

UNCLASSIFIED.

*Revised  
80M*

# TM 9-1750 K

WAR DEPARTMENT TECHNICAL MANUAL

ORDNANCE MAINTENANCE

## TRACKS AND SUSPENSION, TURRET AND HULL FOR MEDIUM TANK M4 AND MODIFICATIONS

REGRADED UNCLASSIFIED BY

AUTHORITY OF DOD DIR. 5200.1 R

BY RAKES ON 1/23/55

Dissemination of restricted matter.—The information contained in restricted documents and the essential characteristics of restricted materiel may be given to any person known to be in the service of the United States and to persons of undoubted loyalty and discretion who are cooperating in Government work, but will not be communicated to the public or to the press except by authorized military public relations agencies. (See also paragraph 18b, AR 380-5, 28 September 1942.)

UNCLASSIFIED

WAR DEPARTMENT

17 NOVEMBER 1943

WAR DEPARTMENT TECHNICAL MANUAL

TM 9-1750K

---

ORDNANCE MAINTENANCE

TRACKS AND SUSPENSION,  
TURRET AND HULL  
FOR MEDIUM TANK M4  
AND MODIFICATIONS



WAR DEPARTMENT

17 November 1943

---

*\*Dissemination of restricted matter.—The information contained in restricted documents and the essential characteristics of restricted material may be given to any person known to be in the service of the United States and to persons of undoubted loyalty and discretion who are cooperating in Government work, but will not be communicated to the public or to the press except by authorized military public relations agencies. (See also paragraph 18b, AR 380-5, 28 September 1942.)*

---

**WAR DEPARTMENT**  
**Washington 25, D. C., 17 November 1943**

**TM 9-1750K—**Ordnance Maintenance, Tracks and Suspension, Turret and Hull for Medium Tanks M4 and Modifications, is published for the information and guidance of all concerned.

[A.G. 300.7 (6 Aug. 43)]

**BY ORDER OF THE SECRETARY OF WAR:**

**G. C. MARSHALL,**  
*Chief of Staff.*

**OFFICIAL:**

**J. A. ULIO,**  
*Major General,*  
*The Adjutant General.*

**DISTRIBUTION: R 9 (4); Bn 9 (2); C 9 (8).**

(For explanation of symbols, see FM 21-6.)

**ORDNANCE MAINTENANCE**

**TRACKS AND SUSPENSION**

**TURRET AND HULL FOR MEDIUM**

**TANKS M4 AND MODIFICATIONS**

---

**CONTENTS**

	Paragraphs	Pages
SECTION I Introduction .....	1-2	4-9
II Tracks and suspension .....	3-8	10-31
III Turret .....	9-14	32-44
IV Hull and electrical wiring .....	15-17	45-58
V Special tools .....	18	59
REFERENCES .....		60-62
INDEX .....		62

**ORDNANCE MAINTENANCE—TRACKS AND SUSPENSION, TURRET AND HULL, FOR MEDIUM TANK M4 AND MODIFICATIONS**

**Section I**

**INTRODUCTION**

	Paragraph
Scope .....	1
Maintenance allocation.....	2

**1. SCOPE.**

a. The instructions contained in this manual are for the information and guidance of personnel charged with the maintenance and repair of Medium Tanks M4, M4A1, M4A2, M4A3, M4A4, and M4A6. Figure 1 illustrates Medium Tank M4. These instructions are supplementary to the Field and Technical Manuals prepared for the using arms. This manual does not contain information which is intended primarily for the using arms, since such information is available to ordnance personnel in the 100-series TM's and FM's.

b. This manual contains a description of, and procedure for, removal, disassembly, inspection, repair and assembly of the tracks and suspension, turret and hull, and turret electrical system for Medium Tanks M4 and modifications. Refer to pertinent operator's manuals and pertinent 1700-series maintenance manuals for information not contained in this TM. (See list of references in the back of this manual.)

**2. MAINTENANCE ALLOCATION.**

a. **Scope.** The scope of maintenance and repair by the crew and other units of the using arms is determined by the availability of suitable tools, availability of necessary parts, capabilities of the mechanics, time available and the tactical situation. No exact system of procedure can be prescribed.

b. **Allocation of Maintenance.** The maintenance duties for which, under normal circumstances, tools and parts have been provided for the using arm and ordnance maintenance personnel are indicated in pertinent using arm 100-series manuals. Certain replacements and repairs are the responsibility of ordnance personnel but may be performed by the using arm personnel when circumstances permit or require, within the discretion of the commander concerned. Echelons and words as used in this list of maintenance allocations are defined as follows:

**Page is  
missing  
from book!**

**Page is  
missing  
from book!**

**INTRODUCTION**

- NOTES:** (1) Operations allocated will normally be performed in the echelon indicated by "X."  
 (2) Operations allocated to the third echelon as indicated by "E" may be performed by these units in emergencies only.  
 (3) Operations allocated to the four echelon by "E" are normal fifth echelon operations. They will not be performed by the fourth echelon, unless the unit is expressly authorized to do so by the chief of the service concerned.  
 (4) Technical Bulletins of the 2830-series should not be consulted for detailed information relative to reclamation procedure.

**ECHELONS**

2nd 3rd 4th 5th

**ELECTRICAL GROUP**

Batteries—service (recharge) and/or replace . . . . .	X			
Batteries—repair . . . . .		X		
Batteries—rebuild . . . . .			X	
Box, terminal—replace . . . . .	X			
Box, terminal—repair . . . . .		X		
Box, turret collector ring—replace . . . . .	X			
Box, turret collector ring—repair . . . . .		X		
Box, turret collector ring—rebuild . . . . .			X	
Brackets, mounting and supports—replace . . . . .	X			
Brackets, mounting and supports—repair . . . . .		X		
Breakers, circuit—replace and/or repair . . . . .	X			
Cables, battery—replace and/or repair . . . . .	X			
Conduits—replace . . . . .	X			
Conduits—repair . . . . .		X		
Filters—replace . . . . .	X			
Filters—repair . . . . .		X		
Generator assembly, auxiliary—adjust and/or replace . . . . .	X			
Generator assembly, auxiliary—repair . . . . .		X		
Generator assembly, auxiliary—rebuild . . . . .			E	X
Lamp assemblies—service and/or replace . . . . .	X			
Lamp assemblies—repair . . . . .		X		
Regulators, current and voltage—replace . . . . .	X			
Regulators, current and voltage—adjust and/or repair . . . . .		X		
Regulators, current and voltage—rebuild . . . . .			X	



**ORDNANCE MAINTENANCE—TRACKS AND SUSPENSION, TURRET AND HULL, FOR MEDIUM TANK M4 AND MODIFICATIONS**

	ECHELONS			
	2nd	3rd	4th	5th
<b>ELECTRICAL GROUP (Cont'd)</b>				
Relays—replace . . . . .	X			
Siren assembly—replace . . . . .	X			
Siren assembly—repair . . . . .		X		
Siren assembly—rebuild . . . . .			X	
Solenoids—replace . . . . .	X			
Solenoids—repair . . . . .		X		
Switch assemblies—replace . . . . .	X			
Switch assemblies—repair . . . . .		X		
Wiring—replace and/or repair . . . . .	X			
<b>HULL</b>				
Clevis, towing—replace . . . . .	X			
Doors and cover plates—replace . . . . .	X			
Doors and cover plates—repair . . . . .		X		
Guards, mud—replace . . . . .	X			
Guards, mud—repair . . . . .		X		
Housing, propeller shaft—replace . . . . .	X			
Housing, propeller shaft—repair . . . . .		X		
Hull—repair . . . . .		X		
Hull—rebuild . . . . .			E	X
Insulation and padding—replace . . . . .	X			
Periscope—replace . . . . .	X			
Periscope—repair . . . . .		X		
Periscope—rebuild . . . . .			X	
Seats—replace . . . . .	X			
Seats—repair . . . . .		X		
<b>TRACK SUSPENSION GROUP</b>				
Bogie components—replace . . . . .	X			
Bogie components—repair . . . . .		X		
Bogie components—rebuild . . . . .			E	X
Idler components—replace . . . . .	X			
Idler components—repair . . . . .		X		
Idler components—rebuild . . . . .			E	X
Roller assemblies, track supporting—replace . . . . .	X			
Roller assemblies, track supporting—repair . . . . .		X		
Roller assemblies, track supporting—rebuild . . . . .			E	X
Track assembly—replace and/or repair . . . . .	X			
Track assembly—rebuild . . . . .			E	X

INTRODUCTION

ECHELONS

2nd 3rd 4th 5th

TURRET ASSEMBLY

Lock, turret—replace.....	X			
Lock, turret—repair.....		X		
Mechanism, turret traversing—replace.....	X			
Mechanism, turret traversing—repair.....		X		
Mechanism, turret traversing—rebuild.....			E	X
Ring, turret—replace.....		X		
Turret and basket assembly—replace and/or repair.....		X		
Turret and basket assembly—rebuild.....			E	X

VEHICLE ASSEMBLY

Tank assembly—service.....	X			
Tank assembly—rebuild (with serviceable unit assemblies).....			X	

**ORDNANCE MAINTENANCE—TRACKS AND SUSPENSION, TURRET AND HULL, FOR MEDIUM TANK M4 AND MODIFICATIONS**

**Section II**

**TRACKS AND SUSPENSION**

	Paragraph
Description .....	3
Tracks .....	4
Track idler wheel and bracket.....	5
Track support roller and bracket.....	6
Suspension wheels, bearings and oil retainers.....	7
Volute spring suspension.....	8

**3. DESCRIPTION.**

a. Two individually driven tracks propel the vehicle forward and backward (fig. 2). The tank is supported on six bogie suspension assemblies bolted to the hull. Each suspension has two rubber-tired wheels. As the tank passes over uneven ground the vertical movement of the suspension wheels is transferred to the supporting arms or levers and is absorbed by the two volute springs in each suspension assembly. Two drive sprockets at the front end of the vehicle pull the tracks from the rear and lay them down in front of the advancing suspension wheels. A track skid and a single steel roller are mounted at the top of each suspension to support and carry the upper position of the track. An adjustable idler wheel for each track is mounted at the rear of the vehicle for adjusting tension of the tracks.

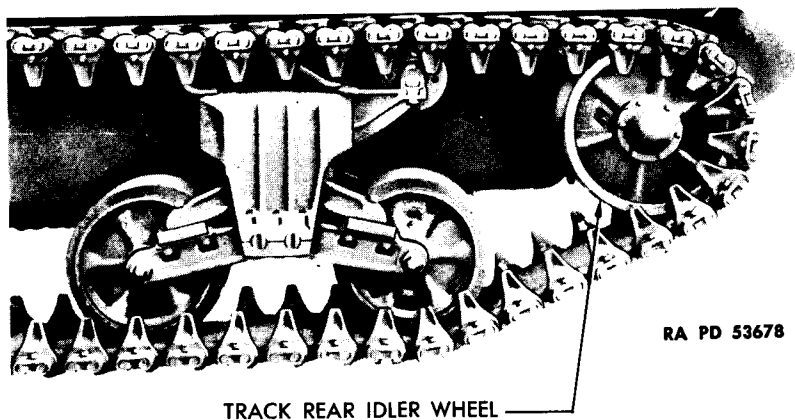
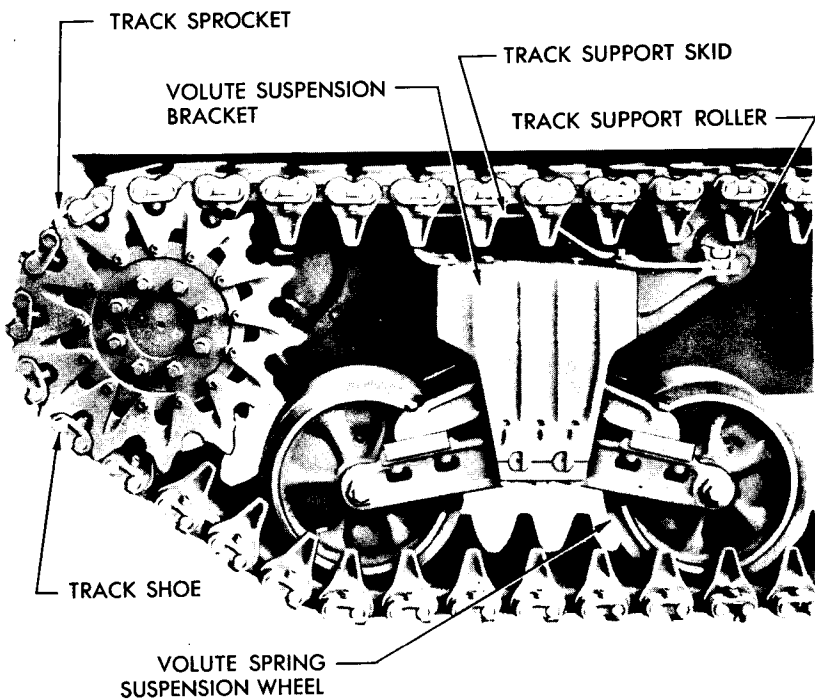
**4. TRACKS.**

a. **Removal.** Place the vehicle on level terrain so that it can be moved as required and remove the track sand shields. Release the track tension at the idler adjustment (step d (1) below). Break the track between the front suspension wheel and the sprocket. If the track has been thrown, break the track underneath either the idler or the sprocket, depending on which end of the track has the least twist. Remove the wedge nuts and the wedges and drive off the connectors. Lay the top half of the track on the ground to the rear of the vehicle.

**b. Installation.**

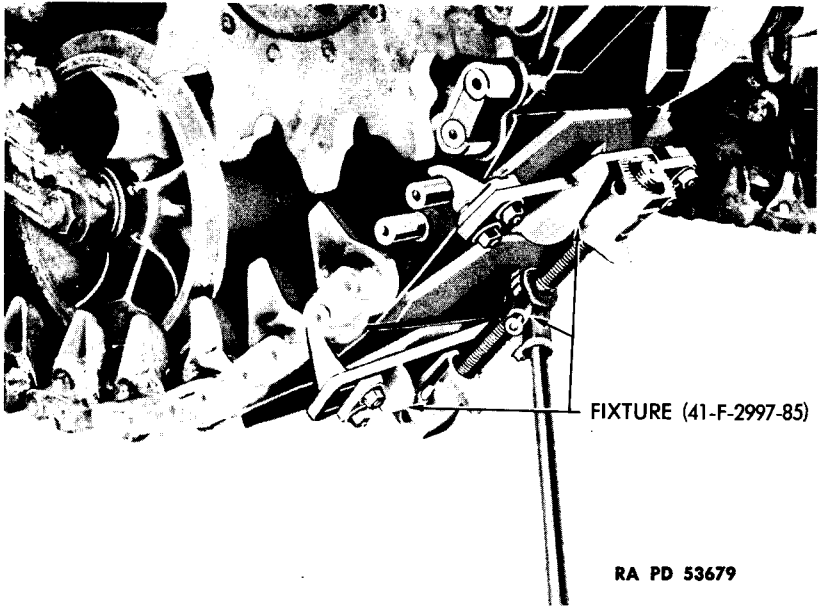
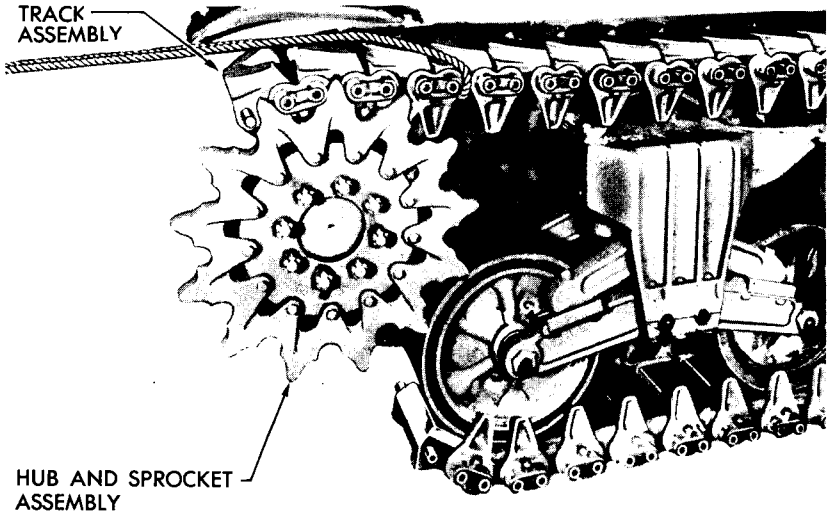
(1) **INSTALL TRACK** (fig. 3). If a new track is to be installed, lay it in front of and in alinement with the old track. If a thrown track is to be installed, dig a trench deep enough for the end of the track, so that the suspension wheel can roll directly onto the track. Tow the

**TRACKS AND SUSPENSION**



**Figure 2—Tracks and Suspension**

**ORDNANCE MAINTENANCE—TRACKS AND SUSPENSION, TURRET  
AND HULL, FOR MEDIUM TANK M4 AND MODIFICATIONS**

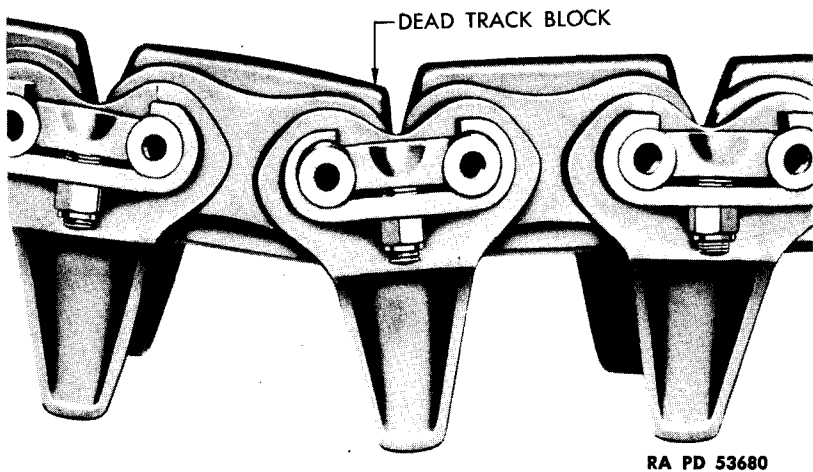


**Figure 3—Connecting Track**

## TRACKS AND SUSPENSION

vehicle onto the track until about 16 inches of the end protrudes beyond the front suspension wheel. Block the suspension wheels in the track to prevent the vehicle from moving. Place the rear idler wheel in the extreme forward position, and lock the spindle in the bracket to prevent breakage of the idler bracket. Roll the end of the track over the idler wheel, and pull the track forward over the support rollers and sprocket with a cable attached to a towing unit.

(2) **CONNECT TRACK SHOES** (fig. 3). Attach the track connecting fixture (41-F-2997-85) to the ends of the track and draw the ends together. **NOTE:** *Track connecting and link pulling fixture (41-P-2997-86) can be used with equal results.* Install connectors, wedges, and wedge nuts. Remove the blocks from the suspension wheels.



