TM 10-3930-255-35

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

MAINTENANCE MANUAL

DS, GS, AND DEPOT

TRUCK, LIFT, FORK, ELECTRIC

SOLID RUBBER TIRES, 2,000-POUND CAPACITY

ARMY MODEL MHE-197, BAKER MODEL FTD-020-EE,

FSN 3930-724-4058, 100-IN. LIFT

FSN 3930-965-0075, 130-IN. LIFT

HEADQUARTERS DEPARTMENT OF THE ARMY

APRIL 1965

SAFETY PRECAUTIONS

OPERATION

Refer to TM 10-3930-255-10 for safety precautions to be observed during operation of the forklift truck.

HYDRAULIC SYSTEMS

Before working on any part of the hydraulic systems, be sure-

1. Lift carriages is fully lowered.
2. Mast is tilted fully DOWN.
3. All hydraulic pressure is relieved from unit or hose to be serviced.
4. All personnel and materiel are , clear, should some system be operated accidentally.
5. Battery at charging receptacle, except when battery power is required to support the maintenance being done, is disconnected.

ELECTRICAL SYSTEM

1. Avoid contact with spilled electrolyte . It is corrosive to most metals and fabrics and can burn skin if not washed off immediately with running water.
2. Be very careful of flame, smoking, or creating sparks by short circuiting near charging or recently charged batteries. Hydrogen gas given off during charging is explosive and easily ignited.
3. Disconnect battery at charging receptacle, except when battery is needed to support maintenance being done.
4. Remove rings, metal watch bands or any object which might short across the electrical circuit. Serious burns can result, and equipment can be damaged if this is not done.

TECHNICAL MANUAL
No. 10-3930-255-35

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 5 April 1965

DS, GS, and Depot Maintenance Manual

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SOLID RUBBER TIRES,

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ARMY MODEL MHE-197, BAKER MODEL FTD-020-EE,

FSN 3930-724-4058, (100-IN. LIFT)

FSN 3930-965-0075 (130-IN. LIFT)

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1. Scope

These instructions are published for the use of personnel responsible for direct and general support and depot maintenance of Truck, Lift, Fork, Electric, Solid Rubber Tires, 2,000-Pound Capacity, Baker Model FTD-020-EE, Army Model MHE-197, Federal stock No. 3930-7244058 (100-in. lift), Federal stock No. 3930965-0075 (130-in. lift). Instructions in this manual are applicable to trucks procured under contract number DSA4-020840-MP302.

2. Appendixes

Appendix I contains a list of publications applicable to this manual. Appendix II contains the direct support maintenance of organizational level service on receipt of new equipment (TM 10-3930-255-10). The maintenance allocation chart is located in the organizational maintenance Manual (TM 10-3930-255-20). Direct and general support and depot maintenance repair parts are listed in TM 10-3930255-85P.

3. Maintenance Forms and Records

The maintenance forms, records, and reports to be used in direct and general support and depot maintenance of this truck are listed and described in TM 38-750.

4. Reporting of Equipment Manual Improvements

a. The direct reporting of errors, omissions, and recommendations for improving this manual by the individual user is authorized and encouraged. DA Form 2028 (Recommended Changes to DA Publications) will be used for reporting these improvements. This form will be completed in triplicate using pencil, pen, or typewriter. The original and one copy will be forwarded direct to Commanding General, U.S. Army Mobility Equipment Center, ATTN: SMOME-MMP, Post Office raster 58, St. Louis, Mo. 63166.

b. Report all equipment improvement recommendations as prescribed by TM 38-750.

5. Orientation

Throughout this manual, the use of the terms right, left, front, and rear, indicates directions from the viewpoint of the operator sitting in the seat of the truck, unless it is obvious from the text this is not intended.

Section II. DESCRIPTION AND DATA

6. Description

Refer to TM 10-3930-255-20 for a general description of the truck.

7. Tabulated Data

Refer also to TM 10-3930-255-10 and TM 10-3930-255-20 for tabulated data related to the organizational maintenance level.

a. Electrical System (fig. 1).

(1) Battery type ---------- GFE, (Government Furnished Equipment) either lead-acid or nickel-iron, alkaline electrolyte. 36 volt, dc, two-wire, battery, spark enclosed.

(2) Motors ---------- Pump motor, travel motor
(a) Type ---------- Series wound, relay energized
(b) Overload protection ---------- Thermal relays (on motor housings and in resistor compartment).

Fuses (in control circuit) Fusetrons (in motor lines)
(c) Pump motor ---------- Controlled by lift and tilt valve actuated switch. Runs only as needed. Constant speed.

(d) Travel motor ---------- Reversible. Four speeds available. Reversing by reversing field current polarity. Speed and power control by selection of resistances in motor circuit.

(e) Travel motor controls:
1. Direction ---------- Directional control switch on steering column. Forward Off Reverse.

2. Speed ---------- Accelerator master assembly. Four cam actuated microswitches energize control relays in sequence. Time delay acceleration and plugging control incorporated.

b. Hydraulic System.

(1) System pressure ---------- 1650 psi (pounds per square inch) relief valve setting.
(2) Hoist speed empty (both lift heights). 50 fpm
(3) Hoist speed loaded ---------- 35 fpm
(4) Main pump
(a) Type ---------- Gear
(b) Capacity (rated) ---------- 3.4 gpm (gallons per minute) at 1000 psi and 1200 rpm.
(c) Actuation ---------- Switch at lift and tilt control

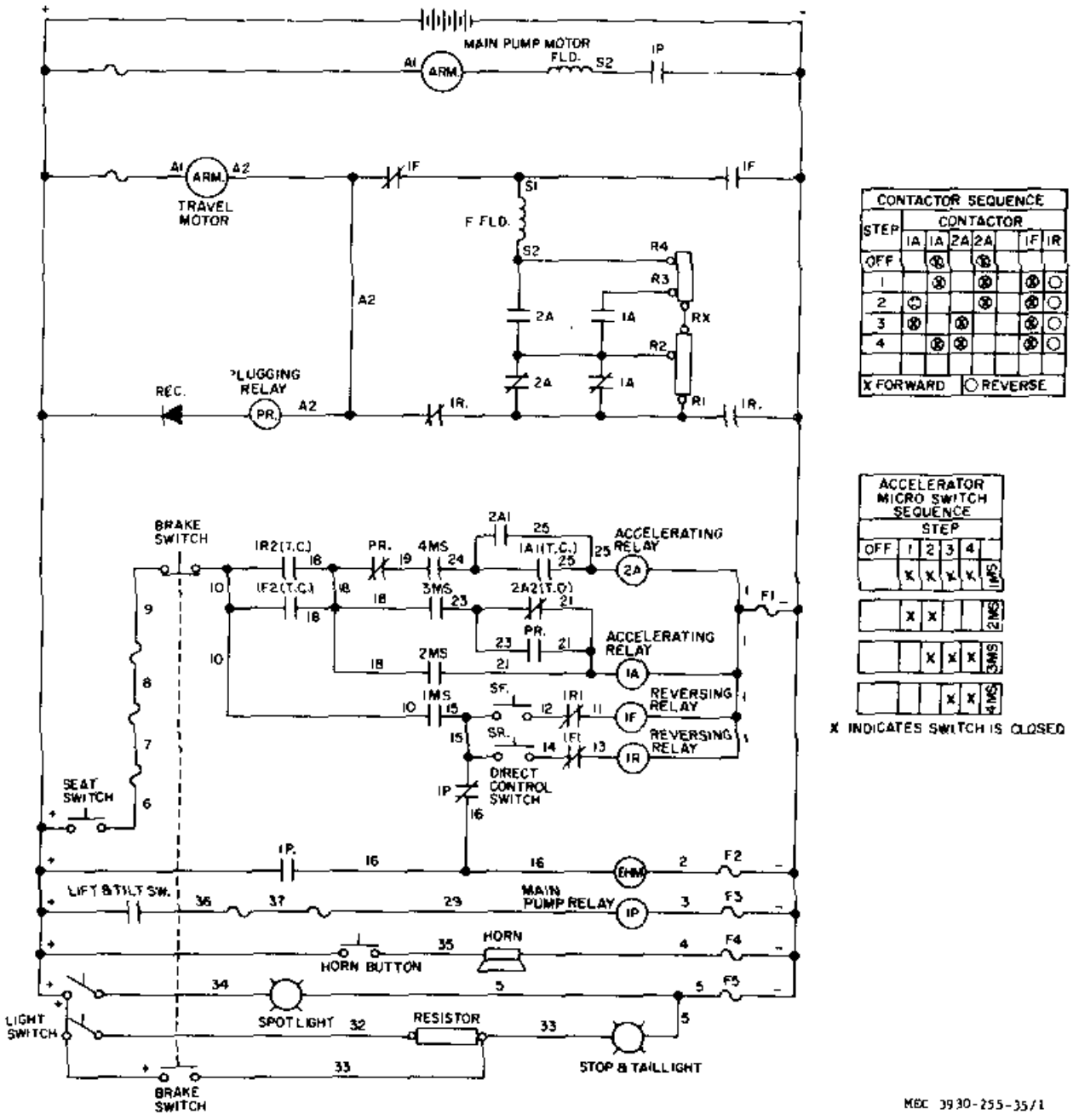


Figure 1. Schematic wiring diagram,

CHAPTER 2

MAINTENANCE INSTRUCTION

Section I. TROUBLESHOOTING

8. Troubleshooting

This paragraph contains, in tabular form, guidance in locating causes of trouble. Some malfunctions of equipment will give more than one symptom. For this reason, determine from the operator, when possible; all complaints on truck performance. Compare these complaints with all "Trouble" entries in the chart, to find a common cause for the complaints. This procedure will usually save time and effort. A troubleshooting chart, with remedies limited to organizational maintenance capabilities, is included in TM 10-3930-255-20.

a. Electrical.

(1) *Truck will not start or develop full power.*

Probable cause	*Remedy*
Dead battery	Replace or charge (TM 10-3930-255-20).
Fusetron blown	Replace (TM 10-3930-255-20).
Defective battery plug or receptacle.	Replace plug or receptacle. (TM 10-3930-255-20).
Braided shunt in contactor broken.	Replace shunt.
Contacts dirty, worn, or broken in contactor or directional switch.	Clean contact tips. Replace if necessary (TM 10-3930-255-20).
Dirt in contactor causing mechanical restriction.	Clean contactor thoroughly.
Mechanical binding in contactor or accelerator master assembly switch.	Adjust or replace defective parts (TM 10-3930-255-20)
Pole faces of plugging relay magnet not sealing properly.	Clean, adjust, or replace.
Snap switches malfunctioning in accelerator master assembly.	Replace and adjust as necessary (TM 10-3930-255-20).
Seat switch not working	Adjust or replace switch (TM 10-3930-255-20).
Open circuit due to loose connections at accelerator master assembly switches.	Clean and secure connections firmly.

(2) *All speeds not obtainable.*

Probable cause	*Remedy*
Open in contactor main circuit.	Locate and eliminate.
Pole faces of plugging relay magnet not making good contact.	Clean, adjust or replace defective parts.
Object lodged in contactor	Remove object.
Dirty tips on contactor	Clean tips.
Snap switches in accelerator master malfunctioning.	Replace snap switches or roller arm and yoke as necessary (TM 10-3930-255-20).
Sticking or binding of accelerator in any part of stroke.	Correct binding of the spring guides.

(3) *Overheating.*

Probable cause	*Remedy*
Dirty contactor tips	Clean tips.
Broken, worn, or improperly adjusted brushes or brush holders in travel motor.	Adjust or replace brushes or brush holders (para 35).
Vehicle operating in low speed for prolonged periods.	Check operation.

(4) *Improper plugging control and timing through all speeds.*

Probable cause	*Remedy*
Sticking of the accelerator stroke in master switch.	Correct binding caused by misalignment of spring guides.
Improper timing through all speeds.	Correct binding of spring guides.
Shorted wires	Locate and eliminate short.
Open contactor in main circuit.	Locate and correct.
Dirt in contactor or directional switch.	Clean unit thoroughly.

Probable cause	*Remedy*
Dirty contact tips in contactor or directional switch.	Clean or replace tips (TM 10-3930-255-20).

b. Brakes.

(1) *Brakes dragging.*

Probable cause	*Remedy*
Master cylinder compensating port plugged.	Overhaul master cylinder (para 19).
Seat brake improperly adjusted.	Adjust so that brake does not drag when seat is down and is firmly applied when seat is up (TM 10-3930-255-20).
Mineral oil in brake system.	Drain and flush system, replace all cups, and service as required (paras 18 and 19).

(2) *Brake pedal goes to floor.*

Probable cause	*Remedy*
Worn lining	Install new lining (para 18).
Air in system	Bleed system (TM 10-3930-255-20).
Fluid low in master cylinder.	Replenish fluid and check for leaks (LO 10-3930-255-20).
Pedal improperly adjusted.	Adjust linkage (para 20).

(3) *Brake pedal under pressure gradually goes to floor plate.*

Probable cause	*Remedy*
Leaks in hydraulic brake system.	Locate and eliminate leaks.
Scored master cylinder barrel.	Install new master cylinder (TM 10-3930-255-20).

(4) *Brake pedal has springy or rubbery action.*

Probable cause	*Remedy*
Air in system	Bleed system (TM 10-3930-255-20).

(5) *Weak braking action.*

Probable cause	*Remedy*
Oil on linings	Replace lining (para 18).
Incorrect lining	Replace lining (para 18).

(6) *Heavy braking action.*

Probable cause	*Remedy*
Brake lining grease soaked.	Replace lining (para 18).
Brake backing plate loose	Tighten or replace.

(7) *Brake releases slowly.*

Probable cause	*Remedy*
Hydraulic fluid congealed	Drain, flush, and replace with proper brake fluid (LO 10-3930-255-20).
Retraction of brakeshoes restricted by weak return springs or dirt.	Clean, or replace as necessary (TM 10-3930-255-20).

(8) *Truck pulls to one side.*

Probable cause	*Remedy*
Brake linings grease soaked.	Replace brake linings (para 18).

c. Hydraulic.

(1) *Lift carriage will not lift load.*

Probable cause	*Remedy*
Oil leaks in hoses	Inspect fittings and couplings, tighten or replace as required (TM 10-3930-255-20).
Defective pump	Replace pump (TM 10-3930-255-20).
Fusetron blown	Replace (TM 10-3930-255-20).
Defective valve	Inspect plunger operation. Check pressures.

(2) *Load creeps down from raised position.*

Probable cause	*Remedy*
Oil leak in lines	Tighten fittings and couplings, (TM 10-3930-255-20).
Leaky control valve	Tighten connections, replace valve if necessary (TM 10-3930-255-20).

(3) *Hoisting speed erratic.*

Probable cause	*Remedy*
Air in system	Bleed air from system (para 30e).
Low level in reservoir	Fill reservoir to prescribed level (LO 10-3930-255-20).

(4) *Control valve plungers will not return to neutral.*

Probable cause	*Remedy*
Sticking plungers	Apply machine oil sparingly to plungers.
Broken springs or dirt lodged in seats.	Replace or clean as necessary (para 28).

(5) *Forks uneven when load is lifted.*

Probable cause	*Remedy*
Lift chains out of adjustment.	Adjust as necessary (TM 10-3930-255-20).

(6) *No motion of hydraulic unit when first started up.*

Probable cause	*Remedy*
Oil supply in tank too low	Fill (LO 10-3930-255-20).
Oil viscosity too heavy	See lubrication chart (LO 10-3930-255-20).
Air leak in pump inlet line.	Tighten hose. (TM 10-3930-255-20).
Restricted pump inlet line	Repair or replace (TM 10-3930-255-20).
Broken pump drive shaft, motor shaft, or coupling.	Repair or replace.
Pump completely worn out.	Replace pump (TM 10-3930-255-20).

Probable cause	*Remedy*
Weak or broken relief valve spring.	Replace spring (para 28).
Relief valve plunger stuck by dirt or foreign matter.	Clean or replace (para 28).
Pump rotating in wrong direction.	Check motor terminal leads.
Insufficient pressure to start load.	Check pressure.
Machine overloaded	Reduce load.
Failure at control valve switch.	Replace. (TM 10-3930-255-20).

(7) *Loss of motion during operation.*

Probable cause	*Remedy*
Loss of oil supply due to broken pump inlet, outlet, or cylinder connecting lines or tank return line.	Replace line (TM 10-3930-225-20).

(8) *Slow motion.*

Probable cause	*Remedy*
Pump wearing out	Replace (TM 10-3930-255-20).
Pump rpm too slow	Check pump motor, battery (para 38 or TM 10-3930-255-10).
Failure in hydraulic lines	Replace lines (TM 10-3930-255-20),
Relief valve plunger held partially off its seat by dirt or foreign matter.	Clean or replace (para 28).
Badly scored relief valve plunger or seat.	Replace valve (para 28).
Weak relief valve spring	Replace (para 28).
Aerated oil supply (foam in tank).	Change oil (LO 10-3930-255-20).
Oil too thin	Check lubrication chart for proper grade (LO 10-3930-255-20).
Oil supply too low	Fill reservoir (LO 10-3930-255-20).
Worn or scored piston racking.	Look for dirt or chips in oil. Replace packing (para 30).
ID of cylinder tube badly scored or nicked.	Replace cylinder (para 30).
Cylinder misalignment	Correct.
Linkage to valve plunger bent or out of adjustment, thereby restricting length of travel of valve plunger to full open position.	Adjust.
Mechanical obstruction of moving parts.	Remove obstruction.

(9) *Jerky motion.*

Probable cause	*Remedy*
Air in system	Bleed hydraulic system (para 30).
Cylinder misaligned due to structural warpage.	Adjust.

(10) *Speed of operation slows down after usage.*

Probable cause	*Remedy*
Pump worn	Replace (TM 10-3930-255-20).
Improper oil used in system.	Check lubrication chart for proper grade (LO 10-3930-255-20).
Dirt or foreign matter in system.	Drain, flush out system, replace with new oil (LO 10-3930-255-20) .

(11) *Noisy operation.*

Probable cause	*Remedy*
Air in hydraulic system	Bleed system (para 30).
Insufficient oil supply	Fill reservoir (LO 10-3930-255-20).
Pump worn out	Replace (TM 10-3930-255-20).
Air leak in pump intake line.	Tighten hose (TM 10-3930-255-20).
Pump coupling worn	Replace.
Misalignment between motor shaft and pump drive shaft.	Align.
Vibration of pump lines	Secure lines.
Chattering relief valve. Weak relief valve spring.	Replace (para 28).
Incorrectly set relief valve pressure.	Reset (para 28)
Broken or cracked gears in pump.	Replace pump (TM 10-3930-255-20).

(12) *Oil heats up rapidly.*

Probable cause	*Remedy*
Pump slippage	Oil too thin. Check LO 10-3930-255-20 for proper grade.
Continued operation at relief valve pressure setting.	(1) Correctly adjust relief valve or (2) Refer operator to TM 10-3930-255-10 for correct operating procedures.
Normal operating pressure is close to relief valve pressure setting.	Correctly adjust relief valve (para 28).
Operating at excessively high pressure.	Check relief valve pressure setting.
Dirty oil	Change oil (LO 10-3930-255-20).
Misalignment between pump drive shaft and motor shaft.	Align.

(13) *Hoist cylinder packing leaks.*

Probable cause	*Remedy*
Packing worn	Tighten gland nut, replace packing (para 30).
Piston scored	Replace cylinder (para 30).

(14) *Hoist or tilt cylinder lowers or tilts while truck stands idle.*

Probable cause	*Remedy*
Worn packing	Replace (para 29 or para 30).
Failure in hydraulic line	Check, tighten or replace (TM 10-3930-255-20).
Scored cylinder walls	Replace entire cylinder (para 30) (hoist cylinder) or TM 10-3930-255-20 (tilt cylinder).

(15) *Reservoir flows over.*

Probable cause	*Remedy*
Excess oil in reservoir	Check oil level plug with forks in lowered position and tilted back (LO 10-3930-255-20).

Section II. ELECTRICAL SYSTEM

9. Horn Button Wiring

a. Removal.

(1) Remove horn button assembly from steering gear (TM 10-3930-255-20). Dismount directional control switch from steering gear jacket (TM 103930-255-20) and tie it out of way.

(2) Remove screws and covers (fig. 2) and disconnect external horn wires.

(3) Remove screws and clamp which hold mast jacket to steering column support bracket. Loosen screws at base of support bracket, and move bracket forward, enough to provide room in which to work at front of steering column.

(4) Remove screws and horn connector assemblies (fig. 3) from mast jacket. Turn shaft to bring wires into view.

(5). Unsolder horn button from contact assembly slip rings.

Caution: **Do not heat slipring more than necessary to free wire.**

(6) solder length of replacement wire to end of each wire to be replaced and pull both wires out top end of shaft by pulling on attached contact.

(7) Unsolder contact from old wires.

b. Installation.

(1) Install contact on new wires. Solder lower end of new wires to slip rings at recesses from which old wires were removed.

Caution: **Location of new wire on slipring must not interfere with sliding contact of horn connector. Remove all excess solder from sliprings.**

(2) Reverse procedure in a (1) through (4) above to install.

10. Wiring, Head-, Tail-, and Stoplights

a. Headlight Wiring Removal.

(1) Remove floor plate and cowl (TM 10-3930-255-20).

(2) Dismount headlight and detach flexible conduit from outer upright and truck frame (TM 10-3930-255-20). Remove clamps as necessary to free conduit and wiring.

(3) Remove twelve screws, and remove front cover of electrical equipment box and cover over fuses on top of box (TM 10-3930-255-20). Disconnect both wires numbered 5 at fuse holder (fig. 5).

(4) Remove instrument housing from steering column (TM 10-3930-255-20). Disconnect lead number 34 at light switch on instrument housing. Remove headlight and wiring from truck.

b. Headlight Wiring Installation. Reverse procedures in above.

