SUPERSEDES COPY DATED 3 MARCH 1986.
SEE PAGE i FOR DETAILS.

TECHNICAL MANUAL

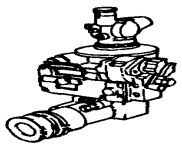
DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)

TELESCOPE, PANORAMIC: M115 (1240-00-895-9186)

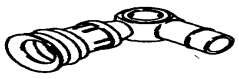
TELESCOPE, ELBOW: M139 (1240-00-328-5631)

MOUNT, TELESCOPE: M138 (1240-00-896-2240)

MOUNT, TELESCOPE: M137 (1240-00-895-6492)



M115



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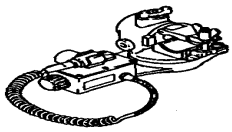

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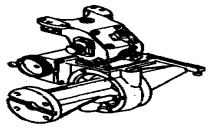

M137

OCTOBER 1993

HEADQUARTERS, DEPARTMENT OF THE ARMY

WARNING

GENERAL

Appropriate safety precautions must be taken while using cleaning materials that may present fire hazards, cause skin irritations, or have toxic effects when breathed in high vapor concentrations.

Use adhesives, cleaning solvents, and sealing compounds in well-ventilated areas away from open flame. Adhesives, cleaning solvents, and sealing compounds are harmful to skin and clothing, can burn easily, and may give off harmful vapor.

Solvent vapors are toxic Do not use solvent in a confined space. Avoid long periods of breathing solvent vapors and/or contact with skin.

Compressed air presents a serious hazard. When it is necessary to use compressed air for cleaning or drying, adequate controls must be taken to protect the user, adjacent operators, and casuals. The minimum amount of air pressure required to perform the specific operations must be used. All users of compressed air must wear eye protection. Compressed air will not be used for cleaning purposes except where reduced to less than 30 psig.

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

ELECTRICAL

High voltage is used in the operation of equipment in these procedures. Death on contact may result if personnel fail to observe safety precautions. For artificial respiration information, refer to FM 21-11.

TECHNICAL MANUAL

No.9-1240-400-34&P

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington DC, 8 October 1993

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)

TELESCOPE, PANORAMIC: M115
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(1240-00-895-6492)

Current as of March 1993 for Appendix B

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

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

Table of Contents

*This manual supersedes TM 9-1240-400-34&P, dated 3, March 1986, including all changes.

Table of Contents (cont)

Table of Contents (cont)

TABLE OF CONTENTS (cont)

HOW TO USE THIS MANUAL

GENERAL. References in the manual are to pages and other technical manuals.

INDEXES. This manual is organized to help the user quickly find the information needed. There are five useful indexes.

a. *Front Cover Index.* Is a tabbed index of chapters and appendixes (keyed to tabbed pages in the manual).

b. *Table of Contents.* Lists in order all chapters, sections, and appendixes. Gives page references.

c. *Nomenclature Cross-References List.* Gives an alphabetical list of common item names used in the manual. Official nomenclature is given for each item (p 1-2).

d. *Symptom Index.* Located just before the troubleshooting table in each maintenance chapter. Lists possible malfunctions and corrective actions. References pages of the troubleshooting tables.

e. *Alphabetical Index.* Located at the end of the manual. An extensive subject index for everything in the manual. Gives page references.

MAINTENANCE PROCEDURES. There is a maintenance chapter for each piece of equipment. Each chapter contains detailed procedures for the maintenance tasks.

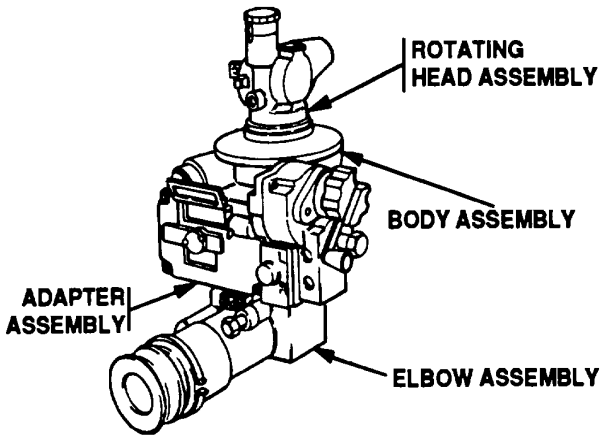
a. *Detailed Procedures.* Contain an initial setup plus step-by-step procedures.

(1) Initial Setup. Gives a list of everything needed in order to do the maintenance task on a component of a fire control instrument.

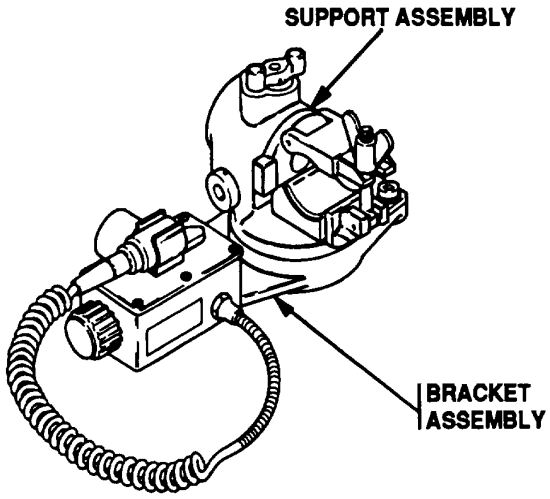
(2) Step-By-Step Procedures. Are illustrated maintenance procedures authorized in Maintenance Allocation Chart (MAC) (TM 9-2350-304-20-2) and Repair Parts and Special Tools List (RPSTL) (appendix B).

b. *Troubleshooting.* Included in each chapter are procedures for direct support or general support troubleshooting.

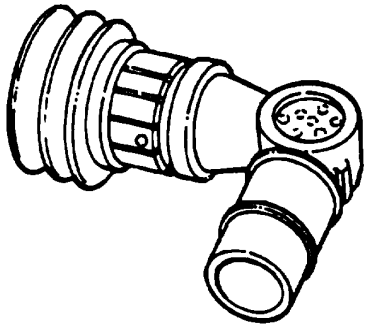
c. *Final Inspection Procedures.* Immediately following the maintenance sections. List inspections and tests required to ensure the serviceability of each fire control instrument.



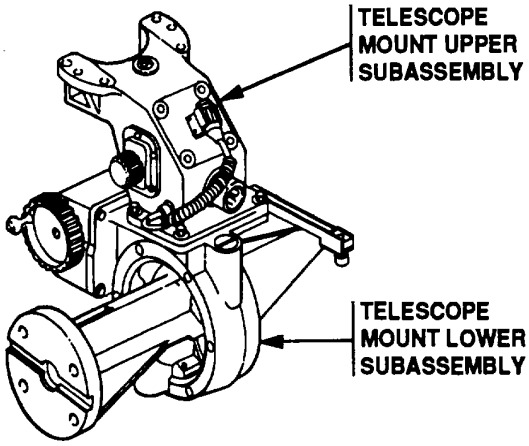
M115 PANORAMIC TELESCOPE

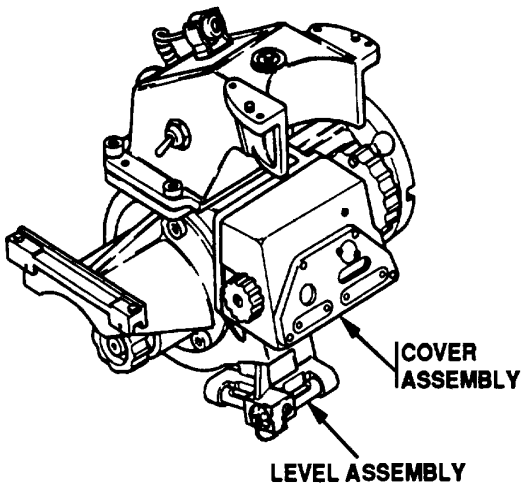


M138 TELESCOPE MOUNT



M139 ELBOW TELESCOPE





M137 TELESCOPE MOUNT

CHAPTER 1
INTRODUCTION

Section I. GENERAL INFORMATION

1-1. SCOPE.

a. Type of Manual. Direct and general support maintenance.

b. Model Numbers and Equipment Names:

(1) M115 Panoramic Telescope
(2) M138 Telescope Mount
(3) M137 Telescope Mount
(4) M139 Telescope Elbow

c. Purpose of Equipment.

(1) M115 Panoramic Telescope is used on M11 OA2 self-propelled howitzer for direct or indirect sighting as part of a two-sight, two-man system.

(2) M138 Telescope Mount adapts M139 elbow telescope to M110A2 self-propelled howitzer and provides adjustments in elevation and deflection (azimuth).

(3) M137 Telescope Mount adapts M115 panoramic telescope to M11 OA2 self-propelled howitzer and provides adjustments in elevation and cant (cross-level).

(4) M139 Telescope Elbow is used to lay the M11 OA2 self-propelled howitzer in elevation and deflection for direct fire operation.

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

1-3. DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE. Fire control instruments must be destroyed in a way that same essential parts, on like equipment, cannot be used to construct one complete unit from damaged ones. Refer to TM 750-244-6.

1-4. PREPARATION FOR STORAGE OR SHIPMENT. Administrative storage is restricted to 90 days and must not be extended. Refer to TM 9-2350-304-20-2 and SB 740-95-700, Storage Serviceability Standards for ARRCOM Materiel for Fire Control Items, for detailed instructions on administrative storage.

1-5. OFFICIAL NOMENCLATURE, NAMES, AND DESIGNATIONS. Shortened nomenclature is used in this manual to make procedures easier for you to read. A cross-reference between the shortened nomenclature and its official nomenclature is shown in the following table.

Nomenclature Cross-Reference List

Manual Nomanclature	Official Nomenclature
Bracket	Angle bracket
Cap	Air valve cap
Setscrew	Socket wrench attachment
Cover	Riveted door
Eccentric	Control cam
Eccentric ring	Optical element holder
Elevation knob	Knob assembly
Elevation level vial tube	Fire control level

1-5. OFFICIAL NOMENCLATURE, NAMES, AND DESIGNATIONS (CONT).

Nomenclature Cross-Reference List (Cont)

Manual Nomenclature	Official Nomenclature
Eye lens	Optical instrument lens
Felt	Preformed felt
Field lens	Optical instrument lens
Gear	Segment gear
Gear	Wormwheel gear
Key	Machine key
Key	Woodruff key
Level vial	Fire control level
Pin	Headless straight pin
Pivot	Shouldered shaft
Plate	Bearing retainer plate
Plate	Gear assembly plate
Plate	Riveted assembly plate
Plug	Machine thread plug
Screw	Machine screw
Spring	Helical compression spring
Retainer	Optical retainer
Tapered pin	Plain tapered pin
Torsion spring	Torsion helical spring
Valve stem	Purging valve stem

1-6. REPORTING EQUIPMENT IMPROVE-MENT RECOMMENDATIONS (EIR).

If your M110 A2 Fire Control needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (Product Quality Deficiency Report). Mail it to us at Commander, U.S. Army Armament, Munitions and Chemical Command, ATTN: AMSMC-QAD, Rock Island, IL 61299-6000. We'll send you a reply.

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

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

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

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

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

Section II. EQUIPMENT DESCRIPTION AND DATA

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

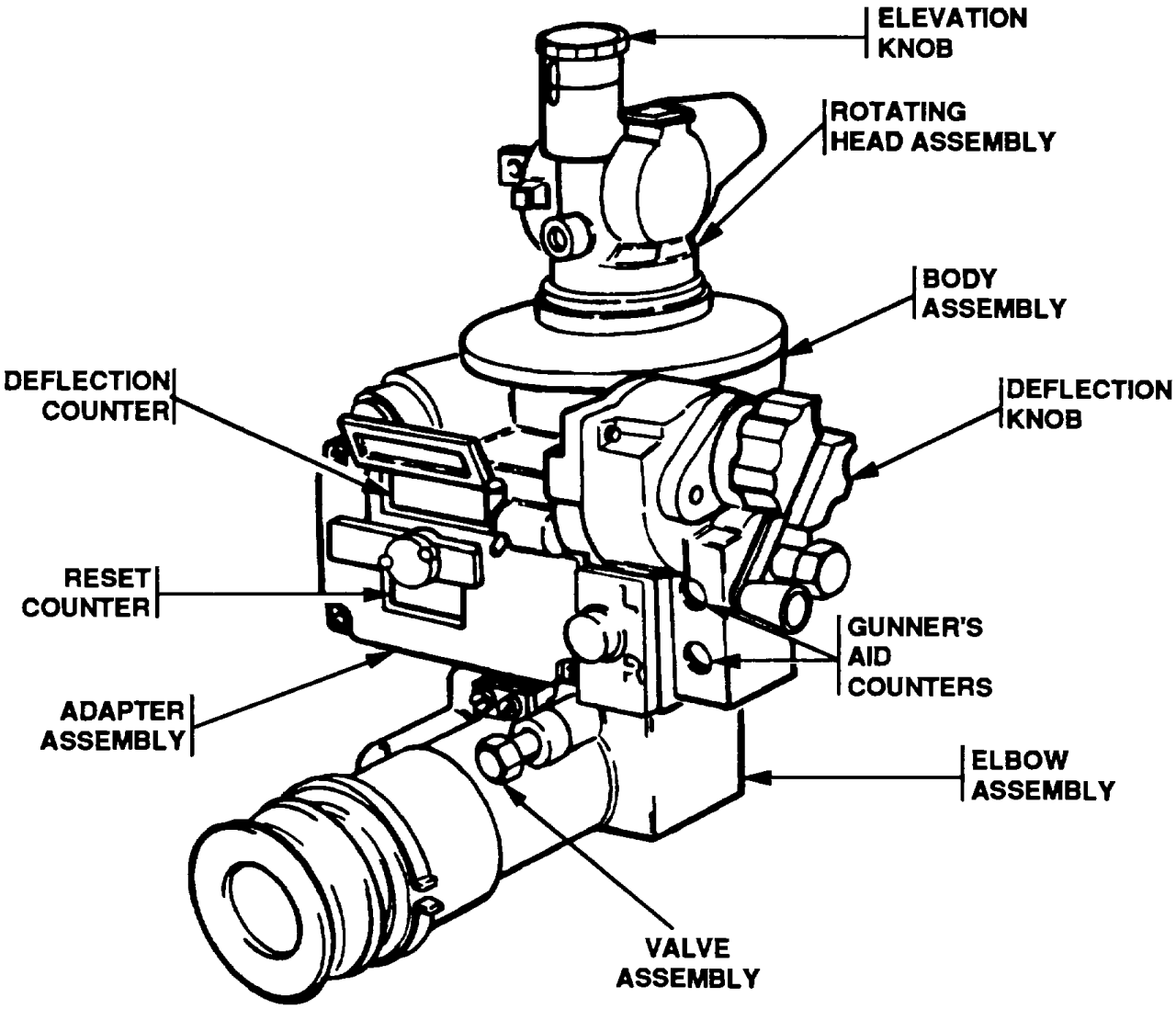
a. *M115 Panoramic Telescope.* The M115 telescope is a hermetically sealed unit used with the M137 telescope mount on the M 11 OA2 self-propelled howitzer. It is a 4-power, 10-degree field of view instrument with analog counters. Counters and reticle are illuminated by LEDs. The telescope consists of three main assemblies: the rotating head, the body assembly, and the elbow assembly. The rotating head contains the entrance window and serves to house the 90-degree prism. The body assembly contains two objective lenses, reticle, deflection knob, and adapter assembly. The elbow assembly has a total excursion of 30 degrees and contains a penta prism, pechan prism assembly, cell assembly (erector), eyepiece assembly, and assembled gearing.

b. *M138 Telescope Mount.* The M138 telescope mount adapts the M139 elbow telescope to the M110 A2 self-propelled howitzer. The mount provides adjustments in elevation and deflection (azimuth) for direct fire with the 8-inch gun. Illumination is adjustable by a variable resistor.

c. *M137 Telescope Mount.* The M137 telescope mount adapts the M115 panoramic telescope to the M11 OA2 self-propelled howitzer. The mount provides adjustments in elevation and cant (cross-level) for indirect fire. The M137 telescope mount consists of two subassemblies, one mounted on top of the other, and secured by four screws. The upper subassembly contains most of the electrical system and the mounting surface for the telescope. The lower subassembly consists of a mounting bracket, elevation knob and elevation counter, correction knob and counter, and cross-level knob.

d. *M139 Telescope Elbow.* The M139 elbow telescope is a 3-power, 13-degree, 20-minute field of view instrument. The reticle, illuminated by the M36 instrument light, is used for direct fire and is graduated in meters for range.

1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS.

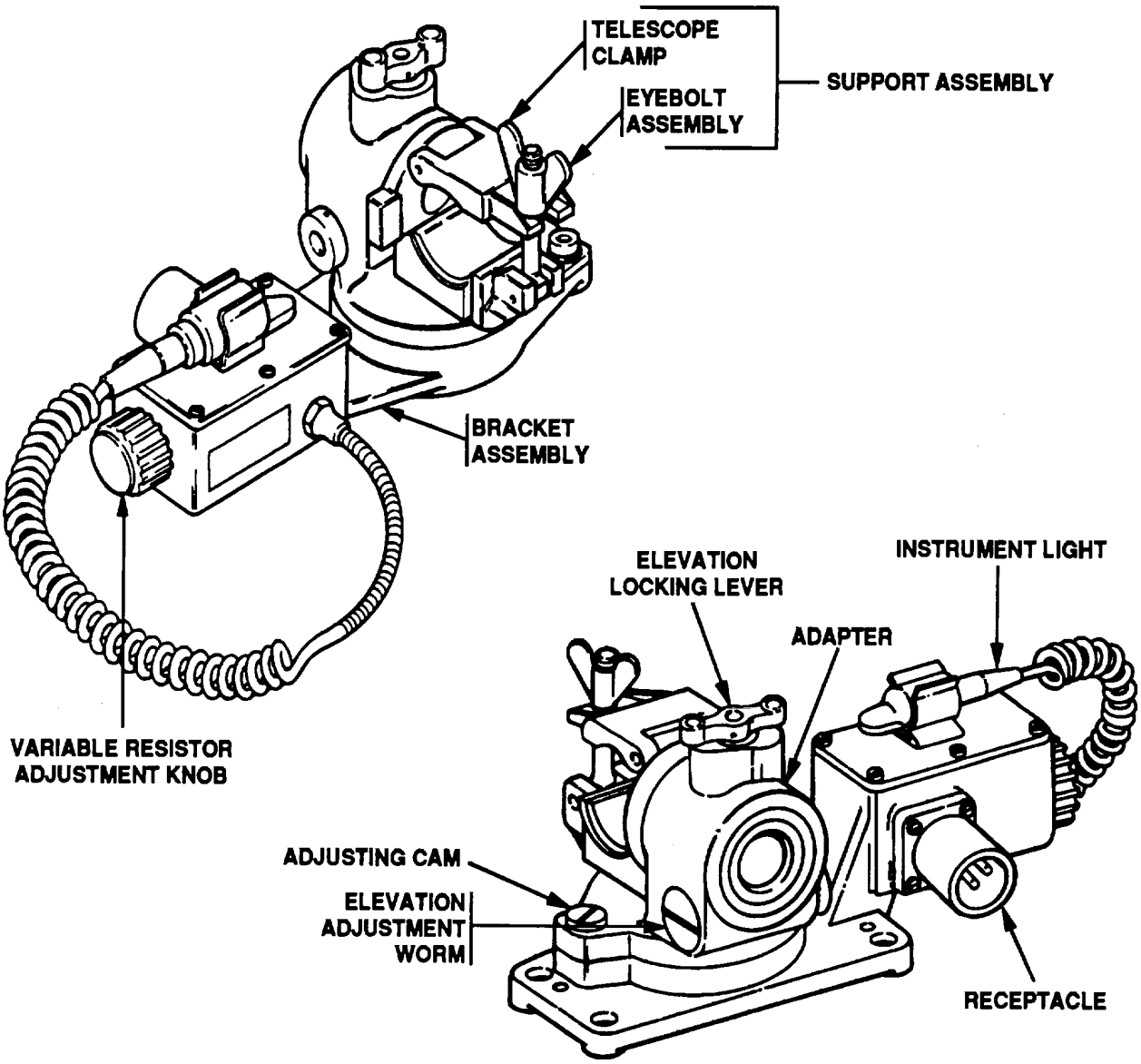


a. *M115 Panoramic Telescope.*

(1) Rotating Head Assembly. The rotating head assembly is capable of 360-degree rotation (6400 mils). It contains a 90-degree prism which is adjustable in elevation (+300 mils) using the elevation knob. The amount of deflection is indicated on the deflection counter on the adapter assembly.

(2) Elbow Assembly. The elbow assembly has an excursion of 30 degrees and contains a penta prism, pechan prism assembly, cell assembly, eyepiece assembly and assembled gearing. A valve assembly is for purging and charging the telescope.

(3) Body Assembly. The body assembly contains two objective lenses, reticle, deflection knob, and adapter assembly. The deflection knob controls deflection of the telescope. The adapter assembly contains a deflection counter, reset counter, two gunner's aid counters, and associated gearing.