RA PD 53680

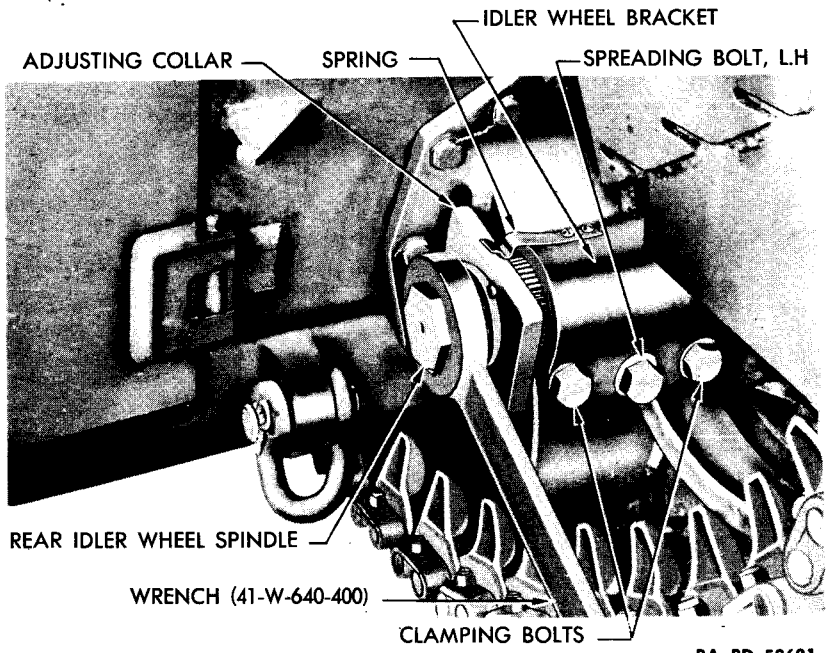
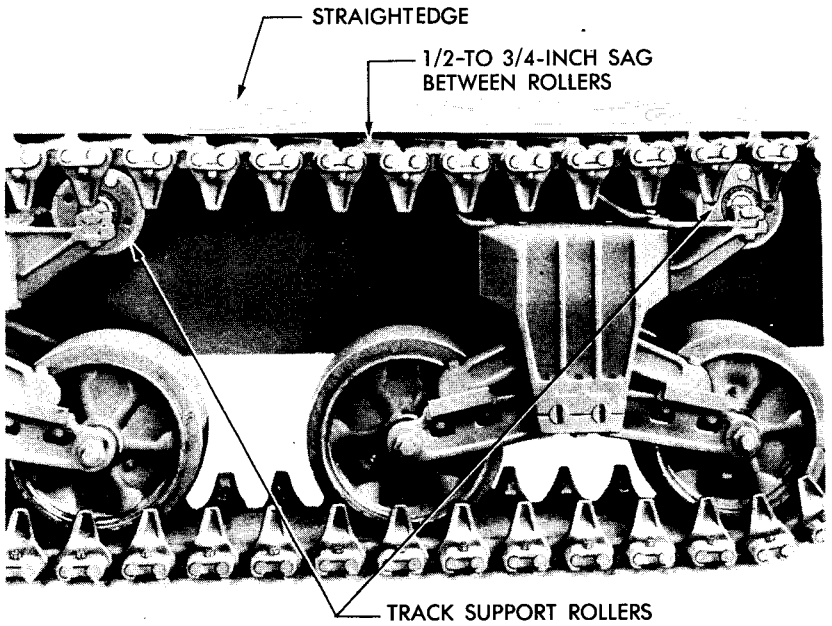
**Figure 4—Dead Track Block Dropping Out of Line on Top of Track**

(3) **ADJUST TRACK TENSION.** Follow procedure outlined in subparagraph d below.

c. **Dead Track Block Replacement** (fig. 4). A dead track block is one in which the rubber bond between the pin and metal frame of the block has failed, leaving the pin free to turn. Dead blocks are easily recognizable (fig. 4). Replace dead blocks immediately to prevent breakage of track.

(1) **REMOVE TRACK BLOCK.** Move the vehicle so that the block to be replaced is midway between the idler wheel and the rear bogie wheel. Set the parking brake. Release the track tension (subpar. d (1) below). Remove the wedge nuts on the two inside and two outside connectors attached to the block to be replaced. Tap out the wedges,

**ORDNANCE MAINTENANCE—TRACKS AND SUSPENSION, TURRET AND HULL, FOR MEDIUM TANK M4 AND MODIFICATIONS**



**Figure 5—Adjusting Track Tension**

RA PD 53681

## TRACKS AND SUSPENSION

being careful not to injure the threads. Drive the two inside and two outside track connectors *halfway* off the pins of the track block to be removed. Connect the track connecting fixture (fig. 3). Pull up the track until the fixture is tight, then knock off the four loosened connectors.

(2) **INSTALL TRACK BLOCK.** Place the new track block in position. Install the track connectors, driving them halfway onto the pins, operating the jack if necessary to position the pins. Remove the track connecting fixture and drive connectors the rest of the way on. Install the wedges in the connectors and draw them tight.

### d. Adjustment of Track Tension.

(1) **RELEASE IDLER LOCK** (fig. 5). Loosen the two outside clamping bolts in the idler wheel bracket. Turn the center bolt counterclockwise to spread the bracket until the spindle is free. **CAUTION:** *Excessive spreading will crack the bracket.* Place the adjusting wrench on the hexagon at the end of the spindle, and turn the spindle to release the bind on the adjusting collar. Raise the spring at the end of the bracket, and slide the collar off the serrations on the idler wheel spindle.

(2) **ADJUST TENSION** (fig. 5). Remove the sand shields over the rear suspension wheels. Lay a straightedge along the top of the track between the center and rear track supporting rollers. Use a piece of pipe on the handle of the adjusting wrench for leverage, and raise the handle of the wrench to tighten the track until there is  $\frac{1}{2}$ - to  $\frac{3}{4}$ -inch clearance between the straightedge and the top of the track, measured midway between the center and rear track supporting rollers. Slide the adjusting collar on and off the spindle when changing the wrench position.

(3) **LOCK IDLER ADJUSTMENT** (fig. 5). Slide the adjusting collar onto the serrations of the spindle, and lock it in place with the spring. Back out the center spreader bolt by turning it clockwise until it does not project through the split in the bracket. Tighten both outside clamping bolts securely; then tighten the center spreader bolt until it binds sufficiently to hold itself from working loose. Remove the idler adjusting wrench. Install the track sand shields.

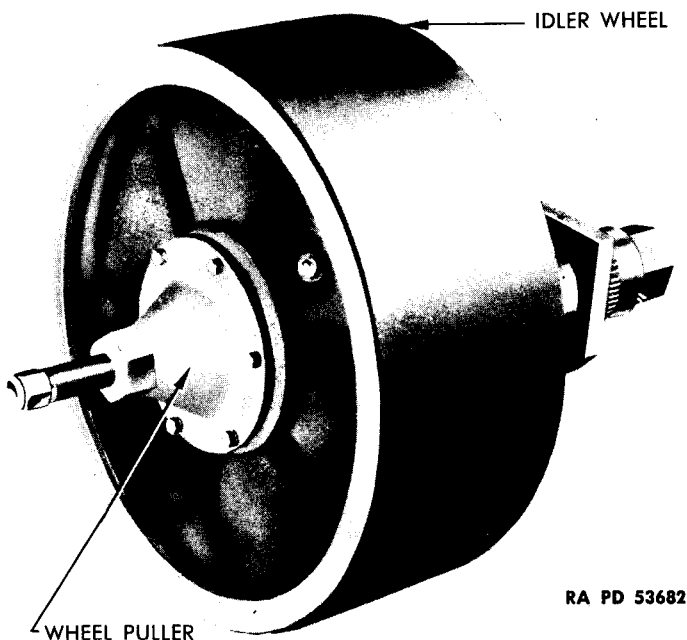
## 5. TRACK IDLER WHEEL AND BRACKET.

### a. Removal and Disassembly.

(1) **REMOVE TRACK.** Follow procedure outlined in paragraph 4 a.

(2) **REMOVE IDLER WHEEL** (fig. 6). Remove the cap screws in the idler wheel cap. Take out the cotter pin which secures the wheel



**ORDNANCE MAINTENANCE—TRACKS AND SUSPENSION, TURRET AND HULL, FOR MEDIUM TANK M4 AND MODIFICATIONS**

RA PD 53682

**Figure 6—Removing Idler Wheel with Puller (41-P-2940-800)**

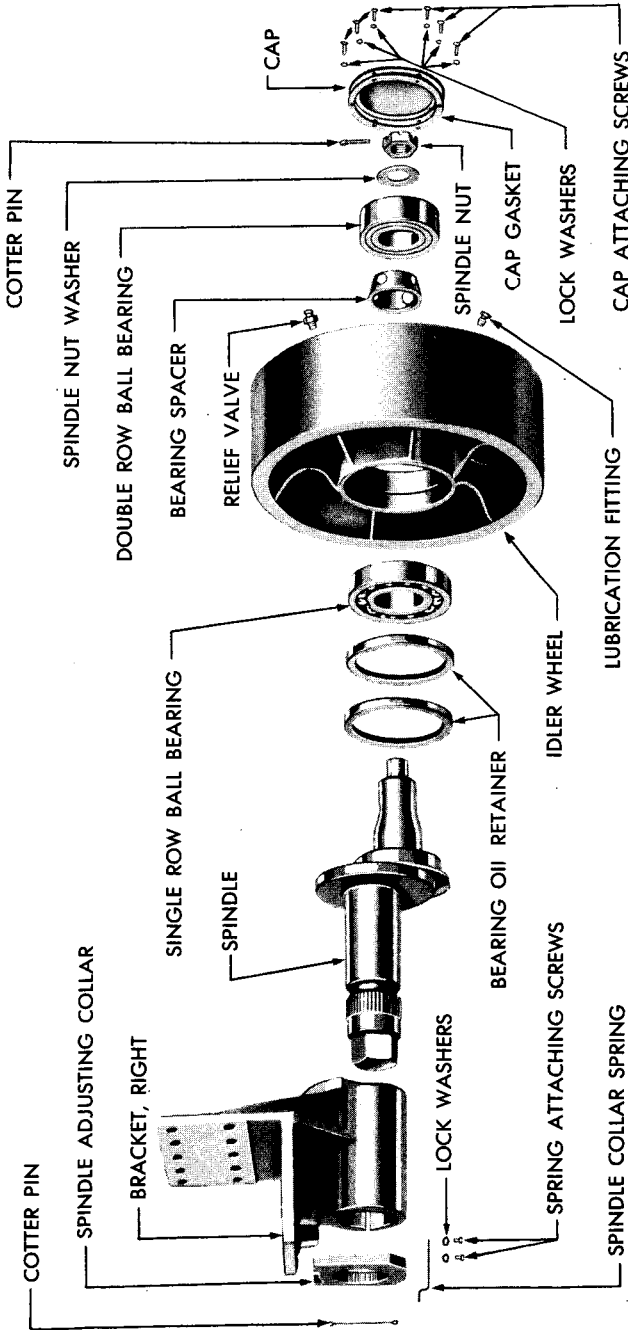
nut, and remove the nut and washer. Pull the wheel off the spindle with the idler wheel puller.

(3) **REMOVE OIL RETAINERS AND BEARING** (fig. 7). Remove the outer idler wheel bearing and oil retainer with the bearing puller (41-P-2900-27). Remove the center bearing spacer. Drift out the inner idler wheel bearing and oil retainer.

**b. Cleaning of Parts.** Clean all parts thoroughly. Use water under pressure to loosen and remove as much foreign matter as possible. Use a stiff brush and dry-cleaning solvent to remove the remaining grease and dirt. Rotate the bearings while immersed in dry-cleaning solvent until all trace of lubricant has been removed. **CAUTION: Do not spin bearings with compressed air.** Oil the bearings immediately to prevent corrosion of the highly polished surfaces and wrap them in oiled paper if they are not to be used at once.

**c. Inspection of Bearings.** The condition of a bearing is best determined by the surface condition of the balls or rollers and races and by looseness in its races. Inspect for pits caused by corrosion. Inspect for discoloration of the balls or rollers, races, or retainers, as this is evidence of overheating. Bearings that have been overheated

TRACKS AND SUSPENSION



RA PD 53683

Figure 7—Idler Wheel Disassembled

**ORDNANCE MAINTENANCE—TRACKS AND SUSPENSION, TURRET AND HULL, FOR MEDIUM TANK M4 AND MODIFICATIONS**

must be discarded. Spinning a bearing while holding it in the hands is not an accurate check for its running qualities, although this test will indicate presence of dirt or foreign matter in the bearing and indicates that it should be rewashed, lubricated, and checked again.

**d. Assembly and Installation.**

(1) **INSTALL OIL RETAINERS AND BEARINGS** (fig. 7). Pack the inner idler wheel bearing with general purpose grease, and place the bearing in position in the hub. Drive the bearing into the hub with the bearing drift (41-P-1540-550) until the bearing seats against the shoulder of the hub. Turn the idler wheel over, and install the center bearing spacer. Pack the outer bearing with general purpose grease, and drive the bearing into place in the hub with the bearing drift (41-D-1540-500). Install two new oil retainers on the spindle *with the lips of the retainers toward the shoulder of the spindle*. Place two shims (made from an old oil retainer) between the shoulder of the spindle and the oil retainer. This will force the oil retainer to the proper depth in the hub when the idler wheel is installed.

(2) **INSTALL TRACK IDLER WHEEL**. Place the idler wheel on the spindle. Screw the idler wheel installing tool (41-T-3216-150) on the spindle, and force the idler wheel onto the spindle. Remove the installing tool. Remove the locating shims between the shoulder of the spindle and the oil retainer. Install the washer and nut on the spindle and tighten securely. Install cotter pin. Install the idler wheel cap and retaining screws.

(3) **INSTALL TRACK AND ADJUST TRACK TENSION**. Follow procedures outlined in paragraphs 4 b and 4 d (2).

**e. Removal of Idler Wheel Bracket.**

(1) **RELEASE IDLER LOCK**. Follow procedure outlined in paragraph 4 d (1).

(2) **DISCONNECT TRACKS AND REMOVE BRACKET**. Disconnect the track between the idler wheel and the rear suspension wheel. Remove the sand shields and move the track toward the front of the vehicle until the end of the track is clear of the idler wheel. Remove the cotter pin from the hexagonal end of the spindle, and slide the adjusting collar off the spindle. Pull the spindle and wheel out of the idler wheel bracket. Remove the cap screws that attach the bracket to the hull, and take off the bracket.

**f. Installation of Idler Wheel Bracket.**

(1) **INSTALL BRACKET AND TRACK**. Attach the idler wheel bracket to the hull with cap screws. Tighten the cap screws securely, and install

## TRACKS AND SUSPENSION

the lock wires. Spread bracket and install the spindle and wheel in the idler wheel bracket. Slide the adjusting collar on the serrated end of the spindle, and install the cotter pin in the hole in the spindle. Pull the track over the idler wheel.

(2) **CONNECT TRACK SHOES AND ADJUST TRACK TENSION.** Follow procedures outlined in paragraphs 4 b (2) and 4 d (2) and (3).

### 6. TRACK SUPPORT ROLLER AND BRACKET.

a. **Removal.** Remove the lock wires, take out the cap screws that attach the track skid (fig. 9) to the top of the volute suspension bracket, and remove the track skid. Place a jack between the track and the top of the bracket, and raise the track sufficiently to take the weight off the roller. Remove the lock wires, take out the cap screws that attach the roller bracket to the volute suspension bracket, and remove roller and track support roller bracket. Remove the lock wires and cap screws that attach the roller shaft to the bracket, and lift roller and spacers from the bracket.

b. **Disassembly** (fig. 8). Remove the bearing lock ring from the shaft with a spanner wrench. Remove the retainer from the shaft with a spanner wrench. Drive the shaft from the roller with a drift and hammer. Turn the roller on its side and rest it on blocks. Move the center spacer to one side and place a drift on the outer race of the bearing. Drive the bearing and oil retainer out of the lower side. Move the drift around the entire circumference of the bearing to prevent damage to the bearing. The inner spacer will drop out when the bearing is removed. Turn the roller over and remove the other bearing and oil retainer in the same manner.

