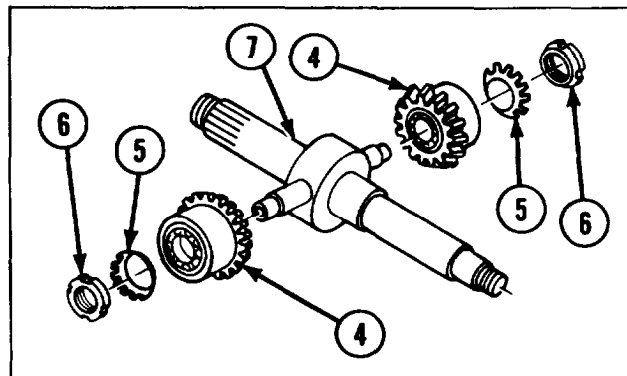
- 1 Using press and drift, install needle roller bearing (1) and ball bearing (2) in each bevel gear (3).



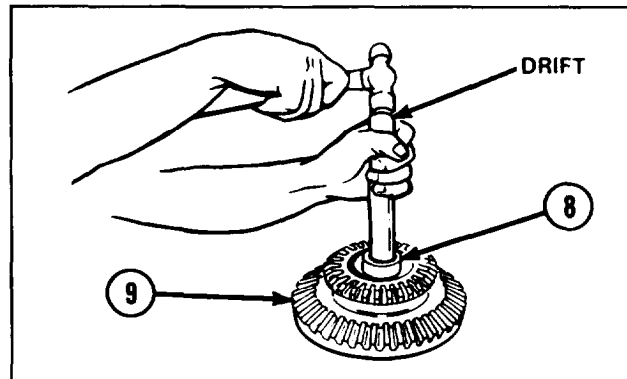
NOTE

If key washers are damaged, install new key washers.

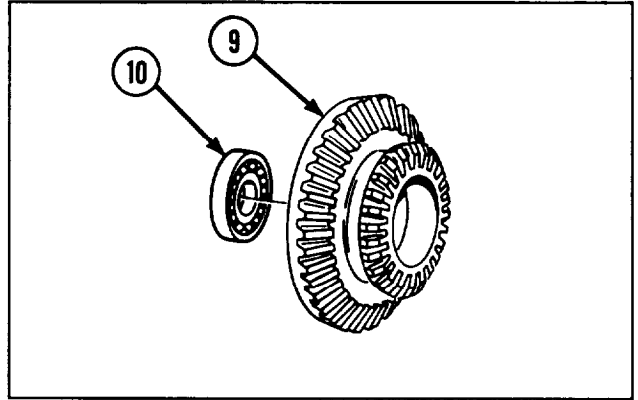
- 2 Install two bevel gears (4), two key washers (5), and two nuts (6) on differential gear shaft (7).



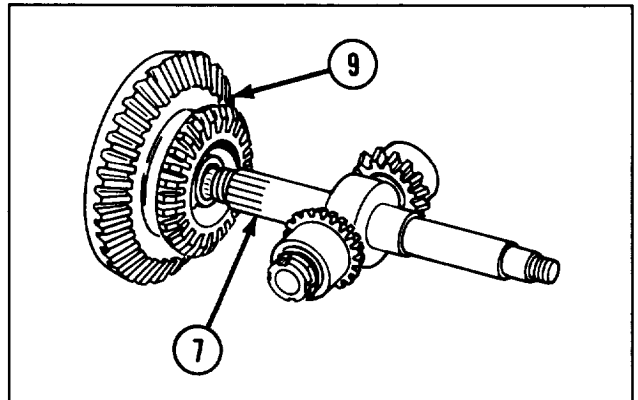
- 3 Using drift, install needle roller bearing (8) in input cluster gear (9).



- 4 Install output gear ball bearing (10) into input cluster gear (9).

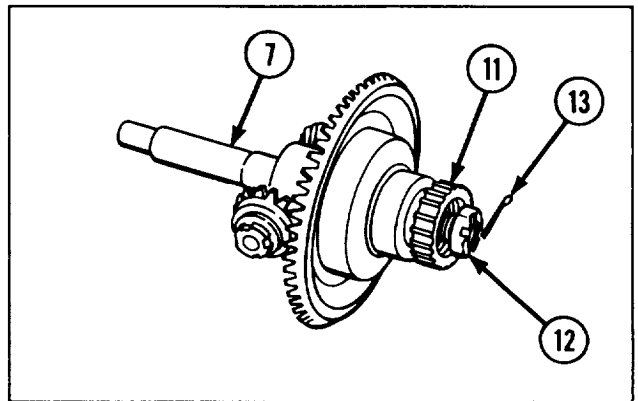


- 5 Install input cluster gear (9) on differential gear shaft (7).

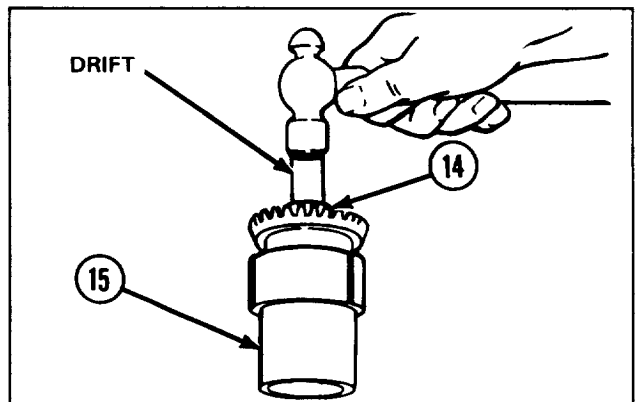


- 6 Install output spur gear (11) on differential gear shaft (7).

- 7 Install nut (12) and new cotter pin (13).



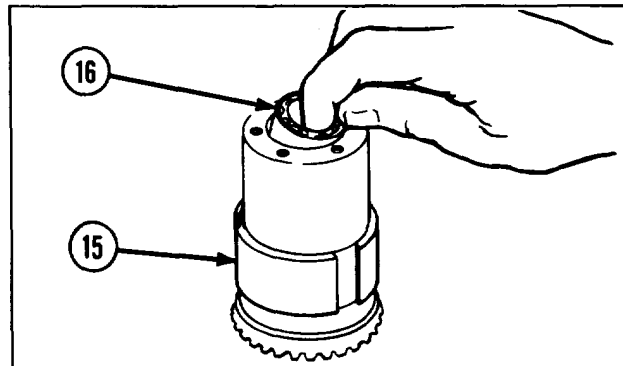
- 8 Using drift, install needle roller ball bearing (14) in differential gear (15).



2-50. MAINTENANCE OF TRAVERSING AND ELEVATING DIFFERENTIAL (CONT).

REASSEMBLY (CONT)

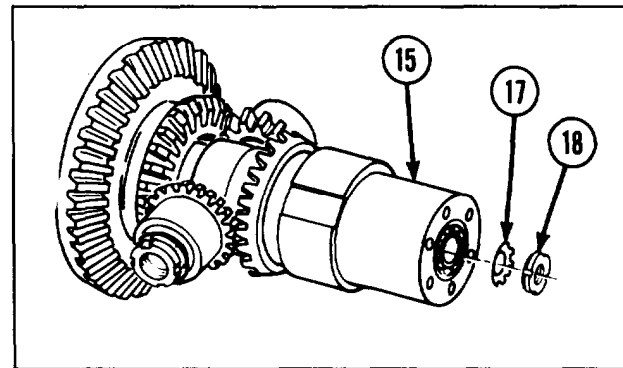
9 Install power input gear ball bearing (16) in differential gear (15).



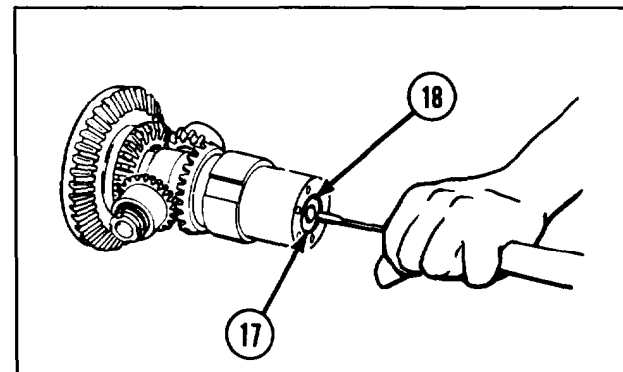
NOTE

If key washer is damaged, install new key washer.

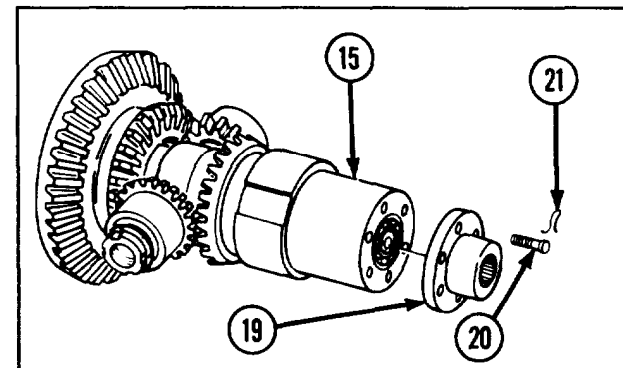
10 Install differential gear (15), key washer (17), and nut (18).



11 Bend tabs of key washer (17) into slots in nut (18).



12 Install input gear retaining plate (19) on differential gear (15), and secure using six capscrews (20) and new lockwire (21) (item 16, appx B). Torque six capscrews (20) (refer to appendix D).

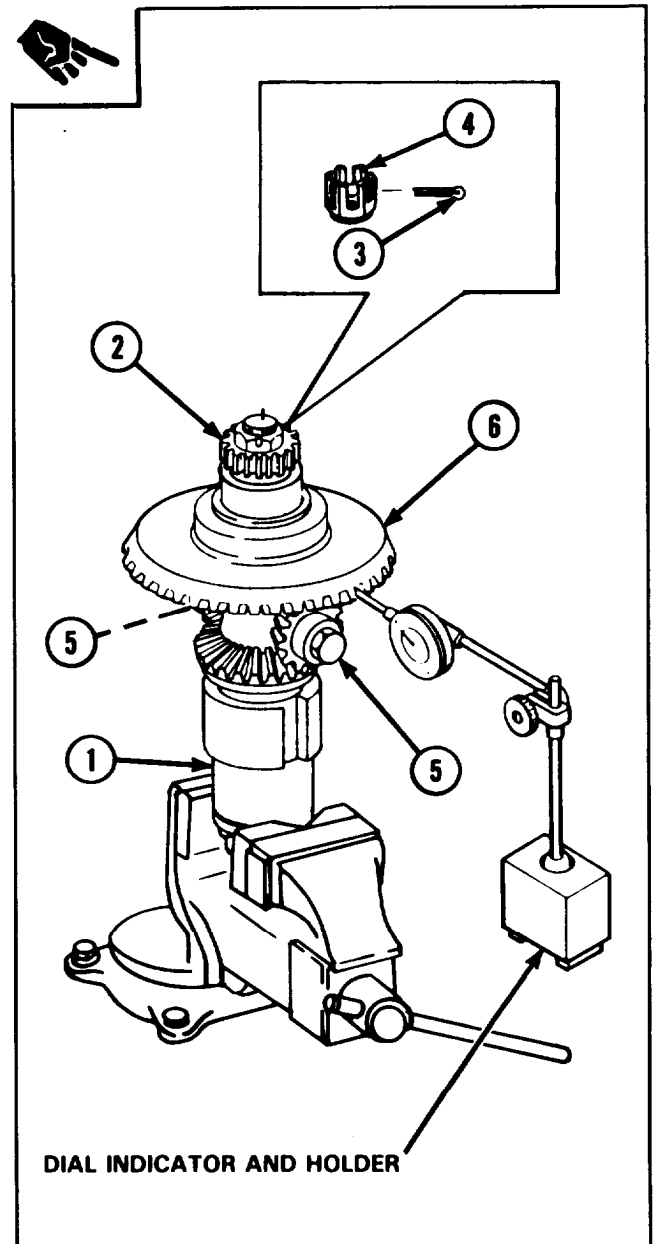


ADJUSTMENT

NOTE

Differential assembly must also be adjusted within reassembly of traversing constant speed drive or elevating hydraulic drive unit.

- 1 Prevent differential gear (1) and spur gear (2) from turning.
- 2 To adjust gear play, remove cotter pin (3) and tighten nut (4). Additional adjustment may be made by tightening two nuts (5).
- 3 Adjust minimum gear play by loosening nut (4) and nuts (5).
- 4 Check minimum gear play by releasing differential gear (1) and spur gear (2), and turning differential assembly. Gear movement must be smooth and without tooth interference.
- 5 Position dial indicator with magnetic base holder so that indicator button contacts tooth tip of input cluster gear (6).
- 6 Attempt to turn input cluster gear (6) by hand and read dial indicator. Reading must not exceed 0.016 in. (0.041 cm).
- 7 Install new cotter pin (3).
- 8 For adjustment of differential assembly after installation, refer to page 2-164.

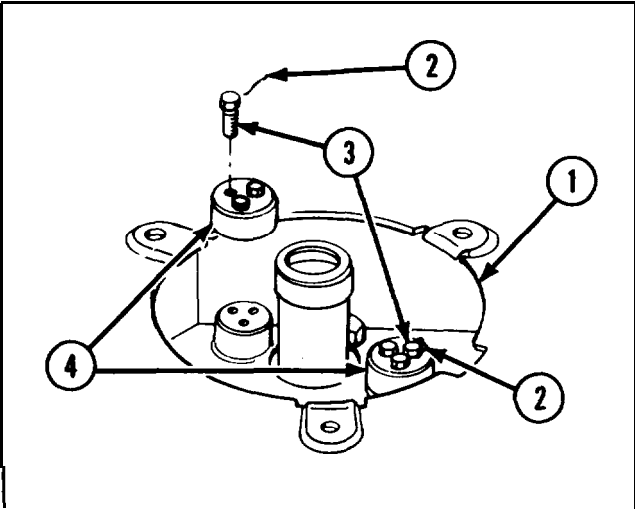


2-51. MAINTENANCE OF TRAVERSING FINAL DRIVE.

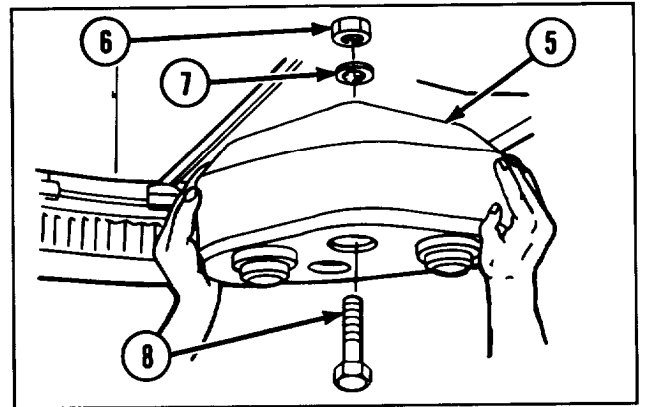
This task covers:	a. <i>Removal</i> b. <i>Disassembly</i> c. <i>Inspection/Repair</i>	d. <i>Reassembly</i> e. <i>Installation</i>
INITIAL SETUP		
<i>Tools and Special Tools</i> Ordnance artillery and turret mechanic's tool kit (SC 5180-95-CL-A12) Remover and replacer (10902750) Remover and replacer handle (7950864) Seal inserter (10904173) Spanner wrench (MS 16147-2) Torque wrench (A-A-2411)	<i>References</i> TM 9-2350-304-24P-2	<i>Personnel Required</i> Two
<i>Materials/Parts</i> Engine oil (item 18, appx B) Grease (item 12, appx B) Lockwire (item 16, appx B) Preformed packing (MS28775-228) Self-locking nut (NAS 1021-N17)	<i>Equipment Conditions</i> 2-164 Traversing constant speed drive removed	

REMOVAL

- 1 From above turret deck (1), remove two lockwires (2), six capscrews (3), and two retainer plates (4).

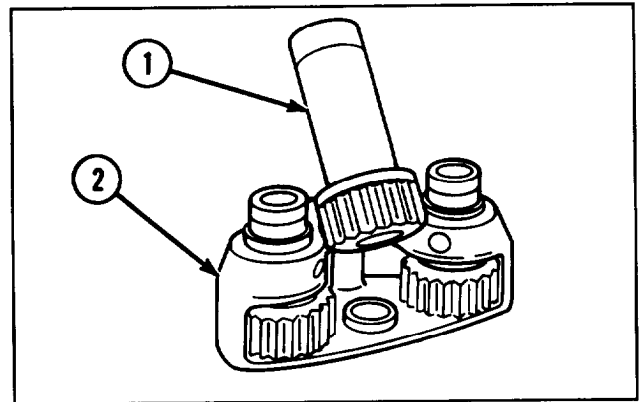


- 2 With one man inside turret well, supporting traversing final drive (5), remove self-locking nut (6), flat washer (7), and cap-screw (8).
- 3 Remove traversing final drive (5).

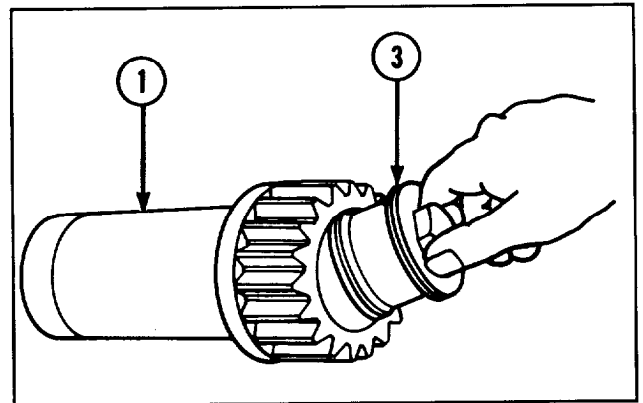


DISASSEMBLY

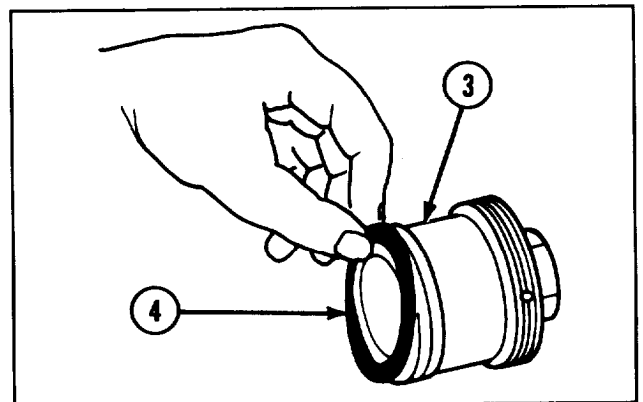
- 1 Remove spur gear shaft (1) from traversing housing (2).



- 2 Unscrew and remove spur gear shaft thrust plug (3) from spur gear shaft (1).



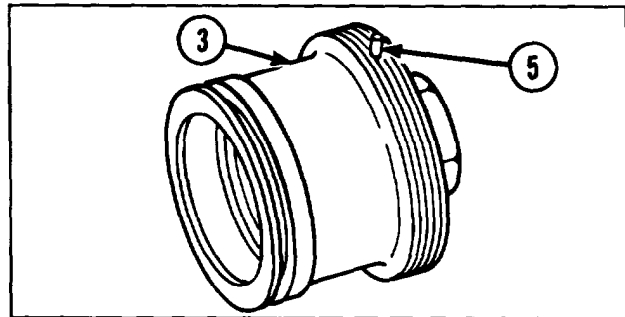
- 3 Remove preformed packing (4) from spur gear shaft thrust plug (3).



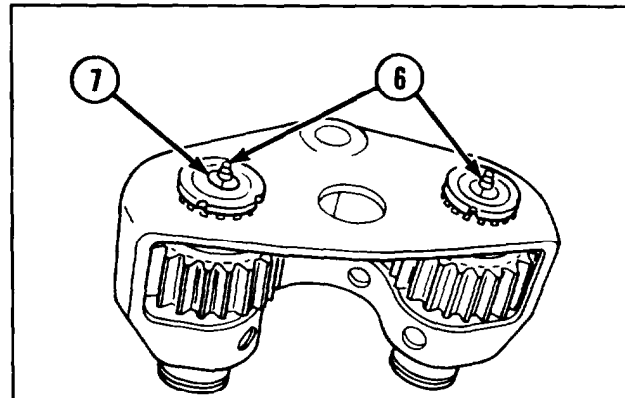
2-51. MAINTENANCE OF TRAVERSING FINAL DRIVE (CONT).

DISASSEMBLY (CONT)

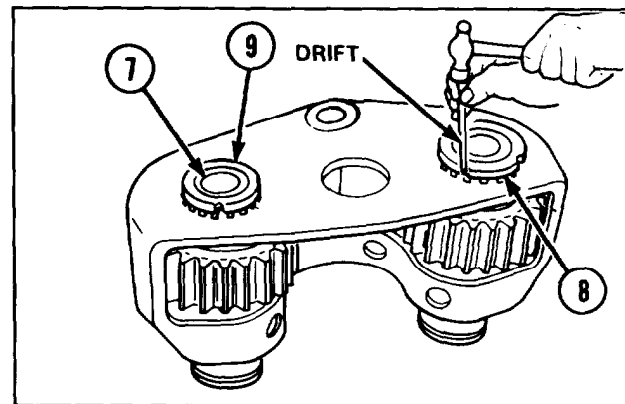
- 4 Remove traversing insert thrust plug (5) from spur gear shaft thrust plug (3).



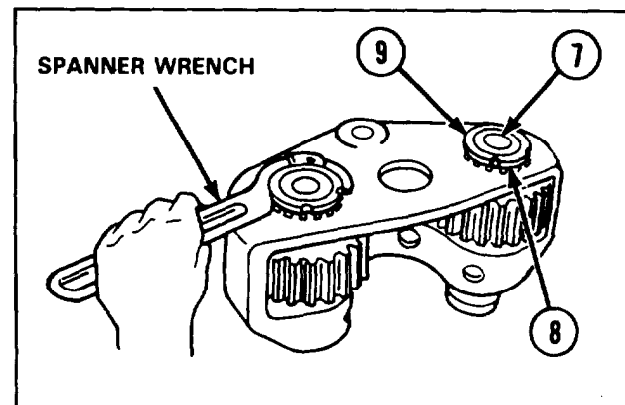
- 5 Remove lubrication fittings (6) from each of two shouldered idler gear shafts (7).



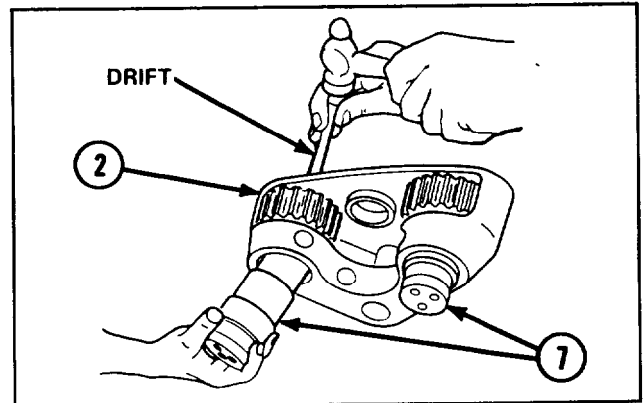
- 6 Using ball peen hammer and drift, bend tabs of key washer (8) out of slots of nut (9) on each of two shouldered idler gear shafts (7).



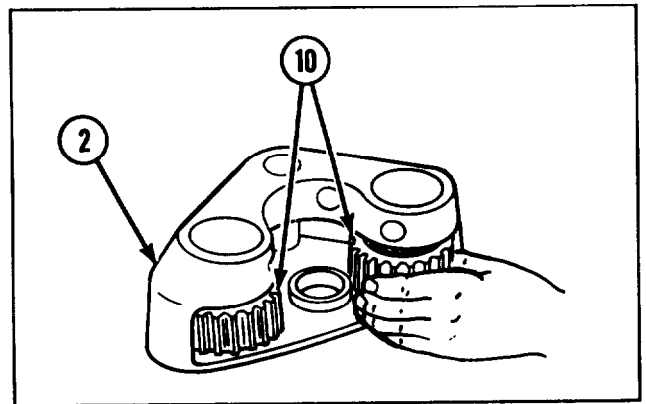
- 7 Using spanner wrench, remove nut (9) and key washer (8) from each of two shouldered idler gear shafts (7).



- 8 Remove two shouldered idler gear shafts (7) from traversing housing (2) using ball peen hammer and drift.



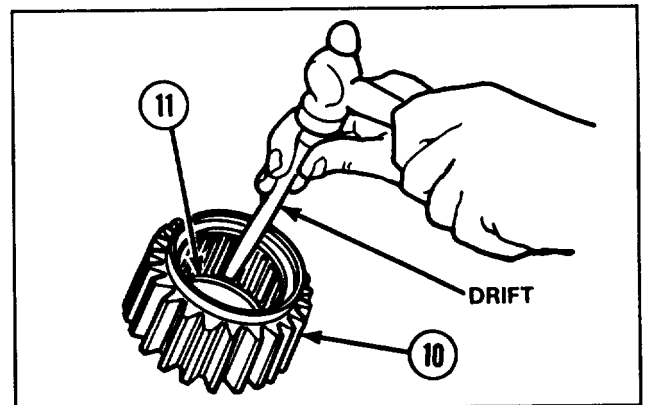
- 9 Remove two spur idler gears (10) from traversing housing (2).



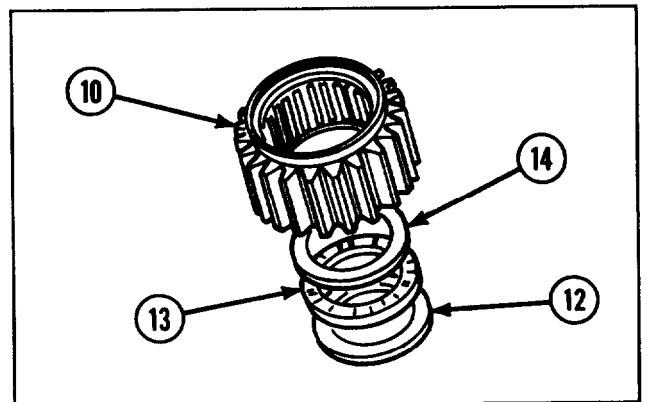
NOTE

Steps 10 thru 15 are written for one spur idler gear, but apply to both spur idler gears.

- 10 Using drift, remove seal (11) from spur idler gear (10).



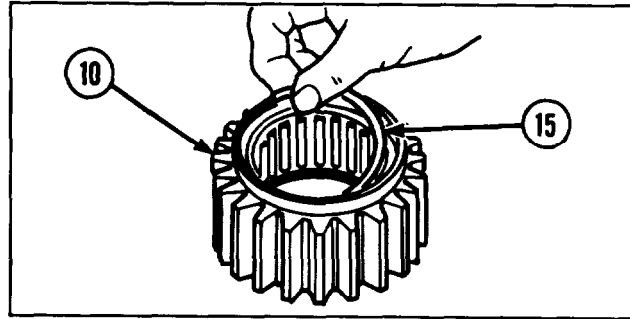
- 11 Remove outer lower bearing ring (12), thrust idler gear retainer and roller (13), and outer upper bearing ring (14) from spur idler gear (10).



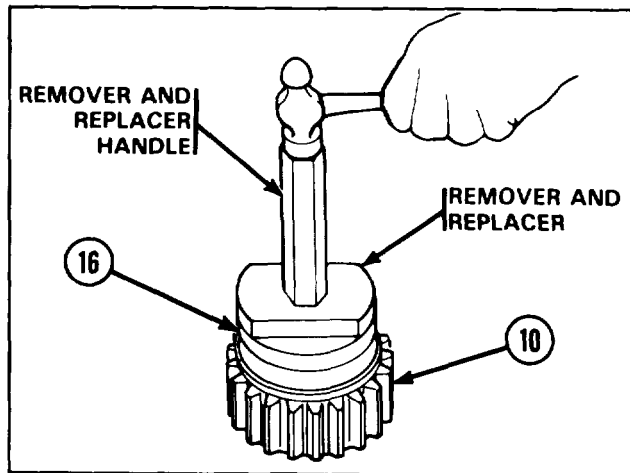
2-51. MAINTENANCE OF TRAVERSING FINAL DRIVE (CONT).

DISASSEMBLY (CONT)

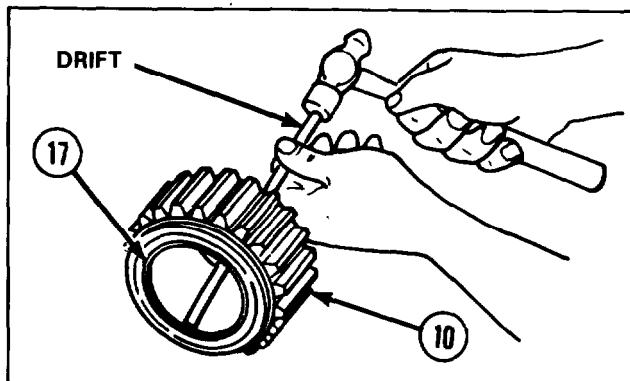
12 Remove retaining idler gear bearing ring (15) from spur idler gear (10).



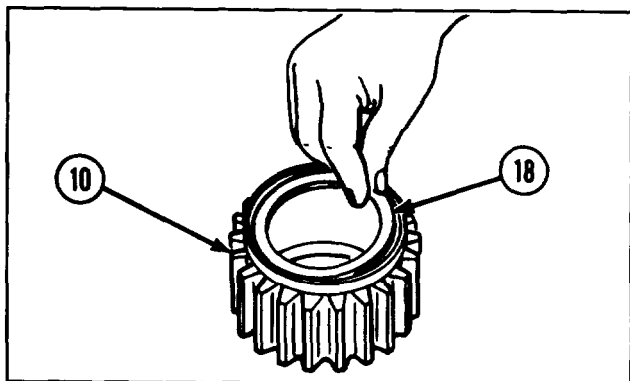
13 Using remover and replacer and remover and replacer handle, remove needle roller bearing (16) from spur idler gear (10).



14 Using drift, remove seal (17) from spur idler gear (10).



15 Remove retaining idler gear bearing ring (18) from spur idler gear (10).



INSPECTION/REPAIR

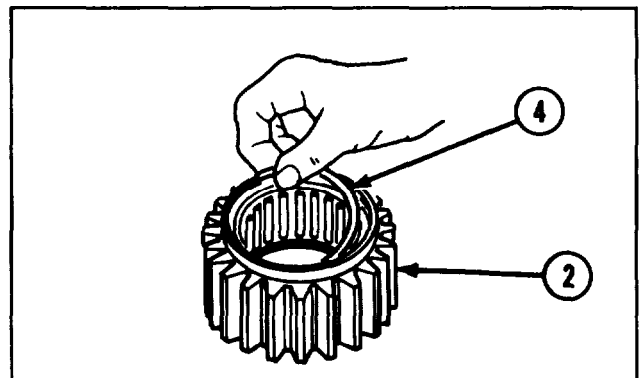
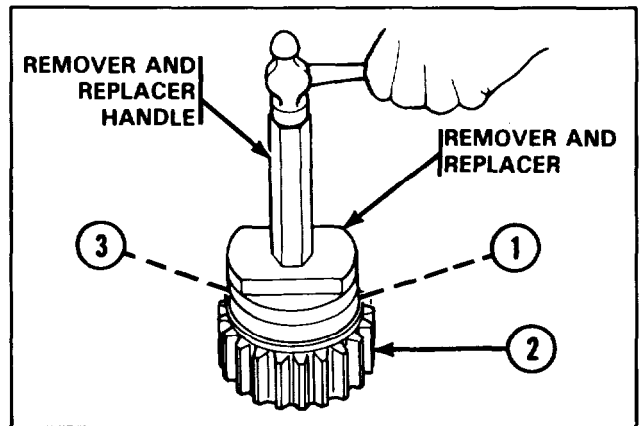
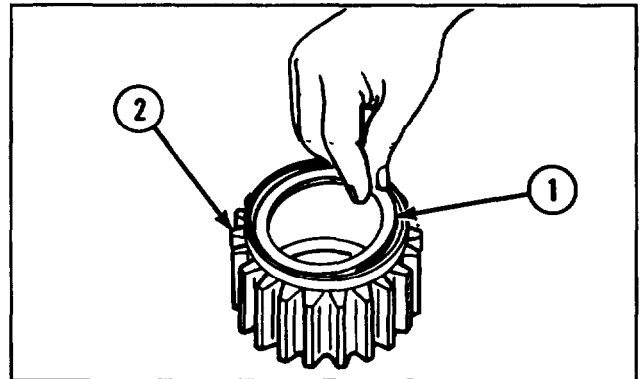
- 1 Inspect for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

REASSEMBLY

NOTE

Steps 1 thru 8 are written for one spur idler gear, but apply to both.

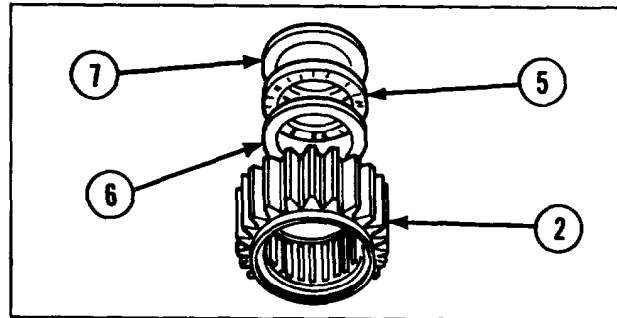
- 1 Coat gear teeth with grease (item 12, appx B).
- 2 Install retaining idler gear bearing ring (1) in outermost groove in spur idler gear (2).
- 3 Pack two needle roller bearings (3) with grease (item 12, appx B).
- 4 Using remover and replacer and remover and replacer handle, install needle roller bearing (3) in spur idler gear (2). Seat needle roller bearing against retaining idler gear bearing ring (1).
- 5 Install retaining idler gear bearing ring (4) in spur idler gear (2).



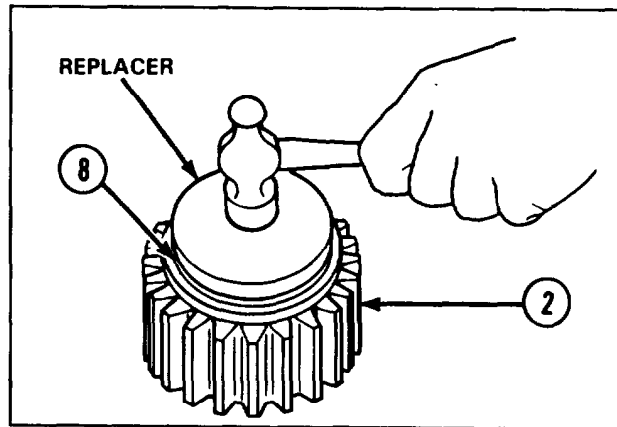
2-51. MAINTENANCE OF TRAVERSING FINAL DRIVE (CONT).

REASSEMBLY (CONT)

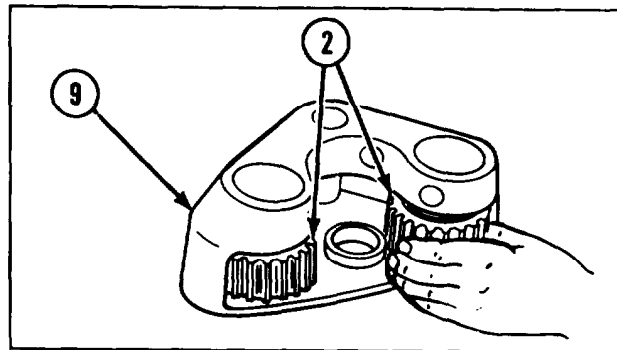
- 6 Pack thrust idler gear retainer and roller (5) with grease (item 12, appx B).
- 7 Install outer upper bearing ring (6), thrust idler gear retainer and roller (5), and outer lower bearing ring (7) in spur idler gear (2).



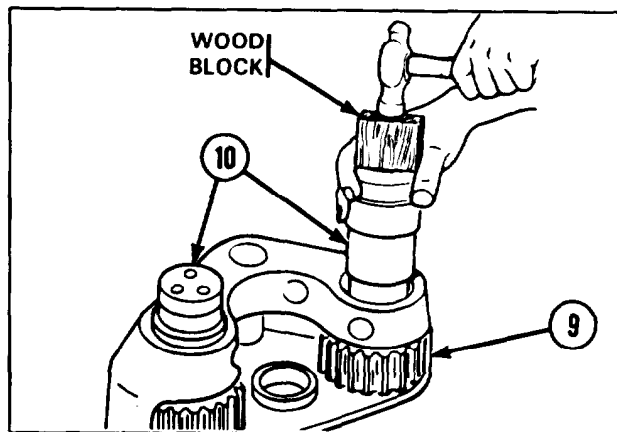
- 8 Using replacer, install two seals (8) in spur idler gear (2).



- 9 Install two spur idler gears (2) in traversing housing (9). Thrust idler gear retainer and roller must face lower side of traversing housing.



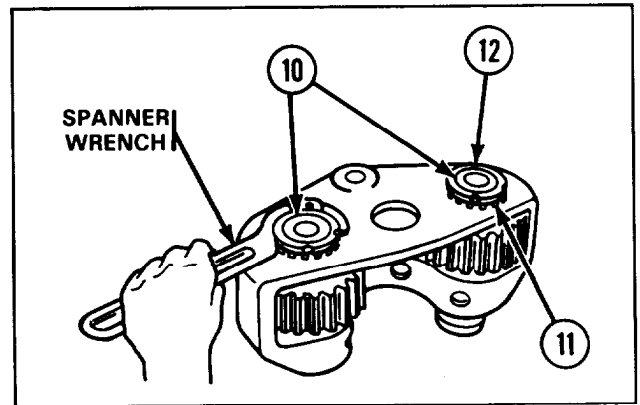
- 10 Using wood block and ball peen hammer, install two shouldered idler gear shafts (10) in traversing housing (9) with shouldered end up.



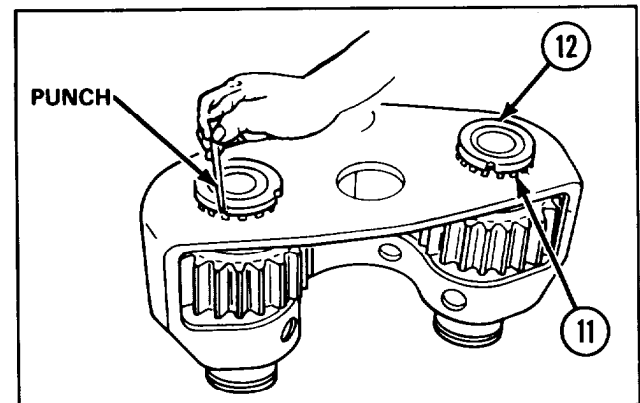
NOTE

If key washer is damaged, new key washer must be installed.

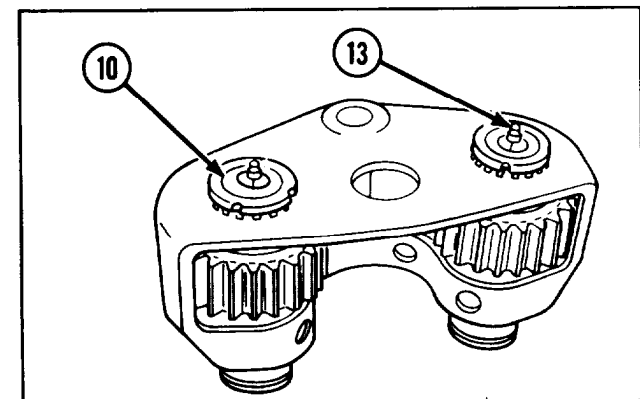
- 11 Using spanner wrench, install key washer (11) and nut (12) on each of two shouldered idler gear shafts (10). Tighten nut.



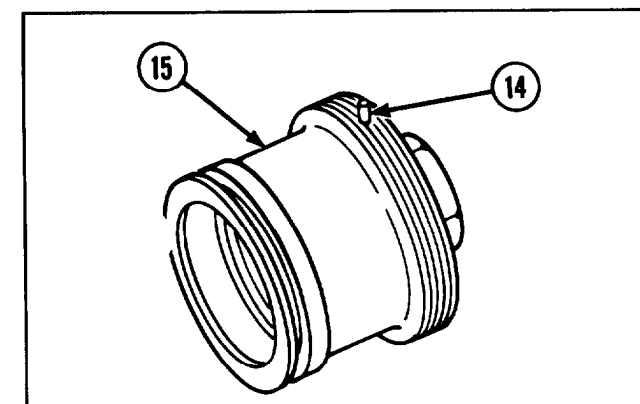
- 12 Bend tabs of key washers (11) into slots of nuts (12).



- 13 Install lubrication fitting (13) in each of two shouldered idler gear shafts (10).



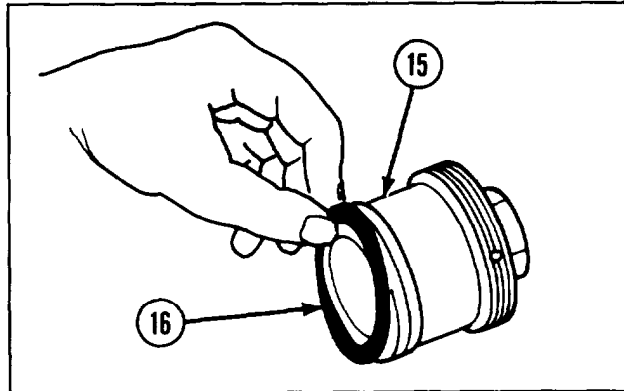
- 14 Install traversing insert thrust plug (14) in threaded end of spur gear shaft thrust plug (15).



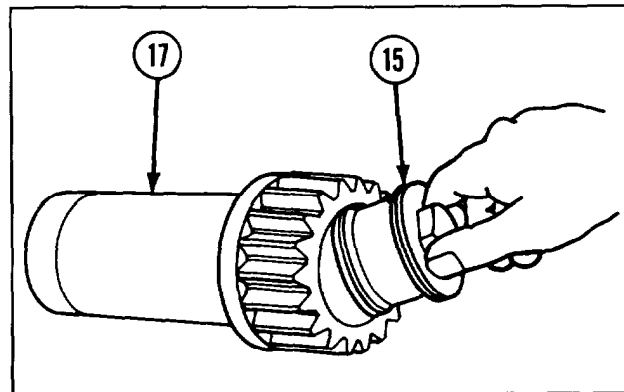
2-51. MAINTENANCE OF TRAVERSING FINAL DRIVE (CONT).

REASSEMBLY (CONT)

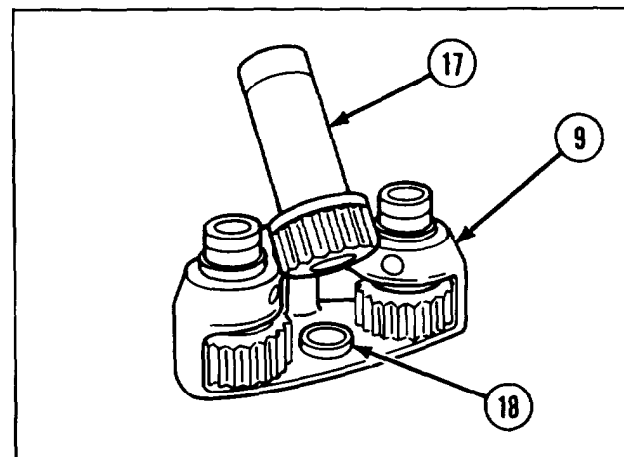
- 15 Lubricate new preformed packing (16) with engine oil (item 18, appx B).
- 16 Install new preformed packing (16) into groove of spur gear shaft thrust plug (15).



- 17 Install spur gear shaft thrust plug (15) into spur gear shaft (17).

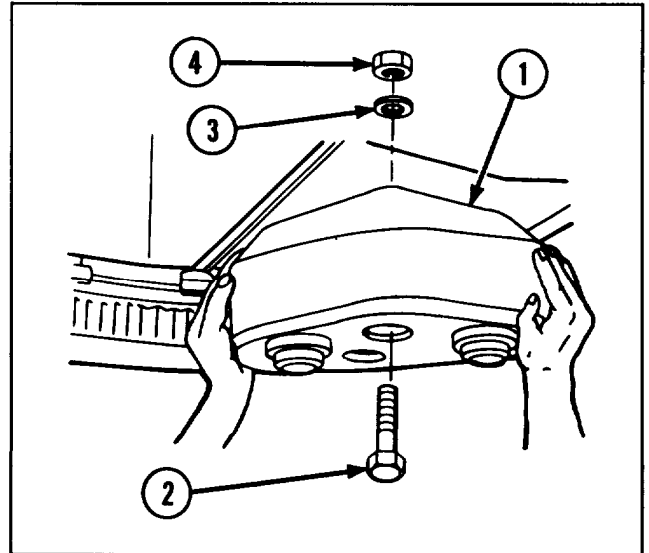


- 18 Install spur gear shaft (17) into traversing housing (9). Aline gear teeth and seat spur gear shaft over alinement sleeve (18) on traversing housing.

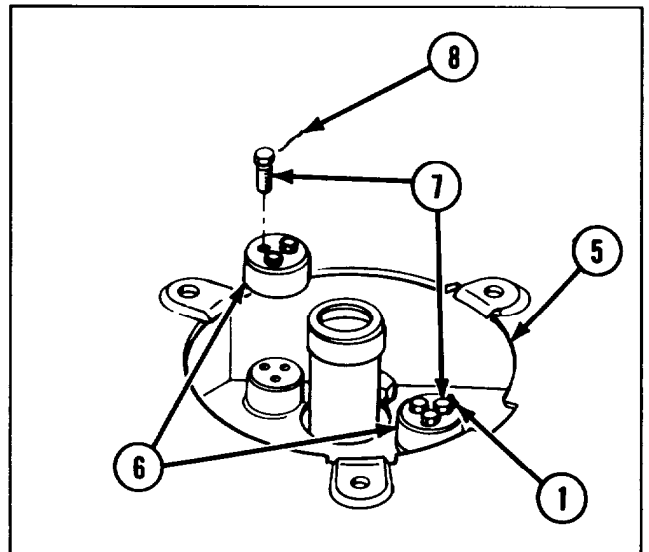


INSTALLATION

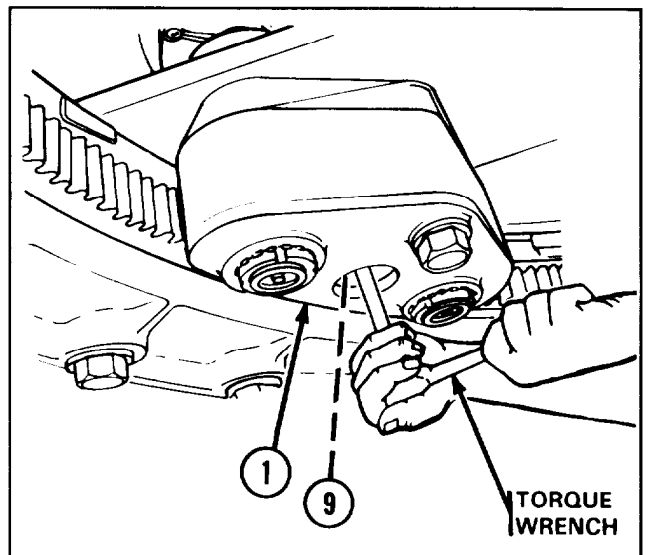
- 1 With one man inside turret well positioning traversing final drive (1), install cap-screw (2), flat washer (3), and new self-locking nut (4). Torque new self-locking nut to 200 to 220 ft-lb (270 to 297 N-m).



- 2 From above turret deck (5), install two retainer plates (6), six cap screws (7), and two new lockwires (8) (item 16, appx B).



- 3 After traversing final drive (1) is installed, tighten spur gear thrust plug (9), using torque wrench, until seated, then back off three full turns.



2-52. MAINTENANCE OF ELEVATING HYDRAULIC DRIVE UNIT.

This task covers: a. *Relieving Hydraulic Pressure* d. *Reassembly/Installation*
 b. *Removal/Disassembly* e. *Applying Hydraulic Pressure*
 c. *Inspection/Repair*

INITIAL SETUP

Tools and Special Tools

Artillery maintenance and shop equipment
 (SC 4933-95-CL-A12)
 Press
 Puller
 Retaining ring pliers
 Vise
 Vise caps
 Bearing and clutch remover and replacer
 (10904175)
 Bearing remover and replacer (10902750)
 Bearing replacer (8350230)
 Bearing replacer (10904194)
 Dial indicator and magnetic base holder
 (MILG8348)
 Dial indicator and magnetic base holder
 (45-1056-04L5000)
 Oil seal replacer (8375152)
 Ordnance artillery and turret mechanic's
 tool kit (SC 5180-95-CL-A12)
 Remover and replacer handle (7950864)
 Torque wrench (A-A-2411)

Materials/Parts

Access hole clamp gasket (11592814)
 Cotter pin (MS24665-283)
 Dry cleaning solvent (item 8, appx B)
 Grease (item 12, appx B)
 Laminated shim (as required)
 Lockwasher (4) (MS35338-44)
 Lockwasher (36) (MS35338-46)
 Hydraulic fluid (item 13, appx B)
 Packing (NAS1523-2OY)
 Preformed packing (3) (MS28778-8)
 Preformed rotary switch (MS28775-264)
 Self-locking nut (MS21044N6)
 Shim (as required)
 Shim (as required) (10892329)
 Shim (as required) (10892333)
 Shim (as required) (10892536)
 Solder (item 22, appx B)

Personnel Required

Two

References

TM 9-2350-304-10
 TM 9-2350-304-20-2
 TM 9-2350-304-24P-2

Equipment Conditions

2-395 Mechanical drive guard removed

General Safety instructions

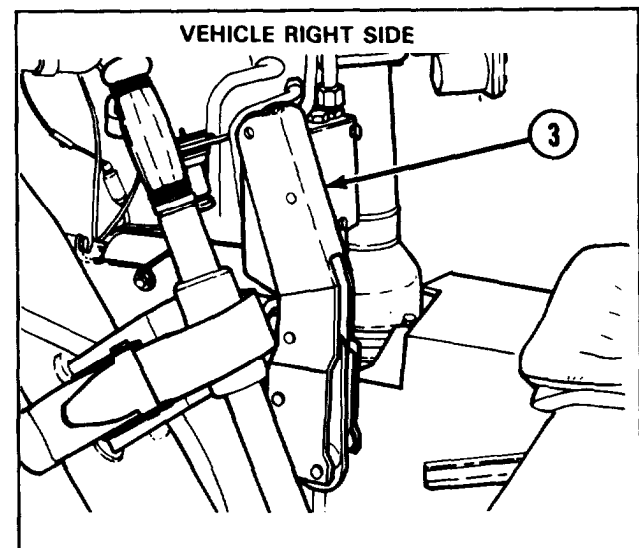
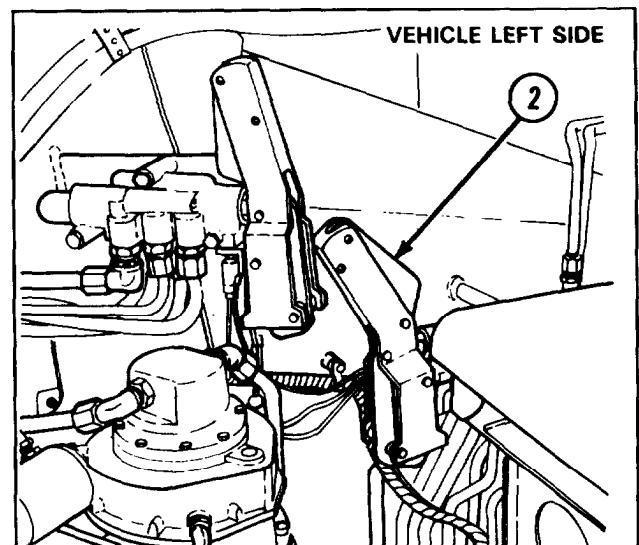
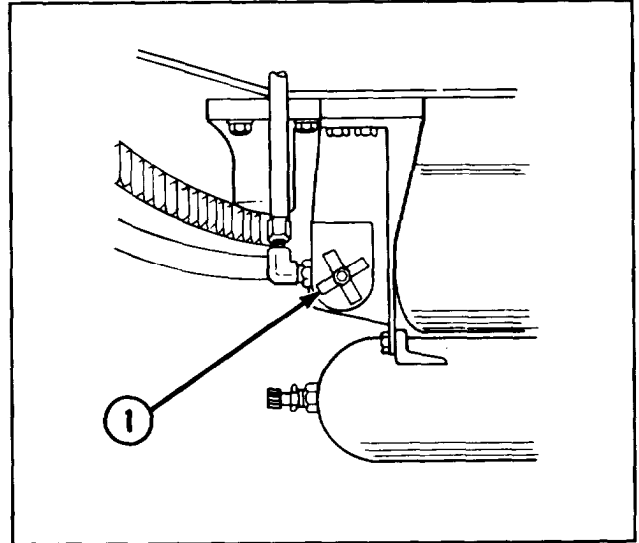
WARNING

- Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as level ground as possible. This will stop the cannon from sliding out of battery.
- Hydraulic fluid is under high pressure. Relieve pressure and drain system before removing connections or components.
- Dry cleaning solvent (SD2) is toxic and flammable. Wear protective goggles and gloves and use only in well-ventilated areas.
- Clutch assembly must be wiped dry. Failure to do so may cause damaged equipment or injury to personnel.

RELIEVING HYDRAULIC PRESSURE**WARNING**

Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as level ground as possible. This will stop the cannon from sliding out of battery.

- 1 Set MASTER switch to OFF.
- 2 Open globe angle valve (1).
- 3 Move elevating manual control handle (2) to full RAISE.
- 4 Move elevating manual control handle (2) to full LOWER.
- 5 Repeat steps 3 and 4 several times to relieve pressure from the system.
- 6 Repeat steps 3 thru 5 for other manual control handle (3).



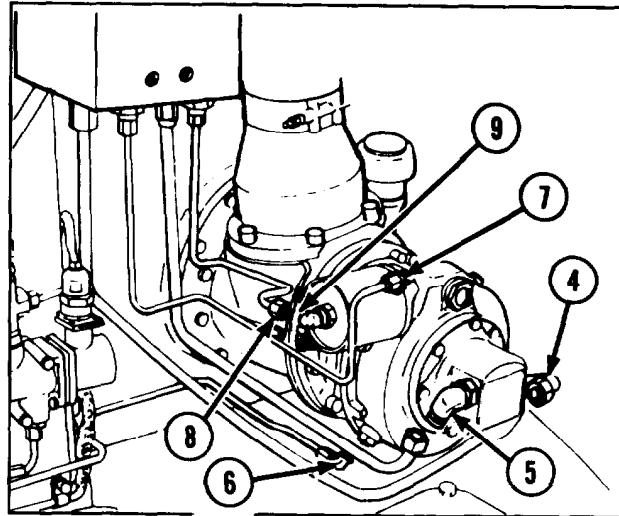
2-52. MAINTENANCE OF ELEVATING HYDRAULIC DRIVE UNIT (CONT).

RELIEVING HYDRAULIC PRESSURE (CONT)

WARNING

Hydraulic fluid is under high pressure. Relieve pressure and drain system before removing connections or components.

- 7 Disconnect six tube assemblies (4, 5, 6, 7, 8, and 9). For complete disassembly of hydraulic lines and fittings, refer to page 2-27.



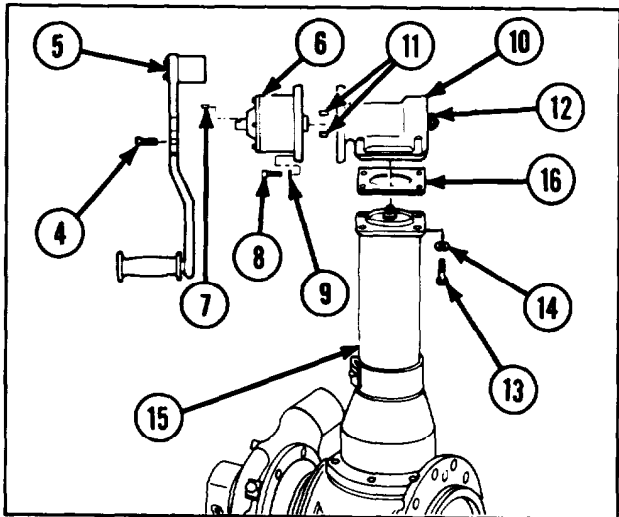
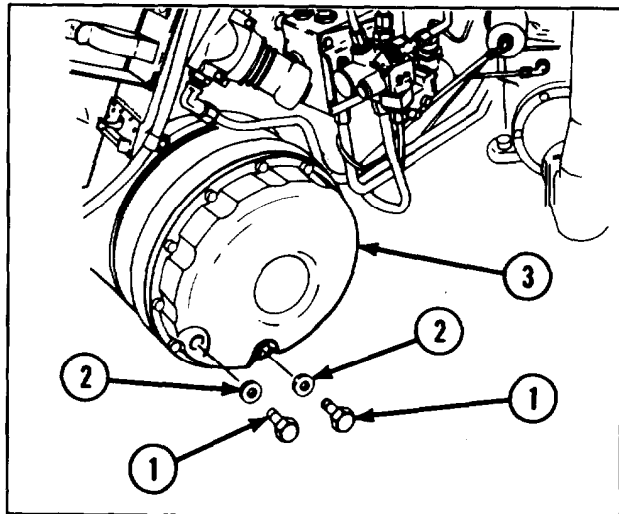
REMOVAL/DISASSEMBLY

- 1 Provide container for draining system.
- 2 Remove two machine plugs (1) and two preformed packings (2) from elevating final drive (3) and drain oil into container.

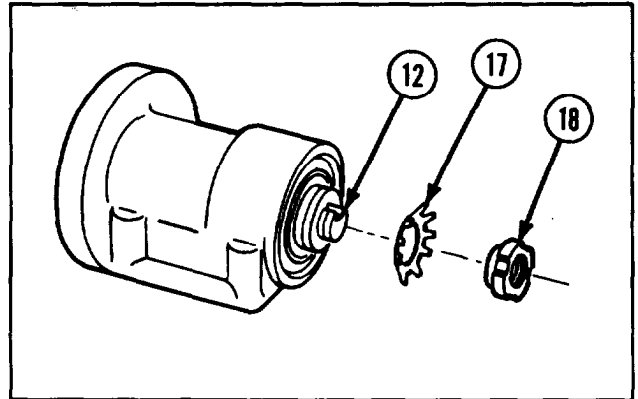
NOTE

Parts shown removed for clarity.

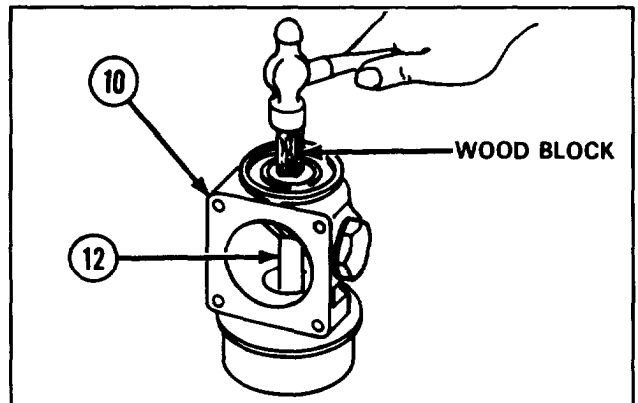
- 3 Loosen screw (4) securing torque handle (5) to torque lock (6).
- 4 Remove torque handle (5).
- 5 Remove machine key (7) from shaft of torque lock (6).
- 6 Remove four capscrews (8), four lockwashers (9), and torque lock (6) from elevating drive assembly housing (10).
- 7 Remove two machine keys (11) from shouldered shaft (12).
- 8 Remove four capscrews (13) and four lockwashers (14) securing elevating drive assembly housing (10) to elevating drive column (15).
- 9 Remove elevating drive housing (10) and shims (16).



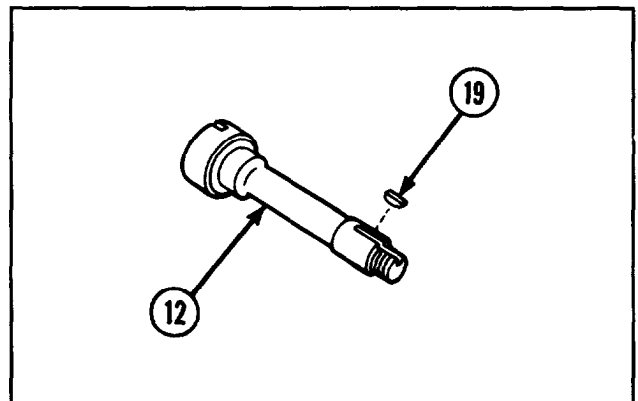
- 10 Bend tabs of key washer (17) out of slots in nut (18).
- 11 Remove nut (18) and key washer (17) from shouldered shaft (12).



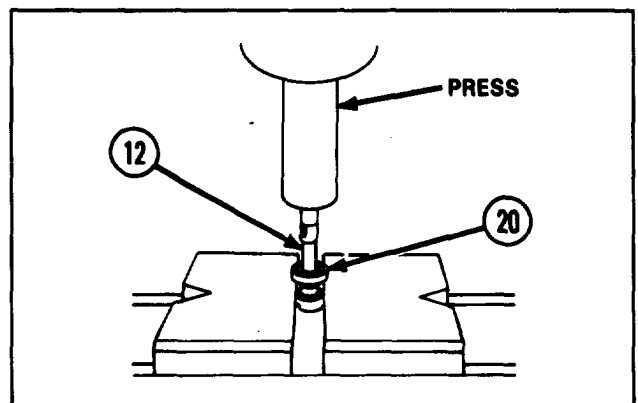
- 12 Using wood block, drive shouldered shaft (12) from elevating drive housing (10).



- 13 Remove woodruff key (19) from shouldered shaft (12).



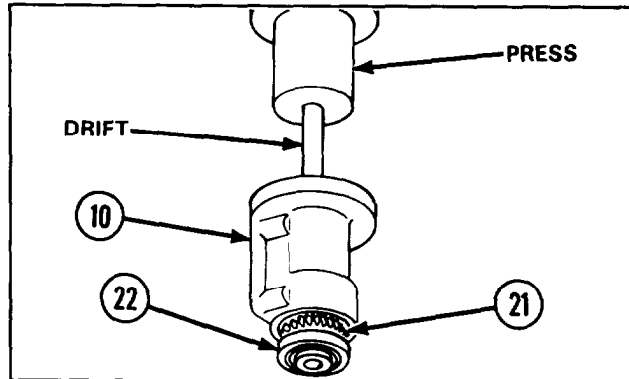
- 14 Using press, remove ball bearing (20) from shouldered shaft (12).



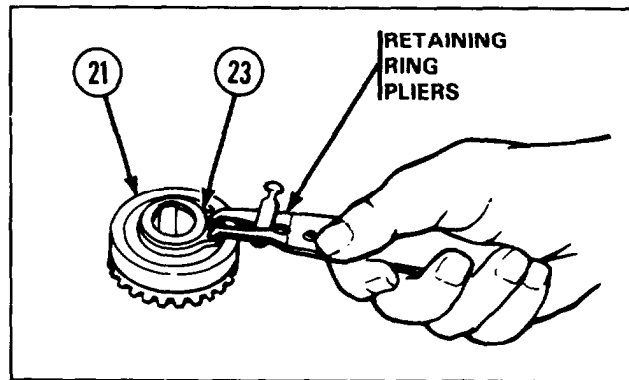
2-52. MAINTENANCE OF ELEVATING HYDRAULIC DRIVE UNIT (CONT).

REMOVAL/DISASSEMBLY (CONT)

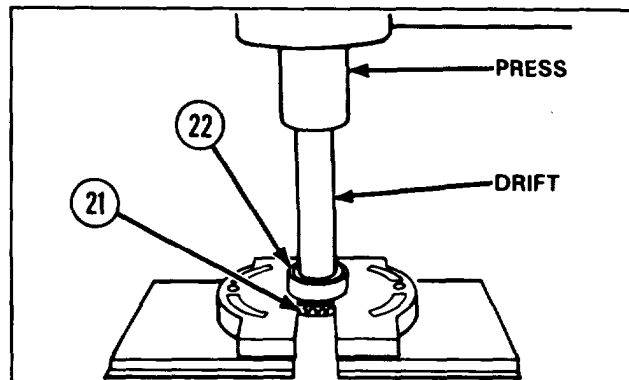
15 Using press and drift, remove miter bevel gear (21) with ball bearing (22) from elevating drive housing (10).



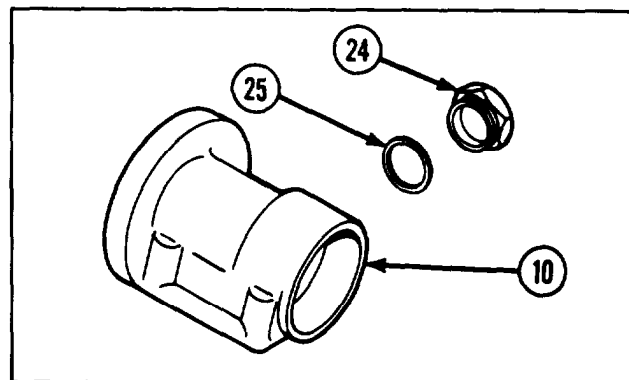
16 Using retaining ring pliers, remove retaining ring (23) from miter bevel gear (21).



17 Using press and drift, remove ball bearing (22) from miter bevel gear (21).



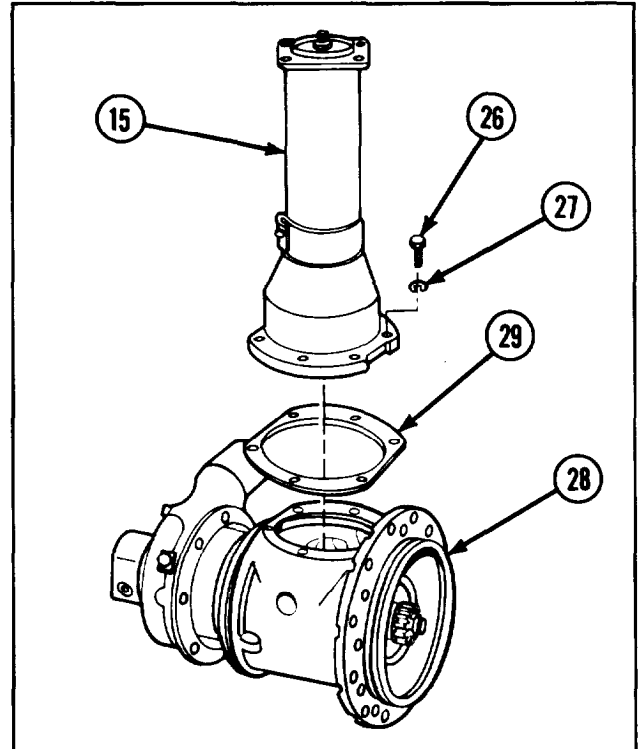
18 Remove machine thread oil filter plug (24) and packing (25) from elevating drive housing (10).



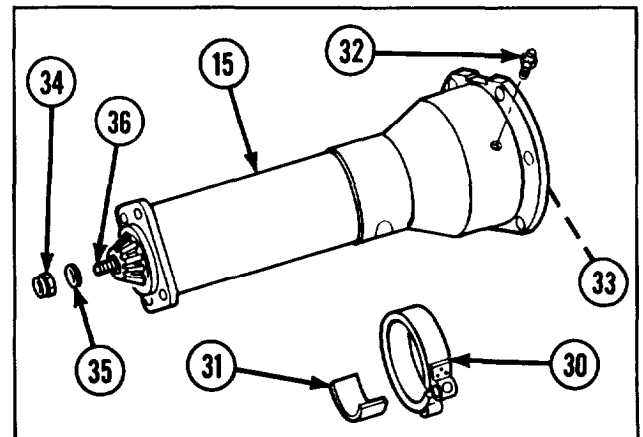
NOTE

Parts shown removed for clarity.

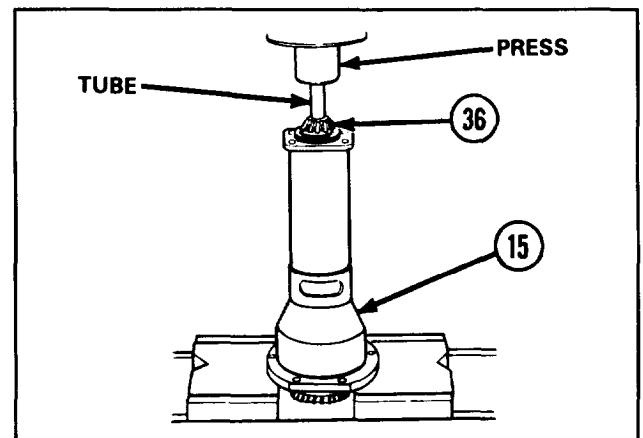
- 19 Remove six capscrews (26) and six lock-washers (27) securing elevating drive column (15) to elevating differential case (28).
- 20 Remove elevating drive column (15) and shims (29).



- 21 Remove access hole hose clamp (30) access hole clamp gasket (31), and lubrication fitting (32) from elevating drive column (15).
- 22 While holding nut (33) on lower end of elevating drive column (15), remove self-locking nut (34) and flat washer (35) from shouldered clutch shaft (36).



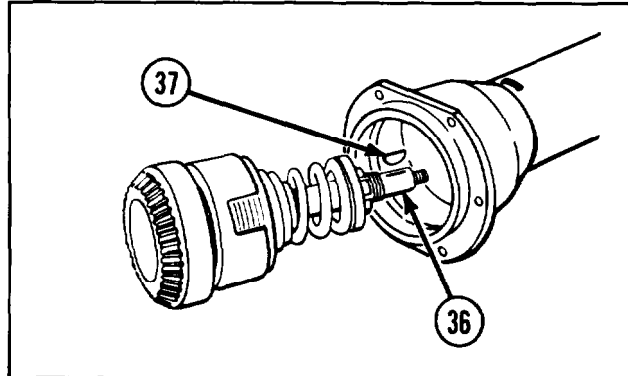
- 23 Using press and tube, press shouldered clutch shaft (36) and attached parts from elevating drive column (15).



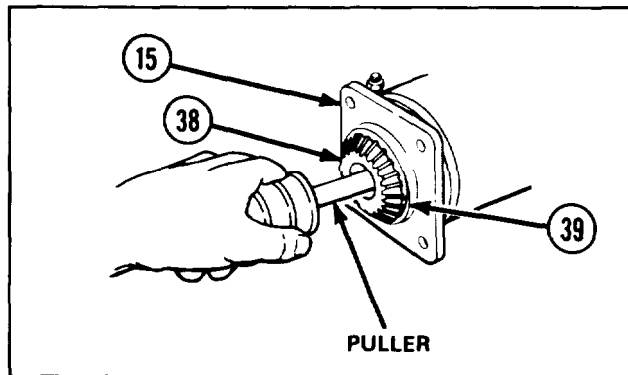
2-52. MAINTENANCE OF ELEVATING HYDRAULIC DRIVE UNIT (CONT).

REMOVAL/DISASSEMBLY (CONT)

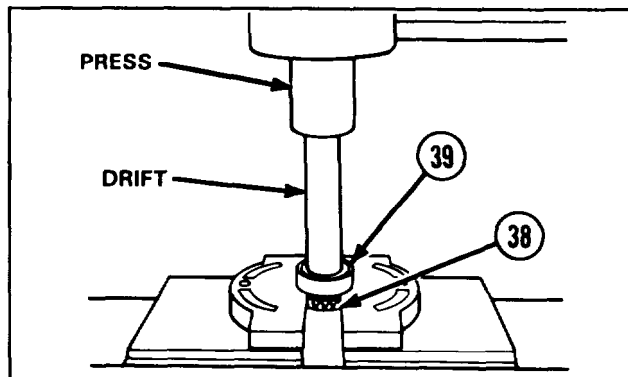
24 Remove woodruff key (37) from shouldered clutch shaft (36).



25 Using puller, remove miter bevel gear (38) and ball bearing (39) from elevating drive column (15).

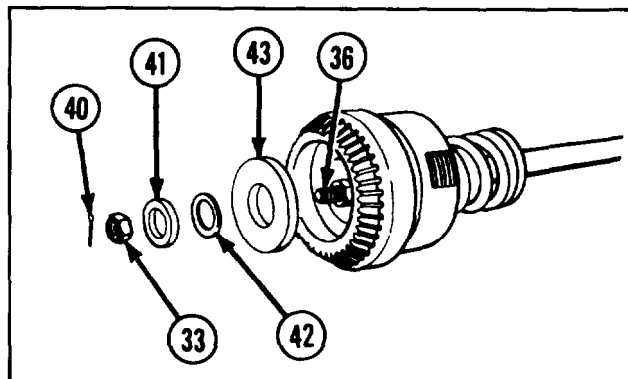


26 Using press and drift, remove ball bearing (39) from miter bevel gear (38).

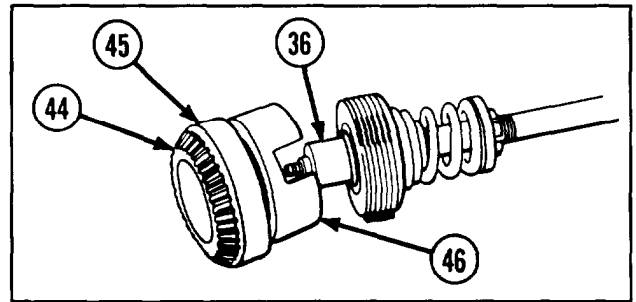


27 Remove cotter pin (40) and nut (33) from lower end of shouldered clutch shaft (36).

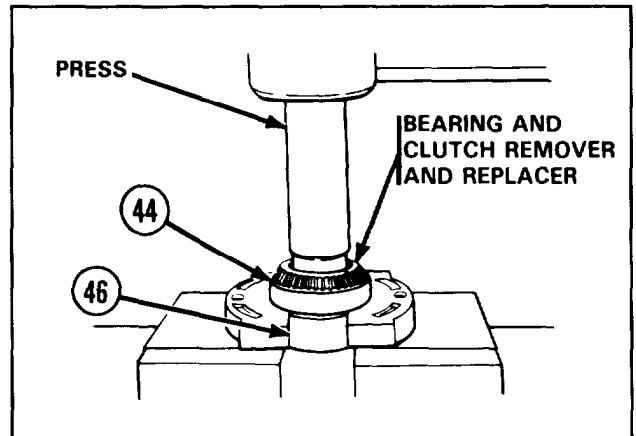
28 Remove recessed pinion gear washer (41), pinion gear thrust roller bearing (42), and pinion gear fiat washer (43).



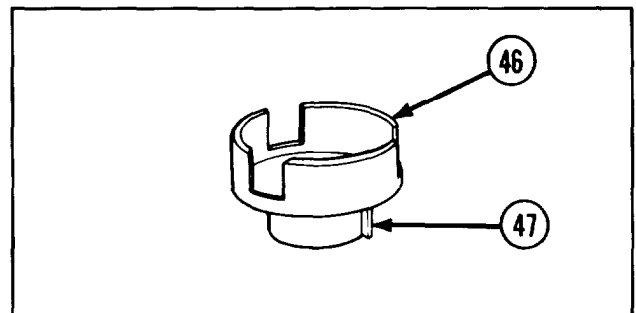
- 29 Remove clutch pinion bevel gear (44), clutch bevel gear ball bearing (45), and clutch cup and bearing assembly (46) from shouldered clutch shaft (36).



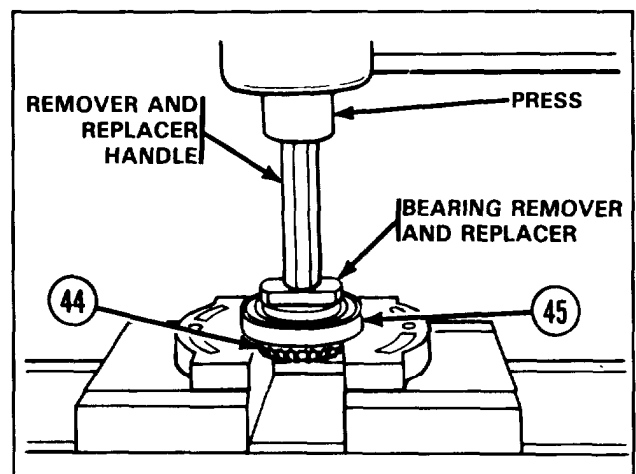
- 30 Using press and bearing and clutch remover and replacer, press clutch cup and bearing assembly (46) from clutch pinion bevel gear (44).



- 31 Remove woodruff key (47) from clutch cup and bearing assembly (46).



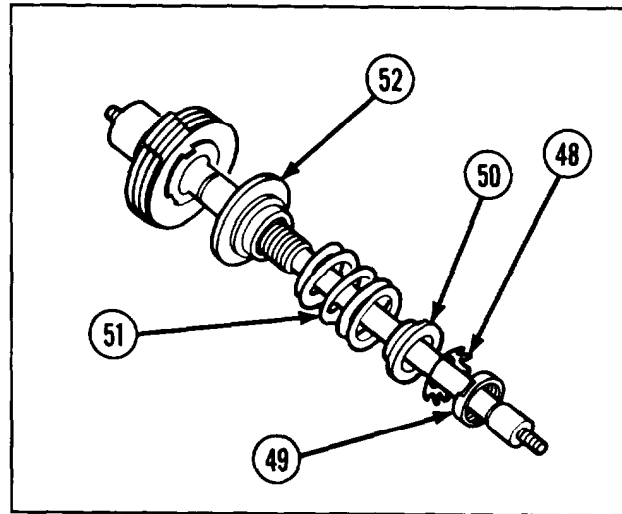
- 32 Using press, remover and replacer handle, and bearing remover and replacer, remove clutch bevel gear ball bearing (45) from clutch pinion bevel gear (44).



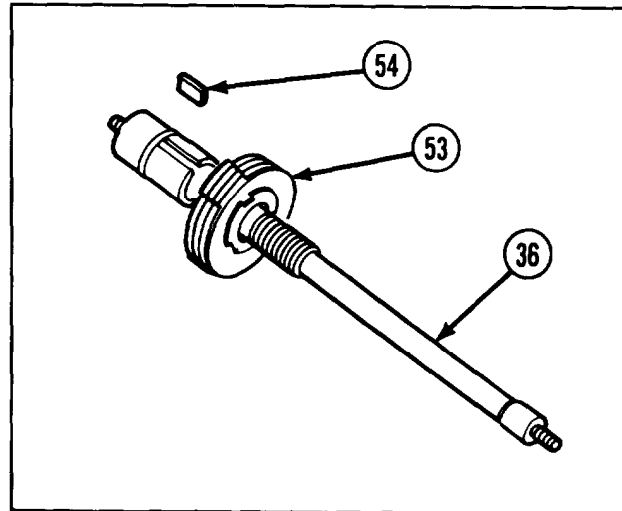
2-52. MAINTENANCE OF ELEVATING HYDRAULIC DRIVE UNIT (CONT).

REMOVAL/DISASSEMBLY (CONT)

- 33 Bend tabs of key washer (48) out of slots in nut (49), and loosen nut to relieve spring tension.
- 34 Remove nut (49), key washer (48), helical compression clutch seat (50), helical compression clutch spring (51), and pressure plate (52).



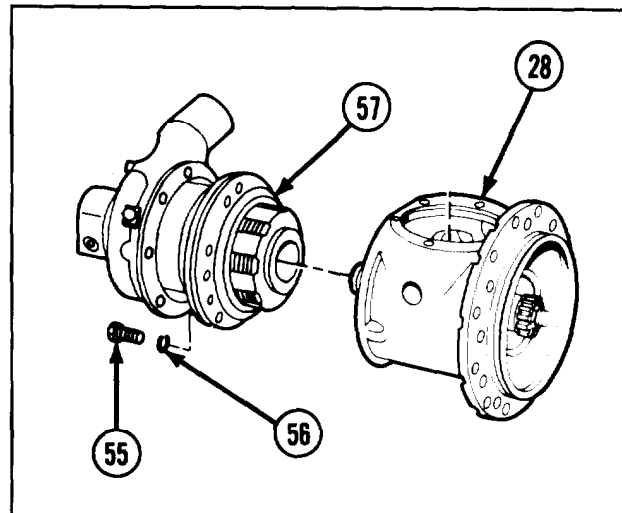
- 35 Remove clutch assembly (53) and machine key (54) from shouldered clutch shaft (36).



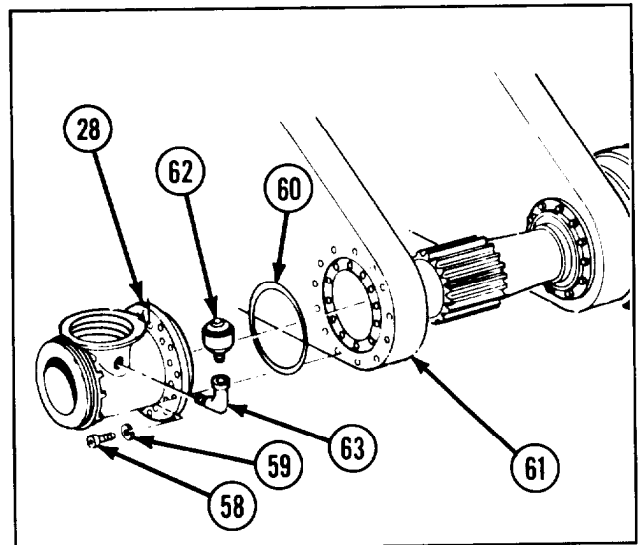
NOTE

Parts shown removed for clarity.

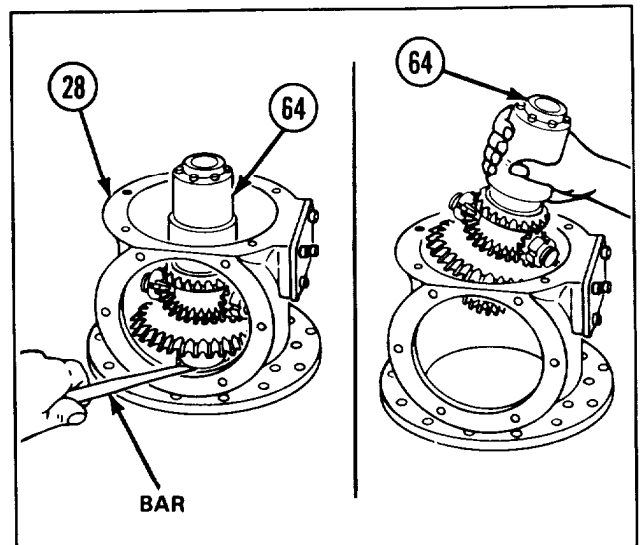
- 36 Remove four capscrews (55) and four lockwashers (56) securing hydraulic motor (57) to elevating differential case (28).
- 37 Remove hydraulic motor (57) from elevating differential case (28).



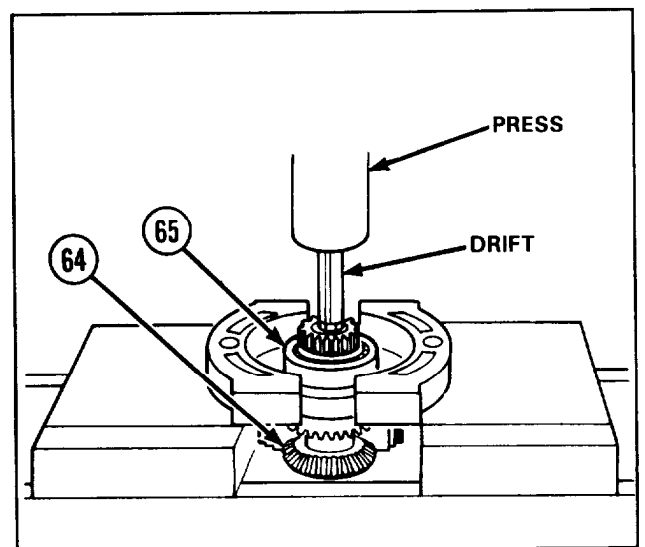
- 38 Remove 22 capscrews (58), 22 lock-washers (59), elevating differential case (28), and preformed rotary switch (60) from right trunnion cap (61).
- 39 Remove elevating drive housing breather (62) and pipe elbow (63) from elevating differential case (28).



- 40 Using bar, pry differential gear (64) loose from elevating differential case (28).
- 41 Remove differential gear (64).



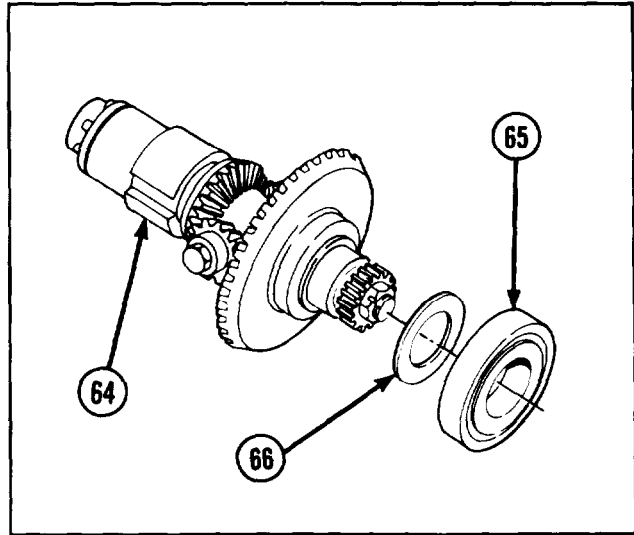
- 42 Using press and drift, press differential ball bearing (65) from differential gear (64).



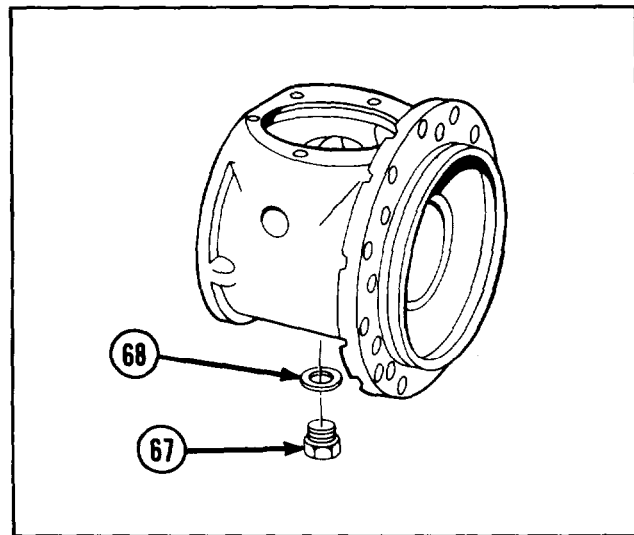
2-52. MAINTENANCE OF ELEVATING HYDRAULIC DRIVE UNIT (CONT).

REMOVAL/DISASSEMBLY (CONT)

43 Remove differential ball bearing (65) and shim (66) from differential gear (64).



44 Remove machine thread plug (67) and preformed packing (68).

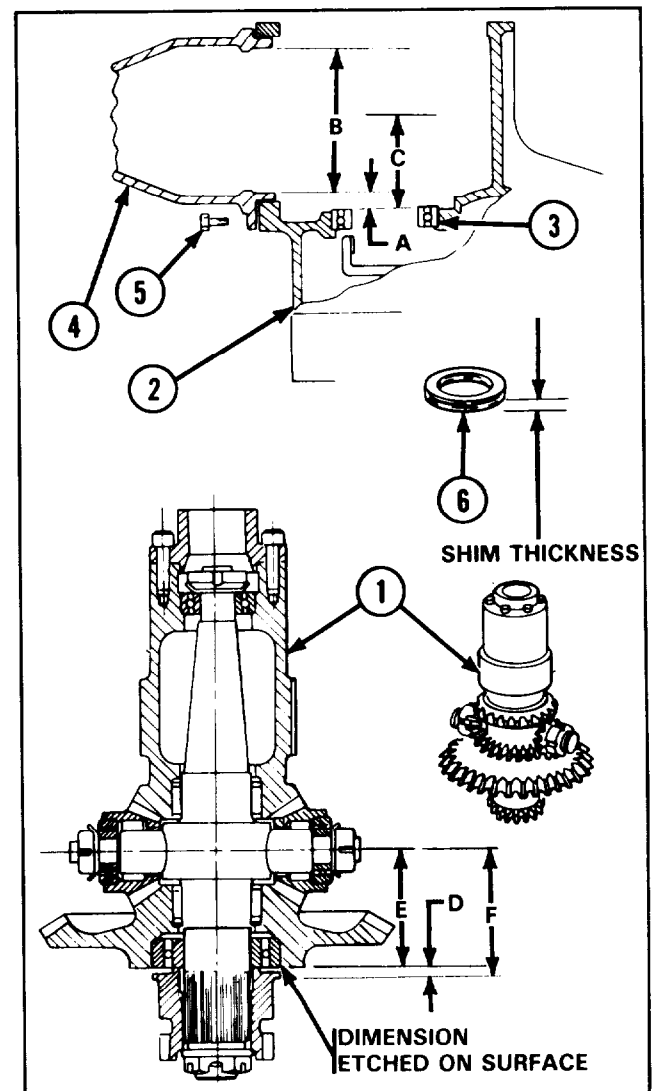
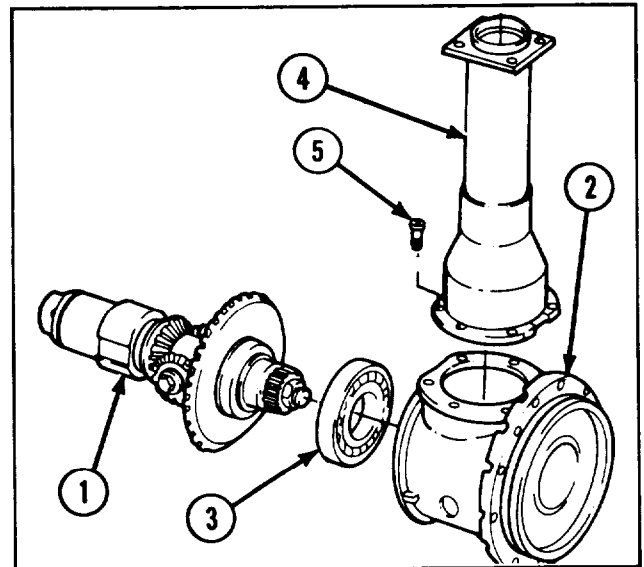


INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 Torque handle is a repairable assembly. Refer to TM 9-2350-304-20-2.
- 3 Torque lock is a repairable assembly. Refer to page 2-204.
- 4 Differential gear is a repairable assembly. Refer to page 2-236.
- 5 Hydraulic motor is a repairable assembly. Refer to pages 2-210 and 2-216
- 6 Repair is by replacement of authorized parts (TM 9-2350-304-24P-23).

REASSEMBLY/INSTALLATION

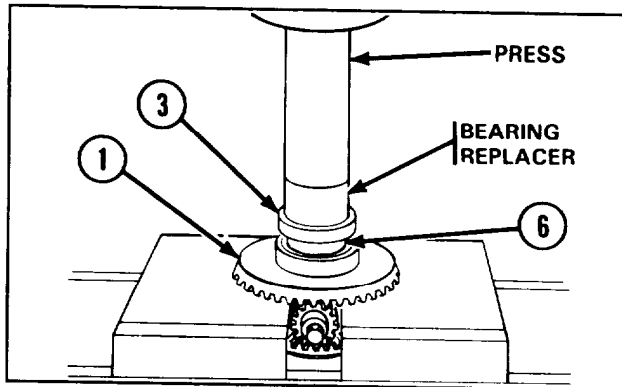
- 1 Coat all uncovered machine surfaces of elevating hydraulic drive unit with grease (item 12, appx B).
- 2 For adjustment of shim thickness in differential gear (1), prior to installation into elevating differential case (2), proceed as follows:
 - a. Insert differential ball bearing (3) into bore in elevating differential case (2).
 - b. Install empty elevating drive column (4) to elevating differential case (2) with six capscrews (5).
- C. Measure and record dimension A as shown on illustration.
- d. Measure and record dimension B as shown on illustration.
- e. Divide dimension B in half.
- f. Add dimension A and one half of dimension B to get dimension C.
- g. Measure and record dimension D on differential gear (1).
- h. Record dimension E etched on surface of differential gear (1).
- i. Add dimension E and dimension D to get dimension F.
- j. Subtract dimension F from dimension C to get correct shim thickness.
- k. Install shim(s) (6) to differential gear (1) as needed to obtain correct shim thickness.
- l. Remove differential ball bearing (3), six capscrews (5), and empty elevating drive column (4).



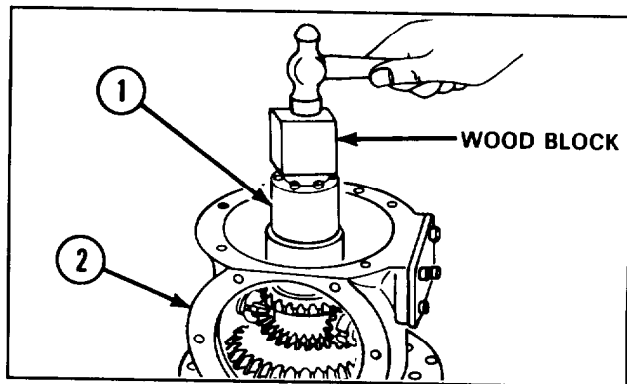
2-52. MAINTENANCE OF ELEVATING HYDRAULIC DRIVE UNIT (CONT).

REASSEMBLY/INSTALLATION (CONT)

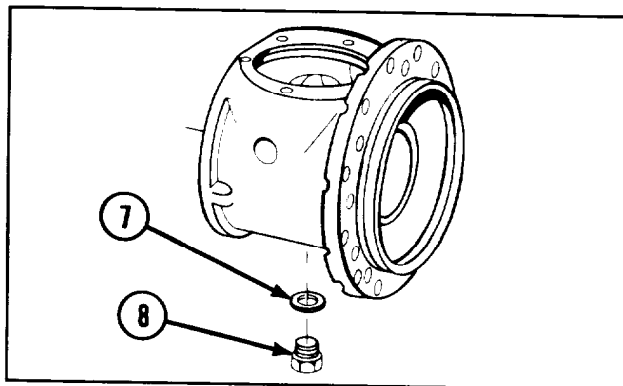
- 3 Using press and bearing replacer, install differential ball bearing (3) against adjusted shim(s) (6) on differential gear (1).



- 4 Using wood block, install differential gear (1) in elevating differential case (2).

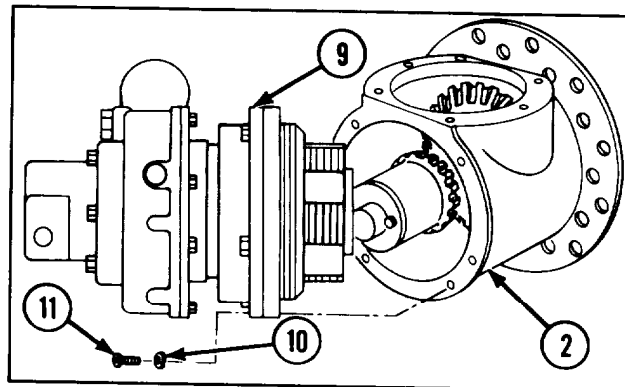


- 5 Install new preformed packing (7) and machine thread plug (8).



- 6 Install hydraulic motor (9) on elevating differential case (2).

- 7 Install four new lockwashers (10) and four capscrews (11). Torque capscrews 40 to 45 ft-lb (54 to 61 N-m).



8 To prevent gear movement inside elevating differential case (2) insert wedges of laminated shim between teeth of two bevel gears (12) and teeth of helical power input gear (13), and insert wedges of laminated shim between teeth of two bevel gears (12) and teeth of input cluster gear (14).

9 Obtain dial indicator and magnetic base holder. Dial indicator must read in units of 0.001 in. (0.002 cm).

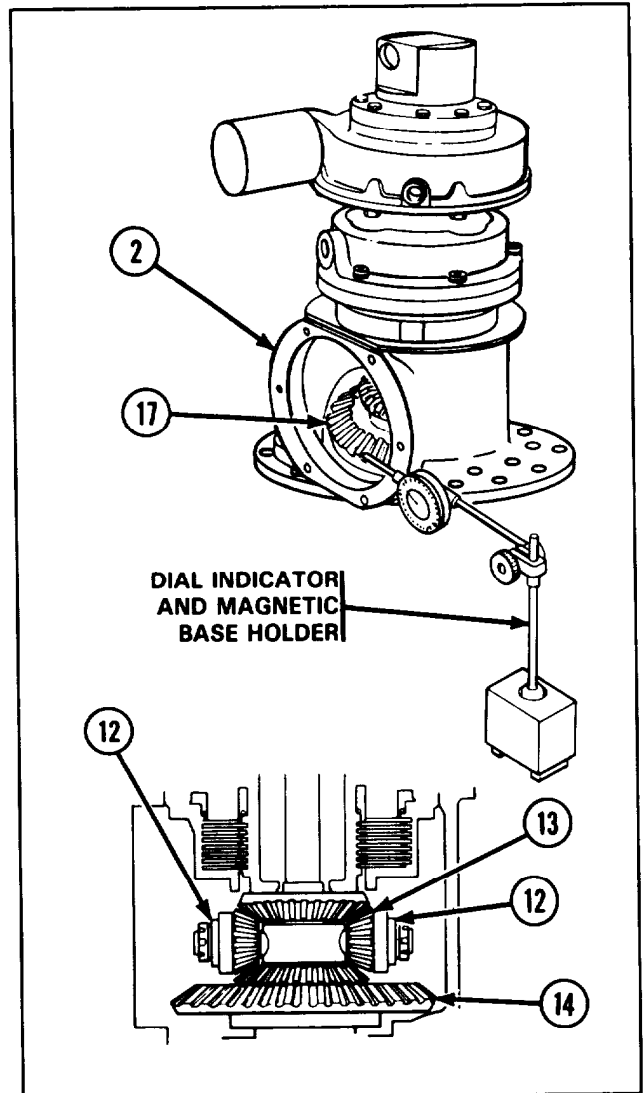
10 Position dial indicator so that indicator button contacts outer tooth flank of input cluster gear (14).

NOTE

Measurement recorded in step 11 will be added to measurement in step 31 to determine correct tolerance. Total measurement must be between 0.002 and 0.004 in. (0.005 and 0.010 cm).

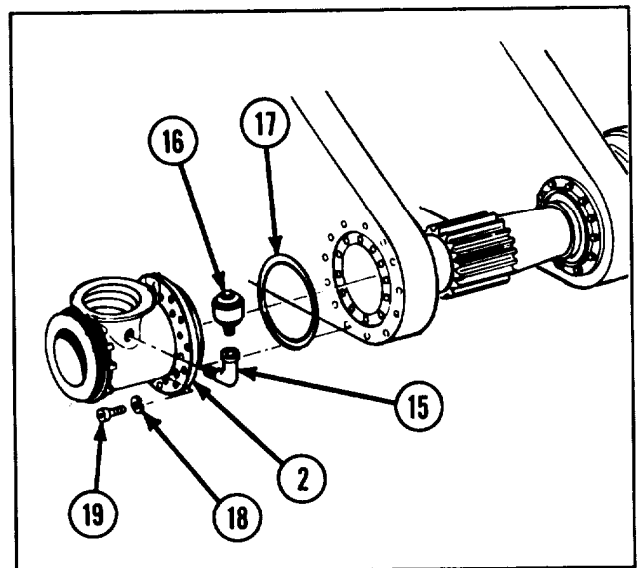
11 Attempt to turn input cluster gear (14) and read dial indicator. Record measurement.

12 Remove dial indicator and holder.



13 Install pipe elbow (15) and elevating drive housing breather (16) on elevating differential case (2).

14 Install new preformed rotary switch (17), elevating differential case (2), 22 new lockwashers (18), and 22 capscrews (19).



2-52. MAINTENANCE OF ELEVATING HYDRAULIC DRIVE UNIT (CONT).

REASSEMBLY/INSTALLATION (CONT)

15 Install machine key (20) on shouldered clutch shaft (21).

WARNING

- Dry cleaning solvent (SD2) is toxic and flammable. Wear protective goggles and gloves and use only in well-ventilated areas.
- Clutch assembly must be wiped dry. Failure to do so may cause damaged equipment or injury to personnel.

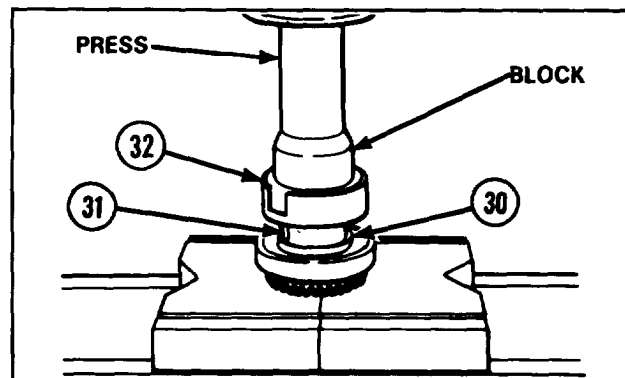
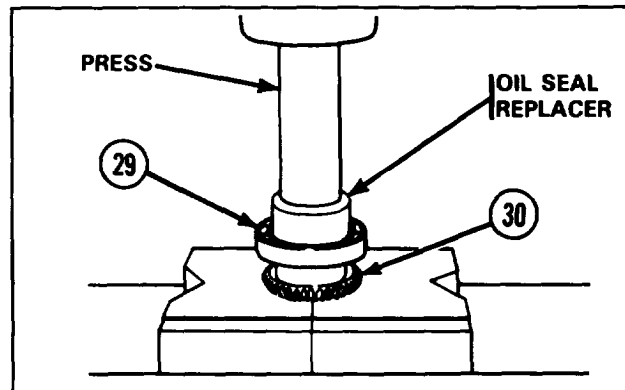
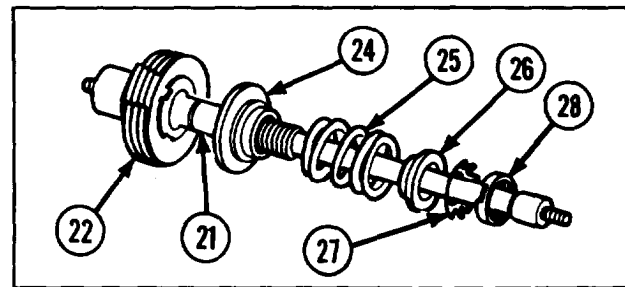
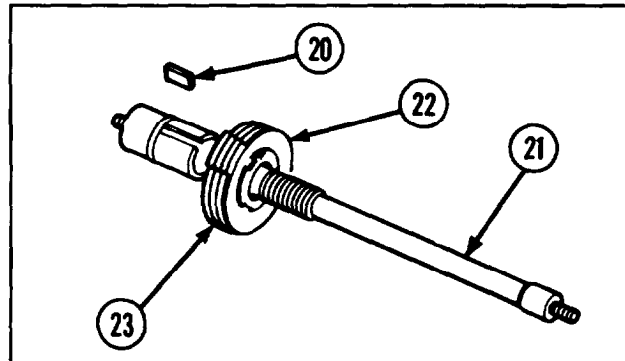
16 Clean clutch assembly (22) with dry cleaning solvent (item 8, appx B), wipe dry, and install clutch assembly (22) on shouldered clutch shaft (21) with thick plate (23) toward differential end of shouldered clutch shaft.

17 Install pressure plate (24), helical compression clutch spring (25), helical compression clutch seat (26), key washer (27), and nut (28) on shouldered clutch shaft (21). Tighten nut (28) to compress helical compression clutch spring (25). Do not bend tabs of key washer (27) into slots in nut (28) until clutch assembly (22) is adjusted, refer to TM 9-2350-304-20-2.

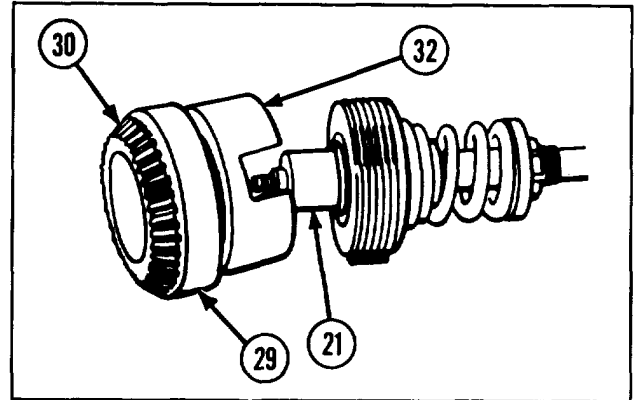
18 Using press and oil seal replacer, install ball bearing (29) on clutch pinion bevel gear (30).

19 Install woodruff key (31) in clutch cup and bearing assembly (32).

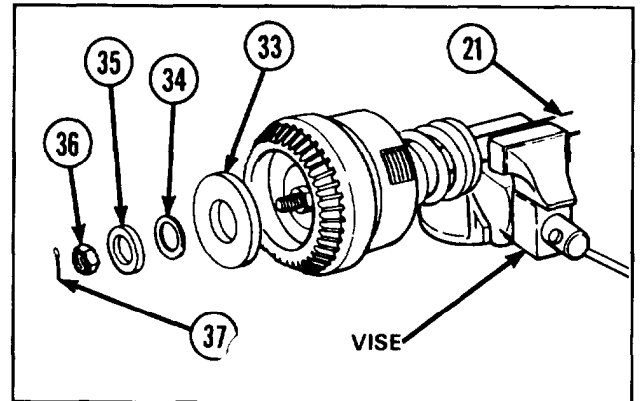
20 Using press and block, install clutch cup and bearing assembly (32) in clutch pinion bevel gear (30).



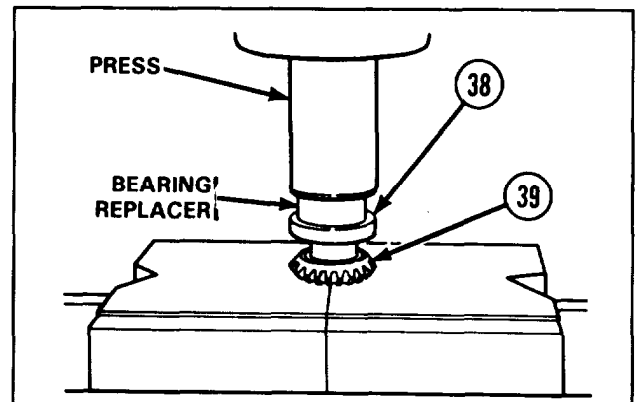
- 21 Install clutch pinion bevel gear (30), ball bearing (29), and clutch cup and bearing assembly (32) on shouldered clutch shaft (21).



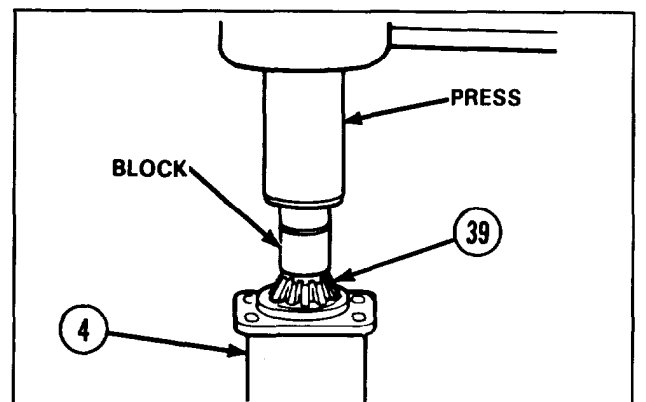
- 22 While holding shouldered clutch shaft (21) in vise with brass vise caps, install pinion gear flat washer (33), pinion gear roller bearing (34), recessed pinion gear washer (35), nut (36), and new cotter pin (37).



- 23 Using press and bearing replacer, install ball bearing (38) on miter bevel gear (39).



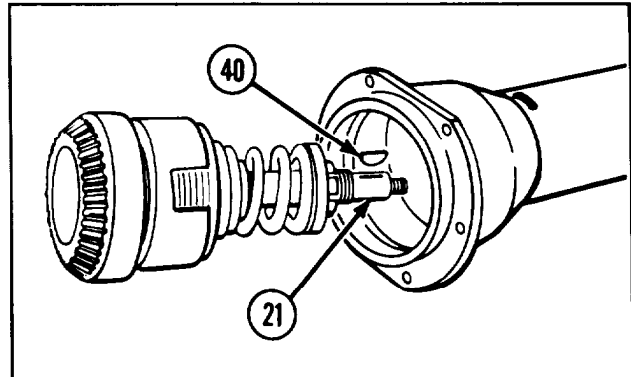
- 24 Using press and block, install miter bevel gear (39) in elevating drive column (4).



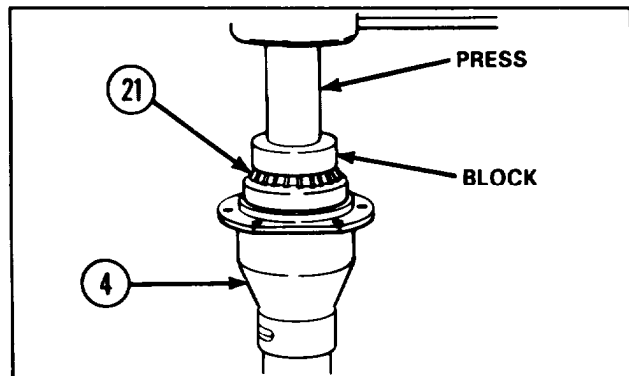
2-52. MAINTENANCE OF ELEVATING HYDRAULIC DRIVE UNIT (CONT).

REASSEMBLY/INSTALLATION (CONT)

25 Install woodruff key (40) on shouldered clutch shaft (21).



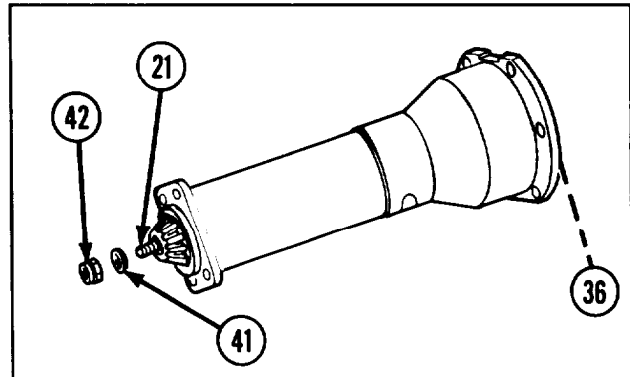
26 Using press and block, install shouldered clutch shaft (21) and connected parts in elevating drive column (4).



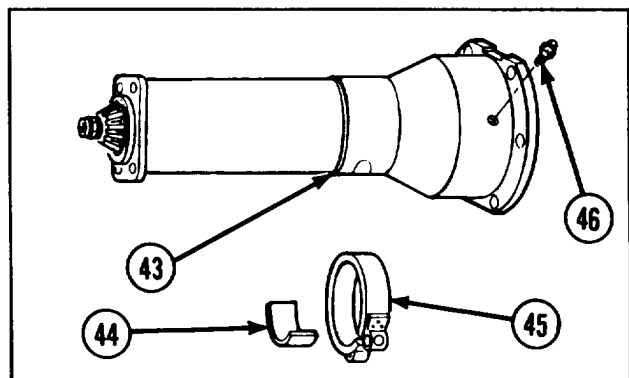
NOTE

Parts shown removed for clarity.

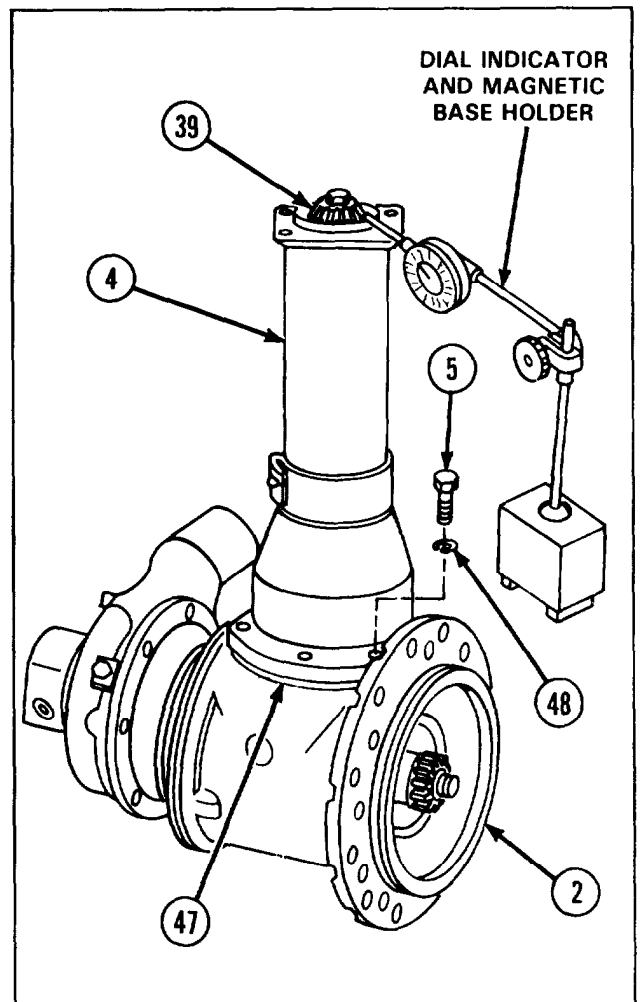
27 While holding nut (36), install flat washer (41) and new self-locking nut (42) on shouldered clutch shaft (21).



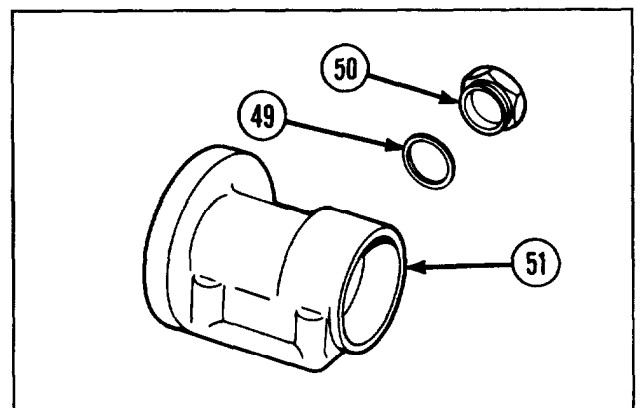
28 Cover access hole (43) with new access hole cover gasket (44) and access hole hose clamp (45), and install lubrication fitting (46).



- 29 Install elevating drive column (4) and shim(s) (47) on elevating differential case (2) and secure using six new lockwashers (48) and six capscrews (5).
- 30 Position dial indicator and magnetic base holder so that indicator button contacts tooth flank of miter bevel gear (39) in elevating drive column (4).
- 31 Turn miter bevel gear (39) by hand until all play is removed, and read dial indicator. Record measurement.
- 32 Add measurements from steps 11 and 31. Total measurement must be between 0.002 and 0.004 in. (0.005 and 0.010 cm).
- 33 To adjust gear play, remove elevating drive column (4). Add shim(s) (47) to increase gear play. Remove shim(s) to decrease gear play.
- 34 Repeat steps 29 thru 33 until required gear play is obtained.
- 35 Remove wedges of laminated shim from gears inside elevating differential case (2).
- 36 Install elevating drive column (4) and adjusted shim(s) (47) to elevating differential case (2) with six new lockwashers (48) and six capscrews (5). Torque cap-screws 40 to 45 ft-lb (54 to 61 N-m).



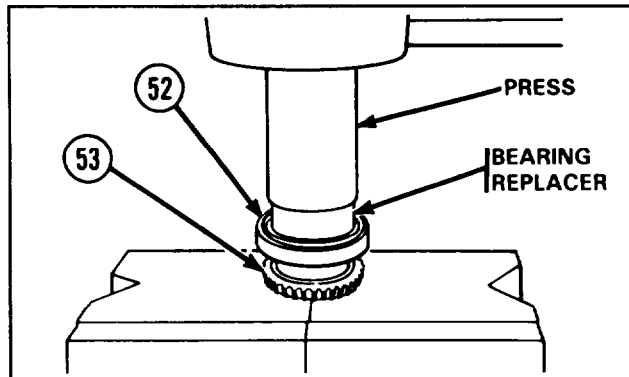
- 37 Install new packing (49) and machine thread plug (50) in elevating drive assembly housing (51).



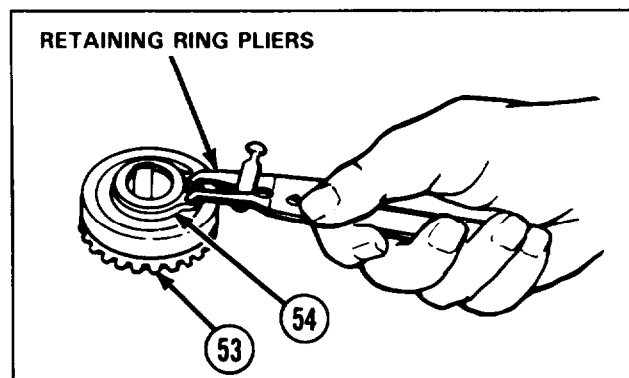
2-52. MAINTENANCE OF ELEVATING HYDRAULIC DRIVE UNIT (CONT).

REASSEMBLY/INSTALLATION (CONT)

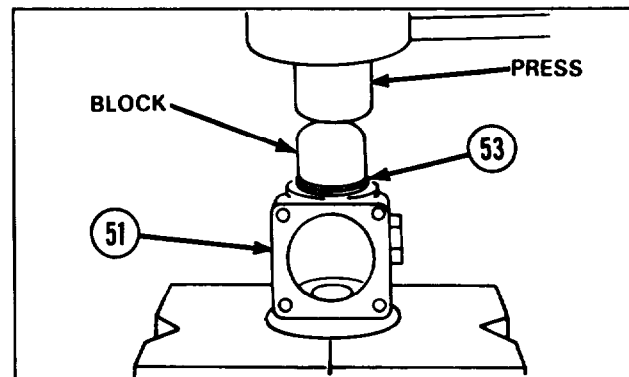
- 38 Using press and bearing replacer, install ball bearing (52) on miter bevel gear (53).



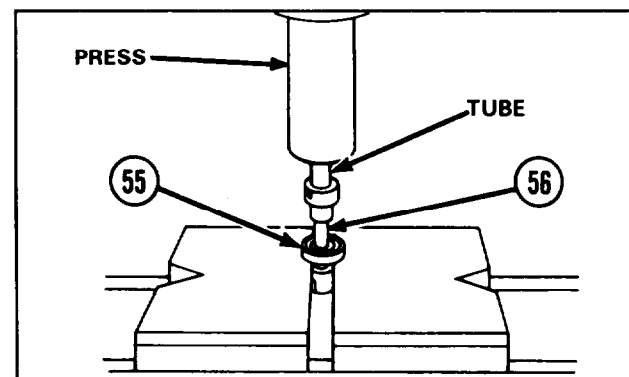
- 39 Using retaining ring pliers, install retaining ring (54) on miter bevel gear (53).