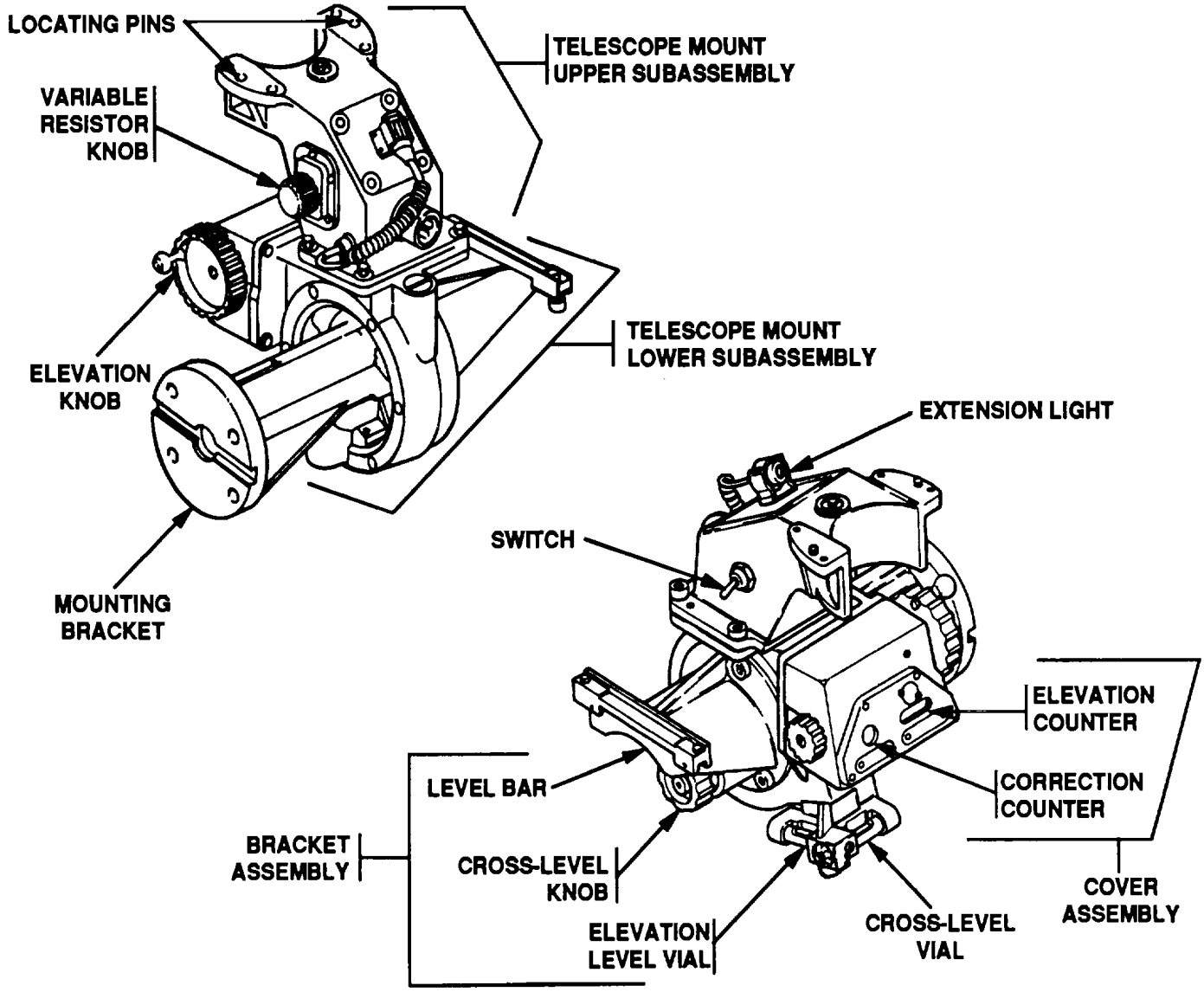
b. M138 Telescope Mount.

(1) Support Assembly. The support assembly consists of an eyebolt assembly and a telescope clamp to hold the M139 elbow telescope in place.

(2) Bracket Assembly. The bracket assembly contains the electrical system. A variable resistor adjustment knob controls the various settings for illumination. A receptacle is provided for connection of a 24-volt dc power source for the instrument light.

(3) Adapter. The adapter contains a deflection adjusting cam and an elevation adjustment worm for adjustments in deflection and elevation. An elevation locking lever provides for adjustment at the desired setting in elevation.

1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (CONT).



c. M137 Telescope Mount.

(1) Telescope Mount Upper Subassembly. The upper subassembly contains most of the electrical system and the mounting surface for the telescope. A variable resistor knob turns the power on and off and controls the brightness of the LED in the extension light only. Switch controls power to the telescope contact and to the LEDs for the counters and level vials on the mount. The top mounting surface has two locating pins to accurately position the telescope.

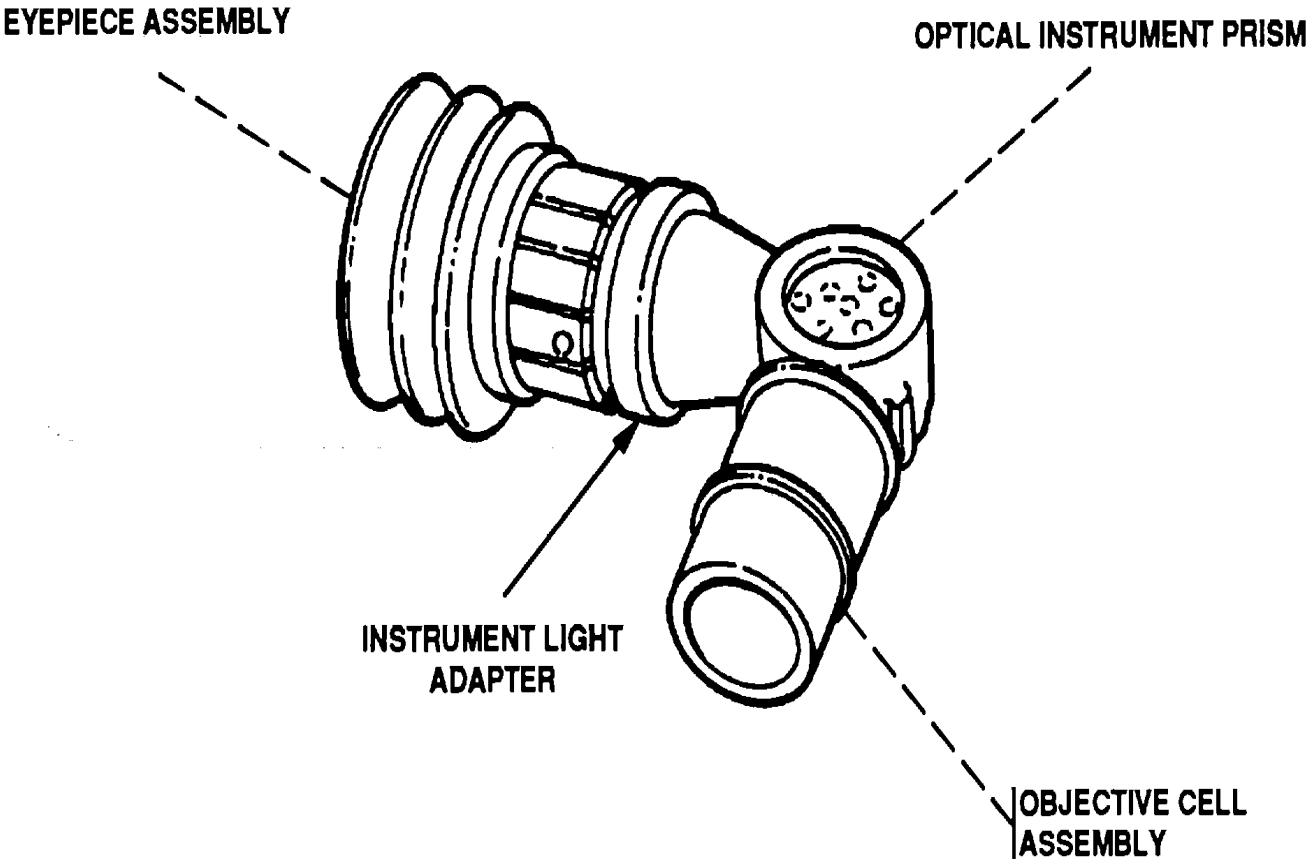
(2) Telescope Mount Lower Subassembly. The lower subassembly includes a mounting bracket, elevation knob, elevation counter, and cross-level knob.

(3) Level Assembly. The level assembly consists of a cross-level vial, an elevation level vial, an LED, and a mounting bracket. The mount is leveled visually by centering the bubble in each level vial.

(4) Bracket Assembly. The bracket assembly provides a seat for the gunner's quadrant and consists of a level bar pinned to a bracket. A screw and spring are used to adjust the level bar and then removed after pinning.

(5) Cover Assembly. The cover assembly is a boxlike cover that fits over the elevation counter and correction counter. It contains windows for both counters and an overlay assembly containing LEDs for illuminating the counter dials.

(6) Extension light. The extension light is used to light the reticle of the M115 panoramic telescope.



d. M139 Elbow Telescope.

(1) Eyepiece Assembly. The eyepiece assembly consists of a cell, eye lens, spacers, field lens, and ring.

(2) Instrument Light Adapter. The instrument light adapter has a dovetail slot for the M36 instrument light lamp bracket and is positioned over the window in the M139 elbow telescope.

(3) Optical Instrument Prism. The optical instrument prism bends the light 90 degrees. It erects the image.

(4) Objective Cell Assembly. The objective cell assembly consists of a cell, reticle, and ring.

1-10 EQUIPMENT DATA. All decimal measurements have been rounded off to the nearest tenth.

a. M115 Panoramic Telescope.

(1) Magnification	4 power
(2) Field of View	10 degrees
(3) Exit Pupil Diameter	0.2 in (4.1 mm)
(4) EFL, Objective	4.0 in (10.1 cm)
(5) EFL, Eyepiece	1.0 in (2.5 cm)
(6) Elevation Range	+300 to -300 mils
(7) Length	9.6 in (24.4 cm)
(8) Height	11.0 in (27.9 cm)
(9) Weight	8.0 lb (3.6 kg) (approx)

b. M138 Telescope Mount.

(1) Deflection (Azimuth)	+12 to -12 mils
(2) Elevation	+444.5 to -444.5 mils
(3) Length	9.6 in (24.4 cm)
(4) Width	5.3 in (13.3 cm)
(5) Height	4.5 in (11.4 cm)
(6) Weight	3.0 lb (1.4 kg)

c. M137 Telescope Mount.

(1) Elevation	+1333 to -89 mils
(2) Elevation Correction	+9 to -9 mils
(3) Cross-Level (Cant)	+20 to -20 degrees
(4) Incremental Reading (Counters)	1 mil
(5) Length	14.1 in (35.9 cm)
(6) Width	9.8 in (25.8 cm)
(7) Height	13 in (33.0 cm)
(8) Weight	38.0 lb (17.3 kg)

d. M139 Elbow Telescope.

(1) Magnification	3 power
(2) Field of View	13 degrees, 20 min
(3) EFL, Objective	4.1 in (10.5 cm)
(4) EFL, Eyepiece	1.4 in (3.5 cm)
(5) Length	4.3 in (10.8 cm)
(6) Height	5.8 in (14.6 cm)
(7) Weight	2.4 lb (1.1 kg)

CHAPTER 2
M115 PANORAMIC TELESCOPE

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

2-1. COMMON TOOLS AND EQUIPMENT. For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE), CTA 50-970, or CTA 8-100, as applicable to your unit. The tool kit assigned to the mechanic is Tool Kit, Electronic: System Maintenance (SC 5180-95-CL-B29).

2-2. SPECIAL TOOLS AND SUPPORT EQUIPMENT. Special tools and support equipment required and authorized for repair of the Ml 15 panoramic telescope, M138 telescope mount, M137 telescope mount, and M139 elbow telescope are listed in the Repair Parts and Special Tools List, Appendix B, of this manual.

2-3. REPAIR PARTS. Repair parts are listed and illustrated in the Repair Parts and Special Tools List, Appendix B, of this manual.

Section II. INITIAL INSPECTIONS

2-4. GENERAL.

a. Inspection is performed primarily to determine the following:
- **(1)** Completeness.
- **(2)** The nature of serviceability.
- **(3)** The work, repair parts, and supplies required to return the materiel to serviceability.
- **(4)** That the work in process is being performed properly.
- **(5)** That completed work complies fully with serviceability standards.

b. The Ml 15 panoramic telescope is considered serviceable when:
- **(1)** It is complete and properly performs its intended function.
- **(2)** All modification work orders (MWO's) have been applied.
- **(3)** All defects disclosed by the inspection have been corrected.

c. DA Form 2408-5 and DA Form 2409 list applicable MWO's.

2-5. CATEGORIES OF INSPECTION. Categories of inspection define responsibilities:

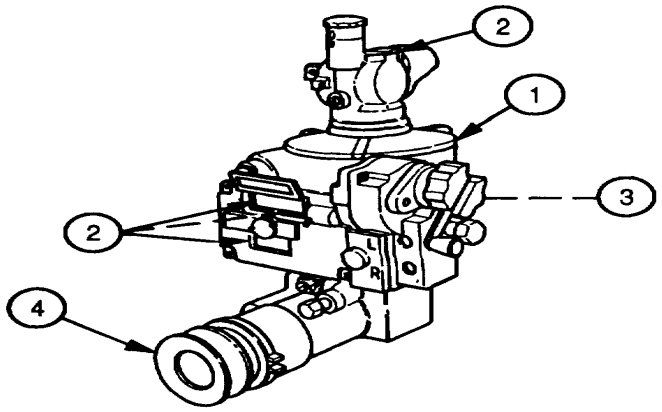
a. An initial inspection of the MI15 panoramic telescope is performed immediately on receipt for maintenance. This inspection will determine the amount and type of work to be performed.

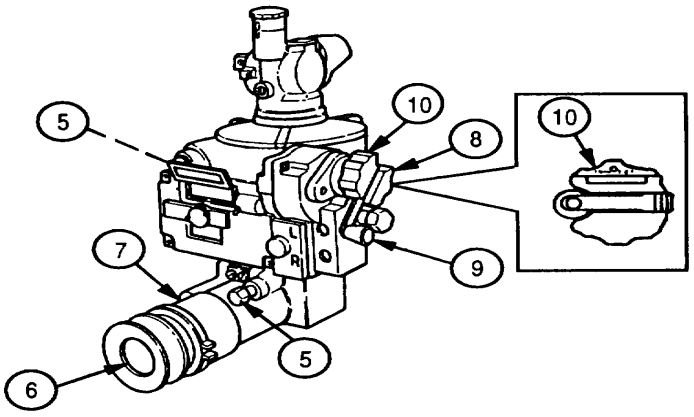
b. A final inspection of the M115 panoramic telescope is performed after repairs have been completed to ensure the item meets serviceability standards.

c. Table 2-1 lists initial inspection procedures for the M115 panoramic telescope. Final inspection procedures are located on page 2-57.

d. Preembarkation inspection procedures are located on page 2-80.

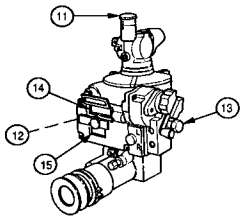
Table 2-1. INITIAL INSPECTION-M115 PANORAMIC TELESCOPE

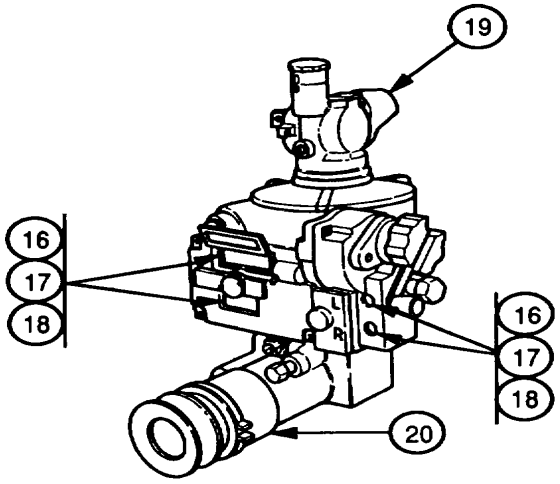
ITEM NO.	ITEM T0 BE INSPECTED	PROCEDURE
		NOTE Azimuth testing fixture must be set up before performing initial inspection. Refer to page 2-58.
		
1	M115 Panoramic Telescope	Inspect telescope for completeness and secureness of parts; must be complete and secure.
2	Identification Plate, Index, and Counter Numbers	Inspect for legibility; must be legible and clearly defined.
3	Mounting Surfaces	Inspect for burrs and corrosion; must be free of burrs and corrosion.
4	Eyeshield	Inspect for security of attachment and damage such as deterioration, cuts, or tears; must be secure, without tears, cuts, or deterioration.

ITEM NO.	ITEM T0 BE INSPECTED	PROCEDURE
		
5	Valve and Cap	Inspect for damage such as bends or breaks and ability to hold pressure; must not be bent or broken and must hold pressure.
6	Window, Eyelens	Inspect for dirt, fungus or condensation, which may obstruct view through eyepiece; must be clean and free of moisture.
7	Elbow Assembly	Inspect by viewing through telescope to determine if interfering fractures exist on window, lens, prisms or reticle; chipped, scratched, or pitted optics that interfere with field of view must be replaced with authorized parts.
8	Deflection Knob	Use torque wrench and torque adapter (8599917) to rotate knob in each direction. Knob shall operate within 4.00 to 8.00 in.-lb (0.45 to 0.90 N-m) of torque.
9	Hand Crank	Swing on pivot pin to determine freedom of movement. Crank must not bind or show evidence of excessive wear at pivot pin.
10	Direct-Indirect Knob	Rotate knob 360 degrees. Knob must snap into detents at 180 degree intervals, and must produce an audible click at each 5 mil excursion of deflection knob when set in DIRECT fire position.

2-5. CATEGORIES OF INSPECTION (CONT).

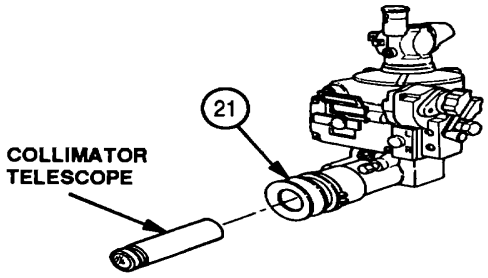
Table 2-1. INITIAL INSPECTION-MI15 PANORAMIC TELESCOPE (CONT)

ITEM NO.	ITEM T0 BE INSPECTED	PROCEDURE
		
11	Elevation Knob	Use torque wrench and torque adapter (8213928) to rotate from midpoint in each direction. The knob shall operate within 0.50 to 2.50 in.-lb (0.06 to 0.28 N-m) of torque.
12	Reset Counter Knob	Use torque wrench and torque adapter (8599920) to push in and rotate the knob counterclockwise. Running torque required to rotate knob shall not exceed 2.50 in.-lb (0.28 N-m) of torque.
13	Gunner's Aid Knob	Rotate knob in both directions while observing effect on gunner's aid counter. Counter indications must increase or decrease as knob is rotated. Using torque wrench and torque adapter (8213929) rotate knob in each direction. Knob shall operate within 10 to 4.00 in.-lb (0.11 to 0.45 N-m) of torque.
14	Gunner's Aid Counters	Rotate gunner's aid knob to stop in both directions. Counters (L and R) must each have an excursion of 50 mils in each direction before contacting the stops at each extreme of the counter setting.
15	Deflection Counter	Rotate deflection knob clockwise, and then counter-clockwise, while observing effect on counter. Counter indication must increase when knob is turned clockwise, and decrease when knob is turned counterclockwise.

ITEM NO.	ITEM T0 BE INSPECTED	PROCEDURE
		
16	Reset Counter	(1) Rotate knob while observing reset counter. Reset counter must be resettable to 3200 mils from any counter position. (2) Rotate deflection knob while observing counter. Counter indication must increase when deflection knob is rotated clockwise, and decrease when rotated counterclockwise.
17	Counter Setting	Set -50 mils (right) into gunner's aid counter and observe that reset counter increases by 50 mils Set +50 mils (left) into gunner's aid counter and observe that reset counter decreases by 50 mils Deflection counter must not change during either of preceding actions.
18	Counter Numerals	Rotate direct-indirect knob, elevation knob, reset counter knob, and gunner's aid knob in turn to lowest digit. Be sure lowest digit of each counter is in coincidence with its respective index line and remaining numbers are in alinement within 1/16 in. (1.6 mm).
19	Rotating Head Assembly	Rotate deflection knob while observing motion of rotating head. Rotating head must move in continuous motion without binding or jumping.
20	Elbow Assembly	Must rotate left and right through its intended distance, and hold in established position.

2-5. CATEGORIES OF INSPECTION (CONT)

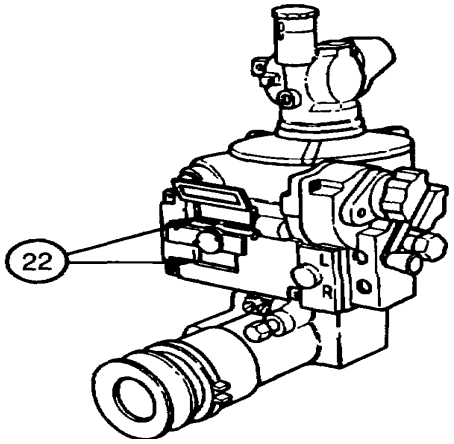
Table 2-1. INITIAL INSPECTION-M115 PANORAMIC TELESCOPE (CONT)

ITEM NO.	ITEM T0 BE INSPECTED	PROCEDURE
	ACCURACY NOTE: For the following inspections mount telescope on preset Azimuth Testing Fixture. Refer to page 2-58 for setup instructions.	
	EVALUATION	
21	Eyepiece Focus	Eyepiece focus shall be tested with aid of calibrated dioptometer adjusted for best focus of dioptometer reticle. Position dioptometer at telescope eyepiece. Telescope reticle shall be in best focus within -0.75 to -1.0 diopter, as measured on dioptometer scale.
-	Parallax	Parallax in center of the field (geometric center of the reticle) shall not exceed 0.15 mil while viewing a target set at 130 + 10 m For purpose of this test, thickness of telescope reticle line may be considered as equal to 0.10 mil.
-	Definition	The telescope shall produce sharp and clear image at center field of view when checked with the aid of dioptometer.
-	Image Tilt	Position pre-plumbed collimator telescope, at eye-piece of M115 panoramic telescope, so that the optical axes of the two telescopes lie in parallel planes. When line of sight is directed through the auxiliary telescope and M115 panoramic telescope to target, image of vertical reticle line shall be within 1 degree, as measured on projector collimator test reticle. Refer to TM 9-254.
--	Parallelism of Reticle and Image	Vertical reticle line shall be parallel to image of a plumb line, within 30 minutes of arc, at any deflec-tion setting through at least 2 full revolutions of head Refer to TM 9-254.