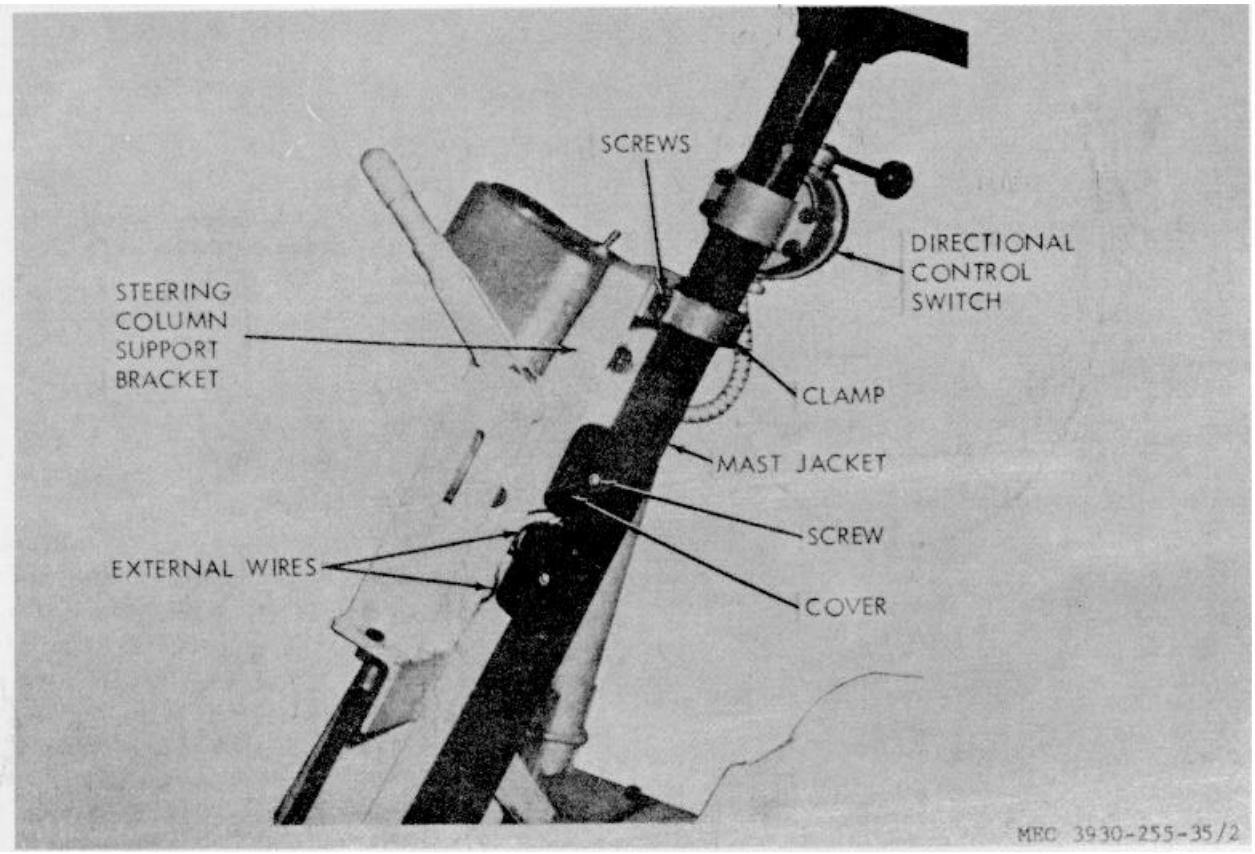
c. Tail-, and Stoplight Wiring Removal.

(1) Remove tail- and stoplight assembly (TM 10-3930-255-20).

(2) Remove truck floor plate and cowl (TM 10-3930-255-20). Remove cover of electrical equipment box (*a* (3) above).

(3) Disconnect wires numbered 5 and 33 at taillight terminal board (fig. 4). Disconnect wires number 5 at fuse holder (fig. 5) and wire number 33 at taillight resistor. Remove conduit box connectors (fig. 4) from conduit at each end of conduit, and remove harness from truck.

d. Tail and Stoplight Wiring Installation. Reverse procedures in c above.



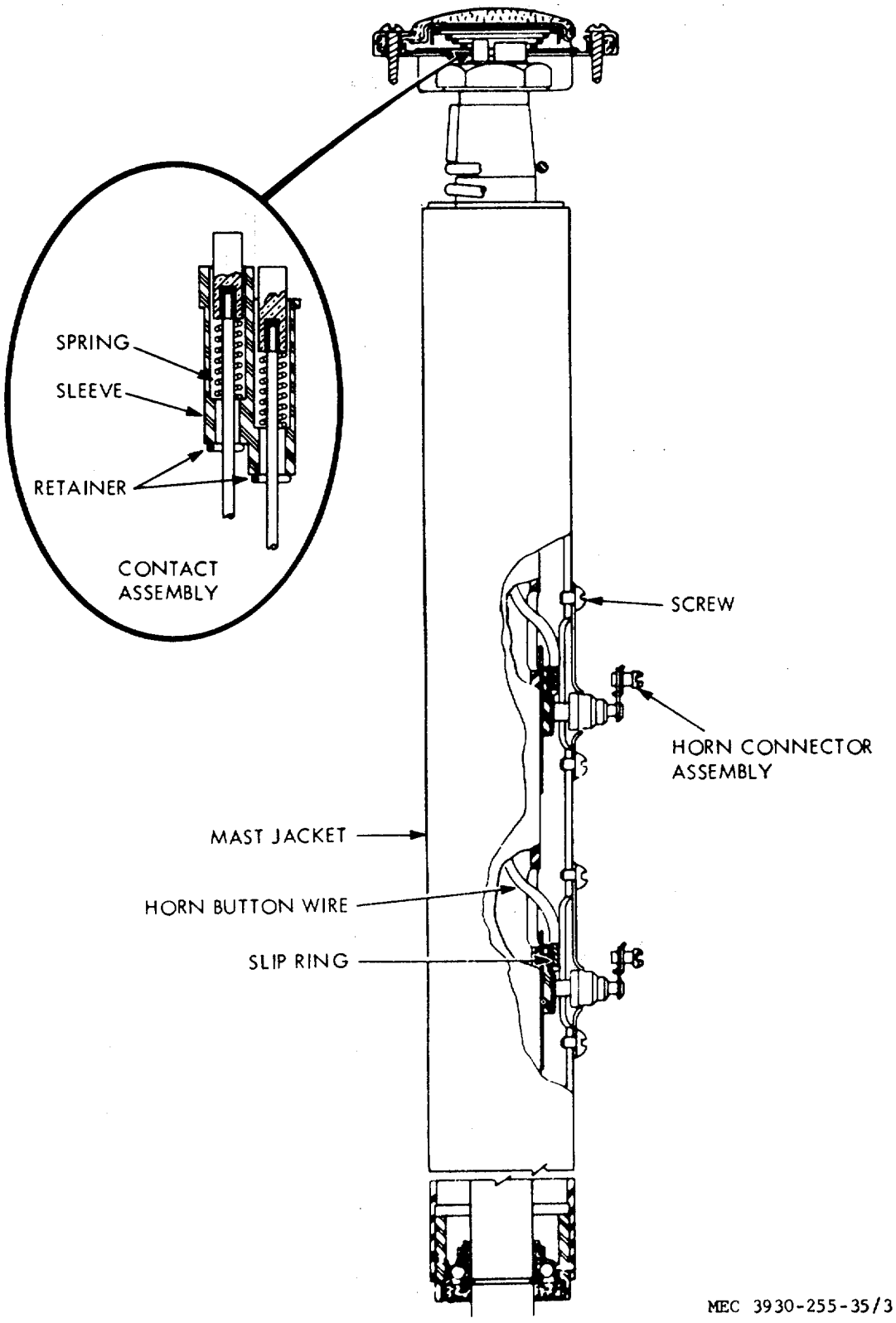


Figure 3. Horn button wire replacement.

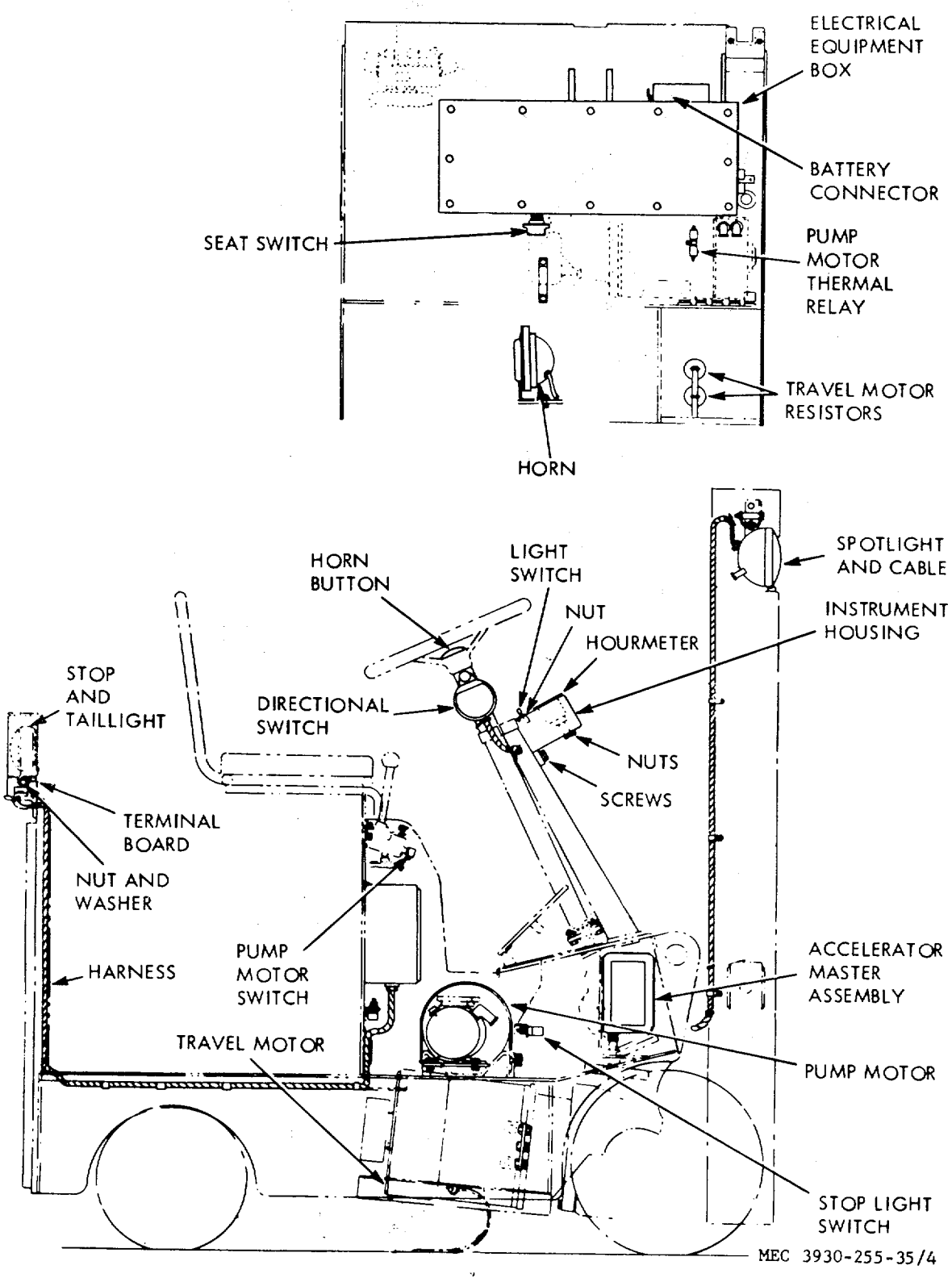


Figure 4. Electrical system arrangement.

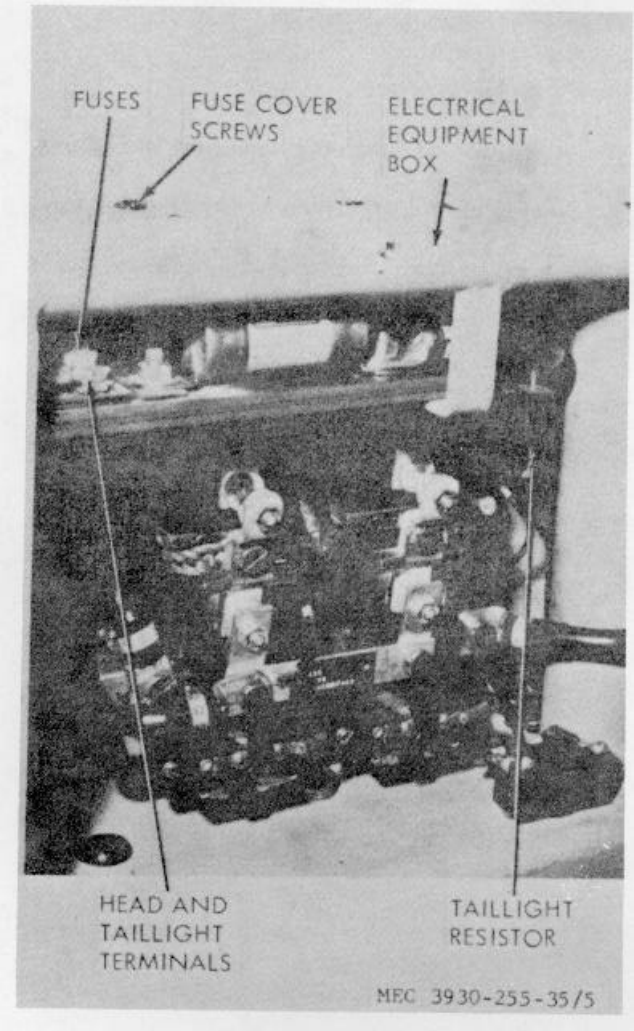


Figure 5. Lighting harness terminal locations.

Section III. FRONT AXLE

11. General

This section contains direct and general support maintenance instructions for the power axle and the mechanical adapter through which the travel motor drives the axle. Because of the mechanical and functional relationship of the axle and adapter, service of these assemblies will be grouped in the order in which they are encountered, in servicing the power axle; though all were axle components.

12. Power Axle

a. Removal.

Note.

Axle shafts, outboard bearings, and oil seals can be replaced without removing entire axle assembly.

(1) Remove entire mast assembly, including carriage, forks, and lift cylinder as a unit, as follows: .

(a) Attach a chain hoist to mast assembly (or use the forks of another fork lift truck), and relieve the weight of the assembly on its supporting parts. Arrange to brace the assembly against tipping as disconnections are made. The forks are to be fully lowered.

(b) Remove forks, load backrest, and headlight assembly from mast column (TM 10-3930-255-20).

(c) Disconnect hydraulic hose at lift

cylinder flow restrictor (fig. 6) and cap hose to prevent entry of dirt.

(d) Disconnect both tilt cylinder assemblies at uprights (TM 10-3930-255-20).

(e) Remove capscrews, washers, and bearing caps which secure outer uprights to bearing bracket on frame (fig. 7). Lift mast assembly from truck. Retrieve bearing halves shown, for reuse at assembly.

(2) Disconnect and remove brake line (fig. 6) from master cylinder. Protect line against kinking, or entry of dirt while disconnected.

(3) Remove floor plate and remove thermal relay (fig. 4) from travel motor. Disconnect rod and cable at brake on rear of motor (TM 10-3930-255-20). Drain lubricant from axle and adapter (LO 10-3930-255-20).

(4) Support motor from below with wheeled dolly, or floor jack. Disconnect and tag four leads from terminals of travel motor (fig. 8).

(5) Remove screws, nuts, washers and bearing brackets (fig. 9) securing motor mounting bracket and axle to truck. Lift front end of truck from axle, and draw axle, adapter, and travel motor from under truck.

(6) Remove screws and washers, and two nuts attaching adapter to axle and take motor and adapter, as a unit, from axle.

(7) Remove screws, nuts, and washers attaching adapter to motor, and draw motor from adapter.

b. Disassembly of Power Axle.

(1) Remove front wheels (TM 10-930255-20). Drain lubricant from axle (LO 10-3930-255-20).

(2) Remove hubcap, cotter pin, spindle nut, washer, and hub from axle shaft. Use a wheel puller to draw hub from taper of axle shaft.

(3) Disconnect brake tubing (fig. 10) at adapters, be careful not to kink tubing or permit dirt to enter. Remove nuts and washers from studs holding brake assembly onto axle housing, and take off brake assembly. The oil seal shown will stay in bore of brake assembly. Remove oil seal.

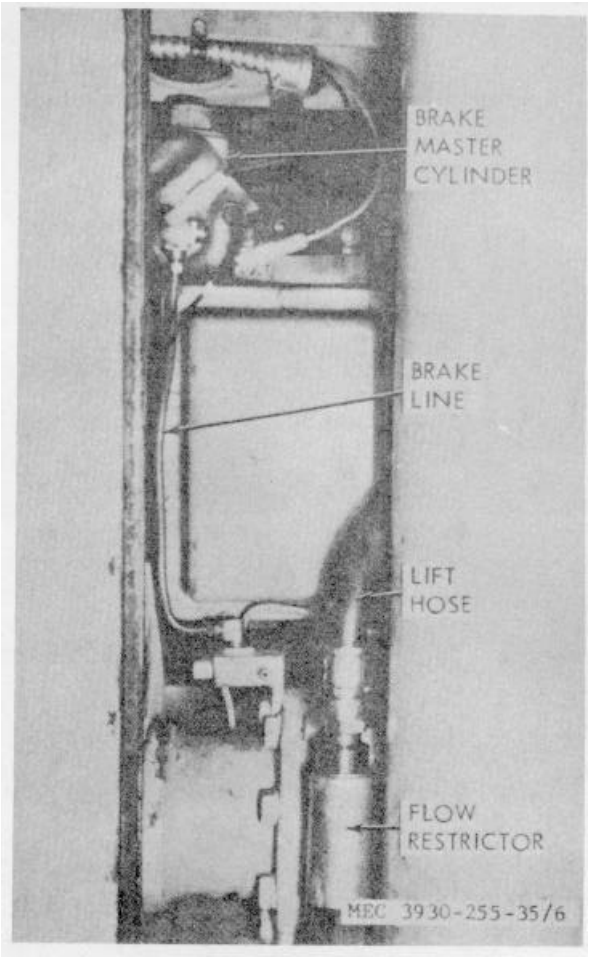


Figure 6. Brake line and lift hose disconnection

(4) Pull axle shaft from housing. Remove both bearing cone and rollers, and outer cup from axle. Pull inner bearing cup from housing at this time, or remove it later when axle housing is removed, by pressing from the inside of housing.

(5) Remove screws and washers holding axle housings to differential housing. Remove axle housings and shims. Measure thickness of shims removed at each side of differential housing and note thicknesses for reference at reassembly and adjustment.

(6) Remove screws and nuts holding differential housing halves together.

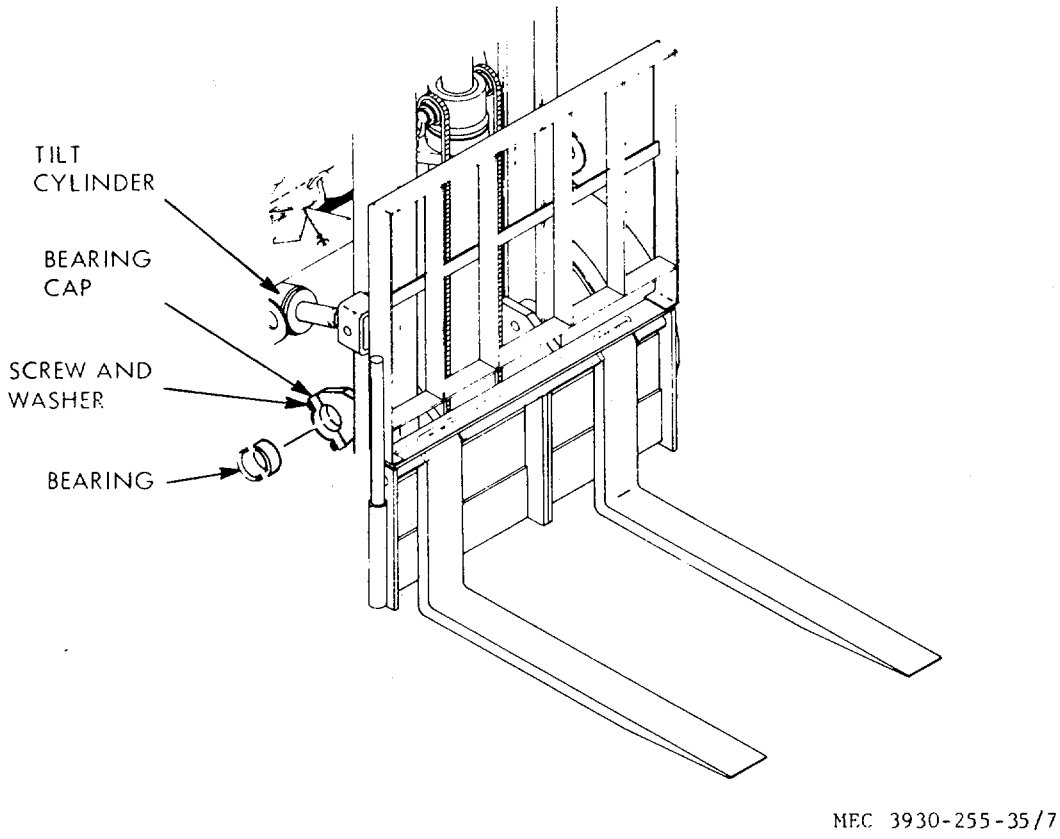


Figure 7. Mast column assembly removal.

Separate halves, removing differential (3) assembly, differential case bearings, and gasket. Use puller to remove cones (4) and rollers if necessary.

(7) Remove screws holding differential (5) case halves together.

Note.

If no orientation marks are visible, (6) punchmark each case half before separating, so it can be reassembled in its original relative position. Separate case halves, remove thrust washers, side gears, and spider pinion gears from cross. Remove screws, and take ring gear from case half.

c. Cleaning. Clean all parts with SD, dry thoroughly, and coat with GO gear oil for surface preservation and initial lubrication. (2)

d. Inspection of Power Axle.

(1) Inspect bearings for roughness, pitting, rusting, or corrosion.

(2) Inspect all threads for damage.

(3) Check axle shafts for runout in excess of 0.010-inch total indicator reading.

(4) Inspect gear teeth for wear, rough spots, or chipping.

(5) Inspect castings for cracks or damage due to rough treatment or accident.

(6) Inspect thrust washers for wear or damage. Replace these washers in complete sets only.

c. Repair of Power Axle.

(1) Repair slight thread damage with tap or thread chaser. Repair stripped threads in castings by installation of helicoil thread inserts.

