

Spec

TM 9-2320-224-10

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

W/P. SCHEMATIC

OPERATOR'S MANUAL

FOR

CARRIER, COMMAND AND

RECONNAISSANCE: ARMORED

M114 (2320-860-2349)

M114A1 (2320-987-9536)

M114A1E1 (2320-937-9539)



This copy is a reprint which includes current pages from Changes 1 through 9. The title is changed by C 6 to read as shown above.

Mark Sweeney



HEADQUARTERS, DEPARTMENT OF THE ARMY

NOVEMBER 1964

WARNING

FIRING OF M139 GUN

EAR PLUGS SHALL BE WORN IN CONJUNCTION WITH THE HELMET AND COMMUNICATION DEVICES NORMALLY WORN BY THE COMMANDER OR CREW, TO PREVENT EAR DAMAGE, DUE TO THE HIGH IMPULSE TYPE NOISE, EXPERIENCED IN THE FIRING OF THE M139 GUN.

✓ BARRAGE extension
 Buffer Body SPRING
 ✓ COVER STRUCTURE
 FORCES CARTRIDGE TO THE
 T stop
 ✓ Pull it BACK
 To insure contact
 Breech Block & Bolt

- Cycle of Operation
- 1 Feeding
 - 2 Chambering
 - 3 Locking
 - 4 Firing
 - 5 Unhooking
 - 6 Extracting
 - 7 Ejection
 - 8 Cocking

Timing

• No Fire Gage

First Check headspace

Replace center hole lug is center

Inspect bore chamber
A fail Cambs

✓ Defected head spring

A crack BARREL

Late Timing

Defected Extra Chamber

This page intentionally left blank.

Detected head spring
 A fall gauge
 Finally bore clapper
 Centre hole put is center
 replace
 First check headspace
 I. No fire gauge
 Timing
 Break block & Bolt
 To insure contact
 Pull it back
 Test
 Forces contact
 Cover protect
 Buffer body spring
 Normal condition
 Cycle of Operation
 1. cocking
 2. rotation
 3. seating
 4. unloading
 5. firing
 6. locking
 7. chamber
 8. ejection
 Chamber
 Detected
 Rate Timing
 Break Barrel

1. The following WARNING is added to the inside of cover page.

WARNING: These vehicles use a lightweight sectionalized band track with molded-in reinforcing cables. Band tracks by nature exhibit completely different failure characteristics than pin type tracks. Pin type tracks rarely separate at failure, whereas, band tracks have the characteristic of sudden and complete separation. This sudden failure results in complete loss of control and, depending on speed and terrain, a serious accident could occur. Instruction on track life contained in SECTION V. TRACK MAINTENANCE will be strictly adhered to.

TECHNICAL MANUAL

No. 9-2320-224-10

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 25 November 1964

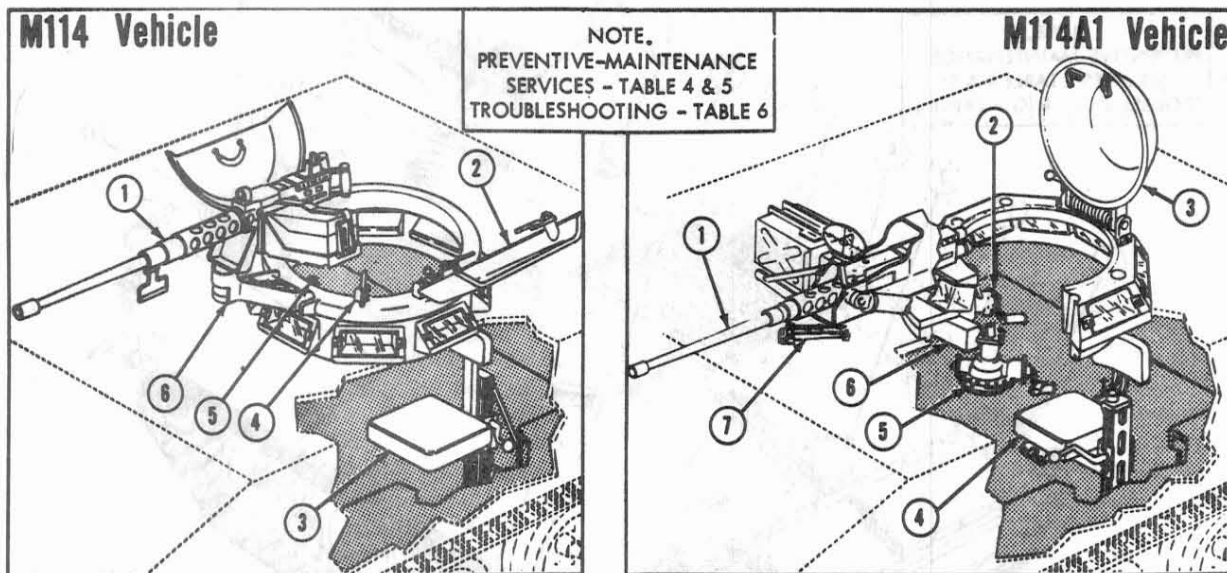
Operator's Manual

CARRIER, COMMAND AND RECONNAISSANCE:

ARMORED, M114/M114A1/M114A1E1

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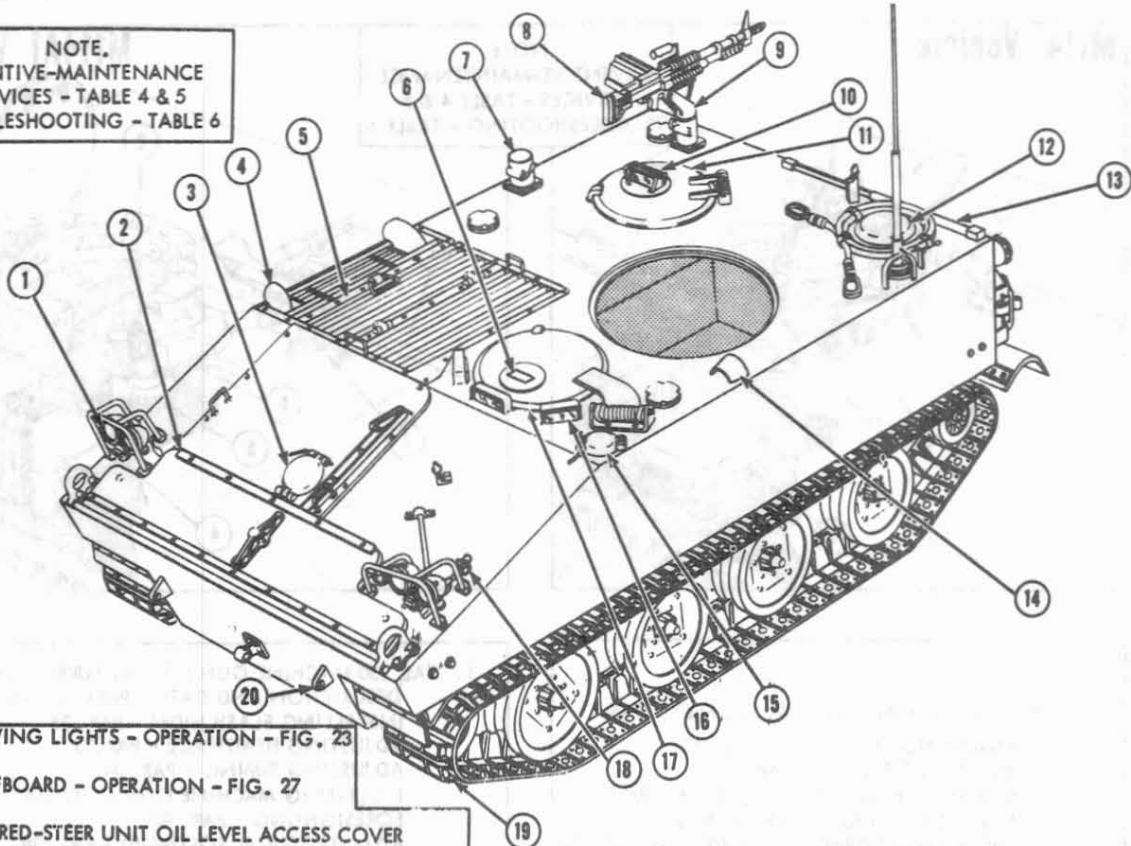
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Figure 1. Visual guide to contents (1 of 5)

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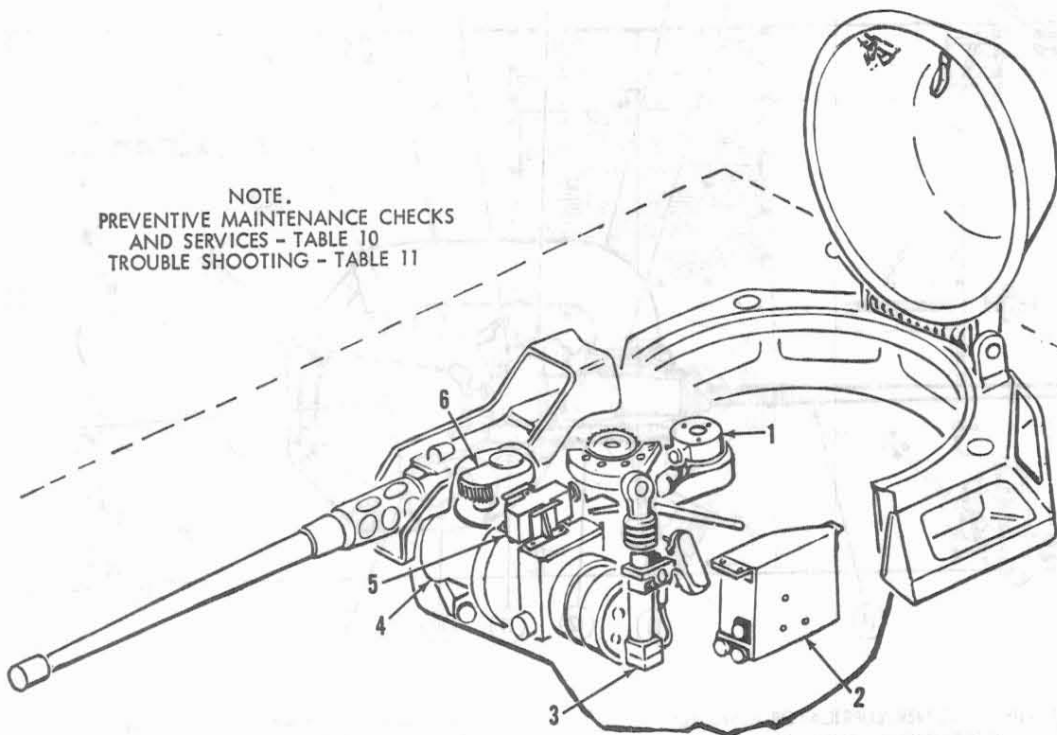
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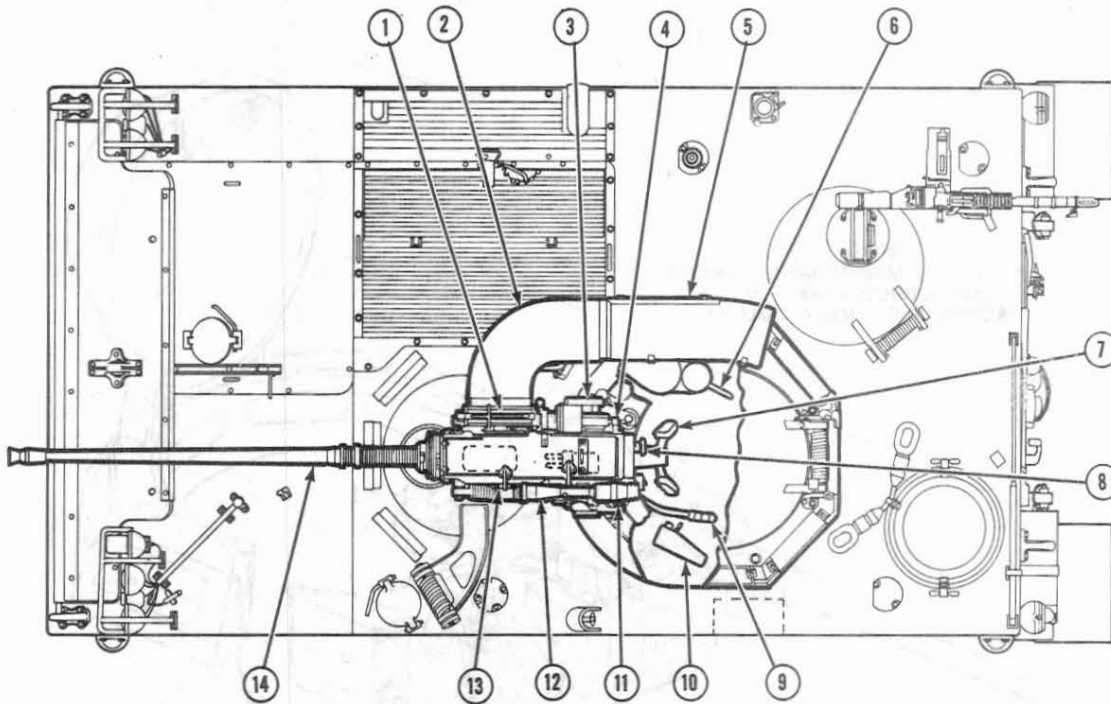
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| | OPERATION - FIG. 91.4, PAR. 110c & d |
| 2. | ELECTRIC CONTROL BOX |
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| | LOCATION - FIG. 91.2, ITEMS 1 and 3 |
| | OPERATION - FIG. 91.4, PAR. 110c |
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| | LOCATION - FIG. 91.2, ITEM 4 |
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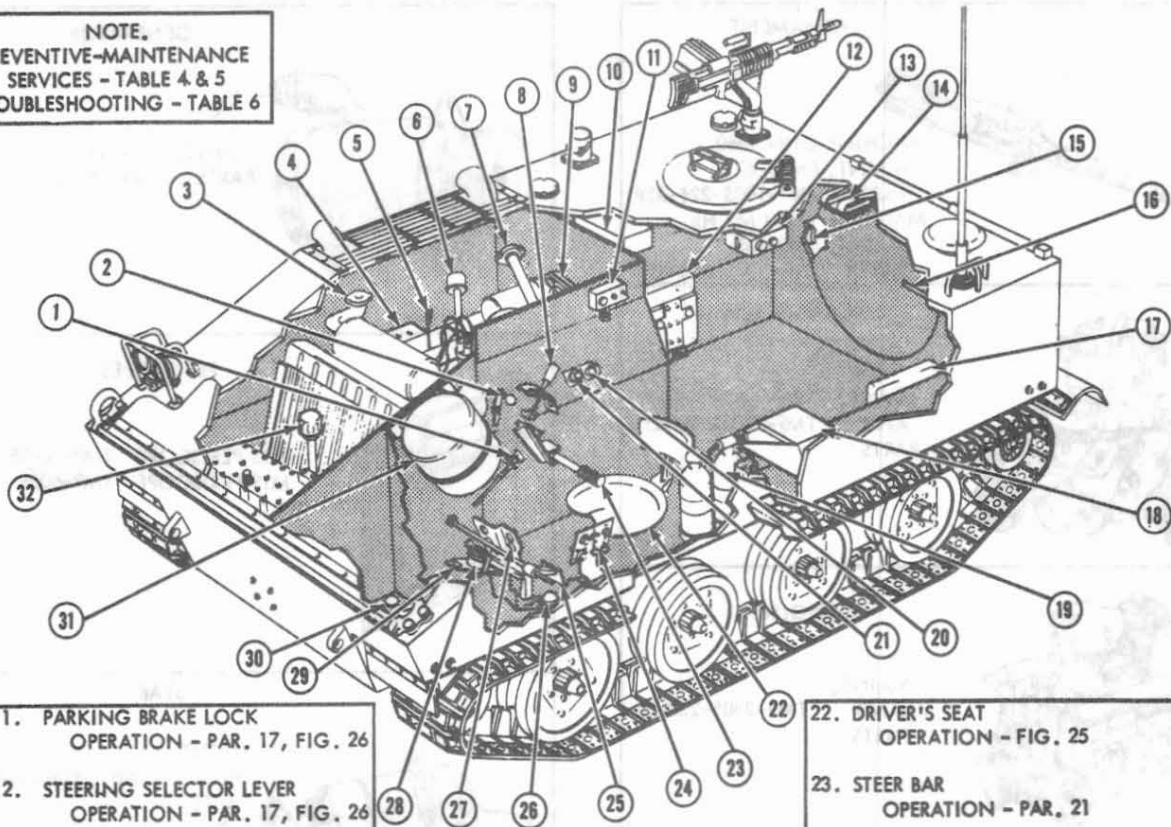
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|---|--|