ITEM NO.	ITEM T0 BE INSPECTED	PROCEDURE
--	Plumb Travel (Elevation Travel) I	Establish telescope line of sight through intersection of reticle line coincident to plumb line target image, that will accommodate +300 mil excursion of line of sight from horizontal position. Elevate and depress line of sight 300 mils from horizontal by means of elevation knob. Any deviation of line of sight from plumb line image during each excursion shall not exceed 0.5 mil.
--	Collimation	Set deflection and reset counters to indicate 3200 mils by use of appropriate control knobs Line of sight through intersection of telescope reticle lines shall not deviate from vertical target line more than 0.5 mil, as measured on projector collimator test reticle.
NOTE: With panoramic telescope set up as described above, the following tests can be performed simultaneously.		
--	Deflection Error (800 Mil Steps)	Error at deflection readings in 800 mil increments, through at least 2 full revolutions of head, shall not exceed 1.5 mil, including backlash. Total spread between greatest positive error and greatest negative error shall not exceed 1.5 mil. Total error including backlash, between the deflection counter and reset counter reading for any one number, shall not exceed 0.5 mil.
--	Deflection Error (15 Mil Steps)	This test should be conducted concurrent with test specified above. Rotate gunner's aid knob until 15 mils are added to reset counter. Error at deflection counter in 15 mil increments of reset counter shall not exceed 0.25 mil, excluding backlash.
--	Level Travel	Establish telescope line of sight horizontal with reference to flat horizontal mounting surface keyways and pivot point elevation of 90-degree prism Position horizontal target line coincident to telescope line of sight. Rotate telescope head through 2 revolutions by means of deflection knob, while simultaneously rotating telescope through 2 revolutions in opposite direction, by means of testing device. During this excursion, any vertical deviation of line of sight from horizontal target line shall not exceed 1.0 mil per revolution (total excursion of 2.0 mils) as measured on projector collimator test reticle. Level travel shall be tested at minimum of eight 800-mil deflection (azimuth) settings.

2-5. CATEGORIES OF INSPECTION (CONT).

Table 2-1. INITIAL INSPECTION-M115 PANORAMIC TELESCOPE (CONT)

ITEM NO.	ITEM T0 BE INSPECTED	PROCEDURE
--	Lift (Deflection)	During level travel test, direction of head rotation shall be reversed. Any vertical displacement of line of sight with respect to horizontal target line resulting from this reversing of travel shall not exceed 0.5 mil. This test shall be performed at minimum of eight 800-mil deflection (azimuth) settings.
--	Backlash	This test should be conducted at same time as level travel test. While rotating deflection knob, backlash in deflection counter must not exceed 1.0 mil, and backlash in reset counter must not exceed 1.25 mil.
--	Open Sight	While viewing a calibrated wall target positioned 50 ft (15 m) from objective end of telescope, line of sight through boresight mark of telescope reticle shall be horizontal and parallel in deflection, with respect to line of sight of open sight, within +10 mils.
	ILLUMINATION EVALUATION	**NOTE:** For the following evaluations apply 24 volt dc power supply to electrical input circuits.
		
22	Counters	Counter illumination shall be sufficient for numerals and markings of each counter to be clearly distinguishable when observed in darkened area.
--	Reticle	When observed in darkened area with reticle LED energized with 24 volts dc, reticle markings must be clearly defined.

Section III. TROUBLESHOOTING

2-6. GENERAL.

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

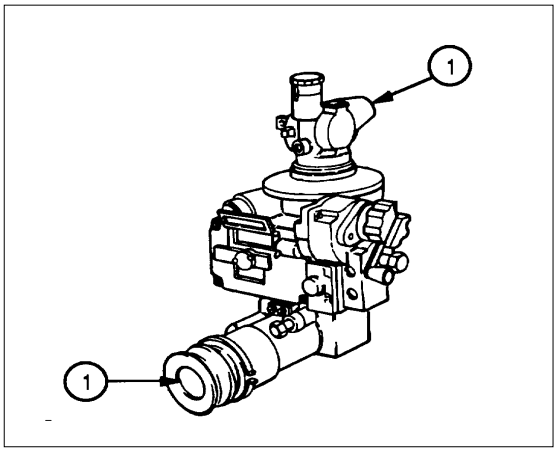
b. The direct support troubleshooting table lists the common malfunctions which may be found during maintenance of the M115 panoramic telescope. Refer to page 29. Perform the tests/inspections and corrective actions in the order listed.

c. The general support troubleshooting table lists the common malfunctions which may be found during maintenance of the M115 panoramic telescope. Refer to page 210. Perform the tests/inspections and corrective actions in the order listed.

d. This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions.

DIRECT SUPPORT SYMPTOM INDEX

Table 2-2. DIRECT SUPPORT TROUBLESHOOTING

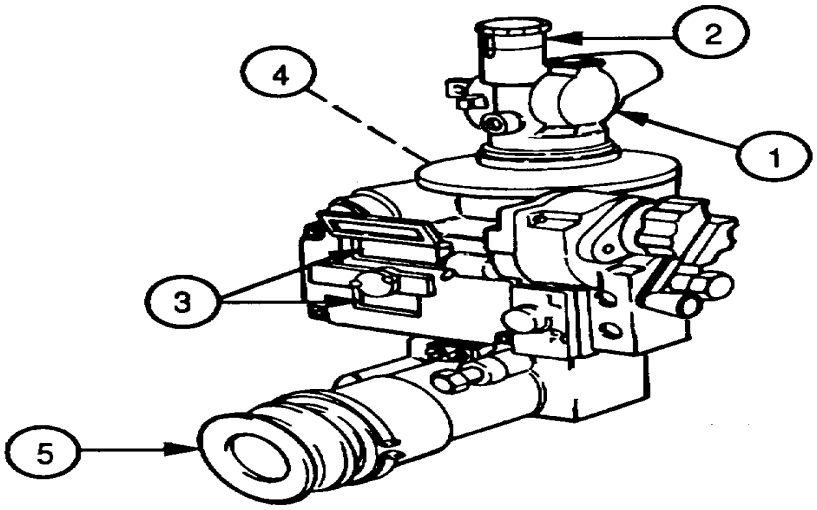
MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION	
OPTICAL LENS	
1. LENS (1) FOCUS OUT OF ADJUSTMENT. Observe visually. Focus lens. Refer to page 2-63. 2. LENS (1) FOGGED OR CONDENSATION PRESENT. Observe visually. Purge and charge telescope. Refer to TM 750-116.	

MALFUNCTION TEST OR INSPECTION	CORRECTIVE ACTION
	a. Repair head assembly. Refer to page 2-22.
	b. Repair body assembly. Refer to page 2-28.
2. ELEVATION KNOB (2) BINDS.	
Observe visually.	
	Focus lens. Refer to page 2-63.
BODY ASSEMBLY	
3. COUNTERS (3) DO NOT OPERATE.	
Adjust knobs.	
	Repair body assembly. Refer to page 2-28.
4. COUNTERS (3) ARE ILLEGIBLE.	
Observe visually.	
	Repair adapter assembly. Refer to page 2-42.
5. GEAR TRAIN (4) IS NOISY WHEN OPERATED.	
Rotate knobs.	
	Repair body assembly. Refer to page 2-28.
ELBOW ASSEMBLY	
6. LENS (5) WILL NOT FOCUS.	
Observe visually.	
	Repair elbow assembly. Refer to page 2-50.
7. LENSES (5) ARE DAMAGED.	
Observe visually.	
	Repair elbow assembly. Refer to page 2-50.

2-6. TROUBLESHOOTING PROCEDURES (CONT).

GENERAL SUPPORT SYMPTOM INDEX

Table 2-3. GENERAL SUPPORT TROUBLESHOOTING

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
 **HEAD ASSEMBLY**
1. HEAD ASSEMBLY (1) BINDS OR JUMPS. Observe visually.

Section IV. DIRECT SUPPORT MAINTENANCE

2-7. MAINTENANCE OF M115 PANORAMIC TELESCOPE.

This task covers: a. Disassembly
b. Cleaning
c. Repair
d. Reassembly

INITIAL SETUP

General Safety Instructions

WARNING

Use adhesives, cleaning solvents, and sealing compounds in well-ventilated area away from open flame. Adhesives, cleaning solvents, and sealing compounds are harmful to skin and clothing, can burn easily, and may give off harmful vapor.

Tools and Special Tools
Tool kit, electronic: system maintenance (SC 5180-95-CL-B29)

Materials/Parts
Lockwasher (8) (MS35333-70)
Sealing compound (item 10, appx C)

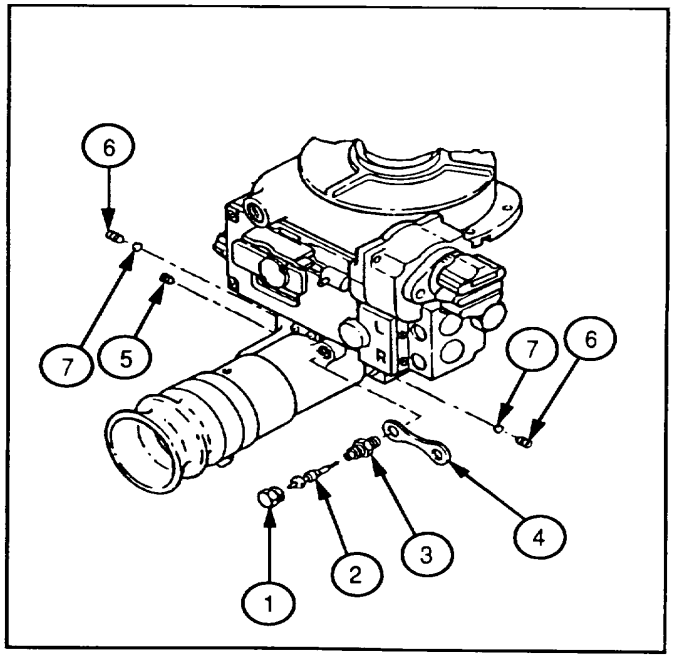
References
TM 750-116
TM 9-254

Equipment Conditions
M115 panoramic telescope removed from howitzer

DISASSEMBLY

1 Remove cap (1), valve core (2), valve stem (3), and nylon retaining strap (4).

2 Remove setscrew (5), two setscrews (6), and two plain solid disks (7).

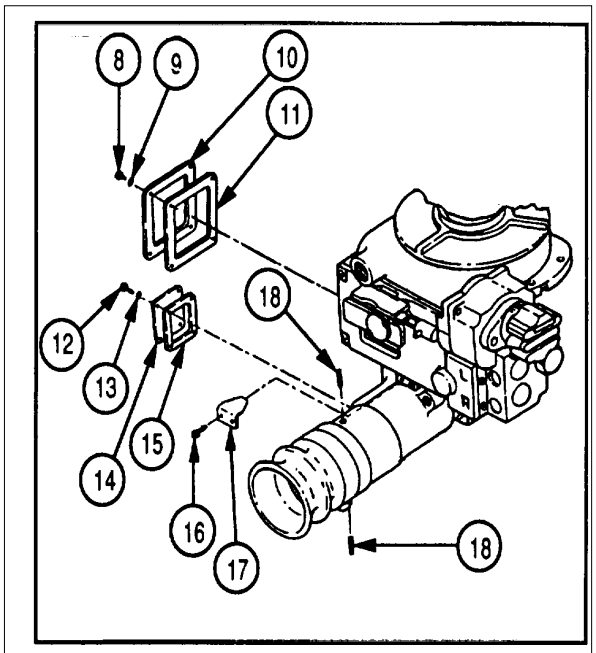


3 Remove four screws (8), four lockwashers (9), access cover (10), and gasket (11).

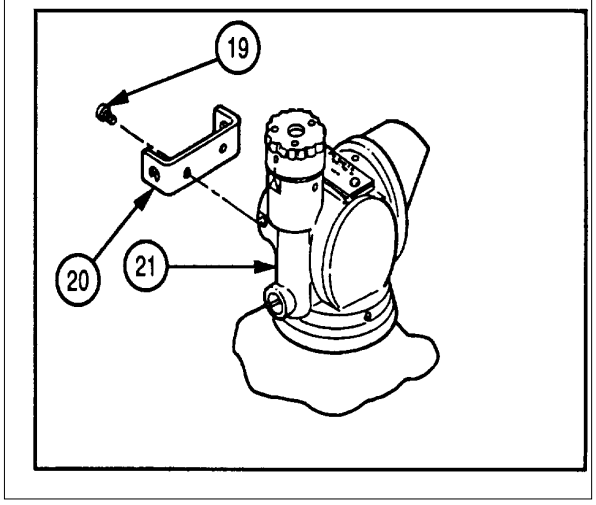
4 Remove four screws (12), four lockwashers (13), access cover (14), and gasket (15).

5 Remove two screws (16) and stop (17).

6 Remove two setscrews (18).



7 Remove two screws (19) and open sight (20) from head assembly (21).



CLEANING

Clean all parts per TM 9-254.

REPAIR

Repair is by replacement of authorized parts as required. Refer to appendix B.

2-7. MAINTENANCE OF MI15 PANORAMIC TELESCOPE (CONT).

REASSEMBLY

1 Install open sight (1) on head assembly (2) and secure using two screws (3).

2 Apply sealing compound (item 10, appx C) to two setscrews (4).

3 Install two setscrews (4).

4 Apply sealing compound (item 10, appx C) under head of two screws (5).

5 Install stop (6) and two screws (5).

6 Install gasket (7), access cover (8), four new lockwashers (9), and screws (10).

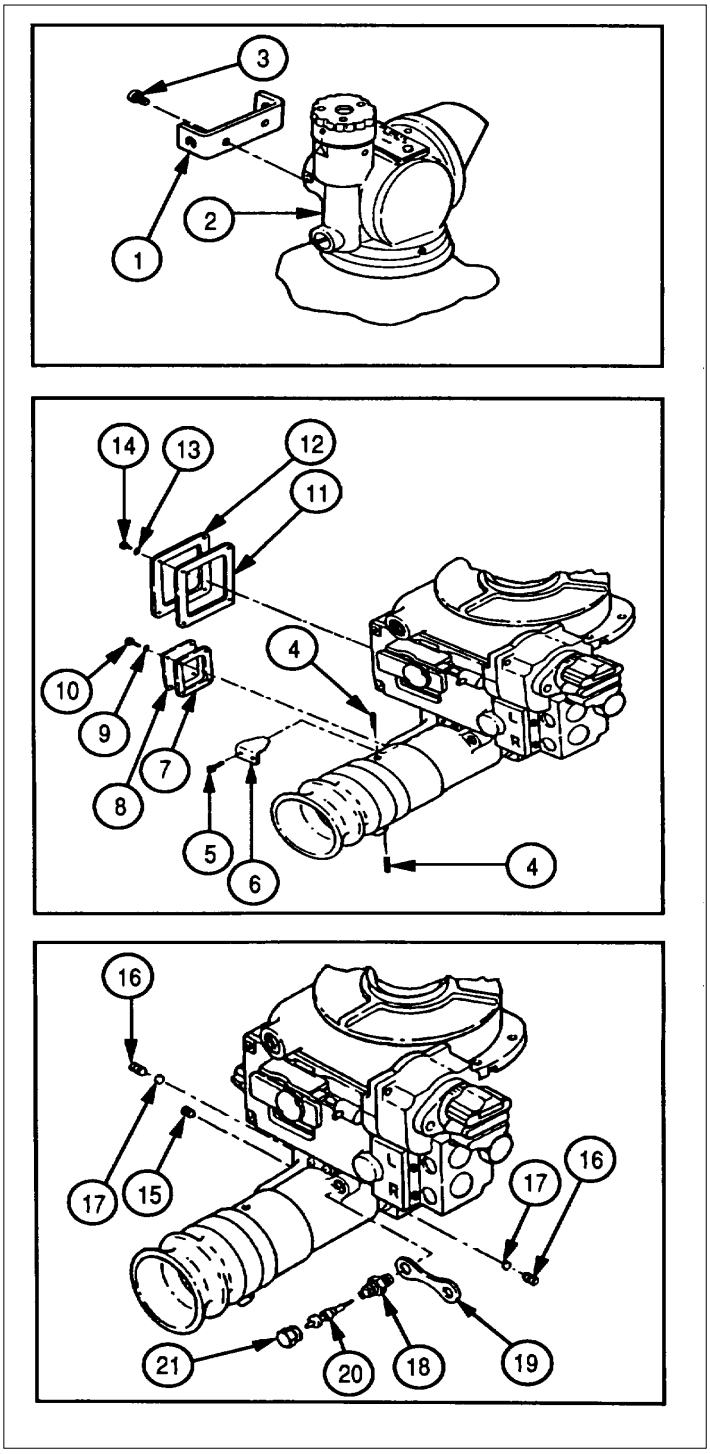
7 Install gasket (11), access cover (12), four new lockwashers (13), and four screws (14).

8 Apply sealing compound (item 10, appx C) to threads of setscrew (15) and two setscrews (16).

9 Install setscrew (15) until flush.
10 Install two plain solid disks (17) and two set-screws (16).

11 Apply sealing compound (item 10, appx C) to threads of purging valve stem (18).

12 Install nylon retaining strap (19), valve stem (18), valve core (20), and cap (21).



2-8. MAINTENANCE OF BODY ASSEMBLY.

This task covers:

a. Disassembly
b. Cleaning
c. Repair
d. Reassembly

INITIAL SETUP:

Tools and Special Tools
Tool kit, electronic: system maintenance

(SC 5180-95-CL-B29)

Materials/Parts
Adhesive (item 4, appx C)
Lockwasher (MS35333-71)
Lockwasher (MS35338-135)
Sealing compound (item 10, appx C)

References
TM 9-254

General Safety Instructions

WARNING

Use adhesives, cleaning solvents, and sealing compounds in well-ventilated area away from open flame. Adhesives, cleaning solvents, and sealing compounds are harmful to skin and clothing, can burn easily, and may give off harmful vapor.

DISASSEMBLY

1 Remove screw (1) and knob (2) from body (3).

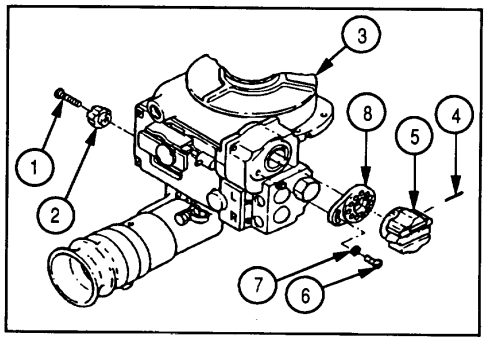
2 Remove pin (4) and knob assembly (5).

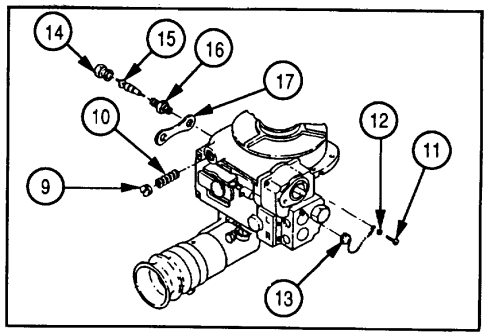
3 Remove capscrew (6), lockwasher (7), and metal plate (8).

4. Remove plug (9) and spring (10).

5. Remove screw (11), lockwasher (12), and assembly cap (13).

6 Remove cap (14), valve core (15), valve stem (16), and retaining strap (17).





2-8. MAINTENANCE OF BODY ASSEMBLY (CONT).

CLEANING

Clean all parts per TM 9-254.

REPAIR

Repair is by replacement of authorized parts as required. Refer to appendix B.

REASSEMBLY

1. Apply sealing compound (item 10, appx C) to threads of valve stem (1).

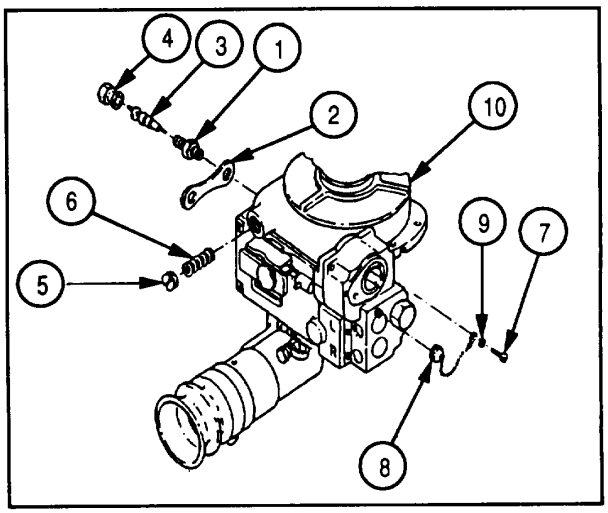
2. Install retaining strap (2), valve stem (1), valve core (3), and cap (4).

3. Apply sealing compound (item 10, appx C) to threads of plug (5).

4. Install spring (6) and thread plug (5).

5. Apply adhesive (item 4, appx C) to head of screw (7).

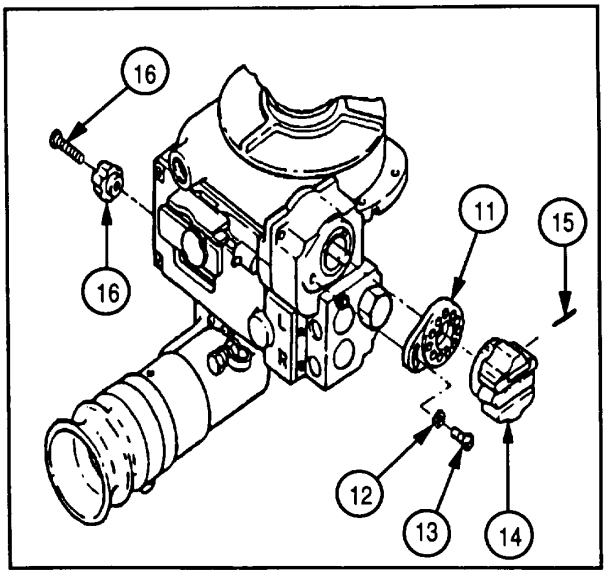
6. Install assembly cap (8), new lockwasher (9), and screw (7) to body (10).



7. Install metal plate (11), new lockwasher (12), and screw (13).

8. Install knob assembly (14) and pin (15).

9. Install knob (16) and screw (17).



2-9. MAINTENANCE OF ADAPTER ASSEMBLY.