(2) Repair slight axle gearshaft runout, by pressing, or hammering, to bring runout within limits.

f. Assembly of Power Axle Particularly if new differential parts have been installed, certain

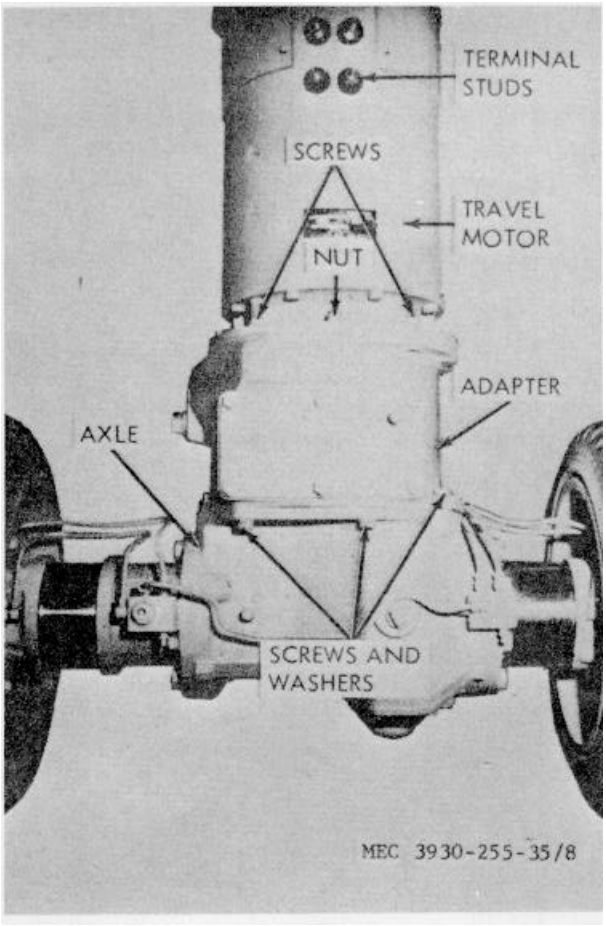


Figure 8. Power axle, adapter, and travel motor, removed.

checks and adjustments may be required in the course of assembly of the axle. At assembly, refer to shim values noted at disassembly and install same thickness of shims to provide a starting point from which to make adjustments. If no new differential parts have been installed, using original shim thickness (use new shims) should restore axle to its original adjustment. Assemble as follows:

(1) Install ring gear (fig. 10) on differential case half with screws, and secure screws with lock wire. Put thrust washers and both differential side gears in place in case halves. Assemble four spider pinion gears and thrust washers to cross, install this assembly in one case half, and install other case half, aligning punchmarks made at disassembly. Secure screws with lock wire.

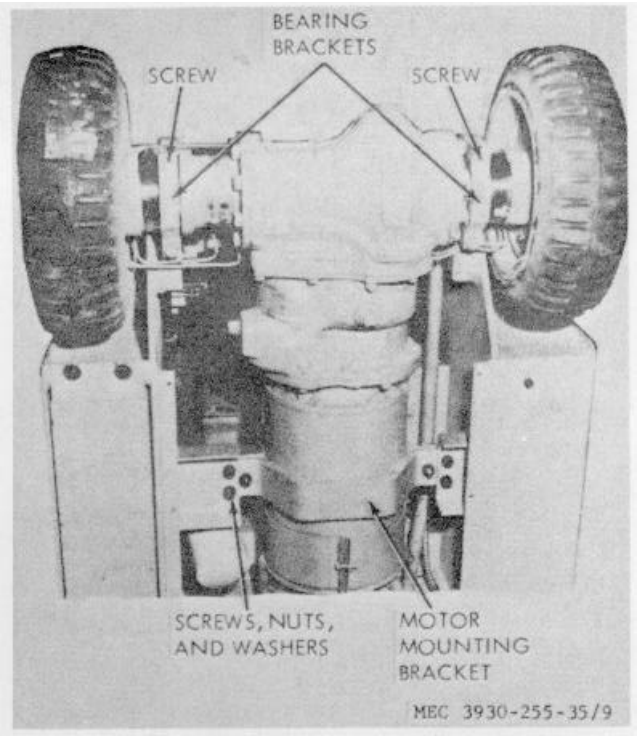


Figure 9. Power axle and motor disconnections.

(2) Press differential bearing cones and rollers onto case half trunnions to bottom. Position differential assembly in differential housing half, with cups positioned to rollers. Install gasket and other housing half. Secure with screws and nuts.

(3) Install shims shown in figure 10 (same thickness as removed, at each side) on axle housing and install axle housings to differential housing. These shims govern differential bearing preload.

Note.

If adjustment must be checked or made, refer to paragraph 13e before continuing assembly.

(4) Press inner axle bearing cups into axle housing to bottom. Press both axle bearing cones and rollers onto each axle shaft.

(5) Install axle shafts, entering shaft splines into side gear bores.

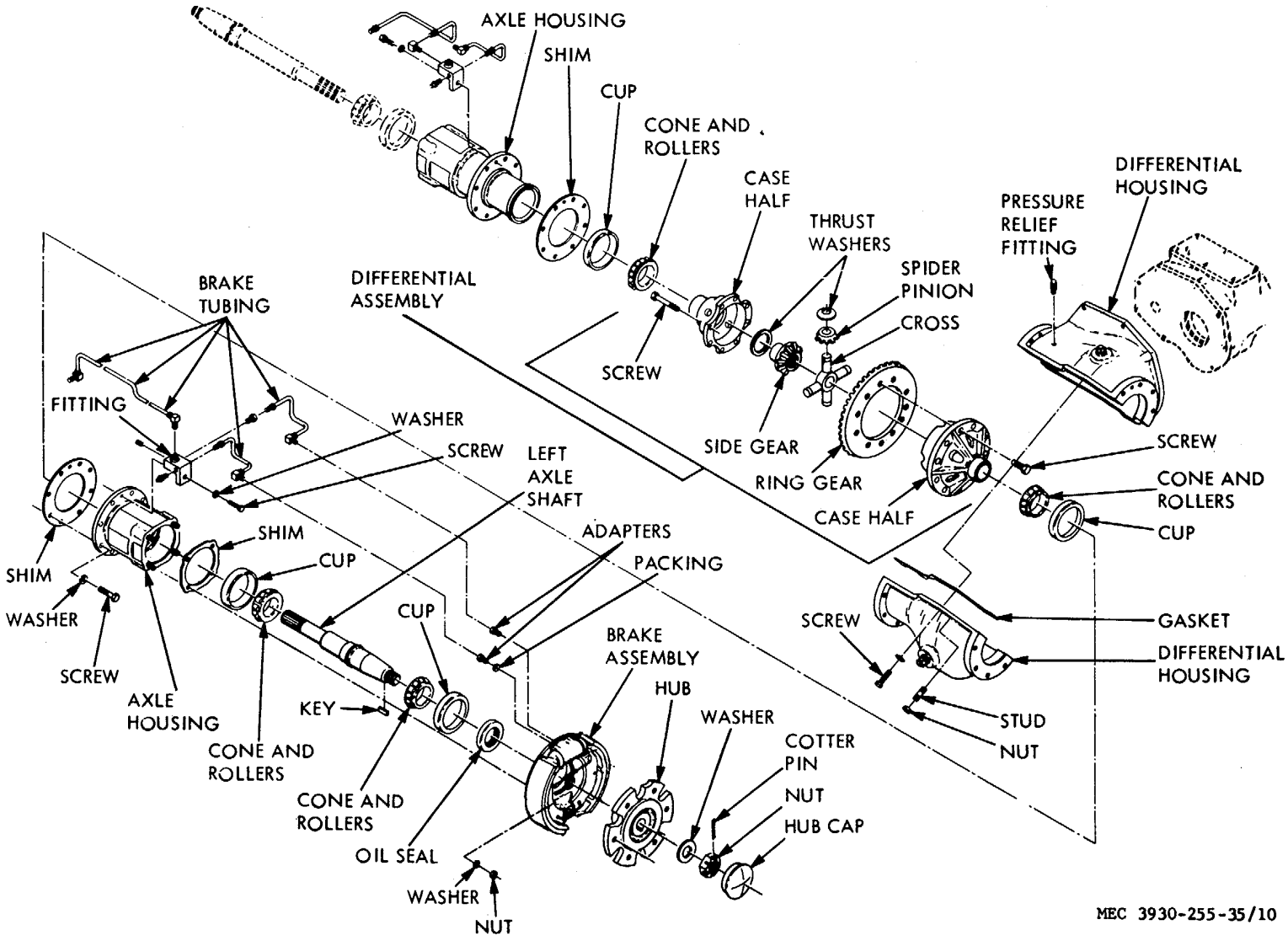


Figure 10. Power axle, exploded view.

Install outer bearing cup and shims between axle housing and brake assembly, as required to give 0.000-inch to 0.006 inch preload to axle bearings (refer to (6) below). Install oil seal in brake assembly.

(6) Install brake assembly. Check axle shaft end play with dial indicator. If no end play exists, add shims until end play can be measured, then remove shims as required to get preload specified in (5) above.

(7) Reverse procedure in b (1) through (4) above. Add lubricant (LO 103930-255-20) and bleed brakes (TM 10-3930-255-20).

13. Differential.

a. Removal and Disassembly. If necessary to remove differential (only) for service, proceed as given in paragraph 12a, remove brake tubing from axle, and perform procedures in paragraph 12b (5), (6), and (7). It is not necessary to disassemble axle completely to service differential.

b. Cleaning, Inspection, and Repair.

(1) Clean all parts in SD.

(2) Inspect all gears for wear, chipped, broken, or overheated teeth. Inspect bearings for wear or damage. Check bolts and rivet holes for elongation or enlargement.

(3) Replace all damaged parts, unless damage is to a threaded item and can be repaired with a tap or thread chaser.

c. Assembly and Installation. Reverse procedure in a above, aligning punchmarks on differential case halves.

d. Adjustment. Three basic adjustments are to be made when the differential has been reassembled after replacement of parts. These are the differential bearing preload adjustment (to be made first), drive gear and pinion backlash adjustment, and tooth contact adjustment.

Note.

The latter two adjustments are so related that a change in either one causes a change of the other adjustment.

(1) Adjustment differential bearing preload to 15 ft-lb. as follows:

(a) Install both axle housings (fig. 10) with same thickness of gaskets at each side as was removed at disassembly.

(b) Turn drive gear by hand, testing for noticeable drag due to preload on bearings. If no drag exists, reverse procedure in (a) above and remove gaskets and repeat test until drag is noticed. Gaskets 0.003 inch thick, 0.005 inch thick, and 0.020 inch thick are used. Decrease total gasket thickness in 0.001 inch steps by removing two 0.003-inch gaskets and adding one 0.005-inch gasket.

(c) If drag is noticeable on first trial, reverse procedure for decreasing gasket thickness in (b) above until no drag is present, then decrease total gasket thickness until drag is felt. Using axle shaft and nut as adapter, check for 15 ft-lb. drag caused by preload. Add or remove shims to obtain this value.

(2) Check pinion and ring gear backlash adjustment as follows:

(a) Install adapter-to-axle gasket (fig. 11) and install adapter assembly to assembled axle (reverse procedure in para 12a(6)). If motor is still attached to adapter, remove screws, nut, and washer (fig. 8) and remove motor from adapter at this time.

(b) Remove drain plug from differential housing. Install plug with slightly longer reach to contact and lock ring gear from rotation.

(c) Remove cover screws and cover (fig. 11) from adapter. Install a dial indicator on adapter cover boss, to take a reading at a point 1/16 inch below top of one of the teeth of input gear. Rotate input driven gear through freedom permitted by pinion and ring gear backlash. Reading is to be 0.019 inch to 0.046 inch. Adjustment to correct is given in (3) below.

(3) Determine, and adjust ring gear and

pinion relationship, *after* performing (1) and (2) above, as follows:

Note.

Several adjustments of both pinion and ring gear position may be necessary in the following procedures before correct adjustment is achieved. It is not possible to specify the exact thickness of shims to be added, removed, or exchanged at any stage. This must be determined by trial and error. (2)

(a) Remove adapter assembly (fig. 11). Apply a thin coating of red lead to drive face of ring gear teeth, and install adapter to axle.

(b) Engage input driven gear with a pry bar or large screwdriver, and turn it until drive wheels have made one revolution in the forward direction.

(c) Remove adapter assembly from (3) axle. Examine teeth of ring gear, and compare marks in red lead from pinion gear contact with examples shown in figure 12.

Note.

Ring gear is on left side of pinion when installed. References to follow will be on this basis.

(d) If marks in red lead compare with those shown in view A or C on figure 12, indicating high, narrow tooth contact (pinion too far out), adjust by adding one or more shims (fig. 11) to the pinion gear shaft c to move pinion in direction indicated in view A, and transfer one or more axle housing-to-differential housing shims (fig. 10) from left side of differential housing to right side. Repeat procedures in (a) through (c) above to check results of adjustment.

Note.

Do not change total thickness of S side gaskets used; merely transfer them from one side to the other as needed, so differential bearing preload will not be (1) changed.

(e) If marks in red lead compare with those in view B or D, figure 12, reverse adjustment procedure given in (d) above, and repeat (a) through (c) above to check results of adjustment.

14. Adapter

a. Removal. Refer to paragraph 12a for removal of adapter as part of axle maintenance.

b. Disassembly.

(1) Remove cover screws and washers fig. 11). Take off cover and cover gasket.

(2) Remove cotter pin from pinion gear shaft. Hold toothed end of pinion gear shaft with padded wrench to protect gear teeth, and remove nut. Tap pinion gear shaft forward, holding input driven gear through top of case, and remove gear shaft and front cone and rollers. Take driven gear out through top of case.

(3) Remove shims and rear spacer (they will have dropped to bottom of case), rear bearing cup, and cone and rollers. Take retaining ring from groove within case.

(4) Press front bearing cone and rollers from gear shaft. Take packing, spacer, and oil seal from front of case.

(5) Hold gear cluster, and push out shaft. Take gear cluster and two washers from case, and remove both roller bearings and spacer from bore of gear cluster.

c. Cleaning, Inspection, and Repair.

(1) Clean all metal parts in SD. Coat reusable parts liberally with GO gear oil after inspection.

(2) Inspect gears for wear or damage. Check bearing conditions, and fit on shaft and in bearing cage.

(3) Replace all nonmetal parts, and unserviceable metal parts at assembly.

d. Assembly.

(1) Place spacer and both needle roller bearings (fig. 11) in bore of gear cluster. Enter tapered end of shaft into case just far enough to install first washer.

(2) Install washer, hold gear cluster in position, and push shaft through bore of gear cluster bearings. As shaft

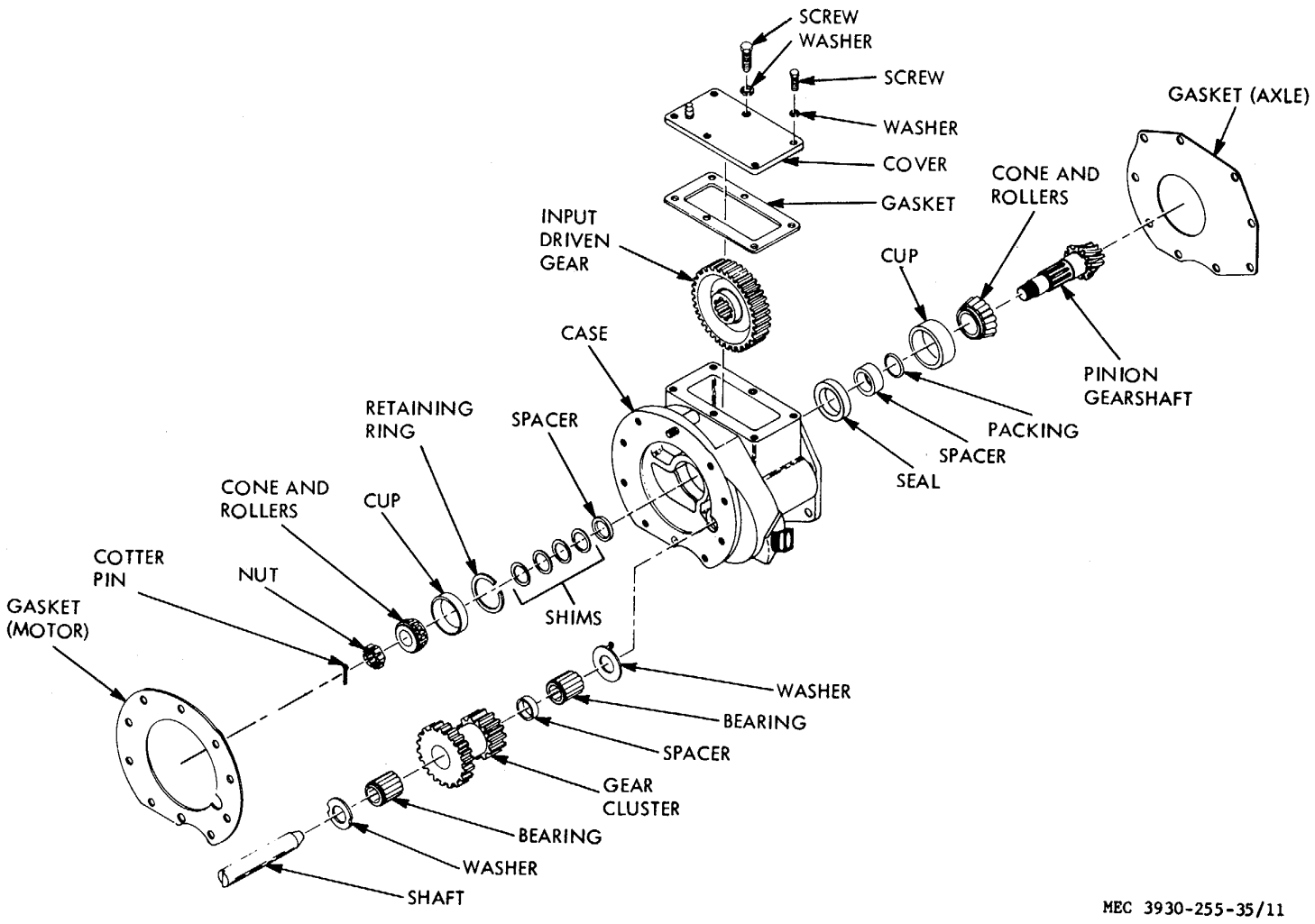


Figure 11. Adapter, exploded view.

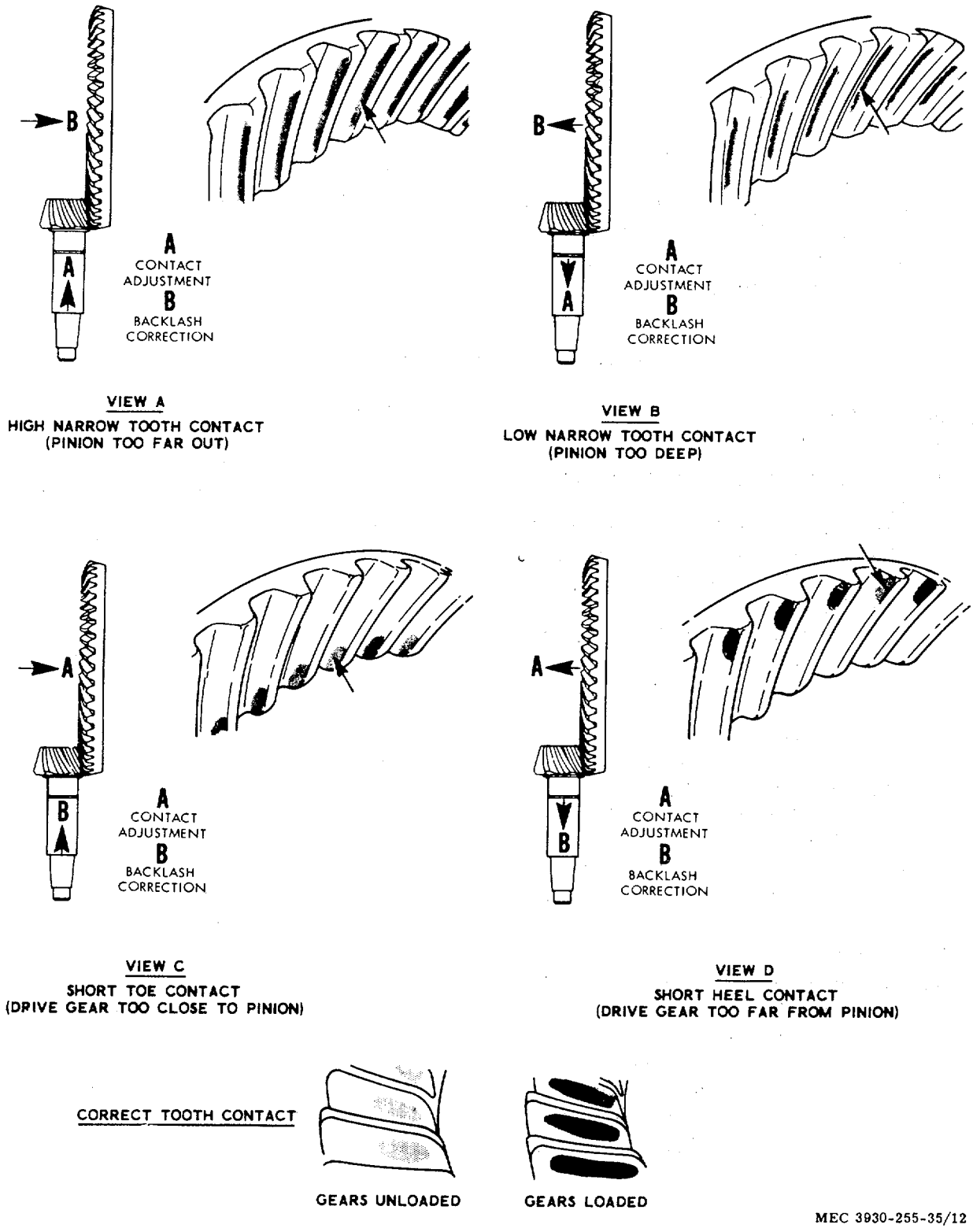


Figure 12. Ring and pinion gear tooth contact indications.

emerges from front of cluster, install front washer.

(3) Position shaft to full depth in case. Shaft is retained by motor, at rear of case, and axle at front. If adapter will not be installed immediately, provide for retention of shaft so it will not be displaced.

(4) Press front bearing cone and rollers onto pinion gear shaft. Put packing in groove in spacer, enter spacer in seal, and position this assembly in bore provided in case.

(5) Install retaining ring in its groove in case, and press rear bearing cup in case, as far as retaining ring.

(6) Hold input driven gear in position, and install pinion gear shaft through splines of gear bore. Install shims, totaling same thickness as those removed, unless adjustment is being made. Install rear cone and rollers, nut, and cotter pin.

(7) Install cover gasket, cover, and cover screws and washers.

e. Installation. Reverse procedures in above.

Section IV. REAR AXLE

15. Steering Axle

a. Removal.