- 40 Using press and block, install miter bevel gear (53) into bore of elevating drive assembly housing (51).



- 41 Using tube and press, install ball bearing (55) on shouldered shaft (56).



- 42 Install woodruff key (57) in shouldered shaft (56).
- 43 Using wood block, drive shouldered shaft (56) into elevating drive assembly housing (51).

NOTE

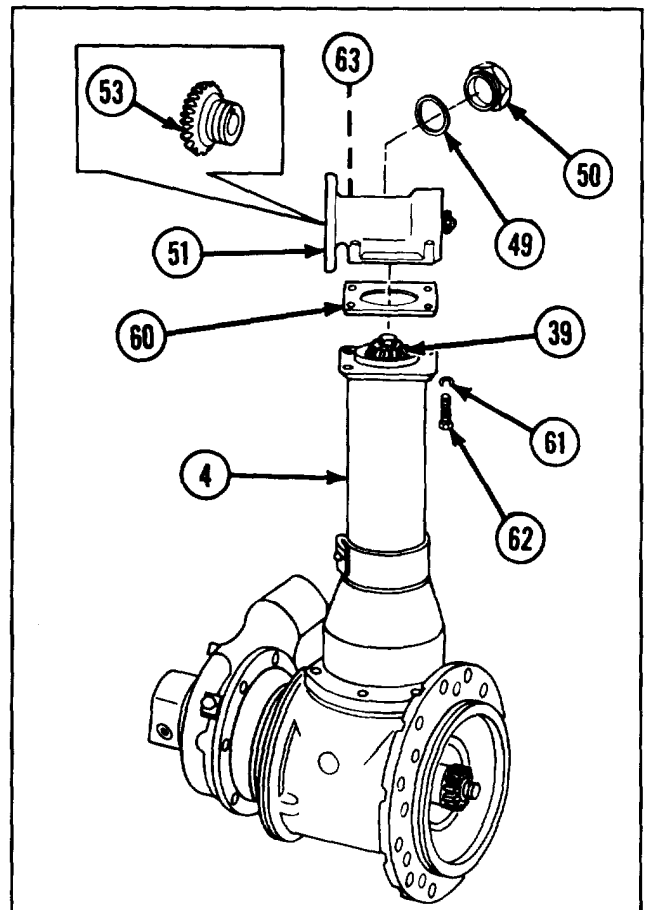
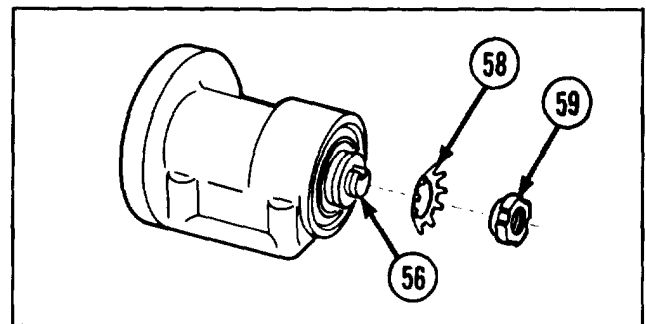
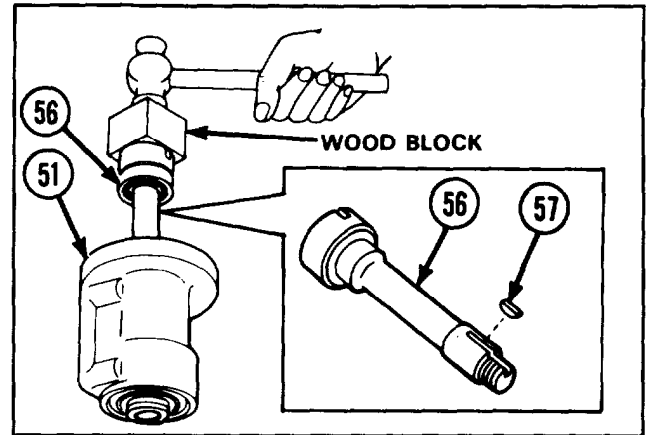
If key washer is damaged, new key washer must be installed.

- 44 Install key washer (58) and nut (59) on shouldered shaft (56).
- 45 Bend tabs of key washer (58) into slots in nut (59).

NOTE

Parts shown removed for clarity.

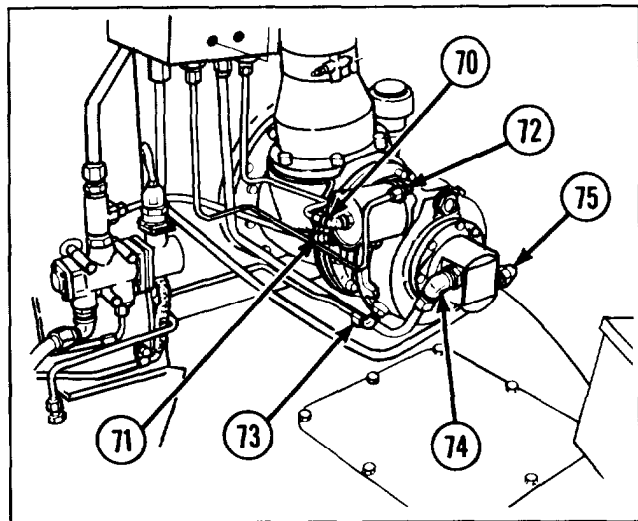
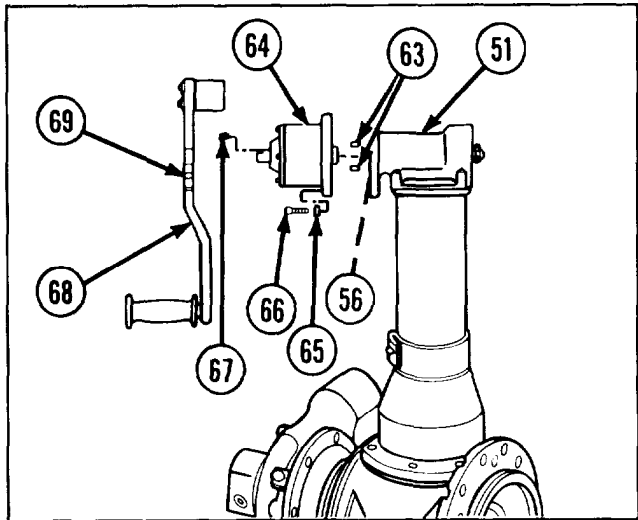
- 46 Install elevating drive assembly housing (51) and shim(s) (60) to elevating drive column (4) with four new lockwashers (61) and four capscrews (62).
- 47 Remove machine thread plug (50) and packing (49).
- 48 Using solder (item 22, appx B) through housing access hole (63), measure play between clutch miter bevel gear (39) and housing miter bevel gear (53). Play between gears must be between 0.002 and 0.004 in. (0.005 and 0.010 cm).
- 49 To adjust gear play, remove elevating drive housing (51). Add shim(s) (60) to increase gear play. Remove shim(s) to decrease gear play.
- 50 When required adjustment is obtained, secure elevating drive housing (51) and shim(s) (60) to elevating drive column (4) with four new lockwashers (61) and four capscrews (62). Torque capscrews 40 to 45 ft-lb (54 to 61 N-m).
- 51 Install new packing (49) and machine thread plug (50).



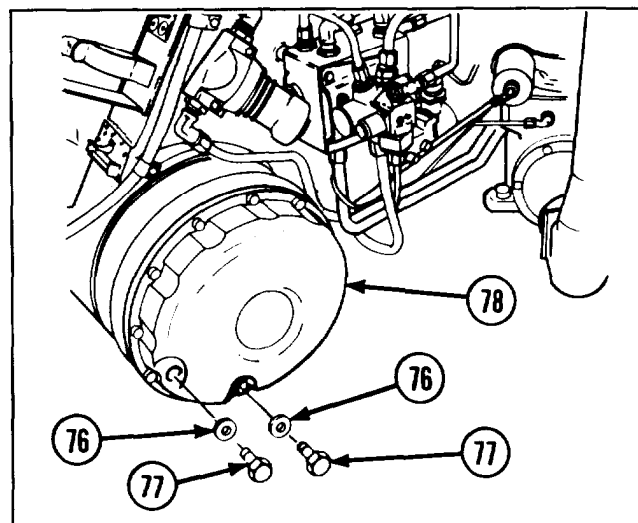
2-52. MAINTENANCE OF ELEVATING HYDRAULIC DRIVE UNIT (CONT).

REASSEMBLY/INSTALLATION (CONT)

- 52 Install two machine keys (63) in key ways in shouldered shaft (56).
- 53 Install torque lock (64), matching key ways in shouldered shaft (56).
- 54 Secure torque lock (64) to elevating drive housing (51) with four new lock-washers (65) and four capscrews (66). Torque capscrews 40 to 45 ft-lb (54 to 61 N-m).
- 55 Install machine key (67) in shaft of torque lock (64).
- 56 Install torque handle (68).
- 57 Torque screw (69) securing torque handle 10 to 12 ft-lb (14 to 16 N-m).
- 58 Connect six tube assemblies (70, 71, 72, 73, 74, and 75). For complete reassembly of hydraulic lines and fittings, refer to page 2-27.

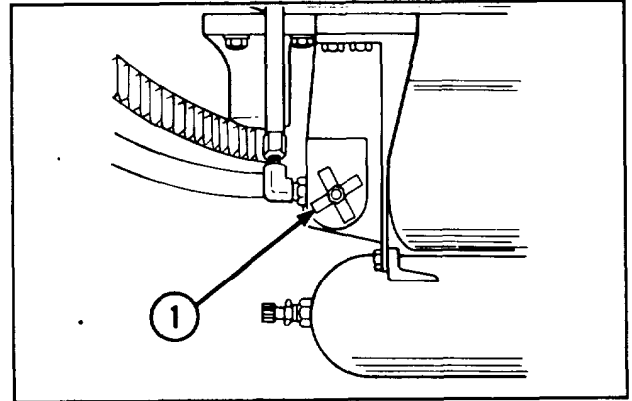


- 59 Install two new preformed packings (76) and two plugs (77) in elevating final drive (78) and fill with hydraulic fluid (item 13, appx B). Refer to TM 9-2350-304-10.
- 60 For adjustment of elevating hydraulic drive unit, refer to TM 9-2350-304-20-2.



APPLYING HYDRAULIC PRESSURE

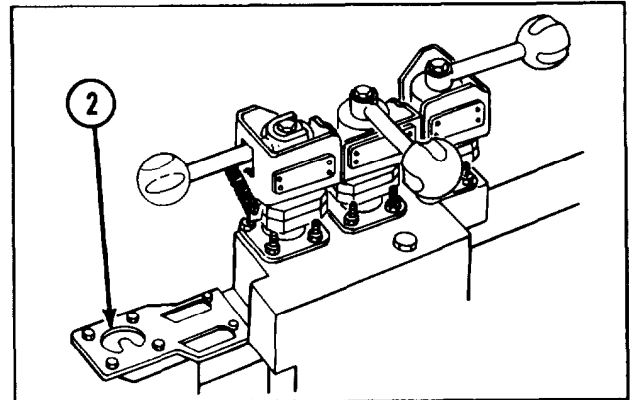
- 1 Close globe angle valve (1).
- 2 Start engine.



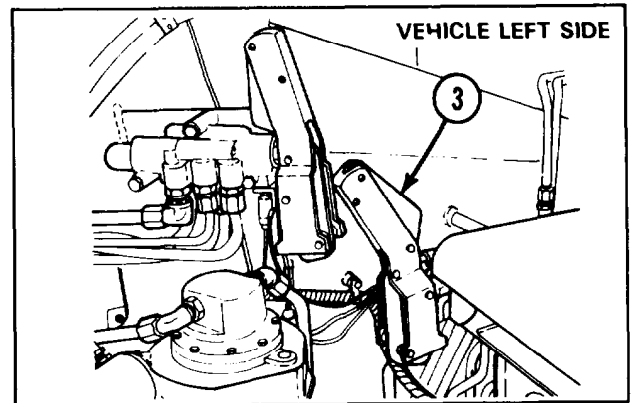
NOTE

Hydraulic motor and pump may be used to apply pressure to hydraulic system without starting engine by setting MASTER switch and OIL PUMP MOTOR Switch ON.

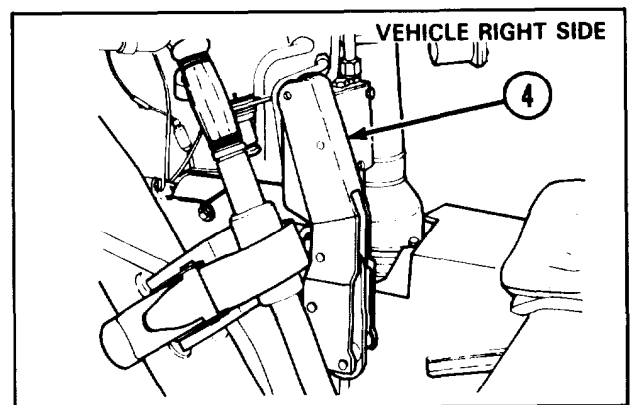
- 3 Set HYD PUMP/PTO CLUTCH switch to ON.
- 4 Check dial pressure gage (2) indication. Normal pressure is 1600 to 2400 psi (11,032 to 16,548 kPa).
- 5 Stop engine.



- 6 Raise and lower, cannon several times using manual control handle (3) to bleed air from system.



- 7 Raise and lower cannon several times using other manual control handle (4) to bleed air from system.

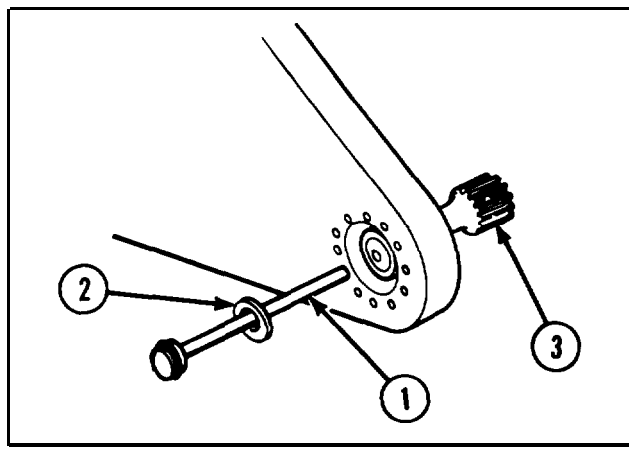


2-53. MAINTENANCE OF ELEVATING FINAL DRIVE ASSEMBLY AND SPEED GEAR ASSEMBLY.

This task covers:		a. <i>Removal</i>	d. <i>Reassembly</i>
		b. <i>Disassembly</i>	e. <i>installation</i>
		c. <i>Inspection/Repair</i>	
INITIAL SETUP			
<i>Tools and Special Tools</i>		Preformed packing (2) (M83461/1-447)	
Artillery maintenance shop equipment (SC 4933-95-CL-A12)		Primary ring gear cover gasket (2) (10892462)	
Press		Seal (4) (MS51000-184-2)	
Puller		Stud (3) (0.625 in. x 8.00 in.)	
Retaining ring pliers		<i>References</i>	
Bearing and bushing replacer (8390340)		TM 9-2350-304-24P-2	
Bearing and seal replacer (10904216)		<i>Personnel Required</i>	
Bearing replacer (8350230)		Two	
Handle (figure 1, appx C)		<i>Equipment Conditions</i>	
Hoist (2), 2000 lb lifting capabilities		2-254 Elevating hydraulic drive unit removed and partially disassembled	
Ordnance artillery and turret mechanic's tool kit (SC 5180-95-CL-A12)		2-37 M201A1 cannon tube removed	
Remover and replacer handle (7950864)		2-57 M174 gun mount removed	
Sling			
<i>Materials/Parts</i>			
Lockwire (item 16, appx B)			
Preformed packing (MS28775-265)			
Preformed packing (2) (MS28778-8)			
Preformed packing (M83461/1-427)			

REMOVAL

- 1 Pull straight shaft (1) with thrust washer bearing (2) from drive assembly (3).



NOTE

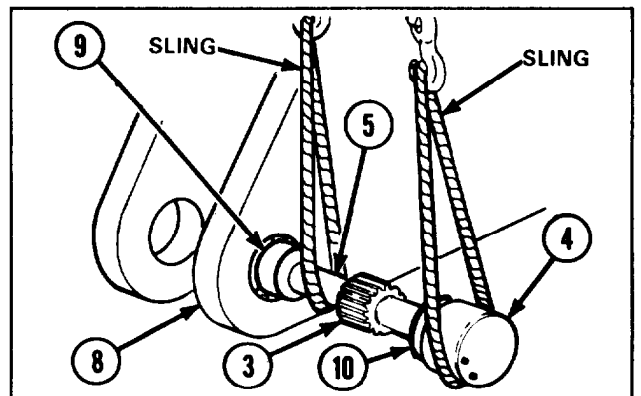
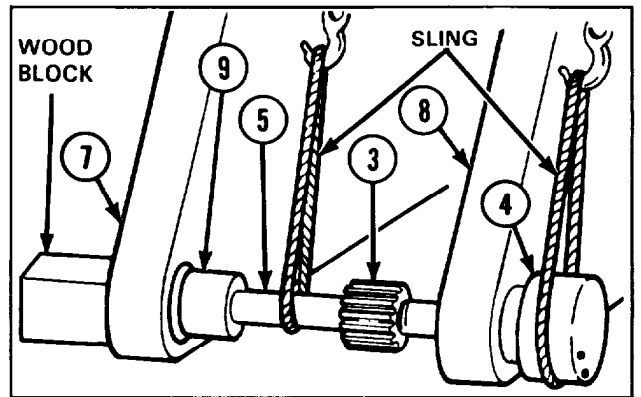
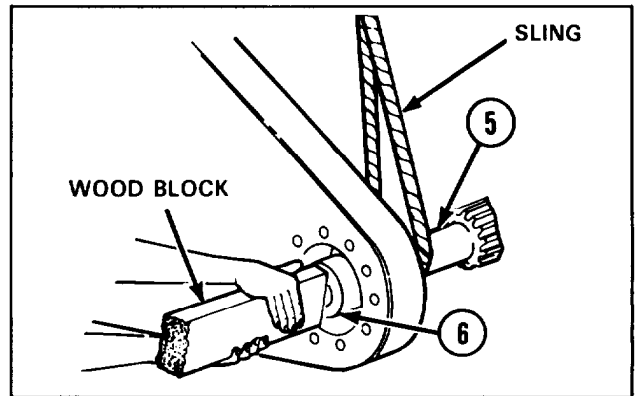
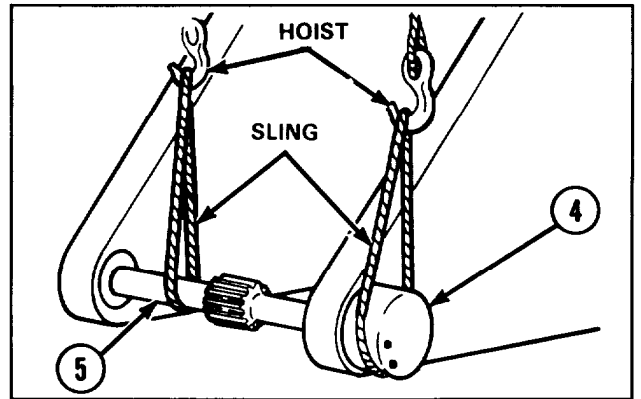
Drive assembly weighs about 1400 lb (635 kg).

- 2 Install wire rope sling around gear housing (4) using a hoist of at least 2000 lb (907 kg) lifting capability.
- 3 Install wire rope sling around pinion gear shaft (5) using a second hoist of at least 2000 lb (907 kg) lifting capability.
- 4 Place wood block against retaining plate (6) on end of pinion gear shaft (5).

CAUTION

Take care to prevent damage to trunnion machined surfaces from drive assembly.

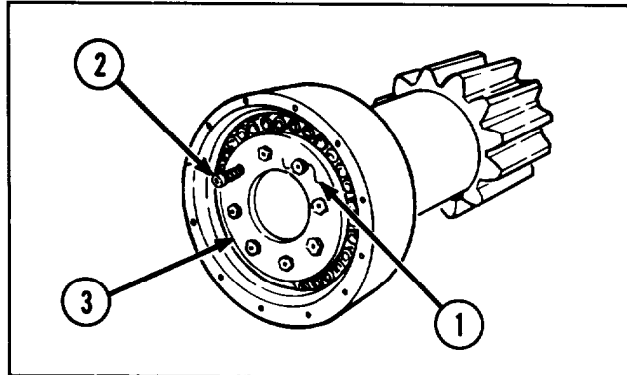
- 5 Strike wood block with hammer to push drive assembly (3) through trunnions (7 and 8).
- 6 When bearing housing (9) begins to clear trunnion (7), reposition inside sling from pinion gear shaft (5) to bearing housing (9).
- 7 Drive assembly (3) again until gear housing (4) clears trunnion (8).
- 8 Push drive assembly (3) through trunnion (8) until bearing housing (9) can be supported in trunnion (8).
- 9 Reposition sling on pinion gear shaft (5).
- 10 Remove drive assembly (3) from trunnion (8).
- 11 Remove two preformed packings (10).



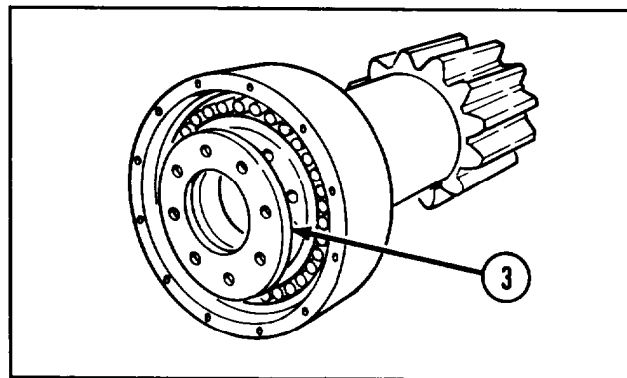
2-53. MAINTENANCE OF ELEVATING FINAL DRIVE ASSEMBLY AND SPEED GEAR ASSEMBLY (CONT).

DISASSEMBLY

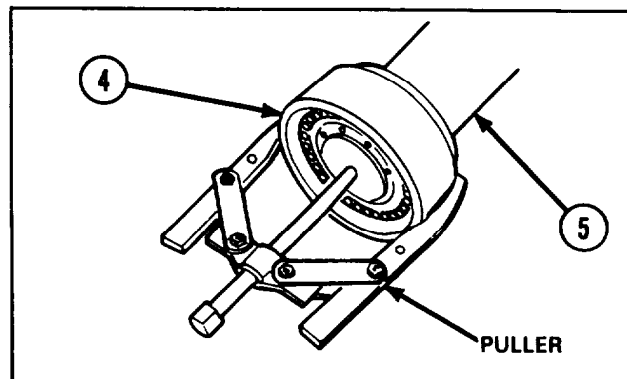
1 Remove lockwire (1) and eight machine bolts (2) from drive shaft bearing retaining plate (3).



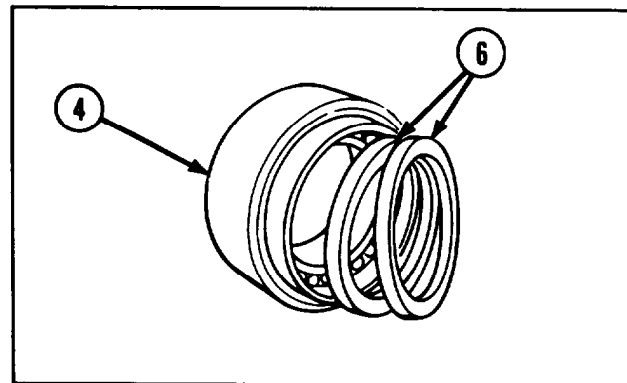
2 Remove drive shaft bearing retaining plate (3).



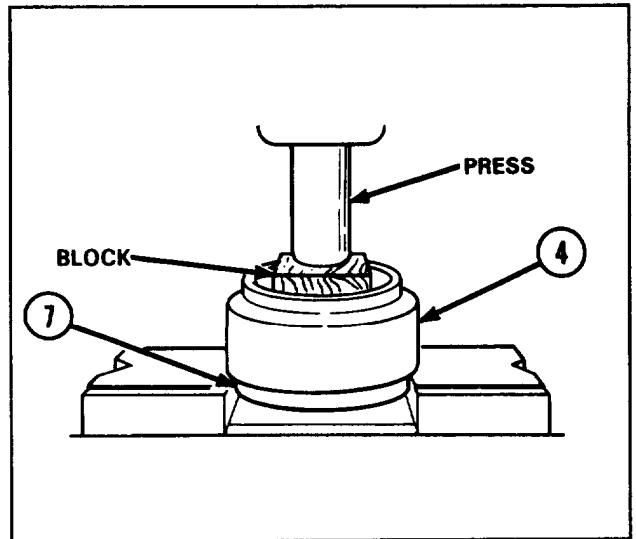
3 Using puller, remove retaining plate (4) from spur elevating pinion gear (5).



4 Remove two seals (6) from retaining plate (4).



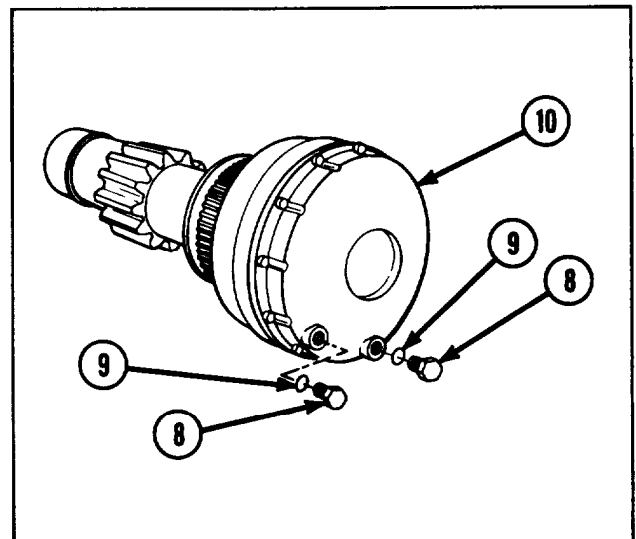
- 5 Using press and block, remove roller bearing (7) from retaining plate (4).



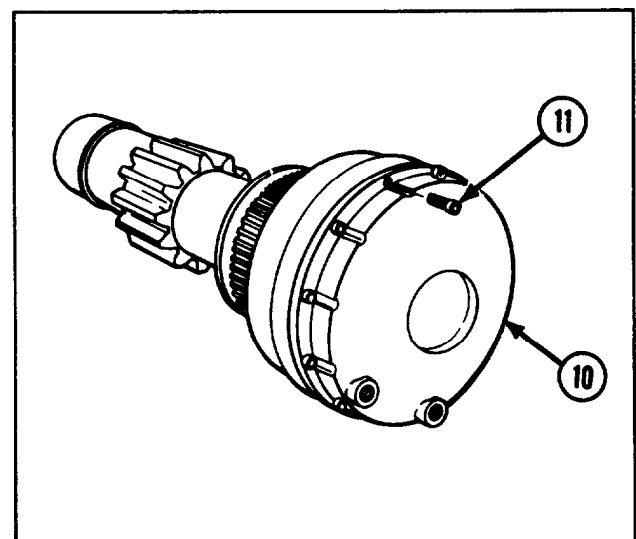
NOTE

If two machine thread plugs and two preformed packings are removed during removal of elevating hydraulic drive unit, proceed to step 7.

- 6 Remove two machine thread plugs (8) and two preformed packings (9) from primary ring gear access cover (10).



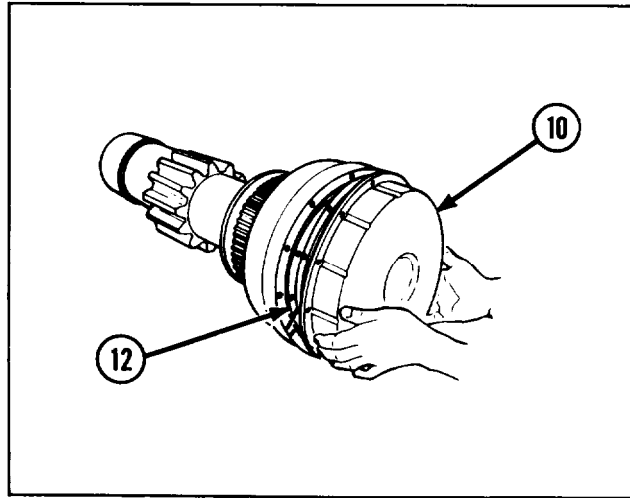
- 7 Remove 12 capscrews (11) from primary ring gear access cover (10).



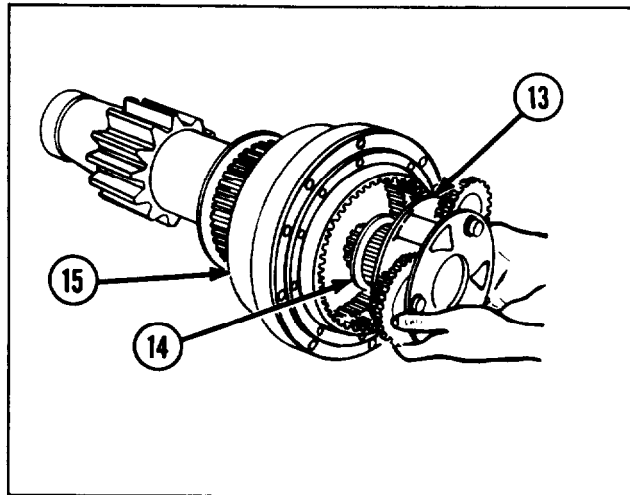
2-53. MAINTENANCE OF ELEVATING FINAL DRIVE ASSEMBLY AND SPEED GEAR ASSEMBLY (CONT).

DISASSEMBLY (CONT)

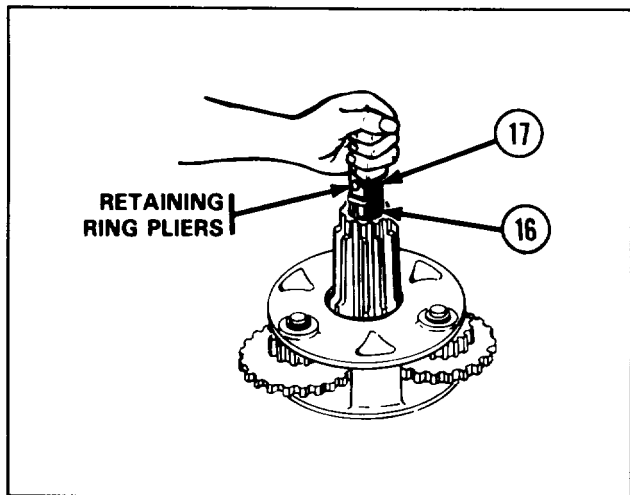
- 8 Remove primary ring gear access cover (10) and primary ring gear cover gasket (12).



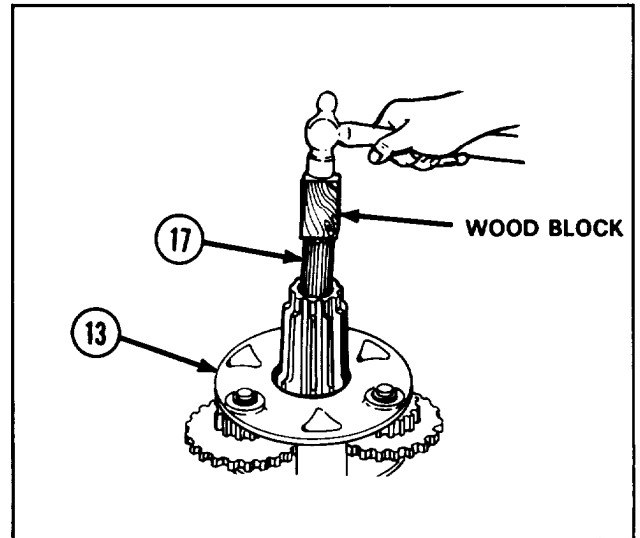
- 9 Remove speed gear assembly (13) and flat washer (14) from internal sun gear shaft (15).



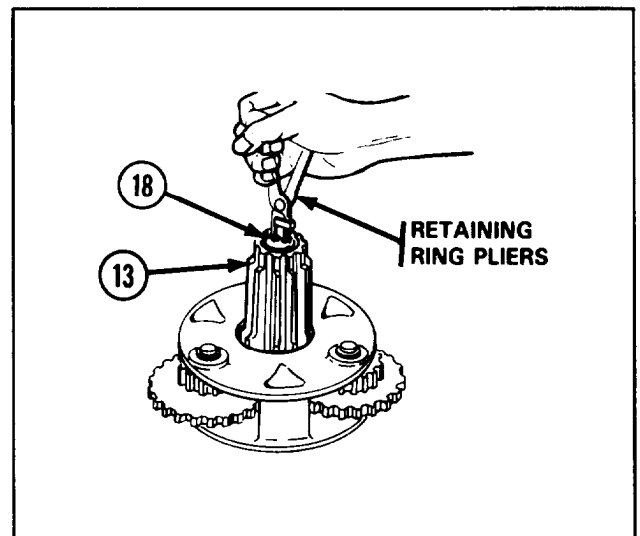
- 10 Using retaining ring pliers, remove retaining ring (16) from spur primary gearshaft (17).



- 11 Using wood block, remove spur primary gearshaft (17) from speed gear assembly (13).



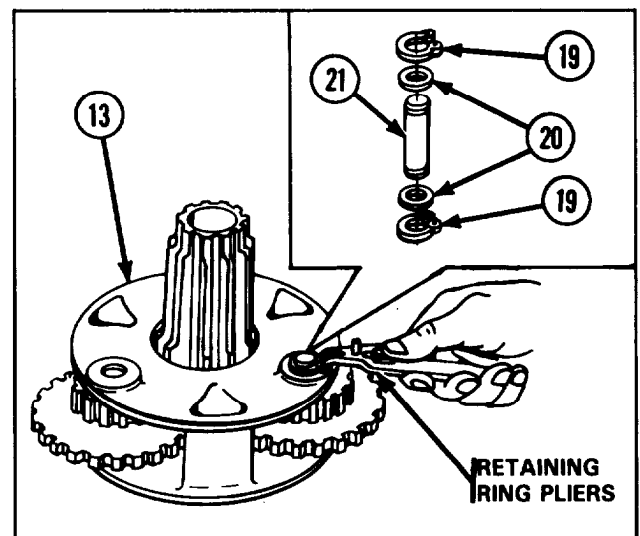
- 12 Using retaining ring pliers, remove retaining ring (18) from bore of speed gear assembly (13).



NOTE

Steps 13 thru 16 refer to the disassembly of the speed gear assembly.

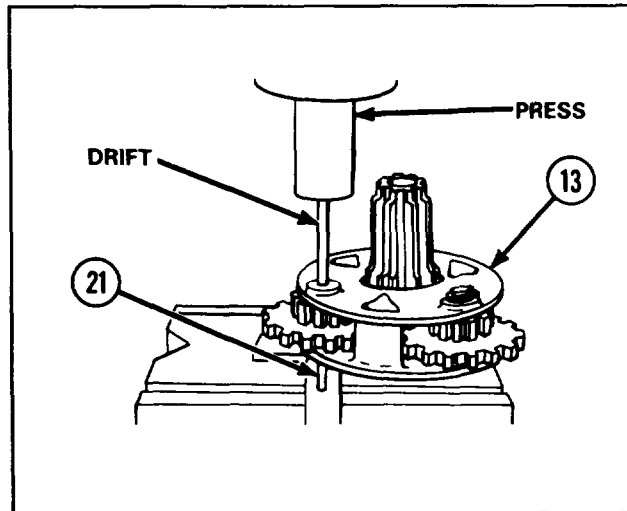
- 13 Using retaining ring pliers, remove two retaining rings (19) and two thrust washer bearings (20) from ends of three headless grooved pins (21) in speed gear assembly (13).



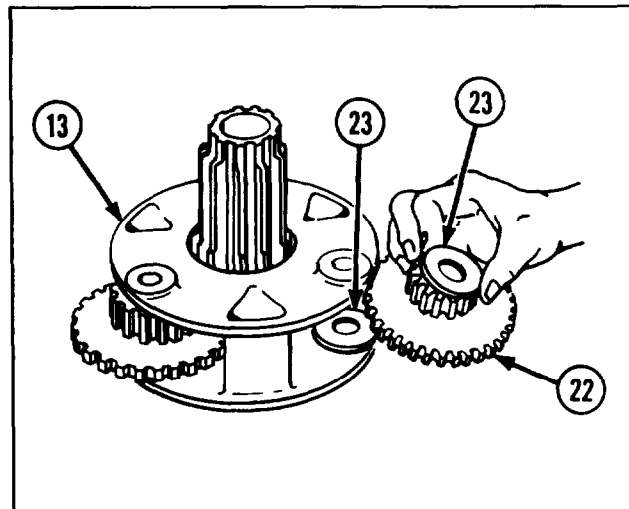
2-53. MAINTENANCE OF ELEVATING FINAL DRIVE ASSEMBLY AND SPEED GEAR ASSEMBLY (CONT).

DISASSEMBLY (CONT)

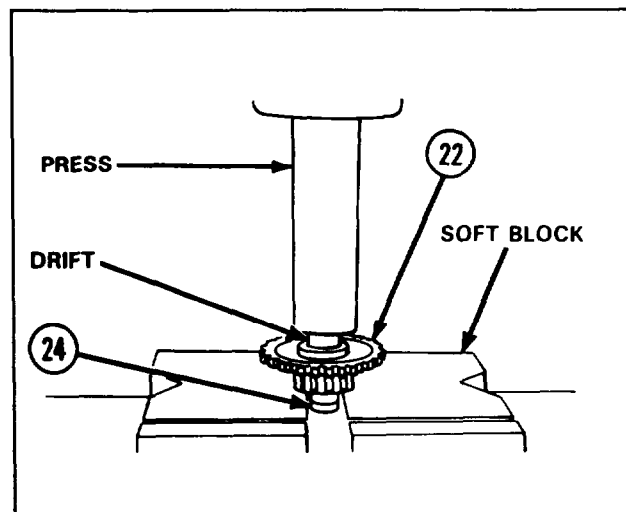
- 14** Using press and drift, remove three headless grooved pins (21) from speed gear assembly (13).



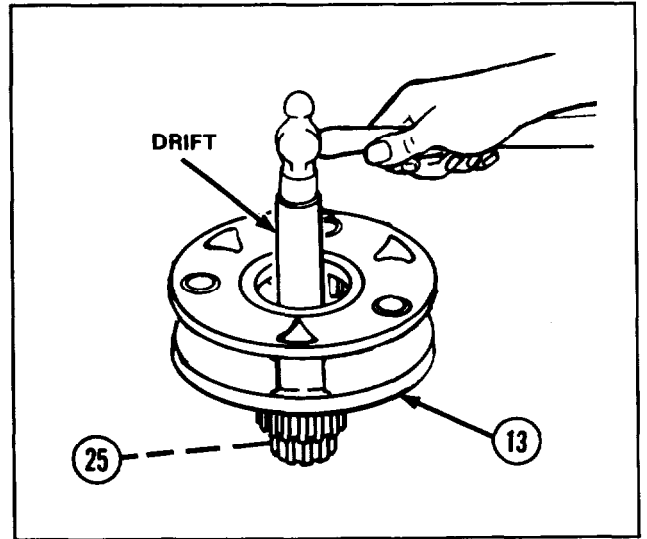
- 15** Remove three traversing cluster gears (22) and six thrust washer bearings (23) from speed gear assembly (13).



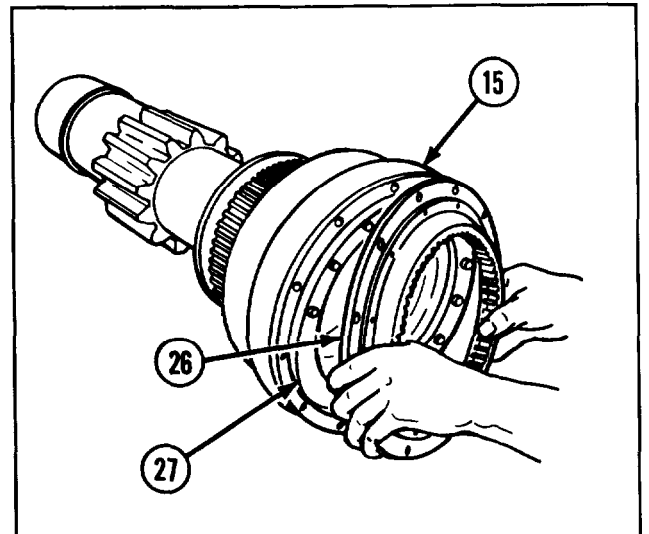
- 16** Using press, drift, and soft block, remove two roller bearings (24) from each of three traversing cluster gears (22).



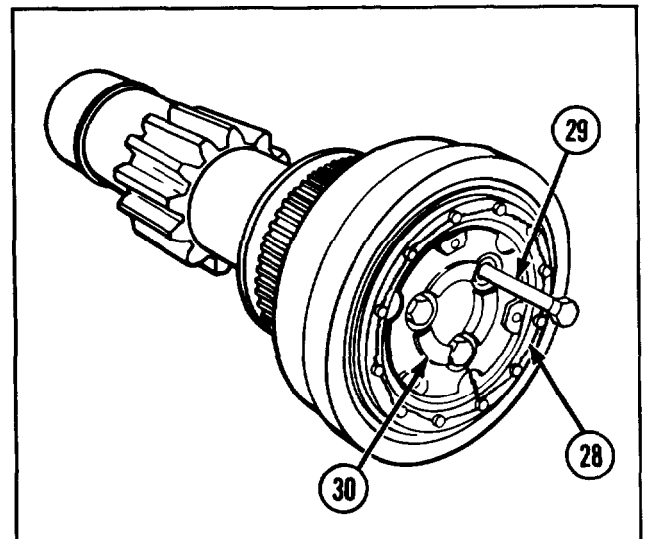
- 17 Using drift, remove ball bearing (25) from bore of speed gear assembly (13).



- 18 Remove internal primary ring gear (26) and primary ring gear cover gasket (27) from internal sun gear shaft (15).



- 19 Remove lockwire (28) and three cap-screws (29) from elevating secondary carrier (30).

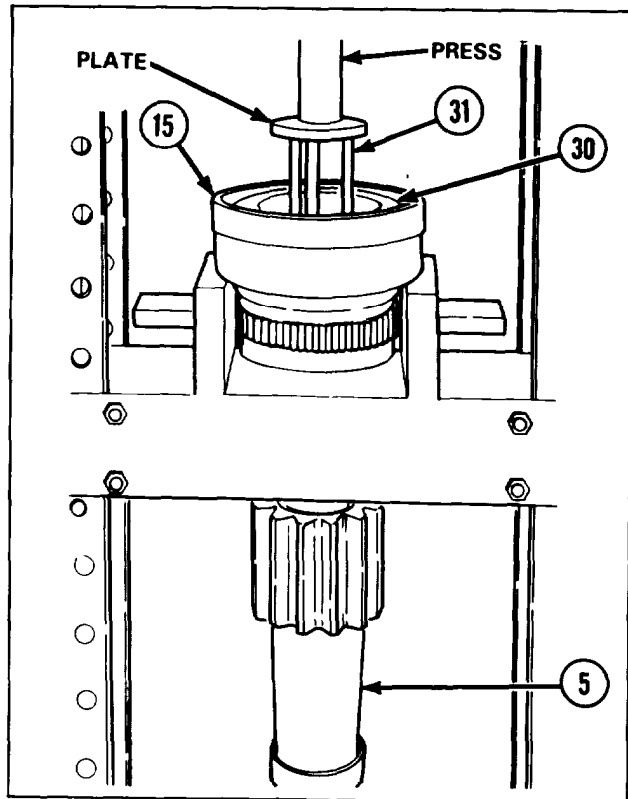


2-53. MAINTENANCE OF ELEVATING FINAL DRIVE ASSEMBLY AND SPEED GEAR ASSEMBLY (CONT).

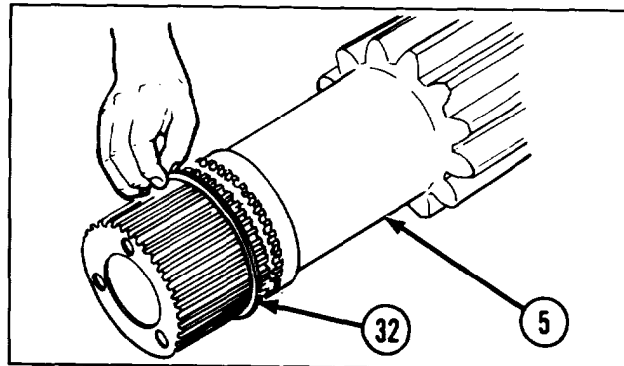
DISASSEMBLY (CONT)

20 Install three studs, (31) 0.625 in. (1.588 cm) in diameter and 8.00 in. (20.32 cm) long in holes of secondary elevating carrier (30).

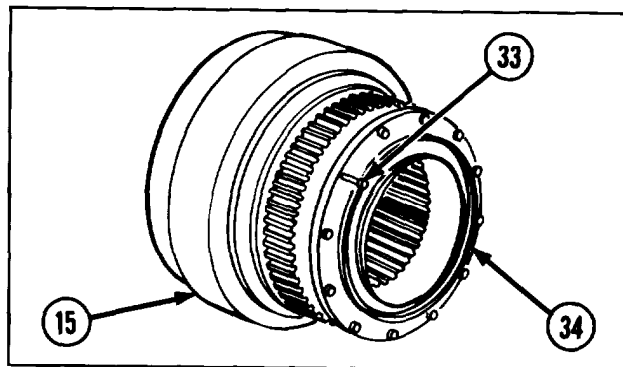
21 Using plate and press, remove spur elevating pinion gear (5) from internal sun gear shaft (15). Remove three studs (31).



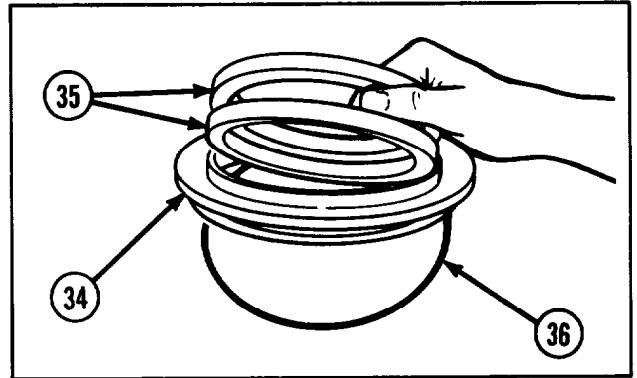
22 Remove preformed packing (32) from spur elevating pinion gear (5).



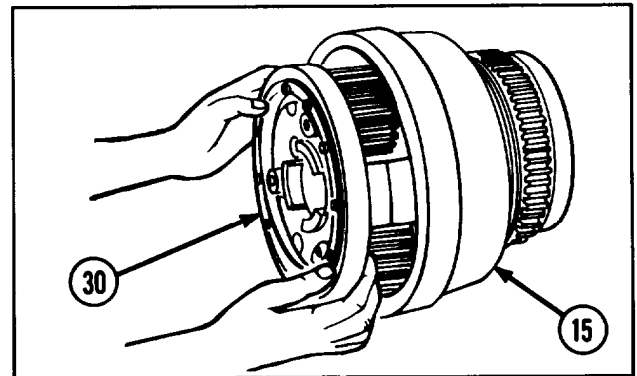
23 Remove 12 capscrews (33) and bearing retaining plate (34) from internal sun gear shaft (15).



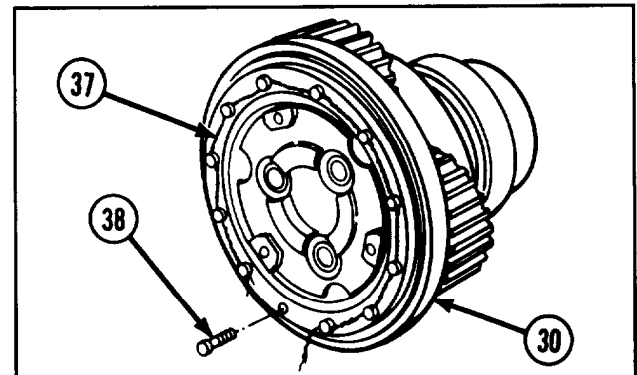
- 24 Remove two seals (35) and preformed packing (36) from bearing retaining plate (34).



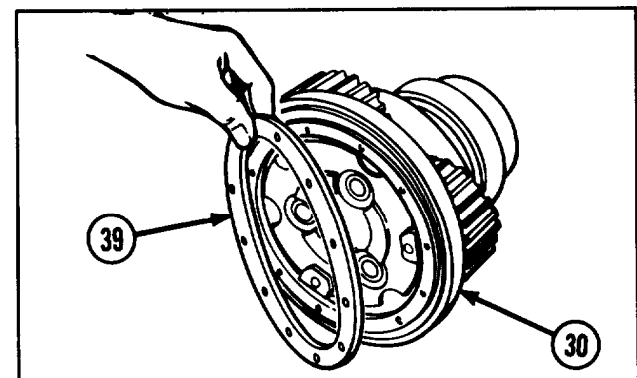
- 25 Remove elevating secondary carrier (30) from internal sun gear shaft (15).



- 26 Remove lockwire (37) and 12 machine bolts (38) from elevating secondary carrier (30).



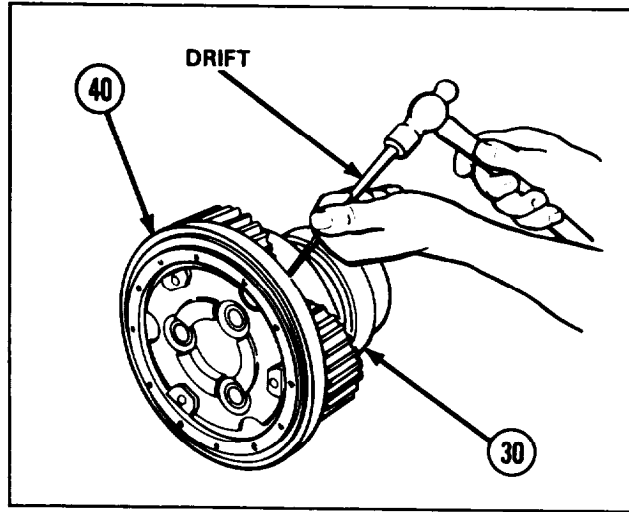
- 27 Remove bearing retainer (39) from elevating secondary carrier (30).



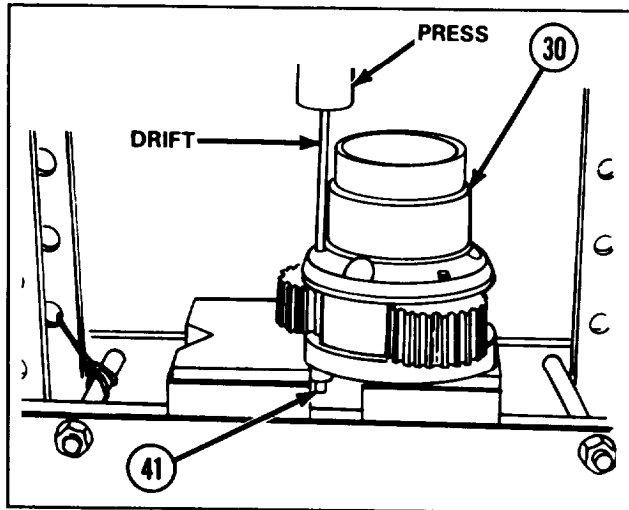
2-53. MAINTENANCE OF ELEVATING FINAL DRIVE ASSEMBLY AND SPEED GEAR ASSEMBLY (CONT).

DISASSEMBLY (CONT)

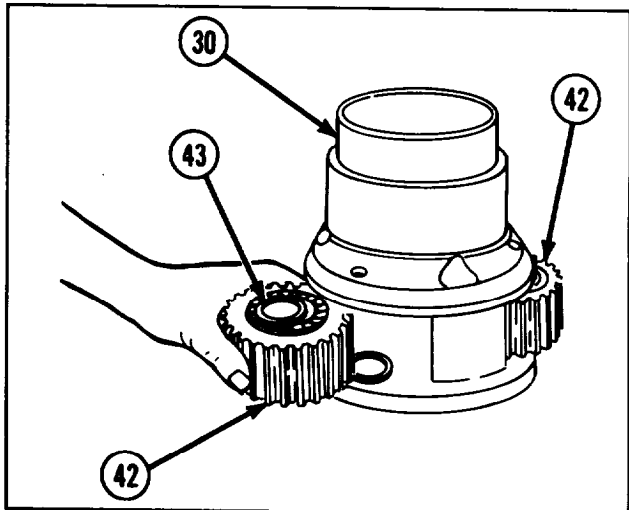
28 Using drift, remove ball bearing (40) from secondary elevating carrier (30).



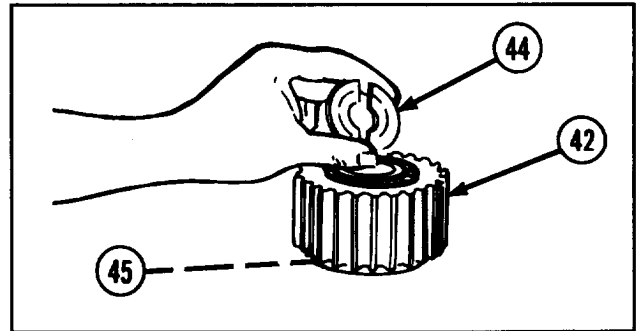
29 Using drift and press, remove three straight shafts (41) from elevating secondary carrier (30).



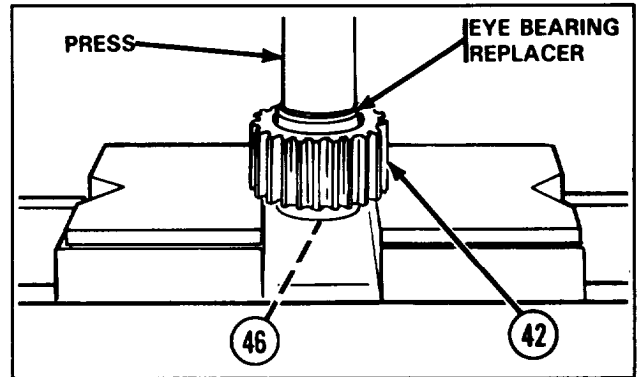
30 Remove three spur gears (42) and six ring spacers (43) from elevating secondary carrier (30).



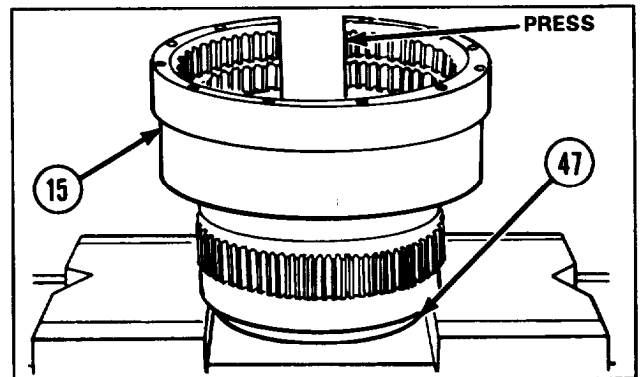
- 31 Using drift and split washer (44), remove one roller bearing (45) from each of three spur gears (42).



- 32 Using press and eye bearing replacer, remove second roller bearing (46) from each of three spur gears (42).



- 33 Using press, remove needle roller bearing (47) from internal sun gear shaft (15).

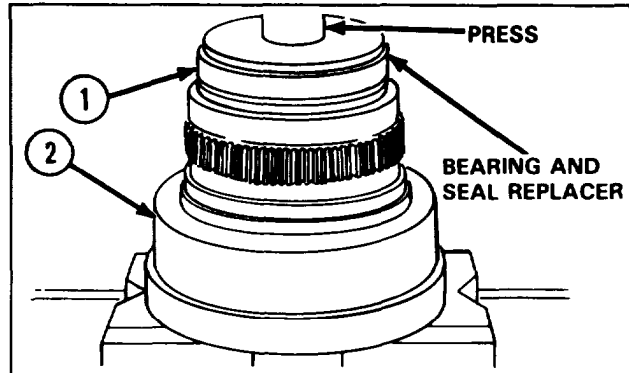


INSPECTION/REPAIR

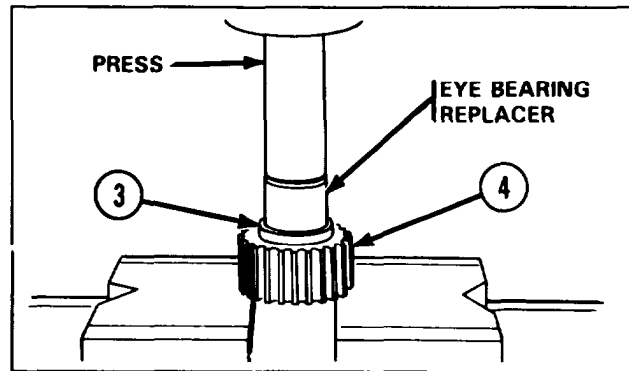
- 1 Inspect for broken, damaged, or missing parts.
- 2 If spur elevating pinion gear is broken, damaged, or missing, repair is by replacement of next higher assembly.
- 3 If internal sun gear shaft is broken, damaged, or missing, repair is by replacement of next higher assembly.
- 4 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

2-53. MAINTENANCE OF ELEVATING FINAL DRIVE ASSEMBLY AND SPEED GEAR ASSEMBLY (CONT).

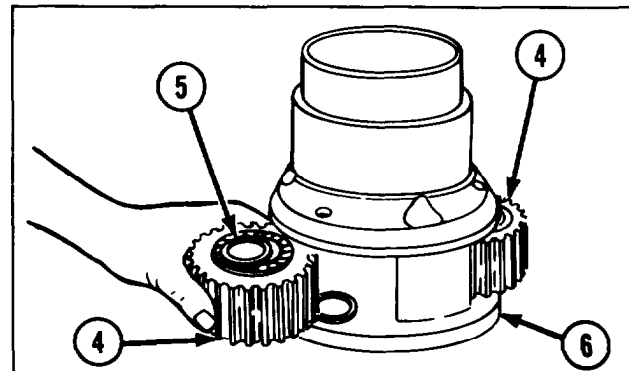
- 1 Using press and bearing and seal replacer, install needle roller bearing (1) into internal sun gear shaft (2).



- 2 Using press and eye bearing replacer, install two roller bearings (3) into each of three spur gears (4). Install one bearing (3) in each end of spur gear (4).



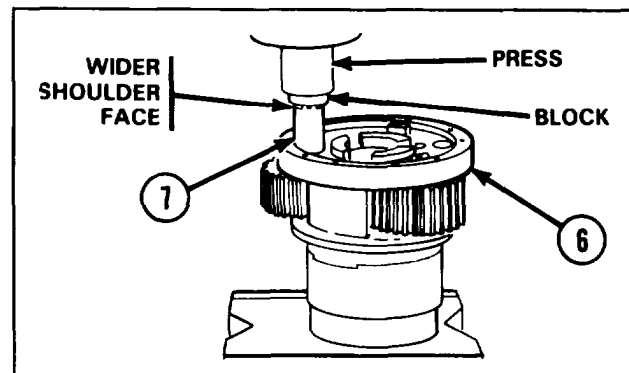
- 3 Install three spur gears (4) and six ring spacers (5) in elevating secondary carrier (6). Position ring spacers (5) at ends of spur gears (4).



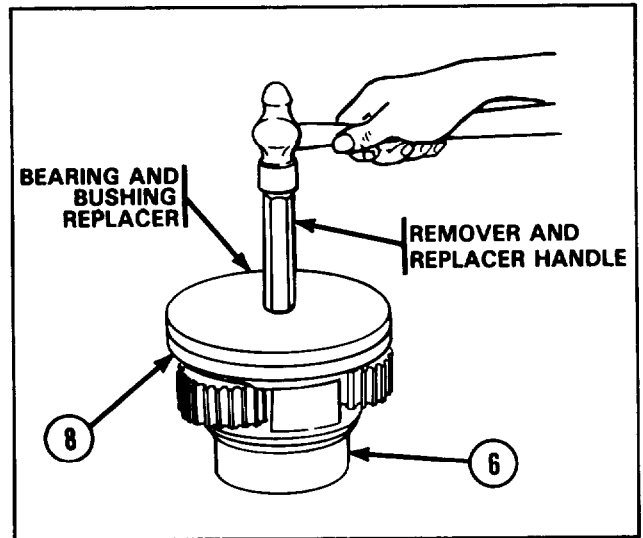
NOTE

Install straight shafts with wide shoulder face outward.

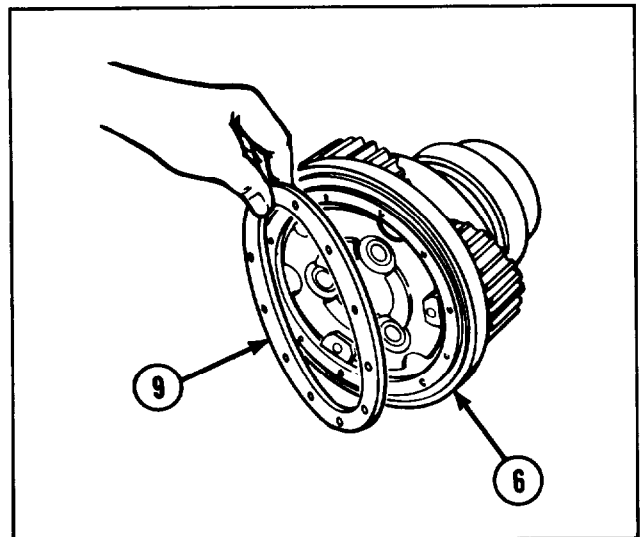
- 4 Using press and block, install three straight shafts (7) in elevating secondary carrier (6).



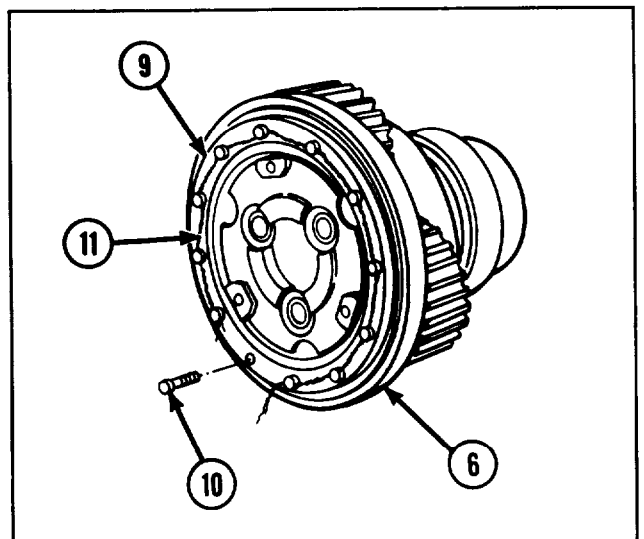
- 5 Using remover and replacer handle and bearing and bushing replacer, install ball bearing (8) on elevating secondary carrier (6).



- 6 Install bearing retainer (9) on elevating secondary carrier (6).



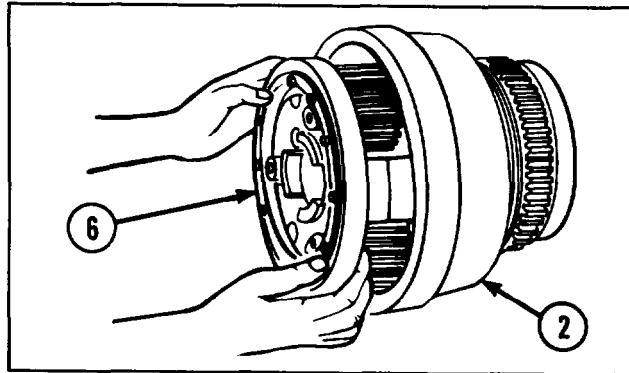
- 7 Secure bearing retainer (9) to elevating secondary carrier (6) with 12 machine bolts (10) and new lockwire (11) (item 16, appx B).



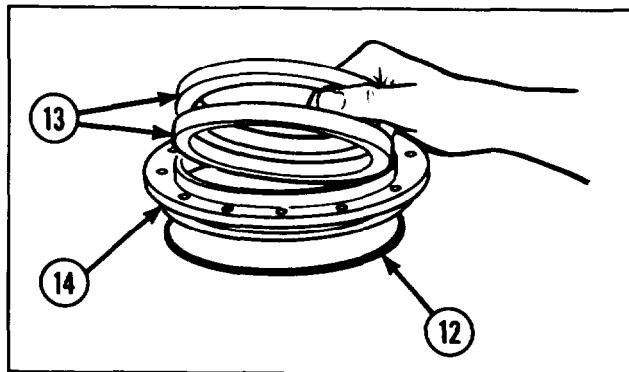
2-53. MAINTENANCE OF ELEVATING FINAL DRIVE ASSEMBLY AND SPEED GEAR ASSEMBLY (CONT).

REASSEMBLY (CONT)

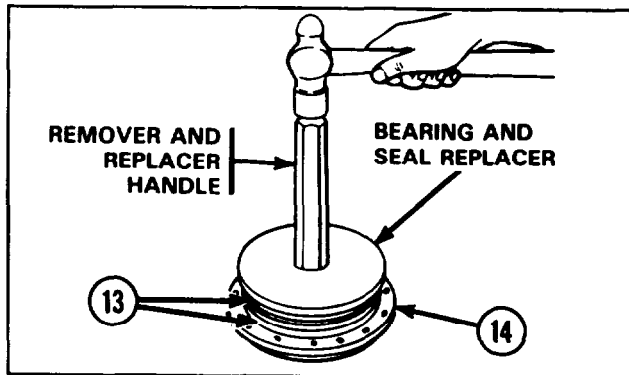
8 Install elevating secondary carrier (6) in internal sun gear shaft (2).



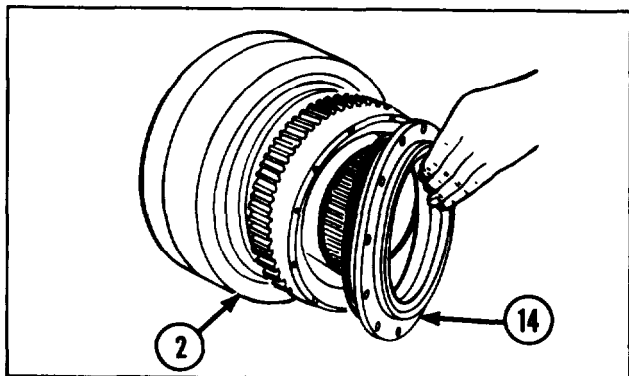
9 Install new preformed packing (12) and two seals (13) in bearing retaining plate (14).



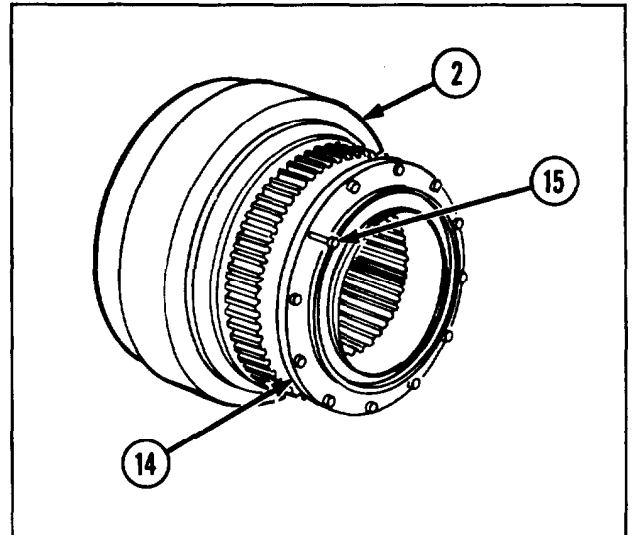
10 Using remover and replacer handle and bearing and seal replacer, press two seals (13) into bearing retaining plate (14).



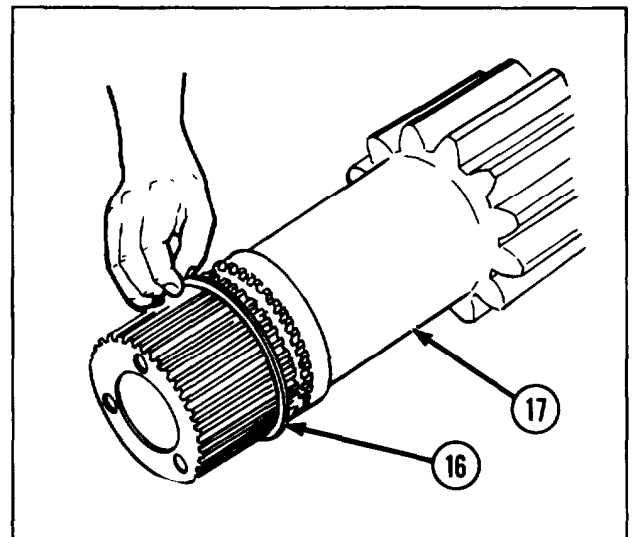
11 Install bearing retaining plate (14) in internal sun gear shaft (2).



- 12 Secure bearing retaining plate (14) to internal sun gear shaft (2) with 12 cap-screws (15).

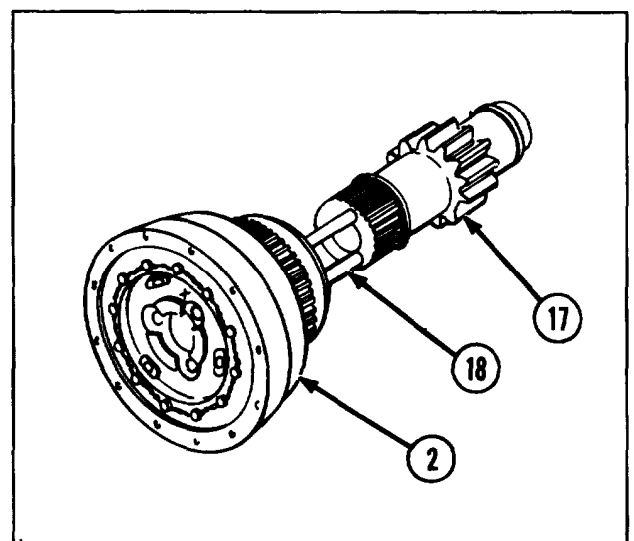


- 13 Install new preformed packing (16) on spur elevating pinion gear (17).



- 14 Install three studs (18), 0.625 in. (1.588 cm) in diameter and 8.00 in. (20.32 cm) long, in holes in spur elevating pinion gear (17).

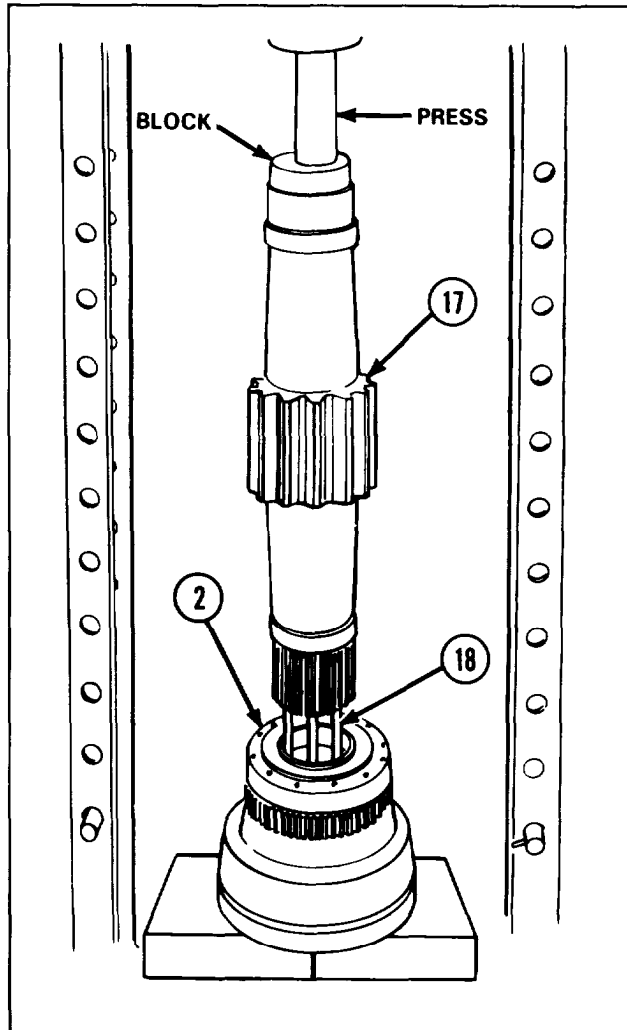
- 15 Install spur elevating pinion gear (17) into internal sun gear shaft (2) so that index marks align.



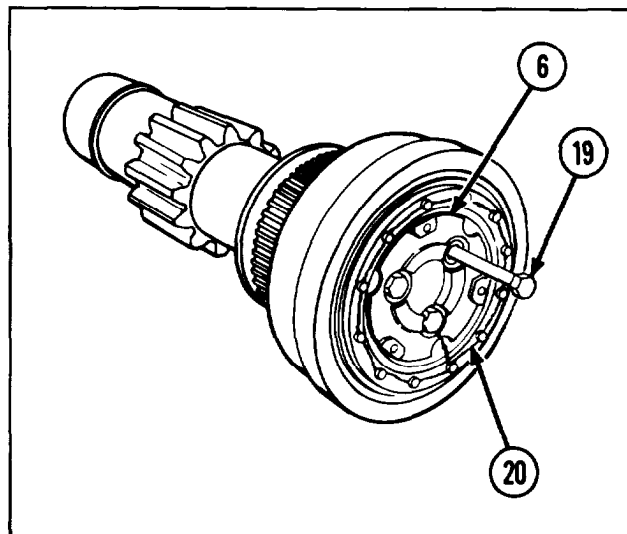
2-53. MAINTENANCE OF ELEVATING FINAL DRIVE ASSEMBLY AND SPEED GEAR ASSEMBLY (CONT).

REASSEMBLY (CONT)

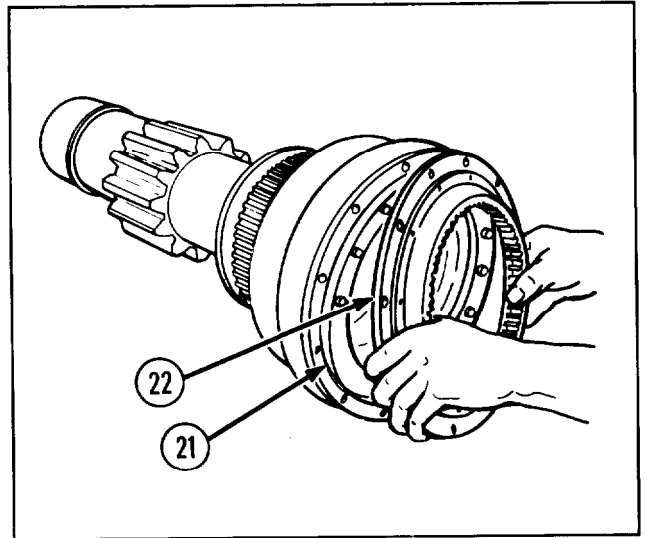
- 16 Using press and block, press spur elevating pinion gear (17) into bore of internal sun gear shaft (2). Remove three studs (18).



- 17 Install three capscrews (19) and new lockwire (20) (item 16, appx B) in elevating secondary carrier (6).



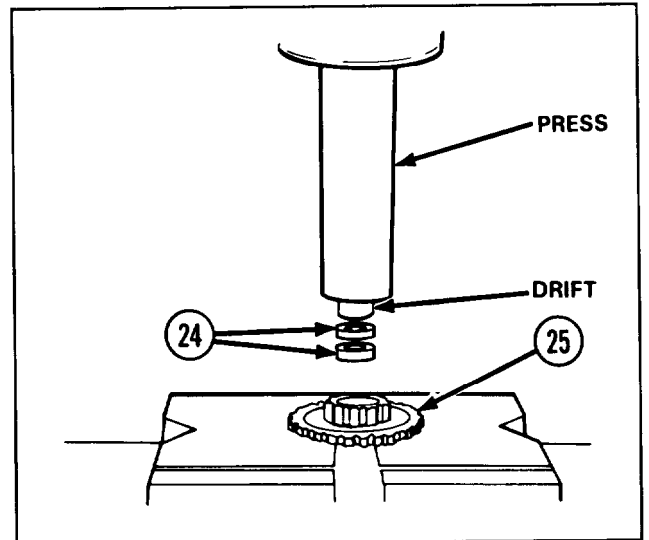
- 18 Install new primary ring gear cover gasket (21) and internal primary ring gear (22).



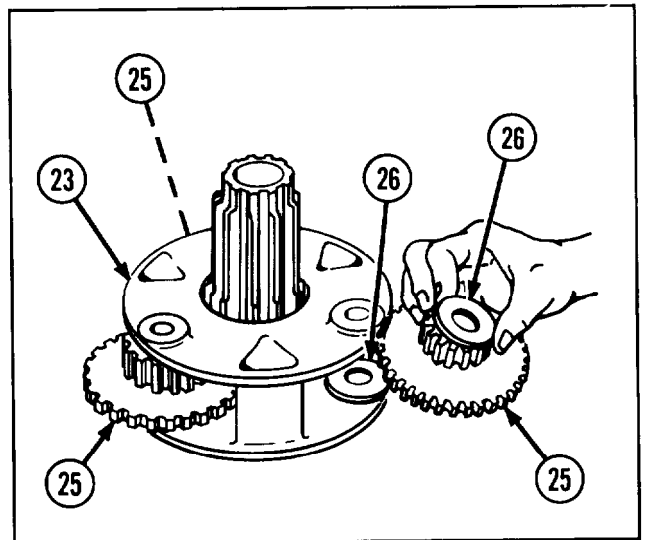
NOTE

Steps 19 thru 22 refer to the re-assembly of the speed gear assembly (23).

- 19 Using press and drift, install two roller bearings (24) on each of three traversing cluster gears (25).



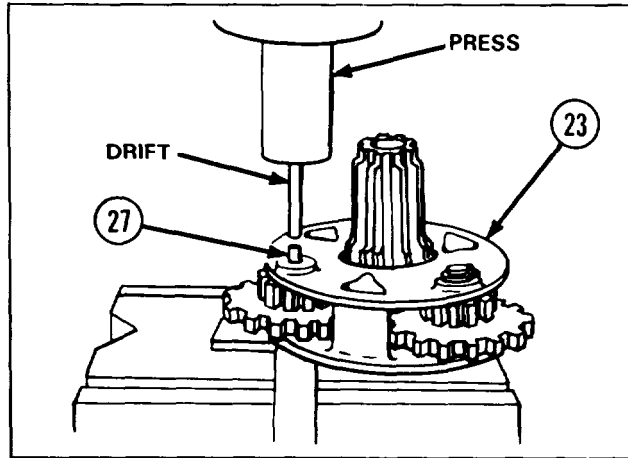
- 20 Install three traversing cluster gears (25) and six thrust washer bearings (26) in speed gear assembly (23).



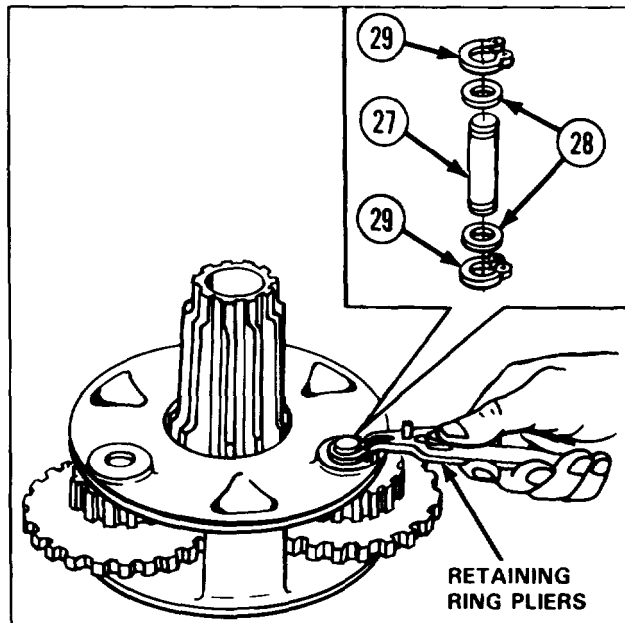
2-53. MAINTENANCE OF ELEVATING FINAL DRIVE ASSEMBLY AND SPEED GEAR ASSEMBLY (CONT).

REASSEMBLY (CONT)

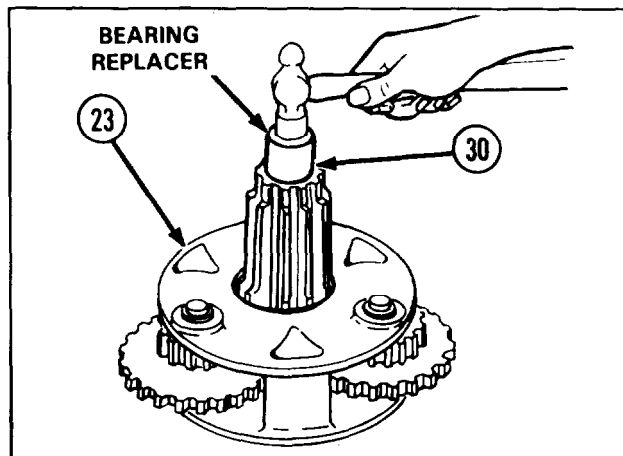
21 Using press and drift, install three headless grooved pins (27) into speed gear assembly (23).



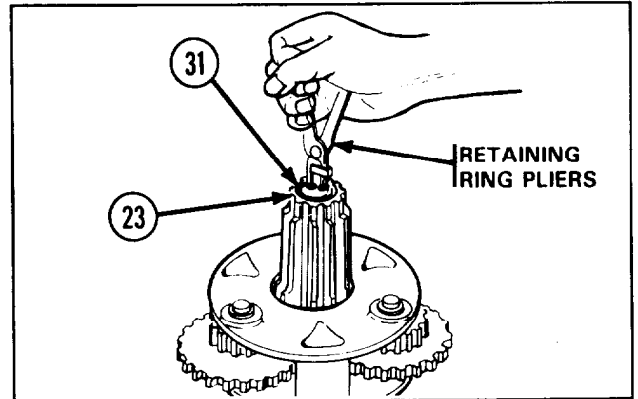
22 Install two thrust washer bearings (28) and use retaining ring pliers to install two retaining rings (29) on ends of three headless grooved pins (27).



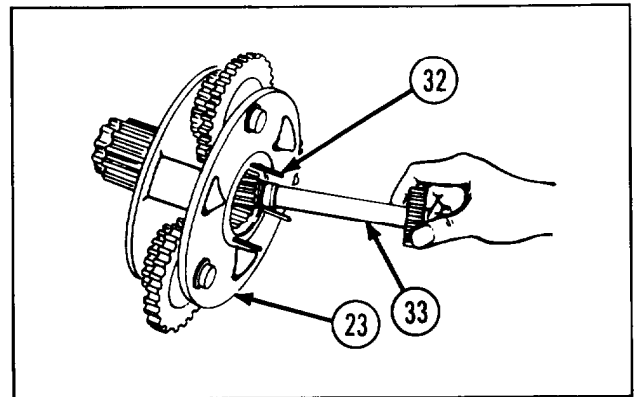
23 Using bearing replacer, install ball bearing (30) in bore of speed gear assembly (23).



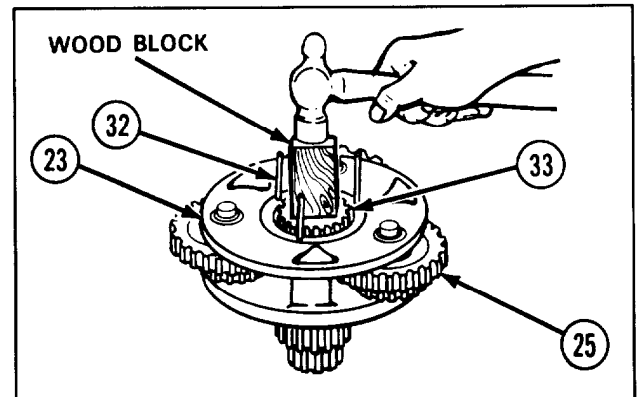
- 24 Using retaining ring pliers, install retaining ring (31) in bore of speed gear assembly (23).



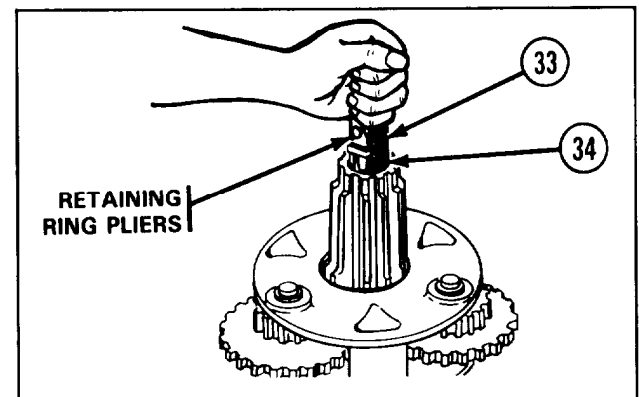
- 25 Install three alignment wires (32), 0.125 in. (0.318 cm) in diameter and 6.00 in. (15.24 cm) long, through speed gear assembly (23).



- 26 Position spur primary gearshaft (33) for installation as shown.



- 27 Using wood block, install spur primary gearshaft (33) in speed gear assembly (23). Make sure spur primary gearshaft (33) meshes with cluster gears (25). Remove alignment wires (32).

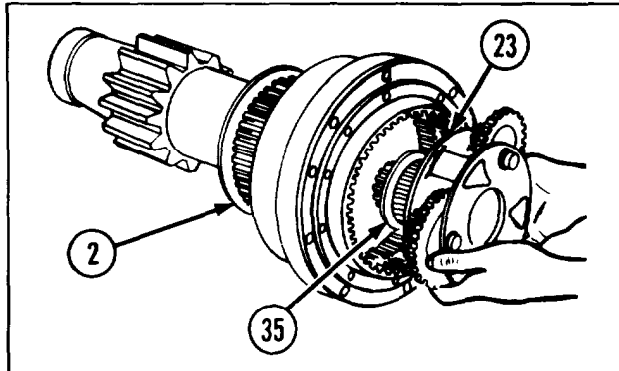


- 28 Using retaining ring pliers, install retaining ring (34) on spur primary gearshaft (33).

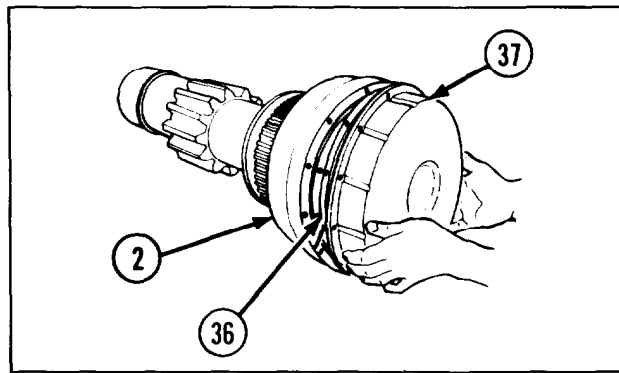
2-53. MAINTENANCE OF ELEVATING FINAL DRIVE ASSEMBLY AND SPEED GEAR ASSEMBLY (CONT).

REASSEMBLY (CONT)

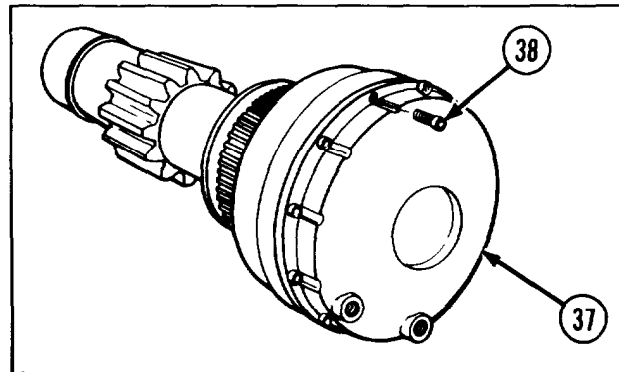
- 29 Install flat washer (35) and speed gear assembly (23) in internal sun gear shaft (2).



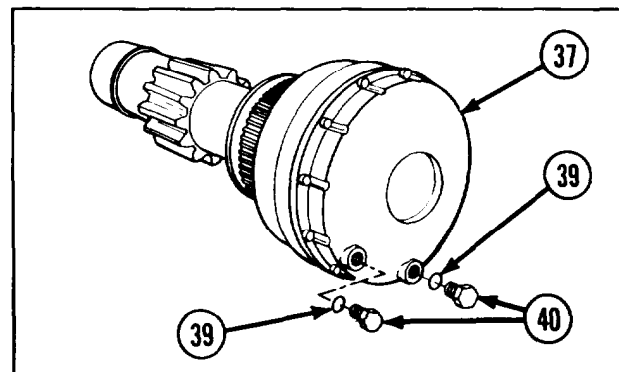
- 30 Install new primary ring gear cover gasket (36) and primary ring gear access cover (37) on internal sun gear shaft (2).



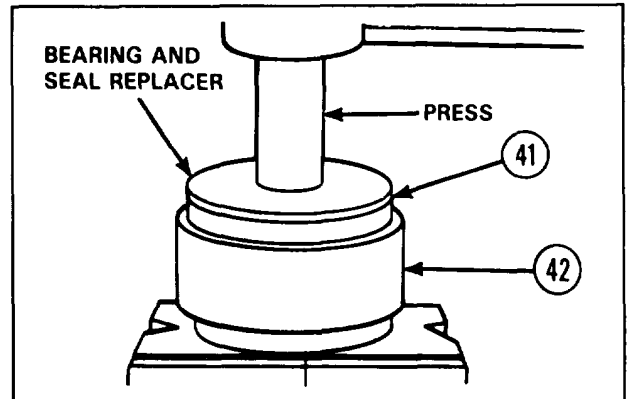
- 31 Install 12 capscrews (38) on primary ring access cover (37). Refer to appendix D for torque requirements.



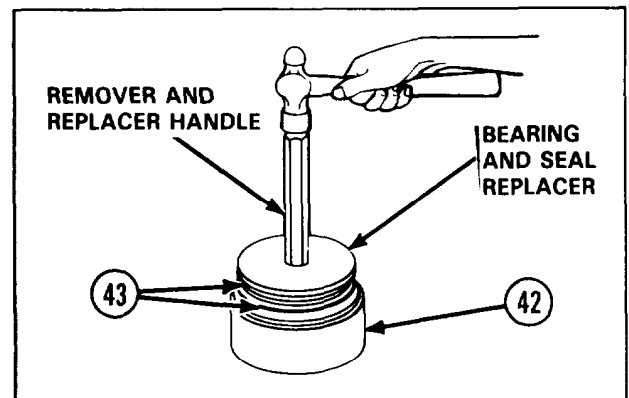
- 32 Install two preformed packings (39) and two machine thread plugs (40) in primary ring access cover (37).



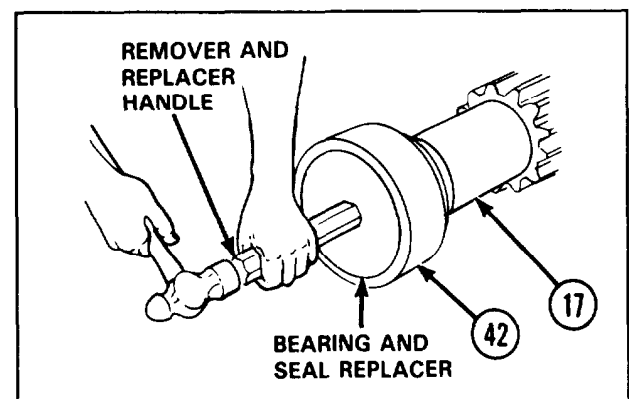
- 33 Using press and bearing and seal replacer, install roller bearing (41) in retaining plate (42).



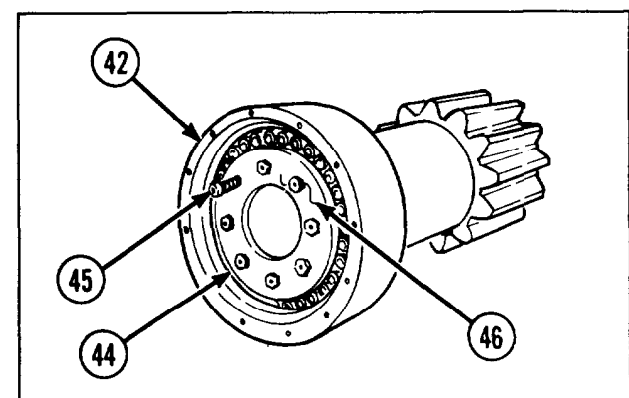
- 34 Using remover and replacer handle and bearing and seal replacer, install two new seals (43) in retaining plate (42).



- 35 Using remover and replacer handle and bearing and seal replacer, install retaining plate (42) on spur elevating pinion gear (17).



- 36 Install drive shaft bearing retaining plate (44) on retaining plate (42) and secure using eight machine bolts (45) and new lockwire (46) (item 16, appx B). Refer to appendix D for torque requirements.



2-53. MAINTENANCE OF ELEVATING FINAL DRIVE ASSEMBLY AND SPEED GEAR ASSEMBLY (CONT).

INSTALLATION

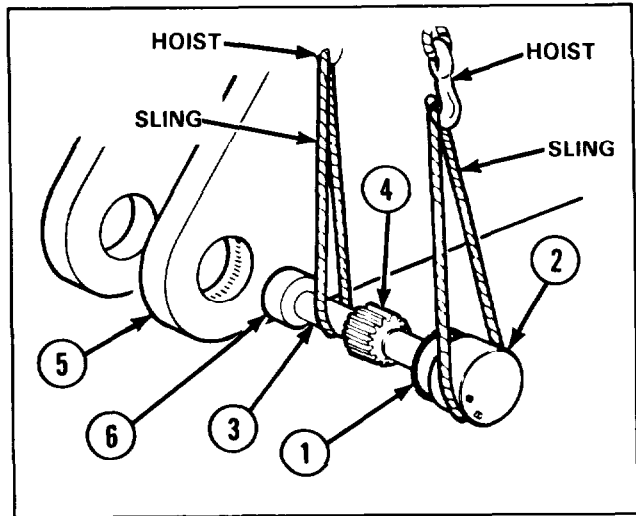
1 Install two new preformed packings (1).

NOTE

Drive assembly weighs about 1400 lb (635 kg).

2 Install wire rope sling around gear housing (2) using a hoist of at least 2000 lb (907 kg) lifting capability.

3 Install wire rope sling around pinion gear shaft (3) using a second hoist of at least 2000 lb (907 kg) lifting capability.

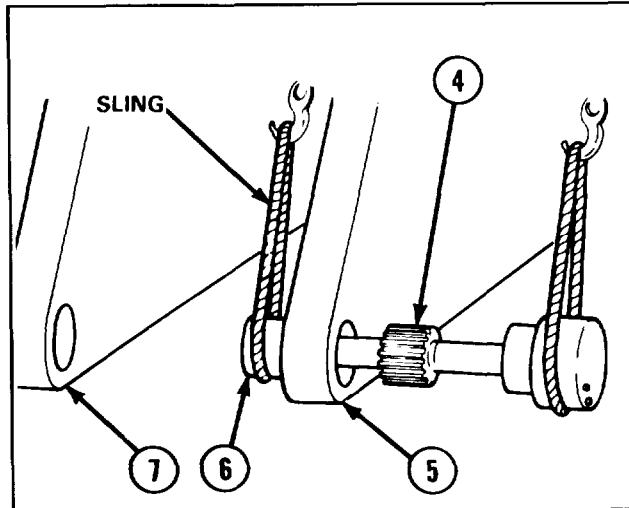


4 Lift and push drive assembly (4) through trunnion (5) until part of bearing housing (6) clears trunnion (5).

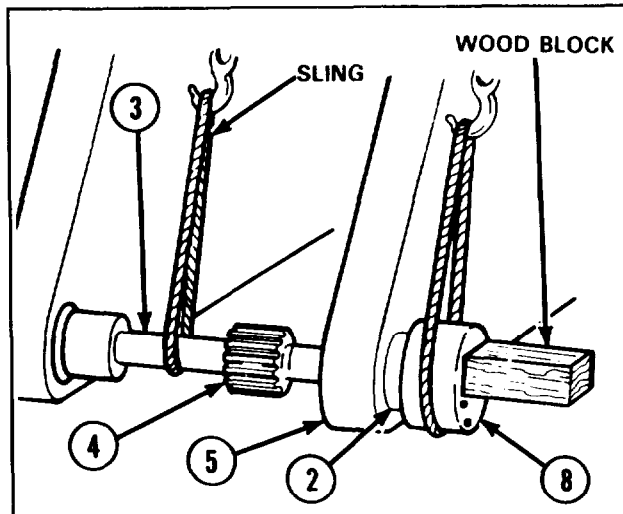
5 Support drive assembly (4) with bearing housing (6) resting inside trunnion (5).

6 Reposition inside sling on bearing housing (6).

7 Move drive assembly (4) through trunnion (5) until bearing housing (6) reaches trunnion (7).



8 Place wood block against gear cover (8).

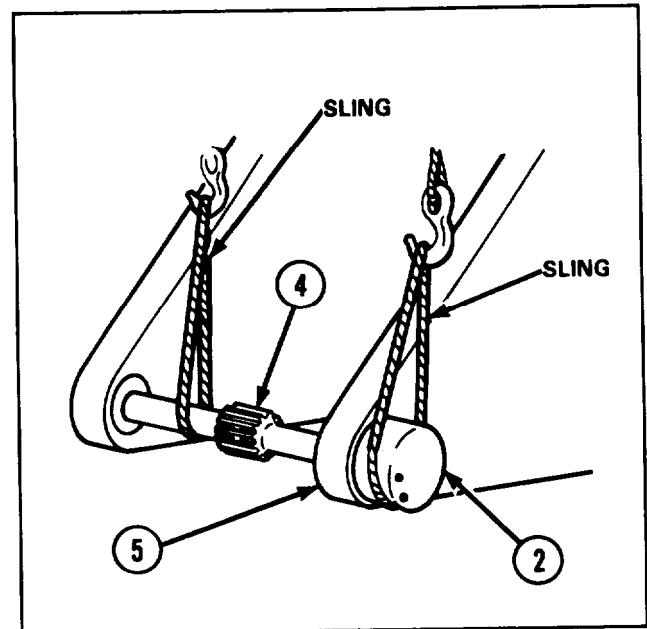


CAUTION

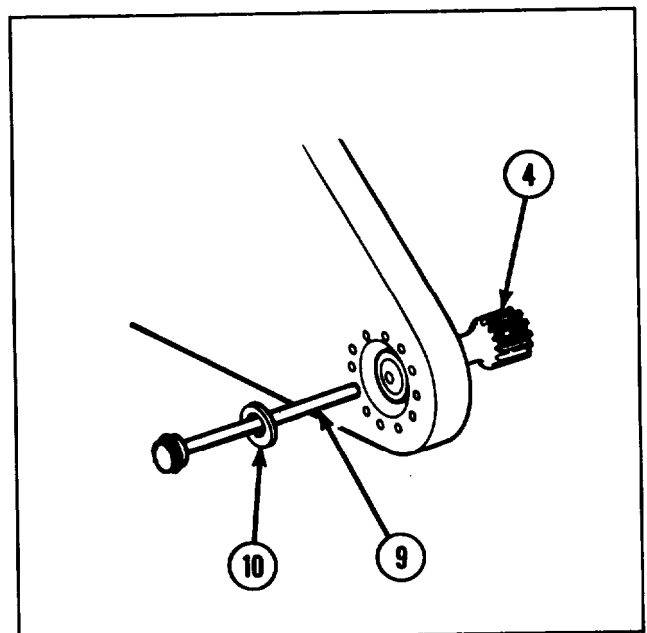
Take care to prevent damage to trunnion machined surfaces from drive assembly.

- 9 Tap wood block with hammer to begin driving gear housing (2) into left trunnion (5). Align gear housing with threaded surface inside trunnion (5).
- 10 Reposition inside sling around pinion gear shaft (3).

- 11 Install drive assembly (4) until gear housing (2) is set in place in trunnion (5).
- 12 Remove slings from drive assembly (4).



- NOTE**
- Position drain hole at bottom of internal sun gear shaft.
- 13 Install straight shaft (9) with thrust washer bearing (10) into drive assembly (4).



2-54. MAINTENANCE OF LOADER-RAMMER INSTALLATION—PIVOT ARM AND RELATED PARTS.

This task covers:	a. <i>Relieving Hydraulic Pressure</i> b. <i>Removal</i> c. <i>Inspection/Repair</i>	d. <i>Installation</i> e. <i>Applying Hydraulic Pressure</i>
-------------------	--	---

INITIAL SETUP

Tools and Special Tools

Hoist, 4000 lb (1814 kg) lifting capability
 Ordnance artillery and turret mechanic's
 tool kit (SC 5180-95-CL-A12)
 Replacer (10908799)
 Sling
 Torque wrench (A-A-2411)

Materials/Parts

Grease (item 12, appx 8)
 Lockwasher (4) (MS35338-46)
 Lockwasher (8) (MS35338-48)
 Lockwasher (MS35338-51)
 Lockwasher (2) (MS35338-65)
 Self-locking nut (16) MS21044N6)
 Self-locking nut (MS21044N10)
 Self-locking nut (MS21044N12)

References

TM 9-2350-304-20-2
 TM 9-2350-304-24P-2

Personnel Required

Two

Equipment Conditions

Loader-rammer partially disassembled (TM
 9-2350-304-20-2)
 Rammer cylinder removed (TM
 9-2350-304-20-2)
 2-419 Hydraulic manifold removed

General Safety Instructions



- Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as level ground as possible. This will stop the cannon from sliding out of battery.
- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.
- Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

RELIEVING HYDRAULIC PRESSURE

WARNING

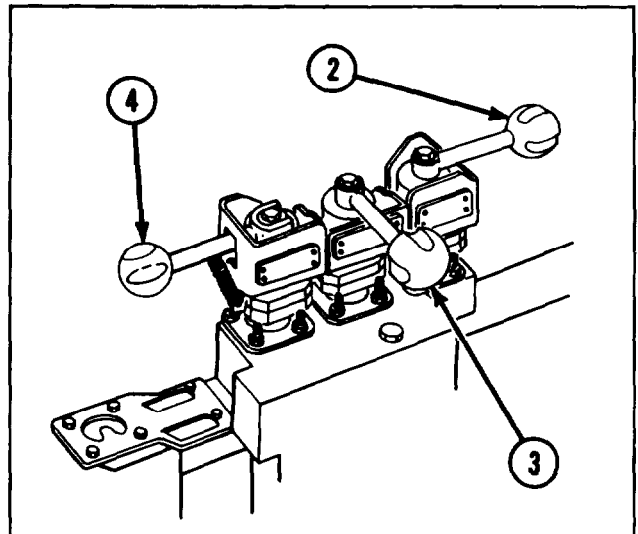
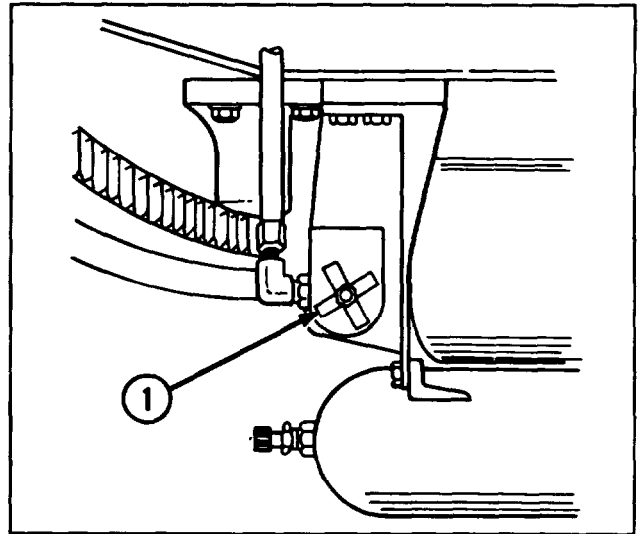
Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as level ground as possible. This will stop the cannon from sliding out of battery.

- 1 Set MASTER switch to OFF.
- 2 Open globe angle valve (1).
- 3 Move SWING control handle (2) to full LOAD.
- 4 Move SWING control handle (2) to full STOW.
- 5 Repeat steps 3 and 4 several times to relieve pressure from system.
- 6 Move LOADER control handle (3) to full IN.
- 7 Move LOADER control handle (3) to full OUT.
- 8 Repeat steps 6 and 7 several times to relieve pressure from system.

CAUTION

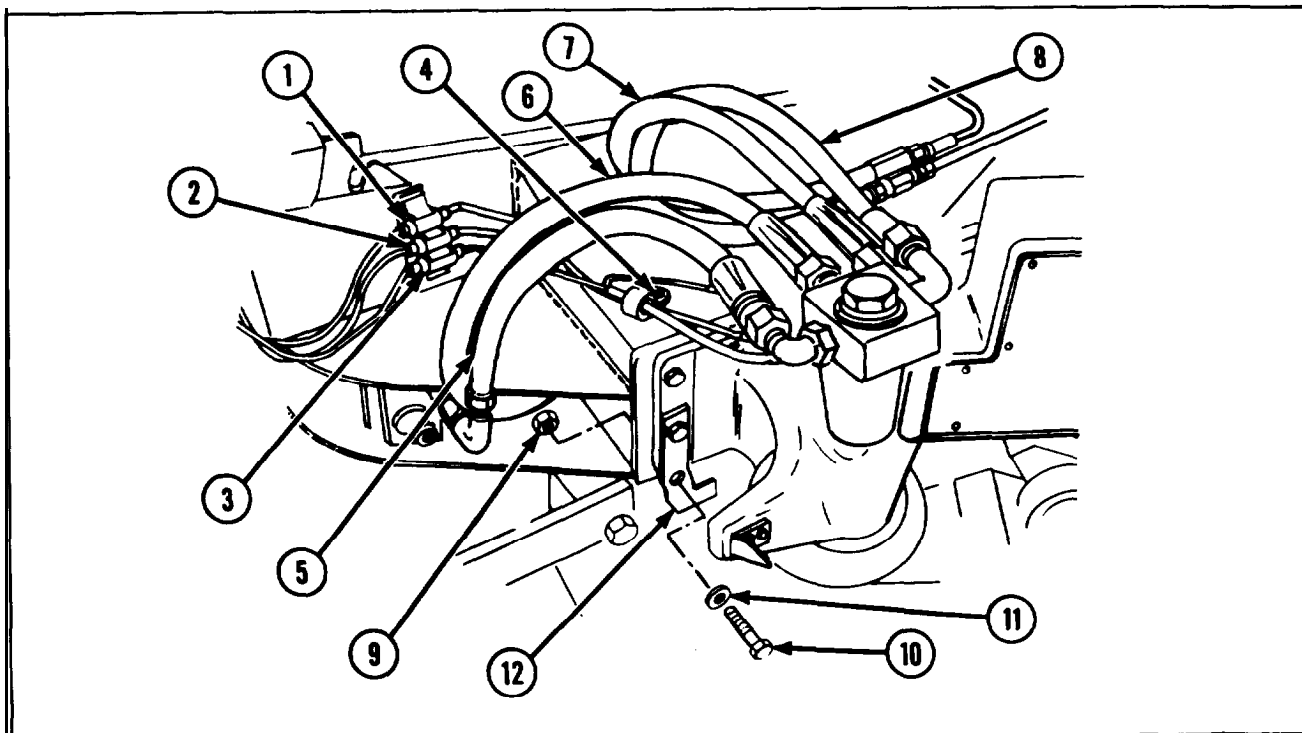
Do not operate RAMMER control handle without a projectile in the trough.

- 9 Move RAMMER control handle (4) to RAM several times to relieve pressure from system.



2-54. MAINTENANCE OF LOADER-RAMMER INSTALLATION—PIVOT ARM AND RELATED PARTS (CONT).

REMOVAL



WARNING

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

1 Disconnect three electrical connectors (1, 2, and 3).

2 Remove screw (4).

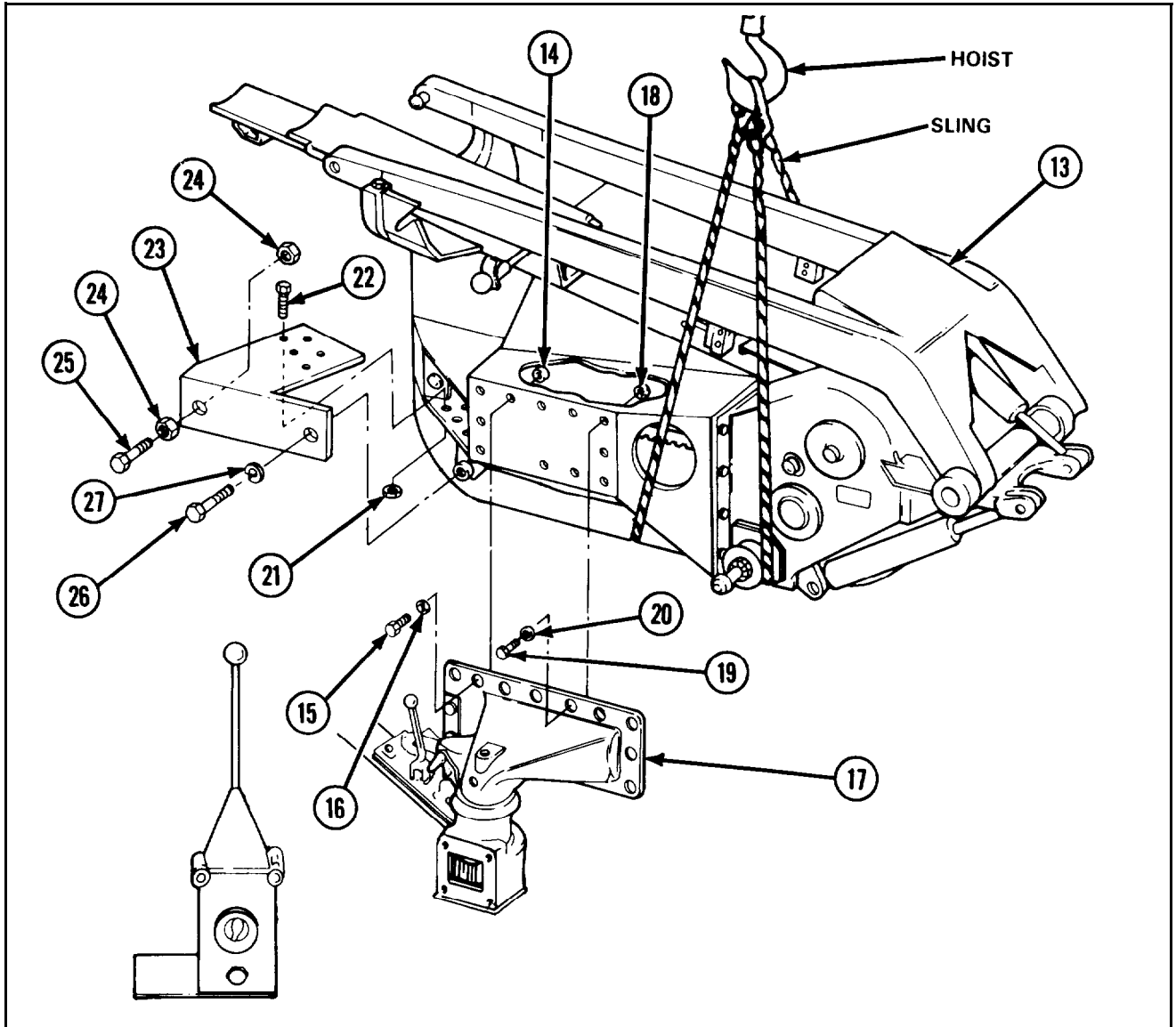
WARNING

Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

3 Disconnect four hydraulic hoses (5, 6, 7, and 8) on each end of rammer traversing cylinder assembly.

4 Cover hose openings and cap fittings.

5 Remove two self-locking nuts (9), two capscrews (10), two flat washers (11), and rammer-loader plate (12).

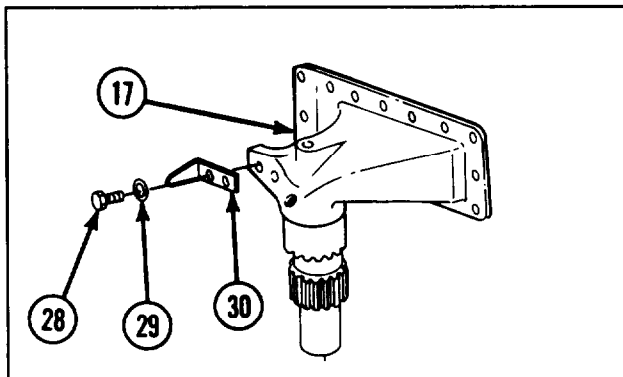


- 6 Support power loader-rammer (13) with sling and hoist of at least 4000 lb (1814 kg) lifting capability.
- 7 Remove eight self-locking nuts (14), eight cap screws (15), and eight flat washers (16) from support arm (17).
- 8 Remove self-locking nut (18), cap screw (19), and flat washer (20).
- 9 Remove power loader-rammer (13).
- 10 Remove five self-locking nuts (21) and five cap screws (22) from weldment bracket (23).
- 11 Loosen two self-locking nuts (24) and remove cap screw (25) and two self-locking nuts from weldment bracket (23).
- 12 Remove cap screw (26), lockwasher (27), and weldment bracket (23).

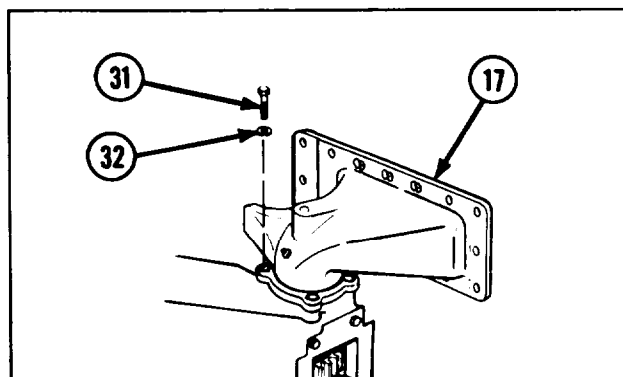
2-54. MAINTENANCE OF LOADER-RAMMER INSTALLATION—PIVOT ARM AND RELATED PARTS (CONT).

REMOVAL (CONT)

13 Remove two capscrews (28), two lockwashers (29), and rammer control guide (30) from support arm (17).



14 Remove four capscrews (31) and four lockwashers (32).

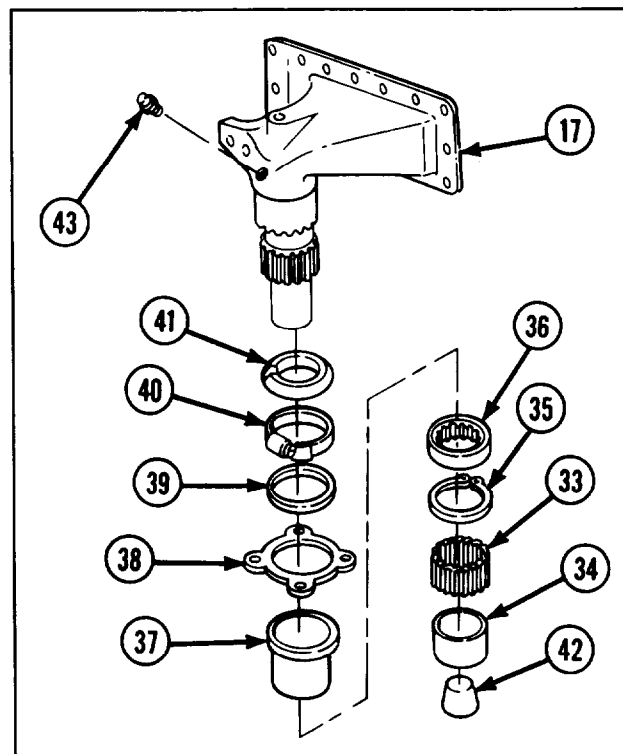


15 Remove support arm (17) with attached parts from trunnion support.

16 Remove spur gear (33).

17 If damaged, remove lower sleeve bearing (34). To remove lower sleeve bearing, split bearing with hammer and chisel.

18 Using retaining ring pliers, remove retaining ring (35), internal gear (36), upper sleeve bearing (37), retainer (38), recessed washer (39), hose clamp (40), and nonmetallic seal (41).



19 Remove pipe plug (42) from support arm (17).

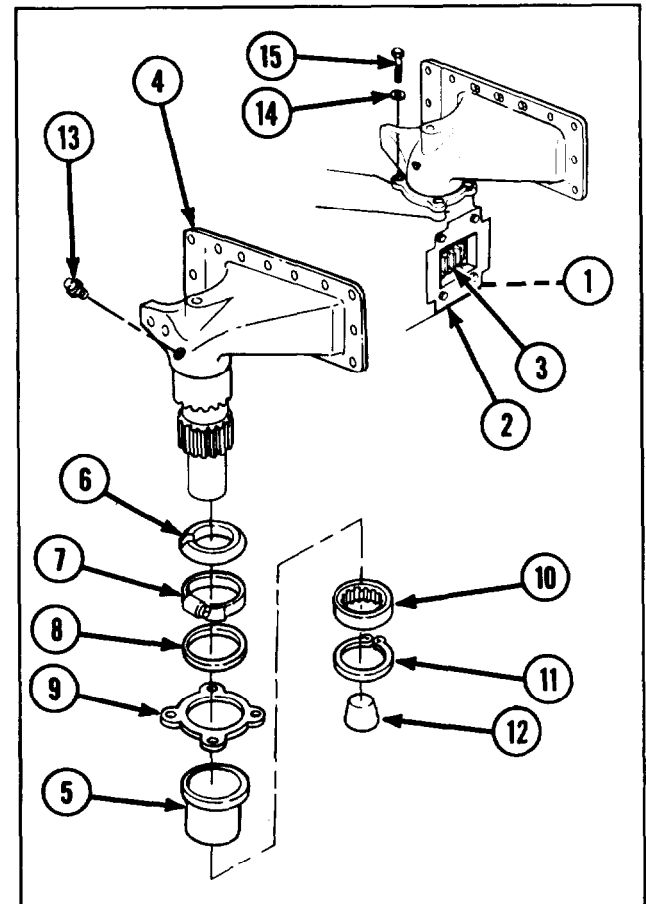
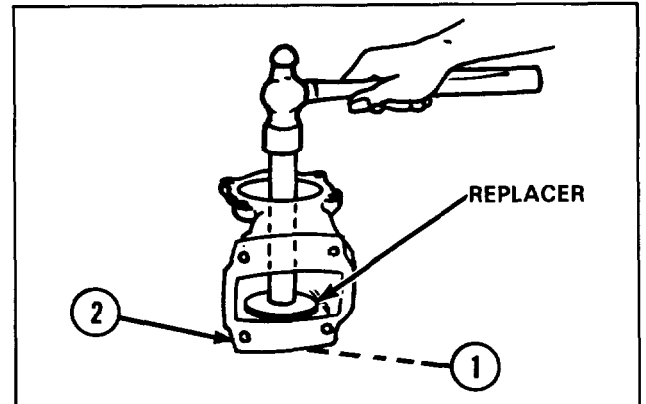
20 Remove lubrication fitting (43) from support arm (17).

INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 Traversing cylinder assembly is a repairable assembly. Refer to page 2-309.
- 3 Power loader-rammer is a repairable assembly. Refer to page 2-325.
- 4 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

INSTALLATION

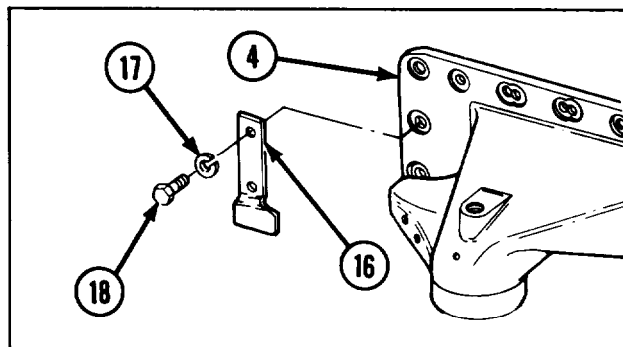
- 1 If removed, install lower sleeve bearing (1) in trunnion support (2) using replacer.
- 2 Lubricate lower sleeve bearing (1) with grease (item 12, appx 6).
- 3 Lubricate spur gear (3) with grease (item 12, appx 6).
- 4 Install spur gear (3) in trunnion support (2).
- 5 Lubricate splines of support arm (4) and upper sleeve bearing (5) with grease (item 12, appx 6) before installing them.
- 6 Install nonmetallic seal (6), hose clamp (7), recessed washer (8), retainer (9), upper sleeve bearing (5), internal gear (10), retaining ring (11), and pipe plug (12) on support arm (4). Install lubrication fitting (13) in support arm (4).
- 7 Install support arm (4) on trunnion support (2). Align splines of spur gear (3) with those of support arm (4) as support arm is lowered.
- 8 Secure support arm (4) with four new lockwashers (14) and four capscrews (15).



2-54. MAINTENANCE OF LOADER-RAMMER INSTALLATION—PIVOT ARM AND RELATED PARTS (CONT).

INSTALLATION (CONT)

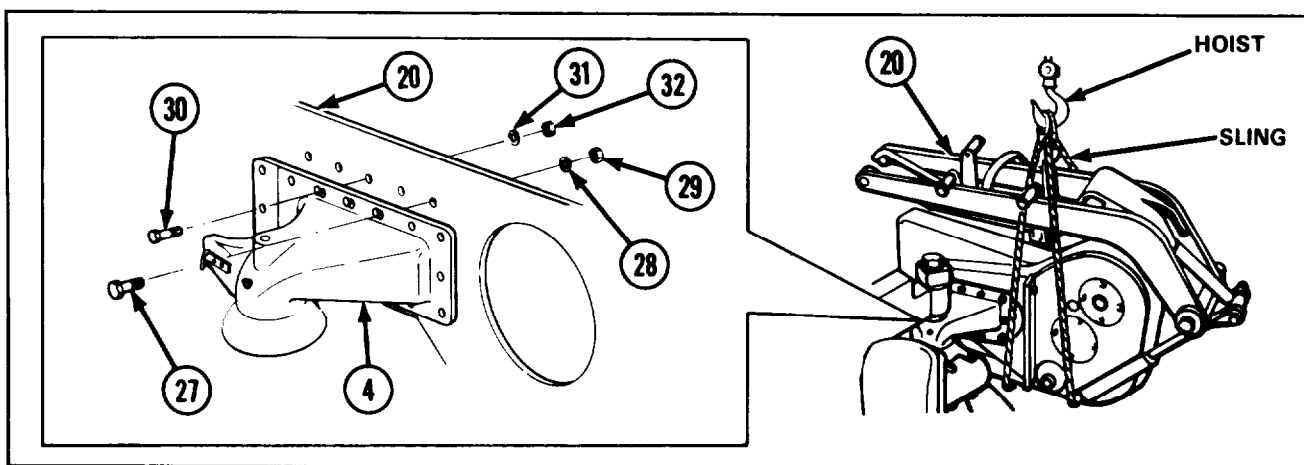
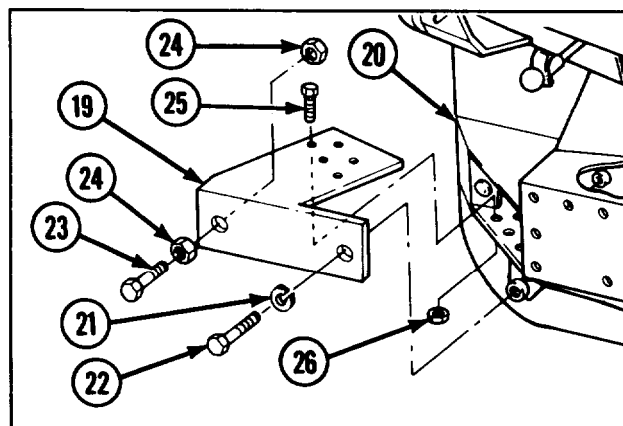
9 Position rammer control guide (16) on support arm (4) and secure with two new lockwashers (17) and two cap-screws (18).



10 Position weldment bracket (19) on power loader-rammer (20) and secure with new lockwasher (21) and capscrew (22).

11 Install capscrew (23) and two new self-locking nuts (24) on weldment bracket (19).

12 Install five capscrews (25) and five new self-locking nuts (26) on weldment bracket (19).



NOTE

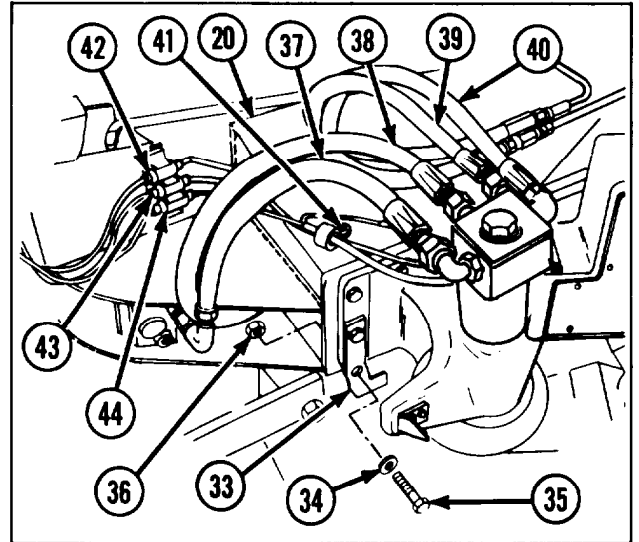
Install power loader-rammer in rear position of support arm.

13 Position power loader-rammer (20) against support arm (4) using sling and hoist of at least 4000 lb (1814 kg) lifting capability.

14 Install capscrew (27), flat washer (28), and new self-locking nut (29). Torque capscrew (27) to 110 to 120 ft-lb (149 to 162 N-m).

15 Install eight capscrews (30), eight flat washers (31), and eight self-locking nuts (32). Torque eight capscrews (30) to 32 to 35 ft-lb (43 to 47 N-m).

- 16 Position rammer-loader plate (33) on power loader-rammer (20) and secure with two flat washers (34), two cap-screws (35), and two new self-locking nuts (36).
- 17 Uncover hose openings and uncap fittings.
- 18 Connect four hydraulic hoses (37, 38, 39, and 40) on each end of rammer traversing cylinder assembly.
- 19 Install screw (41).
- 20 Connect three electrical connectors (42, 43, and 44).

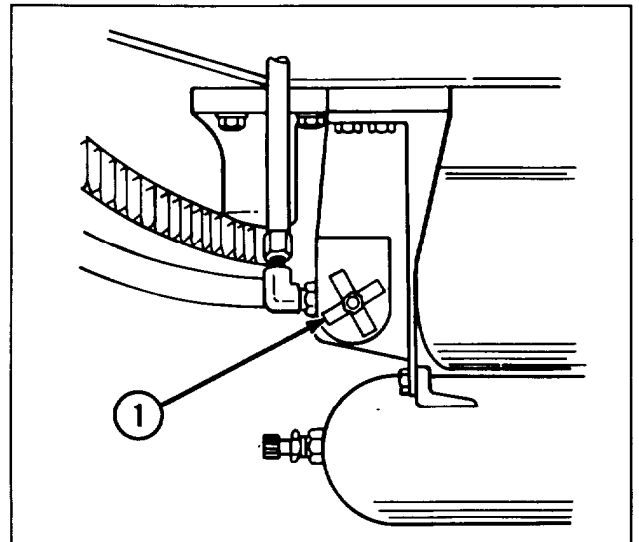


APPLYING HYDRAULIC PRESSURE

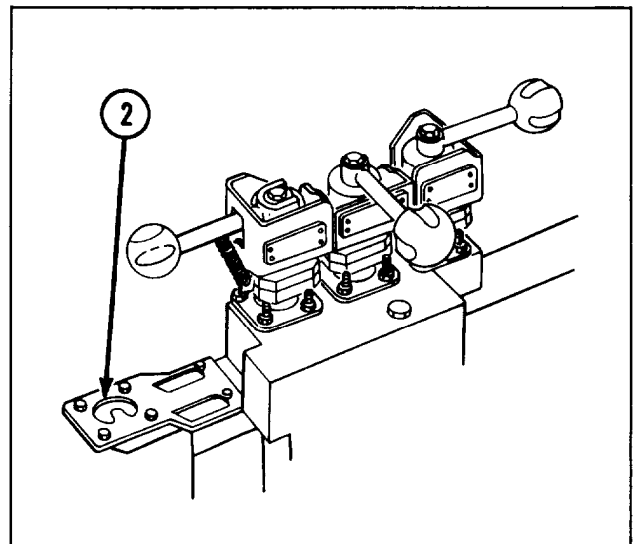
- 1 Close globe angle valve (1)
- 2 Start engine.

NOTE

Hydraulic motor and pump may be used to apply pressure to hydraulic system without starting engine by setting MASTER switch and OIL PUMP MOTOR Switch ON.



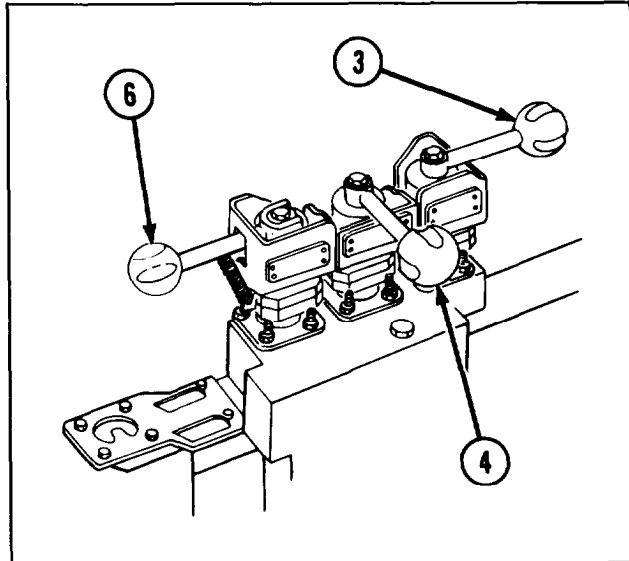
- 3 Set HYD PUMP/PTO CLUTCH switch to ON.
- 4 Check dial pressure gage (2) indication. Normal pressure is 1600 to 2400 psi (11,032 to 16,548 kPa).
- 5 Stop engine.



2-54. MAINTENANCE OF LOADER-RAMMER INSTALLATION—PIVOT ARM AND RELATED PARTS (CONT).

APPLYING HYDRAULIC PRESSURE (CONT)

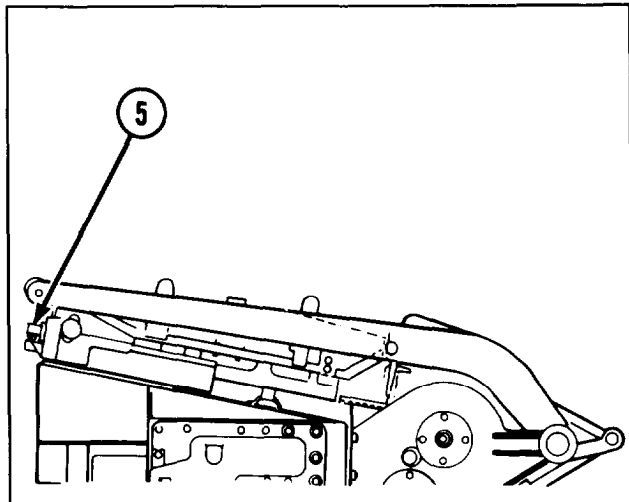
- 6 Traverse loader-rammer in and out of loading position several times, using SWING control handle (3) to bleed air from system.
- 7 Stop with loader-rammer in loading position.
- 8 Operate loader arms in and out several times, using LOADER control handle (4), to bleed air from system.
- 9 Stop with loader arms on tray.
- 10 Traverse loader-rammer to ram position using SWING control handle (3).
- 11 Extend tray into breach, making sure to engage tray interlock switch (5).



CAUTION

Do not operate RAMMER control handle without a projectile in the trough.

- 12 Extend and retract rammer several times using RAMMER control handle (6) to bleed air from system.
- 13 Stop with rammer chain in stowed position.
- 14 Place loader-rammer in stowed position.



2-55. MAINTENANCE OF RAMMER TRAVERSING CYLINDER ASSEMBLY.

This task covers:	a. <i>Disassembly</i>	c. <i>Reassembly</i>
	b. <i>Inspection/Repair</i>	d. <i>Testing</i>

INITIAL SETUP*Tools and Special Tools*

Artillery maintenance shop equipment (SC 4933-95-CL-A12)
 Spanner wrench
 Ordnance artillery and turret mechanic's tool kit (SC 5180-95-CL-A12)

References

TM 9-2350-304-24P-2
 TM 9-4940-468-14

Equipment Conditions

Rammer traversing cylinder assembly removed (TM 9-2350-304-20-2)

Materials/Parts

Hydraulic fluid (item 13, appx 8)
 Hydraulic parts kit (5703749)
 Lockwire (item 16, appx B)

DISASSEMBLY

- 1 Remove capscrew (1), lockwasher (2), cup washer (3), and rammer cylinder cup (4) from linear actuating head (5).
- 2 Using spanner wrench, remove linear actuating head (5) from traversing actuator sleeve (6).
- 3 Remove preformed packing (7) from linear actuating head (5).
- 4 Cut, remove, and discard two lockwires (8).

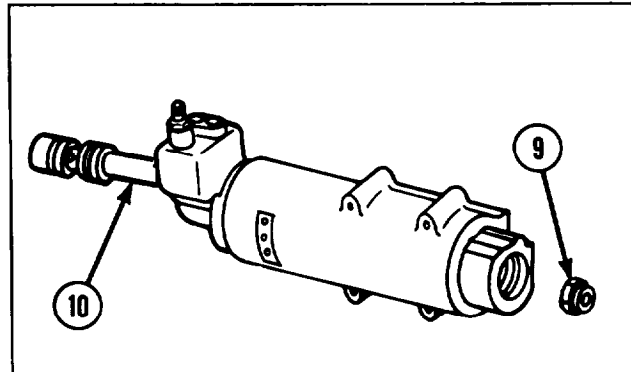
2-55. MAINTENANCE OF RAMMER TRAVERSING CYLINDER ASSEMBLY (CONT).

DISASSEMBLY (CONT)

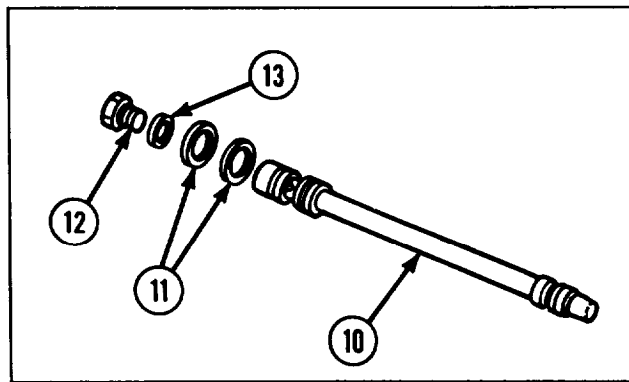
CAUTION

Be careful not to nick or scratch piston rod.

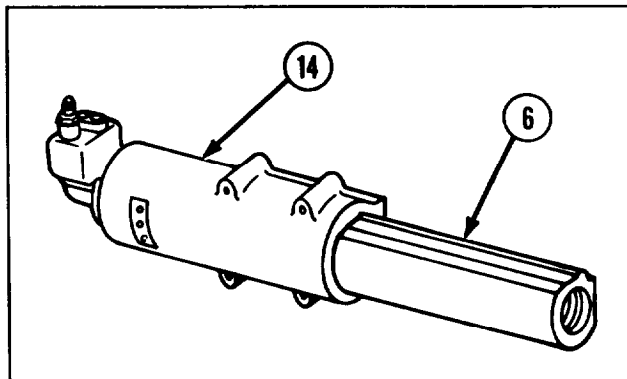
- 5 Using socket wrench, remove self-locking nut (9) from piston rod (10). Remove piston rod (10).



- 6 Remove two preformed packings (11) from piston rod (10).
- 7 Remove machine thread plug (12) and preformed packing (13) from piston rod (10).



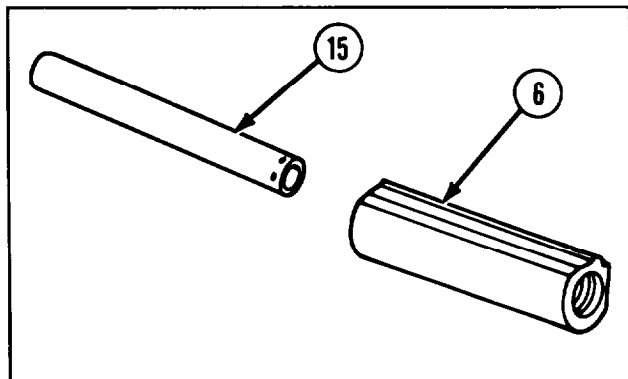
- 8 Remove traversing sleeve (6) from traversing actuating cylinder (14).



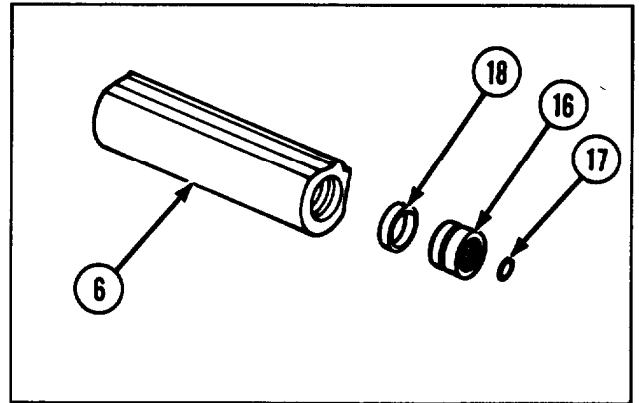
CAUTION

Be careful not to nick or scratch traversing piston rod.

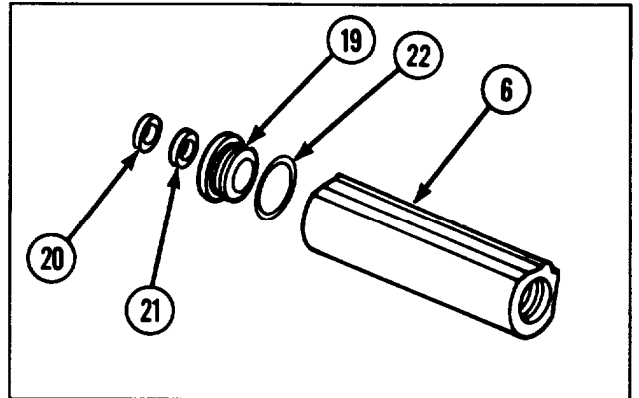
- 9 Remove traversing piston rod (15) from traversing sleeve (6).



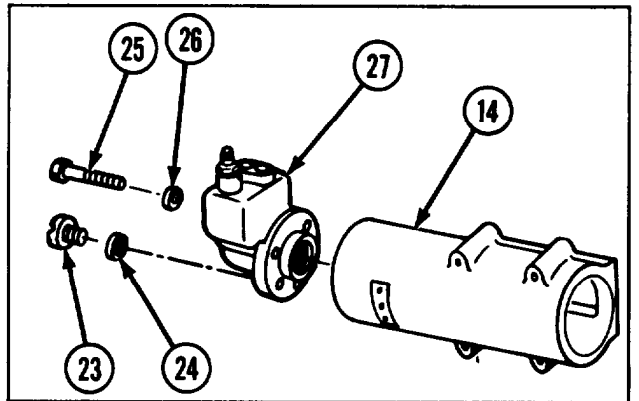
- 10 Remove hydraulic piston (16) from traversing sleeve (6).
- 11 Remove preformed packing (17) and packing assembly (18) from hydraulic piston (16).



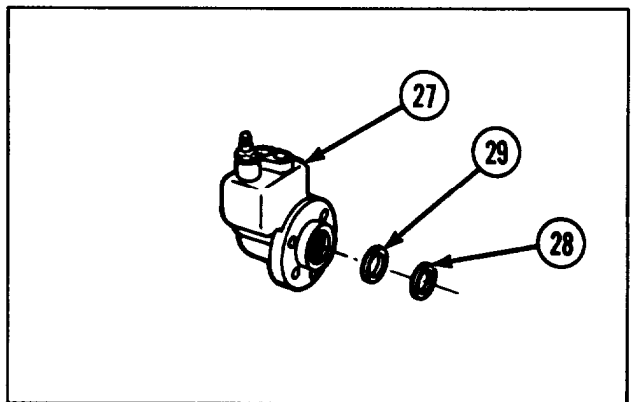
- 12 Remove machine thread bushing (19) from traversing sleeve (6).
- 13 Remove plain encased seal (20), adapter seal (21), and preformed packing (22) from machine thread bushing (19).



- 14 Remove three capscrews (23), three flat washers (24), two capscrews (25), two flat washers (26), and traversing manifold (27) from traversing actuating cylinder (14).



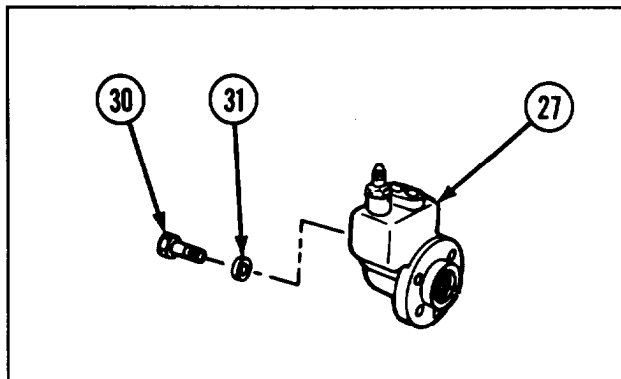
- 15 Remove packing retainer (28) and preformed packing (29) from traversing manifold (27).



2-55. MAINTENANCE OF RAMMER TRAVERSING CYLINDER ASSEMBLY (CONT).

DISASSEMBLY (CONT)

16 Remove machine thread plug (30) and preformed packing (31) from traversing manifold (27).

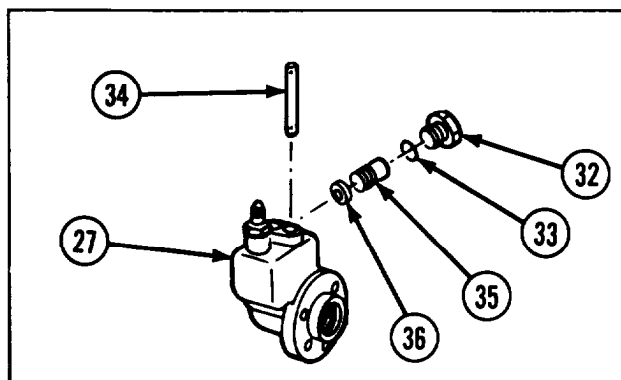


17 Remove four machine thread plugs (32) and four preformed packings (33) from traversing manifold (27).

18 Using long nose pliers, remove two retainer pins (34) from traversing manifold (27).

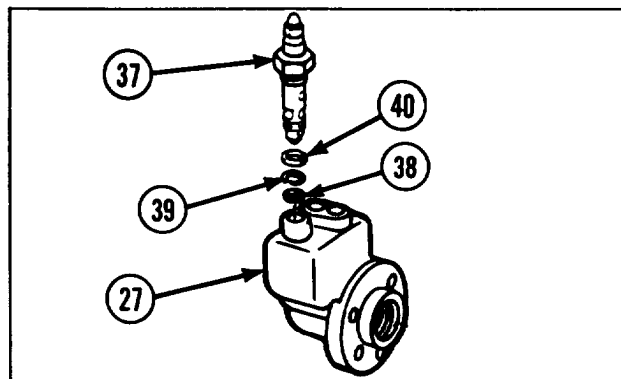
19 Remove four check valves (35) from traversing manifold (27).

20 Remove four preformed packings (36) from four check valves (35).

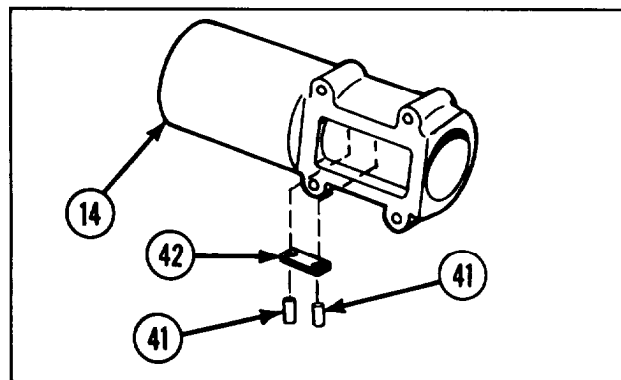


21 Remove cartridge relief valve (37) from traversing manifold (27).

22 Remove packing retainer (38), preformed packing (39), and preformed packing (40) from cartridge relief valve (37).



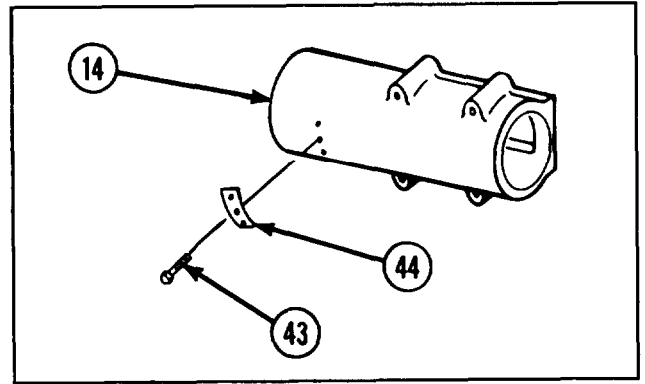
23 Drive out two spring pins (41) and remove key (42) from traversing actuating cylinder (14).



NOTE

Do not remove identification plate unless necessary for replacement or painting.

- 24 Remove three drive screws (43) and identification plate (44) from traversing actuating cylinder (14).

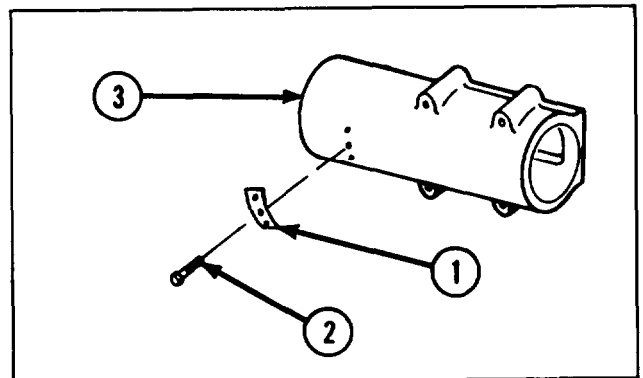


INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 If traversing actuating cylinder is broken, damaged, or missing, repair is by replacement of next higher assembly.
- 3 If traversing sleeve is broken, damaged, or missing, repair is by replacement of next higher assembly.
- 4 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

REASSEMBLY

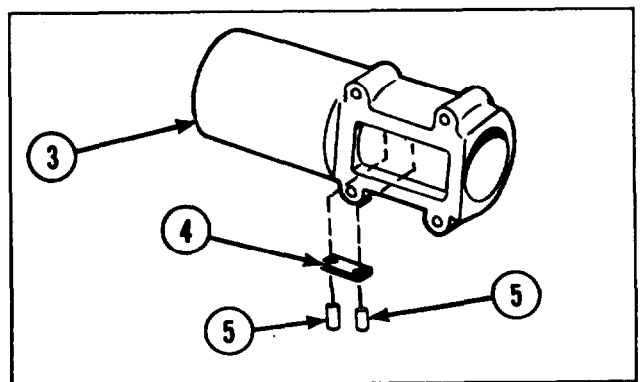
- 1 Lightly coat all packings, seals, and mating surfaces with new hydraulic fluid (item 13, appx B).
- 2 If removed, install identification plate (1) and three drive screws (2) on traversing actuating cylinder (3).



NOTE

Spring pins must not extend beyond face of key after installation.

- 3 Position new key (4) on inner face of traversing actuating cylinder (3) and secure with two new spring pins (5).



2-55. MAINTENANCE OF RAMMER TRAVERSING CYLINDER ASSEMBLY (CONT).

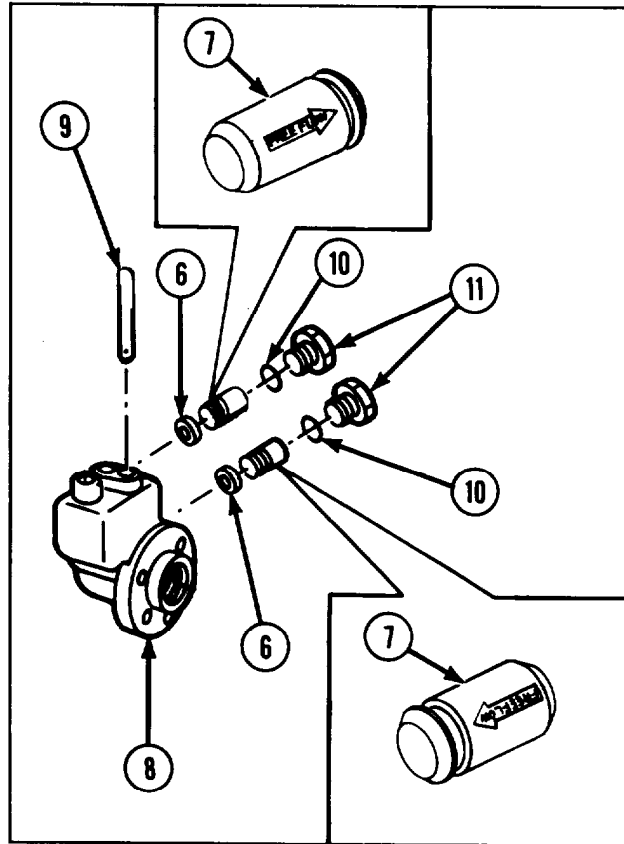
REASSEMBLY (CONT)

- 4 Install four new preformed packings (6) on four check valves (7).

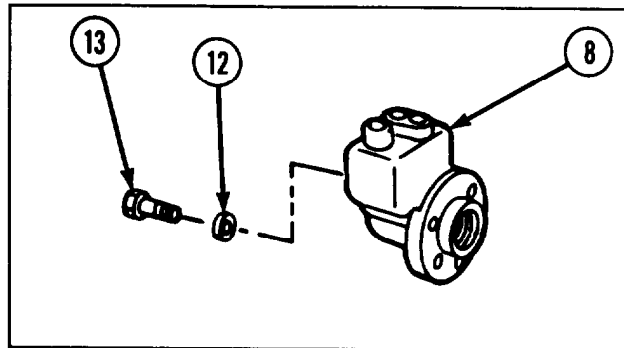
NOTE

Flow arrows on two upper valves must point toward plugs and flow arrows on two lower valves must point away from plugs.

- 5 Install four check valves (7) in traversing manifold (8).
- 6 Install two new retainer pins (9) in traversing manifold (8).
- 7 Install four new preformed packings (10) and four machine thread plugs (11) in traversing manifold (8).

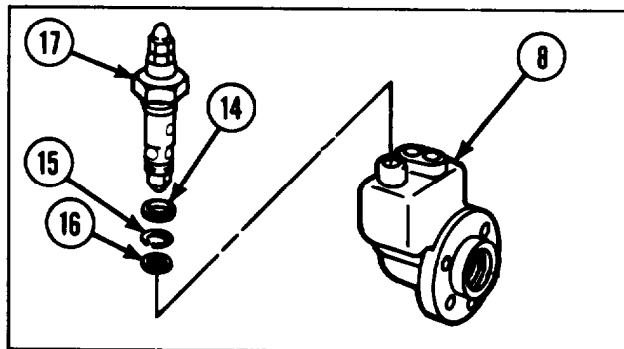


- 8 Install new preformed packing (12) and machine thread plug (13) in traversing manifold (8).

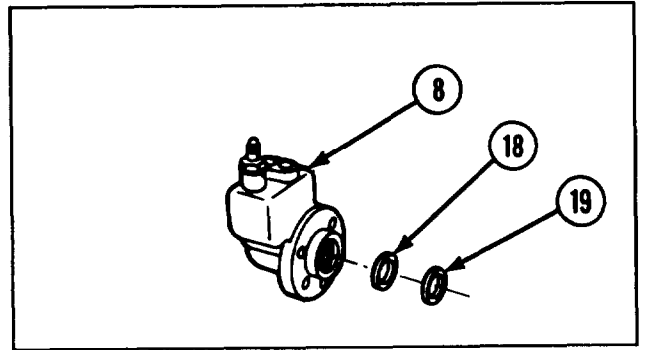


- 9 Install new preformed packing (14), new preformed packing (15), and new packing retainer (16) on cartridge relief valve (17).

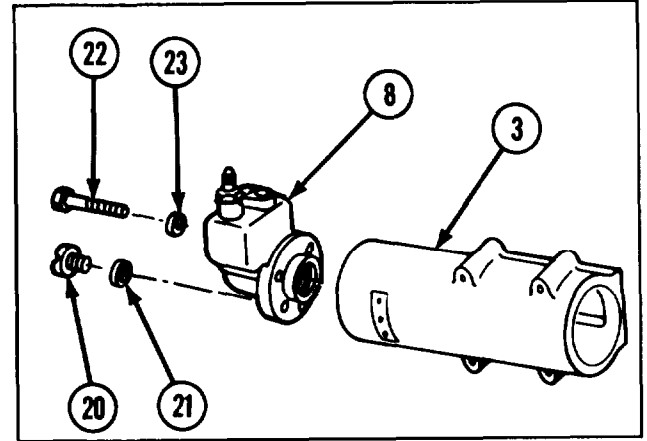
- 10 Install cartridge relief valve (17) on traversing manifold (8).



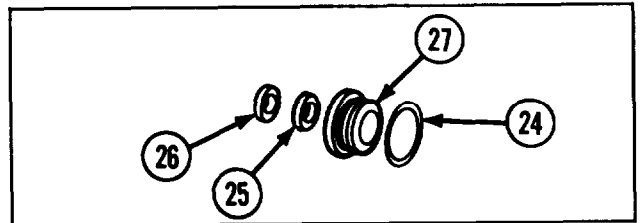
- 11 Install new preformed packing (18) and new packing retainer (19) in traversing manifold (8).



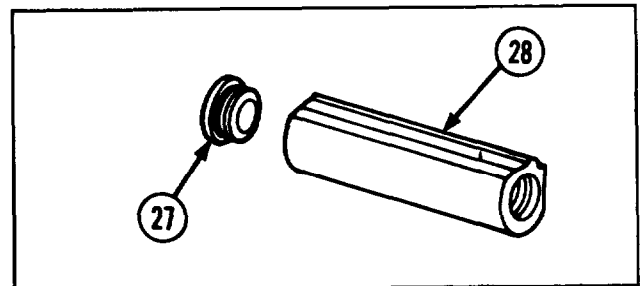
- 12 Position traversing manifold (8) on traversing actuating cylinder (3) and secure with three capscrews (20), three flat washers (21), two capscrews (22), and two flat washers (23).



- 13 Install new preformed packing (24), new adapter seal (25), and new plain encased seal (26) on machine thread bushing (27).



- 14 Install machine thread bushing (27) in traversing sleeve (28).



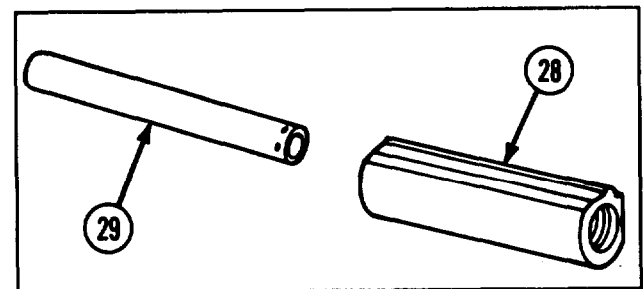
CAUTION

Be careful not to nick or scratch traversing piston rod.

NOTE

Holes in traversing piston rod go inside traversing sleeve.

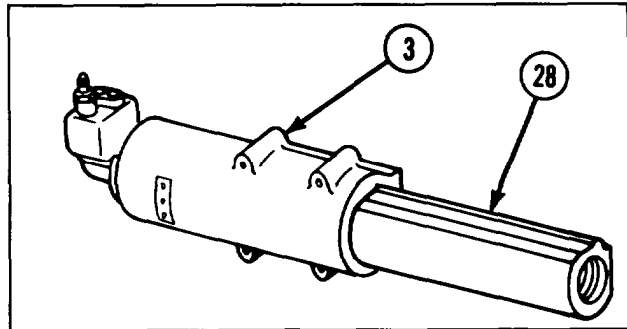
- 15 Install traversing piston rod (29) in traversing sleeve (28).



2-55. MAINTENANCE OF RAMMER TRAVERSING CYLINDER ASSEMBLY (CONT).

REASSEMBLY (CONT)

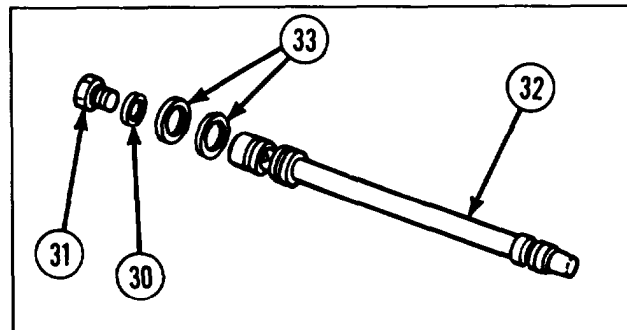
- 16 Install traversing sleeve (28) in traversing actuating cylinder (3).



CAUTION

Be careful not to nick or scratch piston rod.

- 17 Install new preformed packing (30) and new machine thread plug (31) in piston rod (32).

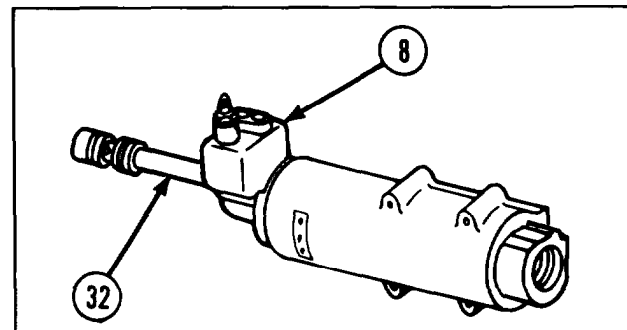


- 18 Install two new preformed packings (33) on piston rod (32).

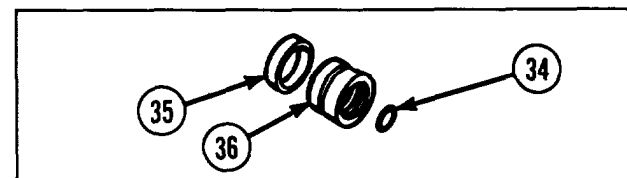
CAUTION

Be careful not to nick or scratch piston rod.

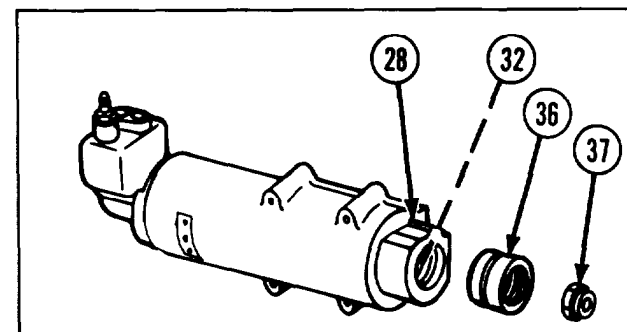
- 19 Install piston rod (32) in traversing manifold (8).



- 20 Install new preformed packing (34) and new packing assembly (35) in hydraulic piston (36).



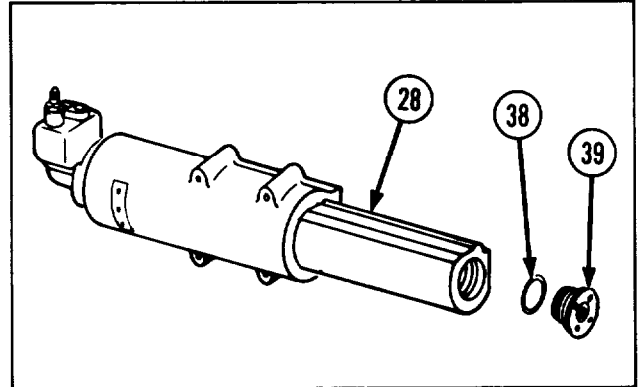
- 21 Install hydraulic piston (36) in traversing sleeve (28) and carefully push hydraulic piston (36) onto piston rod (32).



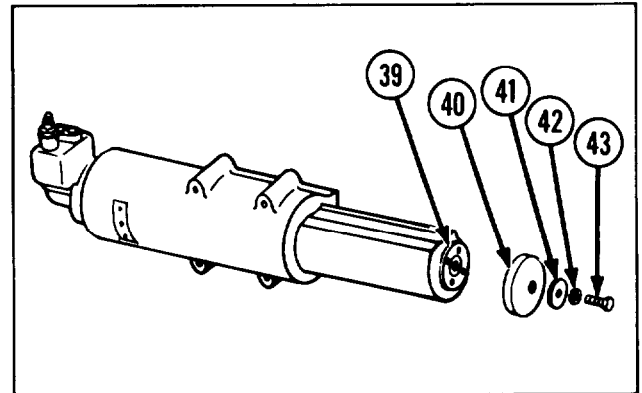
- 22 Install new self-locking nut (37) on piston rod (32). Tighten nut to 90 to 110 ft-lb (122 to 149 N-m).

23 Install new preformed packing (38) on linear actuating head (39).

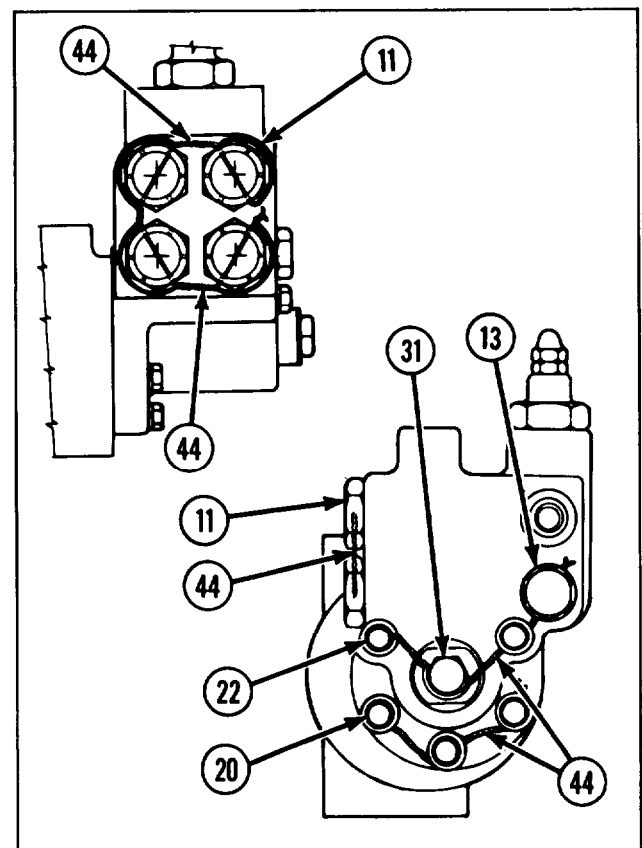
24 Using spanner wrench, install linear actuating head (39) in traversing sleeve (28).



25 Install new rammer cylinder cup (40), new cup washer (41), new lockwasher (42), and new capscrew (43) on linear actuating head (39).



26 Install new lockwire (item 16, appx B) (44) to secure four machine thread plugs (11), machine thread plug (13), machine thread plug (31), three capscrews (20), and two capscrews (22).



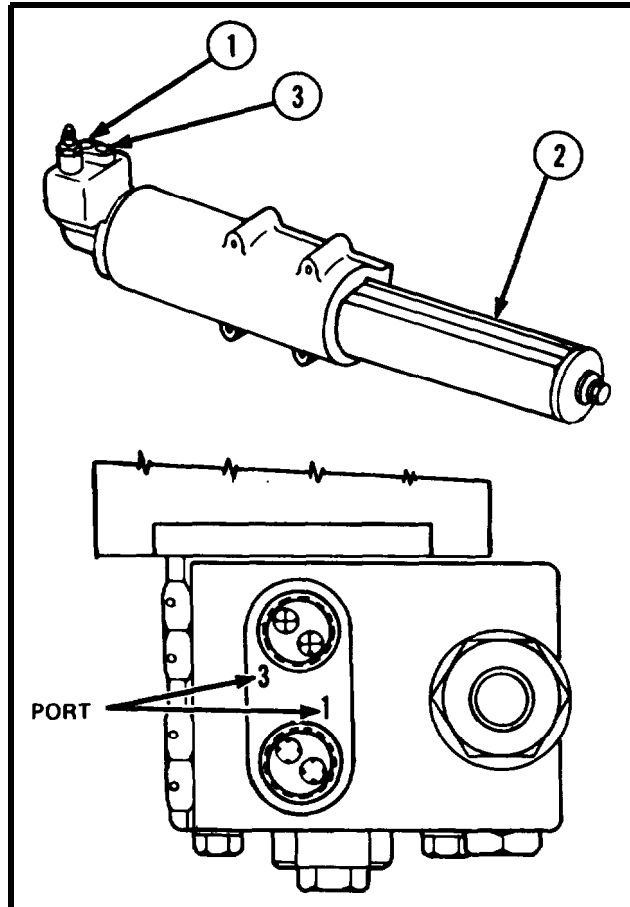
2-55. MAINTENANCE OF RAMMER TRAVERSING CYLINDER ASSEMBLY (CONT).

TESTING

NOTE

New hydraulic fluid (item 13, appx B) must be used when testing traversing cylinder.

- 1 Refer to TM g-4940-468-14 for hydraulic testing setup.
- 2 Apply 3000 psi (20,685 kPa) to port (1) until traversing sleeve (2) is fully extended.
- 3 Maintain 3000 psi (20,685 kPa) for five minutes.
- 4 Apply 3000 psi (20,685 kPa) to port (3) and maintain for five minutes.
- 5 Check traversing cylinder for leaks. Replace traversing cylinder if leakage occurs.

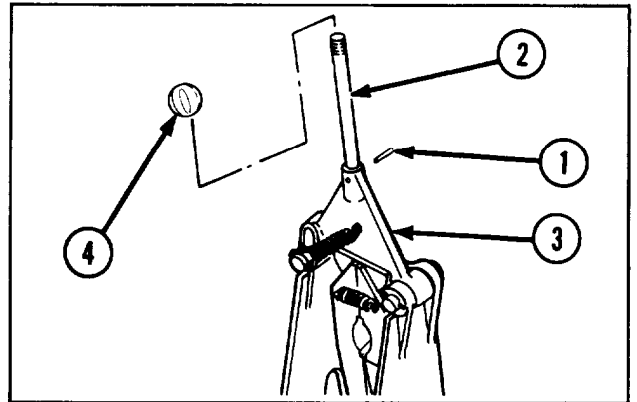


2-56. MAINTENANCE OF RIM LATCH SET.

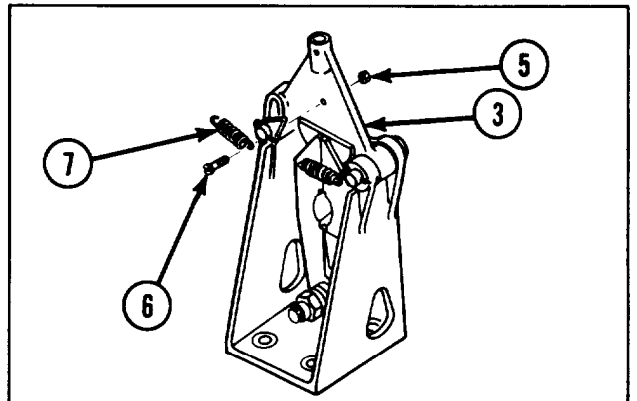
This task covers:		
a. <i>Disassembly</i>	b. <i>Inspection/Repair</i>	c. <i>Reassembly</i>
INITIAL SETUP		
<i>Tools and Special Tools</i>		<i>References</i>
Ordnance artillery and turret mechanic's tool kit (SC 5180-95-CL-A12)		TM 9-2350-304-20-2 TM 9-2350-304-24P-2
<i>Materials/Parts</i>		<i>Equipment Conditions</i>
Cotter pin (MS24665-285) Cotter pin (MS24665-3570) Lockwasher (MS35338-44) Sealing compound (item 21, appx B) Self-locking nut (MS21044N12)		Rim latch set removed (TM 9-2350-304-20-2)

DISASSEMBLY

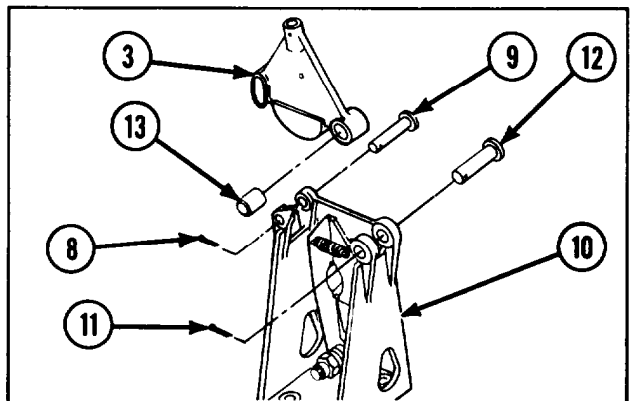
- 1 Remove spring pin (1) and handle (2) from manual control lever (3).
- 2 Remove lever handle shift knob (4) from handle (2).



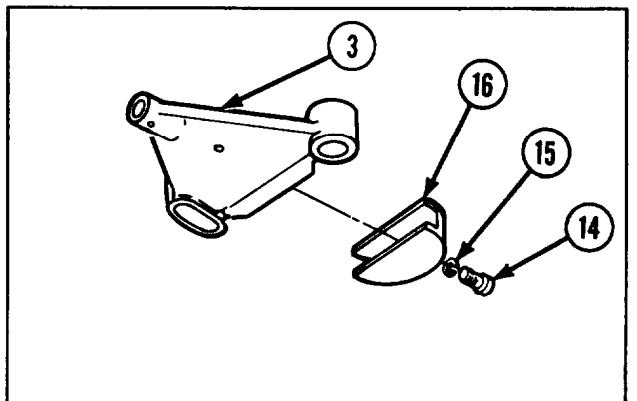
- 3 Remove hex nut (5), machine screw (6), and helical lever spring (7) from manual control lever (3).



- 4 Remove cotter pin (8) and headed straight pin (9) from catch strike (10).
- 5 Remove cotter pin (11) and headed straight pin (12) from catch strike (10).
- 6 Remove manual control lever (3) from catch strike (10).
- 7 Remove sleeve bearing (13) from manual control lever (3).



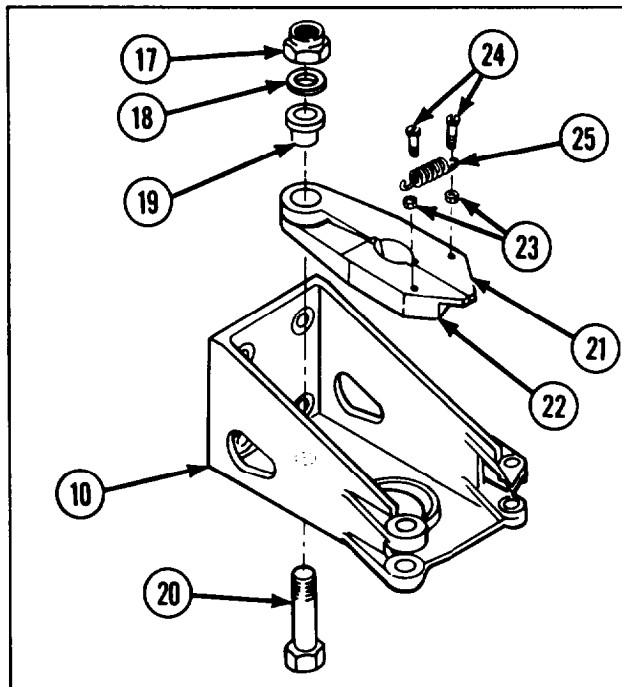
- 8 Remove capscrew (14), lockwasher (15), and control cam (16) from manual control lever (3).



2-56. MAINTENANCE OF RIM LATCH SET (CONT).

DISASSEMBLY (CONT)

- 9 Remove self-locking nut (17), flat washer (18), sleeve bearing (19), and capscrew (20) from strike catch (10).
- 10 Remove two rim latches (21 and 22) from strike catch (10).
- 11 Remove two hex nuts (23), two machine screws (24), and helical spring (25).
- 12 Separate rim latch (21) from rim latch (22).

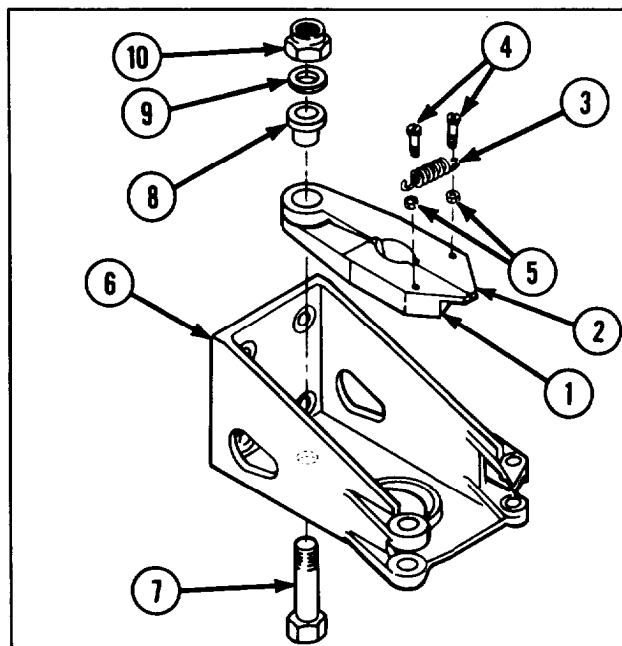


INSPECTION/REPAIR

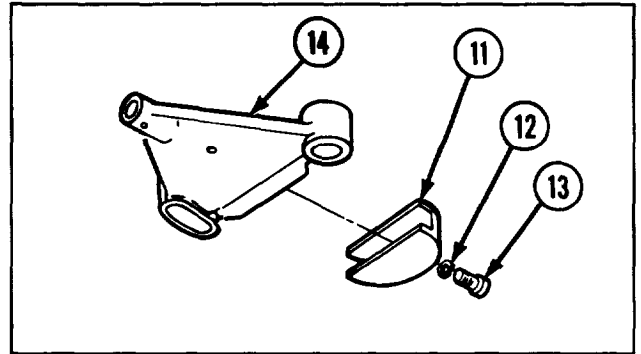
- 1 Inspect for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

REASSEMBLY

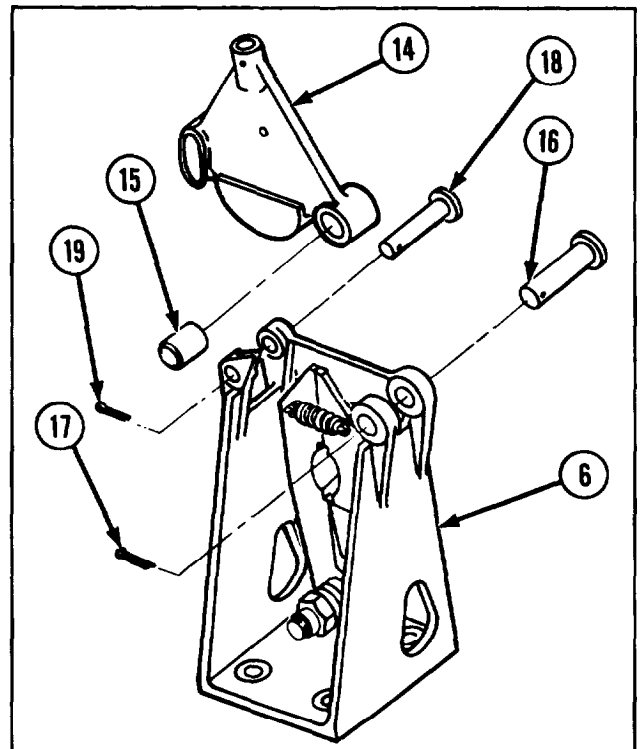
- 1 Join two rim latches (1 and 2), and install helical spring (3), two machine screws (4), and two hex nuts (5).
- 2 Install two rim latches (1 and 2) in strike catch (6).
- 3 Install capscrew (7), sleeve bearing (8), flat washer (9), and new self-locking nut (10) in strike catch (6).



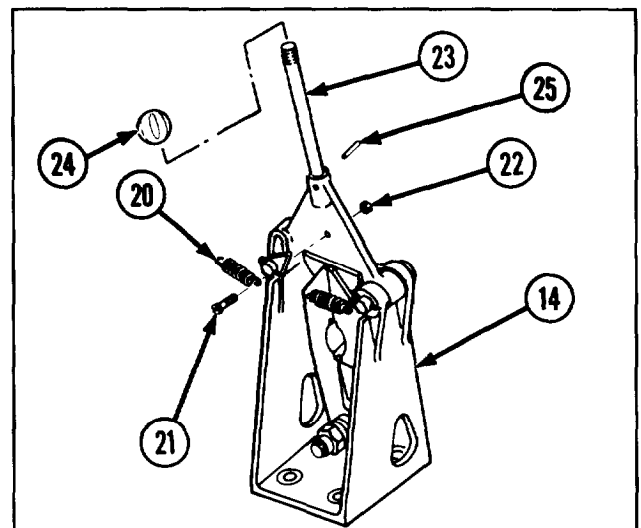
- 4 Install control cam (11), new lockwasher (12), and capscrew (13) in manual control lever (14).



- 5 Install sleeve bearing (15) in manual control lever (14).
- 6 Install manual control lever (14) in catch strike (6).
- 7 Install headed straight pin (16) and secure using new cotter pin (17).
- 8 Install headed straight pin (18) and secure using new cotter pin (19).



- 9 Install helical lever spring (20), machine screw (21), and hex nut (22) in manual control lever (14).
- 10 Apply sealing compound (item 21, appx B) to handle (23) and install lever handle shift knob (24).
- 11 Install handle (23) in manual control lever (14) and secure using spring pin (25).

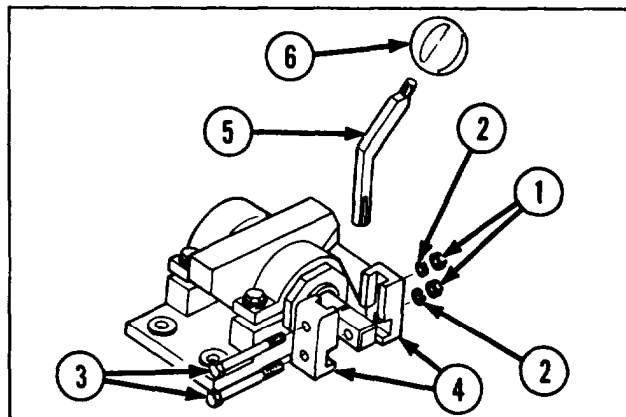


2-57. MAINTENANCE OF RIM LOCK SET.

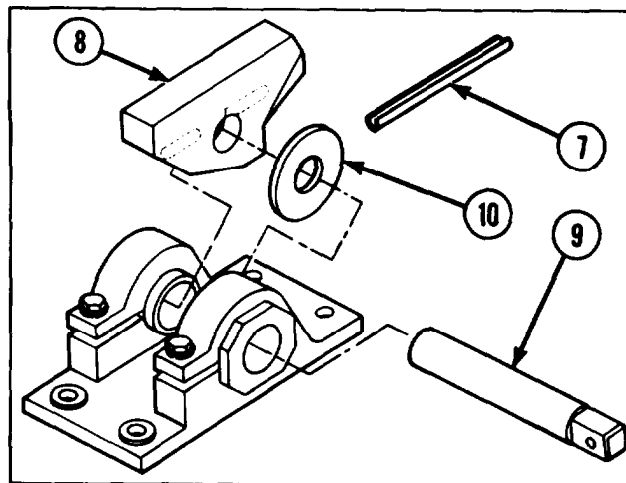
This task covers:		
a. <i>Disassembly</i>	b. <i>Inspection/Repair</i>	c. <i>Reassembly</i>
INITIAL SETUP		
<i>Tools and Special Tools</i>		<i>References</i>
Artillery maintenance shop equipment (SC 4933-95-CL-A12) Press		TM 9-2350-304-10 TM 9-2350-304-24P-2
Ordnance artillery and turret mechanic's tool kit (SC 5180-95-CL-A12) Torque wrench (A-A-2411)		<i>Equipment Conditions</i>
		Rim lock set removed (TM 9-2350-304-20-2)
<i>Materials/Parts</i>		
Lockwasher (2) (MS35338-44)		
Lockwasher (2) (MS35338-46)		
Lockwasher (4) (MS35338-48)		

DISASSEMBLY

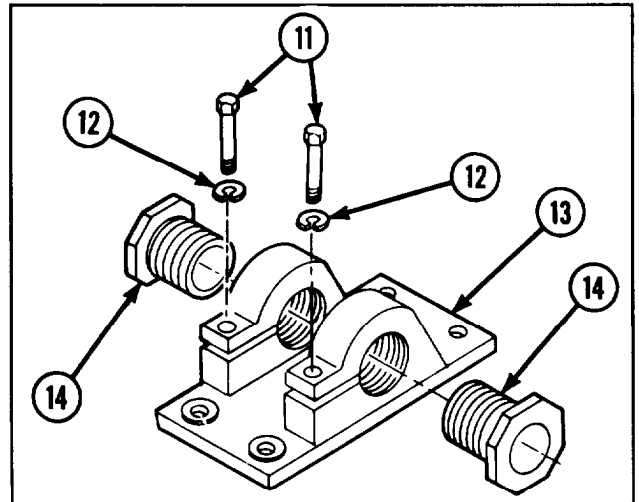
- 1 Remove two hex nuts (1), two lockwashers (2), and two capscrews (3).
- 2 Remove two clamp halves (4), manual control lever (5), and shaft knob (6).



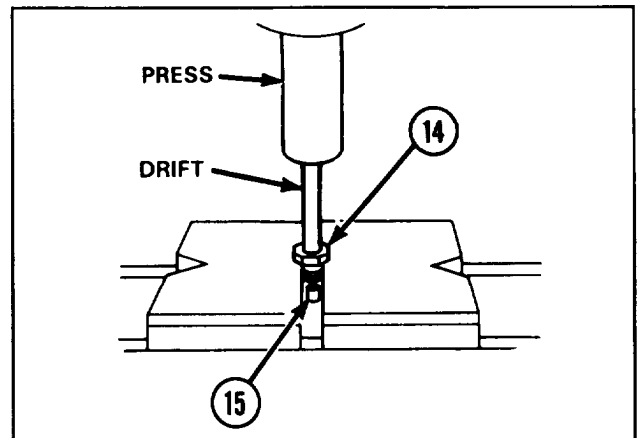
- 3 Remove spring pin (7) from lock tongue (8).
- 4 Remove lock shaft (9), belleville spring (10), and lock tongue (8).



- 5 Remove two capscrews (11) and two lockwashers (12) from eye bracket (13).
- 6 Remove two machine bushings (14) from eye bracket (13).



- 7 Using press and drift, remove one sleeve bearing (15) from each machine bushing (14).

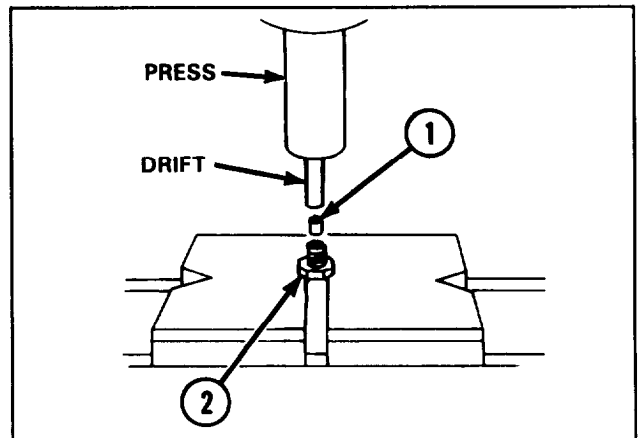


INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 If eye bracket is broken, damaged, or missing, repair is by replacement of next higher assembly.
- 3 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

REASSEMBLY

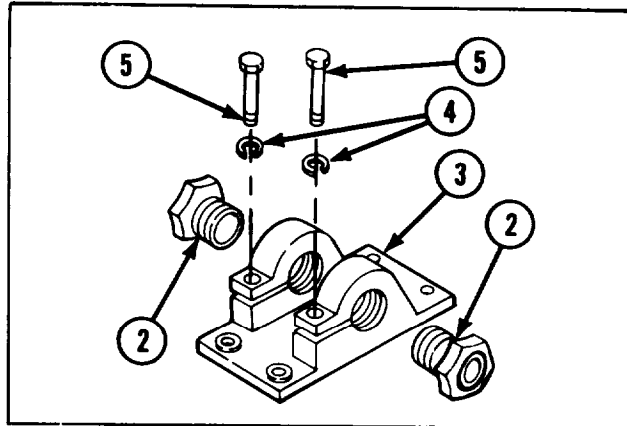
- 1 Using press and drift, install one sleeve bearing (1) in each machine bushing (2).



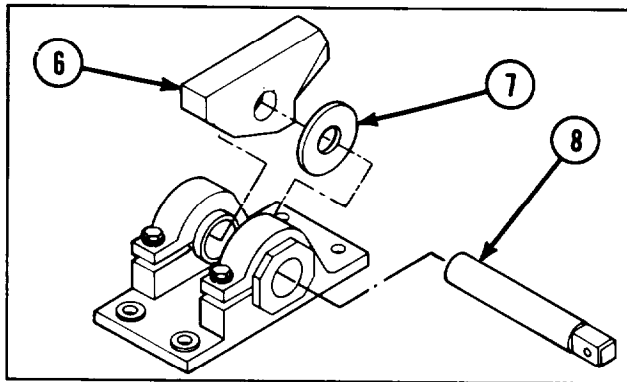
2-57. MAINTENANCE OF RIM LOCK SET (CONT).

REASSEMBLY (CONT)

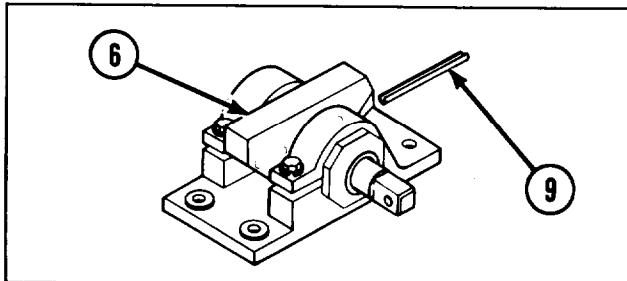
- 2 Install two machine bushings (2) in eye bracket (3).
- 3 Install two new lockwashers (4) and two capscrews (5) in eye bracket (3).



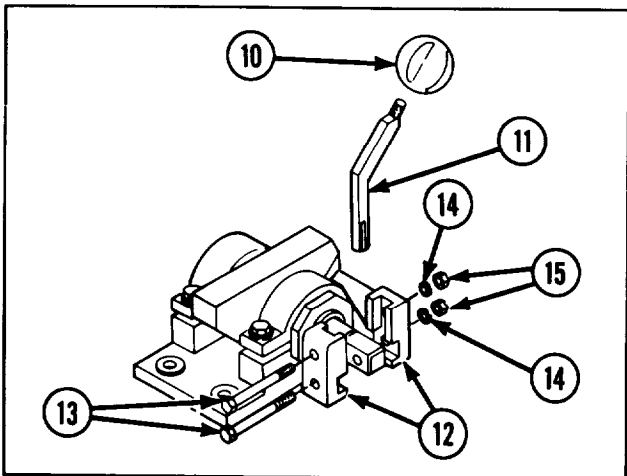
- 4 Install lock tongue (6), belleville spring (7), and lock shaft (8).



- 5 Install spring pin (9) in lock tongue (6).



- 6 Install shaft knob (10), manual control lever (11), and two clamp halves (12).
- 7 Install two capscrews (13), two new lockwashers (14), and two hex nuts (15).



2-58. MAINTENANCE OF POWER LOADER-RAMMER-LOADER ARM, CYLINDER ASSEMBLY, AND RELATED ITEMS.

This task covers:

a. <i>Relieving Hydraulic Pressure</i>	d. <i>Reassembly</i>
b. <i>Disassembly</i>	e. <i>Applying Hydraulic Pressure</i>
c. <i>Inspection/Repair</i>	

INITIAL SETUP

Tools and Special Tools

Artillery maintenance shop equipment (SC 4933-95-CL-A12)
 Hoist, 1-ton lifting capability
 Ordnance artillery and turret mechanic's tool kit (SC 5180-95-CL-A12)
 Retaining ring pliers
 Sling

Materials/Parts

Cotter pin (4) (MS24665-372)
 Lockwasher (4) (MS35338-44)
 Lockwasher (4) (MS35338-46)
 Lockwasher (8) (MS35338-48)

References

TM 9-2350-304-10
 TM 9-2350-304-24P-2

Equipment Conditions

Loader-rammer does not have to be removed to remove loader arm

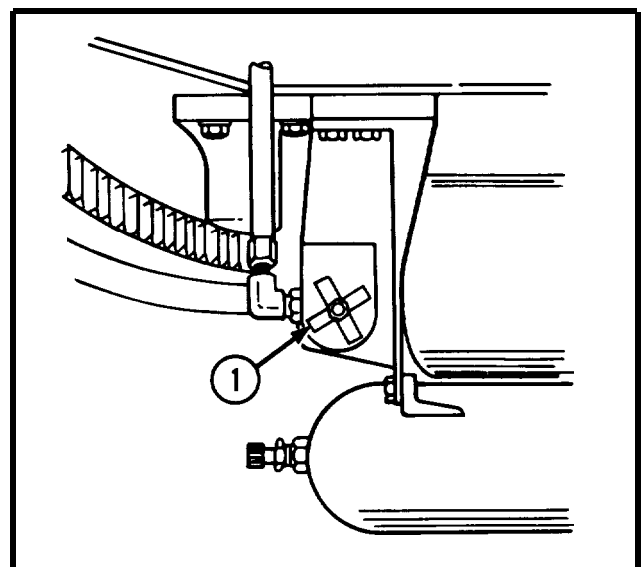
General Safety Instructions

- Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as level ground as possible. This will stop the cannon from sliding out of battery.
- Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

WARNING

Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as level ground as possible. This will stop the cannon from sliding out of battery.

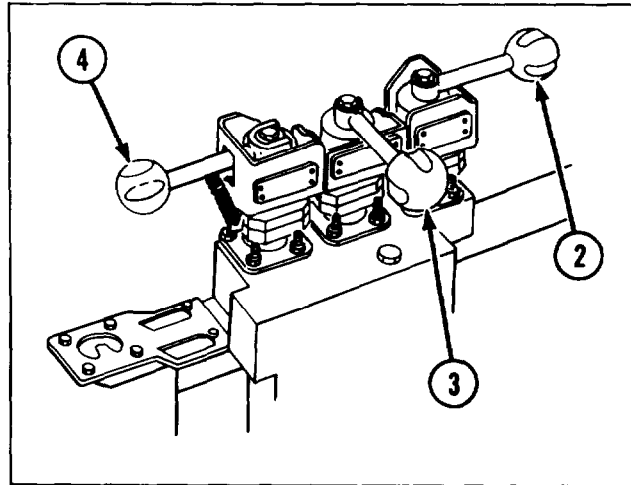
- 1 Set MASTER switch to OFF.
- 2 Open globe angle valve (1).



2-58. MAINTENANCE OF POWER LOADER-RAMMER-LOADER ARM, CYLINDER ASSEMBLY, AND RELATED ITEMS (CONT).

RELIEVING HYDRAULIC PRESSURE (CONT)

- 3 Move SWING control handle (2) to full LOAD.
- 4 Move SWING control handle (2) to full STOW.
- 5 Repeat steps 3 and 4 several times to relieve pressure from system
- 6 Move LOADER control handle (3) to full IN.
- 7 Move LOADER control handle (3) to full OUT.
- 8 Repeat steps 6 and 7 several times to relieve pressure from system.

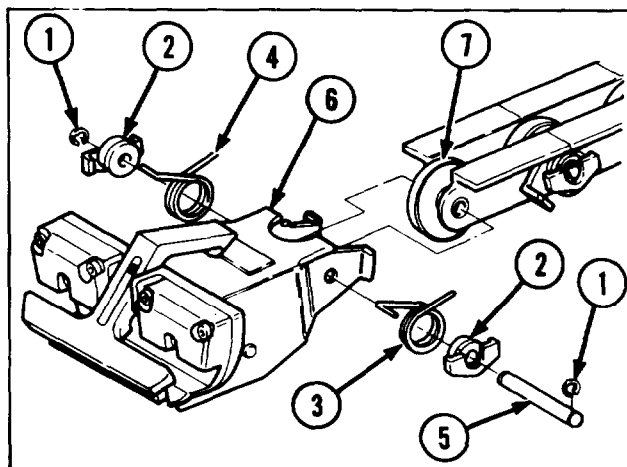


Do not operate RAMMER control handle without a projectile in the trough.

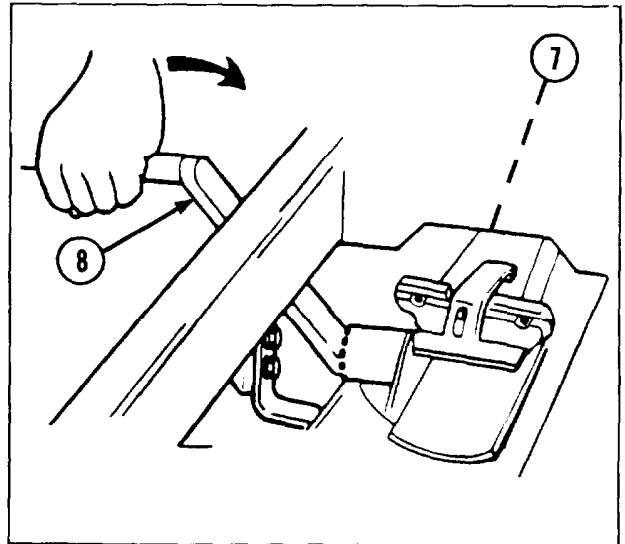
- 9 Move RAMMER control handle (4) to RAM several times to relieve pressure from system.

DISASSEMBLY

- 1 Remove two retaining rings (1), two plate retainers (2), left torsion spring (3), right torsion spring (4), and headless grooved pin (5) from headlink assembly (6).
- 2 Remove roller chain (7) from headlink assembly (6).



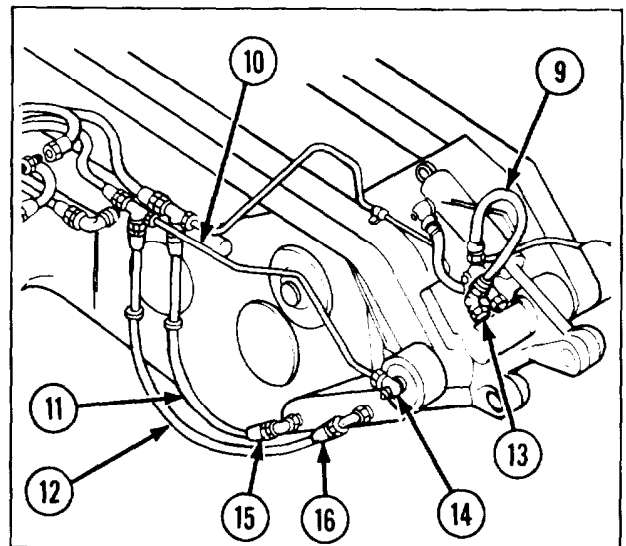
- 3 Turn handcrank (8) clockwise to remove roller chain (7).



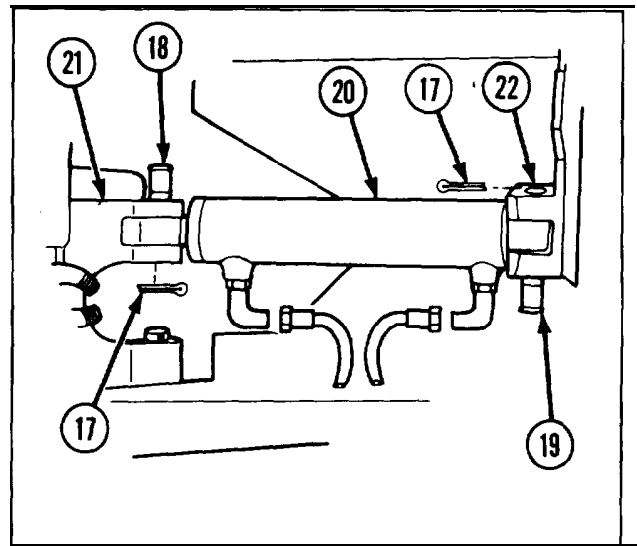
WARNING

Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

- 4 Disconnect and remove four hydraulic lines (9, 10, 11, and 12) and four connectors (13, 14, 15, and 16). For complete disassembly of hydraulic lines and fittings, refer to page 2-27.



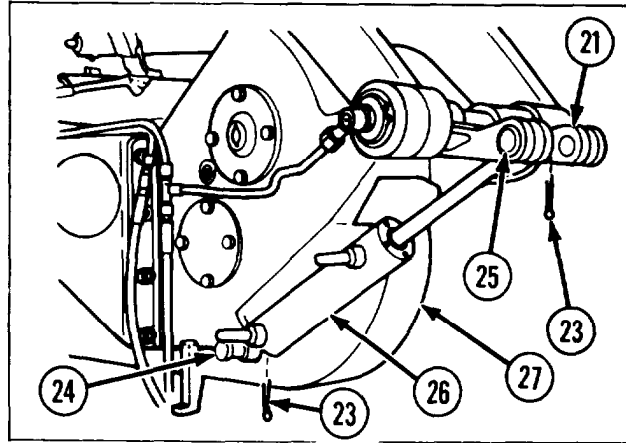
- 5 Remove two cotter pins (17), headed straight pin (18), and headed straight pin (19); and lift cylinder assembly (20) from loader pivot arm (21) and loader arm (22).



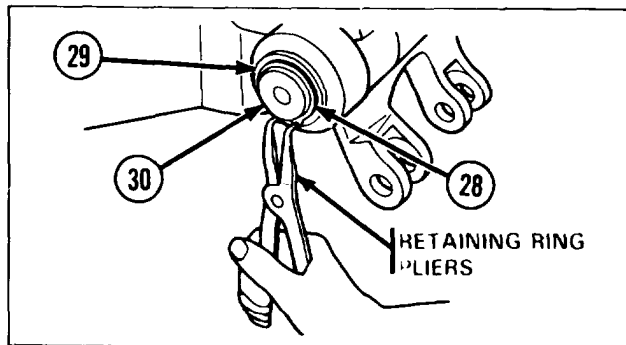
2-58. MAINTENANCE OF POWER LOADER-RAMMER—LOADER ARM, CYLINDER ASSEMBLY, AND RELATED ITEMS (CONT).

DISASSEMBLY (CONT)

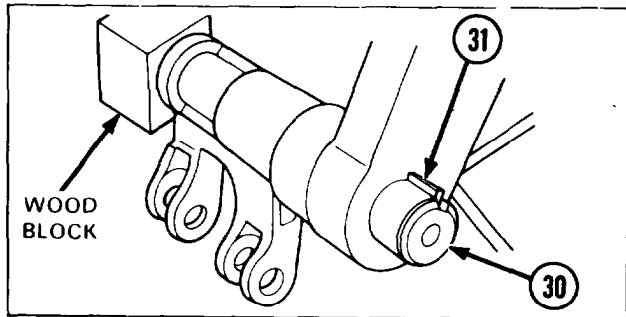
- 6 Remove two cotter parts (23), headed straight pin (24), headed straight pin (25), and lift cylinder assembly (26) from rammer gear case (27) and loader pivot arm (21).



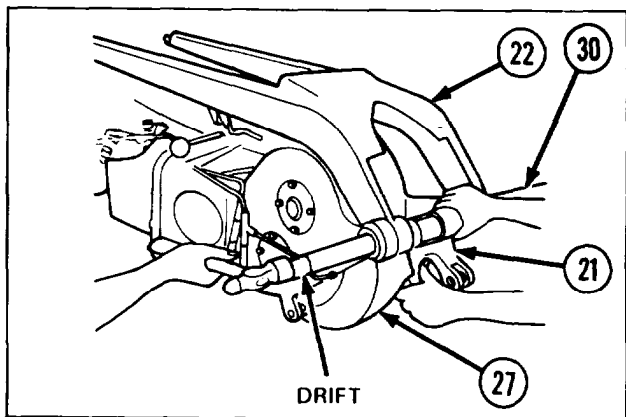
- 7 Using retaining ring pliers, remove one retaining ring (28) and one flat washer (29) from each end of loader shaft (30).



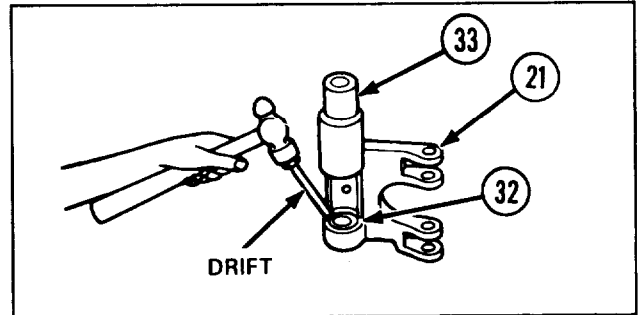
- 8 Using wood block, tap left end of loader shaft (30) until machine key (31) is within reach. Remove machine key.



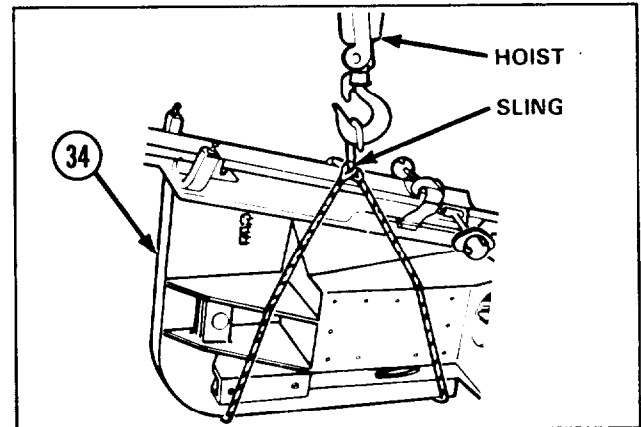
- 9 Using drift, remove loader shaft (30) from rammer gear case (27), loader pivot arm (21), and loader arm (22). Remove loader arm and loader pivot arm.



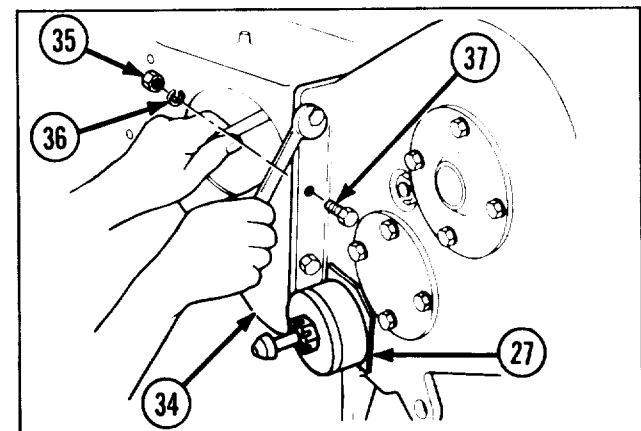
- 10 Using drift, remove sleeve bearing (32) and sleeve bearing (33) from loader pivot arm (21).



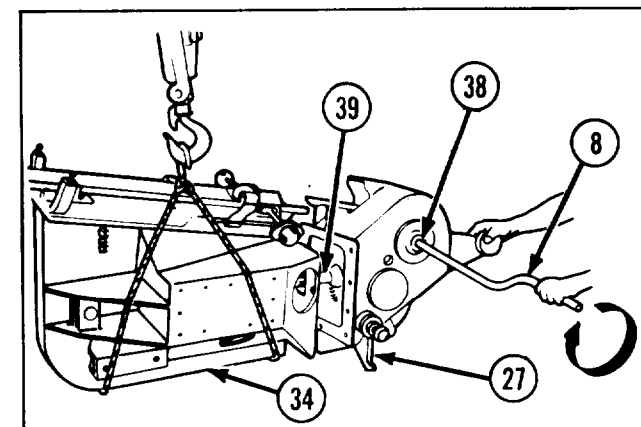
- 11 Put sling around mechanical guard (34) and attach to hoist with 1-ton lifting capability.



- 12 Remove eight hex nuts (35), eight lock-washers (36), and eight capscrews (37) attaching mechanical guard (34) to rammer gear case (27).

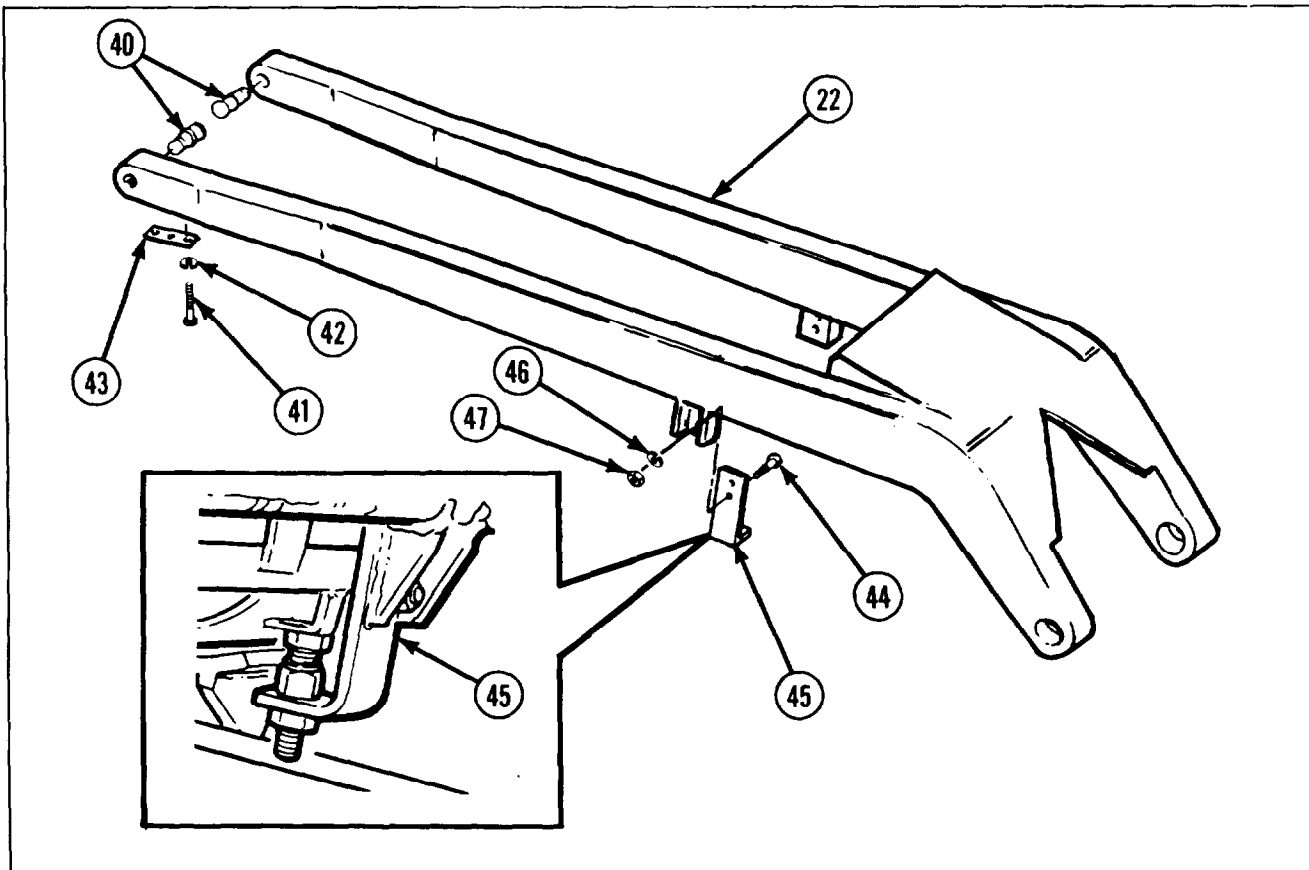


- 13 Insert handcrank (8) into left end of drive shaft (38).
- 14 Turn handcrank (8) clockwise to disengage ramming cylinder (39).
- 15 Lift mechanical guard (34) away from rammer gear case (27).



2-58. MAINTENANCE OF POWER LOADER-RAMMER --LOADER ARM, CYLINDER ASSEMBLY, AND RELATED ITEMS (CONT).

DISASSEMBLY (CONT)

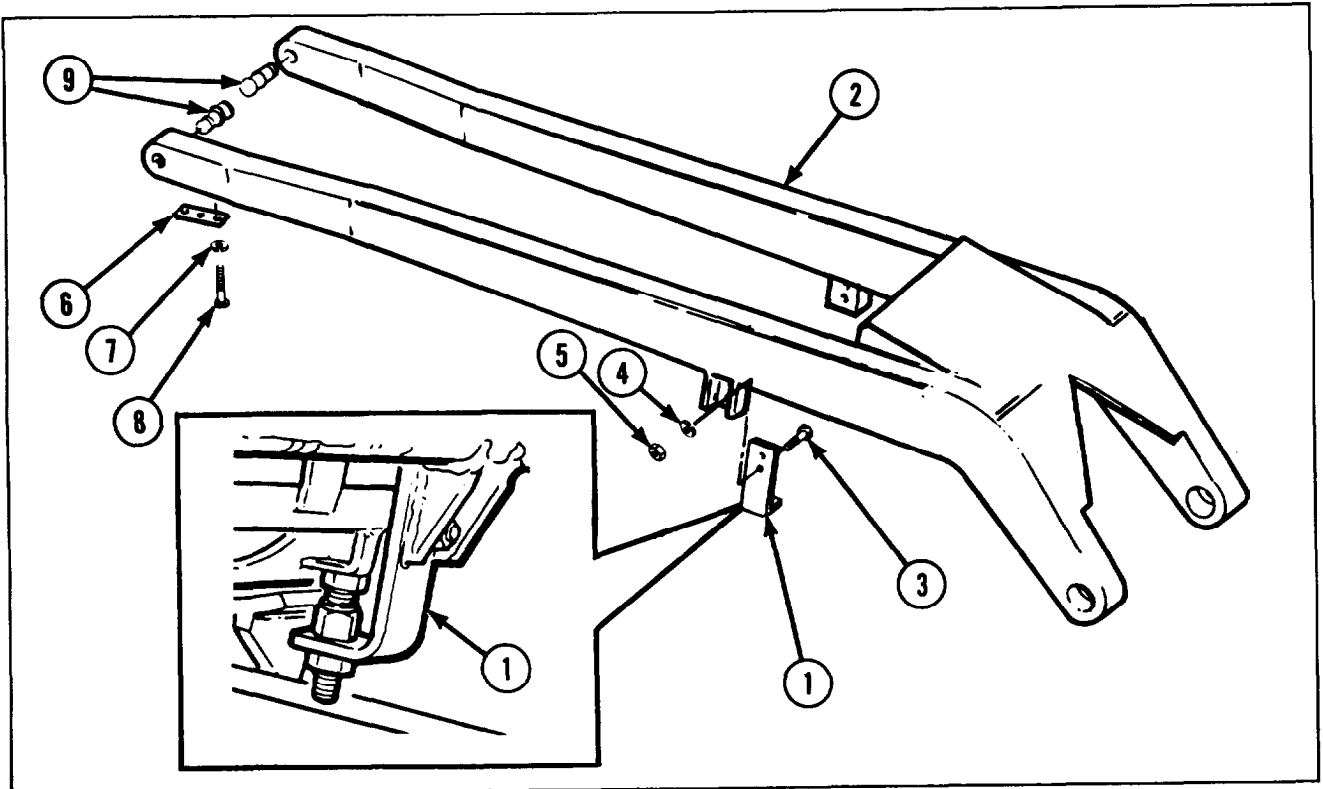


- 16 Remove two threaded straight pins (40) from loader arm (22).
- 17 Remove four cap screws (41), four lockwashers (42), and two plate spacers (43) from loader arm (22).
- 16 Remove four cap screws (44), two stop brackets (45), four lockwashers (46), and four hex nuts (47) from loader arm (22).

INSPECTION/REPAIR

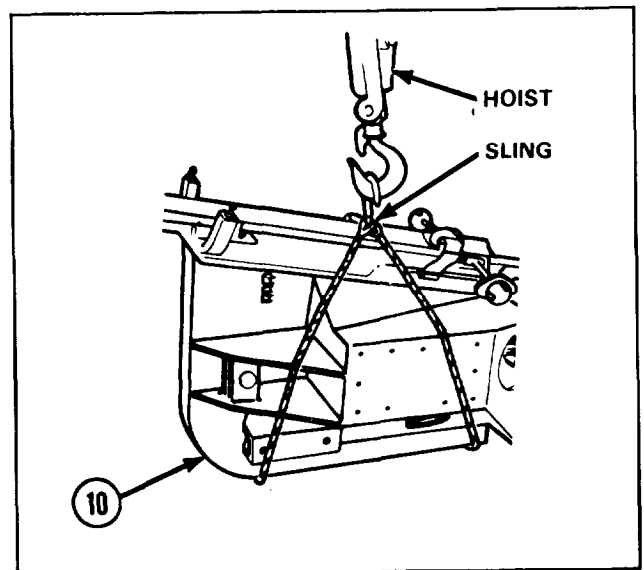
- 1 Inspect for broken, damaged, or missing parts.
- 2 Lift cylinder assemblies are repairable assemblies. Refer to page 2-364.
- 3 Mechanical guard is a repairable assembly. Refer to page 2-337.
- 4 Rammer gear case is a repairable assembly. Refer to page 2-342.
- 5 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

REASSEMBLY



- 1 Position two stop brackets (1) on loader arm (2) and secure with four cap screws (3), four new lockwashers (4), and four nuts (5).
- 2 Position two plate spacers (6) on loader and (2) and secure with four new lockwashers (7) and four cap screws (8).
- 3 Install two threaded straight pins (9) in loader arm (2).

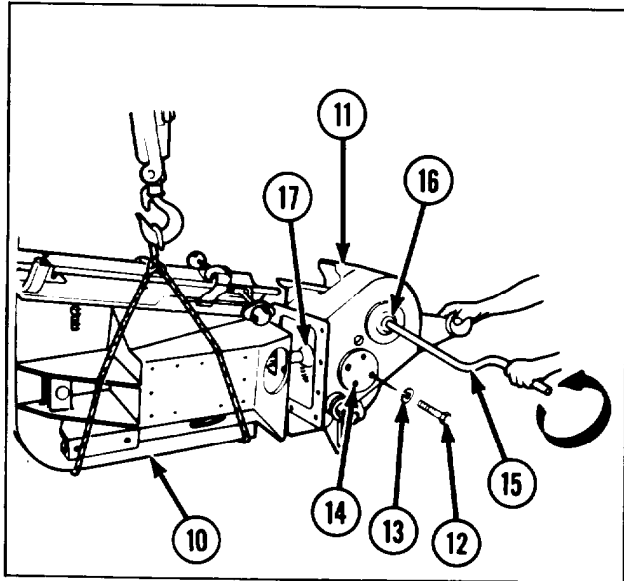
- 4 Put sling around mechanical guard (10) and attach to a hoist with 1-ton lifting capability.



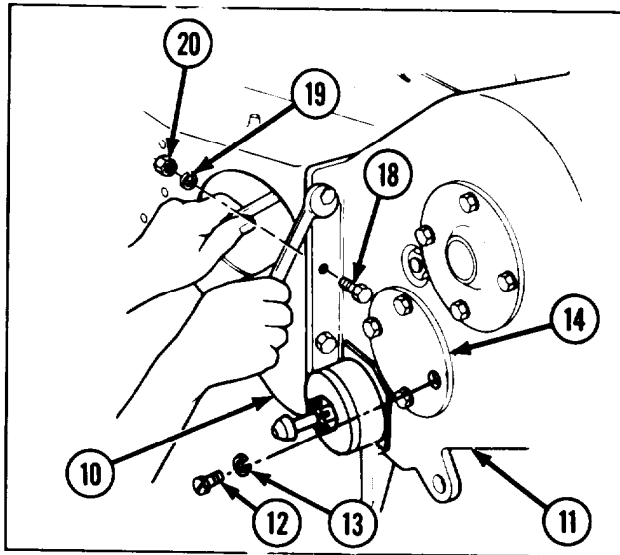
2-58. MAINTENANCE OF POWER LOADER-RAMMER--LOADER ARM, CYLINDER ASSEMBLY, AND RELATED ITEMS (CONT).

REASSEMBLY (CONT)

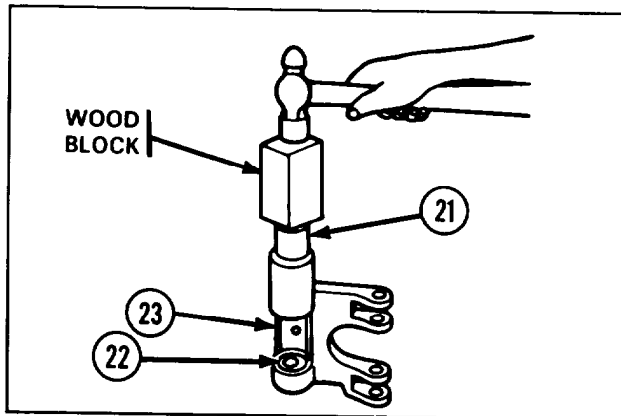
- 5 Raise hoist until there is no slack in sling.
- 6 Position rammer gear case (11) next to mechanical guard (10).
- 7 Remove four capscrews (12), four lockwashers (13), and bearing housing (14).
- 8 Insert handcrank (15) into drive shaft (16).
- 9 Turn handcrank (15) counterclockwise to engage rammer cylinder (17), aligning timing marks on rack and gear.



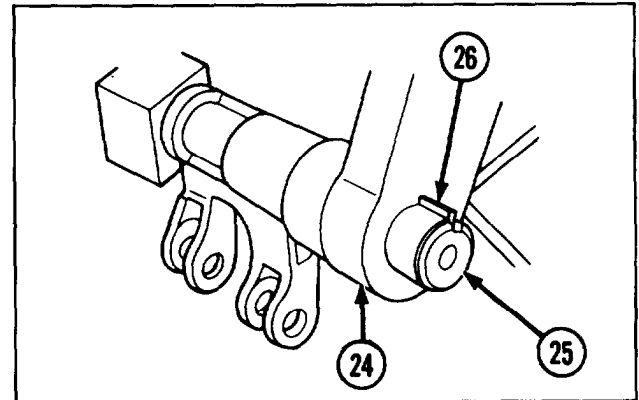
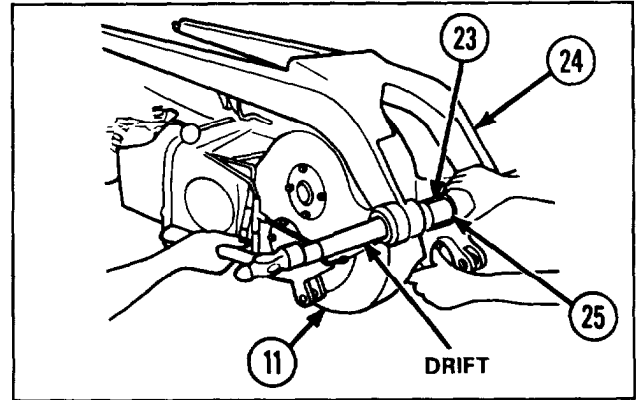
- 10 Secure mechanical guard (10) to rammer gear case (11) with eight capscrews (18), eight new lockwashers (19), and eight nuts (20).
- 11 Position bearing housing (14) on rammer gear case (11) and secure with four new lockwashers (13) and four capscrews (12).



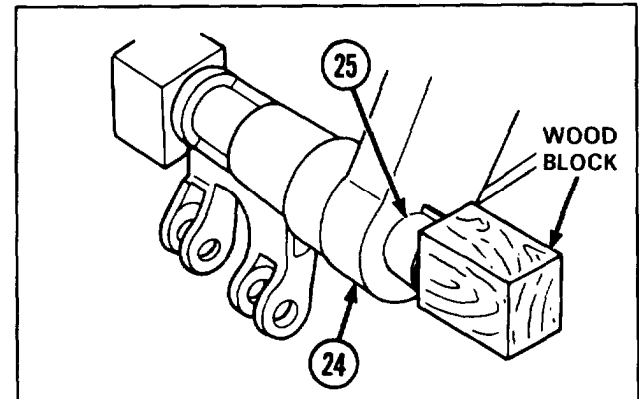
- 12 Using wood block, install sleeve bearing (21) and sleeve bearing (22) in loader pivot arm (23).



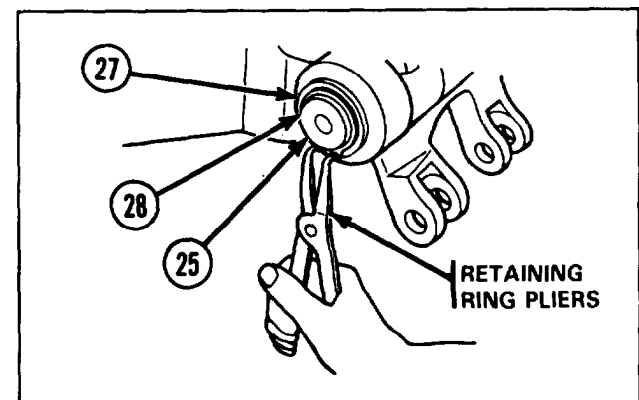
- 13 Aline bores of loader pivot arm (23) and loader arm (24) with bore of rammer gear case (11).
- 14 Using drift, install loader shaft (25) to connect rammer gear case (11), loader pivot arm (23), and loader arm (24).



- 16 Tap wood block until loader shaft (25) is flush with loader arm (24).



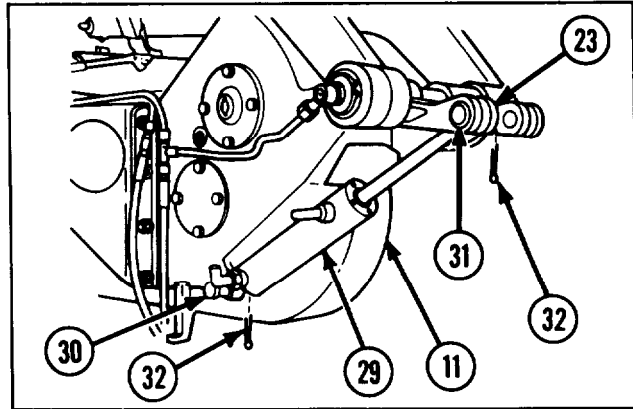
- 17 Using retaining ring pliers, install one flat washer (27) and one retaining ring (28) on each side of loader shaft (25).



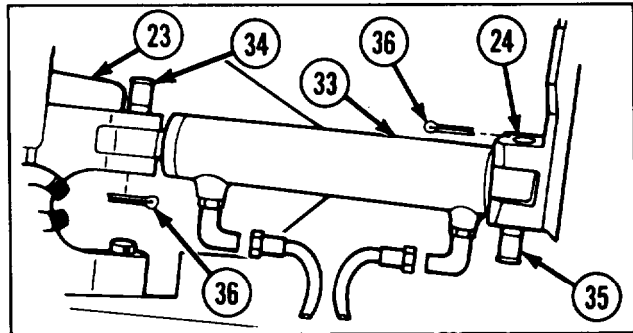
2-58. MAINTENANCE OF POWER LOADER-RAMMER-LOADER ARM, CYLINDER ASSEMBLY, AND RELATED ITEMS (CONT).

REASSEMBLY (CONT)

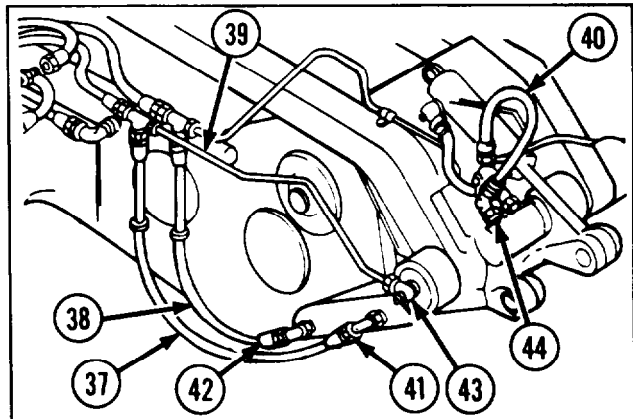
- 18** Position lift cylinder assembly (29) in rammer gear case (11) and loader pivot arm (23). Secure with headed straight pin (30), headed straight pin (31), and two new cotter pins (32).



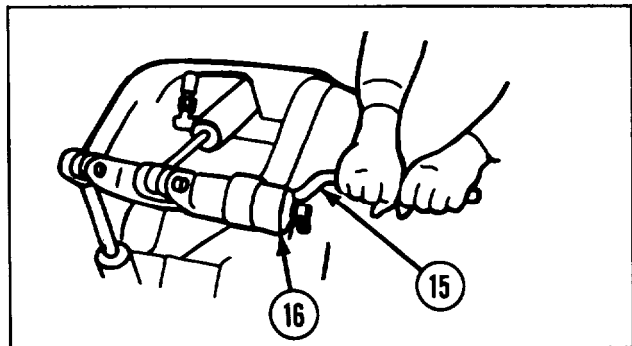
- 19** Position lift cylinder assembly (33) in loader arm (24) and loader pivot arm (23). Secure with headed straight pin (34), headed straight pin (35), and two new cotter pins (36).

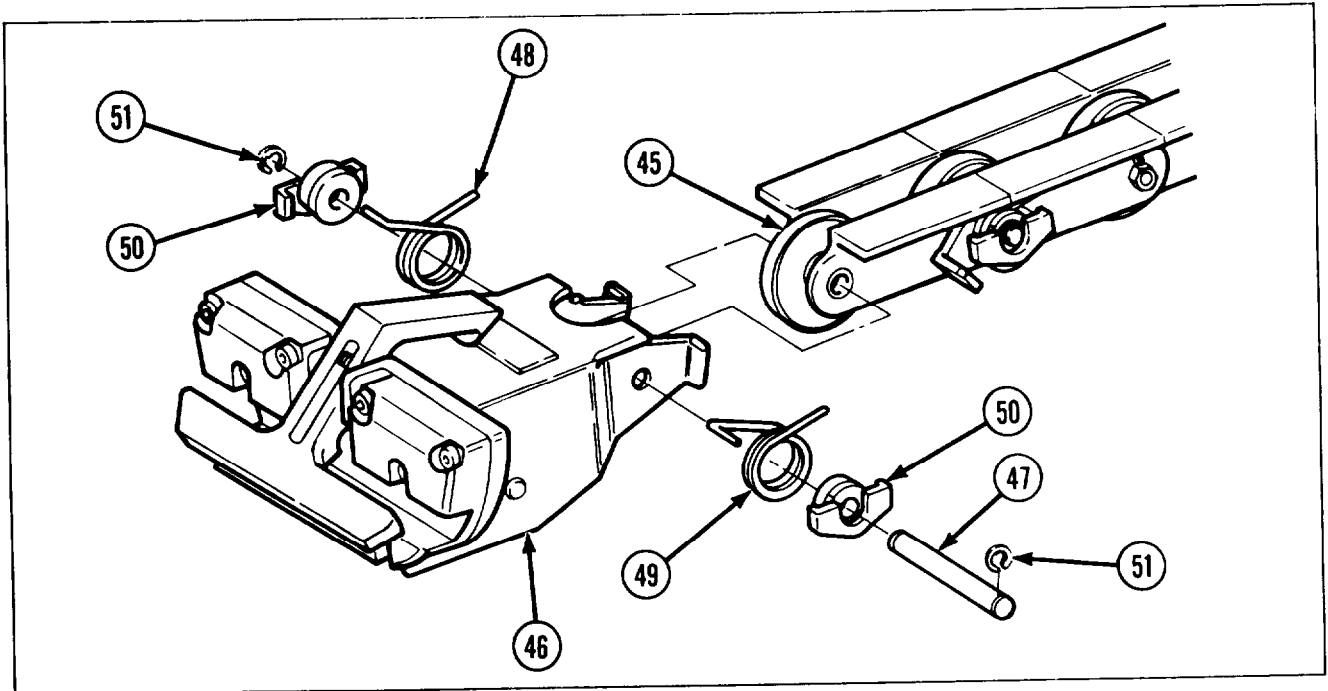


- 20** Reconnect and install four hydraulic lines (37, 38, 39, and 40) and four connectors (41, 42, 43, and 44). For complete reassembly of hydraulic lines and fittings, refer to page 2-27.



- 21** Insert handcrank (15) into drive shaft (16).

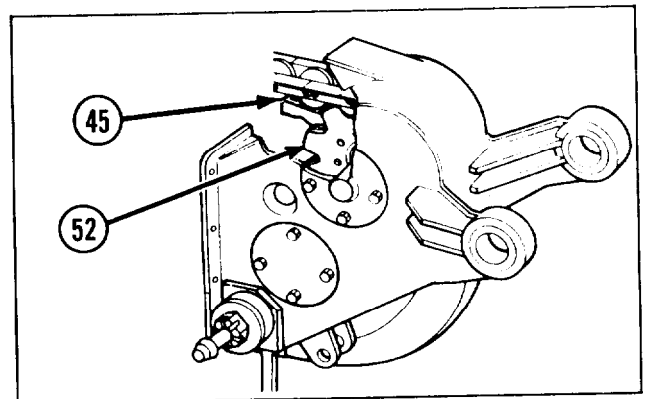




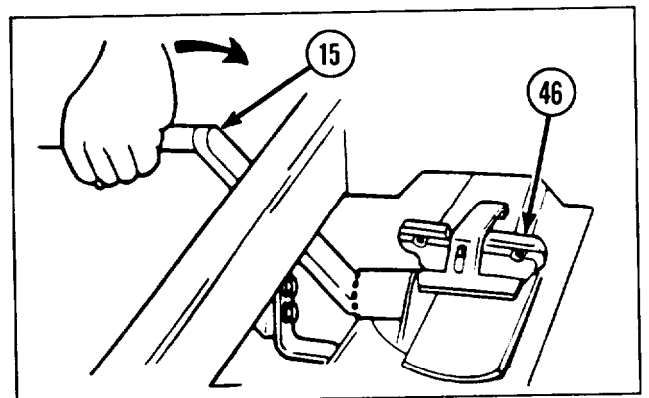
22 Position roller chain (45) in headlink assembly (46)

23 Install headless grooved pin (47), right torsion spring (48), left torsion spring (49), two plate retainers (50), and two retaining rings (51) on headlink assembly (46).

24 Engage end link of roller chain (45) over wheel sprocket (52).



25 Turn handcrank (15) counterclockwise until headlink assembly (46) stops.

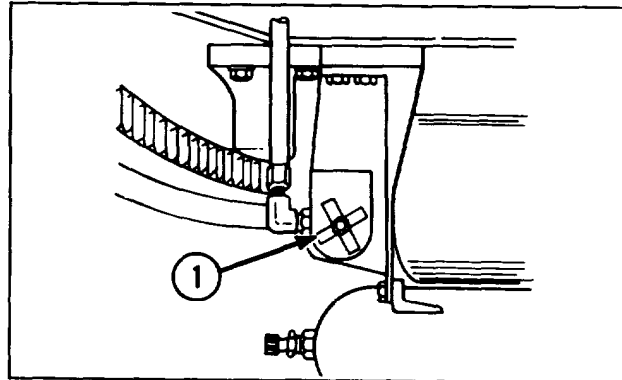


2-58. MAINTENANCE OF POWER LOADER-RAMMER-LOADER ARM, CYLINDER ASSEMBLY, AND RELATED ITEMS (CONT).

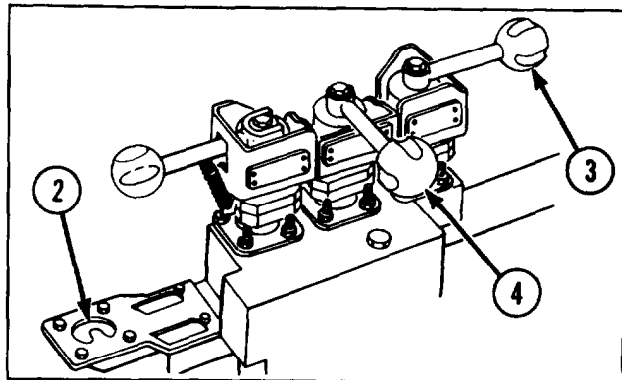
- 1 Close globe angle valve (1).
- 2 Start engine.

NOTE

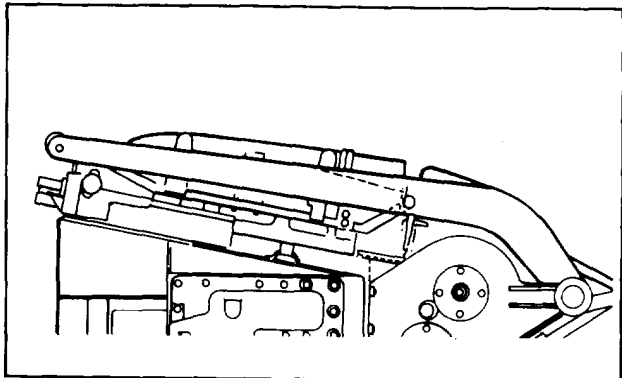
Hydraulic motor and pump may be used to apply pressure to hydraulic system without starting engine by setting MASTER switch and OIL PUMP MOTOR SWitch ON.



- 3 Set HYD PUMP/PTO CLUTCH switch to ON.
- 4 Check dial pressure gage (2) indication. Normal pressure is 1600 to 2400 psi (11,032 to 16,548 kPa).
- 5 Stop engine.



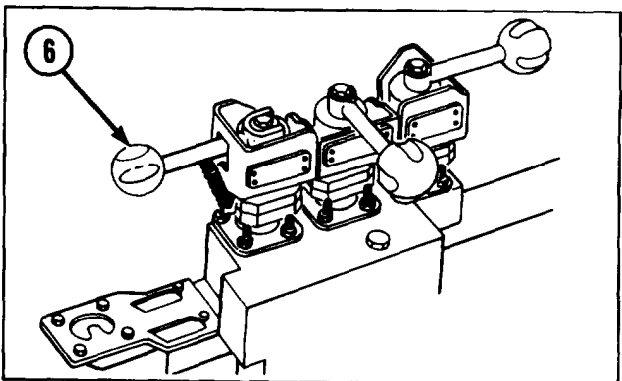
- 6 Traverse loader-rammer in and out of loading position several times, using SWING control handle (3) to bleed air from system.
- 7 Stop with loader-rammer in loading position.
- 8 Operate loader arms in and out several times, using LOADER control handle (4), to bleed air from system.
- 9 Stop with loader arms on tray.
- 10 Traverse loader-rammer to ram position using SWING control handle (3).
- 11 Extend tray into breech, making sure to engage tray interlock switch (5).



CAUTION

Do not operate RAMMER control handle without a projectile in the trough.

- 12 Extend and retract rammer several times using RAMMER control handle (6) to bleed air from system.
- 13 Stop with rammer chain in stowed position.
- 14 Place loader-rammer in stowed position.



2-59. MAINTENANCE OF POWER LOADER-RAMMER-GUARD, SLIDE, TROUGH, CYLINDER, AND RELATED ITEMS.