This task covers:

a. Removal	**c. Inspection**	**e. Pre-Load Check of Bearing**
b. Disassembly	**d. Reassembly**	**f. Installation**

INITIAL SETUP:

Tools and Special Tools
Tool kit, electronic: system maintenance (SC 5180-95-CL-B29)
Tubular spanner wrench, 11/16 and 45/64 (7597638)

Materials/Parts
Lockwasher (3) (MS35338-136)
Sealant adhesive (item 5, appx C)

References
TM 9-254

Equipment Conditions
M115 panoramic telescope removed from M110A2 howitzer

General Safety Instructions

WARNING

Use adhesives, cleaning solvents, and sealing compounds in well-ventilated area away from open flame Adhesives, cleaning solvents, and sealing compounds are harmful to skin and clothing, can burn easily, and may give off harmful vapor.

DISASSEMBLY

1. Remove two screws (1) and cap assembly (2) from adapter (3).

2. Pull wire with lamp base through to the front of the overlay assembly (4).

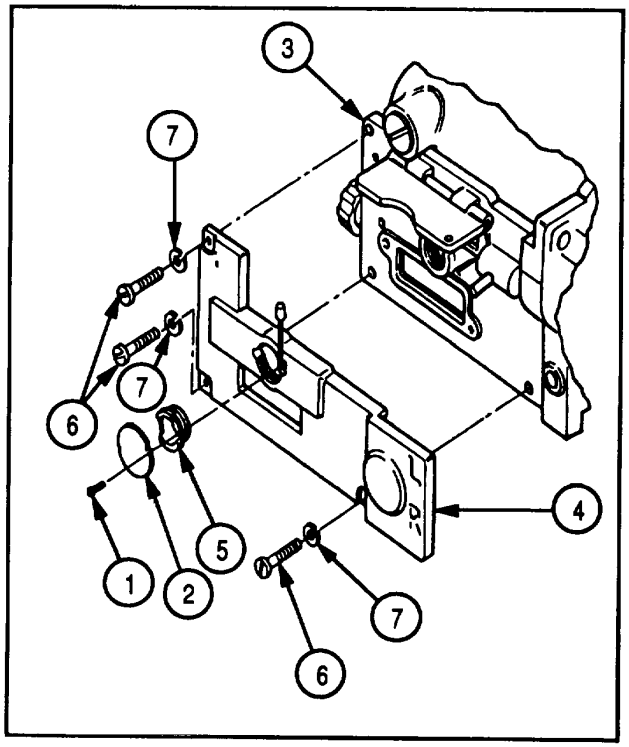
3. Using tubular spanner wrench, remove externally threaded ring (5) from adapter (3).

NOTE

Do not remove upper right hand screw.

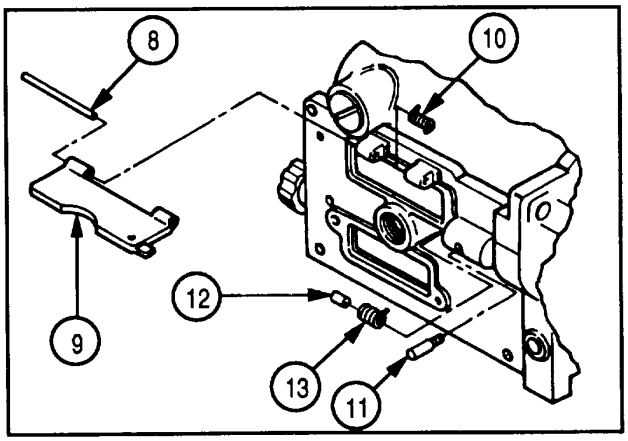
4. Remove three screws (6) and three lockwashers (7).

5. Remove overlay assembly (4) from adapter (3).



2-9. MAINTENANCE OF ADAPTER ASSEMBLY ((

DISASSEMBLY (CONT)



6. Remove rod (8), cover (9), and torsion spring (10).

7. Remove mechanical post (11), detent plunger (12), and spring (13).

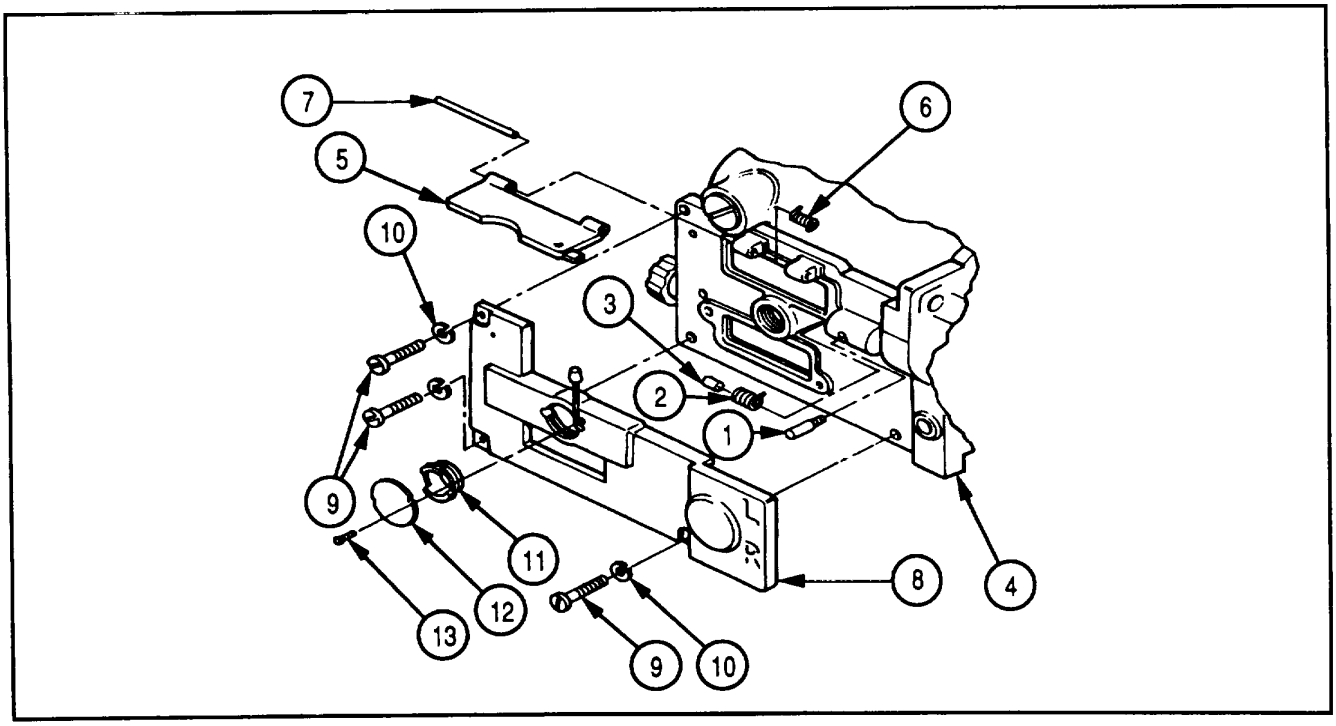
CLEANING

Clean all parts per TM 9-254.

REPAIR

Repair is by replacement of authorized parts as required. Refer to appendix B.

REASSEMBLY



1 Apply sealant adhesive (item 5, appx C) to threads of mechanical post (1).

2 Install spring (2), detent plunger (3), and mechanical post (1) to adapter (4).

3 Install cover (5), torsion spring (6), and rod (7).

4 Pull wire with lamp base through to the front of overlay assembly (8).

5 Install overlay assembly (8) onto adapter (4).

6 Apply sealant adhesive' (item 5, appx C) to tips of three screws (9).

7 Loosely install three new lockwashers (10) and three screws (9).

8 Apply sealant adhesive (item 5, appx C) to threads of externally threaded ring (11).

9 Using tubular spanner wrench (7597638), install externally threaded ring (11) on adapter (4).

10 Insert lamp base portion of overlay assembly (8) into contact of adapter (4).

11 Position wire in recessed area to accommodate cap assembly (12).

12 Install cap assembly (12) and two screws (13).

13 Apply sealant adhesive (item 5, appx C) to outer edge of cap assembly (12).

14 Tighten three screws (9).

Section V. GENERAL SUPPORT MAINTENANCE

2-10. MAINTENANCE OF M115 PANORAMIC TELESCOPE.

This task covers:

a. Disassembly
b. Cleaning
c. Repair
d. Reassembly

INITIAL SETUP:

Tools and Special Tools
Shop equipment, electronic: system maintenance, (SC 5180-95-CL-B29)
Torque adapter (figure 4, appx D)
Torque wrench (GGG-W-686)

Materials/Parts
Preformed packing (8587449-2)
Preformed packing (8587449-5)
Sealing compound (item 10, appx C)
Silicone compound (item 11, appx C)

References
TM 9-254

Equipment Conditions
M1 15 Panoramic telescope removed from M11 A2 howitzer (TM 9-2350-304-20-2)

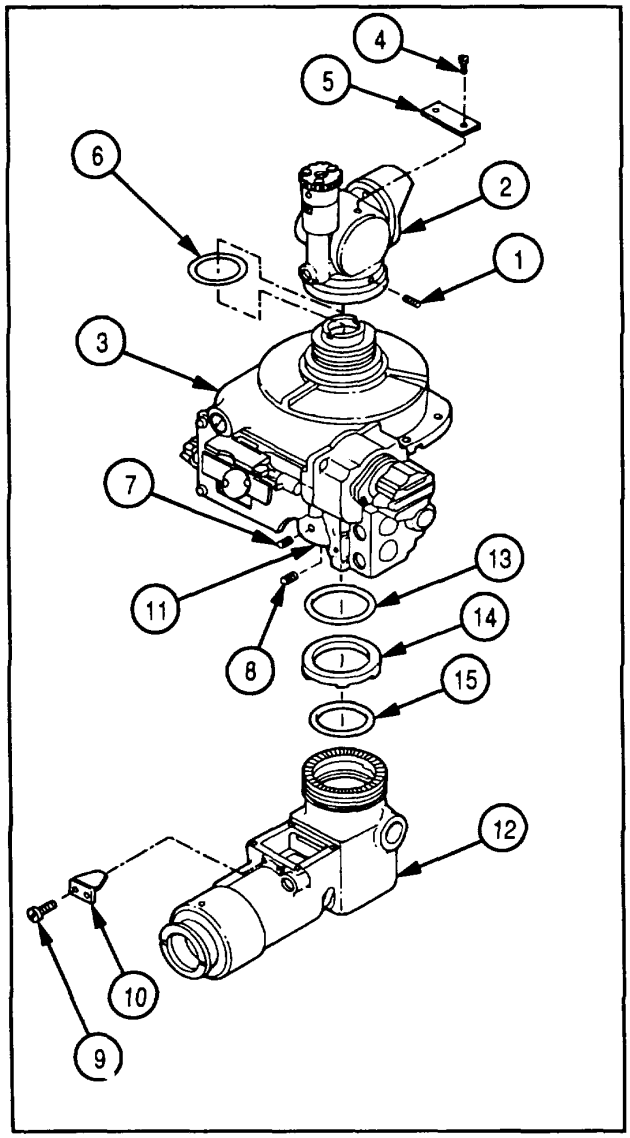
General Safety Instructions

WARNING

Use adhesives, cleaning solvents, and sealing compounds in well-ventilated area away from open flame. Adhesives, cleaning solvents, and sealing compounds are harmful to skin and clothing, can burn easily, and may give off harmful vapor.

2-10. MAINTENANCE OF M115 PANORAMIC TE

DISASSEMBLY



1 Remove three setscrews (1) and head assembly (2) from body assembly (3).

2 Remove two screws (4) and identification plate (5).

3 Remove and discard preformed packing (6).

4 Remove three setscrews (7) and setscrew (8) from body assembly (3).

5 Remove two screws (9) and stop (10).

6 Turn collar (11) counterclockwise to disengage body (3) from elbow assembly (12).

7 Remove spring tension washer (13) and positive clutch half (14) from body assembly (3).

8 Remove preformed packing (15) from groove in elbow assembly (12). Discard preformed packing.

CLEANING

Clean all parts per TM 9-254.

REPAIR

1 Head assembly is a repairable assembly; refer to page 2-22.

2 Body assembly is a repairable assembly; refer to page 2-28.

3 Elbow assembly is a repairable assembly; refer to page 2-50.
Repair is by replacement of authorized parts as required. Refer to appendix B.

REASSEMBLY

1 Apply a coat of silicone compound (item 11, appx C) to new preformed packing (1), and install new preformed packing (1) in groove in elbow assembly (2).

2 Install spring tension washer (3) and positive clutch half (4) on body assembly (5) Make sure pins in body assembly (5) aline with holes in positive clutch half (4).

3 Install elbow assembly (2) on body assembly (5).

4 Turn collar (6) clockwise until snug.

5 Apply sealing compound (item 10, appx C) to threads of three setscrews (7) and setscrew (8).

6 Install three set screws (7) and setscrew (8) in body assembly (5).

7 Install identification plate (9) and two screws (10).

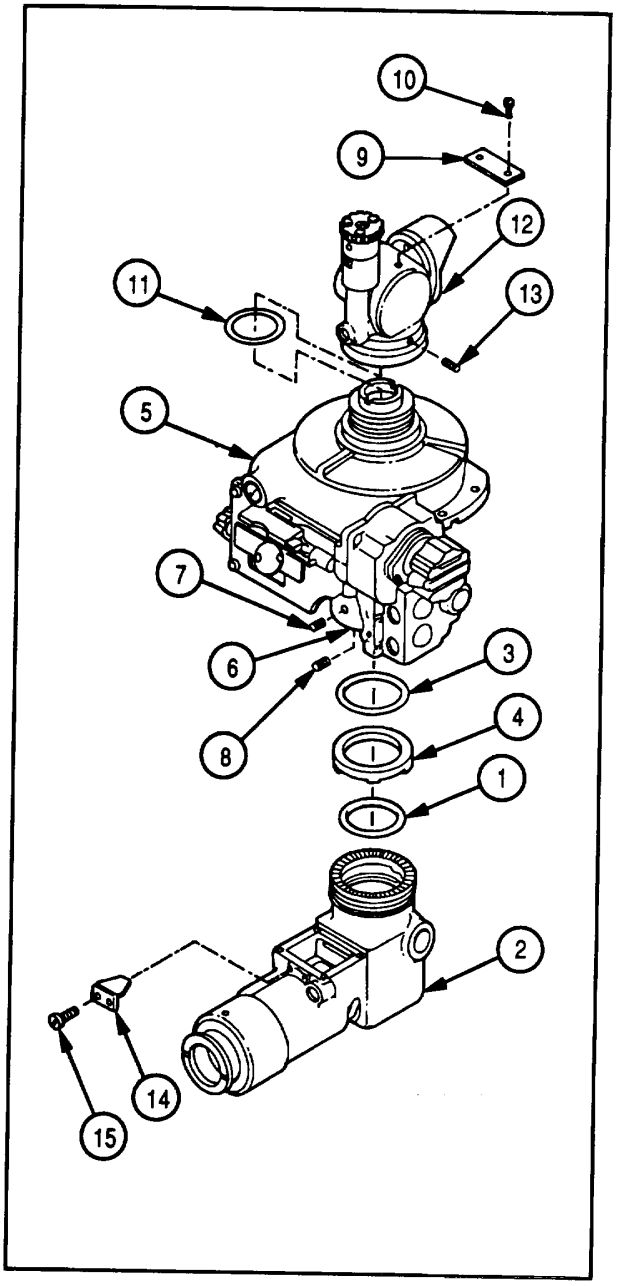
8 Apply a coat of silicone compound (item 11, appx C) to new preformed packing (11).

9 Install new preformed packing (11) and head assembly (12) to body assembly (5) Using torque adapter, torque to 80.00 in.-lb (9.04 N-m) Refer to page 2-64.

10 Apply sealing compound (item 10, appx C) to threads of three setscrews (13).

11 Install three setscrews (13) in head assembly (12).

12 Install stop (14) and two screws (15).



2-11. MAINTENANCE OF HEAD ASSEMBLY.

This task covers:

a. Disassembly
b. Cleaning
c. Repair
d. Reassembly

INITIAL SETUP:

Tools and Special Tools

Tool kit, electronic: system maintenance (SC 5180-95-CL-B29)
Adjustable spanner wrench (8284045)

Materials/Parts

Preformed packing (8587397-1)
Preformed packing (8587449-4)
Sealing compound (item 10, appx C)
Self-locking nut (8587370)
Silicone compound (item 11, appx C)

References

TM 9-254

General Safety Instructions

WARNING

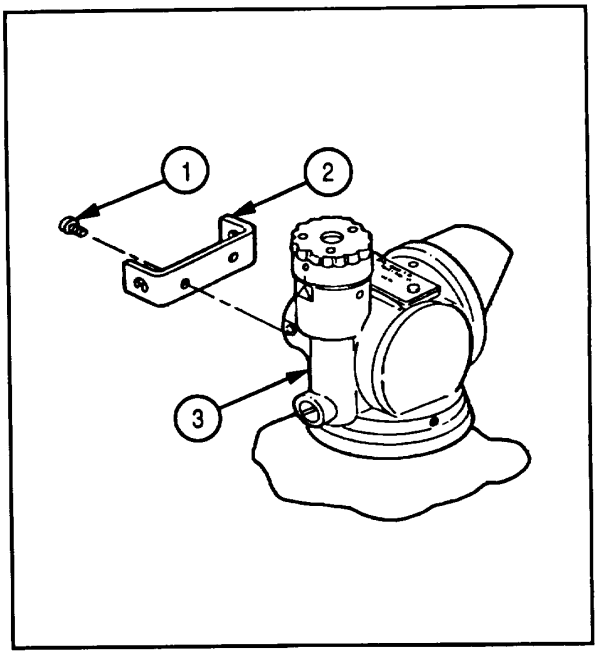
Use adhesives, cleaning solvents, and sealing compounds in well-ventilated are away from open flame. Adhesives, cleaning solvents, and sealing compounds are harmful to skin and clothing, can burn easily, and may give off harmful vapor.

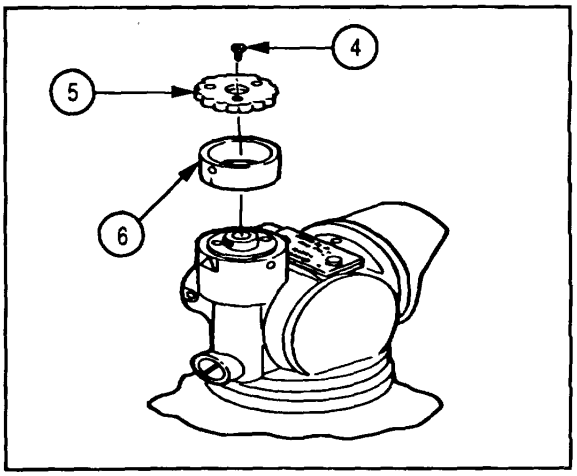
DISASSEMBLY

NOTE

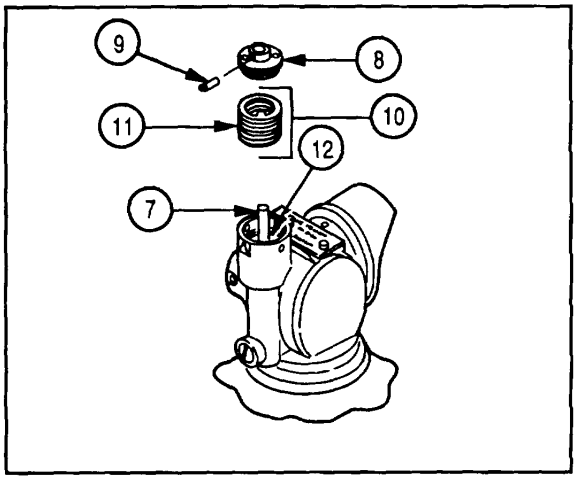
Head assembly does not have to be removed from M115 panoramic telescope to perform disassembly procedures.

1 Remove two screws (1) and open sight (2) from head assembly (3).





2 Remove three screws (4), knob (5), and micrometer (6).



3 Scribe a mark on top of worm shaft (7) and micrometer adapter (8).

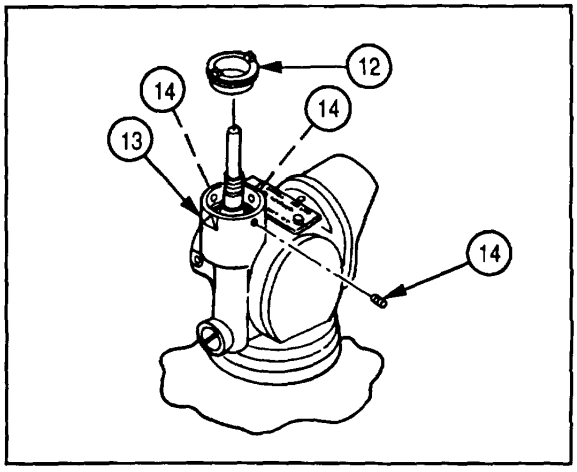
NOTE

Press on adapter to compress key washers.

