TM 9-2320-211-34-2-3
T.O. 36A12-1C-422-2-2

TECHNICAL MANUAL

VOLUME 2 OF 2

PART 3 OF 4

MAINTENANCE

DIRECT SUPPORT AND GENERAL SUPPORT LEVEL

Chapter 17
Winch, Hoist, Crane and
Power Takeoff Assemblies
Group Maintenance

5-TON, 6X6, M39 SERIES TRUCKS (MULTIFUEL)

TRUCK, CHASSIS: M40A2C, M61A2, M63A2; TRUCK, CARGO: M54A2, M54A2C, M55A2; TRUCK, DUMP: M51A2; TRUCK, TRACTOR: M52A2; TRUCK, WRECKER, MEDIUM: M543A2

NOTE:

THE STYLE OF THIS TM IS EXPERIMENTAL. IT IS BEING TRIED BY THE ARMY ONLY ON A LIMITED BASIS

DEPARTMENTS OF THE ARMY AND THE AIR FORCE

FEBRUARY 1981

WARNING

EXHAUST GASES CAN BE DEADLY

Exposure to exhaust gases produces symptoms of headache, dizziness, loss of muscular control, apparent drowsiness, and coma. Permanent brain damage or death can result from severe exposure.

Carbon monoxide occurs in the exhaust fumes of fueI burning heaters and internal combustion engines, and becomes dangerously concentrated under conditions of inadequate ventilation. The following precautions must be observed to insure the safety of personnel whenever fuel burning heater(s) or engine of any vehicle is operated for maintenance purposes or tactical use.

Do not operate heater or engine of vehicle in an enclosed area unless it is adequately ventilated.

Do not idle engine for long periods without maintaining adequate ventilation in personnel compartments.

Do not drive any vehicle with inspection plates or cover plates removed unless necessary for maintenance purposes.

Be alert at all times during vehicle operation for exhaust odors and exposure symptoms. If either are present, immediately ventilate personnel compartments. If symptoms persist, remove affected personnel from vehicle and treat as follows: expose to fresh air; keep warm; do not permit physical exercise; if necessary, administer artificial respiration.

If exposed, seek prompt medical attention for possible delayed onset of acute lung congestion. Administer oxygen if available.

The best defense against exhaust gas poisoning is adequate ventilation.

WARNING

Serious or fatal injury to personnel may result
if the following instructions are not complied with.

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

Eye shields must be worn when using compressed sir. Eye injury can occur if eye shields are not used.

Do not dry bearings with compressed air. Spinning bearings may explode, causing injury to personnel and damage to equipment.

Be careful when handling boom elevating cylinder. Cylinder is heavy, and if it falls can cause injury to personnel and damage to equipment.

The boom assembly is very heavy and bulky. Tie inner boom to outer boom with chain or other suitable means. Do this to stop inner boom from drawing out when the assembly is lifted, which could cause injury to personnel.

WARNING - Cont

Boom assembly must be guided during hoisting so that it does not swing free. If boom assembly swings free it can injure personnel and damage equipment.

Inner boom must be held up at sheave end when pulling it out of outer boom. If this is not done, outer boom can tilt and cause injury.

Always wear gloves when handling wire cable. Never let the cable run through bare hands. Broken wires can cause painful injuries.

Do not use a wire brush or compressed air to clean winch brake drum. There may be asbestos dust on the drum which can be dangerous to your health if you breathe it in.

Be careful when raising and positioning hoist winch on boom. If winch drops it can cause injury to personnel or damage to equipment.

The hoist winch motor assembly is heavy. When replacing assembly tension must be kept on rope sling supporting assembly to keep it from falling. If assembly falls, it can cause serious injury to personnel and damage to equipment.

Be careful when taking off crane turntable gear and bearing assembly. If assembly drops or swings free it can cause injury to personnel and damage to equipment.

*TM 9-2320-211-34-2-3
T.O. 36A12-1C-422-2-2

TECHNICAL MANUAL
NO. 9-2320-21-34-2-3
TECHNICAL ORDER
NO. 36A12-1C-422-2-2

DEPARTMENTS OF THE ARMY
AND
THE AIR FORCE
WASHINGTON, DC, 25 Feburary 1981

TECHNICAL MANUAL

VOLUME 2 OF 2

PART 3 OF 4

MAINTENANCE

DIRECT SUPPORT AND GENERAL SUPPORT LEVEL

5-TON, 6X6, M39 SERIES TRUCKS
(MULTIFUEL)

Model		NSN without Winch	NSN with Winch
Truck, Chassis	M40A2C	2320-00-969-4114	
	M61A2	2320-00-055-9264	2320-00-965-0321
	M63A2	2320-00-226-6251	2320-00-285-3757
Truck, Cargo	M54A2	2320-00-055-9266	2320-00-055-9265
	M54A2C	2320-00-926-0874	2320-00-926-0874
	M55A2	2320-00-073-8476	2320-00-055-9259
Truck, Dump	M51A2	2320-00-055-9262	2320-00-055-9263
Truck, Tractor	M52A2	2320-00-055-9260	2320-00-055-9261
Truck, Wrecker Medium	M543A2		2320-00-055-9258

Current as of 25 Jul 80.

*This manual together with TM 9-2320-211-34-1, 25 February 1981; TM 9-2320-211-34-2-1, 25 February 1981 TM 9-2320-211-34-2-2, 25 February 1981 and TM 9-2320-211-34-2-4, 25 February 1981 supersedes so much of TM 9-2320-211-35, 13 September 1964 as pertains to multifuel vehicles including all changes.

REPORTING OF 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 procedure, 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, US Army Tank-Automotive Command, ATTN: DRSTA-MB, Warren, Michigan 48090. A reply will be furnished to you.

TABLE OF CONTENTS

		Paragraph	Page
CHAPTER 17.	WINCH , HOIST, CRANE AND POWER TAKEOFF ASSEMBLIES GROUP MAINTENANCE		
Section I.	Scope		17-1
	Equipment Items Covered	17-1	17-1
	Equipment Items Not Covered	17-2	17-1
Section 11.	Winch, Hoist, and Crane Assemblies		17-1
	Front Winch Roller Assembly Removal, Repair and Replacement	17-3	17-1
	Preliminary Procedure	17-3a	17-1
	Removal	17-3b	17-2
	Disassembly	17-3c	17-3
	Cleaning	17-3d	17-5
	Inspection and Repair	17-3e	17-5
	Assembly	17-3f	17-6
	Replacement	17-3g	17-8
	Front Winch Tensioner Assembly Removal and Replacement	17-4	17-9
	Preliminary Procedure	17-4a	17-9
	Removal	17-4b	17-9
	Replacement	17-4c	17-10
	Front Winch Sheave and Trolley (Level Wind) Repair (Truck M543A2)	17-5	17-11
	Disassembly	17-5a	17-12
	Cleaning	17-5b	17-18
	Inspection and Repair	17-5c	17-18
	Assembly	17-5d	17-19
	Front Level Wind Removal and Replacement (Truck M543A2)	17-6	17-25
	Preliminary Procedure	17-6a	17-25
	Removal	17-6b	17-25
	Replacement	17-6c	17-27
	Front Winch Tension Sheave Assembly Repair (Truck M543A2)	17-7	17-29
	Disassembly	17-7a	17-29
	Cleaning	17-7b	17-35
	Inspection and Repair	17-7c	17-35
	Assembly	17-7d	17-36

TABLE OF CONTENTS-CONT

	Paragraph	Page
Front Winch Automatic Brake Removal, Replacement, and Adjustment	17-8	17-42
Removal	17-8a	17-42
Replacement and Adjustment	17-8b	17-45
Front Winch Level Wind Removal and Replacement (Truck M542A1)	17-9	17-49
Removal	17-9a	17-49
Replacement	17-9b	17-51
Front Winch Assembly Repair	17-10	17-53
Preliminary Procedures	17-10a	17-53
Disassembly	17-10b	17-54
Cleaning	17-10c	17-70
Inspection	17-10d	17-71
Repair	17-10e	17-73
Assembly	17-10f	17-73
Rear Winch Sheave and Trolley (Level Wind) Removal and Replacement (Truck M543A2)	17-11	17-89
Removal	17-11a	17-89
Replacement	17-11b	17-90
Rear Winch Tension Sheave Assembly Removal and Replacement (Truck M543A2)	17-12	17-91
Preliminary Procedure	17-12a	17-91
Removal	17-12b	17-91
Replacement	17-12c	17-95
Rear Winch Cable Tensioner Brake Chamber Assembly Removal and Replacement (Truck M543A2)	17-13	17-98
Removal	17-13a	17-98
Replacement	17-13b	17-99
Rear Winch Cable Tensioner Assembly Repair (Truck M543A2)	17-14	17-100
Disassembly	17-14a	17-100
Cleaning	17-14b	17-104
Inspection and Repair	17-14c	17-104
Replacement	17-14d	17-104
Rear Winch Sheave and Trolley (Level Wind) Repair (Truck M543A2)	17-15	17-108
Disassembly	17-15a	17-108
Cleaning	17-15b	17-113
Inspection and Repair	17-15c	17-113
Assembly	17-15d	17-114
Rear Winch Assembly Repair (Truck M543A2)	17-16	17-119
Preliminary Procedures	17-16a	17-119
Disassembly	17-16b	17-119
Cleaning	17-16c	17-141

TABLE OF CONTENTS-CONT

	Paragraph	Page
Inspection	17-16d	17-142
Repair	17-16e	17-149
Assembly	17-16f	17-150
Hoist Winch Motor Assembly Removal, Repair, and Replacement (Truck M543A2)	17-17	17-177
Removal	17-17a	17-178
Disassembly	17-17b	17-180
Cleaning	17-17c	17-187
Inspection	17-17d	17-188
Repair	17-17e	17-190
Assembly	17-17f	17-190
Replacement	17-17g	17-198
Hoist Winch Removal, Repair, and Replacement (Truck M543A2)	17-18	17-200
Preliminary Procedures	17-18a	17-200
Removal	17-18b	17-201
Disassembly	17-18c	17-202
Cleaning	17-18d	17-215
Inspection and Repair	17-18e	17-216
Assembly	17-18f	17-219
Replacement	17-18g	17-236
Dump Body Control Valve Adapter - Assembly Removal, Repair and Replacement (Truck M51A2)	17-19	17-238
Preliminary Procedures	17-19a	17-238
Removal	17-19b	17-239
Disassembly	17-19c	17-240
Cleaning, Inspection, and Repair	17-19d	17-241
Assembly	17-19e	17-243
Replacement	17-19f	17-244
Hoist Control Box Assembly Removal, Repair, and Replacement (Truck M51A2)	17-20	17-245
Preliminary Procedures	17-20a	17-245
Removal	17-20b	17-246
Disassembly	17-20c	17-249
Cleaning	17-20d	17-254
Inspection and Repair	17-20e	17-255
Assembly	17-20f	17-256
Replacement	17-20g	17-262
Control Valve Assembly Repair (Truck M51A2)	17-21	17-266
Preliminary Procedures	17-21a	17-266
Disassembly	17-21b	17-266
Cleaning	17-21c	17-269
Inspection and Repair	17-21d	17-270
Assembly	17-21e	17-271

TABLE OF CONTENTS-CONT

	Paragraph	Page
Hoist Control Linkage Removal, Repair and Replacement (Truck M51A2)	17-22	17-275
Removal	17-22a	17-275
Disassembly	17-22b	17-281
Cleaning	17-22c	17-284
Inspection and Repair	17-22d	17-284
Assembly	17-22e	17-284
Replacement	17-22f	17-288
Dump Body Hoist Frame Assembly Removal, Repair and Replacement (Truck M51A2)	17-23	17-294
Preliminary Procedures	17-23a	17-294
Removal	17-23b	17-295
Cleaning	17-23c	17-298
Inspection and Repair	17-23d	17-298
Replacement	17-23e	17-299
Dump Body Hoist Cylinder Removal, Repair and Replacement (Truck M51A2)	17-24	17-302
Preliminary Procedure	17-24a	17-302
Removal	17-24b	17-303
Disassembly	17-24c	17-305
Cleaning	17-24d	17-309
Inspection	17-24e	17-309
Repair	17-24f	17-310
Assembly	17-24g	17-310
Replacement	17-24h	17-315
Hoist Pump Repair (Truck M51A2)	17-25	17-318
Preliminary Procedures	17-25a	17-318
Disassembly	17-25b	17-319
Cleaning	17-25c	17-322
Inspection	17-25d	17-323
Repair	17-25e	17-324
Assembly	17-25f	17-324
Hoist Cylinder Packing Removal and Replacement	17-26	17-327
Preliminary Procedures	17-26a	17-327
Removal	17-26b	17-328
Replacement	17-26c	17-329
Hoist Cable Upper Boom Head and Upper Boom Foot Sheaves and Guard Removal and Replacement (Truck M543A2)	17-27	17-330
Preliminary Procedure	17-27a	17-330
Removal	17-27b	17-330
Disassembly	17-27c	17-333
Cleaning	17-27d	17-334

TABLE OF CONTENTS-CONT

	Paragraph	Page
Inspection and Repair	17-27e	17-334
Assembly	17-27f	17-335
Replacement	17-27g	17-336
Hoist Roller Arm Assembly Removal, Repair and Replacement (Truck M51A2)	17-28	17-340
Preliminary Procedure	17-28a	17-341
Removal	17-28b	17-342
Disassembly	17-28c	17-343
Cleaning	17-28d	17-344
Inspection and Repair	17-28e	17-344
Assembly	17-28f	17-345
Replacement	17-28g	17-346
Crane Swinger Gearcase Assembly Removal and Replacement (Truck M543A2)	17-29	17-349
Preliminary Procedure	17-29a	17-349
Removal	17-29b	17-349
Replacement	17-29c	17-351
Crane Swinger Gearcase Assembly Repair (Truck M543A2)	17-30	17-353
Preliminary Procedure	17-30a	17-353
Disassembly	17-30b	17-354
Cleaning	17-30c	17-360
Inspection	17-30d	17-360
Repair	17-30e	17-362
Assembly	17-30f	17-362
Bevel Gearcase Pump Drive Shaft Lead and Ring Assembly Removal, Repair, and Replacement (Truck M543A2)	17-31	17-370
Preliminary Procedures	17-31a	17-370
Removal	17-31b	17-370
Cleaning	17-31c	17-374
Inspection and Repair	17-31d	17-375
Replacement	17-31e	17-376
Bevel Gearcase Driveshaft Seal Removal and Replacement (Truck M543A2)	17-32	17-382
Preliminary Procedures	17-32a	17-382
Removal	17-32b	17-382
Replacement	17-32c	17-386
Crane Turntable Assembly Removal, Repair and Replacement (Truck M543A2)	17-33	17-390
Preliminary Procedures	17-33a	17-390
Removal	17-33b	17-391
Disassembly	17-33c	17-397
Cleaning	17-33d	17-402
Inspection	17-33e	17-402
Repair	17-33f	17-403
Assembly	17-33g	17-403
Replacement	17-33h	17-408

TABLE OF CONTENTS-CONT

	Paragraph	Page
Turntable Bevel Gear Gearcase Assembly Removal, Repair, and Replacement (Truck M543A2)	17-34	17-415
Preliminary Procedures	17-34a	17-415
Removal	17-34b	17-416
Disassembly	17-34c	17-418
Cleaning	17-34d	17-426
Inspection and Repair	17-34e	17-427
Assembly	17-34f	17-429
Replacement	17-34g	17-439
Hydraulic Turntable Pump Assembly Removal, Repair and Replacement (Truck M543A2)	17-35	17-441
Preliminary Procedures	17-35a	17-441
Removal	17-35b	17-442
Disassembly	17-35c	17-444
Cleaning	17-35d	17-449
Inspection	17-35e	17-449
Repair	17-35f	17-452
Assembly	17-35g	17-452
Replacement	17-35h	17-459
Swing Hydraulic Motor Assembly Removal, Repair and Replacement (Truck M543A2)	17-36	17-461
Removal	17-36a	17-462
Disassembly	17-36b	17-464
Cleaning	17-36c	17-470
Inspection	17-36d	17-471
Repair	17-36e	17-473
Assembly	17-36f	17-473
Replacement	17-36g	17-480
Hydraulic Oil Reservoir Repair (Truck M543A2)	17-37	17-482
Preliminary Procedure	17-37a	17-482
Removal	17-37b	17-482
Disassembly	17-37c	17-487
Cleaning	17-37d	17-490
Inspection	17-37e	17-491
Repair	17-37f	17-493
Assembly	17-37g	19-493
Replacement	17-37h	17-497
Boom and Shipper Roller Assemblies Repair (Truck M543A2)	17-38	17-502
Removal	17-38a	17-503
Disassembly	17-38b	17-504
Cleaning	17-38c	17-506
Inspection and Repair	17-38d	17-507
Assembly	17-38e	17-508
Replacement	17-38f	17-510

TABLE OF CONTENTS-CONT

	Paragraph	Page
Boom Crowd Cylinder Packing Removal and Replacement	17-39	17-511
Preliminary Procedures	17-39a	17-511
Removal	17-39b	17-512
Replacement	17-39c	17-513
Boom Elevating Cylinder Piston Rod Packing Removal and Replacement (Truck M543A2)	17-40	17-514
Preliminary Procedures	17-40a	17-514
Removal	17-40b	17-515
Replacement	17-40c	17-516
Boom Crowd Cylinder Removal, Repair and Replacement (Truck M543A2)	17-41	17-517
Preliminary Procedures	17-41a	17-517
Removal	17-41b	17-518
Disassembly	17-41c	17-519
Cleaning	17-41d	17-522
Inspection and Repair	17-41e	17-523
Assembly	17-41f	17-524
Replacement	17-41g	17-527
Crane Boom Elevating Cylinder Repair (Truck M543A2)	17-42	17-528
Preliminary Procedures	17-42a	17-528
Removal	17-42b	17-529
Disassembly	17-42c	17-533
Cleaning	17-42d	17-536
Inspection	17-42e	17-536
Repair	17-42f	17-537
Assembly	17-42g	17-537
Replacement	17-42h	17-540
Lower Boom Foot Sheave Removal and Replacement (Truck M543A2)	17-43	17-543
Preliminary Procedures	17-43a	17-543
Removal	17-43b	17-544
Cleaning	17-43c	17-546
Inspection and Repair	17-43d	17-546
Replacement	17-43e	17-547
Boom Assembly Removal, Repair and and Replacement (Truck M543A2)	17-44	17-548
Preliminary Procedures	17-44a	17-548
Removal	17-44b	17-548
Replacement	17-44c	17-558
Crane Outer Boom Repair (Truck M543A2)	17-45	17-569
Preliminary Procedures	17-45a	17-569
Removal of Inner Boom	17-45b	17-570
Disassembly	17-45c	17-572
Cleaning	17-45d	17-579

TABLE OF CONTENTS-CONT

	Paragraph	Page
Inspection	17-45e	17-579
Repair	17-45f	17-581
Assembly	17-45g	17-581
Replacement of Inner Boom	17-45h	17-588
Crane Inner Boom Repair (Truck M543A2)	17-46	17-590
Preliminary Procedures	17-46a	17-590
Disassembly	17-46b	17-591
Cleaning	17-46c	17-594
Inspection	17-46d	17-595
Repair	17-46e	17-596
Assembly	17-46f	17-596
Rotochamber Removal and Replacement (Truck M543A2)	17-47	17-599
Preliminary Procedure	17-47a	17-599
Removal	17-47b	17-599
Replacement	17-47c	17-601
Snatch Block Assembly (Double) Repair (Truck M543A2)	17-48	17-603
Preliminary Procedure	17-48a	17-603
Disassembly	17-48b	17-603
Cleaning	17-48c	17-606
Inspection and Repair	17-48d	17-606
Assembly	17-48e	17-607
Snatch Block Assembly (Single) Repair (Truck M543A2)	17-49	17-610
Preliminary Procedure	17-49a	17-610
Disassembly	17-49b	17-610
Cleaning	17-49c	17-613
Inspection and Repair	17-49d	17-613
Assembly	17-49e	17-614
Operator Guard Repair (Truck M543A2)	17-50	17-617
Removal	17-50a	17-617
Cleaning, Inspection and Repair	17-50b	17-618
Replacement	17-50c	17-619
Control Valve Bank Repair (Truck M543A2)	17-51	17-620
Preliminary Procedures	17-51a	17-620
Disassembly into Subassemblies	17-51b	17-621
Disassembly of Subassemblies	17-51c	17-625
Cleaning	17-51d	17-633
Inspection and Repair	17-51e	17-634
Assembly of Subassemblies	17-51f	17-637
Assembly of Control Valve Bank	17-51g	17-645
Gondola Wrecker Assembly Removal, Repair, and Replacement (Truck M543A2)	17-52	17-649
Preliminary Procedures	17-52a	17-649
Removal	17-52b	17-650

TABLE OF CONTENTS-CONT

		Paragraph	Page
	Disassembly	17-52c	17-659
	Cleaning, Inspection, and Repair	17-52d	17-661
	Assembly	17-52e	17-662
	Replacement	17-52f	17-664
	Power Divider Control Linkage Removal, Repair and Replacement (Truck M543A2)	17-53	17-675
	Preliminary Procedure	17-53a	17-675
	Removal	17-53b	17-676
	Cleaning, Inspection, and Repair	17-53c	17-694
	Replacement	17-53d	17-695
	Power Divider Assembly Removal, Repair, and Replacement (Truck M543A2)	17-54	17-714
	Preliminary Procedures	17-54a	17-714
	Removal	17-54b	17-715
	Disassembly	17-54c	17-716
	Cleaning	17-54d	17-736
	Inspection	17-54e	17-736
	Repair	17-54f	17-744
	Assembly	17-54g	17-744
	Replacement	17-54h	17-770
	Power Divider Governor Valve Removal, Replacement, Adjustment (Truck M543A2)	17-55	17-771
	Preliminary Procedure	17-55a	17-771
	Removal	17-55b	17-771
	Replacement	17-55c	17-772
	Adjustment	17-55d	17-773
Section III.	Power Takeoff Assembly		17-774
	Transmission Transfer Power Takeoff Removal, Repair and Replacement (Truck M543A2)	17-56	17-774
	Preliminary Procedures	17-56a	17-774
	Removal	17-56b	17-774
	Disassembly	17-56c	17-777
	Cleaning	17-56d	17-784
	Inspection	17-56e	17-784
	Repair	17-56f	17-785
	Assembly	17-56g	17-785
	Replacement	17-56h	17-791
	Transmission Power Takeoff Seal Removal and Replacement (All Trucks Except M51A2)	17-57	17-794
	Preliminary Procedures	17-57a	17-794
	Removal	17-57b	17-794
	Replacement	17-57c	17-795

TABLE OF CONTENTS-CONT

	Paragraph	Page
Transmission Power Takeoff Seal Removal and Replacement (Truck M51A2)	17-58	17-796
Preliminary Procedures	17-58a	17-796
Removal	17-58b	17-797
Replacement	17-58c	17-799
Transmission Power Takeoff Controls and Linkages Removal, Repair, and Replacement	17-59	17-801
Removal	17-59a	17-801
Cleaning	17-59b	17-806
Inspection and Repair	17-59c	17-806
Replacement	17-59d	17-807
Transmission Power Takeoff Removal, Repair, and Replacement	17-60	17-812
Preliminary Procedures	17-60a	17-812
Removal	17-60b	17-813
Disassembly	17-60c	17-814
Cleaning	17-60d	17-825
Inspection and Repair	17-60e	17-825
Assembly	17-60f	17-829
Replacement	17-60g	17-844
Swivel Valve Removal, Repair, and Replacement (Truck M543A2)	17-61	17-845
Preliminary Procedure	17-61a	17-845
Removal	17-61b	17-846
Disassembly	17-61c	17-849
Cleaning	17-61d	17-852
Inspection and Repair	17-61e	27-852
Assembly	17-61f	17-853
Replacement	17-61g	17-857

LIST OF TABLES

Number	Title	Page
17-1	Cable Drum Bushing and End Frame Bushing Wear Limits	17-71
17-2	Drum Shaft and Gearcase Bushing Wear Limits	17-72
17-3	Drum Shaft Bushing, End Frame Bushing, Sleeve and Drum Shaft Wear Limits	17-148
17-4	Drive Worm Bearing, Drum Shaft Bushing, and Drive Worm Gear Wear Limits	17-148
17-5	Gearcase Bores and Gearcase Cover Bore Wear Limits	17-148
17-6	Control Valve Adapter Wear Limits	17-242
17-7	Bearing Wear Limits	17-737
17-8	Bearing Journal Wear Limits	17-738
17-9	Bearing Bore Wear Limits	17-741
17-10	Spring Wear Limits	17-742
17-11	Detent Spring Wear Limits	17-743

CHAPTER 17

WINCH, HOIST, CRANE AND POWER TAKEOFF ASSEMBLIES GROUP MAINTENANCE

Section 1. SCOPE

17-1. EQUIPMENT ITEMS COVERED. This chapter gives equipment maintenance procedures for winch, hoist., crane, and power takeoff assemblies for which there are authorized corrective maintenance tasks at the direct and general support maintenance levels.

17-2. EQUIPMENT ITEMS NOT COVERED. All equipment items for which corrective maintenance is authorized at the direct and general support maintenance levels are covered in this chapter.

Section II. WINCH, HOIST, AND CRANE ASSEMBLIES

17-3. FRONT WINCH ROLLER ASSEMBLY REMOVAL, REPAIR, AND REPLACEMENT.

TOOLS: No special tools required

SUPPLIES: None

PERSONNEL: Two

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedure. Remove front winch. Refer to TM 9-2320-211-20.

b. Removal.

FRAME 1

1. Place cable (1) as shown.

Soldier A 2. Take out six capscrews (2) and washers (3) from each side of tension roller assembly (4).

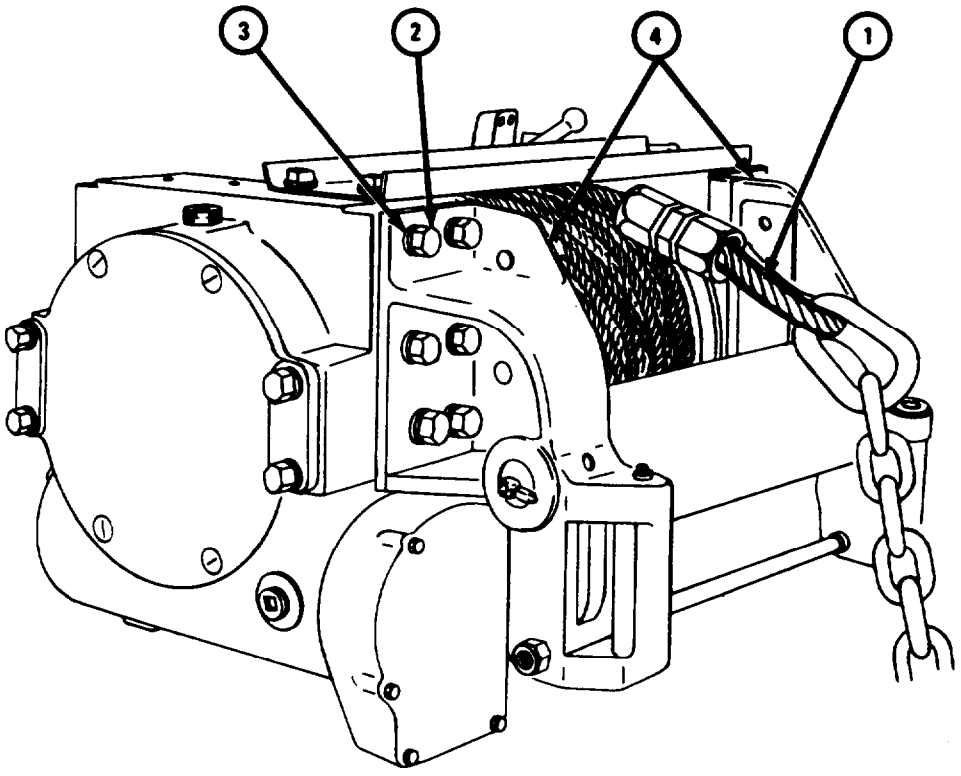
Soldier B 3. Hold roller assembly in place (4).

CAUTION

When taking out roller assembly (4), the right side bracket may fall off.

Soldiers A and B 4. Take off roller assembly (4).

END OF TASK



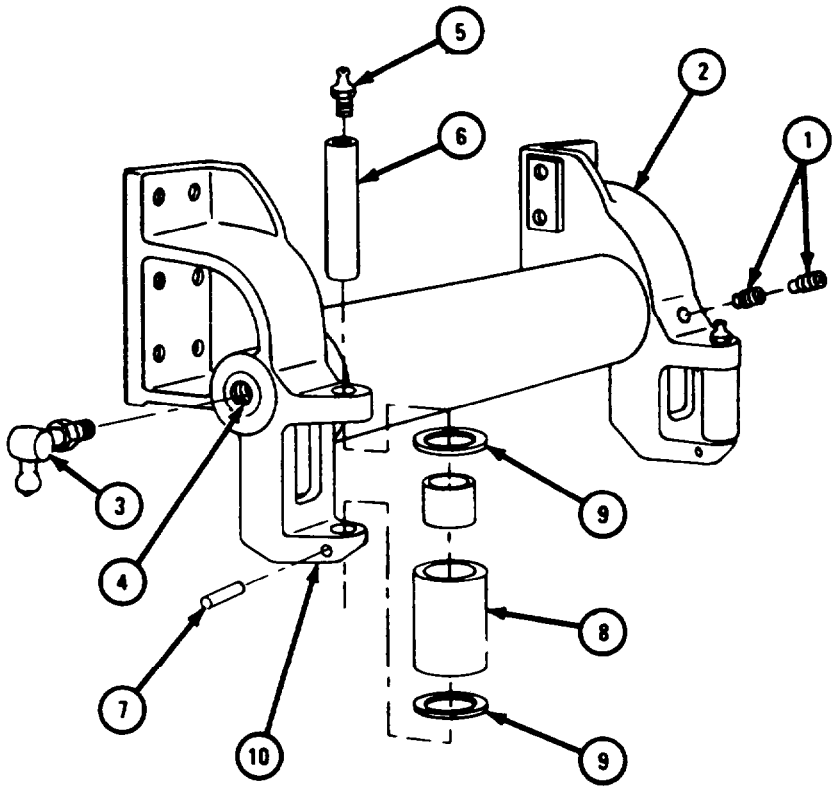
TA 103961

c. Disassembly.

FRAME 1

1. Takeout two setscrews (1) from left bracket (2).
2. Working on right side, take out lube fitting (3) from end of shaft (4).
3. Take out lube fitting (5) from pin (6).
4. Tap out pin (7).
5. Tap out pin (6).
6. Take out roller (8) and two washers (9).
7. Do steps 2 through 6 again for right bracket (10).

GO TO FRAME 2

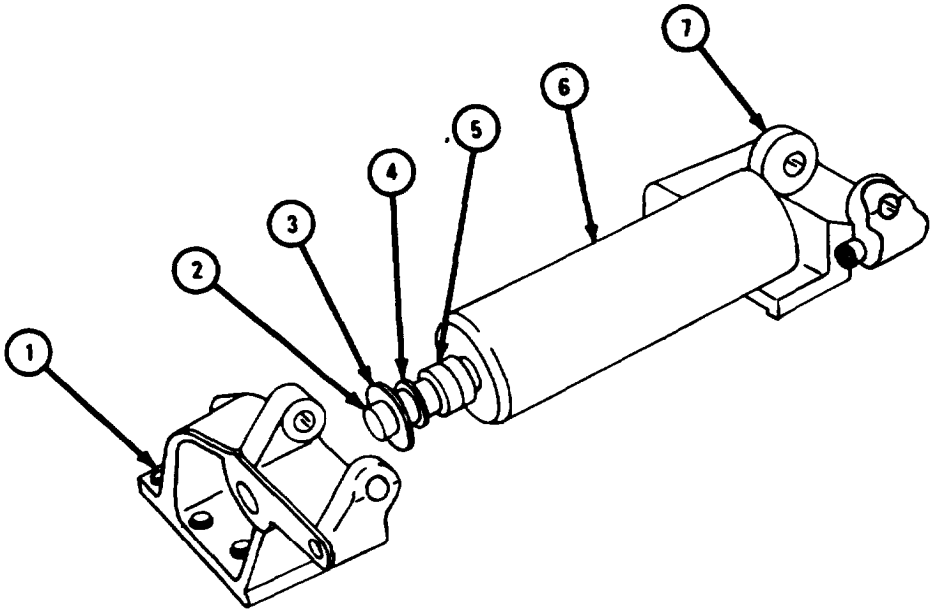


TA 103962

FRAME 2

1. Pull left bracket (1) off shaft (2).
2. Slide off washer (3), felt washer (4), and bearing (5).
3. Pull roller (6) off shaft (2). Take felt washers (4) out of each end of roller (6).
4. Do steps 1 and 2 again for right bracket (7).

END OF TASK



TA 103963

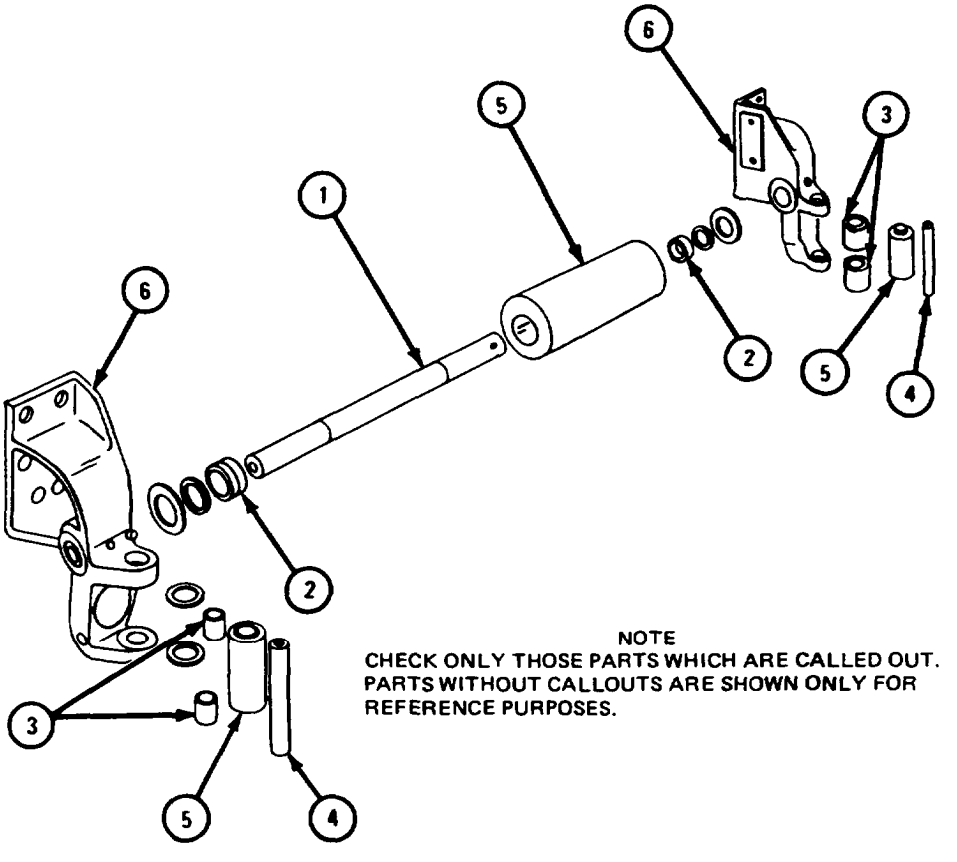
d. Cleaning. There are no special cleaning procedures needed. Refer to cleainng procedures given in Part 1, para 1–3.

e. Inspection and Repair.

FRAME 1

1. Check that shaft (1) is not cracked, scored or bent. If shaft is damaged, get a new one.
2. Check that bearings (2) are not damaged. Refer to TM 9-214.
3. Check that upper and lower bushings (3) are not worn. If bushings are worn, get new ones.
4. Check that pins (4) are not scored or cracked. If pins are damaged, get new ones.
5. Check that rollers (5) are not scored or cracked. If rollers are cracked, get new ones.
6. Check that brackets (6) are not cracked. Weld cracked bracket. Refer to TM 9-237.

END OF TASK

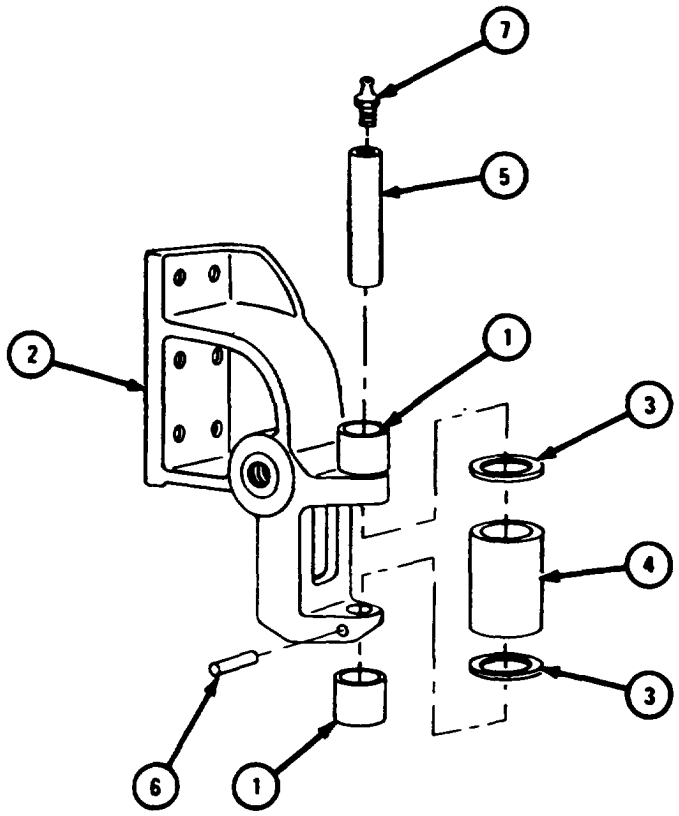


f. Assembly.

FRAME 1

1. If two bushings (1) were taken out, press new bushings into left bracket (2).
2. Put a washer (3) on both sides of roller (4). Put roller with washer in bracket (2).
3. Tap pin (5) through bracket (2), two washers (3), and roller (4).
4. Tap pin (6) through bracket (2).
5. Put on lube fitting (7).
6. Do steps 1 through 5 again for right bracket.

GO TO FRAME 2



TA 103965

FRAME 2

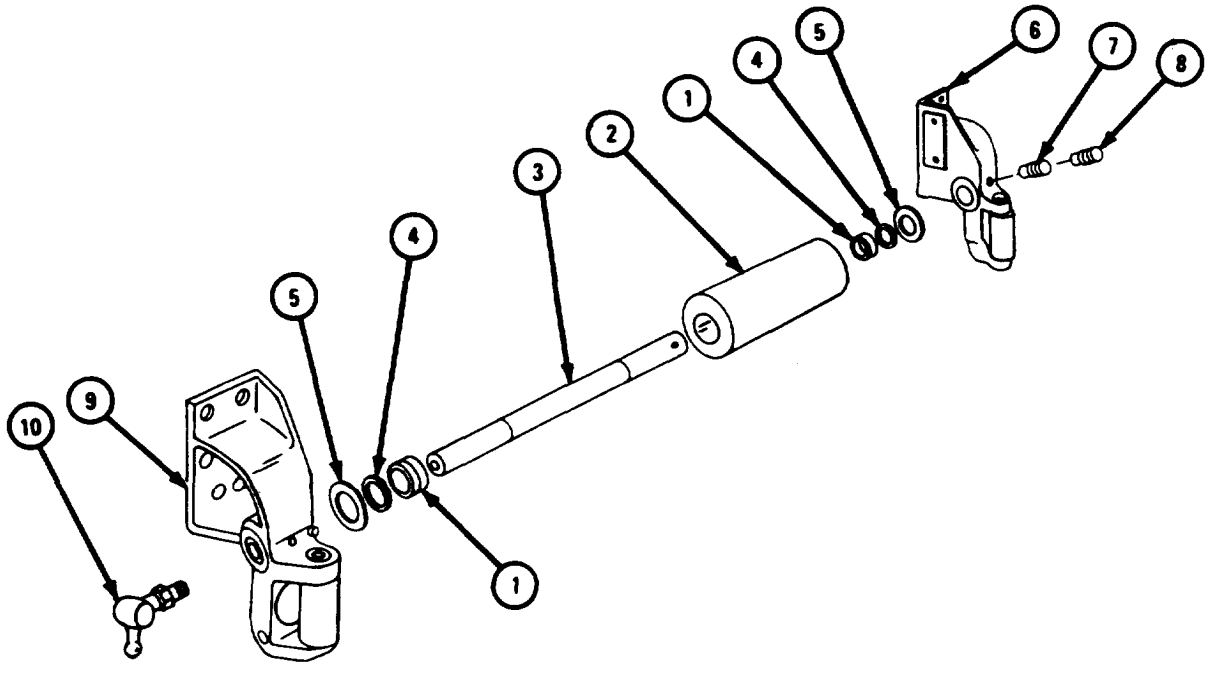
1. Press bearings (1) into roller (2).
2. Put shaft (3) into roller (2).
3. Put two felt washers (4) and two washers (5) on shaft (3).

NOTE

Shaft (3) is drilled for setscrew (7) and must go into left bracket (6).

4. Put shaft (3) into left bracket (6) and put in setscrew (7) and lockscrew (8).
5. Put bracket (9) on shaft (3).
6. Put in lube fittings (10).

END OF TASK



TA 103966

g. Replacement.

FRAME 1

Soldiers A and B
1. Put roller assembly in place on winch.

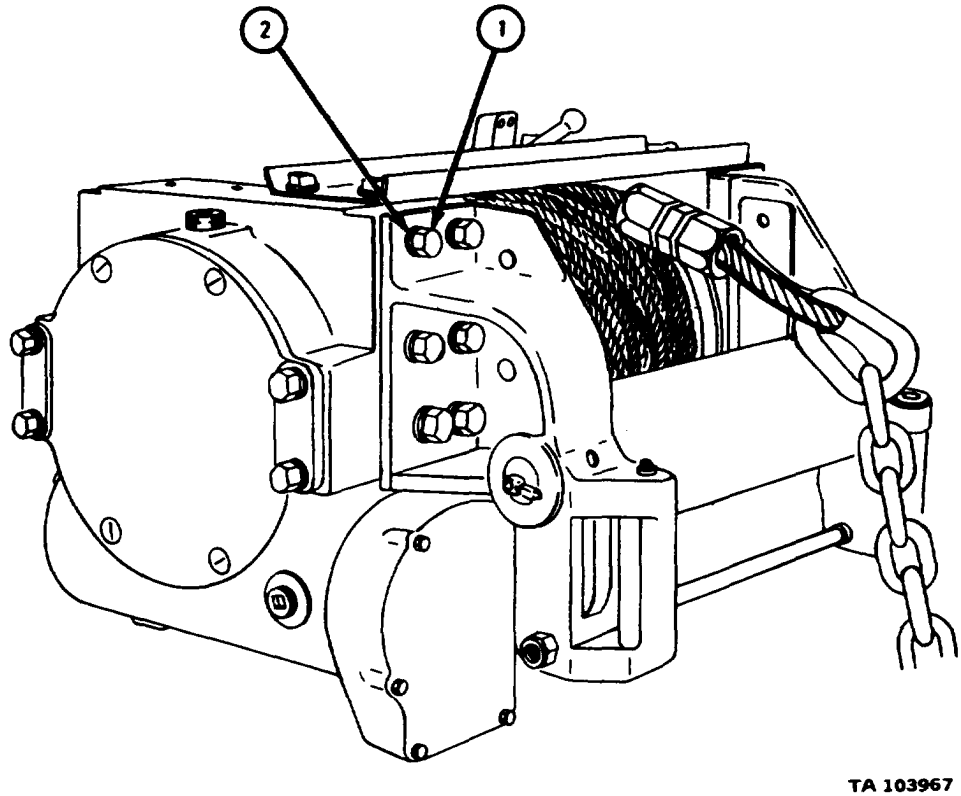
Soldier A
2. Screw in six capscrews (1) with six washers (2).
3. Do step 2 again on right side of winch.

NOTE

Follow-on Maintenance Action Required:

1. Replace front winch assembly. Refer to TM 9-2320-211-20.
2. Grease shaft and rollers. Refer to LO 9-2320-211-12.

END OF TASK



TA 103967

17-4. FRONT WINCH TENSIONER ASSEMBLY REMOVAL AND REPLACEMENT.

TOOLS: No special tools required

SUPPLIES: Artillery and automotive grease, type GAA, MIL-G-10924

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedure. Remove winch cable from winch cable drum. Refer to TM 9-2320-211-20.

b. Removal.

FRAME 1

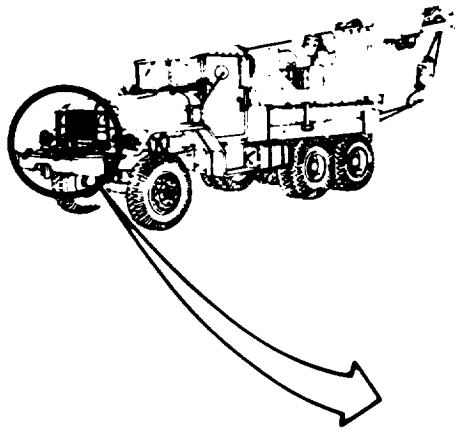
1. Take out four screws and lockwashers (1). Hold winch tensioner assembly (2) to keep it from falling when last screw is taken out.

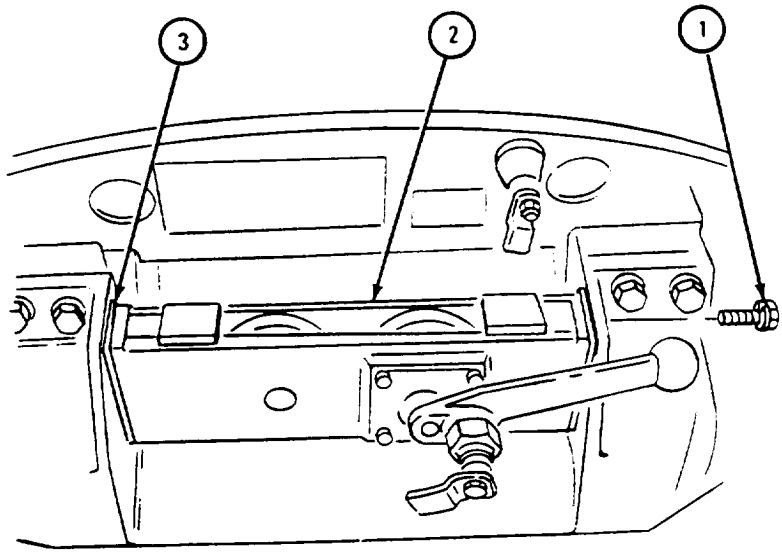
NOTE

Note number of shims (3) removed from each side so they will be put back the same way.

2. Lift out winch tensioner assembly (2) and shims (3) on each side.

END OF TASK





TA 084494

c. Replacement.

FRAME 1

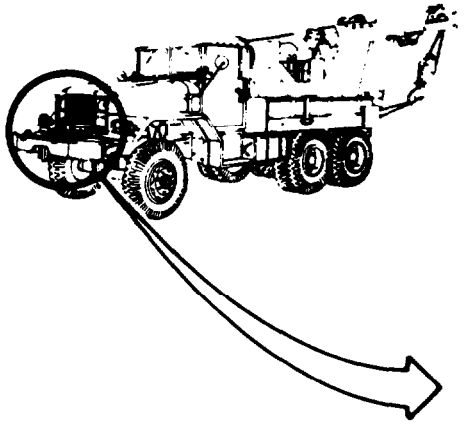
1. Put a coat of grease on shims (1) to keep them from falling while putting them back.
2. Put winch tensioner assembly (2) and shims (1) in place as noted.
3. Using two punches, aline holes in winch tensioner assembly (2) and shims (1).
4. Put in four screws (3) with lockwashers (4).

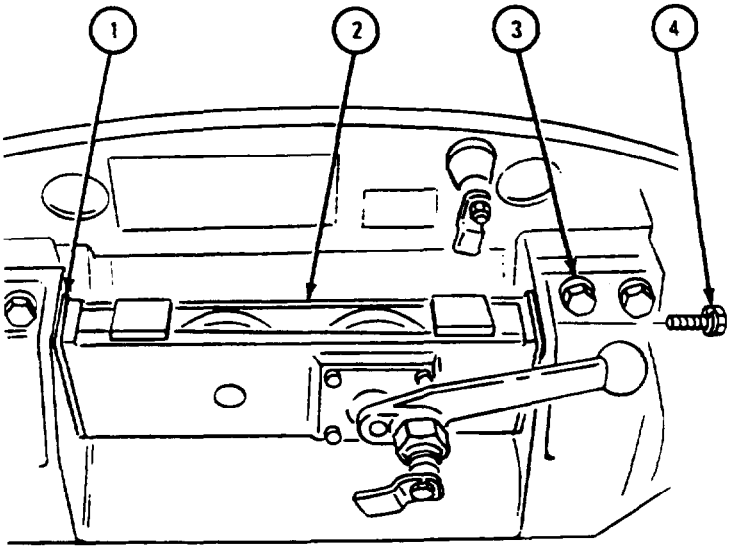
NOTE

Follow-on Maintenance Action Required:

1. Replace winch cable back on winch drum. Refer to TM 9-2320-211-20.
2. Grease and oil winch tensioner assembly. Refer to LO 9-2320-211-12.

END OF TASK





TA 084495

17-5. FRONT WINCH SHEAVE AND TROLLEY (LEVEL WIND) REPAIR (TRUCK M543A2).

TOOLS : No special tools required

SUPPLIES : Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680
Clean dry rags
Crocus cloth
Cotter pin
Felt washer, swivel sheave bearing (2)
Felt ring, trolley
Trolley wheel bearing packing wit h ret airier
Sheave frame shaft bearing preformed felt, mechanical (1 each)

PERSONNEL: One

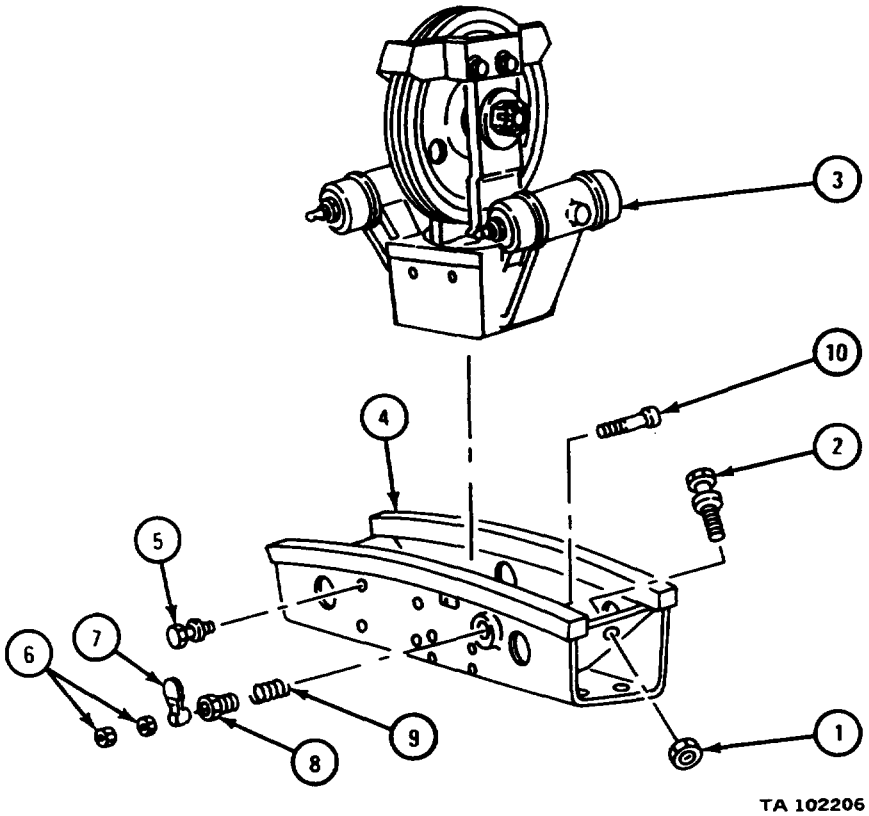
EQUIPMENT CONDITION: Level wind assembly on workbench.

a. Disassembly.

FRAME 1

1. Take off nut (1). Take out stop bolt (2).
2. Do step 1 again on other side.
3. Slide trolley assembly (3) to one side of track (4). Take out four screws and washers (5) through holes in track.
4. Lift out trolley assembly (3).
5. Take out two nuts (6) and lever (7).
6. Take out nut (8) and spring (9).
7. Take out screw (10).

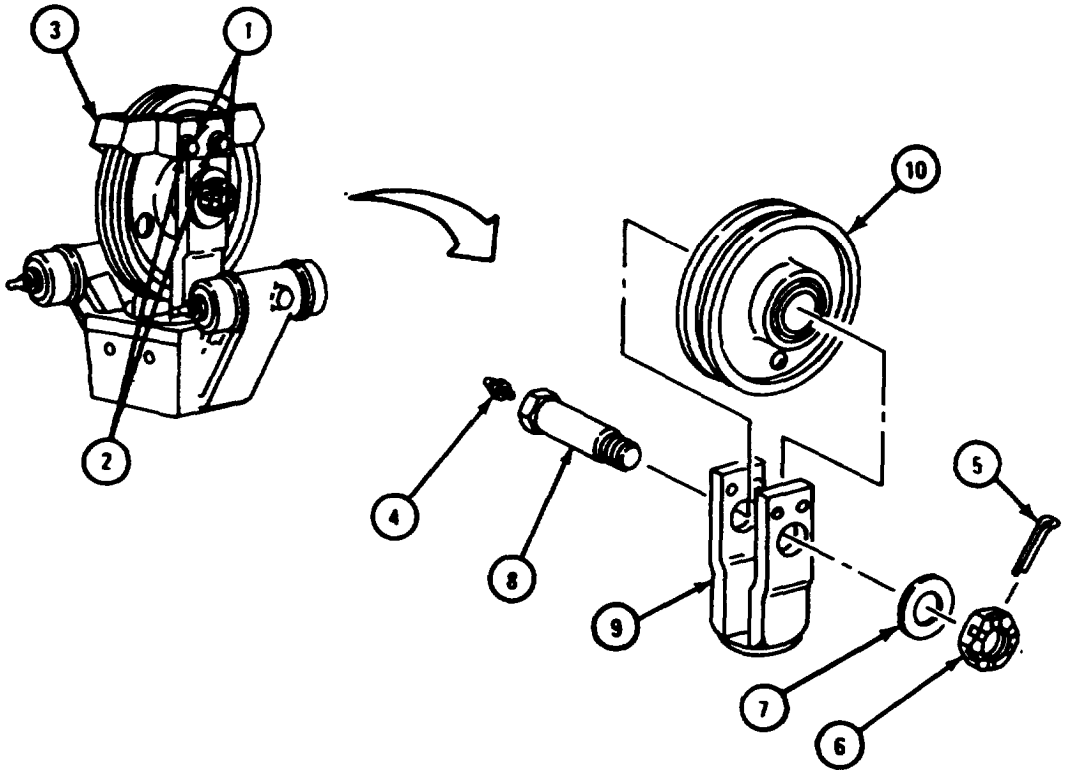
GO TO FRAME 2



FRAME 2

1. Take out four cap screws (1) with washers (2), two on each side.
2. Take off cable guard (3).
3. Take out lubrication fitting (4). Pull out and throw away cotter pin (5).
4. Take off nut (6) with washer (7).
5. Take out bolt (8) from sheave swivel (9).
6. Take out sheave assembly (10).

GO TO FRAME 3

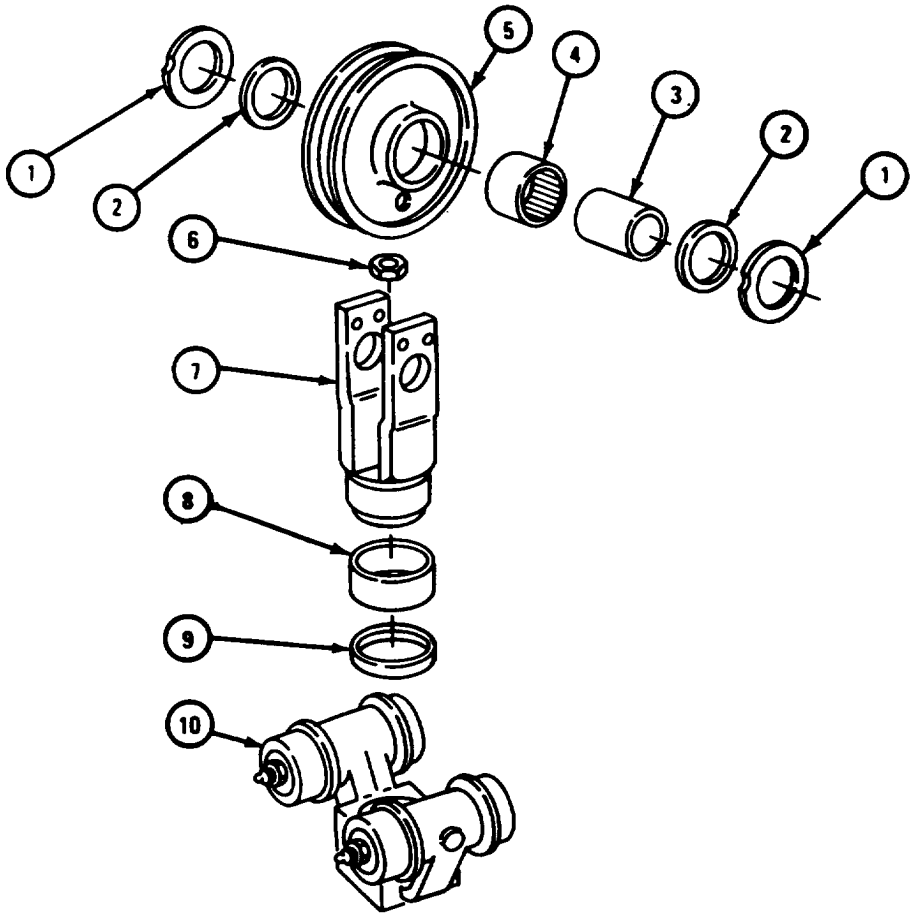


TA 103077

FRAME 3

1. Take out two lockwashers (1). Take out and throw away two felt washers (2).
2. Take out bushing (3) and press out bearing (4) from sheave assembly (5).
3. Take off nut (6).
4. Lift off sheave swivel (7).
5. Take out bearing sleeve (8) and felt ring (9) from trolley assembly (10). Throw away felt ring.

GO TO FRAME 4



TA 103078

FRAME 4

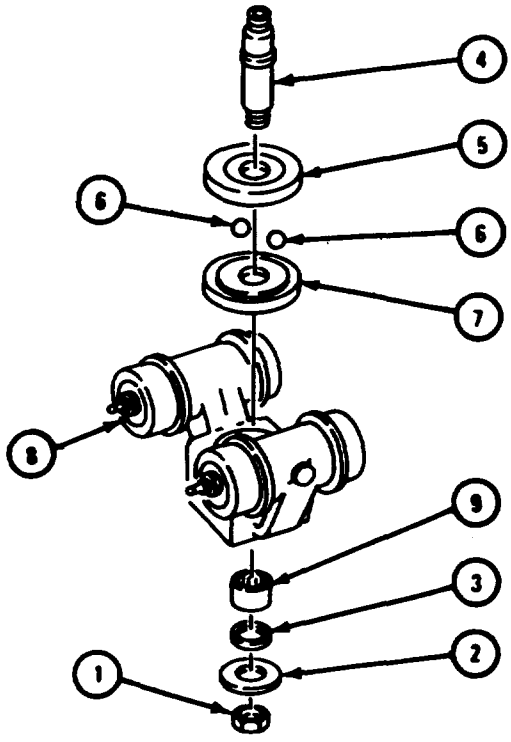
1. Take out nut (1), washer (2), and preformed felt packing (3). Throw away preformed felt packing.
2. Take out shaft (4).
3. Take off outer bearing cup (5).
4. Take out 26 bearing balls (6).
5. Take out inner bearing cup (7) from trolley assembly (8).

NOTE

Do not take out bearing (8) unless it is damaged. Refer to para 17-5c for inspection procedures.

6. Take out bearing (9).

GO TO FRAME 5

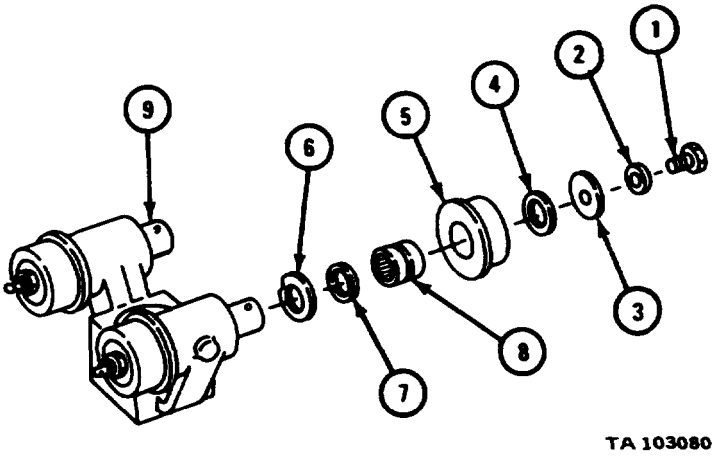


TA 103079

FRAME 5

1. Take out cap screw (1) with lockwasher (2).
2. Take out washer (3) and felt packing (4). Throw away felt packing.
3. Take off wheel (5).
4. Take out washer (6) and felt packing (7). Throw away felt packing.
5. Take bearing (8) out of wheel (5).
6. Do steps 1 through 5 again for other wheel (9).

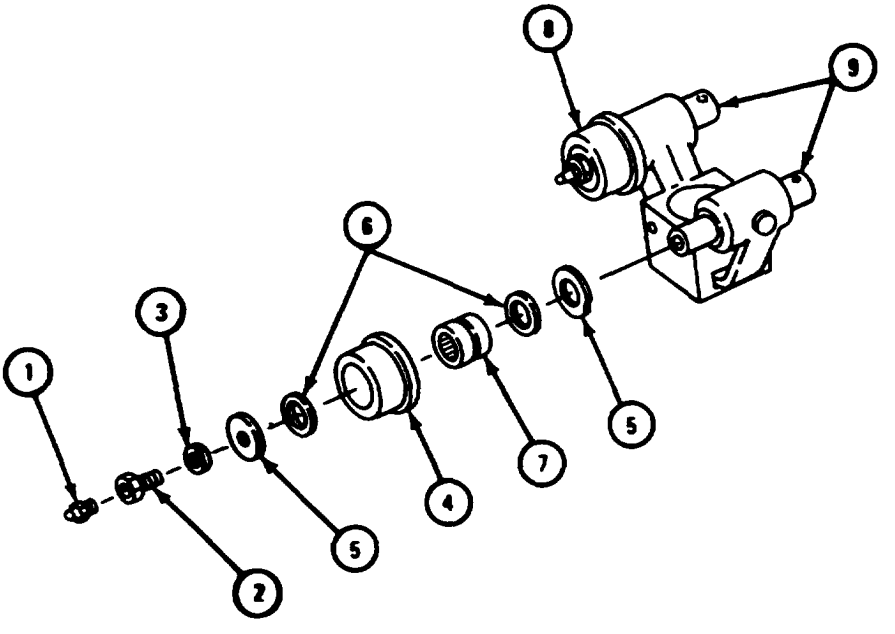
GO TO FRAME 6



FRAME 6

1. Take out lubrication fitting (1).
2. Take out hollow bolt (2) with lockwasher (3).
3. Take out wheel (4) with two washers (5).
4. Take off two washers (5) and two preformed felt packings (6). Throw away preformed felt packings.
5. Take out bearing (7).
6. Do steps 1 through 5 again for other wheel (8).
7. Take out two axles (9).

END OF TASK



TA 103081

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

b. Cleaning. Clean all metal parts with dry cleaning solvent. Dry with clean dry rags.

C. Inspection and Repair.

(1) Check that all bearings are not damaged. Refer to Part 1, para 7-7. If bearings are damaged, get new ones.

(2) Check that axles and shafts have no scoring, burrs or cracks. Polish" burrs with crocus cloth. If axles or shafts are bent or cracked get new ones.

(3) Check that axle housing, swivel frame, and track have no cracks, bends or burrs. Repair cracks by welding. Refer to TM 9-237. Polish burrs with a fine mill file.

(4) Check that cable sheave has no bends or cracks. Repair cracks by welding. Refer to TM 9-237. If sheave is bent, get a new one.

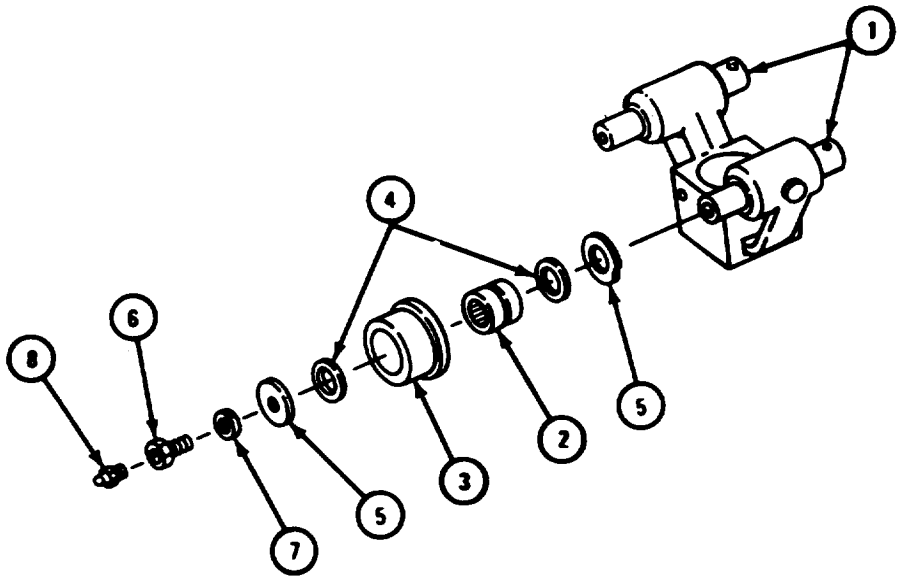
(5) Check that ball bearing cups are not damaged. Refer to Part 1, para 7-7. If bearing cups are damaged, get new ones.

d. Assembly.

FRAME 1

1. Put in two shafts (1).
2. Put bearing (2) in wheel (3). Put two preformed felt packings (4) in wheel. Put two washers (5) in wheel.
3. Slide wheel assembly (3) over shaft (1). Put in hollow bolt (6) with washer (7).
4. Put in lubrication fitting (8).
5. Do steps 2 through 4 again for other shaft (1).

GO TO FRAME 2

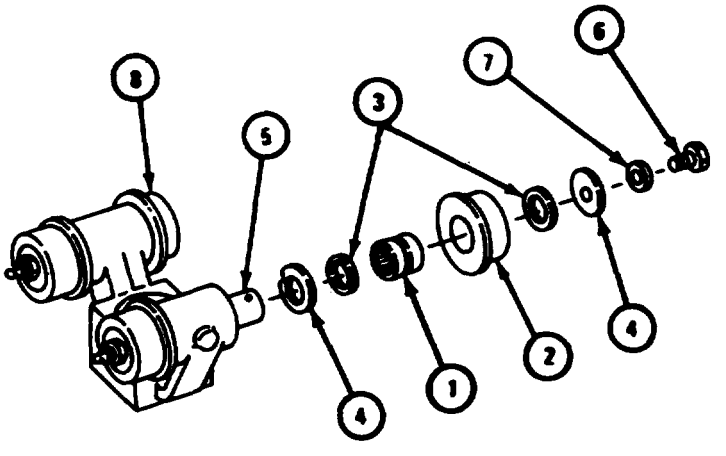


TA 103082

FRAME 2

1. Put bearing (1) into wheel (2).
2. Put two preformed packings (3) into wheel (2). Put in two washers (4).
3. Slide wheel assembly (2) onto shaft (5).
4. Put in capscrew (6) with washer (7).
5. Do steps 1 through 4 for axle (8).

GO TO FRAME 3

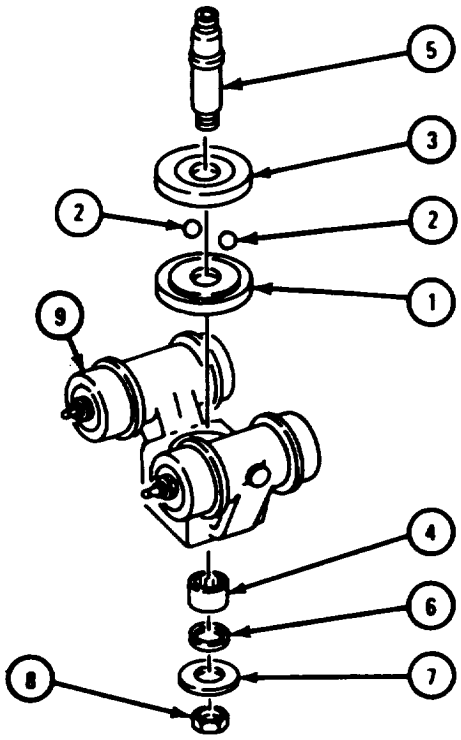


TA 103083

FRAME 3

1. Put in inner bearing cup (1). Put in 26 bearing balls (2).
2. Put on outer bearing cup (3). Put in bearing (4).
3. Put in shaft (5). Put on preformed felt packing (6).
4. Put on washer (7). Put nut (8) on trolley assembly (9).

GO TO FRAME 4

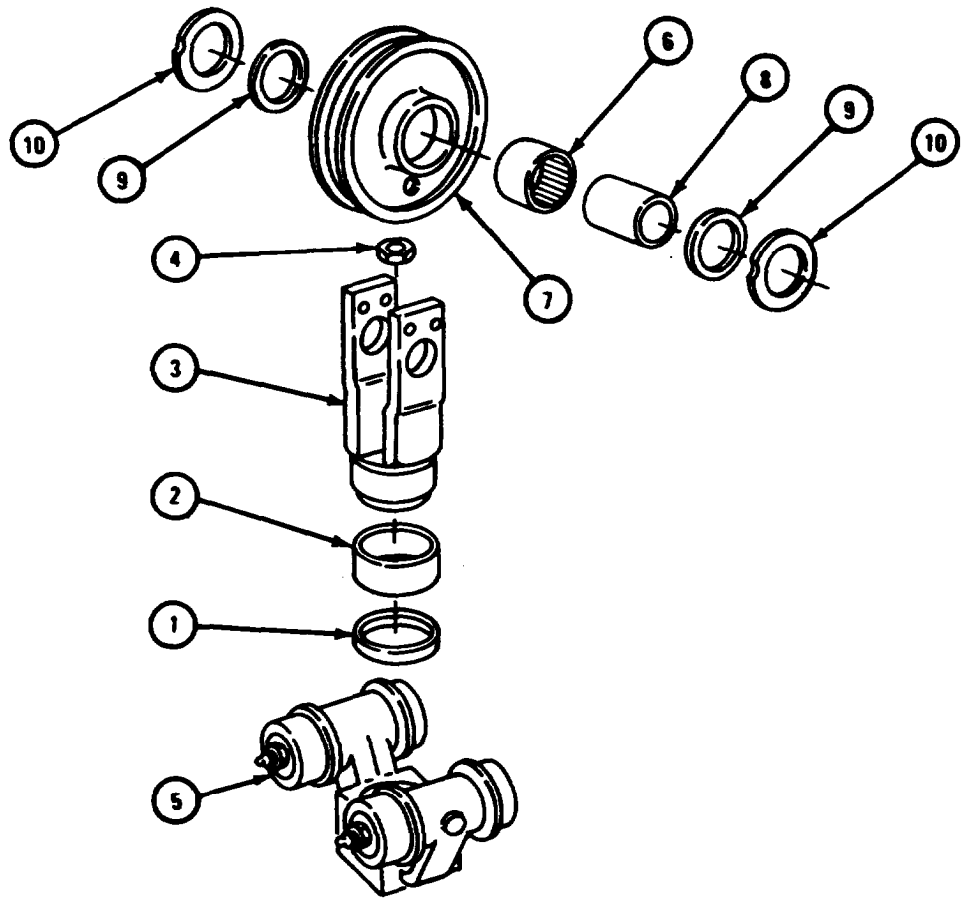


TA 103084

FRAME 4

1. Put in felt ring (1).
2. Put in bearing sleeve (2).
3. Put on sheave swivel (3).
4. Put nut (4) on trolley assembly (5).
5. Press bearing (6) into sheave (7).
6. Put in bushing (8).
7. Put in two felt washers (9).
8. Put in two lockwashers (10).

GO TO FRAME 5

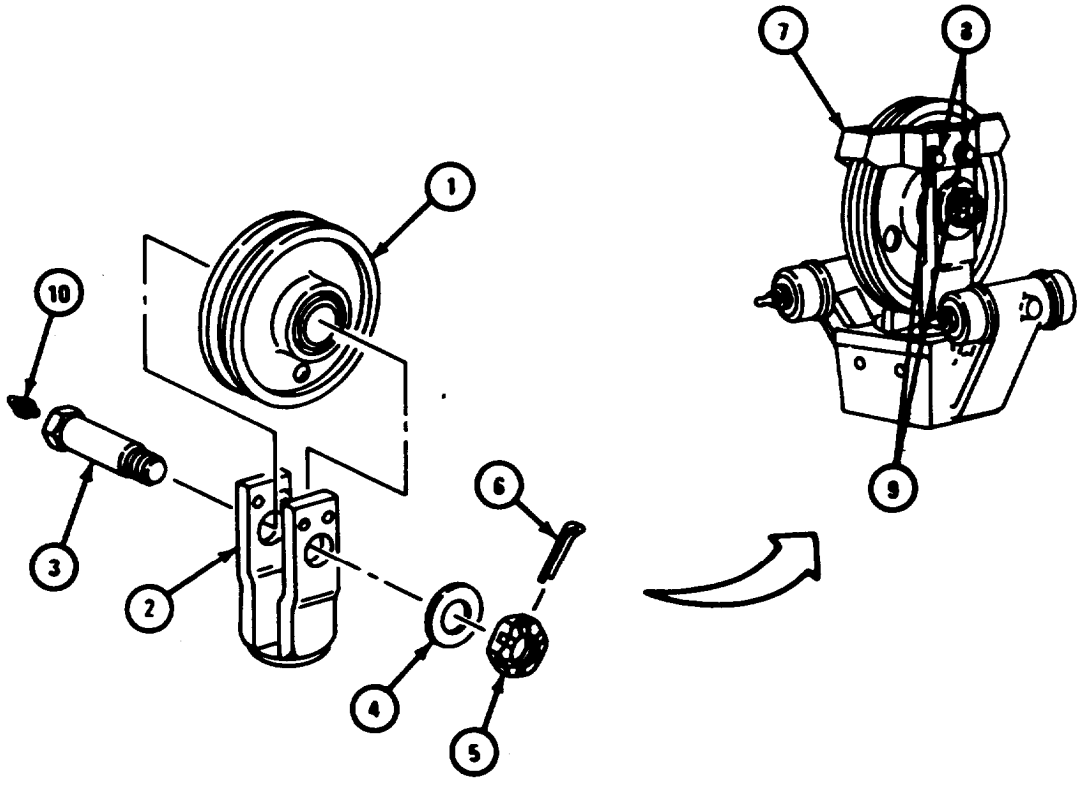


TA 103085

FRAME 5

1. Put sheave assembly (1) into swivel (2).
2. Put in bolt (3).
3. Put on washer (4) and nut (5).
4. Put in cotter pin (6).
5. Put on cable guard (7) with four capscrews (8) and washers (9), two on each side.
6. Put in lubrication fitting (10).

GO TO FRAME 6



TA 103086

FRAME 6

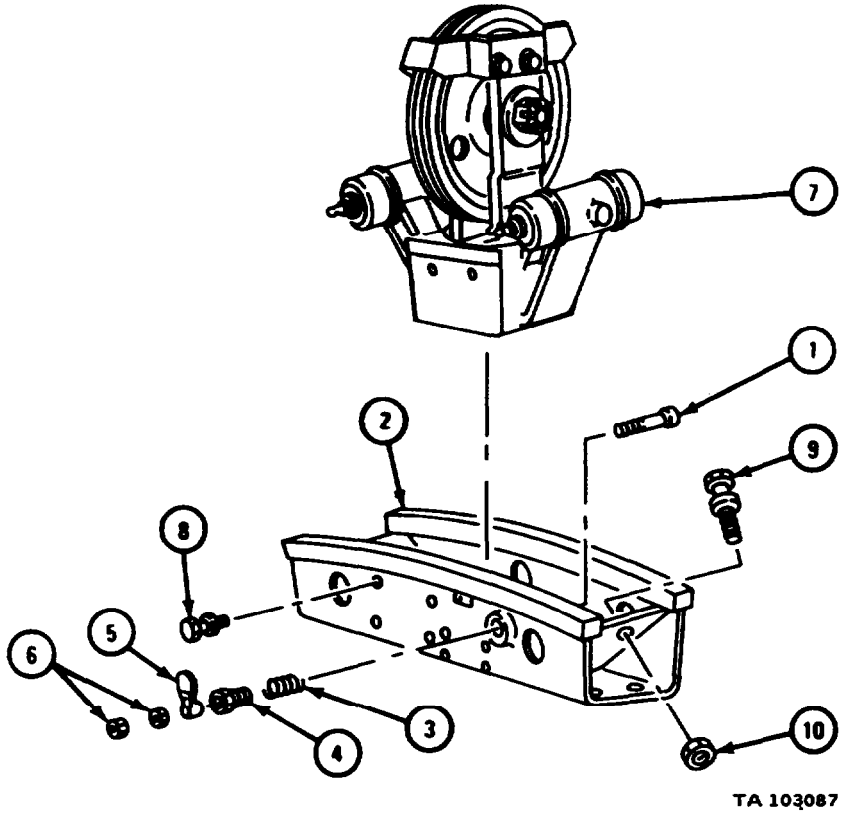
1. Put capscrew (1) in track (2).
2. Put spring (3), nut (4), lever (5), and two nuts (6) on capscrew (1).
3. Set trolley assembly (7) in track (2).
4. Put in four screws with washers (8) through holes in track (2).
5. Put in stop bolts (9) and nuts (10).
6. Do step 5 on other side of track.

NOTE

Follow-on Maintenance Action Required:

Lubricate sheave bolt and wheel axles. Refer to LO 9-2320-211-12.

END OF TASK



TA 103087

17-6. FRONT LEVEL WIND REMOVAL AND REPLACEMENT (TRUCK M543A2).

TOOLS: No special tools required

SUPPLIES: None

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

Preliminary Procedure. Free winch cable from stowed position. Refer to TM 9--2320-211-10.

b. Removal.

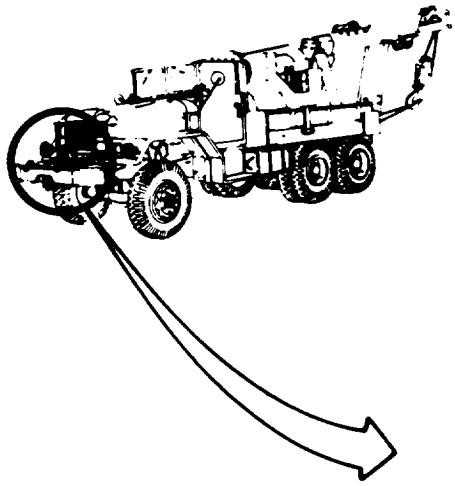
FRAME 1

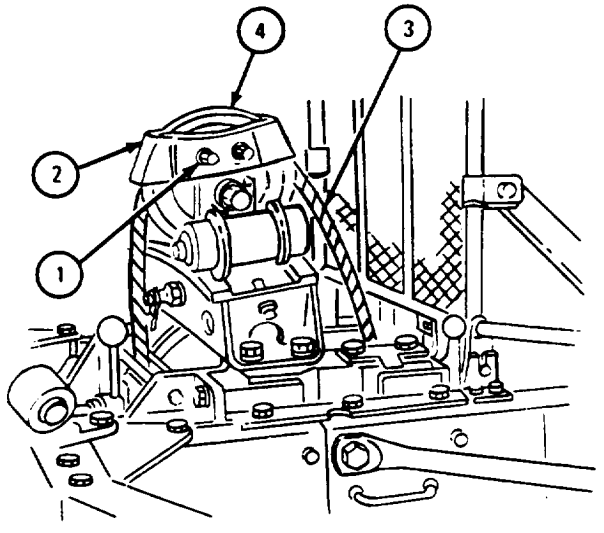
WARNING

Always wear leather gloves when handling winch cable. Do not let cable run through hands. Rusty or broken wires can cause serious injury to personnel.

1. Take out four screws and lockwashers (1).
2. Lift off guard (2).
3. Lift cable (3) off sheave (4) and move cable out of the way.

GO TO FRAME 2



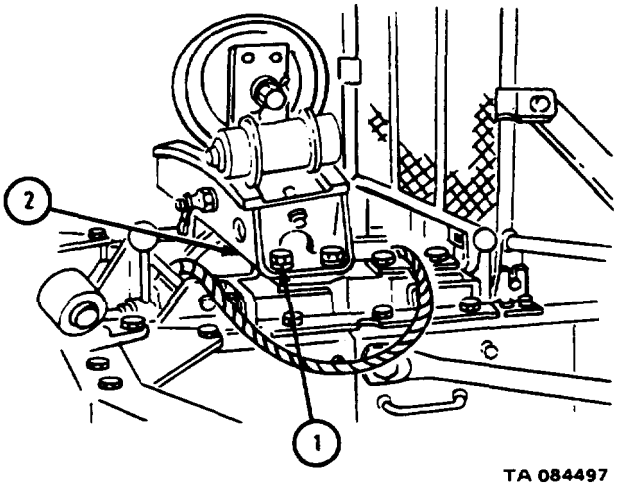


TA 084496

FRAME 2

1. Take out four screws and lockwashers (1).
2. Lift off sheave assembly (2).

END OF TASK

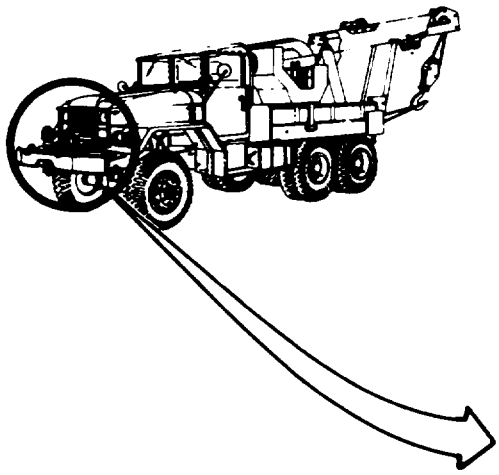


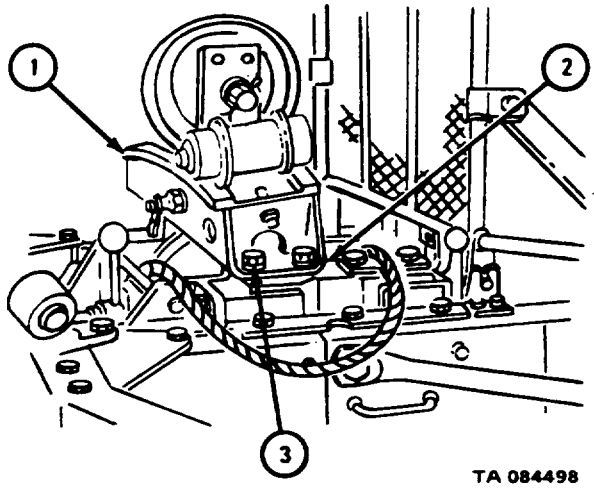
c. Replacement.

FRAME 1

1. Place sheave assembly (1) on top of winch (2) and line up mounting holes.
2. Put on four screws and lockwashers (3).

GO TO FRAME 2





FRAME 2

WARNING

Always wear leather gloves when handling winch cable. Do not let cable run through hands. Broken or rusty wires can cause serious injury to personnel.

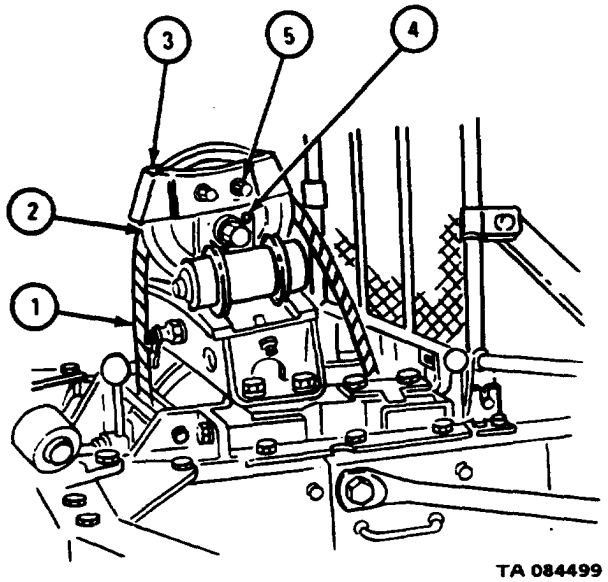
1. Put cable (1) in groove of sheave (2).
2. Put guard (3) on frame (4).
3. Put in four screws and lockwashers (5).

NOTE

Follow-on Maintenance Action Required:

Put cable back into stowed position. Refer to TM 9-2320-211-10.

END OF TASK



17-7. FRONT WINCH TENSION SHEAVE ASSEMBLY REPAIR (TRUCK M543A2).

TOOLS: No special tools required

SUPPLIES: Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680
Lint-free cloth
Crocus cloth

PERSONNEL: One

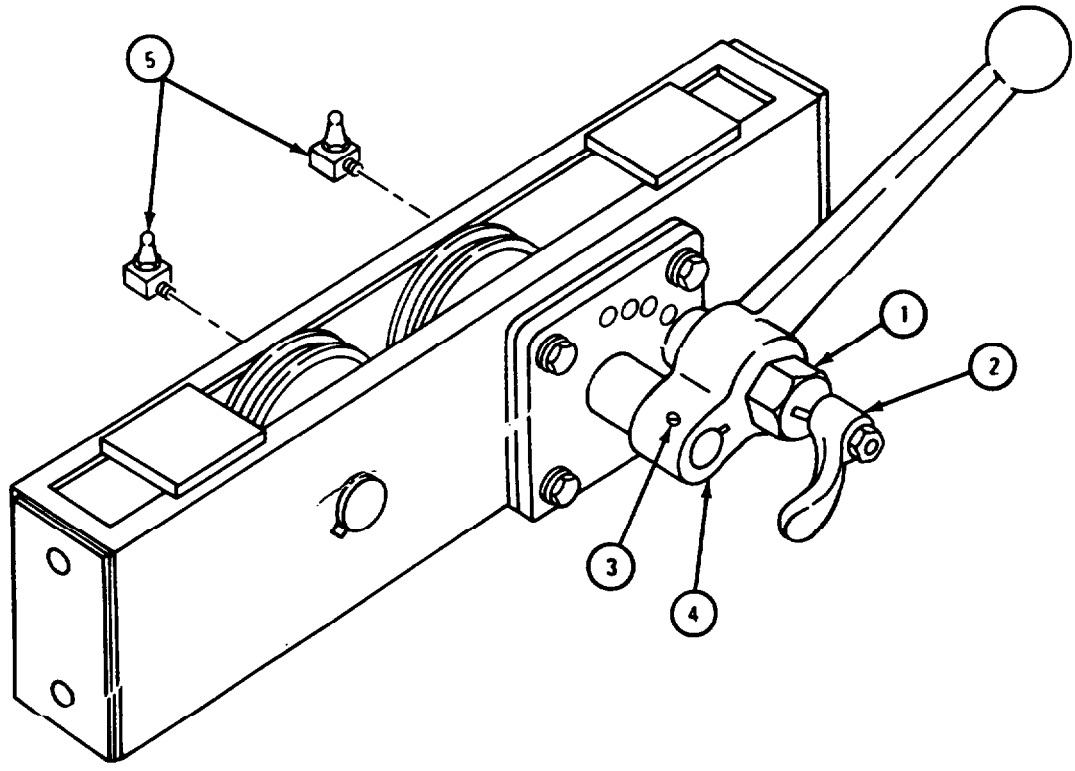
EQUIPMENT CONDITION: Tension sheave assembly removed from truck.

a. Disassembly.

FRAME 1

1. Unscrew nut (1) and take out tensioner lever latch assembly (2).
2. Take out setscrew (3) and take off tension lever (4).
3. Take out two lubrication fittings (5).

GO TO FRAME 2

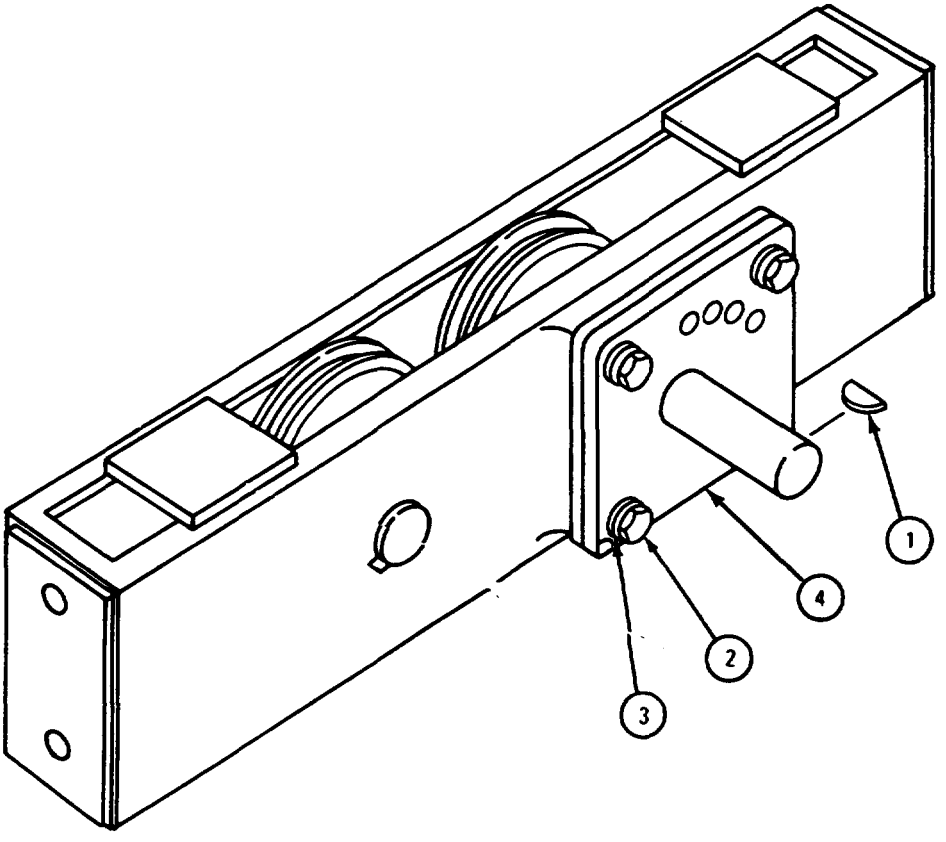


TA 102194

FRAME 2

1. Takeout woodruff key (1).
2. Take out four screws (2) with lockwashers (3).
3. Take off block (4).

GO TO FRAME 3

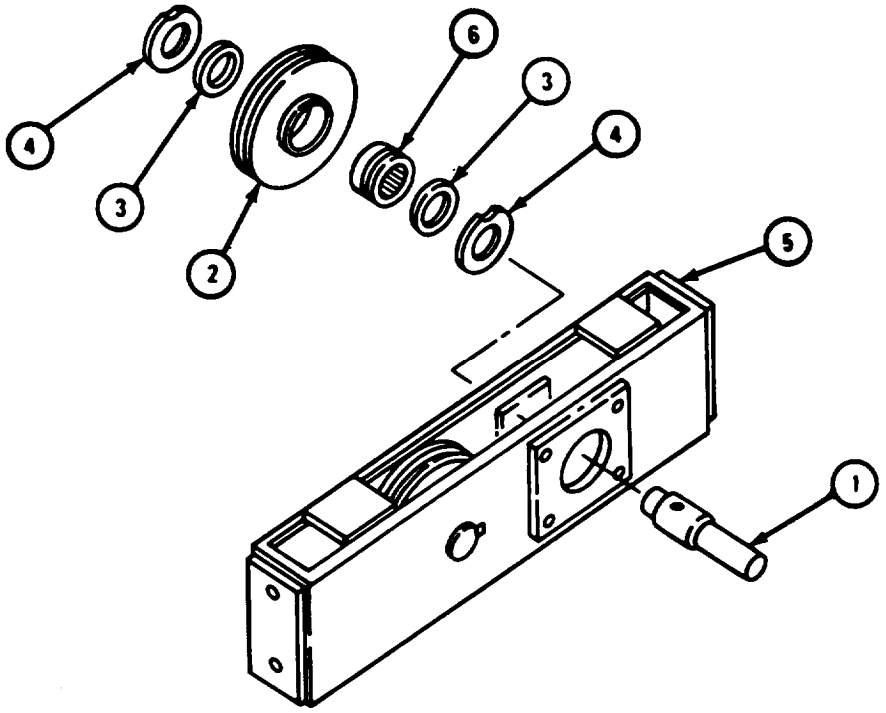


TA 102593

FRAME 3

1. Take out camshaft (1), sheave (2), two felt washers (3) and two thrust washers (4) from frame (5).
2. Press bearing (6) out of sheave (2).

GO TO FRAME 4

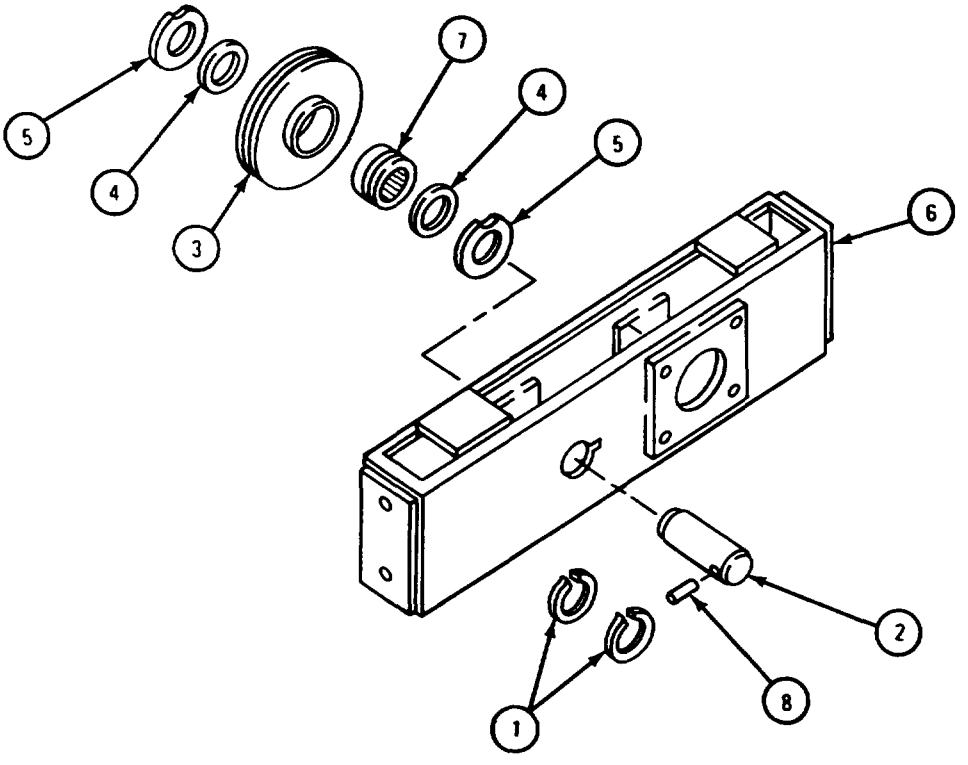


TA 103088

FRAME 4

1. Take two snaprings (1) off shaft (2).
2. Take out shaft (2), sheave (3), two felt washers (4), and two thrust washers (5) from frame (6).
3. Press bearing (7) out of sheave (3).
4. Drill pin (8) out of shaft (2). Throw away pin and get a new one. If shaft (2) is damaged while drilling, throw away shaft and get a new one.

GO TO FRAME 5

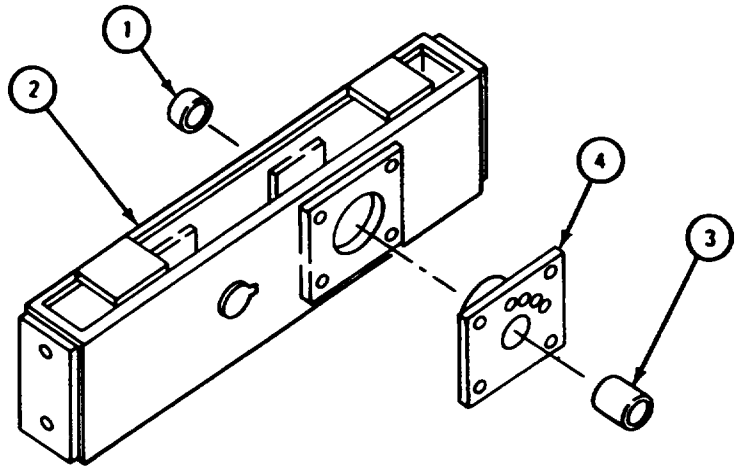


TA 105311

FRAME 5

1. Press bearing sleeve (1) out of frame (2) and throw it away.
2. Press bearing sleeve (3) out of block (4) and throw it away.

GO TO FRAME 6

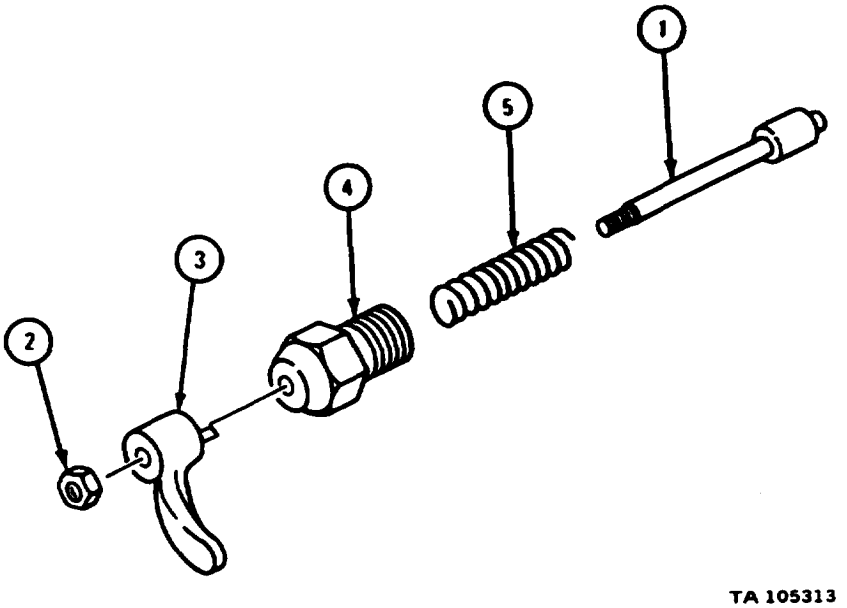


TA 105312

FRAME 6

1. Clamp tensioner sheave lever lock poppet (1) in vise with soft jaw caps.
2. Take off nut (2). Take off latch (3). Take of nut (4) and spring (5).
3. Take poppet (1) out of vise.

END OF TASK



TA 105313

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

b. Cleaning. Wash all metal parts with dry cleaning solvent. Wipe with clean dry rags.

c. Inspection and Repair.

(1) Check that all bearings are not damaged. Refer to Part 1, para 7-7. If bearings are damaged, get new ones.

(2) Check that sheave shafts have no wear, cracks or burrs. Polish burrs with crocus cloth. If shafts are cracked, get new ones.

(3) Check that sheaves have no cracks or bends. If sheaves are cracked, bent or worn, get new ones.

(4) Check that tension frame has no cracks or bends. Repair cracks by welding. Refer to TM 9-237.

(5) Check that operating lever has no cracks or bends. Repair cracks by welding. Refer to TM 9-237.

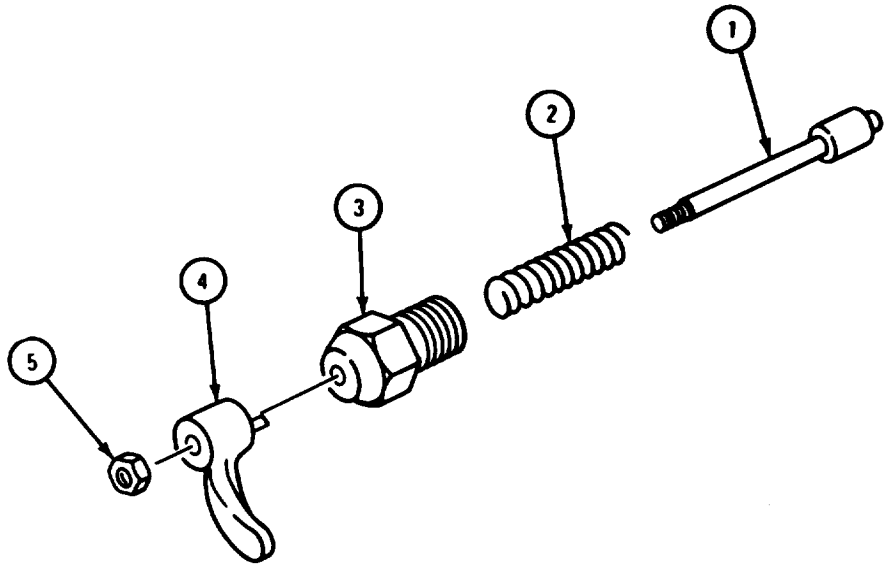
(6) Check that washers have no wear or scoring marks. If washers are worn or scored, get new ones.

d. Assembly.

FRAME 1

1. Clamp tension sheave lever lock poppet (1) in vise with soft jaw caps.
2. Put on spring (2) and nut (3).
3. Push down on nut (3) to compress spring (2) and put on latch (4). Hold down latch (4) and put on nut (5).

GO TO FRAME 2

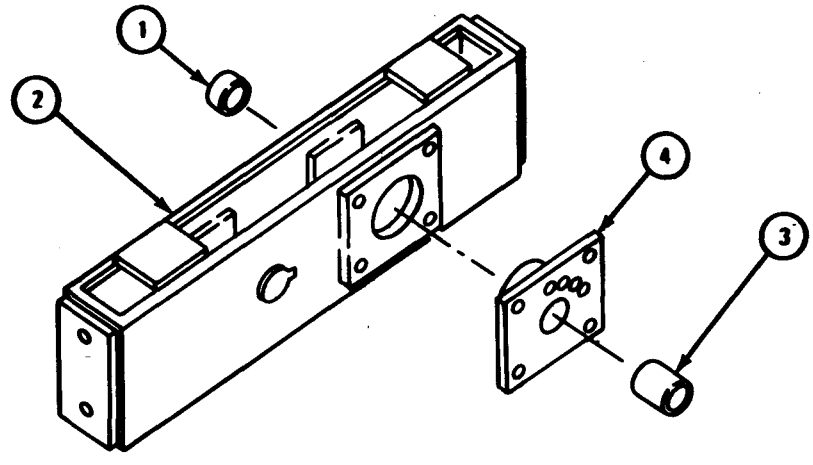


TA 105314

FRAME 2

1. Press bearing sleeve (1) into frame (2).
2. Press bearing sleeve (3) into block (4).

GO TO FRAME 3

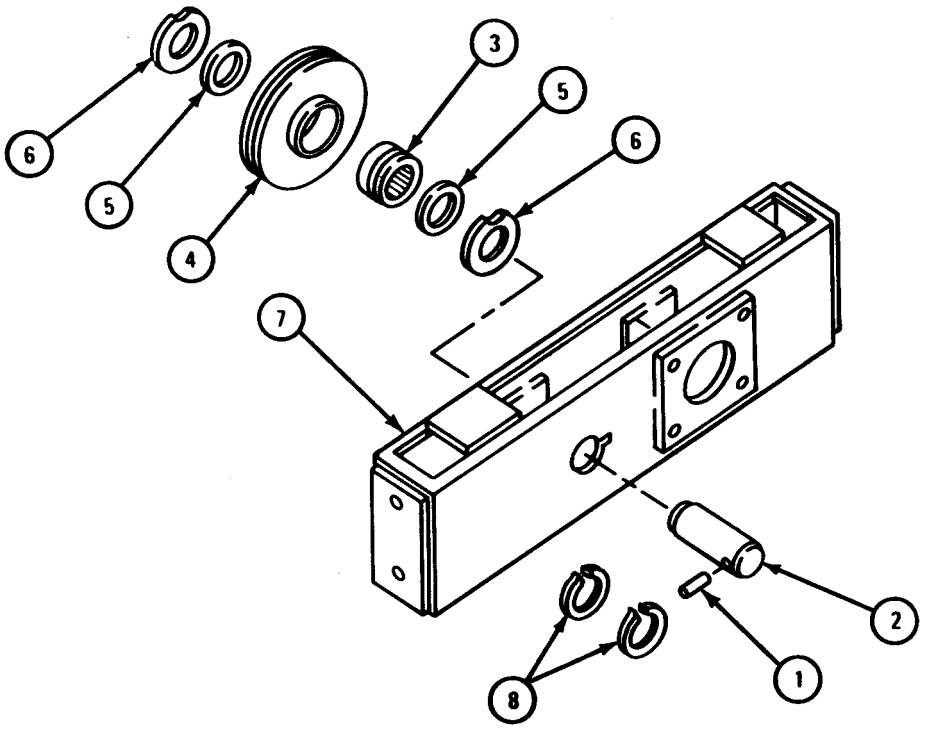


TA 105315

FRAME 3

1. Put pin (1) into shaft (2).
2. Press bearing (3) into sheave (4).
3. Put sheave (4), two felt washers (5), and two thrust washers (6) into frame (7), alining holes.
4. Aline pin (1) with slot in frame (7) and put in shaft (2).
5. Put two retaining rings (8) in grooves in shaft (2).

GO TO FRAME 4

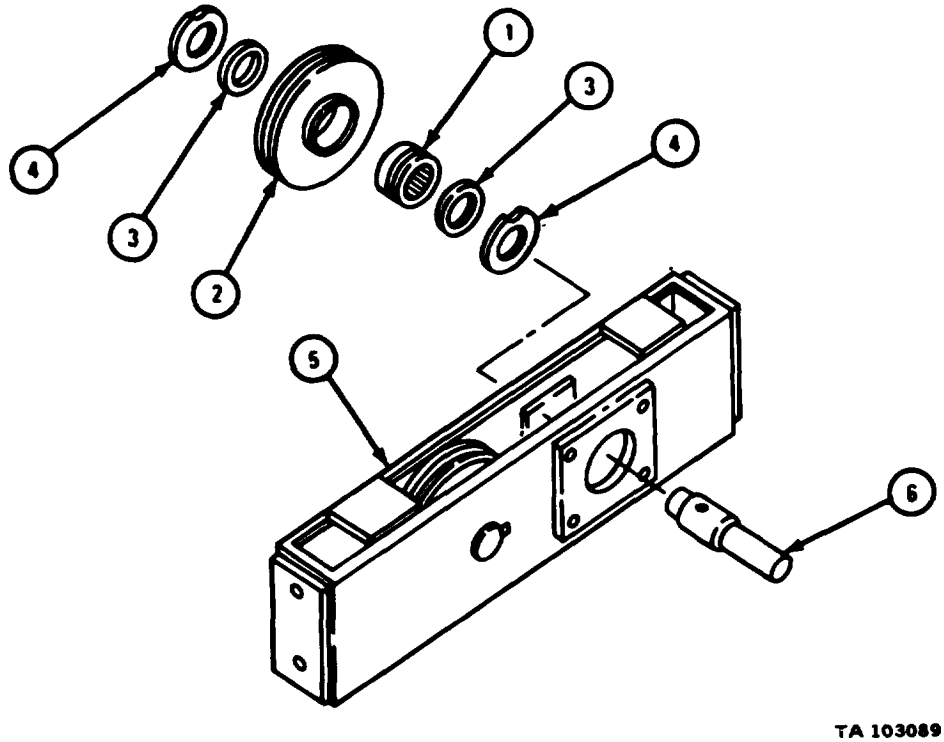


TA 105316

FRAME 4

1. Press bearing (1) into sheave (2).
2. Put sheave (2), two felt washers (3), and two thrust washers (4) into frame (5), alining holes.
3. Put in camshaft (6).

GO TO FRAME 5

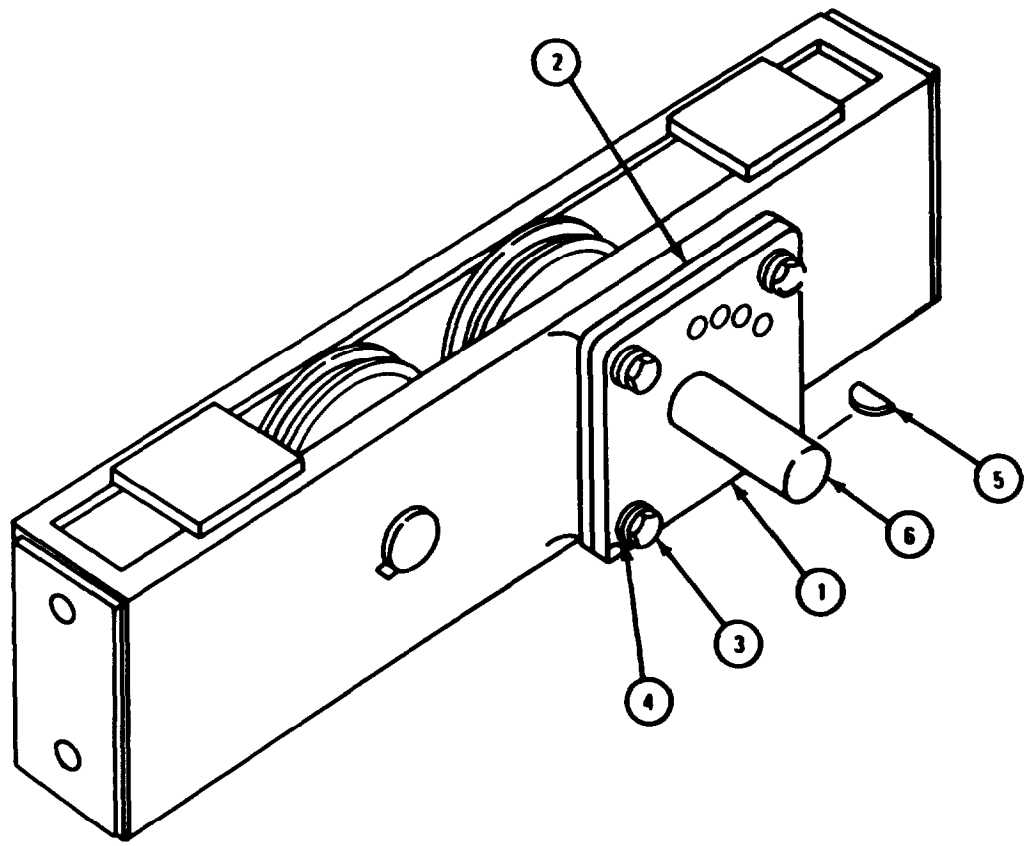


TA 103089

FRAME 5

1. Put block (1) in place on frame (2) with lever locking holes to the upper right and aline screw holes.
2. Put in four screws (3) with lockwashers (4).
3. Tap woodruff key (5) into keyway in camshaft (6).

GO TO FRAME 6



TA 103090

FRAME 6

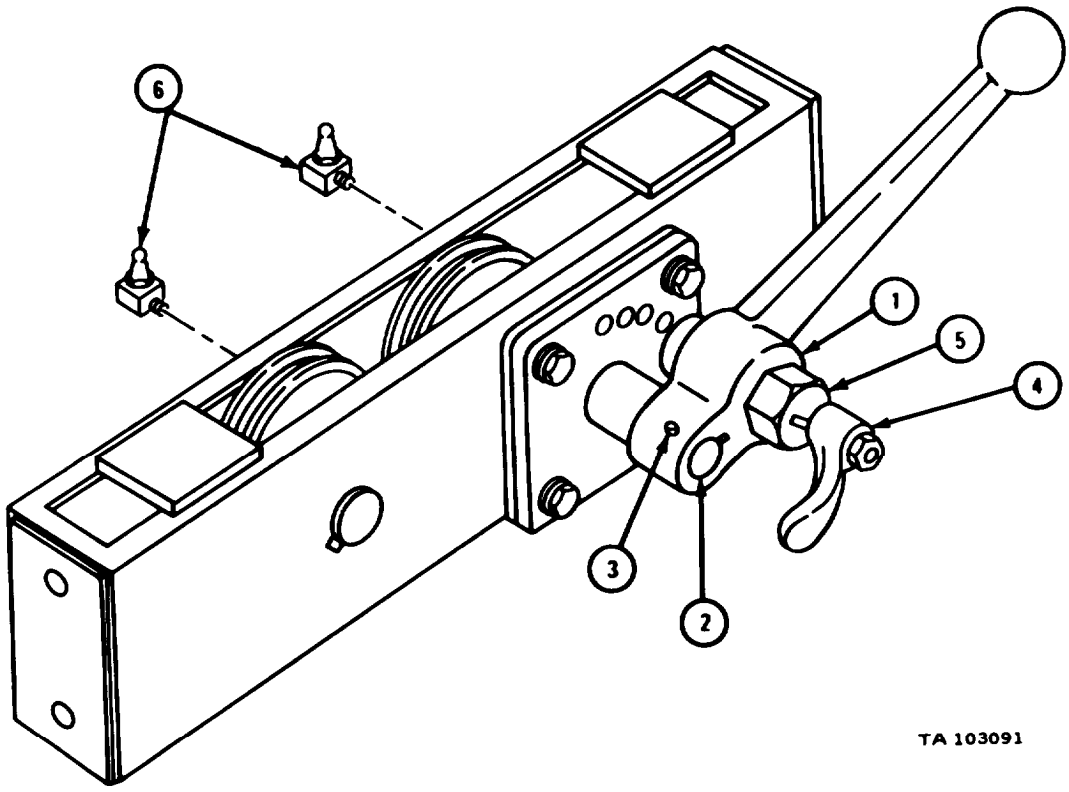
1. Aline keyway in tensioner lever (1) with key on shaft (2). Put on tensioner lever.
2. Put in setscrew (3).
3. Put tension lever latch assembly (4) in place in lever and screw in and tighten retaining nut (5).
4. Screw in and tighten two lubrication fittings (6).

NOTE

Follow-on Maintenance Action Required:

Lubricate sheaves. Refer to LO 9-2320-211-12.

END OF TASK



17-8. FRONT WINCH AUTOMATIC BRAKE REMOVAL, REPLACEMENT, AND ADJUSTMENT.

TOOLS: No special tools required

SUPPLIES: End cover gasket
Preformed packing

PERSONNEL: One

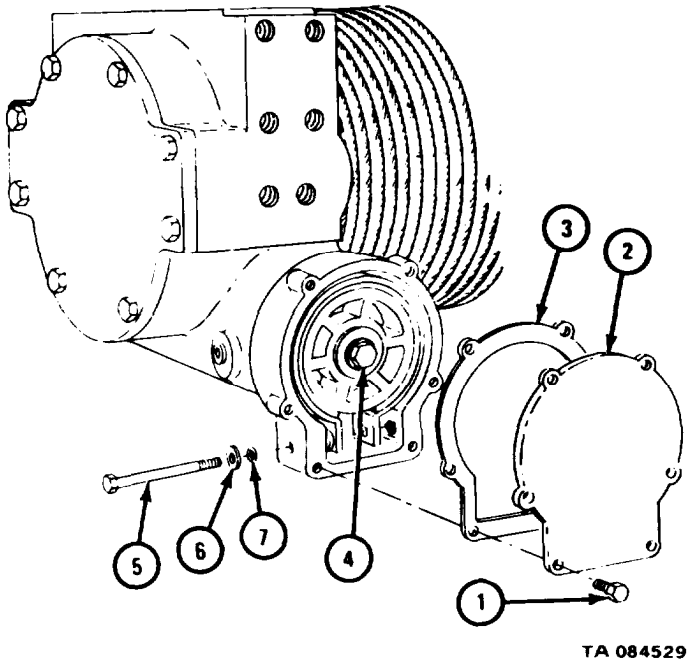
EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Removal.

FRAME 1

1. Take out six locking screws (1).
2. Take off brake case end cover (2) and gasket (3). Throw away gasket.
3. Loosen screw (4).
4. Take out screw (5), washer (6), and preformed packing (7). Throw away preformed packing.

GO TO FRAME 2

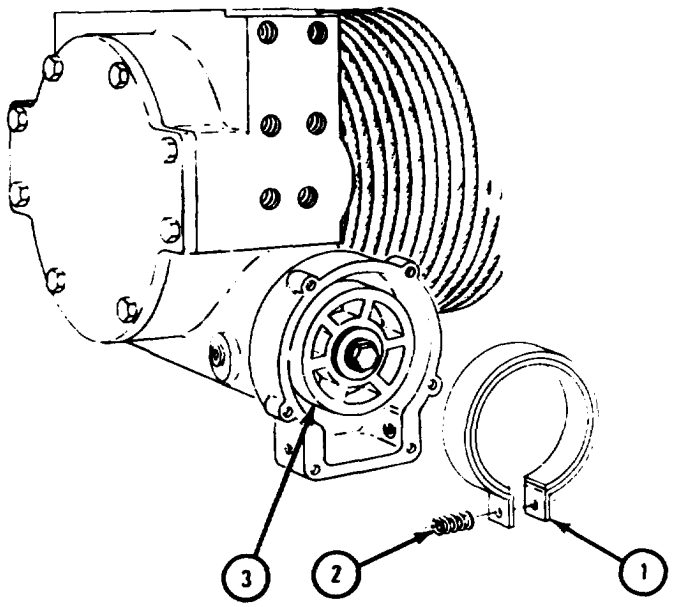


TA 084529

FRAME 2

1. Take out brake band assembly (1) and spring (2).
2. Check that braking surface of automatic brake drum (3) is not scored or damaged in any other way.

IF AUTOMATIC BRAKE DRUM IS DAMAGED, GO TO FRAME 3.
IF AUTOMATIC BRAKE DRUM IS NOT DAMAGED, END OF TASK

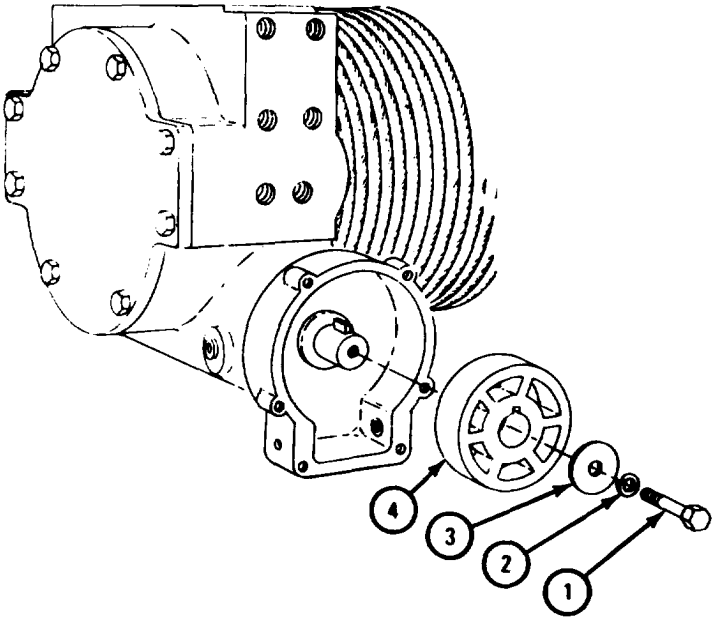


TA 084530

FRAME 3

1. Take out screw (1), lockwasher (2), and flat washer (3).
2. Pull off automatic brake drum (4). Throw away automatic brake drum and get a new one.

END OF TASK



TA 084531

b. Replacement and Adjustment.

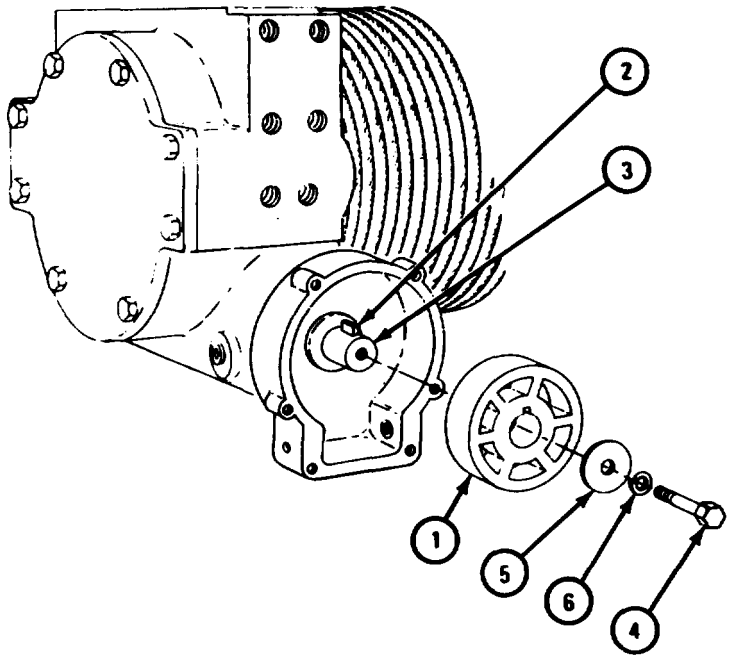
FRAME 1

NOTE

If automatic brake drum (1) was not taken off during disassembly, go to frame 2.

1. Line up keyway in automatic brake drum (1) with key (2).
2. Tap automatic brake drum (1) onto shaft of worm gear (3) and key (2).
3. Put in screw (4) with flat washer (5) and lockwasher (6).

GO TO FRAME 2

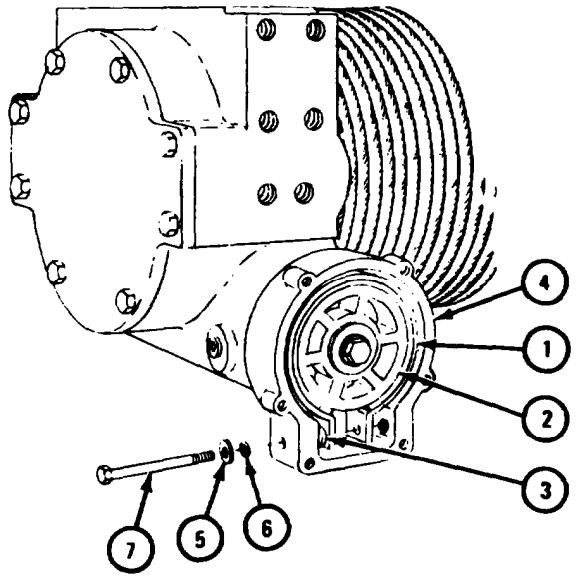


TA 084532

FRAME 2

1. Put brake band assembly (1) on automatic brake drum (2).
2. Put spring (3) between screw holes in brake band assembly (1) and automatic brake case (4).
3. Put flat washer (5) and preformed packing (6) on screw (7), and put in screw.
4. Draw up brake band assembly (1) partway.

GO TO FRAME 3

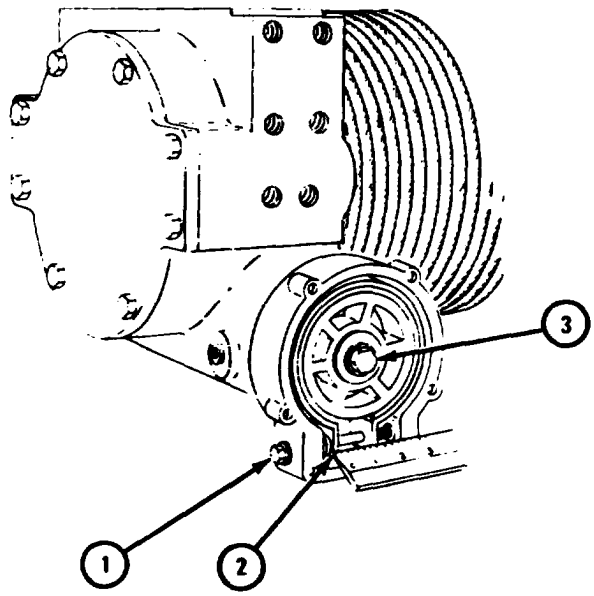


TA 084533

FRAME 3

1. Turn in screw (1) until gap in brake band assembly (2) is between 1 3/16 inches and 1 1/4 inches as shown.
2. Tighten screw (3).

GO TO FRAME 4

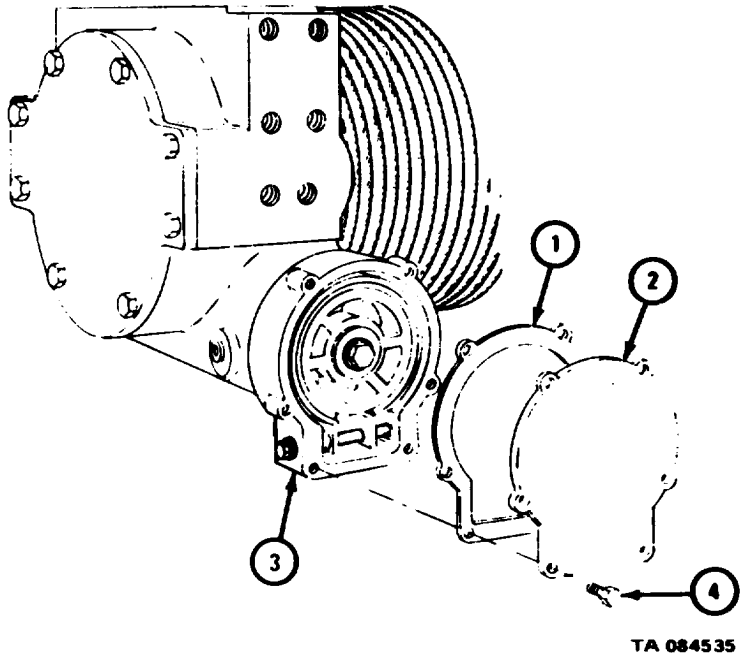


TA 084534

FRAME 4

1. Put gasket (1) and brake case end cover (2) on automatic brake case (3).
2. Put in six locking screws (4).

END OF TASK



17-9. FRONT WINCH LEVEL WIND REMOVAL AND REPLACEMENT (TRUCK M542A2).

TOOLS: Torque wrench

SUPPLIES: None

PERSONNEL: Two

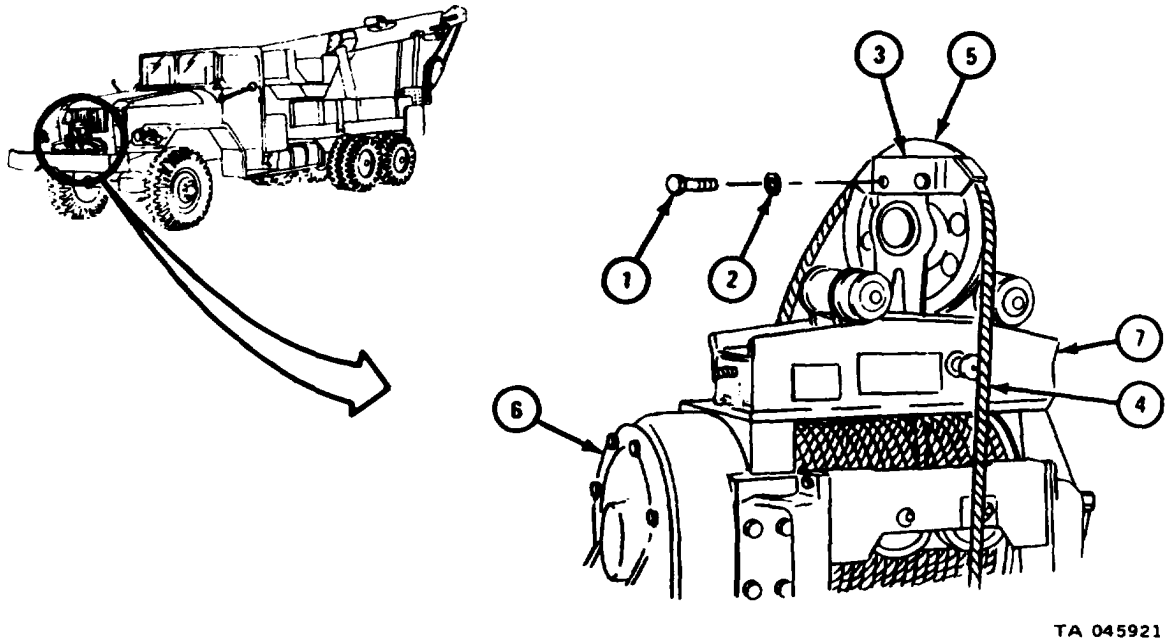
EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Removal.

FRAME 1

1. Takeout four screws (1) and lockwashers (2). Take off cable guard (3).
2. Take cable (4) off swivel sheave (5) and lay cable over gearcase (6) so that it is clear of level wind (7).

GO TO FRAME 2



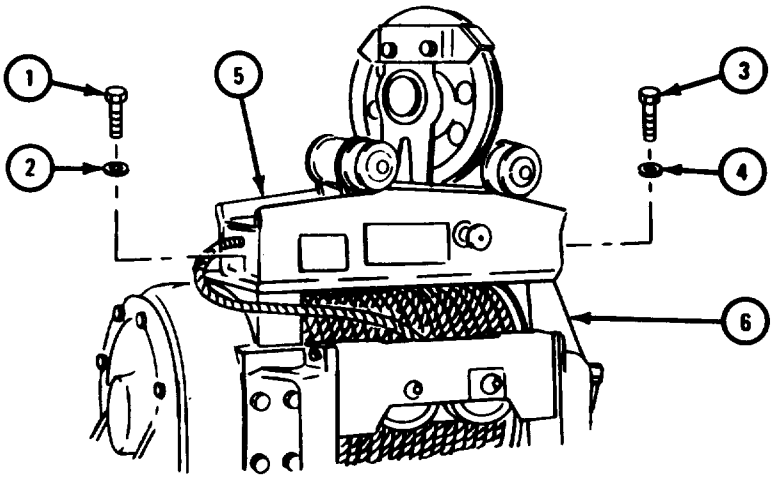
FRAME 2

1. Take out two screws (1) and lockwashers (2).
2. Takeout two screws (3) and lockwashers (4).

Soldiers A and B

3. Lift level wind (5) off frame (6).

END OF TASK



TA 045918

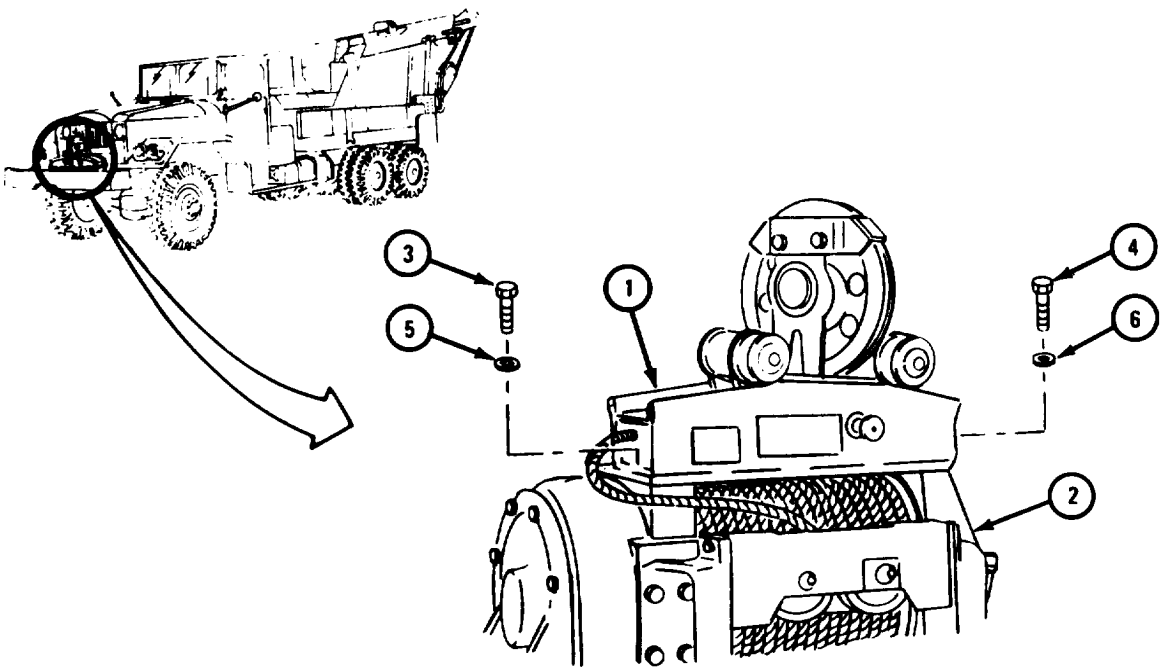
b. Replacement.

FRAME 1

Soldiers A and B 1. Put level wind (1) on frame (2), alining screw holes.

Soldier A 2. Put in and tighten four screws (3 and 4) and four lockwashers (5 and 6) to 80 to 100 pound-feet.

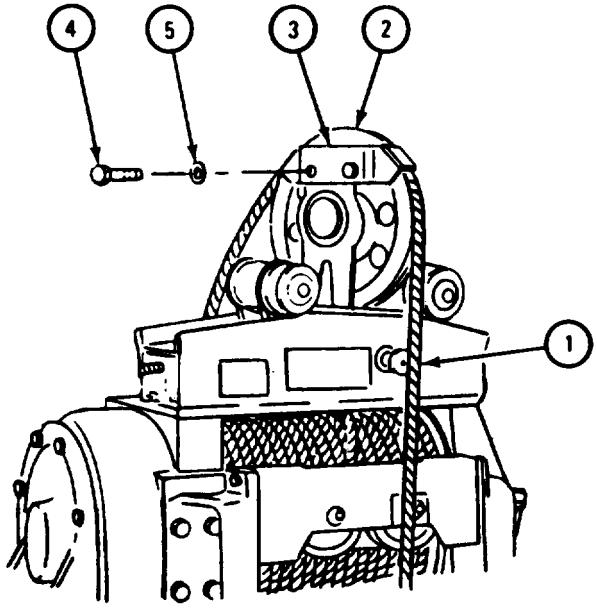
GO TO FRAME 2



FRAME 2

1. Put winch cable (1) on swivel sheave (2).
2. Put cable guard (3) back in place, dining screw holes. Put in four screws (4) and lockwashers (5).
3. Tighten four screws (4) to 20 to 25 pound-feet.

END OF TASK



TA 045920

17-10. FRONT WINCH ASSEMBLY REPAIR.

TOOLS: No special tools required

SUPPLIES: Gearcase cover gasket
Worm gear cap gasket (2)
Worm gear cap seal
Automatic brake case cover gasket
Preformed packing
Automatic brake case seal
Automatic brake case gasket
Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680

PERSONNEL: TWO

EQUIPMENT CONDITION: Truck parked, engine off, bandbrake set.

a. Preliminary Procedures.

(1) Remove cable and chain assembly. Refer to TM 9-2320-211-20.

(2) Remove winch assembly and remove mounting brackets from winch assembly. Refer to TM 9-2320-211-20.

(3) On truck M543A2, remove level wind assembly. Refer to para 17-6.

(4) Remove front winch roller assembly. Refer to para 17-3.

(5) Drain winch assembly. Refer to LO 9-2320-211-12.

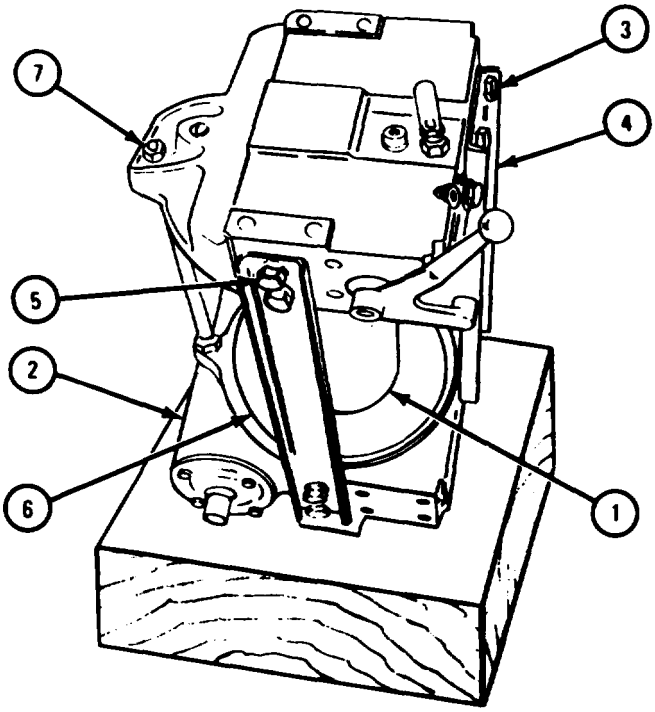
b. Disassembly.

(1) Disassembly of frame assembly.

FRAME 1

1. Put chain sling and chain hoist on cable drum (1).
2. Turn winch assembly (2) on end as shown.
3. Unhook chain hoist and take off chain sling.
4. Take out four screws and lockwashers (3).
5. Take off top channel (4).
6. Take out four screws and lockwashers (5).
7. Take off rear channel (6).
8. Take off nut (7).

GO TO FRAME 2

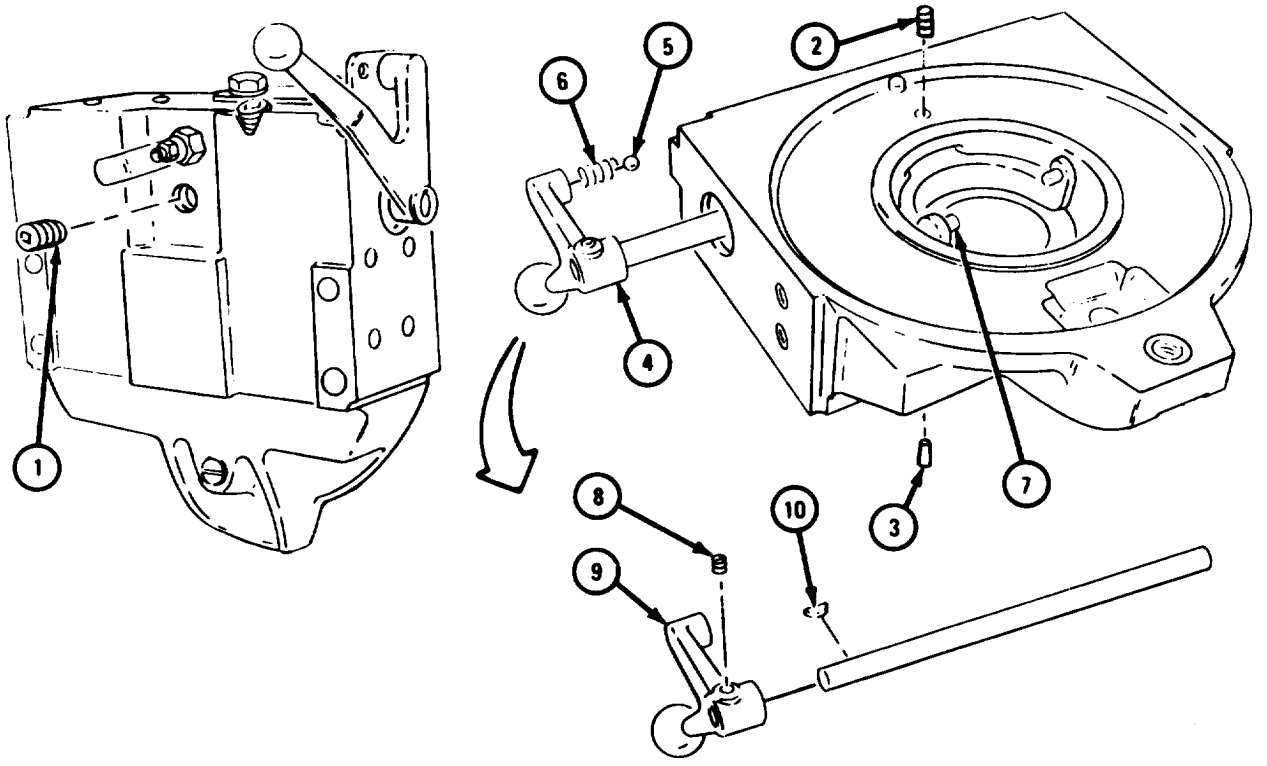


TA 084500

FRAME 2

1. Take out plugs (1 and 2).
2. Drive out pin (3).
3. Slowly pull out lever assembly (4) and take out catch ball (5) and spring (6).
4. Pull out shifter yoke (7).
5. Take out screw (6).
6. Pull off lever (9).
7. Tap out key (10).

GO TO FRAME 3



TA 084501

FRAME 3

Soldiers A and B

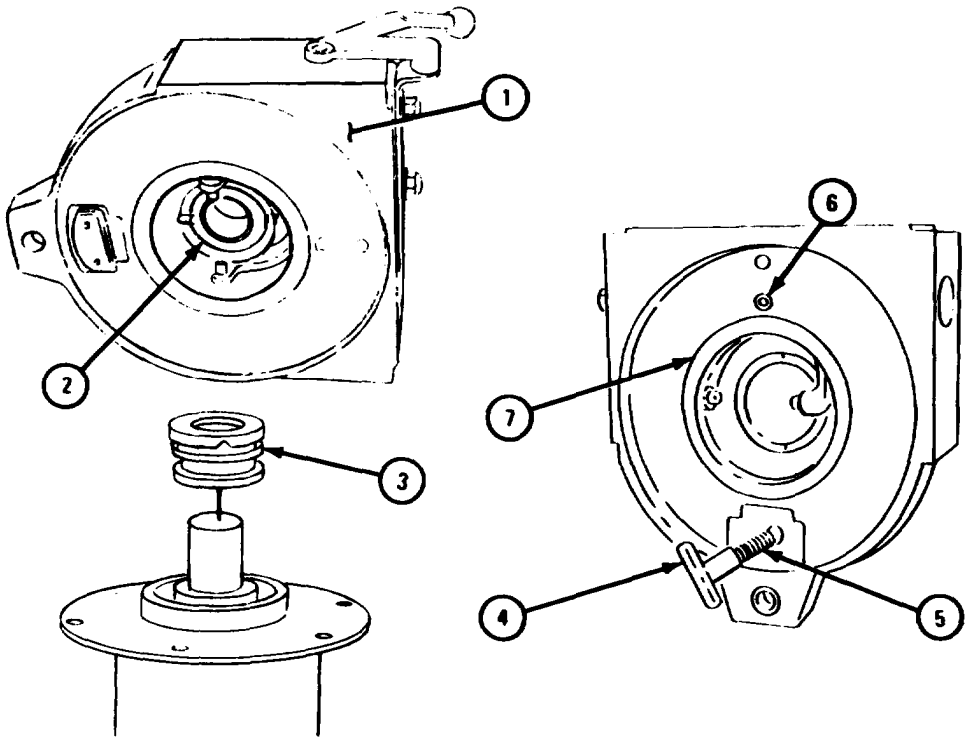
1. Pull off frame assembly (1) and take out thrust ring (2) and sliding clutch (3).
2. Take out drag brake brakeshoe (4) and spring (5).

NOTE

Do not take out seal (7) unless it is damaged. Refer to para 17-10d for inspection procedures.

3. Using punch and hammer through hole (6) in frame, tap out seal (7).

GO TO FRAME 4



TA 084502

FRAME 4

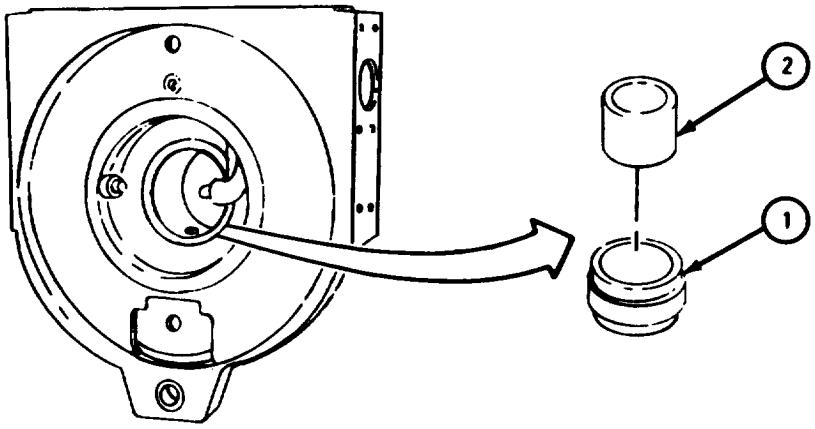
1. Take out sleeve (1) with bushing (2).

NOTE

Do not press out bushing (2) unless it is damaged or worn. Refer to para 17-10d for inspection procedures.

2. Press out bushing (2).

GO TO FRAME 5



TA 084503

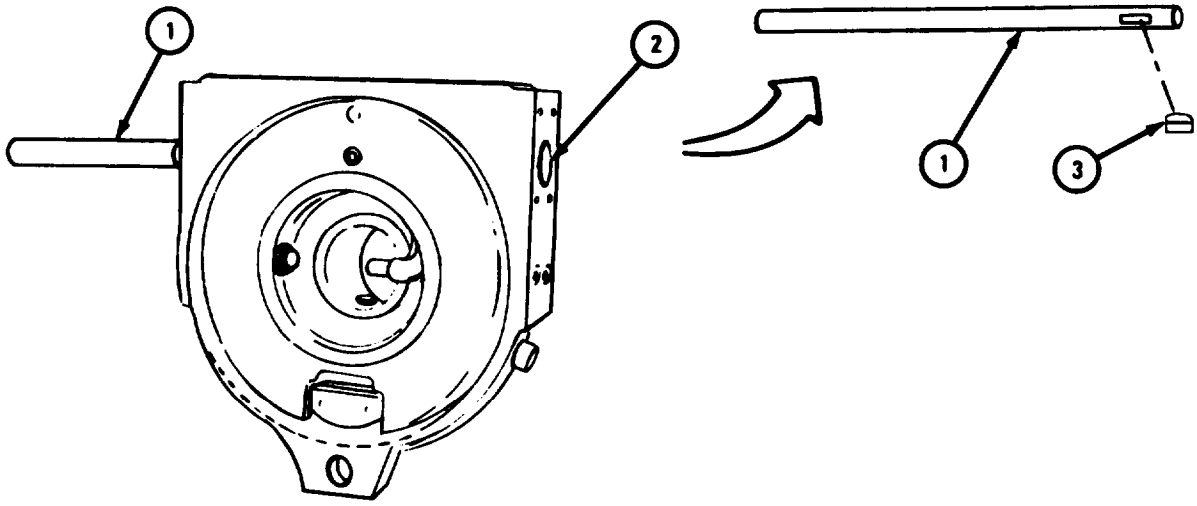
FRAME 5

NOTE

Before tapping out shaft (1), make sure that key (3) lined up with keyway in housing.

1. Tap shaft (1) out in direction of arrow, driving out plug (2). Take out shaft through plug hole.
2. Tap out key (3).

GO TO FRAME 6

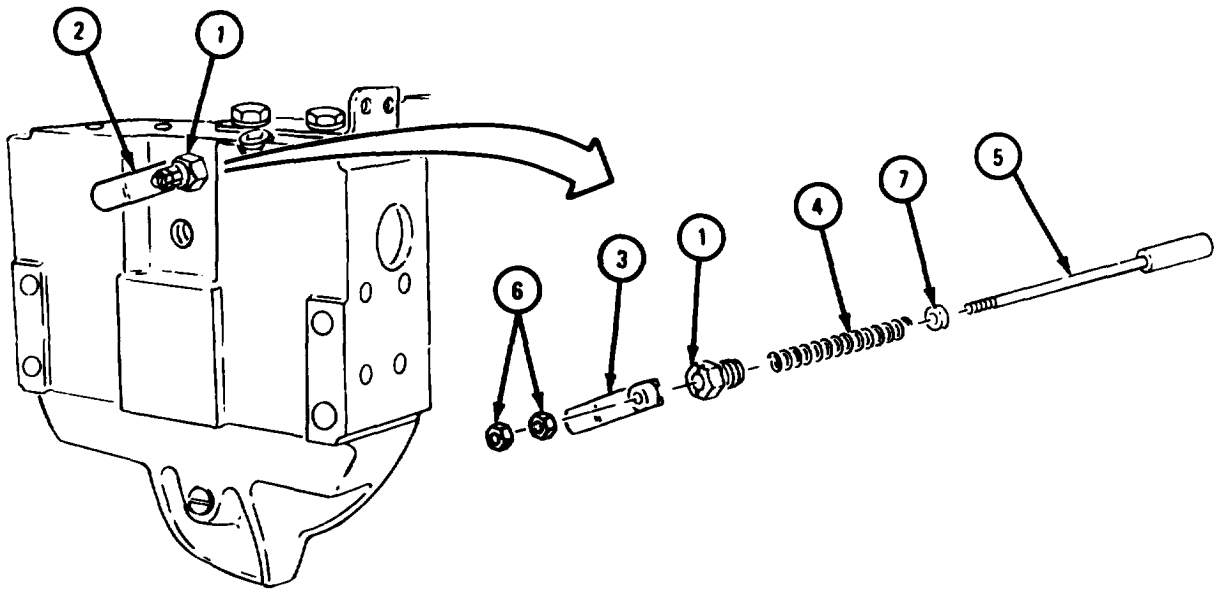


TA 084504

FRAME 6

1. Unscrew nut (1) and take out drum lock assembly (2).
2. Turn drum lock latch (3) to locked position to take tension off spring (4).
3. Put poppet (5) in vise with soft jaw caps.
4. Take off two nuts (6).
5. Take drum lock latch (3), nut (1), spring (4), and spacer (7) off poppet (5).
6. Take poppet (5) out of vise.

GO TO FRAME 7

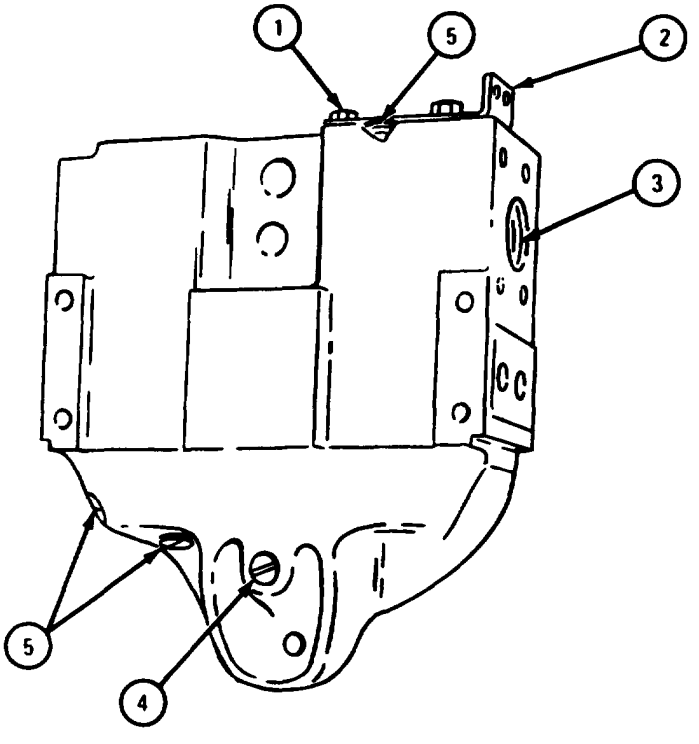


TA 084505

FRAME 7

1. Take out two screws and lockwashers (1).
2. Take off shift lever lock assembly (2).
3. Hook lip of seal (3) and pry it out.
4. Take out drag brake adjusting screw (4).
5. Take out three plugs (5).

END OF TASK



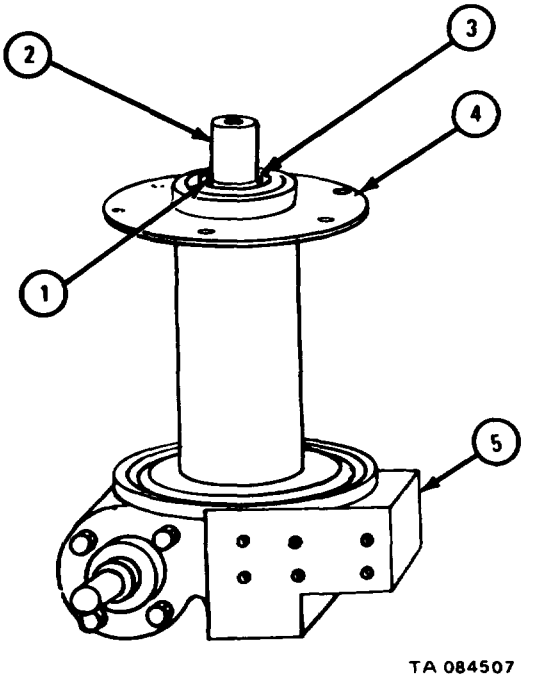
TA 084506

(2) Disassembly of cable drum and gearcase assembly.

FRAME 1

1. Drive back end of key (1) into shaft (2), raising front end of key out of shaft.
2. Drive front end of key (1) down and out of keyway.
3. Slide off thrust ring (3).
4. Pull cable drum (4) off gearcase (5).

GO TO FRAME 2



TA 084507

FRAME 2

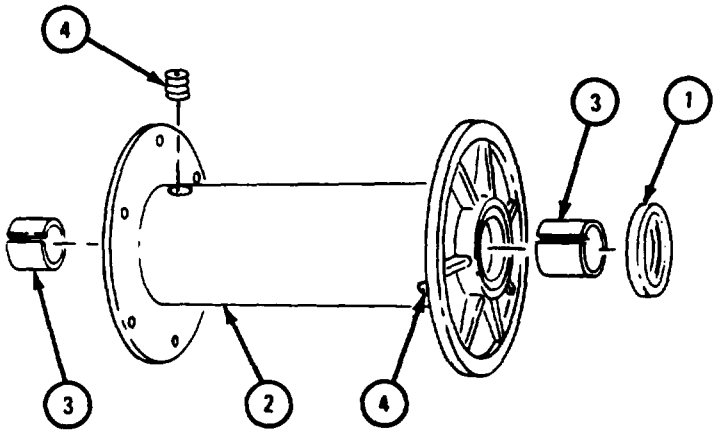
1. Pry seal (1) out of drum (2).

NOTE

Do not take out two bushings (3) unless they are damaged or worn. Refer to para 17-10d for inspection procedures.

2. Pull two bushings (3) out of drum (2).
3. Take out two plugs (4).

GO T0P FRAME 3



TA 084508

FRAME 3

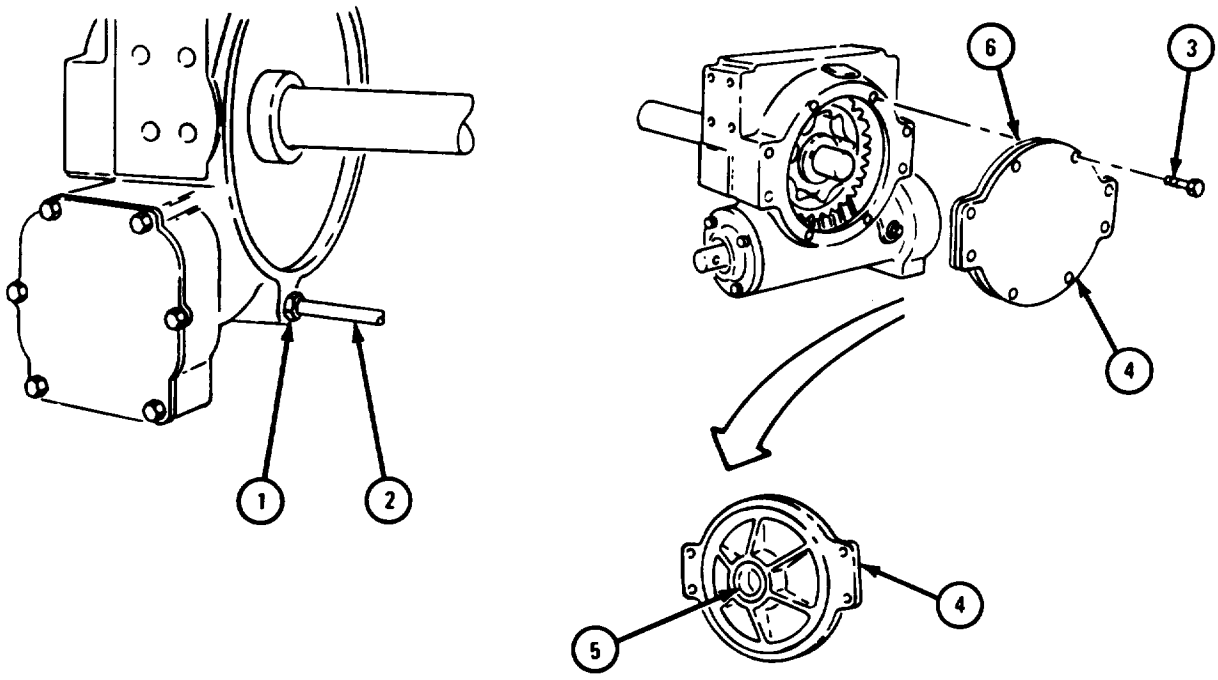
1. Unscrew nut (1).
2. Take out rod (2).
3. Take out four screws (3).
4. Take off gearcase cover (4) with bushing (5) and gasket (6). Throw away gasket.

NOTE

Do not take out bushing (5) unless it is worn or damaged. Refer to para 17-10d for inspection procedures.

5. Pull out bushing (5).

GO TO FRAME 4

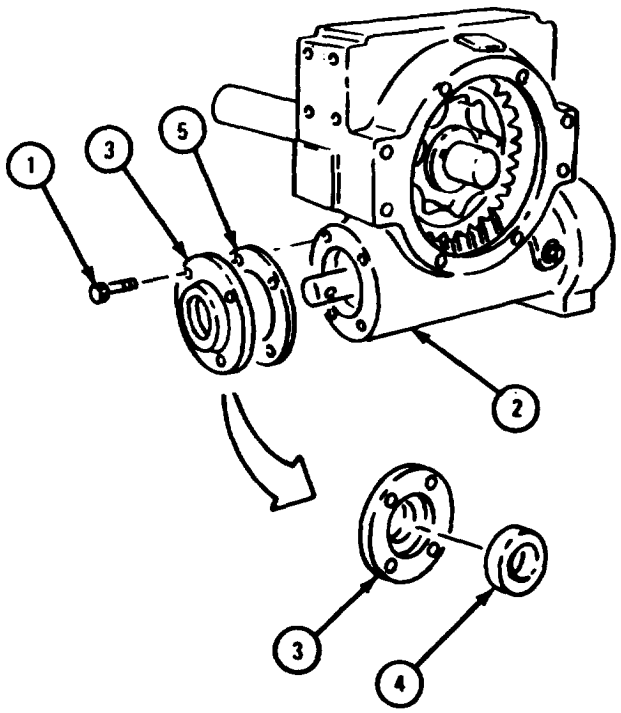


TA 084509

FRAME 4

1. Take out four screws and lockwashers (1) from gearcase (2).
2. Take off worm gear cap (3) with seal (4) and two gaskets (5). Throw away gaskets.
3. Take seal (4) out of worm gear cap (3). Throw away seal.

GO TO FRAME 5



TA 084510

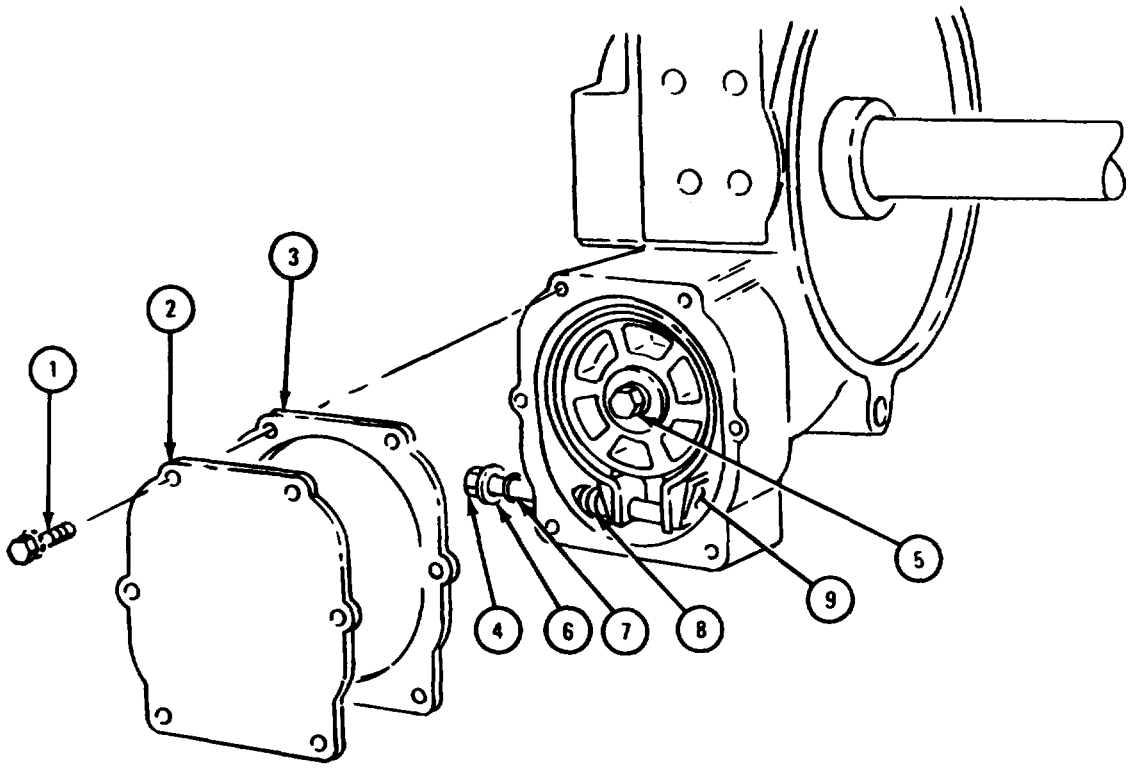
FRAME 5

WARNING

There may be asbestos dust on brake drums and brake band which can be dangerous to your health if you breathe it in.

1. Take out six screw assemblies (1).
2. Take off automatic brake case cover (2) and gasket (3). Throw away gasket.
3. Put in screw (4).
4. Unscrew screw (5).
5. Take out screw (4), lockwasher (6), and preformed packing (7). Throw away preformed packing.
6. Take out spring (8) and automatic brake band (9).

GO TO FRAME 6



TA 084511

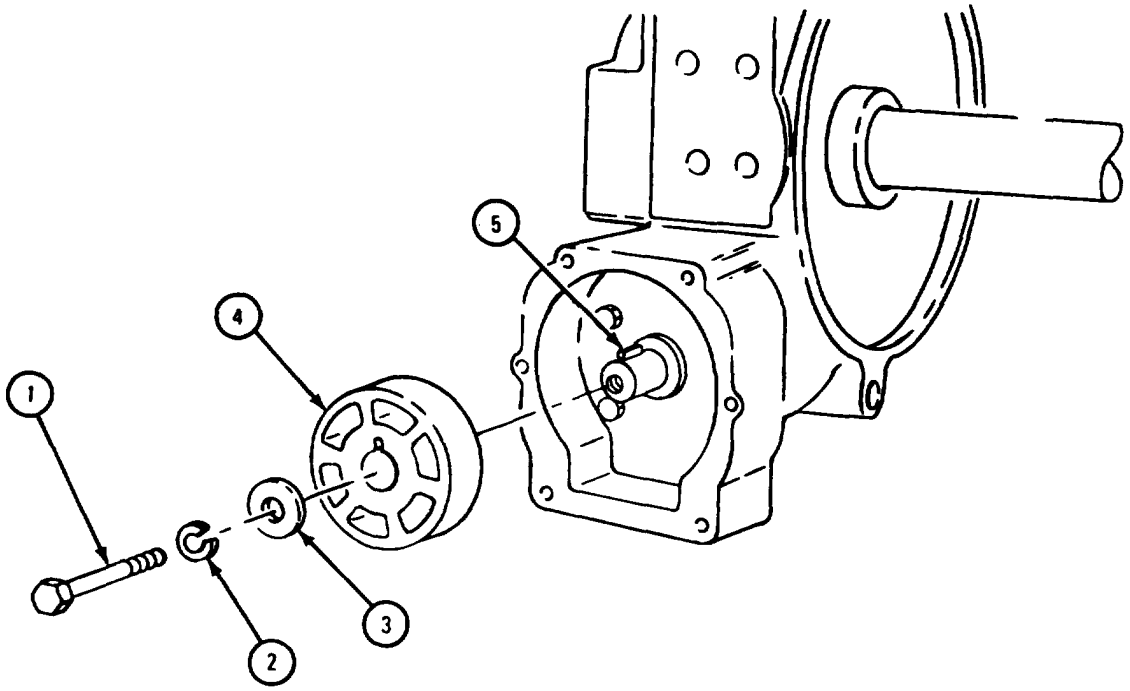
FRAME 6

WARNING

There may be asbestos dust on brake drum which can be dangerous to your health if you breathe it in.

1. Take out screw (1) with lockwasher (2) and spring washer (3).
2. Take off automatic brake drum (4).
3. Take out key (5).

GO TO FRAME 7

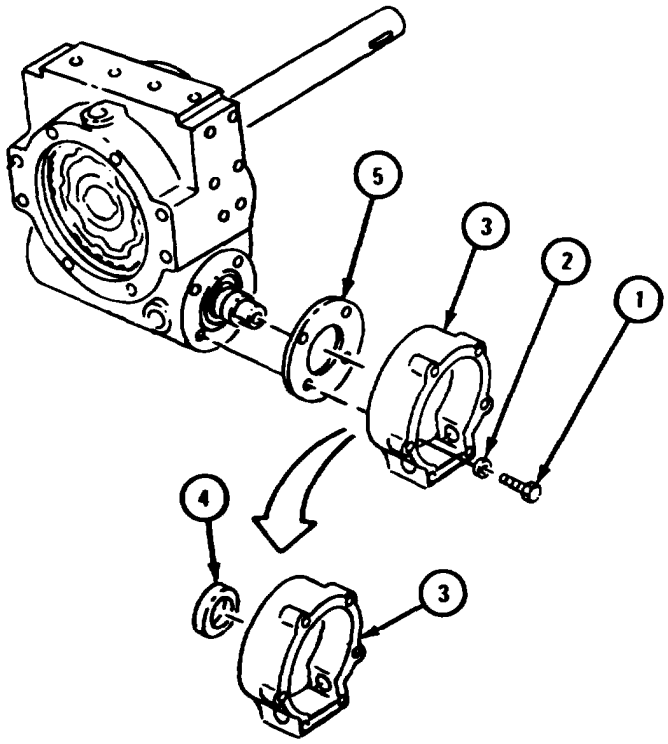


TA 084512

FRAME 7

1. Take out four screws (1) and lockwashers (2).
2. Take off automatic brake case (3) with seal (4) and gasket (5). Throw away gasket.
3. Take seal (4) out of automatic brake case (3). Throw away seal.

GO TO FRAME 8



TA 084513

FRAME 8

1. Tap worm gear (1) until worm gear drops down into gearcase (2). Turn worm gear until it is out of gearcase.

Soldier A 2. Hold shaft (3) so it will not fall.

Soldier B 3. Lift gearcase (2) off shaft (3).

CAUTION

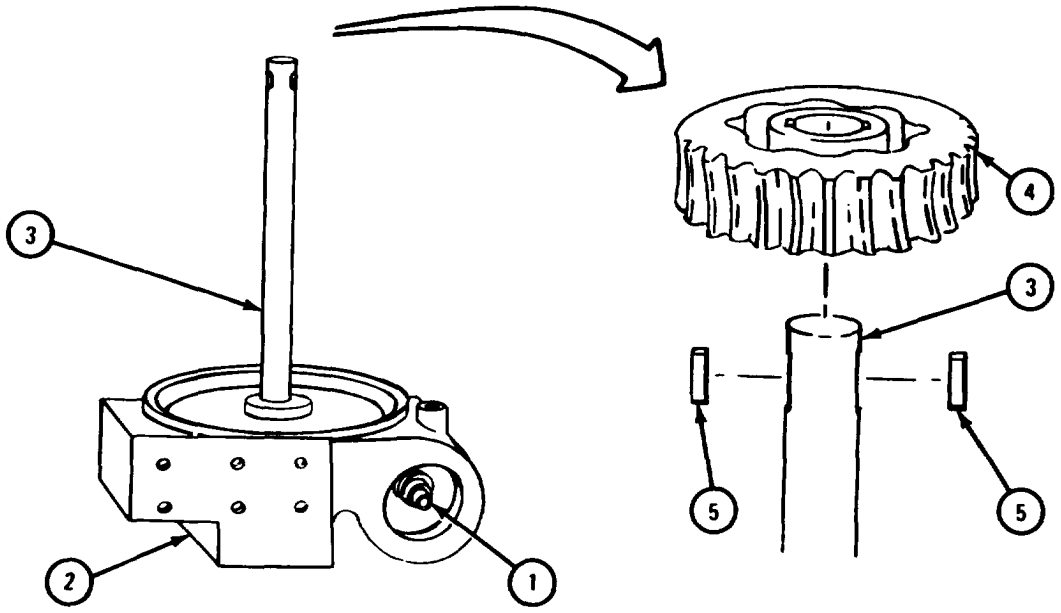
Make sure gear (4) rests on hub when pressing out shaft (3). If gear rests on teeth, teeth can break.

4. Press shaft (3) out of gear (4).

5. Drive one end of two keys (5) into shaft (3).

6. Tap out keys (5) from raised end of key.

GO TO FRAME 9



TA 084514

FRAME 9

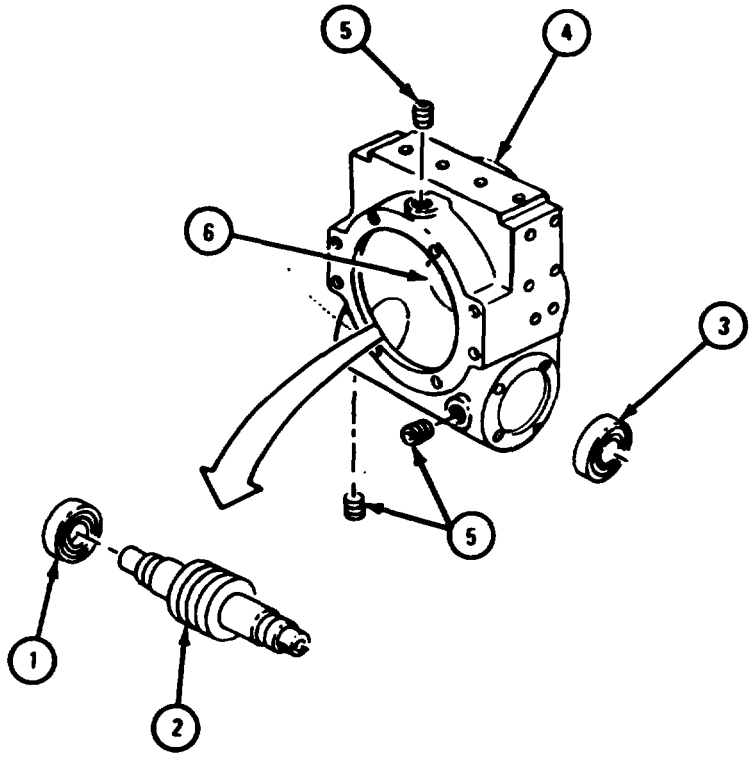
1. Press bearing (1) off worm gear (2).
2. Press bearing (3) out of gearcase (4).
3. Take out three plugs (5).

NOTE

Do not press out bushing (6) unless it is damaged or worn. Refer to para 17-10d for inspection procedures.

4. Press out bushing (6).

END OF TASK



TA 084515

c. Clening.

(1) Clean bearings. Refer to Part 1, para 7-7.

(2) Wipe all seals and automatic brake band assembly with a clean rag.

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

WARNING

Do not use a wire brush or compressed air to clean brake drum. There may be asbestos dust on the drum which can be dangerous to your health if you breathe it in.

(3) Clean dust or mud from brake drum with a brush and water. Take off oil or grease with solvent.

(4) Clean all other parts with solvent. Use stiff wire brush to clean off dirt and hardened grease and oil.

d. Inspection.

FRAME 1

NOTE

Readings must be within limits given in table 17-1. If readings are not within given limits, throw away part and get a new one.

1. Check that seals (1 and 2) are not cracked, burnt, too stiff or damaged in any other way.
2. Check that three bushings (3) are not scored, chipped or damaged in any other way. Measure outer diameter of three bushings.
3. Check that thrust rings (4 and 5), sliding clutch (6), and shifter fork yoke (7) are not worn, broken or damaged in any other way.
4. Check that poppet (8) is not bent or broken.
5. Check that frame (9) is not cracked or damaged in any other way, and that it does not have damaged threads.
6. Check that drag brake brakeshoe assembly (10) is not worn or oil soaked.
7. Check that winch cable and chain assembly has no frayed strands or other damage.

GO TO FRAME 2

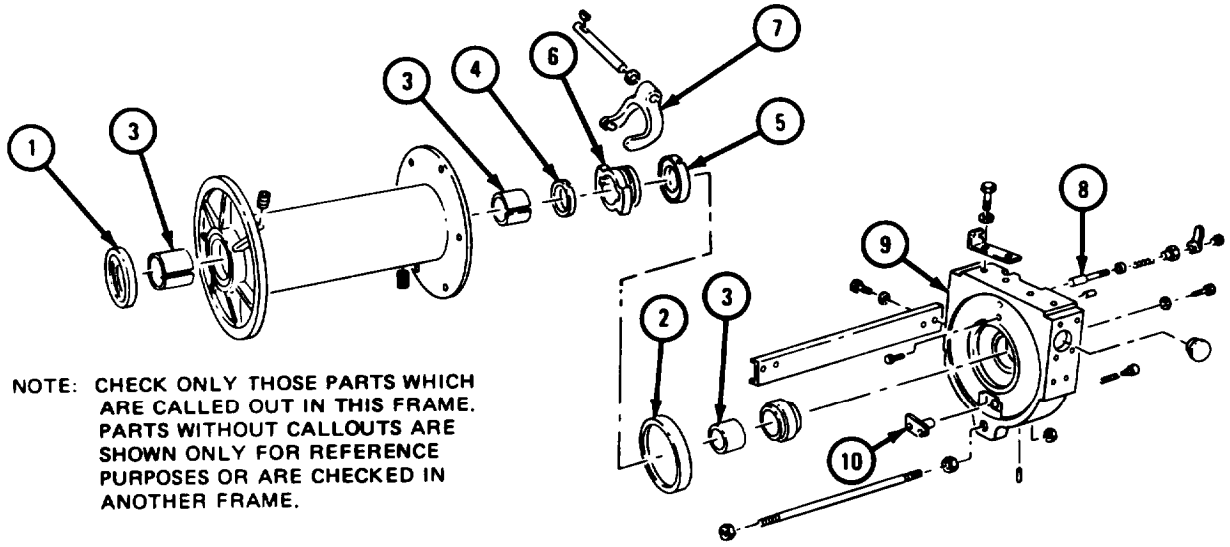


Table 17-1. Cable Drum Bushing and End Frame Bushing Wear Limits

Index Number	Item/Point of Measurement	Wear Limit (inches)
3	Cable drum bushing outer diameter	2.127 to 2.145
3	End frame bushing outer diameter	2.127 to 2.145

FRAME 2

NOTE

Readings must be within limits given in table 17-2. If readings are not within given limits, throw away part and get a new one.

1. Check that two seals (1) are not cracked, burnt, too stiff, or show signs of leakage. If seals are damaged, get new ones in their place.
2. Check that two bearings (2) are not damaged. Refer to Part 1, para 7-7.
3. Check that worm gear (3) and gear (4) are not chipped or scored, and that they have no broken teeth.
4. Check that drum shaft (5) is not bent or damaged in any other way. Measure outer diameter of drum shaft.
5. Check that two bushings (6) are not damaged. Measure outer diameter of bushing.
6. Check that gearcase (7) is not cracked or damaged in any other way, and that it does not have damaged threads.
7. Check that automatic brake drum (8) is not cracked, and that braking surface is not scored or rough.
8. Check that automatic brake band assembly (9) is not worn or oil soaked.

END OF TASK

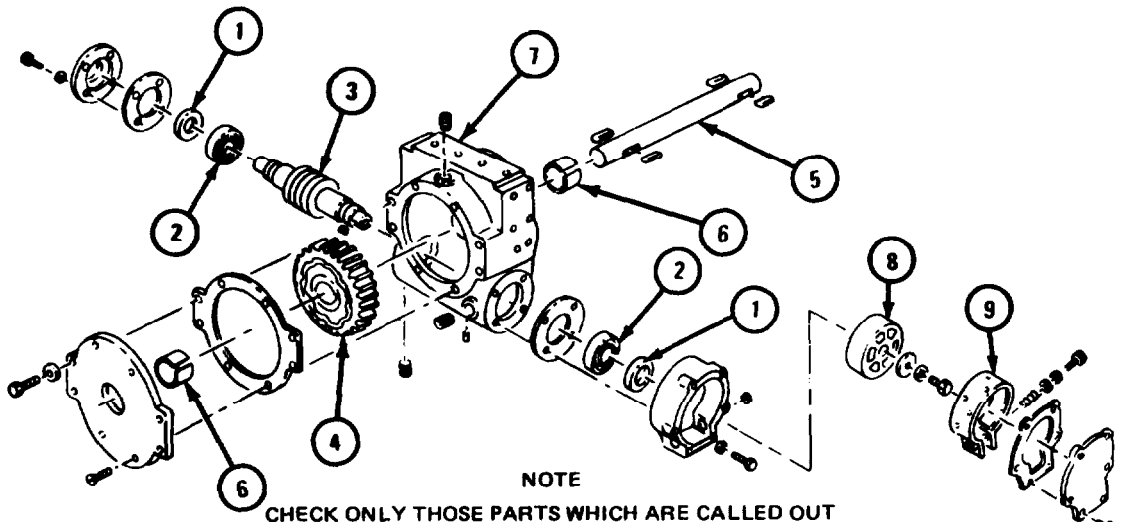


Table 17-2. Drum Shaft and Gearcase Bushing Wear Limits

Index Number	Item/Point of Measurement	Wear Limit (inches)
5	Drum shaft outer diameter	2.121 to 2.125
6	Gearcase bushing outer diameter	2.127 to 2.138

e. Repair.

(1) Using fine mill file, file nicks and burrs from machined surfaces, especially oil seal contact surfaces.

(2) Get new parts for all other damaged parts.

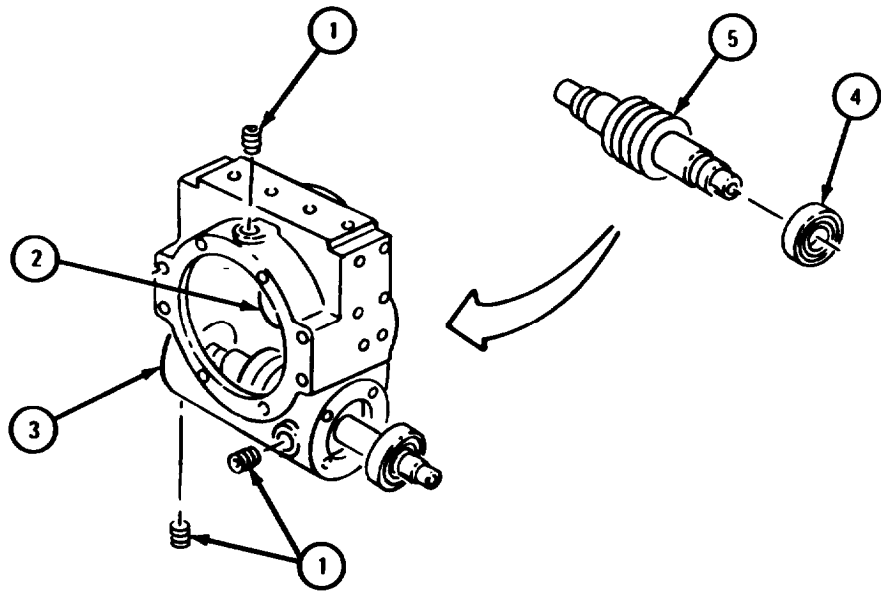
f. Assembly.

(1) Assembly of cable drum and gearcase assembly.

FRAME 1

1. Put in three plugs (1).
2. Press bushing (2) into gearcase (3).
3. Press bearing (4) onto keyway end of worm gear (5).
4. Put worm gear (5) with bearing (4) into right side bore of gearcase (3). Do not seat bearings in bore of gearcase yet.

GO TO FRAME 2



TA 084518

FRAME 2

1. Put two keys (1) into keyways in shaft (2).

CAUTION

Be sure that gear (3) rests on its hub when pressing in shaft (2). If gear rests on its teeth, teeth can break.

2. Press shaft (2) into gear (3).

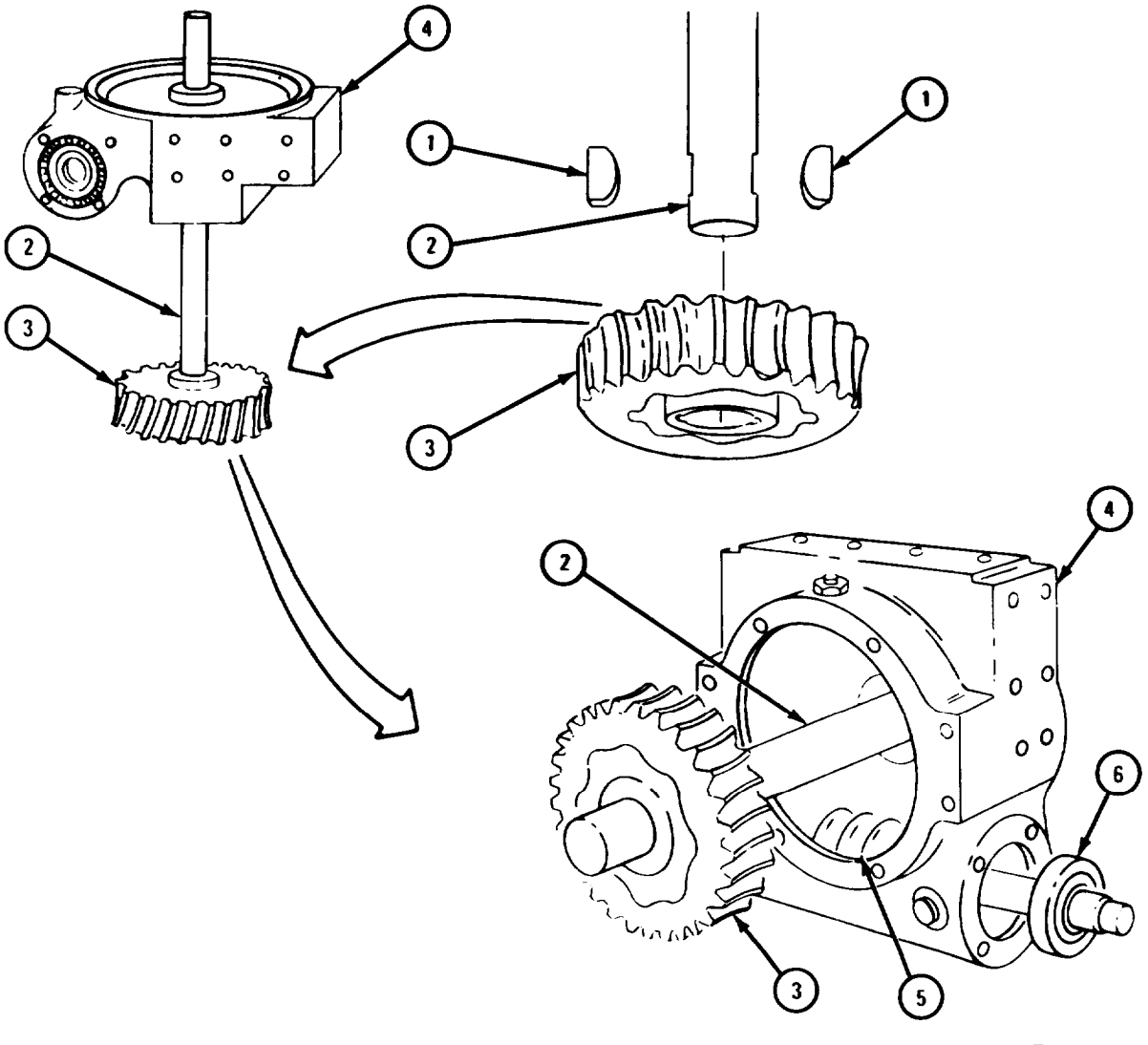
Soldier A 3. Hold shaft (2) on end to keep it from falling.

Soldier B 4. Put gearcase (4) down over shaft (2).

5. Mesh teeth of worm gear (5) with gear (3) by turning worm gear.

6. Tap outer face of bearing (6) flush with outside of gearcase (4).

GO TO FRAME 3

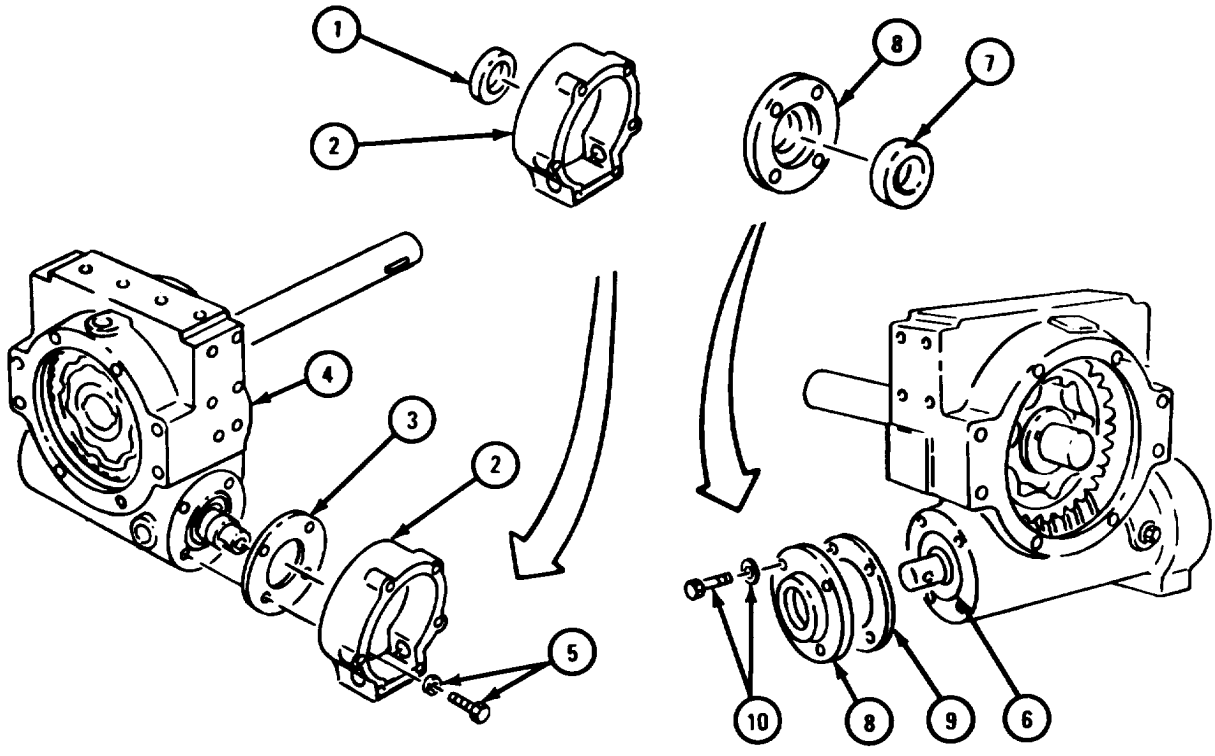


TA 084519

FRAME 3

1. Press seal (1) in place in automatic brake case (2).
2. Put automatic brake case (2) with seal (1) and gasket (3) in place on gearcase assembly (4), alining holes.
3. Put in four screws and lockwashers (5).
4. Put in bearing (6).
5. Press seal (7) into place in worm gear cap (8).
6. Put worm gear cap (8) with seal (7) and gasket (9) in place on gearcase assembly (4), alining holes.
7. Put in four screws and lockwashers (10).

GO TO FRAME 4

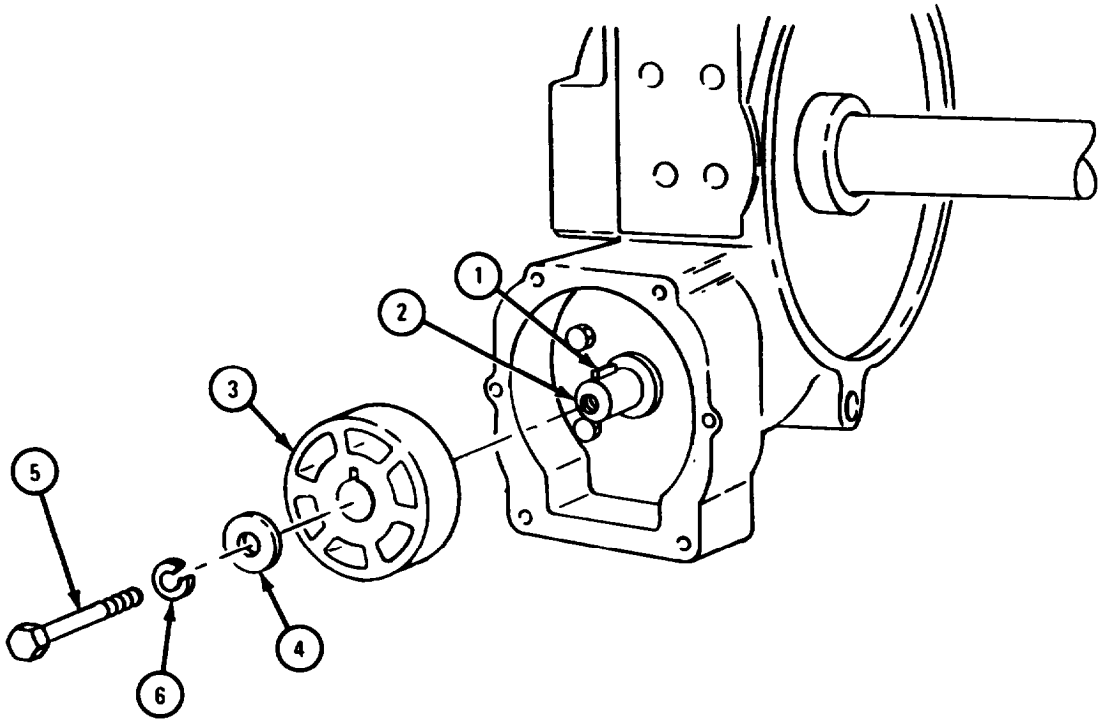


TA 084520

FRAME 4

1. Tap key (1) into keyway in worm gear (2).
2. Aline keyway in automatic brake drum (3) with key (1). Tap automatic brake drum onto worm gear (2) and key, with flat side in.
3. Put on washer (4) with concave side facing automatic brake drum (3).
4. Put in screw (5) and lockwasher (6).

GO TO FRAME 5

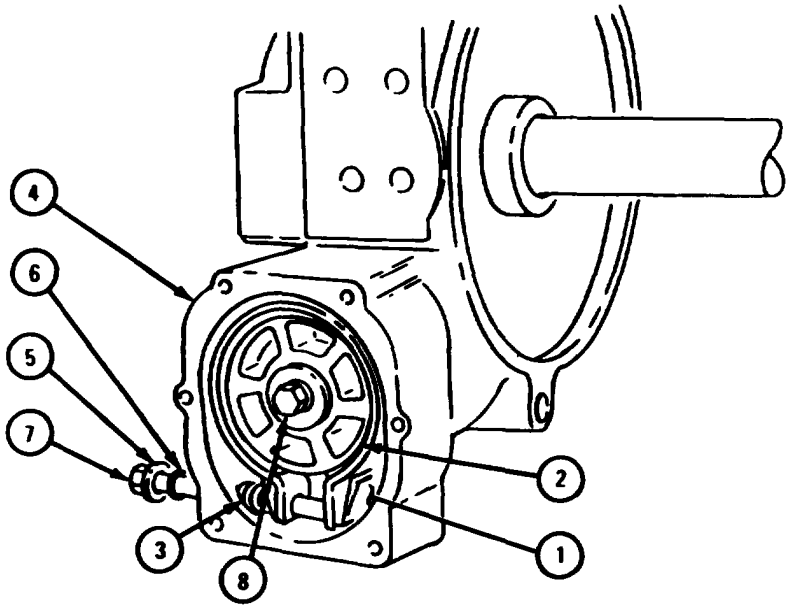


TA 084521

FRAME 5

1. Put automatic brake band assembly (1) on automatic brake drum (2).
2. Put spring (3) between screw holes in automatic brake band assembly (1) and automatic brake case (4) as shown.
3. Put flat washer (5) and preformed packing (6) on screw (7), and put screw through holes in automatic brake case (4), spring (3), and automatic brake band assembly (1).
4. Tighten screws (7 and 8).

GO TO FRAME 6

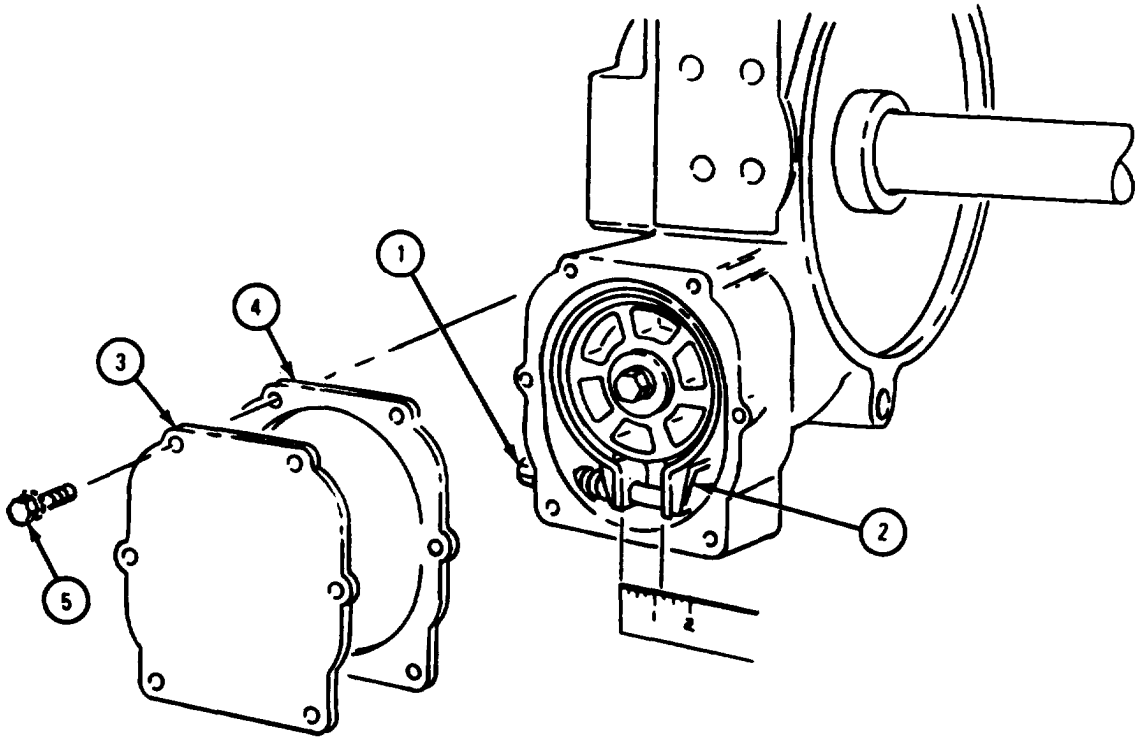


TA 084522

FRAME 6

1. Turn screw (1) in until gap in automatic brake band assembly (2) is between 16/32 inches and 18/32 inches, as shown.
2. Put on automatic brake case cover (3) with gasket (4), alining holes.
3. Put in six screw assemblies (5).

GO TO FRAME 7

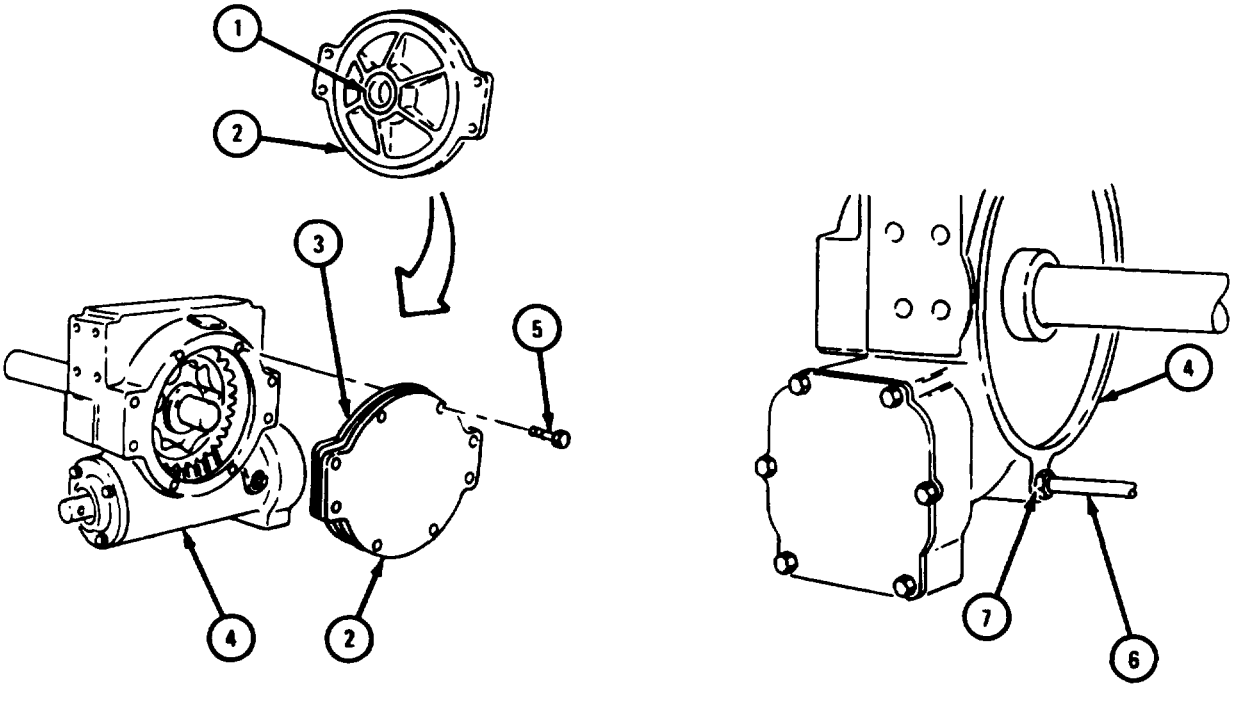


TA 084523

FRAME 7

1. Press bushing (1) into gearcase cover (2).
2. Put gearcase cover (2) with bushing (1) and gasket (3) on gearcase assembly (4), alining holes.
3. Put in four screws (5).
4. Put in rod assembly (6).
5. Tighten nut (7) against gearcase assembly (4).

GO TO FRAME 8



TA 084524

FRAME 8

1. If two bushings (1) were taken out, press bushings into cable drum (2).

2* If seal (3) was taken out, press in seal.

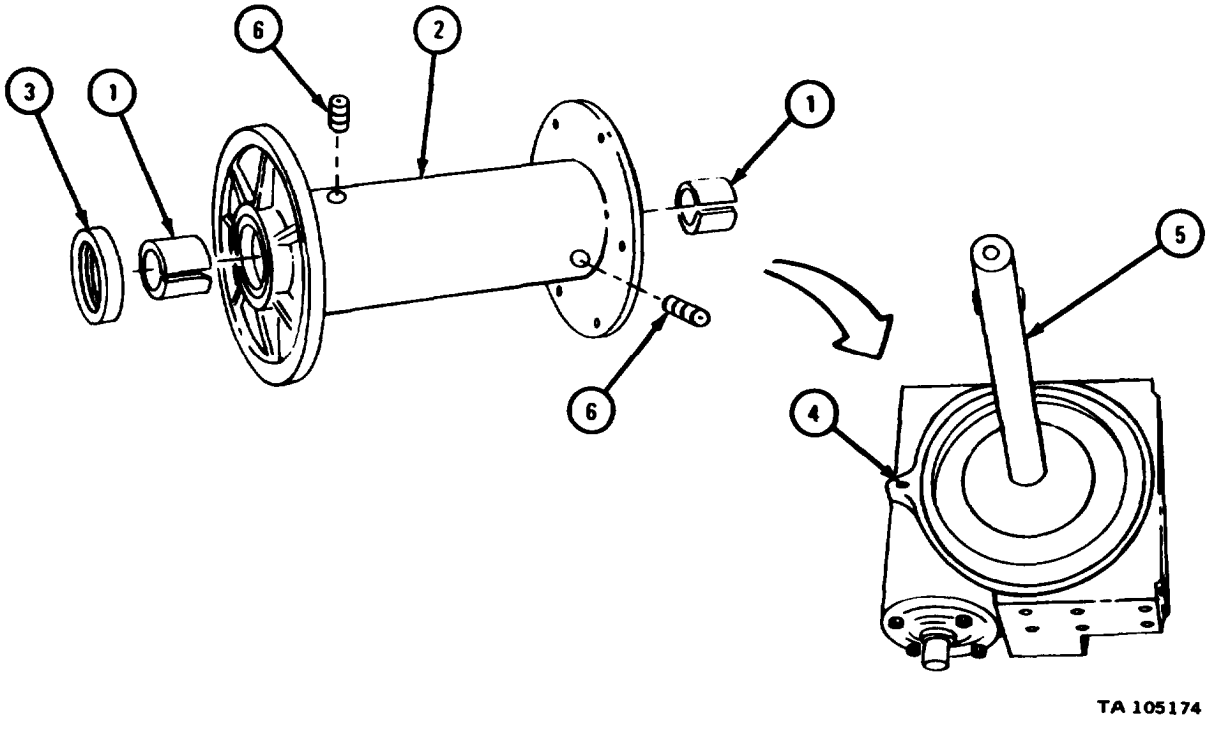
3. Put gearcase (4) on end with shaft (5) up.

Soldiers A and B

4. Pick up cable drum (2) with seal (3) side down and slide cable drum onto shaft (5).

5. Put in two plugs (6).

GO TO FRAME 9

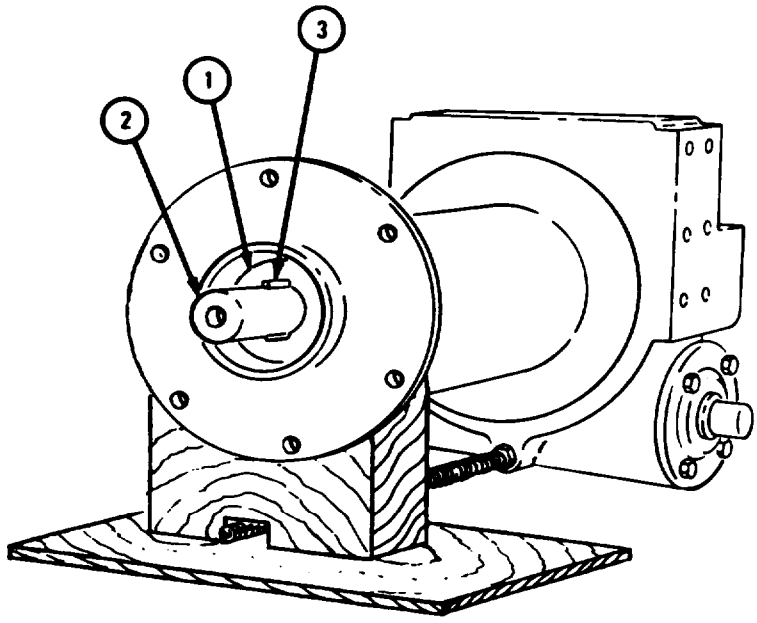


TA 105174

FRAME 9

1. Put thrust ring (1) onto shaft (2) with notches facing out.
2. Tap two keys (3) into keyways in shaft (2).

END OF TASK



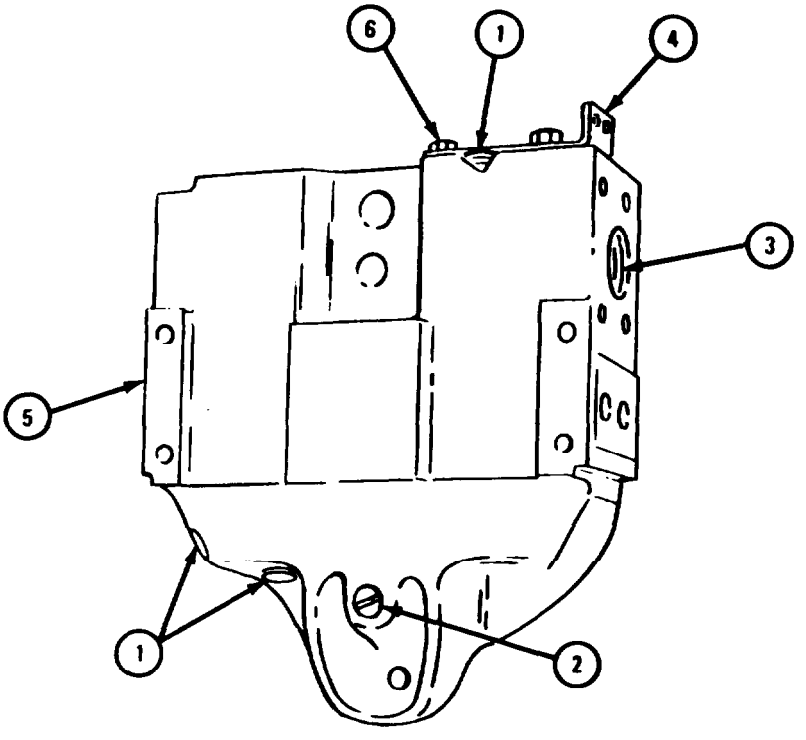
TA 084526

(2) Assembly of frame assembly.

FRAME 1

1. Put in three plugs (1).
2. Put in drag brake adjusting screw (2).
3. If seal (3) was taken out, press in seal.
4. Put shift lever lock assembly (4) in place on frame (5).
5. Put in two screws with lockwashers (6).

GO TO FRAME 2

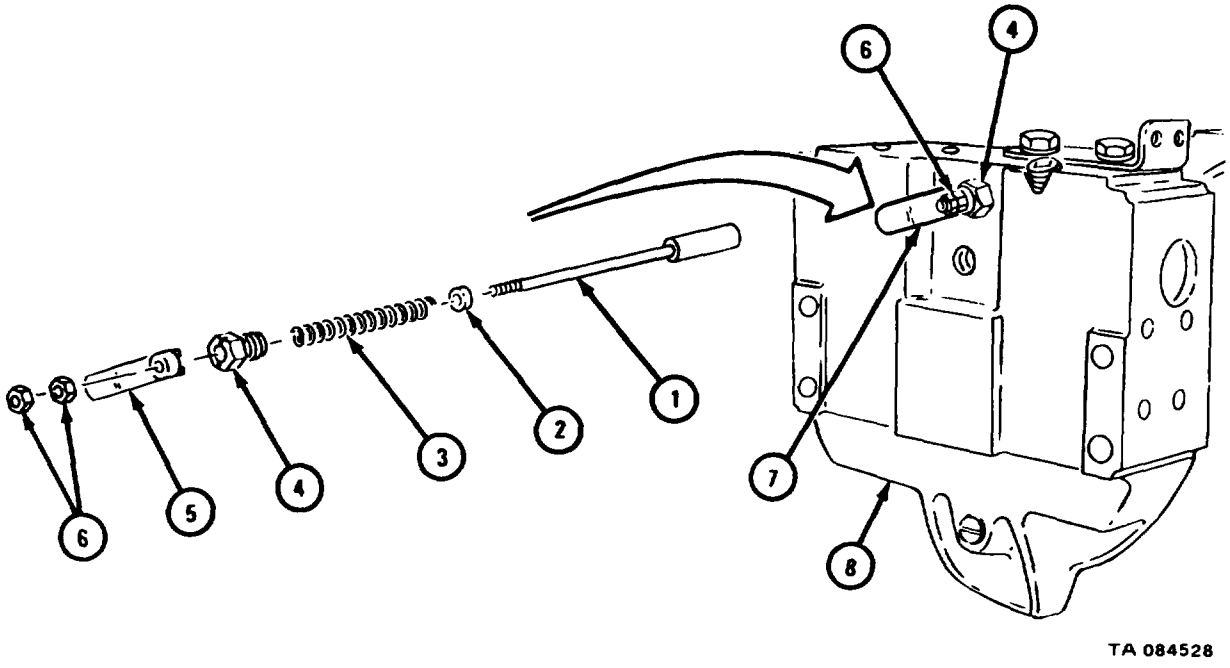


TA 084527

FRAME 2

1. Put poppet (1) in vise with soft jaw caps.
2. Put spacer (2), spring (3), nut (4), and drum lock latch (5) on poppet (1). Put drum lock latch tabs into slots in nut to take tension off spring.
3. Put on two nuts (6).
4. Take poppet (1) out of vise.
5. Put drum lock assembly (7) in bore in frame assembly (8).
6. Tighten nut (4).

GO TO FRAME 3

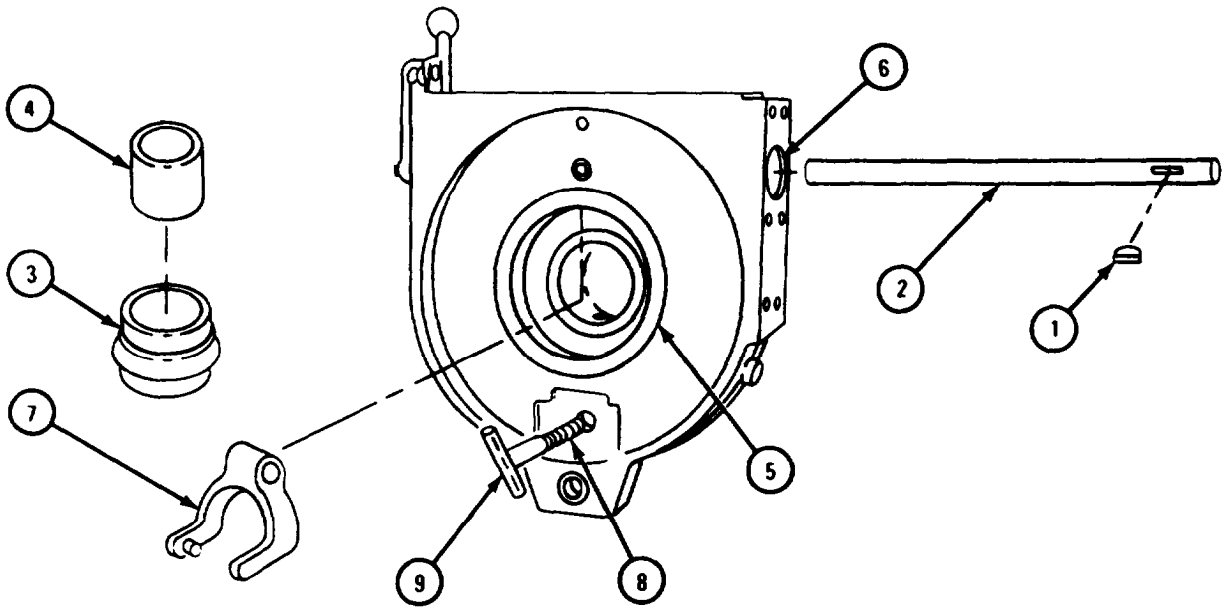


TA 084528

FRAME 3

1. Tap key (1) into keyway in shaft (2).
2. Put sleeve (3) with bushing (4) into frame (5).
3. Put shaft (2) partway into frame (5) through hole (6).
4. Put shifter fork yoke (7) into place in frame (5).
5. Aline key (1) with keyway in frame (5).
6. Tap in shaft (2).
7. Put spring (8) and drag brake brake shoe assembly (9) in bore of frame (5).

GO TO FRAME 4

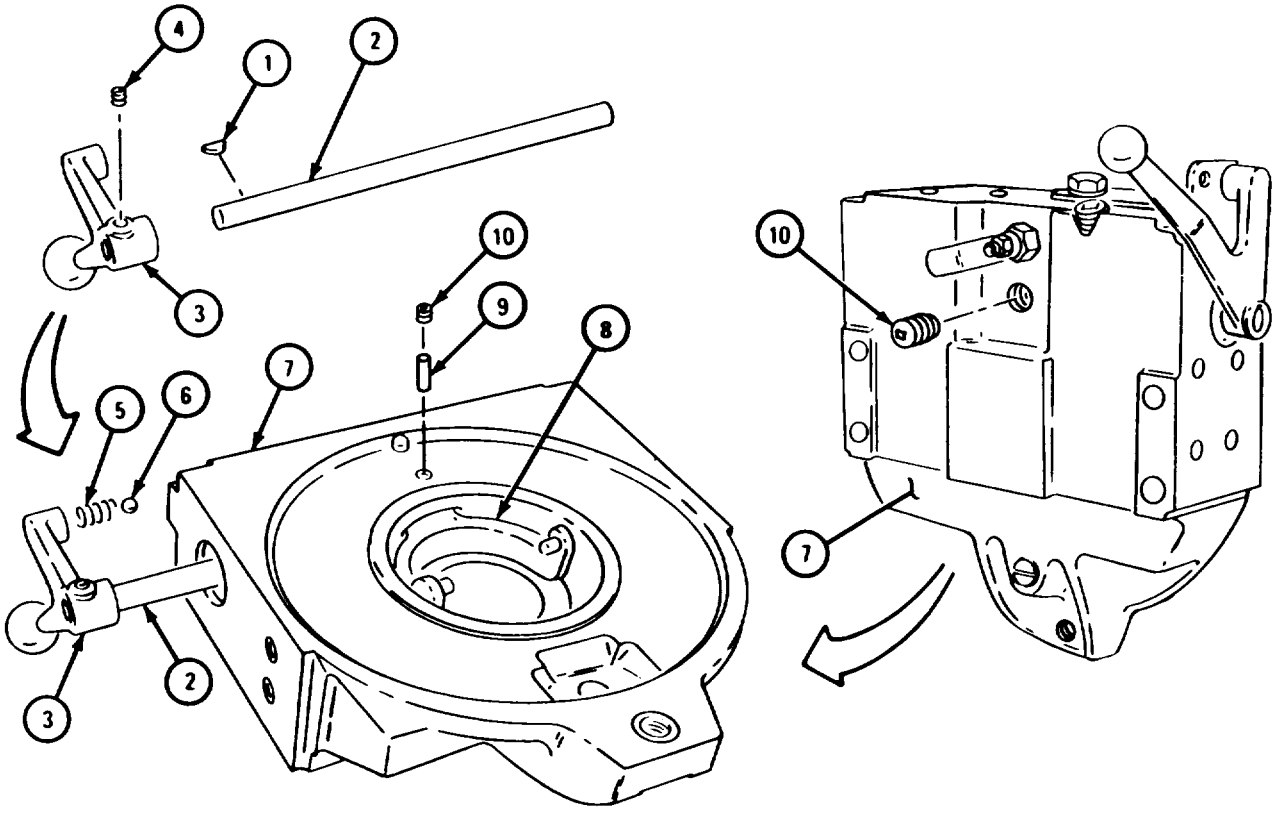


TA 117926

FRAME 4

1. Tap key (1) into keyway in shaft (2).
2. Aline keyway in lever (3) with key (1) and push lever onto shaft (2) and key.
3. Put in setscrew (4).
4. Put spring (5) and catch ball (6) in bore in lever (3) and hold them in place.
5. Push shaft (2) with lever (3) into frame (7) and through bore in shifter fork yoke (8). Aline holes in shaft and shifter fork yoke. Tap pin (9) through shaft and yoke.
6. Put in two plugs (10).

GO TO FRAME 5

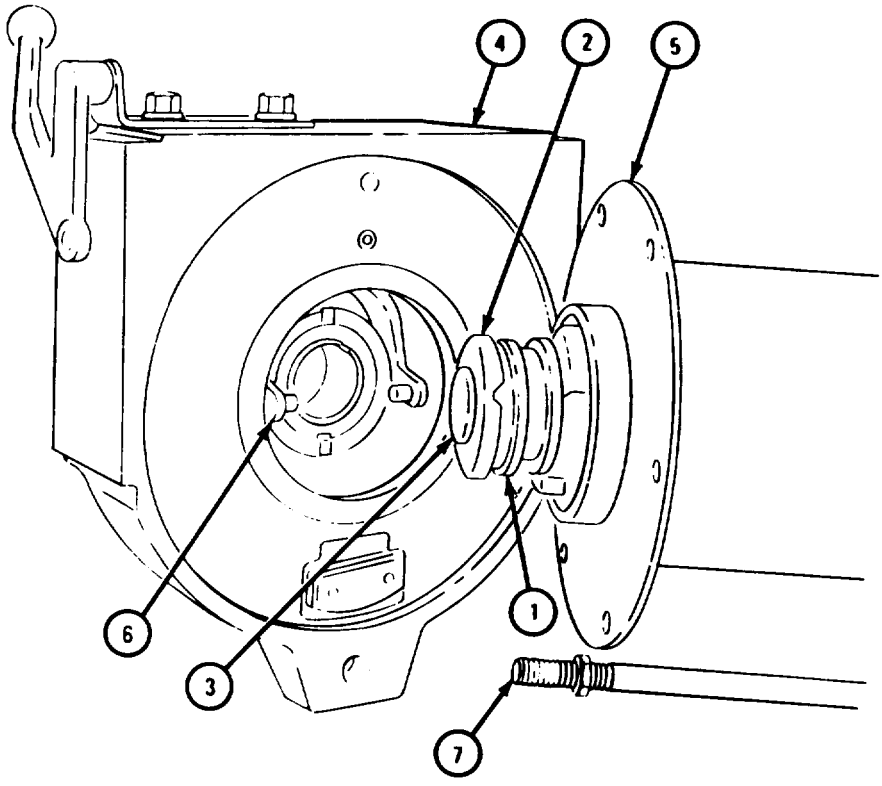


TA 117927

FRAME 5

1. Put sliding clutch (1) and thrust ring (2) onto shaft (3).
2. Mount frame assembly (4) on cable drum and gearcase assembly (5). Make sure that shifter fork yoke (6) hooks onto sliding clutch (1) and that rod (7) passes through bore in frame assembly.

GO TO FRAME 6

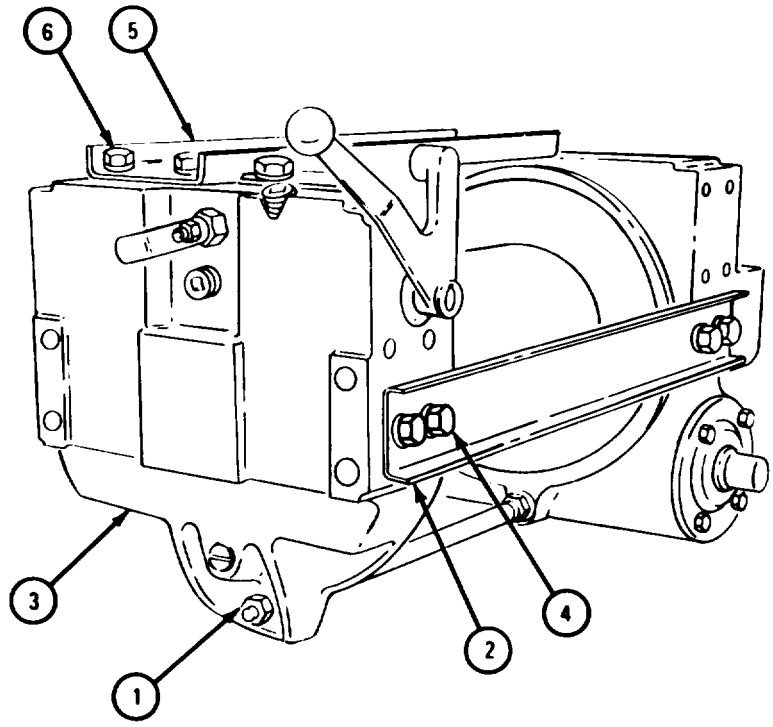


TA 117928

FRAME 6

1. Put on nut (1).
2. Put rear channel (2) in place on winch assembly (3), alining holes.
3. Put in four screws and lockwashers (4).
4. Put top channel (5) in place on winch assembly (3), alining holes.
5. Put in four screws and lockwashers (6).
6. Using chain sling and chain hoist, lower winch assembly (3) to ground. Take off chain sling and chain hoist.

GO TO FRAME 7



TA 117929

FRAME 7

NOTE

Follow-on Maintenance Action Required:

1. Fill winch assembly. Refer to LO 9-2320-211-12.
2. Replace tension roller assembly. Refer to para 17-3.
3. For truck M543A2, replace level wind assembly. Refer to para 17-6.
4. Replace winch mounting brackets and replace winch on truck. Refer to TM 9-2320-211-20.
5. Replace cable and chain assembly. Refer to TM 9-2320-211-20.
6. Check winch assembly for proper operation. Refer to TM 9-2320-211-10.

END OF TASK

17-11. REAR WINCH SHEAVE AND TROLLEY (LEVEL WIND) REMOVAL AND REPLACEMENT (TRUCK M543A2).

TOOLS: No special tools required

SUPPLIES: None

PERSONNEL: One

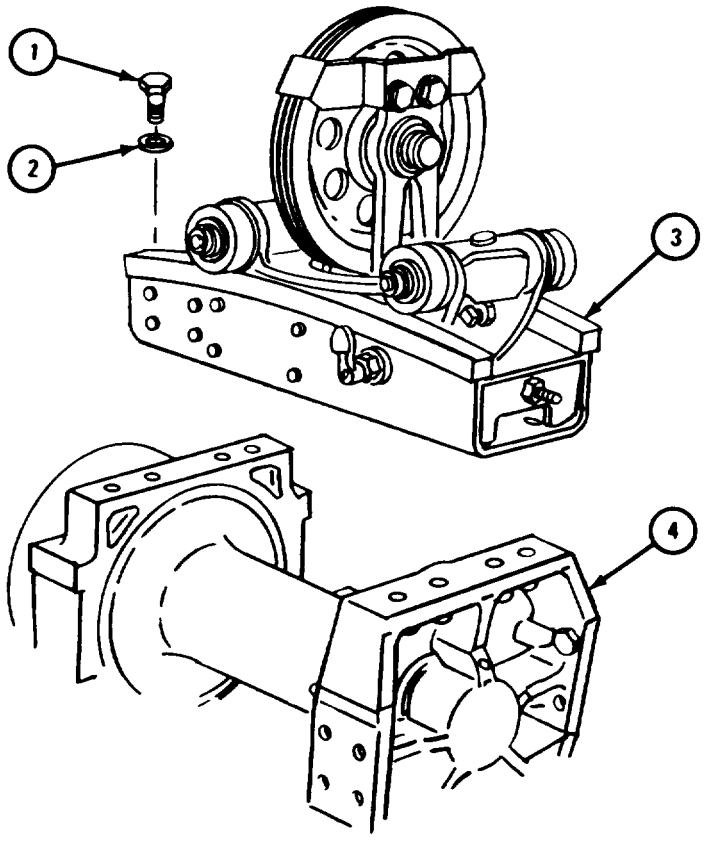
EQUIPMENT CONDITION: Rear winch, removed from truck.

a. Removal.

FRAME 1

1. Take out four cap screws (1) with washers (2), two on each side.
2. Lift trolley and track assembly (3) off winch (4).

END OF TASK



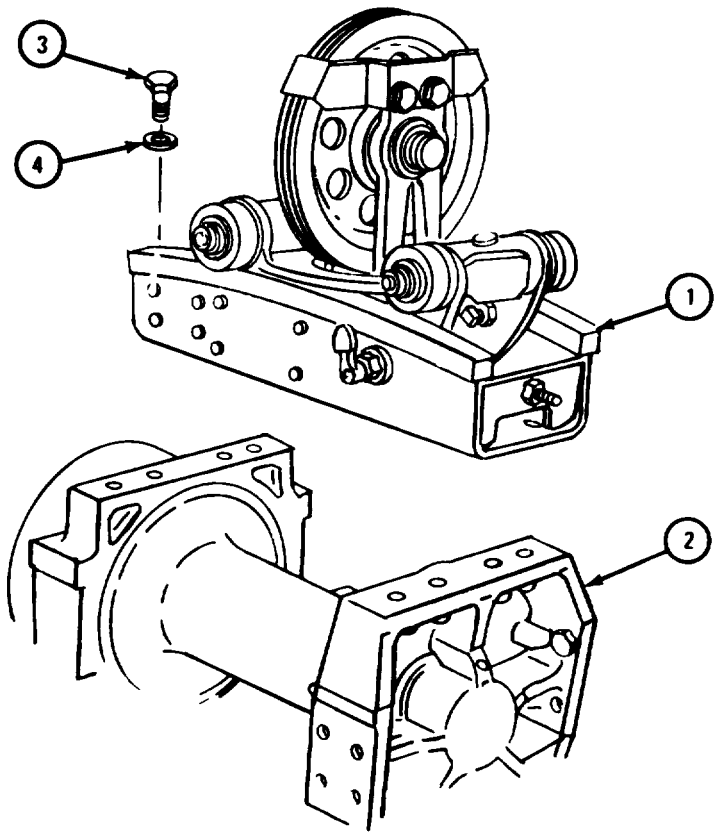
TA 103092

b. Replacement.

FRAME 1

1. Set trolley and track assembly (1) on top of winch (2).
2. Put in four cap screws (3) with washers (4), two on each side.

END OF TASK



TA 103093

17-12. REAR WINCH TENSION SHEAVE ASSEMBLY REMOVAL AND REPLACEMENT (TRUCK M543A2).

TOOLS: No special tools required

SUPPLIES: None

PERSONNEL: Two

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

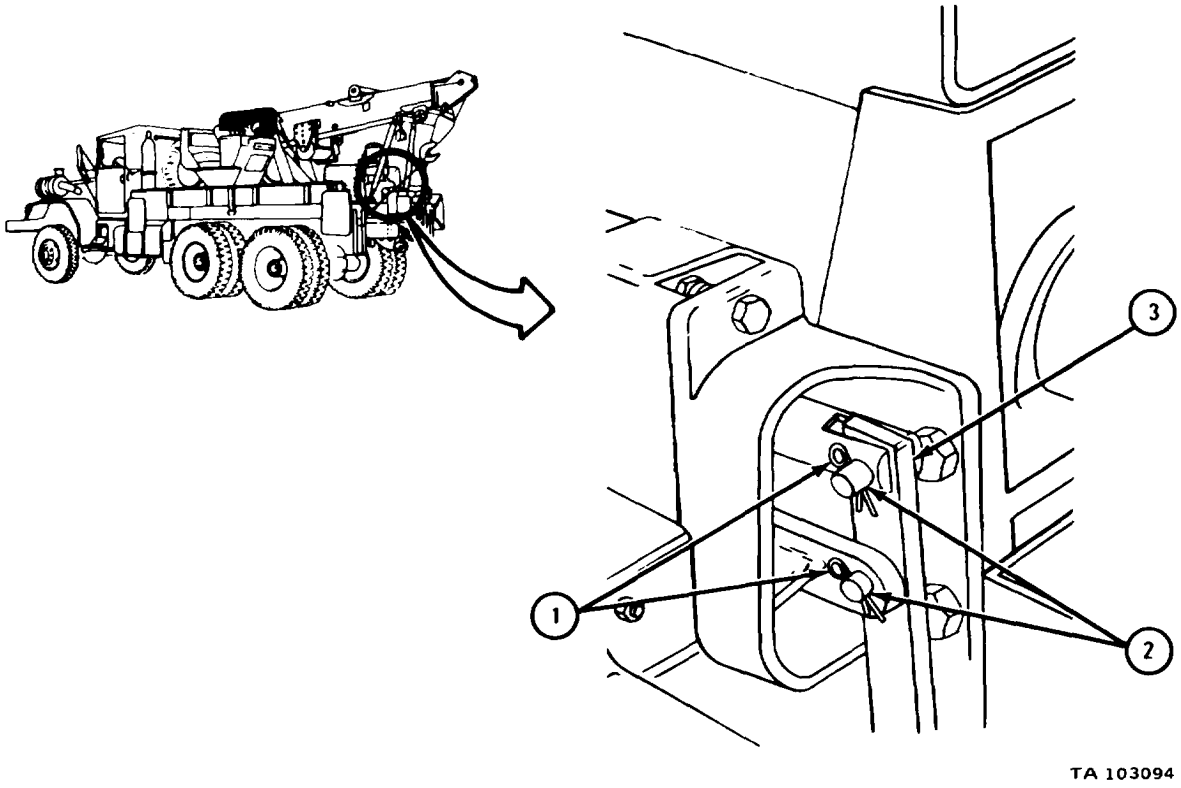
a. Preliminary Procedure. Remove winch cable from drum. Refer to TM 9-2320-211-20.

b. Removal.

FRAME 1

1. On right side of winch, take out two cotter pins (1) and take out two pins (2).
2. Move lever (3) out of way.

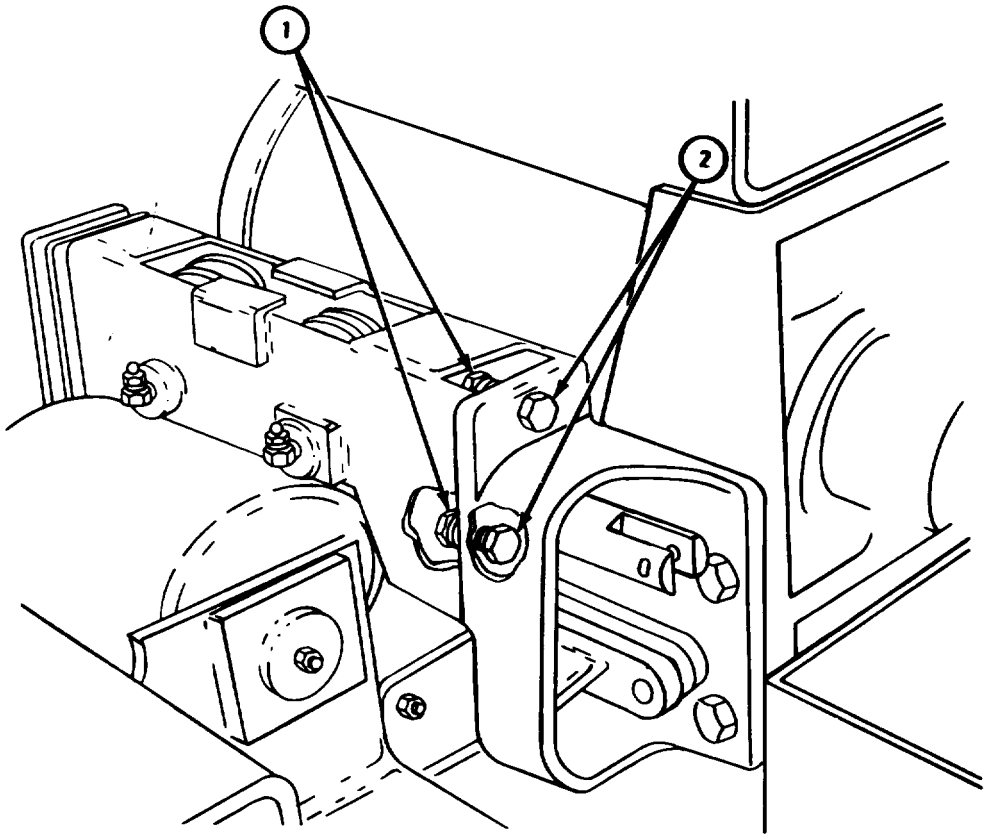
GO TO FRAME 2



FRAME 2

1. Take off two nuts with lockwashers (1) and take out two cap screws (2).

GO TO FRAME 3

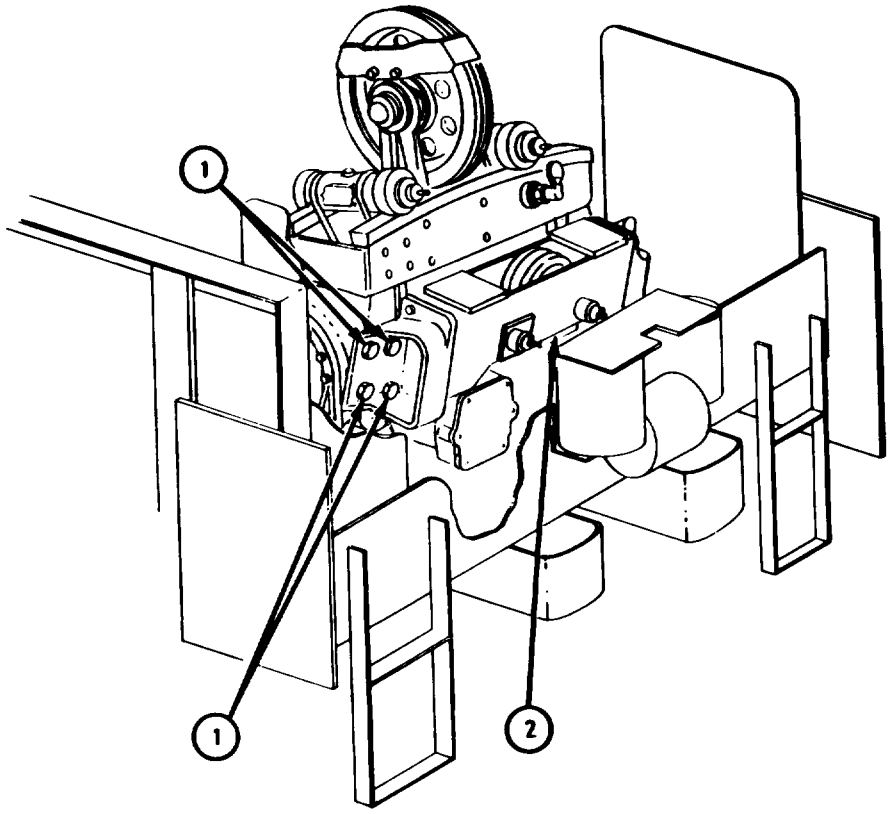


TA 103095

FRAME 3

1. Take out four capscrews with four lockwashers (1).
2. Take off cable tensioner (2).

GO TO FRAME 4

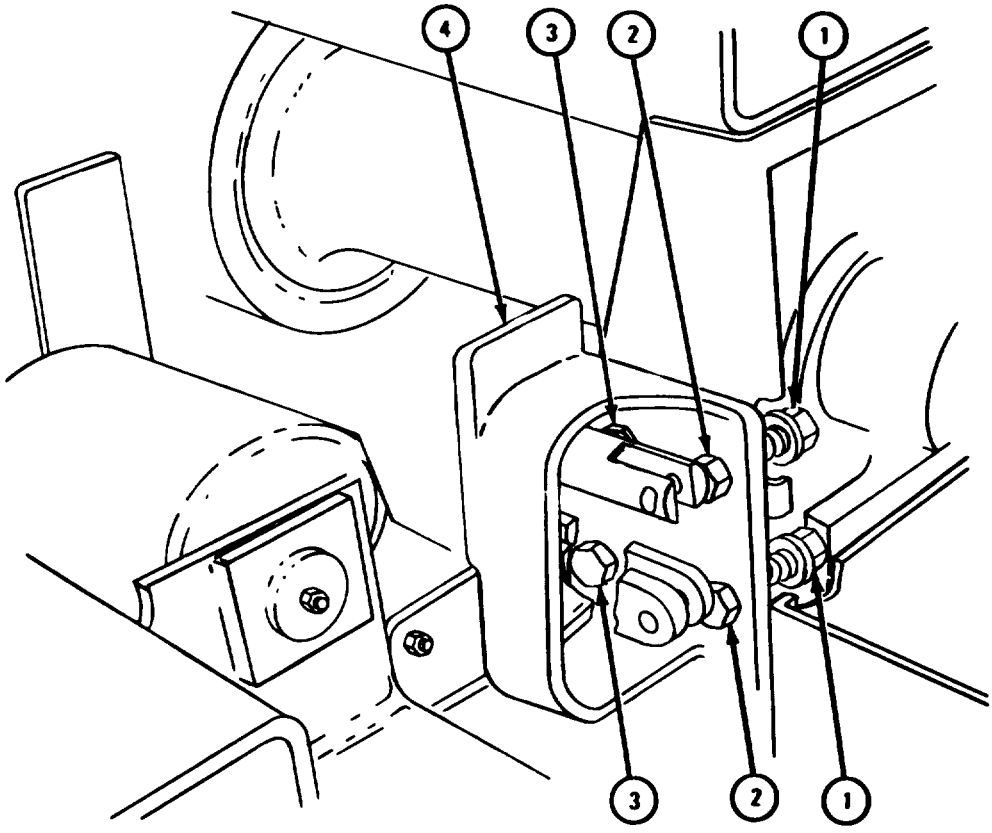


TA 105751

FRAME 4

1. Takeoff two nuts with lockwashers (1). Takeout two capscrews (2).
2. Takeout two capscrews with lockwashers (3).
3. Take off bracket (4).

END OF TASK



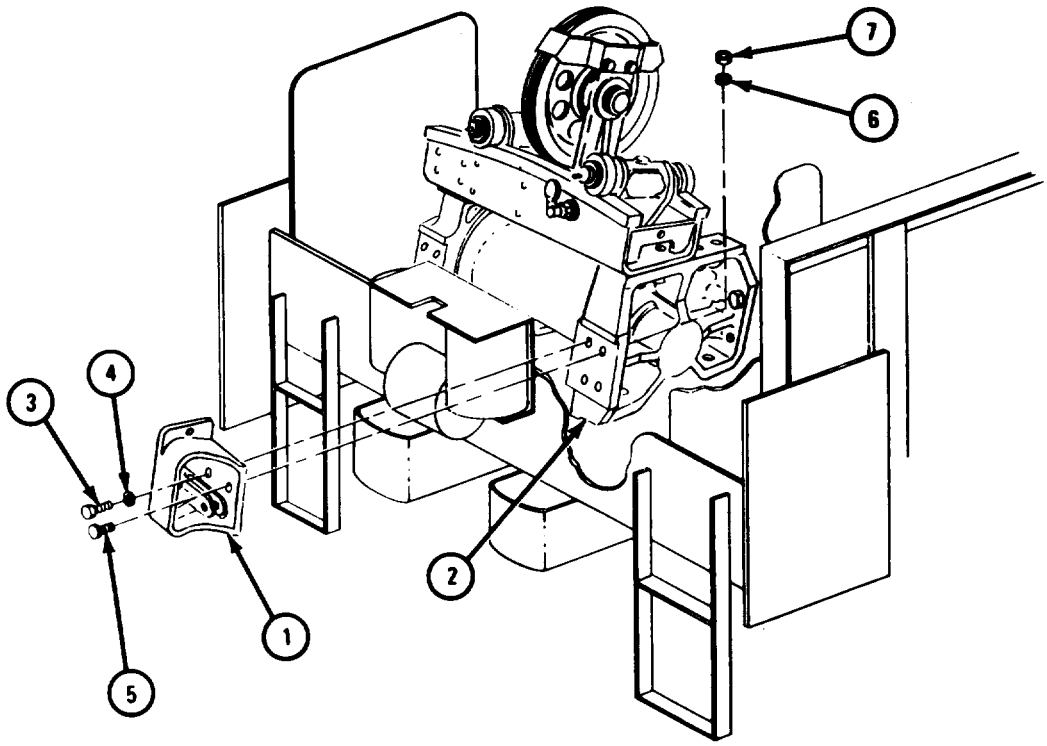
TA 105752

c. Replacement.