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NOTE.
PREVENTIVE-MAINTENANCE
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TROUBLESHOOTING - TABLE 6




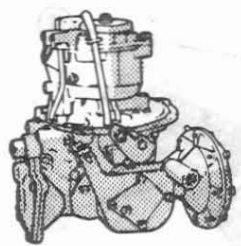
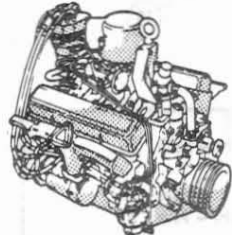
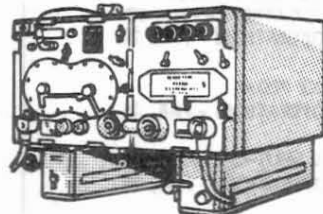
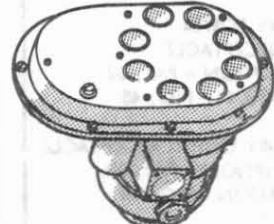
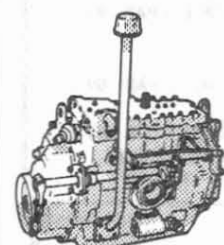
1. PARKING BRAKE LOCK
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2. STEERING SELECTOR LEVER
OPERATION - PAR. 17, FIG. 26
3. RADIATOR COOLANT SURGE
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LOCATION - FIG. 15
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LOCATION - FIG. 15
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Figure 3. Visual guide to contents (5 of 5)

	<p>ARMAMENT</p> <p>MACHINE GUN M60 MAINT. FM23-67 PARTS TM9-1005-224-35P MACHINE GUN M2, HB MAINT. FM23-65 PARTS TM9-1005-213-35P</p>
	<p>CARBURETOR</p> <p>MAINT. AND PARTS TM9-2805-220-35</p>
	<p>ENGINE</p> <p>MAINT. AND PARTS TM9-2805-220-35</p>
	<p>COMMUNICATION EQUIPMENT</p> <p>AN/VRC-13 TM11-291 AN/VRC-13 TM11-263 AN/VRC-15 TM11-600 AN/VRC-18 TM11-611 AN/UIC- 1 TM11-2643</p>
	<p>DISTRIBUTOR</p> <p>MAINT. AND PARTS TM9-2805-220-35</p>
	<p>GEARED STEER UNIT</p> <p>MAINT. PARTS TM9-2520-208-35 TM9-2520-208-35P</p>

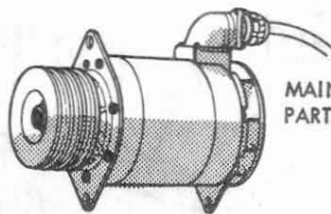
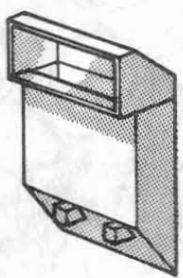
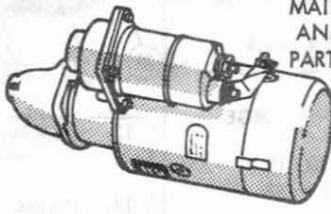
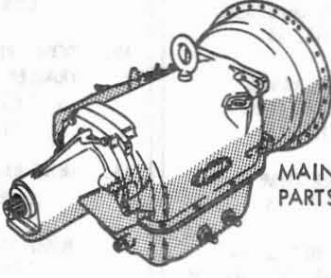

	<p>GENERATOR</p> <p>MAINT. PARTS TM9-2920-225-35 TM9-2920-225-35P</p>
	<p>PERISCOPES</p> <p>M13 PERISCOPE TM9-1608F M19 PERISCOPE TM9-6059</p>
	<p>STARTER</p> <p>MAINT. AND PARTS TM9-2805-220-35</p>
	<p>TRANSMISSION</p> <p>MAINT. PARTS TM9-8025-2 TM9-2520-245-35P</p>
	<p>VEHICLE PUBLICATIONS</p> <p>LO 9-2320-224-12 TM9-2320-224-10 TM9-2320-224-20 TM9-2320-224-25P TM9-2320-224-34 TM9-2320-224-50</p>

Figure 4. Pictorial cross-reference

INTRODUCTION

Section I. GENERAL

1. Scope

a. This technical manual contains instructions for the operation and maintenance of the Carrier, Command and Reconnaissance: Armored, M114 and Carrier, Command Reconnaissance: Armored, M114A1.

b. Appendix I contains a list of current references and publications applicable to the M114/M114A1 Vehicles.

c. Appendix II contains a list of basic issue items for operation and maintenance.

d. Any errors or omissions will be recorded on DA Form 2028 and forwarded to the Commanding General, U.S. Army Tank Automotive Center, Detroit Arsenal, Warren, Michigan, Attn: SMOTA-MS.

2. Maintenance Allocation

The prescribed maintenance responsibilities as allocated in the maintenance allocation charts (TM 9-2320-224-20), are reflected in this technical manual. In all cases where the nature of repair, modification, or adjustment is beyond the scope or facilities of the operator, crew, or user, the supporting unit should be informed in order that trained personnel with suitable tools and equipment may be provided or further instructions issued.

3. Forms, Records, and Reports

a. General. Officers of using units are responsible for executing forms, records, and

reports. These documents show the type, quantity, and condition of materiel to be inspected, repaired, or used in repair, or replacement, as well as for delivery of materiel to supporting maintenance shops. The forms, records, and reports establish the work required, progress of the work within the shops, and status of the materiel on completion of repair.

b. Authorized Forms. The forms applicable to units operating or maintaining this materiel are listed in Appendix I and DA Pamphlet 310-2. For instructions on the use of these forms, refer to TM 38-750.

c. Field Report of Accidents.

(1) Injury to personnel or damage to materiel must be reported to the supporting unit in accordance with instructions contained in AR 385-40 so that reports required by Army regulations can be prepared.

(2) Whenever an accident or malfunction involving the use of ammunition occurs, further firing of the lot which malfunctions will be immediately discontinued and reported in accordance with AR 700-1300-8.

d. Equipment Improvement Recommendations. Any deficiencies that appear to involve unsatisfactory design of materiel will be reported on Maintenance Request Form DA 2407. The Commander of the using organization will submit the completed form in accordance with instructions contained in TM 38-750.

Section II. DESCRIPTION AND DATA

4. Description

The M114 (figs. 6 and 7) and M114A1 Vehicles (figs. 8 and 9) are similar with the exception of the operation of armament and

adaptation of the commander's station on the M114A1 vehicle (Effective with Ordnance Vehicle Serial No. 625). Refer to following tabular listing:

GENERAL	<p>Carrier, command and reconnaissance; armored. Light-weight, low silhouette. Capable of operation with full-rated load over any type of terrain, inland waterways, and under any seasonal conditions. Tracks propel and steer vehicles on both land and water. Transported by cargo aircraft and parachute-dropped to using forces.</p>
CREW	<p>Driver, Commander, Observer with a jump seat provided for one passenger.</p>
COMMANDER'S CUPOLA M114	<p>Located to rear of driver. Support ring capable of 360-degree rotation. Split hatch covers. 8 vision blocks, 360-degrees manually. Support ring traverses full 360-degrees manually. Incorporates pintle mount for cal. .50 machine gun M2, HB, flexible type.</p>
COMMANDER'S STATION M114A1	<p>Located to rear of driver. Single hatch cover. 8 vision blocks, 360-degree vision. Traverses full 360-degrees by a manually operated traverse mechanism. Cal. .50 machine gun, M2, HB, turret type (M13 Cupola Configuration) mounted in trunnion supported cradle. Machine gun and cradle are elevated and depressed by a manually-operated elevating mechanism. Machine gun cradle assembly provides upper sights for sighting gun tracer fire from outside of cupola. Machine gun can be operated electrically by a firing trigger on elevating mechanism handle or manually by a solenoid trigger on back plate of machine gun. Electrical power for cal. .50 machine gun is taken from the accessory outlet (fig. 34), is conducted through the stationary brush holders in the contact ring assembly, picked up by the electrical terminal board and transmitted to the commander's electrical control box. The electrical control box controls power to the firing solenoid and affords automatic fire capabilities in either "SINGLE SHOT" or "AUTO FIRE" position.</p>
CAL. .50 MACHINE GUN M2,HB	<p>An automatic, recoil-operated, link-belt fed, air-cooled weapon (figs. 10 and 11). Major groups and assemblies consist of barrel assembly, back plate assembly, bolt group, barrel extension group, cover group, retracting slide group (flex. gun only), or M10 manual charger (turret type gun only) and receiver group.</p>

<p>7.62-mm MACHINE GUN M60</p>	<p>Air cooled, link-belt fed, gas-operated (fig. 12). Single rounds, short burst, or automatic fire. A quick-change barrel with attached bipod assembly for ground operation.</p>
<p>DRIVER'S COMPARTMENT</p>	<p>Located left front side of vehicle. Three (3) M26 periscopes positioned around driver's hatch opening. One (1) M19 periscope (infrared) can be installed in driver's hatch cover.</p>
<p>OBSERVER'S POSITION</p>	<p>Located at rear of crew compartment on right side of vehicle. Single hatch cover incorporating one (1) M13 rotatable periscope. Two (2) pintle mounts are provided for the 7.62-mm machine gun, M60, one in front and one to rear of observer's hatch opening One (1) jump seat.</p>
<p>DEFINITION OF LOCATIONAL TERMS</p>	<p>All parts of the vehicle, except the transmission and geared steer unit are designated "left," "right," "rear" as viewed when standing at the rear of vehicle and facing toward the engine compartment (fig. 5). The left and right sides of the transmission and geared steer unit are determined by standing at the power output end and looking toward the input end.</p>
<p>POWER TRAIN AND SUSPENSION COMPONENTS</p>	<p>The power train (fig. 5) consists of an engine, a transmission, universal joint, a geared steer unit, and associated drive shafts. Power from the engine is transmitted through the transmission and universal joints, to the geared steer unit, and through drive shafts to the left and right track drive sprockets.</p>

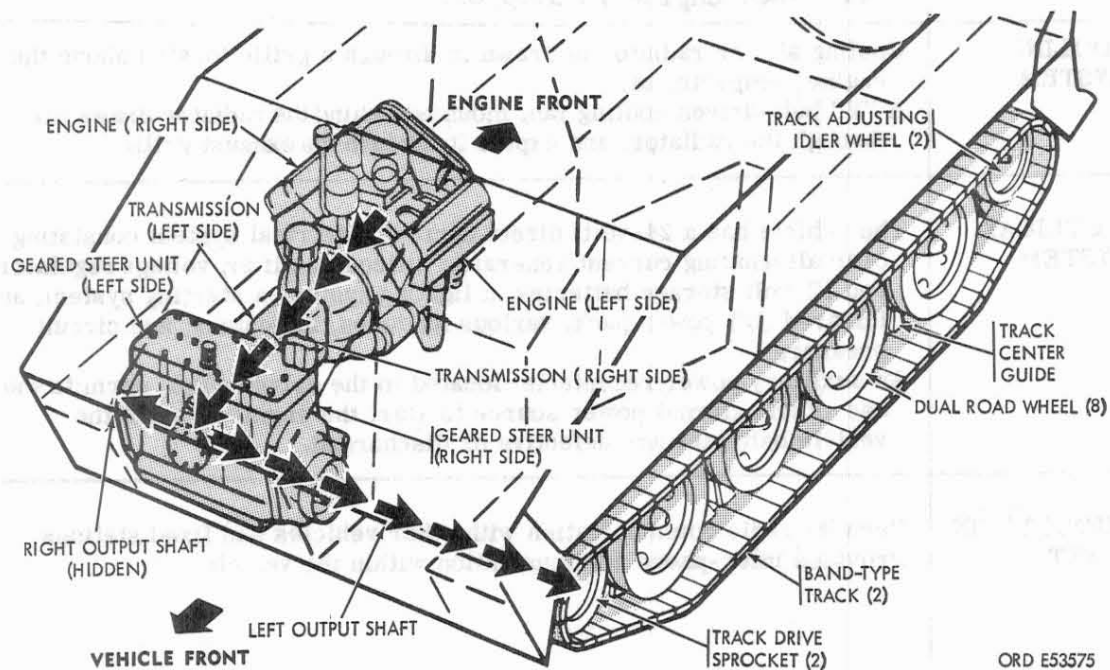
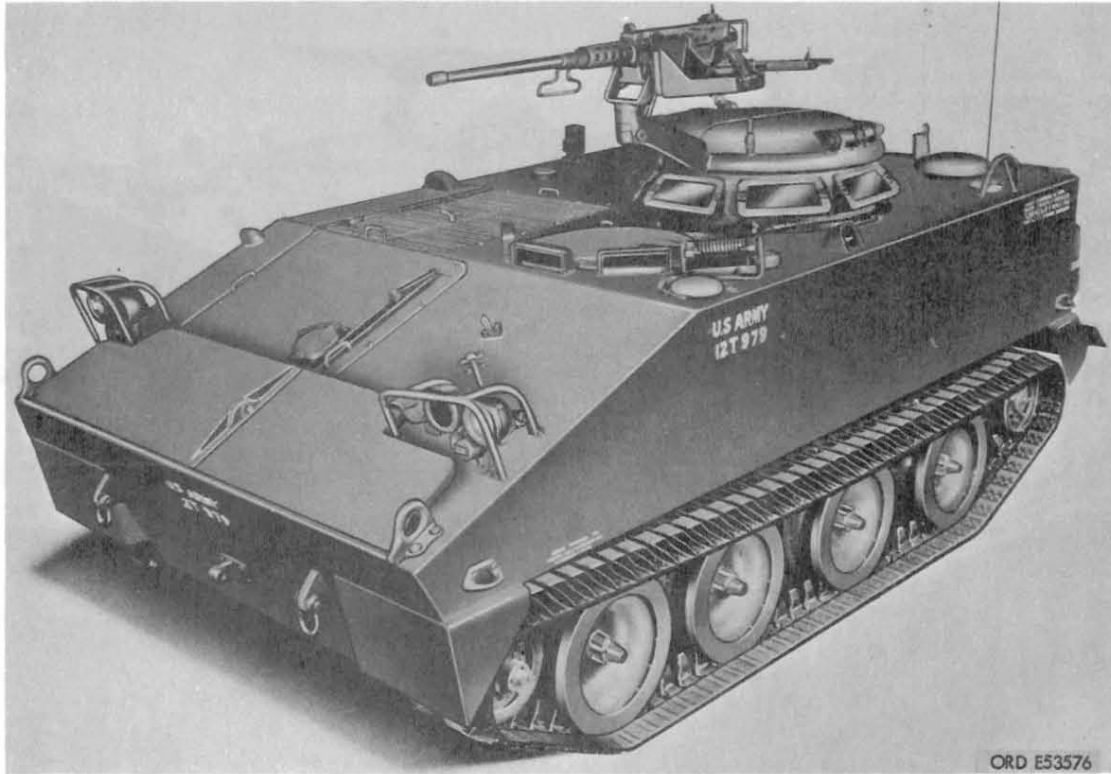