4 Remove tapered pin (9) and micrometer adapter (8).

5 Remove six key washers (10).

6 Remove key washer (11) from pinned adapter (12).

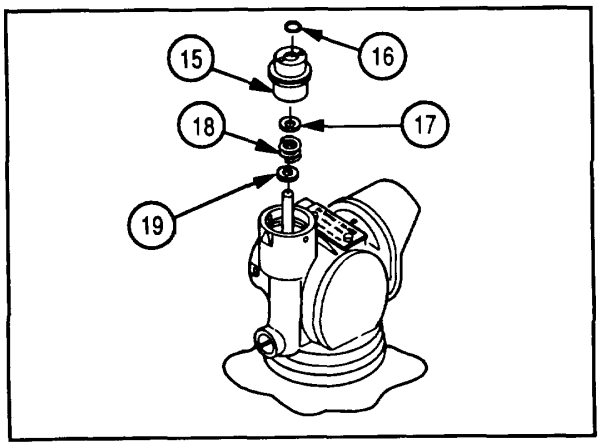


7 Scribe a mark on pinned adapter (12) and rotating head (13).

8 Remove three setscrews (14) and pinned adapter (12).

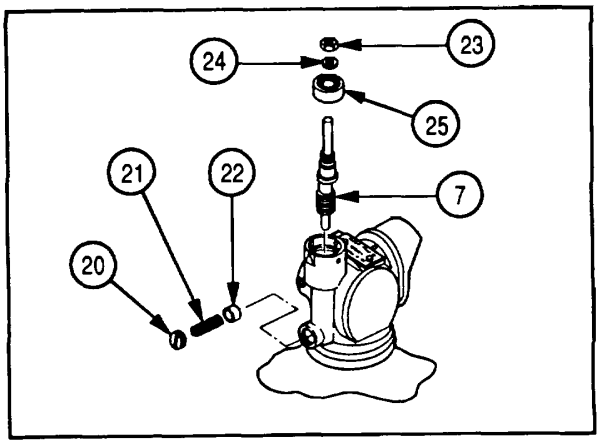
2-11. MAINTENANCE OF HEAD ASSEMBLY (CO

DISASSEMBLY (CONT)



9 Using adjustable spanner wrench, remove retainer (15) and preformed packing (16) Discard preformed packing.

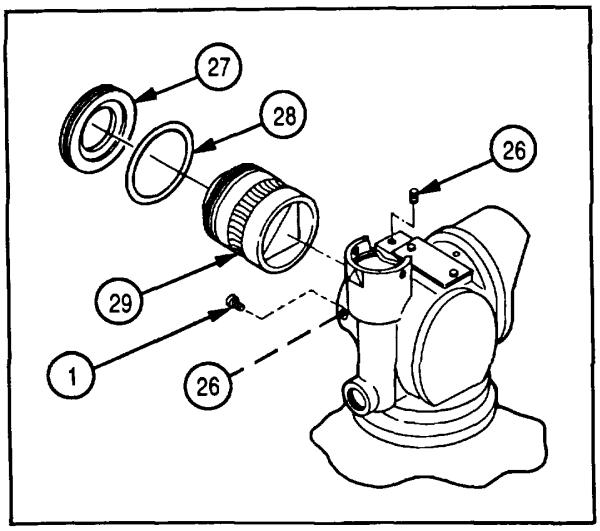
10 Remove nonmetallic washer (17), spring (18), and nonmetallic washer (19).



11 Remove plug (20), spring (21), and bearing (22).

12 Remove worm shaft (7) with self-locking nut (23), flat washer (24), and bearing (25) attached.

13 Remove and discard self-locking nut (23), flat washer (24), and bearing (25) from worm shaft (7).

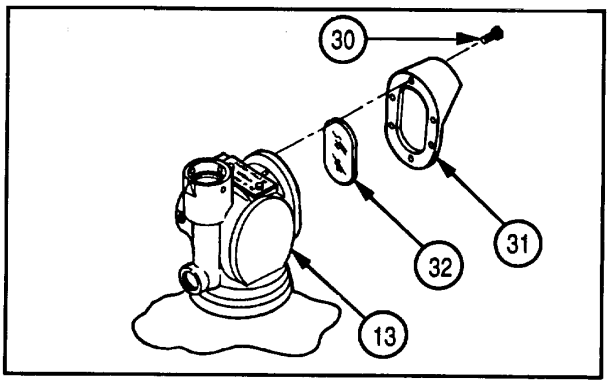


14 Remove two setscrews (26).

NOTE

To aid in removal of prism, install two screws (1) on head assembly.

15 Using adjustable spanner wrench, remove externally threaded ring (27), preformed packing (28), and prism (29) Discard preformed packing.



16 Remove six screws (30) and window frame (31).

17 Carefully remove excess sealer from window (32).

18 Carefully remove window (32) from rotating head (13).

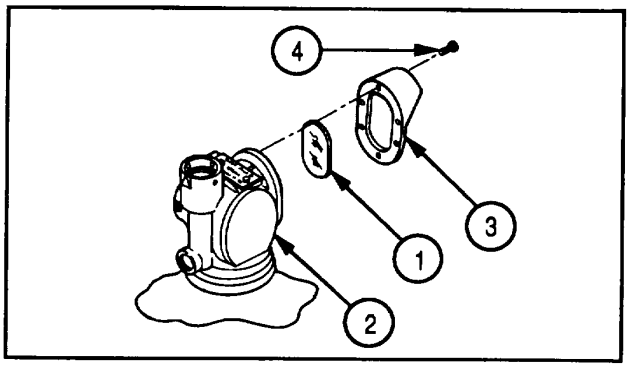
CLEANING

Clean all parts per TM 9-254.

REPAIR

Repair is by replacement of authorized parts as required. Refer to appendix B.

REASSEMBLY

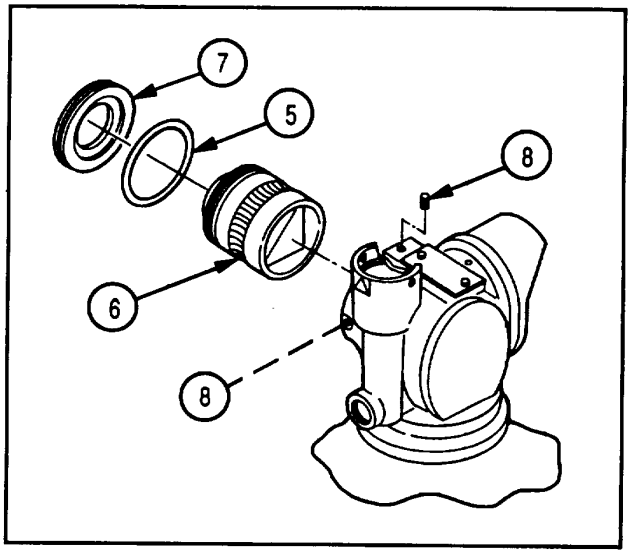


1 Apply a coat of sealing compound (item 10, appx C) to edge of window (1).

2 Carefully install window (1) in rotating head (2).

3 Apply sealing compound (item 10, appx C) to threads of screws (3).

4 Install window frame (4) and six screws (3).



5 Apply a coat of silicone compound (item 11, appx C) to new preformed packing (5) and install new preformed packing in groove of prism (6).

6 Install prism (6).

7 Using adjustable spanner wrench, install externally threaded ring (7).

8 Apply sealing compound (item 10, appx C) to threads of two setscrews (8).

9 Install two setscrews (8).

2-11. MAINTENANCE OF HEAD ASSEMBLY (CONT).

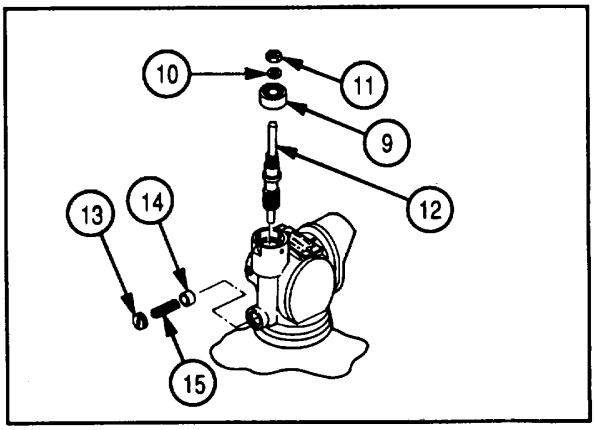
REASSEMBL Y (CONT)

10 Install bearing (9), flat washer (10), and new self-locking nut (11) on worm shaft (12).

11 Install worm shaft (12) by turning clockwise.

12 Apply sealing compound (item 10, appx C) to threads of plug (13).

13 Install bearing (14), spring (15), and plug (13).



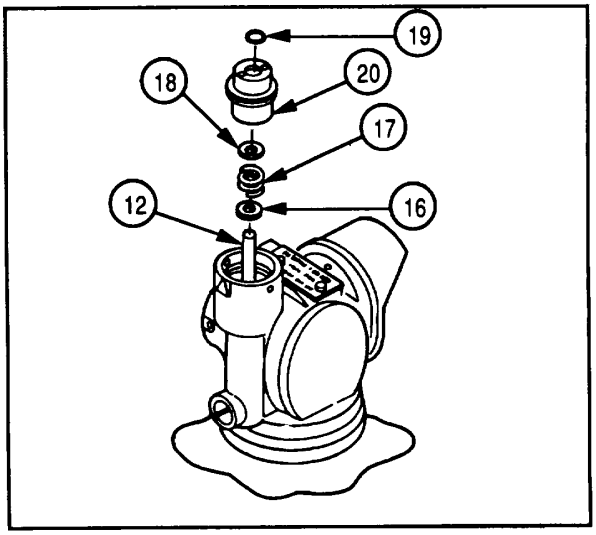
14 Install nonmetallic washer (16), spring (17), and nonmetallic washer (18) on worm shaft (12).

15 Apply a coat of silicone compound (item 11, appx C) to new preformed packing (19).

16 Install new preformed packing (19) in retainer (20).

17 Apply sealing compound (item 10, appx C) to threads of retainer (20).

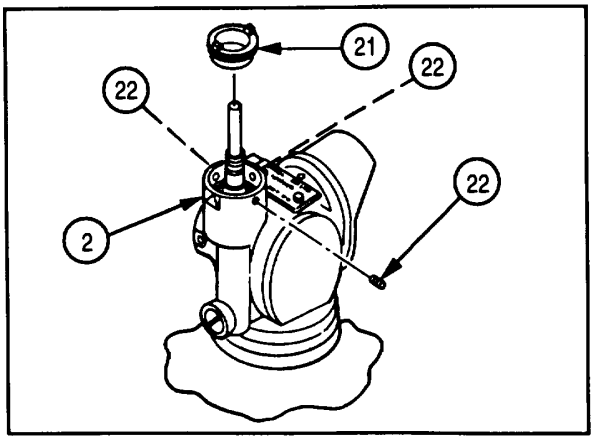
18 Using adjustable spanner wrench, install retainer (20).

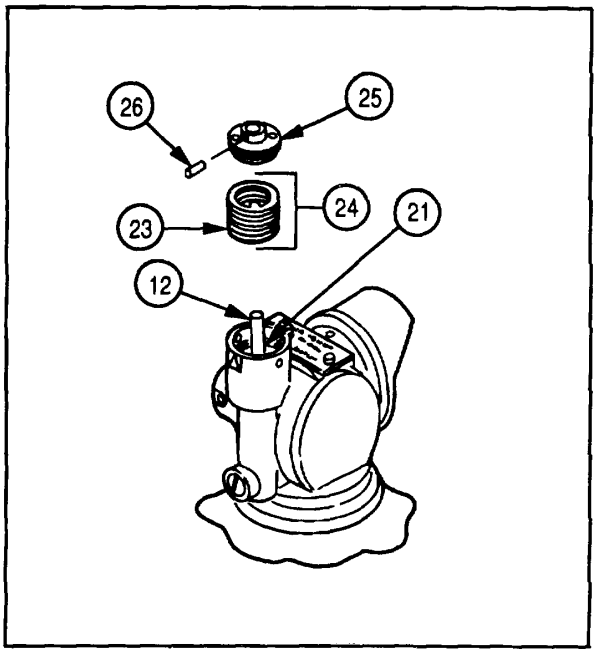


19 Install pinned adapter (21) in rotating head (2) and aline scribe marks.

20 Apply sealing compound (item 10, appx C) to threads of three setscrews (22).

21 Install three setscrews (22).



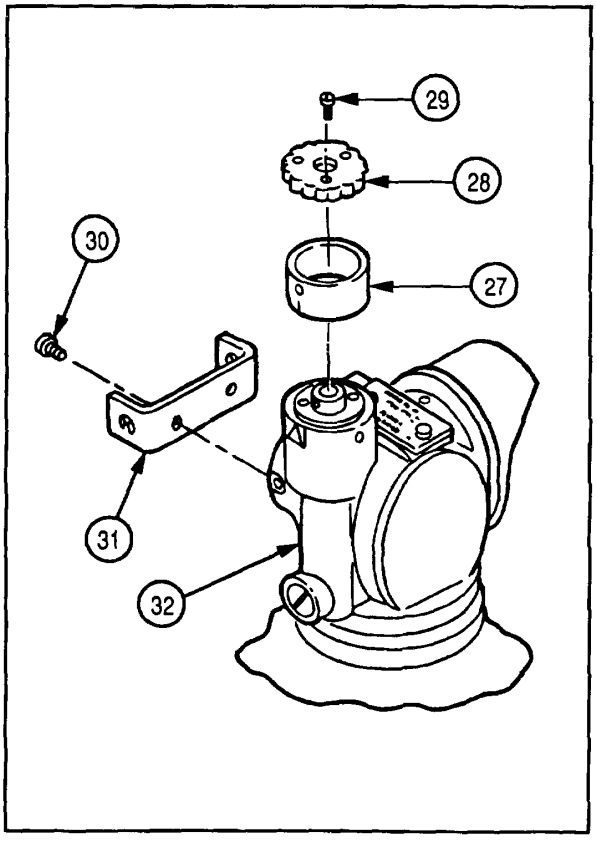


22 Install key washer (23) in pinned adapter (21).

23 Install six key washers (24).

24 Install micrometer adapter (25) on worm shaft (12), aligning scribe marks.

25 Install tapered pin (26).



26 Install micrometer (27) and knob (28).

27 Apply sealing compound (item 10, appx C) to threads of three screws (29).

28 Install three screws (29).

29 Apply sealing compound (item 10, appx C) to threads of two screws (30).

30 Install open sight (31) with two screws (30) on head assembly (32).

2-12. MAINTENANCE OF BODY ASSEMBLY, SUBASSEMBLY.

This task covers:

a. Disassembly
b. Cleaning
c. Repair
d. Reassembly

INITIAL SETUP:

Tools and Special Tools
Tool kit, electronic: system maintenance (SC 5180-95-CL-B29)
Adjustable spanner wrench (7597708)
Adjustable spanner wrench (figure B-25, item 7)

Materials/Parts
Adhesive (item 3, appx C)
Adhesive (item 4, appx C)
Aircraft grease (item 7, appx C)
Aircraft grease (item 8, appx C)
Lockwasher (MS35333-71)
Lockwasher (7) (MS35338-135)
Lockwasher (4) (MS35338-136)
Preformed packing (8587397-2)
Preformed packing (8587397-3)
Preformed packing (8587449-1)
Preformed packing (8587449-6)
Sealing compound (item 10, appx C)
Self-locking nut (MS21044C5)
Silicone compound (item 11, appx C)
Solder (Item 12, appx C)
Soldering flux (item 6, appx C)

References
TM 9-254

Equipment Condition
2-19 Head assembly removed
2-19 Elbow assembly removed

General Safety Instructions

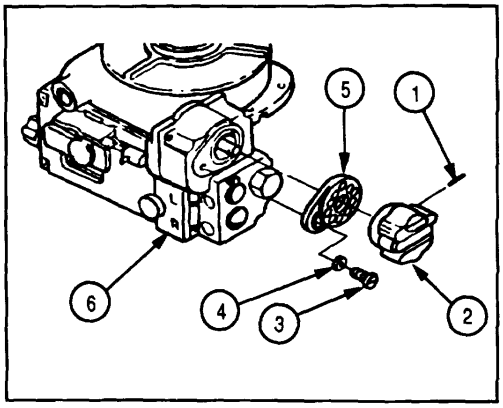
WARNING

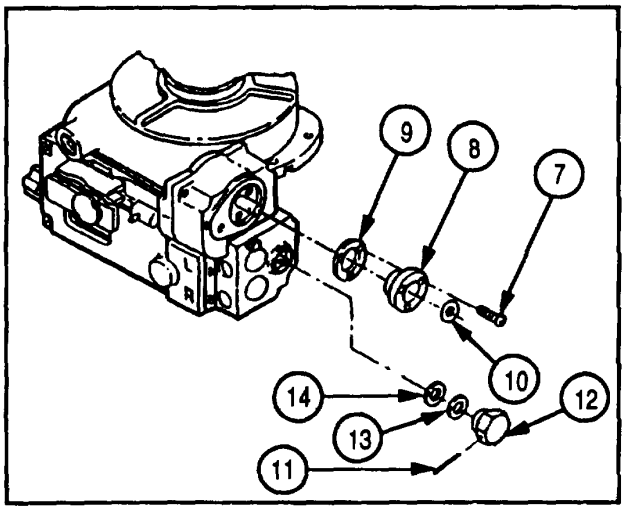
Use adhesives, cleaning solvents, and sealing compounds in well-ventilated area away from open flame. Adhesives, cleaning sol vents, and sealing compounds are harmful to skin and clothing, can burn easily, and may give off harmful vapor.

DISASSEMBLY

1 Remove pin (1) and knob assembly (2).

2 Remove capscrew (3), lockwasher (4), and metal plate (5) from telescope subassembly (6).

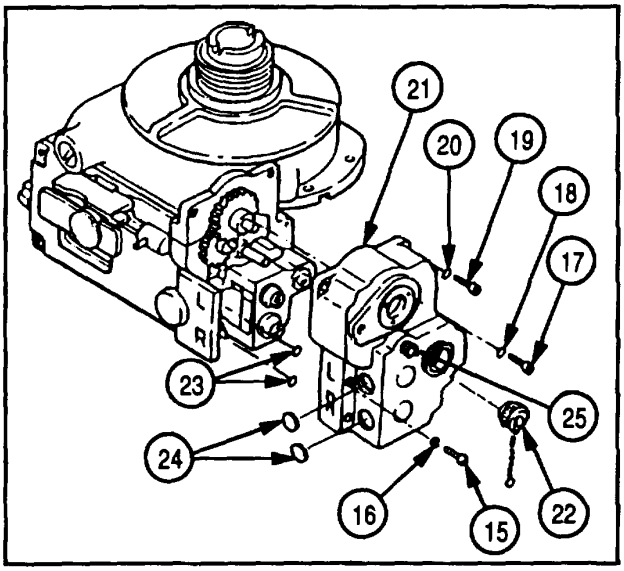




3 Remove three screws (7), sleeve bearing (8), and gasket (9).

4 Remove preformed packing (10) from sleeve bearing (8) and discard preformed packing.

5 Remove pin (11), knob (12), shim(s) (13), and seal (14).



6 Remove four screws (15), four lockwashers (16), two screws (17), two lockwashers (18), screw (19), lockwasher (20), and cover (21).

7 Remove assembly cap (22).

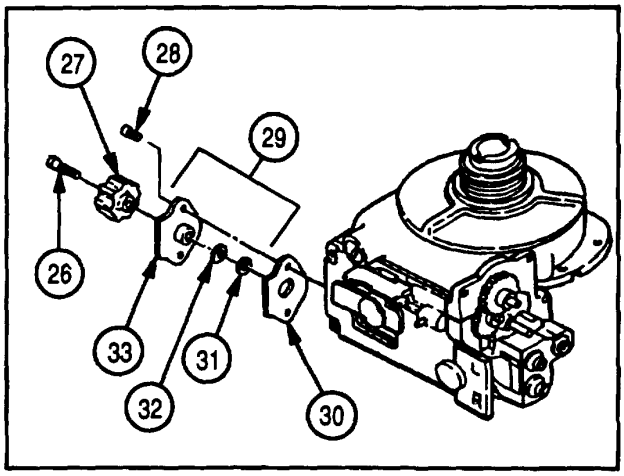
8 Remove seven spacers (23).

NOTE

Steps 9 and 10 are written and illustrated for disassembly of telescope subassembly.

9 Carefully remove two observation windows (24).

10 Remove special sleeve (25) only if damaged.



11 Remove screw (26) and knob (27).

12 Remove two screws (28), cover assembly (29), and gasket (30).

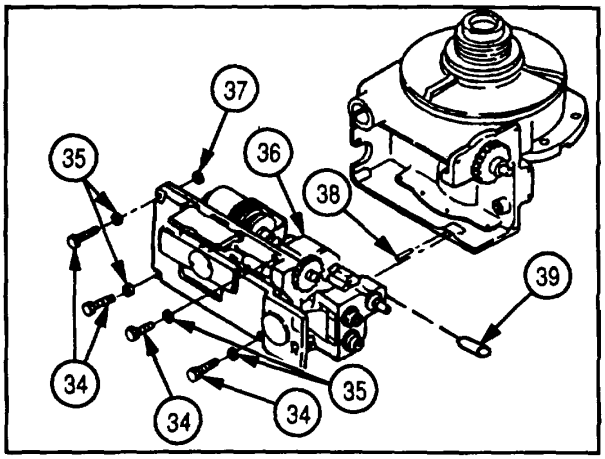
NOTE

Step 13 is written and illustrated for the disassembly of cover assembly.

13 Remove packing retainer (31) and preformed packing (32) from cover (33). Discard preformed packing.

2-12. MAINTENANCE OF BODY ASSEMBLY, COVER ASSEMBLY, AND TELESCOPE

DISASSEMBL Y (CONT)

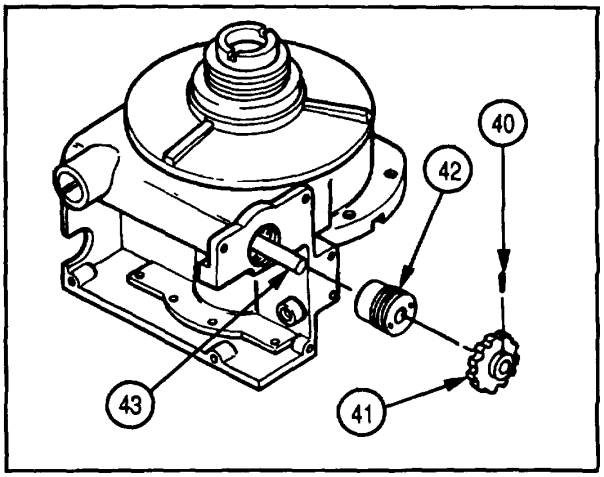


14 Remove four socket capscrews (34), four lockwashers (35), and adapter assembly (36).

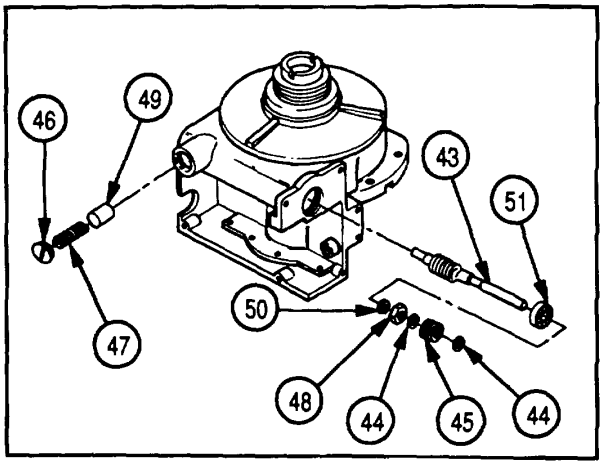
15 Remove four spacers (37).