FRAME 1

1. Put bracket (1) in place and aline holes in bracket (1) with holes in winch (2).
2. Put in two capscrews (3) with two lockwashers (4).
3. Put in two capscrews (5). Put on two lockwashers (6) and two nuts (7).

GO TO FRAME 2

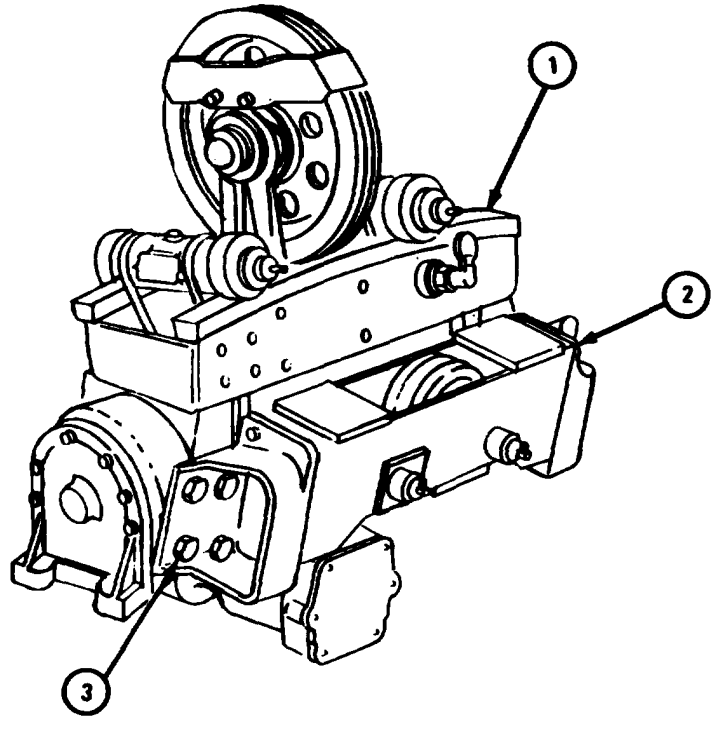


TA 105753

FRAME 2

1. Put tensioner sheave assembly (1) in place on winch (2).
2. Put in four capscrews with lockwashers (3).

GO TO FRAME 3



TA 105754

FRAME 3

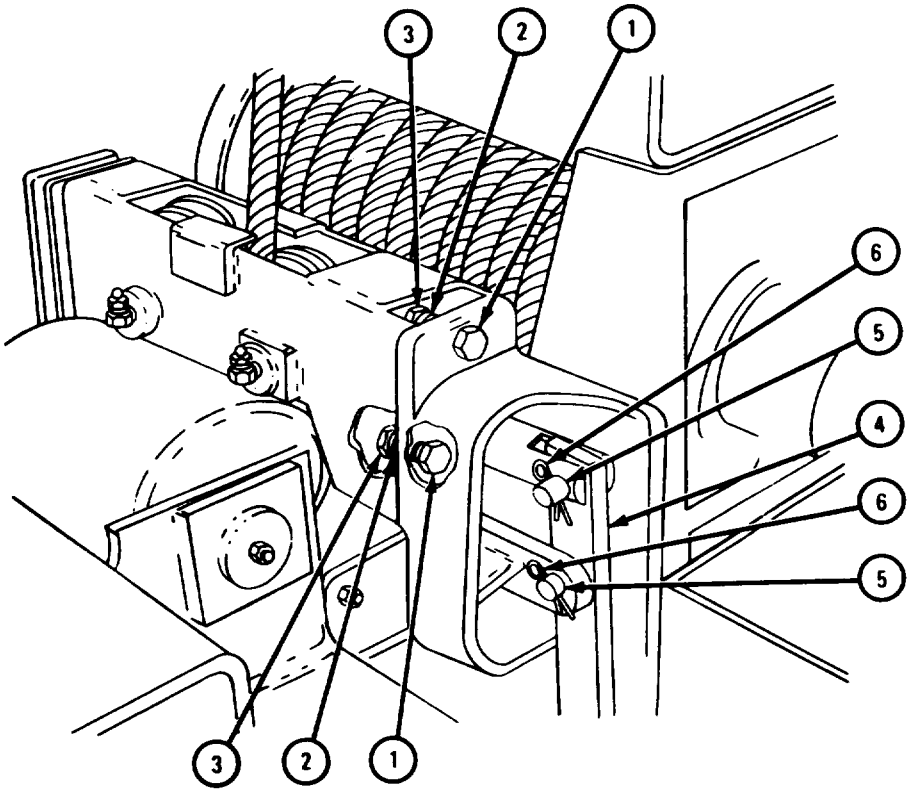
1. Put in two screws (1). Put on two lockwashers (2) and two nuts (3).
2. Put tension sheave lever (4) in place. Put in two pins (5) and two cotter pins (6).

NOTE

Follow-on Maintenance Action Required:

Replace winch cable on drum. Refer to TM 9-2320-211-20.

END OF TASK



TA 105755

17-13. REAR WINCH CABLE TENSIONER BRAKE CHAMBER ASSEMBLY REMOVAL AND REPLACEMENT (TRUCK M543A2).

TOOLS: No special tools required

SUPPLIES: None

PERSONNEL: One

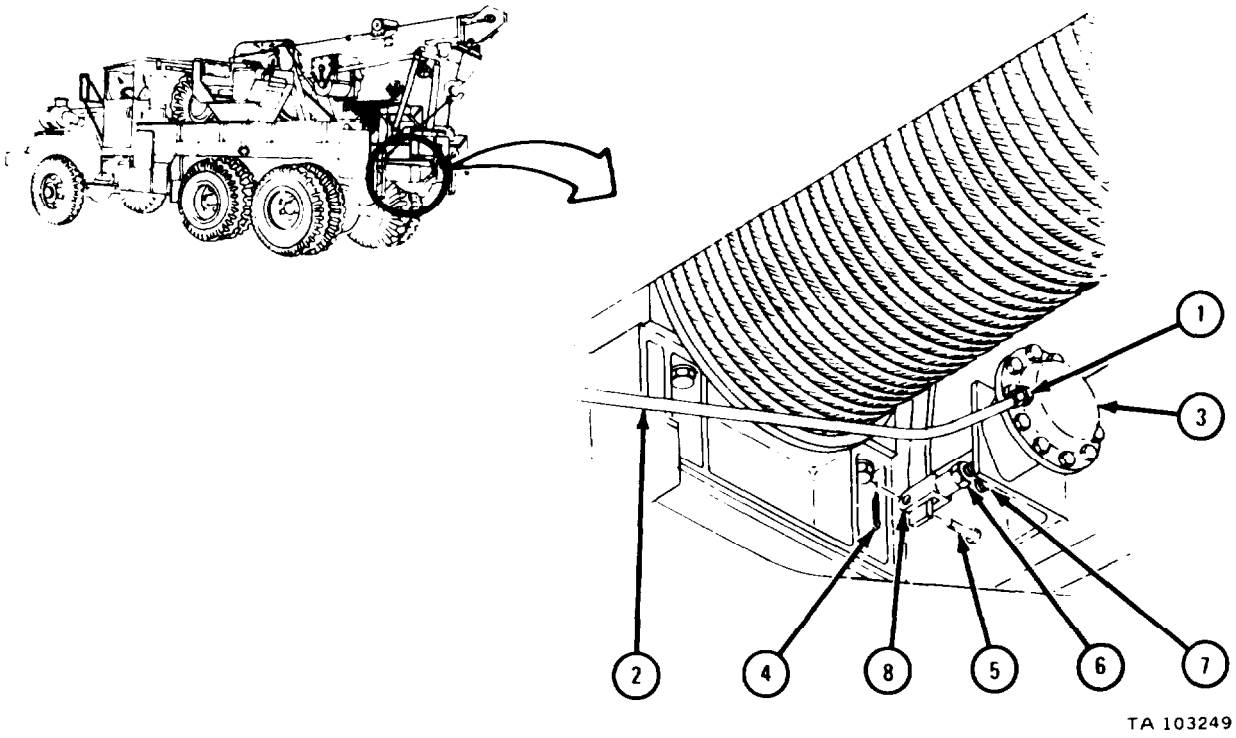
EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Removal.

FRAME 1

1. Unscrew swivel nut (1) on air hose (2) from fitting on tensioner brake chamber (3). Take off air hose.
2. Take out and throw away cotter pin (4).
3. Push out clevis pin (5).
4. Loosen locknut (6). Take off two nuts (7).
5. Tilt tensioner brake chamber (3) and take off clevis (8) and locknut (6).
6. Take off tensioner brake chamber (3).

END OF TASK



b. Replacement.

FRAME 1

1. Put locknut (1) and clevis (2) on tensioner brake chamber (3).
2. Put tensioner brake chamber (3) in place in mounting bracket (4).

NOTE

When tensioner brake chamber (3) is in place on mounting bracket (4), clevis (2) hole must aline with hole in lever (5). If it does not, move clevis until holes are alined.

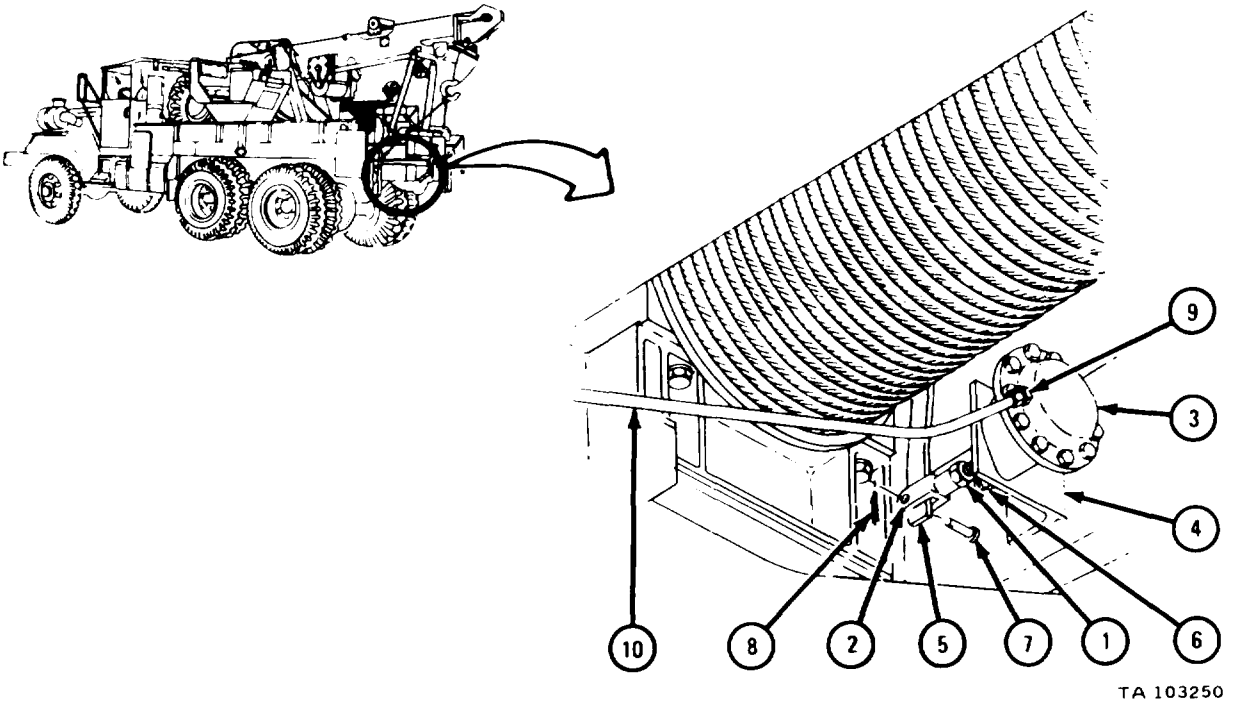
3. Put on two nuts (6). Tighten locknut (1).
4. Aline hole in clevis (2) with hole in lever (5). Push in clevis pin (7).
5. Put in cotter pin (8).
6. Put on swivel nut (9) on air hose (10) onto tensioner brake chamber (3).

NOTE

Follow-on Maintenance Action Required:

Check rear winch cable tensioner assembly for proper adjustment. Refer to TM 9-2320-211-20.

END OF TASK



17-14. REAR WINCH CABLE TENSIONER ASSEMBLY REPAIR (TRUCK M543A2).

TOOLS: No special tools required

SUPPLIES: Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680
Clean dry rags

PERSONNEL: One

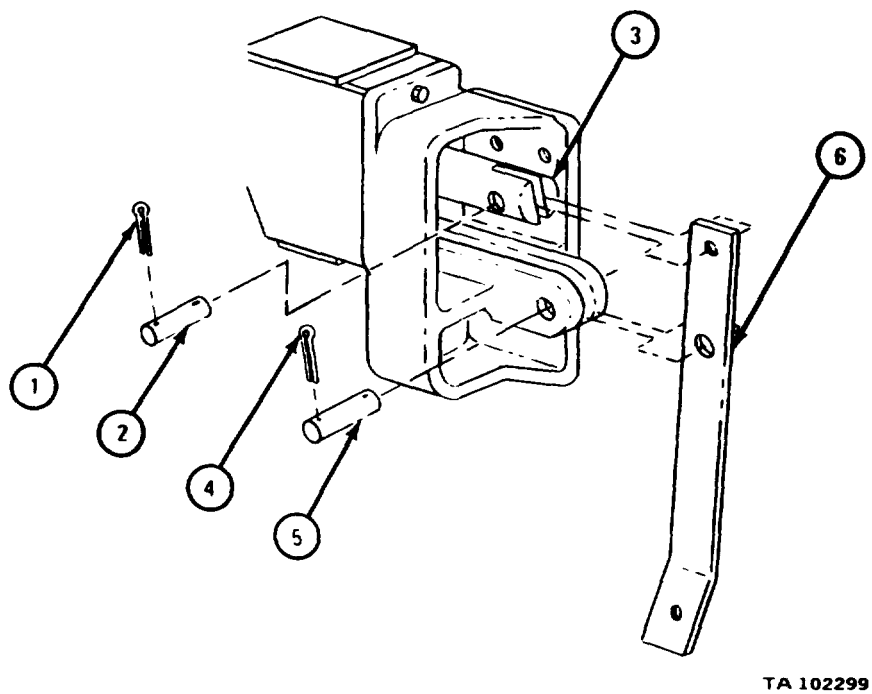
EQUIPMENT CONDITION: Rear winch cable tensioner taken out of truck.

a. Disassembly.

FRAME 1

1. Take cotter pin (1) out of pin (2). Take pin (2) out of adjusting frame lever (3).
2. Take out cotter pin (4). Take out pin (5). Take out sheave lever (6).

GO TO FRAME 2

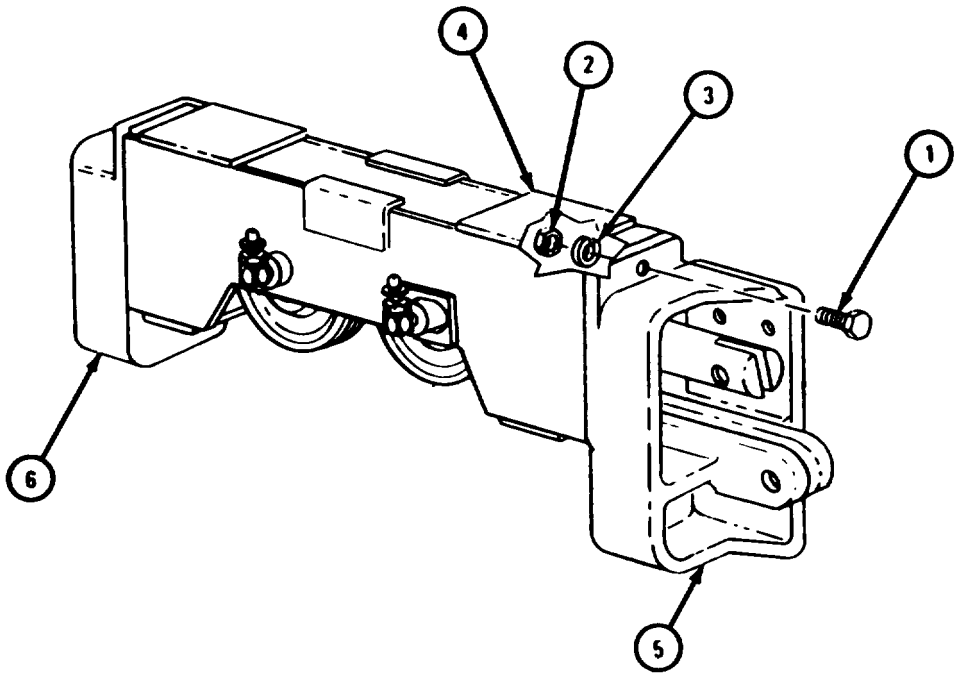


TA 102299

FRAME 2

1. Takeout two capscrews (1). Take out two nuts (2) with washers (3) from inside frame (4). Take off bracket (5).
2. Do step 1 again on other side and take off bracket (6).

GO TO FRAME 3

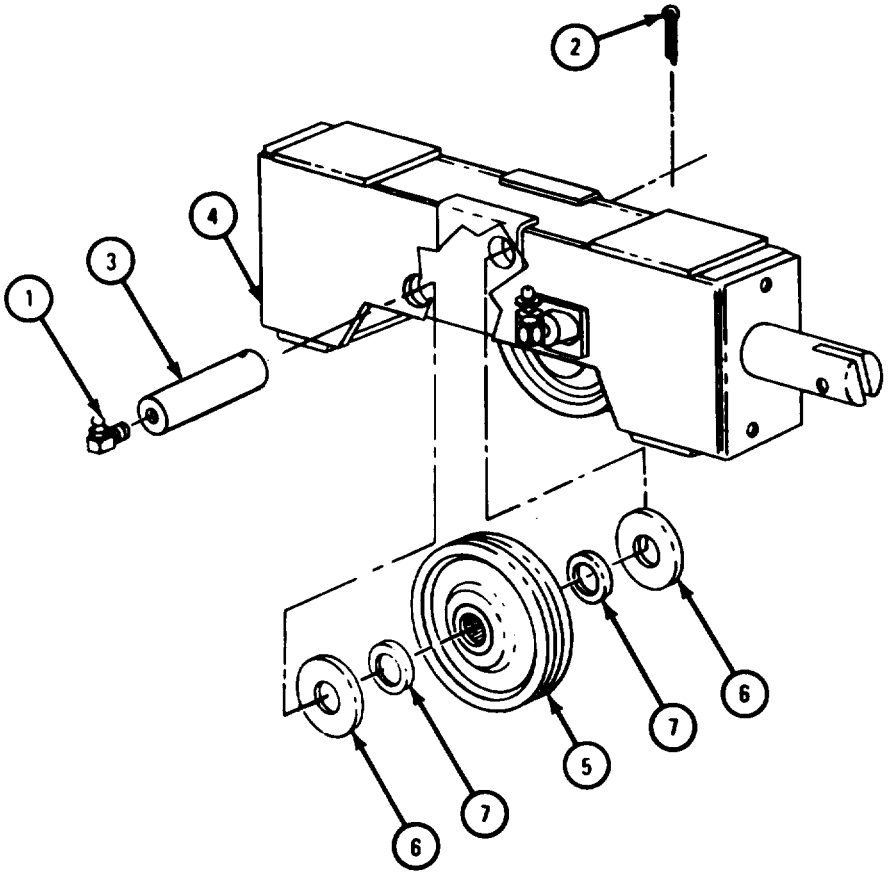


TA 102523

FRAME 3

1. Takeout lubrication fitting (1). Takeout cotter pin (2). Drive pin (3) out of frame (4).
2. Take out sheave (5).
3. Take out two plain washers (6).
4. Take out two felt washers (7).
5. Do steps 1 through 4 again for other sheave.

GO TO FRAME 4



TA 105306

FRAME 4

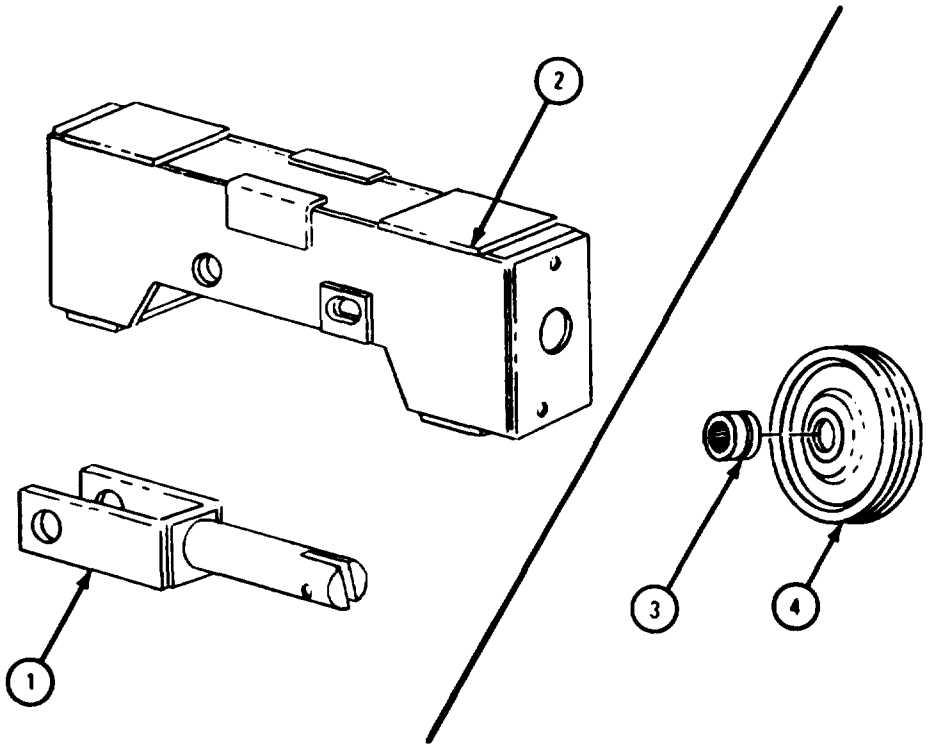
1. Take tension sheave frame (1) out of tension sheave (2).

NOTE

Do not take two bearings (3) out of sheaves unless they are damaged. Refer to Part 1, para 7-7.

2. Press two bearings (3) out of two sheaves (4).

END OF TASK



TA 103031

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

b. Cleaning. Clean all met al parts in dry cleaning solvent. Use wire brush to knock off hardened dirt or lubricant. Wipe with clean dry rags.

c. Inspection and Rep sir.

(1) Check that brackets and tension frames have no cracks. Weld cracks. Refer to TM 9-237.

(2) Check that sheave bearings are not damaged. Refer to Part 1, para 7-7.

(3) Check that pins and lever have no cracks or bends. If pins are cracked or bent, get new ones.

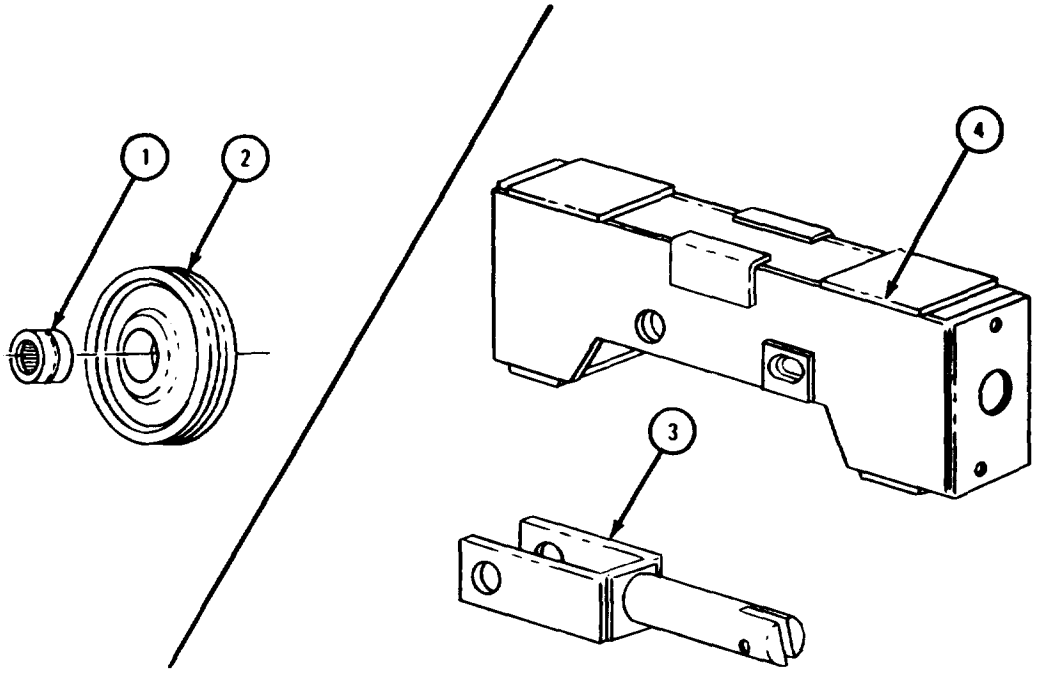
(4) Check that lubrication fittings are not plugged. Unplug fittings if they are blocked. If fittings are damaged, get new ones.

d. Replacement.

FRAME 1

1. If bearings (1) were taken out, press two bearings (1) into two sheaves (2).
2. Put tension frame (3) into frame (4).

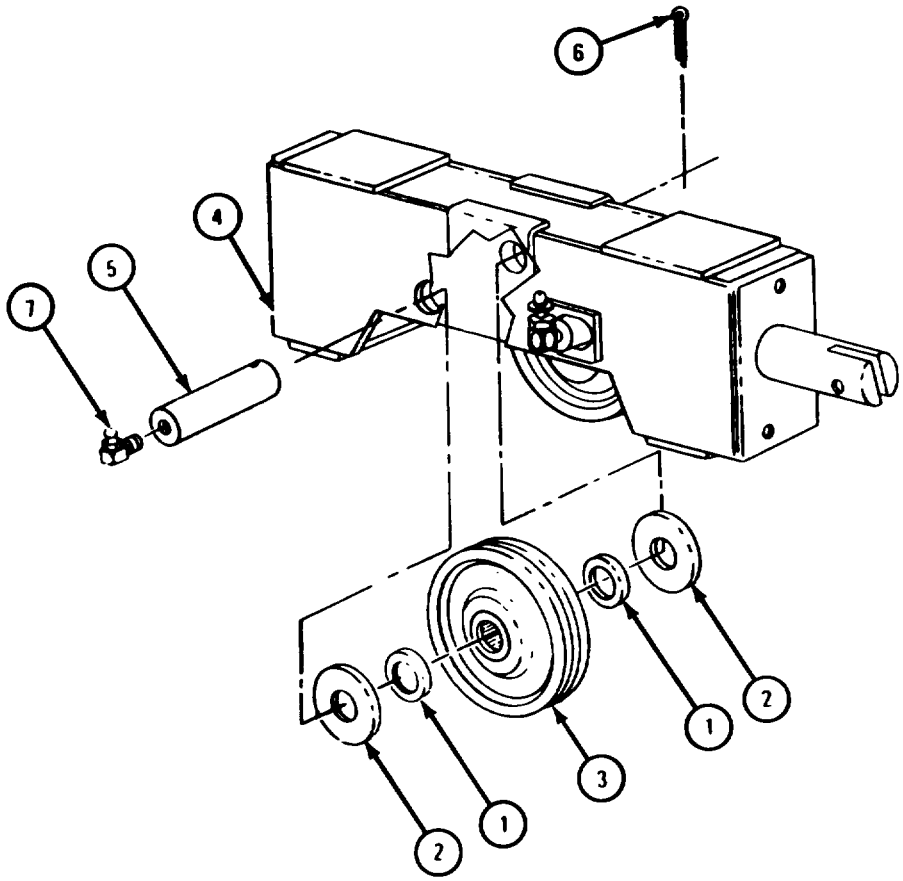
GO TO FRAME 2



FRAME 2

1. Put two felt wahers (1) and two plain washers (2) on sheave (3). put sheave (3) with washers into frame (4).
2. Drive in pin (5). Put in cotter pin (6).
3. Put in lubrication fitting (7).
4. Do steps 1 through 4 again for other sheave (3).

GO TO FRAME 3

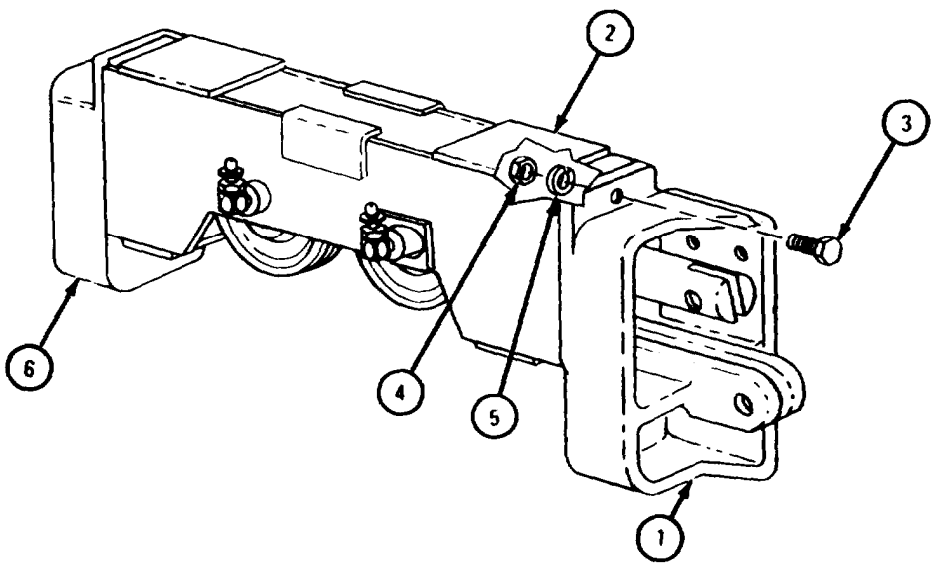


TA 103033

FRAME 3

1. Put bracket (1) against frame (2). Put in two capscrews (3).
2. Put two nuts (4) with lockwashers (5) inside frame (2) on capscrews (3).
3. Do steps 1 and 2 again for bracket (6).

GO TO FRAME 4



TA 105307

FRAME 4

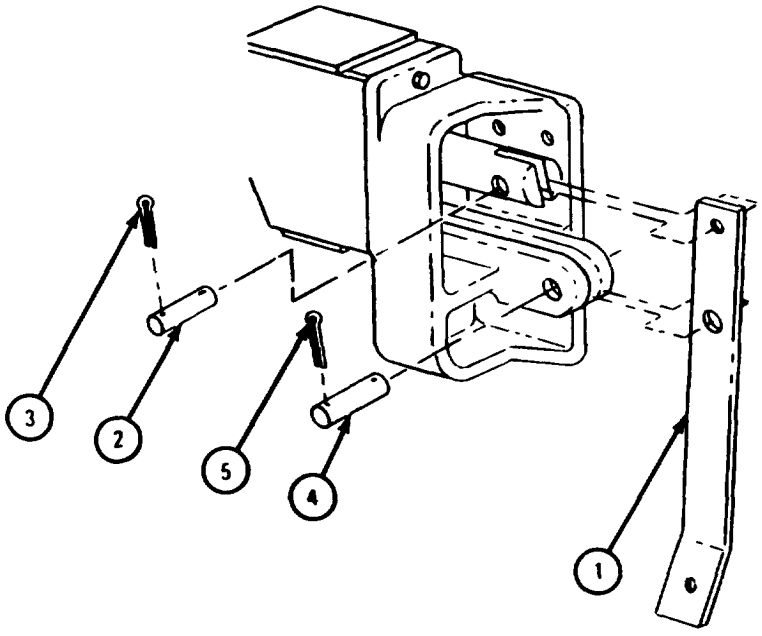
1. Put in lever (1). Put in pin (2). Put in cotter pin (3).
2. Put in pin (4). Put in cotter pin (5).

NOTE

Follow-on Maintenance Action Required:

Lubricate sheave pins. Refer to LO 9-2320-211-12.

END OF TASK



TA 105308

17-15. REAR WINCH SHEAVE AND TROLLEY (LEVEL WIND) REPAIR (TRUCK M543A2).

TOOLS: No special tools required

SUPPLIES: Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680
Clean dry rags
Crocus cloth
Sheave shaft felt washer
Sheave frame felt sheet, 2 feet
Wheel bearing felt washers, 8 each

PERSONNEL: One

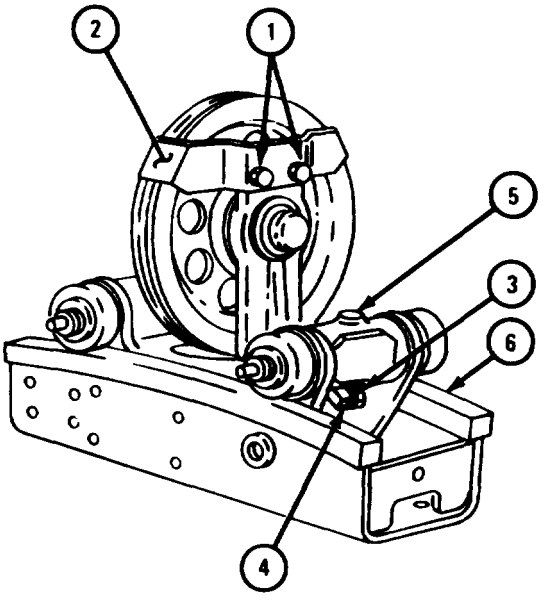
EQUIPMENT CONDITION: Level wind assembly removed from truck.

a. Disassembly.

FRAME 1

1. Take out four cap screws and washers (1), two on each side. Take off cable guard (2).
2. Loosen four jamnuts (3). Unscrew four setscrews (4), two on each side.
3. Lift trolley (5) from track (6).

GO TO FRAME 2

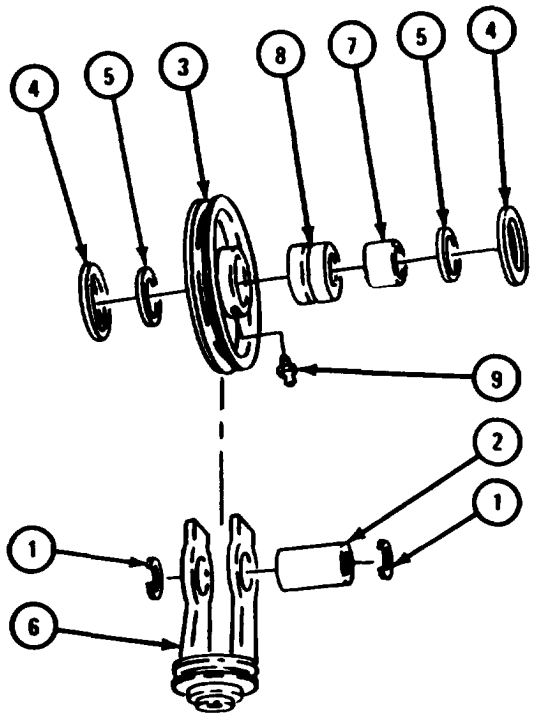


TA 103034

FRAME 2

1. Takeout two snaprings (1) from shaft (2).
2. While holding sheave (3), push out shaft (2). Take out sheave, two spacers (4), and two plain washers (5) from frame (6).
3. Take out sleeve (7), needle bearing (8), and lubrication fitting (9) from sheave (3).

GO TO FRAME 3



TA 103069

FRAME 3

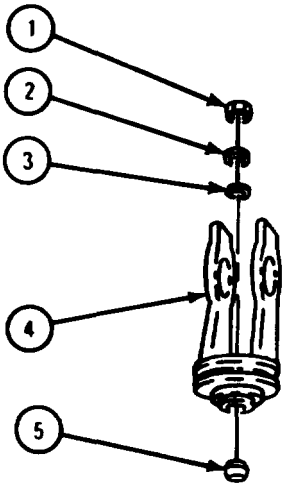
1. Takeout nut (1), plain washer (2), and felt washer (3). Throw away felt washer.
2. Take out sheave swivel frame (4).

NOTE

Do not take out swivel frame bearing unless it is damaged. Refer to para 17-15c for inspection procedures.

3. Press out swivel frame bearing (5).

GO TO FRAME 4

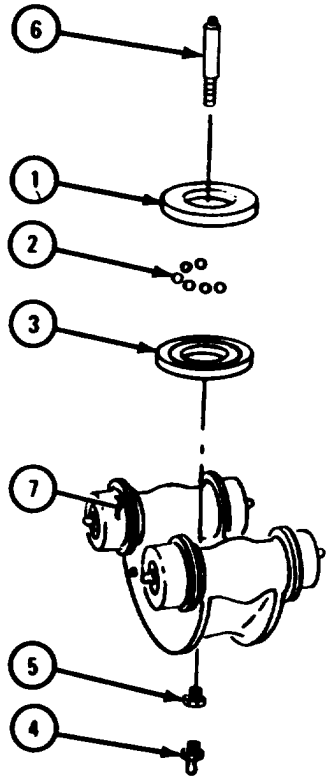


TA 103070

FRAME 4

1. Press out inner bearing race (1).
2. Takeout 45 bearing balls (2). Press out outer bering race (3).
3. Take off lubrication fitting (4) and nut (5).
4. Takeout shaft (6) from trolley assembly (7).

GO TO FRAME 5

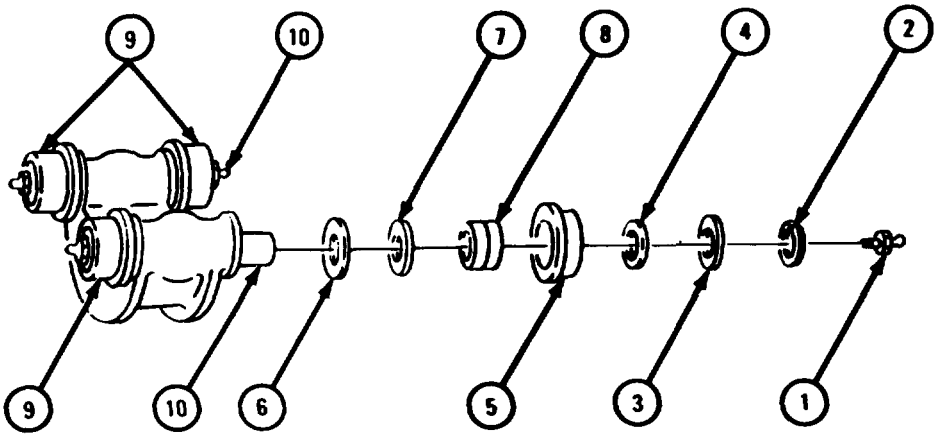


TA 104106

FRAME 5

1. Take out lubrication fitting (1). Take out snapring (2). Take out plain washer (3).
2. Take out and throw away felt washer (4). Slide off trolley wheel (5).
3. Take out felt washer (6). Take plain washer (7) and needle bearing (8) out of wheel (5). Throw away felft washer.
4. Do steps 1, 2, and 3 again for other three trolley wheels (9).
5. Press out two axles (10).

END OF TASK



TA 103071

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby at all times when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

b. Cleaning. Clean all parts with dry cleaning solvent. Dry with clean dry rags.

c. Inspection and Repair.

(1) Check that trolley frame and swivel frame and swivel frame have no cracks . Repair by welding. Refer to TM 9-237.

(2) Check that all bearings are not damaged. Refer to Part 1, para 7-7.

(3) Check that shafts and axles have no burrs, cracks or scoring. Polish burrs with crocus cloth. If shafts are cracked or badly scored, get new ones.

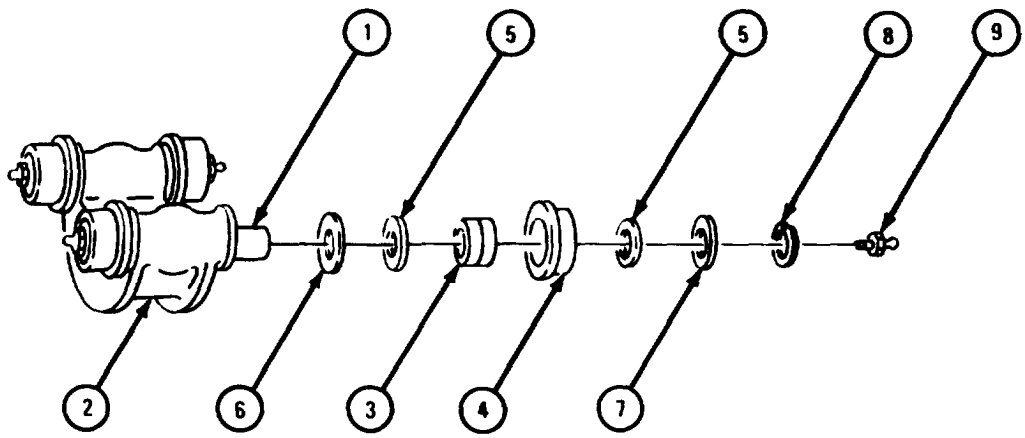
(4) Check that bearing races have no cracks or uneven wear. If bearing races are cracked or unevenly worn, get new ones.

d. Assembly.

FRAME 1

1. Put two axles (1) in trolley frame (2).
2. Put bearing (3) in trolley wheel (4). Put in two felt washers (5).
3. Put plain washer (6) on axle (1). Put trolley wheel (4) assembly on axle.
4. Put on plain washer (7). Put in snapring (8). Put in lubrication fitting (9).
5. Do steps 2 through 4 again for other three trolley wheels (4).

GO TO FRAME 2

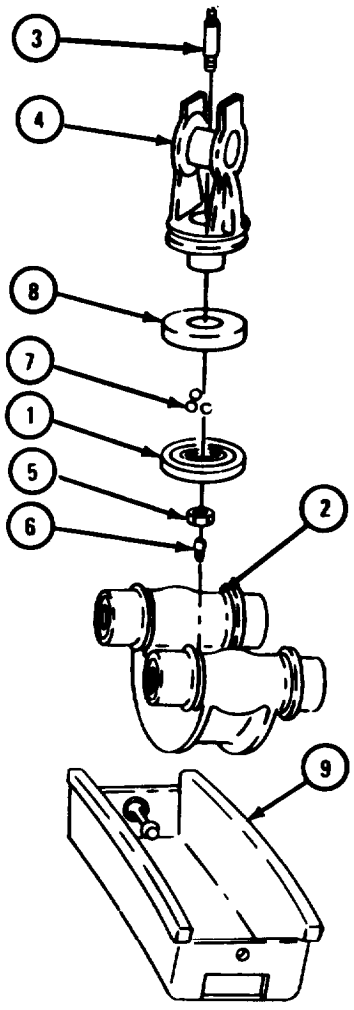


TA 103072

FRAME 2

1. Press outer race (1) into trolley frame (2).
2. Put shaft (3) into sheave swivel frame (4). Screw on nut (5) and lubrication fitting (6).
3. Put 45 bearing balls (7) into outer race (1). Put on inner race (8).
4. Put assembly into trolley frame (9).

GO TO FRAME 3

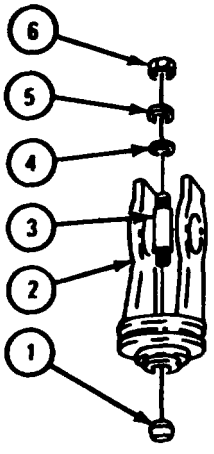


TA 103073

FRAME 3

1. Press bearing (1) into swivel frame (2).
2. Put swivel frame (2) over shaft (3).
3. Put felt washer (4), plain washer (5), and nut (6) on shaft (3).

GO TO FRAME 4

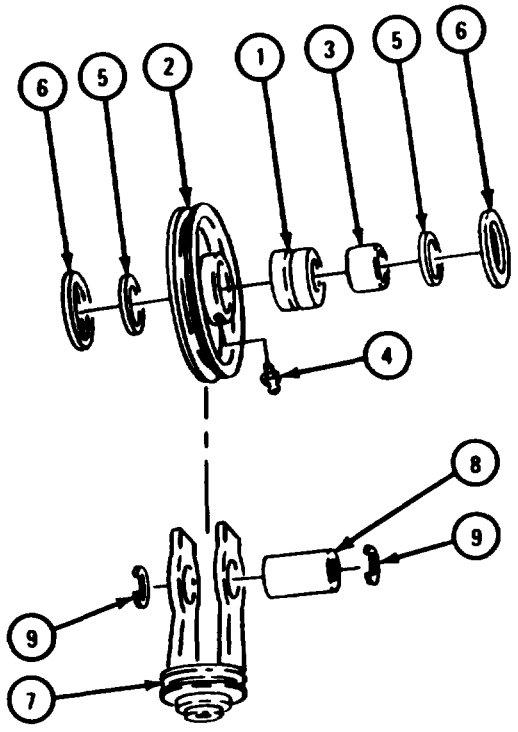


TA 116706

FRAME 4

1. Put needle bearing (1) into sheave (2). Put in sleeve (3). Put in lubrication fitting (4).
2. Put two plain washers (5) on sheave (2). Put on two spacers (6).
3. Put sheave assembly (2) into swivel frame (7). Put in pin (8).
4. Put on two snaprings (9).

GO TO FRAME 5



TA 103074

FRAME 5

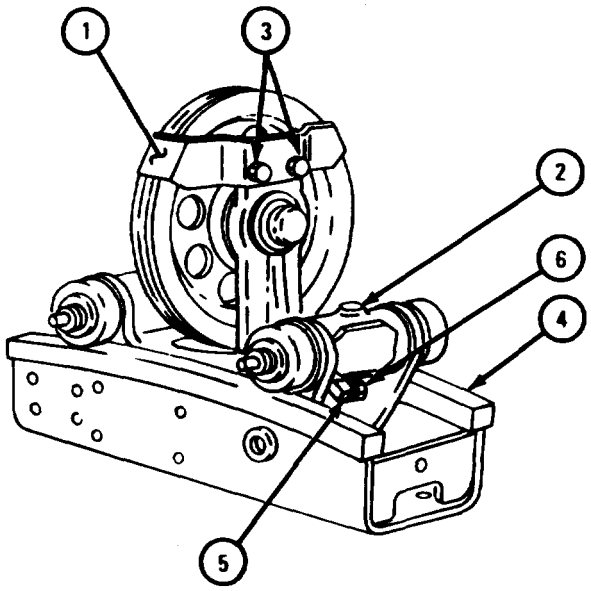
1. Put cable guard (1) on trolley assembly (2).
2. Put in two capscrews and washers.(3).
3. Do step 2 again on other side of cable guard (1).
4. Put trolley assembly (2) into trolley frame (4).
5. Screw in four setscrews (5). Tighten four locknuts (6).

NOTE

Follow-on Maintenance Action Required:

Lubricate shaft and axles. Refer to LO 9-2320-211-12.

END OF TASK



TA 103075

17-16. REAR WINCH ASSEMBLY REPAIR (TRUCK M543A2).

TOOLS: No special tools required

SUPPLIES: Trolley swivel frame felt washer
Trolley wheel bearing felt washer (8)
3-inch cotter pin (2)
3/4-inch cotter pin (4)
1-inch cotter pin
Brake adjusting screw gasket
Brake case gasket
Gearcase cover gasket
Worm gearcase cap gasket (2)
Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680
Clean rags

PERSONNEL: TWO

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Remove winch, from truck. Refer to TM %2320-211-20.

(2) Remove winch cable and chain and hook assembly. Refer to TM 9-2320-211-20.

(3) Drain winch. Refer to LO 9-2320-211-12.

b. Disassemble.

NOTE

Do not take out any seals unless they are cracked, burned, too stiff, or damaged in any other way. Refer to para 17-16d for inspection procedures.

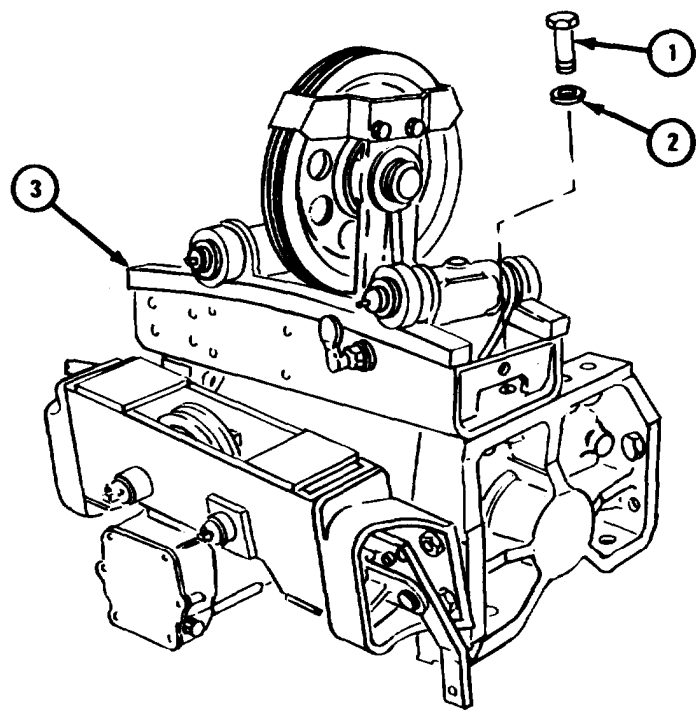
(1) Disassembly of level wind assembly.

FRAME 1

Soldier A 1. Take out four screws (1) and lockwashers (2).

Soldiers A and B 2. Take off level wind assembly (3).

GO TO FRAME 2

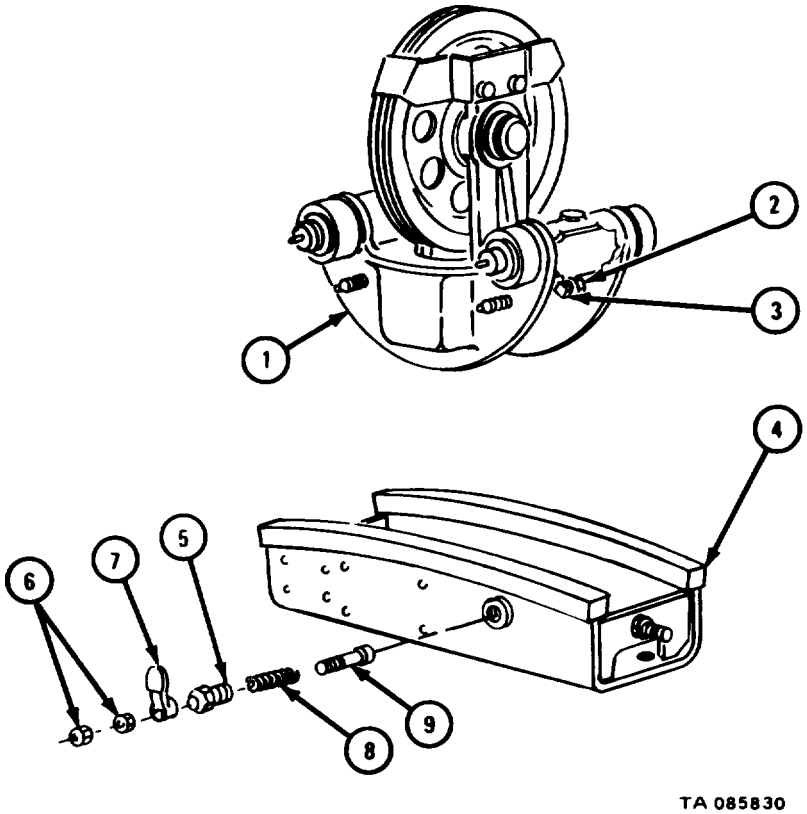


TA 085829

FRAME 2

Soldier A	1.	Hold trolley frame (1).
Soldier B	2.	Loosen four nuts (2).
	3.	Loosen four screws (3) enough to clear lip of trolley track (4).
Soldiers A and B	4.	Take off trolley frame (1).
Soldier A	5.	Take off nut (5) with two nuts (6), latch (7), spring (8), and poppet (9).
	6.	Hold nut(5) and take off two nuts(6).
	7.	Take off latch (7), nut (5), and spring (8).

GO TO FRAME 3



TA 085830

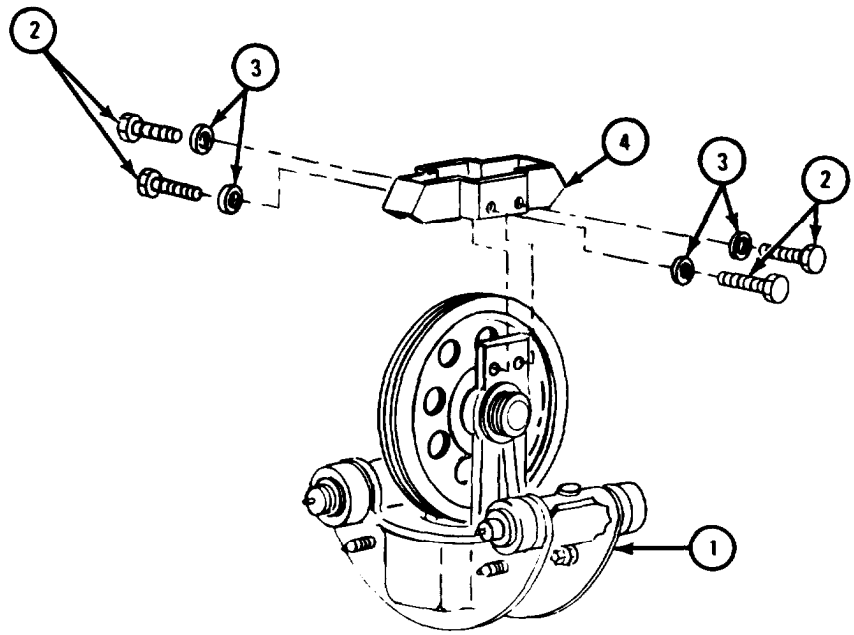
FRAME 3

Soldier A 1. Hold trolley frame (1).

Soldier B 2. Take off four screws (2) and lockwashers (3).

3. Take off cable guard (4).

GO TO FRAME 4



TA 085831

FRAME 4

Soldier A 1. Take off two snap rings (1).

2. Hold swivel sheave (2).

NOTE

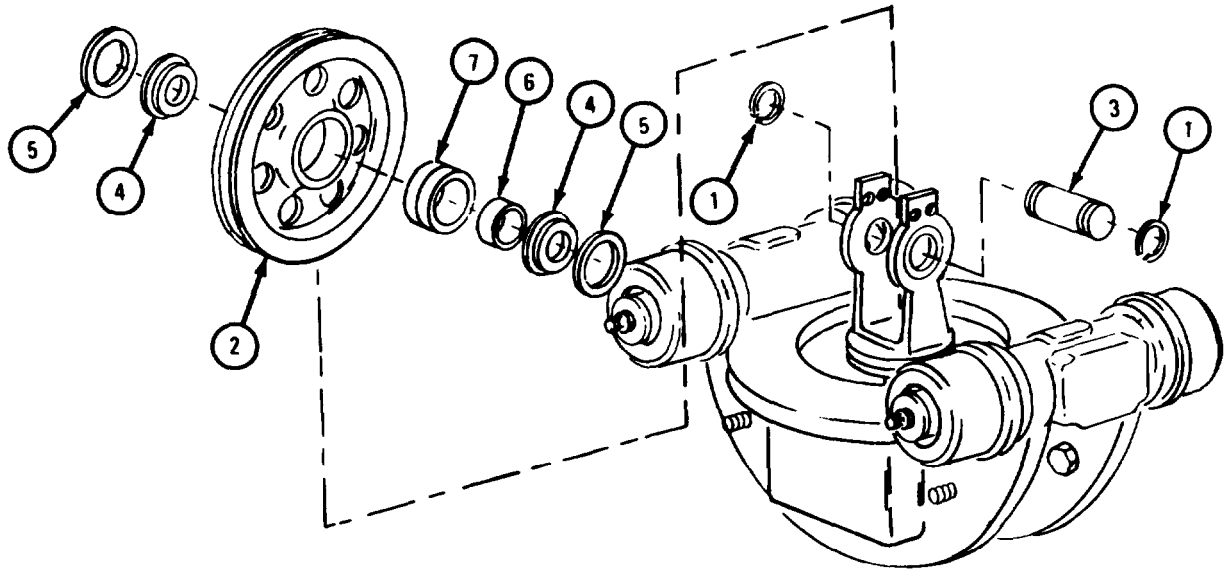
When taking out swivel sheave shaft (3) be careful not to drop loose parts.

Soldier B 3. Take out swivel sheave shaft (3).

Soldier A 4. Take out swivel sheave (2), two washers (4), two spacers (5), and sleeve (6).

5. Press out bearing (7).

GO TO FRAME 5



TA 085832

FRAME 5

Soldier A 1. Hold trolley frame (1).

Soldier B 2. Take off nut (2).

3. Take off lockwasher (3) and felt washer (4). Throw away felt washer.

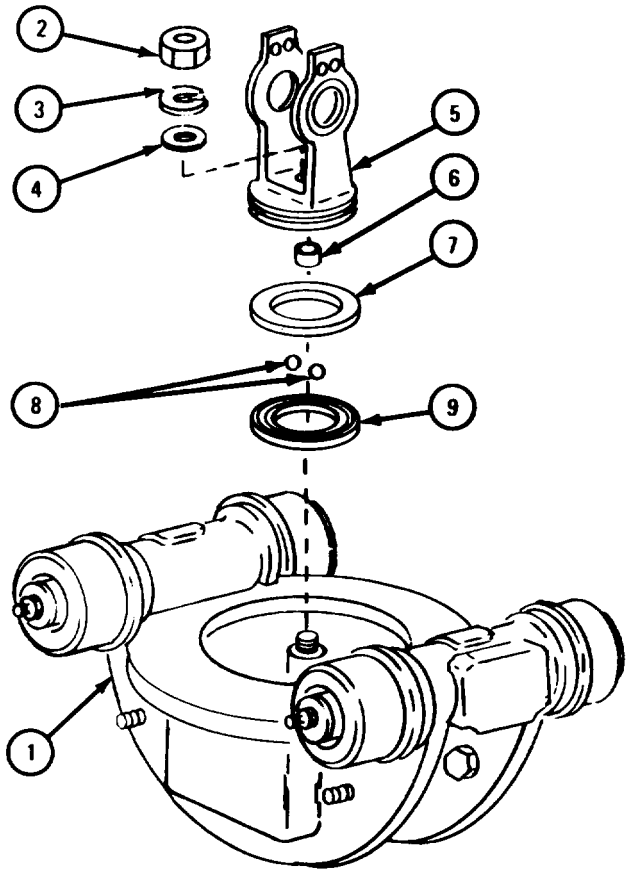
NOTE

When taking off trolley swivel frame (5), be careful not to drop loose parts.

4. Pull up and take off trolley swivel frame (5).

5. Take off shaft bearing (6), inner race (7), 45 balls (8), and outer race (9).

GO TO FRAME 6



TA 085833

FRAME 6

Soldier A 1. Hold trolley frame (1).

Soldier B 2. Take out lubrication fitting (2).

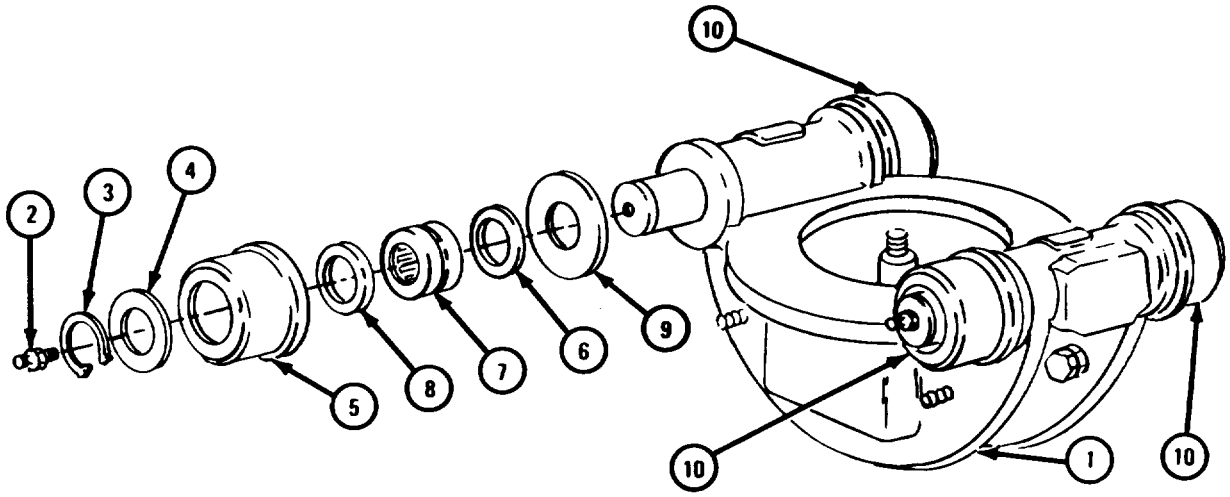
3. Take off snapring (3). Take off washer (4).

4. Take off trolley wheel (5). Take out felt washer (6), wheel bearing (7), and felt washer (8). Throw away felt washers.

5. Take off washer (9).

6. Do steps 2 through 5 again to take off three wheel assemblies (10).

GO TO FRAME 7



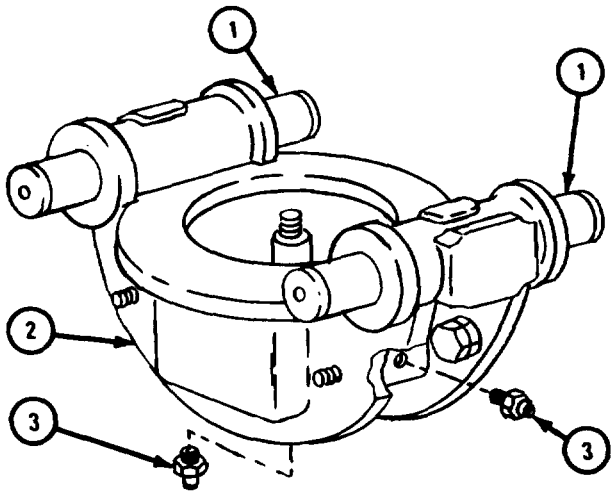
FRAME 7

1. Press out two trolley axles (1).

Soldier A 2. Hold trolley frame (2).

Soldier B 3. Take out two lubrication fittings (3).

END OF TASK



TA 088753

(2) Disassembly of tensioner assembly.

FRAME 1

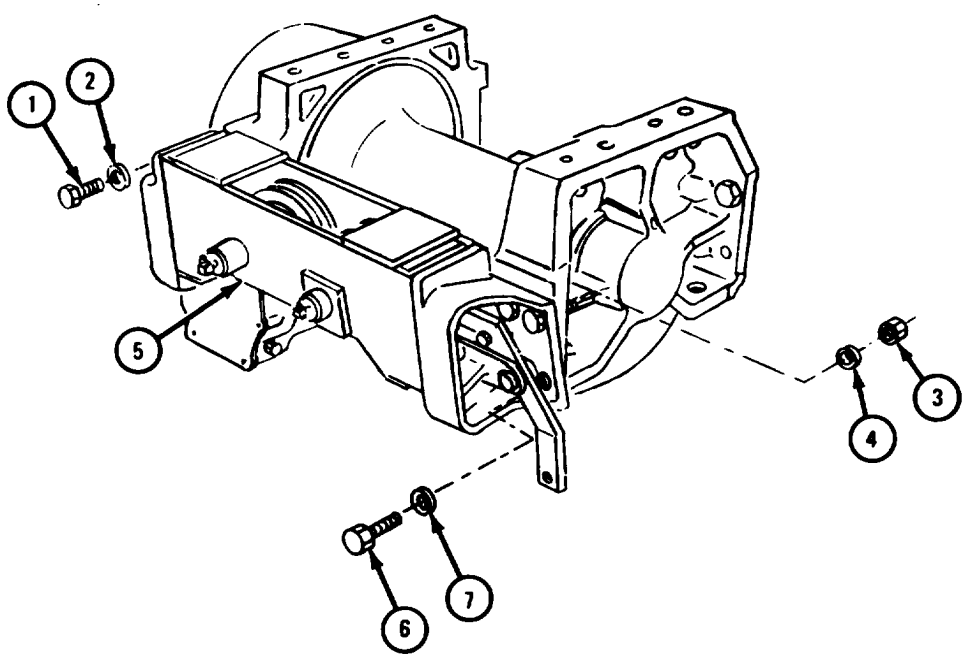
1. Take off four screws (1) and lockwashers (2).
2. Take off two nuts (3) and two washers (4).

Soldier A 3. Hold tensioner assembly (5).

Soldier B 4. Take off two screws (6) and lockwashers (7).

Soldiers A and B 5. Take off tensioner assembly (6).

GO TO FRAME 2

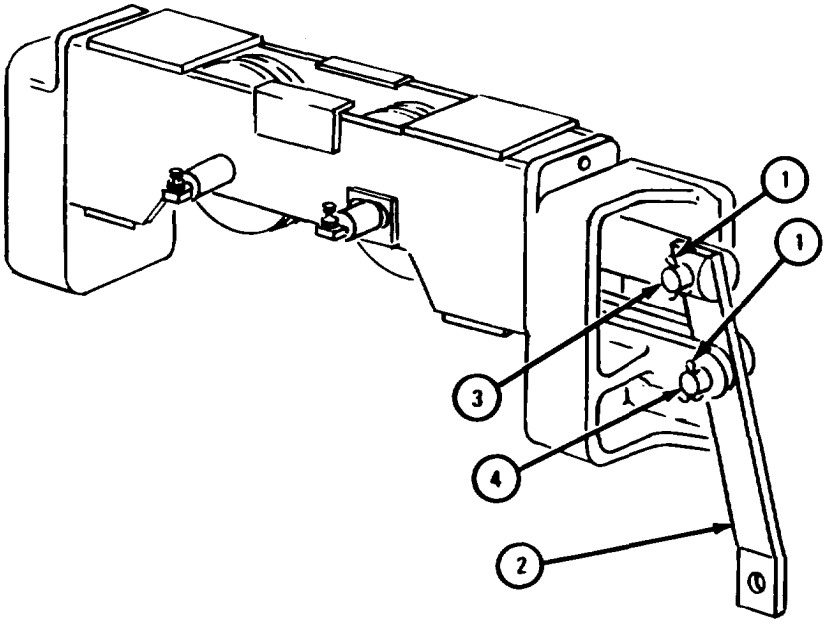


TA 085834

FRAME 2

1. Take out and throw away two cotter pins (1).
2. Hold lever (2) and take out two pins (3 and 4).
3. Take off lever (2).

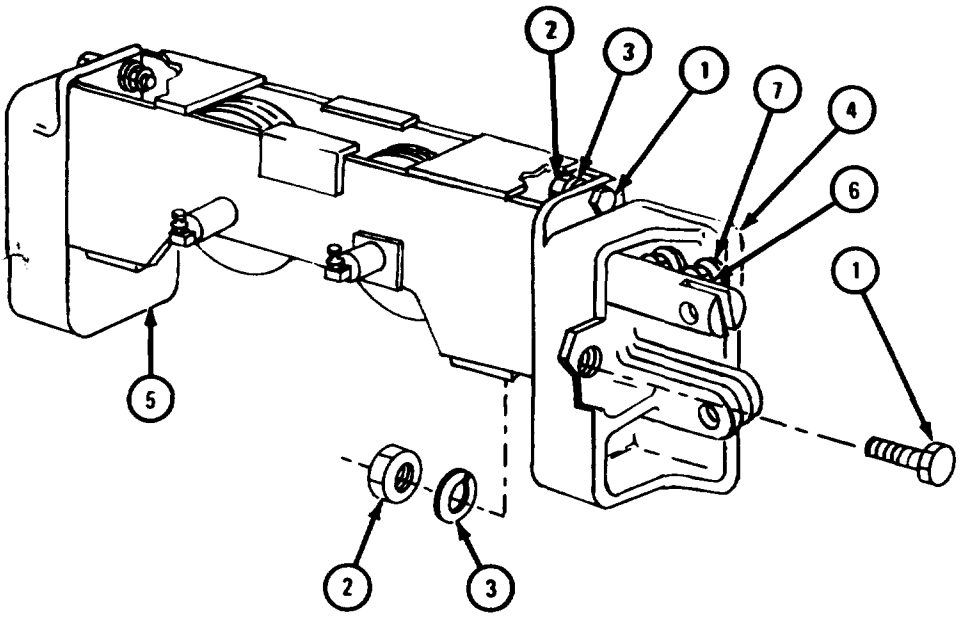
GO TO FRAME 3



FRAME 3

1. Take off two screws (1), nuts (2), and washers (3).
2. Take off tensioner bracket (4).
3. Do steps 1 and 2 again to take off tensioner bracket (5).
4. Take out two screws (6) and washers (7) from tensioner bracket (4).

GO TO FRAME 4



TA 085836

FRAME 4

1. Take out and throw away cotter pin (1).
2. Take out lubrication fitting assembly (2).

NOTE

When taking out sheave pin (3), be careful not to drop loose parts.

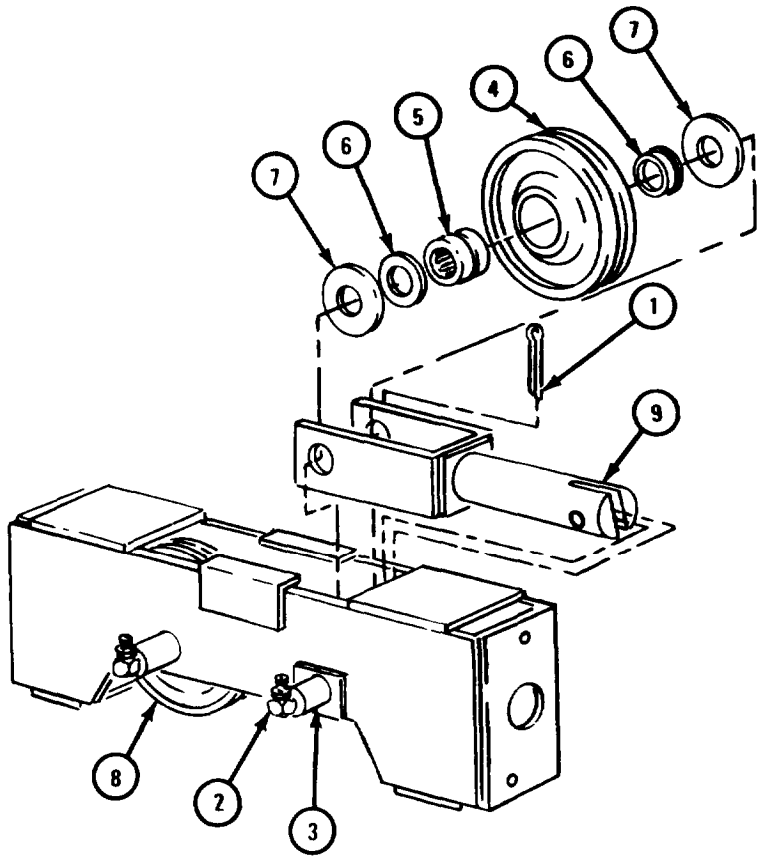
Soldier A 3. Hold tensioner sheave (4).

Soldier B 4. Take out sheave pin (3).

Soldier A 5. Take out tensioner sheave (4) with bearing assembly (5), two washer assemblies (6), and two washers (7).

6. Take bearing assembly (5) out of tensioner sheave (4). Refer to Part 1, para 7-7 and para 17-15.
7. Do steps 1 through 4 again to take out tensioner sheave assembly (8).
8. Take out sheave frame (9).

END OF TASK



TA 085837

(3) Disassembly of winch assembly.

FRAME 1

1. Takeout two plugs (1).
2. Takeout plug (2).

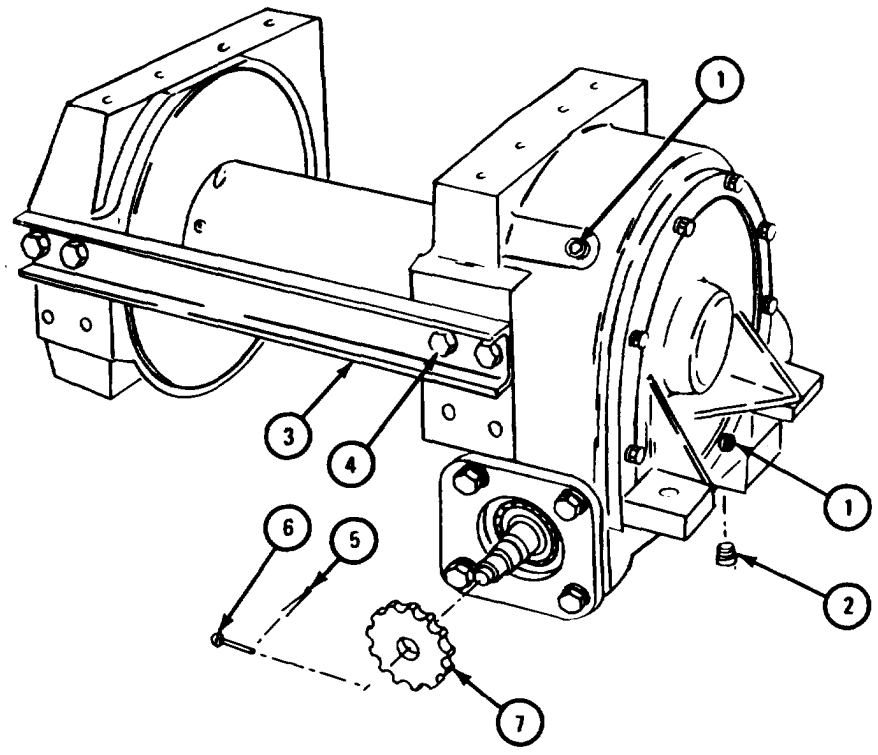
Soldier A 3. Hold channel (3).

Soldier B 4. Takeoff four screws and lockwashers (4).

Soldier A 5. Takeoff channel (3).

6. Take off cotter pin (5). Take of spear pin (6). Take off sprocket (7).

GO TO FRAME 2



TA 085838

FRAME 2

Soldier A 1. Put hoist chains (1) on cable drum (2). Using hoist, raise cable drum.

Soldier B 2. Pull off end frame (3).

3. Using seal puller and hammer, take off seal (4).

4. Take off thrust washer (5) and sleeve (6).

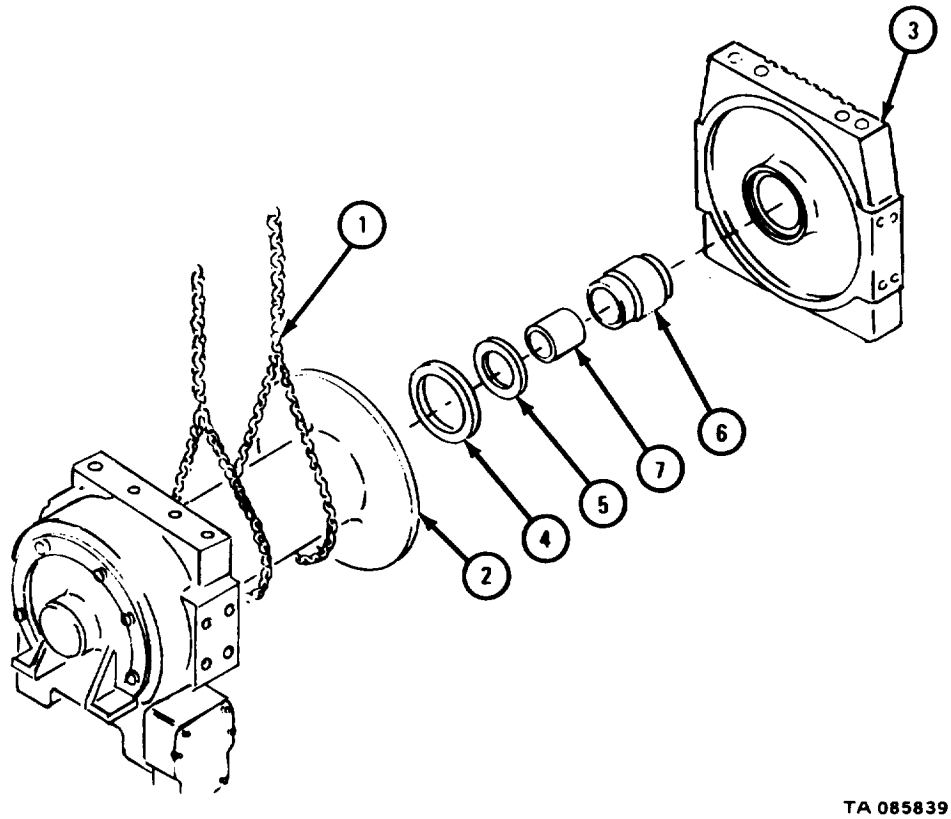
NOTE

Do not take out bushing (7) unless it is worn or damaged. Refer to para 17-16 d for inspection procedures.

5. Take out bushing (7).

Soldiers A and B 6. Using hoist, lower cable drum (2) to working surface. Take off hoist chains (1).

GO TO FRAME 3

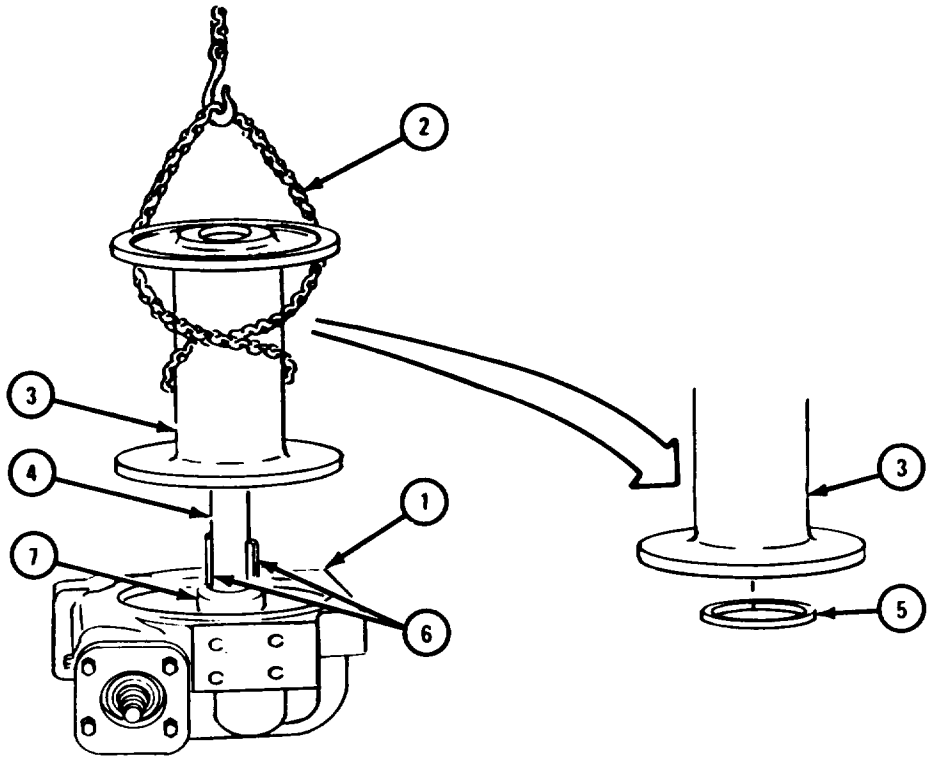


TA 085839

FRAME 3

Soldiers A and B	1.	Rest gearcase (1) on end and put hoist chains (2) on cable drum (3) as shown.
	2.	Using wood block and hammer, tap on shaft (4) and using hoist, take off cable drum (3).
Soldier A	3.	Using seal puller and hammer, take out seal (5).
	4.	Take out two square keys (6).
	5.	Take off thrust washer (7).

GO TO FRAME 4

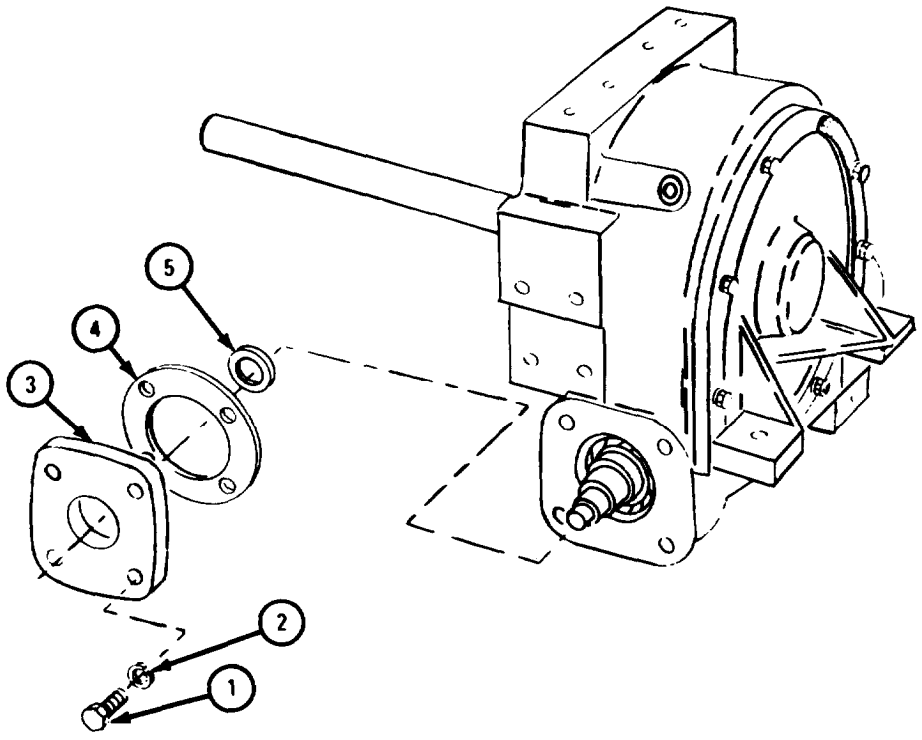


TA 085840

FRAME 4

1. Take off four screws (1) and lockwashers (2). Take off worm gearcase cap (3) and gasket (4). Throw away gasket.
2. Take seal (5) out of worm gearcase cap (3).

GO TO FRAME 5



TA 085841

FRAME 5

Soldier A 1. Take out two screws (l).

Soldier B 2. Hold gearcase cover (2).

Soldier A 3. Take off six screws (3) and lockwaahers (4).

Soldier B 4. Take off gearcase cover (2) and gasket (5). Throw away gasket.

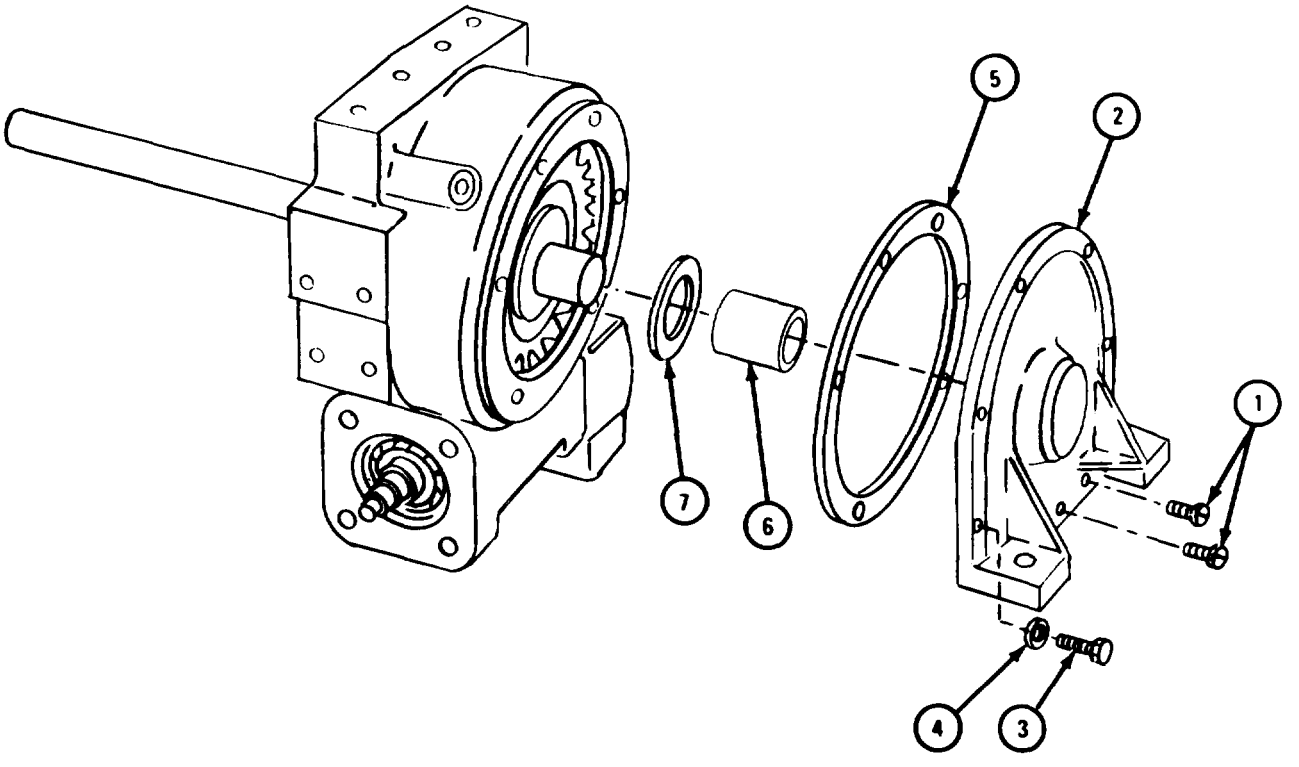
NOTE

Take out bushing (6) only if it is damaged. Refer to para 17-16 **d** for inspection procedures.

Soldier A 5. Take out bushing (6).

6. Take off washer (7).

GO TO FRAME 6

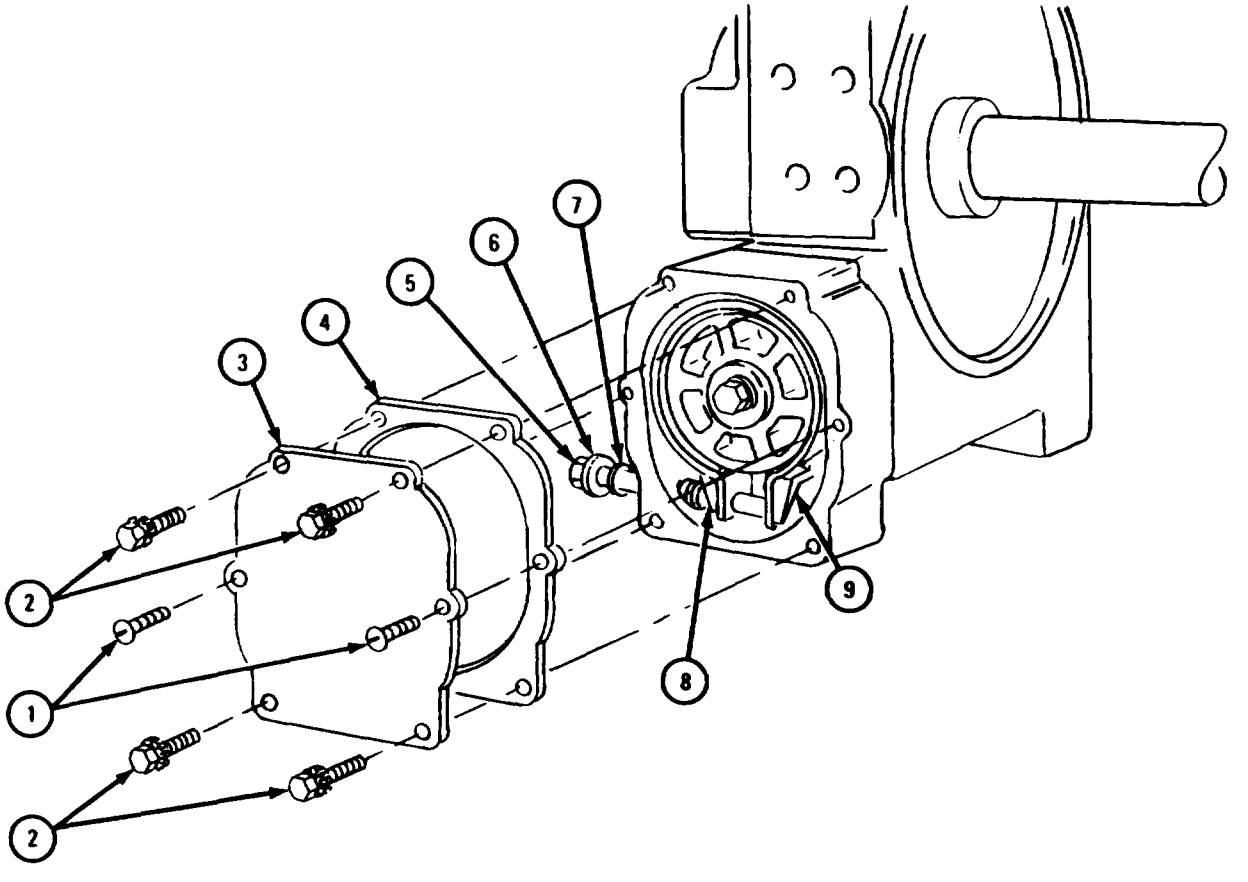


TA 085842

FRAME 6

1. Take out two screws (l).
2. Take out four locking screws (2).
3. Take off brake drum case end cover (3) and gasket (4). Throw away gasket
4. Take out screw (5), washer (6), and preformed packing (7). Throw away performed packing.
5. Take out spring (8) and brake band assembly (9).

GO TO FRAME 7



TA 085843

FRAME 7

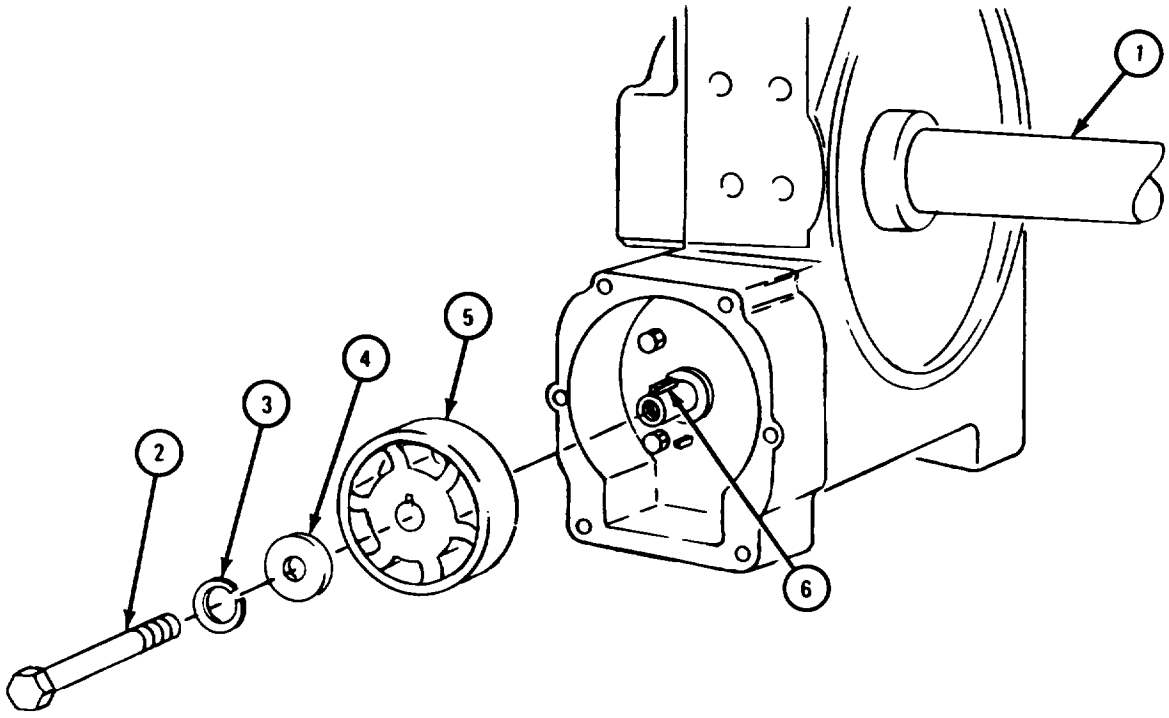
Soldier A 1. Hold shaft (1).

Soldier B 2. Take out screw (2), lockwasher (3), and flat washer (4).

3. Using puller, take out brake drum disk (5).

4. Take out key (6).

GO TO FRAME 8

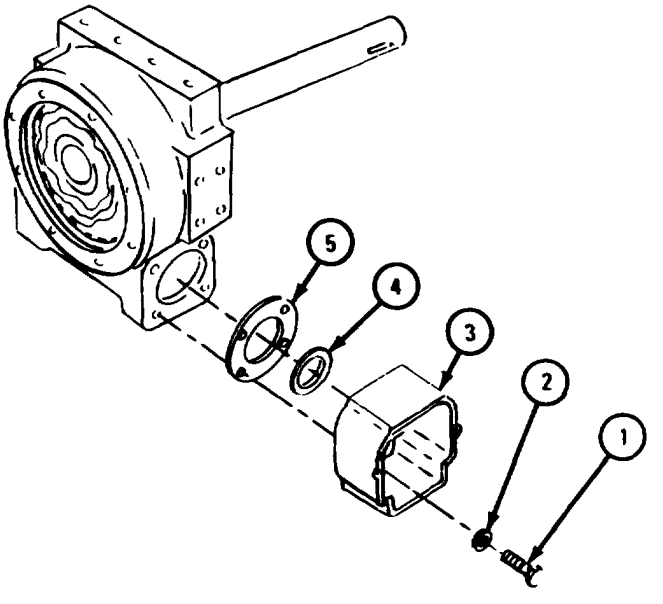


TA 085844

FRAME 8

1. Take out four screws (1) and lockwashers (2).
2. Take off brake case (3) with seal (4) and gasket(5). Throw away gasket.
3. Take seal (4) out of brake case (3).

GO TO FRAME 9



TA 085845

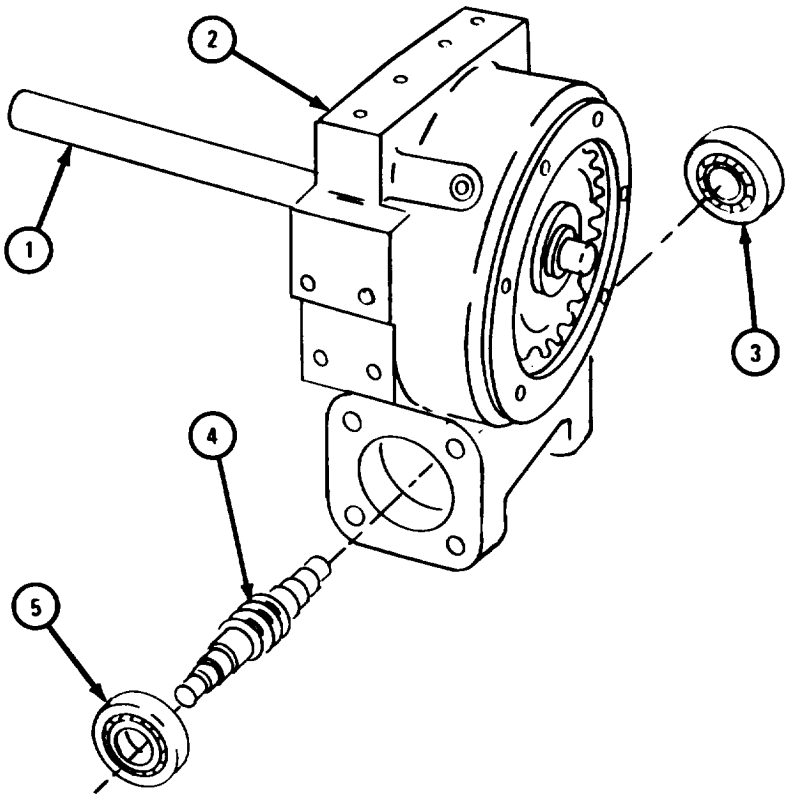
FRAME 9

Soldier A 1. Hold shaft (1).

Soldier B 2. Using brass punch and hammer inside housing (2), drive bearing (3) off worm gear (4).

3. Do step 2 again to take off bearing (5).

GO TO FRAME 10



TA 085847

FRAME 10

Soldiers A and B 1. Takeout gear (1) and shaft (2).

Soldier A 2. Take off washer (3).

CAUTION

Be sure that gear (1) rests on hub when pressing out shaft (2). If gear rests on teeth, they may break.

Soldiers A and B 3. Press out shaft (2).

Soldier A 4. Take out two keys (4).

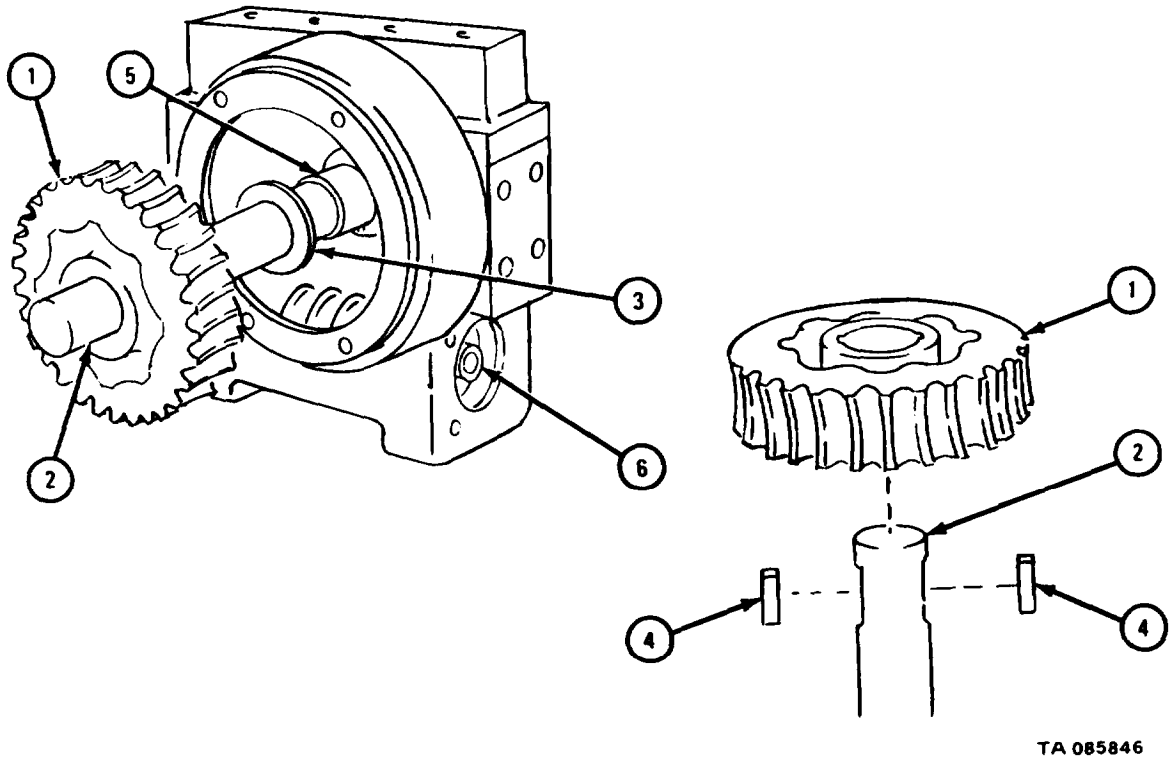
NOTE

Do not take out bushing (5) unless it is worn or damaged. Refer to para 17-16d for inspection procedures.

5. Take out bushing (5).

6. Take out worm gear (6).

END OF TASK



c. Cleaning

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

(1) Clean bearings. Refer to Part 1, para 7-7.

(2) Wipe all seals and automatic brake band assembly with clean rag.

(3) Clean all other parts with solvent. Use stiff wire brush to clean off dirt, hardened grease, and oil.

(4) Let parts dry.

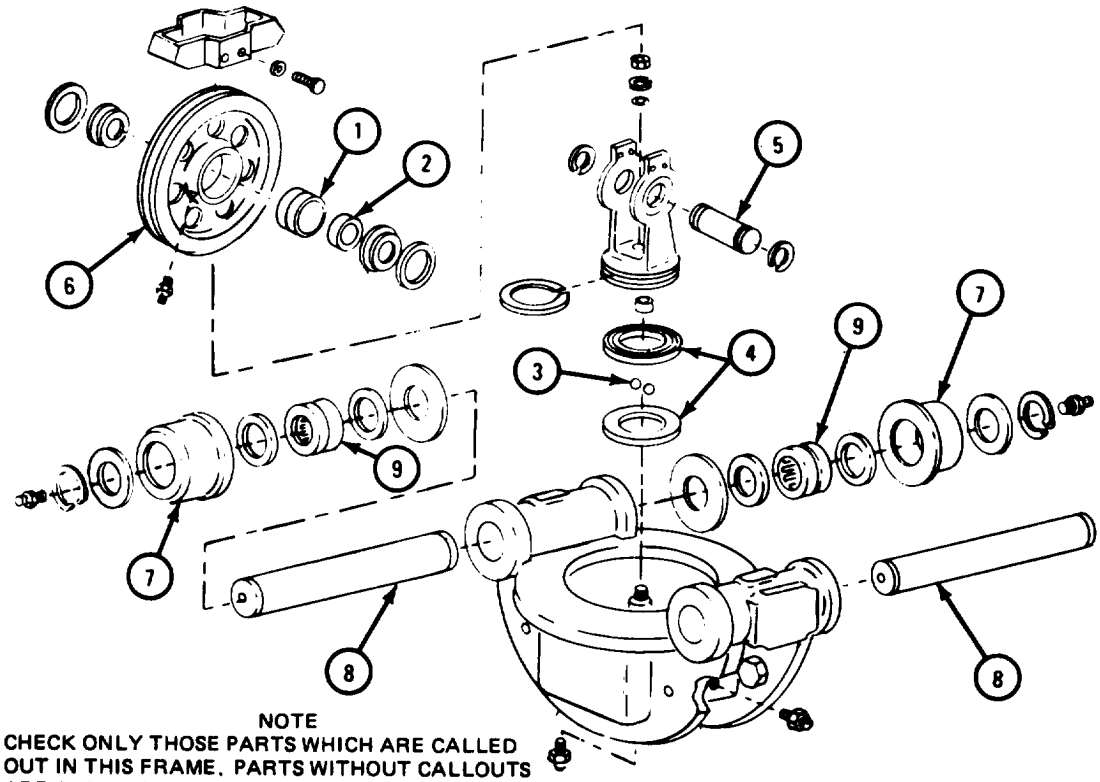
d. Inspection.

(1) Inspection of level wind assembly.

FRAME 1

1. Check that bearing (1) and sleeve (2) are not damaged. Refer to Part 1, para 7-7.
2. Check that 45 balls (3) and two races (4) are not damaged. Refer to Part 1, para 7-7.
3. Check that shaft (5) is not cracked or damaged in any other way.
4. Check that swivel sheave (6) is not broken, cracked, dented or damaged in any other way.
5. Check that four trolley wheels (7) are not worn, cracked or damaged in any other way.
6. Check that two trolley axles (8) are not bent, cracked or damaged in any other way.
7. Check that four bearings (9) are not damaged. Refer to Part 1, para 7-7.

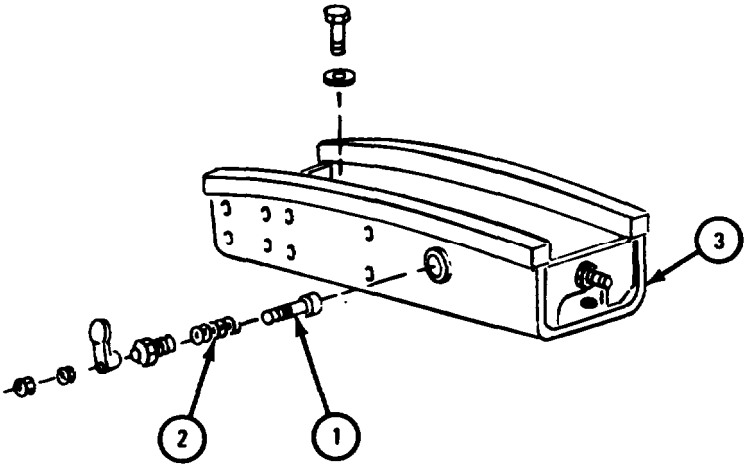
GO TO FRAME 2



FRAME 2

1. Check that poppet (1) is not bent, cracked or broken, and that it does not have damaged threads.
2. Check that spring (2) is not bent, cracked or broken.
3. Check that trclley track (3) is not dented, cracked, broken or damaged in any other way.

END OF TASK



NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT IN THIS FRAME. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES OR ARE CHECKED IN ANOTHER FRAME.

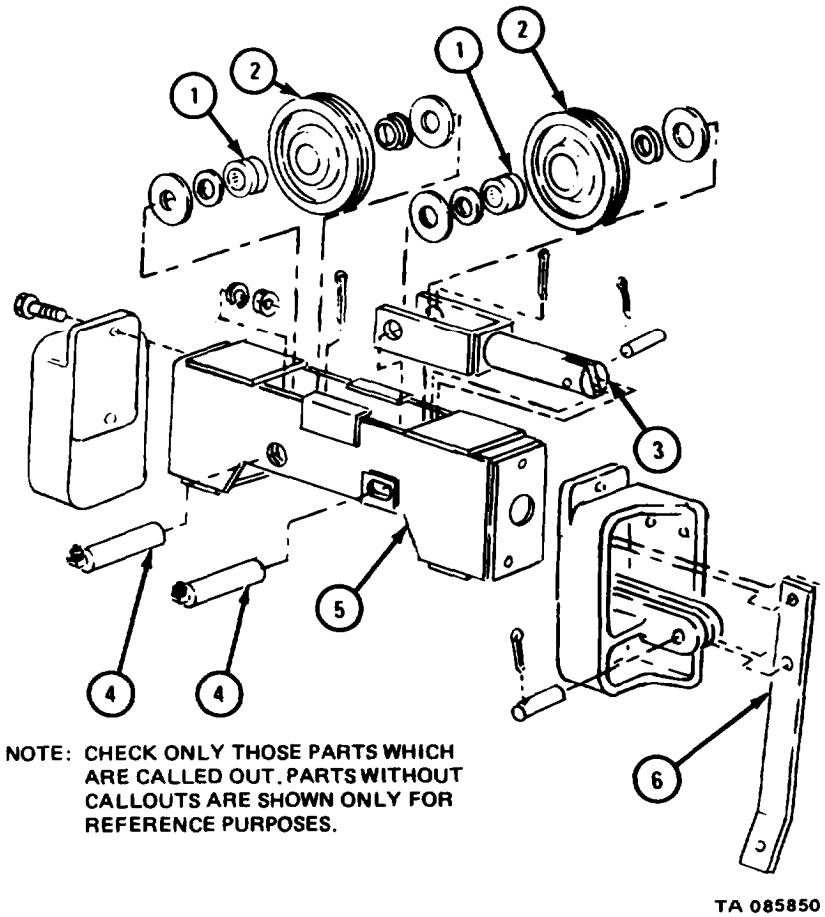
TA 085849

(2) Inspection of tensioner assembly.

FRAME 1

1. Check that two bearings (1) are not damaged. Refer to Part 1, para 7-7.
2. Check that two tensioner sheaves (2) are not bent, cracked or damaged in any other way.
3. Check that sheave frame (3) is not bent, cracked, broken or damaged in any other way.
4. Check that two sheave pins (4) are not bent, cracked or damaged in any other way.
5. Check that tensioner frame (5) is not dented, cracked, bent or damaged in any other way.
6. Check that lever (6) is not bent, cracked, broken or damaged in any other way.

END OF TASK



NOTE: CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 085850

(3) Inspection of winch assembly.

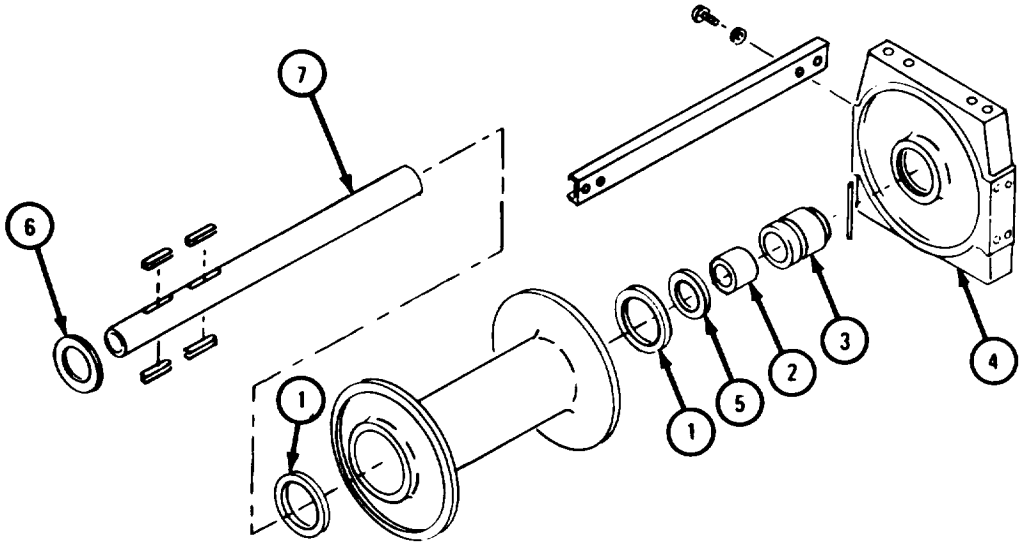
FRAME 1

NOTE

Readings must be within limits given in table 17-3. If readings are not within given limits, throw away part and get a new one.

1. Check that two seals (1) are not cracked, burned, too stiff or damaged in any other way.
2. Check that bushing (2) and sleeve (3) are not scored, chipped or damaged in any other way.
3. Measure bushing (2) and sleeve (3). Check wear limits. Refer to table 17-3.
4. Check that end frame (4) is not cracked and does not have damaged threads or other damage.
5. Check that thrust washers (5 and 6) are not cracked, worn, broken or damaged in any other way.
6. Check that shaft (7) is not cracked or scored.
7. Measure shaft (7) . Check wear limits. Refer to table 17-3.
8. Check that winch cable and chain and hook assembly has no broken or frayed strands or other damage.

GO TO FRAME 2



NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT IN THIS FRAME. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES OR ARE CHECKED IN ANOTHER FRAME.

TA 085851

FRAME 2

NOTE

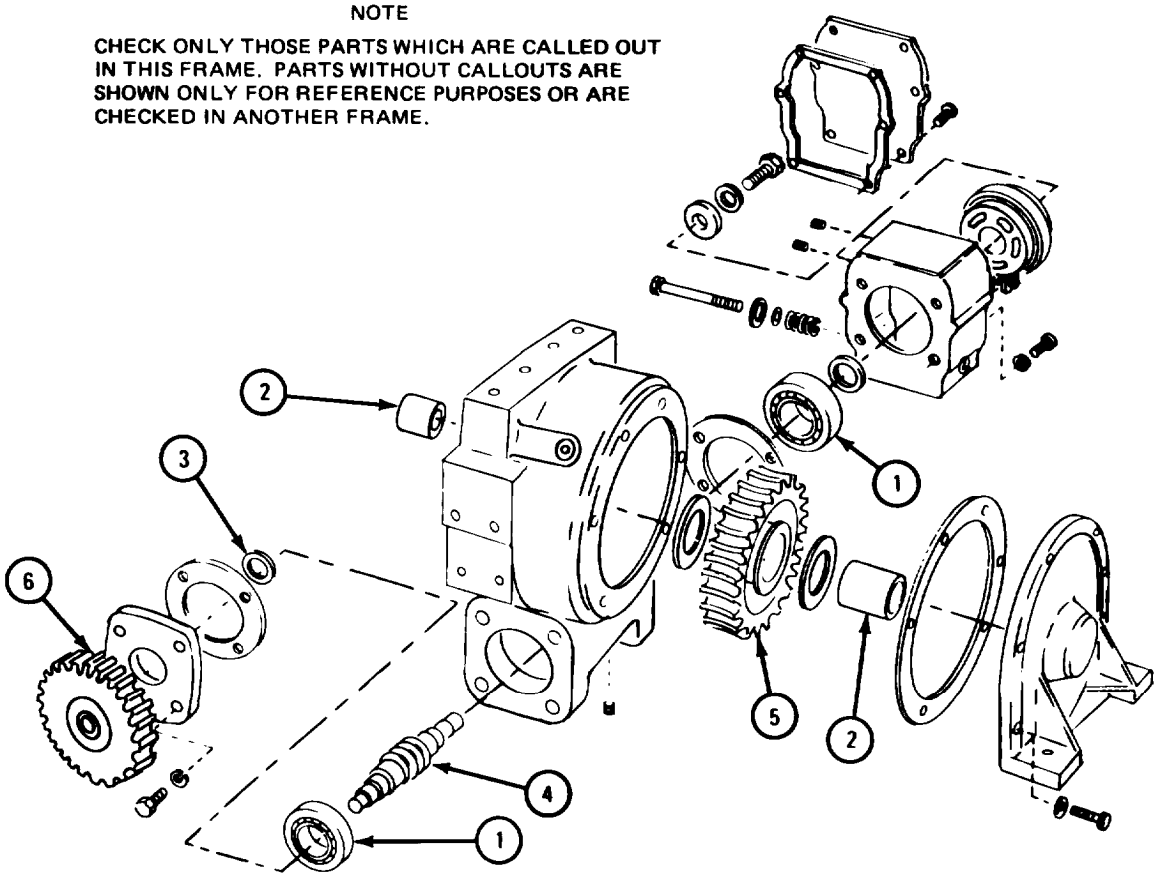
Readings must be within limits given in table 17-4. If readings are not within given limits, throw away part and get a new one.

1. Check that two bearings (1) are not damaged. Refer to Part 1, para 7-7. Check that two bushings (2) are not scored, chipped or damaged in any other way.
2. Measure two bearings (1) and two bushings (2). Check wear limits. Refer to table 17-4.
3. Check that seal (3) is not cracked, burned, too stiff or damaged in any other way.
4. Check that worm gear (4) has no broken, chipped or scored teeth or any other damage.
5. Measure worm gear (4). Check wear limits. Refer to table 17-4.
6. Check that gear (5) and sprocket (6) have no broken or chipped or scored teeth or any other damage.

GO TO FRAME 3

NOTE

CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT IN THIS FRAME. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES OR ARE CHECKED IN ANOTHER FRAME.



TA 085852

FRAME 3

NOTE

Readings must be within limits given in table 17-5. If readings are not within given limits, throw away part and get a new one.

1. Check that gearcase (1) and gearcase cover (2) are not cracked, do not have damaged threads, and are not damaged in any other way.
2. Measure bores for bushing (3) and bearings (4 and 5) in gearcase (1). Check wear limits. Refer to table 17-5.
3. Measure bore for bushing (6) in gearcase and cover (2). Check wear limits. Refer to table 17-5.
4. Check that brake drum (7) has no rough surfaces and is not scored or cracked.
5. Check that brake band assembly (8) is not worn or oil soaked.
6. Check that spring (9) is not cracked, broken or damaged in any other way.
7. Check that seal (10) is not cracked, burned, too stiff or damaged in any other way.

END OF TASK

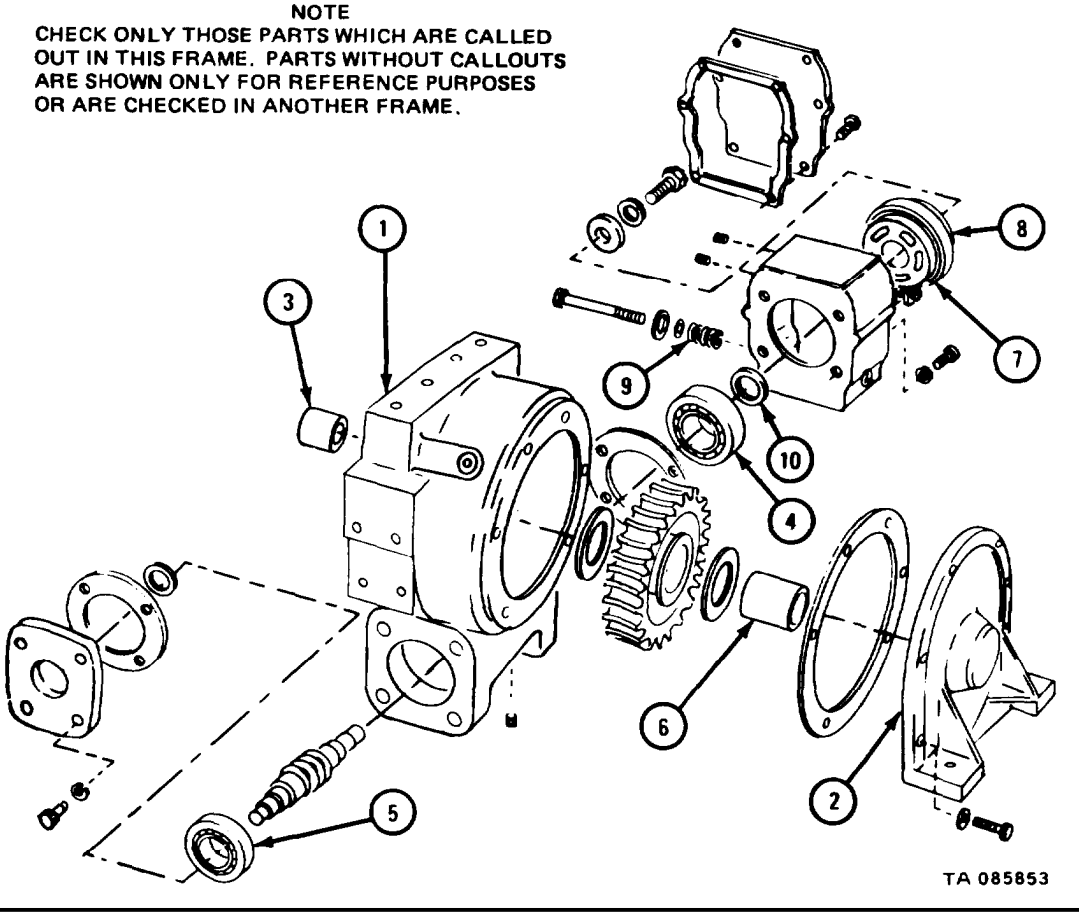


Table 17-3. Drum Shaft Bushing, End Frame Bushing, Sleeve and Drum Shaft Wear Limits

Index Number	Item /Point of Measurement	Wear Limits (inches)
2	Drum shaft bushing inside diameter	3.020 max
2	Drum shaft bushing outside diameter	0.020 min
3	End frame bushing sleeve inside diameter	3.250 to 3.251
7	Drum shaft outside diameter	2.983 min

Table 17-4. Drive Worm Bearing, Drum Shaft Bushing, and Drive Worm Gear Wear Limits

Index Number	Item /Point of Measurement	Wear Limit (inches)
1	Drive worm bearing inside diameter	2.3616 to 2.3622
1	Drive worm bearing outside diameter	5.1173 to 5.1181
2	Drum shaft bushing inside diameter	3.020 max
2	Drum shaft bushing outside diameter	0.020 min
4	Drive worm gear outside diameter	5.1173 to 5.1181

Table 17-5. Gearcase Bores and Gearcase Cover Bore Wear Limits

Index Number	Item /Point of Measurement	Wear Limits (inches)
1	Gearcase bore for bushing (3) (outside diameter)	3.1491 to 3.1496
1	Gearcase bore for bearing (4) (outside diameter)	3.1491 to 3.1496
1	Gearcase bore for bearing (5) (outside diameter)	3.1491 to 3.1496
2	Gearcase cover bore for bushing (6) (outside diameter)	3.1491 to 3.1496

e. Repair.

(1) Using fine mill file, file small nicks and burrs from machined surfaces, especially oil seal contact surfaces.

(2) Get new parts in place of all other damaged parts.

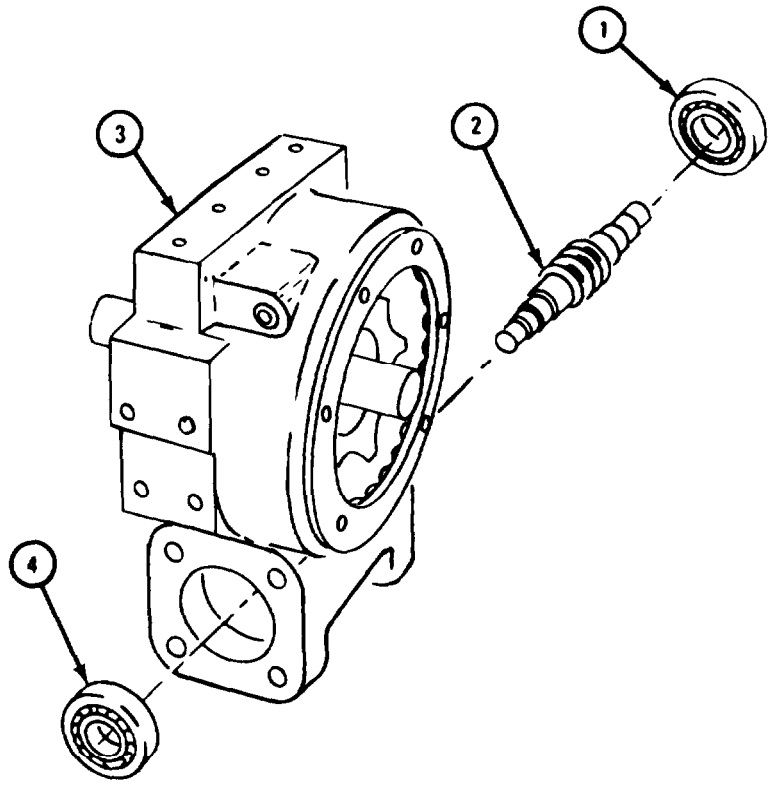
f. Assembly.

(1) Assembly of winch assembly.

FRAME 1

Soldiers A and B	1.	Press bearing (1) on keyway end of worm gear (2). Refer to Part 1, para 7-7.
Soldier A	2.	Put worm gear (2) with bearing (1) into bore of gearcase (3). Do not seat bearing.
	3.	Using brass hammer, tap bearing (4) onto worm gear (2).

GO TO FRAME 2



TA 085854

FRAME 2

NOTE

If bushing (1) was taken out of gearcase (2), do step 1. If bushing was not taken out, go to step 2.

1. Using brass punch and hammer, put bushing (1) into gearcase (2).
2. Using brass hammer, put in two keys (3).

CAUTION

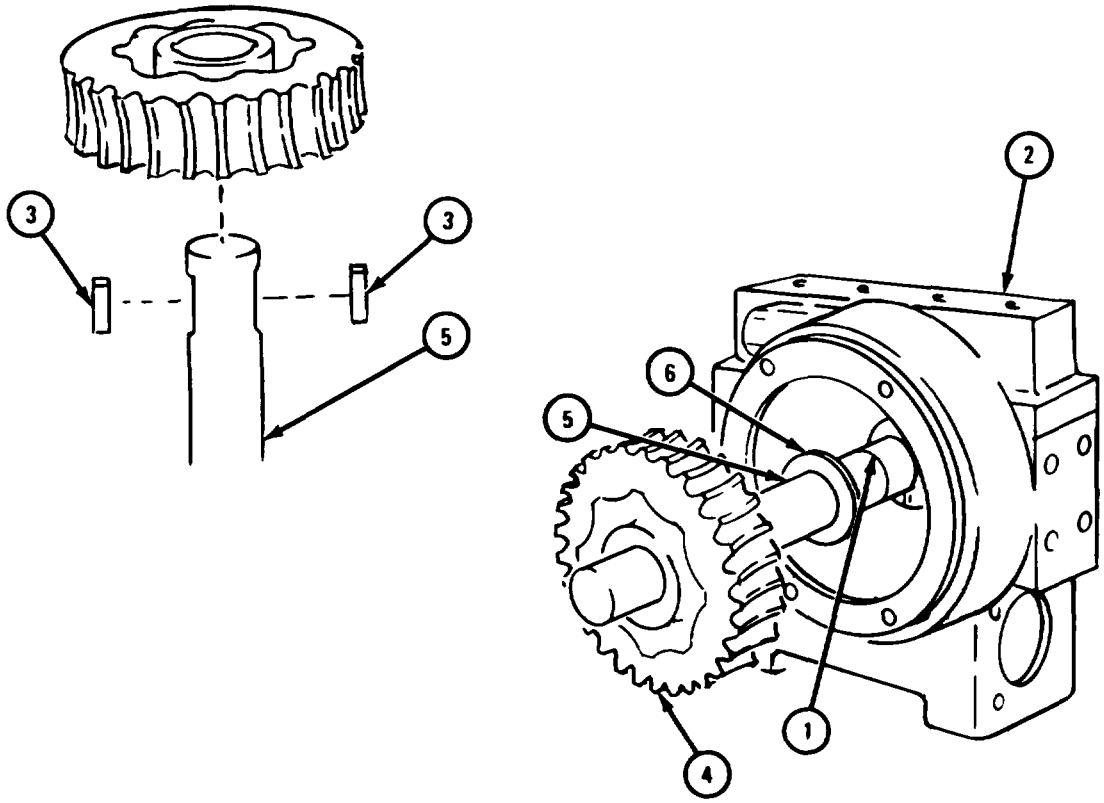
Be sure that gear (4) rests on hub when pressing in shaft (5). If gear rests on teeth, they may break.

Soldiers A and B 3. Press shaft (5) into gear (4).

Soldier A 4. Put on washer (6).

Soldiers A and B 5. Put shaft (5) with gear (4) into bore in gearcase (2).

GO TO FRAME 3



TA 085855

FRAME 3

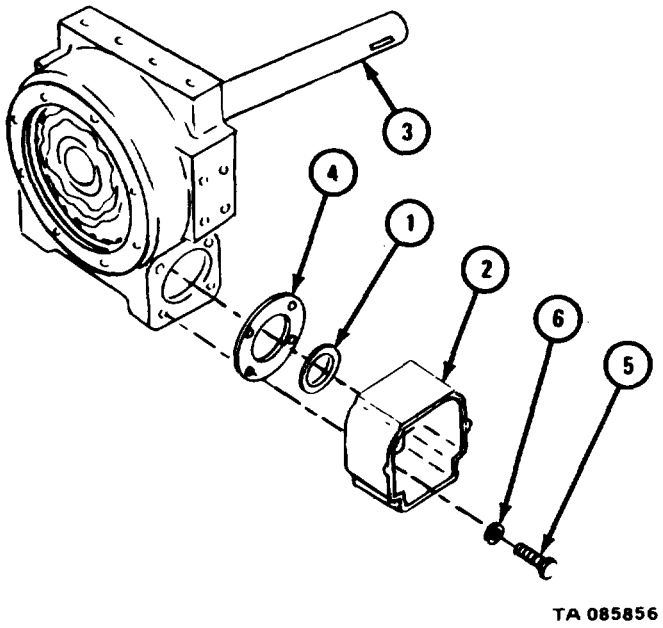
Soldier A 1. Press seal (1) into brake case (2).

Soldier B 2. Hold shaft (3).

3. Put on brake case (2) and gasket (4) and aline screw holes.

4. Put in four screws (5) and lockwashers (6).

GO TO FRAME 4



TA 085856

FRAME 4

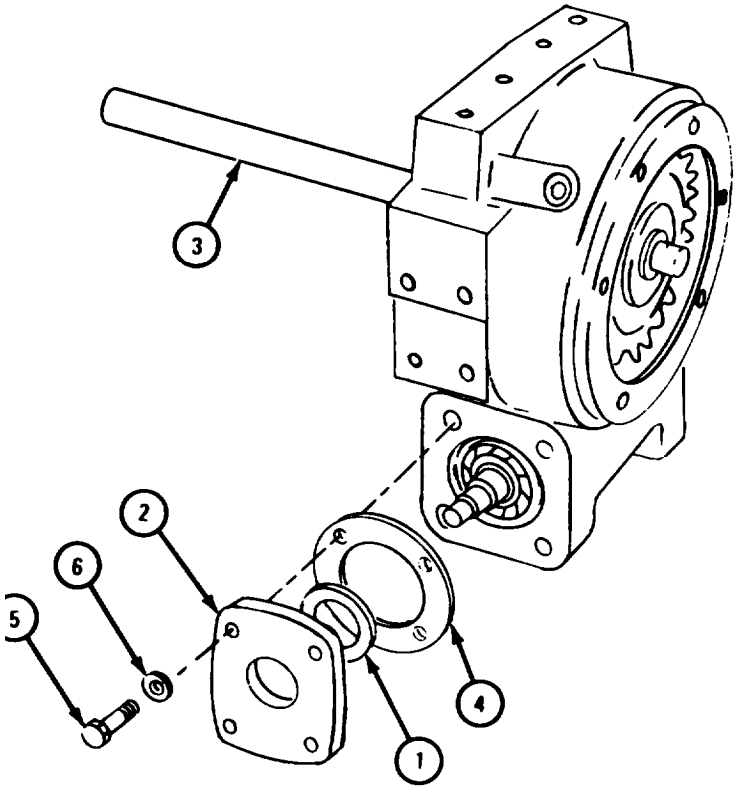
Soldier A 1. Press seal (1) into worm gearcase cap (2).

2. Hold shaft (3).

Soldier B 3. Put on worm gearcase cap (2) and gasket (4) and aline screwholes.

4. Put in four screws (5) and lockwashers (6).

GO TO FRAME 5



FRAME 5

Soldier A 1. Hold shaft (1).

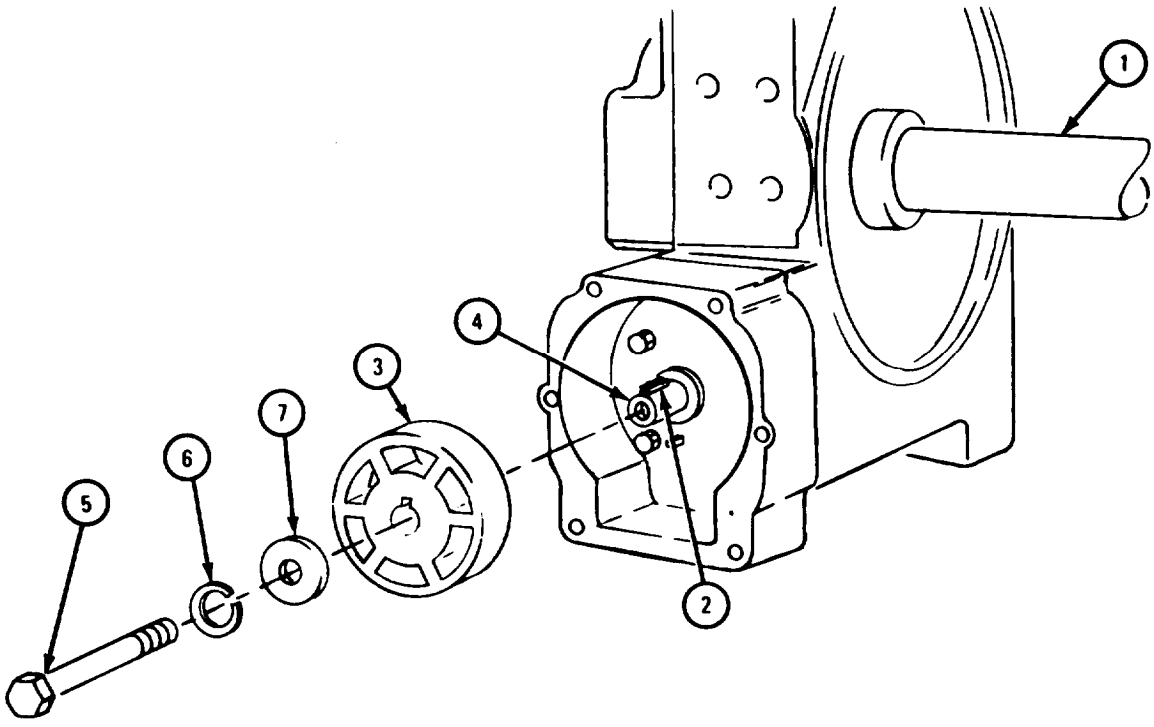
Soldier B 2. Tap in key (2).

3. Aline keyway in brake drum disk (3) with key (2).

4. Using brass hammer, tap brake drum disk (3) onto worm gear (4) and key (2).

5. Put in screw (5), lockwasher (6), and flat washer (7).

GO TO FRAME 6

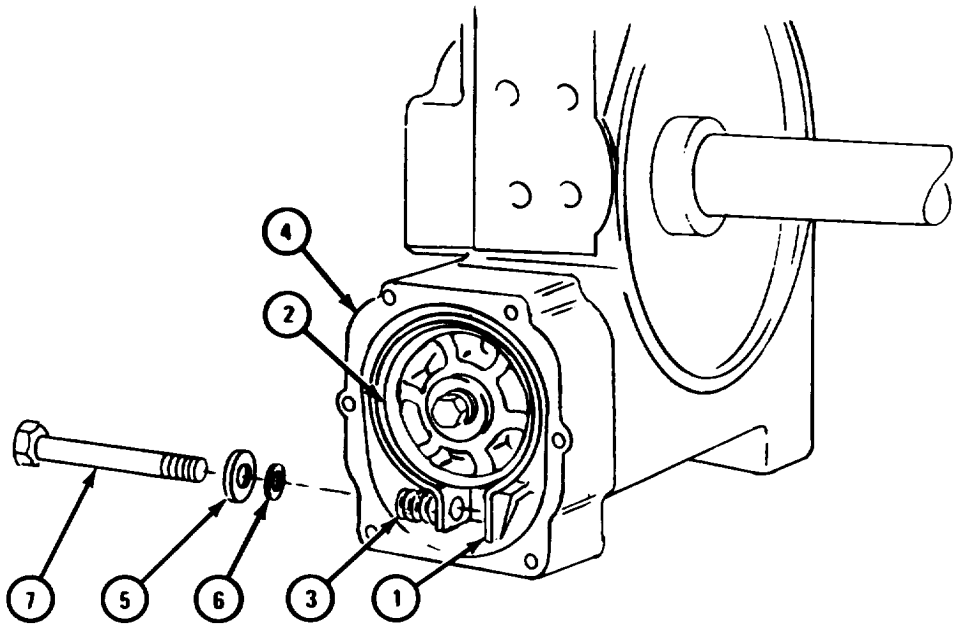


TA 085858

FRAME 6

1. Put brake band assembly (1) on brake drum (2).
2. Put spring (3) between brake band assembly (1) and brake case (4).
3. Put flat washer (5) and gasket (6) on screw (7) and put screw through holes in brake case (4), spring (3), and brake band assembly (1).
4. Turn in screw (7) partway.

GO TO FRAME 7

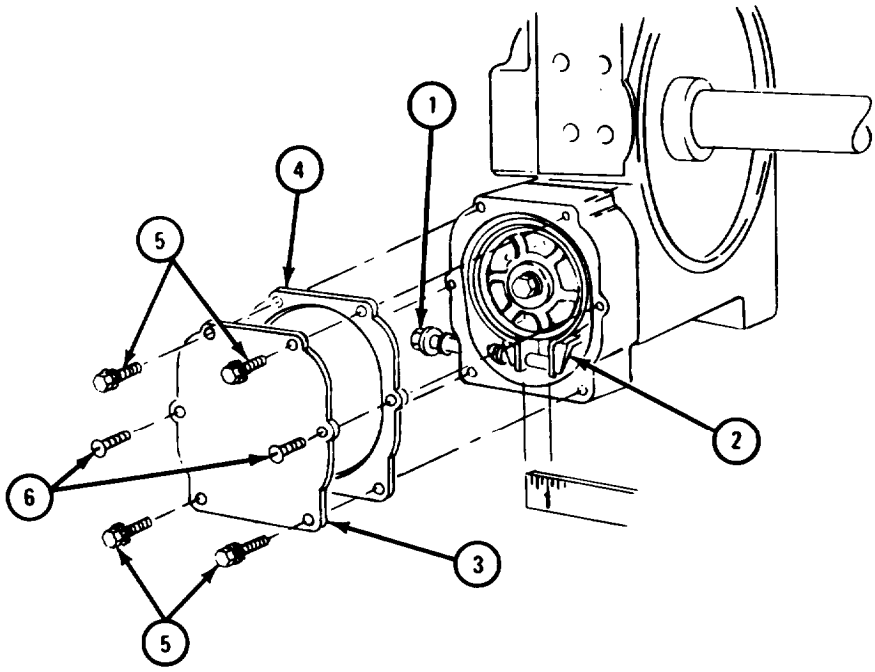


TA 085859

FRAME 7

1. Turn screw (1) until gap in brake band assembly (2) is between 3/16 inch and 1/4 inch as shown.
2. Put on brake cover (3) and gasket (4) and aline screw holes.
3. Put in four screws (5).
4. Put in two screws (6).

GO TO FRAME 8



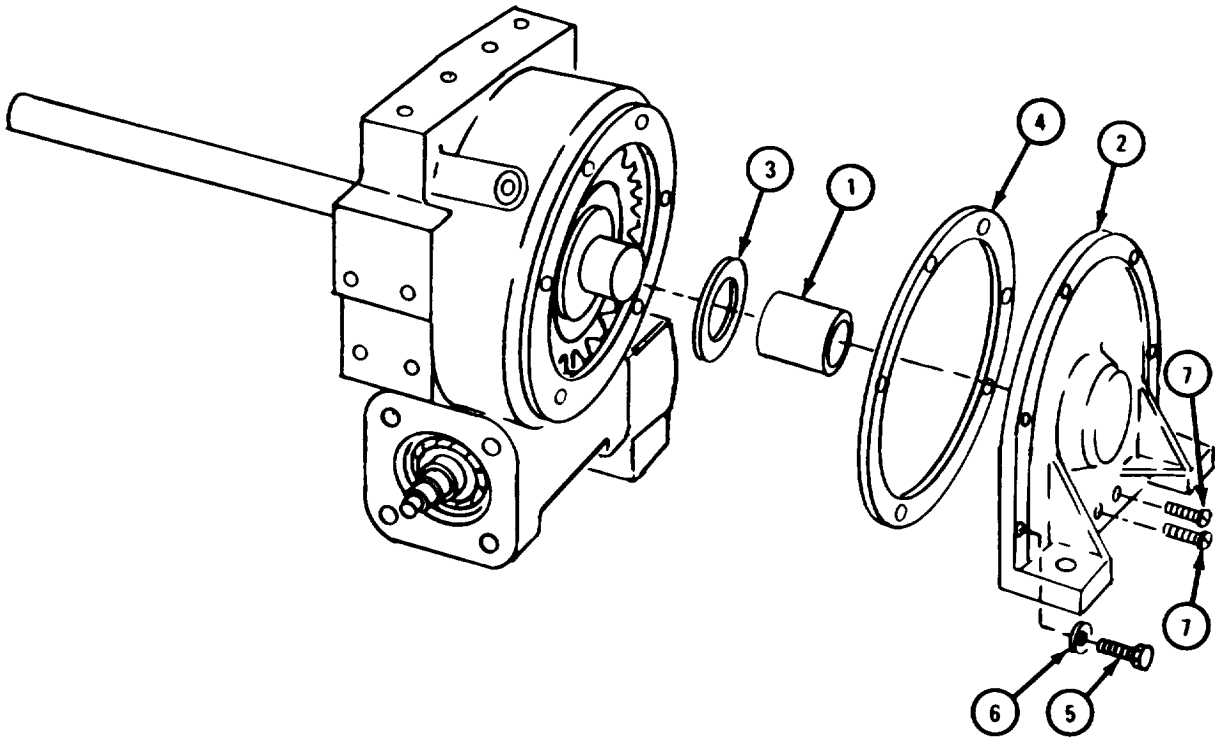
TA 085860

FRAME 8

Soldier A 1. If bushing (1) was taken out, press bushing (1) into gearcase cover (2).
2. Put on washer (3).
3. Put on gearcase cover (2) and gasket (4) and aline screw holes.

Soldier B 4. Put in six screws (5) and Iockwashers (6).
5. Put in two screws (7).

GO TO FRAME 9



TA 085861

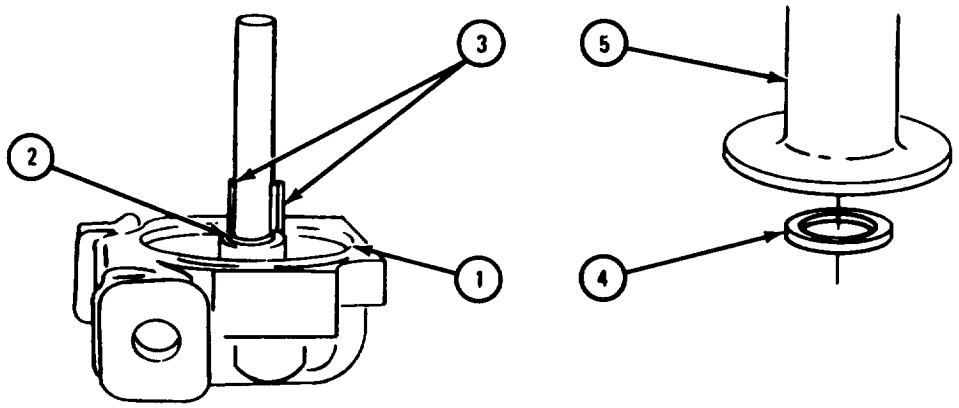
FRAME 9

Soldiers A and B 1. Rest gearcase (1) on end. Put on washer (2).

Soldier A 2. Tap in two keys (3).

3. Put seal (4) in drum (5).

GO TO FRAME 10



TA 085862

FRAME 10

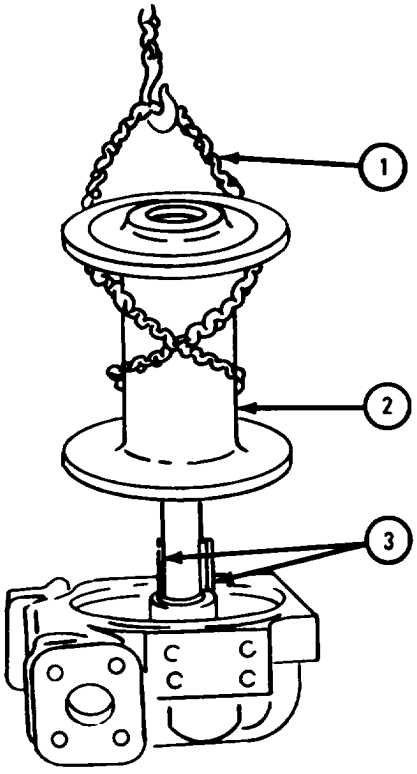
Soldiers A and B

1. Put chains (1) on drum (2) as shown.
2. Using hoist, put on drum (2). Be sure two keyways on inside of drum are lined up with two keys (3).
3. Take off hoist chains.

Soldier A

4. Using wood block and hammer, seat drum (2).

GO TO FRAME 11



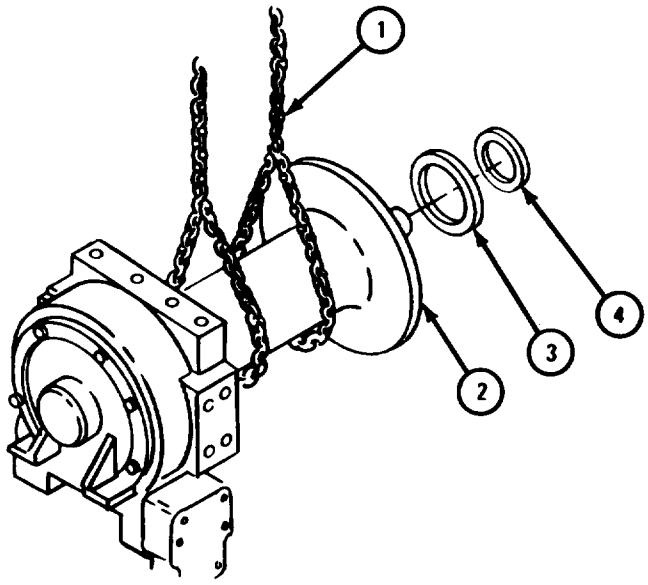
TA 085863

FRAME 11

Soldiers A and B
1. Put hoist chains (1) on drum (2) as shown.
2. Using hoist, raise drum (2).

Soldier A
3. Put on seal (3).
4. Put on washer (4).

GO TO FRAME 12

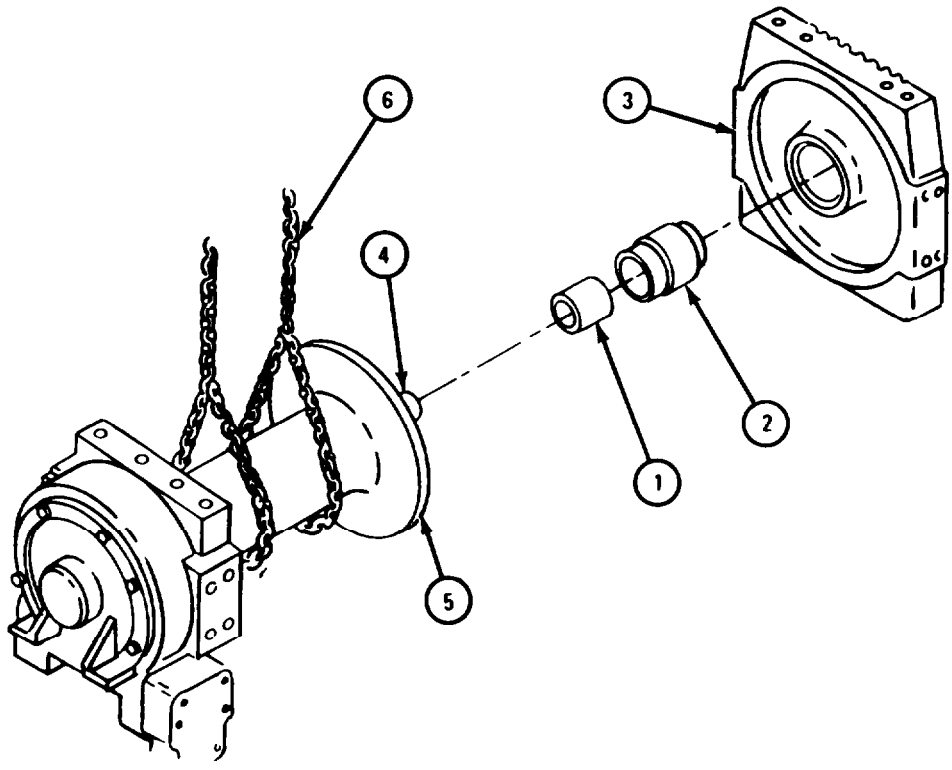


TA 085864

FRAME 12

	1.	Drive bushing (1) into sleeve (2).
Soldiers A and B	2.	Press sleeve (2) into end frame (3).
	3.	Put end frame (3) onto shaft (4).
Soldier A	4.	Seat end frame (3).
Soldiers A and B	5.	Using hoist, lower drum (5)
	6.	Take off chains (6).

GO TO FRAME 13



TA 085865

FRAME 13

Soldier A 1. Hold channel (1) in place and aline screw holes.

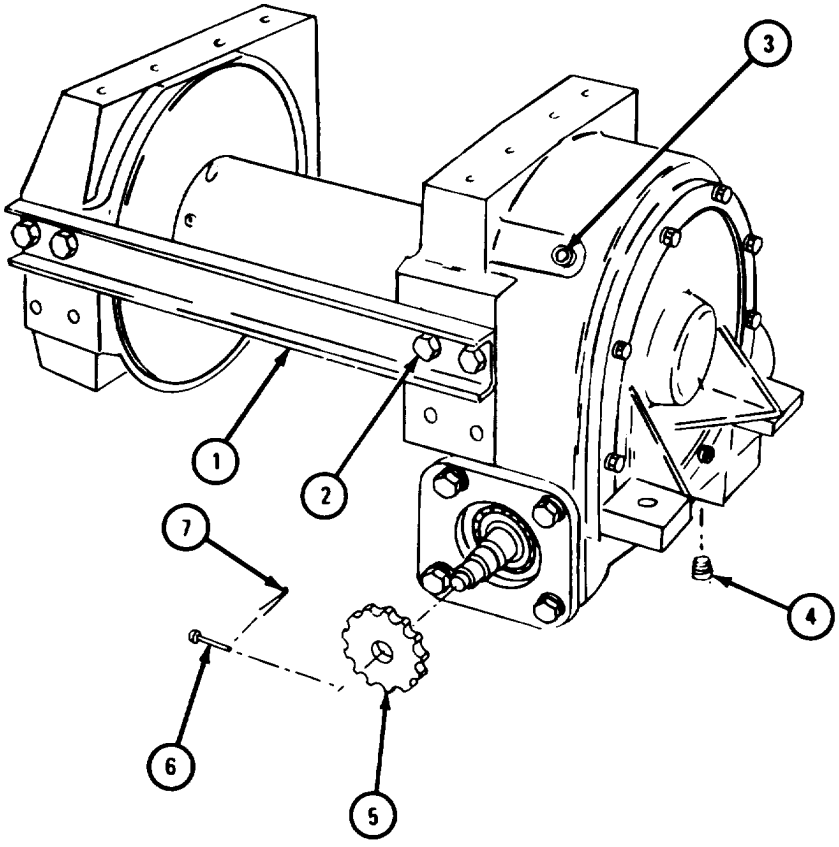
Soldier B 2. Put in four screws with lockwashers (2).

3. Put in two plugs (3).

4. Put in plug (4).

5. Put on sprocket (5). Put in spear pin (6). Put in cotter pin (7).

END OF TASK



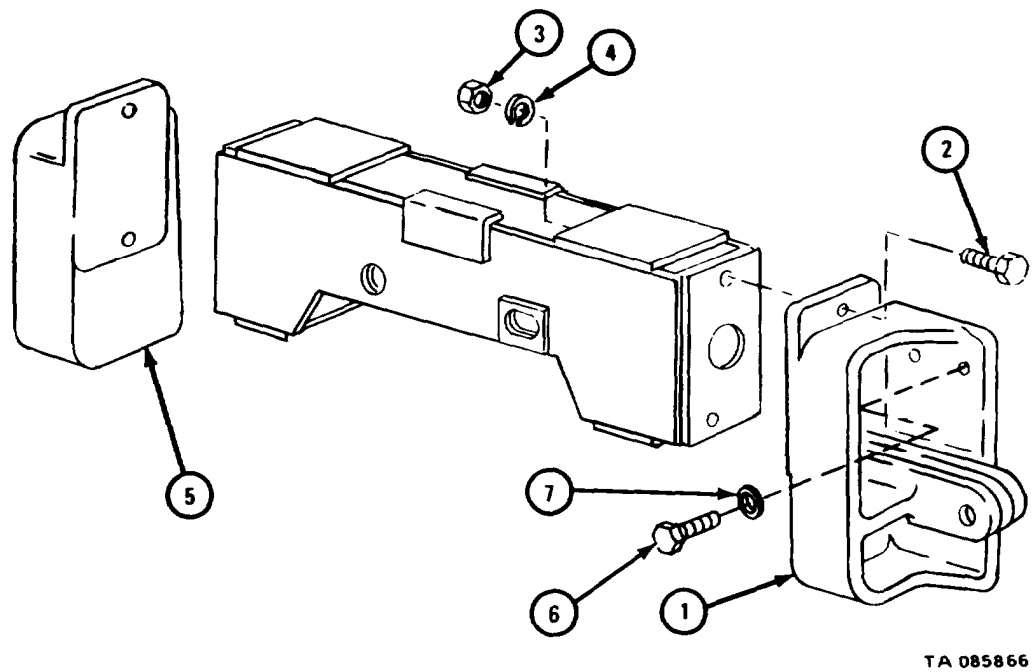
TA 088754

(2) Assembly of tensioner assembly.

FRAME 1

1. Put tensioner bracket (1) in place and aline screw holes.
2. Put in two screws (2), nuts(3), and washers (4).
3. Do steps 1 and 2 again on tensioner bracket (5).
4. Put two screws (6) and lockwasher (7) into tensioner bracket (1).

GO TO FRAME 2



FRAME 2

Soldier A 1. Put sheave frame (1) in place in tensioner frame (2).

2. Put bearing assembly (3) into tensioner sheave assembly (4). Refer to Part 1, para 7-7.

3. Put on two washer assemblies (5).

4. Hold two washers (6) in place.

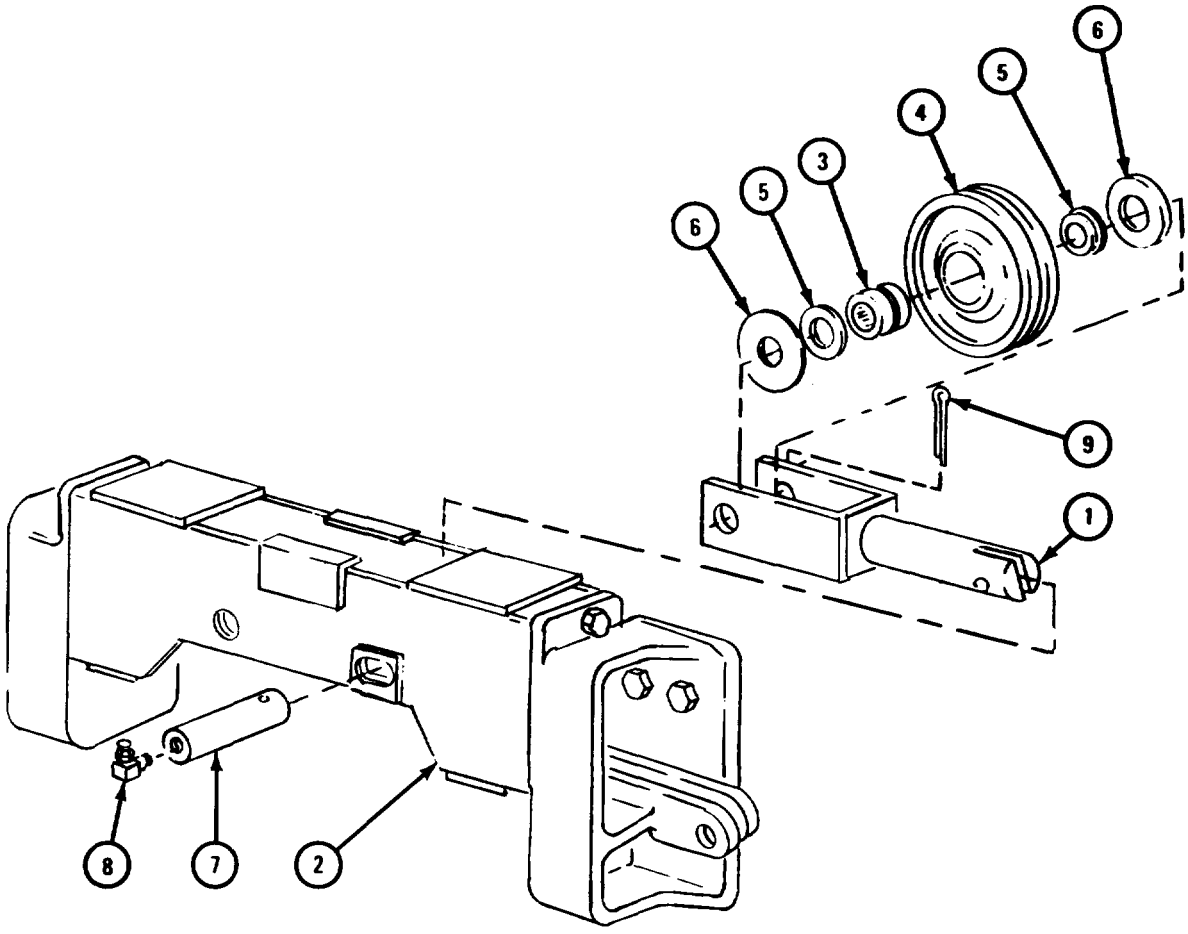
5. Put tensioner sheave assembly (4) into sheave frame (1).

Soldier B 6. Put in and hold sheave pin (7).

Soldier A 7. Put in lubrication fitting assembly (8).

8. Put in cotter pin (9).

GO TO FRAME 3



TA 085867

FRAME 3

Soldier A 1. Put bearing assembly (1) into tensioner sheave (2). Refer to Part 1, para 7-7.

2. Put two washer assemblies (3) on tensioner sheave (2).

3. Hold two washers (4) in place against washer assemblies (3).

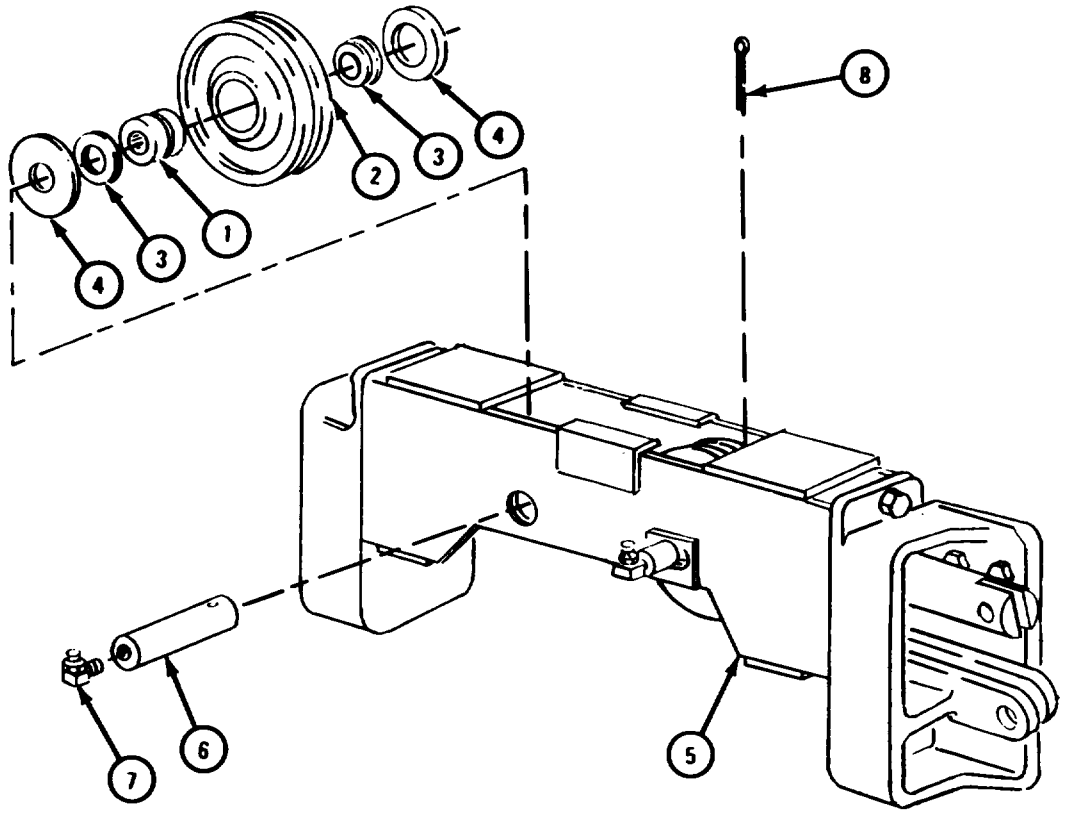
4. Put tensioner sheave assembly (4) into tensioner frame (5) and hold it.

Soldier B 5. Put in sheave pin (6) and hold it.

Soldier A 6. Put in lubrication fitting assembly (7).

7. Put in cotter pin (8).

GO TO FRAME 4

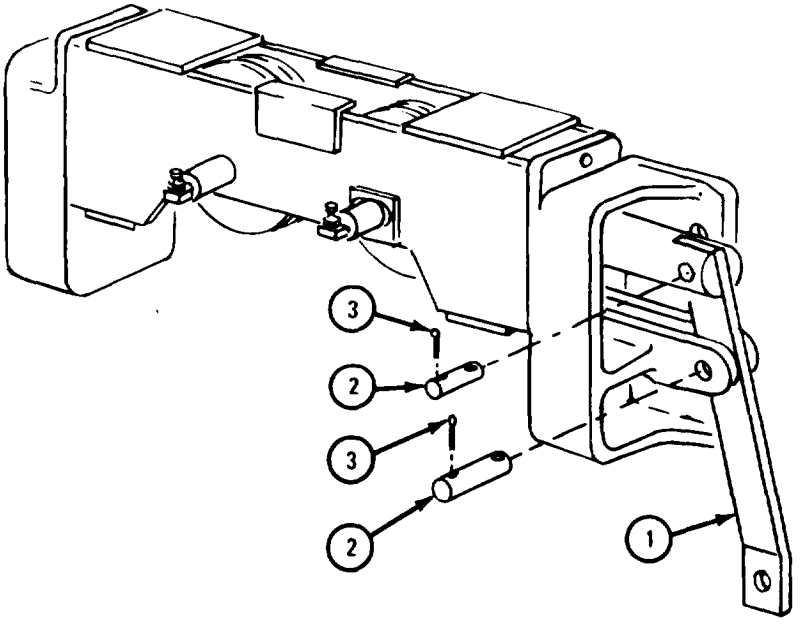


TA 085868

FRAME 4

1. Put lever(l) in place and aline holes.
2. Put in two pins (2).
3. Put in four cotter pins (3).

GO TO FRAME 5



TA 085869

FRAME 5

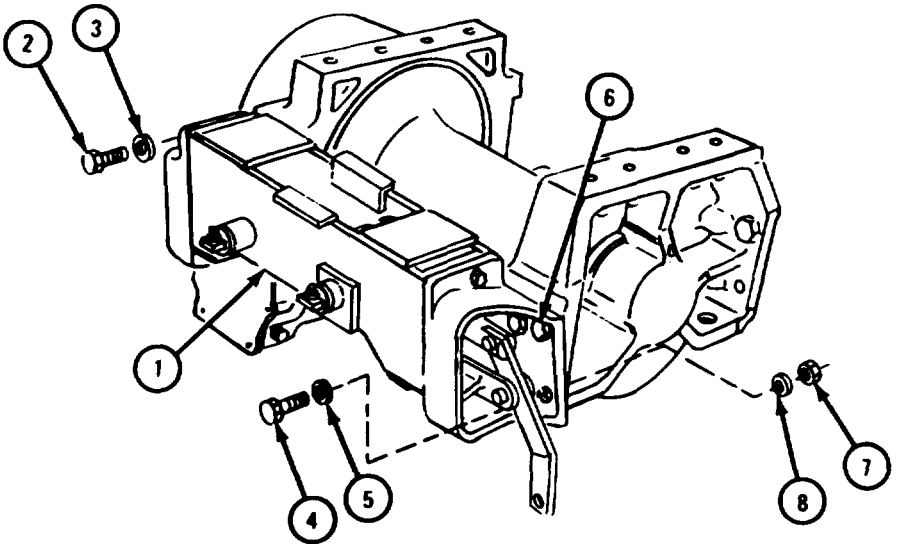
Soldier A 1. Hold tensioner assembly (1) in place and aline screw holes.

Soldier B 2. Put in four screws (2) and lockwashers (3).

3. Put in two screws (4) and lockwashers (5).

4. Hold two screws (6) and put on two nuts (7) and lockwashers (8).

END OF TASK



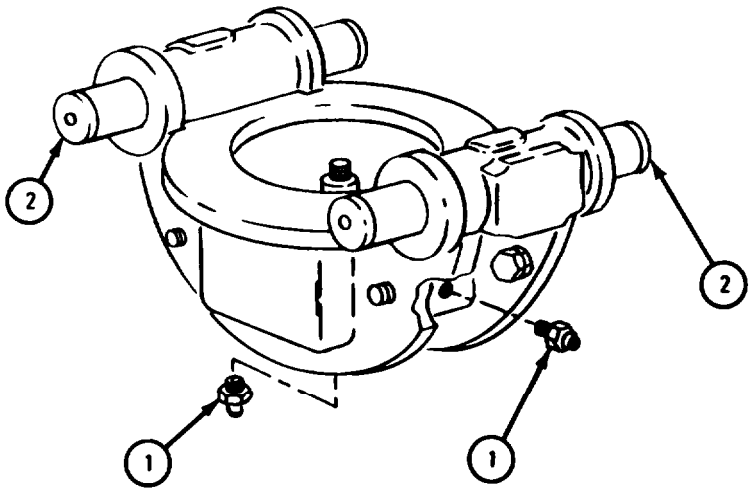
TA 085870

(3) Assembly of level wind assembly.

FRAME 1

1. Put in two lubrication fittings (1).
2. Put in two trolley axles (2).

GO TO FRAME 2



TA 085871

FRAME 2

Soldier A 1. Hold trolley frame (1).

Soldier B 2. Put on washer (2).

3. Put felt washer (3), wheel bearing (4), and felt washer (5) in trolley wheel (6).

4. Put trolley wheel (6) on axle (7).

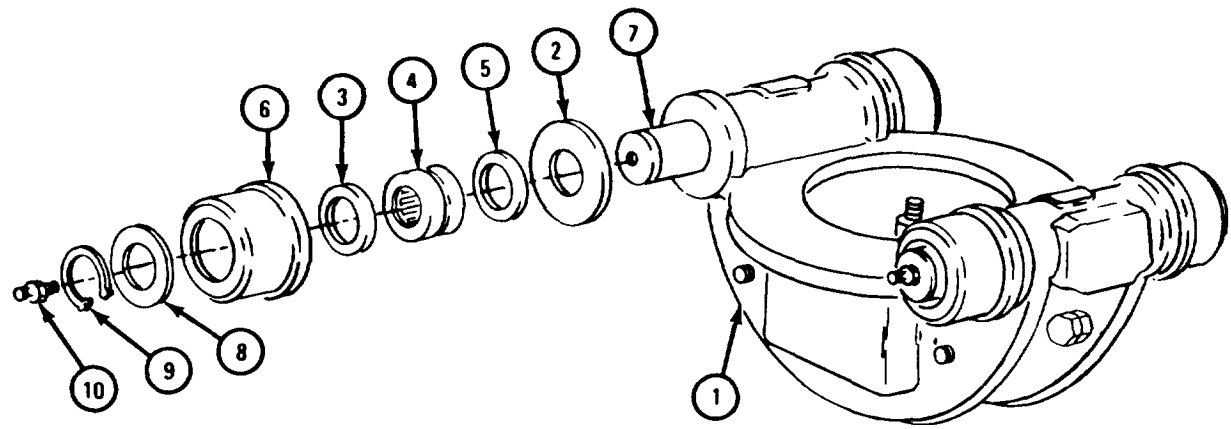
5. Put on washer (8).

6. Put on snap ring (9).

7. Put in lubrication fitting (10).

8. Do steps 1 through 7 again to put on other three trolley wheels (6).

GO TO FRAME 3

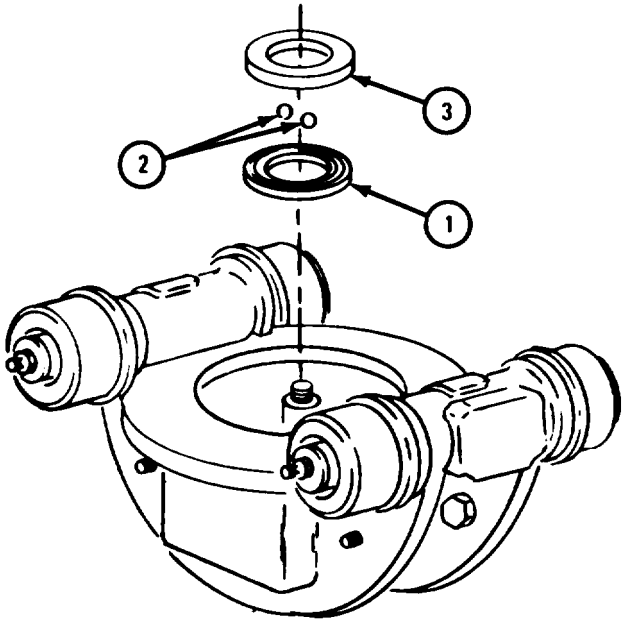


TA 085872

FRAME 3

1. Put on outer race (1).
2. Put 45 balls (2) in outer race (1).
3. Put on inner race (3).

GO TO FRAME 4

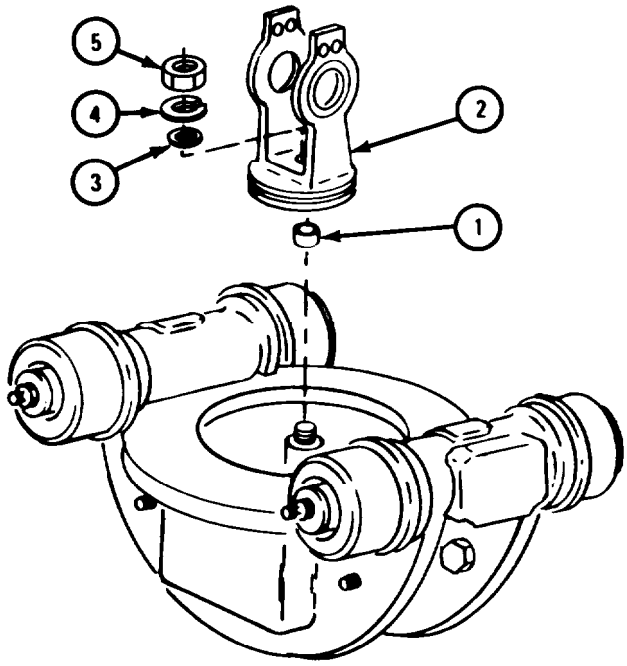


TA 085873

FRAME 4

1. Put on shaft bearing (1).
2. Put on trolley swivel frame (2), felt washer (3), and lockwasher (4).
3. Put on nut (5).

GO TO FRAME 5



TA 085874

FRAME 5

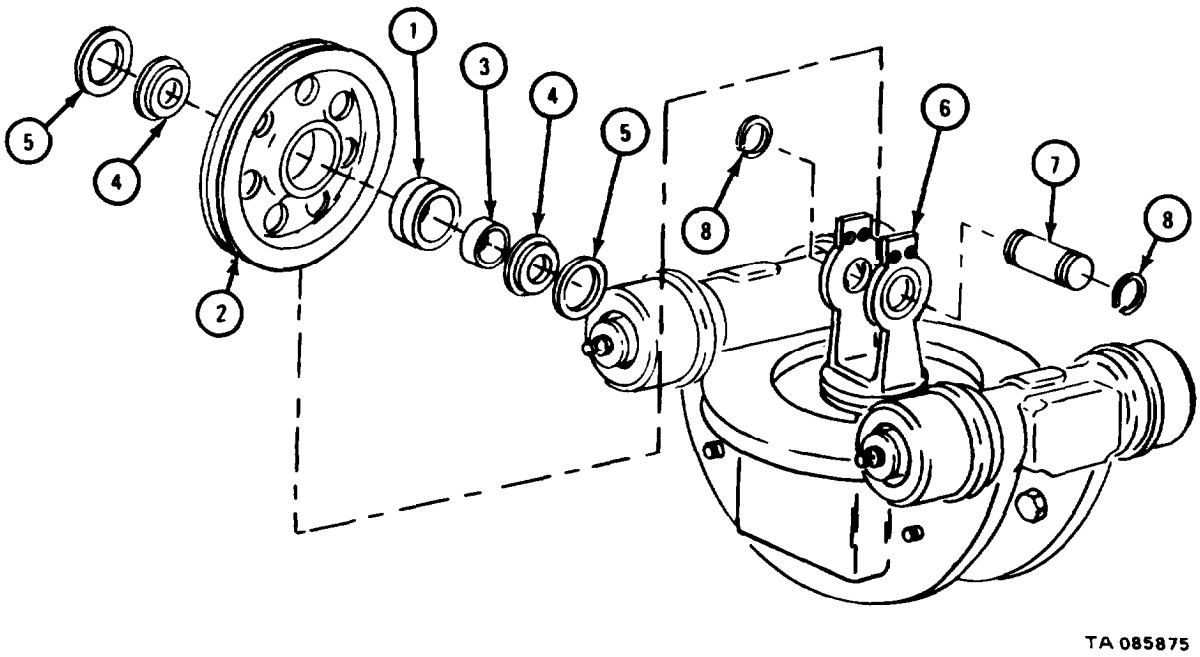
Soldier A 1. Put shaft bearing (1) into swivel sheave (2). Refer to Part 1, para 7-7.

2. Put swivel sheave (2), sleeve (3), two spacers (4), and two washers (5) in place in trolley swivel frame (6) and hold them.

Soldier B 3. Put in swivel sheave shaft (7).

4. Put on two snap rings (8).

GO TO FRAME 6

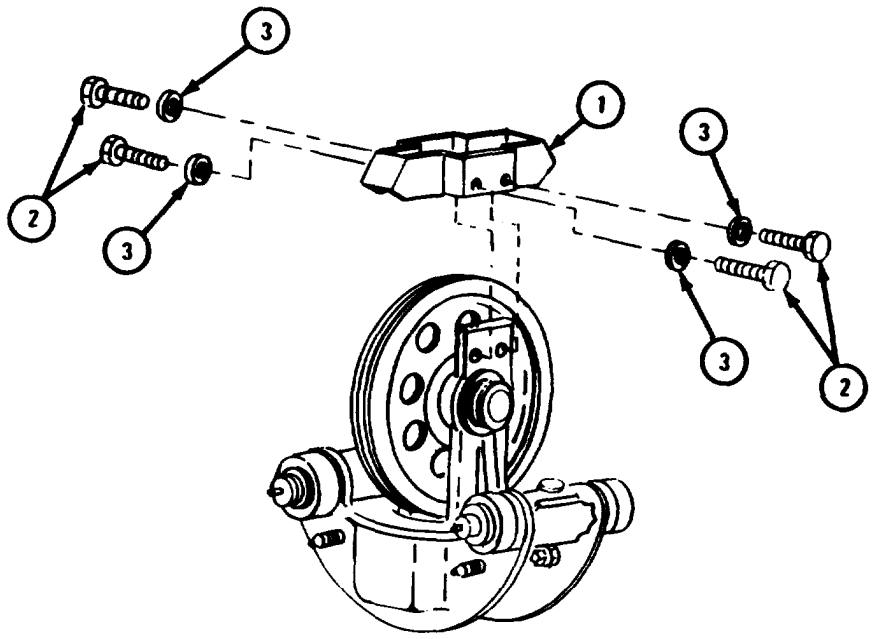


TA 085875

FRAME 6

1. Put on cable guard (1).
2. Put in four screws (2) and lockwashers (3).

GO TO FRAME 7

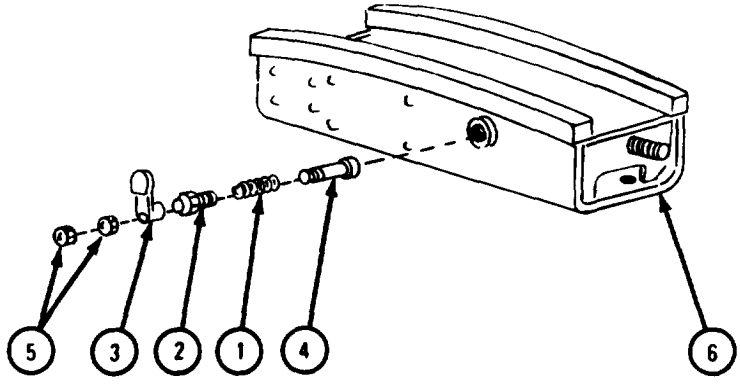


TA 085876

FRAME 7

1. Put spring (1), nut (2), and latch (3) on poppet (4).
2. Put on two nuts (5).
3. Put poppet (4) in trolley track (6).
4. Put in nut (2).

GO TO FRAME 8



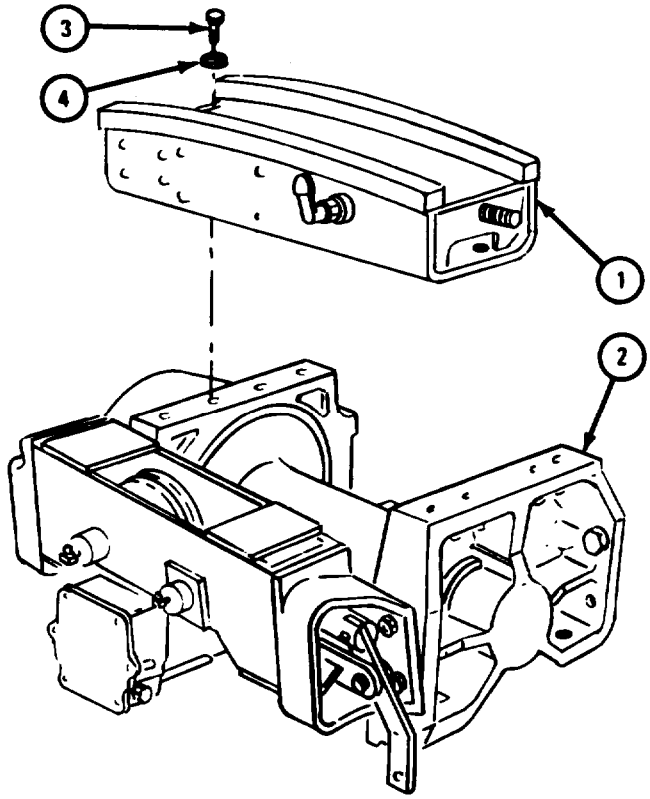
TA 088755

FRAME 8

Soldiers A and B 1. Put trolley track (1) on winch (2) and aline screw holes.

Soldier A 2. Put in four screws (3) and lockwashers (4).

GO TO FRAME 9



TA 088756

FRAME 9

Soldiers A and B 1. Put trolley frame assembly (1) on trolley track (2) and aline screw holes

Soldier A 2. Put in four screws (3) until they stick out under lips of trolley track (2) but do not touch sides of trolley track.

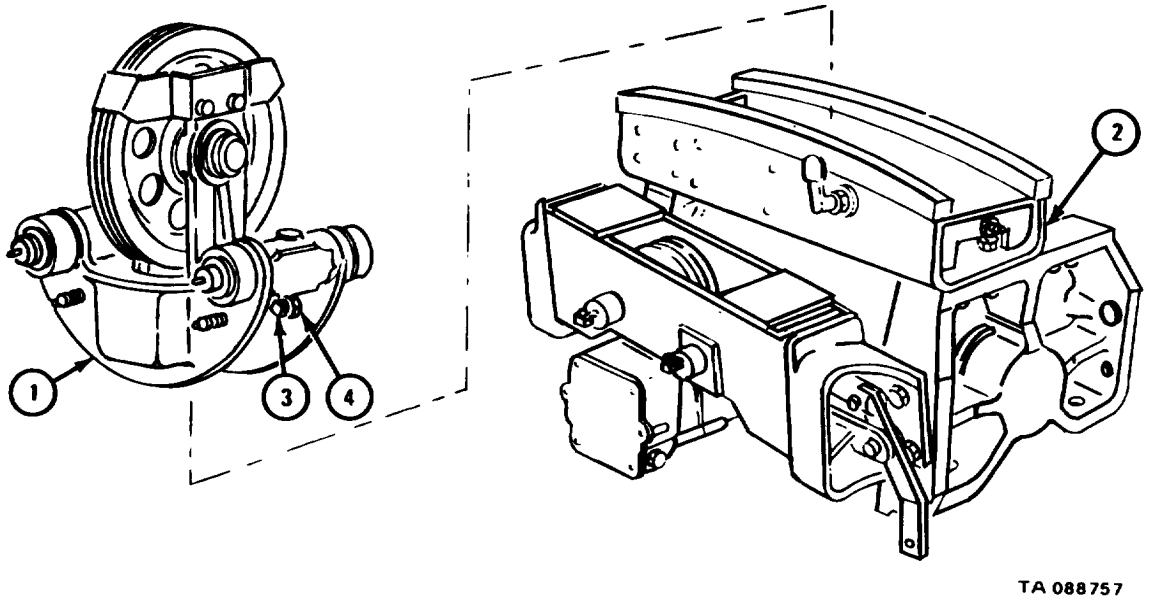
3. Tighten four nuts (4) against sides of trolley frame assembly (1).

NOTE

Follow-on Maintenance Action Required:

1. Replace winch assembly. Refer to TM 9-2320-211-20.
2. Oil and grease winch assembly. Refer to LO 9-2320-211-12.
3. Replace winch cable and chain and hook assembly. Refer to TM 9-2320-211-20.
4. Check winch assembly for proper operation. Refer to TM 9-2320-211-10.

END OF TASK



TA 088757

17-17. HOIST WINCH MOTOR ASSEMBLY REMOVAL, REPAIR, AND REPLACEMENT (TRUCK M543A2).

TOOLS: No special tools required

SUPPLIES: Hoist winch motor gasket
Front cover seal adapter preformed packing (2).
Rear cover seal adapter preformed packing (2)
Drive gear shaft retaining ring (2)
Driven gear shaft retaining ring (2)
Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-880
Lubricating oil, ICE, OE/HDO-10, MIL-L-2104
Wood block
Caps

PERSONNEL: Two

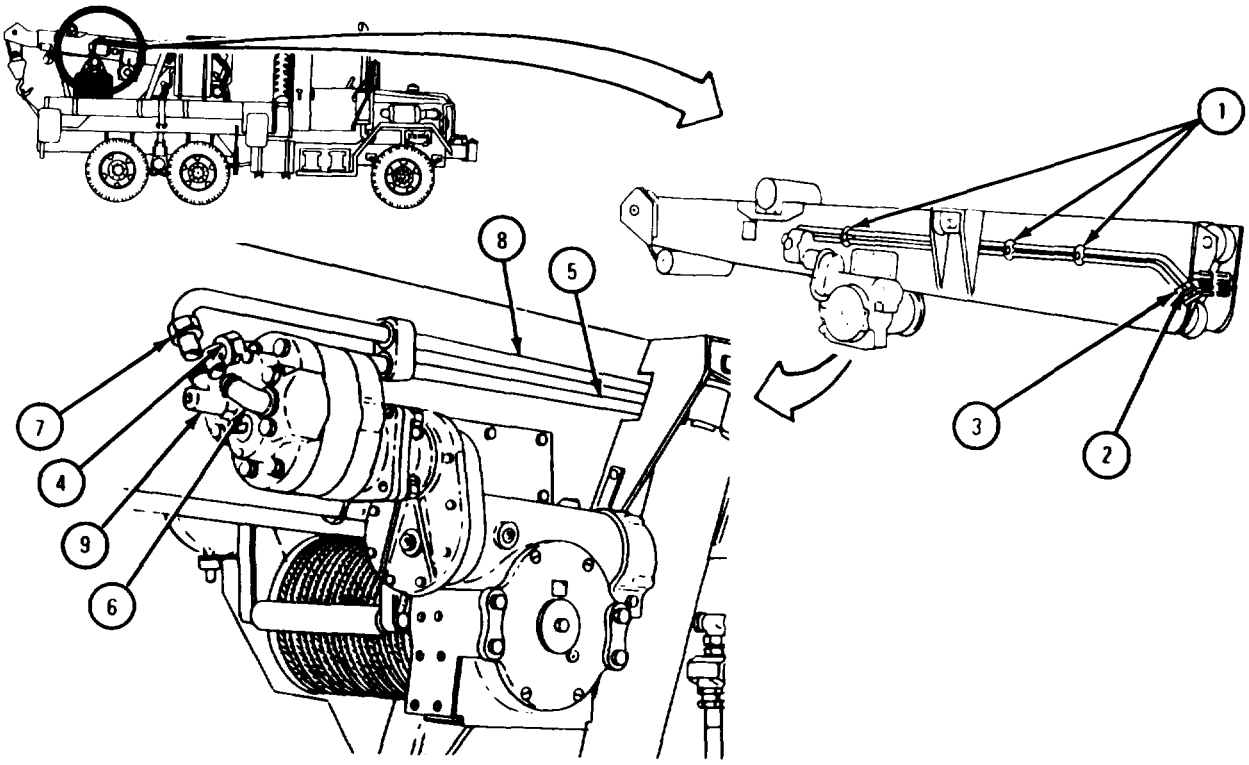
EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Removal.

FRAME 1

1. Loosen three nuts (1).
2. Take off nut (2) and clamp (3).
3. Takeoff nut (4). Move tube assembly (5) away from elbow (6).
4. Take off nut (7). Move tube assembly (8) away from elbow (9).
5. Cap open elbows (6 and 9) and tubes (5 and 8).

GO TO FRAME 2



TA 085710

FRAME 2

WARNING

The hoist winch motor assembly (1) is heavy. Be careful to keep tension on rope sling when screws (2) are taken out so that hoist winch motor assembly does not slip or fall. If motor assembly slips or falls, it can cause serious injury to personnel and damage to equipment.

Soldier A 1. Put rope sling on hoist winch motor assembly (1) and hook up hoist as shown. Tell soldier B when ready.

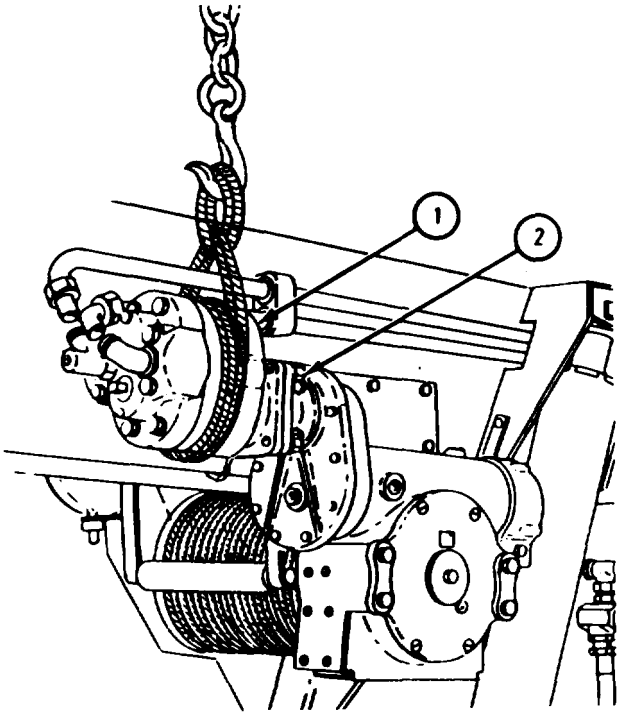
Soldier B 2. Using hoist, take slack out of rope sling.

Soldier A 3. Take out four capscrews with lockwashers (2).

4. Pull off hoist winch motor assembly (1). Guide motor assembly while soldier B moves it.

Soldier B 5. Move hoist winch motor assembly (1) to workbench.

END OF TASK



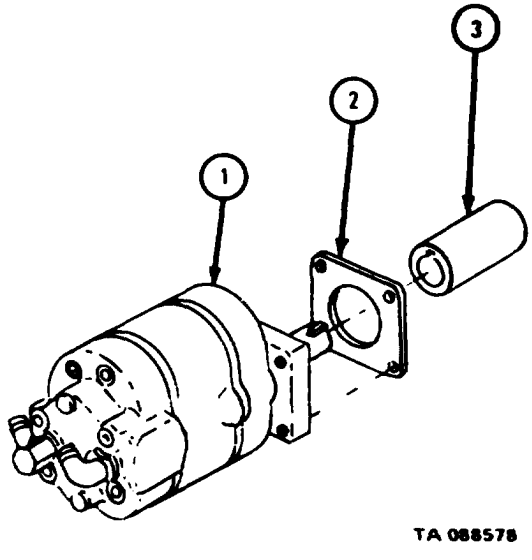
TA 085711

b. Disassembly.

FRAME 1

1. Take rope sling off hoist and hoist winch motor assembly (1).
2. Take off and throw away gasket (2).
3. Take off coupling (3).

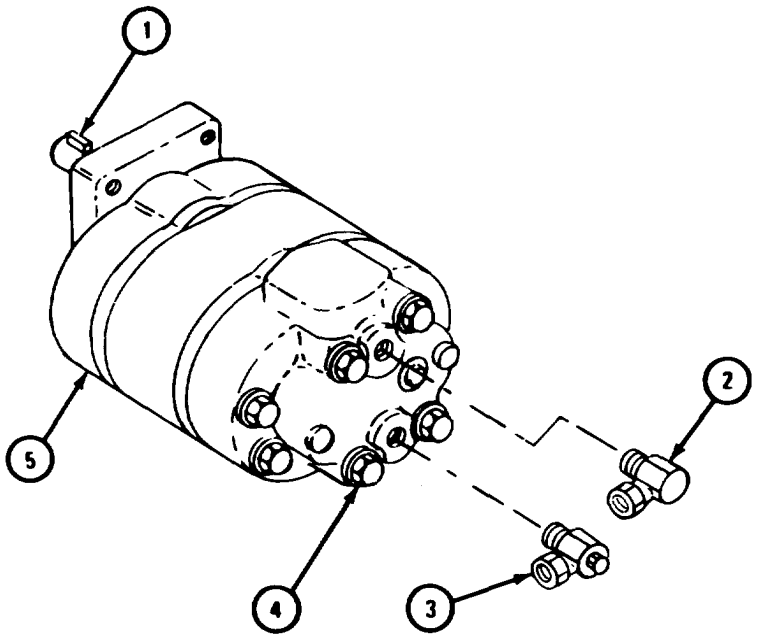
GO TO FRAME 2



FRAME 2

1. Knock out key (1).
2. Take out union assembly (2) and union with plug (3).
3. Take out eight screws and washers (4).
4. Using wood block, loosen front cover assembly (5) by tapping on top, bottom, and sides. When loose, pull off front cover assembly.

GO TO FRAME 3

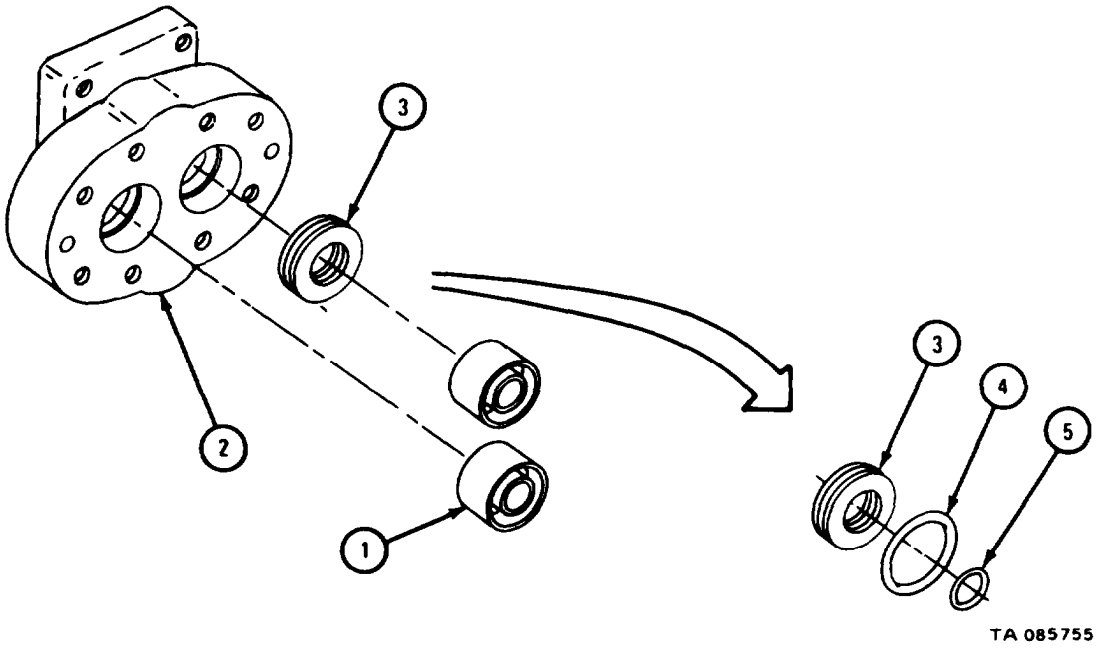


TA 085754

FRAME 3

1. Take out two bearings (1) from front cover (2). Refer to Part 1, para 7-7.
2. Tag bearings (1) to make sure they will be put back in the same places.
3. Take out seal adapter (3) with preformed packings (4 and 5).
4. Take off preformed packings (4 and 5) from seal adapter (3). Throw away preformed packings.

GO TO FRAME 4

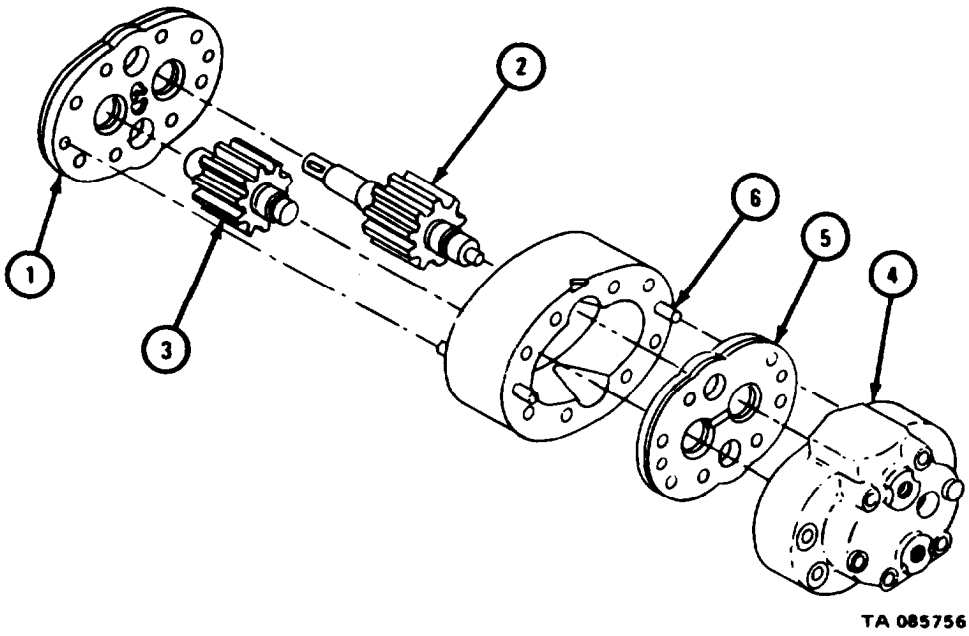


TA 085755

FRAME 4

1. Using wood block, loosen wear plate (1) by tapping on top, bottom, and sides. When loose, pull off wear plate.
2. Take out driven gear shaft assembly (2) and drive gear shaft assembly (3).
3. Using wood block, loosen rear cover assembly (4) and wear plate (5) by tapping on top, bottom and sides. When loose, pull off rear cover assembly and wear plate.
4. Take out four locating pins (6).

GO TO FRAME 5

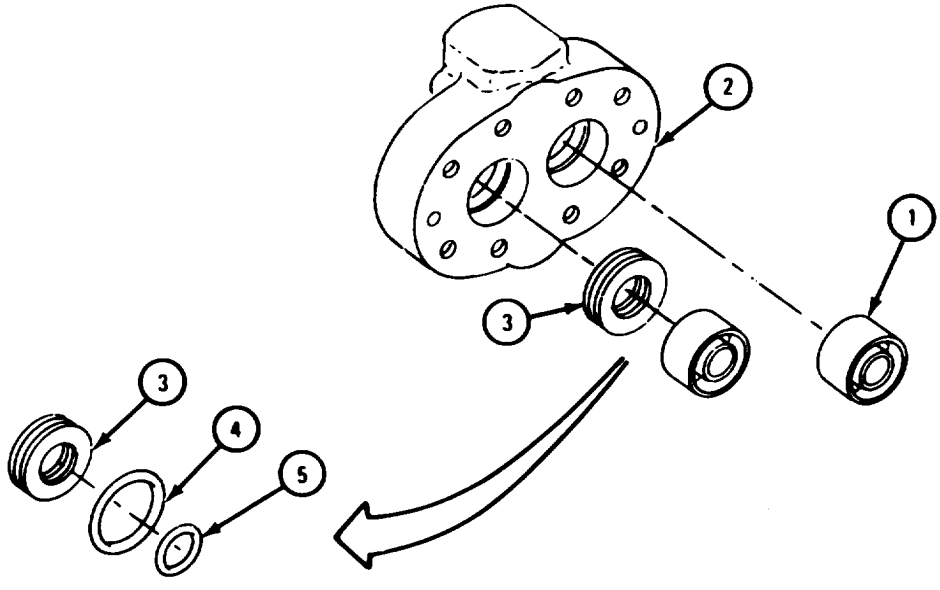


TA 085756

FRAME 5

1. Take out two bearings (1) from rear cover (2). Refer to Part 1, para 7-7.
2. Tag bearings (1) to make sure that they will be put back in the same places.
3. Take out seal adapter (3) with preformed packings (4 and 5).
4. Take off preformed packings (4 and 5) from seal adapter (3). Throw away preformed packings.

GO TO FRAME 6

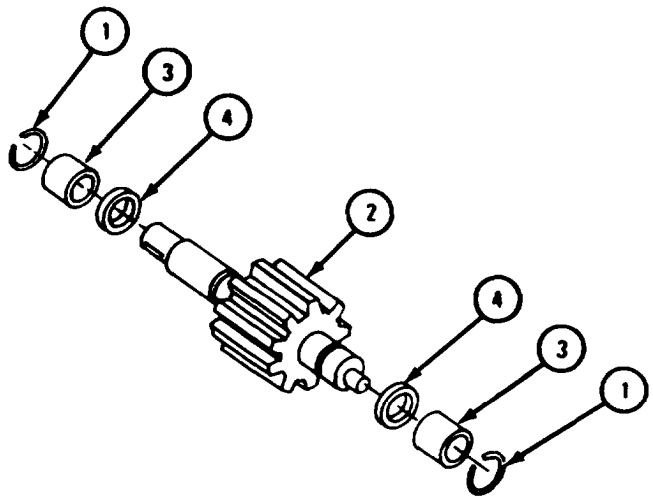


TA 085757

FRAME 6

1. Take off two retaining rings (1) from driven gear shaft (2). Throw away retaining rings.
2. Take off two bearing inner races (3). Refer to Part 1, para 7-7.
3. Tag bearing inner races (3) to make sure that they will be put back in the same places.
4. Take off two spacers (4).

GO TO FRAME 7

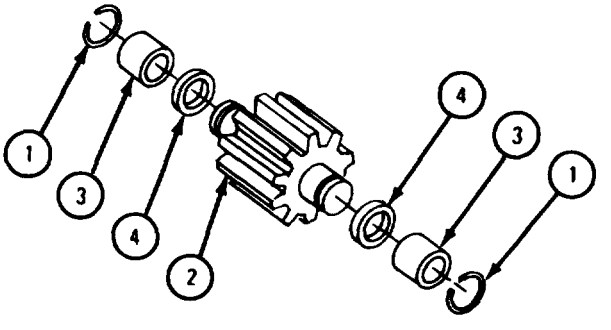


TA 085758

FRAME 7

1. Take off two retaining rings (1) from drive gear shaft (2). Throw away retaining rings.
2. Take off two bearing inner races (3). Refer to Part 1, para 7-7.
3. Tag bearing inner races (3) to make sure that they will be put back in the same places.
4. Take off two spacers (4).

END OF TASK



TA 085759

c. Cleaning.

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

(1) Clean bearings. Refer to Part 1, para 7-7.

(2) Clean all other parts in solvent.

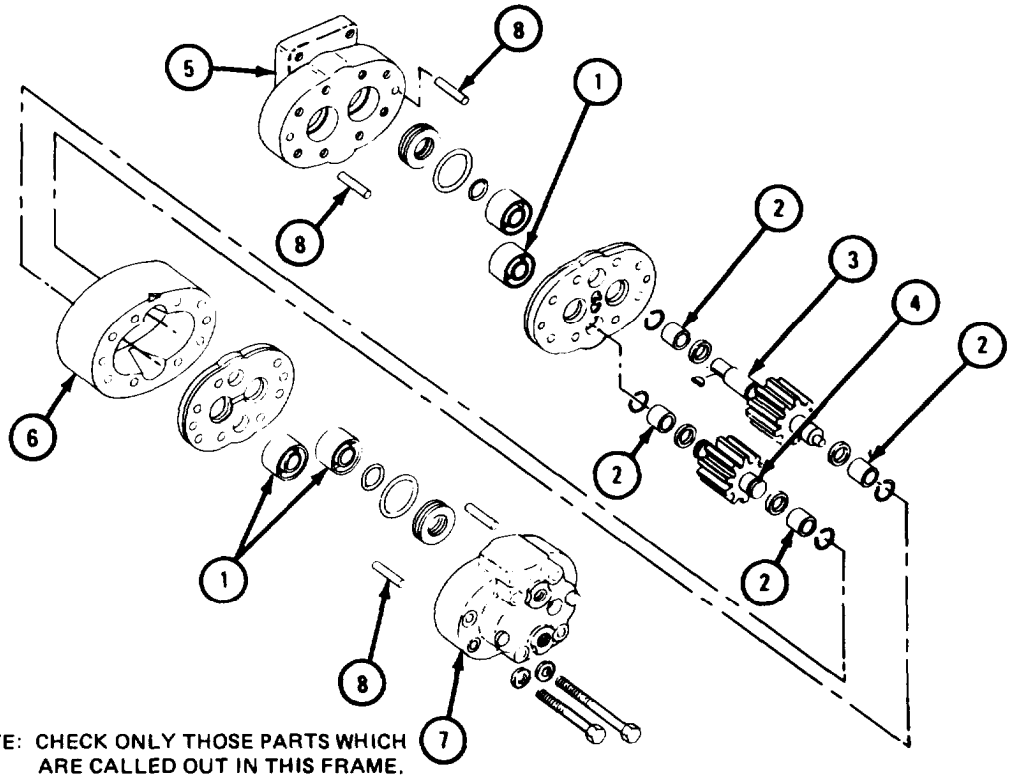
(3) Put a coat of light oil on polished surfaces to stop rust.

d. Inspection.

FRAME 1

1. Check that four bearings (1) and bearing inner races (2) are not damaged. Refer to Part 1, para 7-7.
2. Check that driven gear shaft (3) and drive gear shaft (4) are not scratched, cracked or burred.
3. Check that mating surfaces of front cover (5), motor body (6), and rear cover (7) are not scratched or burred and that bores are not scored.
4. Check that four locating pins (8) are not bent.

GO TO FRAME 2



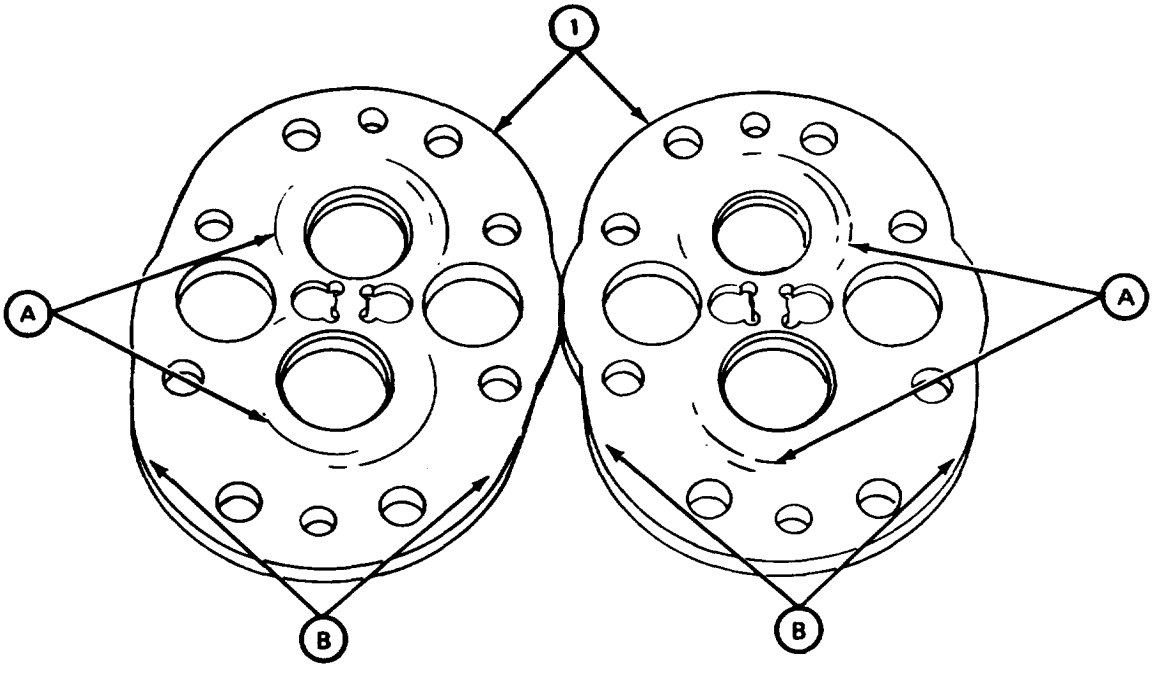
NOTE: CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT IN THIS FRAME. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES OR ARE CHECKED IN ANOTHER FRAME.

TA 085760

FRAME 2

1. Check that two wear plates (1) are not nicked, burred, dented or distorted.
2. Using micrometer, check that thickness of wear plates (1) at gear contact surfaces (A) is within 0.003 inch of thickness at wear plate edges (B).

END OF TASK



TA 085761

e. Repair.

(1) If wear plates are worn more than 0.003 inch, get new ones.

(2) Using fine mill file, file off raised metal from parts.

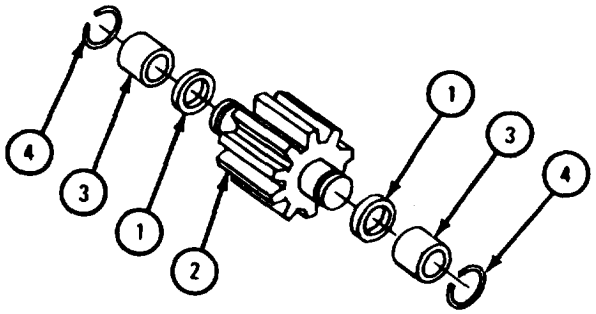
(3) If parts are damaged, get new parts in their place.

f. Assembly.

FRAME 1

1. Put two spacers (1) on drive gear shaft (2).
2. Put two bearing inner races (3) on drive gear shaft (2) as tagged. Refer to Part 1, para 7-7. Take off tags.
3. Put on two retaining rings (4).

GO TO FRAME 2

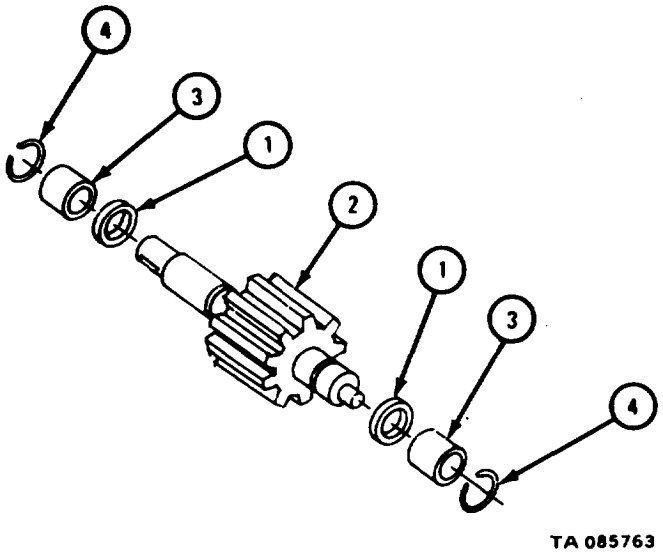


TA 085762

FRAME 2

1. Put two spacers (1) on driven gear shaft (2).
2. Press on two bearing inner races (3) as tagged. Refer to Part 1, para 7-7. Take off tags.
3. Put on two retaining rings (4).

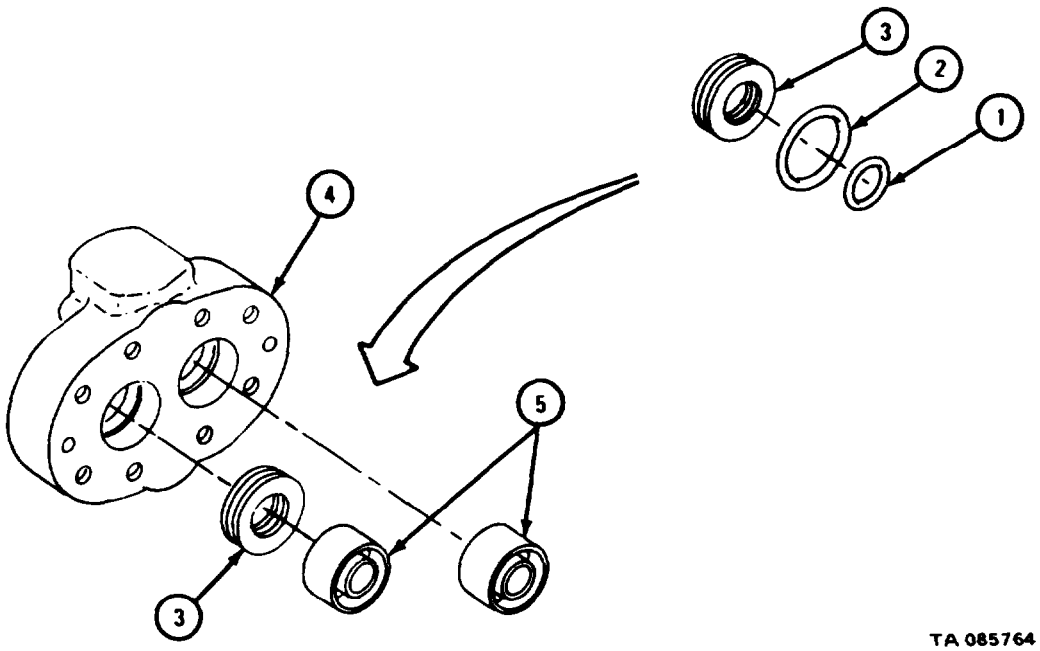
GO TO FRAME 3



FRAME 3

1. Dip preformed packings (1 and 2) in clean oil and put them on seal adapter (3).
2. Put seal adapter (3) with preformed packings (1 and 2) in bore in rear cover (4), with beveled edge facing out.
3. Put two bearings (5) in bores in rear cover (4) as tagged. Refer to Part 1, para 7-7.
4. Lightly oil bearings (5).

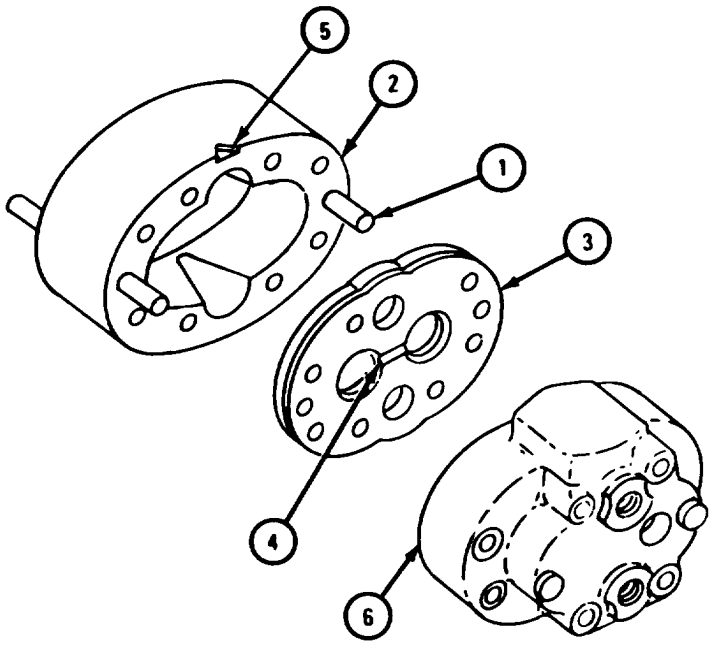
GO TO FRAME 4



FRAME 4

1. Put four locating pins (1) into motor body (2).
2. Put wear plate (3) on two locating pins (1) and push it in place against motor body (2). Be sure that groove (4) in wear plate faces out and that wear plate is on side of motor body with notch (5).
3. Put rear cover assembly (6) on two locating pins (1) and push it in place against wear plate (3).

GO TO FRAME 5

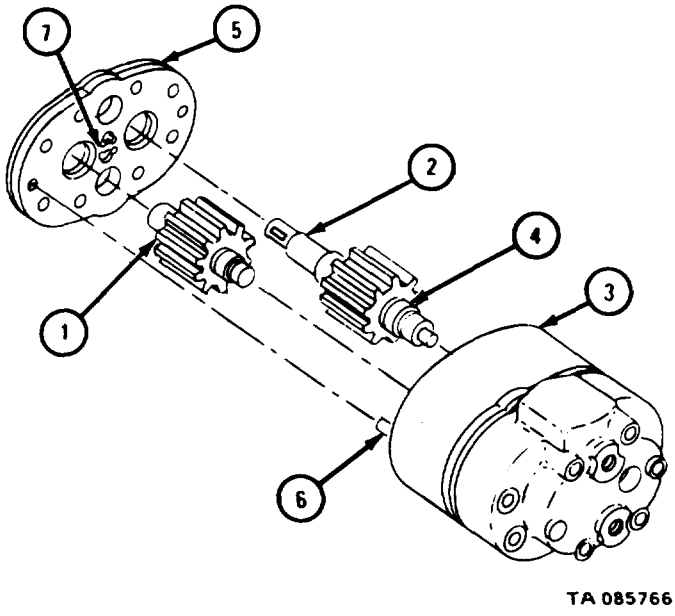


TA 085765

FRAME 5

1. Put drive gear shaft assembly (1) and driven gear shaft assembly (2) in motor assembly (3), mating two bearing inner races (4) with two bearings in motor assembly.
2. Put wear plate (5) on two locating pins (6) and push it into place against motor assembly (3). Be sure that two relief recesses (7) are against motor assembly.

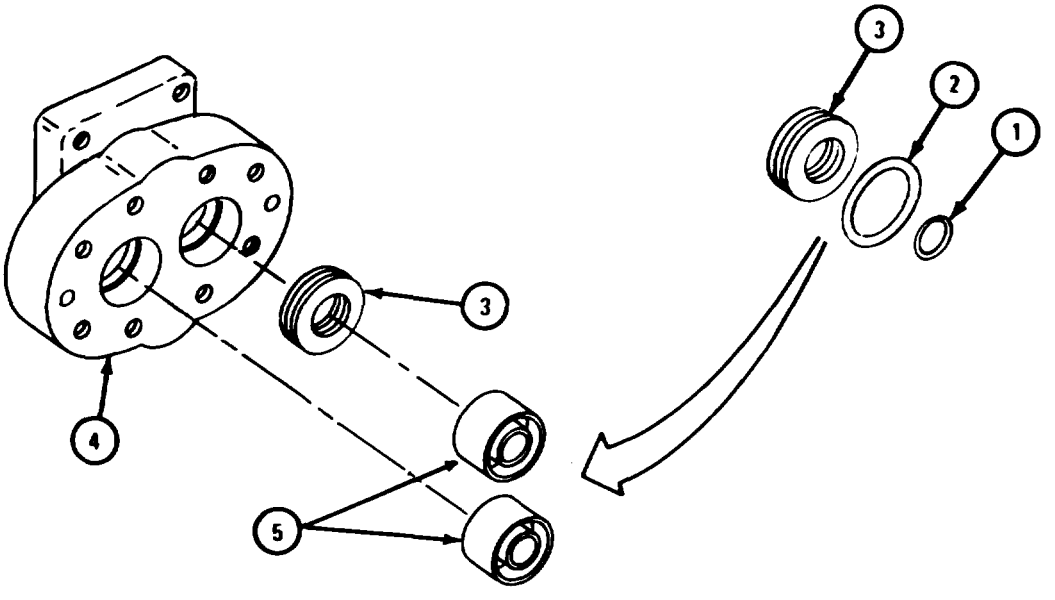
GO TO FRAME 6



FRAME 6

1. Dip preformed packings (1 and 2) in clean oil and put them on seal adapter (3).
2. Put seal adapter (3) with preformed packings (1 and 2) in bore in front cover (4), with beveled edge facing out.
3. Put two bearings (5) in bores in front cover (4) as tagged. Refer to Part 1, para 7-7.
4. Lightly oil bearings (5).

GO TO FRAME 7

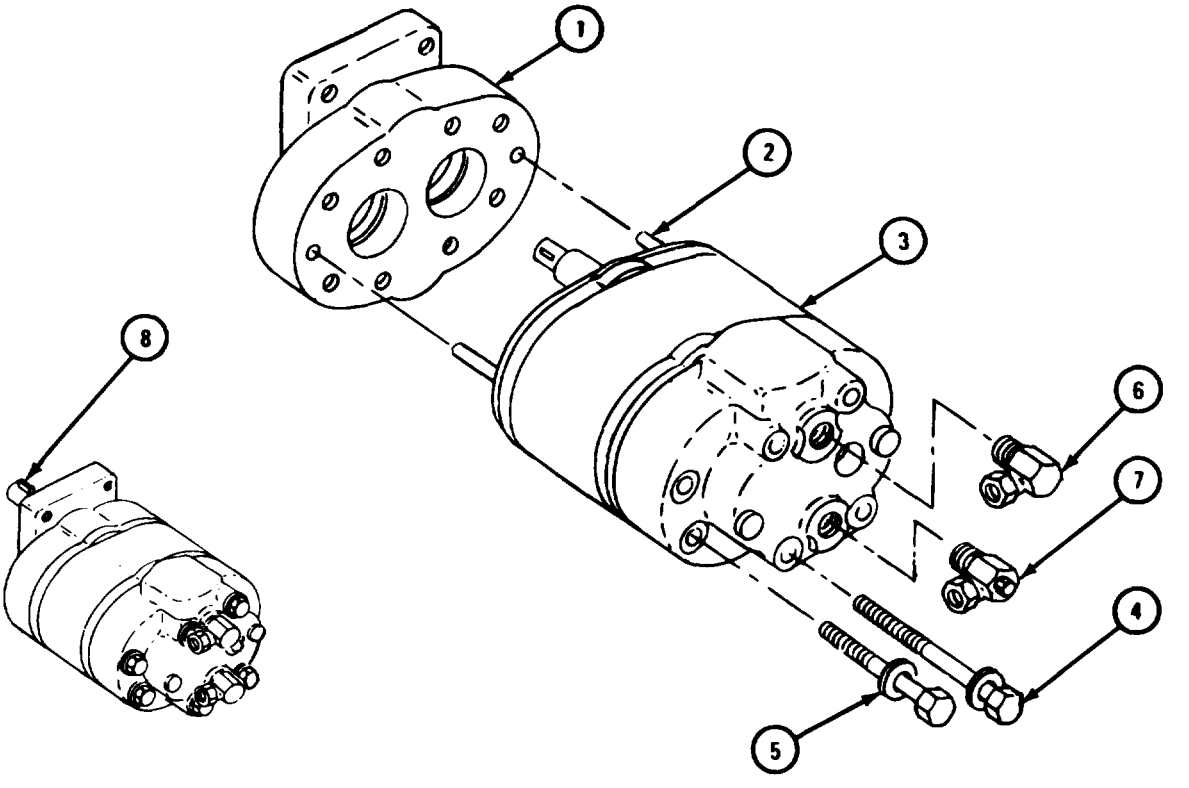


TA 085767

FRAME 7

1. Put front cover assembly (1) on locating pins (2) and push it in place on motor assembly (3).
2. Put in eight screws and washers (4 and 5). Tighten screws a little at a time until all screws are tightened.
3. Put in union assembly (6) and union with plug (7).
4. Put key (8) in place.

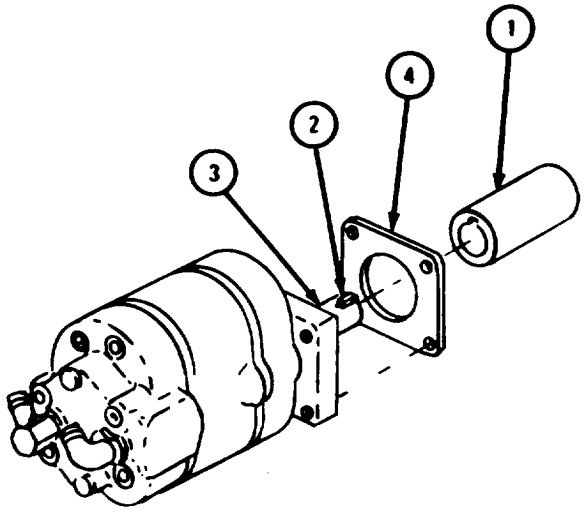
GO TO FRAME 8



FRAME 8

1. Aline keyway in coupling (1) with key (2) in shaft (3). Put uncoupling.
2. Put on gasket (4).

END OF TASK



TA 088579

g. Replacement.

FRAME 1

WARNING

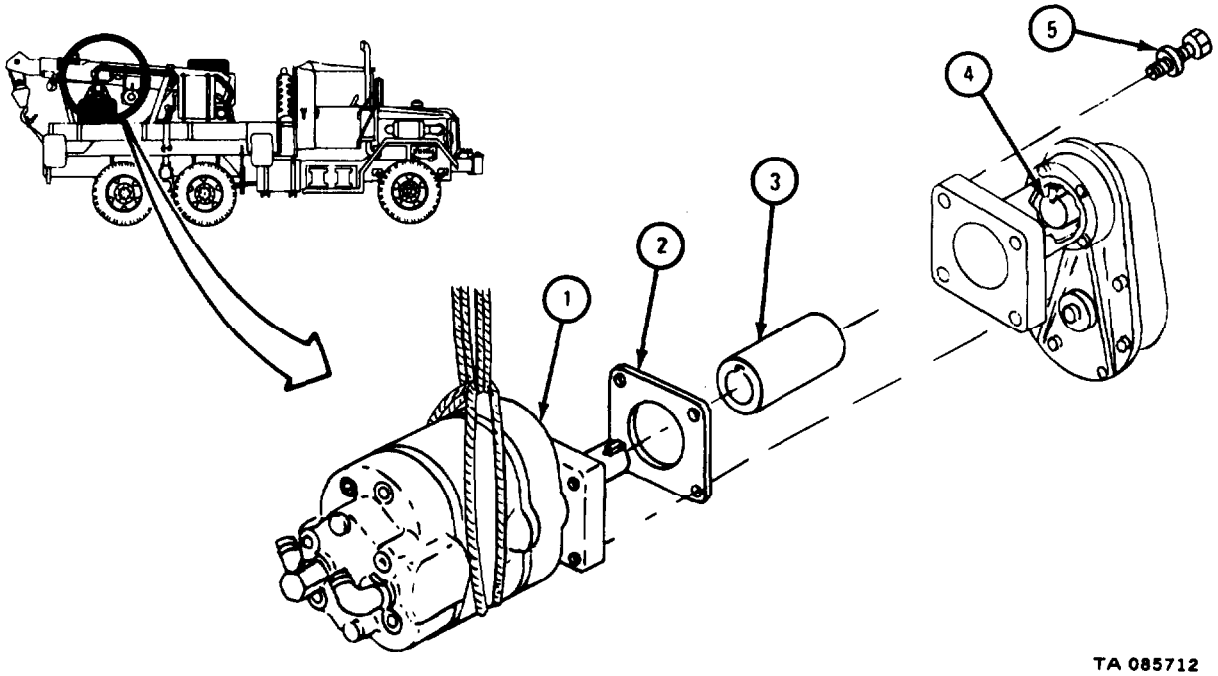
The hoist winch motor assembly (1) is heavy. Be careful to keep tension on rope sling when screws are put in so that the hoist winch motor assembly does not slip or fall. If motor assembly slips or falls, it can cause serious injury to personnel and damage to equipment.

Soldier A
1. Put rope sling on motor assembly (1) and hoist as shown. Tell soldier B when ready. Guide motor assembly into place while soldier B lifts it.

Soldier B
2. Using hoist, lift motor assembly (1). Keep tension on rope sling until motor assembly is in place.

Soldier A
3. Put gasket (2) on motor assembly (1). Aline keyway in coupling (3) with key in shaft (4).
4. Put in four cap screws with lockwashers (5).
5. Tell soldier B to put slack in rope sling. Take rope sling off motor assembly (1) and hoist.

GO TO FRAME 2



TA 085712

FRAME 2

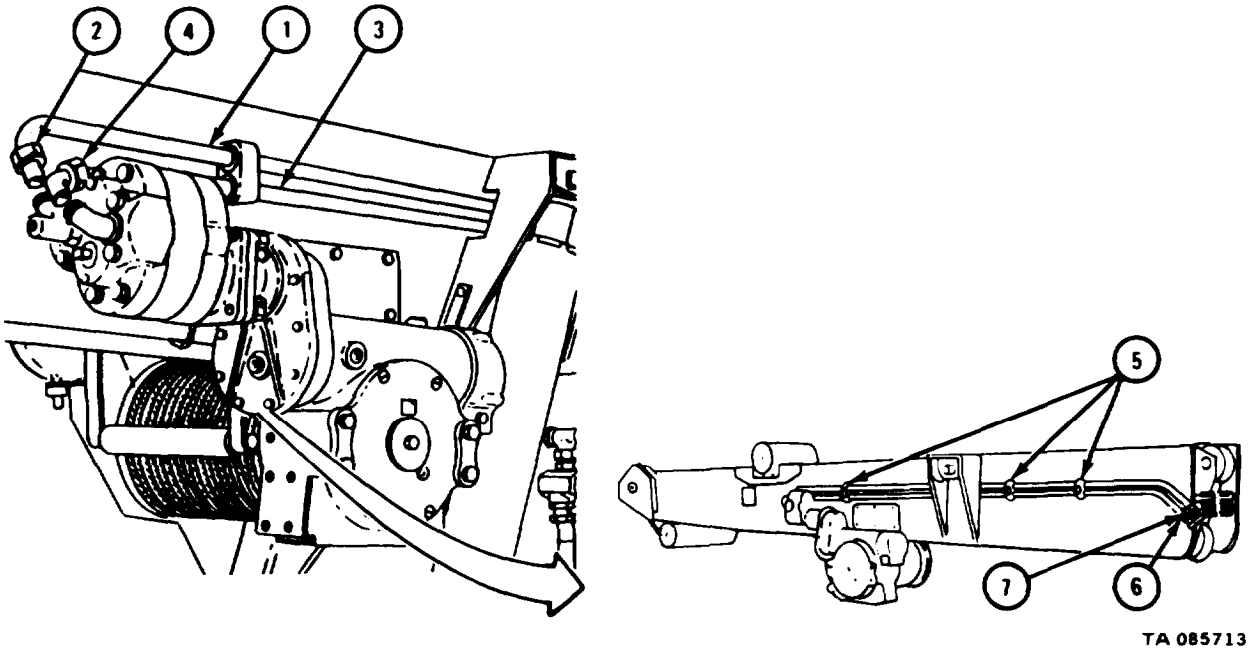
1. Take off all caps.
2. Put tube assembly (1) in place. Put on nut (2).
3. Put tube assembly (3) in place. Put on nut (4).
4. Tighten three nuts (5).
5. Put clamp (6) in place. Put on nut (7).

NOTE

Follow-on Maintenance Action Required:

1. Check level in hydraulic oil tank. If needed, fill tank. Refer to LO 9-2320-211-12.
2. Check hoist winch motor for proper operation. Refer to TM 9-2320-211-10.

END OF TASK



TA 085713

17-18. HOIST WINCH REMOVAL, REPAIR, AND REPLACEMENT (TRUCK M543A2).

TOOLS: No special tools required

SUPPLIES: Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680
End case seal
Brake case seal
Worm gearcase seal
Gearcase oil seal
Brake case cover gasket
Brake case gasket
End case gasket
Gearcase cover gasket
End case cover gasket
End case motor adapter gasket
Expansion plug
Shim (as needed)
Packing

PERSONNEL: Two

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Remove winch cable. Refer to TM 9-2320-211-20.

(2) Remove hoist winch motor. Refer to para 17-17.

(3) Remove hoist winch roller assemblies. Refer to para 17-38.

b. Removal.

FRAME 1

1. Hook up chain (1) and chain hoist (2) to winch (3) as shown. Using chain hoist, take slack out of chain.

Soldier A 2. Take out six screws and lockwashers (4).

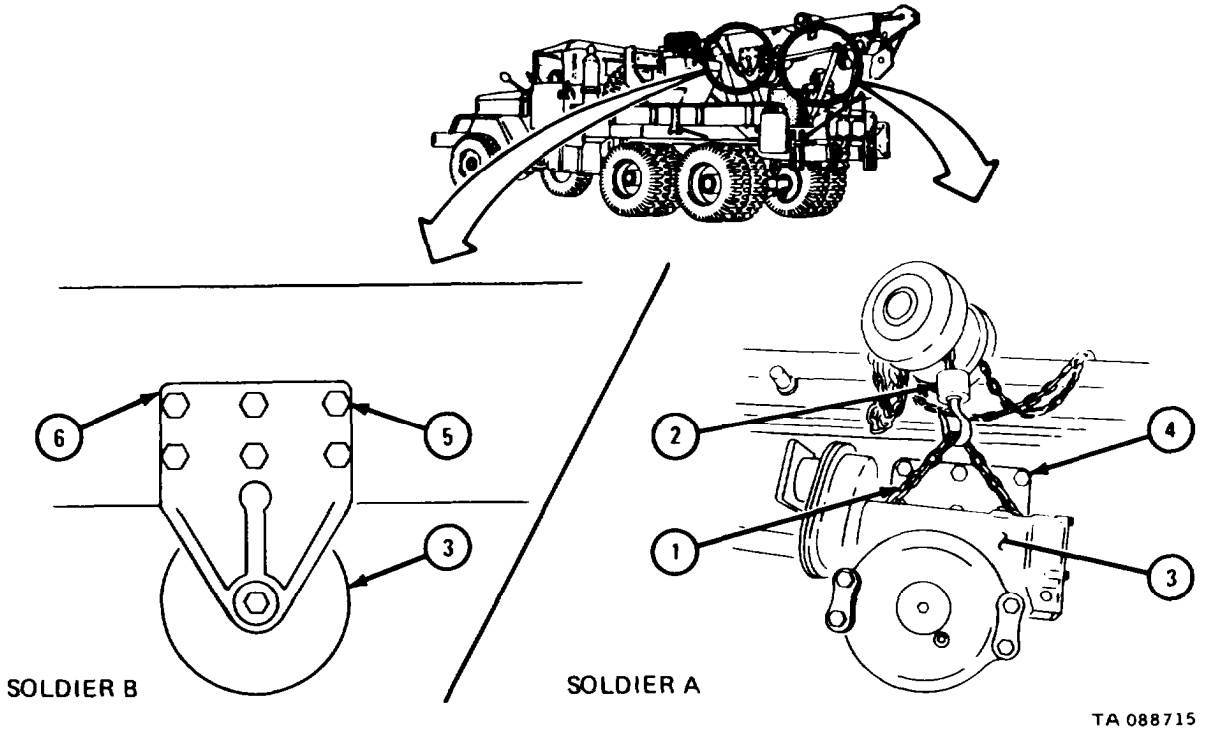
Soldier B 3. Working on other side of winch (3), take out six screws and lockwashers (5). Hold support (6) to keep winch in place when last screw and lockwasher are taken out. Tell soldier A when winch is free.

4. As winch (3) is lowered, hold support (6) to keep winch from swinging and damaging equipment.

Soldier A 5. When winch (3) is free, using chain hoist (2), lower winch to ground.

6. Take off chain (1) and chain hoist (2).

END OF TASK

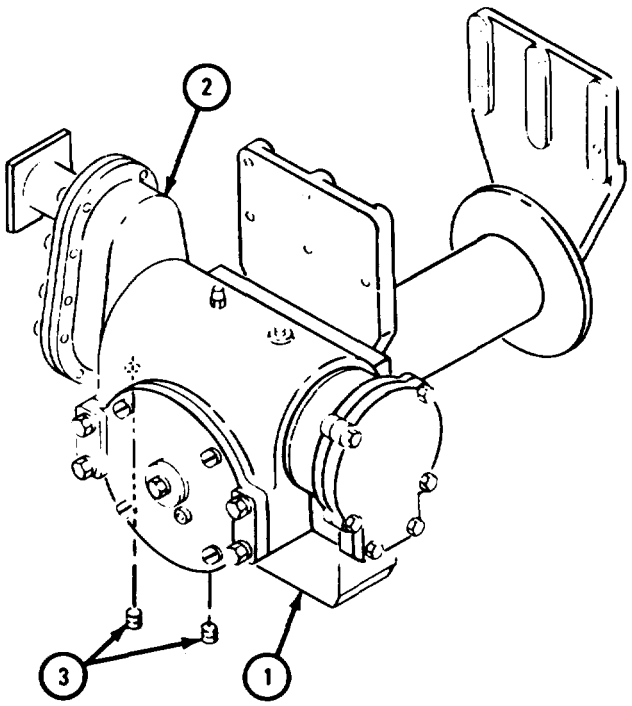


c. Disassembly.

FRAME 1

1. Put one-gallon containers under gearcase (1) and end case (2).
2. Take out two magnetic drain plugs (3). Let gear oil drain into containers.
3. Take out containers and put gear oil in approved disposal area.

GO TO FRAME 2

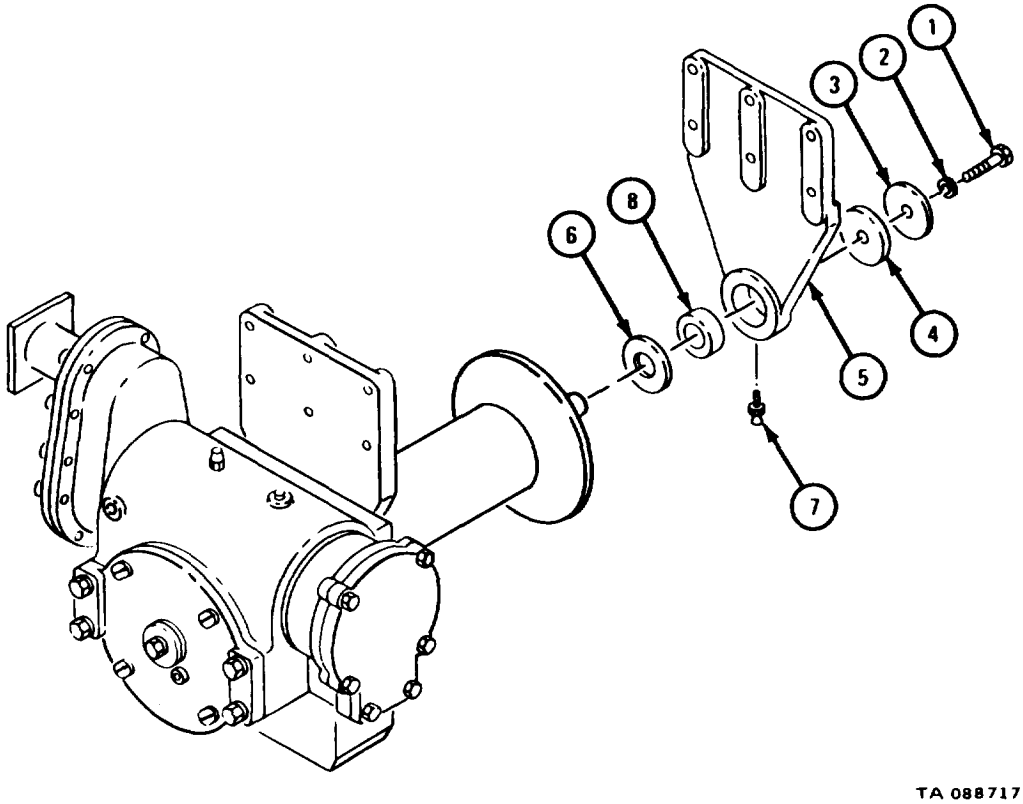


TA 088716

FRAME 2

1. Take out screw (1), lockwasher (2), retaining washer (3), and shims (4).
2. Pull off support (5) and thrust washer (6).
3. Take out lubrication fitting (7).
4. Drive out bushing (8) from support (5).

GO TO FRAME 3

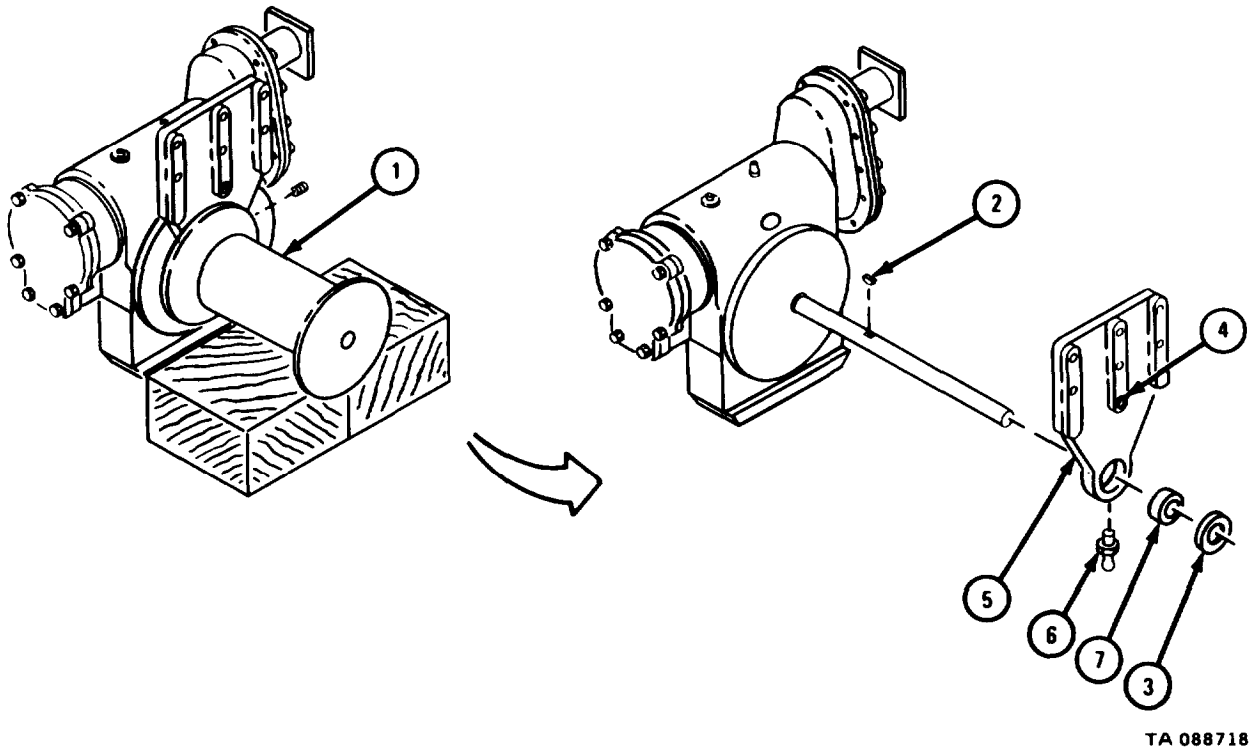


TA 088717

FRAME 3

1. Pull off drum (1).
2. Take out two keys (2).
3. Slide off spacer washer (3).
4. Take out screw (4).
5. Slide off support (5).
6. Take out lubrication fitting (6).
7. Drive out hushing (7) from support (5).