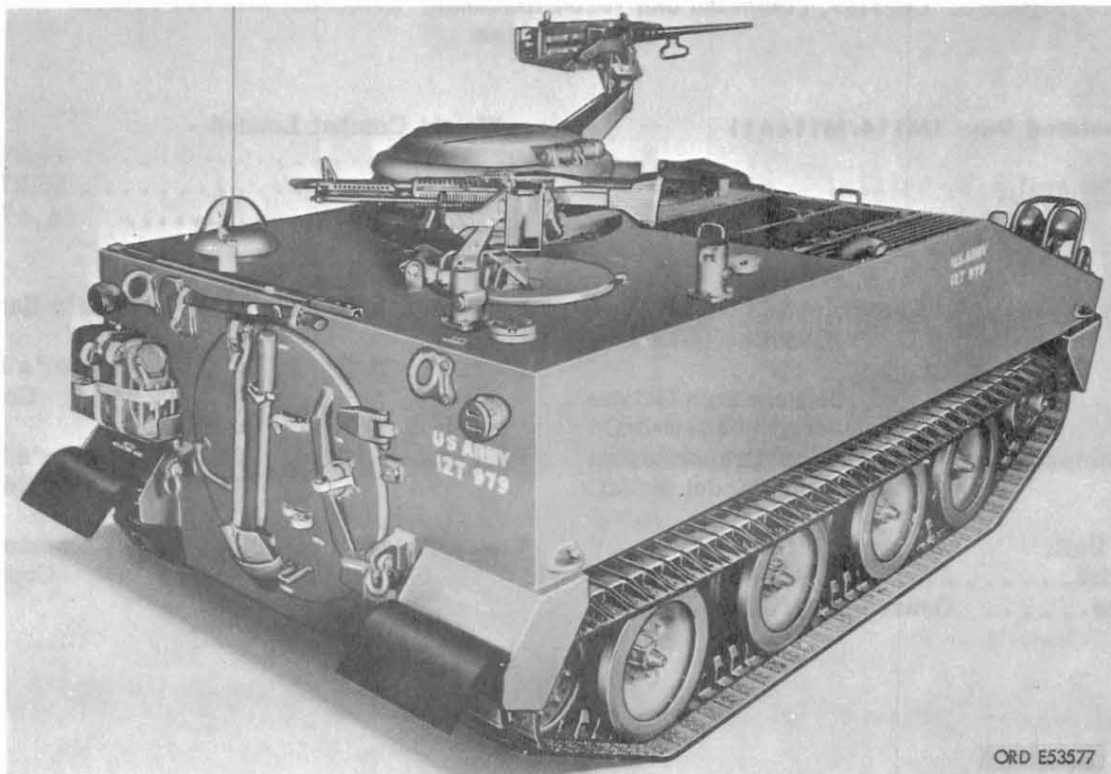
Figure 5. Power train and suspension

HULL CONSTRUCTION	Aluminum armor plates of varied thicknesses to meet ballistic requirements. All-welded construction provides a water tight hull. Drain access covers and a fuel cell drain access plug are provided on bottom of hull.
ENGINE	Chevrolet 283, cubic inch, V-8 (military version). Overhead valve, liquid cooled, gasoline engine developing 160 gross horse-power at 4650 rpm.
TRANSMISSION	Detroit transmission division, Model 305MC. Refer to Paragraph 18.
STEER UNIT	Allison Model GS100-3, geared-steer, clutch-brake unit. Refer to Paragraph 18.
AIR INTAKE AND EXHAUST SYSTEM	A dry-type air cleaner located ahead of the driver, incorporates a dual air inlet system for summer and/or winter operation. The engine exhaust system is a conventional automotive type. Engine exhaust gases pass through a muffler, and then are expelled through an exhaust pipe out of the air exhaust grille.
FUEL SYSTEM	Fuel is stored in a 110 gallon rubber fuel cell mounted in a welded compartment on the left sponson, in front of the driver's position. An engine-driven mechanical fuel pump delivers fuel to the carburetor. Main fuel filter and manual shut-off valve are located in the driver's compartment. The fuel shut-off valve should be turned to "OFF" when engine is stopped.
COOLING SYSTEM	Cooling air for radiator is drawn in through a grille located above the engine compartment. A "V" belt-driven cooling fan, mounted behind the radiator draws air through the radiator, and expels it through the exhaust grille.
ELECTRICAL SYSTEM	The vehicle has a 24-volt, direct current electrical system consisting of an alternating current generator, silicon rectifier, voltage regulator, two 12-volt storage batteries, a lighting system, a starting system, an infrared (IR) power pack, various switches, indicators, and circuit breakers. An auxiliary power receptacle, located to the driver's left, permits the use of an external power source to start the engine in event the vehicle batteries are defective or discharged.
COMMUNICATION SET	Permits radio communication with other vehicles and fixed stations. Provides inter-phone communication within the vehicle.



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Figure 6. Carrier, command and reconnaissance: armored, M114 - left front view



ORD E53577

Figure 7. Carrier, command and reconnaissance: armored, M114 - right rear view



ORD E53578

Figure 8. Carrier, command and reconnaissance: armored, M114A1 vehicle - left front view

5. Tabulated Data (M114/M114A1)

a. General.

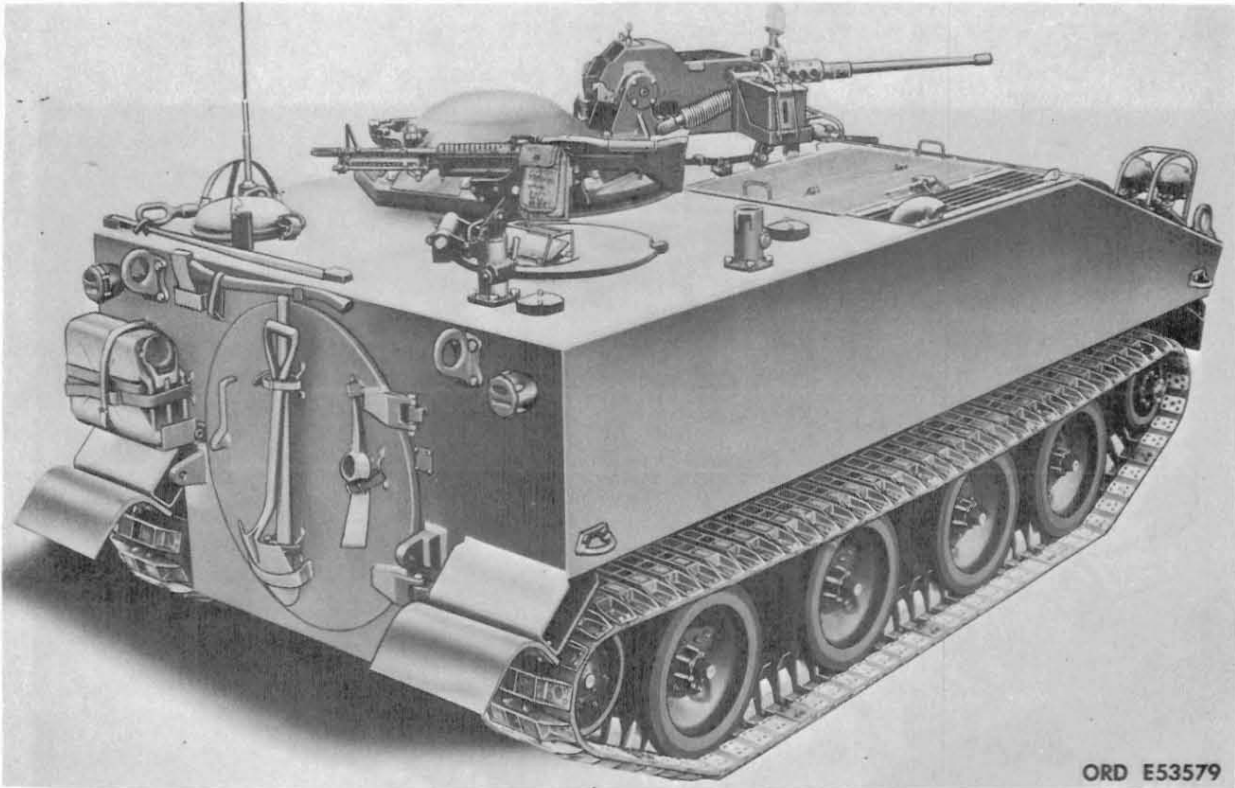
Crew 3 with provisions for 4th
 Engine Chevrolet 283 cu. in., V-8
 Gasoline (Military)
 Fuel 91 Research Octane
 MIL-G-3056
 Transmission Detroit Transmission
 Division Model 305MC
 Steer Unit:
 Model Allison GS-100-3
 Type Geared-Steer, Clutch-Brake

Weight Combat Loaded -

M114 15,093 lbs
 M114A1 15,276 lbs
 M114A1E1 15,678 lbs

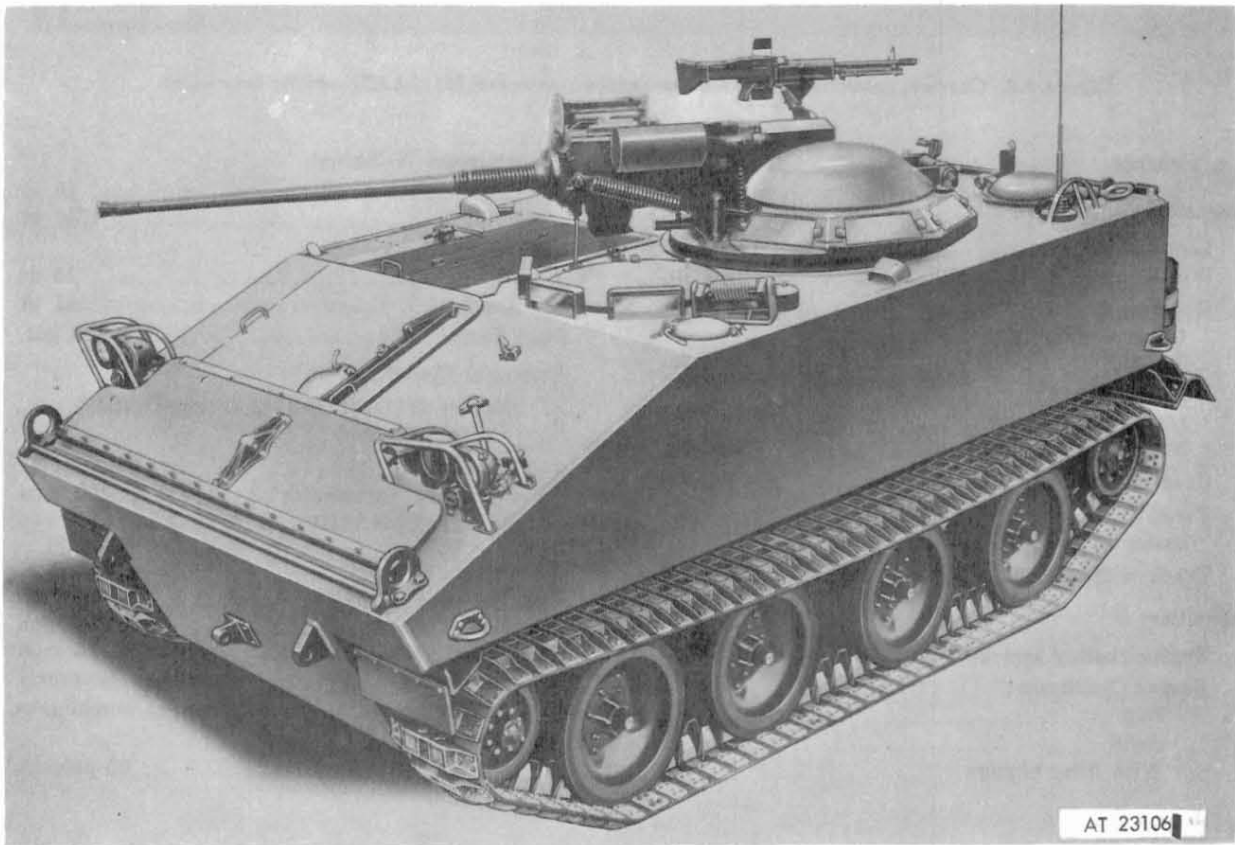
b. Vision Devices.

Periscope M26 Driver's Hatch, 3
 Periscope M19 Driver's Hatch
 Cover 1
 Periscope M13 Observer's Hatch
 Cover 1
 Vision Block Commander's
 Cupola, 8



ORD E53579

Figure 9. Carrier, command and reconnaissance: armored, M114A1 vehicle—right rear view



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Figure 9.1. Carrier, command and reconnaissance: armored M114A1E1—left front view.

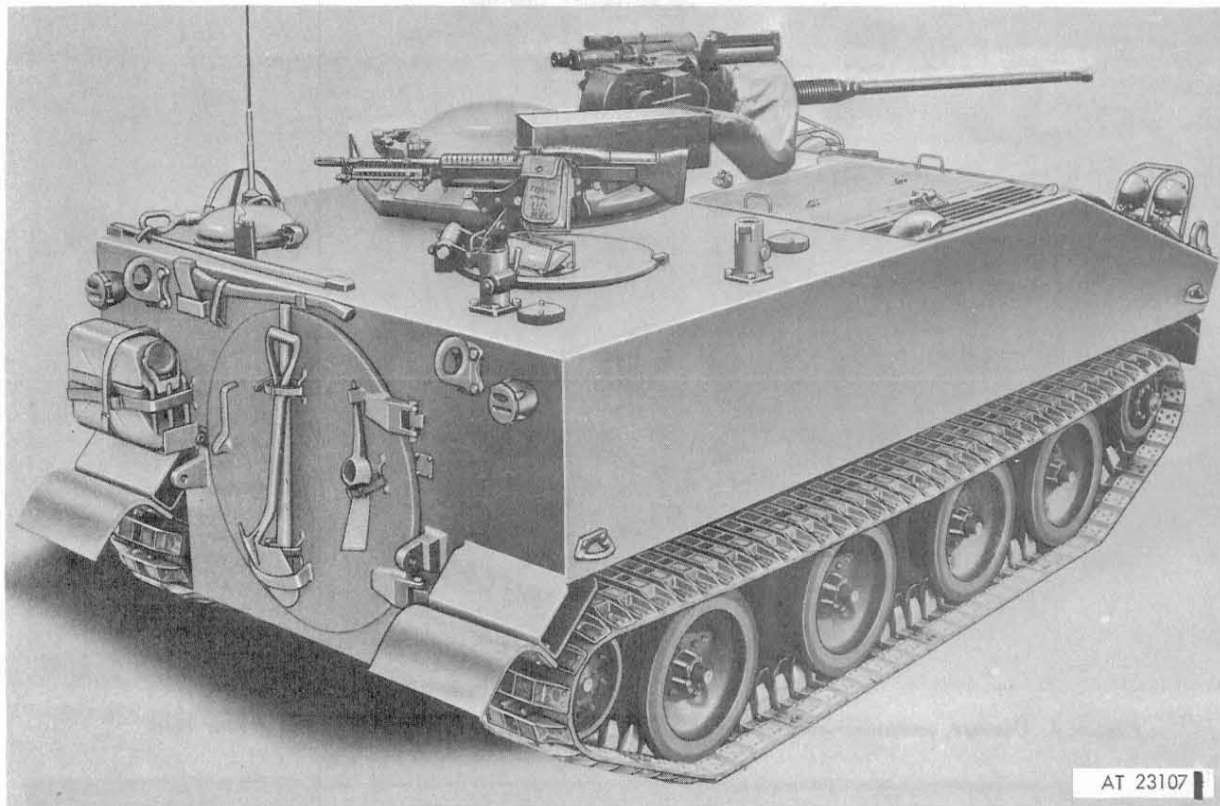


Figure 9.2. Carrier, command and reconnaissance: armored M114A1E1—right rear view.

c. Vehicle.

Dimensions:

Length	175¾ in.
Width	91¾ in.
Height (M114)	
(Over machine gun	
M2, HB)	91½ in.
Height (M114A1)	
(Over machine gun	
M2, HB front sight)	84⅞ in.
Ground Clearance	14¼ in.
Tread (Center to	
center of track)	72¾ in.
Track width	16½ in.

Capacities:

Engine cooling system	35 qt
Engine Crankcase:	
Dry	7 qt
Refill	6 qt
With filter change	7 qt

Transmission W/Torus:

Dry	16 qt
Refill	15½ qt

Gear Steer Unit:

Dry	15 qt
Refill	11 qt

Fuel Tank

110 gal.