16 Remove pin (38) only if damaged.

17 Remove two pins (39).



18 Using adjustable spanner wrench (7597708), remove tapered pin (40), spur gear (41), and retainer (42) from worm shaft (43).



19 Remove two nonmetallic washers (44) and spring (45) from worm shaft (43).

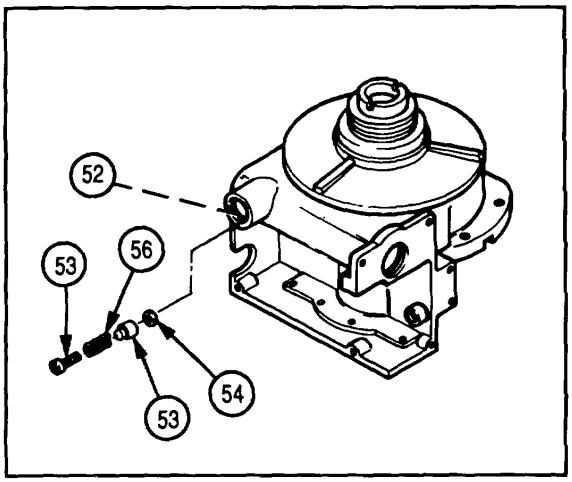
20 Remove plug (46) and spring (47).

21 Remove worm shaft (43) by rotating self-locking nut (48) counterclockwise, then remove plunger (49).

22 Remove self-locking nut (48), thrust washer (50), and bearing (51) from worm shaft (43).

23 Unsolder wire (52) from electrical contact (53).

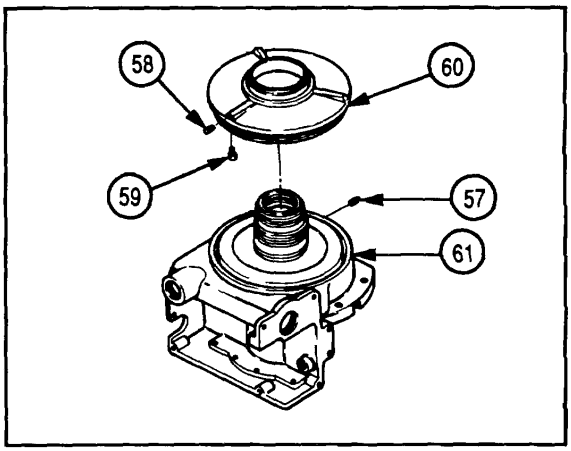
24 Remove retaining ring (54), bushing insulator (55), spring (56), and electrical contact (53).



25 Remove three setscrews (57), three setscrews (58), and loosen three plug assemblies (59).

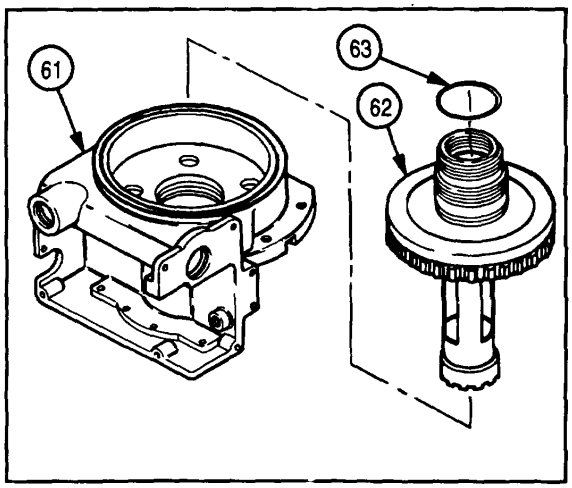
26 Rotate cover (60) counterclockwise and remove from body (61).

27 Remove three plug assemblies (59) from cover (60).



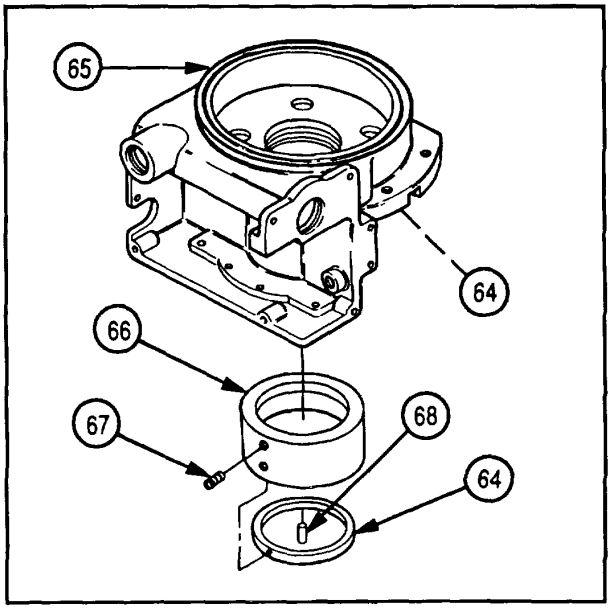
28 Remove worm assembly (62) from body (61).

29 Remove preformed packing (63) and discard.



2-12. MAINTENANCE OF BODY ASSEMBLY, COVER ASSEMBLY, AND TELESCOPE SUBASSEMBLY (CONT).

DISASSEMBL Y (CONT)



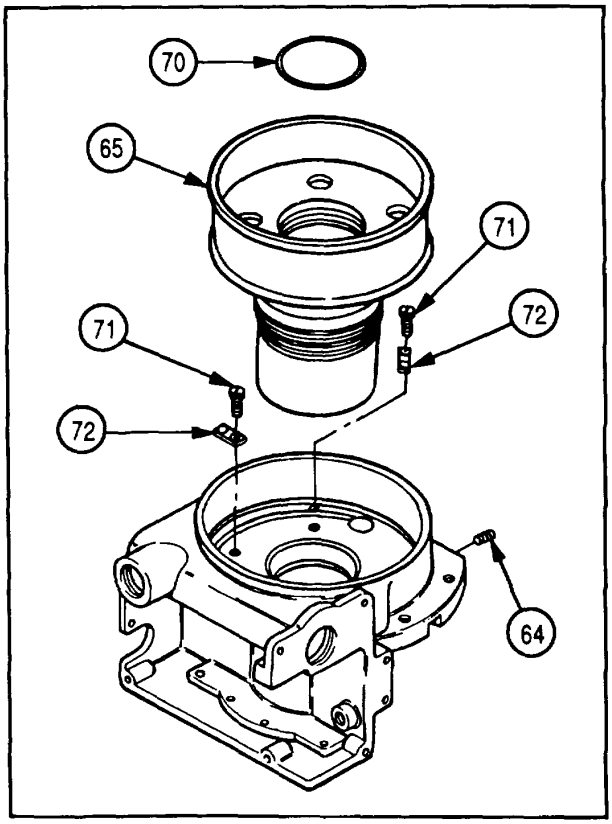
30 Loosen two setscrews (64) and then loosen support (65) using adjustable spanner wrench (fig. B-25, item 7).

31 Rotate collar (66) to expose four setscrews (67) Remove setscrews.

32 Tighten support (65) and two setscrews (64).

33 Remove two pins (68) from round nut (69) only if damaged.

34 Remove round nut (69) and collar (66) together.



35 Remove two setscrews (64) and unscrew support (65).

36 Remove preformed packing (70) and discard.

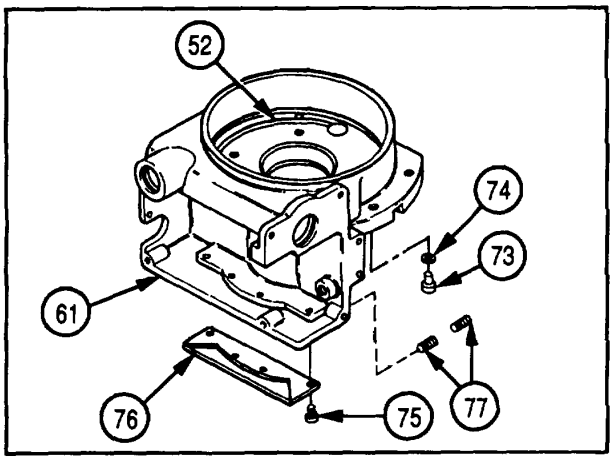
37 Remove four screws (71) and two plate spacers (72).

38 If damaged, unsolder wire (52) from contact (73).

39 Remove wire (52), contact (73), and insulator (74).

40 Remove four screws (75) and guide (76) from body (61).

41 Remove two setscrews (77).



CLEANING

Clean all parts per TM 9-254.

REPAIR

1 Adapter assembly is a repairable assembly; refer to page 2-42.

2 Worm assembly is a repairable assembly; refer to page 2-39.

3 Repair is by replacement of authorized parts as required. Refer to appendix B.

REASSEMBLY

NOTE

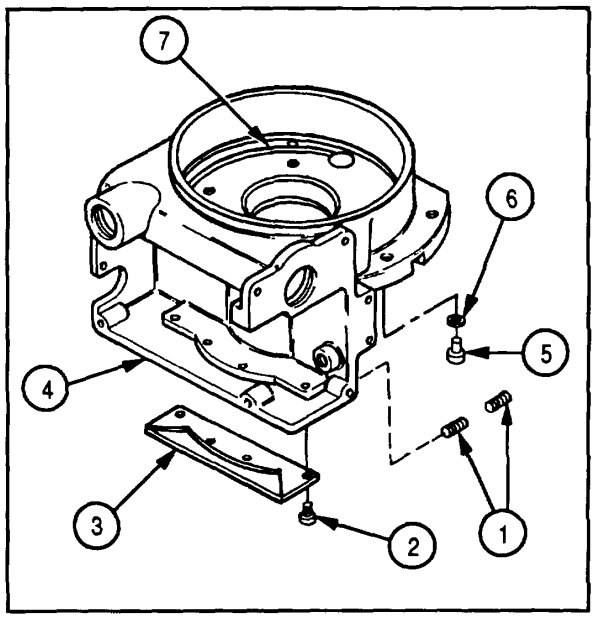
Apply a light film of aircraft grease (item 7, appx C) to contacting surfaces of all moving or operable mechanical parts.

1 Apply sealing compound (item 10, appx C) to setscrews (1) and to threads of four screws (2).

2 Install guide (3) and four screws (3) to body (4).

3 If removed, apply sealing compound (item 10, appx C) to threads of contact (5) and insulator (6) and install.

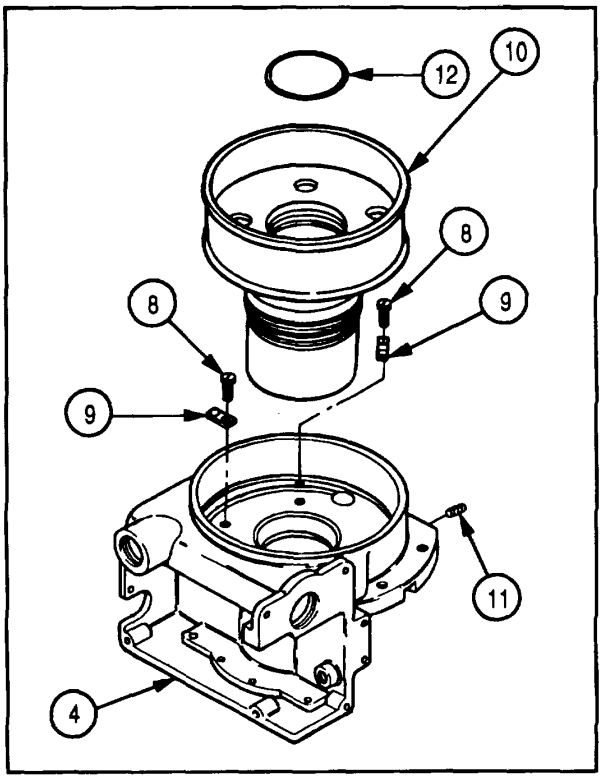
4 Using solder (item 12, appx C), and soldering flux (item 6, appx C), solder wire (7) to contact (5).



2-12. MAINTENANCE OF BODY ASSEMBLY, COVER ASSEMBLY, AND TELESCOPE SUBASSEMBLY (CONT).

REASSEMBL Y (CONT)

2-34



5 Apply sealing compound (item 10, appx C) under heads of four screws (8).

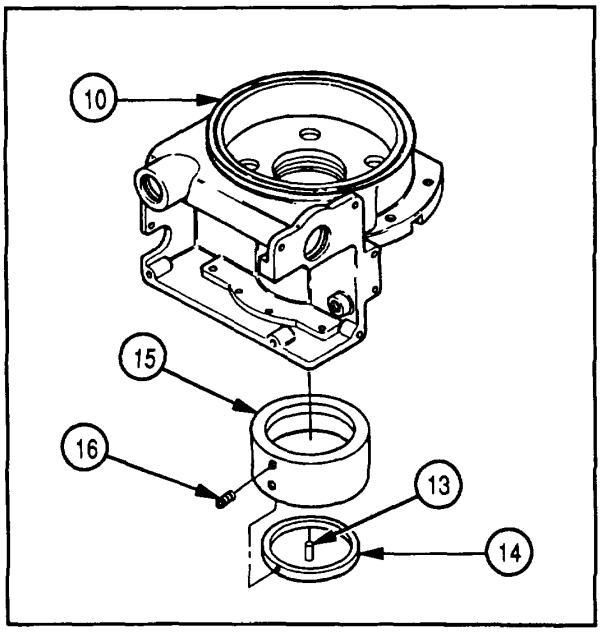
6 Install two plate spacers (9) and four screws (8).

7 Apply sealing compound (item 10, appx C) to support (10) and threads of two setscrews (11).

8 Install support (10) in body (4) Secure support with two setscrews (11).

9 Apply a coat of aircraft grease (item 8, appx C) to new preformed packing (12).

10 Install new preformed packing (12) in support (10).



11 If removed, install two pins (13) in round nut (14).

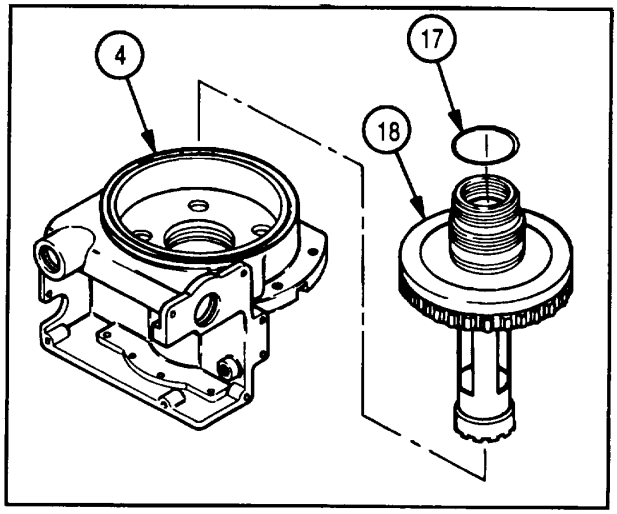
12 Install collar (15) on support (10) and secure with round nut (14).

13 Apply sealing compound (item 10, appx C) to four setscrews (16).

14 Install four setscrews (16) by rotating collar (15) to gain access to holes.

15 Apply a light coat of silicone compound (item 11, appx C) to new preformed packing (17).

16 Install new preformed packing (17) in worm assembly (18), and install worm assembly in body (4).

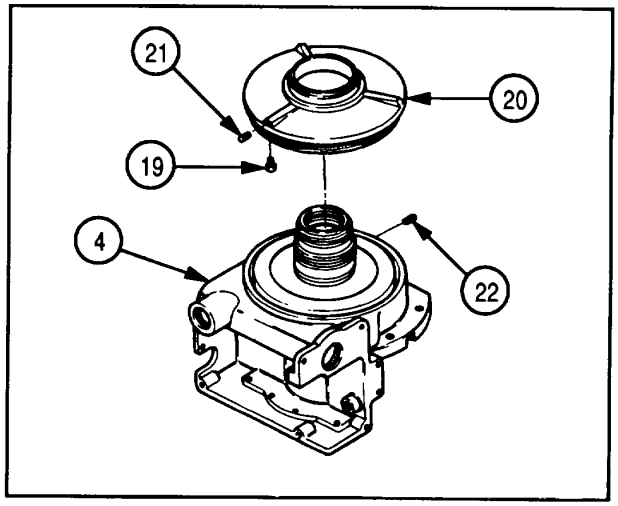


17 Install three plug assemblies (19) in cover (20).

18 Apply sealing compound (item 10, appx C) to lip of cover (20).

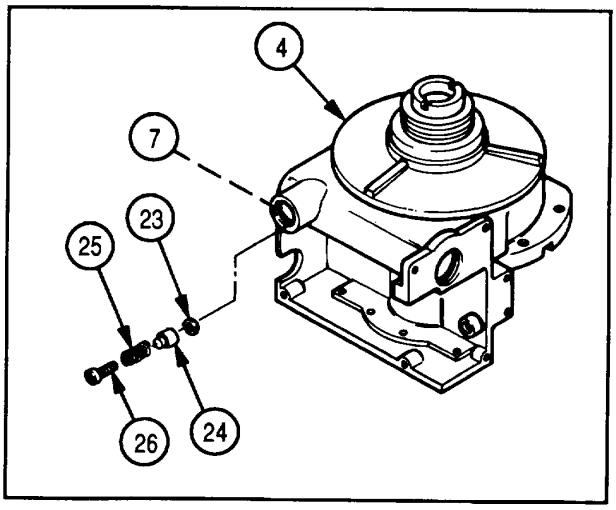
19 Install cover (20) on body (4) by turning clockwise.

20 Install three setscrews (21) and three setscrews (22).



21 Assemble retaining ring (23), bushing insulator (24), spring (25), and electrical contact (26) as a unit and install in body (4).

22 Using solder (item 12, appx C), and soldering flux (item 6, appx C), solder wire (7) to electrical



2-12. MAINTENANCE OF BODY ASSEMBLY, COVER ASSEMBLY, AND TELESCOPE

REASSEMBL Y (CONT)

23 Install bearing (27) on worm shaft (28) and secure with thrust washer (29) and new self-locking nut (30).

24 Install plunger (31) and aline hole.

25 Install worm shaft (28) in body (4) by rotating clockwise.

26 Install spring (32) and plug (33).

27 Install two nonmetallic washers (34) and spring (35) on worm shaft (28).

28 Apply sealing compound (item 10, appx C) to threads of retainer (36).

29 Using adjustable spanner wrench (7597708), install retainer (36) and spur gear (37) on worm shaft (28).

30 If necessary, drill and ream spur gear (37) and worm shaft (28).

31 Install tapered pin (38).

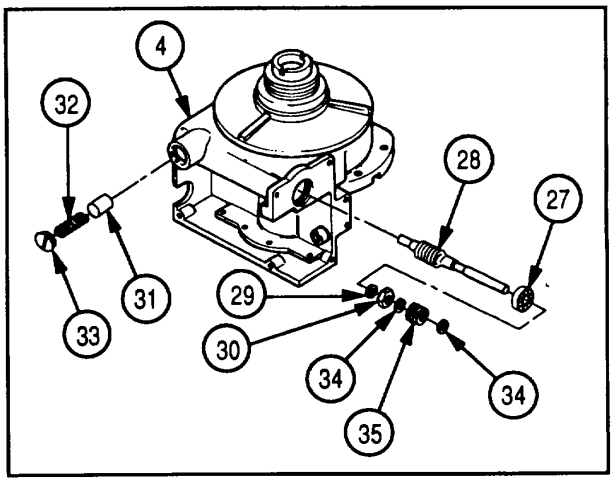
32 If removed, install pin (39) in body (4).

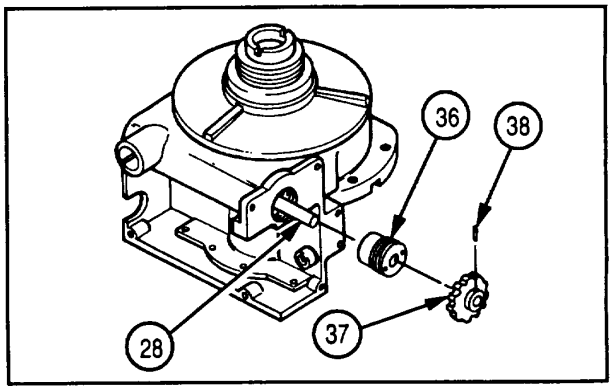
33 Apply a coat of adhesive (item 4, appx C) to mating surfaces of adapter assembly (40), body (4), and to tips of four socket capscrews (41).

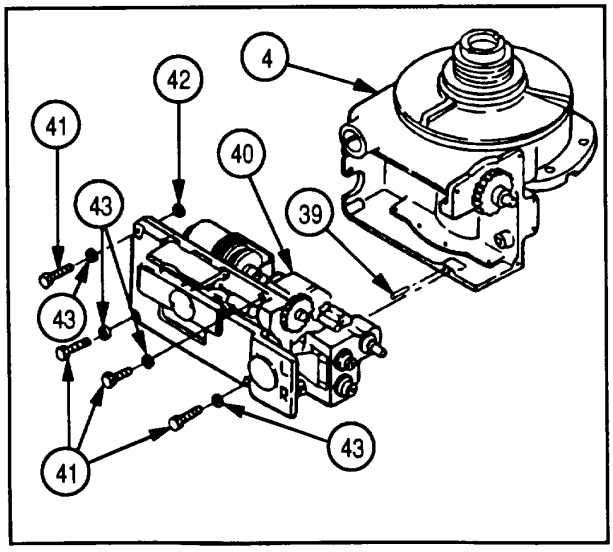
34 Apply sealing compound (item 10, appx C) to four spacers (42).