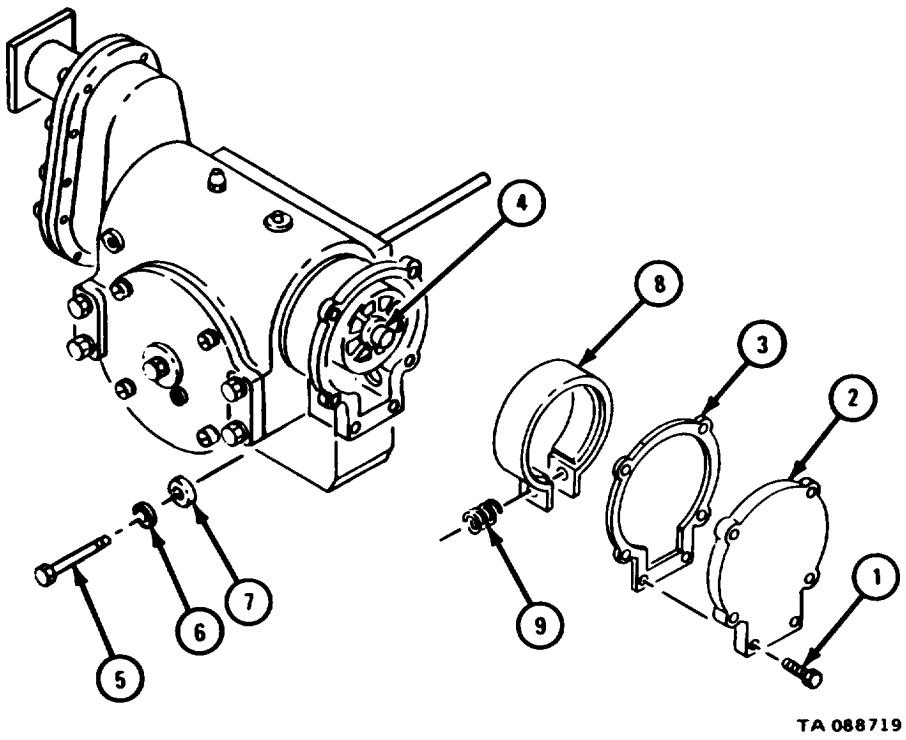
GO TO FRAME 4



FRAME 4

1. Take out six locking screws (1).
2. Pulloff brake case cover (2) and gasket (3). Throw away gasket.
3. Loosen screw (4).
4. Take out screw (5), flat washer (6), and packing (7). Throw away packing.
5. Take out brake band assembly (8) and spring (9).

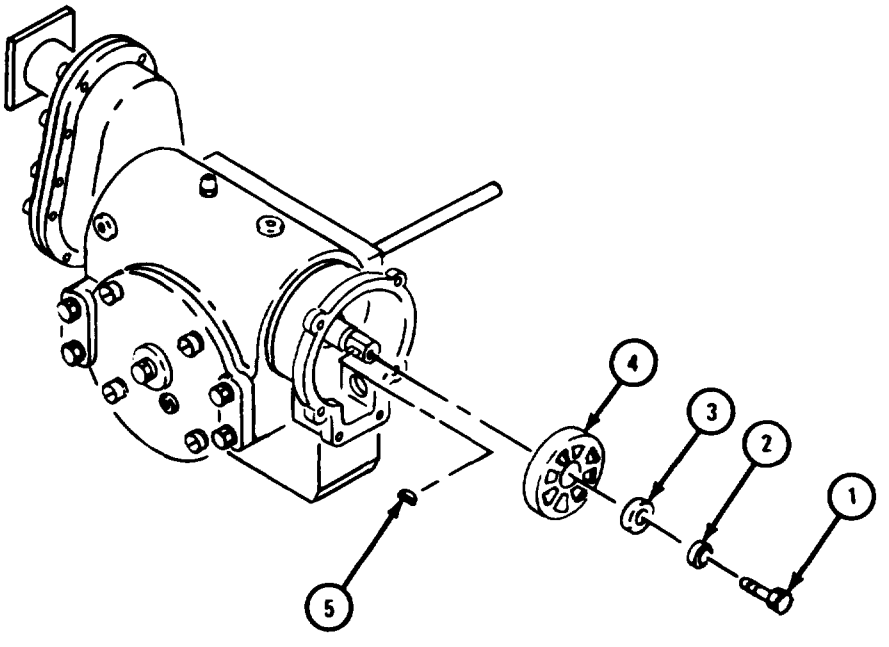
GO TO FRAME 5



FRAME 5

1. Take out screw (1), lockwasher (2), and flat washer (3).
2. Pull off brake drum disk (4).
3. Take out key (5).

GO TO FRAME 6



TA 088720

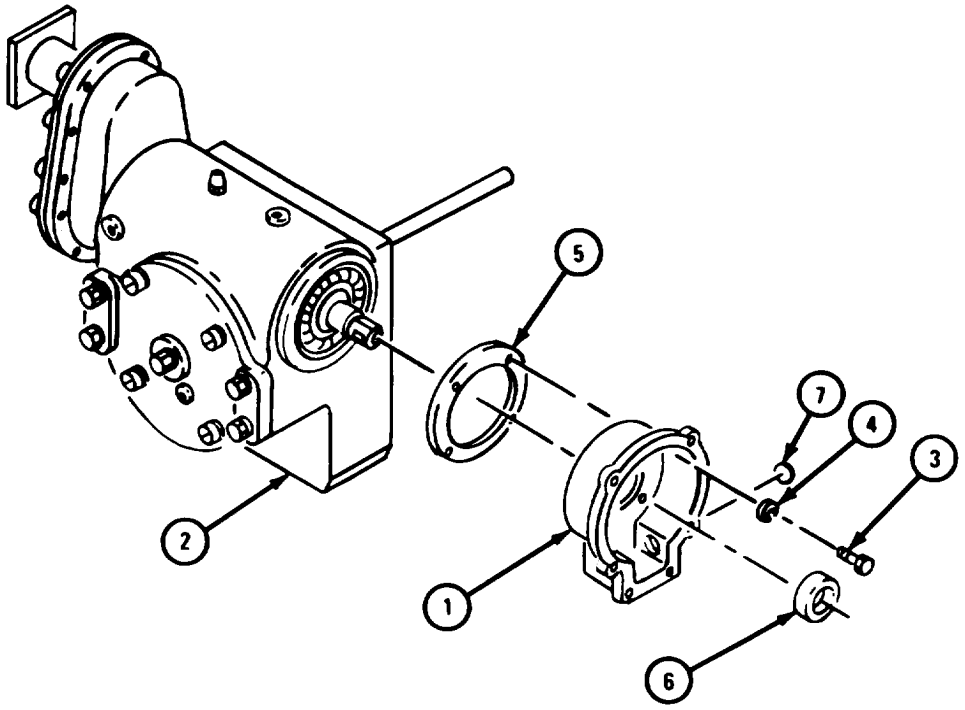
FRAME 6

NOTE

Note position of brake housing case (1) on gearcase (2) so it will be put back in right place.

1. Take out four screws (3) and lockwashers (4).
2. Take off brake housing case (1) and gasket (5) from gearcase (2). Throw away gasket.
3. Drive out seal (6) from brake housing case (1). Throw away seal.
4. Drive out and throw away expansion plug (7).

GO TO FRAME 7

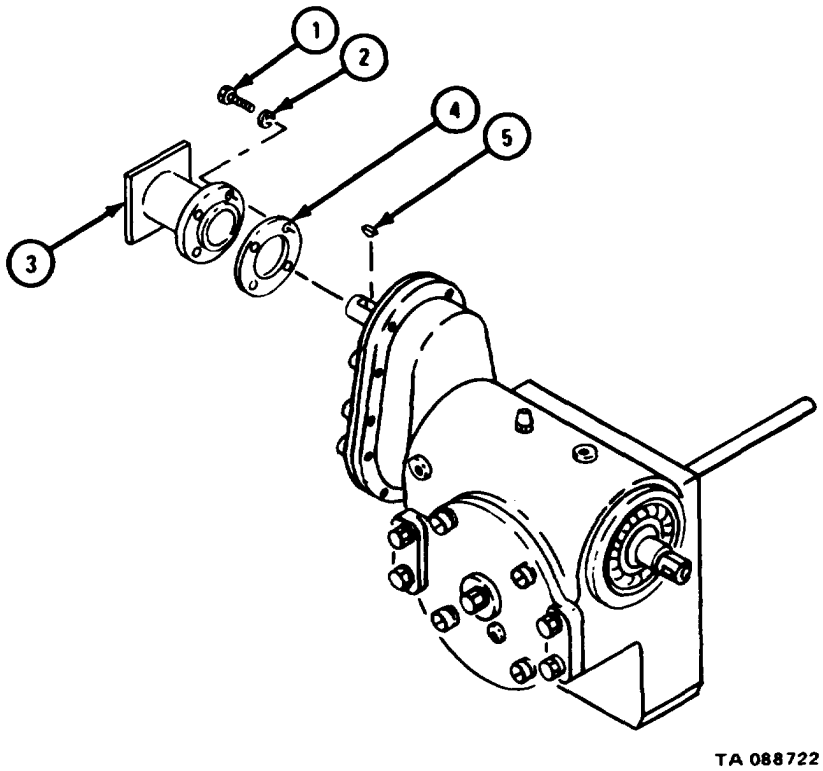


TA 088721

FRAME 7

1. Take out four screws (1) and lockwashers (2).
2. Take off motor adapter (3) and gasket (4). Throw away gasket.
3. Take out key (5).

GO TO FRAME 8

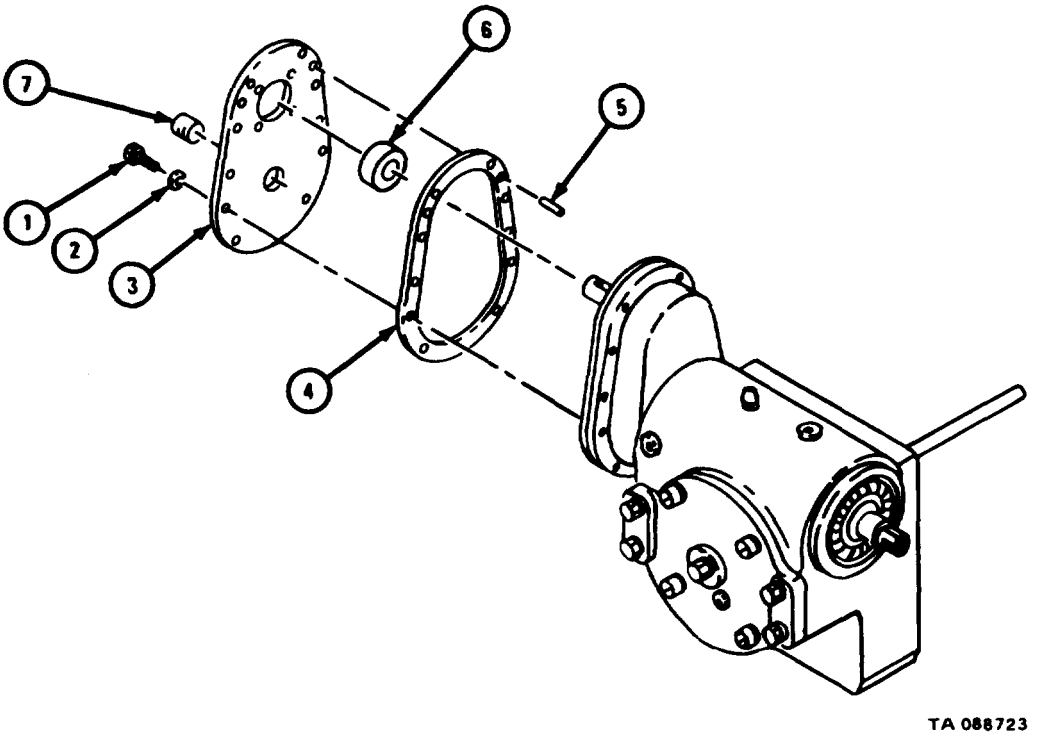


TA 088722

FRAME 8

1. Take out ten bolts (1) and lockwashers (2).
2. Pull off end case cover (3) and gasket (4). Throw away gasket.
3. Take out two pins (5) from end cover (3).
4. Press bearing (6) out of end cover (3).
5. Take out pipe plug (7).

GO TO FRAME 9

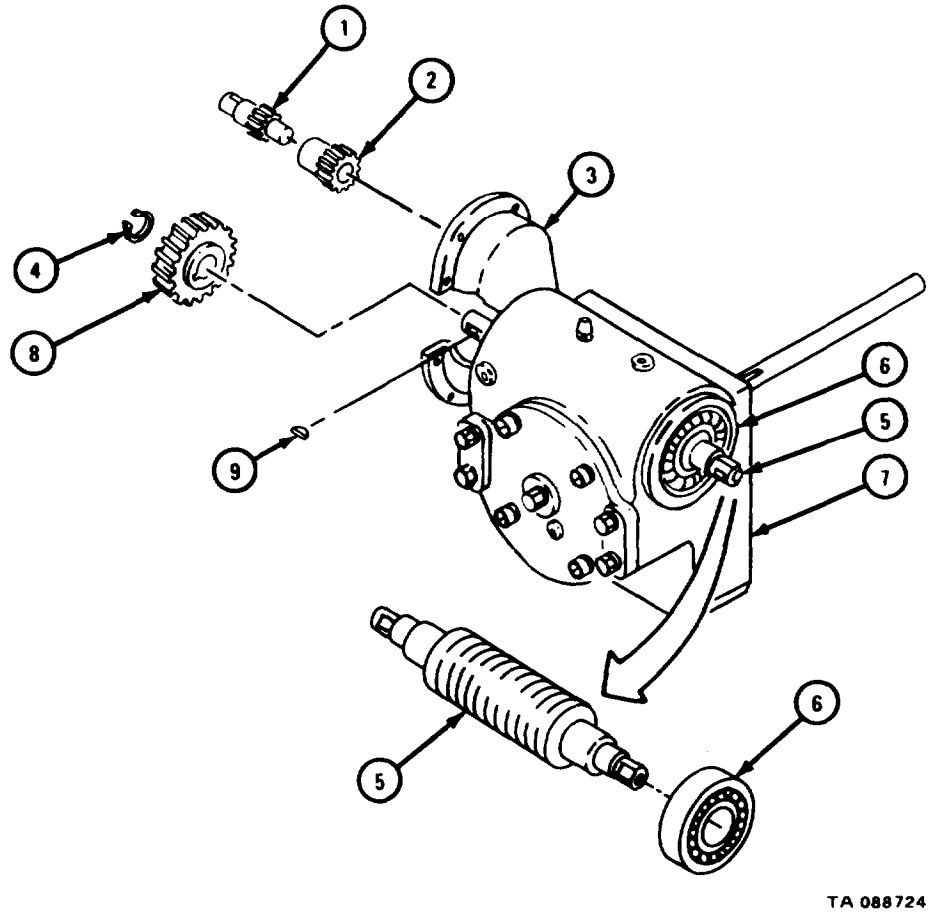


TA 088723

FRAME 9

1. Pull gearshaft (1) with gear (2) out of end case (3).
2. Pull gear (2) off gearshaft (1).
3. Take off retaining ring (4).
4. Drive worm gear (5) and bearing (6) out of gearcase (7) until end of shaft is free of gear (8).
5. Take off gear (8).
6. Take out two keys (9) from shaft of worm gear (5) and take out worm gear and bearing (6) from gearcase (7).
7. Drive worm gear (5) out of bearing (6).

GO TO FRAME 10

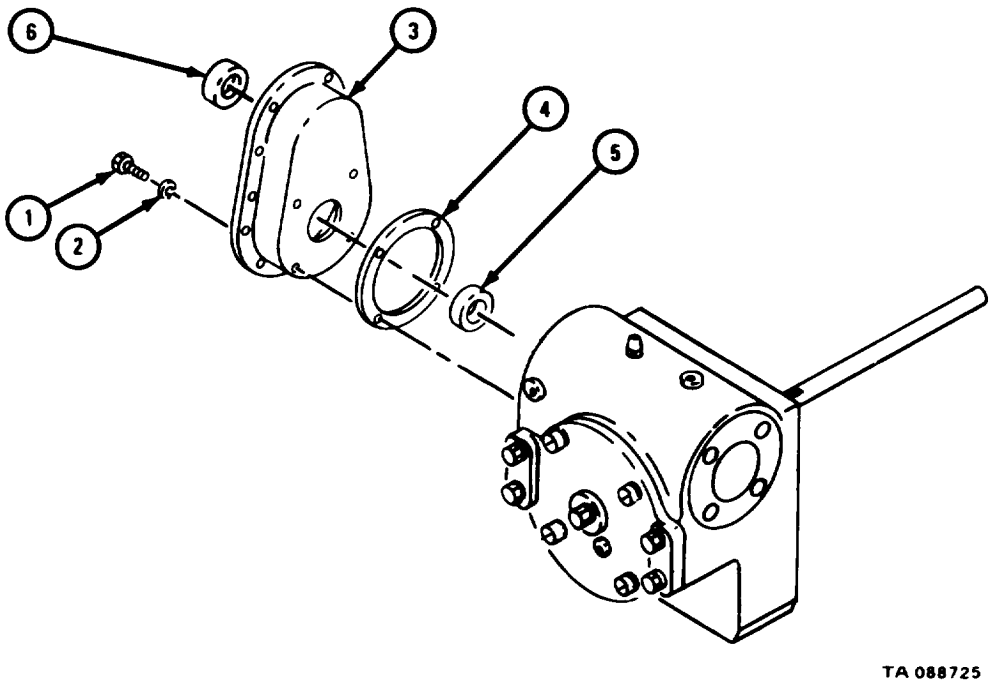


TA 088724

FRAME 10

1. Take out four screws (1) and lockwashers (2).
2. Take off end case (3) and gasket (4). Throw away gasket.
3. Drive out seal (5) from end case (3). Throw away seal.
4. Pull bearing (6) from end case (3).

GO TO FRAME 11

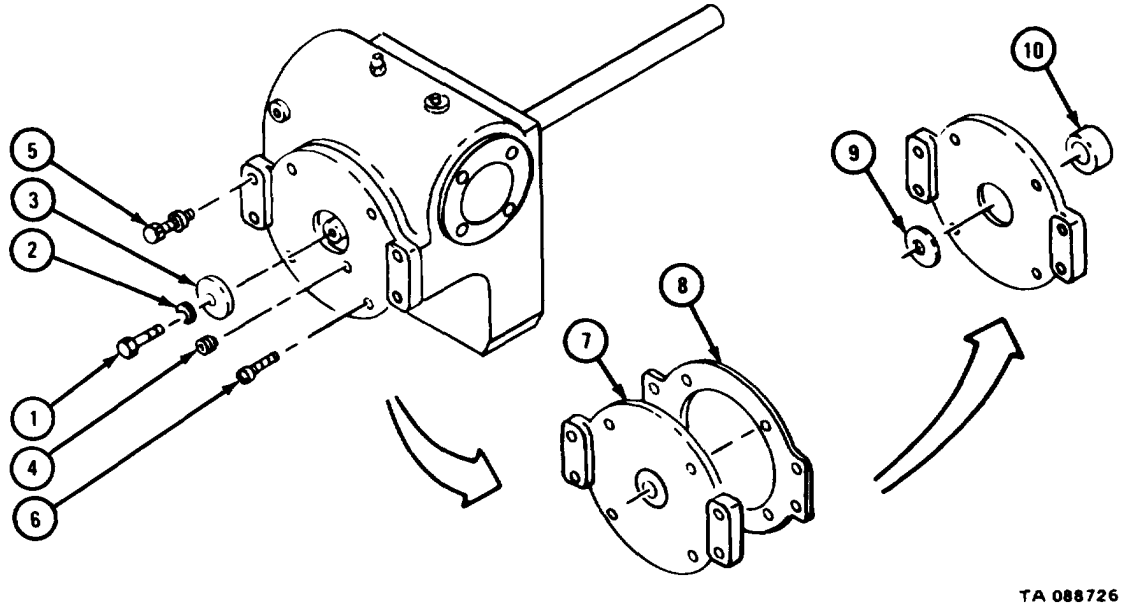


TA 088725

FRAME 11

1. Take out screw (1), lockwasher (2), and retaining washer (3).
2. Take out pipe plug (4).
3. Take out four screws with lockwashers (5).
4. Take out four screws (6).
5. Pull off gearcase cover (7) and gasket (8). Throw away gasket.
6. Press out seal (9) and bushing (10). Throw away seal.

GO TO FRAME 12

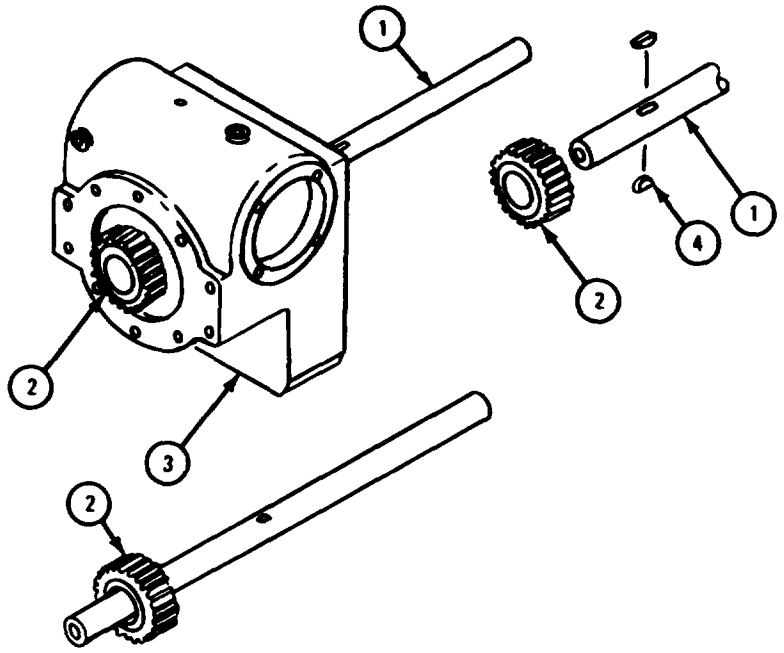


TA 088726

FRAME 12

1. Drive shaft (1) with gear (2) out of gearcase (3).
2. Press shaft (1) out of gear (2).
3. Take out two keys (4) from shaft (1).

GO TO FRAME 13

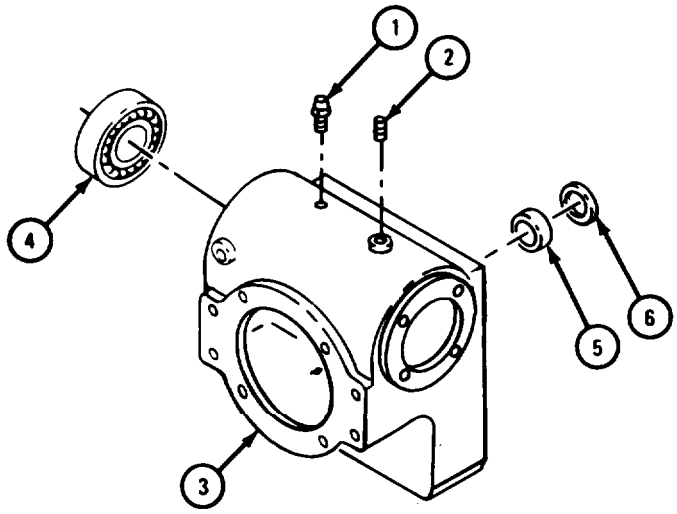


TA 088727

FRAME 13

1. Take out breather assembly (1).
2. Take out pipe plug (2) from gearcase (3).
3. Press out bearing (4), bushing (5), and seal (6).

END OF TASK



TA 088728

d. Cleaning.

FRAME 1

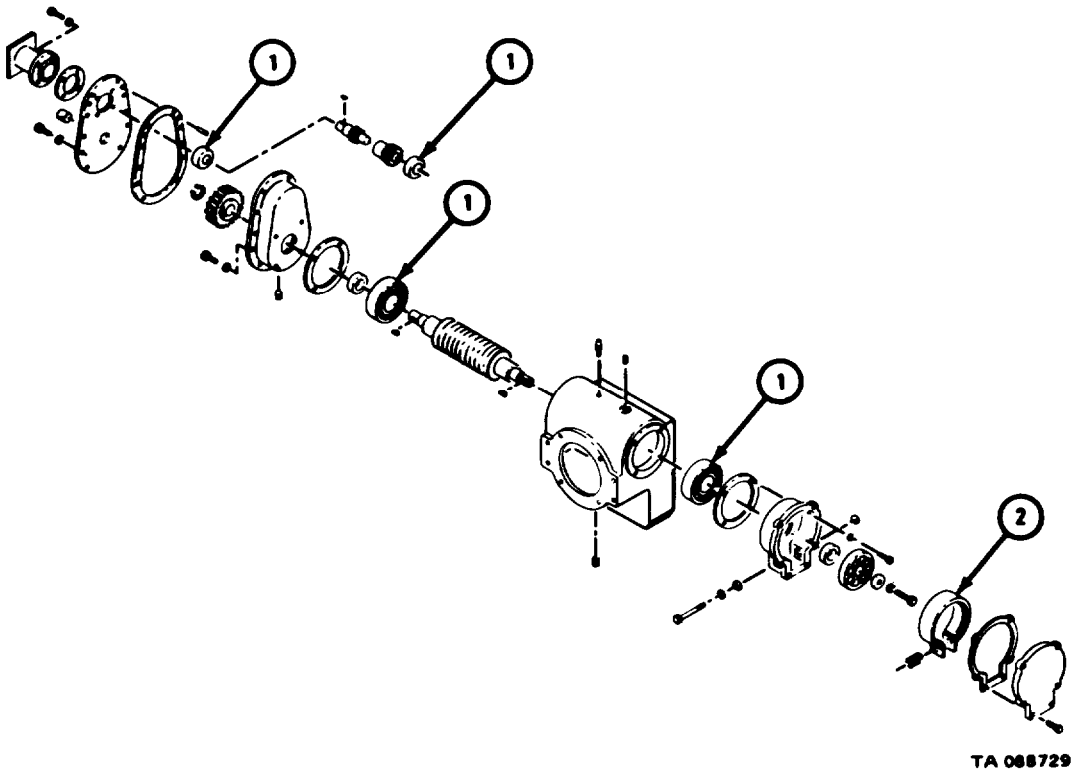
WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

Do not use compressed air to dry bearings or allow bearings to spin while drying. Spinning bearings may explode, causing injury to personnel and damage to equipment.

1. Clean bearings (1). Refer to Part 1, para 7-7.
2. Clean all parts except brake band assembly (2) with solvent. Make sure that grease passages are open and clean.
3. Let all parts dry.

END OF TASK

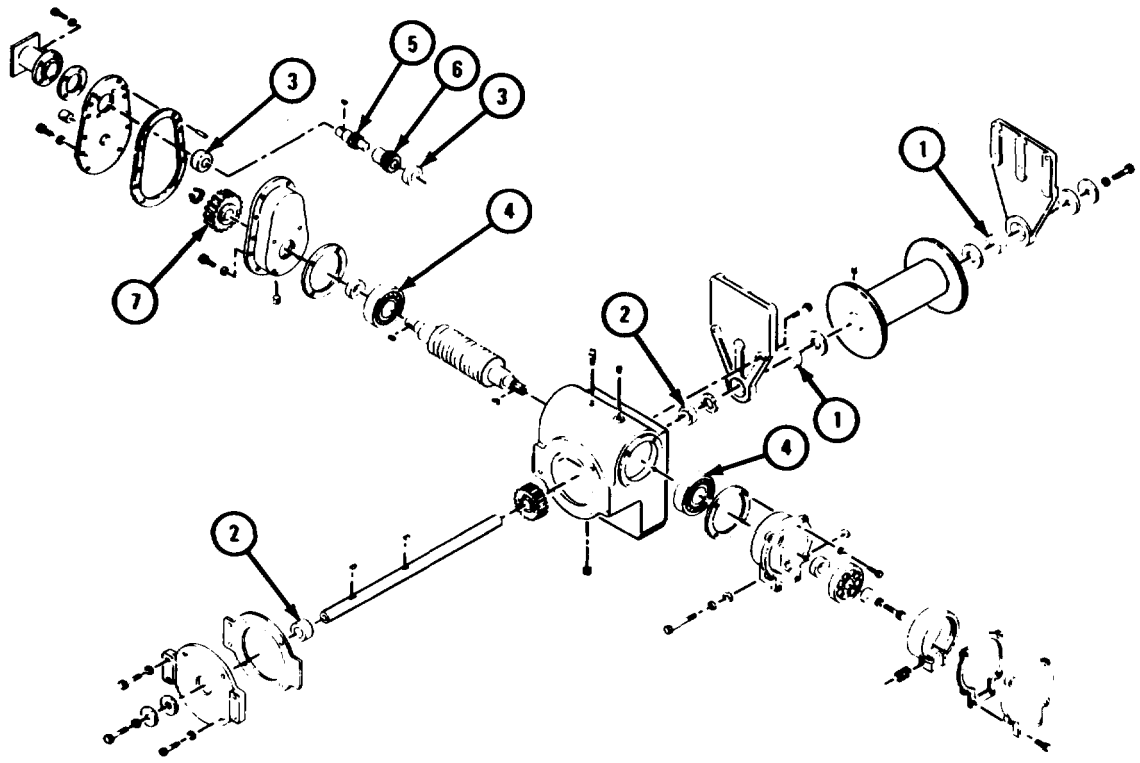


e. Inspection and Repair.

FRAME 1

1. Check that two bushings (1) and two bushings (2) are not scored, pitted or cracked.
2. Check that two bearings (3) and two bearings (4) are not damaged. Refer to Part 1, para 7-7.
3. Check that gearshaft (5) is not scored or damaged in any other way.
4. Check that gears (6 and 7) are not cracked and that they do not have damaged teeth.

GO TO FRAME 2



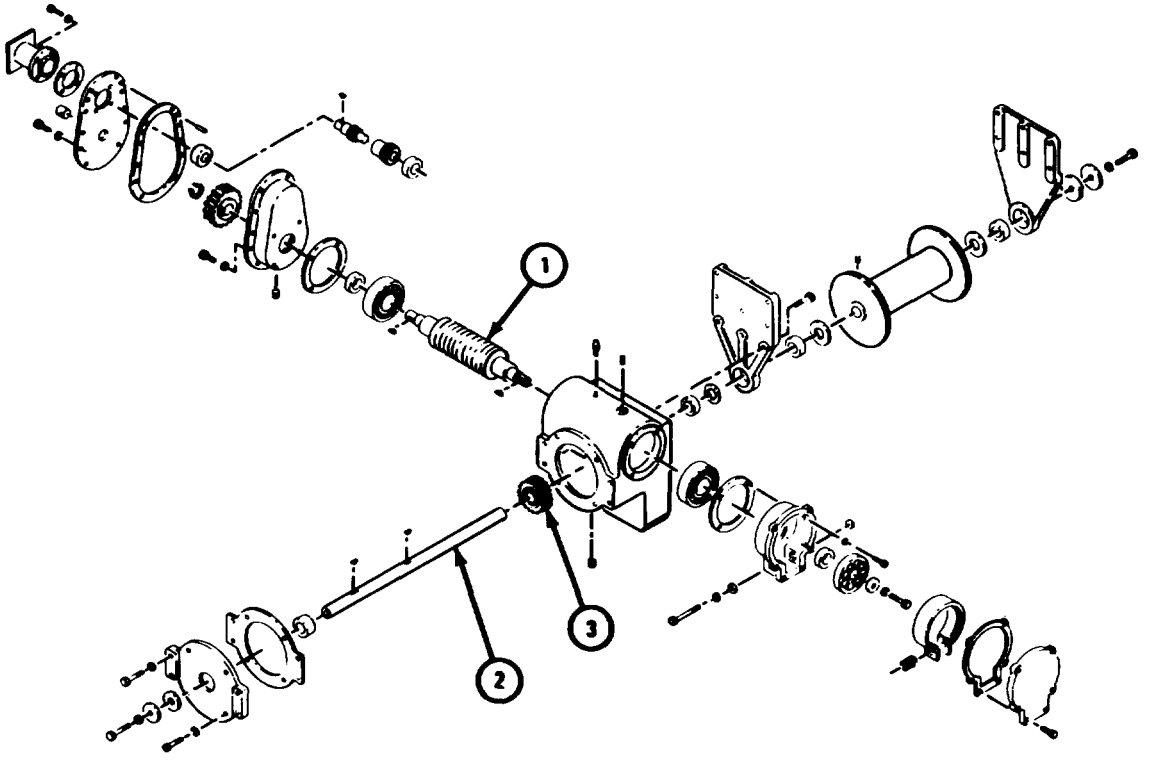
NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT IN THIS FRAME. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES OR ARE CHECKED IN ANOTHER FRAME.

TA 088730

FRAME 2

1. Check that wormshaft (1) is not scored and that it does not have chipped or broken teeth.
2. Using straight edge, check that shaft (2) **is** not bent. Also check that shaft is not scored or damaged in any other way.
3. Check that gear (3) is not scored and that it does not have chipped or broken teeth.

GO TO FRAME 3



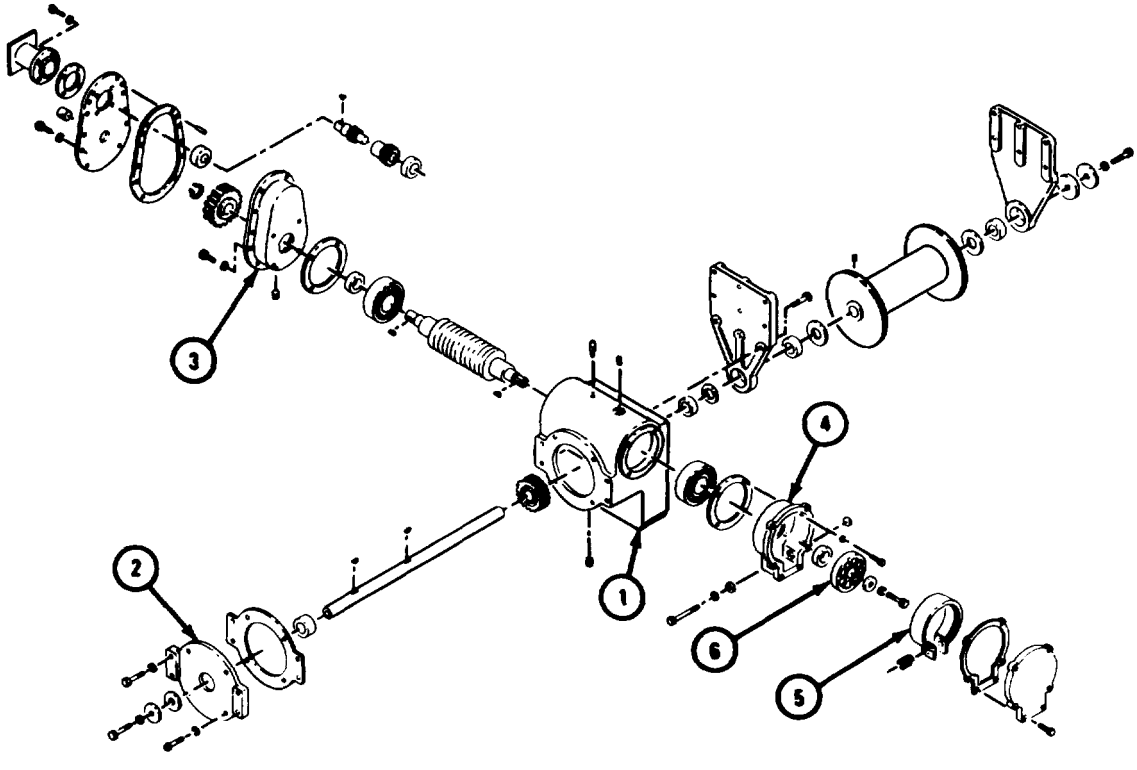
NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT IN THIS FRAME. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES OR ARE CHECKED IN ANOTHER FRAME.

TA 088731

FRAME 3

1. Check that gearcase (1), gearcase cover (2), end case (3), and brake housing case (4) are not cracked, warped or broken, and that they do not have stripped screw threads.
2. Check that brake band assembly (5) is not oil soaked or worn down to rivet heads.
3. Check that braking surface of brake drum disk (6) is not scored.
4. Using fine mill file, file off small nicks and burrs from parts. If parts need more repair, get new ones.

END OF TASK



NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT IN THIS FRAME. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES OR ARE CHECKED IN ANOTHER FRAME.

TA 088732

f. Assembly.

FRAME 1

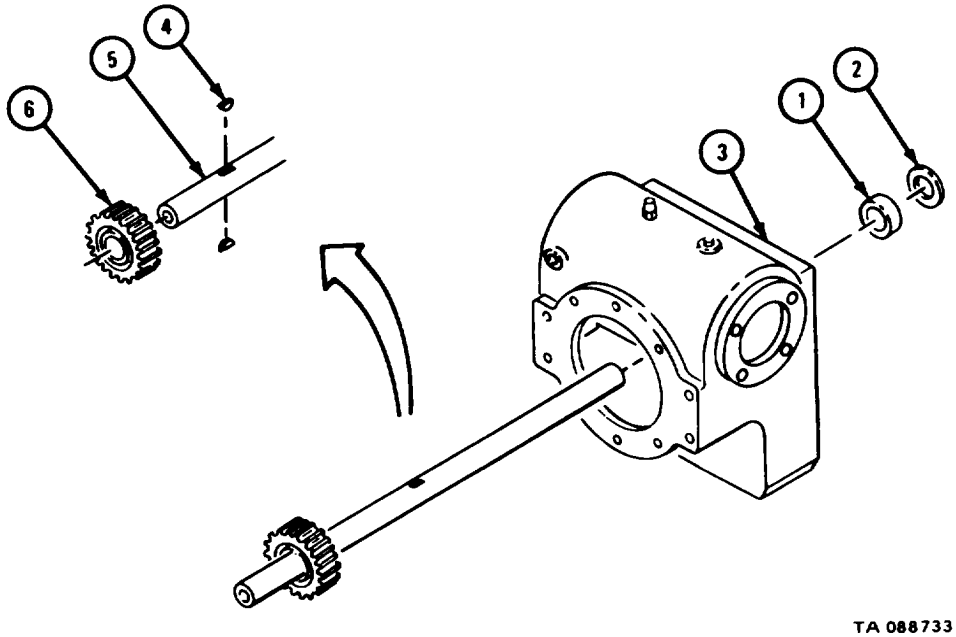
1. Press bushing (1) and seal (2) into gearcase (3).
2. Tap two keys (4) into slots in shaft (5).
3. Start shaft (5) into gear (6) and line up two keys (4) with keyway in gear.

CAUTION

Gear (6) must rest on its hub when pressing in shaft (5) or teeth may be damaged.

4. Press shaft (5) into gear (6).
5. Slide shaft (5) with gear (6) into bore of gearcase (3).

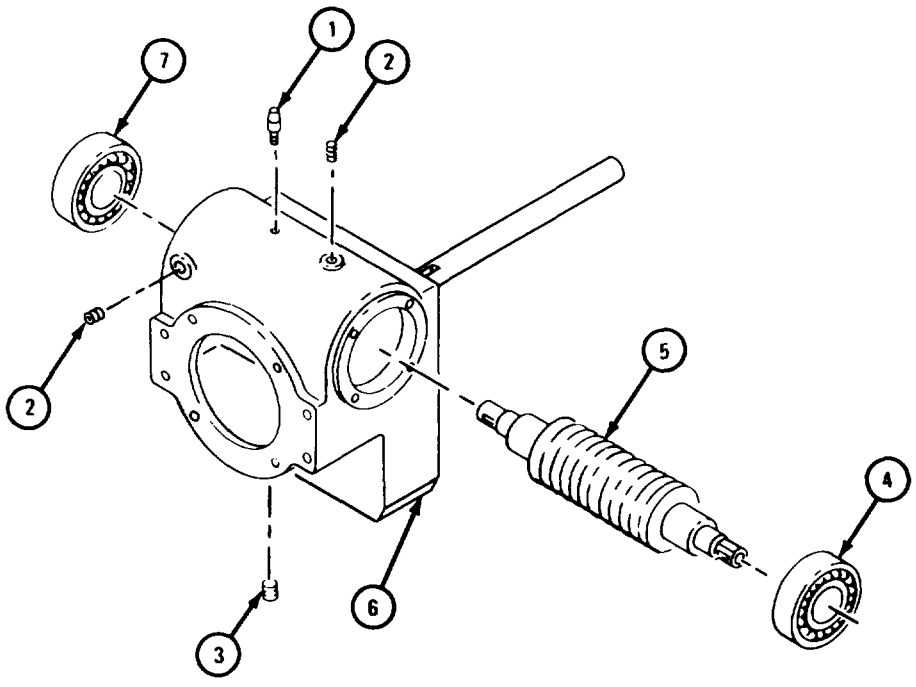
GO TO FRAME 2



FRAME 2

1. Put in breather assembly (1).
2. Put in two pipe plugs (2) and magnetic drain plug (3).
3. Press bearing (4) on tapped hole end of wormshaft (5).
4. Put assembled wormshaft (5) and bearing (4) into right side of gearcase (6) as shown.
5. Tap bearing (4) flush with gearcase (6).
6. Tap bearing (7) on other end of wormshaft (5) and tap bearing flush with gearcase (6).

GO TO FRAME 3

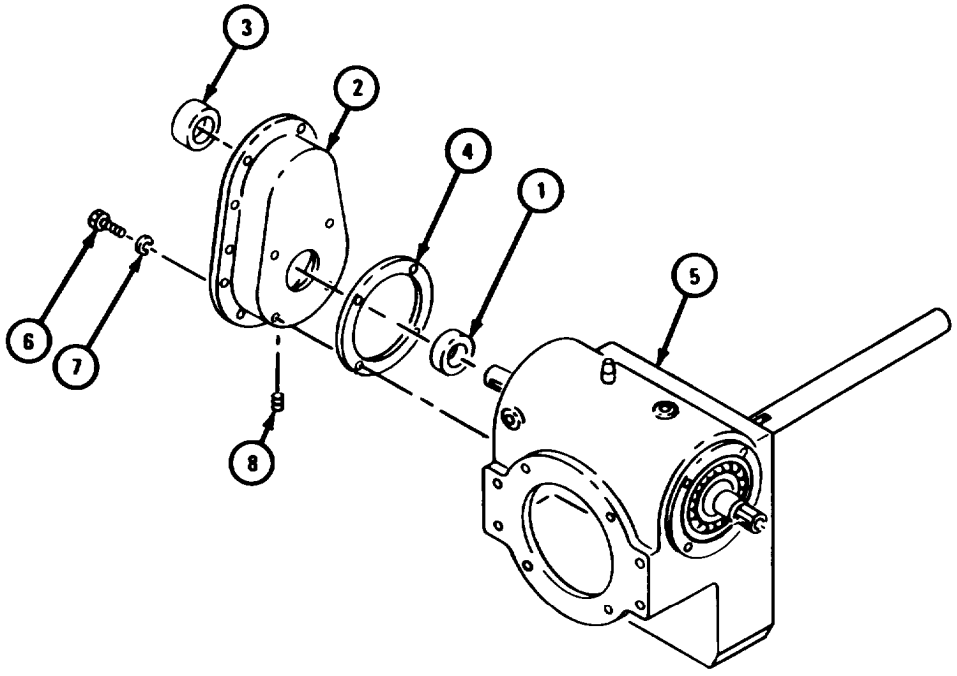


TA 088734

FRAME 3

1. Put seal (1) into end case (2).
2. Press bearing (3) into end case (2).
3. Put gasket (4) and assembled end case (2) with seal (1) in place on gearcase (5), alining holes.
4. Put in four screws (6) and lockwashers (7).
5. Put in magnetic drain plug (8).

GO TO **FRAME 4**

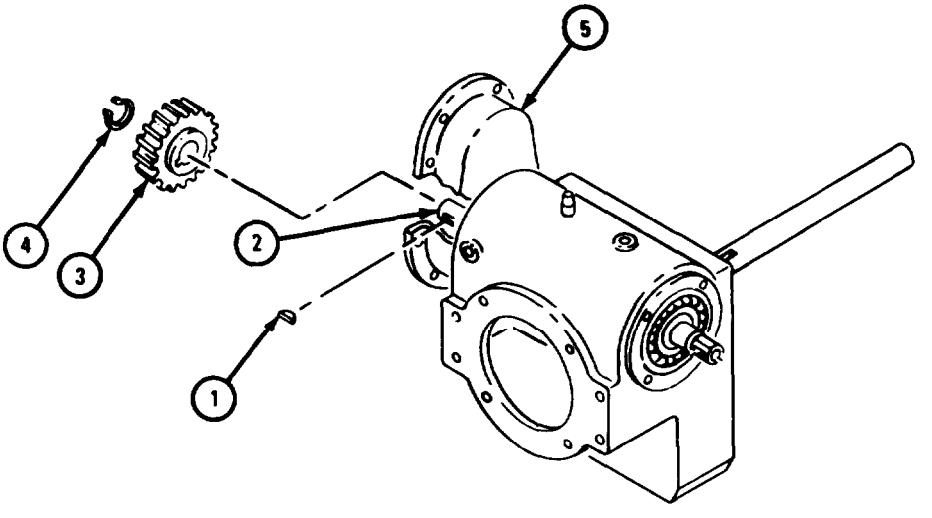


TA 088735

FRAME 4

1. Tap two keys (1) into slot in wormshaft (2).
2. Line up keyway in gear (3) with key (1) in wormshaft (2).
3* Tap gear (3) in place on wormshaft (2).
4. Put retaining ring (4) in groove in wormshaft (2).

GO TO FRAME 5

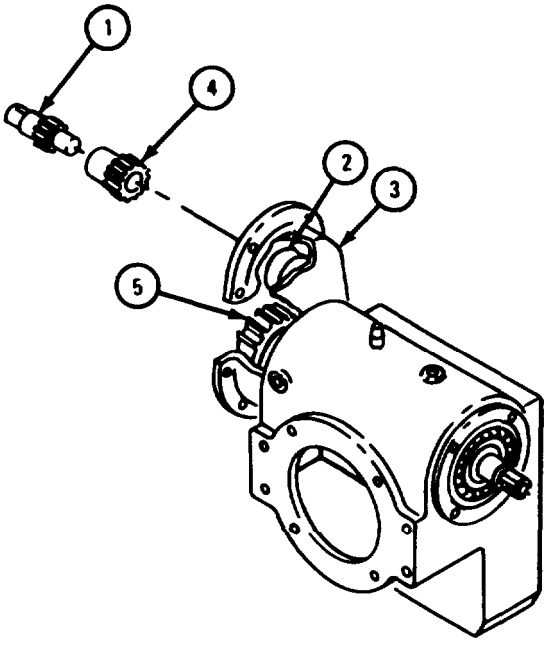


TA 088736

FRAME 5

1. Put gearshaft (1) into bearing (2) in end case (3).
2. Slide gear (4) into gearshaft (1) and mesh gear with gear (5).

GO TO FRAME 6

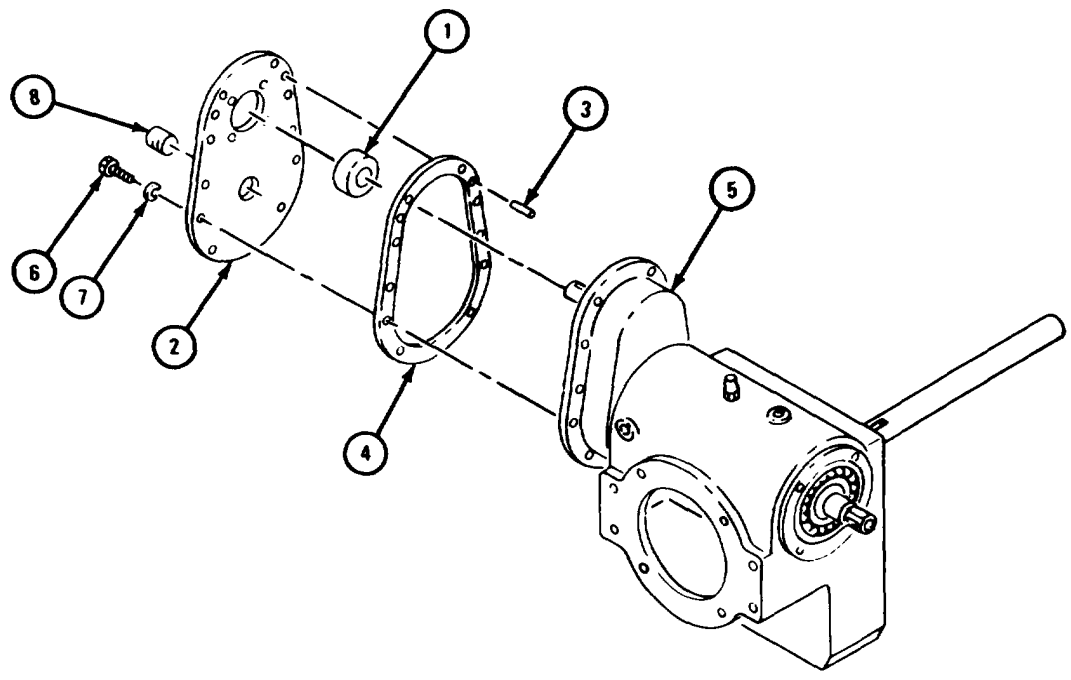


TA 088737

FRAME 6

1. Press bearing (1) into end case cover (2).
2. Put two pins (3) into end case cover (2).
3. Put gasket (4) in place on end case cover (2) and pins (3).
4. Line up two pins (3) with pin holes in end case (5) and push end case cover (2), gasket (4), and pins into place.
5. Put in ten bolts (6) and lockwashers (7).
6. Put in pipe plug (8).

GO TO FRAME 7

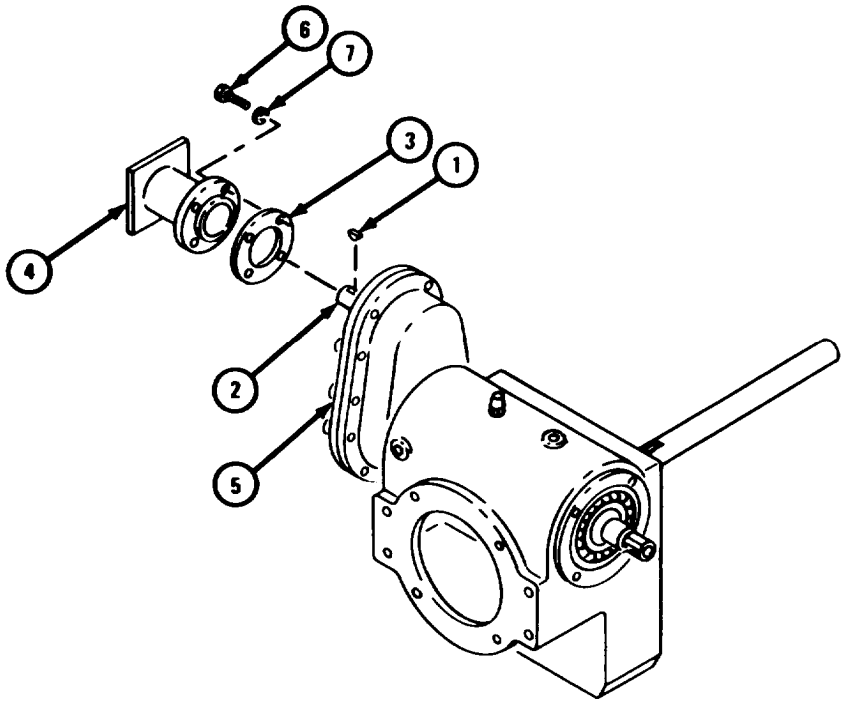


TA 088738

FRAME 7

1. Tap key (1) into slot in gearshaft (2).
2. Put gasket (3) and motor adapter (4) in place on end case cover (5), alining holes.
3. Put in four screws (6) and lockwashers (7).

GO TO FRAME 8



TA 088739

FRAME 8

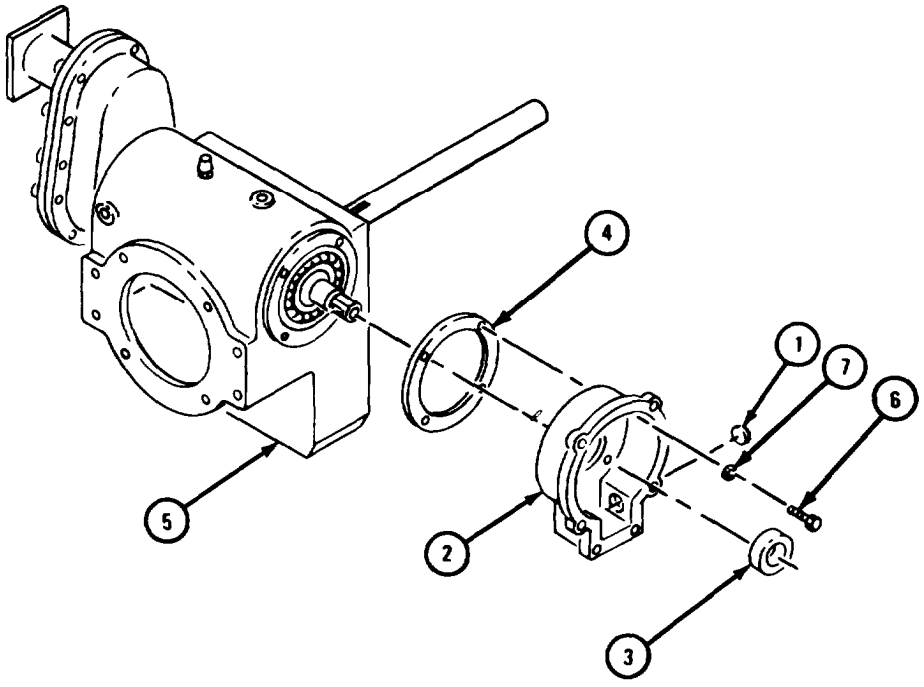
1. Drive expansion plug (1) into right side of brake housing case (2) as shown.
2. Press seal (3) into brake housing case (2).

NOTE

Be sure to put brake housing case (2) back in position as noted.

3. Put gasket (4) and assembled brake housing case (2) with seal (3) in place on gearcase (5), alining holes.
4. Put in four screws (6) and lockwashers (7).

GO TO FRAME 9

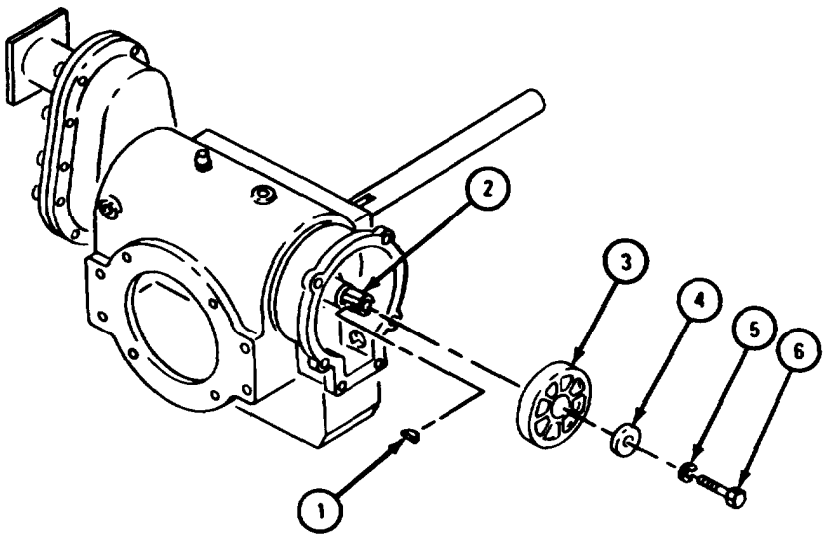


TA 088740

FRAME 9

1. Tap key (1) into slot in wormshaft (2).
2. Line up keyway in brake drum disk (3) with key (1), with flat side of disk towards wormshaft (2).
3. Tap brake drum disk (3) onto wormshaft (2) and key (1).
4. Put in flat washer (4), lockwasher (5), and screw (6).

GO TO FRAME 10

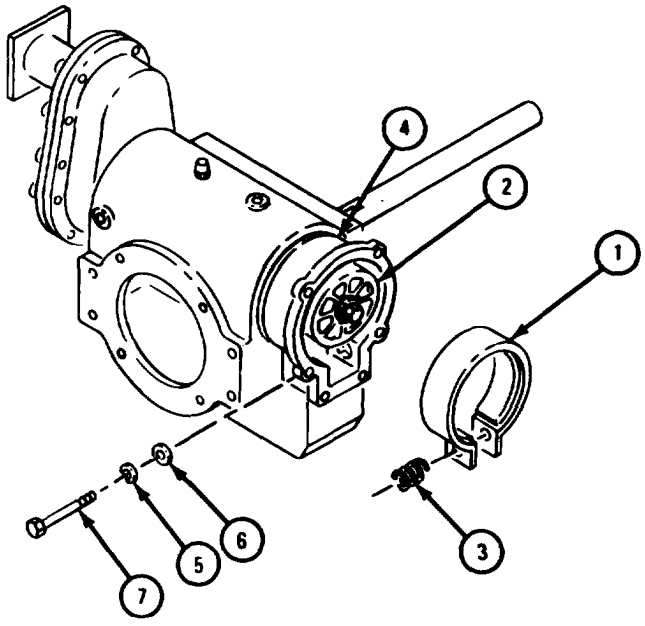


TA 088741

FRAME 10

1. Put brake band assembly (1) on brake drum disk (2).
2. Put spring (3) between screw holes in brake band assembly (1) and brake housing case (4).
3. Put flat washer (5) and packing (6) on screw (7) and put screw through brake housing case (4), spring (3), and brake band assembly (1).
4. Draw up brake band assembly (1) partway by turning in screw (7).

GO TO FRAME 11

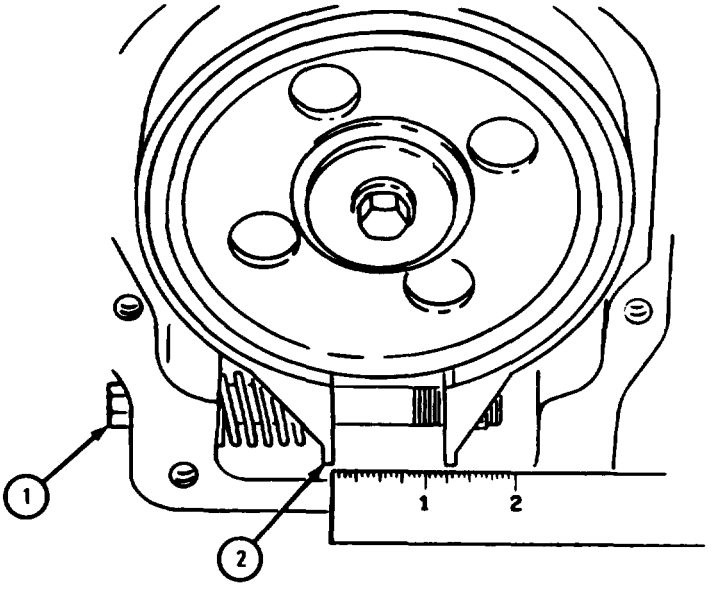


TA 088742

FRAME 11

1. Turn in screw (1) until gap in brake band assembly (2) is between 1 6/32 inches and 1 8/32 inches as shown.

GO TO FRAME 12

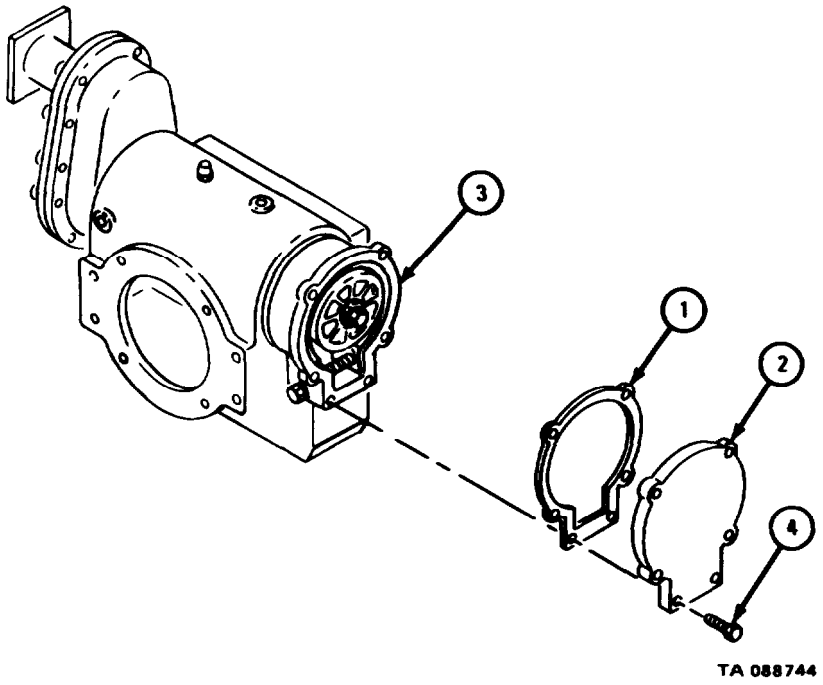


TA 088743

FRAME 12

1. Put gasket (1) and end case cover (2) on brake housing case (3), alining holes.
2. Put in six locking screws (4),

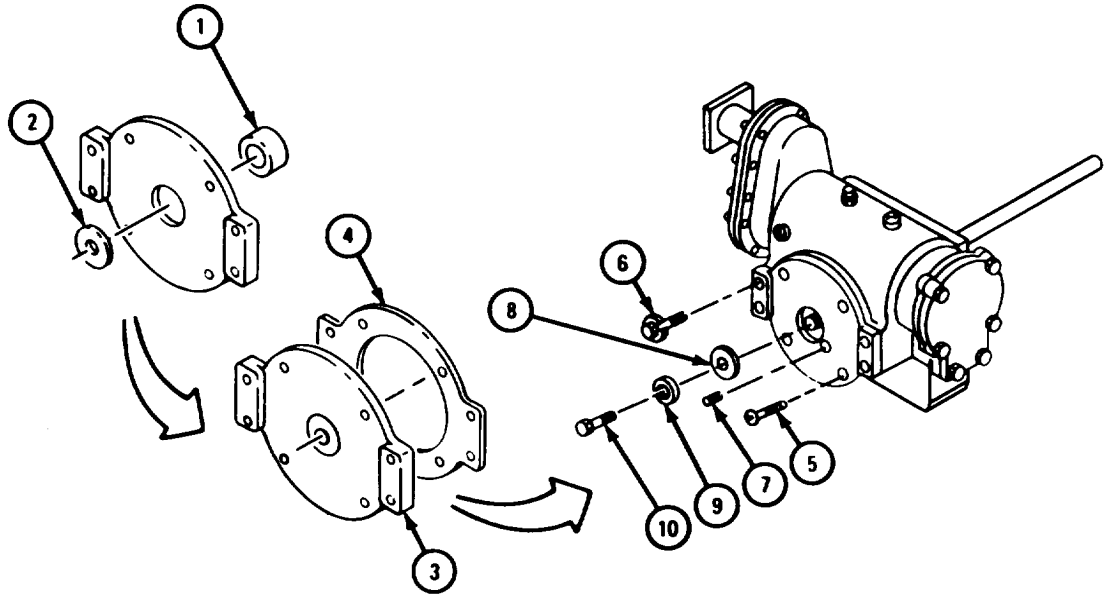
GO TO FRAME 13



FRAME 13

1. Press bushing (1) and seal (2) into gearcase cover (3).
2. Put gasket (4) and gearcase cover (3) in place.
3. Put in four screws (5).
4. Put in four screws and lockwashers (6).
5. Put in pipe plug (7).
6. Put in retaining washer (8), lockwasher (9), and screw (10).

GO TO FRAME 14

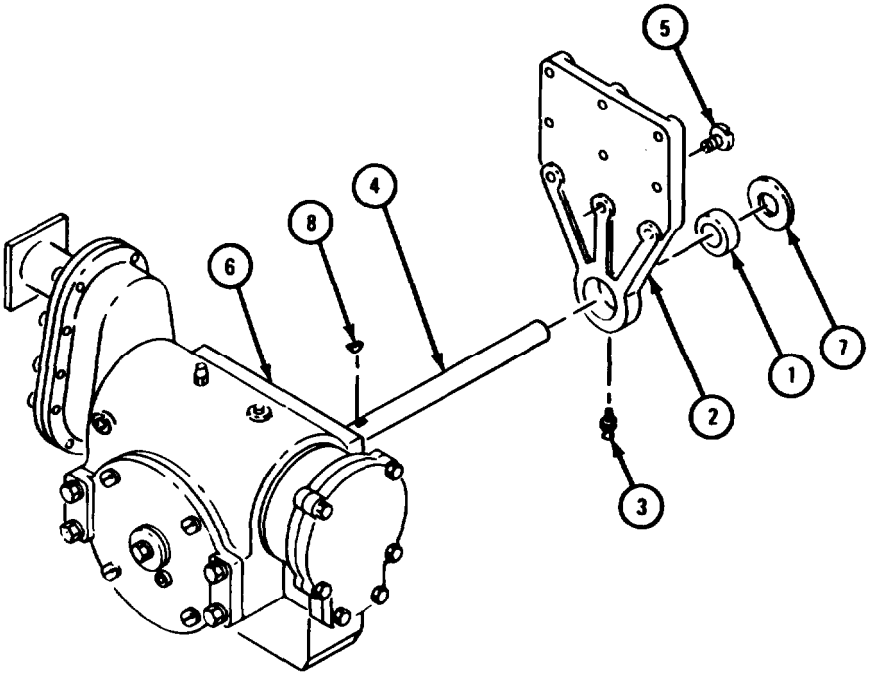


TA 088745

FRAME 14

1. Press inrushing (1), with lubrication hole in bushing lined up with hole in support (2).
2. Put in lubrication fitting (3).
3. Slide support (2) on shaft (4).
4. Put in screw (5) through support (2) and into gearcase (6).
5. Slide spacer washer (7) on shaft (4).
6. Tap two keys (8) into slots in shaft (4).

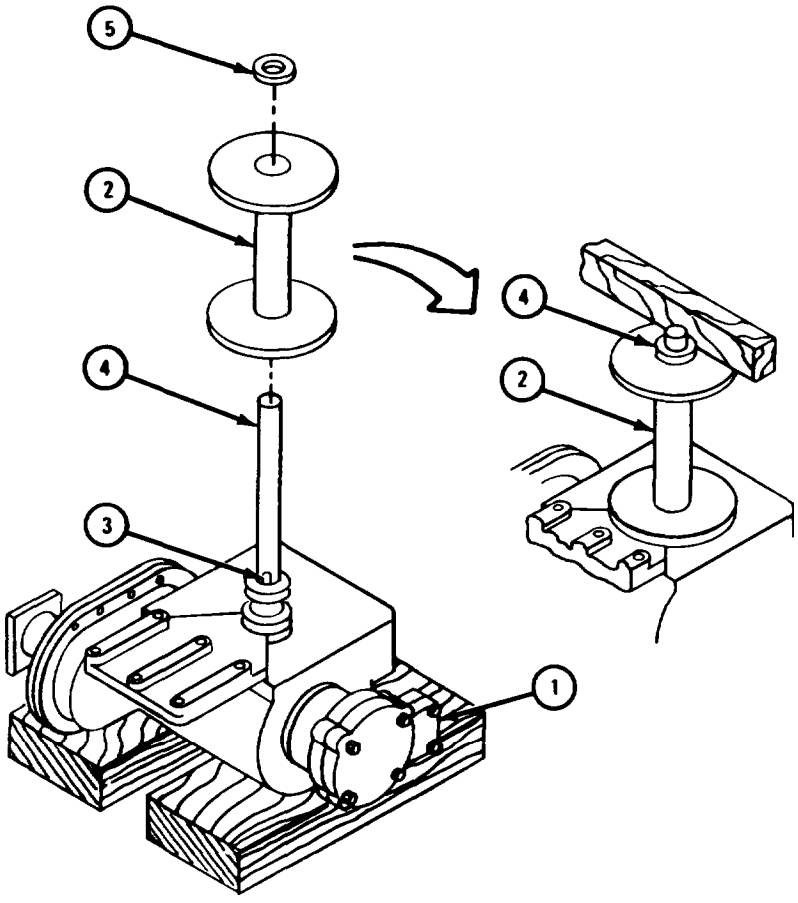
GO TO FRAME 15



FRAME 15

1. Put gearcase (1) on end on wood block as shown.
2. Line up keyways in drum (2) with two keys (3) in shaft (4) and slide drum onto shaft. Put spacer washer (5) on shaft.
3. Drive drum (2) all the way down on shaft (4).

GO TO FRAME 16

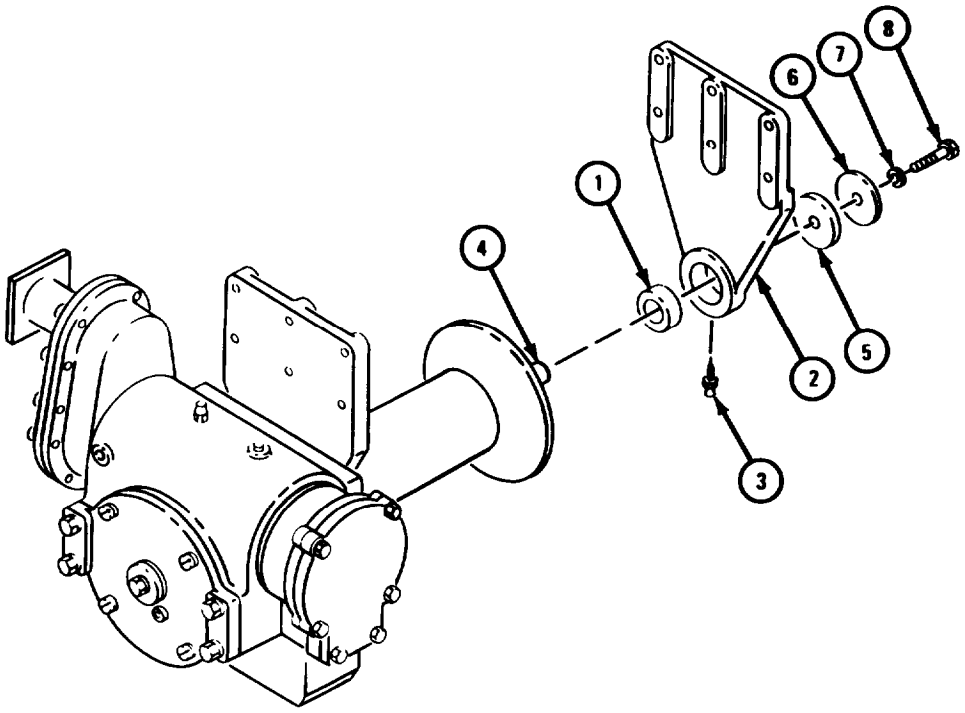


TA 088747

FRAME 16

1. Press in bushing (1), with lubrication hole in bushing lined up with hole in support (2).
2. Put in lubrication fitting (3).
3. Slide support (2) on shaft (4).
4. Put in shims (5), retaining washer (6), lockwasher (7), and screw (8).

GO TO FRAME 17

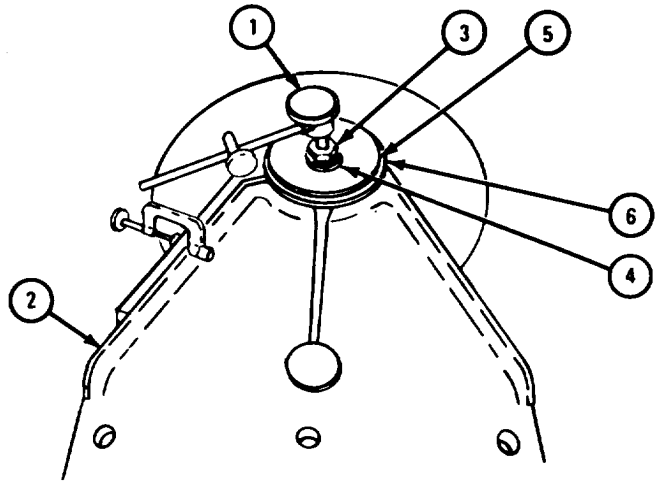


TA 088748

FRAME 17

1. Put dial indicator (1) on support (2) as shown with rod of dial indicator resting against head of screw (3).
2. Push and pull support (2) in and out and check that reading on dial indicator is between 0.005 and 0.015 inches.
3. If reading is between limits given, go to step 9. If reading is not between limits given, go to step 4.
4. Move dial indicator (1) out of the way.
5. Take out screw (3), lockwasher (4), and retaining washer (5).
6. If reading was more than 0.015 inches, take out shim (6). If reading was less than 0.005 inches, add another shim.
7. Put in retaining washer (5), lockwasher (4), and screw (3).
8. Do steps 1 through 3 again.
9. Take off dial indicator (1).

END OF TASK



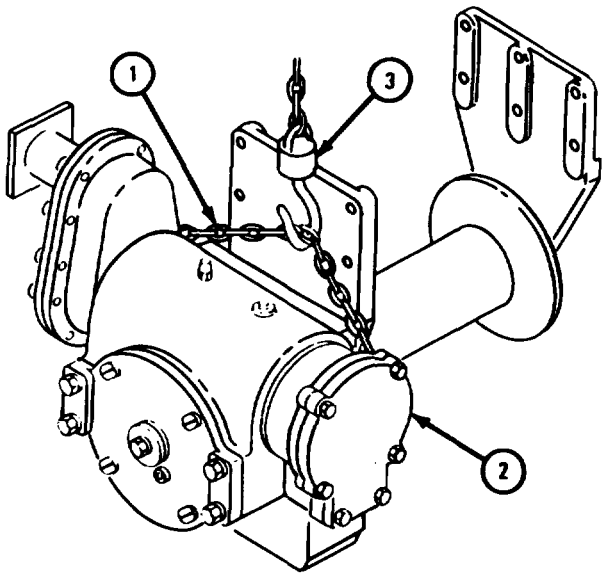
TA 088749

g. Replacement.

FRAME 1

1. Hook up chain (1) to hoist winch (2) as shown.
2. Hook chain hoist (3) to chain (1) as shown.

GO TO FRAME 2



TA 088750

FRAME 2

WARNING

Be careful when raising and positioning hoist winch on boom to prevent injury to personnel or damage to equipment.

Soldier A 1. Using chain hoist (1), raise winch (2) in position on boom (3).

Soldier B 2. As soldier A raises winch (2), hold support (4) and lift it into place.

3. Put in six screws and lockwashers (5).

Soldier A 4. Put in six screws and lockwashers (6).

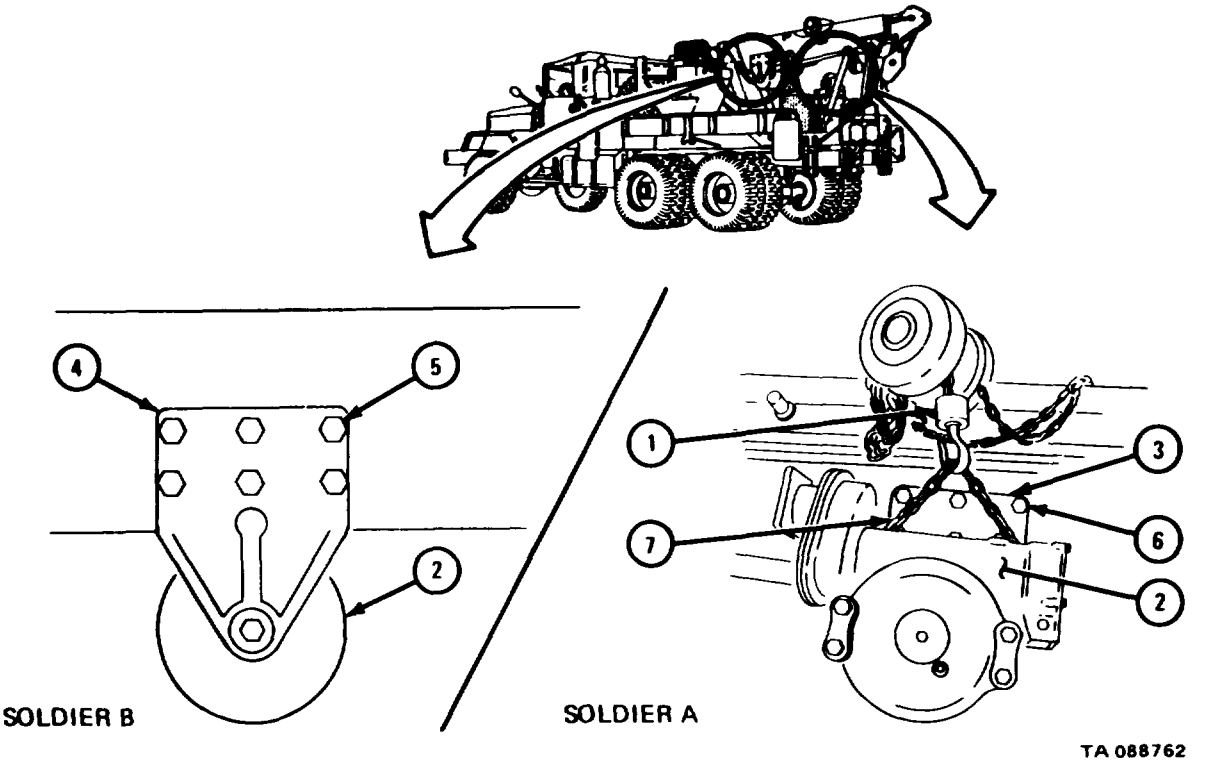
5. Take off chain hoist (1) and chain (7).

NOTE

Follow-on Maintenance Action Required:

1. Replace hoist winch motor on winch. Refer to para 17-17.
2. Oil and grease hoist winch assembly. Refer to LO 9-2320-260-12.
3. Replace hoist winch roller assemblies on boom. Refer to para 17-38.
4. Replace hoist winch cable on winch. Refer to TM 9-2320-260-20.

END OF TASK



17-19. DUMP BODY CONTROL VALVE ADAPTER ASSEMBLY REMOVAL, REPAIR, AND REPLACEMENT (TRUCK M51A2).

TOOLS: No special tools required

SUPPLIES: Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680
Clean dry rags

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Drain hydraulic oil reservoir. Refer to LO 9-2320-211-12.

(2) Remove hydraulic hoist pump propeller shaft. Refer to TM 9-2320-211-20.

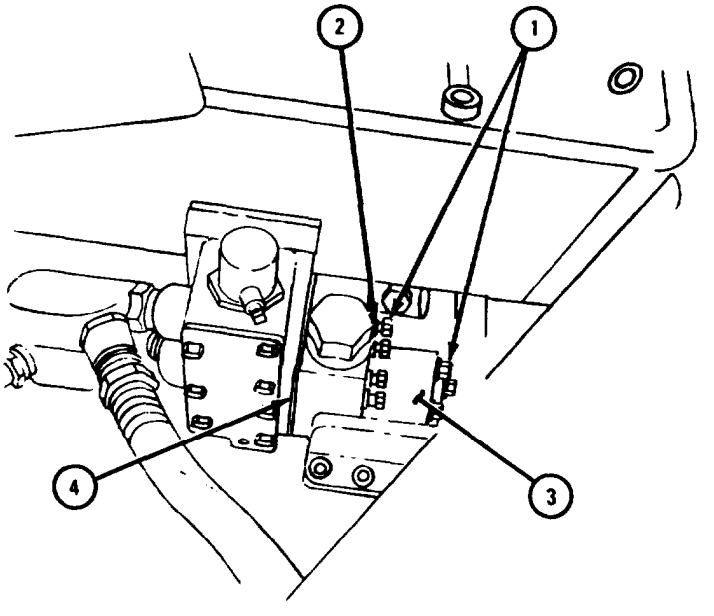
(3) Remove dump truck body hoist pump. Refer to TM 9-2320-211-20.

b. Removal.

FRAME 1

1. Take out eight cap screws (1) with washers (2).
2. Take off valve adapter (3) and gasket (4).

END OF TASK



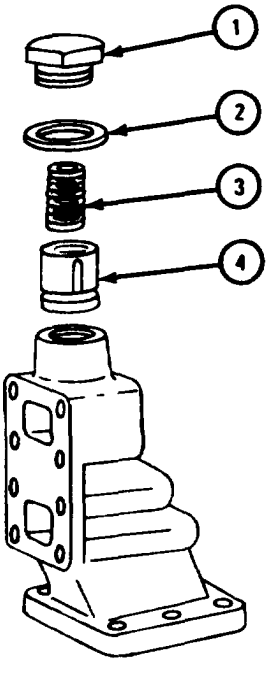
TA 102175

c. Disassembly.

FRAME 1

1. Take out plug (1) and washer (2).
2. Takeout spring (3).
3. Takeout plunger (4).

END OF TASK



TA 102176

d. Cleaning, Inspection and Repair.

FRAME 1

WARNING

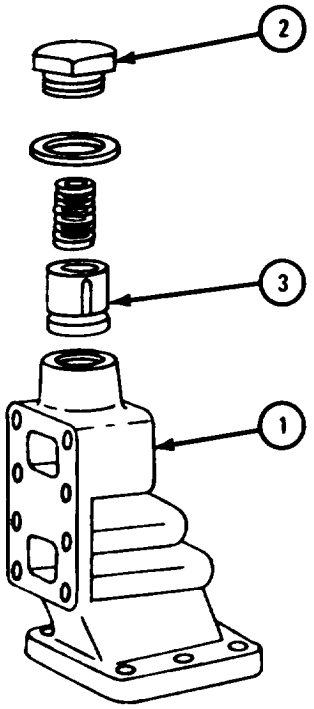
Cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do so may cause damage to equipment and injury to personnel.

1. Clean all parts with dry cleaning solvent, type II (SD-2), Fed. Spec P-D-680. Dry with clean rags.
2. Check that valve adapter (1) is not cracked. If valve adapter is cracked, get a new one.
3. Check threads on plug (2). If plug is damaged, get a new one.
4. Check wear on plunger (3) and valve adapter (1).

NOTE

Readings must be within wear limits given in table 17-6. L indicates a loose fit. If parts are not within wear limits, throw away plunger (3) and valve adapter (1) and get new ones.

END OF TASK



NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CAL LOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 102177

Table 17-6. Control Valve Adapter Wear Limits

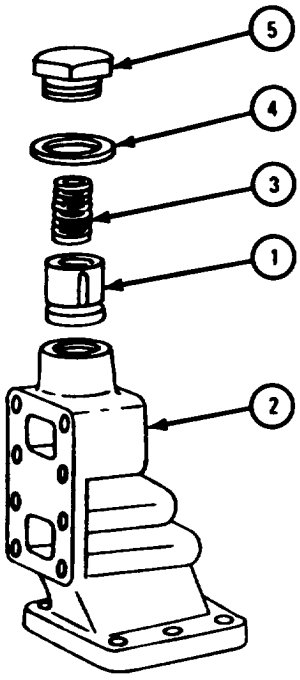
Index Number	Item /Point of Measurement	Size and Fit of New Parts (inches)	Wear Limit (inches)
1	Valve body	1.156 to 1.157	None
3	Plunger	1.154 to 1.155	None
1 and 2	Plunger in body	0.001L to 0.003L	None

e. Assembly.

FRAME 1

1. Put plunger (1) in valve adapter (2).
2. Put spring (3) on top of plunger (1).
3. Put washer (4) on plug (5). Put plug and washer into body.

END OF TASK



TA 102178

f. Replacement.

FRAME 1

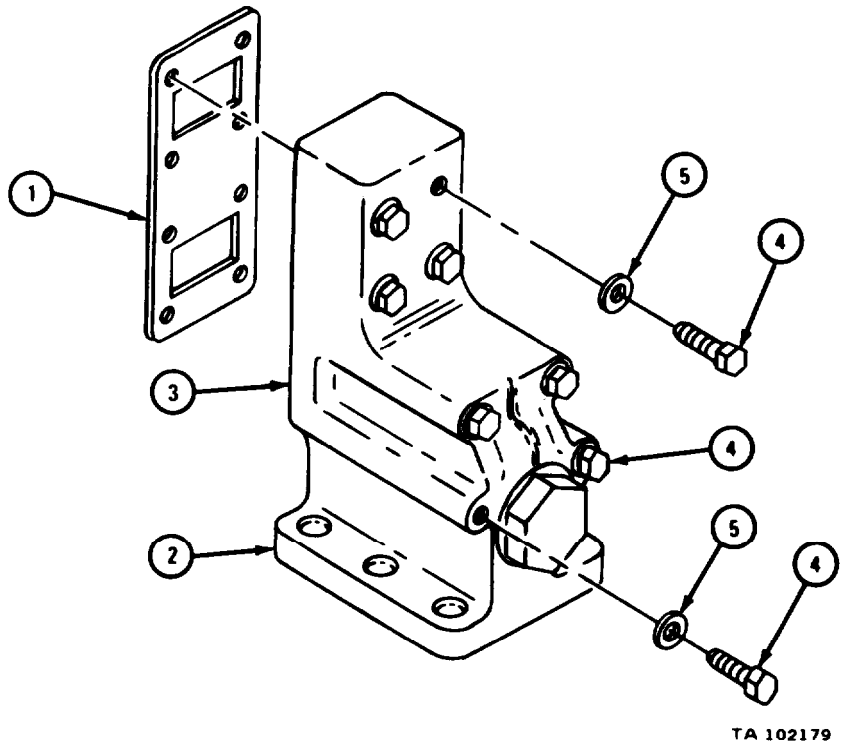
1. Put new gasket (1) against mount (2).
2. Hold valve adapter (3) against gasket (1).
3. Put in eight capscrews (4) with washers (5). Tighten capscrews.

NOTE

Follow-on Maintenance Action Required:

1. Replace dump truck body hoist pump. Refer to TM 9-2320-211-20.
2. Replace hydraulic hoist pump propeller shaft. Refer to TM 9-2320-211-20.
3. Check operation. Refer to TM 9-2320-211-10.

END OF TASK



TA 102179

17-20. HOIST CONTROL BOX ASSEMBLY REMOVAL, REPAIR, AND REPLACEMENT (TRUCK M51A2).

NOTE

There are two types of control boxes. One has the control valve lever on the left and the power takeoff lever on the right. The other control box has the power takeoff lever on the left and the control valve lever on the right. Since the task is the same for both control boxes, only the control box with the control valve lever on the left is shown.

TOOLS: No special tools required

SUPPLIES: Cover gasket
Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Raise dump body as high as it will go. Refer to TM 9-2320-211-10.

(2) Lock hoist braces under dump body. Refer to TM 9-2320-211-20.

b. Removal.

FRAME 1

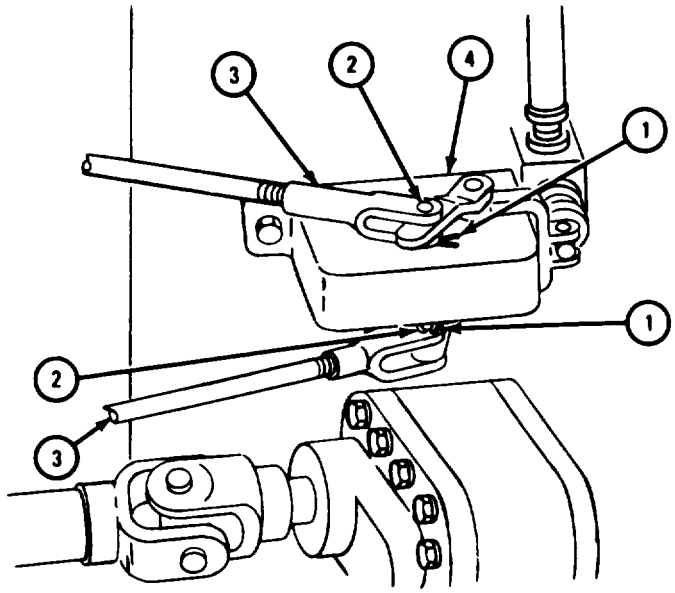
1. Takeout cotter pins (1).

NOTE

If pins (2) are rusted drive out pins (2) with hammer and punch.

2. Take out pins (2).
3. Move rods (3) away from control box assembly (4).

GO TO FRAME 2

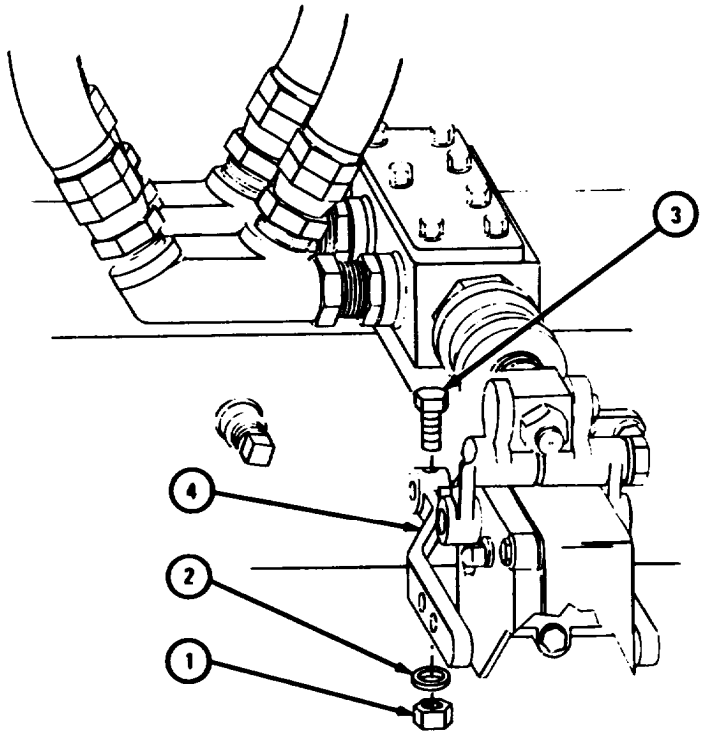


TA 085977

FRAME 2

1. Take off nut (1), washer (2), take out screw (3) and take off lever arm (4).

GO TO FRAME 3



TA 085978

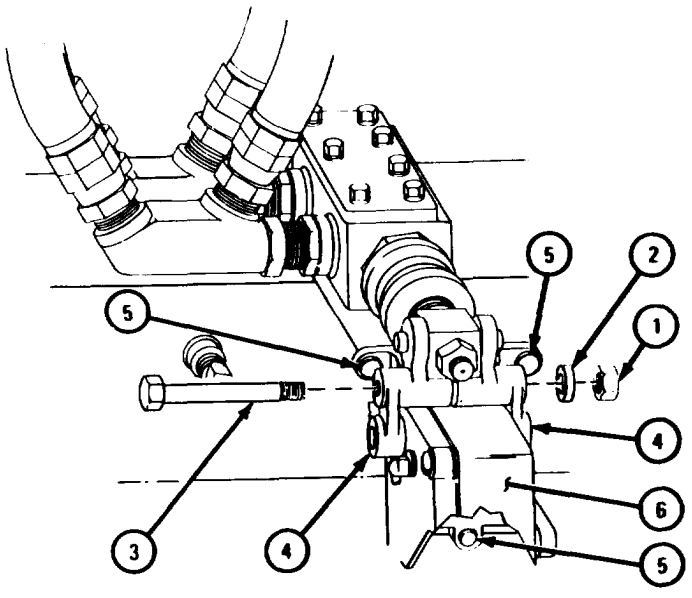
FRAME 3

NOTE

Hold control box assembly (6) when taking out screw so control box assembly will not fall.

1. Take off nut (1) and lockwasher (2).
2. Pull out screw (3) and take off control box levers (4).
3. Take off three screws (5).
4. Take off control box assembly (6).

END OF TASK



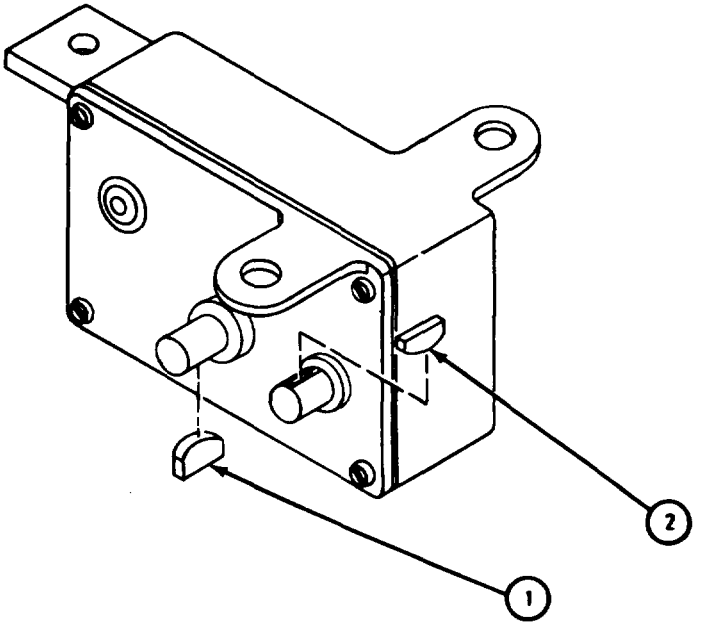
TA 085979

c. Disassembly.

FRAME 1

1. Take out woodruff keys (1 and 2).

GO TO FRAME 2

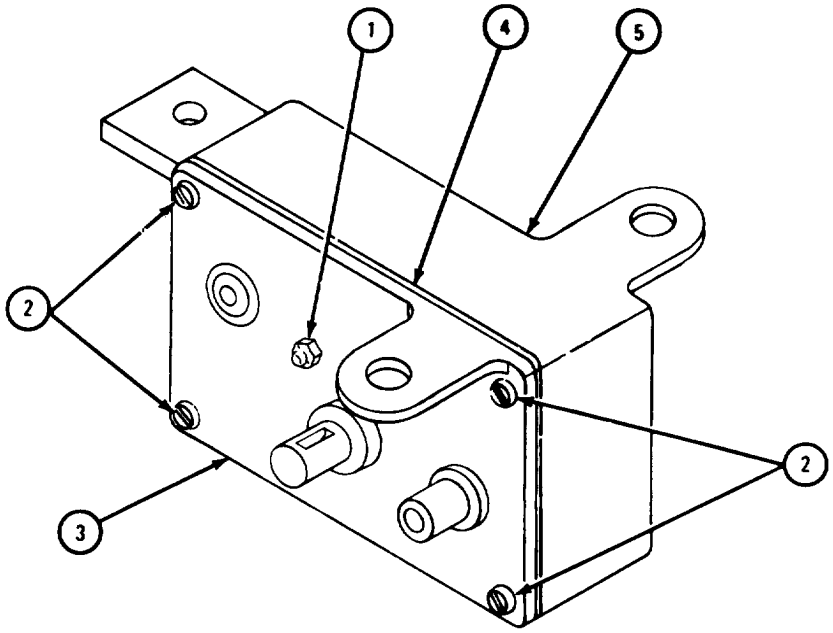


TA 085980

FRAME 2

1. Take out lubrication fitting (1).
2. Take out four screws (2).
3. Take control box cover (3) with control box cover gasket (4) off control box housing (5). Throw away gasket.

GO TO FRAME 3

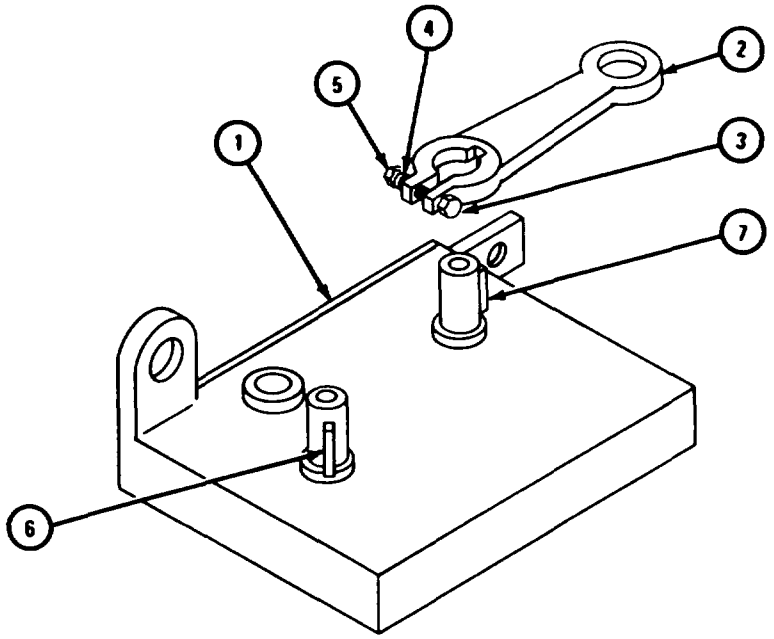


TA 085981

FRAME 3

1. Turn control box housing (1) so lever (2) is facing up.
2. Take out screw (3), lockwasher (4), and nut (5).
3. Take off control box lever (2).
4. Using hammer and punch, take out woodruff keys (6 and 7).

GO TO FRAME 4

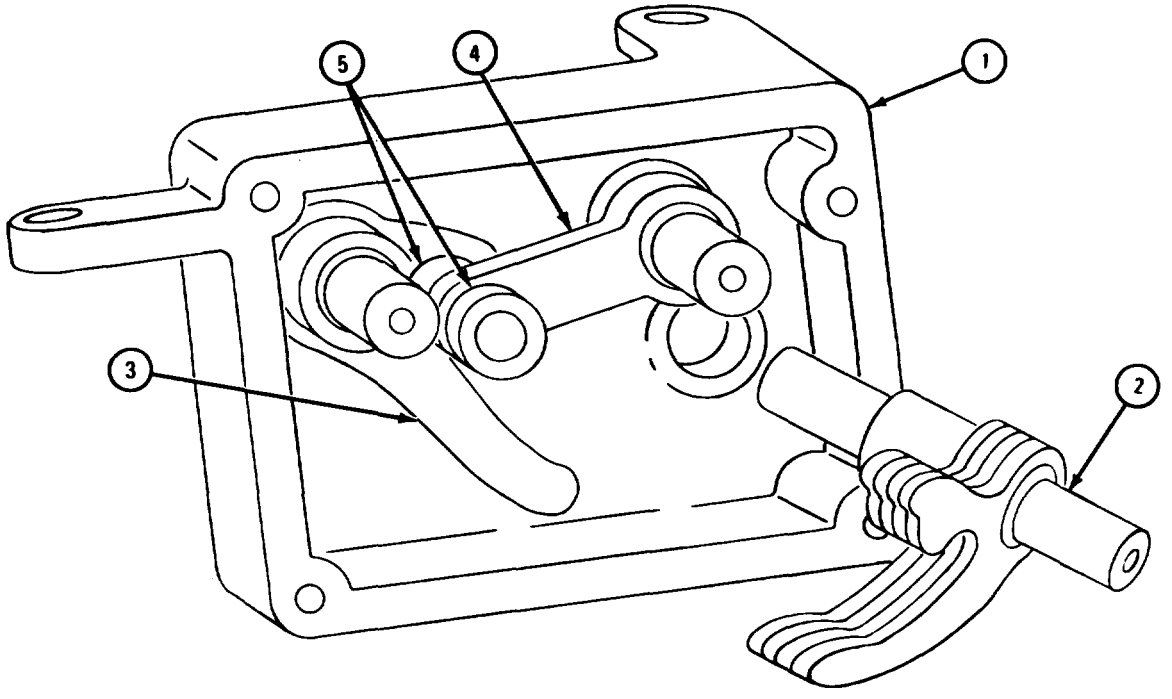


TA 085982

FRAME 4

1. Turn control box housing (1) so cam and shaft assemblies (2 and 3) and lever (4) can be seen.
2. Take out cam and shaft assembly (2).
3. Take out lever (3) and roller (5).
4. Take out cam and shaft assembly (5).

GO TO FRAME 5

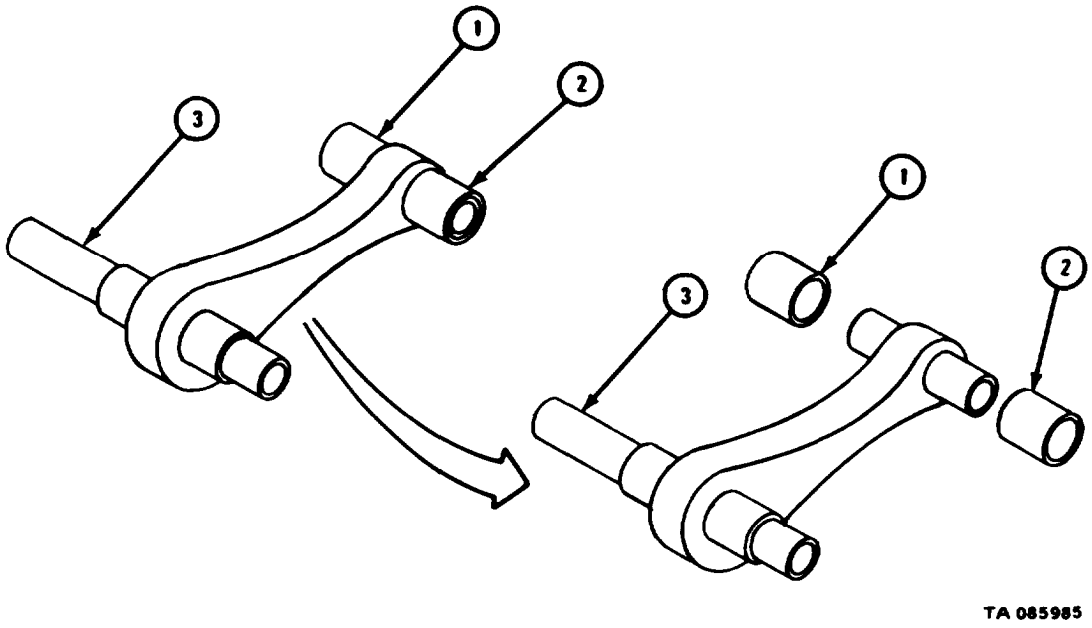


TA 085983

FRAME 5

1. Take rollers (1 and 2) off control box lever (3).

END OF TASK



d. Cleaning.

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

(1) Clean all parts with solvent.

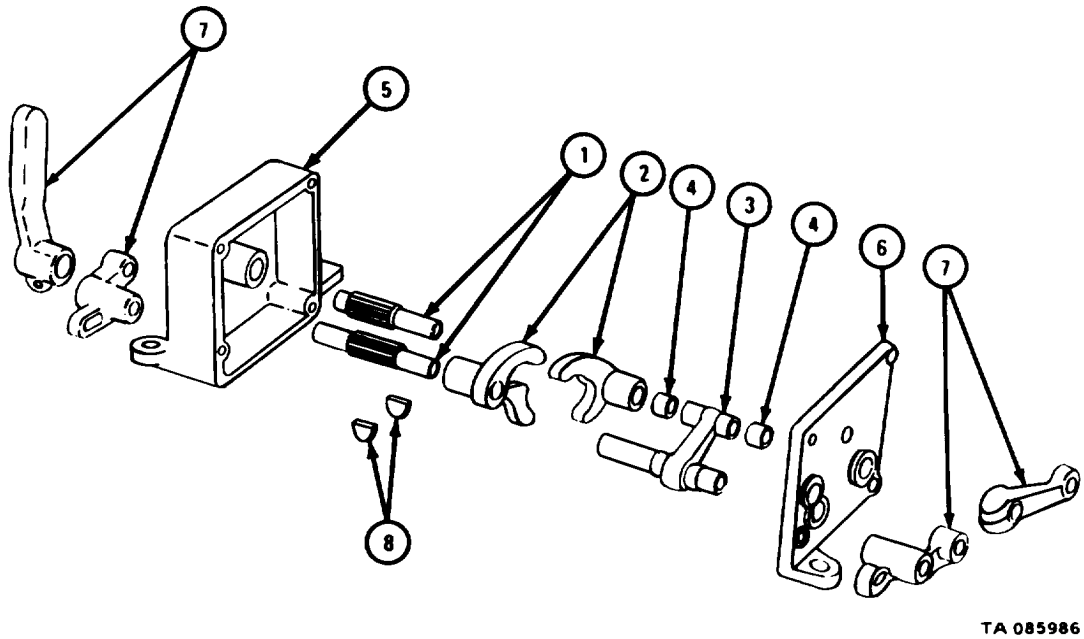
(2) Let parts dry.

e. Inspection and Repair.

FRAME 1

1. Check that shafts (1) and cams (2) have no worn or damaged areas, nicks or burrs. Throw away damaged parts and get new ones in their place.
2. Check that control box lever (3) and rollers (4) have no worn or damaged areas, nicks or burrs. Throw away damaged parts and get new ones in their place.
3. Check that control box housing (5) and cover (6) are not cracked or damaged. Throw away damaged parts and get new ones in their place.
4. Check that control box levers (7) are not cracked, bent, or damaged in any other way. If control box levers are damaged or bent, throw them away and get new ones in their place.
5. Check that woodruff keys (8) are not damaged or worn. Replace keys with new keys if damaged.

END OF TASK

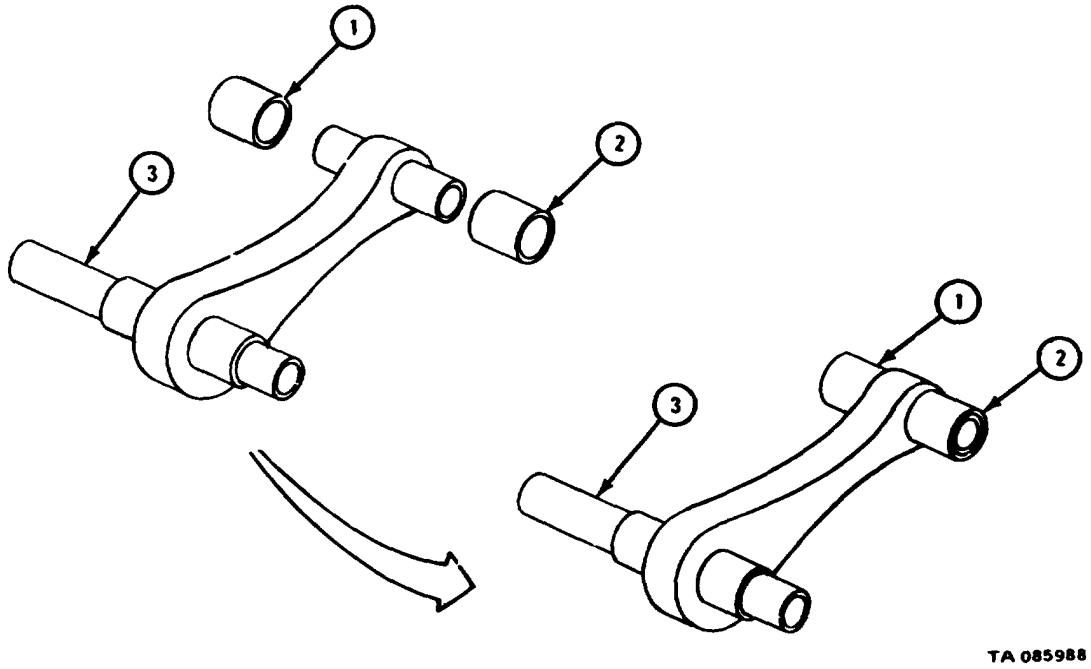


f. Assembly.

FRAME 1

1. Put rollers (1 and 2) onto control box lever (3) as shown.

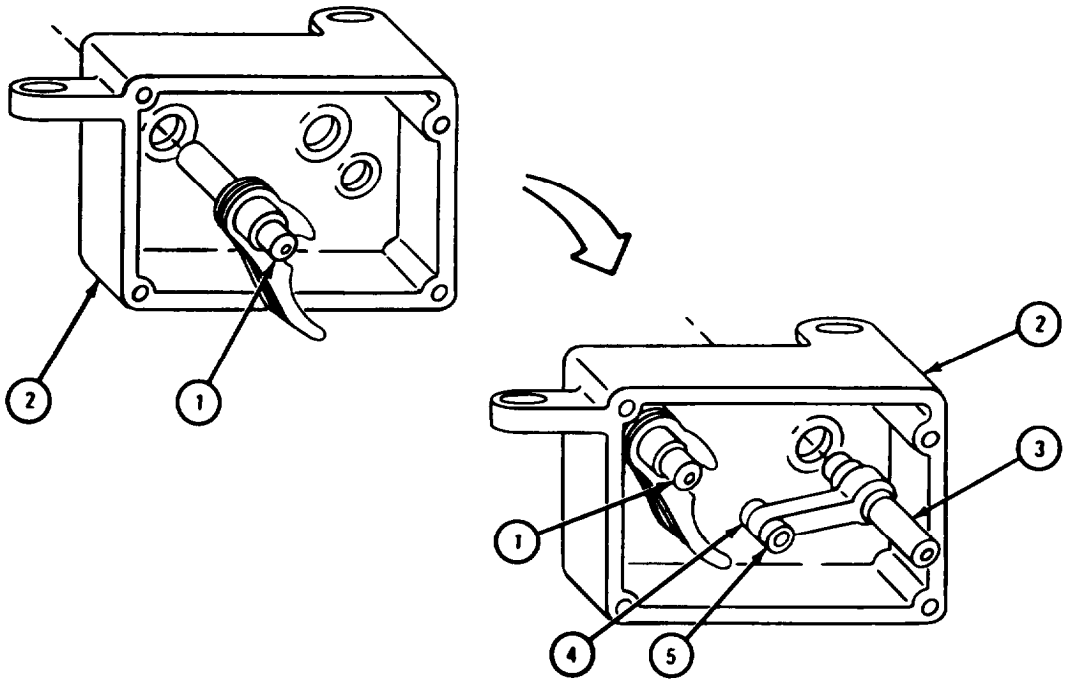
GO TO FRAME 2



FRAME 2

1. Put cam and shaft assembly (1) into control box housing (2) as shown with large lobe out._
2. Put control box lever (3) with rollers (4 and 5) into control box housing (2), putting roller (4) into notch of cam and shaft assembly (1).

GO TO FRAME 3

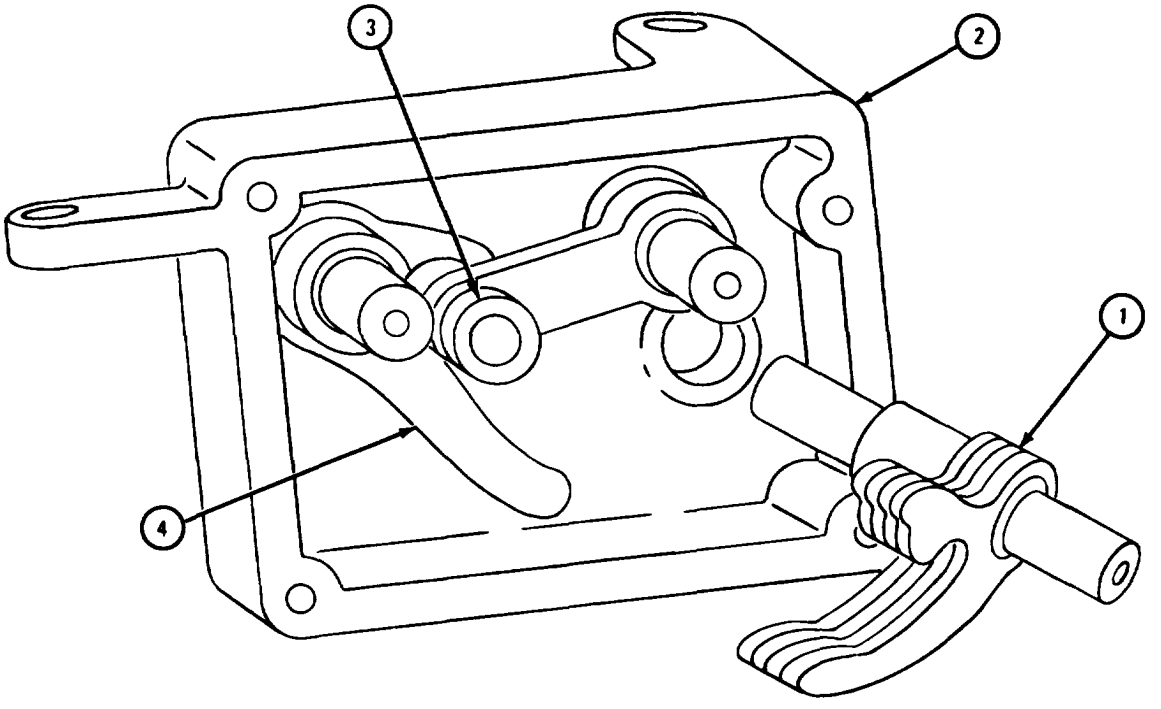


TA 085989

FRAME 3

1. Put cam and shaft assembly (1) into control box housing (2), alining notches in cam and shaft assembly (1) with roller (3) and cam and shaft assembly (4) with large lobe in.

GO TO FRAME 4

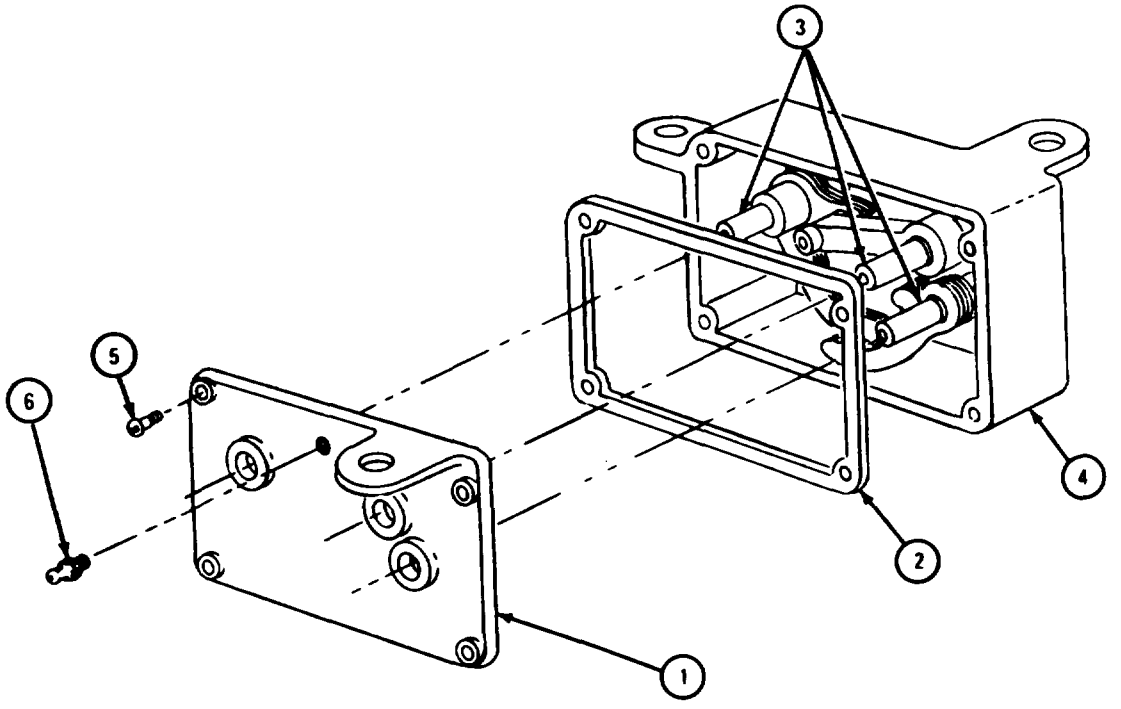


TA 085990

FRAME 4

1. Aline four holes in control box cover (1) with holes in control box cover gasket (2).
2. Aline three holes in control box cover (1) with three shafts (3). Put control box cover gasket (2) on control box cover housing (4).
3. Put m four screws (5).
4. Put in lubrication fitting (6).

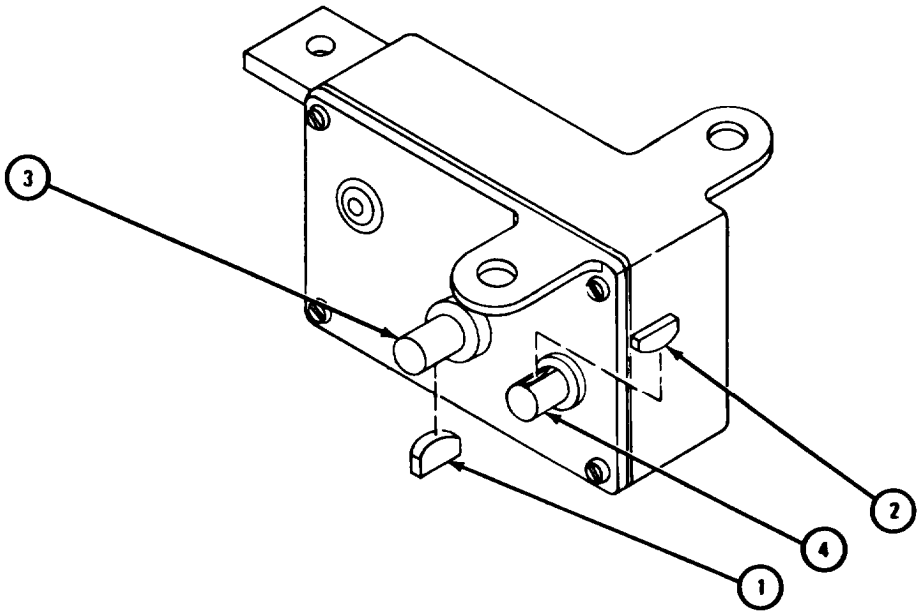
GO TO FRAME 5



FRAME 5

1. Using hammer and punch, tap woodruff keys (1 and 2) into shafts (3 and 4).

GO TO FRAME 6

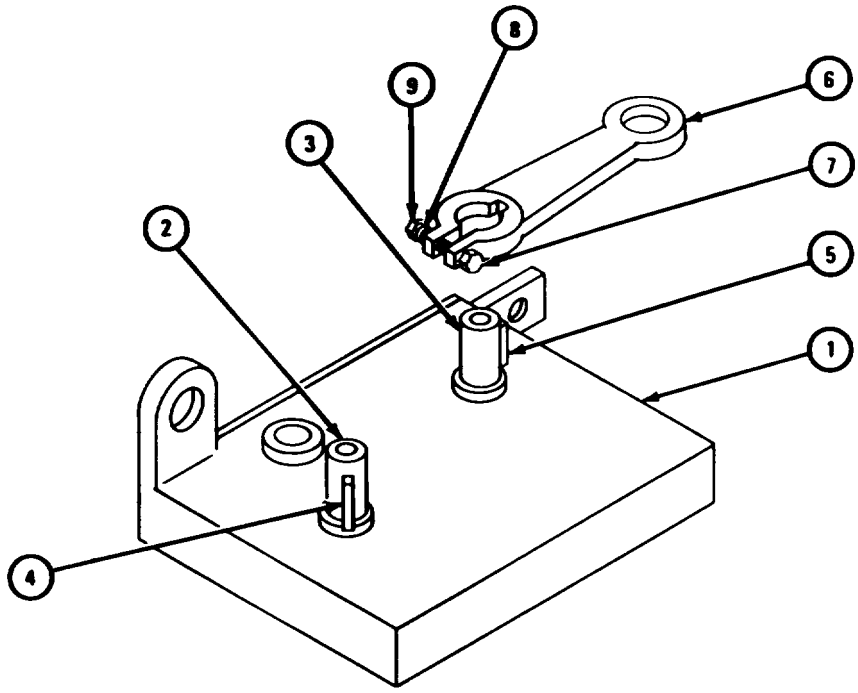


TA 085992

FRAME 6

1. Turn control box housing (1) so shafts (2 and 3) are facing up.
2. Using hammer and punch, tap woodruff keys (4 and 5) into shafts (2 and 3).
3. Aline woodruff key (5) in shaft (3) with notch in lever (6).
4. Put lever (6) onto shaft (3).
5. Put screw (7) into lever (6) and put on lockwasher (8) and nut (9).

END OF TASK



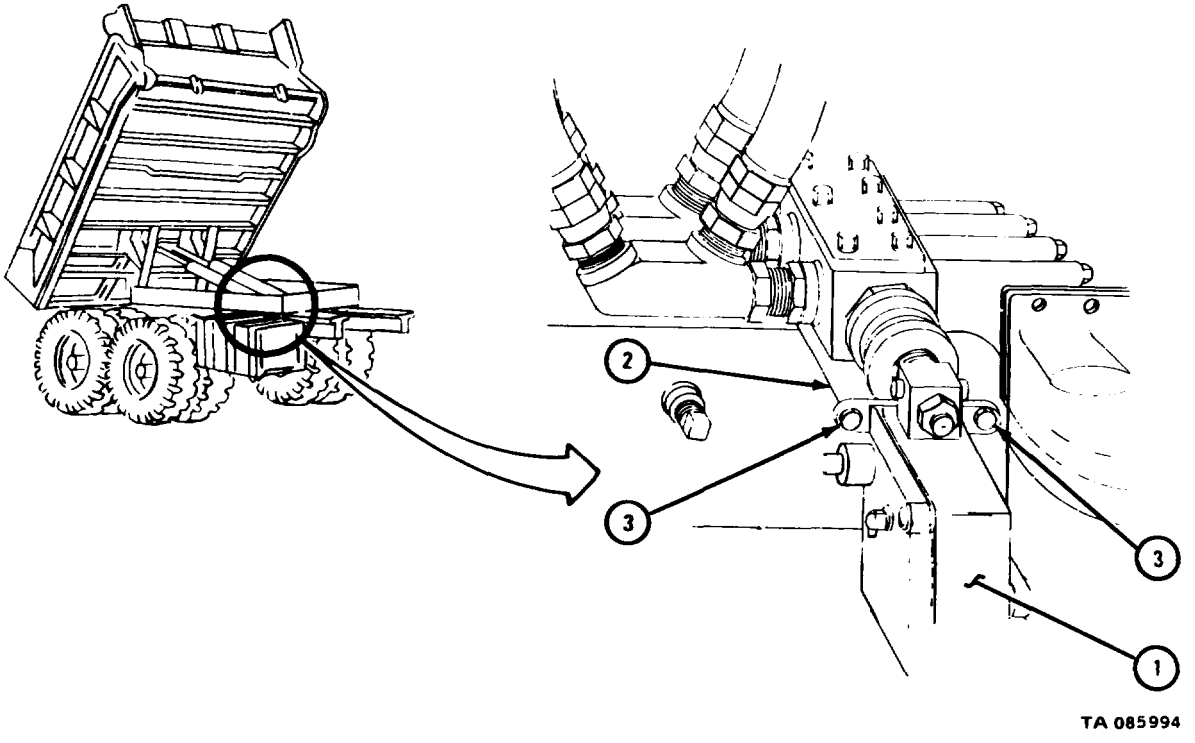
TA 085993

g. Replacement.

FRAME 1

1. Aline holes in control box assembly (1) with holes in truck subframe assembly (2) and put control box assembly (1) on truck subframe (2).
2. Put in two screws (3).

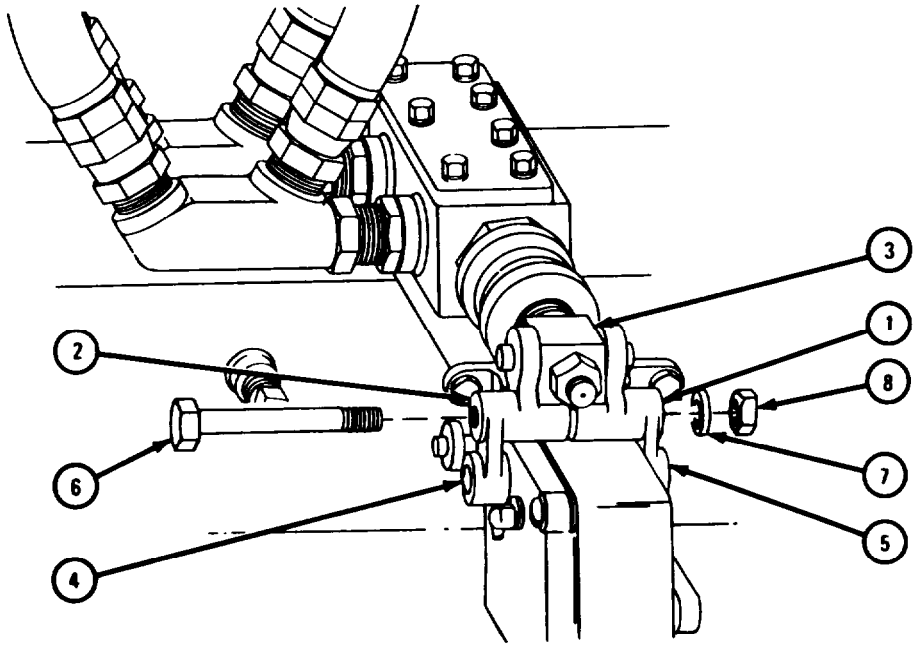
GO TO FRAME 2



FRAME 2

1. Aline keys, put control box levers (1 and 2) onto trunnion (3), and control box assembly shafts (4 and 5).
2. Push screw (6) through control box levers (1 and 2) and put on lockwasher (7) and nut (8).

GO TO FRAME 3

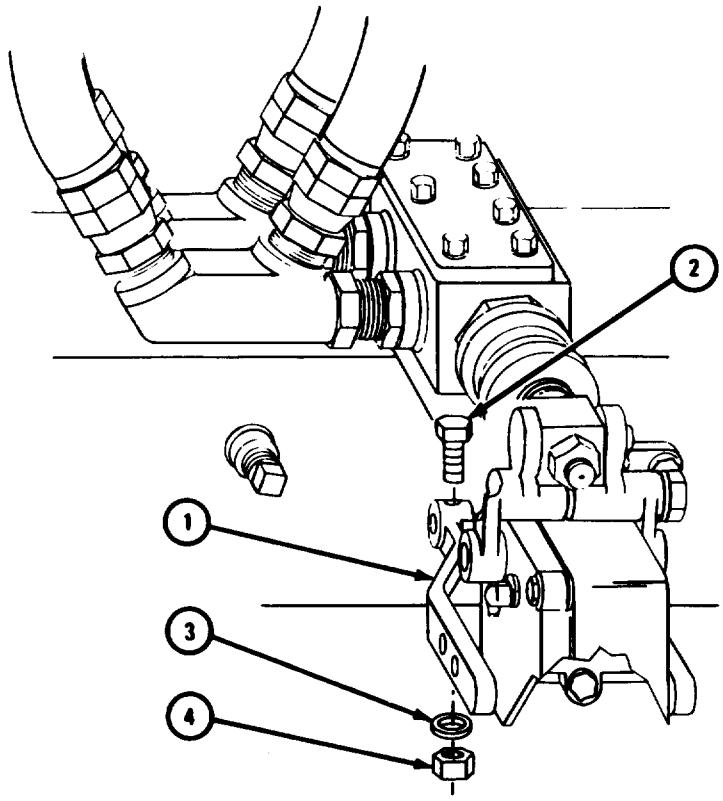


TA 085995

FRAME 3

1. Put lever (1) on control box, put screw (2) through lever (1).
2. Put on washer (3) and nut (4) and tighten.

GO TO FRAME 4



TA 102730

FRAME 4

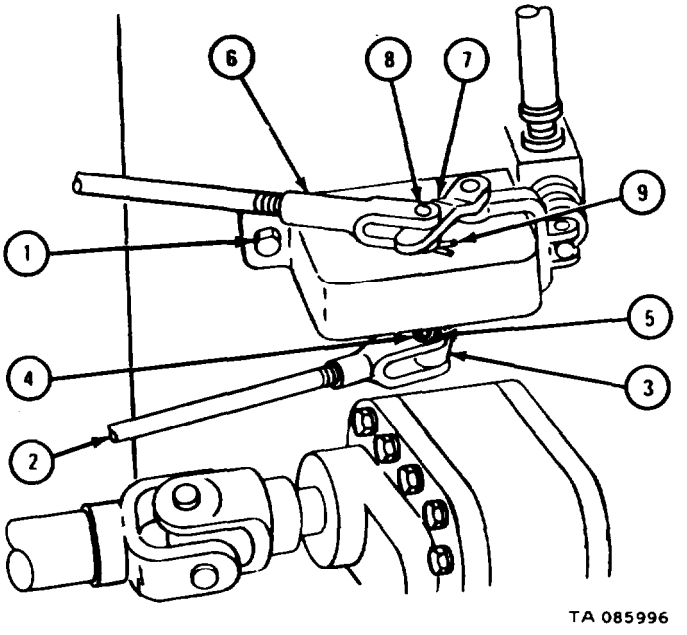
1. Put in screw (1).
2. Aline hole in rod (2) with hole in control box lever (3) and put in pin (4).
3. Put cotter pin (5) into hole in end of pin (4).
4. Aline hole in rod (6) with hole in control box lever (7) and put in pin (8).
5. Put cotter pin (9) into hole in end of pin (7).

NOTE

Follow-on Maintenance Action Required:

1. Lubricate control box assembly. Refer to LO 9-2320-211-12.
2. Unlock and lower hoist braces under dump body. Refer to TM 9-2320-211-20.
3. Lower dump body. Refer to TM 9-2320-211-10.
4. Check dump body for proper operation. Refer to TM 9-2320-211-10.

END OF TASK



17-21. CONTROL VALVE ASSEMBLY REPAIR (TRUCK M51A2).

TOOLS: No special tools required

SUPPLIES: Valve spool packing
Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680

PERSONNEL: One

EQUIPMENT CONDITION: Control valve assembly on bench.

a. Preliminary Procedures.

(1) Remove dump truck body hoist pump. Refer to TM 9-2320-211-20.

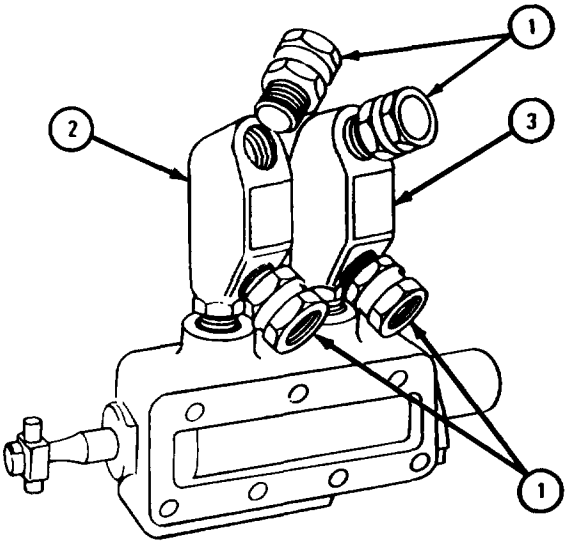
(2) Remove control valve assembly. Refer to TM 9-2320-211-20.

b. Disassembly.

FRAME 1

1. Take out four flexible line unions (1).
2. Take out manifolds (2 and 3).

GO TO FRAME 2

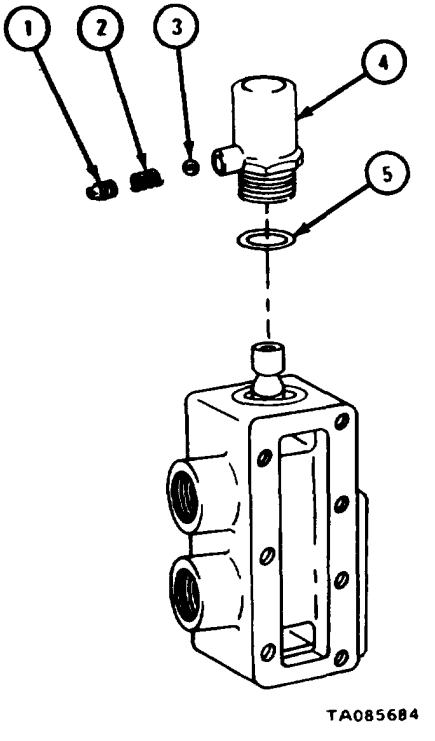


TA085683

FRAME 2

1. Takeout pipe plug (1), poppet ball spring (2), and poppet ball (3).
2. Takeout control valve end cap (4) and washer (5).

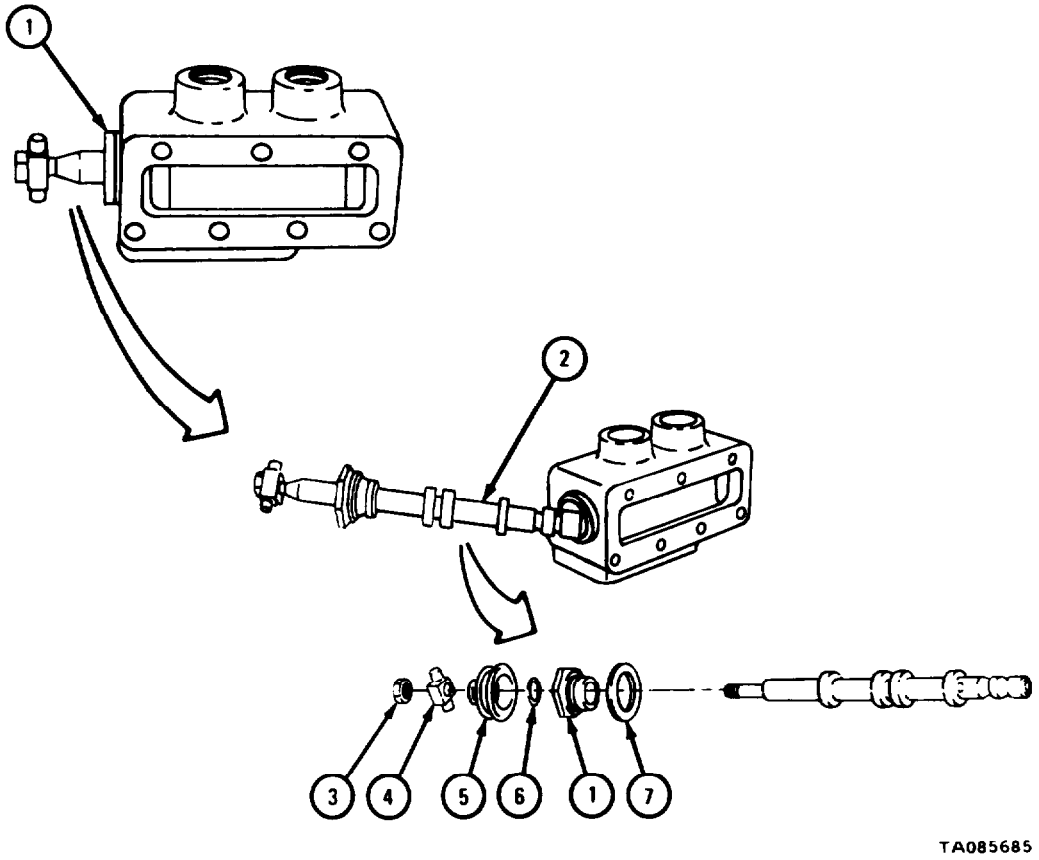
GO TO FRAME 3



FRAME 3

1. Unscrew spool retaining plug (1).
2. Pull out valve spool assembly (2).
3. Take off jamnut (3), spool trunnion (4), boot (5), packing (6), spool retaining plug (1), and washer (7). Throw away packing.

END OF TASK



c. Cleaning.

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

(1) Clean all parts in solvent. Make sure you do not damage valve spool

(2) Make sure all oil passages are open.

(3) Let parts dry.

d. Inspection and Repair.

FRAME 1

1. Check that manifolds (1 and 2) and four flexible line unions (3) do not have any stripped threads or cracks. Throw away damaged parts and get new ones in their place.
2. Check that control valve body (4) is not cracked, scratched or worn. If control valve body is damaged, get a new one.

NOTE

Control valve spool (9) and control valve body (4) are matched parts, and must be replaced as an assembly.

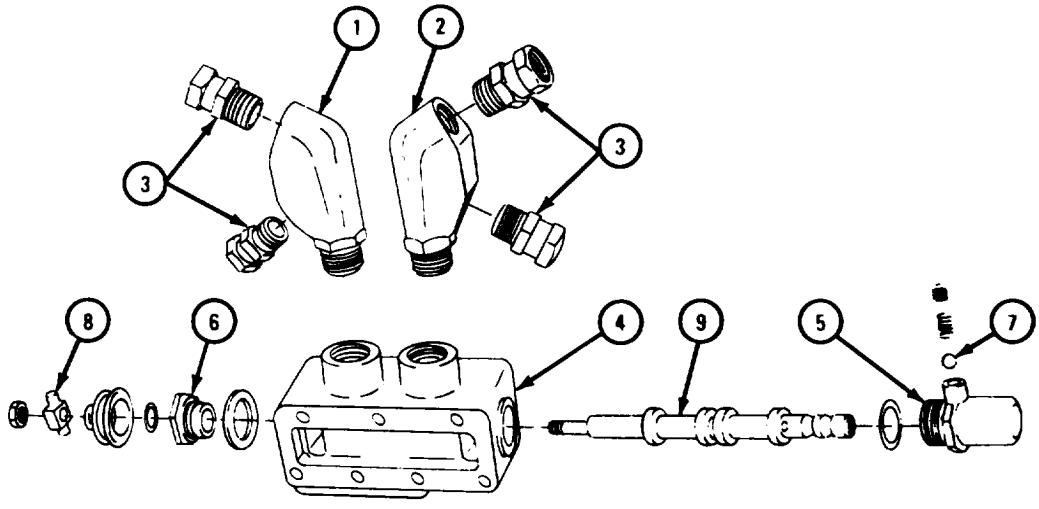
3. Check that threads on end cap (5) and spool retaining plug (6) are not stripped. If parts are damaged, get new ones in their place.
4. Check that inside of end cap (5) is not worn. Check that poppet ball (7) is not pitted or worn. If parts are damaged, get new ones in their place.
5. Check that spool trunnion (8) is not worn or cracked. If spool trunnion is damaged, get a new one in its place.

NOTE

Control valve spool (9) and control valve body (4) are matched parts, and must be replaced as an assembly.

6. Check that control valve spool (9) is not cracked or nicked. Use a fine file to take off scratches or nicks. If control valve spool is damaged, get a new control valve spool and control valve body (4).

END OF TASK



NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

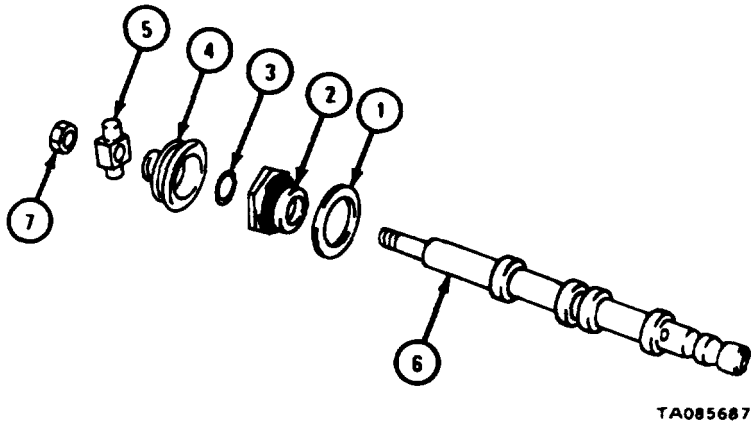
TA085686

e. Assembly.

FRAME 1

1. Put washer (1) onto spool retaining plug (2).
2. Put spool retaining plug (2) with washer (1), packing (3), boot (4), and spool trunnion (5) onto threaded end of control valve spool (6).
3. Put on jamnut (7).

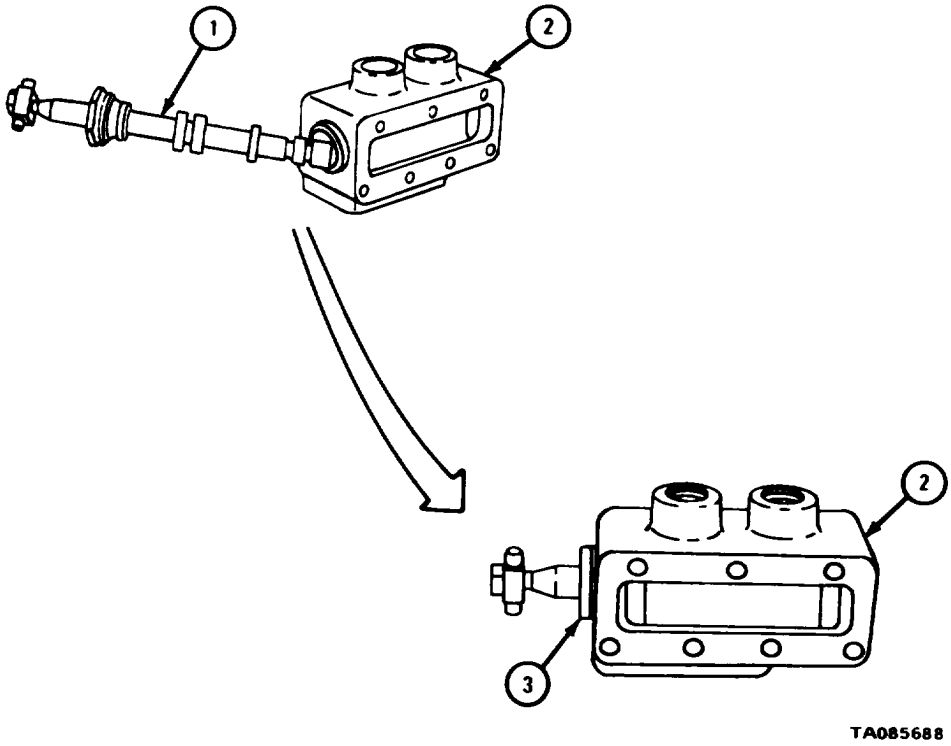
GO TO FRAME 2



FRAME 2

1. Push control valve spool (1) into bore of control valve body (2) as shown.
2. Screw spool retaining plug (3) into control valve body (2).

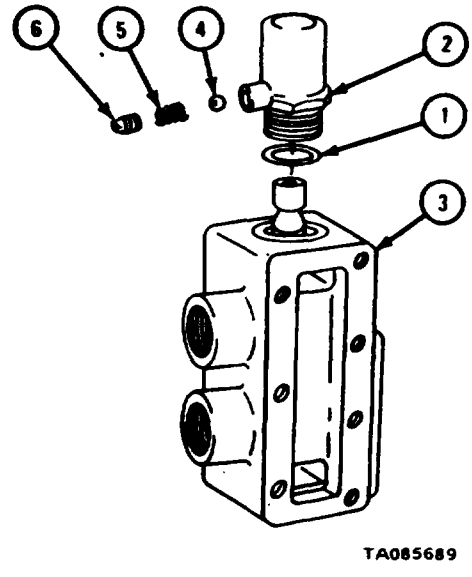
GO TO FRAME 3



FRAME 3

1. Put washer (1) onto end cap (2).
2. Put end cap (2) with washer (1) into valve control body (3).
3. Put poppet ball (4), poppet ball spring (5), and pipe plug (6) into end cap (2).

GO TO FRAME 4



FRAME 4

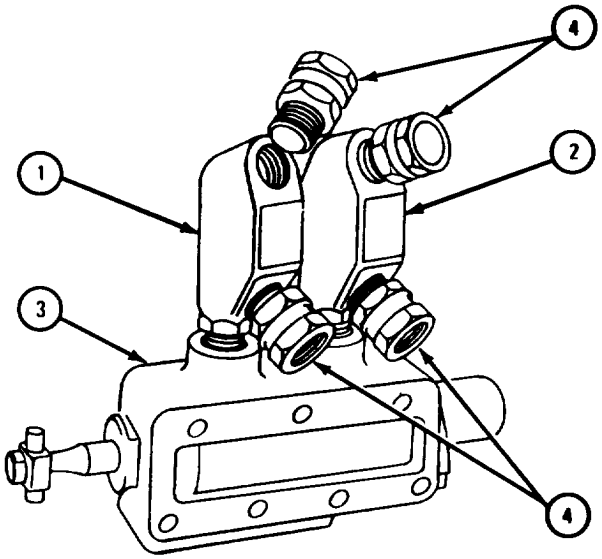
1. Put manifolds (1 and 2) into control valve body (3).
2. Put four flexible line unions (4) into manifolds (1 and 2).

NOTE

Follow-on Maintenance Action Required:

1. Replace control valve assembly. Refer to TM 9-2320-211-20.
2. Replace dump truck body hoist pump. Refer to TM 9-2320-211-20.
3. Fill hydraulic reservoir. Refer to LO 9-2320-211-12.
4. Check operation of control valve assembly. Refer to TM 9-2320-211-10.

END OF TASK



TA085690

17-22. HOIST CONTROL LINKAGE REMOVAL, REPAIR, AND REPLACEMENT (TRUCK M51A2).

TOOLS: No special tools required

SUPPLIES: Tags

PERSONNEL: Two

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Removal.

FRAME 1

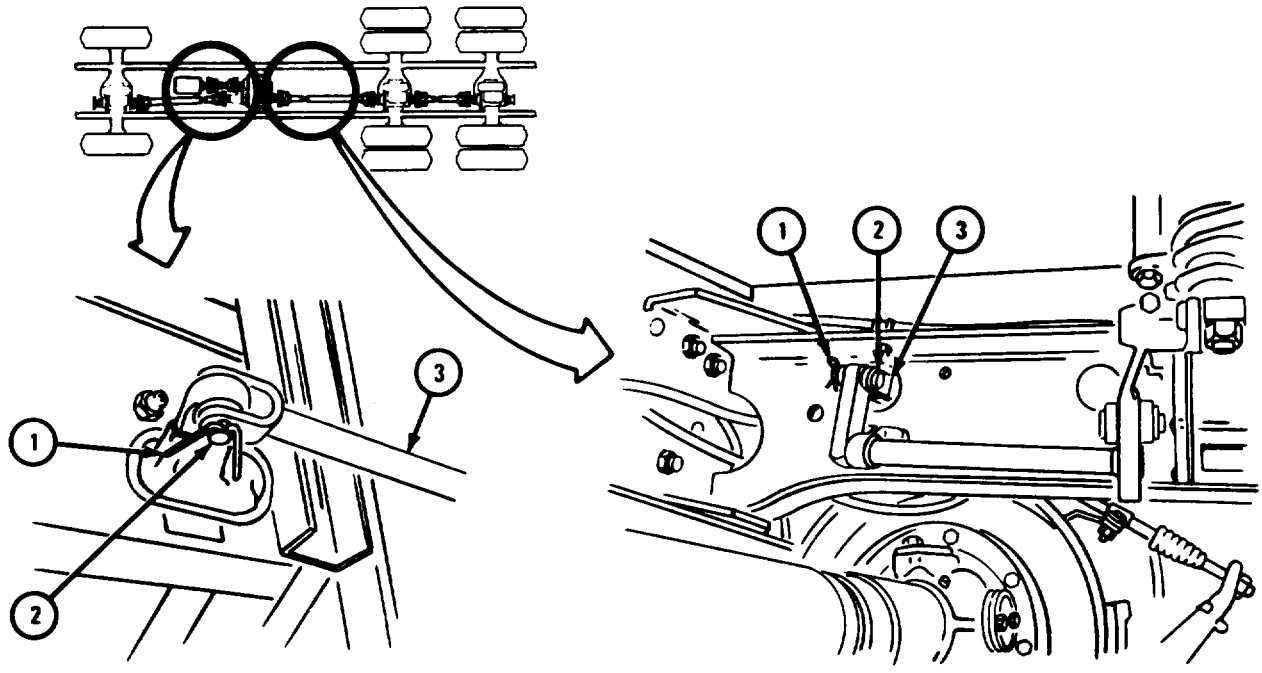
1. Take out cotter pin (1).

NOTE

If clevis pin (2) is rusted in place, drive it out.

2. Take out clevis pin (2).
3. Do steps 1 and 2 again at rear end of hand lever rod assembly (3). Take out hand lever rod assembly.

GO TO FRAME 2



FRAME 2

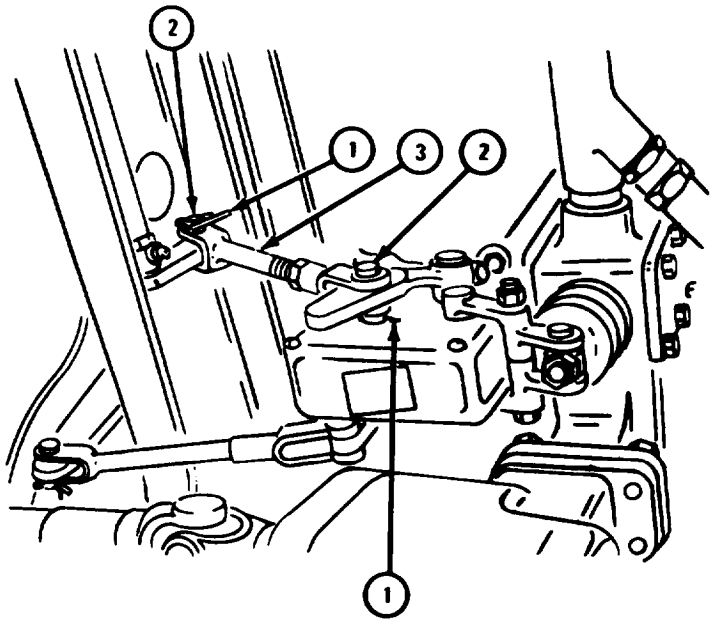
1. Takeout two cotter pins (1).

NOTE

If clevis pins (2) are rusted in place, drive them out.

2. Take out two clevis pins (2).
3. Take out dump control box rod (3).

GO TO FRAME 3



TA 103943

FRAME 3

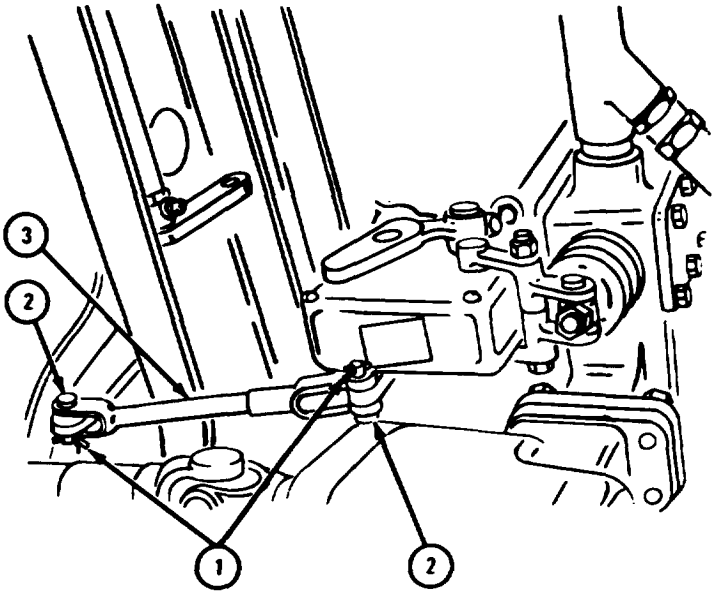
1. Take out two cotter pins (1).

NOTE

If clevis pins (2) are rusted in place, drive them out.

2. Take out two clevis pins (2).
3. Take off dump control box rod assembly (3).

GO TO FRAME 4



TA 103944

FRAME 4

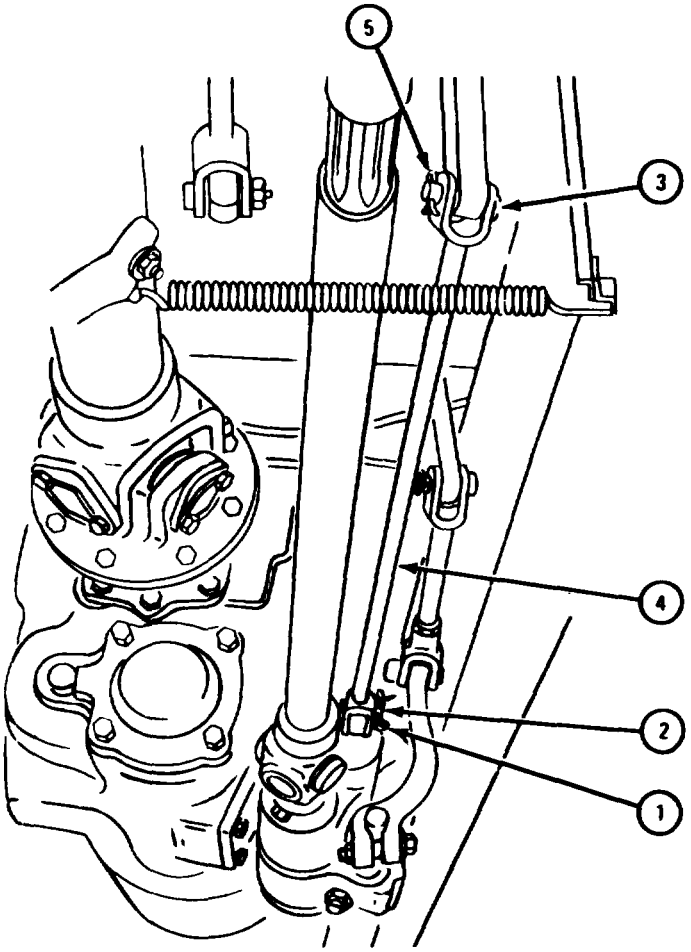
1. Takeout cotter pin (1).

NOTE

If clevis pins (2 and 3) are rusted in place, drive them out.

2. Take out clevis pin (2).
3. Take out end of hand lever rod assembly (4).
4. Take out cotter pin (5).
5. Take out clevis pin (3).
6. Take out other end of hand lever rod assembly (4).

GO TO FRAME 5

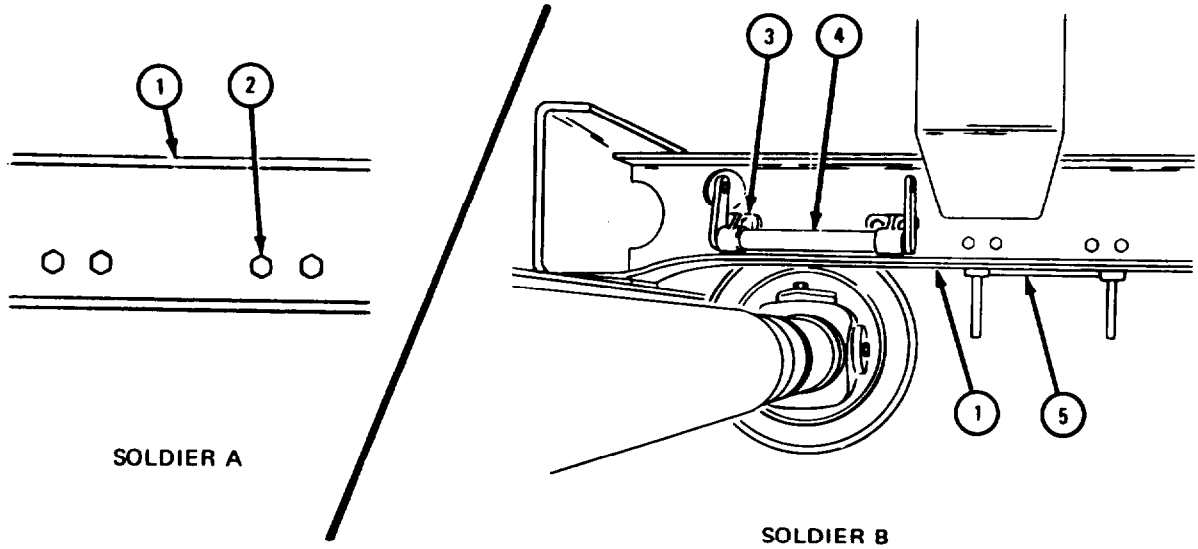


TA 103945

FRAME 5

Soldier A	1. Working from forward side of crossmember (1), hold four locknuts (2). Tell soldier B when ready.
Soldier B	2. Working from rear side of crossmember (1), take off four capScrews (3).
	3. Take off transfer motion rod assembly (4).
Soldiers A and B	4. Do steps 1 and 2 again to take off power takeoff connecting rod shaft assembly (5).

GO TO FRAME 6



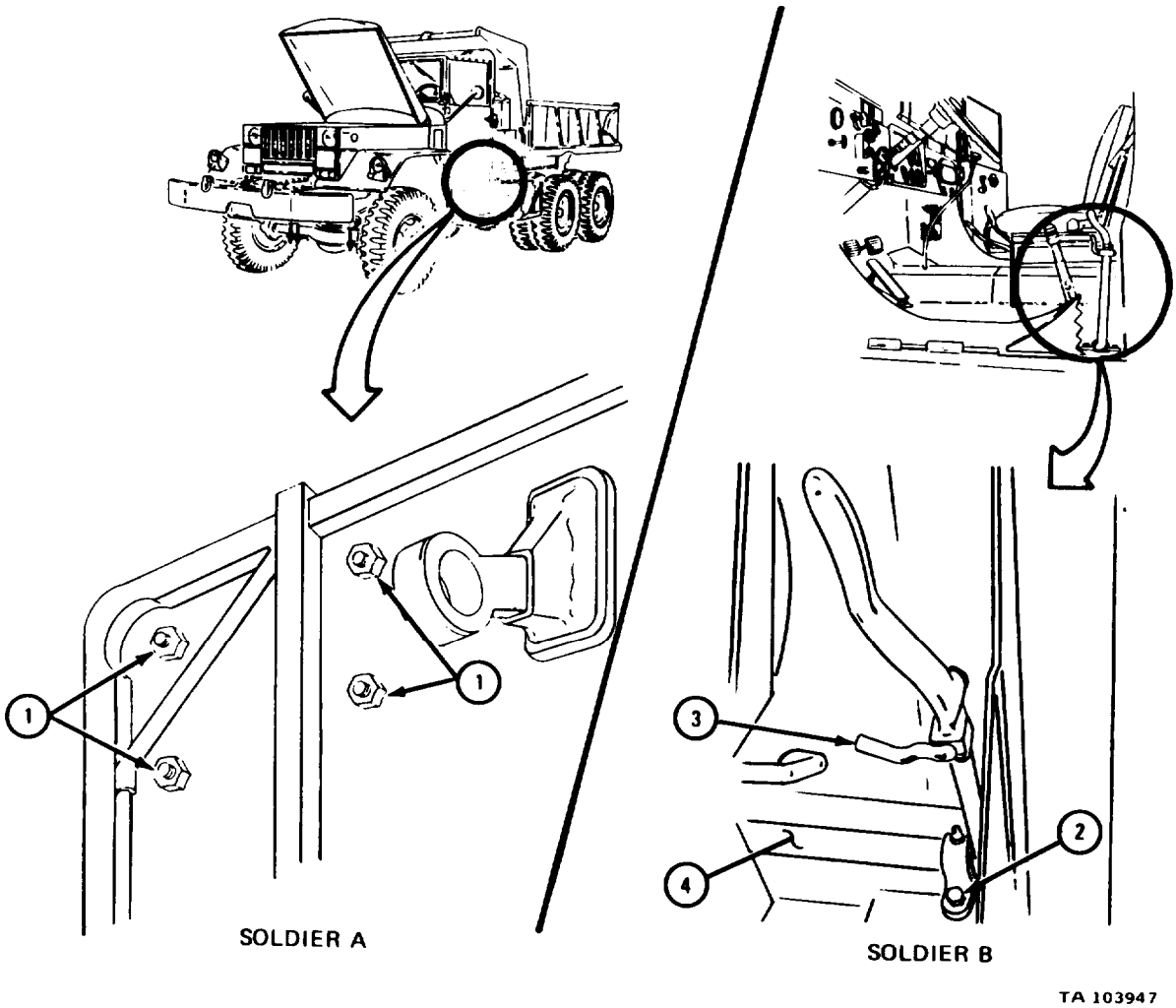
FRAME 6

Soldier A 1. Working from left running board, hold four locknuts (1). Tell soldier B when ready.

Soldier B 2. Working from behind driver's seat, take out four cap screws (2).

3. Unlock hand lever lock (3) and take out hand lever cross shaft assembly (4).

END OF TASK



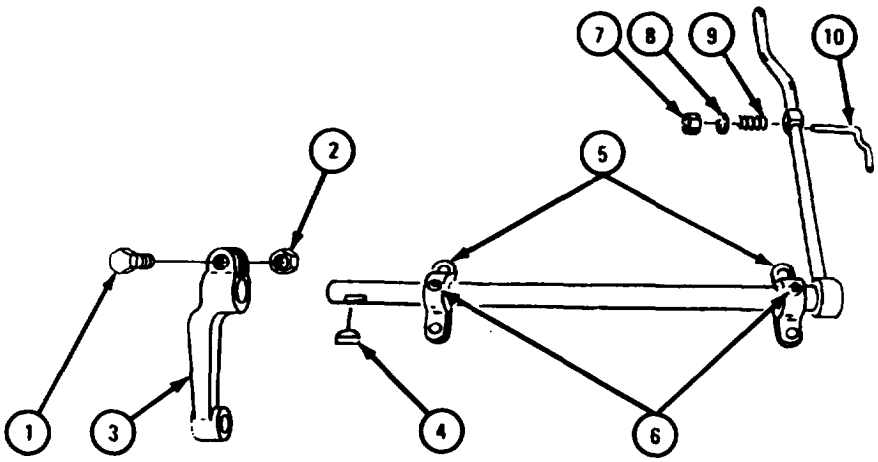
b. Disassembly.

(1) Hand lever cross shaft assembly.

FRAME 1

1. Take off capscrew (1) and locknut (2).
2. Tap off lever (3).
3. Tap out woodruff key (4).
4. Take off two support brackets (5).
5. Take off lubrication fitting (6) from each support bracket (5).
6. Take off locknut (7), washer (8), spring (9), and hand lever lock (10).

END OF TASK



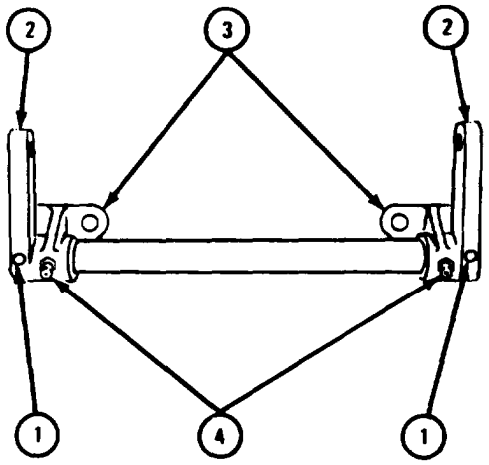
TA 103948

(2) Power takeoff connecting rod shaft assembly and transfer motion rod assembly.

FRAME 1

1. Tap out two shaft lever pins (1).
2. Tap off two shaft levers (2).
3. Take off two control rod and shaft brackets (3).
4. Take off lubrication fitting (4) from each of two control rod and shaft brackets (3).

END OF TASK



TA 103949

(3) Control rods and clevises.

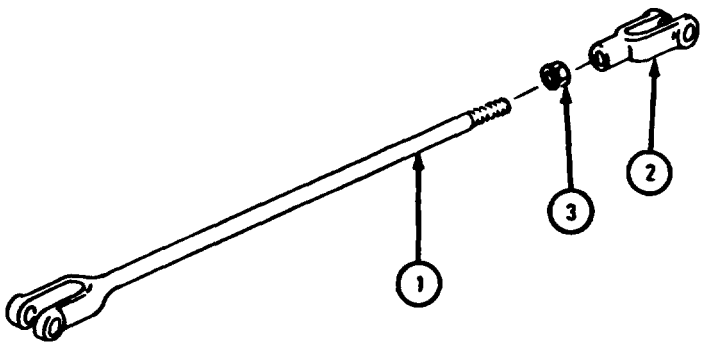
FRAME 1

NOTE

Tag each control rod (1) with number of turns it takes to remove clevises (2).

1. Hold clevis (2) and loosen nut (3). Unscrew and take off clevis and unscrew and take off nut.
2. Do step 1 again for other two control rods.

END OF TASK



TA 103950

c. Cleaning. There are no special cleaning procedures needed. Refer to cleaning procedures given in Part 1, para 1-3.

d. Inspection and Repair.

(1) Check that all threaded parts have no stripped or damaged threads.

(2) Check that all control rods have no bends or cracks.

(3) Check that all cross shafts are not bent, cracked, burred or worn.

(4) Check that all cross shaft support brackets have no cracks. Check that bores are not burred or worn.

(5) Throw away damaged parts and get new ones in their place. If control rods or cross shafts are bent, repair by straightening. Refer to FM 43-2.

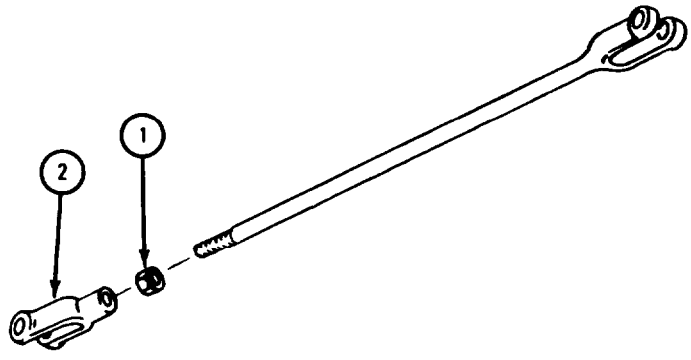
e. Assembly.

(1) Control rods and clevises.

FRAME 1

1. Screw on nut (1).
2. Screw on clevis (2) with same number of turns as tagged. Take off tag.
3. Hold clevis (2). Tighten nut (1) against clevis.
4. Do steps 1 through 3 again to put clevises (2) on other two control rods.

END OF TASK



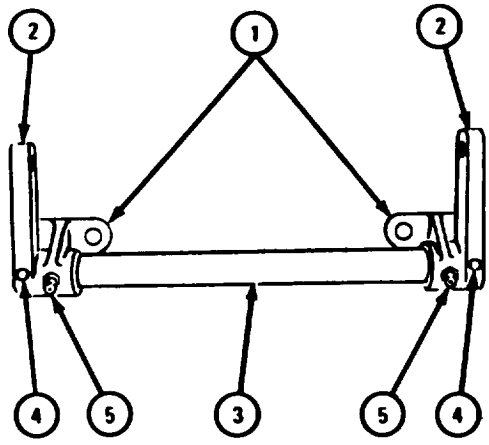
TA 103951

(2) Power takoff connecting rod shaft assembly and transfer motion rod assembly.

FRAME 1

1. Put on two control rod and shaft brackets (1).
2. Tap shaft lever (2) on cross shaft (3) and aline pin holes.
3. Tap shaft lever pin (4) through shaft lever (2) and cross shaft (3).
4. Do steps 2 and 3 again for shaft lever (2) on other end of cross shaft (3).
5. Screw in and tighten lubrication fitting (5) in each of two control rod and shaft brackets (1).

END OF TASK



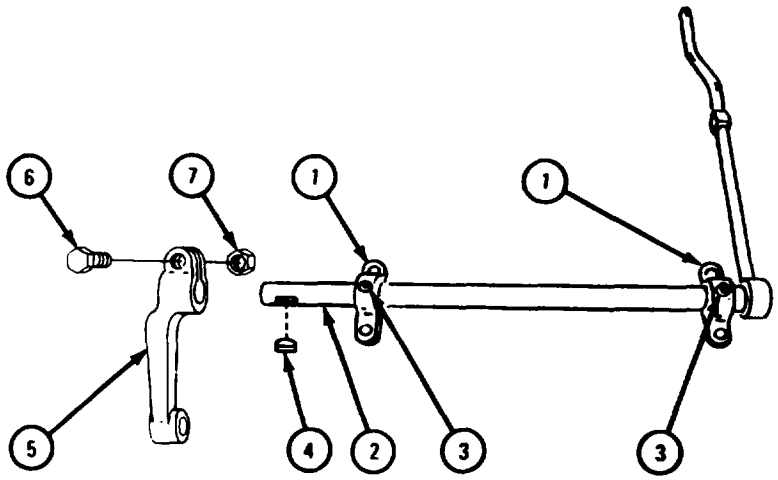
TA 103952

(3) Hand lever cross shaft assembly.

FRAME 1

1. Put two support brackets (1) on cross shaft (2).
2. Screw in and tighten lubrication fitting (3) in each support bracket (1).
3. Tap woodruff key (4) into end of cross shaft (2).
4. Aline key way in lever (5) with woodruff key (4). Tap on lever.
5. Put in capscrew (6) and locknut (7).

GO TO FRAME 2

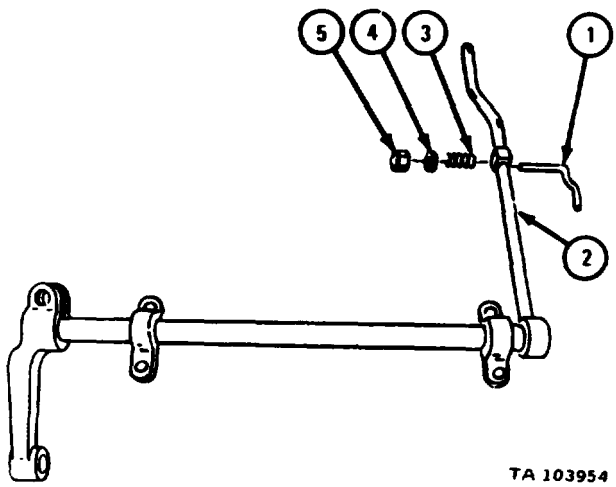


TA 103953

FRAME 2

1. Put hand lever lock (1) through hand control lever (2).
2. Put spring (3) and washer (4) on hand lever lock (1).
3. Put on locknut (5).

END OF TASK



f. Replacement.

FRAME 1

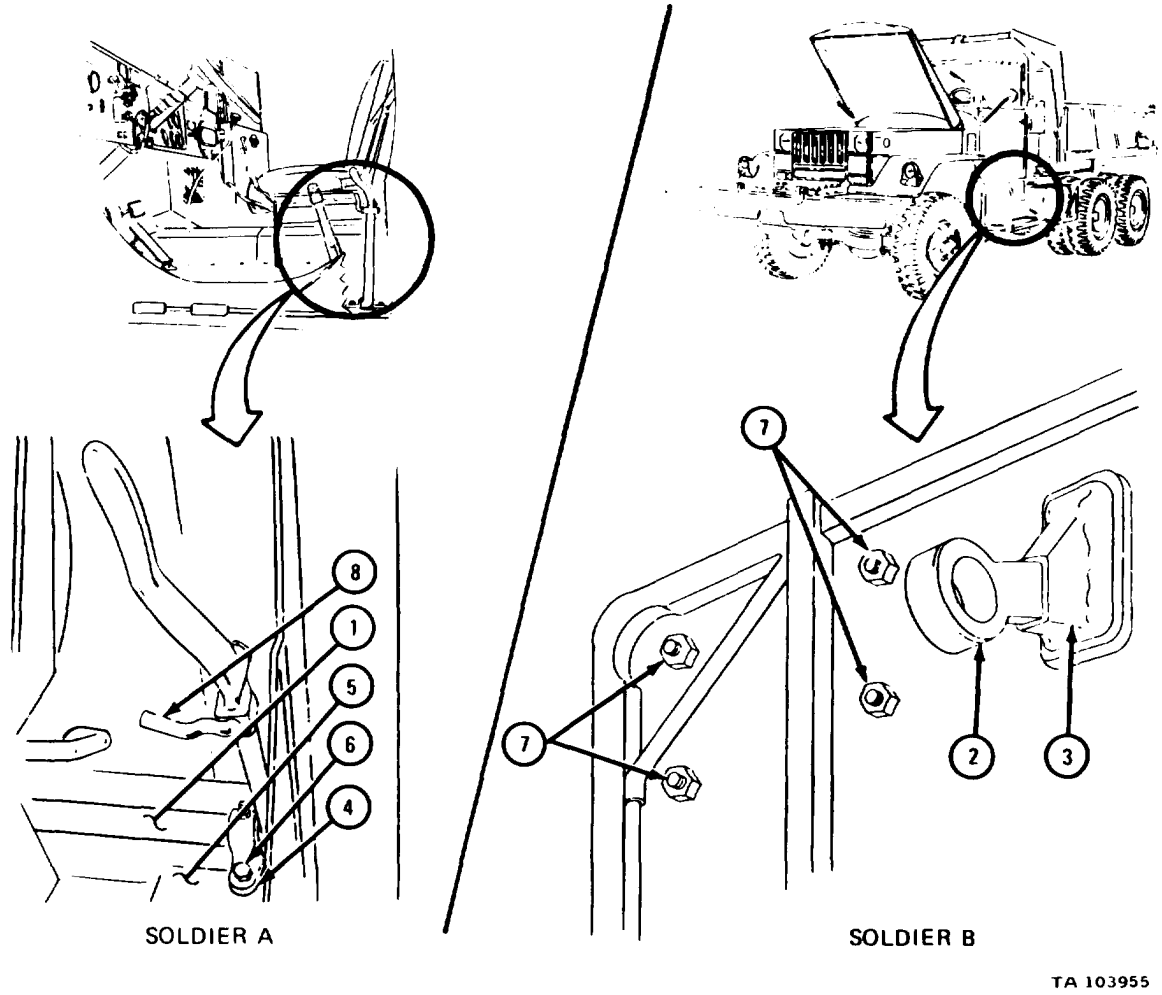
Soldier A 1. Working from behind driver's seat, put in hand lever cross shaft assembly (1). Make sure that hand lever (2) goes through seal (3).

2. Aline holes in support brackets (4) with holes in cab floor (5). Put in four capscrews (6).

Soldier B 3. Working from under truck, put on and hold four locknuts (7) on four capscrews (6). Tell soldier A when ready.

Soldier A 4. Tighten four capscrews (6). Put hand lever lock (8) in lock position.

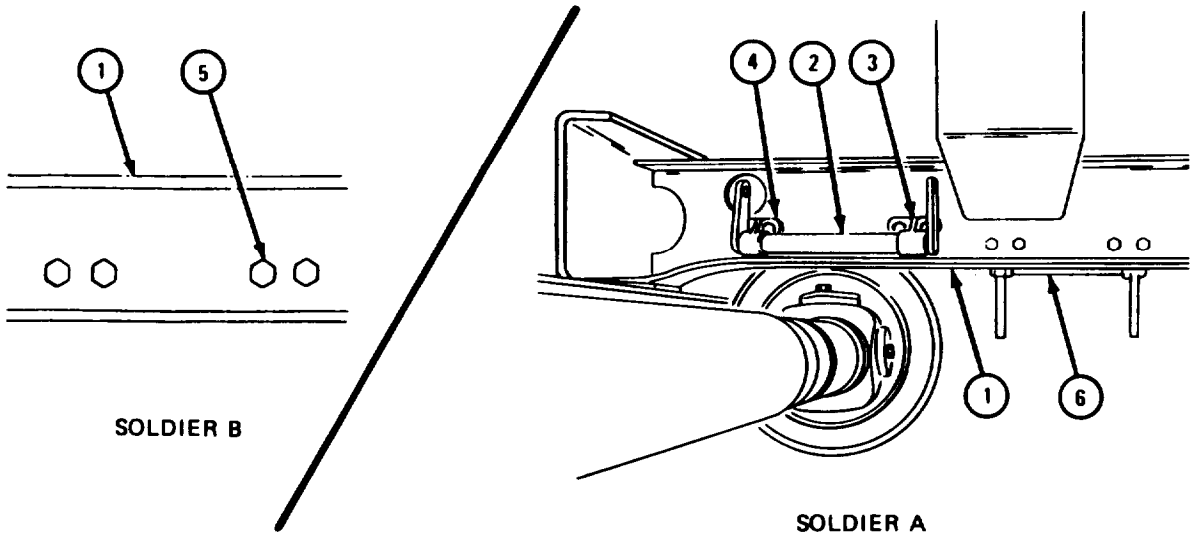
GO TO FRAME 2



FRAME 2

Soldier A	1.	Working from rear side of crossmember (1), put transfer motion rod assembly (2) in place and aline holes in crossmember and support brackets (3).
	2.	Put in and hold four capscrews (4).
Soldier B	3.	Working from forward side of crossmember (1), put on four locknuts (5).
Soldiers A and B	4.	Do steps 1 through 3 again to put on power takeoff shaft connecting rod assembly (6).

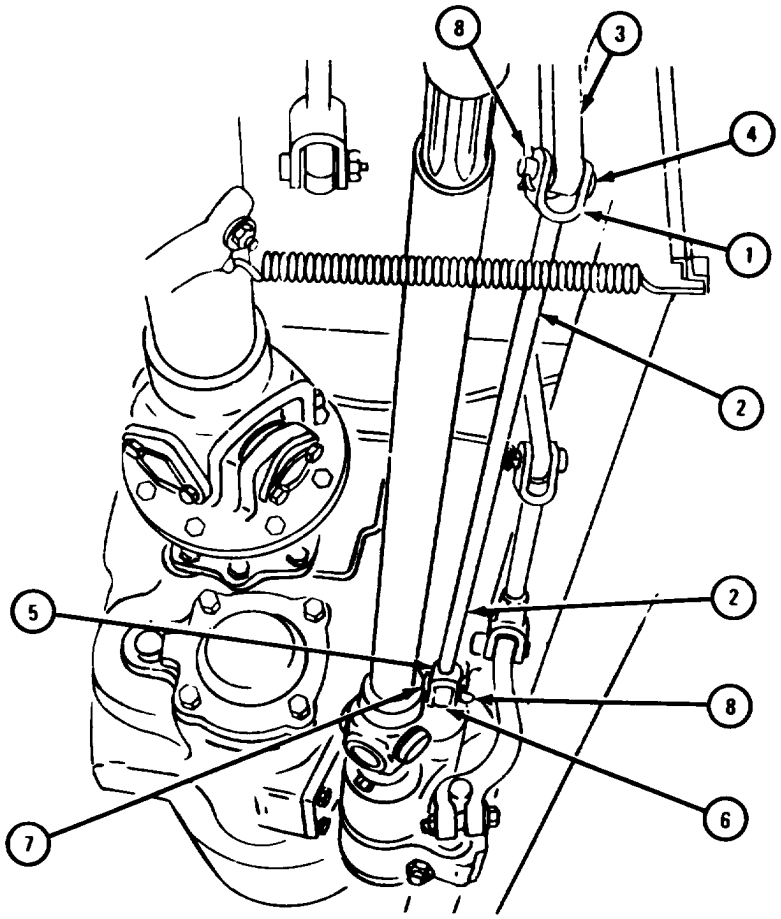
GO TO FRAME 3



FRAME 3

1. Put adjustable clevis (1) of hand lever rod assembly (2) over power takeoff connecting rod lever (3) and put in clevis pin (4).
2. Aline clevis (5) on other end of hand lever rod assembly (2) with power takeoff (6) and put in clevis pin (7).
3. Put two cotter pins (8) through two clevis pins (4 and 7).

GO TO FRAME 4

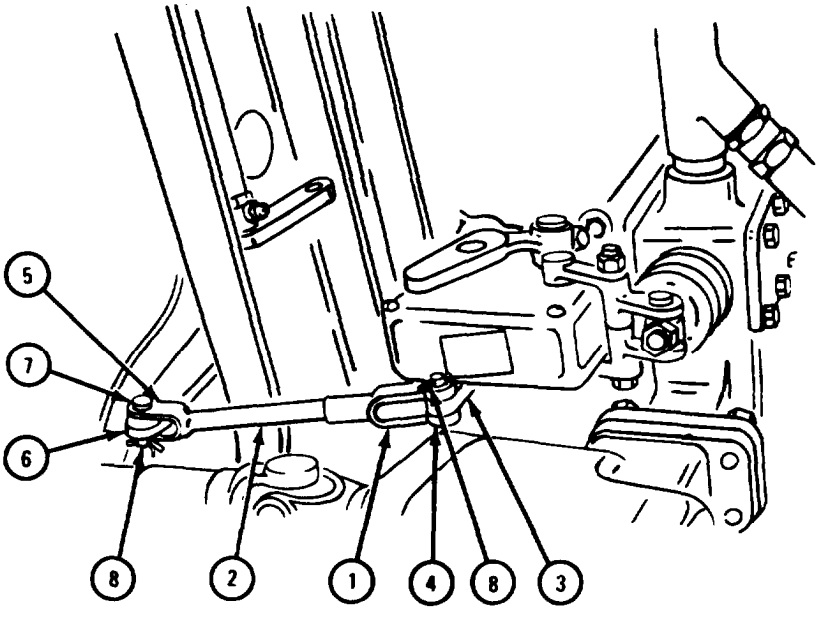


TA 103957

FRAME 4

1. Aline adjustable clevis (1) of dump control box rod assembly (2) with power takeoff relay lever (3) and put in clevis pin (4).
2. Aline clevis (5) on other end of dump control box rod assembly (2) with dump body actuating lever (6) and put in clevis pin (7).
3. Put two cotter pins (8) through two clevis pins (4 and 7).

GO TO FRAME 5

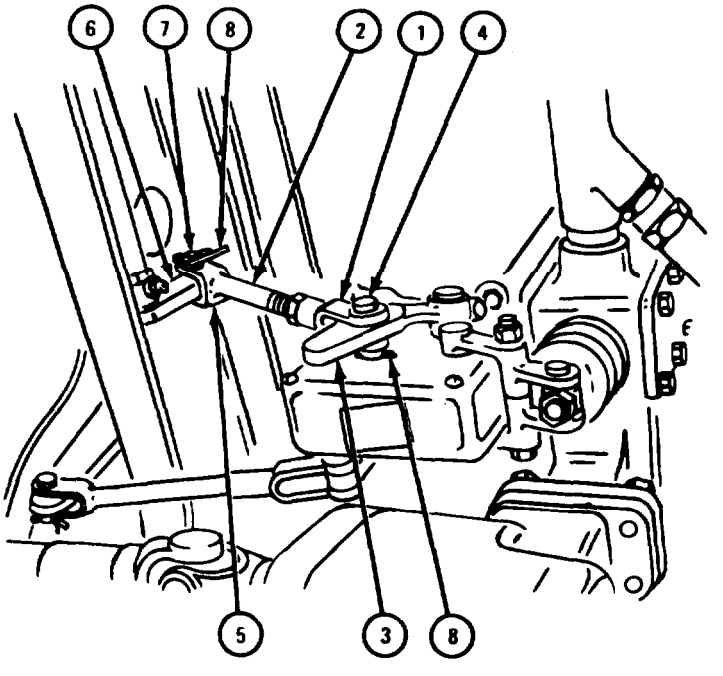


TA 103958

FRAME 5

1. Aline adjustable clevis (1) of dump control box rod assembly (2) with relay lever (3) and put in clevis pin (4).
2. Aline clevis (5) on other end of dump control box rod assembly (2) with motion rod transfer shaft lever (6) and put in clevis pin (7).
3. Put two cotter pins (8) through two clevis pins (4 and 7).

GO TO FRAME 6



TA 103959

FRAME 6

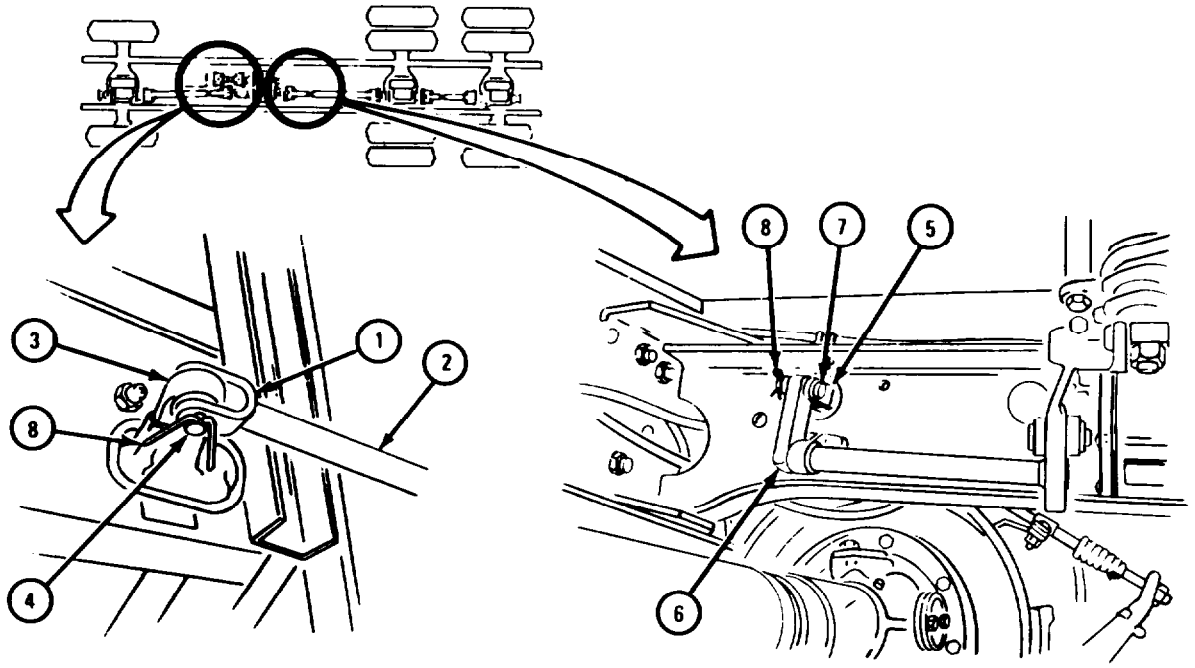
1. Aline clevis (1) on hand lever rod assembly (2) with lever (3) and put in clevis pin (4).
2. Aline adjustable clevis (5) on other end of hand lever rod assembly (2) with motion rod transfer shaft lever (6) and put in clevis pin (7).
3. Put two cotter pins (8) through clevis pins (4 and 7).

NOTE

Follow-on Maintenance Action Required:

1. Lubricate hoist control linkage. Refer to LO 9-2320-211-12.
2. Adjust hoist control linkage. Refer to TM 9-2320-211-20.

END OF TASK



FRONT VIEW

REAR VIEW

TA 103960

17-23. DUMP BODY HOIST FRAME ASSEMBLY REMOVAL, REPAIR, AND REPLACEMENT (TRUCK M51A2).

TOOLS: No special tools required

SUPPLIES: None

PERSONNEL: Two

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Drain hydraulic system. Refer to LO 9-2320-211-12.

(2) Take off hoist control linkage from hoist. Refer to para 17-22.

(3) Remove dump truck body. Refer to Part 2, para 16-28.

(4) Remove hoist roller arms. Refer to para 17-28.

(5) Remove hoist hydraulic cylinders. Refer to para 17-24.

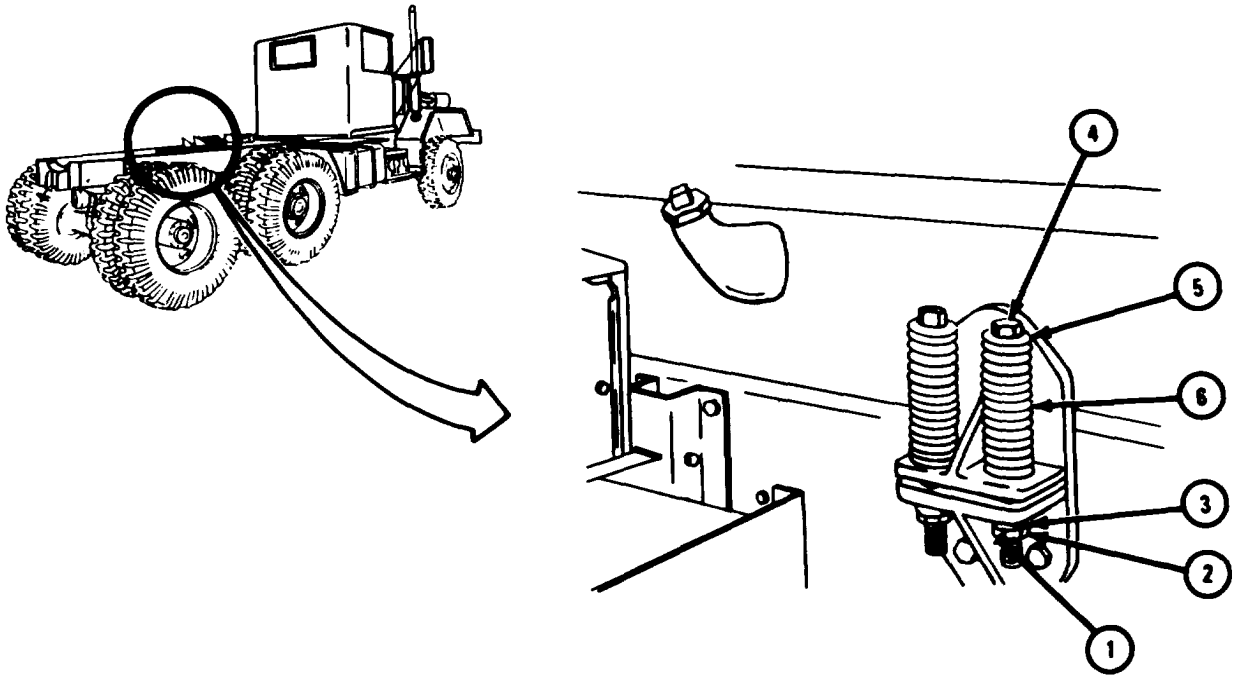
(6) Remove control valve. Refer to para 17-21.

b. Removal.

FRAME 1

1. Take out two cotter pins (1), nuts (2), and washers (3). Throw away cotter pins.
2. Take out two bolts (4), keepers (5), and springs (6).
3. Do steps 1 and 2 again on right side of truck.

GO TO FRAME 2



TA 103968

FRAME 2

Soldier A 1. Hold four nuts (1).

Soldier B 2. Take out four screws (2).

Soldier A 3. Take off four nuts (1).

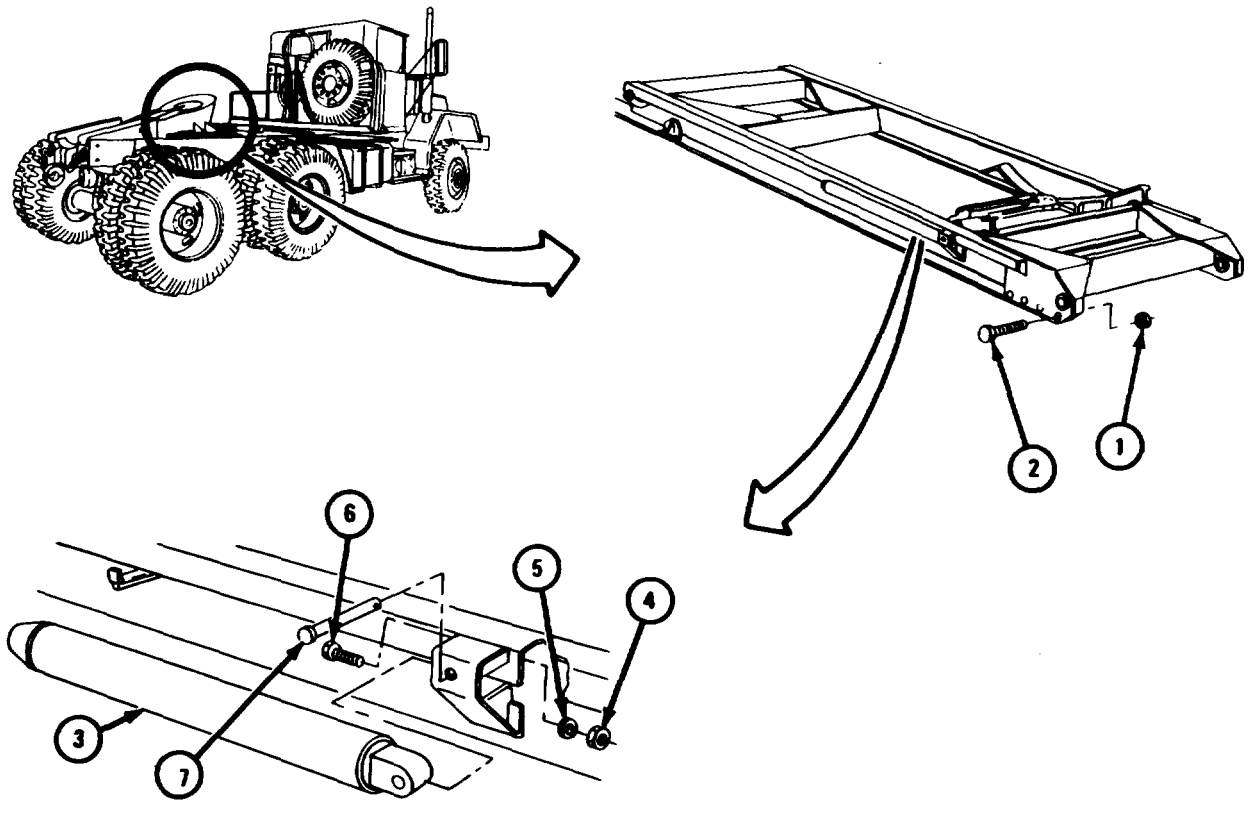
4. Hold brace (3).

Soldier B 5. Takeoff nut (4), washer (5), screw (6), and clevis pin (7).

Soldier A 6. Takeoff brace (3).

Soldiers A and B 7. Do steps 1 through 6 again on right side of truck.

GO TO FRAME 3

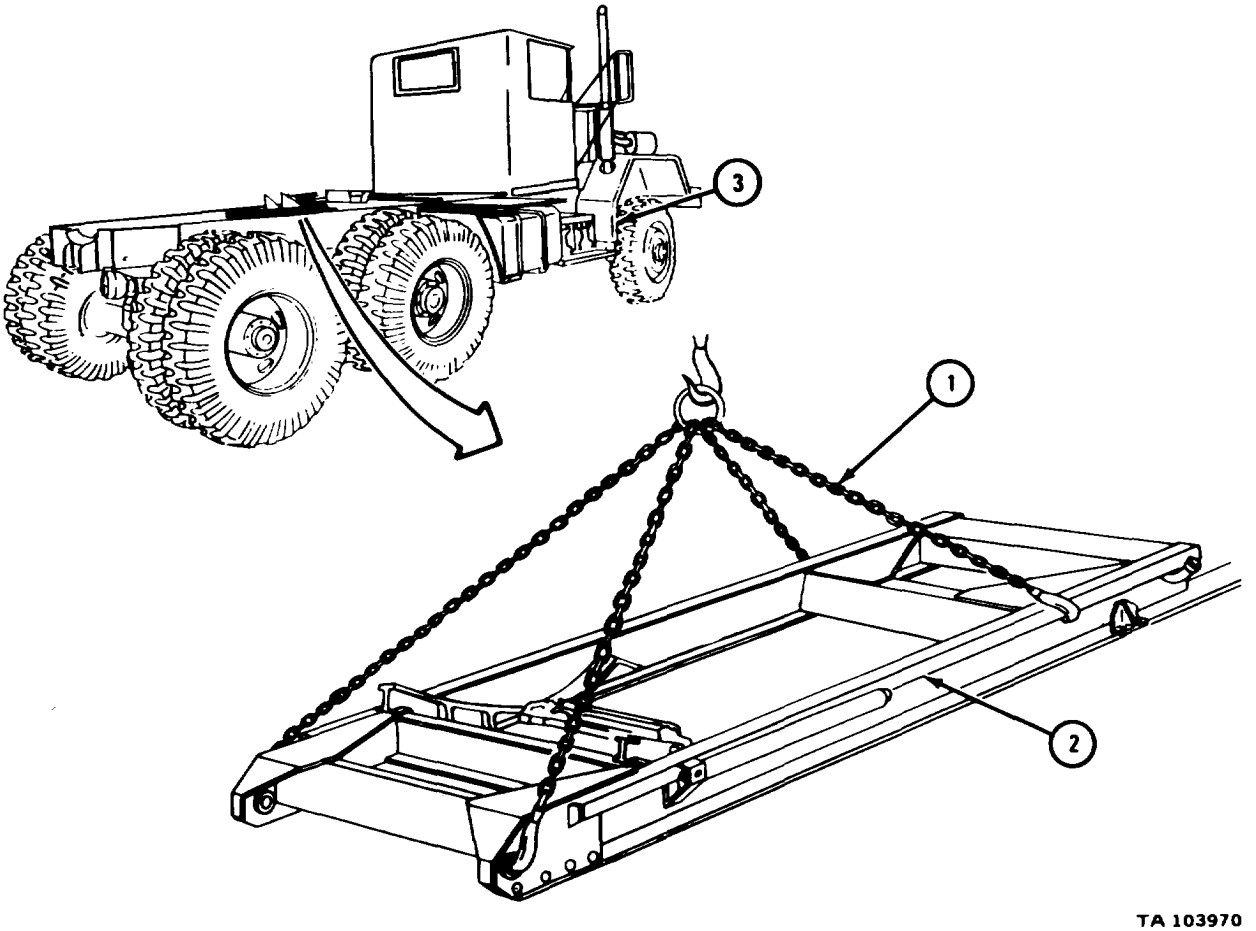


TA 103969

FRAME 3

	1.	Put chain sling (1) on hoist frame assembly (2) as shown.
Soldier A	2.	using hoist, take out slack in chain sling (1). Tell soldier B when ready.
Soldier B	3.	Guide hoist frame assembly (2) when soldier A lifts frame off truck (3).
Soldiers A and B	4.	Using hoist, lift hoist frame assembly (2) off truck.
	5.	Take off hoist and chain sling (1).

END OF TASK



TA 103970

c. Cleaning There are no special cleaning procedures needed. Refer to cleaning procedures given in Part 1, para 1-3.

d. Inspection and Repair. Check that hoist frame assembly has no cracks, elongated holes or bent or broken members. Repair is limited to straightening bent members and brazing or welding of cracks. Refer to FM 43-2 and TM 9-237. If more repair is needed, get a new hoist frame assembly.

e. Replacement.

FRAME 1

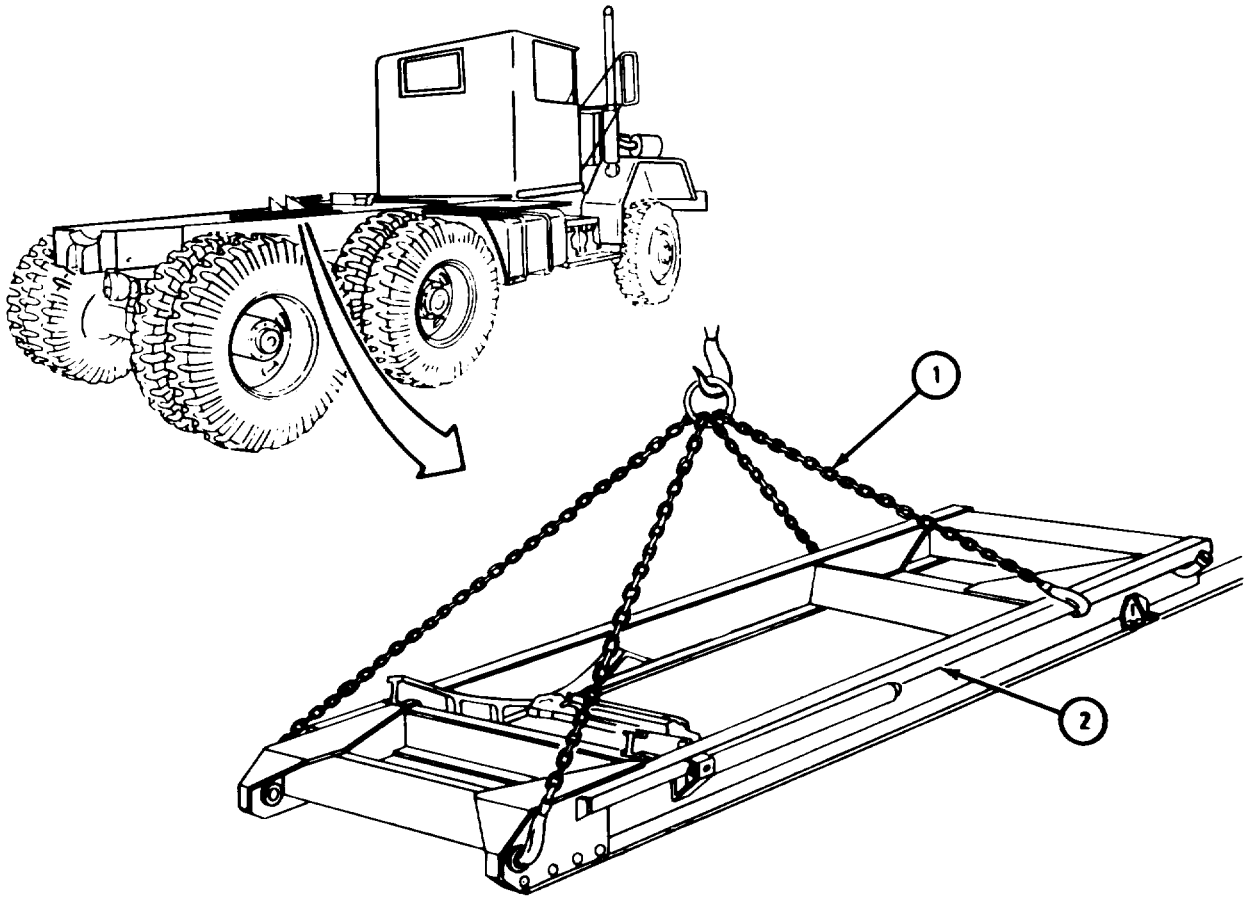
Soldier A 1. Put on hoist and chain sling (1) as shown.

Soldier B 2. Guide hoist frame assembly (2) when soldier A lifts it.

Soldier A 3. Lift hoist frame assembly (2) and put it on truck.

Soldiers A and B 4. Take off hoist and chain sling (1).

GO TO FRAME 2



FRAME 2

Soldier A 1. Hold brace (1) in place.

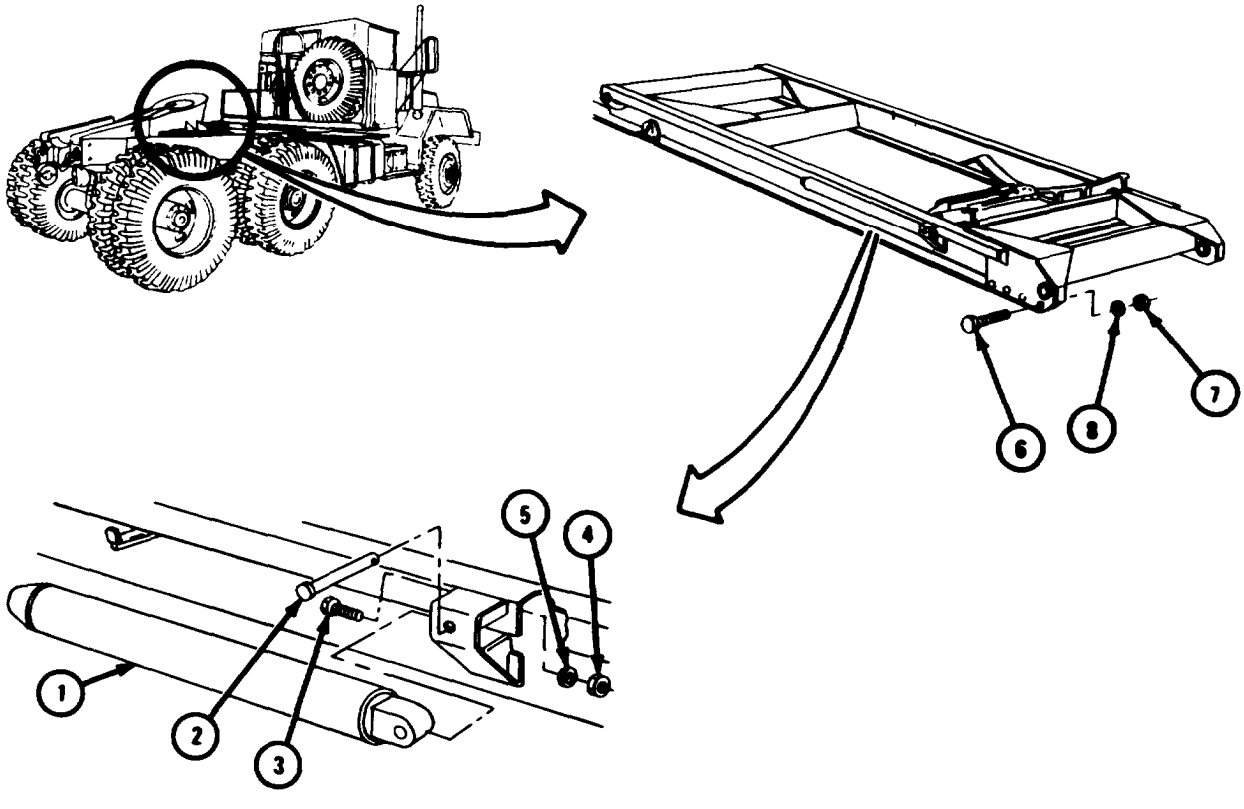
Soldier B 2. Put in clevis pin (2), screw (3), nut (4), and washer (5).

Soldier A 3. Put in and hold four screws (6).

Soldier B 4. Put on and tighten four nuts (7).

Soldiers A and B 5. Do steps 1 through 4 on right side of truck.

GO TO FRAME 3



TA 105168

FRAME 3

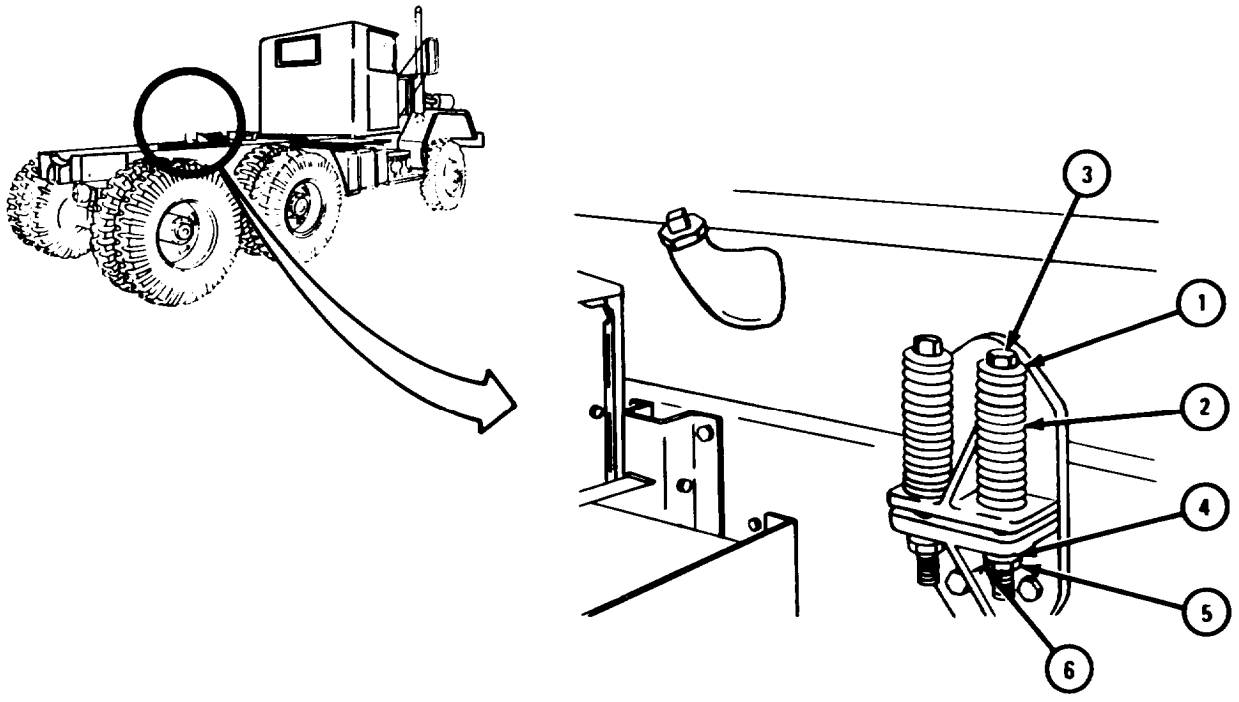
1. Put in two keepers (1), springs (2), and bolts (3).
2. Put on two washers (4) and nuts (5).
3. Put in two cotter pins (6).
4. Do steps 1 through 3 again on right side of truck.

NOTE

Follow-on Maintenance Action Required:

1. Replace control valve. Refer to para 17-21.
2. Replace hoist hydraulic cylinders. Refer to para 17-24.
3. Replace hoist roller arms. Refer to para 17-28.
4. Replace dump truck body. Refer to Part 2, para 16-28.
5. Replace hoist control linkage. Refer to para 17-22.
6. Fill hydraulic system. Refer to LO 9-2320-211-12.

END OF TASK



TA 105169

17-24. DUMP BODY HOIST CYLINDER REMOVAL. REPAIR. AND REPLACEMENT (TRUCK M51A2).

NOTE

This task is the same for the left and right hoist cylinder assemblies. This task is shown for the left hoist cylinder assembly.

TOOLS: No special tools required

SUPPLIES: Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680
Lubricating oil, ICE, OE/HDO 10, MIL-L-2104
Cylinder head gland packing
Cylinder head preformed packing

PERSONNEL : Two

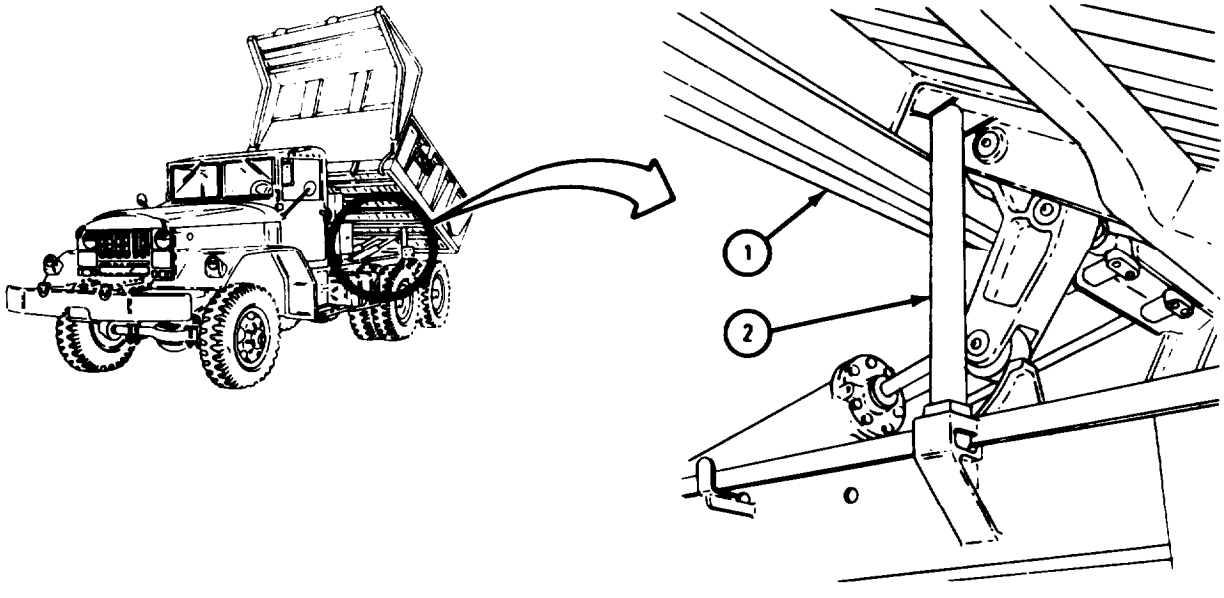
EQUIPMENT CONDITION : Truck parked, engine off, handbrake set.

a. Preliminary Procedure.

FRAME 1

1. Start engine and raise dump body (1). Refer to TM 9-2320-211-10.
2. Put two hoist braces (2), one on each side, in place under dump body (1).
3. Lower dump body (1) onto braces (2) and stop engine. Refer to TM 9-2320-211-10.

END OF TASK



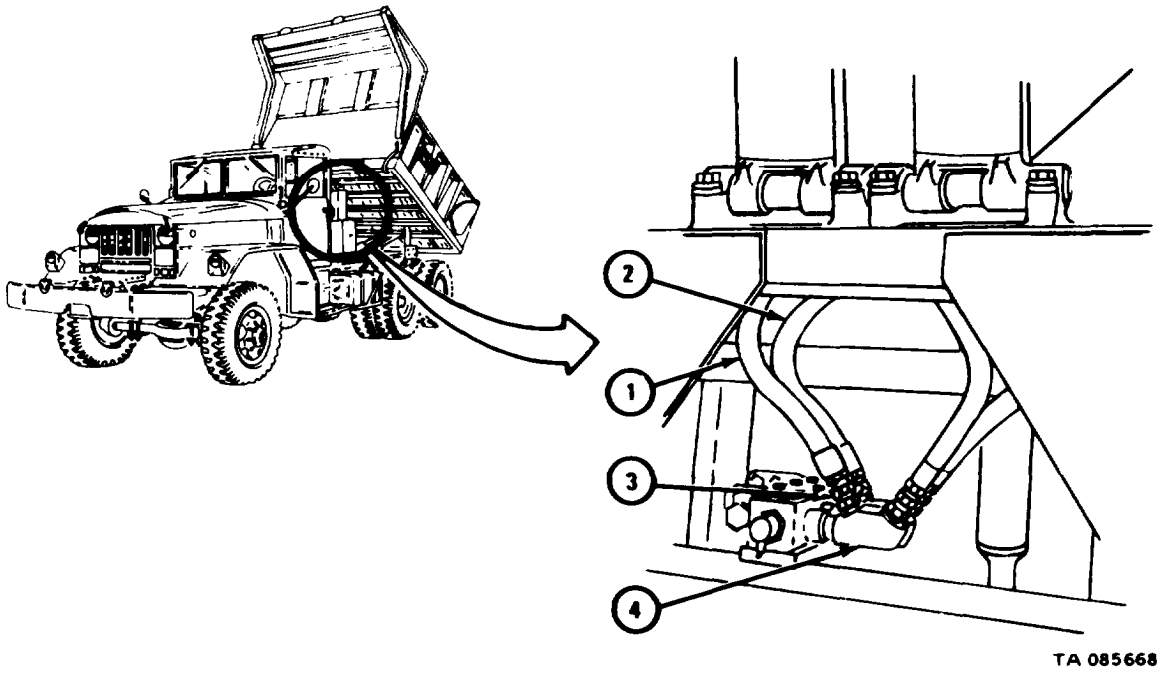
TA 085667

b. Removal.

FRAME 1

1. Drain hydraulic reservoir. Refer to LO 9-2320- 211–12.
2. Tag two hoses (1 and 2) to make sure they are put back in the right place.
3. Take off two coupling nuts (3).
4. Take hoses (1 and 2) off manifold (4).

GO TO FRAME 2



FRAME 2

1. Place wooden block under upper end of two hoist cylinder assemblies (1).
2. Take out two screws and lockwashers (2). Catch lower retainer (3) which will fall when last screw is taken out. Lift out upper retainer (4).
3. Take out four screws and lockwashers (5).
4. Take off two bearing caps (6).

CAUTION

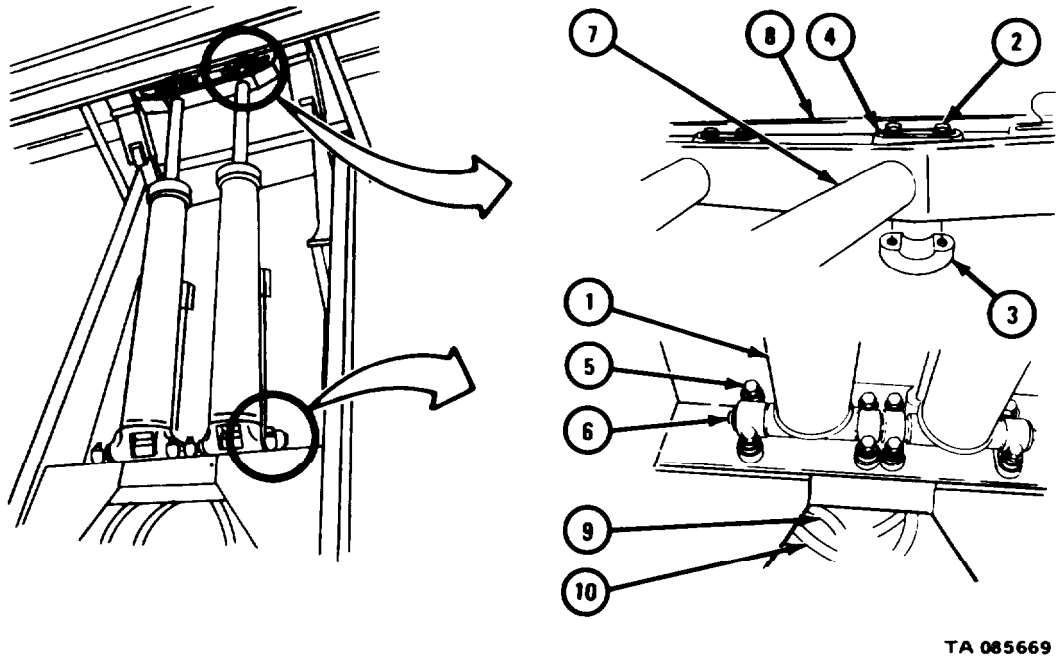
Bypass tubes on outside of hoist cylinder assembly (1) are easily damaged. Be careful when lifting out hoist cylinder assembly.

Soldier A 5. Hold hoist cylinder assembly (1).

Soldier B 6. Pry bottom of hoist cylinder assembly (1) towards rear of truck.

Soldiers A and B 7. Pull piston rod (7) out of crosshead (8) and lift hoist cylinder assembly (1) with two hoses (9 and 10) off truck.

END OF TASK



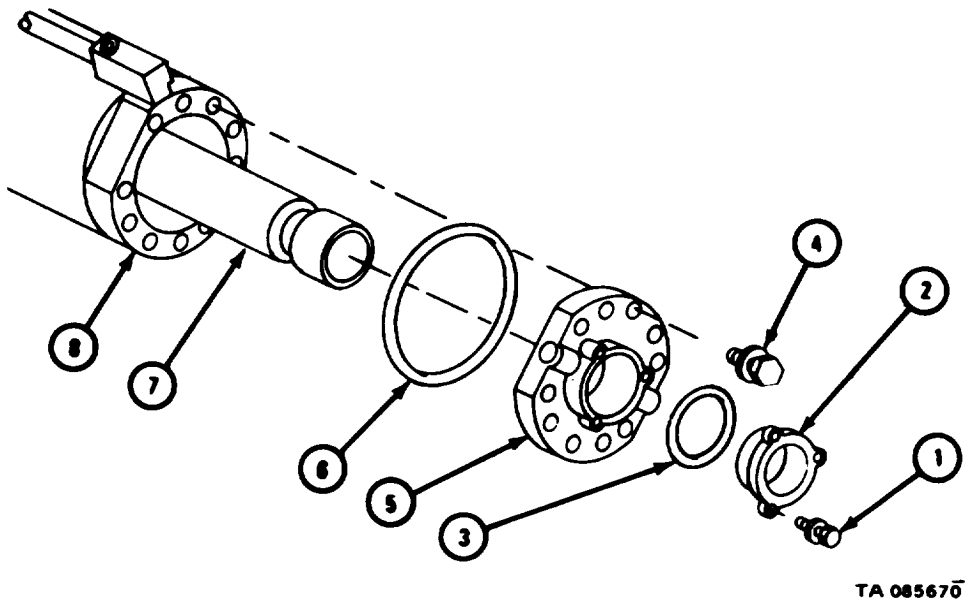
TA 085669

c. Disassembly.

FRAME 1

1. Take out three screws and lockwashers (1).
2. Take out cylinder head and gland (2) and packing (3). Throw away packing.
3. Take out bolts and lockwashers (4).
4. Take off cylinder head (5) with preformed packing (6).
5. Take off and throw away preformed packing (6).
6. Slide piston rod assembly (7) out of tube assembly (8). Be careful not to damage bore of tube assembly.

GO TO FRAME 2

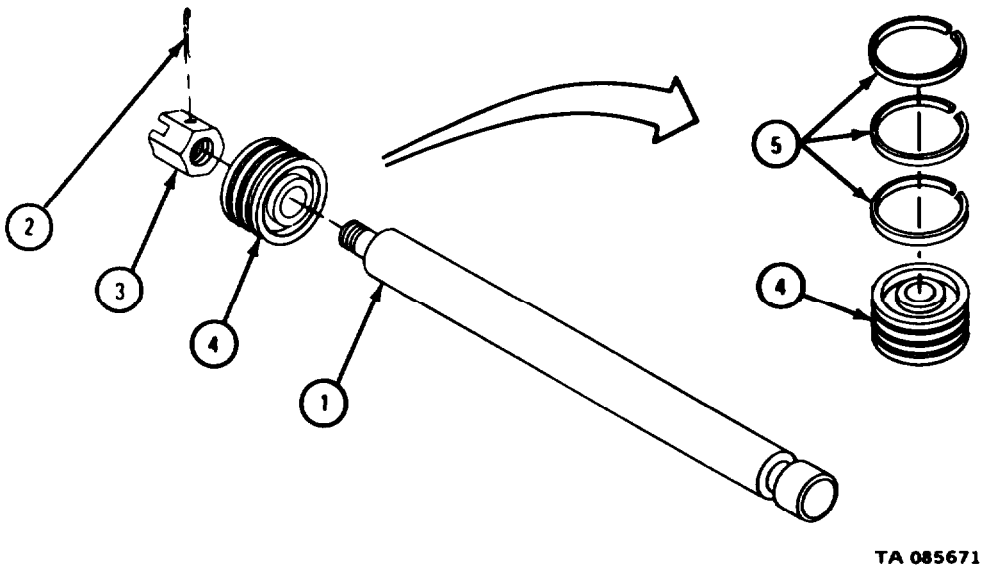


TA 085670

FRAME 2

1. Clamp piston rod (1) in vise with soft jaw caps.
2. Take out and throw away cotter pin (2).
3. Take off nut (3).
4. Take off piston (4).
5. Take piston rod (1) out of vise.
6. Using piston ring remover, take three piston rings (5) off piston (4).

GO TO FRAME 3

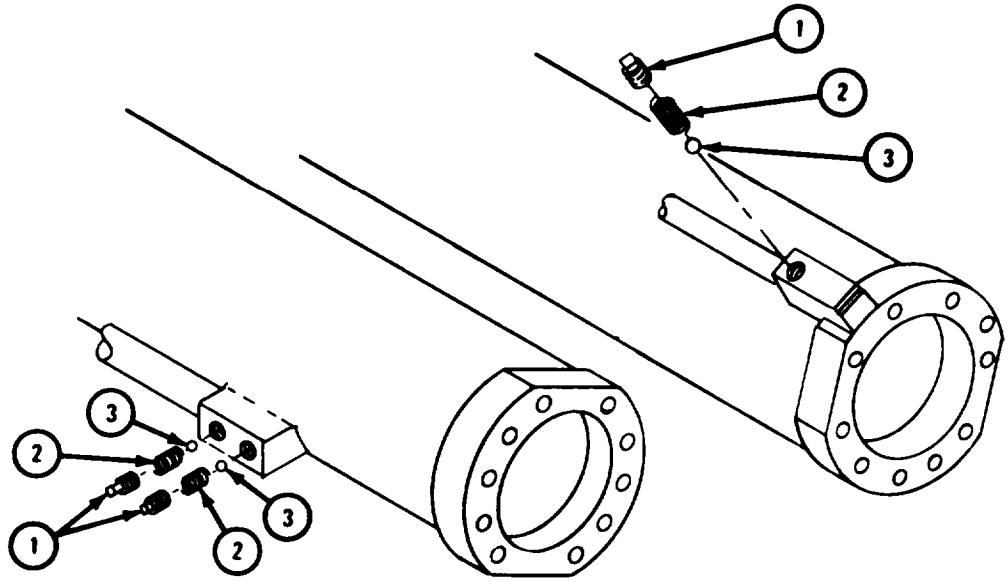


TA 085671

FRAME 3

1. Takeout three plugs (1) and springs (2).
2. Takeout check balls (3).

GO TO FRAME 4

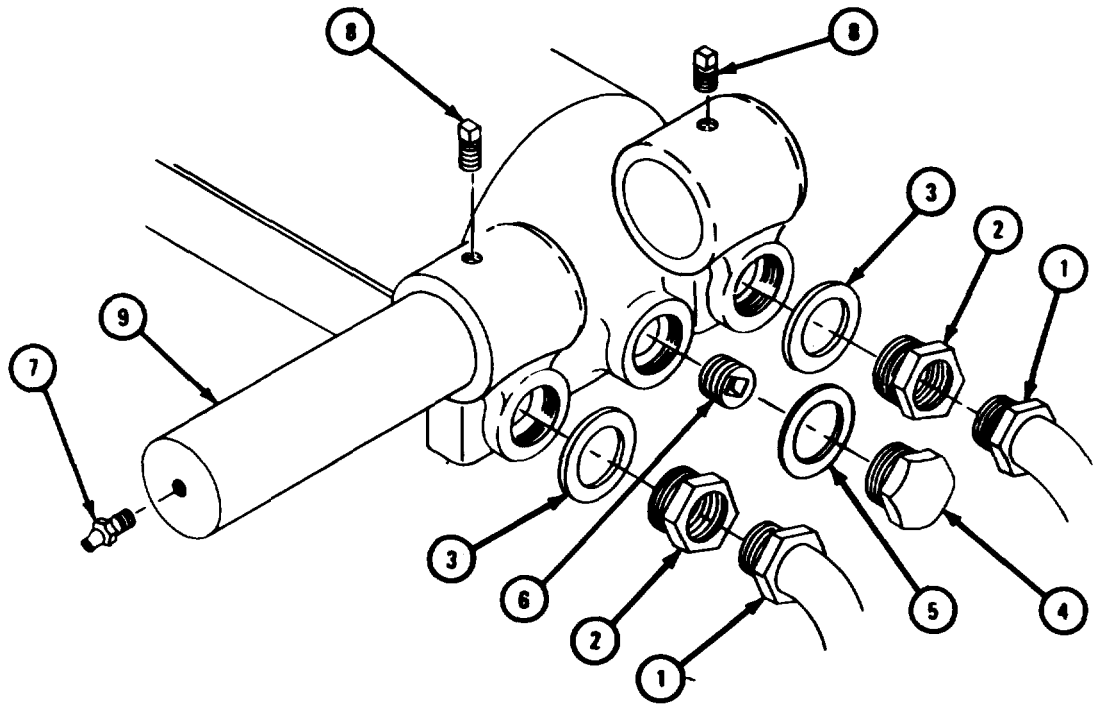


TA 085672

FRAME 4

1. Take out two hoses (1).
2. Take out two piston end plugs (2) with spacers (3).
3. Take out plug (4) with ring spacer (5).
4. Take out orifice plug (6).
5. Take out lubrication fitting (7).
6. Take out two screws (8).
7. Using brass punch and ballpeen hammer, drive out pin (9).

END OF TASK



TA 085673

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well–ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

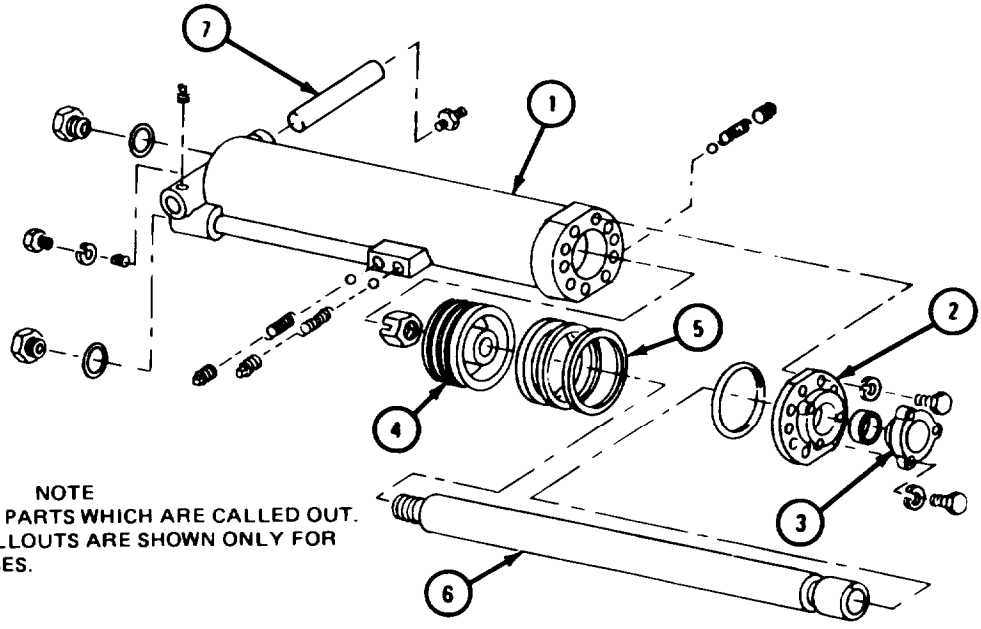
d. Cleaning. Clean all parts in solvent. Make sure grease and oil passages are open.

e. Inspection.

FRAME 1

1. Check that tube assembly (1) is not cracked and does not have broken welds. Check that inner bore of tube assembly is not scratched or scored, and has no badly worn surfaces.
2. Check that oil passages in tube assembly (1) are not clogged or burred. Check that screw threads are not burred, stripped or crossed.
3. Check that cylinder head (2) and gland (3) are not cracked or broken, and that bores are not burred.
4. Check that piston (4) and three piston rings (5) are not nicked, scratched or cracked, and that they do not have worn surfaces.
5. Check that piston rod (6) is not bent, nicked or scratched, and that it does not have burred, stripped or crossed threads.
6. Check that pin (7) is not chipped or scored, and that it has no flat spots.

END OF TASK



NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 085674

f. Repair.

(1) Using thread file, fix damaged threads.

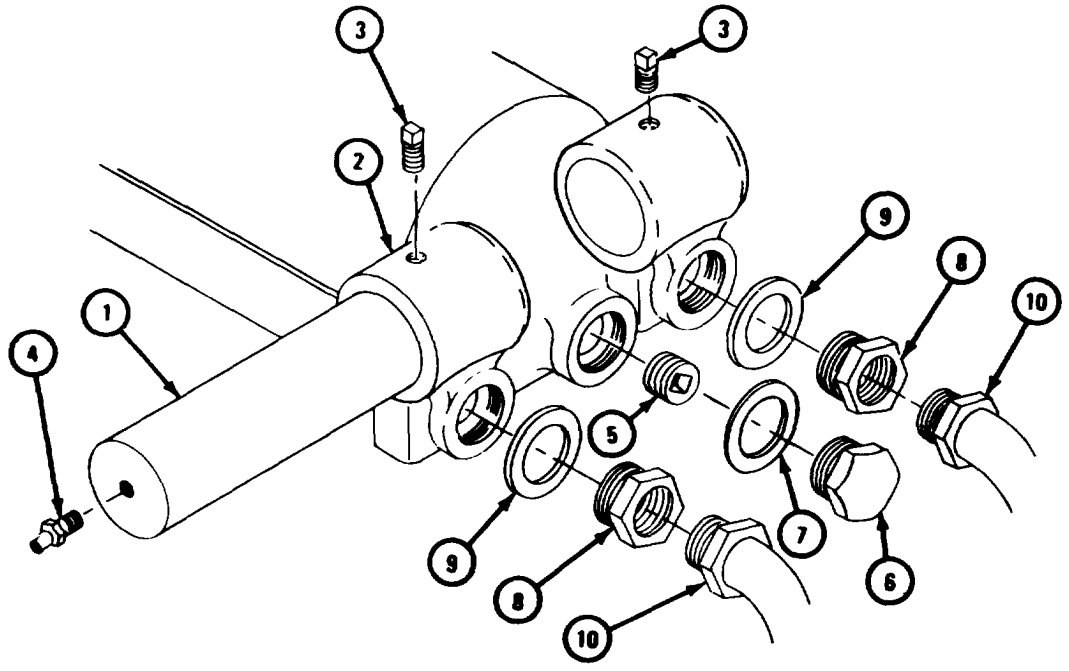
(2) Get new parts for all other damaged parts.

g. Assembly.

FRAME 1

1. Using brass hammer, drive pin (1) into bore in tube assembly (2), until it is centered.
2. Put in two screws (3).
3. Put in lubrication fitting (4).
4. Put in orifice plug (5).
5. Put in plug (6) with ring spacer (7).
6. Put in two piston end plugs (8) with spacers (9).
7. Put in two hoses (10) .

GO TO FRAME 2

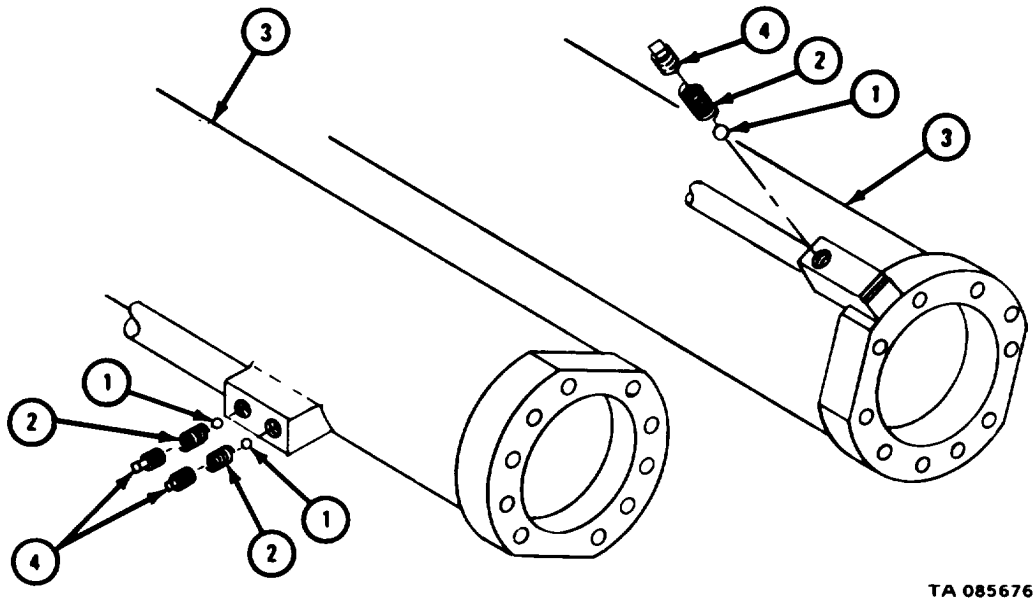


TA 085675

FRAME 2

1. Put three check balls (1) and springs (2) into bores in tube assembly (3).
2. Put in three plugs (4).

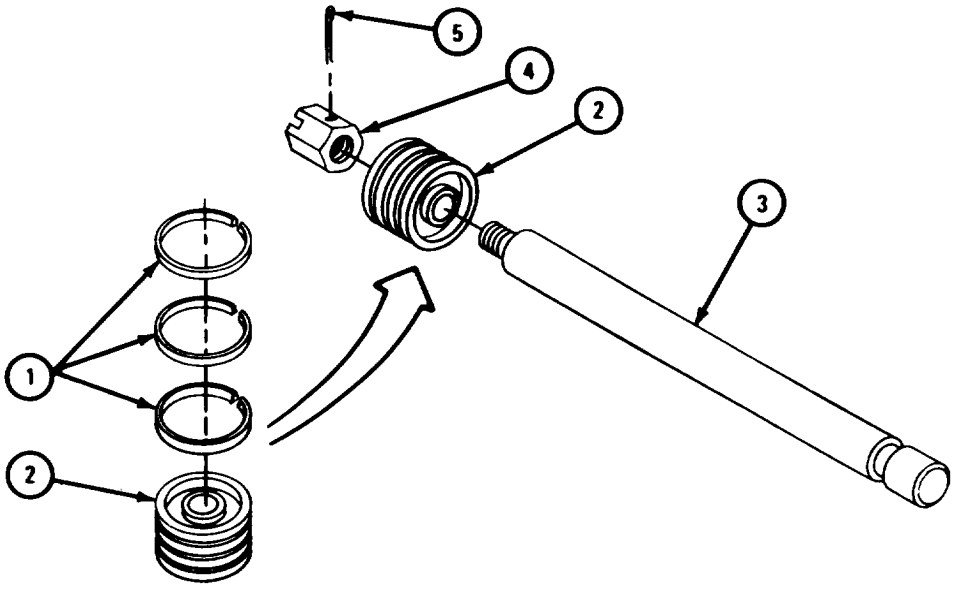
GO TO FRAME 3



FRAME 3

1. Put three piston rings (1) in grooves in piston (2). Turn rings so ring gaps are not in line with each other.
2. Put grooved end of piston rod (3) in vise with soft jaw caps.
3. Put piston (2) with rings (1) on piston rod (3).
4. Put on nut (4) and line up hole for cotter pin (5).
5. Put in cotter pin (5).
6. Take piston rod (3) out of vise with soft jaw caps.
7. Clamp piston ring compressor on piston rings (1).

GO TO FRAME 4

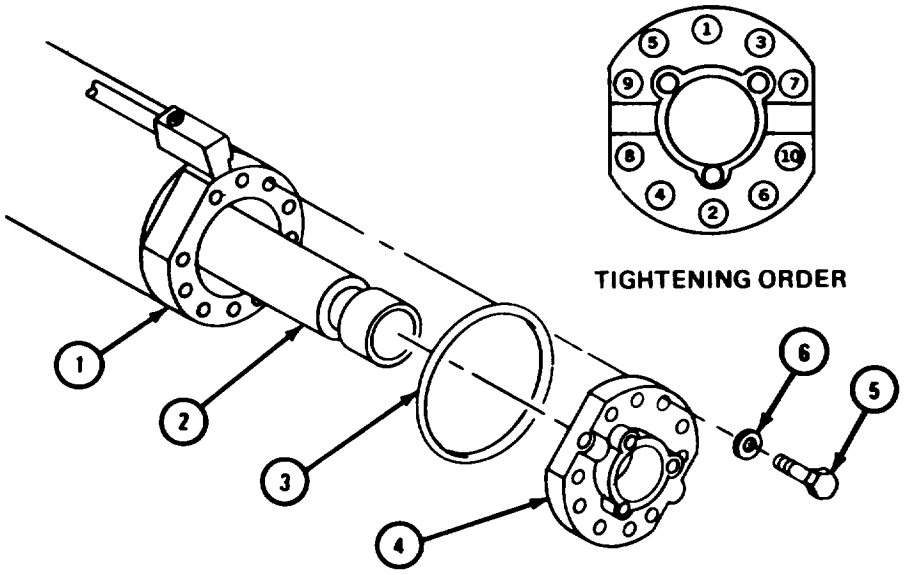


TA 085677

FRAME 4

1. Put a coat of oil in bore of cylinder assembly (1).
2. Carefully clamp closed end of cylinder assembly (1) in vise with soft jaw clamps.
3. Carefully push piston rod assembly (2) into bore of cylinder assembly (1).
4. Take off piston ring compressor.
5. Put preformed packing (3) in place on cylinder head (4).
6. Slide cylinder head (4) with preformed packing (3) onto piston rod assembly (2) and into place against cylinder assembly (1). Line up screw holes.
7. Put in 10 screws (5) and lockwashers (6).
8. Tighten screws (5) in the tightening order shown to 35 pound-feet.

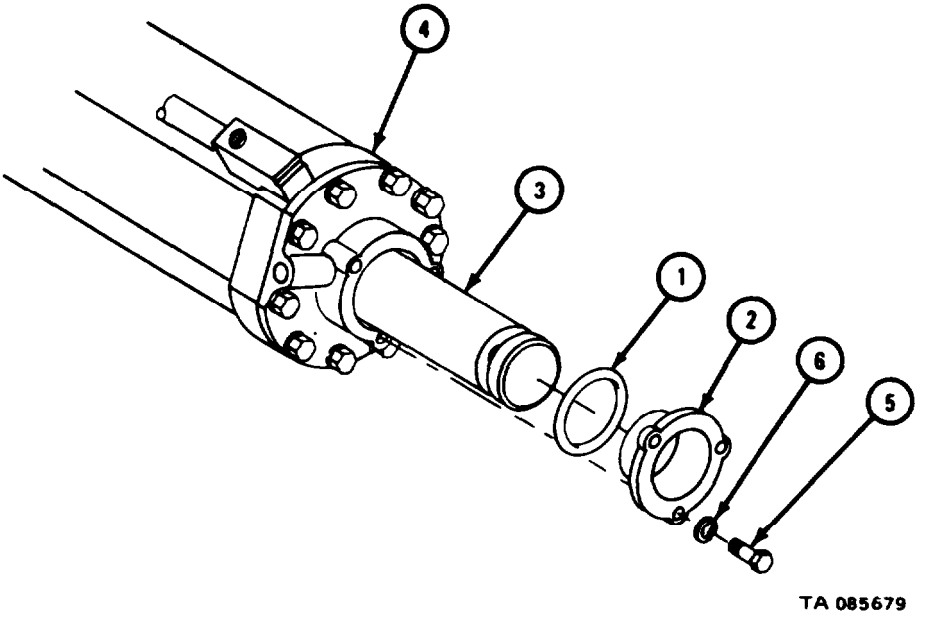
GO TO FRAME 5



FRAME 5

1. Slide packing (1) and gland (2) down piston rod (3) and into place in cylinder head (4).
2. Line up bolt holes and put in three bolts (5) and lockwashers (6).
3. Tighten bolts (5) to 35 pound-feet.