Electrical System:

Battery M114/M114A1 2 (normal) and 4	
(winterization)	
Voltage	24
Generator (alternator)	100 amp
Battery M114A1E1	4

Performance:

Vehicle Speed (Max.)	36 mph
Speed in Water	3.3 mph
Tow Speed (W/O Shafts)	15 mph
Cruising Range	300 mi. (approx.)
Fording Depth	amphibious
Grade-ascending	
Ability (max.)	60 percent

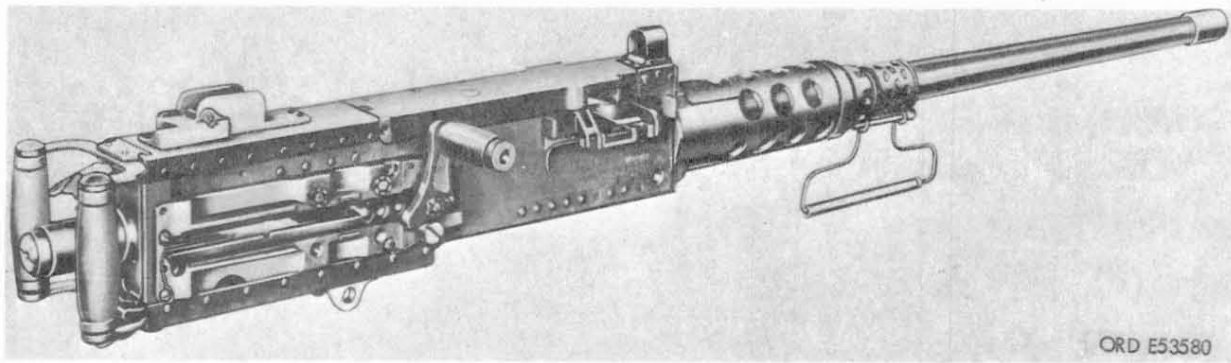


Figure 10. Caliber .50 machine gun M2, HB, flexible type

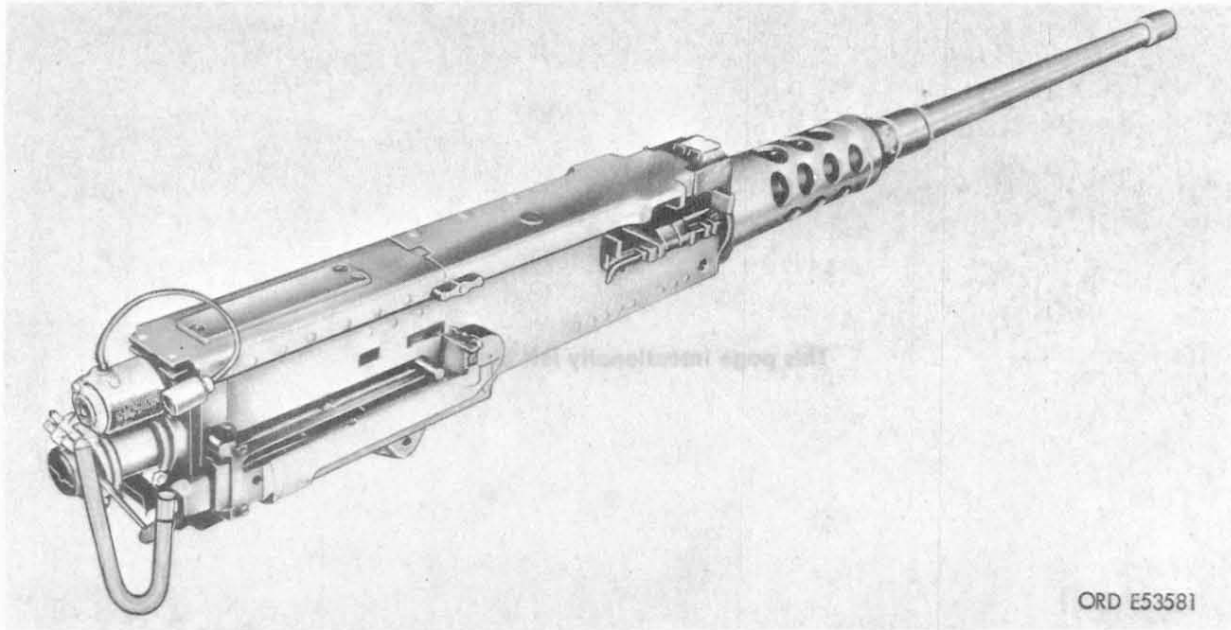


Figure 11. Caliber .50 machine gun M2, HB, turret type

d. Armament

Machine Gun, cal. .50 M2, Heavy Barrel:
 Weight of gun (approx.) 84.00 lbs.
 Length overall 65.13 in.
 Length of barrel 45.00 in.
 Weight of barrel 28.00 lbs.
 Rifling (length) (approx) 41.88 in.
 Number of lands and grooves 8
 Twist, right-hand one turn in 15 in.
 Operation short recoil

Muzzle velocity 3,050 fps
 Caliber50
 Rate of fire (Cyclic) 450-550-rds
 per min.
 Feed link-belt
 Cooling air
 Maximum range 7,400 yds
 Maximum effective
 range 2,000 yds
 Chamber pressure 53,000 psi

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Figure 12. 7.62-mm machine gun M60 mounted on gun mount M142

d. Armament - Continued

Machine Gun, 7.62-mm, M60:

- Weight 23.16 lb
- Length 43.50 in. (overall)
- Ammunition 7.62-mm, all types
- Rate of fire . . 550 rds per min (approx)
- Type of operation gas
- Method of feeding link belt
- Range (maximum) See FT7.62-A-2
- Capacity of magazine 100 Rounds


6. Identification Plates and Signs

a. Engine, Transmission, Geared Steer Unit, Personnel Heater, Vehicle and Bilge Pump Identification Plates and Signs are illustrated in figures 13 and 14.

b. Refer to Following Tabular Listing for Additional Identification Plates and Signs.


IDENTIFICATION PLATES AND SIGNS	FIG.
Basic Issue and Troop Installed Items	92
Cal. .50 Machine Gun Headspace Caution	30
Cal. .50 Machine Gun Name and Serial Number	66
7.62-mm Machine Gun Name and Serial Number	84
Engine Air Cleaner Instructions	58
M19 Periscope Caution	24
Personnel Heater Control Panel	52
Portable Fire Extinguisher	50
Driver's Indicator & Switch Panels	26
Steering Selector Instruction Plates	26

BELL HOUSING INSTRUCTIONS




LOCATED ON TOP OF ENGINE BELL HOUSING

BILGE PUMP NAMEPLATE




BILGE PUMP IS LOCATED IN ENGINE COMPARTMENT ON FLOOR AGAINST HULL RIGHT SIDE

COOLING FAN AND SHAFT BEARINGS NAMEPLATE




COOLING FAN AND SHAFT BEARINGS ARE LOCATED ON FRONT AND REAR OF FAN SHAFT

ENGINE NAMEPLATE



LOCATED ON LEFT SIDE OF ENGINE BELL HOUSING

ENGINE FIRING ORDER



STAMPED ON TOP OF ENGINE AIR INTAKE MANIFOLD

ENGINE OIL FILTER NAMEPLATE



OIL FILTER IS LOCATED ON RIGHT LOWER REAR OF ENGINE

GEARED STEER UNIT NAMEPLATE



LOCATED ON OUTPUT END OF GEARED STEER UNIT

GEARED STEER UNIT OIL FILTER NAMEPLATE



OIL FILTER IS LOCATED ON REGULATOR AND RECTIFIER MOUNTING BRACKET

GENERATOR (ALTERNATOR) NAMEPLATE



GENERATOR IS LOCATED ON RIGHT UPPER FRONT OF ENGINE

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Figure 13. Identification plates and signs (1 of 2)

 <p>REGULATOR, ENGINE GENERATOR R0013392RP 8699744 MSS51311-1 28 VOLTS 100 AMPS U.S. THE LEECE-NEVILLE CO CLEVELAND OHIO U.S.A. LICENSED UNDER U.S.A. PATENT NO. 7268718</p>	<p>REGULATOR IS LOCATED ON RIGHT SIDE OF ENGINE</p>
<p>GOVERNOR NAMEPLATE</p> 	<p>GOVERNOR IS LOCATED ON CARBU-RRETOR</p>
<p>TRANSMISSION NAMEPLATE</p> 	<p>LOCATED ON RIGHT SIDE OF TRANSMISSION</p>
<p>IGNITION UNIT (DISTRIBUTOR) NAMEPLATE</p> 	<p>IGNITION UNIT IS LOCATED ON TOP REAR OF ENGINE</p>
<p>MASTER RELAY NAMEPLATE</p> 	<p>MASTER RELAY IS LOCATED ON BALLISTIC SHIELD RIGHT OF ENGINE AND FRONT OF BATTERIES</p>
<p>PERSONNEL HEATER NAMEPLATE</p> 	<p>PERSONNEL HEATER IS LOCATED IN ENGINE COMPARTMENT AGAINST REAR BULK-HEAD</p>
<p>PERSONNEL HEATER ELECTRIC FUEL PUMP NAMEPLATE</p> 	<p>FUEL PUMP IS LOCATED ON ENGINE COMPARTMENT BULKHEAD IN DRIVERS' COMPARTMENT</p>
<p>STARTER, ENGINE NAMEPLATE</p> 	<p>STARTER IS LOCATED ON LEFT LOWER REAR OF ENGINE</p>
<p>VEHICLE NAMEPLATE</p> 	<p>LOCATED ON LEFT SPONSON IN DRIVER'S COMPARTMENT</p>

ORD E53583

Figure 14. Identification plates and signs (2 of 2)

CHAPTER 2

OPERATION INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF MATERIEL

7. General

a. When new, used, or reconditioned materiel is first received by the using organization, it is the responsibility of the officer-in-charge to determine whether the materiel has been properly prepared for service by the supplying organization and to be sure it is in condition to perform its function.

b. Services to be performed by the operator, crew, or user are designated in paragraphs 8 through 11 below. Whenever practicable, the operator, crew, or user will assist organizational maintenance personnel in the performance of their services.

c. Read the (DD Form 1397) tag and follow all precautions checked thereon.

8. Break-In Services

a. Drive Belts.

- (1) Check all drive belts (fig. 15) for proper tension before vehicles are operated.
- (2) If vehicles are scheduled for storage in excess of 90 days, release tension on all drive belts.
- (3) For proper tension and adjustment refer to the Organizational Maintenance Personnel.

b. Lubrication. Before starting road tests, perform a complete suspension lubrication in accordance with LO 9-2320-224-12. Check DD Form 1397 tag for engine, transmission and geared steer unit oil viscosity. If tag states oil is of proper viscosity for local operation, check the level but do not change the oil.

NOTE. Preservative engine oils PE1 and PE2 are identical to engine oils OE-10 and OE 30, except that PE1 and PE2 have a preservative additive. PE1 and PE2 will be used in the same manner as the regularly used engine oil OE-10 or OE-30. PE1 or PE2

will also be used in transmission and gear steer units until the first scheduled 1500 mile 150 hours, or semi-annual change.

c. Road Test. Conduct a road test for at least 5 to 10 miles on all new or reconditioned vehicles. Road test all used vehicles a sufficient number of miles to check their operation completely.

NOTE. If a new or reconditioned vehicle was driven to the using organization, consider the mileage so traveled as break-in mileage.

Observe all instruments and gages (fig. 26) during road test. Do not engage in excessive speeds, accelerate rapidly, or in any way load the engine or power train to capacity during the break-in period. Stop at least every mile and make external observations around the vehicle; look particularly for overheated hubs on road wheels and idler wheels, and for lubricant leaks.

d. After Road Test. Upon completion of road test place the vehicle in normal service. Organizational preventive-maintenance checks and services will be performed at 750 miles or quarterly, whichever occurs first, except for engine, transmission and geared steer unit. See note in 8b above.

e. Batteries. Serviced dry charged batteries according to TM 9-6140-200-15.

f. Correction of Deficiencies. Serious deficiencies which appear to involve unsatisfactory design or materiel will be reported on DA Form 2407. The commander of the organization will submit the completed form in accordance with TM 38-750.

9. New Materiel

a. Cal. .50 machine gun, M2, HB. New machine guns are coated with a light film of special preservative oil and serviced as described in (1) through (12) below.

- (1) Disassemble Cal. .50 machine gun M2, HB. Refer to paragraph 96.
- (2) Clean oil film from all parts.

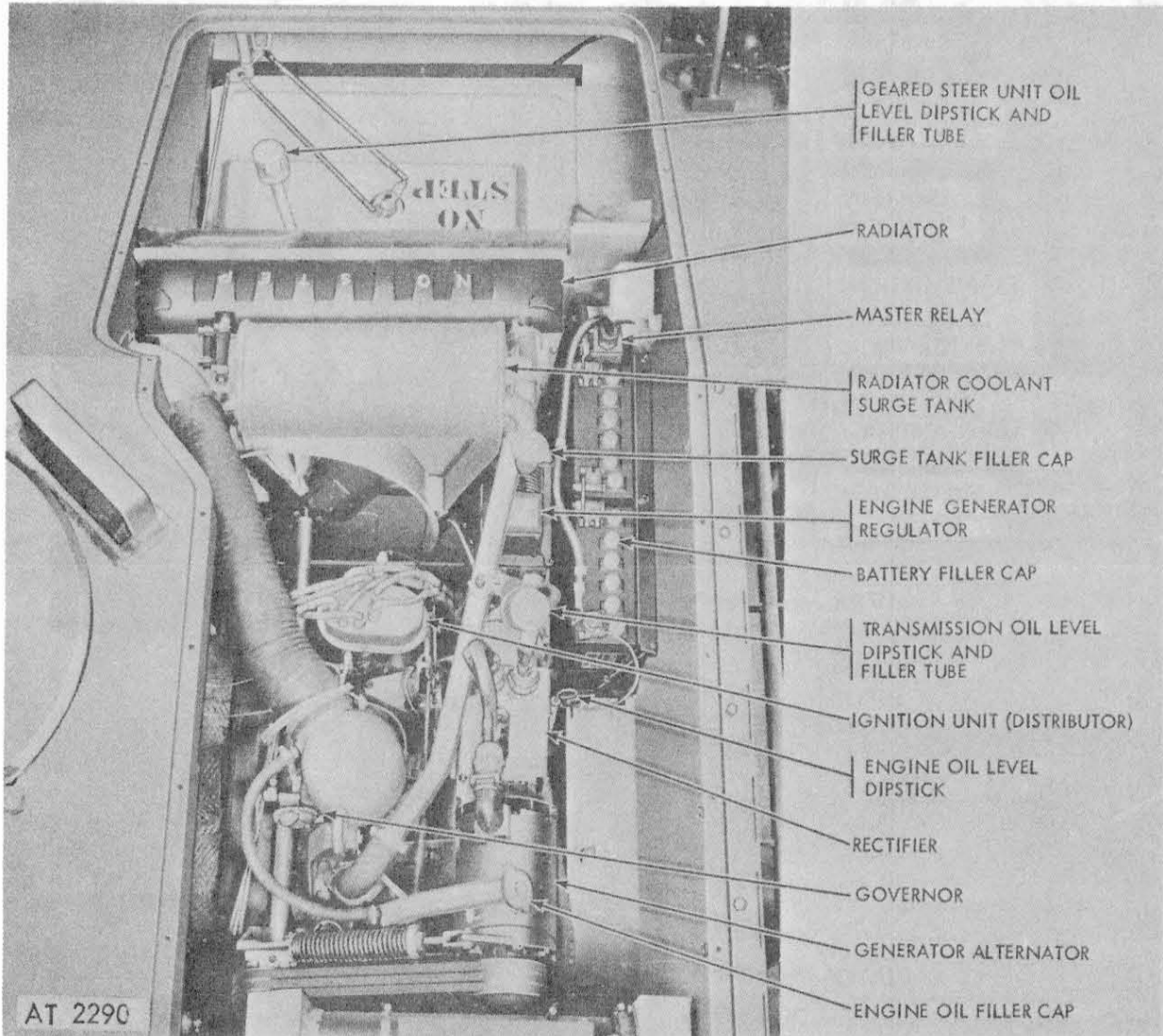


Figure 15. Power plant installed in vehicle M114/M114A1.