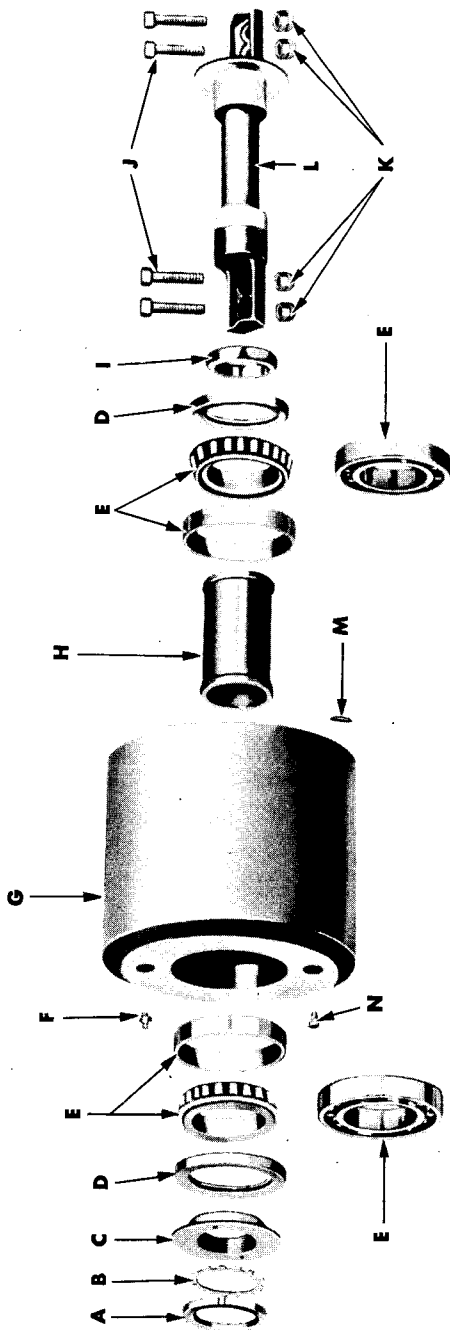
c. **Cleaning of Bearings.** See paragraph 5 b.

d. **Inspection of Bearings.** See paragraph 5 c.

e. **Assembly** (fig. 8). Position one of the bearings and tap it into the roller with a drift, working around the outer race. Install the oil retainer on the spacer with the lip toward the flange. Tap the retainer and inner spacer into place. Turn the roller over, install the center spacer and install the other bearing and oil retainer in the same manner. Slide the roller shaft in the track support roller, and install the retainer and lock ring.

f. **Installation.** Place the roller and spacers in the support roller bracket, and install the four cap screws that attach the roller shaft to the bracket. Tighten cap screws securely, and install lock wires. Attach the roller bracket to the volute suspension bracket with the six cap screws. Tighten cap screws securely and install lock wires. Remove

ORDNANCE MAINTENANCE—TRACKS AND SUSPENSION, TURRET AND HULL, FOR MEDIUM TANK M4 AND MODIFICATIONS

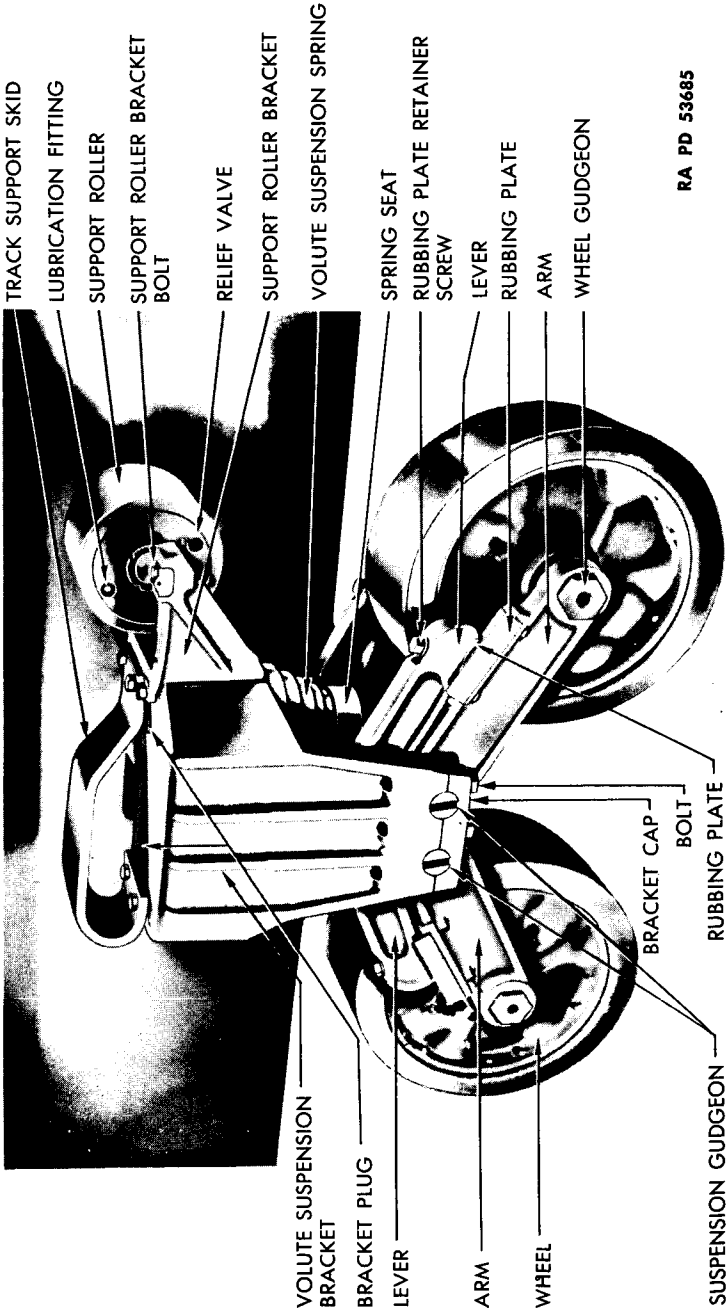


- |                        |                         |                  |
|------------------------|-------------------------|------------------|
| A—BEARING LOCK RING    | F—LUBRICATING FITTING   | K—NUT            |
| B—BEARING LOCK WASHER  | G—ROLLER ASSEMBLY       | L—ROLLER SHAFT   |
| C—BEARING RETAINER     | H—BEARING CENTER SPACER | M—EXPANSION PLUG |
| D—BEARING OIL RETAINER | I—BEARING INNER SPACER  | N—RELIEF FITTING |
| E—BEARING              | J—BOLT                  |                  |

RA PD 53684

Figure 8—Track Support Roller Disassembled

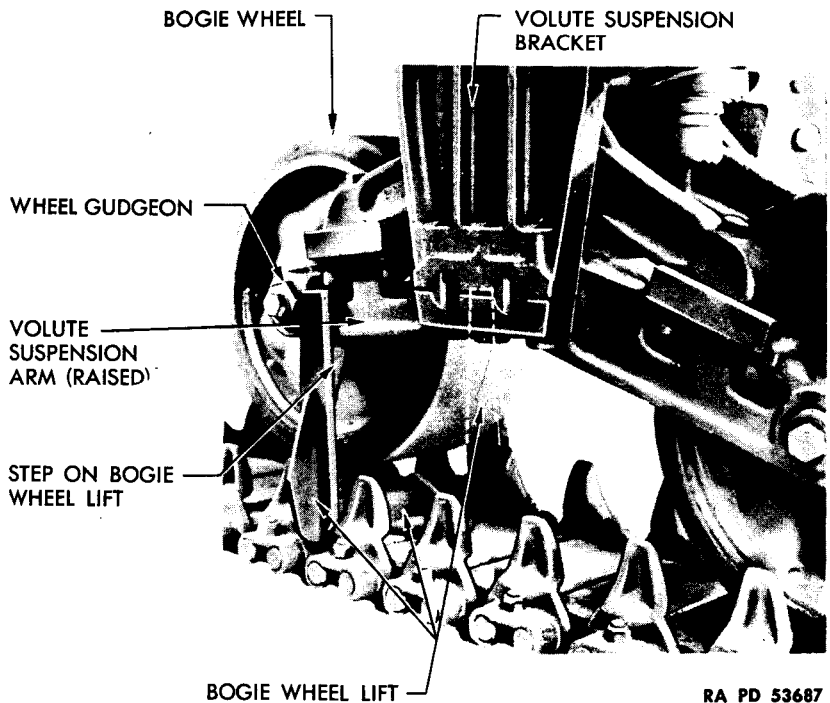
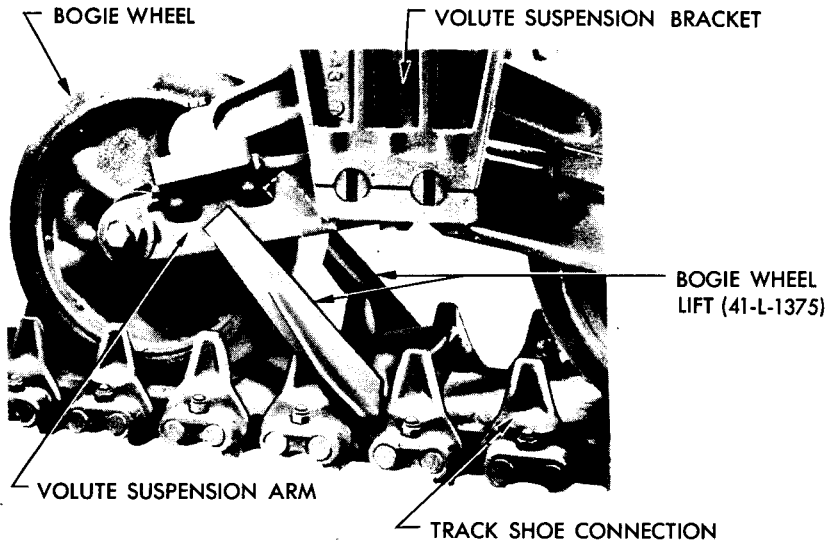
TRACKS AND SUSPENSION



RA PD 53685

Figure 9—Volute Spring Suspension Assembly

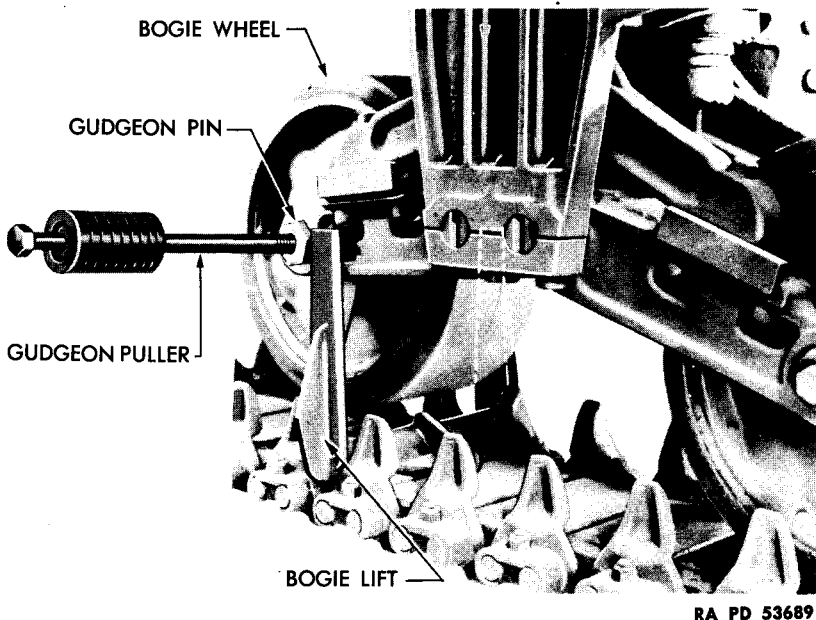
**ORDNANCE MAINTENANCE—TRACKS AND SUSPENSION, TURRET AND HULL, FOR MEDIUM TANK M4 AND MODIFICATIONS**



RA PD 53687

**Figure 10—Raising Volute Suspension Wheel with Lift (41-L-1375)**

**TRACKS AND SUSPENSION**



RA PD 53689

**Figure 11—Removing Wheel Gudgeon with Puller (41-P-2957-33)**

the jack. Attach the track skid to the top of the volute suspension bracket with the four cap screws. Tighten cap screws securely, and install lock wires.

**7. SUSPENSION WHEELS, BEARINGS AND OIL RETAINERS.**

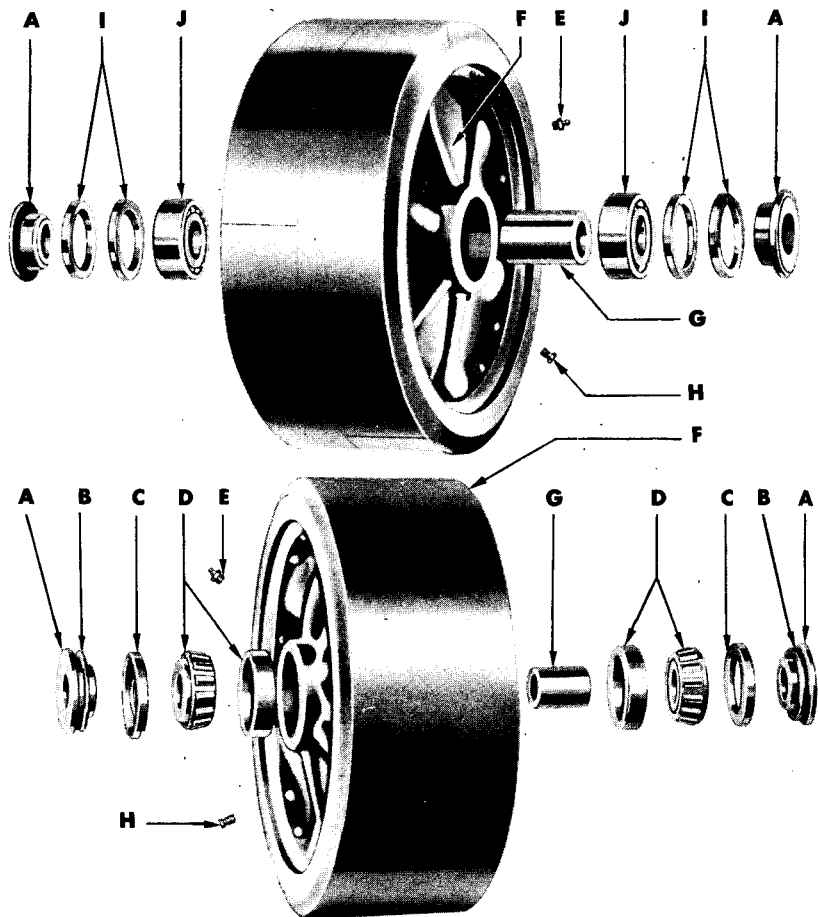
**a. General.** The forward suspension wheel under the drive sprocket for each track cannot be removed without disconnecting the track. The remainder of the suspension wheels can be removed without disconnecting the track.

**b. Removal and Disassembly.**

(1) **REMOVE SUSPENSION WHEEL** (figs. 9, 10 and 11). Place the bogie wheel lift (41-L-1375) on the track under the suspension arms to be lifted. Carefully drive the vehicle forward or backward, depending on the wheel to be lifted, until the lift is vertical and the wheel has been raised (fig. 10). If a forward wheel is being removed, release track tension (par. 4 d (1)) and break the track between front suspension wheel and drive sprocket. Remove the cotter pin from the nut on the inner end of the wheel gudgeon and remove the nut. Remove the plug in the head of the gudgeon pin. Screw the gudgeon puller (41-P-2957-27) into the plug hole, pull out the gudgeon pin and remove the wheel



**ORDNANCE MAINTENANCE—TRACKS AND SUSPENSION, TURRET AND HULL, FOR MEDIUM TANK M4 AND MODIFICATIONS**



**A**—BEARING SPACER, OUTER

**B**—BEARING OIL SEAL

**C**—BEARING OIL SEAL BACKING PLATE

**D**—ROLLER BEARING AND RACE

**E**—LUBRICATION FITTING

**F**—WHEEL AND TIRE ASSEMBLY

**G**—BEARING SPACER, CENTER

**H**—RELIEF FITTING

**I**—BEARING OIL RETAINER

**J**—DOUBLE ROW BALL BEARING

RA PD 53688

**Figure 12—Volute Suspension Wheel Disassembled**

## TRACKS AND SUSPENSION

(fig. 11). NOTE: *Screw-type bogie gudgeon puller (41-P-2905-63), without adapter, may also be used for this operation.*

(2) REMOVE OIL RETAINERS AND BEARING (fig. 12). Support the wheel on its side on blocks. Move the center bearing spacer, located in the center of the hub between the bearings, to one side. Use a drift seated on the outer bearing race to drive out the bearing, oil retainers or oil seals and outer spacer. Keep moving the drift around the entire circumference of the outer bearing race and drive the bearing out evenly. Remove the inner spacer, turn the wheel over and drive out the other bearing, oil retainers or oil seals and outer spacer.

c. **Cleaning of Bearings.** See paragraph 5 b.

d. **Inspection of Bearings.** See paragraph 5 c.

e. **Assembly and Installation.**

(1) INSTALL BEARINGS AND OIL RETAINERS (fig. 12). Lay the wheel on its side. Pack one bearing with general purpose grease and start the inner bearing in the hub by hand. Tap the bearing into place with the bearing installing drift (41-D-1463) until it seats against the shoulder in the hub. Install both the inner and outer oil retainers or oil seals on the outer spacer *with the lips of the retainers toward the shoulder of the spacer*. Start the spacer into the wheel hub and tap it into place with the drift. Turn the wheel over and install the inner spacer. Pack the bearing with general purpose grease and tap the bearing into place in the hub. Install the oil retainers or oil seals on the outer spacer. Install spacer in wheel.

(2) INSTALL SUSPENSION WHEEL. Place the wheel, with lubricant fitting toward the outside, on the track between the arms. Aline the gudgeon hole in the arms and wheel. Install the plug in the hexagon end of the gudgeon pin, and start the gudgeon pin through the outer arms and into the outer spacer and wheel bearing. Line up the center spacer with a bar from the inner side of the wheel and tap the gudgeon pin into the center spacer. Drive the gudgeon pin through far enough to aline the key slot in the gudgeon pin with the slot in the outer arm. Install the key and drive the gudgeon pin all the way in. Install and tighten the nut on the inner end of the gudgeon pin and secure with a cotter pin.

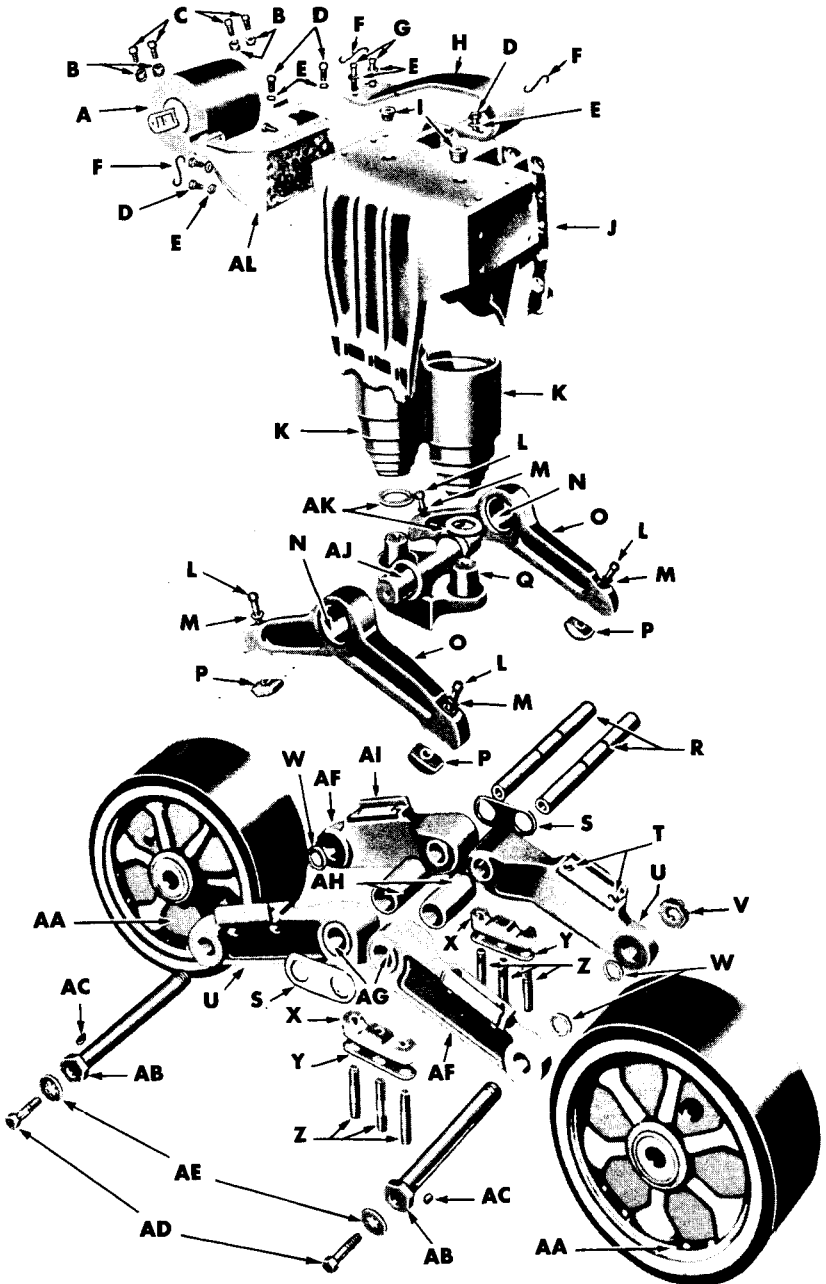
## 8. VOLUTE SPRING SUSPENSION.

a. **Removal of Volute Suspension Assembly (fig. 9).**

(1) RELEASE TRACK TENSION. Follow procedure outlined in paragraph 4 d (1).