END OF TASK



h. Replacement.

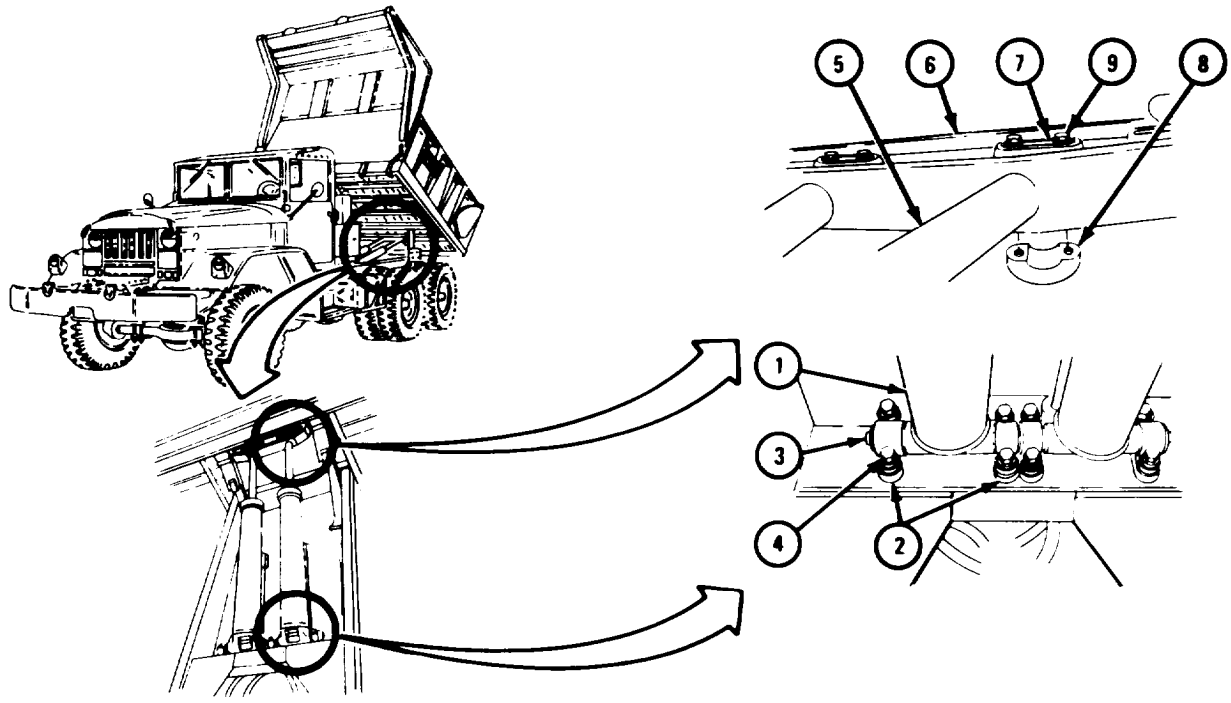
FRAME 1

CAUTION

Bypass tubes on outside of hoist cylinder assembly are easily damaged. Be careful when replacing hoist cylinder assembly.

Soldiers A and B	1.	Lift hoist cylinder assembly (1) into place on truck. Seat pin of hoist cylinder assembly in two bearing seats (2).
Soldier A	2.	Place wood block under end of cylinder assembly (1).
Soldier B	3.	Put two bearing caps (3) in place.
	4.	Put in four screws and lockwashers (4).
Soldiers A and B	5.	Aline and slide piston rod (5) into bore in crosshead (6). Line up groove in piston rod with slots in crosshead.
Soldier A	6.	Hold hoist cylinder assembly (1) in place.
Soldier B	7.	Put upper retainer (7) in slot in crosshead (6) and hold lower retainer (8) in place in slot in crosshead.
	8.	Put in two screws and lockwashers (9).
	9.	Take out wood block from under cylinder assembly (1).

GO TO FRAME 2

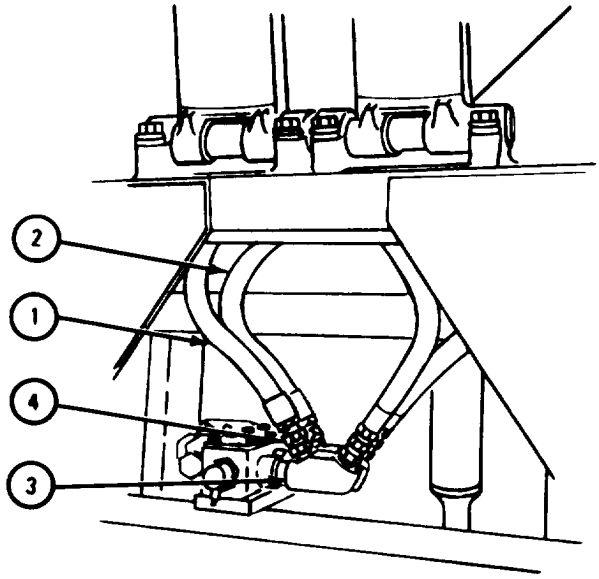


TA 085680

FRAME 2

1. Put two hoses (1 and 2) in place on manifold (3) as tagged.
2. Put on two coupling nuts (4). Take off tags.

GO TO FRAME 3



TA 085681

FRAME 3

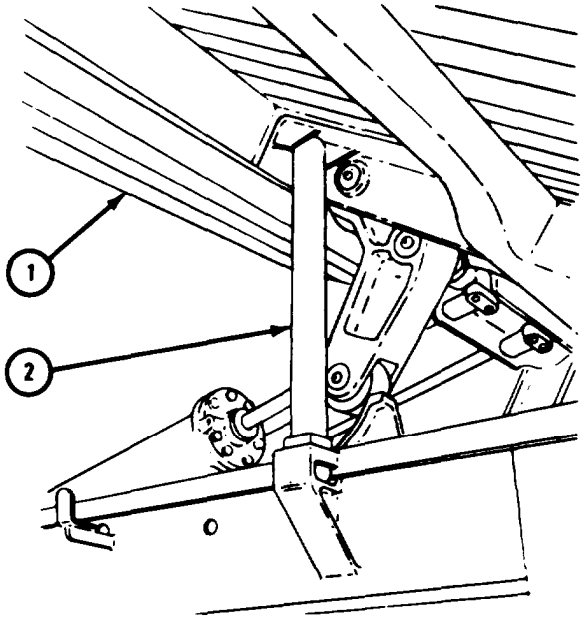
1. Fill hydraulic reservoir. Refer to LO 9-2320-211-12.
2. Raise dump body (1) far enough to clear two hoist braces (2). Refer to TM 9-2320-211-10.
3. Swing hoist braces (2), one on each side, down to stowed position.
4. Lower dump body and stop engine. Refer to TM 9-2320-211-10.

NOTE

Follow-on Maintenance Action Required:

Check hoist assembly for proper operation. Refer to TM 9-2320-211-10.

END OF TASK



TA 085682

17-25. HOIST PUMP REPAIR (TRUCK M51A2).

TOOLS: No special tools required

SUPPLIES: Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680
Oil seal assembly

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Drain hydraulic reservoir. Refer to LO 9-2320-211-12.

(2) Take power take off propeller shaft off hydraulic hoist pump assembly. Refer to TM 9-2320-211-20.

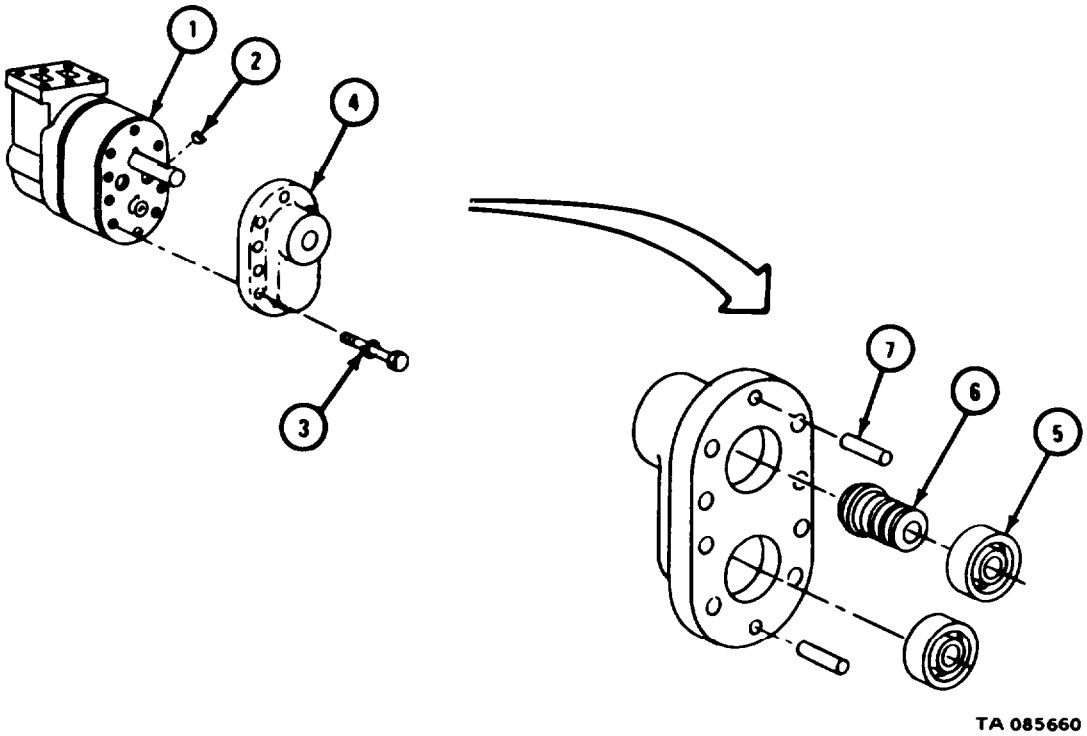
(3) Remove hydraulic hoist pump assembly. Refer to TM 9-2320-211-20.

b. Disassembly.

FRAME 1

1. Carefully clamp hoist pump assembly (1) in vise with soft jaw caps.
2. Take out key (2).
3. Take out eight screws and lockwashers (3).
4. Pull off front end cover (4) with two bearings (5), oil seal assembly (6), and two pins (7).
5. Take bearings (5) and oil seal assembly (6) out of front end cover (4). Refer to Part 1, para 7-7. Throw away oil seal assembly.
6. Pull out pins (7).
7. Take hoist pump assembly (1) out of vise.

GO TO FRAME 2



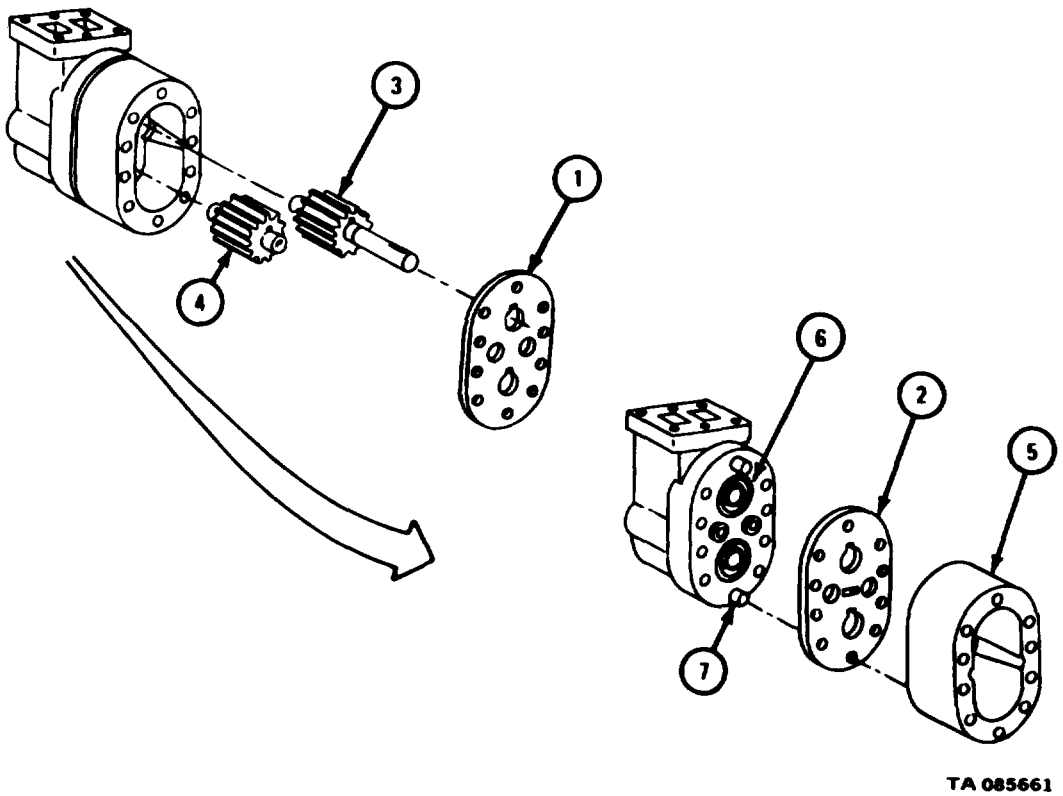
FRAME 2

NOTE

Note positions of wear plates (1 and 2) to make sure they are put back in the right place.

1. Pull off wear plate (1), taking care not to scratch or nick it.
2. Pull out driveshaft assembly (3) and driven shaft assembly (4), taking care not to scratch or nick them.
3. Pull off pump body (5).
4. Pull off wear plate (2), taking care not to scratch or nick it.
5. Take out two bearings (6). Refer to Part 1, para 7-7.
6. Pull out two pins (7).

GO TO FRAME 3

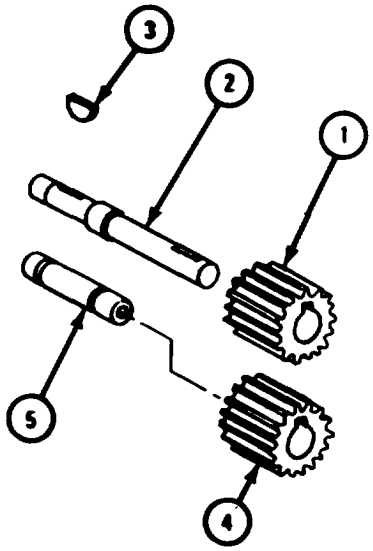


TA 085661

FRAME 3

1. Press gear (1) off driveshaft (2).
2. Clamp drive shaft (2) in vise with soft jaw caps.
3. Take out key (3).
4. Take drive shaft (2) out of vise.
5. Press gear (4) off driven shaft (5).

END OF TASK



TA 085662

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

Do not dry bearings with compressed air. Spinning bearings may explode, causing injury to personnel and damage to equipment.

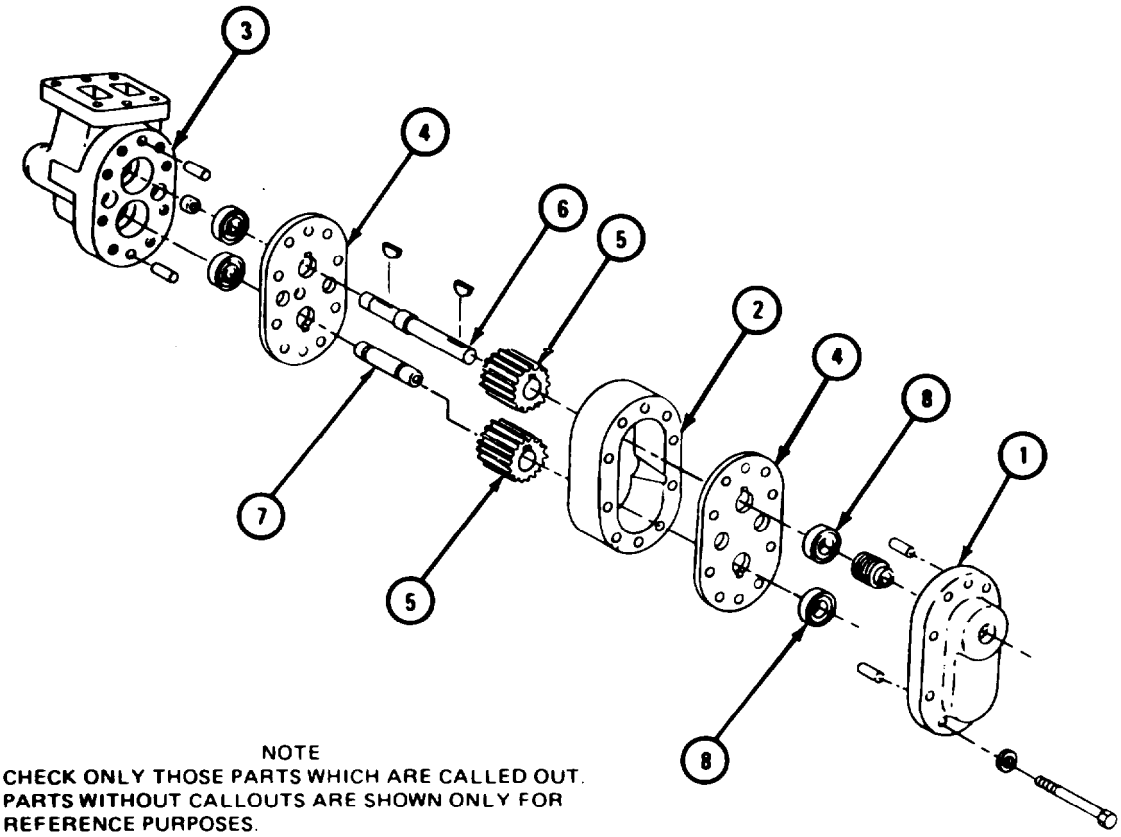
c. Cleaning. Clean all parts with solvent.

d. Inspection.

FRAME 1

1. Check that front end cover (1), pump body (2), and rear end cover (3) are not cracked or broken, and that bores are not scored or worn.
2. Check that two wear plates (4) have no nicks, burrs or deep scratches.
3. Check that two gears (5) have no nicks, burrs, deep scratches or broken teeth .
4. Check that drive shaft (6) and driven shaft (7) are not cracked or scored.
5. Check that four bearings (8) are not damaged. Refer to Part 1, para 7-7.

END OF TASK



NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 085663

e. Repair.

(1) Get new hoist pump assembly if front end cover, pump body or rear end cover are damaged.

(2) Use honing stone to smooth raised metal from gears. If gears cannot be repaired with honing stone, get new ones in their place.

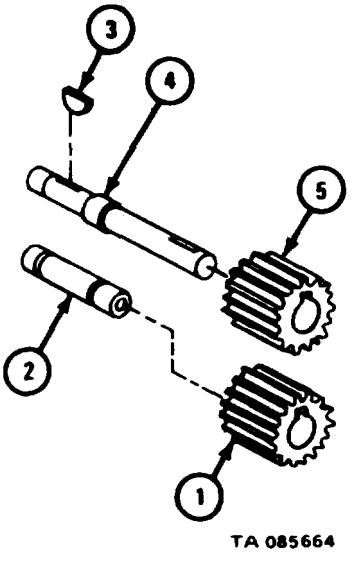
(3) Get new parts for all other damaged parts.

f. Assembly.

FRAME 1

1. Press gear (1) onto driven shaft (2).
2. Tap key (3) into slot in driveshaft (4).
3. Line up keyway in gear (5) with key (3) in driveshaft (4).
4. Press gear (5) onto key (3) and driveshaft (4).

GO TO FRAME 2



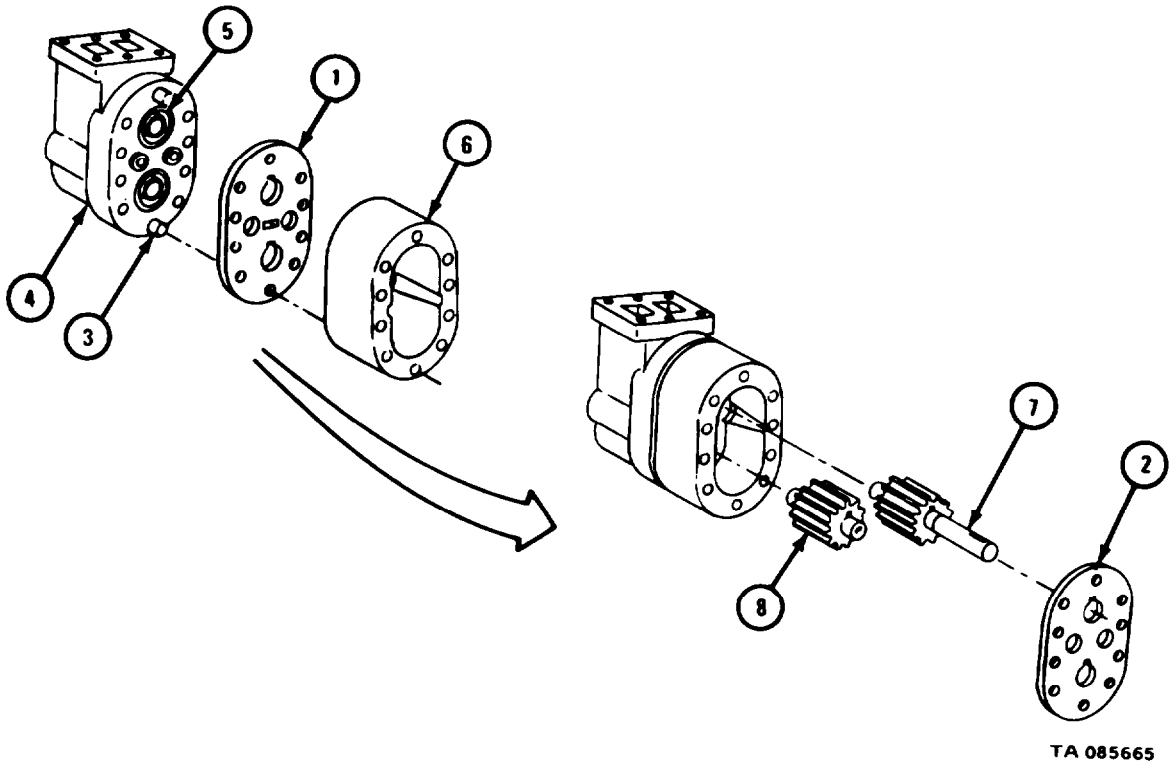
FRAME 2

NOTE

Be sure to put wear plates (1 and 2) back in positions noted in disassembly.

1. Tap two pins (3) into bores in rear end cover (4).
2. Press two bearings (5) into bores in rear end cover (4). Refer to Part 1, para 7-7.
3. Put wear plate (1) on pins (3) and push it in place against rear end cover (4). Take care not to scratch or nick wear plate.
4. Put pump body (6) on pins (3) and push it in place against wear plate (1). Notch on pump body must be on same side as notch on rear end cover (4).
5. Put driveshaft assembly (7) and driven shaft assembly (8) into bores of bearings (5), taking care not to scratch or nick bearings or shafts.
6. Put wear plate (2) on driveshaft assembly (7) and driven shaft assembly (8) and push it in place against pump body (6). Take care not to scratch or nick wear plate.

GO TO FRAME 3



TA 085665

FRAME 3

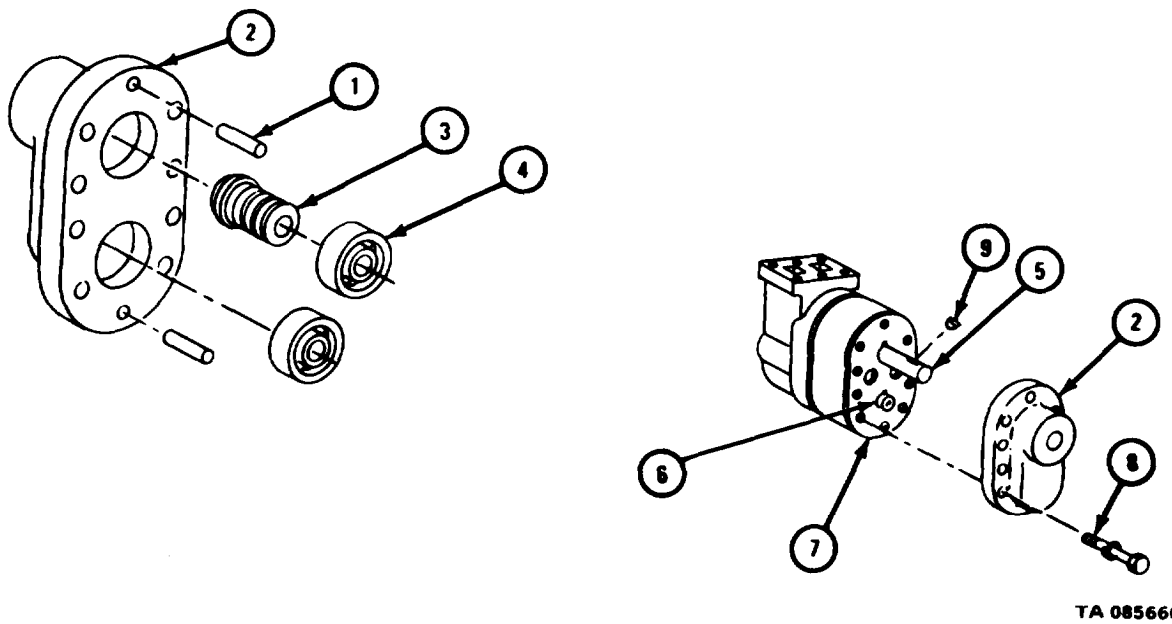
1. Tap two pins (1) into front end cover (2).
2. Press oil seal assembly (3) and two bearings (4) into front end cover (2). Refer to Part 1, para 7-7.
3. Line up bearings (4) in front end cover (2) with drive shaft assembly (5) and driven shaft assembly (6).
4. Push front end cover (2) with pins (1), oil seal assembly (3), and bearings (4) into place against hoist pump assembly (7). Notch on front end cover must be on same side as notches on hoist pump assembly.
5. Carefully clamp hoist pump assembly (7) in vise with soft jaw caps.
6. Put in eight screws and lockwashers (8).
7. Tighten screws (8) to 30 to 40 pound-feet.
8. Tap key (9) into slot in driveshaft assembly (5).
9. Take hoist pump assembly (7) out of vise.

NOTE

Follow-on Maintenance Action Required:

1. Replace hoist pump assembly. Refer to TM 9-2320-211-20.
2. Replace power take off to hydraulic hoist pump. Refer to TM 9-2320-211-20.
3. Fill hydraulic reservoir. Refer to LO 9-2320-211-12.
4. Check hoist pump assembly for proper operation. Refer to TM 9-2320-211-10.

END OF TASK



TA 085666

17-26. HOIST CYLINDER PACKING REMOVAL AND REPLACEMENT.

NOTE

This task is the same for right and left hoist cylinder packings. This task is shown for the right side hoist cylinder packing.

TOOLS: No special tools required

SUPPLIES: Preformed packing set
Artillery and automotive grease, type GAA, MIL-G-10924

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Start engine and raise dump body. Refer to TM 9-2320-211-10.

(2) Put in safety brace. Refer to TM 9-2320-211-20.

(3) Stop engine. Refer to TM 9-2320-211-10.

b. Removal.

FRAME 1

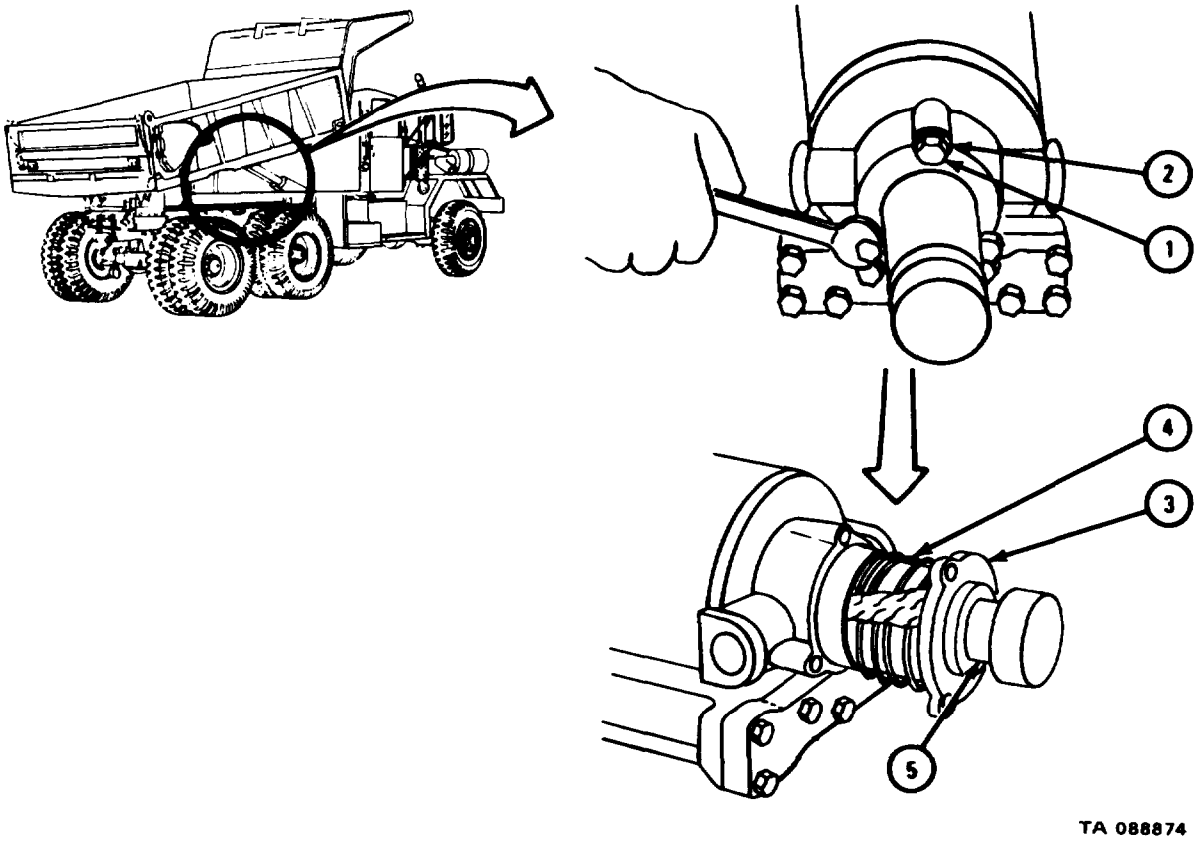
1. Take out three cap screws (1) and lockwashers (2).
2. Slide back cylinder packing gland (3).

CAUTION

Be careful not to scratch or mar polished surface of piston rod (5).

3. Carefully pry out piston rod packing (4).

END OF TASK



c. Replacement.

FRAME 1

NOTE

Packing rings are split so they can be put on easily. Be sure to put joints around piston rod to make sure there is a tight seal.

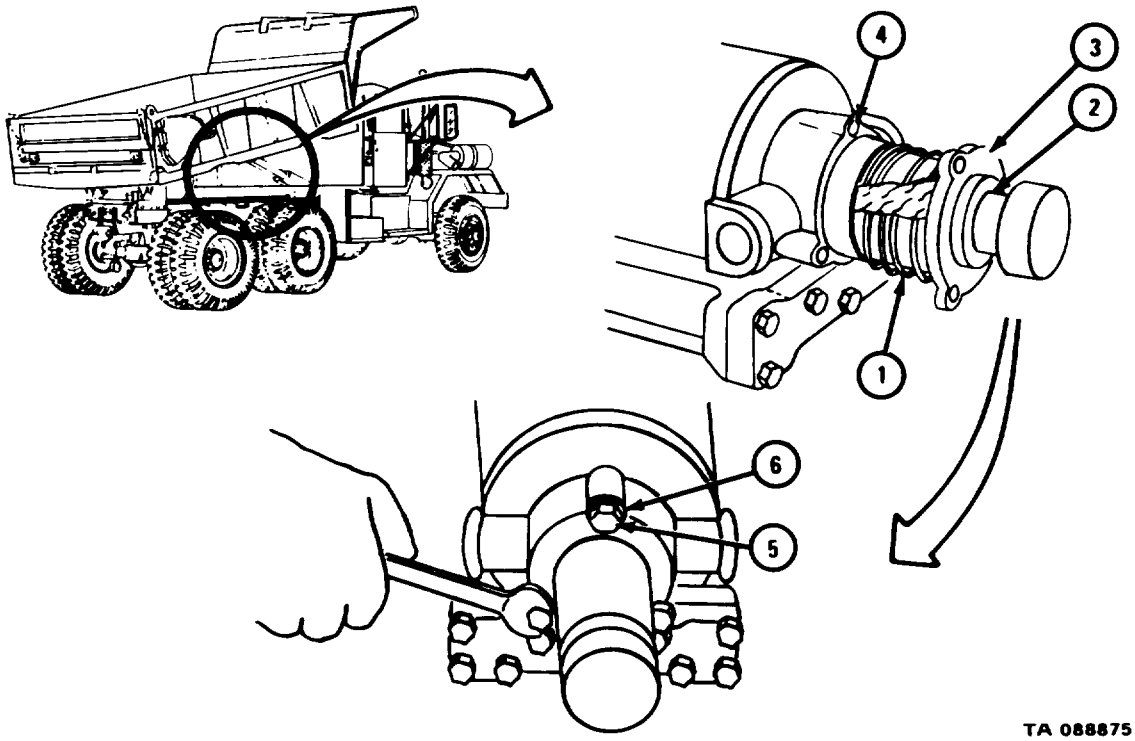
1. Put a coat of grease on packing (1) and piston rod (2).
2. Carefully push packing (1) around piston rod (2) using block of wood or brass bar.
3. Aline holes in cylinder packing gland (3) with holes (4).
4. Put in three cap screws (5) and lockwashers (6).

NOTE

Follow-on Maintenance Action Required:

1. Start engine. Refer to TM 9-2320-211-10.
2. Take out safety braces. Refer to TM 9-2320-211-20.
3. Lower dump body and chink that there are no leaks. Refer to TM 9-2320-211-10.
4. Stop engine. Refer to TM 9-2320-211-10.

END OF TASK



17-27. HOIST CABLE UPPER BOOM HEAD AND UPPER BOOM FOOT SHEAVES AND GUARD REMOVAL AND REPLACEMENT (TRUCK M543A2).

TOOLS: None

SUPPLIES: Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

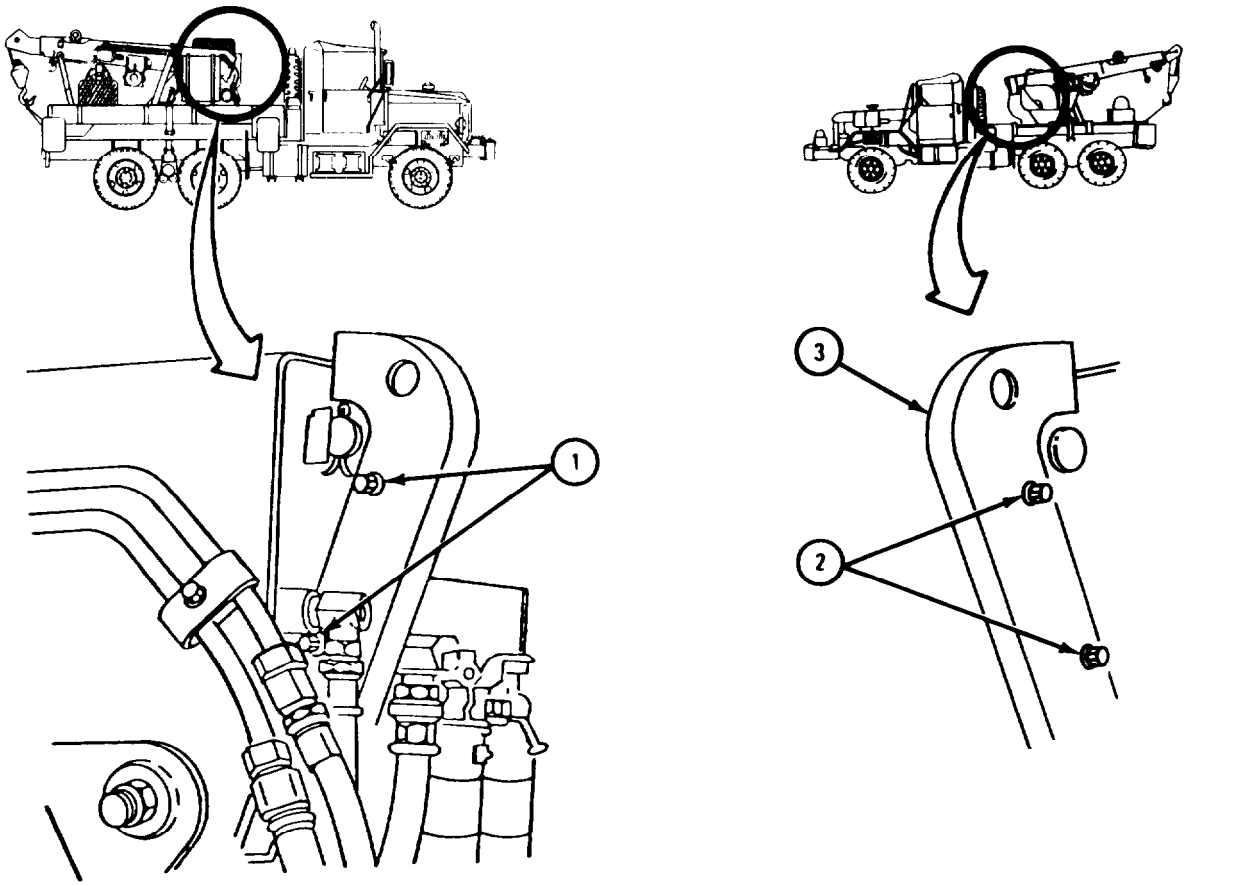
a. Preliminary Procedure. Lower crane hook to floor and slack off hoist cable. Refer to TM 9-2320-211-10.

b. Removal.

FRAME 1

1. On right side of truck, take out two capscrews with washers (1).
2. On left side of truck, take out two cap screws with washers (2).
3. Take off cable guard (3).

GO TO FRAME 2



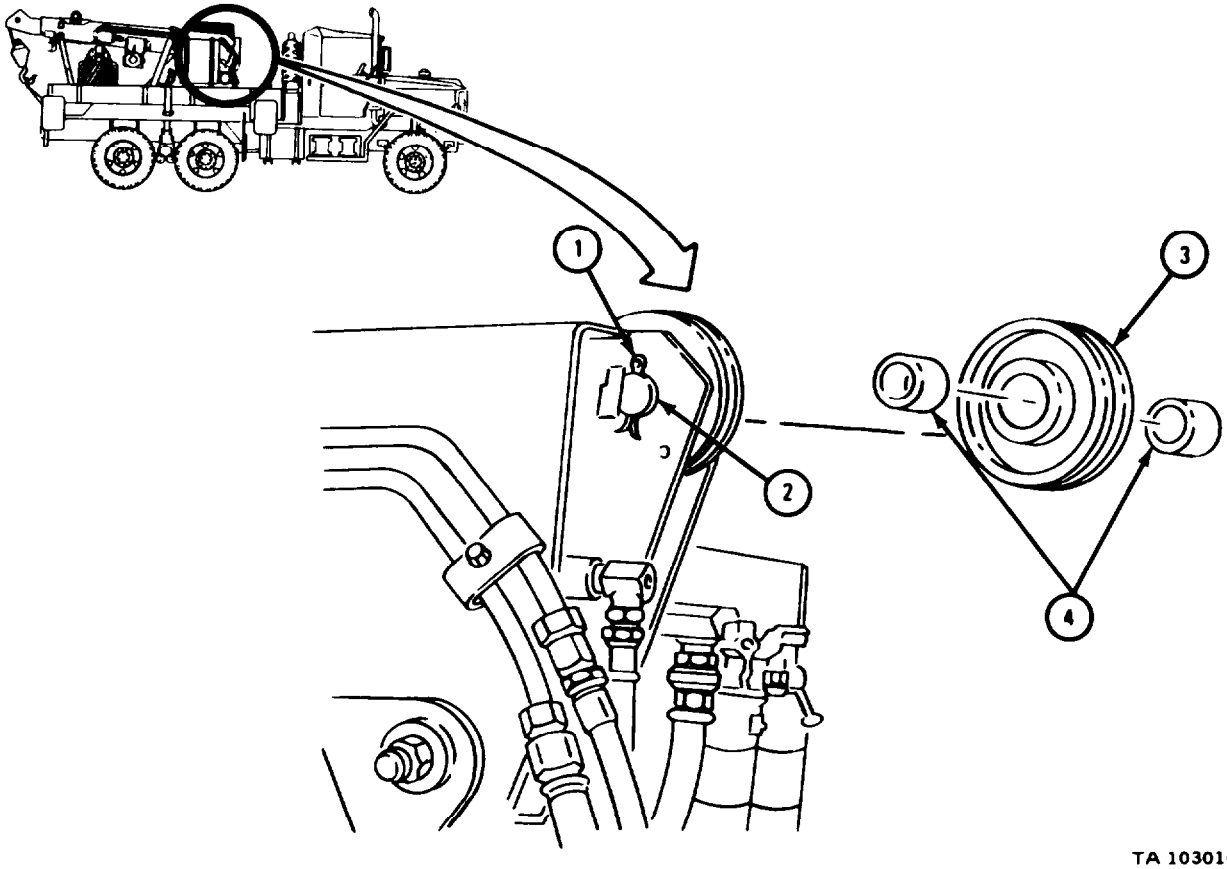
FRAME 2

WARNING

Always wear gloves when handling wire cable. Never let cable run through bare hands. Broken wires can cause painful injuries.

1. Take out and throw away cotter pin (1).
2. Drive out sheave pin (2).
3. Take out upper boom foot sheave (3) and two sleeve bearings (4).

GO TO FRAME 3

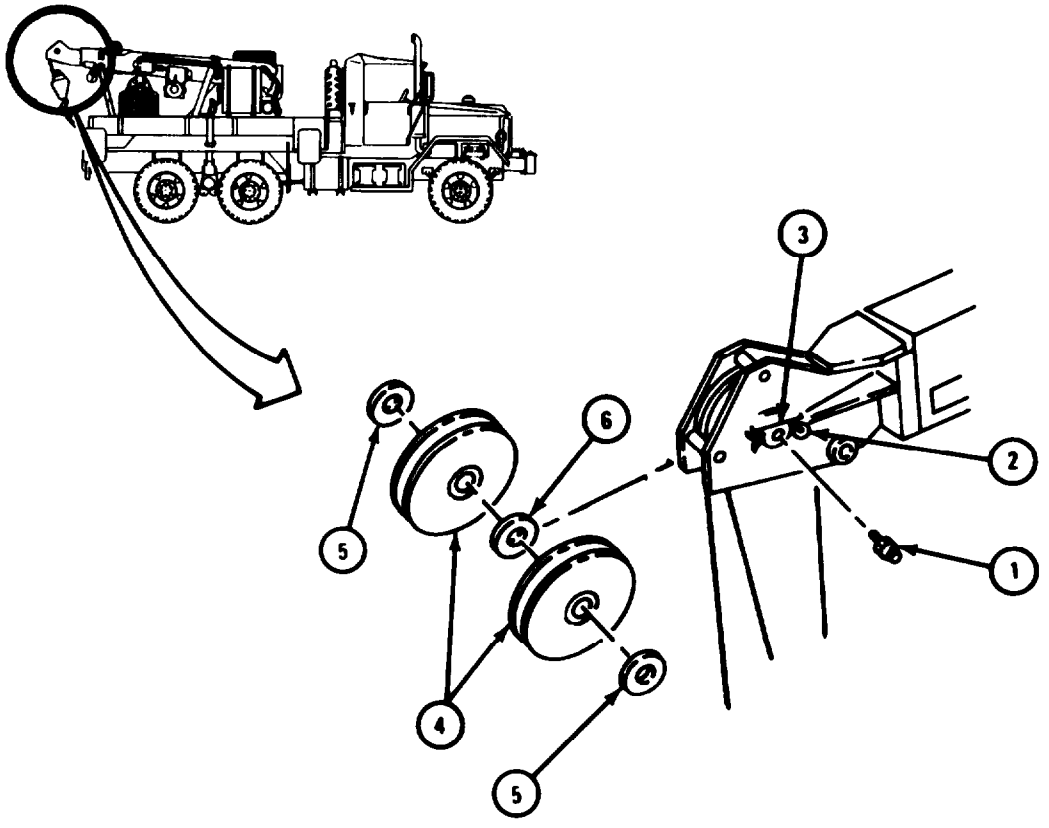


TA 103010

FRAME 3

1. Take off lubrication fitting (1).
2. Take out and throw away cotter pin (2).
3. Drive out pin (3).
4. Take out two boom head sheaves (4), two thrust washers (5), and flat washer (6).

END OF TASK



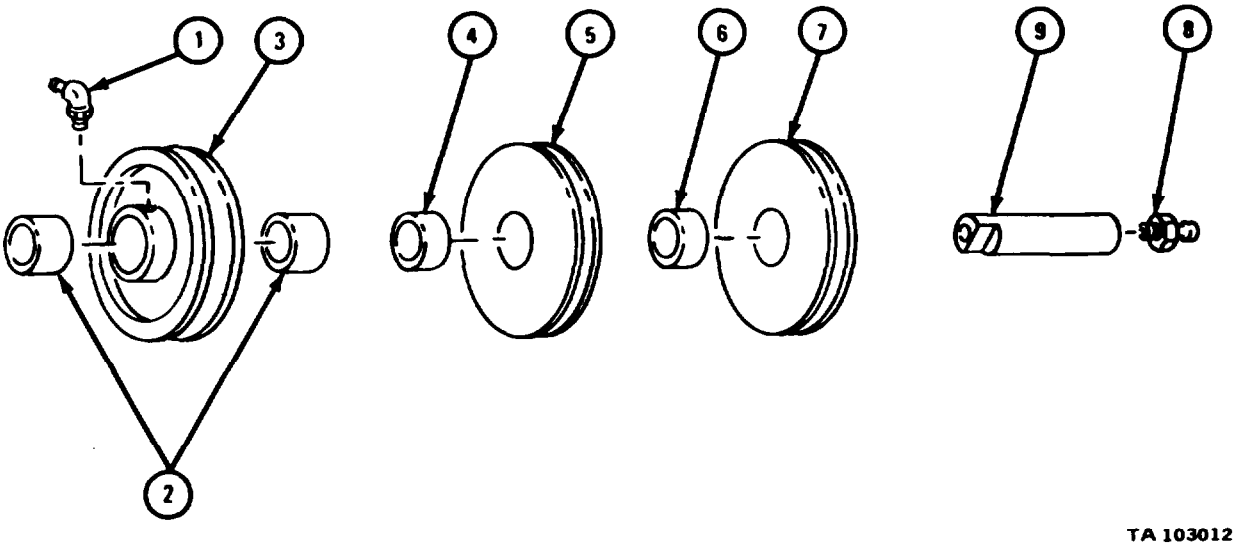
TA 103011

c. Disassembly.

FRAME 1

1. Take off lubrication fitting (1) and take out two sleeve bearings (2) from upper boom foot sheave (3).
2. Take out bushing (4) from boom head sheave (5). Take out bushing (6) from head sheave (7).
3. Take out lubrication fitting (8) from boom head sheave pin (9).

END OF TASK



TA 103012

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

d. Cleaning. Using a stiff bristle brush, clean all parts with dry cleaning solvent wipe dry with clean, lint-free cloth.

e. Inspection and Repair.

(1) Check cable sheaves for cracks, breaks or damaged cable grooves.

(2) Check cable bushings, washers, and bearings for wear and damage.

(3) Check boom head sheave pin for lubrication stoppage.

(4) Check upper boom front sheave and all lubrication fittings for lubrication stoppage.

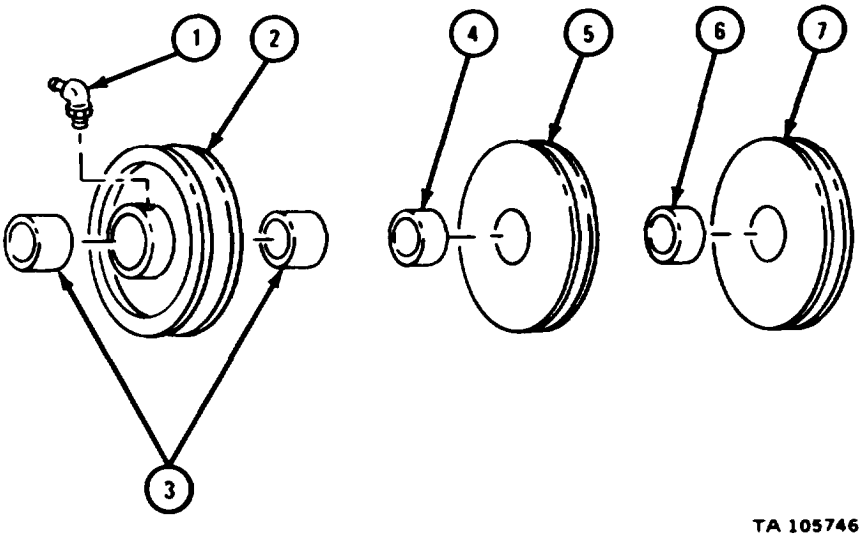
(5) Replace all damaged parts.

f. Assembly.

FRAME 1

1. Put lubrication fitting (1) on upper boom foot sheave (2).
2. Put two sleeve bearings (3) in upper boom foot sheave (2).
3. Put bushing (4) in boom head sheave (5). Put bushing (6) in boom head sheave (7).

END OF TASK



TA 105746

g. Replacement.

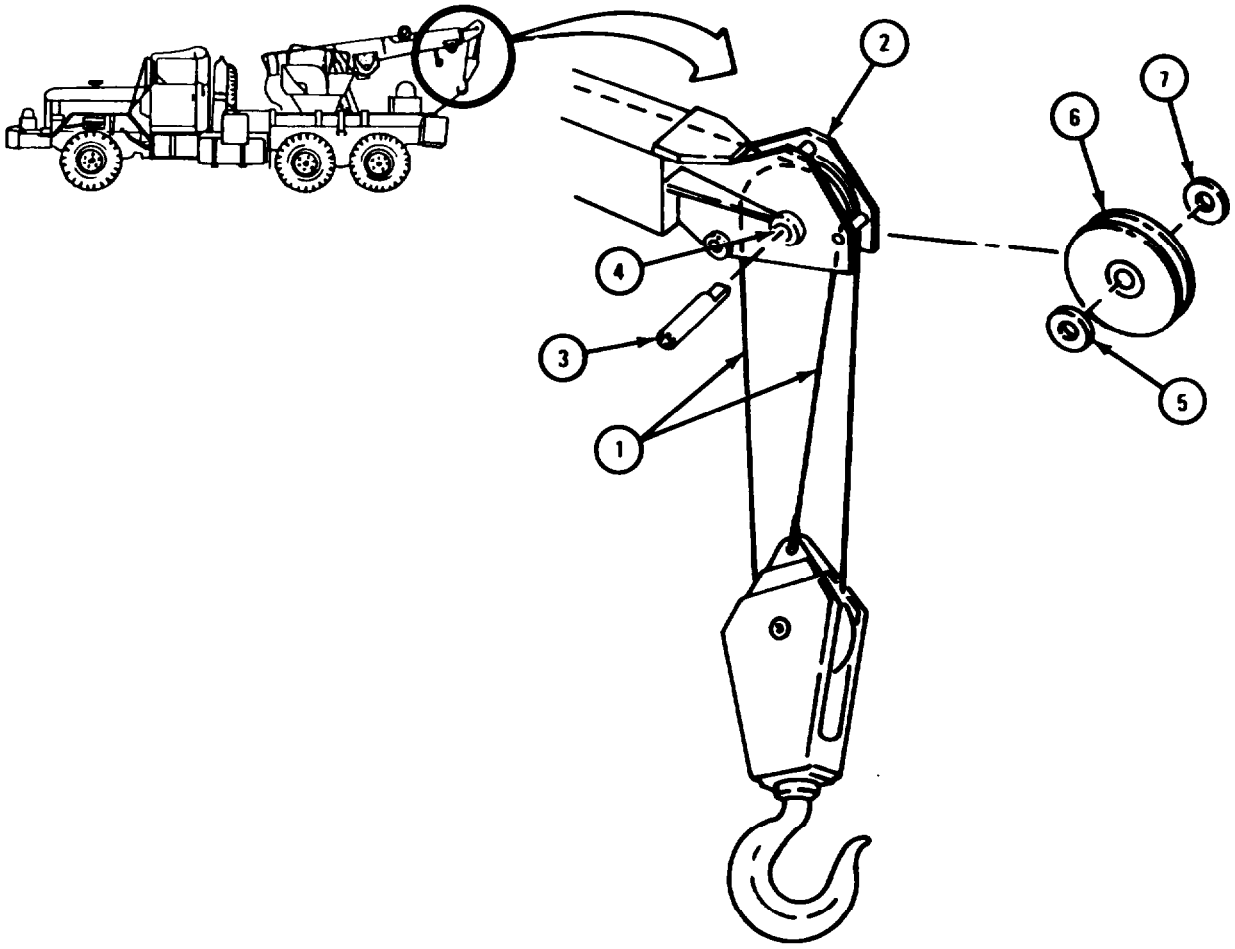
FRAME 1

WARNING

Always wear gloves when handling wire cable.
Never let cable run through bare hands. Broken wires can cause painful injuries.

1. On left side of truck, hold loop (1) of cable at top of boom head (2). Put cotter pin end of pin (3) in hole (4) and push pin half way to matching hole on other side of boom head (2).
2. Put thrust washer (5) on pin (3).
3. Put sheave (6) on pin (3). Put loop (1) of cable in groove of sheave (6).
4. Put flat washer (7) on pin (3).

GO TO FRAME 2

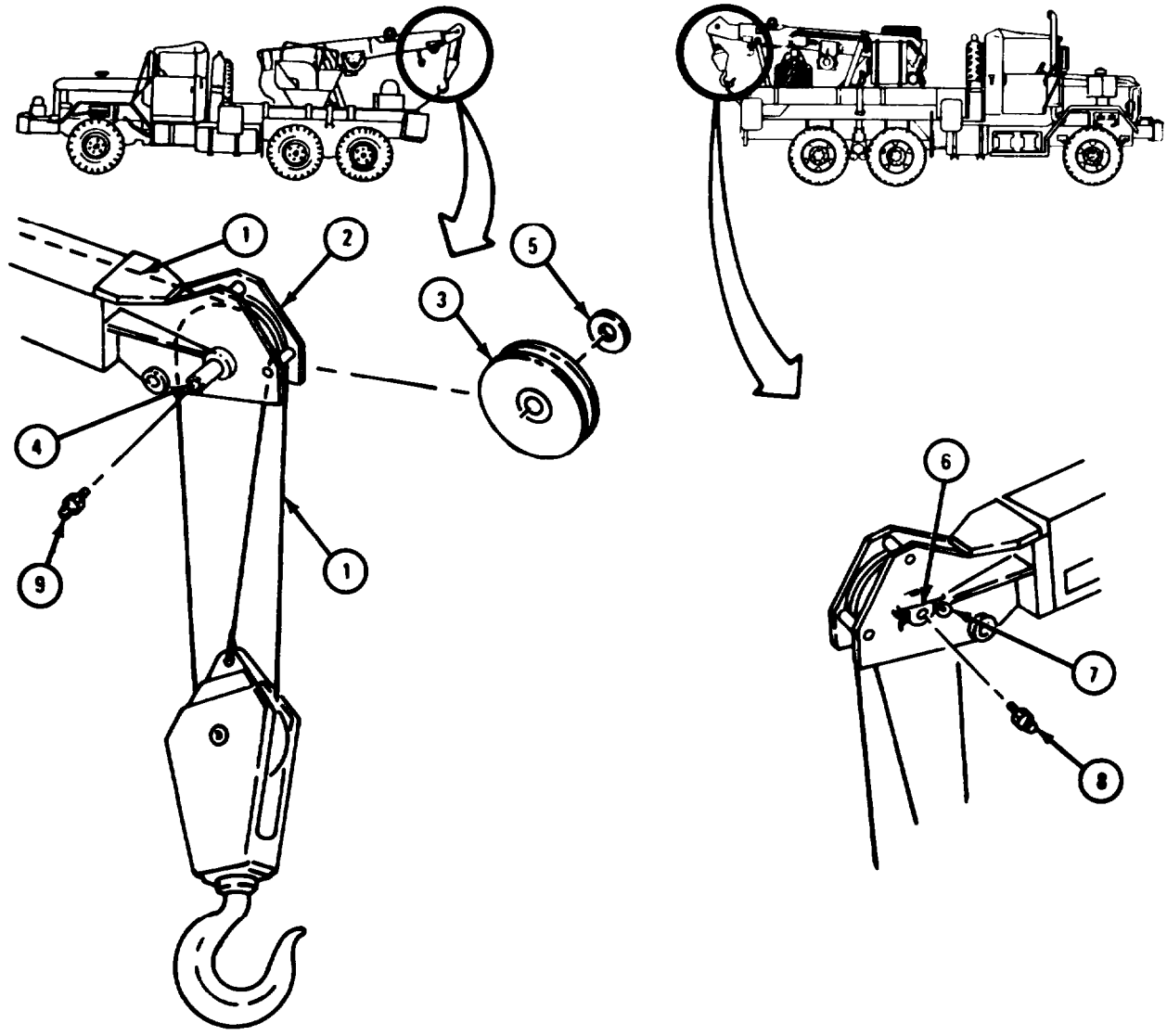


TA 105747

FRAME 2

1. Hold bend (1) of cable at top of boom head (2).
2. Hold sheave (3) in boom head (2) and put cable bend (1) in groove of sheave (3).
3. Aline hole of sheave (3) with pin (4) and tap pin (4) through sheave (3).
4. Put thrust washer (5) on pin (4).
5. Aline flat side of pin (4) with flat side of hole (6) on left side of boom head. Tap in pin (4).
6. Put in cotter pin (7).
7. Put in lubrication fitting (8). Put in lubrication fitting (9).

GO TO FRAME 3

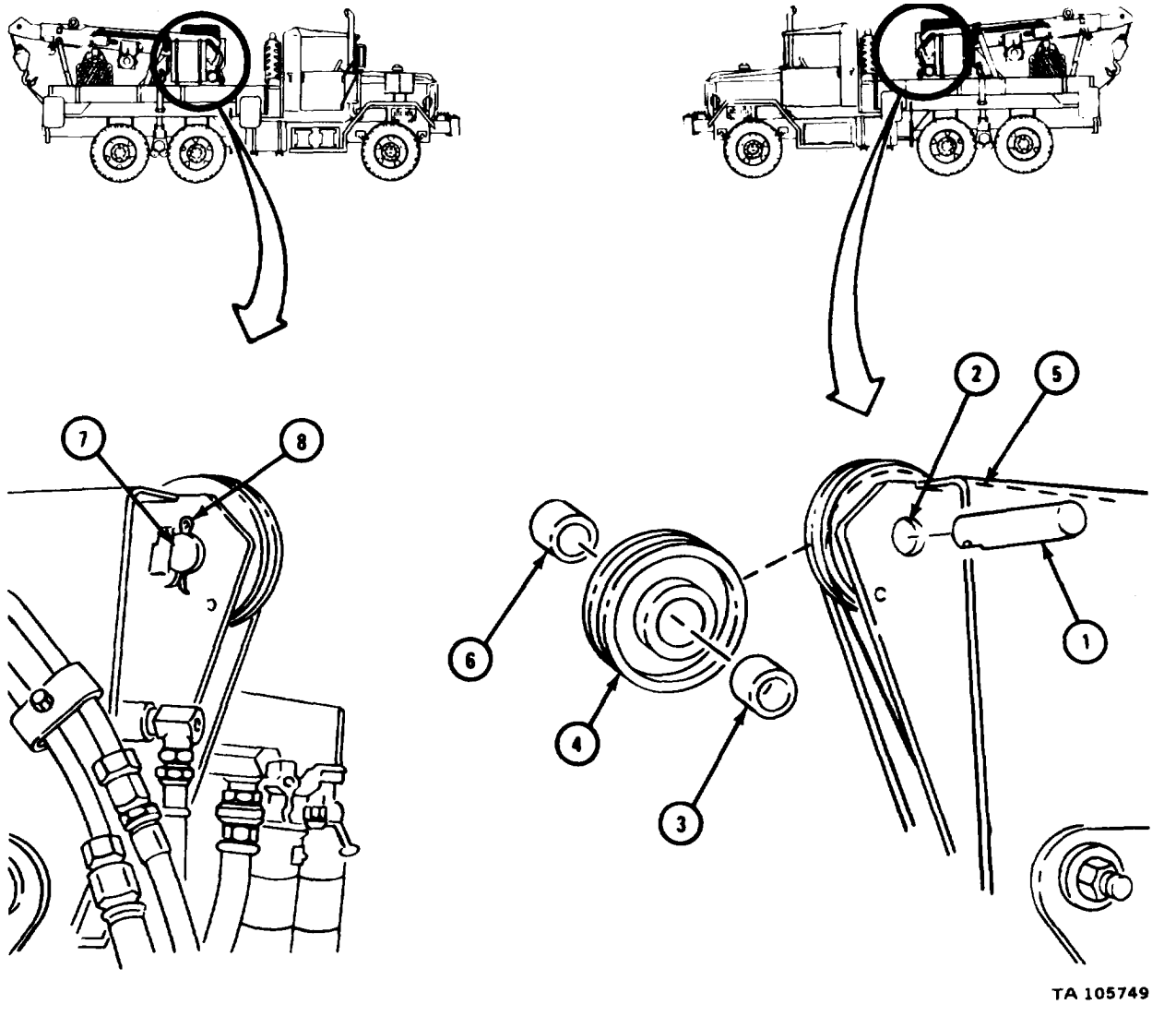


TA 105748

FRAME 3

1. On left side of truck, put cotter pin end of sheave pin (1) in sheave pin hole (2). Push pin (1) half way to matching hole on other side of boom foot.
2. Put sleeve bearing (3) on pin (1).
3. Put upper boom foot sheave (4) on pin (1). Put cable (5) in groove of sheave (4).
4. Aline hole in sleeve bearing (6) with pin (1). Tap pin (1) through sleeve bearing (6).
5. Aline flat side of pin (1) with flat side of hole (7) on right side of boom foot. Tap in pin (1).
6. Put in cotter pin (8).
7. Lubricate upper boom foot sheave. Refer to LO 9-2320-211-12.

GO TO FRAME 4



FRAME 4

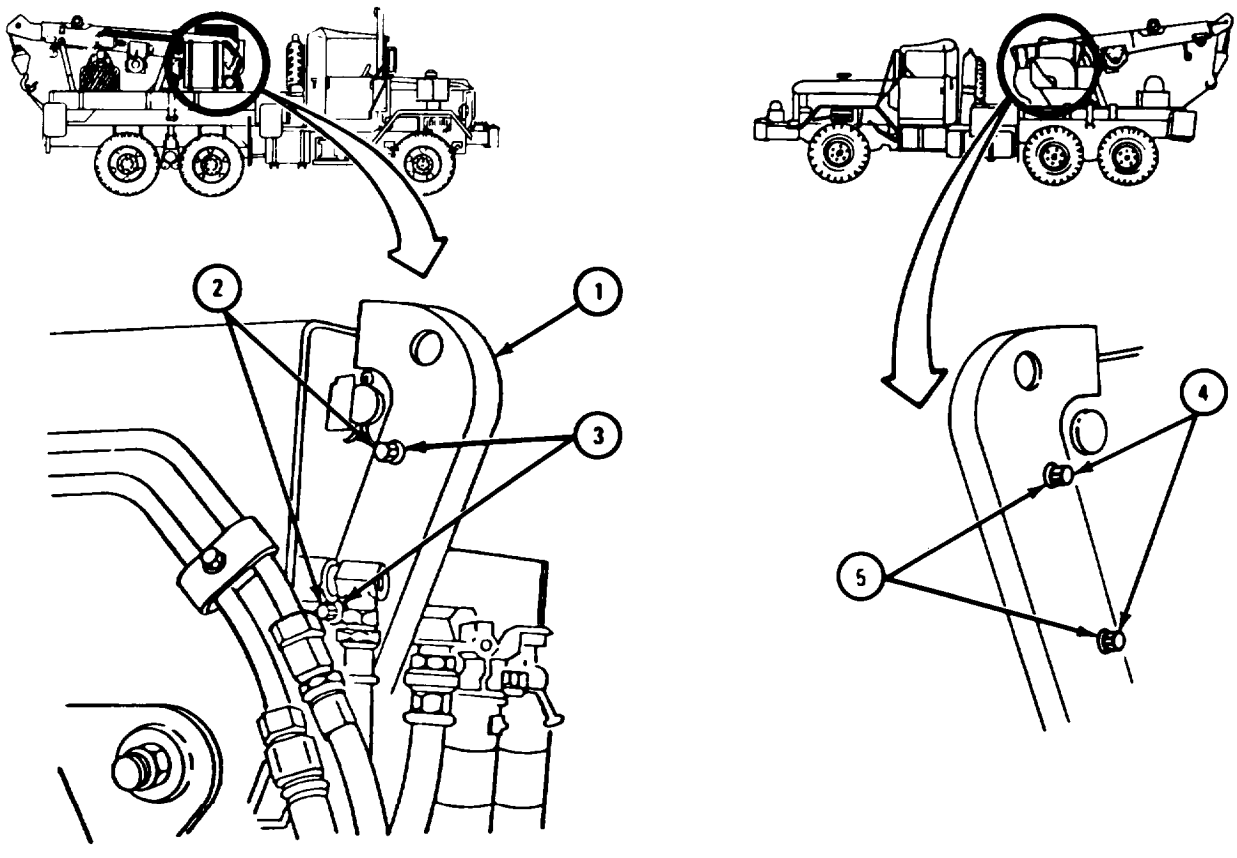
1. Hold cable guard (1) over cable at boom foot.
2. Put in two capscrews (2) with two washers (3).
3. On other side of cable guard, put in two capscrews (4) with two washers (5).

NOTE

Follow-on Maintenance Action Required:

1. Lubricate head boom sheaves. Refer to LO 9-2320-211-12.
2. Raise and secure crane hook. Refer to TM 9-2320-211-10.

END OF TASK



TA 105750

17-28. HOIST ROLLER ARM ASSEMBLY REMOVAL, REPAIR, AND REPLACEMENT (TRUCK M51A2).

NOTE

This task is the same for the right and left roller arm assemblies. This task is shown for the left roller arm assembly.

TOOLS: No special tools required

SUPPLIES : Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680
Wooden block, 4 x 4 inches, 4 feet long

PERSONNEL : Two

EQUIPMENT CONDITION : Truck parked, engine off, handbrake set.

a. Preliminary Procedure.

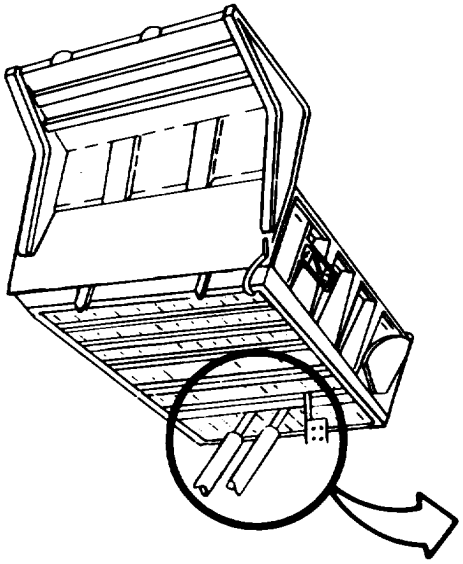
FRAME 1

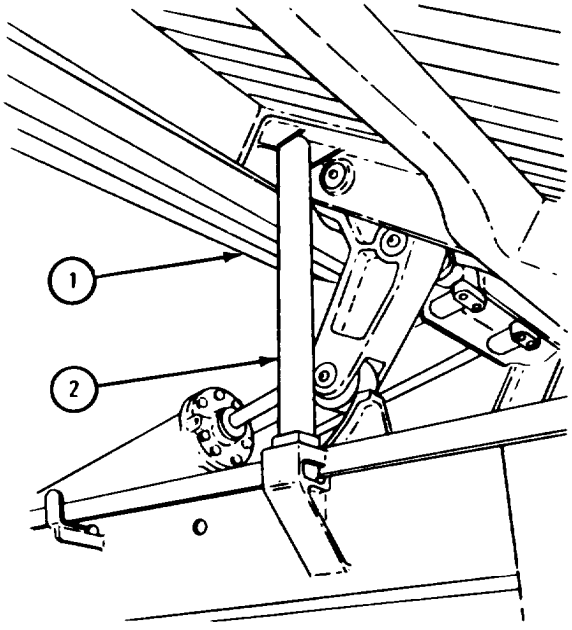
Soldier A 1. Start engine and raise dump body (1). Refer to TM 9-2320-211-10.

Soldier B 2. Swing two hoist braces (2), one on each side, into place under dump body (1).

Soldier A 3. Lower dump body (1) onto hoist braces (2) and stop engine. Refer to TM 9-2320-211-10.

END OF TASK





TA 085772

b. Removal.

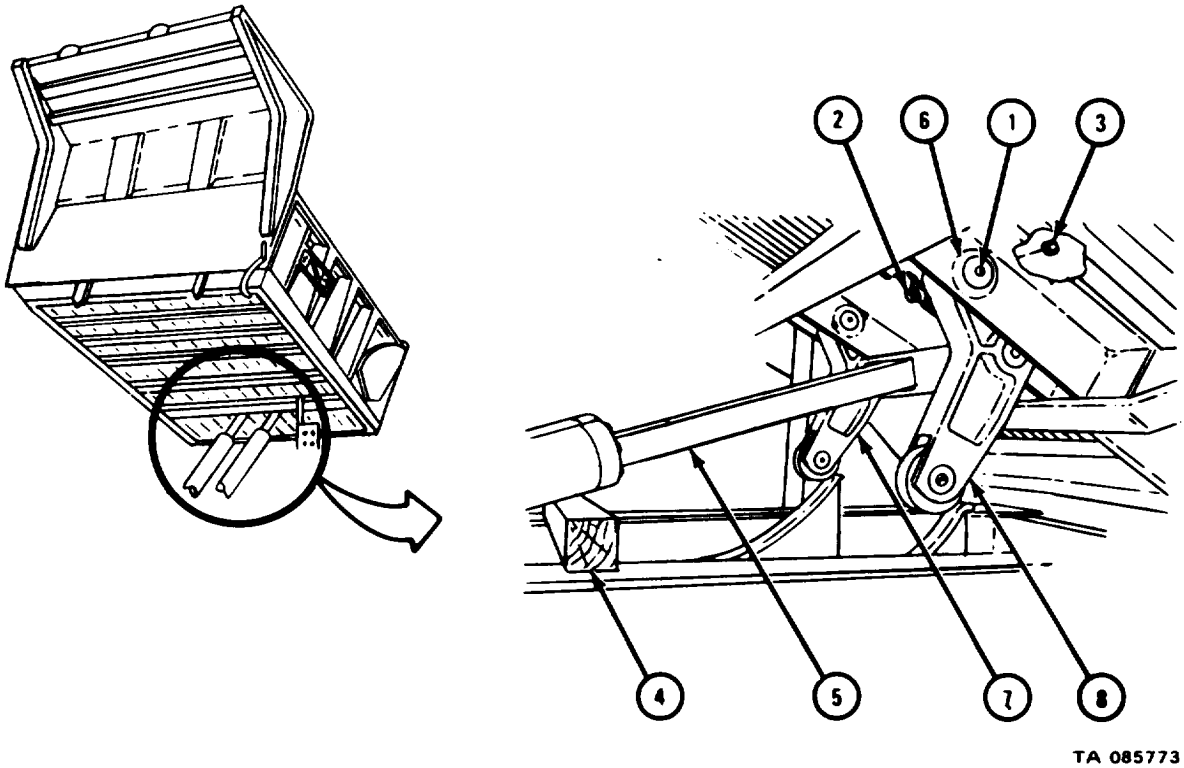
FRAME 1

1. Take out lubrication fitting (1).
2. Take out screw (2) and nut (3).
3. Place wood block (4) under ends of two hoist cylinders (5) as shown.
4. Drive out pin (6).

Soldier A

5. Do steps 1, 2, and 4 for other side.
6. Start engine. Place dump body control in down position to retract hoist assembly. Refer to TM 9-2320-211-10.
7. Slide off two roller arm assemblies (7 and 8).

END OF TASK

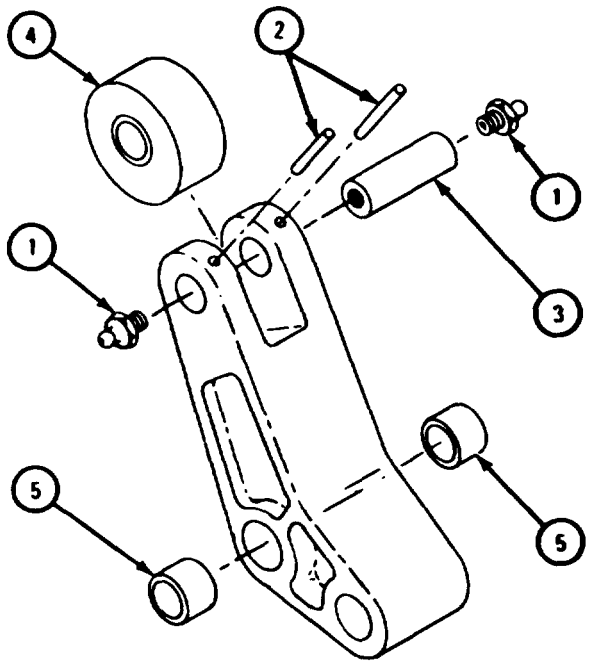


c. Disassembly.

FRAME 1

1. Put roller assembly into vise.
2. Take out two lubrication fittings (1).
3. Drive out two pins (2).
4. Drive out pin (3).
5. Take out roller (4).
6. Press out two bushings (5).

END OF TASK



TA 085774

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

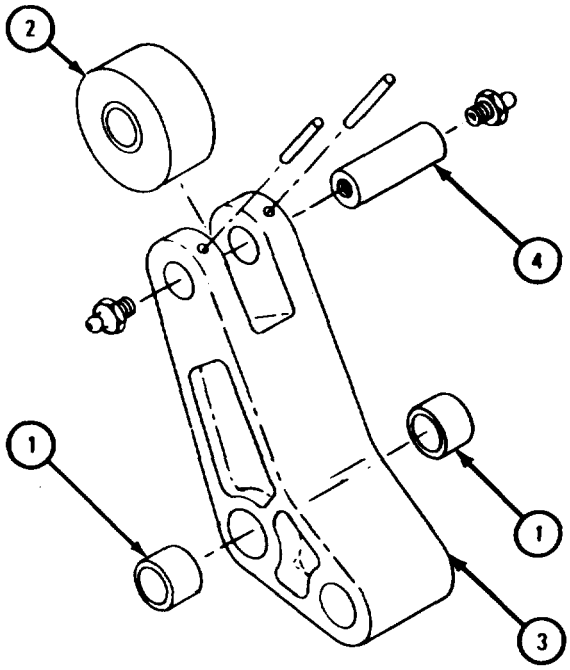
d. Cleaning. Clean all parts in solvent. Make sure grease passages are open.

e. Inspection and Repair.

FRAME 1

1. Check that two bushings (1) are not damaged.
2. Check that roller (2), roller arm (3), and pin (4) are not cracked, broken or damaged in any other way.
3. If any parts are damaged, throw them away and get new parts in their place.

END OF TASK



NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

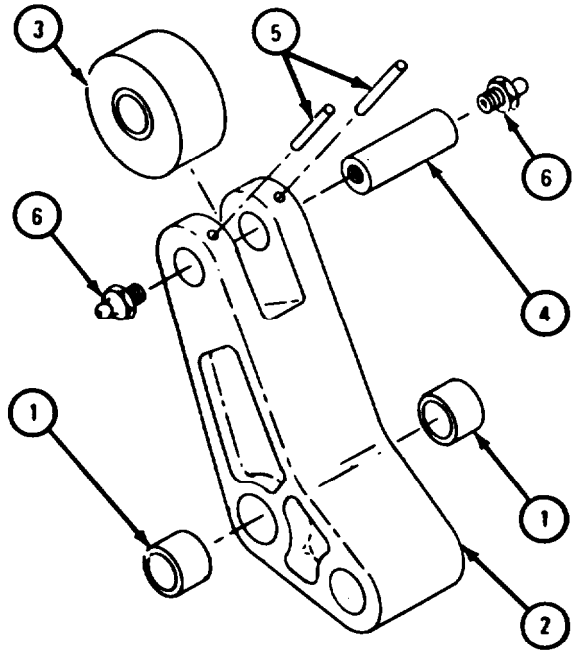
TA 085775

f. Assembly.

FRAME 1

1. Press two bushings (1) into roller arm (2).
2. Put roller arm (2) into vise.
3. Put roller (3) in place in slot in roller arm (2).
4. Aline holes in pin (4) with holes in roller arm (2).
5. Drive pin (4) through holes in roller arm (2) and roller (3).
6. Drive two pins (5) into roller arm (2) and pin (4).
7. Put in two lubrication fittings (6).

END OF TASK



TA 085776

g. Replacement.

FRAME 1

1. Slide railer arm assemblies (1 and 2) onto crosshead (3).

Soldier A 2. Raise dump body to raise crosshead (3) with roller arm assemblies (1 and 2). Refer to TM 9-2320-211-10.

Soldier B 3. Aline holes in roller arm assembly (1) with holes in dump body (1).

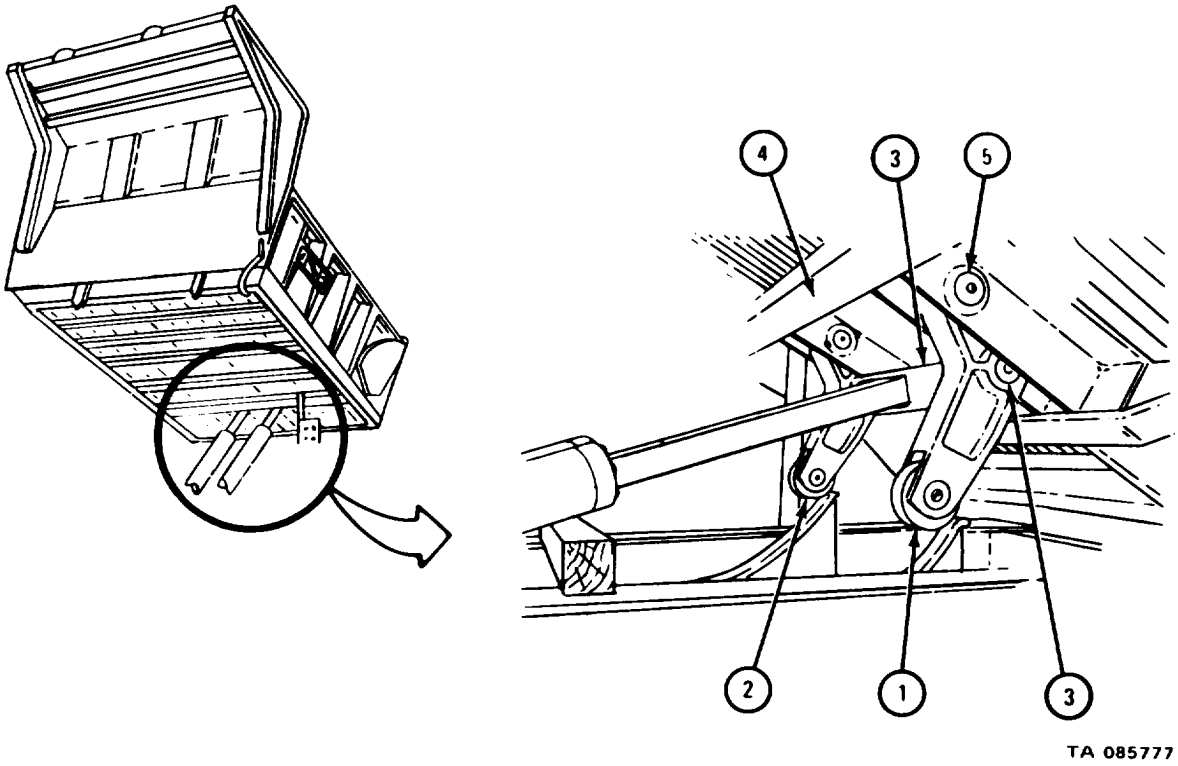
NOTE

A jack may be needed to finish alining holes.

4. Drive pin (5) through dump body (4) and roller arm assembly (1). Aline screw hole in pin with screw holes in dump body.

5. Repeat step 4 for other side.

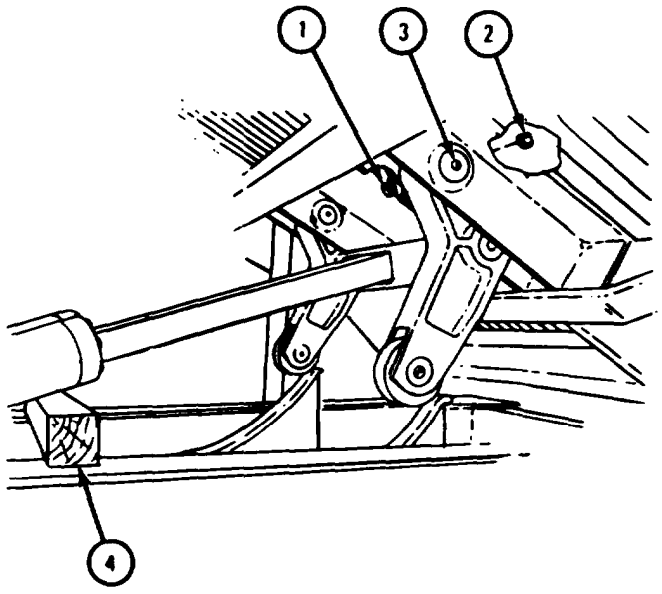
GO TO FRAME 2



FRAME 2

1. Put in screw (1) and nut (2).
2. Put in lubrication fitting (3).
3. Repeat steps 1 and 2 for other side.
4. Take out wood block (4).

GO TO FRAME 3

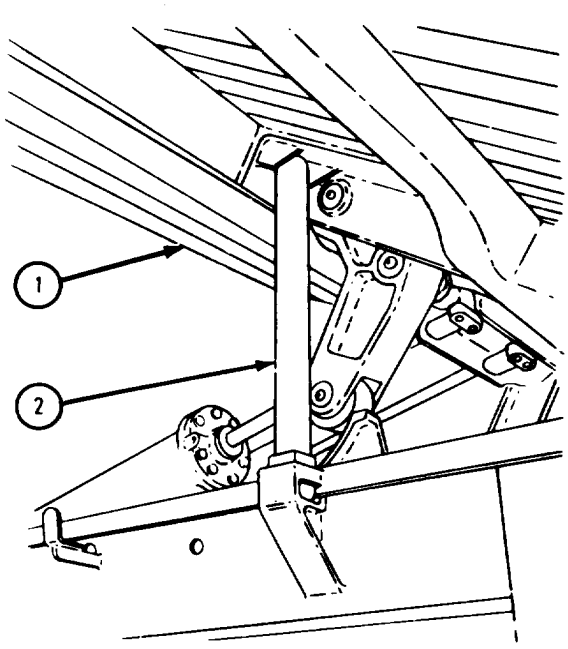


TA 085778

FRAME 3

1. Grease roller arm assemblies. Refer to LO 9-2320-211-12.
2. Raise dump body (1) far enough to free two hoist braces (2). Refer to TM 9-2320-211-10.
3. Swing hoist braces (2), one on each side, down to stowed position.
4. Lower dump body (1) and stop engine. Refer to TM 9-2320-211-10.

END OF TASK



TA 085779

17-29. CRANE SWINGER GEARCASE ASSEMBLY REMOVAL AND REPLACEMENT (TRUCK M543A2) .

TOOLS: No Special tools required

SUPPLIES: Tags
Caps

PERSONNEL: Two

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

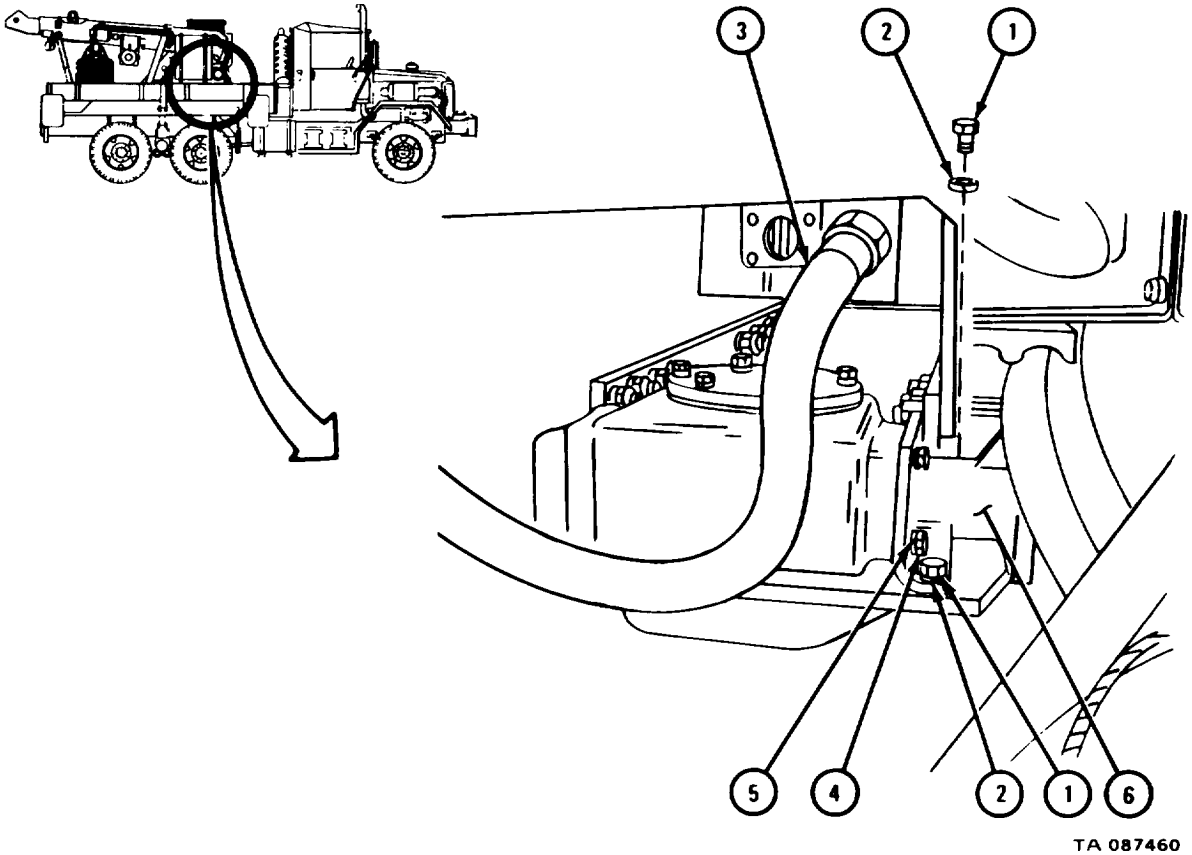
a. Preliminary Procedure. Remove crane turntable swinger motor assembly. Refer to para 17-33.

b . Removal .

FRAME 1

1. Take out six screws (1) and lockwashers (2).
2. Tag hose (3) so it will be put back in the same place. Take off hose and cap end.
3. Take out four screws (4) and lockwashers (5).
4. Take off motor adapter (6).

GO TO FRAME 2



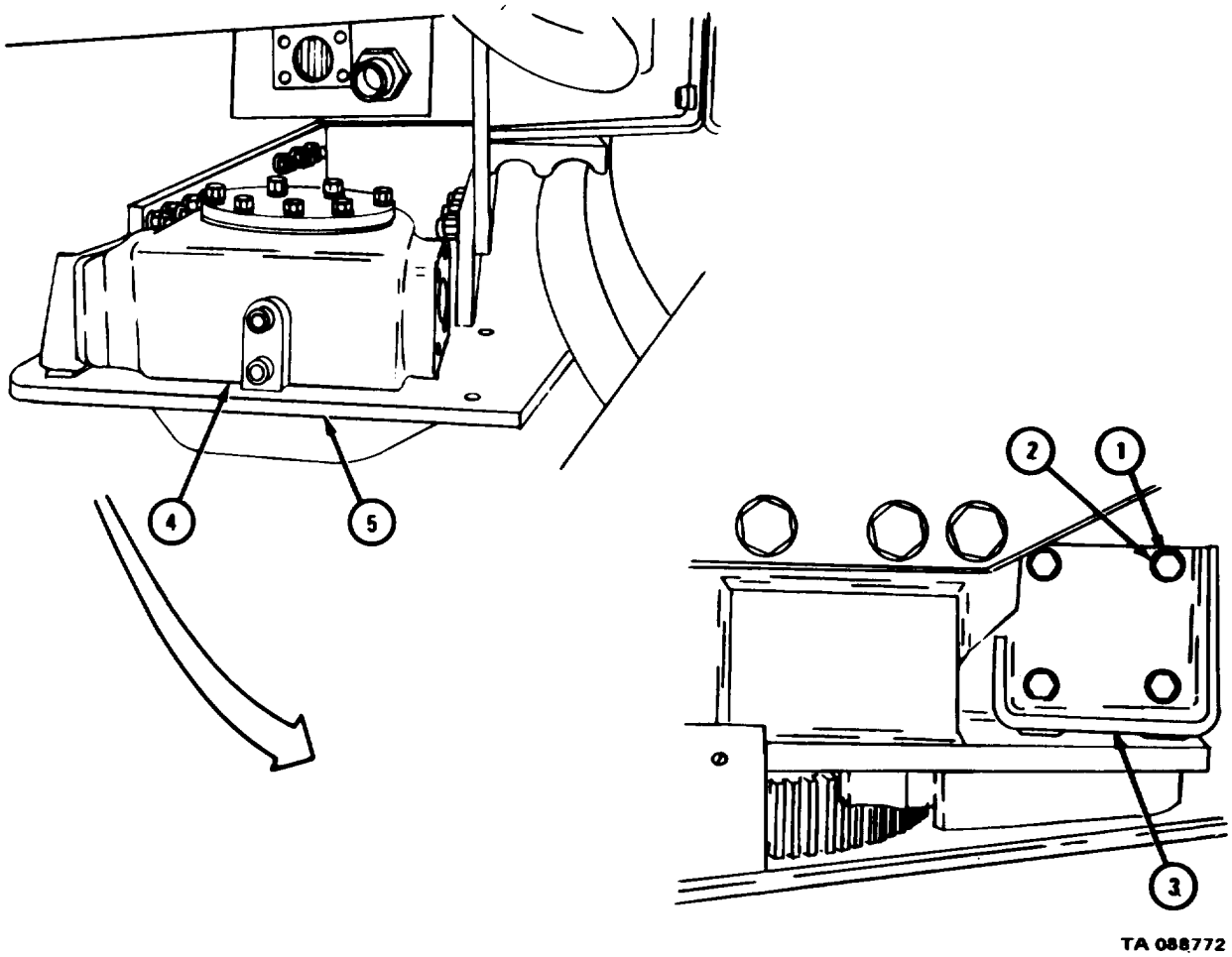
FRAME 2

1. Take off four screws (1) and lockwashers (2).
2. Take off gearcase end cap (3).

Soldiers A and B

3. Pry under gearcase (4) and slide it off turntable (5).
4. Hook chain hoist to gearcase (4) and lift it off vehicle.

END OF TASK



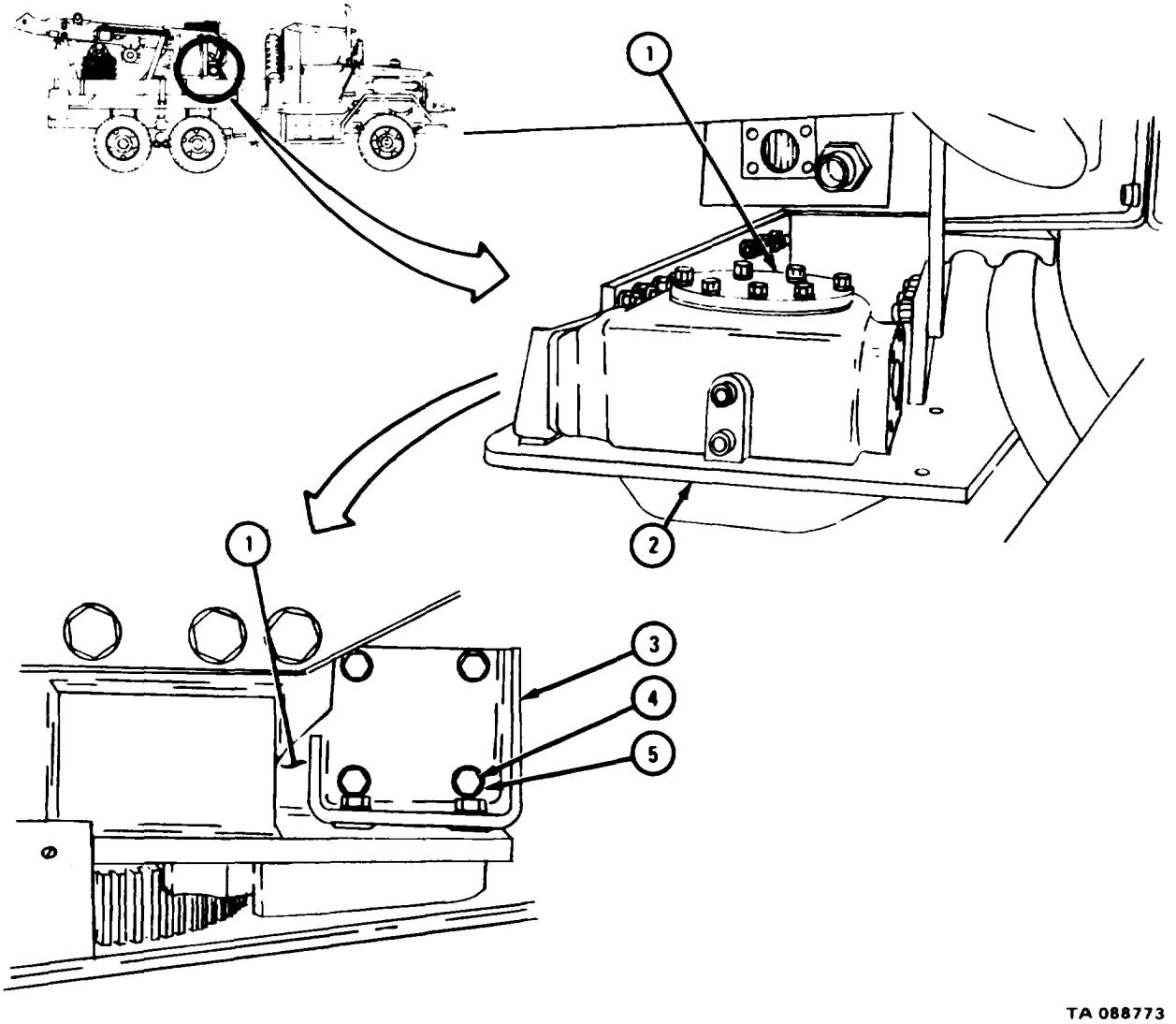
c. Replacement.

FRAME 1

Soldiers A and B

1. Hook chain hoist to gearcase assembly (1) and lift it onto vehicle.
2. Put swinger gearcase assembly (1) in place on turntable (2) and aline holes.
3. Put gearcase end cap (3) in place on gearcase assembly (1) and aline holes.
4. Put in four screws (4) and lockwashers (5).

GO TO FRAME 2



TA 088773

FRAME 2

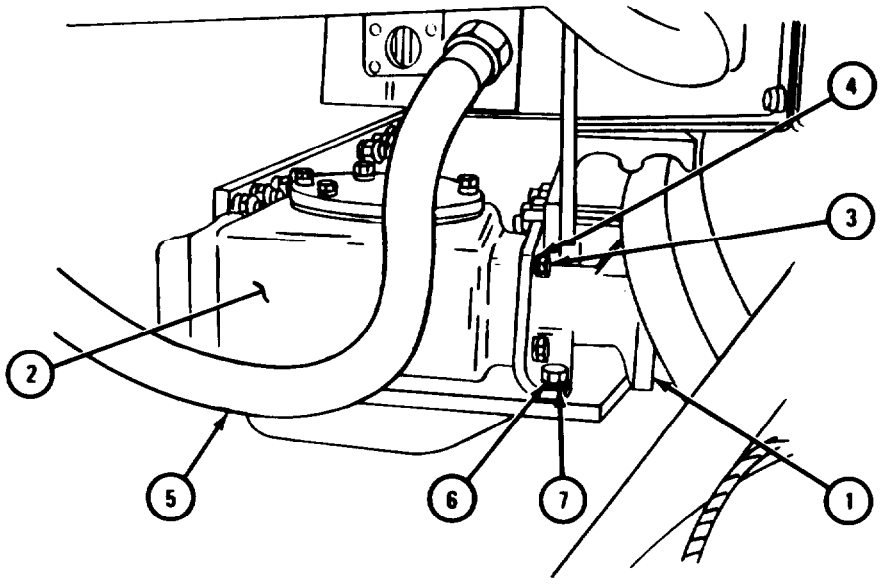
1. Put motor adapter (1) in place on swinger gearcase (2) and aline holes.
2. Put in four screws (3) and lockwashers (4).
3. Remove cap and put on hose (5). Take off tag.
4. Put in six screws (6) and lockwashers (7).

NOTE

Follow-on Maintenance Action Required:

Replace crane turntable swinger motor assembly. Refer to para 17-33.

END OF TASK



TA 087461

17-30. CRANE SWINGER GEARCASE ASSEMBLY REPAIR (TRUCK M543A2).

TOOLS: No special tools required

SUPPLIES: Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680
Gearcase cover gasket
End cap gasket (2)
Gearcase gear shaft seal

PERSONNEL: Two

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedure. Remove crane swinger gearcase assembly. Refer to para 17-29.

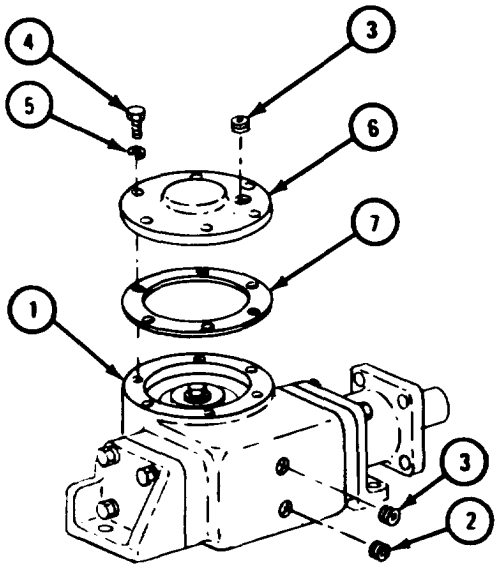
b. Disassembly.

(1) Disassembly of gearshaft assembly.

FRAME 1

1. Place one-gallon container under gearcase assembly (1).
2. Take out magnetic drain plug (2) and let oil drain into container.
3. Take out two plugs (3).
4. Take out six screws (4) and lockwashers (5).
5. Put three screws (4) into jacking holes in gear case cover (6). Tighten screws evenly to jack gearcase cover off gearcase assembly (1).
6. Take off gearcase cover (6) and gasket (7). Throw away gasket.
7. Take out three screws (4) from jacking holes in gearcase cover (6).
8. Take out container and put oil in approved disposal area.

GO TO FRAME 2



TA 085714

FRAME 2

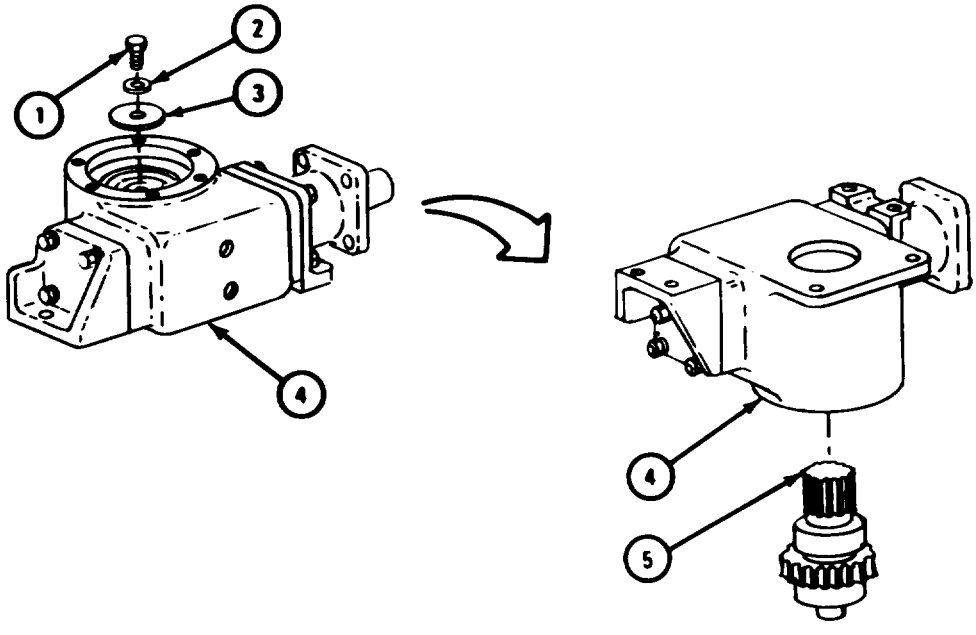
Soldier A 1. Take out screw (1), lockwasher (2), and flat washer (3). Turn over gearcase assembly (4).

Soldier A and B 2. Put gearcase assembly (4) on arbor press.

Soldier B 3. Hold gearcase assembly (4) with one hand. Put other hand under gearshaft assembly (5) to keep it from falling when it is pressed out.

Soldier A 4. Press gearshaft assembly (5) out of gearcase assembly (4).

GO TO FRAME 3

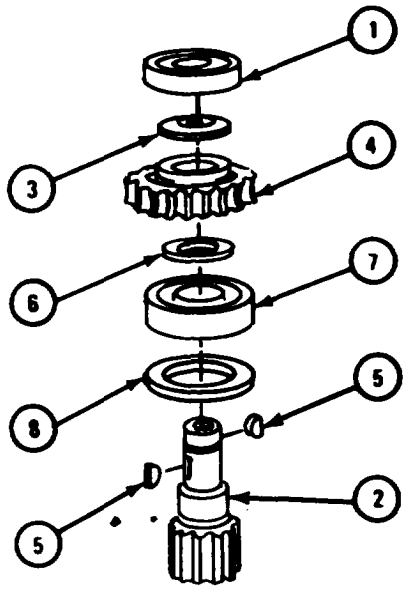


TA 085715

FRAME 3

1. Press bearing (1) off gearshaft (2). Refer to Part 1, para 7-7.
2. Takeoff upper (thin) thrust washer (3).
3. Press gear (4) off gearshaft (2).
4. Takeout two keys (5).
5. Takeoff lower (thick) thrust washer (6).
6. Hold gearshaft (2) so it does not fall. Press bearing (7) off gearshaft (2). Refer to Part 1, para 7-7.
7. Take off and throw away seal (8).

END OF TASK



TA 085716

(2) Disassembly of worm and shaft assembly.

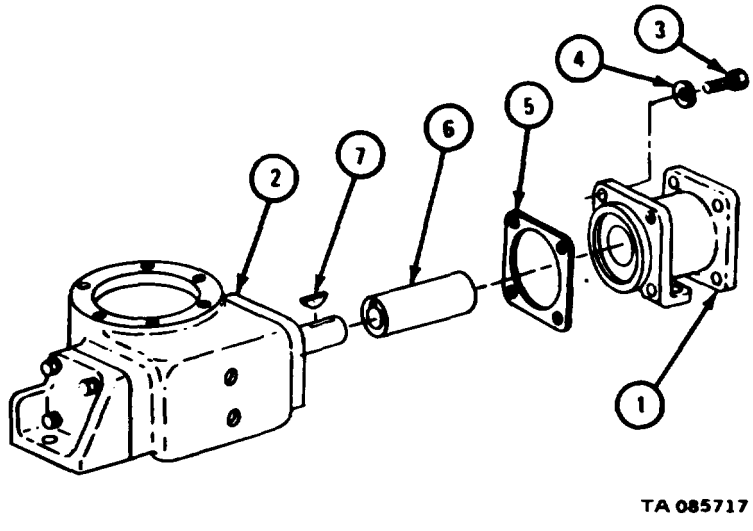
FRAME 1

NOTE

Note position of motor mounting cap (1) on gearcase (2) to make sure it is put back on right end of gearcase.

1. Take out four screws (3) and lockwashers (4).
2. Take off motor mounting cap (1) and gasket (5). Throw away gasket.
3. Pull off coupling (6).
4. Take out key (7).

GO TO FRAME 2



TA 085717

FRAME 2

Soldier A 1. Take out four screws (1) and lockwashers (2).

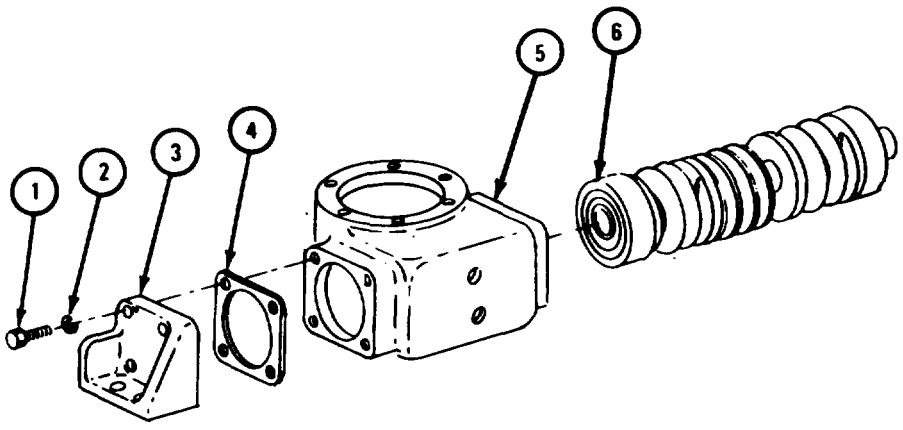
2. Take off bearing retaining cap (3) and gasket (4). Throw away gasket.

Soldier B 3. Put gearcase (5) on arbor press.

4. Hold gearcase (5) with one hand. With other hand, catch worm and shaft assembly (6) when it is pressed out.

Soldier A 5. Press worm and shaft assembly (6) out of gearcase (5).

GO TO FRAME 3

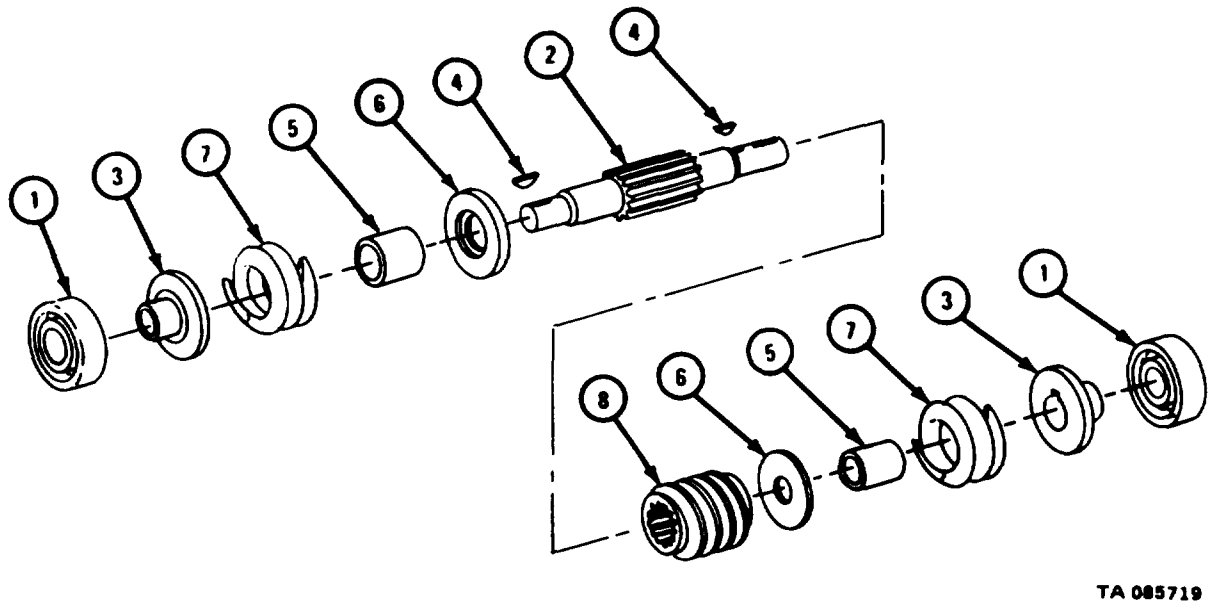


TA 085718

FRAME 3

1. Press bearing (1) off shaft (2). Refer to Part 1, para 7-7.
2. Press thrust bushing (3) out of bearing (1).
3. Take out key (4).
4. Slide off spacer (5), retaining washer (6), and spring (7).
5. Do steps 1 through 4 again on other side of shaft (2).
6. Press shaft (2) out of worm (8).

END OF TASK



TA 085719

c. Cleaning. There are no special cleaning procedures needed. Refer to cleaning procedures given in Part 1, para 1-3.

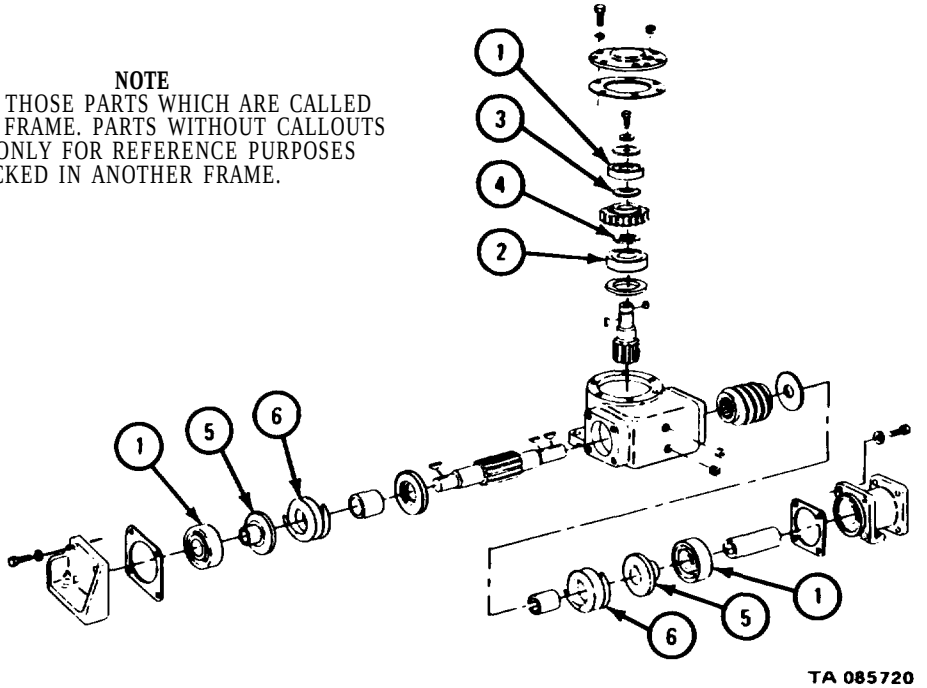
d. Inspection.

FRAME 1

1. Check that four bearings (1 and 2) are not damaged. Refer to Part 1, para 7-7.
2. Check that upper (thin) thrust washer (3), lower (thick) thrust washer (4), and two thrust bushings (5) are not scored or damaged in any other way.
3. Check that two springs (6) are not broken.

GO TO FRAME 2

NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT IN THIS FRAME. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES OR ARE CHECKED IN ANOTHER FRAME.



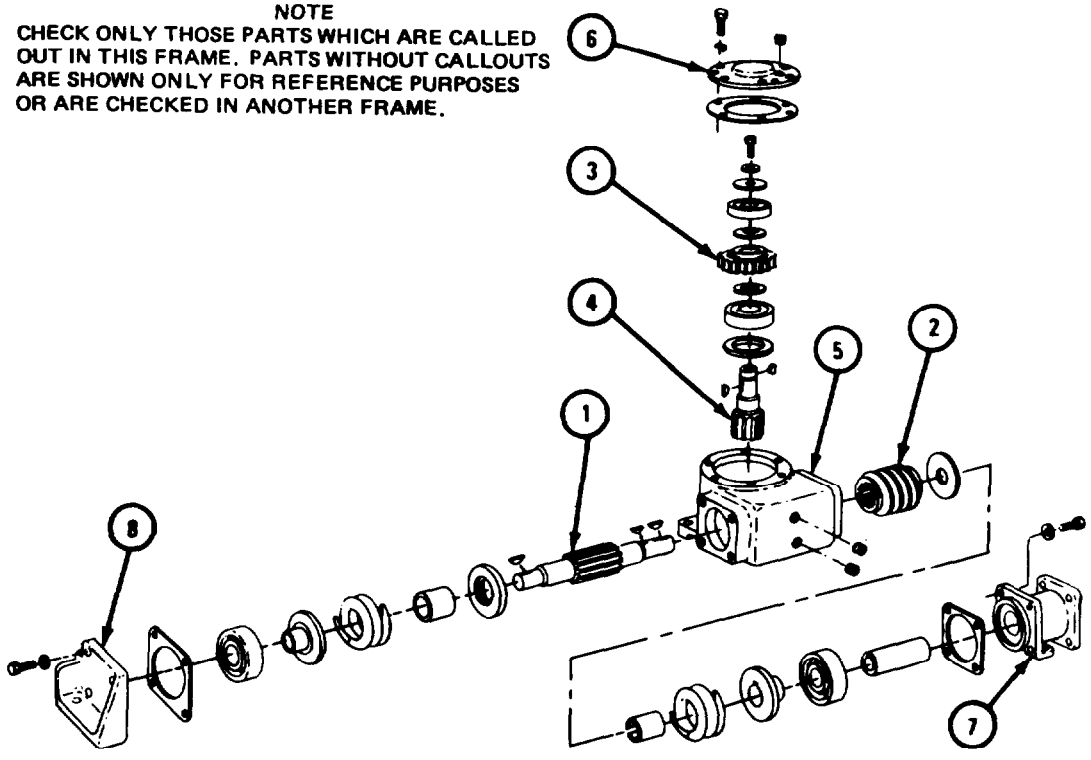
TA 085720

FRAME 2

1. Check that shaft (1) is not bent, cracked or damaged in any other way.
2. Check that worm (2) is not cracked, broken or damaged in any other way.
3. Check that gear (3) does not have chipped or broken teeth or other damage.
4. Check that gearshaft (4) is not bent or cracked and does not have chipped or broken teeth.
5. Check that gearcase (5), gearcase cover (6), motor mounting cap (7), and bearing retaining cap (8) are not cracked, broken or damaged in any other way.

END OF TASK

NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT IN THIS FRAME. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES OR ARE CHECKED IN ANOTHER FRAME.



TA 085721

e. Repair. Get new parts in place of damaged parts.

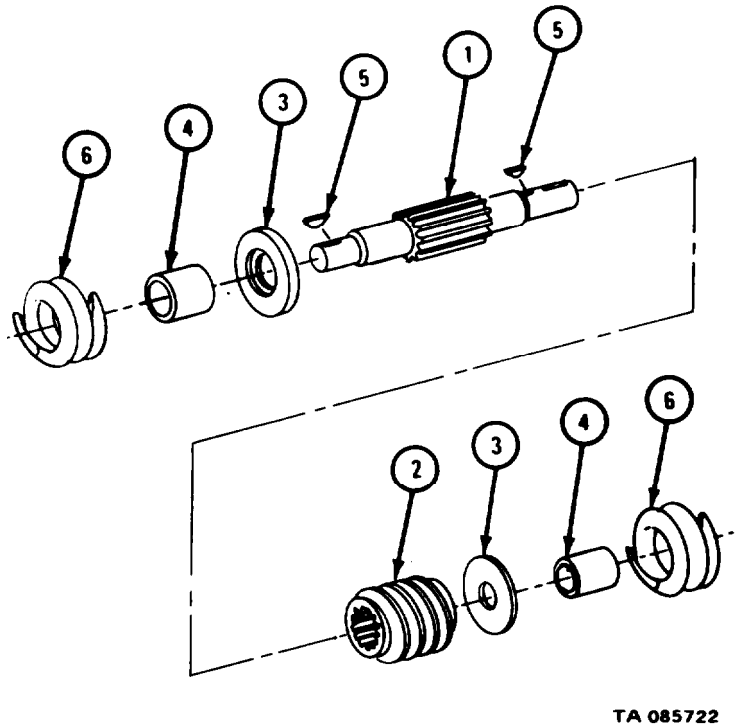
f. Assembly.

(1) Assembly of worm and shaft assembly.

FRAME 1

1. Press shaft (1) into worm (2).
2. Slide retaining washer (3) and spacer (4) on shaft (1).
3. Tap two keys (5) into slots in shaft (1).
4. Put spring (6) on shaft (1).
5. Do steps 2 through 4 again on other side of shaft (1).

GO TO FRAME 2



TA 085722

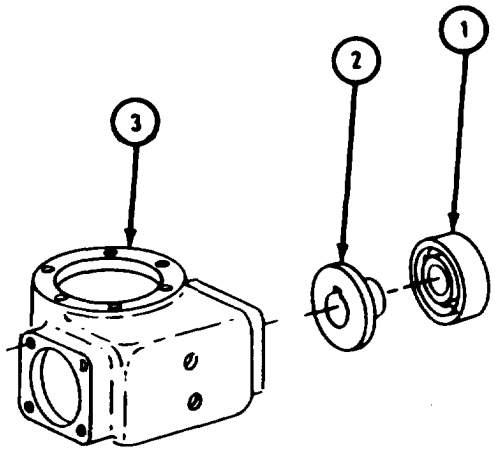
FRAME 2

Soldier A 1. Press bearing (1) onto thrust bushing (2). Refer to Part 1, para 7-7.

Soldier B 2. Hold gearcase (3) on arbor press.

Soldier A 3. Press bearing (1) and thrust bushing (2) assembly into gearcase (3).

GO TO FRAME 3



FRAME 3

Soldier A 1. Press bearing (1) onto thrust bushing (2). Refer to Part 1, para 7-7.

NOTE

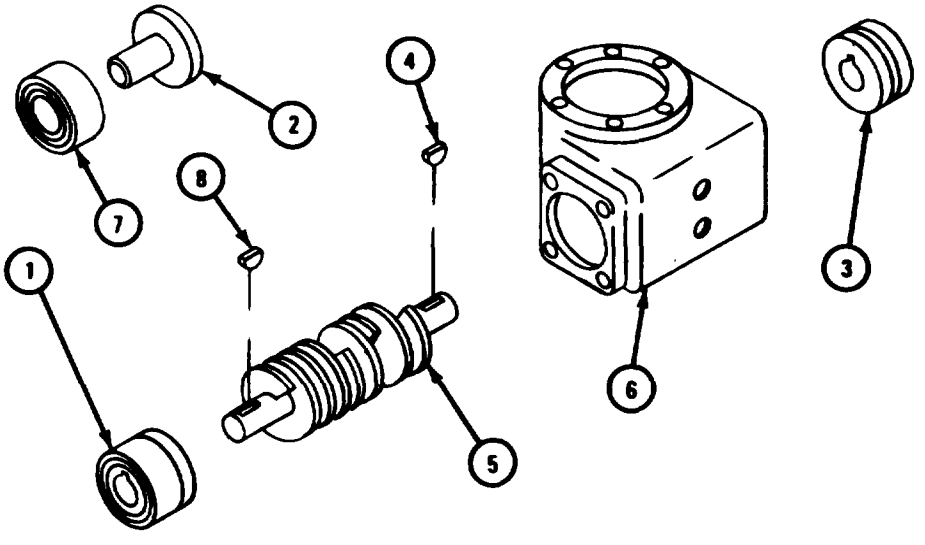
Make sure shaft assembly (5) is pressed into gearcase (6) with long end of shaft at motor mounting cap end of gearcase.

2. Line up keyway in thrust bearing assembly (3) with key (4) and press shaft assembly (5) into bores in gearcase (6).

Soldier B 3. Hold gearcase (6) and shaft assembly (5) on arbor press.

Soldier A 4. Line up keyway in thrust bearing assembly (7) with key (8) and press thrust bearing assembly onto shaft assembly (5) and into gearcase (6).

GO TO FRAME 4

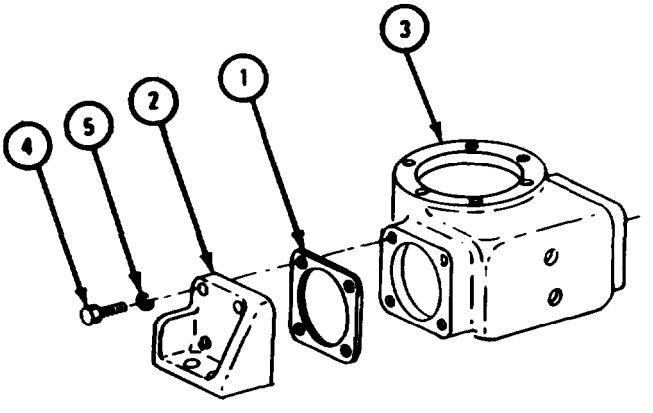


TA 087347

FRAME 4

1. Put gasket (1) and bearing retaining cap (2) on gearcase (3). Aline holes for four screws (4).
2. Put in four screws (4) and lockwashers (5).

GO TO FRAME 5

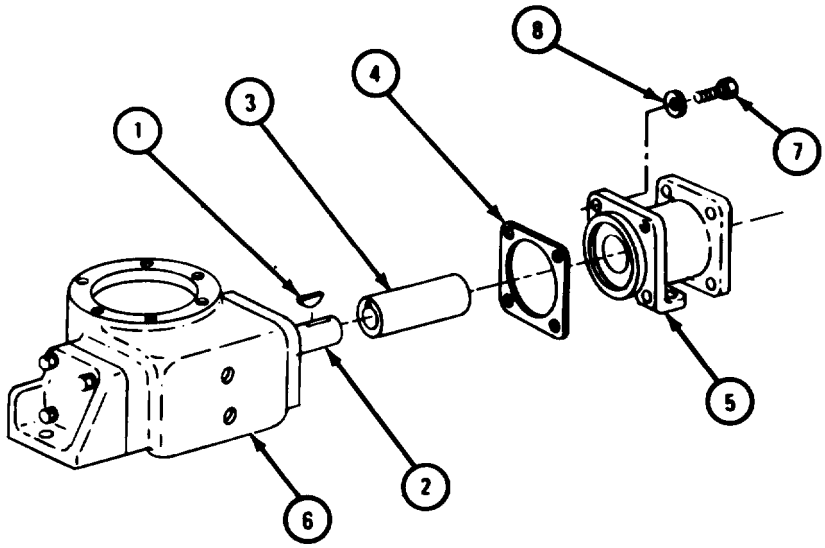


TA 085723

FRAME 5

1. Tap key (1) into slot in shaft (2).
2. Line up keyway uncoupling (3) with key (1) and push coupling on shaft (2) and key.
3. Put gasket (4) and motor mounting cap (5) on gearcase assembly (6) as noted. Aline holes.
4. Put in four screws (7) and lockwashers (8).

END OF TASK



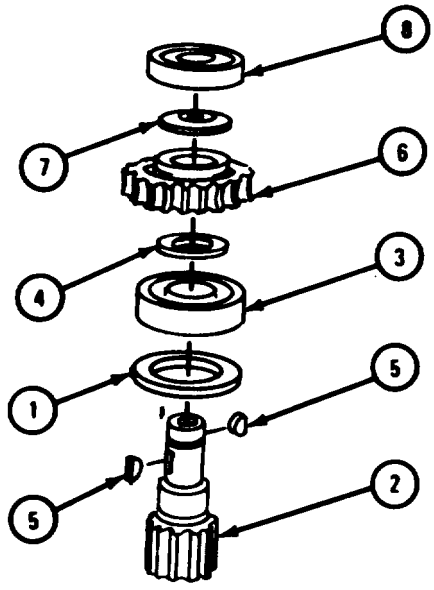
TA 085724

(2) Assembly of gearshaft assembly.

FRAME 1

1. Put seal (1) on gearshaft (2).
2. Press bearing (3) onto gearshaft (2). Refer to Part 1, para 7-7. Make sure shielded side of bearing is at bottom, as shown.
3. Put lower (thick) thrust washer (4) on gearshaft (2) with tapered edge towards bearing (3).
4. Tap two keys (5) into slots in gearshaft (2).
5. Line up two keyways in gear (6) with keys (5).
6. Press gear (6) on gearshaft (2) and keys (5).
7. Put upper (thin) thrust washer (7) on gearshaft (2) with tapered edge away from gear (6).
8. Press bearing (8) on gearshaft (2). Refer to Part 1, para 7-7.

GO TO FRAME 2

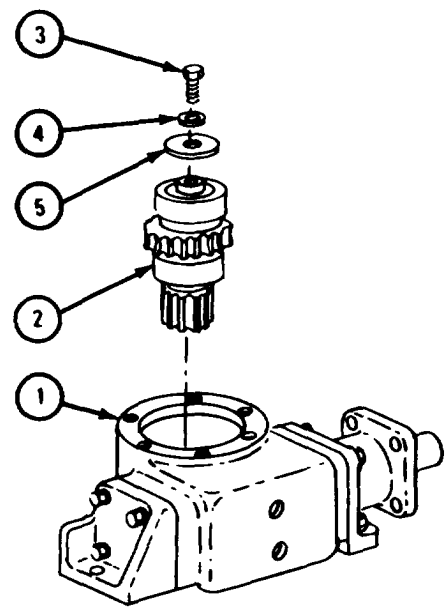


TA 085725

FRAME 2

Soldiers A and B	1.	Put gearcase assembly (1) on arbor press.
Soldier B	2.	Hold gearcase assembly (1).
Soldier A	3.	Press gearshaft assembly (2) into gearcase assembly (1).
	4.	Put screw (3) with lockwasher (4) and flat washer (5) into gearshaft assembly (2).

GO TO FRAME 3



TA 085726

FRAME 3

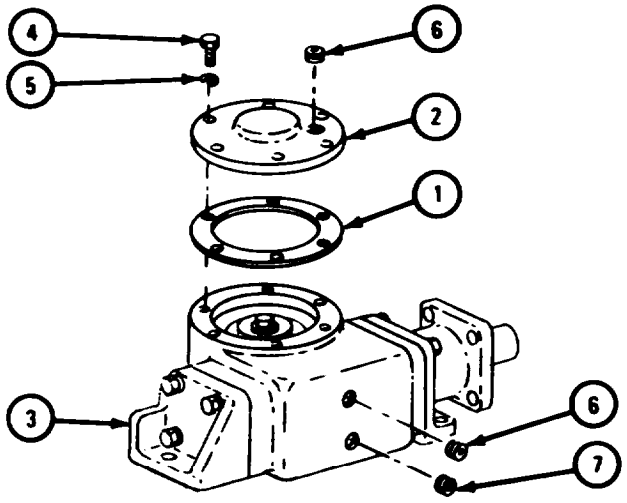
1. Put gasket (1) and gearcase cover (2) on gearcase assembly (3). Aline holes.
2. Put in six screws (4) and lockwashers (5).
3. Put in two plugs (6) and magnetic drain plug (7).

NOTE

Follow-on Maintenance Action Required:

1. Fill crane swinger gearcase assembly. Refer to LO 9-2320-211-12.
2. Replace crane swinger gearcase assembly. Refer to para 17-29.
3. Check crane swinger gearcase assembly for proper operation. Refer to TM 9-2320-211-10.

END OF TASK



TA 085727

17-31. BEVEL GEARCASE PUMP DRIVE SHAFT LEAD AND RING ASSEMBLY REMOVAL, REPAIR, AND REPLACEMENT (TRUCK M543A2).

TOOLS: No special tools required

SUPPLIES: Solvent, dry cleaning, type II (SD-2) Fed. Spec P-D-680
Electrical contact cleaner, pn MS230

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Remove hydraulic pump assembly. Refer to para 17-35.

(2) Remove contact brushes from brush plate assembly. Refer to Slipring Contact Brushes, TM 9-2320-211-20.

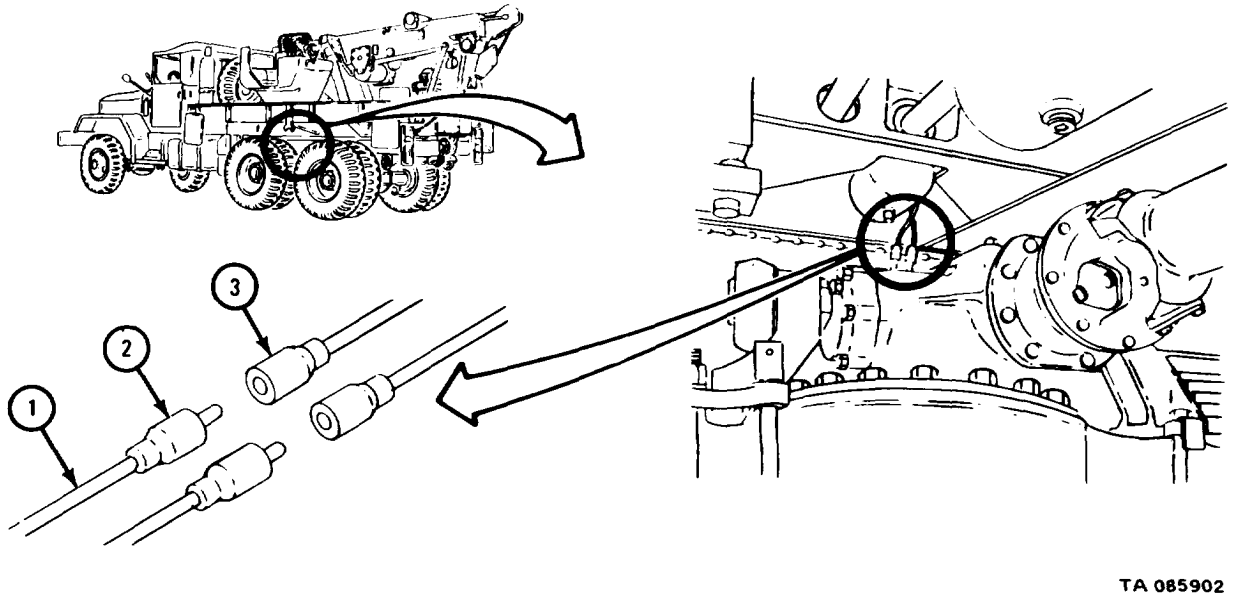
(3) Raise boom and position shipper braces to maximum. Refer to TM 9-2320-211-10.

b. Removal.

FRAME 1

1. Working below truck body, tag four electrical leads (1) to make sure they are put back in the right place.
2. Take two male connectors (2) out of two female connectors (3).

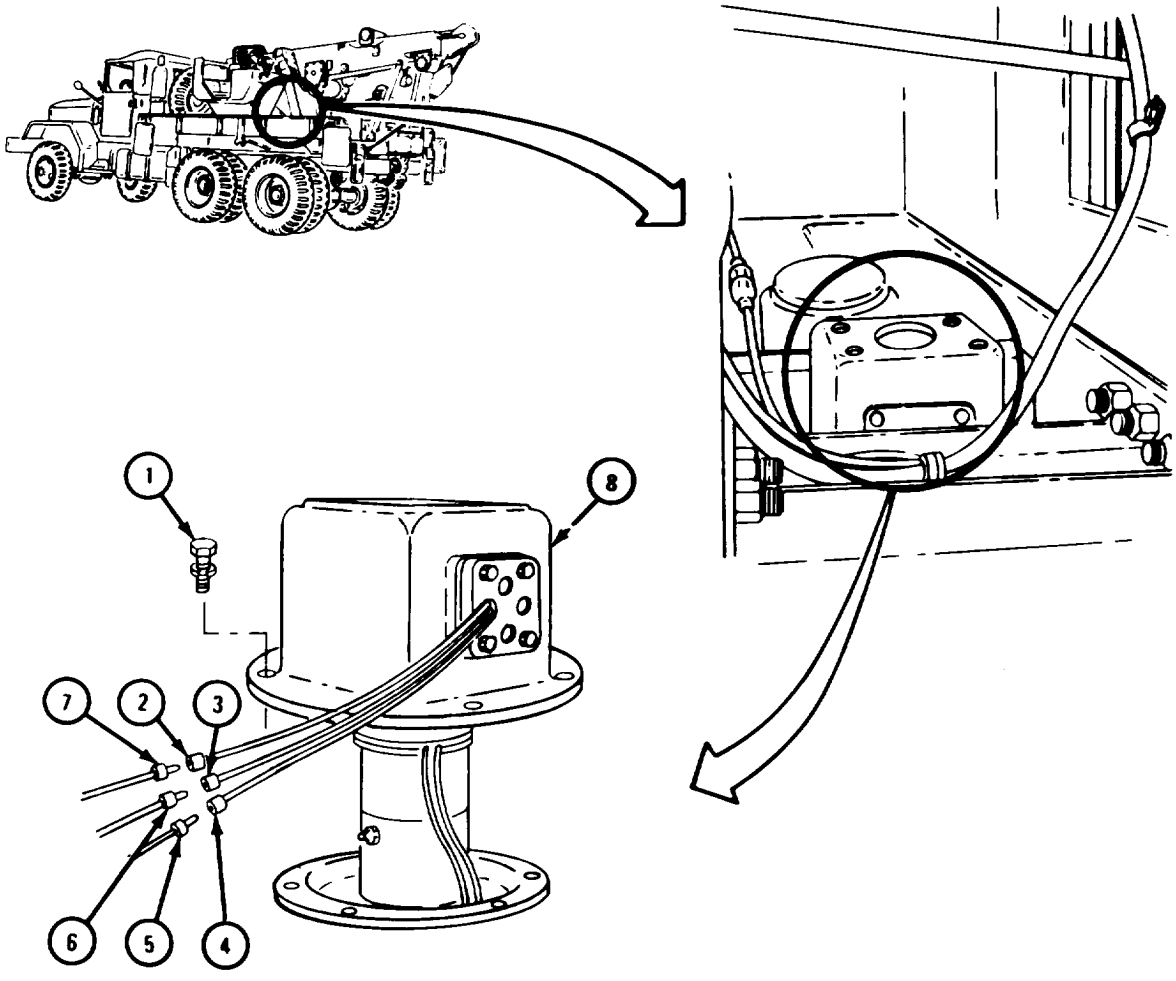
GO TO FRAME 2



FRAME 2

1. Take out six screws and lockwashers (1).
2. Tag connectors (2, 3, and 4) to make sure they are put back in the right place. Unplug connectors from connectors (5, 6, and 7).
3. Lift off hydraulic pump support (8).

GO TO FRAME 3

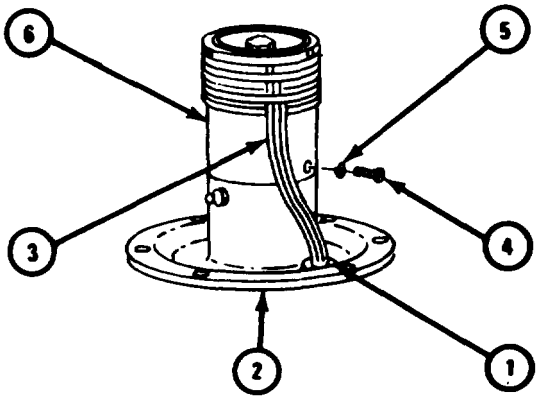


TA 085903

FRAME 3

1. Take out grommet (1) from housing (2) and slide it back on electrical leads (3).
2. Pull three electrical leads (3) up through hole in housing (2). Make sure tags stay in place on leads.
3. Take out screw (4) and lockwasher (5).
4. Lift off ring support assembly (6).

GO TO FRAME 4



TA 085904

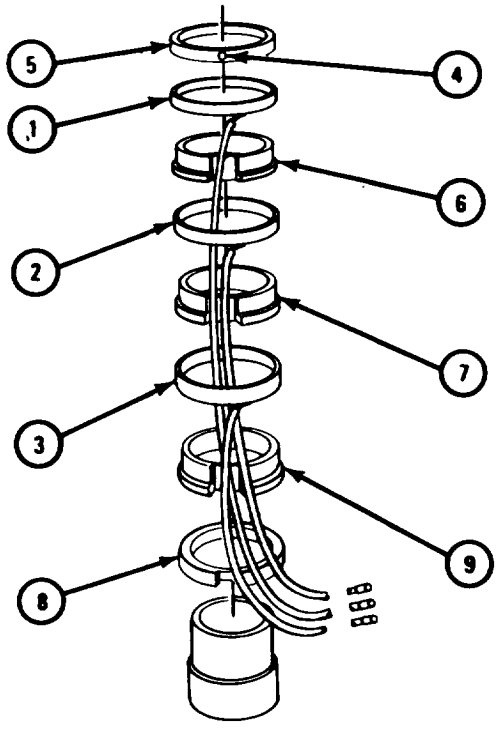
FRAME 4

NOTE

Note order in which lead and ring assemblies (1, 2, and 3) are stacked to be sure they are put back in the same place.

1. Take out screw (4).
2. Pull off ring (5), lead and ring assembly (1), insulation ring (6), lead and ring assembly (2), insulation ring (7), lead and ring assembly (3) and insulation rings (8 and 9).

END OF TASK



TA 085905

c. Cleaning.

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

NOTE

Make sure tags stay on leads.

(1) Clean all metal parts with solvent.

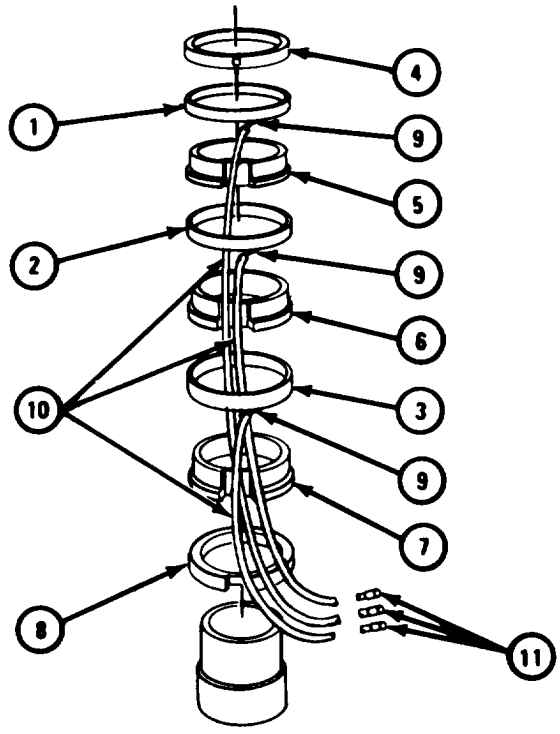
(2) Clean contacts on electrical leads with electrical contact cleaner.

d. Inspection and Repair.

FRAME 1

1. Check that lead and ring assemblies (1, 2, and 3) and insulation rings (4, 5, 6, 7, and 8) have no cracks or glazed or worn areas. Throw away damaged parts and get new ones in their place.
2. Check that soldered connections (9) on lead and ring assemblies (1, 2, and 3), are not damaged. If leads (10) are broken or not soldered to rings (1, 2, and 3), get new leads in their place or solder leads to rings.
3. Check that cable connectors (11) are not damaged or broken. If connectors are damaged, throw them away and get new ones in their place.

END OF TASK



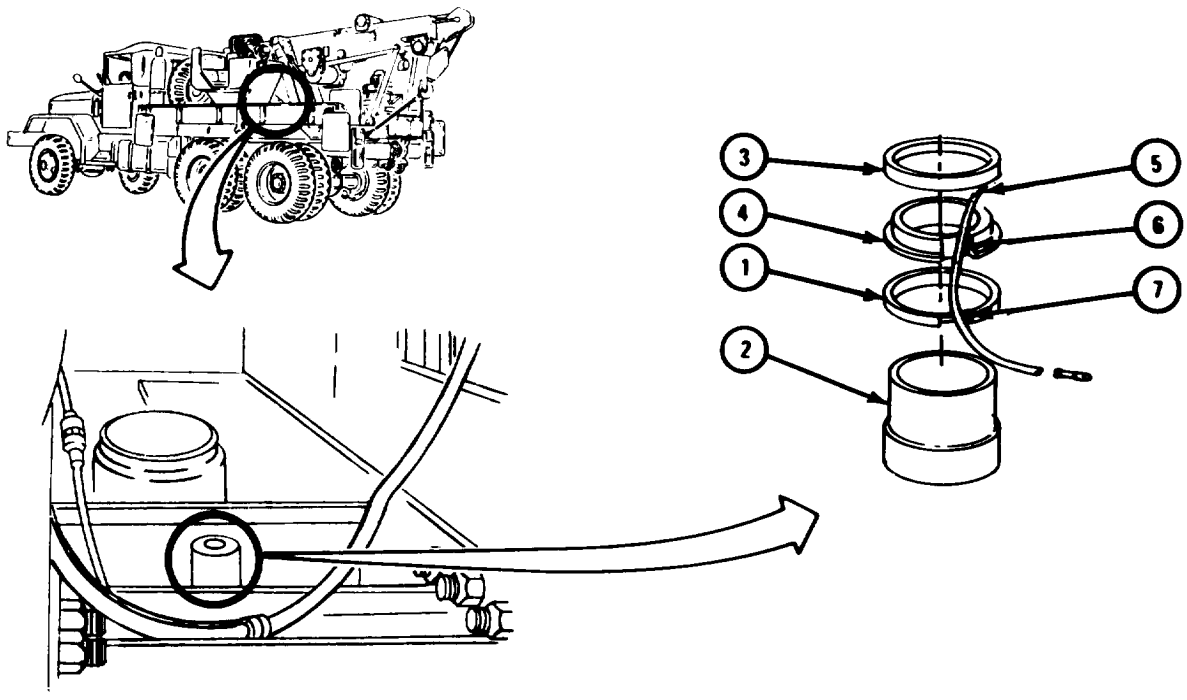
TA 085906

e. Replacement.

FRAME 1

1. Put insulation ring (1) on insulating ring support (2).
2. Put ring and lead assembly (3) onto insulating ring (4) as noted, with lead (5) through notch (6) in insulating ring (4).
3. Put ring and lead assembly (3) and insulating ring (4) onto insulating ring supper; (2). Pull lead (5) through notch (7) insulating ring (1).

GO TO FRAME 2

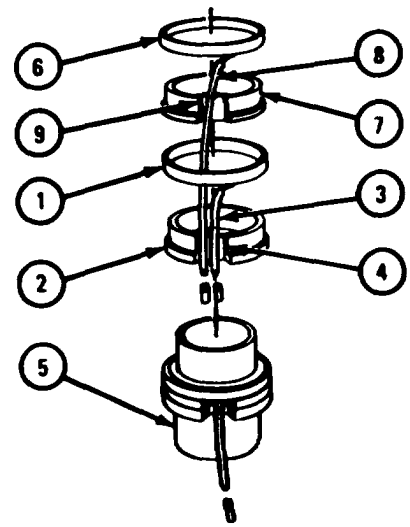


TA 085907

FRAME 2

1. Put lead and ring assembly (1) onto insulating ring (2) as noted, with lead (3) through notch (4) in insulating ring (2).
2. Put lead and ring assembly (1) an insulating ring (2) onto insulating ring support (5). Pull lead (3) through notches in rings on insulating ring support (5).
3. Put lead and ring assembly (6) onto insulating ring (7) as noted, with lead (8) through notch (9) in insulating ring (6).
4. Put lead and ring assembly (6) and insulating ring (7) onto insulating ring support (5). Pull lead (8) through notches in rings on insulating ring support (5).

GO TO FRAME 3

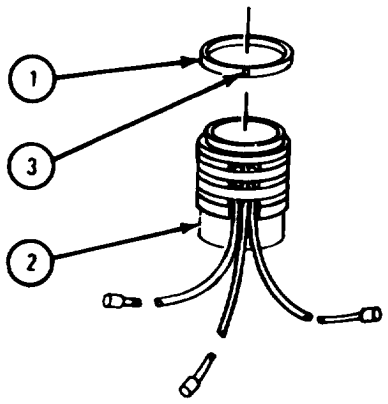


TA 087473

FRAME 3

1. Put insulation ring (1) on insulation ring support (2) and aline holes.
2. Put in screw and washer (3).

GO TO FRAME 4

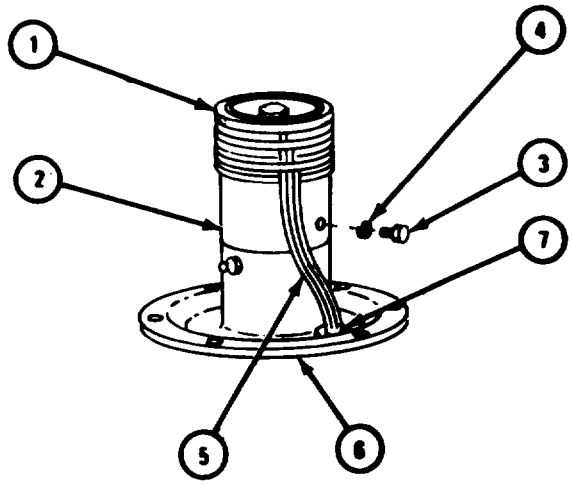


TA 087474

FRAME 4

1. Aline holes in ring support assembly (1) and pump driveshaft assembly (2).
2. Put in screw (3) and lockwasher (4).
3. Push three electrical leads (5) down through hole in housing (6). Make sure tags on electrical leads stay in place.
4. Put grommet (7) into hole in housing (6).

GO TO FRAME 5

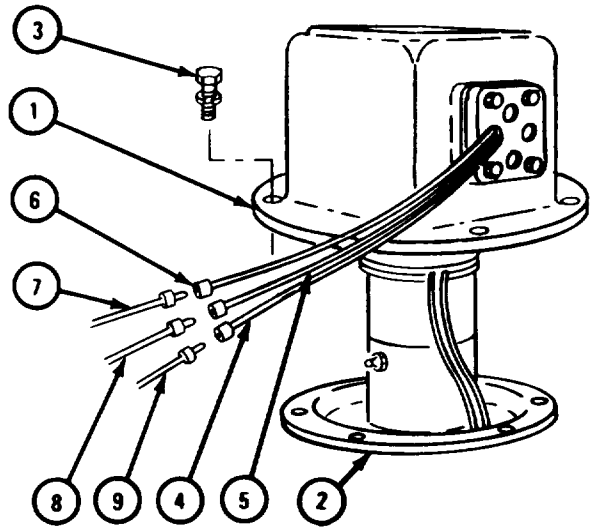


TA 085908

FRAME 5

1. Put hydraulic pump support (1) on pump driveshaft housing assembly (2) with hole for contact brush plate assembly facing towards rear of truck.
2. Aline holes in hydraulic pump support (1) and pump driveshaft housing assembly (2).
3. Put in six screws and lockwashers (3).
4. Plug three connectors on wires (4, 5, and 6) into connectors on wires (7, 8, and 9) as tagged. Take off tags.

GO TO FRAME 6



TA 085909

FRAME 6

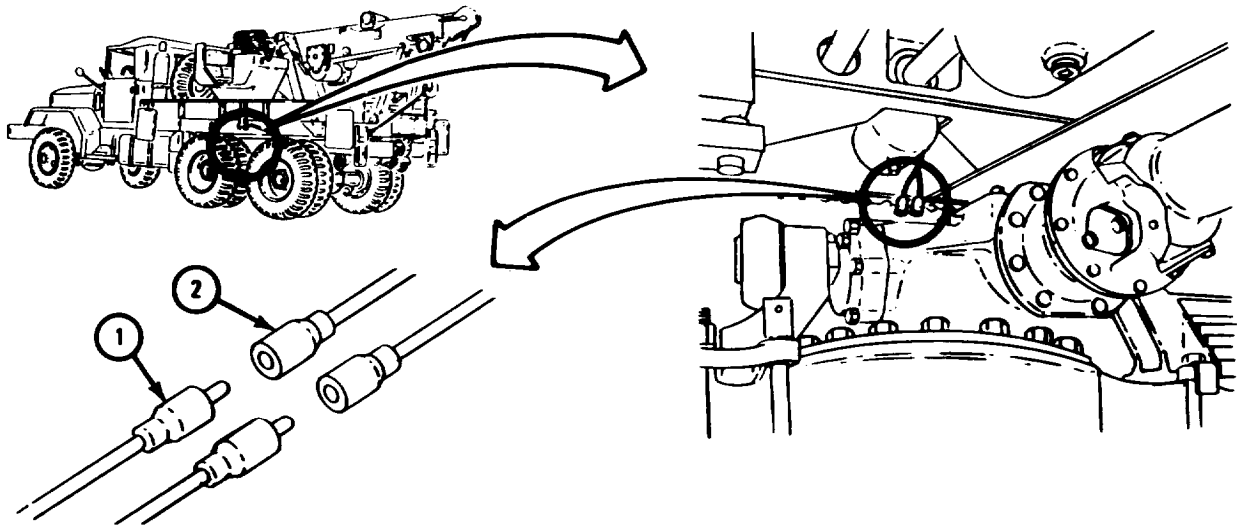
1. Working under truck, push two male connectors (1) into two female connectors (2) as tagged. Take off tags.

NOTE

Follow-on Maintenance Action Required:

1. Replace hydraulic pump assembly. Refer to para 17-35.
2. Replace contact brushes in brush plate assembly. Refer to Slipring Contact Brushes, TM 9-2320-211-20.
3. Check floodlight assemblies for proper operation. Refer to TM 9-2320-211-20.

END OF TASK



TA 085910

17-32. BEVEL GEARCASE DRIVESHAFT SEAL REMOVAL AND REPLACEMENT (TRUCK M543A2).

TOOLS: No special tools required

SUPPLIES: Contact brush plate assembly gasket
End cover gasket
Bevel gearcase drive shaft seal
Tags

PERSONNEL: One

EQUIPMENT CONDITION : Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Remove hydraulic pump assembly from truck. Refer to para 17-35.

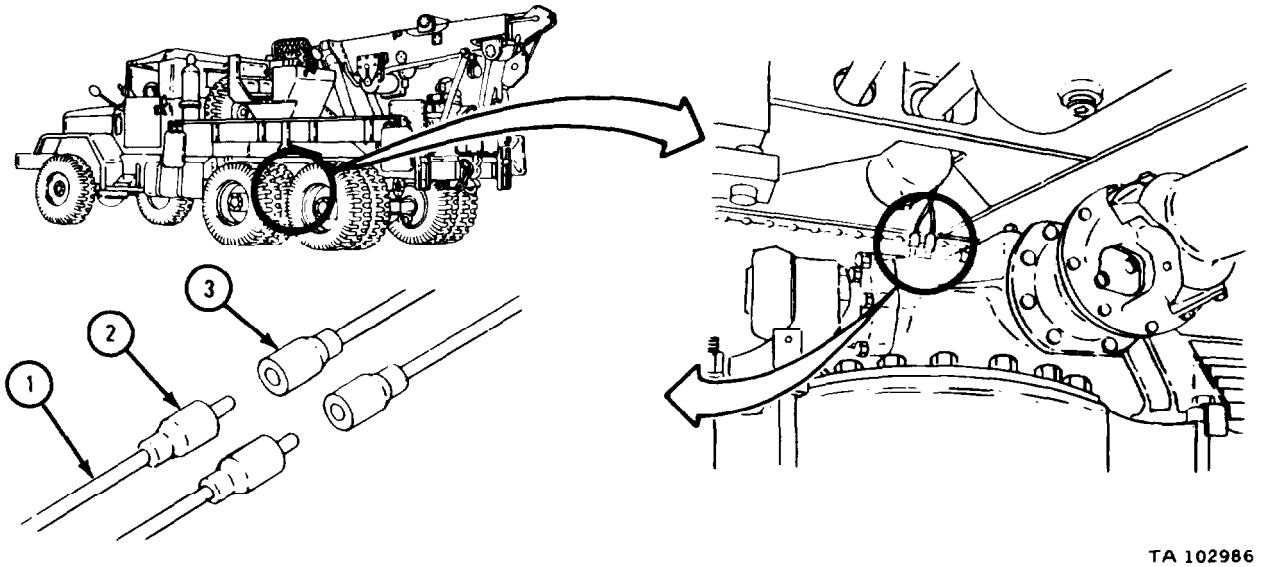
(2) Remove slipring brushes from brush plate assembly. Refer to Slipring Contact Brushes, TM 9-2320-211-20.

b. Removal.

FRAME 1

1. Working under truck, tag four electrical leads (1) so that they will be put back in the right places.
2. Take two male connectors (2) out of two female connectors (3).

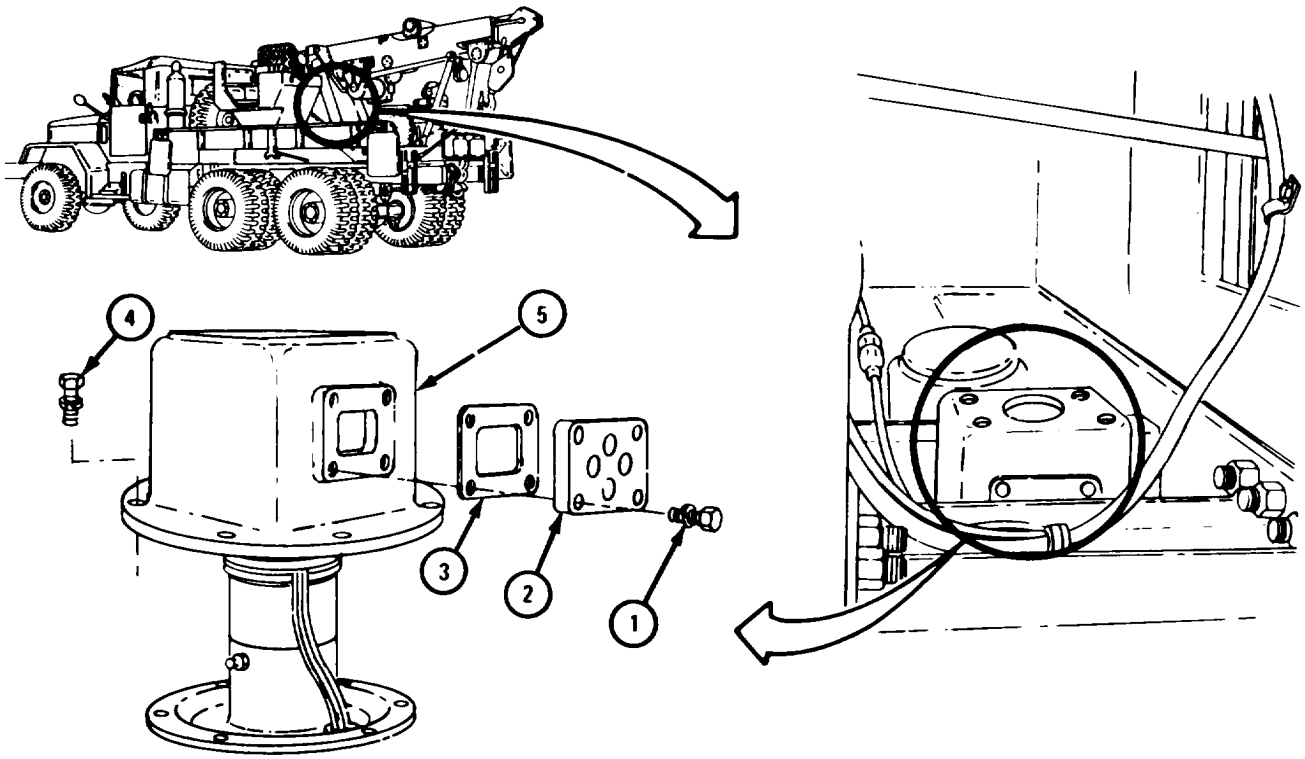
GO TO FRAME 2



FRAME 2

1. Take out four screws and lockwashers (1).
2. Take off contact brush plate assembly (2) and gasket (3). Throw away gasket.
3. Take out six screws and lockwashers (4).
4. Lift off hydraulic pump support (5).

GO TO FRAME 3

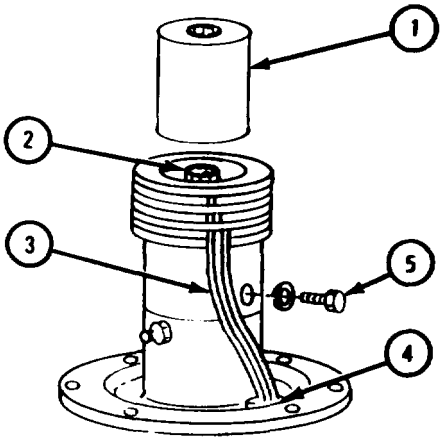


TA 102987

FRAME 3

1. Pull coupling (1) off pump drive shaft (2).
2. Pull three electrical leads (3) up through grommet (4). Make sure that tags on electrical leads stay in place.
3. Take out screw and lockwasher (5).

GO TO FRAME 4

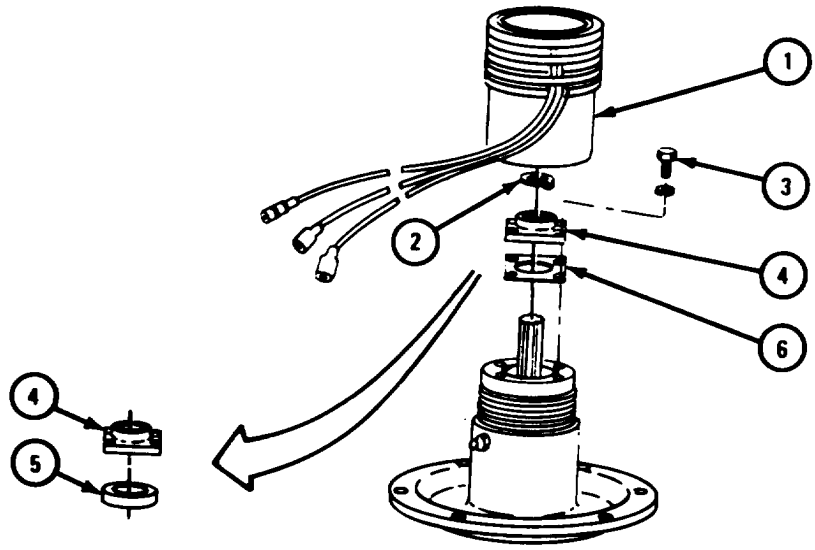


TA 102988

FRAME 4

1. Lift off ring support assembly (1).
2. Take out retaining ring (2).
3. Take out four screws with lockwashers (3).
4. Lift off end cover (4) with driveshaft seal (5) and gasket (6). Throw away gasket.
5. Press driveshaft seal (5) out of end cover (4). Throw away driveshaft seal.

END OF TASK



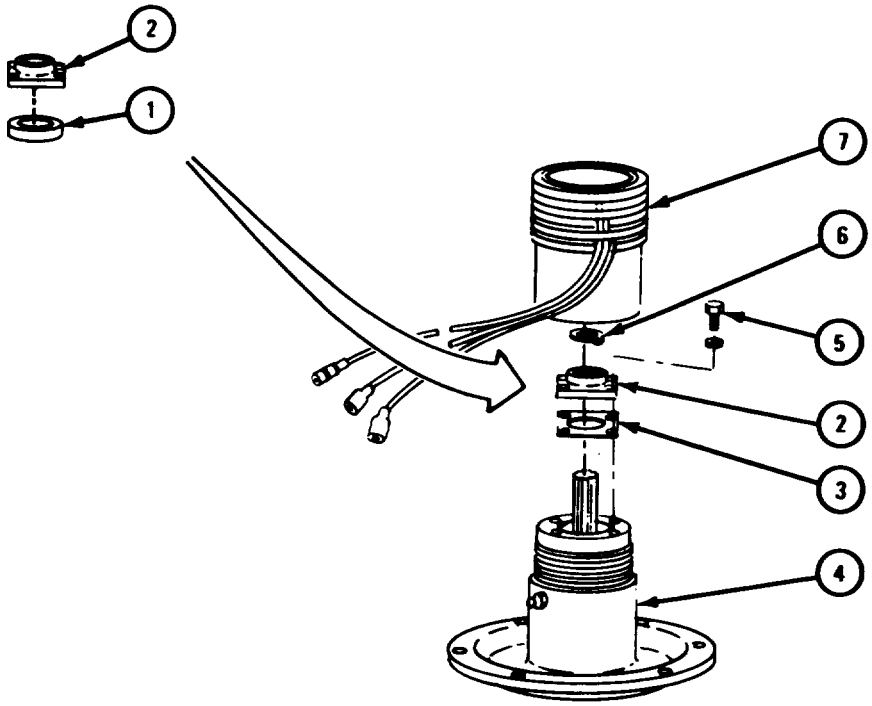
TA 102989

c. Replacement.

FRAME 1

1. Press driveshaft seal (1) into end cover (2).
2. Put gasket (3) and end cover (2) with driveshaft seal (1) on driveshaft housing (4), alining holes.
3. Put in and tighten four screws with lockwashers (5).
4. Put retaining ring (6) in groove in end cover (2).
5. Put ring support assembly (7) in place on driveshaft housing (4).

GO TO FRAME 2

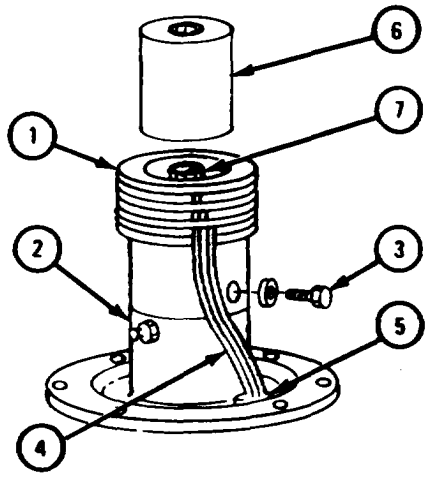


TA 102990

FRAME 2

1. Aline holes in ring support assembly (1) and driveshaft housing (2).
2. Put in screw and lockwasher (3).
3. Push three electrical leads (4) down through grommet (5). Make sure that tags on electrical leads stay in place.
4. Put coupling (6) on driveshaft (7).

GO TO FRAME 3

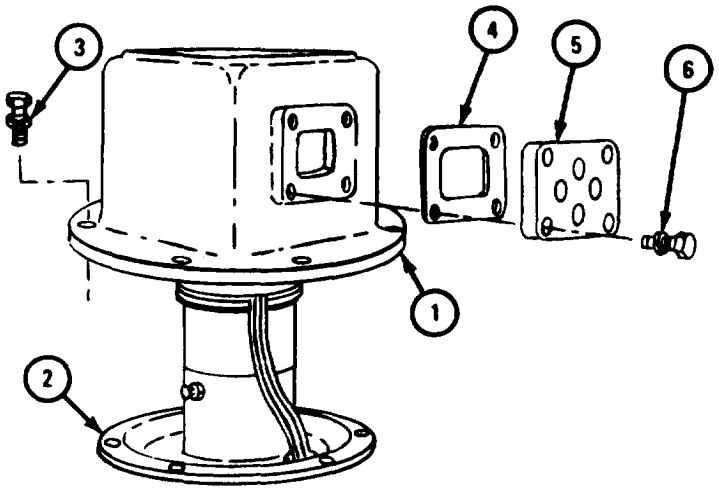


TA 102991

FRAME 3

1. Put hydraulic pump support (1) on driveshaft housing assembly (2). Hole for contact brush plate assembly faces towards rear of truck.
2. Aline holes in hydraulic pump support (1) and driveshaft housing assembly (2).
3. Put in six screws and lockwashers (3).
4. Hold gasket (4) and contact brush plate assembly (5) in place on hydraulic pump support (1), alining holes.
5. Put in four screws and lockwashers (6).

GO TO FRAME 4



TA 102992

FRAME 4

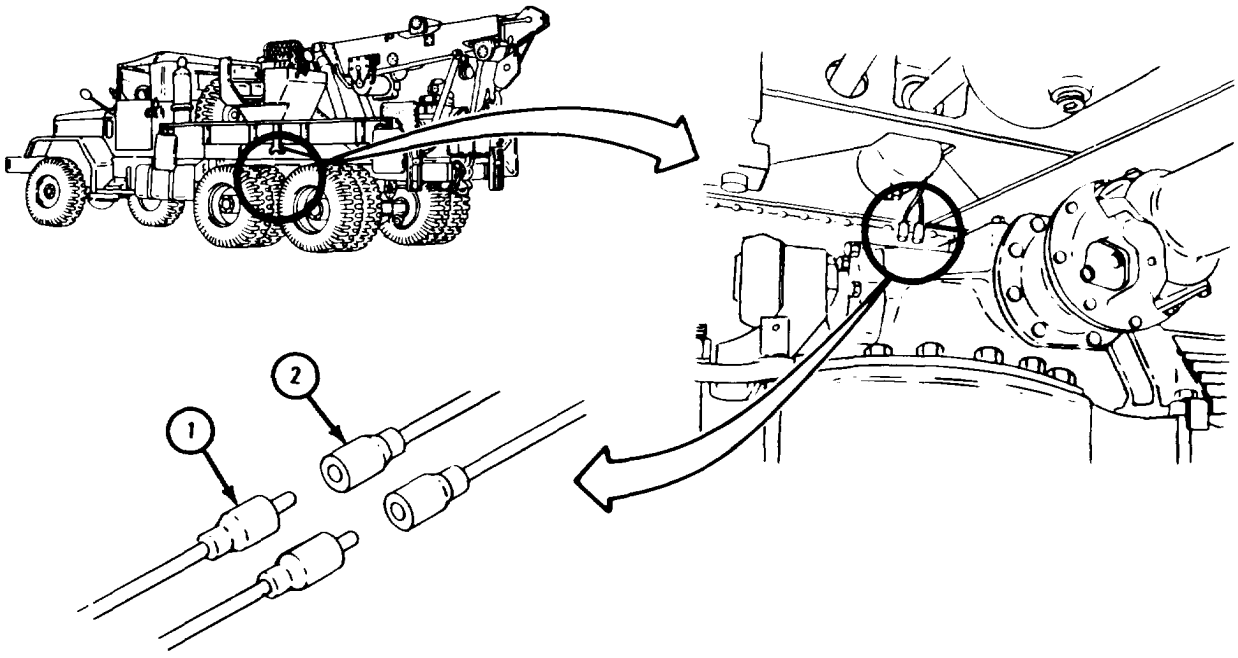
1. Working under truck, push two male connectors (1) into two female connectors (2) as tagged. Take off tags.

NOTE

Follow-on Maintenance Action Required:

1. Replace hydraulic pump assembly on truck. Refer to para 17-35.
2. Replace slipring brushes in brush plate assembly. Refer to Slipring Contact Brushes, TM 9-2320-211-20.

END OF TASK



TA 102993

17-33. CRANE TURNTABLE ASSEMBLY REMOVAL, REPAIR AND REPLACEMENT (TRUCK M543A2).

TOOLS: No special tools required

SUPPLIES: Wooden block (4)
Lubricating oil, ICE, OE/HDO 10, MIL-L-2104
Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680
1/4-inch screw
Artillery and automotive grease, type GAA, MIL-G-10924

PERSONNEL: TWO

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set, wheels chocked.

a. Preliminary Procedures.

(1) Remove hoist winch cable. Refer to TM 9-2320-211-20.

(2) Remove boom assembly. Refer to para 17-44.

(3) Remove hydraulic oil reservoir. Refer to para 17-37.

(4) Remove boom elevating cylinders. Refer to para 17-42.

(5) Remove gondola assembly operator's cab. Refer to para 17-52.

(6) Remove crane swinger gearcase with swinger motor. Refer to para 17-29.

(7) Remove hydraulic turntable pump assembly. Refer to para 17-35.

(8) Remove slipring contact brushes. Refer to TM 9-2320-211-20.

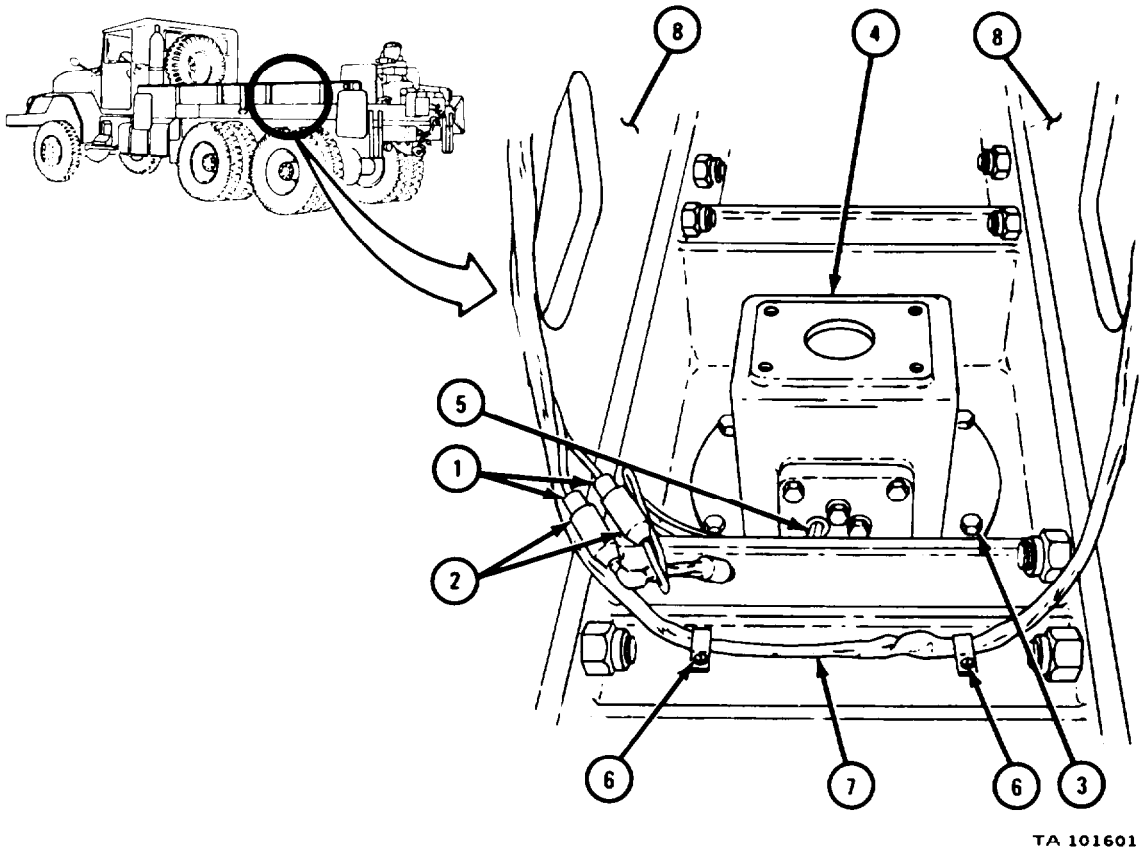
(9) Disconnect battery ground cable. Refer to TM 9-2320-211-20.

b. Removal.

FRAME 1

1. Pull out two male connectors (1) from two female connectors (2).
2. Take out six screws and lockwashers (3).
3. Lift off hydraulic pump support (4) with two electrical leads (5).
4. Take out two screws (6).
5. Move cable assembly (7) away from boom support assembly (8).

GO TO FRAME 2



FRAME 2

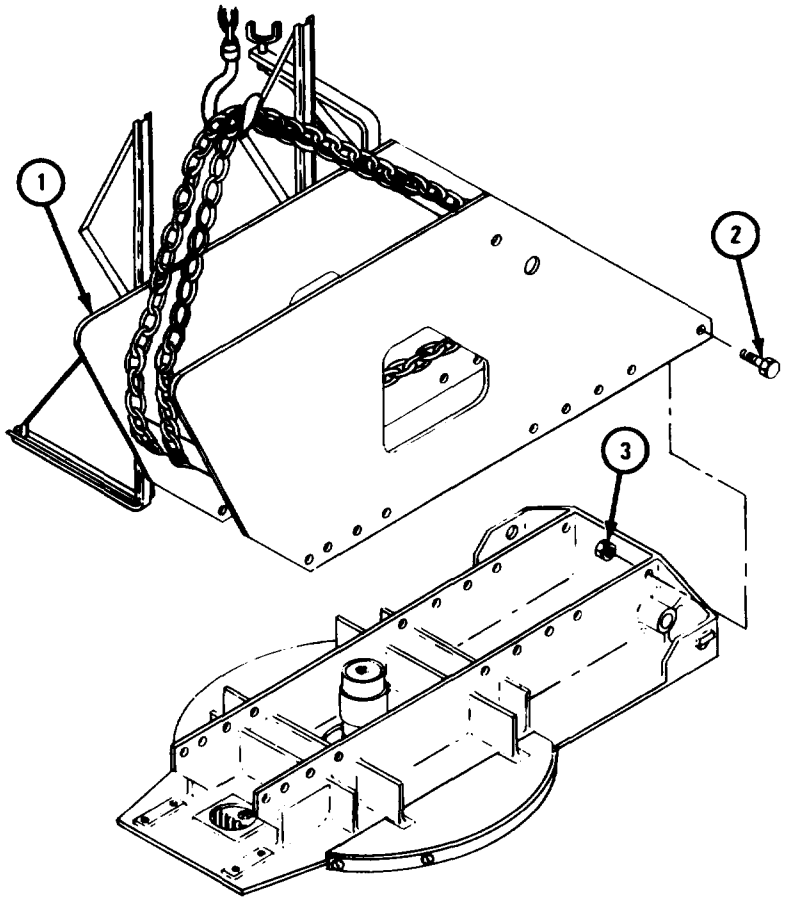
1. Hook up chain sling and hoist to boom support assembly (1).
2. Take out 18 screws (2) and nuts (3).

Soldier A 3. Guide boom support assembly (1) from truck when soldier B lifts it.

Soldier B 4. Using hoist, lift boom support assembly (1) up and off truck, and set it down on ground.

5. Take chain sling and hoist off boom support assembly (1).

GO TO FRAME 3

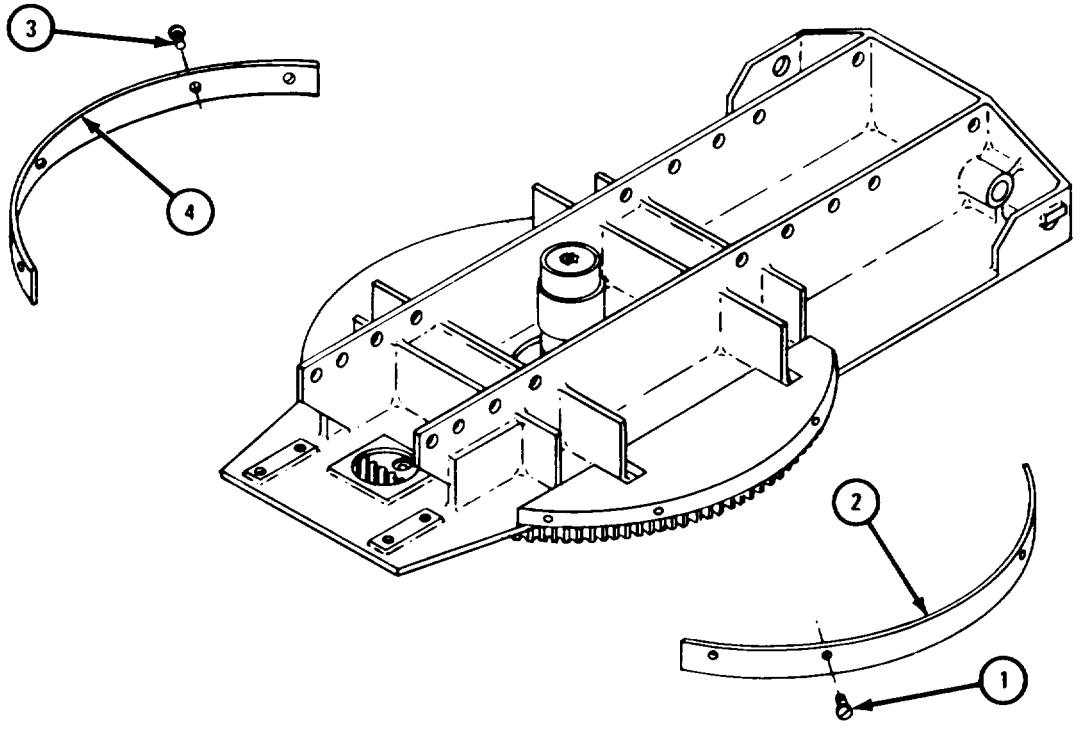


TA 101602

FRAME 3

1. Take out four screws (1).
2. Take off left guard assembly (2).
3. Take out four screws (3).
4. Take off right guard assembly (4).

GO TO FRAME 4

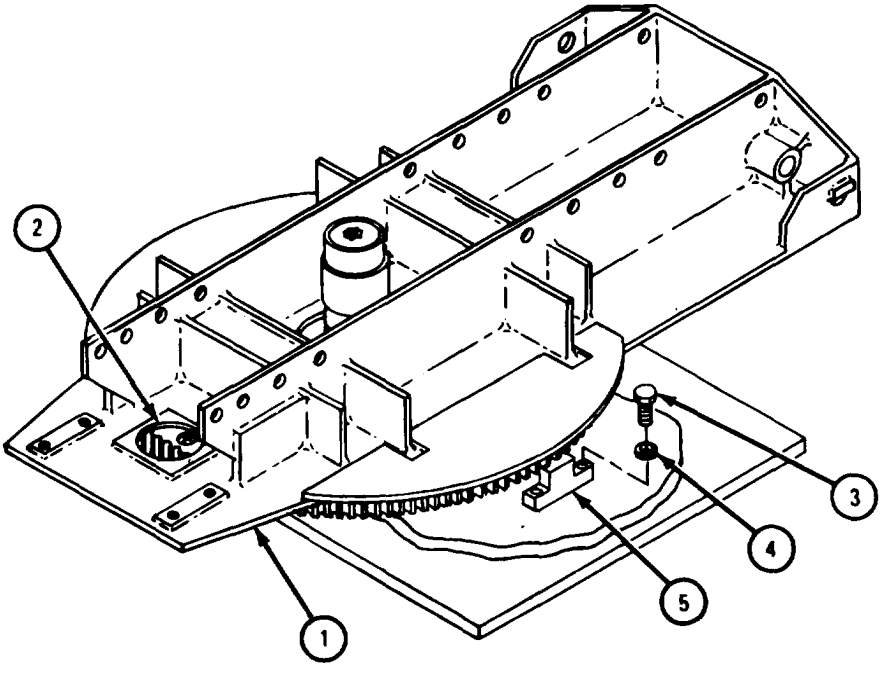


TA 101603

FRAME 4

1. Turn turntable assembly (1) until access hole (2) is facing side of truck.
2. Take out two capscrews (3) and washers (4).
3. Take off stop block (5).

GO TO FRAME 5

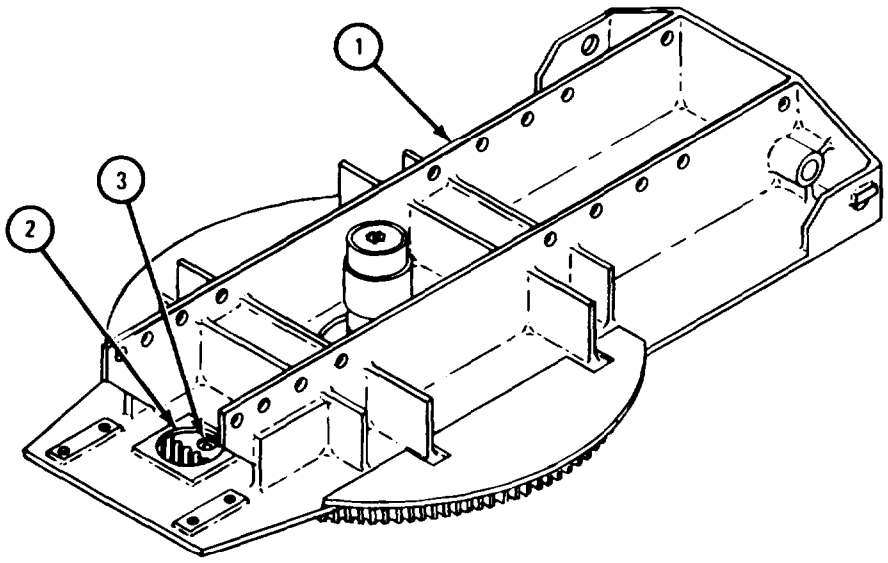


TA 101604

FRAME 5

1. Turn turntable assembly (1) so access hole (2) is over 18 outer screws (3), one at a time.
2. Take out 18 screws (3).

GO TO FRAME 6



TA 101605

FRAME 6

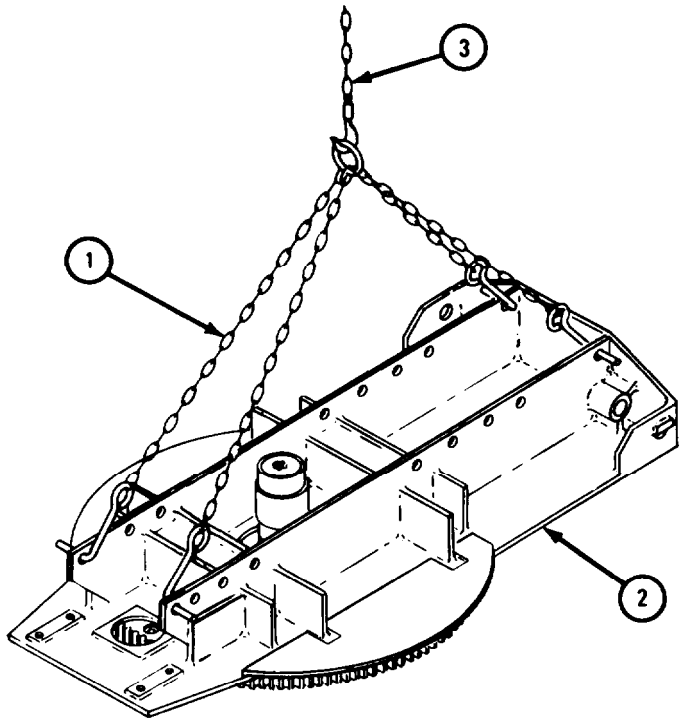
1. Hook chain sling (1) to turntable assembly (2) as shown, and join chain sling to chain hoist (3).
2. Put two wooden blocks on ground.

Soldier A 3. Guide turntable assembly (2) when soldier B lifts it.

Soldier B 4. Using hoist (3), lift turntable assembly (2) off truck and set it down on wood blocks.

5. Unhook hoist (3) from chain sling (1), and unhook chain sling from turntable assembly (2).

END OF TASK



TA 101606

Disassembly.

FRAME 1

1. Hook chain sling (1) to one end of turntable assembly (2) as shown. Join hoist (3) to chain sling.

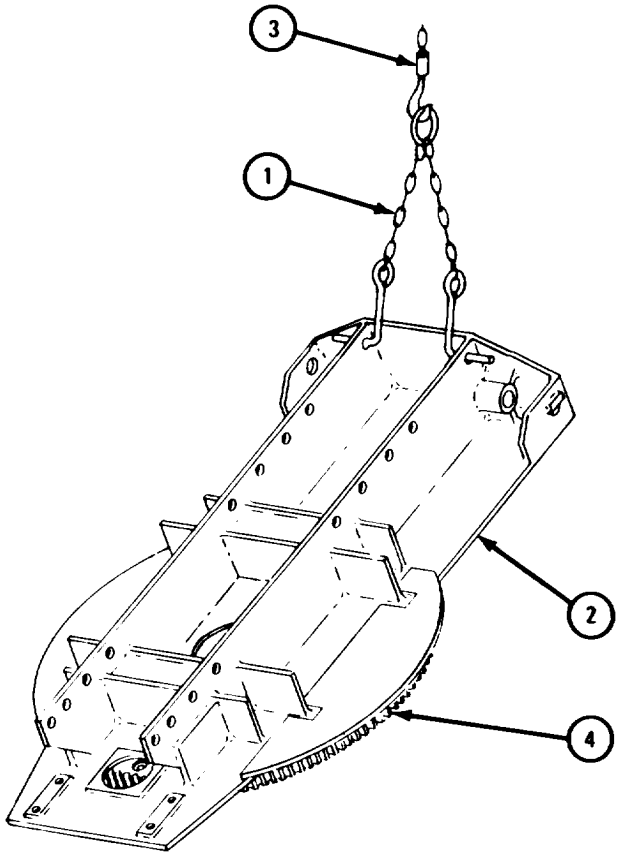
Soldier A 2. Using hoist (3), raise turntable assembly (2), so that it stands up on one end.

Soldier B 3. When soldier A has raised turntable assembly (2), turn it over so that gear and bearing assembly (4) is facing up.

Soldier A 4. Using hoist (3), lower turntable assembly (2) to ground so that gear and bearing assembly (4) is facing up.

5. Take off hoist (3) and chain sling (1).

GO TO FRAME 2

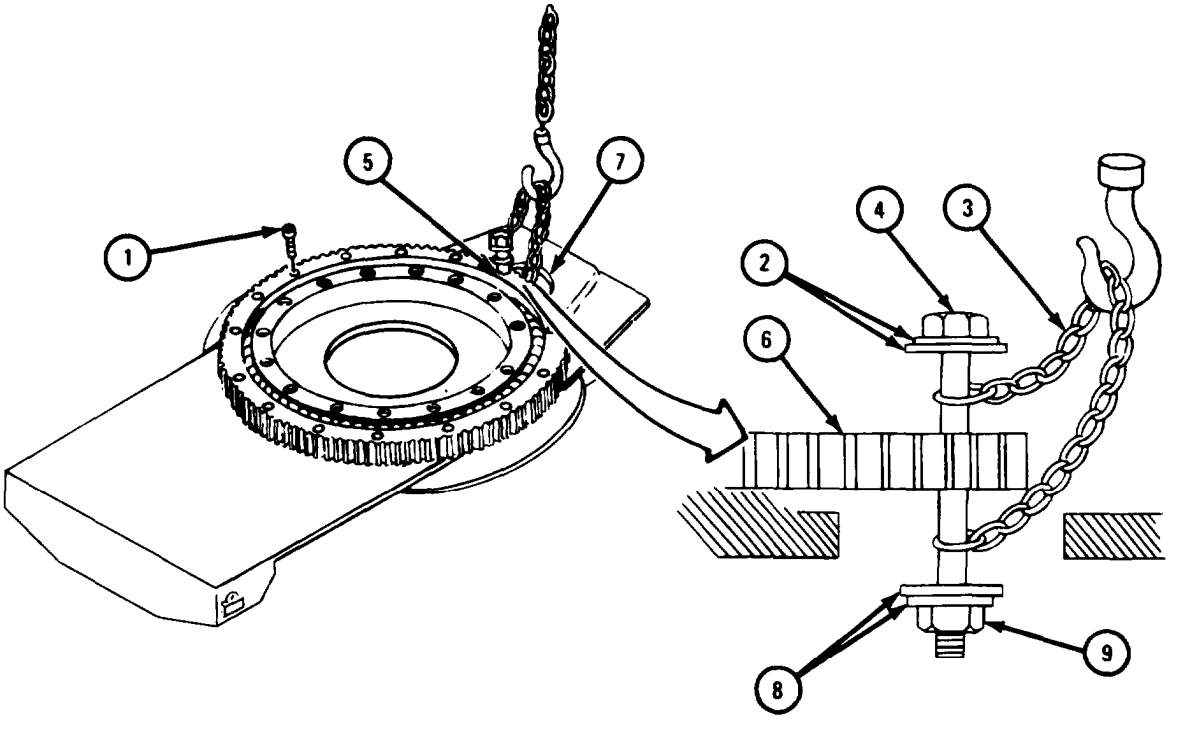


TA 101607

FRAME 2

1. Takeout 18 screws (1).
2. Put two washers (2) and chain (3) on 3/8-inch diameter 4-inch long bolt (4). Slide bolt through hole (5) in gear (6).
3. Working through hole (7) in turntable, place chain (3), two washers (8), and nut (9) on bolt (4).

GO TO FRAME 3



TA 101608

FRAME 3

WARNING

Be careful when taking off gear and bearing assembly to prevent damage to gear teeth and injury to personnel.

1. Hook a hoist to chain (1).

Soldier A 2. Using hoist, raise gear (2) and bearing assembly (3) off turntable assembly (4).

Soldier B 3. Place wooden blocks (5 and 6) so that bearing assembly (3) rests on two blocks and gear (2) rests on two blocks.

4. Guide gear (2) and bearing assembly (3) to wooden blocks (5 and 6).

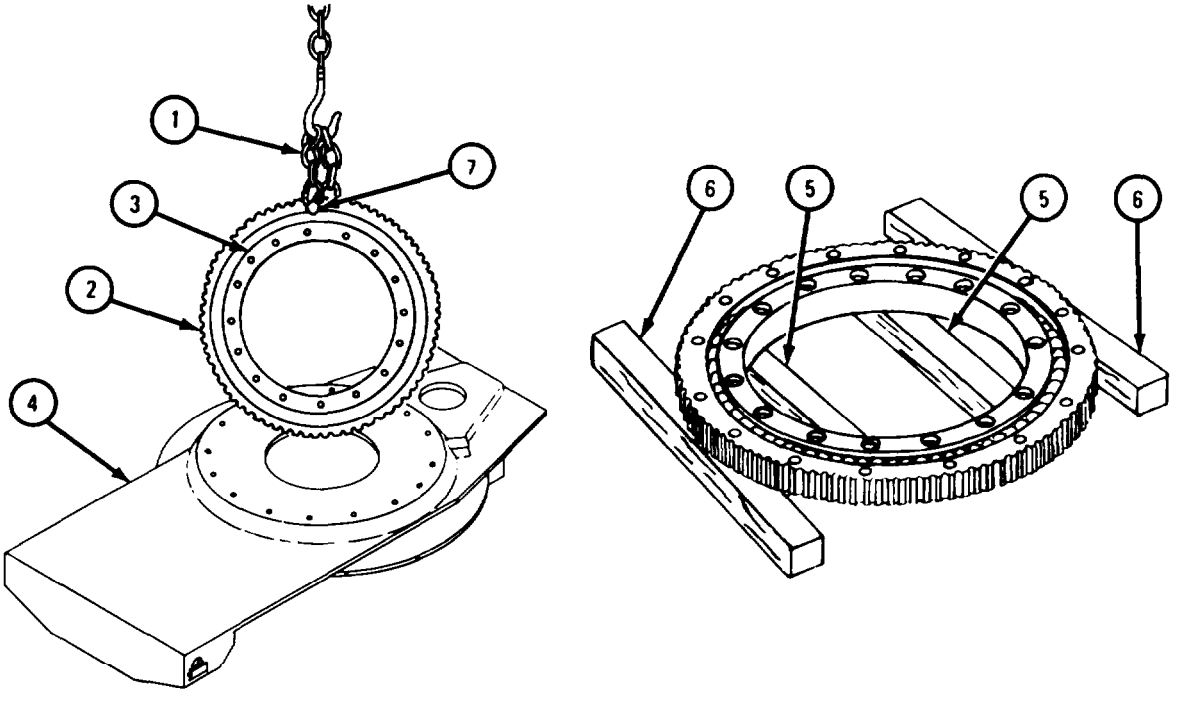
Soldier A 5. Lower gear (2) and bearing assembly (3) until it almost rests on wooden blocks (5 and 6).

Soldier B 6. Turn gear (2) and bearing assembly (3) around so that turntable side of gear faces up while soldier A lowers gear onto wooden blocks (5 and 6).

Soldier A 7. Lower gear (2) and bearing assembly (3) onto wooden blocks (5 and 6).

Soldier B 8. Unhook hoist. Take off bolt, washers, nut (7), and chain (1).

GO TO FRAME 4

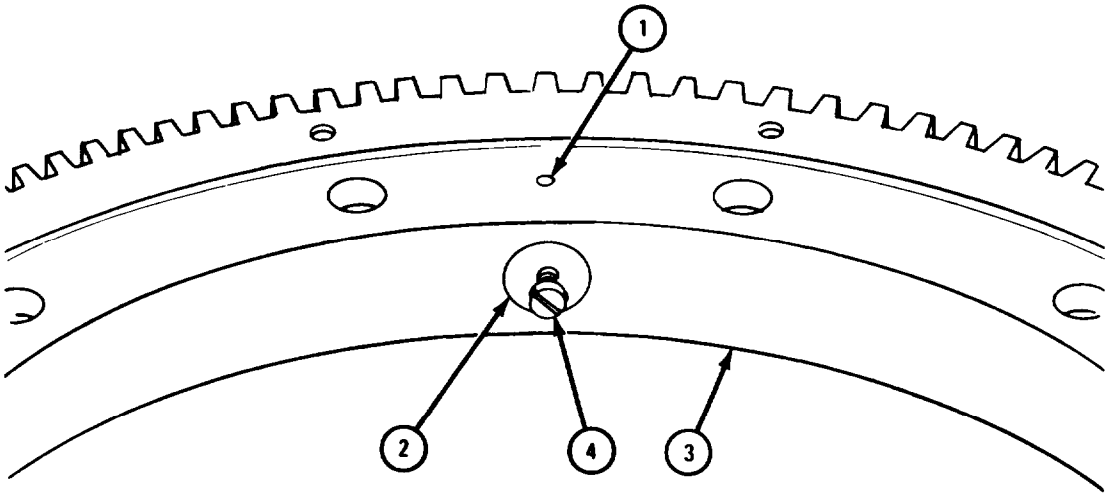


TA 101609

FRAME 4

1. Tap taper pin (1) up and out of retaining plug (2) and gear and bearing assembly (3).
2. Put screw (4) into hole in retaining plug (2).
3. Pull out screw (4) and retaining plug (2).
4. Take screw (4) out of retaining plug (2).

GO TO FRAME 5

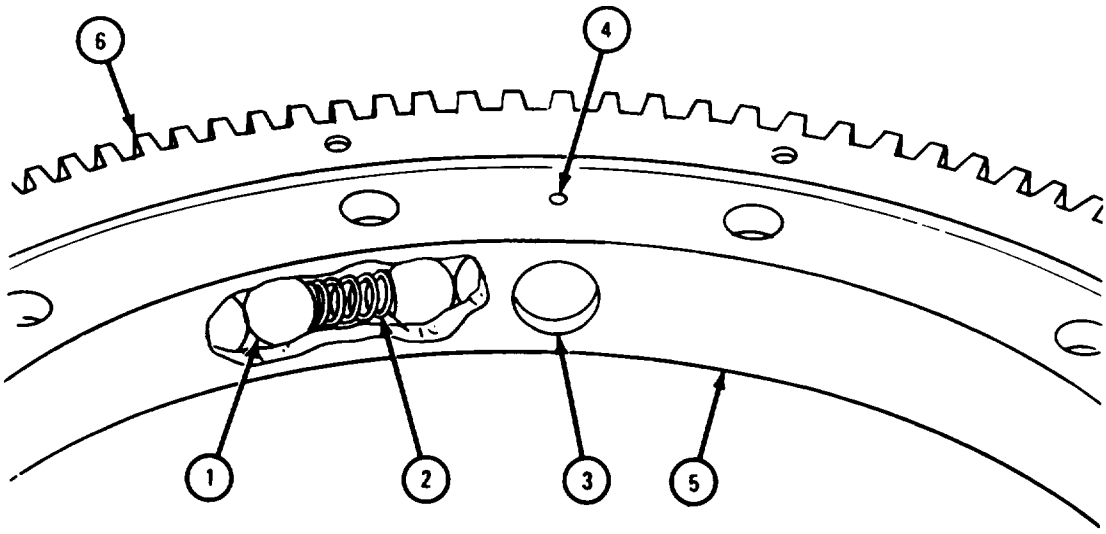


TA 101610

FRAME 5

1. Push ball bearings (1) and spacer springs (2) toward retaining plug bore (3).
2. Working through pin hole (4), push out 54 ball bearings (1) and nine spacer springs (2).
3. Lift bearing race (5) out of gear (6).

END OF TASK



TA 101611

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

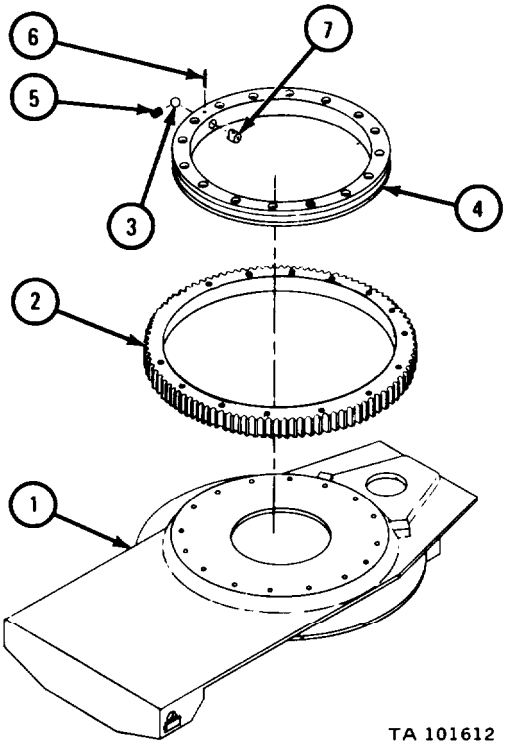
d. Cleaning. There are no special cleaning procedures needed. Refer to cleaning procedures given in Part 1, para 1-3.

e. Inspection.

FRAME 1

1. Check that turntable base plate (1) has no cracks or broken welds and that it is not warped.
2. Check that teeth of gear (2) are not broken or damaged.
3. Check that 54 bearing balls (3) and ball bearing races of gear (2) and bearing race (4) are not damaged. Refer to Part 1, para 7-7.
4. Check that nine spacer springs (5), pin (6), and plug (7) are not cracked or broken.
5. Check that all screws and threaded holes are not stripped or damaged in any other way.

END OF TASK



TA 101612

f. Repair.

(1) Weld small cracks or broken welds in turntable baseplate. Refer to TM 9-237.

(2) If turntable base plate is badly cracked or broken, get a new one.

(3) If bearing race, gear, bearing ball, springs, pin or plug are damaged, get a new turntable gear and bearing assembly.

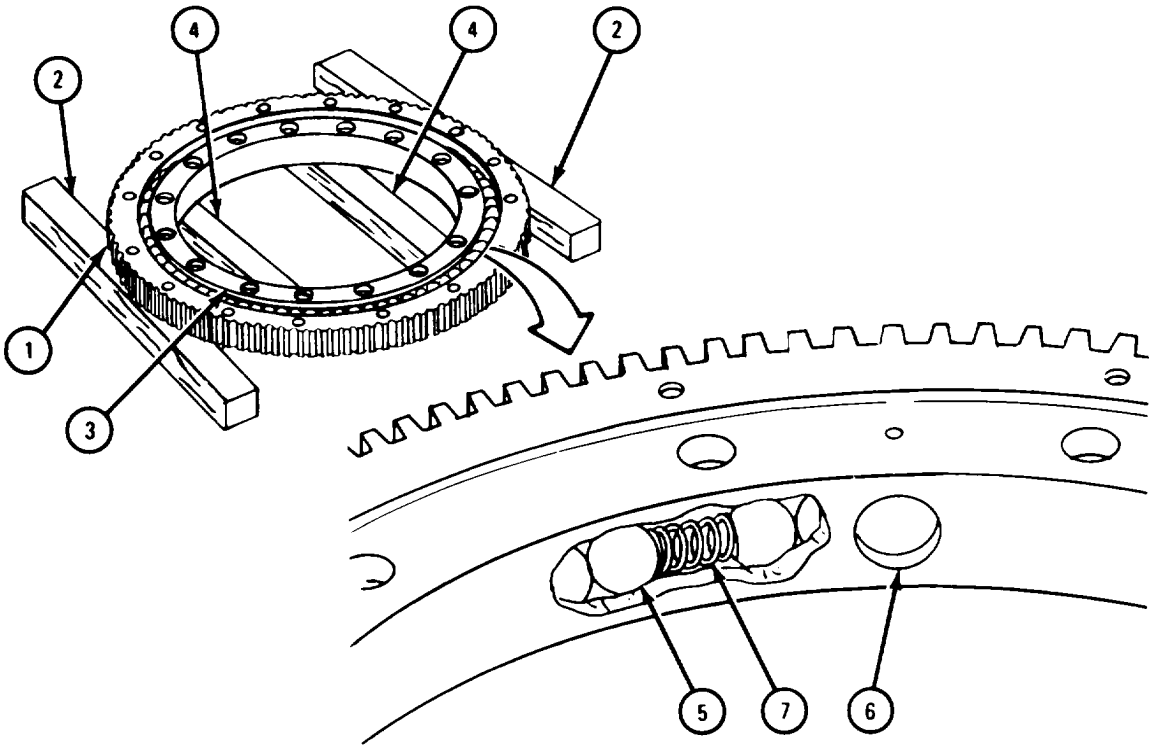
(4) If any screws are damaged, get new ones in their place.

g. Assembly.

FRAME 1

1. Place gear (1) on wooden blocks (2).
2. Put bearing race (3) in place in gear (1) on wood blocks (4), with large flange facing up.
3. Put six bearing balls (5) into retaining plug bore (6).
4. Put one spacer spring (7) into retaining plug bore (6).
5. Push bearing balls (5) and spacer spring (7) away from retaining plug bore (6).
6. Do steps 3, 4, and 5 again until all 54 bearing balls (5) and nine space springs (7) are in bearing race (3).

GO TO FRAME 2

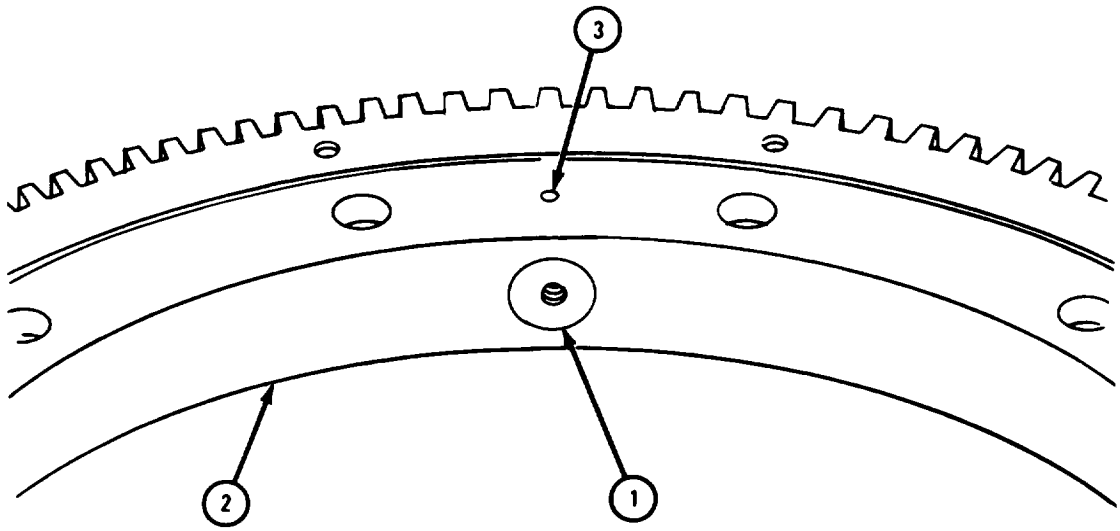


TA 101613

FRAME 2

1. Tap taper retaining plug (1) into bore in bearing race (2). Make sure that hole for pin (3) in retaining plug is alined with hole for pin unbearing race.
2. Tap taper pin (3) through bearing race (2) and retaining plug (1).

GO TO FRAME 3



TA 101614

FRAME 3

1. Put two washers (1) and chain (2) on 3/8-inch diameter 4-inch bolt (3). Slide bolt through any outer hole in gear and bearing assembly (4).
2. Put other end of chain (2) on bolt (3). Put on two washers (5) and nut (6).
3. Join hoist to chain (2).

WARNING

Be careful when putting back gear and bearing assembly (7) to avoid damaging gear teeth and injury to personnel.

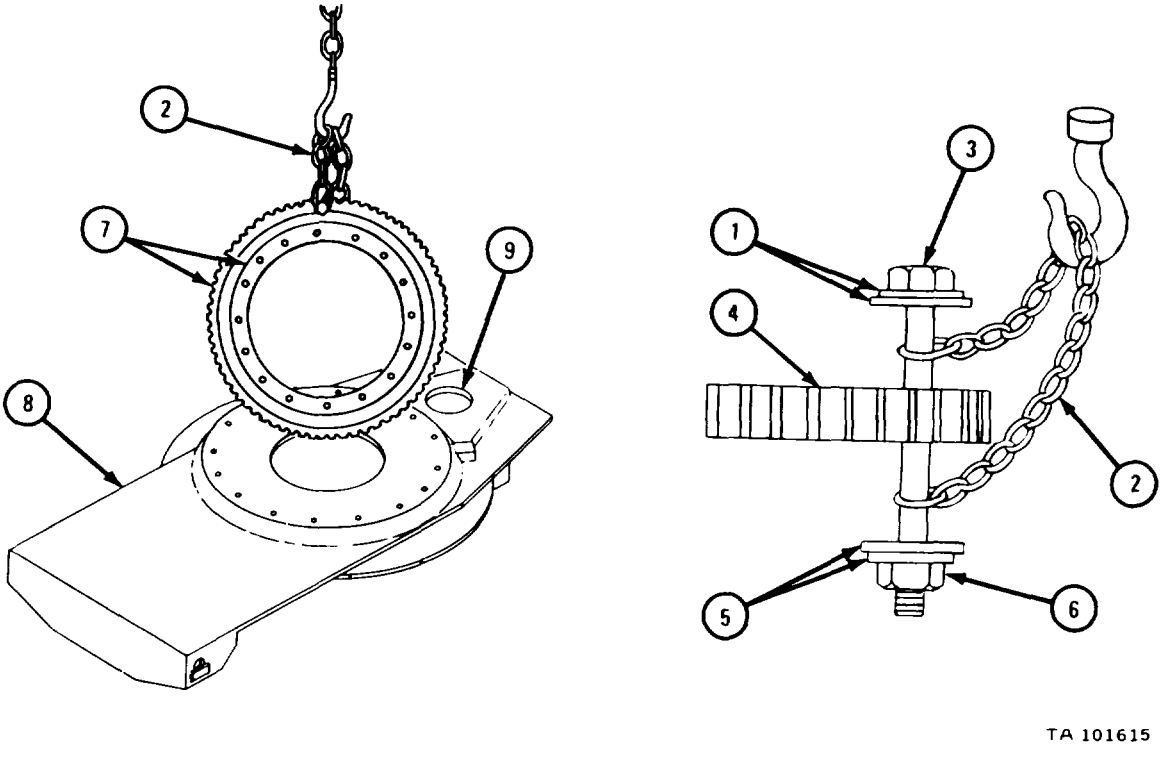
Soldier A 4. Guide gear and bearing assembly (7) off wooden blocks to turntable assembly (8) when soldier B lifts it.

Soldier B 5. Using hoist, lift gear and bearing assembly (7) off wooden blocks and move it over turntable assembly (8). Lower gear and bearing assembly until it almost touches turntable assembly.

Soldier A 6. Turn gear and bearing assembly (7) so that bolt (3) goes into access hole (9) when soldier B lowers gear and bearing assembly onto turntable assembly (8).

Soldier B 7. Lower gear and bearing assembly (7) onto turntable assembly (8).

GO TO FRAME 4

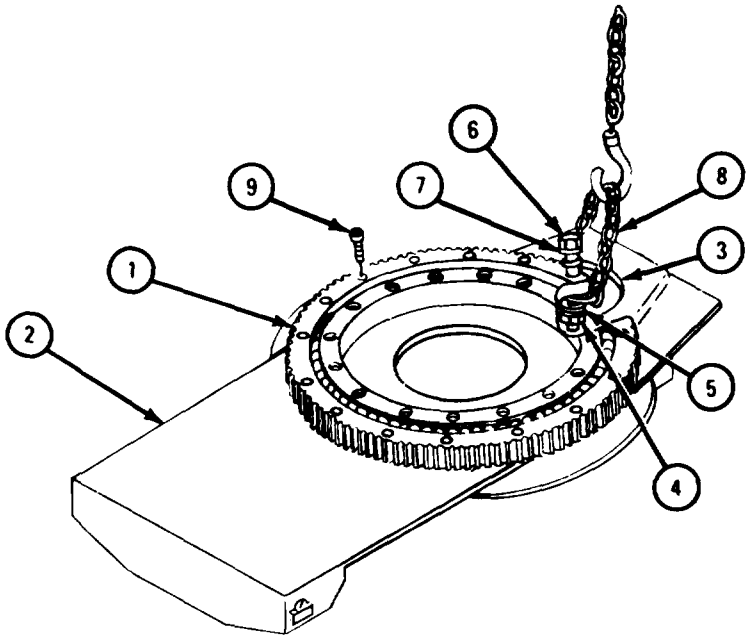


TA 101615

FRAME 4

1. Aline mounting holes in gear and bearing assembly (1) with holes in turntable assembly (2).
2. Unhook hoist. Working through access hole (3) in turntable assembly (2), take off nut (4), two washers (5), bolt (6), two washers (7), and chain (8).
3. Put in 18 screws (9).

GO TO FRAME 5



TA 101616

FRAME 5

1. Hook up chain sling (1) to end of turntable assembly (2) as shown. Join chain sling to hoist (3).

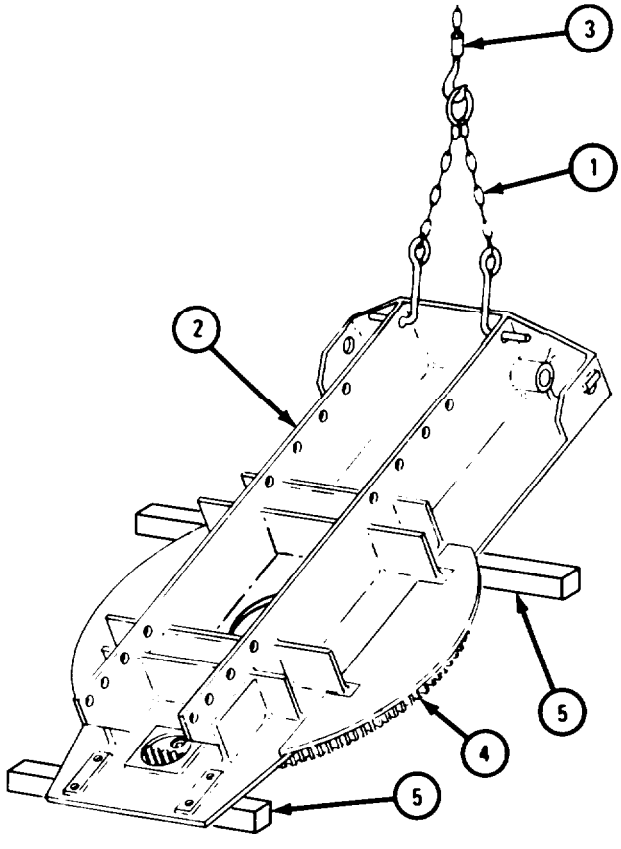
Soldier A 2. Using hoist (3), raise turntable assembly (2) so that it stands up on one end.

Soldier B 3. When Soldier A has raised turntable assembly (2), turn it around so that gear and bearing assembly (4) is facing down.

Soldier A 4. Using hoist (3), lower turntable assembly (2) onto wooden blocks (5), with gear and bearing assembly (4) facing down.

5. Take hoist (3) off chain sling (1) and take chain sling off turntable assembly (2).

END OF TASK



TA 101617

h. Replacement.

FRAME 1

1. Hook up chain sling (1) to turntable assembly (2), and join chain sling, to hoist (3) as shown.

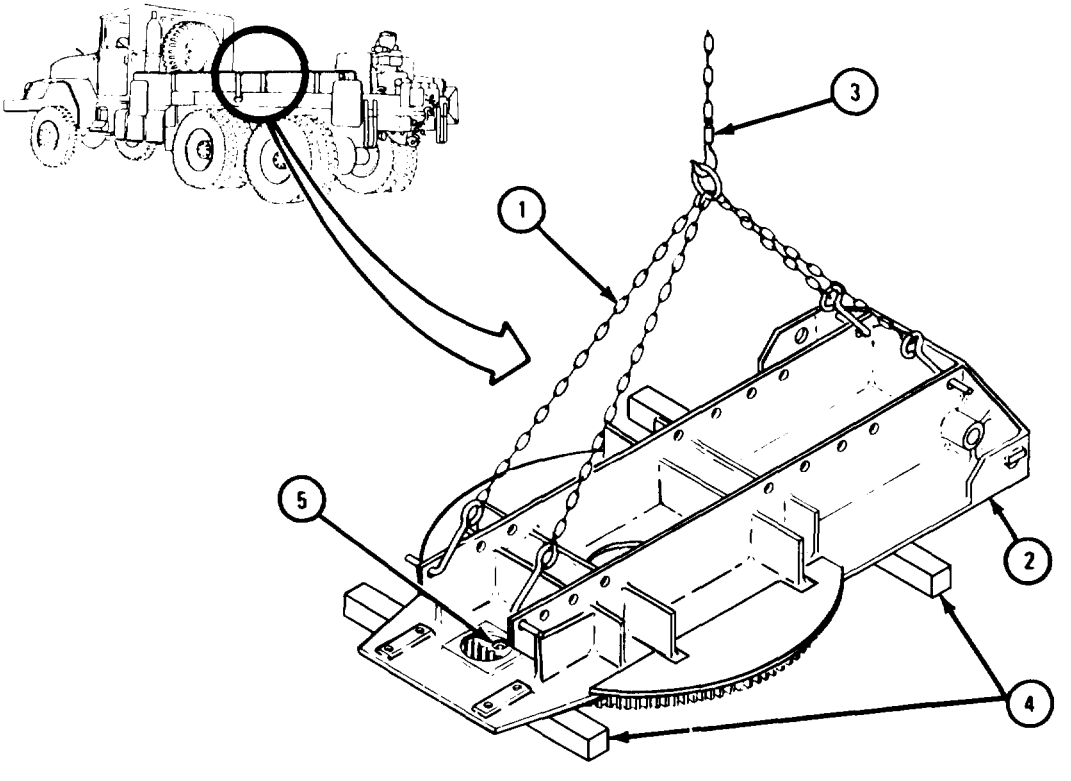
Soldier A 2. Guide turntable assembly (2) when soldier B lifts it onto truck.

Soldier B 3. Using hoist (3), raise turntable assembly (2) off wood blocks (4) and set it down in place on truck.

4. Aline mounting holes (5) of gear with holes in truck body.

5. Unhook hoist (3) from chain sling (1) and unhook chain sling from turntable assembly (2).

GO TO FRAME 2

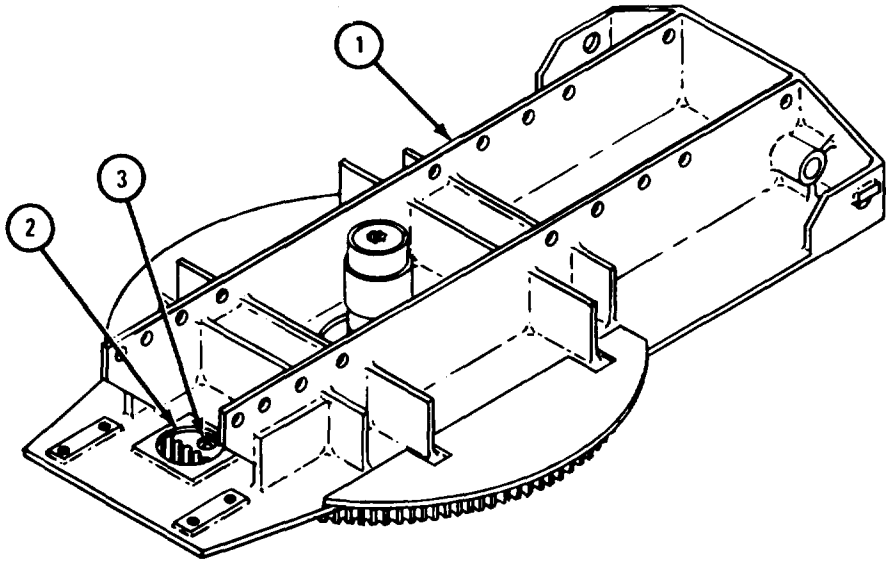


TA 101618

FRAME 2

1. Turn turntable assembly (1) so that access hole (2) is over 18 outer screw holes, one at a time.
2. Put in 18 screws (3). Tighten screws to 170 to 180 pound-feet.

GO TO FRAME 3

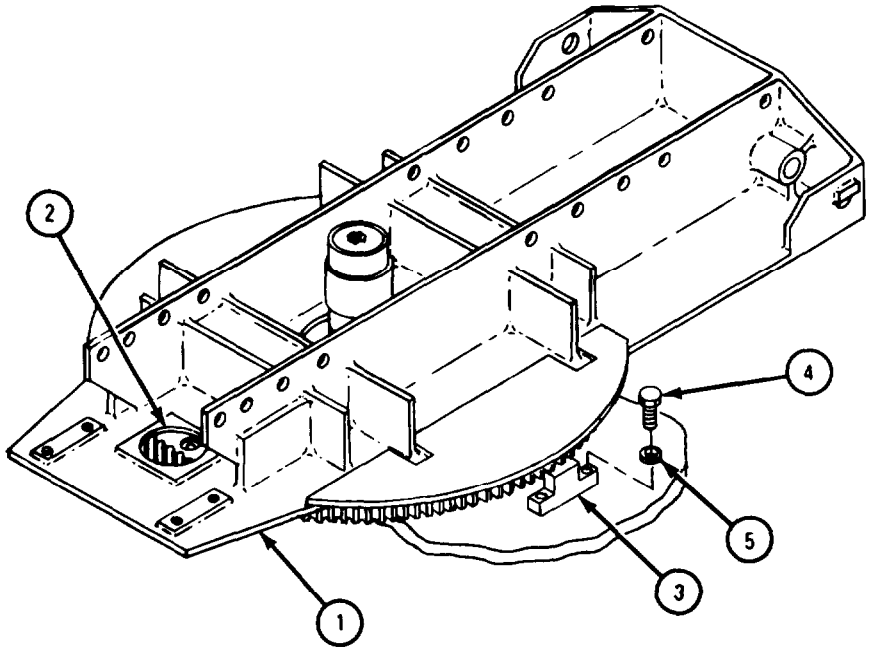


TA 101605

FRAME 3

1. Turn turntable assembly (1) so that access hole (2) is facing side of truck.
2. Working under turntable assembly (1), put stop block (3) in place.
3. Put in two screws (4) and lockwashers (5).

GO TO FRAME 4

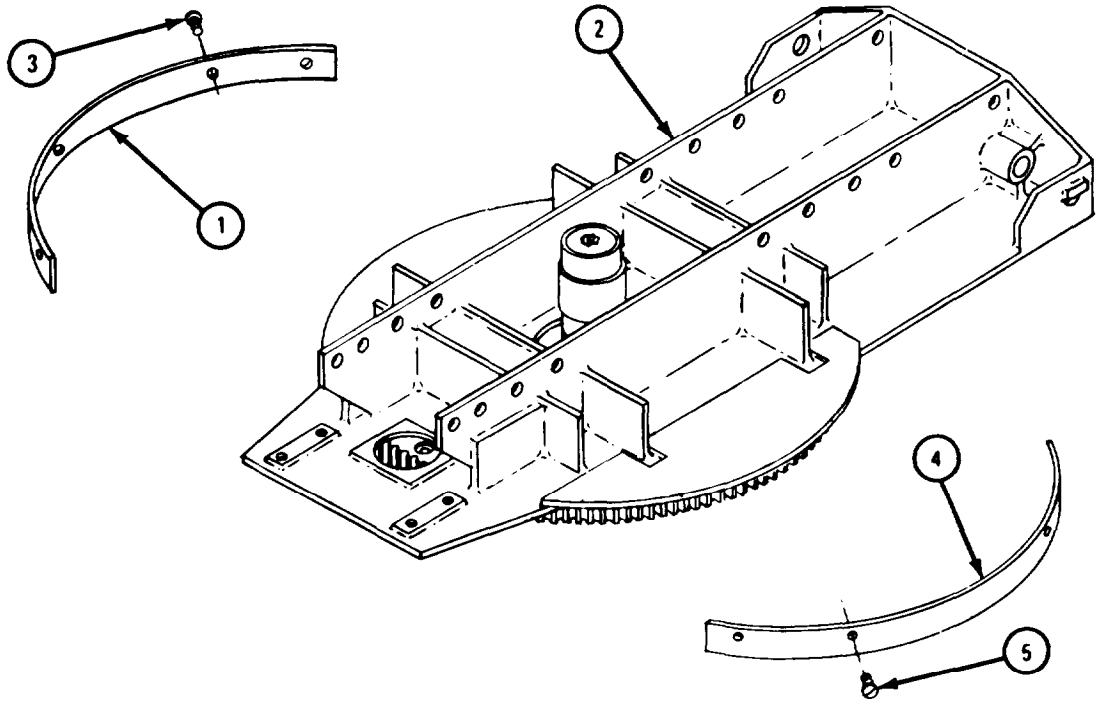


TA 101619

FRAME 4

1. Put right guard assembly (1) in place on turntable assembly (2).
2. Put in four screws (3).
3. Put left guard assembly (4) in place on turntable assembly (2).
4. Put in four screws (5).

GO TO FRAME 5



TA 101620

FRAME 5

1. Hook up chain sling and hoist to boom support assembly (1) as shown.

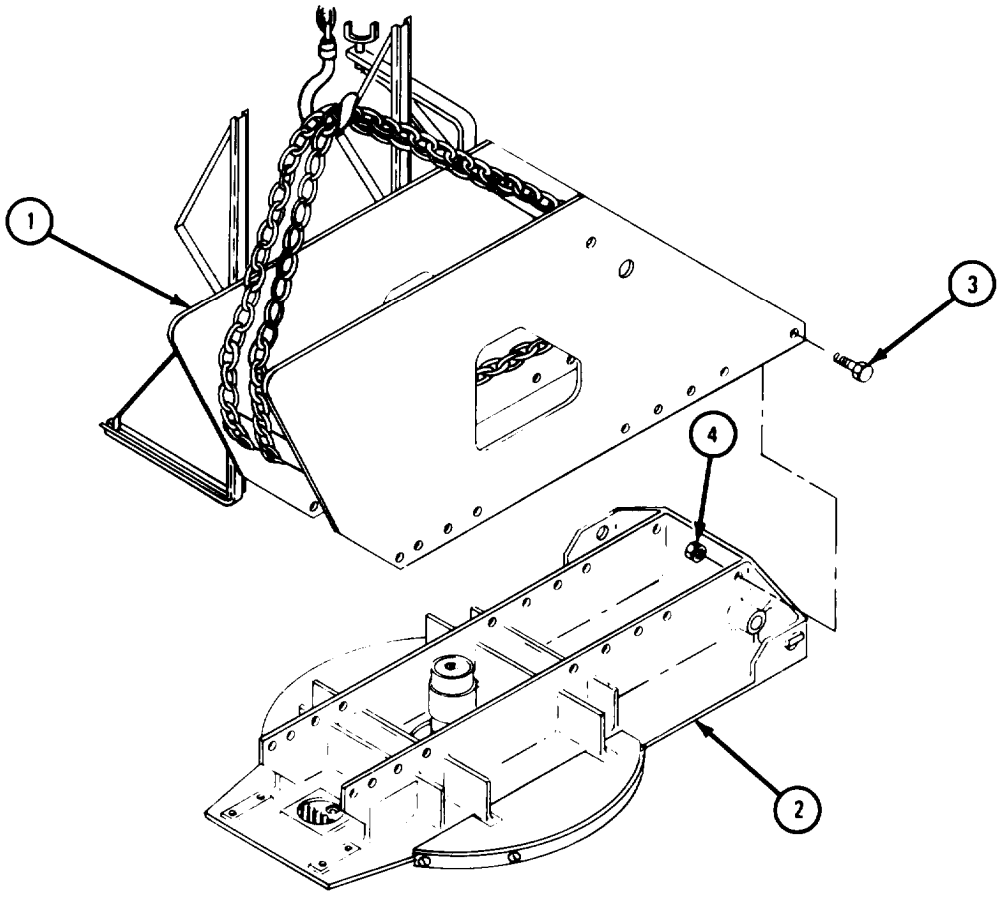
Soldier A 2. Guide boom support assembly (1) into place on turntable assembly (2) when soldier B lifts it.

Soldier B 3. Using hoist, lift boom support assembly (1) up and set it down in place on turntable assembly (2).

4. Put in 18 screws (3) and put on nuts (4).

5. Unhook chain sling and hoist from boom support assembly (1).

GO TO FRAME 6

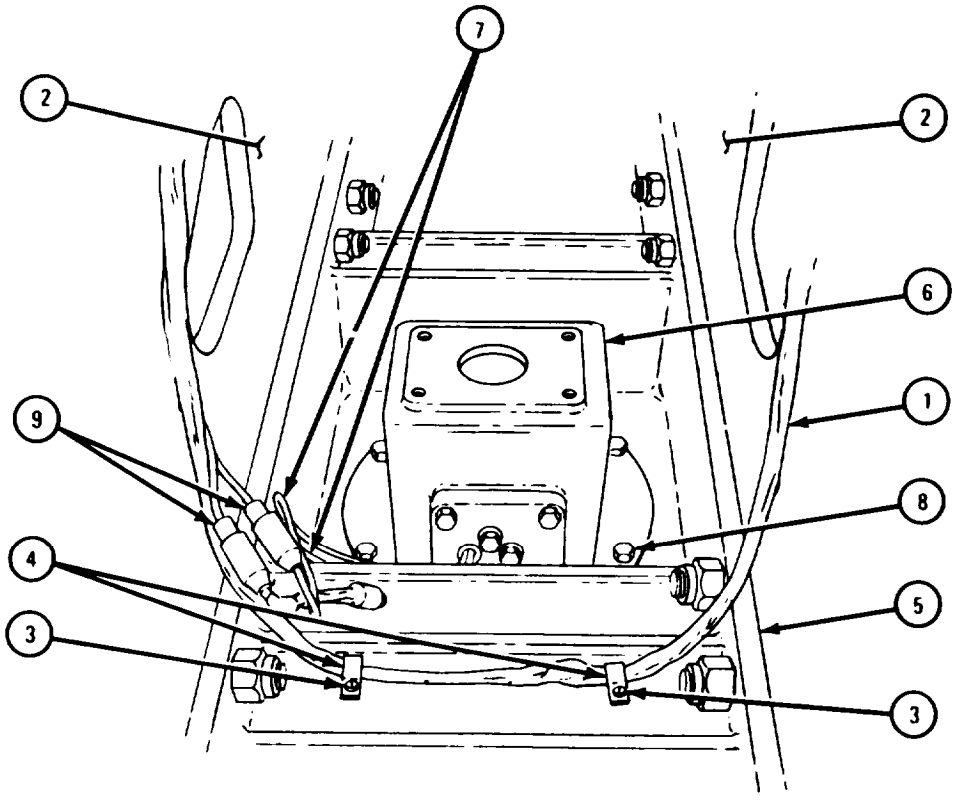


TA 101621

FRAME 6

1. Put cable assembly (1) around boom support assembly (2) as shown,
2. Put in two screws (3) through two clamps (4) and turntable assembly (5).
3. Put hydraulic pump support (6) with two electrical leads (7) in place on turntable assembly (5), alining holes.
4. Put in six screws and lockwashers (8).
5. Push two male connectors (9) into female connectors on electrical leads (7).

GO TO FRAME 7



TA 101622

FRAME 7

NOTE

Follow-on Maintenance Action Required:

1. Replace slipring contact brushes. Refer to TM 9-2320-211-20.
2. Replace hydraulic turntable pump assembly. Refer to para 17-35.
3. Replace crane swinger gearcase with crane swinger motor. Refer to para 17-29.
4. Replace gondola assembly operator's cab. Refer to para 17-52.
5. Replace boom elevating cylinders. Refer to para 17-42.
6. Replace hydraulic oil reservoir. Refer to para 17-37.
7. Replace boom assembly. Refer to para 17-44.
8. Replace hoist winch cable. Refer to TM 9-2320-211-20.
9. Check crane turntable assembly for proper operation. Refer to TM 9-2320-211-10.
10. Reconnect battery ground cable. Refer to TM 9-2320-211-20.

END OF TASK

17-34. TURNTABLE BEVEL GEAR GEARCASE ASSEMBLY REMOVAL, REPAIR, AND REPLACEMENT (TRUCK M543A2).

TOOLS: No special tools required

SUPPLIES: 5-gallon container
Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680
Layout dye
Gearcase housing gasket
End cover gasket
Drive housing gasket
End cover seal
Tags
Bearing cover gasket

PERSONNEL: TWO

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Remove hoist winch cable. Refer to TM 9-2320-211-20.

(2) Remove boom assembly. Refer to para 17-44.

(3) Drain hydraulic oil reservoir. Refer to TM 9-2320-211-10.

(4) Remove hydraulic oil reservoir. Refer to para 17-37.

(5) Remove boom elevating cylinders. Refer to para 17-42.

(6) Remove gondola assembly. Refer to para 17-52.

(7) Remove hydraulic pump assembly. Refer to para 17-35.

(8) Remove crane swinger gearcase with crane swinger motor. Refer to para 17-29.

(9) Remove crane turntable assembly. Refer to para 17-33.

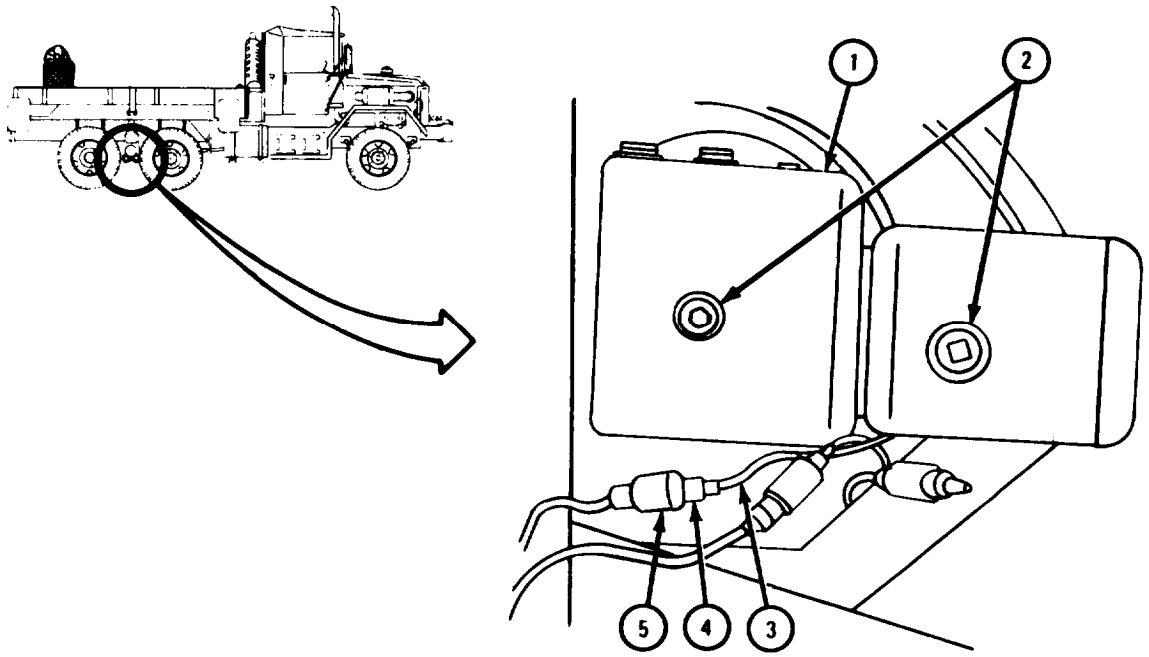
(10) Remove power divider to bevel gear case propeller shaft. Refer to TM 9-2320-211-20.

b. Removal.

FRAME 1

1. Put 5-gallon container under bevel gearcase housing assembly (1).
2. Take out two drain plugs (2) and let oil drain into container.
3. When oil has stopped draining, put back two drain plugs (2).
4. Tag four electrical leads (3) to make sure that they will be put back in the right places.
5. Pull two male connectors (4) out of female connectors (5).

GO TO FRAME 2



TA 085728

FRAME 2

Soldier A 1. Hold bevel gearcase housing assembly (1) while soldier B takes out six screws (2). Tell soldier B that you are ready.

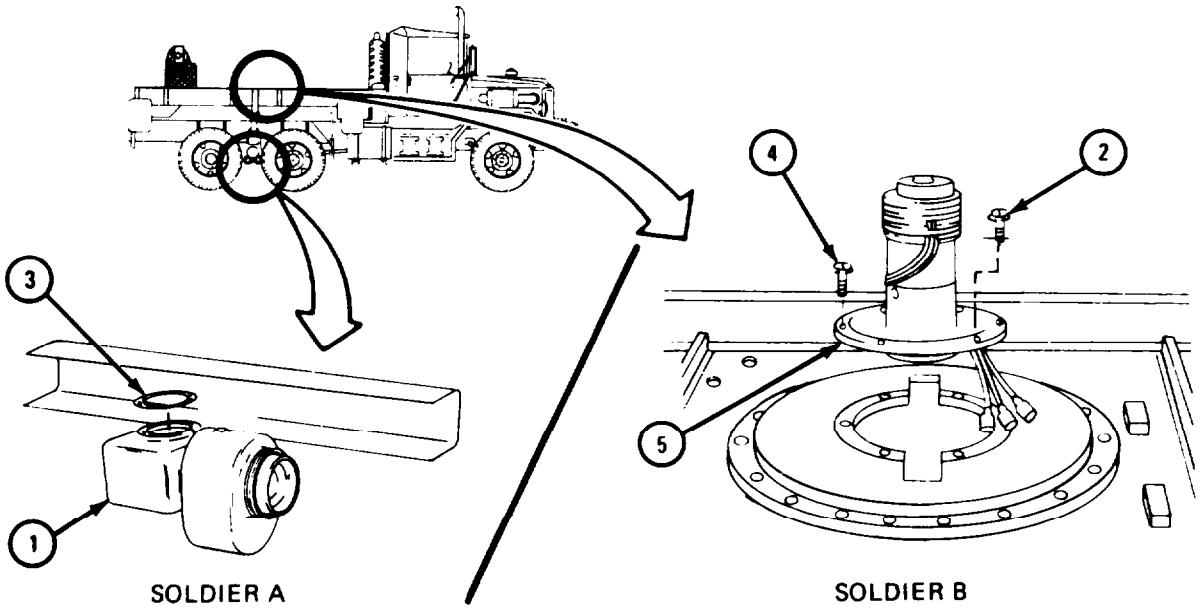
Soldier B 2. Take out six screws and lockwashers (2).

Soldier A 3. Lower bevel gearcase housing assembly (1) and gasket (3) to ground. Throw away gasket.

Soldier B 4. Take out six screws and lockwashers (4).

5. Lift pump driveshaft housing assembly (5) off truck body.

END OF TASK



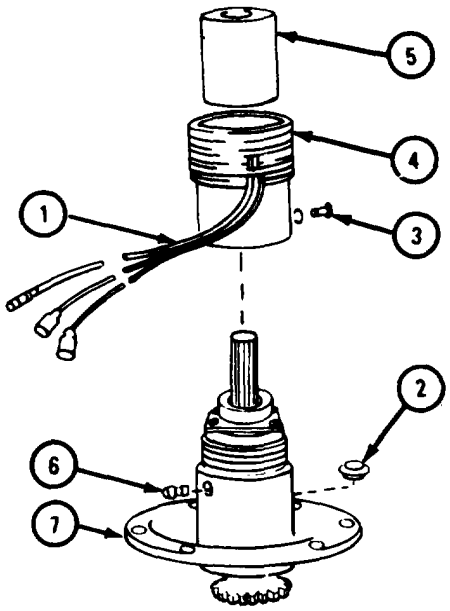
c. Disassembly.

(1) Disassembly of pump driveshaft housing assembly.

FRAME 1

1. Pull three electrical leads (1) up through grommet (2).
2. Take out screw and lockwasher (3).
3. Lift off ring support assembly (4).
4. Takeout pump drive shaft coupling (5).
5. Pullout grommet (2).
6. Take breather assembly (6) out of housing assembly (7).

GO TO FRAME 2

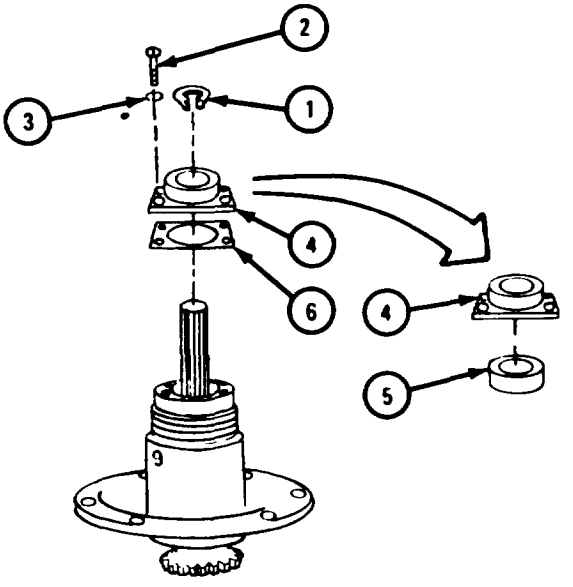


TA 085730

FRAME 2

1. Take out retaining ring (1).
2. Take out four screws (2) with lockwashers (3).
3. Lift off end cover (4) with seal (5) and gasket (6). Throw away gasket.
4. Press seal (5) out of end cover (4). Throw away seal.

GO TO FRAME 3



TA 085731

FRAME 3

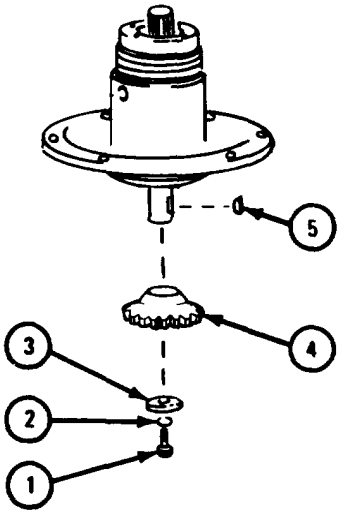
1. Takeout screw (1), lockwasher (2), and flat washer (3).
2. Takeoff gear (4).

NOTE

Tag gear (4) to make sure that it is put back on pump driveshaft, and not on input shaft.

3. Take out key (5).

GO TO FRAME 4

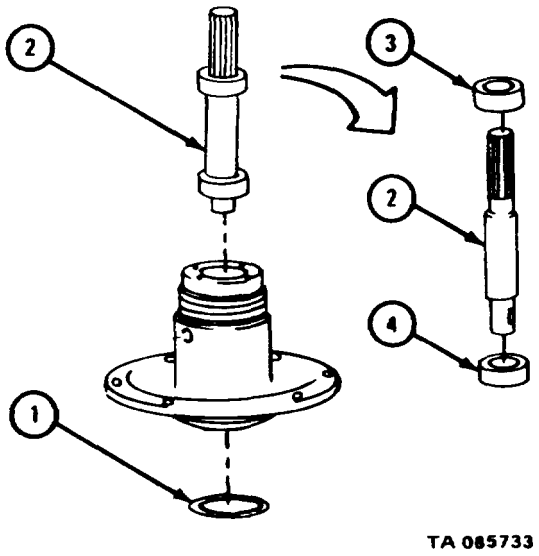


TA 085732

FRAME 4

1. Take out retaining ring (1).
2. Pull out pump driveshaft (2) with bearings (3 and 4).
3. Press bearings (3 and 4) off pump driveshaft (2). Refer to Part 1, para 7-7.