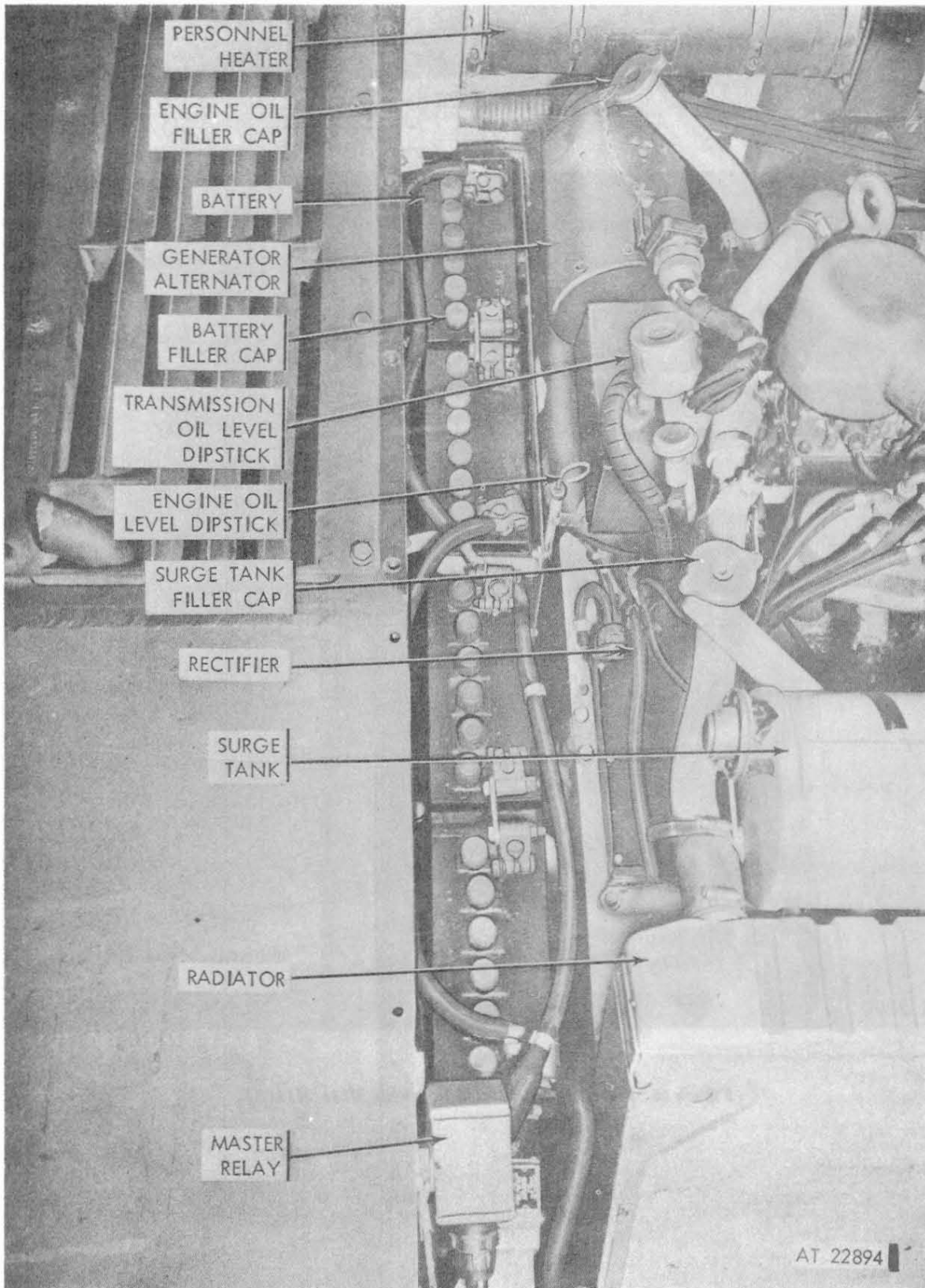


Figure 15.1. Power plant installed for M114A1E1 vehicle.

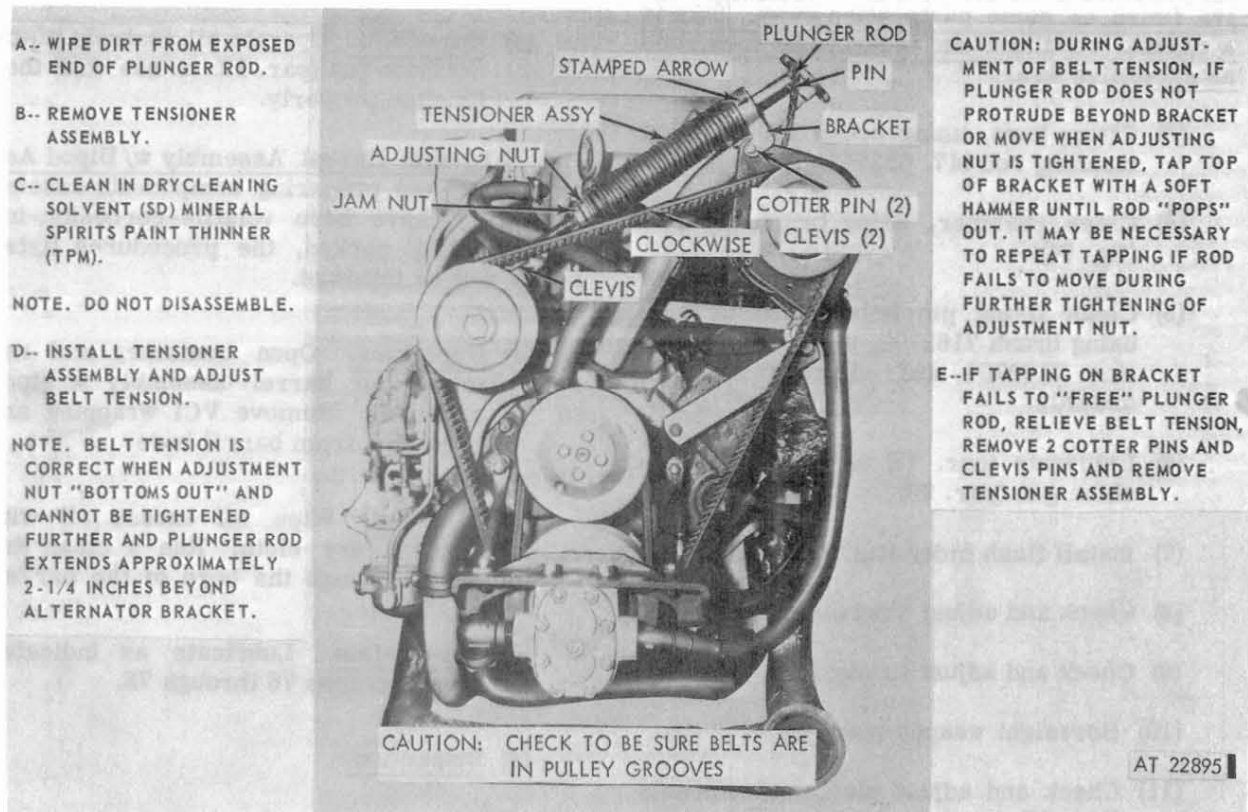


Figure 15.2. Belt tensioner installed on power plant.

NOTE. All new machine guns are test-fired and therefore will have the protective finish on some parts worn away. This is a normal condition and is not to be construed as excessive wear.

- (3) Clean bore, using brush 5504037 and cleaning rod M7, 6535441 (fig. 94).
- (4) Clean chamber, using brush 8407954 (fig. 94).
- (5) Clean firing pin hole (well) of bolt, using brush 7162702, swab holder section 7162704 and cleaning rod M4, 5564102.
- (6) Lubricate (par. 77) and assemble machine gun (par. 96).
- (7) Install flash hider (fig. 32).
- (8) Check and adjust headspace (par. 33).
- (9) Check and adjust timing (par. 34).
- (10) Boresight weapon (par. 40).
- (11) Check and adjust electrical solenoid (fig. 38) on turret type machine gun, after installed in cradle.
- (12) Check spare parts and equipment in accordance with basic issue items list (Appendix II).

b. 7.62-mm Machine Gun M60. When preparing weapons that have been volatile-corrosion-inhibitor (VCI) packed, the procedures listed below will be followed.

- (1) Unpacking. Open container and remove gun. Remove VCI wrapping and bore tube from barrel bore. Clean per paragraph c. below and assemble.
- (2) Cleaning. Wipe off excess oil with a clean dry cloth. Run a clean dry patch through the bore of the weapon before firing.

- (3) Lubrication. Lubricate as indicated in paragraphs 76 through 78.
- (4) Inspection. Operate all controls of the machine gun (par. 12) to see that they function properly.

c. 7.62-mm Barrel Assembly w/Bipod Assembly. When preparing components assemblies that have been volatile-corrosion-inhibitor (VCI) packed, the procedures listed below will be followed.

- (1) Unpacking. Open container and remove the barrel assembly w/bipod assembly. Remove VCI wrapping and bore tube from barrel bore.
- (2) Cleaning. Wipe off excess oil with a clean dry cloth. Run a clean dry patch through the bore of the barrel.
- (3) Lubrication. Lubricate as indicated in paragraphs 76 through 78.
- (4) Inspection.
 - (a) Remove the barrel assembly w/bipod assembly from the gun (fig. 84).
 - (b) Install the spare barrel assembly w/bipod assembly on the gun (fig. 84).
 - (c) Make certain that the spare barrel locks securely in gun.

10. Used Materiel

Used materiel requires the same inspection and service as prescribed for new materiel (par. 9).

11. Installing Retracting Slide Assembly on Cal. .50 Machine Gun, M2, Heavy Barrel, Flex

Refer to figure 16.

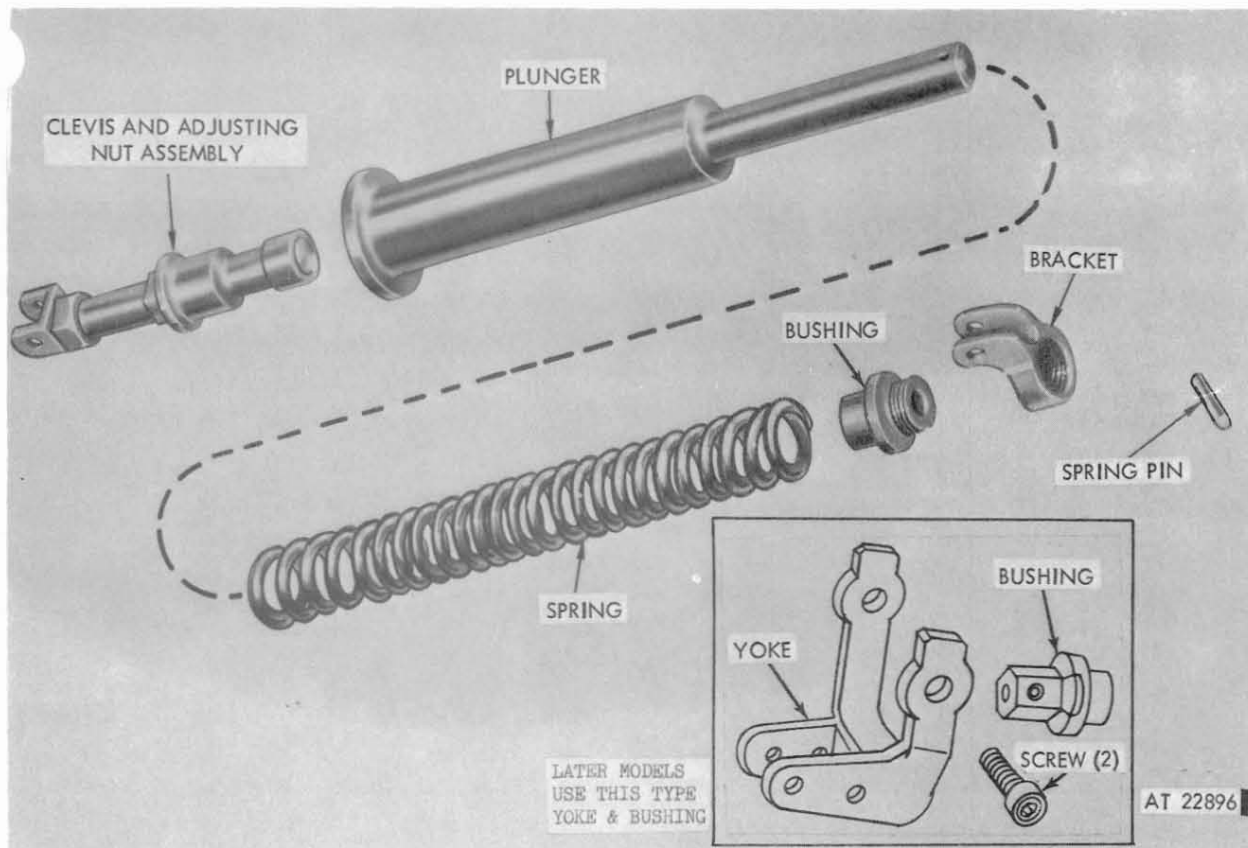


Figure 15.3. Disassembly and reassembly of belt tensioner.

A—Disassemble tensioner.

- 1 Slide clevis and adjusting nut assembly from plunger.
- 2 Place tensioner assembly in a suitable press or compressor.
- 3 Compress spring and remove spring pin.
- 4 Release pressure on spring.

Warning: Free length of spring is $17\frac{1}{8}$ inches.

- 5 Remove plunger, bushing and bracket from spring.

B—Clean, inspect, and remove nicks and scratches on the plunger rod and from inside diameter of bushing.

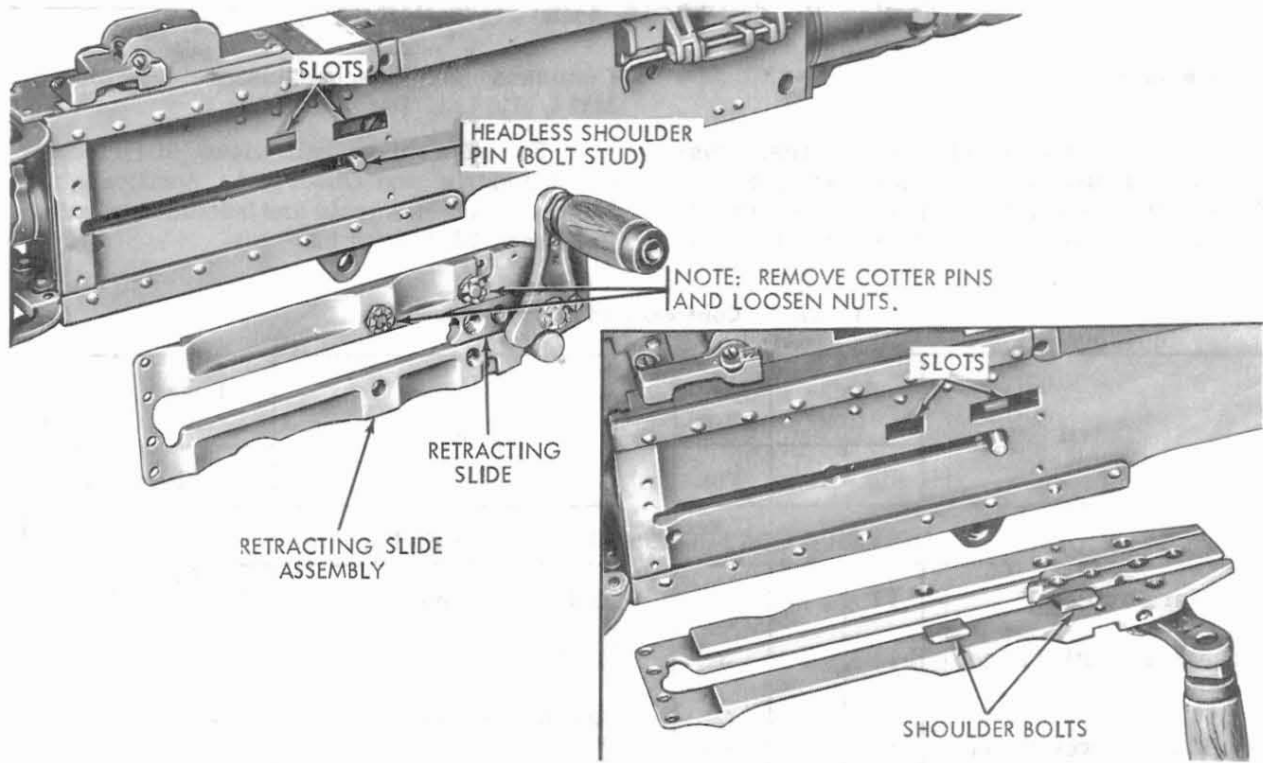
C—If plunger rod is bent or worn excessively, replace the tensioner assembly, FSN 2930-789-0421.