35 Install four spacers (42) on adapter assembly (40).

36 Install adapter assembly (40), four new lockwashers (43), and four socket capscrews (41) on body (4).







NOTE

Steps 37 thru 39 are written and illustrated for reassembly of cover assembly.

37 Apply a coat of aircraft grease (item 7, appx C) to new preformed packing (44).

38 Apply adhesive (item 3, appx C) to packing retainer (45).

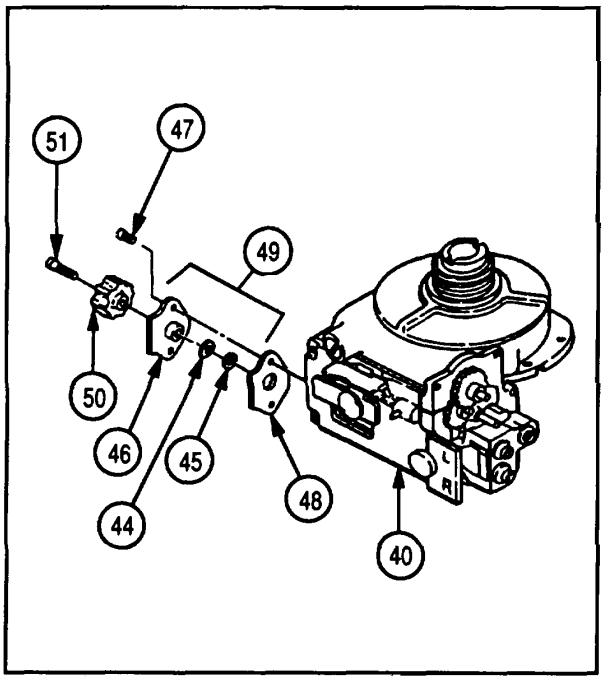
39 Install new preformed packing (44) and packing retainer (45) in cover (46).

40 Apply sealing compound (item 10, appx C) to threads of two screws (47).

41 Apply adhesive (item 4, appx C) to both sides of gasket (48).

42 Install gasket (48), cover assembly (49), and two screws (47).

43 Install knob (50) and screw (51) on adapter assembly (40).



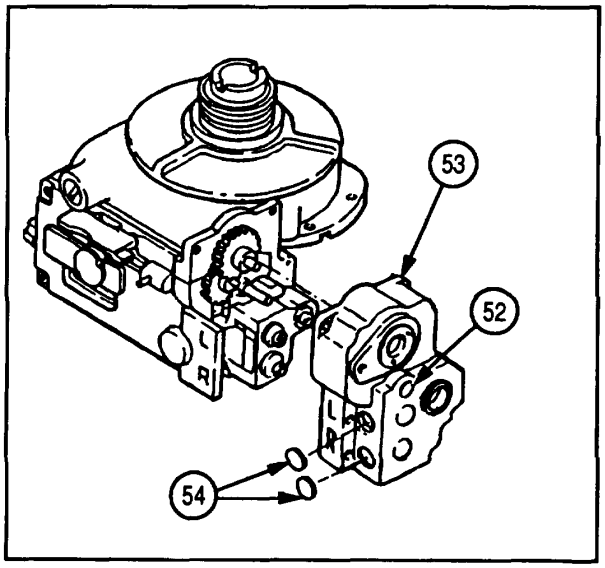
NOTE

Steps 44 thru 46 are written and illustrated for reassembly of telescope subassembly.

44 If removed, apply sealing compound (item 10, appx C) and install sleeve (52) on cover (53).

45 Apply a light coat of sealing compound (item 10, appx C) to outer edges of two observation windows (54).

46 Install two observation windows (54) on cover (53) Wipe away any excess sealing compound.



2-12. MAINTENANCE OF BODY ASSEMBLY, COVER ASSEMBLY, AND TELESCOPE SUBASSEMBLY (CONT).

REASSEMBL Y (CONT)

47 Apply adhesive (item 4, appx C) to mating surface of telescope subassembly (55), and heads of two screws (56), screw (57), and four screws (58).

48 Apply adhesive (item 4, appx C) to seven spacers (59).

49 Install seven spacers (59) on telescope subassembly (55).

50 Apply bead of adhesive (item 4, appx C) to mating surface of telescope subassembly (55).

51 Install telescope subassembly (55), two new lockwashers (60), two screws (56), four new lockwashers (61), four screws (58), new lockwasher (62), assembly cap (63), and new screw (57).

52 Apply a coat of silicone compound (item 11, appx C) to seal (64).

53 Install seal (64) and necessary number of shims (65) to remove slack on knob (66).

54 Install knob (66) and pin (67).

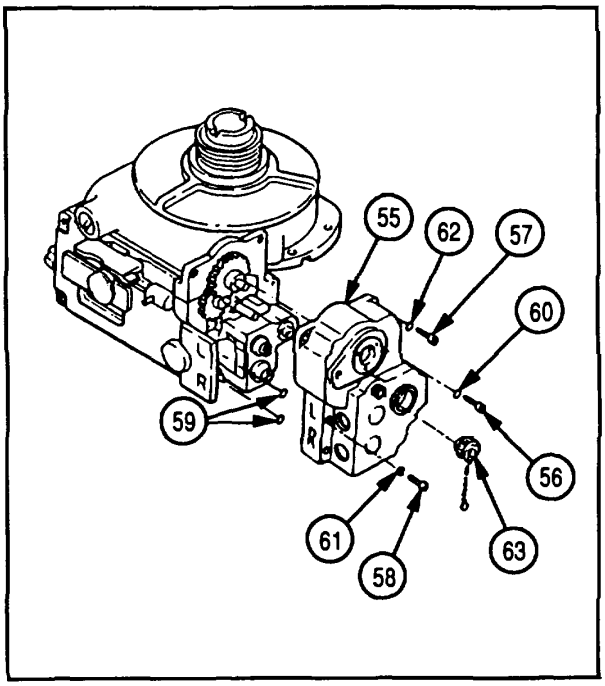
55 Apply a coat of silicone compound (item 11, appx C) to new preformed packing (68).

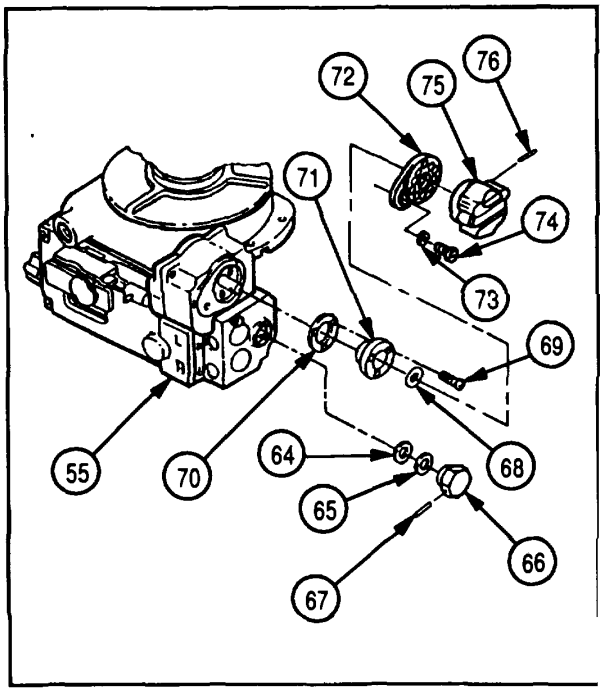
56 Apply sealing compound (item 10, appx C) to heads of three screws (69).

57 Install gasket (70), sleeve bearing (71), new preformed packing (68), and three screws (69).

58 Install metal plate (72), new lockwasher (73), and socket capscrew (74) on telescope subassembly (55).

59 Install knob assembly (75) and pin (76).





213 MAINTENANCE OF OPTICAL INSTRUMENT WORM ASSEMBLY, OPTICAL INSTRUMENT COLLECTIVE CELL ASSEMBLY, OPTICAL INSTRUMENT OBJECTIVE CELL ASSEMBLY, AND RETICLE ASSEMBLY.

This task covers:

a. Removal/ Disassembly
b. Cleaning
c. Repair
d. Reassembly/Installation

INITIAL SETUP:

Tools and Special Tools

Tool kit, electronic: system maintenance (SC 5180-95-CL-B29)
Spanner wrench (item 7, appx D)
Tubular spanner wrench, 27/32 and 55/64 (7597650)
Tubular spanner wrench, 31/32 and 63/6 (7597647)
Tubular spanner wrench, 1 and 1-1/64 (7597648)
Tubular spanner wrench, 1-1/16 and 1-5/64 (7597650)

Materials/Parts

Sealing compound (item 10, appx C)

References

TM 9-254

Equipment Conditions

2-28 Worm assembly removed

General Safety Instructions

WARNING

Use adhesives, cleaning solvents, and sealing compounds in well-ventilated area away from open flame. Adhesives, cleaning sol vents, and sealing compounds are harmful to skin and clothing, can burn easily, and may give off harmful vapor.

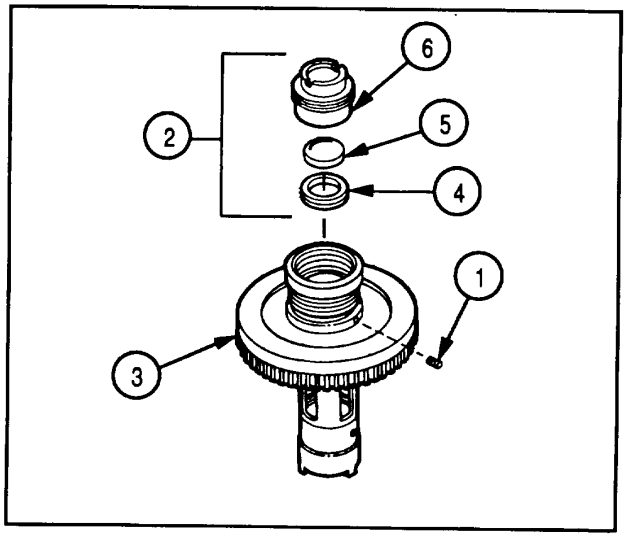
REMOVAL/DISASSEMBLY

1 Remove setscrew (1) and cell assembly (2) from gear (3) using tubular spanner wrench (7597650).

NOTE

Step 2 is written and illustrated for disassembly of cell assembly (8587297).

2 Remove cell (4) and lens (5) from optical element cell (6) using tubular spanner wrench (7597647).



2-13. MAINTENANCE OF OPTICAL INSTRUMENT WORM ASSEMBLY, OPTICAL INSTRU- MENT COLLECTIVE CELL ASSEMBLY, OPTICAL INSTRUMENT OBJECTIVE CELL ASSEMBLY, AND RETICLE ASSEMBLY (CONT).

REMOVAL/DISASSEMBL Y (CONT)

NOTE

Measure distance between top of gear to cell assembly lens and record for reassembly.

3 Remove setscrew (7). Remove cell assembly (8) from gear (3) using fabricated spanner wrench (item 7, appx D).

NOTE

Step 4 is written and illustrated for disassembly of cell assembly (8587296).

4 Remove retainer (9) and lens (10) from optical element cell (11) using tubular spanner wrench (7597648).

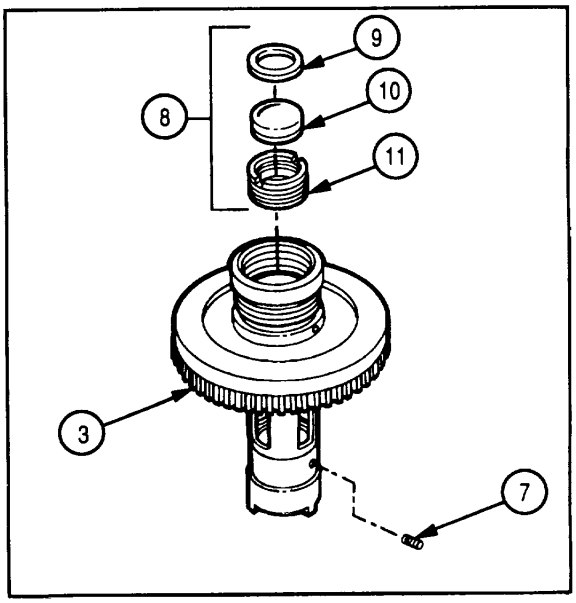
5 Scribe a mark on gear (3) and reticle assembly (12).

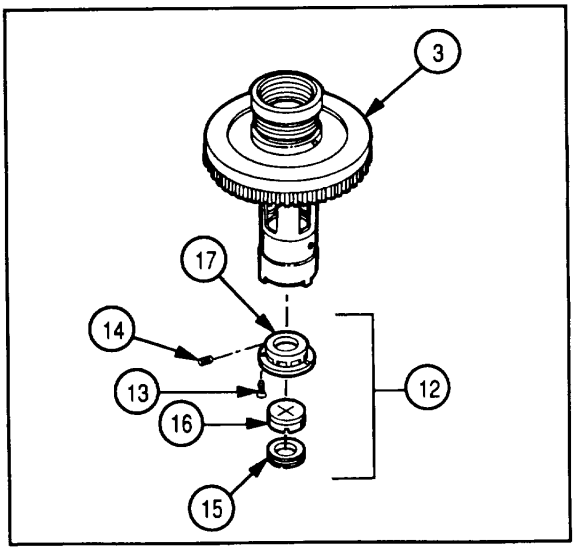
6 Remove three screws (13) and reticle assembly (12) from gear (3).

NOTE

Step 7 is written and illustrated for disassembly of reticle assembly.

7 Remove setscrew (14), retainer (15), and reticle (16) from spur gear (17) using tubular spanner wrench (7597643).





CLEANING

Clean all parts per TM 9-254.

REPAIR

Repair is by replacement of authorized parts as required. Refer to appendix B.

REASSEMBLY/INSTALLATION

NOTE

Steps 1 thru 3 are written and illustrated for reassembly of reticle assembly.

1 Install reticle (1) in spur gear (2).

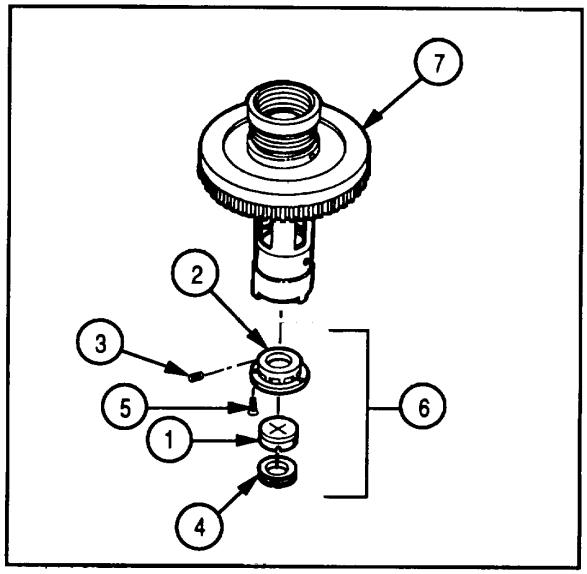
2 Install setscrew (3).

3 Install retainer (4) in spur gear (2) using tubular spanner wrench (7597643). Do not tighten.

4 Apply sealing compound (item 10, appx C) to threads of three screws (5).

5 Install reticle assembly (6) on gear (7), aligning scribe marks.

6 Install three screws (5) on gear (7), aligning scribe marks.



NOTE

Steps 7 thru 9 are written and illustrated for reassembly of cell assembly (8587296).

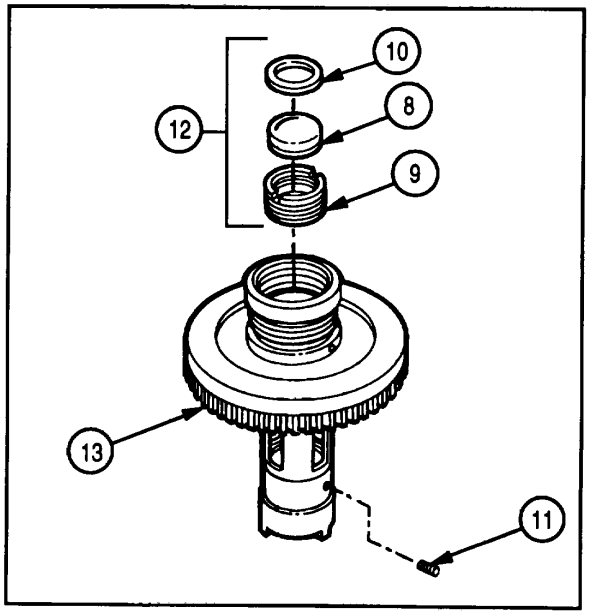
7 Install lens (8) in cell (9).

8 Apply small amount of sealing compound (item 10, appx C) to retainer (10) in three places.

9 Install retainer (10) to cell (9) using tubular spanner wrench (7597648).

10 Apply sealing compound (item 10, appx C) to threads of setscrew (11).

11 Install cell assembly (12) and setscrew (11) in gear (13) to recorded depth using fabricated spanner wrench (item 7, appx D).



2-13. MAINTENANCE OF OPTICAL INSTRUMENT WORM ASSEMBLY, OPTICAL INSTRU- MENT COLLECTIVE CELL ASSEMBLY, OPTICAL INSTRUMENT OBJECTIVE CELL ASSEMBLY, AND RETICLE ASSEMBLY (CONT).

REASSEMBL Y/INSTALLA TION (CONT)

NOTE

Steps 12 thru 14 are written and illustrated for reassembly of cell assembly (8587297).

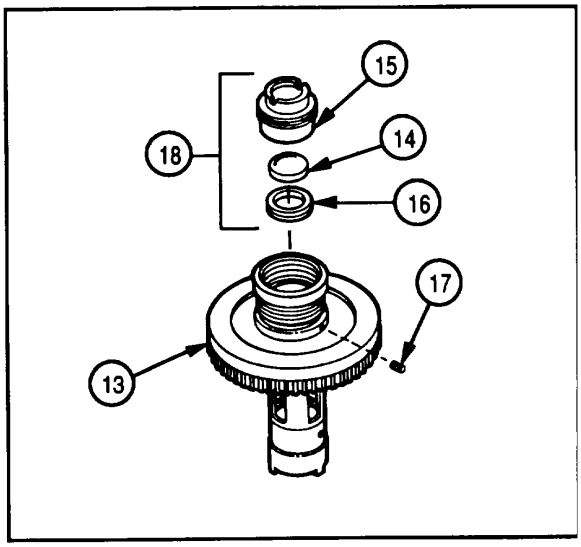
12 Install lens (14) in optical element cell (15).

13 Apply small amount of sealing compound (item 10, appx C) to cell (16) in three places.

14 Install cell (16) in optical element cell (15).

15 Apply sealing compound (item 10, appx C) to threads of setscrew (17).

16 Install cell assembly (18) and setscrew (17) in gear (13) using tubular spanner wrench (7597648).



2-14. MAINTENANCE OF ADAPTER ASSEMBLY AND COUNTER ASSEMBLY.

This task covers:

a. Removal/ Disassembly
b.
c. Repair
d. Reassembly/Installation

INITIAL SETUP:

Tools and Special Tools
Tool kit, electronic: system maintenance (SC 5180-95-CL-B29)
Tubular spanner wrench, 11/16 and 45/64 (7597638)

Materials/Parts
Adhesive sealant (item 5, appx C)
Aircraft grease (item 7, appx C)
Lockwasher (MS35338-134)
Lockwasher (7) (MS35338-135)
Lockwasher (2) (MS35338-136)
Sealing compound (item 10, appx C)
Solder (item 12, appx C)
Soldering flux (item 6, appx C)

Reference
TM 9-254

Equipment Conditions
2-28 Adapter assembly removed

General Safety Instructions

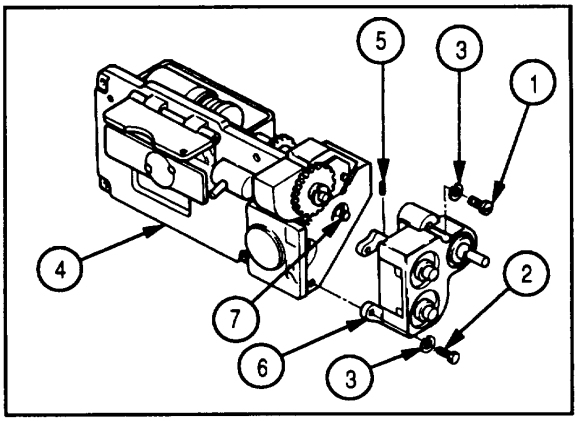
WARNING

Use adhesives, cleaning solvents, and sealing compounds in well-ventilated area away from open flame. Adhesives, cleaning solvents, and sealing compounds are harmful to skin and clothing, can burn easily, and may give off harmful vapor.

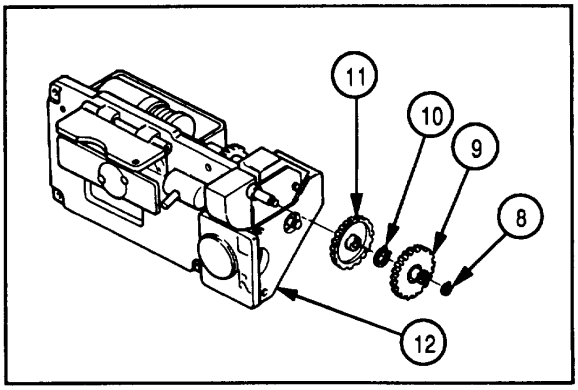
REMOVAL/DISASSEMBLY

1 Remove screw (1), two screws (2), and three lockwashers (3) from adapter.

2 Remove pin (5) and careful slide gear assembly (6) from straight shaft (7).



3 Remove retaining ring (8), gear cluster (9), retaining ring (10), and spur gear (11) from plate (12).



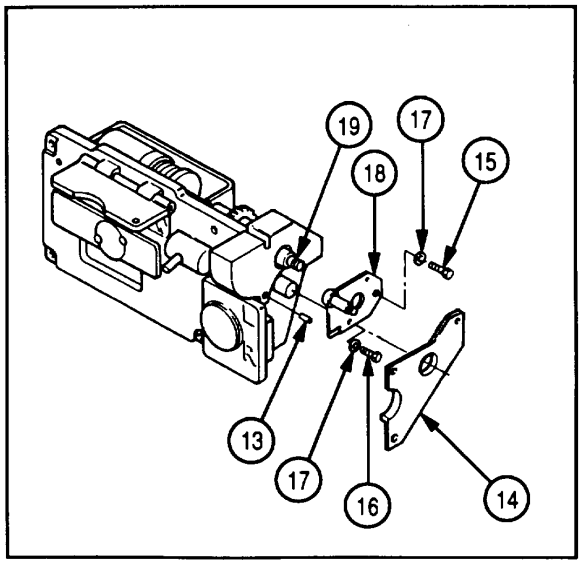
NOTE

Remove pins (13) only if damaged.