END OF TASK

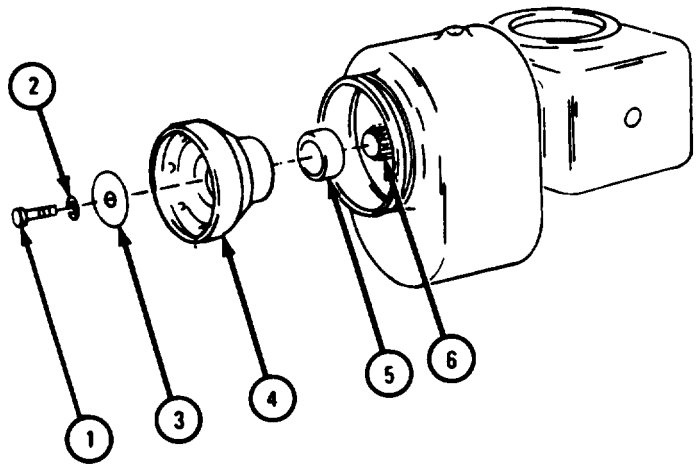


(2) Disassembly of bevel gearcase housing assembly.

FRAME 1

1. Takeout screw (1), lockwasher (2), and flat washer (3).
2. Takeoff yoke (4).
3. Slide spacer (5) off input shaft (6).

GO TO FRAME 2

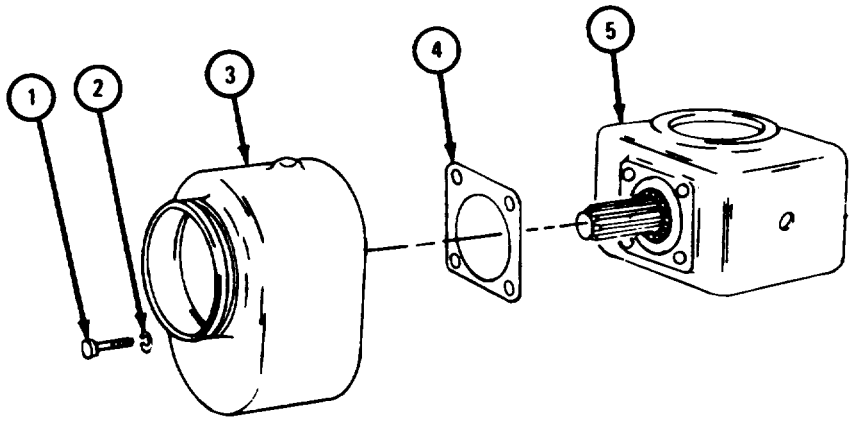


TA 085734

FRAME 2

1. Take out four screws (1) with lockwashers (2).
2. Take off input drive housing (3) and gasket (4) from bevel gearcase housing assembly (5). Throw away gasket.

GO TO FRAME 3



TA 085735

FRAME 3

1. Takeout four screws (1) with lockwashers (2).
2. Take off bearing cover (3), gasket (4), and shims (5). Throw away gasket.

NOTE

Note number of shims (5) needed to be sure the same number are put back.

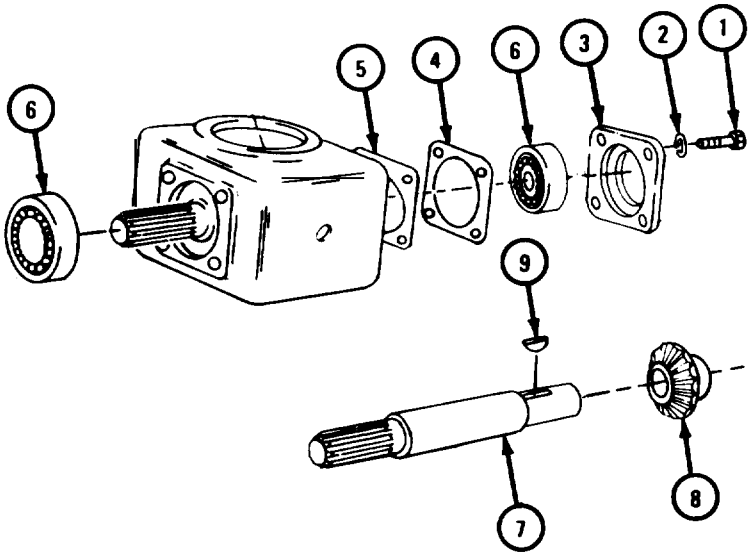
3. Take out two bearings (6).
4. Pull out input shaft (7) with gear (8).

CAUTION

Be sure that gear (8) rests on its hub when pressing out input shaft (7). If gear rests on its teeth, teeth may break.

5. Press input shaft (7) out of gear (8).
6. Tag gear (8) to make sure that it is put back on input shaft (7) and not on pump drive shaft.
7. Take key (9) out of input shaft (7).

GO TO FRAME 4.

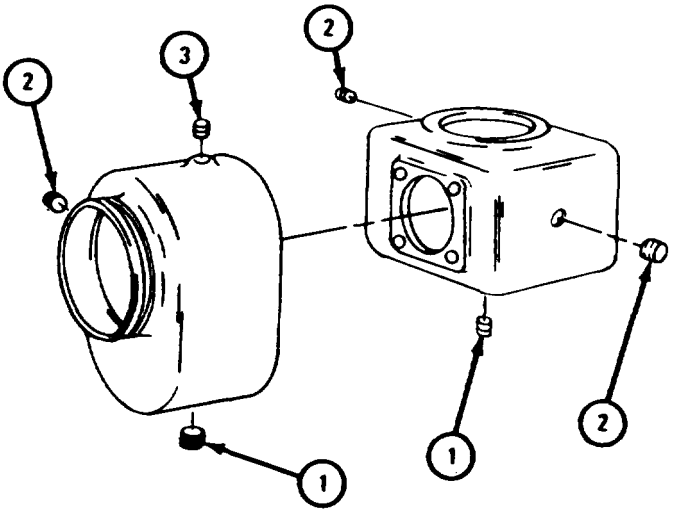


TA 085736

FRAME 4

1. Take out two drain plugs (1).
2. Take out three plugs (2).
3. Take out plug (3).

END OF TASK



TA 085737

d. Cleaning.

(1) Clean bearings. Refer to Part 1, para 7-7.

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

(2) Clean all other metal parts with solvent. Let parts air dry.

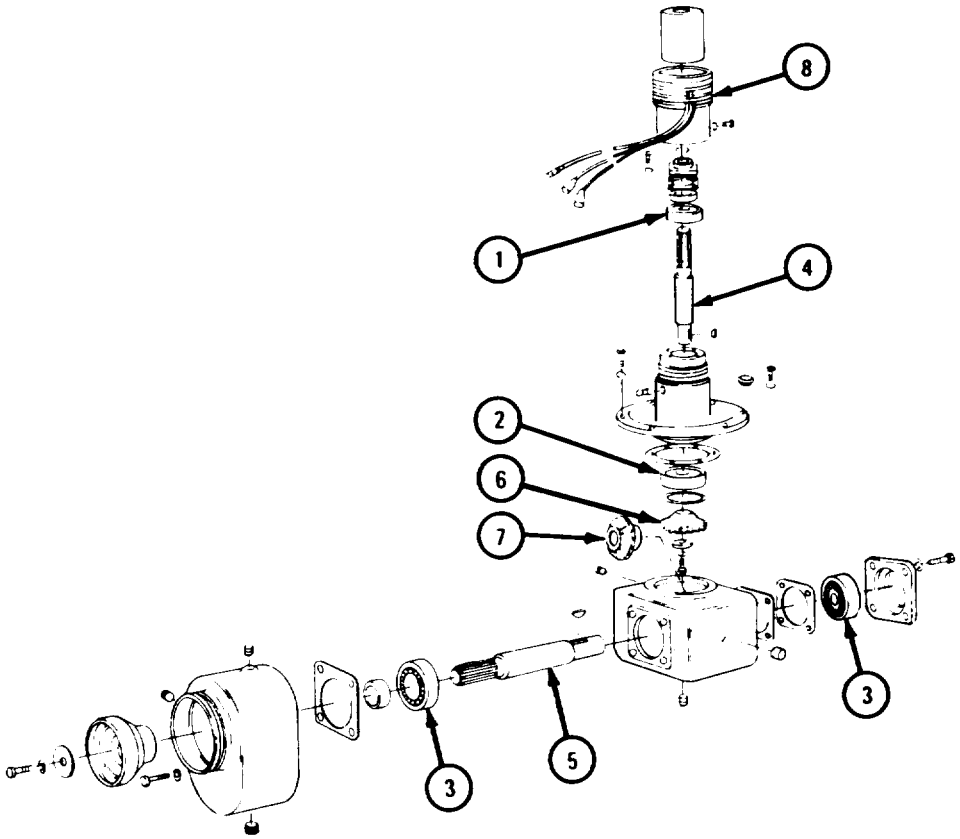
(3) Clean rubber grommet with warm water. Dry with a clean rag.

e. Inspection and Repair.

FRAME 1

1. Check that bearings (1 and 2) and two bearings (3) are not damaged. Refer to Part 1, para 7-7. If parts are damage, get new ones.
2. Check that pump drive shaft (4) and input shaft (5) are not chipped or twisted and do not have damaged splines. If parts are damaged, get new ones.
3. Check that gears (6 and 7) are not chipped and do not show signs of wear. If parts are damaged, get new ones.
4. Check that lead and ring assemblies (8) are not damaged. If parts are damaged, put in new ones.

GO TO FRAME 2



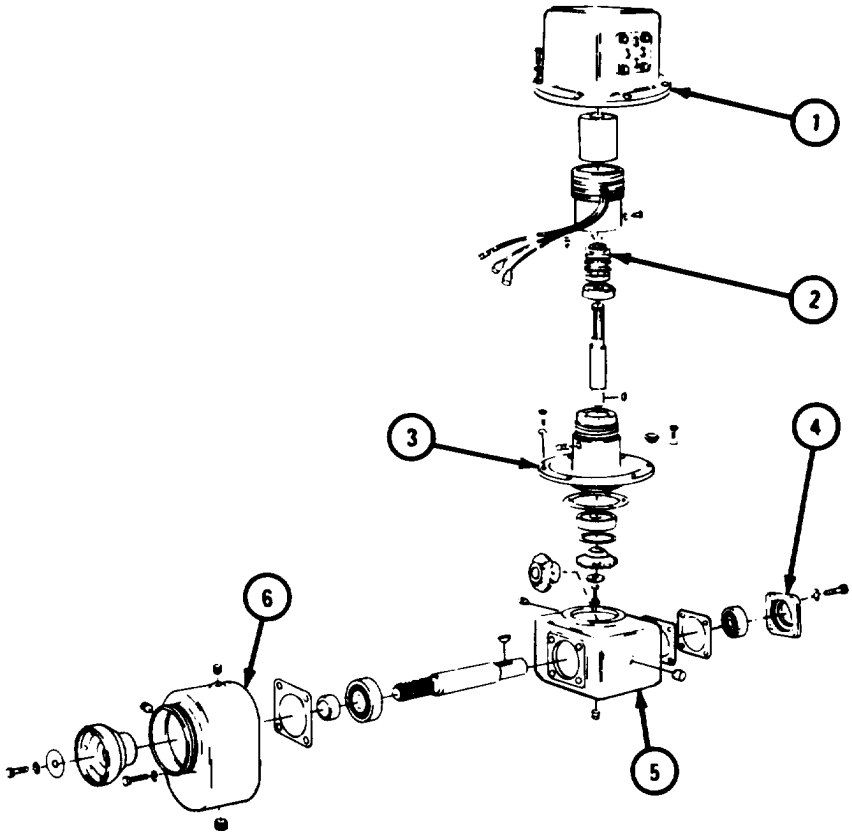
NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT IN THIS FRAME, PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES OR ARE CHECKED IN ANOTHER FRAME.

TA 085738

FRAME 2

1. Check that hydraulic pump support (1), end cover (2), pump drive shaft housing (3), bearing cover (4), bevel gearcase housing (5), and input drive housing (6) are not cracked or warped. If parts are damaged, get new ones.

END OF TASK



NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT IN THIS FRAME. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES OR ARE CHECKED IN ANOTHER FRAME.

TA 085739

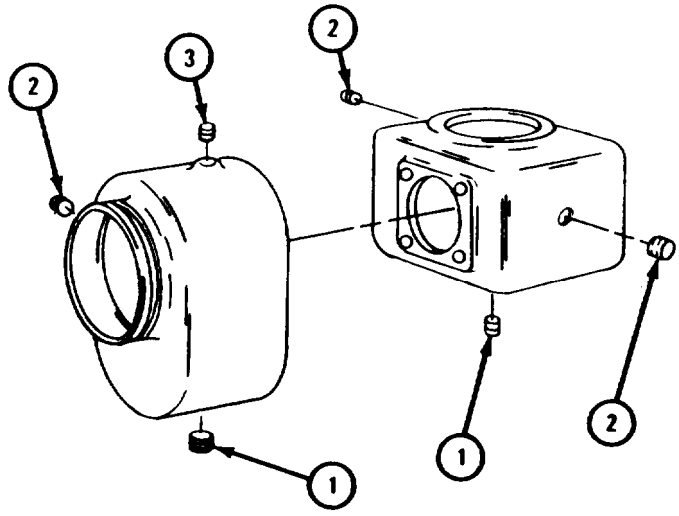
f. Assembly.

(1) Assembly of bevel gearcase housing assembly.

FRAME 1

1. Put in two drain plugs (1).
2. Put in three plugs (2).
3. Put in plug (3).

GO TO FRAME 2



TA 085737

FRAME 2

1. put key (1) into keyway in input shaft (2).

CAUTION

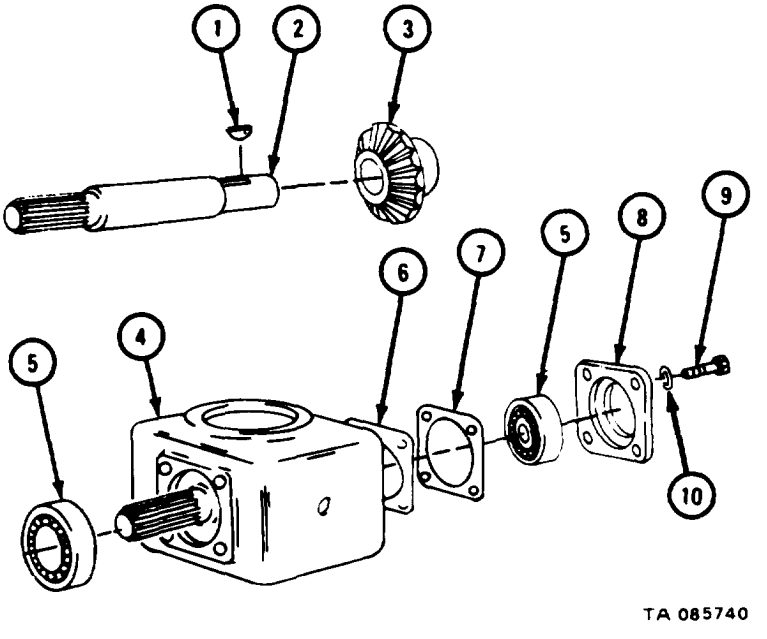
Be sure that gear (3) rests on its hub when pressing in input shaft (2). If gear rests on its teeth, teeth may break.

NOTE

Be sure gear (3) tagged during disassembly is pressed back onto input shaft (2). Take off tag.

2. Press input shaft (2) into gear (3).
3. Put input shaft (2) with gear (3) into bevel gearcase housing (4).
4. Drive two bearings (5) onto input shaft (2) and into bevel gearcase housing (4). Refer to Part 1, para 7-7.
5. Put noted number of shims (6), gasket (7), and bearing cover (8) in Place, alining holes.
6. Put in four screws (9) with lockwashers (10).

GO TO FRAME 3

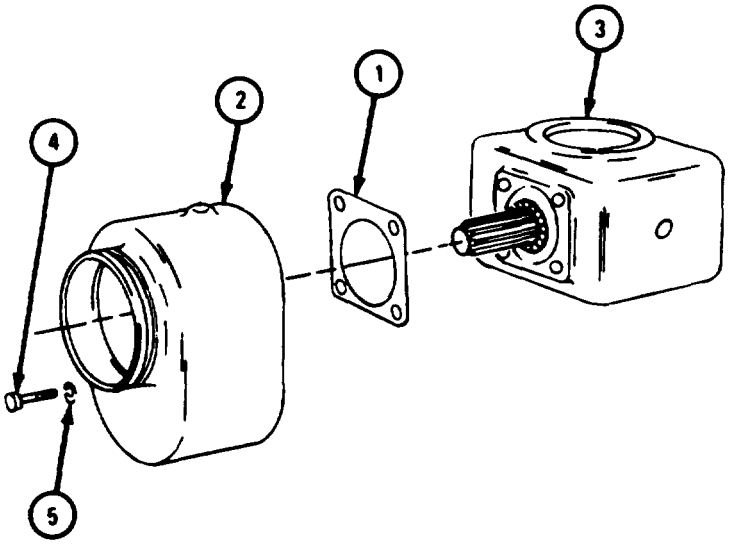


TA 085740

FRAME 3

1. Put gasket (1) and input drive housing (2) on bevel gearcase housing assembly (3), alining holes.
2. Put in four screws (4) with lockwashers (5).

GO TO FRAME 4

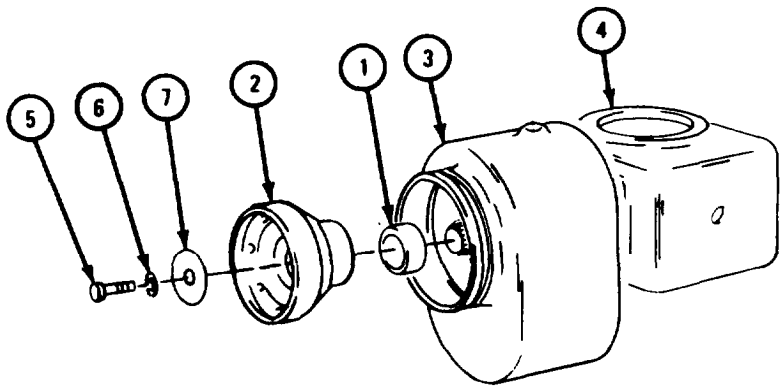


TA 085741

FRAME 4

1. Slide spacer (1) and yoke (2) onto input shaft (3).
2. Clamp locking pliers on input shaft (3) through hole in top of bevel gearcase housing (4).
3. Put in screw (5), lockwasher (6), and flat washer (7).
4. Take locking pliers off input shaft (3).

END OF TASK



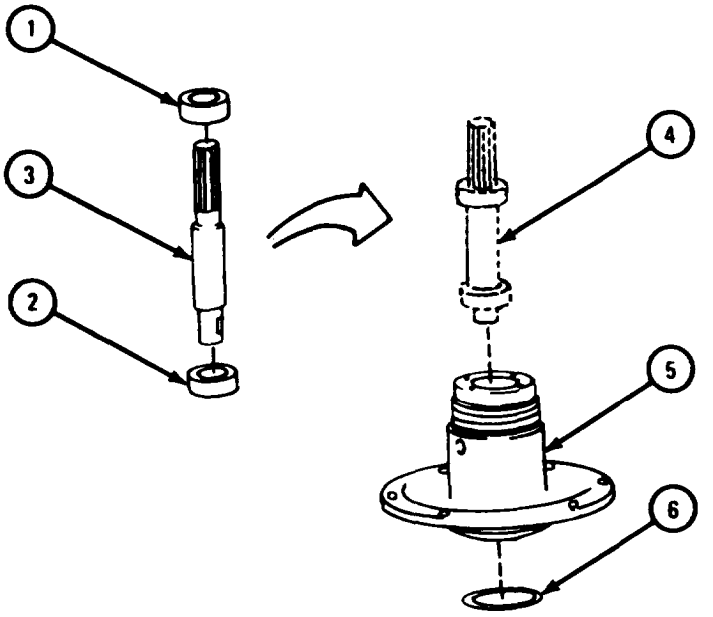
TA 085742

(2) Assembly of pump driveshaft housing assembly.

FRAME 1

1. Press bearings (1 and 2) onto pump driveshaft (3). Refer to Part 1, para 7-7.
2. Push pump driveshaft assembly (4) into bore in pump driveshaft housing (5).
3. Put retaining ring (6) into groove in pump driveshaft housing (5).

GO TO FRAME 2



FRAME 2

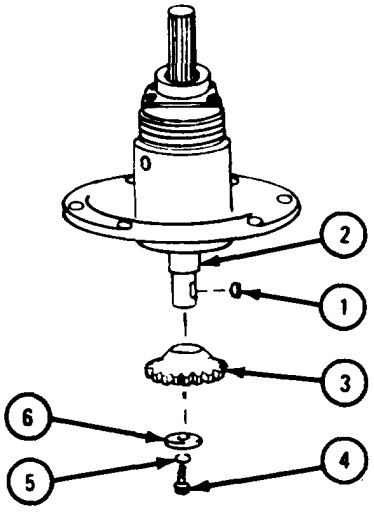
1. Put key (1) into keyway in pump driveshaft (2).

NOTE

Be sure gear (3) tagged during disassembly is put back on pump drive shaft. Take off tag.

2. Aline keyway in gear (3) with key (1), and push gear onto pump driveshaft (2) and key.
3. Clamp locking pliers on pump driveshaft (2).
4. Put in screw (4), lockwasher (5), and flat washer (6).
5. Take locking pliers off pump driveshaft (2).

GO TO FRAME 3

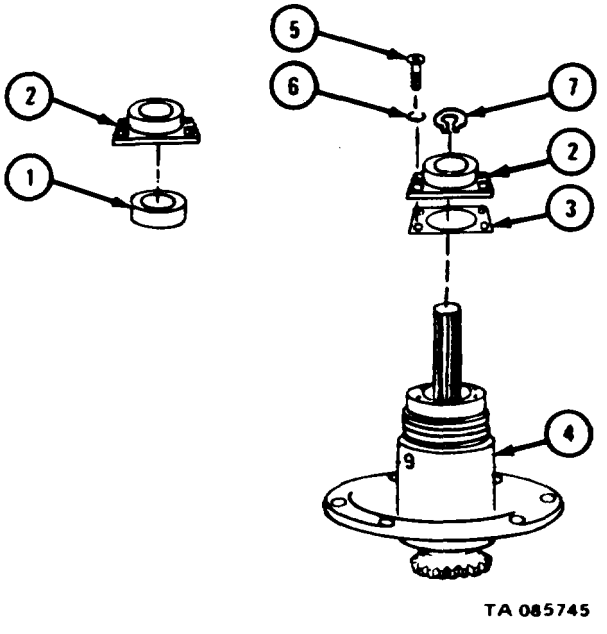


TA 085744

FRAME 3

1. Press seal (1) into end cover (2).
2. Put end cover (2) with seal (1) and gasket (3) on pump drive shaft housing assembly (4), alining holes.
3. Put in four screws (5) with lockwashers (6).
4. Put retaining ring (7) in groove in end cover (2).

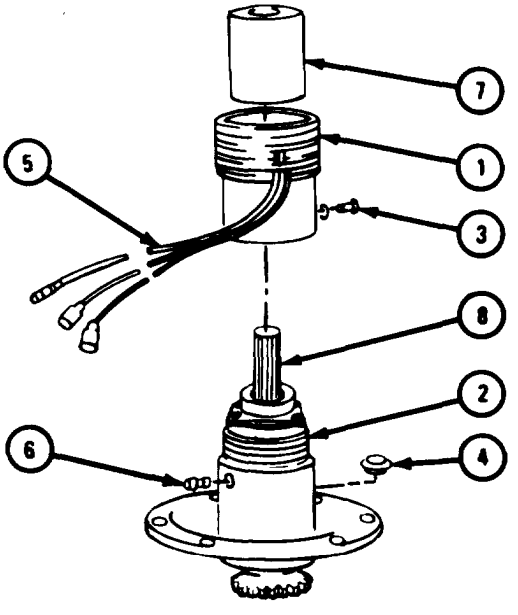
GO TO FRAME 4



FRAME 4

1. Put ring support assembly (1) on pump driveshaft housing assembly (2), alining holes.
2. Put in screw and lockwasher (3).
3. Put grommet (4) into hole in pump driveshaft housing assembly (2).
4. Put three electrical leads (5) down through grommet (4).
5. Put in breather assembly (6).
6. Put pump driveshaft coupling (7) on pump driveshaft (8).

GO TO FRAME 5

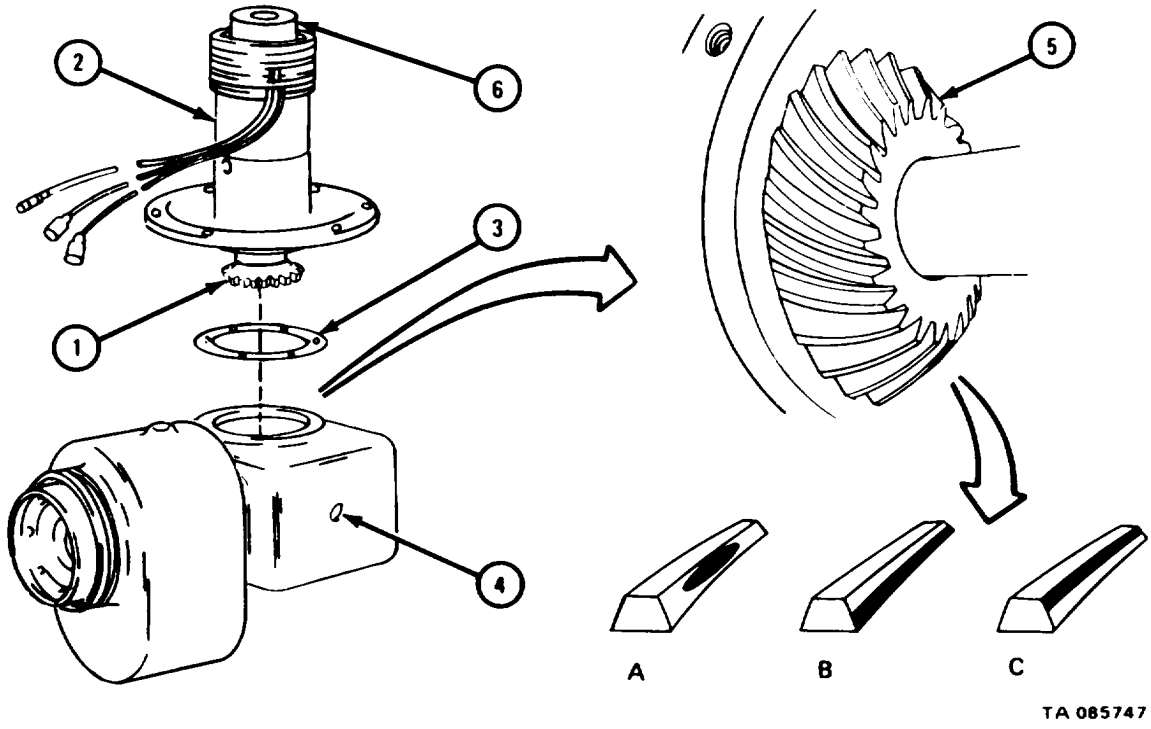


TA 085746

FRAME 5

1. Put layout dye on two or three teeth of gear (1).
2. Put pump driveshaft housing assembly (2) and gasket (3) bevel gearcase housing (4), meshing gear (1) with gear (5).
3. Turn pump driveshaft coupling (6) 1/4-turn.
4. Take off pump driveshaft housing assembly (2) and gasket (3).
5. Look at layout dye pattern on gear (5). If pattern A is seen, gear backlash is correct.

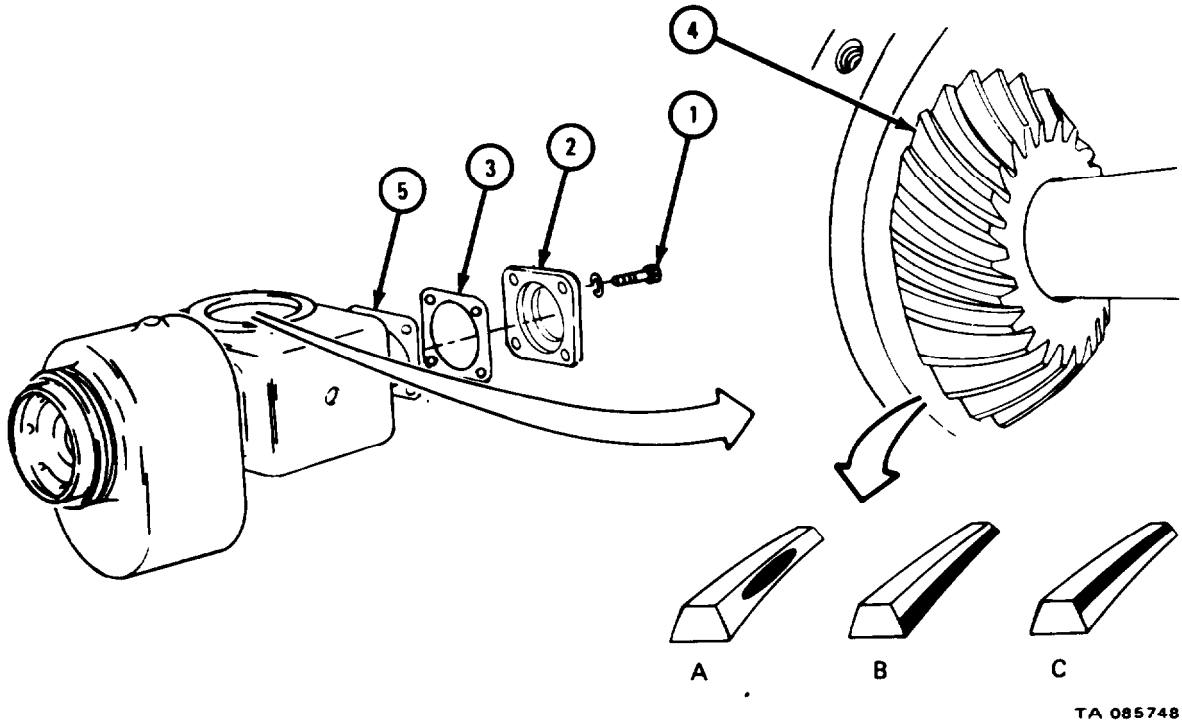
IF PATTERN B OR C IS SEEN, GO TO FRAME 6.
IF PATTERN A IS SEEN, END OF TASK



FRAME 6

1. Takeout four screws and lockwashers (1).
2. Take off bearing cover (2) and gasket (3).
3. If pattern B is seen on gear (4), add another shim (5).
4. If pattern C is seen on gear, take away a shim (5).
5. Put gasket (3) and bearing cover (2) in place, alining holes.
6. Put in four screws and lockwashers (1).

GO TO FRAME 5



g. Replacement.

FRAME 1

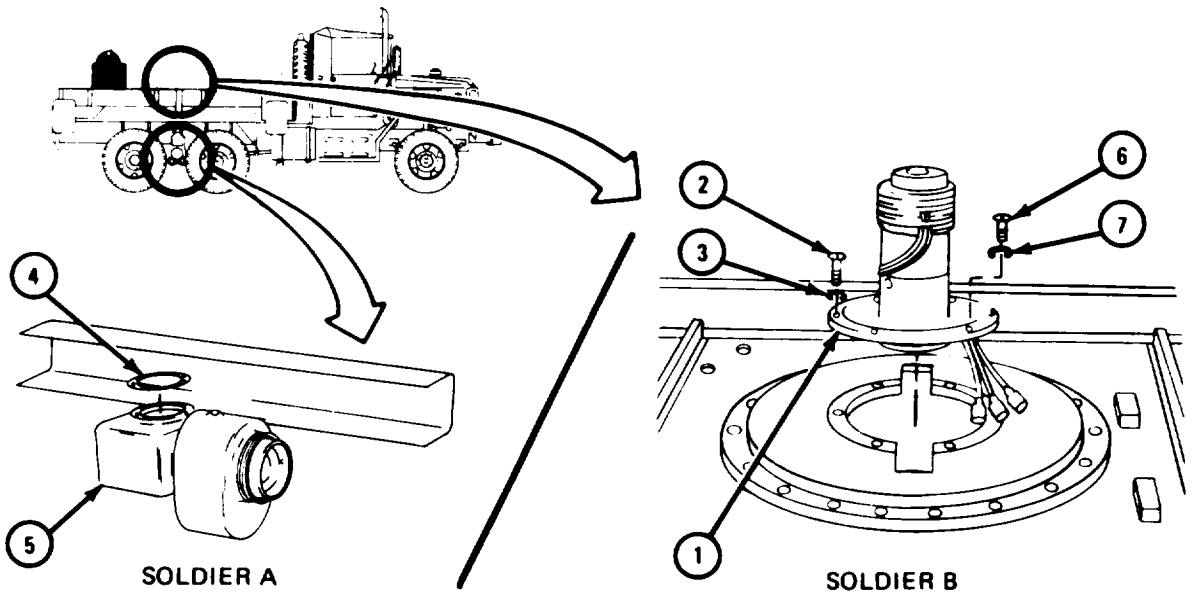
1. Set pump driveshaft housing assembly (1) in place on truck body, alining holes.
2. Put in six screws (2) and lockwashers (3).

Soldier A 3. Put gasket (4) in place on bevel gearcase housing assembly (5), alining holes.

4. Lift bevel gearcase housing assembly (5) with gasket (4) into place below pump drive shaft housing assembly (1), alining holes.

Soldier B 5. Put on six screws (6) with lockwashers (7).

GO TO FRAME 2



FRAME 2

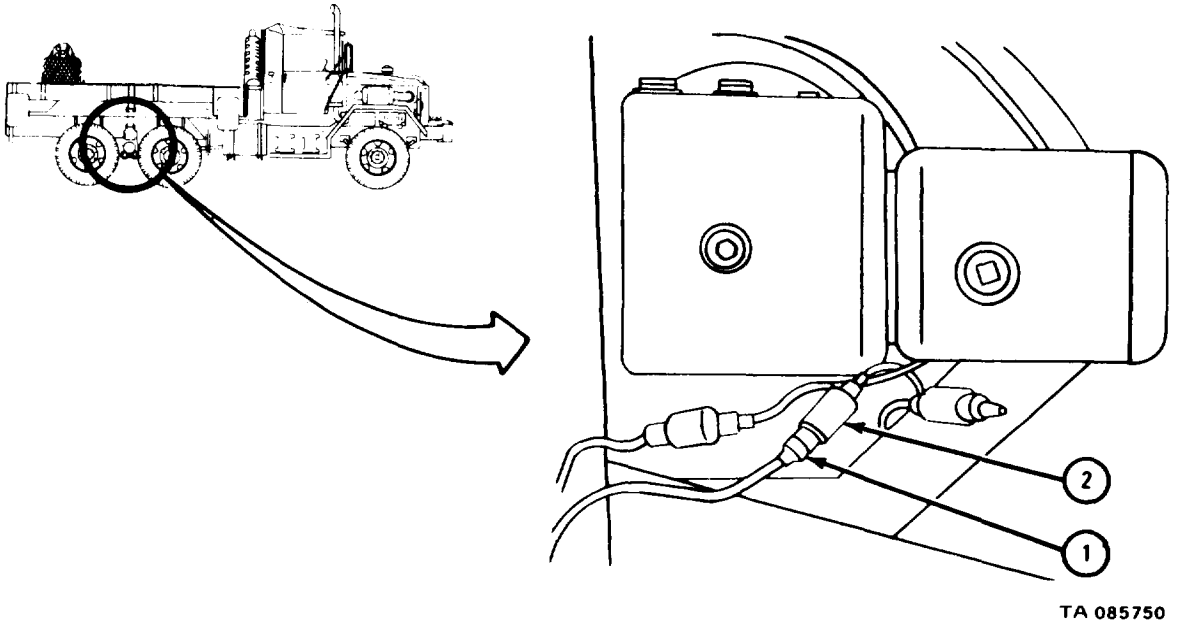
1. Push two male connectors (1) into two female connectors (2) as tagged. Take off tags.

NOTE

Follow-on Maintenance Action Required:

1. Fill bevel gear gearcase assembly. Refer to LO 9-2320-211-12.
2. Replace power divider to bevel gearcase propeller shaft. Refer to TM 9-2320-211-20.
3. Replace crane turntable assembly. Refer to para 17-33.
4. Replace crane swinger gearcase with crane swinger motor. Refer to para 17-29.
5. Replace hydaulic pump assembly. Refer to para 17-35.
6. Replace gondola assembly. Refer to para 17-52.
7. Replace boom elevating cylinders. Refer to para 17-42.
8. Replace hydraulic oil reservoir. Refer to para 17-37.
9. Fill hydraulic oil reservoir. Refer to LO 9-2320-211-12.
10. Replace boom assembly. Refer to para 17-44.
11. Replace hoist winch cable. Refer to TM 9-2320-211-20.
12. Check that bevel gear gearcase assembly and all lines and fittings removed and replaced during this task are not leaking.

END OF TASK



TA 085750

17-35. HYDRAULIC TURNTABLE PUMP ASSEMBLY REMOVAL, REPAIR AND REPLACEMENT (TRUCK M543A2).

TOOLS: No special tools required

SUPPLIES: Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680
Lubricating oil, ICE, OE/HDO 10, MIL-L-2104
Small block of wood
Caps
Crane pump inlet adapter preformed packing
Crane pump outlet adapter preformed packing
Gear shaft bearing retainer ring (2)

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Drain hydraulic oil reservoir. Refer to LO 9-2320-211-12.

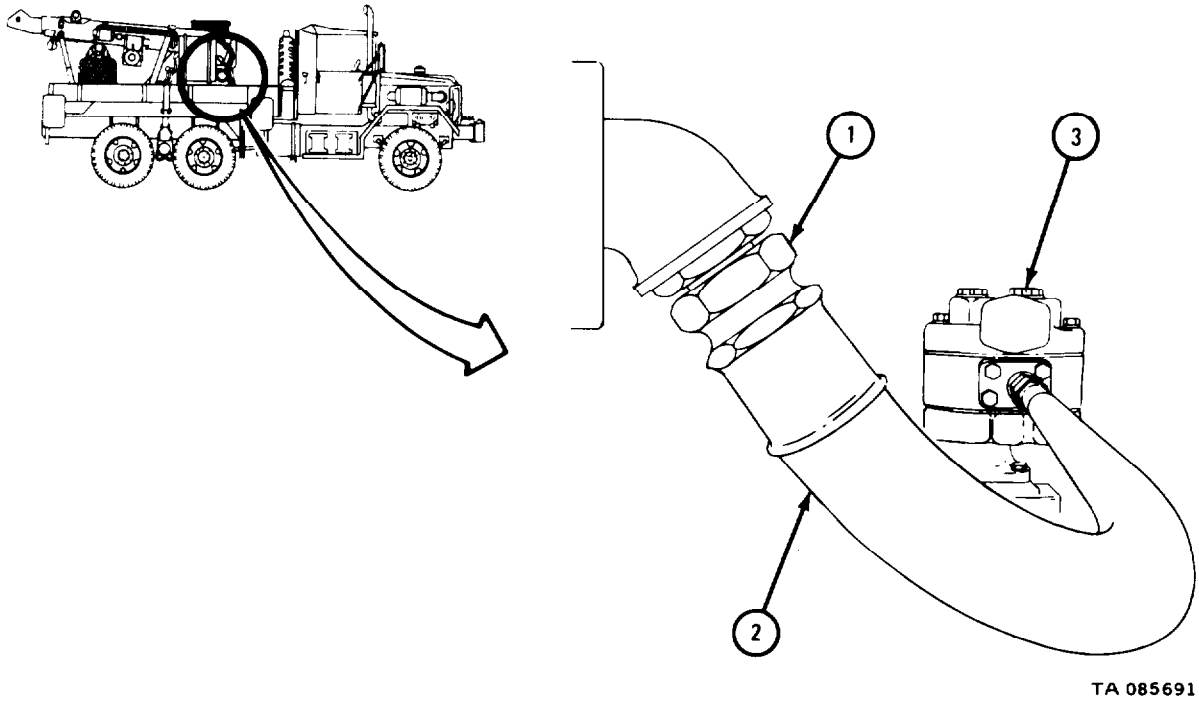
(2) Raise boom and put shipper braces in place. Refer to TM 9-2320-211-10.

b. Removal.

FRAME 1

1. Unscrew union nut (l) from fitting on hose (2). Takeoff hose.
2. Unscrew fitting on hose (2) from hydraulic pump assembly (3). Take off hose.
3. Cap open ports.

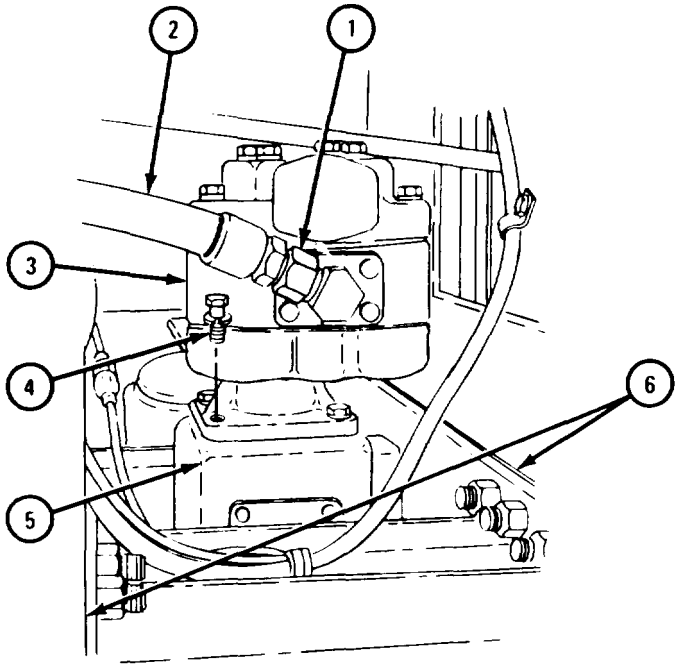
GO TO FRAME 2



FRAME 2

1. Unscrew nut (1) and take hose (2) off hydraulic pump (3).
2. Cap open ports.
3. Take out four screws and lockwashers (4).
4. Tie *a* 5/8-inch rope to hydraulic pump (3). Hook rope to hoist and raise hydraulic pump until hydraulic pump gearshaft clears pump support (5) by about two inches.
5. Slide a board between hydraulic pump (3) and pump support (5). Lower hydraulic pump onto board. Unhook rope from hoist.
6. Slide hydraulic pump (3) on board out of crane support assembly (6).
7. Hook rope on hoist and lift hydraulic pump (3) off truck.

END OF TASK



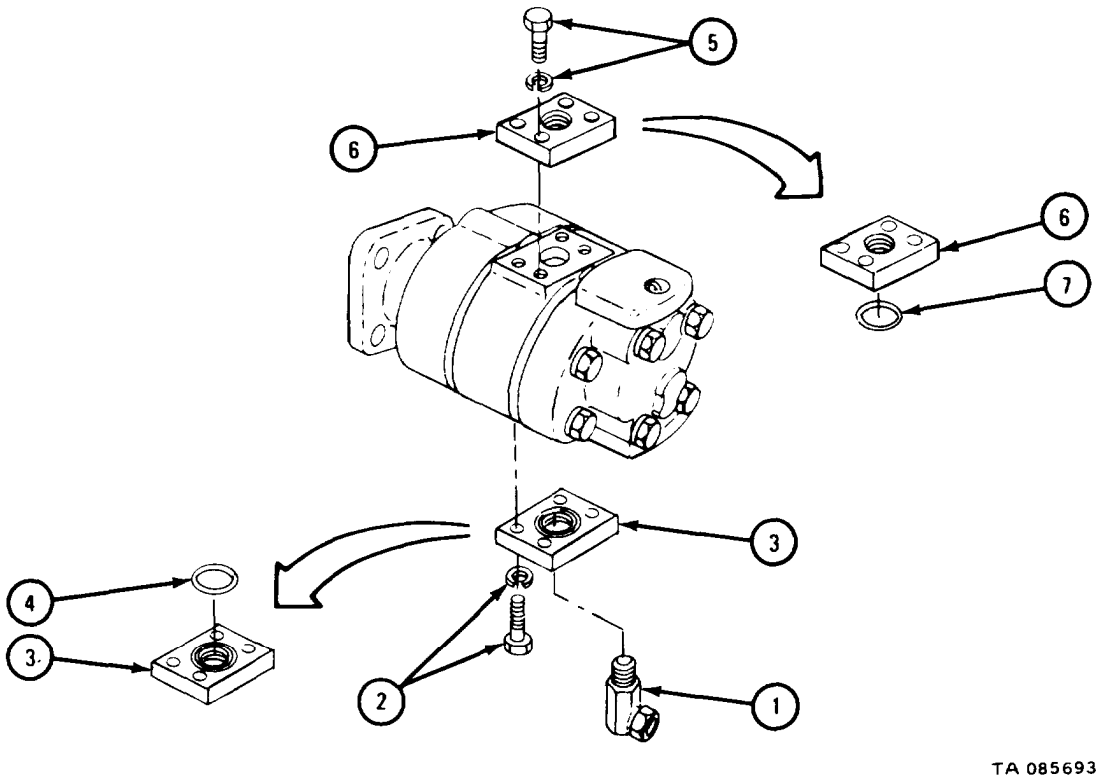
TA 085692

c. Disassembly.

FRAME 1

1. Take out union assembly (1).
2. Take out four screws and lockwashers (2).
3. Take off outlet adapter (3) with preformed packing (4).
4. Take and throw away preformed packing (4) from outlet adapter (3).
5. Take out four screws and lockwashers (5).
6. Take off inlet adapter (6) with preformed packing (7).
7. Take out and throw away preformed packing (7).

GO TO FRAME 2

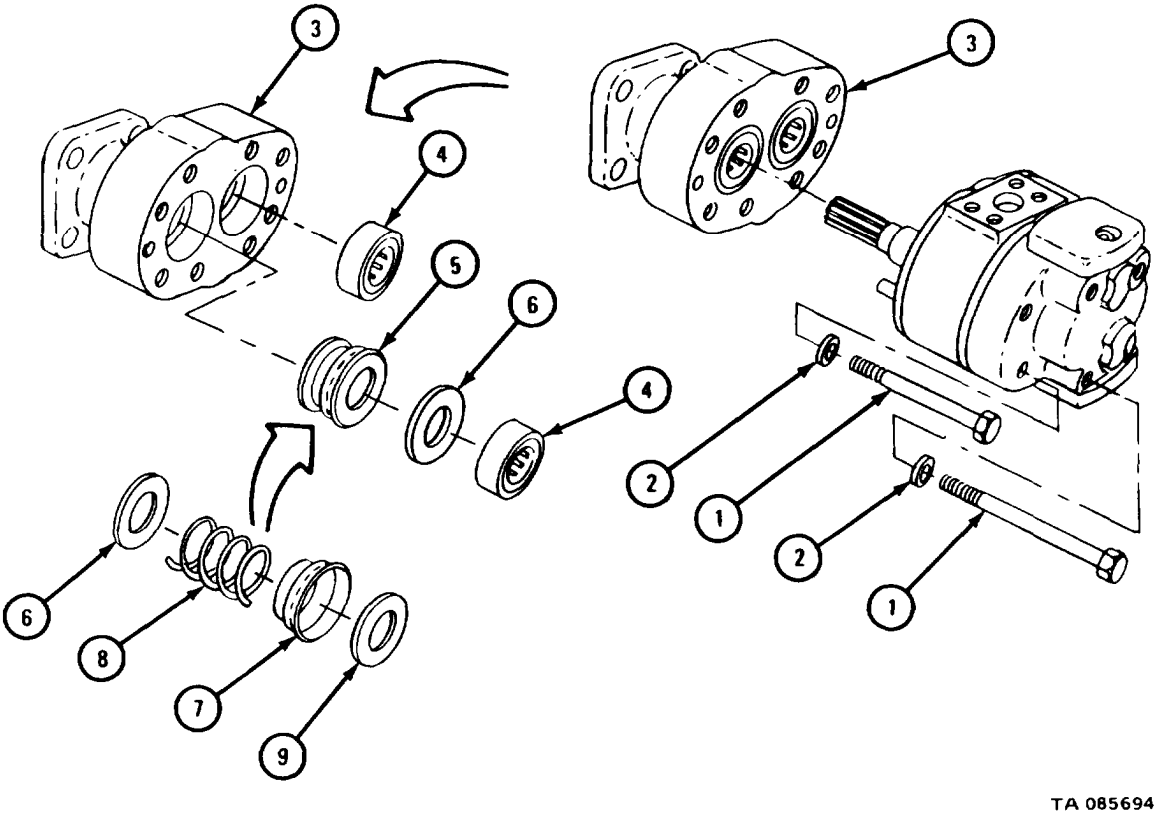


TA 085693

FRAME 2

1. Take out eight screws (1) and washers (2).
2. Using small block of wood, loosen lower cover (3) by tapping on its top, bottom, and sides. When loose, pull off lower cover with two bearings (4) and seal assembly (5).
3. Press two bearings (4) out of lower cover (3). Refer to Part 1, para 7-7.
4. Tag two bearings (4) so that they will be put back in the right places.
5. Take seal assembly (5) and spring seals (6) out of lower cover (3).
6. Take seal retainer (7) off spring (8). Take seal (9) out of seal retainer.

GO TO FRAME 3



TA 085694

FRAME 3

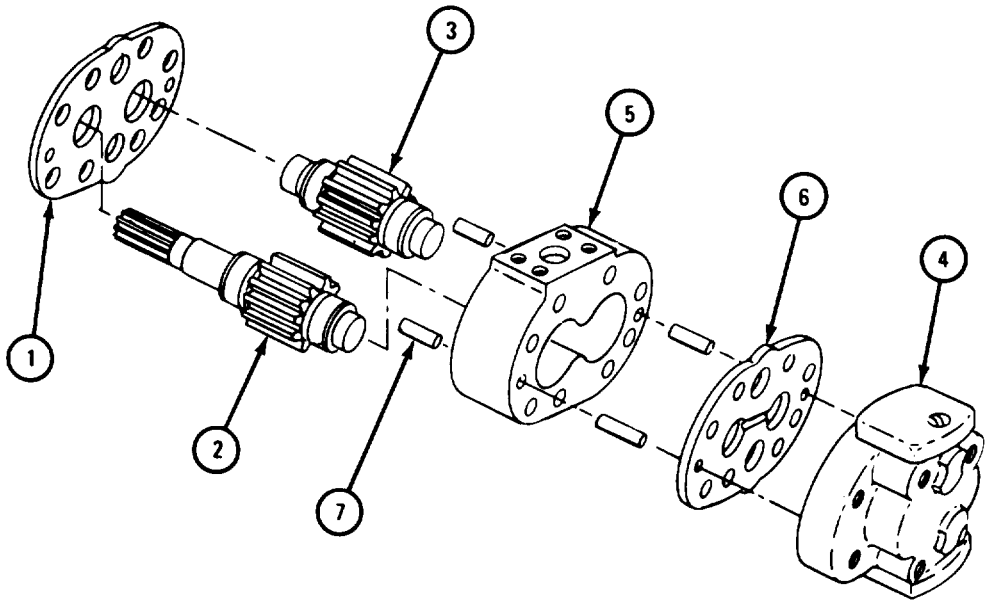
1. Using small block of wood, loosen wear plate (1) by tapping on its top, bottom, and sides. When loose, pull off wear plate.
2. Take out pump gearshaft assembly (2) and drive gearshaft assembly (3).

NOTE

Note position of upper cover assembly (4) to pump body (5) to make sure that it will be put back in the same position.

3. Using small block of wood, loosen upper cover assembly (4) and wear plate (6) by tapping on their tops, bottoms, and sides. When loose, pull off upper cover assembly and wear plate.
4. Take out four centering pins (7).

GO TO FRAME 4

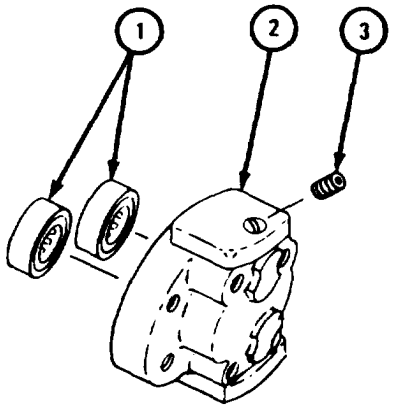


TA 085695

FRAME 4

1. Take two bearings (1) out of upper cover (2). Refer to Part 1, para 7-7.
2. Tag bearings (1) so that they will be put back in the right places.
3. Take out plug (3).

GO TO FRAME 5

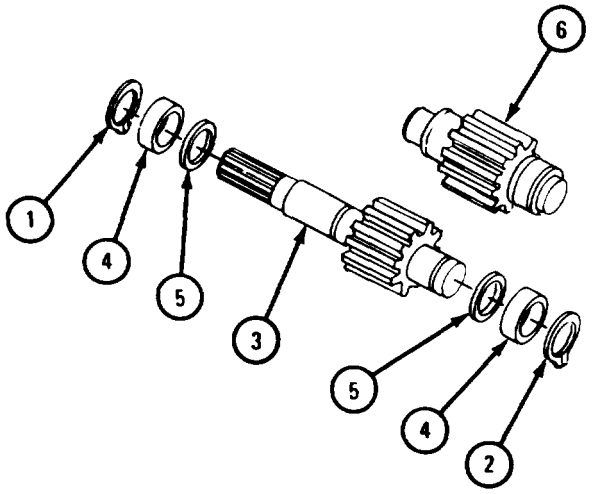


TA 085696

FRAME 5

1. Take off retaining rings (1 and 2) from pump gearshaft (3). Throw away retaining rings.
2. Take off two bearing inner races (4).
3. Tag bearing inner races (4) so that they will be put back in the right places.
4. Take off two spacers (5).
5. Do steps 1 through 4 again on drive gearshaft assembly (6).

END OF TASK



TA 085697

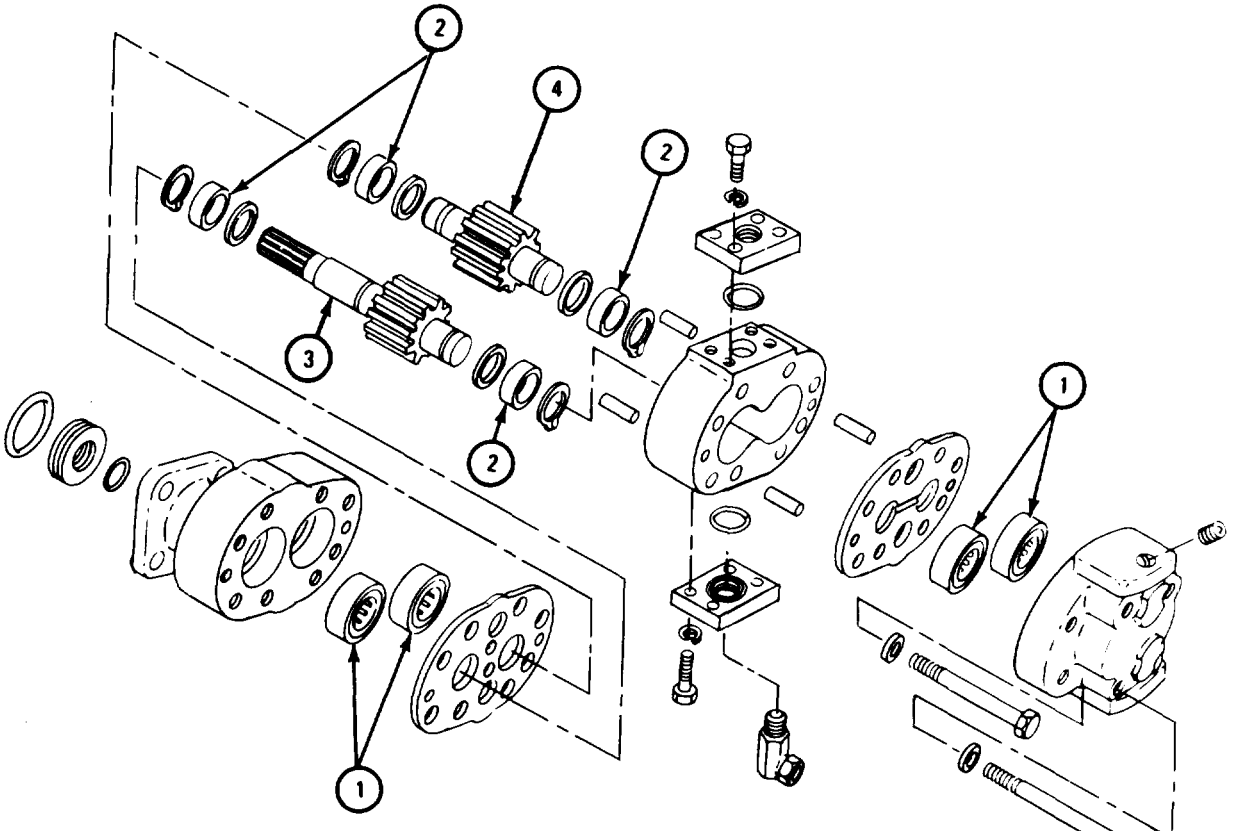
c. Cleaning. There are no special cleaning procedures needed. Refer to cleaning procedures given in Part 1, para 1-3.

d. Inspection

FRAME 1

1. Check that four bearings (1) and four bearing inner races (2) are not damaged. Refer to Part 1, para 7-7.
2. Check that pump gearshaft (3) and drive gearshaft (4) are not scratched, cracked, or burred.

GO TO FRAME 2



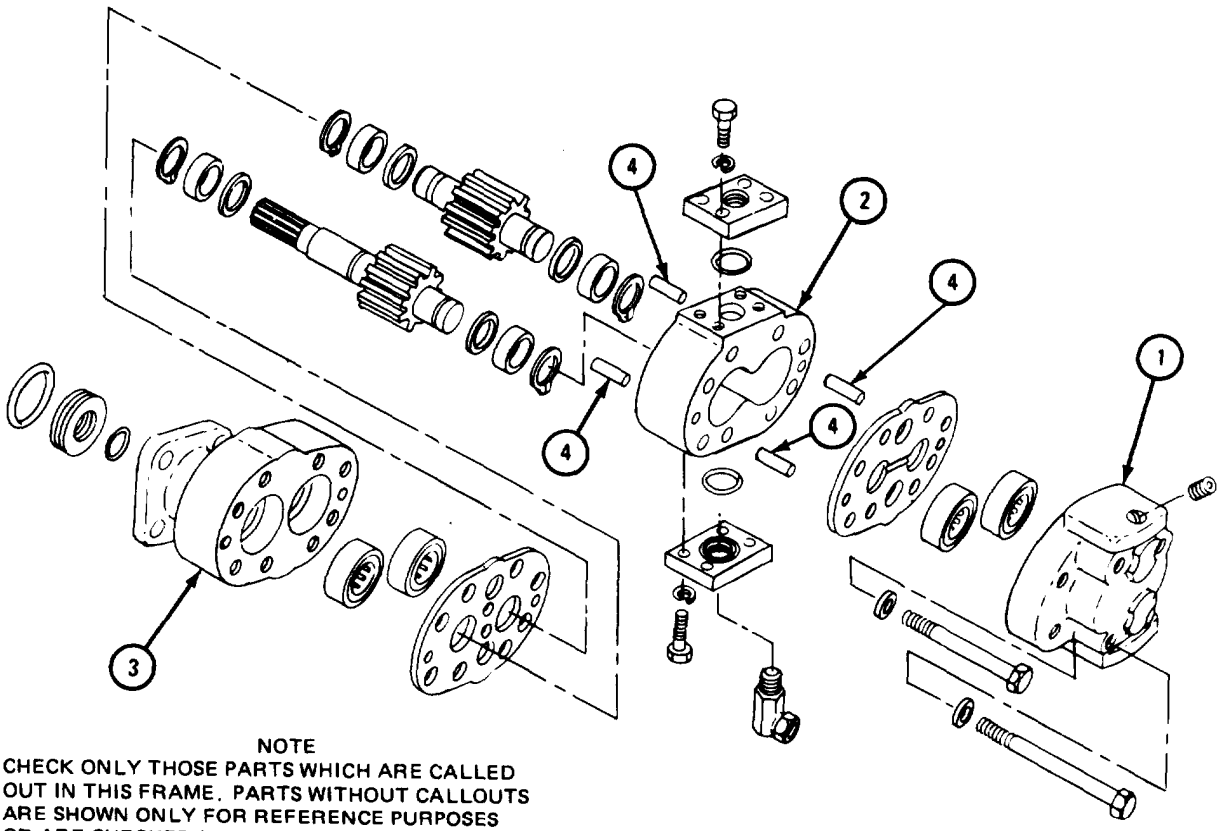
NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT IN THIS FRAME. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES OR ARE CHECKED IN ANOTHER FRAME.

TA 085698

FRAME 2

1. Check that upper cover (1), pump body (2), and lower cover (3) are not cracked, especially around bearing openings and screw holes.
2. Check that four centering pins (4) are not bent. If pins are bent, get new ones.

GO TO FRAME 3



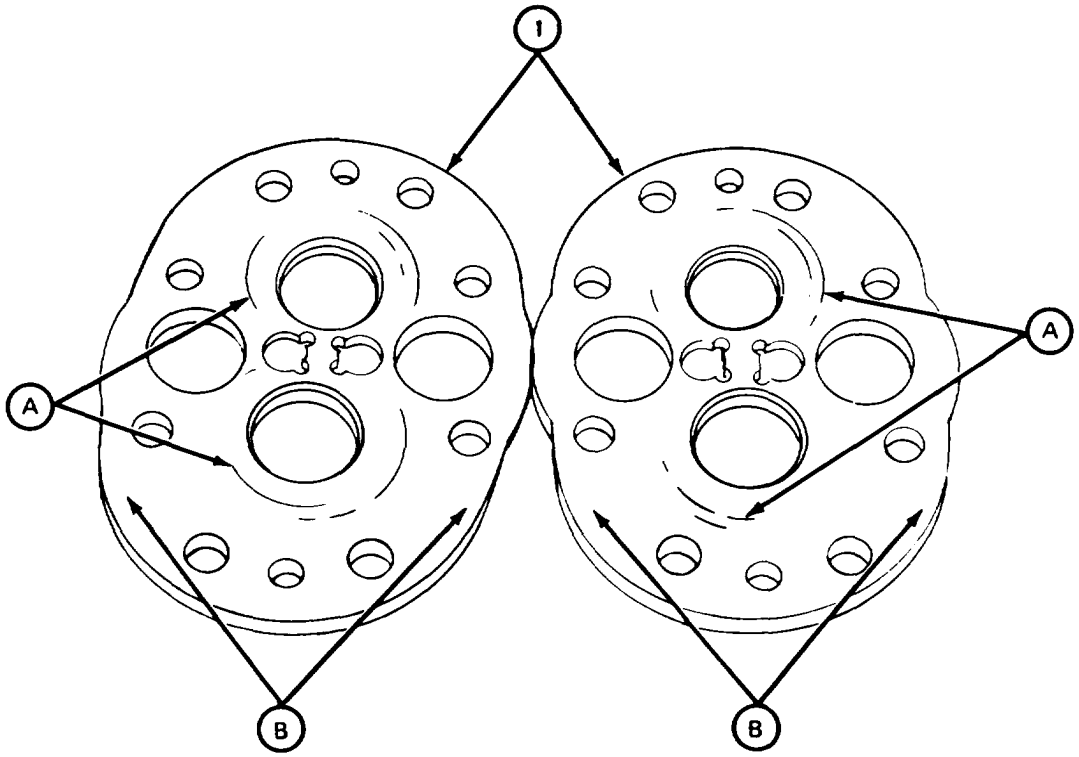
NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT IN THIS FRAME. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES OR ARE CHECKED IN ANOTHER FRAME.

TA 085699

FRAME 3

1. Check that two wear plates (1) are not nicked, burred, dented or distortied.
2. Using micrometer, check that thickness of wear plates (1) at gear contact surfaces (A) is within 0.003 inch of thickness at wear plate edges (B).

END OF TASK



TA 085700

f. Repair.

(1) Replace wear plates if worn more than 0.003 inch.

(2) Raised metal may be filed from parts using fine mill file.

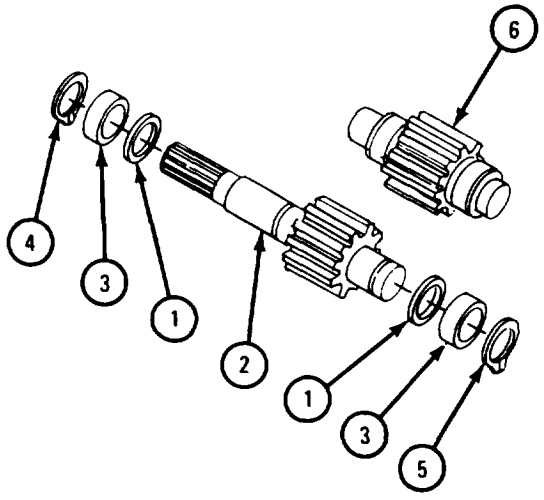
(3) Get new parts in place of damaged parts.

g. Assembly.

FRAME 1

1. Slide two spacers (1) onto pump gearshaft (2).
2. Press on two bearing inner races (3) as tagged. Refer to Part 1, para 7-7. Take off tags.
3. Put on two retaining rings (4 and 5).
4. Do steps 1 through 3 again on drive gearshaft assembly (6).

GO TO FRAME 2

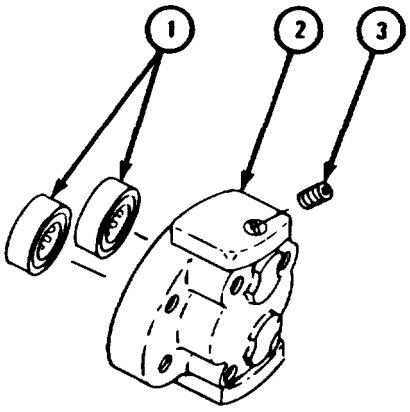


TA 065701

FRAME 2

1. Press two bearings (1) into upper cover (2) as tagged. Refer to Part 1, para 7-7. Take off tags.
2. Put a light coat of oil on bearings (1).
3. Put in plug (3).

GO TO FRAME 3

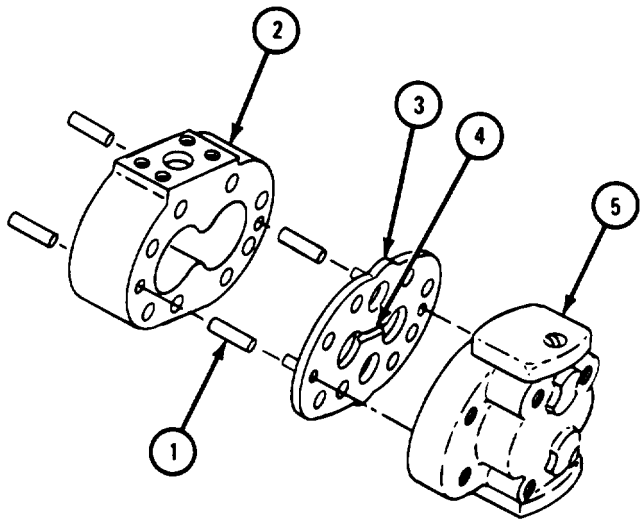


TA 085702

FRAME 3

1. Put four centering pins (1) into pump body (2).
2. Put wear plate (3) on two centering pins (1) as shown and push it in place against pump body (2). Make sure that groove (4) in wear plate faces out.
3. Put upper cover assembly (5) on two centering pins (1) as noted and push it in place against wear plate (3).

GO TO FRAME 4

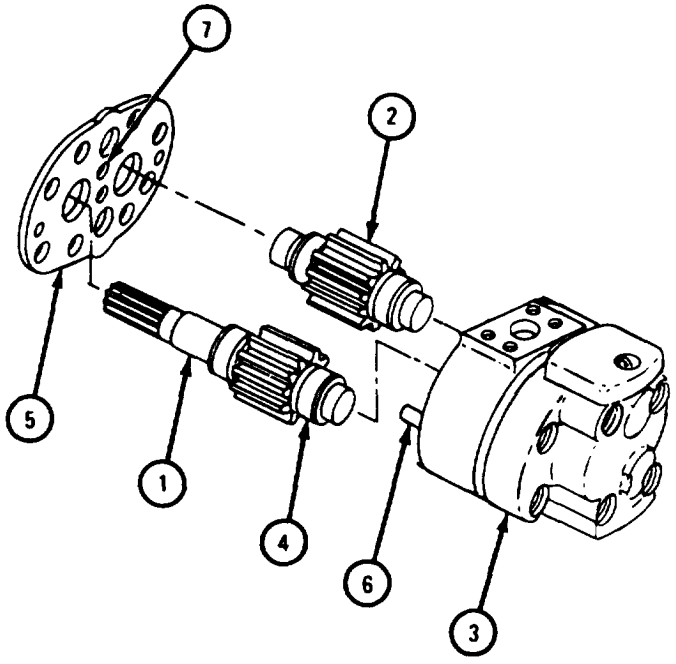


TA 085703

FRAME 4

1. Put pump gearshaft assembly (1) and drive gearshaft assembly (2) in pump assembly (3), mating two bearing inner races (4) with two bearings in pump assembly.
2. Put wear plate (5) on pump gearshaft assembly (1) and two centering pins (6). Push it in place against pump assembly (3). Make sure that two relief recesses (7) are on the inside, next to pump assembly.

GO TO FRAME 5

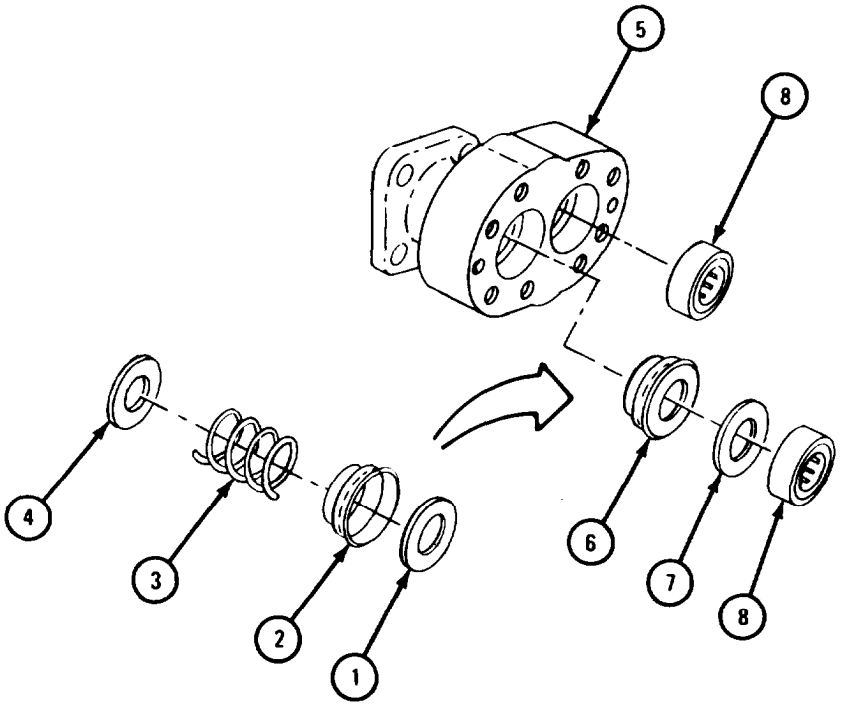


TA 085704

FRAME 5

1. Put seal (1) in place in seal retainer (2). Put seal retainer with seal into spring (3).
2. Put spring seat (4) in lower cover (5). Put seal assembly (6) in lower cover. Put in spring seat (7).
3. Press two bearings (8) into lower cover (5). Refer to Part 1, para 7-7.

GO TO FRAME 6

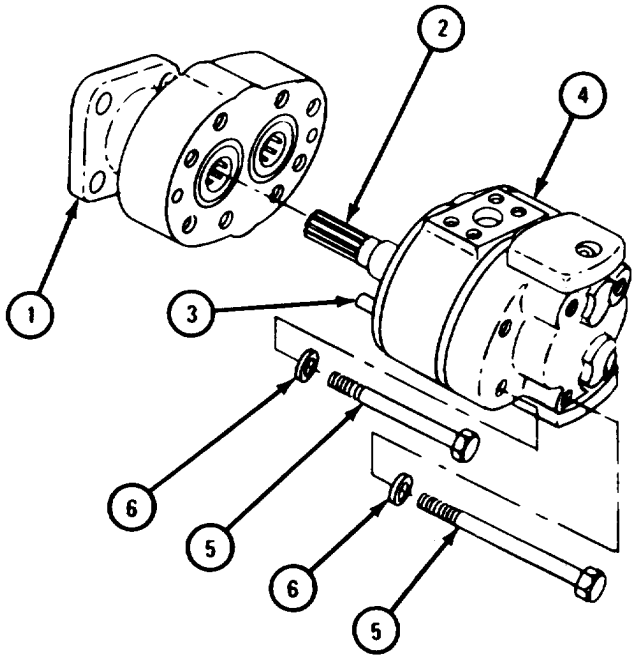


TA 085705

FRAME 6

1. Aline lower cover assembly (1) with pump gearshaft (2) and two centering pins (3). Push cover assembly in place on pump assembly (4).
2. Clamp lower cover assembly (1) in vise with soft jaw caps.
3. Put in eight screws (5) and washers (6). Tighten screws a little at a time until all screws are tightened.
4. Tighten eight screws (5) to 150 pound-feet.
5. Take lower cover assembly (1) out of vise.

GO TO FRAME 7

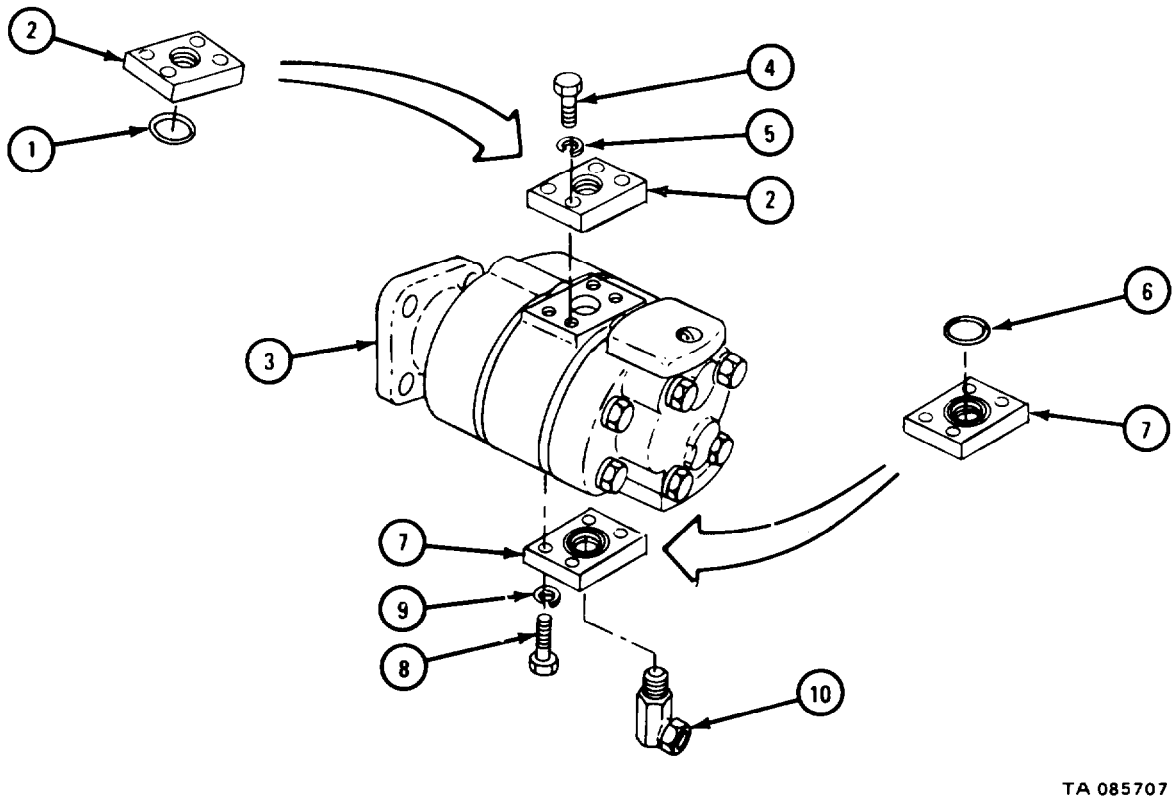


TA 085706

FRAME 7

1. Put preformed packing (1) in groove in inlet adapter (2),
2. Put inlet adapter (2) with preformed packing (1) on pump assembly (3), and aline holes.
3. Put in four screws (4) and lockwashers (5).
4. Put preformed packing (6) in groove in outlet adapter (7).
5. Put outlet adapter (7) with preformed packing (6) on pump assembly (3), alining holes.
6. Put in four screws (8) and lockwashers (9).
7. Put in union assembly (10).

END OF TASK



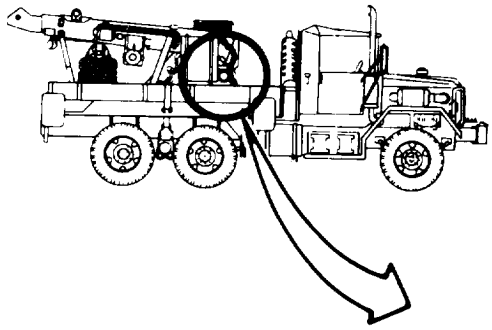
TA 085707

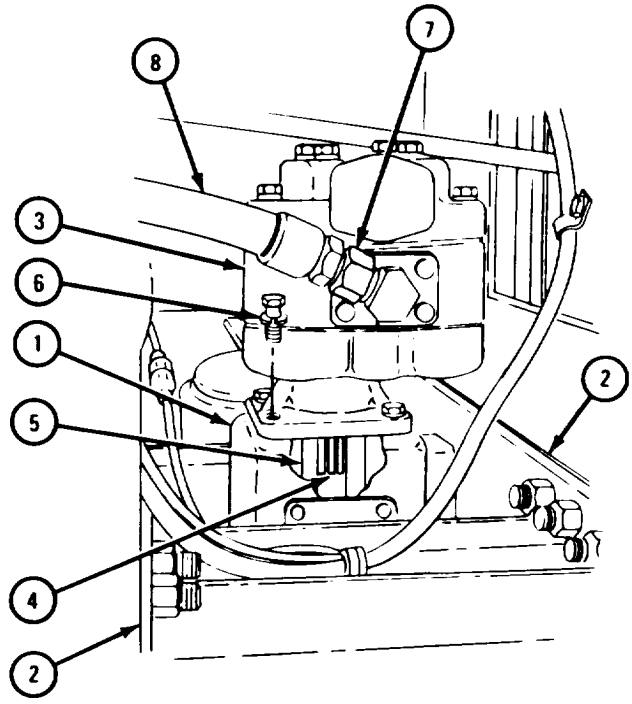
h. Replacement.

FRAME 1

1. Place board on pump support (1) between crane support assembly (2).
2. Tie 5/8 -inch rope to pump assembly (3). Hook rope to hoist and lift pump assembly onto board. Unhook rope from hoist.
3. Slide pump assembly (3) and board into place over pump support (1) between crane support assembly (2).
4. Hook rope to hoist and raise pump assembly (3) off board. Take out board.
5. Aline pump gearshaft (4) with coupling (5) and lower pump assembly (3) onto pump support (1), alining holes.
6. Put in four screws and lockwashers (6).
7. Take off caps.
8. Put nut (7) on fitting on hose (8).

GO TO FRAME 2





TA 085708

FRAME 2

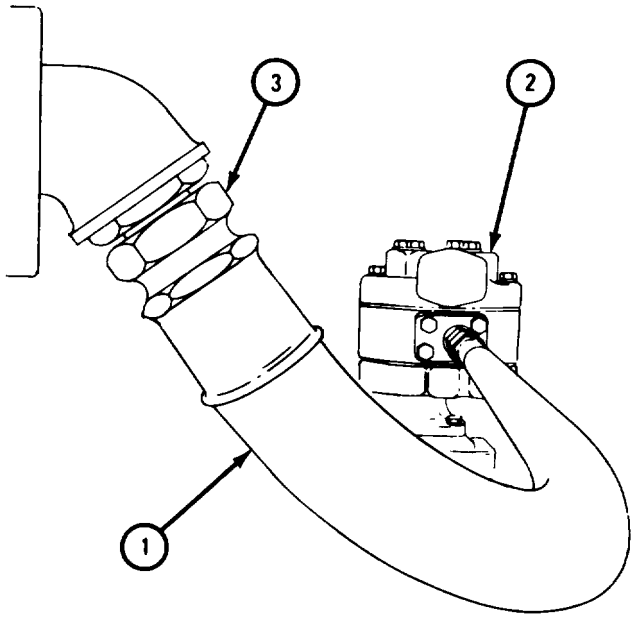
1. Take caps off fittings on hose (1).
2. Put fitting on hose (1) on hydraulic pump assembly (2).
3. Put on union nut (3).

NOTE

Follow-on Maintenance Action Required:

1. Fill hydraulic oil reservoir. Refer to LO 9-2320-211-12.
2. Take shipper braces off boom and lower boom. Refer to TM 9-2320-211-10.
3. Operate crane and check hydraulic pump assembly for proper operation and check that there are no leaks. Refer to TM 9-2320-211-10.

END OF TASK



TA 085709

17-36. SWING HYDRAULIC MOTOR ASSEMBLY REMOVAL, REPAIR, AND REPLACEMENT (TRUCK M543A2).

TOOLS: No special tools required

SUPPLIES:
- Swinger motor gasket
- Front cover seal adapter preformed packing (2)
- Rear cover seal adapter performed packing (2)
- Driven gearshaft retaining ring (2)
- Drive gearshaft retaining ring (2)
- Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680
- Lubricating oil, ICE, OD/HDO-10, MIL-L-2104
- Small block of wood
- Caps
- Tags

PERSONNEL: TWO

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Removal.

FRAME 1

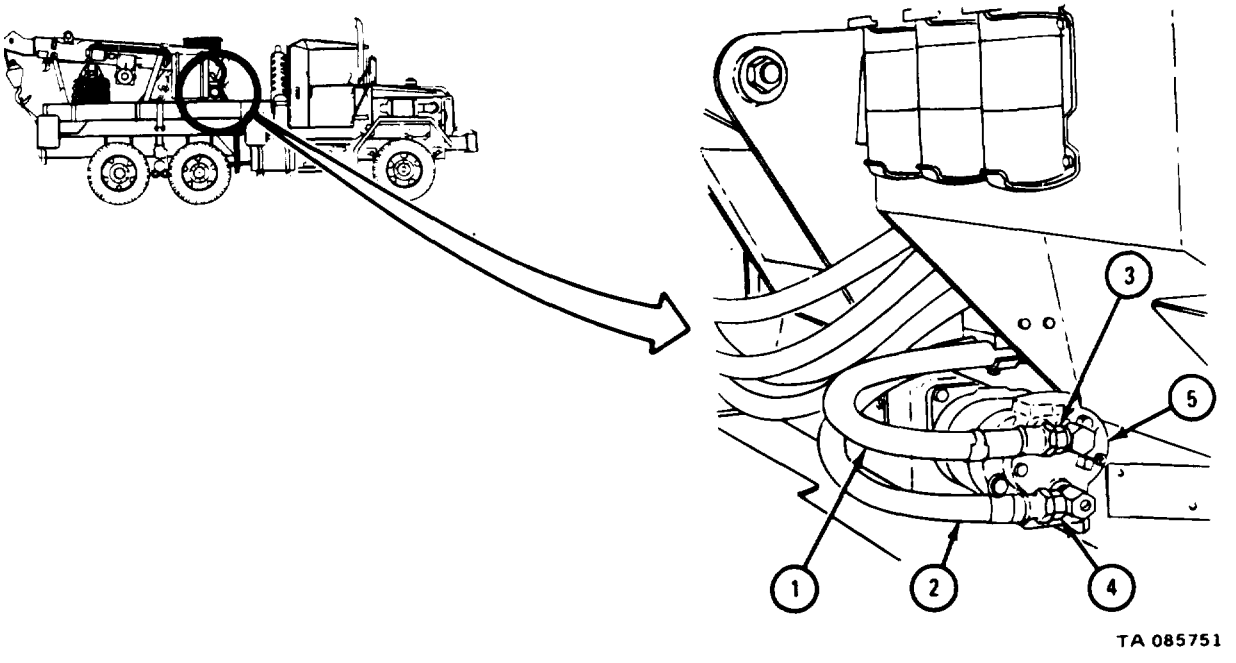
a. Put container near hoses (1 and 2).

b. Tag hoses (1 and 2) to make sure they will be put back in the right place.

c. Take off nuts (3 and 4). Put hoses (1 and 2) into container.

d. When oil stops draining from hoses (1 and 2) and swinger motor (5), cap all hoses and fittings.

GO TO FRAME 2



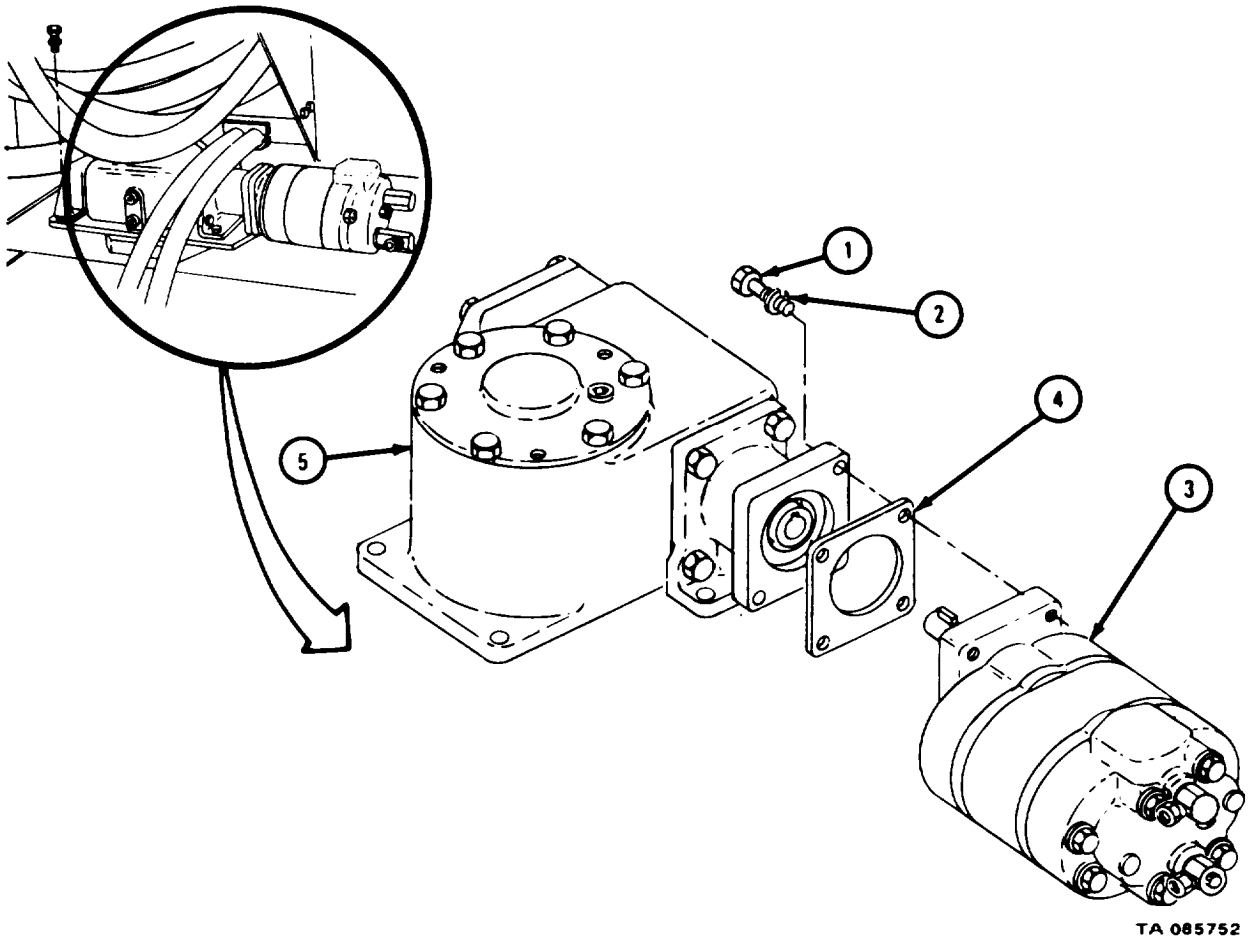
FRAME 2

1. Takeout four screws (1) and lockwashers (2).

Soldiers A and B

2. Take swinger motor (3) and gasket (4) off swinger drive gearcase (5). Throw away gasket.

END OF TASK

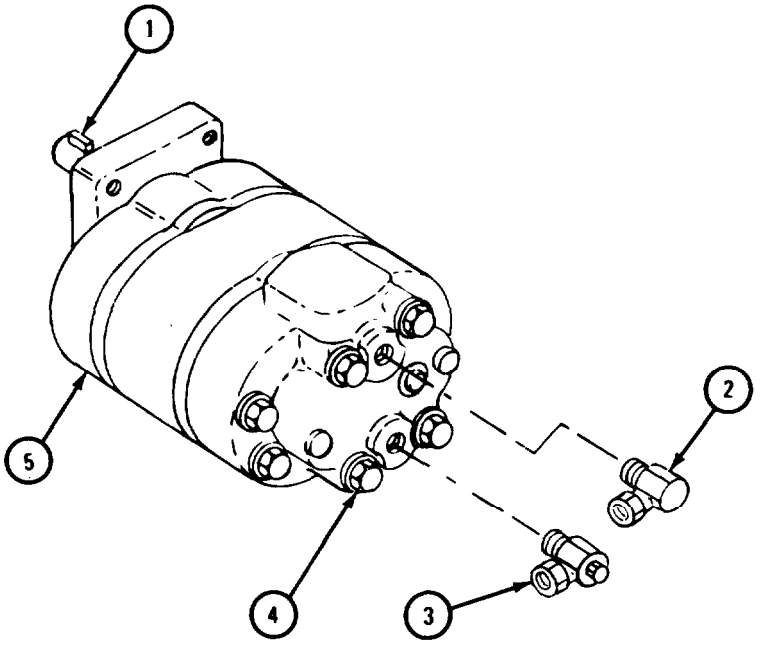


b. Disassembly.

FRAME 1

1. Take out key (1).
2. Take out union assembly (2) and union with plug (3).
3. Takeout eight screws and washers (4).
4. Using small block of wood, loosen front cover assembly (5) by tapping on its top, bottom, and sides. Pull off front cover assembly.

GO TO FRAME 2

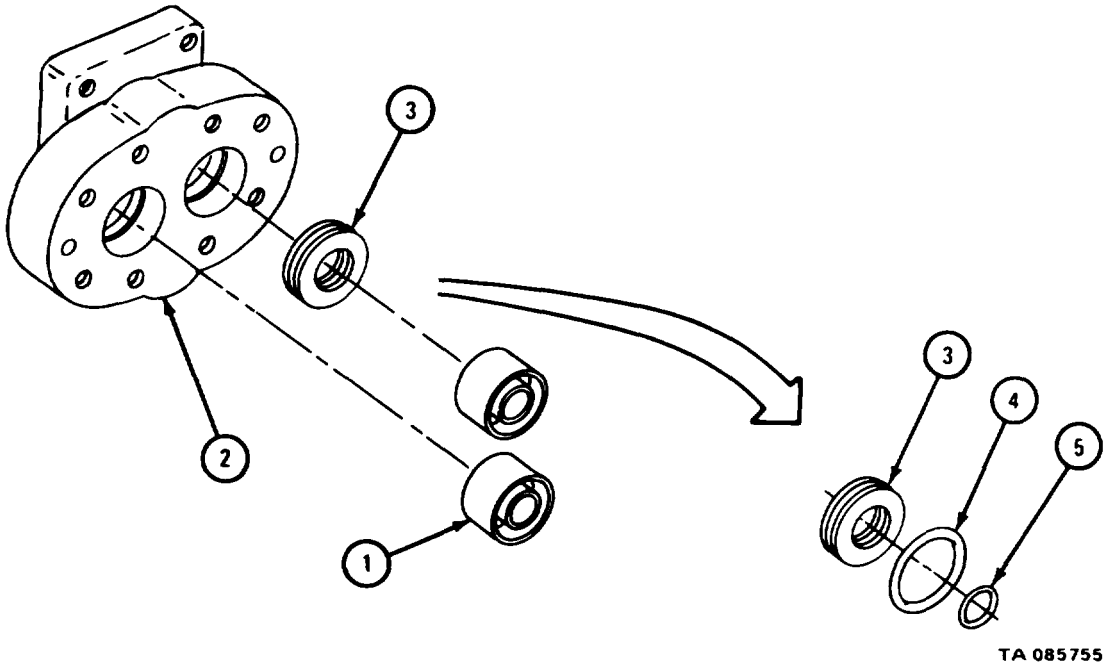


TA 085754

FRAME 2

1. Take two bearings (1) out of front cover (2). Refer to Part 1, para 7-7.
2. Tag bearings (1) to make sure they will be put back in the right places.
3. Take out seal adapter (3) with preformed packings (4 and 5).
4. Take off and throw away preformed packings (4 and 5).

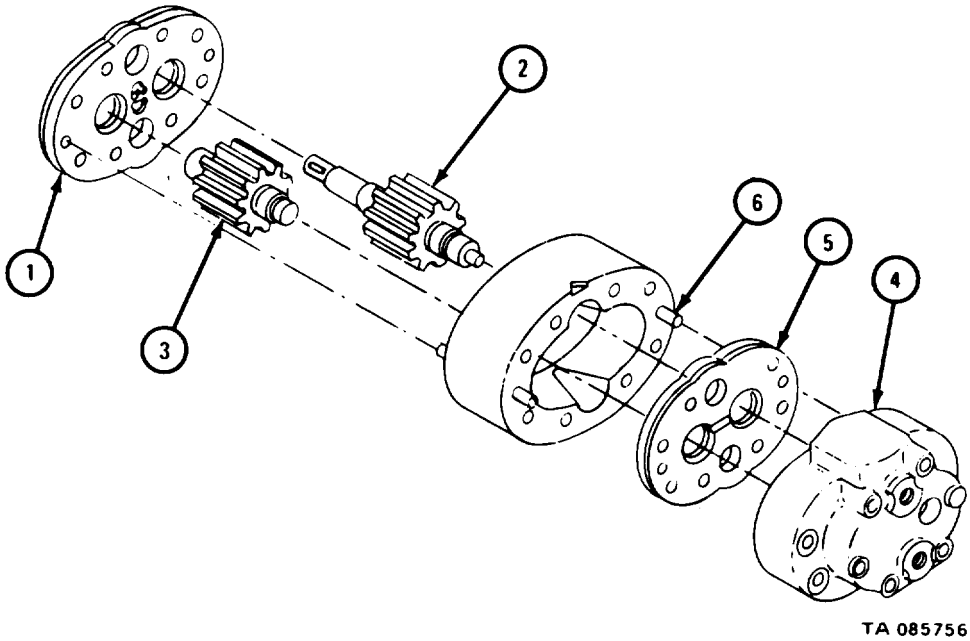
GO TO FRAME 3



FRAME 3

1. Using small block of wood, loosen wear plate (1) by tapping on its top, bottom, and sides. Pull off wear plate.
2. Take out driven gearshaft assembly (2) and drive gearshaft assembly (3).
3. Using small block of wood, loosen rear cover assembly (4) and wear plate (5) by tapping on their top, bottom and sides. Pull off rear cover assembly and wear plate.
4. Take out four locating pins (6).

GO TO FRAME 4

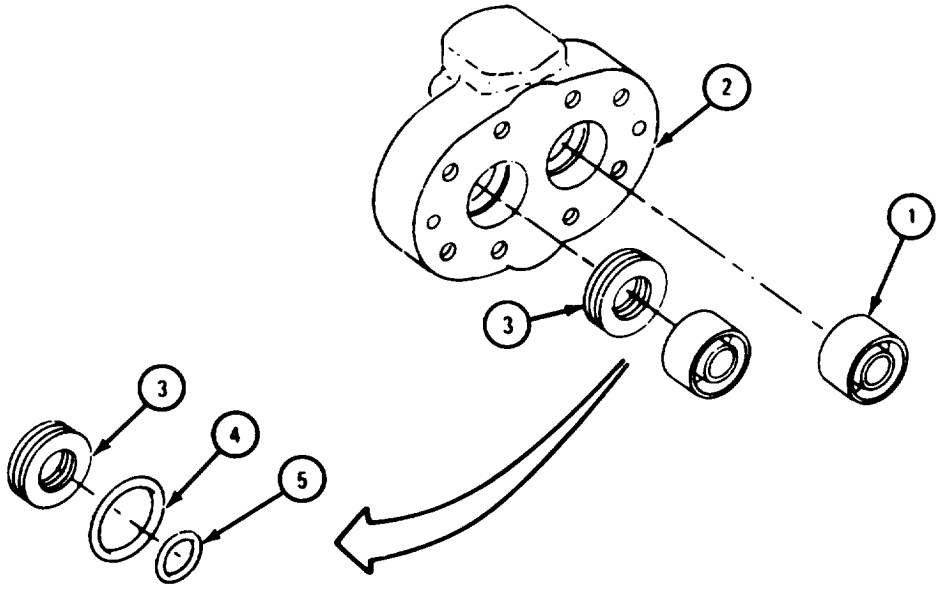


TA 085756

FRAME 4

1. Take two bearings (1) out of rear cover (2). Refer to Part 1, para 7-7.
2. Tag bearings (1) to make sure they will be put back in the right places.
3. Take out seal adapter (3) with preformed packings (4 and 5).
4. Take off and throw away preformed packings (4 and 5).

GO TO FRAME 5

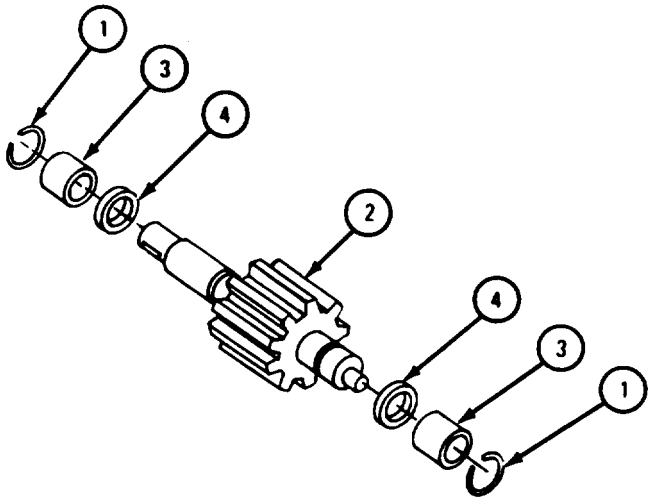


TA 085757

FRAME 5

1. Take off and throw away two retaining rings (1) from driven gearshaft (2).
2. Take off two bearing inner races (3). Refer to Part 1, para 7-7.
3. Tag bearing inner races (3) to make sure they will be put back in the right places.
4. Take off two spacers (4).

GO TO FRAME 6

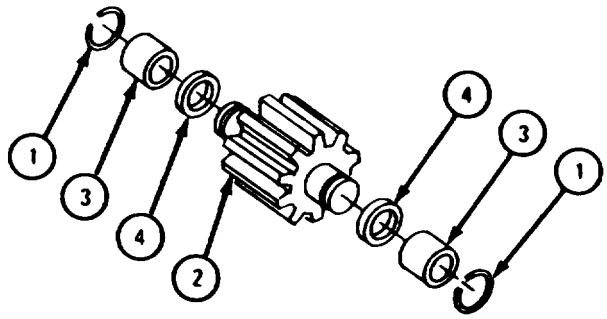


TA 085758

FRAME 6

1. Takeoff and throw away two retaining rings (1) from drive gearshaft (2).
2. Take off two bearing inner races (3). Refer to Part 1, para 7-7.
3. Tag bearing inner races (3) to make sure they will be put back in the right places.
4. Take off two spacers (4).

END OF TASK



TA 085759

c. Cleaning.

(1) Clean bearings. Refer to Part 1, para 7-7.

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

(2) Clean all other parts in solvent.

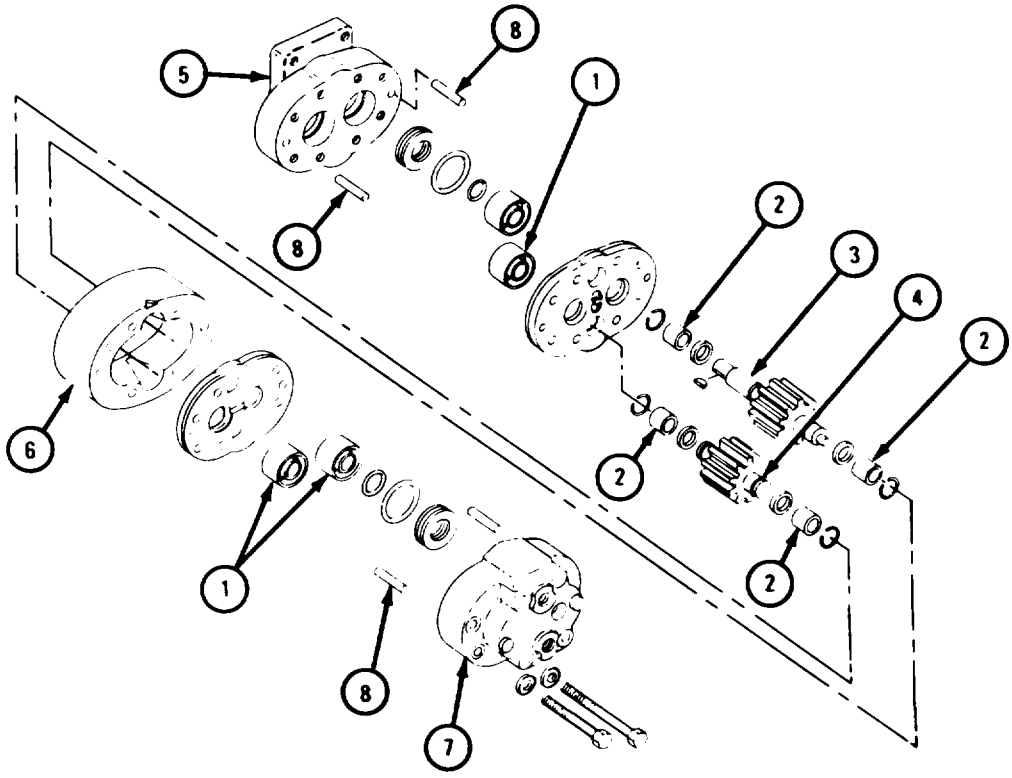
(3) Put a coat of light oil on polished surfaces.

d. Inspection.

FRAME 1

1. Check that four bearings (1) and bearing inner races (2) are not damaged. Refer to Part 1, para 7-7.
2. Check that driven gearshaft (3) and drive gearshaft (4) are not scratched, cracked, or burred.
3. Check that front cover (5), motor body (6), and rear cover (7) mating surfaces are not scratched or burred, and that bores are not scored.
4. Check that four locating pins (8) are not bent.

GO TO FRAME 2



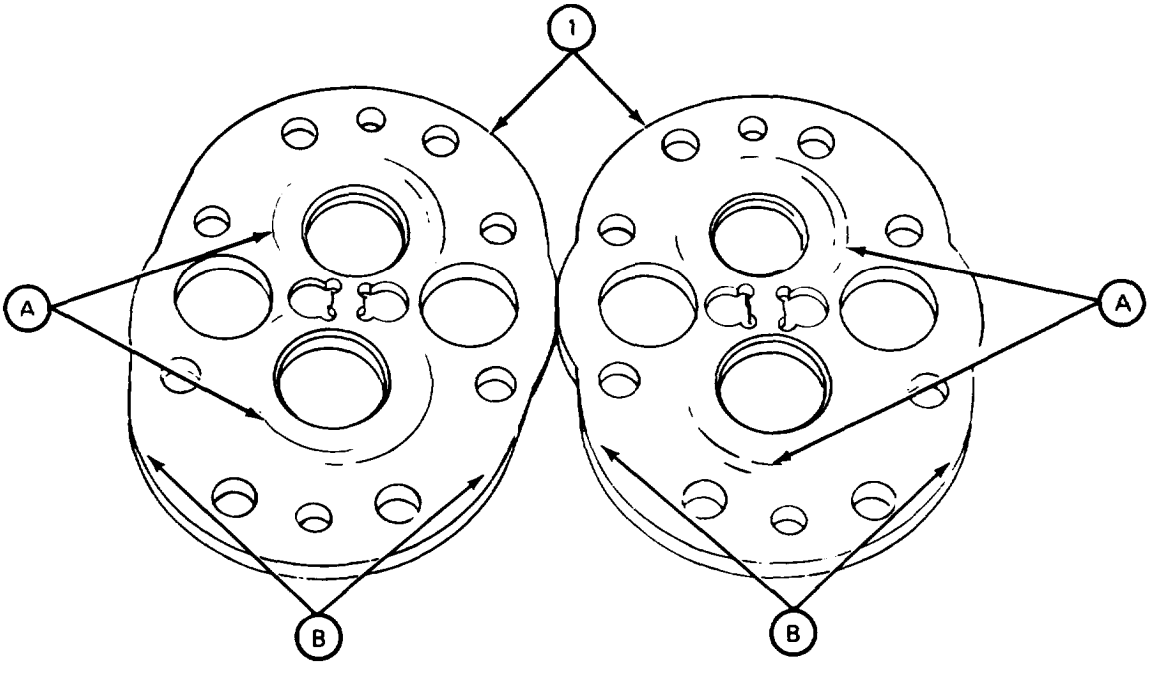
NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 085760

FRAME 2

1. Check that two wear plates (1) are not nicked, burred, dented or distorted.
2. Using micrometer, check that thickness of wear plates (1) at gear contact surfaces (A) are within 0.003 inch of thickness at wear plate edges (B).

END OF TASK



TA 085761

e. Repair.

(1) If wear plates are worn more than 0.003 inch, get new wear plates.

(2) Using fine mill file, file off raised metal from parts.

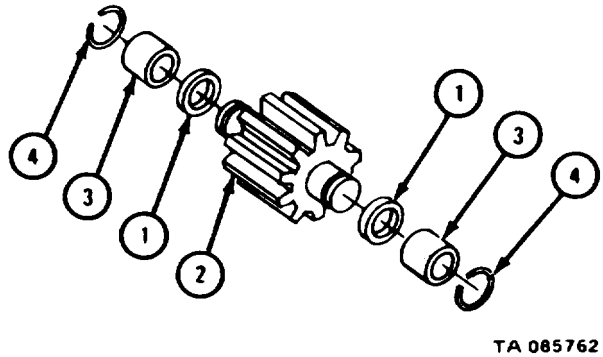
(3) Throw away damaged parts and get new parts in their place.

f. Assembly.

FRAME 1

1. Put two spacers (1) on drive gear shaft (2).
2. Put two bearing inner races (3) on drive gearshaft (2) as tagged. Refer to Part 1, para 7-7.
3. Put on two retaining rings (4).

GO TO FRAME 2

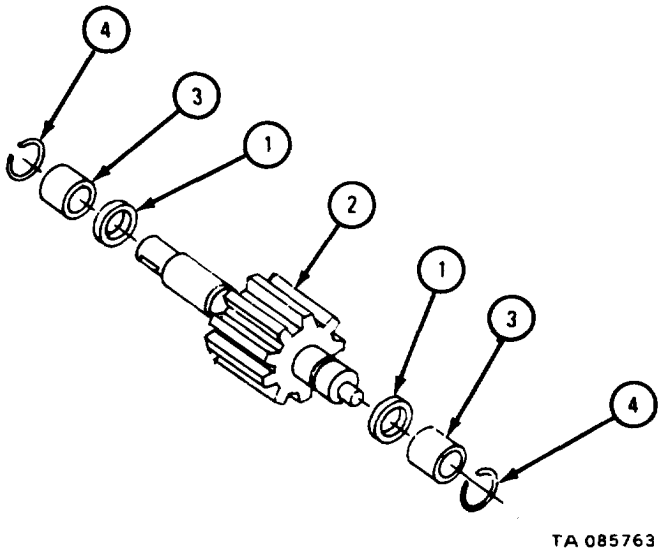


TA 085762

FRAME 2

1. Put two spacers (1) on driven gearshaft (2).
2. Press on two bearing inner races (3) as tagged.' Refer to Part 1, para 7-7. Take off tags.
3. Put on two retaining rings (4).

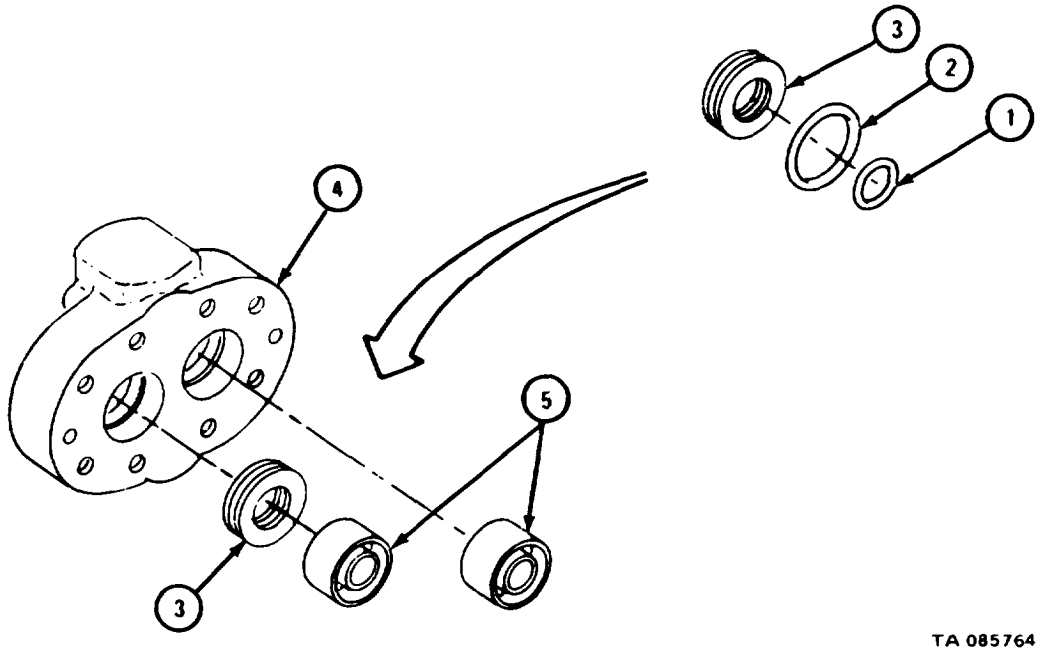
GO TO FRAME 3



FRAME 3

1. Dip preformed packings (1 and 2) in clean oil and put them on seal adapter (3).
2. Put seal adapter (3) with preformed packings (1 and 2) in bore in rear cover (4), with beveled edge facing out.
3. Put two bearings (5) in bores in rear cover (4) as tagged. Refer to Part 1, para 7-7. Take off tags.
4. Put a light coat of oil on bearings (5).

GO TO FRAME 4

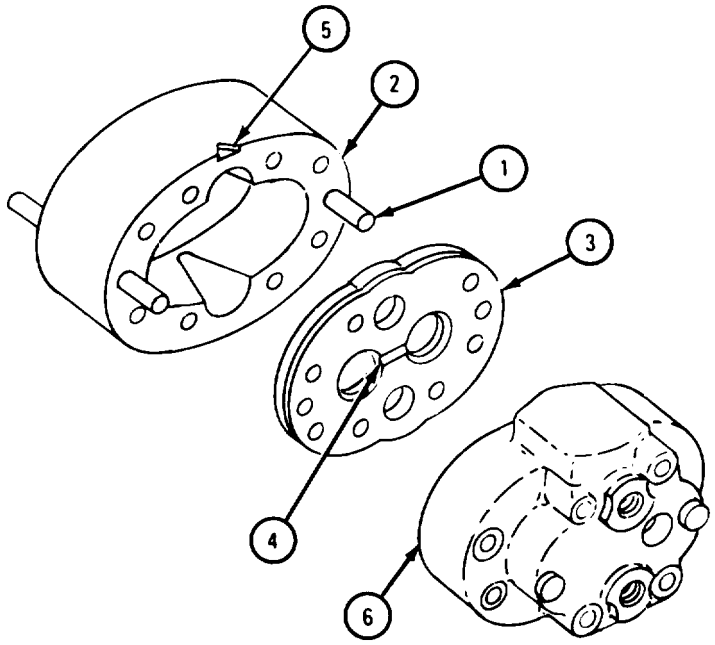


TA 085764

FRAME 4

1. Put four locating pins (1) into motor body (2).
2. Put wear plate (3) on two locating pins (1) and push it in place against motor body (2) . Be sure that groove (4) in wear plate faces out and that wear plate is on side of motor body with notch (5).
3. Put rear cover assembly (6) on two locating pins (1) and push it in place against wear plate (3).

GO TO FRAME 5

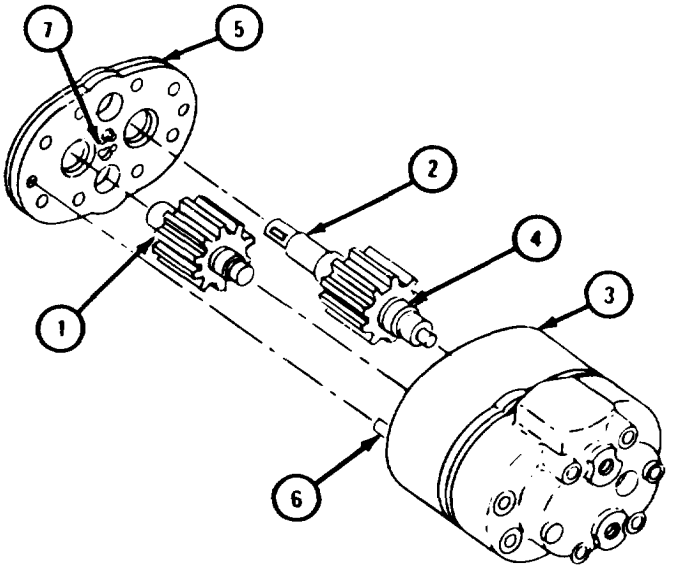


TA 085765

FRAME 5

1. Put drive gear shaft assembly (1) and driven gearshaft assembly (2) into motor assembly (3), mating two bearing inner races (4) with two bearings in motor assembly.
2. Put wear plate (5) on two locating pins (6) and push it into place against motor assembly (3). Be sure that two relief recesses (7) are on the inside.

GO TO FRAME 6

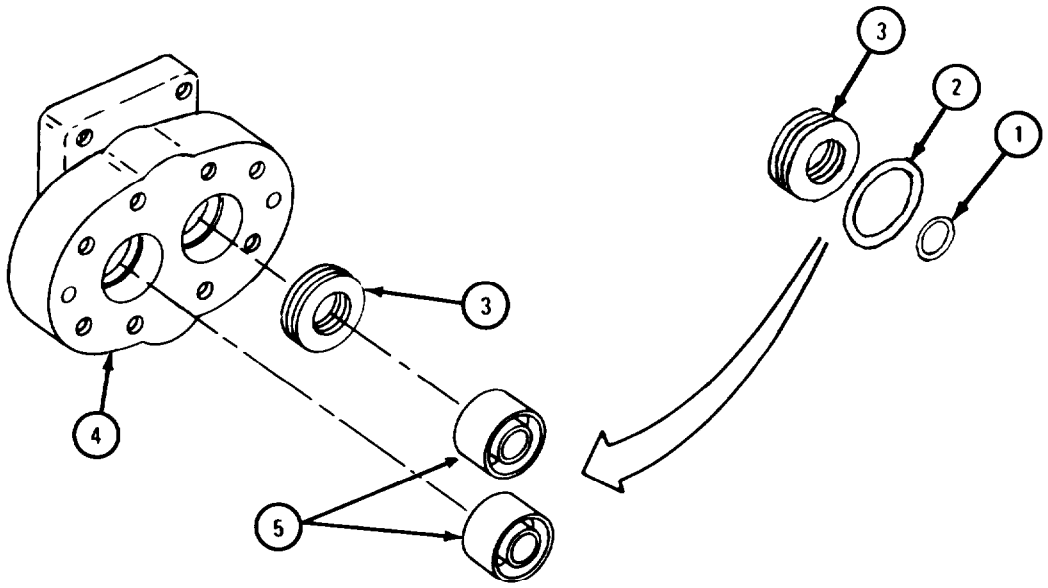


TA 085766

FRAME 6

1. Dip preformed packings (1 and 2) in clean oil and put them on seal adapter (3).
2. Put seal adapter (3) with preformed packings (1 and 2) into bore in front cover (4), wit h beveled edge facing out.
3. Put two bearings (5) into bores in front cover (4) as tagged. Refer to Part 1, para 7-7. Take off tags.
4. Put a light coat of oil on bearings (5).

GO TO FRAME 7

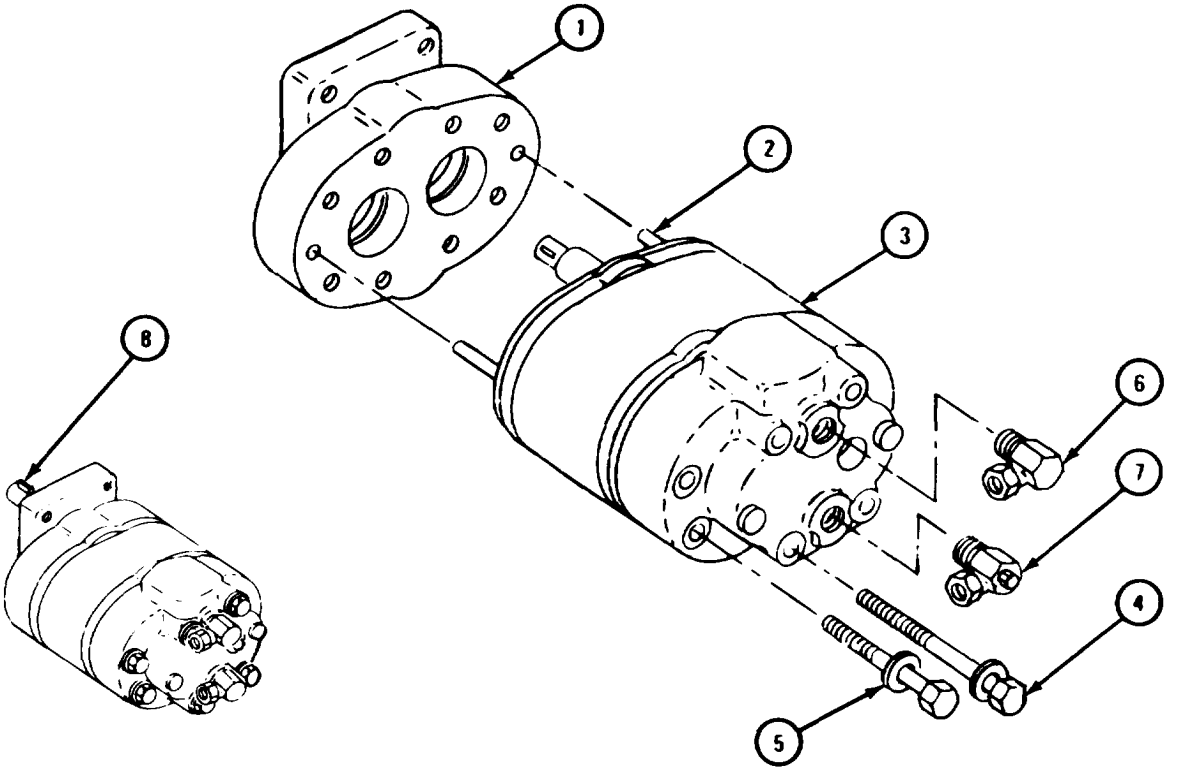


TA 085767

FRAME 7

1. Put front cover assembly (1) on locating pins (2) and push it in place on motor assembly (3).
2. Put in eight screws and washers (4 and 5) and tighten screws a little at a time until all screws are tightened.
3. Put in union assembly (6) and union with plug (7).
4. Put key (8) in place as shown.

END OF TASK



g. Replacement.

FRAME 1

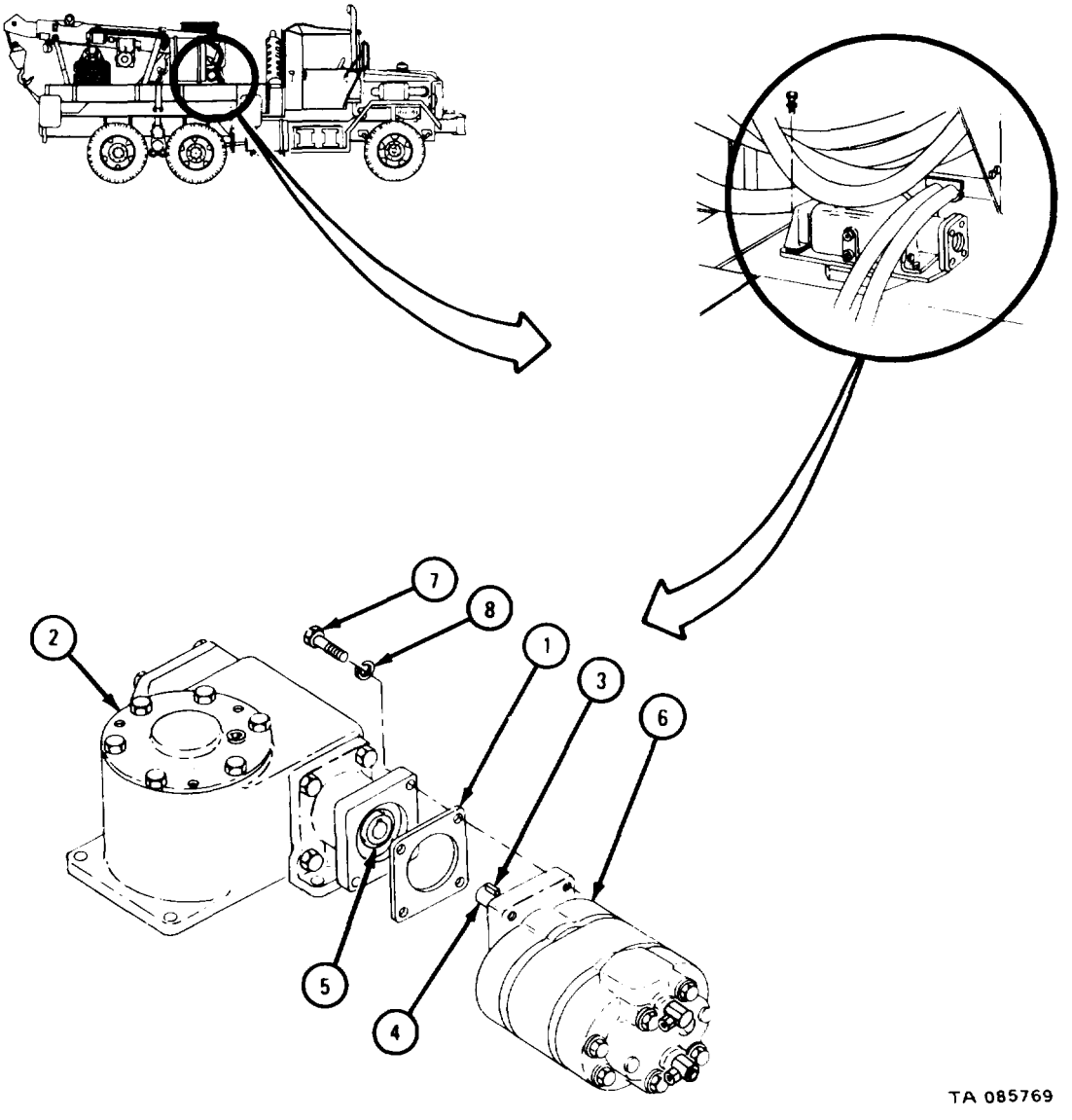
1. Put gasket (1) on swinger drive gearcase (2).

Soldiers A and B

2. Aline key (3) in shaft (4) with keyway in coupling (5) and push swinger motor (6) in place on swinger drive gearcase (2).

3. Put in four screws (7) and lockwashers (8).

GO TO FRAME 2



FRAME 2

NOTE

Take caps off hoses and fittings.

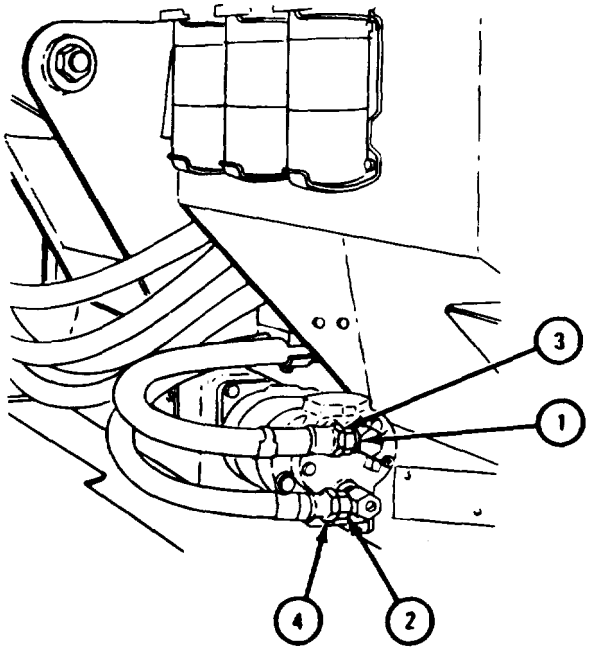
1. Put nuts (1 and 2) onto hoses (3 and 4) as tagged. Take off tags.

NOTE

Follow-on Maintenance Action Required:

1. Operate crane and check swinger motor for proper operation and check that there are no leaks. Refer to TM 9-2320-211-10.
2. Fill hydraulic oil reservoir as given in LO 9-2320-211-12.

END OF TASK



TA 085771

17-37. HYDRAULIC OIL RESERVOIR REPAIR (TRUCK M543A2).

TOOLS: No special tools required

SUPPLIES: Compressed air source, 30 psi max
Antiseize tape
Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680
Tub filled with water
Permatex

PERSONNEL: Two

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

Preliminary Procedure. Drain hydraulic oil reservoir. Refer to LO 9-12320-211-12.

a. Removal.

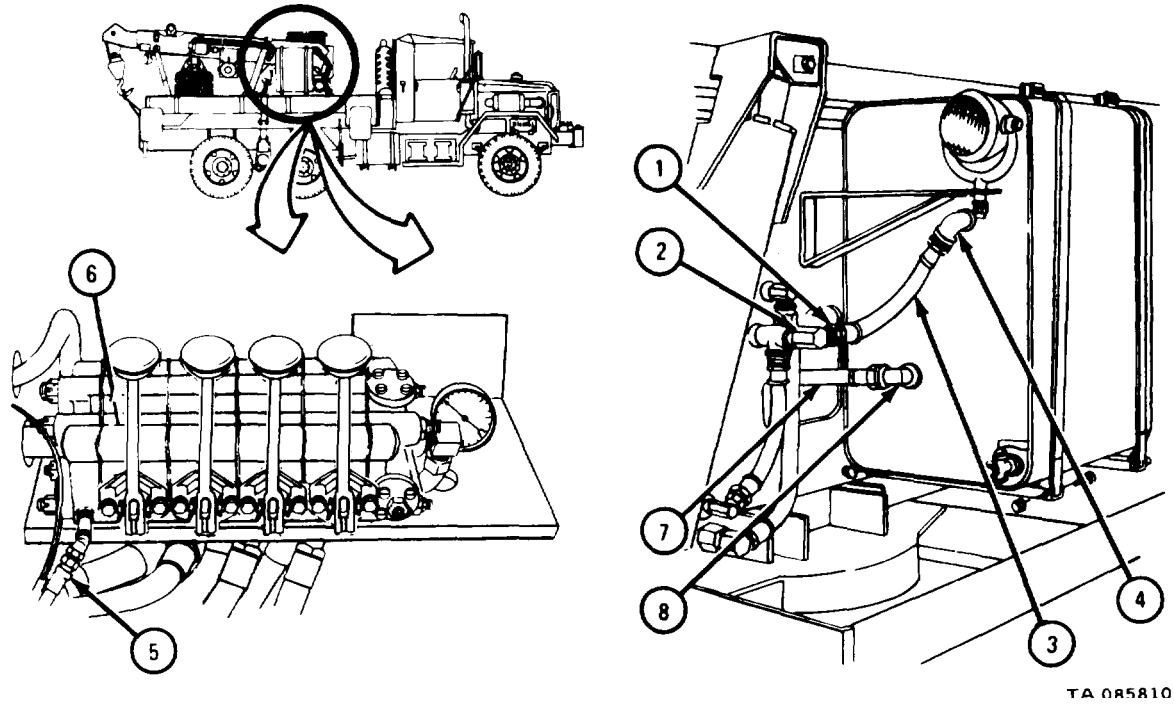
FRAME 1

NOTE

Use container to catch oil that may be in hoses when hoses are taken off.

1. Unscrew nut (1) on union (2). Pull hose (3) away from union (2).
2. Unscrew fitting on hose (3) from elbow (4). Take off hose.
3. Take off hose (5) from control valve.
4. Take off hose (5) from elbow (6).

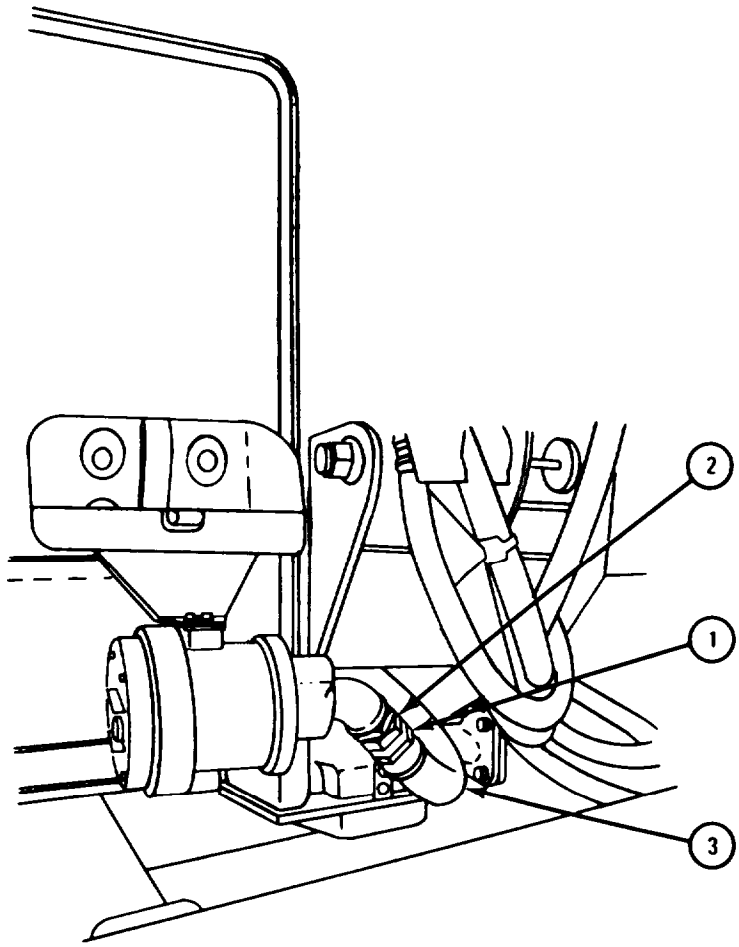
GO TO FRAME 2



FRAME 2

1. Hold hose fitting (1) and unscrew slip nut (2).
2. Take off hose (3) .

GO TO FRAME 3

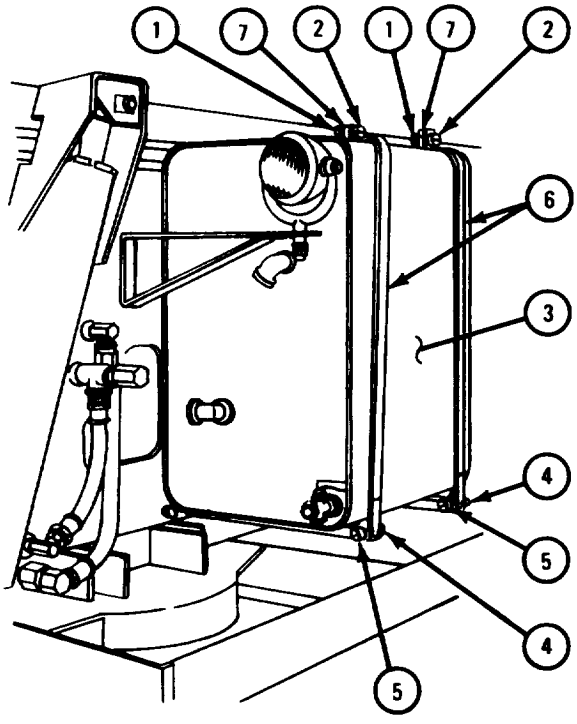


TA 085811

FRAME 3

1. Take off two nuts (1) and take out two screws (2) , one from each side of oil reservoir (3).
2. Take off two nuts (4). Take out two screws (5) and take off two lower straps (6).
3. Lift up and push back two upper straps (7).

GO TO FRAME 4



TA 085812

FRAME 4

Soldier A 1. Using two pieces of 1 /2-inch rope, tie two slings (1) around oil reservoir (2) as shown.

2. Hook up chain hoist (3) to rope sling (1).

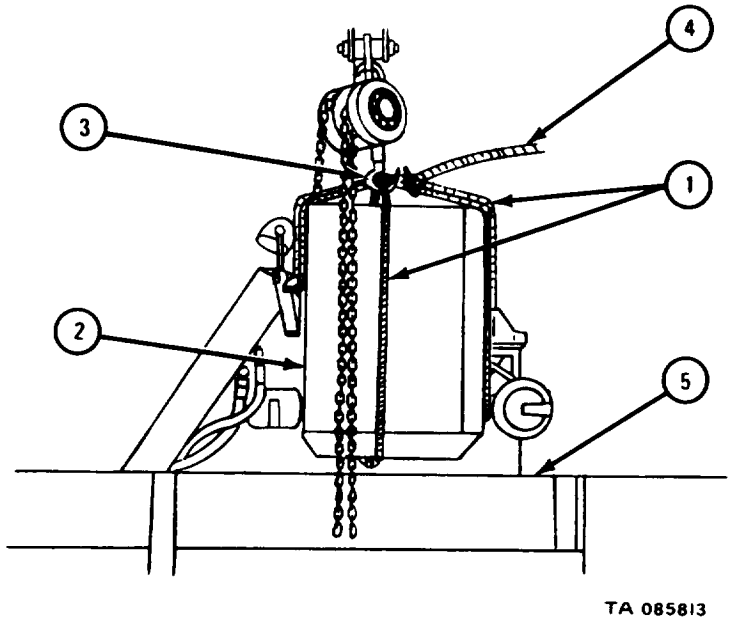
3. Tie guide line (4) to rope sling (1).

4. Using chain hoist (3), raise oil reservoir (2) up off wrecker body (5).

Soldier B 5. Guide oil reservoir (2) from ground, watching soldier A as oil reservoir is moved.

Soldier A 6. Using chain hoist (3), move oil reservoir (2) off truck onto ground.

GO TO FRAME 5

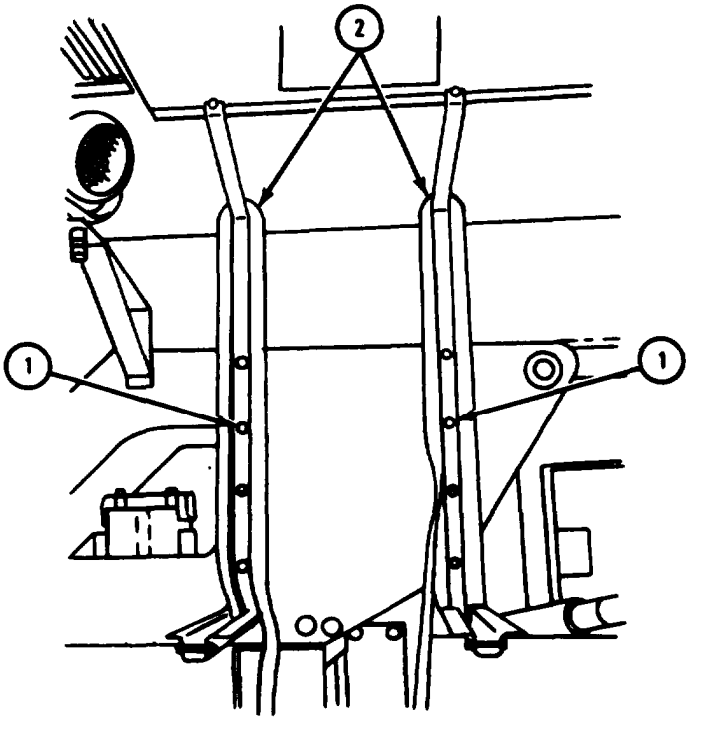


TA 085813

FRAME 5

1. Takeout eight screws and lockwashers (1).
2. Take off two strap and support assemblies (2).

END OF TASK



TA 085814

NOTE

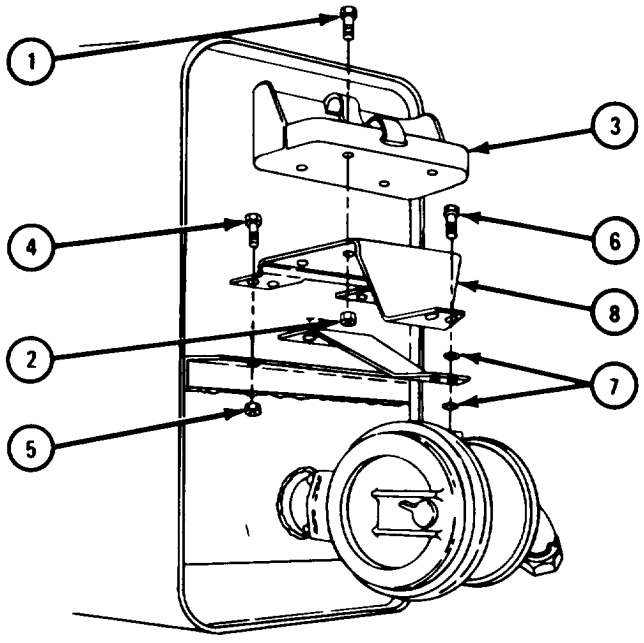
If truck is not equipped with fuel can bracket, take out screws (6) and washers (7) and go to frame 2.

c. Disassembly.

FRAME 1

1. Take out four screws (1) and nuts (2). Take off fuel can ret airier bracket (3).
2. Take out four screws (4) and nuts (5).
3. Take out two screws (6) and four washers (7). Take off fuel can mounting bracket (8).

GO TO FRAME 2



TA 085815

FRAME 2

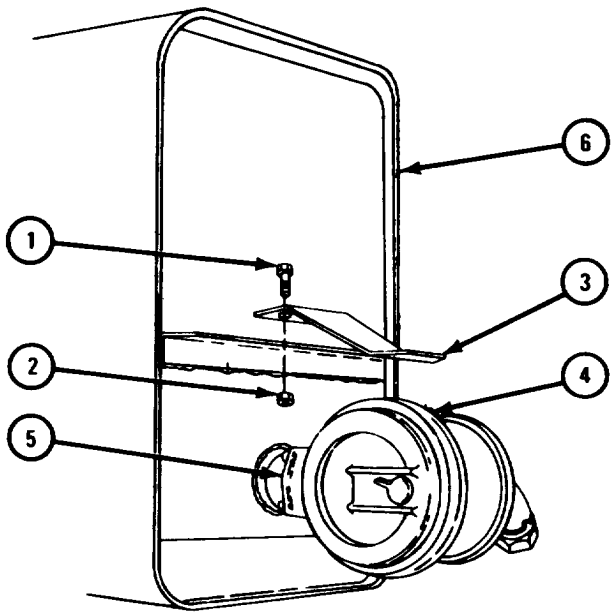
1. Take out three screws (1) and nuts (2). Take off oil filter bracket (3).

Soldier A 2. Hold oil filter assembly (4) with both hands.

Soldier B 3. Unscrew oil filter assembly (4) and oil filter flange (5) from oil reservoir (6).

Soldier A 4. Take off oil filter assembly (4) and flange (5).

GO TO FRAME 3



TA 085816

FRAME 3

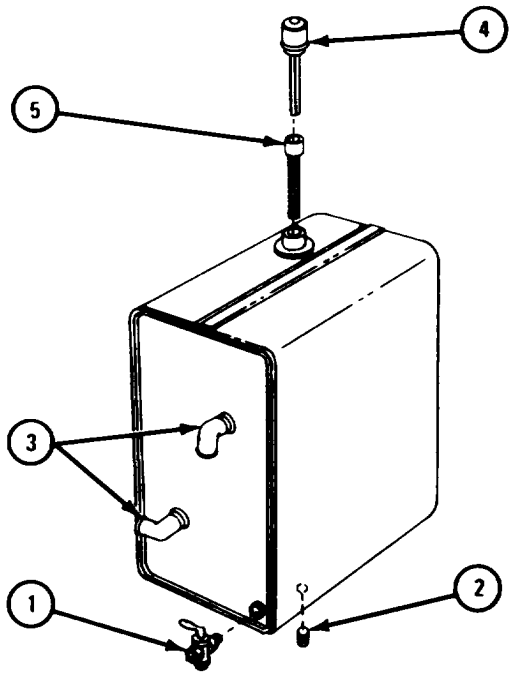
1. Take out drain cock (1).
2. Take out drain plug (2).

NOTE

Note position of two elbows (3) before taking them out so that they can be put back at same angle.

3. Take off two elbows (3).
4. Pull out gage assembly (4) and filter screen (5).

END OF TASK



d. Cleaning..

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

(1) Clean all metal parts in solvent. Let parts air dry.

(2) Flush inside of oil reservoir with an approved cleaning solvent. Refer to TM 9-247.

(3) Steam clean outside surface of oil reservoir.

e. Inspection.

FRAME 1

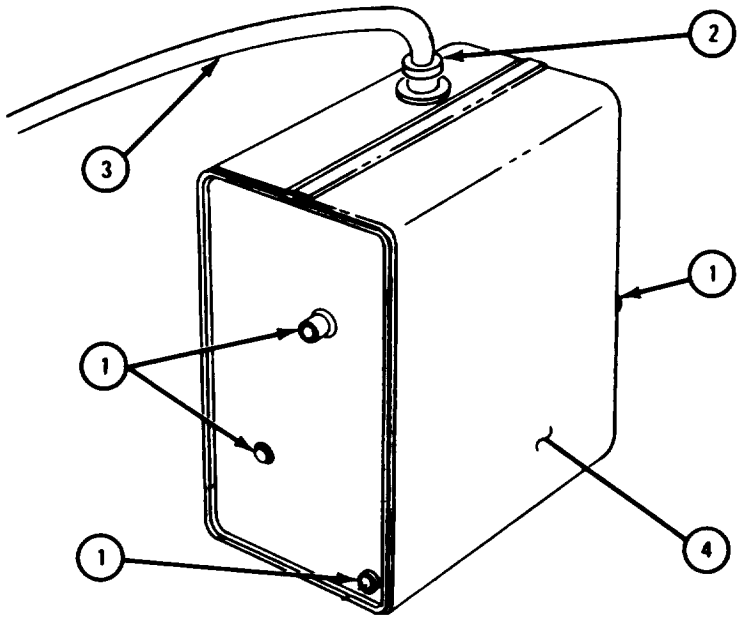
1. Using plug set, seal all openings (1) except filter inlet (2).
2. Put air hose (3) with proper fitting into filter inlet (2).
3. Put oil reservoir (4) into tub filled with water.

WARNING

Eye shields must be worn when using compressed air.
Eye injury can occur if eye shields are not used.

4. Apply air pressure of five pounds per square inch. Bubbles will show any leaks in oil reservoir (4). Mark leaking areas for repair.
5. Take oil reservoir (4) out of tub. Take out all seals and take away air hose.
6. Dry oil reservoir (4) with compressed air at 15 psi max.

GO TO FRAME 2

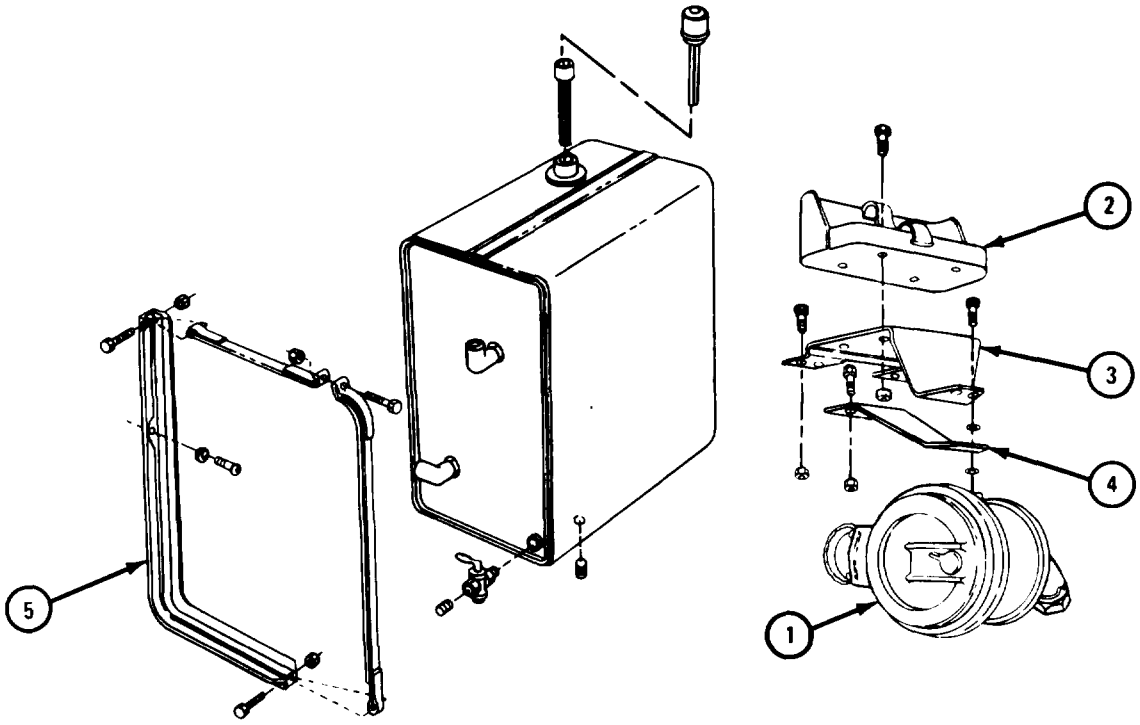


TA 085818

FRAME 2

1. Check that housing of oil filter assembly (1) is not cracked or broken.
2. Check that fuel can retainer bracket (2), fuel can mounting bracket (3), and oil filter bracket (4) are not cracked or bent, and that they do not have broken welds or damaged screw holes.
3. Check that two strap and support assemblies (5) are not cracked, bent, or broken, and that insulating strips are not damaged.
4. Check that screws and nuts do not have damaged threads.

END OF TASK



NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT IN THIS FRAME. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES OR ARE CHECKED IN ANOTHER FRAME.

TA 085819

f. Repair.

(1) If there is a large leak in oil reservoir, get a new one. If there is a small leak, repair it by welding. Refer to TM 9-237 for welding procedures.

(2) If filter housing of oil filter assembly is damaged, get a new one.

(3) If fuel can retainer bracket, fuel can mounting bracket, oil filter bracket, screw or nut is damaged, get a new one.

(4) If strap and support assembly insulation is loose, fix it with Permatex.

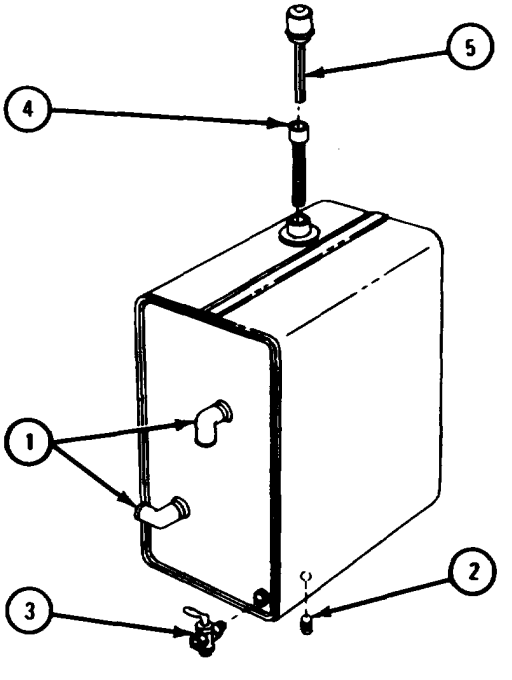
(5) If strap and support assembly insulating strip is frayed or if strap and support assembly is damaged, get a new strap and support assembly.

g. Assembly.

FRAME 1

1. Put in two elbows (1) as noted.
2. Put in drain plug (2).
3. Put in drain cock (3).
4. Put in filter screen (4) and gage assembly (5).

GO TO FRAME 2



TA 085820

FRAME 2

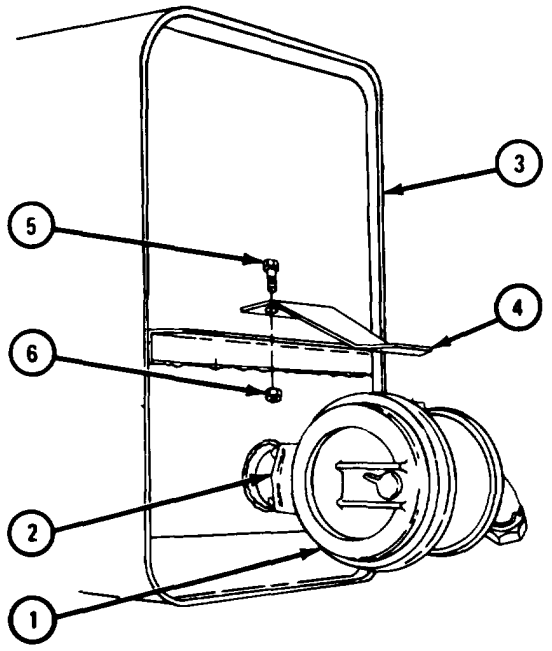
Soldier A 1. Put oil filter assembly (1) and flange (2) in position on oil reservoir (3).

Soldiers A and B 2. Screw oil filter assembly (1) and flange (2) into oil reservoir (3). Tighten flange in oil reservoir.

Soldier A 3. Put oil filter bracket (4) on oil reservoir (3) and aline three holes. Put three screws (5) through holes.

4. Put on three nuts (6).

GO TO FRAME 3



TA 085821

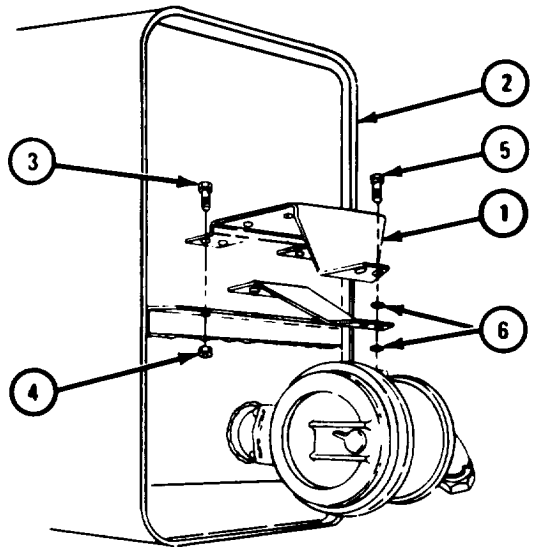
NOTE

If truck is not equipped with fuel can mounting bracket, END OF TASK.

FRAME 3

1. Put fuel can mounting bracket (1) in position on oil reservoir (2) and put four screws (3) through holes. Put on four nuts (4).
2. Put in two screws (5) and four washers (6).

GO TO FRAME 4

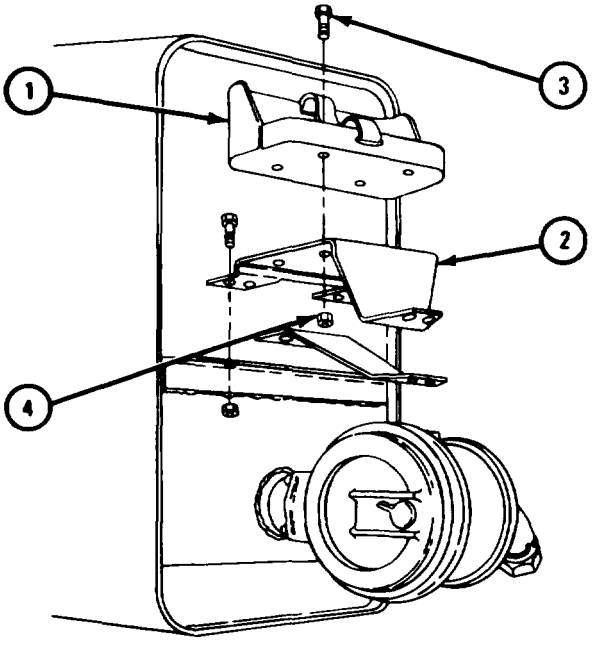


TA 085822

FRAME 4

1. Put fuel can retainer bracket (1) on fuel can mounting bracket (2) and put four screws (3) through holes.
2. Put on four nuts (4).

END OF TASK



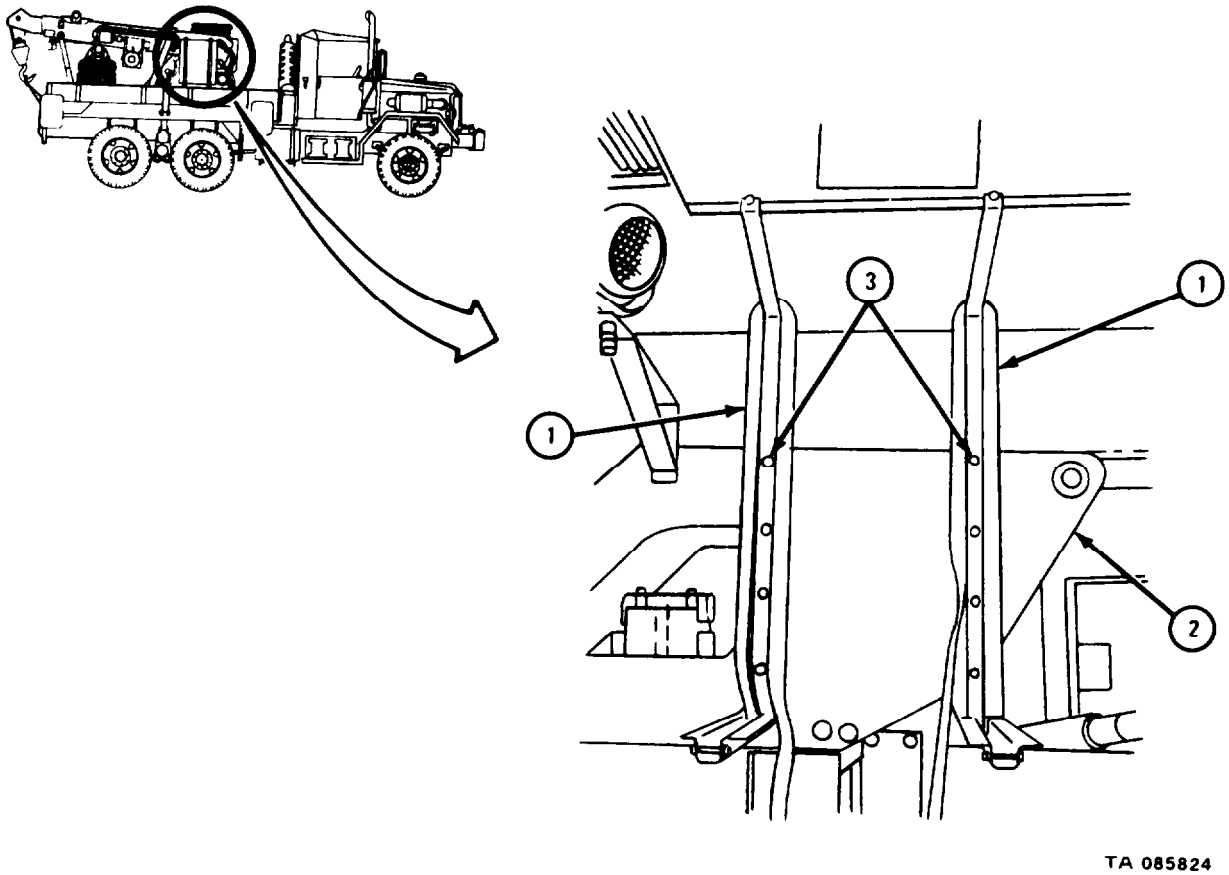
TA 085823

h. Replacement.

FRAME 1

1. Put two strap and support assemblies (1) in place on crane support assembly (2), alining holes.
2. Put in eight screws and lockwashers (3).

GO TO FRAME 2



FRAME 2

Soldier A 1. Using two pieces of l/2-inch rope, tie two slings (1) around oil reservoir (2) as shown.

2. Hook up chain hoist (3) to rope sling (1).

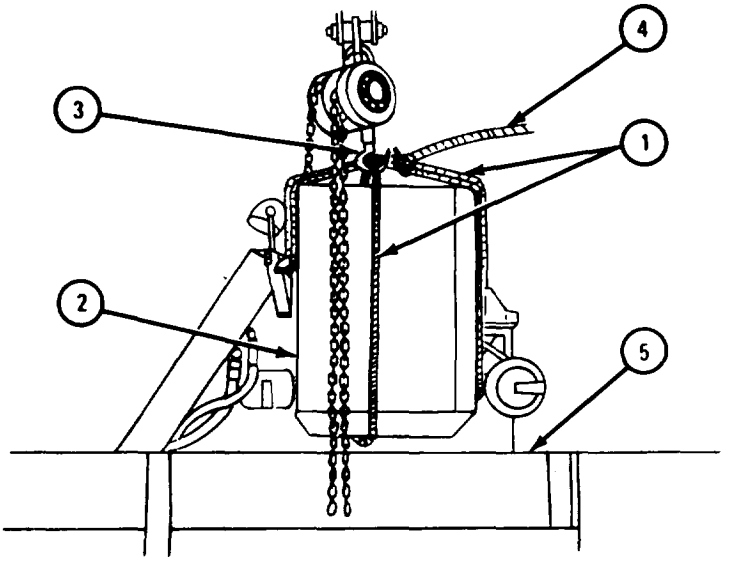
3. Tie guide line (4) to rope sling (1).

Soldier B 4. Guide oil reservoir (2) from ground, watching soldier A.

Soldier A 5. Using chain hoist (3), raise oil reservoir (2) up onto wrecker body (5).

Soldier B 6. From truck, guide oil reservoir (2) into position on wrecker body (5). Take off hoist (3) and rope sling (1).

GO TO FRAME 3

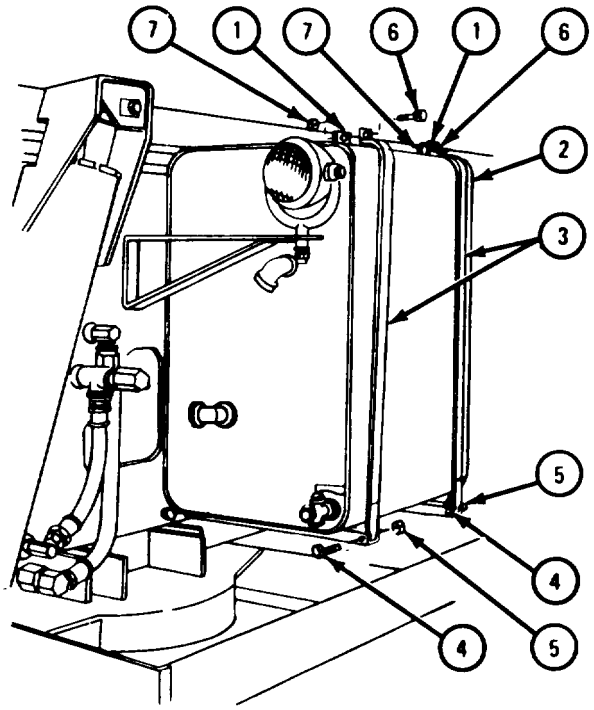


TA 085825

FRAME 3

1. Put two upper straps (1) in place on top of oil reservoir (2).
2. Put two tank lower straps (3) in place on oil reservoir (2) and put two screws (4) through bottom ends of lower straps.
3. Put on two nuts (5).
4. Put two screws (6) through upper straps (1) and lower straps (3). Put on two nuts (7).

GO TO FRAME 4



TA 085826

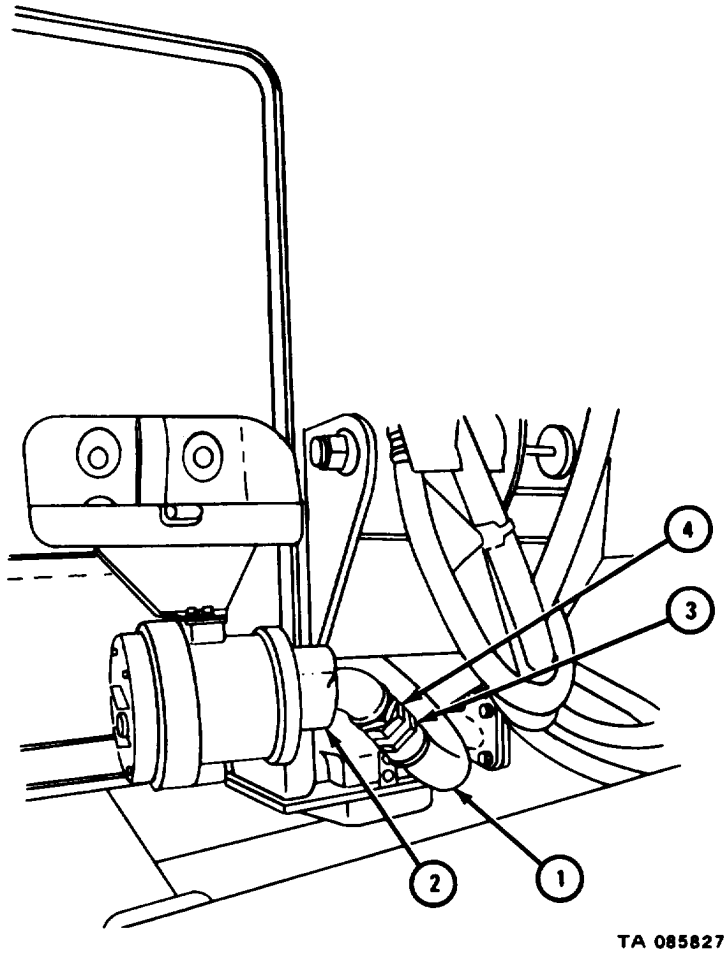
FRAME 4

NOTE

Put antiseize tape on male end of each hose assembly connector before joining hose assembly to fitting.

1. Put inlet hose assembly (1) in place on oil filter assembly (2).
2. Hold hose fitting (3) and tighten slipnut (4).

GO TO FRAME 5



TA 085827

FRAME 5

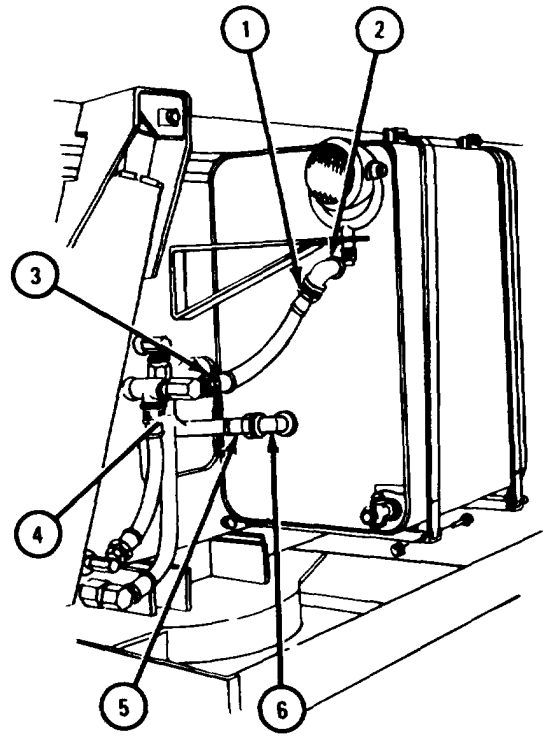
1. Put hose assembly fitting (1) on elbow (2). Tighten fitting (1).
2. Put hose assembly fitting (3) on union assembly (4) and tighten.
3. Put hose assembly (5) on elbow (6).
4. Put hose assembly (5) on control valve.

NOTE

Follow-on Maintenance Action Required:

Fill hydraulic oil reservoir. Refer to LO 9-2320-211-12.

END OF TASK



TA 085828

17-38. BOOM AND SHIPPER ROLLER ASSEMBLIES REPAIR (TRUCK M543A2).

NOTE

This task is the same for the boom and shipper roller assemblies. This task is shown for the boom roller assembly.

TOOLS: No special tools required

SUPPLIES: Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680.

PERSONNEL: One

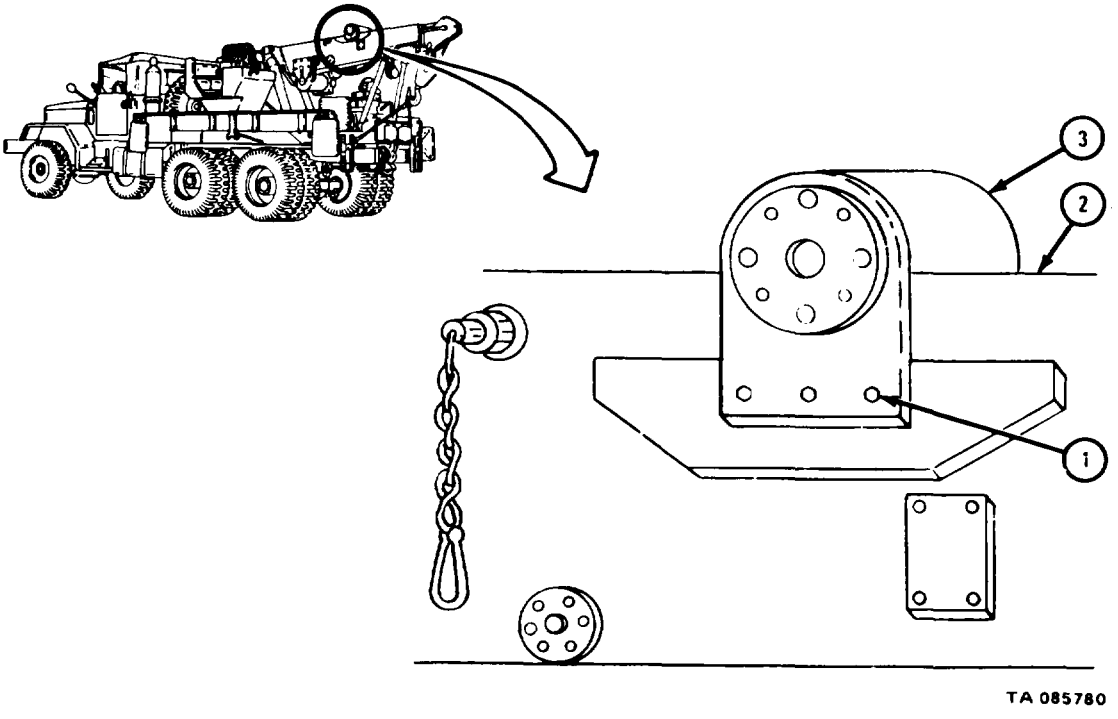
EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Removal.

FRAME 1

1. Take out six screws and lockwashers (1), three on each side of outer boom assembly (2).
2. Lift off boom roller assembly (3).

END OF TASK



b. Disassembly.

FRAME 1

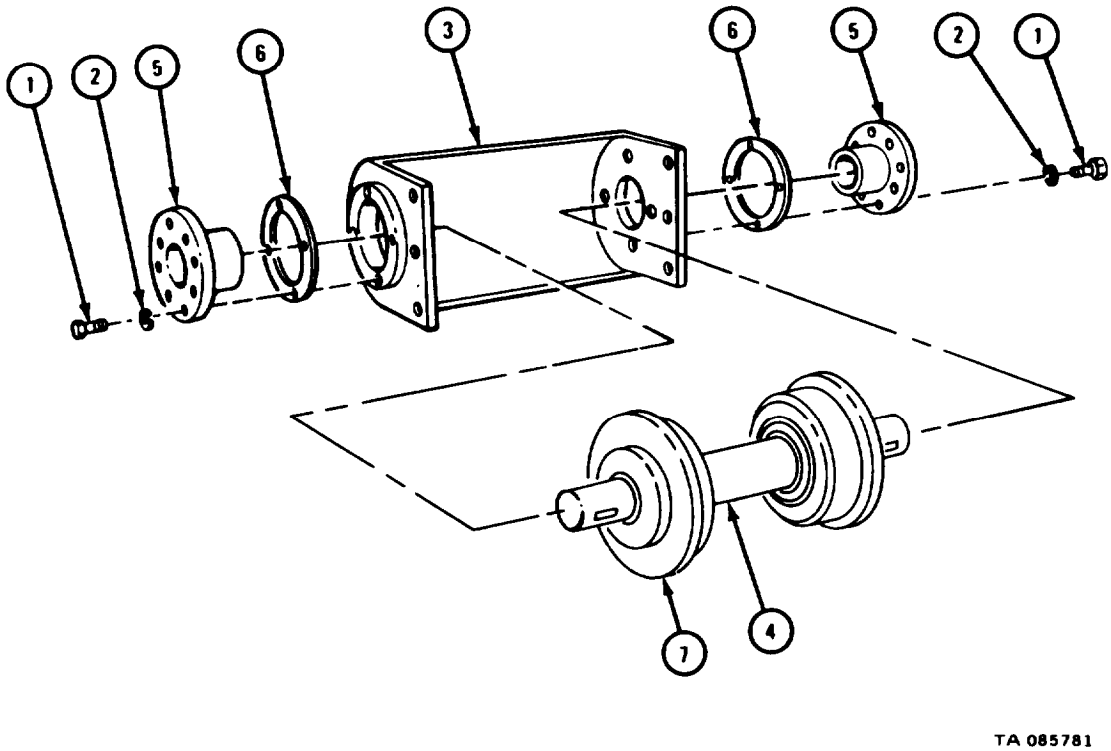
1. Take out eight screws (1) and lockwashers (2), four on each end of frame (3).
2. Drive end of shaft (4) 1/2-inch into bore in shaft support (5).

NOTE

Note positions and number of shims (6) to make sure they are put back in the right place.

3. Pull off shaft support (5) and shims (6).
4. Do steps 2 and 3 again on other end of shaft (4).
5. Take shaft (4) with two roller wheel assemblies (7) out of frame (3).

GO TO FRAME 2

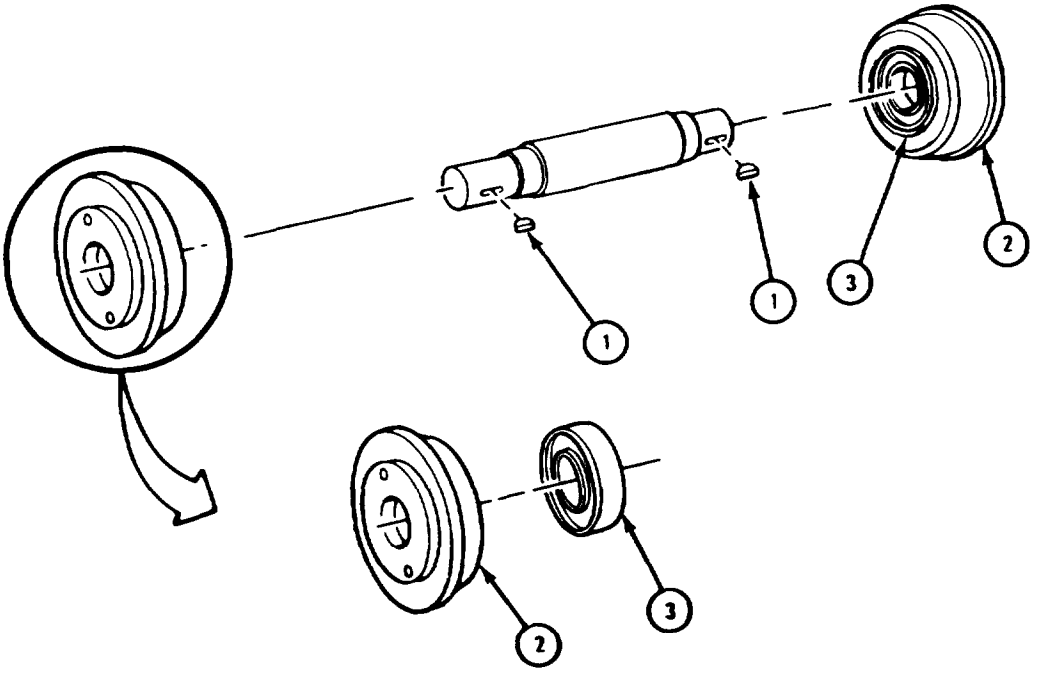


TA 085781

FRAME 2

1. Take out two keys (1).
2. Pull off two assembled roller wheels (2) and bearings (3).
3. Working through pin holes in two roller wheels (2), drive out two bearings (3).

END OF TASK



T A085782

c. Cleaning.

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment

Do not dry bearings with compressed air. Spinning bearings may explode, causing injury to personnel and damage to equipment.

(1) Clean all parts with solvent.

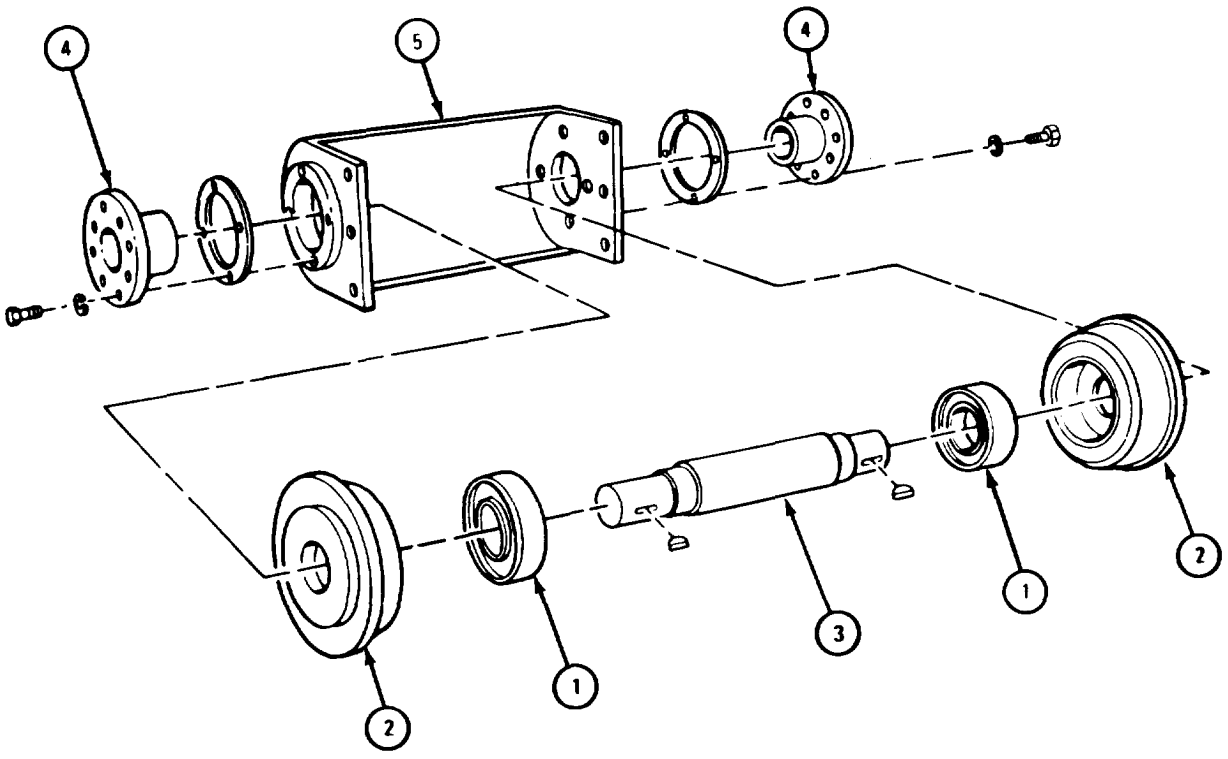
(2) Let parts dry.

d. Inspection and Repair.

FRAME 1

1. Check that bearings (1) are not worn or damaged. Refer to Part 1, para 7-7. If bearings are worn or damaged, get new ones.
2. Check that two roller wheels (2) are not cracked or damaged in any other way. If roller wheels are damaged, get new ones.
3. Check that shaft (3) is not nicked or burred. If nicks or burrs cannot be taken off with a honing stone, get a new shaft.
4. Check that two shaft supports (4) and frame (5) are not cracked or damaged in any other way. If they are damaged, get a new complete boom roller assembly.

END OF TASK



NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

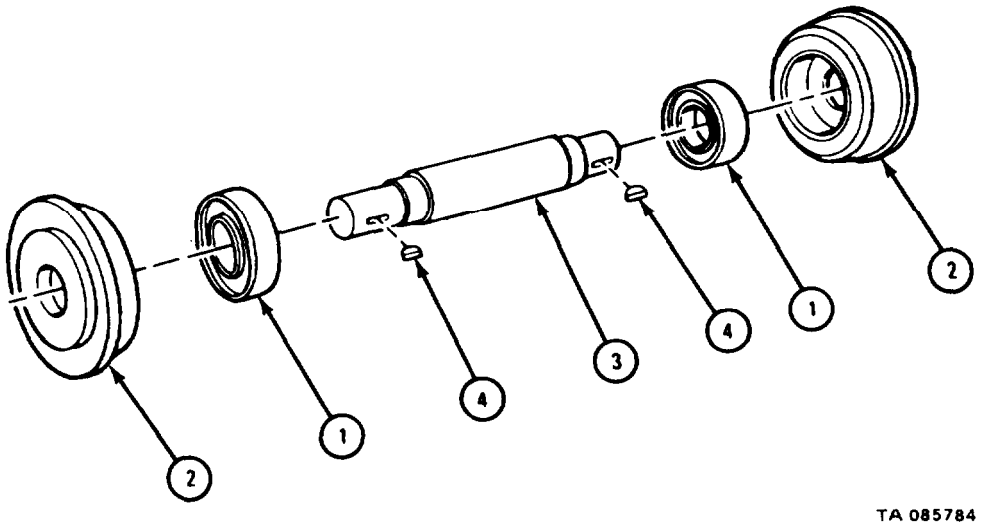
TA 085783

e. Assembly.

FRAME 1

1. Press two bearings (1) into two roller wheels (2). Refer to Part 1, para 7-7.
2. Press two assembled roller wheels (2) and bearings (1) on shaft (3). Refer to Part 1, para 7-7.
3. Put in two keys (4).

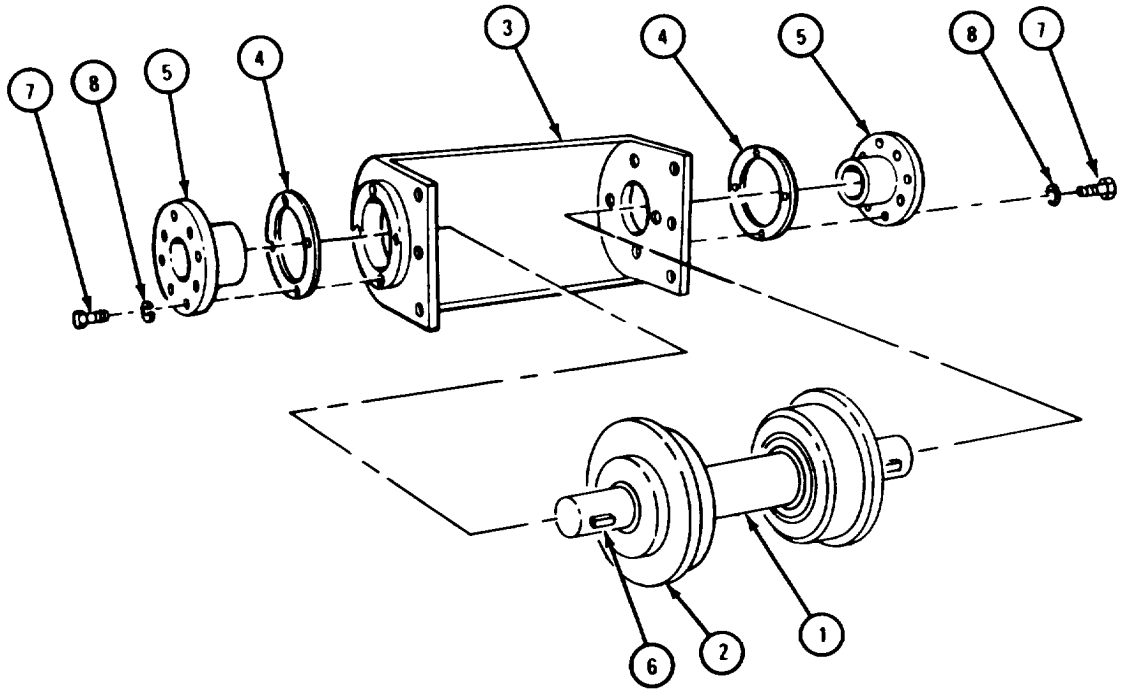
GO TO FRAME 2



FRAME 2

1. Put shaft (1) with two roller wheel assemblies (2) into frame (3).
2. Put needed number of shims (4) on two shaft supports (5) in position noted during disassembly.
3. Put shaft supports (5) with shims (4) on shaft (1). Line up keyways in shaft supports with keys (6) and push shaft supports into place.
4. Turn shaft supports (5) so that high sides of shaft supports are at closed end of frame (3).
5. Put in eight screws (7) and lockwashers (8).

END OF TASK



TA 085785

f. Replacement.

FRAME 1

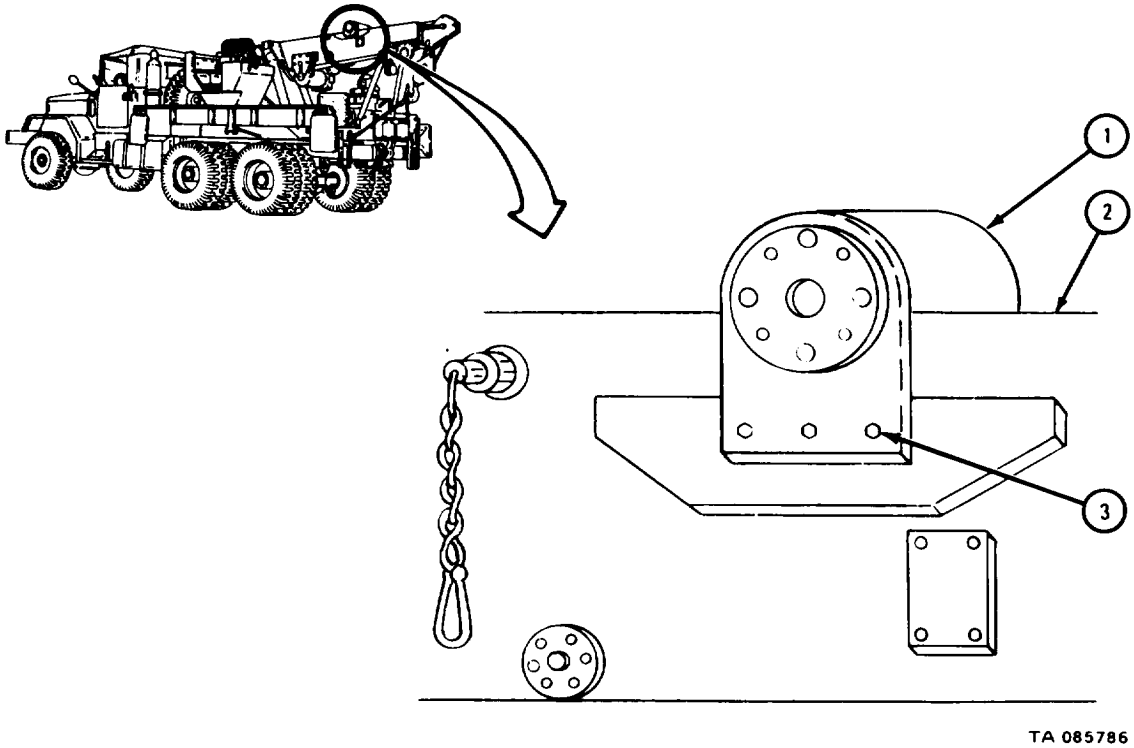
1. Put boom roller assembly (1) in place on outer boom assembly (2).
2. Put in six screws and lockwashers (3), three on each side of outer boom assembly (2).

NOTE

Follow-on Maintenance Action Required:

Adjust crane inner and outer boom roller assemblies. Refer to TM 9-2320-211-20.

END OF TASK



17-39. BOOM CROWD CYLINDER PACKING REMOVAL AND REPLACEMENT.

TOOLS: No special tools required

SUPPLIES: Preformed packing
Artillery and automotive grease, type GAA, MIL-G-10924
Brass bar

PERSONNEL: Two

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

CAUTION

When operating the crowd control lever so as to extend the boom, be careful not to jam the crane block into the boom sheaves. Pushing the crowd and hoist control levers away from the operator together will eliminate this possibility and will cause the cable hook to maintain a constant distance from the boom head as the boom is extended.

a. Preliminary Procedures.

(1) Start engine. Draw out inner boom until boom crowd cylinder packing nut can be seen. Refer to TM 9-2320-211-10.

(2) Stop engine. Move boom control lever back and forth to take hydraulic pressure off cylinders. Refer to TM 9-2320-211-10.

b. Removal.

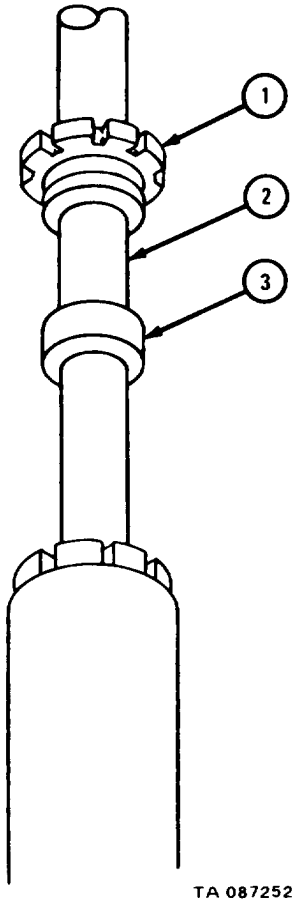
FRAME 1

CAUTION

Handle piston with care so that piston rod is not scratched or scored.

1. Loosen packing nut (1) and slide it back on piston rod (2).
2. Pry out packing (3) using a brass rod.

END OF TASK



c. Replacement.

FRAME 1

1. Put a coat of grease on packing (1) and piston rod (2).

NOTE

Packing comes in sets. Each ring is split to allow easy installation. Be sure to stagger joints around piston rod to assure a tight seal.

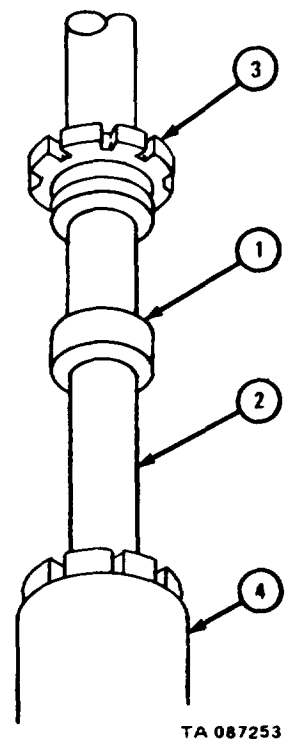
2. Put new packing (1) on piston (2).
3. Using a block of wood or a brass bar carefully push packing around piston rod.
4. Slide packing nut (3) down and tighten to 1/8-inch clearance between packing nut and cylinder head (4).

NOTE

Follow-on Maintenance Action Required:

1. Start engine. Draw back inner boom and check that piston rod does not leak.
2. Stop engine. Refer to TM 9-2320-211-10.

END OF TASK



TA 087253

17-40. BOOM ELEVATING CYLINDER PISTON ROD PACKING REMOVAL AND REPLACEMENT (TRUCK M543A2).

NOTE

This task is the same for right side and left side boom elevating cylinder piston rod packings. This task is shown for the right side boom elevating cylinder piston rod packing.

TOOLS: No special tools required

SUPPLIES: Artillery and automotive grease, type GAA, MIL-G-10924
Packing

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Start engine. Raise boom assembly as far as it will go, and put boom jacks in place. Refer to TM 9-2320-211-10.

(2) Stop engine. Move BOOM control lever back and forth to take hydraulic pressure off boom elevating cylinders. Refer to TM 9-2320-211-10.

b. Removal.

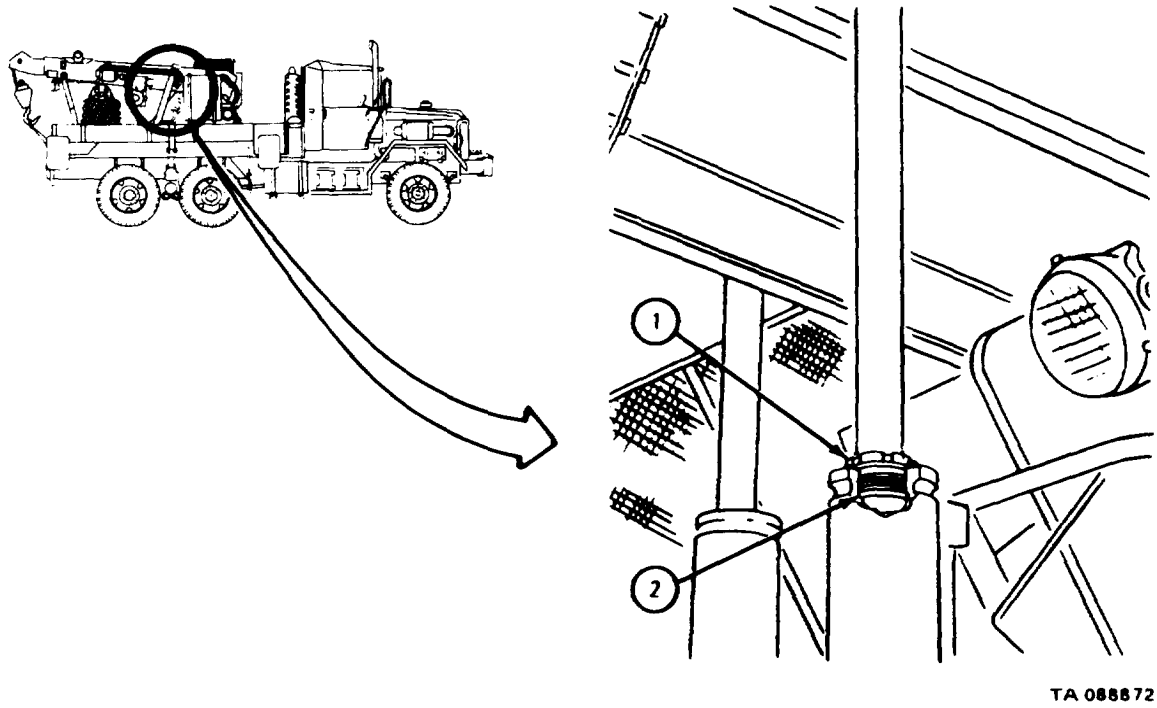
FRAME 1

CAUTION

Be careful not to scratch piston rod. A scratched piston rod can cause boom elevating cylinder to leak.

1. Unscrew packing nut (1) and slide it up out of the way.
2. Pry out and throw away piston rod packing (2).

END OF TASK



c. Replacement.

FRAME 1

NOTE

Packing rings are split so that they can be put on easily. Make sure that joints are alined on piston rod so that there is a tight seal.

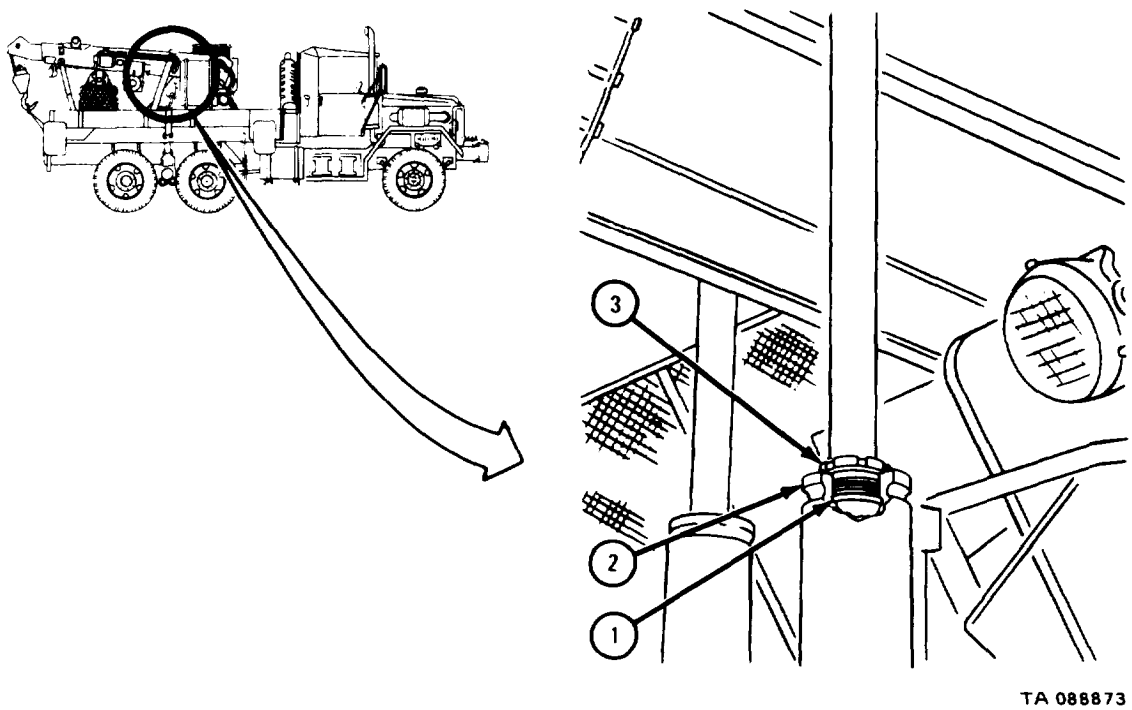
1. Coat packing (1) with grease and put packing into cylinder head (2).
2. Carefully push packing (1) around piston rod.
3. Slide down packing nut (3). Tighten nut until there is 1/8 inch clearance between packing nut and cylinder head (2).

NOTE

Follow-on Maintenance Action Required:

1. Take off boom jacks. Refer to TM 9-2320-211-10.
2. Start engine. Raise and lower boom assembly several times and check that piston rod packing does not leak. Refer to TM 9-2320-211-10.
3. Stop engine. Refer to TM 9-2320-211-10.

END OF TASK



17-41. BOOM CROWD CYLINDER REMOVAL, REPAIR AND REPLACEMENT (TRUCK M543A2).

TOOLS: No special tools required

SUPPLIES: Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680
Lubricating oil, ICE, OE/HDO 10, MIL-L-2104
Extension cylinder seal (2)
Extension cylinder piston ring (2)
Extension cylinder head sealing ring
Piston rod cylinder sleeve bearing
Piston rod preformed packing
Piston rod seal
Cotter pin
Safety wire

PERSONNEL: Three

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

WARNING

Be careful when handling these parts. They are heavy and can cause injury to personnel.

(1) Remove hoist winch cable. Refer to TM 9-2320-211-20.

(2) Remove boom assembly. Refer to para 17-44.

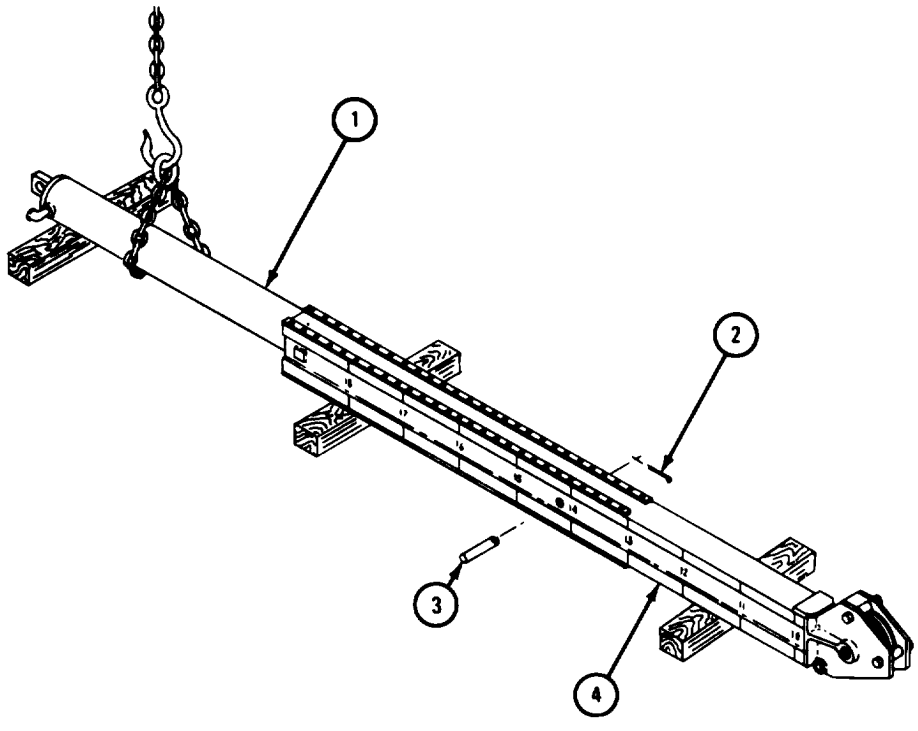
(3) Remove inner boom from outer boom. Refer to para 17-45.

b. Removal.

FRAME 1

	1.	Hook up chain sling and chain hoist to extension cylinder assembly (1).
	2.	Take out and throw away cotter pin (2).
Soldier A	3.	Drive out pin (3).
Soldiers Band C	4.	Pull extension cylinder assembly (1) out of inner boom (4).
	5.	Move extension cylinder assembly (1) to blocks. Take off chain sling and hoist.

END OF TASK



c. Disassembly.

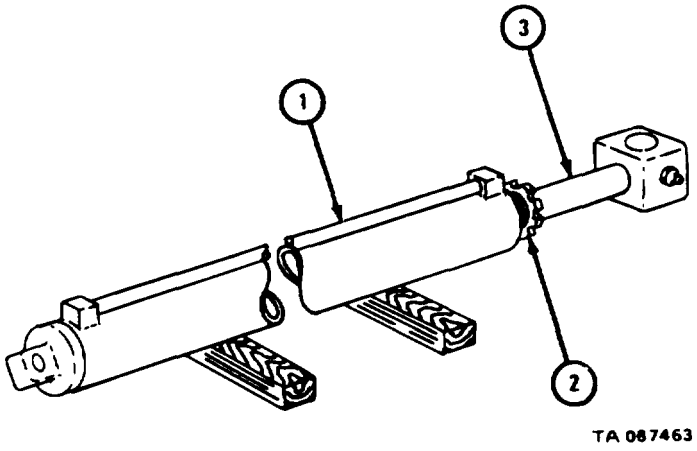
FRAME 1

Soldier A 1. Hold prybar in clevis pin hole of cylinder assembly (1) while soldier B unscrews cylinder head assembly (2).

Soldier B 2. Take off cylinder head assembly (2) from cylinder assembly (1).

Soldiers A and B 3. Carefully slide out piston rod assembly (3).

GO TO FRAME 2



FRAME 2

1. Take off and throw away safety wire (l).

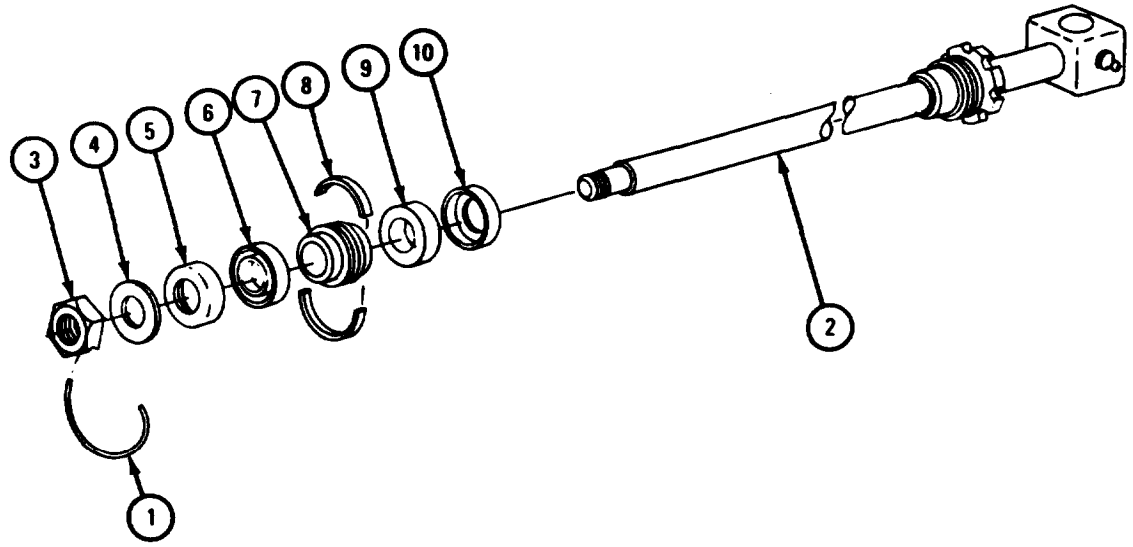
Soldier A 2. Hold prybar in clevis pin hole of piston rod (2) while soldier B unscrews nut (3).

Soldier B 3. Take off nut (3).

4. Slide off retaining washer (4), seal washer (5), seal (6), piston (7) with two piston rings (8), seal (9), and seal washer (10). Throw away seals.

5. Take two piston rings (8) off piston (7). Throw away piston rings.

GO TO FRAME 3

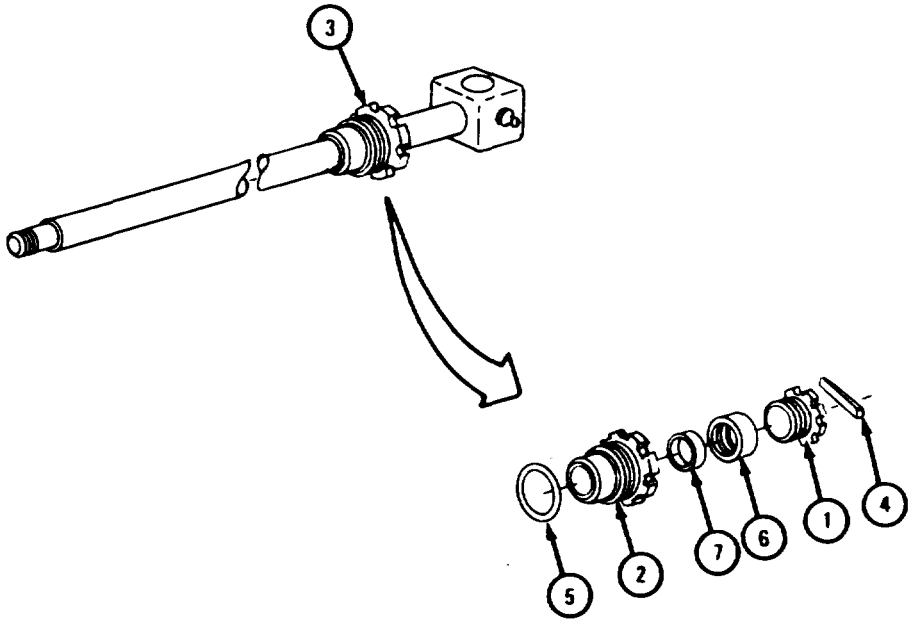


TA 087464

FRAME 3

1. Take off packing nut (1) from cylinder head (2).
2. Slide off cylinder head and packing nut assembly (3).
3. Take piston rod seal (4) out of packing nut (1).
4. Take sealing ring (5) off cylinder head (2).
5. Take preformed packing (6) out of cylinder head (2).
6. Using step plate, take sleeve bearing (7) out of cylinder head (2).
7. Throw away piston rod seal (4), sealing ring (5), preformed packing (6), and sleeve bearing (7).

END OF TASK



TA 087465

d. Cleaning.

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

(1) Clean all parts with solvent.

(2) Let parts dry.

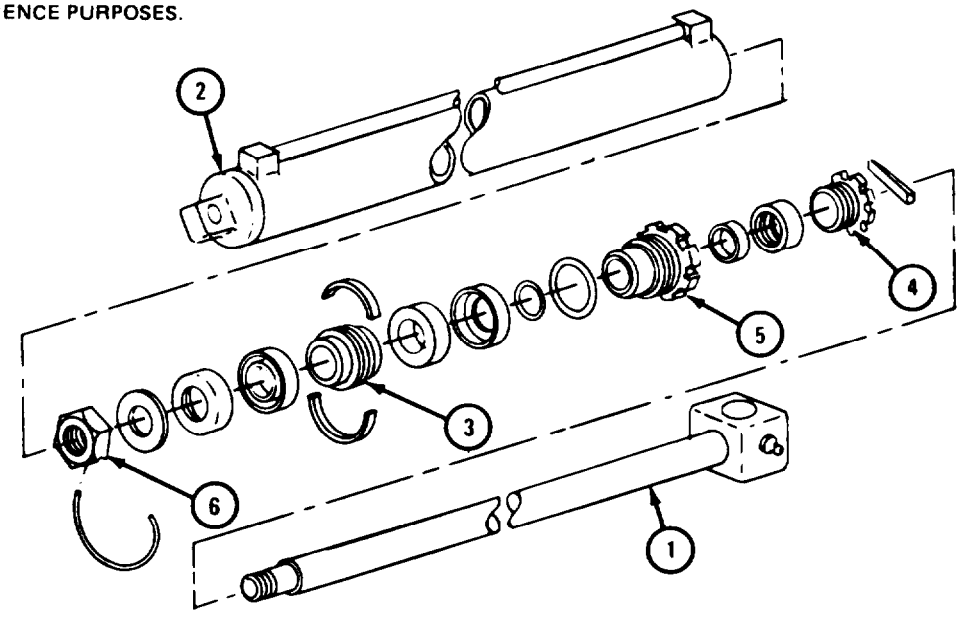
e. Inspection and Repair.

FRAME 1

1. Check that piston rod (1) is not bent, burred or scratched. If scratches or burrs cannot be filed off with a fine mill file, use a new piston rod.
2. Check that cylinder assembly (2) is not cracked and that cylinder head threads are not damaged. Check that inside of cylinder assembly is not scored. If cylinder assembly is damaged, get a new one.
3. Check that piston (3) is not scored and does not show other signs of wear. If piston is damaged, get a new one.
4. Check that packing nut (4), cylinder head (5), and nut (6) do not have damaged threads. If they are damaged, get new ones.

END OF TASK

NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.



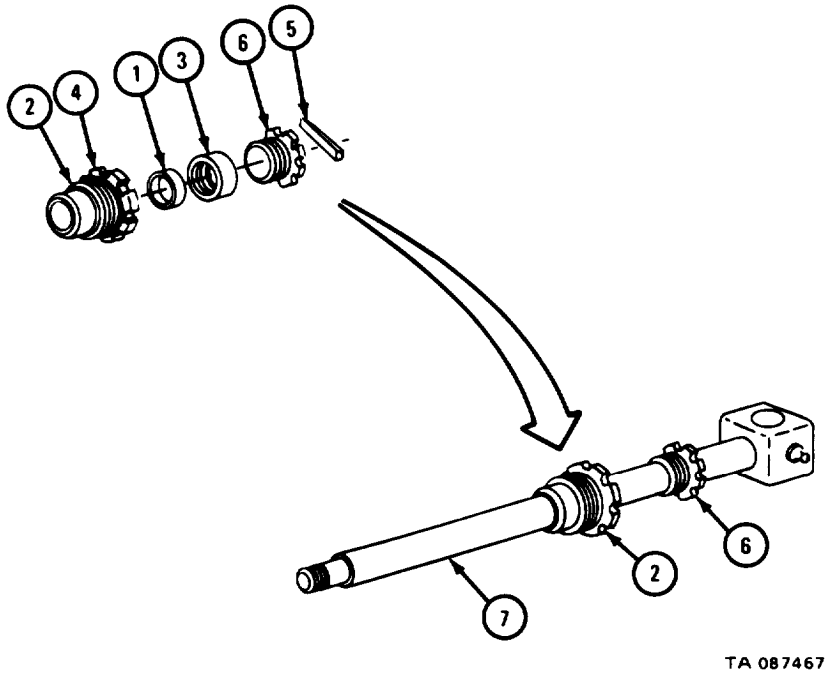
TA 087466

f. Assembly.

FRAME 1

1. Using step plate, seat sleeve bearing (1) in cylinder head (2).
2. Soak preformed packing (3) in oil and put it in cylinder head (2).
3. Put sealing ring (4) in place on cylinder head (2).
4. Put piston rod seal (5) in groove in packing nut (6).
5. Slide packing nut (6) with piston rod seal (5) onto piston rod (7).
6. Slide cylinder head (2) with sleeve bearing (1), preformed packing (3), and sealing ring (4) onto piston rod (7).
7. Using spanner wrenches and 6-inch ruler, screw together packing nut (6) and cylinder head (2) until there is about 1/8-inch clearance between them.

GO TO FRAME 2



FRAME 2

1. Slide seal washer (1), seal (2), piston (3), seal (4), seal washer (3), and retaining washer (6) onto piston rod (7).

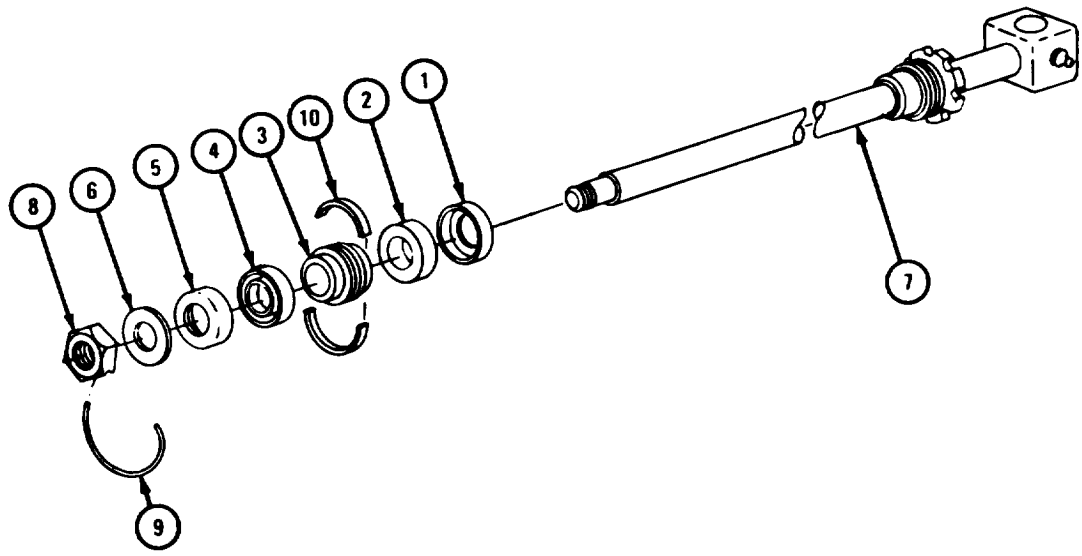
Soldier A 2. Hold prybar in clevis pin hole of piston rod (7) while soldier B screws on nut (8).

Soldier B 3. Put on nut (8).

4. Put safety wire (9) through nut (8) and piston rod (7).

5. Put two piston rings (10) on piston (3).

GO TO FRAME 3

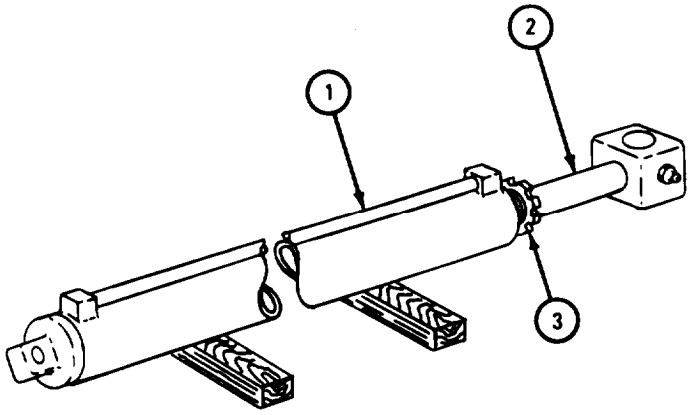


TA 087468

FRAME 3

	1.	Coat inside of cylinder assembly (1) with oil
Soldiers A and B	2.	Carefully slide piston rod assembly (2) about halfway into cylinder assembly (1).
Soldier A	3.	Hold prybar in clevis pin hole of cylinder assembly (1) while soldier B puts on cylinder head assembly (3).
Soldier B	4.	Using spanner wrench, put on cylinder head assembly (3).

END OF TASK



TA 087469

g. Replacement.

FRAME 1

1. Hook up chain sling and chain hoist to extension cylinder assembly (1).

NOTE

When putting extension cylinder (1) into inner boom (2), the grease fitting in piston rod (3) should be down.

Soldiers A and B
2. Raise extension cylinder assembly (1) and guide it into place in inner boom (2).

Soldier C
3. Using brass punch, aline bore in piston rod (3) with bores in inner boom (2). Push in pin (4).

4. Put in cotter pin (5).

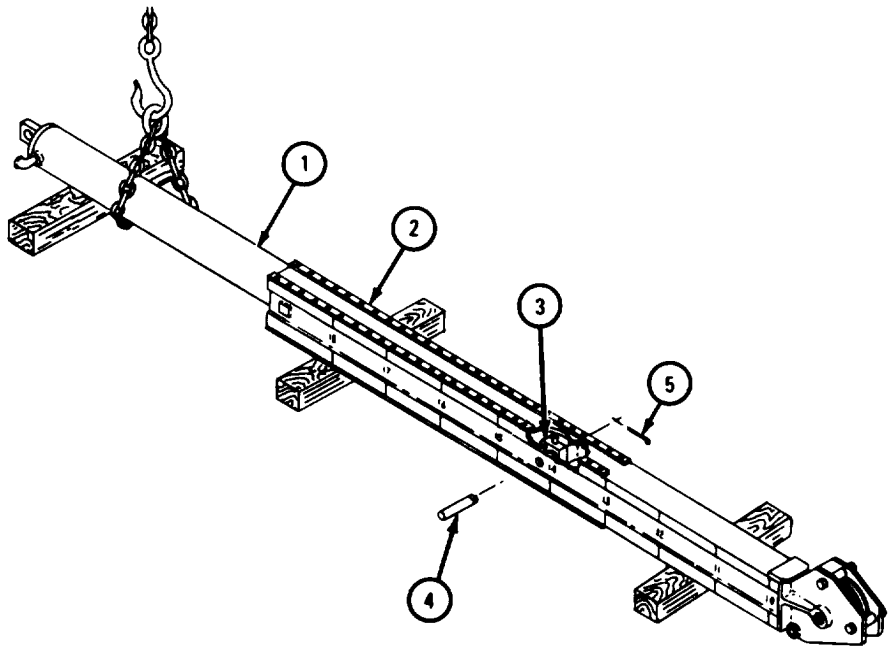
5. Take off chain sling and chain hoist.

NOTE

Follow-on Maintenance Action Required:

1. Replace inner boom in outer boom. Refer to para 17-45.
2. Replace boom assembly. Refer to para 17-44.
3. Replace hoist winch cable. Refer to TM 9-2320-211-20.
4. Oil and grease boom assembly as given in LO 9-2320-211-12.
5. Adjust crane inner and outer boom rollers. Refer to TM 9-2320-211-20.

END OF TASK



17-42. CRANE BOOM ELEVATING CYLINDER REPAIR (TRUCK M543A2).

NOTE

This task is the same for the right and left crane boom elevating cylinders, except where noted. This task is shown for the right crane boom elevating cylinder.

TOOLS: No special tools required

SUPPLIES: Lubricating oil, ICE, OE/HDO 10, MIL-L-2104
Artillery and automotive grease, type GAA, MIL-G-10924
Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680
Antiseize tape
Tags
Caps
Safety wire

PERSONNEL: Two

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Free hoist cable hook from lifting sling. Refer to TM 9-2320-211-10.

(2) If working on left boom elevating cylinder, take off gondola guard assembly. Refer to para 17-50.

b. Removal.

FRAME 1

Soldier A 1. Hook up chain and shackle (1) to boom assembly (2) and join hook (3) to chain and shackle as shown.

2. Pull out two pins (4).

Soldier B 3. Using chain hoist (3), raise boom assembly (2).

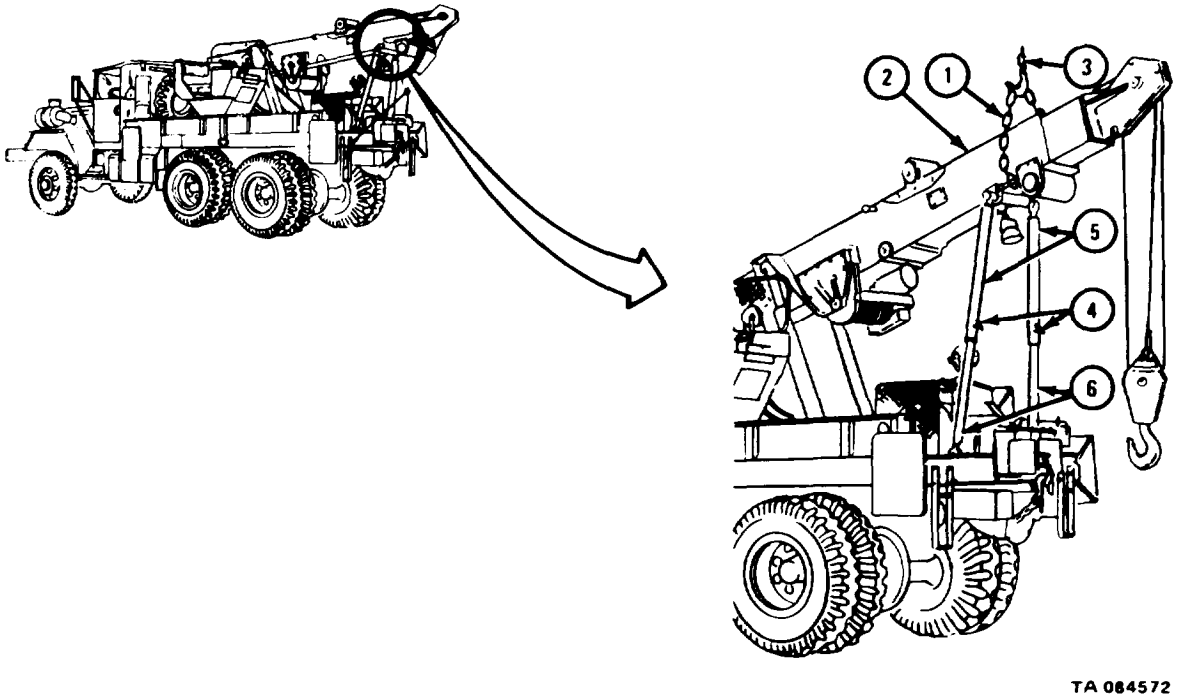
Soldier A 4. Aline hole in outer support tube (5) with fourth hole in inner support tube (6).

5. Push in two pins (4).

Soldier B 6. Using chain hoist (3), put slack in chain and shackle (1).

Soldier A 7. Take chain and shackle (1) off boom assembly (2).

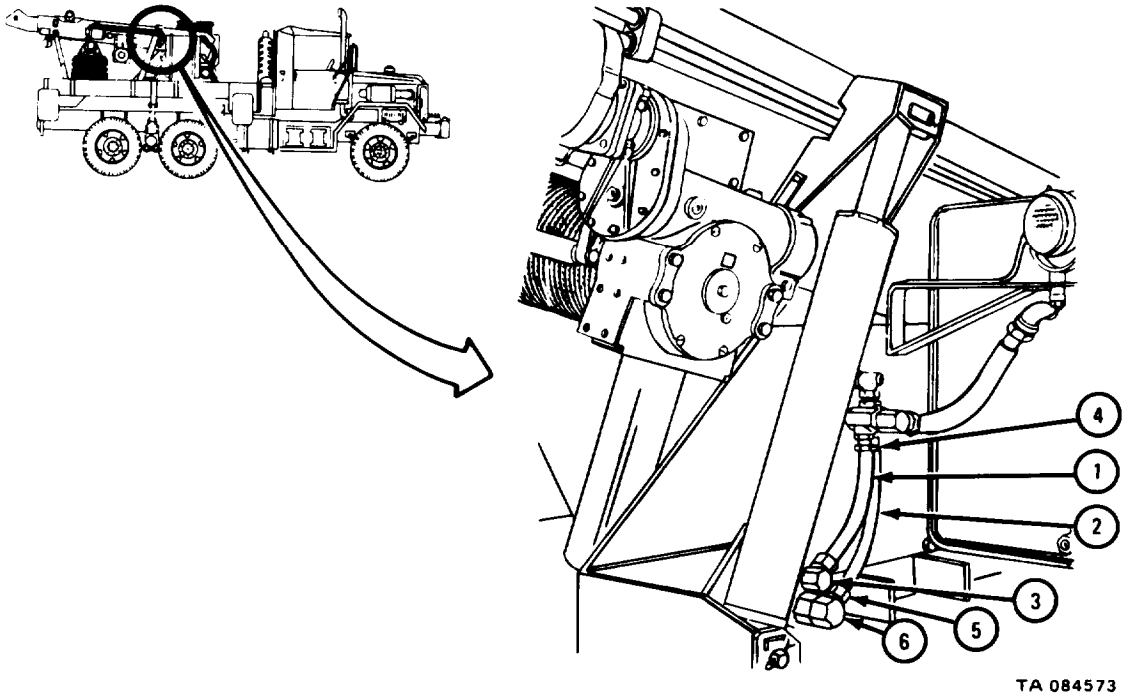
GO TO FRAME 2



FRAME 2

1. Tag hoses (1 and 2) so that they will be put back in the same places.
2. Put five-gallon container under hoses (1 and 2).
3. Unscrew nut of fitting (3) and move hose (1) out of the way.
4. Cap hose (1) and fitting (3) .
5. Unscrew nut (4) on hose (2).
6. Unscrew nut (5) at snubber valve (6) and take off hose (2).
7. Cap hose (2) on both ends and cap snubber valve (6).
8. Take out container and put fluid in approved disposal area.

GO TO FRAME 3



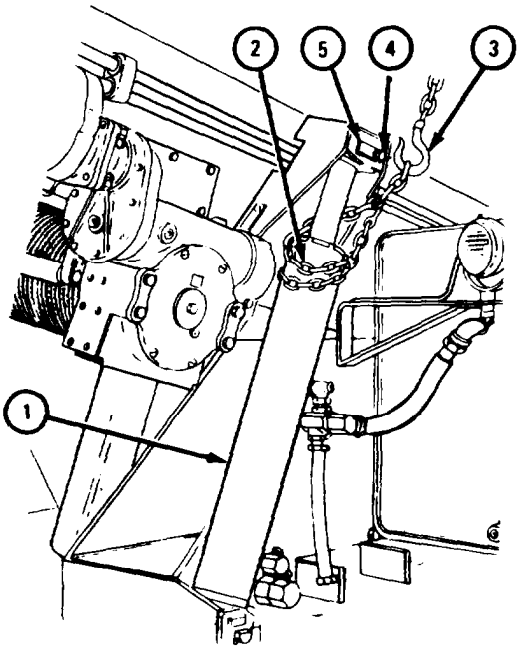
FRAME 3

WARNING

Be careful when handling boom elevating cylinder (1). It is heavy and can cause injury to personnel.

1. Wrap chain (2) around boom elevating cylinder (1) and hook chain to chain hoist (3) as shown.
2. Using chain hoist (3), take slack out of chain (2).
3. Take out screw and lockwasher (4).
4. Pull out pin (5).

GO TO FRAME 4



TA 084574

FRAME 4

Soldier A 1. Take out cotter pin (1).

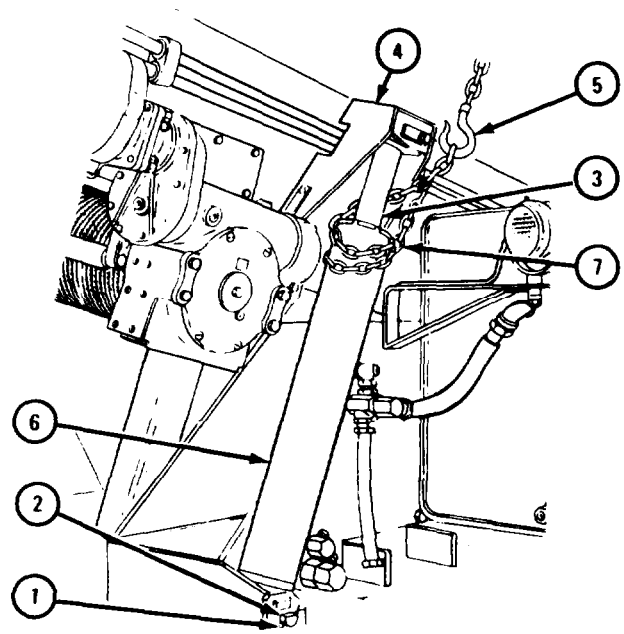
2. Drive out pin (2).

3. Push piston rod (3) down to clear bracket (4).

Soldier B 4. Using chain hoist (5), lift boom elevating cylinder (6) off truck and set it down on workbench.

Soldier A 5. Take chain (7) off boom elevating cylinder (6).

END OF TASK



TA 084575

c. Disassembly.

FRAME 1

WARNING

Be careful when handling boom elevating cylinder. It is heavy and can cause injury to personnel.

NOTE

Using scriber, scribe marks on snubber valve (1), fitting (2), and cylinder (4) so that they are put back in the same place.

1. Take off snubber valve (1).
2. Take off fitting (2).
3. Unscrew packing nut (3) and take cylinder head assembly (4) from cylinder assembly (5).

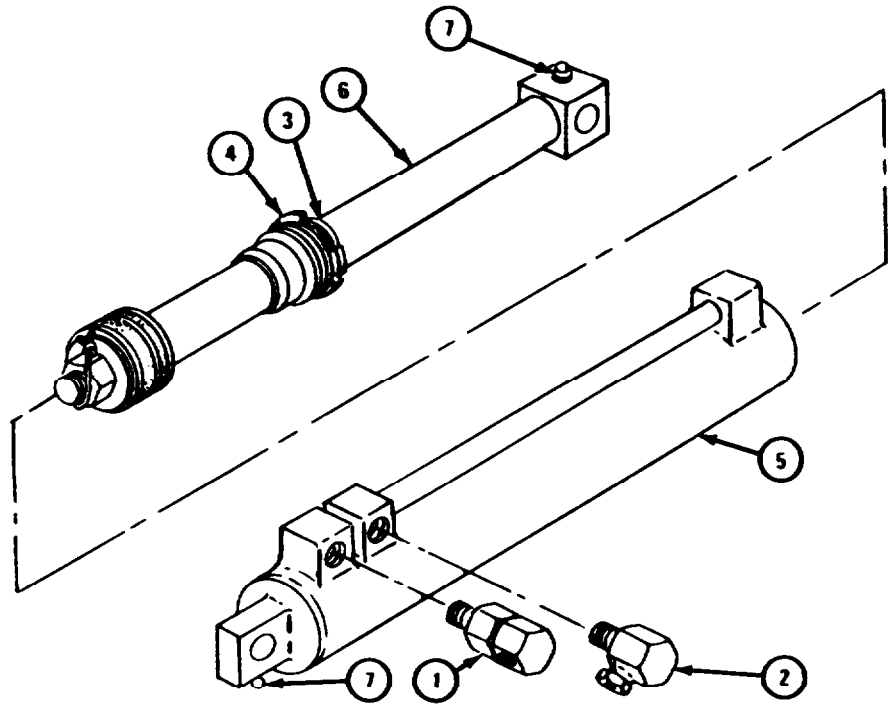
Soldiers A and B

4. Pull piston rod assembly (6) out of cylinder assembly (5).

Soldier A

5. Take out two lubrication fittings (7).

GO TO FRAME 2

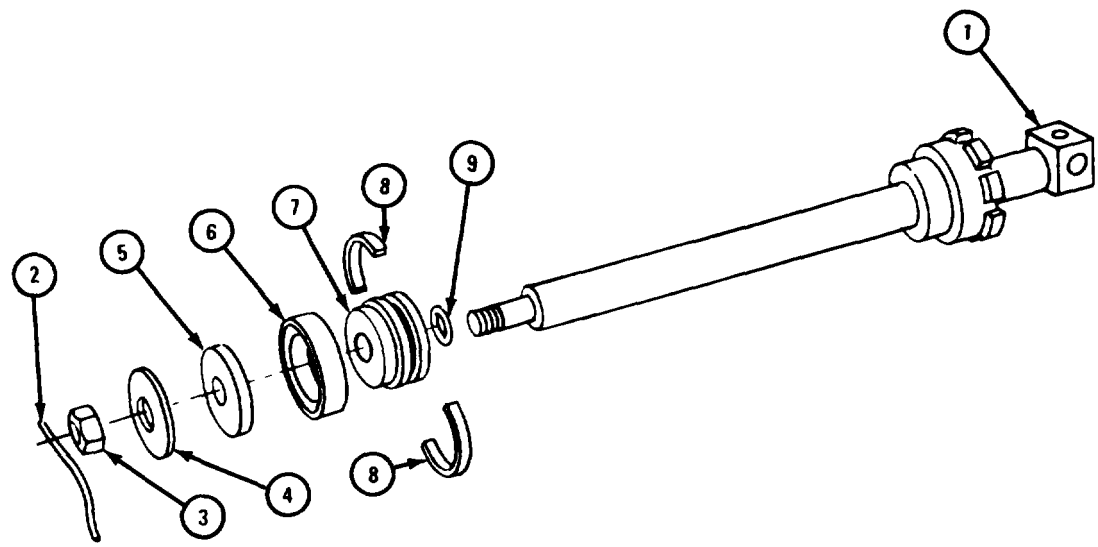


FRAME 2

Soldiers A and B
1. Clamp head of piston rod (1) in vise.

Soldier A
2. Take off safety wire (2).
3. Take off nut (3).
4. Slide off retaining washer (4), seal retainer washer (5), seal (6), piston (7) with two piston rings (8), and sealing ring (9). Throw away seal and sealing ring.
5. Take two piston rings (8) off piston (7). Throw away piston rings.

GO TO FRAME 3



TA 084577

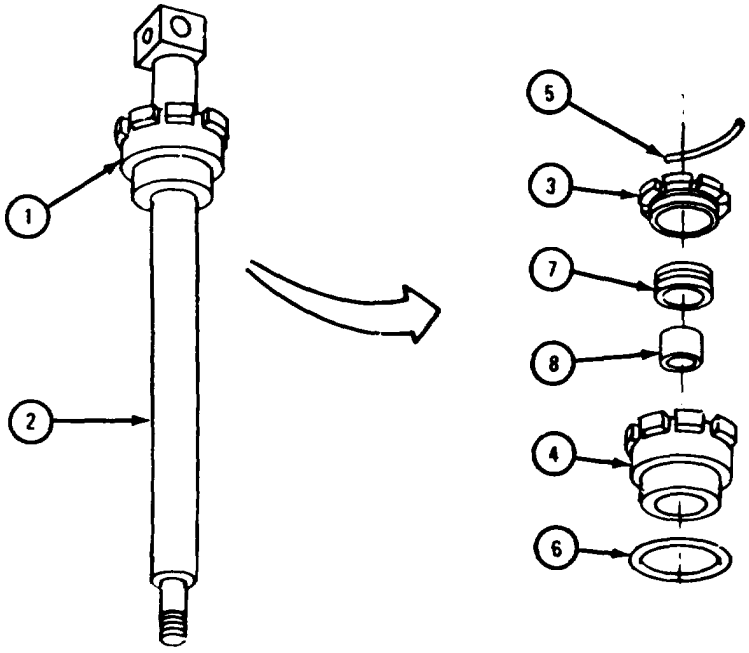
FRAME 3

1. Slide cylinder head and packing nut assembly (1) off piston rod (2).
2. Take off packing nut (3) from cylinder head (4).
3. Take seal (5) out of packing nut (3).
4. Take sealing ring (6) off cylinder head (4).
5. Take out packing (7) from cylinder head (4).
6. Press sleeve bearing (8) out of cylinder head (4) from bottom to top.
7. Throw away seal (5), sealing ring (6), packing (7), and sleeve bearing (8).

Soldiers A and B

8. Take piston rod (2) out of vise.

END OF TASK



TA 084578

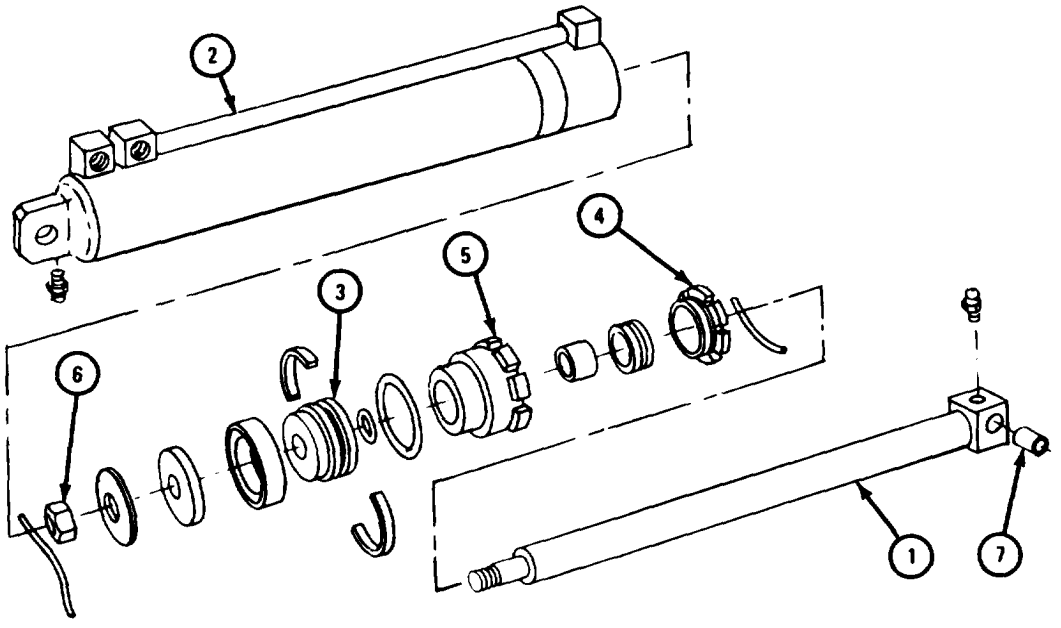
d. Cleaning. There are no special cleaning procedures needed. Refer to cleaning procedures given in Part 1, para 1-3

e. Inspection.

FRAME 1

1. Check that piston rod (1) is not burred, bent or scratched.
2. Check that cylinder assembly (2) is not cracked or scored and that threads are not damaged.
3. Check that piston (3) is not scored or worn.
4. Check that packing nut (4), cylinder head (5), and nut (6) do not have damaged threads.
5. Check that sleeve bearing (7) is not pitted, scored or damaged.

END-OF TASK



NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT.
PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR
REFERENCE PURPOSES.

TA 084579

f. Repair. No repairs are to be made on these parts. Throw away all damaged parts and get new ones in their places. If cylinder assembly is damaged, replace boom elevating cylinder assembly.

g. Assembly.

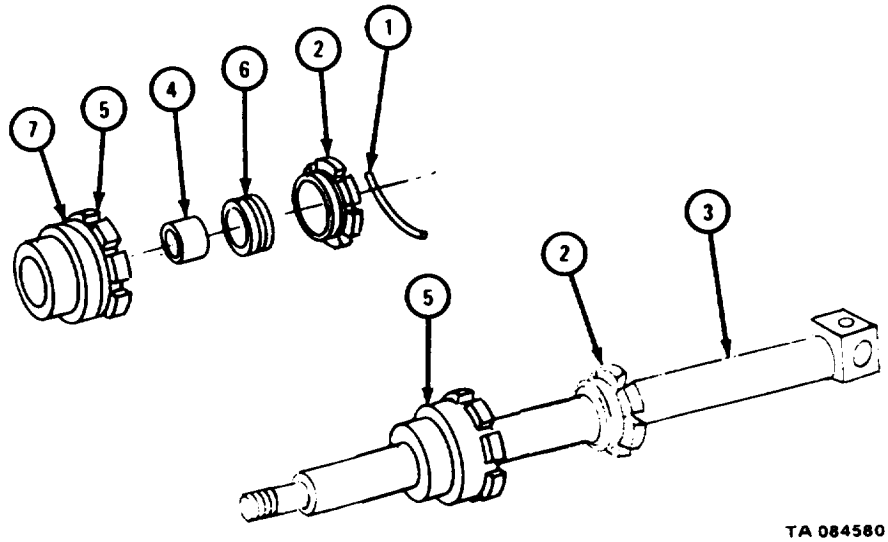
FRAME 1

WARNING

Be careful when handling boom elevating cylinder. It is heavy and can cause injury to personnel.

1. Put seal (1) in groove in packing nut (2).
2. Slide packing nut (2) with seal (1) onto piston rod (3).
3. Press sleeve bearing (4) into place in cylinder head (5).
4. Coat packing (6) with grease and put packing in place in cylinder head (5).
5. Put sealing ring (7) in place in groove in cylinder head (5).
6. Slide cylinder head (5) with sleeve bearing (4), packing (6), and sealing ring (7) onto piston rod (3).
7. Put packing nut (2) into cylinder head (5) until there is about 1/8-inch clearance between them.

GO TO FRAME 2



FRAME 2

Soldiers A and B 1. Put square head of piston rod (1) in vise.

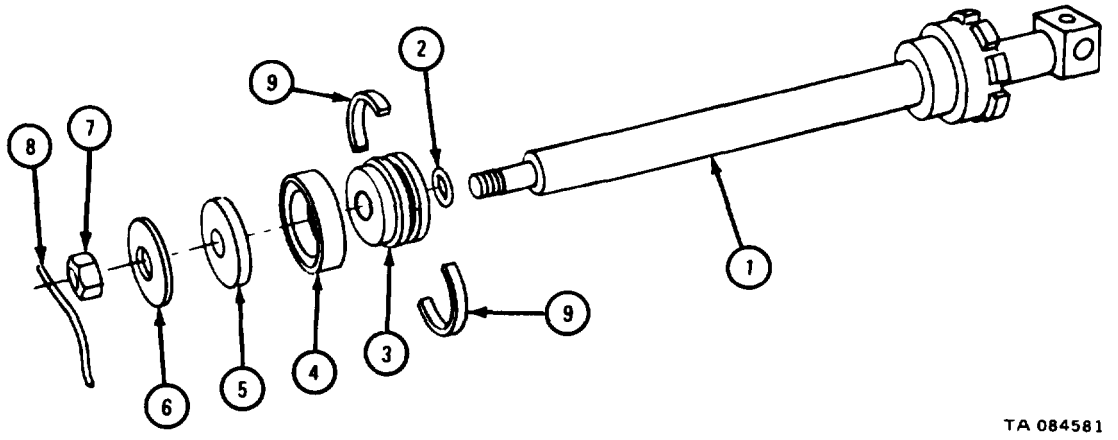
Soldier A 2. Put sealing ring (2), piston (3), seal (4), seal retainer washer (5), and retainer washer (6) on piston rod (1).