D—To assemble tensioner.

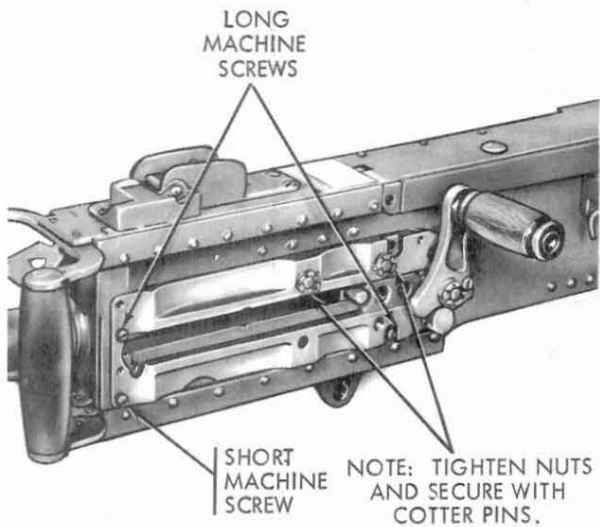
- 1 Slide plunger and bushings into each end of spring and place assembly in press.
- 2 Compress spring until end of plunger extends beyond bushing.
- 3 Install spring pin.
- 4 Remove assembly from press and install bracket on bushing.
- 5 Slide clevis and adjusting nut assembly into plunger.

E—Reinstall tensioner.

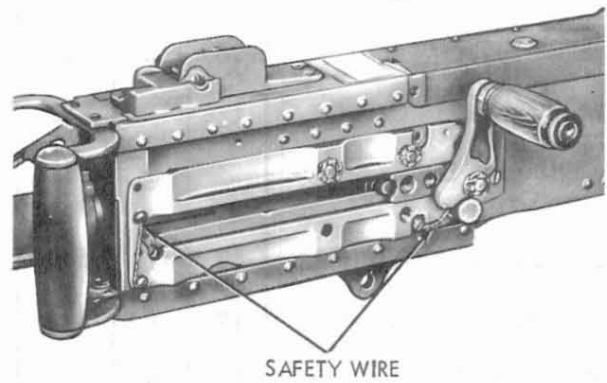
Note. For new belts, stamped arrow must point toward belt tensioner spring. Clevis is off set and must be installed so tensioner assembly is parallel with belts when viewed from top.



STEP 1: POSITION RETRACTING SLIDE ASSEMBLY SO THAT SHOULDER BOLTS ALINE WITH SLOTS IN RECEIVER AND RETRACTING SLIDE ALINES WITH HEADLESS SHOULDER PIN (BOLT STUD) IN BOLT.



STEP 2: INSTALL RETRACTING SLIDE ASSEMBLY TO RIGHT SIDE OF RECEIVER WITH THE THREE MACHINE SCREWS.



STEP 3: SAFETY WIRE THE RETRACTING SLIDE ASSEMBLY.

ORD F7891

Figure 16. Installation of retracting slide assembly on cal. .50 machine gun M2, HB, flex. type

Section II. CONTROLS AND INSTRUMENTS

12. General

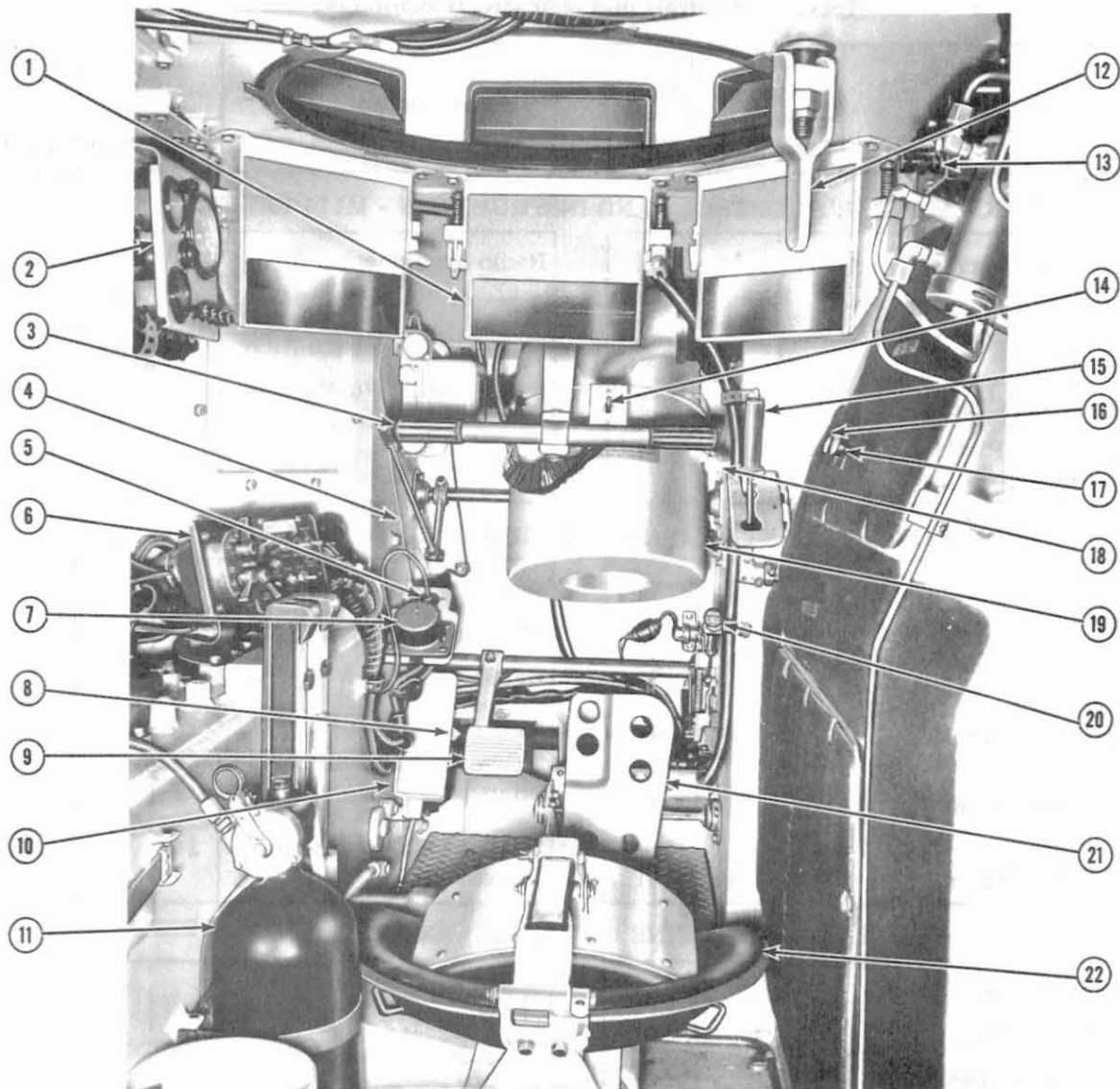
a. This section describes, locates, illustrates, and furnishes the operator, crew, or driver, sufficient information on the controls and instruments for operation of the Carrier,

Command and Reconnaissance: armored, M114/M114A1. Refer to Table I.

b. For general overall views of Driver's, Commander's and Observer's positions and Miscellaneous Controls and Instruments, refer to figures 17 through 22.

Table 1. Controls and Instruments

Detail	Loca- tion		Oper- ation	Detail	Loca- tion		Oper- ation
	Fig.	Item	Fig.		Fig.	Item	Fig.
DRIVER'S CONTROLS AND INSTRUMENTS							
Accelerator Pedal	17	21		Indicator Panel	17	2	26
Accessory Outlet Receptacle	17	5	34	Light Switch Assy	26	10	
Auxiliary Power Receptacle	17	7	48	Master Switch	26	16	
Bilge Pump Switch	26	14	51	M19 Periscope			24
Brake Lock Knob	17	20		M26 Periscope	17	1	62
Brake Pedal	17	9		Personnel Heater Control Panel	17	13	52
Choke Control Knob	17	16		Portable Fire Extinguisher			50
Dome Light	18	2	22	Power Plant Master Warning Light	26		
Driving Lights Chart			23	Seat	17	22	25
Engine Air Intake Selector Lever			58	Starter Switch	26	18	
Fixed Fire Extinguisher	17	11	49	Steer Bar	17	3	
Fuel Shut-Off Valve	17	8	25	Steering Selector Lever	17	18	
Fuel Sight Tube	17	4	25	Surfboard			27
Hatch Cover Locking Lever	17	12	25	Switch Panel	17	6	
Hatch Cover Hold-Open Latch			25	Throttle Control Knob	17	17	26
Headlight Dimmer Switch	17	14		Transmission Shift Lever	17	15	26
High Voltage Power Supply Switch	26	21		Vehicular Light Switch	26	10	23



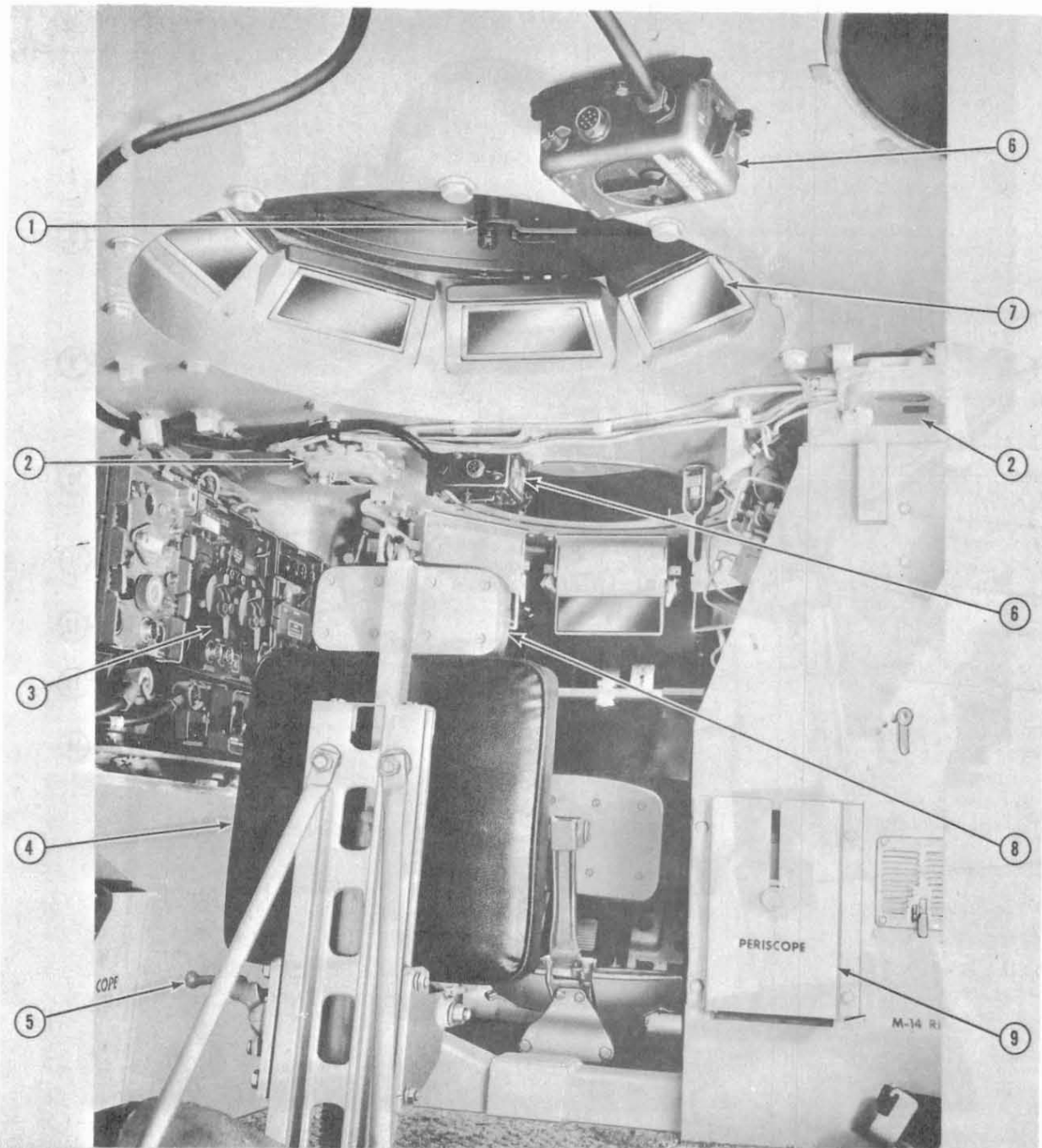
- | | |
|---------------------------------|---|
| 1 - M26 PERISCOPE | 12 - DRIVER'S HATCH COVER LOCKING LEVER |
| 2 - INDICATOR PANEL | 13 - PERSONNEL HEATER CONTROL PANEL |
| 3 - STEER BAR | 14 - HEADLIGHT DIMMER SWITCH |
| 4 - FUEL SIGHT TUBE | 15 - TRANSMISSION SHIFT LEVER |
| 5 - ACCESSORY OUTLET RECEPTACLE | 16 - CHOKE CONTROL KNOB |
| 6 - DRIVER'S SWITCH PANEL | 17 - THROTTLE CONTROL KNOB |
| 7 - AUXILIARY POWER RECEPTACLE | 18 - STEERING SELECTOR LEVER |
| 8 - FUEL SHUT-OFF VALVE | 19 - ENGINE AIR CLEANER |
| 9 - BRAKE PEDAL | 20 - PARKING BRAKE LOCK |
| 10 - FOOT REST | 21 - ACCELERATOR PEDAL |
| 11 - FIXED FIRE EXTINGUISHER | 22 - DRIVER'S SEAT |