This task covers: a. *Disassembly* b. *Inspection/Repair* c. *Reassembly*

INITIAL SETUP

Tools and Special Tools

Ordnance artillery and turret mechanic's tool kit (SC 5180-95-CL-A12)

Materials/Parts

- Cotter pin (MS24665-374)
- Lockwasher (4) (MS35338-46)
- Sealing compound (item 21, appx B)
- Self-locking nut (8) (MS21042-3)
- Self-locking nut (MS21042-6)

References

TM 9-2350-304-24P-2

Equipment Conditions

- 2-325 Mechanical guard removed
- Tray interlock switch removed (TM 9-2350-304-20-2)

General Safety Instructions

WARNING

Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

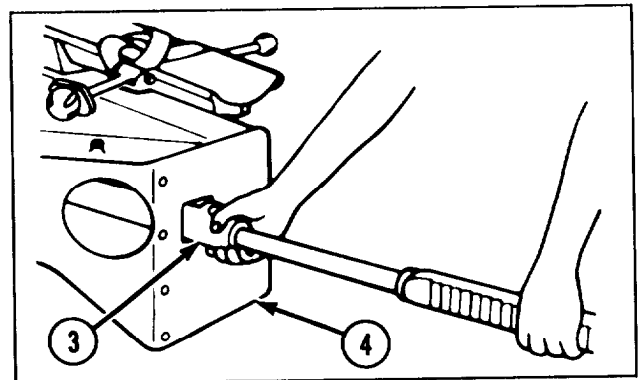
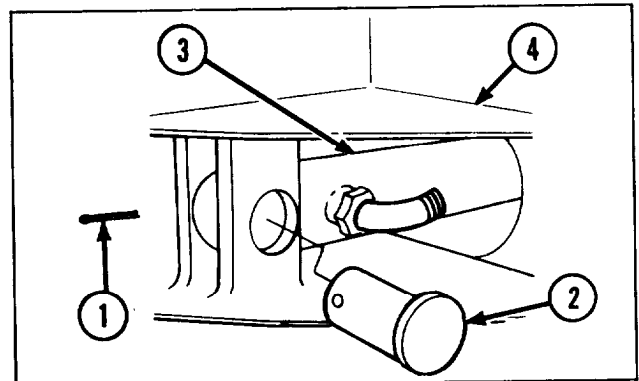
Rammer trough contains parts under spring tension. Use caution during removal.

DISASSEMBLY

WARNING

Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

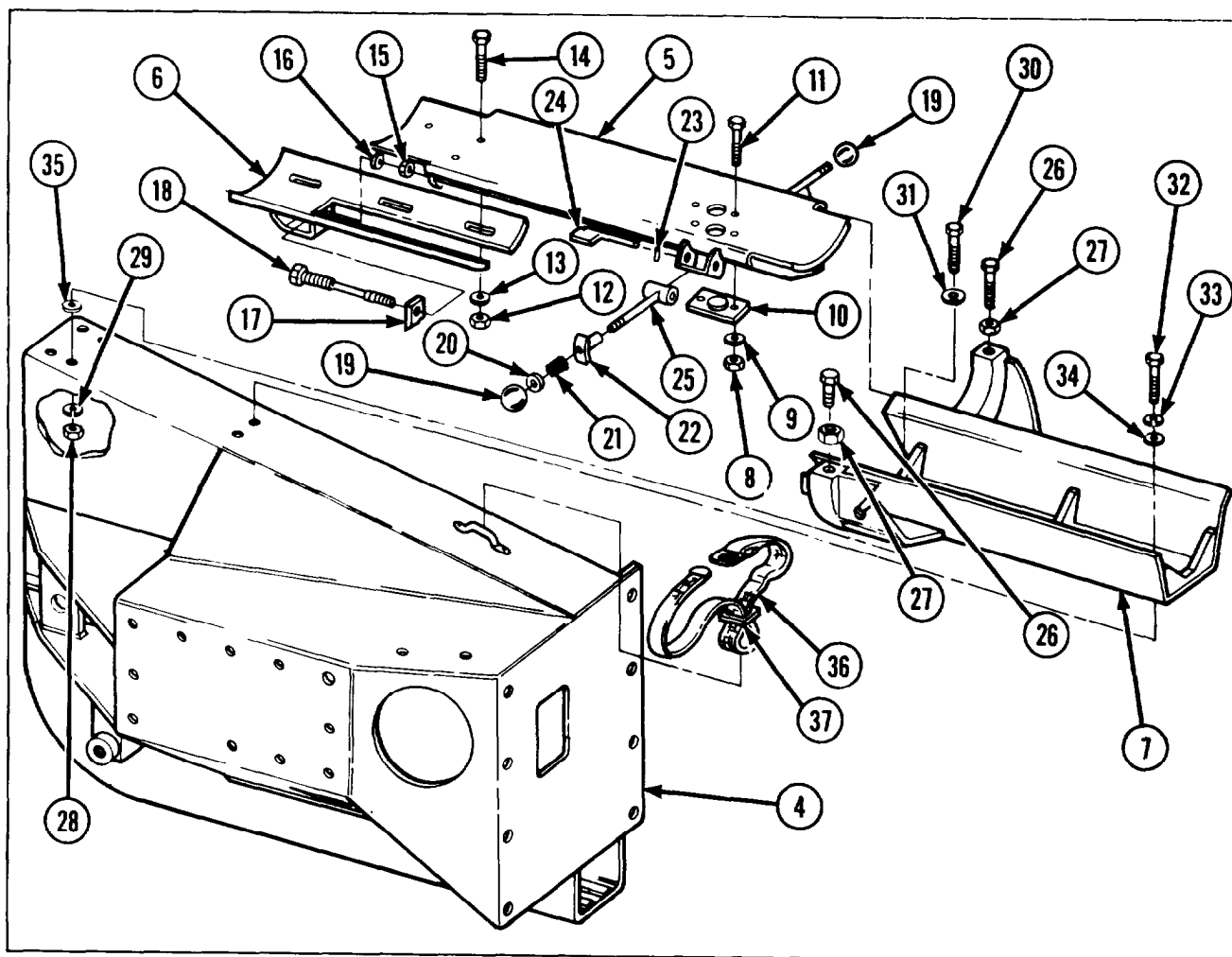
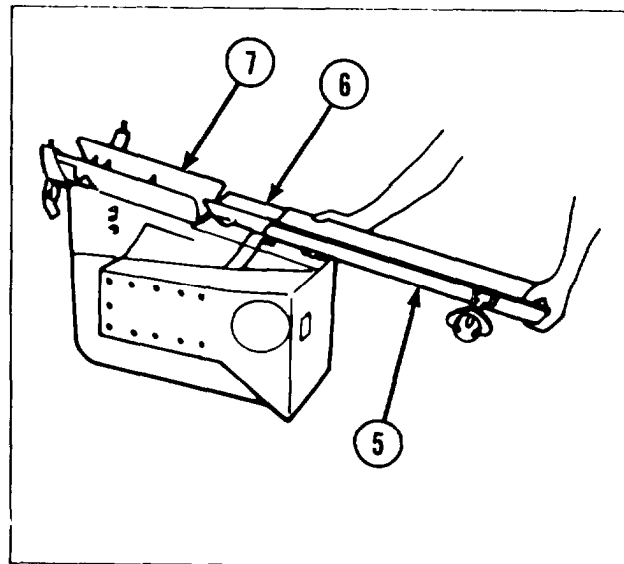
- 1 Remove cotter pin (1) and headed straight pin (2) from ramming cylinder (3) and mechanical guard (4).
- 2 Remove ramming cylinder (3) from mechanical guard (4).



2-59. MAINTENANCE OF POWER LOADER-RAMMER-GUARD, SLIDE, TROUGH, CYLINDER, AND RELATED ITEMS (CONT).

DISASSEMBLY (CONT)

- 3 Remove rammer trough (5) and ammunition loading tray (6) from rammer slide (7) as a unit.



NOTE

Steps 4 thru 8 apply to disassembly of ammunition loading tray and rammer trough.

- 4 Remove four self-locking nuts (8), four flat washers (9), two weldment plugs (10), and four machine screws (11) from rammer trough (5).
- 5 Remove four self-locking nuts (12), four flat washers (13), and four machine screws (14), securing rammer trough (5) to ammunition loading tray (6).
- 6 Remove self-locking nut (15), flat washer (16), slide bolt spacer (17), and clevis bolt (18).
- 7 Remove ammunition loading tray (6) from rammer trough (5).

WARNING

Rammer trough contains parts under spring tension. Use caution during removal.

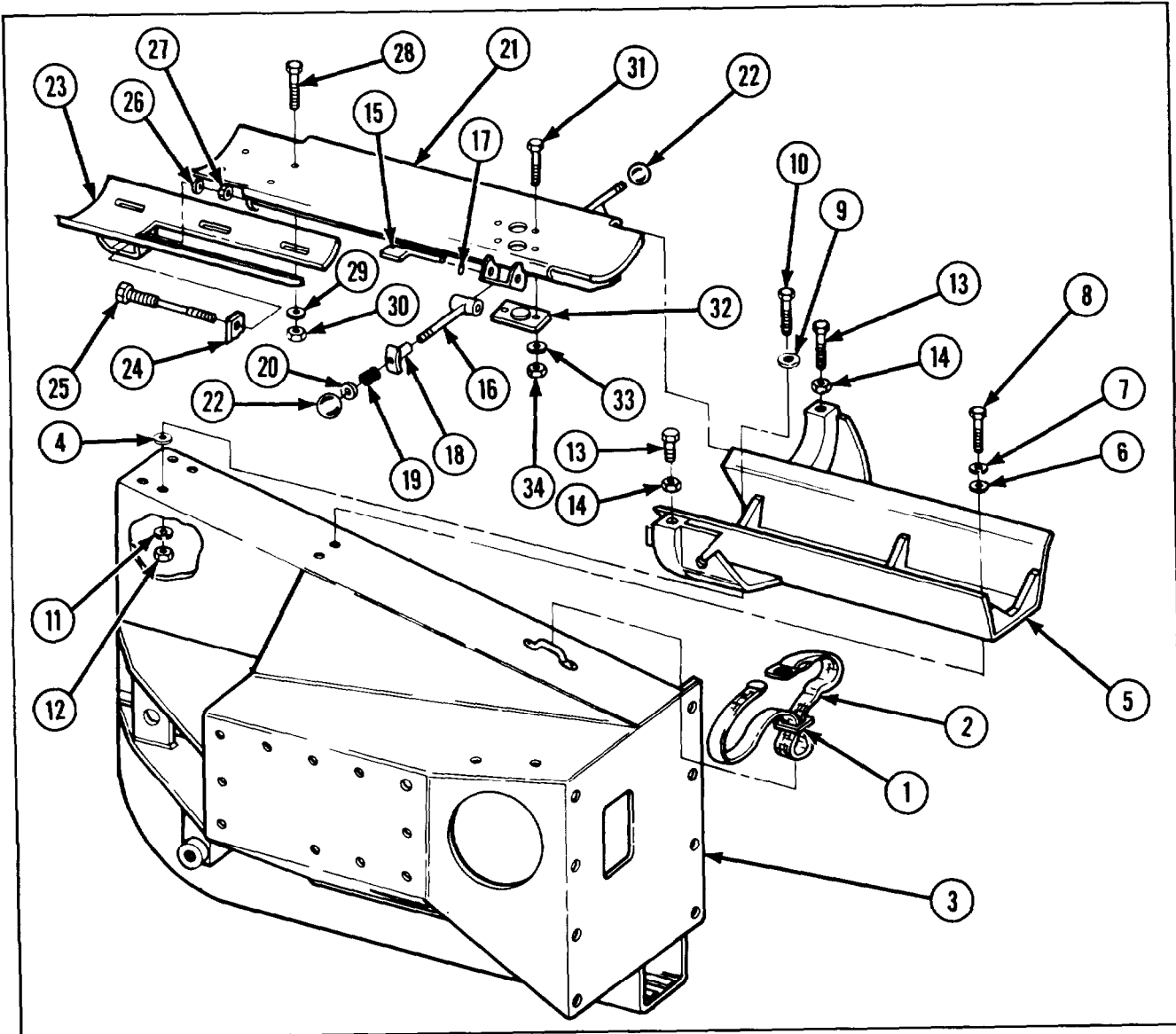
- 8 Remove two knobs (19), flat washer (20), helical spring (21), rammer plunger (22), spring pin (23), manual control lever (24), and manual control handle (25) from rammer trough (5).
- 9 Remove two capscrews (26) and two hex nuts (27) from rammer slide (7).
- 10 Remove two hex nuts (28), two lockwashers (29), two capscrews (30), two flat washers (31), two capscrews (32), two lockwashers (33), and two flat washers (34) from rammer slide (7).
- 11 Remove rammer slide (7) and 14 plate spacers (35) from mechanical guard (4).
- 12 Remove webbing strap (36) and buckle (37) from mechanical guard (4).

INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 Ramming cylinder is a repairable assembly. Refer to page 2-371.
- 3 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

2-59. MAINTENANCE OF POWER LOADER-RAMMER-GUARD, SLIDE, TROUGH, CYLINDER, AND RELATED ITEMS (CONT)

REASSEMBLY



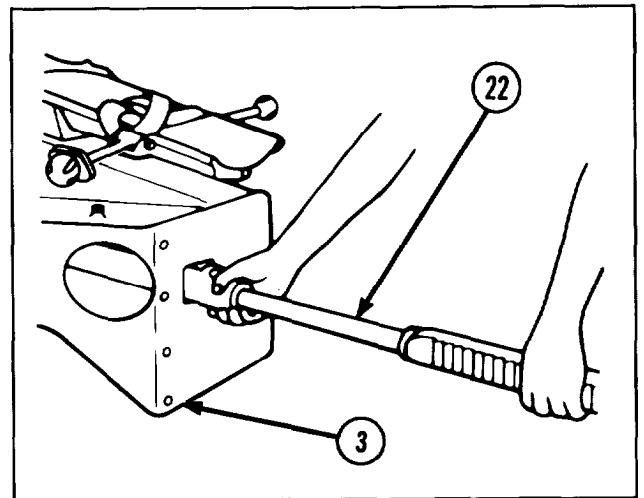
1 Install buckle (1) and webbing strap (2) on mechanical guard (3).

2 Install 14 plate spacers (4) and rammer slide (5) on mechanical guard (3).

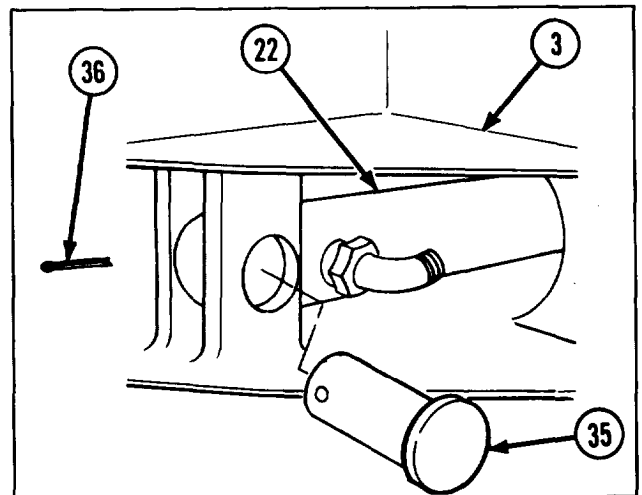
3 Install two flat washers (6), two new lockwashers (7), two capscrews (8), two flat washers (9), two capscrews (10), two new lockwashers (11), and two hex nuts (12) on rammer slide (5).

- 4 Install two capscrews (13) and two hex nuts (14) on rammer slide (5).
- 5 Install manual control handle (15), manual control lever (16), spring pin (17), rammer plunger (18), helical spring (19), and flat washer (20) on rammer trough (21).
- 6 Apply sealing compound (item 21, appx B) to threads on two knobs (22).
- 7 Install two knobs (22).
- 8 Install ammunition loading tray (23) on rammer trough (21) and secure using slide bolt spacer (24), clevis bolt (25), flat washer (26), and new self-locking nut (27).
- 9 Adjust clevis bolt (25). Refer to TM 9-2350-304-20-2.
- 10 Install four machine screws (28), four flat washers (29), and four new self-locking nuts (30).
- 11 Install four machine screws (31), two weldment plugs (32), four flat washers (33), and four new self-locking nuts (34) on rammer trough (21).

- 12 Install ramming cylinder (22) in mechanical guard (3).



- 13 Secure ramming cylinder (22) in mechanical guard (3) with headed straight pin (35) and new cotter pin (36).



2-60. MAINTENANCE OF POWER LOADER-RAMMER-HEADLINK AND CHAIN ASSEMBLY, GEAR CASE GROUP, AND HEAD SHAFT GROUP.

This task covers: a. *Disassembly* b. *Inspection/Repair* c. *Reassembly*

INITIAL SETUP

Tools and Special Tools

Ordnance artillery and turret mechanic's tool kit (SC 5180-95-CL-A12)

Materials/Parts

- Cotter pin (MS24665-423)
- Gasket (4) (10898557)
- Grease (item 12, appx B)
- Lockwasher (2) (MS35338-44)
- Lockwasher (16) (MS35338-46)
- Lockwasher (MS35338-51)

References

TM 9-2350-304-24P-2

Equipment Conditions

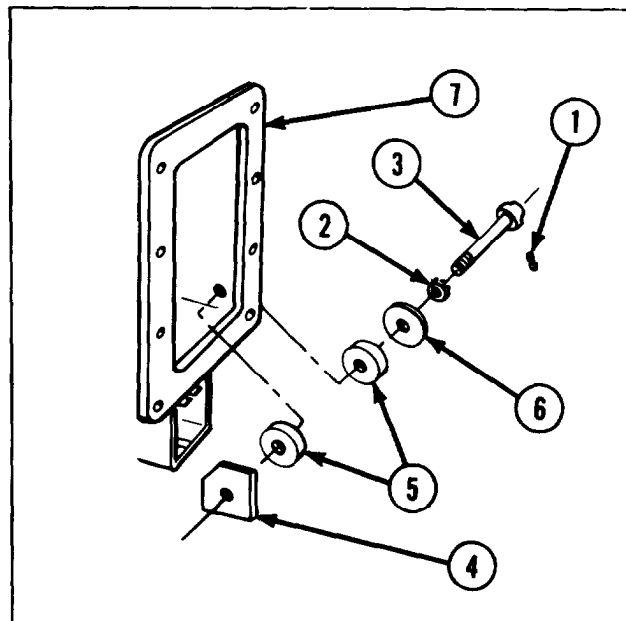
- 2-325 Mechanical housing removed
- 2-325 Roller chain and headlink assembly removed

General Safety Instructions



Hold upper flat washer firmly against spring tension before removing retaining ring.

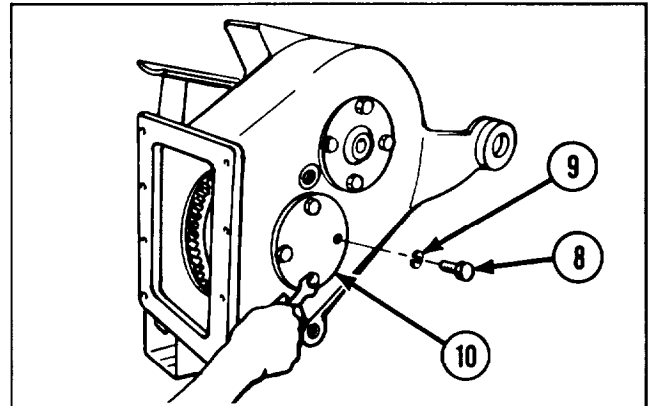
- 1 Remove cotter pin (1) and loosen nut (2).
- 2 Remove latch plunger (3), plain nut plate (4), two rubber bushings (5), flat washer (6), and nut (2) from mechanical housing (7).



NOTE

Steps 3 thru 8 are written for the removal of one bearing housing but apply to both.

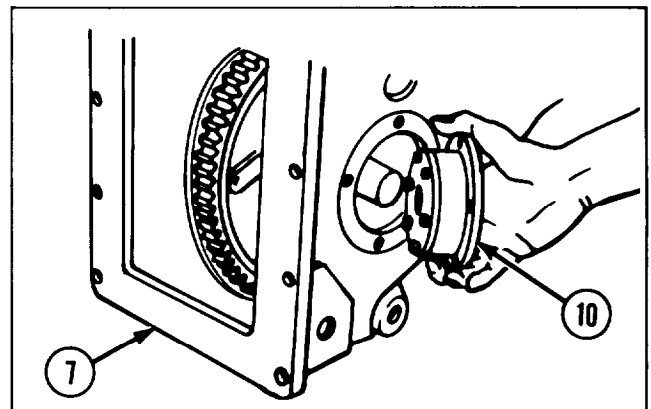
- 3 Remove four capscrews (8) and four lockwashers (9) from bearing housing (10).



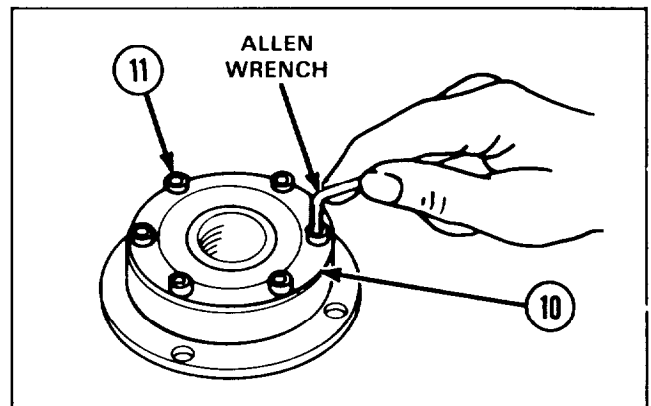
CAUTION

Apply even pressure on bearing housing when prying from mechanical housing to prevent damaging seal and shaft.

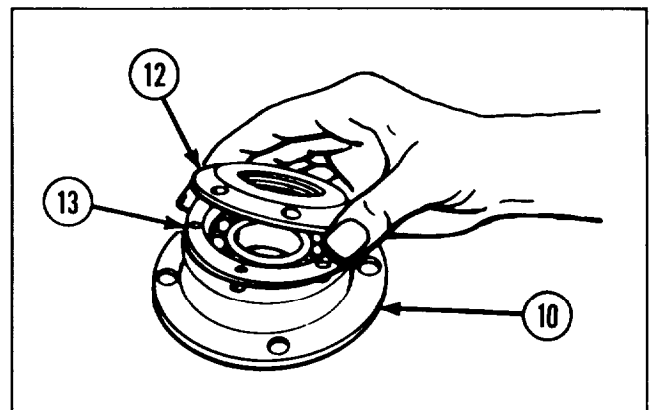
- 4 Remove bearing housing (10) from mechanical housing (7).



- 5 Using allen wrench, remove six cap-screws (11) from bearing housing (10).



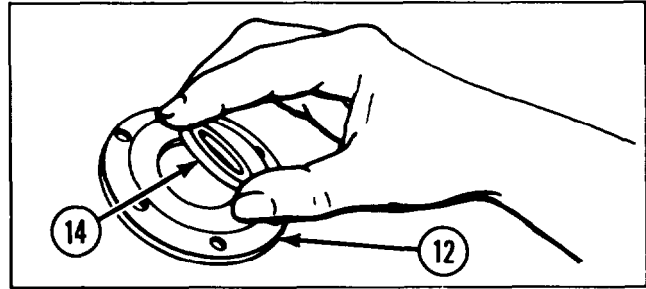
- 6 Remove packing retainer (12) and gasket (13) from bearing housing (10).



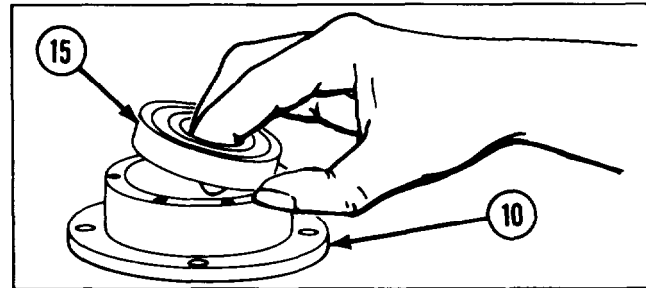
2-60. MAINTENANCE OF POWER LOADER-RAMMER-HEADLINK AND CHAIN ASSEMBLY, GEAR CASE GROUP, AND HEAD SHAFT GROUP (CONT).

DISASSEMBLY (CONT)

- 7 Remove plain encased seal (14) from packing retainer (12).



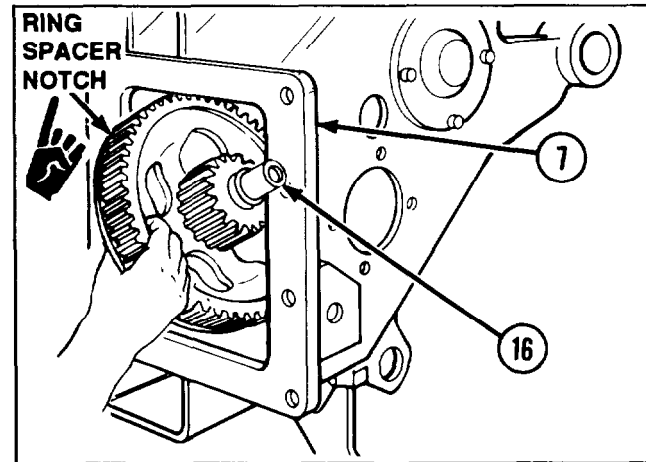
- 8 Remove annular ball bearing (15) from bearing housing (10).



NOTE

During removal of spur gearshaft, the notch in the ring spacer should be positioned in the upper left-hand corner of the mechanical housing.

- 9 Remove spur gearshaft (16) from mechanical housing (17).

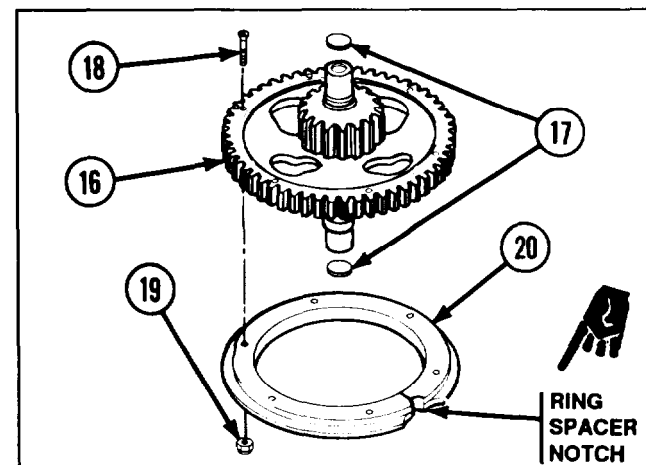


NOTE

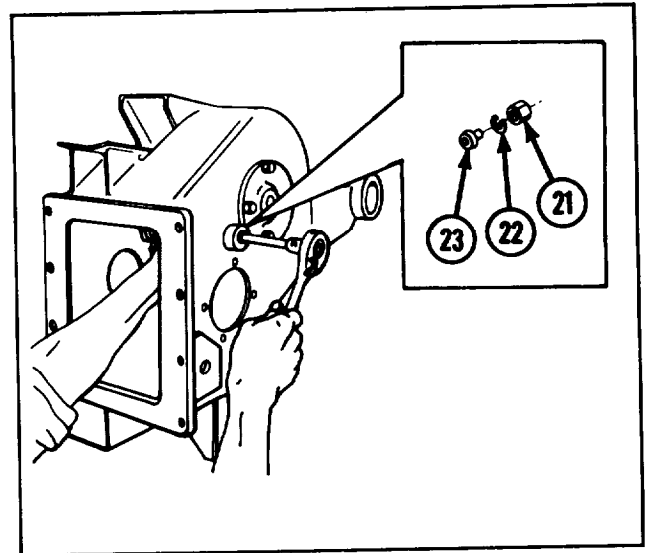
Drill or punch hole and pry out two expansion plugs.

- 10 Remove two expansion plugs (17) from spur gearshaft (16).

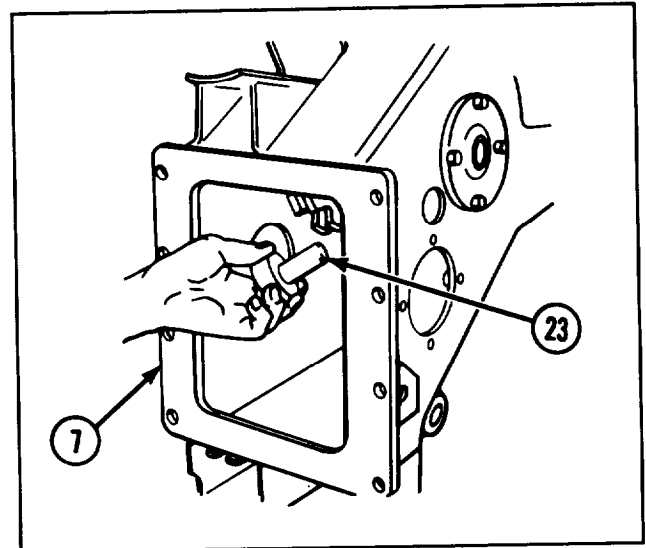
- 11 Remove six capscrews (18), six nuts (19), and ring spacer (20) from spur gearshaft (16).



- 12 Remove hex nut (21) and lockwasher (22) from needle cam follower (23).



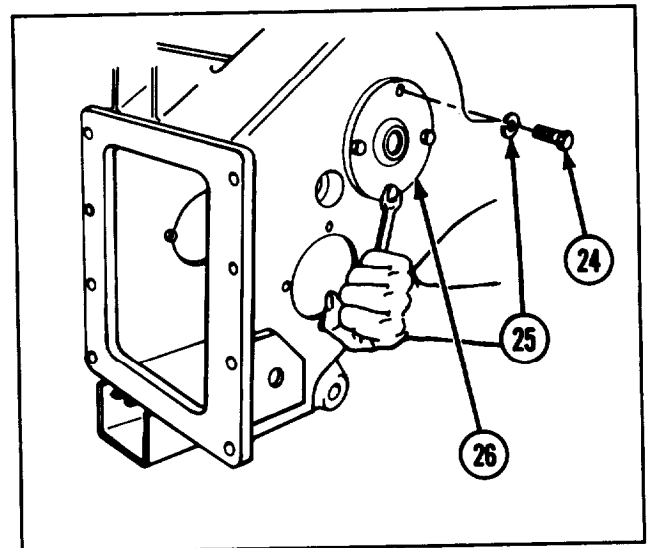
- 13 Remove needle cam follower (23) from mechanical housing (7).



NOTE

Steps 14 thru 20 are written for the removal of one bearing housing but apply to both.

- 14 Remove four capscrews (24) and four lockwashers (25) from bearing housing (26).



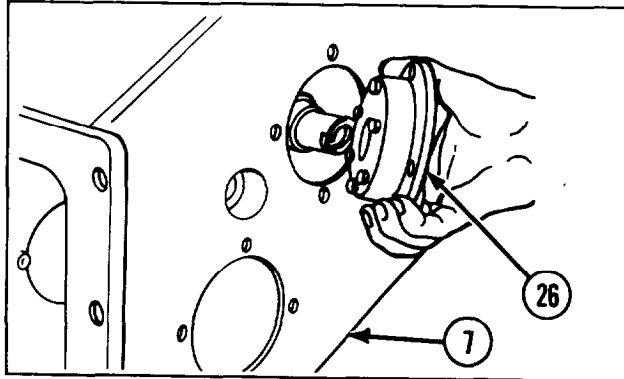
2-60. MAINTENANCE OF POWER LOADER-RAMMER-HEADLINK AND CHAIN ASSEMBLY, GEAR CASE GROUP, AND HEAD SHAFT GROUP (CONT).

DISASSEMBLY (CONT)

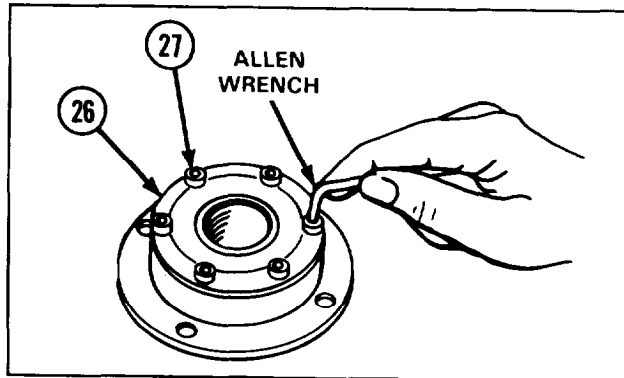
CAUTION

Apply even pressure on bearing housing when prying from mechanical housing to prevent damaging seal and shaft.

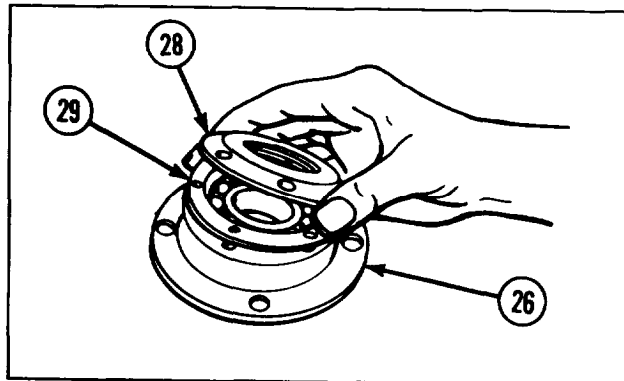
- 15 Remove bearing housing (26) from mechanical housing (7).



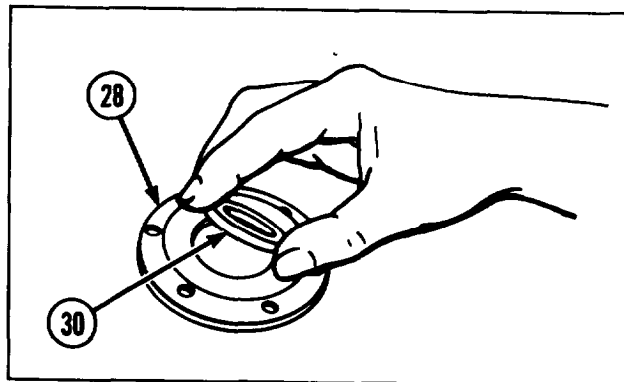
- 16 Using allen wrench, remove six cap-screws (27) from bearing housing (26).



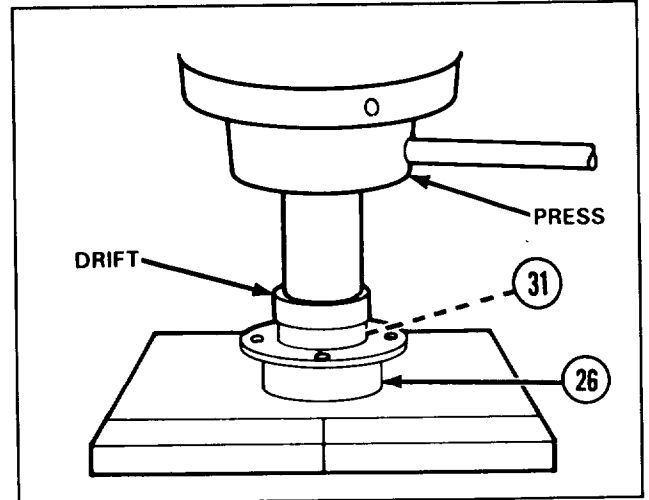
- 17 Remove packing retainer (28) and gasket (29) from bearing housing (26).



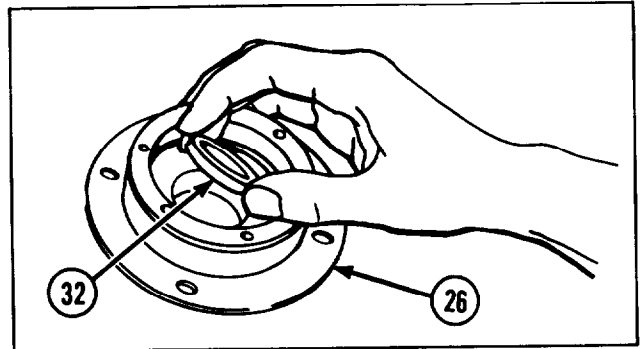
- 18 Remove plain encased seal (30) from packing retainer (28).



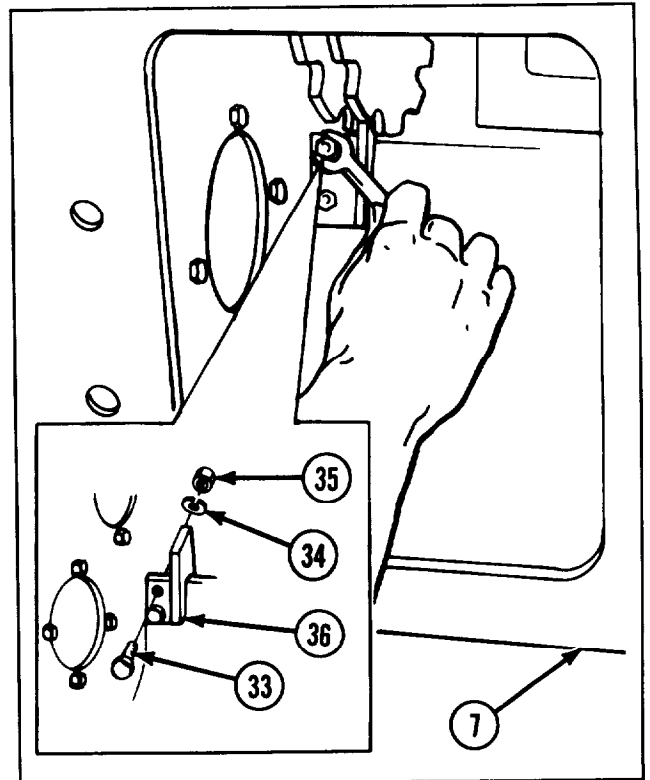
- 19 Using drift and press, remove annular ball bearing (31) from bearing housing (26).



- 20 Remove plain encased seal (32) from bearing housing (26).

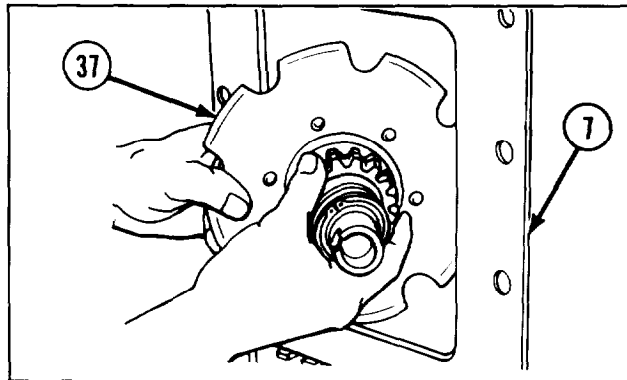


- 21 Remove two capscrews (33), two lock-washers (34), two hex nuts (35), and chain stripper (36) from mechanical housing (7).



2-60. MAINTENANCE OF POWER LOADER-RAMMER-HEADLINK AND CHAIN ASSEMBLY, GEAR CASE GROUP, AND HEAD SHAFT GROUP (CONT).

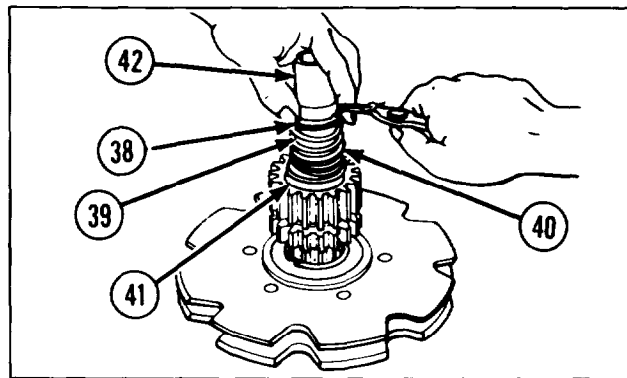
22 Remove wheel sprocket (37) from mechanical housing (7).



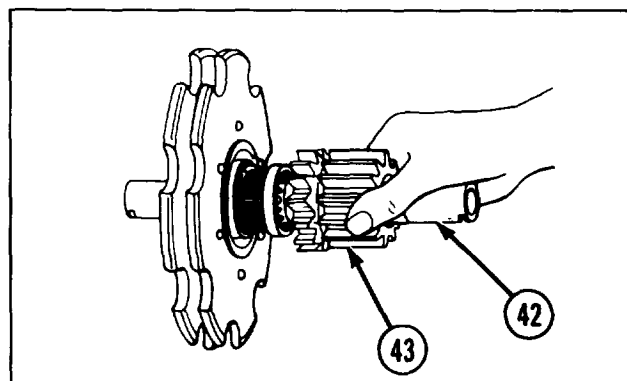
WARNING

Hold upper flat washer firmly against spring tension before removing retaining ring.

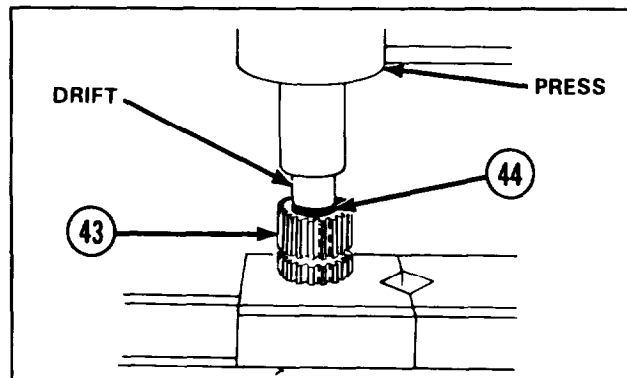
23 Remove retaining ring (38), flat washer (39), helical spring (40), and flat washer (41) from head shaft (42).



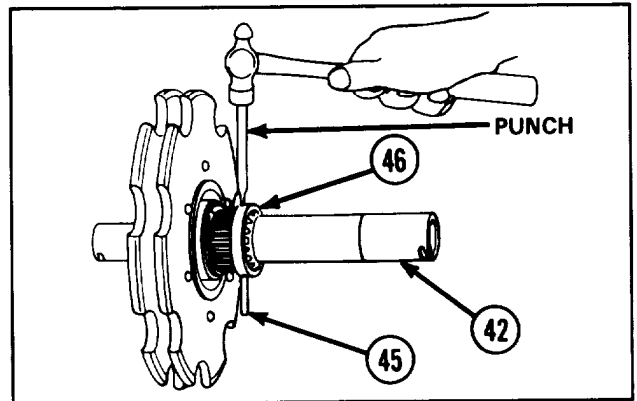
24 Remove sliding gear (43) from head shaft (42).



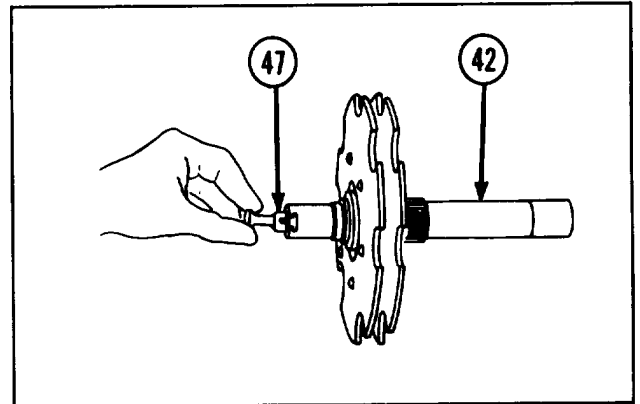
25 Using drift and press, remove sleeve bearing (44) from sliding gear (43).



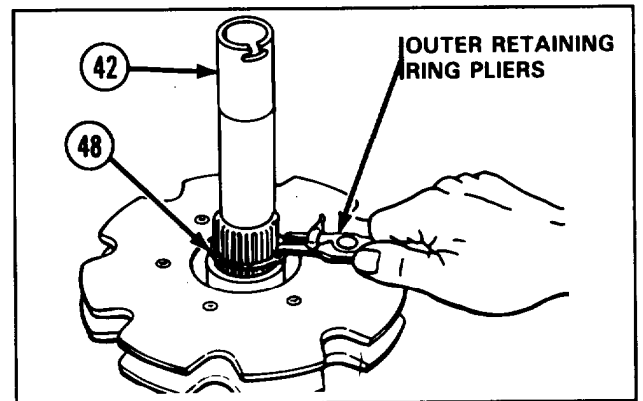
- 26 Using punch, remove headless straight pin (45) and ring spacer (46) from head shaft (42).



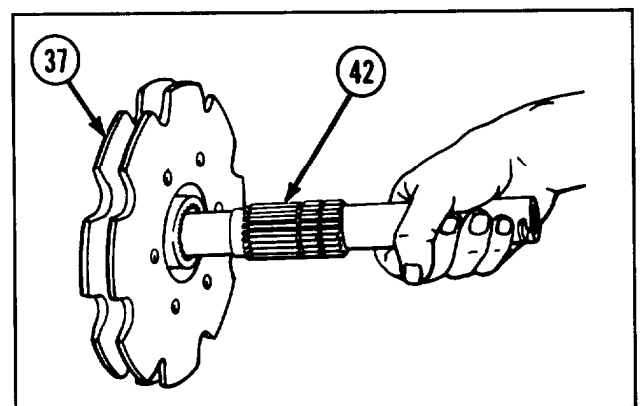
- 27 Remove gear disengage plug (47) from head shaft (42).



- 28 Using outer retaining ring pliers, remove retaining ring (48) from head shaft (42).



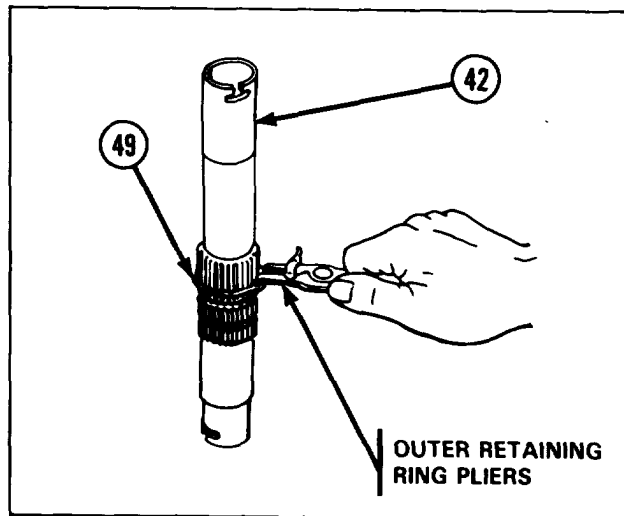
- 29 Remove wheel sprocket (37) from head shaft (42).



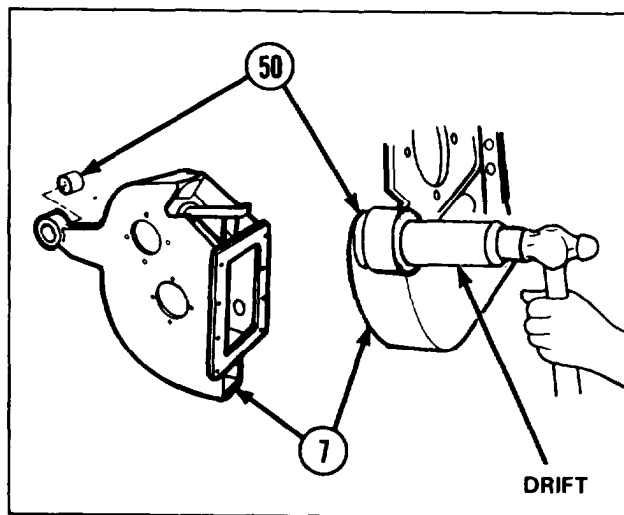
2-60. MAINTENANCE OF POWER LOADER-RAMMER-HEADLINK AND CHAIN ASSEMBLY, GEAR CASE GROUP, AND HEAD SHAFT GROUP (CONT).

DISASSEMBLY (CONT)

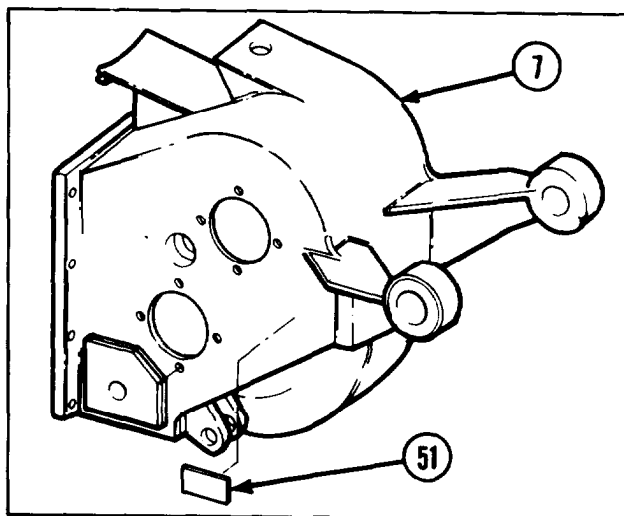
30 Using outer retaining ring pliers, remove retaining ring (49) from head shaft (42).



31 Using drift, remove two sleeve bearings (50) from mechanical housing (7).



32 If damaged, remove instruction plate (51) from mechanical housing (7).

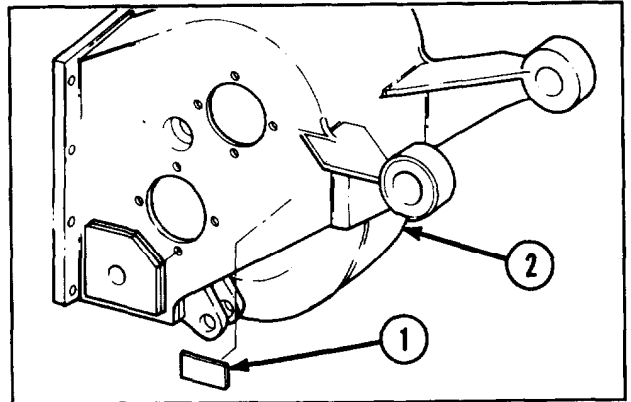


INSPECTION/REPAIR

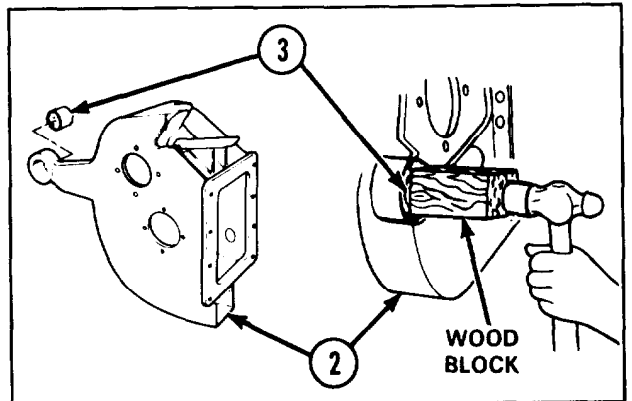
- 1 Inspect for broken, damaged, or missing parts.
- 2 Roller chain is a repairable assembly. Refer to page 2-360.
- 3 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

REASSEMBLY

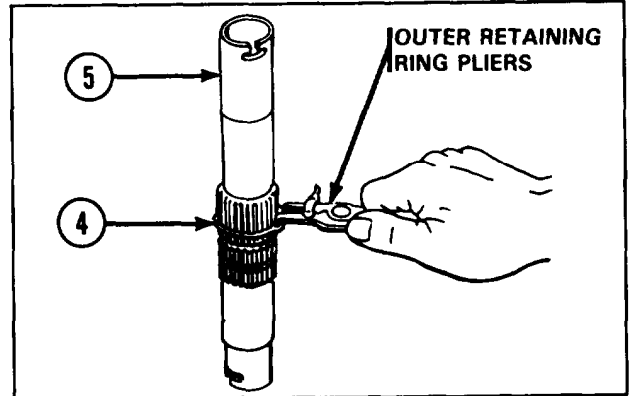
- 1 If removed, install instruction plate (1) on mechanical housing (2).



- 2 Using wood block, install two sleeve bearings (3) in mechanical housing (2).



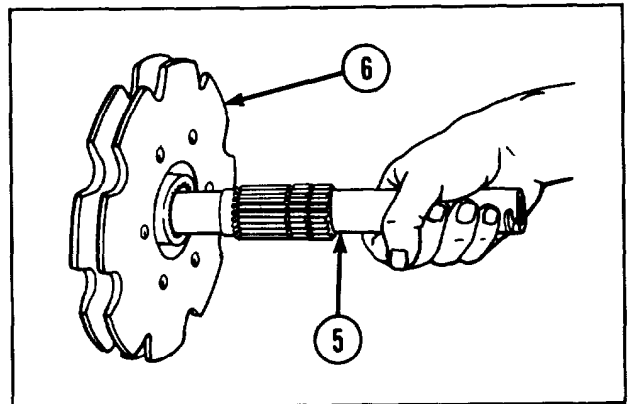
- 3 Using outer retaining ring pliers, install retaining ring (4) on head shaft (5).



NOTE

If wheel sprocket or spur gear-shaft is replaced, rammer must be re-timed. Refer to step 28.

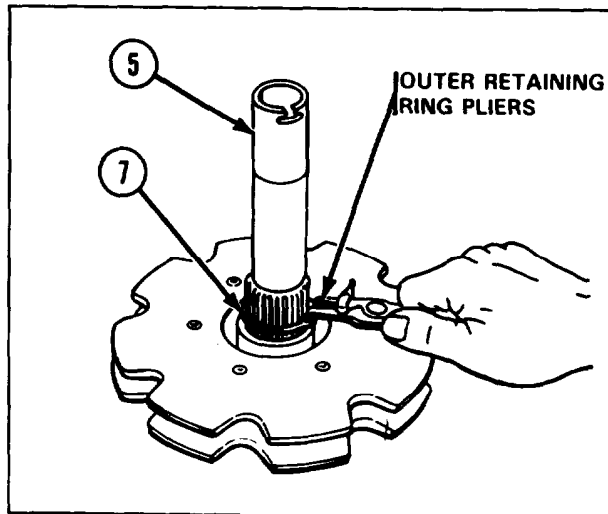
- 4 Install wheel sprocket (6) on head shaft (5).



2-60. MAINTENANCE OF POWER LOADER-RAMMER-HEADLINK AND CHAIN ASSEMBLY, GEAR CASE GROUP, AND HEAD SHAFT GROUP (CONT).

REASSEMBLY (CONT)

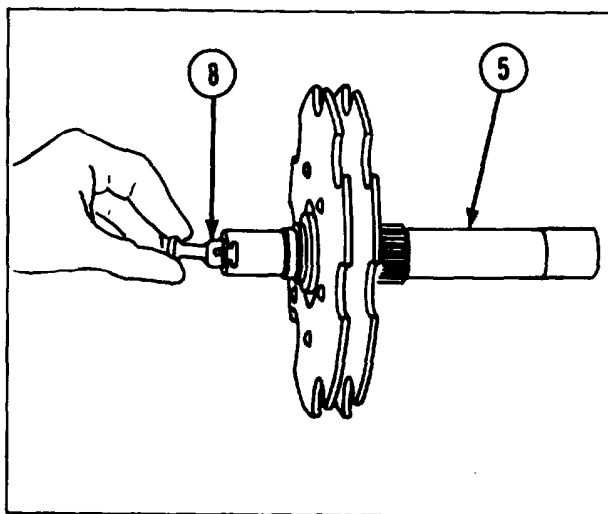
- 5 Using outer retaining ring pliers, install retaining ring (7) on head shaft (5).



CAUTION

Position drilled end of gear disengage plug facing long end of head shaft. Manual operation is not possible if reversed.

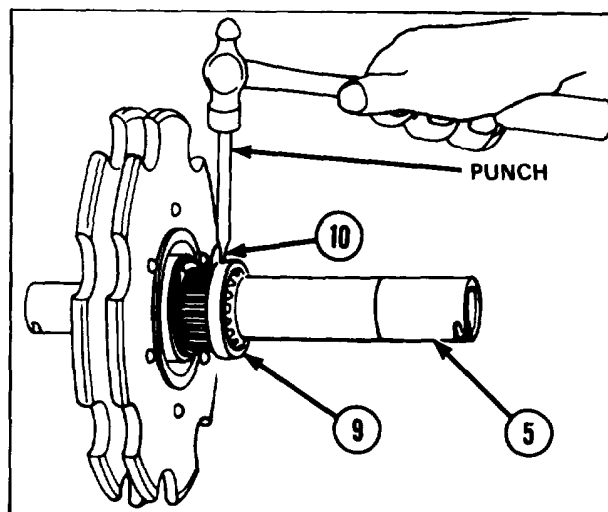
- 6 Install gear disengage plug (8) in head shaft (5).



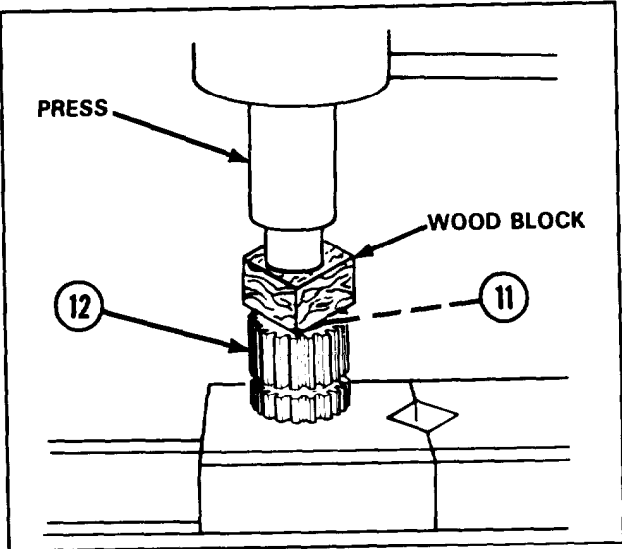
NOTE

Headless straight pin must pass through drilled hole in gear disengage plug.

- 7 Using punch, install ring spacer (9) and headless straight pin (10) on head shaft (5).



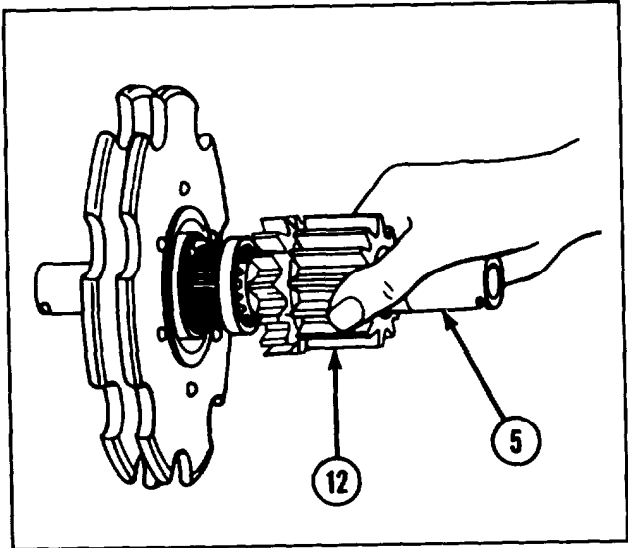
8 Using press and wood block, install sleeve bearing (11) in sliding gear (12).



CAUTION

Position inner splines of sliding gear facing wheel sprocket.

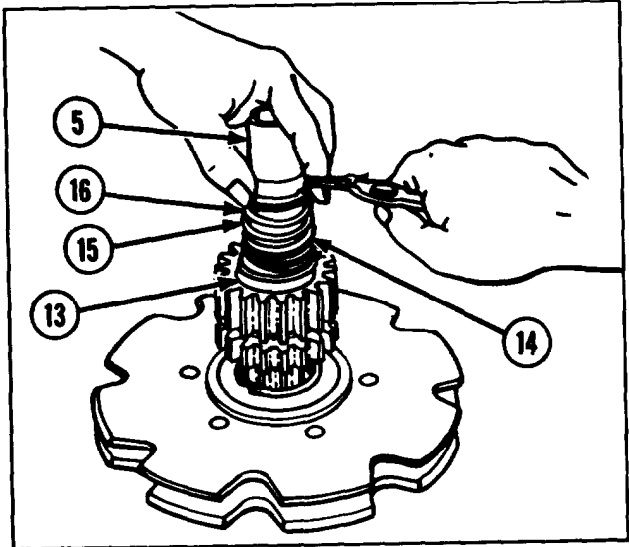
- 9 Coat sliding gear (12) with grease (item 12, appx B).
- 10 Install sliding gear (12) on head shaft (5).



WARNING

Hold upper flat washer firmly against spring tension before installing retaining ring.

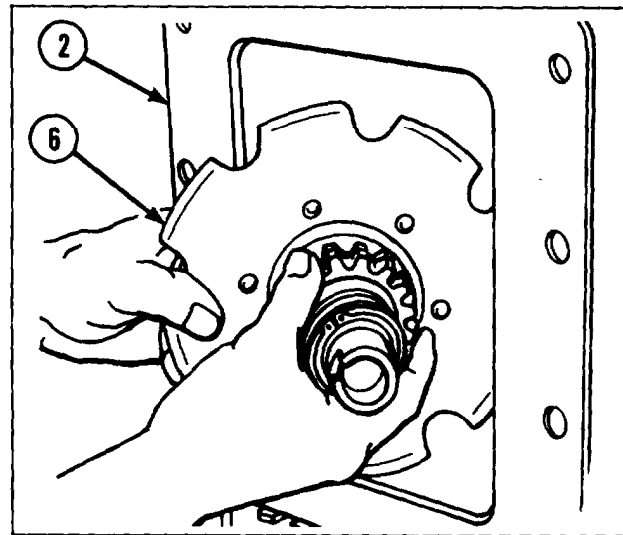
- 11 Install flat washer (13), helical spring (14), flat washer (15), and retaining ring (16) on head shaft (5).



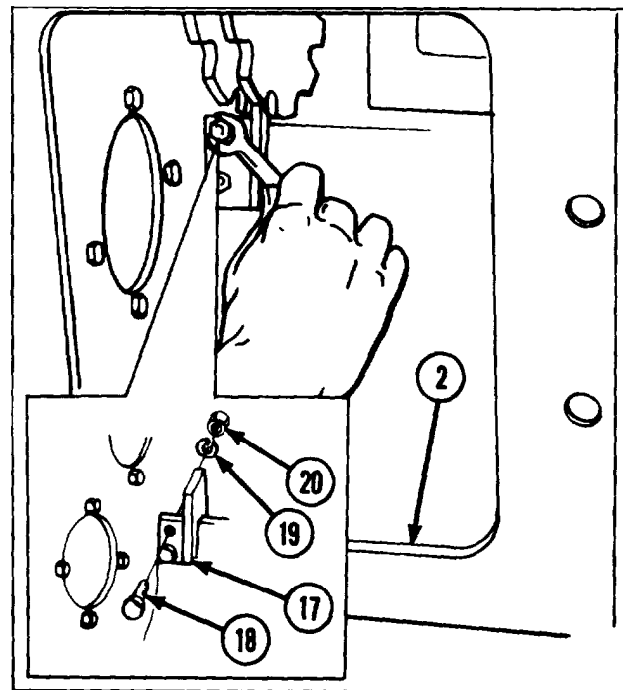
2-60. MAINTENANCE OF POWER LOADER-RAMMER-HEADLINK AND CHAIN ASSEMBLY, GEAR CASE GROUP, AND HEAD SHAFT GROUP (CONT).

REASSEMBLY (CONT)

12 Install wheel sprocket (6) in mechanical housing (2).



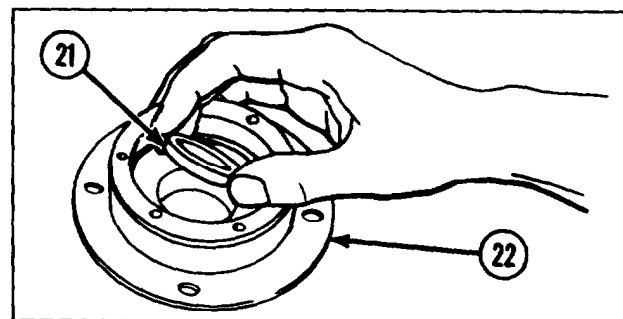
13 Position chain stripper (17) in mechanical housing (2) and secure with two cap-screws (18), two new lockwashers (19), and two hex nuts (20).



NOTE

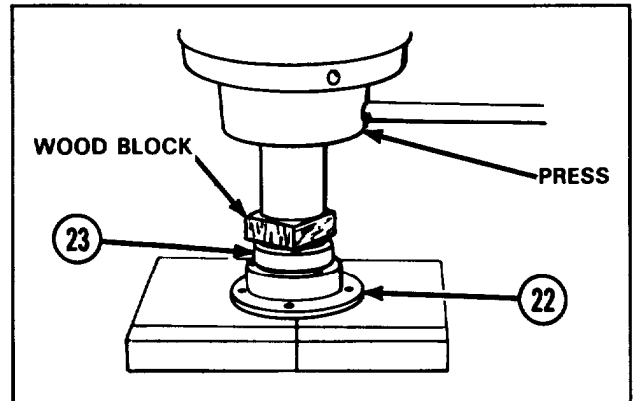
Steps 14 thru 21 are written for installation of one bearing housing but apply to both.

14 Install plain encased seal (21) in bearing housing (22).

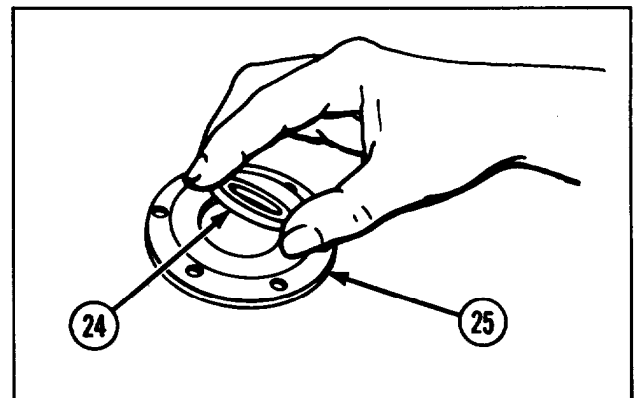


15 Pack annular ball bearing (23) with grease (item 12, appx B).

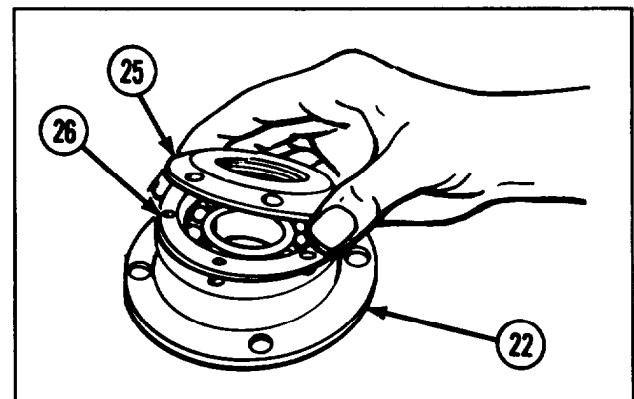
16 Using press and wood block, install annular ball bearing (23) in bearing housing (22).



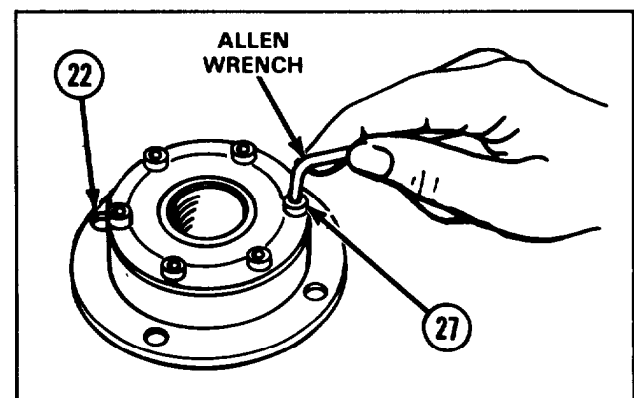
17 Install plain encased seal (24) in packing retainer (25).



18 Install new gasket (26) and packing retainer (25) on bearing housing (22).



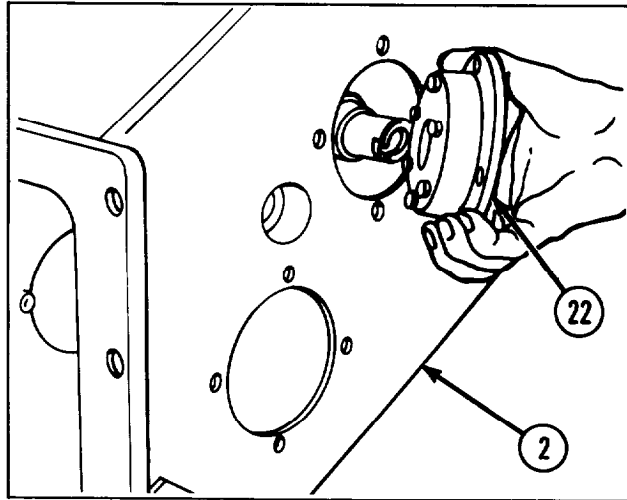
19 Using allen wrench, install six capscrews (27) in bearing housing (22).



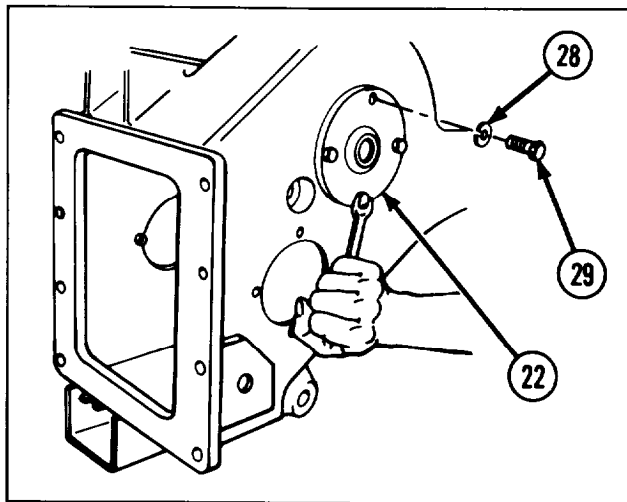
2-60. MAINTENANCE OF POWER LOADER-RAMMER-HEADLINK AND CHAIN ASSEMBLY, GEAR CASE GROUP, AND HEAD SHAFT GROUP (CONT).

REASSEMBLY (CONT)

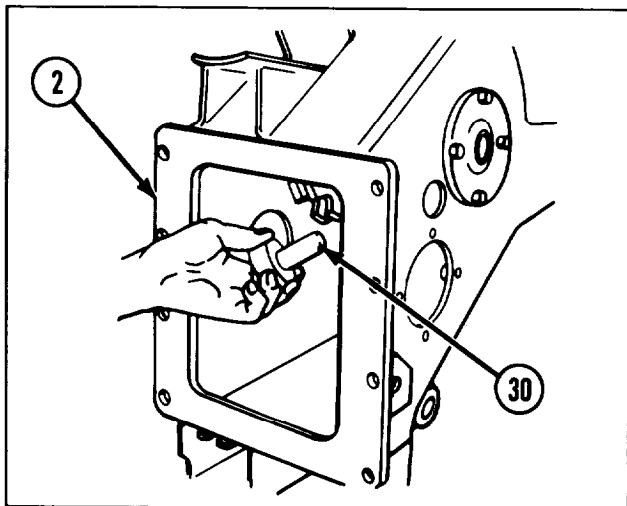
20 Install bearing housing (22) in mechanical housing (2).



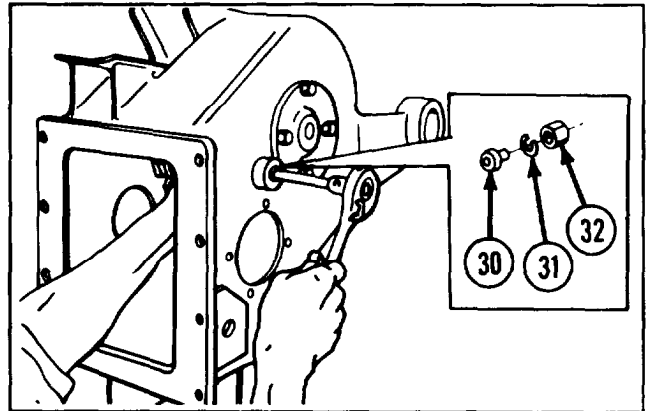
21 Secure bearing housing (22) with four new lockwashers (28) and four cap-screws (29).



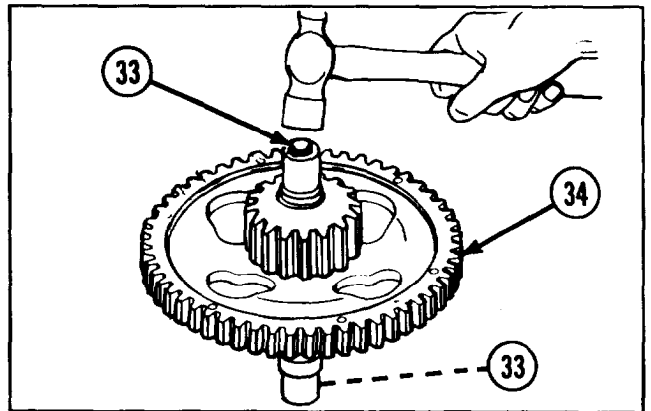
22 Install needle cam follower (30) in mechanical housing (2).



- 23 Install new lockwasher (31) and hex nut (32) on needle cam follower (30).



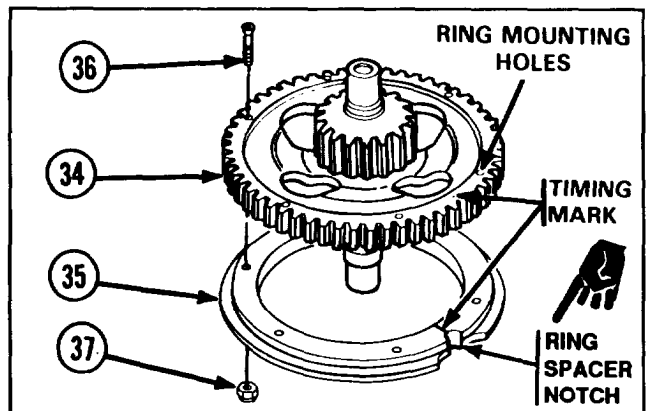
- 24 Install two new expansion plugs (33) in spur gearshaft (34).



NOTE

If rammer timing is required, go to step 28.

- 25 Aline timing marks and install ring spacer (35) on spur gearshaft (34) with six capscrews (36) and six nuts (37).

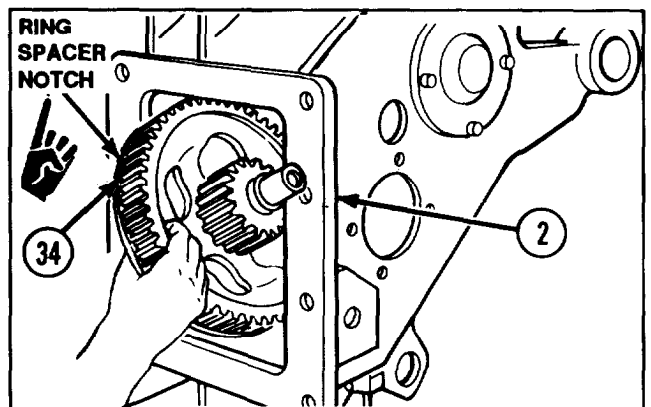


- 26 Coat teeth on spur gearshaft (34) with grease (item 12, appx B).

NOTE

During installation of spur gearshaft, the notch in the ring spacer should be positioned in the upper left-hand corner of the mechanical housing.

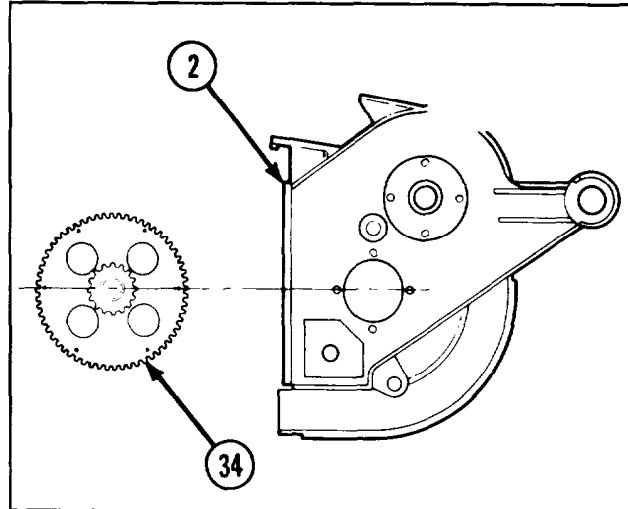
- 27 Install spur gearshaft (34) in mechanical housing (2).



2-60. MAINTENANCE OF POWER LOADER-RAMMER-HEADLINK AND CHAIN ASSEMBLY, GEAR CASE GROUP, AND HEAD SHAFT GROUP (CONT).

REASSEMBLY (CONT)

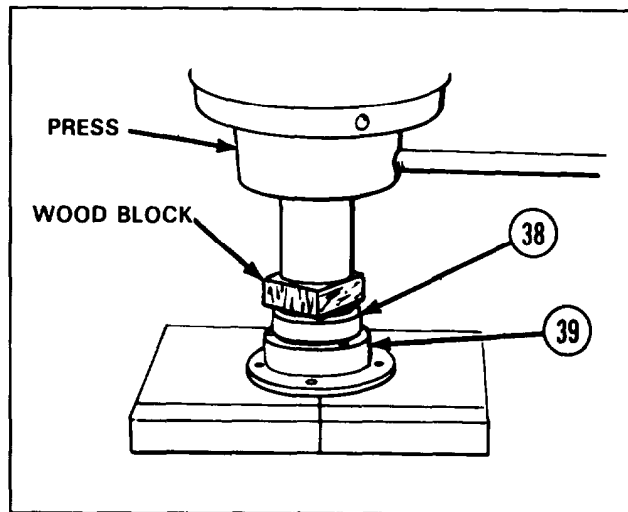
28 If rammer is to be timed, install spur gearshaft (34) in mechanical housing (2) with ring mounting holes, if any, aligned with bearing housing mounting holes.



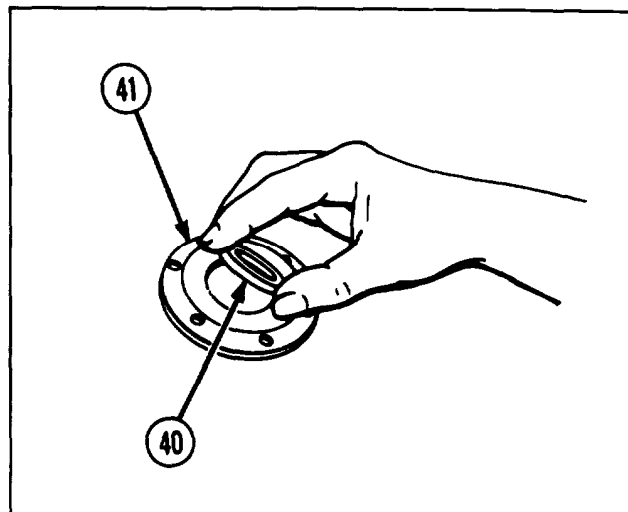
NOTE

Steps 29 thru 35 are written for installation of one bearing housing but apply to both.

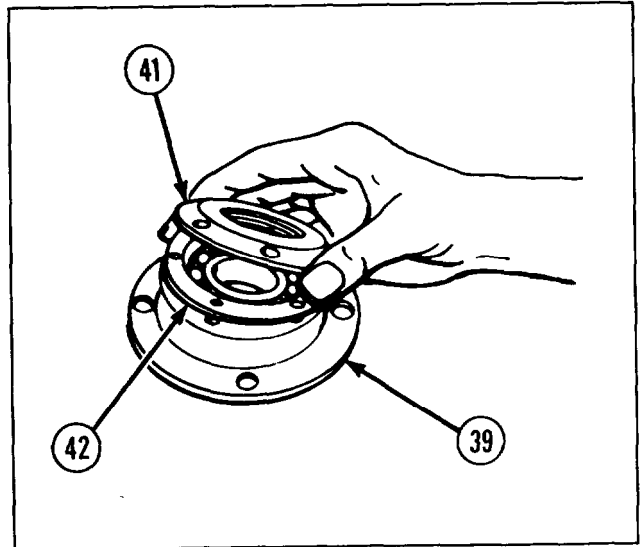
- 29** Pack annular ball bearing (38) with grease (item 12, appx B).
- 30** Using press and wood block, install annular ball bearing (38) in bearing housing (39).



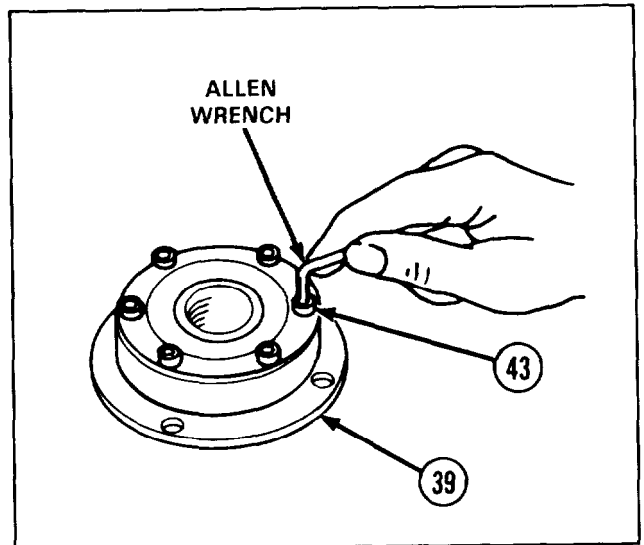
31 Install plain encased seal (40) in packing retainer (41).



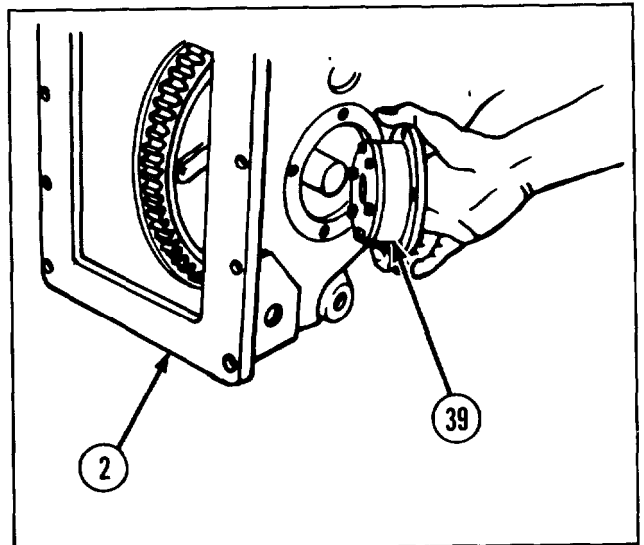
32 Install new gasket (42) and packing re-
tainer (41) on bearing housing (39).



33 Using allen wrench, install six capscrews
(43) in bearing housing (39).



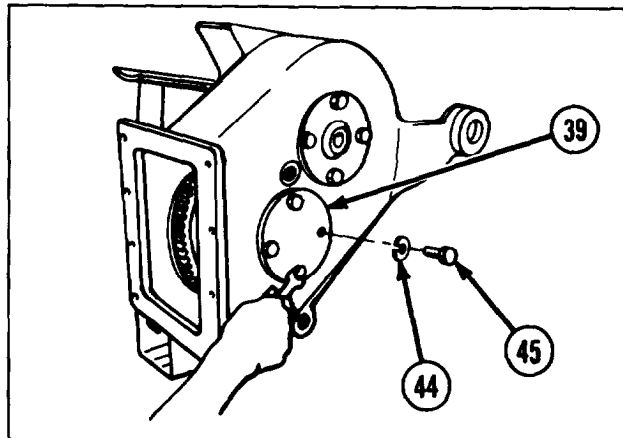
34 Install bearing housing (39) in mechanical
housing (2).



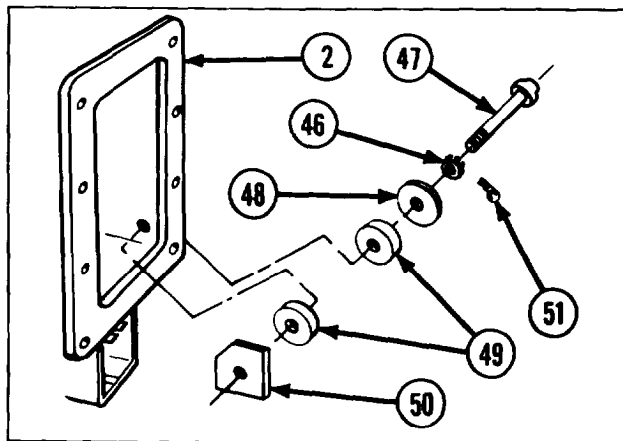
2-60. MAINTENANCE OF POWER LOADER-RAMMER-HEADLINK AND CHAIN ASSEMBLY, GEAR CASE GROUP, AND HEAD SHAFT GROUP (CONT).

REASSEMBLY (CONT)

35 Secure bearing housing (39) with four new lockwashers (44) and four cap-screws (45).



36 Install nut (46), latch plunger (47), flat washer (48), two rubber bushings (49), and plain nut plate (50) in mechanical housing (2).



37 Tighten nut (46) and install new cotter pin (51).

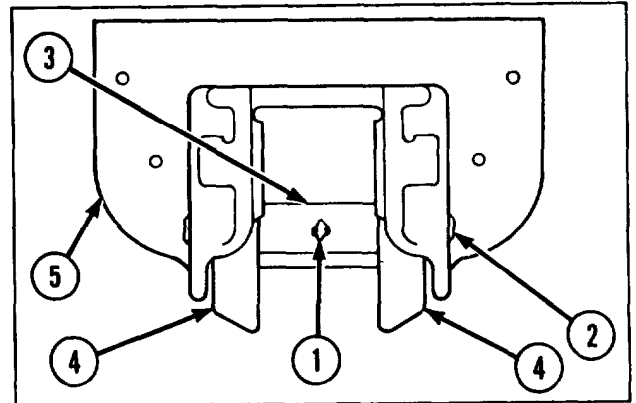
2-61. MAINTENANCE OF ROLLER CHAIN AND HEADLINK ASSEMBLY.

This task covers:	a. <i>Disassembly</i>	b. <i>Inspection/Repair</i>	c. <i>Reassembly</i>
INITIAL SETUP			
<p>Tools and Special Tools Ordnance artillery and turret mechanic's tool kit (SC 5180-95-CL-A12)</p> <p>Materials/Parts Adhesive (item 2, appx B) Cotter pin (74) (MS24665-351) Cotter pin (MS24665-353) Self-locking nut (MS21044N6)</p> <p>References TM 9-2350-304-24P-2</p>		<p>Equipment Conditions 2-325 Roller chain and headlink assembly removed Headlink assembly partially disassembled (TM 9-2350-304-20-2)</p> <p>General Safety Instructions</p> <div style="border: 1px solid black; padding: 5px; text-align: center; width: fit-content; margin: 10px auto;">WARNING</div> <p>Roller chain contains parts under spring tension. Use caution during removal.</p>	

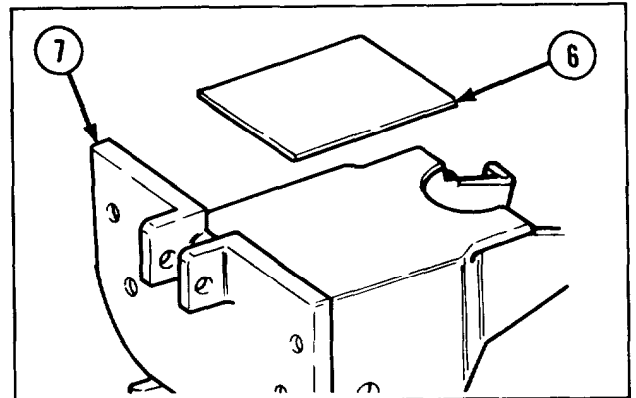
NOTE

Steps 1 and 2 refer to the disassembly of the headlink assembly.

Remove cotter pin (1), pin (2), spacer (3), and two wheel assemblies (4) from headlink support (5).



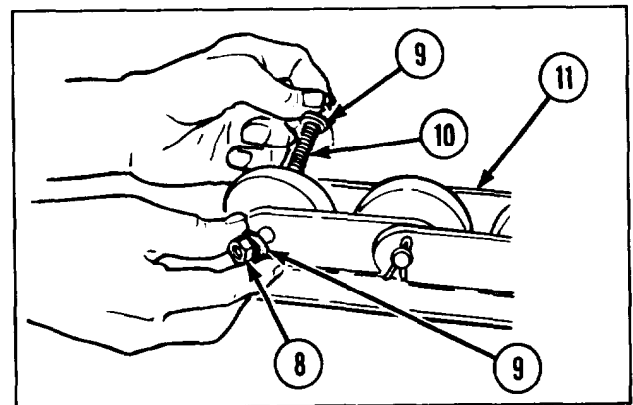
2 If damaged, remove instruction plate (6) from headlink assembly (7).



NOTE

Steps 3 thru 6 refer to the disassembly of the roller chain.

3 Remove self-locking nut (8), two flat washers (9), and capscrew (10) from roller chain (11).



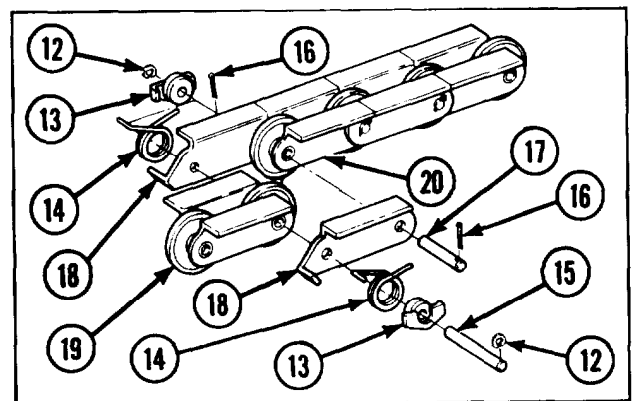
WARNING

Roller chain contains parts under high tension. Use caution during removal.

NOTE

Step 4 applies to the outer rammer chain link connecting the first and second rammer chain links together.

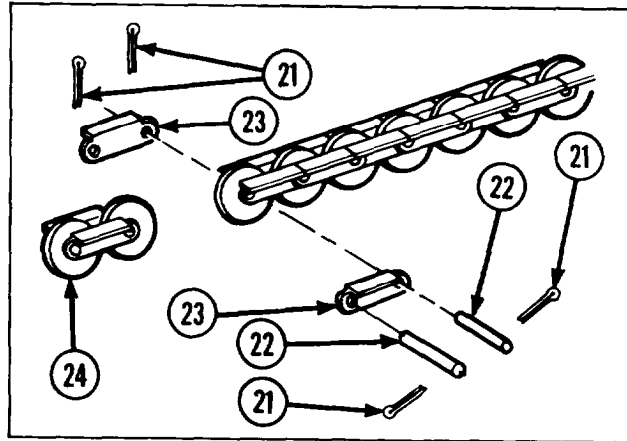
4 Remove two retaining rings (12), two weldment retainers (13), two torsion springs (14), headless grooved pin (15), two cotter pins (16), headless straight pin (17), and two outer rammer chain links (18) connecting two rammer chain links (19 and 20) together.



2-61. MAINTENANCE OF ROLLER CHAIN AND HEADLINK ASSEMBLY (CONT).

DISASSEMBLY (CONT)

- 5 Remove four cotter pins (21), two headless straight pins (22), two chain link plates (23), and rammer chain link (24).
- 6 Repeat step 5 until the 18 other rammer chain links have been disassembled.



- 1 Inspect for broken, damaged, or missing parts.
- 2 If headlink support is damaged, replace entire headlink assembly.
- 3 If either plate is damaged, replace entire roller chain.
- 4 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

REASSEMBLY

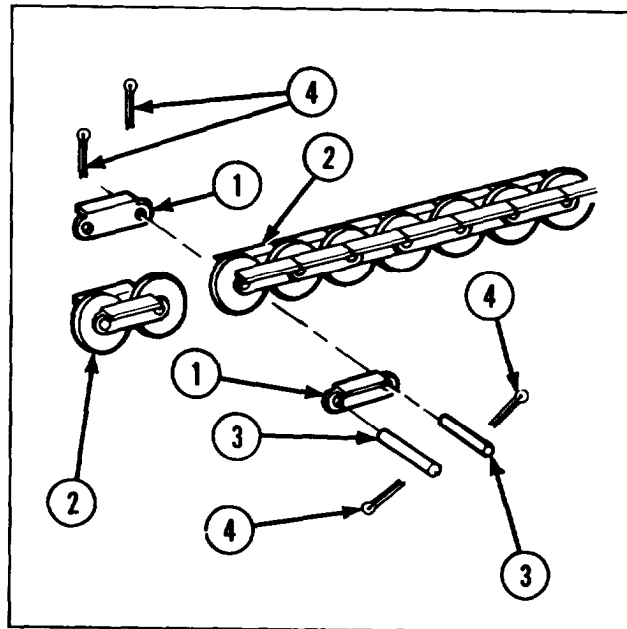
CAUTION

Be sure you have 36 chain link plates and one outer chain link plate for a total of 37.

NOTE

Steps 1 thru 5 refer to the reassembly of the roller chain.

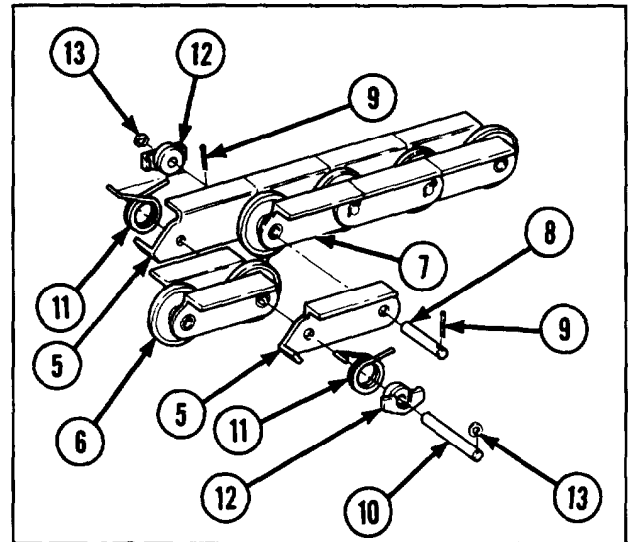
- 1 Position two chain link plates (1) on opposite sides of facing wheels of two rammer chain links (2) and secure with two headless straight pins (3) and four new cotter pins (4).
- 2 Repeat step 1 until the 18 other rammer chain links have been assembled.



NOTE

Step 3 applies to the outer rammer chain link plate connecting the first and second chain links together.

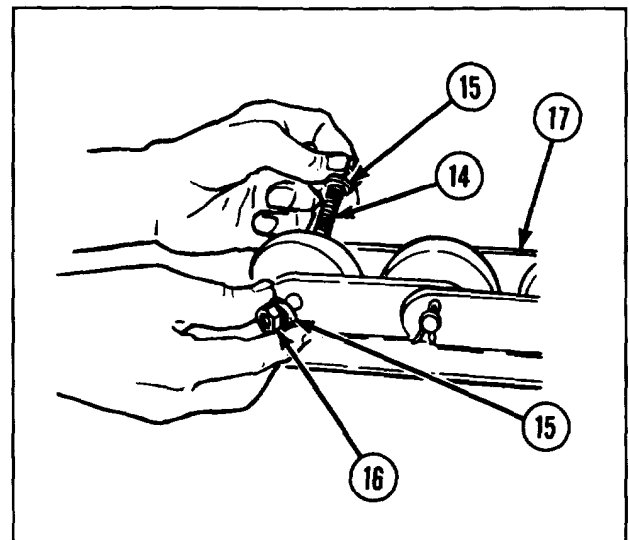
- 3 Position two outer rammer chain links (5) on opposite sides of two rammer chain links (6 and 7) and secure with headless straight pin (8), two new cotter pins (9), headless grooved pin (10), two torsion springs (11), two weldment retainers (12), and two retaining rings (13).



NOTE

Step 4 applies to reassembly of the last rammer chain links.

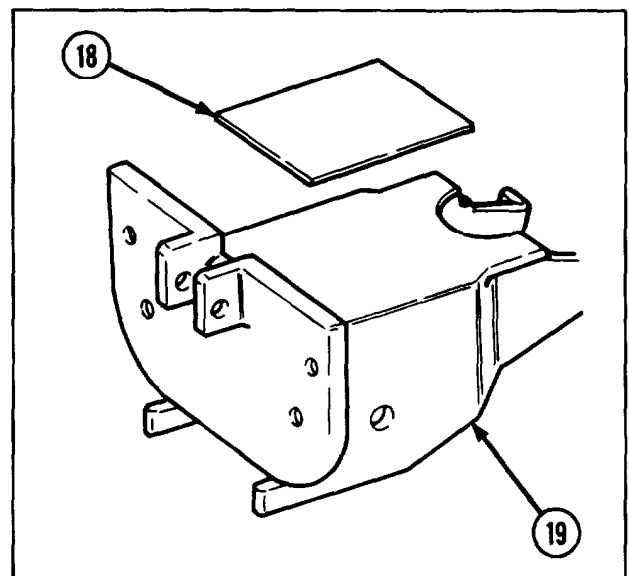
- 4 Install capscrew (14), two flat washers (15), and new self-locking nut (16) on roller chain (17).



NOTE

Steps 5 and 6 refer to the reassembly of the headlink assembly.

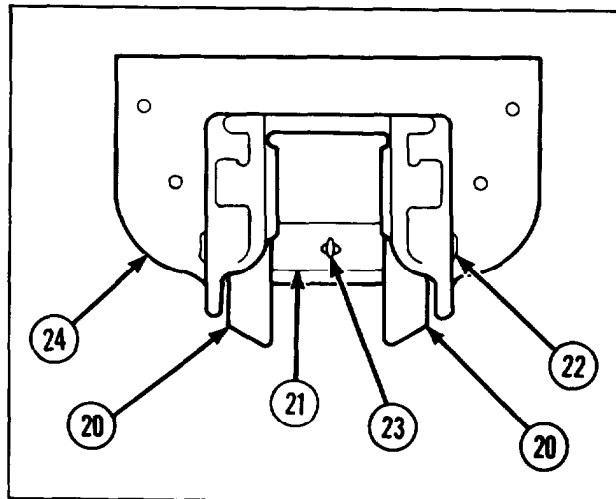
- 5 If removed, install instruction plate (18) on headlink assembly (19) using adhesive (item 2, appx B).



2-61. MAINTENANCE OF ROLLER CHAIN AND HEADLINK ASSEMBLY (CONT).

REASSEMBLY (CONT)

6 Install two wheel assemblies (20), spacer (21), pin (22), and new cotter pin (23) on headlink support (24).



2-62'. MAINTENANCE OF LIFT CYLINDER ASSEMBLY.

This task covers:

- a. *Disassembly*
- b. *Inspection/Repair*

- c. *Reassembly*
- d. *Testing*

INITIAL SETUP

Tools and Special Tools

- Artillery maintenance shop equipment (SC 4933-95-CL-A12)
- Spanner wrench
- Ordnance artillery and turret mechanic's tool kit (SC 5180-95-CL-A12)

Materials/Parts

- Hydraulic fluid (item 13, appx B)
- Parts kit (5911216)

References

- TM 9-2350-304-24P-2
- TM 9-4940-468-14

Equipment Conditions

2-325 Lift cylinder assembly removed

General Safety Instructions

WARNING

Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

DISASSEMBLY

WARNING

Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

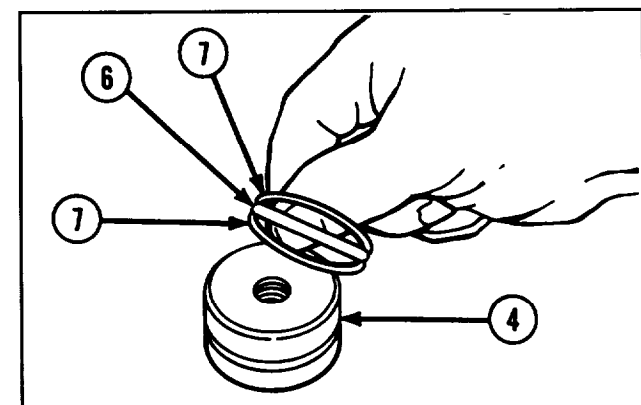
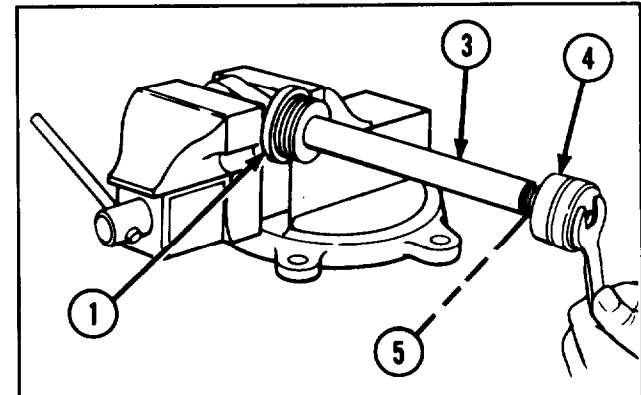
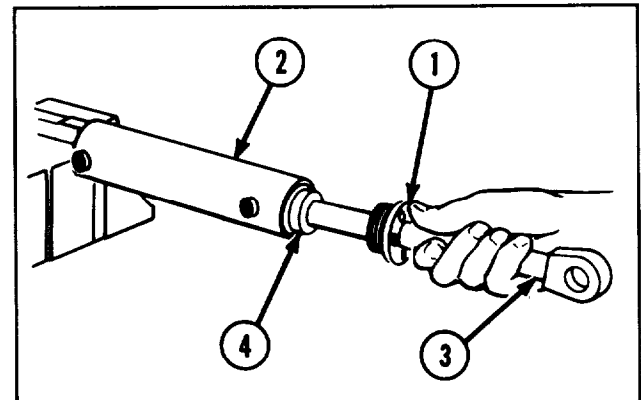
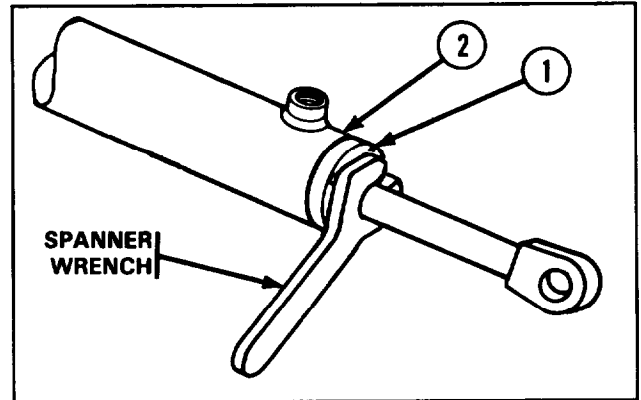
1 Using spanner wrench, loosen lift cylinder head (1) from actuating cylinder (2).

2 Remove linear piston rod (3), lift cylinder head (1), and linear actuating piston (4) from actuating cylinder (2).

3 Remove linear actuating piston (4) and preformed packing (5) from linear piston rod (3).

4 Remove lift cylinder head (1) from linear piston rod (3).

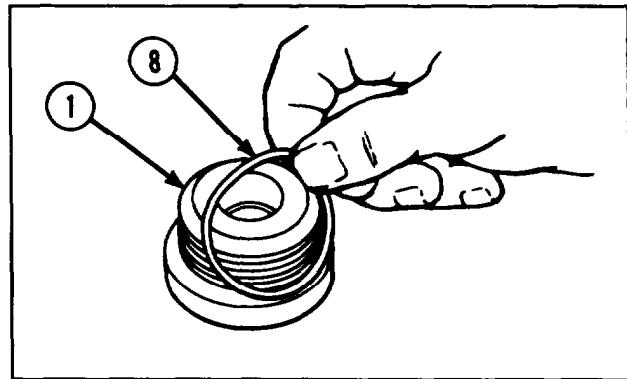
5 Remove gasket (6) and two backup rings (7) from linear actuating piston (4).



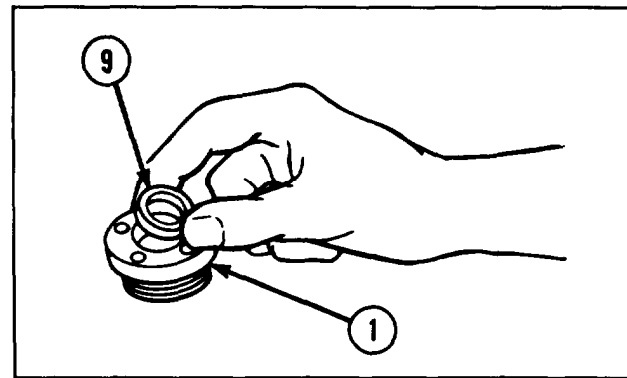
2-62. MAINTENANCE OF LIFT CYLINDER ASSEMBLY (CONT).

DISASSEMBLY (CONT)

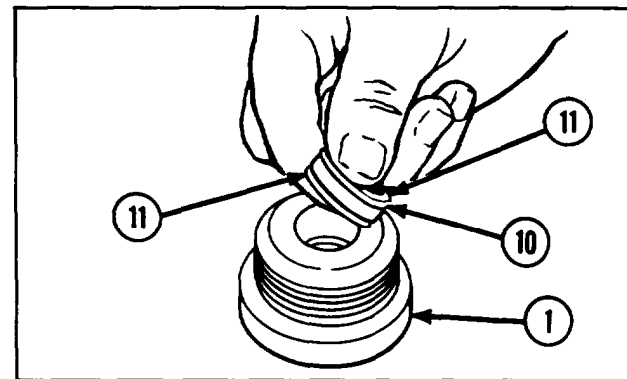
6 Remove preformed packing (8) from lift cylinder head (1).



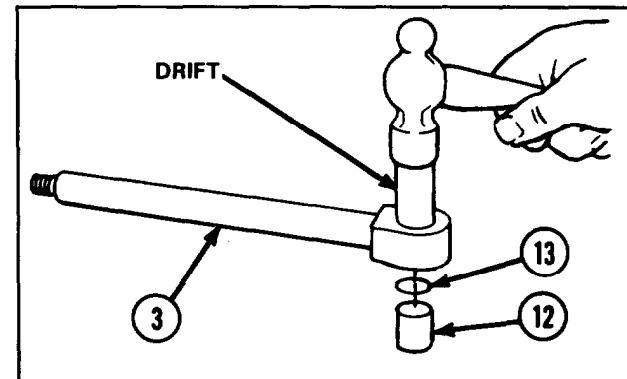
7 Remove plain encased seal (9) from lift cylinder head (1).



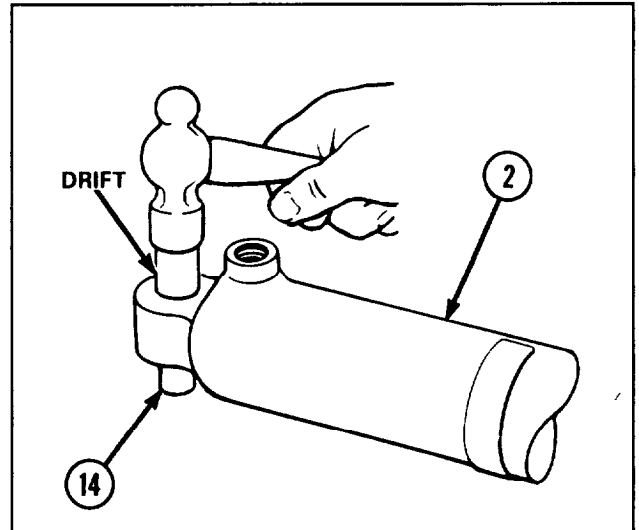
8 Remove preformed packing (10) and two backup rings (11) from lift cylinder head (1).



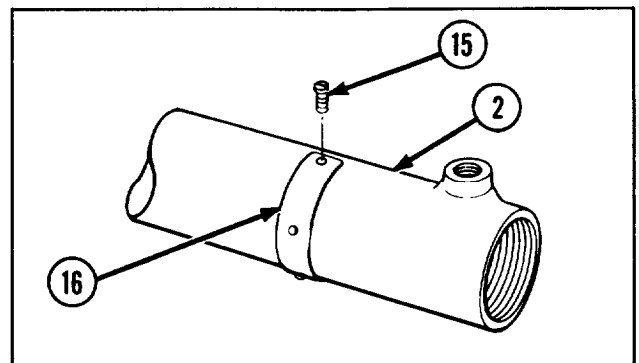
9 Using drift, remove sleeve bearing (12) and preformed packing (13) from linear piston rod (3).



- 10 Using drift, remove sleeve bearing (14) from actuating cylinder (2).

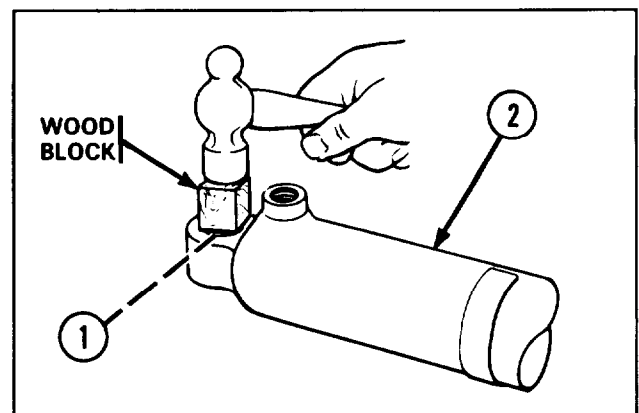


- 11 Remove three drive screws (15) and identification plate (16) from actuating cylinder (2).



- 1 Inspect for broken, damaged, or missing parts.
- 2 If actuating cylinder is damaged, replace entire lift cylinder assembly
- 3 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

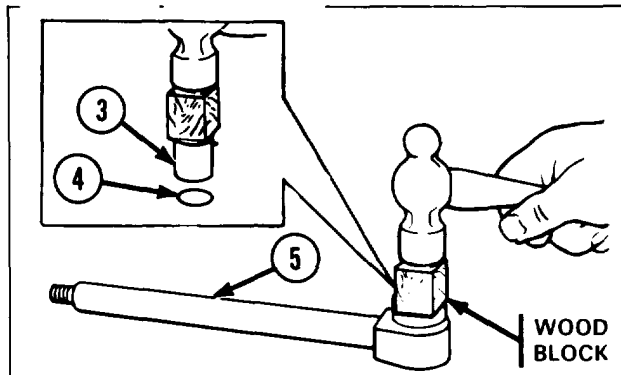
- 1 Using wood block, install sleeve bearing (1) in actuating cylinder (2).



2-62. MAINTENANCE OF LIFT CYLINDER ASSEMBLY (CONT).

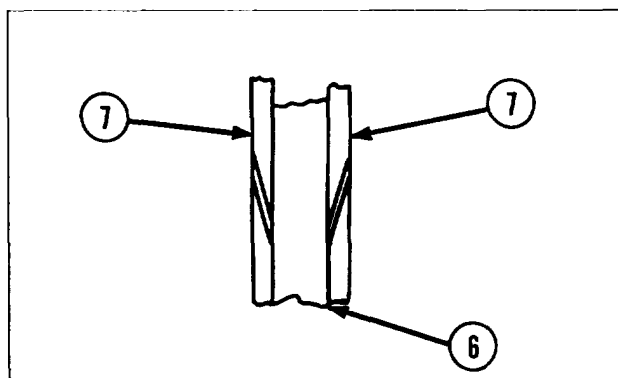
REASSEMBLY (CONT)

2 Using wood block, install sleeve bearing (3) and new preformed packing (4) in linear piston rod (5).

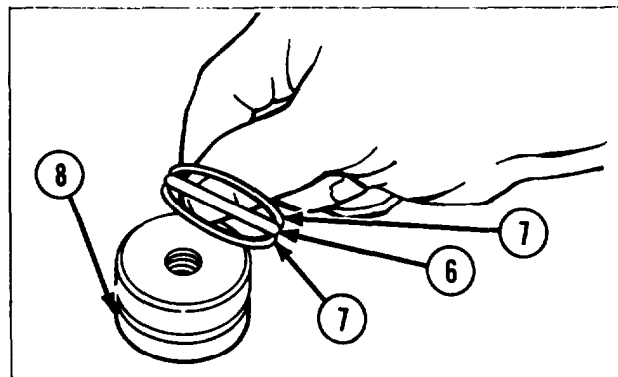


NOTE

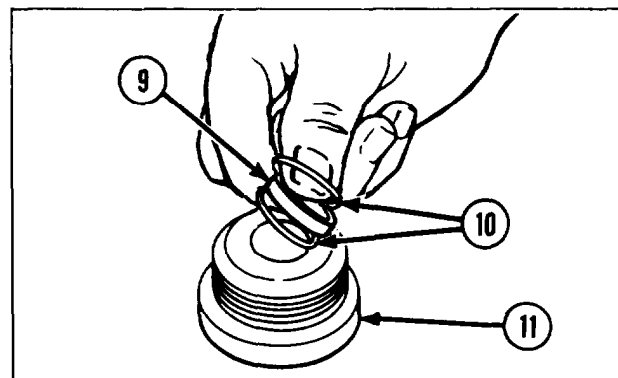
In steps 3 and 4, install backup rings on shoulders of performed packing or gasket with scarfed edges matched as shown.



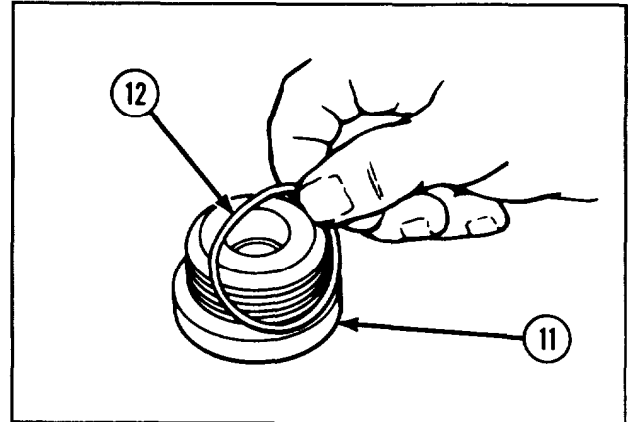
3 Install new gasket (6) and two backup rings (7) on linear actuating piston (8).



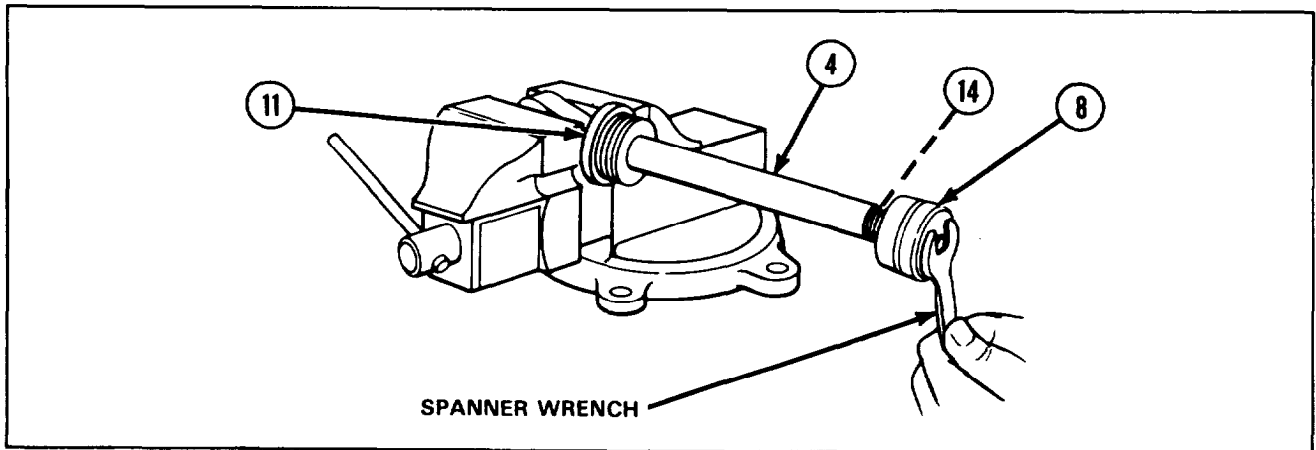
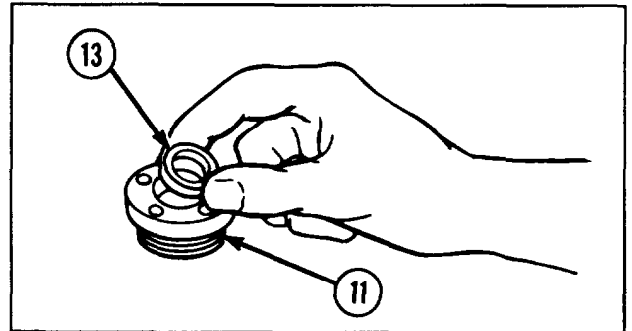
4 Install new preformed packing (9) and two backup rings (10) in inner groove of lift cylinder head (11).



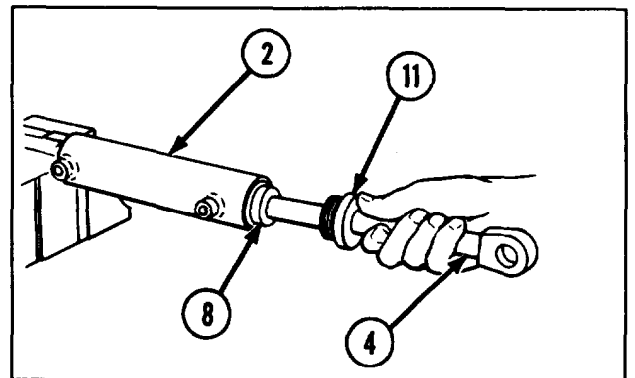
- 5 Install new preformed packing (12) on lift cylinder head (11).



- 6 Install new plain encased seal (13) in outer groove of lift cylinder head (11).



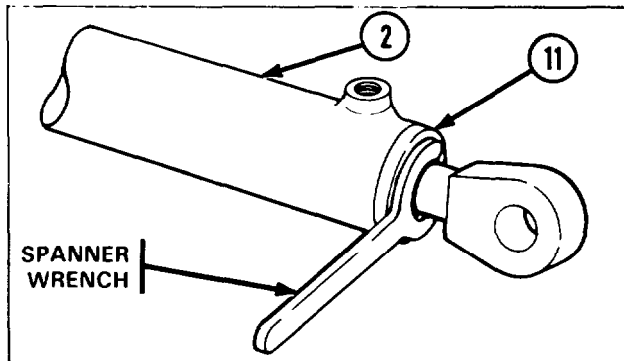
- 7 Install lift cylinder head (11) and new preformed packing (14) on linear piston rod (4).
- 8 Using spanner wrench, install linear actuating piston (8) on linear piston rod (4).
- 9 Install linear actuating piston (8), linear piston rod (4), and lift cylinder head (11) in actuating cylinder (2).



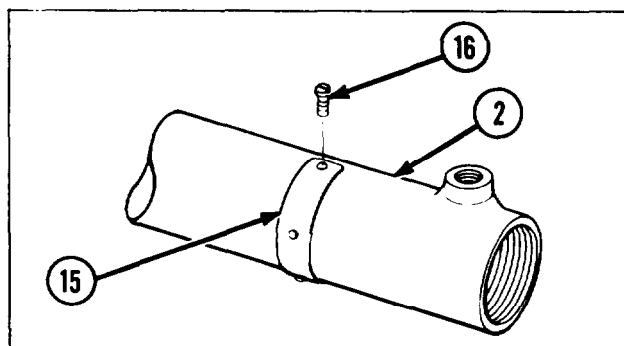
2-62. MAINTENANCE OF LIFT CYLINDER ASSEMBLY (CONT).