3. Put on nut (7).

4. Put safety wire (8) through holes in nut (7) and piston rod (1).

5. Put two piston rings (9) on piston (3).

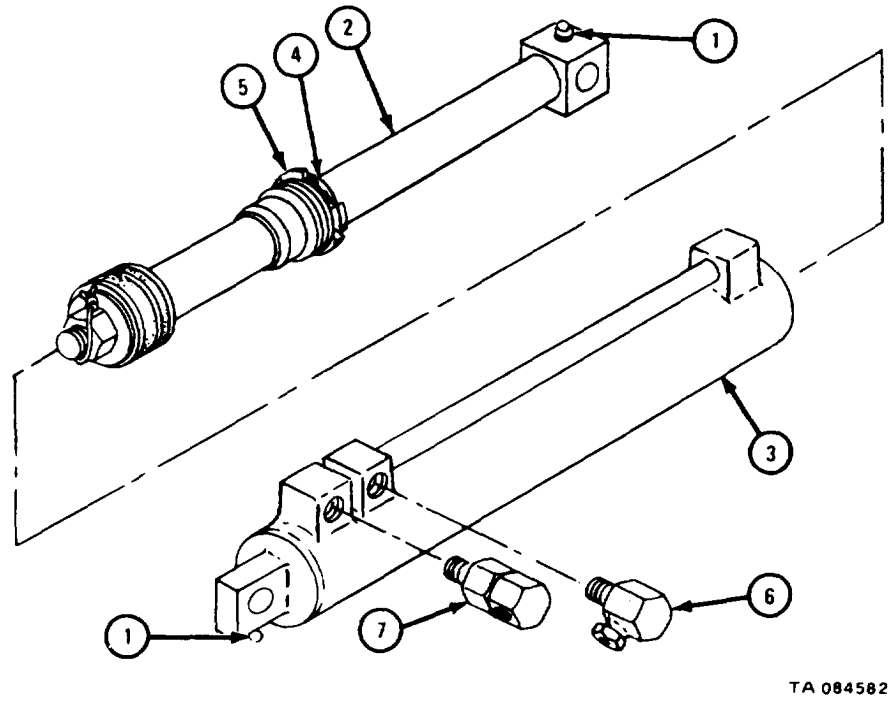
GO TO FRAME 3



FRAME 3

	1.	Put in two lubrication fittings (1).
Soldiers A and B	2.	Take piston rod assembly (2) out of vise.
Soldier A	3.	Coat inside of cylinder assembly (3) with oil.
Soldiers A and B	4.	Push piston rod assembly (2) into cylinder assembly (3).
Soldier B	5.	Tighten packing nut (4) in cylinder head assembly (5).
	6.	Put antiseize tape on threads of fitting (6) and snubber valve (7).
	7.	Put in fitting (6) in top hole of cylinder assembly (3), alining scribe marks.
	8.	Put in snubber valve (7), alining scribe marks.
	9.	Put caps on fitting (6) and snubber valve (7).

END OF TASK



TA 084582

h. Replacement.

FRAME 1

WARNING

Be careful when handling boom elevating cylinder (1). It is heavy and can cause injury to personnel.

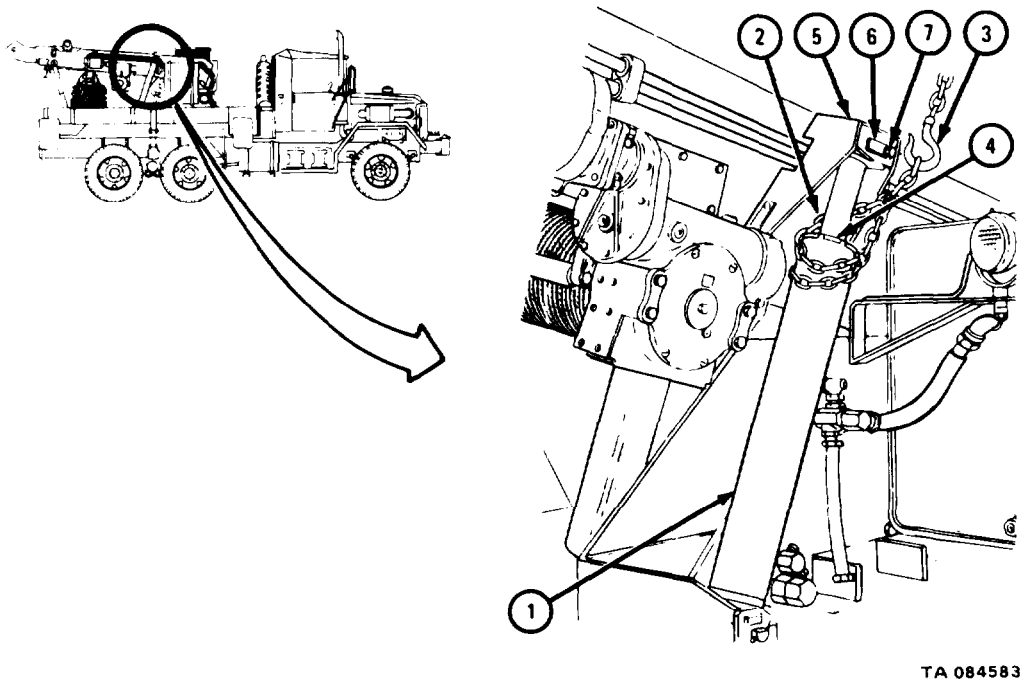
Soldier A 1. Wrap chain (2) around boom elevating cylinder (1) and hook chain to chain hoist (3) as shown.

Soldier B 2. Using chain hoist (3), lift boom elevating cylinder (1) into place.

Soldier A 3. Aline holes in piston rod (4) and bracket (5) and push pin (6) through bracket and piston rod.

4. Put in screw and lockwasher (7).

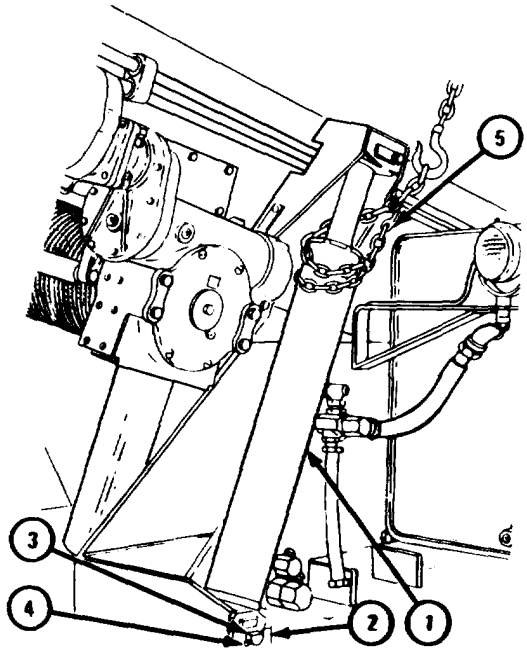
GO TO FRAME 2



FRAME 2

1. Pull boom elevating cylinder (1) down into place in bracket (2).
2. Aline holes in boom elevating cylinder (1) and bracket (2) and push pin (3) through bracket and boom elevating cylinder.
3. Put in cotter pin (4).
4. Take chain (5) off boom elevating cylinder (1).

GO TO FRAME 3



TA 084584

FRAME 3

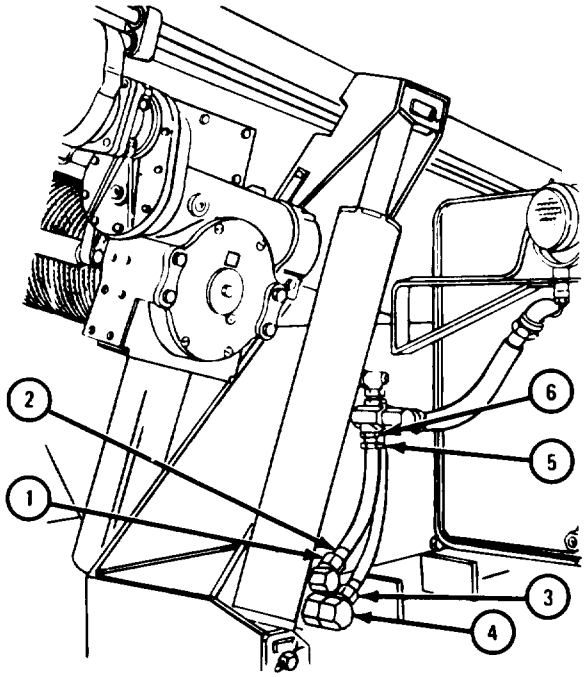
1. Take caps off all fittings.
2. Put nut (1) onto fitting of hose (2) as tagged. Take off tag.
3. Put antiseize tape on threads of nut (3).
4. Put nut (3) into snubber valve (4).
5. Put nut (5) onto fitting (6) as tagged. Take off tag.

NOTE

Follow-on Maintenance Action Required:

1. Fill hydraulic oil reservoir and grease sleeve bearings. Refer to LO 9-2320-211-12.
2. Raise and lower boom assembly several times, checking boom elevating cylinders for proper operation. Refer to TM 9-2320-211-10.
3. Check level in hydraulic oil reservoir again. Refer to LO 9-2320-211-12.
4. Put boom assembly in travel position. Refer to TM 9-2320-211-10.

END OF TASK



TA 084585

17-43. LOWER BOOM FOOT SHEAVE REMOVAL AND REPLACEMENT (TRUCK M543A2).

TOOLS : No special tools required

SUPPLIES : Artillery and automotive grease, types GAA and MIL-G-10924
Clean rags
Solvent, dry cleaning, type 11 (SD-2), Fed. Spec. P-D-680
Gloves

PERSONNEL: Two

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Lower crane hook to ground in order to take tension off hoist cable. Refer to TM 9-2320-211-10.

(2) Take off sheave guard. Refer to paragraph 17-27.

b. Removal.

FRAME 1

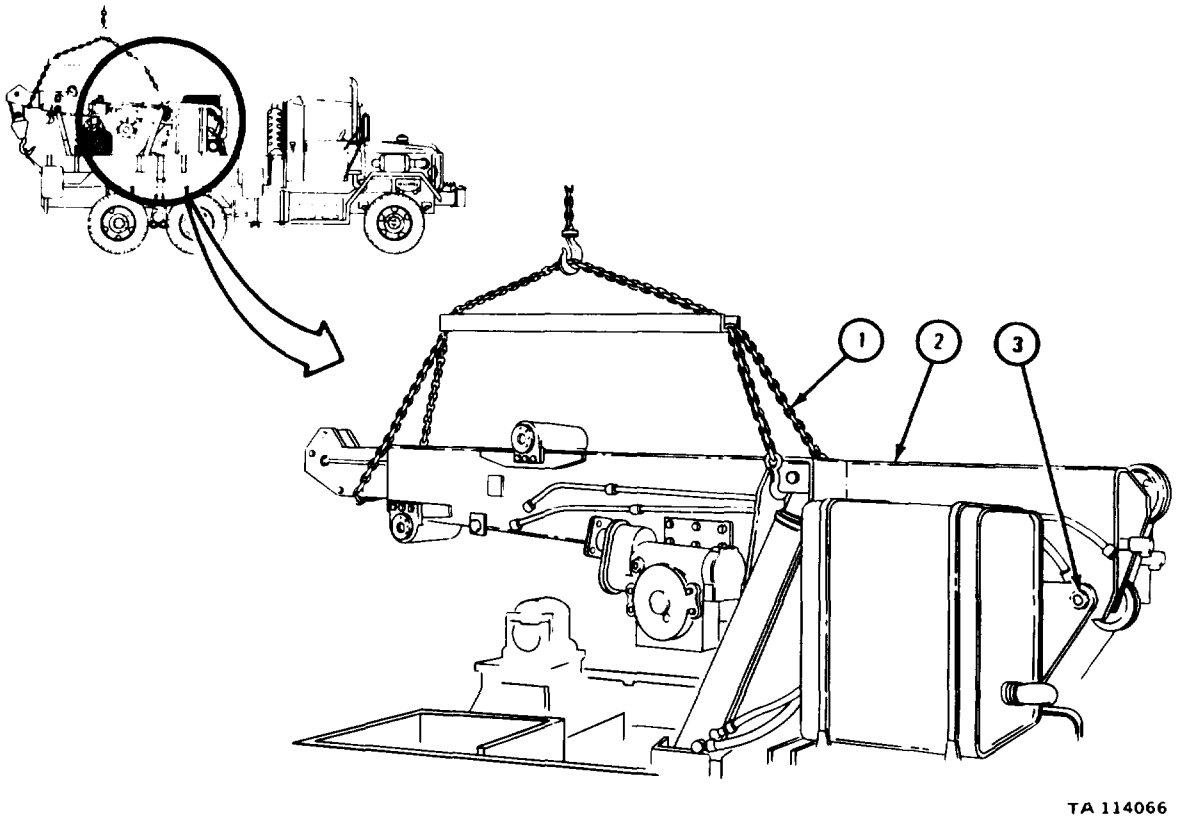
WARNING

This equipment is very heavy and bulky. Tie inner boom to outer boom with chain or other suitable means. Do this to stop inner boom from drawing out when the assembly is lifted, which could cause injury to personnel.

Soldier A 1. Using overhead hoist (1), lift boom assembly (2) until pressure is removed from pivot pin (3).

Soldier B 2. Check with soldier A when pressure is off pivot pin (3) and stop.

GO TO FRAME 2

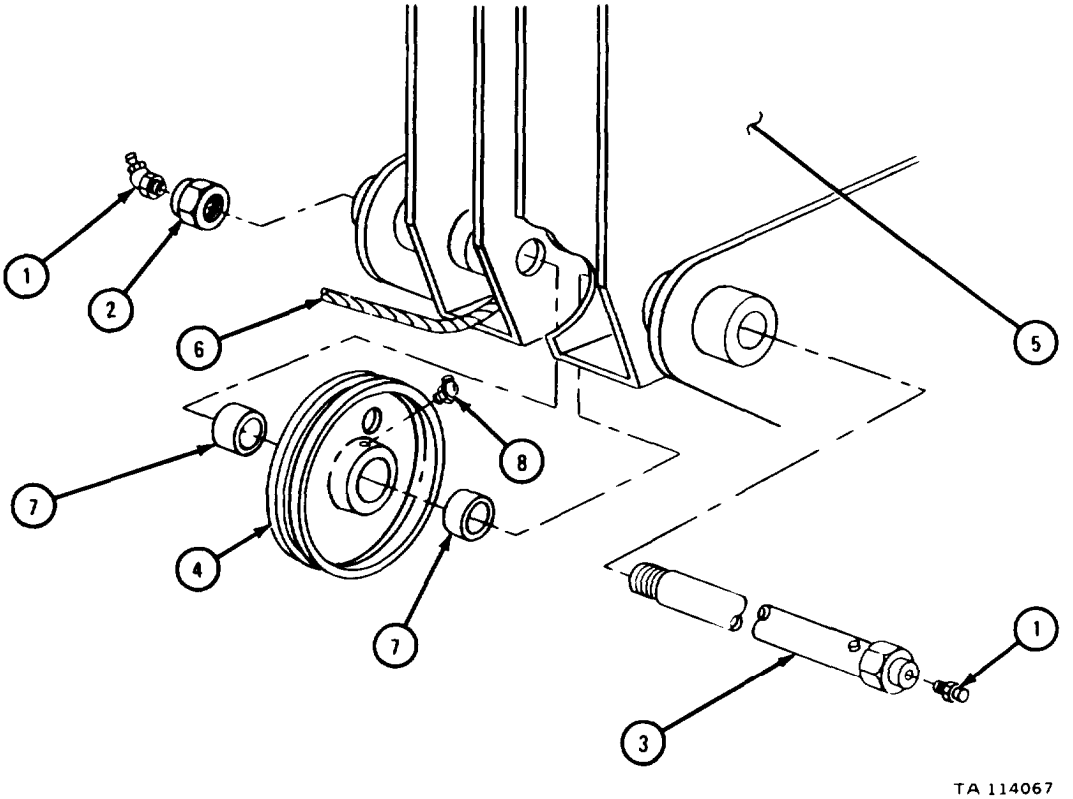


WARNING

Always wear gloves when handling wire cable.
Never let the cable run through bare hands.
Broken wires can cause painful injuries.

FRAME 1

Soldier A 1. Take off grease fittings (1) and nut (2).
Soldier B 2. Drive out pivot pin (3).
Soldier A 3. Take out sheave (4) from boom assembly (5) and off cable (6).
Soldier B 4. Take off two bearings (7) and grease fitting (8) from sheave (4).
END OF TASK



c. Cleaning. There are no special cleaning procedures required. Refer to cleaning procedures given in Part 1, para 1-3.

d. Inspection and Repair.

(1) Check that sheave, pivot pin, bearings, nut and grease fittings are not worn or damaged.

(2) If defective, throw away and get new parts.

e. Replacement.

FRAME 1

WARNING

Always wear gloves when handling wire cable. Never let the cable run through bare hands. Broken wires can cause painful injuries.

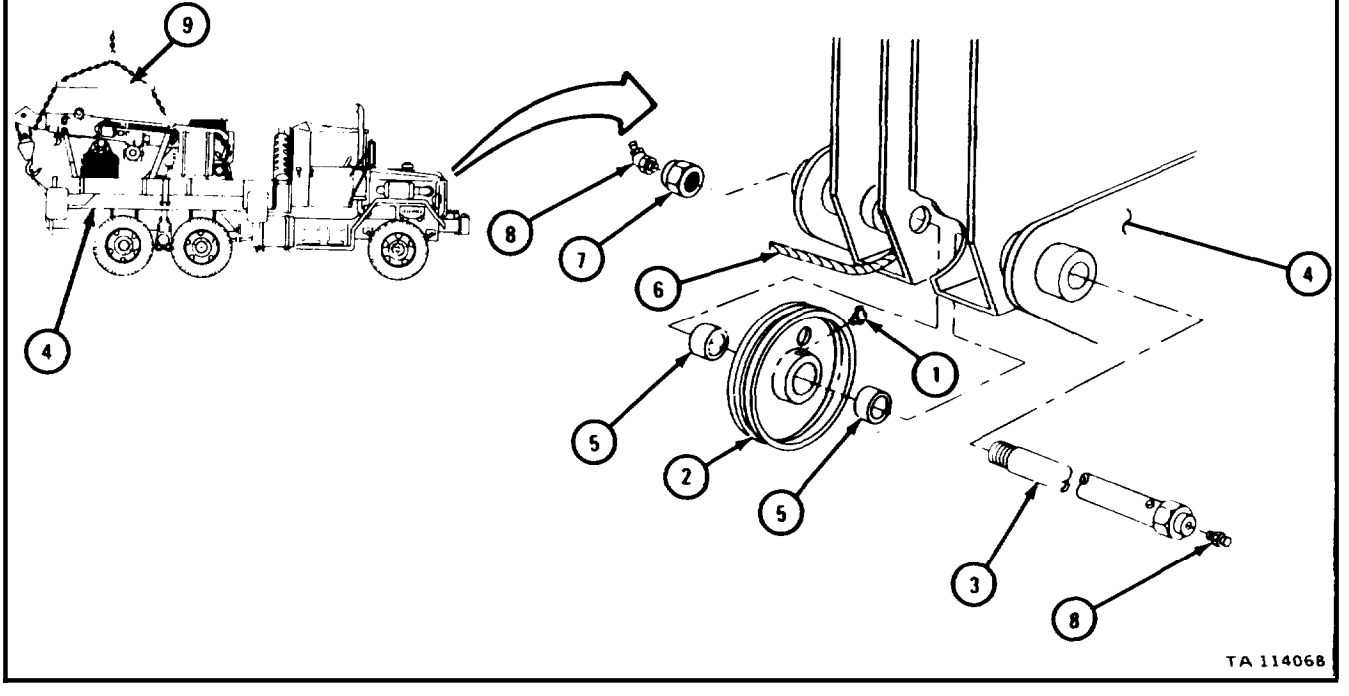
Soldier A	1.	Put grease fitting (1) into sheave (2).
Soldier B	2.	Aline pivot pin (3) with holes in boom assembly (4).
Soldier A	3.	Aline sheave (2) and two bearings (5) under cable (6) with boom assembly (4) and pivot pin (3). Tell soldier B to drive pivot pin slowly through to other side.
Soldier B	4.	Put nut (7) on pivot pin (3).
Soldier A	5.	Put two grease fittings (8) on each end of pivot pin (3).
Soldier B	6.	Put grease into grease fittings (1) and (8).
Soldiers A and B	7.	Lower overhead hoist (9) and remove from boom.

NOTE

Follow-on Maintenance Action Required:

1. Put on sheave guard. Refer to paragraph 17-27.
2. Raise crane hook and tie. Refer to TM 9-2320-211-10.

END OF TASK



17-44. BOOM ASSEMBLY REMOVAL, REPAIR, AND REPLACEMENT (TRUCK M543A2).

TOOLS : No special tools required

SUPPLIES : Hose caps (8)

PERSONNEL : Four

EQUIPMENT CONDITION: Truck parked on level ground, engine off, handbrake set.

a. Preliminary Procedures.

(1) Take off cable from hoist winch drum. Refer to TM 9-2320-211-20.

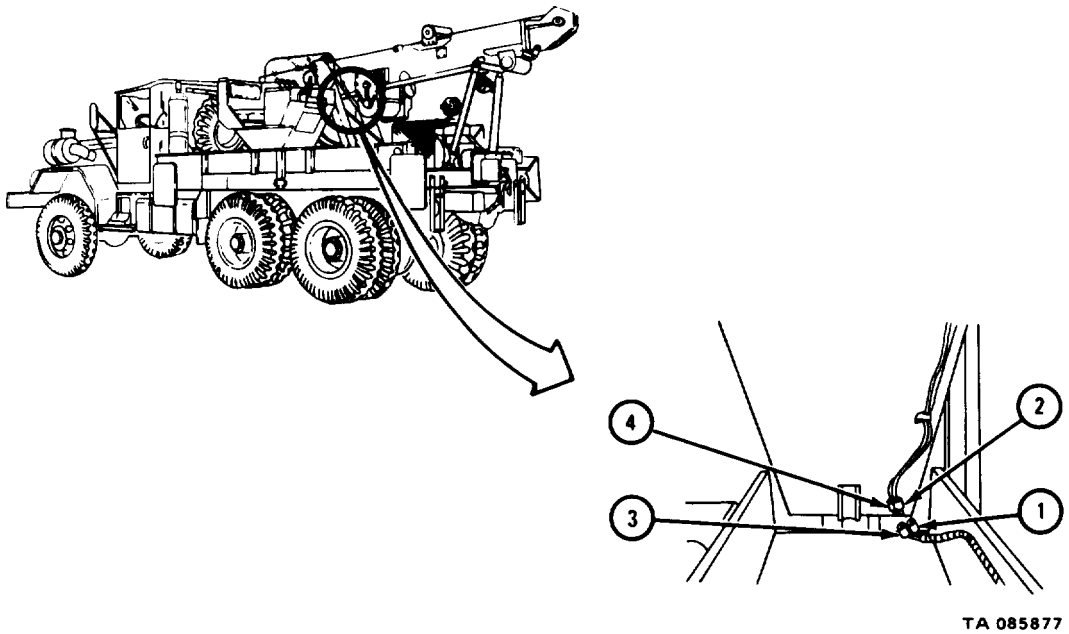
(2) Drain hydraulic system. Refer to LO 9-2320-211-12.

b. Removal.

FRAME 1

1. Pull plug (1) out of receptacle (2).
2. Pull plug (3) out of receptacle (4).

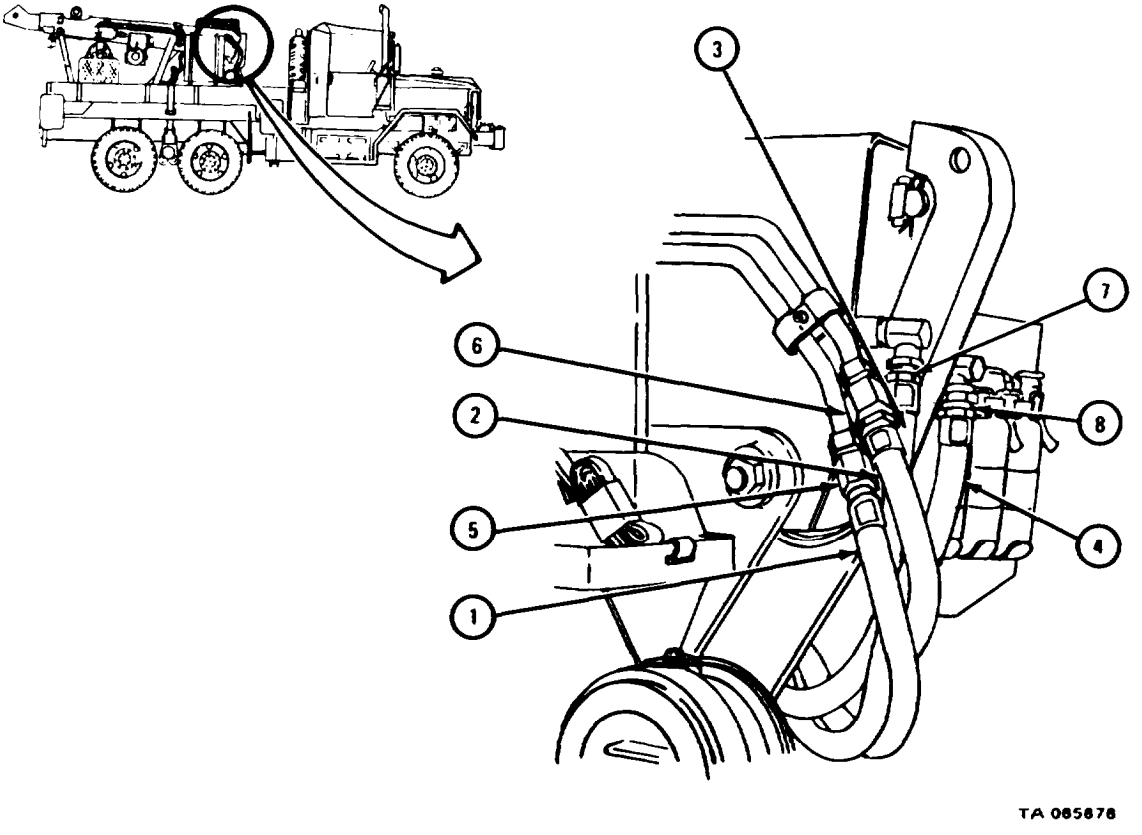
GO TO FRAME 2



FRAME 2

1. Take hydraulic hoses (1 through 4) off hydraulic lines (5 through 8). Tag hydraulic lines and hydraulic hoses so that they will be put back in the same places.
2. Put caps on hydraulic hoses (1 through 4) and hydraulic lines (5 through 8).

GO TO FRAME 3



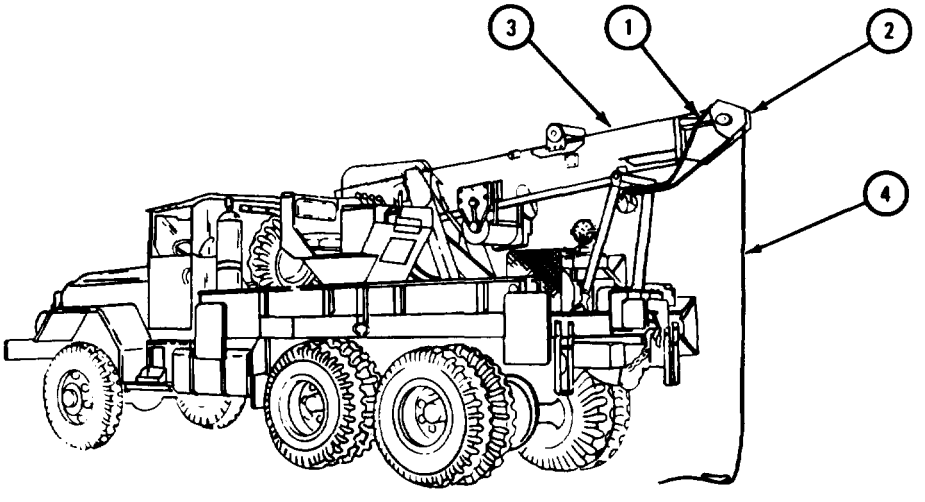
FRAME 3

WARNING

Inner boom (2) must be tied to outer boom (3) with a chain or heavy rope. This will stop inner boom from coming out and causing injury when taking off boom assembly.

1. Using 4-foot chain (1), tie inner boom (2) to outer boom (3). Tie 1/2-inch rope (4) on front of inner boom.

Go GO TO FRAME 4

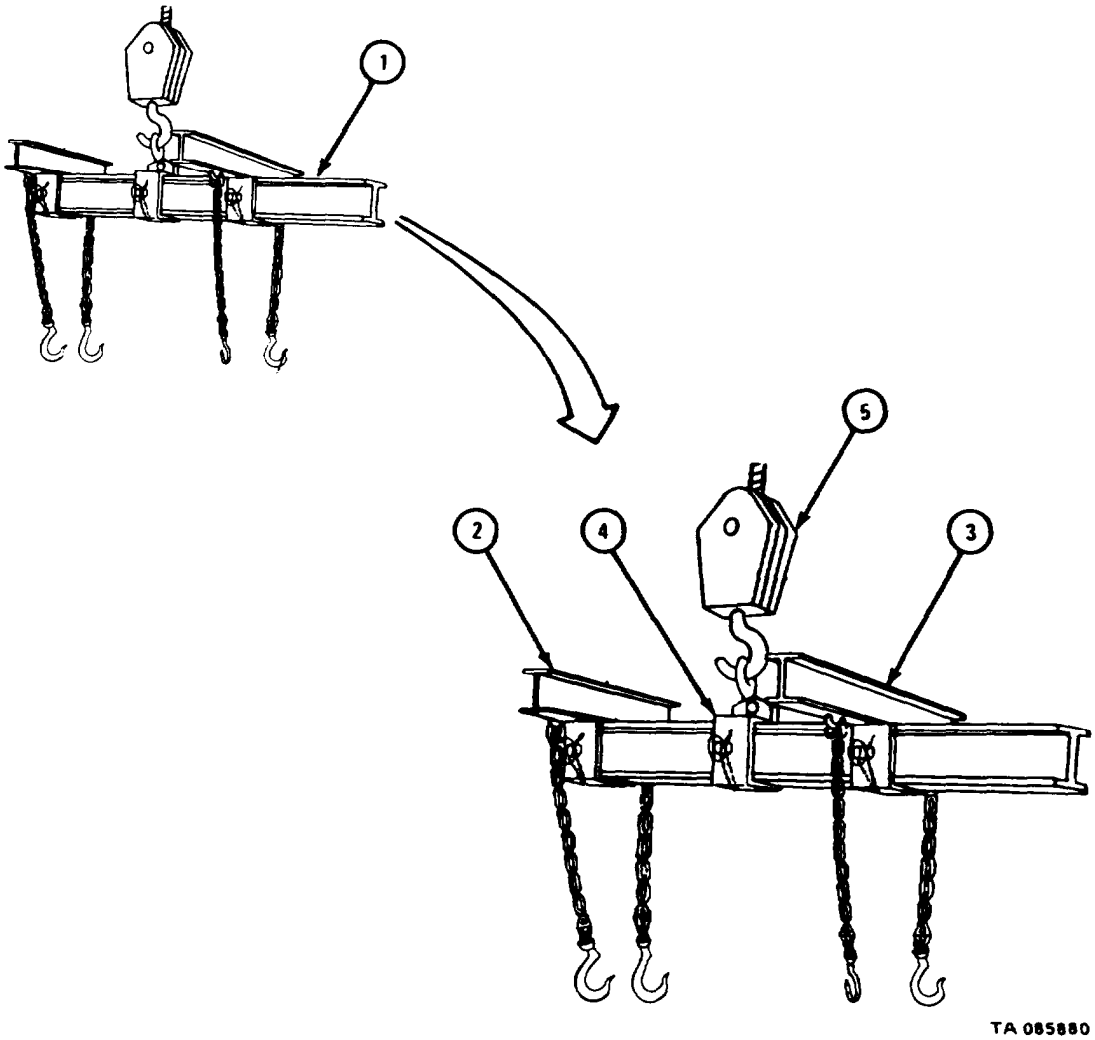


TA 085879

FRAME 4

1. Set uplifting sling (1) as follows:
   (a) Put pin for short crosspiece (2) through POWER PACK hole.
   (b) Put pin for long crosspiece (3) through ENG. AND DECK hole.
   (c) Put pin for shackle assembly (4) through ENG. hole.
2. Join hook (5) to shackle assembly (4).

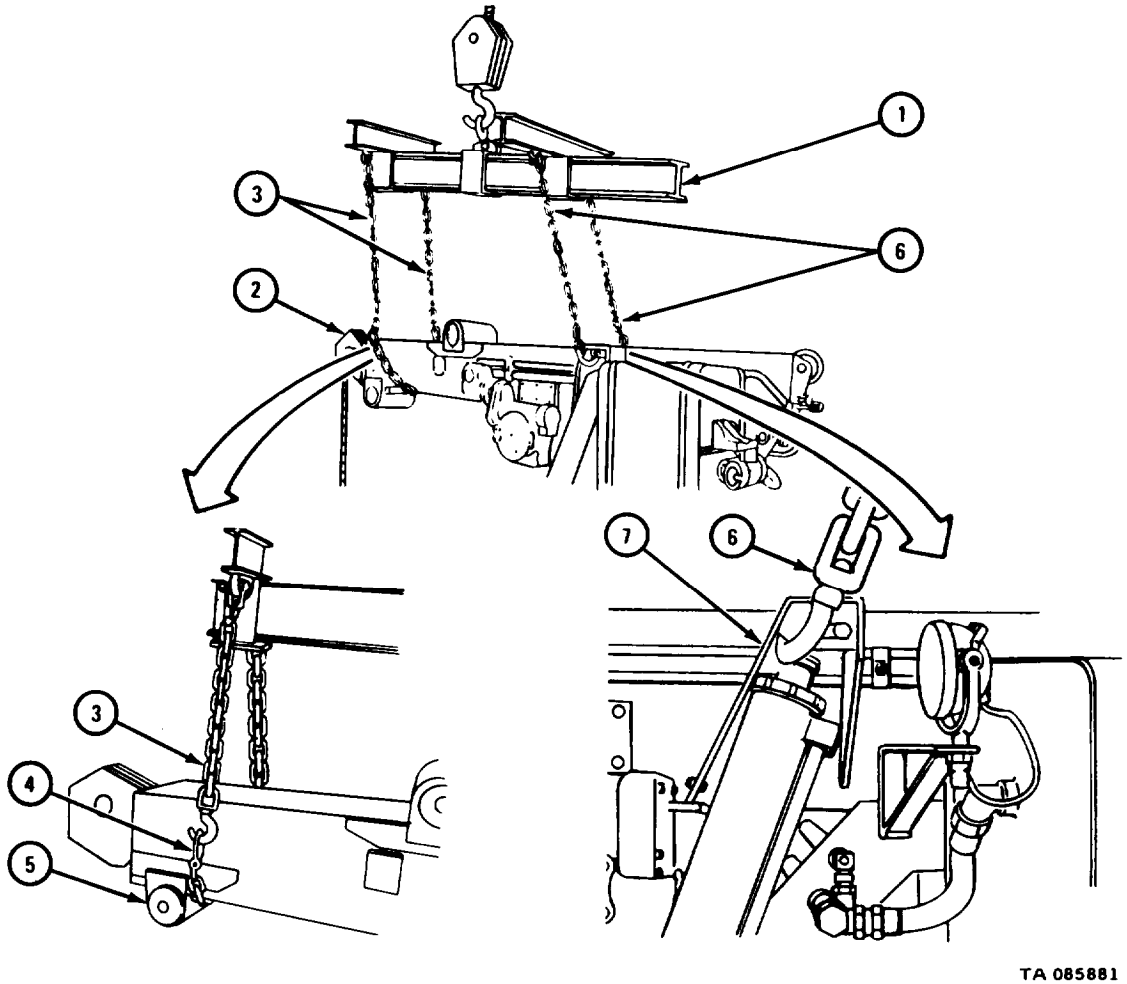
GO T0 FRAME 5



FRAME 5

1. Using hoist, position lifting sling (1) over boom assembly (2).
2. Hook two short crosspiece chains (3) onto 3-foot chain (4) placed in front of boom roller (5).
3. Hook two long crosspiece chains (6) at rear of boom elevating cylinder brackets (7).

GO TO FRAME 6

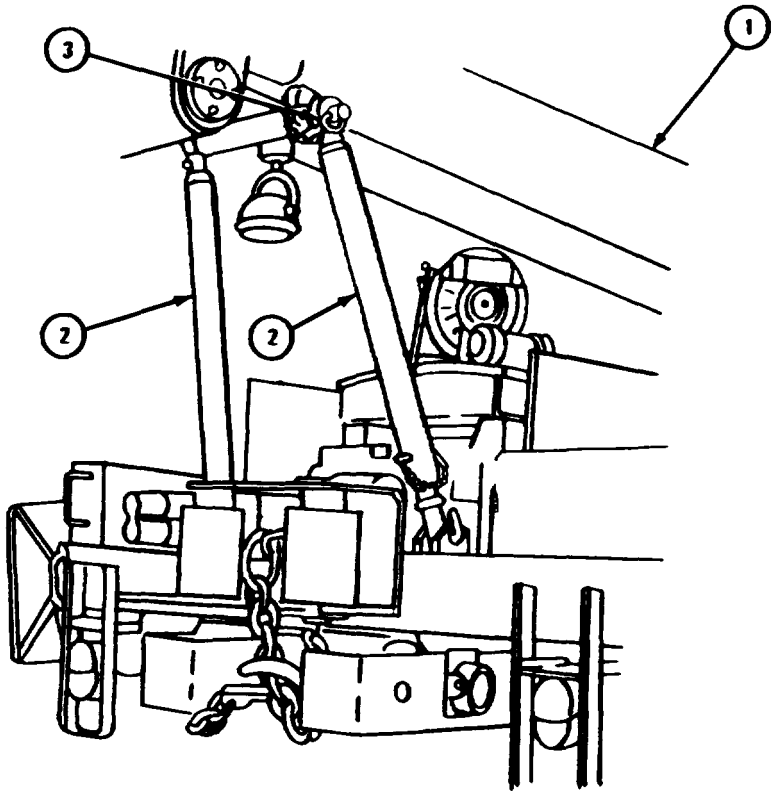


TA 085881

FRAME 6

1. Using hoist, take weight of boom assembly (1) off two shipper braces (2).
2. Take out two pins (3). Take shipper braces (2) off boom assembly (1) and lay them down.

GO TO FRAME 7

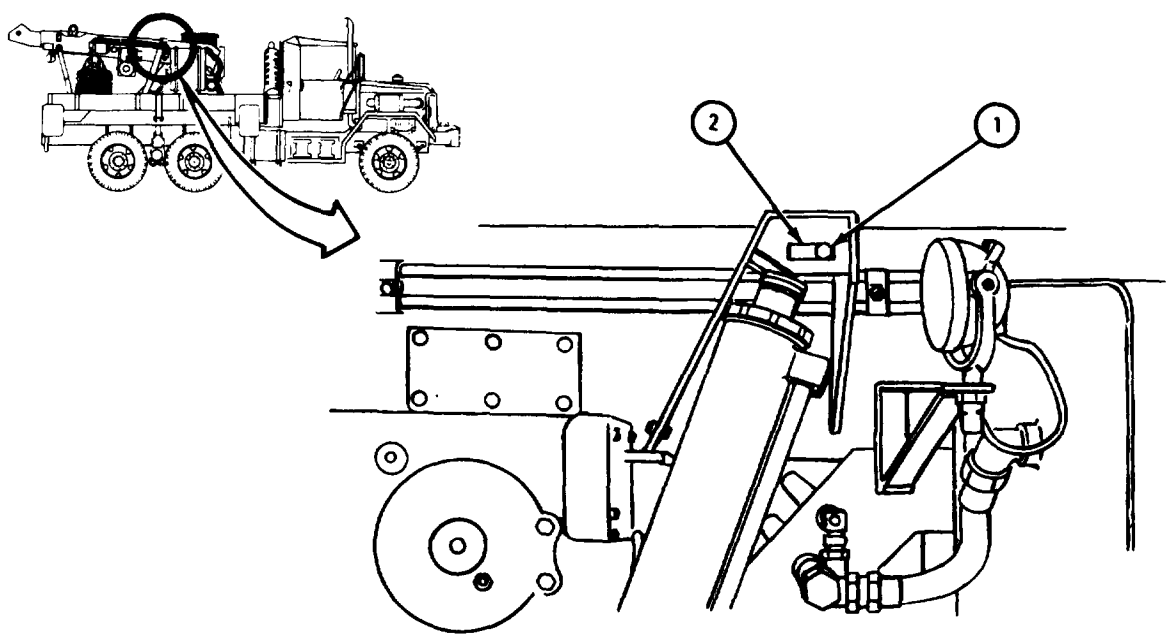


TA 085882

FRAME 7

1. Take out bolt and lockwasher (1).
2. Take out pin (2).
3. Do steps 1 and 2 again for elevating cylinder on other side of boom assembly.

GO TO FRAME 8



FRAME 8

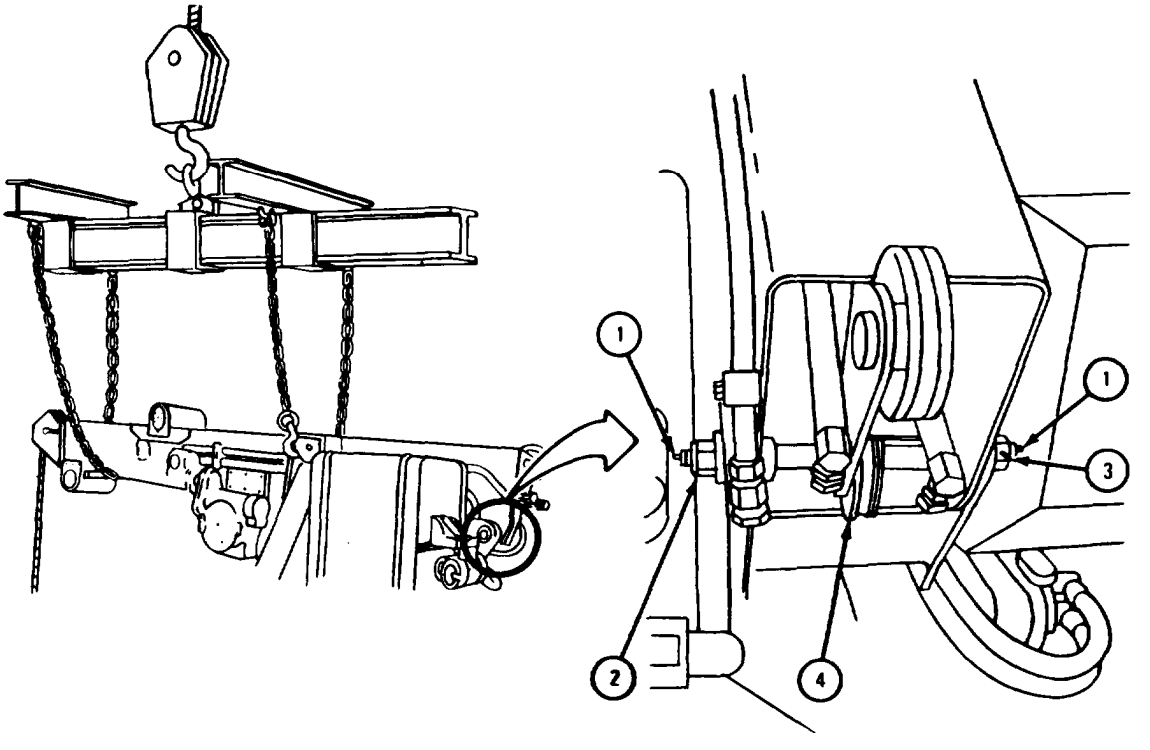
1. Take out two grease fittings (1).
2. Take off locknut (2).

Soldier A 3. Stand at hoist controls.

Soldier B 4. Check that pivot pin (3) turns freely. If pivot pin does not turn freely, tell soldier A to raise or lower boom assembly until it does.

5. Drive out pivot pin (3). Take out sheave (4).

GO TO FRAME 9

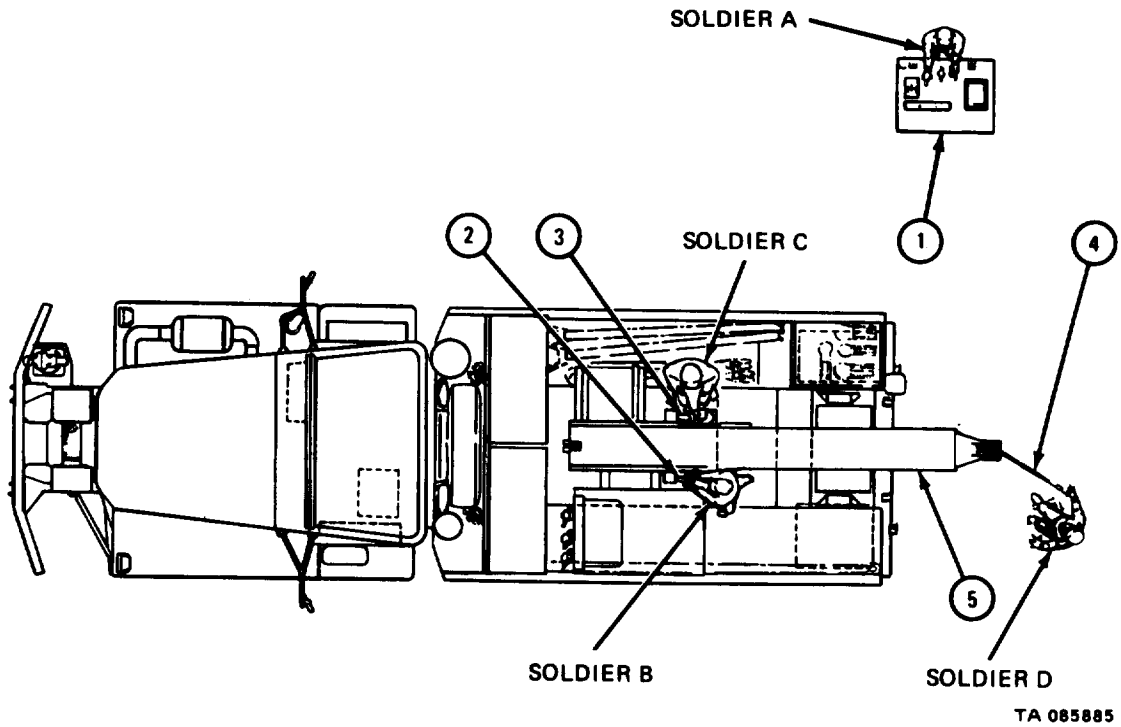


TA 085884

FRAME 9

Soldier A	1.	Stand at hoist controls (1).
Soldier B	2.	Stand on wrecker next to left boom elevating cylinder (2).
Soldier C	3.	Stand on wrecker next to right boom elevating cylinder (3).
Soldier D	4.	Stand at rear of wrecker and hold guide rope (4).
Soldier A	5.	When soldiers B, C, and D are ready, use hoist to lift boom assembly (5) clear of boom elevating cylinders (2 and 3).
Soldiers B and C	6.	Move boom elevating cylinders (2 and 3) away from boom assembly (5) and go to pivot pin end of boom assembly.

GO T'0 FRAME 10



FRAME 10

WARNING

Boom assembly (1) must be guided during hoisting so that it does not injure personnel.

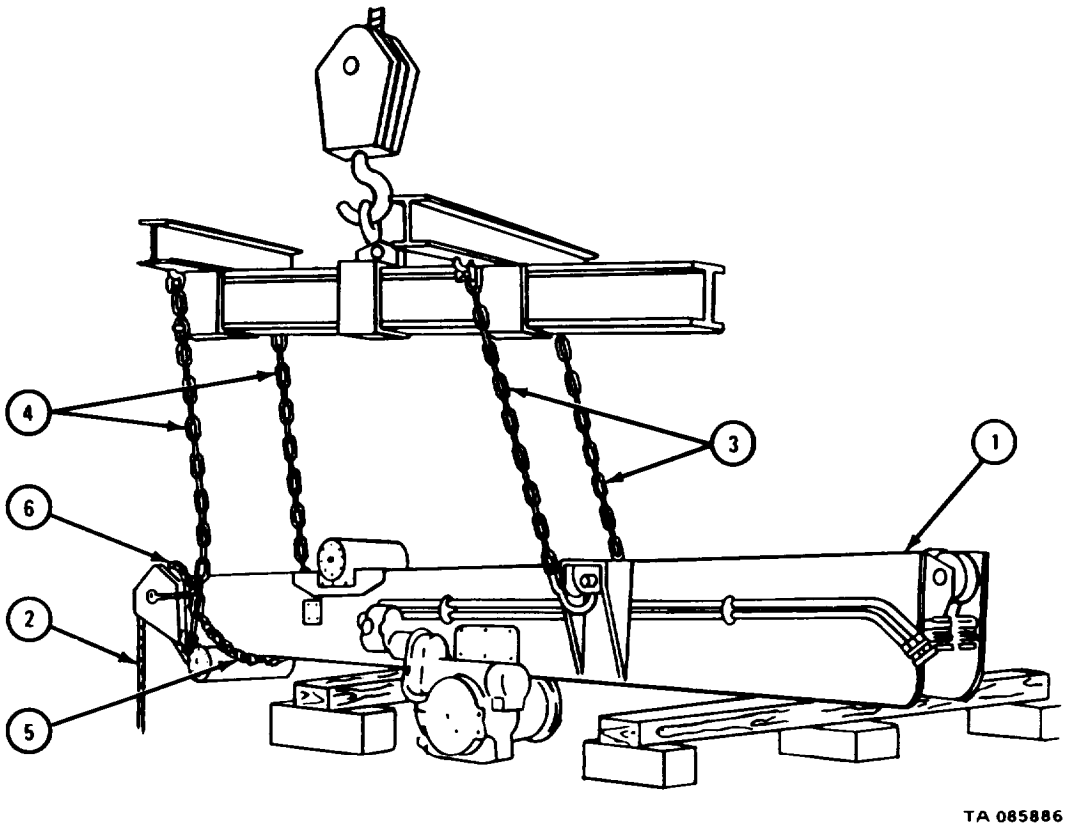
Soldiers B and C
1. Tell soldiers A and D which way to move boom assembly (1) as it is being lifted.

Soldiers A and D
2. Using hoist and guide rope (2), lift and guide boom assembly (1) off truck and onto boom assembly supports.

3. Unhook two chains (3). Unhook two chains (4) from 3-foot chain (5) and take off 3-foot chain.

4. Take off guide rope (2) and 4-foot chain (6).

END OF TASK



c. Replacement.

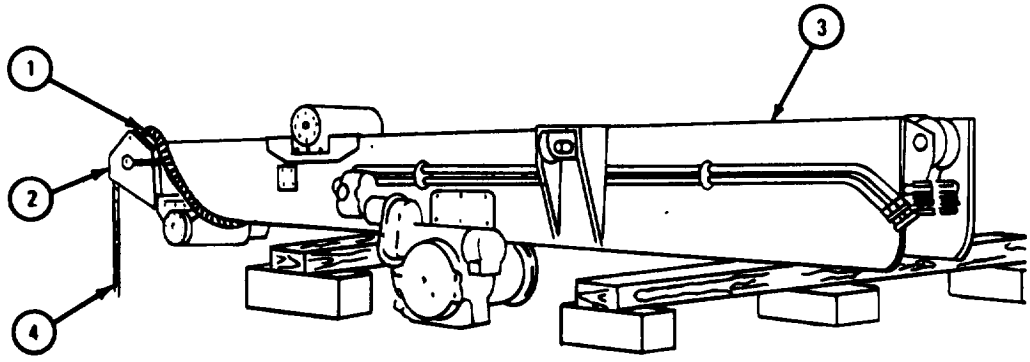
FRAME 1

WARNING

Inner boom (2) must be tied to outer boom (3) with chain or heavy rope (1). This will stop inner boom from sliding out and causing injury when hoisting boom assembly.

1. Using 4-foot chain (1), tie inner boom (2) to outer boom (3). Tie 1/2-inch rope (4) to front of inner boom.

GO TO FRAME 2

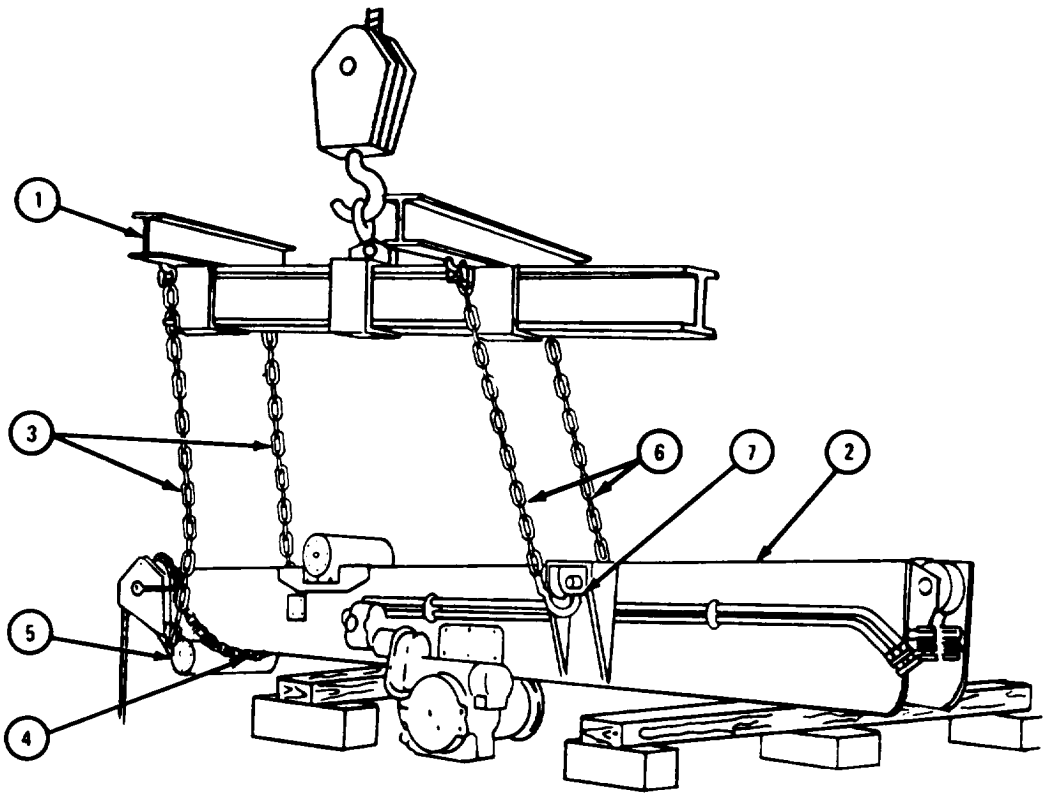


TA 085887

FRAME 2

1. Using hoist, put lifting sling (1) over boom assembly (2) as shown.
2. Hook two short crosspiece chains (3) to 3-foot chain (4) placed in front of boom roller (5).
3. Hook two long crosspiece chains (6) at rear of boom elevating cylinder brackets (7).
4. Using hoist, take slack out of chains.

GO TO FRAME 3



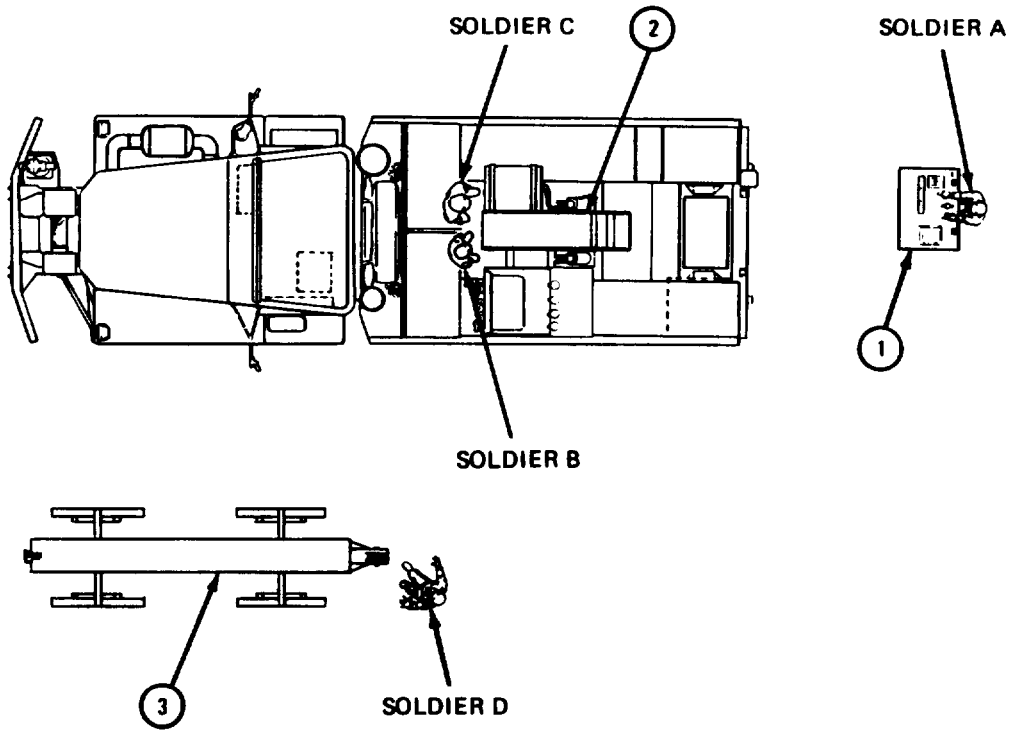
FRAME 3

Soldier A 1. Stand at hoist controls (1).

Soldiers B and C 2. Stand on wrecker in front of boom support assembly (2).

Soldier D 3. Stand at front end of boom assembly (3).

GO TO FRAME 4



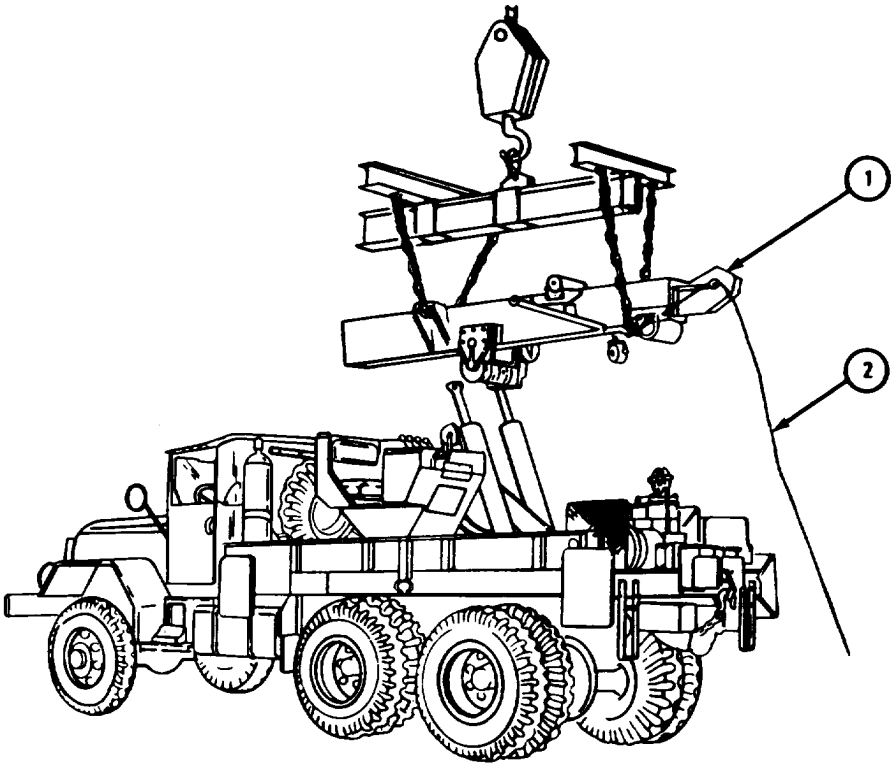
FRAME 4

WARNING

Boom assembly (1) must be guided during hoisting so that it does not injure personnel.

Soldier D	1. Hold guide rope (2) at front end of boom assembly (1) to guide it when it is hoisted. Tell soldier A that you are ready.
Soldiers B and C	2. Tell soldiers A and D which way to move boom assembly (1) as it is being lifted into place.
Soldiers A and D	3. Using hoist and guide rope (2), lift and guide boom assembly (1) into place on truck.

GO TO FRAME 5



TA 085890

FRAME 5

NOTE

It may be necessary to move boom assembly (1) often as pivot pin (3) is tapped into place. All four soldiers will have to work together to keep pivot pin holes alined.

Soldier B 1. Tell soldiers A and D to move boom assembly (1) until pivot pin holes in boom support (2) and boom assembly are alined. Put brass drift through pivot pin holes to keep them alined as pivot pin (3) is tapped into place.

2. Start pivot pin (3) through holes.

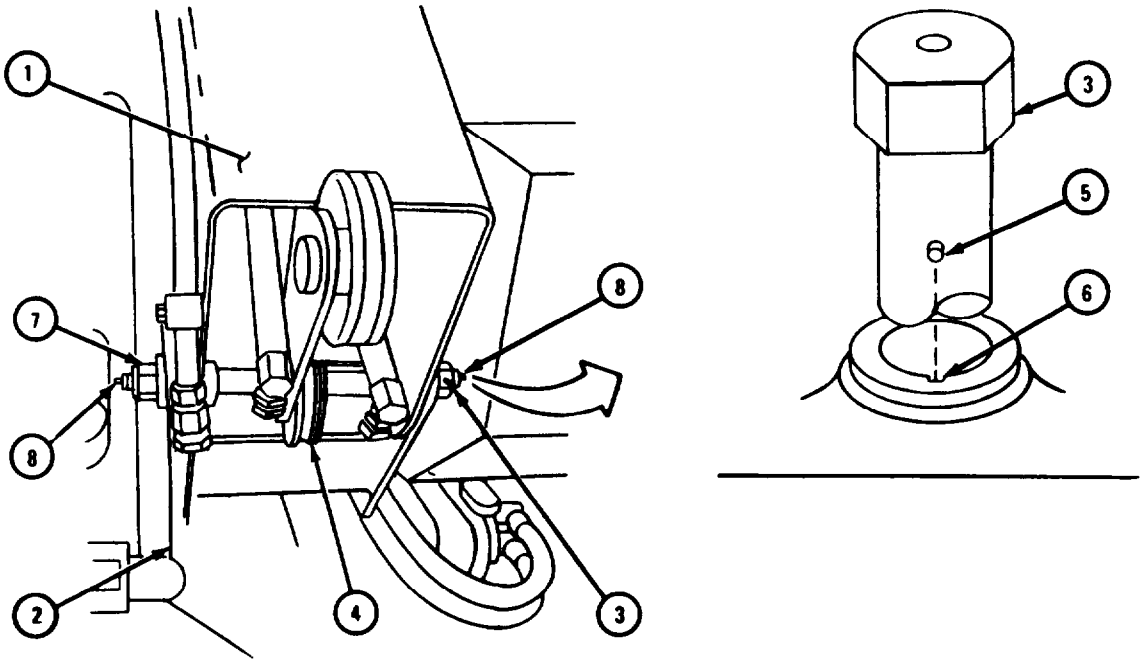
Soldier C 3. Hold sheave (4) in place. Use brass drift to keep pivot pin holes alined while soldier B taps in pivot pin (3).

Soldier B 4. Line up key (5) on pivot pin (3) with keyway (6) in boom support (2). Tap pivot pin into place.

5. Put on locknut (7).

6. Put in two grease fittings (8).

GO TO FRAME 6



TA 085891

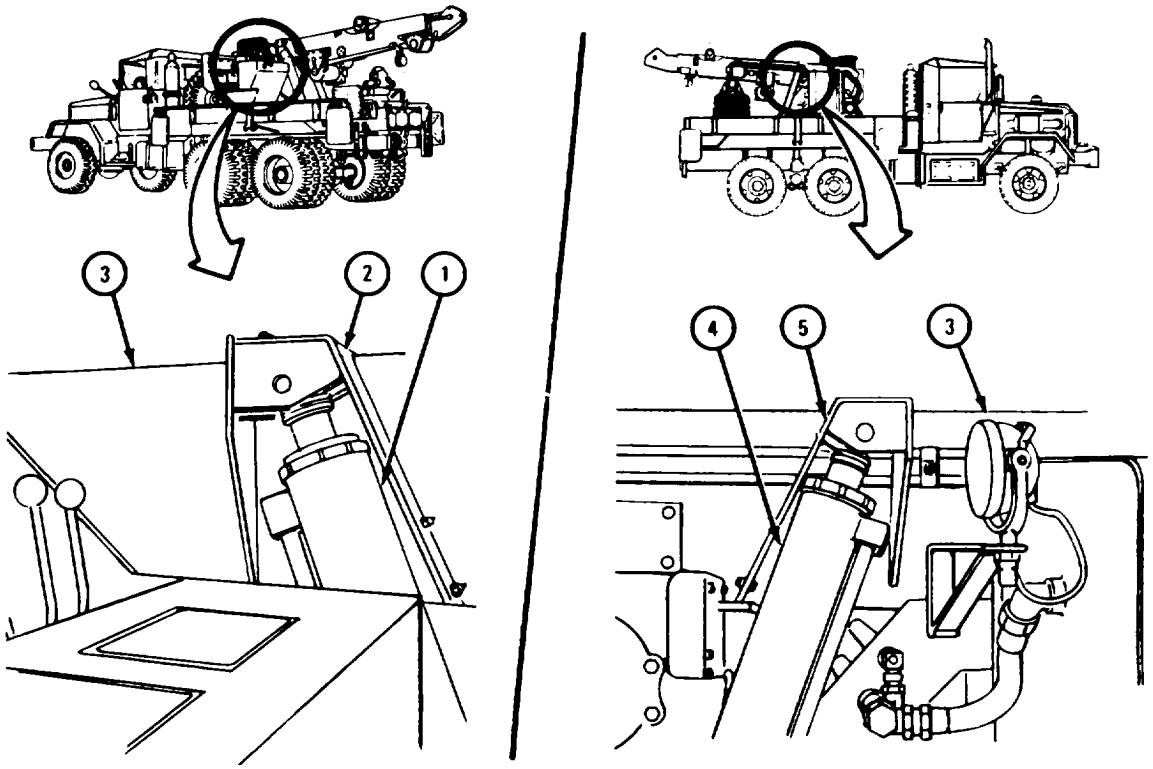
FRAME 6

Soldier B 1. Working on left boom elevating cylinder (1), guide it into bracket (2) as boom assembly (3) is lowered.

Soldier C 2. Working on right boom elevating cylinder (4), guide it into bracket (5) as boom assembly (3) is lowered.

Soldier A 3. Using hoist, lower boom assembly (3) until soldiers B and C tell you that elevating cylinders (1 and 4) are inside brackets (2 and 5)

GO TO FRAME 7



SOLDIER B

SOLDIER C

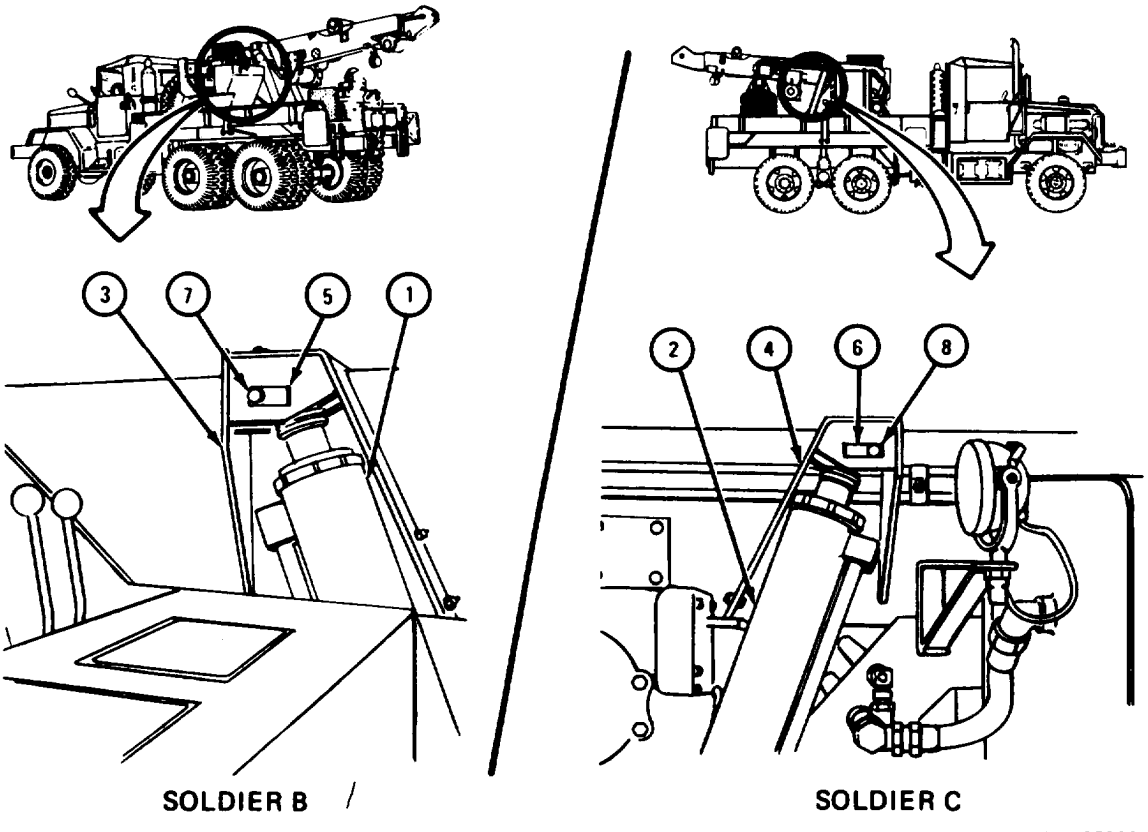
TA 085892

FRAME 7

Soldiers B and C

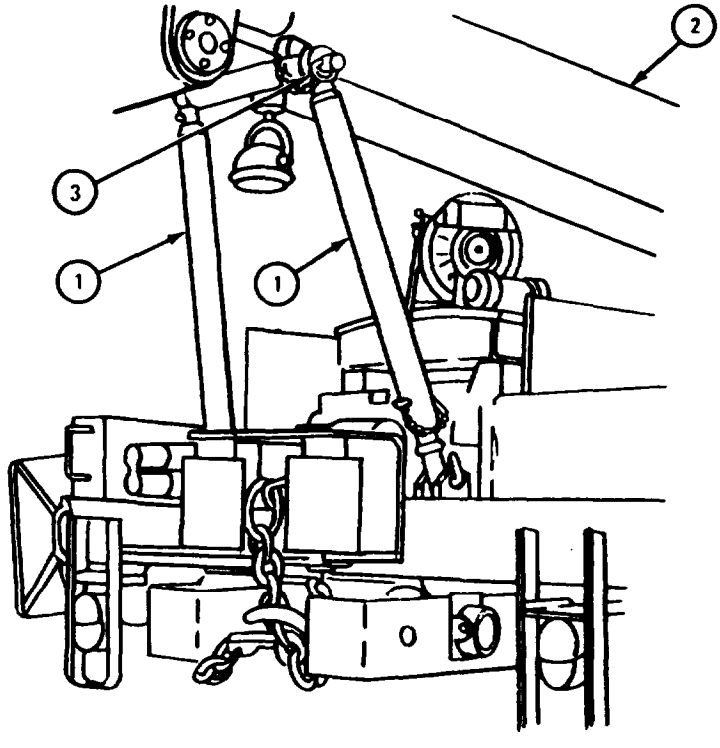
1. Aline holes in boom elevating cylinders (1 and 2) and brackets (3 and 4).
2. Tap in pins (5 and 6).
3. Put in two bolts and loclwashers (7 and 8).

GO TO FRAME 8



FRAME 8

1. Put two shipper braces (1) in place on boom assembly (2). Put in two pins (3).
GO TO FRAME 9

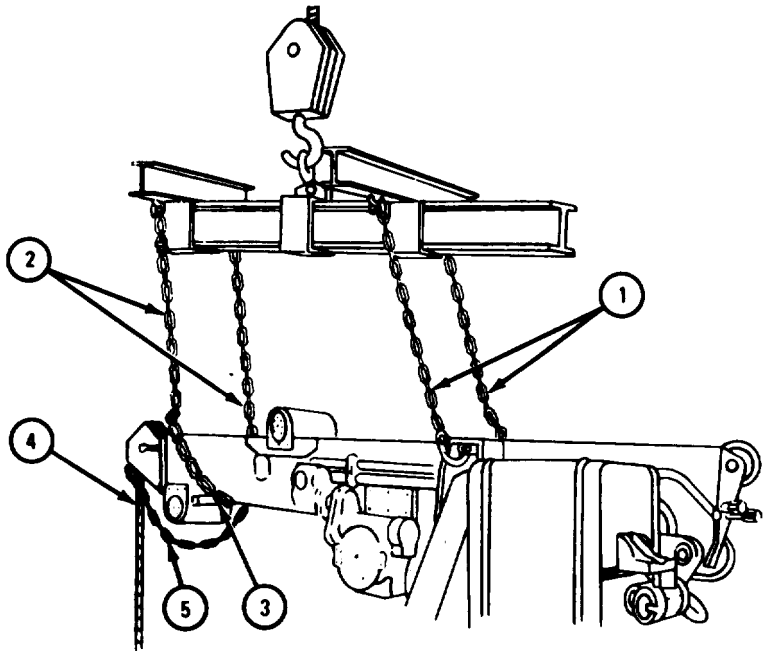


TA 085894

FRAME 9

1. Lower hoist until there is slack in chains (1 and 2).
2. Unhook two chains (1). Unhook two chains (2) from 3-foot chain (3). Take off 3-foot chain.
3. Take off guide rope (4) and 4-foot chain (5).

GO TO FRAME 10



TA 085895

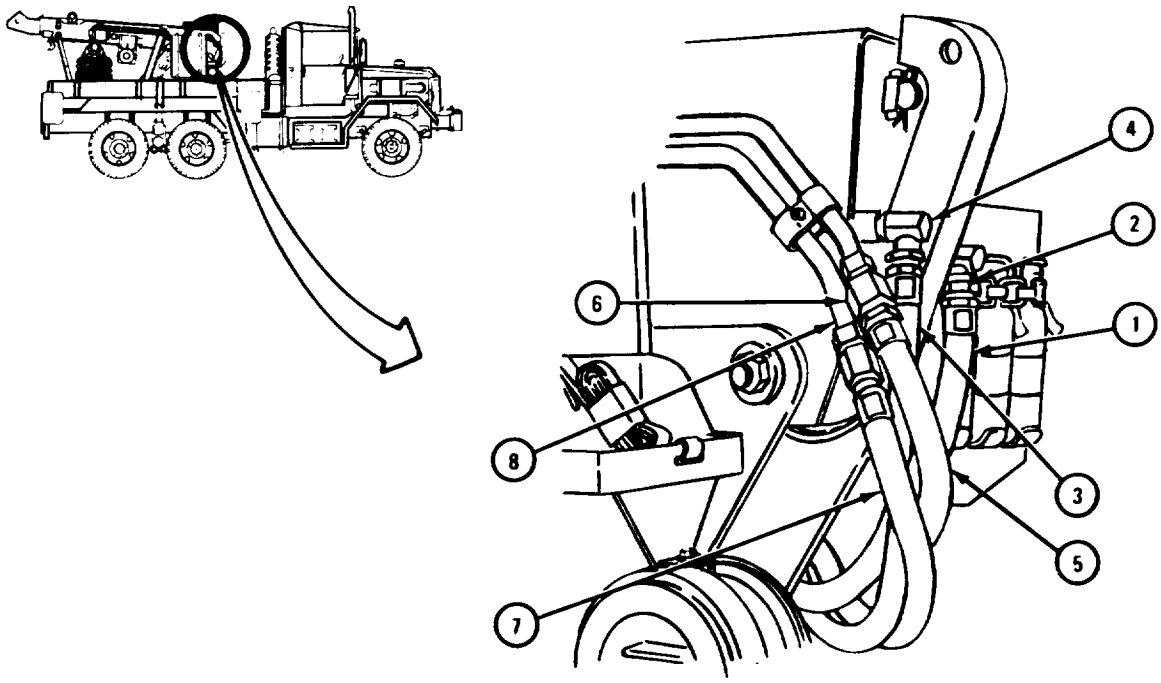
FRAME 10

NOTE

Take off caps from hydraulic lines and hoses before putting lines and hoses in place.

1. Tighten fitting on hydraulic hose (1) to hydraulic line (2) as tagged.
2. Tighten fitting on hydraulic hose (3) to hydraulic line (4) as tagged.
3. Tighten fitting on hydraulic hose (5) to hydraulic line (6) as tagged.
4. Tighten fitting on hydraulic hose (7) to hydraulic line (8) as tagged.
5. Take off all tags.

GO TO FRAME 11



FRAME 11

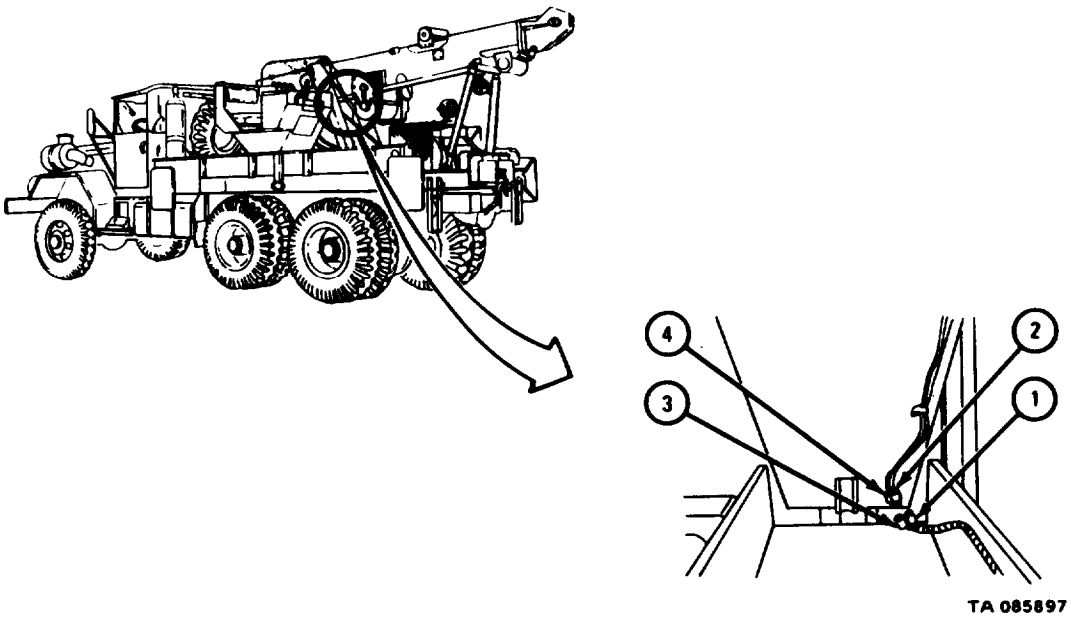
1. Join plug (1) to receptacle (2).
2. Join plug (3) to receptacle (4).

NOTE

Follow-on Maintenance Action Required:

1. Put cable on hoist winch drum. Refer to TM 9-2320-211-20.
2. Fill hydraulic system. Refer to LO 9-2320-211-12.

END OF TASK



17-45. CRANE OUTER BOOM REPAIR (TRUCK M543A2).

TOOLS : No special tools required

SUPPLIES : Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680
Caps
Wooden blocks
Cotter pins
Tags

PERSONNEL : Three

EQUIPMENT CONDITION : Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Remove hoist winch cable. Refer to TM 9-2320-211-20.

WARNING

Be careful when handling outer boom. It is heavy and can cause injury to personnel.

(2) Remove boom assembly. Refer to para 17-44.

b. Removal of Inner Boom.

FRAME 1

WARNING

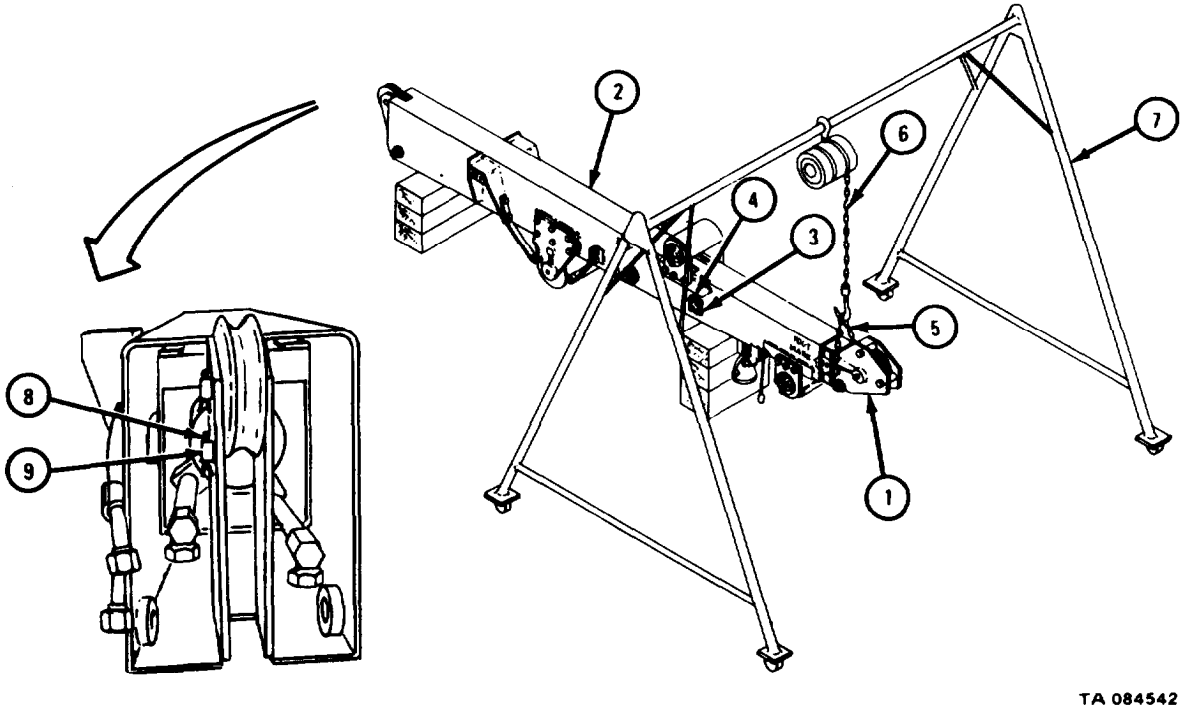
Inner boom (1) must be held up at sheave end when pulling it out of outer boom (2). If this is not done, outer boom can tilt and cause injury.

1. Take out four screws and lockwashers (3).
2. Take off boom stop (4).
3. Do steps 1 and 2 again on other side of outer boom (2).
4. Put chain sling (5) in place on sheave end of inner boom (1) and join chain sling to chain hoist (6) on A-frame (7).
5. Take out cotter pin (8).

Soldier A 6. Using chain hoist (6), raise and lower inner boom (1) to keep tension off crowd cylinder clevis pin (9).

Soldier B 7. Drive out crowd cylinder clevis pin (9).

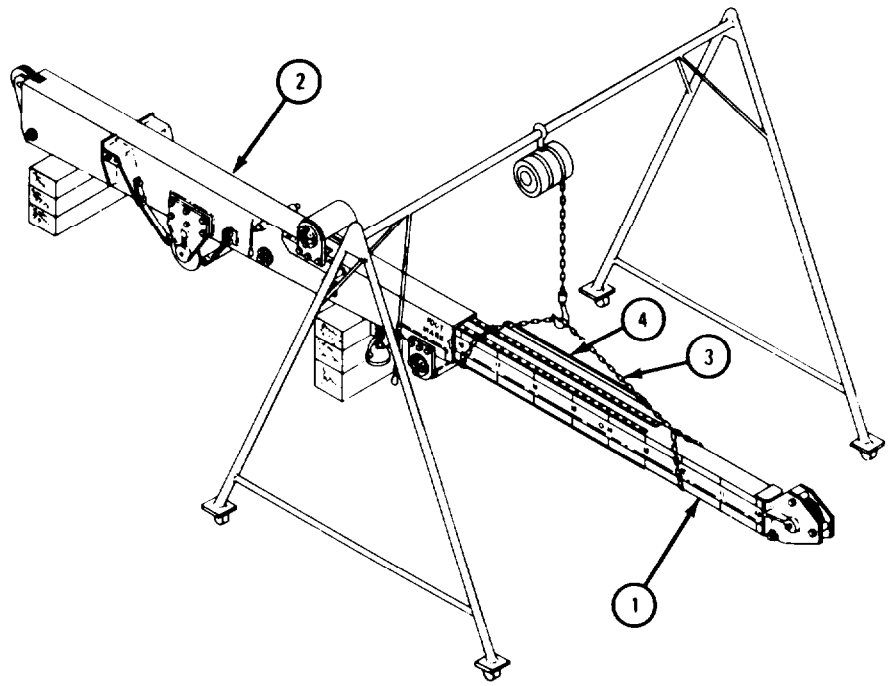
GO TO FRAME 2



FRAME 2

Soldiers A and B	1.	Walk inner boom (1) out of outer boom (2) until 18-FOOT MARK shows.
Soldier C	2.	As soldiers A and B walk inner boom (1) out of outer boom (2), raise and lower inner boom to keep it from binding.
	3.	When 18-FOOT MARK shows, put safety jack under sheave end of inner boom (1).
	4.	Lower inner boom (1) onto safety jack.
	5.	Move chain sling (3) to 12-FOOT MARK and 18-FOOT MARK on inner boom (1) as shown, and put in spreader bar (4).
Soldiers A and B	6.	Walk inner boom (1) out of outer boom (2).
Soldier C	7.	As soldiers A and B walk inner boom (1) out of outer boom (2), raise and lower inner boom to keep it from binding.
	8.	When inner boom (1) is out of outer boom (2) lower it onto wooden blocks.
	9.	Take chain hoist off chain sling (3), and take chain sling and spreader bar (4) off inner boom (1).

END OF TASK



TA 084543

c. Disassembly.

FRAME 1

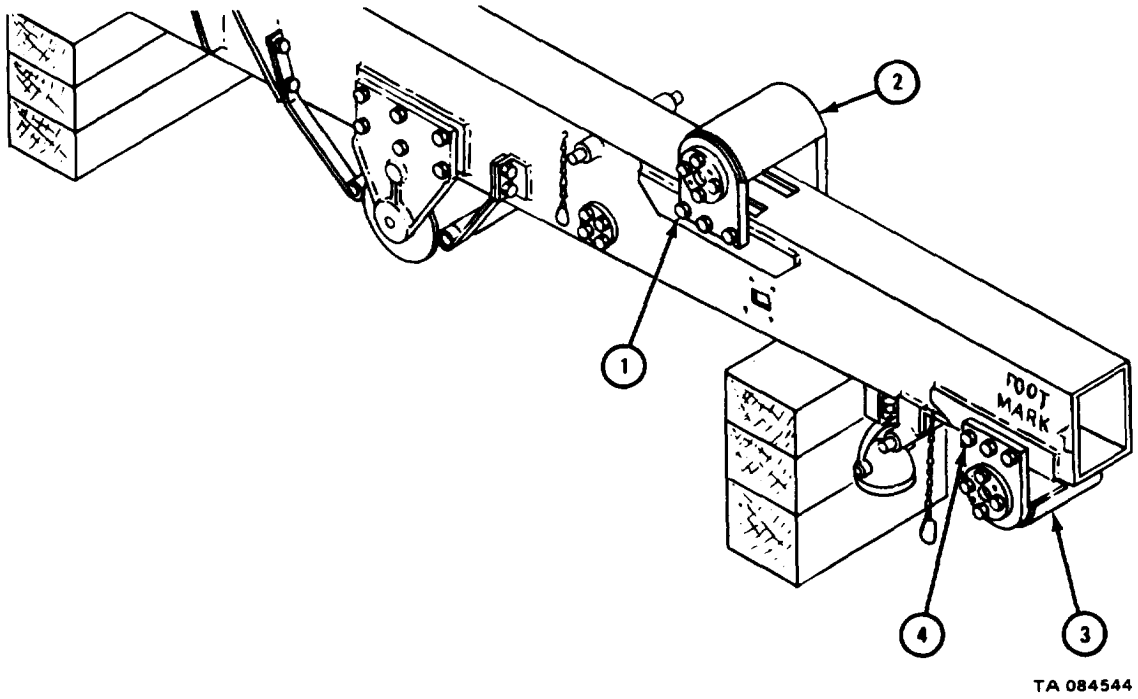
1. Take out six screws and lockwashers (1).
2. Lift off upper boom roller assembly (2).

Soldier A 3. Hold lower boom roller assembly (3) while soldier B takes out-six screws and lockwashers (4).

Soldier B 4. Take out six screws and lockwashers (4).

Soldier A 5. Take off lower boom roller assembly (3).

GO TO FRAME 2

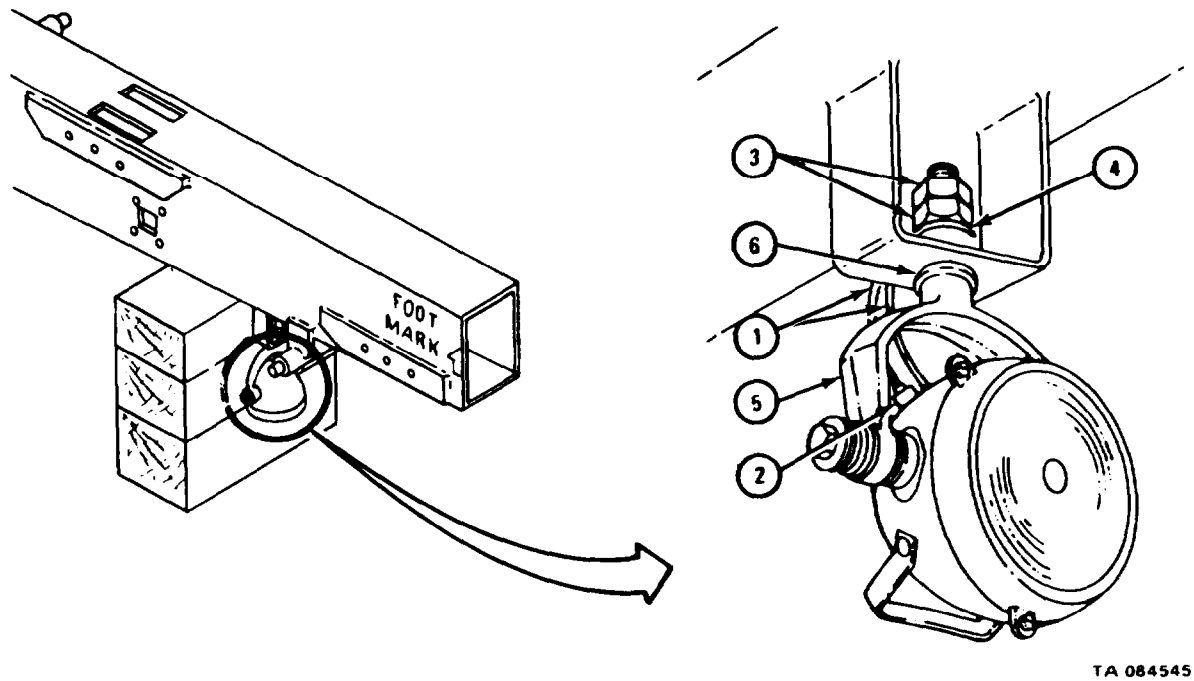


TA 084544

FRAME 2

1. Pull two electrical leads (1) off two connectors (2).
2. Take off two nuts (3), washer (4), floodlight assembly (5), and washer (6).

GO TO FRAME 3



TA 084545

FRAME 3

Soldier A 1. Hold hoist winch roller assembly (1) to keep it from falling when soldier B takes out last screw (2).

Soldier B 2. Take out four screws and locknuts (2), two from each side of outer boom (3).

Soldier A 3. Take off hoist winch roller assembly (1).

4. Take out lubrication fitting (4).

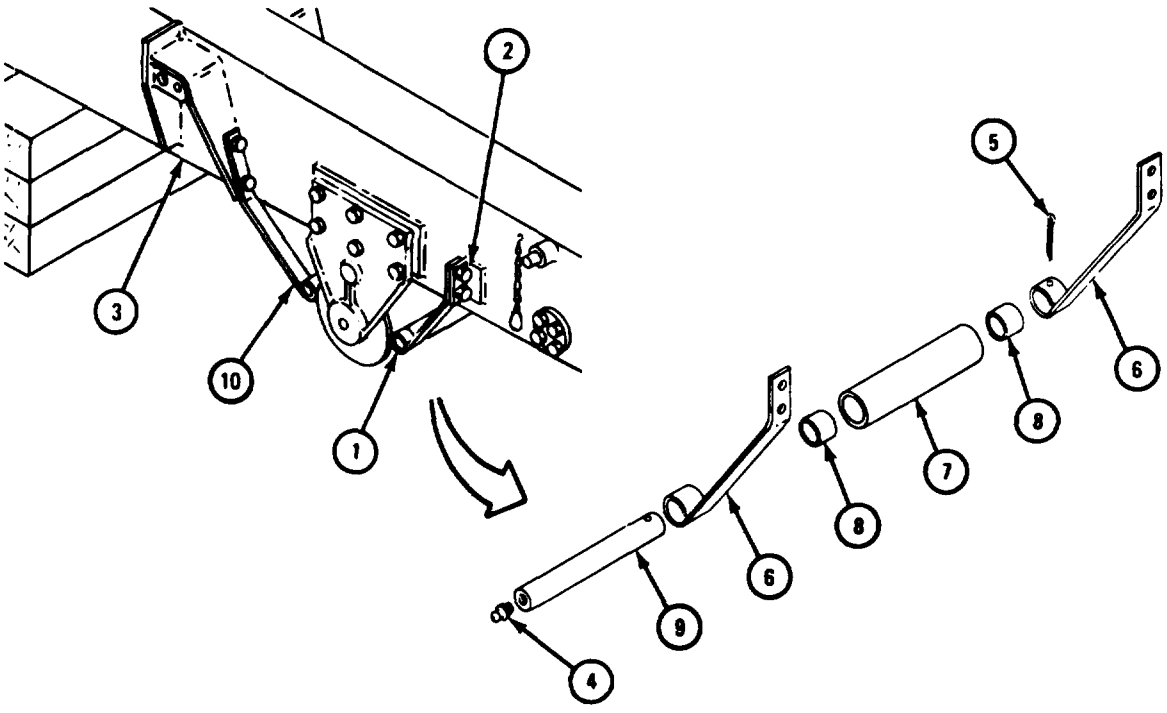
5. Using pliers, take out cotter pin (5).

6. Slide off two hangers (6) and roller tube (7) with two bushings (8) from roller tube shaft (9).

7. Take out bushings (8) from roller tube (7).

8. Do steps 1 through 7 again on other hoist winch roller assembly (10).

GO TO FRAME 4



FRAME 4

NOTE

Tag tube assemblies (1 and 2) so that they will be put back in the right places.

1. Slide away two fittings (3). Pull out tube assemblies (1 and 2). Cap open ports.
2. Hook up chain sling and chain hoist (4) to hoist winch assembly (5) and put tension on chain sling.

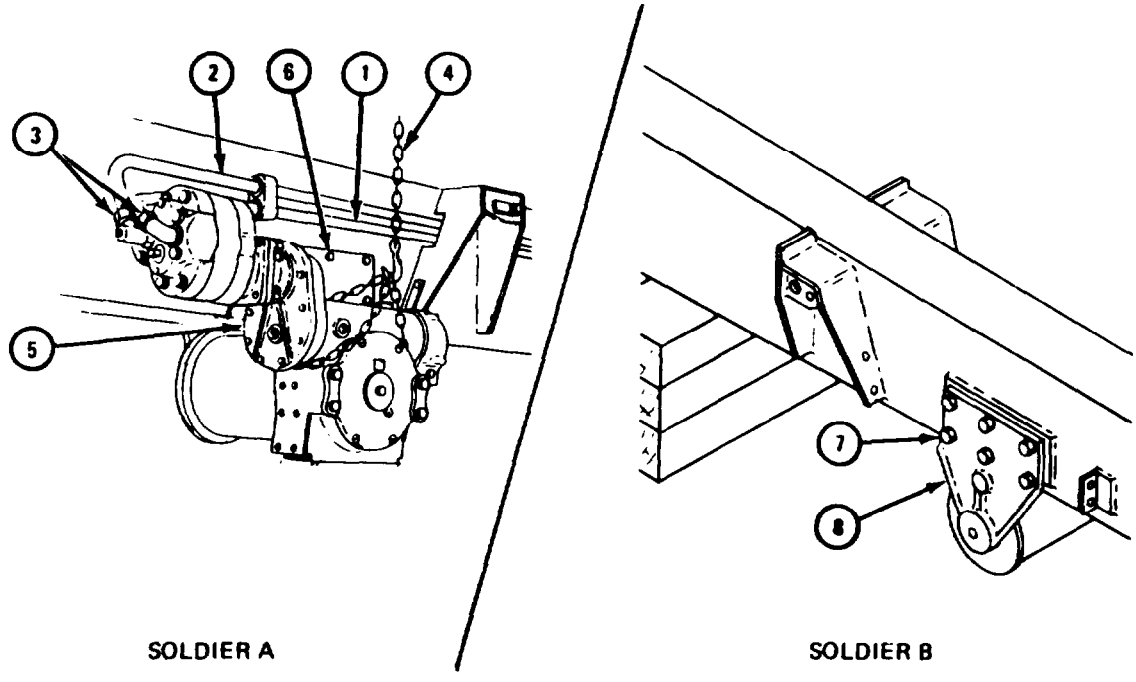
Soldier A 3. Take out six screws and lockwashers (6).

Soldier B 4. Take out six screws and lockwashers (7). Hold support (8) before taking out last screw to keep hoist winch assembly (5) from shifting.

5. Tell soldier A when last screw (7) is taken out. Hold support (8) to guide hoist winch assembly (5) as soldier A lowers it to ground.

Soldier A 6. Lower hoist winch assembly (5) to the ground. Unhook chain sling and chain hoist (4).

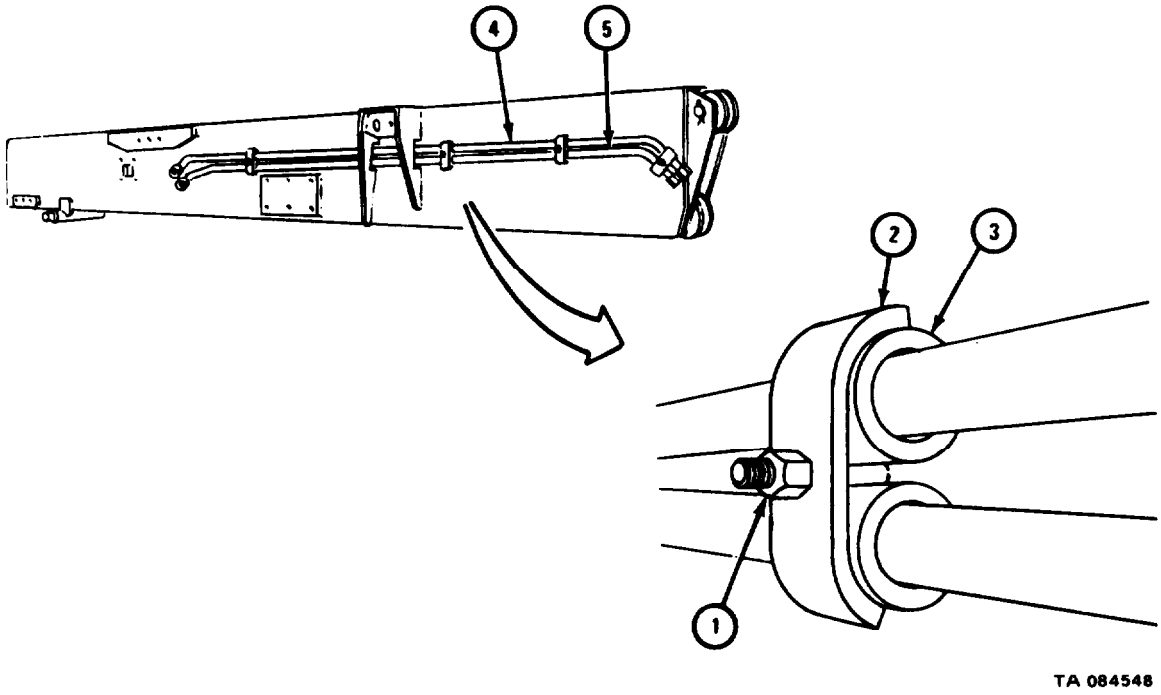
GO TO FRAME 5



FRAME 5

1. Take off four nuts (1).
2. Take off four clamps (2) and eight pads (3).
3. Slide out tube assemblies (4 and 5).

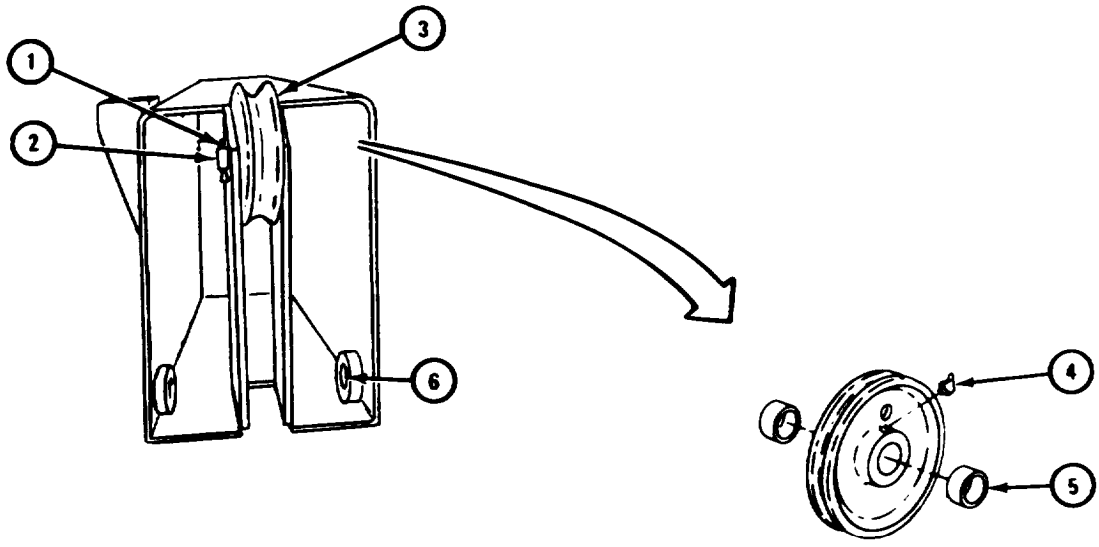
GO TO FRAME 6



FRAME 6

1. Take out cotter pin (1).
2. Push out pin (2) and take out sheave assembly (3).
3. Take out lubrication fitting (4).
4. Take out two sheave assembly bearings (5). Refer to Part 1, para 7-7.
5. Do steps 3 and 4 again on sheave assembly taken off during boom assembly removal.
6. Take out two pivot pin bushings (6).

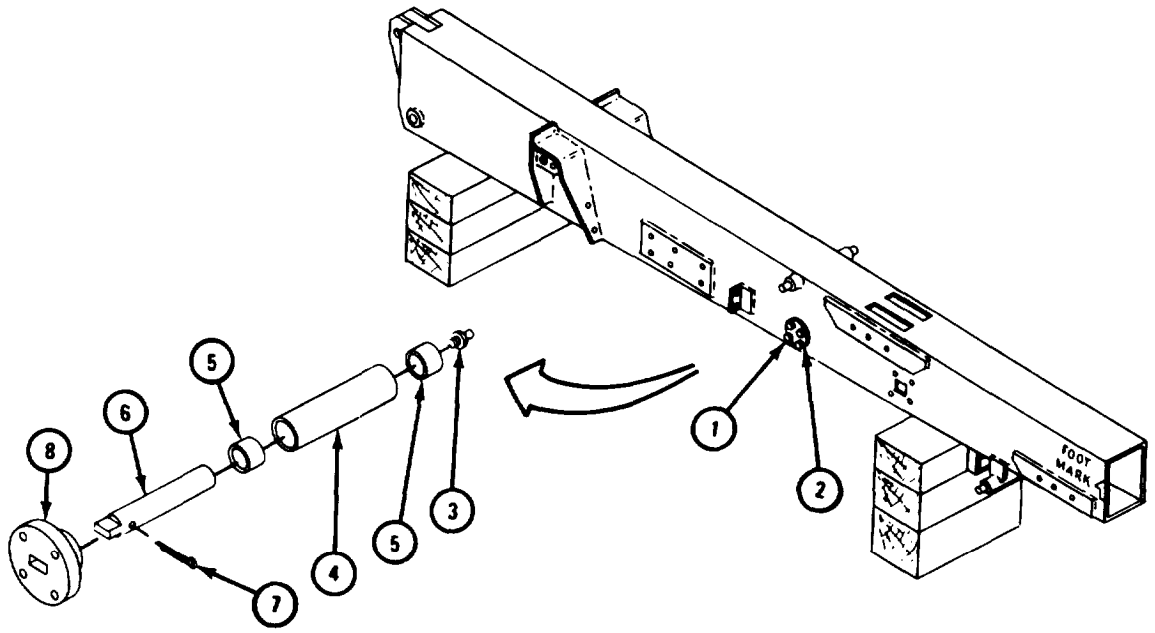
GO TO FRAME 7



FRAME 7

1. Take out four screws and lockwashers (1).
2. Pull out inner boom roller tube assembly (2).
3. Take out lubrication fitting (3).
4. Slide inner boom roller tube (4) with two sleeve bearings (5) off inner boom roller tube shaft (6).
5. Take sleeve bearings (5) out of inner boom roller tube (4). Refer to Part 1, para 7-7.
6. Take out cotter pin (7).
7. Pull inner boom roller tube shaft (6) out of shaft plate (8).

END OF TASK



TA 084550

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

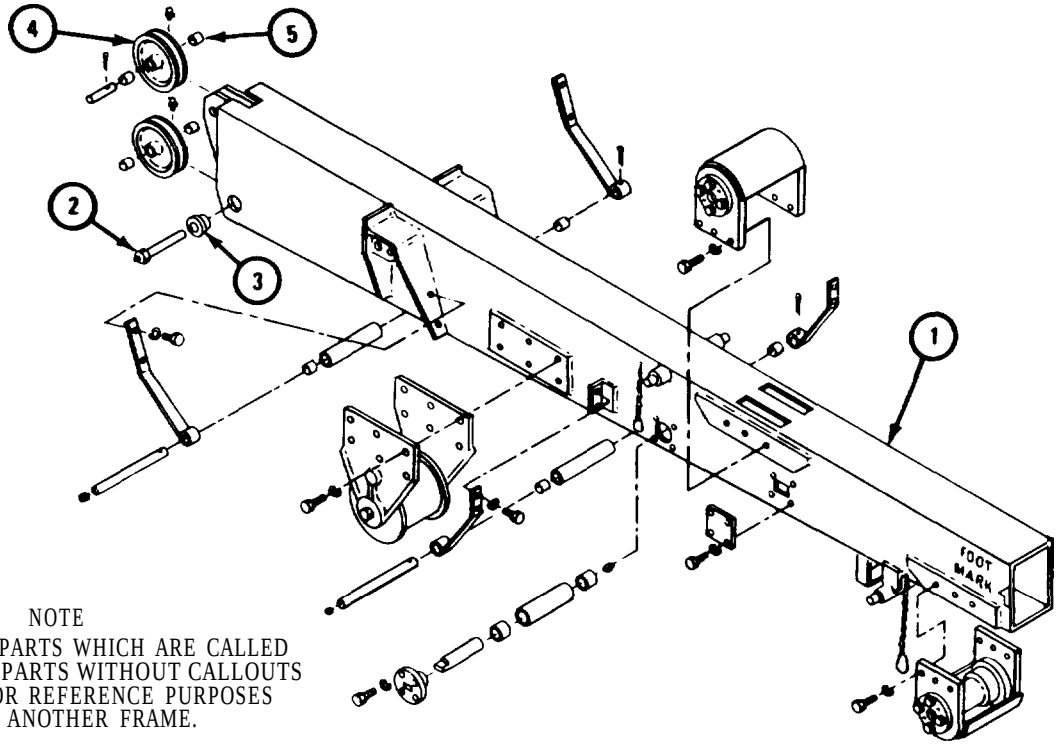
d. Cleaning. Clean all parts with solvent. Make sure that grease passages are open. Dry all parts well.

e. Inspection.

FRAME 1

1. Check that outer boom (1) has no broken welds, and that it is not bent or damaged.
2. Check that boom sheave pin (2) is not bent or damaged.
3. Check that two pivot pin bushings (3) are not damaged. Check that boom sheave pin (2) turns freely but not loosely in pivot pin bushings.
4. Check that two sheave assemblies (4) are not cracked, broken or damaged.
5. Check that four sheave assembly bearings (5) are not damaged. Refer to Part 1, para 7-7.

GO TO FRAME 2

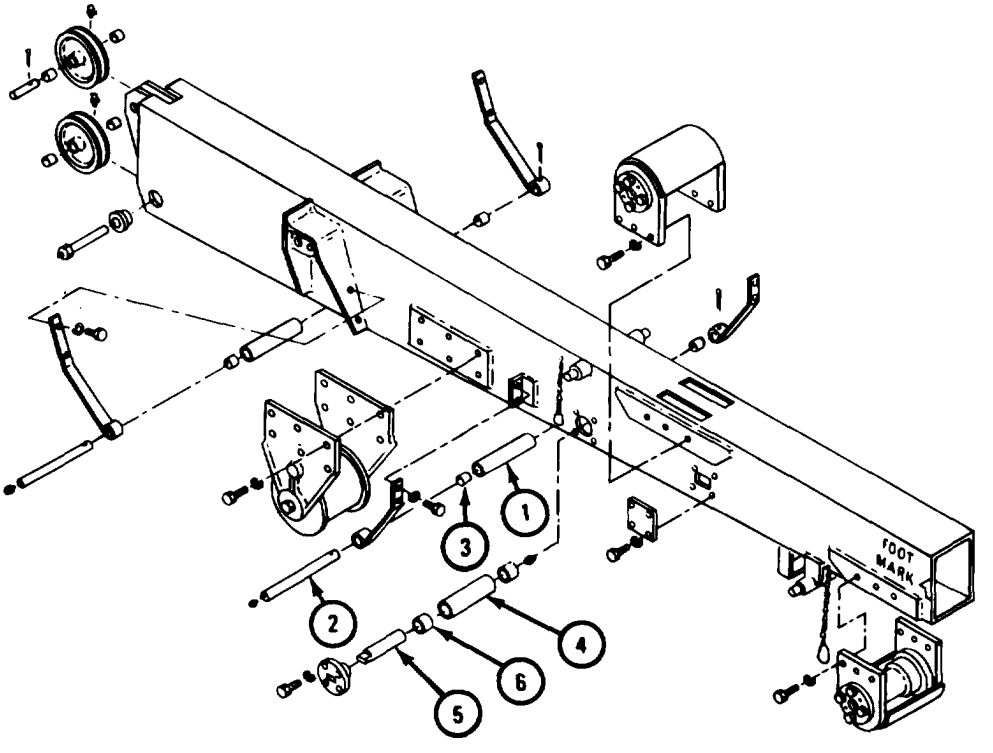


NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT IN THIS FRAME. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES OR ARE CHECKED IN ANOTHER FRAME.

FRAME 2

1. Check that two roller tubes (1) and roller tube shafts (2) are not bent or damaged.
2. Check that four bushings (3) are not damaged.
3. Check that inner boom roller tube (4) and inner boom roller tube shaft (5) are not bent or damaged.
4. Check that two sleeve bearings (6) are not damaged. Refer to Part 1, para 7-7.

END OF TASK



NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT IN THIS FRAME. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES OR ARE CHECKED IN ANOTHER FRAME.

TA 084552

f. Repair.

(1) If outer boom has broken welds, or is bent, weld or straighten it. Refer to TM 9-237.

(2) Refer to para 17-38 for repair of upper and lower boom rollers.

(3) Refer to para 17-18 for repair of hoist winch assembly.

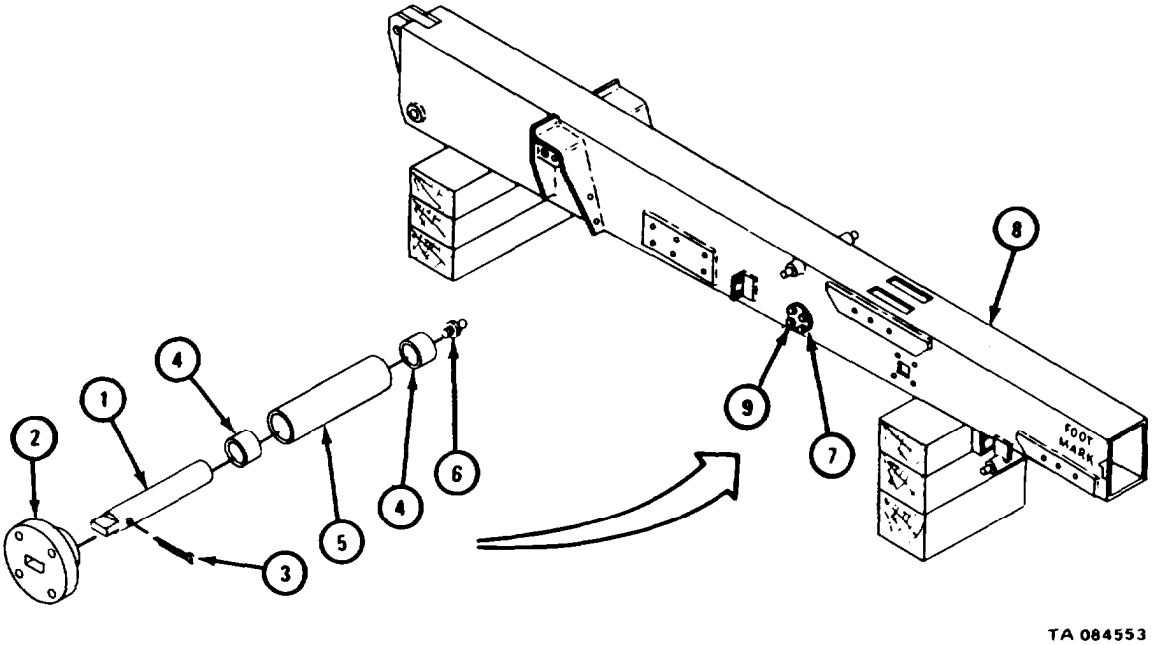
(4) Throw away damaged parts and get new ones in their place.

g. Assembly.

FRAME 1

1. Put inner boom roller tube shaft (1) into bore in shaft plate (2) and line up cotter pin holes.
2. Put in cotter pin (3).
3. Put two sleeve bearings (4) into boom roller tube (5). Refer to Part 1, para 7-7.
4. Slide inner boom roller tube (5) with sleeve bearings (4) onto inner boom roller tube shaft (1).
5. Put in lubrication fitting (6).
6. Put inner boom roller tube assembly (7) into bores in outer boom (8).
7. Put in four screws and lockwashers (9).

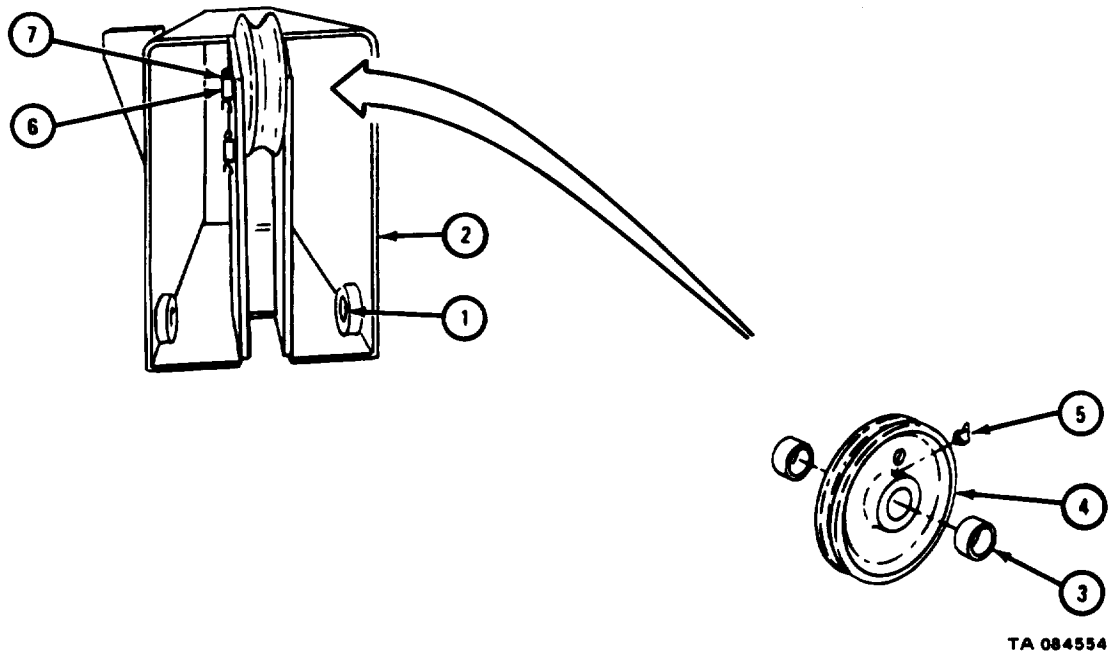
GO TO FRAME 2



FRAME 2

1. Put two pivot pin bushings (1) into outer boom (2).
2. Put two sheave assembly bearings (3) into sheave (4). Refer to Part 1, para 7-7.
3. Put in lubrication fitting (5).
4. Do steps 2 and 3 again on other sheave.
5. Put sheave (4) with sheave assembly bearings (3) into place in outer boom (2) and line up pin holes.
6. Push in pin (6).
7. Put in cotter pin (7).

GO TO FRAME 3

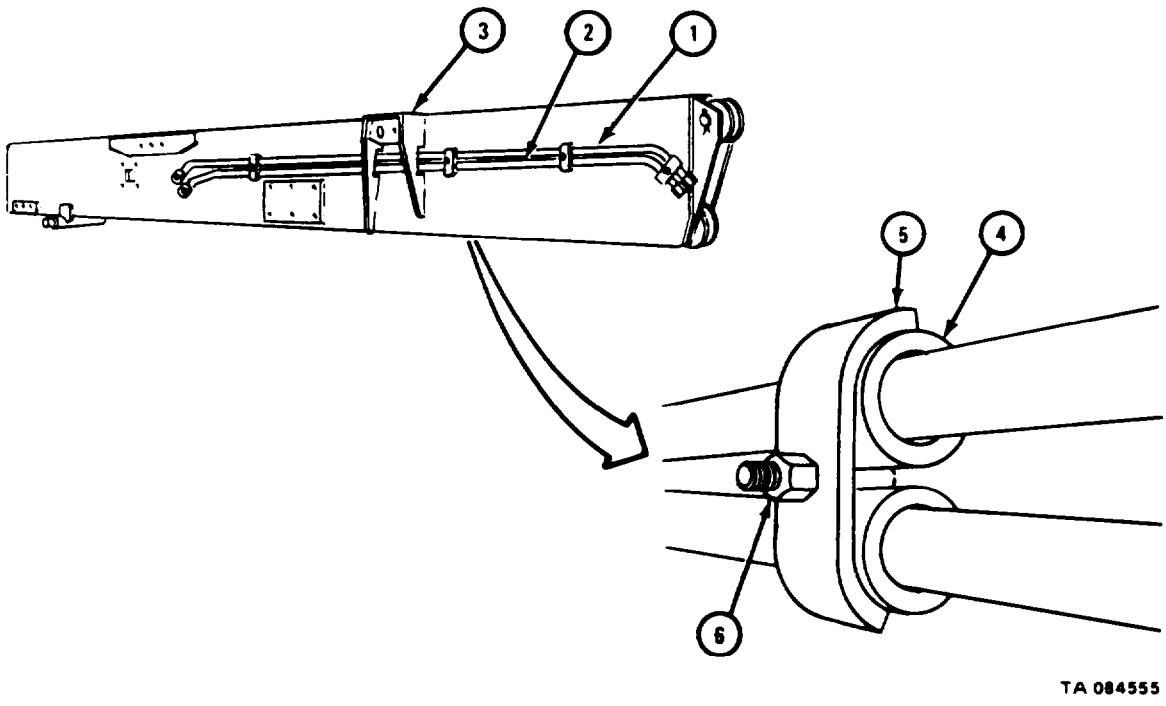


TA 084554

FRAME 3

1. Slide tube assemblies (1 and 2) through opening in elevating cylinder bracket (3). Make sure that tube assemblies are in position as tagged.
2. Put eight pads (4) and four clamps (5) in place.
3. Put on four nuts (6).

GO TO FRAME 4



FRAME 4

1. Hook up chain sling and chain hoist (1) to hoist winch assembly (2).

Soldier A 2. Raise hoist winch assembly (2) into position.

Soldier B 3. As soldier A raises hoist winch assembly (2), hold support (3) and guide it into position.

4. Put in six screws and lockwashers (4).

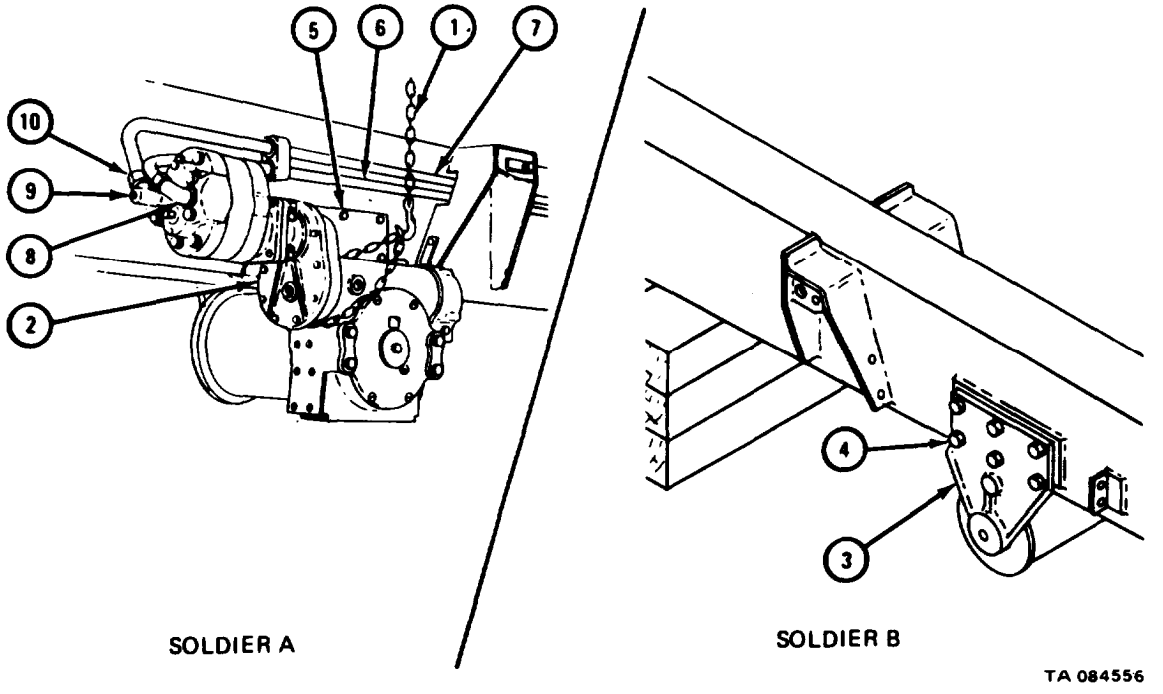
Soldier A 5. Put in six screws and lockwashers (5).

6. Take chain sling and chain hoist (1) off hoist winch assembly (2).

7. Take caps off tube assemblies (6 and 7). Put tube assemblies into elbows (8 and 9) as tagged.

8. Tighten two fittings (10). Take tags off tube assemblies (6 and 7).

GO TO FRAME 5



FRAME 5

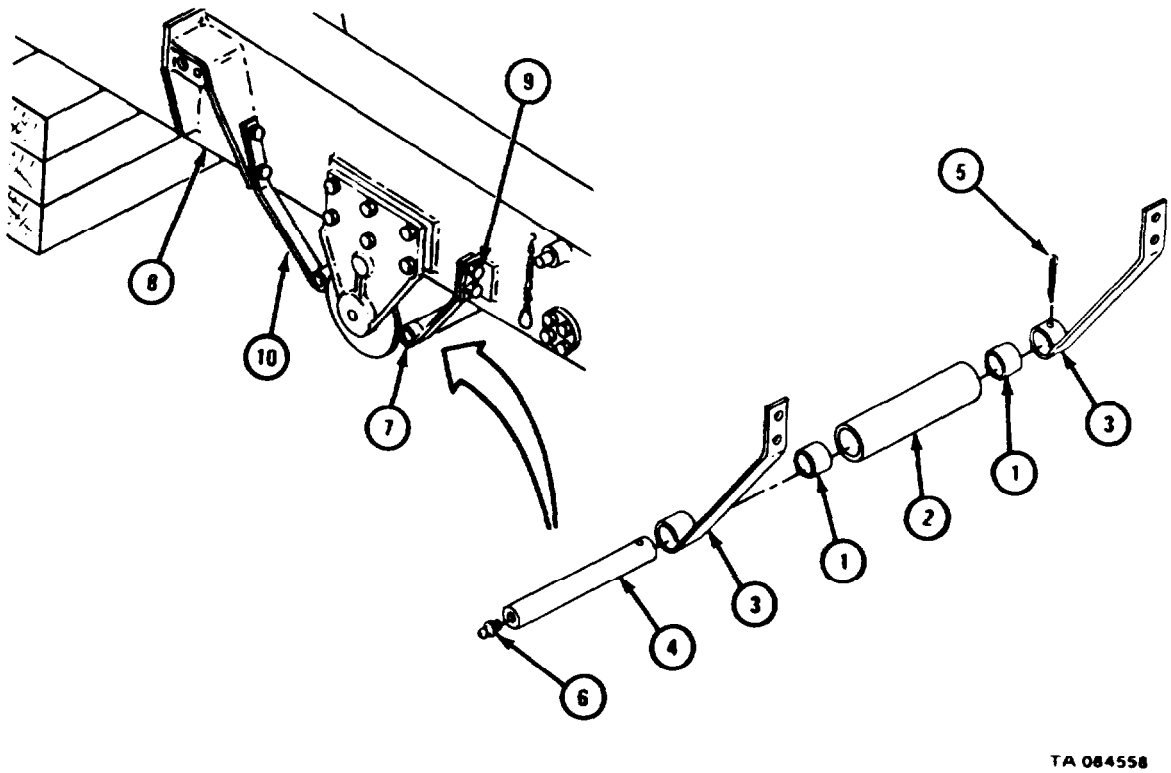
1. Put two bushings (1) in roller tube (2).
2. Slide roller tube (2) with bushings (1) and two hangers (3) onto roller tube shaft (4), and line up holes for cotter pin (5).
3. Put in cotter pin (5).
4. Put in lubrication fitting (6).

Soldier A 5. Hold hoist winch roller tube assembly (7) in place on outer boom (8)

Soldier B 6. Put in four screws and locknuts (9), two on each side of outer boom (8) and tighten.

7. Do steps 1 through 6 again on other hoist winch roller assembly (10)

GO TO FRAME 6

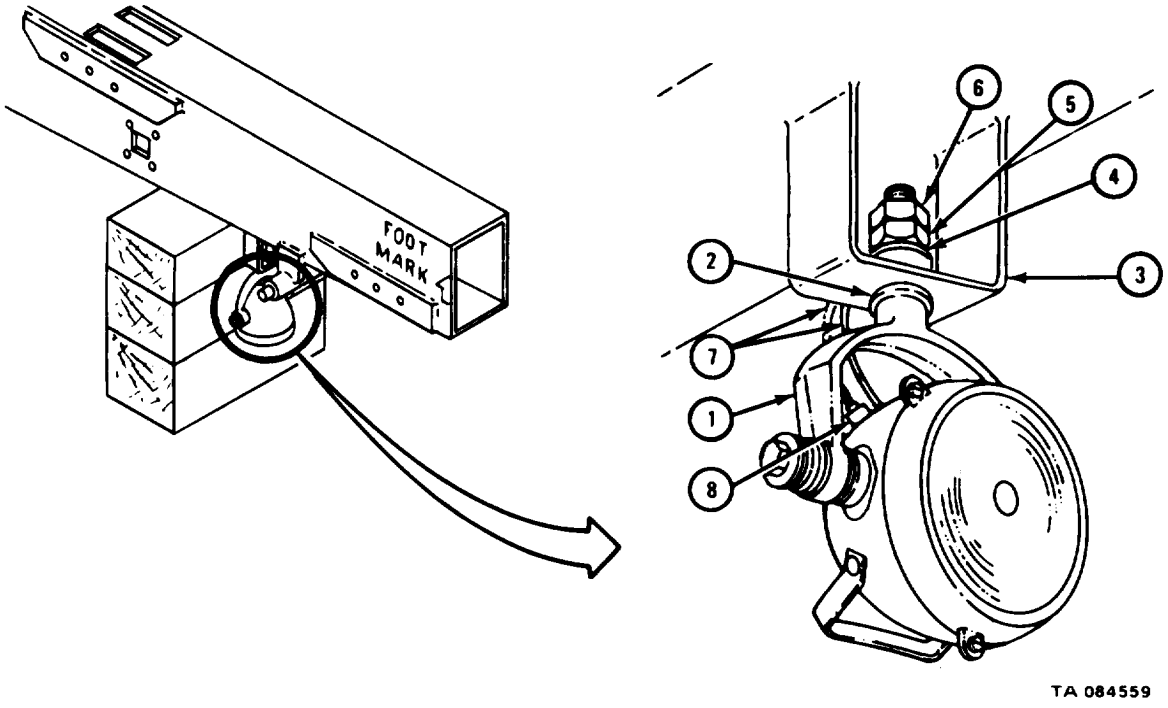


TA 084558

FRAME 6

1. Put floodlight assembly (1) with washer (2) up through hole in outer boom bracket (3).
2. Put on washer (4) and hand tighten nut (5).
3. Put on and tighten nut (6) against nut (5).
4. Push two electrical leads (7) onto two connectors (8).

GO TO FRAME 7



TA 084559

FRAME 7

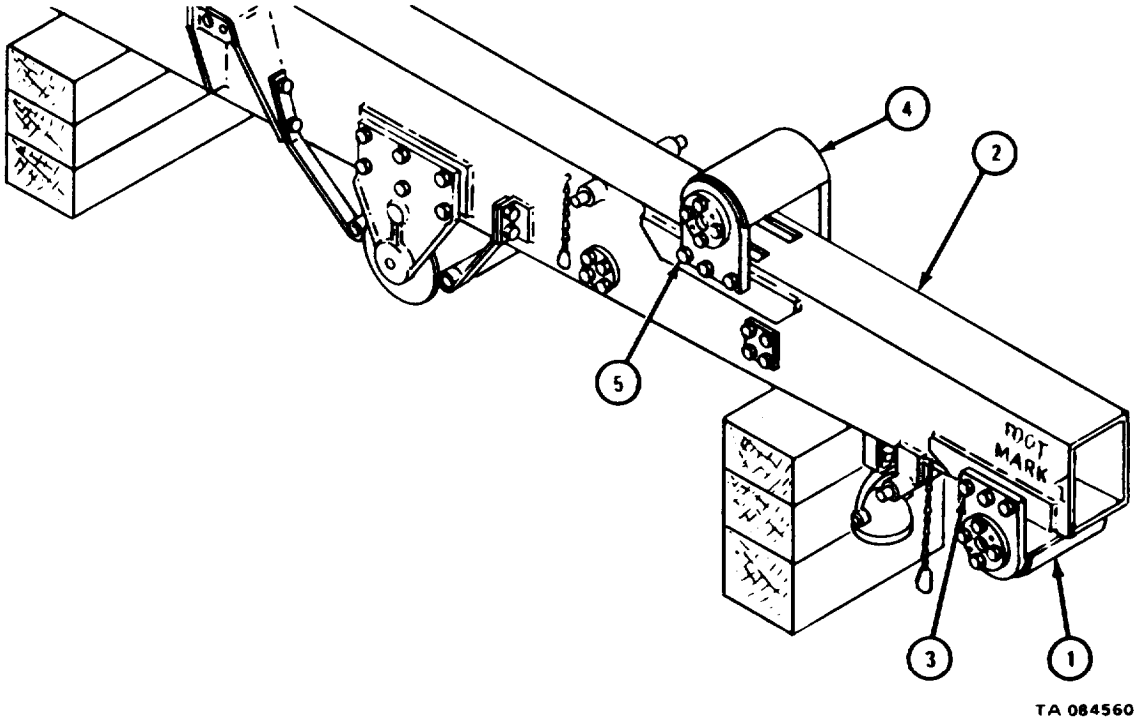
Soldier A 1. Hold lower boom roller assembly (1) in place on outer boom (2), and line up screw holes.

Soldier B 2. Put in six screws and lockwashers (3).

3. Set upper boom roller assemby (4) in place on outer boom (2), and line up screw holes.

4. Put in six screws and lockwashers (5).

END OF TASK



h. Replacement of Inner Boom.

FRAME 1

WARNING

Inner boom (1) must be held up at sheave end when sliding it into outer boom (2). If this is not done, outer boom can tilt and cause injury.

1. Put chain sling (3) with spreader bar (4) in place at 12-FOOT MARK and 18-FOOT MARKS on inner boom (1) and join chain sling to chain hoist (5) on A-frame (6).

Soldier A 2. Raise inner boom (1) to level of outer boom (2).

3. As soldiers B and C walk inner boom (1) into outer boom, raise and lower inner boom to keep it from binding.

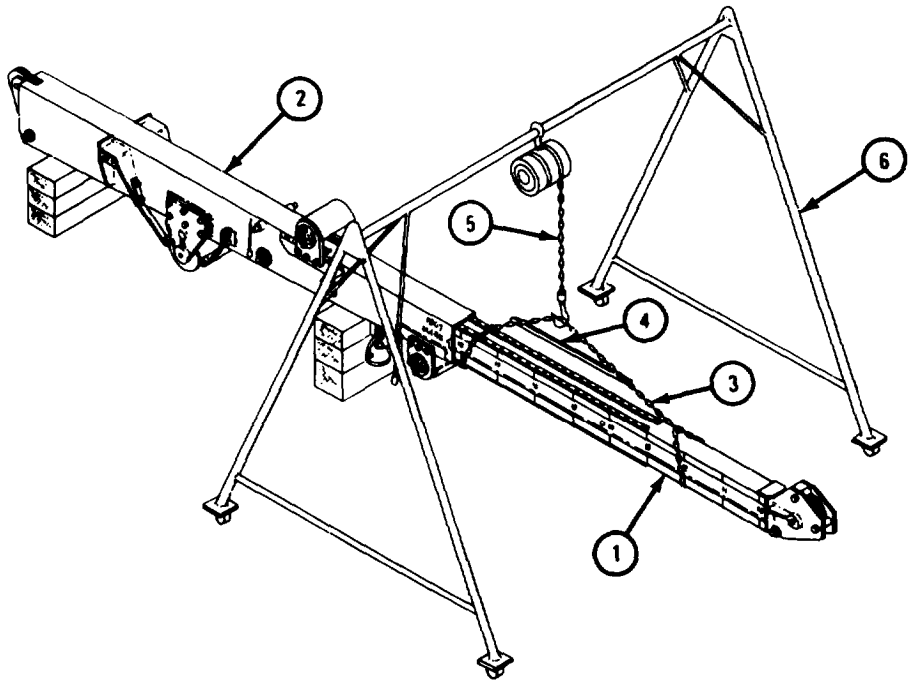
Soldiers B and C 4. Walk inner boom (1) into outer boom (2) up to 18-FOOT MARK.

5. Put safety jack under sheave end of inner boom (1).

Soldier A 6. Lower inner boom (1) onto safety jack.

7. Move chain sling (3) to sheave end of inner boom (1) and take out spreader bar (4).

GO TO FRAME 2



TA 084561

FRAME 2

Soldiers B and C

1. Walk inner boom (1) all the way into outer boom (2).

Soldier A

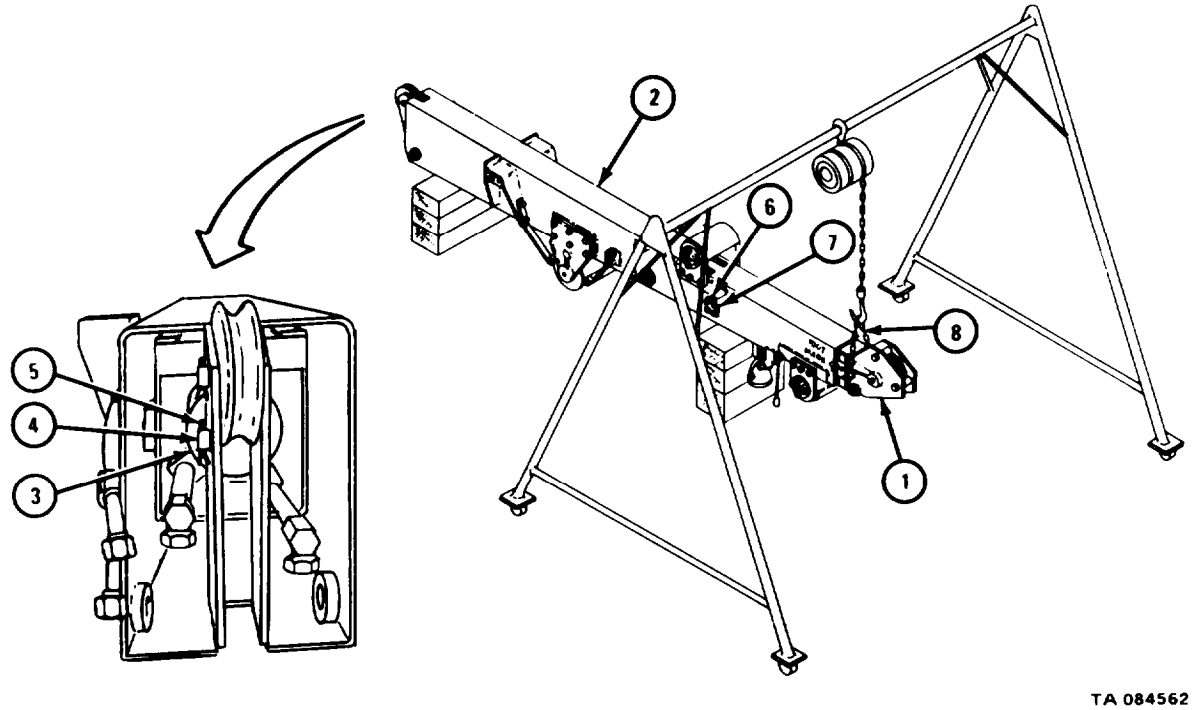
2. Raise or lower inner boom (1) to aline clevis pin hole in crowd cylinder (3) with clevis pin hole in outer boom (2).
3. Push crowd cylinder clevis pin (4) into place.
4. Put in cotter pin (5).
5. Put boom stop (6) in place.
6. Put in four screws and lockwashers (7).
7. Do steps 5 and 6 again on other side of outer boom (2).
8. Take chain hoist off chain sling (8) and take chain sling off inner boom (2).

NOTE

Follow-on Maintenance Action Required:

1. Replace boom assembly. Refer to para 17-44.
2. Replace hoist winch cable. Refer to TM 9-2320-211-20.
3. Oil and grease boom assembly as given in LO 9-2320-211-12.
4. Adjust crane inner and outer boom rollers. Refer to TM 9-2320-211-20.

END OF TASK



TA 084562

17-46. CRANE INNER BOOM REPAIR (TRUCK M543A2).

TOOLS: No special tools required

SUPPLIES: Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680

PERSONNEL: Three

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Remove hoist winch cable. Refer to TM 9-2320-211-20.

(2) Remove boom assembly. Refer to para 17-44.

(3) Remove inner boom from outer boom. Refer to para 17-45.

b. Disassembly.

WARNING

Be careful when handling inner boom. It is heavy and can cause injury to personnel.

FRAME 1

Soldier A
1. Hook up chain sling and chain hoist to crowd cylinder assembly (1).
2. Take out cotter pin (2).
3. Drive out pin (3).

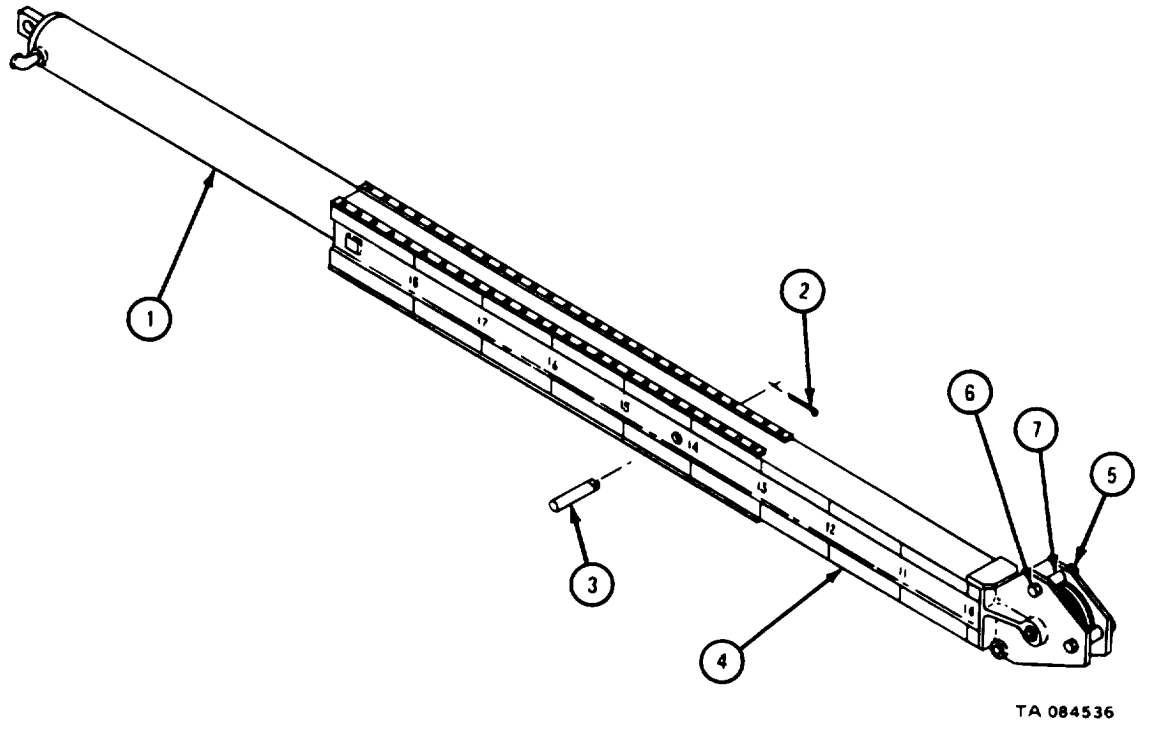
NOTE

Pull crowd cylinder about two feet out of inner boom.

Soldiers B and C
4. Using chain and chain hoist, pull crowd cylinder assembly (1) out of inner boom (4).
5. Lower crowd cylinder assembly (1) onto wood blocks. Take off chain sling and chain hoist.

Soldier A
6. Take off two nuts (5).
7. Take out two screws (6) and two spacers (7).

GO TO FRAME 2



FRAME 2

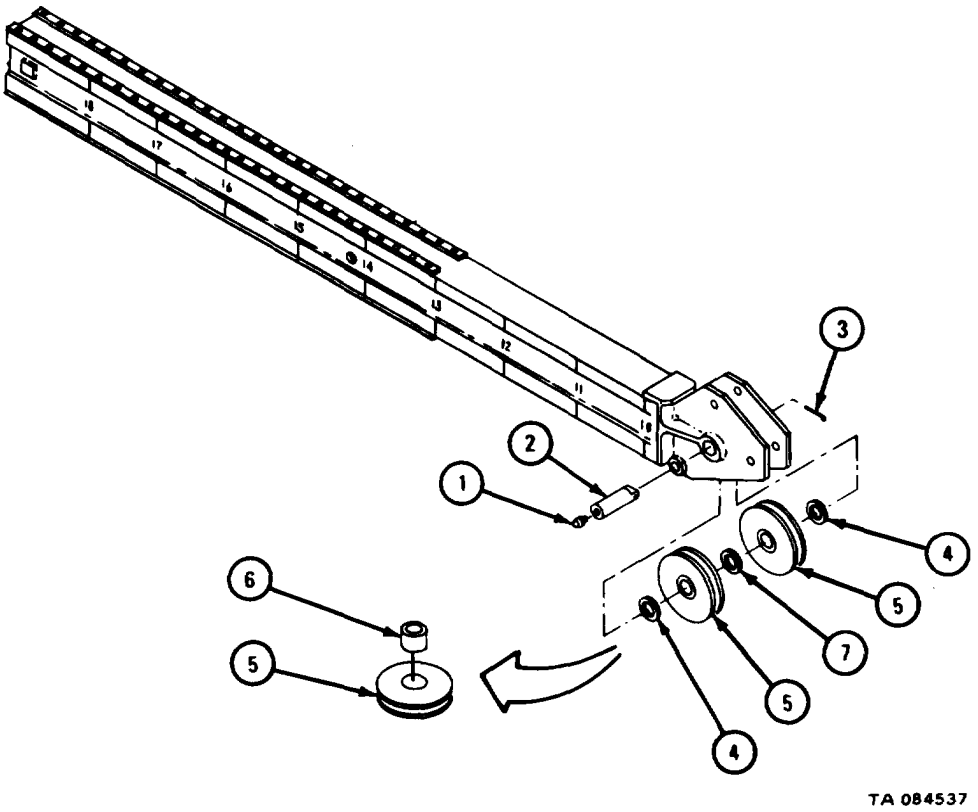
1. Take out lubrication fittings (1) from ends of pin (2).
2. Take out cotter pin (3).

NOTE

Be careful when driving out pin (2) so that sheaves (5), thrust washers (4), and flat washer (7) do not fall out.

3. Drive out pin (2).
4. Take out two thrust washers (4), two sheaves (5) with two sheave bushings (6), and flat washer (7).
5. Press out two sheave bushings (6).

GO TO FRAME 3

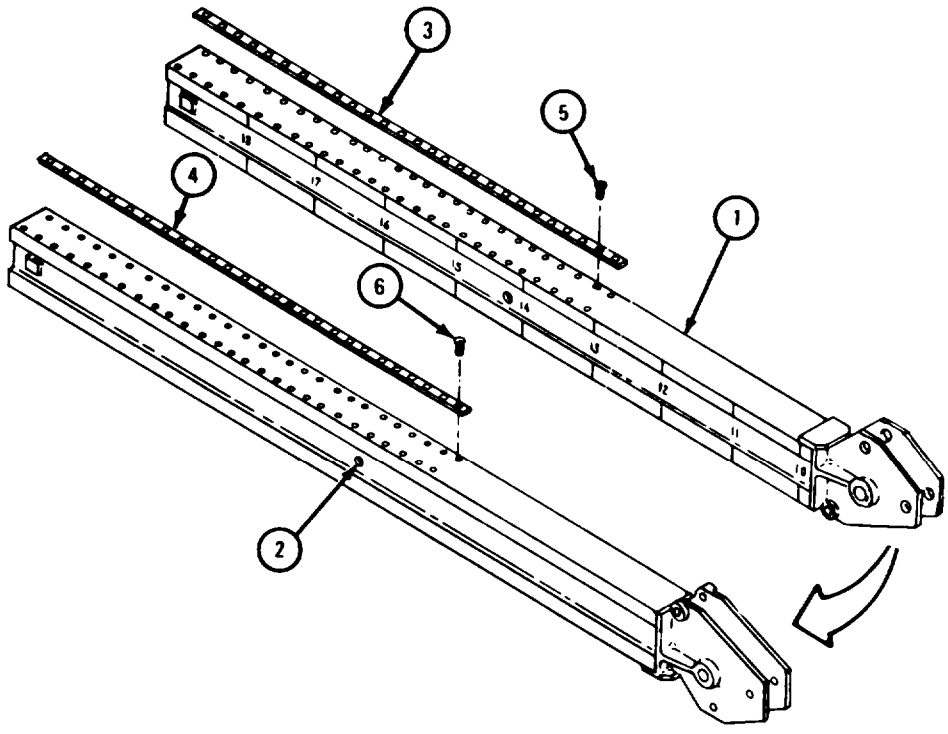


TA 084537

FRAME 3

Soldiers A, B and C	1.	Hook up chain sling and chain hoist to inner boom (1).
Soldier A	2.	Using chain sling and chain hoist, take up slack to support inner boom (1).
Soldiers B and C	3.	Put prybar through center hole (2) in inner boom (1) and turn inner boom on its side to work on two top roller tracks (3) and two bottom roller tracks (4).
Soldier A	4.	Using chain hoist, lower inner boom (1) onto wood blocks.
	5.	Take off chain sling and chain hoist.
Soldiers A and B	6.	Take out 52 screws (5) and lift off two top roller tracks (3).
Soldiers A and B	7.	Take out 52 screws (6) and lift off two bottom roller tracks (4).

END OF TASK



c. Cleaning.

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

(1) Clean all parts with solvent. Make sure that all grease passages are open.

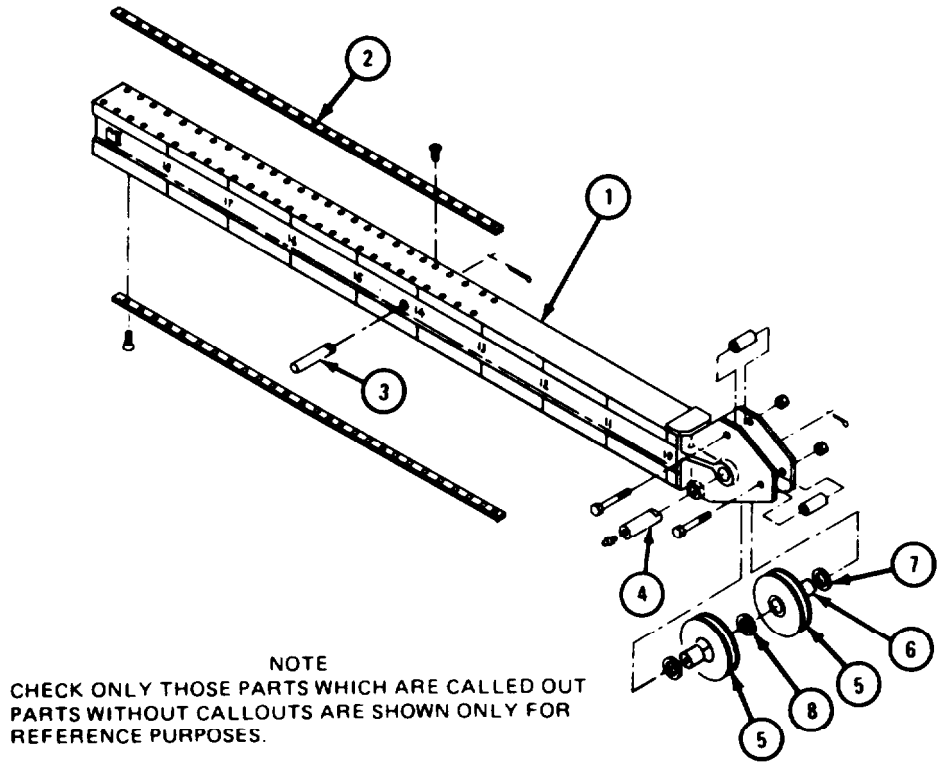
(2) Let parts dry.

d. Inspection.

FRAME 1

1. Check that inner boom (1) has no broken welds, and is not bent or damaged in any other way.
2. Check that four boom roller tracks (2) are not cracked, worn, or damaged in any other way.
3. Check that pins (3 and 4) are not worn or damaged.
4. Check that two sheaves (5) are not cracked, broken, or damaged in any other way.
5. Check that two sheave bushings (6) are not damaged. Refer to Part 1, para 7-7.
6. Check that two thrust washers (7) and flat washer (8) are not worn or damaged.

END OF TASK



NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT
PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR
REFERENCE PURPOSES.

TA 084557

e. Repair.

(1) If inner boom has broken welds or is bent, straighten or weld it. Refer to TM 9-237.

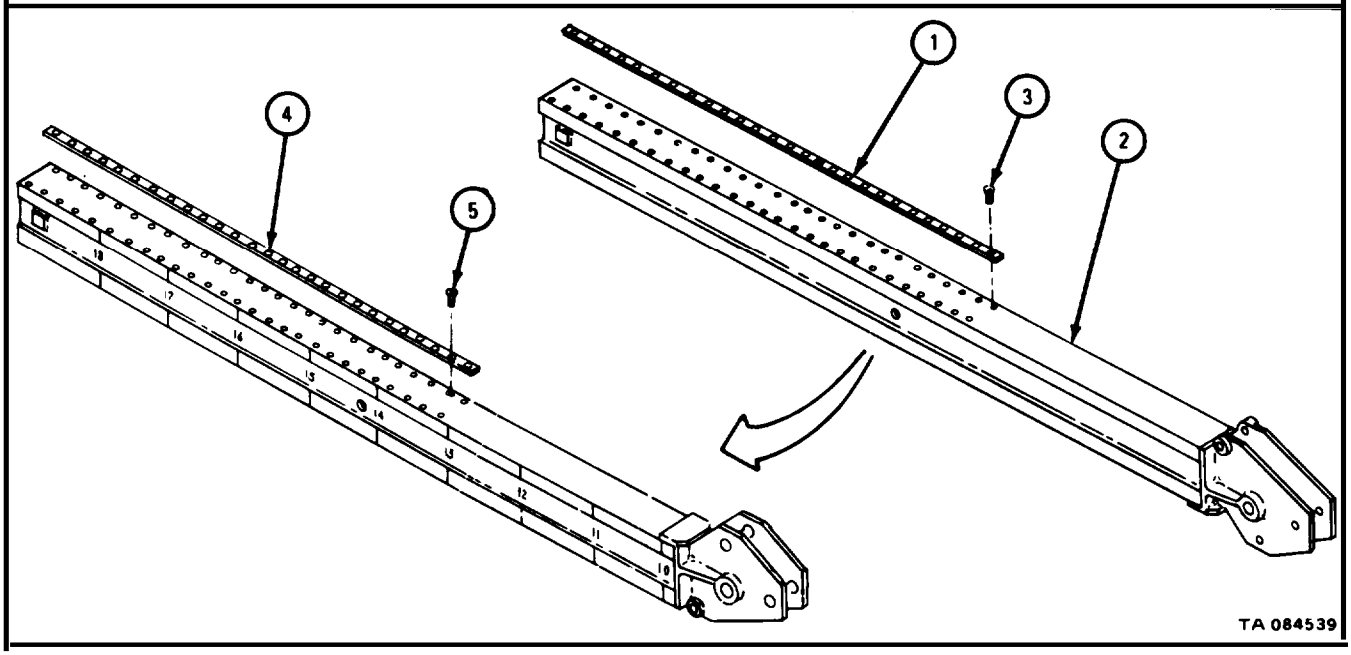
(2) Throw away all damaged parts and get new ones in their place.

f. Assembly.

FRAME 1

Soldiers A, B and C	1.	Put two top boom roller tracks (1) in place on inner boom (2), alining holes in tracks and boom.
Soldiers A and B	2.	Hold two top boom roller tracks (1) in place at each end.
Soldier C	3.	Put three center screws (3) in each top roller track (1).
Soldiers A and B	4.	Put in other 49 screws (3).
Soldiers A and B	5.	Put two bottom boom roller tracks (4) in place on inner boom (2), alining holes. Hold them in place.
Soldier C	6.	Put three center screws (5) in each bottom roller track (4).
Soldiers A and B	7.	Put in other 49 screws (5).
Soldier A	8.	Using chain sling and chain hoist, take up slack to support inner boom (2).
Soldiers B and C	9.	Using prybar, turn inner boom (2) over on wood blocks.

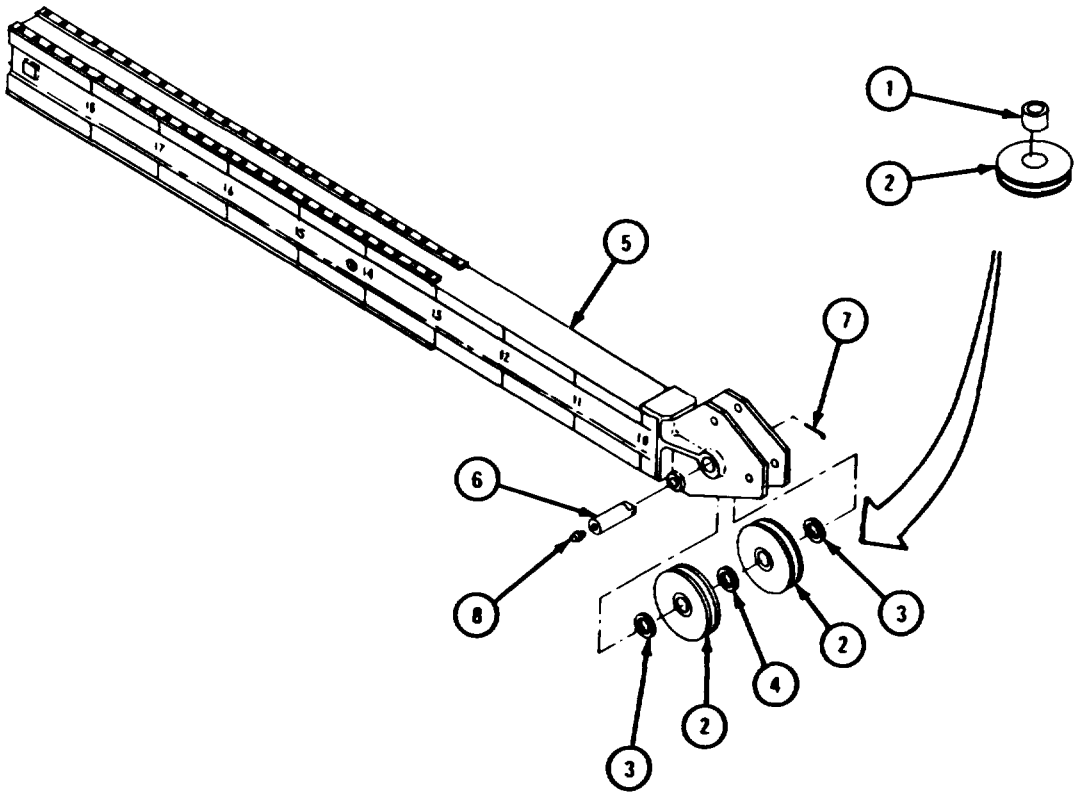
GO TO FRAME 2



FRAME 2

1. Put two sheave bushings (1) into two sheaves (2).
2. Put sheaves (2) with sheave bushings (1), two thrust washers (3), and flat washer (4) in place in inner boom (5).
3. Push in pin (6).
4. Put in cotter pin (7).
5. Put in lubrication fitting (8).

GO TO FRAME 3



FRAME 3

1. Put two spacers (1) in place inner boom (2) and push two screws (3) through inner boom and spacers.
2. Put two nuts (4) onto screws (3).
3. Hook up chain sling and chain hoist to crowd cylinder assembly (5).

Soldiers A and B

4. Using chain sling and chain hoist, raise crowd cylinder assembly (5) and guide it into place in inner boom (2).

Soldier C

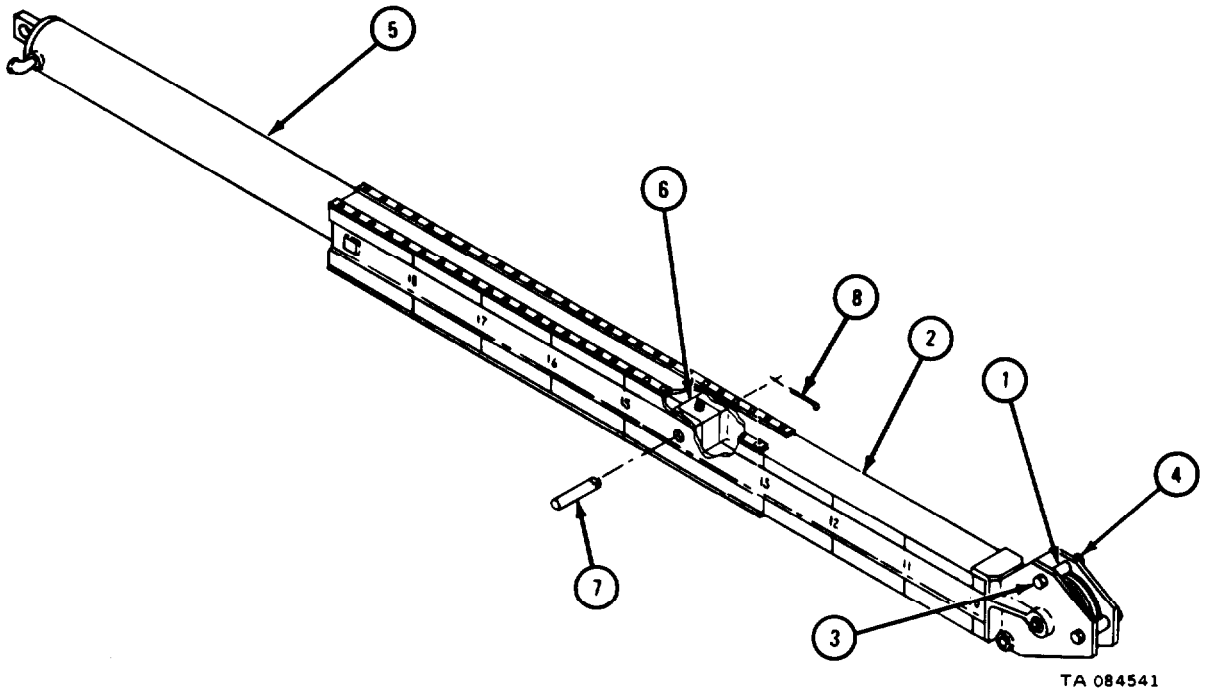
5. Aline bore in piston rod (6) with bore in inner boom (2). Push in pin (7).
6. Put in cotter pin (8).
7. Take off chain sling and chain hoist.
8. Push crowd cylinder (5) all the way into inner boom (2).

NOTE

Follow-on Maintenance Action Required:

1. Replace inner boom in outer boom. Refer to para 17-45.
2. Replace boom assembly. Refer to para 17-44.
3. Replace hoist winch cable. Refer to TM 9-2320-211-20.
4. Oil and grease boom assembly. Refer to LO 9-2320-211-12.
5. Adjust crane inner and outer boom rollers. Refer to TM 2320-211-20.

END OF TASK



17-47. ROTOCHAMBER REMOVAL AND REPLACEMENT (TRUCK M543A2).

TOOLS: No special tools required

SUPPLIES: None

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

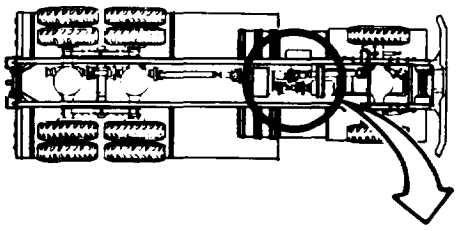
a. Preliminary Procedure. Remove cab tunnel. Refer to TM 9-2320-211-20.

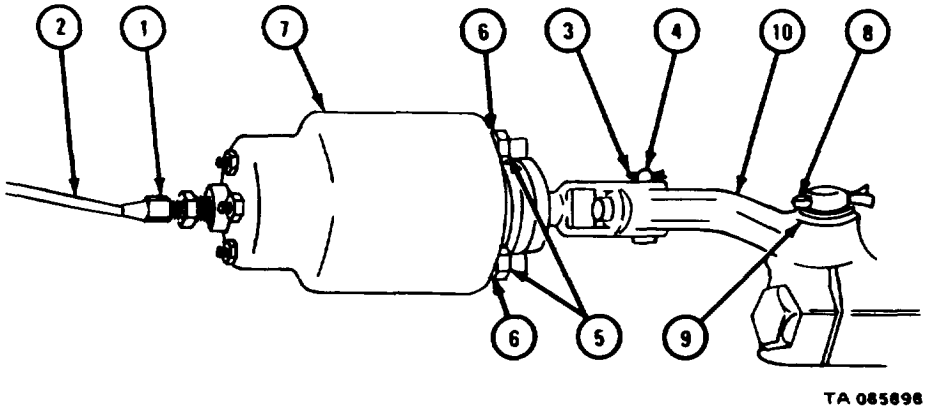
b. Removal.

FRAME 1

1. Unscrew sleeve nut (1) and take out air line (2).
2. Take out cotter pin (3). Take out clevis pin (4).
3. Take out two screws (5) and lockwashers (6).
4. Take out rotochamber assembly (7).
5. Take out cotter pin (8). Take off washer (9) and lever (10).

GO TO FRAME 2

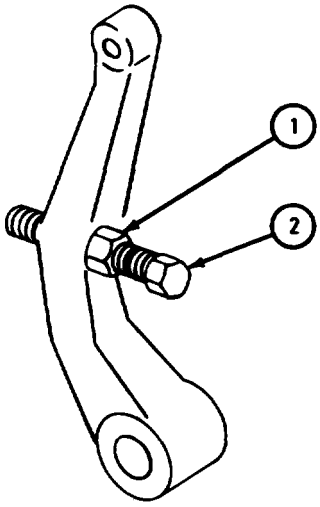




FRAME 2

1. Loosen nut (1) and take out screw (2).

END OF TASK

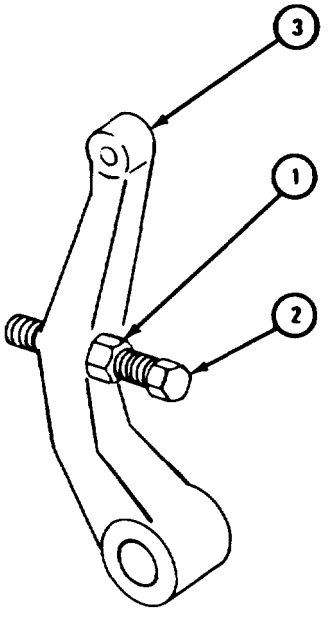


c. Replacement.

FRAME 1

1. Put nut (1) on screw (2). Put screw into lever (3), but do not tighten it. Adjustment will be made after rotochamber assembly is put back in truck.

GO TO FRAME 2



TA 085900

FRAME 2

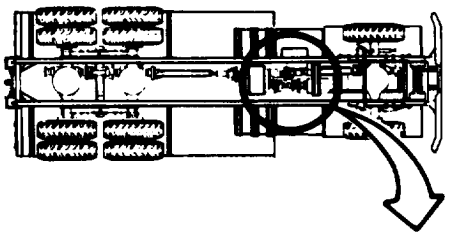
1. Put lever (1) in place and put on washer (2). Put cotter pin (3) in place.
2. Put rotochamber assembly (4) in place. Put in two screws (5) with lockwashers (6).
3. Put air line (7) in place. Put on sleeve nut (8).
4. Put clevis pin (9) in place. Put cotter pin (10) in place.

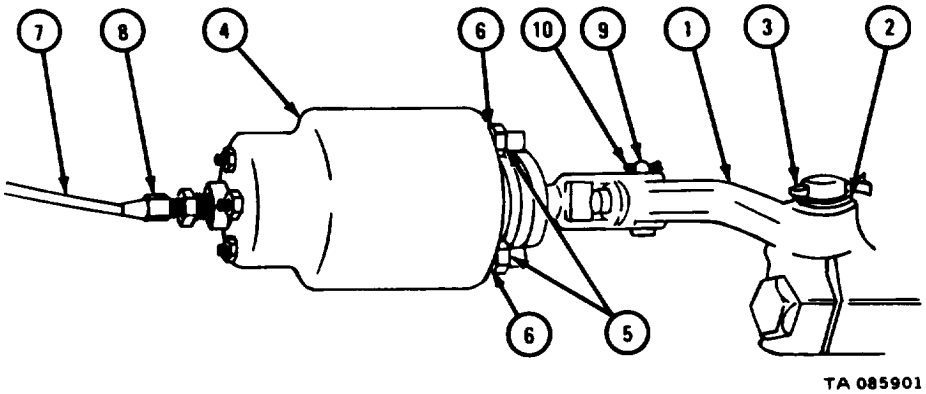
NOTE

Follow-on Maintenance Action Required:

1. Adjust rotochamber clutch release lever. Refer to TM 9-2320-211-20.
2. Replace cab tunnel. Refer to TM 9-2320-211-20.

END OF TASK





TA 085901

17-48. SNATCH BLOCK ASSEMBLY (DOUBLE) REPAIR (TRUCK M543A2).

TOOLS: No special tools required

SUPPLIES: Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680

PERSONNEL: Two

a. Preliminary Procedure. Remove snatch block from storage box on truck. Refer to TM 9-2320-211-10.

b. Disassembly.

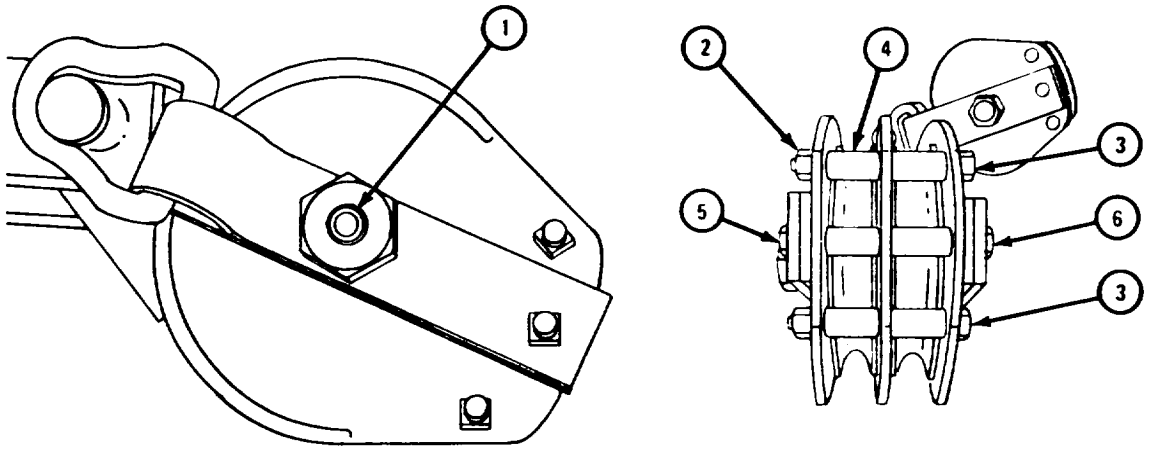
FRAME 1

1. Takeout lubrication fitting (1).
2. Take off three nuts (2) and takeout three screws (3).
3. Take out six spacers (4).

Soldier A 4. Hold nuts (5).

Soldier B 5. Takeoff nuts (6).

GO TO FRAME 2

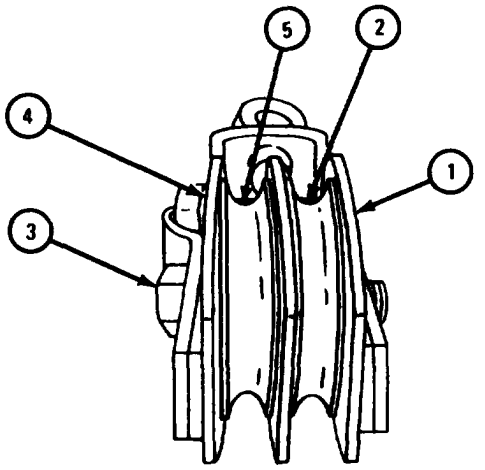


TA 102976

FRAME 2

1. Take off side cover and bracket (1).
2. Take off sheave (2).
3. Take sheave screws (3) out of side cover (4) and sheave and bracket (5).

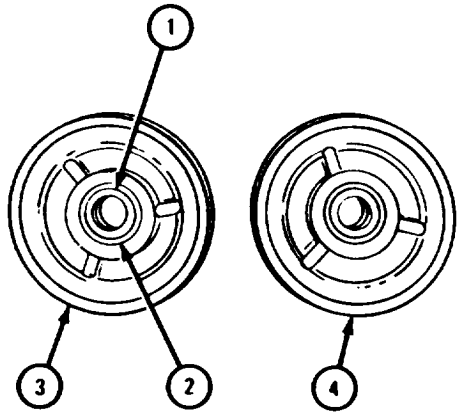
GO TO FRAME 3



FRAME 3

1. Take spacer (1) out of sheave bushing (2).
2. If bushing (2) is damaged, press it out of sheave (3).
3. Do steps 1 and 2 again for sheave (4).

END OF TASK



TA 102978

c. Cleaning. There are no special cleaning procedures required. Refer to cleaning procedures given in Part 1, para 1-3.

d. Inspection and Repair.

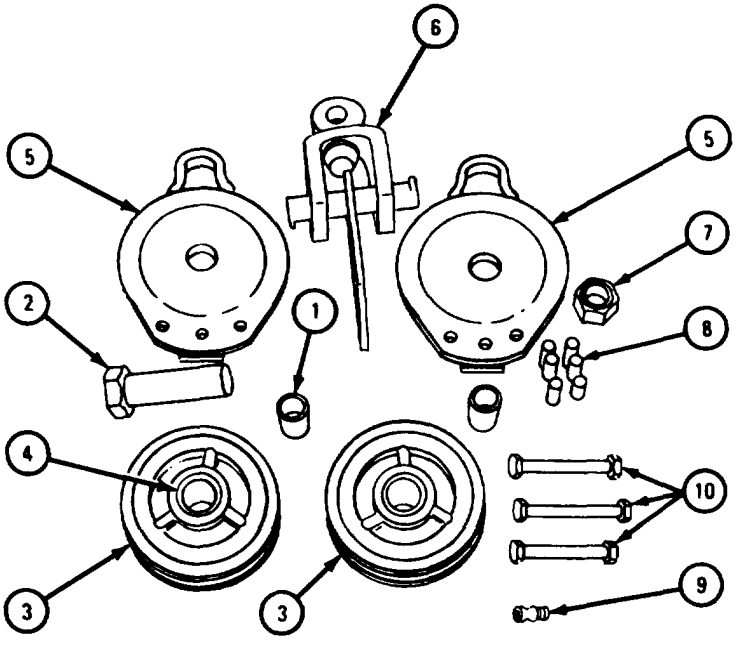
NOTE

If any part of the snatch block is found damaged, get a new snatch block.

FRAME 1

1. Check that spacer (1), sheave screw (2), sheaves (3), and sheave bushings (4) have no damage.
2. Check that side covers (5), block frame (6), sheave screw nut (7), spacers (8), lubrication fitting (9), and screws with nuts (10) have no damage.

END OF TASK



TA 105760

e. Assembly.

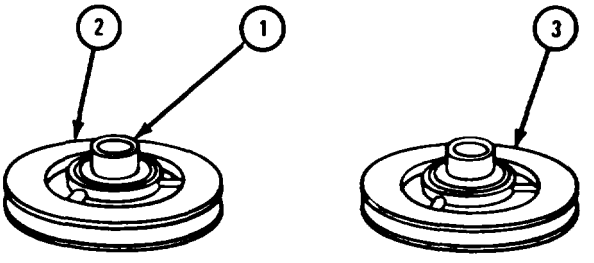
NOTE

If bushings were taken out, do frame 1. If bushings were not taken out, go to frame 2.

FRAME 1

1. Using press, press bushing (1) into sheave (2).
2. Do step 1 again for sheave (3).

GO TO FRAME 2

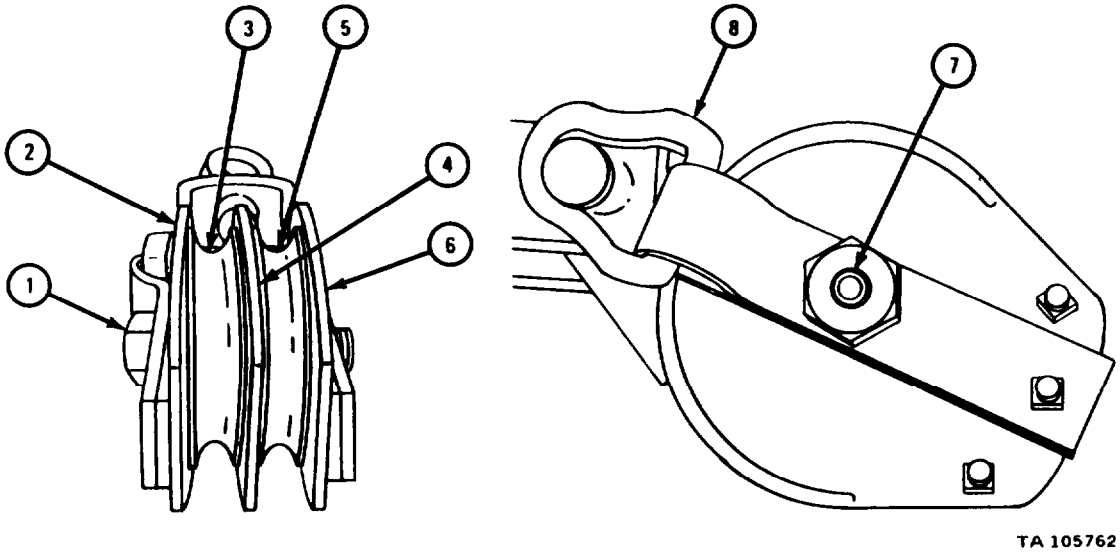


TA 105761

FRAME 2

1. Put sheave screw (1) through bracket and side cover (2), sheave (3) with spacer, and through block frame (4).
2. Put sheave (5) with spacer onto sheave screw (1). Put on side cover (6) and bracket.
3. Put lubrication fitting (7) into end of sheave screw (1).
4. Put hatch (8) onto stud.

GO TO FRAME 3



TA 105762

FRAME 3

1. Put in six spacers (1) and three screws (2).
2. Put on and tighten three nuts (3).

Soldiers A and B

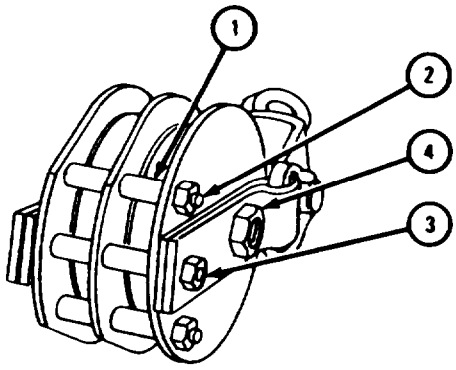
3. Put on and tighten nut (4).

NOTE

Follow-on Maintenance Action Required:

1. Grease snatch block. Refer to LO 9-2320-211-12.
2. Put snatch block back in storage box on truck. Refer to TM 9-2320-211-10.

END OF TASK



TA 105763

17-49. SNATCH BLOCK ASSEMBLY (SINGLE) REPAIR (TRUCK M543A2).

TOOLS: No special tools required

SUPPLIES: Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680

PERSONNEL: One

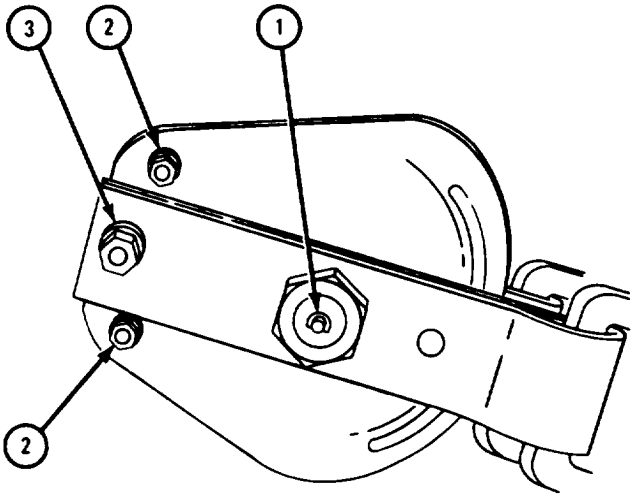
a. Preliminary Procedures. Remove snatch block from storage box on truck. Refer to TM 9-2320-211-10.

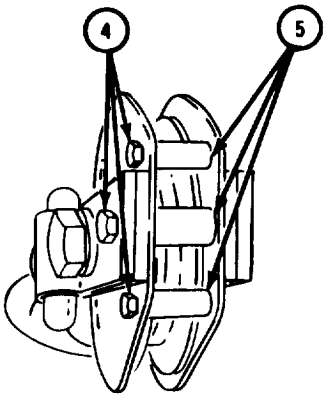
b. Disassembly.

FRAME 1

1. Take out lubrication fitting (1).
2. Take off two nuts and lockwashers (2).
3. Take out one nut and lockwasher (3).
4. Take out three screws (4).
5. Take out three spacers (5).

GO TO FRAME 2



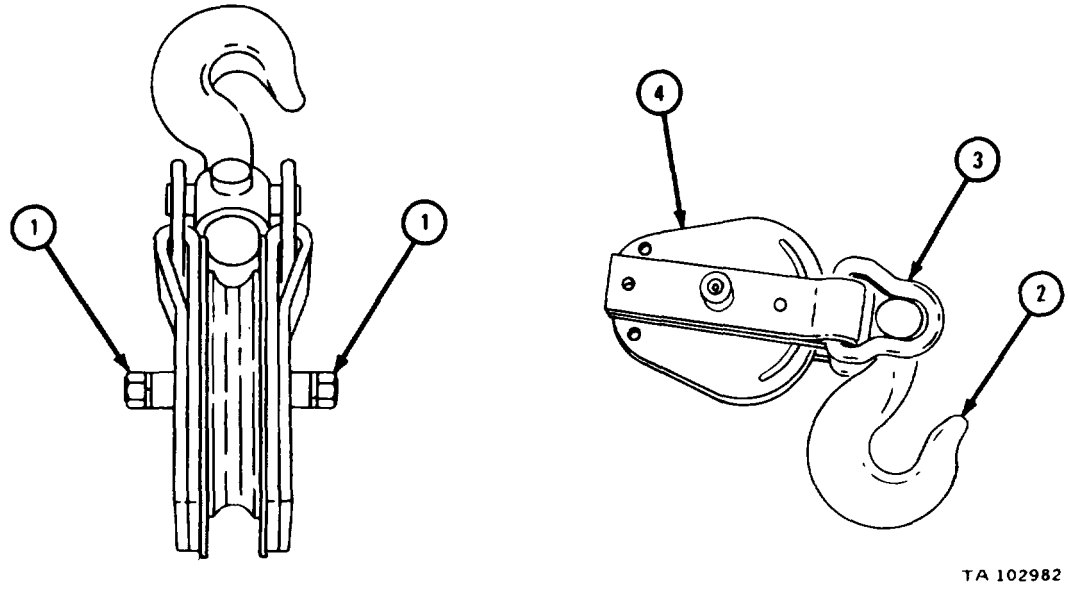


TA 102981

FRAME 2

1. Take off two nuts and lockwashers (1).
2. Turn hook (2) to one side and unhook side shell catch (3) from hook.
3. Take off side shell (4).

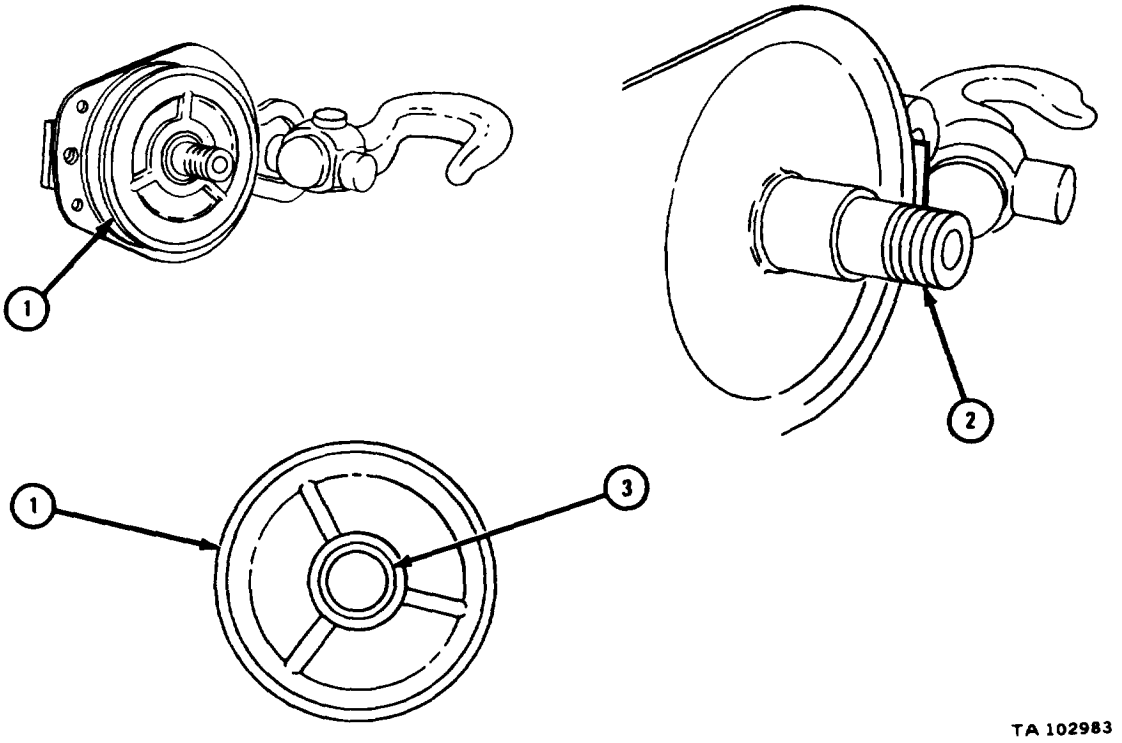
GO TO FRAME 3



FRAME 3

1. Take off sheave (1).
2. Take out sheave pin (2).
3. Press sheave bushing (3) out of sheave (1).

END OF TASK



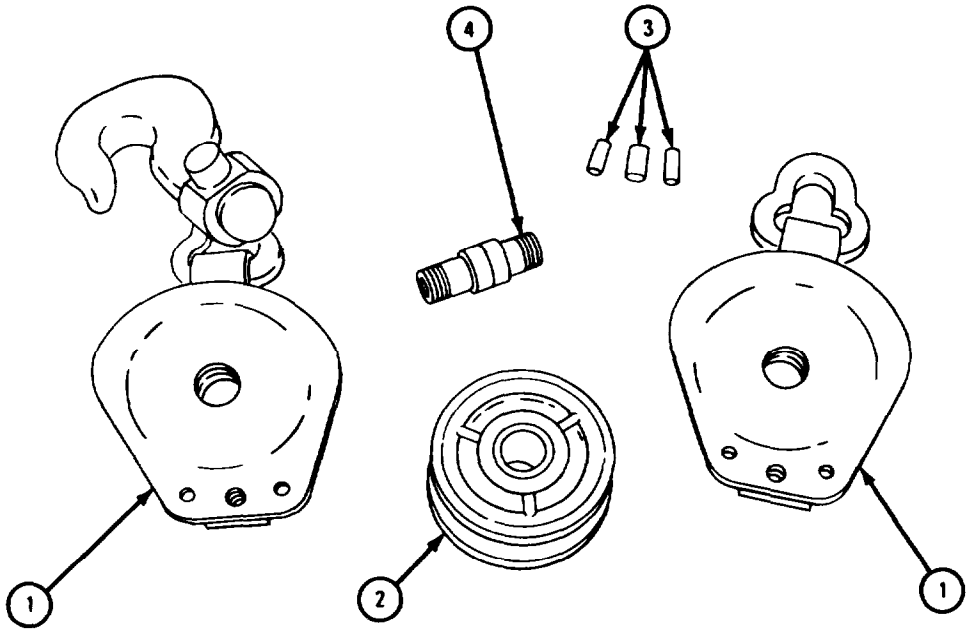
c. Cleaning. There are no special cleaning procedures required. Refer to cleaning procedures given in Part 1, para 1-3.

d. Inspection and Repair.

FRAME 1

1. Check shell sides (1), sheave (2), and spacers (3) for cracks, bends, burrs or warping. If damaged, get new ones.
2. Check sheave pin (4) for cracks, bends, warping, burrs, and distorted threads. If damaged get a new part. If sheave pin (4) has burrs, use hand file to take off burrs. If threads are distorted, use a tap and die set to straighten out threads.

END OF TASK

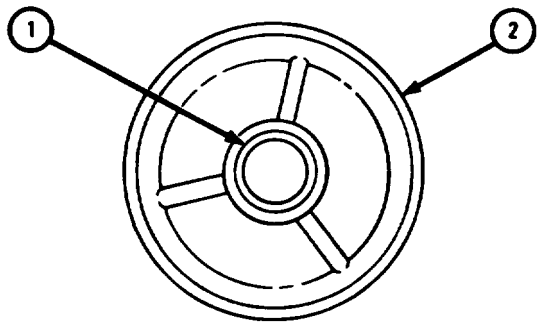


e. Assembly.

FRAME 1

1. Press sheave bushing (1) into sheave (2).

GO TO FRAME 2

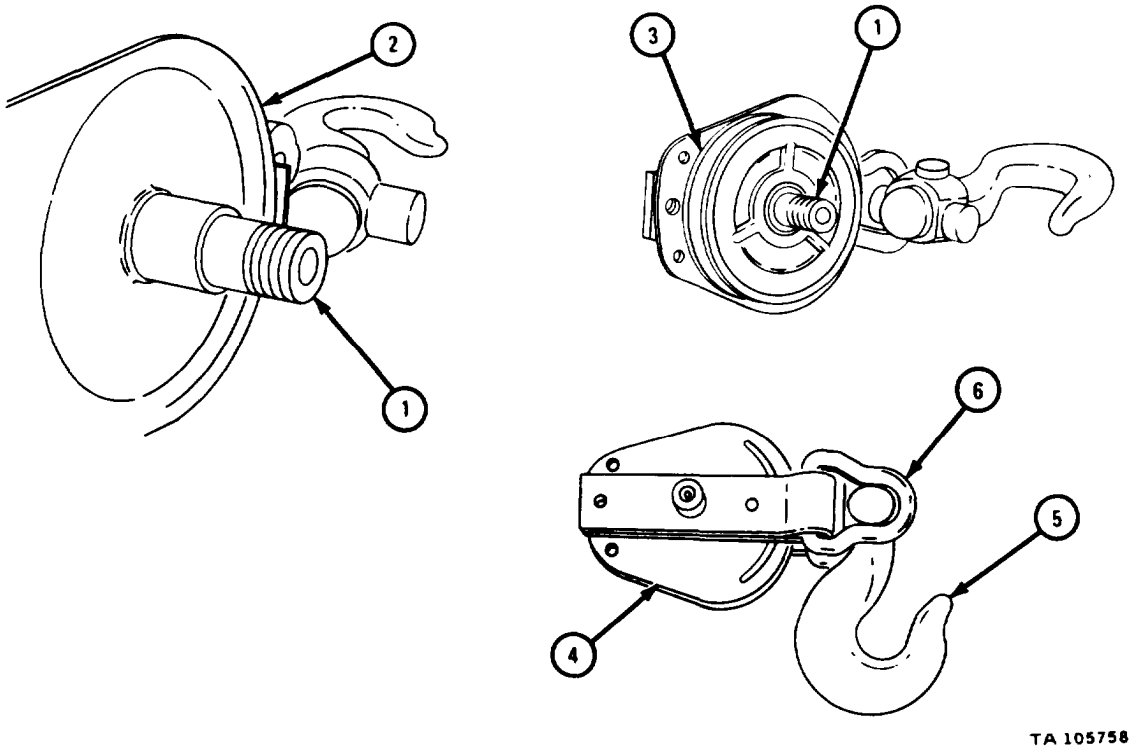


TA 102985

FRAME 2

1. Put sheave pin (1) into side shell with hook (2).
2. Put sheave (3) on sheave pin (1).
3. Put on side shell without hook (4).
4. Turn hook (5) to one side and hookup catch (6) to hook (5).

GO TO FRAME 3



TA 105758

FRAME 3

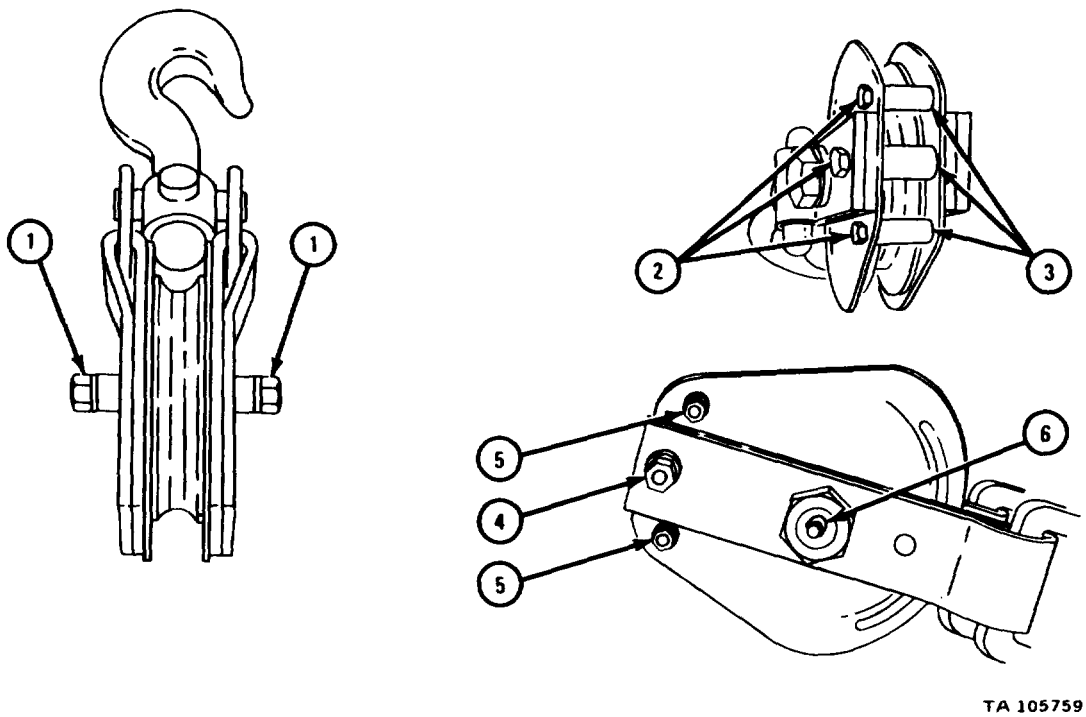
1. Put on two nuts and lockwashers (1) and tighten.
2. Put on three screws (2) and three spacers (3).
3. Put on one nut and lockwasher (4) and tighten.
4. Put on two nuts and lockwashers (5) and tighten.
5. Grease and put on fitting (6) and tighten.

NOTE

Follow-on Maintenance Action Required:

Put snatch block back in storage box on truck. Refer to TM 9-2320-211-10.

END OF TASK



17-50. OPERATOR GUARD REPAIR (TRUCK M543A2).

TOOLS: No special tools required

SUPPLIES: Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680

PERSONNEL: One

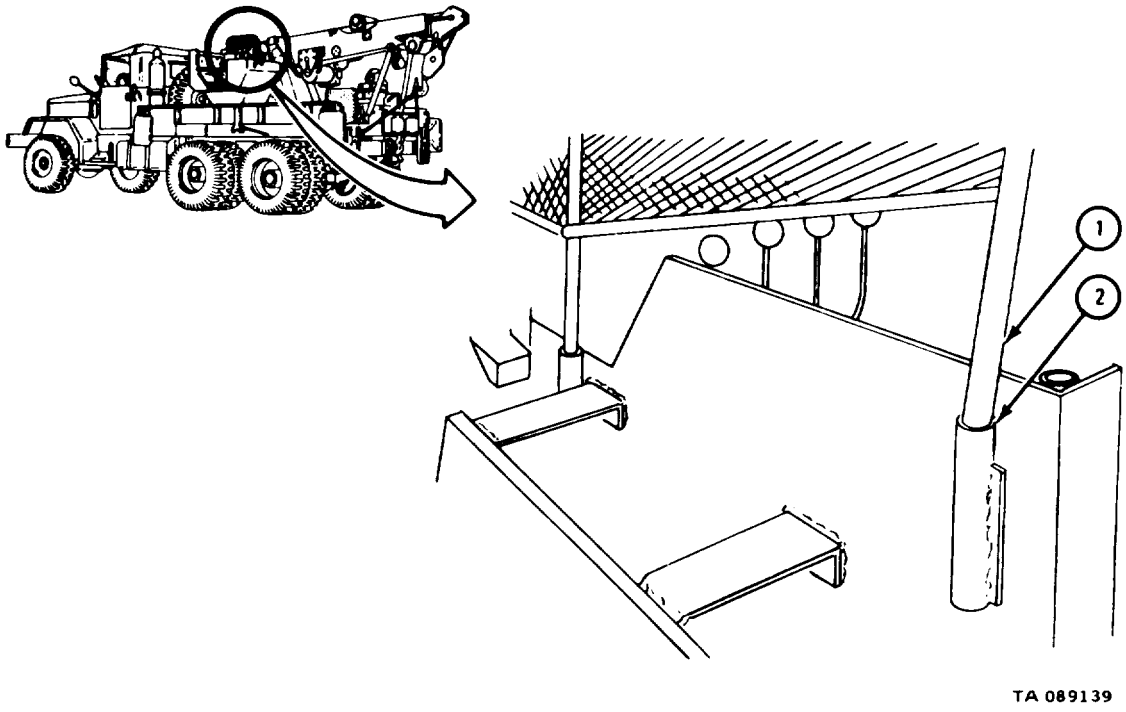
EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Removal.

FRAME 1

1. Lift guard (1) up and out of two gondola brackets (2).

END OF TASK



b. Cleaning, Inspection, and Repair.

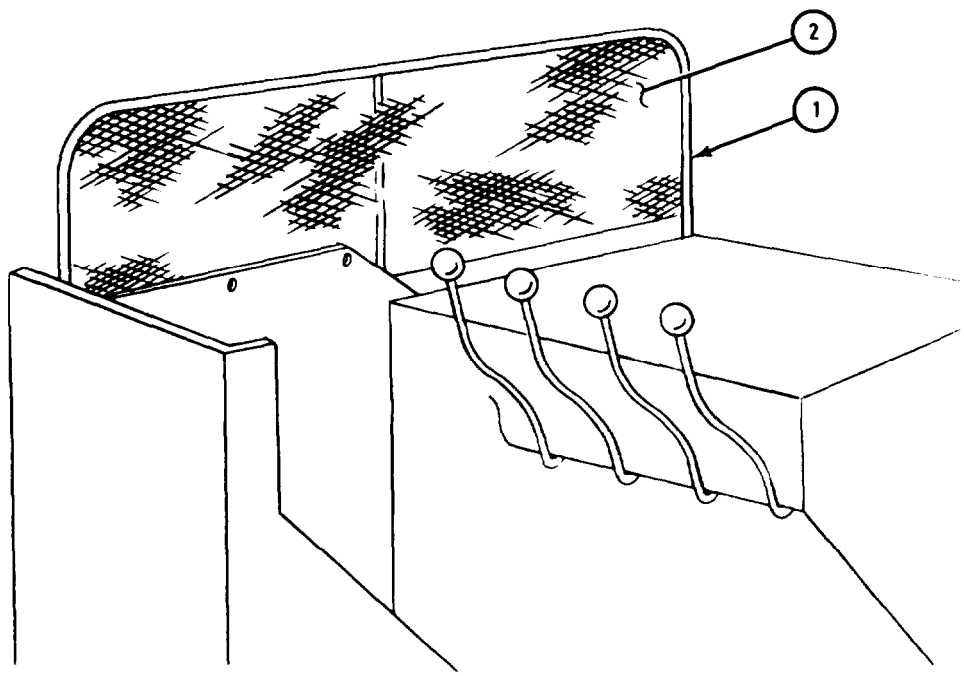
FRAME 1

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

1. Clean operator guard with solvent.
2. Check that frame (1) has no cracks, bends or breaks. Repair by straightening or welding. Refer to TM 9-237.
3. Check wire mesh (2) for holes or broken welds. Repair by welding. Refer to TM 9-237.
4. If frame (1) or wire mesh (2) cannot be fixed, get new operator guard.

END OF TASK



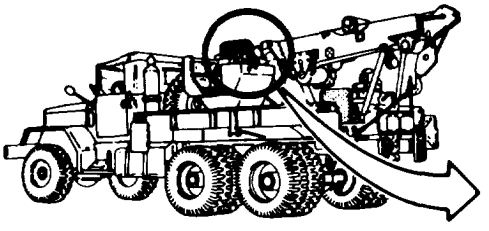
TA 089140

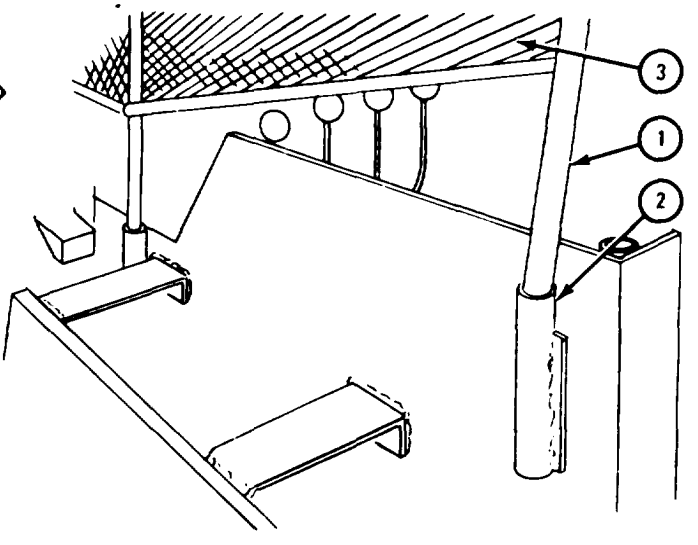
c. Replacement.

FRAME 1

1. Place two guard supports (1) into gondola brackets (2) and push down evenly until guard (3) is seated.

END OF TASK





TA 089141

17-51. CONTROL VALVE BANK REPAIR (TRUCK M543A2).

TOOLS: No special tools required

SUPPLIES: Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680
Lubricating oil, ICE, OE/HDO 30, MIL-L-2104
Clean rags
Control valve bank seal and preformed packing set
3/32 x 5/8-inch cotter pins (8)
1/16 x 1/2-inch cotter pins (16)

PERSONNEL: One

EQUIPMENT CONDITION: Control valve bank taken off vehicle and on work-bench.

a. **Preliminary Procedures.**

(1) Remove control valve bank assembly. Refer to TM 9-2320-211-20.

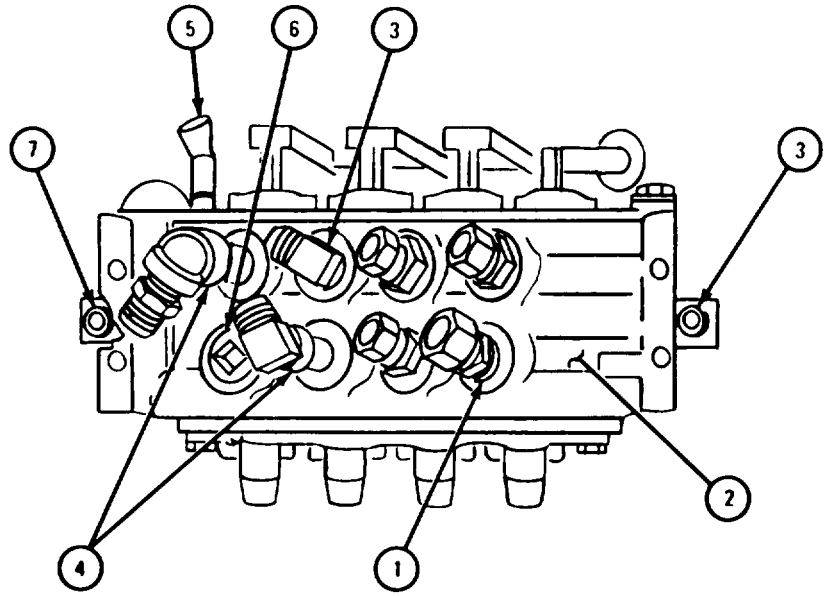
(2) Clean outside of control valve bank. Refer to para 17-51d.

b. Disassembly into Subassemblies.

FRAME 1

1. Unscrew and take out four nipples (1) from control valve bank (2).
2. Unscrew and take out two nipples (3).
3. Unscrew and take out two nipples (4) and nipple (5).
4. Unscrew and t take out pipe plug (6) and nipple (7).

GO TO FRAME 2

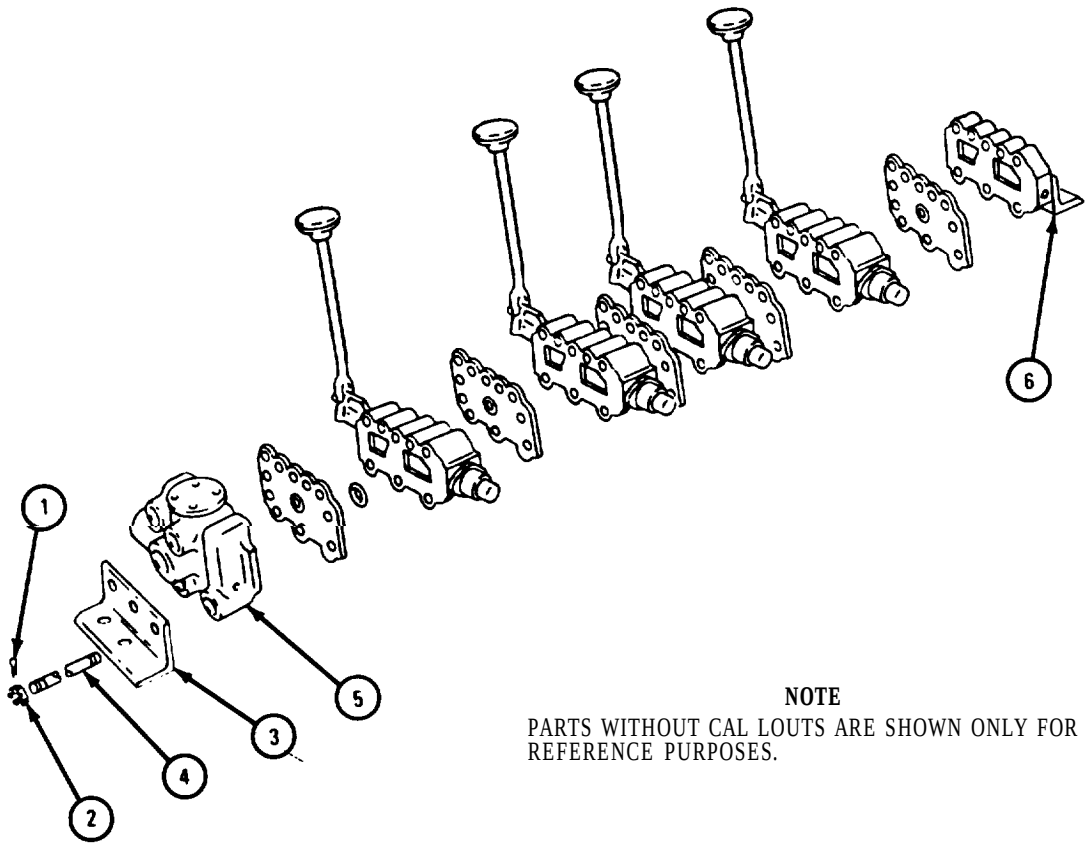


TA 087475

FRAME 2

1. Take off five spring pins (1) from nuts (2).
2. Take off five nuts (2).
3. Take off mounting angle (3).
4. Push out five rods (4) from valve bank (5).
5. Take off mounting angle (6).

GO TO FRAME 3



NOTE

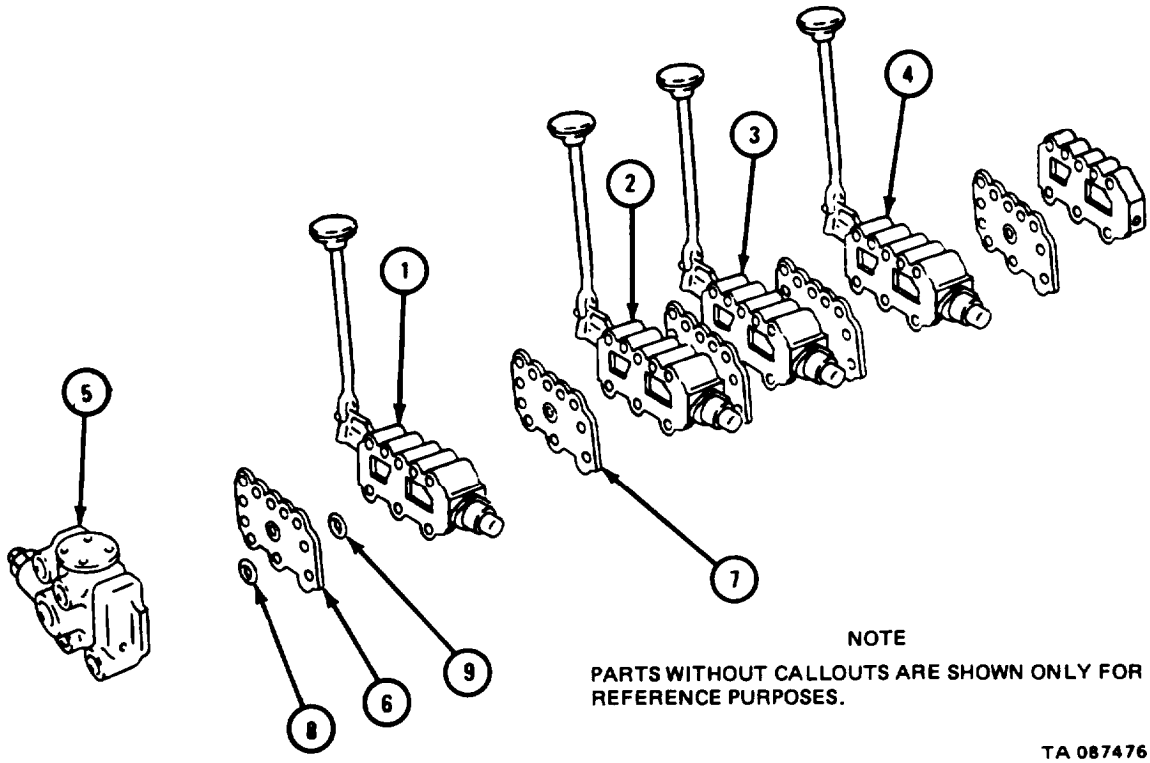
PARTS WITHOUT CAL LOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 087479

FRAME 3

1. Mark valve assemblies (1, 2, 3, and 4) so they can be put back together in the right order.
2. Pull off end cover (5), spacer plate (6), and four metal seals (7). Take off four large preformed packings (8) and two small preformed packings (9). Throw away preformed packings.
3. Do step 2 again for valve assemblies (1, 2, and 3).

GO TO FRAME 4



NOTE

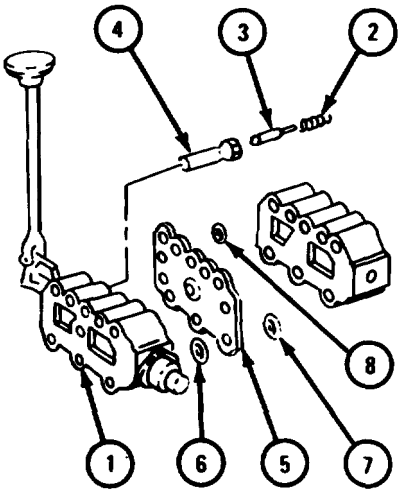
PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 087476

FRASME 4

1. Takeoff valve assembly (1). Takeout spring (2), poppet (3), and sleeve (4) from valve assembly (1).
2. Take off spacer plate (5), three metal seals (6), four large preformed packings (7), and four small preformed packings (8). Throw away preformed packings.

END OF TASK



NOTE

PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 087477

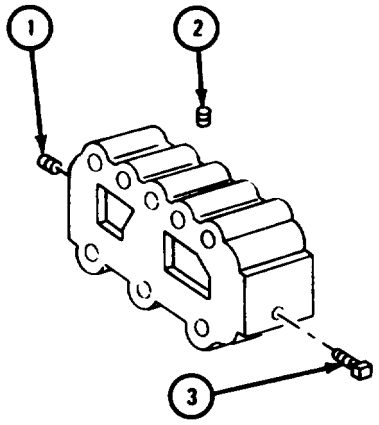
c* Disassembly of Subassemblies.

(1) Side plate.

FRAME 1

1. Unscrew and take out 1/4-inch pipe plug (1), 1/4-inch closure plug (2), and 1/8-inch plug (3).

END OF TASK



TA 087478

(2) Crane valve assembly.

FRAME 1

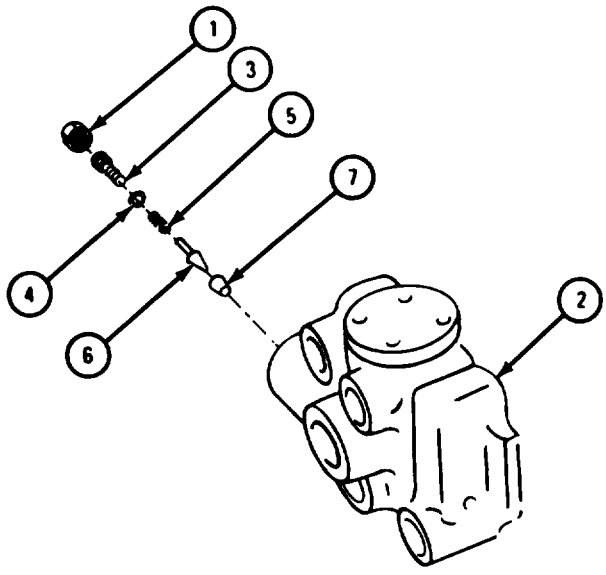
1. Take off nut (1) from valve assembly (2).
2. Take out adjusting screw (3), preformed packing (4), spring (5), and valve (6).

NOTE

Do not take out valve seat (7) unless found damaged during inspection.

3. Take valve seat (7) out of valve assembly (2).

GO TO FRAME 2

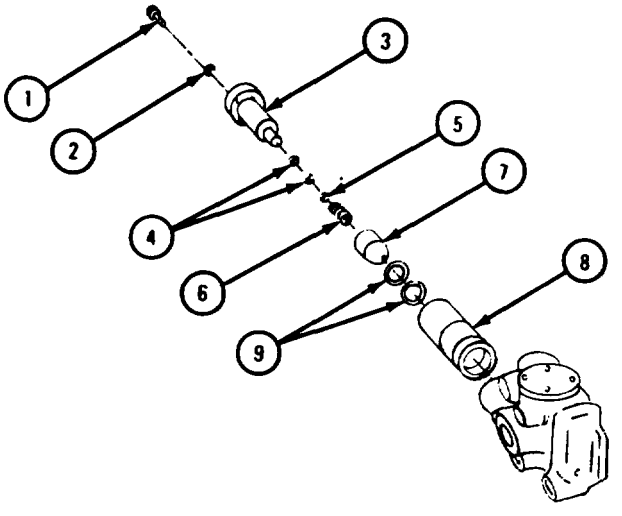


TA 087492

FRAME 2

1. Take out four screws (1) and lockwashers (2) from body (3).
2. Take out two preformed packings (4) and preformed packing (5). Throw away preformed packings.
3. Take out spring (6).
4. Take out spool (7).
5. Take out seat (8). Take off two preformed packings (9). Throw away preformed packings.

GO TO FRAME 3

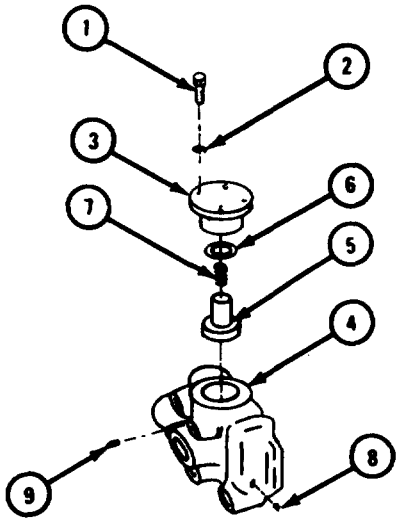


TA 087480

FRAME 3

1. Unscrew and take out four screws (1) and lockwashers (2) from cover (3).
2. Take off cover (3) from end cover (4).
3. Take out valve (5), preformed packing (6), and spring (7). Throw away preformed packing.
4. Unscrew and take out 1/4-inch pipe plug (8) and 1/8-inch pipe plug (9).

END OF TASK



TA 087481

(3) Valve assembly.

CAUTION

Keep parts from each valve assembly (2) separate. Some parts are not interchangeable. Trying to force fit parts can cause damage to equipment.

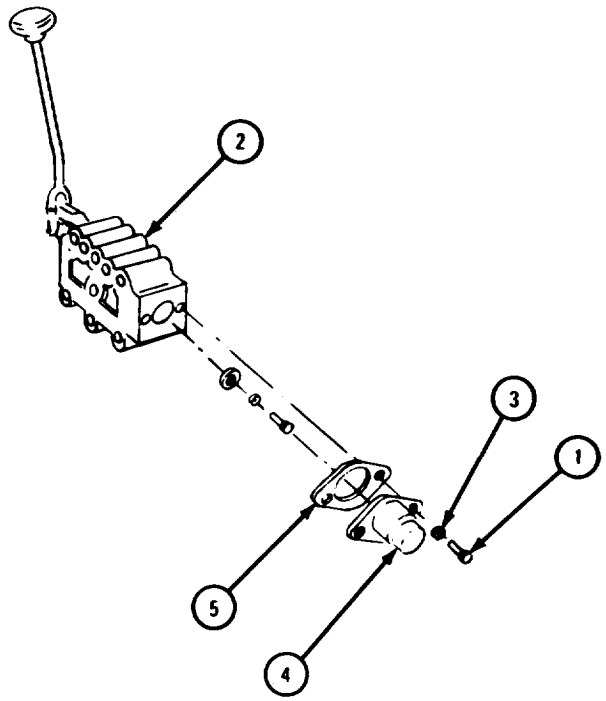
NOTE

Each valve assembly is taken apart the same way.

FRAME 1

1. Unscrew and take off two bolts (1) from valve assembly (2). Take off two lockwashers (3).
2. Take off end cap (4) and spacer (5).

GO TO FRAME 2

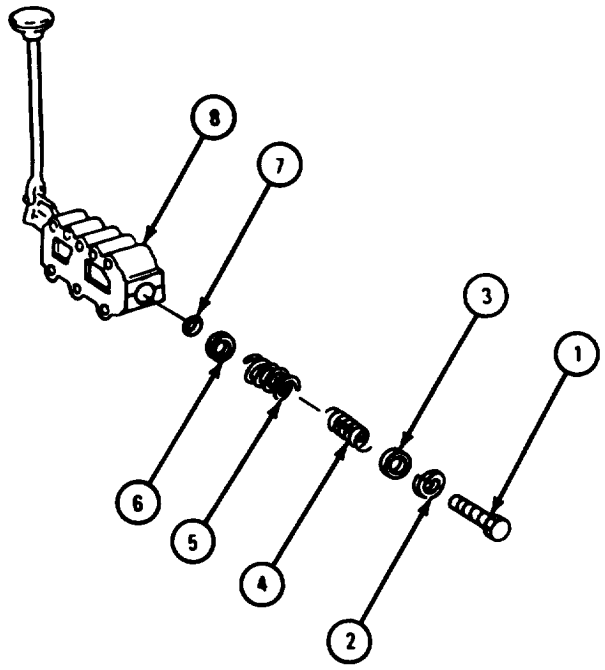


TA 087482

FRAME 2

1. Unscrew and takeout screw (1), lockwasher (2), and washer (3).
2. Take out two springs (4 and 5), washer (6), and preformed packing (7) from valve body (8). Threw away preformed packing.

GO TO FRAME 3



TA 087483

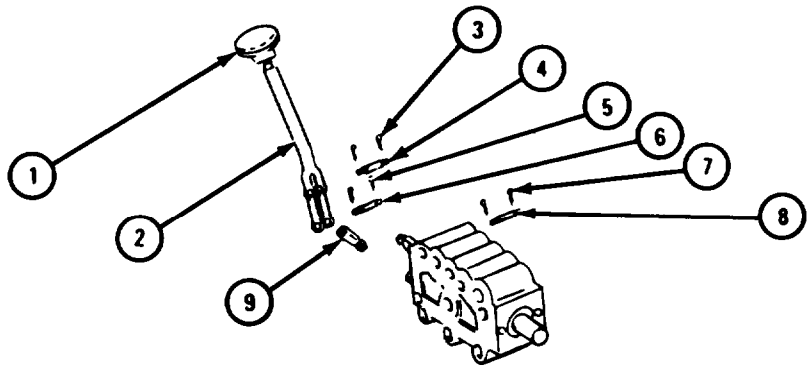
FRAME 3

NOTE

Take off knob (1) from lever (2) only if knob is damaged.

1. Unscrew and take off knob (1) from lever (2).
2. Take out two cotter pins (3) from 3/8-inch pin (4). Take out 3/8-inch pin.
3. Takeout two cotter pins (5) from 1/4-inch pin (6). Takeout 1/4-inch pin.
4. Take off lever (2).
5. Do step 3 again for two cotter pins (7) and pin (8).
6. Takeoff link (9).

GO TO FRAME 4

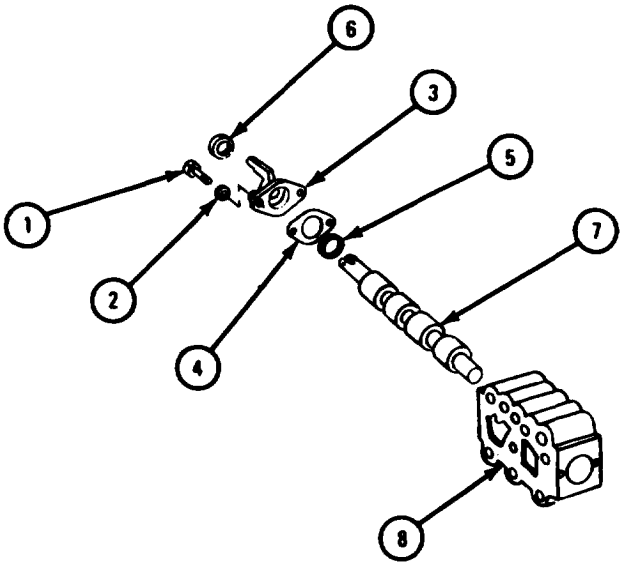


TA 087484

FRAME 4

1. Takeout two screws (1) and lockwashers (2) from end cover (3).
2. Takeoff end cover (3), spacer (4), and preformed packing (5). Throw away preformed packing.
3. Take out seal (6) from end cover (3). Threw away seal.
4. Take out spool (7) from valve body (8).
5. Coat outside of spool (7) and inside of valve body (8) with a light coat of lubricating oil, ICE, OE/HDO 30, MIL-L-2104.

END OF TASK



TA 087485

d. Cleaning.

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

Eye shields must be worn when using compressed air. Eye injury can occur if eye shields are not used.

(1) Clean all parts in solvent.

(2) Dry with compressed air.

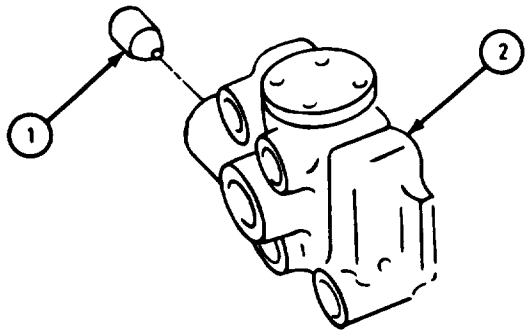
(3) Put a light coat of lubricating oil on all highly polished parts.

e. Inspection and Repair.

FRAME 1

1. Check that spool assembly (1) and spool bore in relief valve (2) does not have deep scratches or grooves.
2. Check that spool assembly (1) cannot be moved from side to side when in place in relief valve (2).
3. If damage or wear were found in steps 1 or 2, throw away relief valve assembly and get a new one in its place.

GO TO FRAME 2



TA 087500

FRAME 2

1. Check that poppet (1) does not bind in cover and guide (2).
2. Check that poppet (3) does not bind in body (4).
3. If binding is found, throw away relief valve and get a new one in its place.
4. Check that valve poppets (1 and 3) and their seating faces in bores of relief valve (5), do not have grooves, scratches, or pits. If damage is major, throw away relief valve and get a new one in its place.

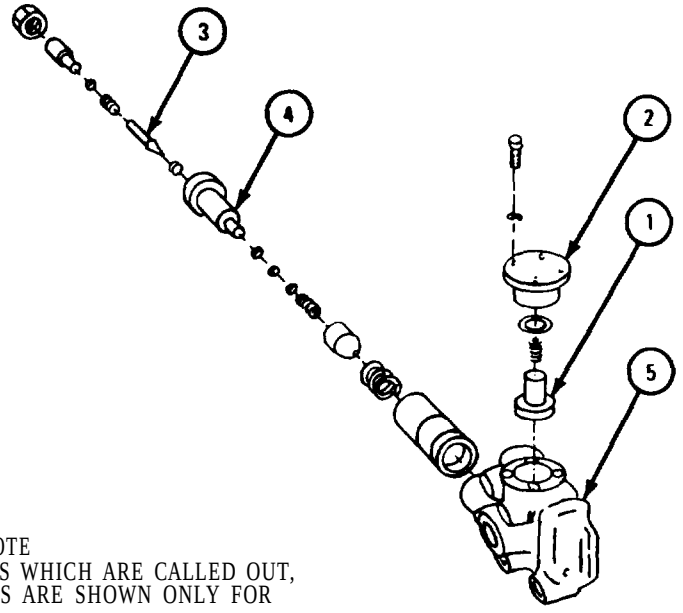
WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

Eye shields must be worn when using compressed air. Eye injury can occur if eye shields are not used.

5. Using lapping compound, lap poppets (1 and 3) against their seating faces. Be very careful to keep poppets centered in bores of relief valve.
6. Using solvent, wash away all traces of lapping compound. Dry with compressed air.

GO TO FRAME 3



NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT, PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 087703

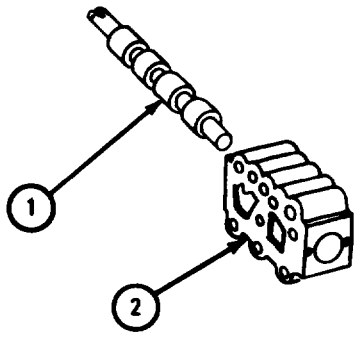
NOTE

All valve assemblies are inspected and repaired the same way.

FRAME 3

1. Check that spool assembly (1) and spool bore in valve (2) does not have deep scratches or grooves.
2. Check that spool assembly (1) cannot be moved from side to side when in place in swing control valve (2).
3. If damage or wear were found in steps 1 or 2, throw away valve assembly and get a new one in its place.

END OF TASK



TA 121220

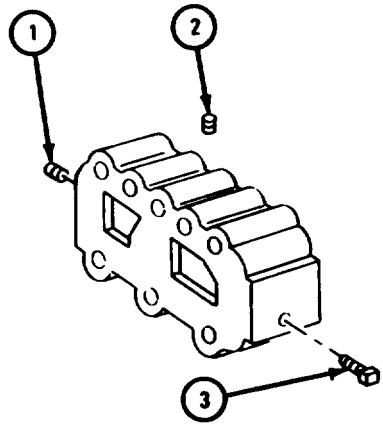
f. Assembly of Subassemblies.

(1) Side plate.

FRAME 1

1. Screw in and tighten 1/4-inch pipe plug (1), 1/4-inch closure plug (2) and 1/8-inch pipe plug (3).

END OF TASK



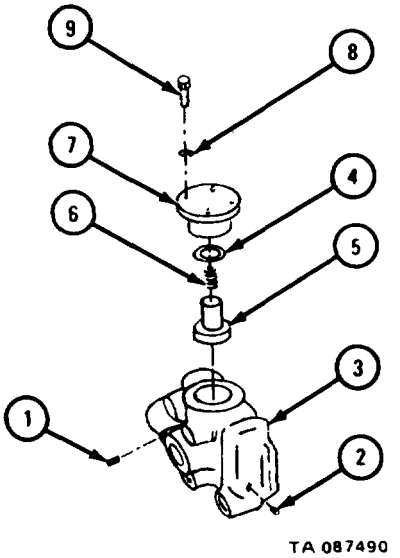
TA 087494

(2) Relief valve assembly.

FRAME 1

1. Screw in and tighten 1/8-inch pipe (1) and 1/4-inch pipe plug (2) into end cover (3).
2. Put new preformed packing (4) on valve (5). Put valve (5) in end cover (3). Put in spring (6).
3. Put on cover (7). Put on four lockwashers (8). Screw in and tighten four screws (9).

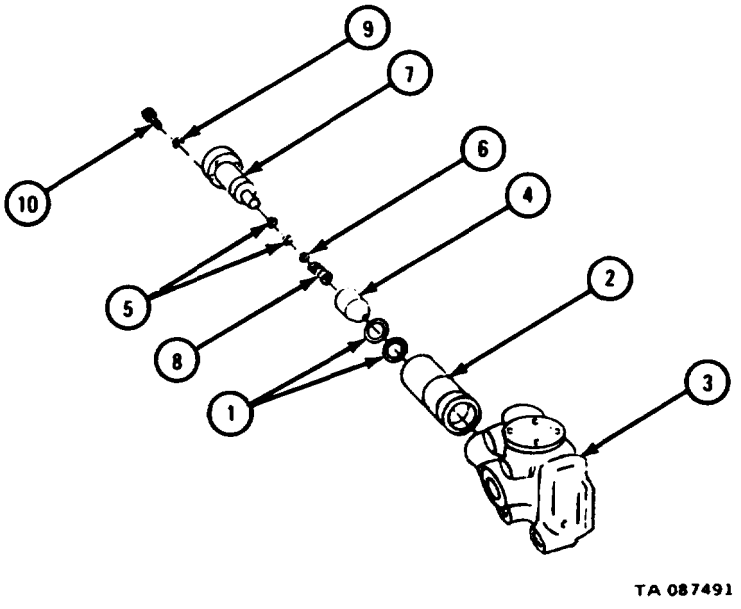
GO TO FRAME 2



FRAME 2

1. Put two new preformed packings (1) on seat (2). Put seat (2) in end cover (3). Put in spool (4).
2. Put two new preformed packings (5) and one new preformed packing (6) on body (7). Put spring (8) in body (7).
3. Put body (7) on end cover (3). Put on four lockwashers (9). Screw in and tighten four screws (10).

GO TO FRAME 3



TA 087491

FRAME 3

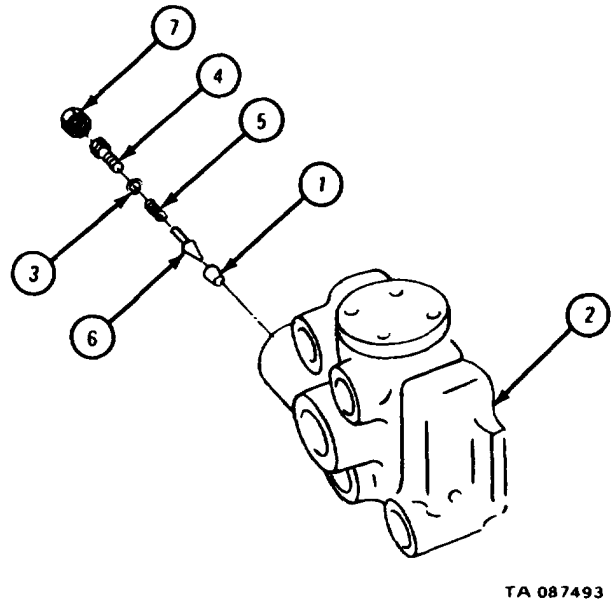
1. Put seat (1) in end cover (2).
2. Put new preformed packing (3) on adjusting screw (4).
3. Put spring (5) on valve (6). Put valve (6) in adjusting screw (4).

CAUTION

Do not tighten adjusting screw. Damage to valve (6) and seat (1) will result.

4. Screw adjusting screw (4) into end cover (2).
5. Screw on and tighten nut (7).

END OF TASK



TA 087493

(3) Valve assembly.

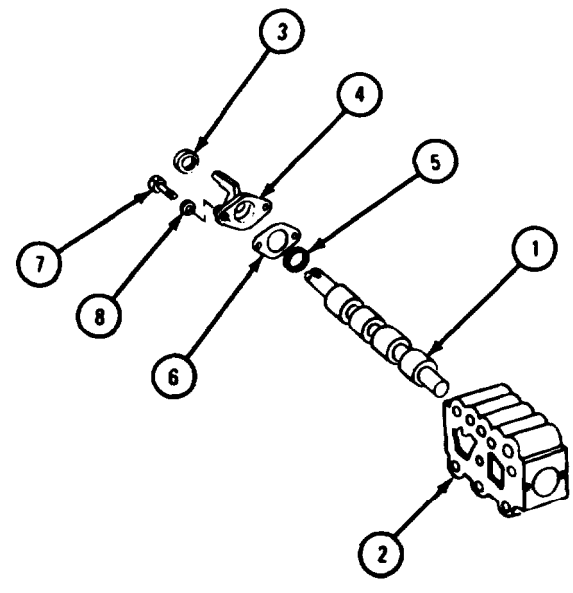
NOTE

Each valve assembly is put together the same way.

FRAME 1

1. Put spool (1) in valve body (2).
2. Put new seal (3) in end cover (4).
3. Put new preformed packing (5), spacer (6), and end cover (4) over spool (1).
4. Screw in and tighten two screws (7) and lockwashers (8) in end cover (4).

GO TO FRAME 2



FRAME 2

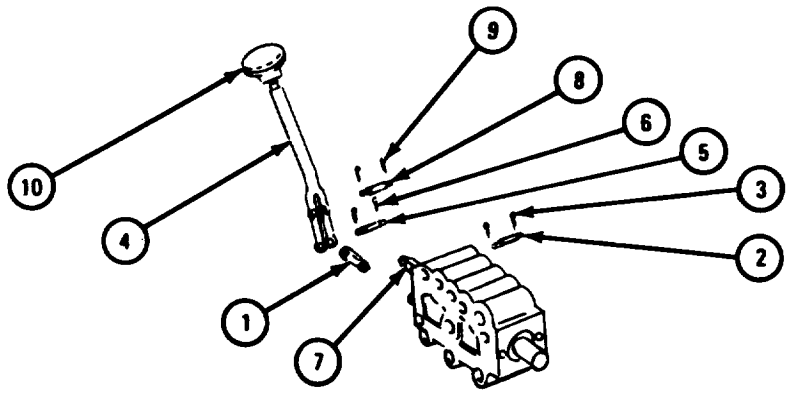
1. Put on link (1). Put in 1/4-inch by 1 1/8-inch long pin (2).
2. Put in two 1/16-inch cotter pins (3), one at each end of pin (2). Bend over ends of cotter pins.

NOTE

Bend in lever (4) should bend away from valve body.

3. Put lever (4) on end of link (1). Put in 1/4-inch by 1 1/2-inch pin (5).
4. Do step 2 again for two cotter pins (6).
5. Aline holes in lever (4) and end cover (7). Put in 3/8-inch pin (8).
6. Do step 2 again for two 3/32-inch cotter pins (9).
7. Screw on and tighten by hand, knob (10) onto lever (4).

GO TO FRAME 3

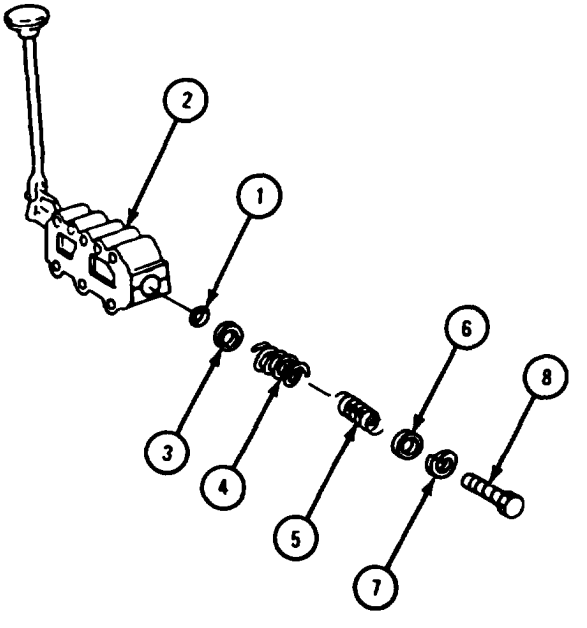


TA 087487

FRAME 3

1. Put new preformed packing (1) in valve body (2).
2. Put washer (3), two springs (4 and 5) in valve body (2).
3. Put on washer (6) and lockwasher (7).
4. Screw in and tighten screw (8).

GO TO FRAME 4

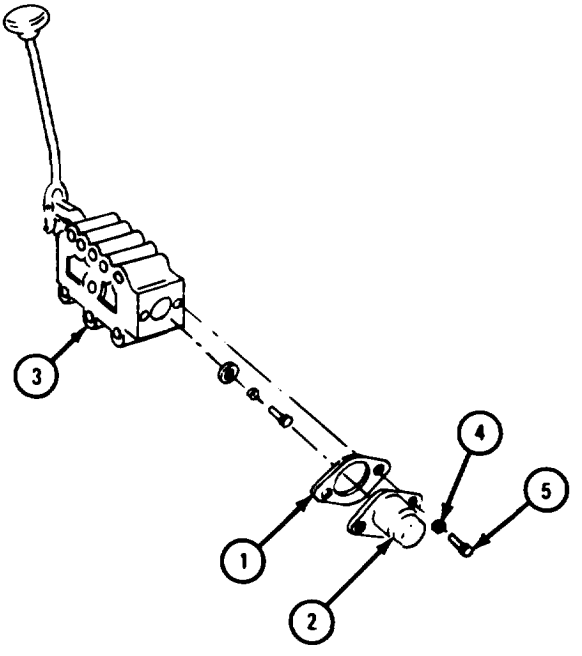


TA 087488

FRAME 4

1. Put spacer (1) and end cap (2) on valve assembly. (3).
2. Put on two lockwashers (4). Screw in and tighten screw (5).

END OF TASK



TA 087489

g. Assembly of Control Valve Bank.

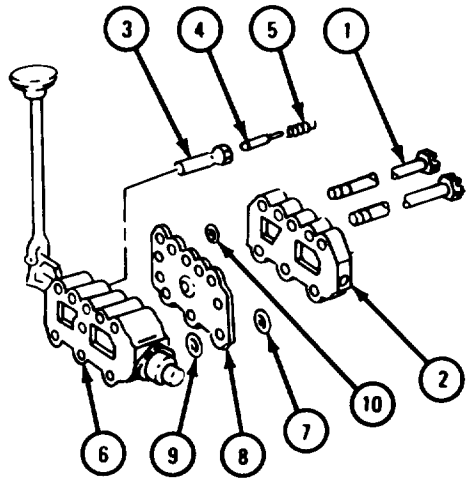
NOTE

Be sure valve assemblies (6) are put back on in the same way that they were taken off.