(1) Jack or hoist truck high enough to provide enough space in which to work. Block truck so it cannot fall after being raised. Remove rear wheel and tire assemblies (TM 103930-255-20).

(2) Disconnect drag link from steering axle bellcrank (fig. 13).

(3) If rear axle is raised from ground, support it against falling when attaching parts are removed. Remove four screws and washers from retainer bar at rear of axle, and four screws and washers, and front retainer bar.

(4) Lower axle, or hoist truck, to get clearance and roll axle from beneath truck.

b. Disassembly.

(1) Remove two neoprene axle blocks (fig. 13) from axle.

(2) Remove cotter pins and nuts from both tie rod ends, and remove tie rods.

(3) Remove retaining ring at top of bellcrank, take off top washer and lift off bellcrank with bearings. Press out bellcrank bearings if they are to be replaced.

(4) Remove nuts at top of spindle pin, and take out screw and top and bottom washer. Press spindle pin from axle, and remove steering arm.

(5) Remove spindle bearings.

c. Cleaning, Inspection, and Repair.

(1) Clean all parts in SD.

(2) Inspect threaded parts for damage. Inspect all bearings for wear. If practicable, repair damaged threads with a tap or thread chaser. Replace all unserviceable parts at assembly.

d. Lubrication and Assembly.

(1) Pack spindle bearings with grease, GAA.

(2) Reverse procedures in b above to assemble axle.

e. Installation. Reverse procedures in a above.

f. Adjustment. Adjust tie rods (TM 10l930-255-20).

16. Steering Knuckles, Pins, and Bearings

Refer to paragraph 15 for removal and installation of steering knuckles, pins, and bearings.

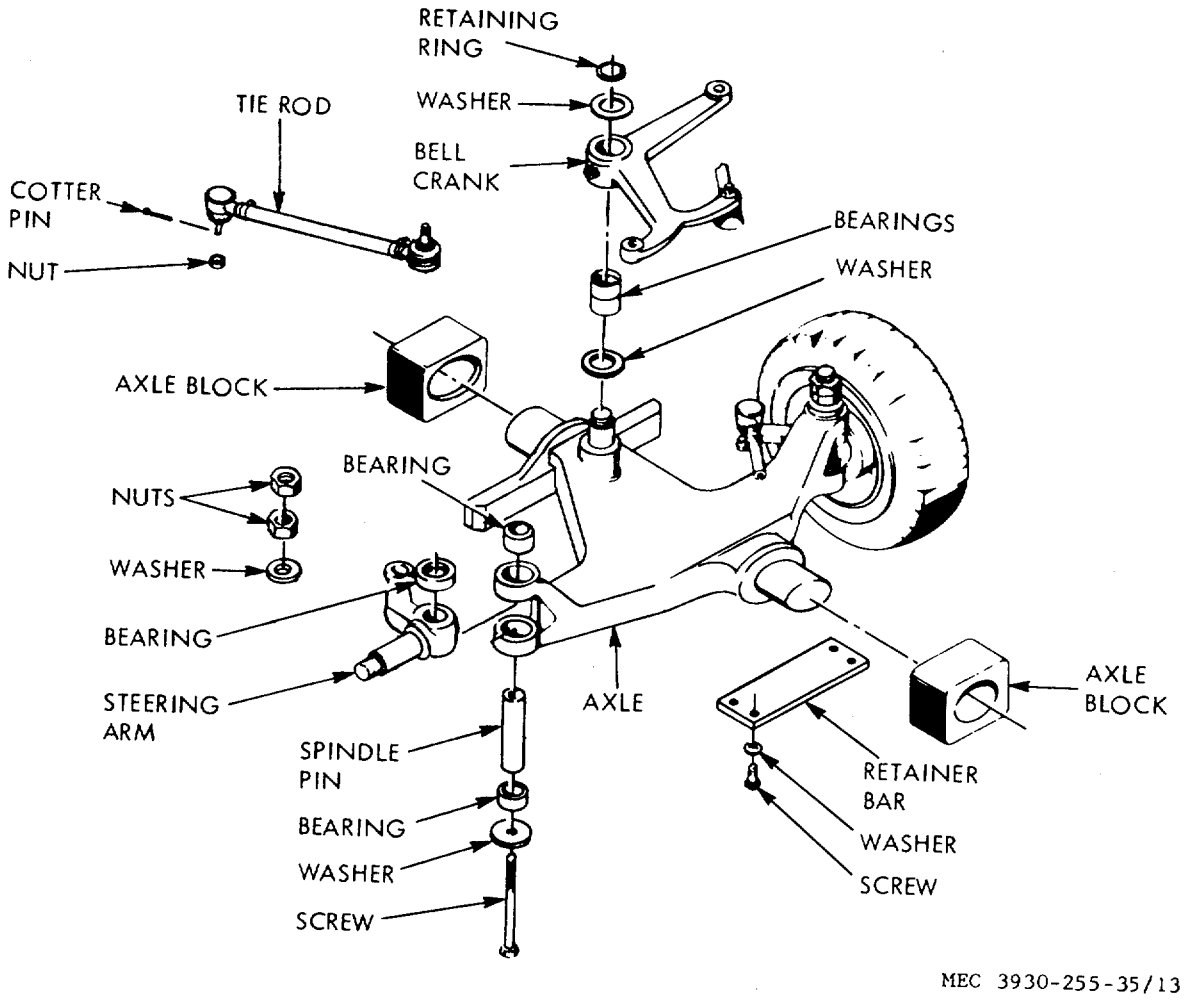


Figure 13. Steering axle, exploded view).

Section V. BRAKES

17. General

This section covers direct and general support maintenance of the service (wheel) brake system. Maintenance of the parking brake system is covered in TM 10-3930-255-20.

18. Brake Assembly

a. Removal and Disassembly.

(1) front wheels from truck (TM 10-3930-255-20) and disconnect both brake lines to each wheel (fig. 14) Remove wheel hub (para 12b).

(2) Remove four nuts and washers holding backing plates to axle housing and take brake assembly from truck.

(3) Use brake servicing tools to remove shoe retaining spring and return spring, then lift off both brakeshoes.

(4) Remove bolts and washers, and take wheel cylinder from backing plate.

(5) oil seal is to be replaced, remove it from backing plate.

b. Wheel Cylinder Repair.

(1) Remover cylinder by performing procedure a above.

(2) Remove rubber boots from cylinder.

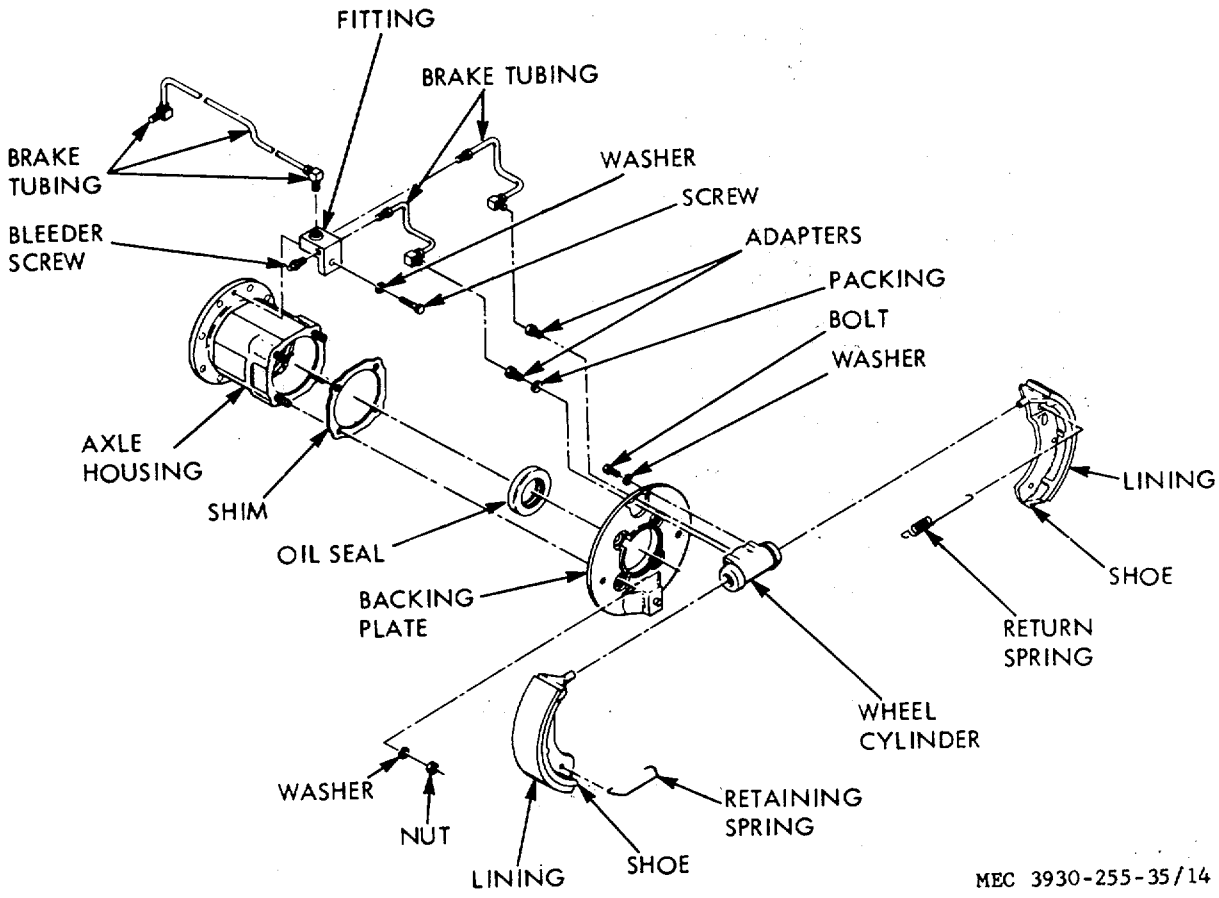


Figure 14. Service brake, exploded view.

(3) Remove spring, pistons, and cups.

(4) Inspect bore of cylinder, and pistons for pits or scoring. Hone cylinder bore clean if minor pits are present. If bore cannot be cleaned up readily, install complete new cylinder assembly.

(5) Clean all metal parts in alcohol. Dry thoroughly and install cylinder repair kit. Assemble by reversing procedures in (1) to (3) above.

c. Cleaning (except wheel cylinder).

(1) Remove dust from assembly with compressed air and stiff bristle brush.

(2) If brake fluid has leaked onto assembly, replace brake linings (d below), and wash off fluid with alcohol.

(3) If axle lubricant has leaked onto assembly

replace oil seal (fig. 14), replace brake linings, (d below), and clean parts with SD.

***Caution*: Do not get SD on any rubber brake parts. It will cause them to swell and rot.**

d. Brakeshoe Repair. Install new bonded lining on brakeshoes, when less than 1/16 inch of lining remains at thinnest point. Apply lining in accordance with good practice, and instructions for use of equipment available.

e. Installation. Reverse procedures in a (1 above. Bleed air from brakes (TM 10-3930255-20).

19. Brake -Master Cylinder

a. Removal. Refer to TM 10-3930-255-20.

b. Disassembly. (3.

(1) Remove both boot retaining rings, push rod, and boot (fig. 15).

(2) Remove lock wire from cylinder. b. In Take out piston stop, 'piston, cups, spring, and check valve.

c. Cleaning. Clean all reusable parts with denatured alcohol. Flush reservoir section (3) thoroughly, and be sure fluid passages are open.

d. Inspection. Inspect bore of cylinder for any surface roughness, particularly in the area of piston and cup travel.

e. Repair. Hone minor surface irregularities from cylinder bore.

f. Assembly and Installation. Reverse procedures in a and b above, installing all parts from repair kit listed in TM 10-3930-255-35P. After installation, adjust pedal travel as given in paragraph 20 below.

20. Brake Pedal and Linkage

a. Removal.

(1) Remove cowl and floor plate from truck (TM 10-3930-255-20).

(2) Remove cotter pin and clevis pin (fig. 16) from brake rod. Loosen jamnut and unscrew brake rod from master cylinder push rod.

(3) Remove screws, nuts, and washers attaching shaft. Lift entire assembly free of truck.

b. Installation and Adjustment.

(1) Reverse procedures in a above.

(2) brakes and adjust lining clearance (TM 10-3930-255-20).

(3) pedal free travel to 1/4 inch 5/8 inch by turning master cylinder push rod (fig. 15) on threads of brake rod (fig. 16). Tighten jamnut on brake rod to secure adjustment.

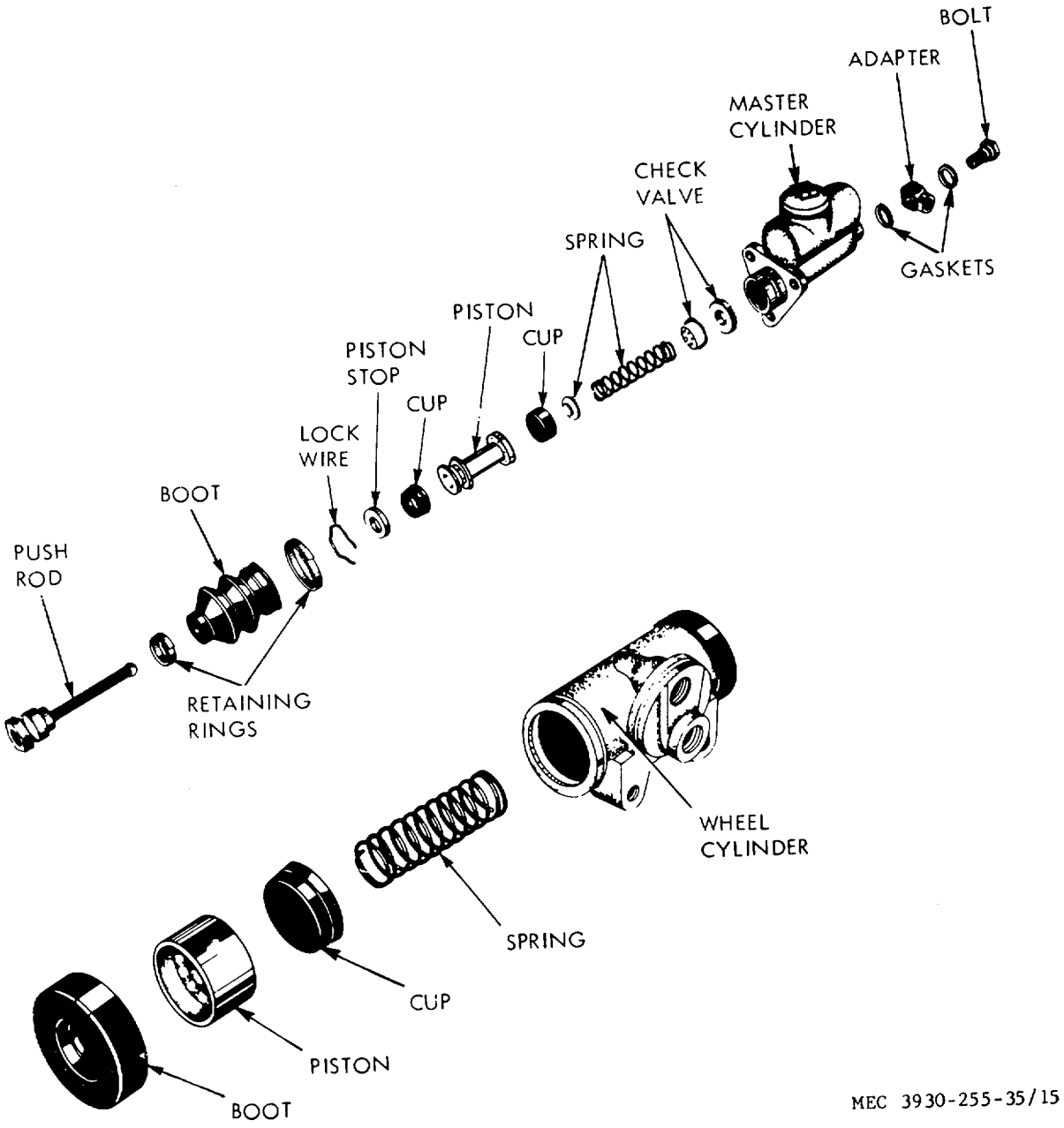


Figure 15. Master and wheel cylinder, exploded view-.

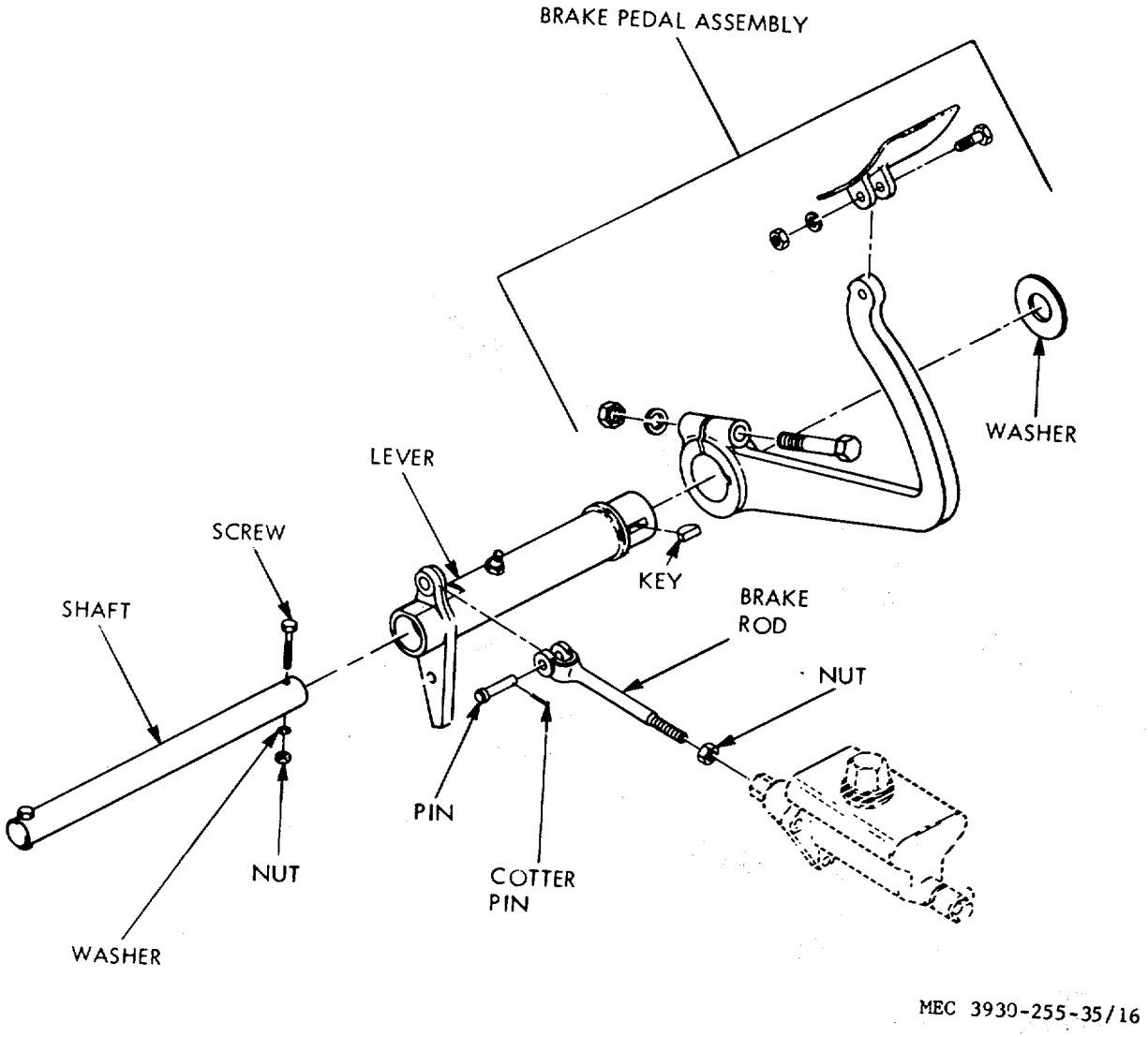


Figure 16. Brake pedal and linkage, exploded view.

Section VI. WHEELS

21. Wheels

Refer to TM 10-3930-255-20 for removal and installation of wheels.

22. Tires

Replacement is usually made by pressing off old tire simultaneously with pressing on new one Pressure required to install tire is 5000 pounds for each inch of wheel diameter. *For example*, a tire used on a wheel of 18 inches diameter requires 18 x 5000 pounds, or 45 tons press capacity for replacement. Using a press of adequate capacity, proceed a follows:

a. Remove wheel on which tire is to be replaced TM 10-3930-255-20).

b. As shown in figure 17, support felloe of wheel with ring just slightly smaller in diameter than wheel felloe and at least as wide as tire to be pressed off.

c. Place new tire over the old, and center carefully.

d. Start press platen down slowly, check alignment, and proceed with pressing operation.

e. Be sure that pressure is always applied through the metal base band and that there is never interference with the rubber. *Never hamper tire*. Use rings rather than blocks for applying pressure on wheels, to avoid any localized damage to tires or wheels.

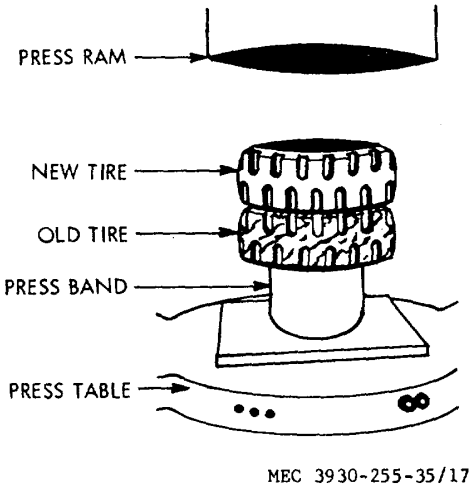


Figure 17. Solid tire replacement.

Note

In some cases it may be difficult to remove old tire cause of a peened-over condition of base band or felloe. In this event, remove old tire by burning or cutting through base band. In applying tires to wheels without old tires, take care to see that felloes are smooth and free of burs, and that new tire is started squarely and not cocked on wheel.

Section VII. STEERING

23. Steering Gear

Complete disassembly of the steering gear is seldom necessary. Disassemble only to extent necessary to perform needed repairs. cleanliness in work area is of the utmost importance. Clean exterior of steering gear with (3) SD before beginning disassembly. The following instructions present complete overhaul procedures.

a. External Adjustments.