ORD E53585

Figure 17. Driver's controls and instruments

Table 1. Controls and Instruments—Continued

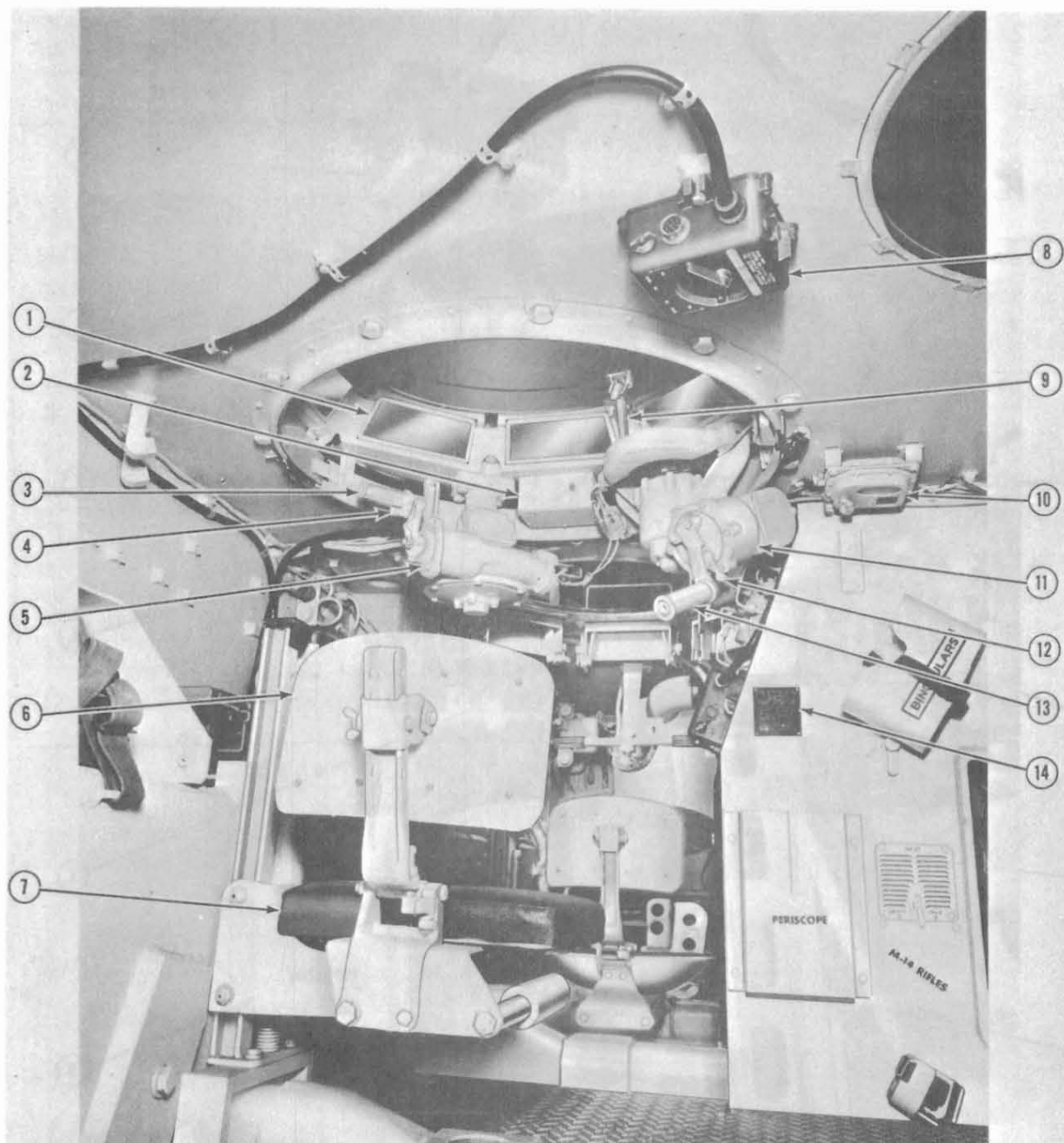
Detail	Location		Operation	Detail	Location		Operation
	Fig.	Item	Fig.		Fig.	Item	Fig.
COMMANDER'S CONTROLS AND INSTRUMENTS - M114 VEHICLE							
Hatch Cover Locking Assy	18	1	33	Radio Equipment	18	3	91
Hatch Cover Hold-Open Lock Handle			33	Seat	18	5	18
Machine Gun Cradle	33		63	Support Ring Brake Assy			33
Machine Gun Pintle Support and Travel Lock	33		33	Support Ring Positioning Assy			33
				Vision Block	18	7	
COMMANDER'S CONTROLS AND INSTRUMENTS - M114A1 VEHICLE							
Hatch Cover Lock Handle	19	9	34	Gun Sights	37		
Hatch Cover Hold-Open Lock Handle			34	Machine Gun Travel Lock			34
Electrical Control Box Assy	19	2	41	Radio Equipment	91		
Elevating Mechanism Handle	19	3	35	Seat	19	7	34
Gun Firing Trigger	19	4	41	Traverse Mechanism Handle	19	13	35
				Trav. Mech. Speed Shift Lever	19	12	35
CAL. .50 MACHINE GUN M2, HB, CONTROLS							
Back Plate Latch			67	Manual Charger M10 (Turret Type)			41
Back Plate Latch Lock			67	Rear Sight (Flex. Type)	39		
Bolt Latch Release (Flex. Type)			39	Retracting Slide Handle Assy (Flex. Type)			39
Bolt Latch Release Lock (Flex. Type)			39	Solenoid Trigger (Turret Type)			38
Bolt Lock (Turret Type)			43	Timing Adjustment Nut			31
Cover Latch			39	Trigger (Flex. Type)			39
Front Sight (Flex. Type)	39			Trigger Bar			31
7.62-mm MACHINE GUN M60 CONTROLS							
Barrel Lock Lever			84	Rear Sight Elev. Release Assy	46		
Cocking Handle Slide Assy	46		45	Rear Sight Windage Knob	46		
Latch Lever Assembly			45	Small Arms Safety			45
Rear Sight Elevation Knob	46			Trigger Assembly			45



- | | |
|---|-------------------------------|
| 1 - HATCH COVER LOCKING ASSEMBLY | 6 - INTERCOM BOX |
| 2 - DOME LIGHT | 7 - VISION BLOCK (8) |
| 3 - RADIO EQUIPMENT | 8 - COMMANDER'S SEAT BACKREST |
| 4 - COMMANDER'S SEAT | 9 - M13 SPARE PERISCOPE |
| 5 - HEIGHT ADJUSTMENT HANDLE
(PULL UP AND WITH BODY WEIGHT
RAISE OR LOWER SEAT) | |

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Figure 18. Commander's controls and instruments - M114 vehicle



- 1 - VISION BLOCK
- 2 - ELECTRICAL CONTROL BOX ASSY
- 3 - ELEVATING MECHANISM HANDLE
- 4 - GUN FIRING TRIGGER
- 5 - ELEVATING MECHANISM ASSY
- 6 - COMMANDER'S SEAT BACK REST
- 7 - COMMANDER'S SEAT

- 8 - INTERCOM BOX
- 9 - CUPOLA HATCH COVER LOCK HANDLE
- 10 - DOME LIGHT
- 11 - TRAVERSE MECHANISM ASSY
- 12 - TRAVERSE MECHANISM SPEED SHIFT LEVER
- 13 - TRAVERSE MECHANISM HANDLE
- 14 - FIXED FIRE EXTINGUISHER INSTRUCTION PLATE

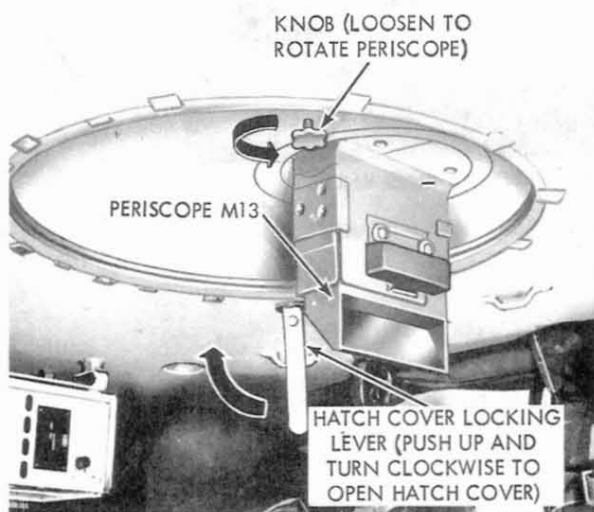
NOTE. Do not lubricate cupola bearing, traversing pinon or ring gear.

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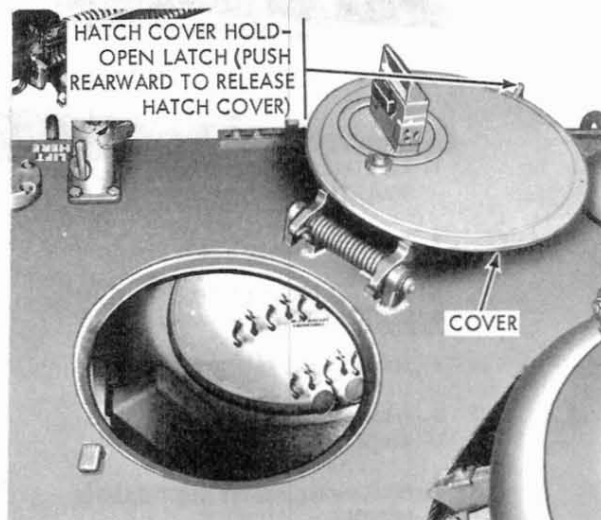
Figure 19. Commander's controls and instruments—M114A1 vehicle.

Table 1. Controls and Instruments—Continued

Detail	Location		Operation	Detail	Location		Operation
	Fig.	Item			Fig.	Item	
OBSERVER'S CONTROLS AND INSTRUMENTS							
7.62-mm Machine Gun Mount & Pintle Assy			44	M13 Periscope	21	9	60
Hatch Cover			20	7.62-mm Machine Gun Pintle Support			44
Jump Seat	21	12					
MISCELLANEOUS CONTROLS AND INSTRUMENTS							
Air Inlet Grille	51			Intercom Box	19	8	91
Dome Light	18		22	Jump Seat (Passenger)			22
Engine Oil Filler Cap	15			Personnel Air Vent			22
Engine Oil Level Dipstick	15			Personnel Heater Controls			52
Fixed Fire Extinguisher	17	11	49	Portable Fire Extinguisher			50
Fuel Filler Cap			22	Radiator Coolant Surge Tank Filler Cap	15		59
Gas-Particulate Filter Unit M8A3	90			Trans. Oil Level Dipstick	15		
Hull Rear Door	22		25	Trailer Lighting Receptacle			54



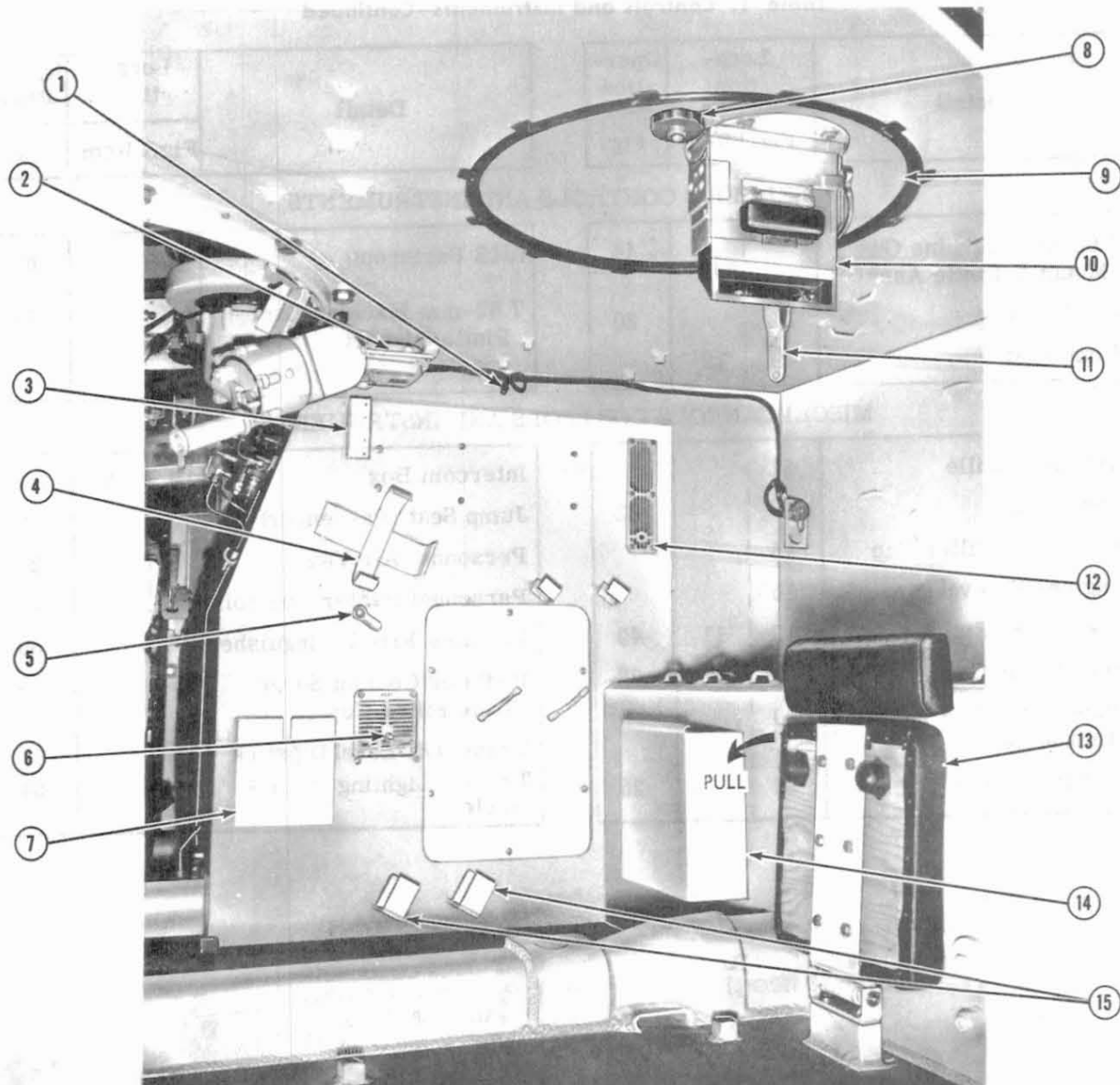
A - OBSERVER'S HATCH COVER LOCKING LEVER AND M13 PERISCOPE.



B - OBSERVER'S HATCH COVER HOLD-OPEN LATCH.

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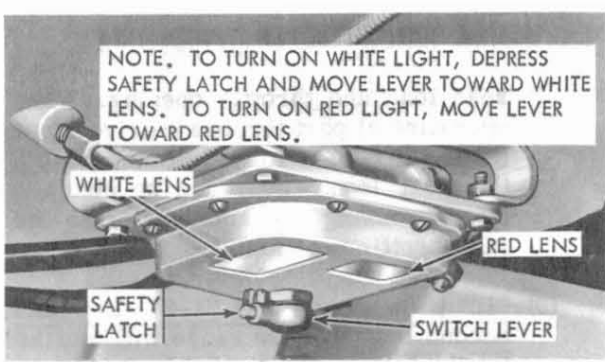
Figure 20. Observer's controls and instruments (1 of 2)



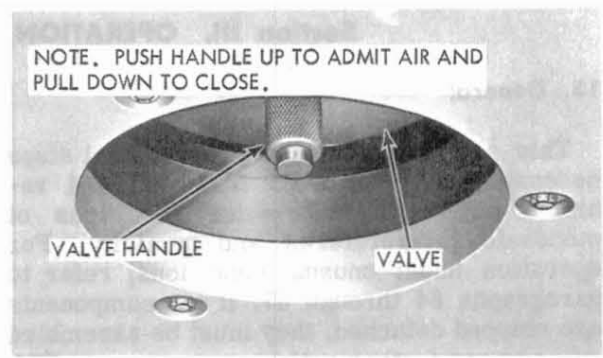
- | | |
|---|---|
| 1. ELECTRICAL CONNECTOR FOR GAS-PARTICULATE FILTER UNIT (CIRCUIT NO. 10). | 8. PERISCOPE LOCKING KNOB. |
| 2. DOME LIGHT. | 9. OBSERVER'S HATCH COVER. |
| 3. BRACKET (PROVIDED FOR GAS-PARTICULATE FILTER UNIT M8A3). | 10. M13 PERISCOPE. |
| 4. BINOCULARS BRACKET. | 11. HATCH COVER LOCKING LEVER. |
| 5. PERSONNEL HEATER HEAT CONTROL KNOB. | 12. PERSONNEL HEATER AIR INLET GRILLE (CREW COMPARTMENT). |
| 6. PERSONNEL HEATER DUCT DAMPER HANDLE. | 13. JUMP SEAT. |
| 7. M13 SPARE PERISCOPE STOWAGE BOX. | 14. M26 SPARE PERISCOPE STOWAGE BOX. |
| | 15. M14 RIFLE RETAINING CLIPS. |

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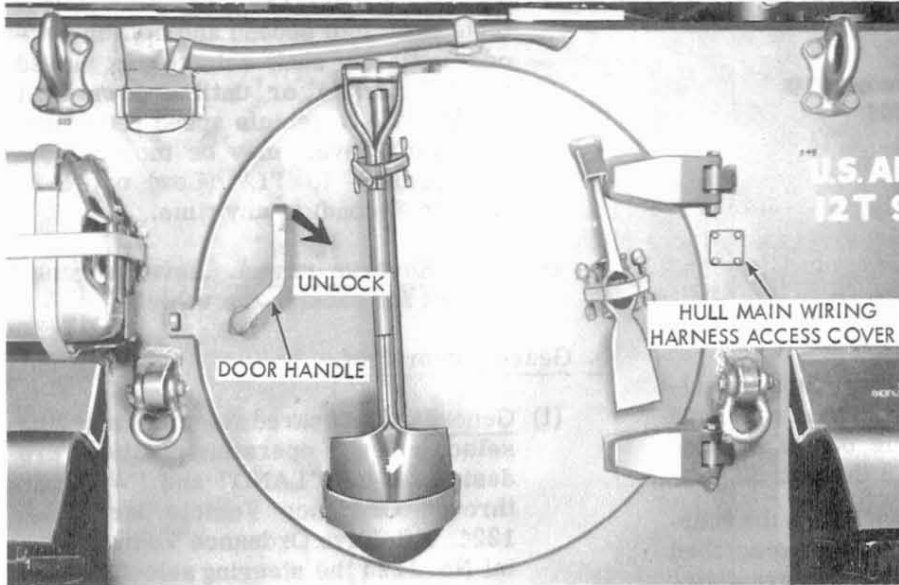
Figure 21. Observer's controls and instruments (2 of 2)



A - DOME LIGHT



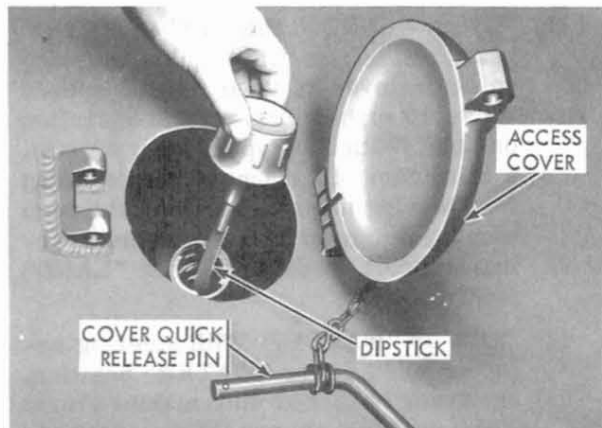
B - PERSONNEL AIR INLET VENTILATOR.