REASSEMBLY (CONT)

- 10 Using spanner wrench, tighten lift cylinder head (11) on actuating cylinder (2).



- 11 Position identification plate (15) on actuating cylinder (2) and secure with three drive screws (16).

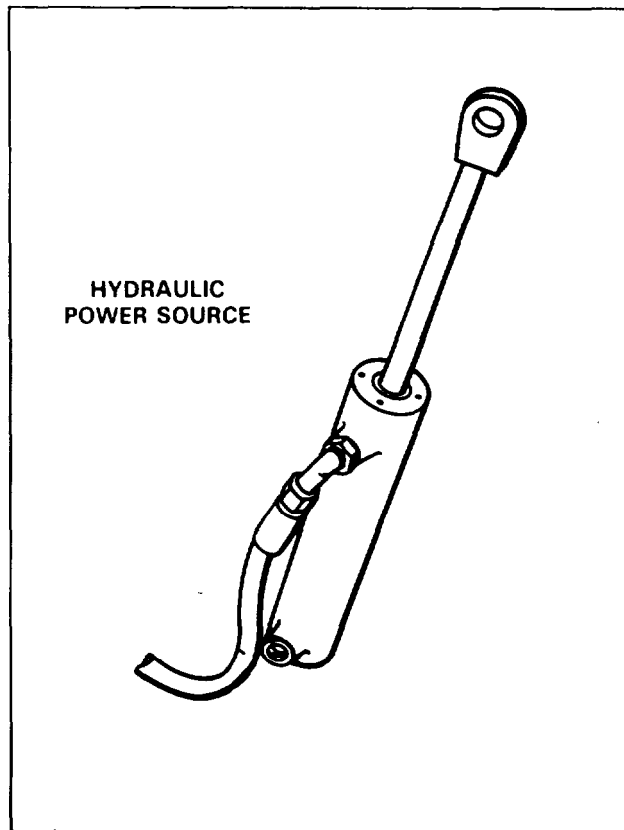


- 1 Refer to TM 9-4940-468-14 for test setup and test procedures.

WARNING

Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

- 2 Charge lift cylinder assembly with new hydraulic fluid (item 13, appx B).
- 3 Obtain a source of hydraulic power capable of providing 3000 psi (20,685 kPa) using hydraulic fluid (item 13, appx B).
- 4 Apply pressure of 3000 psi (20,685 kPa) for 5 minutes minimum with linear piston rod fully extended. Maximum leakage allowed is 1 drop per minute. If lift cylinder assembly fails pressure test, replace lift cylinder assembly. Refer to page 2-325.



2-63. MAINTENANCE OF RAMMING CYLINDER.

This task covers:

- a. *Disassembly*
- b. *Inspection/Repair*

- c. *Reassembly*
- d. *Testing*

INITIAL SETUP

Tools and Special Tools

Ordnance artillery and turret mechanic's tool kit (SC 5180-95-CL-A12)

Materials/Parts

Hydraulic fluid (item 13, appx B)
Parts kit (5911250)

References

TM 9-2350-304-24P-2
TM 9-4940-468-14

Equipment Conditions

2-337 Ramming cylinder removed

General Safety Instructions

WARNING

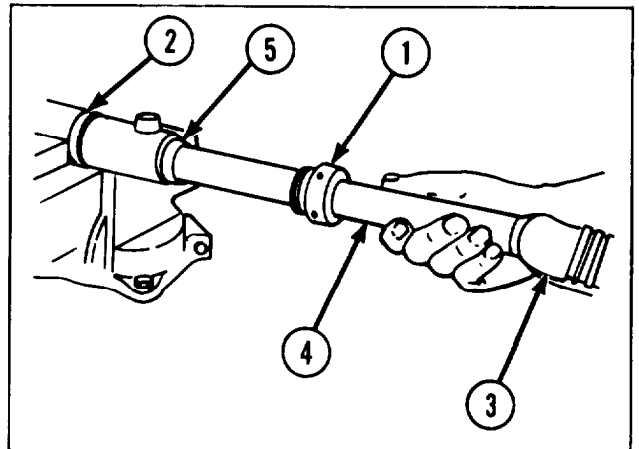
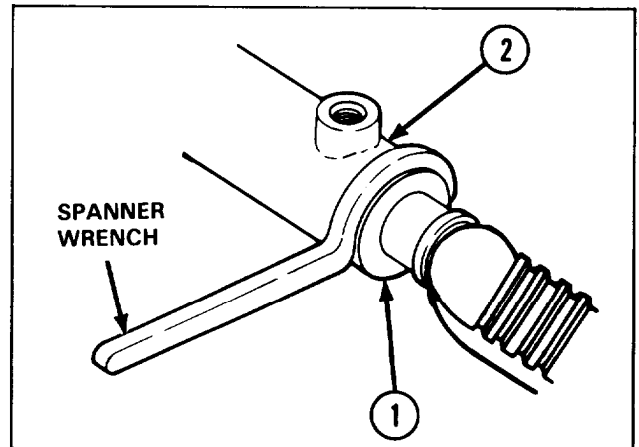
Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

DISASSEMBLY

WARNING

Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

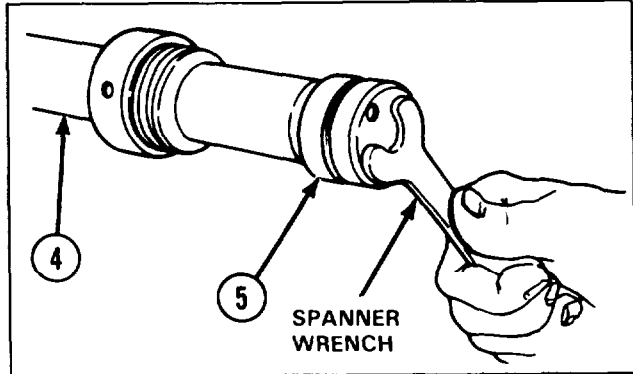
- 1 Using spanner wrench, loosen linear actuating head (1) from rammer cylinder shell (2).
- 2 Remove rammer cylinder rack (3), linear piston rod (4), linear actuating head (1), and linear actuating piston (5) from rammer cylinder shell (2).



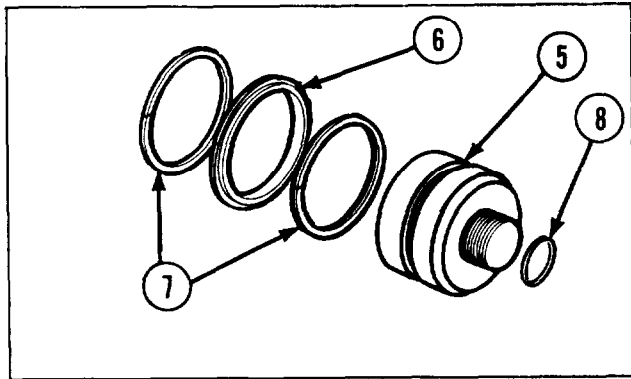
2-63. MAINTENANCE OF RAMMING CYLINDER (CONT).

DISASSEMBLY (CONT)

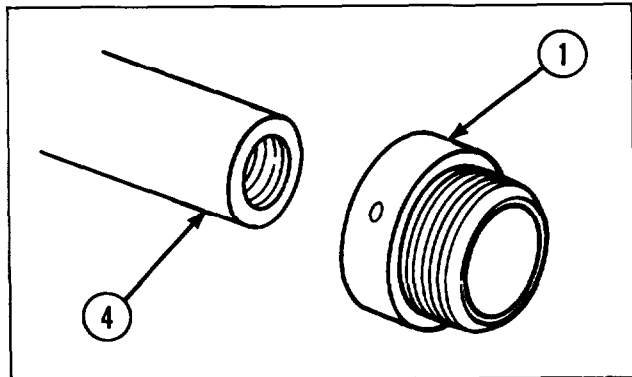
- 3 Using spanner wrench, remove linear actuating piston (5) from linear piston rod (4).



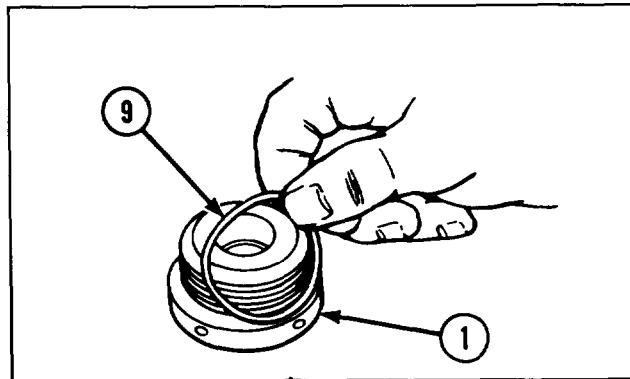
- 4 Remove gasket (6) and two backup rings (7) and preformed packing (8) from linear actuating piston (5).



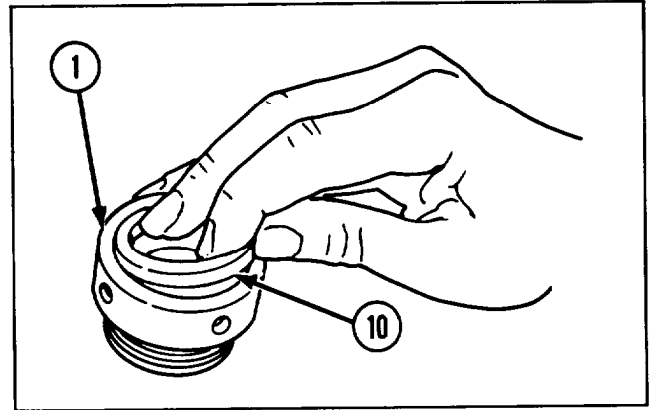
- 5 Remove linear actuating head (1) from linear piston rod (4).



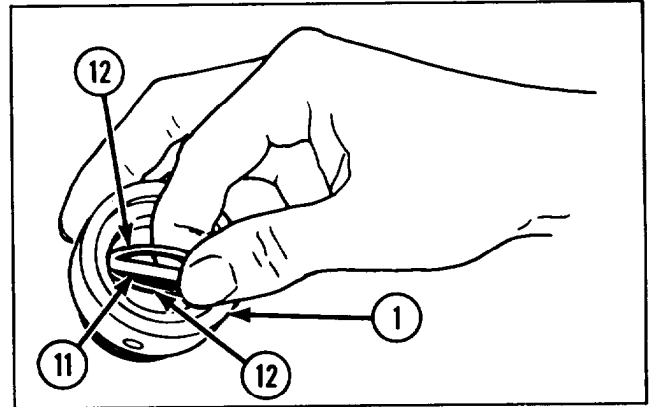
- 6 Remove preformed packing (9) from linear actuating head (1).



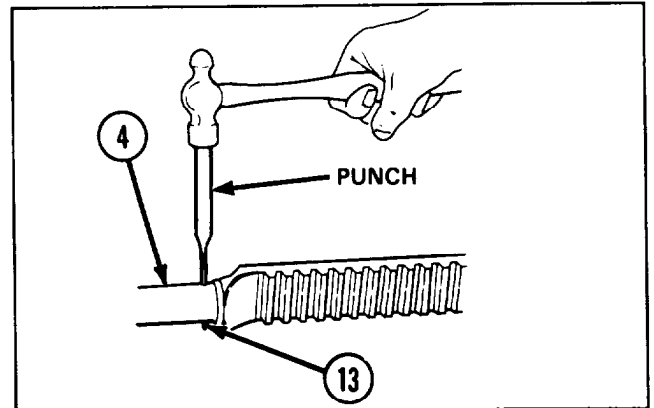
- 7 Remove plain encased seal (10) from linear actuating head (1).



- 8 Remove gasket (11) and two backup rings (12) from linear actuating head (1).



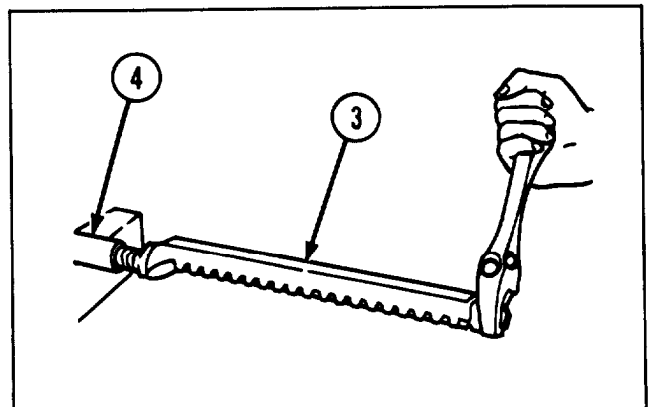
- 9 Using punch, remove spring pin (13) from linear piston rod (4).



NOTE

Keep linear piston rod and rammer cylinder rack as a matched set.

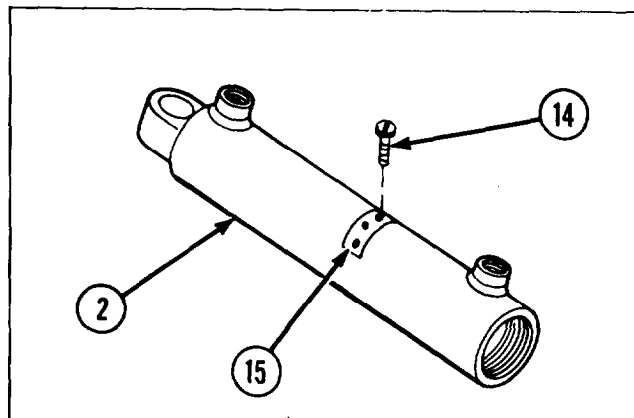
- 10 Remove rammer cylinder rack (3) from linear piston rod (4).



2-63. MAINTENANCE OF RAMMING CYLINDER (CONT).

DISASSEMBLY (CONT)

- 11 Remove three drive screws (14) and identification plate (15) from rammer cylinder shell (2).



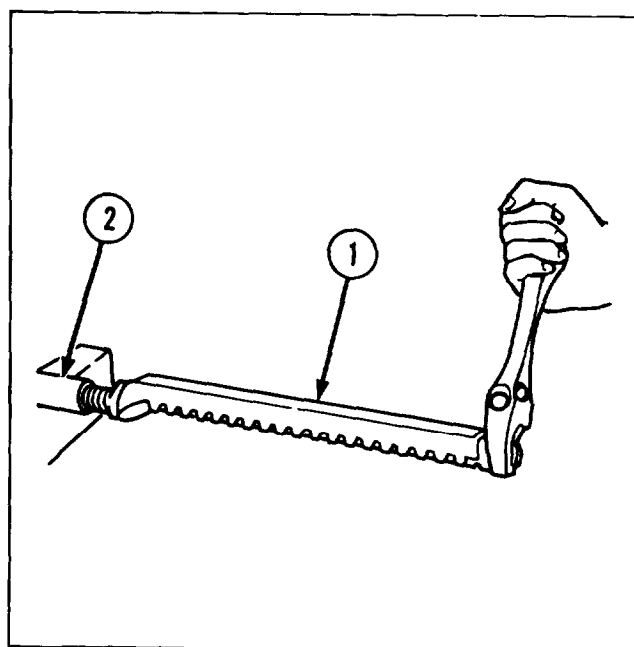
- 1 Inspect for broken, damaged, or missing parts.
- 2 If rammer cylinder shell is damaged, replace entire ramming cylinder.
- 3 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

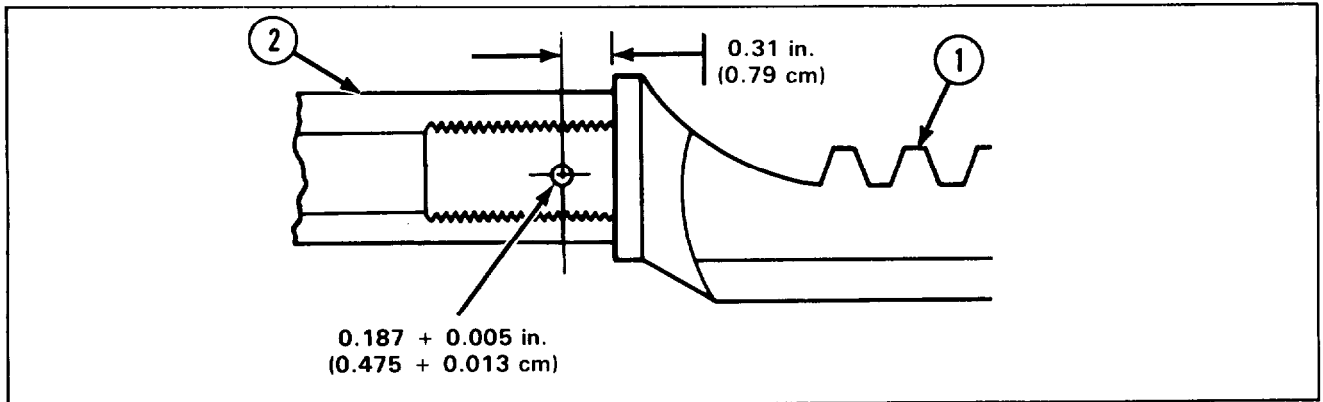
NOTE

If rammer cylinder shell, linear piston rod, rammer cylinder rack, or linear actuating piston is replaced, ramming cylinder must be retimed. Refer to page 2-337.

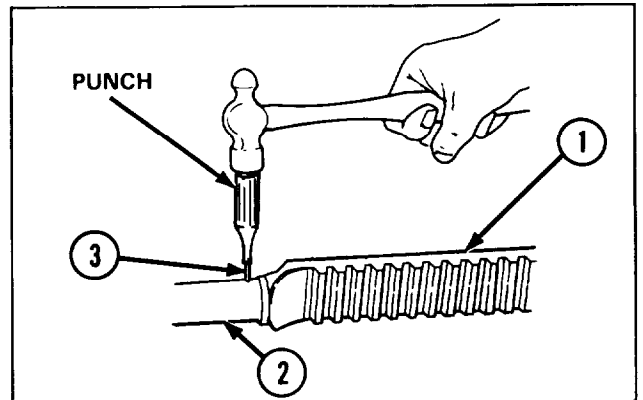
REASSEMBLY

- 1 Install rammer cylinder rack (1) in linear piston rod (2).



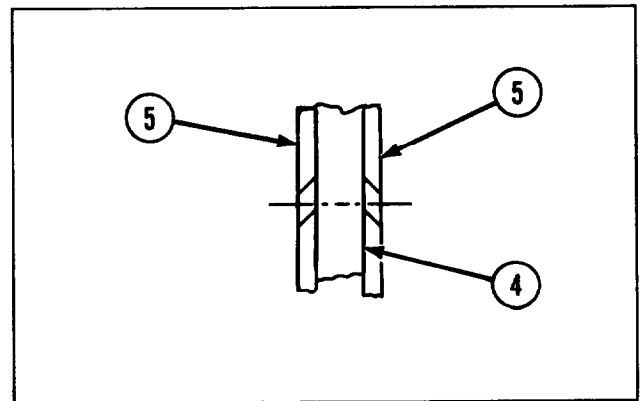


- 2 If rammer cylinder rack (1) and/or linear piston rod (2) is replaced, drill a hole 0.187 + 0.005 in. (0.475 + 0.013 cm) in diameter at the assembly.
- 3 Using punch, install spring pin (3) in linear piston rod (2) and rammer cylinder rack (1).

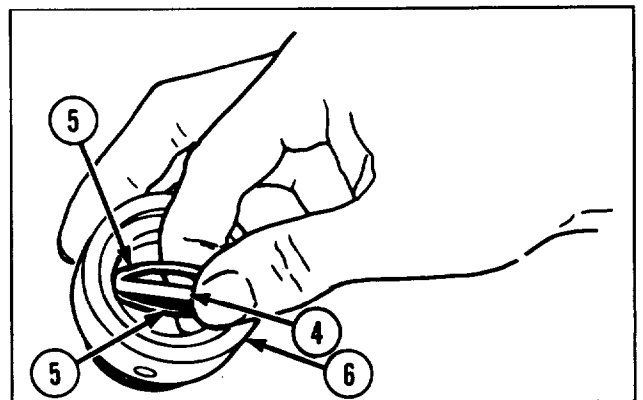


NOTE

Install backup rings on shoulders of gasket with scarf edges matched as shown.



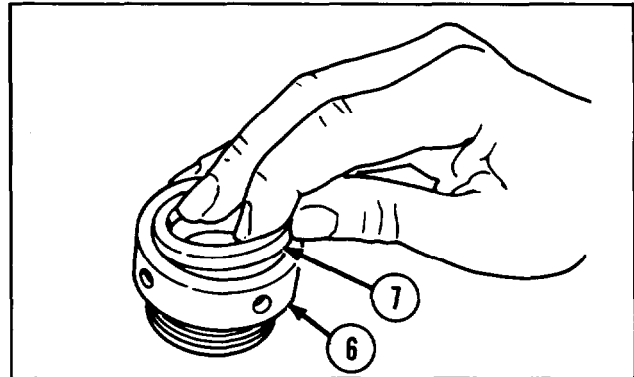
- 4 Install new gasket (4) and two backup rings (5) in inner groove of linear actuating head (6).



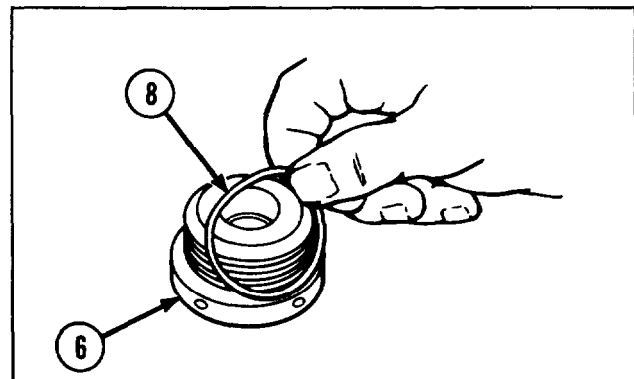
2-63. MAINTENANCE RAMMING CYLINDER (CONT).

REASSEMBLY (CONT).

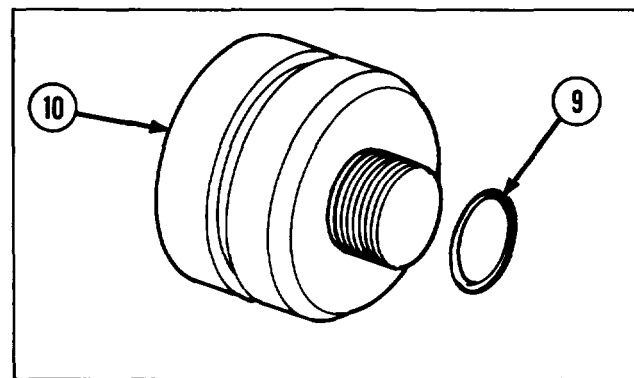
- 5 Install new plain encased seal (7) in outer groove of linear actuating head (6).



- 6 Install new preformed packing (8) on linear actuating head (6).



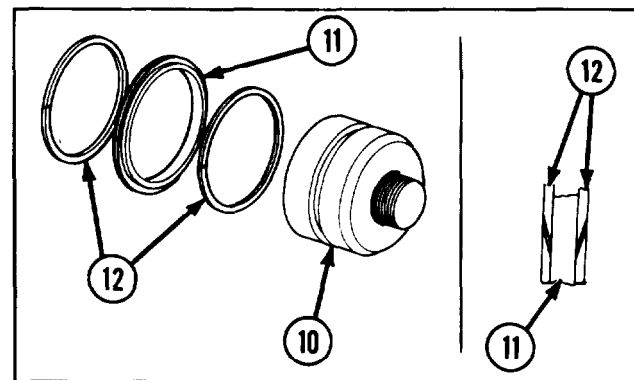
- 7 Install new preformed packing (9) on linear actuating piston (10).



NOTE

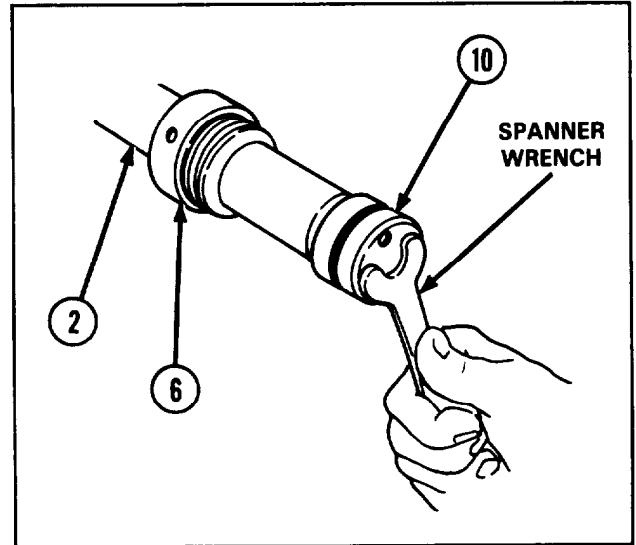
Install backup rings on shoulders of gasket with scarf edges matched as shown.

- 8 Install new gasket (11) and two backup rings (12) on linear actuating piston (10).

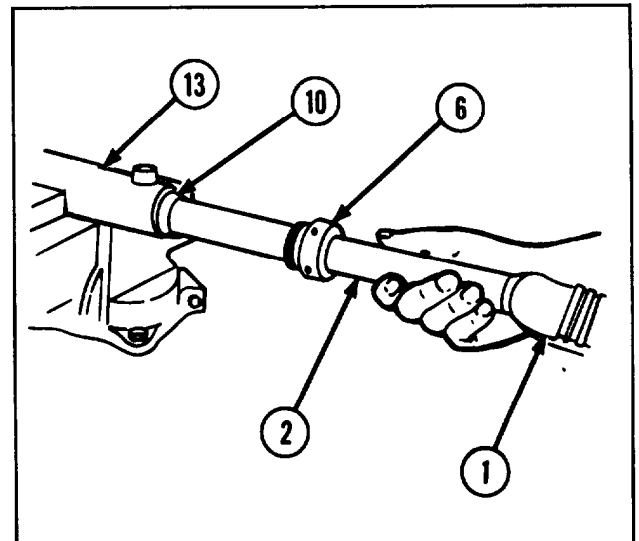


9 Install linear actuating head (6) on linear piston rod (2).

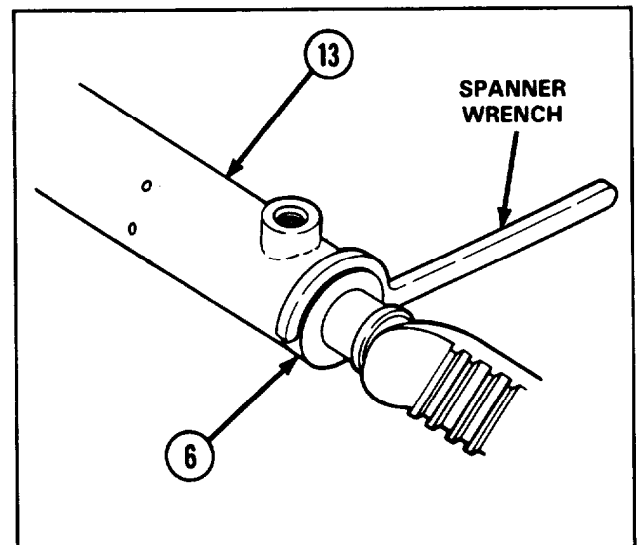
10 Using spanner wrench, install linear actuating piston (10) on linear piston rod (2).



11 Install rammer cylinder rack (1), linear piston rod (2), linear actuating head (6), and linear actuating piston (10) in rammer cylinder shell (13).



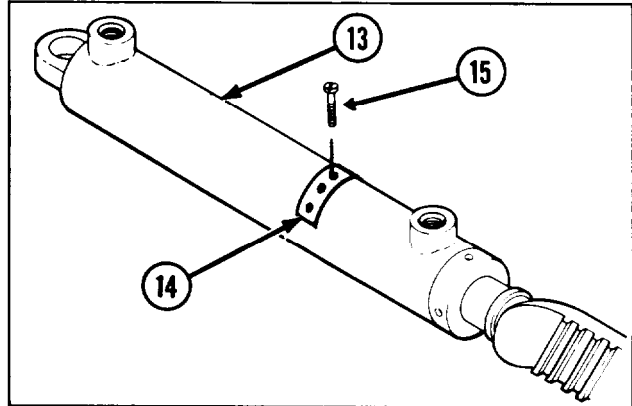
12 Using spanner wrench, tighten linear actuating head (6) to rammer cylinder shell (13).



2-63. MAINTENANCE OF RAMMING CYLINDER (CONT).

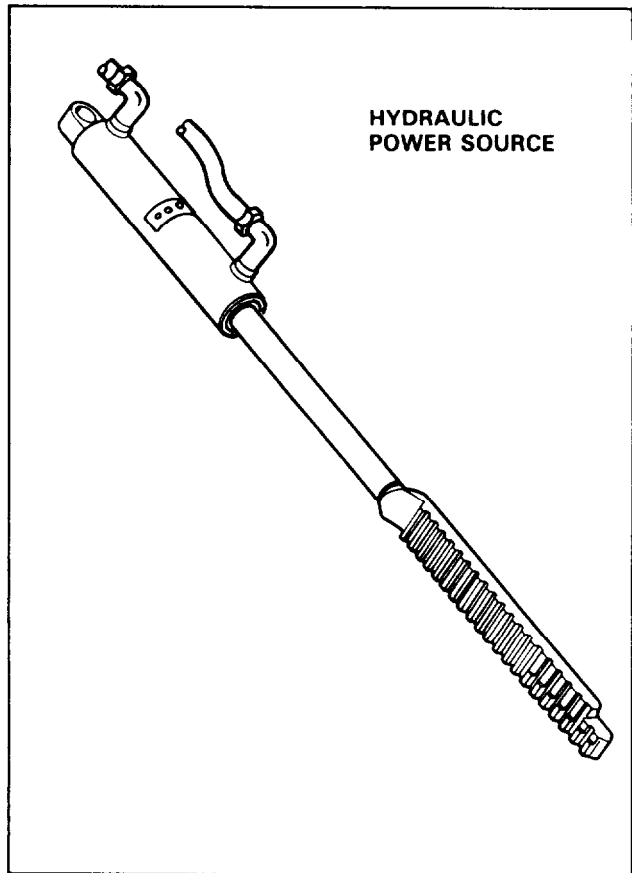
REASSEMBLY (CONT)

- 13 Position identification plate (14) on rammer cylinder shell (13) and secure with three drive screws (15).



TESTING

- 1 Refer to TM 9-4940-468-14 for test setup and test procedures.
- 2 Charge ramming cylinder with new hydraulic fluid (item 13, appx B).
- 3 Obtain a source of hydraulic power capable of providing 3000 psi (26,685 kPa) using hydraulic fluid (item 13, appx B).
- 4 Apply pressure of 3000 psi (20,685 kPa) for 5 minutes minimum with linear piston rod fully extended. Maximum leakage allowed is 1 drop per minute. If ramming cylinder assembly fails pressure test, replace ramming cylinder assembly. Refer to page 2-337.



2-64. MAINTENANCE OF HYDRAULIC SYSTEM-TRAVERSING VALVES AND CHECK VALVE.

This task covers: a. *Service*
 b. *Relieving Hydraulic Pressure*
 c. *Removal*
 d. *Inspection/Repair*
 e. *Installation*
 f. *Applying Hydraulic Pressure*

INITIAL SETUP

Tools and Special Tools

Ordnance artillery and turret mechanic's tool kit (SC 5180-95-CL-A12)

Materials/Parts

- Drive screw (8) (MS21318-35)
- Lockwasher (4) (MS35338-43)
- Lockwasher (3) (MS35338-44)
- Lockwasher (3) (MS35338-45)
- Lockwasher (3) (MS35338-46)
- Preformed packing (MS28778-6)
- Preformed packing (2) (MS28778-8)

References

- TM 9-2350-304-24P-2
- TM 9-4940-468-14

General Safety Instructions

WARNING

- Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as

level ground as possible. This will stop the cannon from sliding out of battery.

- Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.
- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

SERVICE

When notified by unit maintenance to perform 18 month hydraulic fluid service, drain and fill hydraulic reservoir with hydraulic fluid (item 13, appx B) to applicable full mark (spade raised or spade extended) on level gage. Capacity 27 gal. (102.2 l).

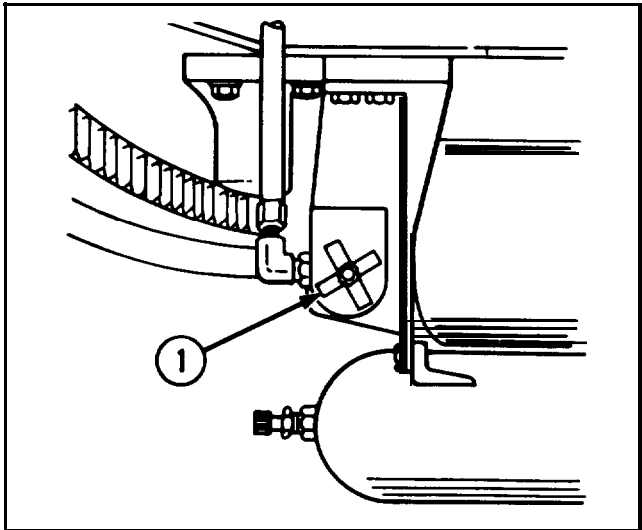
2-64. MAINTENANCE OF HYDRAULIC SYSTEM-TRAVERSING VALVES AND CHECK VALVE (CONT).

RELIEVING HYDRAULIC PRESSURE

WARNING

Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as level ground as possible. This will stop the cannon from sliding out of battery.

- 1 Set MASTER switch to OFF.
- 2 Open globe angle valve (1).



RELIEVING HYDRAULIC PRESSURE (CONT)

- 3 Move traversing control grip assembly (2) to full RIGHT.
- 4 Move traversing control grip assembly (2) to full LEFT.
- 5 Repeat steps 3 and 4 several times to relieve pressure from system.

REMOVAL

NOTE

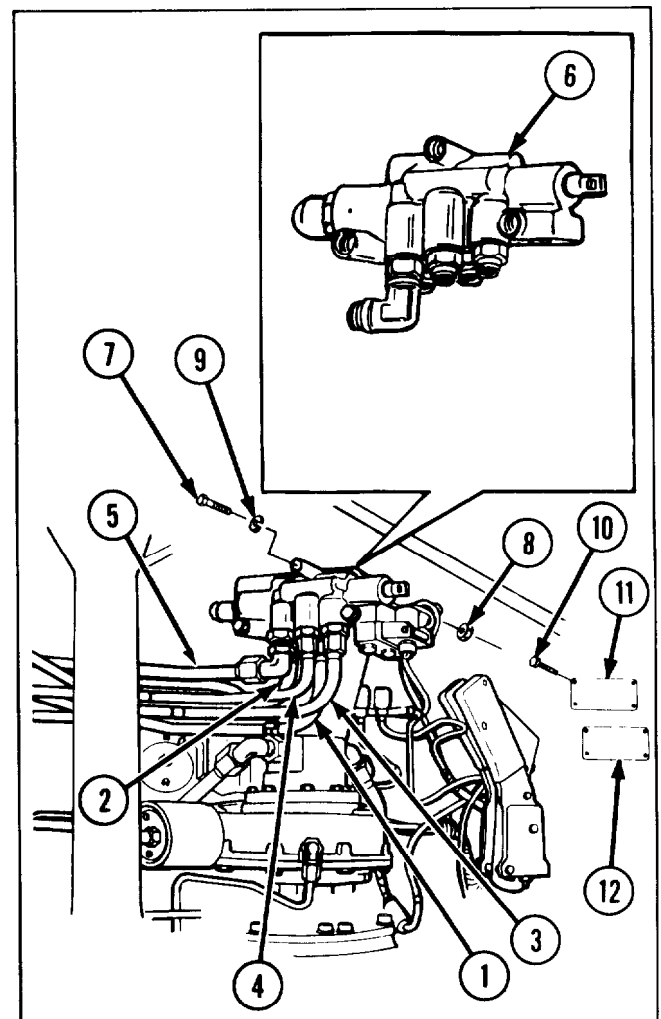
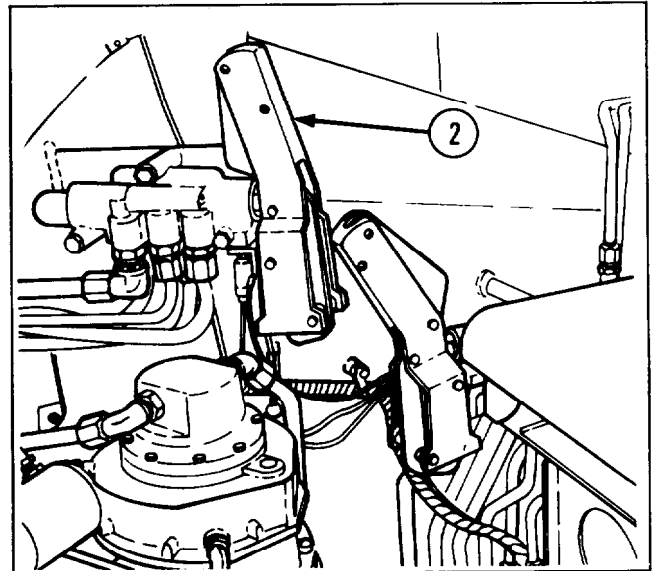
Steps 1 thru 4 apply to removal of hydraulic control valve.

- 1 Remove right side manual control handle and switch. Refer to TM 9-2350-304-20-2.

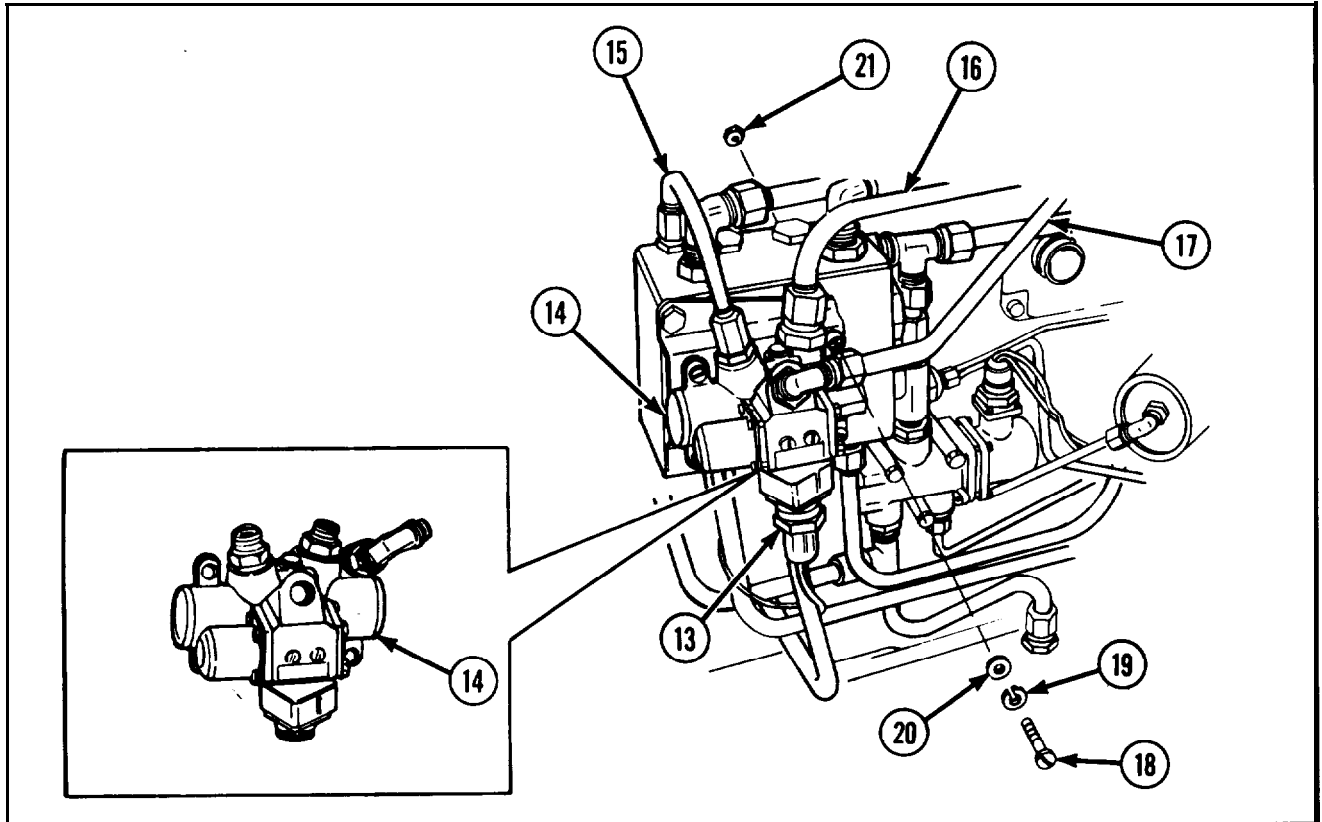
WARNING

Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

- 2 Disconnect five hydraulic tubes (1, 2, 3, 4, and 5) from hydraulic control valve (6). For complete disassembly of hydraulic lines and fittings, refer to page 2-27.
- 3 Cover tube openings.
- 4 Remove three machine bolts (7), three hex nuts (8), three lockwashers (9), and hydraulic control valve (6).
- 5 If damaged, use punch to remove eight drive screws (10), traversing control instruction plate (11), and elevating control instruction plate (12).







WARNING

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

NOTE

Steps 6 thru 9 apply to removal of turret deceleration solenoid valve.

- 6 Disconnect electrical lead (13) from turret deceleration solenoid valve (14).

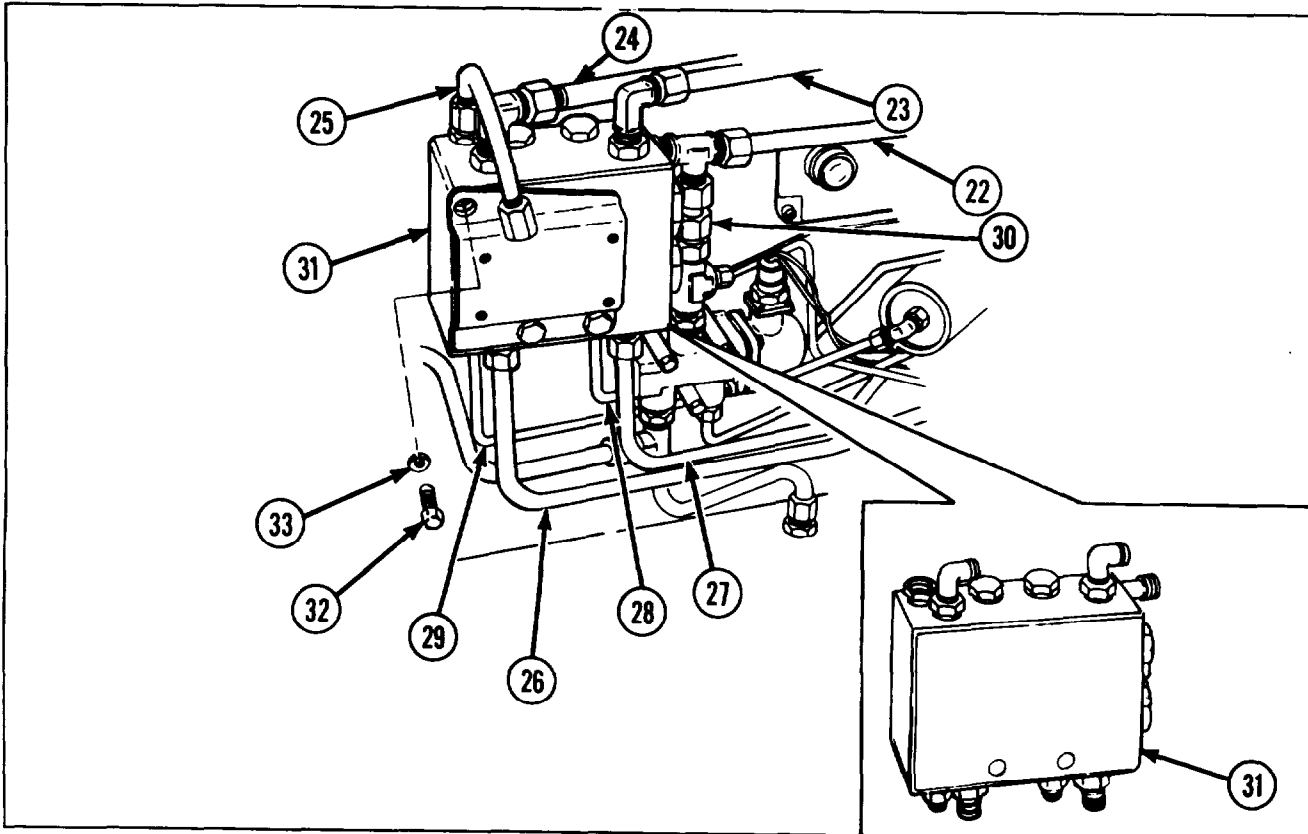
WARNING

Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

- 7 Disconnect three hydraulic tubes (15, 16, and 17). For complete disassembly of hydraulic tubes and fittings, refer to page 2-27.
- 8 Cover tube openings.
- 9 Remove four machine screws (18), four lockwashers (19), four flat washers (20), four hex nuts (21), and turret deceleration solenoid valve (14).

2-64. MAINTENANCE OF HYDRAULIC SYSTEM -TRAVERSING VALVES AND CHECK VALVE (CONT).

REMOVAL (CONT)



WARNING

Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

NOTE

- Steps 10 thru 12 apply to removal of check valve multiple connector.
- Turret deceleration solenoid valve must be removed prior to removal of check valve multiple connector.

10 Disconnect nine hydraulic tubes (22, 23, 24, 25, 26, 27, 28, 29, and 30) from check valve multiple connector (31). For complete disassembly of hydraulic lines and fittings, refer to page 2-27.

11 Cover tube openings.

12 Remove three capscrews (32), three lockwashers (33), and check valve multiple connector (31).

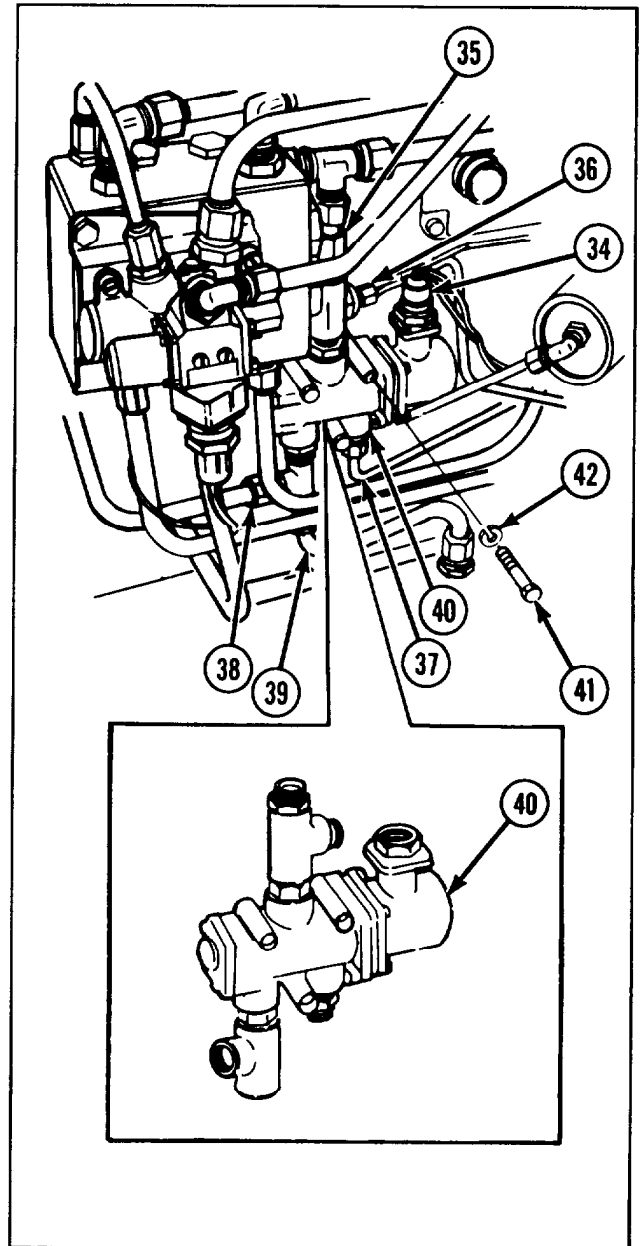
WARNING

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

NOTE

- Steps 13 thru 16 apply to removal of solenoid shut-off valve.
- Solenoid shut-off valve can be removed with turret deceleration solenoid valve and check valve multiple connector removed from or installed on the Howitzer.

- 13 Disconnect electrical lead (34).
- 14 Disconnect five hydraulic tubes (35, 36, 37, 38, and 39) from solenoid shut-off valve (40). For complete disassembly of hydraulic lines and fittings, refer to page 2-27.
- 15 Cover tube openings.
- 16 Remove three capscrews (41), three lockwashers (42), and solenoid shut-off valve (40).



2-64. MAINTENANCE OF HYDRAULIC SYSTEM -TRAVERSING VALVES AND CHECK VALVE (CONT).

INSPECTION/REPAIR

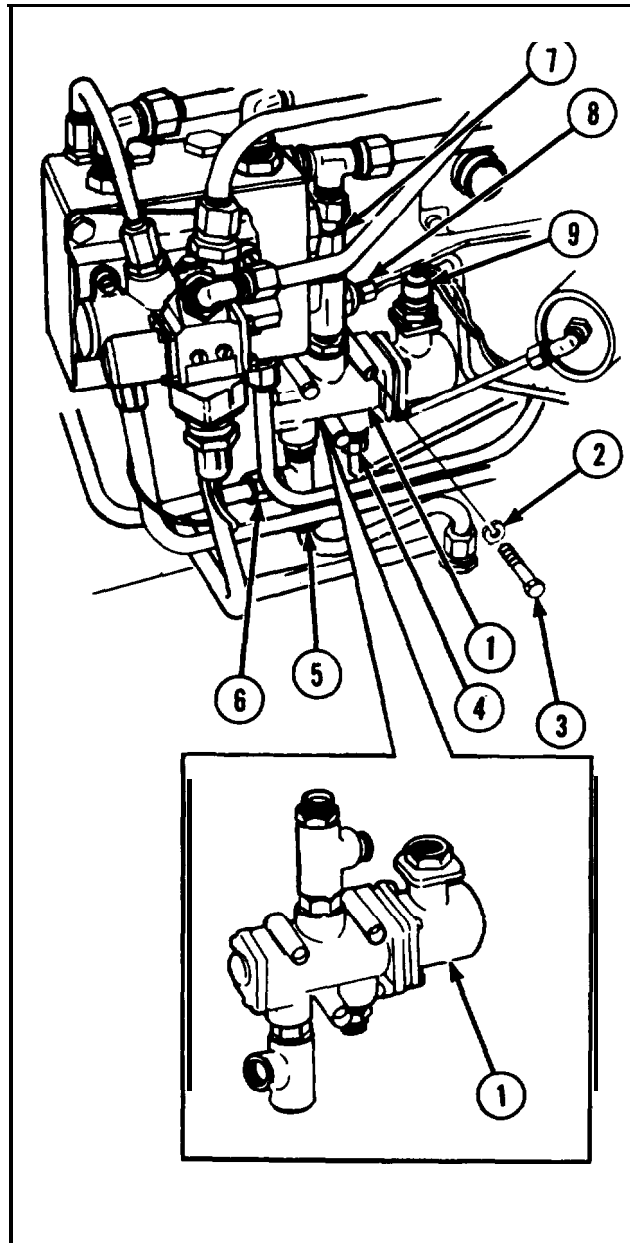
- 1 Inspect for broken, damaged, or missing parts.
- 2 Check valve multiple connector is a repairable assembly. Refer to page 2-389.
- 3 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

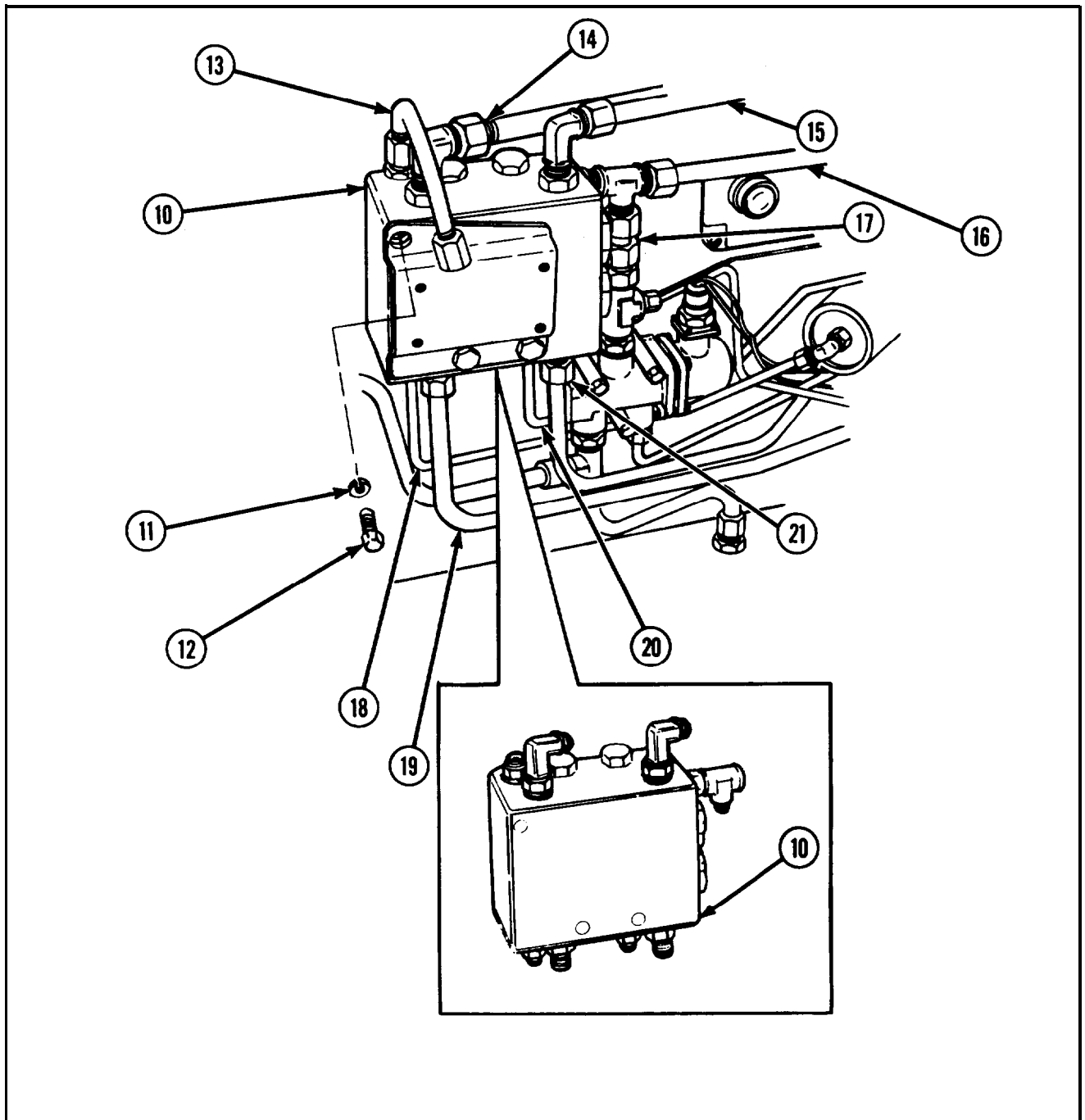
INSTALLATION

NOTE

Steps 1 thru 3 apply to installation of solenoid shut-off valve.

- 1 Install solenoid shut-off valve (1), three new lockwashers (2), and three cap-screws (3).
- 2 Uncover and connect five hydraulic tubes (4, 5, 6, 7, and 8). For complete reassembly of hydraulic lines and fittings, refer to page 2-27.
- 3 Connect electrical lead (9).



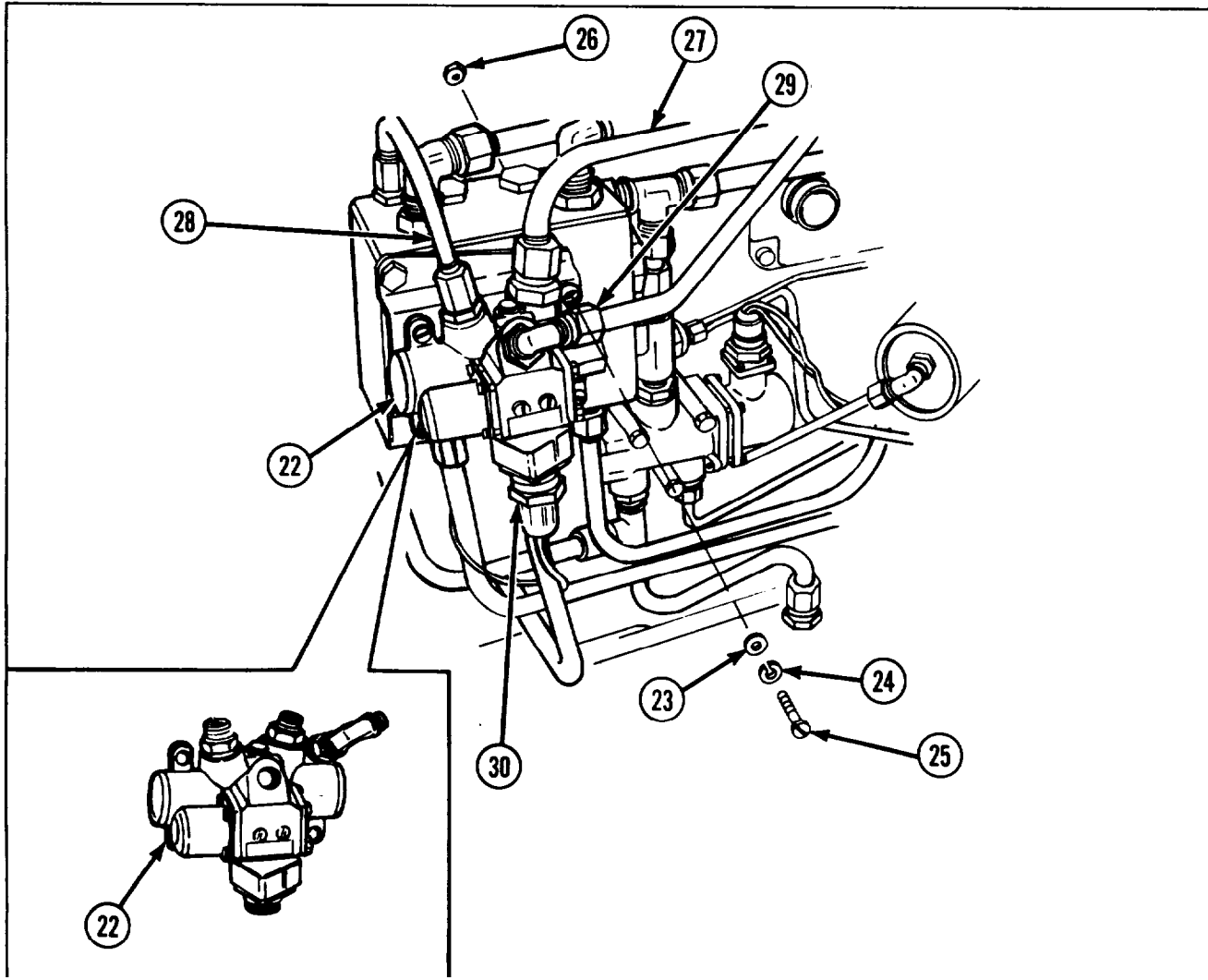
**NOTE**

Steps 4 and 5 apply to installation of check valve multiple connector.

- 4 Install check valve multiple connector (10), three new lockwashers (11), and three capscrews (12).
- 5 Uncover and connect nine hydraulic tubes (13, 14, 15, 16, 17, 18, 19, 20, and 21). For complete reassembly of hydraulic lines and fittings, refer to page 2-27.

2-64. MAINTENANCE OF HYDRAULIC SYSTEM -TRAVERSING VALVES AND CHECK VALVE (CONT).

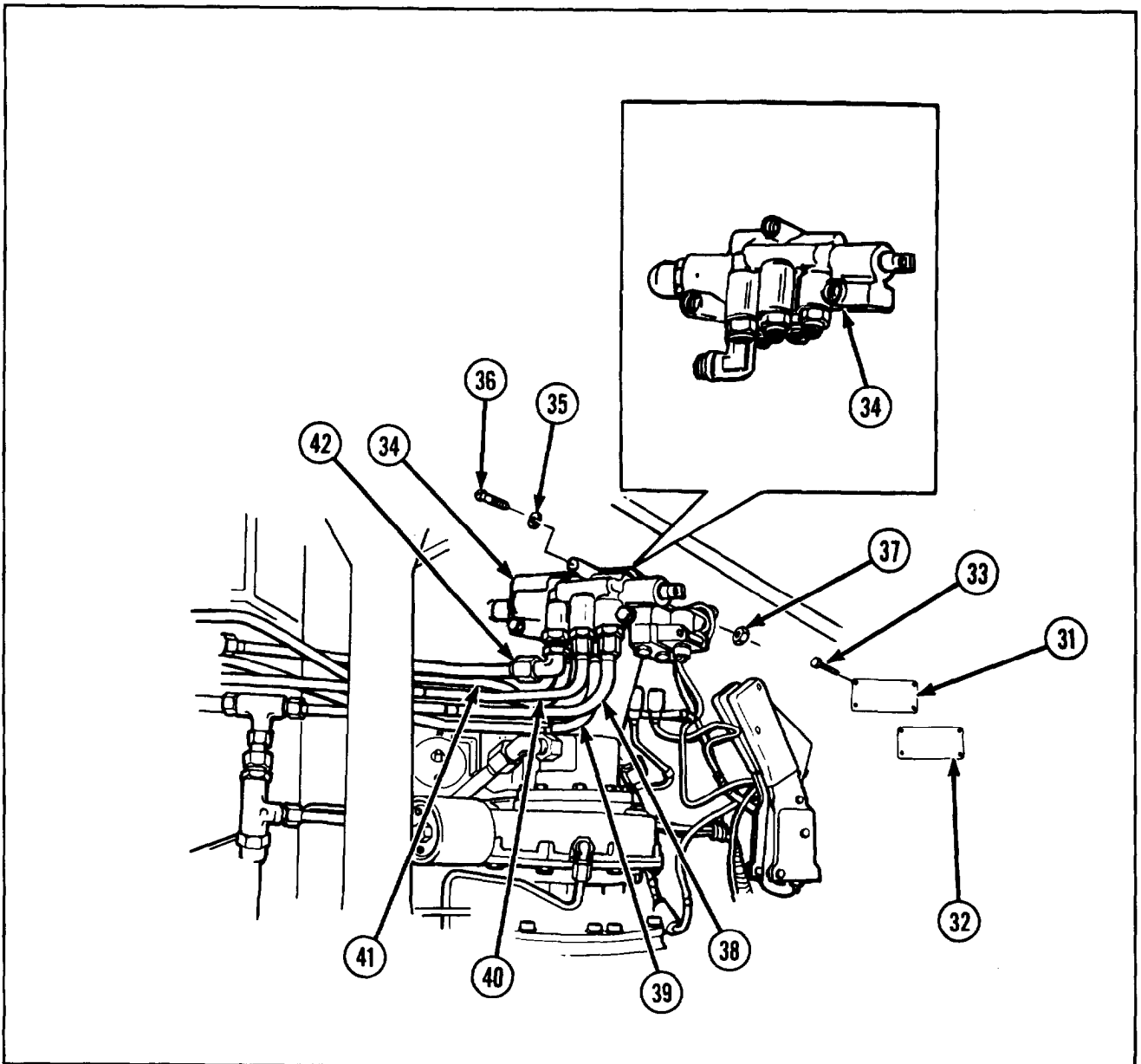
INSTALLATION (CONT)



NOTE

Steps 6 thru 8 apply to installation of turret deceleration solenoid valve,

- 6 Install turret deceleration solenoid valve (22), four flat washers (23), four new lockwashers (24), four machine screws (25), and four hex nuts (26).
- 7 Uncover and connect three hydraulic tubes (27, 28, and 29). For complete reassembly of hydraulic lines and fittings, refer to page 2-27.
- 8 Connect electrical lead (30).



- 9 If necessary, install new traversing control instruction plate (31), new elevating control instruction plate (32), and eight new drive screws (33).

NOTE

Steps 10 thru 12 apply to installation of hydraulic control valve.

- 10 Install hydraulic control valve (34), three new lockwasher (35), three machine bolts (36), and three hex nuts (37).
- 11 Uncover and connect five hydraulic tubes (38, 39, 40, 41, and 42). For complete reassembly of hydraulic lines and fittings, refer to page 2-27.
- 12 Install right side manual control handle and switch. Refer to TM 9-2350-304-20-2.

2-64. MAINTENANCE OF HYDRAULIC SYSTEM -TRAVERSING VALVES AND CHECK VALVE (CONT).

APPLYING HYDRAULIC PRESSURE

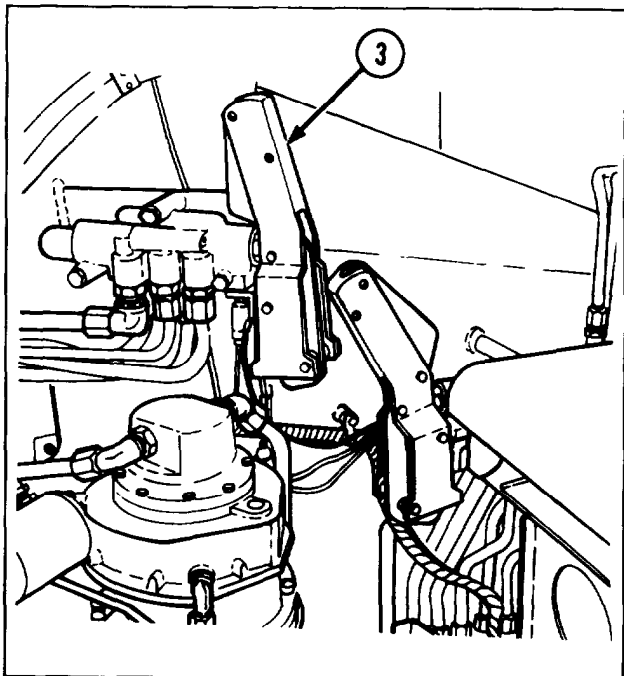
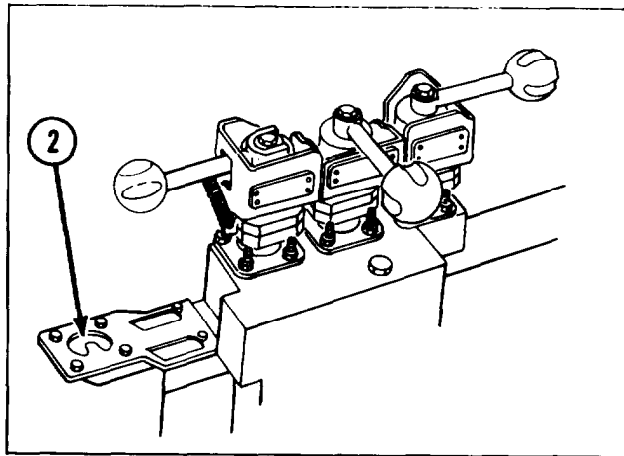
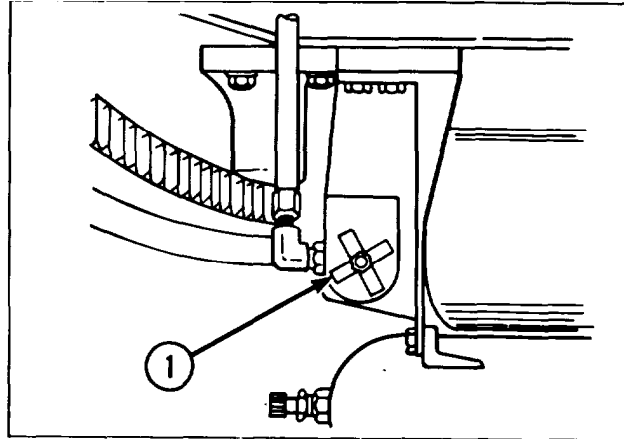
- 1 Close globe angle valve (1)
- 2 Start engine

NOTE

Hydraulic motor and pump may be used to apply pressure to hydraulic system without starting engine by setting MASTER switch and OIL PUMP MOTOR Switch to ON.

- 3 Set HYD PUMP/PTO CLUTCH switch to ON.
- 4 Check rammer pressure gage (2) indication. Normal pressure is 1600 to 2400 psi (11,032 to 16,548 kPa).
- 5 Stop engine.

- 6 Traverse turret full right and full left several times using handle (3) to bleed air from system.



2-65. MAINTENANCE OF CHECK VALVE MULTIPLE CONNECTOR.

This task covers:

- a. *Disassembly*
- b. *Inspection/Repair*

- c. *Reassembly*
- d. *Testing*

INITIAL SETUP

Tools and Special Tools

Ordnance artillery and turret mechanics tool kit (SC 5180-95-CL-A12)

2-395 Check valve multiple connector (elevating) removed

Materials/Parts

Hydraulic fluid (item 13, appx B)
 Hydraulic parts kit (5703250)
 Lockwire (item 16, appx B)

General Safety Instructions

WARNING

Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

References

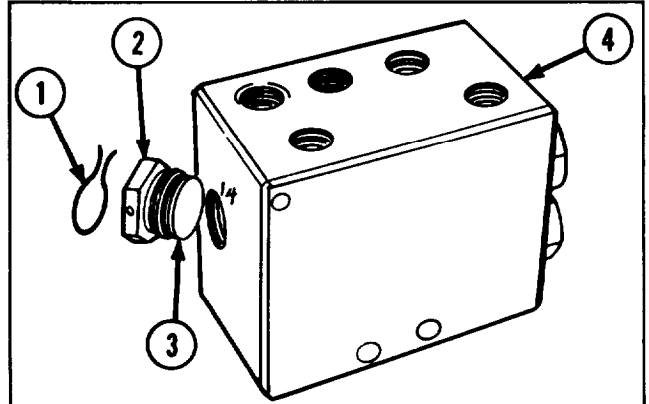
TM 9-2350-304-24P-2
 TM 9-4940-468-14

Equipment Conditions

2-379 Check valve multiple connector (traversing) removed

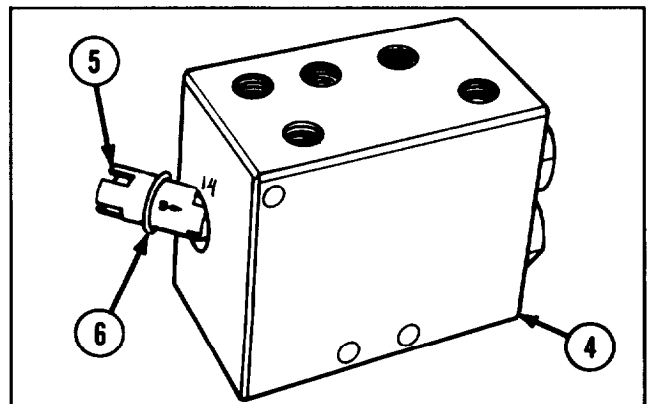
DISASSEMBLY

1 Remove lockwire (1), machine thread plug (2), and preformed packing (3) from port 14 of manifold (4).



2 Remove check valve (5) from port 14 of manifold (4).

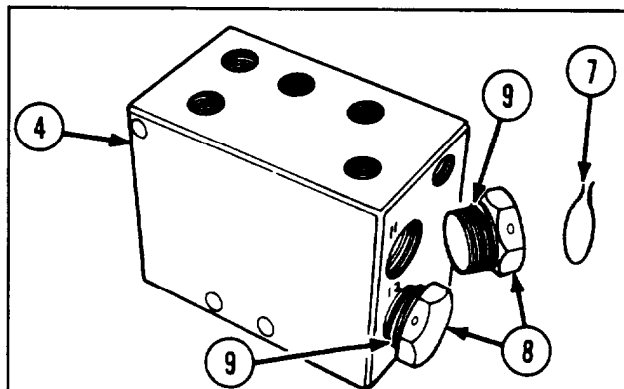
3 Remove preformed packing (6) from check valve (5).



2-65. MAINTENANCE OF CHECK VALVE MULTIPLE CONNECTOR (CONT).

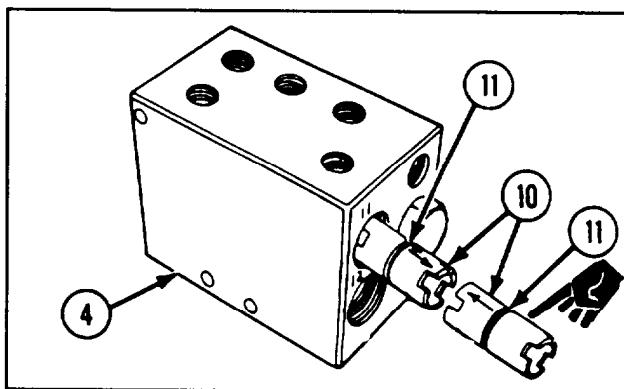
DISASSEMBLY (CONT)

- 4 Remove lockwire (7), two machine thread plugs (8), and two preformed packings (9) from ports 11 and 12 of manifold (4).



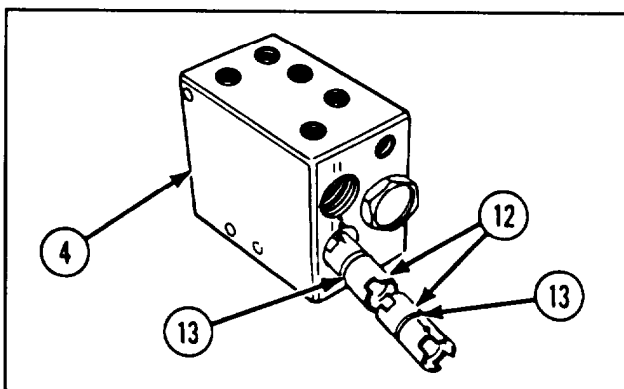
- 5 Remove two check valves (10) from port 11 of manifold (4).

- 6 Remove one preformed packing (11) from each of two check valves (10).



- 7 Remove two check valves (12) from port 12 of manifold (4).

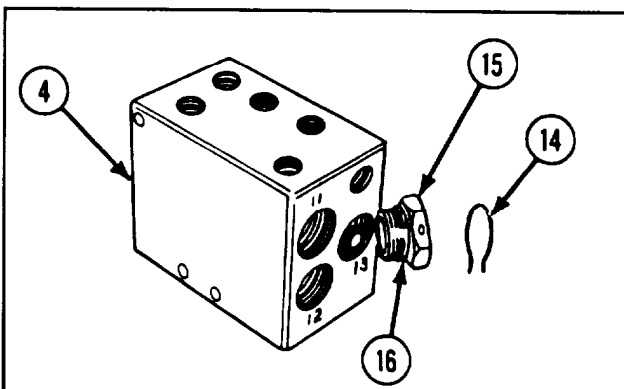
- 8 Remove one preformed packing (13) from each of two check valves (12).



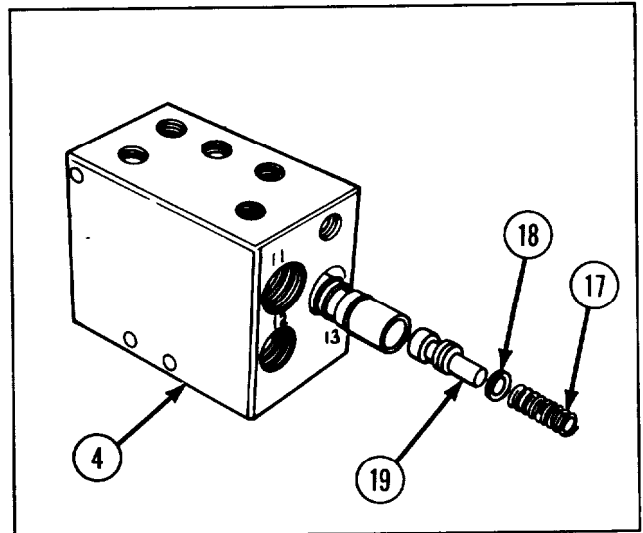
NOTE

Use care not to lose helical spring during removal of machine thread plug.

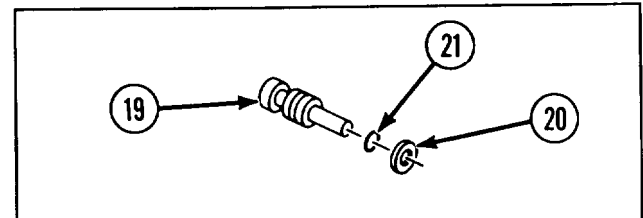
- 9 Remove lockwire (14), machine thread plug (15), and preformed packing (16) from port 13 in manifold (4).



- 10 Remove helical spring (17), spring washer (18), and rotary valve plug (19) from port 13 in manifold (4).



- 11 Remove flat washer (20) and preformed packing (21) from rotary valve plug (19).

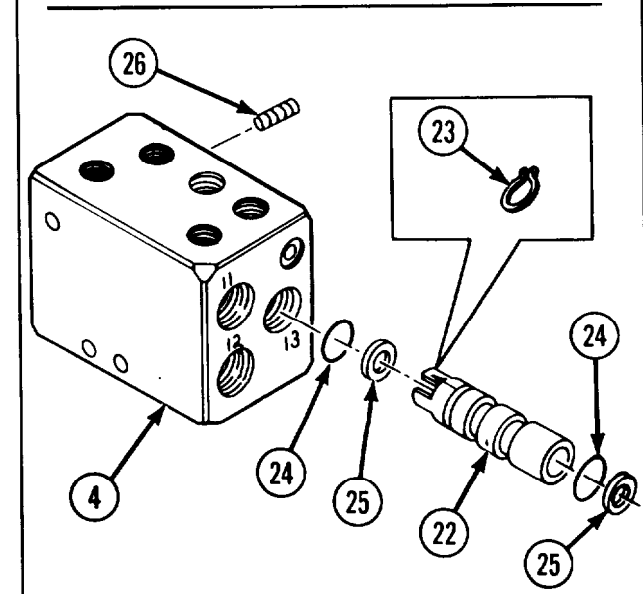


- 12 Remove directional sleeve (22) from port 13 in manifold (4).

- 13 Remove retaining ring (23) from directional sleeve (22).

- 14 Remove two preformed packings (24) and two packing retainers (25) from directional sleeve (22).

- 15 Remove two pipe plugs (26) from manifold (4).



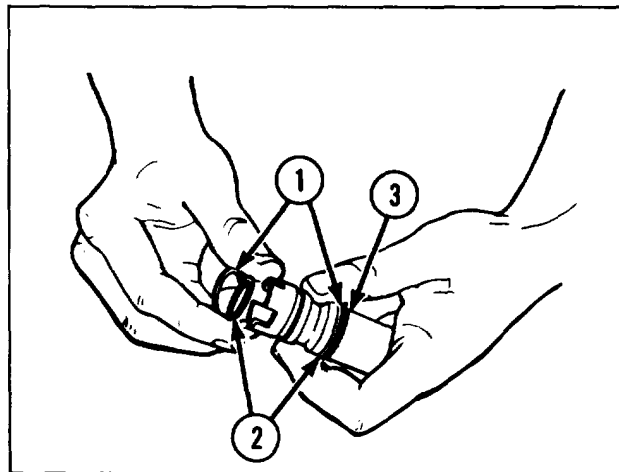
INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 If manifold is broken or damaged, repair is by replacement of next higher assembly.
- 3 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

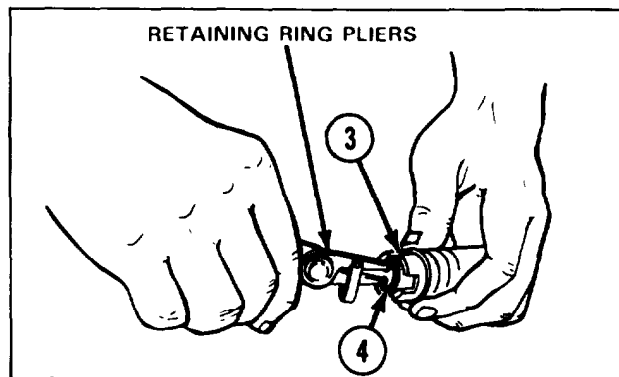
2-65. MAINTENANCE OF CHECK VALVE MULTIPLE CONNECTOR (CONT).

REASSEMBLY

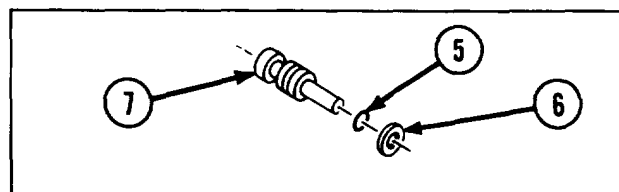
- 1 Install two new preformed packings (1) and two new packing retainers (2) on directional sleeve (3).



- 2 Using retaining ring pliers, install new retaining ring (4) inside directional sleeve (3).

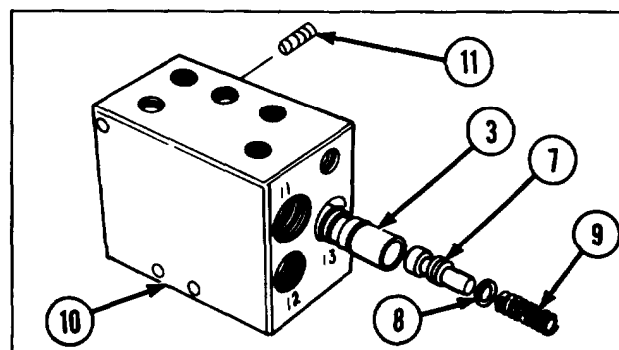


- 3 Install new preformed packing (5) and new flat washer (6) on rotary valve plug (7).

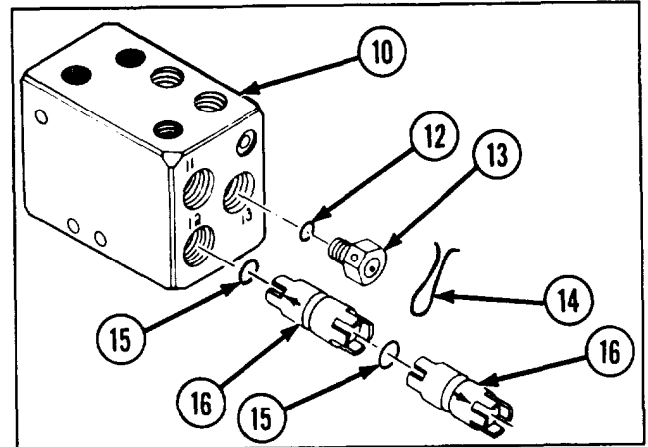


- 4 Install directional sleeve (3), rotary valve plug (7), new spring washer (8), and helical spring (9) in port 13 of manifold (10).

- 5 Install two pipe plugs (11) in manifold (10).



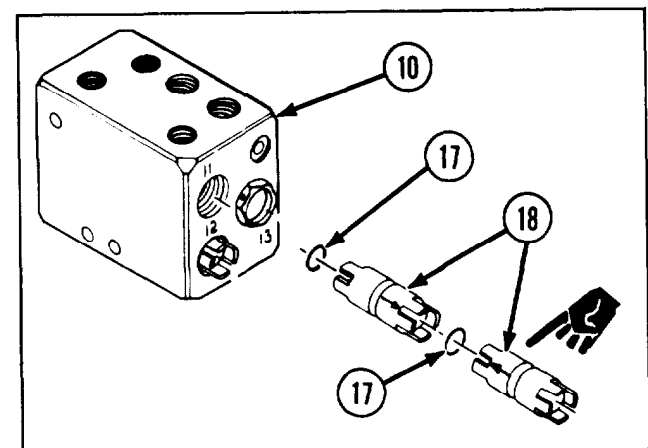
6 Install new preformed packing (12), machine thread plug (13), and new lockwire (14) (item 16, appx B) in port 13 of manifold (10).



7 Install new preformed packing (15) on each of two check valves (16).

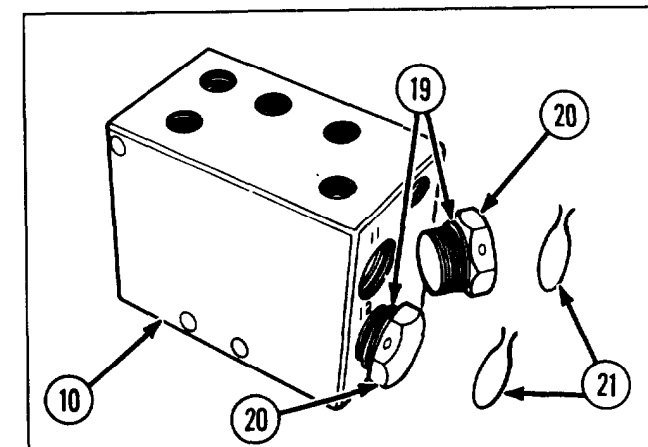
8 Install two check valves (16), with arrows pointing away from each other, into port 12 of manifold (10).

9 Install new preformed packing (17) on each of two check valves (18).

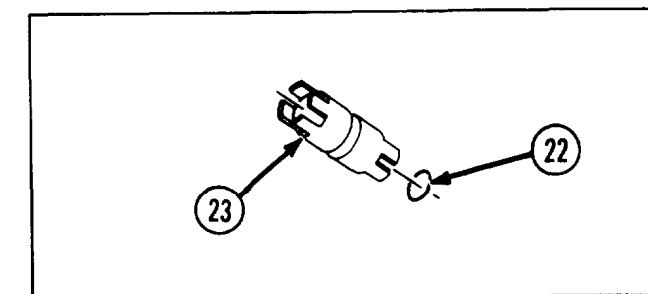


10 Install two check valves (18), with arrows pointing toward each other, into port 11 of manifold (10).

11 Install two new preformed packings (19), two machine thread plugs (20), and new lockwire (21) (item 16, appx B) in ports 11 and 12 of manifold (10).



12 Install new preformed packing (22) on check valve (23).

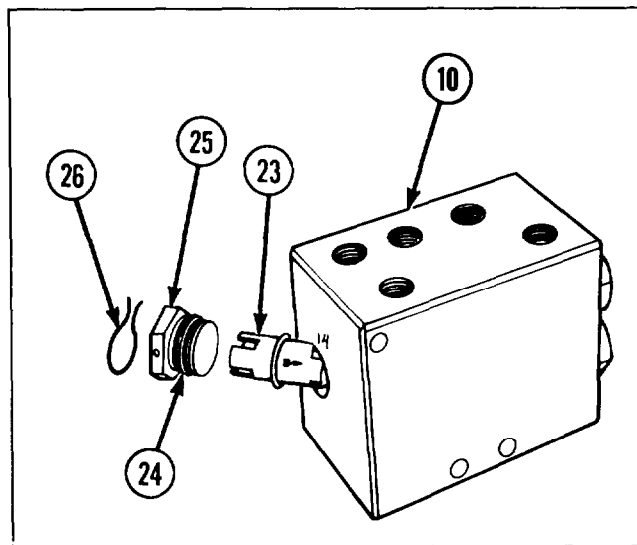


2-65. MAINTENANCE OF CHECK VALVE MULTIPLE CONNECTOR (CONT).

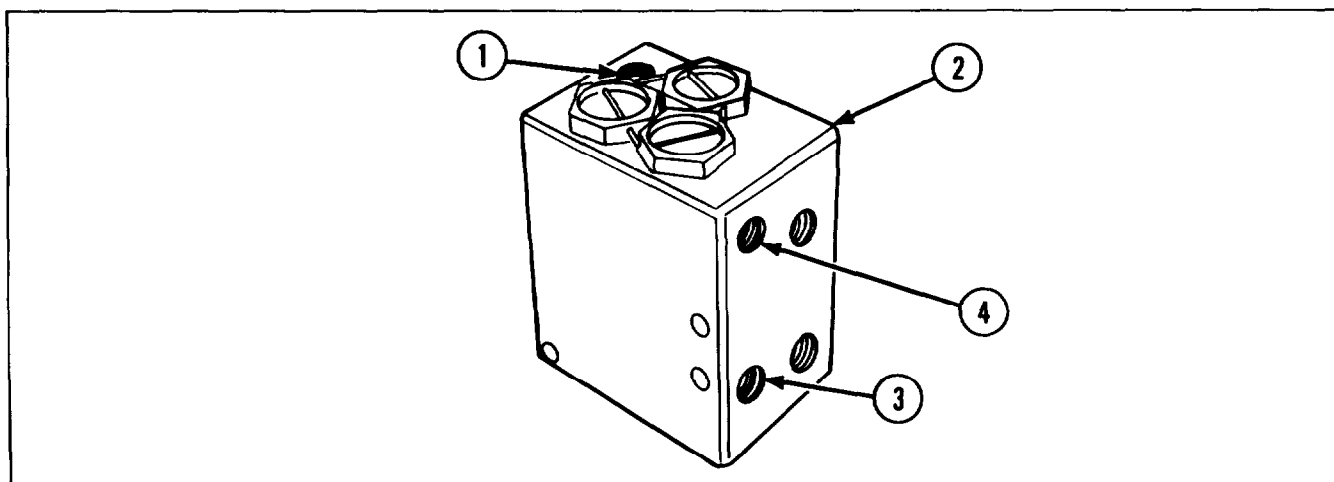
REASSEMBLY (CONT)

13 Install check valve (23) into port 14 of manifold (10) with arrow pointing inward.

14 Install new preformed packing (24), machine thread plug (25), and new lockwire (26) (item 16, appx B) in port 14 of manifold (10).



TESTING



WARNING

Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

- 1 Refer to TM 9-4940-468-14 for test setup.
- 2 Obtain a source of hydraulic power capable of providing 3900 psi (26,891

kPa) using hydraulic fluid (item 13, appx 6).

- 3 Connect hydraulic power source to port 10 (1) on check valve multiple connector (2).
- 4 Install plug having a 0.049 in. (0.124 cm) diameter in port 7 (3) of check valve multiple connector (2).
- 5 Install 0 to 200 psi (0 to 1379 kPa) pressure gage in port 6 (4) of check valve multiple connector (2).
- 6 Plug all remaining ports in check valve multiple connector (2).

- | | |
|---|---|
| <p>7 Slowly increase hydraulic pressure at port 10 (1) to 1800 to 2200 psi (12,411 to 15,169 kPa).</p> <p>8 Observe pressure gage in port 6 (4). Reading must be 92 to 102 psi (634 to 703 kPa).</p> <p>9 Reduce pressure at port 10 (1) to 0 psi.</p> <p>10 Remove plug with hole from port 7 (3) and pressure gage from port 6 (4).</p> | <p>11 Plug port 6 (4) and port 7 (3).</p> <p>12 Apply pressure of 3000 psi (20,685 kPa) to port 10 (1).</p> <p>13 Observe check valve multiple connector (2) for signs of leakage.</p> <p>14 Reduce pressure at port 10 (1) to 0 psi, and remove power source.</p> <p>15 If pressure reading was not correct in step 8, or check valve multiple connector (2) leaks, replace check valve multiple connector assembly.</p> |
|---|---|

2-66. MAINTENANCE OF HYDRAULIC SYSTEM -ELEVATING CONTROL VALVES, MECHANICAL DRIVE GUARD, CHECK VALVE MULTIPLE CONNECTOR, AND ELEVATING SOLENOID VALVE.

<p>This task covers:</p>	<p>a. <i>Relieving Hydraulic Pressure</i></p> <p>b. <i>Removal</i></p> <p>c. <i>inspection/Repair</i></p>	<p>d. <i>Installation</i></p> <p>e. <i>Applying Hydraulic Pressure</i></p>
<p>INITIAL SETUP</p> <p><i>Tools and Special Tools</i> Ordnance artillery and turret mechanics tool kit (SC 5180-95-CL-AI21)</p> <p><i>Materials/Parts</i> Drive screw (4) (MS21318-25) Lockwasher (3) (MS35338-44) Lockwasher (6) (MS35338-45) Lockwasher (5) (MS35338-46) Preformed packing (2) (MS28778-8)</p> <p><i>References</i> TM 9-2350-304-20-2 TM 9-2350-304-24P-2</p> <p><i>Equipment Conditions</i> Right side hydraulic tube guard removed (TM 9-2350-304-20-2)</p> <p><i>General Safety instructions</i></p> <div style="border: 2px solid black; padding: 5px; display: inline-block; margin: 10px 0;">WARNING</div> <ul style="list-style-type: none"> ● Before relieving hydraulic pressure, be sure travel lock is 		
<p>engaged and vehicle is on as level ground as possible. This will stop the cannon from sliding out of battery.</p> <ul style="list-style-type: none"> ● Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury! Wipe up spilled hydraulic fluid. ● Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel. ● Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment. 		

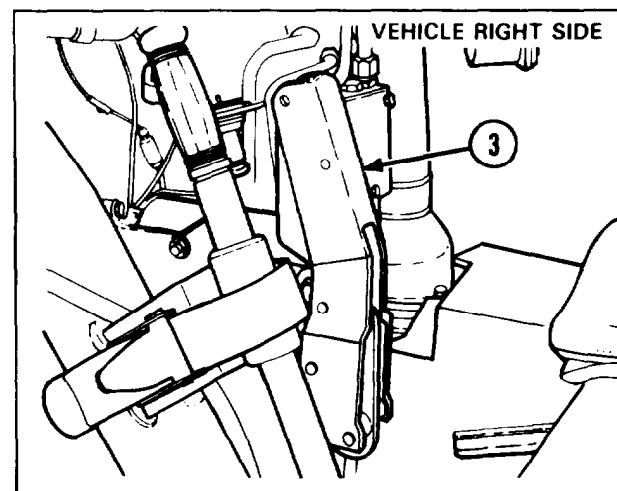
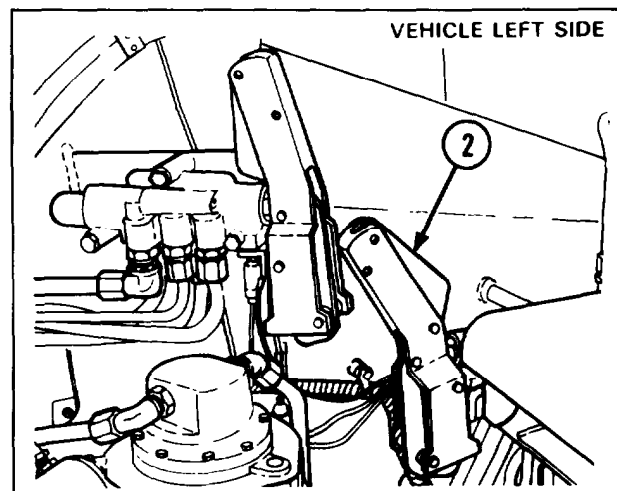
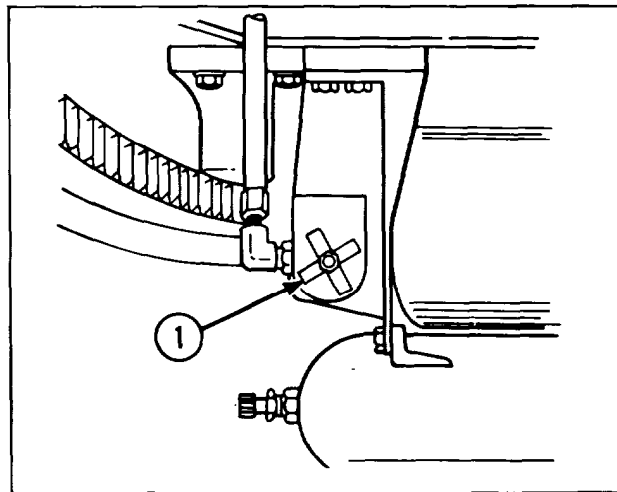
2-66. MAINTENANCE OF HYDRAULIC SYSTEM-ELEVATING CONTROL VALVES, MECHANICAL DRIVE GUARD, CHECK VALVE MULTIPLE CONNECTOR, AND ELEVATING SOLENOID VALVE (CONT).

RELIEVING HYDRAULIC PRESSURE

WARNING

Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as level ground as possible. This will stop the cannon from sliding out of battery.

- 1 Set MASTER switch to OFF.
- 2 Open globe angle valve (1).
- 3 Move manual control handle (2) to full RAISE.
- 4 Move manual control handle (2) to full LOWER.
- 5 Repeat steps 3 and 4 several times to relieve pressure from the system.
- 6 Repeat steps 3 thru 5 for other manual control handle (3).



REMOVAL

NOTE

Steps 1 thru 4 apply to removal of elevating control valve.

- 1 Remove left side manual control handle and switch. Refer to TM 9-2350-304-20-2.

WARNING

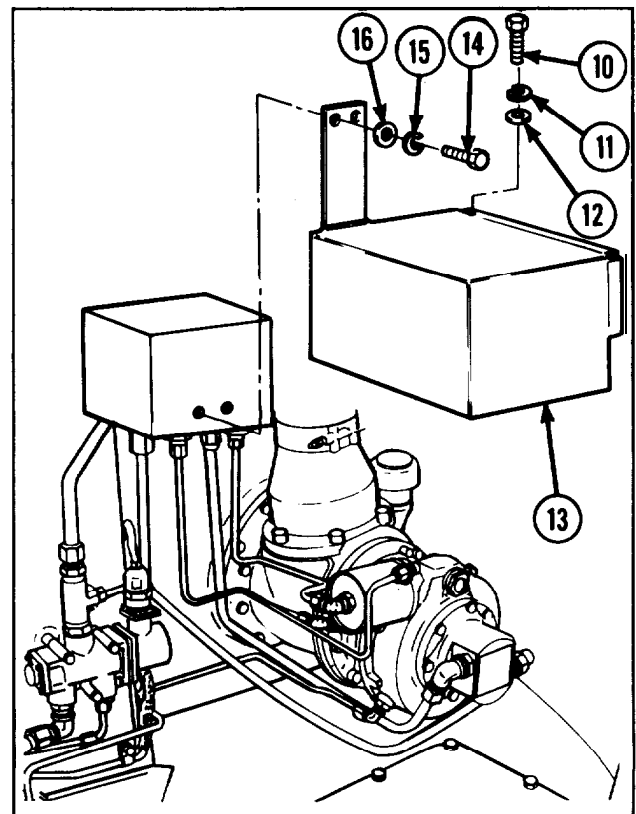
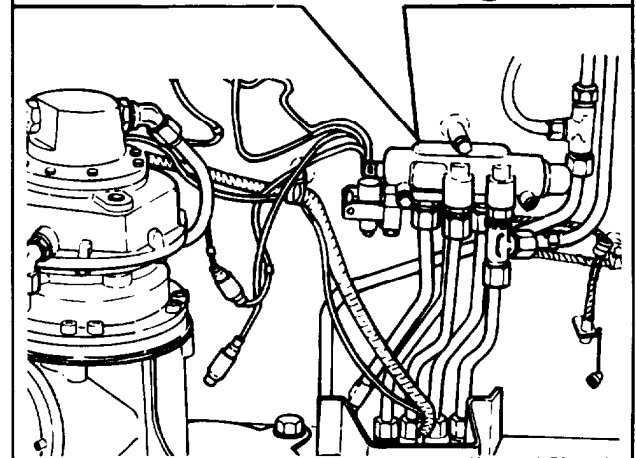
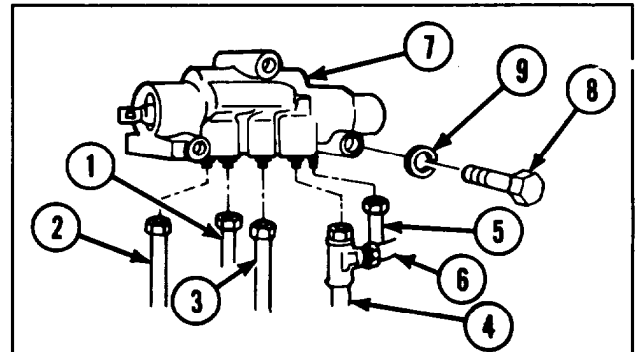
Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

- 2 Disconnect six hydraulic tubes (1, 2, 3, 4, 5, and 6) from elevating control valve (7). For complete disassembly of hydraulic lines and fittings, refer to page 2-27.
- 3 Cover tube openings.
- 4 Remove three capscrews (8), three lockwashers (9), and control valve (7).

NOTE

Steps 5 and 6 apply to removal of mechanical drive guard.

- 5 Remove two capscrews (10), two lockwashers (11), and two flat washers (12) from mechanical drive guard (13).
- 6 Remove two capscrews (14), two lockwashers (15), two flat washers (16), and mechanical drive guard (13).



2-66. MAINTENANCE OF HYDRAULIC SYSTEM-ELEVATING CONTROL VALVES, MECHANICAL DRIVE GUARD, CHECK VALVE MULTIPLE CONNECTOR, AND ELEVATING SOLENOID VALVE (CONT).

REMOVAL (CONT)

NOTE

Steps 7 thru 9 apply to removal of check valve multiple connector.

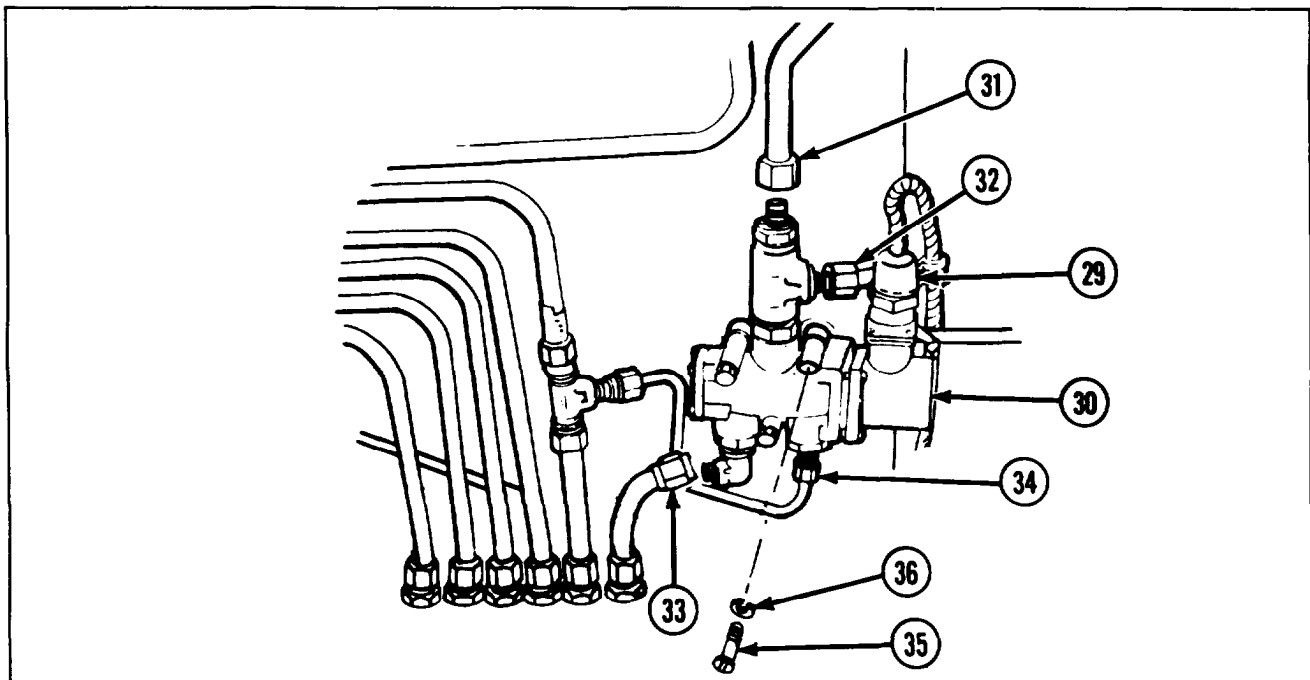
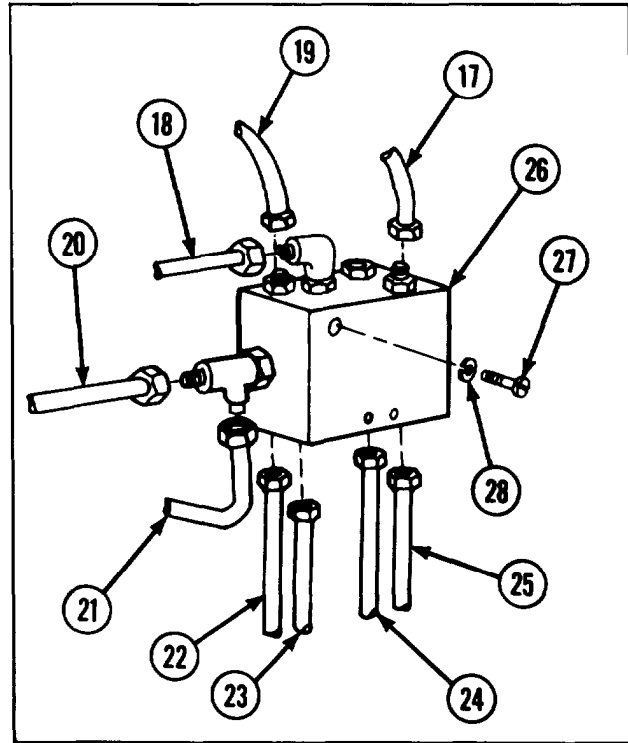
7 Disconnect nine hydraulic tubes (17, 18, 19, 20, 21, 22, 23, 24, and 25) from check valve multiple connector (26). For complete disassembly of hydraulic lines and fittings, refer to page 2-27.

8 Cover tube openings.

NOTE

If mechanical drive guard has been removed, one capscrew and lock-washer will be removed, not three.

9 Remove three capscrews (271, three lockwashers (28). and check valve multiple connector (26).



WARNING

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

NOTE

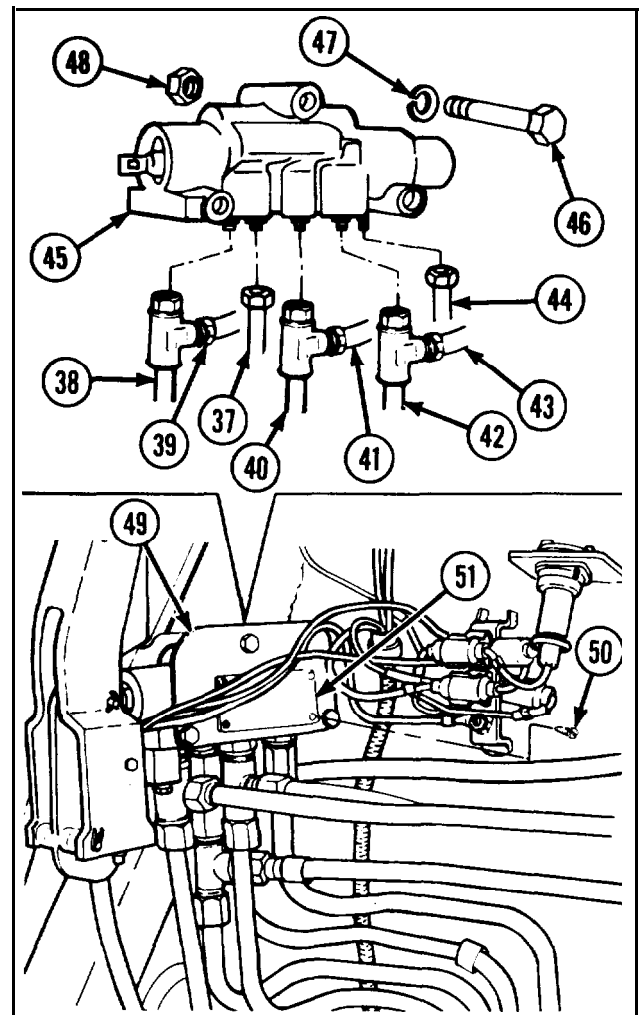
Steps 10 thru 13 apply to removal of elevating solenoid valve.

- 10 Disconnect electrical lead (29) from elevating solenoid valve (30).
- 11 Disconnect four hydraulic tubes (31, 32, 33, and 34) from elevating solenoid valve (30). For complete disassembly of hydraulic lines and fittings, refer to page 2-27.
- 12 Cover tube openings.
- 13 Remove three capscrews (35), three lockwashers (36), and elevating solenoid valve (30).

NOTE

Steps 14 thru 18 apply to removal of hydraulic control valve.

- 14 Remove right side manual control handle and switch. Refer to TM 9-2350-304-20-2.
- 15 Disconnect eight hydraulic tubes (37, 38, 39, 40, 41, 42, 43 and 44) from hydraulic control valve (45). For complete disassembly of hydraulic tubes and fittings, refer to page 2-27.
- 16 Cover tube openings.
- 17 Remove three capscrews (46), three lockwashers (47), three nuts (48), elevating instruction plate bracket (49), and hydraulic control valve (45).
- 18 If damaged, remove four drive screws (50) and elevating control instruction plate (51).

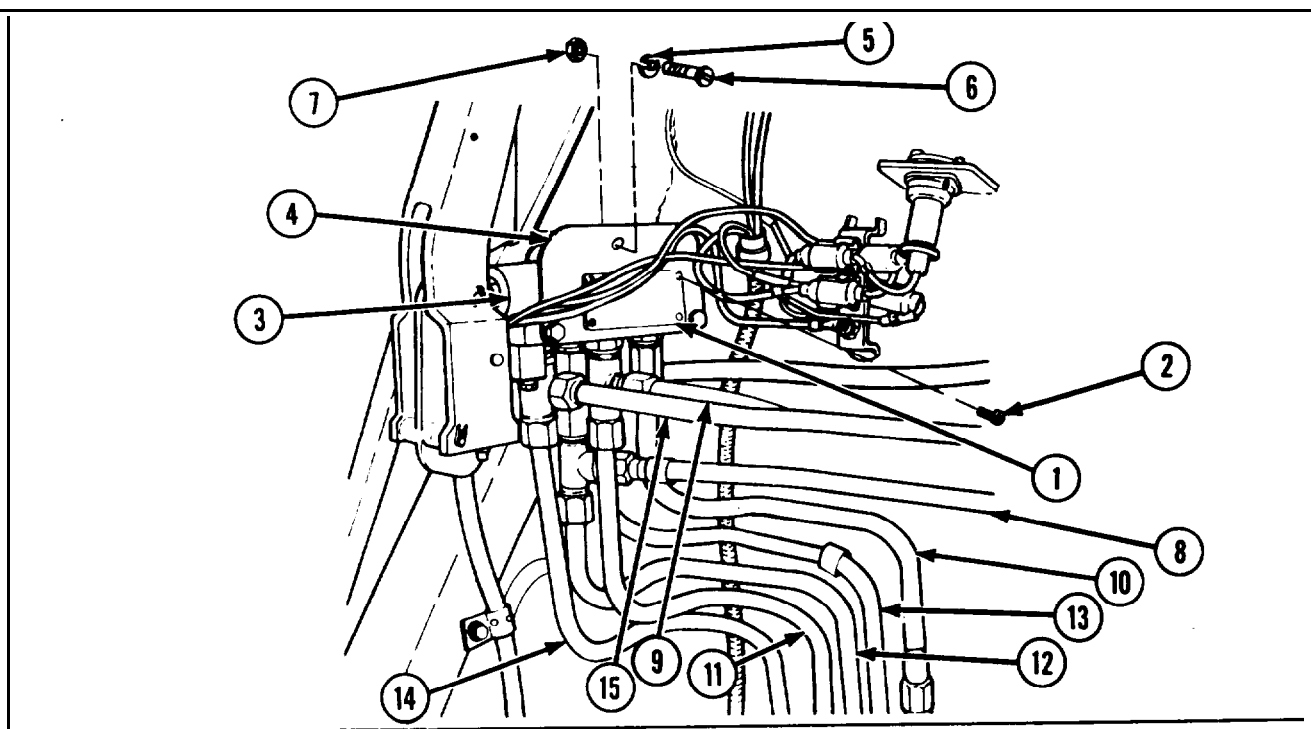


2-66. MAINTENANCE OF HYDRAULIC SYSTEM-ELEVATING CONTROL VALVES, MECHANICAL DRIVE GUARD, CHECK VALVE MULTIPLE CONNECTOR, AND ELEVATING SOLENOID VALVE (CONT).

INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 Check valve multiple connector is a repairable assembly. Refer to page 2-389.
- 3 Repair is by replacemen' of authorized parts (TM 9-2350-304-24P-2).

INSTALLATION



NOTE

Steps 1 thru 4 apply to installation of hydraulic control valve.

- 1 If necessary, install new elevating control instruction plate (1) and four drive screws (2).
- 2 Install hydraulic control valve (3) and elevating instruction plate bracket (4), and secure using three new lockwashers (5), three capscrews (6), and three nuts (7).

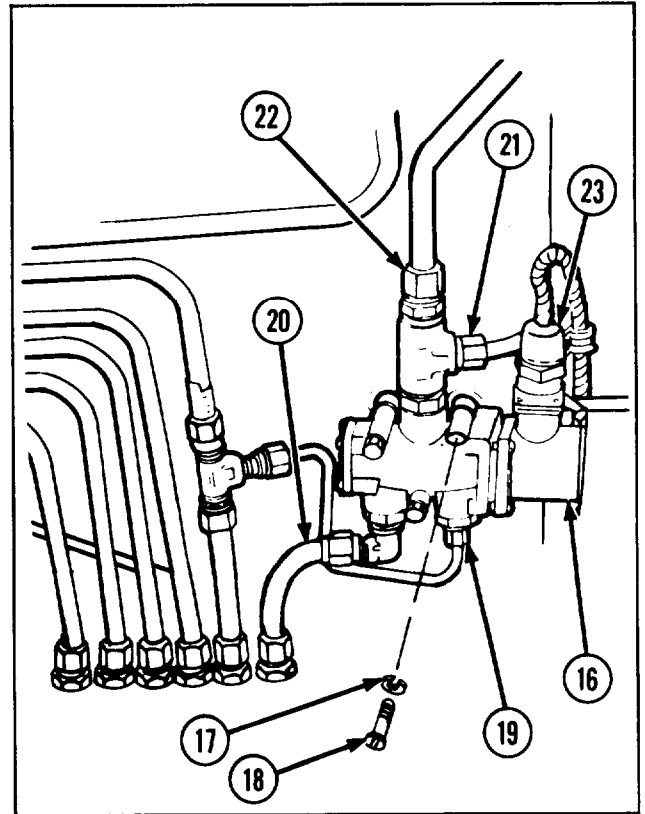
3 Uncover and connect eight hydraulic tubes (8, 9, 10, 11, 12, 13, 14, and 15) to hydraulic control valve (3). For complete reassembly of hydraulic lines and fittings, refer to' page 2-27.

4 Install right side manual control handle and switch. Refer to TM 9-2350-304-20-2.

NOTE

Steps 5 thru 7 apply to installation of elevating solenoid valve.

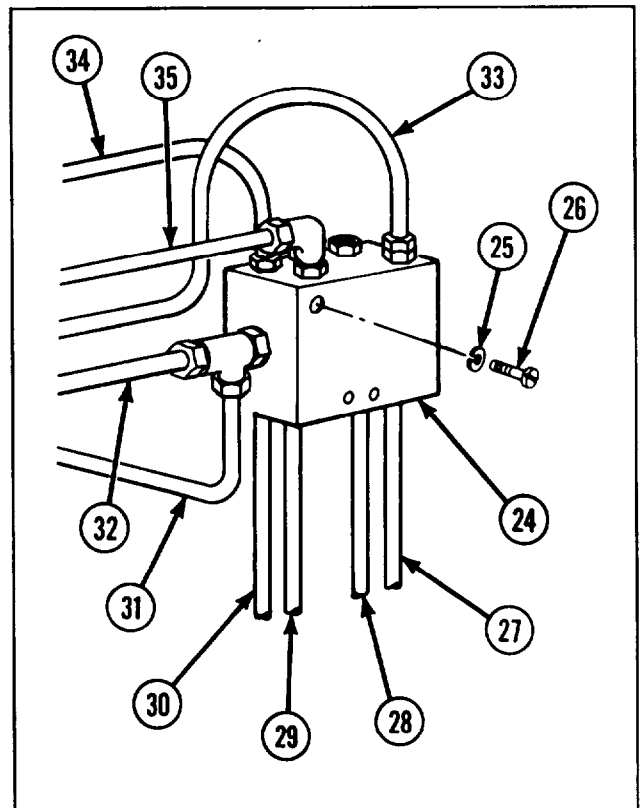
- 5 Install elevating solenoid valve (16) and secure using three new lockwashers (17) and three capscrews (18).
- 6 Uncover and connect four hydraulic tubes (19, 20, 21, and 22) to elevating solenoid valve (16). For complete reassembly of hydraulic lines and fittings, refer to page 2-27.
- 7 Connect electrical lead (23) to elevating solenoid valve (16).



NOTE

- Steps 8 and 9 apply to installation of check valve multiple connector.
- Two of three capscrews securing check valve multiple connector also secure mechanical drive guard.

- 8 Install check valve multiple connector (24) and secure using new lockwasher (25) and capscrew (26).
- 9 Uncover and connect nine hydraulic tubes (27, 28, 29, 30, 31, 32, 33, 34, and 35) to check valve multiple connector (24). For complete reassembly of hydraulic lines and fittings, refer to page 2-27.