(1) Remove nut and cotter pin (fig. 18), and disconnect drag link from pitman arm,

(2) Loosen lash adjuster locknut and turn adjuster screw a few turns counter (4) clockwise. This removes load imposed on worm bearings by the close meshing of rack and sector teeth. Turn steering wheel gently in one direction until stopped by gear, then back away about one turn.

(3) Measure pull at rim of wheel which is required to keep wheel in motion. This should be between 3/8 and 5/8 pound.

Note.

When making this check, it is important that centerline of scale be kept at right angles to wheel spoke. If pull necessary to move wheel does not lie between limits given above, adjustment of worm bearings necessary.

(4) To adjust worm bearings, loosen worm bearing adjuster locknut and

turn worm bearing adjuster until there is no perceptible end play in worm. Check pull at wheel rim, readjusting if necessary to obtain proper pull. Tighten locknut and recheck pull. If the gear feels "lumpy" after adjustment of worm bearings, there is probably damage in the bearings due to severe impact or to improper adjustment and the gear must be disassembled for replacement of damaged parts.

(5) After proper adjustment of worm bearing is obtained, and all mounting bolts securely tightened, adjust lash adjuster screw. First turn steering wheel gently from one stop all the way to the other, carefully counting total number of turns. Then turn wheel back exactly half-way, to center position. Turn lash adjuster screw clockwise to take out all lash in gear teeth, and tighten locknut. Check pull at wheel rim with checking scale, taking highest reading of checking scale as wheel is turned through center position. This should be between 7/8 and 11/2 pound. Readjust if necessary to obtain proper pull.

***Note*. If 11 i pound is exceeded, turn lash adjuster screw counterclockwise, then come up on adjustment by turning lash adjuster with a clockwise motion.**

(6) Tighten locknut then recheck pull as it must lie between specified limits.

(7) Reassemble pitman arm to drag link.

b. Removal.

(1) Remove floor plate (TM 10-3930255-20).

(2) Disconnect horn wires at steering column, and free steering column from support bracket (para 9*a* (3)). Remove steering wheel (TM 10-3930255-20).

(3) Remove nut and cotter pin, and disconnect drag link from pitman arm (fig. 18).

(4) Remove bolts and washers holding bracket to truck, and remove steering gear, with bracket attached, from truck.

c. Major Disassembly.

(1) Remove nut and washer from pitman shaft gear, and with a puller remove pitman arm from gear. Remove nut, screw, and washer (fig. 19) and take bracket from steering gear. Remove horn connector assemblies (fig. 3) from steering column.

(2) Loosen locknut on end of pitman gear shaft (fig. 19) and turn lash adjuster a few turns counterclockwise. This will remove load from worm bearings caused by close meshing of the rack and sector teeth.

(3) Loosen locknut on worm bearing adjuster and turn adjuster counterclockwise a few turns.

(4) Place a pan under the assembly to catch lubricant and remove three bolts and washers attaching side cover to housing.

(5) Pull side cover with the sector and shaft from housing.

***Note*. If sector does not clear opening in housing easily, turn wormshaft by hand until sector will pass through opening in housing.**

(6) Remove worm bearing adjuster, adjuster locknut and lower ball bearing from housing.

(7) Draw wormshaft and nut assembly from housing. Remove upper ball bearing.

***Caution*: Use care that ball nut does not run down to either end of worm. Damage will be done to the ends of ball guides if nut is allowed to rotate until stopped at end of the worm.**

(8) Remove locknut from lash adjuster and unscrew adjuster from side cover by turning adjuster clockwise. Slide adjuster and shim out of slot in en, of sector shaft.

(9) Remove sector shaft packing retainer; then remove and discard sector shaft packing.

d. Ball Nut Disassembly. As a rule, disassembly of the ball bearing nut will not be necessary if it is perfectly free with no indication

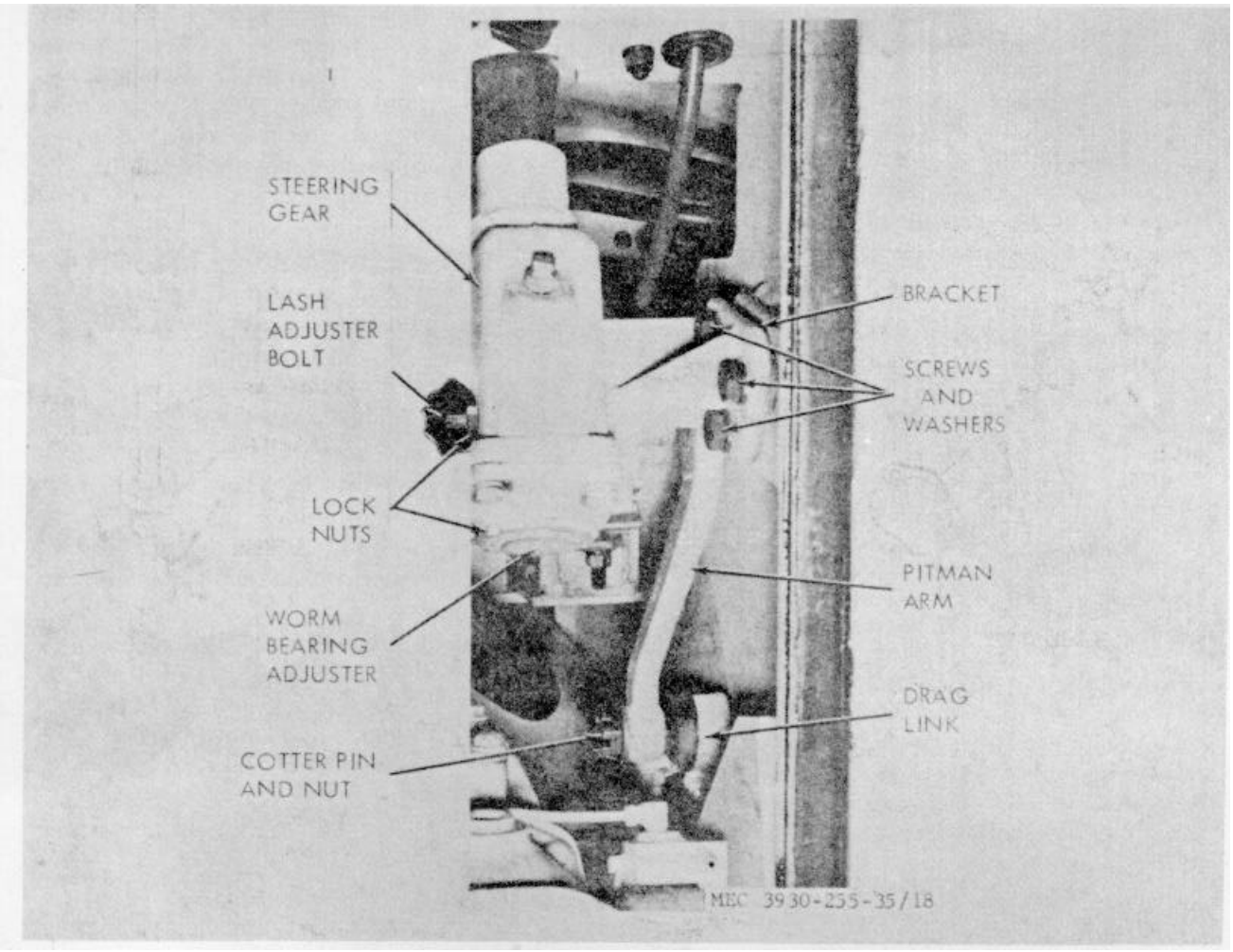


Figure 18. Steering gear removal.

of binding or tightness when rotated on the worm. However, if there is any indication of binding or tightness, the unit should be disassembled, cleaned, and inspected as follows: (1) Remove screw and clamp retaining ball guides in nut. Draw guides out of nut. (2) Turn nut upside down and rotate wormshaft back and forth until all balls have dropped out of nut into a clean pan. With balls removed, nut can be pulled endwise off of worm.

e. Cleaning and Inspection.

(1) With steering gear completely disassembled, wash all parts in SD. Dry them thoroughly with clean rags. With a magnifying glass inspect ball bearings, bearing cups, worm and nut grooves, and surface of all balls for signs of indentation. Also check for signs of chipping or breakdown of the surface.

(2) Inspect pitman gear shaft for wear and check fit of shaft in housing bushings Inspect fit of pilot on end of pitman gear shaft in its bushing in side cover. If this bushing is worn, a new side cover and bushing assembly should be installed. Check ball guides for damage at ends where they deflect or pick the balls from the helical path. Any damaged guides should be replaced.

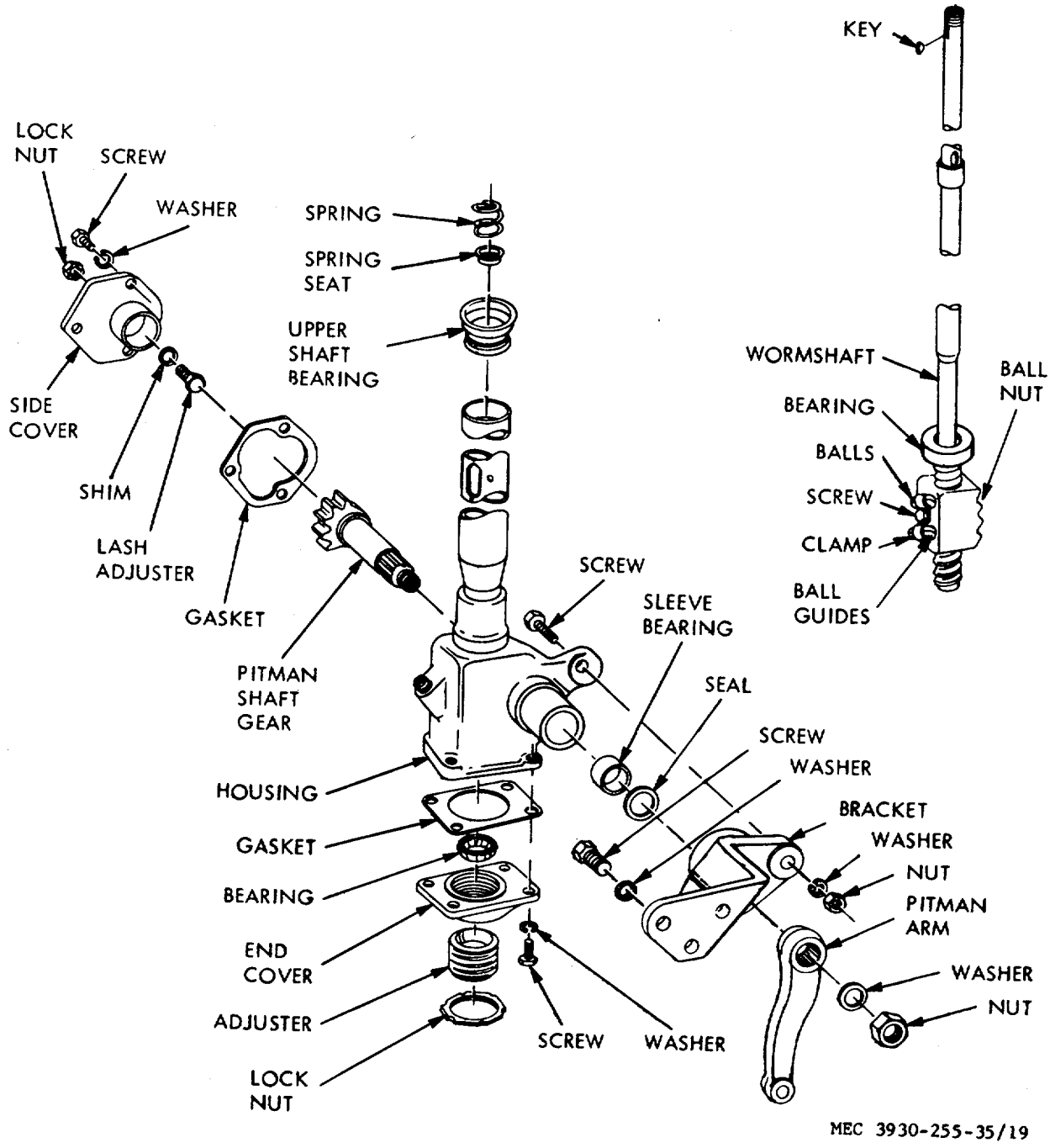


Figure 19. Steering gear, exploded view.

Check steering gear wormshaft assembly for bent or damaged shaft.

f. Sector Shaft Bushing Replacement.

(1) Support steering gear housing in an arbor press and press sector shaft bushing from housing with piloted driver inserted from lower end of housing.

(2) Press new bushing into position using same sector shaft bushing driver, used for removal.

***Note*. Service bushings are diamond bored to size and require no further reaming.**

g. Wormshaft Seal Replacement. If wormshaft indicates need of replacement, it should be removed and a new seal pressed into position in housing. Use a suitable socket pressing an outer diameter of seal. (5)

***Note*. Take care to insure that seal is not assembled in a cocked position.**

h. Side Cover Bushing Replacement. The side cover assembly, including bushing, is serviced as a unit and should be replaced when it is desired to replace the bushing. (6)

i. Pitman Gear Shaft Seal Replacement. The pitman gear shaft seal must be replaced (7) each time a defective packing is indicated or steering gear is disassembled. This operation is similar to g above.

j. Wormshaft Bearing Cup Replacement.

(1) Remove wormshaft bearing cup.

(2) Press new bearing cups into position.

k. Ball Nut Assembly.

(1) Place wormshaft flat on bench and slip nut over worm with ball guide holes up and shallow end of rack teeth to the left from steering wheel position. Align grooves in worm and nut by sighting through ball guides holes.

(2) Count 27 balls into suitable container. This is the proper number of balls for half of the circuit. Place these balls into one of the guide holes while turning worm gradually away from that hole. Continue until ball circuit is full from bottom of one guide hole to bottom of the other or until stopped by reaching the end of the worm.

Note.

In cases where balls are stopped by the end of the worm, hold down those balls already dropped into the nut with blunt end of a clean rod or punch and turn worm in reverse directions a few turns. The filling of the circuit can then be continued. It may be necessary to work worm back and forth, holding balls down first in one hole then the other, to close up the spaces between balls and fill circuit completely and solidly.

(3) Lay one-half of ball guide, groove up, on the bench and place remaining (2) balls from the count container in it.

(4) Close this half of guide with the other half. Hold the two halves together and plug each open end with petroleum jelly so balls will not drop out while installing guides.

(5) Push guide into guide holes of nut. This completes one circuit of balls. if guide does not push all the way down easily, tap it lightly into place with the wooden handle of a screwdriver.

(6) Fill second ball circuit in same manner.

(7) Assemble ball guide clamp to nut, being sure to use a lockwasher under clamp screw, then tighten screw securely. Check assembly by rotating the nut on the worm to see that it moves freely. Do not rotate nut to the end of the worm threads as this may damage ball guides. If there is any stickiness in the motion of the nut, some slight damage to the ends of ball guides or to other gear components may have been overlooked.

l. Steering Gear Assembly. After a major service overhaul where all original factory installed lubricant has been washed out of steering gear assembly, the thread of the adjuster, side cover bolts, and lash adjuster should be coated with a suitable nondrying, oil resistant sealing compound such as Permatex No. 2. This is to prevent leakage of gear lubricant from steering gear assembly. The compound should not be applied to female threads and extreme care should be exercised in applying this compound to the bearing adjuster, as the compound must be kept away from the wormshaft bearing. Also apply grease GAA to worm bearings, pitman shaft bushings, and ball nut teeth.

(1) With wormshaft seal, bushings, and bearing cups installed and ball nut assembly installed on wormshaft, slip upper ball bearing over wormshaft and insert wormshaft and nut assembly into housing, feeding end of shaft through upper ball bearing cup and seal

(2) Place ball bearing in adjuster cup, press stamped retainer into place using a socket of suitable size, and install

adjuster and locknut in lower end of housing.

(3) Assemble lash adjuster with shim in slot in end of sector shaft. Check end clearance which should not be greater than .002 inch. For the purpose of adjusting this end clearance, a steering gear lash adjuster shim unit is available. It contains four shims-.063 inch, .065 inch, .067 inch, and .069 inch thick.

(4) After lash adjuster end clearance has been adjusted, start sector shaft pilot into bushing in side cover. Then, using a screwdriver, through hole in cover, turn lash adjuster counterclockwise to pull sector gear shaft pilot into its bushing as far as it will go.

(5) Rotate wormshaft by hand until ball nut is about in the center of travel. This is to make sure that rack and sector will engage properly with center tooth of sector entering center tooth space of nut.

(6) Place new gasket on side cover, then push side cover assembly including sector shaft into place. After making sure there is some lash between rack and sector teeth, assemble and tighten side cover bolt.

m. Installation. Reverse procedures in b above.

24. Tie Rods

a. Removal. Remove cotter pin and nut from each tie rod end (fig. 20), and remove tie rod ends from steering knuckle and bellcrank.

b. Installation. Reverse procedures in a above

25. Bellcrank

a. Removal.

(1) Remove steering axle (para 15a).

(2) Remove retaining ring (fig. 20) and washer, and lift bellcrank from axle.

b. Installation. Reverse procedures in a above

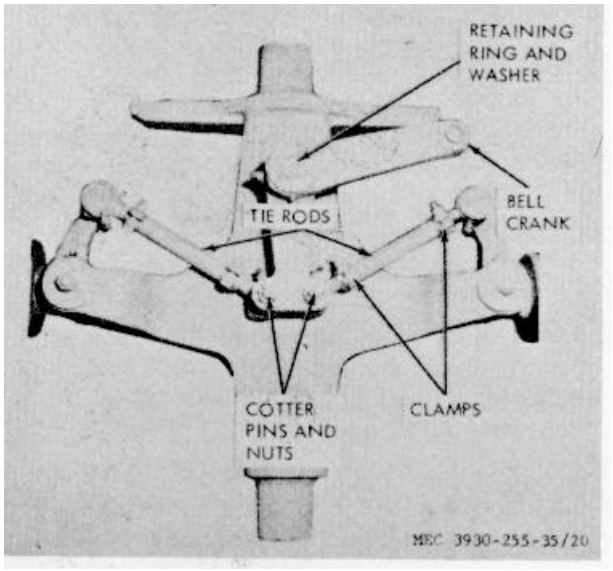


Figure 20. Steering axle.

Section VIII. HYDRAULIC LIFT COMPONENTS

26. Hydraulic Pump

a. Removal and Installation. Refer to TM 10-3930-255-20.

b. Disassembly.

(1) Remove cotter pin, nut, and gear from pump drive gear shaft (13, fig. 21).

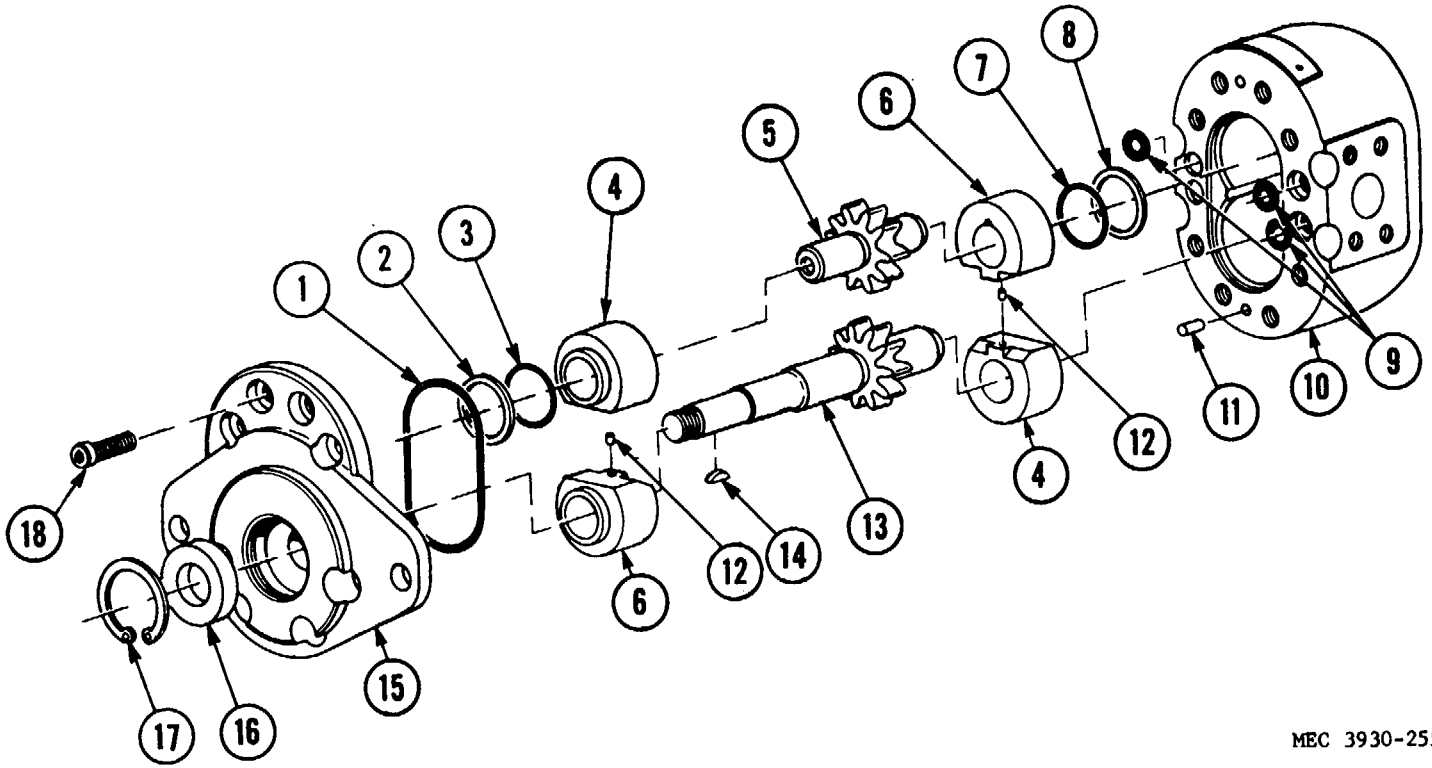
(2) Remove woodruff key (14) from slot in pump drive gear shaft.

(3) Remove retaining ring (17), cap-screw (18), seal (16), and mounting flange cover (15).

(4) Remove driven and drive gear shafts (5 and 13), bearings (4 and 6), and pins (12).

(5) Remove packing retainers (2 and 8) and packings (1, 3, 7, and 9).

(6) Remove pins (11) from pump housing (10) only if replacement is necessary.