(2) DISCONNECT TRACK. Break the track between the idler wheel and rear suspension wheel. Remove the sand shields. Drive tank for-

ORDNANCE MAINTENANCE—TRACKS AND SUSPENSION, TURRET AND HULL, FOR MEDIUM TANK M4 AND MODIFICATIONS



RA PD 53686

Figure 13—Volute Spring Suspension, Disassembled

## TRACKS AND SUSPENSION

<b>A</b> —SUPPORT ROLLER ASSEMBLY	<b>T</b> —RUBBING PLATE SCREW
<b>B</b> —NUT	<b>U</b> —VOLUTE SUSPENSION ARM, LEFT
<b>C</b> —CAP SCREW	<b>V</b> —VOLUTE SUSPENSION GUDGEON NUT
<b>D</b> —CAP SCREW	<b>W</b> —WHEEL GUDGEON OIL SEAL
<b>E</b> —LOCK WASHER	<b>X</b> —VOLUTE SUSPENSION BRACKET CAP
<b>F</b> —LOCK WIRE	<b>Y</b> —VOLUTE SUSPENSION BRACKET CAP LOCK
<b>G</b> —CAP SCREW	<b>Z</b> —BRACKET CAP STUD
<b>H</b> —TRACK SUPPORT SKID	<b>AA</b> —VOLUTE SUSPENSION WHEEL ASSEMBLY
<b>I</b> —BRACKET PLUG	<b>AB</b> —WHEEL GUDGEON
<b>J</b> —VOLUTE SUSPENSION BRACKET	<b>AC</b> —WOODRUFF KEY
<b>K</b> —VOLUTE SUSPENSION SPRING	<b>AD</b> —WHEEL GUDGEON CAP SCREW
<b>L</b> —CAP SCREW	<b>AE</b> —LOCK WASHER
<b>M</b> —LOCK WASHER	<b>AF</b> —VOLUTE SUSPENSION ARM, RIGHT
<b>N</b> —LEVER BUSHING	<b>AG</b> —VOLUTE SUSPENSION BUSHING
<b>O</b> —LEVER	<b>AH</b> —VOLUTE SUSPENSION SPACER
<b>P</b> —RUBBING PLATE	<b>AI</b> —VOLUTE SUSPENSION RUBBING PLATE
<b>Q</b> —SPRING SEAT	<b>AJ</b> —SPRING SEAT BUSHING
<b>R</b> —SUSPENSION GUDGEON	<b>AK</b> —SPRING SEAT RING
<b>S</b> —VOLUTE SUSPENSION PLATE	<b>AL</b> —TRACK SUPPORT ROLLER BRACKET

RA PD 53686-B

**Legend for Figure 13—Volute Spring Suspension, Disassembled**

**ORDNANCE MAINTENANCE—TRACKS AND SUSPENSION, TURRET AND HULL, FOR MEDIUM TANK M4 AND MODIFICATIONS**

ward until the end of the top of the track clears the volute suspension assembly to be removed. Set the hand brake to prevent the track from moving.

(3) **REMOVE VOLUTE SUSPENSION ASSEMBLY.** Remove all cap screws or nuts which hold volute suspension bracket to tank hull. Jack up the tank hull so that the suspension wheel will clear the track. Attach a hoist to the volute suspension and lift out the assembly.

**b. Installation of Volute Suspension Assembly.**

(1) **INSTALL VOLUTE SUSPENSION ASSEMBLY.** Attach a hoist to the volute suspension, and lift the assembly into the track. Place a jack under the tank hull, and lift the side of the tank sufficiently to allow the foot of the bracket of the volute suspension to clear the bottom of the tank hull. Lower the hoist and move the top of the assembly into position against tank hull. Line up the mounting holes and install cap screws or nuts.

(2) **CONNECT TRACK.** Drive tank backward and guide the track over the rollers with a bar or plank into position so that it can be connected. Connect the track with track connecting fixture (fig. 3).

(3) **ADJUST TRACK TENSION.** Follow procedure outlined in paragraph 4 d (2) and (3).

**c. Removal of Volute Springs, Arms, and Levers (fig. 13).**

(1) **RELEASE TRACK TENSION AND DISCONNECT TRACK.** Follow procedures outlined in paragraphs 4 d (1) and 4 a.

(2) **COMPRESS SPRINGS.** Place a jack under the hull of the vehicle near the volute suspension to be serviced. This will maintain the level of the hull when the springs are removed. Remove the track skid. Remove the two plugs in the top of the volute suspension bracket with wrench (41-W-1960). Insert the two volute spring compressors (41-C-2556) into the holes and screw them tightly into the spring seat. Tighten the spring compressor nuts against the suspension and draw up the nuts evenly. Compress the springs until the levers are free at the rubbing plates.

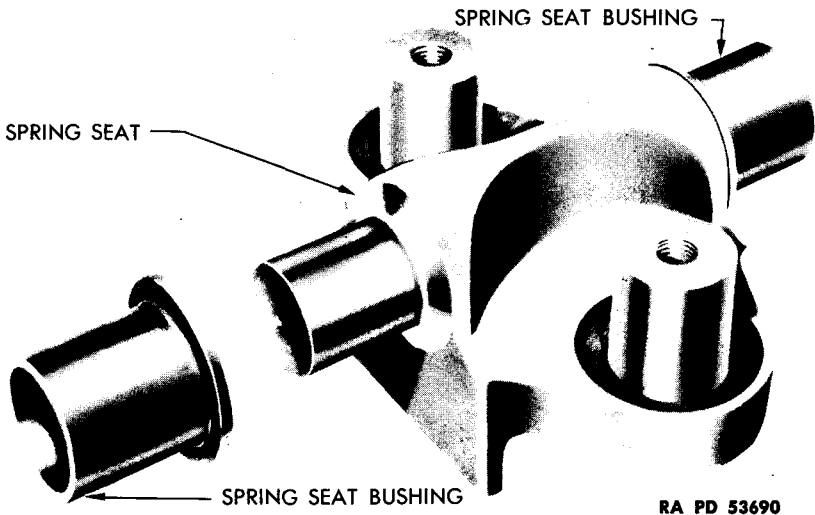
(3) **REMOVE SPRINGS, ARMS, AND LEVERS.** Place a jack on the track under the two spacers between the suspension arms to support the arms when the gudgeon caps are removed. Bend the ears of the locks away from the heads and remove the cap screws which hold the gudgeon caps to the volute suspension and remove the gudgeon caps. Lower the jack and remove the volute suspension plates. Then place the jack under the spring seat to support the seat. **CAUTION: Keep a wrench on the hexagon at the top of the spring compressor when re-**

## TRACKS AND SUSPENSION

leasing the spring to prevent unscrewing the spring compressors from the spring seat. Loosen the nuts on the compressors evenly and a little at a time, while lowering the jack. When the springs are fully released, remove the jack. Remove the spring compressors. Then the springs, spring seat, levers and arms can be lifted out.

### d. Inspection of Parts (fig. 13).

(1) **INSPECT GUDGEONS.** Measure gudgeons for out-of-round with a micrometer. Examine the threads for damage.



**Figure 14—Bushing Removed from Spring Seat**

(2) **INSPECT VOLUTE SUSPENSION ARMS.** Inspect the suspension arms for cracks in the castings. Inspect the bushings in the arms for excessive wear. Use a new gudgeon as a plug gage.

(3) **INSPECT TRACK SUPPORT SKID, RUBBING PLATES AND BRACKET CAPS.** Inspect these parts for excessive wear, cracks or damage.

(4) **INSPECT SPRING LEVERS.** Inspect for cracks in the levers. Check the bushings for excessive wear.

(5) **INSPECT SPRING SEAT (fig. 14).** Inspect the spring seat casting for cracks. Inspect the bushing for scores, excessive wear or out-of-round.

(6) **INSPECT VOLUTE SPRINGS.** Inspect volute spring coils for cracks. Inspect for sagging by comparing old spring with new spring.

(7) **INSPECT VOLUTE SUSPENSION BRACKET.** Inspect the bracket

**ORDNANCE MAINTENANCE—TRACKS AND SUSPENSION, TURRET AND HULL, FOR MEDIUM TANK M4 AND MODIFICATIONS**

casting for cracks. Inspect all threaded holes and studs for damaged threads.

**e. Bushing Replacement.**

(1) **VOLUTE SUSPENSION ARM OR LEVER BUSHING REPLACEMENT.** Place the arm or lever in an arbor press and press out the bushing. Oil the outer surface of a new bushing, set it in position on the arm or lever and press it into place.

(2) **SPRING SEAT BUSHING REMOVAL** (fig. 14). Place the spring seat on a solid base and peen the bushing to loosen it, starting at the outer edge and working toward the bushing flange. This will expand the bushing so that it can be removed from the spring seat.

(3) **SPRING SEAT BUSHING INSTALLATION.** Place the new bushing in oil heated to a temperature of approximately 270° F. for approximately 20 minutes. While the bushing is being heated, place the spring seat in a vise with the trunnion vertical and as close to the heating oil as possible to permit quick installation when the bushing is removed from the oil. Remove the bushing from the oil with a pair of tongs, line the bushing up with the trunnion of the spring seat and slide it in place.

**f. Installation of Volute Springs, Arms, and Levers** (fig. 13).

(1) **INSTALL SPRINGS, ARMS, AND LEVERS.** Place the two spring compressors (41-C-2556) through the two openings in the top of the suspension bracket. Position the springs, spring seat, and levers in the suspension bracket and screw the spring compressors into the spring seat securely. Screw the nuts on the spring compressors against the suspension bracket and compress the springs. Place a jack on the track under the spring seat. Raise the jack and draw the spring compressor nuts up evenly to compress the springs. Remove the jack. Place the wheels and arms in position under the suspension bracket, and install the volute suspension plates. Raise the arms and place a jack under the volute suspension spacers. Raise the jack and locate the gudgeons in the recesses in the lower ends of the bracket. Attach the two gudgeon caps with the cap screws and locks. Tighten cap screws securely, and bend the ears of the locks around the heads of the cap screws. Remove the jack. **CAUTION:** *Keep a wrench on the hexagon at the top of the spring compressor when releasing the spring to prevent unscrewing the spring compressors from the spring seat.* Then loosen the nuts on the spring compressors evenly and release the springs. Remove the spring compressors and install the plugs with wrench (41-W-1960) in the bracket. Remove the jack from under the hull. Install track skid.

**TRACKS AND SUSPENSION**

(2) **CONNECT TRACK AND ADJUST TRACK TENSION.** Follow procedures outlined in paragraphs 4 b (2) and 4 d (2) and (3).

**g. Replacement of Rubbing Plates.** Place a pinch bar between the lever and arm to relieve the pressure on the rubbing plate. Insert a block between the arm and lever. Unscrew the rubbing plate retainer screw from the plate, install a new plate and tighten the screw slowly. Remove the block from between the arm and lever with a pinch bar.



**ORDNANCE MAINTENANCE—TRACKS AND SUSPENSION, TURRET  
AND HULL, FOR MEDIUM TANK M4 AND MODIFICATIONS**

**Section III**

**TURRET**

	Paragraph
Description .....	9
Turret hatch.....	10
Removal of turret.....	11
Installation of turret.....	12
Platform and turret race.....	13
Collector ring assembly.....	14

**9. DESCRIPTION.**

a. The turret (fig. 15) is a one-piece casting of armor which rotates on a ball bearing race recessed and protected against direct hits from enemy fire. The platform of the fighting compartment is bolted to the turret race ring. The turret hatch ring acts as an anti-aircraft gun mount and rotates on a ball bearing race. The turret and hatch ring must rotate freely. A hole is provided under the hinge of the periscope half of the hatch door for removing the bolts that attach the hatch ring to the turret. The collector ring, mounted in the center of the platform floor, provides a means of conducting electrical power from the battery to the turret when the turret is in motion or stationary.

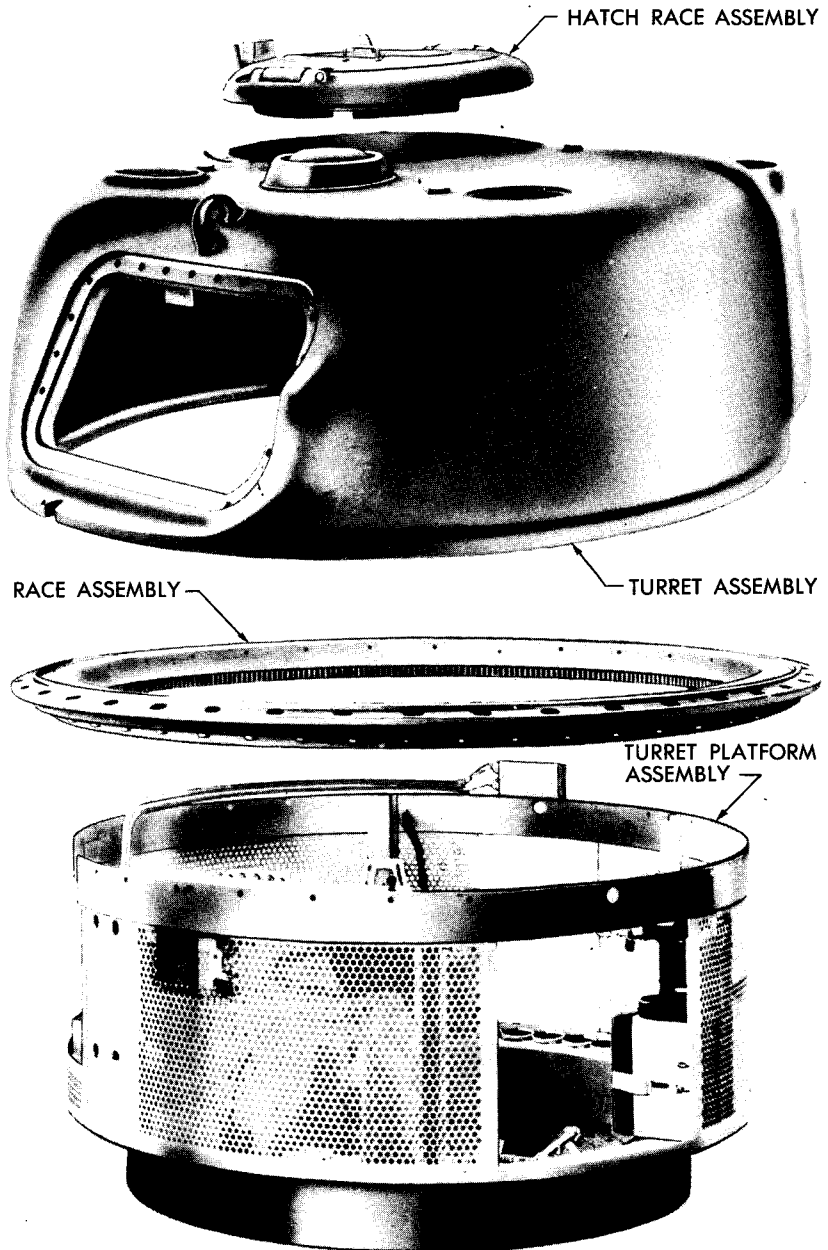
**10. TURRET HATCH.**

a. **Removal and Disassembly.** Unlatch the safety lock, loosen the knurled nut and remove the periscope. Drift out the small pin in the center of the door hinge that retains the hinge pin. Drive out the hinge pin and remove the door. With a heavy duty screwdriver, remove the oval-head cap screws (fig. 16) that attach the hatch ring to the turret and lift off the hatch ring with a hoist. Place the hatch ring on blocks in an inverted position. Remove the cap screws that attach the retainer ring to the hatch race and lift out the retainer ring. Loosen the three cap screws in the hatch ring lock. Remove the felt grease retainer, balls, lower inner ring, and lower outer ring.

b. **Cleaning and Inspection.** Clean the balls and races. Inspect for cracked or chipped balls and pitted races. Inspect the felt grease retainer. Replace all damaged or worn parts.

c. **Assembly and Installation** (figs. 17 and 18). Install the lower inner and lower outer races and balls. Install the felt retainer and