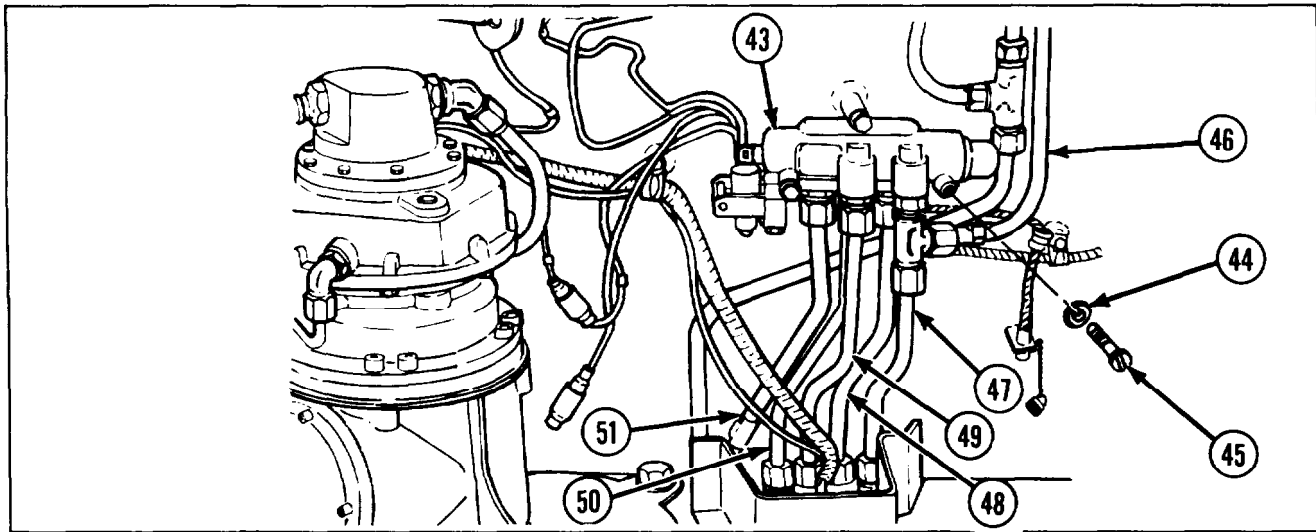
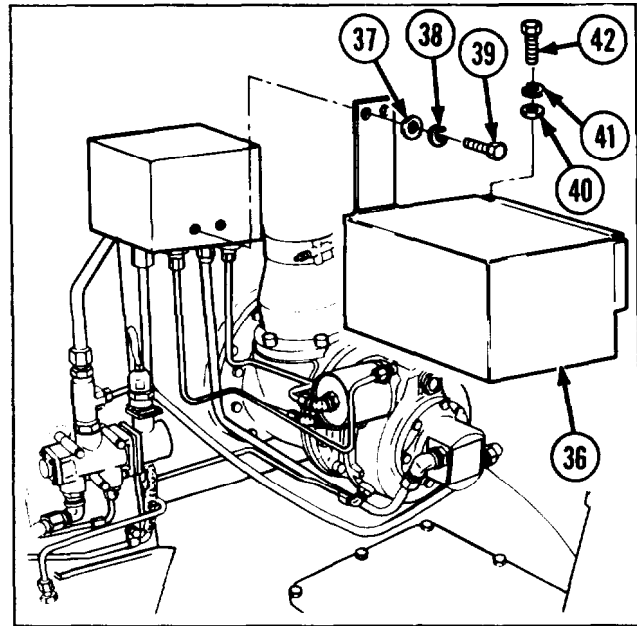
2-66. MAINTENANCE OF HYDRAULIC SYSTEM-ELEVATING CONTROL VALVES, MECHANICAL DRIVE GUARD, CHECK VALVE MULTIPLE CONNECTOR, AND ELEVATING SOLENOID VALVE (CONT).

INSTALLATION (CONT)

NOTE

- Steps 10 and 11 apply to installation of mechanical drive guard.
- Installation of capscrews, lockwashers, and flat washers will complete installation of check valve multiple connector.

- 10 Install mechanical drive guard (36) and secure using two flat washers (37), two new lockwashers (38), and two capscrews (39).
- 11 Install two flat washers (40), two new lockwashers (41), and two capscrews (42).



NOTE

Steps 12 and 13 apply to installation of elevating control valve.

- 12 Install elevating control valve (43), and secure using three new lockwashers (44) and three capscrews (45).
- 13 Uncover and connect six hydraulic tubes (46, 47, 48, 49, 50, and 51) to elevating control valve (43). For complete reassembly of hydraulic lines and fittings, refer to page 2-27.
- 14 Install left side manual control handle and switch. Refer to TM 9-2350-304-20-2.

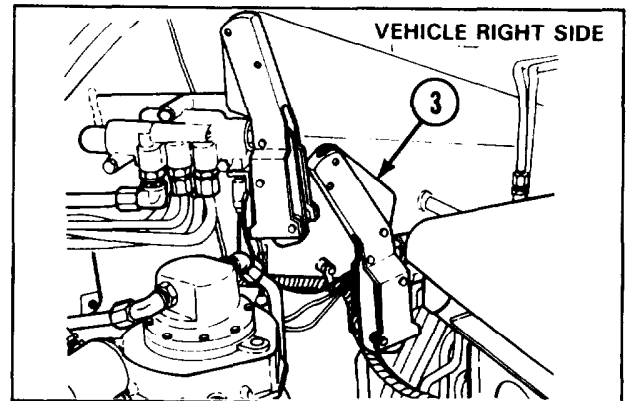
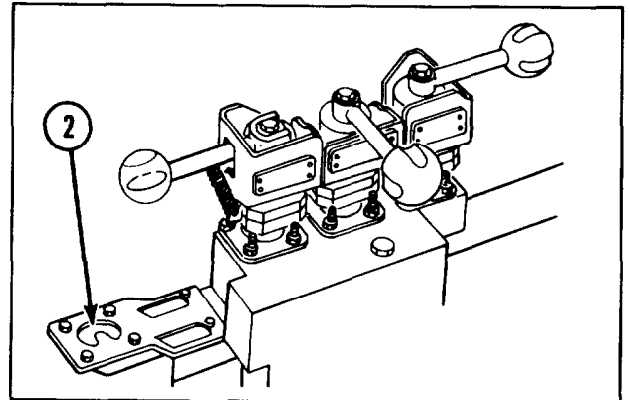
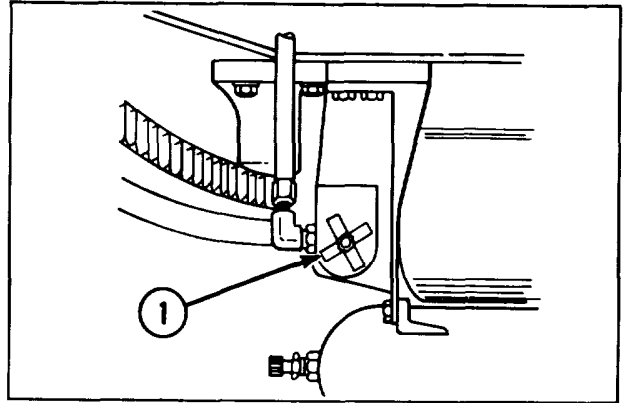
APPLYING HYDRAULIC PRESSURE

- 1 Close globe angle valve (1).
- 2 Start engine.

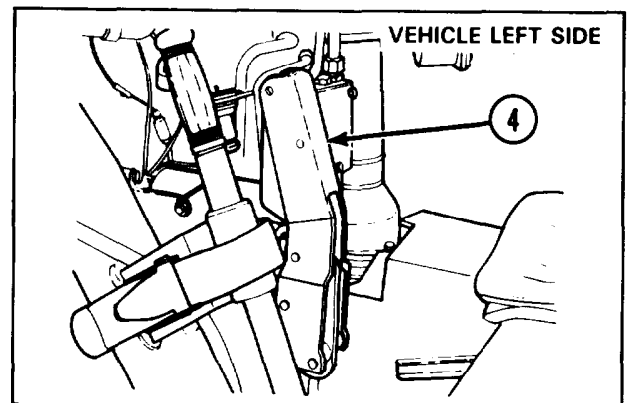
NOTE

Hydraulic motor and pump may be used to apply pressure to hydraulic system without starting engine by setting MASTER Switch to ON.

- 3 Set HYD PUMP/PTO CLUTCH switch to ON.
- 4 Check dial pressure gage (2) indication. Normal pressure is 1600 to 2400 psi (11,032 to 16,548 kPa).
- 5 Stop engine.



- 6 Raise and lower cannon several times using manual control handle (3) to bleed air from system.



- 7 Raise and lower cannon several times using manual control handle (4) to bleed air from system.

2-67. MAINTENANCE OF RAMMER MULTIPLE CONNECTOR, REGULATOR FLOW VALVE, RAMMER PRESSURE SENSITIVE CABLE ASSEMBLY, AND SOLENOID VALVE.

- This task covers:
- | | |
|--|---------------------------------------|
| a. <i>Relieving Hydraulic Pressure</i> | e. <i>Reassembly</i> |
| b. <i>Removal</i> | f. <i>Installation</i> |
| c. <i>Disassembly</i> | g. <i>Applying Hydraulic Pressure</i> |
| d. <i>Inspection/Repair</i> | |

INITIAL SETUP

Tools and Special Tools

Ordnance artillery turret and mechanics tool kit (SC 5180-95-CL-A12)

Materials/Parts

Cotter pin (MS24665-132)
Hydraulic fluid (item 13, appx B)
Lockwasher (3) (MS35338-43)
Lockwasher (MS35338-44)
Lockwasher (4) (MS35338-46)
Marker band (2) (M43436/1-1)
Preformed packing (3) (MS28778-6)
Preformed packing (16) (MS28775-012)
Rammer manifold parts kit (11784314)
Sealing compound (item 21, appx B)
Solenoid valve parts kit (11784315)

Equipment Conditions

Access cover removed (TM 9-2350-304-20-2)
Pressure gage dial assembly removed (TM 9-2350-304-20-2)

References

TM 9-2350-304-20-2
TM 9-2350-304-24P-2

General Safety Instructions

WARNING

- Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as level ground as possible. This will prevent the cannon from sliding out of battery.
- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.
- Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

RELIEVING HYDRAULIC PRESSURE**WARNING**

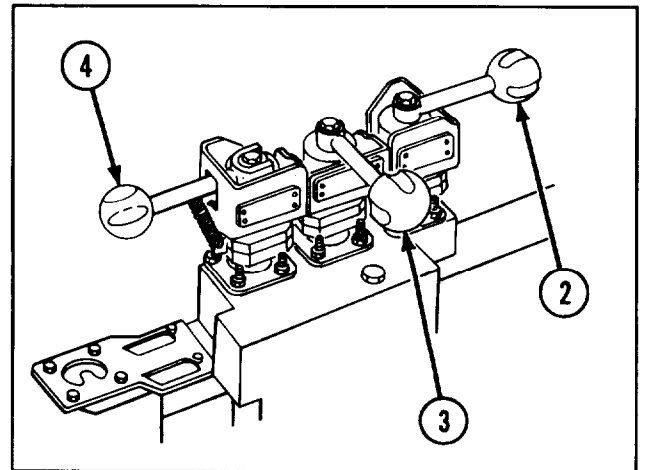
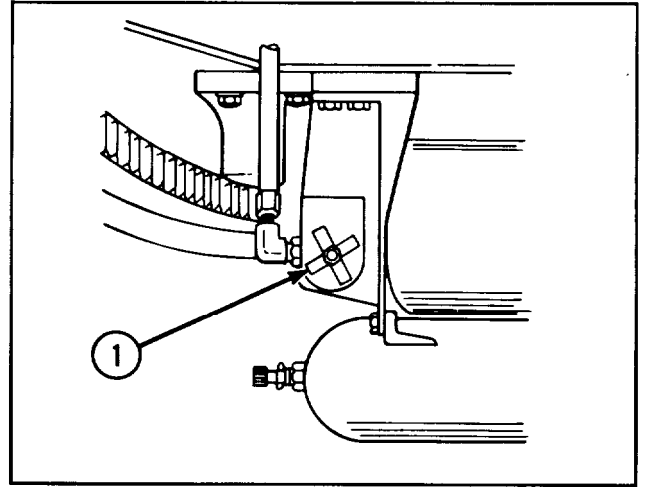
Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as level ground as possible. This will prevent the cannon from sliding out of battery.

- 1 Set MASTER switch to OFF.
- 2 Open globe angle valve (1).
- 3 Move SWING control handle (2) to full LOAD.
- 4 Move SWING control handle (2) to full STOW.
- 5 Repeat steps 3 and 4 several times to relieve pressure from system.
- 6 Move LOADER control handle (3) to full IN.
- 7 Move LOADER control handle (3) to full OUT.
- 8 Repeat steps 6 and 7 several times to relieve pressure from system.

CAUTION

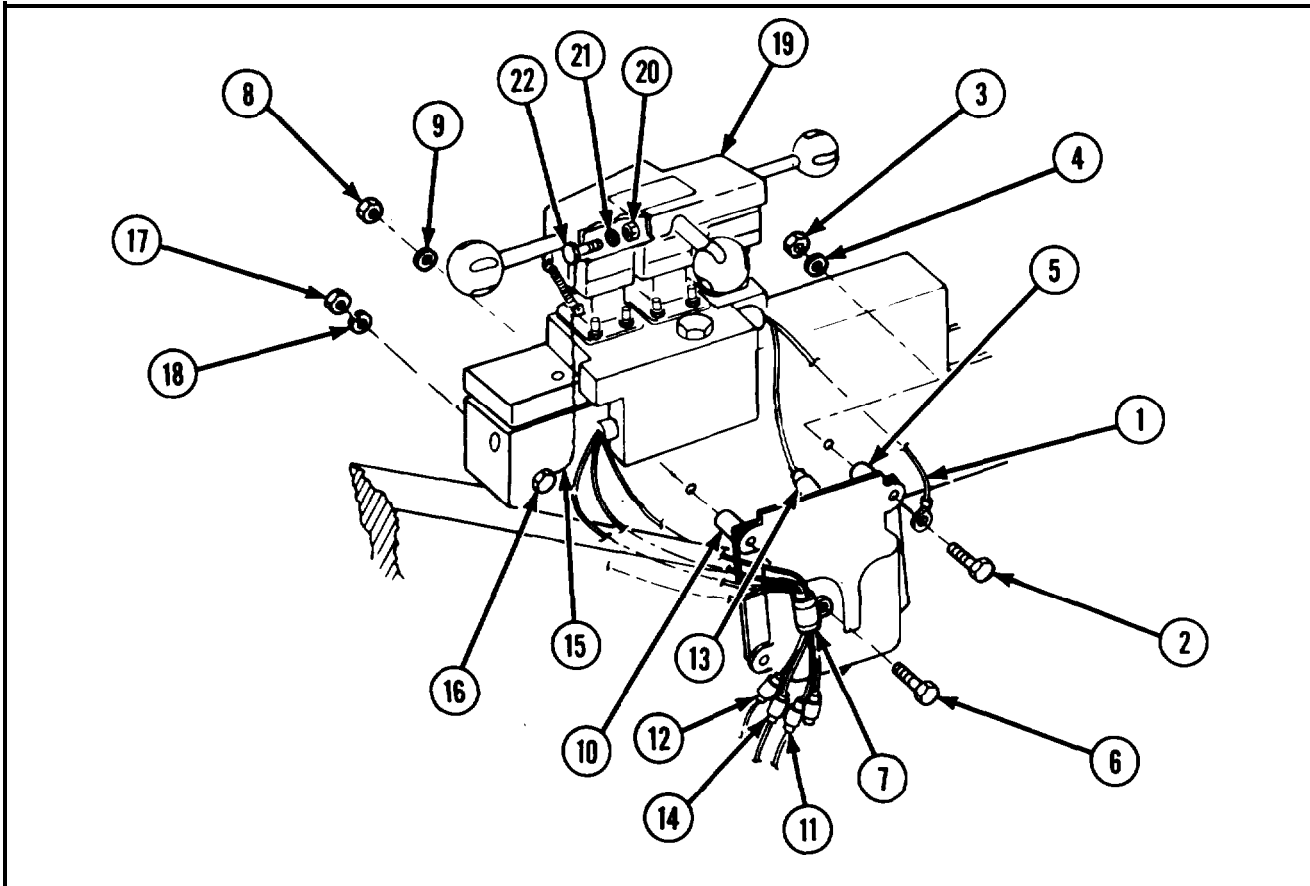
Do not operate RAMMER control handle (4) without a projectile in the trough.

- 9 Move RAMMER control handle (4) to RAM several times to relieve pressure from system.



2-67. MAINTENANCE OF RAMMER MULTIPLE CONNECTOR, REGULATOR FLOW VALVE, RAMMER PRESSURE SENSITIVE CABLE ASSEMBLY, AND SOLENOID VALVE (CONT).

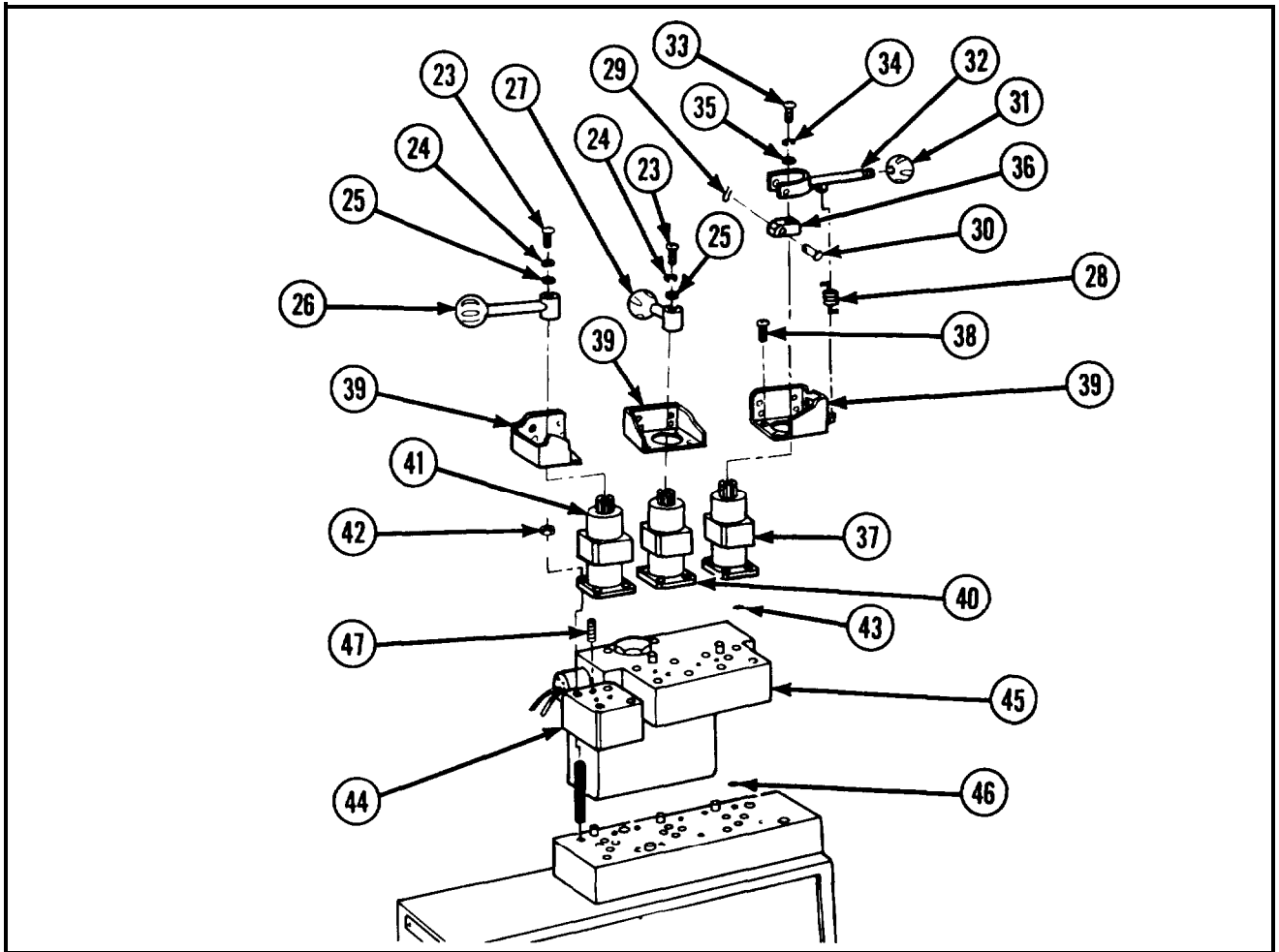
REMOVAL



WARNING

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.
- Disconnect ground lead (1) by removing screw (2), nut (3), washer (4), and spacer (5).

- 2 Remove screw (6), clamp (7), nut (8), washer (9), and spacer (10).
- 3 Disconnect four electrical leads (11, 12, 13, and 14).
- 4 Disconnect wire rope assembly (15) by removing capscrew (16), nut (17), and lockwasher (18).
- 5 Lift valve control cover assembly (19).
- 6 Remove self-locking nut (20), flat washer (21), and machine screw (22) securing wire rope assembly (15) to valve control cover assembly (19).



- 7 Remove two machine screws (23), two lockwashers (24), two flat washers (25), SWING control handle (26), and LOADER control handle (27).
- 8 Disconnect helical spring (28).
- 9 Remove cotter pin (29), headed straight pin (30), and valve handle knob (31) from RAMMER control handle (32).
- 10 Remove RAMMER control handle (32).
- 11 Remove machine screw (33), lockwasher (34), flat washer (35), and rammer control block (36) from loader and traversing direct rammer rotary valve (37).
- 12 Remove 12 machine screws (38) and three control valve guards (39) from three loader and traversing direct rammer rotary valves (37, 40, and 41).
- 13 Remove twelve hex nuts (42) securing three loader and traversing direct rammer rotary valves (37, 40, and 41).
- 14 Remove three loader and traversing direct rammer rotary valves (37, 40, and 41) and eight preformed packings (43).
- 15 Remove rammer plate spacer (44), rammer multiple connector (45), and eight preformed packings (46).
- 16 If damaged, remove spring pin (47) from rammer plate spacer (44).

2-67. MAINTENANCE OF RAMMER MULTIPLE CONNECTOR, REGULATOR FLOW VALVE, RAMMER PRESSURE SENSITIVE CABLE ASSEMBLY, AND SOLENOID VALVE (CONT).

REMOVAL (CONT)

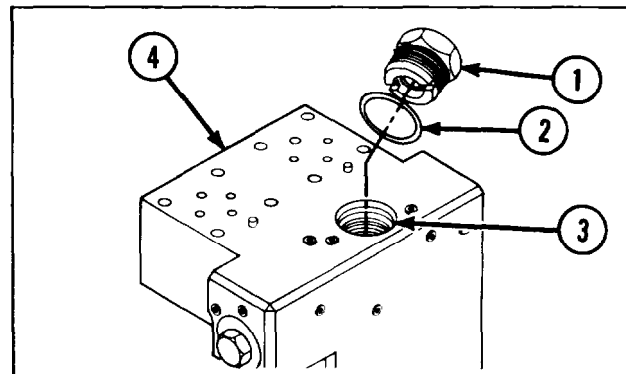
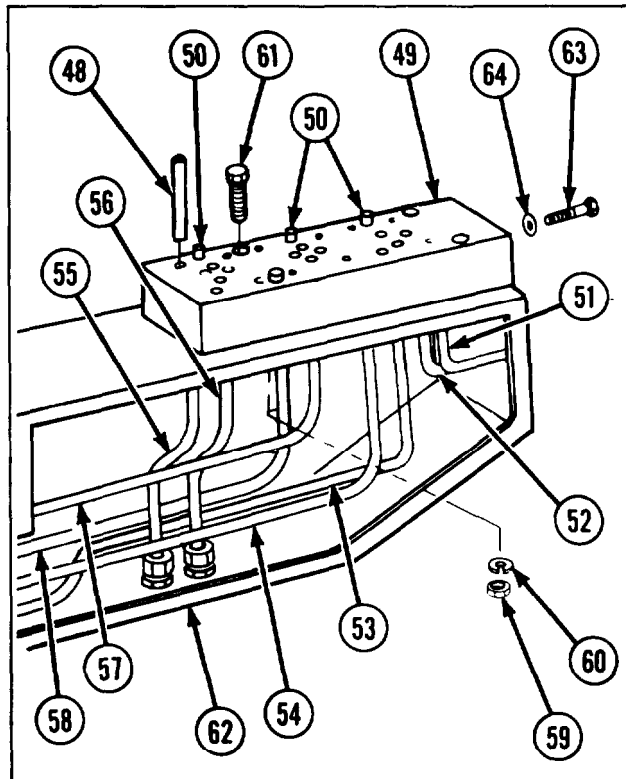
- 17 Remove 12 plain studs (48) from multiple connector (49).
- 18 If damaged, remove three locating pins (50) from multiple connector (49).

WARNING

Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

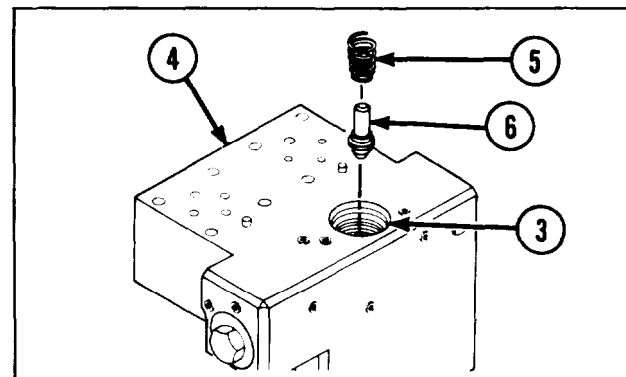
- 19 Disconnect eight tube assemblies (51, 52, 53, 54, 55, 56, 57, and 58) from fittings in multiple connector (49) and cover tube openings. For complete disassembly of hydraulic lines and fittings, refer to page 2-27.

- 20 Remove four hex nuts (59), four lock-washers (60), and four capscrews (61) securing multiple connector (49) to control valve manifold support (62).
- 21 Remove multiple connector (49).
- 22 Remove machine threaded plug (63) and three preformed packings (64) from multiple connector (49).

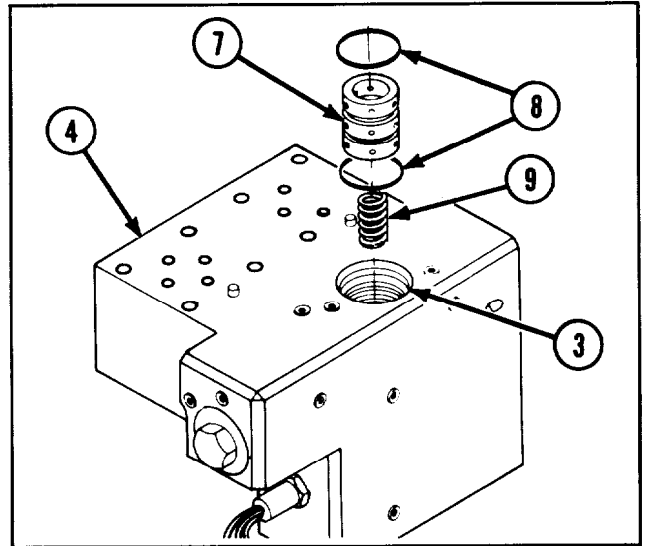


DISASSEMBLY

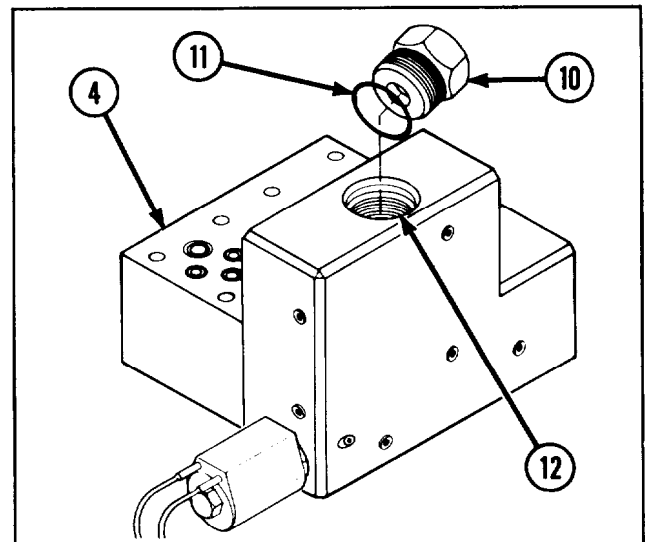
- 1 Remove rammer manifold port machine thread plug (1) and preformed packing (2) from port 1 (3) of rammer manifold (4).
- 2 Remove helical compression spring (5) and rammer manifold valve disk (6) from port 1 (3) of rammer manifold (4).



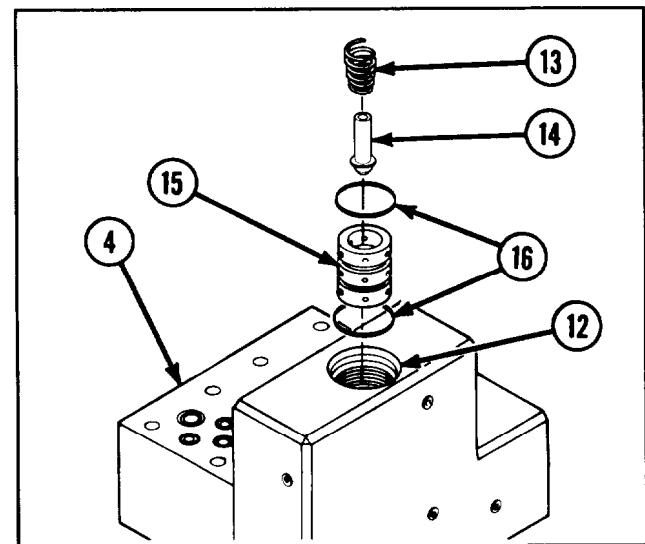
- 3 Remove manifold insert (7), two preformed packings (8) and helical compression spring (9) from port 1 (3) of rammer manifold (4).



- 4 Remove rammer manifold machine thread plug (10) and preformed packing (11) from port 2 (12) of rammer manifold (4).



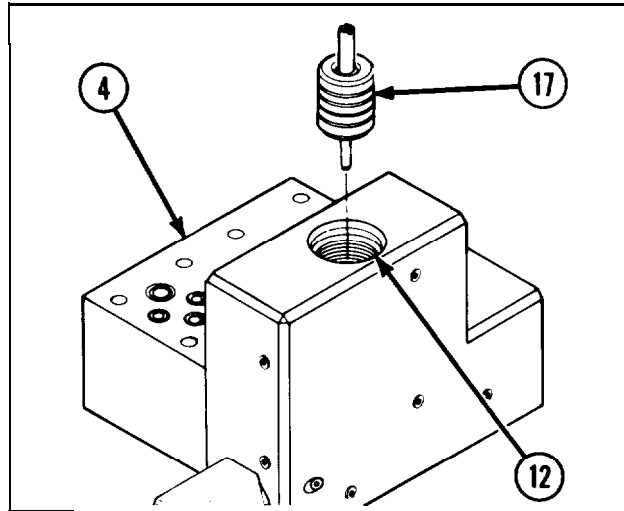
- 5 Remove helical compression spring (13), direct linear valve (14), manifold insert (15), and two preformed packings (16) from port 2 (12) of rammer manifold (4).



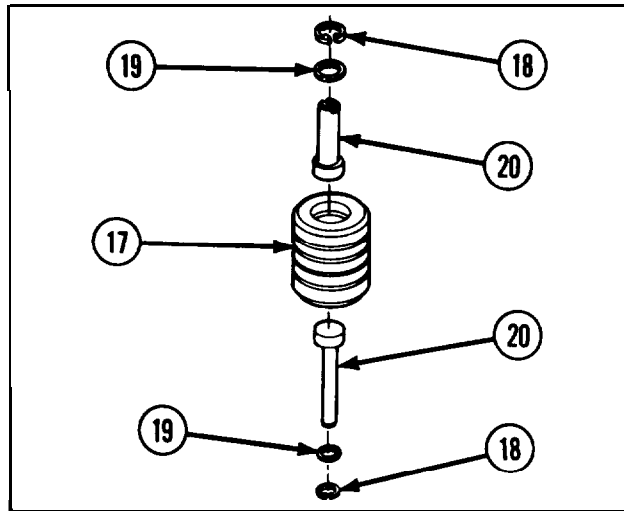
2-67. MAINTENANCE OF RAMMER MULTIPLE CONNECTOR, REGULATOR FLOW VALVE, RAMMER PRESSURE SENSITIVE CABLE ASSEMBLY, AND SOLENOID VALVE (CONT).

DISASSEMBLY (CONT)

6 Remove manifold piston (17) from port 2 (12) of rammer manifold (4).

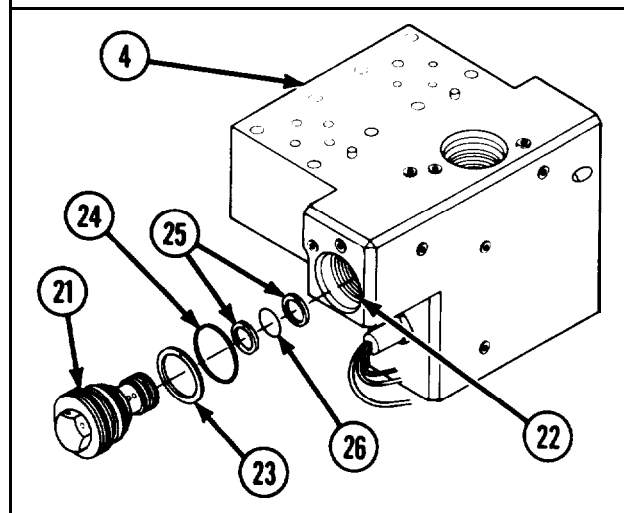


7 Remove two retaining rings (18), two flat washers (19), and two linear piston rods (20) from manifold piston (17).



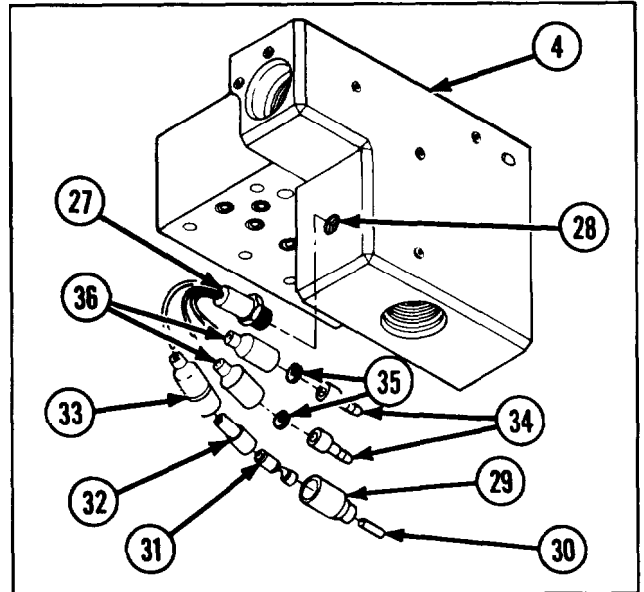
8 Remove rammer manifold regulator flow valve (21) from port 3 (22) of rammer manifold (4).

9 Remove packing retainer (23), preformed packing (24), two packing retainers (25), and preformed packing (26) from rammer manifold regulator flow valve (21).



10 Remove pressure sensitive switch (27) from port 4 (28) of rammer manifold (4).

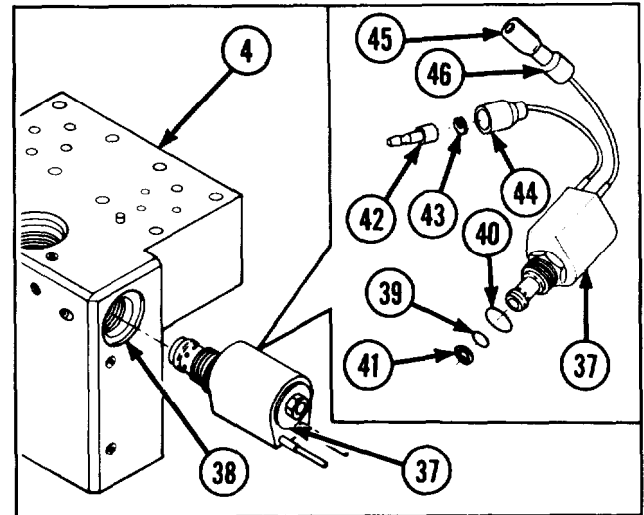
11 Remove female type electrical shell (29), dummy connector (30), female terminal assembly (31), bushing insulator (32), single electrical shell (33), two electrical contacts (34), two slotted washers (35), and two female receptacle electrical shells (36) from pressure sensitive switch (27).



12 Remove solenoid valve (37) from port 5 (38) of rammer manifold (4).

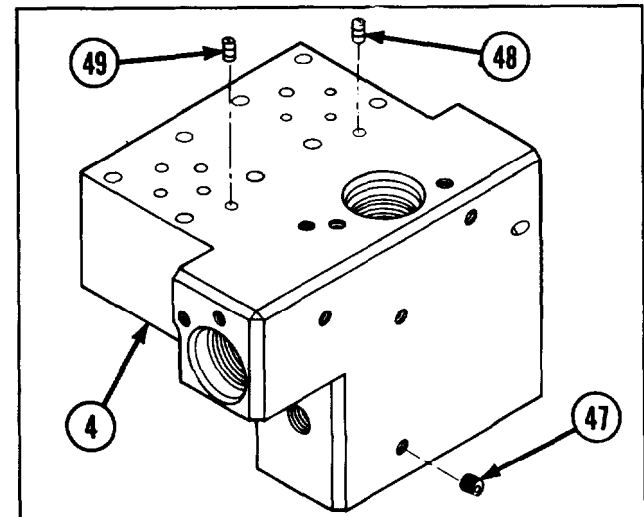
13 Remove preformed packing (39), preformed packing (40), and packing retainer (41) from solenoid valve (37).

14 Remove contact (42), slotted washer (43), plug connector (44), lug terminal (45), and marker band (46).



15 Remove 16 pipe plugs (47) from rammer manifold (4).

16 If damaged, remove two spring pins (48 and 49) from rammer manifold (4).



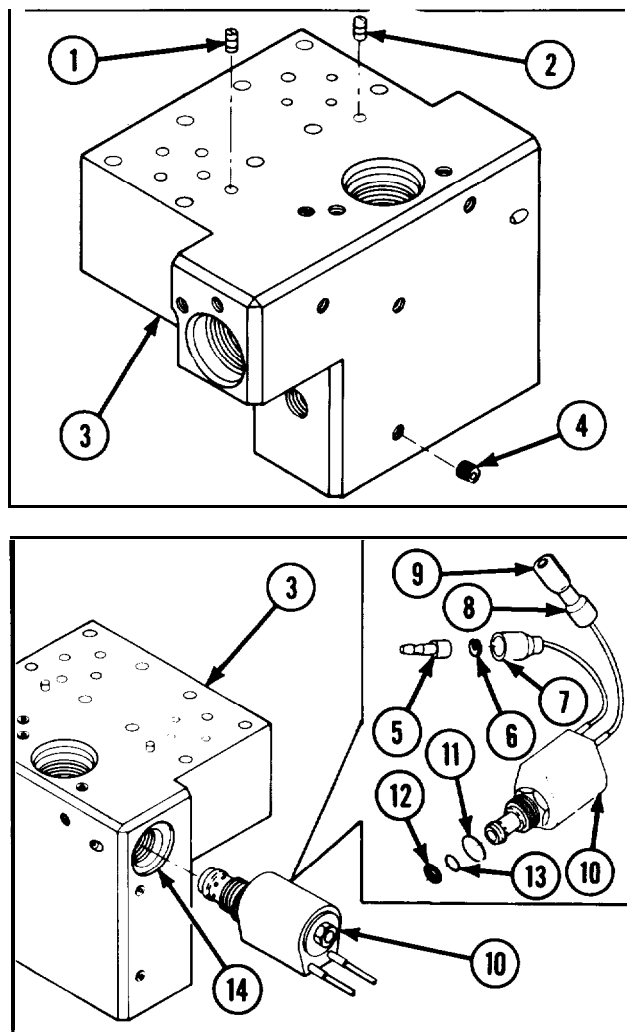
2-67. MAINTENANCE OF RAMMER MULTIPLE CONNECTOR, REGULATOR FLOW VALVE, RAMMER PRESSURE SENSITIVE CABLE ASSEMBLY, AND SOLENOID VALVE (CONT).

INSPECTION/REPAIR

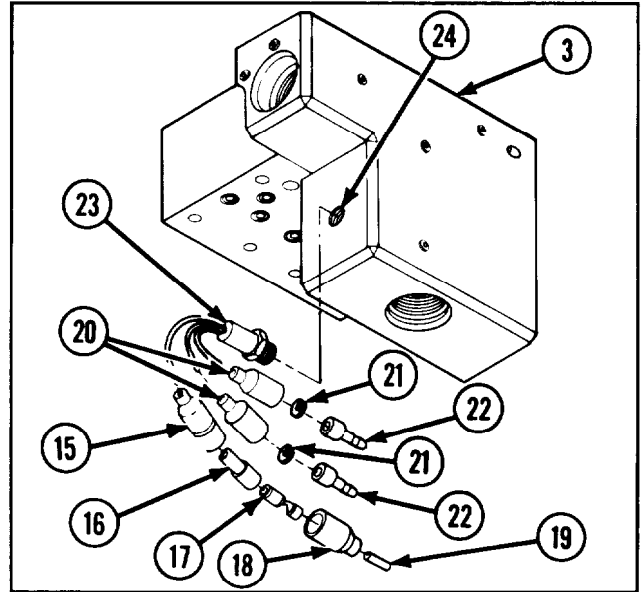
- 1 Inspect for broken, damaged, or missing parts.
- 2 If pressure sensitive switch is broken, damaged, or missing, repair is by replacement of next higher assembly.
- 3 If solenoid valve is broken, damaged, or missing, repair is by replacement of next higher assembly.
- 4 If rammer manifold is broken or damaged, repair is by replacement of next higher assembly.
- 5 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

REASSEMBLY

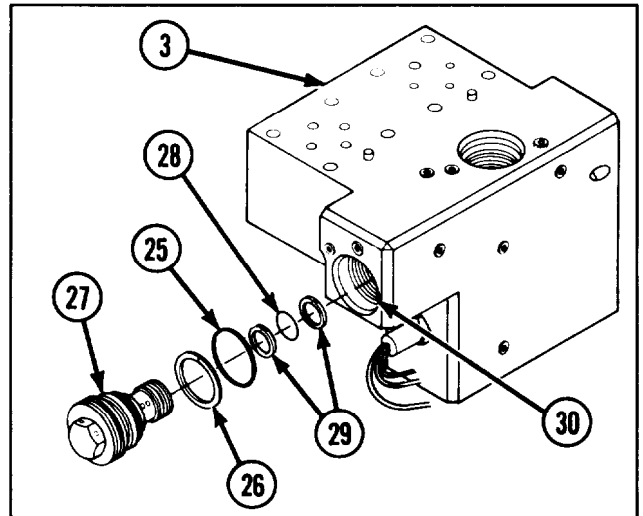
- 1 Apply sealing compound (item 21, appx B) to all threads prior to installation
- 2 Coat all new preformed packings with hydraulic fluid (item 13, appx B) before reassembly to make installation easier and to aid in proper seating.
- 3 If removed, install two spring pins (1 and 2) in rammer manifold (3).
- 4 Install 16 pipe plugs (4) in rammer manifold (3).
- 5 Install contact (5), slotted washer (6), plug connector (7), new marker band (8), and lug terminal (9) on solenoid valve (10).
- 6 Install new preformed packing (11), new preformed packing (12), and new packing retainer (13) on solenoid valve (10).
- 7 Install solenoid valve (10) in port 5 (14) of rammer manifold (3).



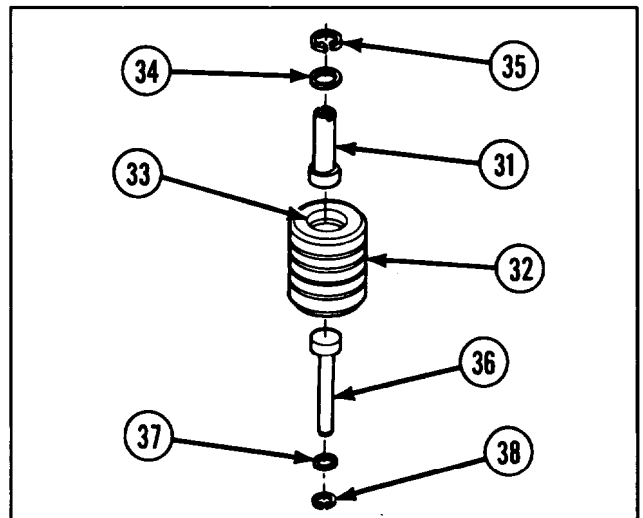
- 8 Install electrical shell (15), bushing insulator (16), female terminal assembly (17), female receptacle electrical shell (18), dummy connector (19), two female receptacle electrical shells (20), two slotted washers (21), and two electrical contacts (22) on pressure sensitive switch (23).
- 9 Install pressure sensitive switch (23) in port 4 (24) of rammer manifold (3).



- 10 Install new preformed packing (25) and new packing retainer (26) on rammer manifold regulator flow valve (27).
- 11 Install new preformed packing (28) and two new packing retainers (29) on rammer manifold regulator flow valve (27).
- 12 Install rammer manifold regulator flow valve (27) with attached parts to port 3 (30) of rammer manifold (3).



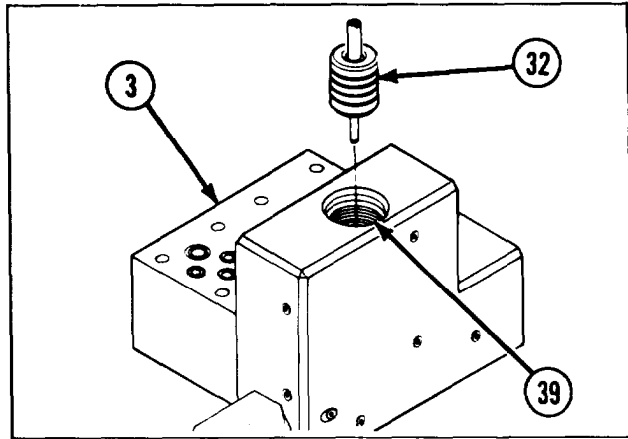
- 13 Install slotted piston rod (31) in end of manifold piston (32) with small bore diameter (33). Secure slotted piston rod (31) using flat washer (34) and retaining ring (35).
- 14 Install piston rod (36) in manifold piston (32) and secure using flat washer (37) and retaining ring (38).



2-67. MAINTENANCE OF RAMMER MULTIPLE CONNECTOR, REGULATOR FLOW VALVE HAMMER PRESSURE SENSITIVE CABLE ASSEMBLY, AND SOLENOID VALVE (CONT).

REASSEMBLY (CONT)

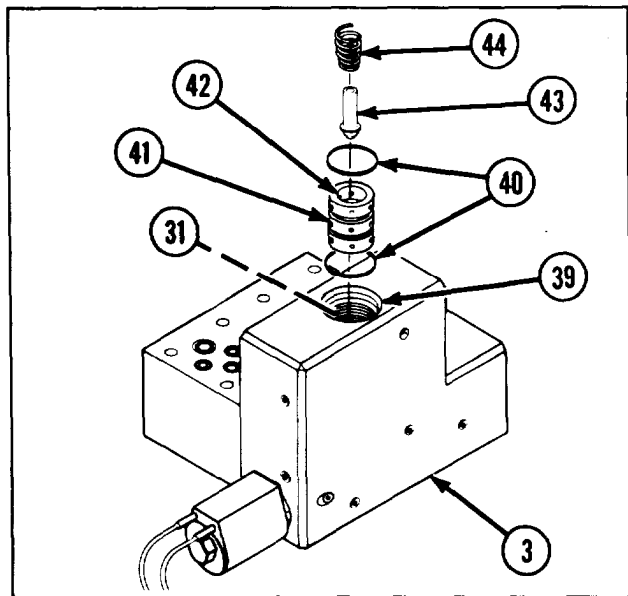
- 15 Install manifold piston (32) in port 2 (39) of rammer manifold (3).



- 16 Install two new preformed packings (40) on manifold insert (41).

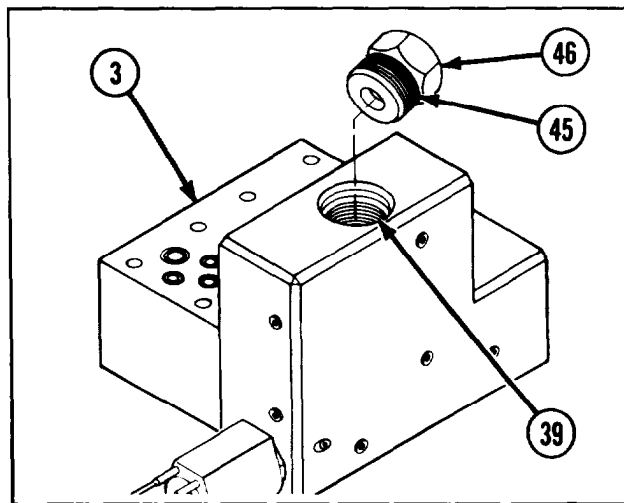
- 17 Install manifold insert (41) in port 2 (39) of rammer manifold (3) with tapered valve seat (42) facing out. Make sure manifold insert (41) fits over slotted piston rod (31).

- 18 Install direct linear valve (43) into manifold insert (41) and install helical compression spring (44) on direct linear valve (43) with smaller diameter of helical compression spring (44) facing direct linear valve (43).

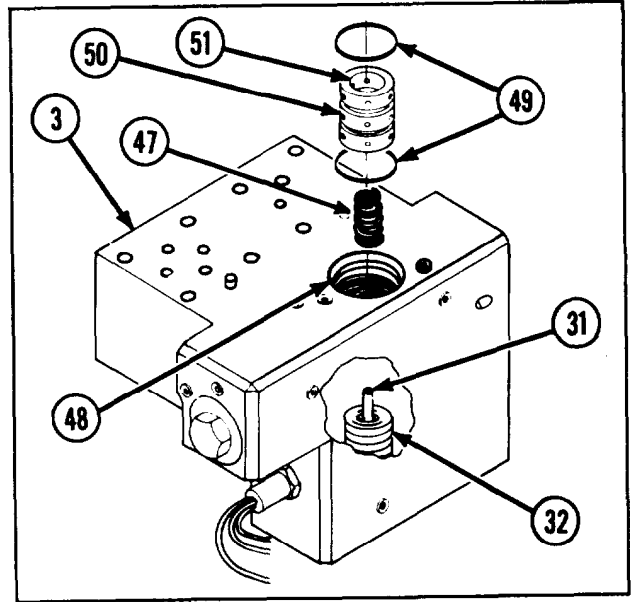


- 19 Install new preformed packing (45) on machine thread plug (46).

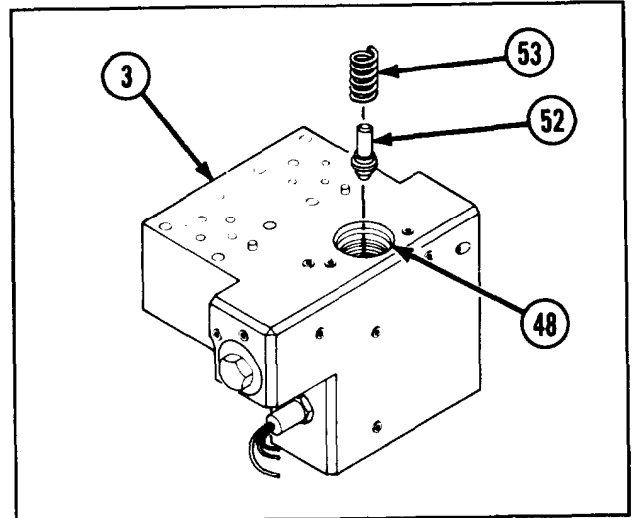
- 20 Install machine thread plug (46) in port 2 (39) of rammer manifold (3).



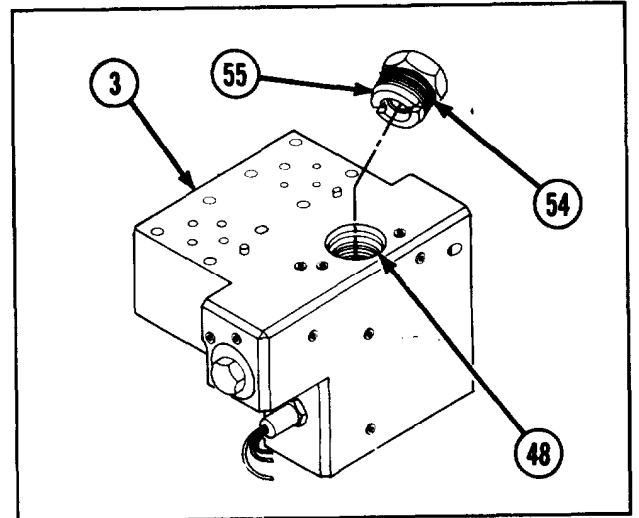
- 21 Install helical compression spring (47) in port 1 (48) of rammer manifold (3) making sure it seats fully in bore of manifold piston (32).
- 22 Install two new preformed packings (49) on manifold insert (50).
- 23 Install manifold insert (50) in port 1 (48) of rammer manifold (3) with tapered valve seat (51) facing out. Make sure manifold insert (50) fits over slotted piston rod (31).



- 24 Install rammer manifold valve disk (52) in port 1 (48) of rammer manifold (3).
- 25 Install helical compression spring (53) over rammer manifold valve disk (52) with smaller diameter of helical compression spring (53) facing rammer manifold valve disk (52).



- 26 Install new preformed packing (54) on rammer manifold port machine plug (551).
- 27 Install rammer manifold port machine plug (55) in port 1 (48) of rammer manifold (3).



2-67. MAINTENANCE OF RAMMER MULTIPLE CONNECTOR, REGULATOR FLOW VALVE, RAMMER PRESSURE SENSITIVE CABLE ASSEMBLY, AND SOLENOID VALVE (CONT).

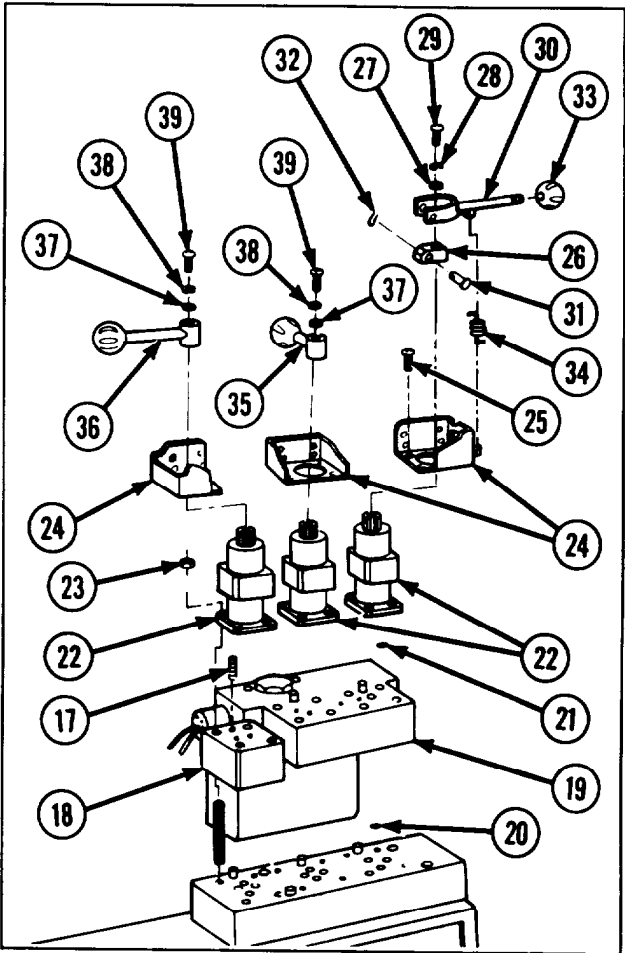
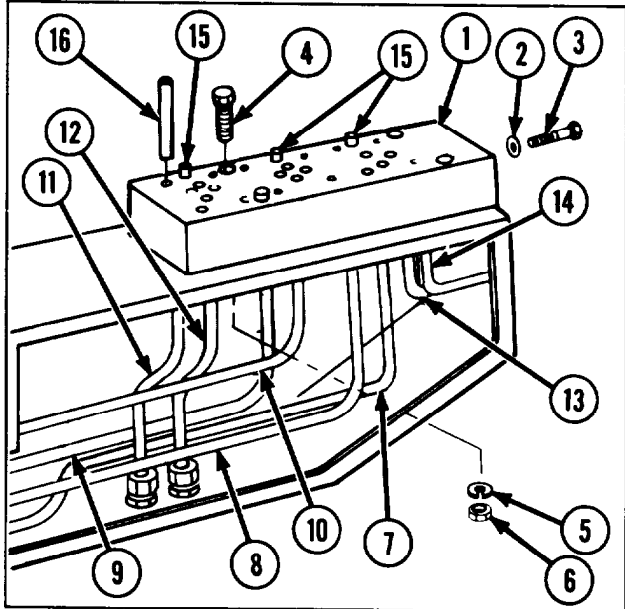
INSTALLATION

- 1 Install multiple connector (1), three new preformed packings (2), and machine threaded plug (3).
- 2 Secure multiple connector (1) using four capscrews (4), four new lockwashers (5), and four hex nuts (6).
- 3 Uncover tube openings and connect eight tube assemblies (7, 8, 9, 10, 11, 12, 13, and 14) on fittings in multiple connector (1). For complete reassembly of hydraulic lines and fittings, refer to page 2-27.
- 4 If removed, install three locating pins (15) in multiple connector (1).
- 5 Install 12 plain studs (16) on multiple connector (1).
- 6 If removed, install spring pin (17) in rammer plate spacer (18).
- 7 Install rammer plate spacer (18), rammer multiple connector (19), and eight new preformed packings (20).

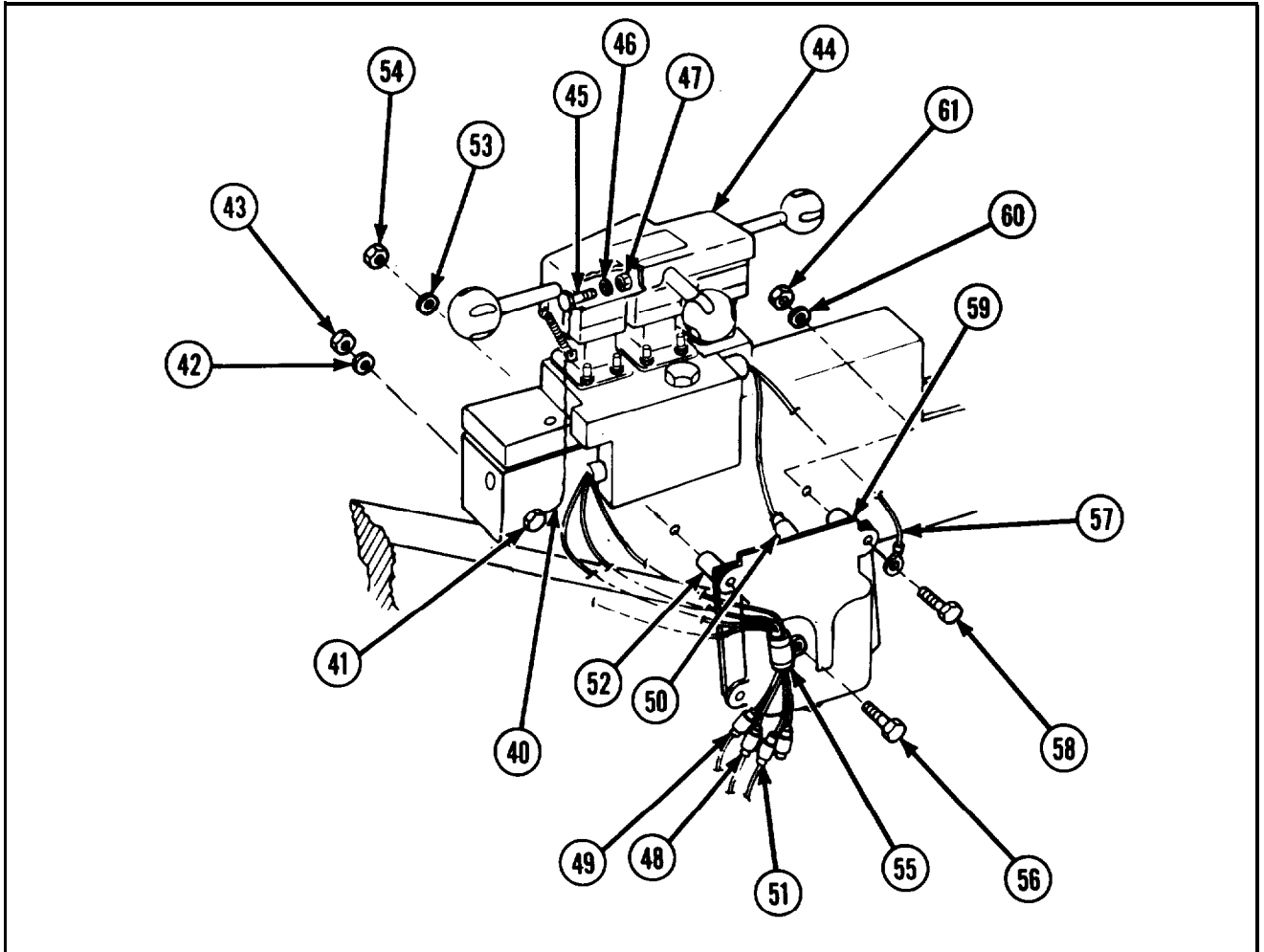
NOTE

When installing loader and traversing direct rammer rotary valves, ensure V-slots are aligned with spring pins.

- 8 Install eight new preformed packings (21). Aline V-slot of three loader and traversing direct rammer rotary valves (22) with three spring pins (17) and install.
- 9 Install four hex nuts (23) securing each loader and traversing direct rammer rotary valve (22).
- 10 Install three control valve guards (24) and secure using 12 machine screws (25).
- 11 Install rammer control block (26), and secure using flat washer (27), new lock-washer (28), and machine screw (29).



- 12 Install RAMMER control handle (30) and secure using headed straight pin (31) and new cotter pin (32). Install valve handle knob (33).
- 13 Connect helical spring (34).
- 14 Install LOADER control handle (35), SWING control handle (36), two flat washers (37), two new lockwashers (38), and two machine screws (39).



- 15 Position wire rope assembly (40) and connect one end by installing machine screw (41), flat washer (42), and new self-locking nut (43).
- 16 Connect second end of wire rope assembly (40) to valve control cover assembly (44) using capscrew (45), new lockwasher (46), and nut (47) and install valve control cover assembly.
- 17 Connect four electrical leads (48, 49, 50, and 51).
- 18 Install spacer (52), washer (53), nut (54), clamp (55), and screw (56).
- 19 Connect ground lead (57) by installing screw (58), spacer (59), washer (60), and nut (61).

2-67. MAINTENANCE OF RAMMER MULTIPLE CONNECTOR, REGULATOR FLOW VALVE, RAMMER PRESSURE SENSITIVE CABLE ASSEMBLY, AND SOLENOID VALVE (CONT).

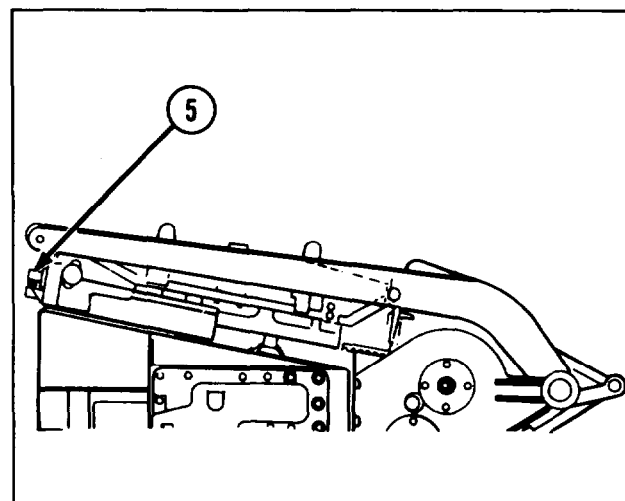
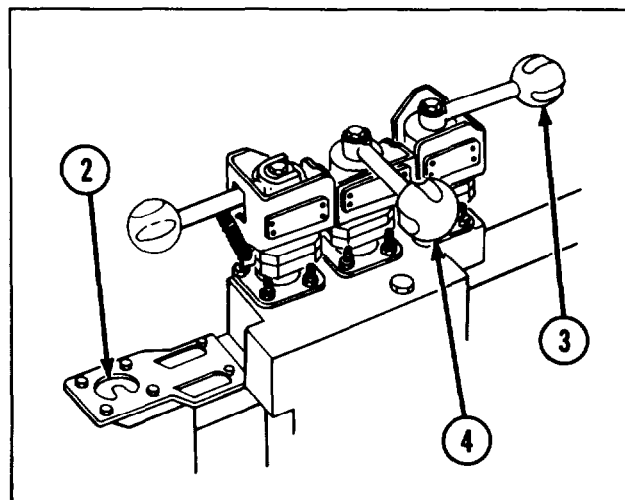
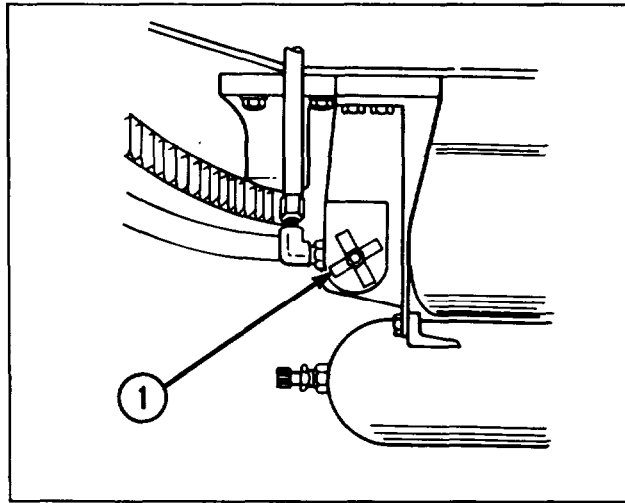
APPLYING HYDRAULIC PRESSURE

- 1 Close globe angle valve (1).
- 2 Start engine.

NOTE

Hydraulic motor and pump may be used to apply pressure to hydraulic system without starting engine by setting MASTER switch and OIL PUMP MOTOR Switch ON.

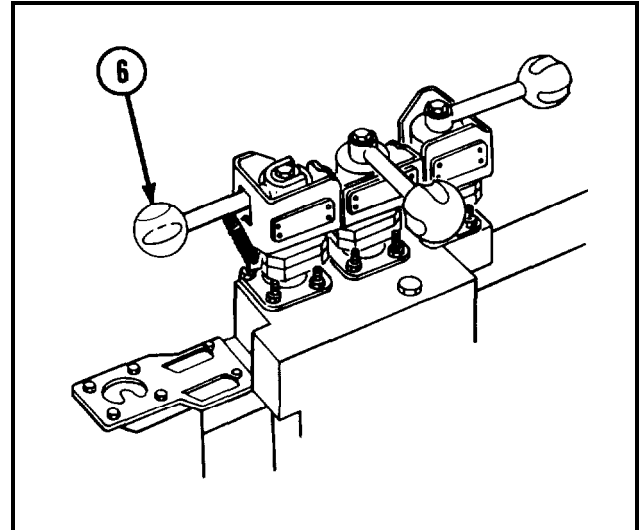
- 3 Set HYD PUMP/PTO CLUTCH switch to ON.
- 4 Check dial pressure gage (2) indication. Normal pressure is 1600 to 2400 psi (11,302 to 16,548 kPa).
- 5 Stop engine.
- 6 Traverse loader-rammer in and out of loading position several times, using SWING control handle (3) to bleed air from system.
- 7 Stop with loader-rammer in loading position.
- 8 Operate loader arms in and out several times, using LOADER control handle (4), to bleed air from system.
- 9 Stop with loader arms on tray.
- 10 Traverse loader-rammer to ram position using SWING control handle (3).
- 11 Extend tray into breach, making sure to engage tray interlock switch (5).



CAUTION

Do not operate RAMMER control handle without a projectile in the trough.

- 12 Extend and retract rammer several times using RAMMER control handle (6) to bleed air from system.
- 13 Stop with rammer chain in stowed position.
- 14 Place loader-rammer in stowed position.



2-68. MAINTENANCE OF HYDRAULIC MANIFOLD.

This task covers:

- | | |
|---|--|
| <ul style="list-style-type: none"> a. <i>Relieving Hydraulic Pressure</i> b. <i>Removal</i> c. <i>Disassembly</i> d. <i>Inspection/Repair</i> | <ul style="list-style-type: none"> e. <i>Reassembly</i> f. <i>Testing</i> g. <i>Installation</i> h. <i>Applying Hydraulic Pressure</i> |
|---|--|

INITIAL SETUP

Tools and Special Tools

Ordnance artillery and turret mechanics tool kit (SC 5180-95-CL-A12)

Materials/Parts

- Hydraulic fluid (item 13, appx B)
- Locknut (2) (AN6289-6)
- Locknut (AN6289-8)
- Lockwasher (4) (MS35338-44)
- Lockwasher (MS35338-51)
- Packing retainer (10) (MS28774-228)
- Preformed packing (2) (MS28776-8)
- Preformed packing (4) (MS28778-6)
- Preformed packing (2) (MS28778-8)
- Preformed packing (5) (MS28775-228)

References

- TM 9-2350-304-20-2
- TM 9-2350-304-24P-2
- TM 9-4940-468-14

Equipment Conditions

Access cover removed (TM 9-2350-304-20-2)

General Safety Instructions

WARNING

- Before relieving hydraulic pressure be sure travel lock is engaged and vehicle is on as level ground as possible. This will stop the cannon from sliding out of battery.
- Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

2-68. MAINTENANCE OF HYDRAULIC MANIFOLD (CONT).

RELIEVING HYDRAULIC PRESSURE

WARNING

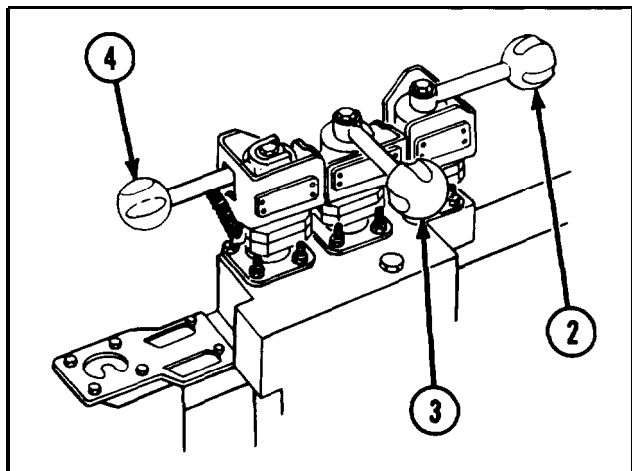
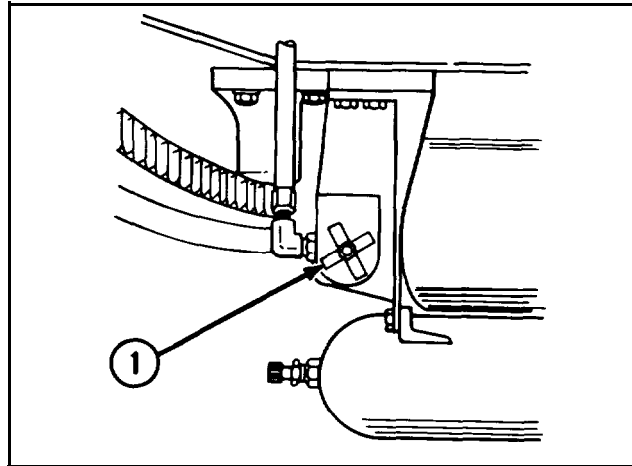
Before relieving hydraulic pressure be sure travel lock is engaged and vehicle is on as level ground as possible. This will stop the cannon from sliding out of battery.

- 1 Set MASTER switch to OFF.
- 2 Open globe angle valve (1).
- 3 Move SWING control handle (2) to full LOAD.
- 4 Move SWING control handle (2) to full STOW.
- 5 Repeat steps 3 and 4 several times to relieve pressure from system.
- 6 Move LOADER control handle (3) to full IN.
- 7 Move LOADER control handle (3) to full OUT.
- 8 Repeat steps 6 and 7 several times to relieve pressure from system,

CAUTION

Do not operate RAMMER control handle without a projectile in the trough.

- 9 Move RAMMER control handle (4) to RAM several times to relieve pressure from system.

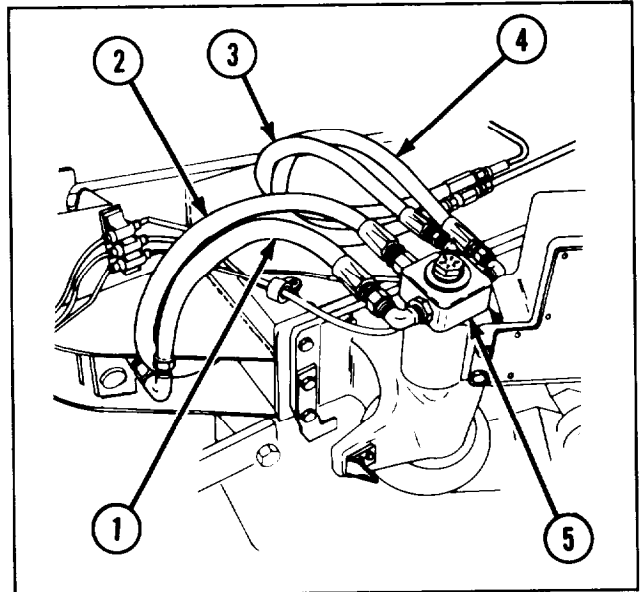


REMOVAL

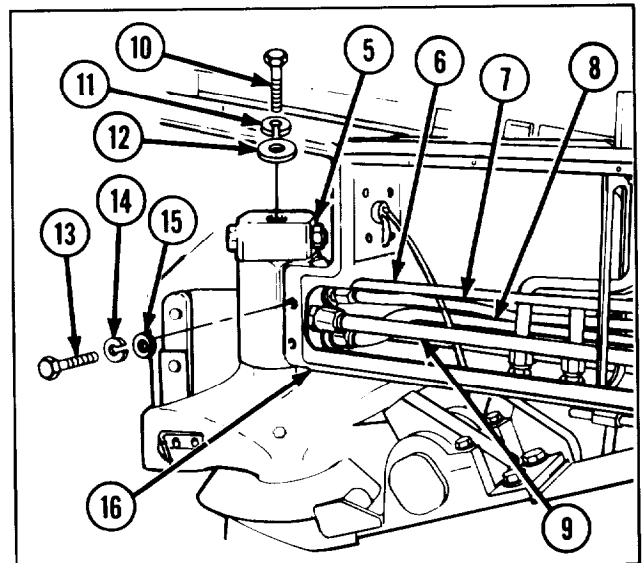
WARNING

Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

- 1 Disconnect four hydraulic hoses (1, 2, 3, and 4) from fittings in hydraulic manifold (5). For complete disassembly of hydraulic lines and fittings, refer to page 2-27. Cover hose openings.

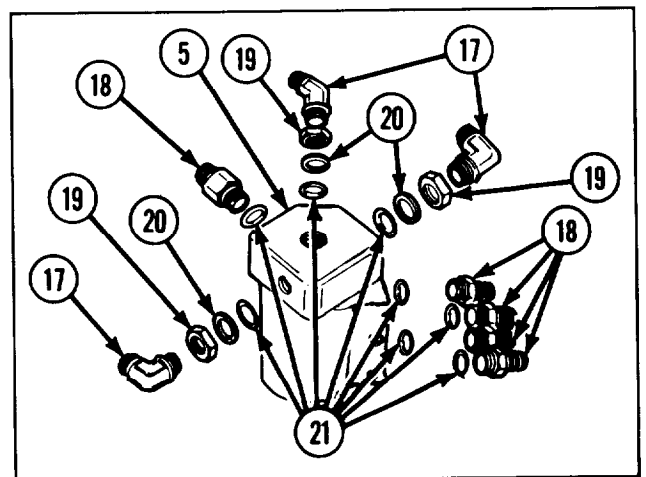


- 2 Disconnect four hydraulic tubes (6, 7, 8, and 9) from fittings on hydraulic manifold (5). For complete disassembly of hydraulic lines and fittings, refer to page 2-27. Cover tube openings.



- 3 Remove cap screw (10), lockwasher (11), and flat washer (12).
- 4 Remove two cap screws (13), two lockwashers (14), and two flat washers (15) securing hydraulic manifold (5) on each side of control valve manifold support (16).
- 5 Remove hydraulic manifold (5).

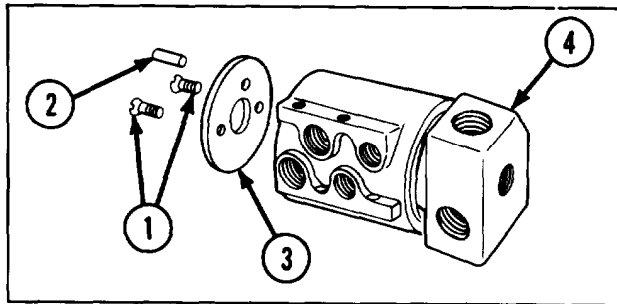
- 6 Remove three elbows (17), five nipples (18), three locknuts (19), three washers (20), and eight preformed packings (21) from hydraulic manifold (5).



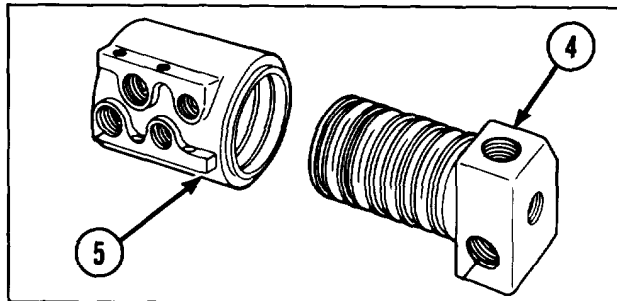
2-68. MAINTENANCE OF HYDRAULIC MANIFOLD (CONT).

DISASSEMBLY

- 1 Remove two machine screws (1), headless straight pin (2), and retaining plate (3) from manifold post (4).



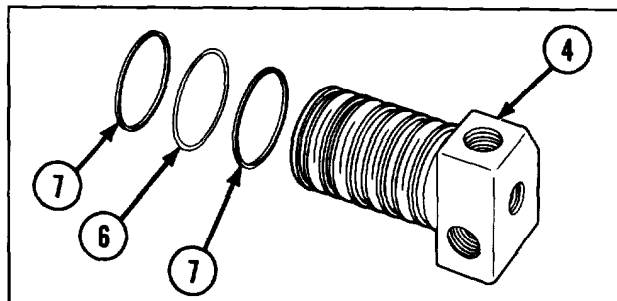
- 2 Remove manifold post (4) from sleeve (5).



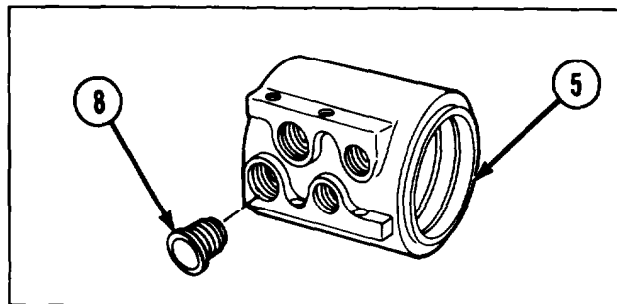
NOTE

Preformed packings and packing retainers are positioned in groups of three; one packing retainer, one preformed packing, and one packing retainer. Step 3 is illustrated for one group but written for five.

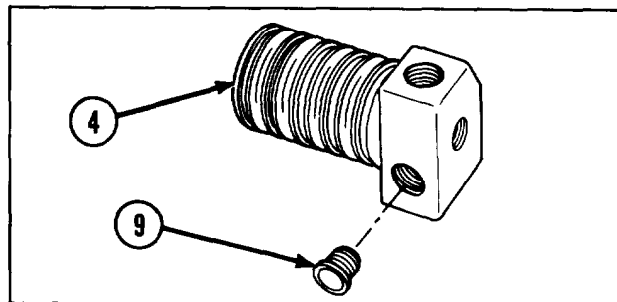
- 3 Remove five preformed packings (6) and 10 packing retainers (7) from grooves in manifold post (4), one group at a time.



- 4 Remove four protective plugs (8) from sleeve (5).



- 5 Remove four protective plugs (9) from manifold post (4).

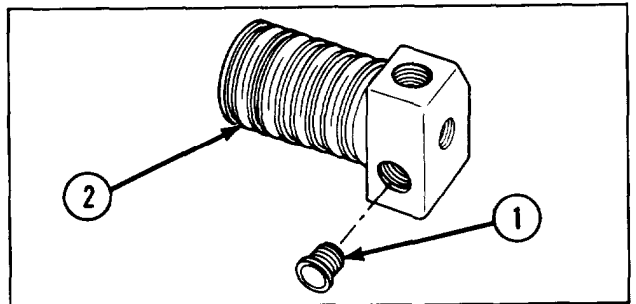


INSPECTION/REPAIR

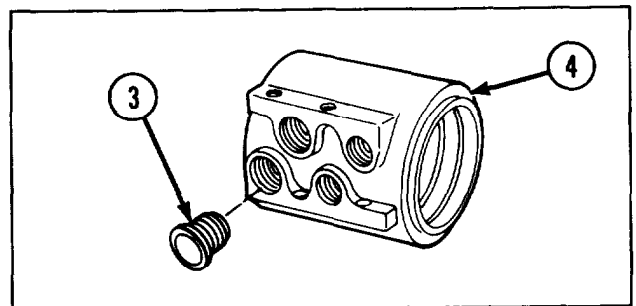
- 1 Inspect for broken, damaged, or missing parts.
- 2 If sleeve is broken, damaged, or missing, repair is by replacement of next higher assembly
- 3 If manifold post is broken, damaged, or missing, repair is by replacement of next higher assembly.
- 4 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

REASSEMBLY

- 1 Install four protective plugs (1) in manifold post (2).



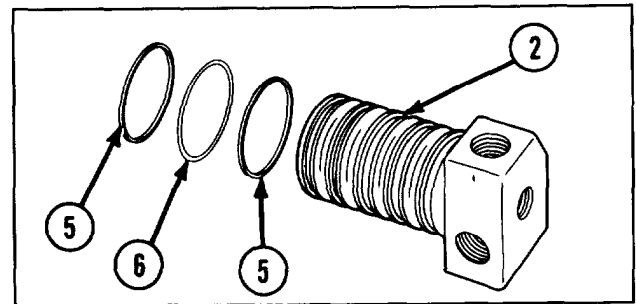
- 2 Install four protective plugs (3) in sleeve (4).



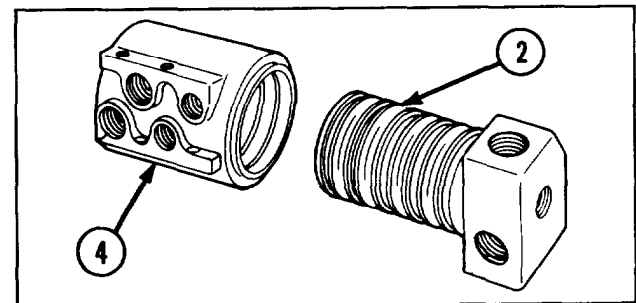
NOTE

Preformed packings and packing retainers are positioned in groups of three; one packing retainer, one preformed packing, and one packing retainer. Step 3 is illustrated for one group but written for five.

- 3 Install 10 new packing retainers (5) and five new preformed packings (6) in grooves in manifold post (2), one group at a time.



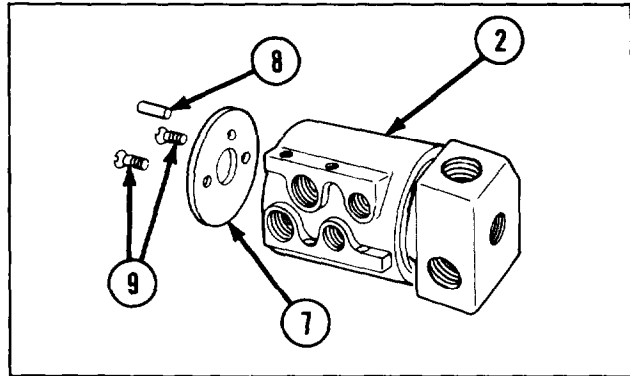
- 4 Install manifold post (2) in sleeve (4).



2-68. MAINTENANCE OF HYDRAULIC MANIFOLD (CONT).

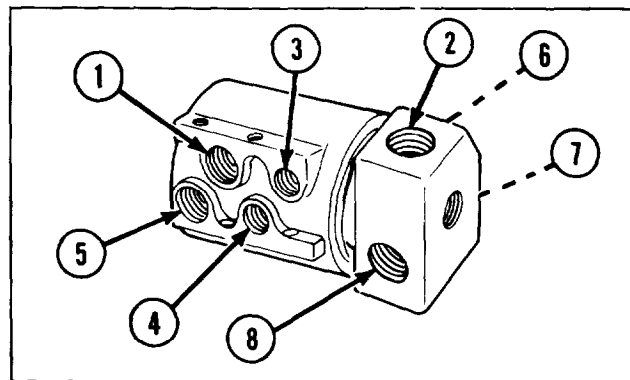
REASSEMBLY (CONT)

- 5 Position retaining plate (7) on manifold post (2) and secure using headless straight pin (8) and two machine screws (9).



TESTING

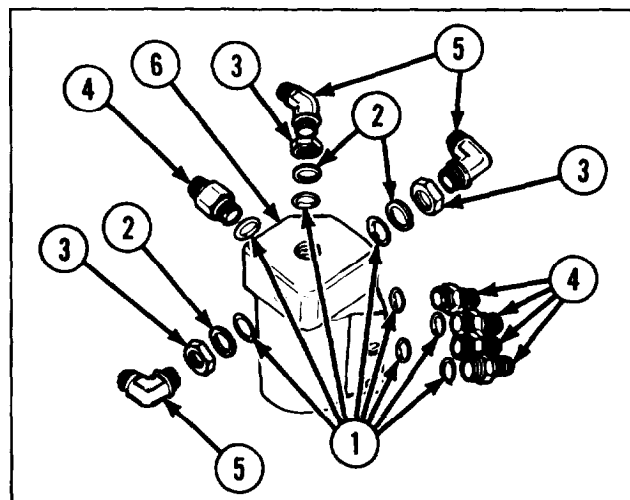
- 1 Refer to TM 9-4940-468-14 for test setup.
- 2 Plug port (1).
- 3 Warm hydraulic fluid (item 13, appx B) to 100oF (38°C).
- 4 Apply 4500 psi (31,028 kPa) to port (2) using hydraulic fluid (item 13, appx B).
- 5 Check unplugged ports (3, 4, and 5) for leaks.



- 6 Replace rotating manifold if leakage at ports (3, 4, or 5) is more than five drops per minute.
- 7 Repeat steps 1 thru 5 for ports (3 and 6).
- 8 Repeat steps 1 thru 5 for ports (4 and 7).
- 9 Repeat steps 1 thru 5 for ports (5 and 8).

INSTALLATION

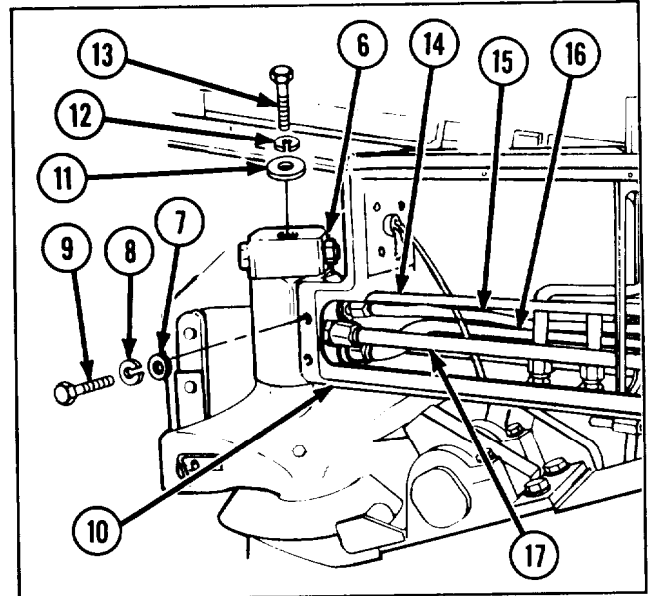
- 1 Install eight new preformed packings (1), three washers (2), three new locknuts (3), five nipples (4), and three elbows (5) on hydraulic manifold (6).



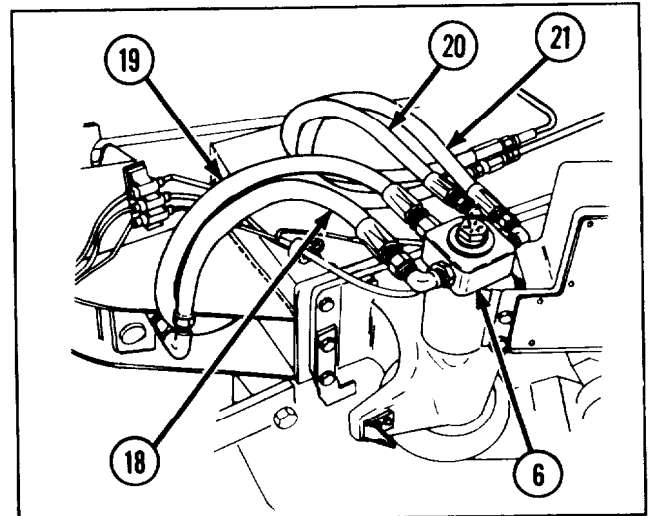
2 Install hydraulic manifold (6), and secure using two flat washers (7), two new lockwashers (8), and two capscrews (9) on each side of control valve manifold support (10).

3 Install flat washer (11), new lockwasher (12), and capscrew (13).

4 Uncover tube openings, and connect four hydraulic tubes (14, 15, 16, and 17) to fittings on hydraulic manifold (6). For complete reassembly of hydraulic lines and fittings, refer to page 2-27.



5 Uncover hose openings, and connect four hydraulic hoses (18, 19, 20, and 21) to fittings in hydraulic manifold (6). For complete reassembly of hydraulic lines and fittings, refer to page 2-27.



APPLYING HYDRAULIC PRESSURE

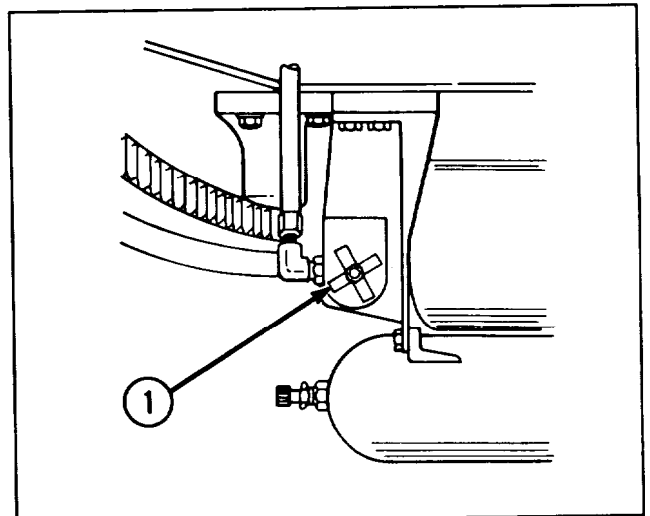
1 Close globe angle valve (1).

2 Start engine.

NOTE

Hydraulic motor and pump may be used to apply pressure to hydraulic system without starting engine by setting MASTER switch and OIL PUMP MOTOR Switch ON.

3 Set HYD PUMP/PTO CLUTCH switch to ON.



2-68. MAINTENANCE OF HYDRAULIC MANIFOLD (CONT).

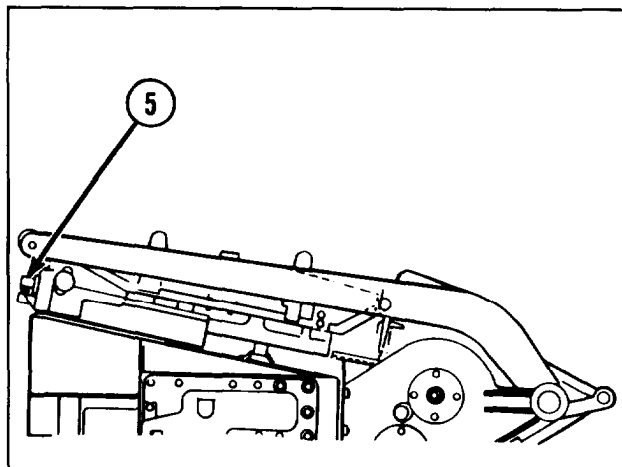
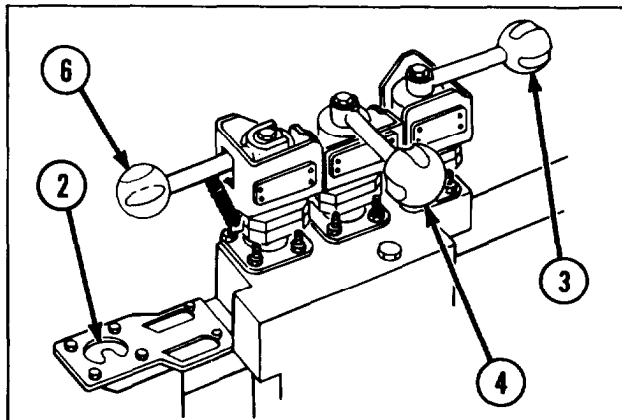
APPLYING HYDRAULIC PRESSURE (CONT)

- 4 Check dial pressure gage (2) indication. Normal pressure IS 1600 to 2400 PSI (11,032 to 16,548 kPa)
- 5 Stop engine.
- 6 Traverse loader-rammer in and out of loading position several times, using SWING control handle (3) to bleed air from system.
- 7 Stop with loader-rammer in loading position.
- 8 Operate loader arms in and out several times, using LOADER control handle (4), to bleed air from system.
- 9 Stop with loader arms on tray.
- 10 Traverse loader-rammer to ram position using SWING control handle (3).
- 11 Extend tray into breech, making sure to engage tray interlock switch (5).

CAUTION

Do not operate RAMMER control handle without a projectile in the trough.

- 12 Extend and retract rammer several times using RAMMER control handle (6) to bleed air from system.
- 13 Stop with rammer chain in stowed position.
- 14 Place loader-rammer in stowed position.



2-69. MAINTENANCE OF POWER SYSTEM LINES AND FITTINGS-OIL PRESSURE SWITCH AND SAFETY RELIEF VALVE.

This task covers:

a. <i>Relieving Hydraulic Pressure</i>	d. <i>Installation</i>
b. <i>Removal</i>	e. <i>Applying Hydraulic Pressure</i>
c. <i>Inspection/Repair</i>	

INITIAL SETUP

Tools and Special Tools

Ordnance artillery and turret mechanic's tool kit (SC 5180-95-CL-A12)

Materials/Parts

Elevating and traversing pressure and return hose assembly (2) (figure 5, appx C)

References

TM 9-2350-304-20-2
 TM 9-2350-304-24P-2

General Safety Instructions

WARNING

- Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as level ground as possible. This will stop the cannon from sliding out of battery.

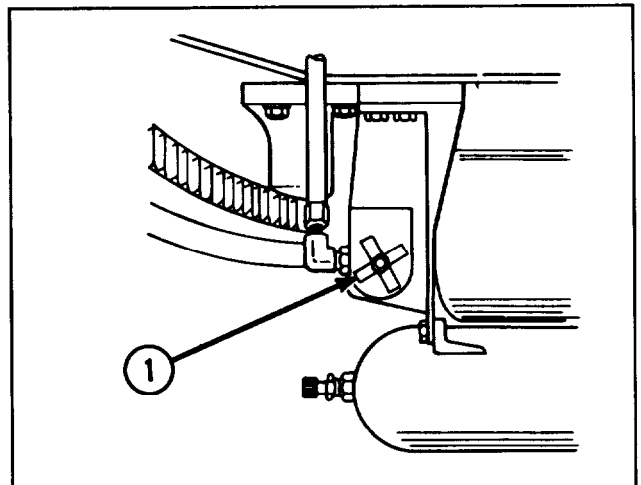
- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.
- Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

RELIEVING HYDRAULIC PRESSURE

WARNING

Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as level ground as possible. This will stop the cannon from sliding out of battery.

- 1 Set MASTER switch to OFF.
- 2 Open globe angle valve (1).



2-69. MAINTENANCE OF POWER SYSTEM LINES AND FITTINGS-OIL PRESSURE SWITCH AND SAFETY RELIEF VALVE (CONT).

REMOVAL

WARNING

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

NOTE

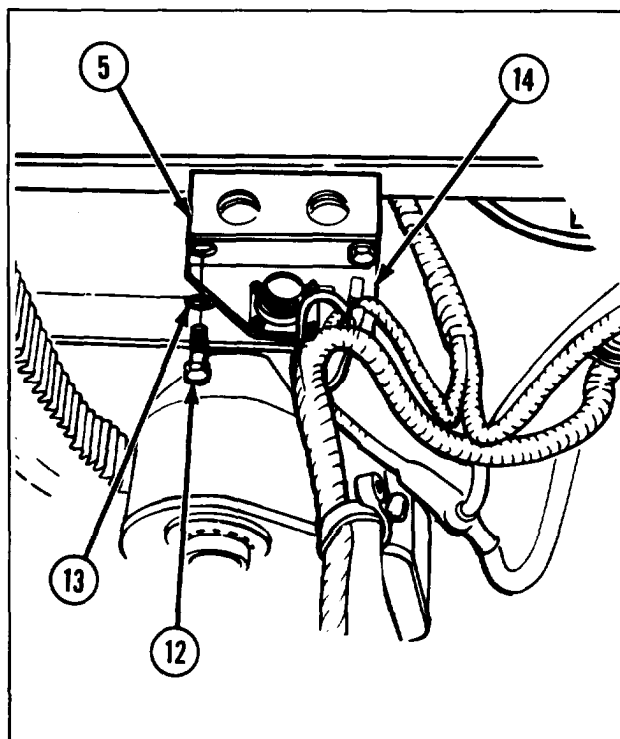
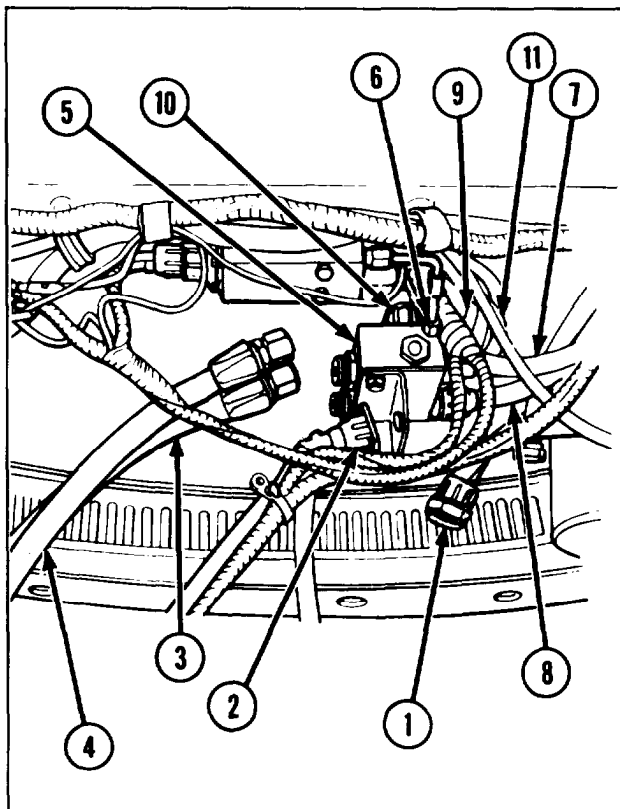
Steps 1 thru 5 apply to removal of manifold.

- 1 Disconnect two electrical leads (1 and 2).

WARNING

Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

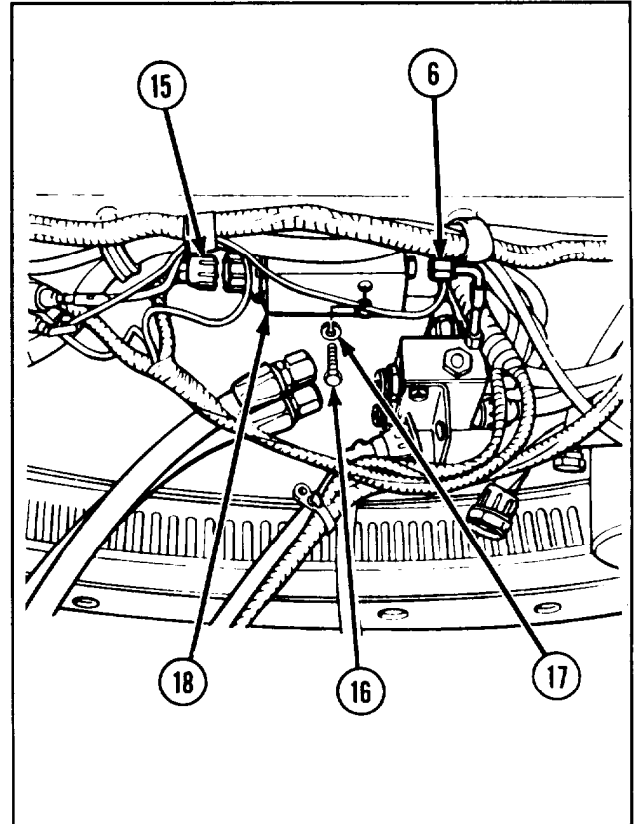
- 2 Disconnect two hydraulic hoses (3 and 4) from manifold (5). For complete disassembly of hydraulic lines and fittings, refer to page 2-27.
- 3 Disconnect six hydraulic tubes (6, 7, 8, 9, 10, and 11) from manifold (5). For complete disassembly of hydraulic lines and fittings, refer to page 2-27.
- 4 Cover tube and hose openings.
- 5 Remove two capscrews (12), two marker bands (13), manifold angle bracket (14), and manifold (5).



NOTE

Steps 6 thru 9 apply to removal of oil pressure switch.

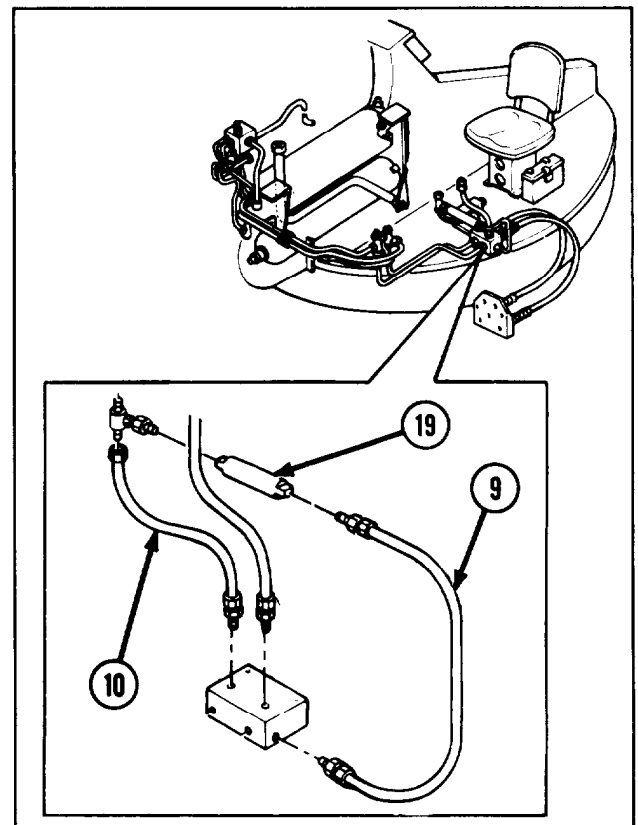
- 6 Disconnect electrical lead (15).
- 7 Disconnect hydraulic tube (6).
- 8 Cover tube opening
- 9 Remove two screws (16), two lock-washers (17), and oil pressure switch (18).



NOTE

Steps 10 and 11 apply to removal of safety relief valve.

- 10 Disconnect two hydraulic lines (9 and 10) from safety relief valve (19), and remove safety relief valve. For complete disassembly of hydraulic lines and fittings, refer to page 2-27.
- 11 Cover tube openings.



2-69. MAINTENANCE OF POWER SYSTEM LINES AND FITTINGS-OIL PRESSURE SWITCH AND SAFETY RELIEF VALVE (CONT).

INSPECTION/REPAIR

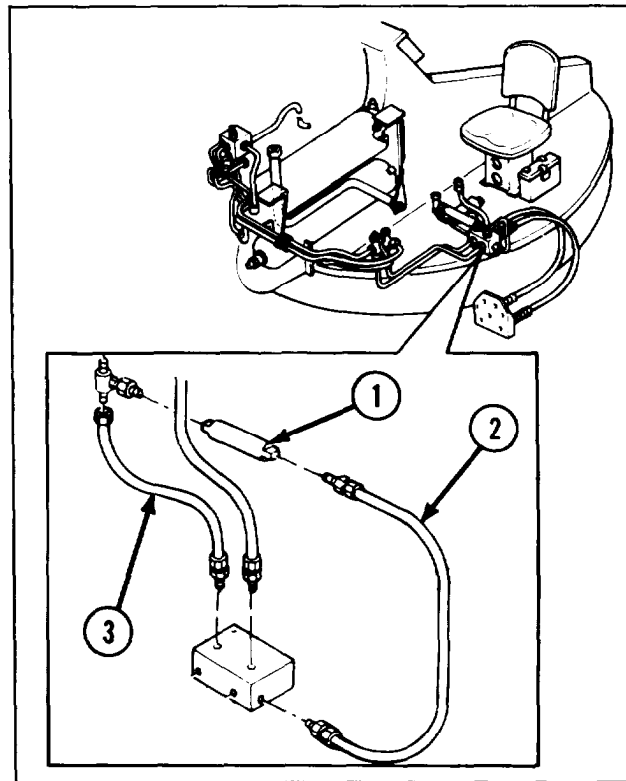
- 1 Inspect for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

INSTALLATION

NOTE

Step 1 applies to installation of safety relief valve.

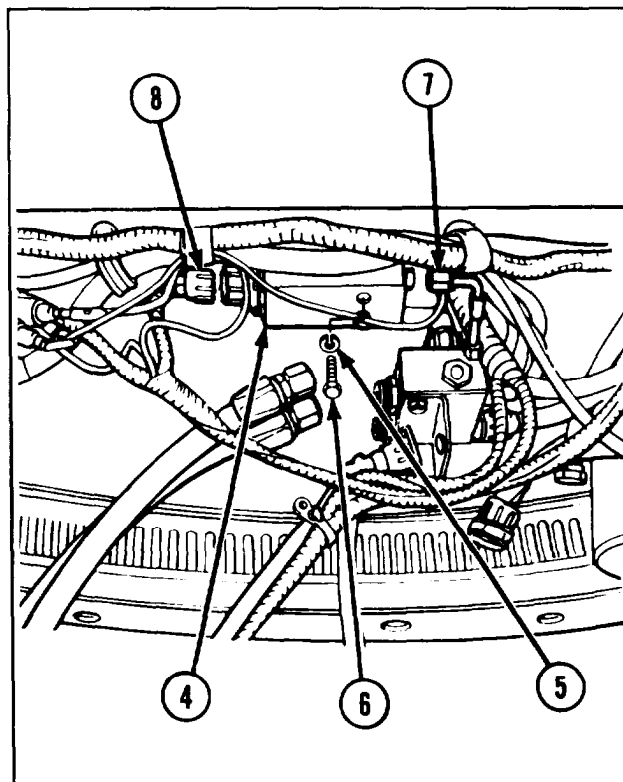
- 1 Uncover tube openings and install safety relief valve (1) by connecting two hydraulic lines (2 and 3). For complete reassembly of hydraulic lines and fittings, refer to page 2-27.



NOTE

Step 2 thru 4 apply to installation of oil pressure switch.

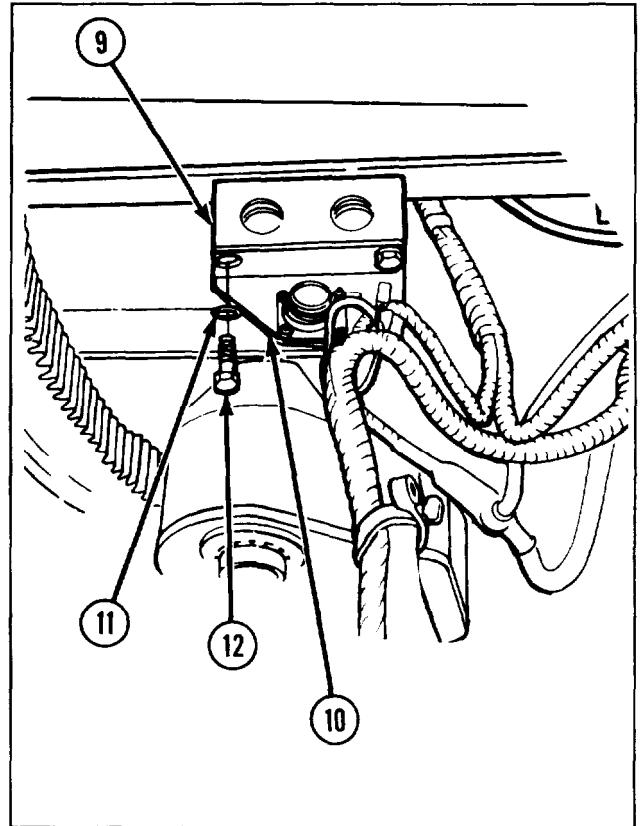
- 2 Install oil pressure switch (4), two new lockwashers (5), and two screws (6).
- 3 Uncover tube opening and connect hydraulic tube (7) to oil pressure switch (4). For complete reassembly of hydraulic lines and fittings, refer to page 2-27.
- 4 Connect electrical lead (8).



NOTE

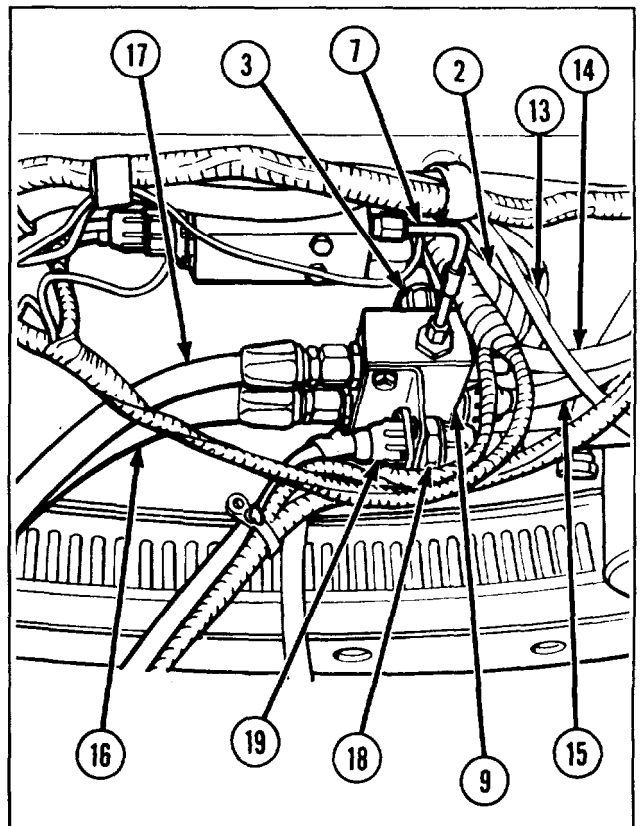
Step 5 thru 7 apply to installation of manifold.

- 5 Install manifold (9), manifold angle bracket (10), two marker bands (11), and two capscrews (12).



- 6 Uncover tube and hose openings and connect six hydraulic tubes (13, 14, 15, 2, 3, and 7) and two hoses (16 and 17) to manifold (9). For complete reassembly of hydraulic lines and fittings, refer to page 2-27.

- 7 Connect two electrical leads (18 and 19).



2-69. MAINTENANCE OF POWER SYSTEM LINES AND FITTINGS-OIL PRESSURE SWITCH AND SAFETY RELIEF VALVE (CONT).

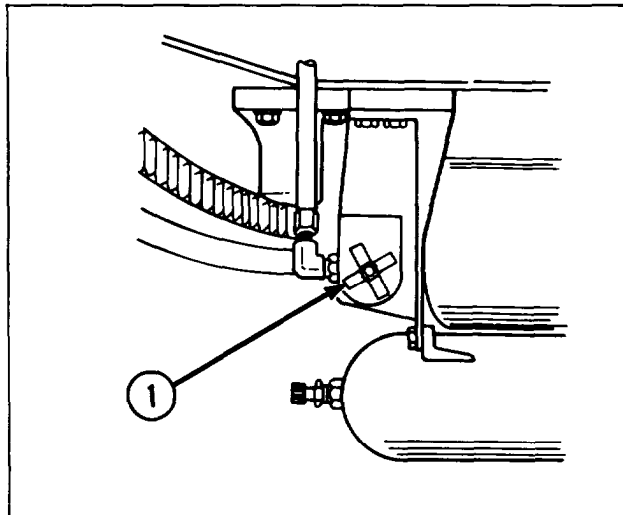
APPLYING HYDRAULIC PRESSURE

- 1 Close globe angle valve (1).
- 2 Start engine.

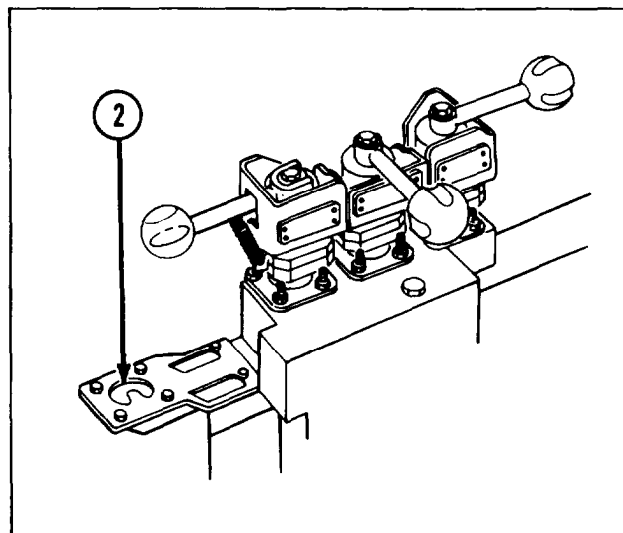
NOTE

Hydraulic motor and pump may be used to apply pressure to hydraulic system without starting engine by setting MASTER switch and OIL PUMP MOTOR SWITCH ON.

- 3 Set HYD PUMP PTO CLUTCH switch to ON.



- 4 Check dial pressure gage (2) indication
Normal pressure is 1600 to 2400 psi
(11,032 to 16,548 kPa).
- 5 Stop engine.



2-70. MAINTENANCE OF HYDRAULIC ACCUMULATOR.

- This task covers:
- a. Relieving Hydraulic Pressure
 - b. Removal
 - c. Disassembly
 - d. Inspection/Repair
 - e. Reassembly
 - f. Testing
 - g. Installation
 - h. Applying Hydraulic Pressure

INITIAL SETUP

Tools and Special Tools

- Accumulator headnut wrench (figure 11, appx C)
- Artillery maintenance shop equipment (SC 4933-95-CL-A12)
- Strap wrench
- Ordnance artillery and turret mechanic's tool kit (SC 5180-95-CL-A12)

Materials/Parts

- Hydraulic fluid (item 13, appx B)
- Lockwasher (4) (MS35338-44)
- Lockwasher (12) (MS35338-46)
- Lockwasher (12) (MS35338-48)
- Preformed packing (2) (MS28778-10)
- Preformed packing (4) (10900551)
- Self-locking nut (4) (MS21044N8)
- Tube fitting locknut (2) (AN6289-10)

Personnel Required

Two

References

- TM 9-2350-304-10
- TM 9-2350-304-20-2
- TM 9-2350-304-24P-2
- TM 9-4940-468-14

Equipment Conditions

2-153 Hydraulic reservoir drained

General Safety Instructions

WARNING

Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as level ground as possible. This will stop the cannon from sliding out of battery.

Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

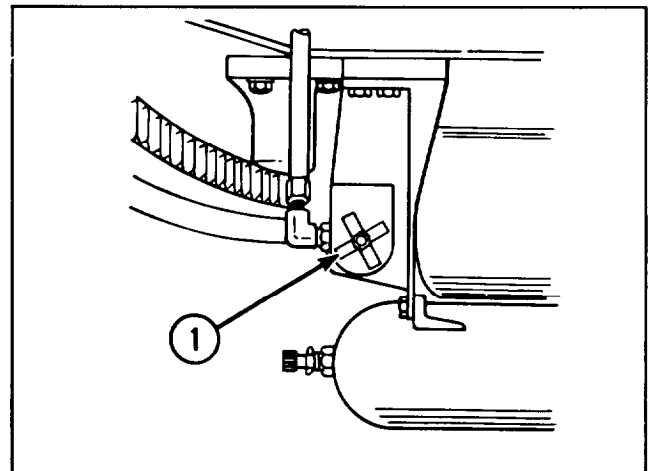
Actuating cylinder contains high pressure nitrogen that can cause severe injury. Relieve all gas pressure slowly before removing bottle.

RELIEVING HYDRAULIC PRESSURE

WARNING

Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as level ground as possible. This will stop the cannon from sliding out of battery.

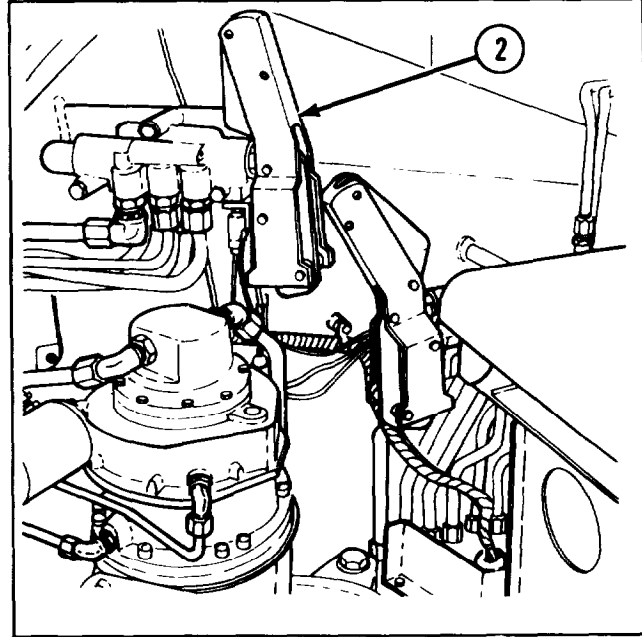
- 1 Set MASTER switch to OFF.
- 2 Open globe angle valve (1).



2-70. MAINTENANCE OF HYDRAULIC ACCUMULATOR (CONT).

RELIEVING HYDRAULIC PRESSURE (CONT)

- 3 Move manual control handle (2) to full RIGHT.
- 4 Move manual control handle (2) to full LEFT.
- 5 Repeat steps 3 and 4 several times to relieve pressure from system.