1 Packing
2 Packing retainer
3 Packing
4 Bearing
5 Driven gear shaft
6 Bearing
7 Packing
8 Packing retainer
9 Packing
10 Pump housing
11 Pin
12 Pin
13 Drive gear shaft
14 Woodruff key
15 Mounting flange cover
16 Seal
17 Retaining ring
18 Screw

Figure 21. Hydraulic pump, exploded view.

c. Cleaning, Inspection and Repair.

(1) Clean all metal parts in SD.

(2) Discard all nonmetal items removed.

(3) Inspect bearings and seals for wear, and gears for damage.

(4) True any slight irregularities in mating surfaces which can be cleaned up by removal of less than 0.005 inch of metal.

d. Assembly.

(1) Install pins (11, fig. 21) in pump housing (10).

(2) Install packing (1) in mounting flange cover (15). Install packings (3 and 7) on bearings (4 and 6) as shown. Retain them by installing packing retainers (2 and 8).

(3) Install packings (9) in pump housing recesses.

(4) Assemble pins (12) and bearings (4) to bearings (6) as shown; assemble them onto pump gear shafts (5 and 13) and install assembly in pump housing.

(5) Install mounting flange cover on pump housing, and retain it with screws (18). Install seal (16) and retaining ring (17) in cover. Replace key (14), gear,, nut, and cotter pin on drive gear shaft.

27. Directional Control Valve

a. Removal and Installation. Refer to TM 10-3930-255-20.

b. Disassembly.

(1) Remove relief valve capnut (fig. 22), loosen jamnut on setscrew, and unscrew setscrew fully to take pressure from spring seat. Unscrew relief valve plug and take spring seat, spring, and popper from valve body. Remove bottom plug and bearing from relief valve.

(2) Remove plugs from below plungers. Take out gaskets, spring retainer, screws, springs, and washers. Remove plungers and packing surrounding plungers at top.

(3) Remove remaining plugs in valve body to open passages for cleaning and inspection.

(4) Discard all packings. Do not reuse them.

c. Cleaning and Inspection.

(1) Clean all metal parts in SD. Do not probe passages to remove foreign matter.

(2) Inspect body for cracks or damaged threads, and plunger bores for surface imperfections.

(3) Inspect plungers for surface defects or wear.

Note. Defects found in (2) or (3) above, if they render valve unserviceable, require replacement of valve assembly.

(4) Inspect check valve spring for deformation or rust spots. Inspect poppet and bearing for wear or scoring on bearing surfaces.

d. Assembly. Reverse procedures in b above, except leave off relief valve nut, and leave jamnut loose until valve has been adjusted.

e. Adjustment.

(1) Connect pressure port of valve to a hydraulic test set pressure source of 2000 psi and 4 gpm (or greater) capacity ratings.

(2) Connect leadaway hose to return port of valve, directed back to reservoir of test set. Plug (temporarily) discharge ports normally leading to lift and tilt cylinders.

(3) Raise either plunger, with test pressure applied to valve. Test set pressure gage will show pressure setting of relief valve. If this reading is not 1650 psi, plus or minus 50 psi, turn setscrew clockwise to increase pressure, or counterclockwise to decrease pressure.

(4) When desired pressure is reached, tighten jamnut, install relief valve capnut, and remove plugs and leadaway hose installed for test.

28. Hydraulic Tilt Cylinders

a. Removal and Installation. See TM 103930-255-20.

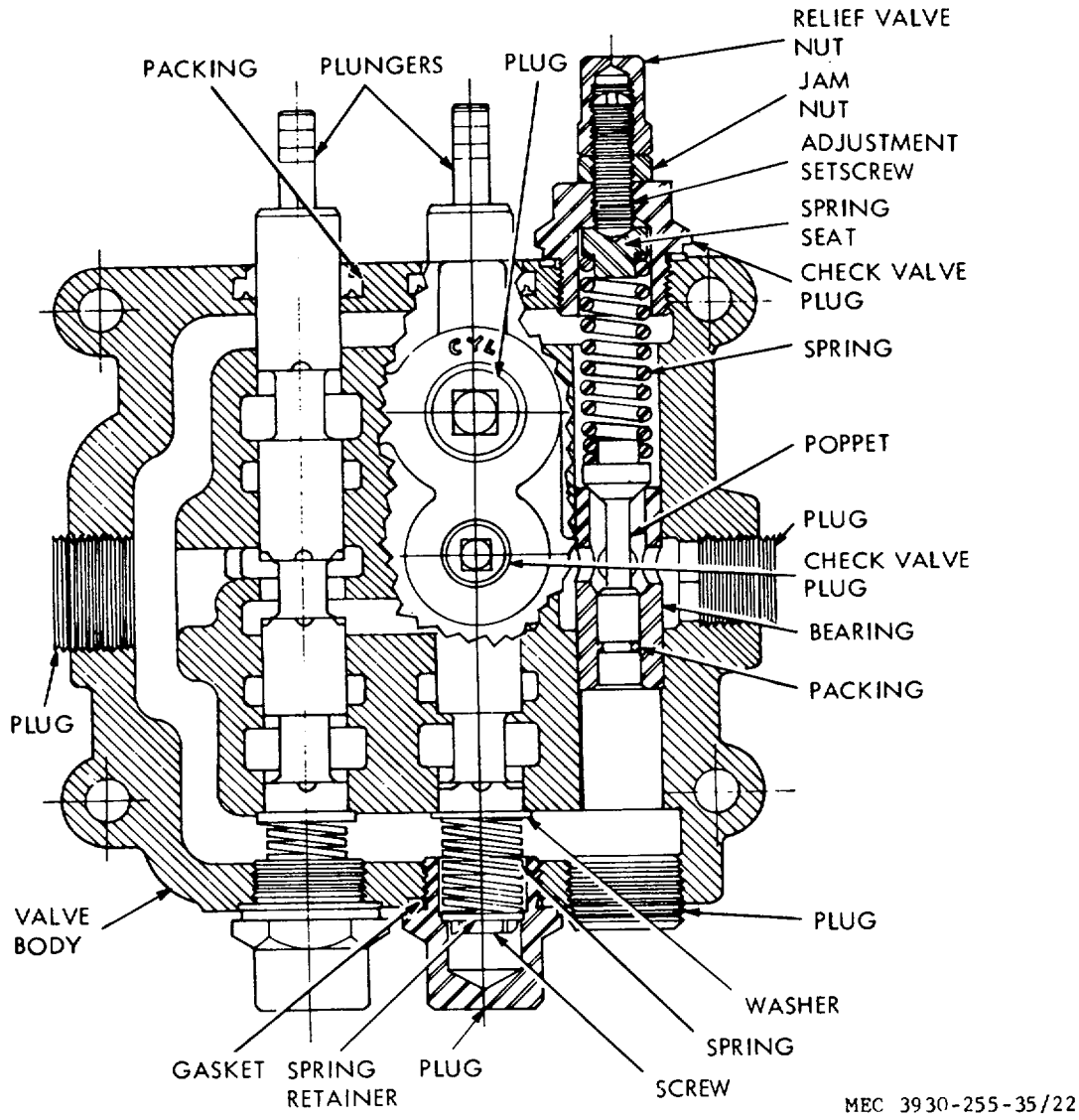


Figure 22. Control valve, sectional view.

b. Repair. Repair of tilt cylinders is accomplished by installation of new parts to replace defective items found during disassembly.

c. Disassembly.

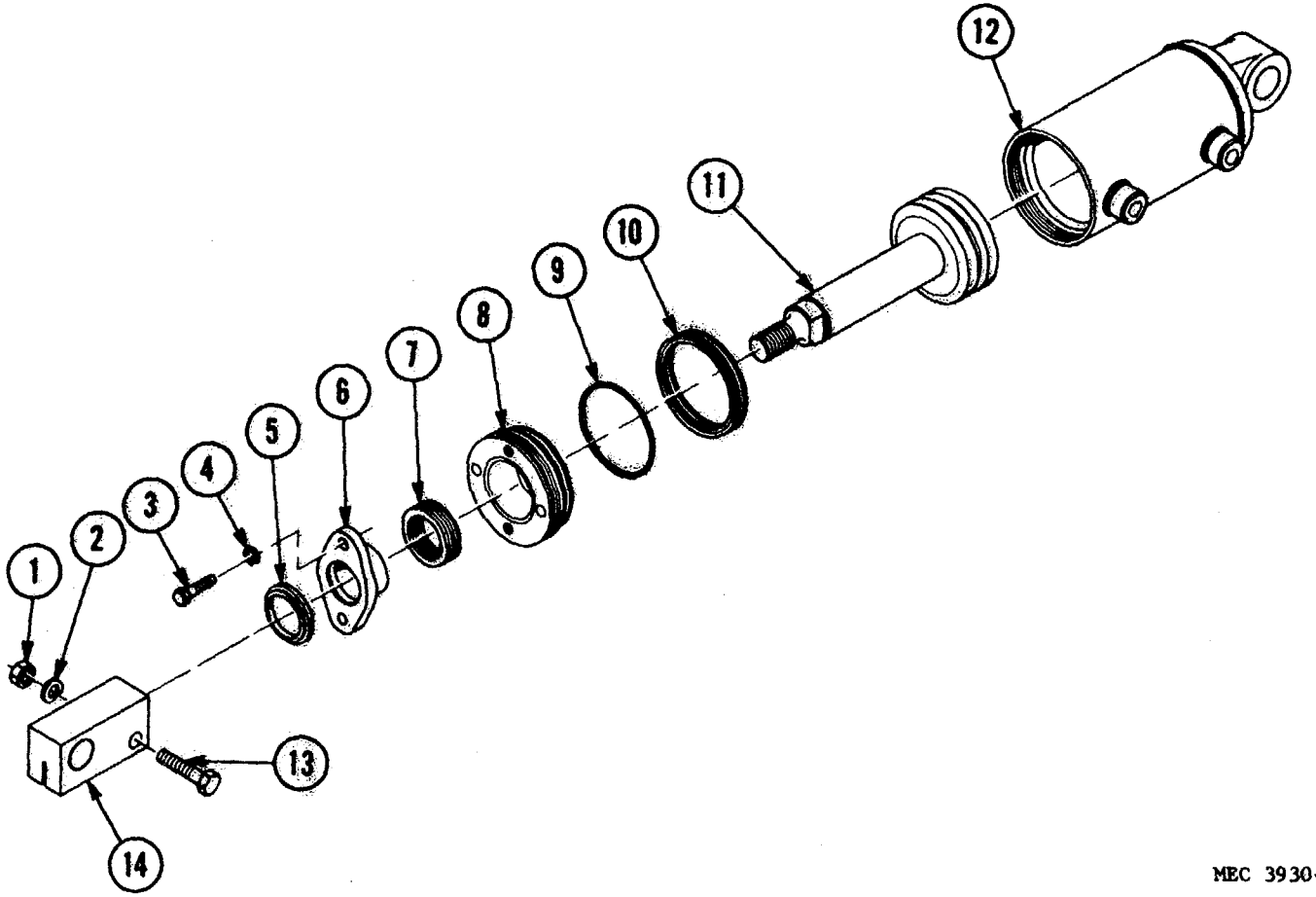
(1) Remove nut (1, fig. 23), washer (2), and screw (13). Remove rod end (14) from piston and rod (11).

(2) Remove screw (3), washer (4), and retainer (6). Remove wiper ring (5) and packing (7). Unscrew stuffing box (8) from cylinder (12), take out piston and rod (11), and remove packings (9 and 10) from piston.

d. Assembly

(1) Install packing (9 and 10, fig. 23) on piston (11), and install in cylinder (12) Screw stuffing box (8) snugly into cylinder with a pin spanner wrench.

(2) Position packing (7) in stuffing box and install packing retainer (6) with screws (3) and washers (4) only tight enough to prevent seepage of fluid This item can be further tightened after installation of cylinder if necessary to stop leakage.



1 Nut
2 Washer
3 Screw
4 Washer
5 Wiper ring
6 Packing retainer
7 Packing
8 Stuffing box
9 Packing
10 Packing
11 Piston and rod
12 Cylinder
13 Screw
14 Rod end

Figure 23. Tilt cylinder, exploded view.

(3) Install wiper ring (5) on piston rod. Replace rod end (14), screw (13), washer (2), and nut (1).

29. Lift Cylinder

a. Removal.

(1) Drain hydraulic system oil (LO 103930-255-20).

(2) Disconnect lift cylinder hose from flow restrictor (fig. 6).

(3) Remove chain assemblies (TM 10 (5) 3930-255-20) from crosshead.

(4) Remove nut (11, fig. 24) and washer (12) from top of lift cylinder (23). Raise and brace inner upright (52) to clear lift cylinder and remove cylinder from truck.

b. Disassembly.

(1) Clamp lift cylinder in vise equipped with V-shaped jaws. Remove two screws (1, fig. 25) and washers (2). Unscrew packing nut (7) from primary plunger (29). Remove wiper (3) Repairing (6), washer (5), packing (4), retainer (8), and packing assembly (9).

(2) Unscrew packing nut (12) from cylinder (28). Remove ring (11), packing retainer (13), and packing (1) assembly (26).

(3) plunger (29) from primary, cylinder (28) and remove guide (15), retaining ring (14), and bearings (10 and (27)

(4) Unscrew packing nut (19) from cylinder (23). Remove ring (18), packing retainer (20)., and packing assembly (21). Slide cylinder from plunger (24). Remove bearing (22) from cylinder.

(5) Remove packing (17) and washer (16) from cylinder. Unscrew cylinder end (3) and remove plunger (24). Remove two bearings (25).

c. Cleaning Inspection, and Repair.

(1) Clean metal parts with SD.

(2) Inspect all tubular sections for dents or bends. Check all friction surfaces for roughness, pits, or other irregularities Discard, without inspection, all nonmetal parts for replacement at assembly.

(3) Repair moderate damage to threaded holes with a tap. Remove minor roughness on friction surfaces by honing, followed by thorough reclining to remove traces of abrasive.

d. Assembly.

(1) Install bearings (22 and 25, fig. 25) on secondary plungers (24).

---

1. Load backrest
2. Fork.
3. Spacer.
4. Plate.
5. Screw.
6. Washer.
7. Fork support shaft.
8. Roller chain.
9. Adjusting screw.
10. Nut.
11. Nut.
12. Washer.
13. Lubrication fitting.
14. Retaining ring.
15. Washer.
16. Sleeve bearing.
17. Bearing roller.
18. Crosshead.
19. Adapter.
20. Regulator valve.
21. Elbow.
22. Pipe nipple.
23. Hoist cylinder assembly.
24. Ball.
25. Angle bracket.
26. Screw.
27. Bearing cap.
28 Bearing insert
29. Screw
30. Washer
31. Spacer
32. Pin
33. Screw
34. Spring
35. Bolt
36. Plate
37. Right-hand latch striker
38. Left-hand latch striker
39. Screw
40. Washer
41. Washer
42. Shim
43. Lowering plate
44. Screw
45. Insert
46. Screw
47. Washer
48. Roller
49. Ball bearing
50. Washer
51. Lubrication fitting
52. Inner upright
53. Outer upring
54. Lift carriage

Figure 24. Mast assembly, exploded view.

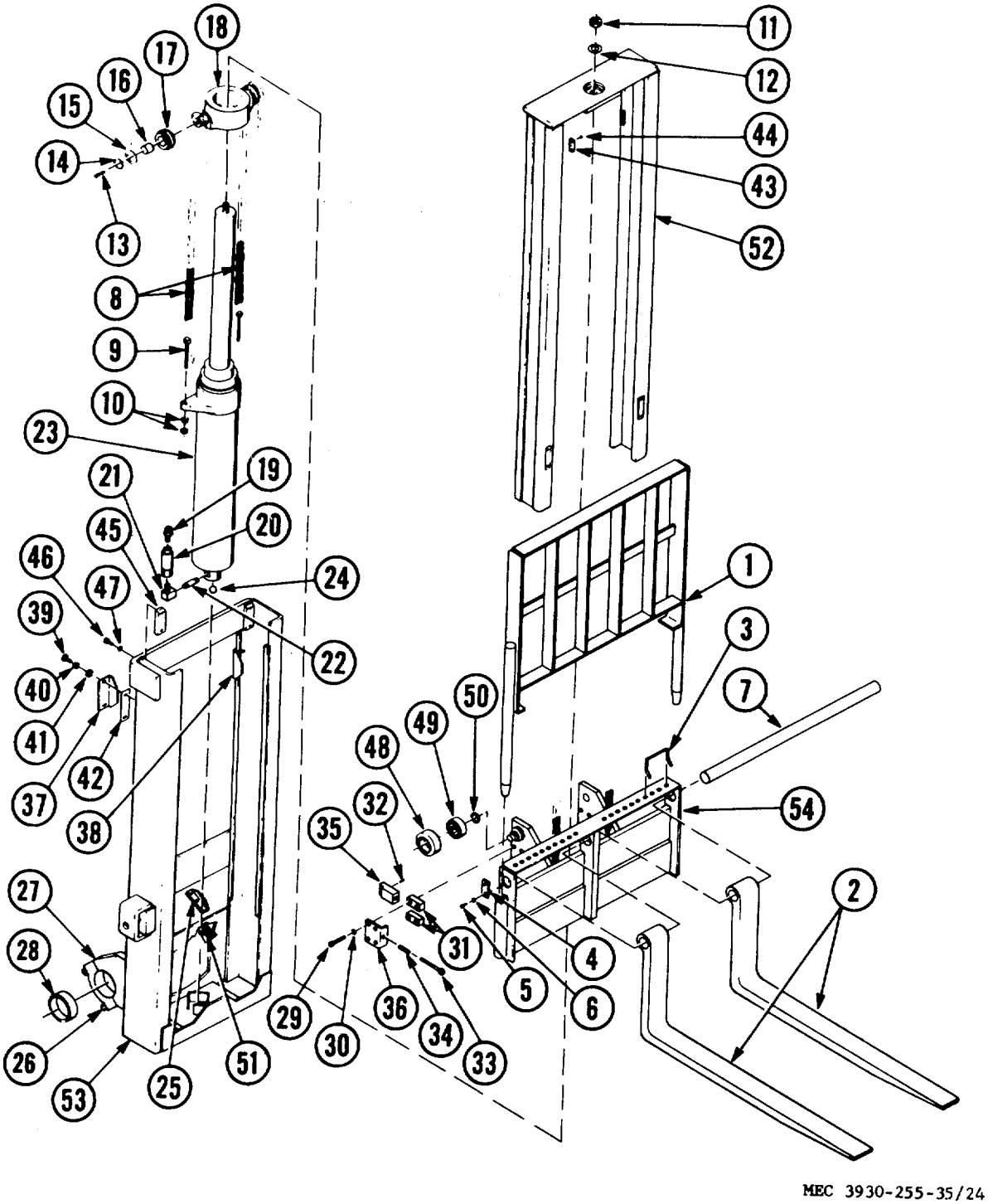
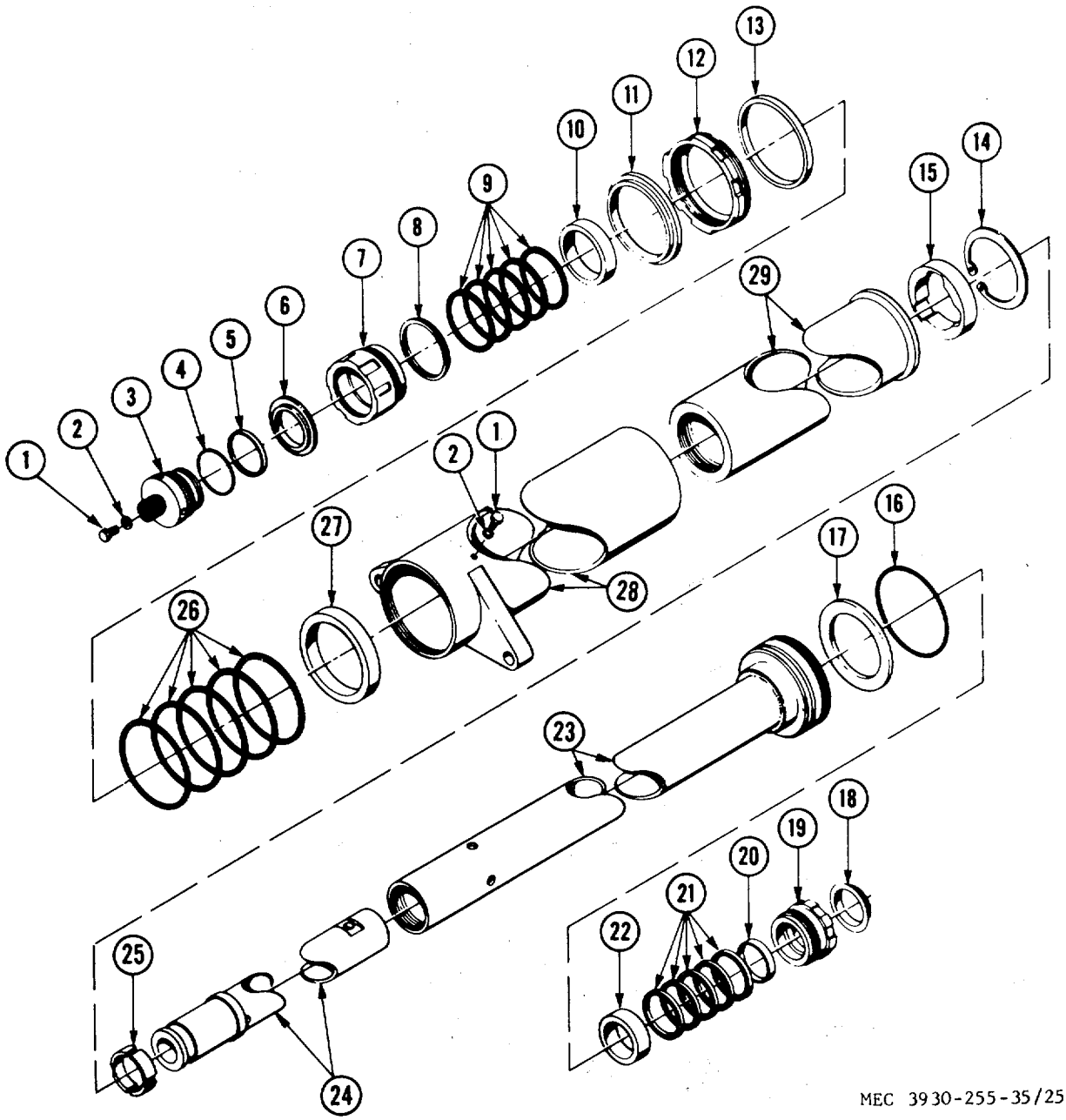


Figure 24-Continued.