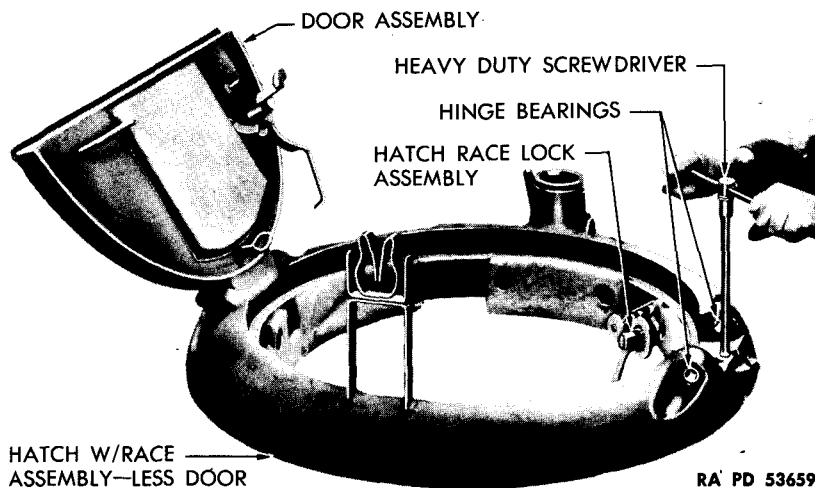
**TURRET**



RA PD 53658

**Figure 15—Turret and Platform, Disassembled**

**ORDNANCE MAINTENANCE—TRACKS AND SUSPENSION, TURRET  
AND HULL, FOR MEDIUM TANK M4 AND MODIFICATIONS**



**Figure 16—Removing Hatch Ring**

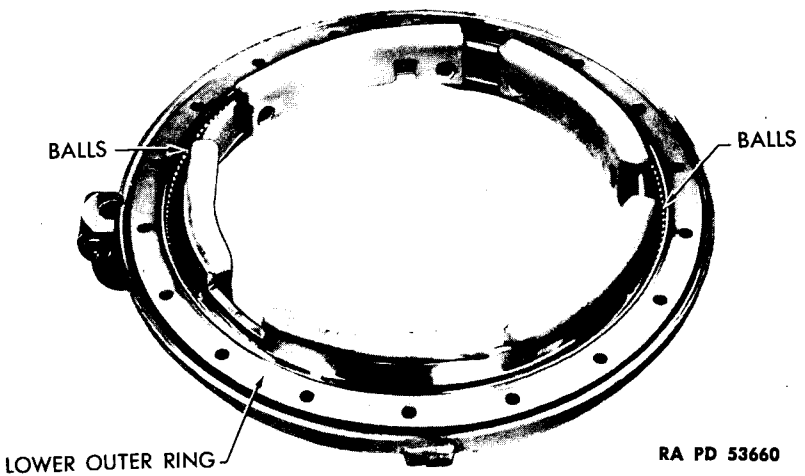
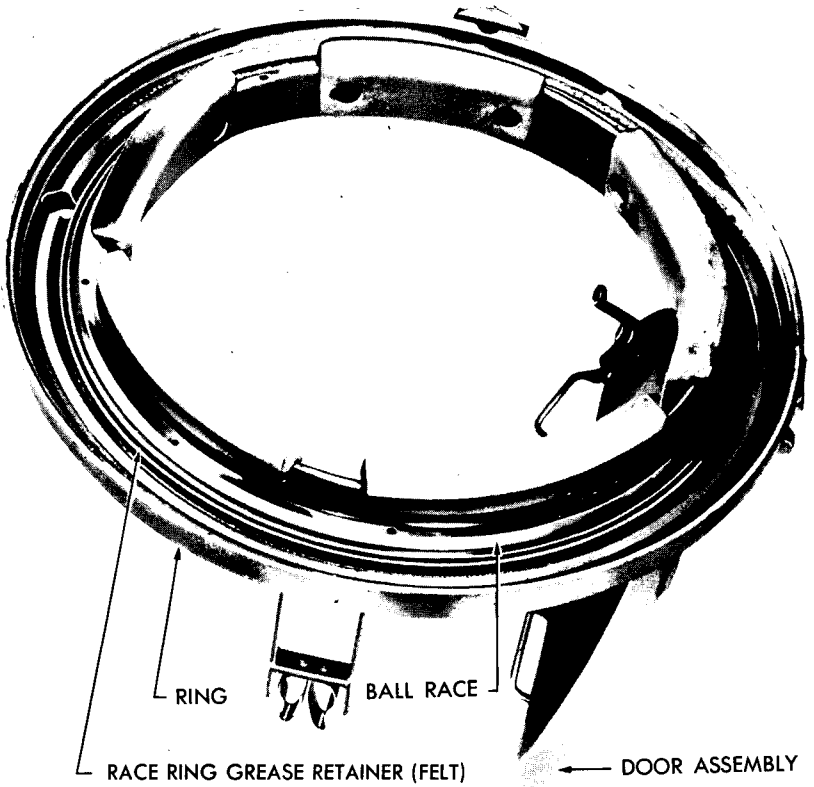
attach the retainer ring to the race with the cap screws. Tighten the cap screws on the hatch ring lock. Apply joint and thread compound around the flange of the hatch ring. Position the hatch ring on the turret with the punch marks on the turret and hatch ring aligned and install the oval-head attaching screws. Install the hatch door and insert the hinge pin and the retaining pin. Install the periscope.

## **11. REMOVAL OF TURRET.**

a. **Remove Wires and Conduits** (fig. 21). Open the main battery switch. Remove the cover from the terminal box at the left of the electric motor or motor generator and disconnect the wire leads. Mark the wires for reassembly. Remove the conduit and wires from the terminal box. Remove the cover from the commander's switch box. Take out the attaching screws and remove the switch box from the turret ceiling. Remove the cover from the turret main switch box. Disconnect the wire to the stabilizer switch, the wires to the inner circuit breaker and the wires leading to the gunner's switch. Disconnect the two conduits and pull the conduits and wires out of the turret main switch box. Remove the cover on the terminal box at the bottom of the electric motor and disconnect the wire leads. Mark the wires for reassembly. Disconnect the conduit and pull the conduit and wires out of the terminal box.

b. **Remove Traverse Motor (Electric)** (fig. 19). Support the traverse motor on a block and jack. Remove the two cap screws that

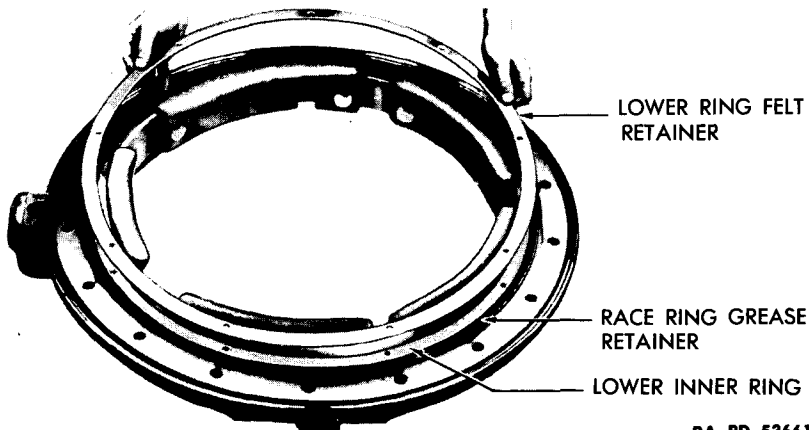
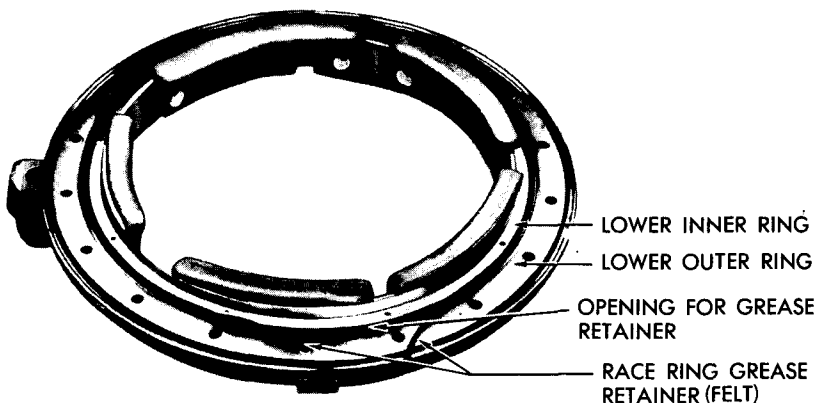
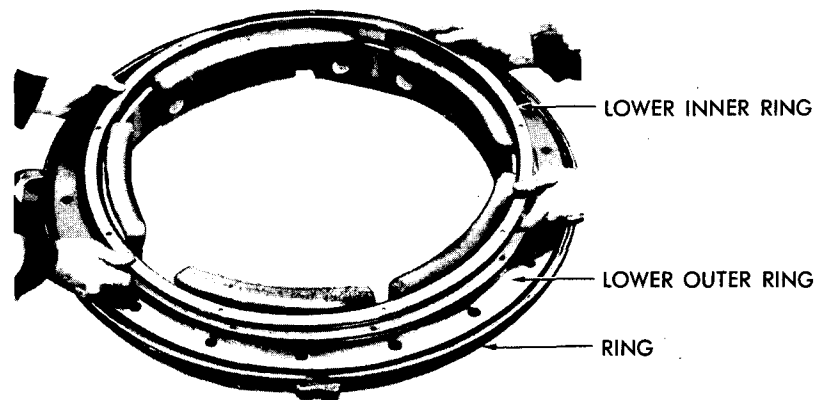
TURRET



RA PD 53660

Figure 17—Installing Hatch Race Lower Outer Ring

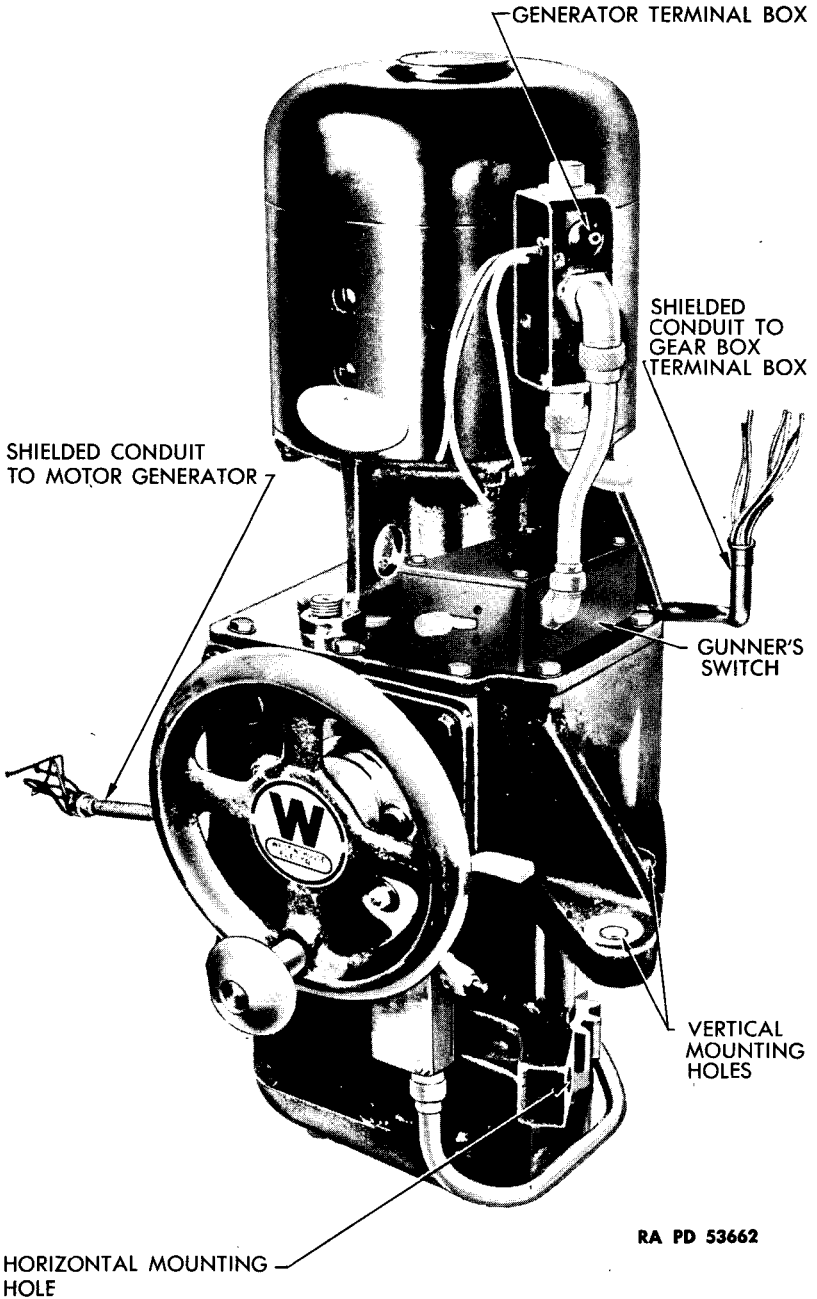
**ORDNANCE MAINTENANCE—TRACKS AND SUSPENSION, TURRET AND HULL, FOR MEDIUM TANK M4 AND MODIFICATIONS**



RA PD 53661

**Figure 18—Installing Turret Hatch Rings and Retainers**

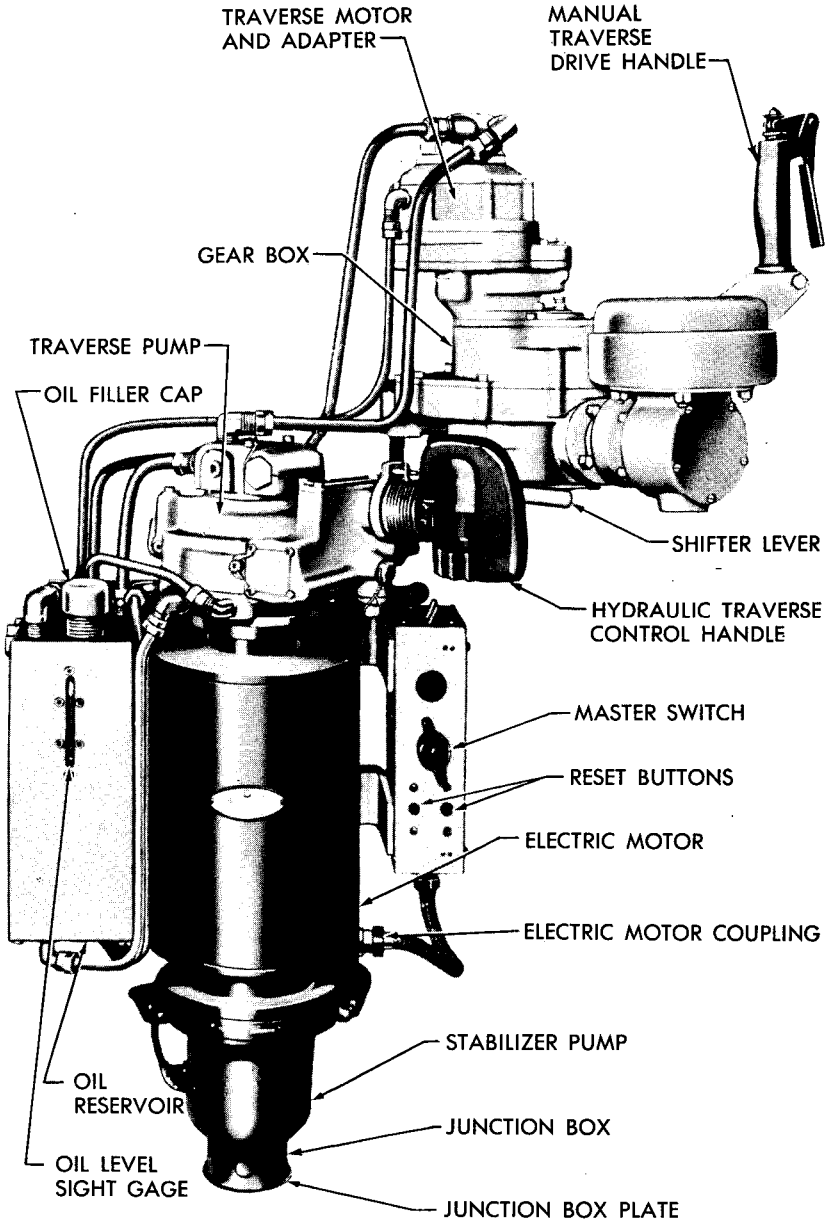
TURRET



RA PD 53662

Figure 19—Electric Traverse Motor

**ORDNANCE MAINTENANCE—TRACKS AND SUSPENSION, TURRET AND HULL, FOR MEDIUM TANK M4 AND MODIFICATIONS**



RA PD 53663

**Figure 20—Turret Hydraulic Traversing Mechanism**

## TURRET

attach the lower portion of the traverse motor mounting bracket (horizontal mounting holes) to the inner bearing ring. Remove the two cap screws that attach the mounting bracket to the base of the hull (vertical mounting holes). Mark the shims, spacers and key between the mounting bracket and the turret for reassembly. Slide the traverse motor over to the gunner's seat.

c. **Remove Traverse Motor (Hydraulic)** (fig. 20). Disconnect the three oil tubes from the traverse motor. Cover the ends of the tubes to prevent entrance of dirt. Remove the two upper and two lower cap screws that attach the traverse motor mounting bracket to the turret. Lift out the traverse motor and mark the shims, spacers and key between the mounting bracket and turret for reassembly.

d. **Remove Turret.** Drain the oil from the reservoir of the gun stabilizer unit. Disconnect the oil supply line, the oil pressure lines, and the oil return line at the unions under the gun mount. Tag the oil lines for reassembly and cover the ends of the lines to prevent entrance of dirt. Remove the bolt and nut from the collar on the solenoid under the 75-mm gun breech and pull out the manual firing control cable. Take out the cap screws that attach the splash guard to the bottom of the gun cradle and remove the splash guard. Remove the four long cap screws that attach the radio shelf support brackets to the turret race. Remove the row of cap screws that attach the turret to the bearing race. Remove the four cap screws that attach the reinforcement section of the platform to the turret. Hoist the turret off the turret race.

## 12. INSTALLATION OF TURRET.

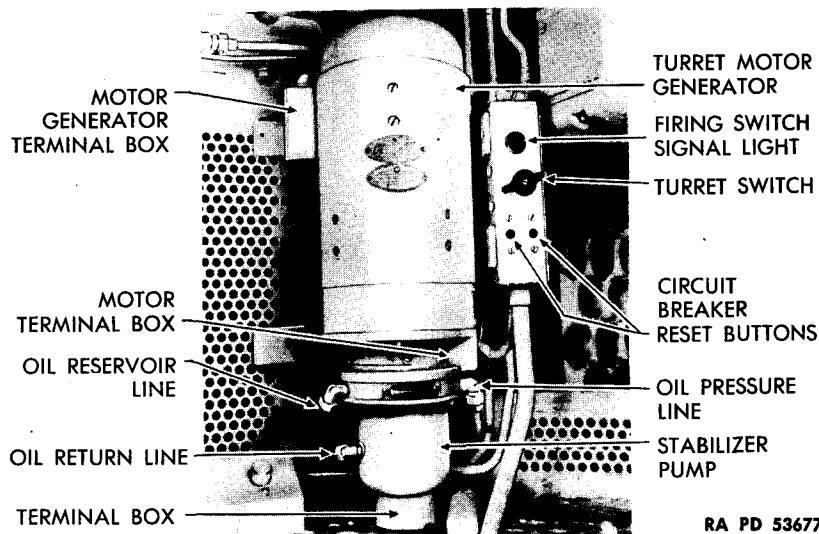
a. **Install Turret.** Hoist the turret into position over the race. Guide the conduit back of the electric motor. Use drift pins to align the cap screw holes in the turret and race. Start the row of cap screws that attach the turret to the race. Start the four long cap screws that attach the radio support brackets to the race, and the cap screws that attach the platform reinforcement section to the race. Lower the turret into place and tighten the attaching cap screws. Connect the manual firing control cable to the solenoid under the 75-mm gun breech. Connect the oil supply line, the oil pressure lines, and the oil return line at the connections under the gun mount.

b. **Install Traverse Motor (Electric).** Position the traverse motor and bracket in the turret. Place a block and jack under the unit. Install the key, shims and spacers between the mounting bracket and the turret. Attach the unit to the turret race with the four cap screws.

c. **Install Traverse Motor (Hydraulic).** Position the traverse motor in the turret with the key, shims and spacers in place. Install



## ORDNANCE MAINTENANCE—TRACKS AND SUSPENSION, TURRET AND HULL, FOR MEDIUM TANK M4 AND MODIFICATIONS



RA PD 53677

**Figure 21—Stabilizer Oil Pump and Turret Motor Generator Set**

the four cap screws that attach the bracket to the turret. Connect the oil tubes to the traverse motor.