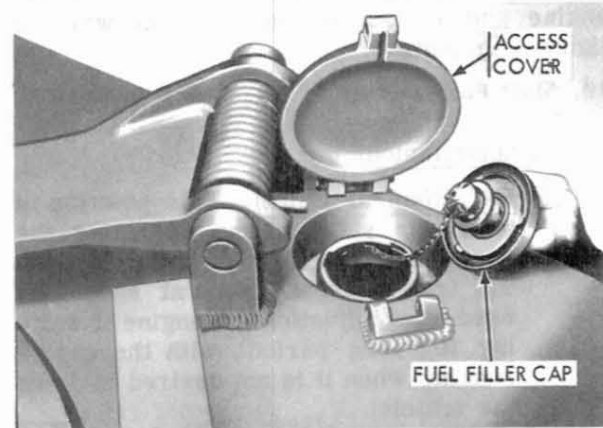
C - HULL REAR - EXTERIOR VIEW



D - JUMP SEAT (PASSENGER)



E - GEARED STEER UNIT OIL LEVEL ACCESS COVER AND DIPSTICK.



F - FUEL CELL ACCESS COVER AND FUEL FILLER CAP.

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Figure 22. Miscellaneous controls and instruments

Section III. OPERATION UNDER USUAL CONDITIONS

13. General

This section contains the mechanical steps necessary to operate the M114/M114A1 vehicles and armament under conditions of moderate temperatures and humidity. For operation under unusual conditions, refer to paragraphs 64 through 67. If any components are shipped detached, they must be assembled prior to any further action.

14. Vehicle Driving Lights Chart

Refer to figure 23.

15. Installation and Operation of M19 Periscope (Refer to Fig. 24)

16. Preliminary Steps Before Operating Vehicle

Refer to figure 25.

17. Vehicle Operation

a. General. Vehicle operating steps including starting engine, operating vehicle on land and water, and taking vehicle out of service are covered in paragraphs 18 through 30.

b. Preliminary Instructions. When the vehicle is to be operated, perform all the prescribed before and during operation preventive-maintenance services under usual conditions (pars. 79 through 85). Observe all instruments and gages during operation. Stop vehicle and engine and investigate cause if any warning lights illuminate.

18. Shift Positions

a. Transmission.

- (1) "N" (Neutral range). This position is used for starting and operating the engine without directing power through the transmission. Neutral should be used when adjusting the engine or waiting for long periods with the engine running when it is not desired to drive the vehicle.
- (2) "D" (Drive range). This position is used for all normal operation on roads and level or rolling across country terrain. In drive range, the transmission will automatically upshift or downshift into the proper gear depending on

road load and throttle opening. When operating at part throttle in drive range (except first), a forced downshift into the next lower gear can be obtained by depressing the accelerator to the full-throttle position.

- (3) "L" (Low range) and "1-2" (Low and Second Range). Low range will hold the transmission in low gear. Low to Second range (1-2) will hold the transmission in low gear until the vehicle exceeds 8 mph. The transmission will then shift into second and hold in second until the shift selector is moved to "D" (drive) or until a down-shift occurs due to vehicle speed reduction. The shift lever may be moved from "D" (Drive) to "L" (Low) or "1-2" (Low to Second) at any time.
- (4) "R" (Reverse range). Reverse range is used for backing the vehicle.

b. Geared Steer Unit.

- (1) General. The geared steer unit steering selector lever operating positions are designated as "LAND" and "WATER" through Ordnance Vehicle Serial No. 1224. Effective Ordnance Vehicle Serial No. 1225 the steering selector lever land operation position is designated as "HI" and water operating position as "LO."
- (2) "HI" or "LAND." The "HI" or "LAND" geared-steer position of the steering selector lever is used for all speeds above 10 mph during vehicle operation on land. With this type of steer system, a minimum of horsepower is required for steering maneuvers. The minimum turning radius is 34 feet with the steering selector lever in "HI" or "LAND" position.
- (3) "LO" or "WATER." With steering selector in "LO" or "WATER" position, one track is locked when making a turn. This position is used for extremely sharp turns during low-speed (not to exceed 10 mph) land operation and must be used for all water operation. The "LO" or "WATER" position permits a minimum turning radius of 11 feet during land operations.

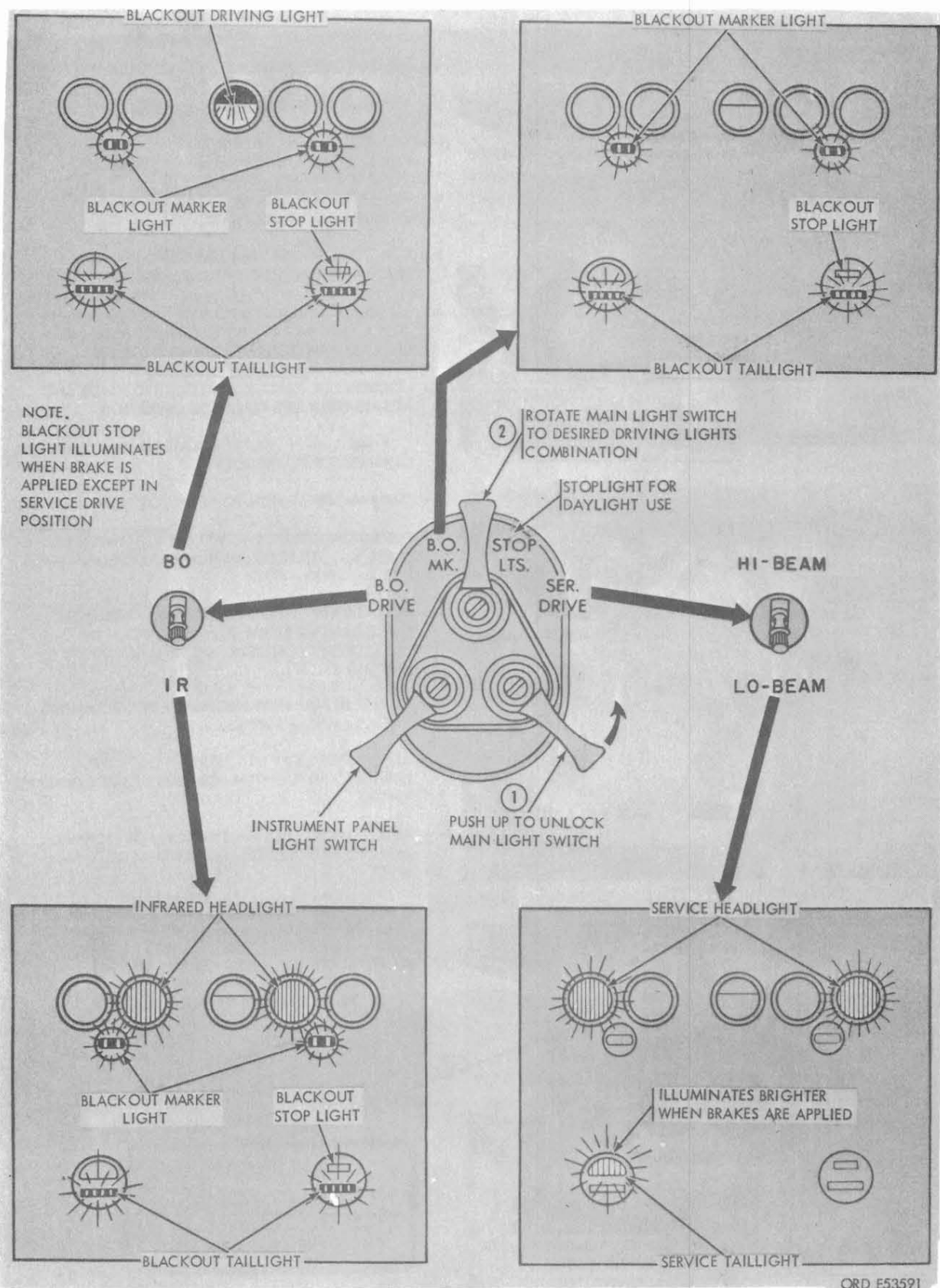
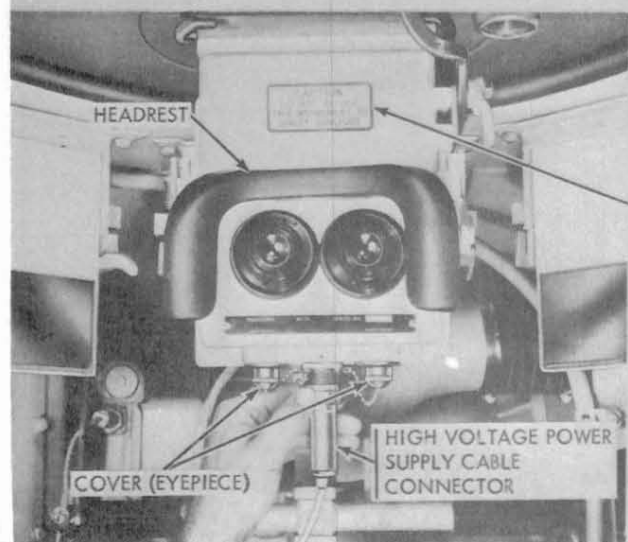
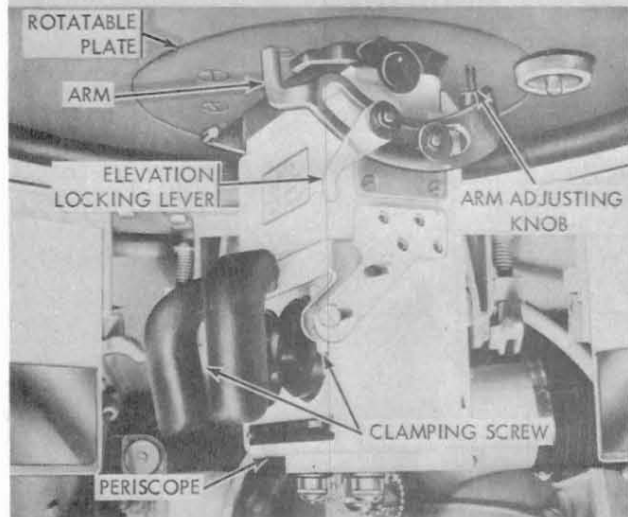
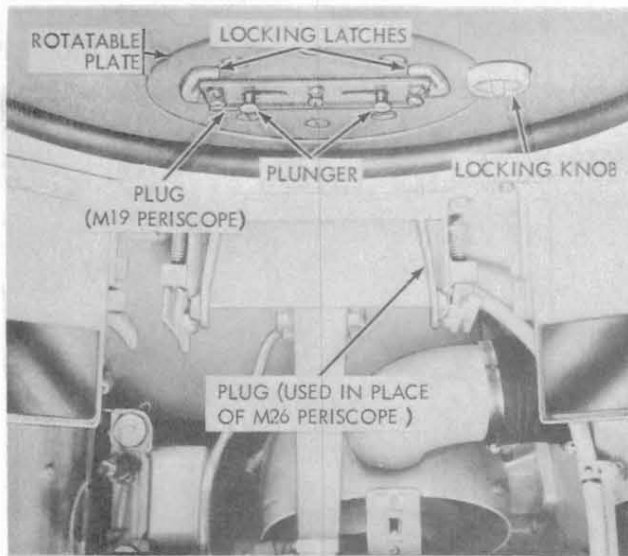


Figure 23. Driving lights chart



- 1 - REMOVE DRIVER'S FRONT M26 PERISCOPE (FIG. 62).
- 2 - INSERT PLUG IN PLACE OF M26 PERISCOPE.
- 3 - MOVE PLUNGERS INWARD TO REMOVE M19 PERISCOPE PLUG FROM ROTATABLE PLATE. STORE IN PERISCOPE CONTAINER FOR RE-USE.
- 4 - PUSH PERISCOPE LOCKING LATCHES UPWARD AGAINST ROTATABLE PLATE.
- 5 - CAREFULLY INSERT PERISCOPE INTO ROTATABLE PLATE AND ENGAGE LOCKING LATCHES.
- 6 - LOOSEN ELEVATION LOCKING LEVER AND TURN ARM ADJUSTING KNOB CLOCKWISE UNTIL BOTH ENDS OF ARM CONTACT ROTATABLE PLATE.
- 7 - LOOSEN ROTATABLE PLATE LOCKING KNOB AND ROTATE PERISCOPE TO CHECK OPERATION.
- 8 - CONNECT HIGH VOLTAGE POWER SUPPLY CABLE CONNECTOR TO PERISCOPE.
- 9 - TURN MASTER SWITCH TO "ON" POSITION (FIG. 27).
- 10 - PUSH HIGH VOLTAGE POWER SUPPLY SWITCH UP; PLACE B.O. SELECTOR SWITCH IN "I.R." (INFRARED) POSITION (FIG. 27).
- 11 - HOLD SAFETY SWITCH IN "UNLOCK" POSITION, PLACE DRIVING LIGHT SELECTOR SWITCH IN "B.O. DRIVE" POSITION, AND RELEASE SAFETY SWITCH (FIG. 27).
- 12 - ADJUST HEADREST AS NECESSARY BY LOOSENING TWO CLAMPING SCREWS.
- 13 - ADJUST PERISCOPE IN AZIMUTH FOR NORMAL DRIVING AND TIGHTEN ROTATABLE PLATE LOCKING KNOB.
- 14 - ADJUST PERISCOPE IN ELEVATION FOR NORMAL DRIVING AND TIGHTEN ELEVATION LOCKING LEVER.
- 15 - REMOVE TWO COVERS AND FOCUS EACH EYEPIECE OF PERISCOPE AS NECESSARY.

NOTE: PERISCOPE OPENING COVERS (PLUGS) WILL BE STORED IN THE PERISCOPE STORAGE CONTAINER FOR RE-USE.

CAUTION PLATE

CAUTION
DO NOT EXPOSE
THIS INSTRUMENT TO
DIRECT SUNLIGHT

AT 21168

Figure 24. Installation and operation of M19 periscope.