(2) Install secondary plunger in cylinder (23). Place packing (4) and washer (5) on end of cylinder and install cylinder end (3). Install bleeder screw (1) and washer (2) in cylinder end.



1 Bleeder screw
2 Washer
3 Cylinder end
4 Packing
5 Washer
6 Wiper ring
7 Packing nut
8 Packing retainer
9 Packing assembly
10 Sleeve bearing
11 Wiper ring
12 Packing nut
13 Packing retainer
14 Retaining ring
15 Plunger guide
16 Washer
17 Packing
18 Wiper ring
19 Packing nut
20 Packing retainer
21 Packing assembly
22 Sleeve bearing
23 Secondary cylinder
24 Secondary plunger
25 Sleeve bearing
26 Packing assembly
27 Sleeve bearing
28 Primary cylinder
29 Primary plunger

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Figure 25. Lift cylinder, exploded view.

(3) Install packing (17) and washer (16) in groove on secondary cylinder. Replace packing assembly (21), retainer (20), packing nut (19), and wiper ring (18).

(4) Install plunger guide (15) and retaining ring (14) in bore of primary plunger (29). Install items assembled in (1) to (3) above in primary plunger, then install primary cylinder over this assembly, and screw secondary cylinder into primary cylinders.

(5) Install bleeder screw (1) and washer (2) in primary cylinder. Place bearing (27) for primary plunger in position in primary cylinder. Install wiper ring (11) in packing nut (12), and install packing assembly (26), packing retainer (13), and retain with packing nut (12).

(6) Place bearing (10) over secondary cylinder (23). Install packing assembly (9), retainer (8), and nut (7).

e. Installation. Reverse procedures in a above. Bleed air from cylinder by removing both bleeder screws (1, fig. 25) from cylinder, 32 and pressurizing cylinder until oil appears at the bleed holes. Replace screws after bleeding cylinders.

30. Crosshead Assembly

a. Removal.

(1) Remove lift chains (TM 10-3930255-20).

(2) Remove nut 11 'fig. 24) and washer (12). Raise inner upright (52) to clear lift cylinder (23) and lift off crosshead (18) assembly.

b. Disassembly. Remove retaining rings (14, fig. 24), washers (15), sleeve bearings (16), and rollers (17).

c. Assembly. Reverse procedures in b above.

d. Installation. Reveres procedure in a above.

31. Inner Upright Assembly

a. Removal.

(1) Remove nut (11, fig. 24) and washer (12).

(2) Remove screws (29), spacers (31), and lockwashers (30) attaching latch assemblies within carriage; remove latch assemblies. Raise and block up inner upright.

(3) Slide roller assemblies from carriage (54). Remove rollers (48) and bearings (49). Slide washers (50) from carriage. Disconnect lift chains from carriage and remove carriage.

(4) Remove screws (44) and plates (43).

(5) Remove screws (46) and lockwashers (47) attaching inserts (45) to outer upright (53). Remove inserts.

(6) Remove screws (39) and lockwashers (40) attaching strikers (37 and 38). Remove strikers and shims (42).

(7) Slide inner upright (52) up and out of outer upright (53).

b. Installation. Pack bearings (49, fig. 24) GAA, and liberally apply GAA to sliding aces of inner and outer uprights, then .reverse procedures in a above.

32. Hydraulic Oil Tank

a. Removal.

(1) Raise truck high enough to clear oil tank for removal from below, and to provide access to attaching parts.

(2) Drain oil from tank (LO 10-3930225-20).

(3) Loosen hose clamp (fig. 26) and disconnect return hose between control valve and filter.

(4) Loosen pump suction hose clamp at tank and pull suction hose free of tank outlet.

(5) Remove return filter cartridge from bottom of filter (TM 10-3930-25520) and remove filter top, elbows, and nipples from tank.

(6) Remove screws and washers (fig. 26) and take tank from truck.

b. Installation. Reverse procedures in a above, and fill tank with oil as instructed in LO 10-3930-255-20.

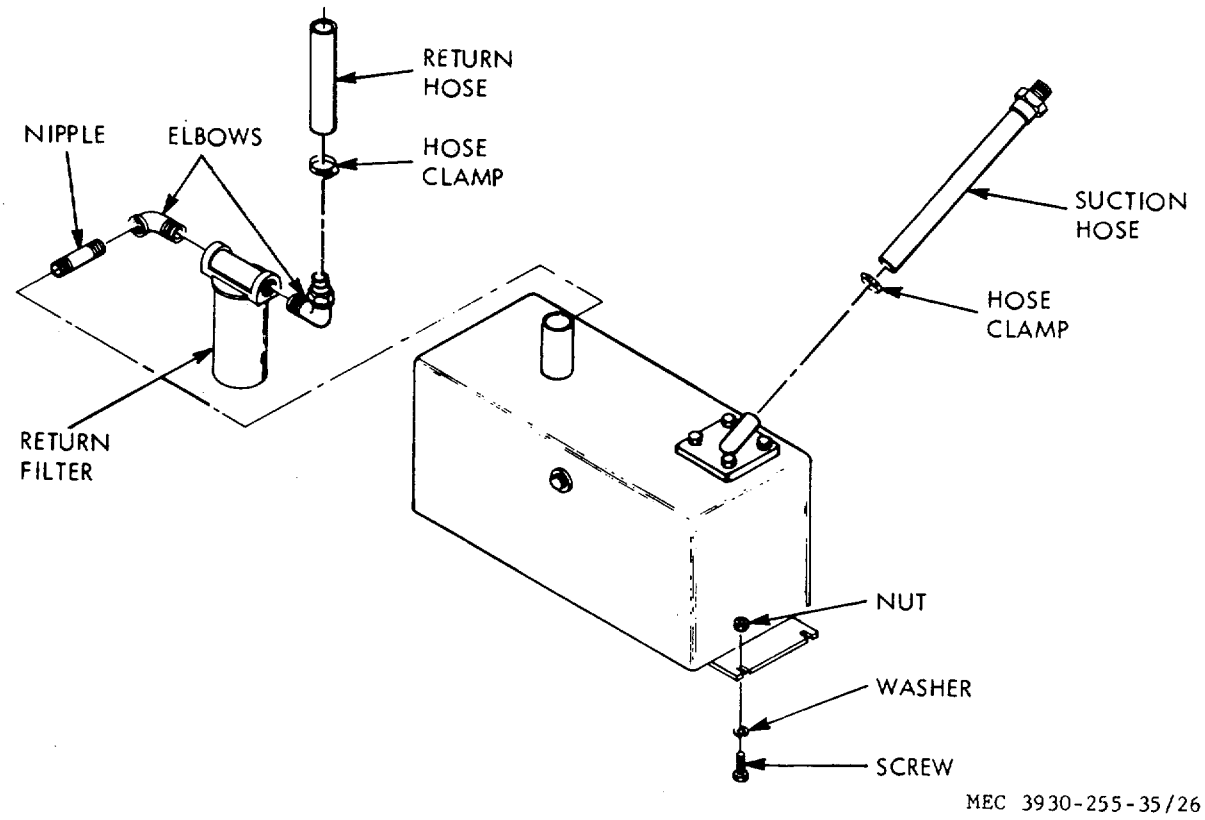


Figure 26. Oil tank removal.

Section IX. ELECTRIC MOTORS

33. General

Both motors on the truck are series wound dc motors. The travel motor and hydraulic pump motor are products of the same maker, and are quite similar, except for size, and provision for parking brake mounting and rotation reversal on the travel motor. The following general procedures apply to both motors They will not be repeated subsequently.

a. Inspection.

(1) With the motor on test operation for 5 minutes, observe for bearing heating, unusual noises from bearings or brushes, and vibration.

(2) Observe action of brushes on commutation. Excessive sparking of brushes indicates worn brushes or weak brush springs, or defective armature or commutation.

(3) Note length of brushes at inspection by comparison with a new replacement brush. Replace any brush worn to less than half the length of the new brush.

(4) Inspect interior of motors and brush inspection covers for thrown solder, indicating overheating in operation.

b. Cleaning

(1) Before disassembly, wipe exterior with a cloth moistened with SD.

(2) Remove as much dirt as practical from parts with compressed air.

(3) Wipe remaining dirt from parts with

a cloth slightly moistened with SD. Do not wet armature or field windings.

(4) Clean commutations to bright finish with 00 or finer sandpaper, or commutation stone. Do not use emery cloth.

c. Lubrication. Lubricate unsealed bearings with grease, GAA. Do not try to lubricate sealed bearings.

d. Repair. Repair of all motors is limited to soldering loose solder joint connections, truing commutations in lathe, and replacing defective parts.

34. Travel Motor

a. Removal. Refer to paragraph 12*a*.

b. Installation.

(1) Perform procedures in paragraph 16*d* (2) and (3).

(2) Reverse procedures in a above.

c. Disassembly. Disassemble only as far as necessary, as follows:

(1) Remove cotter pill and nut (fig. 27) from brake end of armature shaft, and pull brakedrum from armature shaft. Remainder of brake assembly may remain in position.

(2) Remove retaining ring (26, fig. 28) and spur gear (25) from motor armature shaft.

(3) Remove screw (33) and take off covers (t4 and 15). Remove screw (11), washer (12), press down on brush spring (6) to unhook it at bottom, and lift out each brush spring, and brush (7).

(4) Remove screw (10) and washer (9) to free one end of lead (8). Remove screws (38) and take off endbell (1), and spacer yoke and brush holders (35). Remove armature (21) from field frame (32).

(5) Take nuts (5), washers (3 and 4), insulators (2), and terminal screw (36) from endbell (1). Remove screws and washers (34), and take spacer yoke (35) from endbell.

(6) Remove nuts (20), washers (17 and 19), and take terminal stud (16), insulators (18), and lead (8) from field frame.

(7) Remove retaining ring (24) and take bearing retainer cap (23) and bearing (13) from endbell (22).

(8) Remove bolts (27), screws and washers (28), and take endbell (22) from field frame.

(9) Remove screws (31), and take pole pieces (30) and field windings (29) from frame.

d. Inspection.

(1) Refer to paragraph 33*a*.

(2) With motor assembled, check that brush spring tension is between 43 and 53 ounces.

e. Cleaning. Refer to paragraph 33b.

f. Assembly. Reverse procedures ill c above.

g. Test After Assembly.

(1) Separately excite the series field with rated current .(50 amps), making S1 positive and S2 negative

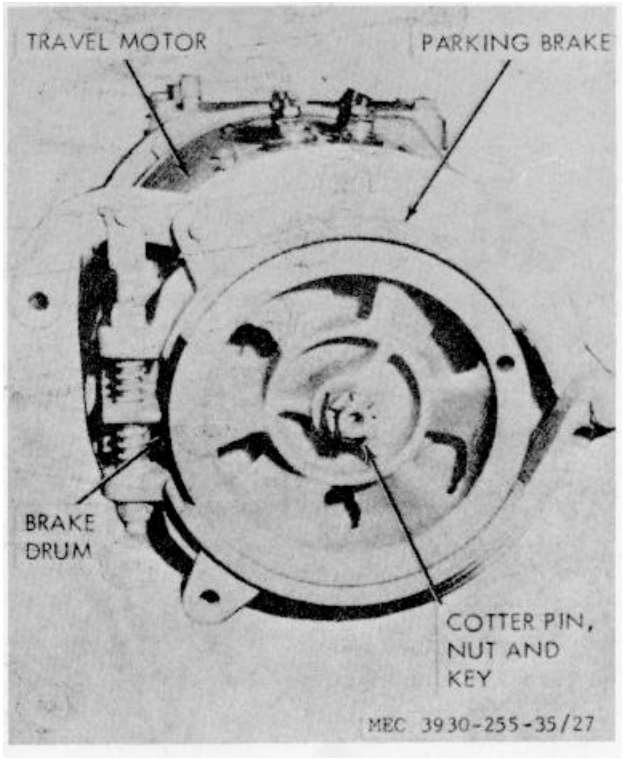


Figure 27. Parking brake, removal.

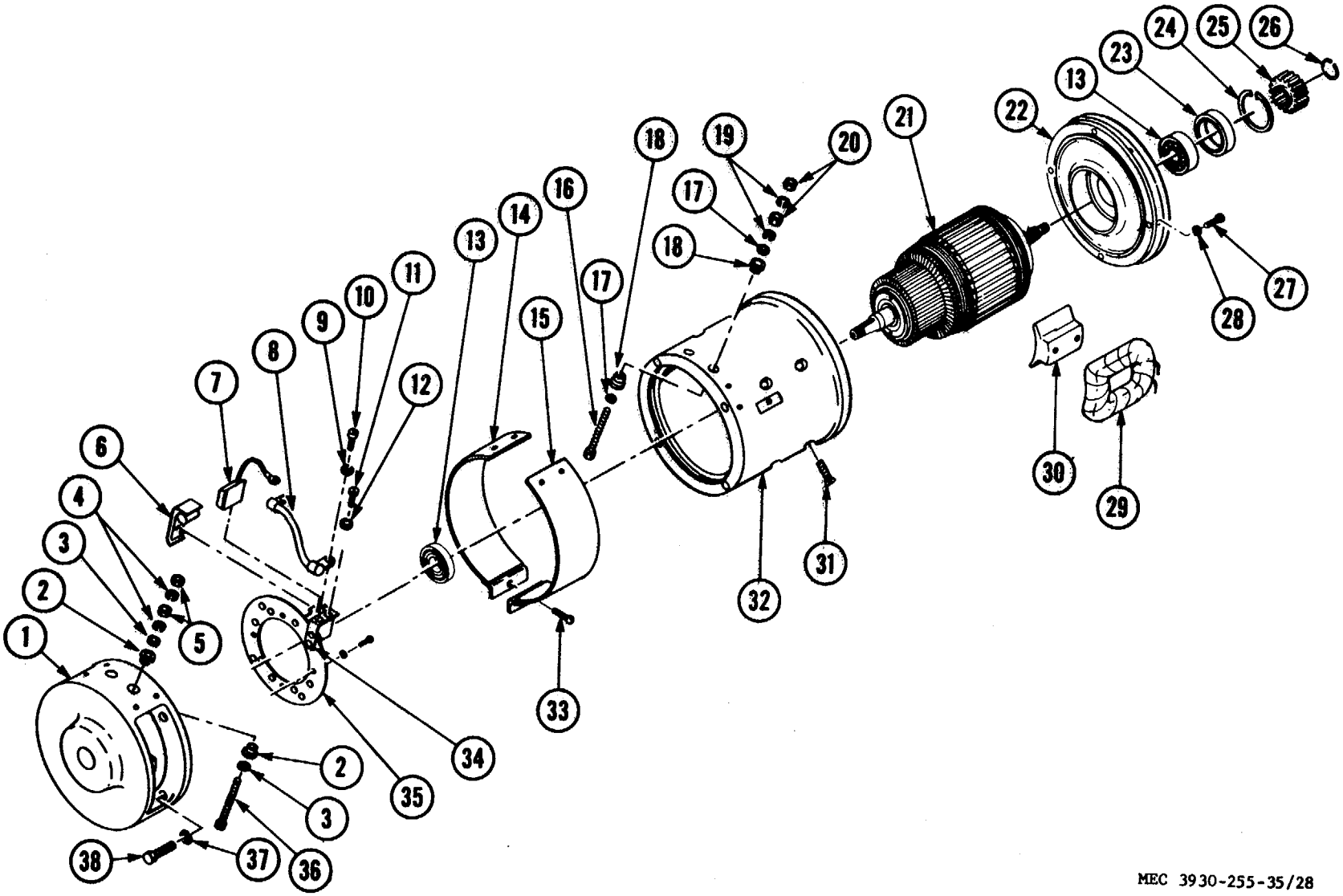


Figure 28. Travel motor, exploded view.

1. Endbell
2. Insulator
3. Washer (flat)
4. Lockwasher
5. Nuts
6. Brush spring
7. Brush
8. Lead
9. Lockwasher
10. Screw
11. Screw
12. Lockwasher
13. Bearing
14. Cover
15. Cover
16. Terminal screw
17. Washer
18. Insulator
19. Lockwashers
20. Nuts
21. Armature
22. Endbell
23. Bearing retainer
24. Retaining ring
25. Spur gear
26. Retaining ring
27. Screw
28. Washer
29. Field winding
30. Pole piece
31. Screw
32. Field frame
33. Screw
34. Screw and washer
35. Spacer yoke and brush holders
36. Terminal screw
37. Washer
38. Screw

Figure 28-Continued.

(2) Seat the brushes, and run motor with rated voltage on the armature terminals, making A2 positive and A1 negative. Armature must now turn clockwise, viewed from commutation end.

(3) After brushes have been seated and motor has run for 4 minutes, record speed, armature current and voltage, and field current. Observe commutation and brushes for sparking at this time.

(4) Make a high potential test above ground on all windings, using 600 volts ac for 1 second, or 500 volts ac for 1 minute.

35. Hydraulic Pump Motor

a. Removal and Installation. Refer to TM 10-3930-255-20.

b. Disassembly. Disassemble only as far as necessary, as follows:

(1) Remove screw (22, fig. 29), and brush access cover (5). Press down on each brush spring (2) to unhook it at the bottom, and remove brush springs. Remove screws (4) and brushes (3).

(2) Remove screws and washers (26) and take off endbell (1) with spacer yoke (25). Remove screws and washers (24), and yoke.

(3) Remove armature (12), and bearings (14 and 23).

(4) Remove screws (16), washers (17), and take endbell (15) from field frame (21).

(5) Remove nuts (11), washers (7 and 10), insulators (8), and terminal screws (6) from field frame.

(6) Remove screws (20), pole piece (19), and field windings (18).

c. Inspection.

(1) Refer to paragraph 33a.

(2) With motor assembled, check that brush spring tension is between 26 and 32 ounces.

d. Cleaning. Refer to paragraph 33b.

e. Assembly. Reverse procedures in b above.

f. Test After Assembly.

(1) Refer to TM 10-3930-255-20.

(2) Make a test connection to a brush holder 90 mechanical degrees from the brush holder connected to terminal A1.

(3) From an independent source separately excite the series field at 90 amperes, making the test connection positive, and S2 negative.

(4) From a separate independent power source apply rated voltage to the armature, making A1 positive and the test connection negative. Seat the brushes and run motor. Rotation should be clockwise, viewed from commutation end.

(5) Make a high potential test above ground on all windings, using 600

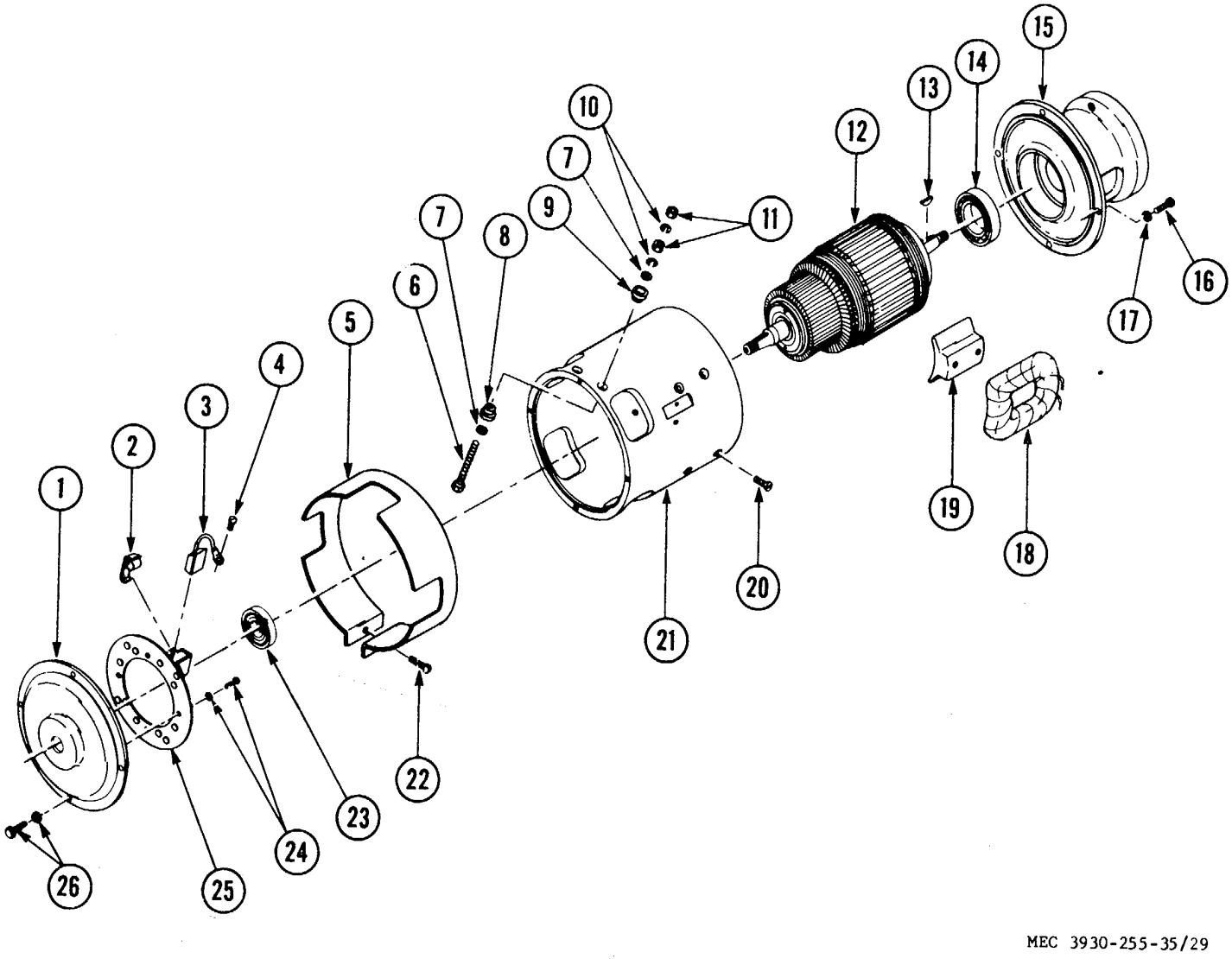


Figure 29. Hydraulic pump motor, exploded view.

1. Commutation endbell
2. Brush spring
3. Brush
5. Brush access cover
4. Screw
6. Terminal screw
7. Washer
8. Insulator
9. Insulator
10. Washers
11. Nuts
12. Armature
13. Woodruff key
14 Bearing
15 Endbell
16 Bolt
17 Washer
18 Field winding
19 Pole piece
20 Screw
21 Field frame
22 Screw
23 Bearing
24 Screw and washer
25 Spacer yoke and brush holders
26 Bolt and washer

Figure 29-Continued.

volts ac for 1 second, or 500 volts ac for 1 minute.