**d. Connect Wires and Conduits.** Connect the wires and conduits in the turret main switch box, and install the cover. Connect the wires and conduits in the terminal boxes on the left side and bottom of the electric motor or motor generator and install the terminal box covers. Attach the commander's switch box to the turret ceiling.

**e. Adjust Traverse Gears.** Turn the turret one revolution by hand and inspect for lag, backlash, or bind in the gears while rotating. The minimum allowable clearance between the teeth of the traversing gears at the highest point is 0.002 inch. Shim between the traverse motor mounting bracket and the turret to obtain the proper gear mesh.

**f. Fill and Remove Air from Stabilizer System.** Open the master switch. Fill the reservoir with hydraulic oil. Loosen the oil return line connection at the stabilizer. Allow the oil to run out of the connection until the flow of oil is free of air bubbles. Add oil in the reservoir as required. Tighten the return line connection. Loosen the bleeder valves on the stabilizer cylinder. Allow the oil to run out of the bleeder valves until the flow is free of air bubbles and tighten the valves finger-tight. Loosen the top bleeder valve. Raise the gun breech slowly to its highest position. Close the top bleeder valve. Loosen the lower bleeder valve. Pull the gun breech slowly downward to its lowest position.

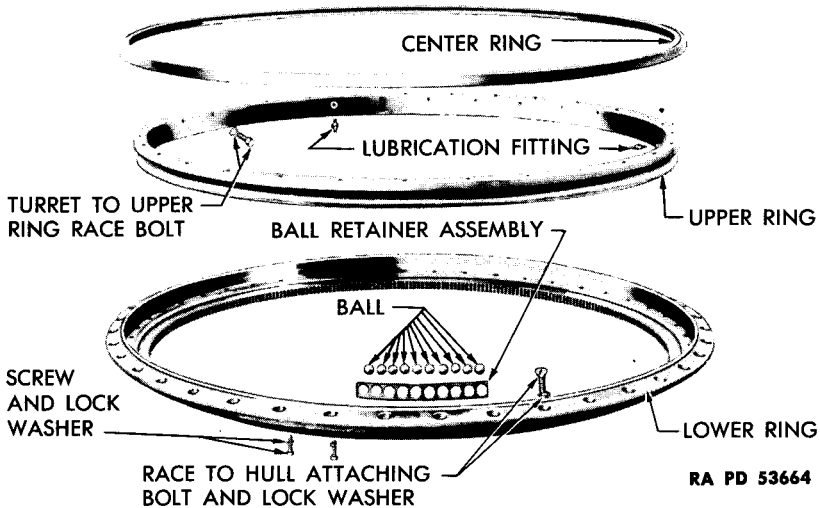
## TURRET

Close the lower bleeder valve. Repeat the bleeding operation, raising and lowering the gun breech until a flow of oil is obtained free of air bubbles. Lock the gun in fixed position. Close master switch and turret switch. If the oil level lowers in the reservoir gage, there is air in the system. Repeat the bleeding and testing operation until the oil remains at constant level in the reservoir gage when the turret switch is closed.

### 13. PLATFORM AND TURRET RACE.

#### a. Removal of Platform and Turret Race.

(1) REMOVE TURRET. Follow procedure outlined in paragraph 11.



**Figure 22—Turret Race, Disassembled**

(2) REMOVE PLATFORM. Position the platform floor door over the battery box. Remove the cap screws that attach the turret race to the hull. Take out the six cap screws and remove the crash pad in the front compartment. Attach a sling and raise the platform to provide access to the collector ring under the platform. Place blocks between the race ring and the hull as a safety measure. Raise the platform floor door and disconnect the collector ring ground cable. Remove the cover on the terminal box on top of the battery box and disconnect the cable from the terminal. Unscrew the connector nut on the cannon plug and pull the plug apart. Hoist the platform out of the hull and lower it onto blocks to protect the collector ring.

**ORDNANCE MAINTENANCE—TRACKS AND SUSPENSION, TURRET AND HULL, FOR MEDIUM TANK M4 AND MODIFICATIONS**

b. **Disassembly and Inspection of Turret Race** (fig. 22). Attach a sling and hoist to the turret race. Remove the oval-head cap screws that attach the turret race to the platform. Remove the turret locking fixture and the lubrication fittings. Hoist the turret race off the platform and place it on blocks. Remove the cap screws from the underside of the lower ring that attach the lower ring to the upper ring and lift out the ring. Remove the center ring, balls and retainers. Clean the races, balls and retainers and inspect for pits and flat spots or broken balls.

c. **Assembly of Turret Race** (fig. 22). Place the center ring in the lower ring. Install the balls and retainers. Place the upper ring in the lower ring. Aline the rings by indexing the marks on the rings. Install the cap screws that attach the lower ring to the upper ring. Attach a sling to the turret race and hoist it into position on the turret platform. Attach the race to the platform with the oval-head cap screws. Install the locking fixture and the lubrication fittings.

d. **Installation of Platform and Turret Race.**

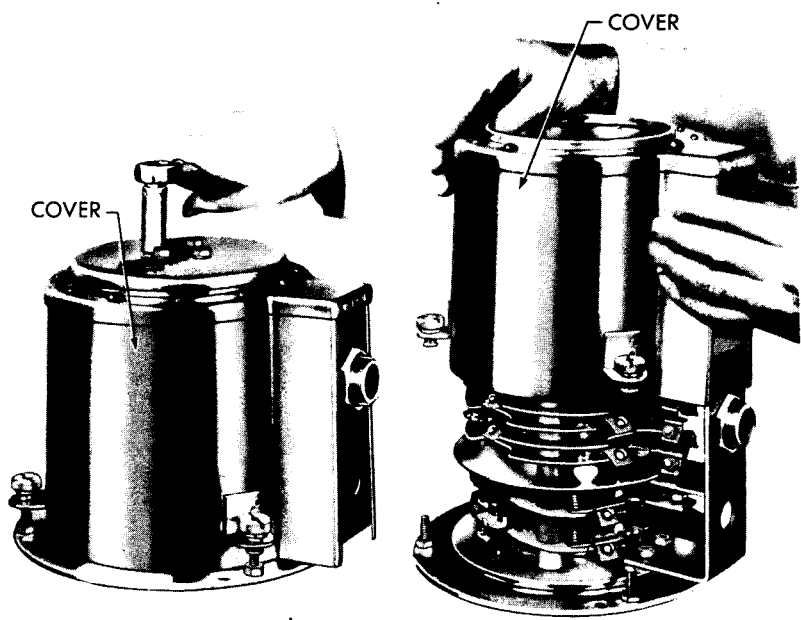
(1) **INSTALL PLATFORM.** Index the marks on the race and hull and position the platform in the hull with the turret race about 6 inches above the top of the hull. Place blocks between the race and the hull for safety. Open the door in the floor of the platform and connect the collector ring cable, ground wire, and cannon plug. Loosen the screws in the collector ring yoke. Remove the blocks and lower the platform until the collector ring enters the yoke with the arrow on the collector ring cover pointing toward the front of the tank. Aline the turret race and start all of the attaching cap screws. Lower the platform all the way and tighten the cap screws in the race. Tighten the screws in the collector ring yoke. Install the crash pad in the front compartment. Install the turret locking fixture.

(2) **INSTALL TURRET.** Follow procedure outlined in paragraph 12.

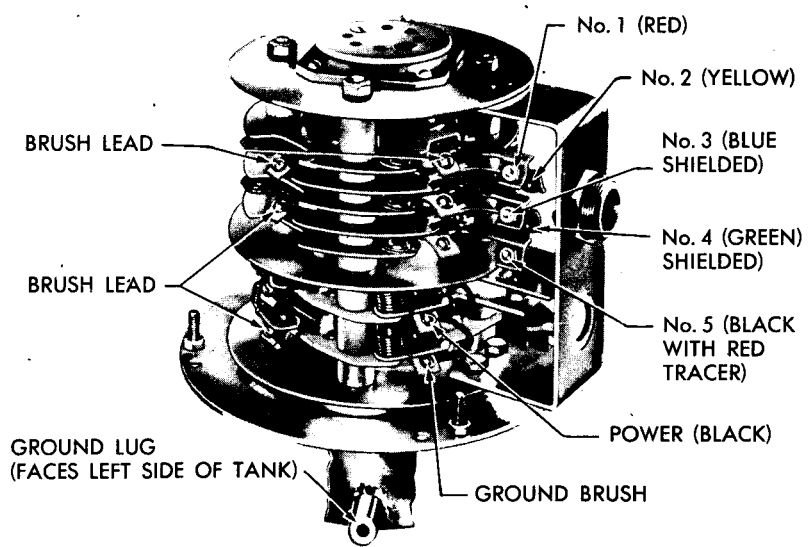
#### **14. COLLECTOR RING ASSEMBLY.**

a. **General** (fig. 23). Current for operating electrical units in the turret passes through the collector ring assembly mounted in the center of the turret platform floor. The upper rings of the unit carry 12-volt current for the radio and interphone system. The lower rings carry 24-volt current for the firing switches, traversing motor, generator unit, and stabilizer mechanism. The collector ring assembly will seldom require attention other than cleaning of brushes and slip rings and checking brush springs.

**TURRET**



1. REMOVING COVER



2. WIRE LOCATIONS

RA PD 53665

**Figure 23—Turret Collector Ring**

**ORDNANCE MAINTENANCE—TRACKS AND SUSPENSION, TURRET AND HULL, FOR MEDIUM TANK M4 AND MODIFICATIONS**

**b. Removal.** Remove the collector ring cover and disconnect the wires and conduits. Remove the screws that attach the unit to the platform floor and lift up the assembly.

**c. Installation.** Connect the ground wire, cannon plug and main lead cable. Position the collector ring on the floor of the platform. Install the attaching screws. Connect the wires and conduits and install the cover.

## Section IV

**HULL AND ELECTRICAL WIRING**

	Paragraph
Seats .....	15
Wiring and conduits.....	16
Removal and installation of conduits.....	17

**15. SEATS.**

a. **Removal and Disassembly (Pedestal Type)** (fig. 24). Raise the seat to its highest position. Remove the guide key in the floor seat support and lift out the seat support tube assembly. Take out the cotter pin in the seat base locking plunger and remove the latch support. Remove the plunger and spring from the inside of the support. Remove the cotter pin and washer from the shaft of the seat support adjusting lever shaft and pull out the handle and shaft assembly. Take out the bolts and remove the two seat pan bracket clips in the channels of the seat body. Slide the seat assembly out of the seat support. Take out the cotter pin in the end of the seat support latch handle and remove the washer, spring, and handle.

b. **Assembly and Installation (Pedestal Type)**. Insert the seat support latch handle in the bracket under the seat and install the spring, washer and cotter pin. Position the seat support adjusting lever shaft and install the retaining washer and cotter pin. Slide the seat assembly into the seat support and attach the seat pan bracket clips with the bolts and nuts. Install the base locking plunger and spring in the seat floor support. Place the latch support on the plunger and secure with a cotter pin. Enter the upper support assembly in the lower support and install the guide key with the attaching bolt.

c. **Removal and Disassembly (Hinge Type)**. Raise seat to its highest position. Remove the cap screws that attach the seat base to the floor. Remove the lock rings in the upper and lower axle assemblies and unhook the seat spring.

d. **Assembly and Installation (Hinge Type)**. Position the hinge sections and connect the seat spring. Insert the upper and lower axle assemblies and install the lock rings. Attach the seat to the floor with the cap screws.

e. **Removal and Disassembly (Folding Type)**. Take out the attaching cap screws and remove the seat from the turret platform. Unhook the bracket spring from the seat hinge shaft and remove the shaft, base, and cushion assembly.

f. **Assembly and Installation (Folding Type)**. Position the base and cushion assembly in the bracket and install the hinge shaft. Con-



**HULL AND ELECTRICAL WIRING**

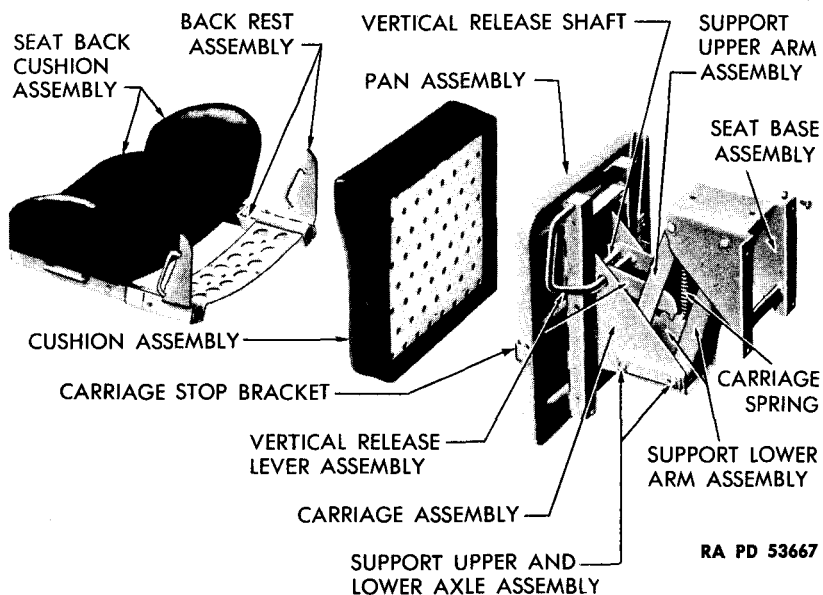
- |   |  |
|---|--|
| <b>A</b> —SEAT PEDESTAL BASE BODY ASSEMBLY  | <b>V</b> —SEAT ADJUSTING ROLLER WASHER           |
| <b>B</b> —SEAT BASE PLUNGER SPRING          | <b>W</b> —COTTER PIN                             |
| <b>C</b> —SEAT PEDESTAL BASE LATCH PIN KNOB | <b>X</b> —SCREW                                  |
| <b>D</b> —COTTER PIN                        | <b>Y</b> —LOCK WASHER                            |
| <b>E</b> —SEAT BASE LOCKING PLUNGER         | <b>Z</b> —SEAT PAN BRACKET CLIP                  |
| <b>F</b> —SEAT SUPPORT LATCH RETAINER       | <b>AA</b> —NUT                                   |
| <b>G</b> —SEAT PEDESTAL TUBE                | <b>AB</b> —COTTER PIN                            |
| <b>H</b> —NUT                               | <b>AC</b> —PLAIN WASHER                          |
| <b>I</b> —LOCK WASHER                       | <b>AD</b> —SEAT SUPPORT LATCH HANDLE ASSEMBLY    |
| <b>J</b> —SEAT SUPPORT GUIDE KEY            | <b>AE</b> —SEAT ASSEMBLY                         |
| <b>K</b> —CAP SCREW                         | <b>AF</b> —CUSHION ASSEMBLY                      |
| <b>L</b> —SEAT SUPPORT SPRING               | <b>AG</b> —BACK REST ASSEMBLY                    |
| <b>M</b> —COTTER PIN                        | <b>AH</b> —SEAT BACK ASSEMBLY                    |
| <b>N</b> —SEAT SUPPORT LATCH SUPPORT        | <b>AI</b> —SEAT SUPPORT ADJUSTING LEVER ASSEMBLY |
| <b>O</b> —SEAT ADJUSTING SHAFT              | <b>AJ</b> —COTTER PIN                            |
| <b>P</b> —SEAT ADJUSTING SHAFT LEVER        | <b>AK</b> —SEAT UPPER SUPPORT ASSEMBLY           |
| <b>Q</b> —SEAT SUPPORT ADJUSTING LEVER      | <b>AL</b> —SEAT LOWER SUPPORT ASSEMBLY           |
| <b>R</b> —STRAIGHT PIN                      | <b>AM</b> —CAP SCREW                             |
| <b>S</b> —SEAT SUPPORT PIN                  | <b>AN</b> —LOCK WASHER                           |
| <b>T</b> —SEAT ADJUSTING ROLLER             | <b>AO</b> —NUT                                   |
| <b>U</b> —SEAT ADJUSTING ROLLER BEARING     |  |

RA PD 53666-B

**Legend for Figure 24—Pedestal Type Seat, Disassembled**



**ORDNANCE MAINTENANCE—TRACKS AND SUSPENSION, TURRET  
AND HULL, FOR MEDIUM TANK M4 AND MODIFICATIONS**

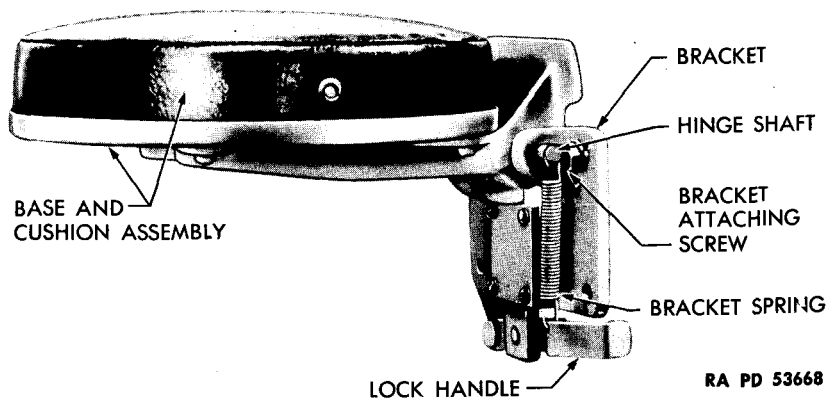


**Figure 25—Hinge Type Seat, Disassembled**

nect the bracket spring to the hinge shaft. Attach the seat bracket to the turret platform with the cap screws.

**16. WIRING AND CONDUITS.**

a. **Description.** Two 12-volt batteries connected in series furnish 24 volts to the electrical system. A separate wiring system supplies 12



**Figure 26—Folding Type Seat**

## HULL AND ELECTRICAL WIRING

volts to the radio. The negative side of the battery and all electrical equipment are grounded to the hull. The wiring is protected by conduits made from lengths of flexible waterproof materials or solid tubing most adaptable to the location and purpose. The conduits are equipped with several types of connectors and attachment fittings. All conduits are securely attached to the hull to insure a good ground contact to prevent radio interference. **NOTE:** *Refer to wiring diagram in pertinent 100-series manuals.*

**b. Wiring Conduit Assemblies.** The wiring conduit assemblies contained in the tanks are listed below. Figures 27 to 34, inclusive, illustrate typical conduits, terminal boxes, and wiring diagrams.

- (1) Instrument panel to bulkhead terminal box.
- (2) Instrument panel to rear terminal box.
- (3) Instrument panel to rear battery box.
- (4) Instrument panel to front of battery box.
- (5) Instrument panel to front end of hull.
- (6) Battery box to rear terminal box.
- (7) Battery box to engine generator regulator.
- (8) Battery box to auxiliary generator regulator.
- (9) Battery box to radio terminal box in hull.
- (10) Battery box to turret collector ring.
- (11) Engine generator to regulator.
- (12) Auxiliary generator to regulator.
- (13) Auxiliary generator to battery box.
- (14) Bulkhead terminal box to rear terminal box.
- (15) Radio terminal box in hull to turret collector ring.
- (16) Turret collector ring to radio terminal box.
- (17) Rear terminal box to magnetos.
- (18) Rear terminal box to starter.