FRAME 1

1. Push two rods (1) through two upper holes in side plate (2).
2. Put sleeve (3), poppet (4) and spring (5) into valve assembly (6).
3. Put three metal seals (7) on side plate (2).
4. Put spacer plate (8) over rods (1) and onto side plate (2).
5. Put four new large preformed packings (9) and four new small preformed packings (10) into holes in spacer plate (8).
6. Hold spring (5) in place. Put valve assembly (6) over rods (1) and onto spacer plate.

GO TO FRAME 2

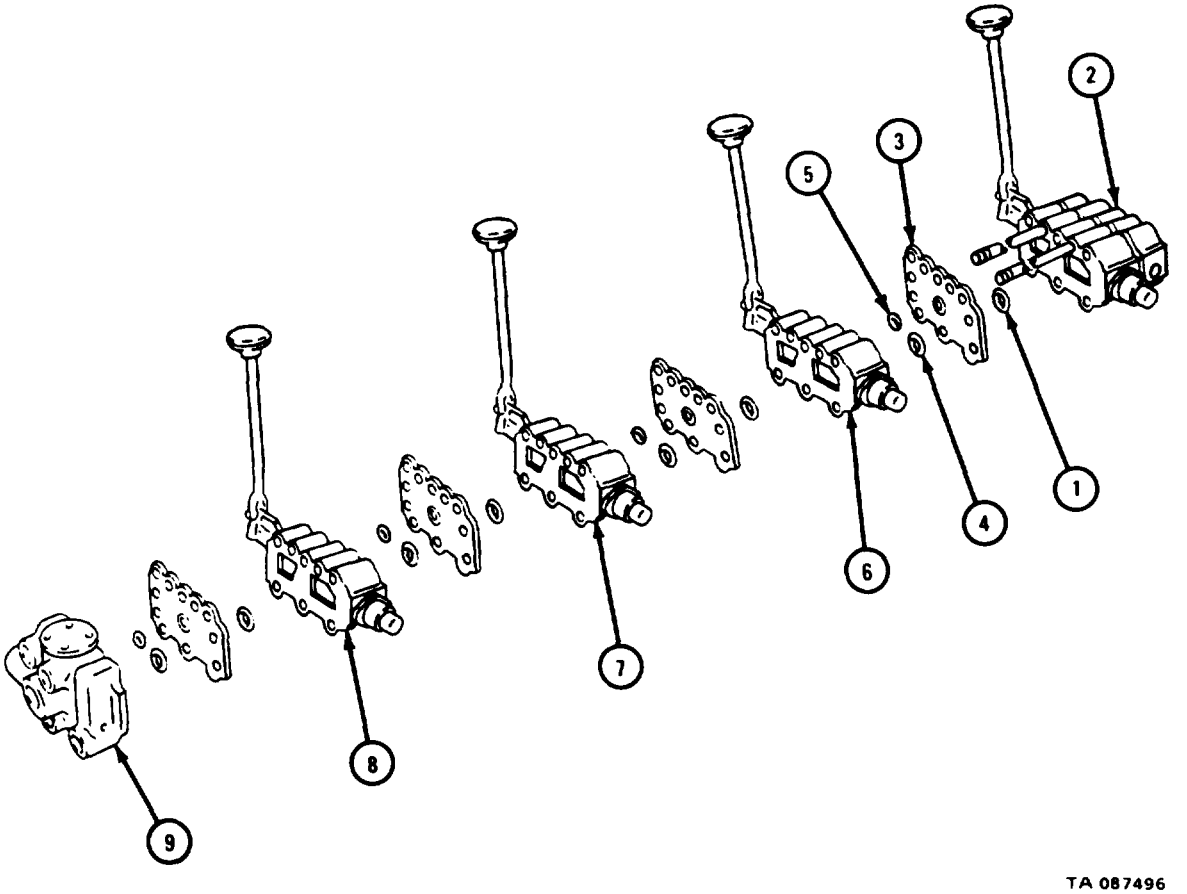


TA 087495

FRAME 2

1. Put four metal seals (1) on valve assembly (2). Put on spacer plate (3). Put four new large preformed packings (4) and small preformed packings (5) into holes in spacer plate (3).
2. Put on valve assembly (6).
3. Do step 1 again. Put on valve assembly (7).
4. Do step 1 again. Put on valve assembly (8).
5. Do step 1 again. Put on relief valve (9).

GO TO FRAME 3



TA 087496

FRAME 3

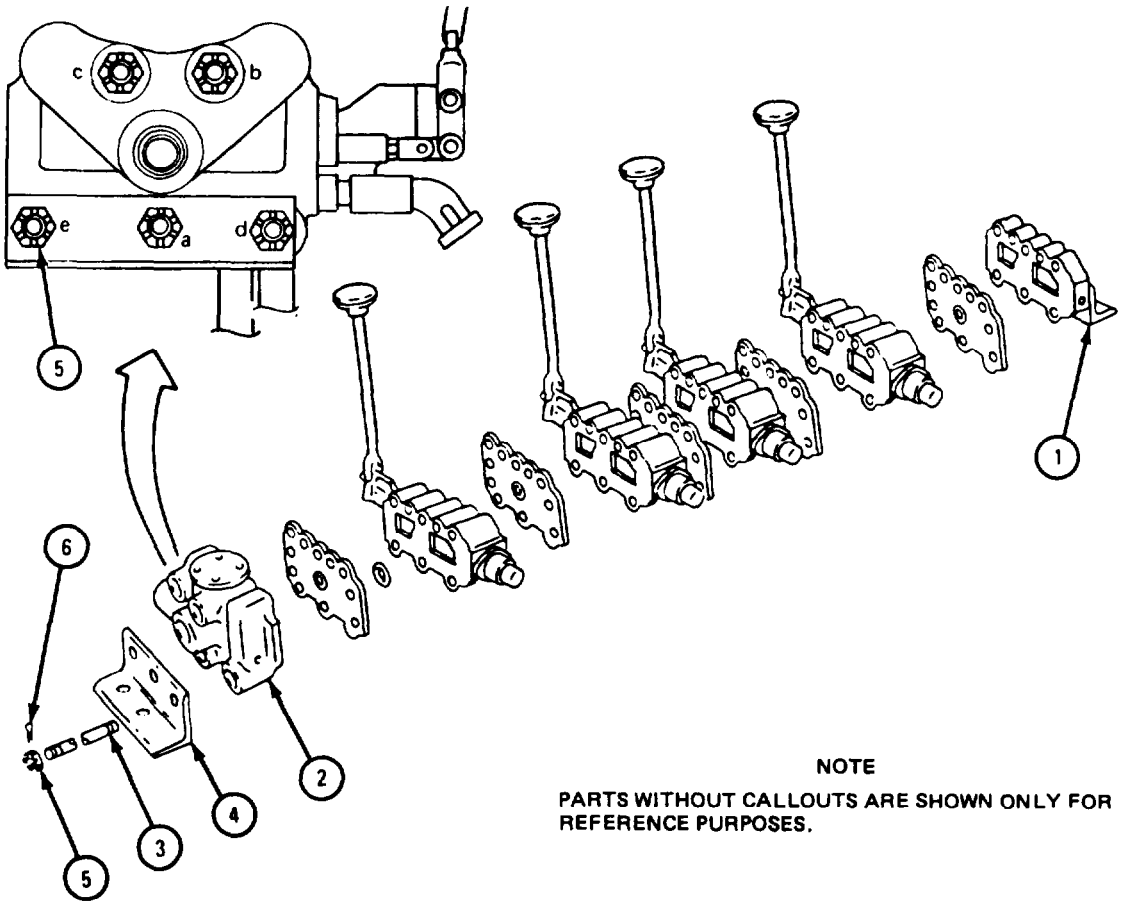
1. Put mounting angle (1) on control valve bank (2).
2. Push three rods (3) through control valve bank (2).
3. Put on mounting angle (4).
4. Screw on and hand tighten five nuts (5).
5. Tighten nuts (5) in order shown to 25 pound-feet.
6. Do step 5 again to 50 pound-feet.

NOTE

Be sure holes in rods (3) line up with slots in nuts (5) when final tightness is reached.

7. Do step 5 again to 75 pound-feet.
8. Put five spring pins (6) through nuts (5) and rods (3).

GO TO FRAME 4



NOTE

PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 087497

FRAME 4

NOTE

Be sure nipples point in direction as shown. Hydraulic lines will not be able to be put on if this is not done.

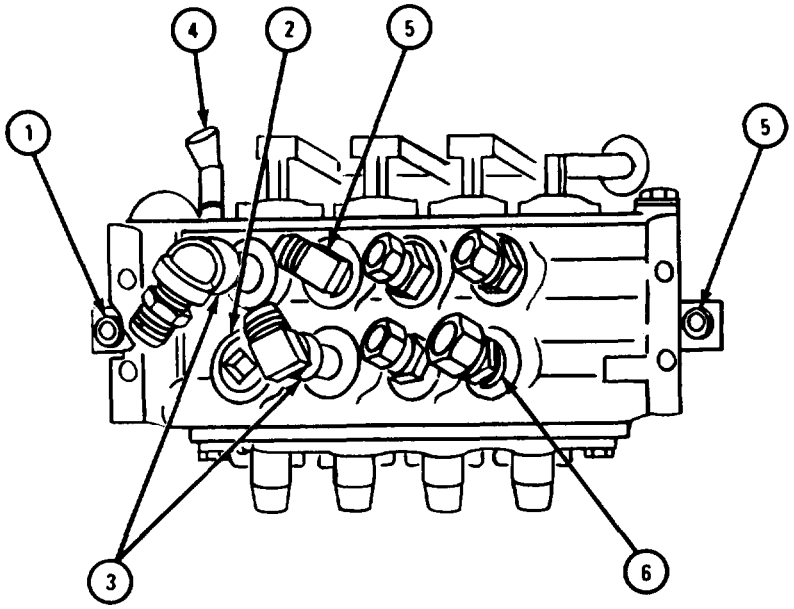
1. Screw in and tighten nipple (1) and pipe plug (2).
2. Screw in and tighten two nipples (3) and nipple (4).
3. Screw in and tighten two nipples (5).
4. Screw in and tighten four nipples (6).

NOTE

Follow-on Maintenance Action Required:

1. Replace control valve bank assembly. Refer to TM 9-2320-211-20.
2. Adjust valve bank relief valve. Refer to TM 9-2320-211-20.

END OF TASK



TA 087498

17-52. GONDOLA WRECKER ASSEMBLY REMOVAL, REPAIR, AND REPLACEMENT (TRUCK M543A2).

TOOLS: No special tools required

SUPPLIES: Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680

PERSONNEL: Two

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Drain hydraulic oil reservoir. Refer to LO 9-2320-211-12.

(2) Remove control valve bank cover. Refer to TM 9-2320-211-20.

(3) Remove gondola control valve assembly. Refer to TM 9-2320-211-20.

(4) Remove gondola floodlight assembly. Refer to TM 9-2320-211-20.

(5) Remove gondola guard. Refer to para 17-50.

(6) Remove oilcan bracket. Refer to TM 9-2320-211-20.

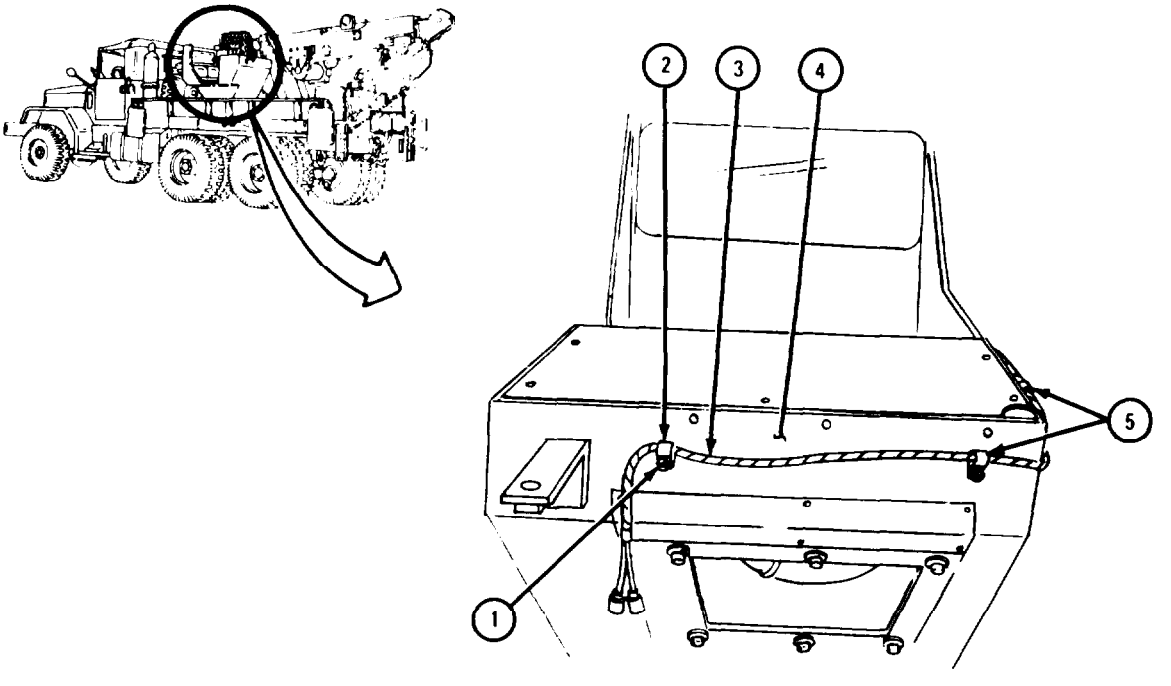
(7) Remove operator seat and backrest. Refer to TM 9-2320-211-20.

b. Removal.

FRAME 1

1. Take out screw (1).
2. Pry open ends of clip (2) and take out cable (3).
3. Close clip (2) and hand tighten screw (1) through clip and into gondola (4).
4. Do steps 1 through 3 again for other two clips (5).
5. Coil loose cable (3) and move it out of the way.

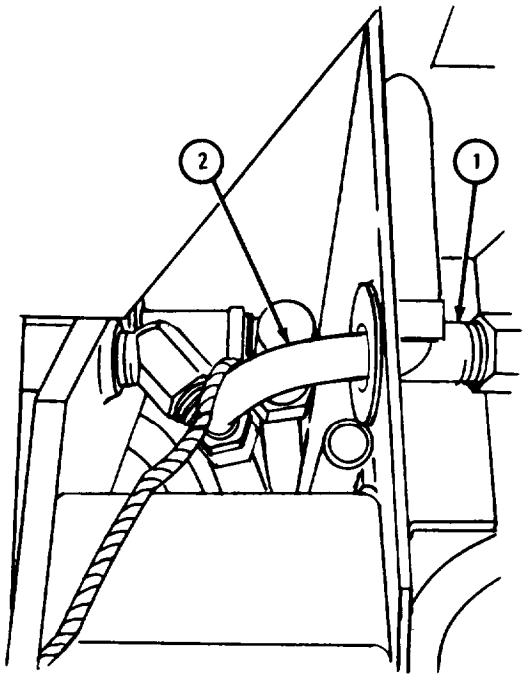
GO TO FRAME 2



FRAME 2

1. Take off nipple (1).
2. Unscrew and pull out tube (2) with attached hose.

GO TO FRAME 3

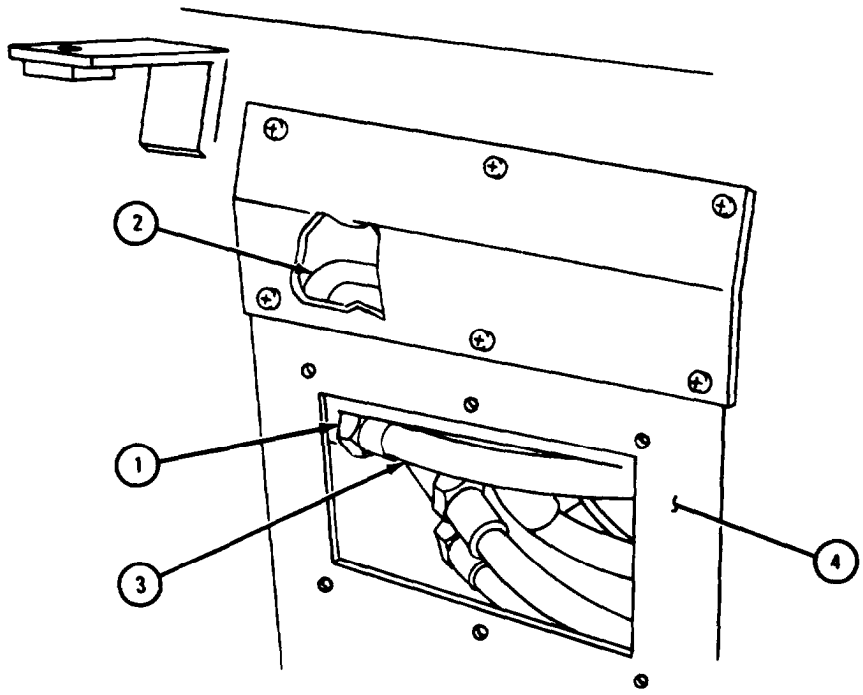


TA 089145

FRAME 3

1. Unscrew coupling (1) and take out tube (2).
2. Pull hose (3) out of hole in side of gondola (4).

GO TO FRAME 4

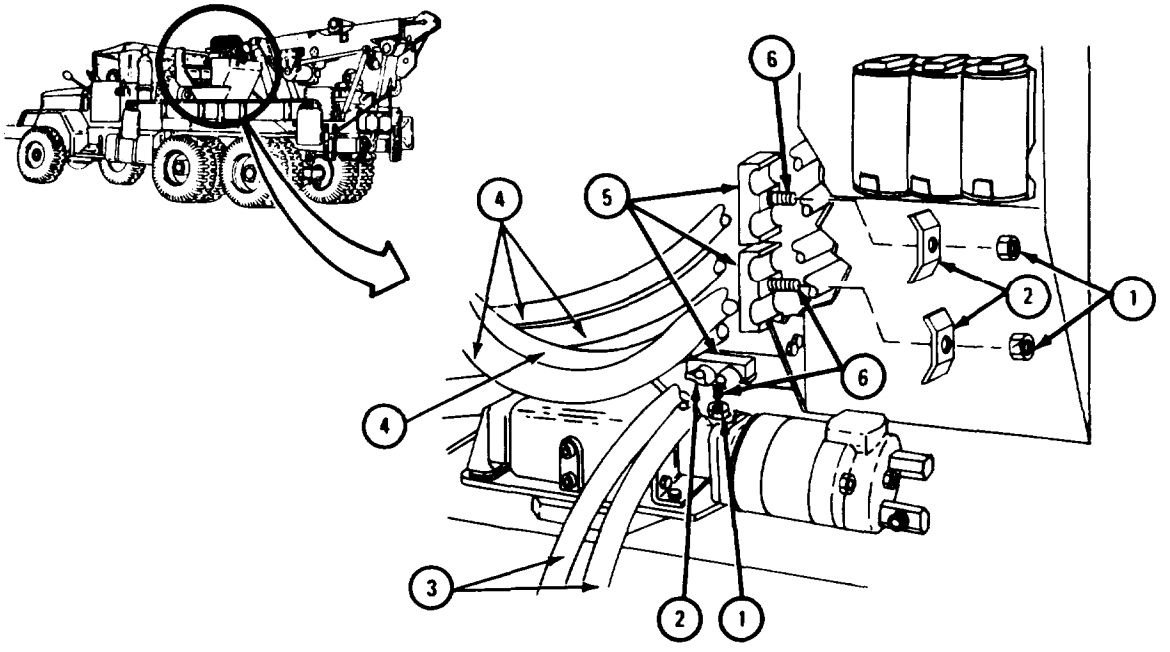


TA 089146

FRAME 4

1. Working outside rear of gondola, take off three nuts (1).
2. Takeoff three hose clamps (2).
3. Pullback hoses (3 and 4).
4. Takeoff three wooden brackets (5) from studs (6).

GO TO FRAME 5



TA 101627

FRAME 5

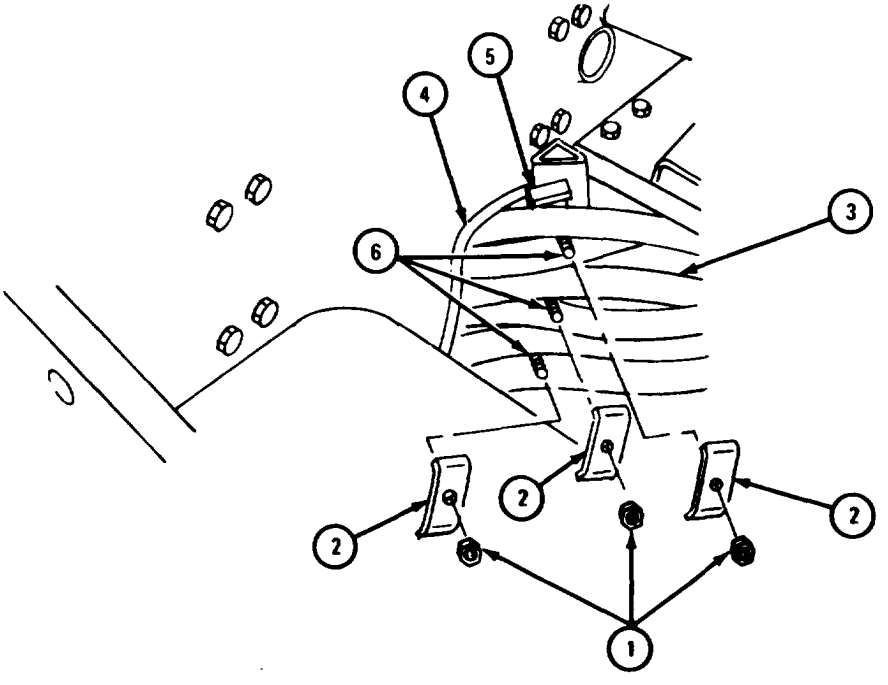
1. Take off three nuts (1).
2. Take off three hose clamps (2).
3. Push six hoses (3) out through opening (4).

CAUTION

Be careful not to damage three wooden brackets (5). Cracked or chipped brackets will not hold hoses safely.

4. Take three wooden brackets (5) off studs (6).

GO TO FRAME 6

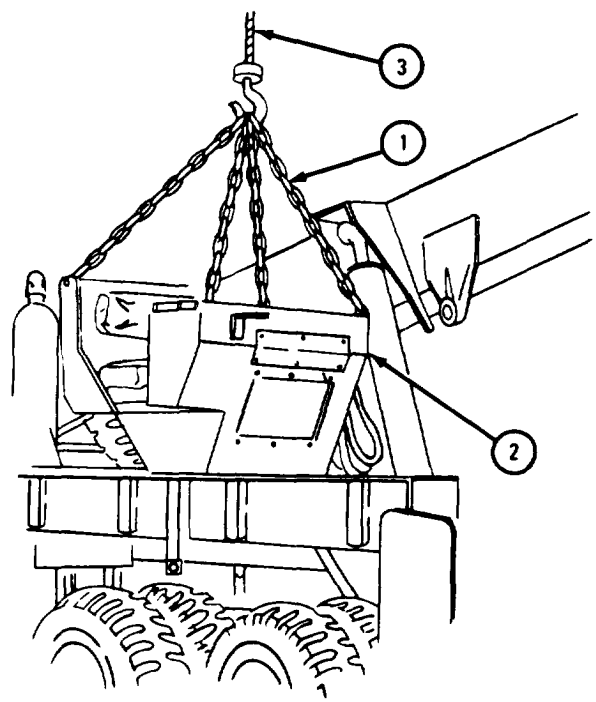


TA 089147

FRAME 6

1. Hook chain sling (1) to gondola (2).
2. Hook hoist (3) to sling (1).
3. Using hoist (3), take up slack in sling (1).

GO TO FRAME 7

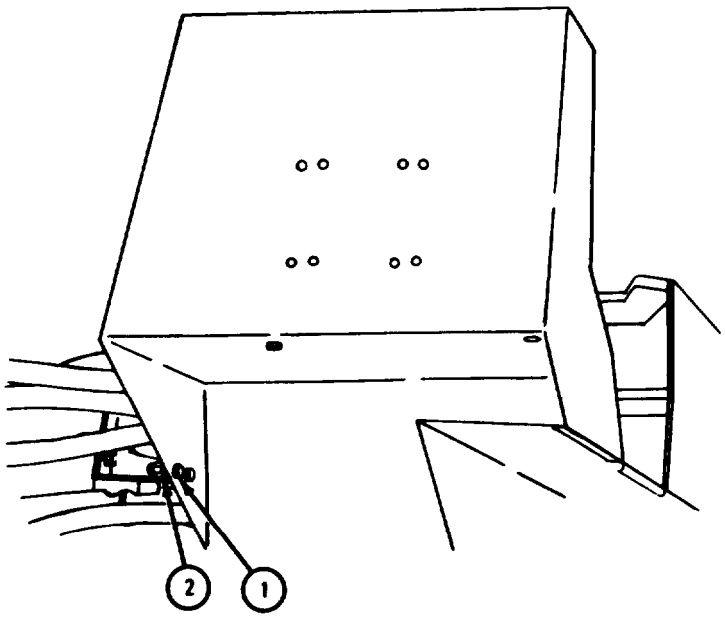


TA 089148

FRAME 7

1. Take out two screws (1) and nuts (2).

GO TO FRAME 8

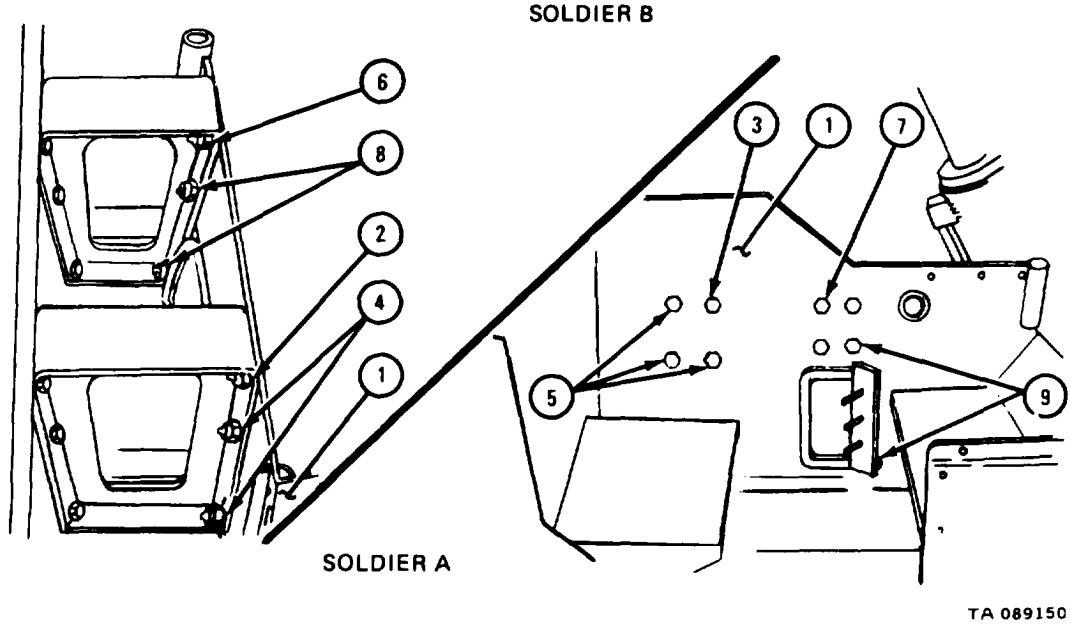


TA 089149

FRAME 8

Soldier A	1.	Working outside rear left side of gondola (1), hold nut (2). Tell soldier B when ready.
Soldier B	2.	Working inside rear left side of gondola (1), take out screw (3).
Soldier A	3.	Take off nut (2).
Soldiers A and B	4.	Do steps 1 through 3 again for three nuts (4) and screws (5).
Soldier A	5.	Working outside front left side of gondola (1), hold nut (6). Tell soldier B when ready.
Soldier B	6.	Working inside front left side of gondola (1), tak eout screw (7).
Soldier A	7.	Take off nut (6).
Soldiers A and B	8.	Do steps 5 through 7 again for five nuts (8) and screws (9).

GO TO FRAME 9



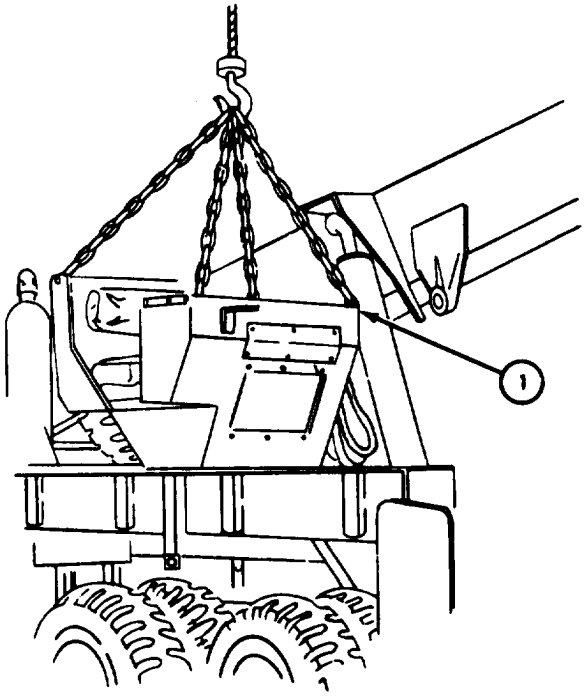
FRAME 9

Soldier A 1. Put wood blocks in place or ground. Guide gondola (1) onto wood blocks as soldier B moves it off truck. Tell soldier B when ready.

Soldier B 2. Using hoist, take gondola (1) off truck and onto wood blocks.

Soldier A 3. Take off hoist and sling.

END OF TASK



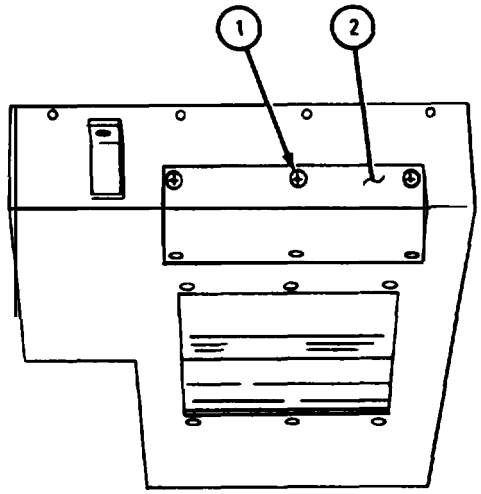
TA 089151

c. Disassembly.

FRAME 1

1. Take out six screws (1).
2. Take off gondola cover plate (2).

GO TO FRAME 2

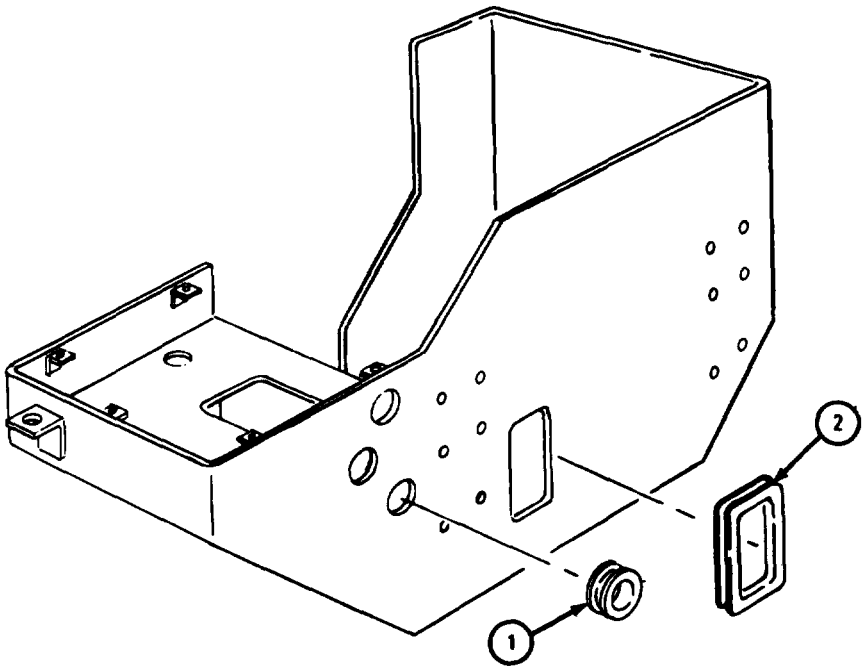


TA 089152

FRAME 2

1. Pull out three hydraulic line hole seals (1).
2. Pull out gondola body rubber seal (2).

END OF TASK



d. Cleaning, Inspection, and Repair.

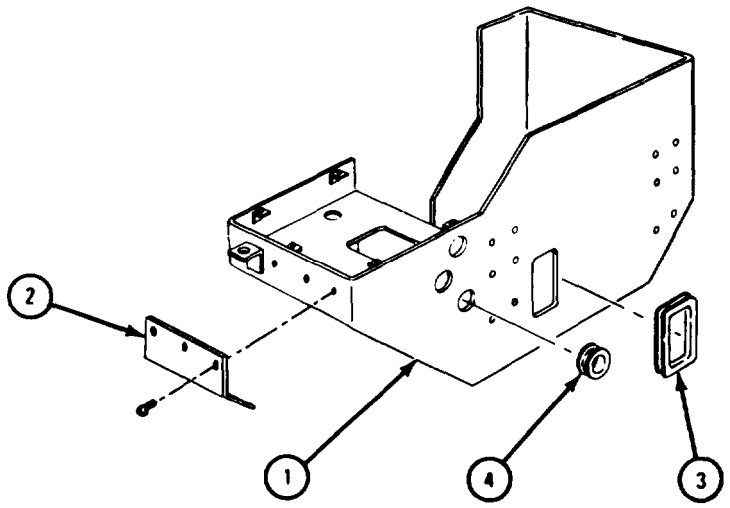
FRAME 1

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

1. Clean all parts with solvent.
2. Check that gondola (1) and gondola cover plate (2) have no dents, bends or broken welds. Repair by straightening or welding. Refer to TM 9-237 for welding procedures.
3. Check that gondola body rubber seal (3) and three hydraulic line hole seals (4) are not cracked, broken or damaged in any other way. If parts are damaged, get new ones.

END OF TASK



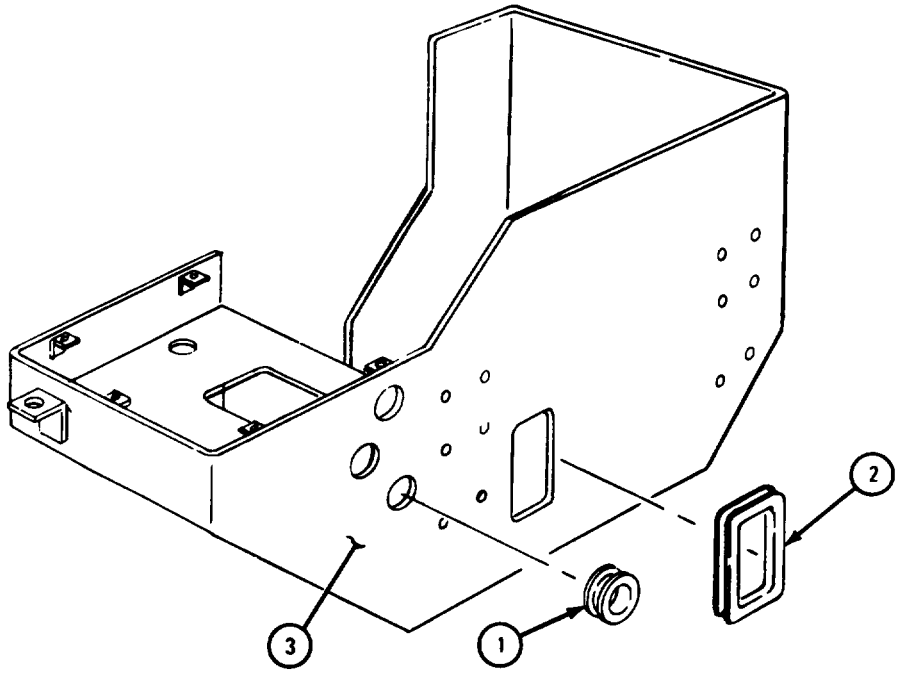
TA 089154

e. Assembly.

FRAME 1

1. Put three hydraulic line hole seals (1) and gondola body rubber seal (2) in place on gondola body (3).

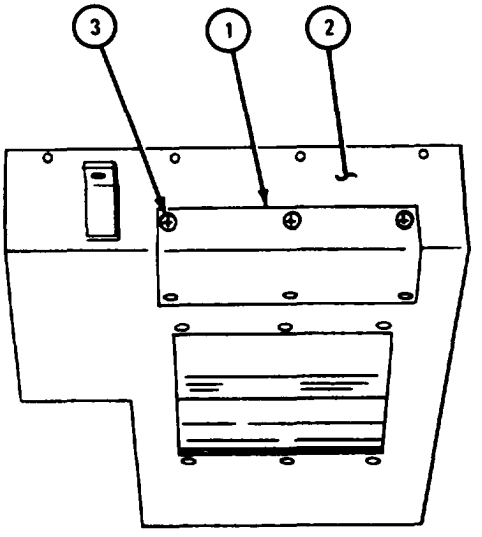
GO TO FRAME 2



FRAME 2

1. Put gondola cover plate (1) in place on gondola (2).
2. Put in six screws (3).

END OF TASK



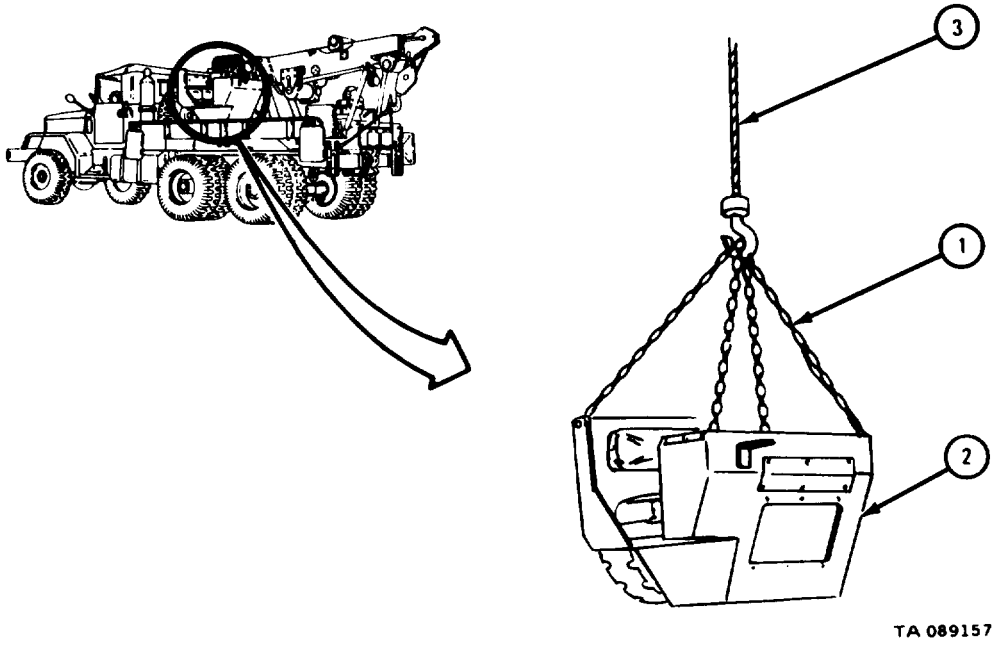
TA 089156

f. Replacement.

FRAME 1

1. Hook up chain sling (1) to gondola (2).
2. Hook up hoist (3) to sling (1).
3. Using hoist (3), take up slack in sling (1).

GO TO FRAME 2

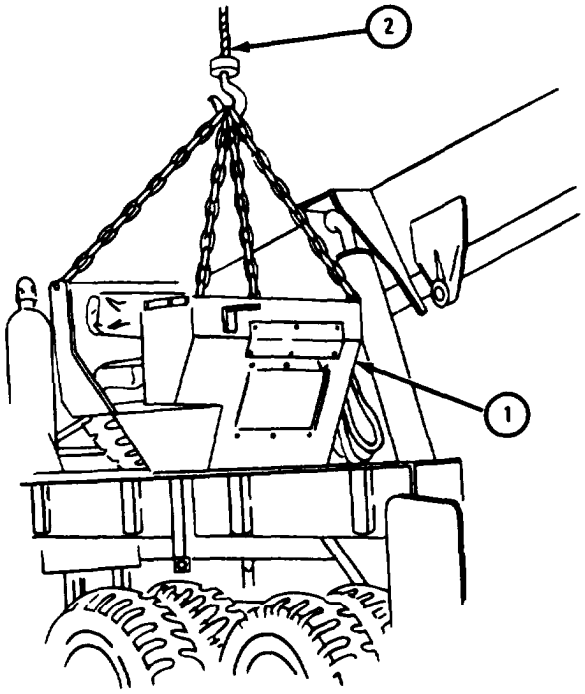


FRAME 2

Soldier A 1. Guide gondola (1) as soldier B moves it onto truck. Tell soldier B when ready.

Soldier B 2. Using hoist (2), raise gondola (1) up and onto truck.

GO TO FRAME 3

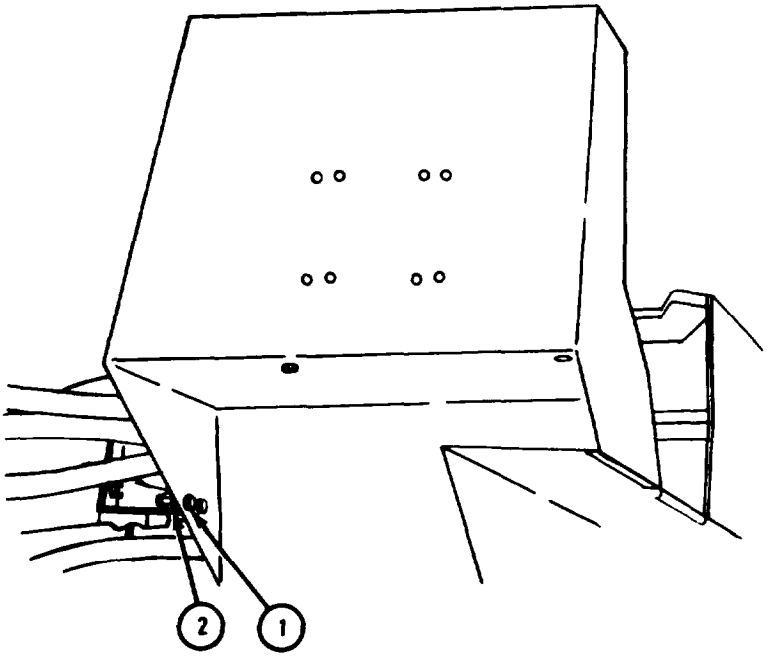


TA 089158

FRAME 3

1. Put in two screws (1) and nuts (2).

GO TO FRAME 4



TA 089149

FRAME 4

Soldier A 1. Working inside front left side of gondola (1), put screw (2) in place as shown and hold it. Tell soldier B when ready.

Soldier B 2. Working outside front left side of gondola (1), hand tighten nut (3) and hold it. Tell soldier A when ready.

Soldier A 3. Tighten screw (2).

Soldiers A and B 4. Do steps 1 through 3 again for five screws (4) and nuts (5).

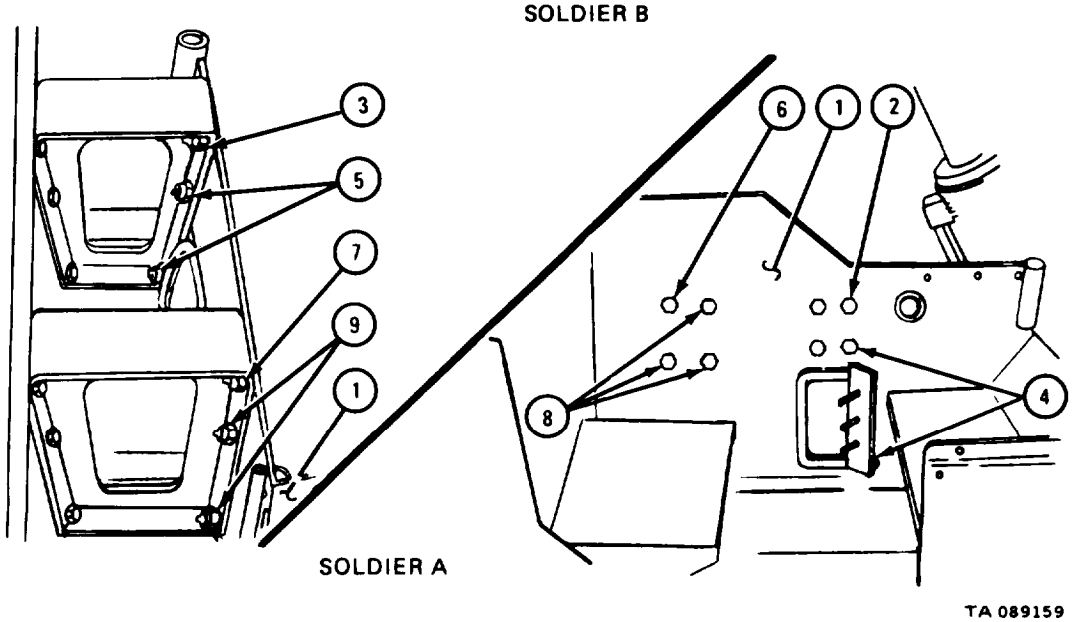
Soldier A 5. Working inside rear left side of gondola (1), put in screw (6) and hold it. Tell soldier B when ready.

Soldier B 6. Working outside rear left side of gondola (1) hand tighten nut (7), and hold it. Tell soldier A when ready.

Soldier A 7. Tighten screw (6).

Soldiers A and B 8. Do steps 5 through 7 again for three screws (8) and nuts (9).

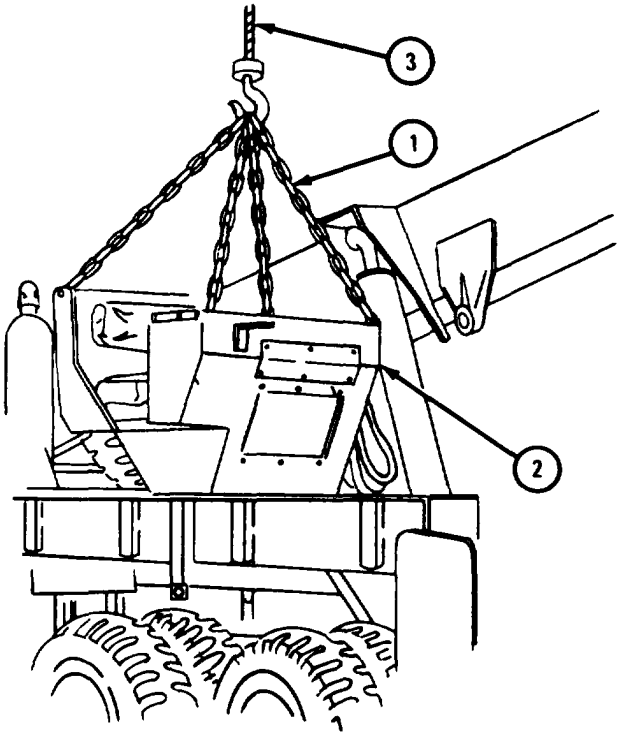
GO TO FRAME 5



FRAME 5

1. Unhook chain sling (1) from gondola (2).
2. Take away sling (1) and hoist (3).

GO TO FRAME 6

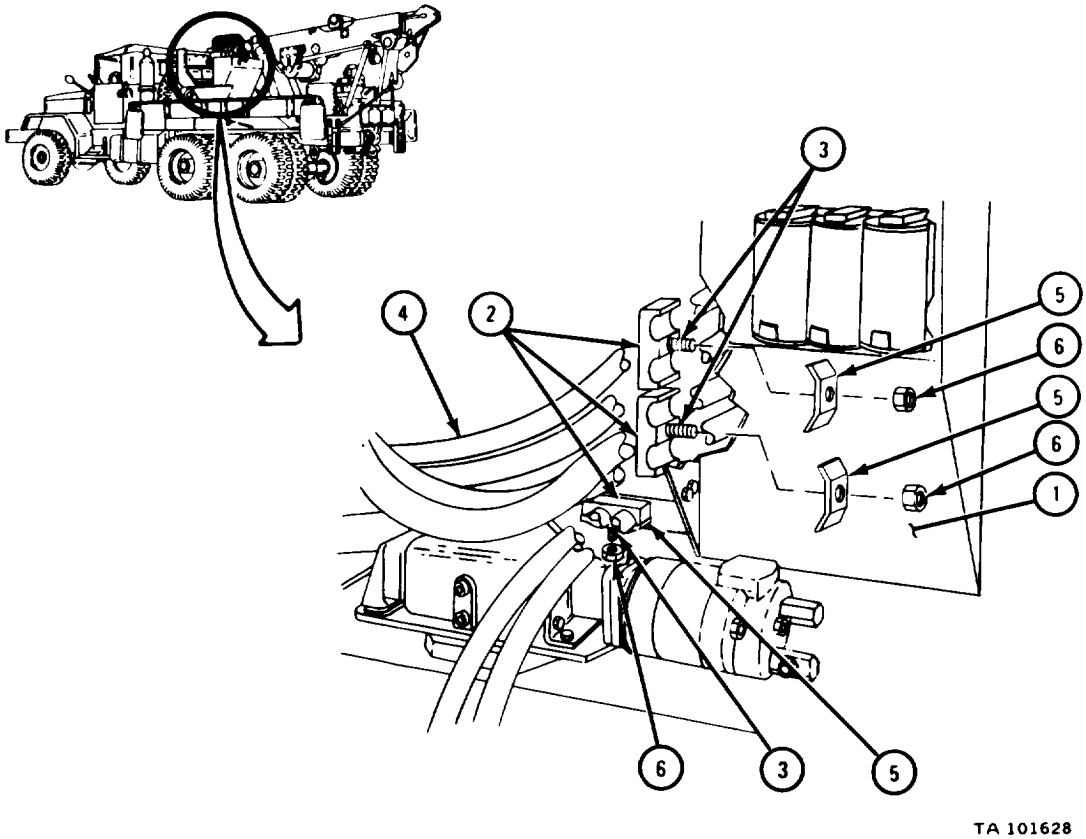


TA 089148

FRAME 6

1. Working outside rear of gondola (1), put three wooden brackets (2) on three studs (3).
2. Place six hoses (4) in wooden brackets (2).
3. Put three clamps (5) on studs (3). Put on three nuts (6).

GO TO FRAME 7

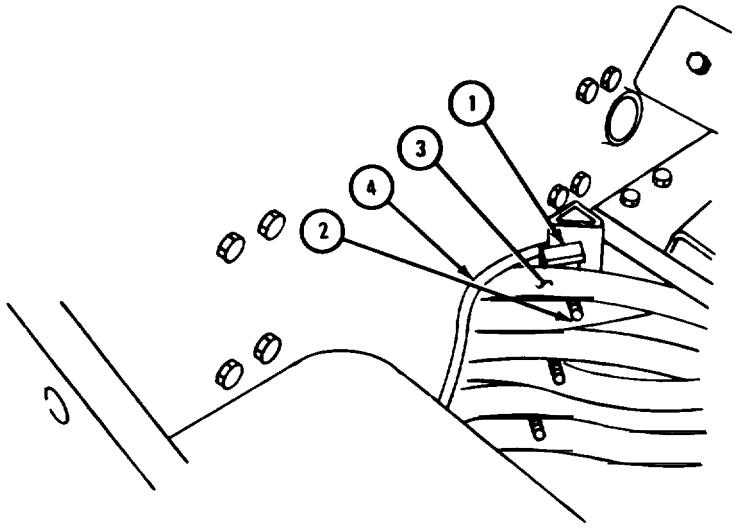


TA 101628

FRAME 7

1. Put three wooden brackets (1) on studs (2).
2. Pull six hoses (3) through opening in gondola (4) and put hoses on three wooden brackets (1).

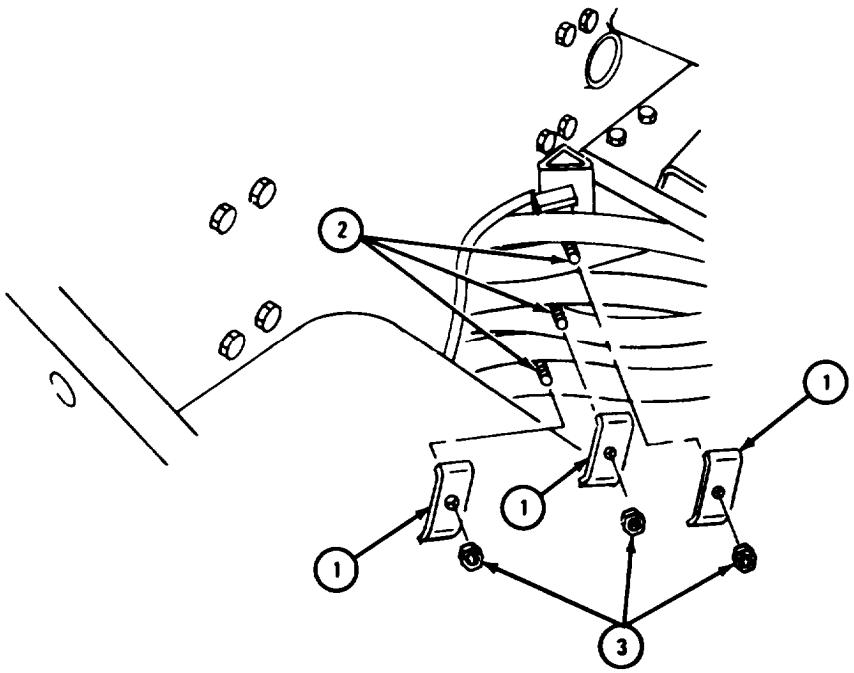
GO TO FRAME 8



FRAME 8

1. Put three hose clamps (1) on studs (2).
2. Put on three nuts (3).

GO TO FRAME 9



TA 089161

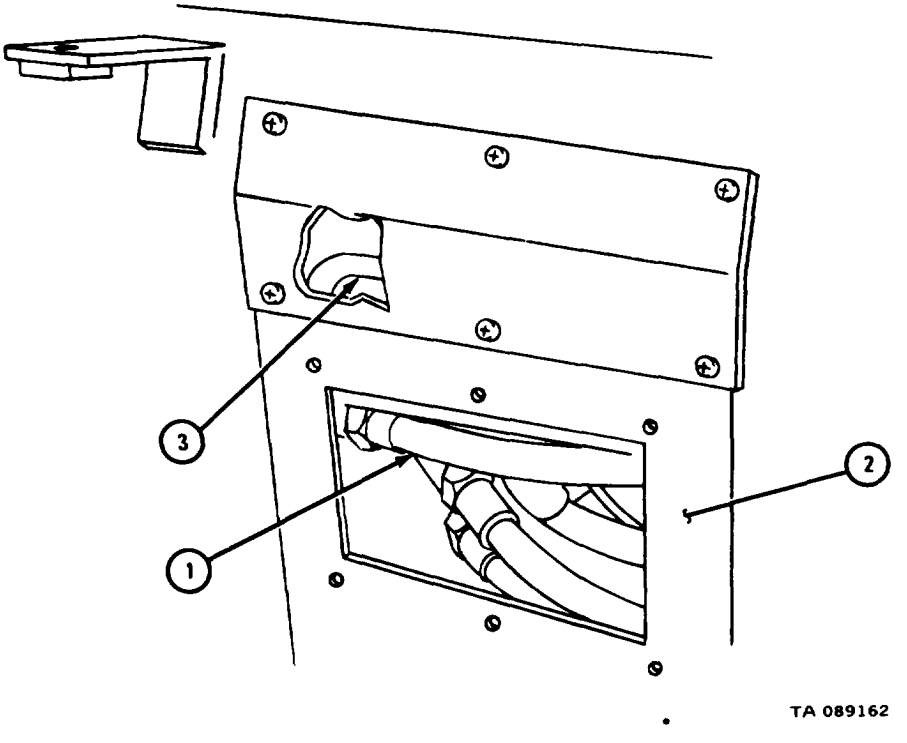
FRAME 9

CAUTION

When joining hoses and tubes, do not overtighten couplings. Overtightening couplings may damage adapters or tubes and cause oil leaks.

1. Put hose (1) through hole in side of gondola (2).
2. Put tube (3) in place as shown and put hose (1) onto tube.

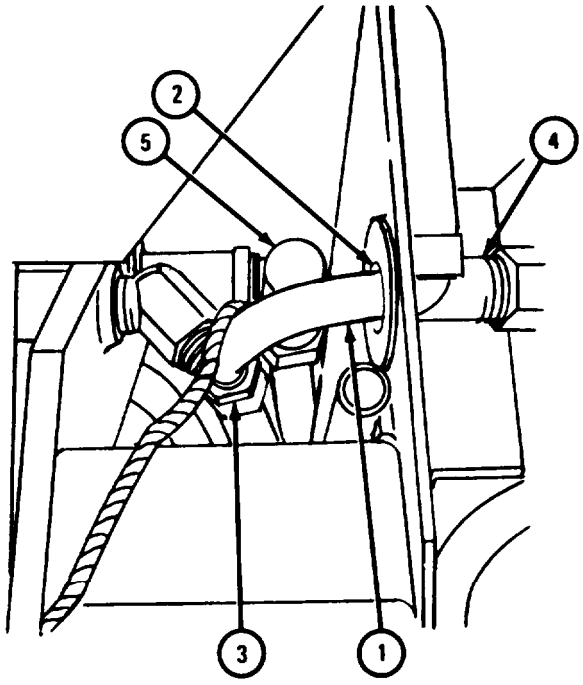
GO TO FRAME 10



FRAME 10

1. Push tube (1) with attached hose through opening (2) and into place on tee fitting (3) as shown.
2. Put fitting of tube (1) onto tee fitting (3) and tighten.
3. Put nipple (4) in place on tee fitting (5) and tighten.

GO TO FRAME 11



TA 089163

FRAME 11

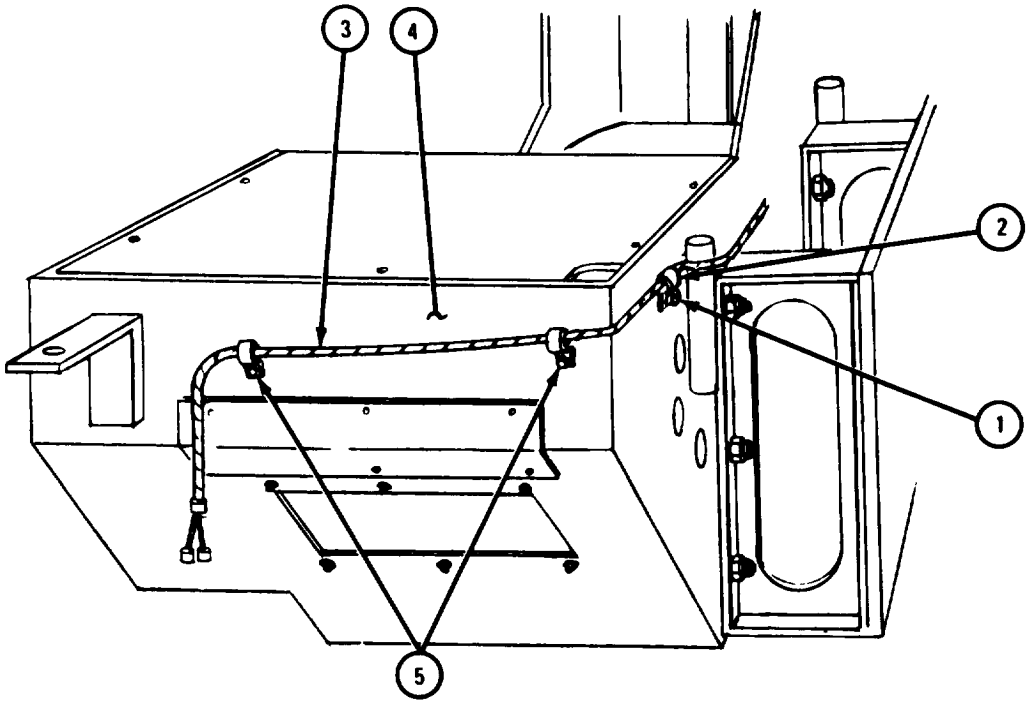
1. Take out screw (1) with clip (2) and pry open ends of clip.
2. Uncoil and lay out cable (3). Put cable into clip (2) and close ends.
3. Put screw (1) through clip (2) and into hole in gondola (4).
4. Do steps 1 through 3 again for other two clips (5).

NOTE

Follow-on Maintenance Action Required:

1. Replace operator seat and backrest. Refer to TM 9-2320-211-20.
2. Replace oil can bracket. Refer to TM 9-2320-211-20.
3. Replace gondola guard. Refer to para 17-50.
4. Replace gondola floodlight assembly. Refer to TM 9-2320-211-20.
5. Replace gondola control valve assembly. Refer to TM 9-2320-211-20.
6. Replace control valve bank cover. Refer to TM 9-2320-211-20.
7. Fill hydraulic oil reservoir. Refer to LO 9-2320-211-12.

END OF TASK



TA 089164

17-53. POWER DIVIDER CONTROL LINKAGE REMOVAL , REPAIR, AND REPLACEMENT (TRUCK M543A2).

TOOLS: No special tools required

SUPPLIES: Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680

PERSONNEL: Two

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary procedure. Remove driver's seat. Refer to TM 9-2320-211-20.

b. Removal.

(1) Cab linkage.

FRAME 1

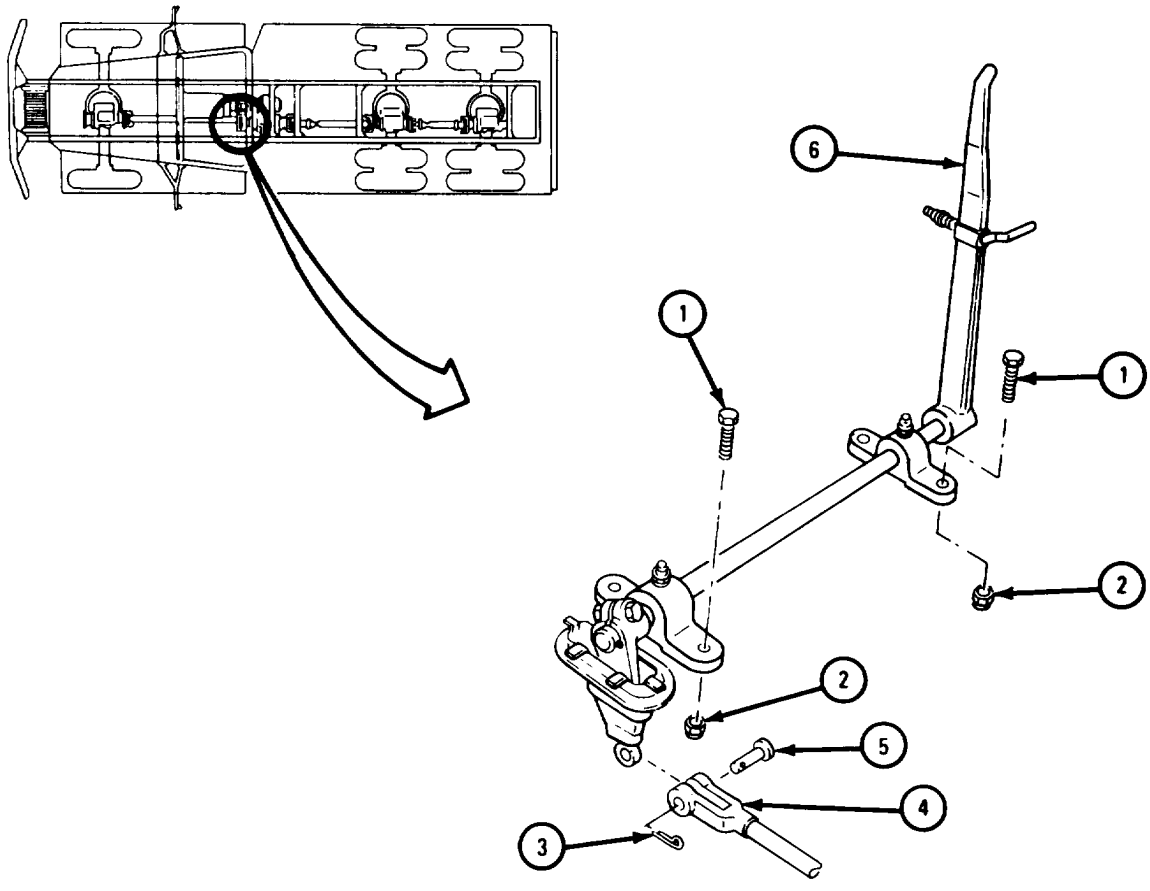
Soldier A 1. Working in cab, hold four screws (1) with wrench.

Soldier B 2. Working under cab, take off four locknuts (2).

3. Take out cotter pin (3). Holding yoke (4), take out link pin (5).

Soldier A 4. Lift out power divider control lever assembly (6).

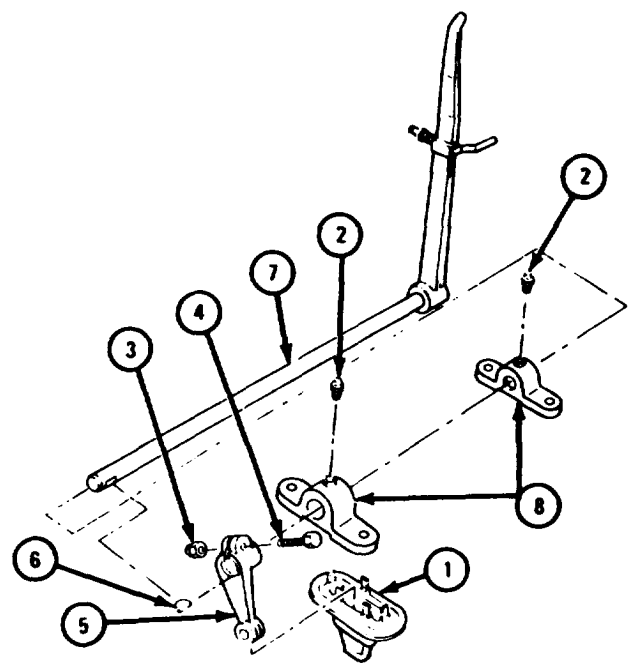
GO TO FRAME 2



FRAME 2

1. Working out of vehicle, take off boot (1).
2. Take out two lube fittings (2).
3. Take out nut (3) and screw (4). Take off lever arm (5).
4. Take key (6) out of shaft (7).
5. Slide two brackets (8) off shaft (7).

GO TO FRAME 3

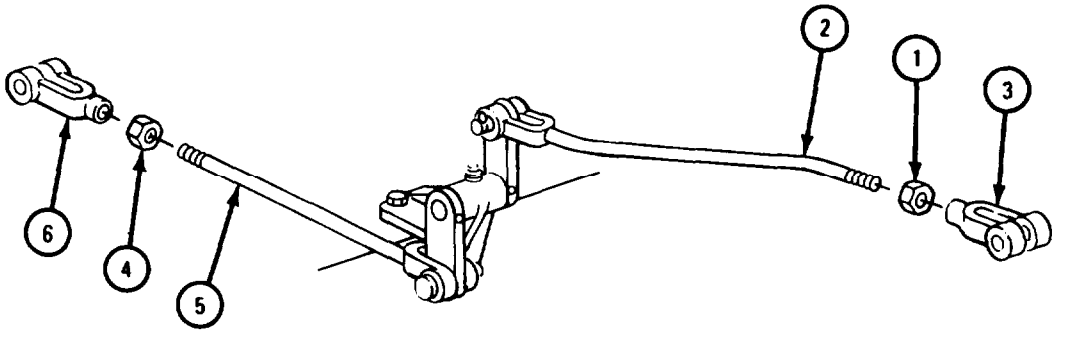


TA 102103

FRAME 3

1. Loosen nut (1) on shaft (2).
2. Take off yoke (3) from shaft (2).
3. Take nut (1) off shaft (2).
4. Loosen nut (4) on shaft (5).
5. Take yoke (6) off shaft (5). Take nut (4) off shaft (5).

GO TO FRAME 4

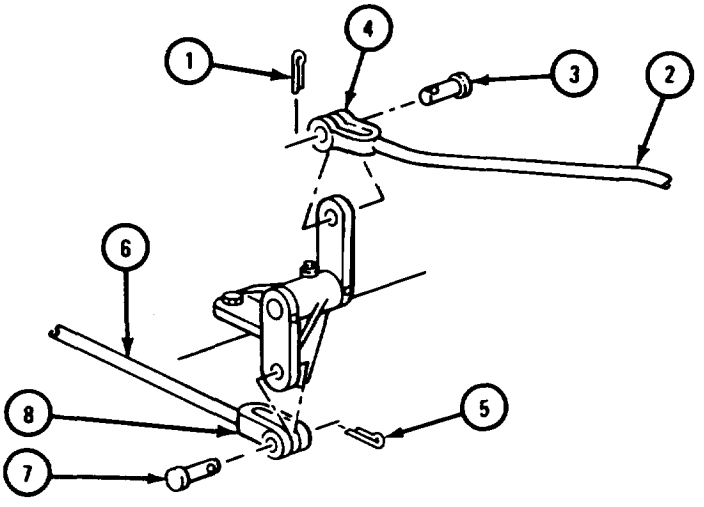


TA 102223

FRAME 4

1. Tak eout cotter pin (1). Holding shaft (2), take out link pin (3) from yoke (4). Lower shaft (2).
2. Take out cotter pin (5). Holding shaft (6), take out link pin (7) from yoke (8). Lower shaft (6).

GO TO FRAME 5

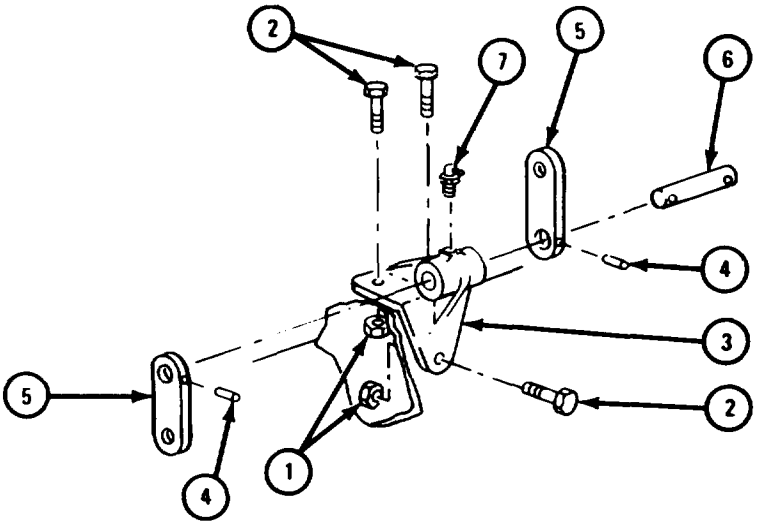


TA 102224

FRAME 5

1. Take off three nuts (1). Take out three screws (2). Take mount (3) out of truck.
2. Working beside truck, take out two pins (4).
3. Take off two arms (5).
4. Tap out pin (6).
5. Take out lube fitting (7).

END OF TASK



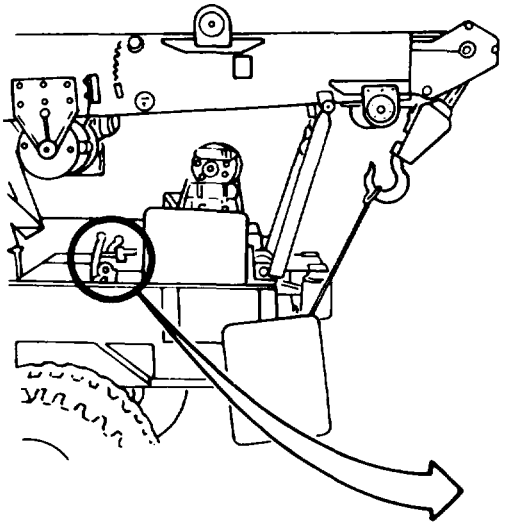
TA 102225

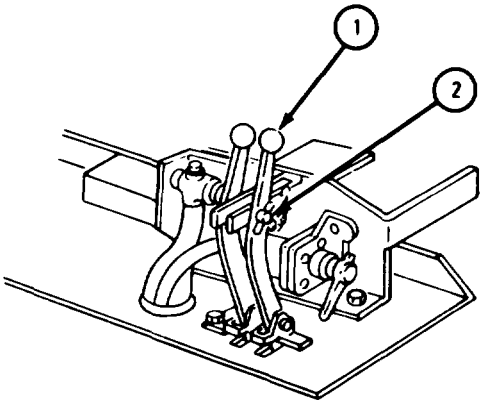
(2) Rear winch linkage.

FRAME 1

1. Working in front of rear winch controls, place rear winch shift lever (1) in neutral position.
2. Put locking pin (2) in place.

GO TO FRAME 2



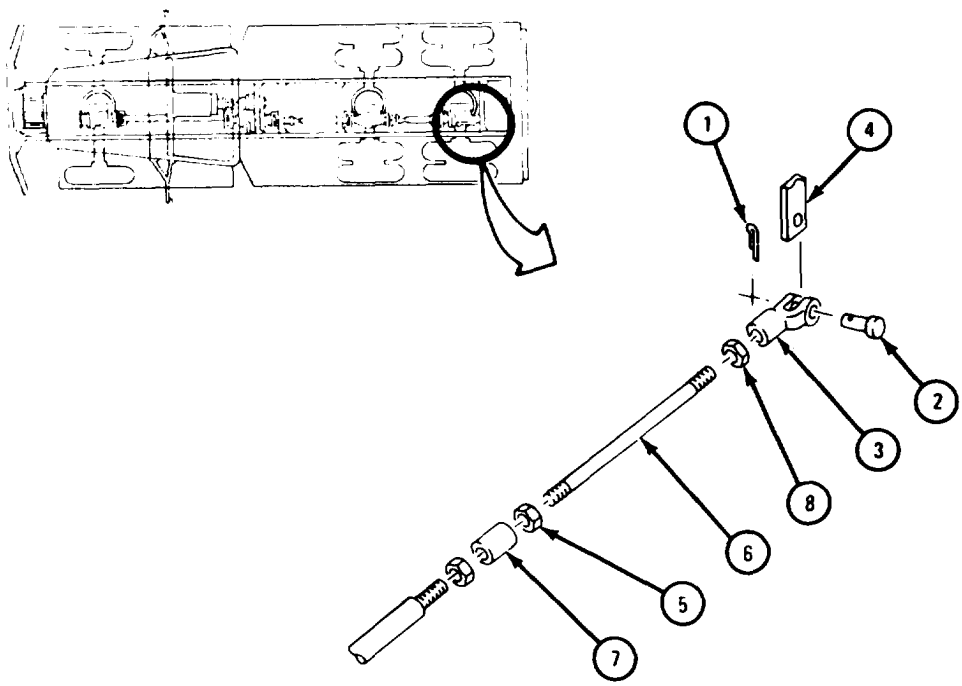


TA 102233

FRAME 2

1. Working through deck plate on top of vehicle, take cotter pin (1) and link pin (2) out of yoke (3). Take yoke (3) off winch shift lever (4).
2. Loosen nut (5) and take shaft (6) out of coupling (7).
3. Take shaft assembly out of truck bed. Take yoke (3), nut (5), and nut (8) off shaft (6).

GO TO FRAME 3



NOTE

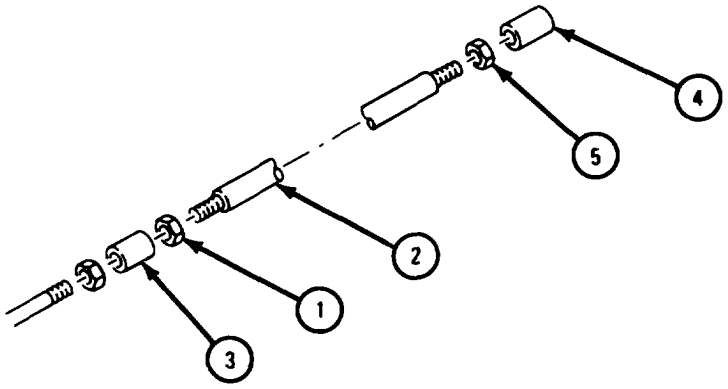
PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 102226

FRAME 3

1. Working on the winch control linkage (left hand side), loosen nut (1). Take shaft (2) out of coupling (3).
2. Take shaft assembly out of truck.
3. Take nut (1), coupling (4), and nut (5) off shaft (2).

GO TO FRAME 4



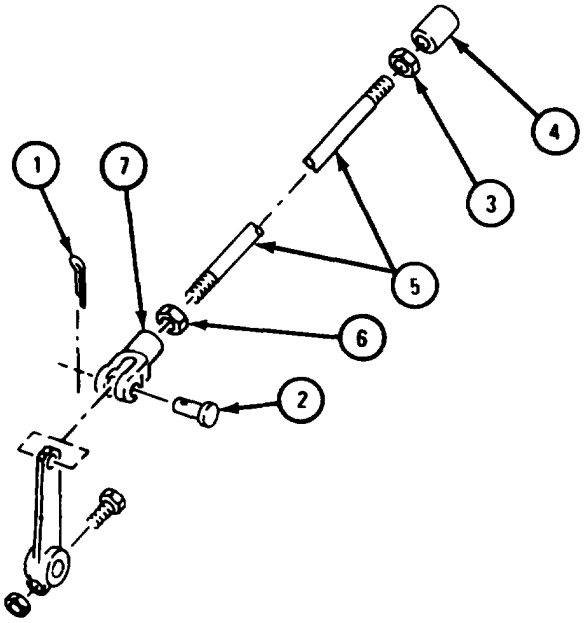
NOTE
PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 102227

FRAME 4

1. Working on the winch control linkage (left hand side), take out cotter pin (1) and link pin (2).
2. Remove shaft assembly from truck chassis.
3. Loosen nut (3). Take coupling (4) and nut (3) off shaft (5).
4. Loosen nut (6). Take yoke (7) and nut (6) off shaft (3).

GO TO FRAME 5



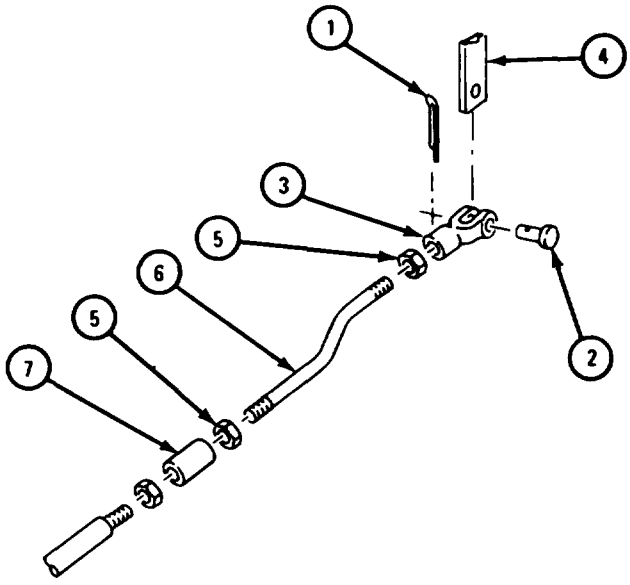
NOTE
PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 102228

FRAME 5

1. Working through deck plate on top of vehicle, take cotter pin (1) and link pin (2) out of yoke (3). Take yoke (3) off hydraulic power control lever (4).
2. Loosen nut (5) and take shaft (6) out of coupling (7).
3. Take shaft assembly out of truck bed. Take yoke (3) and nut (5) off shaft (6).

GO TO FRAME 6



NOTE

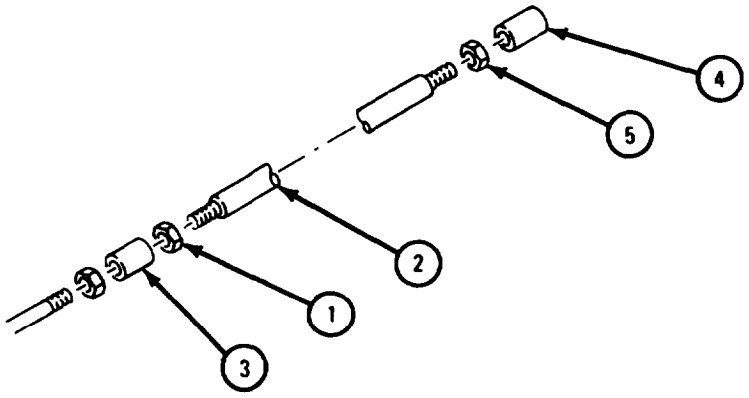
PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 102229

FRAME 6

1. Working on the hydraulic power linkage (right hand side), loosen nut (1). Take shaft (2) out of coupling (3).
2. Take shaft assembly out of truck.
3. Take nut (1), coupling (4), and nut (5) off shaft (2).

GO TO FRAME 7



NOTE

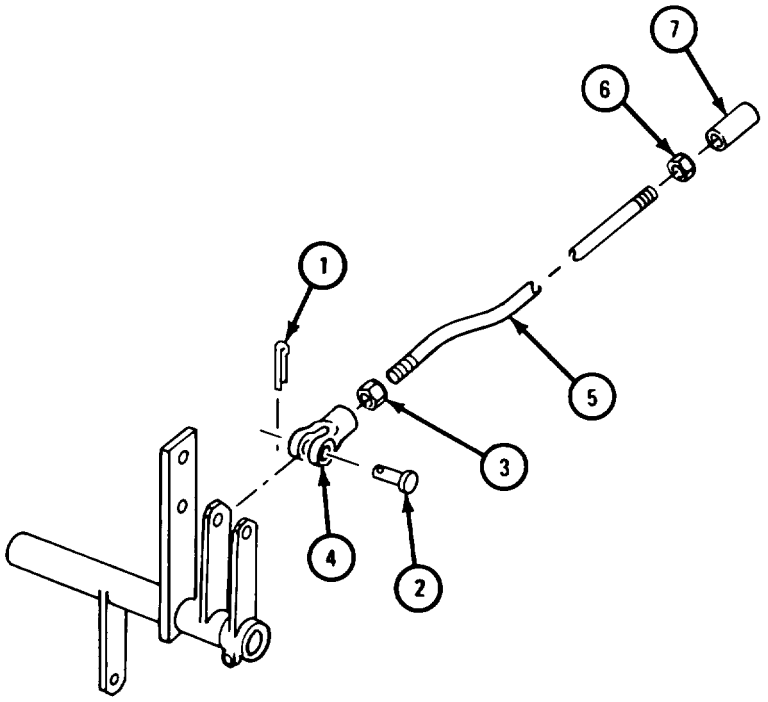
PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 102230

FRAME 7

1. Working on the hydraulic power linkage (right hand side), take out cotter pin (1) and link pin (2).
2. Take shaft assembly out of truck chassis.
3. Loosen nut (3). Take out yoke (4) and nut (3) from shaft (5).
4. Loosen nut (6). Take off coupling (7) and nut (6).

GO TO FRAME 8

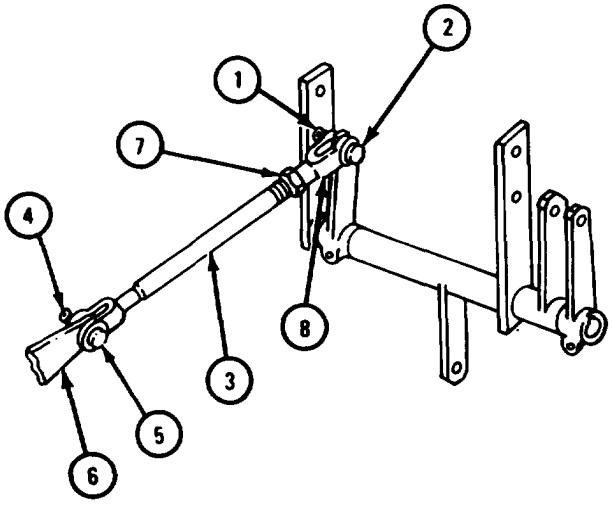


TA 102231

FRAME 8

1. Working under the truck, take out cotter pin (1) and link pin (2).
2. Holding shaft (3), takeout cotter pin (4) and link pin (5).
3. Remove shaft (3) from power divider lever (6).
4. Working by side of truck, loosen nut (7). Take off yoke (8) and nut (7) from shaft (3).

GO TO FRAME 9

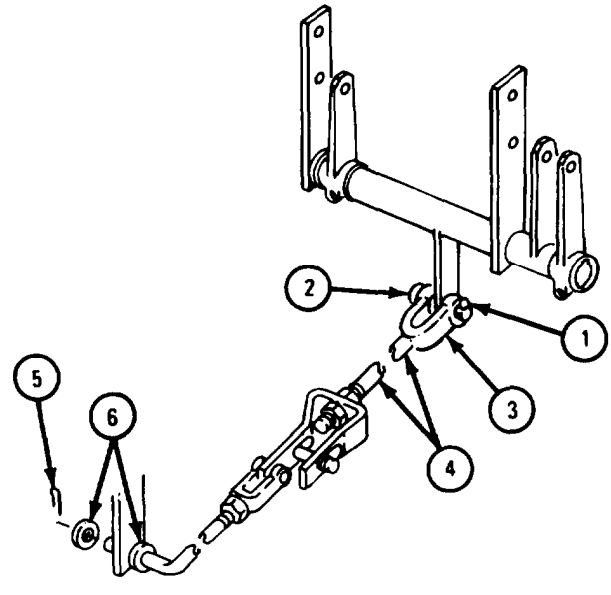


TA 102232

FRAME 9

1. Working under the truck, takeout cotter pin (1) and link pin (2) from yoke (3).
2. Holding linkage assembly (4), take out cotter pin (5) and two washers (6)

GO TO FRAME 10

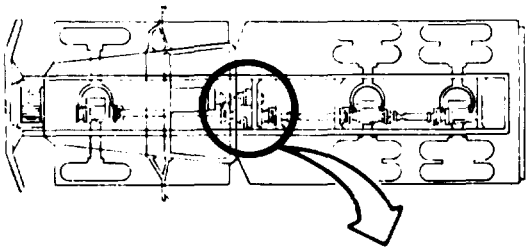


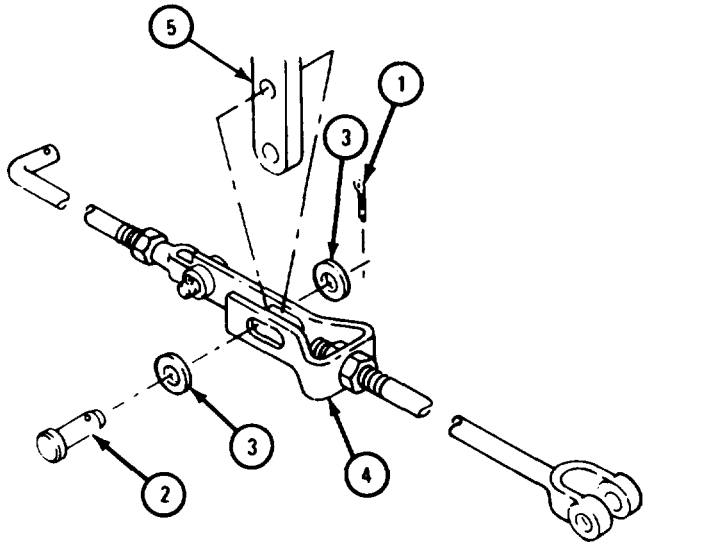
TA 102234

FRAME 10

1. Takeout cotter pin (1), link pin (2), and two washers (3). Takeout governor linkage rod assembly (4) from power divider shifter arm (5).

GO TO FRAME 11



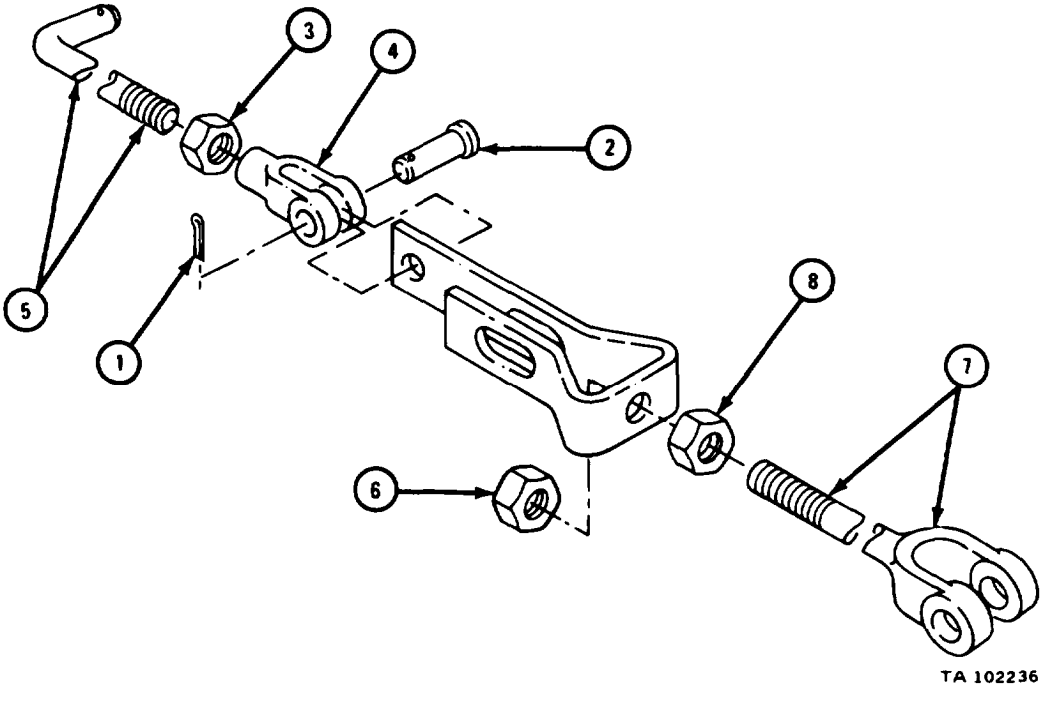


TA 102235

FRAME 11

1. Working beside truck, take out cotter pin (1) and link pin (2).
2. Loosen nut (3). Take off yoke (4) and nut (3) from crane control governor rod (5).
3. Take off nut (6). Take out crane control power divider link rod (7).
4. Take off nut (8).

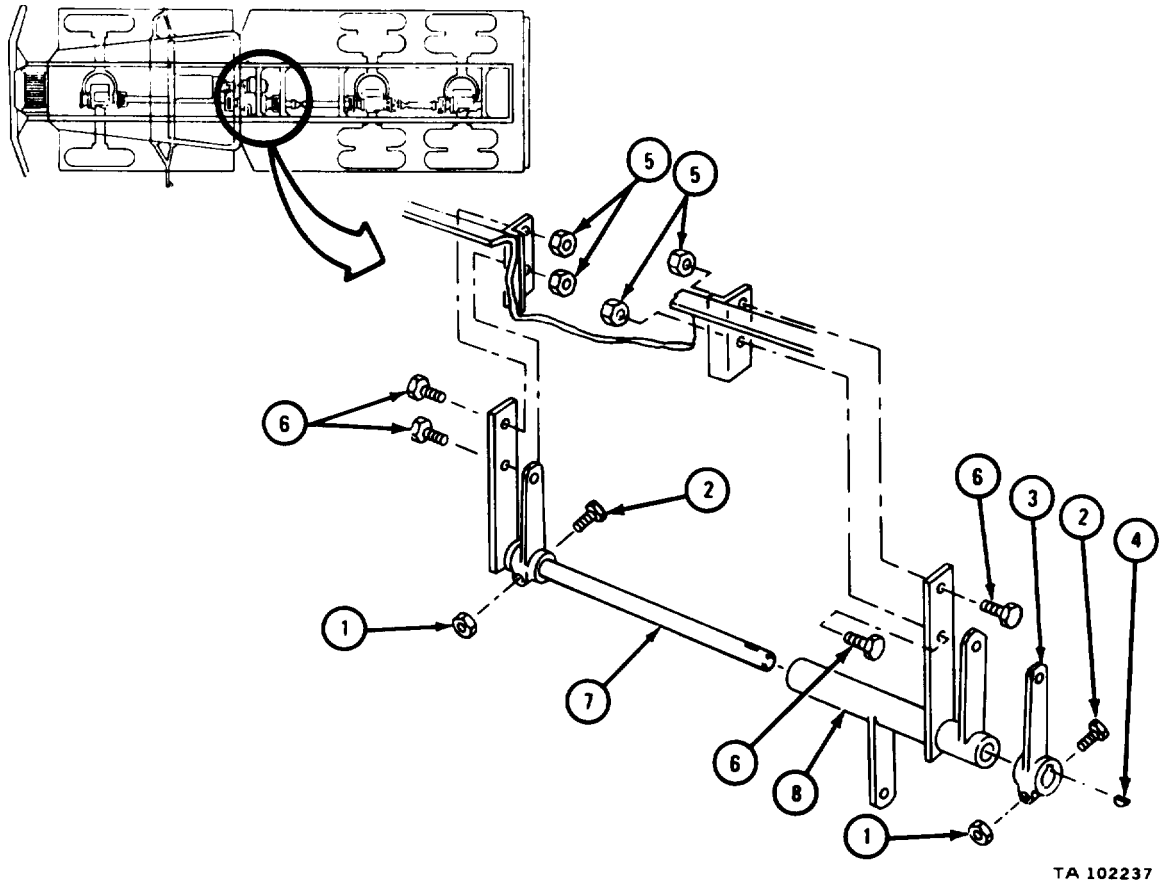
GO TO FRAME 12



FRAME 12

1. Working under truck, take out two nuts (1) and two screws (2).
2. Take off winch control shaft lever (3). Take out woodruff key (4).
3. Take off four nuts (5). Take out four screws (6).
4. Take out shaft (7) and tube assembly (8) from truck.

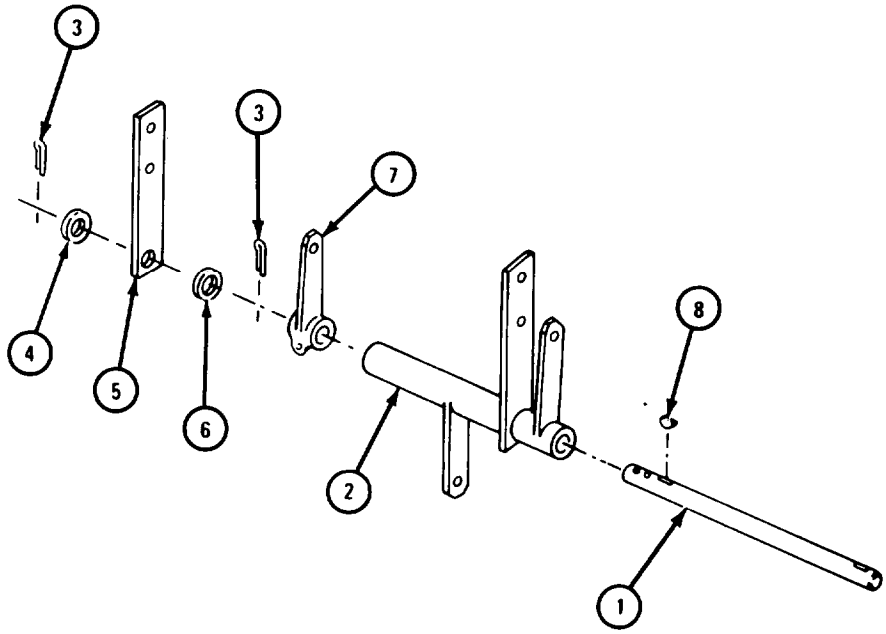
GO TO FRAME 13



FRAME 13

1. Take shaft (1) out of tube assembly (2).
2. Takeout two cotter pins (3). Takeoff washer (4).
3. Take off plate (5), washer (6), and lever (7).
4. Take woodruff key (8) out of shaft (1).

END OF TASK



c. Cleaning, Inspection, and Repair.

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

(1) Cleaning. Clean all parts with dry cleaning solvent. Dry with a clean rag.

(2) Check linkage yokes for cracks. Repair by welding. Refer to TM 9-237.

(3) Check threads on linkage. If threads are damaged, get new parts.

(4) Check links and mount for cracks. Repair by welding. Refer to TM 9-237.

(5) Check linkage rods for bends. Repair by straightening. Refer to FM 43-2.

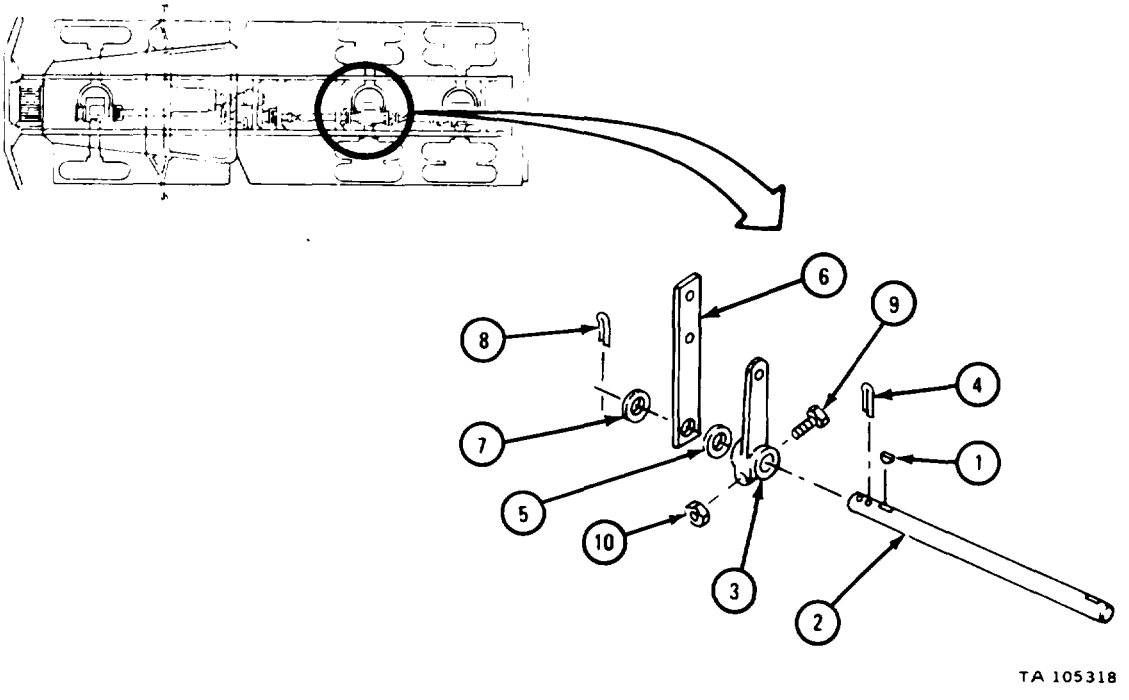
d. Replacement.

(1) Rear winch linkage.

FRAME 1

1. Seat woodruff key (1) in shaft (2). Tap lever arm (3) on shaft (2). Put in and spread apart cotter pin (4).
2. Put on washer (5), plate (6), and spacer (7). Put in cotter pin (8). Spread ends of cotter pin (8).
3. Put in screw (9). Put on and tighten nut (10).

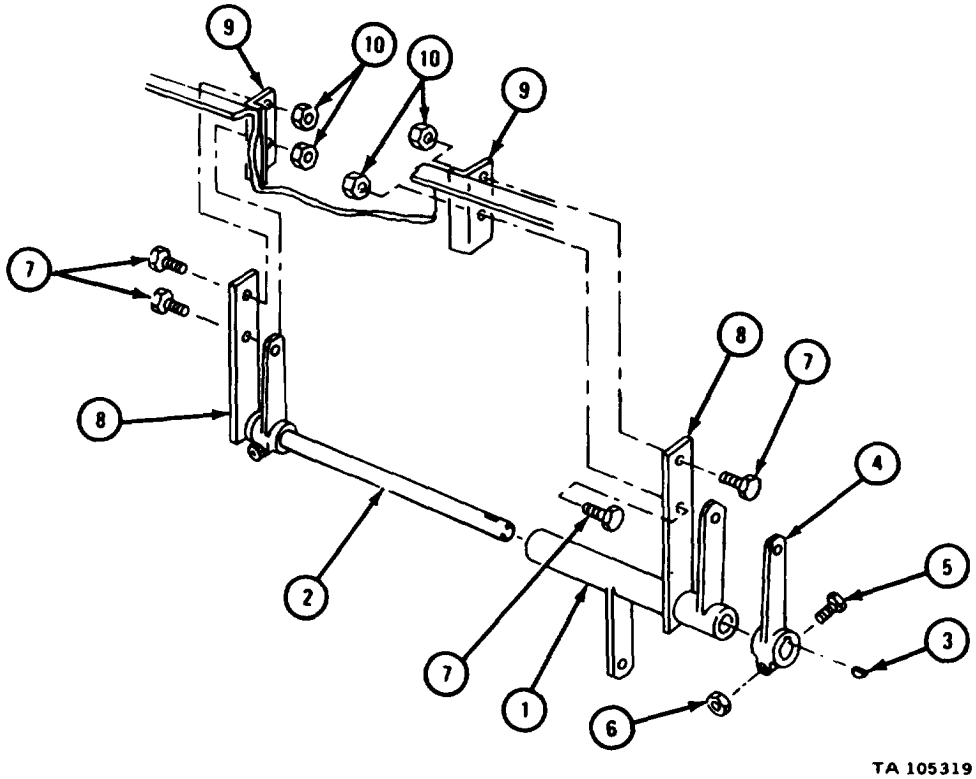
GO TO FRAME 2



FRAME 2

1. Put tube assembly (1) on shaft (2). Put woodruff key (3) in shaft (2).
2. Put lever arm (4) over shaft (2) and woodruff key (3).
3. Put in screw (5). Put on and tighten nut (6).
4. Put four screws (7) through plates (8) and brackets (9). Put on and tighten four nuts (10).

GO TO FRAME 3

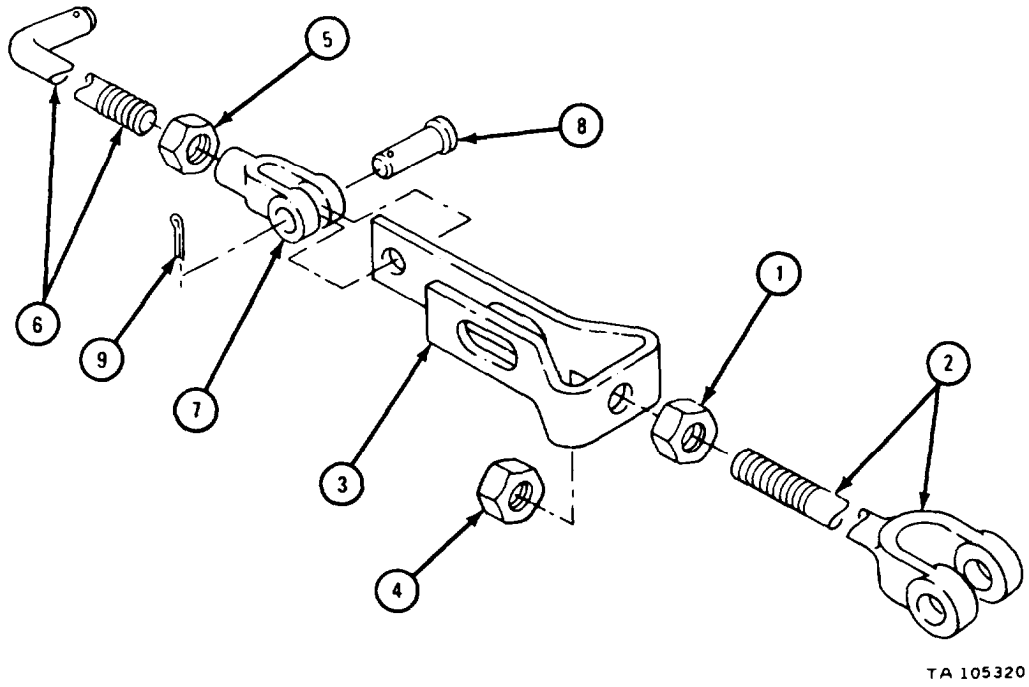


TA 105319

FRAME 3

1. Working beside truck, put nut (1) all the way on divider link rod (2).
2. Put rod (2) through hole in yoke (3). Put on nut (4).
3. Put nut (5) all the way on rod (6). Put on yoke (7).
4. Put in link pin (8) and cotter pin (9). Spread ends of cotter pin.

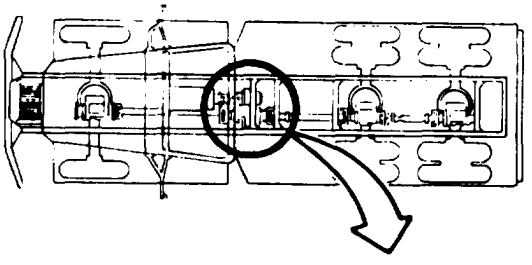
GO TO FRAME 4

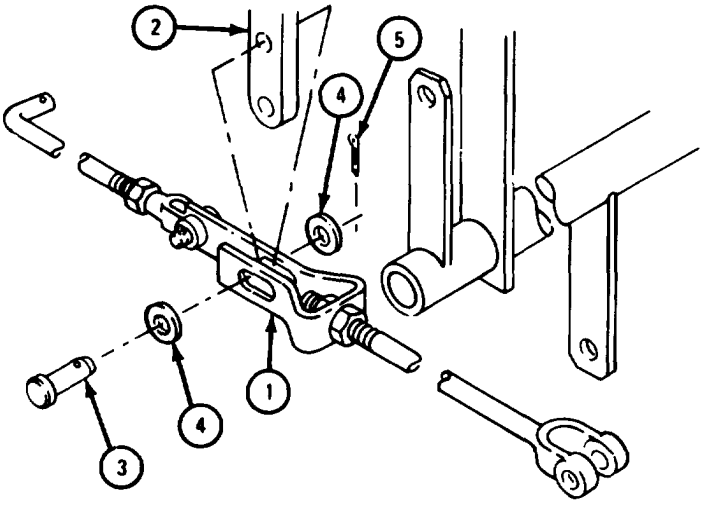


FRAME 4

1. Working under truck, put yoke (1) on power divider shifter arm (2).
2. Put in link pin (3) and two washers (4) through yoke (1).
3. Put cotter pin (5) through pin (3). Spread cotter pin (5).

GO TO FRAME 5



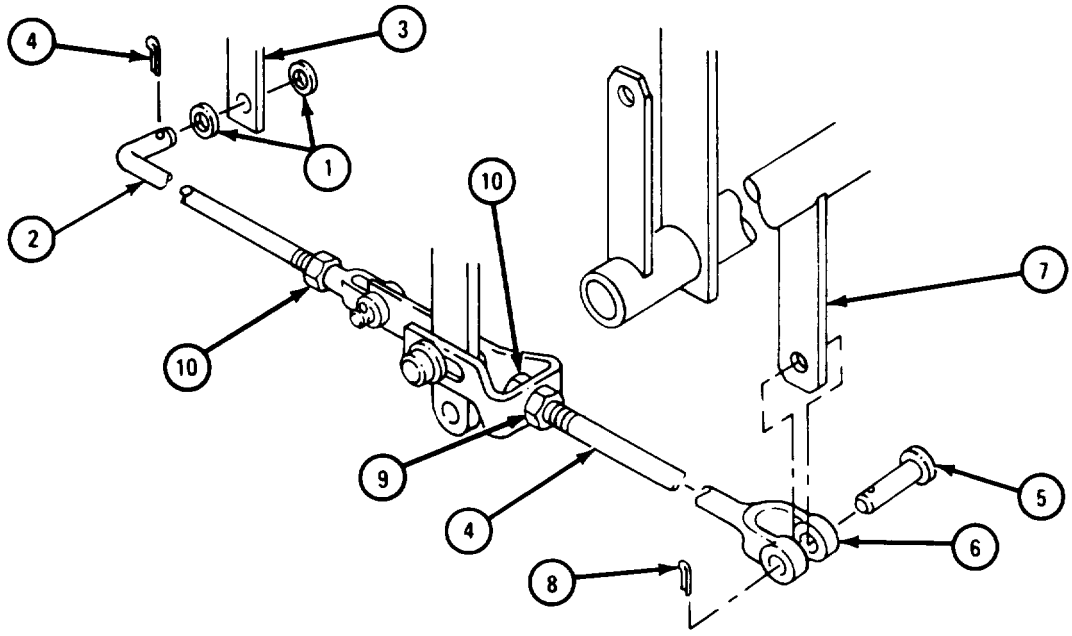


TA 105321

FRAME 5

1. Put washer (1) on rod (2). Put end of rod (2) through hole in governor control valve arm (3).
2. Put washer (1) on end of rod (2). Put in cotter pin (4). Spread ends of cotter pin.
3. Put link pin (5) through holes in yoke (6) and lever arm (7). Put in cotter pin (8). Spread ends of cotter pin (8).
4. Tighten nut (9). Tighten two adjusting nuts (10).

GO TO FRAME 6

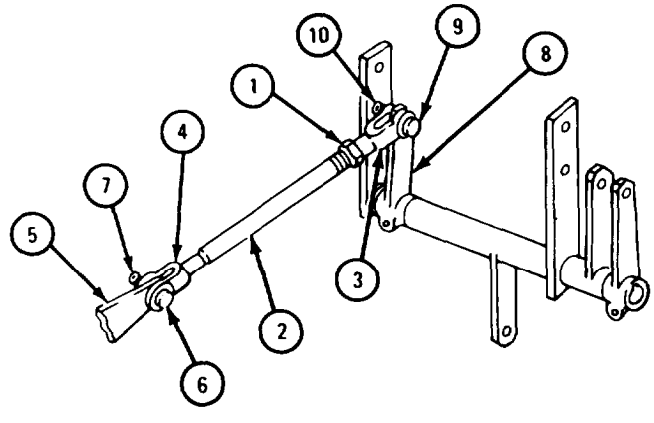


TA 105322

FRAME 6

1. Put nut (1) all the way on shaft (2). Put yoke (3) on shaft (2).
2. Aline hole in yoke (4) with holes in operating lever (5).
3. Put link pin (6) through yoke (4). Put in cotter pin (7). Spread ends of cotter pin.
4. Turn yoke (3) until holes in yoke (3) line up with holes in lever arm (8).
5. Put link pin (9) through yoke (3). Put in cotter pin (10). Spread ends of cotter pin.
6. Tighten nut (1) against yoke (3).

GO TO FRAME 7

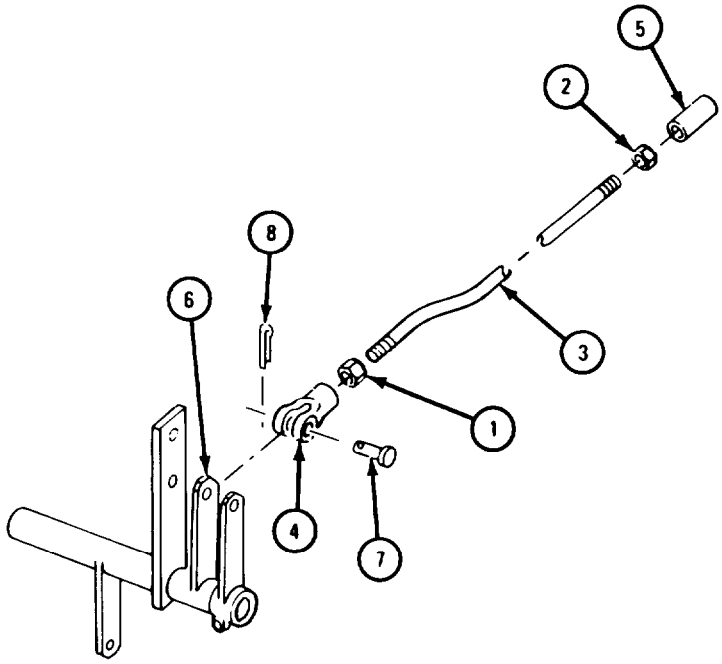


TA 105323

FRAME 7

1. Put nut (1) and nut (2) all the way on shaft (3).
2. Put yoke (4) and coupling (5) on shaft (3).
3. Put shaft assembly (3) into position in truck bed.
4. Aline holes in yoke (4) with holes in lever arm (6). Put link pin (7) through holes in yoke (4). Put cotter pin (8) into link pin (7) and spread ends of cotter pin (8).

GO TO FRAME 8

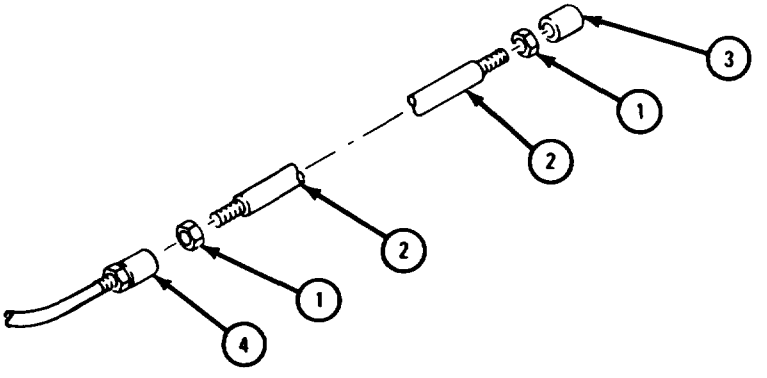


TA 105324

FRAME 8

1. Put two nuts (1) on shaft (2). Put coupling (3) on shaft (2).
2. Put shaft assembly (2) into position in truck bed.
3. Screw shaft assembly (2) into coupling (4).

GO TO FRAME 9

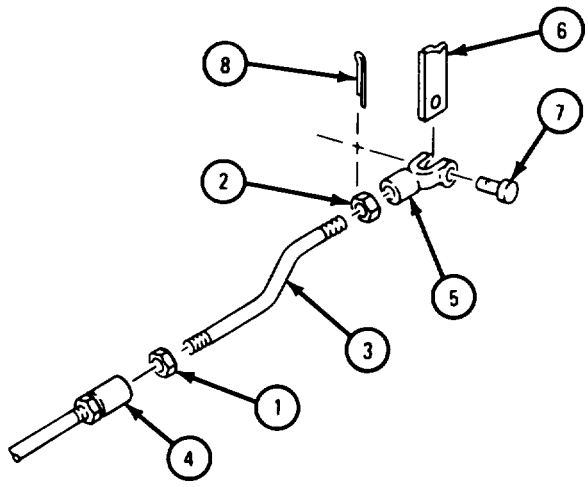


TA 105325

FRAME 9

1. Working beside truck, put nut (1) and nut (2) on shaft (3).
2. Working under truck, put shaft assembly (3) into coupling (4).
3. Put yoke (5) on shaft assembly (3). Turn yoke (5) so that holes in yoke (5) aline with holes in shift lever (6).
4. Put in link pin (7) and cotter pin (8). Spread the ends of cotter pin (8).

GO TO FRAME 10

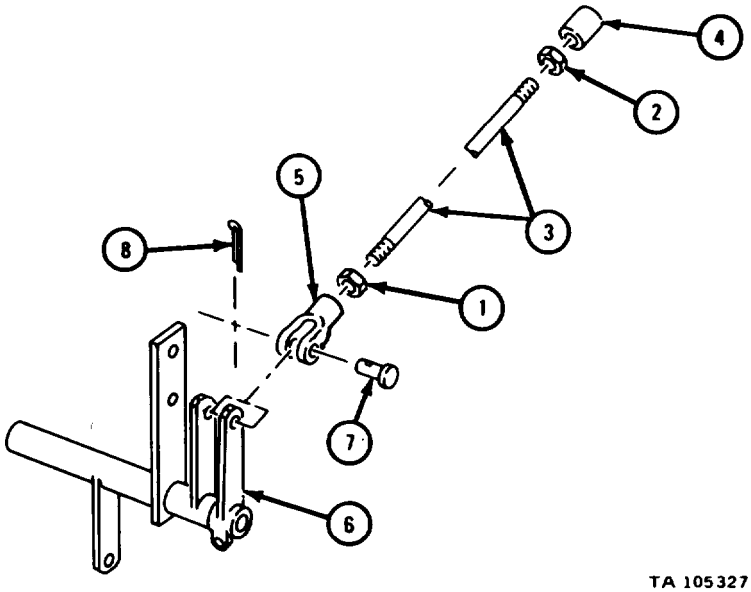


TA 105326

FRAME 10

1. Put nut (1) and nut (2) on shaft (3). Put coupling (4) and yoke (5) on shaft (3).
2. Working under truck, put shaft assembly (3) in place in truck bed.
3. Aline holes in yoke (5) with holes in lever arm (6).
4. Put in link pin (7) and cotter pin (8). Spread ends of cotter pin (8).

GO TO FRAME 11

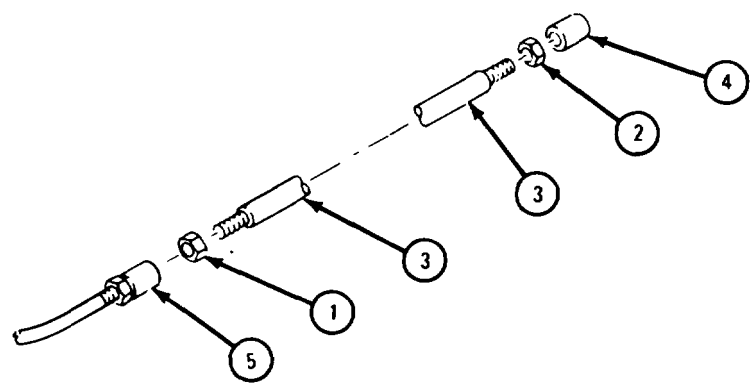


TA 105327

FRAME 11

1. Working beside truck, put nut (1) and nut (2) on shaft (3). Put coupling (4) on shaft (3).
2. Working under truck, screw shaft (3) into coupling (5).

GO TO FRAME 12

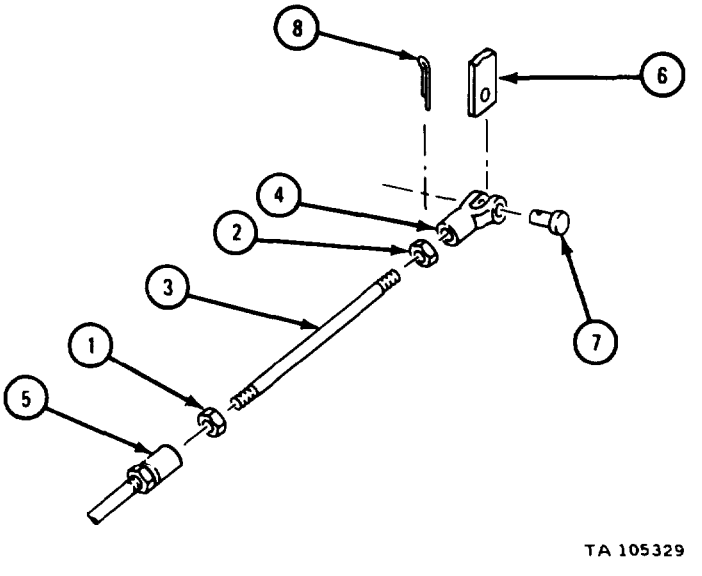


TA 105328

FRAME 12

1. Working beside truck, put nut (1) and nut (2) on shaft (3). Put yoke (4) on shaft (3).
2. Working under truck, put shaft assembly (3) into position in truck bed. Screw shaft assembly (3) into coupling (5).
3. Turn yoke (4) until holes in yoke (4) aline with holes in winch shifter lever (6).
4. Put in link pin (7) and cotter pin (8). Spread ends of cotter pin (8).

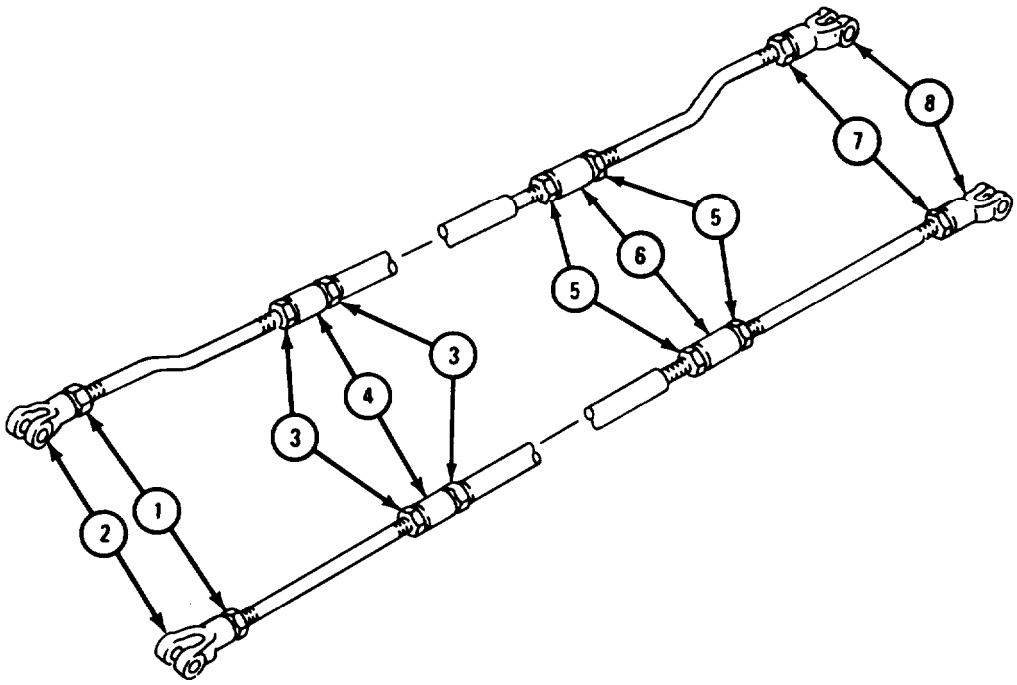
GO TO FRAME 13



FRAME 13

1. Reaching through access holes, tighten nuts (1) against yokes (2).
2. Tighten nuts (3) against couplings (4).
3. Tighten nuts (5) against couplings (6).
4. Tighten nuts (7) against yokes (8).

END OF TASK



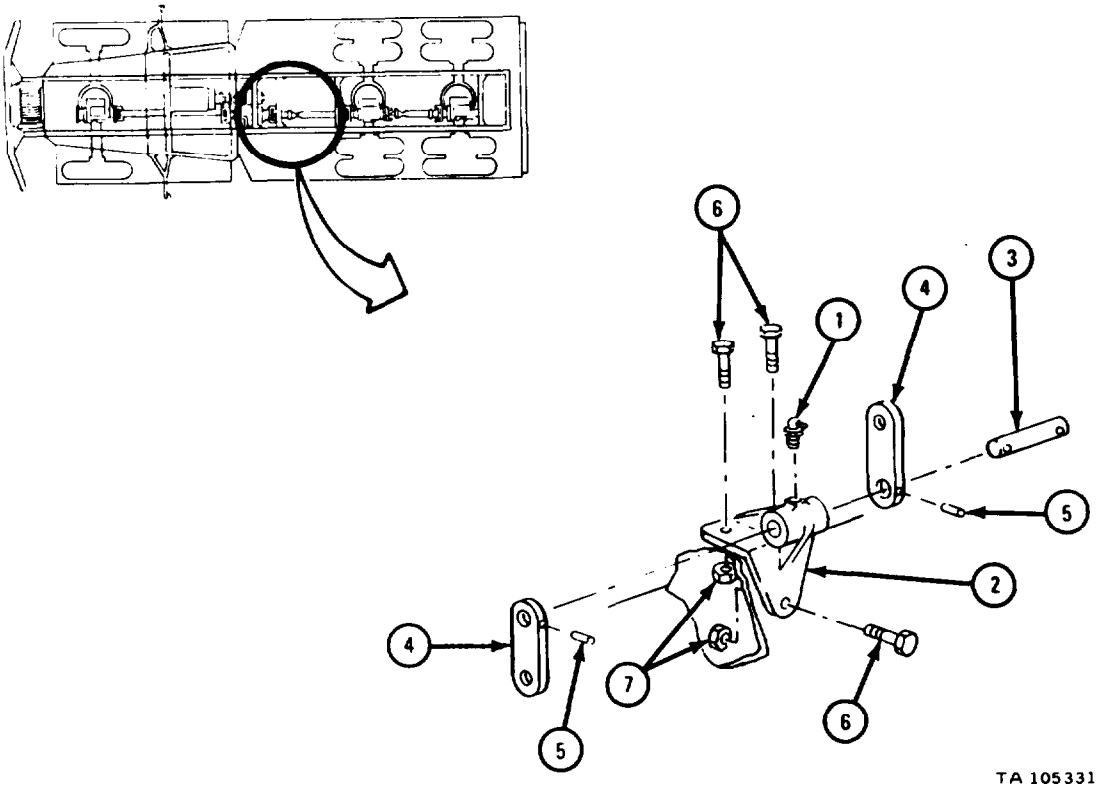
TA 105330

(2) Cab linkage.

FRAME 1

1. Working beside truck, put in lube fitting (1) in mount (2).
2. Tap in pin (3).
3. Put on two arms (4). Tap in two pins (5).
4. Working under truck, put three screws (6) through mount (2).
5. Screw on and tighten three nuts (7).

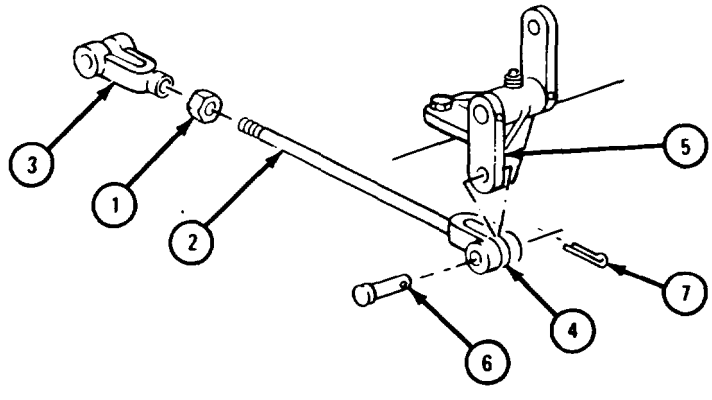
GO TO FRAME 2



FRAME 2

1. Put nut (1) all the way on shaft (2).
2. Put yoke (3) on shaft (2).
3. Put yoke (4) on arm (5). Put in link pin (6) and cotter pin (7). Open cotter pin (7).

GO TO FRAME 3

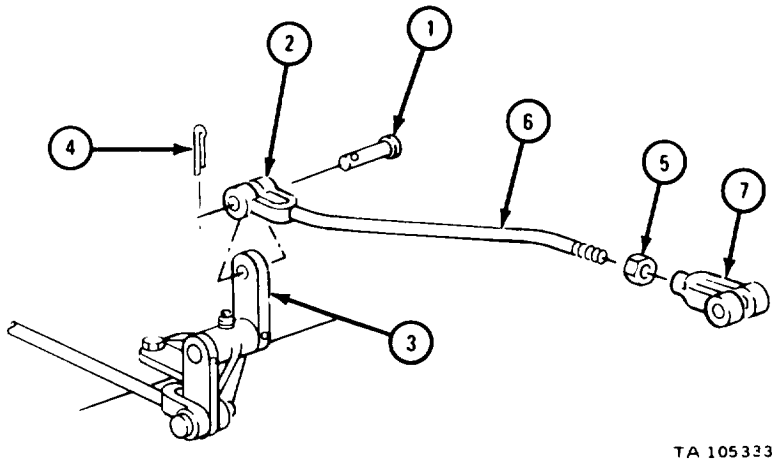


TA 105332

FRAME 3

1. Put link pin (1) through yoke (2) and arm (3).
2. Put cotter pin (4) in link pin (1). Open cotter pin (4).
3. Put nut (5) all the way on shaft (6). Put yoke (7) on shaft (6).

GO TO FRAME 4

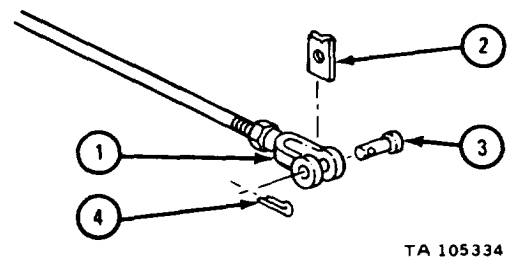


TA 105333

FRAME 4

1. Working under truck, put yoke (1) on power divider lever (2).
2. Put link pin (3) through yoke (1). Put in cotter pin (4). Open cotter pin (4).

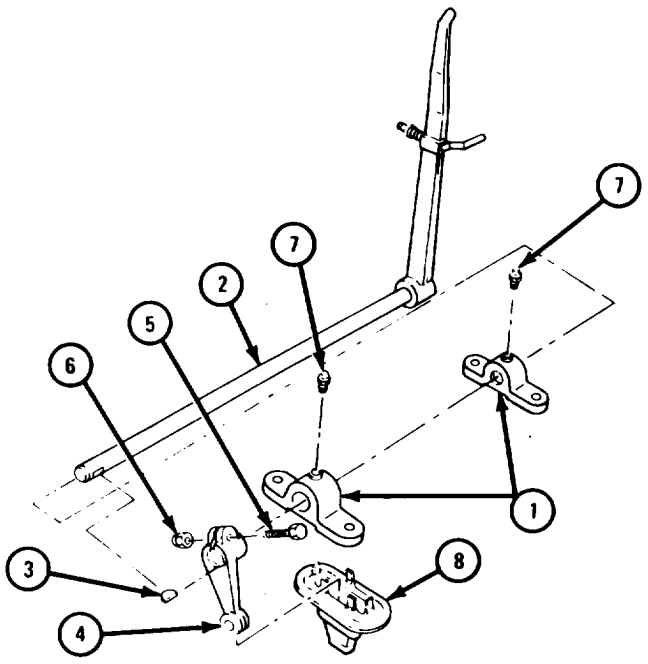
GO TO FRAME 5



FRAME 5

1. Put two brackets (1) on shaft (2).
2. Put woodruff key (3) in shaft (2).
3. Put lever (4) on shaft (2). Put screw (5) in lever (4). Put on nut (6).
4. Put in two lube fittings (7).
5. Put on boot (8).

GO TO FRAME 6



TA 105335

FRAME 6

Soldier A 1. Put lever assembly (1) in left rear side of cab.

2. Put in and hold four screws (2).

Soldier B 3. Put on four nuts (3).

4. Put link pin (4) through yoke (5).

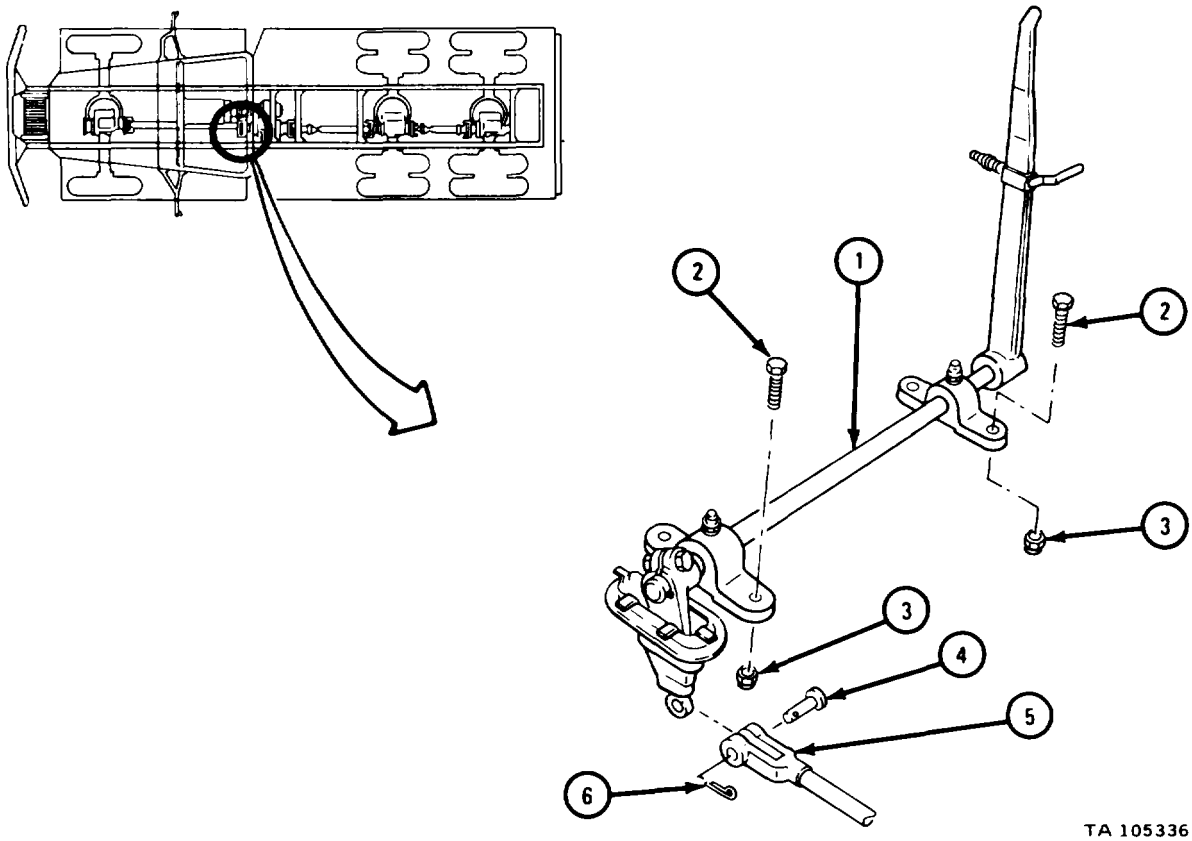
5. Put cotter pin (6) through link pin (4). Open cotter pin (6).

NOTE

Follow-on Maintenance Action Required:

Replace driver's seat. Refer to TM 9-2320-211-20.

END OF TASK



17-54. POWER DIVIDER ASSEMBLY REMOVAL, REPAIR, AND REPLACEMENT (TRUCK M543A2).

TOOLS: No Special tools required

SUPPLIES: Crane drive housing assembly gasket (2)
Cover gasket (4)
Pump adapter housing gasket
Shifter cover gasket (2)
Power divider governor adapter gasket
Cover plate gasket
Output shaft yoke gasket
Input shaft yoke gasket
Power divider governor drive gasket
Artillery and automotive grease, type GAA, MIL-G-10924
Gear lubricating oil, GO 80/90, MIL-L-2105
Housing seal
Pump adapter seal
Power divider pump adapter seal
Crane power divider housing seal
Oil seal retainer cover seal
Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680

PERSONNEL: TWO

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Drain power divider assembly. Refer to LO 9-2320-211-12.

(2) Remove power divider-to-hydraulic hoist pump propeller shaft. Refer to TM 9-2320-211-20.

(3) Remove power divider-to-transfer propeller shaft. Refer to TM 9-2320-211-20.

(4) Remove power divider-to-winch propeller shaft. Refer to TM 9-2320-211-20.

(5) Remove power divider linkage. Refer to para 17-53.

(6) Remove control valve assembly. Refer to para 17-51.

b. Removal.

FRAME 1

NOTE

Hoist cable (1) was joined to power divider lift ring (2) during removal of pump propeller shaft.

Soldier A 1. Hold two nuts (3).

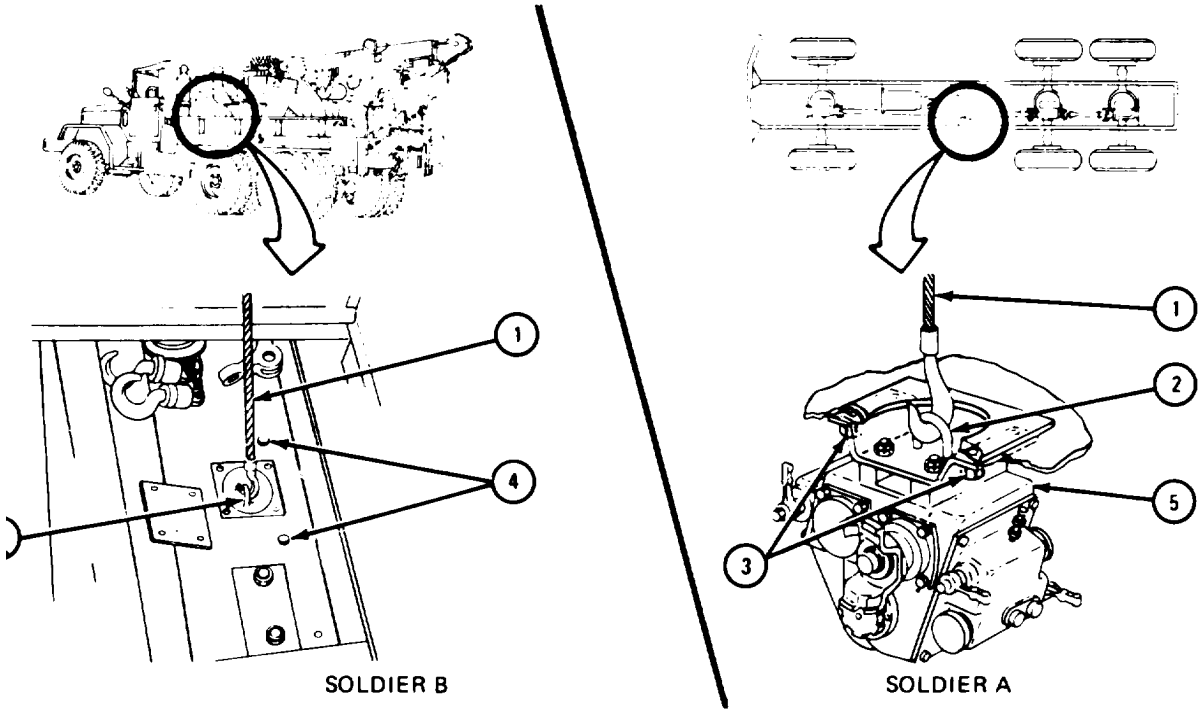
Soldier B 2. Take out two front mounting screws (4).

Soldier A 3. Guide power divider and crane drive assembly (5) as soldier B lowers it to the ground.

Soldier B 4. Using hoist, lower power divider and crane drive assembly (5) the ground.

Soldier A 5. Unhook hoist cable (1) from power divider lift ring (2) and slide power divider and crane drive assembly (5) out from under truck.

END OF TASK



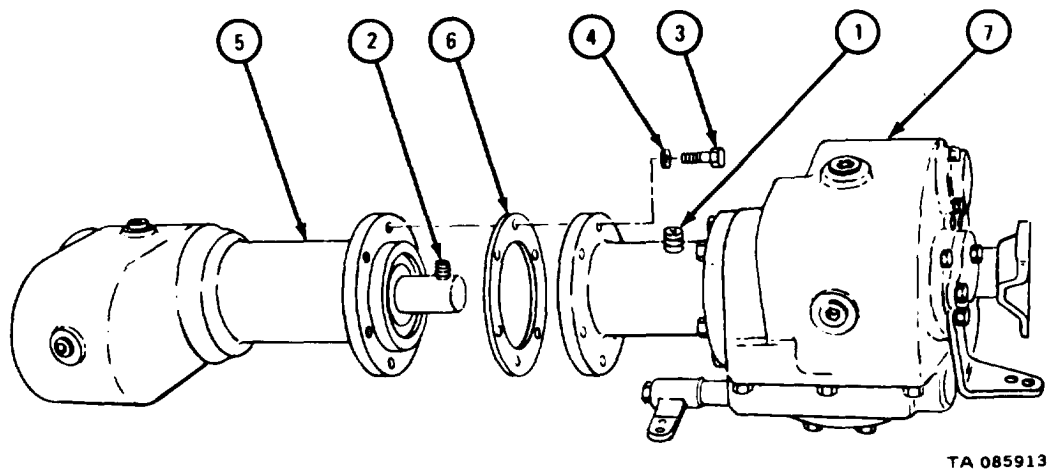
c. Disassembly.

(1) Disassembly of crane drive assembly.

FRAME 1

1. Takeout plug (1).
2. Takeout setscrew (2).
3. Take out six screws (3) and lockwashers (4).
4. Take crane drive assembly (5) and gasket (6) off power divider (7). Throw away gasket.

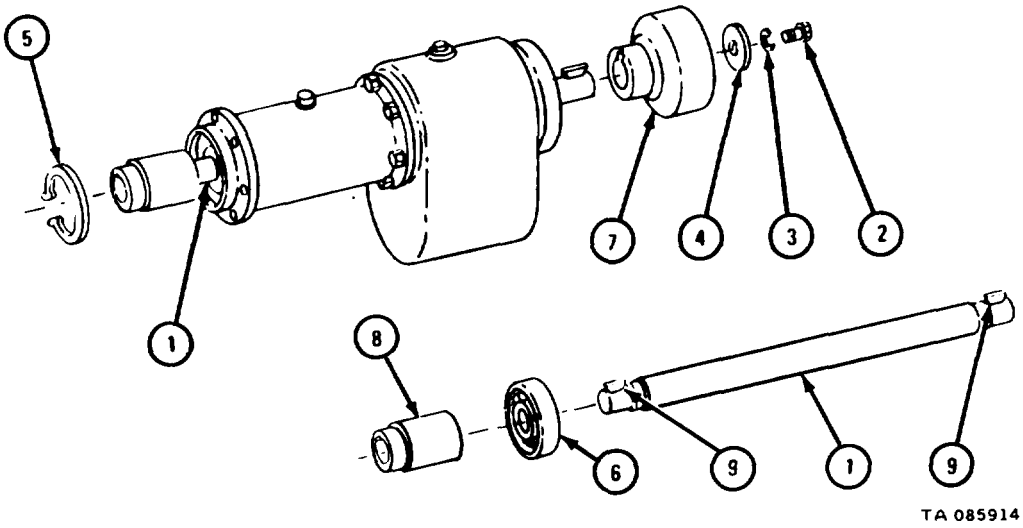
GO TO FRAME 2



FRAME 2

1. Hold shaft (1) at point shown and take out screws (2), lockwasher (3), and flat washer (4).
2. Take out snapring (5).
3. Take shaft (1) and bearing (6) out of yoke (7).
4. Mark shaft (1) before taking off coupling (8), so that coupling is put back in the same position.
5. Press shaft (1) out of bearing (6) and coupling (8).
6. Take out two keys (9).

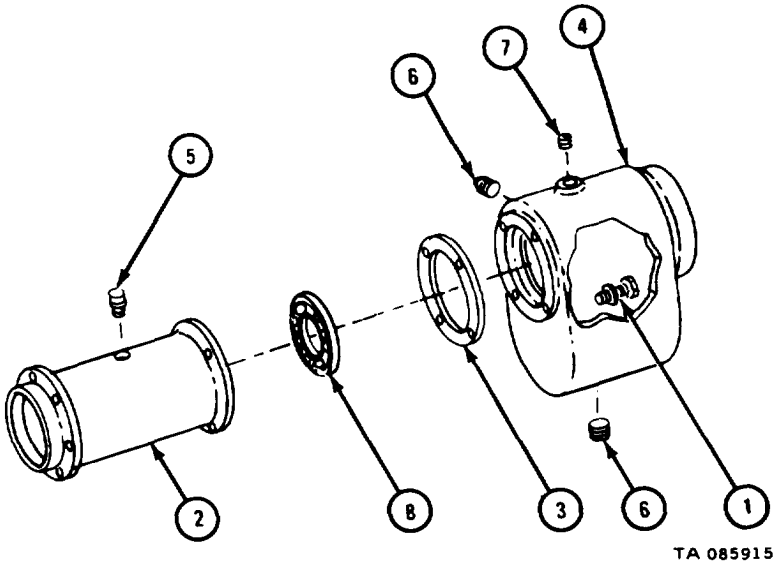
GO TO FRAME 3



FRAME 3

1. Take out four screws and lockwashers (1).
2. Take crane drive housing (2) and gasket (3) off output housing (4). Throw away gasket.
3. Take out breather (5).
4. Take out two plugs (6).
5. Take out plug (7).
6. Take bearing (8) out of housing (2).

END OF TASK

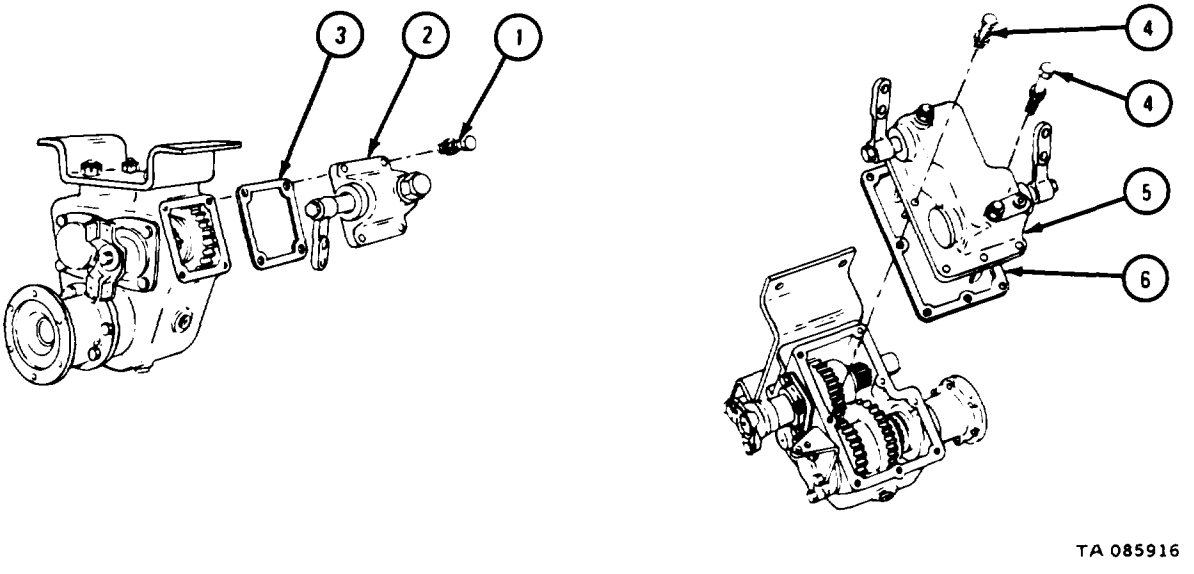


(2) Disassembly of power divider.

FRAME 1

1. Take out four screws and lockwashers (1).
2. Take off output shaft shifter cover assembly (2) and gasket (3). Throw away gasket.
3. Take out eight screws and lockwashers (4).
4. Take off input shaft and pump shaft shifter cover assembly (5) and gasket (6). Throw away gasket.

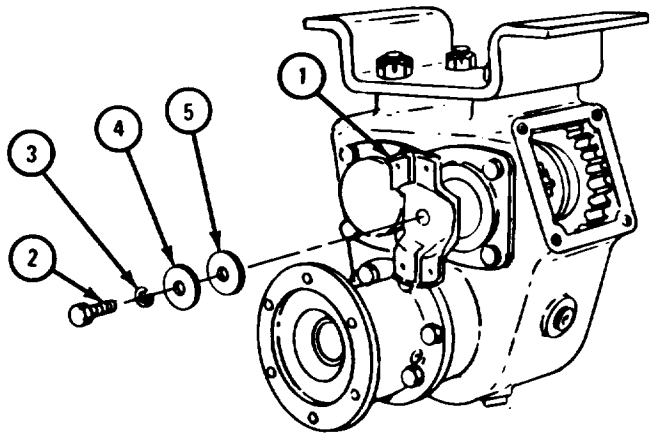
GO TO FRAME 2



F R A M E 2

1. Hold yoke (1) and take out screw (2), lockwasher (3), flat washer (4), and gasket (5). Throw away gasket.
2. Take off yoke (1).

GO TO FRAME 3

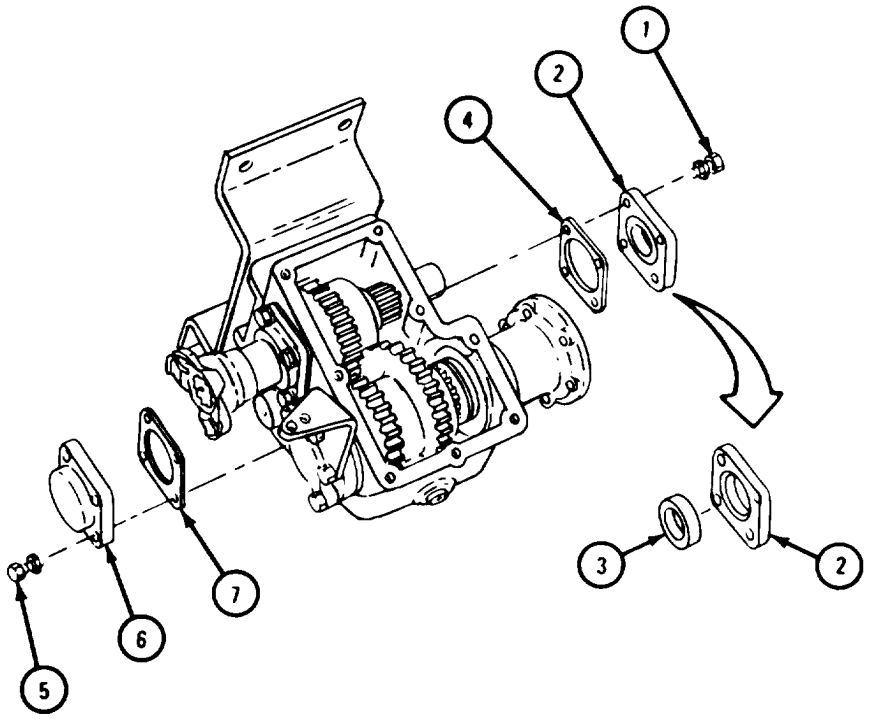


TA 085917

FRAME 3

1. Take out four screws and lockwashers (1).
2. Take off cap (2) with seal (3) and gasket (4). Throw away gasket.
3. Press seal (3) out of cap (2). Throw away seal.
4. Take out four screws and lockwashers (5).
5. Take off cover (6) and gasket (7). Throw away gasket.

GO TO FRAME 4

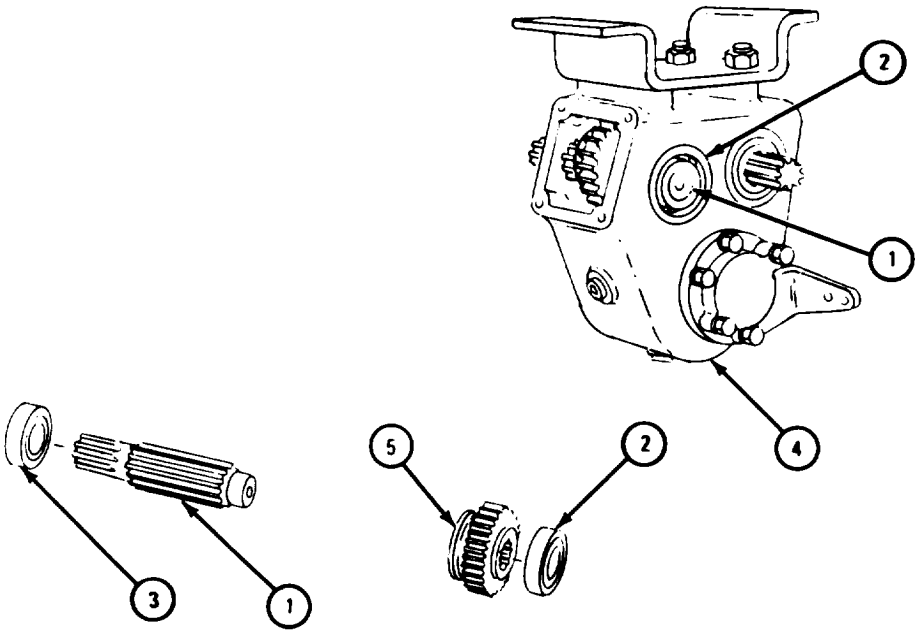


TA 085918

FRAME 4

1. Using brass punch and hammer, tap on forward end of output shaft (1) and outer race of front bearing (2). Drive output shaft, together with front bearing and rear bearing (3), towards rear of housing (4).
2. Hold output gear (5) and front bearing (2), Using brass punch and hammer, drive output shaft (1) with rear bearing (3) out of output gear and front bearing.
3. Take out output shaft (1) with rear bearing (3), output gear (5), and front bearing (2).
4. Press rear bearing (3) off output shaft (1). Refer to Part 1, para 7-7.

GO TO FRAME 5

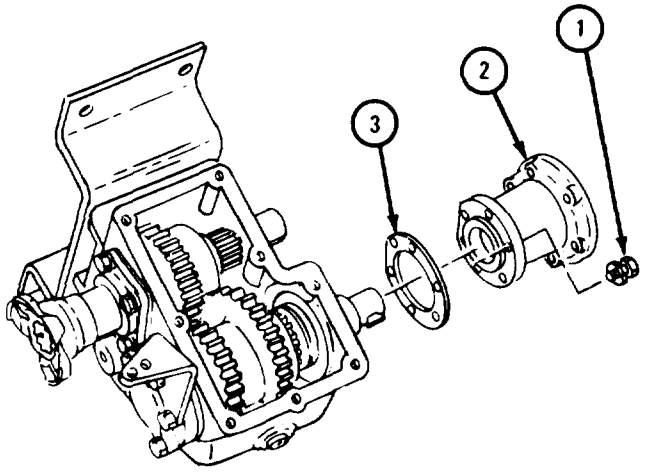


TA 085919

FRAME 5

1. Take out six screws and lockwashers (1).
2. Take off pump adapter (2) and gasket (3). Throw away gasket.

GO TO FRAME 6

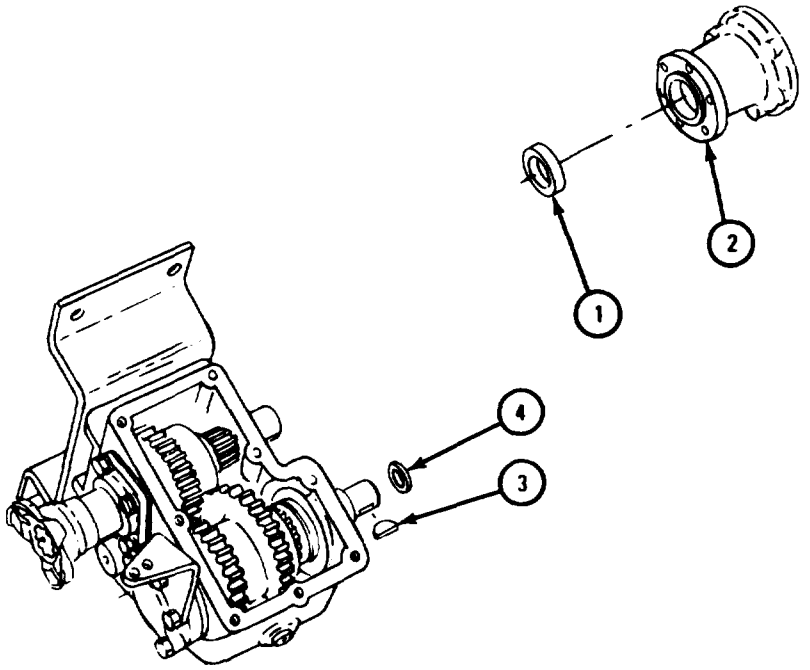


TA 085920

FRAME 6

1. Take seal (1) out of pump adapter (2). Throw away seal.
2. Take out key (3).
3. Slide off and throw away seal (4).

GO TO FRAME 7

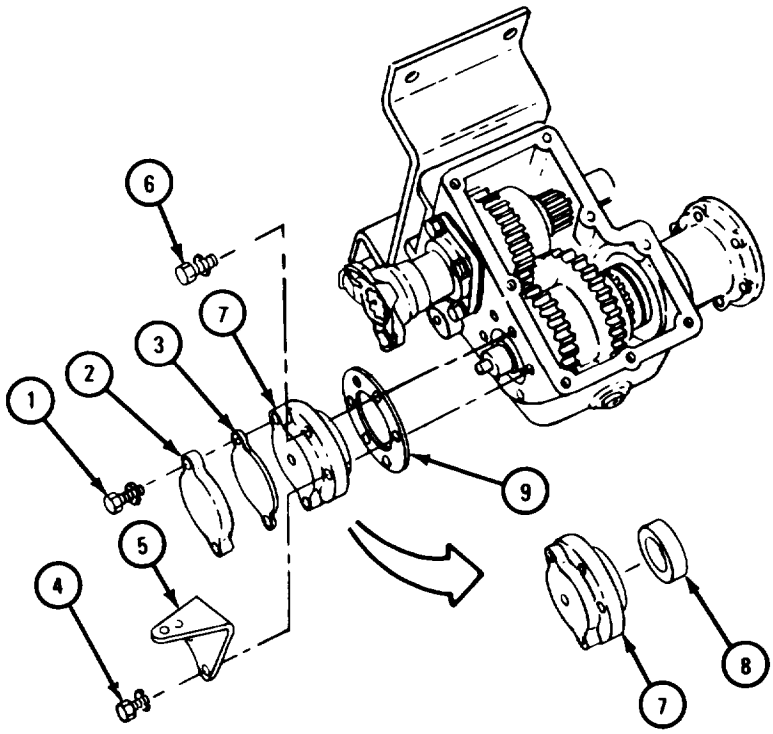


TA 085921

FRAME 7

1. Take out two screws and lockwashers (1).
2. Take off cover plate (2) and gasket (3). Throw away gasket.
3. Take out two screws and lockwashers (4).
4. Take off bracket (5).
5. Take out four screws and lockwashers (6).
6. Take off adapter (7) with seal (8) and gasket (9). Throw away gasket.
7. Take seal (8) out of adapter (7). Throw away seal.

GO TO FRAME 8

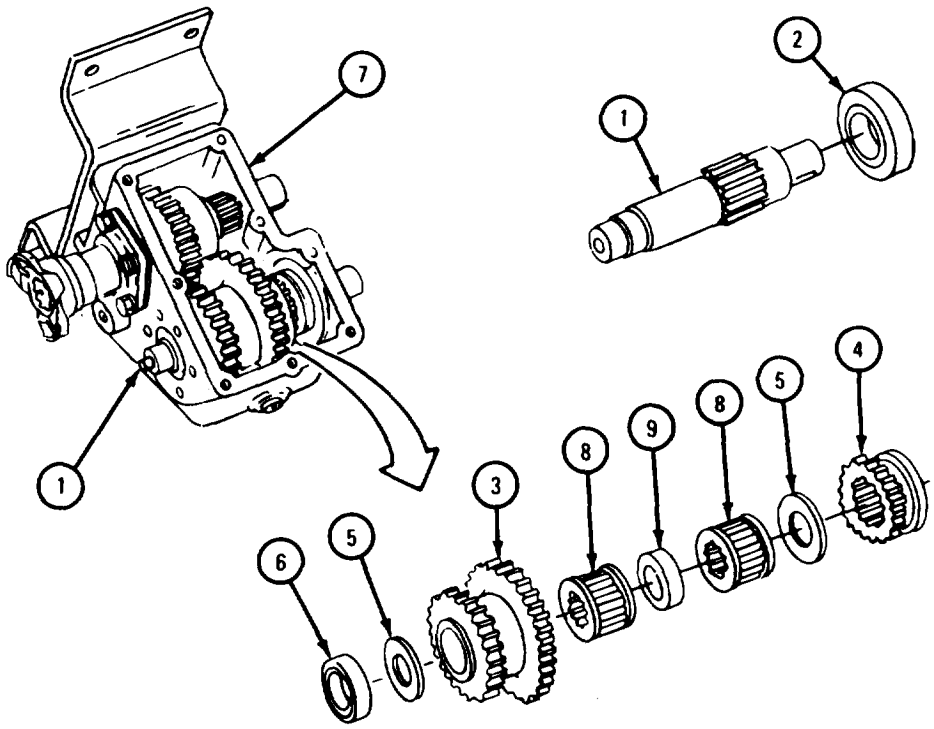


TA 085922

FRAME 8

1. Drive out shaft (1) and bearing (2) from front.
2. Take gear assembly (3), clutch (4), two thrust washers (5), and bearing (6) out of housing (7).
3. Take two bearings (8) and spacer (9) out of gear (3).
4. Take bearing (2) off shaft (1).

GO TO FRAME 9

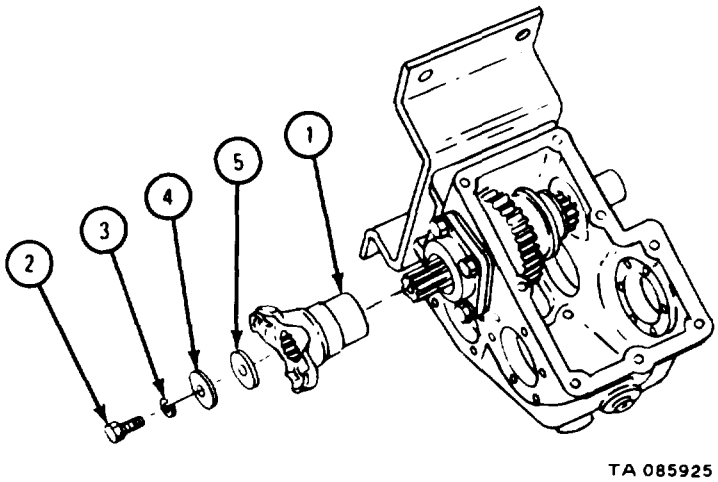


TA 085923

FRAME 9

1. Hold yoke (1) and take out screw (2), lockwasher (3), flat washer (4), and gasket (5). Throw away gasket.
2. Pull off yoke (1).

GO TO FRAME 10

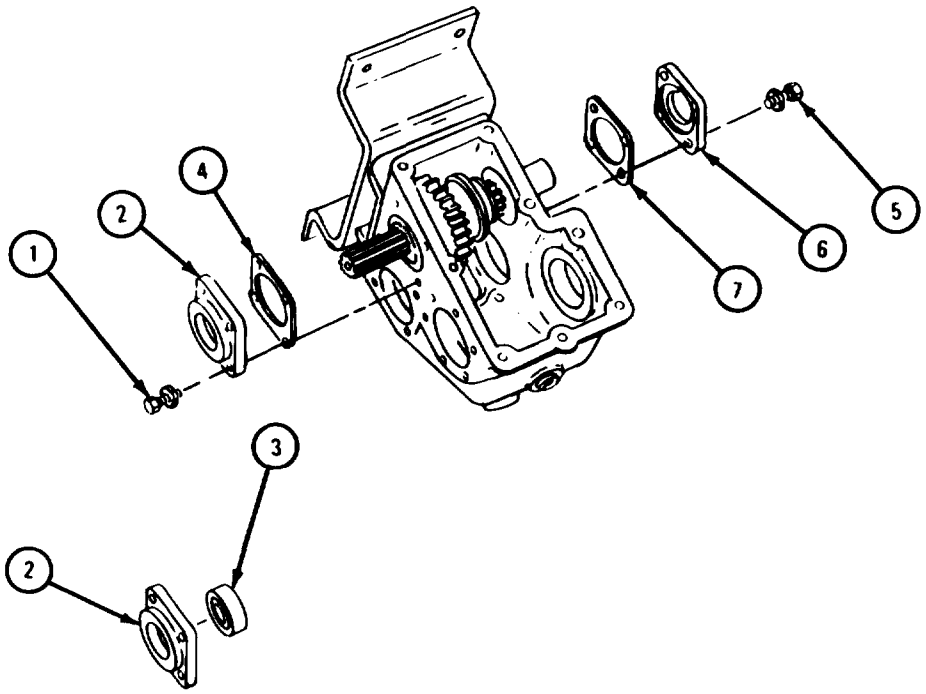


TA 085925

FRAME 10

1. Take out four screws and lockwashers (1).
2. Takeoff cap (2) with seal (3) and gasket (4). Throw away gasket.
3. Press seal (3) from cap (2). Throw away seal.
4. Take out four screws and lockwashers (5).
5. Takeoff cover (6) and gasket (7). Throw away gasket.

GO TO FRAME 11

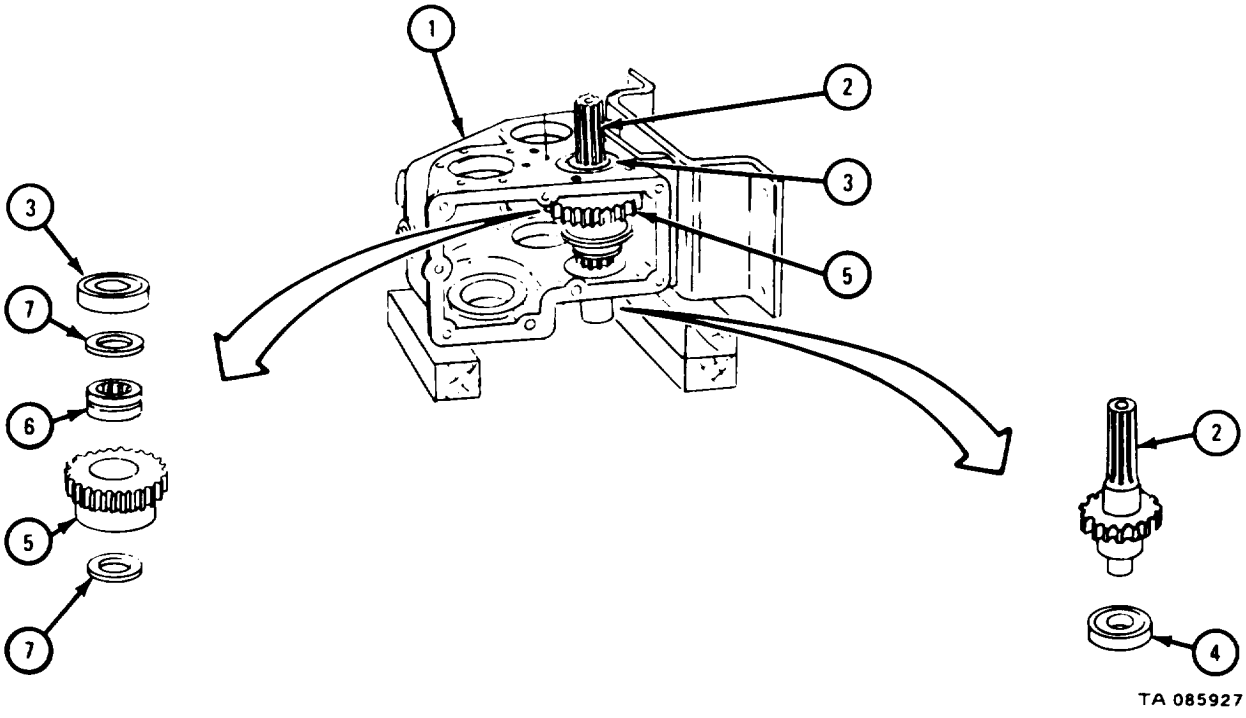


TA 085926

FRAME 11

1. Turn housing (1) on one side on wood blocks as shown so that input shaft can be driven out of rear opening.
2. Using brass punch and hammer, tap on forward end of input shaft (2) and outer race of front bearing (3). Drive input shaft together with front bearing and rear bearing (4) towards rear of housing (1).
3. Take out front bearing (3), input drive gear (5) with bearing (6), and two thrust washers (7).
4. Press bearing (6) out of input drive gear (5). Refer to Part 1, para 7-7.
5. Press rear bearing (4) off input shaft (2). Refer to Part 1, para 7-7.

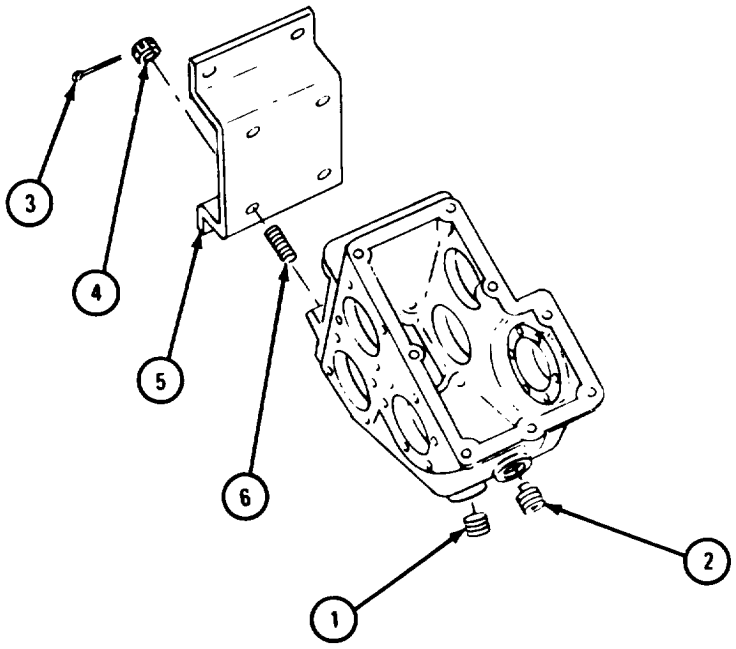
GO TO FRAME 12



FRAME 12

1. Take Out plugs (1 and 2).
2. Take out and throw away four cotter pins (3).
3. Take off four nuts (4).
4. Take off bracket (5).
5. Take out four studs (6).

END OF TASK



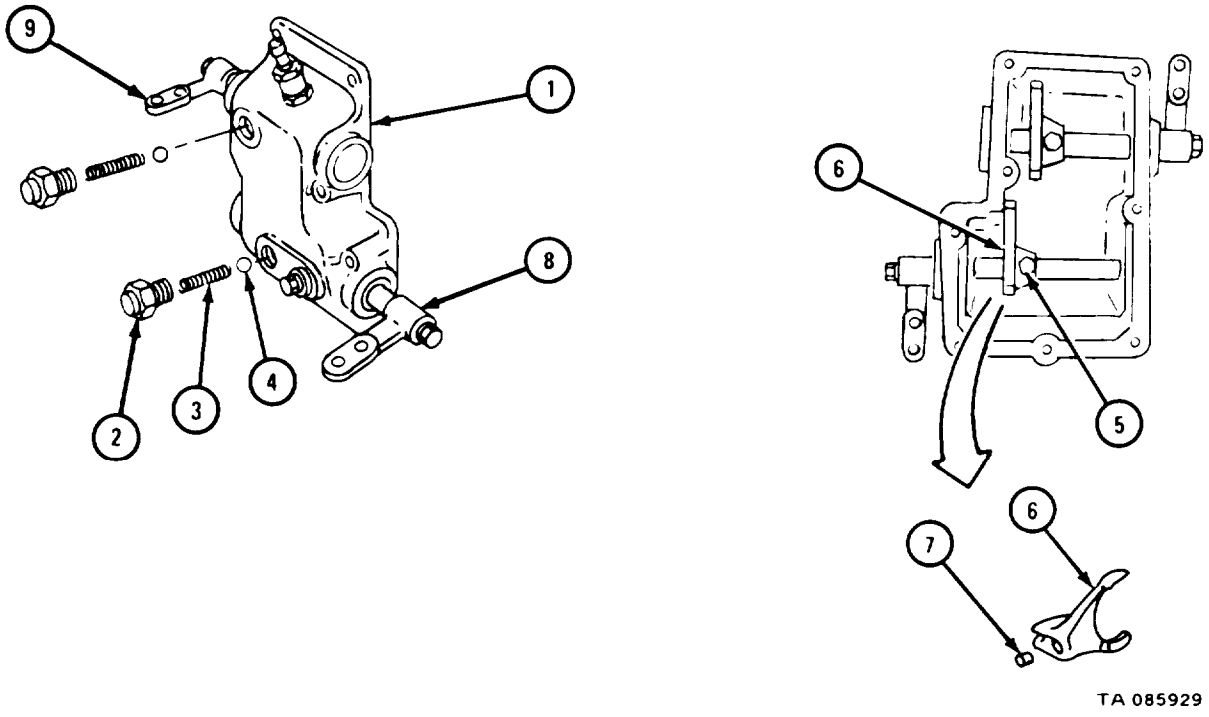
TA 085928

(3) Disassembly of input shaft and pump shaft shifter cover.

FRAME 1

1. Carefully clamp cover (1) in vise.
2. Slowly unscrew and take out poppet (2), spring (3), and ball (4). Be careful not to lose spring and ball.
3. Take out screw and lockwasher (5). Take off fork (6).
4. Pull pin (7) out of fork (6).
5. Slide out pump shaft and arm assembly (8).
6. Do steps 2 through 5 again for input shaft and arm assembly (9).

GO TO FRAME 2

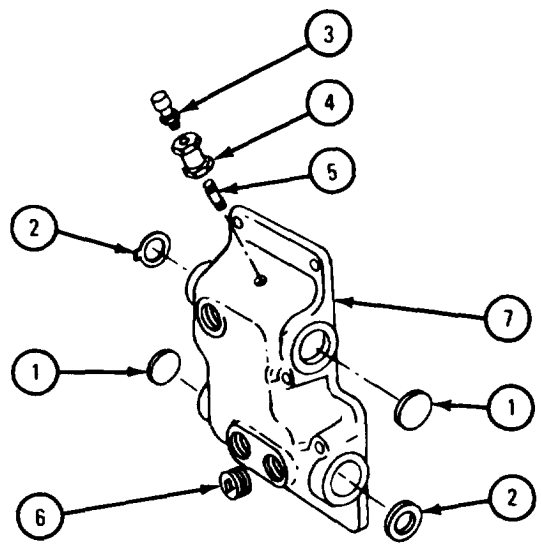


TA 085929

FRAME 2

1. Drive out two plugs (1).
2. Take out two seals (2).
3. Take out breather assembly (3).
4. Take out coupling (4).
5. Take out nipple (5).
6. Take out plug (6).
7. Take cover (7) out of vise.

GO TO FRAME 3

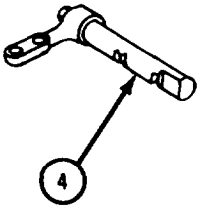


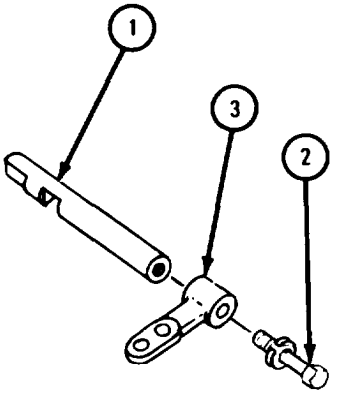
TA 085930

FRAME 3

1. Clamp pump shaft (1) in vise.
2. Take out screw and lockwasher (2).
3. Take off arm (3).
4. Take pump shaft (1) out of vise.
5. Do steps 1 through 4 again for input shaft and arm assembly (4).

END OF TASK





TA 085931

(4) Disassembly of output shaft shifter cover.

FRAME 1

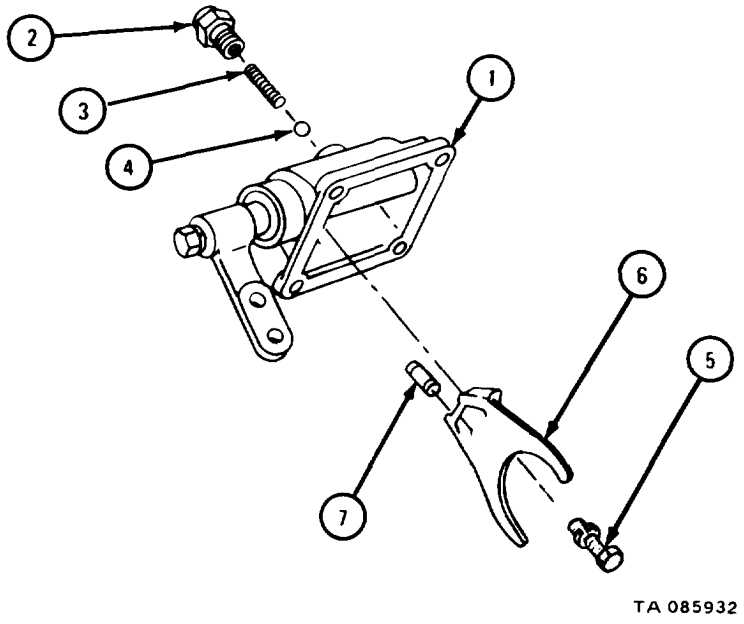
1. Carefully clamp cover (1) in vise.
2. Take out poppet (2) with spring (3) and ball (4).
3. Take out screw and lockwasher (5).
4. Take off fork (6).

NOTE

Do not take out pin (7) unless it is cracked or damaged.

5. Take pin (7) out of fork (6).

GO TO FRAME 2

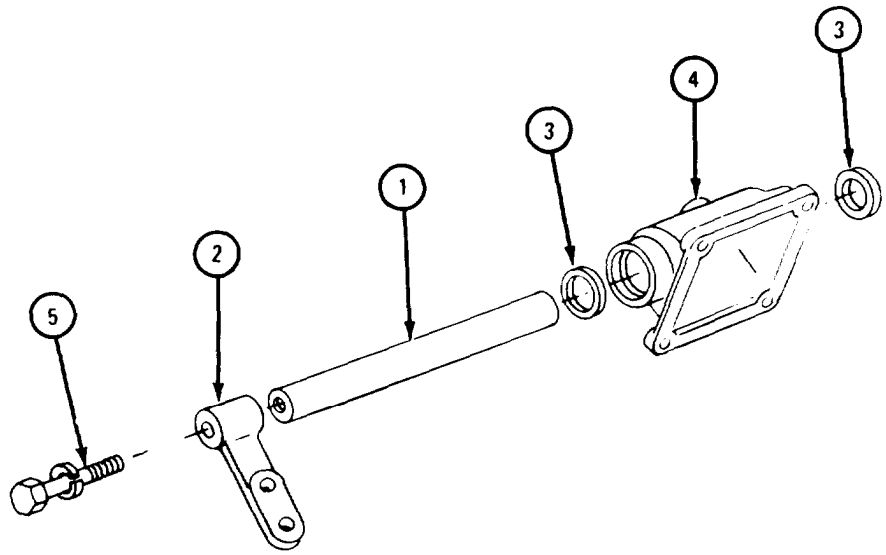


TA 085932

FRAME 2

1. Slide out shaft (1) with arm (2).
2. Take out two seals (3).
3. Take cover (4) out of vise.
4. Clamp shaft (1) in vise.
5. Take out screw and lockwasher (5).
6. Slide arm (2) off shaft (1).
7. Take shaft (1) out of vise.

END OF TASK



TA 085933

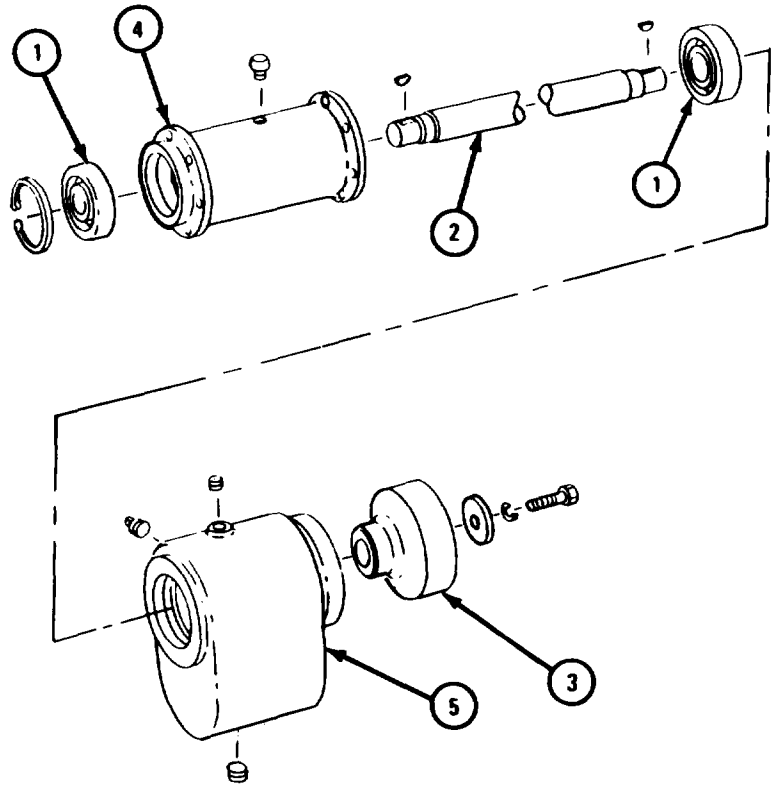
d. Cleaning. There are no special cleaning procedures needed. Refer to cleaning procedures given in Part 1, para 1-3.

e. Inspection.

FRAME 1

1. Check that two bearings (1) are not damaged. Refer to Part 1, para 7-7.
2. Check that shaft (2) is not bent, twisted or damaged in any other way.
3. Check that yoke (3) is not cracked or broken and that it has no stripped screw holes.
4. Check that crane drive housing (4) and output housing (5) are not cracked or broken and that they have no stripped screw holes.

GO TO FRAME 2



NOTE: CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT IN THIS FRAME. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES OR ARE CHECKED IN ANOTHER FRAME.

TA 085934

FRAME 2

NOTE

Readings must be within limits given in table 17-7. If readings are not within given limits, throw away part and get a new one.

1. Check that three bearings (1), two bearings (2), bearing (3), two bearings (4), and bearing (5) are not damaged. Refer to Part 1, para 7-7.
2. Measure bearings (1, 2, and 5).
3. Check that two thrust washers (6) and two thrust washers (7) are not scored, worn unevenly or damaged in any other way.

GO TO FRAME 3

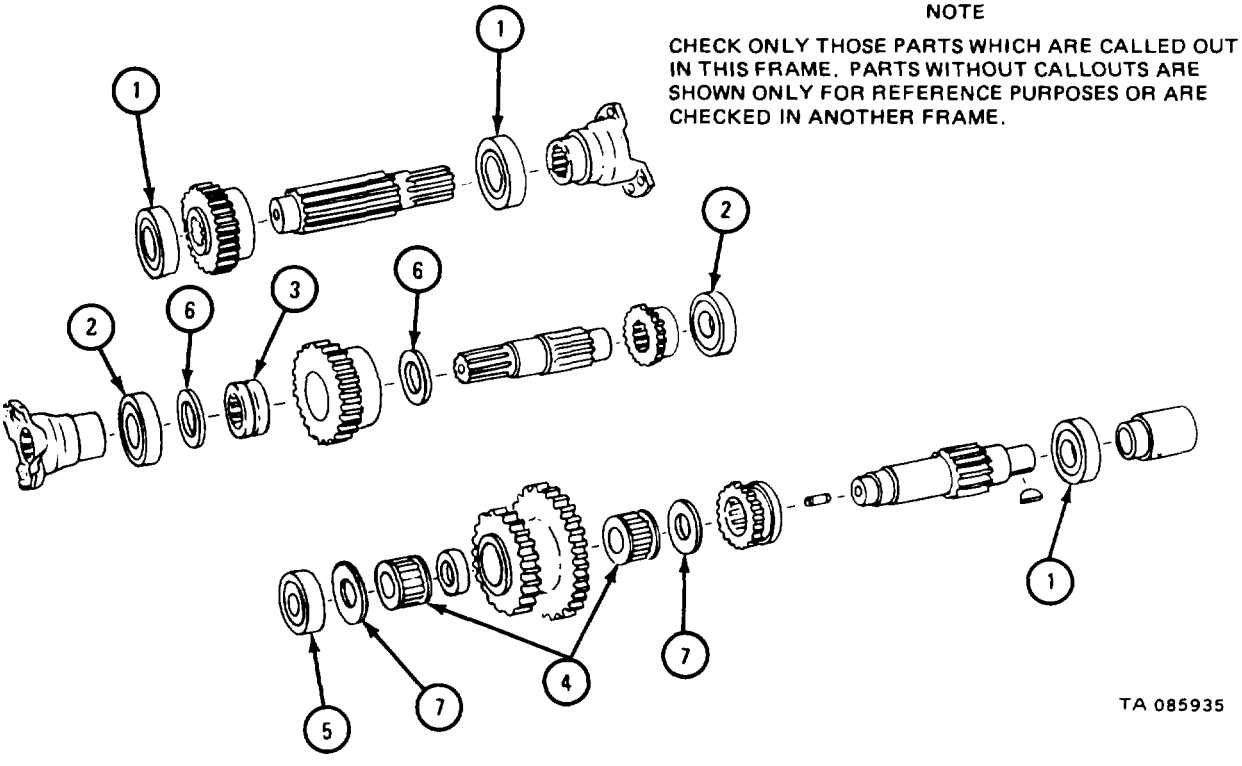


Table 17-7. Bearing Wear Limits

Index Number	Item /Point of Measurement	Wear Limit (inches)
1 and 2	Bearing inner diameter	1.574 max
1 and 2	Bearing outer diameter	3.149 min
5	Bearing inner diameter	1.377 to 1.378
5	Bearing outer diameter	2.834 min

FRAME 3

NOTE

Readings must be within limits given in table 17-8. If readings are not within given limits, throw away part and get a new one.

1. Check that output shaft (1), input shaft (2), and pump drive shaft (3) are not chipped, scored, twisted, or damaged in any other way.
2. Measure two output shaft bearing journals (4), two input shaft bearing journals (5), pump drive shaft front bearing journal (6) and rear bearing journal (7).

GO TO FRAME 4

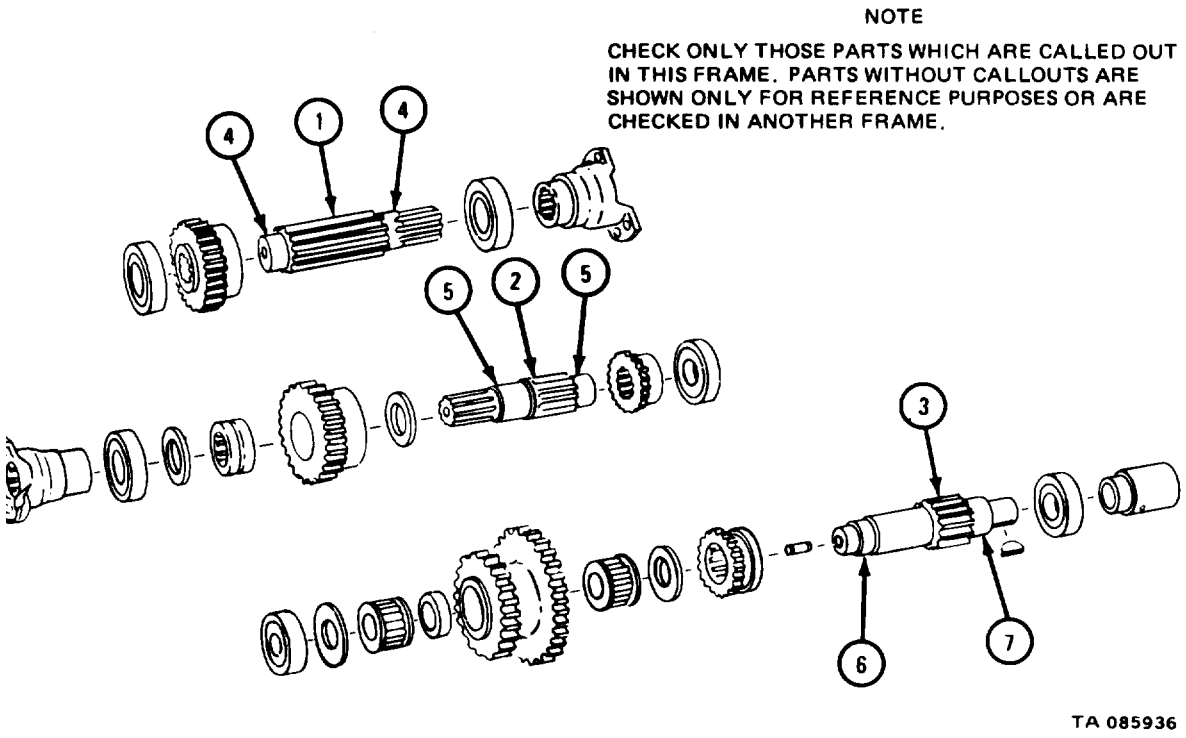


Table 17-8. Bearing Journal Wear Limits

Index Number	Item/Point of Measurement	Wear Limit (inches)
4	Output shaft bearing journal outer diameter	1.573 to 1.575
5	Input shaft bearing journal outer diameter	1.573 to 1.575
6	Pump drive shaft front bearing journal outer diameter	1.376 to 1.378
7	Pump drive shaft rear bearing journal outer diameter	1.573 to 1.575

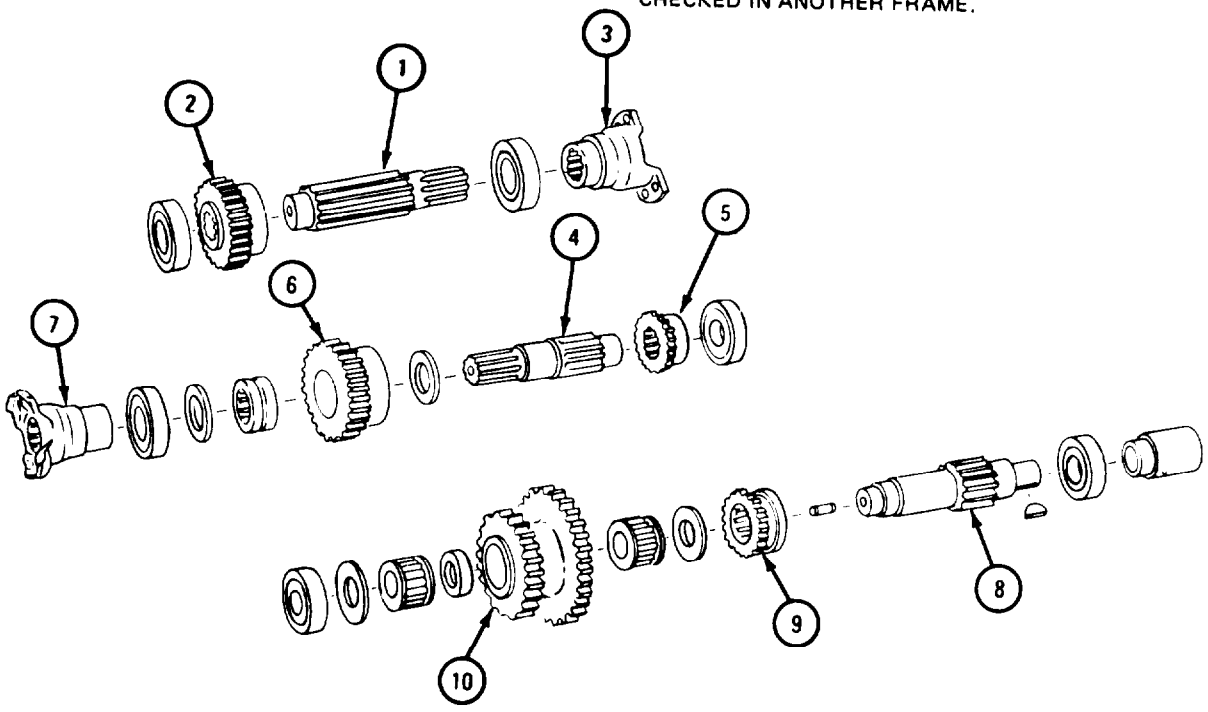
FRAME 4

1. Check that splines of output shaft (1), output gear (2), and yoke (3) fit snugly.
2. Check that splines of input shaft (4), clutch (5), input gear (6), and yoke (7) fit snugly.
3. Check that splines of pump drive shaft (8), clutch (9), and pump drive gear (10) fit snugly.

GO TO FRAME 5

NOTE

CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT IN THIS FRAME. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES OR ARE CHECKED IN ANOTHER FRAME.



TA 085937

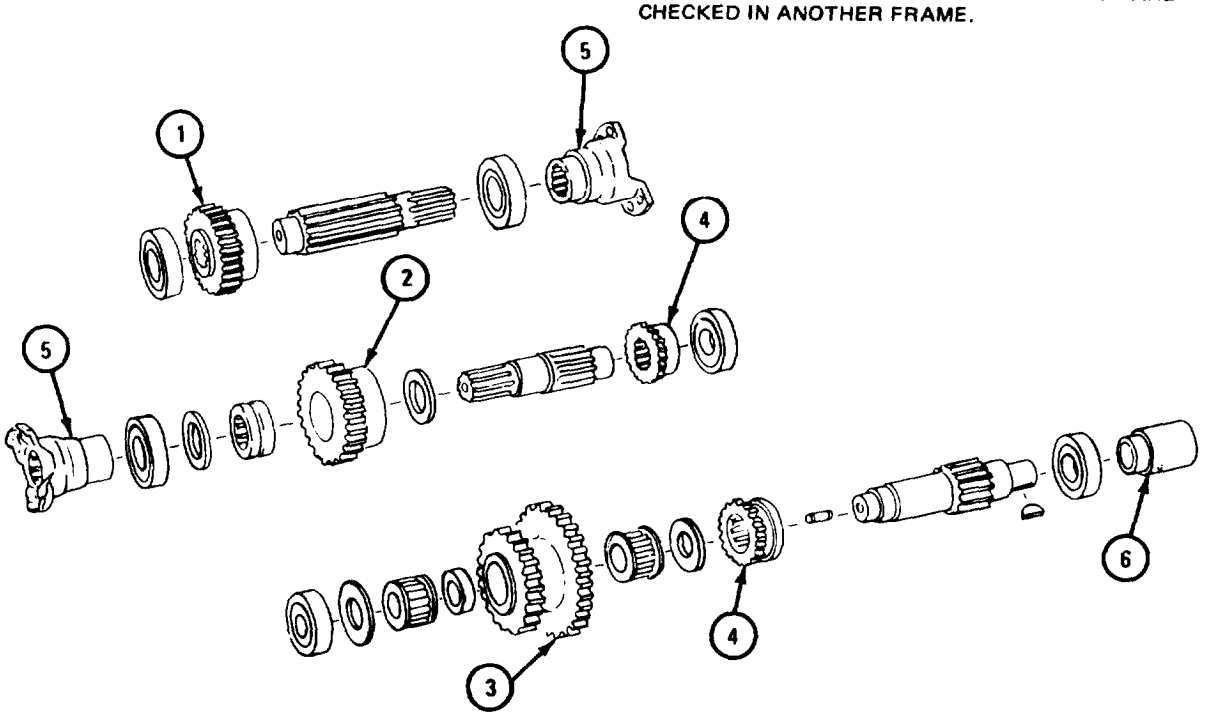
FRAME 5

1. Check that output gear (1), input gear (2), and pump drive gear (3) have no burred, chipped or broken teeth. Check that they are not damaged in any other way.
2. Check that two clutches (4) are not burred, chipped or damaged in any other wav.
3. Check that sealing surfaces of two yokes (5) are not worn and that threaded holes are not damaged.
4. Check that coupling (6) is not twisted or damaged in any other way.

(GO TO FRAME 6

NOTE

CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT IN THIS FRAME. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES OR ARE CHECKED IN ANOTHER FRAME.



TA 085938

FRAME 6

NOTE

Readings must be within limits given in table 17-9. If readings are not within given limits, throw away part and get a new one.

1. Check that housing (1), two caps (2), two covers (3), pump adapter (4), and adapter (5) are not cracked or warped.
2. Check that threaded holes in housing (1) and pump adapter (4) are not darnaged.
3. Measure two output shaft bearing bores (6), two input shaft bearing bores (7), pump drive shaft front bearing bore (8), and rear bearing bore (9).

GO TO FRAME 7

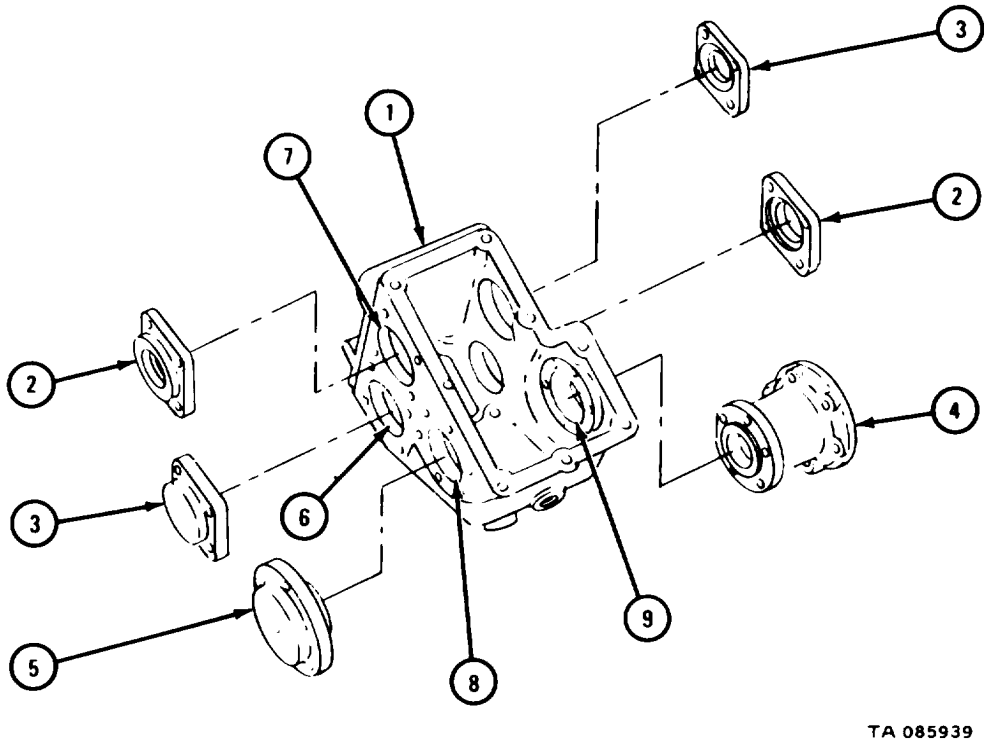


Table 17-9. Bearing Bore Wear Limits

Index Number	Item/Point of Measurement	Wear Limit (inches)
6	Output shaft bearing bore inner diameter	3.149 to 3.151
7	Input shaft bearing bore inner diameter	3.149 to 3.151
8	Pump drive shaft bearing bore inner diameter	2.834 to 2.836
9	Pump drive shaft rear bearing bore inner diameter	3.149 to 3.151

FRAME 7

NOTE

Readings must be within limits given in table 17-10. If readings are not within given limits, throw away part and get a new one.

1. Check that input shaft and pump shaft shifter cover (1) is not cracked or warped, and that threaded holes are not damaged.
2. Check that two shafts (2 and 3) and two forks (4) are not cracked or broken. Check that forks fit well on shafts.
3. Measure two springs (5).

GO TO FRAME 8

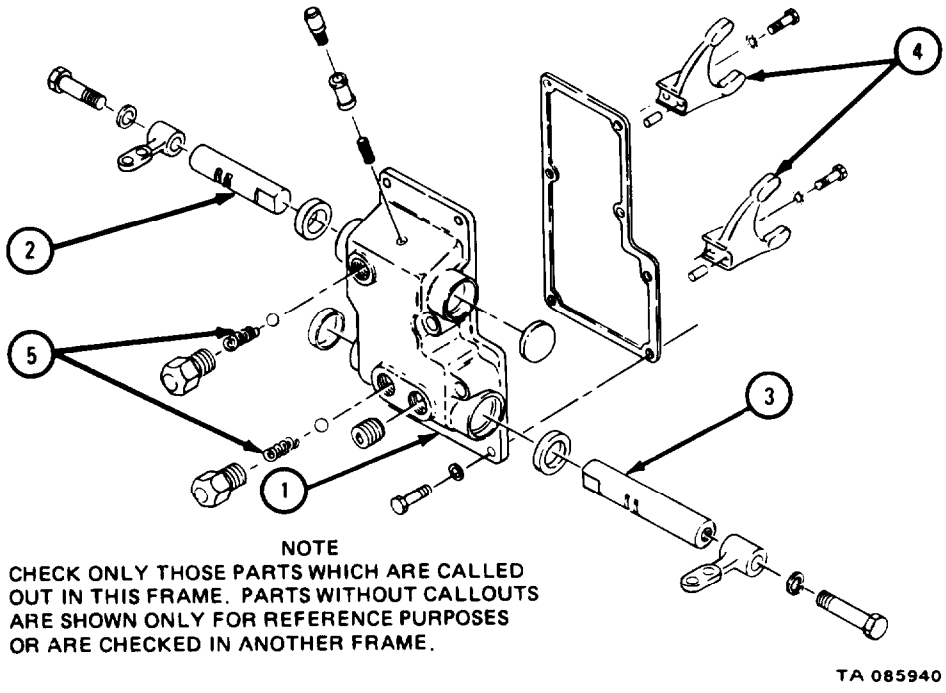


Table 17-10. Spring Wear Limits

Index Number	Item /Point of Measurement	Wear Limit (inches)
5	Spring free length	1 21/32
5	Spring length when compressed by 38-pound force	1

FRAME 8

NOTE

Readings must be within limits given in table 17-11. If readings are not within given limits, throw away part and get a new one.

1. Check that output shaft shifter cover (1) is not cracked or warped, and that threaded hole is not damaged.
2. Check that shaft (2) and fork (3) are not cracked or broken. Check that fork fits snugly on shaft.
3. Measure spring (4).

END OF TASK

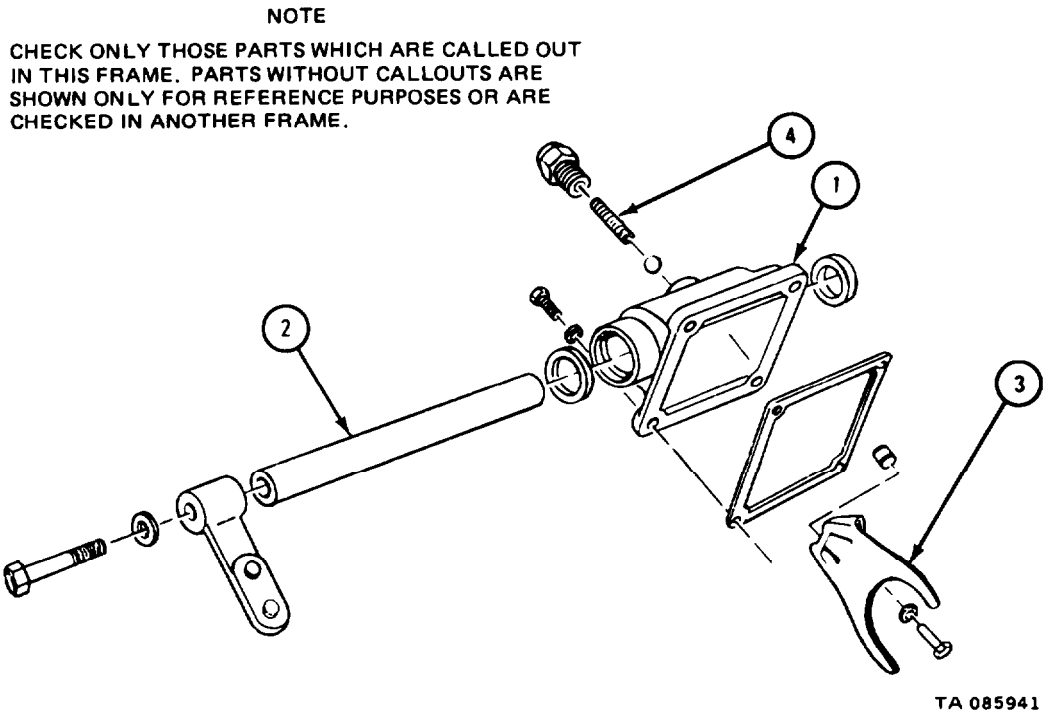


Table 17-11. Detent Spring Wear Limits

Index Number	Item/Point of Measurement	Wear Limit (inches)
4	Spring free length	1 21/32
4	Spring length when compressed by 38-pound force	1

f. Repair.

(1) Using fine mill file or soapstone, file small nicks and burrs from parts.

(2) Throw away damaged parts and get new ones in their place.

g. Assembly.

NOTE

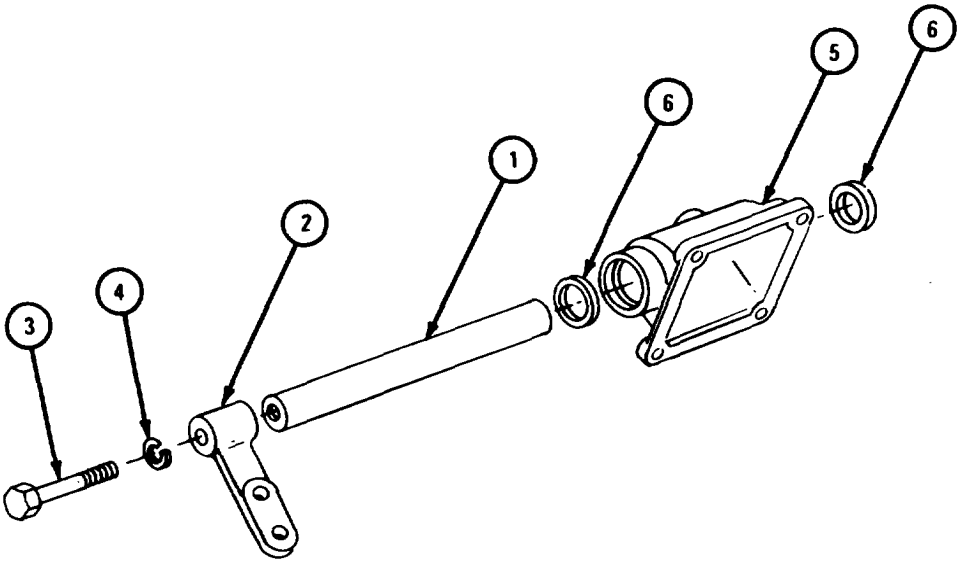
Oil all bearings, shafts, and gears during assembly.

(1) Assembly of output shaft shifter cover.

FRAME 1

1. Clamp shaft (1) in vise and put arm (2) in place on end of shaft (1).
2. Put in screw (3) and lockwasher (4).
3. Take shaft (1) out of vise.
4. Carefully clamp cover (5) in vise.
5. Put in two seals (6).
6. Slide shaft (1) through bores in cover (5). Be careful not to damage seals (6).

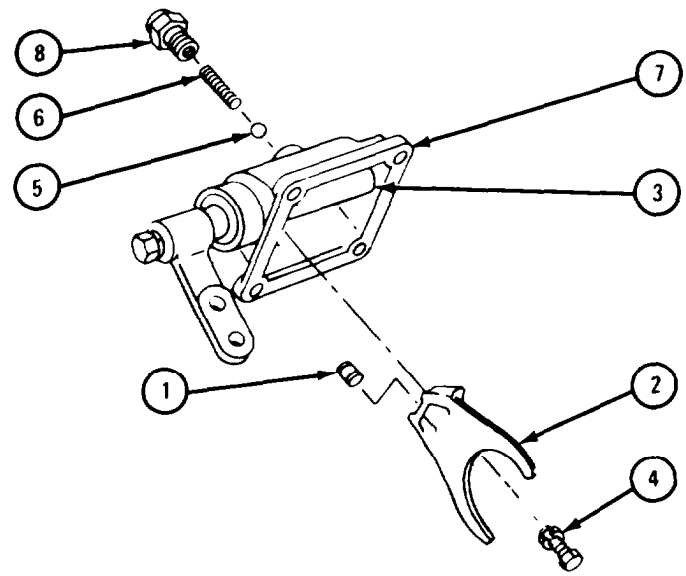
GO TO FRAME 2



FRAME 2

1. Push pin (1) into hole in fork (2).
2. Put fork (2) with pin (1) in place on shaft (3).
3. Put in screw and lockwasher (4).
4. Put ball (5) and spring (6) in bore of cover (7).
5. Put in poppet (8).
6. Take cover (7) out of vise.

END OF TASK



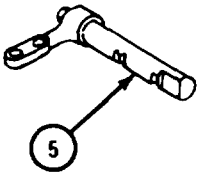
TA 085943

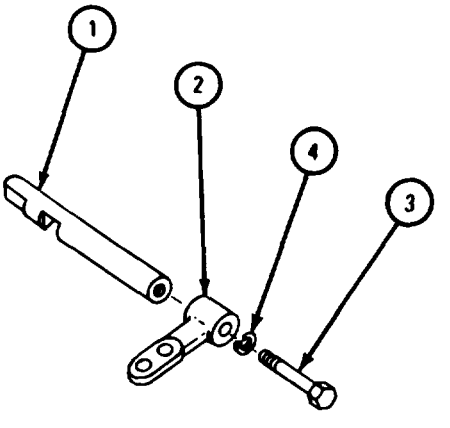
(2) Assembly of input shaft and pump shaft shifter cover.

FRAME 1

1. Clamp shaft (1) in vise.
2. Put arm (2) on shaft (1).
3. Put in screw (3) and lockwasher (4).
4. Take shaft (1) out of vise.
5. Do steps 1 through 4 again for input shaft and arm assembly (5).

GO TO FRAME 2



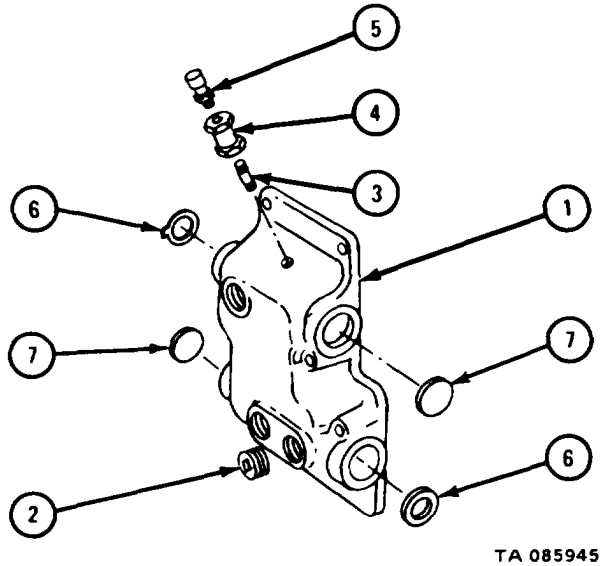


TA 085944

FRAME 2

1. Put cover (1) in vise.
2. Put in plug (2).
3. Put in nipple (3).
4. Put uncoupling (4).
5. Put in breather assembly (5).
6. Put in two seals (6).
7. Tap in two plugs (7).

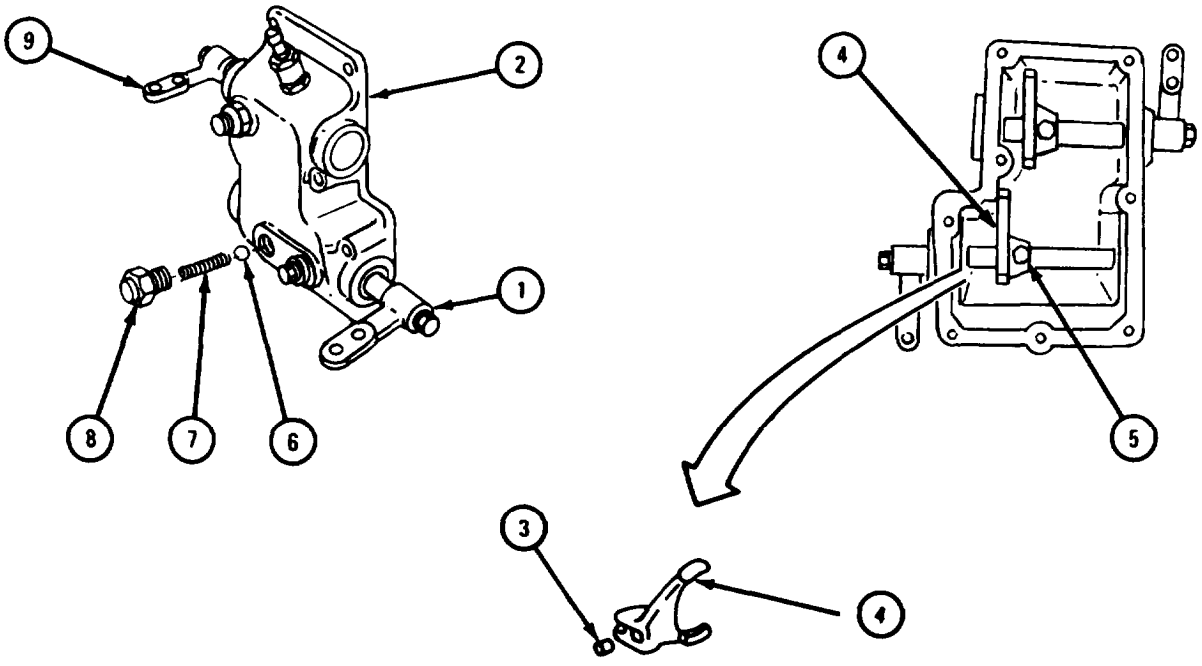
GO TO FRAME 3



FRAME 3

1. Slide shaft and arm assembly (1) through bores in cover (2). Be careful not to damage seal in bore.
2. Push pin (3) into place in fork (4), and put fork with pin in place on shaft and arm assembly (1).
3. Put in screw and lockwasher (5).
4. Put ball (6) and spring (7) in bore of cover (2).
5. Put in poppet (8).
6. Do steps 1 through 5 again for input shaft and arm assembly (9).
7. Take cover (2) out of vise.

END OF TASK



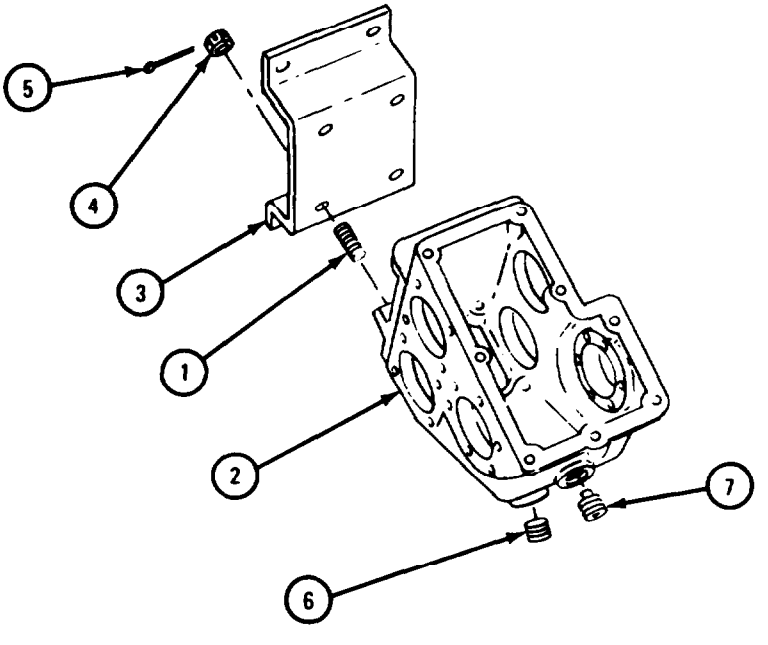
TA 085946

(3) Assembly of power divider.

FRAME 1

1. Put four studs (1) into housing (2).
2. Put bracket (3) in place.
3. Put in four nuts (4). Aline slots in nuts with cotter pin holes in studs (1).
4. Put in four cotter pins (5).
5. Put in plugs (6 and 7).

GO TO FRAME 2

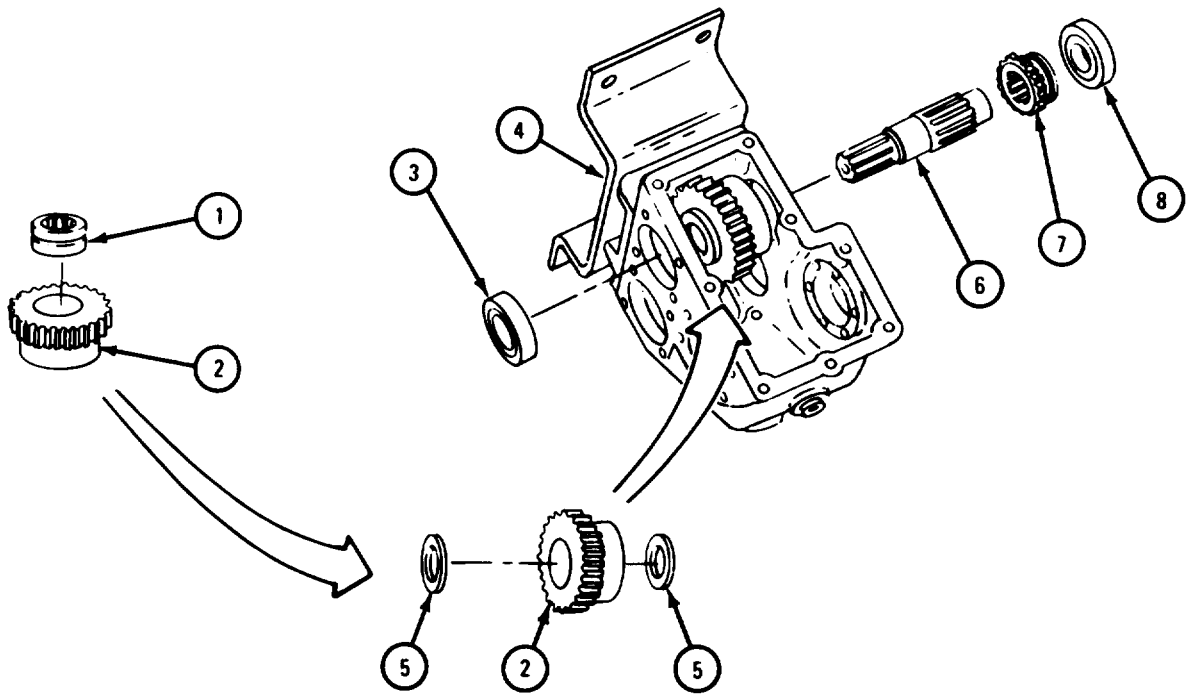


TA 085947

FRAME 2

1. Press bearing (1) into bore of input drive gear (2). Refer to Part 1, para 7-7.
2. Put bearing (3) into input shaft bore of housing (4). Refer to Part 1, para 7-7.
3. Hold input drive gear (2) and two thrust washers (5) in place in housing(4) Push input shaft (6), splined end first, through bores of input drive gear, thrust washers, and bearing (1).
4. Slide clutch (7) onto input shaft (6).
5. Put bearing (8) in place. Refer to Part 1, para 7-7.

GO TO FRAME 3

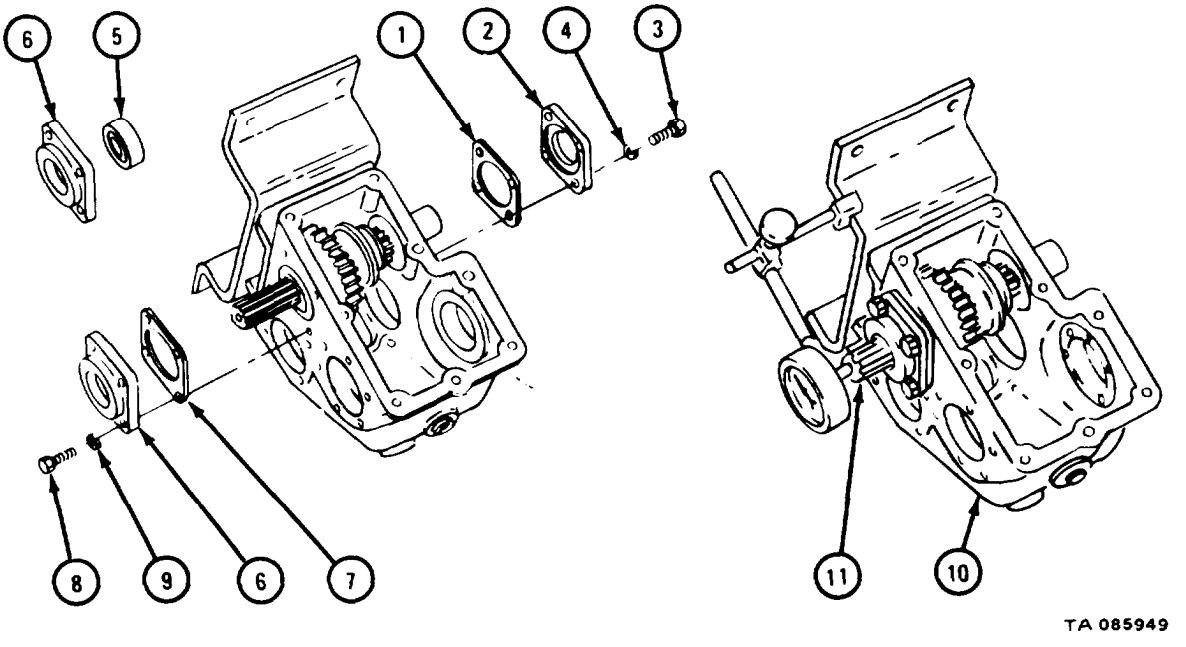


TA 085948

FRAME 3

1. Put gasket (1) and cover (2) in place.
2. Put in four screws (3) and lockwashers (4).
3. Press seal (5) into cap (6).
4. Pack inside of cap (6) with grease.
5. Put gasket (7) and cap (6) with seal (5) in place.
6. Put in four screws (8) and lockwashers (9) .
7. Fasten dial indicator to housing (10) so that plunger of dial indicator is against end of input shaft (11) as shown.
8. Push in and pull out input shaft (11) to check that end play is between 0.010 inch and 0.033 inch.
9. Take off dial indicator.
10. If end play is not within limits given in step 8, do steps 11 through 14. If end play is within limits given, go to frame 4.
11. Take out four screws (8) and lockwashers (9) .
12. Take off cap (6) with seal (5) .
13. Put on another gasket (7) . Put cap (6) with seal (5) back in place.
14. Do steps 6 through 13 again until end play is within given limits.

GO TO FRAME 4

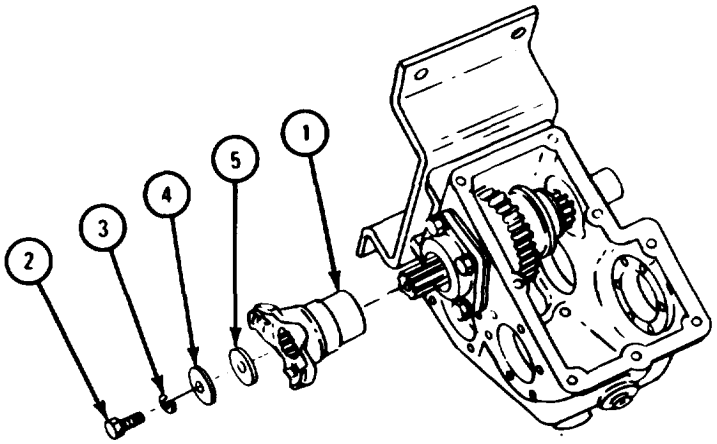


FRAME 4

1. Push on yoke (1).

2. Hold yoke (1) and put in screw (2), locksvasher (3), flat washer (4), and gasket (5).

GO TO FRAME 5

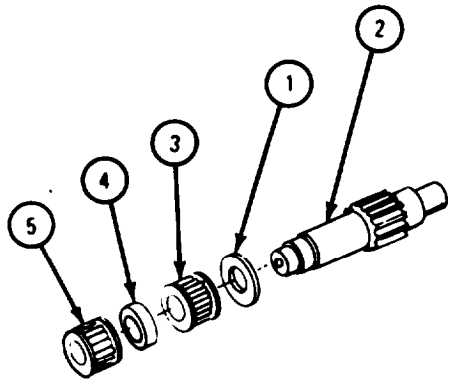


TA 085925

FRAME 5

1. Slide thrust washer (1) onto pump drive shaft (2).
2. Slide on bearing (3).
3. Slide on collar (4).
4. Slide on bearing (5).

Go TO FRAME 6

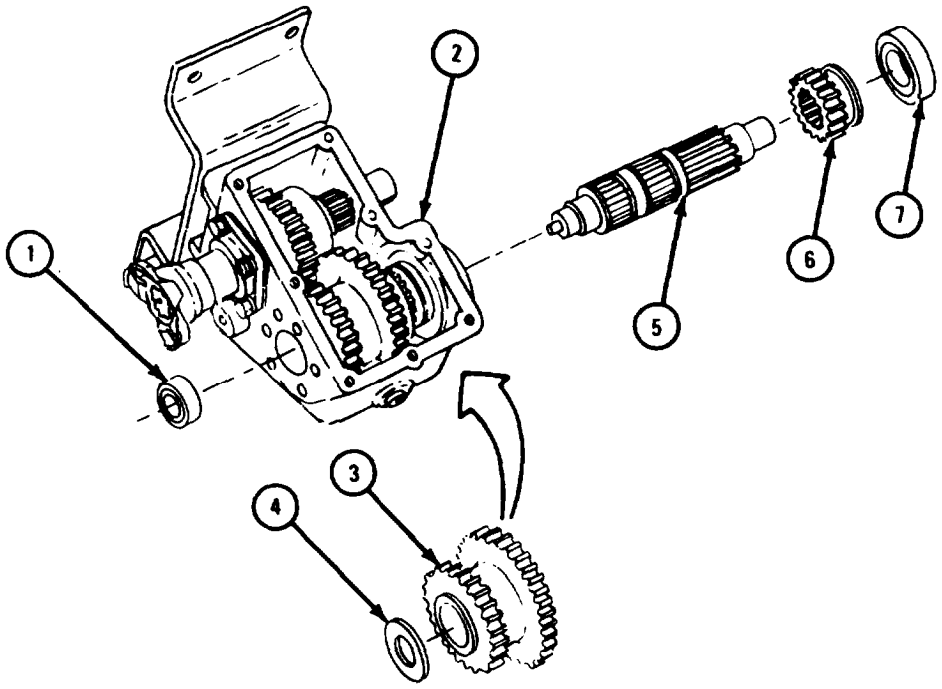


TA 085950

FRAME 6

1. Put bearing (1) into pump drive shaft bore of housing (2). Refer to Part 1, para 7-7.
2. Hold pump drive gear (3) and thrust washer (4) in place in housing (2). Push pump drive shaft assembly (5) through bores of pump drive gear, thrust washer, and bearing (1).
3. Slide clutch (6) onto splines of pump drive shaft assembly (5).
4. Put bearing (7) in place. Refer to Part 1, para 7-7.

GO TO FRAME 7

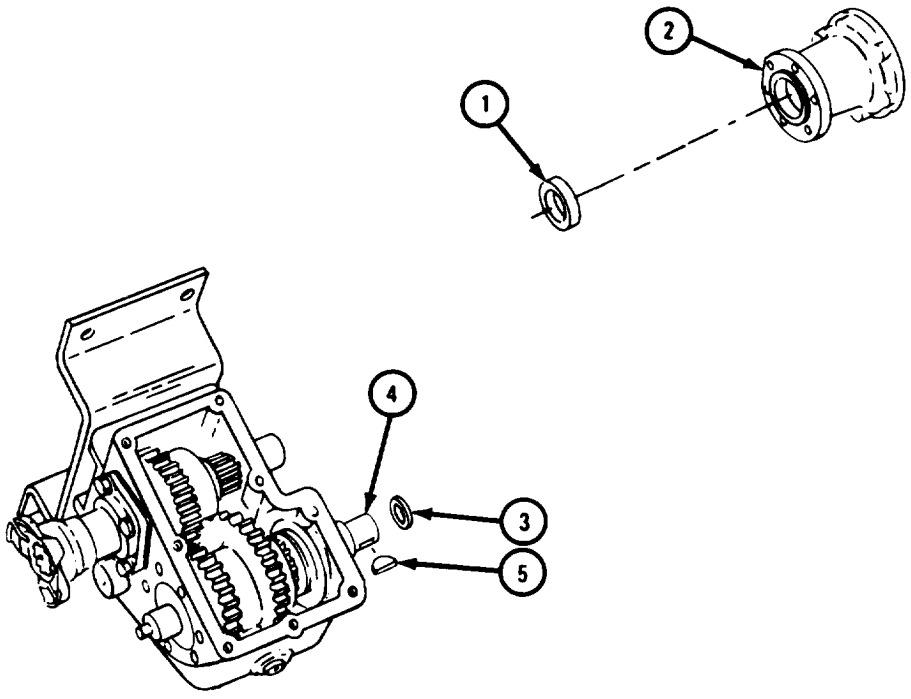


TA 085951

FRAME 7

1. Put seal (1) into adapter (2).
2. Slide seal (3) onto pump drive shaft (4).
3. Put in key (5).

GO TO FRAME 8

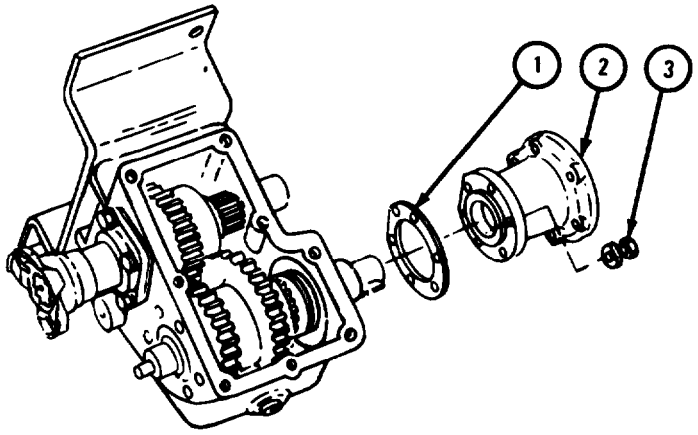


TA 085952

FRAME 8

1. Put gasket (1) in place on pump adapter (2).
2. Put in six screws and lockwashers (3).

GO TO FRAME 9

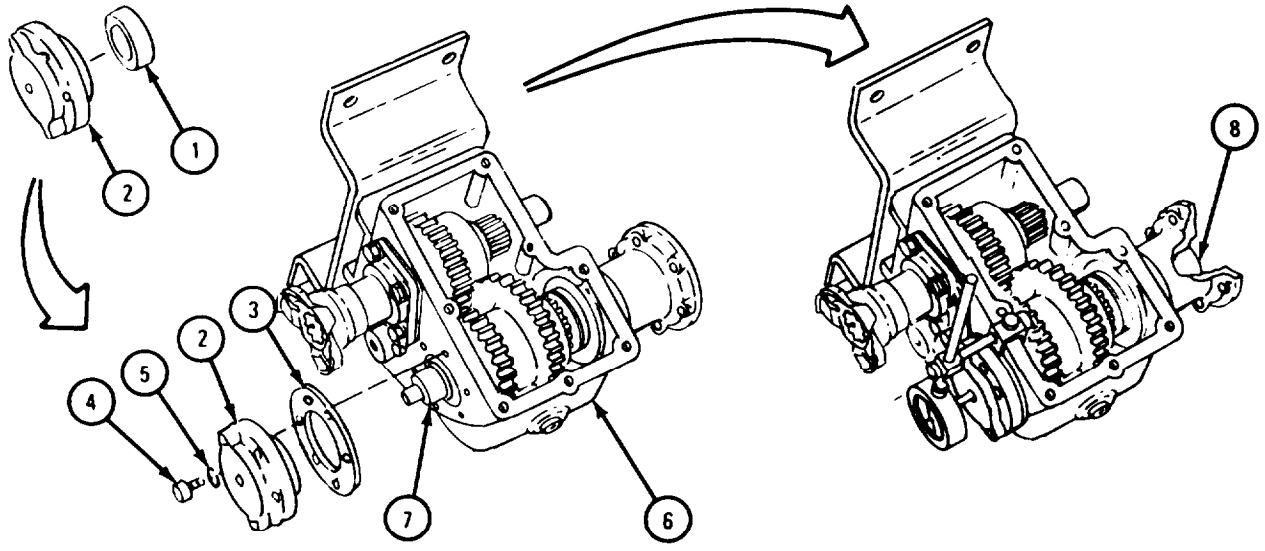


TA 085953

FRAME 9

1. Press seal (1) into adapter (2).
2. Put gasket (3) and seal (1) with adapter (2) in place.
3. Put in four screws (4) and lockwashers (5).
4. Fasten dial gage to housing (6) so that plunger of dial gage goes through bore in adapter (2) and rests against pin in end of pump drive shaft (7) as shown.
5. Push in and pull out on coupling (8) to check that end play of pump drive shaft (7) is between 010 inch and 0.033 inch.
6. Take off dial gage.
7. If end play is not within limits given in step 5, do steps 8 through 11. If end play is within limits given in step 5, go to frame 10.
8. Take out four screws (4) and lockwashers (5).
9. Take off adapter (2) with seal (1).
10. Put on another gasket (3). Put adapter (2) with seal (1) back in place.
11. Do steps 3 through 10 again until end play is within given limits.

GO TO FRAME 10

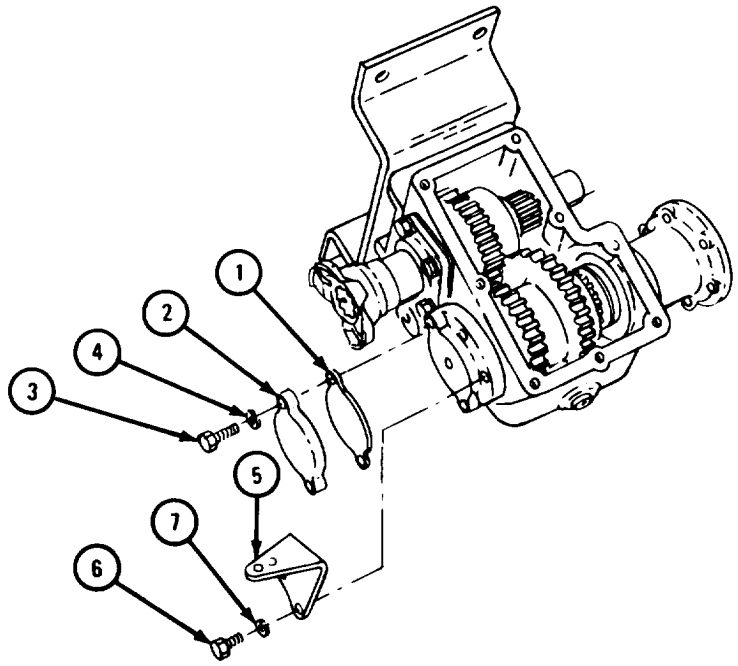


TA 085954

FRAME 10

1. Put gasket (1) and cover plate (2) in place.
2. Put in two screws (3) and lockwashers (4).
3. Put bracket (5) in place.
4. Put in two screws (6) and lockwashers (7).

GO TO FRAME 11

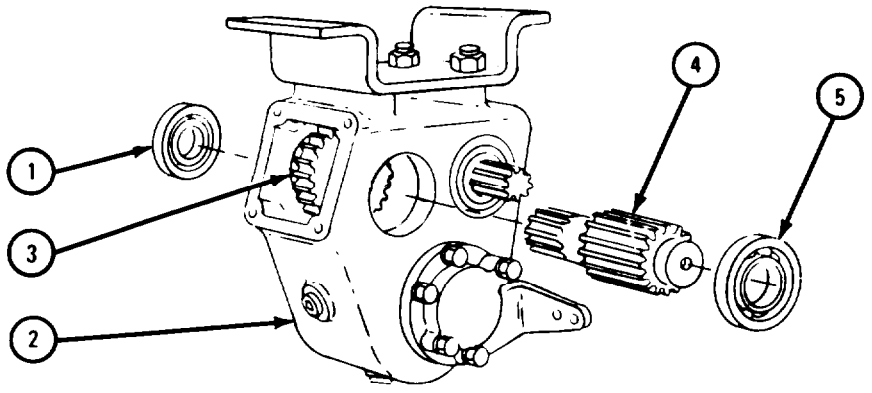


TA 085955

FRAME 11

1. Put bearing (1) into output shaft bore of housing (2). Refer to Part 1, para 7-7.
2. Hold output gear (3) in place. Push output shaft (4), splined end first as shown, through bores of output gear and bearing (1).
3. Put bearing (5) in place. Refer to Part 1, para 7-7.

GO TO FRAME 12

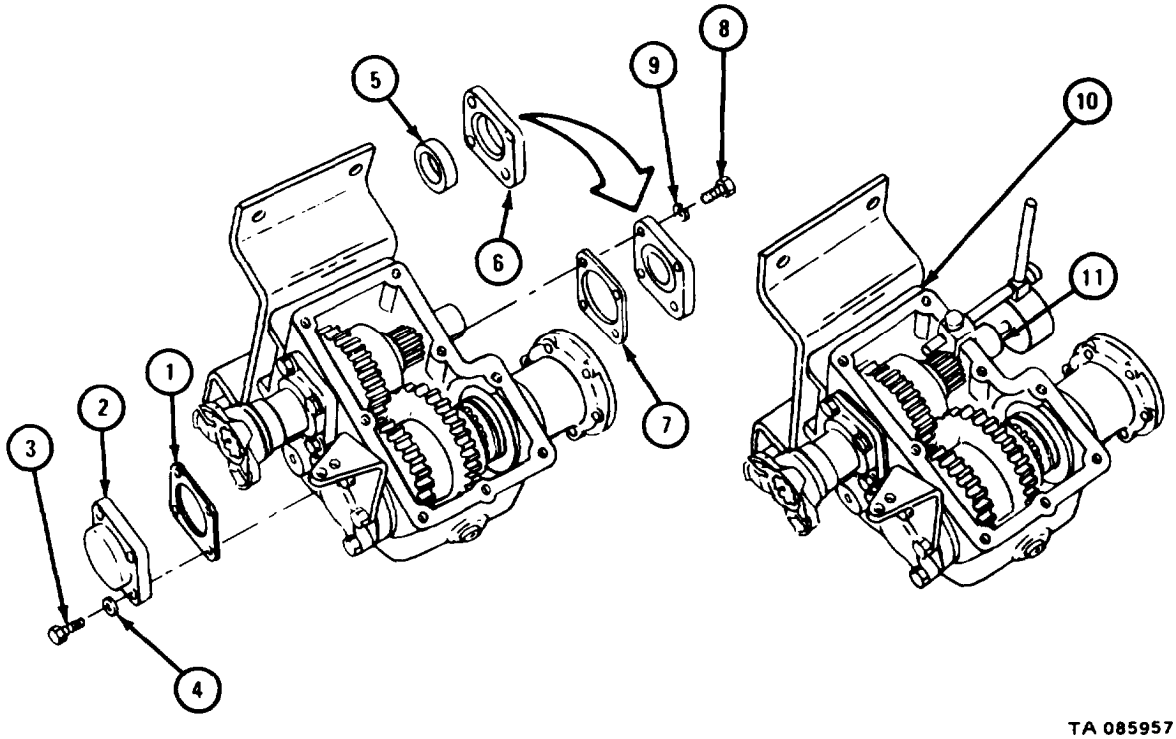


TA 085956

FRAME 12

1. Put gasket (1) and cover (2) in place.
2. Put in four screws (3) and lockswashers (4).
3. Press seal (5) into cap (6).
4. Put gasket (7) and cap (6) with seal (5) in place.
5. Put in four screws (8) and lockwashers (9).
6. Fasten dial indicator to housing (10) so that plunger of dial gage is against end of output shaft (11) as shown.
7. Push in and pull out output shaft (11) to check that end play is between 0.010 inch and 0.033 inch.
8. Take off dial indicator.
9. If end play is not within limits given in step 7, do steps 10 through 13. If end play is within given limits, go to frame 13.
10. Take out four screws (8) and lockwashers (9).
11. Take off cap (6) with seal (5).
12. Put on another gasket (7). Put cap (6) with seal (5) back in place.
13. Do steps 5 through 12 again until end play is within given limits.