36. Electrical Equipment Box Cover

a. Removal.

(1) Removal truck cowl (TM 10-3930255-20).

(2) Remove cover screws (fig. 30) and cover.

b. Installation. Reverse procedures in a above.

37. Relays

All relays are housed in the electrical equipment box (fig. 30). All are attached to the box with thread cutting screws and washers. Removal and installation procedures for all relays are the same.

a. Removal.

(1) Remove electrical equipment box cover (para 36a).

(2) Disconnect electrical leads to relay.

Note. Disconnect only those leads which prevent removal of relay. Do not remove any braided conductor which is a component of a relay.

(3) Remove thread cutting screws and washers, and take relay from electrical equipment bow.

b. Installation. Referring to figure ,guidance in connecting leads, reverse procedures in a above.

38. Fuse Holder Assembly

Refer to figure 30 for location of the fuse f holder assembly.

a. Removal.

(1) Remove electrical equipment box cover (para 36a).

(2) Remove fuses and fusetrons (TM 103930-255-20).

(3) Disconnect wires from bus bar (fig. 30).

Note. Wires to fusetrons have been removed in performing (2) above.

(4) Remove nuts (10, fig. 31), washers (11), and screw (12), and remove fuse holder assembly from equipment box.

(5) Remove nuts (7), washers (8 and 9), screws (16), and take fuse holder (14) for small fuses from larger fuse holder (15).

b. Installation. Reverse procedures in a above.

39. Directional Switch

a. Removal and Installation. Refer to TM 10-3930-255-20.

b. Contact Replacement.

(1) Remove screws (3, fig. 32), washers (4), and cover (2).

(2) Press contact fingers (8) together, rotate them one-quarter turn, and take from contact carrier (10).

(3) Re-move screws holding terminal boards (5 and 6). Remove terminal boards with contacts.

(4) Install new contacts by reversing (1) to (3) above.

c. Switch Disassembly. Disassemble only as far as necessary to repair, as follows:

(1) Perform procedures in b (1) to (3) above.

(2) Remove springs (19, fig. 32). Remove clips and screws (15), hinge

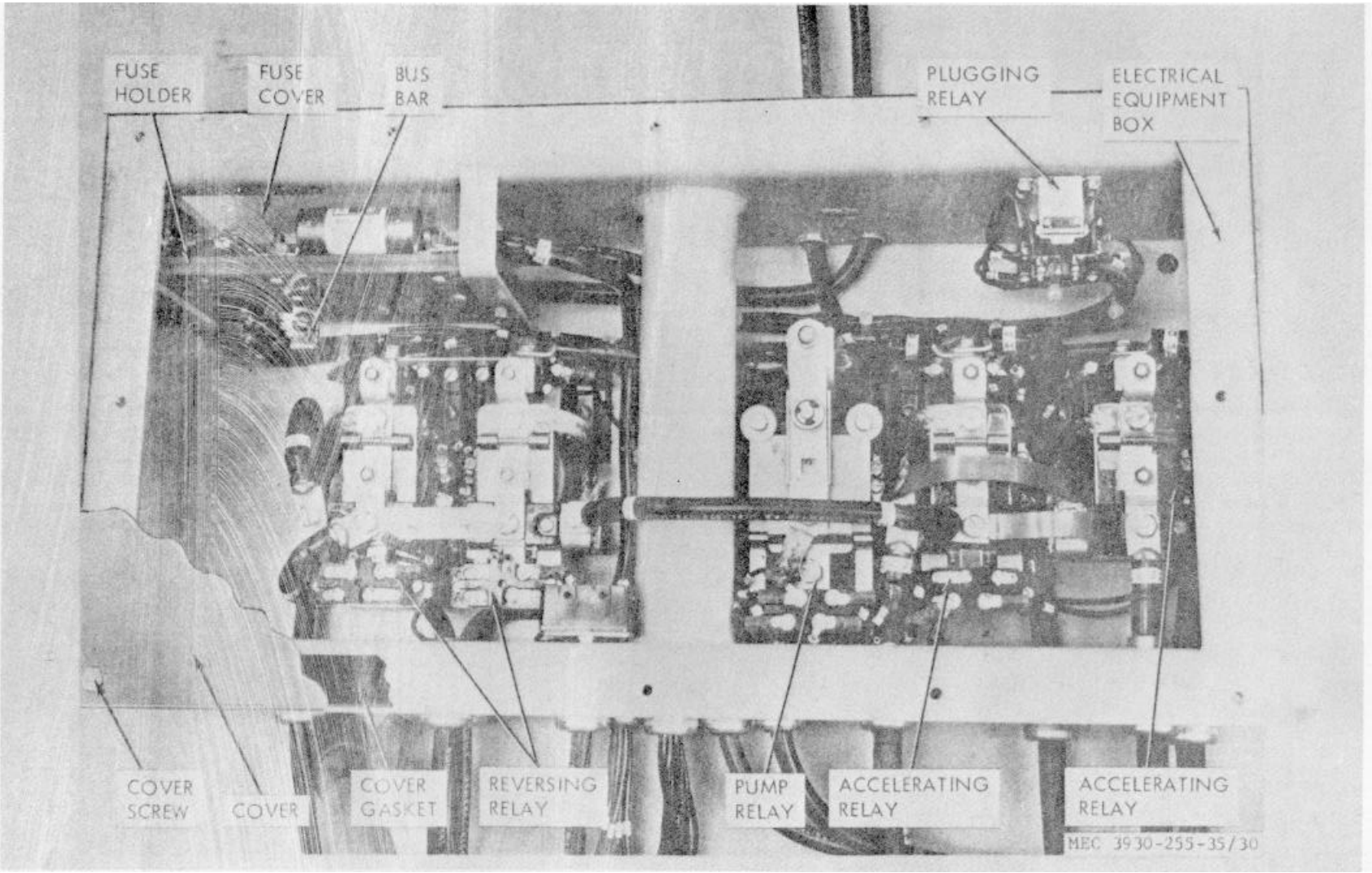
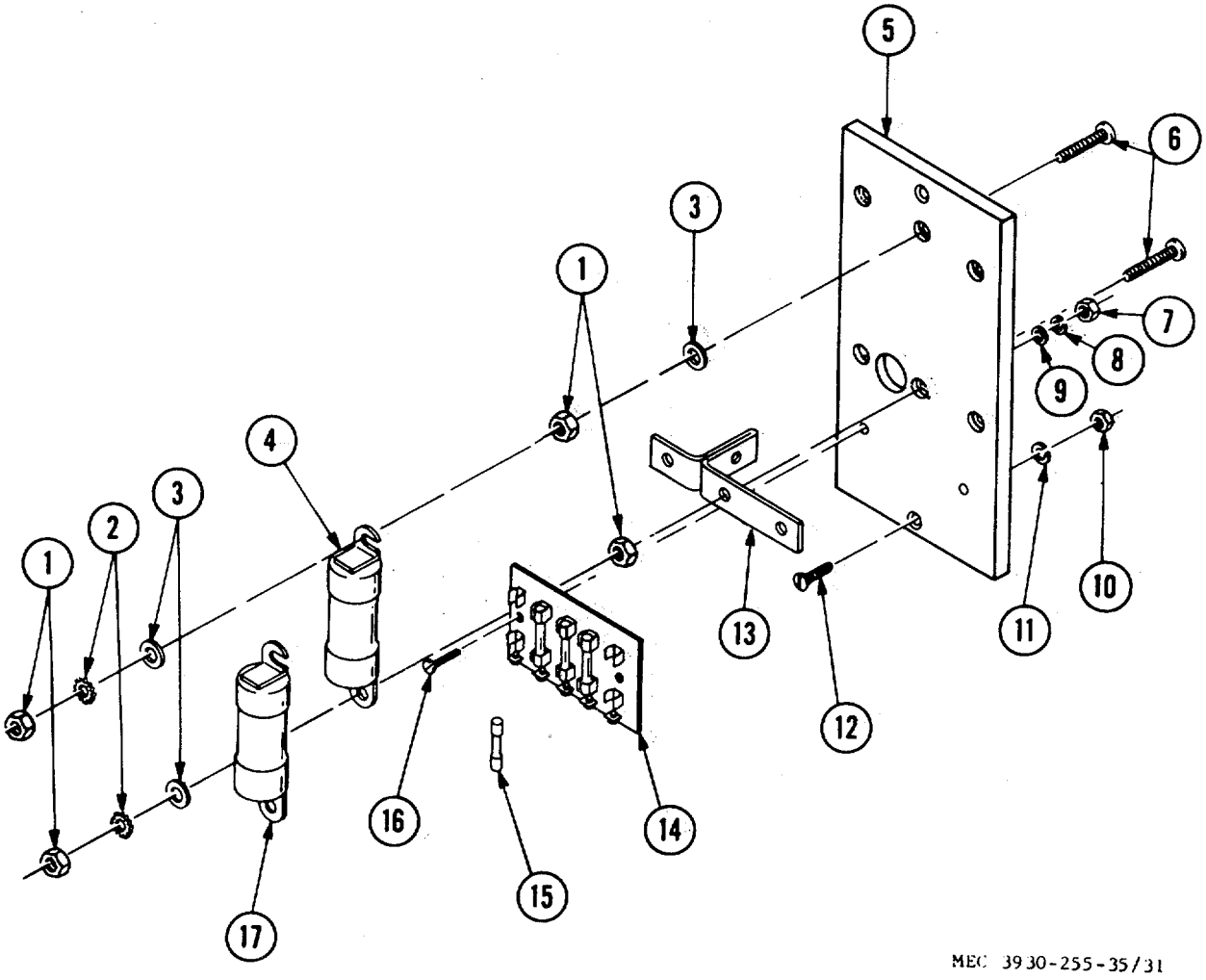


Figure 30. Electrical equipment box.



1 Nuts
2 Lockwashers
3 Flat washers
4 Fuse (200 a rating)
5 Fuse holder
6 Screws
7 Nut
8 Lockwasher
9 Flat washer
10 Nut
11 Lockwvasher
12 Screw
13 Bus bar
14 Fuse holder
15 Fuse (14 a rating)
16 Screw
17 Fuse (90 a rating)

Figure 31. Fuse holder assembly, exploded view.

pins (16), and roller arm assemblies (18).

(3) Remove screw (13) and washers (11 and 12), then take operating shaft (17), bushing (9), and contact carrier (10) from housing (14).

d. Switch Assembly. Reverse procedures in c above.

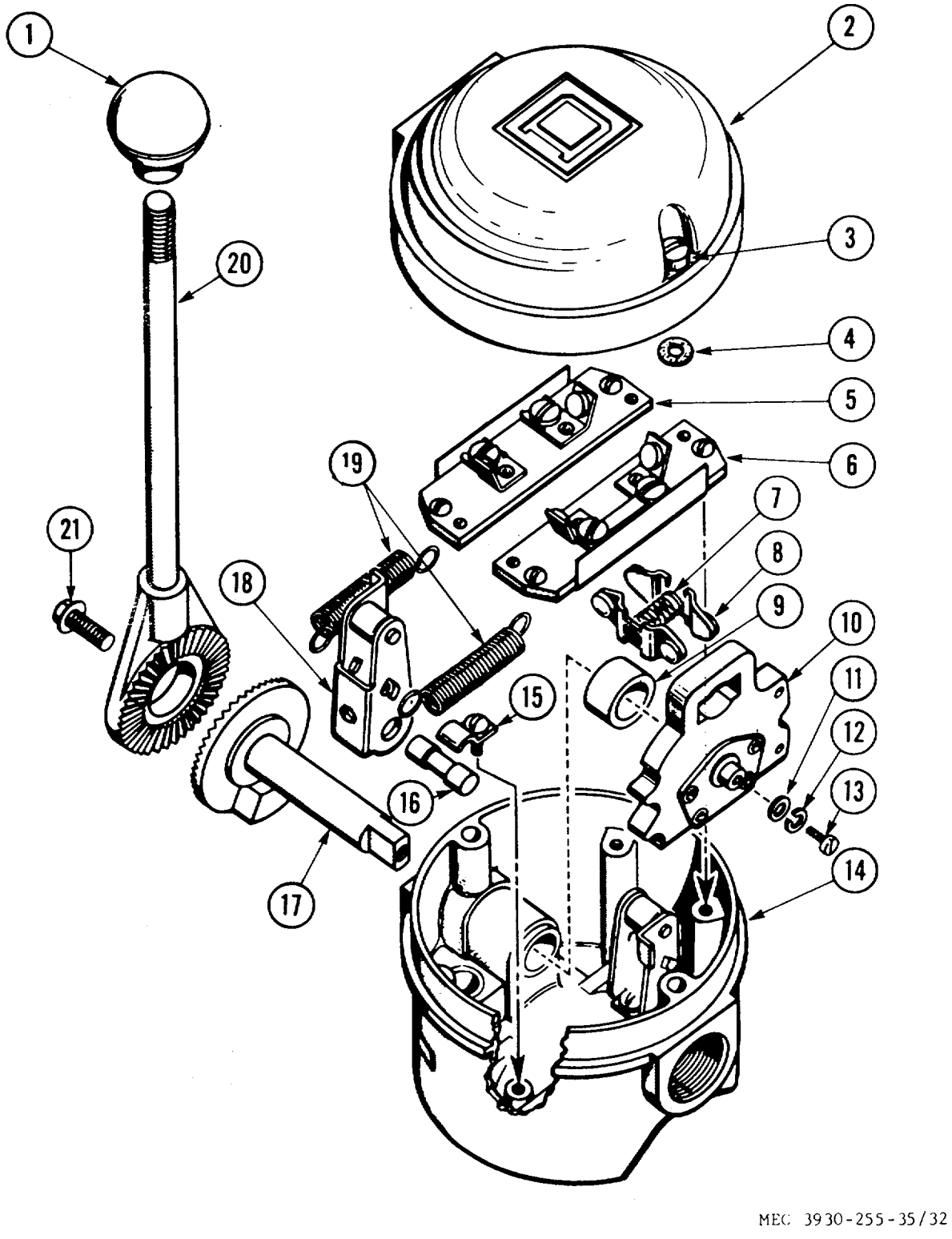


Figure 32. Directional switch, exploded view.

1. Knob
2. Cover
3. Screw
4. Washer
5. Terminal board
6. Terminal board
7. Contact spring
8. Contact fingers
9. Bushing
10. Contact carrier
11. Washer
12. Washer
13. Screw
14. Housing
15. Retaining clip and screw
16. Hinge pin
17. Operating shaft
18. Roller arm assembly
19. Handle returns springs
20. Lever
21. Screw

Figure 32-Continued.

APPENDIX I.

REFERENCES

AR 320-5	Dictionary of United States Army Terms
AR 320-50	Authorized Abbreviations and Brevity Codes
AR 700-58	Report of Damaged or Improper Shipment
AR 700-3900-5	Registration of Materials Handling Equipment and Special Purpose Vehicles
AR 750-5	Organization, Policies, and Responsibilities for Maintenance Operation
AR 750-3900-1	Materials Handling Equipment
DA Pam 108-1	Index of Army Motion, Pictures, Film Strips, Slides, Tapes, and Phono-Recordings
DA Pam 310-1	Military Publications: Index of Administrative Publications
DA Pam 310-2	Military Publications: Index of Blank Forms
DA Pam 310-3	Military Publications: Index of Doctrine, Training, and Organizational Publications
DA Pam '310	Military Publications: Index of Technical Manuals, Technical Bulletins, Supply Manuals (types 4, 6, 7, 8, and 9), Supply Catalogs (type CL), Supply Bulletins, Lubrication Orders, and Modification Work Orders
FM 21-5	Military Training Management
FM 21-6	Techniques of Military Instruction
FM 31-30	Military Symbols
LO 10-3930-255-20	Lubrication Order; Truck, Lift, Fork, Electric, Solid Rubber Tired Wheels, 2000-Pound Capacity, Army Model MHE-197, Baker Model FTD-020-EE, Federal Stock Number 3930-724-4058 (100-in. lift), Federal Stock Number 3930-965-0075 (130-in. lift)
MIL-STD-162A	Preparation for Delivery of Warehouse Materials Handling Equipment for Domestic and Oversea Shipment and Storage
SB 5-111	Supply of DA Approved Fire Extinguishers to Army Troop Users
TM 9-213	Painting Instructions for Field Use
TM 10-3930-255-10	Operator's Manual: Truck, Lift, Fork, Electric, Solid Rubber Tires, 2000-Pound Capacity, Army Model MHE-197, Baker Model FTD-020-EE, Federal Stock Number 3930-7344658 (100-in. lift), Federal Stock Number 3930-965-0075 (130-in. lift)
TM 10-3930-255-20	Organizational Maintenance Manual: Truck, Lift, Fork, Electric, Solid Rubber Tires, 2000-Pound Capacity, Army Model MHE-197, Baker Model FTD-020-EE, Federal Stock Number 3930-724-4058 (100-in. lift), Federal Stock Number 3930-965-0075 (130-in. lift)
TM 10-3930-255-20P	Organizational Maintenance Repair Parts and Special Tool Lists: Truck, Lift, Fork, Electric, Solid Rubber Tires, 2000-Pound Capacity, Army Model MHE-197, Baker Model FTD-020-EE, Federal Stock Number 3930-724-4058 (100-in. lift), Federal Stock Number 3930-965-0075 (130-in. lift)

TM 10-3930-255-35P	DS, GS, and Depot Maintenance Repair Parts and Special Tool Lists: Truck Lift, Fork, Electric, Solid Rubber Tires, 2000-Pound Capacity, Army Model MHE-197, Baker Model FTD-020-EE, Federal Stock Number 3930-724-4058 (100-in. lift), Federal Stock Number 3930-965-0075 (130-in. lift)
TM 21-300	Driver Selection and Training (Wheeled Vehicles)
TM 38-230	Preservation, Packaging, and Packing of Military Supplies and Equipment
TM 38750	Army Equipment Record Procedures
TM 5-764	Electric Motor and Generator Repair
TM 10-1690A	Industrial Motive Power Storage Batteries for Materials Handling Equipment.

APPENDIX II.

DIRECT AND GENERAL SUPPORT OF ORGANIZATIONAL LEVEL SERVICE ON RECEIPT OF NEW EQUIPMENT (TM 10-3930-255-20)

On receipt of a new truck, the using organization will require the assistance of maintenance facilities with welding capability, for the initial installation of battery retaining parts shipped loose with truck. Refer to basic issue items list in TM 10-3930-255-10 for part numbers of these parts. Locate two angles to suit dimensions of battery installed. Weld and assemble parts as shown in figure 33.

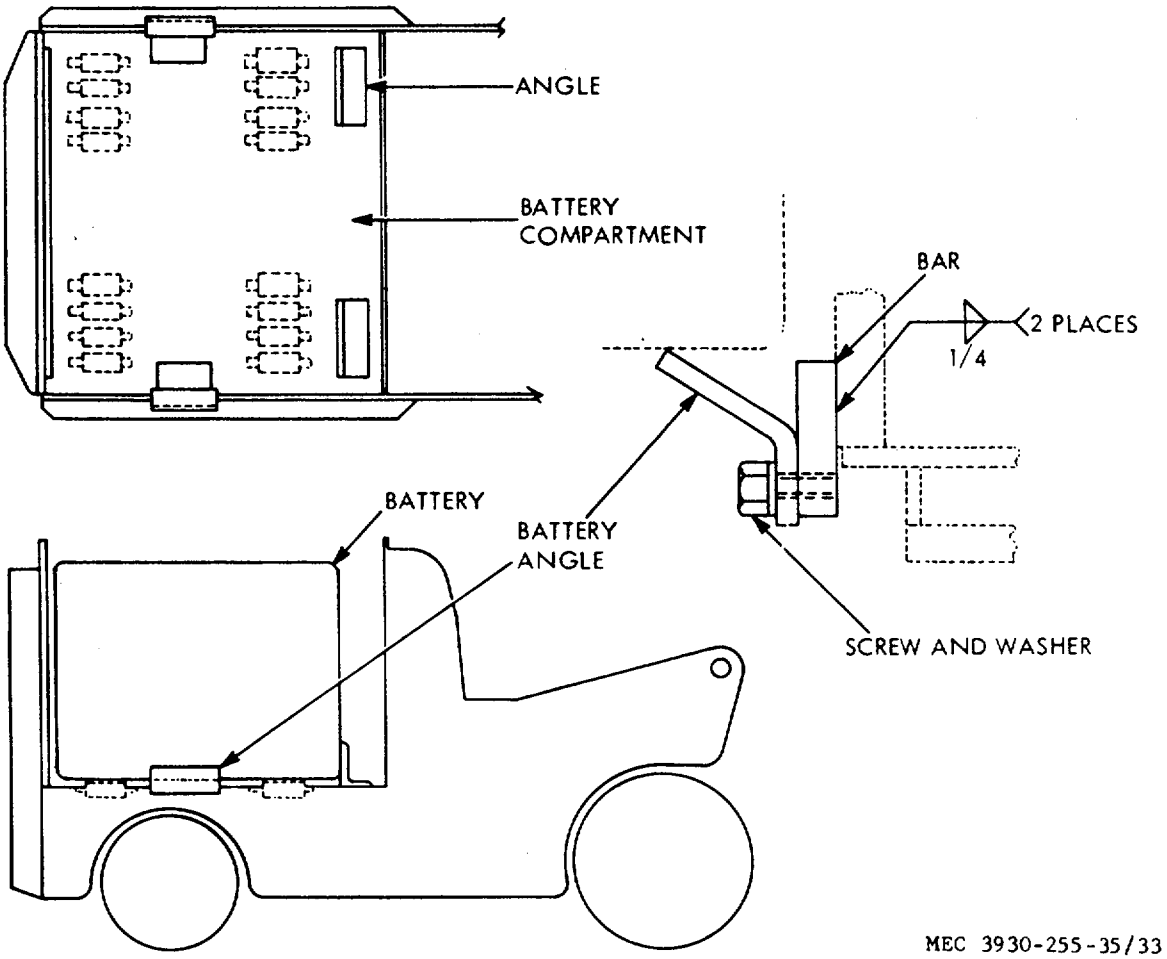


Figure 33. Installation drawing, battery retaining parts.

By Order of the Secretary of the Army:

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POE (2)
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USA Tml Comd (2)
Arsenals (2)
PG (2)
QM Fid Maint Shops (2)
Units org under fol TOE:
8-187 (2)
10-337 (2)
10-407 (2)
10467 (2)
55-458 (2)

NG: State AG (3).

USAR: None.

For explanation of abbreviations used, see AR 320-50.

AGO 8167A

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