## 17. REMOVAL AND INSTALLATION OF CONDUITS.

**a. Removal.** Remove the hold-down clamps or clips that secure the conduit to the hull or turret. Loosen slip joint retaining clamps to allow the conduit to be moved if clearance is required when removing conduit ends from terminal boxes or other units. If multiple terminal connectors are used, unscrew the knurled lock nut holding the connector together, until the nut is hard to turn, then pull on the conduit to separate the connector. This will relieve the pressure on the knurled lock nut threads and prevent damage. Do not use strap wrench or



HULL AND ELECTRICAL WIRING

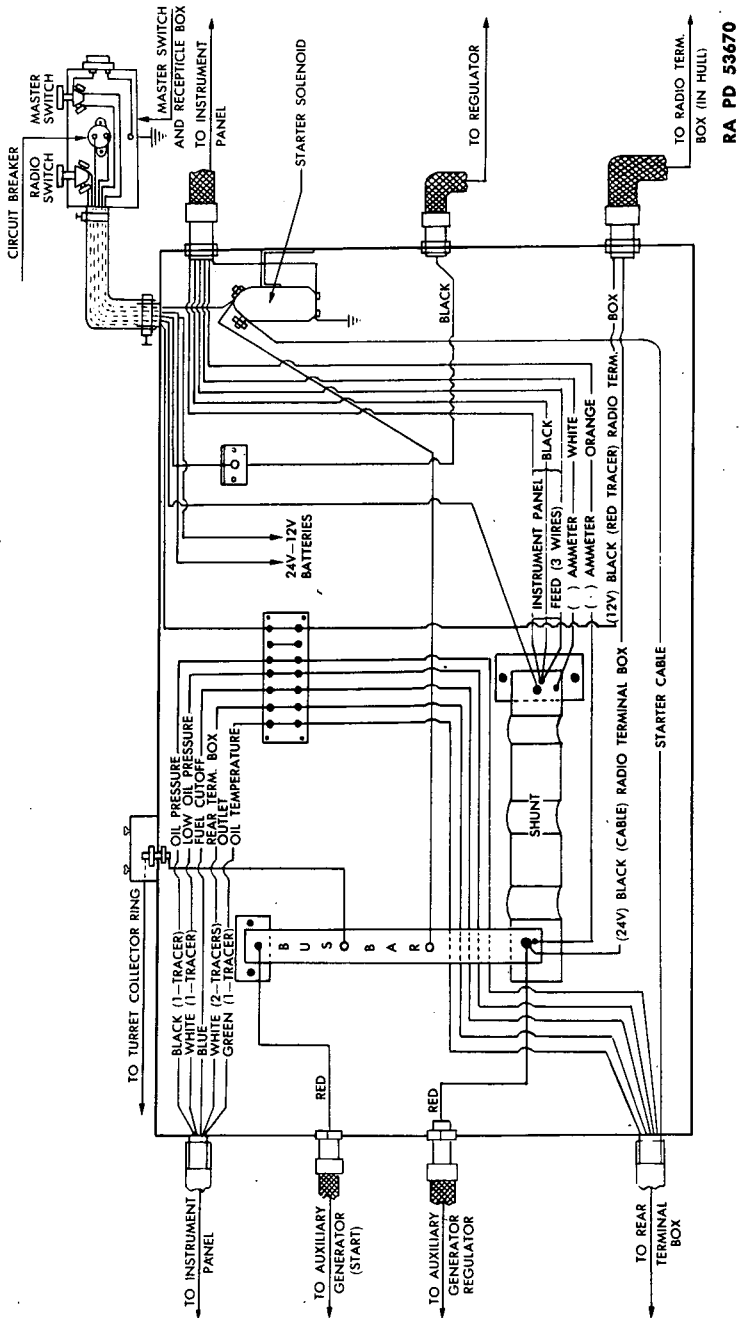
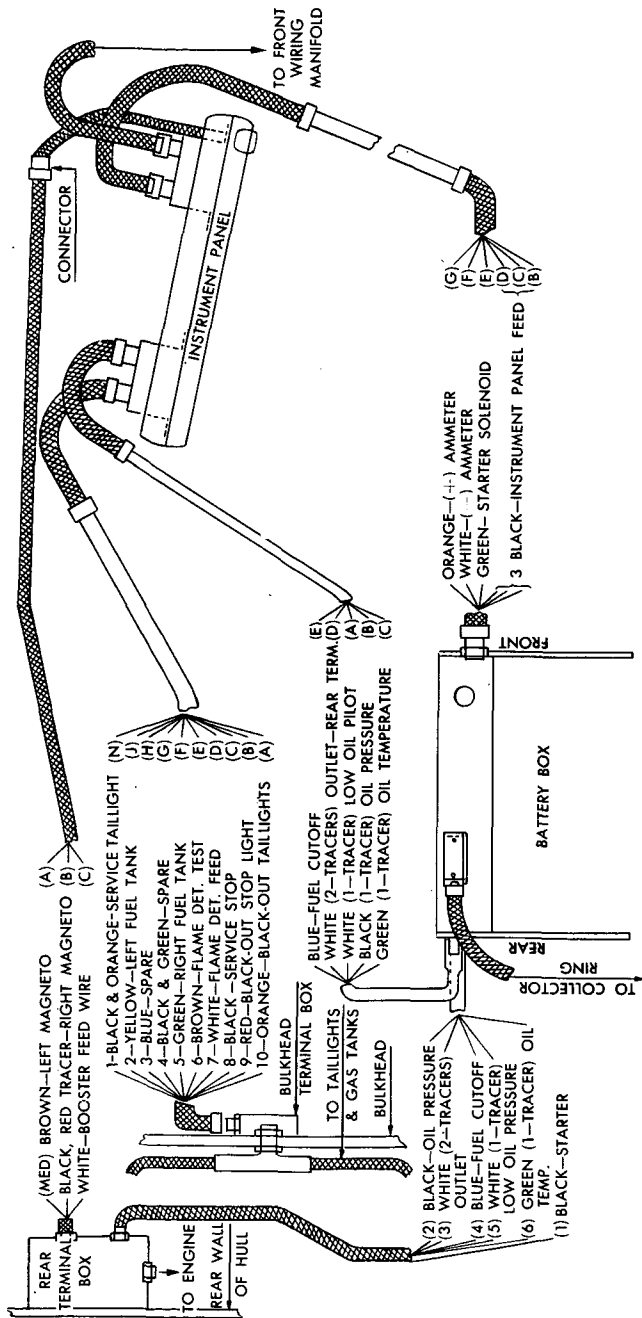


Figure 28—Battery Box Wiring Panel

ORDNANCE MAINTENANCE—TRACKS AND SUSPENSION, TURRET AND HULL, FOR MEDIUM TANK M4 AND MODIFICATIONS

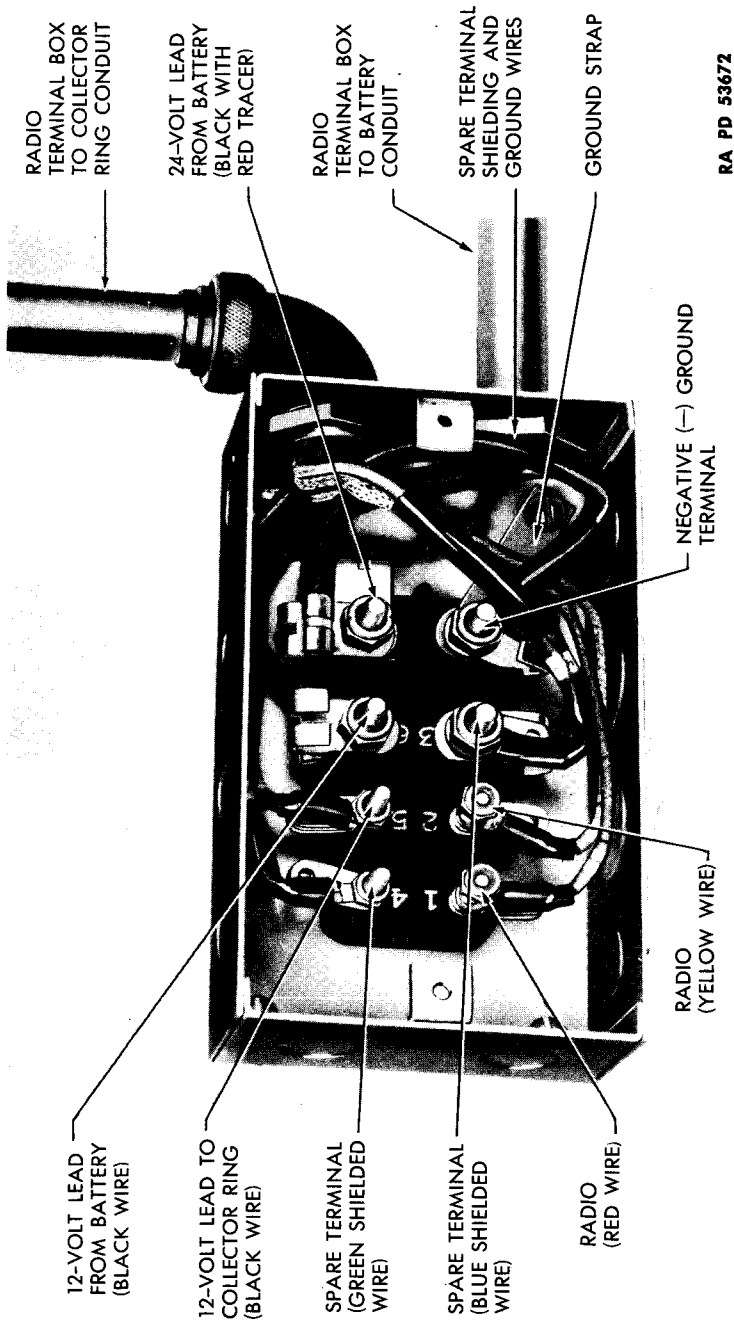


RA PD 53671

29

Figure 29—Instrument Panel Conduits

HULL AND ELECTRICAL WIRING



RA PD 53672

Figure 30—Radio Terminal Box

ORDNANCE MAINTENANCE—TRACKS AND SUSPENSION, TURRET AND HULL, FOR MEDIUM TANK M4 AND MODIFICATIONS

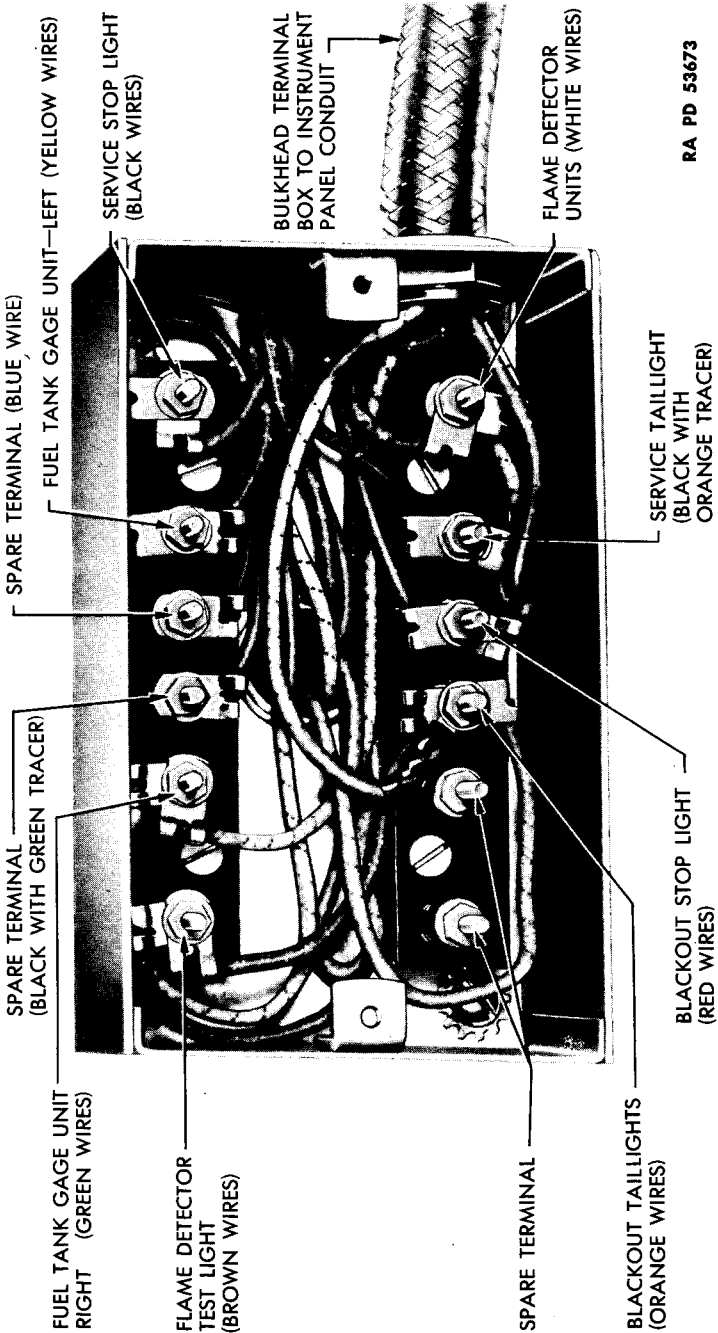


Figure 31—Bulkhead Terminal Box

HULL AND ELECTRICAL WIRING

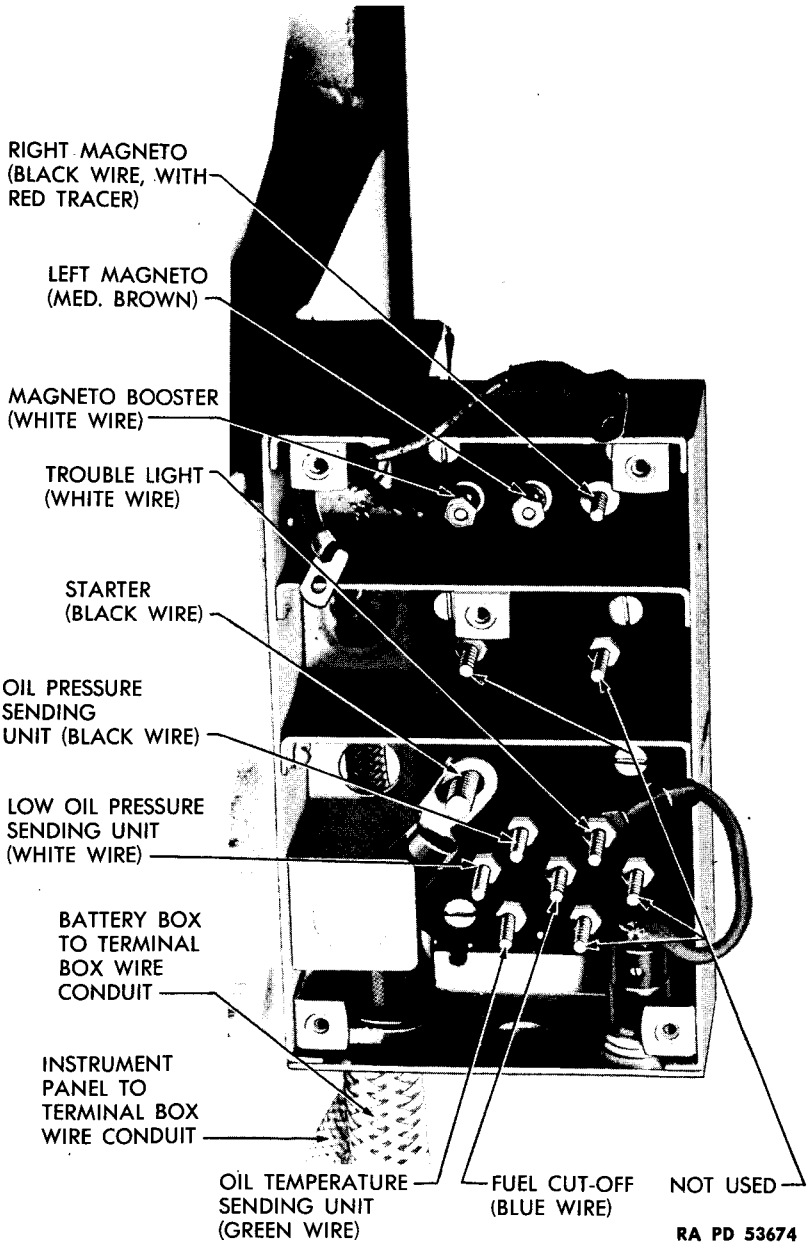
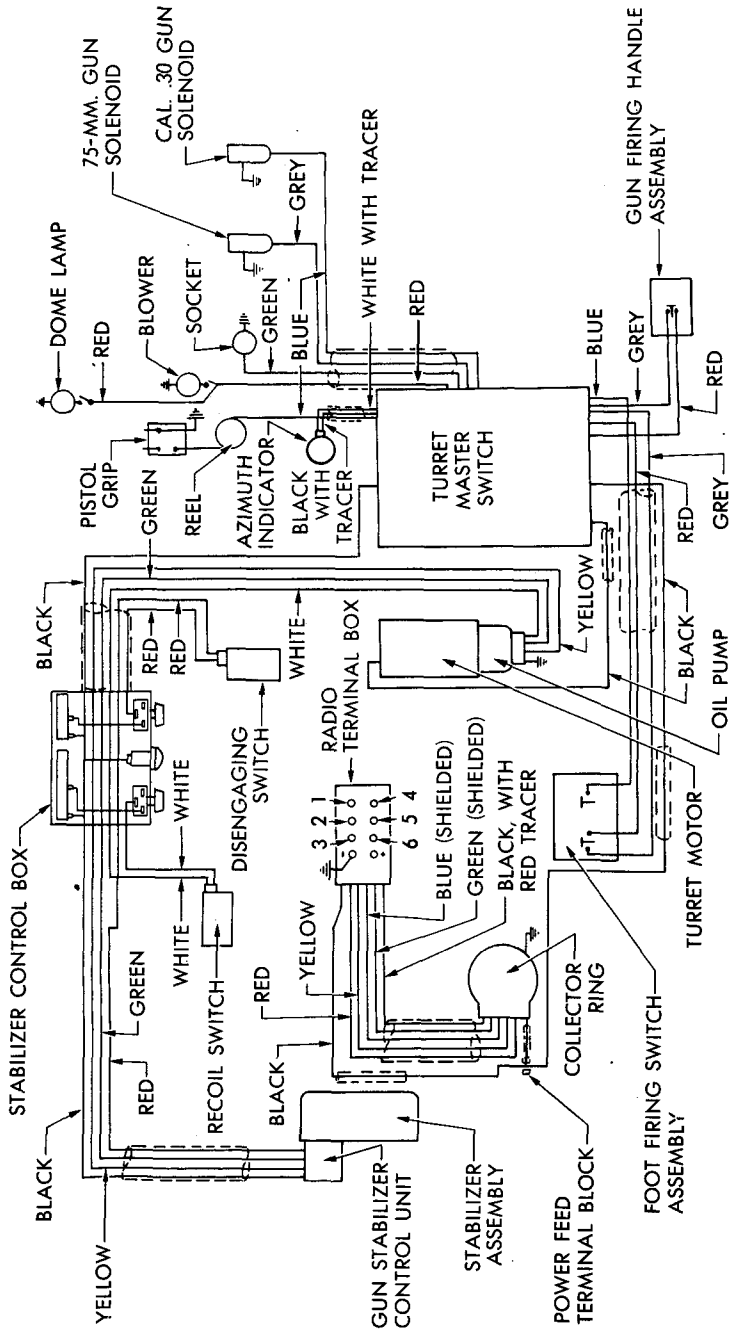