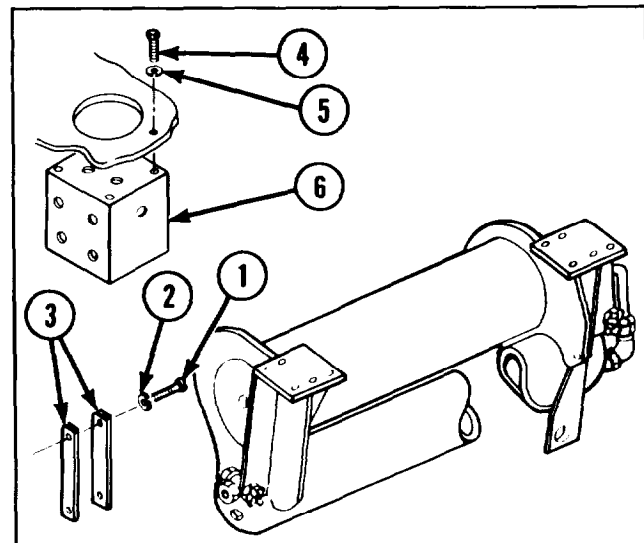


REMOVAL

- 1 Reduce nitrogen pressure to zero. Refer to TM 9-2350-304-20-2.
- 2 Remove two screws (1), two lockwashers (2), and two clamps (3).

WARNING

Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.



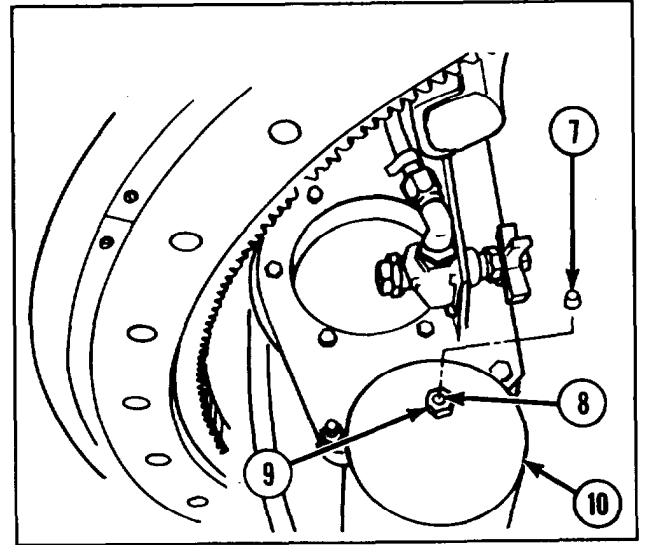
- 3 Disconnect all hydraulic tubes and fittings. For complete disassembly of hydraulic lines and fittings, refer to page 2-27. Cap or plug all openings.
- 4 Remove four capscrews (4), four lockwashers (5), and main oil tank supply and return manifold (6).

- 5 Remove valve cap (7) from nitrogen high pressure charge valve (8).

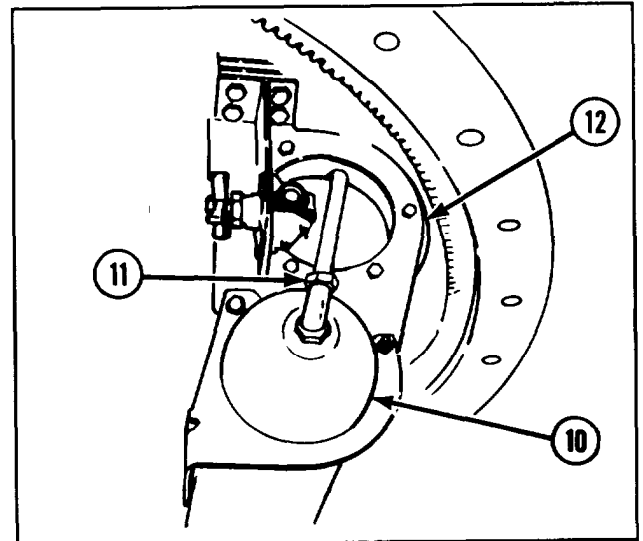
WARNING

Actuating cylinder contains high pressure nitrogen that can cause severe injury. Relieve all gas pressure slowly before removing bottle.

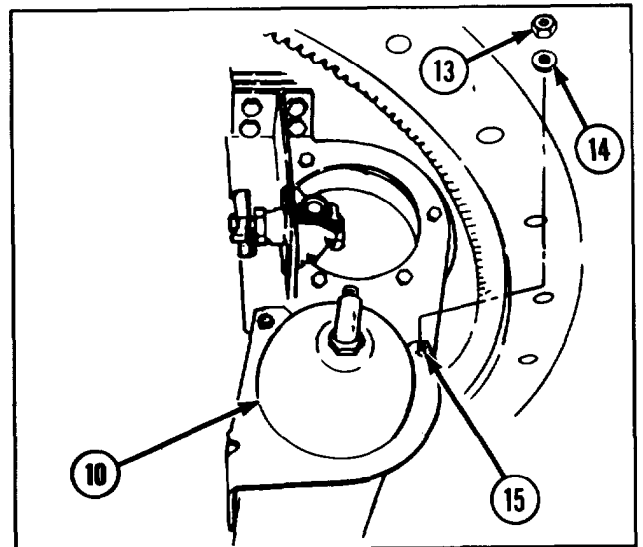
- 6 Turn nut (9) on nitrogen high pressure charge valve (8) counterclockwise to bleed off all gas pressure in actuating cylinder (10).



- 7 Disconnect and remove nitrogen bottle to accumulator tube assembly (11) from fittings on actuating cylinder (10) and hydraulic accumulator (12).



- 8 Remove self-locking nut (13) and flat washer (14) from stud (15) at rear end of actuating cylinder (10).



2-70. MAINTENANCE OF HYDRAULIC ACCUMULATOR (CONT).

REMOVAL (CONT)

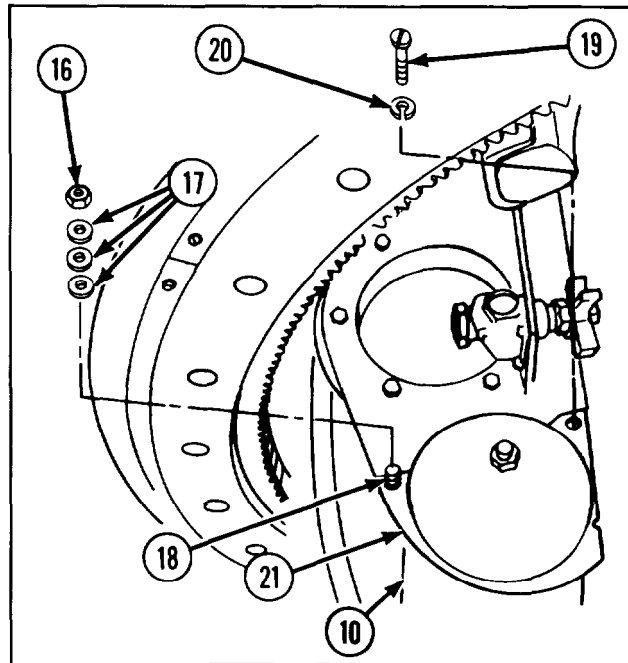
- 9 Remove self-locking nut (16) and three flat washers (17) from stud (18) at forward end of actuating cylinder (10).

NOTE

Actuating cylinder weighs approximately 70 lb (32 kg). Support with blocks before removing capscrews.

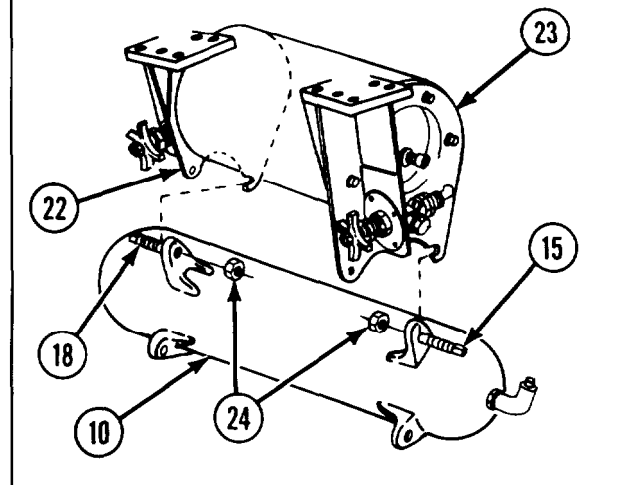
- 10 Remove two capscrews (19) and two lockwashers (20) and allow actuating cylinder (10) to pivot on studs (15 and 18).

- 11 Remove nitrogen bottle lower bracket (21) from actuating cylinder (10).



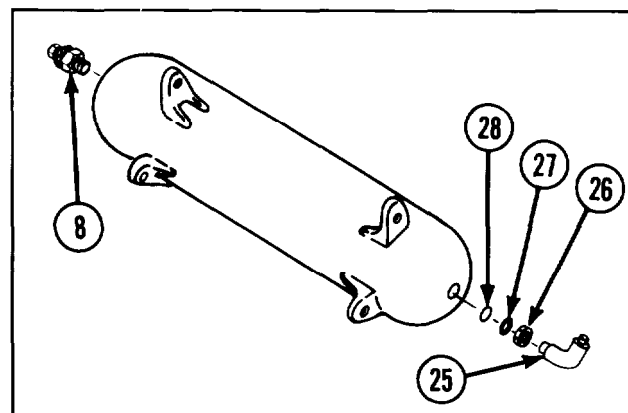
- 12 Remove actuating cylinder (10) from slots in accumulator drain valve bracket (22) and drain valve and accumulator bracket (23).

- 13 Remove two self-locking nuts (24) and two studs (15 and 18).



- 14 Remove nitrogen high pressure charge valve (8).

- 15 Remove tube elbow (25), tube fitting locknut (26), flat washer (27), and preformed packing (28).



NOTE

Hydraulic accumulator weighs approximately 188 lb (85 kg). Support with blocks when removing.

16 Remove five capscrews (29) and five lockwashers (30) from accumulator drain valve bracket (22).

17 Remove five capscrews (31) and five lockwashers (32) from drain valve and accumulator bracket (23).

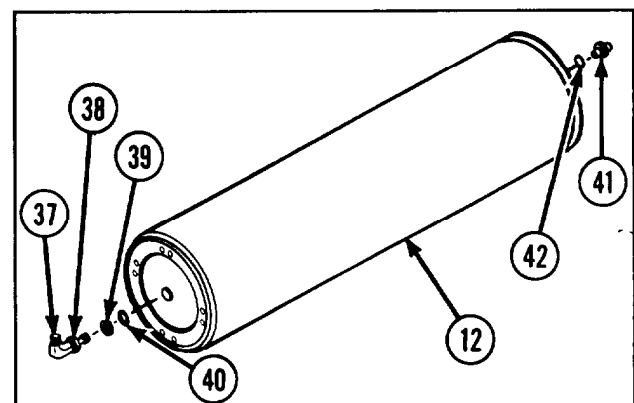
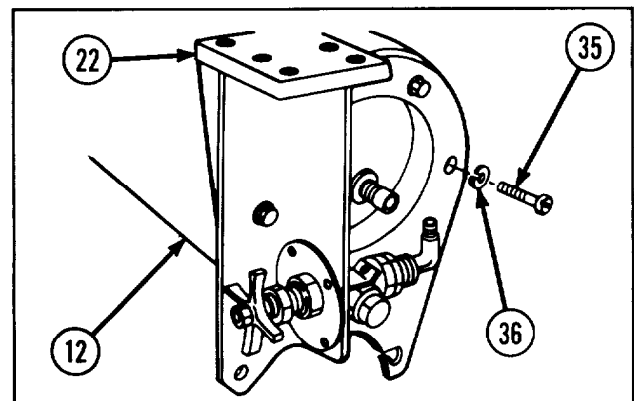
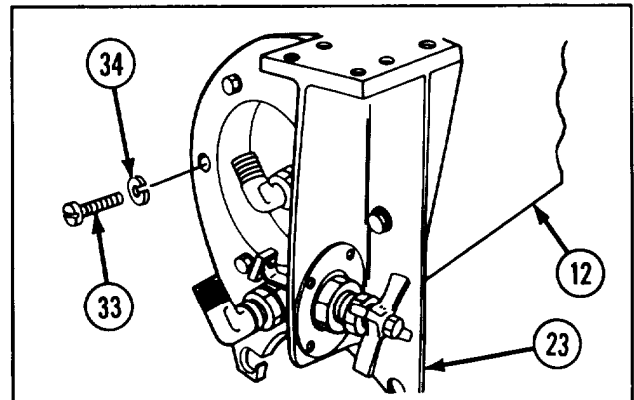
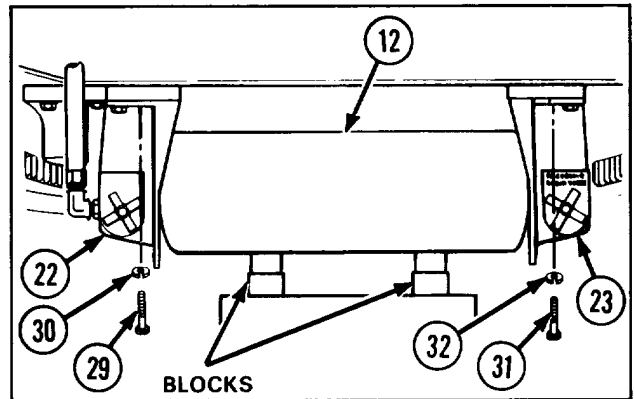
18 Remove hydraulic accumulator (12) with accumulator drain valve bracket (22) and drain valve and accumulator bracket (23) attached.

19 Remove six capscrews (33), six lockwashers (34), and drain valve and accumulator bracket (23) from hydraulic accumulator (12).

20 Remove six capscrews (35), six lockwashers (36), and accumulator drain valve bracket (22) from hydraulic accumulator (12).

21 Remove tube elbow (37), tube fitting locknut (38), flat washer (39), and preformed packing (40) from hydraulic accumulator (12).

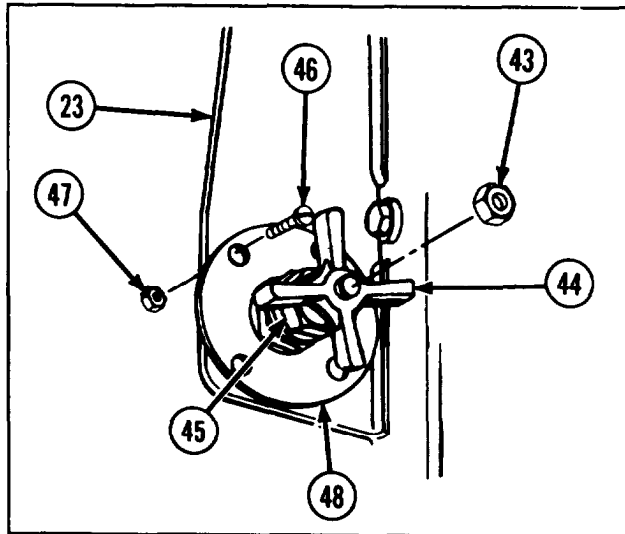
22 Remove tube nipple (41) and preformed packing (42) from hydraulic accumulator (12).



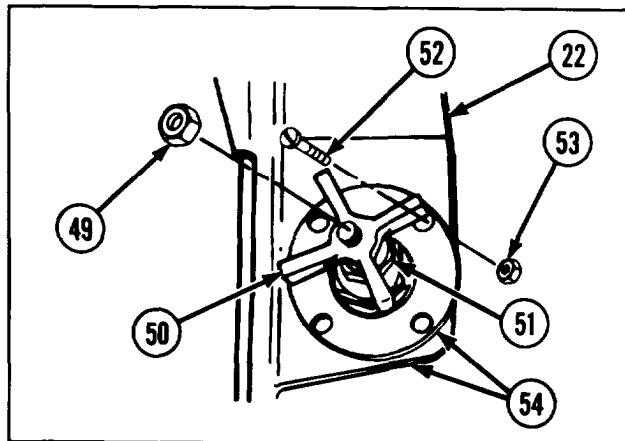
2-70. MAINTENANCE OF HYDRAULIC ACCUMULATOR (CONT).

REMOVAL (CONT)

- 23 Remove nut (43) and handle (44) from globe angle valve (45).
- 24 Remove four capscrews (46) and four nuts (47).
- 25 Remove globe angle valve (45) and plate (48) from drain valve and accumulator bracket (23).



- 26 Remove nut (49) and handle (50) from second globe angle valve (51).
- 27 Remove four capscrews (52) and four nuts (53).
- 28 Remove globe angle valve (51) and two plates (54), from accumulator drain valve bracket (22).



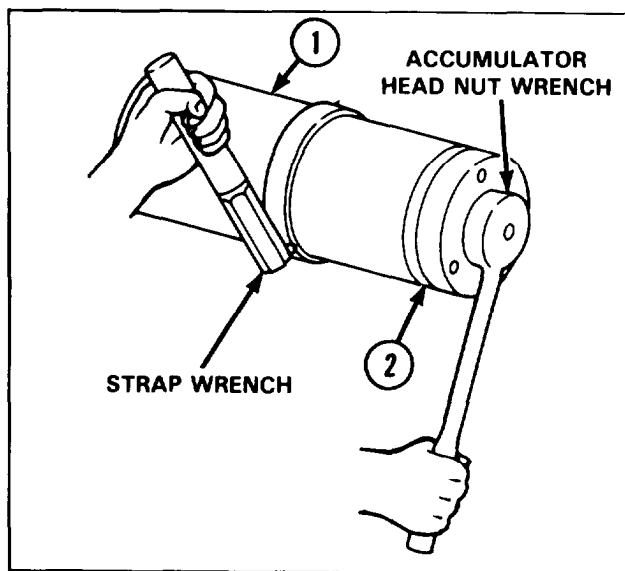
DISASSEMBLY

- 1 Secure accumulator housing (1) with strap wrench.

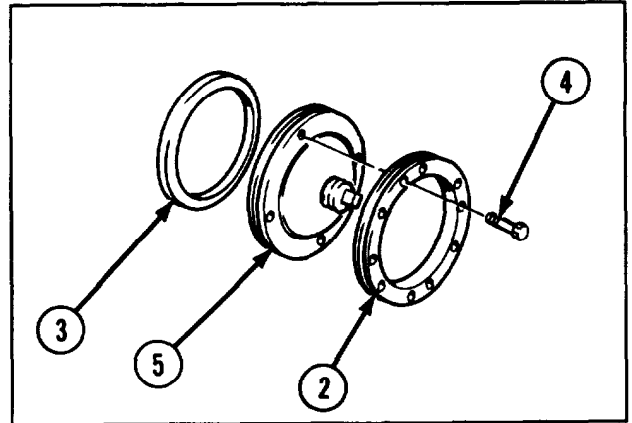
NOTE

Steps 2 thru 5 are written and illustrated for one end of accumulator housing but apply to both ends.

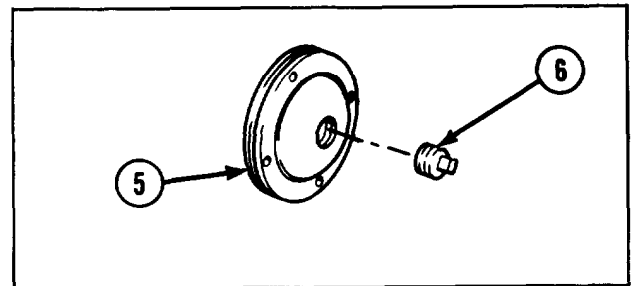
- 2 Remove head nut assembly (2) from end of accumulator housing (1), using an accumulator head nut wrench.



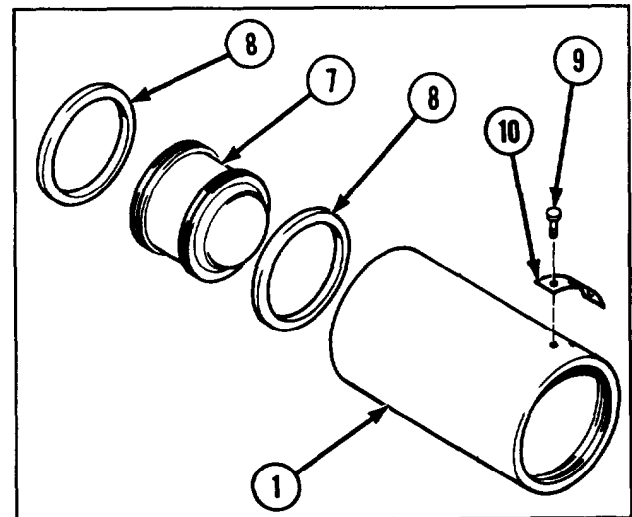
- 3 Remove preformed packing (3) from head nut assembly (2).
- 4 Remove four capscrews (4).
- 5 Remove linear head (5) from head nut assembly (2).



- 6 Remove one protective plug (6) from each linear head (5).



- 7 Push hydraulic piston (7) from accumulator housing (1).
- 8 Remove two preformed packings (8) from hydraulic piston (7).
- 9 Remove three drive screws (9) and identification plate (10) from accumulator housing (1).



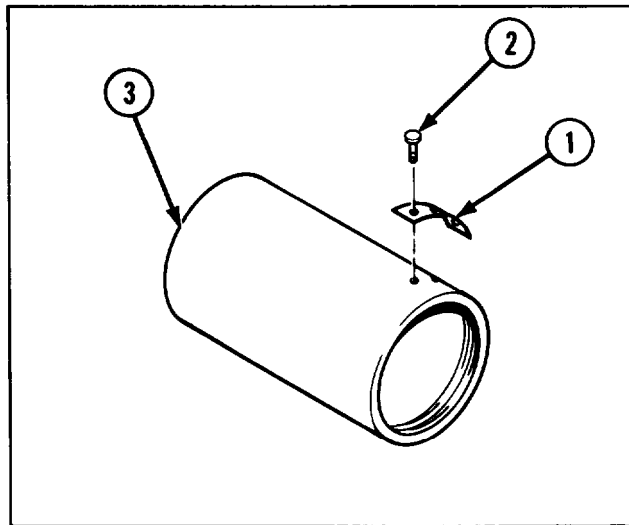
INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 If accumulator housing is broken, damaged, or missing, repair is by replacement of next higher assembly.
- 3 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

2-70. MAINTENANCE OF HYDRAULIC ACCUMULATOR (CONT).

REASSEMBLY

- 1 Coat all mating surfaces and new preformed packings with hydraulic fluid (item 13, appx B).
- 2 Install identification plate (1) and three drive screws (2) on accumulator housing (3).

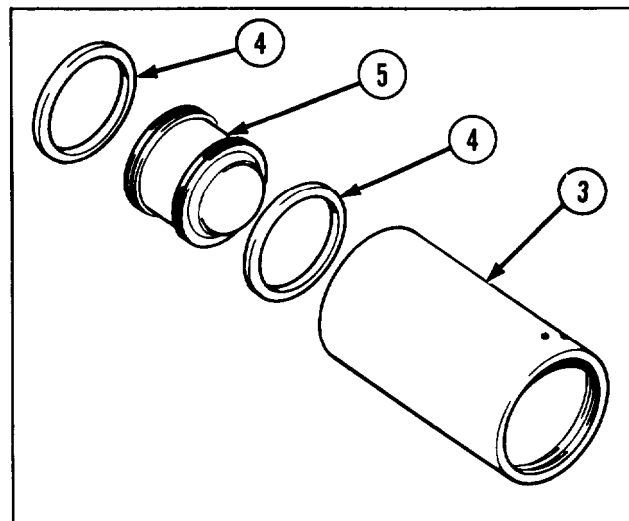


- 3 Install two new preformed packings (4) on hydraulic piston (5).

NOTE

Closed end of hydraulic piston is toward identification plate.

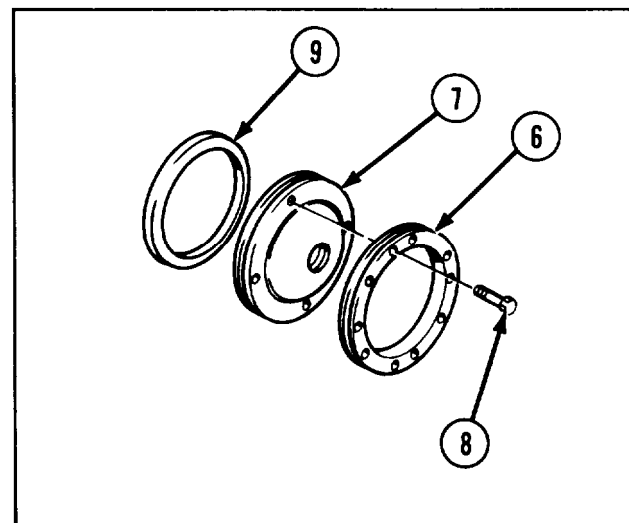
- 4 Install hydraulic piston (5) in accumulator housing (3).



NOTE

Steps 5 and 6 are written and illustrated for one head nut assembly but apply to both.

- 5 Secure head nut assembly (6) to linear head (7) using four capscrews (8).
- 6 Install new preformed packing (9) on linear head (7).

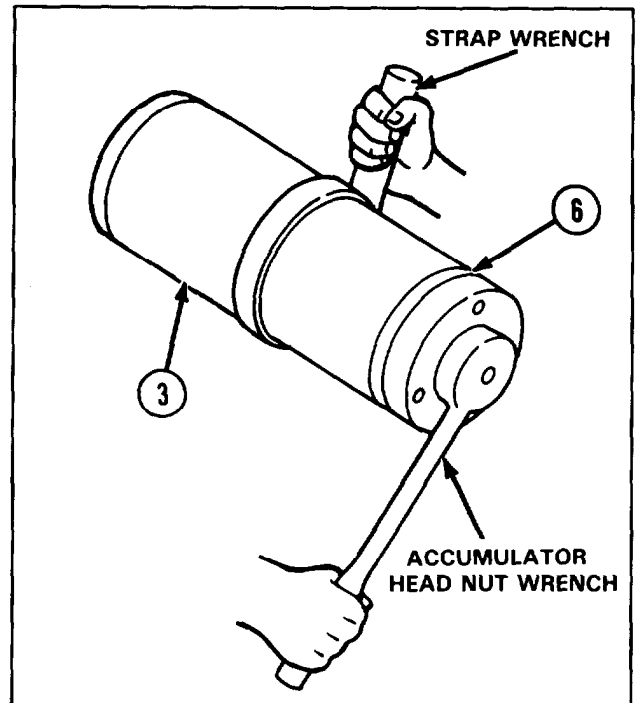


- 7 Secure accumulator housing (3) with strap wrench.

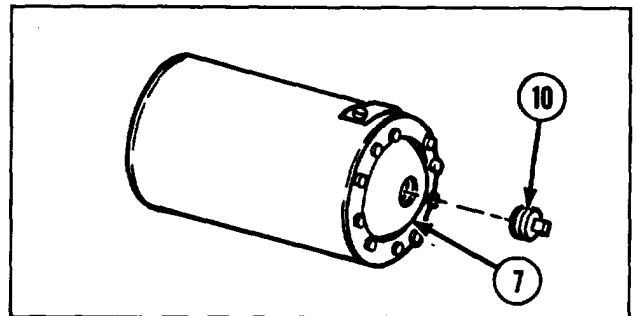
NOTE

- Threaded holes in head nut assembly must be aligned with holes in opposite head nut assembly to within 0.0156 in. (0.0396 cm).
- Head nut assemblies should be either even with end of accumulator housing or extend less than 0.0156 in. (0.0396 cm) from end of accumulator housing.

- 8 install one head nut assembly (6) into each end of accumulator housing (3) using an accumulator head nut wrench.



- 9 Install one protective plug (10) in each linear head (7).

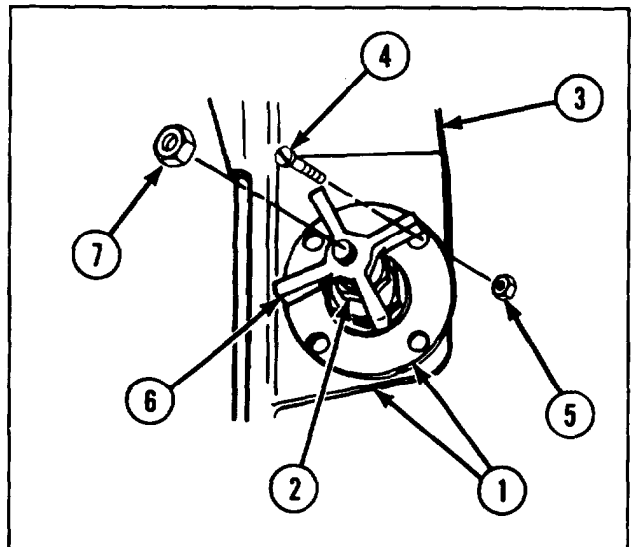


TESTING

- 1 Refer to TM 9-4940-468-14 for testing setup.
- 2 Pressure check accumulator at 5000 psi (34,475 kPa) for 5 minutes using hydraulic fluid (item 13, appx B).
- 3 Check for leaks. Replace accumulator if leaks occur.

INSTALLATION

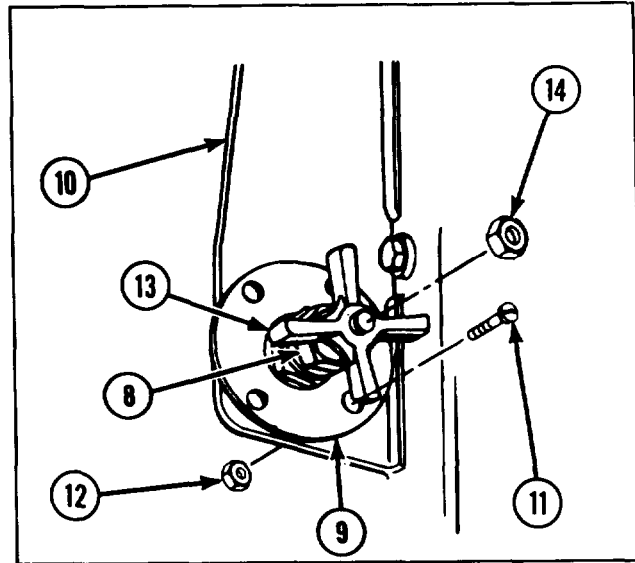
- 1 Install two plates (1) and globe angle valve (2) in accumulator drain valve bracket (3). Secure using four capscrews (4) and four nuts (5).
- 2 Install handle (6) and nut (7) on globe angle valve (2).



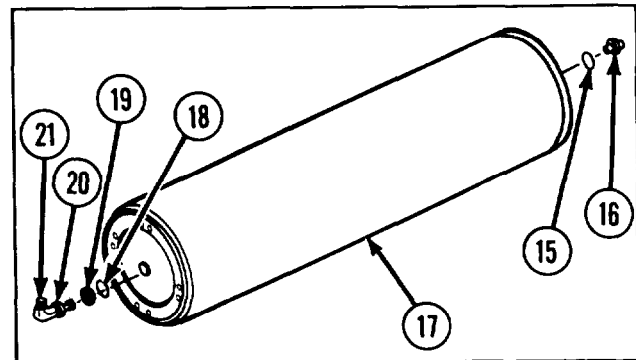
2-70. MAINTENANCE OF HYDRAULIC ACCUMULATOR (CONT).

INSTALLATION (CONT)

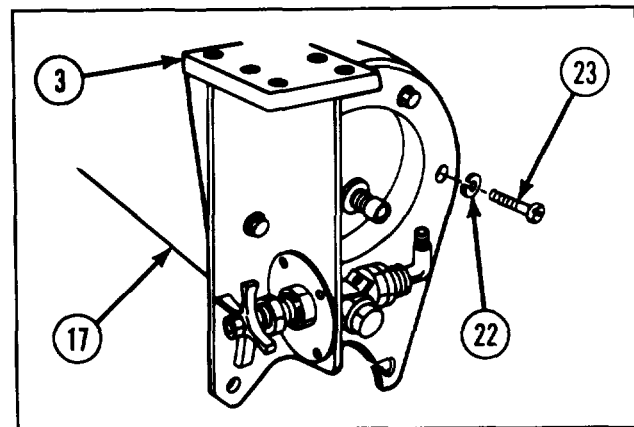
- 3 Install globe angle valve (8) and plate (9) in front drain valve and accumulator bracket (10). Secure using four cap-screws (11) and four nuts (12).
- 4 Install handle (13) and nut (14) on globe angle valve (8).



- 5 Install new preformed packing (15) and tube nipple (16) in hydraulic accumulator (17).
- 6 Install new preformed packing (18), flat washer (19), tube fitting locknut (20), and tube elbow (21) on hydraulic accumulator (17).



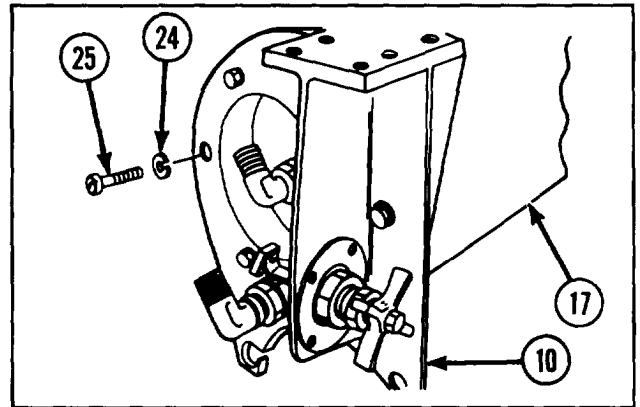
- 7 Install accumulator drain valve bracket (3), six new lockwashers (22), and six capscrews (23) on hydraulic accumulator (17).



- 8** Install drain valve and accumulator bracket (10), six new lockwashers (24), and six capscrews (25) on hydraulic accumulator (17).

NOTE

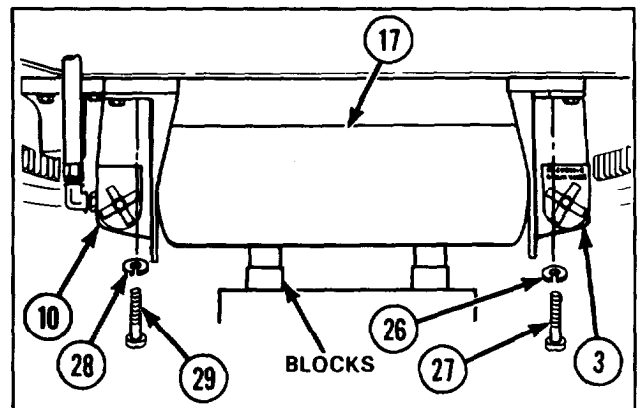
- When installing hydraulic accumulator, make sure end with nameplate is facing front of vehicle.
- Hydraulic accumulator weighs approximately 188 lb (85 kg). Support while installing capscrews and lockwashers.



- 9** Install hydraulic accumulator (17), accumulator drain valve bracket (3), and drain valve and accumulator bracket (10).

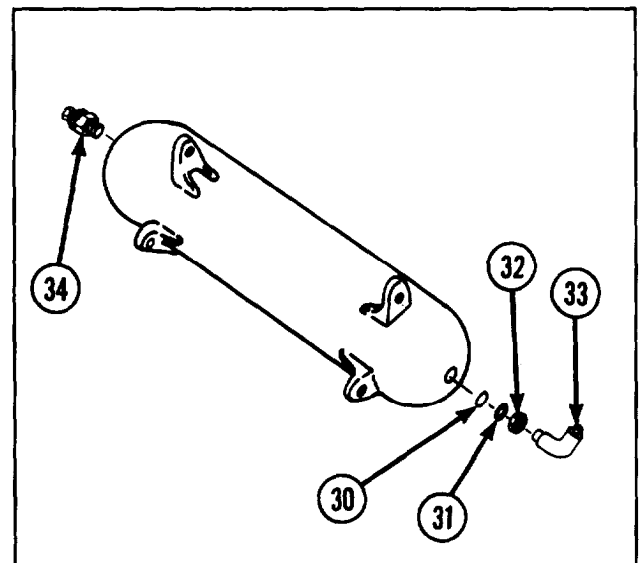
- 10** Install five new lockwashers (26) and five capscrews (27) in accumulator drain valve bracket (3).

- 11** Install five new lockwashers (28) and five capscrews (29) on drain valve and accumulator bracket (10).



- 12** Install new preformed packing (30), flat washer (31), new tube fitting locknut (32), and tube elbow (33).

- 13** Install nitrogen high pressure charge valve (34).



2-70. MAINTENANCE OF HYDRAULIC ACCUMULATOR (CONT).

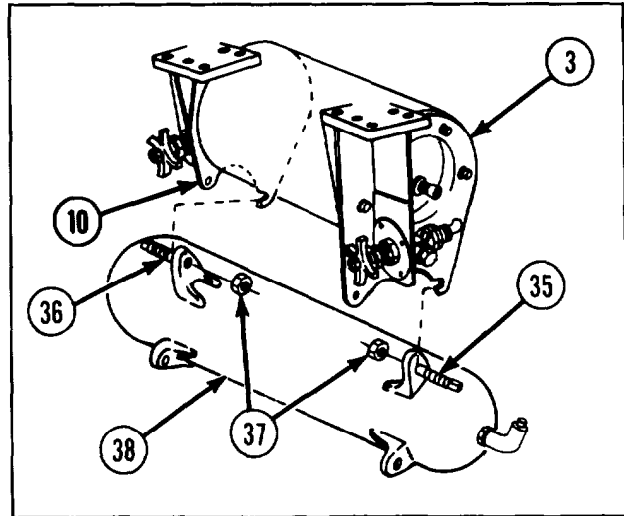
INSTALLATION (CONT)

- 14 Install two studs (35 and 36) and two new self-locking nuts (37).

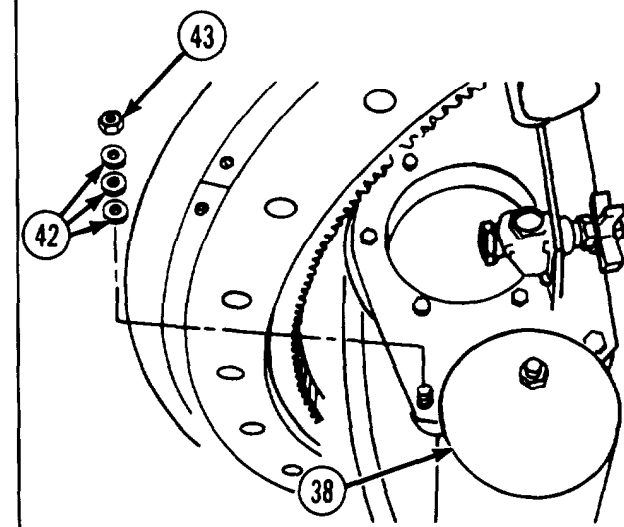
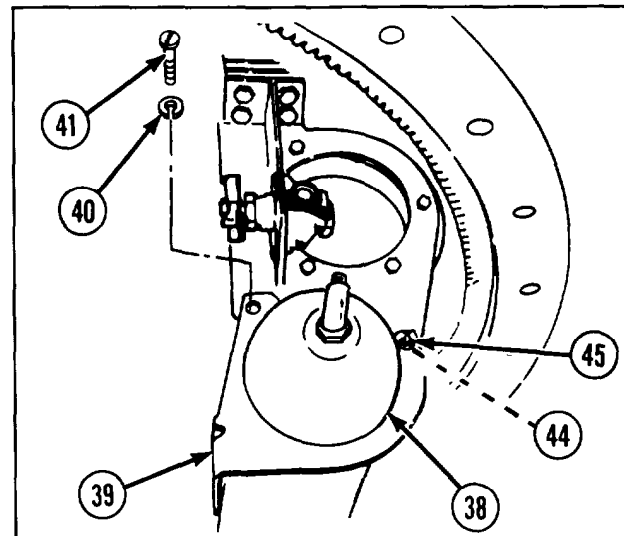
NOTE

Actuating cylinder weighs approximately 70 lb (31 kg). Support while installing capscrews and lockwashers.

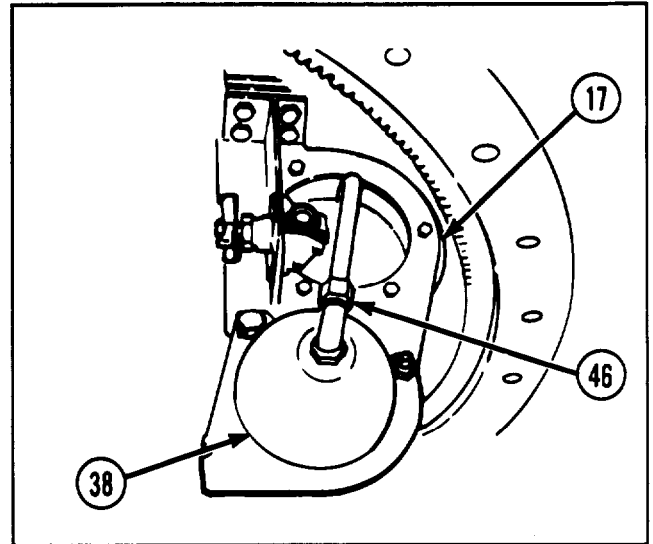
- 15 Install actuating cylinder (38) in slots in accumulator drain valve bracket (3) and drain valve and accumulator bracket (10).



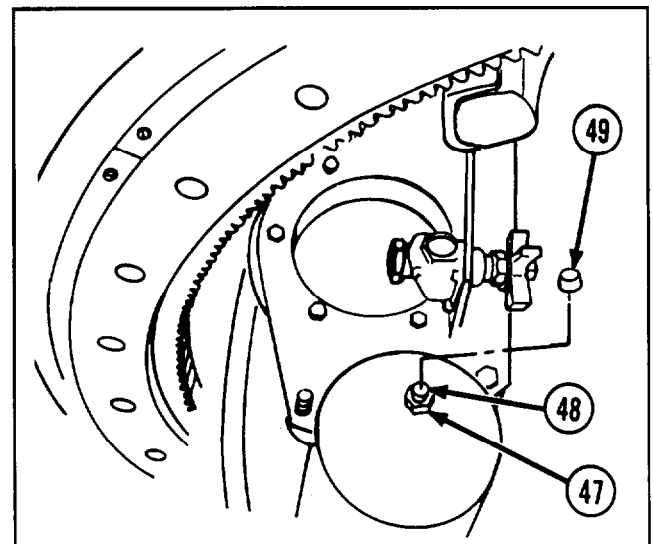
- 16 Install nitrogen bottle lower bracket (39) on actuating cylinder (38).
- 17 Install two new lockwashers (40) and two capscrews (41) to prevent actuating cylinder (38) from pivoting on studs.
- 18 Install three flat washers (42) and new self-locking nut (43) on stud at forward end of actuating cylinder (38).
- 19 Install flat washer (44) and new self-locking nut (45) on stud at rear end of actuating cylinder (38).



- 20 Install nitrogen bottle to accumulator tube assembly (46) on fittings on actuating cylinder (38) and hydraulic accumulator (17).



- 21 Turn nut (47) on nitrogen high pressure charge valve (48) clockwise, and install valve cap (49) on nitrogen high pressure charge valve (48).



- 22 Install main oil tank supply and return manifold (50) and secure using four new lockwashers (51) and four capscrews (52).

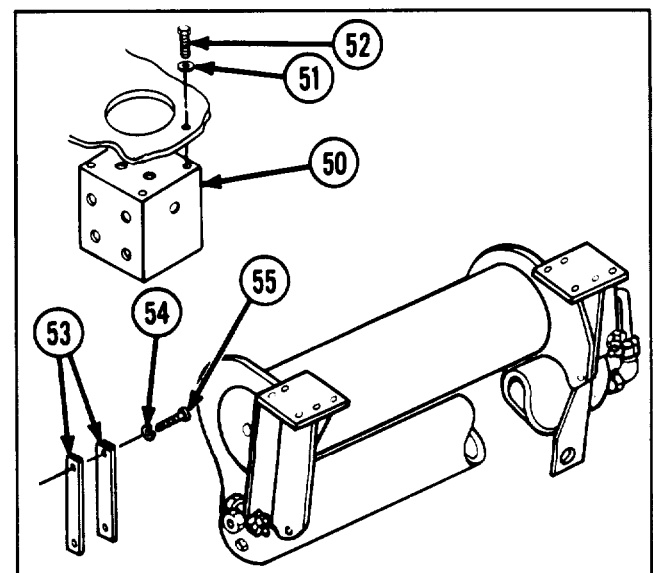
- 23 Remove caps or plugs from hydraulic tube openings.

- 24 Connect all hydraulic tubes and fittings. Refer to page 2-27.

- 25 Install two clamps (53), two new lockwashers (54), and two capscrews (55).

- 26 Fill hydraulic reservoir, refer to TM 9-2350-304-10.

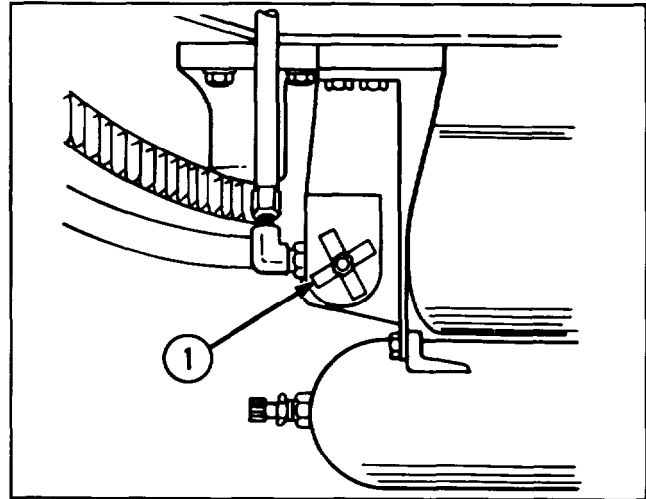
- 27 Charge accumulator with nitrogen. Refer to TM 9-2350-304-20-2.



2-70. MAINTENANCE OF HYDRAULIC ACCUMULATOR (CONT).

APPLYING HYDRAULIC PRESSURE

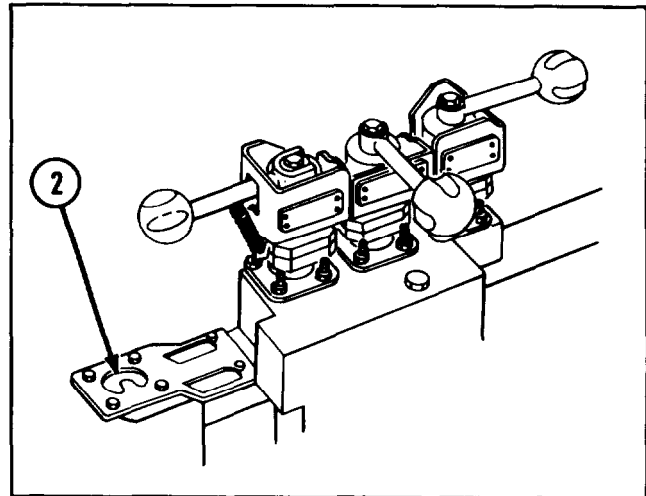
- 1 Close globe angle valve (1).
- 2 Start engine.



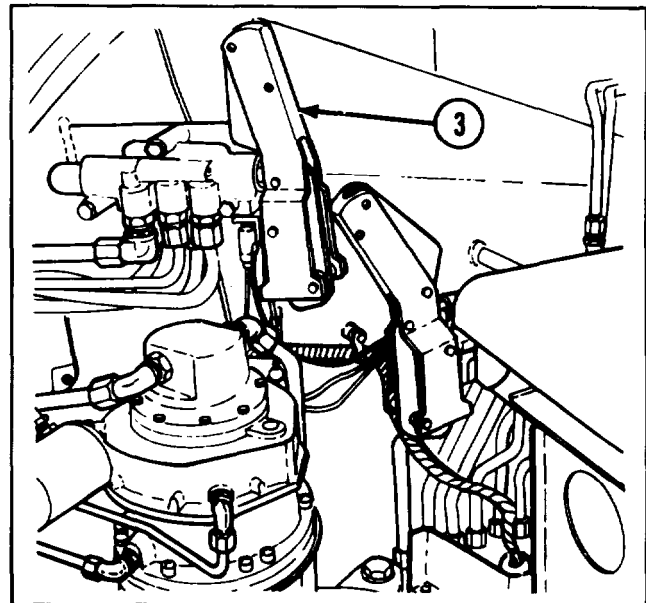
NOTE

Hydraulic motor and pump may be used to apply pressure to hydraulic system without starting engine by setting MASTER switch and OIL PUMP MOTOR SWitch ON.

- 3 Set HYD PUMP/PTO CLUTCH switch to ON.
- 4 Check dial pressure gage (2) indication. Normal pressure is 1600 to 2400 psi (11,032 to 16,548 kPa).
- 5 Stop engine.



- 6 Traverse turret full right and full left several times using manual control handle (3) to bleed air from system.



2-71. MAINTENANCE OF HYDRAULIC RESERVOIR AND HAND PUMP.

This task covers:

a. <i>Relieving Hydraulic Pressure</i>	d. <i>Installation</i>
b. <i>Removal</i>	e. <i>Applying Hydraulic Pressure</i>
c. <i>Inspection/Repair</i>	

INITIAL SETUP*Tools and Special Tools*

Ordnance artillery and turret mechanic's tool kit (SC 5180-95-CL-A12)

Materials/Parts

Adhesive (item 2, appx B)
Lockwasher (6) (MS35338-43)
Preformed packing (MS28775-222)

References

TM 9-2350-304-24P-2

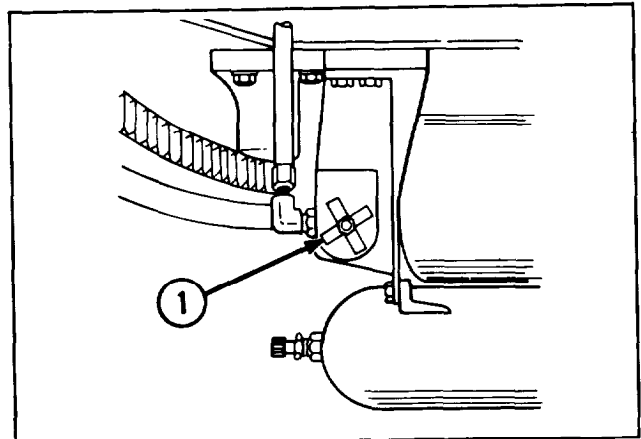
General Safety Instructions

- Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as level ground as possible. This will stop the cannon from sliding out of battery.
- Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

RELIEVING HYDRAULIC PRESSURE**WARNING**

Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as level ground as possible. This will stop the cannon from sliding out of battery.

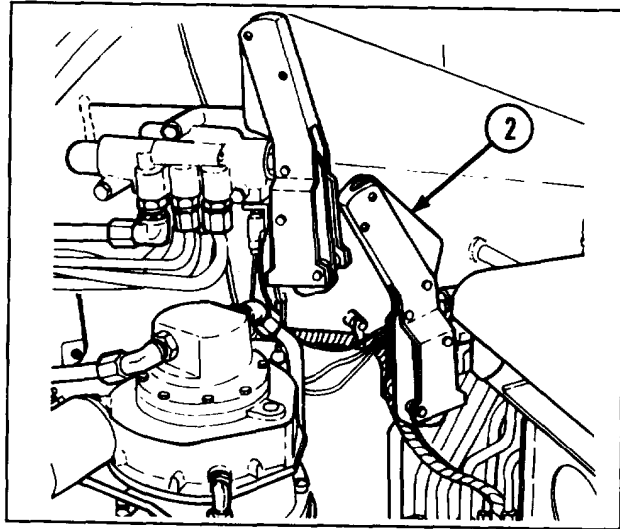
- 1 Set MASTER switch to OFF.
- 2 Open globe angle valve (1).



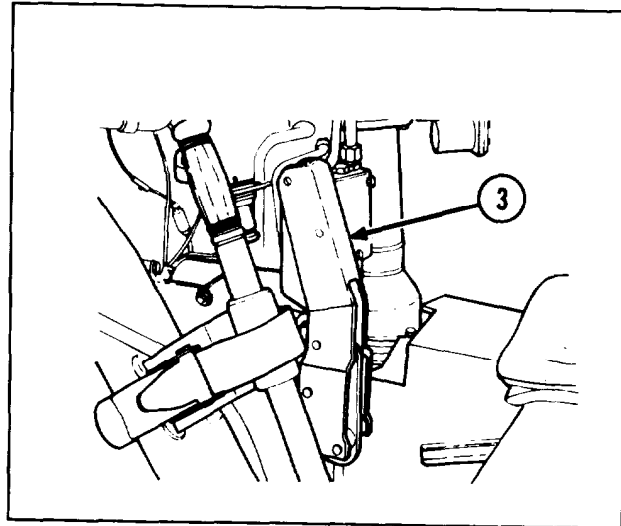
2-71. MAINTENANCE OF HYDRAULIC RESERVOIR AND HAND PUMP (CONT).

RELIEVING HYDRAULIC PRESSURE (CONT)

- 3 Move manual control handle (2) to full RAISE.
- 4 Move manual control handle (2) to full LOWER.
- 5 Repeat steps 3 and 4 several times to relieve pressure from system.



- 6 Repeat steps 3, 4, and 5 for manual control handle (3).

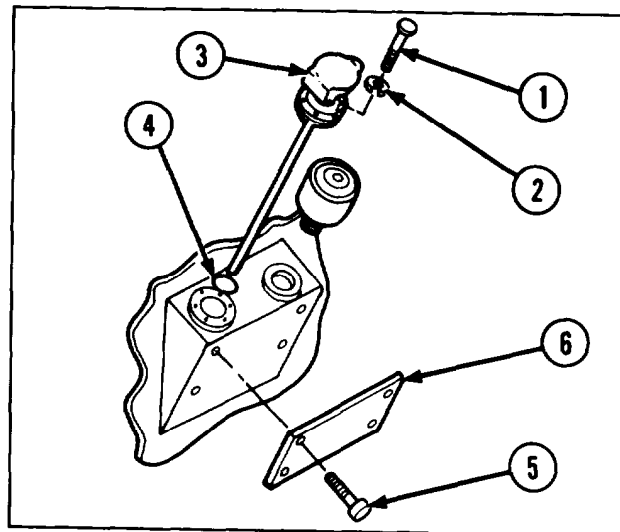


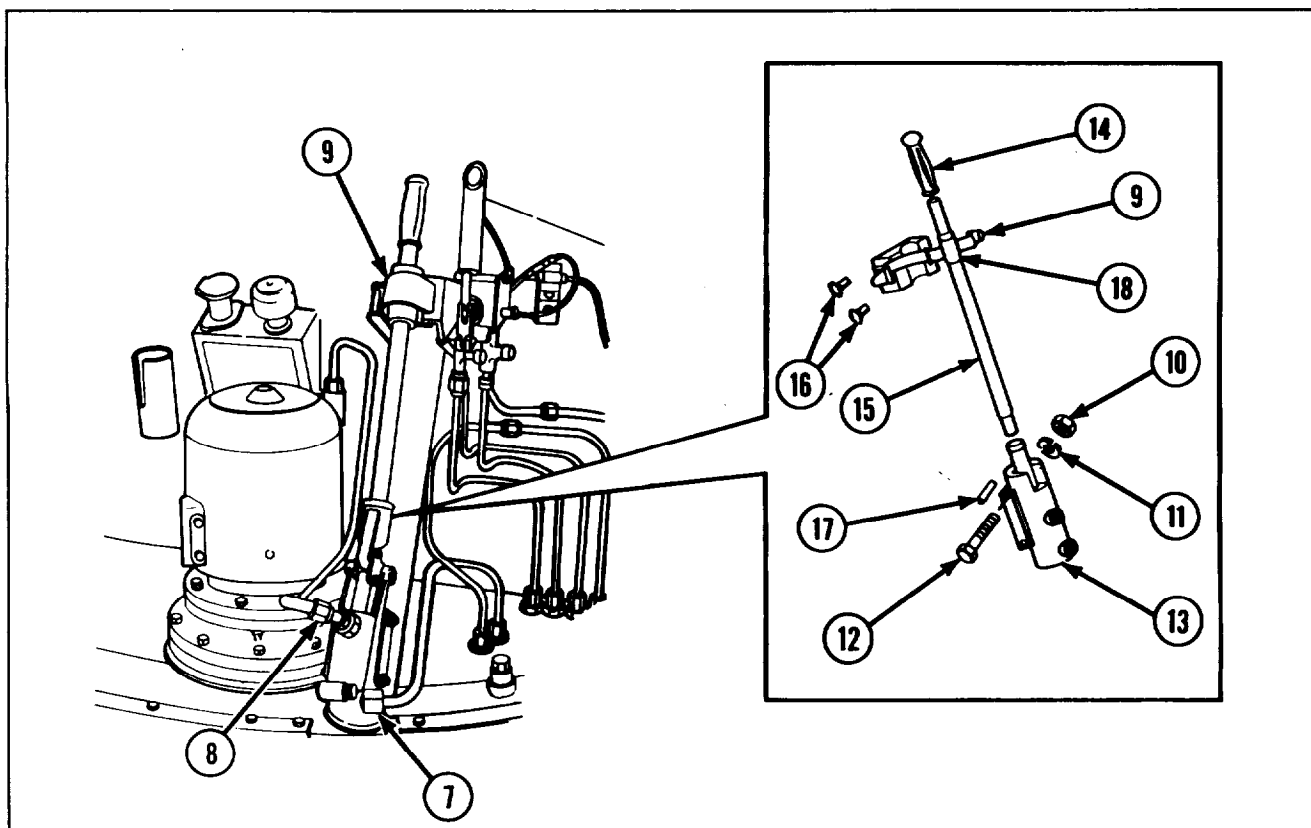
REMOVAL

NOTE

Steps 1 thru 3 refer to the removal of the hydraulic reservoir cap.

- 1 Remove six machine screws (1) and six lockwashers (2).
- 2 Remove hydraulic reservoir filler cap (3) and preformed packing (4).
- 3 Remove four drive screws (5) and instruction plate (6).





WARNING

Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

NOTE

Steps 4 thru 10 refer to the removal of the hand pump.

- 4 Disconnect two hydraulic tube assemblies (7 and 8) and cover tube openings. For complete disassembly of hydraulic lines and fittings, refer to page 2-27.
- 5 Unfasten webbing strap (9).
- 6 Remove two nuts (10), two lockwashers (11), two capscrews (12), and reciprocating hydraulic pump (13).

- 7 Remove handle grip (14) from shouldered shaft (15).

- 8 If webbing strap (9) is damaged, drill out two solid rivets (16) and remove webbing strap.

- 9 Remove spring pin (17) and shouldered shaft (15) from reciprocating hydraulic pump (13).

- 10 Remove nonmetallic hose (18) from shouldered shaft (15).

INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

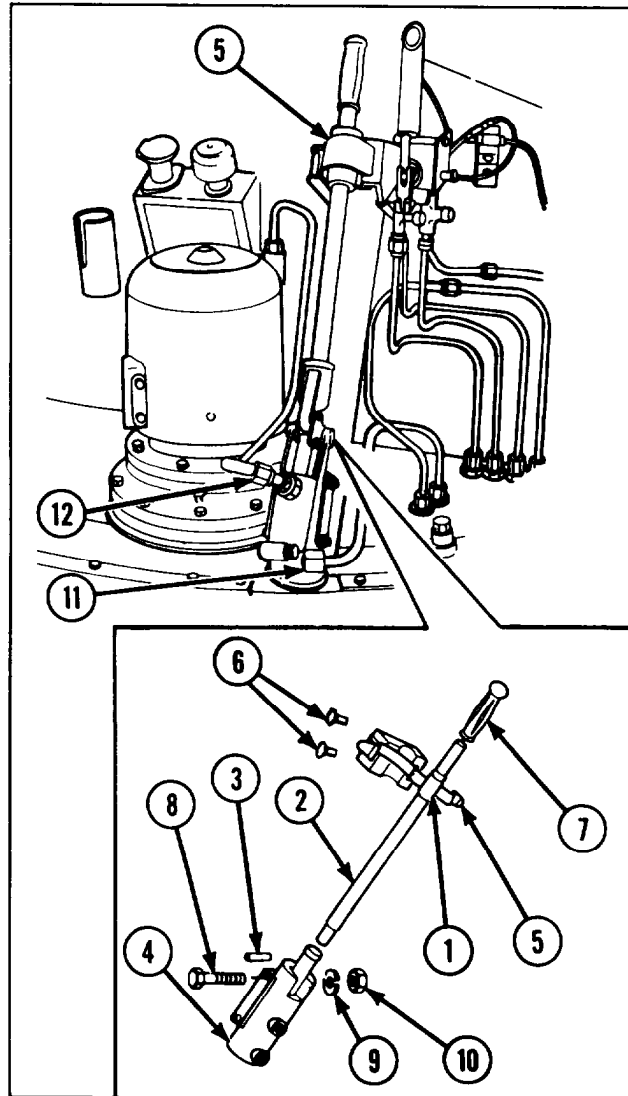
2-71. MAINTENANCE OF HYDRAULIC RESERVOIR AND HAND PUMP (CONT).

INSTALLATION

NOTE

Steps 1 thru 7 refer to the installation of the hand pump.

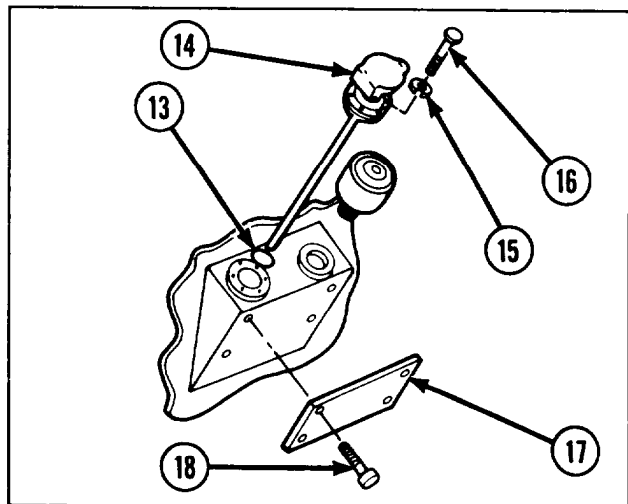
- 1 Using adhesive (item 2, appx B), install nonmetallic hose (1) on shouldered shaft (2).
- 2 Install shouldered shaft (2) and spring pin (3) in reciprocating hydraulic pump (4).
- 3 If removed, install new webbing strap (5) and two new solid rivets (6).
- 4 Using adhesive (item 2, appx B), install handle grip (7) on shouldered shaft (2).
- 5 Install reciprocating hydraulic pump (4), two capscrews (8), two new lockwashers (9), and two nuts (10).
- 6 Fasten webbing strap (5).
- 7 Uncover and connect hydraulic tube assemblies (11 and 12). For complete reassembly of hydraulic lines and fittings, refer to page 2-27.



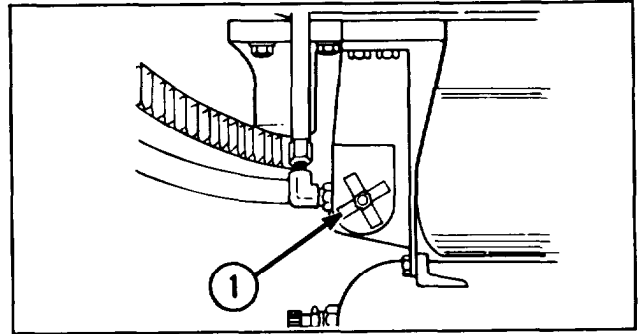
NOTE

Steps 8 thru 11 refer to the installation of the hydraulic reservoir cap.

- 8 Install new preformed packing (13) and hydraulic reservoir filler cap (14).
- 9 Install six new lockwashers (15) and six machine screws (16).
- 10 Install instruction plate (17) and four drive screws (18).



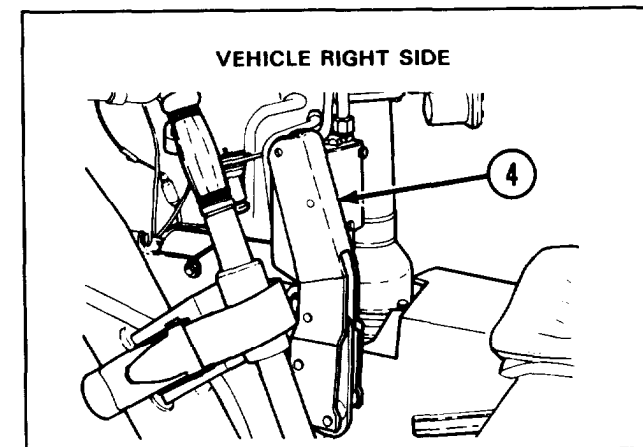
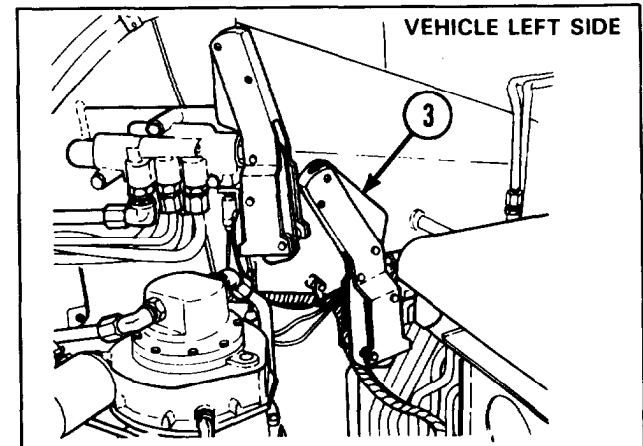
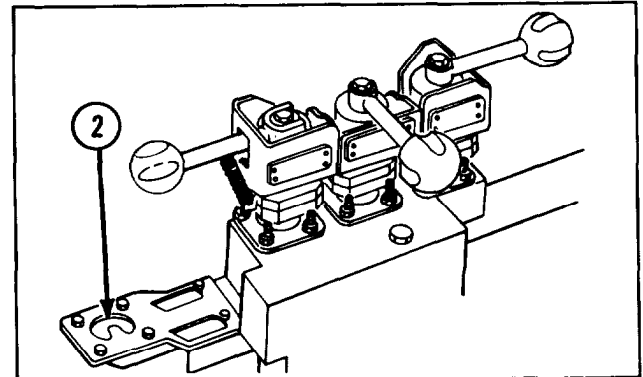
- 1 Close globe angle valve (1).
- 2 Start engine.



NOTE

Hydraulic motor and pump may be used to apply pressure to hydraulic system without starting engine by setting MASTER switch and OIL PUMP MOTOR SWITCH ON.

- 3 Set HYD PUMP/PTO CLUTCH switch to ON.
- 4 Check dial pressure gage (2) indication. Normal pressure is 1600 to 2400 psi (11,032 to 16,548 kPa).
- 5 Stop engine.
- 6 Raise and lower cannon several times using manual control handle (3) to bleed air from system.



- 7 Raise and lower cannon several times using manual control handle (4) to bleed air from system.

2-72. MAINTENANCE OF HYDRAULIC MOTOR AND PUMP ASSEMBLY.

- This task covers:
- | | |
|--|---------------------------------------|
| a. <i>Relieving Hydraulic Pressure</i> | e. <i>Reassembly</i> |
| b. <i>Removal</i> | f. <i>Installation</i> |
| c. <i>Disassembly</i> | g. <i>Applying Hydraulic Pressure</i> |
| d. <i>Inspection/Repair</i> | |

INITIAL SETUP

Tools and Special Tools

Ordnance artillery and turret mechanic's tool kit (SC 5180-95-CL-A12)

Materials/Parts

- Gasket (7388352)
- Grease (item 12, appx B)
- Lockwasher (18) (MS35338-46)
- Lockwire (item 16, appx B)
- Motor and pump assembly gasket (10902720)
- Motor to adapter gasket (10901538)
- Preformed packing (2) (10909059)
- Preformed packing (MS28778-8)
- Preformed packing (4) (MS28778-10)
- Pump to motor adapter gasket (10901251)
- Tube fitting locknut (3) (AN6289-10)

References

- TM 9-2350-304-20-2
- TM 9-2350-304-24P-2

General Safety Instructions

WARNING

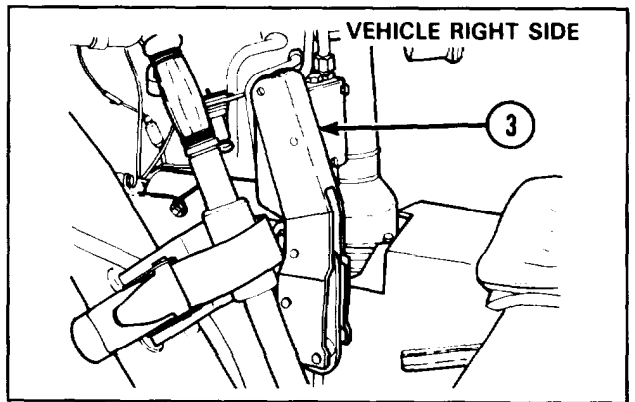
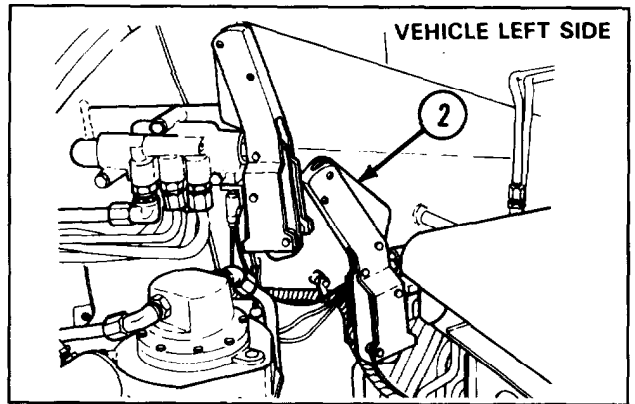
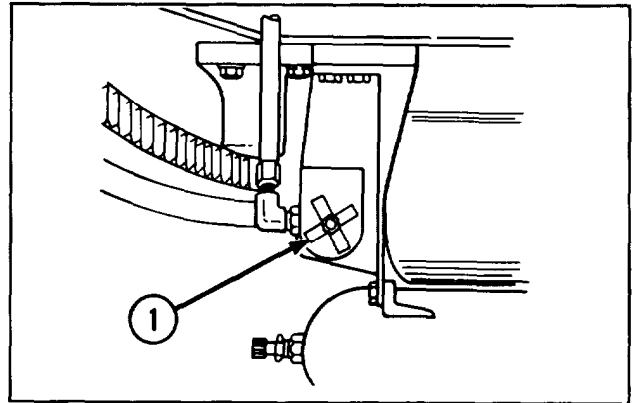
- Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as level ground as possible. This will stop the cannon from sliding out of battery.
- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.
- Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

RELIEVING HYDRAULIC PRESSURE

WARNING

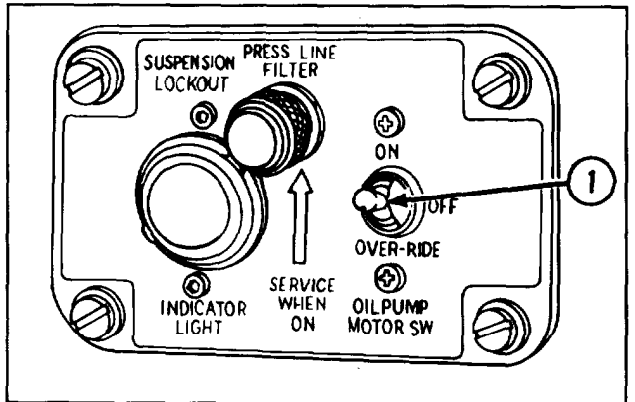
Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as level ground as possible. This will stop the cannon from sliding out of battery.

- 1 Set MASTER switch to OFF.
- 2 Open globe angle valve (1).
- 3 Move manual control handle (2) to full RAISE.
- 4 Move manual control handle (2) to full LOWER.
- 5 Repeat steps 3 and 4 several times to relieve pressure from system.
- 6 Repeat steps 3 thru 5 for other manual control handle (3).



REMOVAL

- 1 Set OIL PUMP MOTOR SWitch control switch (1) to OFF.



2-72. MAINTENANCE OF HYDRAULIC MOTOR AND PUMP ASSEMBLY (CONT).

REMOVAL (CONT)

WARNING

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

2 Disconnect electrical lead (2).

WARNING

Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

3 Disconnect pump and motor assembly to filter manifold tube assembly (3) from tube elbow (4) on motor and pump (5).

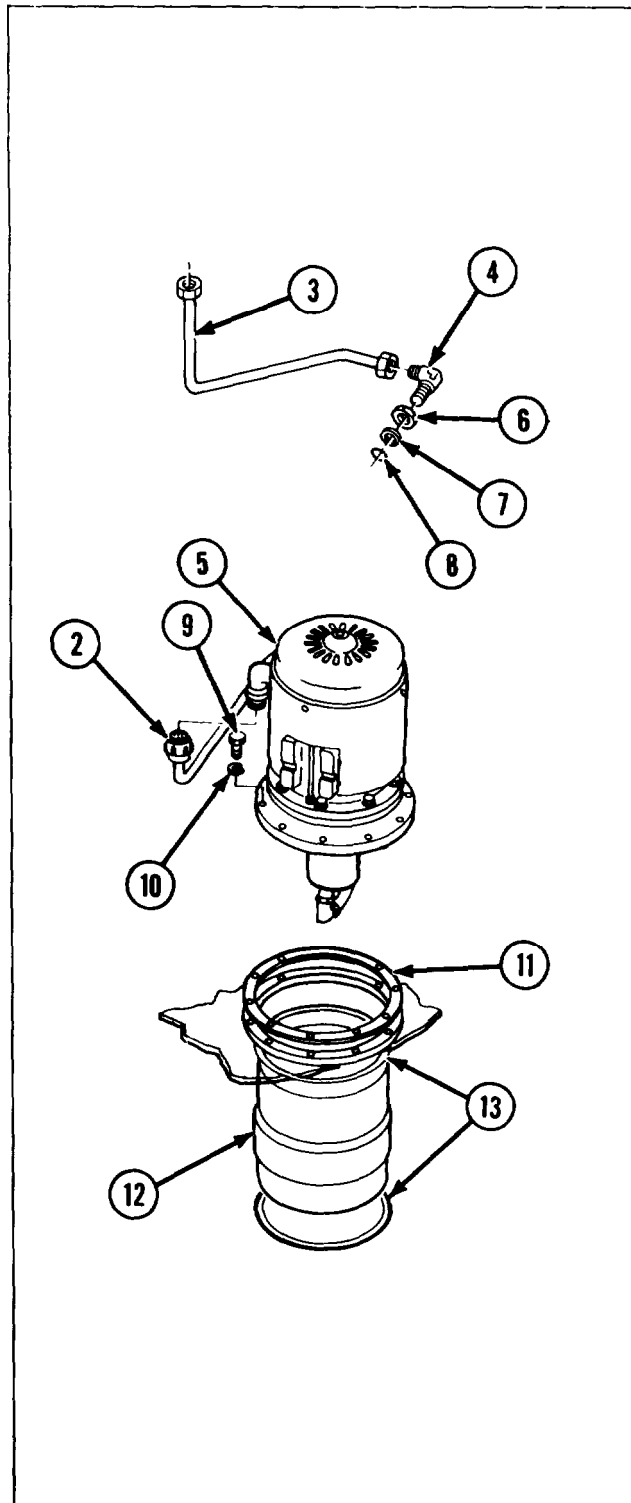
4 Cover tube opening.

5 Loosen tube fitting locknut (6), and remove tube elbow (4), flat washer (7), and preformed packing (8) from motor and pump (5).

6 Remove 10 capscrews (9) and 10 lock-washers (10).

7 Remove motor and pump (5) and motor and pump assembly gasket (11).

8 Remove hydraulic reservoir strainer element (12) and two preformed packings (13).

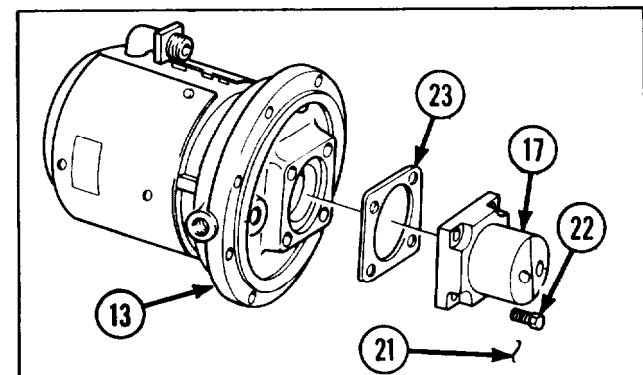
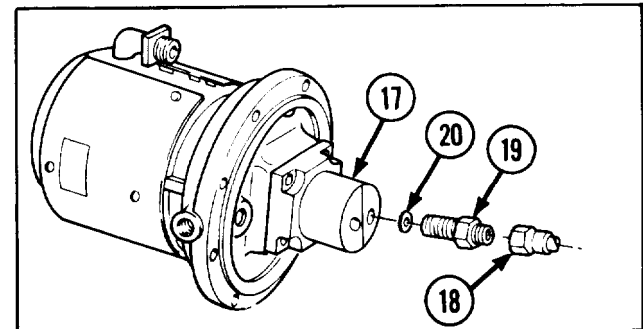
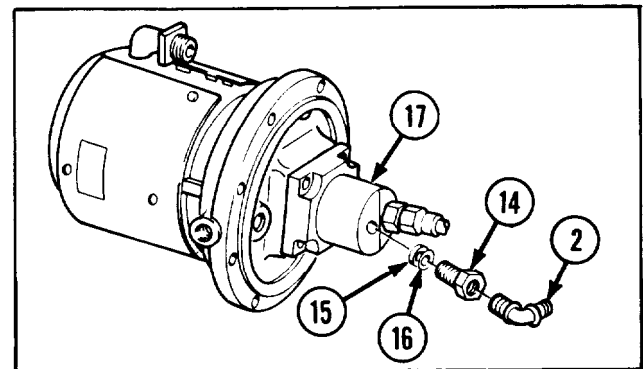
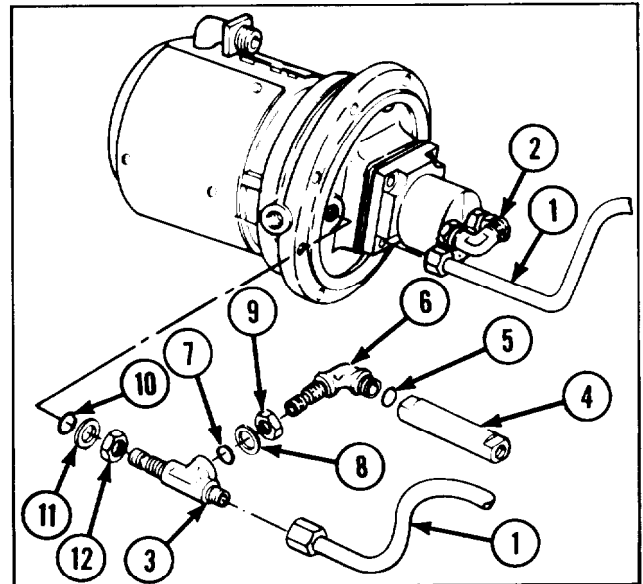


DISASSEMBLY

NOTE

For complete disassembly of hydraulic lines and fittings, refer to page 2-27.

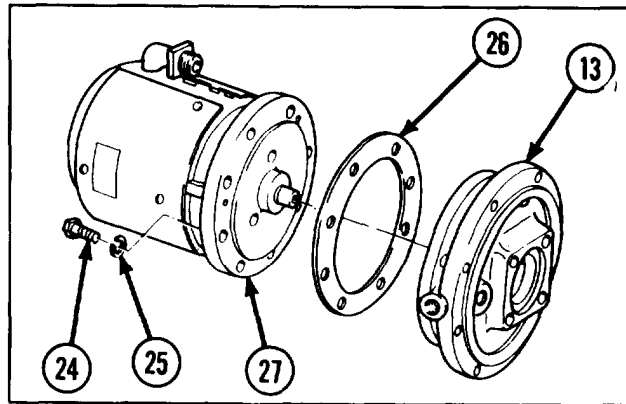
- 1 Remove hydraulic motor and pump tube assembly (1) from tube elbow (2) and tube to boss tee (3).
- 2 Remove safety relief valve (4), preformed packing (5), tube elbow (6), preformed packing (7), flat washer (8), tube fitting locknut (9), tube to boss tee (3), preformed packing (10), flat washer (11), and tube fitting locknut (12) from hydraulic motor and pump adapter (13).
- 3 Remove tube elbow (2), tube fitting locknut (14), preformed packing (15), and flat washer (16) from rotary hydraulic pump (17).
- 4 Remove reservoir to pump inlet port tube assembly (18) from tube nipple (19).
- 5 Remove tube nipple (19) and preformed packing (20) from rotary hydraulic pump (17).
- 6 Remove lockwire (21).
- 7 Remove four capscrews (22).
- 8 Remove rotary hydraulic pump (17) and pump to motor adapter gasket (23) from hydraulic motor and pump adapter (13).



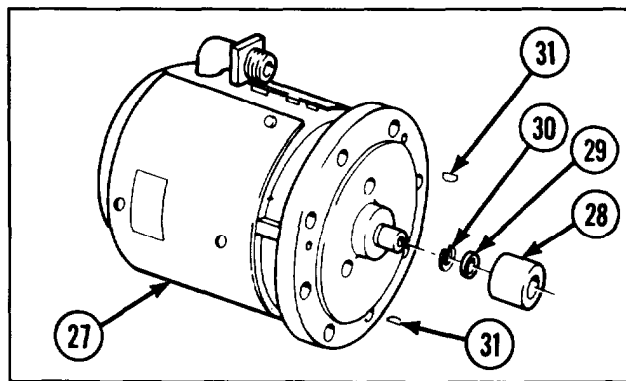
2-72. MAINTENANCE OF HYDRAULIC MOTOR AND PUMP ASSEMBLY (CONT).

DISASSEMBLY (CONT)

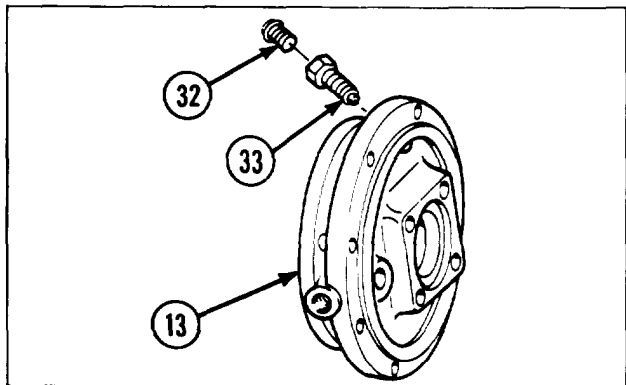
- 9 Remove eight capscrews (24) and eight lockwashers (25).
- 10 Remove hydraulic motor and pump adapter (13) and motor to adapter gasket (26) from electric motor (27).



- 11 Remove rigid shaft coupling (28), flat washer (29), and retaining ring (30) from shaft on electric motor (27).
- 12 Remove two woodruff keys (31).



- 13 Remove machine screw (32) and hydraulic bleeder valve (33) from hydraulic motor and pump adapter (13).

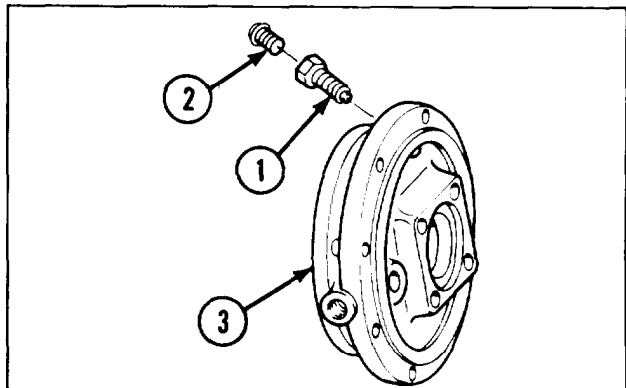


INSPECTION/REPAIR

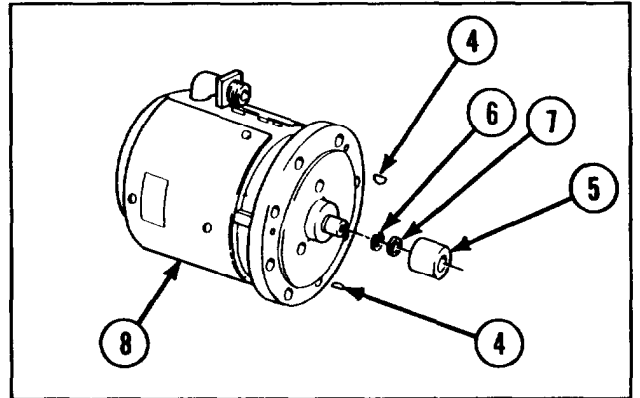
- 1 Inspect for broken, damaged, or missing parts.
- 2 If electric motor is broken, damaged, or missing, repair is by replacement of next higher assembly.
- 3 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

REASSEMBLY

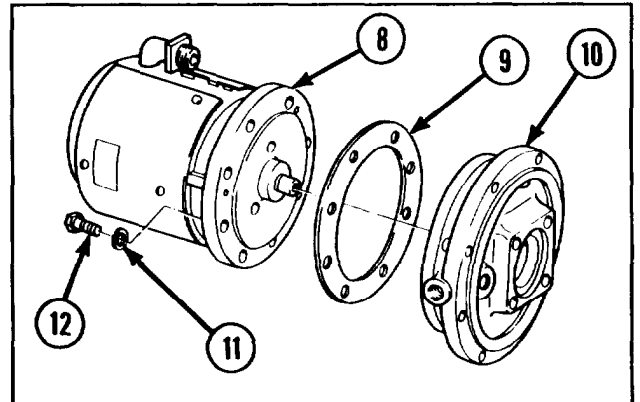
- 1 Install hydraulic bleeder valve (1) and machine screw (2) in hydraulic motor and pump adapter (3).



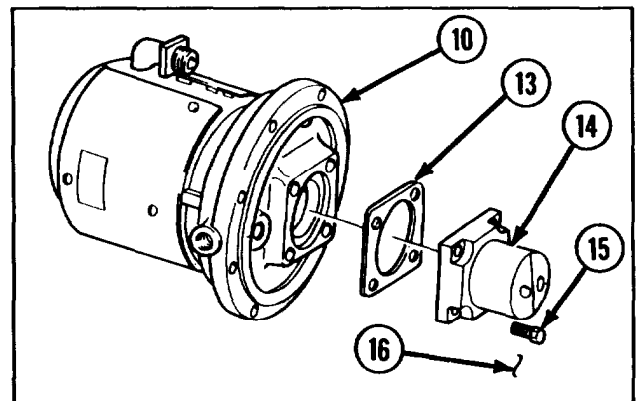
- 2 Install two woodruff keys (4).
- 3 Pack rigid shaft coupling (5) with grease (item 12, appx B) and install retaining ring (6), flat washer (7), and rigid shaft coupling (5) on shaft on electric motor (8).



- 4 Install new motor to adapter gasket (9) and hydraulic motor and pump adapter (10) on electric motor (8). Secure with eight new lockwashers (11) and eight capscrews (12).



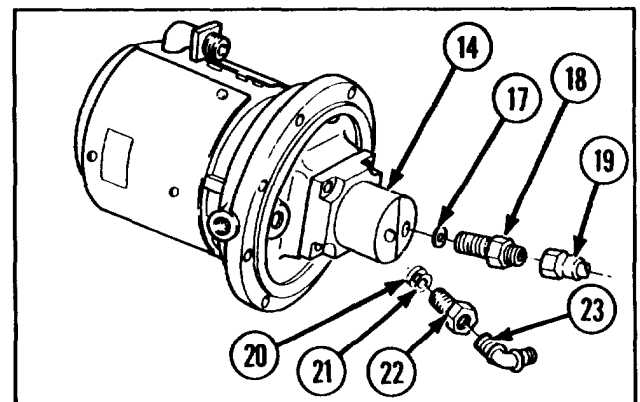
- 5 Install new pump to motor adapter gasket (13) and rotary hydraulic pump (14) on hydraulic motor and pump adapter (10). Secure using four capscrews (15) and new lockwire (16) (item 16, appx B).



NOTE

For complete reassembly of hydraulic lines and fittings, refer to page 2-27,

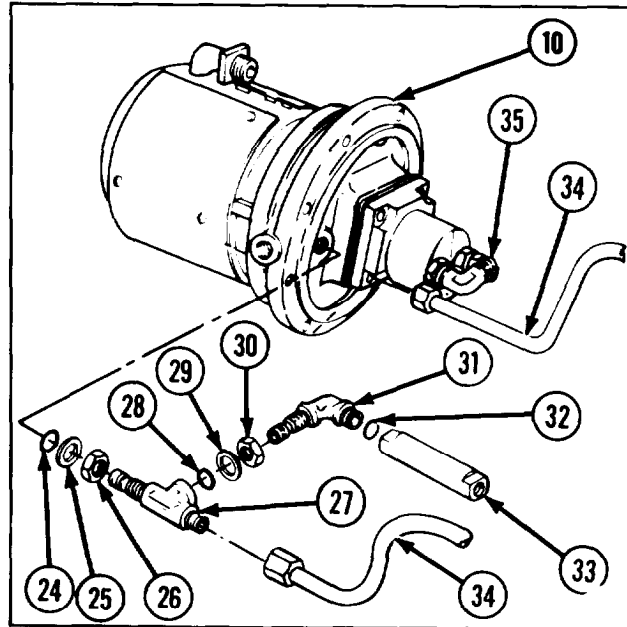
- 6 Install new preformed packing (17) and tube nipple (18) on rotary hydraulic pump (14).
- 7 Install reservoir to pump inlet port tube assembly (19) on tube nipple (18).
- 8 Install new preformed packing (20), flat washer (21), new tube fitting locknut (22), and tube elbow (23) on rotary hydraulic pump (14).



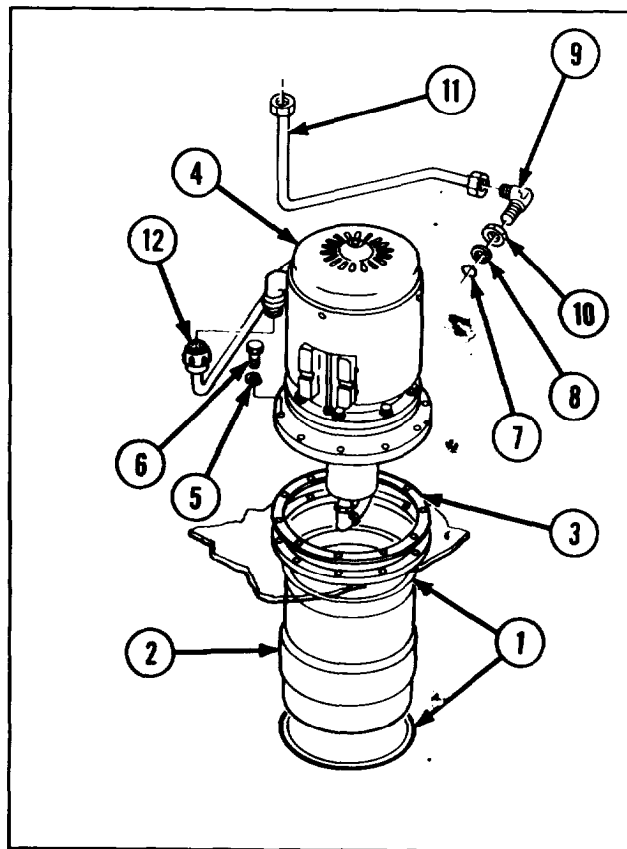
2-72. MAINTENANCE OF HYDRAULIC MOTOR AND PUMP ASSEMBLY (CONT).

REASSEMBLY (CONT)

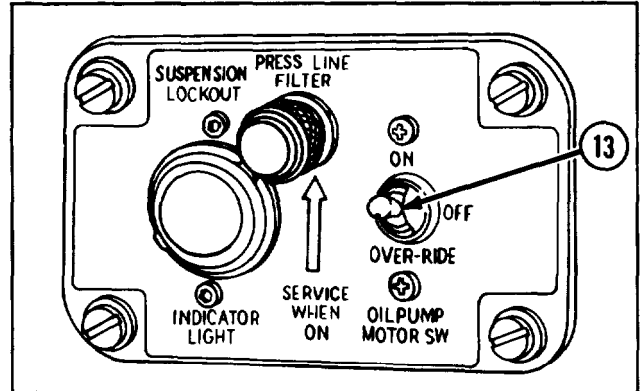
- 9 Install new preformed packing (24), flat washer (25), new tube fitting locknut (26), tube to boss tee (27), new preformed packing (28), flat washer (29), new tube fitting locknut (30), tube elbow (31), new preformed packing (32), and safety relief valve (33) on hydraulic motor and pump adapter (10).
- 10 Install hydraulic motor and pump tube assembly (34) on tube elbow (35) and tube to boss tee (27).



- 1 Install two new preformed packings (1) and hydraulic reservoir strainer element (2).
- 2 Install new motor and pump assembly gasket (3) and motor and pump (4). Secure using 10 new lockwashers (5) and 10 capscrews (6).
- 3 Uncover tube opening.
- 4 Install new preformed packing (7), flat washer (8), and tube elbow (9) in motor and pump (4), and tighten tube fitting locknut (10).
- 5 Connect pump and motor assembly to filter manifold tube assembly (11) to tube elbow (9) on motor and pump (4).
- 6 Connect electrical lead (12).



- 7 Set OIL PUMP MOTOR SWitch control switch (13) to ON.



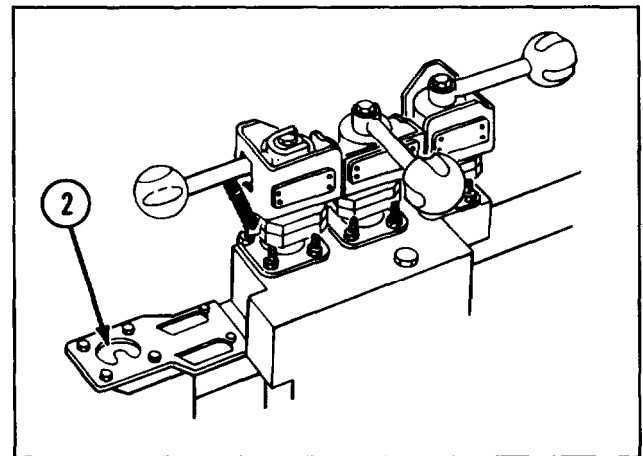
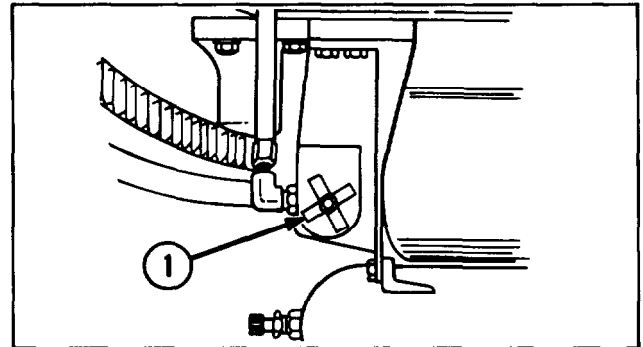
APPLYING HYDRAULIC PRESSURE

- 1 Close globe angle valve (1).
- 2 Start engine.

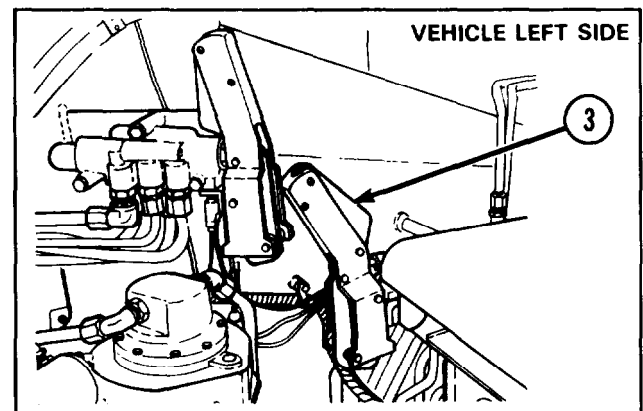
NOTE

Hydraulic motor and pump may be used to apply pressure to hydraulic system without starting engine by setting MASTER switch and OIL PUMP MOTOR SWitch ON.

- 3 Set HYD PUMP/PTO CLUTCH switch to ON.
- 4 Check dial pressure gage (2) indication. Normal pressure is 1600 to 2400 psi (11,032 to 16,548 kPa).
- 5 Stop engine.



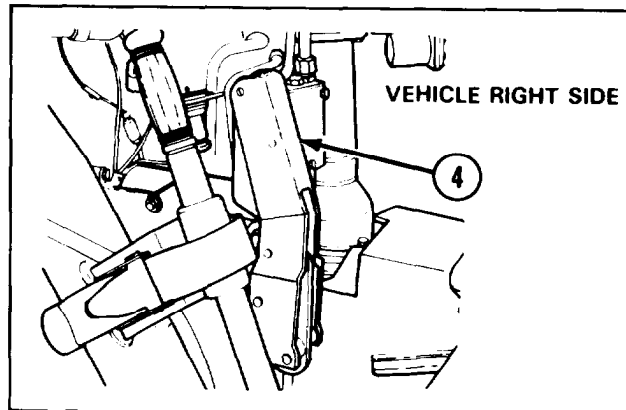
- 6 Raise and lower cannon several times using manual control handle (3) to bleed air from system.



2-72. MAINTENANCE OF HYDRAULIC MOTOR AND PUMP ASSEMBLY (CONT).

APPLYING HYDRAULIC PRESSURE (CONT)

- 7 Raise the lower cannon several times using other manual control handle (4) to bleed air from system.



2-73. MAINTENANCE OF ELECTRICAL INSTALLATION -UTILITY OUTLET ELECTRICAL LEAD.

This task covers:

- a. *Removal/Disassembly*
b. *Inspection/Repair*

- c. *Reassembly/Installation*

INITIAL SETUP

Tools and Special Tools

Ordnance artillery and turret mechanic's tool kit (SC 5180-95-CL-A12)

Materials/Parts

- Lockwasher (4) (MS35335-29)
Lockwasher (3) (MS35338-41)

References

- TM 9-2350-304-20-2
TM 9-2350-304-24P-2

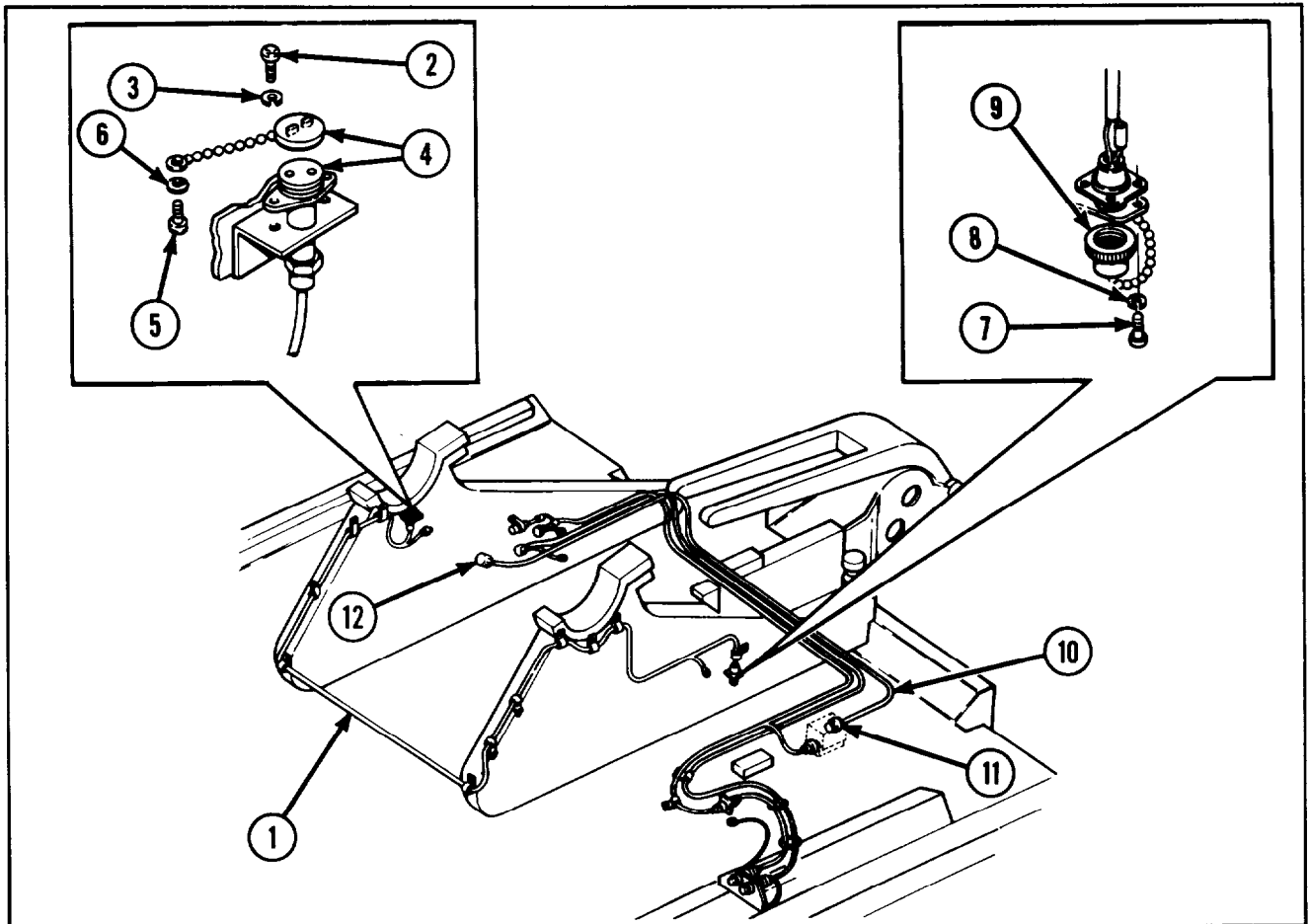
General Safety Instructions

WARNING

Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.

Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

REMOVAL/DISASSEMBLY



- 1 Remove branched collimator to utility outlet wiring harness (1). Refer to TM 9-2350-304-20-2.
- 2 Remove two machine screws (2) and two lockwashers (3) from utility outlet electrical lead (4).
- 3 Remove machine screw (5), lockwasher (6), and utility outlet electrical lead (4).
- 4 Remove four machine screws (7), four lockwashers (8), and protective dust cap (9).

WARNING

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe

this warning could result in injury to personnel.

- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

NOTE

Tag all wires and leads before disconnecting to ensure proper installation.

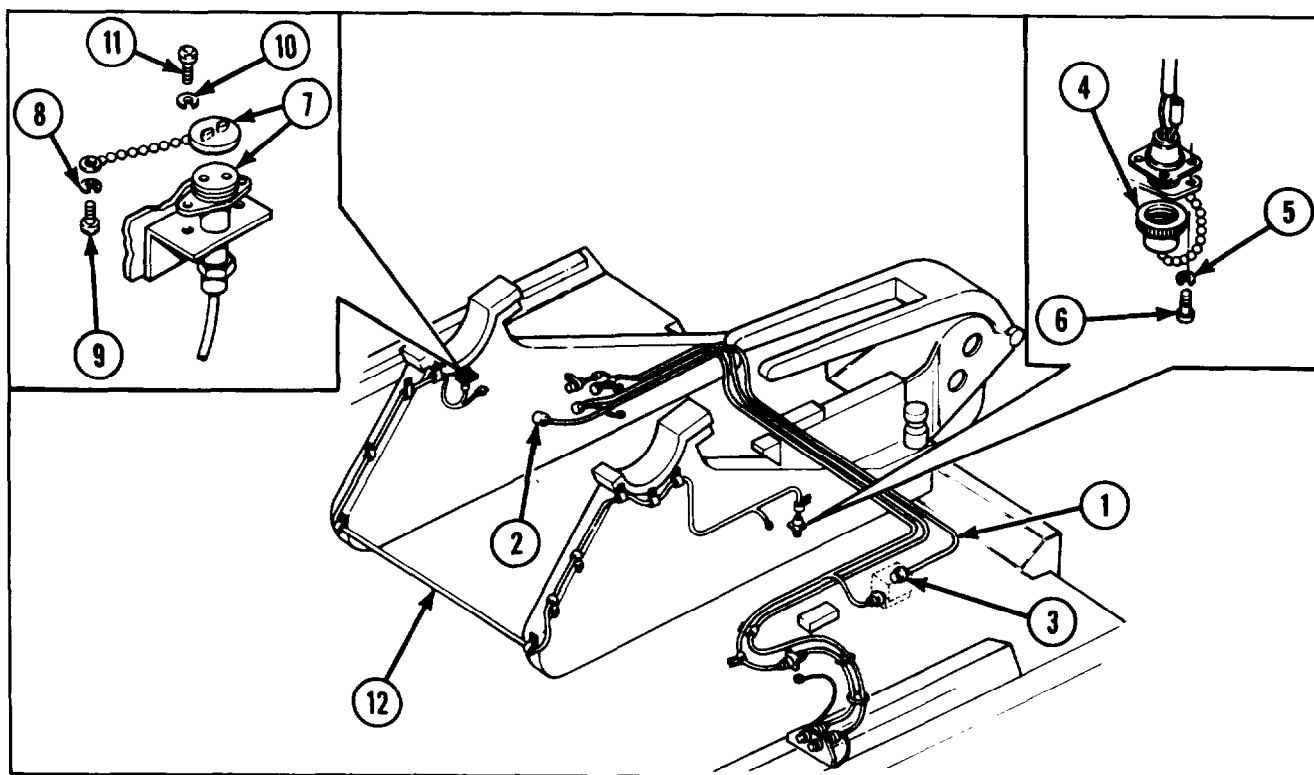
- 5 Disconnect relay to oil pump motor electrical lead (10) at connectors (11 and 12).
- 6 Remove relay to oil pump motor electrical lead (10).

2-73. MAINTENANCE OF ELECTRICAL INSTALLATION -UTILITY OUTLET ELECTRICAL LEAD (CONT).

INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 For complete repair of branched collimator to utility outlet wiring harness, refer to TM 9-2350-304-20-2.
- 3 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

REASSEMBLY/INSTALLATION



CAUTION

Make sure wires and leads are connected to proper connectors. Refer to TM 9-2350-304-20-2.

- 1 Install relay to oil pump motor relay electrical lead (1) and connect relay to oil pump motor relay electrical lead at connectors (2 and 3).
- 2 Install protective dust cap (4), four new lockwashers (5), and four machine screws (6).
- 3 Install utility outlet electrical lead (7), new lockwasher (8), machine screw (9), two new lockwashers (10), and two machine screws (11).
- 4 Install branched collimator to utility outlet wiring harness (12). Refer to TM 9-2350-304-20-2.

2-74. MAINTENANCE OF PLAIN BEARING UNIT AND OUTER RACE ASSEMBLY.

This task covers:	a. <i>Service</i>	d. <i>Inspection/Repair</i>
	b. <i>Removal</i>	e. <i>Reassembly</i>
	c. <i>Disassembly</i>	f. <i>Installation</i>

INITIAL SETUP

Tools and Special Tools

- Adapter (11643222)
- Alinement pin (2) (figure 8, appx C)
- Artillery maintenance shop equipment (SC 4933-95-CL-A12)
- Ratchet, 3/4 in. drive
- Chain sling
- Eyebolt (5222910)
- Hoist, 20,000 lb lifting capability
- Magnetic pickup tool (GGG-F-00360)
- Ordnance artillery and turret mechanic's tool kit (SC 5180-95-CL-A12)
- Sling
- Socket wrench (6105331)
- Spring scale (AAA-S-133)
- Torque wrench (A-A-2411)
- 5-ton jack stands (4)

Materials/Parts

- Adhesive (item 2, appx B)
- Adhesive silicone (item 4, appx B)
- Dry cleaning solvent (item 8, appx B)
- Grease (GAA) (item 12, appx B)
- Lockwasher (26) (MS35338-44)
- Lockwasher (28) (MS35338-53)
- Rubber strip seal assembly (2) (11592868)
- Sealing compound (item 21, appx B)

Personnel Required

Two

References

TM 9-2350-304-24P-2

Equipment Conditions

2-153 Turret assembly removed

General Safety Instructions



Dry cleaning solvent (SD2) is toxic and flammable. Wear protective goggles and gloves and use only in well-ventilated area.

SERVICE

When notified by unit maintenance to perform 18 month turret bearing service, remove, disassemble, clean, and lubricate the turret bearings. Clean the turret bearing with dry cleaning Solvent (item 8, appx B). Lubricate turret bearing with grease (item 12, appx B) while rotating the outer race at least two complete turns to be sure bearing is completely packed with grease. Capacity 41 lb (18.6 kg).

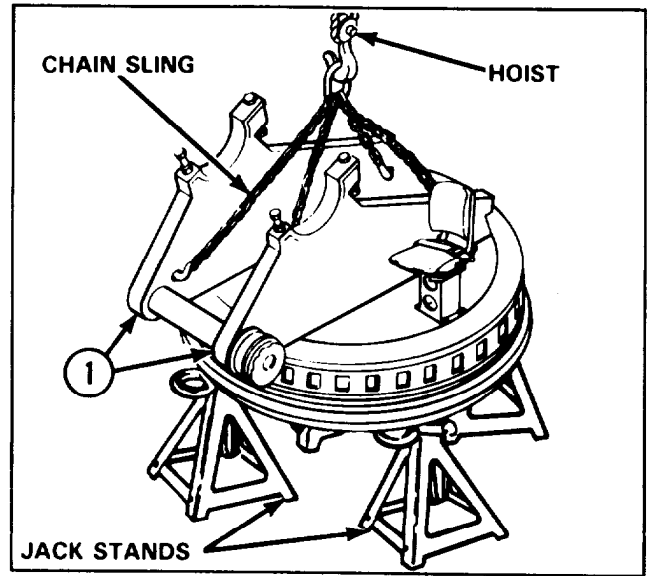
2-74. MAINTENANCE OF PLAIN BEARING UNIT AND OUTER RACE ASSEMBLY
(CONT).

REMOVAL

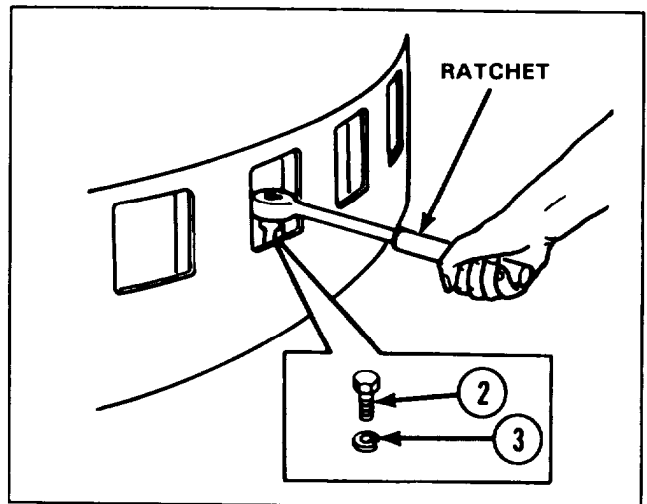
NOTE

Check the position of the plain bearing unit before removing it from the turret assembly. The plain bearing unit should be rotated 180 degrees from the original position after scheduled maintenance has been performed to prevent uneven wear.

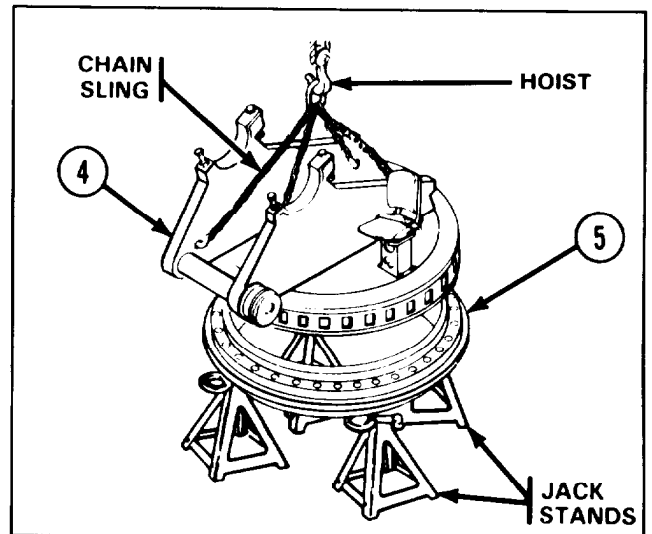
- 1 Provide hoist and chain slings of 20,000 lb (9072 kg) minimum lifting capability.
- 2 Attach chain slings to four lifting points in turret trunnions (1).



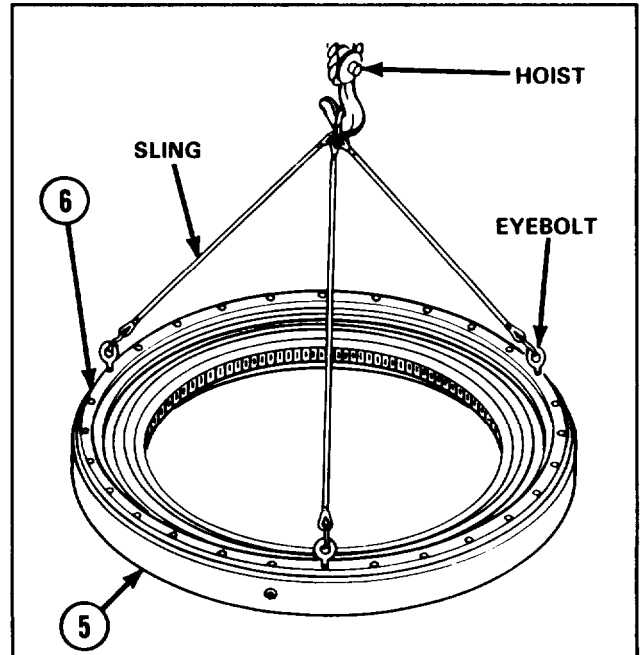
- 3 Using ratchet, remove 28 capscrews (2) and 28 lockwashers (3).



- 4 Using hoist and chain slings, lift turret assembly (4) from plain bearing unit (5) and place on four 5-ton jack stands. Remove chain slings from hoist.

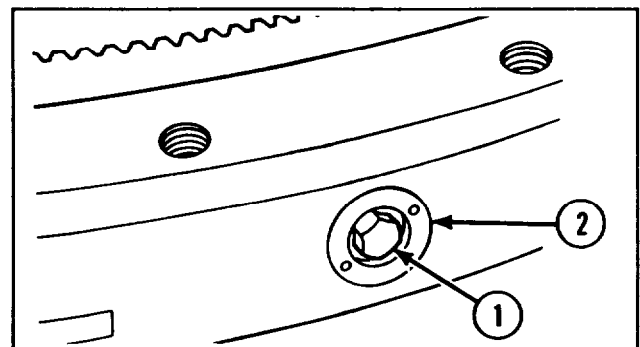


- 5 Install three eyebolts in threaded holes of outer race (6) an equal distance apart.
- 6 Attach sling to eyebolts and hoist.
- 7 Lift and position plain bearing unit (5) on flat, level surface.
- 8 Slack off on sling, but do not remove.

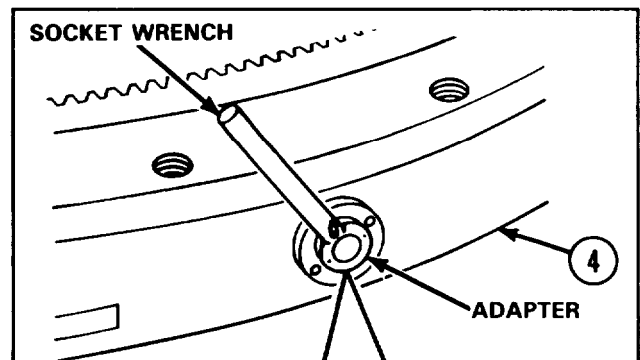


DISASSEMBLY

- 1 Loosen capscrew (1) securing turret filler plug retainer (2) 0.5 in. (1.3 cm).



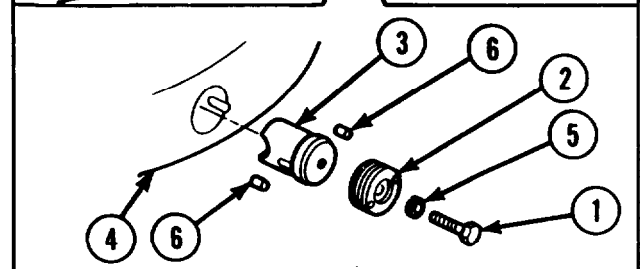
- 2 Using adapter and socket wrench, unscrew turret filler plug retainer (2) until it contacts head of capscrew (1).
- 3 Tighten capscrew (1) to pull turret filler plug (3) out from outer race (4).



CAUTION

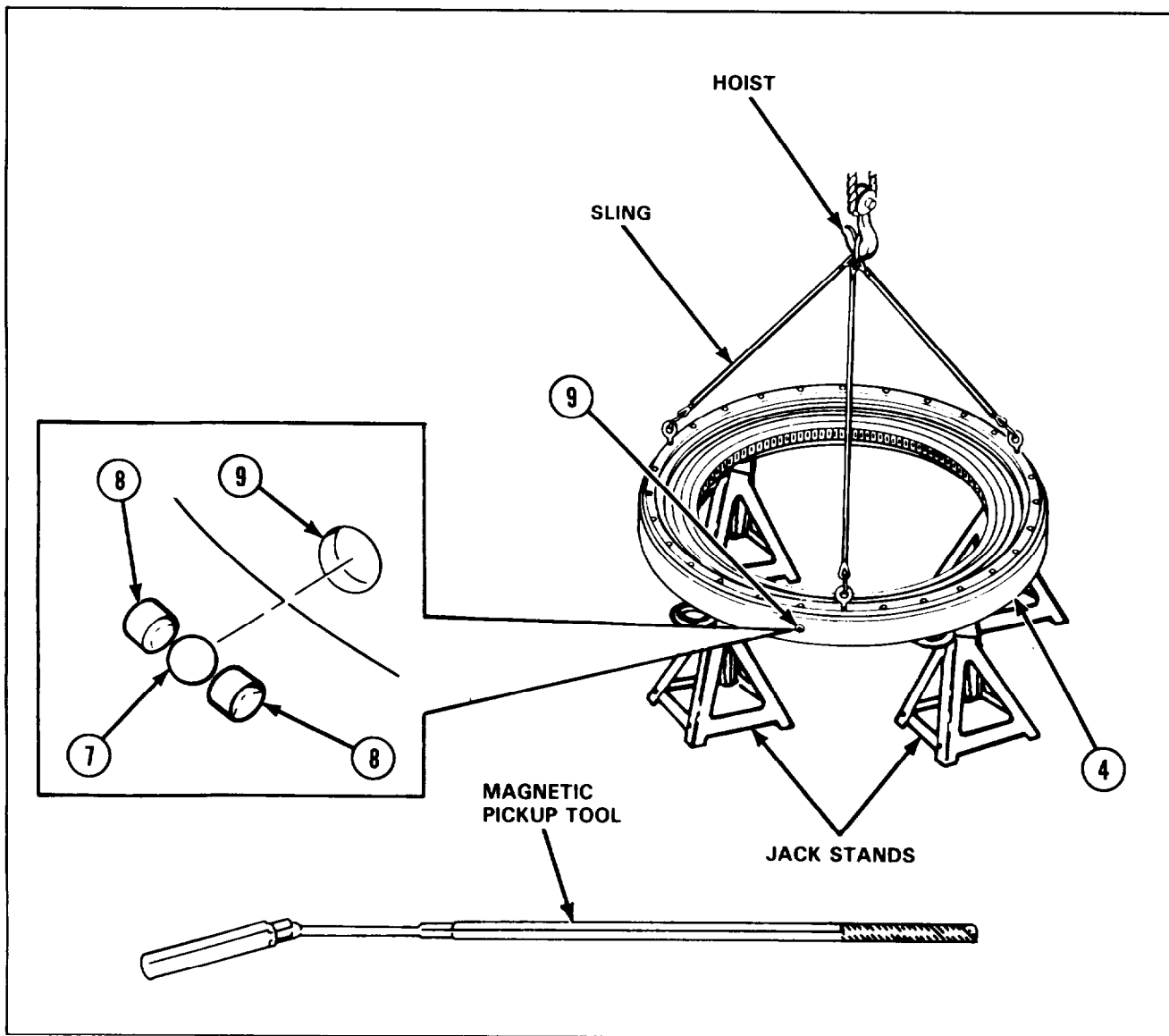
Use care not to lose or damage turret filler plug during removal.