Go TO FRAME 13

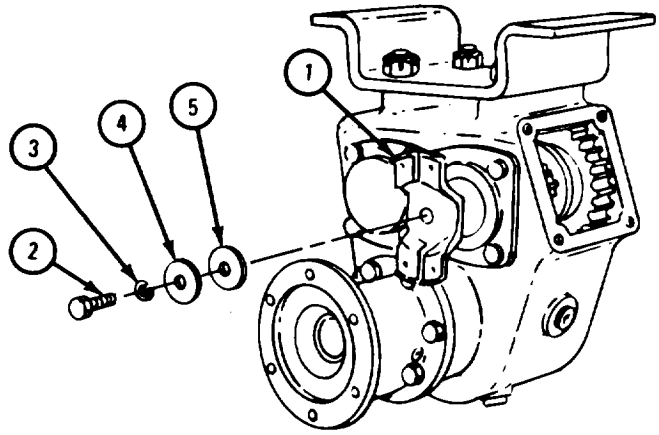


TA 085957

FRAME 13

1. Push on yoke (1).
2. Hold yoke (1) and put in screw (2), lockwasher (3), flat washer (4), and gasket (5).

GO TO FRAME 14



TA 085917

NOTE

This frame tells how to check backlash for all gears. Do this frame when measuring backlash for each set of gears in frame 5.

FRAME 14

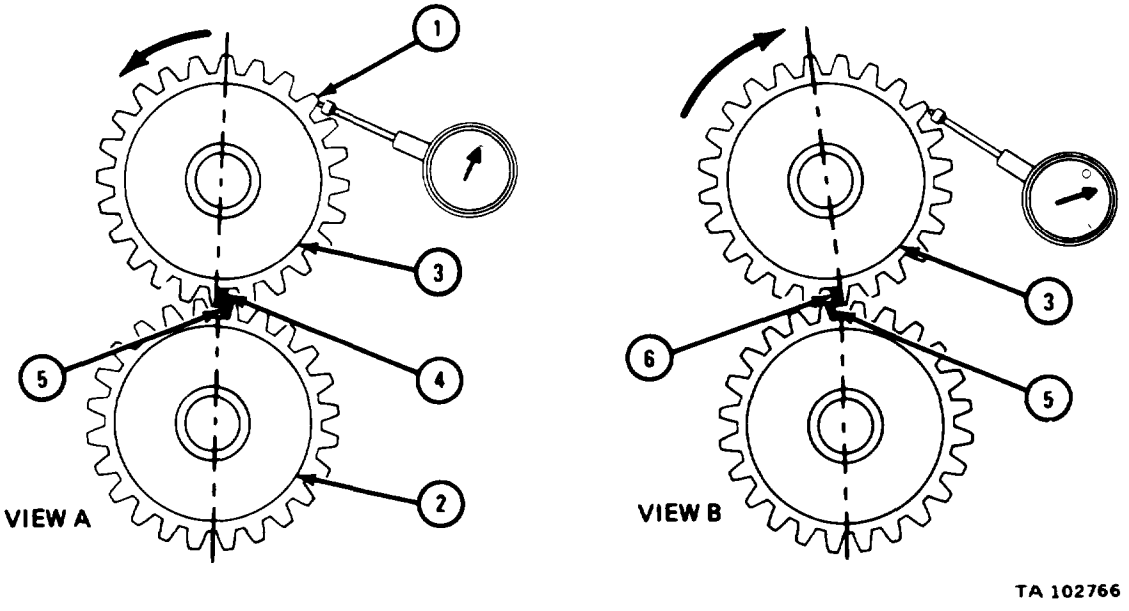
1. Mount dial indicator on housing and set stem against side of gear tooth (1) as shown.

NOTE

When measuring backlash make sure that gear (2) does not turn. If gear turns, backlash readings will be wrong.

2. Turn gear (3) away from dial indicator until gear tooth (4) touches gear tooth (5) as shown in view A.
3. Set dial indicator to read 0.
4. Turn gear (3) towards dial indicator until gear tooth (6) touches other side of gear tooth (5) as shown in view B.
5. Check that dial indicator readings are within wear limits given for each set of gears.
6. Do steps 1 through 5 when measuring backlash for each set of gears.

GO TO FRAME 15



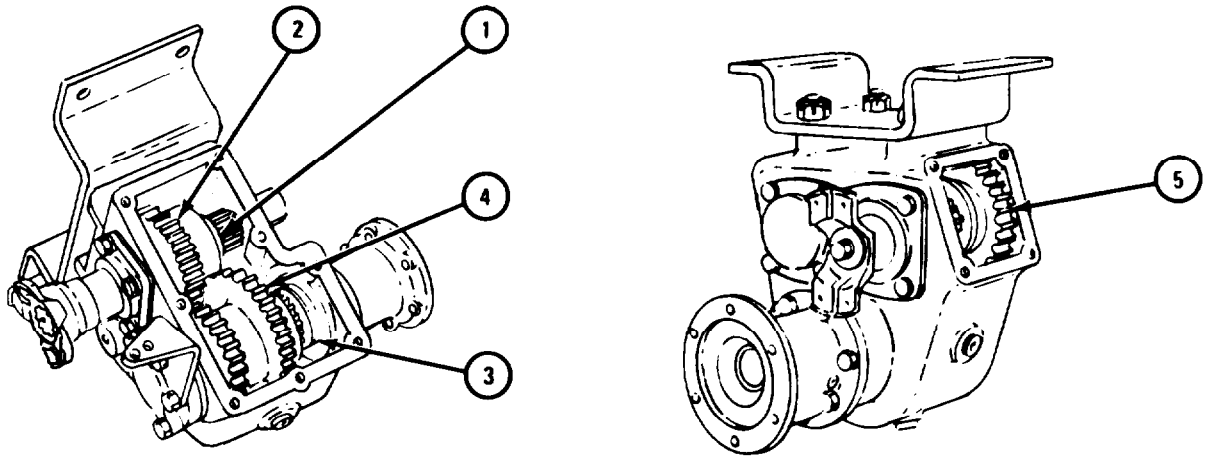
FRAME 15

NOTE

If backlash is greater than limits given for any of the following checks, get a new power divider. Send damaged power divider to depot level maintenance.

1. Mesh clutch (1) with input drive gear (2).
2. Using dial indicator, check that backlash between clutch (1) and input drive gear (2) is between 0.006 inch and 0.035 inch.
3. Mesh clutch (3) with pump drive gear (4).
4. Using dial indicator, check that backlash between clutch (3) and pump drive gear (4) is between 0.006 inch and 0.035 inch.
5. Using dial indicator, check that backlash between input drive gear (2) and pump drive gear (4) is between 0.006 inch and 0.035 inch.
6. Mesh pump drive gear (4) with output gear (5).
7. Using dial indicator, check that backlash between pump drive gear (4) and output gear (5) is between 0.006 inch and 0.035 inch.
8. Mesh input drive gear (2) and output gear (5).
9. Using dial indicator, check that backlash between input drive gear (2) and output gear (5) is between 0.006 inch and 0.035 inch.

GO TO FRAME 16

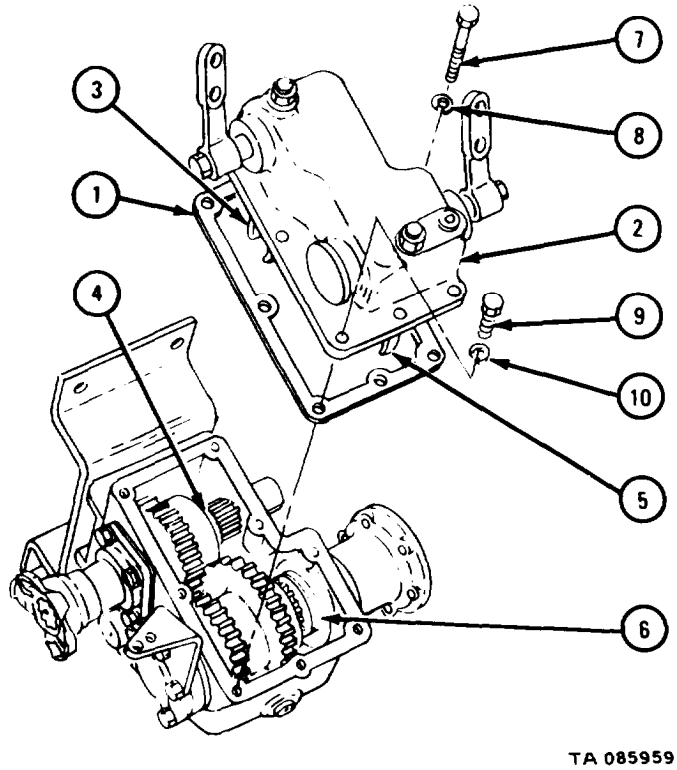


TA 085958

FRAME 16

1. Put gasket (1) and input shaft and pump shaft shifter cover assembly (2) in place. Make sure that fork (3) alines with yoke of clutch (4) and that fork (5) alines with yoke of clutch (6).
2. Put in two screws (7), lockwashers (8), six screws (9), and lockwashers (10).

GO TO FRAME 17

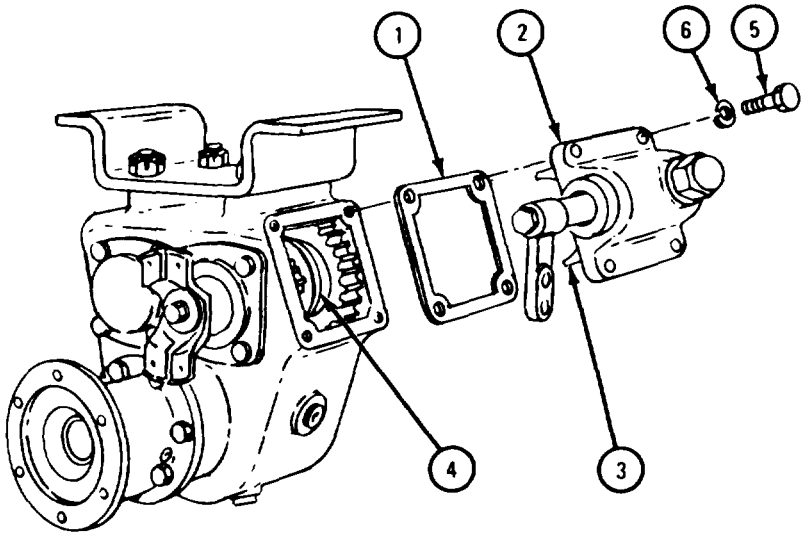


TA 085959

FRAME 17

1. Put gasket (1) and output shaft shifter cover assembly (2) in place. Make sure that fork (3) alines with yoke of gear (4).
2. Put in four screws (5) and lockwashers (6).

END OF TASK



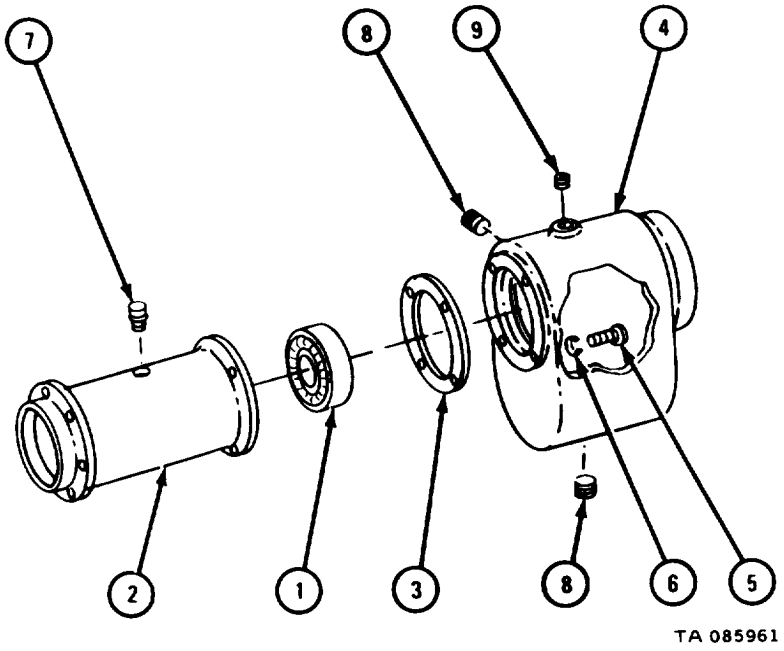
TA 085960

(4) Assembly of crane drive assembly.

FRAME 1

1. Put bearing (1) in housing (2).
2. Put crane drive housing (2) and gasket (3) in place on output housing (4).
3. Put in four screws (5) and lockwashers (6).
4. Put in breather (7).
5. Put in two plugs (8).
6. Put in plug (9).

GO TO FRAME 2

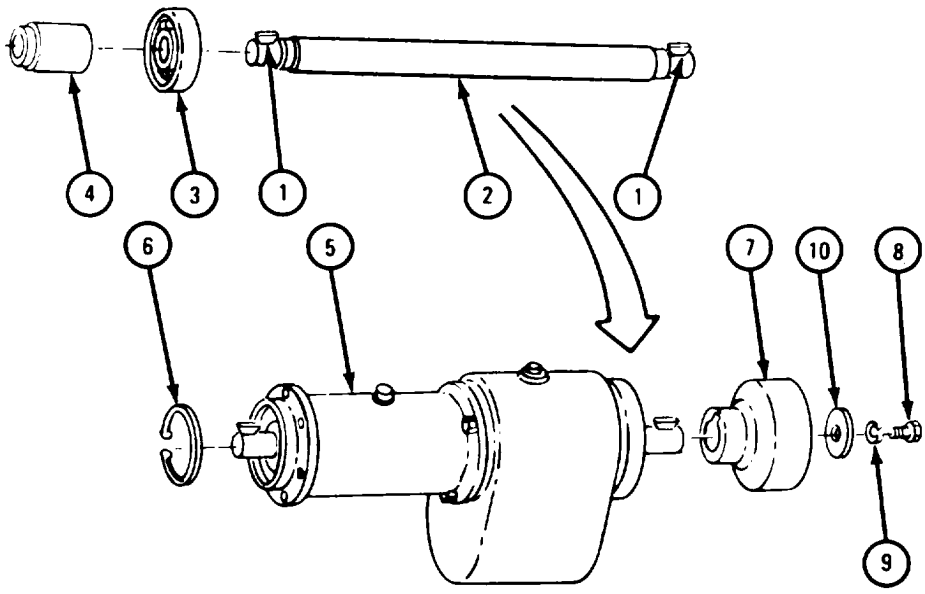


TA 085961

FRAME 2

1. Press two keys (1) in shaft (2).
2. Press bearing (3) on shaft (2).
3. Press coupling (4) on shaft (2) to position marked.
4. Put bearing (3) and shaft assembly (2) in housing (5).
5. Put snapring (6) in housing (5).
6. Put on yoke (7) and put in screw (8), lockwasher (9), and flat washer (10).

GO TO FRAME 3

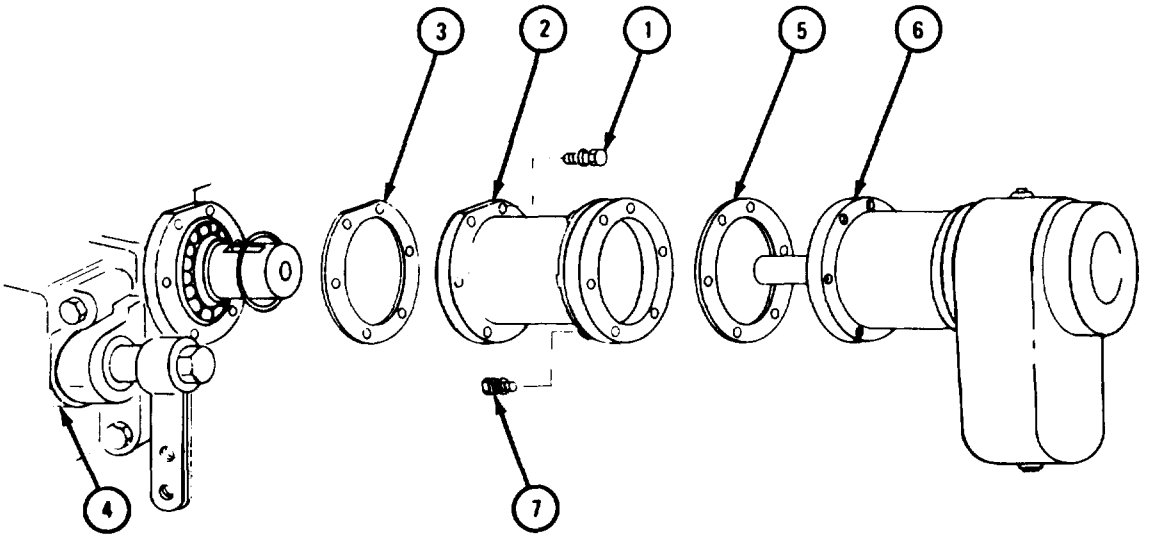


TA 085962

FRAME 3

1. Take out six screws and lockwashers (1) and take pump drive adapter (2) and gasket (3) off power divider (4).
2. Put adapter (2) and gasket (5) on crane drive assembly (6) and put in six screws and lockwashers (7).

GO TO FRAME 4

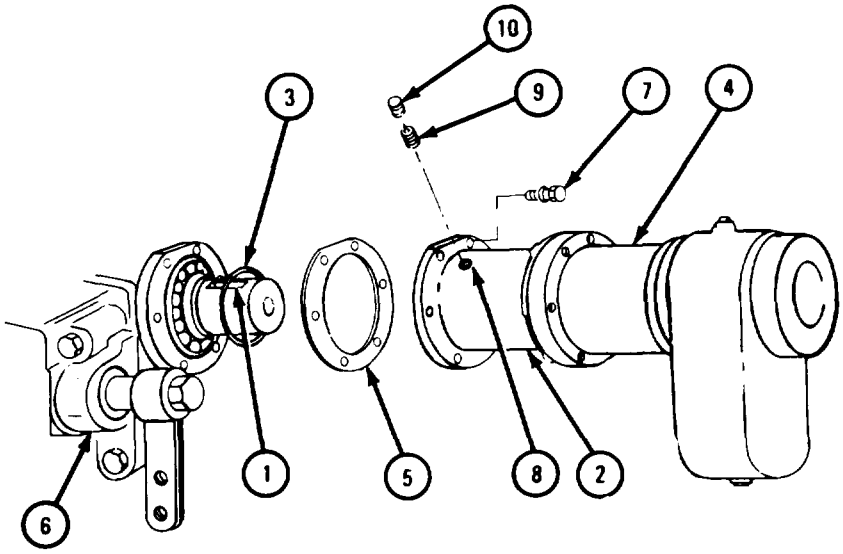


TA 085963

FRAME 4

1. Aline key (1) with keyway in coupling (2) and put on seal (3).
2. Put crane drive assembly (4) and gasket (5) on power divider (6) and put in six screws and lockwashers (7).
3. Through hole in adapter (8), put setscrew (9) in coupling and put plug (10) in adapter.

END OF TASK



TA 085964

h. Replacement.

FRAME 1

Soldier A 1. Lower hoist cable (1) through opening in bottom of tool compartment (2).

Soldier B 2. Slide power divider and crane drive assembly (3) into position below truck. Join hook on hoist cable (1) to power divider lift ring (4). Guide power divider and crane drive assembly as soldier A raises it.

Soldier A 3, Using hoist, raise power divider and crane drive assembly (3) into place.

Soldier B 4. Hold two nuts (5).

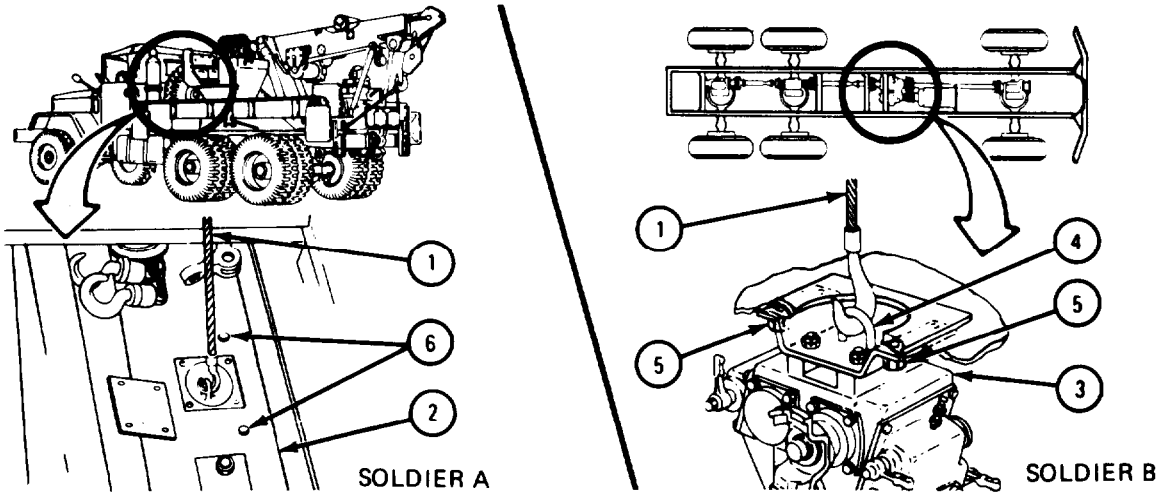
Soldier A 5. Put in, but do not tighten, two front mounting screws (6).

NOTE

Follow-on Maintenance Action Required:

1. Replace power divider-to-hydraulic hoist pump propeller shaft. Refer to TM 9-2320-211-20,
2. Replace input propeller and winch propeller shafts. Refer to TM 9-2320-211-20.
3. Replace pump propeller shaft-to-power divider dust boot. Refer to TM 9-2320-211-20.
4. Replace transfer-to-power divider propeller shaft, Refer to TM 9-2320-211-20.
5. Replace power divider-to-winch propeller shaft. Refer to TM 9-2320-211-20.
6. Replace power divider linkage. Refer to para 17-53.
7. Replace control valve assembly. Refer to para 17-51,
8. Fill power divider assembly as given in LO 9-2320-211-12.
9. Check power divider assembly for proper operation. Refer to TM 9-2320-211-10.

END OF TASK



17-55. POWER DIVIDER GOVERNOR VALVE REMOVAL, REPLACEMENT, AND ADJUSTMENT (TRUCK M543A2).

TOOLS: No special tools required

SUPPLIES: None

PERSONNEL: Two

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

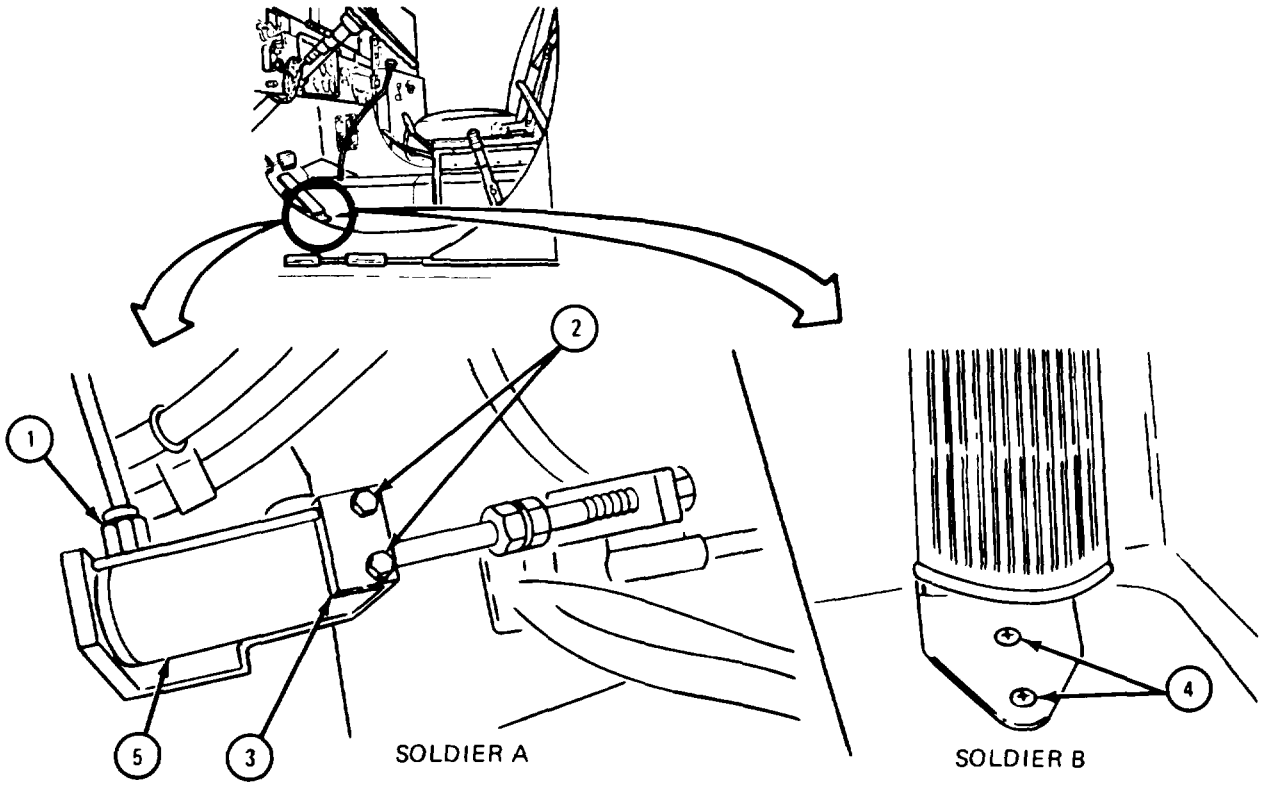
a. Preliminary procedure. Open drain cock on lower air reservoir. Refer to Venting Air System Pressure, TM 9-2320-211-20.

b. Removal.

FRAME 1

SoIdier A	1.	Working under truck, take off air line (1).
	2.	Hold nuts (2) on governor mounting bracket (3).
Soldier B	3.	Working inside cab, take out two screws (4).
Soldier A	4.	Take out governor (5).

END OF TASK

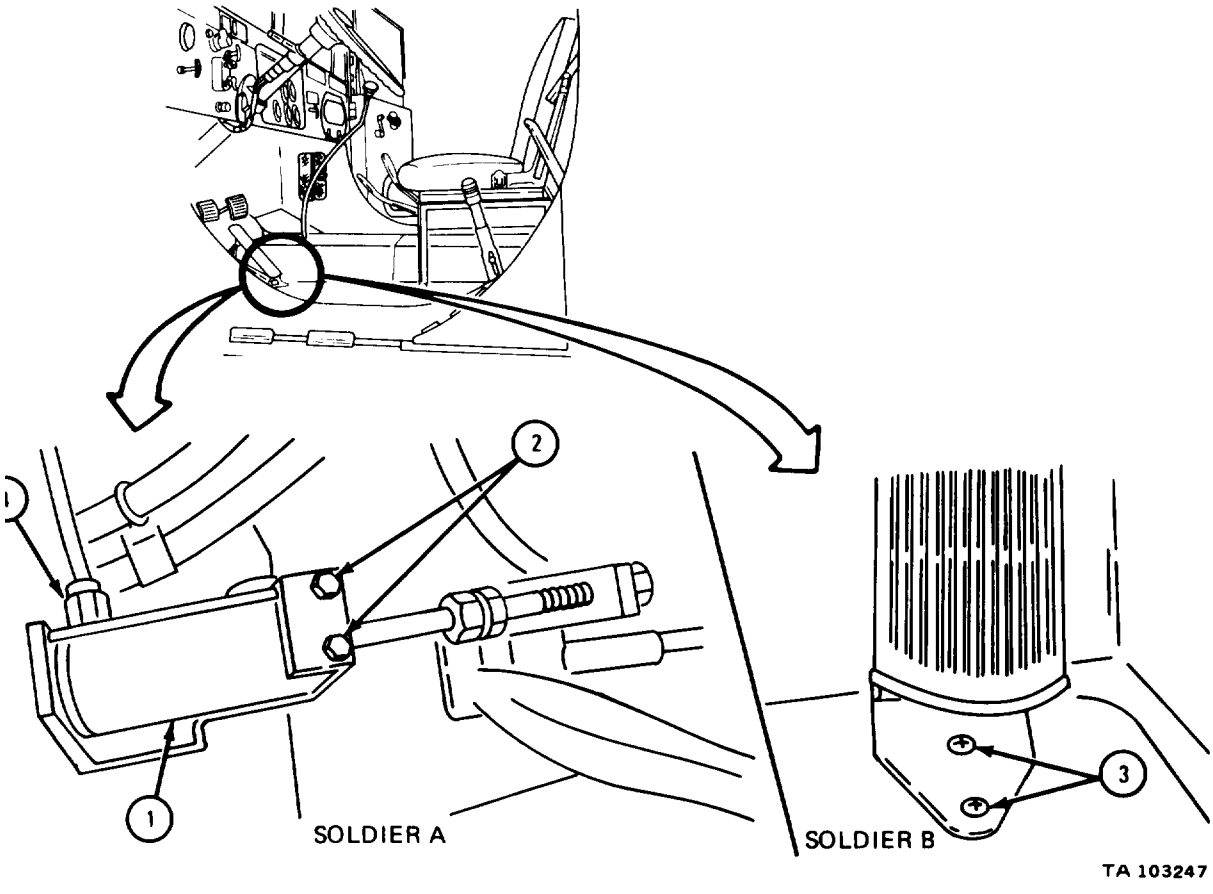


c. Replacement.

FRAME 1

Soldier A	1.	Working under truck, put governor (1) in place.
	2.	Hold two nuts (2) in place.
Soldier B	3.	Inside cab, put in two screws (3).
Soldier A	4.	Put on air line (4).

END OF TASK



d. Adjustment.

FRAME 1

Soldier A
1. Start engine. Refer to TM 9-2320-211-10.
2. Set boom controls. Refer to TM 9-2320-211-10.
3. Observe engine rpm for reading of 1600 to 1700 rpm. If rpm is right, end of task. If wrong, go to step 4.

Soldier B
4. Working under truck, loosen locknut (1). Adjust stud (2) until soldier A sees correct rpm. Tighten locknut (1) .

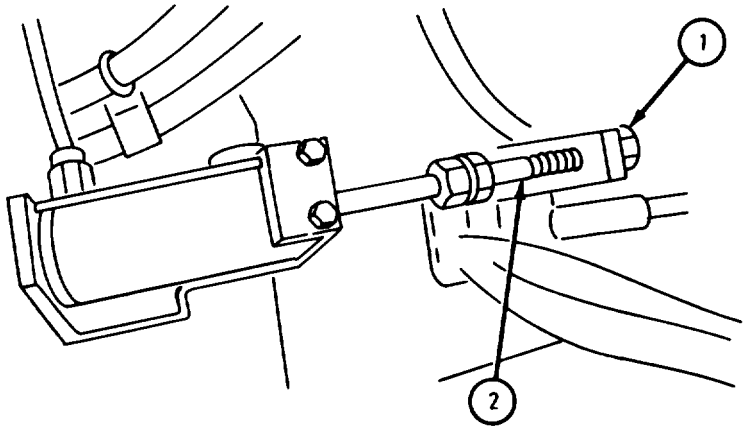
Soldier A
5. Shut off engine. Let off boom controls.

NOTE

Follow-on Maintenance Action Required:

Close drain cock on lower air reservoir. Refer to Venting Air System Pressure, TM 9-2320-211-20.

END OF TASK



TA 103248

Section III. POWER TAKEOFF AND SWIVEL VALVE ASSEMBLIES

17-56. TRANSMISSION TRANSFER POWER TAKEOFF REMOVAL, REPAIR , AND REPLACEMENT (TRUCK M543A2).

TOOLS: No special tools required

SUPPLIES: Retaining cap gasket
Valve assembly gasket
Check valve screw gasket
Power takeoff gasket

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Remove propeller shaft and yoke from power takeoff shaft. Refer to TM 9-2320-211-20.

(2) Remove handbrake brake drum. Refer to TM 9-2320-211-20.

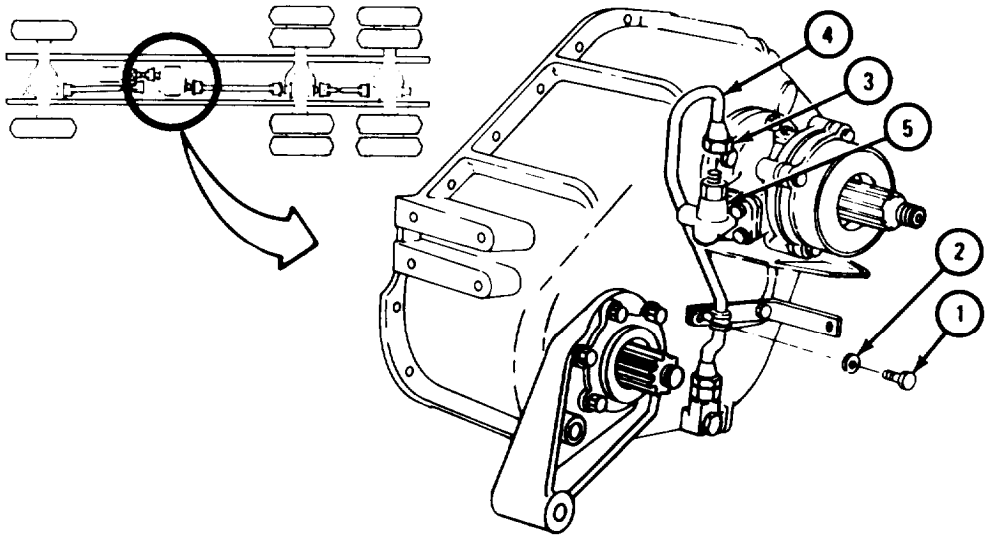
(3) Drain transfer housing. Refer to LO 9-2320-211-12.

b. Removal.

FRAME 1

1. Take out screw (1) and flatwasher (2).
2. Loosen coupling nut (3) and take off driveshaft lube tube (4) from relief valve housing (5).

GO TO FRAME 2

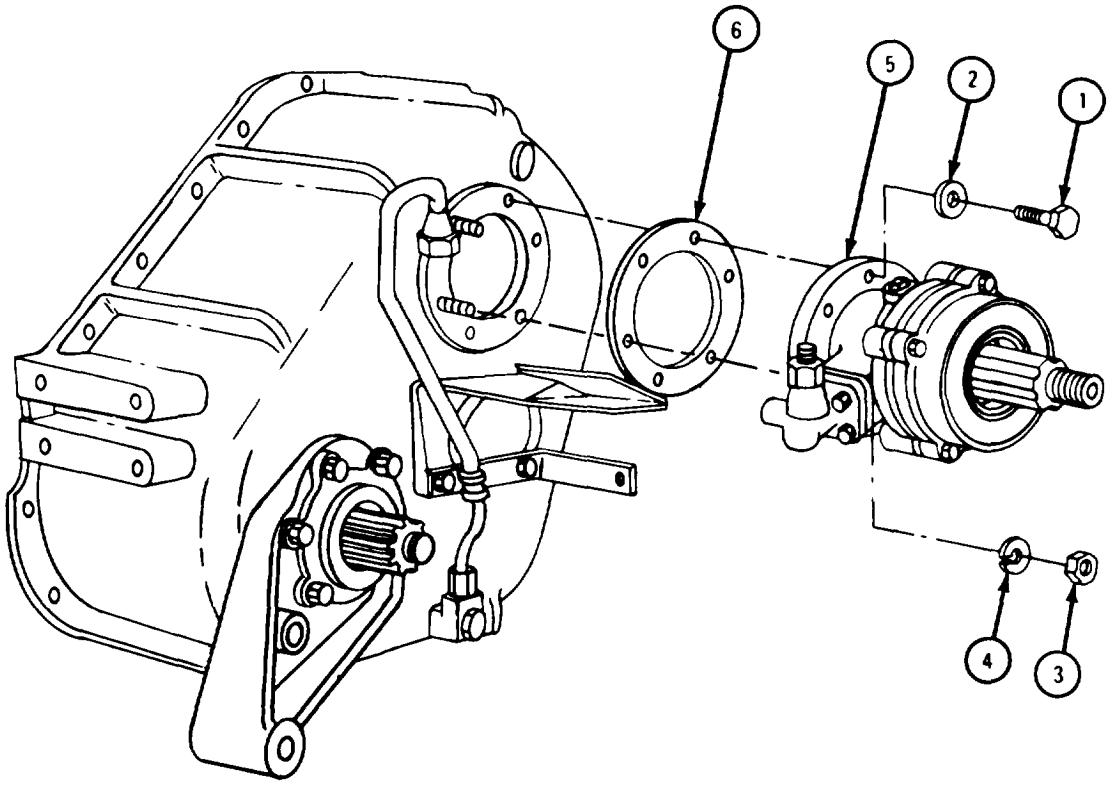


TA 102571

FRAME 2

1. Takeout four capscrews (1) and flat washers (2).
2. Take off two nuts (3) and lockwashers (4).
3. Take off transfer transmission power takeoff(5) and gasket (6). Throw away gasket.

GO TO FRAME 3



TA 102572

FRAME 3

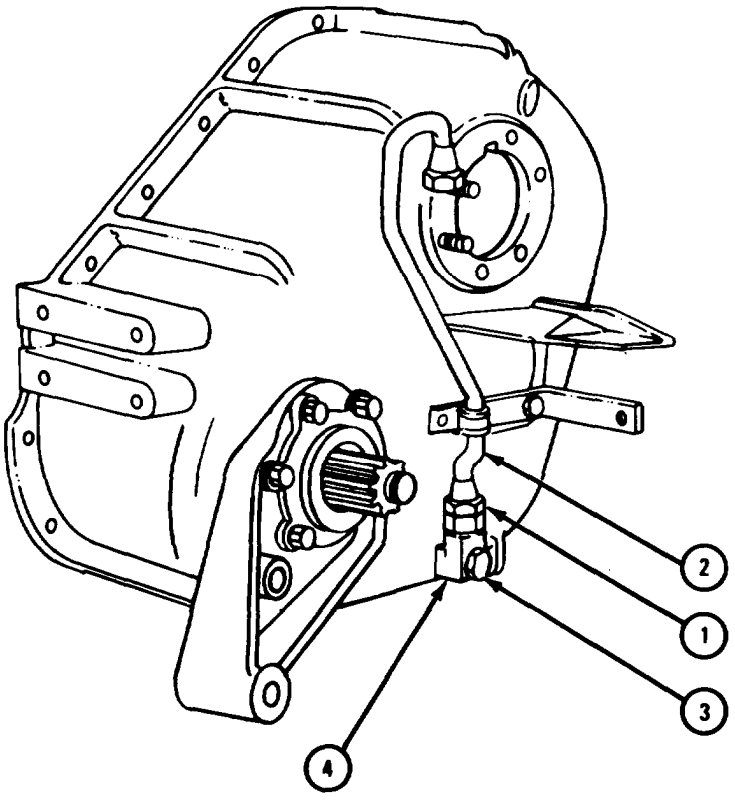
1. Loosen coupling nut (1) and take out driveshaft lubrication tube (2) and coupling nut (1).

NOTE

Do not take out cap screw (3) when taking out check valve assembly (4).

2. Unscrew check valve assembly (4).

END OF TASK



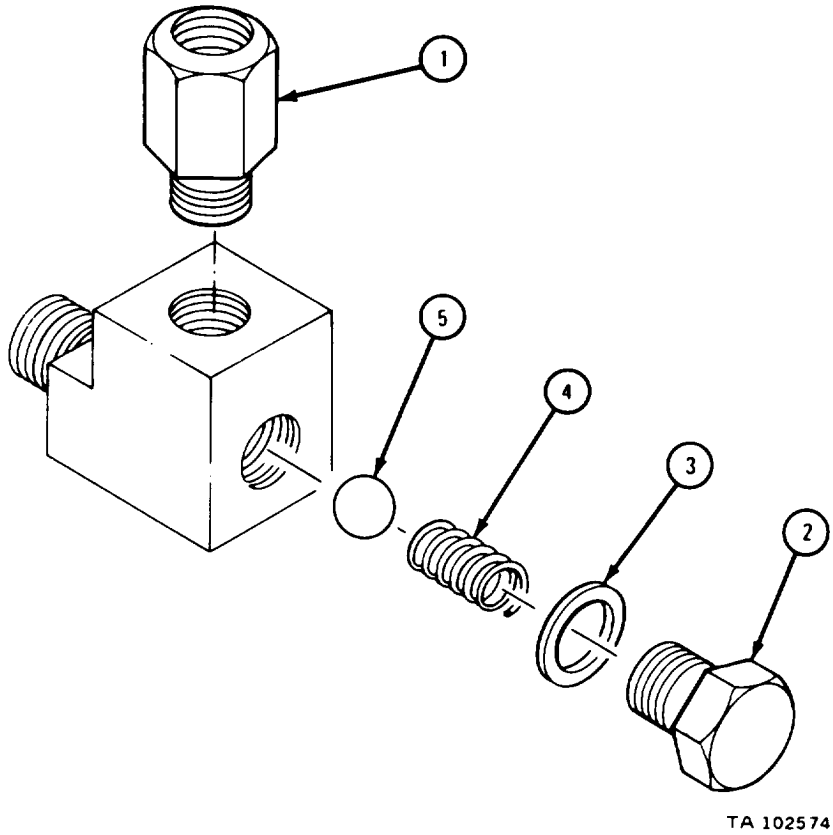
TA 102573

c. Disassembly.

FRAME 1

1. Take out connector (1).
2. Take out capscrew (2), gasket (3), check valve spring (4), and check valve ball (5).

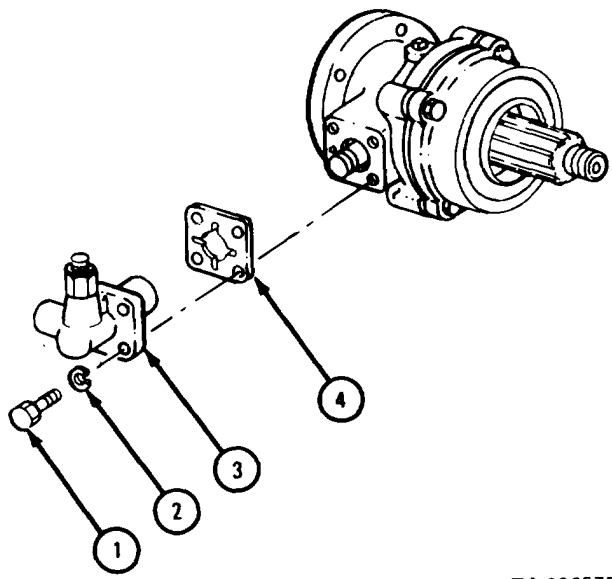
GO TO FRAME 2



FRAME 2

1. Take out four capscrews (1) and lockwashers (2) and slide out relief valve assembly (3) and gasket (4). Throw away gasket.

GO TO FRAME 3

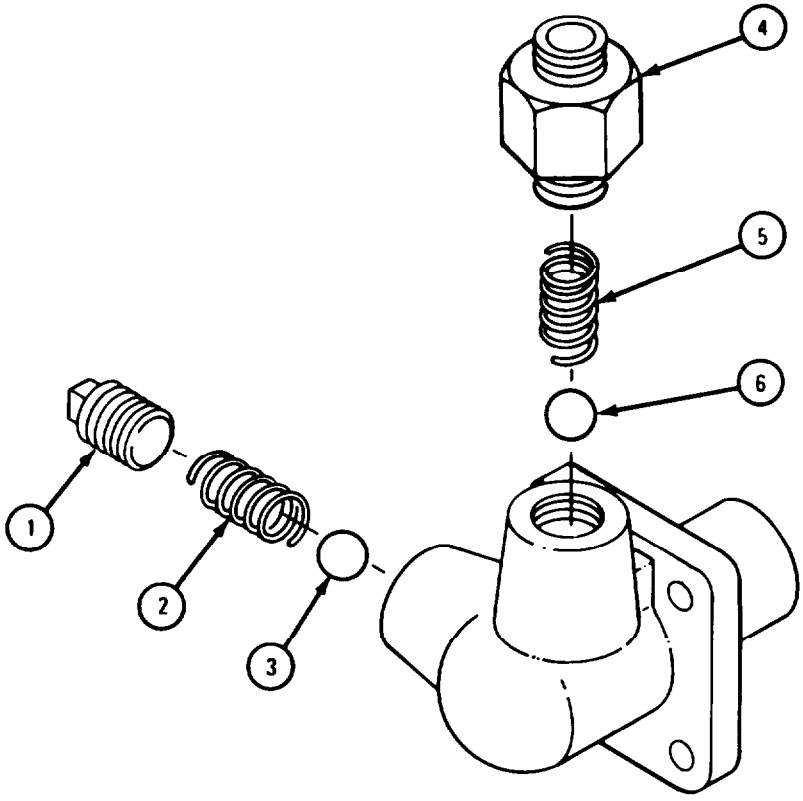


TA 102575

FRAME 3

1. Take out relief valve plug (1), relief valve ball spring (2), and relief valve ball (3).
2. Take out connector (4), relief valve ball spring (5), and relief valve ball (6).

GO TO FRAME 4

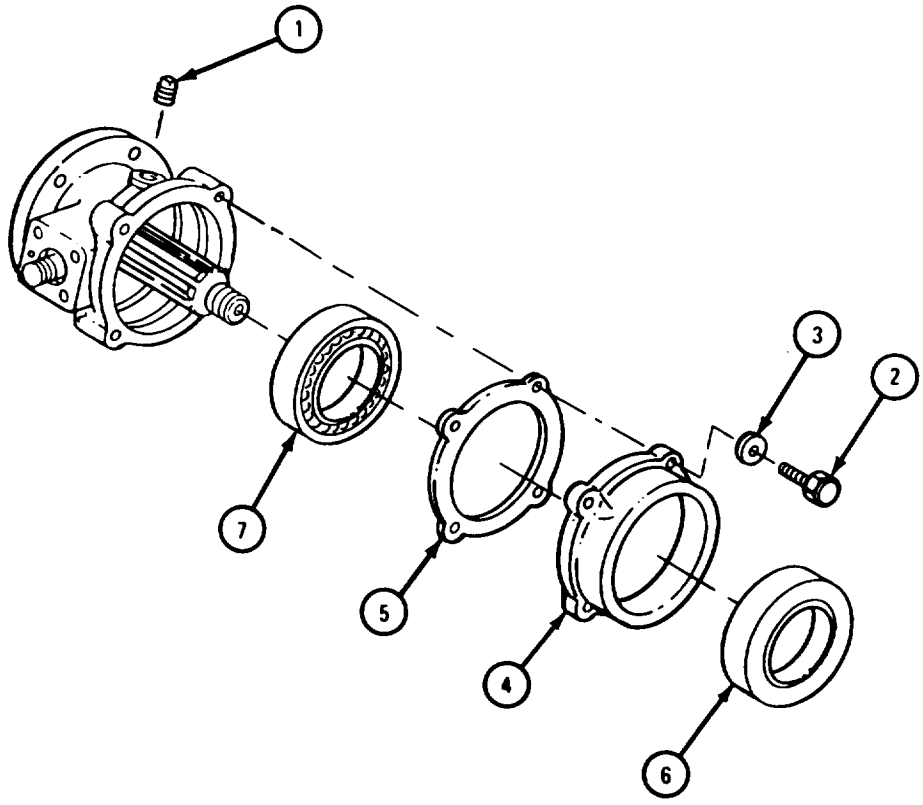


TA 102576

FRAME 4

1. Take out oil filter plug (1).
2. Takeout four capscrews (2) and flat washers (3).
3. Take off cap (4) and gasket (5). Throw away gasket.
4. Press seal assembly (6) out of cap (4).
5. Using arbor press, press out bearing (7). Refer to Part 1, para 7-7.

GO TO FRAME 5

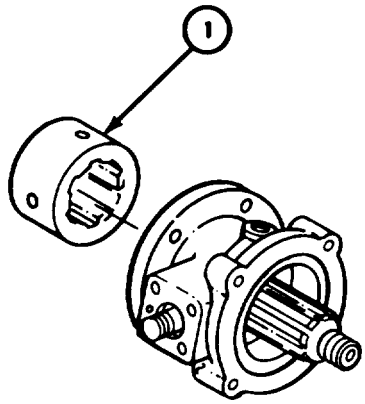


TA 102577

FRAME 5

1. Take out coupling (1).

GO TO FRAME 6

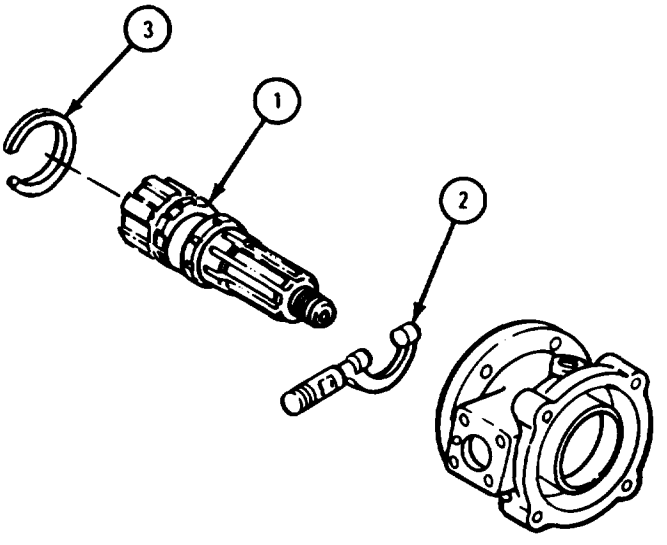


TA 102578

FRAME 6

1. Move driveshaft (1) out of lubricating oil pump plunger (2) and take out driveshaft.
2. Take out lubricating oil pump plunger (2).
3. Take off shaft coupling ring (3).

GO TO FRAME 7

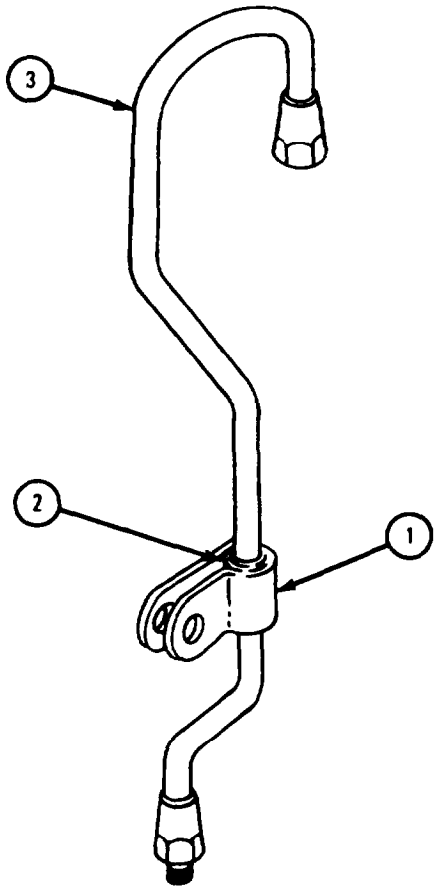


TA 102579

FRAME 7

1. Take off lubricating tube clamp (1).
2. Do not take out grommet (2) from lubricating tube (3).

END OF TASK



TA 102580

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

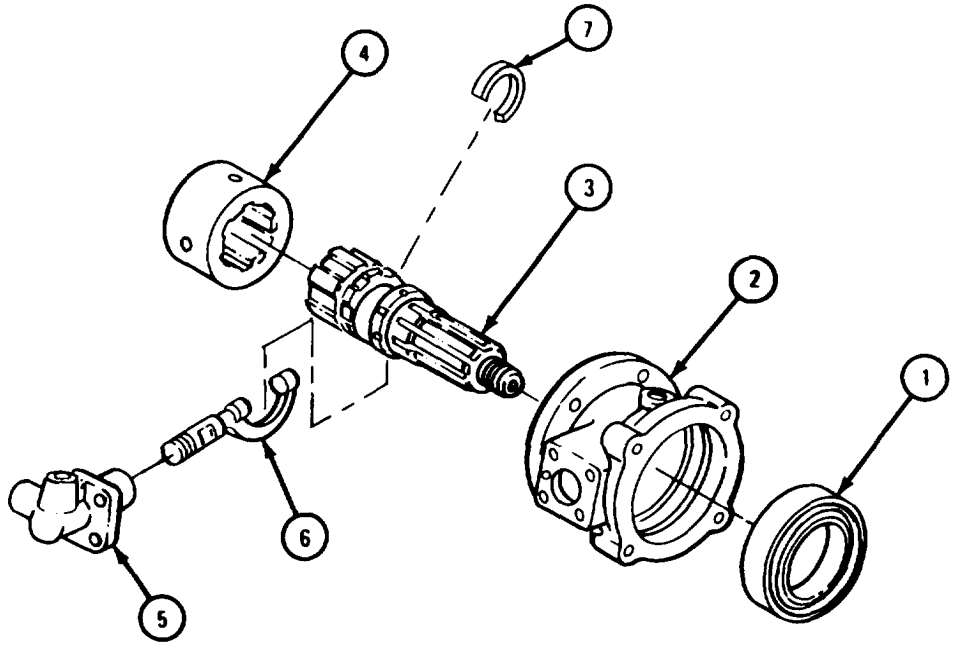
d. Cleaning. There are no special cleaning procedures needed. Refer to clearnng procedures given in Part 1, para 1-3.

e. Inspection.

FRAME 1

1. Check that bearing (1) is not scored, chipped or cracked.
2. Check that housing (2) in not chipped, cracked or warped.
3. Check that shaft (3) and coupling (4) are not chipped, twisted or damaged.
4. Check that relief valve body (5) and lubricating oil pump plunger (6) are not worn, chipped or cracked.
5. Check that retaining ring (7) in not scored or cracked.

END OF TASK



TA 102581

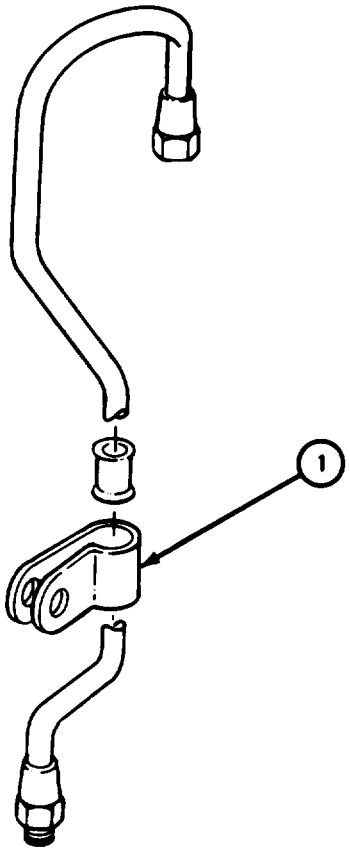
f. Repair. Using fine mill file, file off slight nicks and burrs. Get new parts place of all other damaged parts.

g. Assembly.

FRAME 1

1. Put on lubricating tube clamp (1).

GO TO FRAME 2



NOTE

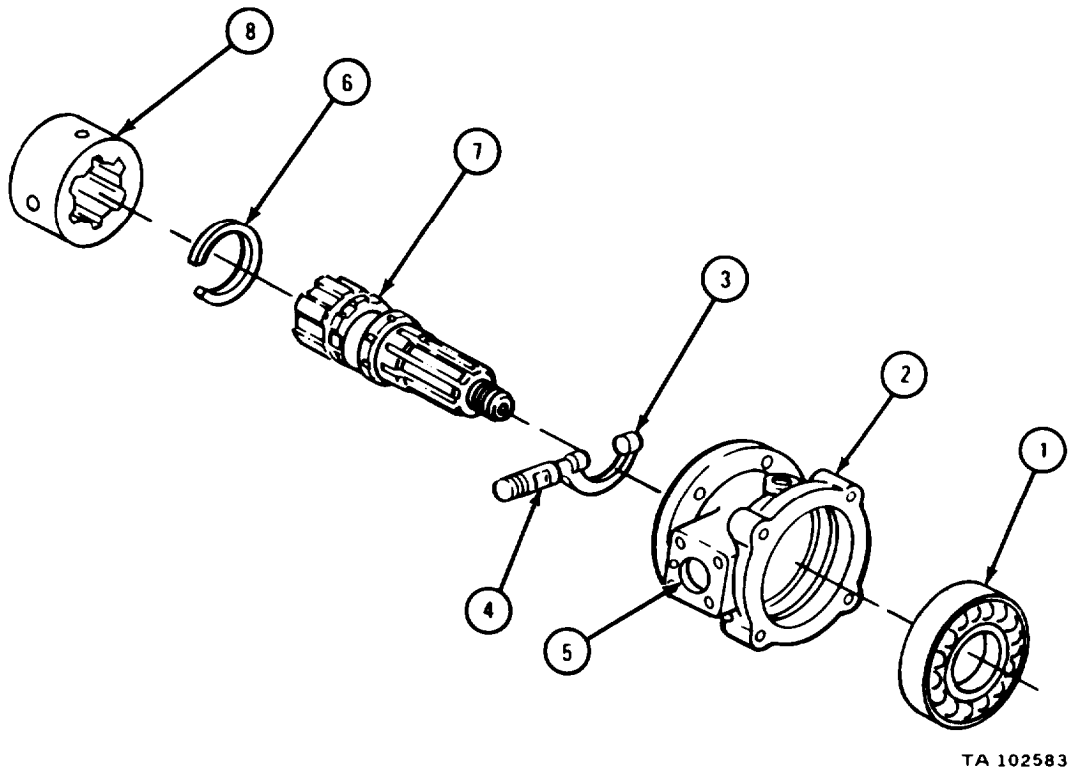
PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 102582

FRAME 2

1. Using arbor press, press bearing (1) into housing (2). Refer to Part 1, para 7-7.
2. Tilt lubricating oil pump plunger (3) and slide housing (2) over shaft and plunger so that plunger shaft (4) goes into housing bore (5).
3. Put retaining ring (6) on driveshaft (7).
4. Put lubricating oil pump plunger (3) on driveshaft (7).
5. Put coupling (8) on driveshaft (7).

GO TO FRAME 3

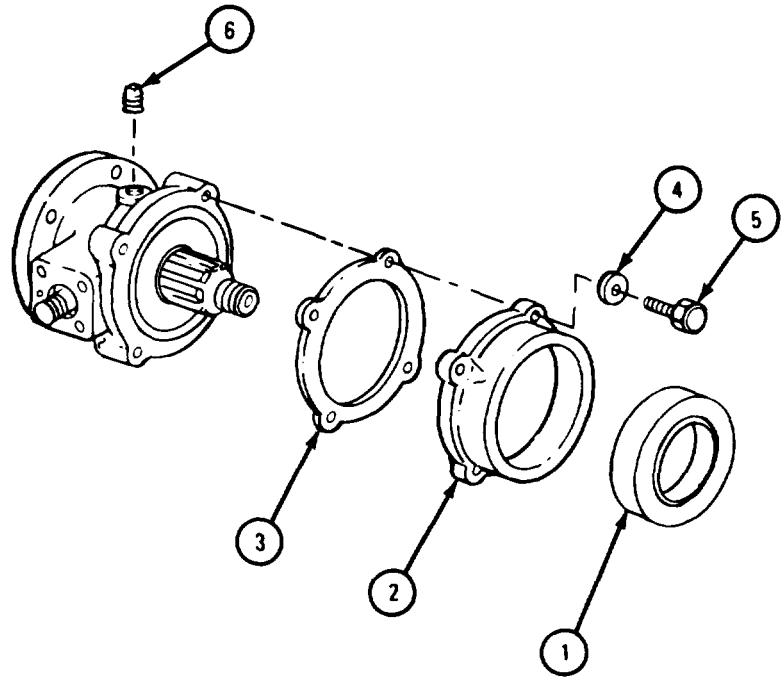


TA 102583

FRAME 3

1. Using arbor press, press seal assembly (1) into cap (2).
2. Put on gasket (3) and retaining cap (2).
3. Put in four flat washers (4) and capscrews (5) and tighten capscrews to 16 to 20 pound-feet.
4. Put in oil filter plug (6).

GO TO FRAME 4

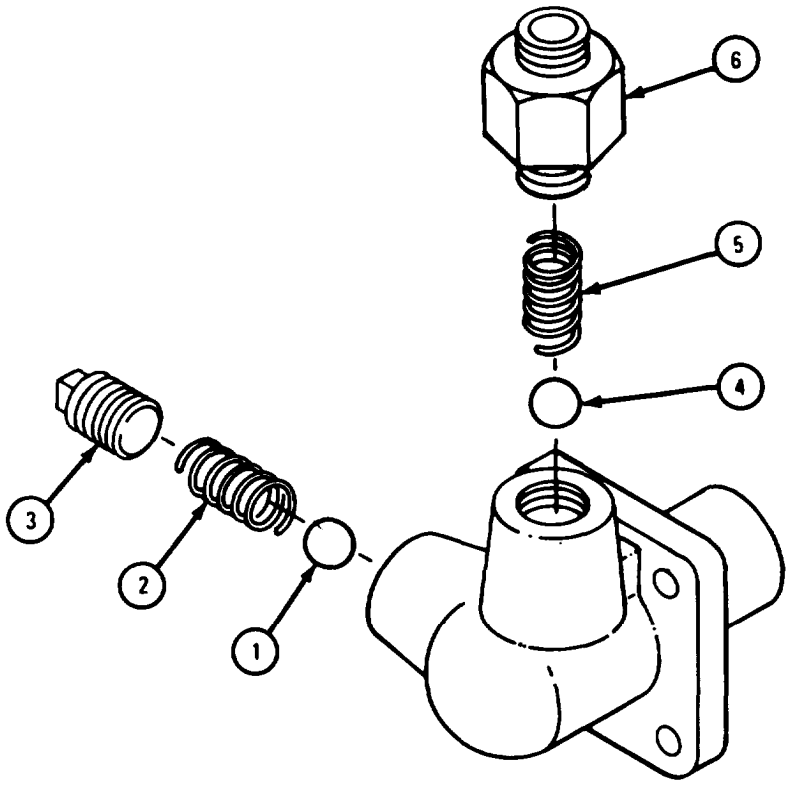


TA 102584

FRAME 4

1. Put in relief valve ball (1) and relief valve ball spring (2).
2. Put in relief valve plug (3).
3. Put in relief valve ball (4) and relief valve spring (5).
4. Put in connector (6).

GO TO FRAME 5

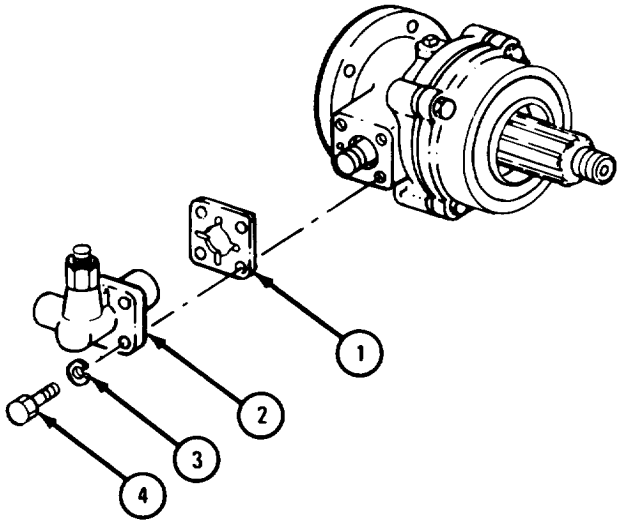


TA 102585

FRAME 5

1. Put gasket (1) and relief valve assembly (2) in place.
2. Put in four lockwashers (3) and capscrews (4) and tighten capscrews to 22 to 28 pound-feet.

GO TO FRAME 6

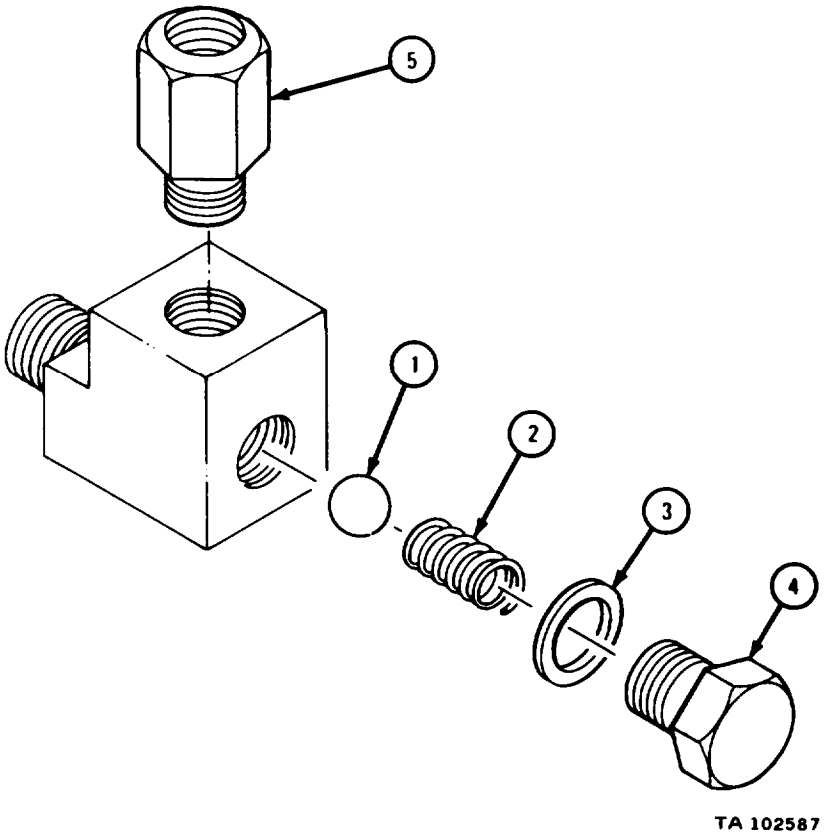


TA 102583

FRAME 6

1. Put in check valve ball (1) and check valve spring (2).
2. Put in gasket (3) and capscrew (4).
3. Put in connector (5).

END OF TASK

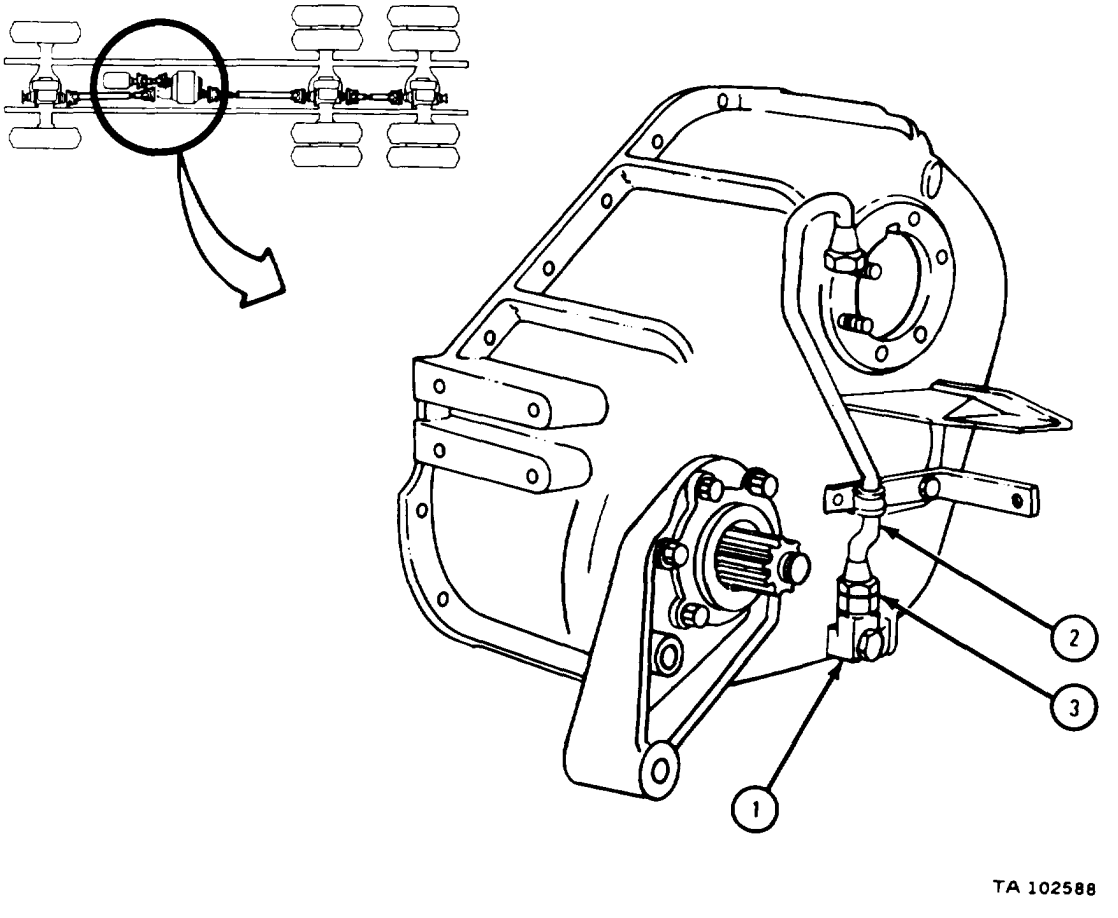


h. Replacement

FRAME 1

1. Put in check valve assembly (1).
2. Put driveshaft lubricating tube (2) in place.
3. Put on coupling nut (3).

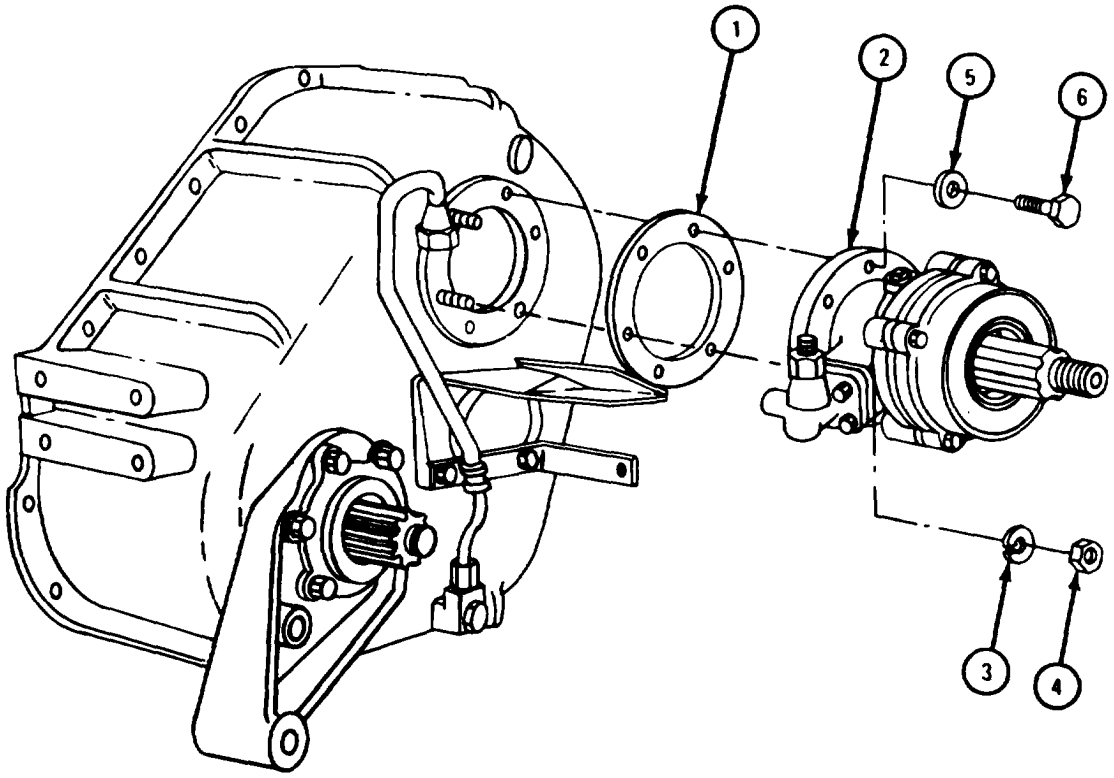
GO TO FRAME 2



FRAME 2

1. Put gasket (1) and power takeoff (2) in place.
2. Put on two lockwashers (3) and nuts (4) and tighten nuts to 53 to 67 pound-feet.
3. Put in four flat washers (5) and capscrews (6) and tighten nuts and capscrews to 53 to 67 pound-feet.

GO TO FRAME 3



TA 102589

FRAME 3

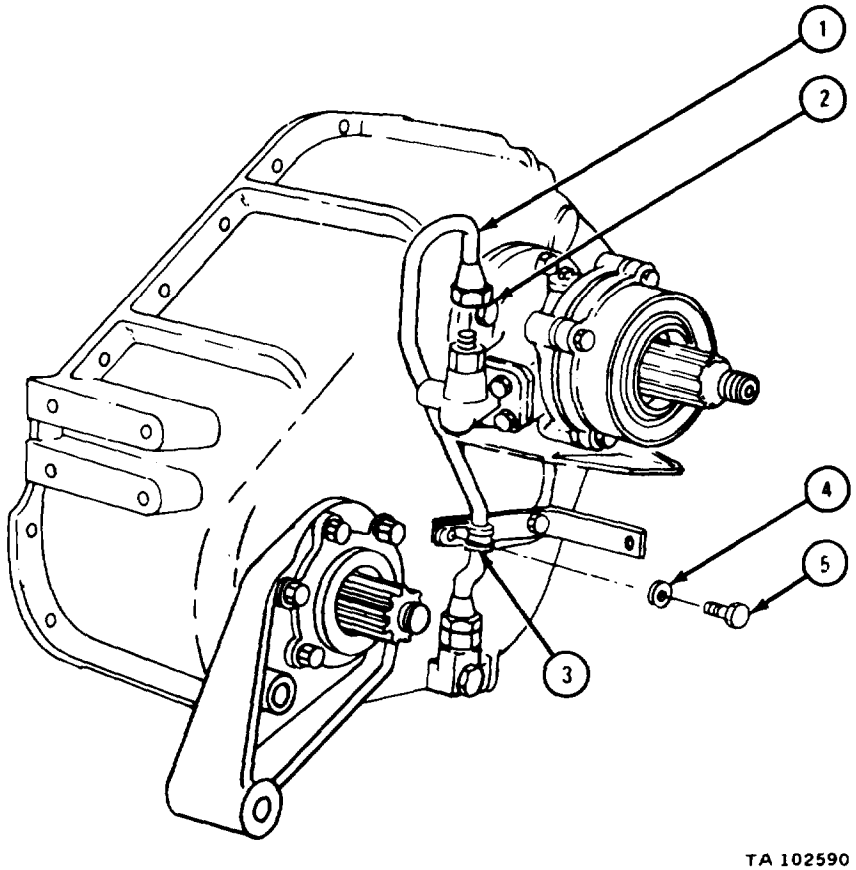
1. Put driveshaft lubricating tube (1) in place.
2. Put on coupling nut (2).
3. Put driveshaft lubricating tube clamp (3) in place.
4. Put in flat washer (4) and capscrew (5).

NOTE

Follow-on Maintenance Action Required:

1. Replace handbrake brake drum. Refer to TM 9-2320-211-20.
2. Replace yoke and propeller shaft. Refer to TM 9-2320-211-20.
3. Refill transfer housing. Refer to LO 9-2320-211-12.

END OF TASK



TA 102590

17-57. TRANSMISSION POWER TAKEOFF SEAL REMOVAL AND REPLACEMENT (ALL TRUCKS EXCEPT M51A2).

TOOLS: No special tools required

SUPPLIES: Oil seal
Bearing cap gasket

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Remove power takeoff-to-front winch propeller shaft from power takeoff. Refer to TM 9-2320-211-20.

(2) Remove universal joint yoke. Refer to TM 9-2320-211-20.

(3) Drain oil from power takeoff. Refer to LO 9-2320-211-12.

(4) Remove power takeoff from transmission. Refer to para 17-60.

b. Removal.

FRAME 1

1. Takeout four capscrews (1) and starwashers (2).

NOTE

If front bearing cap (3) is stuck to power takeoff housing case (4), tap sides of bearing cap with soft-faced hammer.

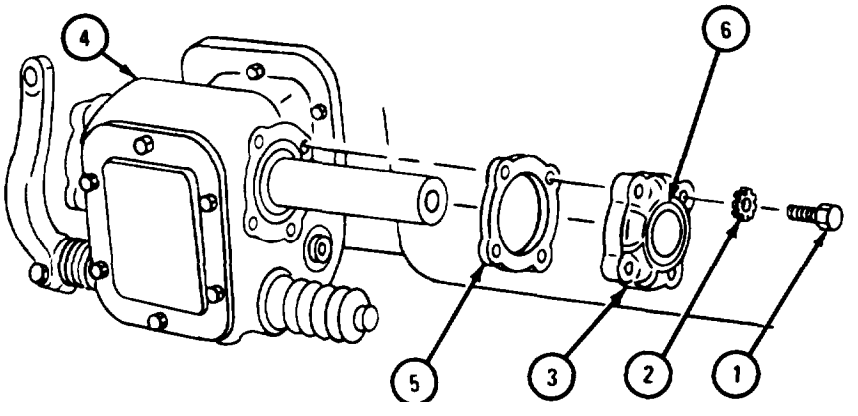
2. Takeoff front bearing cap (3) and gasket (5). Throw away gasket.

CAUTION

Be careful not to damage front bearing cap (3) when removing oil seal (6).

3. Using punch, drive out oil seal (6). Throw away seal.

END OF TASK



TA 102125

Replacement.

FRAME 1

CAUTION

Be careful not to damage shaft when putting oil seal (1) into bearing cap (2) .

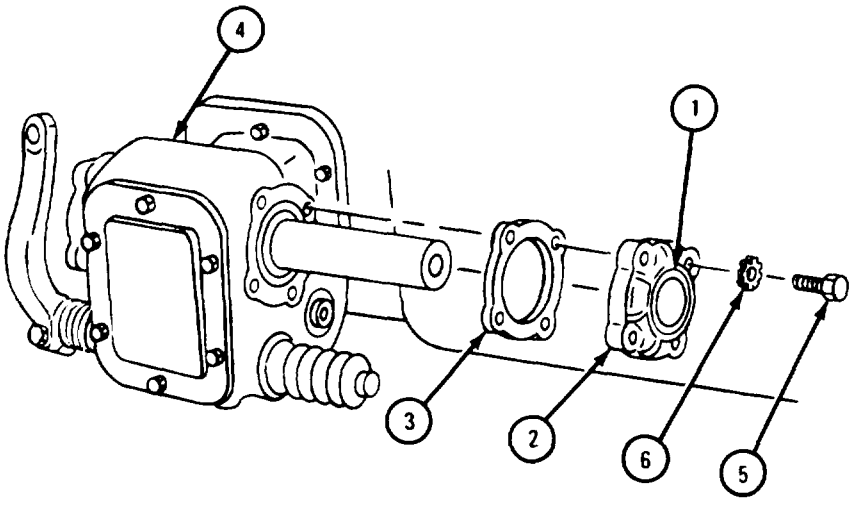
1. Put oil seal (1) into bearing cap (2).
2. Aline holes in gasket (3) and front bearing cap (2) with holes in housing case (4).
3. Put in four screws (5) and starwashers (6).

NOTE

Follow-on Maintenance Action Required:

1. Install power takeoff on transmission. Refer to para 17-60.
2. Replace universal joint yoke. Refer to TM 9-2320-211-20.
3. Install power takeoff-to-front winch propeller shaft on power takeoff. Refer to TM 9-2320-211-20.
4. Make sure drain plug is tightened. Refer to LO 9-2320-211-12.
5. Replace oil. Refer to LO 9-2320-211-12.

END OF TASK



TA 102126

17-58. TRANSMISSION POWER TAKEOFF SEAL REMOVAL AND REPLACEMENT (TRUCK M51A2).

TOOLS: No special tools required

SUPPLIES: Oil seal
Gaskets

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Remove power takeoff-to-front winch propeller shaft at power takeoff. Refer to TM 9-2320-211-20.

(2) Remove driveshaft universal yoke. Refer to TM 9-2320-211-20.

(3) Remove power takeoff-to-hydraulic hoist pump propeller shaft from power takeoff. Refer to TM 9-2320-211-20.

(4) Remove driveshaft assembly universal joint. Refer to TM 9-2320-211-12.

(5) Drain transmission and power takeoff. Refer to LO 9-2320-211-12.

b. Removal.

FRAME 1

1. Take out four capscrews (1) and starwashers (2).

NOTE

If front bearing cap (3) is stuck to power takeoff housing case (4), tap sides of bearing cap with soft-faced hammer.

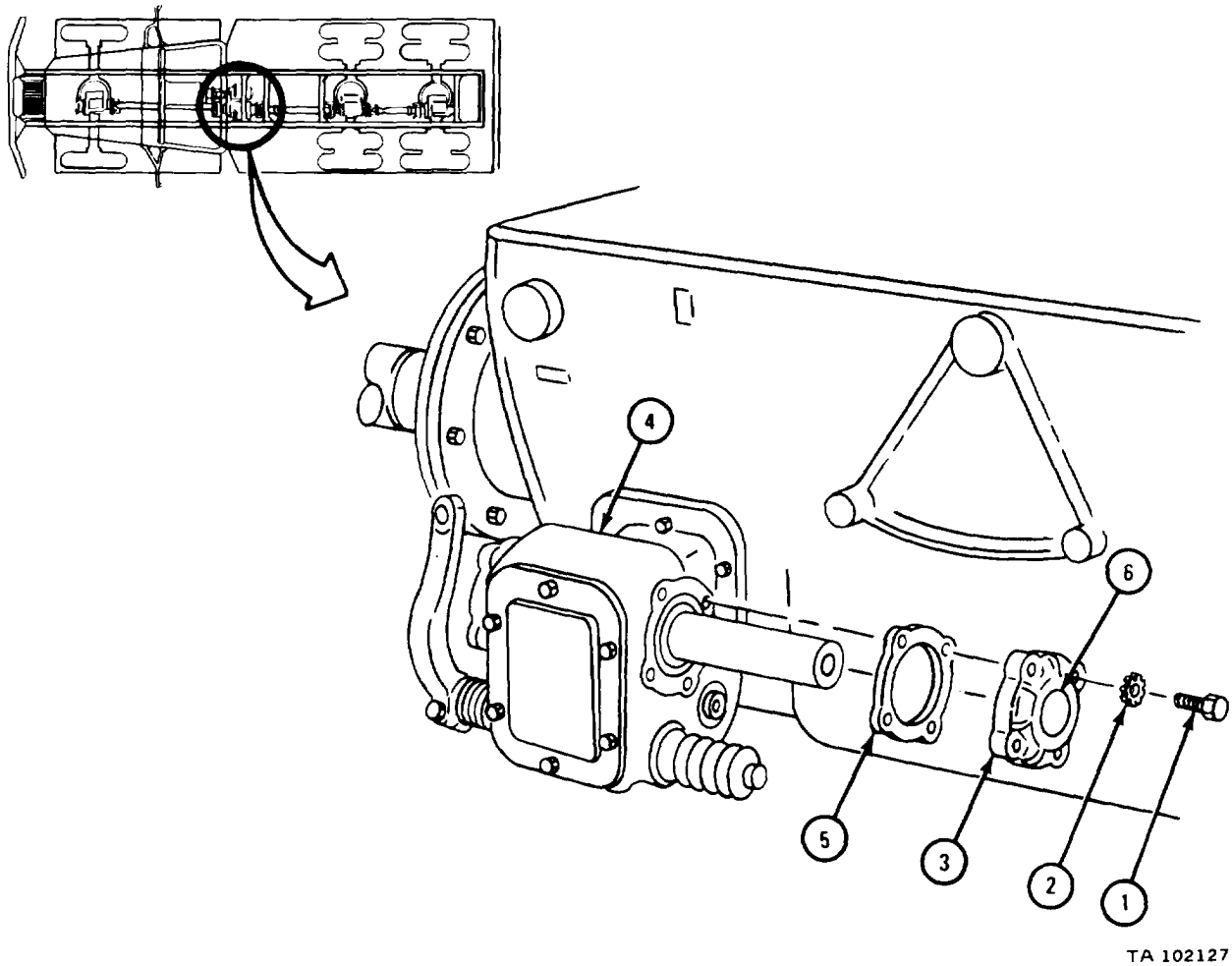
2. Take off front bearing cap (3) and gasket (5). Throw away gasket.

CAUTION

Be careful not to damage shaft when taking out oil seal (6).

3. Using punch, drive out oil seal (6). Throw away seal.

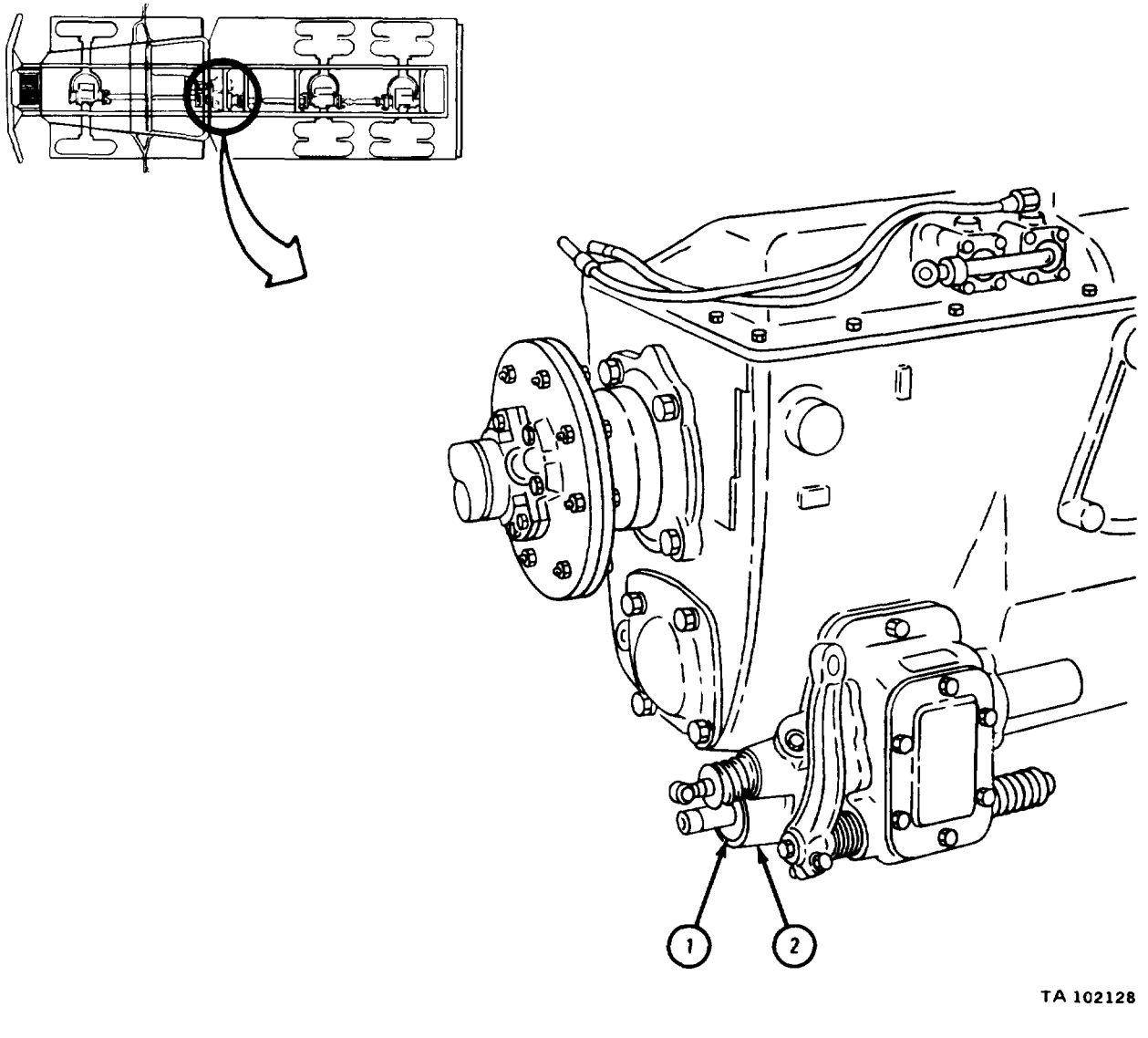
GO TO FRAME 2



FRAME 2

1. Take seal (1) out of outside accessory drive housing (2).

END OF TASK



c. Replacement.

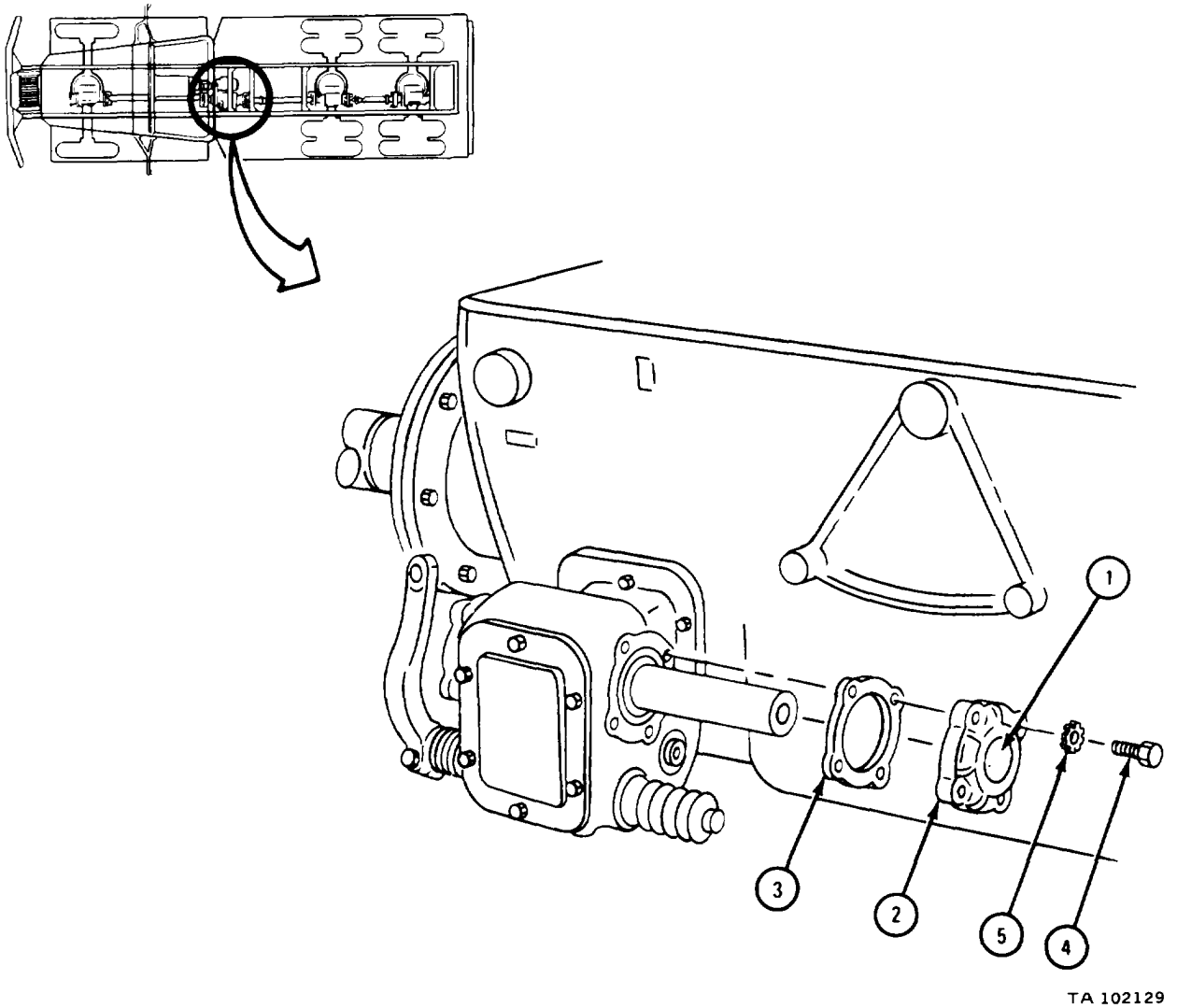
CAUTION

Be careful not to damage shaft when putting oil seals into power takeoff housing case.

FRAME 1

1. Press oil seal (1) into bearing cap (2).
2. Put gasket (3) and front bearing cap (2) in place. Put in four screws (4) and starwashers (5).

GO TO FRAME 2



FRAME 2

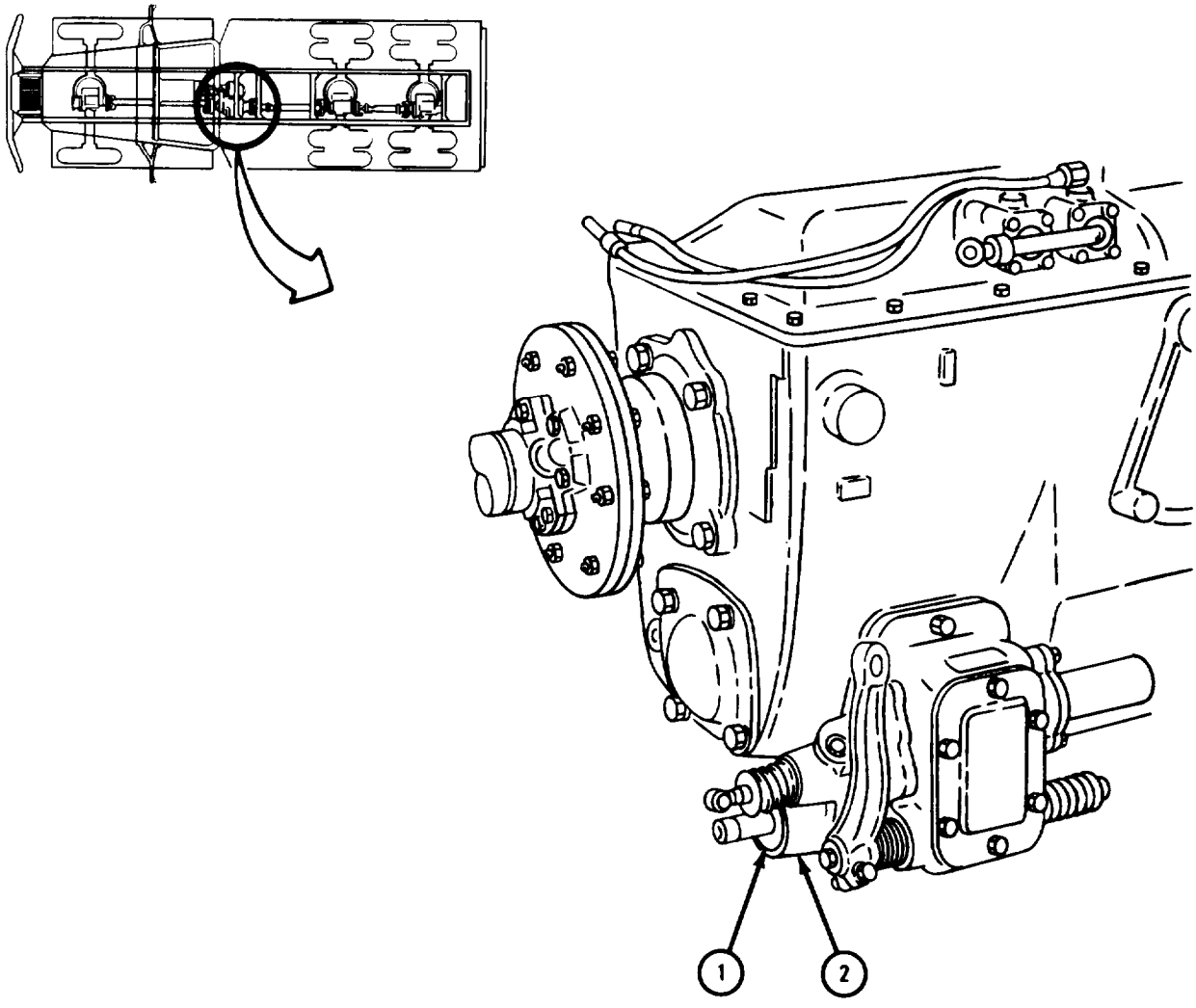
1. Put seal (1) into accessory drive housing (2).

NOTE

Follow-on Maintenance Action Required:

1. Replace driveshaft assembly universal joint. Refer to TM 9-2320-211-20.
2. Replace power takeoff-to-front winch propeller shaft. Refer to TM 9-2320-211-20.
3. Replace driveshaft universal yoke. Refer to TM 9-2320-211-20.
4. Replace power takeoff-to-hydraulic hoist pump propeller shaft. Refer to TM 9-2320-211-20.

END OF TASK



17-59. TRANSMISSION POWER TAKEOFF CONTROLS AND LINKAGES REMOVAL, REPAIR, AND REPLACEMENT.

TOOLS: No special tools required

SUPPLIES: Cotter pin
Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680

PERSONNEL: One

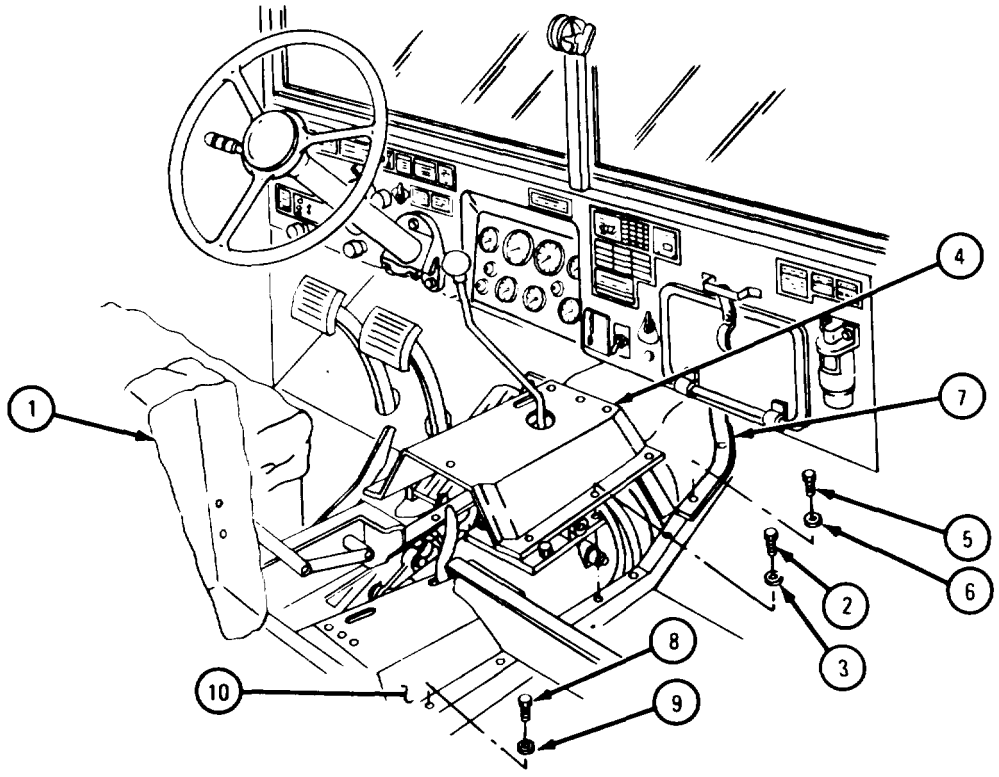
EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Removal.

FRAME 1

1. Lift up companion seat (1).
2. Take out 12 screws (2) and lockwashers (3) from front tunnel (4).
3. Lift up and slide off front tunnel (4).
4. Take out 8 screws (5) and lockwashers (6) from toeboard (7). Take off toeboard.
5. Take out six screws (8) and lockwashers (9). Lift up and slide off rear tunnel (10).

GO TO FRAME 2



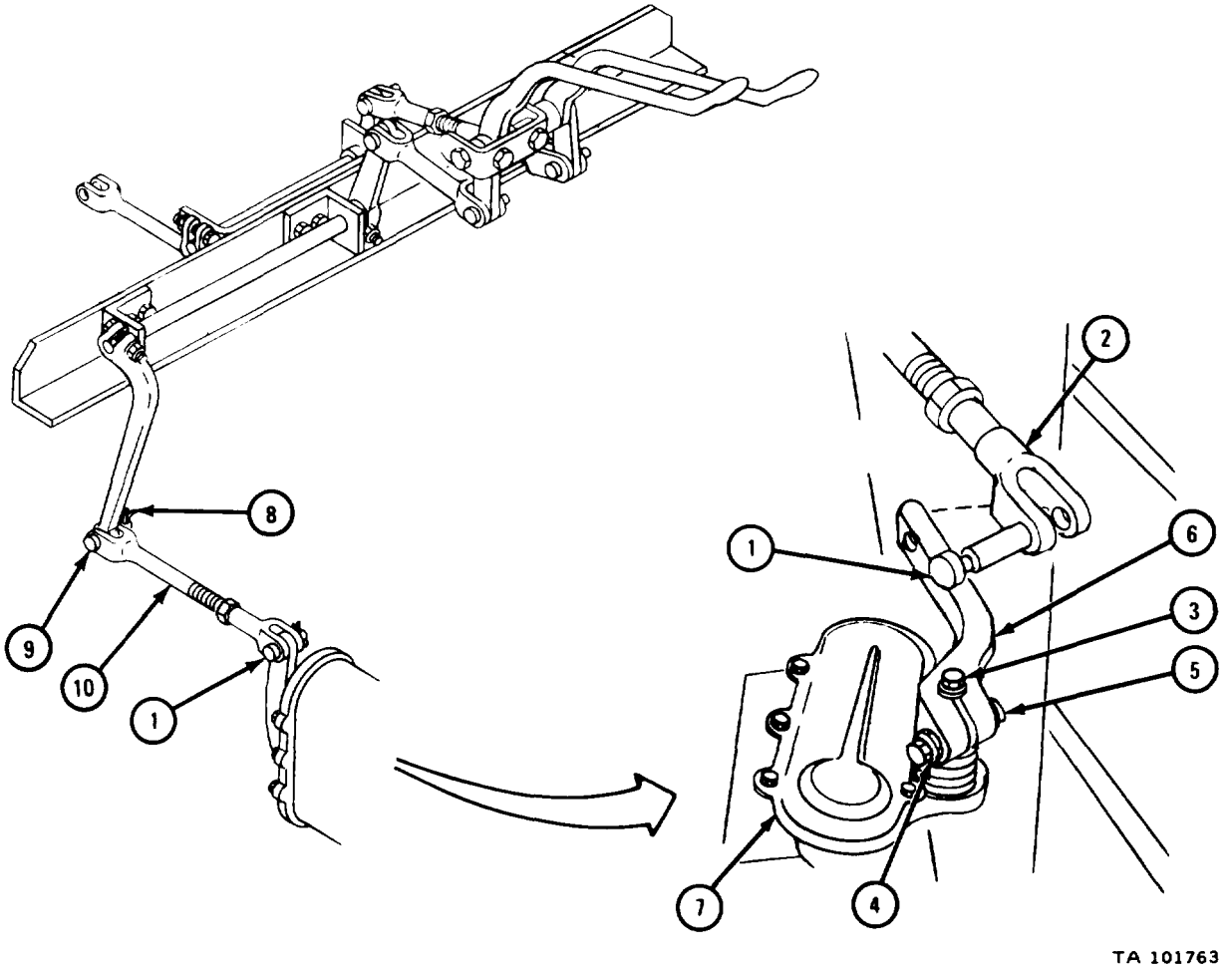
FRAME 2

CAUTION

Do not pull clevis pin (1) all the way out or spring and poppet ball will fall out.

1. Working under truck, pull out clevis pin (1) from clevis (2) until you feel the detent.
2. Take out screw and washer (3).
3. Take off nut (4) and screw (5).
4. Take lever (6) off transmission power takeoff (7).
5. Take out and throw away cotter pin (8).
6. Take out clevis pin (9).
7. Take off linkage (10). Note number of threads showing on linkage.

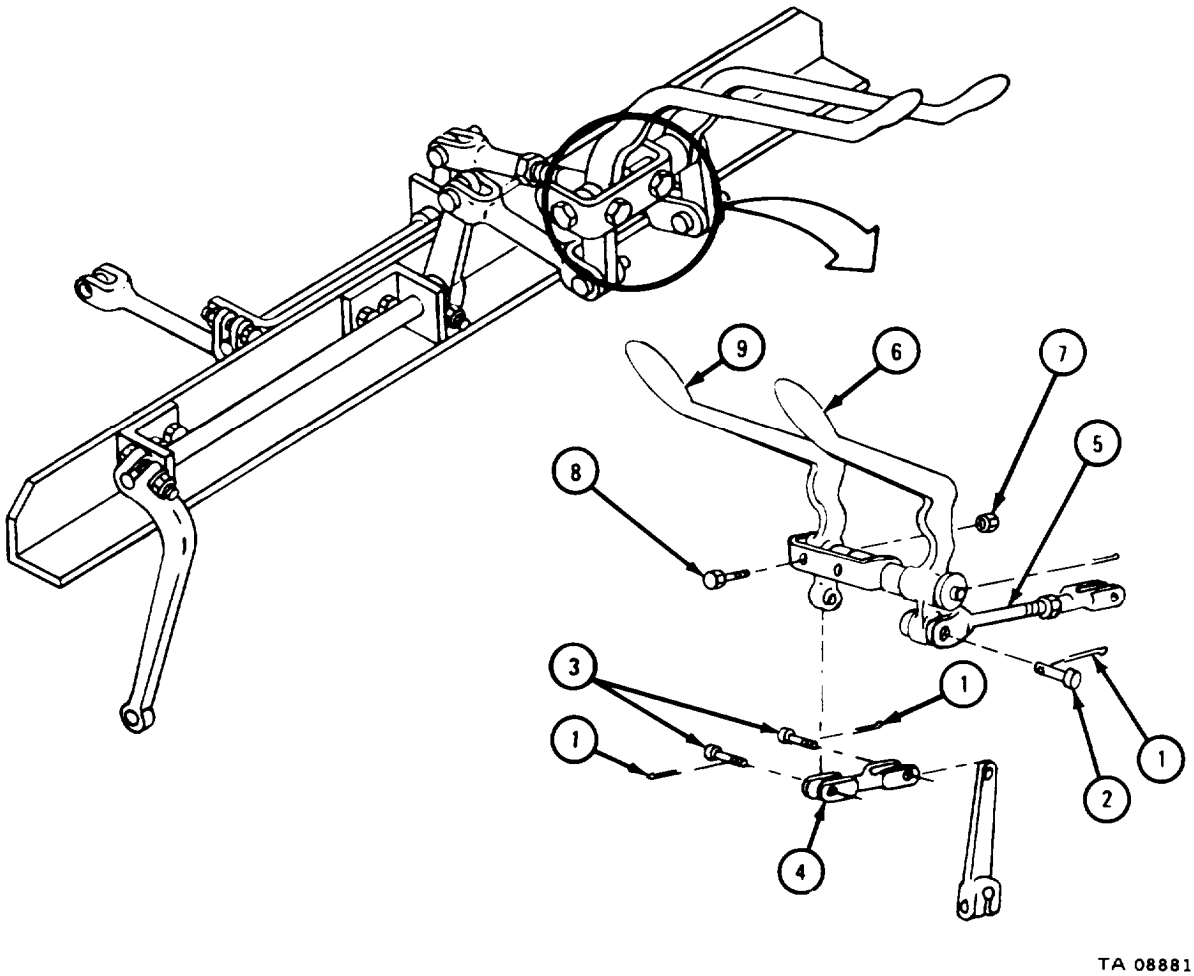
GO TO FRAME 3



FRAME 3

1. Take out and throw away three cotter pins (1).
2. Take out three clevis pins (2 and 3).
3. Take off linkage (4). Take linkage (5) off transfer lever (6).
4. Take off two nuts (7) and take out two bolts (8).
5. Lift transfer lever assembly (6) and power takeoff lever assembly (9) out of truck.

GO TO FRAME 4



TA 088815

FRAME 4

1. Take off nut (1) and slide screw (2) back.
2. Take off lock shaft (3).

NOTE

Be careful not to lose spacer (6) on shifter shaft (4).

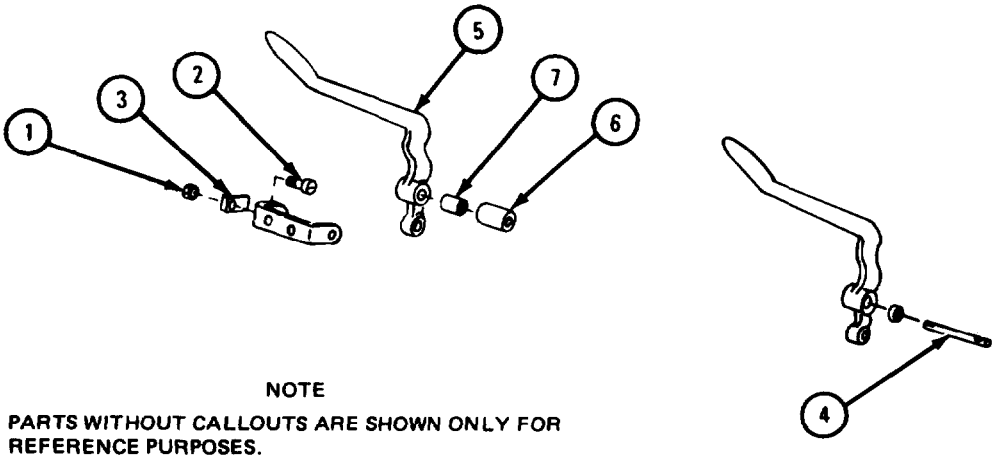
3. Drive out shifter shaft (4) until it clears power takeoff lever (5). Take out lever.

NOTE

Do not take out bushing (7) unless it is damaged. Refer to para 17-59c for inspection procedures.

4. Press out bushing (7).

GO TO FRAME 5



NOTE

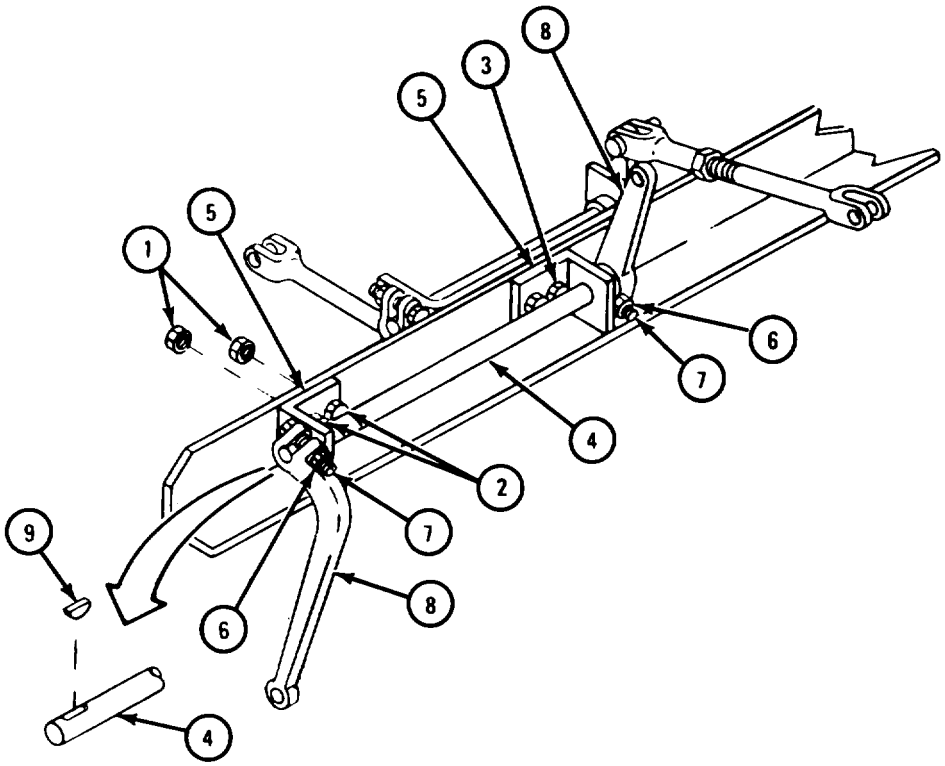
PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 101764

FRAME 5

1. Take off four nuts (1) from screws (2 and 3).
2. Take out shifter shaft (4) and brackets (5) with screws (2 and 3).
3. Take off two nuts (6) and take out two screws (7).
4. Take off two levers (8). Take out two woodruff keys (9).
5. Take off brackets (5) and take out screws (2 and 3).

END OF TASK



TA 101765

b. Cleaning.

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

(1) Clean all parts before, during and after inspection with dry cleaning solvent.

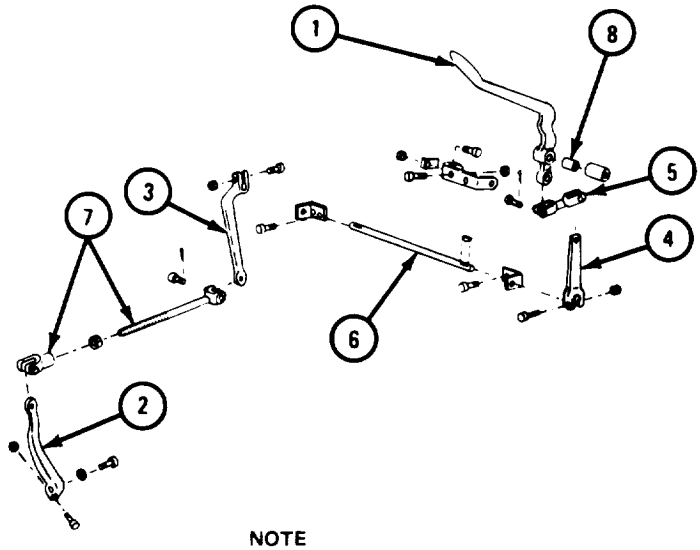
(2) Allow parts to air dry.

c. Inspection and Repair.

FRAME 1

1. Check that shifting lever (1) and linkages (2 through 5) are not broken, cracked or bent. If lever or linkages are damaged, get new ones.
2. Check that relay shaft (6) is not bent and that keyway is not damaged. If shaft or keyway is damaged, get a new relay shaft.
3. Check that threads on adjustable yoke (7) are not damaged. If threads are damaged, get a new adjustable yoke.
4. Check that bushing (8) is not scored or out-of-round. If bushing is damaged, get a new one.

END OF TASK



NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

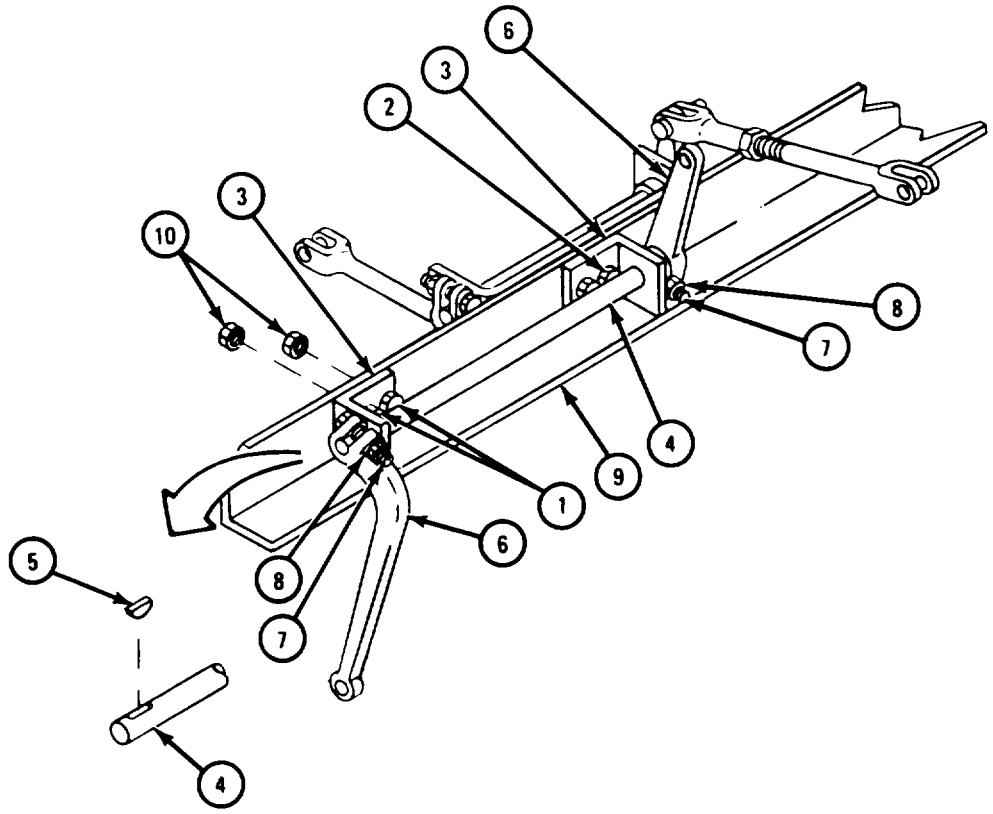
TA 101766

d. Replacement.

FRAME 1

1. Put four screws (1 and 2) in two brackets (3).
2. Put shaft (4) through brackets (3) as shown.
3. Put two woodruff keys (5) into shaft (4).
4. Put on levers (6). Aline woodruff key (5) in shaft (4) with keyways in levers.
5. Put in two screws (7) and put on two nuts (8).
6. Aline holes in support (9) with screws (1 and 2). Put on brackets (3) with screws.
7. Put on four nuts (10).

GO TO FRAME 2

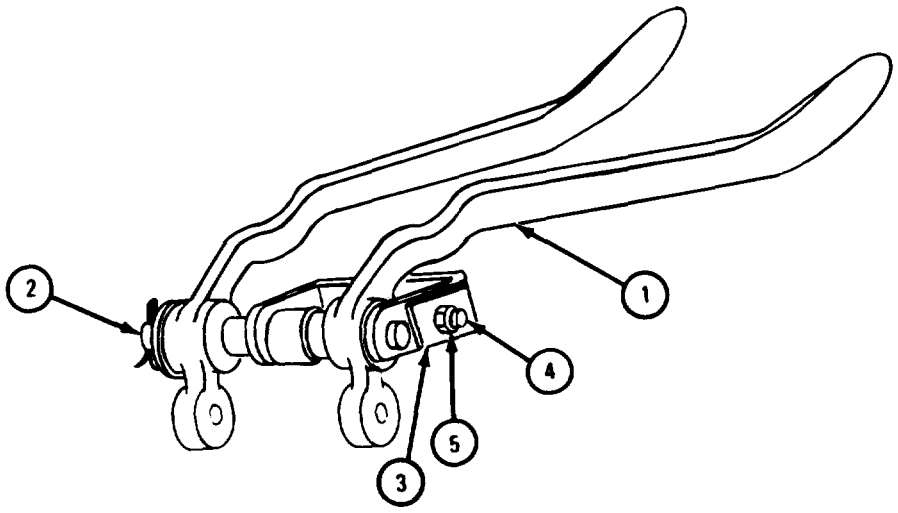


TA 101767

FRAME 2

1. Put transmission power takeoff lever (1) in place. Tap in shifter shaft (2)
2. Put on lockshaft (3).
3. Slide screw (4) through lockshaft (3). Put on nut (5).

GO TO FRAME 3

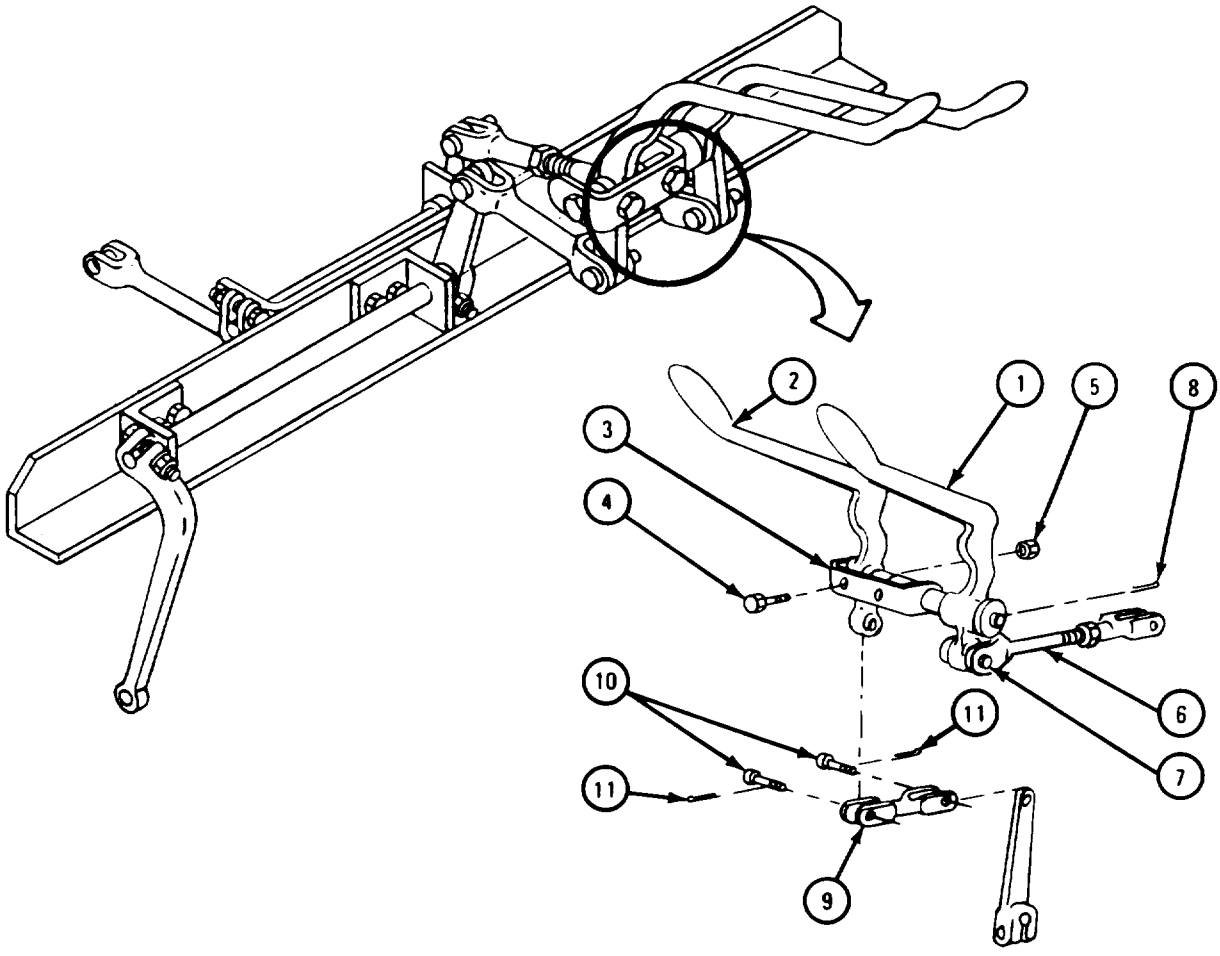


TA 088816

FRAME 3

1. Put transfer lever (1), transmission power takeoff lever (2), and bracket (3) in place on cab floor.
2. Put in two bolts (4) and put on two nuts (5).
3. Put linkage (6) in place on transfer lever (1). Put in clevis pin (7) and cotter pin (8).
4. Put linkage (9) in place. Put in two clevis pins (10) and cotter pins (11).

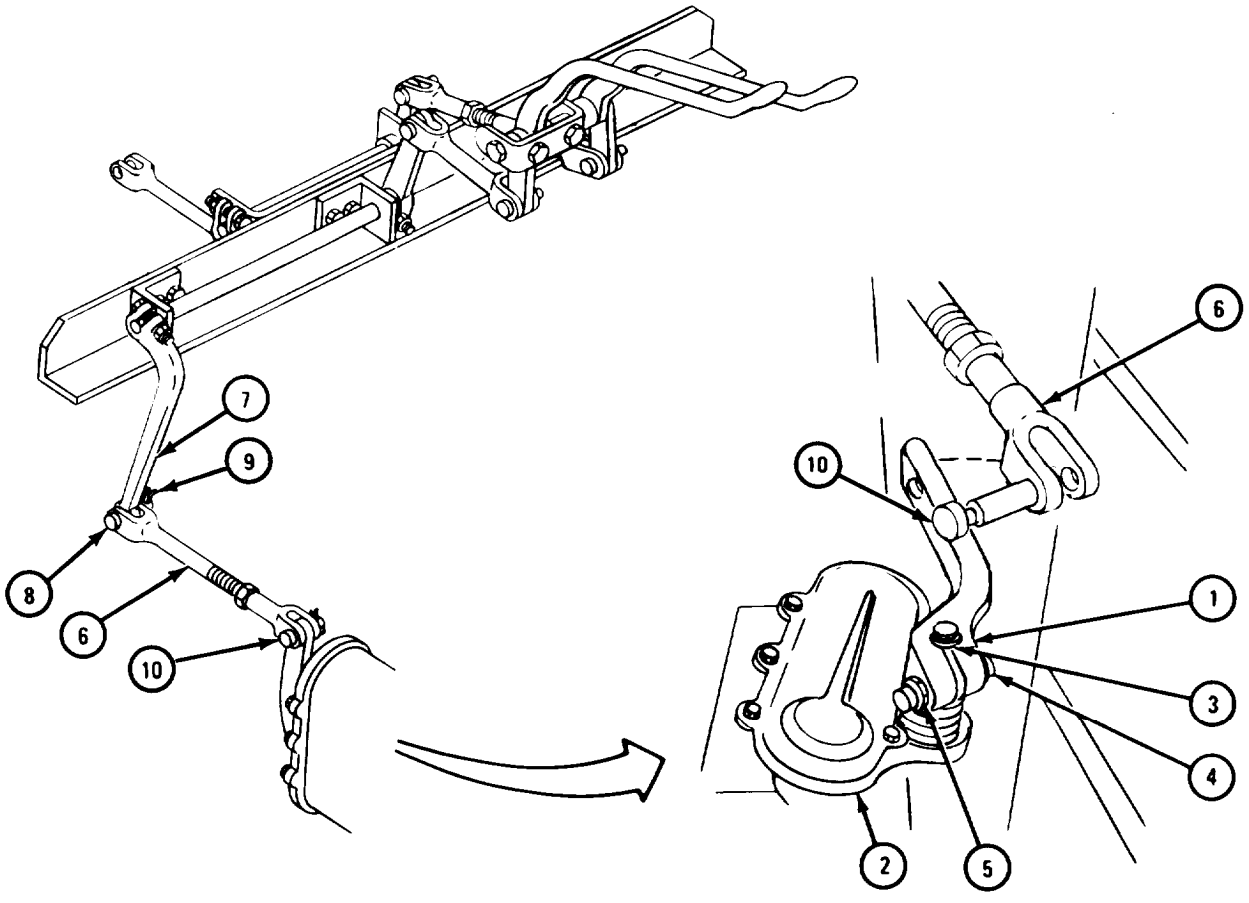
GO TO FRAME 4



FRAME 4

1. Put lever (1) in place on shaft of transmission power takeoff (2).
2. Put in screw and washer (3).
3. Put in screw (4) and put on nut (5).
4. Check that number of threads showing on linkage (6) is the same as noted.
5. Put linkage (6) on lever (7) and put in clevis pin (8). Put in cotter pin (9).
6. Put linkage (6) on lever (1). Push clevis pin (10) all the way in.

GO TO FRAME 5

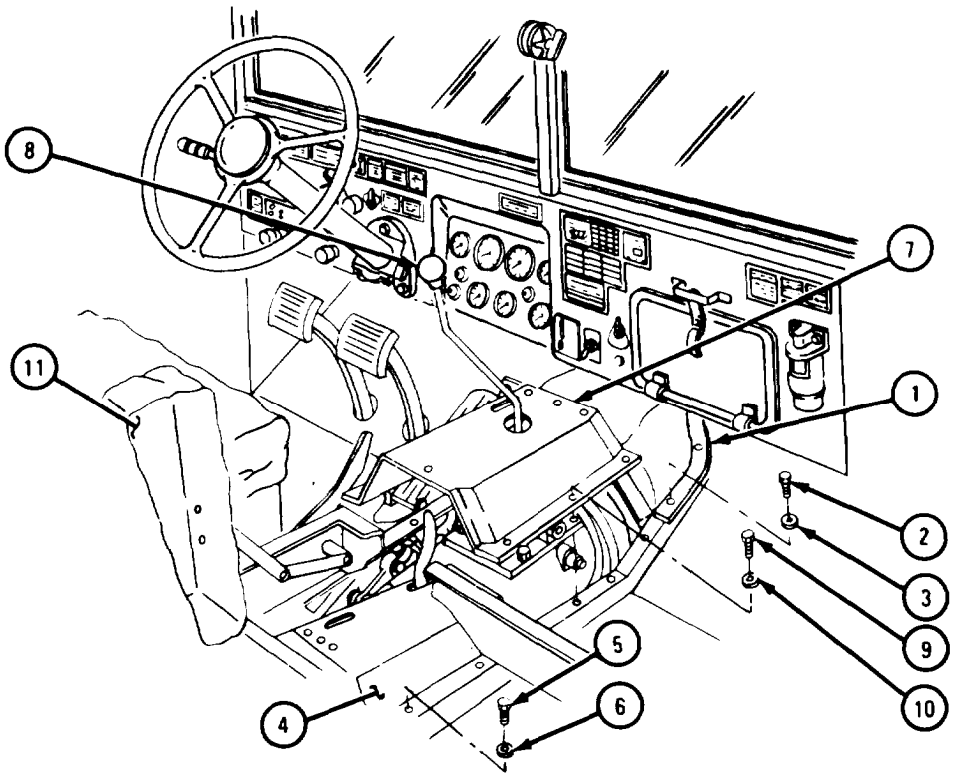


TA 101769

FRAME 5

1. Put toeboard (1) in place and aline holes. Put in 11 screws (2) and lockwashers (3).
2. Slide rear tunnel (4) down into place and aline holes.
3. Put in six screws (5) and lockwashers (6).
4. Slide front tunnel (7) down over shift lever (8).
5. Aline holes in front tunnel (7) with holes in cab floor, toeboard (1), and rear tunnel (4).
6. Put in 12 screws (9) and lockwashers (10).
7. Put down companion seat (11).

END OF TASK



TA 101770

17-60. TRANSMISSION POWER TAKEOFF REMOVAL, REPAIR, AND REPLACEMENT.

TOOLS: No special tools required

SUPPLIES: Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680
Housing gasket
Cap gasket (2)
Lint-free cloth
Safety wire
Cotter pin
Oil seal (2)
Cover gasket

PERSONNEL: One

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedures.

(1) Drain transmission. Refer to LO 9-2320-211-12.

(2) On trucks with front winches, remove power takeoff-to-front winch propeller shaft. Refer to TM 9-2320-211-20.

(3) On trucks with front winches, remove power takeoff control linkages. Refer to para 17-59.

(4) On truck M51A2, remove power takeoff-to-hydraulic hoist pump propeller shaft. Refer to TM 9-2320-211-20.

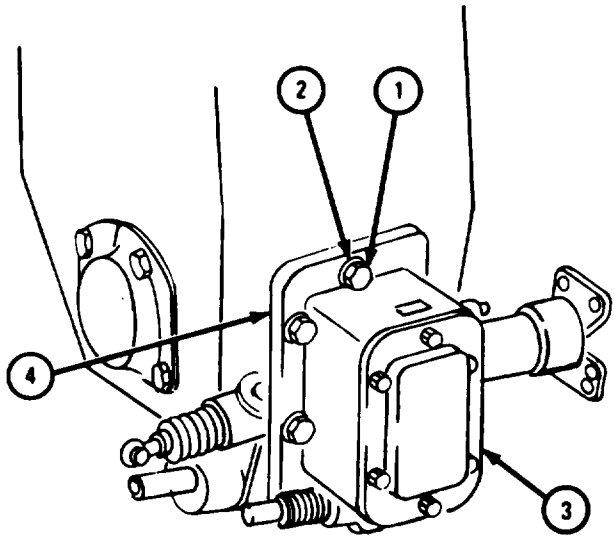
(5) On truck M51A2, remove hoist control linkage. Refer to para 17-22.

b. Removal.

FRAME 1

1. Takeout six capscrews (1) and washers (2).
2. Pull off power takeoff assembly (3).
3. Takeoff and throw away gasket (4).

END OF TASK



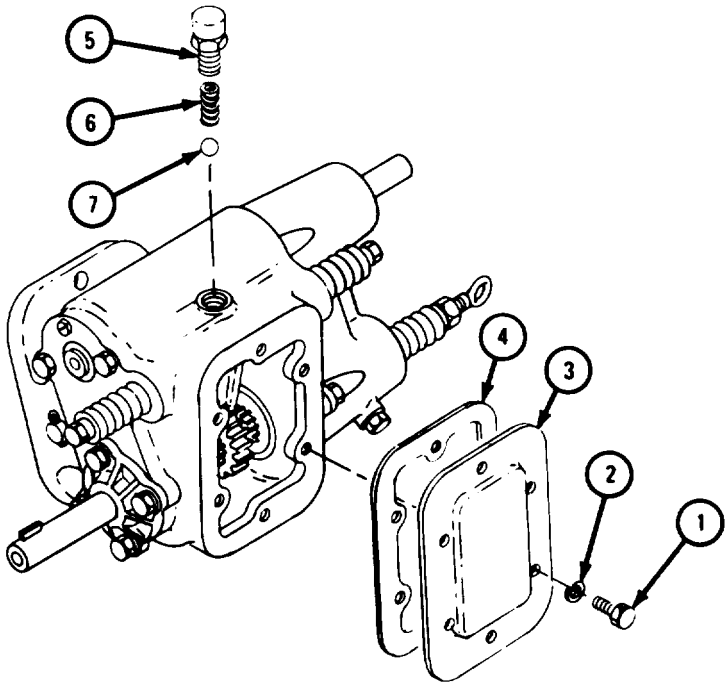
TA 102195

c. Disassembly.

FRAME 1

1. Take out six screws (1) and washers (2).
2. Take off cover (3).
3. Take off and throw away gasket (4).
4. Take out retainer (5), spring (6), and ball (7).

GO TO FRAME 2

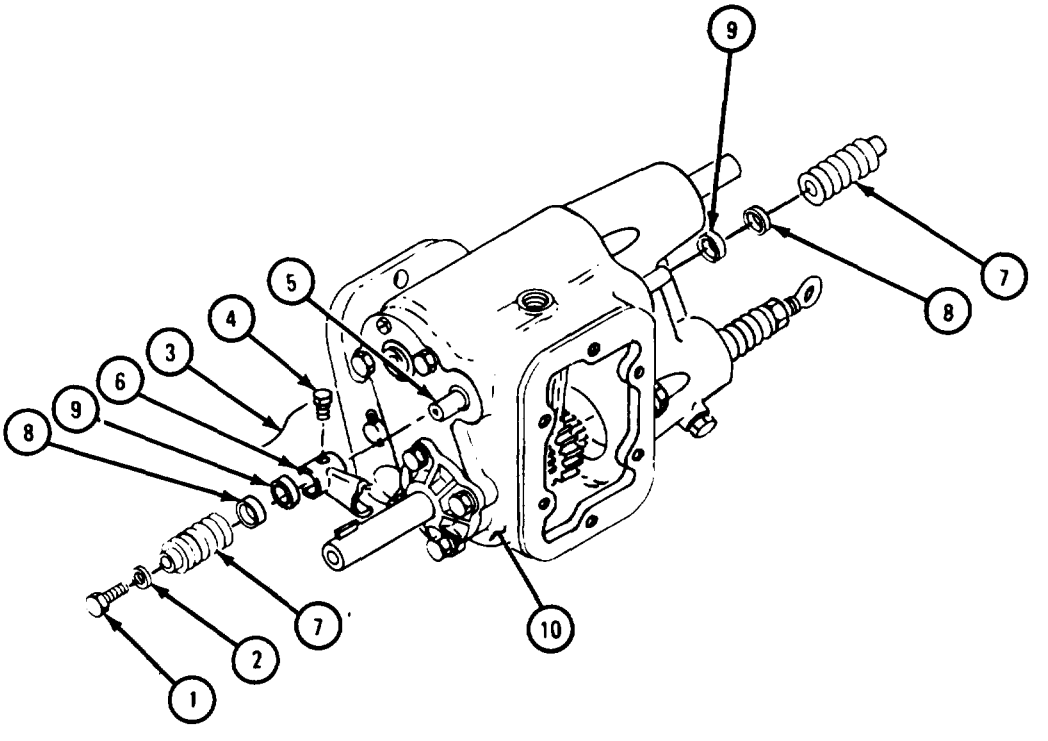


TA 102196

FRAME 2

1. Takeout screw (1) and washer (2).
2. Take out and throw away safety wire (3).
3. Take out screw (4). Take out shifter shaft (5). Take out shift fork (6).
4. Take boots (7), retainers (8), and oil seals (9) out of case (10).

GO TO FRAME 3

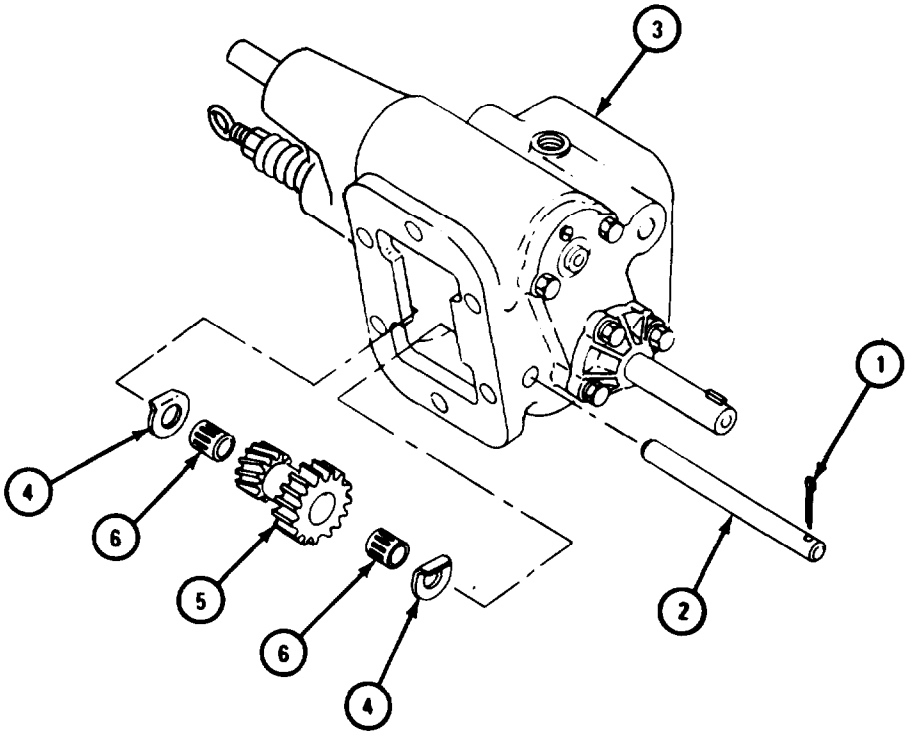


TA 102592

FRAME 3

1. Pull out and throw away cotter pin (1).
2. Tap gear shaft (2) away from pin end (1). Tap until shaft comes out of case (3).
3. Take out two thrust washers (4), input gear (5), and two bearings (6).
4. Take out two bearings (6) from gear (5).

IF WORKING ON DOUBLE OUTPUT POWER TAKEOFF, GO TO FRAME 4.
IF WORKING ON SINGLE OUTPUT POWER TAKEOFF, GO TO FRAME 7

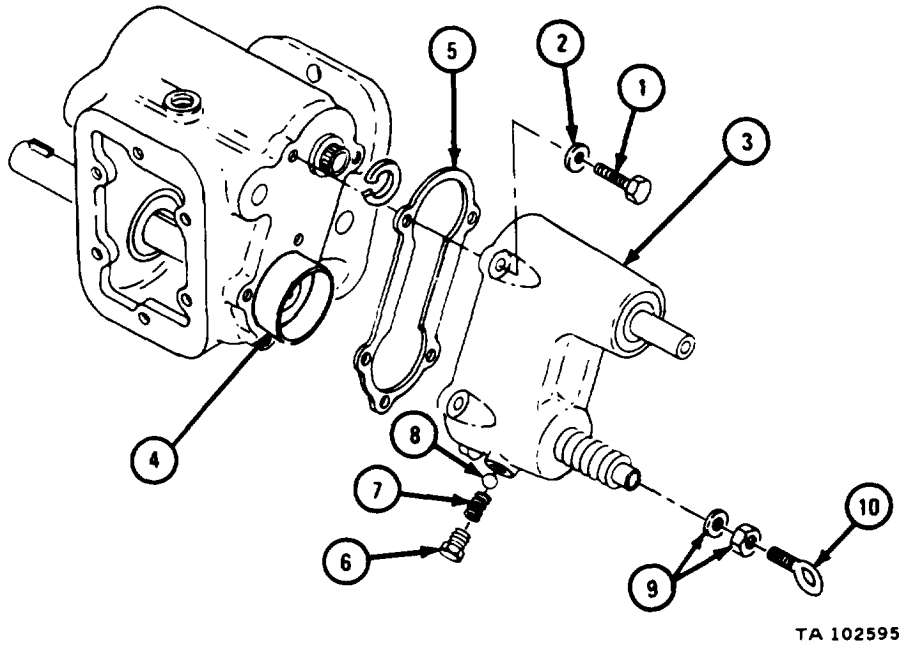


TA 102594

FRAME 4

1. Takeout five screws (1) and washers (2).
2. Take off housing (3) and spacer (4).
3. Take off and throw away gasket (5).
4. Take out retainer (6), spring (7), and ball (8).
5. Loosen nut (9).
6. Take out eyebolt (10), nut and washer (9).

GO TO FRAME 5

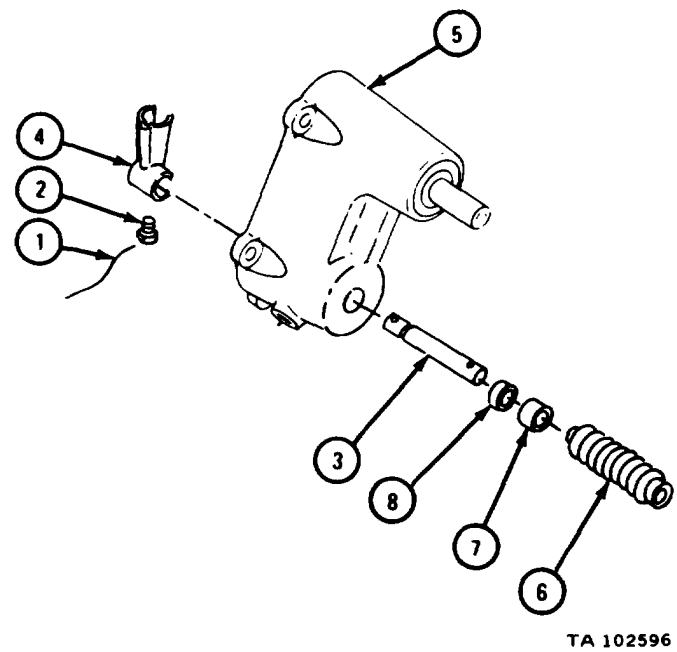


TA 102595

FRAME 5

1. Take out and throw away safety wire (1).
2. Take out screw (2).
3. Take out shaft (3). Take off fork (4) out of drive housing (5).
4. Take off boot (6) and retainer (7).
5. Take out and throw away seal (8).

GO TO FRAME 6

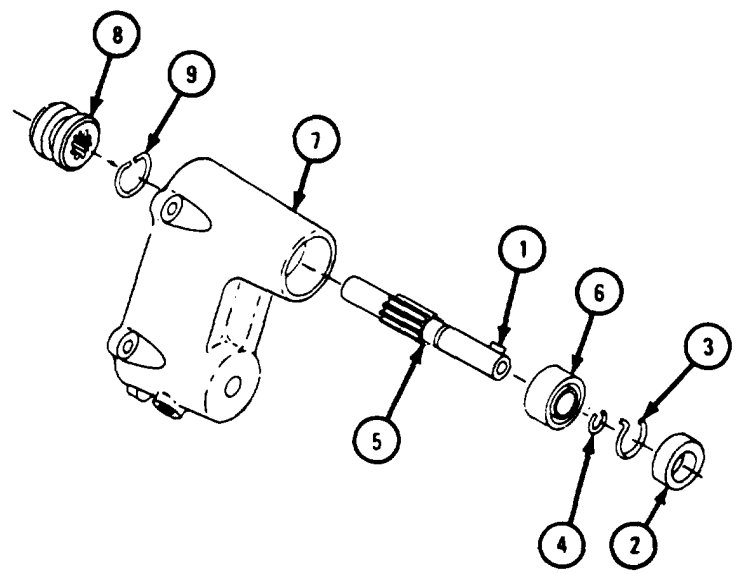


TA 102596

FRAME 6

1. Takeout key (1).
2. Takeout seal (2).
3. Takeout snaprings (3 and 4).
4. Pull output shaft (5) with bearing (6) out from front of accessory drive housing (7).
5. Take out clutch (8).
6. Take snapring (9) off shaft (5).
7. Press bearing (6) off shaft (5).
8. Take snapring (9) out of drive housing (7).

GO TO FRAME 8

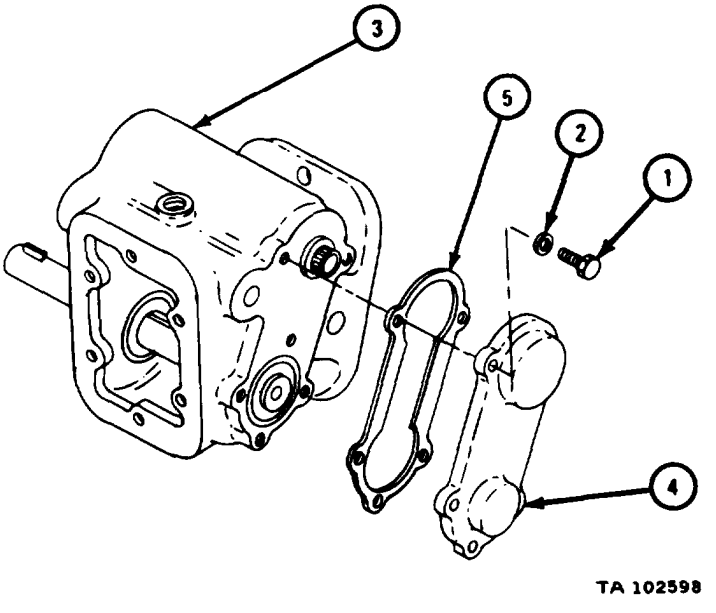


TA 102597

FRAME 7

1. Take out five screws (1) and washers (2) from case (3).
2. Takeoff cap (4) and-gasket (5). Throw away gasket.

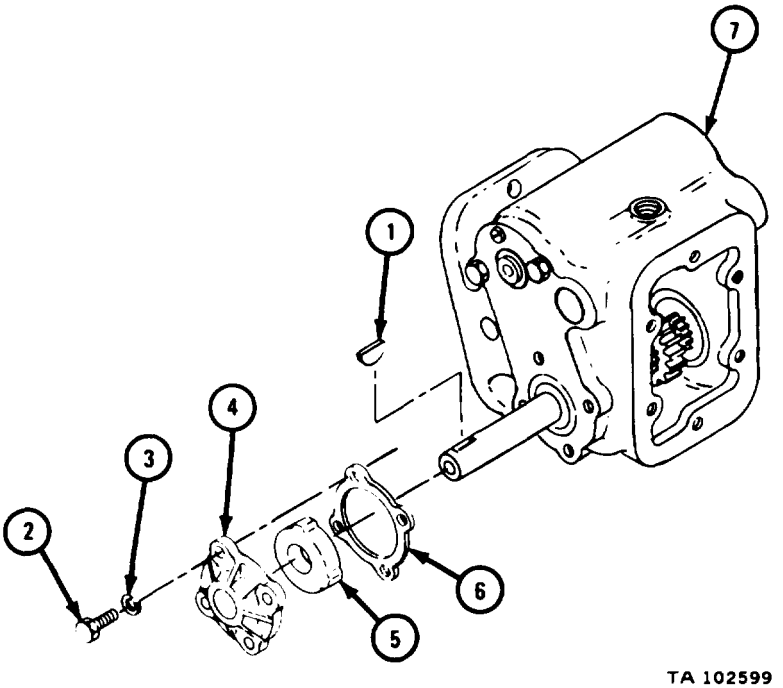
GO TO FRAME 8



FRAME 8

1. Takeout key (1).
2. Take out four bolts (2) and washers (3).
3. Take off cap (4) with seal (5) and gasket (6) from case (7). Throw away gasket.
4. Take out seal (5).

GO TO FRAME 9

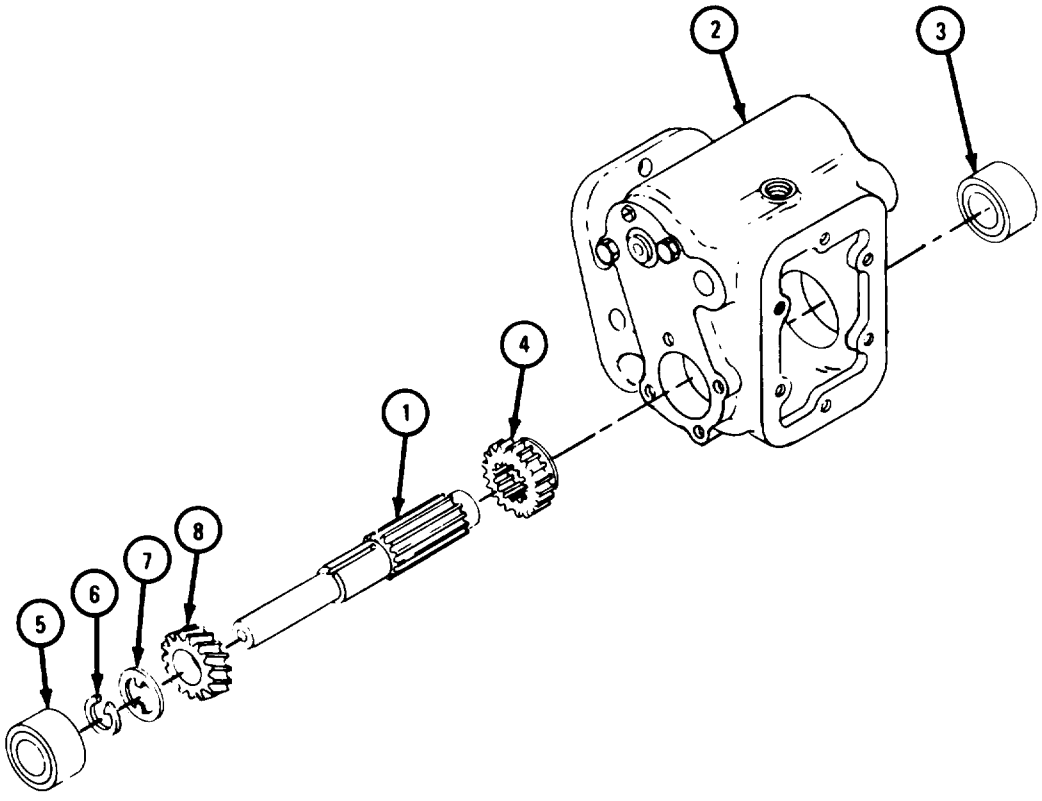


TA 102599

FRAME 9

1. Tap short end of shaft (1) to front of case (2).
2. Take out bearing (3) and gear (4).
3. Pull front shaft (1) out through front of case (2).
4. Take off bearing (5).
5. Take off snapring (6). Take off thrust washer (7), and gear (8).

GO TO FRAME 10

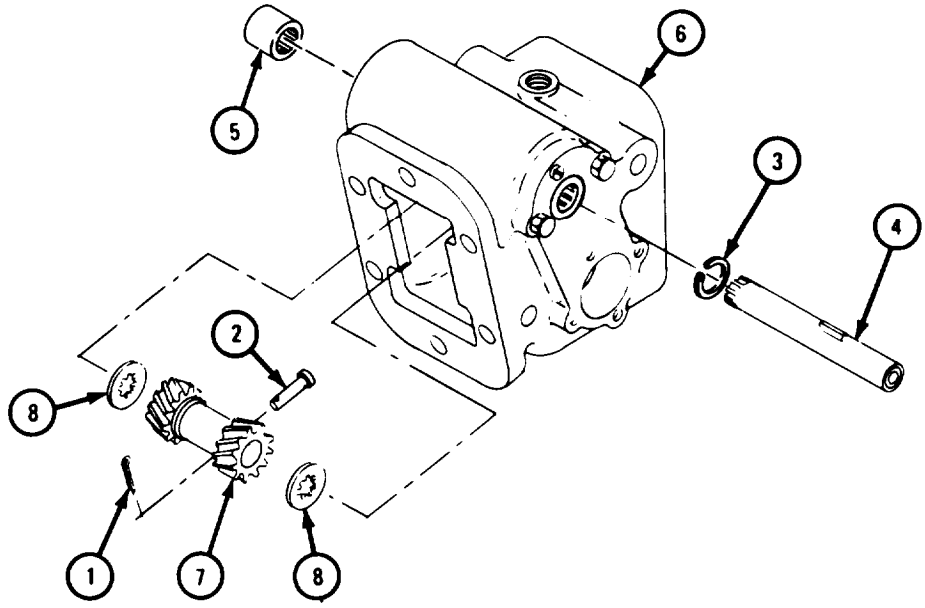


TA 102600

FRAME 10

1. Take out cotter pin (1) from clevis pin (2). Take out clevis pin.
2. Take out snapring (3).
3. Tap gearshaft assembly (4) toward closed bearing, forcing bearing (5) out of case (6). Take out gear (7) and two thrust washers (8).

GO TO FRAME 11

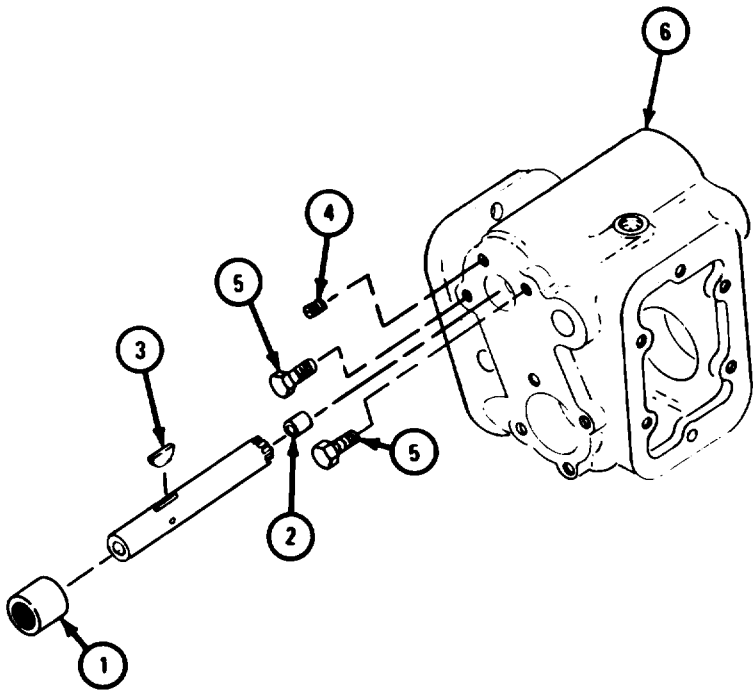


TA 102601

FRAME 11

1. Take out needle bearings (1).
2. Take out bushing (2).
3. Take out key (3).
4. Take out plug (4).
5. Take two bolts (5) out of case (6).

END OF TASK



TA 102602

d. Cleaning.

(1) Clean all bearings. Refer to Part 1, para 7-7.

(2) Clean rubber boots with water. Dry well.

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

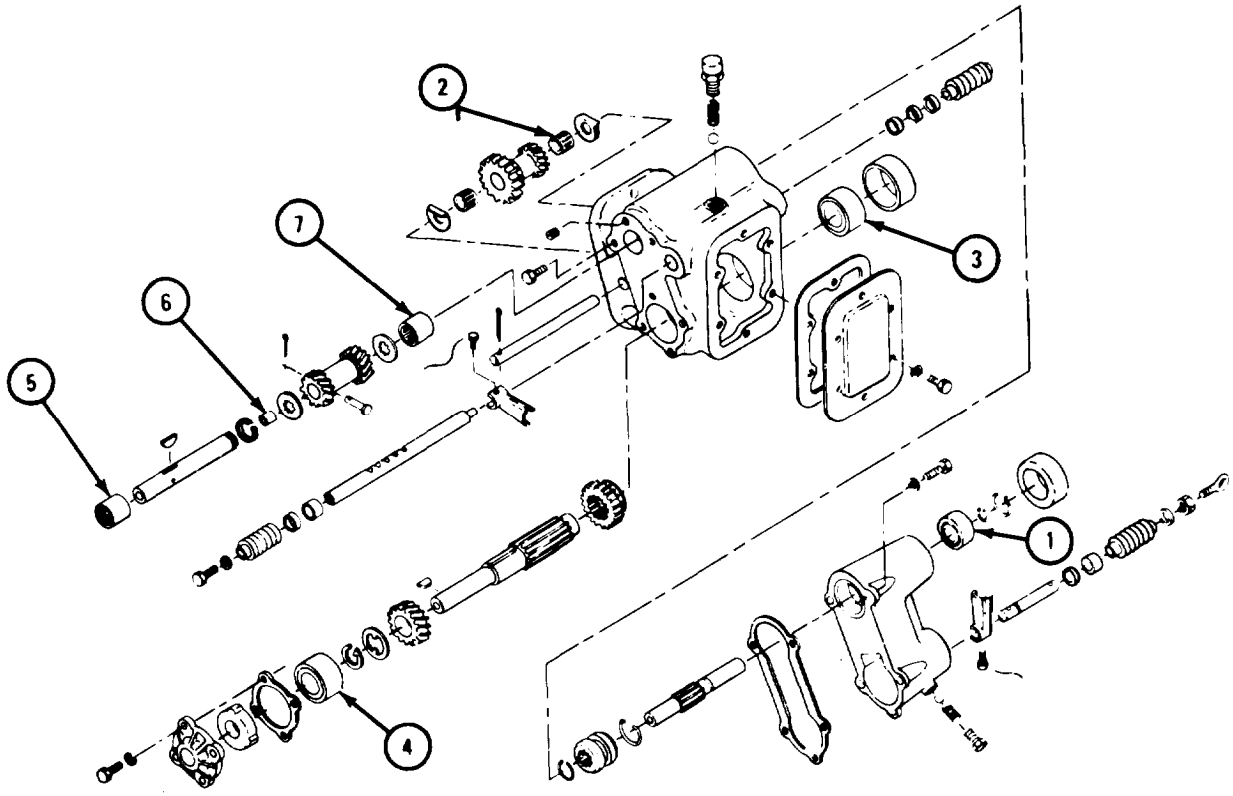
(3) Clean all other parts with solvent. Dry well.

e. Inspection and Repair.

FRAME 1

1. Check that bearings (1 through 7) are not damaged. Refer to Part 1, para 7-7.

GO TO FRAME 2



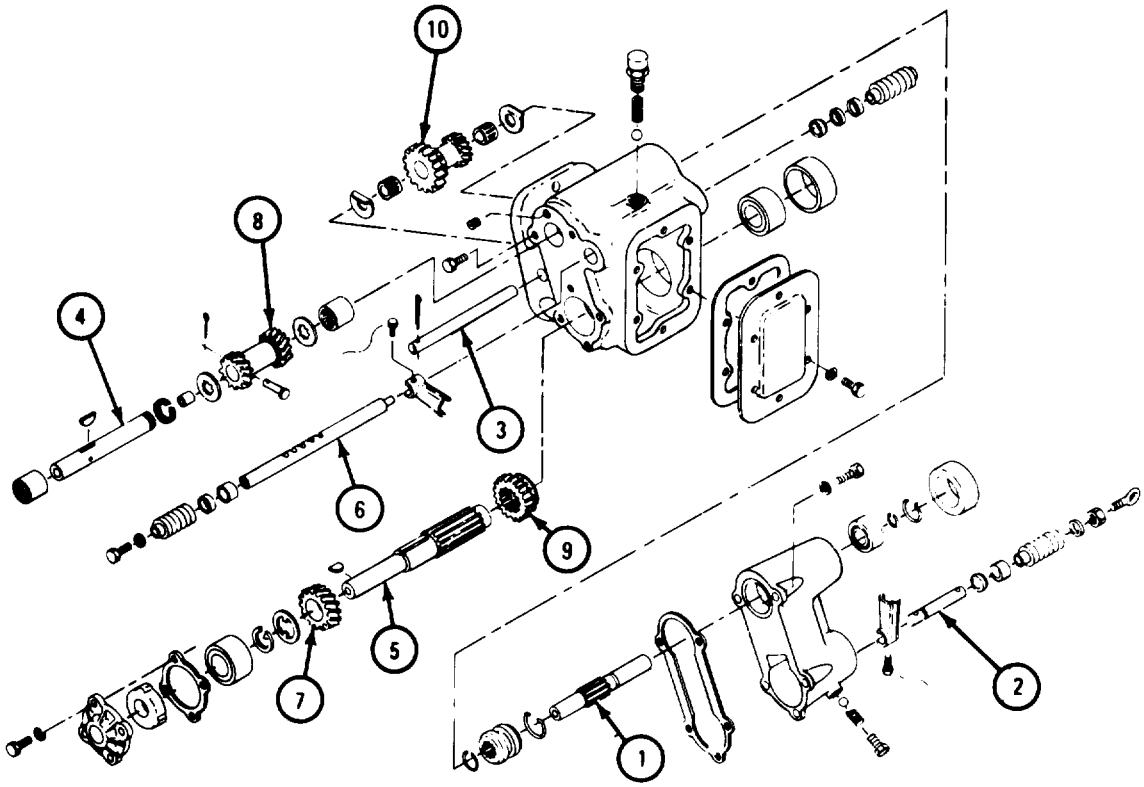
NOTE
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT IN THIS FRAME. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES OR ARE CHECKED IN ANOTHER FRAME.

TA 102603

FRAME 2

1. Check that shafts (1 through 6) have no scoring, pitting or wear.
2. Check that shafts (1, 4, and 5) do not have twisted splines.
3. Check that gears (7, 8, 9, and 10) do not have chipped, cracked or broken teeth. Check that bores of gears are not pitted or scored.

GO TO FRAME 3



NOTE

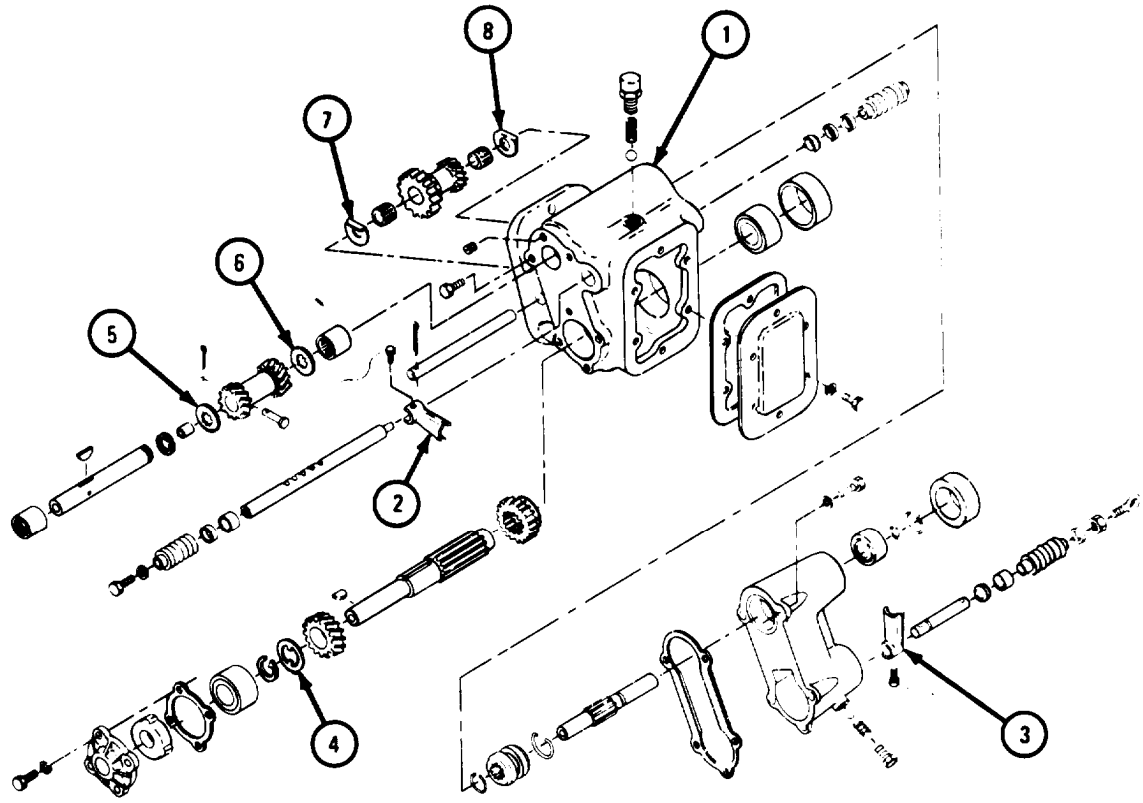
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT IN THIS FRAME. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES OR ARE CHECKED IN ANOTHER FRAME.

TA 102604

FRAME 3

1. Check that case (1) and sliding gear forks (2 and 3) are not cracked or damaged in any other way.
2. Check that thrust washers (4 through 8) are not scored or worn.

GO TO FRAME 4



NOTE

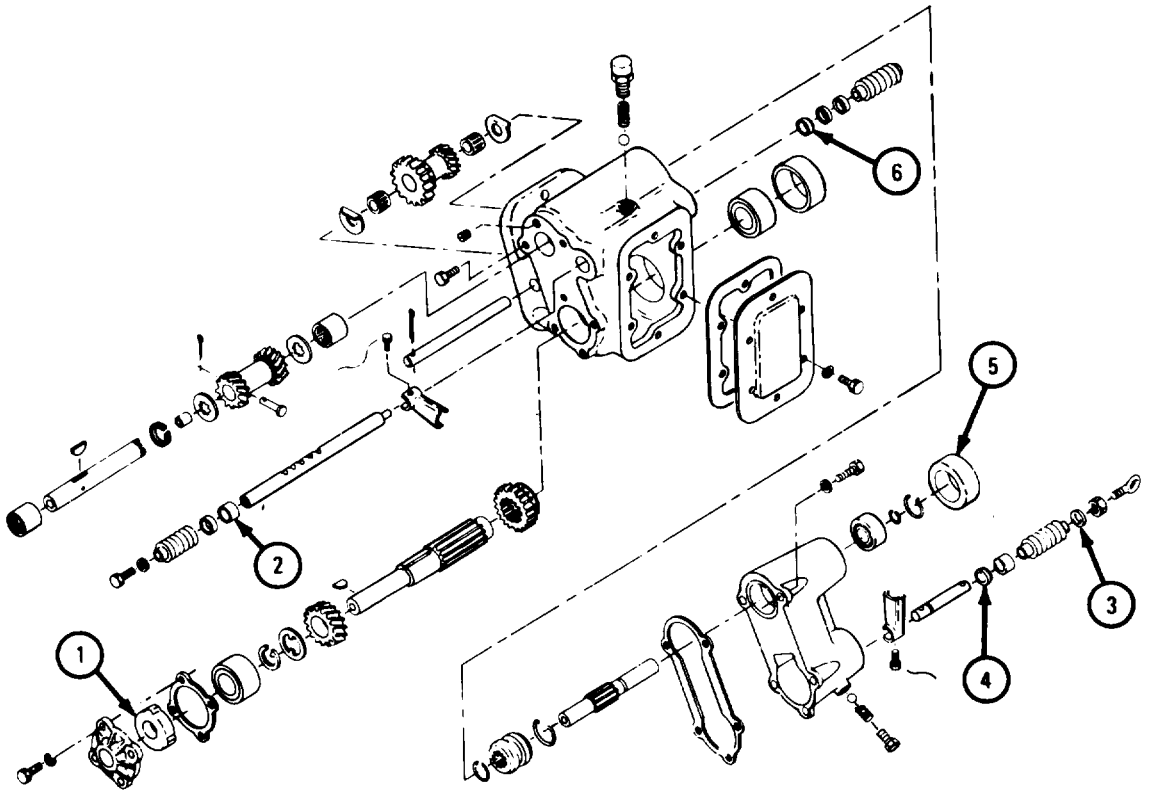
CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT IN THIS FRAME. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES OR ARE CHECKED IN ANOTHER FRAME.

TA 102605

FRAME 4

1. Check that seals (1 through 6) are not damaged.
2. Take out and throw away all damaged parts and get new ones in their place.

END OF TASK



NOTE

CHECK ONLY THOSE PARTS WHICH ARE CALLED OUT IN THIS FRAME. PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES OR ARE CHECKED IN ANOTHER FRAME.

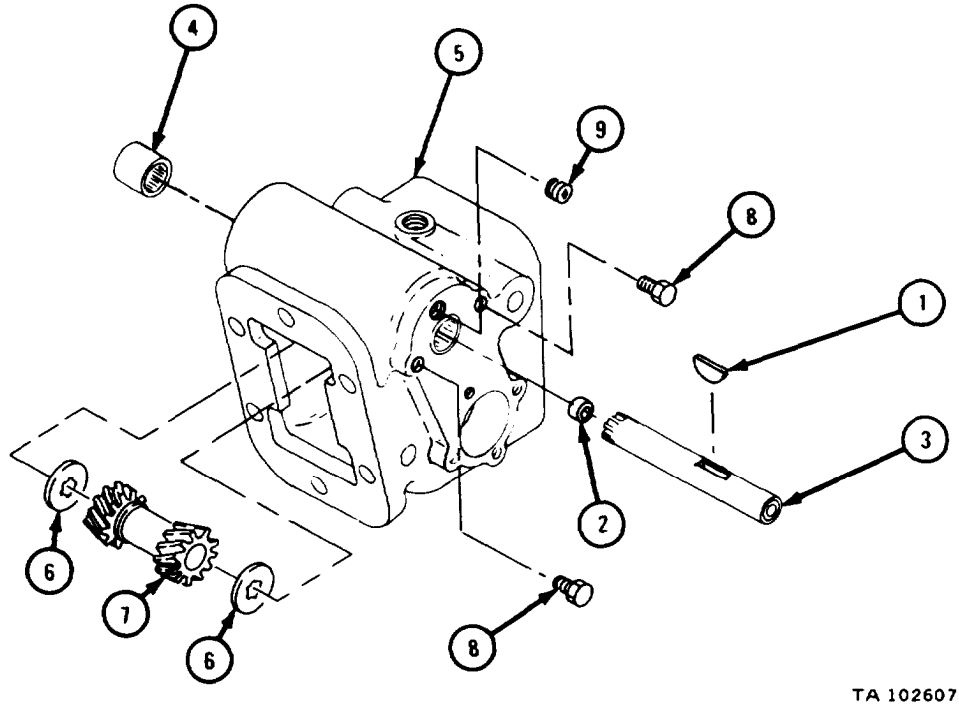
TA 102606

f. Assembly.

FRAME 1

1. Put key (1) and bushing (2) in place on reverse shaft (3). Put closed end bearing (4) into case (5).
2. Put reverse shaft (3) through bore of case (5), smooth end first.
3. Put one thrust washer (6) on reverse shaft (3). Push reverse shaft through reverse gear (7).
4. Put other thrust washer (6) on end of reverse shaft (3). Push reverse shaft into place.
5. Line up clevis hole in reverse gear (7) with clevis hole on reverse shaft (3).
6. Put in two bolts (8).
7. Put in plug (9).

GO TO FRAME 2

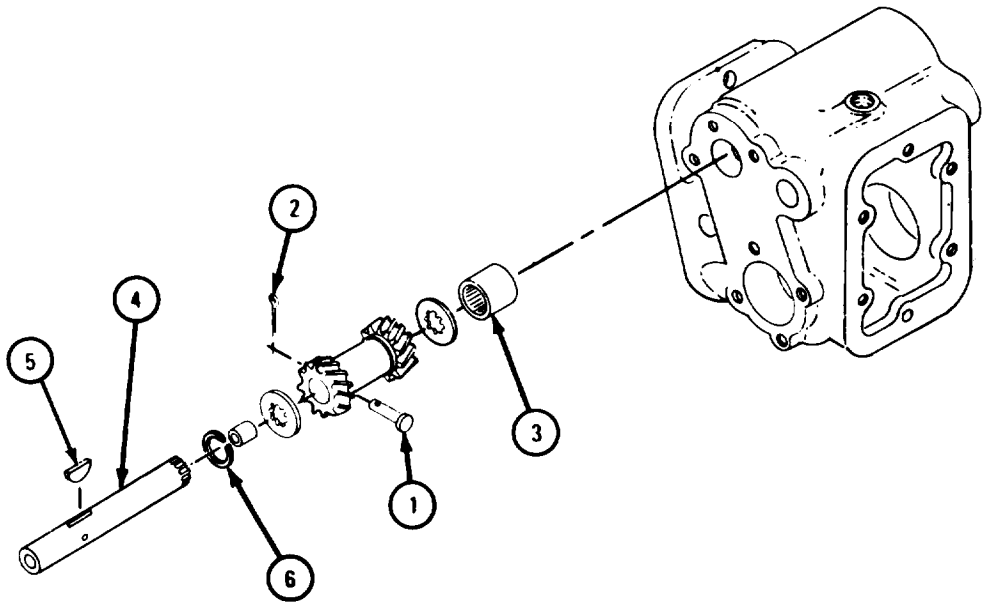


TA 102607

FRAME 2

1. Put in clevis pin (1). Put cotter pin (2) in end of clevis pin and bend open ends of cotter pin.
2. Put reverse gear shaft rear needle bearing (3) on reverse shaft (4). Refer to Part 1, para 7-7.
3. Put in woodruff key (5).
4. Put on snapring (6).

GO TO FRAME 3



NOTE

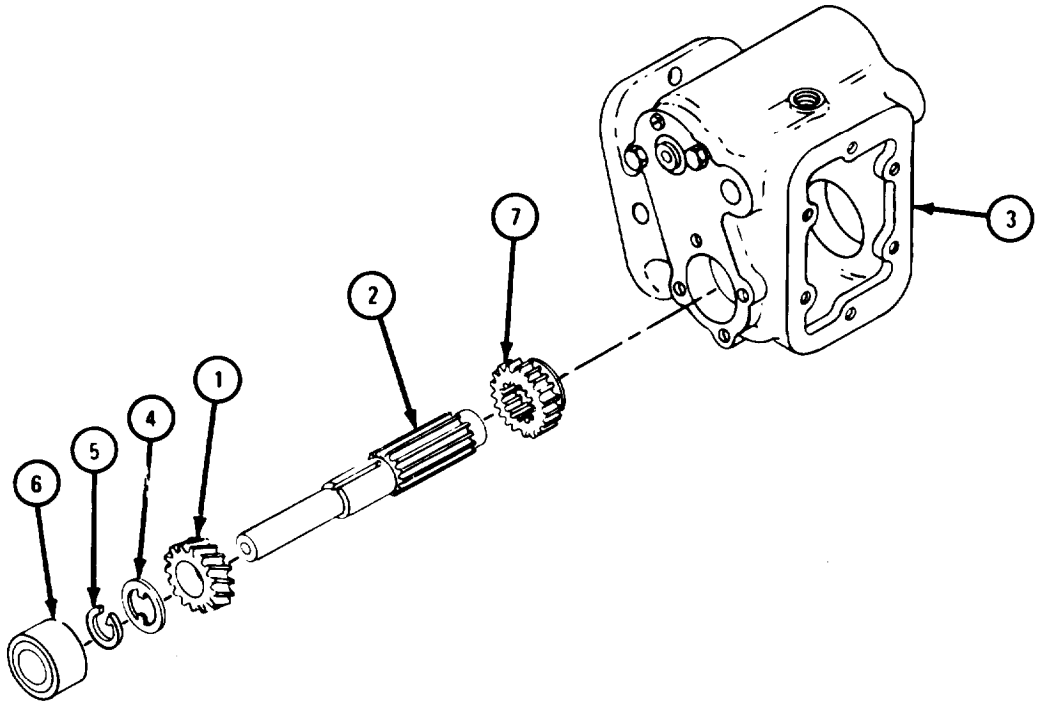
PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 102608

FRAME 3

1. Put gear (1) on shaft (2), with spiral end of gear toward front of case (3) as shown.
2. Put thrust washer (4) on shaft (2). Put on snapring (5).
3. Put bearing (6) on shaft (2). Put shaft into case (3) with splined end toward front of case. Put gear (7) on shaft with groove toward rear of case.

GO TO FRAME 4

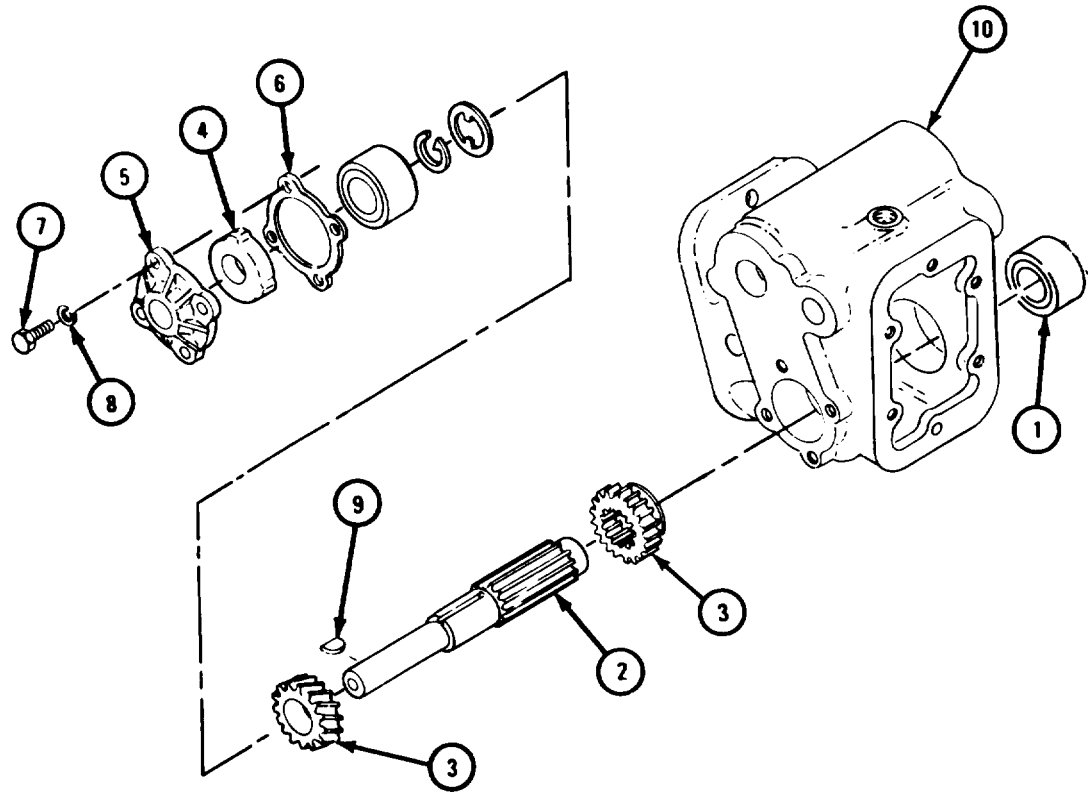


TA 102609

FRAME 4

1. Put bearing (1) on shaft (2). Refer to Part 1, para 7-7.
2. Put gears (3) on shaft (2).
3. Put oil seal (4) in cap (5).
4. Put gasket (6) and cap (5) in place.
5. Put in four screws (7) and washers (8).
6. Put key (9) into case (10).

GO TO FRAME 5



NOTE

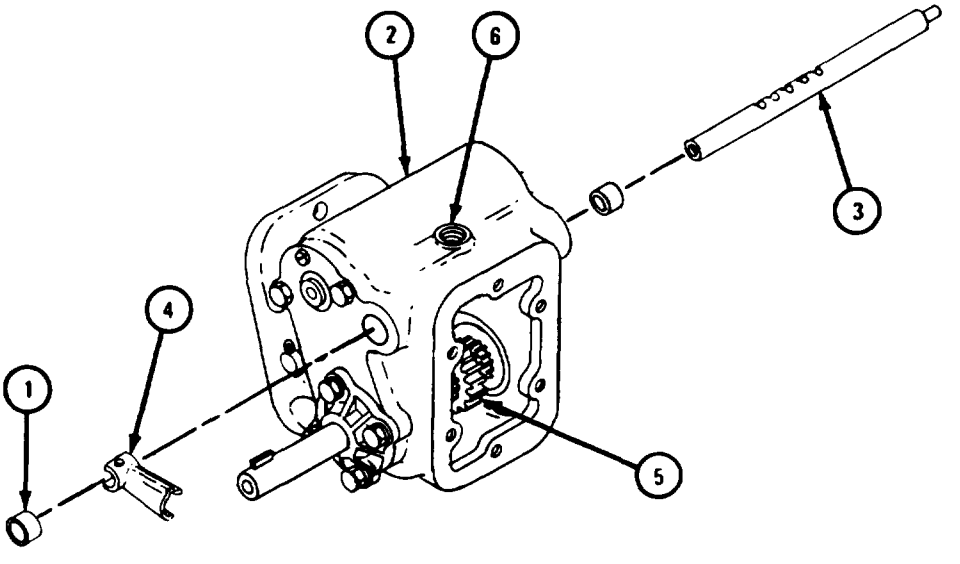
PARTS WITHOUT CALLOUTS ARE SHOWN ONLY FOR REFERENCE PURPOSES.

TA 102610

FRAME 5

1. Put two seals (1) in case (2) with lip of seals towards inside of case.
2. Slide shaft (3) into opening at rear of case (2), putting in end opposite step-cut first.
3. Put fork (4) in case (2) on gear (5) and push shaft through fork until slots in shaft can be seen through ball spring retainer opening (6) in case.

GO TO FRAME 6

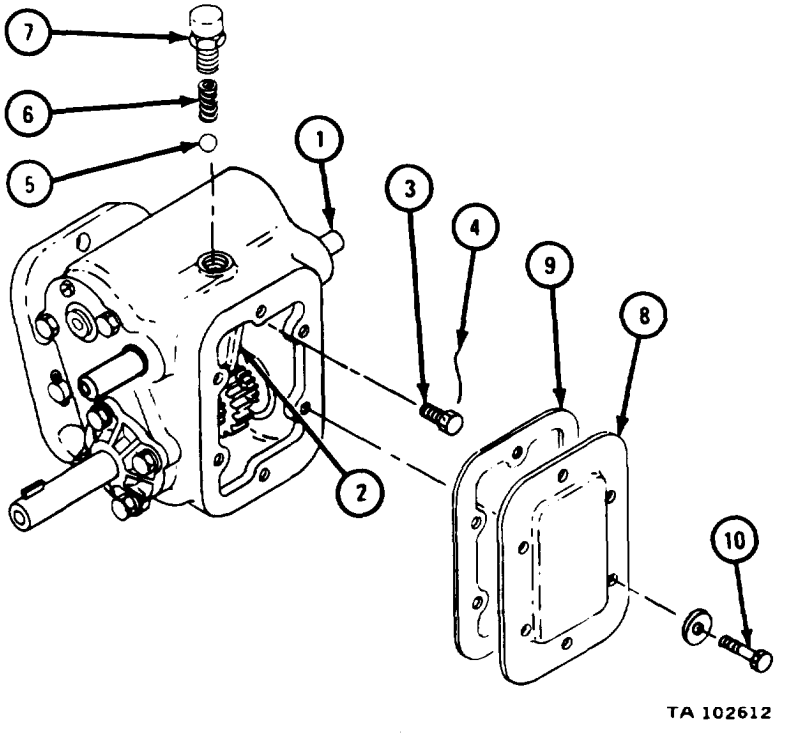


TA 102611

FRAME 6

1. Lineup slot in shaft (1) with fork (2).
2. Put in screw (3).
3. Put in safety wire (4).
4. Put ball (5) and spring (6) in place.
5. Put in retainer (7).
6. Put cover (8) and gasket (9) in place.
7. Put in six screws (10) with washers.

GO TO FRAME 7

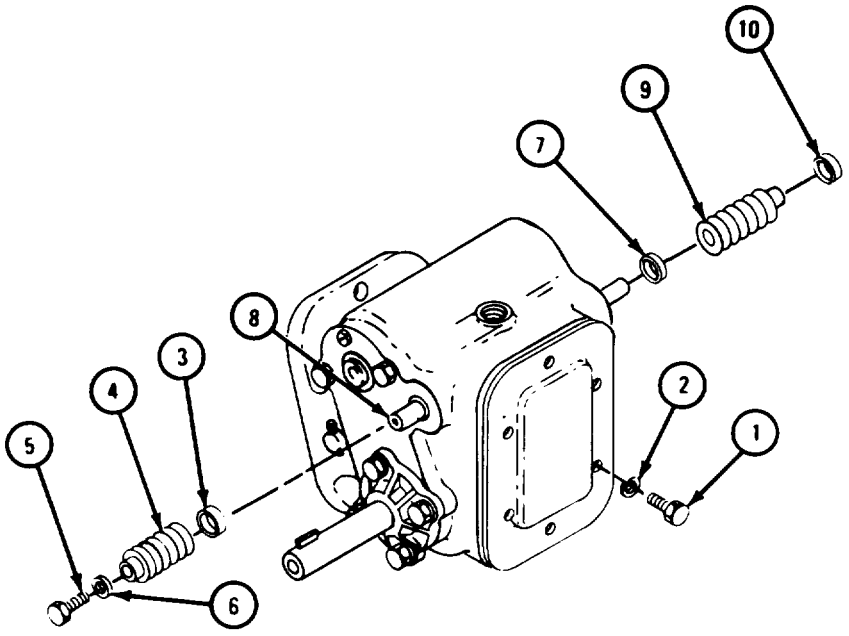


TA 102612

FRAME 7

1. Put in six screws (1) and lockwashers (2).
2. Put on retainer (3) and boot (4).
3. Put in screw (5) and washer (6).
4. Put oil seal (7) at rear of shaft (8).
5. Put in retainer (9) and washer (10).

GO TO FRAME 8

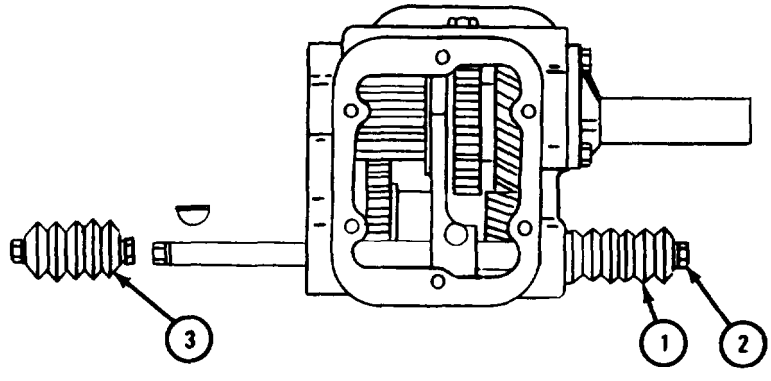


TA 102613

FRAME 8

1. Put boot (1) in place.
2. Put in screw and washer (2).
3. Put boot (3) in place.

IF WORKING ON DOUBLE OUTPUT POWER TAKEOFF, GO TO FRAME 9.
IF WORKING ON SINGLE OUTPUT POWER TAKEOFF, GO TO FRAME 14

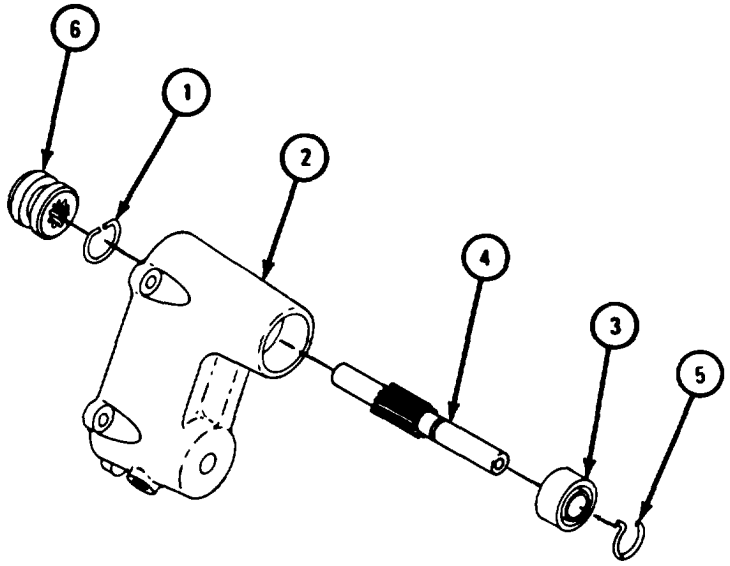


TA 102614

FRAME 9

1. Put snapring (1) in place in housing (2).
2. Put in bearing (3). Press bearing (3) on shaft (4).
3. Hold clutch (5) in place in housing (2) and slide shaft (4) through clutch.
4. Put in snapring (6).

GO TO FRAME 10

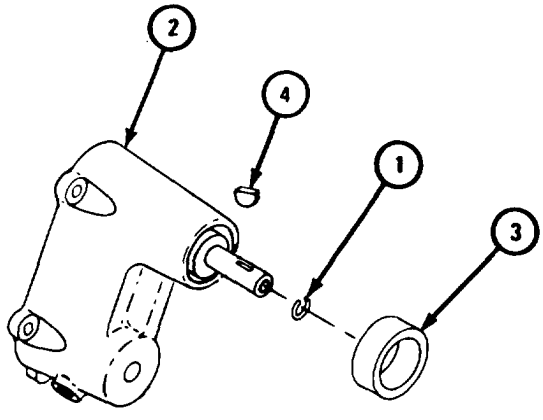


TA 102615

FRAME 10

1. Put snapring (1) in place in housing (2).
2. Put in seal (3).
3. Put in key (4).

GO TO FRAME 11

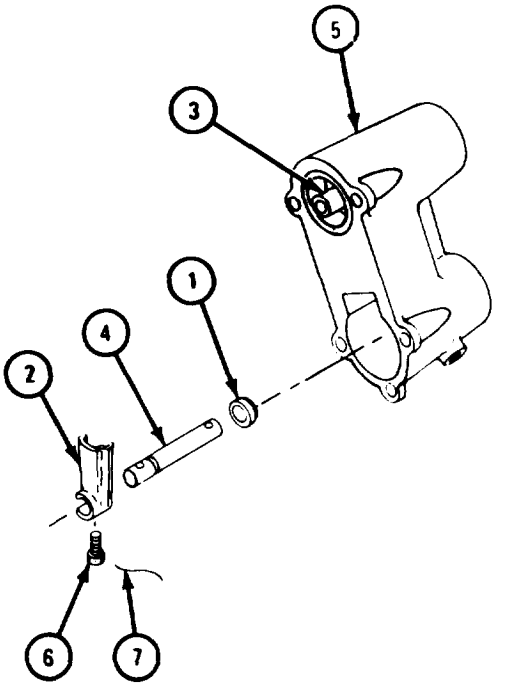


TA 102616

FRAME 11

1. Put in seal (1).
2. Put fork (2) in place on shaft (3).
3. Slide smooth end of shaft (4) through fork (2) until slots in shaft line up with ball retainer hole in housing (5).
4. Line up slot in shaft (4) with fork (2). Put in screw (6).
5. Put in safety wire (7).

GO TO FRAME 12

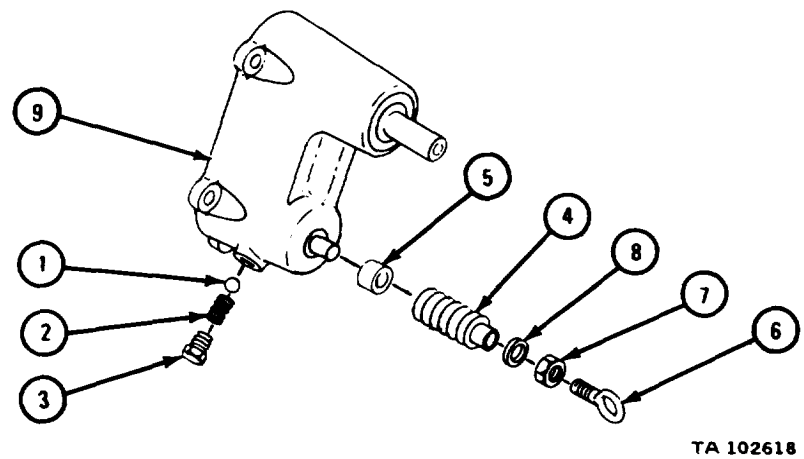


TA 102617

FRAME 12

1. Put in ball (1) and spring (2). Put in retainer (3).
2. Put in boot (4) and retainer (5). Put in eyebolt (6), nut (7), and washer (8).
3. Tighten nut (7) on housing (9).

GO TO FRAME 13

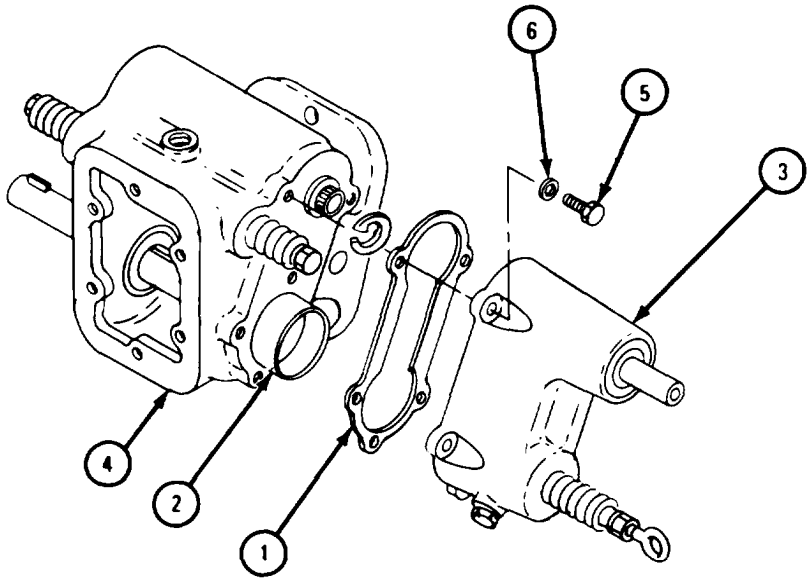


TA 102618

FRAME 13

1. Put gasket (1), spacer (2) and rear output housing assembly (3) in place on case assembly (4).
2. Put in five screws (5) and lockwashers (6).

GO TO FRAME 15

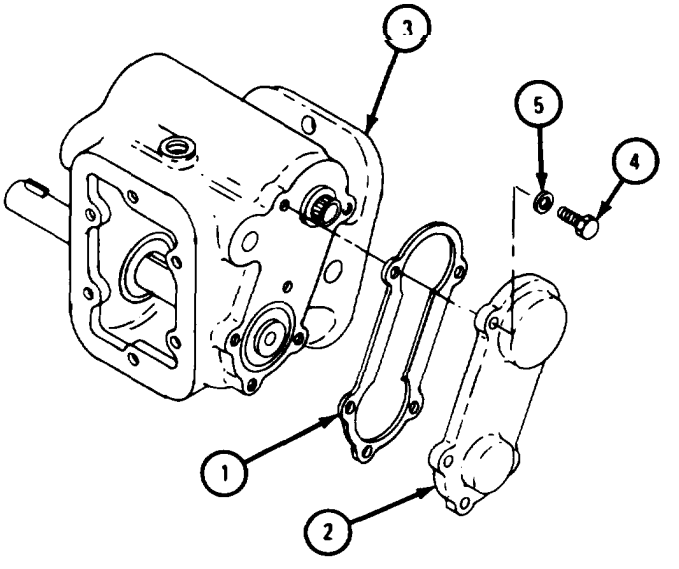


TA 102619

FRAME 14

1. Put gasket (1) and rear cover (2) in place on case assembly (3).
2. Put in four screws (4) and lockwashers (5).

GO TO FRAME 15

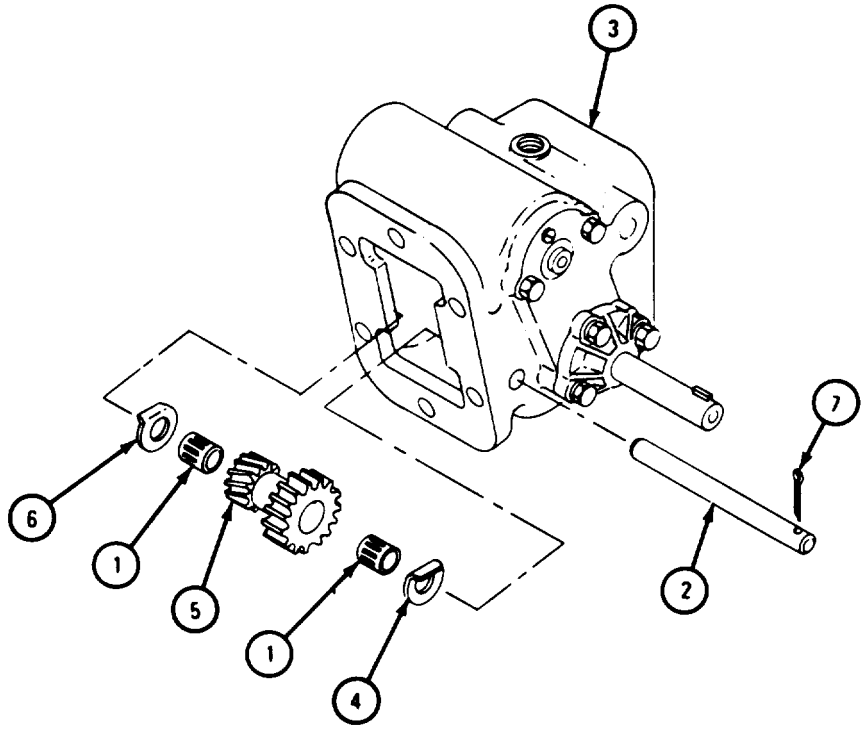


TA 102620

FRAME 15

1. Put in two bearings (1). Refer to Part 1, para 7-7.
2. Press shaft (2) into case (3). Put thrust washer (4) on shaft.
3. Press shaft through bearings (1) and gear (5). Put on thrust washer (6).
4. Press shaft all the way in.
5. Put in cotter pin (7).

END OF TASK



TA 102621

g. Replacement.

FRAME 1

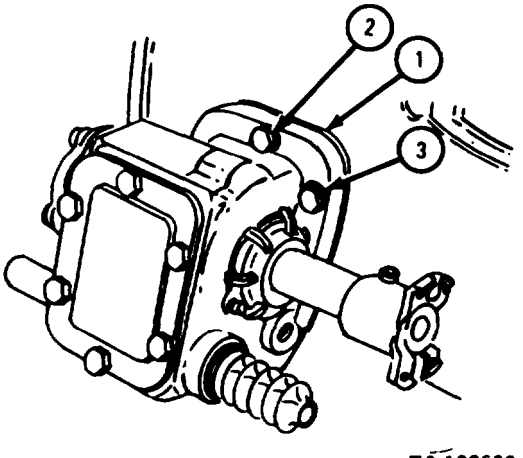
1. Put on gasket (1).
2. Put in six capscrews (2) with washers (3).

NOTE

Follow-on Maintenance Action Required:

1. On truck M51A2, replace hoist control linkage. Refer to para 17-22.
2. On truck M51A2, replace power takeoff-to-hydraulic hoist pump propeller shaft. Refer to TM 9-2320-211-20.
3. On trucks with front winches, replace power takeoff-to-hydraulic hoist pump propeller shaft. Refer to TM 9-2320-211-20.
4. On trucks with front winches, replace power takeoff control linkages. Refer to para 17-59.
5. Fill transmission. Refer to LO 9-2320-211-12.

END OF TASK



TA 102622

17-61. SWIVEL VALVE REMOVAL, REPAIR, AND REPLACEMENT (TRUCK M543A2).

TOOLS: No special tools required

SUPPLIES: Solvent, dry cleaning, type II (SD-2), Fed. Spec P-D-680
Cable seal
Valve body oil seal
Collector cap gasket
Valve cap gasket

PERSONNEL: TWO

EQUIPMENT CONDITION: Truck parked, engine off, handbrake set.

a. Preliminary Procedure. Raise boom to highest point of position crane supports. Refer to TM 9-2320-211-10.

b. Removal.

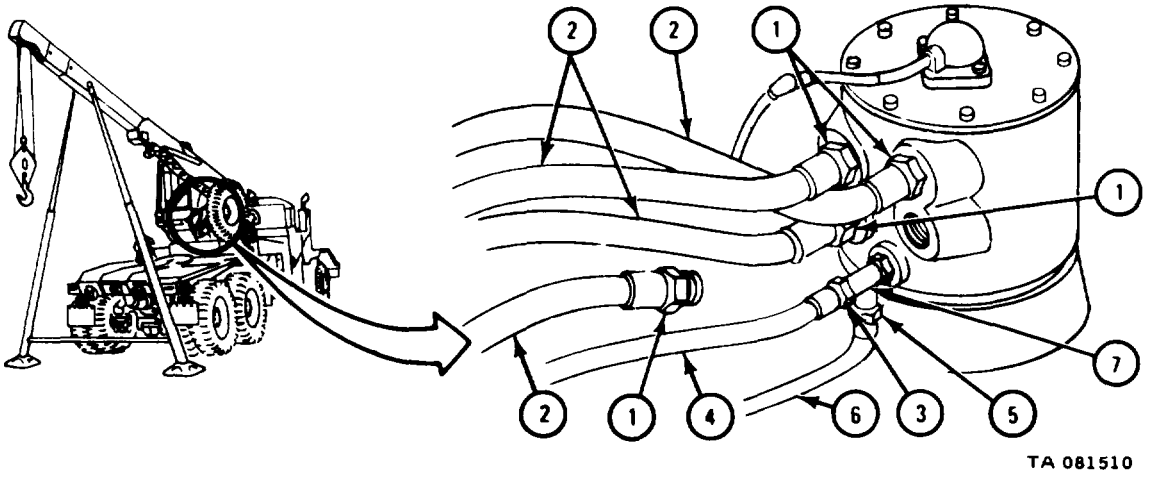
NOTE

Tag all hydraulic lines so they will be put back in the same place.

FRAME 1

1. Unscrew four nuts (1) and take off four hydraulic lines (2). Cap lines.
2. Unscrew nut (3) and take off hydraulic line (4). Cap line.
3. Unscrew nut (5) and take off hydraulic line (6). Cap line.
4. Unscrew and take out hydraulic tee (7).

GO TO FRAME 2

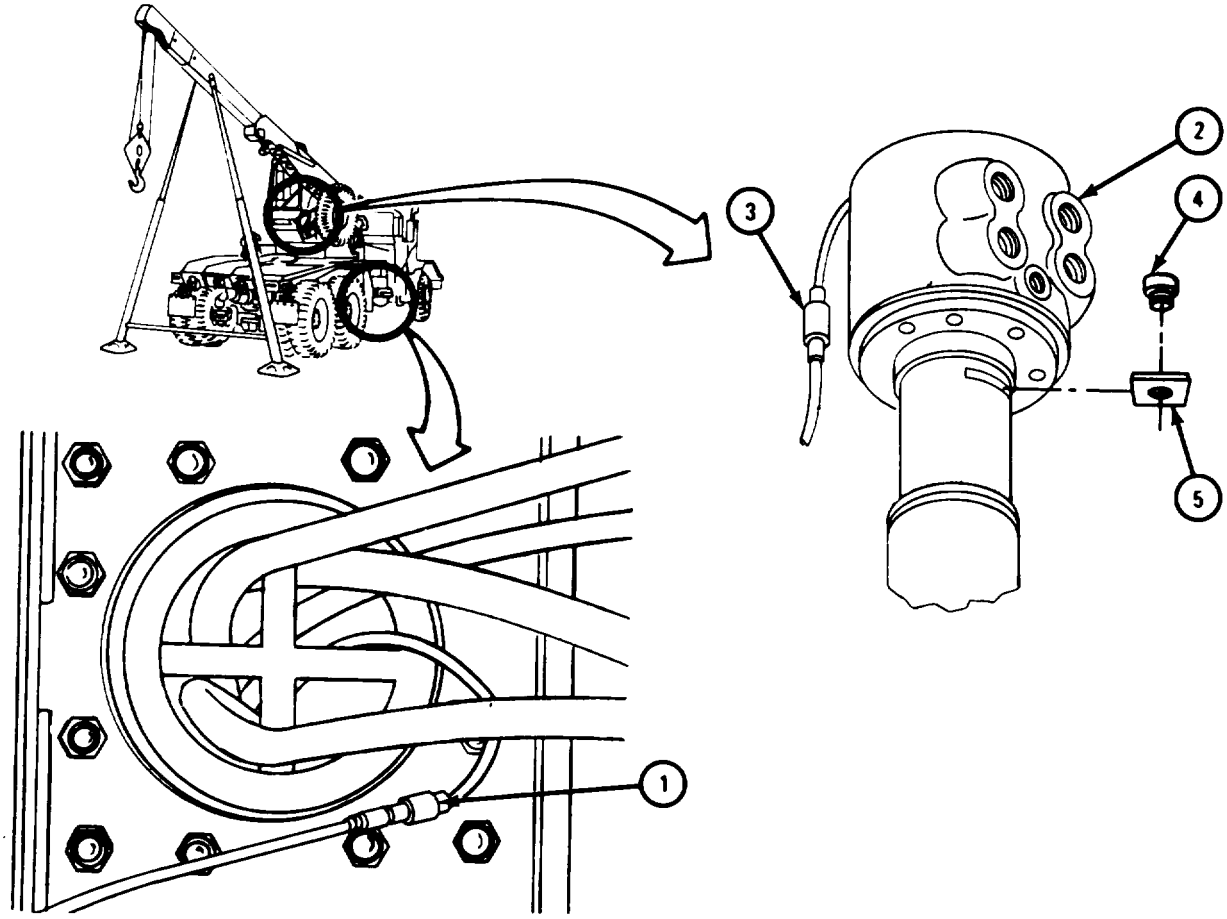


TA 081510

FRAME 2

1. Go under truck and pull apart electrical connection (1).
2. Go back to swivel valve (2) and pull apart electrical connection (3).
3. Loosen two screws (4) and slide two retaining plates (5) out of grooves in swivel valve (2).

GO TO FRAME 3

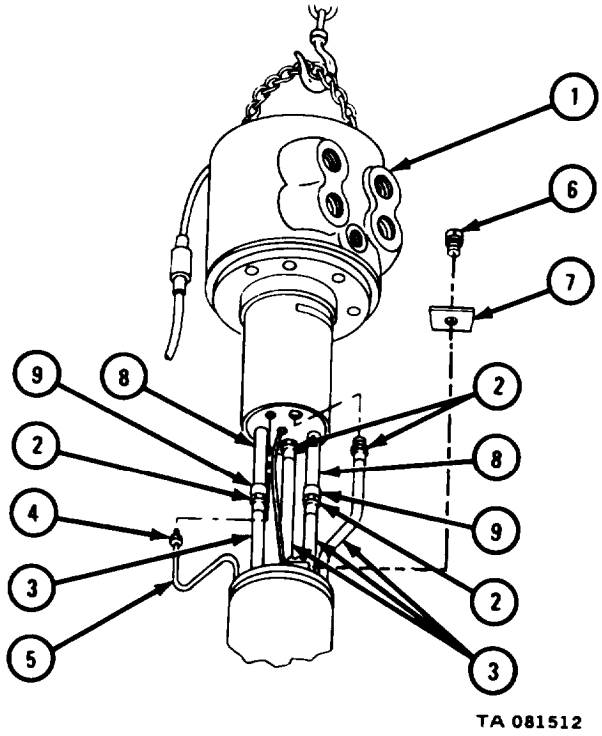


TA 081511

FRAME 3

Soldier A	1.	Using short chain and chain hoist, lift out and hold swivel valve (1).
Soldier B	2.	Unscrew four coupling nuts (2) and take off four hydraulic lines (3). Cap lines.
	3.	Unscrew coupling nut (4) and take off hydraulic line (5). Cap line.
	4.	Unscrew and take out two screws (6) . Take off two retaining plates (7).
	5.	Take off two nipples (8) with couplings (9).
Soldier A	6.	Using short chain and chain hoist, set swivel valve (1) down on work bench.

END OF TASK



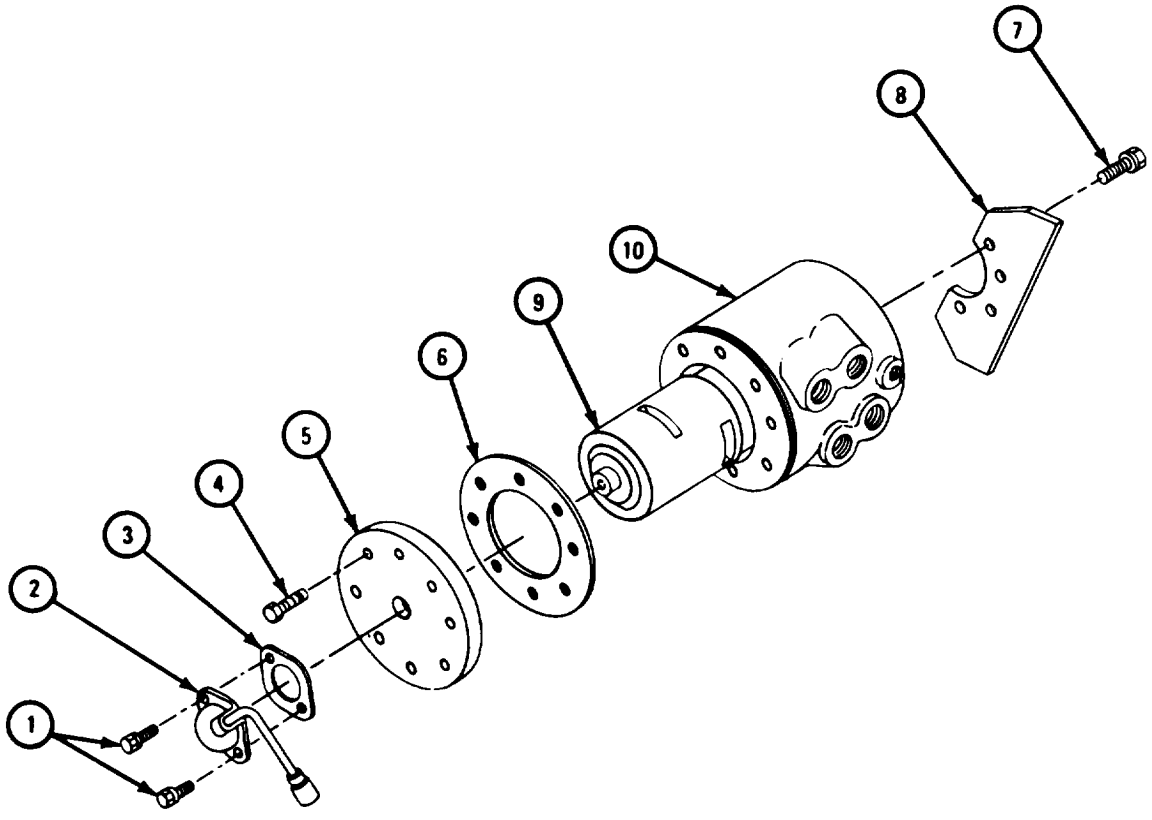
TA 081512

c. Disassembly.

FRAME 1

1. Unscrew and take out two screws and washers (1). Take off collector cap (2) and gasket (3). Throw away gasket.
2. Unscrew and take out eight screws (4). Take off swivel valve cap (5) and gasket (6). Throw away gasket.
3. Unscrew and take out four screws and washers (7) from valve guide (8).
4. Slide inner valve plug (9) out of valve body (10).

GO TO FRAME 2

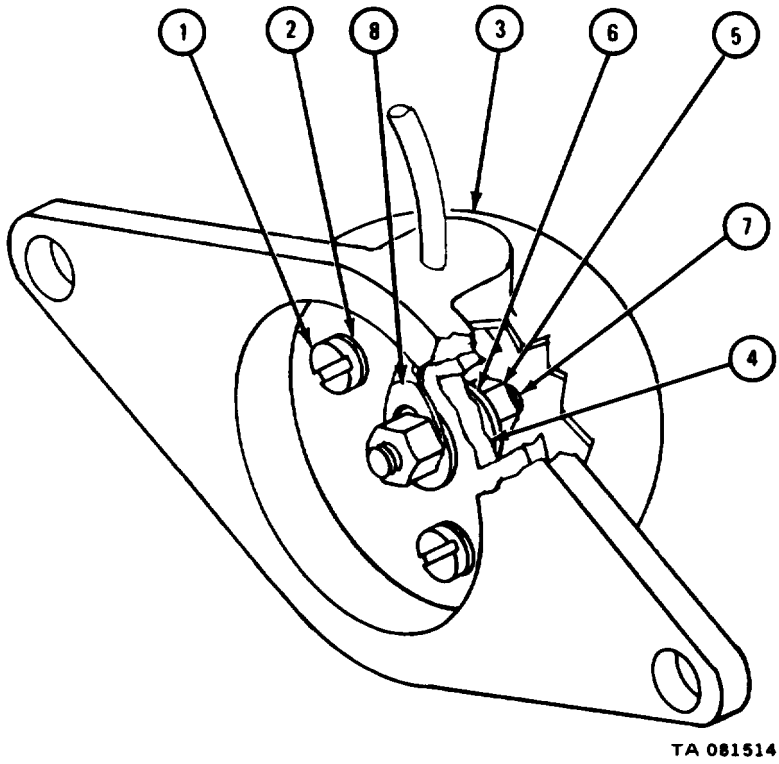


TA 081513

FRAME 2

1. Unscrew and take out two screws (1) and washers (2) from inside collector cap (3).
2. Lift out insulator (4) and unscrew and take off nut (5) and washer (6).
3. Take out screw (7).
4. Take off insulator (4).
5. Pull electrical lead (8) out of collector cap (3).

GO TO FRAME 3

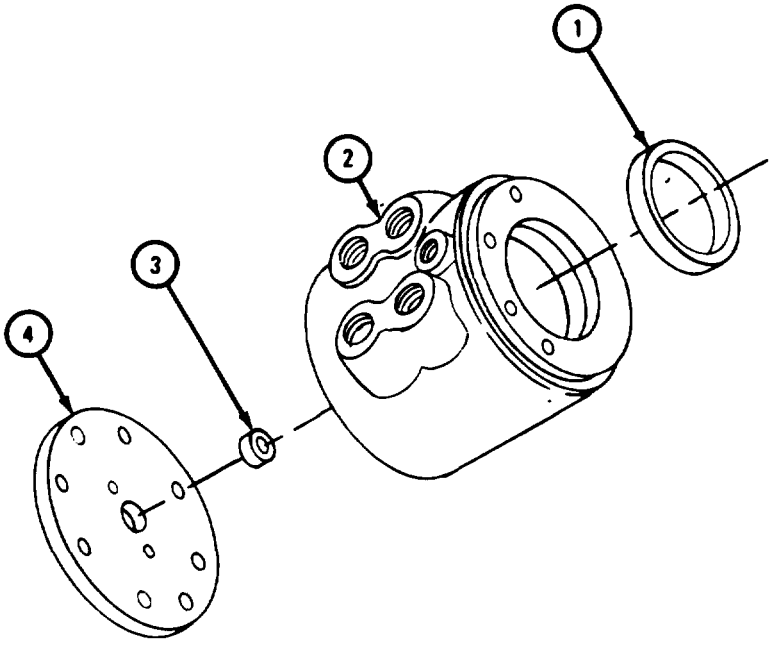


TA 081514

FRAME 3

1. Take out and throw away oil seal (1) from valve body (2).
2. Take out and throw away cable seal (3) from swivel valve cap (4).

END OF TASK



TA 081515

d. Cleaning.

WARNING

Dry cleaning solvent is flammable. Do not use near an open flame. Keep a fire extinguisher nearby when solvent is used. Use only in well-ventilated places. Failure to do this may result in injury to personnel and damage to equipment.

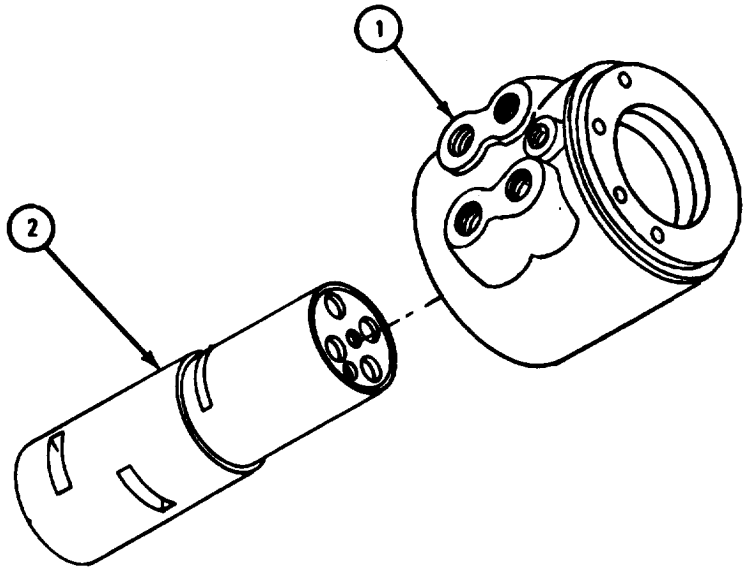
Using solvent, clean all metal parts.

e. Inspection and Repair.

FRAME 1

1. Check that valve body (1) and inner valve plug (2) are not nicked, scratched or burred.
2. Using soapstone, take off small nicks, scratches, and burrs as needed from valve body (1) and inner valve plug (2). If valve body of inner valve plug is damaged in any other way, get a new one.

END OF TASK



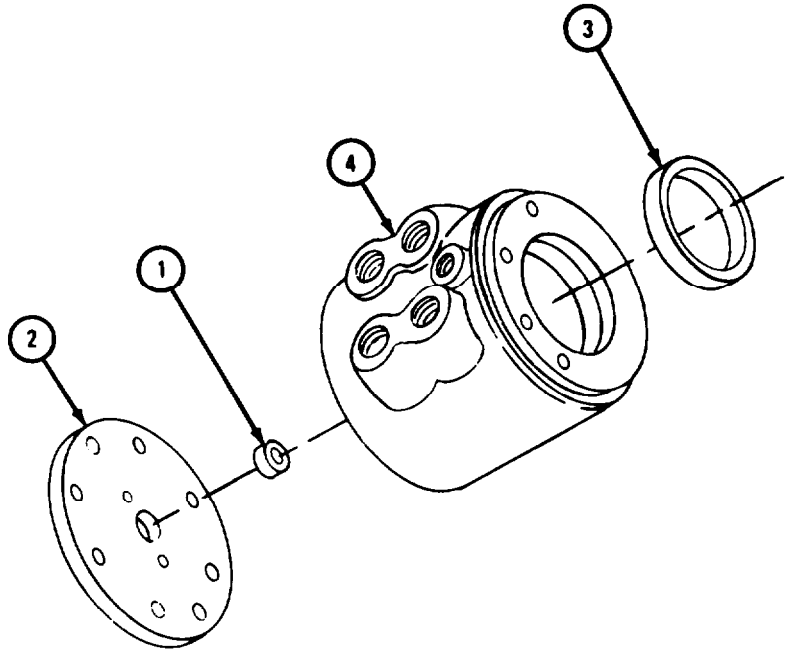
TA 081516

f. Assembly.

FRAME 1

1. Put cable seal (1) in swivel valve cap (2).
2. Put oil seal (3) in valve body (4).

GO TO FRAME 2

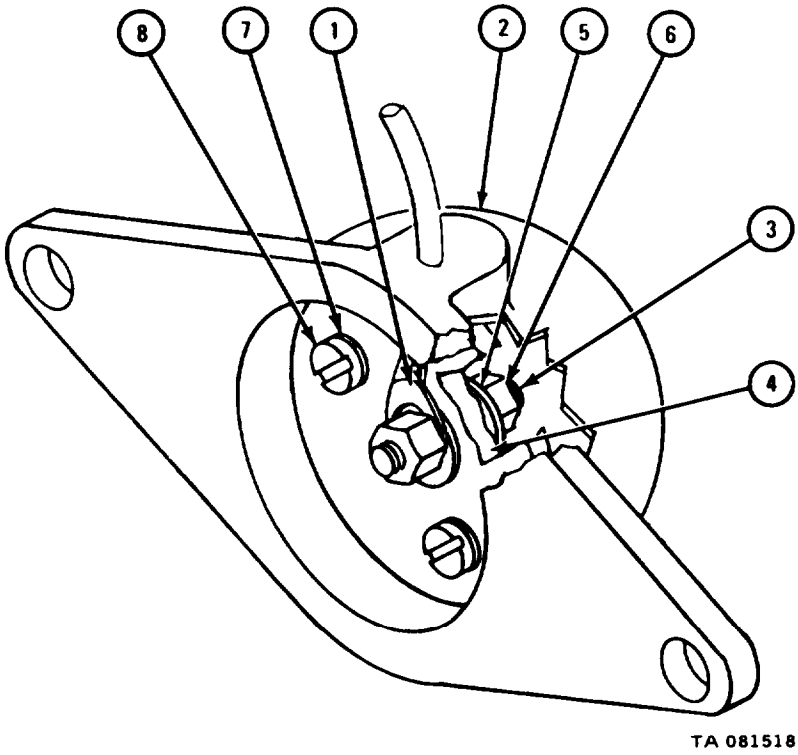


TA 081517

FRAME 2

1. Slide electrical lead (1) into collector cap (2).
2. Put screw (3) through terminal of electrical lead (1) and insulator (4).
3. Screw on and tighten washer (5) and nut (6).
4. Put insulator (4) in place in collector cap (2).
5. Screw in and tighten two washers (7) and screws (8).

GO TO FRAME 3

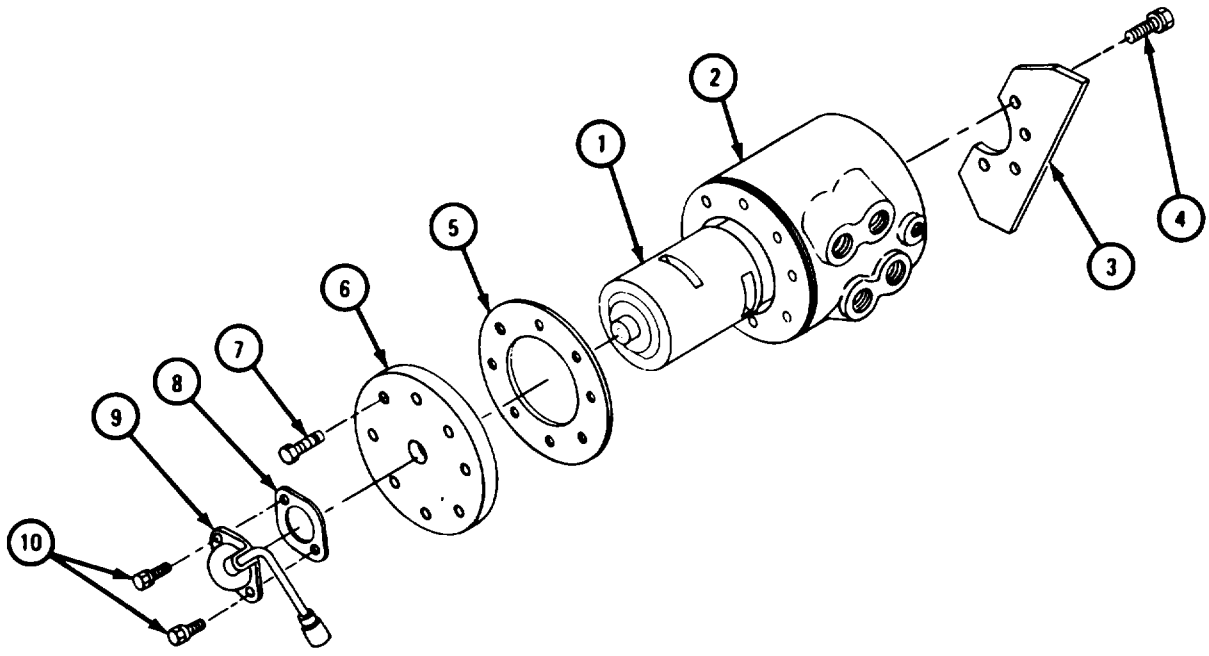


TA 081518

FRAME 3

1. Slide inner valve plug (1) into valve body (2).
2. Put valve guide (3) on body and screw in and tighten four screws and lockwashers (4).
3. Put gasket (5) and swivel valve cap (6) in place on valve body (2).
4. Screw in and tighten eight screws (7).
5. Put gasket (8) and collector cap (9) in place.
6. Screw in and tighten two screws and lockwashers (10).

GO TO FRAME 4

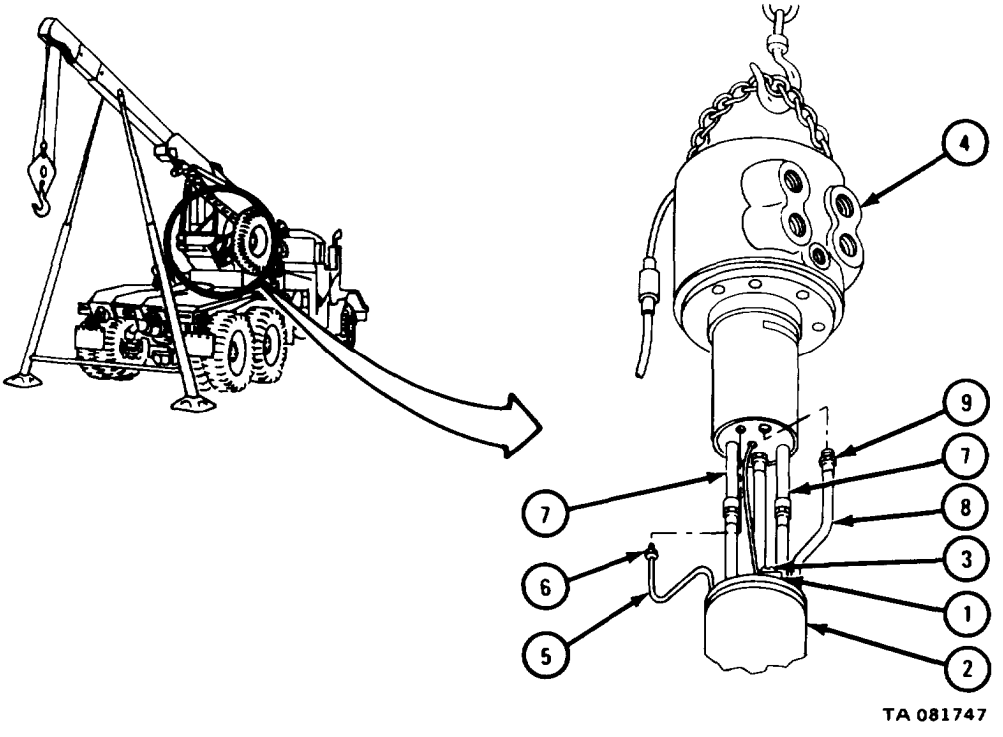


TA 081519

FRAME 4

Soldier A	1.	Put two retaining plates (1) in place on pivot post (2).
	2.	Screw in but do not tighten two screws (3).
Soldier B	3.	Using short chain and chain hoist, hold swivel valve (4) over pivot post (2).
Soldier A	4.	Uncap and hold hydraulic line (5) in place on swivel valve (4) as tagged. Tighten coupling nut (6). Take off tag.
	5.	Screw in and tighten two pipe nipples with couplings (7).
	6.	Uncap and hold four hydraulic lines (8) in place as tagged. Tighten four coupling nuts (9). Take off tag.

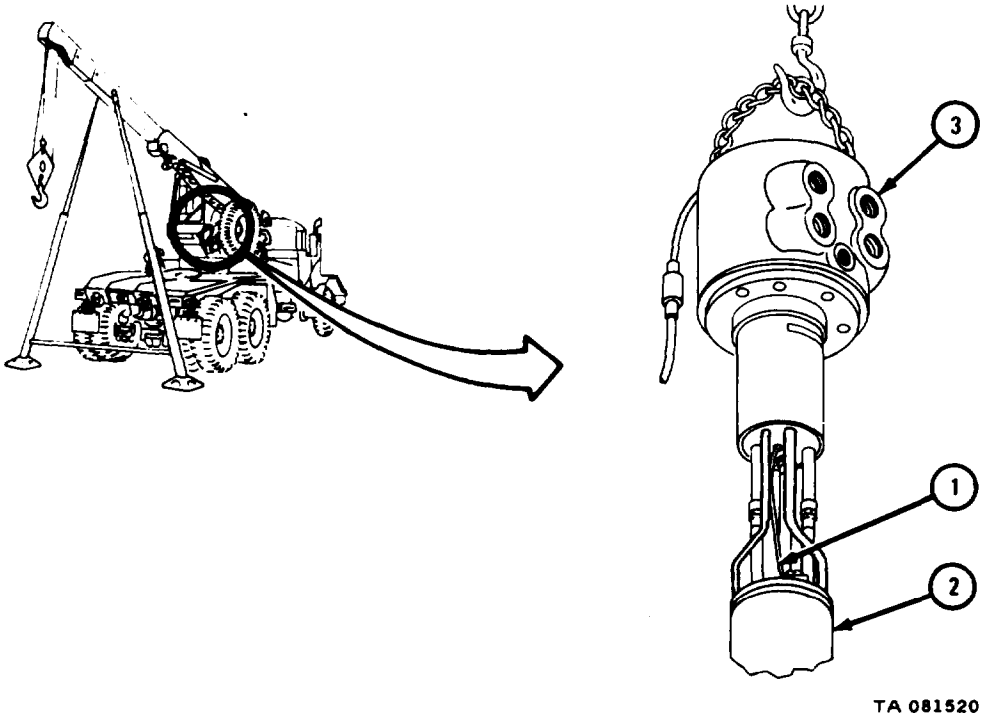
END OF TASK



g. Replacement.

FRAME 1

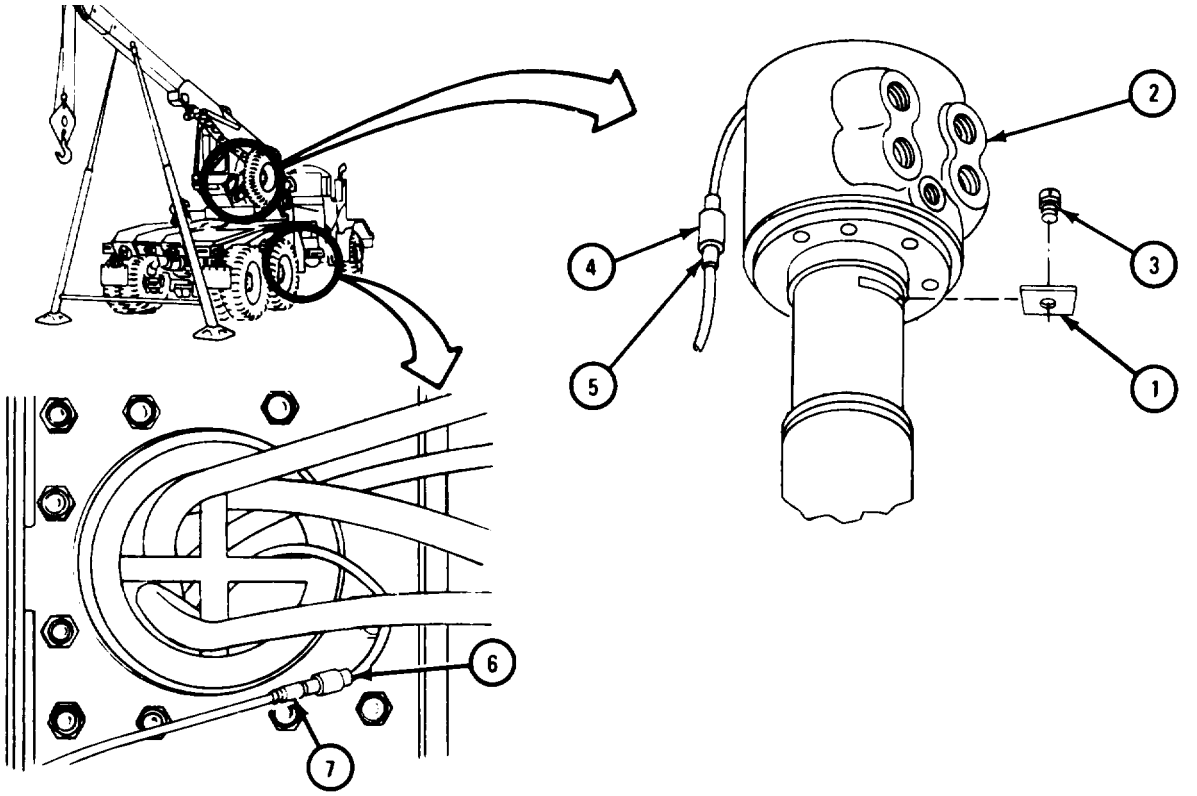
Soldier A 1. Route electrical lead (1) through opening at bottom of pivot post (2).
Soldier B 2. Using chain hoist, put swivel valve (3) in place on pivot post (2).
GO TO FRAME 2



FRAME 2

1. Put two retaining plates (1) in grooves in swivel valve (2).
2. Tighten two screws (3).
3. Plug electrical leads (4 and 5) together.
4. Go under truck and plug electrical leads (6 and 7) together.

GO TO FRAME 3



TA 081521

FRAME 3

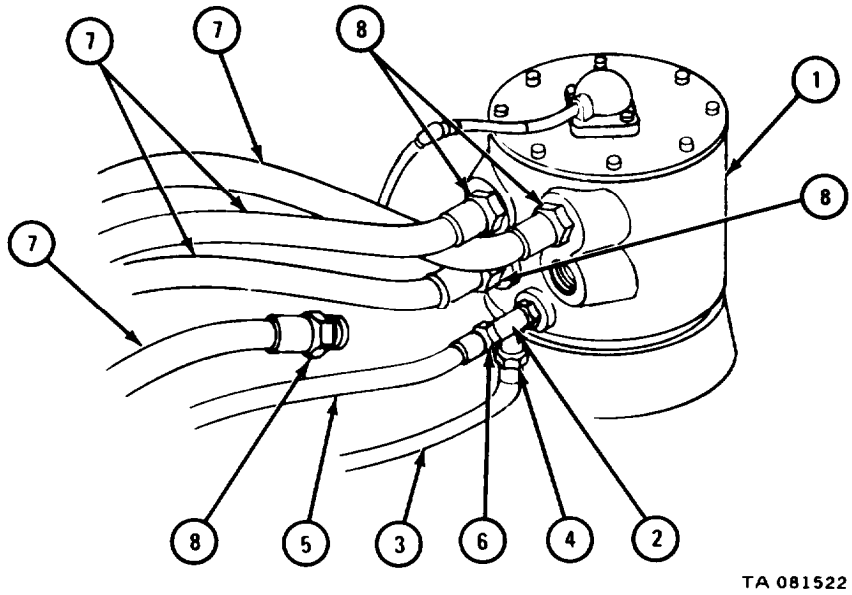
1. Go back to swivel valve (1).
2. Screw in and tighten connector (2).
3. Uncap and hold hydraulic line (3) in place on connectors (2) as tagged. Tighten coupling nut (4). Take off tag.
4. Uncap and hold hydraulic line (5) in place as tagged. Tighten coupling nut (6). Take off tag.
5. Uncap and hold four hydraulic lines (7) in place as tagged. Tighten four coupling nuts (8). Take off tags.

NOTE

Follow-on Maintenance Action Required:

1. Fill hydraulic reservoir. Refer to LO 9-2320-211-12.
2. Check swivel valve for proper operation. Refer to TM 9-2320-211-10.

END OF TASK



TA 081522

By Order of the Secretaries of the Army and the Air Force:

E. C. MEYER
General, United States Army
Chief of Staff

Official:

J. C. PENNINGTON
Major General, United States Army
The Adjutant General

LEW ALLEN, JR., General, USAF
Chief of Staff

Official:

VAN L. CRAWFORD, JR., Colonel, USAF
Director of Administration

Distribution:

To be distributed in accordance with DA Form 12-38, Direct and General Support Maintenance requirements for 5-Ton Truck Chassis: 5-Ton, 6x6, M39A2.

*U.S. GOVERNMENT PRINTING OFFICE: 1995 - 395-878/30719

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)
CDR, 1st Bn, 65th ADA
Attn: SP4 Jane Idone
Key West, FL 33040

DATE SENT
Date sent in

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 9-2320-211-34-2-3	25 Feb 1981	DIR. & GEN. SUPPORT MAINT. MANUAL

BE EXACT PIN-POINT WHERE IT IS

PAGE NO	PARAGRAPH	FIGURE NO	TABLE NO
17-51	17-9 b		
17-148			17-4
17-733	17-54 c (3)		

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

FRAME 1, step 2 reads "Put in four screws (3 and 4) and four lockwashers (5 and 6)." Should read "Put in and tighten four screws (3 and 4) and four lockwashers (5 and 6) to 80 to 100 pound-feet."

Item 4, wear limit is given as 5.1173 inches. Should be 5.1173 to 5.1181 inches.

FRAME 3, change illustration callouts. Reason: callouts for pump shaft (1) and input shaft and arm assembly (4) are reversed.

SAMPLE

PRINTED NAME GRADE OR TITLE AND TELEPHONE NUMBER	SIGN HERE
SP4 Jane Idone Autovon 222-2224	Jane Idone

DA FORM 1 JUL 79 2028-2

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

REVERSE OF DA FORM 2028-2

FILL IN YOUR UNIT'S ADDRESS

FOLD

DEPARTMENT OF THE ARMY

OFFICIAL BUSINESS

SAMPLE

Commander
U.S. Army Tank-Automotive Command
ATTN: DRSTA-MB
Warren, MI 48090

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	PUBLICATION DATE	PUBLICATION TITLE
TM 9-2320-211-34-2-3	25 Feb 1981	DIR. & GEN. SUPPORT MAINT. MANUAL

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 1 JUL 79 2028-2

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

REVERSE OF DA FORM 2028-2

FILL IN YOUR UNIT'S ADDRESS

FOLD BACK

DEPARTMENT OF THE ARMY

OFFICIAL BUSINESS

Commander
U.S. Army Tank-Automotive Command
ATTN: DRSTA-MB
Warren, MI 48090

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	PUBLICATION DATE	PUBLICATION TITLE
TM 9-2320-211-34-2-3	25 Feb 1981	DIR. & GEN. SUPPORT MAINT. MANUAL

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 1 JUL 79 **2028-2**

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

REVERSE OF DA FORM 2028-2

FILL IN YOUR UNIT'S ADDRESS

FOLD BACK

DEPARTMENT OF THE ARMY

OFFICIAL BUSINESS

TEAR ALONG PERFORATED LINE

Commander
U.S. Army Tank-Automotive Command
ATTN: DRSTA-MB
Warren, MI 48090

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

SOMETHING WRONG WITH THIS PUBLICATION?

FROM (PRINT YOUR UNIT'S COMPLETE ADDRESS)

DATE SENT

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 9-2320-211-34-2-3	25 Feb 1981	DIR. & GEN. SUPPORT MAINT. MANUAL

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 1 JUL 79 2028-2

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

REVERSE OF DA FORM 2028-2

FILL IN YOUR UNIT'S ADDRESS

FOLD BACK

DEPARTMENT OF THE ARMY

OFFICIAL BUSINESS

Commander
U.S. Army Tank-Automotive Command
ATTN: DRSTA-MB
Warren, MI 48090

TEAR ALONG PERFORATED LINE

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

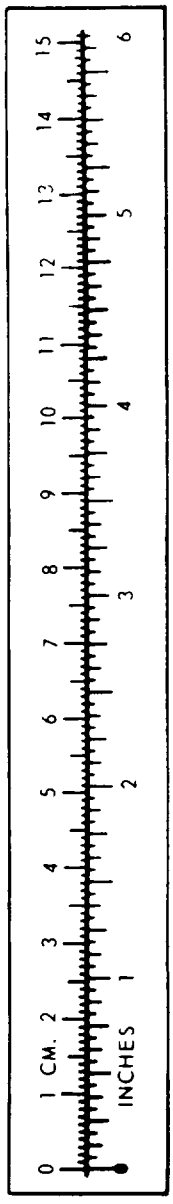
TEMPERATURE

$\frac{5}{9}(°F - 32) = °C$
212° Fahrenheit is equivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
$\frac{9}{5}\,°C + 32 = °F$

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
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



TA089991