Figure 32—Rear Terminal Box



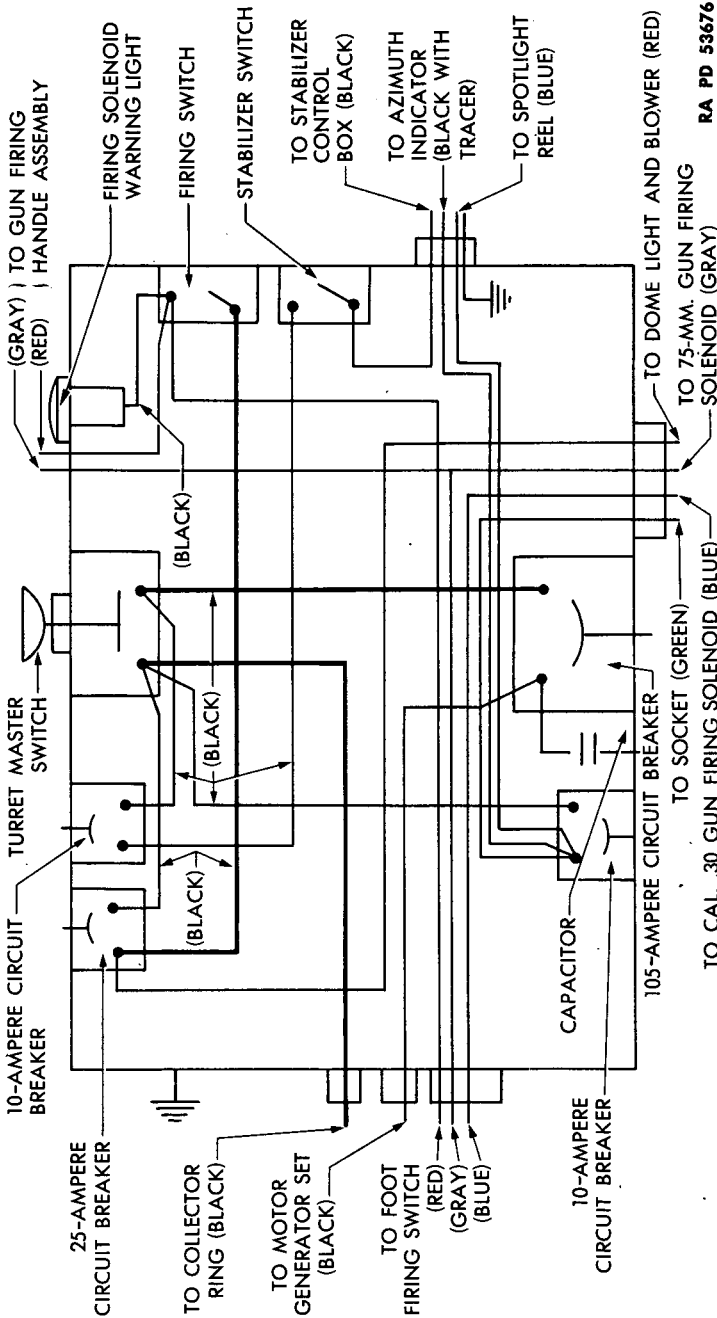
ORDNANCE MAINTENANCE—TRACKS AND SUSPENSION, TURRET AND HULL, FOR MEDIUM TANK M4 AND MODIFICATIONS



RA PD 53675

Figure 33—Turret Wiring Diagram

HULL AND ELECTRICAL WIRING



RA PD 53676

Figure 34—Turret Master Switch Box Wiring Diagram

**ORDNANCE MAINTENANCE—TRACKS AND SUSPENSION, TURRET AND HULL, FOR MEDIUM TANK M4 AND MODIFICATIONS**

wrenches to force the lock nuts to turn. Where elbows and bushings are used for attaching conduits to terminal boxes or electrical units, disconnect the conduit lock nut at the elbow or bushing. When bushings are part of the conduit assemblies, remove the bushing lock nut inside the terminal box. Disconnect the wires from the terminal posts. If the wiring is discolored, tag or mark the wires for identification before removing the conduit from the tank when installation or replacement is to be made.

**b. Installation.** Place the new conduit in position, enter the bushing in the terminal box or start the conduit lock nut on the elbow or fitting. Do not tighten the lock nuts until the hold-down clamps and clips have been installed and tightened. This will prevent twisting the flexible conduits, or bending the solid tubes. Connect the wiring according to previous identification, or use the wiring diagrams showing the color code. When multiple terminal connectors are joined, carefully align the tongue and groove on the shell of the connector to insure proper connection of the wires and avoid damage to the connector. Push the connector shells together as far as possible and start the lock nut. Tighten the lock nut until the two halves of the connector start to draw together. Push or bump the connector lightly to cause the halves of the connector to slide together so that the lock nut will turn up easily. This will avoid damage to the threads on the connector or in the lock nut. Where self-locking terminal nuts are used, be sure the nut bottoms against the terminal when tightened. Do not tighten more than necessary as breakage of the terminal stud will occur. When the conduit is in place, clamps tightened and terminals connected, tighten all conduit lock nuts. Test the circuits for operation and install the terminal box covers.

Section V

**SPECIAL TOOLS**

Special tools..... 18

**18. SPECIAL TOOLS.**

a. Common tools required to repair medium tanks are listed in SNL N-19 and SNL N-21.

b. SNL G-27 lists standard maintenance tool sets for use by third and fourth echelon maintenance establishments. In addition, SNL G-27 lists special tools designed specifically for repair of these tanks. The special tools required for the operations described in this manual are listed below:

NAME OF TOOL	FEDERAL STOCK NUMBER	MANUFACTURER'S NUMBER
Compressor, suspension volute spring.....	41-C-2556	MTM-M3-3
Drift, bogie wheel, installing....	41-D-1463	MTM-M3-13
Drift, idler wheel inner bearing..	41-D-1540-500	MTM-M3-15
Drift, idler wheel outer bearing..	41-D-1540-550	MTM-M3-14
Fixture, track connecting.....	41-F-2997-85	—
Fixture, track connecting and link pulling.....	41-F-2997-86	—
Lift, bogie wheel.....	41-L-1375	MTM-M3-813
Puller, bearing, idler wheel (outer)	41-P-2900-27	MTM-M3-40
Puller, bogie gudgeon, screw type, without adapter.....	41-P-2905-63	MTM-M3-6
Puller, idler wheel.....	41-P-2940-800	MTM-M3-8
Puller, slide-hammer type, bogie gudgeon.....	41-P-2957-33	—
Wrench, box, 3-in. hex. 44 <sup>5</sup> / <sub>8</sub> in. long.....	41-W-640-400	MTM-M3-7
Wrench, plug, male, 5 <sup>5</sup> / <sub>8</sub> in. hex...	41-W-1960	MTM-M3-10

**ORDNANCE MAINTENANCE—TRACKS AND SUSPENSION, TURRET AND HULL, FOR MEDIUM TANK M4 AND MODIFICATIONS**

**REFERENCES**

**STANDARD NOMENCLATURE LISTS.**

Tank, medium, M4 . . . . .	SNL G-104, Vol. 6
Tank, medium, M4A1 . . . . .	SNL G-104, Vol. 11
Tank, medium, M4A2 . . . . .	SNL G-104, Vol. 7
Tank, medium, M4A3 . . . . .	SNL G-104, Vol. 8
Tank, medium, M4A4 . . . . .	SNL G-104, Vol. 9
Tank, medium, M4A6 . . . . .	SNL G-104, Vol. 13
Cleaning, preserving and lubrication materials, recoil fluids, special oils, and miscellaneous related items. . . . .	SNL K-1
Soldering, brazing, and welding materials, gases, and related items. . . . .	SNL K-2
Interchangeability chart of organizational special tools for combat vehicles. . . . .	SNL G-19
Ordnance maintenance sets. . . . .	SNL N-21
Tools, maintenance, for repair of automotive vehicles. . . . .	SNL G-27
Tool-sets, motor transport. . . . .	SNL N-19
Tool-sets, for ordnance service command, automotive shops. . . . .	SNL N-30
Current Standard Nomenclature Lists are listed above. An up-to-date list of SNL's and other publications is maintained in the Index to Ordnance Publications. . . . .	OFSB 1-1

**EXPLANATORY PUBLICATIONS.**

**General.**

List of publications for training. . . . .	FM 21-6
Military motor vehicles. . . . .	AR 850-15
Standard military motor vehicles. . . . .	TM 9-2800

**Related Technical Manuals.**

Medium tanks M4 and M4A1 . . . . .	TM 9-731A
Medium tank M4A2 . . . . .	TM 9-731B
Medium tank M4A3 . . . . .	TM 9-759
Medium tank M4A4 . . . . .	TM 9-754
Medium tank M4A6 . . . . .	TM 9-756
Ordnance maintenance: Accessories for tank engine, model GAA V-8 (Ford) . . . . .	TM 9-1731C
Ordnance maintenance: Accessories for Wright R975-EC2 engine for medium tanks M3 and M4. . . . .	TM 9-1750D

## REFERENCES

- Ordnance maintenance: Auxiliary generator (Homelite HRUH-28) for medium tank M4 and modifications . . . . . TM 9-1731K
- Ordnance maintenance: Breeze cartridge starter for radial diesel engines . . . . . TM 9-1731
- Ordnance maintenance: Electric traversing mechanism for medium tank M4 and modifications . . . . . TM 9-1731E
- Ordnance maintenance: Fire extinguishers . . . . . TM 9-1799
- Ordnance maintenance: Ford tank engine model GAA V-8 . . . . . TM 9-1731B
- Ordnance maintenance: General motors twin Diesel 6-71 power plant for medium tanks M3A3, M3A5, and M4A2 . . . . . TM 9-1750G
- Ordnance maintenance: Guiberson Diesel T1400 engine, Series 3, for medium tanks M3 and M4 and related gun motor carriages . . . . . TM 9-1750E
- Ordnance maintenance: Hydraulic traversing mechanism (Logansport) for medium tank M4 and modifications . . . . . TM 9-1731F
- Ordnance maintenance: Hydraulic traversing mechanism (Oilgear) for medium tank M4 and modifications . . . . . TM 9-1731G
- Ordnance maintenance: Ordnance engine model RD-1820 . . . . . TM 9-1756A
- Ordnance maintenance: Stabilizers . . . . . TM 9-1334
- Ordnance maintenance: Power train (one-piece differential case) for medium tanks M3, M4, and modifications, and related gun motor carriages . . . . . TM 9-1750B
- Ordnance maintenance: Power train unit (three-piece differential case) for medium tanks M3, M4, and modifications . . . . . TM 9-1750
- Ordnance maintenance: Power unit accessories for medium tanks M3A4 and M4A4 . . . . . TM 9-1750J
- Ordnance maintenance: Power unit for medium tanks M3A4 and M4A4 . . . . . TM 9-1750F
- Ordnance maintenance: Wright whirlwind engine model R975 EC-2 . . . . . TM 9-1751
- Maintenance and Repair.**
- Automotive electricity . . . . . TM 10-580
- Basic maintenance manual . . . . . TM 38-250

## TM 9-1750K

### ORDNANCE MAINTENANCE—TRACKS AND SUSPENSION, TURRET AND HULL, FOR MEDIUM TANK M4 AND MODIFICATIONS

Cleaning, preserving, lubricating and welding materials and similar items issued by the Ordnance Department . . . . .	TM 9-850
Detailed lubrication instructions for ordnance materiel . . . . .	OFSB 6-Series
Motor vehicle inspections and preventive maintenance services . . . . .	TM 9-2810
<b>Protection of Materiel.</b>	
Chemical decontamination, materials and equipment . . . . .	TM 3-220
Decontamination of armored force vehicles . . . . .	FM 17-59
Defense against chemical attack . . . . .	FM 21-40
Explosives and demolitions . . . . .	FM 5-25
<b>Storage and Shipment.</b>	
Ordnance storage and shipment chart, group G—Major items . . . . .	OSSC-G
Registration of motor vehicles . . . . .	AR 850-10
Storage of motor vehicle equipment . . . . .	AR 850-18
Rules governing the loading of mechanized and motorized army equipment; also major caliber guns, for the United States Army and Navy, on open top equipment, published by Operations and Maintenance Department of Association of American Railroads.	

INDEX

<b>A</b>	Page No.	<b>A</b>	Page No.
Assembly		removal and disassembly	
seats .....	45	(hinge type) .....	45
suspension wheels, bearings and		removal and disassembly	
oil retainers .....	25	(pedestal type) .....	45
track idler wheel and bracket ..	18	wiring and conduits	
track support roller and bracket	19	description .....	48
turret hatch .....	32	wiring conduit assemblies ..	49
turret race .....	42	Hull maintenance .....	8
<b>C</b>		<b>I</b>	
Collector ring assembly .....	42	Installation procedure	
Conduits and wiring .....	48	collector ring assembly .....	44
<b>D</b>		idler wheel bracket .....	18
Description of		platform and turret race .....	42
tracks and suspension .....	10	seats .....	45
turret .....	32	suspension wheels, bearings and	
wiring and conduits .....	48	oil retainers .....	25
Disassembly		track idler wheel and bracket ..	18
seats .....	45	track support roller and bracket	19
suspension wheels, bearings and		tracks .....	10
oil retainers .....	23	traverse motor (electric) .....	39
track idler wheel and bracket ..	15	traverse motor (hydraulic) ..	39
track support roller and bracket	19	turret .....	39
turret hatch .....	32	turret hatch .....	32
turret race .....	42	volute springs, arms, and levers	30
<b>E</b>		volute suspension assembly ..	28
Echelon system of maintenance		wiring and conduits .....	58
allocation		Introduction	
electrical group .....	7	maintenance allocation .....	4
hull .....	8	scope of manual .....	4
track suspension group .....	8	<b>M</b>	
turret assembly .....	8	Maintenance allocation by	
vehicle assembly .....	9	echelons .....	7-9
Electrical group maintenance .....	7	Manual, scope of .....	4
<b>H</b>		<b>P</b>	
Hull and electrical wiring		Platform and turret race .....	41
conduits		<b>R</b>	
installation .....	58	References	
removal .....	49	explanatory publications	
seats		general .....	60
assembly and installation		maintenance and repair .....	61
(folding type) .....	45	protection of materiel .....	62
assembly and installation		related technical manuals ..	60
(hinge type) .....	45	storage and shipment .....	62
assembly and installation		standard nomenclature lists	
(pedestal type) .....	45	Removal procedure	
removal and disassembly		collector ring assembly .....	44
(folding type) .....	45	idler wheel bracket .....	18



**ORDNANCE MAINTENANCE—TRACKS AND SUSPENSION, TURRET AND HULL, FOR MEDIUM TANK M4 AND MODIFICATIONS**

R—Cont'd	Page No.		Page No.
Removal procedure—Cont'd		tracks	
platform and turret race . . . . .	41	adjustment of track tension . . . . .	15
seats . . . . .	45	dead track block replacement . . . . .	13
suspension wheels, bearings and oil retainers . . . . .	23	installation and removal . . . . .	10
track idler wheel and bracket . . . . .	15	volute spring suspension	
track support roller and bracket . . . . .	19	bushing replacement . . . . .	30
tracks . . . . .	10	inspection of parts . . . . .	29
traverse motor (electric) . . . . .	34	installation of assembly . . . . .	28
traverse motor (hydraulic) . . . . .	39	removal of assembly . . . . .	25
turret . . . . .	39	replacement of rubbing plates . . . . .	31
turret hatch . . . . .	32	springs, arms, and levers	
volute springs, arms, and levers . . . . .	28	installation . . . . .	30
volute suspension assembly . . . . .	25	springs, arms, and levers	
wires and conduits . . . . .	34	removal . . . . .	28
wiring and conduits . . . . .	49	Turret	
		collector ring assembly	
<b>S</b>		general . . . . .	42
Seats . . . . .	45	installation and removal . . . . .	44
Special tools . . . . .	59	description . . . . .	32
Suspension and tracks . . . . .	10	installation	
Suspension wheels, bearings and oil retainers . . . . .	23	adjust traverse gears . . . . .	40
		connect wires and conduits . . . . .	40
<b>T</b>		fill and remove air from stabilizer system . . . . .	40
Tools (special) . . . . .	59	traverse motor (electric) . . . . .	39
Track suspension group		traverse motor (hydraulic) . . . . .	39
maintenance . . . . .	8	turret . . . . .	39
Track tension adjustment . . . . .	15	platform and turret race	
Tracks and suspension		assembly of turret race . . . . .	42
description . . . . .	10	disassembly and inspection . . . . .	42
suspension wheels, bearings and oil retainers		installation . . . . .	42
assembly and installation . . . . .	25	removal . . . . .	41
general . . . . .	23	removal	
removal and disassembly . . . . .	23	traverse motor (electric) . . . . .	34
track idler wheel and bracket		traverse motor (hydraulic) . . . . .	39
assembly and installation . . . . .	18	turret . . . . .	39
cleaning of parts . . . . .	16	wires and conduits . . . . .	34
inspection of bearings . . . . .	16	turret hatch	
installation of idler wheel bracket . . . . .	18	assembly and installation . . . . .	32
removal and disassembly . . . . .	15	cleaning and inspection . . . . .	32
removal of idler wheel bracket . . . . .	18	removal and disassembly . . . . .	32
track support roller and bracket		Turret assembly maintenance . . . . .	8
assembly . . . . .	19	Turret hatch . . . . .	32
disassembly . . . . .	19		
installation . . . . .	19	<b>V</b>	
removal . . . . .	19	Vehicle assembly maintenance . . . . .	9
		Volute spring suspension . . . . .	25
		<b>W</b>	
		Wiring and conduits . . . . .	48