- 4 Repeat steps 1 thru 3 until turret filler plug (3) is free of outer race (4).
- 5 Disassemble capscrew (1), lockwasher (5), turret filler plug retainer (2), turret filler plug (3), and two filler plug headless straight pins (6).



2-74. MAINTENANCE OF PLAIN BEARING UNIT AND OUTER RACE ASSEMBLY
(CONT).

DISASSEMBLY (CONT)



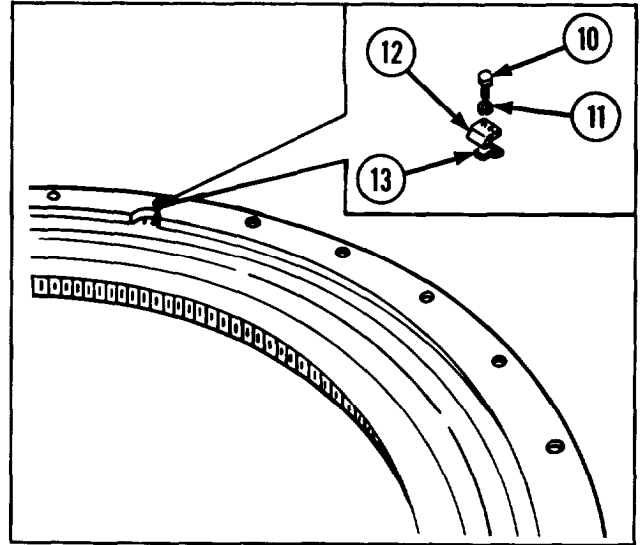
6 Using hoist and sling, raise outer race (4) slightly to remove weight from bearing balls (7).

7 Using a magnetic pickup tool for bearing balls (7) and machinist's tweezers for ball spacers (8), remove bearing balls (7) and ball spacers (8) from plain bearing unit. Remove 100 to 103 bearing balls (7) and 100 to 103 ball spacers (8) through turret filler plug opening (9).

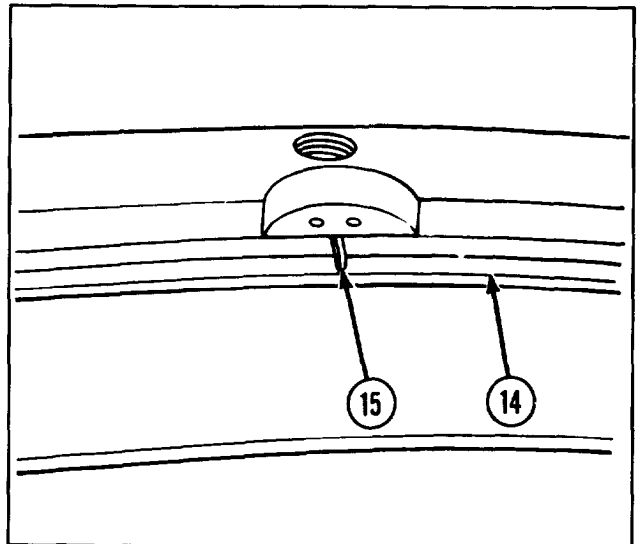
NOTE

It may be necessary to rotate outer race two or more complete turns to locate and remove all bearing balls and ball spacers.

- 8 Remove two capscrews (10), two lockwashers (11), outer seal retaining strap (12), and turret keeper plate (13).



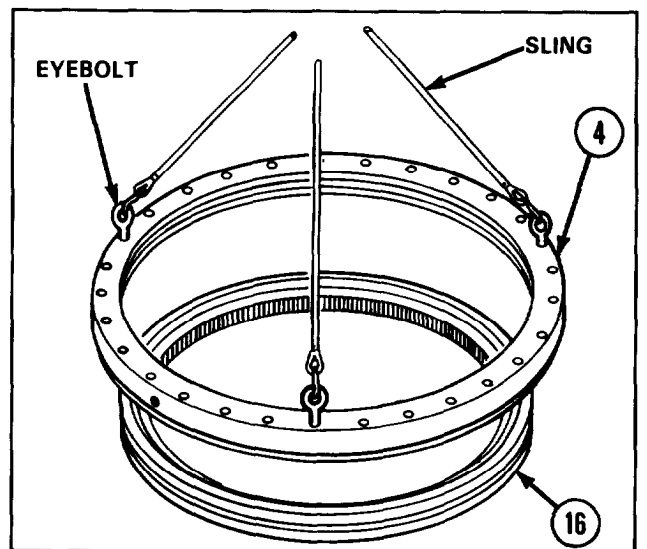
- 9 Remove retaining ring (14) and rubber strip seal assembly (15).
 10 Peel rubber strip seal assembly (15) from retaining ring (14).



CAUTION

Make sure bearing surfaces are not damaged while lifting outer race.

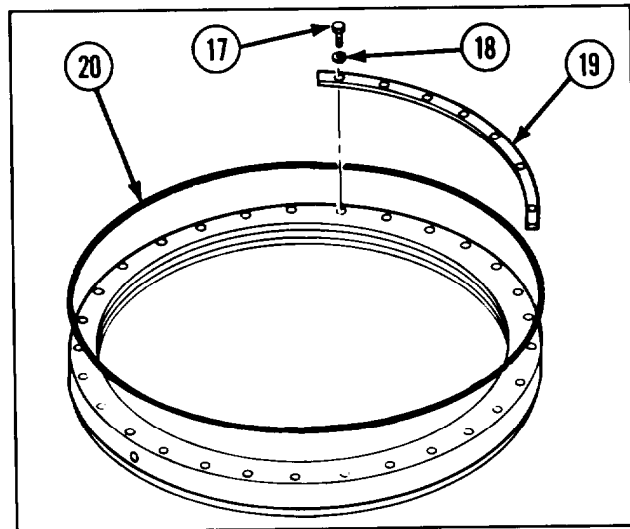
- 11 Using sling, carefully lift outer race (4) from inner race (16).
 12 Place outer race (4) on level surface and remove slings and eyebolts.
 13 Using suitable sling, turn outer race (4) over with threaded holes down.



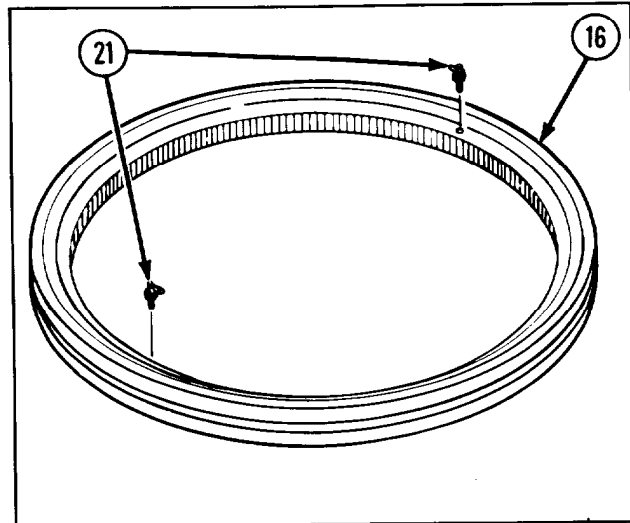
2-74. MAINTENANCE OF PLAIN BEARING UNIT AND OUTER RACE ASSEMBLY (CONT).

DISASSEMBLY (CONT)

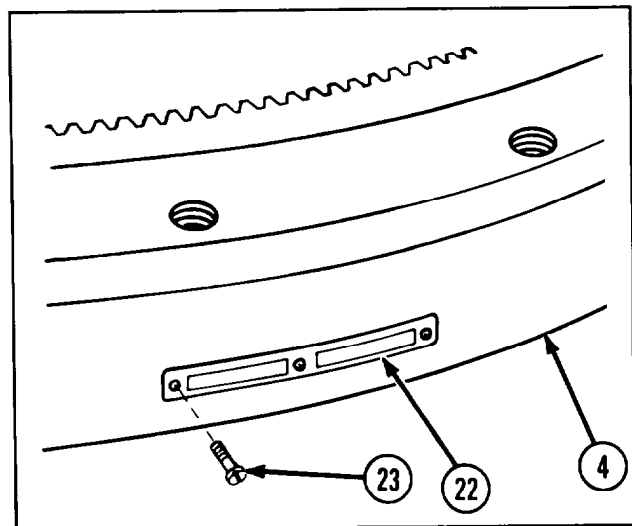
- 14 Remove 24 capscrews (17) and 24 lockwashers (18).
- 15 Remove four seal retaining plates (19).
- 16 Remove rubber strip seal assembly (20).



- 17 Remove six lubrication fittings (21) from inner race (16).



- 18 If turret bearing identification plate (22) is damaged, use chisel to cut off heads of three drive screws (23), and remove turret bearing identification plate (22) from outer race (4).



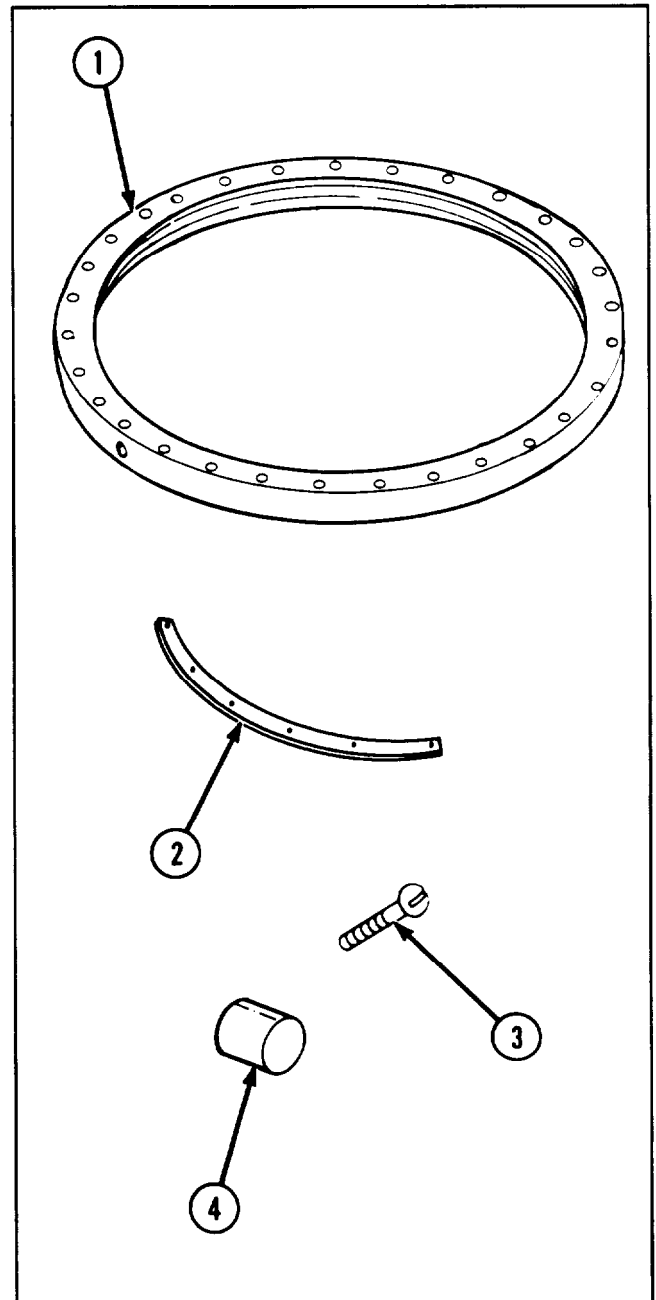
INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.

WARNING

Dry cleaning solvent (SD2) is toxic and flammable. Wear protective goggles and gloves and use only in well-ventilated area.

- 2 Remove adhesive from upper and lower surfaces of outer race (1) with wire brush and dry cleaning solvent (item 8, appx B).
- 3 Remove sealing compound from seal retaining plates (2) and capscrews (3) with wire brush and dry cleaning solvent (item 8, appx B).
- 4 Clean ball spacers (4) with soft brush and mild soap solution.
- 5 Turret ring is unserviceable if there are five or more pits within a 12.00 in. (30.48 cm) distance or any pit is more than 1.00 in. (2.54 cm) long, 0.06 in. (0.16 cm) wide, or 0.03 in. (0.08 cm) deep.
- 6 If inner race is broken, damaged, or missing, repair is by replacement of next higher assembly.
- 7 If turret filler plug is broken, damaged, or missing, repair is by replacement of next higher assembly.
- 8 If outer race or outer race assembly is broken, damaged, or missing, repair is by replacement of next higher assembly.
- 9 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2) which do not meet inspection criteria.



2-74. MAINTENANCE OF PLAIN BEARING UNIT AND OUTER RACE ASSEMBLY (CONT).

REASSEMBLY

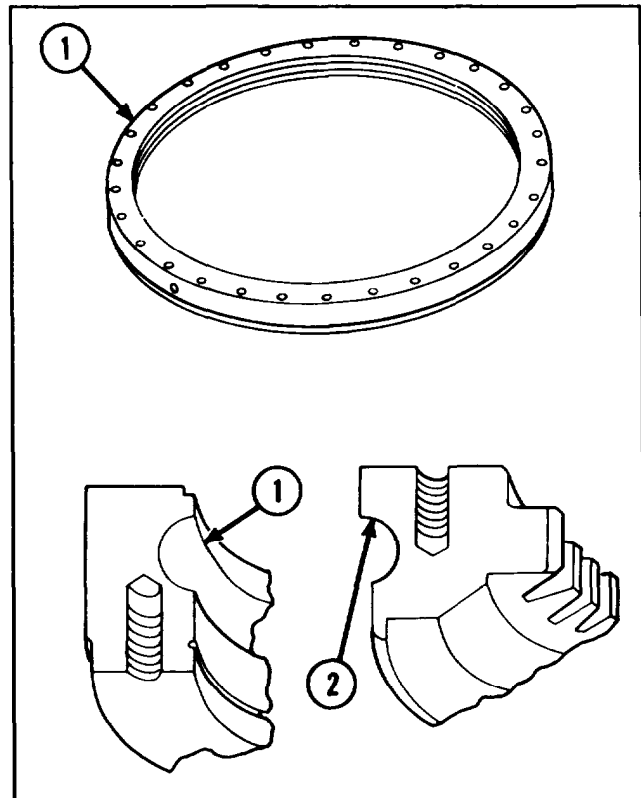
CAUTION

Inner race and outer race must have the same class letters stamped after part number.

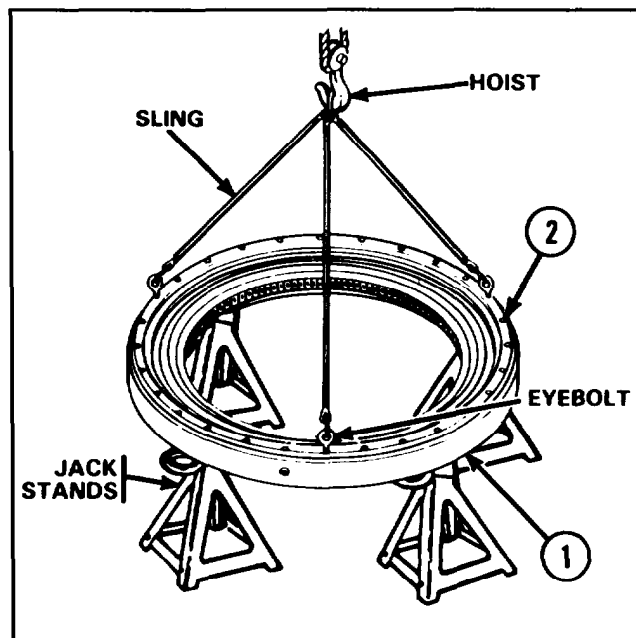
- 1 Position outer race (1) on clean level surface with threaded holes down.
- 2 Apply a light coat of grease (item 12, appx B) to ball bearing surfaces of outer race (1) and inner race (2).

NOTE

Make sure grease is not applied to seal surfaces of outer race.



- 3 Install three eyebolts in threaded holes of inner race (2) an equal distance apart.
- 4 Attach sling to eyebolts and hoist.
- 5 Lift and center inner race (2) over outer race (1).
- 6 Carefully lower inner race (2) into outer race (1) and aline ball bearing grooves.



NOTE

Alignment is correct when bearing balls can be installed without difficulty.

- 7 Support weight of inner race (2) with hoist so it can be turned easily during installation of bearing balls (3) and ball spacers (4).

NOTE

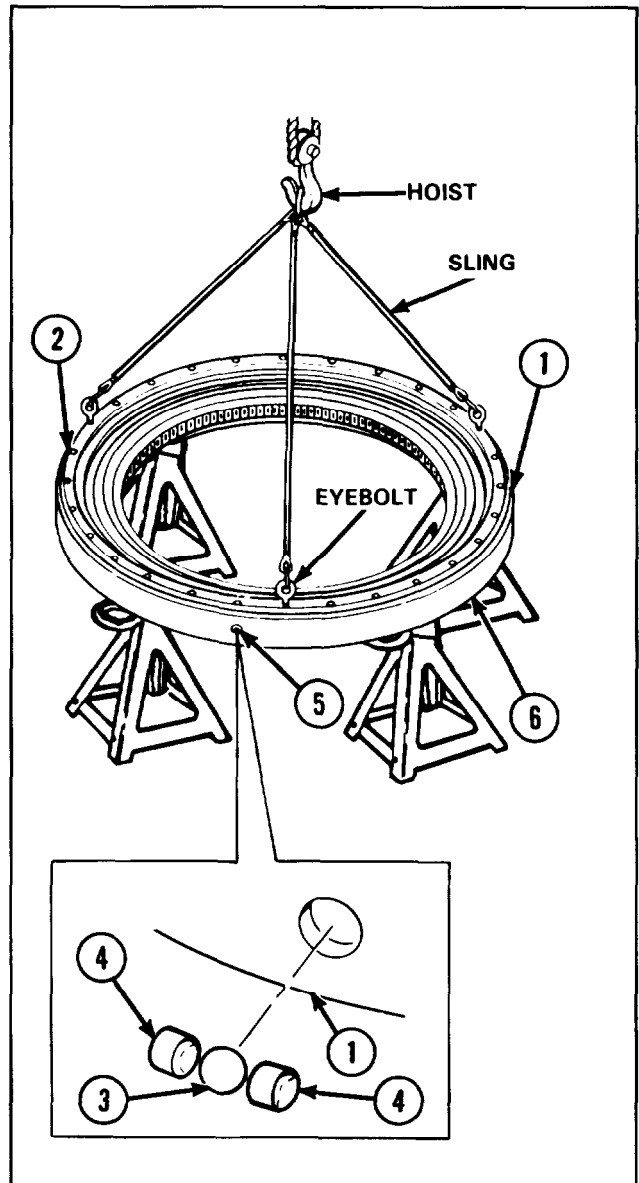
Prior to installation, lubricate bearing balls using grease (item 12, appx B).

- 8 Install bearing ball (3) through turret filler plug hole (5) in outer race (1) and push bearing ball (3) to one side in groove.

CAUTION

Bearing balls must fit into curved-in surfaces of ball spacers.

- 9 Install ball spacer (4) through turret filler plug hole (5) in outer race (1) and fit to bearing ball (3) in groove.
- 10 Turn inner race (2) and continue installing one bearing ball (3) and one ball spacer (4) until plain bearing unit (6) is filled (100 to 103 bearing balls and 100 to 103 ball spacers). The last part installed must be a bearing ball (3) fitted between two ball spacers (4).
- 11 Lower inner race (2) and remove sling and eyebolts.



2-74. MAINTENANCE OF PLAIN BEARING UNIT AND OUTER RACE ASSEMBLY (CONT).

REASSEMBLY (CONT)

12 Align pin holes in turret filler plug (7) and outer race (1) and insert turret bearing filler plug (7) into outer race (1).

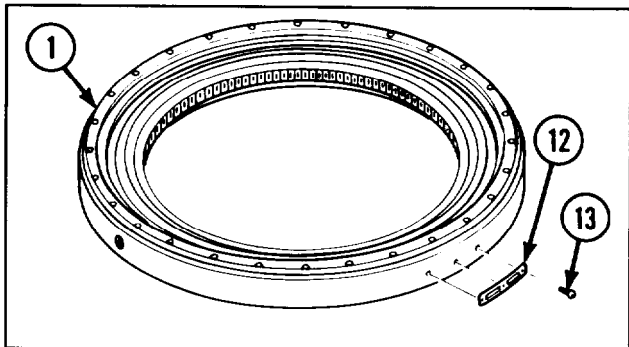
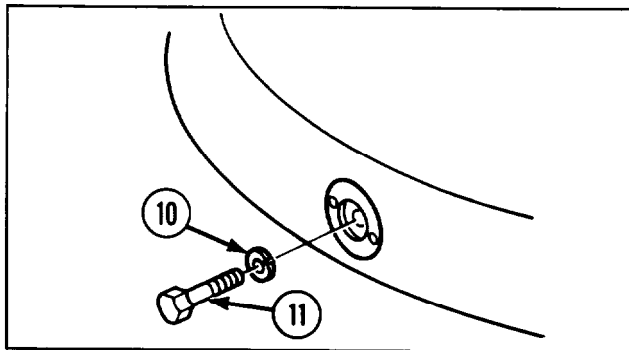
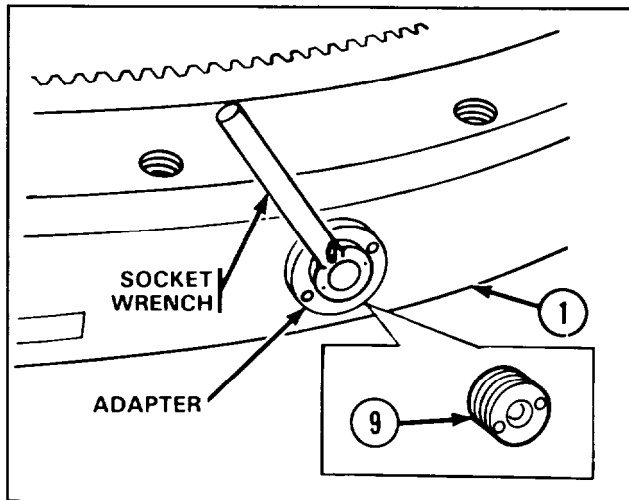
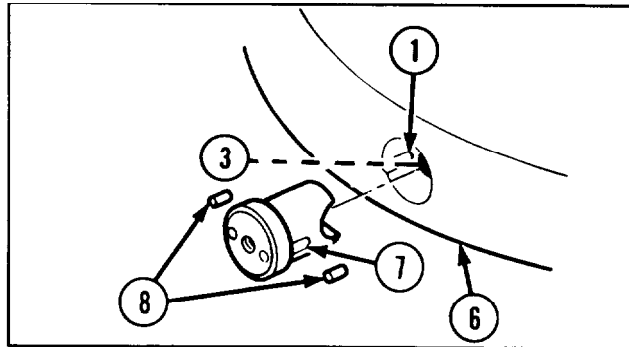
13 Using a soft face hammer (mallet), tap turret bearing filler plug (7) into outer race (1) until it seats against last bearing ball (3) installed in plain bearing unit (6).

14 Install two filler plug headless straight pins (8) through turret filler plug (7) into outer race (1) and tap into place.

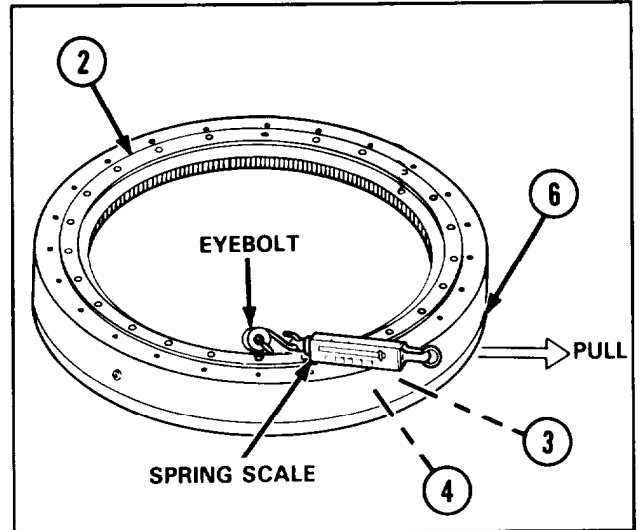
15 Using adapter and socket wrench, install turret filler plug retainer (9) in outer race (1). Torque turret filler plug retainer (9) to 150 ft-lb (203 N-m).

16 Install new lockwasher (10) and cap-screw (11). Torque capscrew (11) to 150 ft-lb (203 N-m).

17 If removed, install new turret bearing identification plate (12) by drilling three holes, 0.052 in. (0.132 cm) in diameter and 0.32 in. (0.813 cm) deep, next to the old location of the turret bearing identification plate on the outer race (1) and securing with three new drive screws (13).



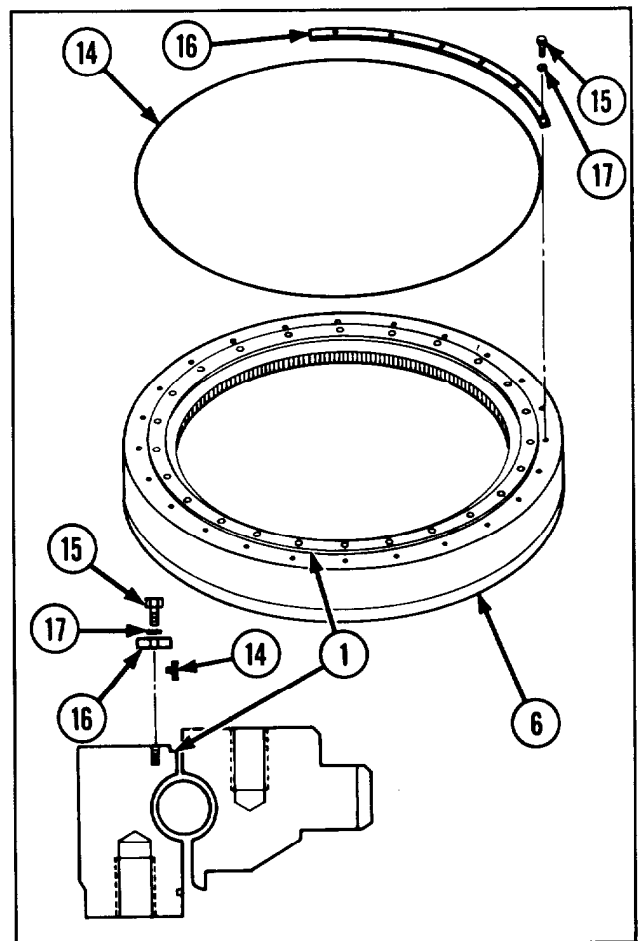
- 18 Install eyebolt in threaded hole of inner race (2).
- 19 Install spring scale to eyebolt. Pull spring scale until inner race (2) moves, and read spring scale measurement. Spring scale must read 75 lb (34 kg) or less for proper bearing load before lubrication.
- 20 If spring scale reading exceeds 75 lb (34 kg), disassemble plain bearing unit. Inspect all bearing balls (3) for damage. Check bearing balls (3) and ball spacers (4) for proper placement in plain bearing unit (6); see reassembly steps 8 thru 10.
- 21 If spring scale reading indicates proper bearing load, remove spring scale and eyebolt.



CAUTION

New lower rubber strip seal assembly must slide on inner race. Make sure no adhesive is applied to surface of inner race, or surface of new lower rubber strip seal assembly that contacts inner race.

- 22 Coat seal groove of outer race (1) with adhesive (item 2, appx B).
- 23 Coat mounting edges of new lower rubber strip seal assembly (14) with adhesive (item 2, appx B).
- 24 Install new lower rubber strip seal assembly (14) in groove of outer race (1). Trim new rubber strip seal assembly (14) to length during installation.
- 25 Coat threads of 24 capscrews (15) with sealing compound (item 21, appx B).
- 26 Install four seal retaining plates (16) over new rubber strip seal assembly (14) and secure to outer race (1) with 24 new lockwashers (17) and 24 capscrews (15).
- 27 Using sling, turn plain bearing unit (6) to rest on inner race.



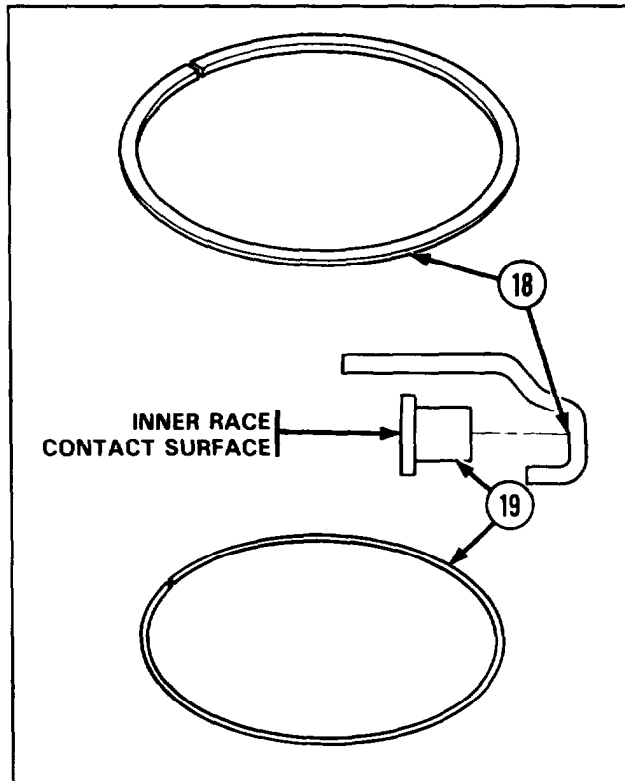
2-74. MAINTENANCE OF PLAIN BEARING UNIT AND OUTER RACE ASSEMBLY (CONT).

REASSEMBLY (CONT)

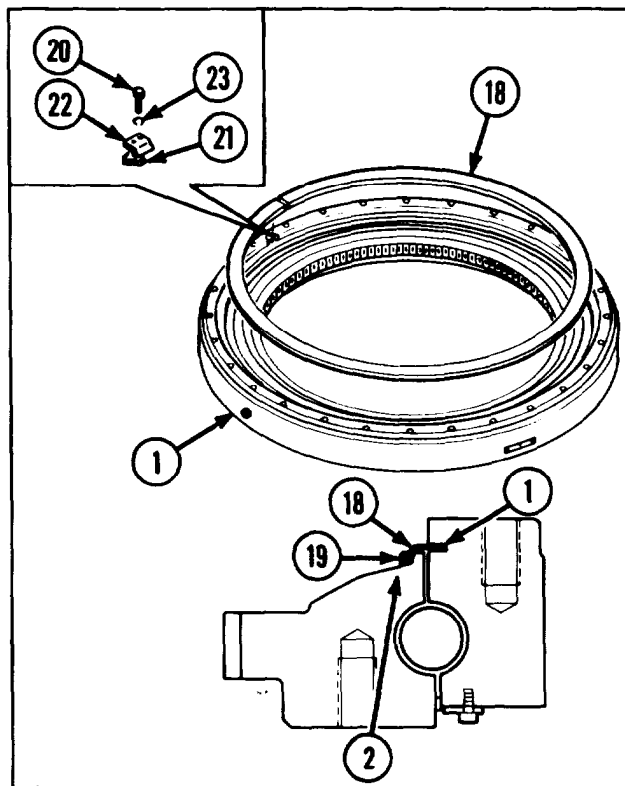
CAUTION

New upper rubber strip seal assembly must slide on inner race. Make sure no adhesive is applied to surface of new upper rubber strip seal assembly that contacts inner race.

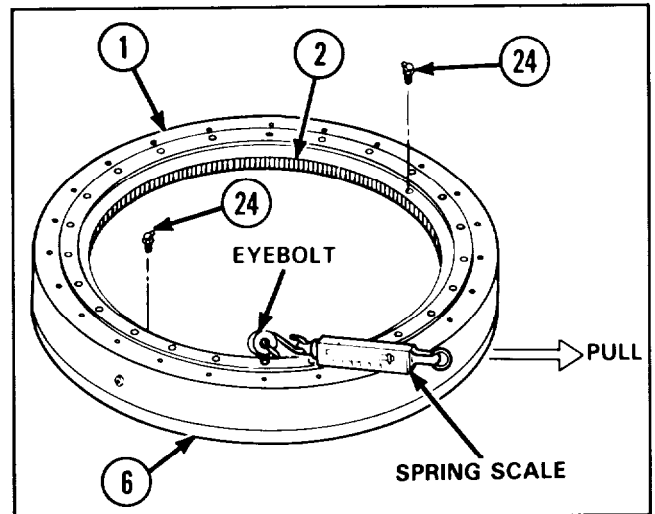
- 28 Coat seal mounting surface of retaining ring (18) with adhesive (item 2, appx B).
- 29 Coat mounting edges of new upper rubber strip seal assembly (19) with adhesive (item 2, appx B).
- 30 Beginning at one end of retaining ring (18), install new upper rubber strip seal assembly (19) around retaining ring (18) and trim to length.



- 31 Install retaining ring (18) with ends centered on clip mounting surface of outer race (1). Fit edge of retaining ring (18) into groove in outer race (1) with new rubber strip seal assembly (19) fitted against surface of inner race (2).
- 32 Coat threads of two capscrews (20) with sealing compound (item 21, appx B).
- 33 Install turret keeper plate (21) and outer seal retaining strap (22) over ends of retaining ring (18). and secure using two new lockwashers (23) and two cap-screws (20).
- 34 Apply adhesive silicone (item 4, appx B) around turret keeper plate (21), outer seal retaining strap (22), and retaining ring (18) where it contacts outer race (1).

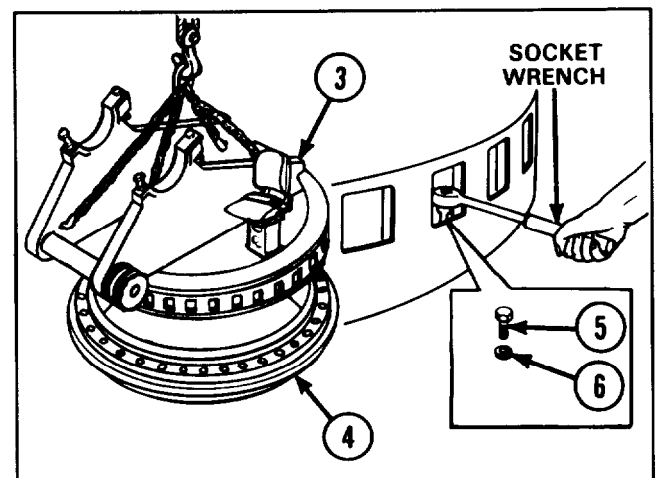
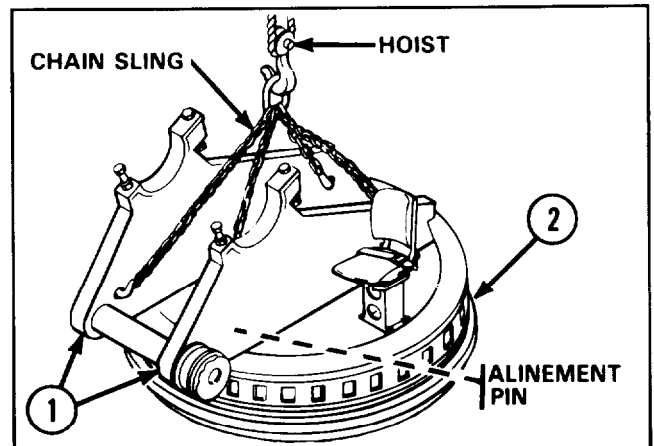


- 35 Install six lubrication fittings (24) in inner race (2).
- 36 Lubricate plain bearing unit (6) with grease (item 12, appx B). During lubrication, rotate outer race (1) at least two complete turns to be sure plain bearing unit (6) is packed with grease (item 12, appx B). Plain bearing unit (6) holds 4.0 lb (1.8 kg) of grease (item 12, appx B).
- 37 Install eyebolt in threaded hole in outer race (1).
- 38 Attach spring scale on eyebolt and pull on spring scale until outer race (1) moves. Observe reading. Reading must be 95 lb (43 kilograms) or less for proper bearing load after reassembly and lubrication.



INSTALLATION

- 1 Provide hoist and chain slings of 20,000 lb (9072 kg) minimum lifting capability.
- 2 Attach chain slings to four lifting points in turret trunnions (1).
- 3 Install two fabricated alinement pins (figure 8, appx C) in threaded holes in outer race (2). Alinement pins should be 180 degrees apart.
- 4 Position turret assembly (3) over plain bearing unit (4) and lower turret assembly into place.
- 5 Coat threads of capscrews (5) with sealing compound (item 21, appx B) and, using torque wrench, install 28 new lock-washers (6) and 28 capscrews. Torque capscrews to 200 to 215 ft-lb (271 to 292 N-m).
- 6 Remove alinement pins.



Section V. PREPARATION FOR STORAGE OR SHIPMENT

Refer to TM 9-2350-304-20-2 for detailed preparation for storage or shipment.

CHAPTER 3

GENERAL SUPPORT MAINTENANCE INSTRUCTIONS

There are no general support maintenance procedures at this time.

APPENDIX A REFERENCES

A-1. SCOPE

This appendix lists all forms, field manuals, technical bulletins, technical manuals, and miscellaneous publications referenced in this manual.

A-2. FORMS

DA Form 2028	Recommended Changes to Publications and Blank Forms
DA Form 2028-2	Recommended Changes to Equipment Technical Publications
SF 368	Product Quality Deficiency Report

A-3. FIELD MANUALS

FM 5-25	Explosives and Demolitions
FM 21-11	First Aid for Soldiers

A-4. TECHNICAL MANUALS

TM 9-214	Inspection, Care, and Maintenance of Antifriction Bearings
TM 9-237	Operator's Manual for Welding Theory and Application
TM 9-1000-202-14.	Operator's, Organizational, Direct Support, and General Support Maintenance Manual for Evaluation of Cannon Tubes
TM 9-2350-274-BD	Operator's, Organizational, Direct Support, and General Support Maintenance, Battlefield Damage Assessment and Repair: for M109/M110/M578 Vehicles
TM 9-2350-304-10	Operator's Manual, Howitzer, Heavy, Self-Propelled 8-inch, M110A2.
TM 9-2350-304-20-2	Unit Maintenance Manual for: Howitzer, Heavy, Self-Propelled: 8-Inch M110A2 (2350-01-041-4590) Armament and Turret Components
TM 9-2350-304-24P-2	Unit, Direct Support, and General Support Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools) for Howitzer, Heavy, Self-Propelled: 8-Inch, M110A2 (2350-01-041-4590) Armament and Turret Components

A-4. TECHNICAL MANUALS (CONT)

TM 9-2350-304-34-1	Direct and General Support Maintenance Manual for: Howitzer, Heavy, Self-Propelled: 8-Inch, M110A2 (2350-01-041-4590) Hull Components
TM 9-4940-468-14	Operator's, Organizational, Direct Support and General Support Maintenance Manual for Tool Outfit, Hydraulic Systems Test and Repair (HSTRU) (4940-01-036-5784)
TM 740-90-1	Administrative Storage of Equipment
TM 750-244-5-1	Destruction of Conventional Ammunition and Improved Conventional Munitions to Prevent Enemy Use
TM 750-244-6	Procedures for Destruction of Tank-Automotive Equipment to Prevent Enemy Use
TM 750-244-7	Procedures for Destruction of Equipment to Prevent Enemy Use

A-5. MISCELLANEOUS PUBLICATIONS

CTA 8-100	Army Medical Department Expendable/Durable Items
CTA 50-970	Expendable/Durable Items (Except Medical, Class V, Repair Parts, and Heraldic Items)
DA PAM 738-750	The Army Maintenance Management System (TAMMS)
MIL-STD-130	Identification Marking of U.S. Military Property

APPENDIX B

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

B-1. SCOPE. This appendix lists expendable/durable supplies and materials you will need to operate and maintain the M110A2 Heavy, Self-propelled Howitzer. This listing is for informational purposes only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, Expendable/Durable Items (Except Medical, Class V, Repair Parts, and Heraldic Items), or CTA 8-100, Army Medical Department Expendable/Durable Items.

B-2. EXPLANATION OF COLUMNS.

a. Column (1)–Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., adhesive (item 3, appx B)).

b. Column (2)–Level. This column identifies the lowest level of maintenance that requires the listed item.

F-Direct Support Maintenance
H-General Support Maintenance

c. Column (3)–National Stock Number. This is the national stock number assigned to the item; use it to request or requisition the item.

d. Column (4)–Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the Contractor and Government Entity Code (CAGEC) in parentheses followed by the part number.

e. Column (5)–Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in., pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	U/M
1	F	5350-00-598-5537	ABRASIVE PAPER, FLINT (58536) A-A-1202	SH
2	F	8040-00-204-5841 8040-00-264-5840 8040-00-543-7170	ADHESIVE MM-A-189 4 oz can 1 gal. container 1 pint can	OZ GL PT
3	F	8040-00-290-4301	ADHESIVE, RUBBER SYNTHETIC 1 qt (0.95 l) can (81348) MMM-A-1617	QT
4	F	8040-00-118-2695	ADHESIVE SILICONE: RTV MIL-A-46146 one tube	TB
5	F	6850-00-281-3061 6850-00-281-1985	CLEANER, LUBRICANT, PRESERVATIVE: CLP (81349) MIL-L-63460 1 gal. container 1 pint container	GL PT
6	F	8305-01-152-3587	CLOTH, LINT-FREE (81349) MIL-C-40129 45 in. (114.30 cm) wide	EA
7	F	5350-00-221-0872	CLOTH, CROCUS: 9 x 11 sheet (81348) P-C-458	EA
8	F	6850-00-281-3061 6850-00-281-1985	DRY CLEANING SOLVENT: liquid, white, 140 degree flash point (SD-21 (81348) P-D-680 4 oz can 1 gal. can	OZ GL
9	F	8010-01-229-9561	ENAMEL, olive drab (81349) MIL-C-22750 1 gal. can	GL
10	F	8010-01-154-2334	ENAMEL, white (81348) MIL-C-22750 1 pint can	PT
11	F	8010-00-082-2435	EPOXY COATING KIT (81349) MIL-C-22750	GL

Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST (CONT)

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
12	F	9150-01-197-7693 9150-01-197-7689 9150-01-197-7690	GREASE, AUTOMOTIVE AND ARTILLERY: (GAA) (81349) MIL-G-10924 14 oz carton 1.75 lb can 6.5 lb can	OZ LB LB
13	F	9150-00-935-9807 9150-00-935-5808	HYDRAULIC FLUID, PETROLEUM BASE: (OHT) (81349) MIL-G-6083 1 qt can 1 gal. can	QT GL
14	F	5350-00-193-7227	LAPPING GRINDING COMPOUND (58536) A-A-1203	TB
15	F	6850-00-621-1819	LEAK DETECTOR (81349) MIL-L-22567C	OZ
16	F	9505-00-684-4843	LOCKWIRE (96906) QQW461	FT
17			Deleted.	
18	F	9150-00-402-2372	LUBRICATING OIL, COMBUSTION ENGINE: (OEA) (15445) MIL-L-46167	QT
19	F	5610-00-141-7838	PAINT, NONSLIP (81349) MIL-W-5044	GL
20	F	8010-00-142-9279	PRIMER, RUST INHIBITOR (81349) MIL-P-23377	QT
21	F	8030-00-081-2339 8030-00-900-4412	SEALING COMPOUND: blue, liquid, C or CV (80244) MIL-S-22473 10 cc bottle 250 cc bottle	CC CC
22	F	3439-00-095-3672	SOLDER, TIN ALLOY (81348) QQ-S-571 1lb (0.45 kg) spool	LB

Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST (CONT)

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
23	F	7510-00-266-6712	TAPE, MASKING (58536) A-A-883	RO
24	F	9505-00-684-4841	WIRE, NONELECTRICAL (96906) MS20995F32-96	F T

APPENDIX C

ILLUSTRATED LIST OF MANUFACTURED ITEMS

C-1. INTRODUCTION. This appendix includes complete instruction for making items authorized to be manufactured or fabricated at direct support and general support maintenance.

a. A part number index in alphanumeric order is provided for cross referencing the part number of the item to be manufactured to the figure which covers fabrication criteria.

b. All bulk materials needed for manufacture of an item are listed by part number or specification number in a tabular list on the illustration.

C-2. MANUFACTURED ITEMS PART NUMBER INDEX.

Part Number	Figure Number
ASTM A108	1
MS28762-6-0140	2
MS28762-6-0200	3
MS28762-8-0260	4
MS28762-10-0450	5
M43436/1-1	6
RRC271, Type II, CL6	7
595419	8
9344321	9
No part number available.	10
No part number available.	11
No part number available.	12
No part number available.	13
No part number available.	14

C-3. MANUFACTURED ITEMS ILLUSTRATIONS.

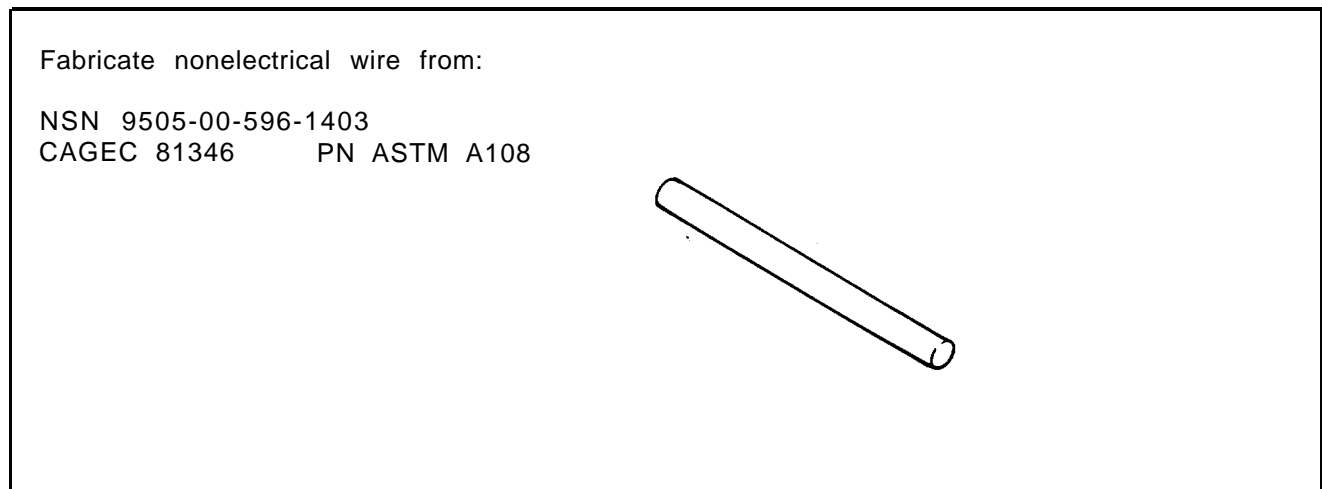


Figure 1. Nonelectrical Wire (ASTM A108).

C-3. MANUFACTURED ITEMS ILLUSTRATIONS (CONT).

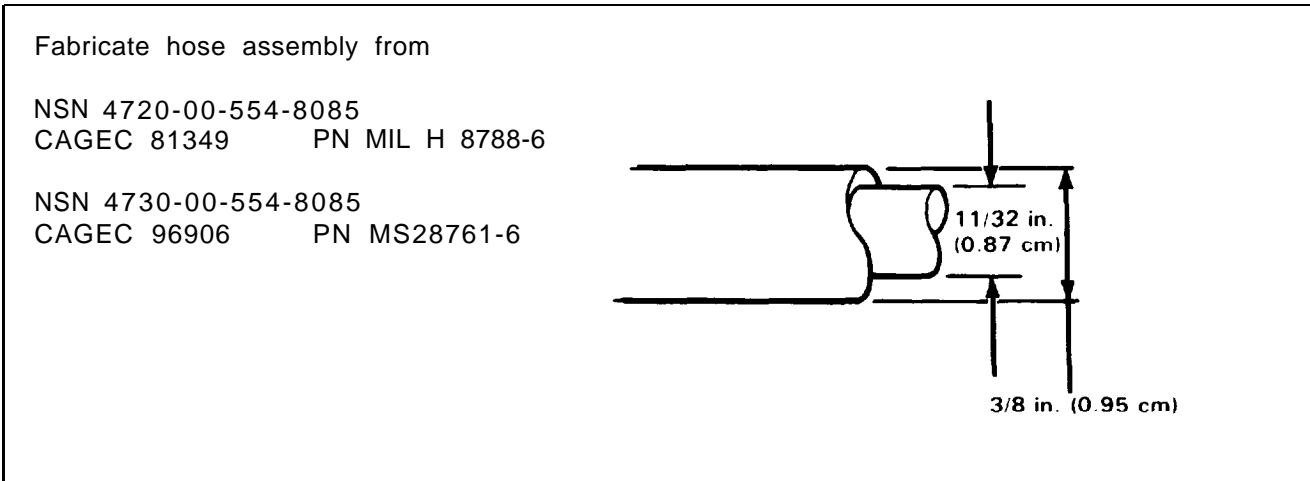


Figure 2. Hose Assembly (MS28762-6-0140)

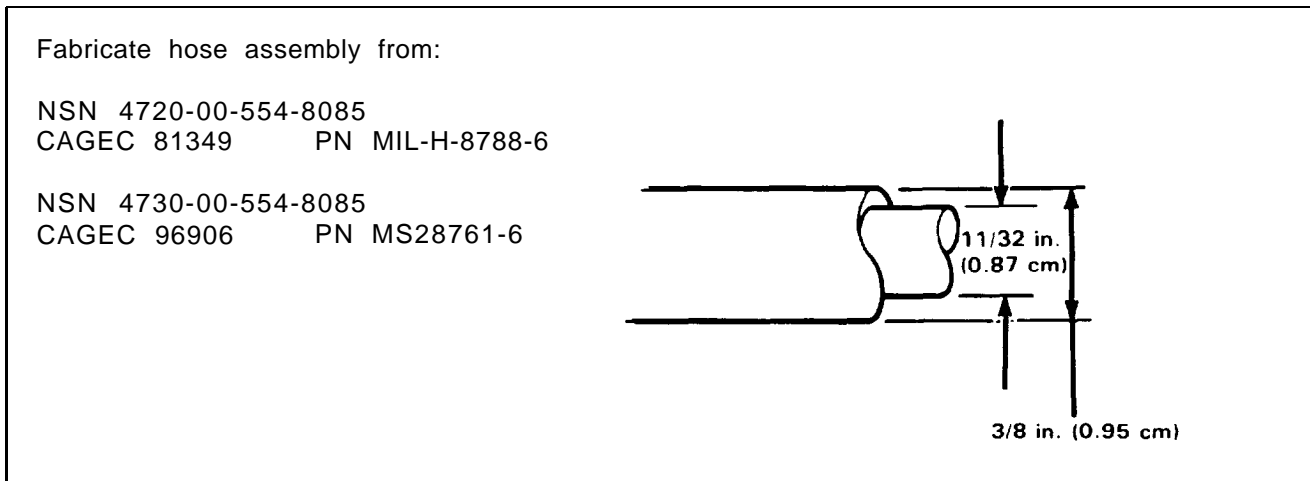


Figure 3. Hose Assembly (MS28 762-6-0200).

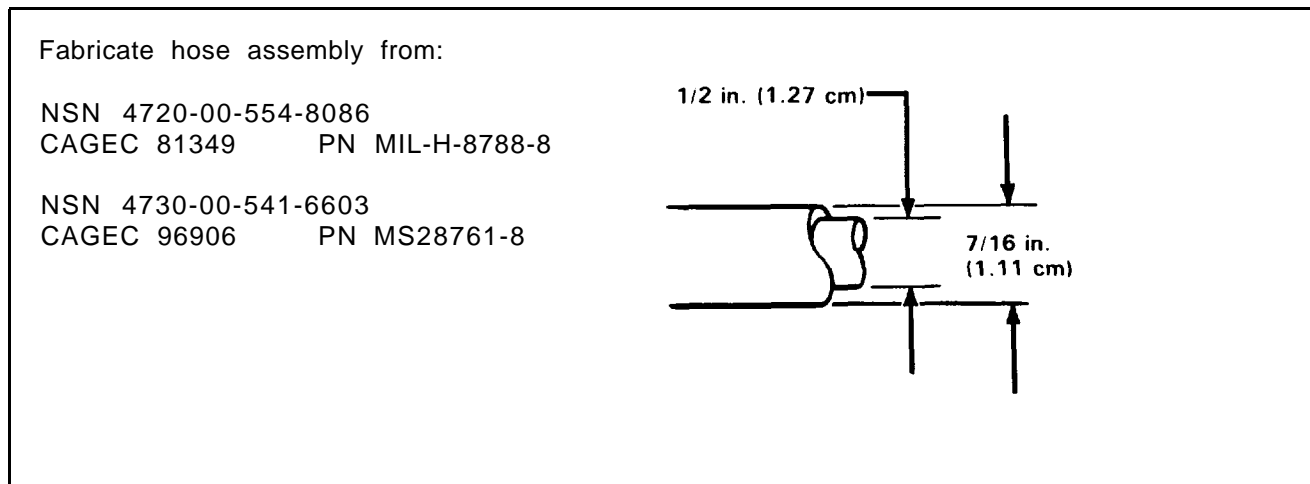


Figure 4. Hose Assembly (MS28762-8-0260).

Fabricate hose assembly from:

NSN 4720-00-554-8087
 CAGEC 81349 PN MIL-H-8788-10

NSN 4730-00-541-6608
 CAGEC 96906 PN MS28761-10

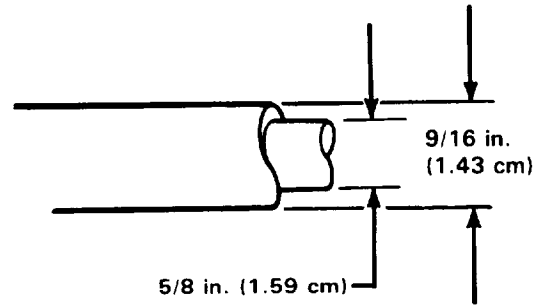


Figure 5. Hose Assembly (MS28762-10-0450).

Fabricate marker band from:

NSN 9905-00-752-4649
 CAGEC 81349 PN M43436/1-1

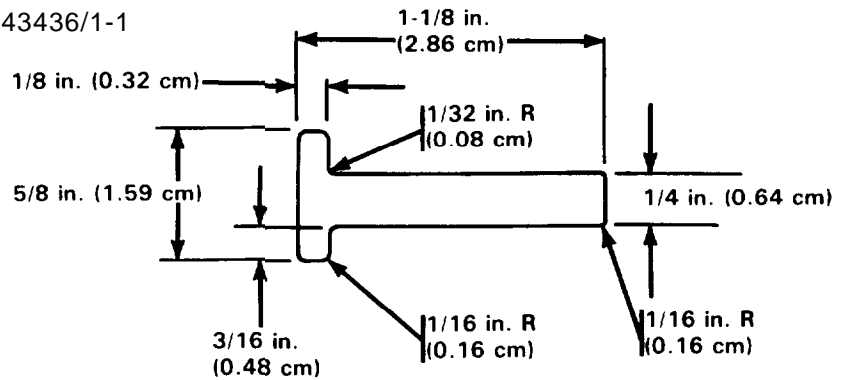


Figure 6. Marker Band (M43436/1-1).

Fabricate safety chain from:

NSN 4010-00-554-8661
 CAGEC 84248 PN 42016550



Figure 7. Safety Chain (RRC271, Type II, CL6).

C-3. MANUFACTURED ITEMS ILLUSTRATIONS (CONT).

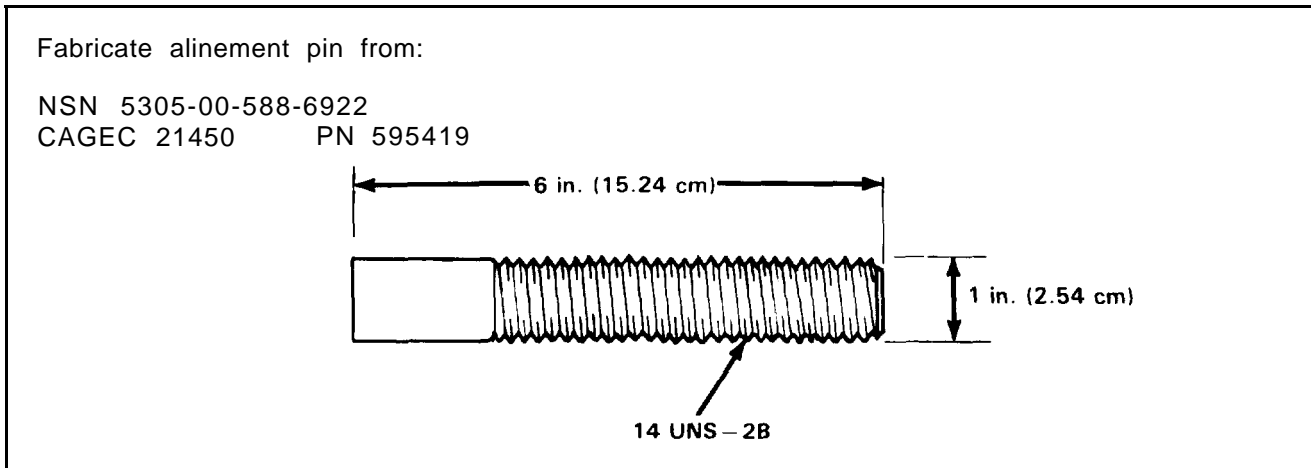


Figure 8. Pin, Alinement (595419).

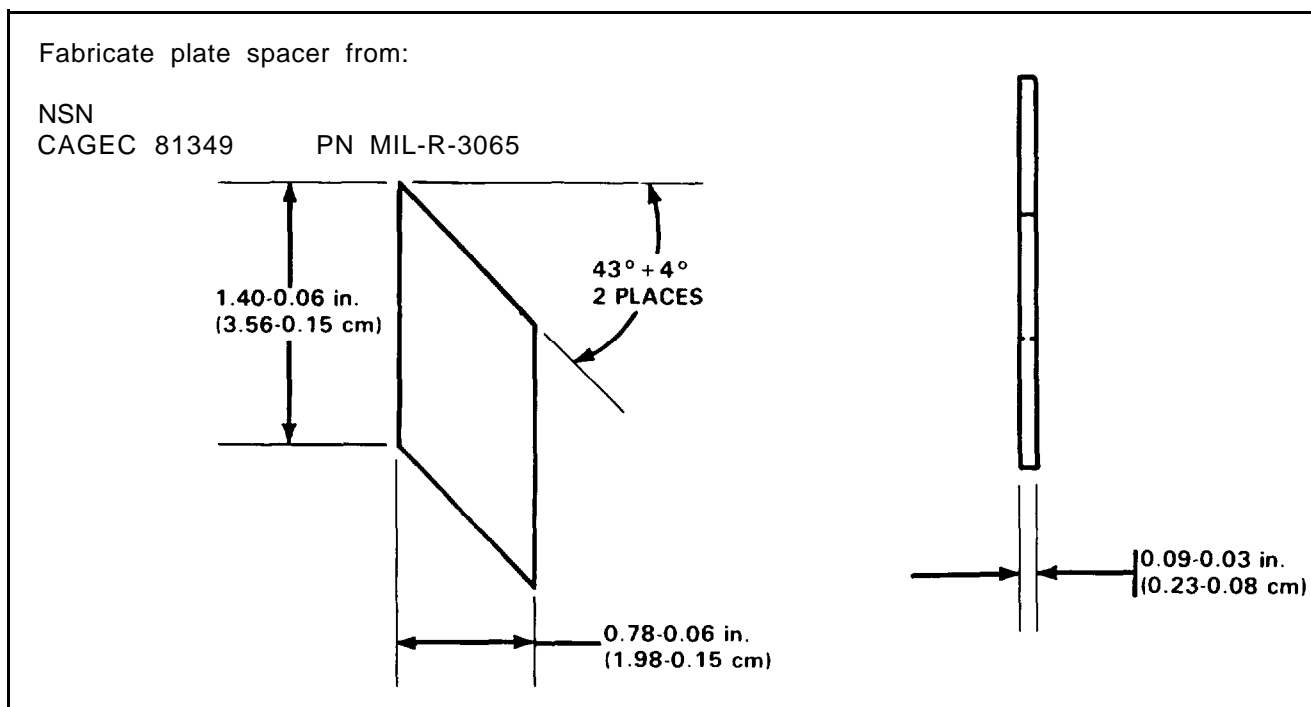


Figure 9. Spacer, Plate (9344321).

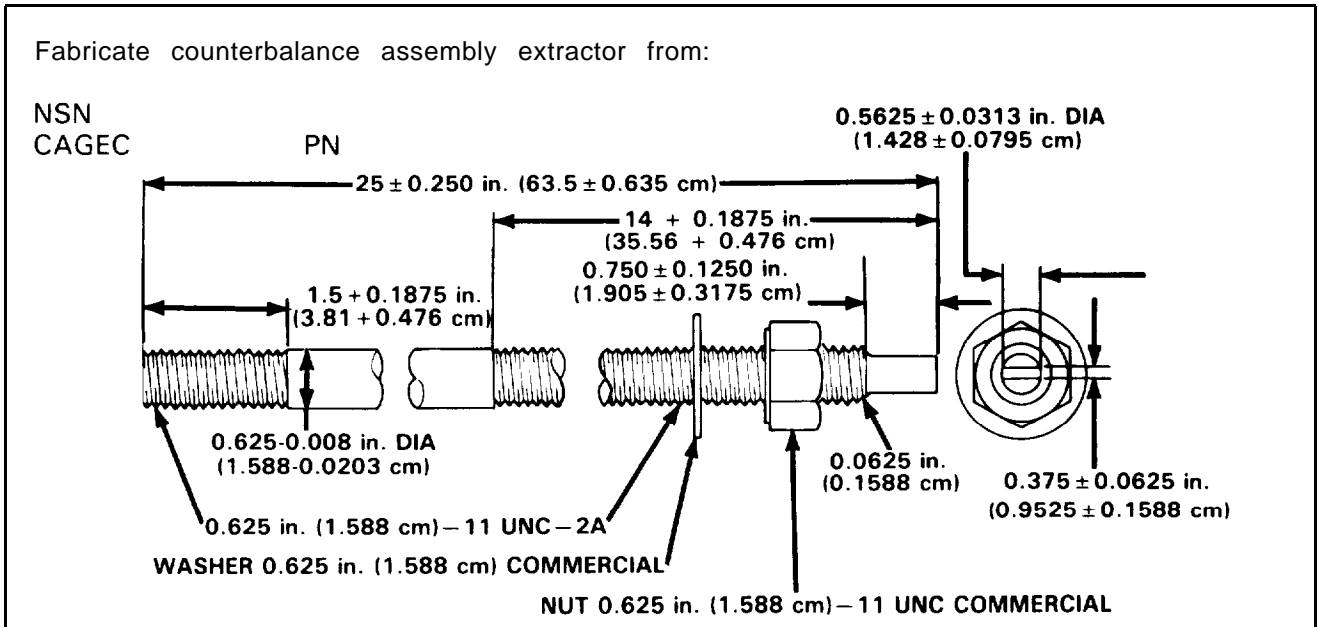


Figure 10. Extractor, Counterbalance Assembly.

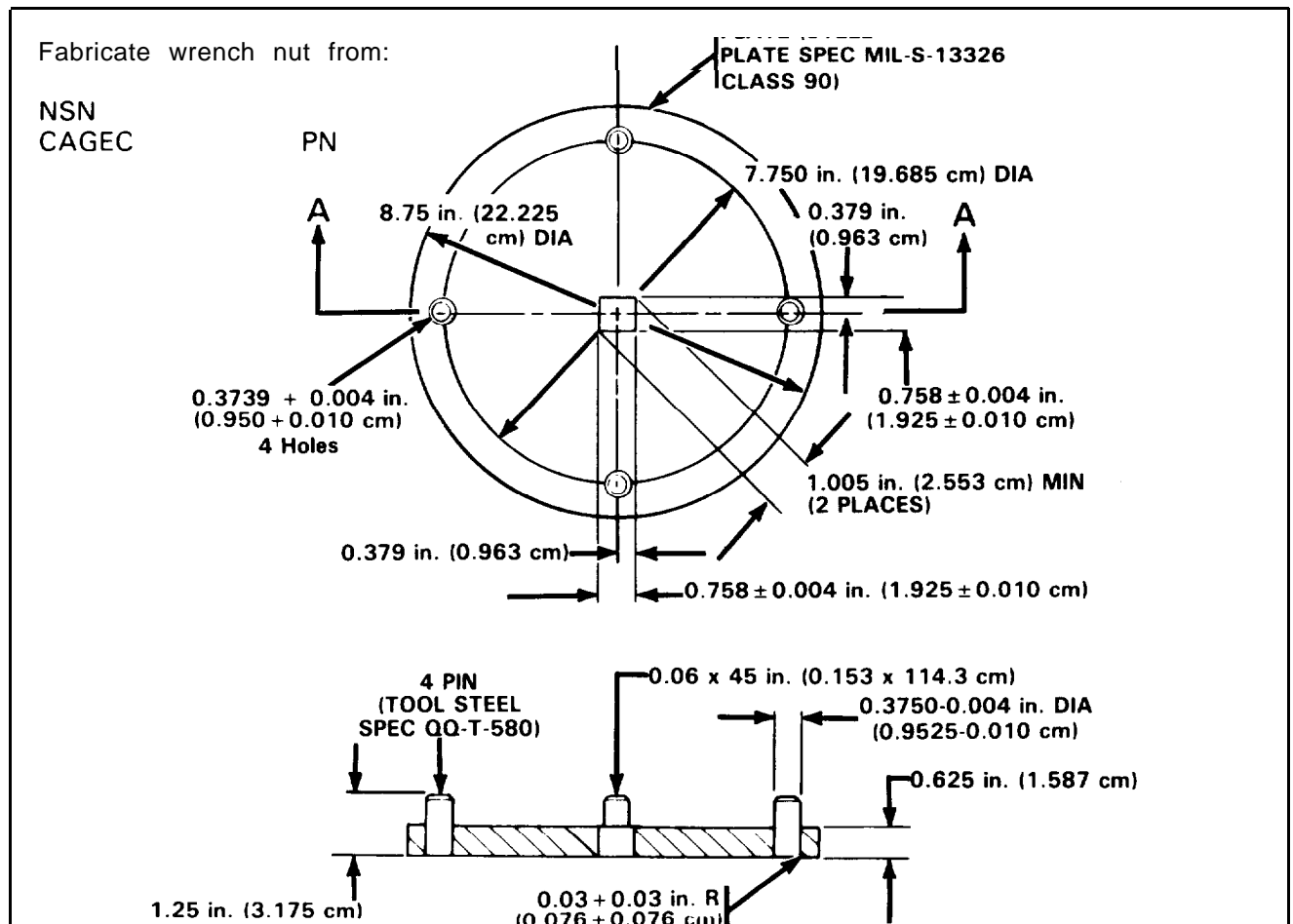


Figure 11. Accumulator Headnut Wrench.

C-3. MANUFACTURED ITEMS ILLUSTRATIONS (CONT).

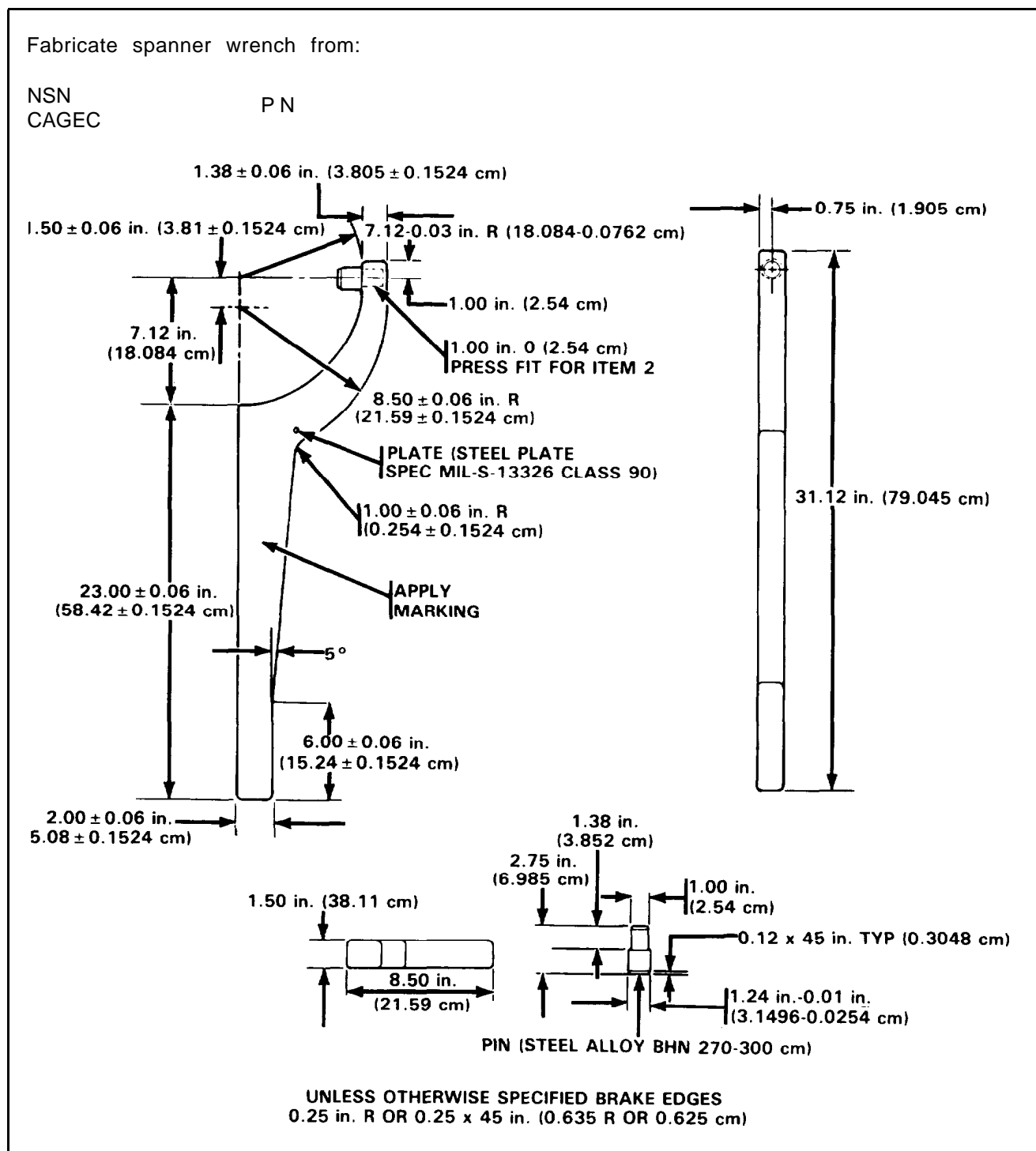


Figure 12. Wrench, Spanner.

Fabricate quadrant from:

NSN
CAGEC PN

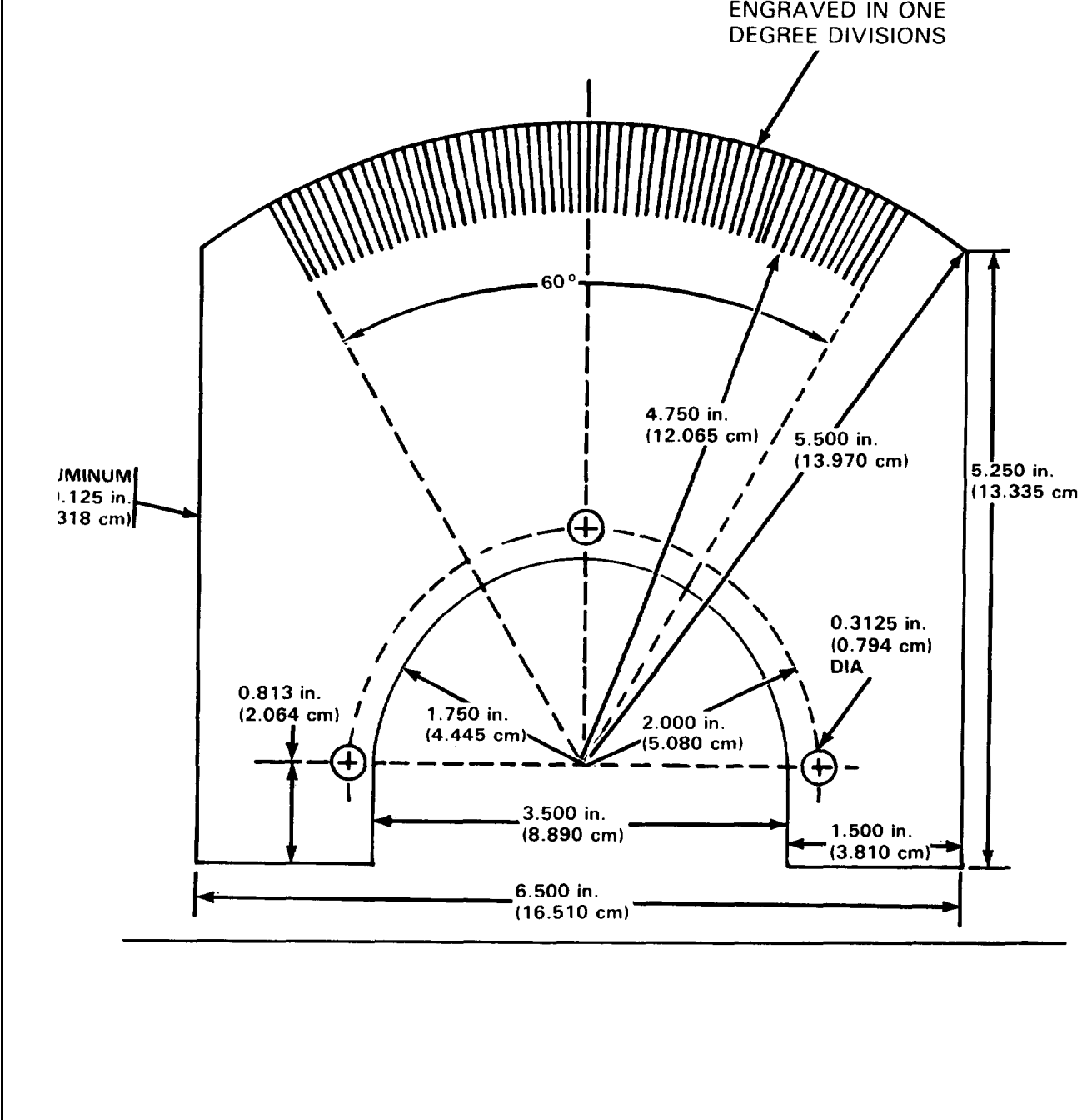


Figure 13. Quadrant.

C-3. MANUFACTURED ITEMS ILLUSTRATIONS (CONT).

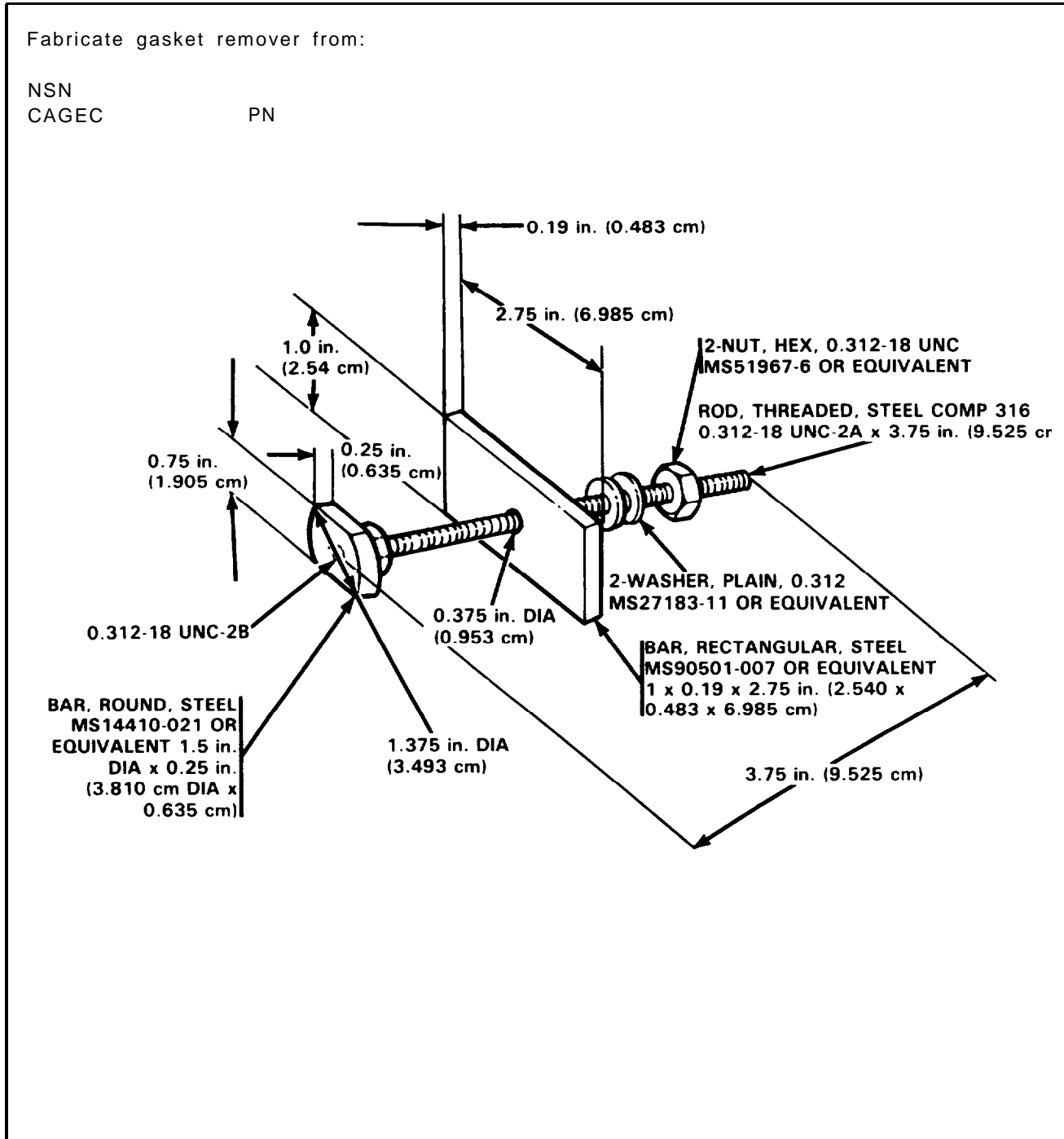


Figure 14. Gasket Remover.

APPENDIX D TORQUE VALUES

D-1. Follow torque values given throughout this manual. When no torque value is given, follow the guide to prevent damaging parts.

D-2. The guide is based on using clean, dry threads.

TORQUE VALUE GUIDE

SCREW DIAMETER	TORQUE NO DASHES (SAE GRADE 2)	TORQUE 3 DASHES (SAE GRADE 5)	TORQUE 6 DASHES (SAE GRADE 8)	SOCKET SIZE
1/4-20 UNC	3-5 ft-lb (4-7 N-m)	6-8 ft-lb (8-11 N-m)	10-12 ft-lb (14-16 N-m)	7/16
1/4-28 UNF	4-6 ft-lb (5-8 N-m)	8-10 ft-lb (11-14 N-m)	9-14 ft-lb (12-19 N-m)	7/16
5/16-18 UNC	7-11 ft-lb (9-15 N-m)	13-17 ft-lb (18-23 N-m)	19-24 ft-lb (26-33 N-m)	1/2
5/16-24 UNF	7-11 ft-lb (9-15 N-m)	14-19 ft-lb (19-26 N-m)	23-28 ft-lb (31-38 N-m)	1/2
3/8-16 UNC	14-18 ft-lb (19-24 N-m)	26-31 ft-lb (35-42 N-m)	39-44 ft-lb (53-60 N-m)	9/16
3/8-24 UNF	15-19 ft-lb (20-26 N-m)	30-35 ft-lb (41-47 N-m)	46-51 ft-lb (62-69 N-m)	9/16
7/16-14 UNC	23-28 ft-lb (31-38 N-m)	44-49 ft-lb (60-66 N-m)	65-70 ft-lb (88-95 N-m)	5/8
7/16-20 UNF	23-28 ft-lb (31-38 N-m)	44-54 ft-lb (60-73 N-m)	69-79 ft-lb (94-107 N-m)	5/8
1/1-13 UNC	32-37 ft-lb f43-50 N-m)	65-75 ft-lb (88-102 N-m)	95-105 ft-lb (129-142 N-m)	3/4
1/2-20 UNF	34-41 ft-lb (46-6 N-m)	73-83 ft-lb (99-113 N-m)	113-123 ft-lb (153-167 N-m)	3/4
9/16-12 UNC	46-56 ft-lb (62-76 N-m)	100-110 ft-lb (136-149 N-m)	145-155 ft-lb (197-210 N-m)	13/16
9/16-18 UNF	47-57 ft-lb (64-77 N-m)	107-117 ft-lb (145-159 N-m)	165-175 ft-lb (224-237 N-m)	13/16
5/8-11 UNC	62-72 ft-lb (84-98 N-m)	140-150 ft-lb (190-203 N-m)	200-210 ft-lb (271-285 N-m)	15/16
5/8-18 UNF	67-77 ft-lb (91-104 N-m)	153-163 ft-lb (207-221 N-m)	235-245 ft-lb (319-332 N-m)	15/16
3/4-10 UNC	106-116 ft-lb (144-157 N-m)	260-270 ft-lb (353-366 N-m)	365-375 ft-lb (495-508 N-m)	1-1/4
3/4-16 UNF	115-125 ft-lb (156-169 N-m)	268-278 ft-lb (363-377 N-m)	417-427 ft-lb (565-579 N-m)	1-1/4
7/8-9 UNC	165-175 ft-lb (224-237 N-m)	385-395 ft-lb (522-536 N-m)	595-605 ft-lb (807-820 N-m)	1-5/16

TORQUE VALUE GUIDE (CONT)

SCREW DIAMETER	TORQUE NO DASHES (SAE GRADE 2)	TORQUE 3 DASHES (SAE GRADE 5)	TORQUE 6 DASHES (SAE GRADE 8)	SOCKET SIZE
7/8-14 UNF	178-188 ft-lb (241-255 N-m)	424-434 ft-lb (575-588 N-m)	663-673 ft-lb 1899-912 N-m)	1-5/16
1-8 UNC	251-261 ft-lb (340-354 N-m)	580-590 ft-lb (786-800 N-m)	900-910 ft-lb (1220-1234 N-m)	1-1/2
1-14 UNF	255-265 ft-lb (346-359 N-m)	585-634 ft-lb (793-860 N-m)	943-993 ft-lb (1279-1346 N-m)	1-1/2
1-1/4-7 UNC	451-461 ft-lb (611-625 N-m)	1070-1120 ft-lb (1451-1518 N-m)	1767-1817 ft-lb (2396-2463 N-m)	1-7/8
1-1/4-12 UNF	488-498 ft-lb (662-675 N-m)	1211-1261 ft-lb (1642-1710 N-m)	1963-2013 ft-lb (2661-2729 N-m)	1-7/8
1-1/2-6 UNC	727-737 ft-lb (986-999 N-m)	1899-1949 ft-lb (2575-2642 N-m)	3111-3161 ft-lb (4218-4286 N-m)	2-1/4
1-1/2-12 UNF	816-826 ft-lb (1106-1120 N-m)	2144-2194 ft-lb (2907-2975 N-m)	3506-3556 ft-lb (4753-4821 N-m)	2-1/4

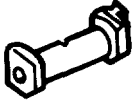


APPENDIX E SPECIAL TOOLS AND EQUIPMENT

E-1. GENERAL. Repair parts, special tools, and support equipment are issued for maintaining the vehicle. Tools and equipment should not be used for purposes other than those prescribed. When not in use, they should be properly stowed.

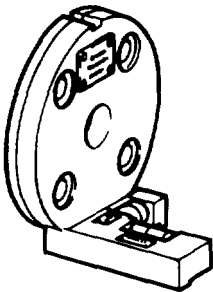
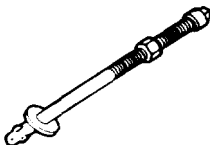
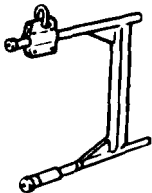

E-2. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT. Special tools and equipment necessary to perform the maintenance described in this manual are listed for your information. Special tools and support equipment are listed in TM 9-2350-304-24P-2 which is the authority for requisitioning replacements.

E-3. REPAIR PARTS. Repair parts are issued for the replacement of parts that have become worn, broken, or otherwise unserviceable. Repair parts are listed in TM 9-2350-304-24P-2 which is the authority for requisitioning replacements.



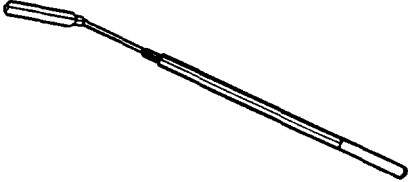
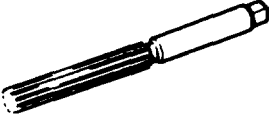
SPECIAL TOOLS AND EQUIPMENT

ITEM	NUMBER	USE
 ADAPTER, MUZZLE	(11579530)	Used with fixture 4933-00-868-6872 to remove or install muzzle brake.
 ADAPTER, RETAINER	5120-00-472-2731 (11643222)	Used to remove turret bearing plug retainer.
 BOLT, EYE LIFTING	5306-00-522-2910 (5222910)	To lift turret bearing locking ring, roller ring, or turret bearing.

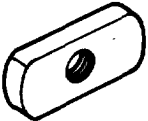

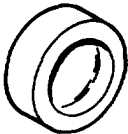
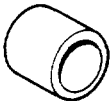
SPECIAL TOOLS AND EQUIPMENT (CONT)

ITEM	NUMBER	USE
 <p>END PLATE GAGE</p>	<p>4931-00-863-5651 (82132591)</p>	<p>To aline adapter plates (fire control).</p>
 <p>EXTRACTOR ASSEMBLY, PISTON REPLENISHER</p>	<p>4933-00-711-4815 (7114815)</p>	<p>To maintain tension to remove or install piston guide.</p>
 <p>FIXTURE, MUZZLE BRAKE</p>	<p>4933-00-868-6872 (11576380)</p>	<p>To remove or install breech mechanism. Used with muzzle adapter (11579530) to remove or install muzzle brake.</p>
 <p>GAGE ASSEMBLY, AIR PRESSURE, DIAL INDICATING</p>	<p>6685-00-646-6913 (MILG8348) (ASG)</p>	<p>Used with regulator 4910-00-861-2068 to test air pressure 0 to 1500 psi (TM 9-2350-304-20-2).</p>

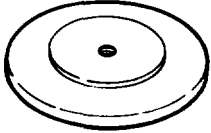
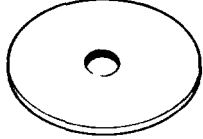


SPECIAL TOOLS AND EQUIPMENT (CONT)

ITEM	NUMBER	USE
 <p>HANDLE, REMOVER AND REPLACER</p>	<p>5120-00-316-9182 (7950864)</p>	<p>Used with 5120-00-722-4063 and 5120-00-722-4071, remover and replacer.</p>
 <p>HANDLE, REPLACER</p>	<p>(7083883)</p>	<p>To install encased oil seal in oil seal retainer.</p>
 <p>MAGNETIC RETRIEVING TOOL</p>	<p>5120-00-545-4268 (GGG-F-00360)</p>	<p>To retrieve turret ball bearings.</p>
 <p>REAMER, 3/8-INCH</p>	<p>5110-00-255-6579 (GGG-R-180)</p>	<p>To ream holes for mounting fire control adapter plates.</p>

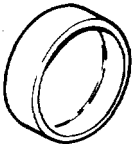
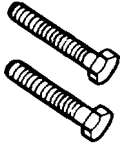

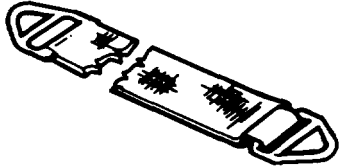
SPECIAL TOOLS AND EQUIPMENT (CONT)

ITEM	NUMBER	USE
 <p>REMOVER AND REPLACER, BEARING</p>	<p>5120-00-722-4063 (10902750)</p>	<p>Used with handle 5120-00-316-9182 to replace idler gear bearings, pinion bearing, or planetary gear.</p>
 <p>REMOVER AND REPLACER, BEARING AND CLUTCH</p>	<p>5120-00-733-8932 (10904175)</p>	<p>To replace traversing internal gear bearing or remove slip clutch cup from bevel pinion,</p>
 <p>REPLACER/BEARING</p>	<p>5120-00-733-8962 (10904194)</p>	<p>To replace elevating or traversing power unit miter gear bearings.</p>
 <p>REPLACER, BEARING</p>	<p>5120-00-602-4855 (8350230)</p>	<p>To replace elevating or traversing power unit differential gear bearings.</p>

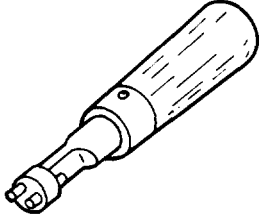
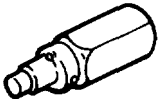
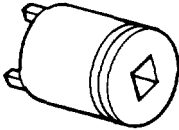
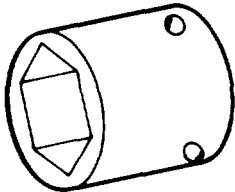
SPECIAL TOOLS AND EQUIPMENT (CONT)

ITEM	NUMBER	USE
 <p>REPLACER, BEARING AND BUSHING</p>	<p>5120-00-212-4722 (8390340)</p>	<p>To replace elevating planetary carrier bearing.</p>
 <p>REPLACER, BEARING AND SEAL</p>	<p>5120-00-733-8978 (109042161)</p>	<p>To replace elevating pinion shaft carrier bearing; elevating pinion shaft carrier seals; or elevating gear house bearing.</p>
 <p>REPLACER, BUSHING</p>	<p>5120-00-860-9580 (10908799)</p>	<p>To replace rammer traversing arm lower bushing.</p>
 <p>REPLACER, EYE BEARING</p>	<p>5120-00-733-8979 (10904217)</p>	<p>To replace planetary pinion bearings and bearing in guide and liner.</p>


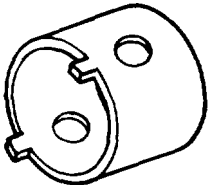


SPECIAL TOOLS AND EQUIPMENT (CONT)

ITEM	NUMBER	USE
 <p>REPLACER, OIL SEAL</p>	<p>5120-00-378-4323 (8375152)</p>	<p>To replace elevating or traversing power unit pinion bearing.</p>
 <p>SCREW, JACKING</p>	<p>4910-00-722-3915 (10904195)</p>	<p>To remove traversing internal gear bearing (two required per operation).</p>
 <p>SEAL INSERTER</p>	<p>5120-00-733-8915 (10904173)</p>	<p>To replace traversing final drive seals.</p>
 <p>SLING</p>	<p>5340-00-699-9307 (87354401)</p>	<p>To remove tube from M174 gun mount.</p>

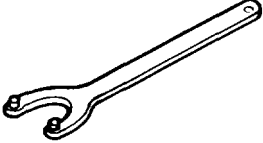
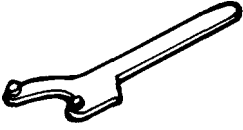
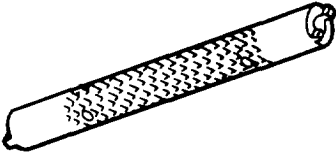

SPECIAL TOOLS AND EQUIPMENT (CONT)

ITEM	NUMBER	USE
 <p>WRENCH, AIR CHECK VALVE GUIDE</p>	<p>5120-00-619-3630 (6193630)</p>	<p>To remove or install relief valve guide from counter-recoil front head assembly.</p>
 <p>WRENCH, AIR CHECK VALVE HOUSING</p>	<p>5120-00-619-3825 (6193825)</p>	<p>To remove or install relief valve housing from counter-recoil front head assembly.</p>
 <p>WRENCH, AIR SEAL</p>	<p>5120-00-733-8975 (10904215)</p>	<p>To remove or install elevating and traversing handcrank shaft bearing locknut.</p>
 <p>WRENCH, RECOIL ROD NUT</p>	<p>5120-00-556-9223 (5569223)</p>	<p>Used with wrench 4933-00-610-5331 to remove or install counterrecoil rod nut.</p>

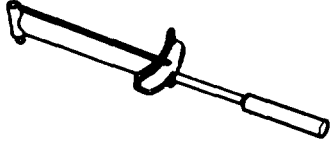
SPECIAL TOOLS AND EQUIPMENT (CONT)

ITEM	NUMBER	USE
 <p>WRENCH, SOCKET</p>	<p>5120-00-610-5331 (6105331)</p>	<p>To remove or Install counter-recoil rod nut..</p>
 <p>WRENCH, SPANNER</p>	<p>5120-00-064-6208 (10919860)</p>	<p>To remove or install trunnion bearing locknuts.</p>
 <p>WRENCH, SPANNER</p>	<p>5120-00-550-7360 (5507360)</p>	<p>To remove or install trunnion bearing caps.</p>
 <p>WRENCH, SPANNER</p>	<p>4933-00-473-7744 (7079082)</p>	<p>To remove or install head of counterrecoil front head assembly.</p>

SPECIAL TOOLS AND EQUIPMENT (CONT)

ITEM	NUMBER	USE
 <p>WRENCH, SPANNER</p>	<p>5120-00-712-4975 (7124975)</p>	<p>To remove or install replenisher guide.</p>
 <p>WRENCH, SPANNER</p>	<p>5120-00-633-1389 (7309882)</p>	<p>To remove or install counterbalance head.</p>
 <p>WRENCH, SPANNER</p>	<p>5120-00-500-7488 (5007488)</p>	<p>Used with 9505-00-596-1403 to remove externally threaded ring from recuperator cylinder rear head assembly.</p>
 <p>WRENCH, SPANNER</p>	<p>5120-00-277-9075 (MS16147-2)</p>	<p>To remove and install traversing internal gear bearing and traversing final drive locknut.</p>

SPECIAL TOOLS AND EQUIPMENT (CONT)

ITEM	NUMBER	USE
 <p>WRENCH, TORQUE</p>	5120-00-221-7983 (A-A-2411)	To torque turret bolts.

ALPHABETICAL INDEX

Subject	Page	Subject	Page
B			
Breech mechanism assembly, hinge pin, breechblock assembly, carrier assembly, and breech ring assembly: (See maintenance of breech mechanism assembly, hinge pin, breechblock assembly, carrier assembly, and breech ring assembly.)		Elevating hydraulic drive unit (See maintenance of elevating hydraulic drive unit.)	
C			
Check valve multiple connector (See maintenance of check valve multiple connector.)		Equilibrator valve assembly (See maintenance of equilibrator valve assembly.)	
Cleaning . . . . .	.2-29	Equipment characteristics, capabilities, and features	1-3
Common tools and equipment. . . . .	.2-3	Equipment data	1-3
Corrosion prevention and control . . . . .	.1-2	Expendable/durable supplies and materials lists	B-1
Counterbalance assembly (See maintenance of counterbalance assembly.)		G	
Counterrecoil piston assembly (See maintenance of counterrecoil piston assembly.)		General . . . . .	.2-27, 2-29
D			
Destruction of army materiel to prevent enemy use	1-1	Gun mount -equilibrator adjusting parts (See maintenance of gun mount – equilibrator adjusting parts.)	
E			
Electrical installation -utility outlet electrical lead (See maintenance of electrical installation -utility outlet electrical lead.)		Gun mount -left and right trunnion caps and bearings (See maintenance of gun mount – left and right trunnion caps and bearings.)	
Elevating final drive assembly and speed gear assembly (See maintenance of elevating final drive assembly and speed gear assembly.)		H	
		Hand grenade box assembly (See maintenance of hand grenade box assembly.)	
		How to use this manual	ii
		Hydraulic accumulator (See maintenance of hydraulic accumulator.)	

ALPHABETICAL INDEX (CONT)

Subject	Page	Subject	Page
H (Cont)			
Hydraulic manifold (See maintenance of hydraulic manifold.)		Location and description of major components	1-3
Hydraulic motor and pump assembly (See maintenance of hydraulic motor and pump assembly.)		Lubrication	2-30
Hydraulic reservoir and hand pump (See maintenance of hydraulic reservoir and hand pump.)		M	
Hydraulic system -elevating control valves, mechanical drive guard, check valve multiple connector, and elevating solenoid valve (See maintenance of hydraulic system-elevating control valves, mechanical drive guard, check valve multiple connector, and elevating solenoid valve.)		Maintenance forms, records, and reports	1-1
Hydraulic system -traversing valves and check valve (See maintenance of hydraulic system-traversing valves and check valve.)		Maintenance of breech mechanism assembly, hinge pin, breechblock assembly, carrier assembly, and breech ring assembly: Disassembly	2-46
		Inspection/repair	2-49
		Reassembly	2-50
		Maintenance of check valve multiple connector: Disassembly	2-389
		Inspection/repair	2-391
		Reassembly	2-392
		Testing	2-394
		Maintenance of counterbalance assembly: Disassembly	2-53
		Inspection/repair	2-55
		Reassembly	2-55
		Maintenance of counterrecoil piston assembly: Inspection/repair	2-142
		Installation	2-142
		Removal	2-141
		Maintenance of electrical installation — utility outlet electrical lead: Inspection/repair	2-462
		Reassembly/installation	2-462
		Removal/disassembly	2-461
		Maintenance of elevating final drive assembly and speed gear assembly: Disassembly	2-278
		Inspection/repair	2-287
		Installation	2-298
		Reassembly	2-288
		Removal	2-276
I			
Illustrated list of manufactured items	C-1		
L			
Lift cylinder assembly (See maintenance of lift cylinder assembly.)			
Linear actuating head assembly (See maintenance of linear actuating head assembly.)			
Loader-rammer installation-pivot arm and related parts (See maintenance of loader-rammer installation-pivot arm and related parts.)			

ALPHABETICAL INDEX (CONT)

Subject	Page	Subject	Page
M			
Maintenance of elevating hydraulic drive unit:		Maintenance of hydraulic manifold:	
Applying hydraulic pressure	2-275	Applying hydraulic pressure	2-425
Inspection/repair	2-264	Disassembly	2-422
Reassembly/installation	2-265	Inspection/repair	2-423
Relieving hydraulic pressure	2-255	Installation	2-424
Removal/disassembly.	2-256	Reassembly.	2-423
Maintenance of equilibrator valve assembly:		Relieving hydraulic pressure	2-420
Disassembly	2-83	Removal	2-421
Inspection/repair	2-83	Testing	2-424
Installation	2-84	Maintenance of hydraulic motor and pump assembly:	
Reassembly.	2-83	Applying hydraulic pressure	2-459
Removal	2-81	Disassembly	2-455
Maintenance of gun mount—		Inspection/repair	2-456
equilibrator adjusting parts:		Installation	2-458
Disassembly	2-66	Reassembly.	2-456
inspection/repair	2-67	Relieving hydraulic pressure	2-453
Installation	2-68	Removal	2-453
Reassembly.	2-67	Maintenance of hydraulic reservoir and hand pump:	
Removal	2-64	Applying hydraulic pressure	2-451
Maintenance of gun mount-left and right trunnion caps and bearings:		Inspection/repair	2-449
Disassembly	2-72	Installation	2-450
Inspection/repair	2-73	Relieving hydraulic pressure	2-447
Installation	2-75	Removal	2-448
Reassembly.	2-74	Maintenance of hydraulic system — elevating control valves, mechanical drive guard, check valve multiple connector, and elevating solenoid valve:	
Removal	2-71	Applying hydraulic pressure	2-403
Service	2-70	Inspection/repair	2-400
Maintenance of hand grenade box assembly:		Installation	2-400
Disassembly	2-162	Relieving hydraulic pressure	2-396
Inspection/repair	2-163	Removal	2-397
Reassembly.	2-163	Maintenance of hydraulic accumulator:	
Maintenance of hydraulic accumulator:		Applying hydraulic pressure	2-446
Applying hydraulic pressure	2-446	Disassembly	2-438
Disassembly	2-438	Inspection/repair	2-439
Inspection/repair	2-439	Installation	2-441
Installation	2-441	Reassembly.	2-440
Reassembly.	2-440	Relieving hydraulic pressure	2-433
Relieving hydraulic pressure	2-433	Removal	2-434
Removal	2-434	Testing	2-441
Testing	2-441		

ALPHABETICAL INDEX (CONT)

Subject	Page	Subject	Page
M (Cont)			
Maintenance of hydraulic system – traversing valves and check valve:		Maintenance of M174 gun mount:	
Applying hydraulic pressure	2-388	Applying hydraulic pressure	2-62
Inspection/repair	2-384	Inspection/repair	2-60
Installation	2-384	Installation	2-60
Relieving hydraulic pressure	2-379	Relieving hydraulic pressure	2-57
Removal	2-380	Removal	2-58
Service	2-379		
Maintenance of lift cylinder assembly:		Maintenance of M174 gun mount assembly-cover, control cam, and related items:	
Disassembly	2-365	Inspection/repair	2-95
Inspection/repair	2-367	Reassembly/installation	2-96
Reassembly.	2-367	Removal/disassembly.	2-92
Testing	2-370		
Maintenance of linear actuating head assembly:		Maintenance of M174 gun mount assembly-gun sight adapters:	
Inspection/repair	2-139	Alinement	2-86
Reassembly/installation	2-139	Inspection/repair	2-85
Removal/disassembly.	2-137	Installation	2-85
		Removal	2-85
Maintenance of loader-rammer installa- tion-pivot arm and related parts:		Maintenance of M174 gun mount assembly-retracting valve:	
Applying hydraulic pressure	2-307	Applying hydraulic pressure	2-109
Inspection/repair	2-305	Disassembly	2-104
Installation	2-305	Inspection/repair	2-107
Relieving hydraulic pressure	2-301	Reassembly.	2-107
Removal	2-302	Relieving hydraulic pressure	2-104
Maintenance of modified recuperator cylinder front head assembly:		Maintenance of M174 gun mount assembly-travel lock group:	
Applying hydraulic pressure	2-145	Disassembly	2-100
Disassembly	2-144	Inspection/repair	2-101
Inspection/repair	2-144	Reassembly	2-102
Reassembly.	2-145		
Relieving hydraulic pressure	2-143	Maintenance of M201A1 cannon assembly, cannon assembly, and tube assembly:	
Maintenance of muzzle brake:		Disassembly	2-41
Inspection/repair	2-34	Inspection/repair	2-42
Installation	2-34	Installation	2-42
Removal	2-32	Reassembly.	2-42
Maintenance of M140 alinement device mount:		Removal	2-38
Realinement	2-89		

ALPHABETICAL INDEX (CONT)

Subject	Page	Subject	Page
M			
Maintenance of plain bearing unit and outer race assembly:		Maintenance of rammer multiple connector, regulator flow valve, rammer pressure sensitive cable assembly, and solenoid valve:	
Disassembly	2-465	Applying hydraulic pressure	2-418
Inspection/repair	2-469	Disassembly	2-408
Installation	2-475	Inspection/repair	2-412
Reassembly.	2-470	Installation	2-416
Removal	2-464	Reassembly	2-412
Service	2-463	Relieving hydraulic pressure	2-405
		Removal	2-406
Maintenance of pneumatic equilibrator assembly:		Maintenance of rammer traversing cylinder assembly:	
Disassembly	2-79	Disassembly.	2-309
Inspection/repair	2-79	Inspection/repair	2-313
Installation	2-79	Reassembly	2-313
Reassembly.	2-79	Testing	2-318
Removal	2-77		
Maintenance of power loader-rammer – guard, slide, trough, cylinder, and related items:		Maintenance of ramming cylinder:	
Disassembly	2-337	Disassembly	2-371
Inspection/repair	2-339	Inspection/repair	2-374
Reassembly.	2-340	Reassembly.	2-374
		Testing	2-378
Maintenance of power loader-rammer – headlink and chain assembly, gear case group, and head shaft group:		Maintenance of recoil connecting link:	
Disassembly	2-342	Inspection/repair	2-152
Inspection/repair	2-350	Reassembly/installation	2-152
Reassembly	2-351	Removal/disassembly	2-152
Maintenance of power loader-rammer– loader arm, cylinder assembly, and related items:		Maintenance of recoil stroke control cam:	
Applying hydraulic pressure	2-336	Disassembly	2-124
Disassembly	2-326	Inspection/repair	2-129
Inspection/repair	2-330	Reassembly.	2-130
Reassembly.	2-331		
Relieving hydraulic pressure	2-325	Maintenance of recuperator cylinder rear head assembly:	
Maintenance of power system lines and fittings-oil pressure switch and safety relief valve:		Applying hydraulic pressure	2-150
Applying hydraulic pressure	2-432	Disassembly	2-148
Inspection/repair	2-430	Inspection/repair	2-149
Installation	2-430	Installation	2-150
Relieving hydraulic pressure	2-427	Reassembly	2-149
Removal	2-428	Relieving hydraulic pressure	2-147
		Removal	2-147

ALPHABETICAL INDEX (CONT)

Subject	Page	Subject	Page
M (Cont)			
Maintenance of replenisher assembly:		Maintenance of traversing and elevating drive hydraulic motors:	
Applying hydraulic pressure	2-116	Disassembly	2-210
Disassembly	2-112	Inspection/repair	2-212
Inspection/repair	2-113	Reassembly	2-213
Installation	2-116	Testing	2-215
Reassembly	2-113		
Relieving hydraulic pressure	2-110	Maintenance of traversing and elevating drive torque locks and remote control levers:	
Removal	2-111	Disassembly	2-204
Testing	2-115	Inspection/repair	2-206
Maintenance of replenisher assembly (alternate) and actuating cylinder:		Reassembly	2-207
Applying hydraulic pressure	2-123		
Disassembly	2-119	Maintenance of traversing and elevating hydraulic motors:	
Inspection/repair	2-120	Disassembly	2-216
Installation	2-122	Inspection/repair	2-225
Reassembly	2-120	Reassembly	2-226
Relieving hydraulic pressure	2-118	Testing	2-235
Removal	2-118		
Maintenance of rim latch set:		Maintenance of traversing constant speed drive and speed gear assembly:	
Disassembly	2-319	Applying hydraulic pressure	2-203
Inspection/repair	2-320	Disassembly	2-167
Reassembly	2-320	Inspection/repair	2-181
Maintenance of rim lock set:		Installation	2-201
Disassembly	2-322	Reassembly	2-182
Inspection/repair	2-323	Removal	2-165
Reassembly	2-323	Relieving hydraulic pressure	2-165
Maintenance of roller chain and headlink assembly:			
Disassembly	2-361	Maintenance of traversing final drive:	
Inspection/repair	2-362	Disassembly	2-245
Reassembly	2-362	Inspection/repair	2-249
Maintenance of traversing and elevating differential:		Installation	2-253
Adjustment	2-243	Reassembly	2-249
Disassembly	2-236	Removal	2-244
Inspection/repair	2-240		
Reassembly	2-240	Maintenance of turret assembly:	
		Applying hydraulic pressure	2-159
		Inspection/repair	2-157
		Installation	2-157
		Relieving hydraulic pressure	2-154
		Removal	2-155

ALPHABETICAL INDEX (CONT)

Subject	Page	Subject	Page
M		O	
Modified recuperator cylinder front head assembly (See maintenance of modified recuperator cylinder front head assembly.)		Official nomenclature, names, and designations.....	1-2
Muzzle brake (See maintenance of muzzle brake.)		P	
M140 alinement device mount (See maintenance of M140 alinement device mount.)		Painting instructions	2-30
M174 gun mount (See maintenance of M174 gun mount.)		Painting load marks	2-32
M174 gun mount assembly-cover, control cam, and related items (See maintenance of M174 gun mount assembly-cover, control cam, and related items.)		Painting retract mark	2-32
M174 gun mount assembly-gun sight adapters (See maintenance of M174 gun mount assembly-gun sight adapters)		Plain bearing unit and outer race assembly (See maintenance of plain bearing unit and outer race assembly.)	
M174 gun mount assembly-retracting valve (See maintenance of M174 gun mount assembly-retracting valve.)		Pneumatic equilibrator assembly (See maintenance of pneumatic equilibrator assembly.)	
M174 gun mount assembly-travel lock group (See maintenance of M174 gun mount assembly-travel lock group.)		Power loader-rammer guard, slide, trough, cylinder, and related items (See maintenance of power loader-rammer-guard, slide, trough, cylinder, and related items.)	
M201A1 cannon assembly, cannon assembly, and tube assembly (See maintenance of M201A1 cannon assembly, cannon assembly, and tube assembly.)		Power loader-rammer - headlink and chain assembly, gear case group, and head shaft group (See maintenance of power loader-rammer - headlink and chain assembly, gear case group, and head shaft group.)	
N		Power loader-rammer-loader arm, cylinder assembly, and related items (See maintenance of power loader-rammer-loader arm, cylinder assembly, and related items.)	
Nonskid areas	2-30	Power system lines and fittings-oil pressure switch and safety relief valve (See maintenance of power system lines and fittings-oil pressure switch and safety relief valve.)	
		Preparation for storage or shipment	1-2

ALPHABETICAL INDEX (CONT)

Subject	Page	Subject	Page
R			
Rammer multiple connector, regulator flow valve, rammer pressure sensitive cable assembly, and solenoid valve (See maintenance of rammer multiple connector, regulator flow valve, rammer pressure sensitive cable assembly, and solenoid valve.)		Restenciling vehicle markings	2-32
Rammer traversing cylinder assembly (See maintenance of rammer traversing cylinder assembly.)		Rim latch set (See maintenance of rim latch set.)	
Ramming cylinder (See maintenance of ramming cylinder.)		Rim lock set (See maintenance of rim lock set.)	
Recoil connecting link (See maintenance of recoil connecting link.)		Roller chain and headlink assembly (See maintenance of roller chain and headlink assembly.)	
Recoil stroke control cam (See maintenance of recoil stroke control cam.)		S	
Recuperator cylinder rear head assembly (See maintenance of recuperator cylinder rear head assembly.)		Scope.....	1-1
References	A-1	Special tools and equipment	E-1
Repair methods . . . . .	.2-29	Special tools, TMDE, and support equipment . . . . .	.2-3
Repair parts . . . . .	.2-3	Straight adapter to tube fitting Disassembly	2-29
Replenisher assembly (See maintenance of replenisher assembly.)		Reassembly . . . . .	.2-29
Replenisher assembly (alternate) and actuating cylinder (See maintenance of replenisher assembly (alternate) and actuating cylinder.)		T	
Reporting equipment improvement recommendations (EIR)	1-2	Torque values. . . . .	.2-29, D-1
		Touchup and recoating . . . . .	.2-31
		Traversing and elevating differential (See maintenance of traversing and elevating differential.)	
		Traversing and elevating drive hydraulic motors (See maintenance of traversing and elevating drive hydraulic motors.)	
		Traversing and elevating drive torque locks and remote control levers (See maintenance of traversing and elevating drive torque locks and remote control levers.)	

ALPHABETICAL INDEX (CONT)

Subject	Page	Subject	Page
T			
Traversing and elevating hydraulic motors (See maintenance of traversing and elevating hydraulic motors.)		Tube nipple to tube fitting Disassembly .....2-28 Reassembly .....2-28	
Traversing constant speed drive and speed gear assembly (See maintenance of traversing constant speed drive and speed gear assembly.)		Tube reducer to tube fitting Disassembly 2-28 Reassembly .....2-28	
Traversing final drive (See maintenance of traversing final drive. I		Tube tee to tube fitting Disassembly .....2-28 Reassembly .....2-28	
Troubleshooting information .....2-3		Turret assembly (See maintenance of turret assembly.)	
Tube elbow to tube fitting Disassembly2-27 Reassembly2-27			

By Order of the Secretary of the Army:

CARL E. VUONO
General, United States Army
Chief of Staff

Official:

PATRICIA P. HICKERSON
Colonel, United States Army
The Adjutant General

DISTRIBUTION: To be distributed in accordance with DA Form 12-373, (Block 1643), Direct and General Support Maintenance Requirements for TM 9-2350-304-34-2.

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS



THEN JOT DOWN THE DOPE ABOUT IT ON THIS FORM CAREFULLY TEAR IT OUT FOLD IT AND DROP IT IN THE MAIL.

SOMETHING WENT WITH THIS PUBLICATION

FROM (PRINT YOUR UNIT'S COMPLETE ADDRESS)

Your mailing address

DATE SENT Date you filled out this form

PUBLICATION NUMBER
TM 9-2350-304-34-2

PUBLICATION DATE
1 Feb 91

PUBLICATION TITLE DS and GS Maintenance Manual for Howitzer, Heavy, Self-Propelled, 8 in., M110A2

BE EXACT PIN-POINT WHERE IT IS

PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO
2-321	2-55		

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

Removal and installation procedures for the rim lock set are missing. They should be included in paragraph 2-55.

SAMPLE

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

SIGN HERE

Your name

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS



THEN JOT DOWN THE DOPE ABOUT IT ON THIS FORM. CAREFULLY TEAR IT OUT. FOLD IT AND DROP IT IN THE MAIL.

SOMETHING WRONG WITH THIS PUBLICATION?

FROM (PRINT YOUR UNIT'S COMPLETE ADDRESS)

DATE SENT

PUBLICATION NUMBER

TM 9-2350-304-34-2

PUBLICATION DATE

1 Feb 91

PUBLICATION TITLE DS and GS Maintenance Manual for Howitzer, Heavy, Self-Propelled, 8 in., M110A2

BE EXACT PIN-POINT WHERE IT IS

PAGE NO

PARA-GRAPH

FIGURE NO

TABLE NO

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

SIGN HERE

DA FORM 2028-2
1 JUL 79

PREVIOUS EDITIONS ARE OBSOLETE.

P.S. --IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS

FILL IN YOUR
UNIT'S ADDRESS

FOLD BACK

DEPARTMENT OF THE ARMY

OFFICIAL BUSINESS



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

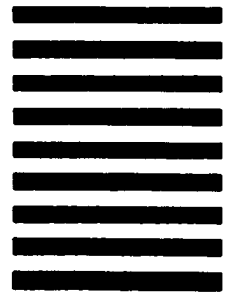
BUSINESS REPLY MAIL

FIRST CLASS

PERMIT NO. 82

ROCK ISLAND IL

POSTAGE WILL BE PAID BY ROCK ISLAND ARSENAL



**COMMANDER
US ARMY ARMAMENT MUNITIONS
AND CHEMICAL COMMAND
ATTN AMSMC-MAS
ROCK ISLAND IL 61201-9948**

TEAR ALONG PERFORATED LINE

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS



THEN JOT DOWN THE DOPE ABOUT IT ON THIS FORM. CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL.

SOMETHING WRONG WITH THIS PUBLICATION?

FROM (PRINT YOUR UNIT'S COMPLETE ADDRESS)

DATE SENT

PUBLICATION NUMBER

TM 9-2350-304-34-2

PUBLICATION DATE

1 Feb 91

PUBLICATION TITLE DS and GS Maintenance Manual for Howitzer, Heavy, Self-Propelled, 8 in., M110A2

BE EXACT PIN-POINT WHERE IT IS

PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO
---------	------------	-----------	----------

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

SIGN HERE

FILL IN YOUR
UNIT'S ADDRESS
↓

FOLD BACK

DEPARTMENT OF THE ARMY



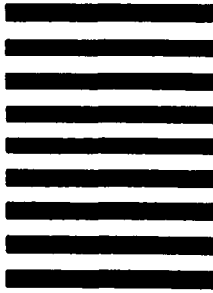
OFFICIAL BUSINESS

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

TEAR ALONG PERFORATED LINE


BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 82 ROCK ISLAND IL

POSTAGE WILL BE PAID BY ROCK ISLAND ARSENAL



**COMMANDER
US ARMY ARMAMENT MUNITIONS
AND CHEMICAL COMMAND
ATTN AMSMC-MAS
ROCK ISLAND IL 61201-9948**

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS



SOMETHING WRONG WITH THIS PUBLICATION?

THEN JOT DOWN THE DOPE ABOUT IT ON THIS FORM. CAREFULLY TEAR IT OUT. FOLD IT AND DROP IT IN THE MAIL.

FROM (PRINT YOUR UNIT'S COMPLETE ADDRESS)

DATE SENT

PUBLICATION NUMBER

TM 9-2350-304-34-2

PUBLICATION DATE

1 Feb 91

PUBLICATION TITLE

DS and GS Maintenance Manual for Howitzer, Heavy, Self-Propelled, 8 in., M110A2

BE EXACT PIN-POINT WHERE IT IS				IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO	

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

SIGN HERE

FILL IN YOUR
UNIT'S ADDRESS

FOLD BACK

DEPARTMENT OF THE ARMY



OFFICIAL BUSINESS

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS

PERMIT NO. 82

ROCK ISLAND IL

POSTAGE WILL BE PAID BY ROCK ISLAND ARSENAL



**COMMANDER
US ARMY ARMAMENT MUNITIONS
AND CHEMICAL COMMAND
ATTN AMSMC-MAS
ROCK ISLAND IL 61201-9948**

TEAR ALONG PERFORATED LINE

METRIC CHART

THE METRIC SYSTEM AND EQUIVALENTS

LINEAR 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
 $9/5 \text{ C}^{\circ} + 32 = \text{F}^{\circ}$

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
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	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
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	Miles per Hour	0.621