4. Remove plate (14) and two pins (13).

5 Remove screw (15), screw (i6), and two lockwashers (17).

6 Carefully remove plate (18) to avoid damage to gearshaft (19).



2-14. MAINTENANCE OF ADAPTER ASSEMBLY AND COUNTER ASSEMBLY (CONT).

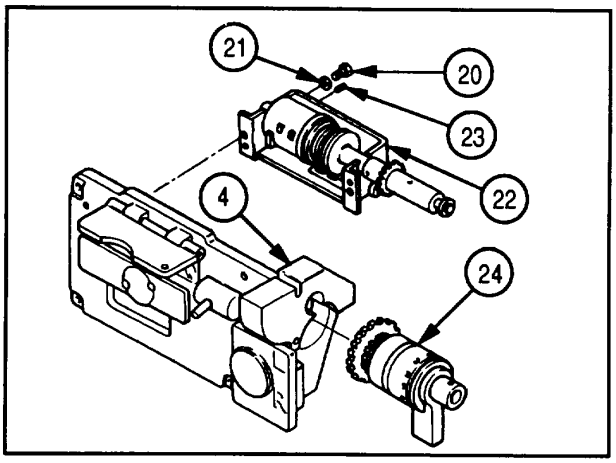
REMOVAL/DISASSEMBL Y (CONT)

NOTE

- Steps 7, 9, and 10 are written and illustrated for removal and disassembly of counter assembly.
- Remove pins only if damaged.

7 Remove two screws (20), two lockwashers (21), counter assembly (22), and two pins (23) from adapter (4).

8 Remove differential gear (24).

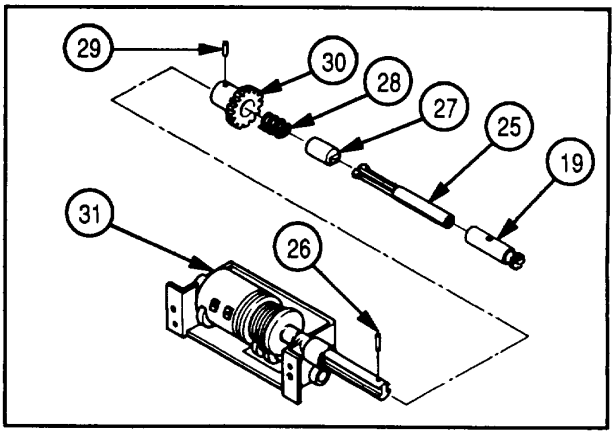


NOTE

Depress key shaft (25) and rotate gearshaft (19) to gain access to pin (26).

9 Remove pin (26), gearshaft (19), key shaft (25), clutch half (27), and spring (28).

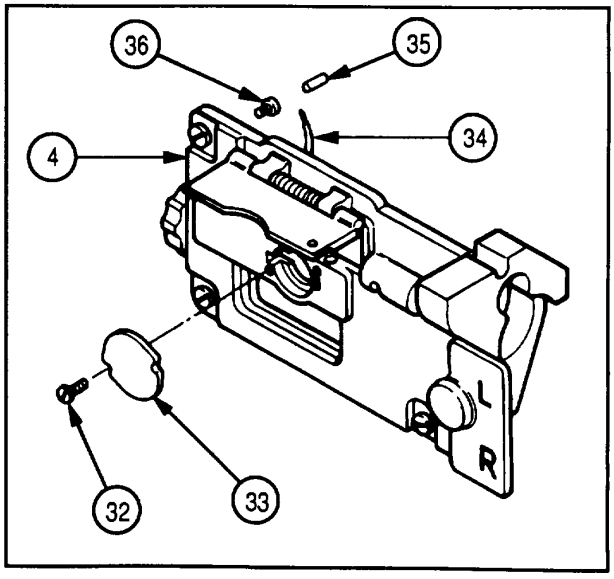
10 Remove tapered pin (29) and spur gear (30) from rotating counter (31).



11 Remove two screws (32) and cap (33) from adapter (4).

12 Unsolder wire (34) from contact (35).

13 Remove contact (35) and plug (36).



14 Pull wire with lamp base through to the front of the overlay assembly (37).

15 Remove externally threaded ring (38) from adapter (4) using tubular spanner wrench.

16 Remove overlay assembly (37), electrical lead (39), and light lens (40).

17 Remove two screws (41), two lockwashers (42), and rotating counter (43) from adapter (4).

18 Remove rod (44), cover (45), and helical torsion spring (46).

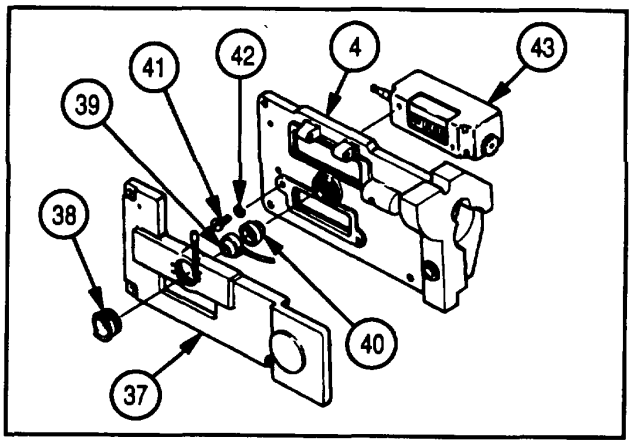
19 Remove mechanical post (47), detent plunger (48), and spring (49).

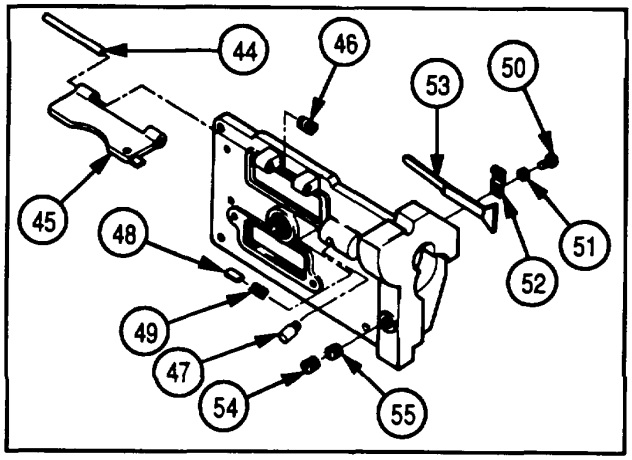
20 Remove screw (50), lockwasher (51), retaining strap (52), and light conductor (53).

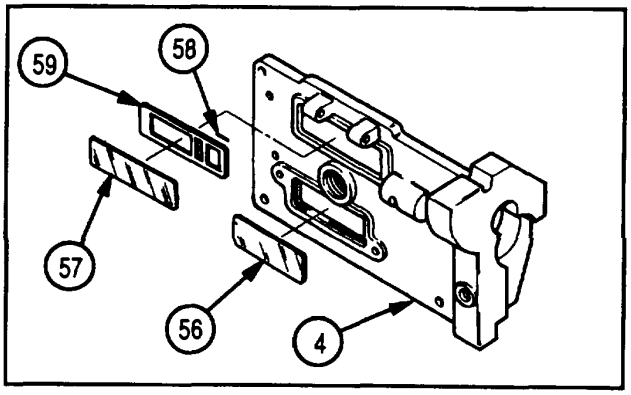
21 Remove setscrew (54) and setscrew (55).

22 Remove observation window (56) by pressing gently from backside of adapter (4).

23 Remove observation window (57), index (58), and mask (59) by pressing gently from backside of adapter (4).







CLEANING

Clean all parts per TM 9-254.

REPAIR

Repair is by replacement of authorized parts as required. Refer to appendix B.

2-14. MAINTENANCE OF ADAPTER ASSEMBLY AND COUNTER ASSEMBLY (CONT).

REASSEMBLY/INSTALLATION

NOTE
Apply a light coat of aircraft grease (item 7, appx C) to all moving parts.

1 Apply sealing compound (item 10, appx C) to edges of observation windows (1 and 2).

2 Install mask (3) and index (4) in adapter (5).

3 Install observation windows (1 and 2). Remove excess sealing compound.

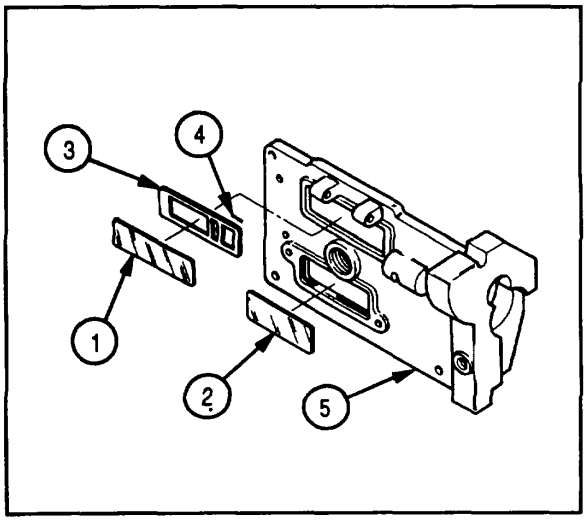
4 Install setscrew (6) and setscrew (7).

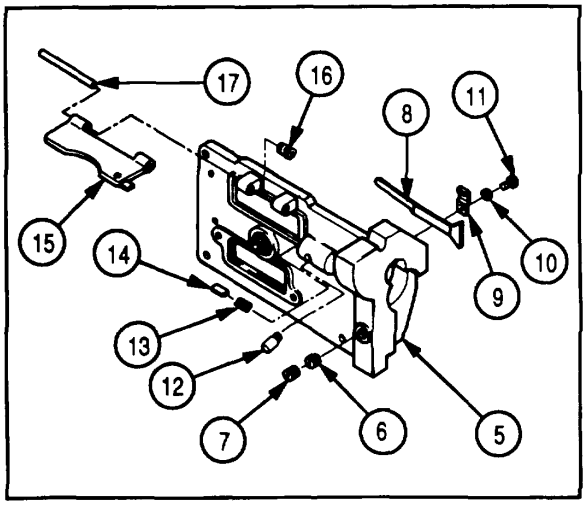
5 Install light conductor (8), retaining strap (9), new lockwasher (10), and screw (11).

6 Apply adhesive sealant (item 5, appx C) to mechanical post (12).

7 Install spring (13), detent plunger (14), and mechanical post (12) to adapter (5).

8 Install cover (15), helical torsion spring (16), and rod (17).





9 Install rotating counter (18) and secure with two new lockwashers (19) and two screws (20).

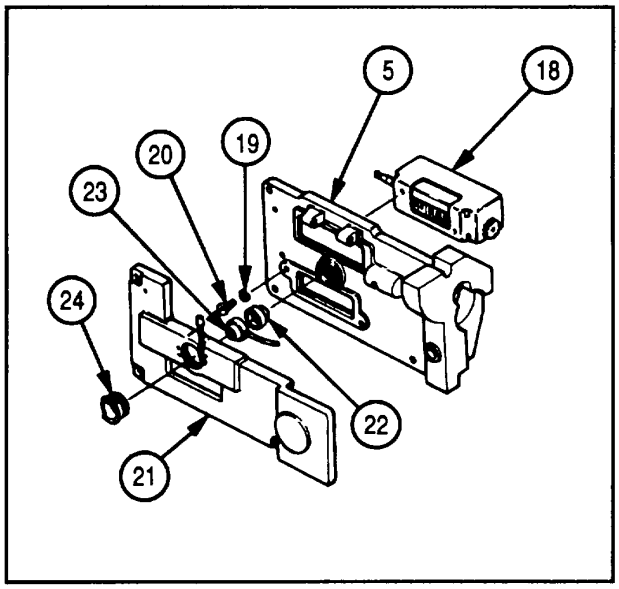
10 Pull wire with lamp base through to the front of overlay assembly (21).

11 Install light lens (22), electrical lead (23), and overlay assembly (21).

12 Apply adhesive sealant (item 5, appx C) to threads of externally threaded ring (24).

13 Install externally threaded ring (24) on adapter (5) using tubular spanner wrench.

14 Insert lamp base portion of overlay assembly (21) into electrical lead (23).



15 Position wire in recessed area to accommodate cap (25).

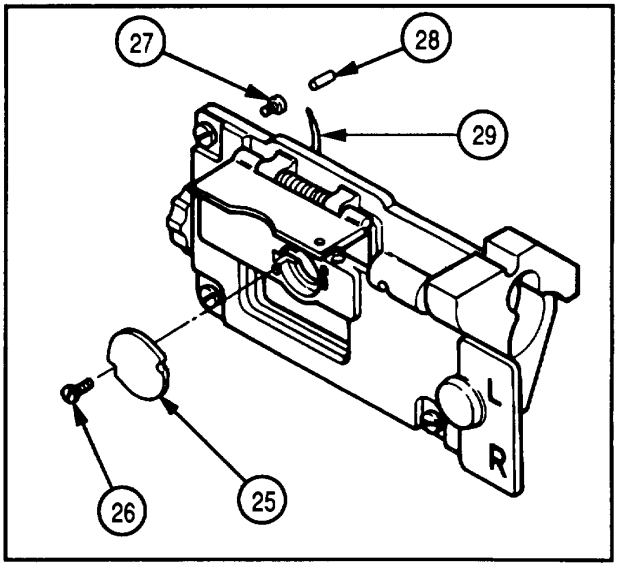
16 Install cap (25) and secure with two screws (26).

17 Apply adhesive sealant (item 5, appx C) to outer edge of cap (25).

18 Install plug (27) and contact (28).

19 Cut and split contact wire (29) to correct length.

20 Using solder (item 6, appx C), solder contact wire (29) to contact (28).



2-14. MAINTENANCE OF ADAPTER ASSEMBLY AND COUNTER ASSEMBLY (CONT).

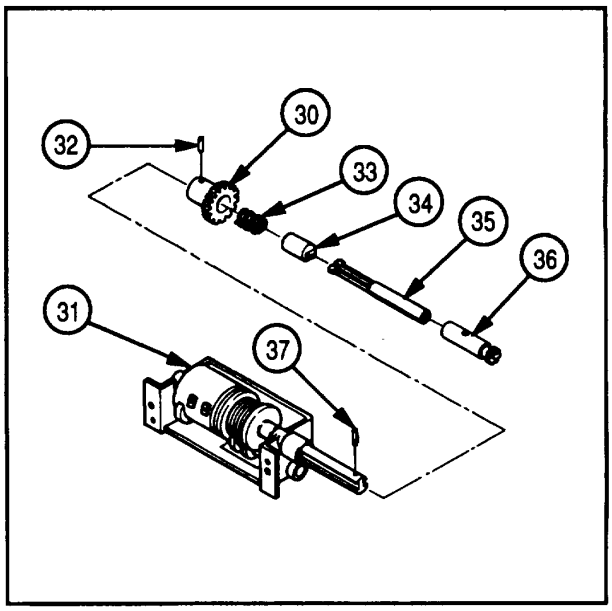
REASSEMBLY/INSTALLATION (CONT)

NOTE
Steps 21 thru 23 are written and illustrated for reassembly of counter assembly.

21 If required, drill through spur gear (30) and shaft on rotating counter (31). Ream hole and install tapered pin (32). Refer to TM 9-254.

22 Install spring (33), clutch half (34), key shaft (35), and gearshaft (36).

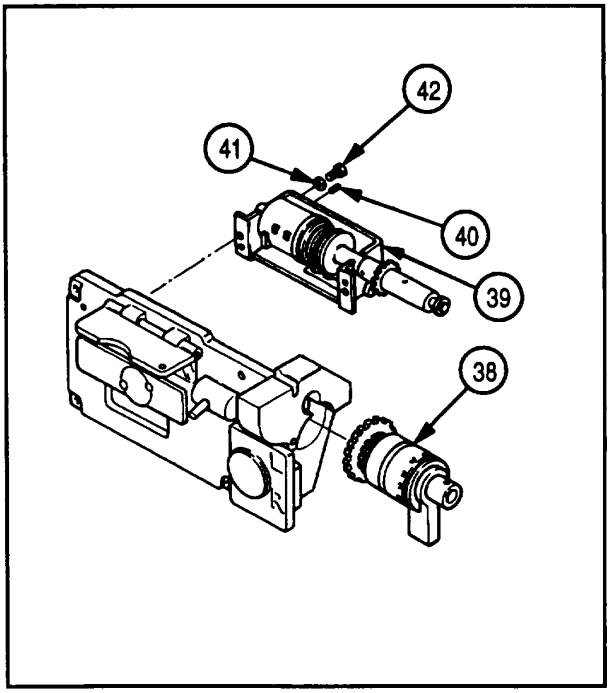
23 Install pin (37) through spur gearshaft (36) and shaft on rotating counter (31).



24 Wind up small gear on differential gear (38) 2 or 3 teeth and hold.

25 Install differential gear (38) on counter assembly (39), meshing gears.

26 If removed, install two headless shoulder pins (40), counter assembly (39), differential gear (38), two new lockwashers (41), and two screws (42).



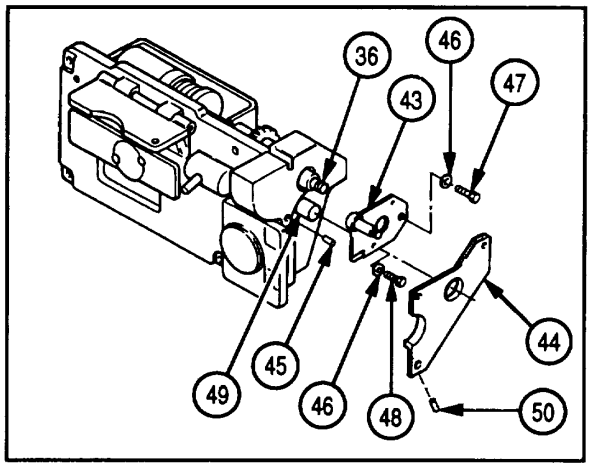
NOTE

Gearshaft (36) must rotate freely when plate (43) and plate (44) are installed.

27 If removed, install two pins (45), plate (43), two new lockwashers (46), screw (47), and screw (48) over gearshaft (36).

28 Install plate (44) over shaft (49).

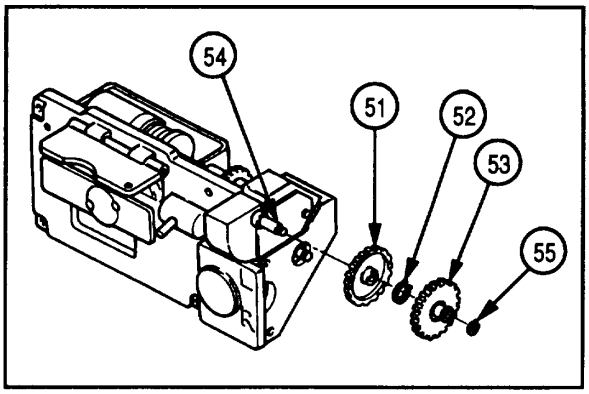
29 If removed, install two pins (50).



30 Install spur gear (51), retaining ring (52), and gear cluster (53) on shaft (54).

31 Wind up spur gear (51) and gear cluster (53) two or three teeth and hold.

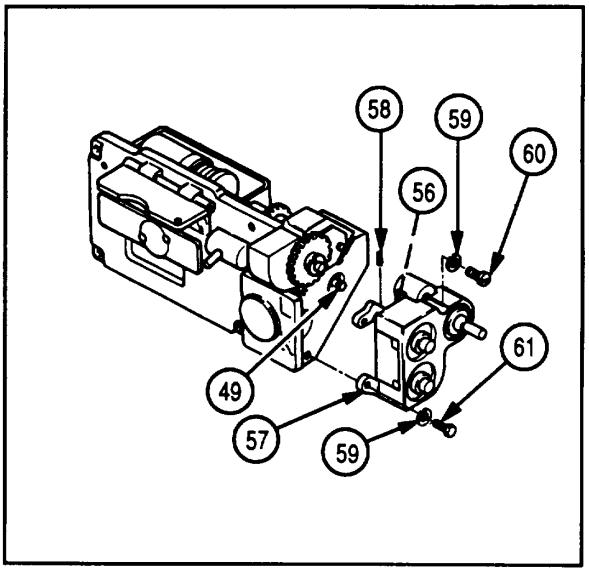
32 Mesh spur gear (51) and gear cluster (53) and install retaining ring (55).



33 Rotate shaft (49) until pinhole alines with spur gear (56).

34 Install housing (57) on shaft (49) and install pin (58).

35 Install three new lockwashers (59), screw (60), and two screws (61). Tighten screws evenly to prevent binding.



2-15. MAINTENANCE OF ELBOW ASSEMBLY, AND OPTICAL INSTRUMENT CELL ASSEMBLY.

This task covers:

a. Removal/Disassembly
b. Cleaning
c. Repair
d. Reassembly/Installation

INITIAL SETUP:

Tools and Special Tools
Tool kit, electronic: system maintenance (SC 5180-95-CL-B29)
Gun, hand injection (7648117)
Tubular spanner wrench, 1-5/8 and 1-41/64 (7597668)
Tubular spanner wrench, 1-3/32 and 1-7/64 (7597651)
Tubular spanner wrench, 1-25/32 and 1-51/64 (7597673)
Tubular spanner wrench, 7/8 and 57/64 (7597644)

Materials/Parts
Lockwasher (8) (MS35333-70)
Preformed packing (8587449-3)
Screw (MS35249-3)
Sealing compound (item 10, appx C)
Silicone compound (item 11, appx C)

References
TM 9-254

Equipment Conditions
2-19 Elbow assembly removed

General Safety Instructions

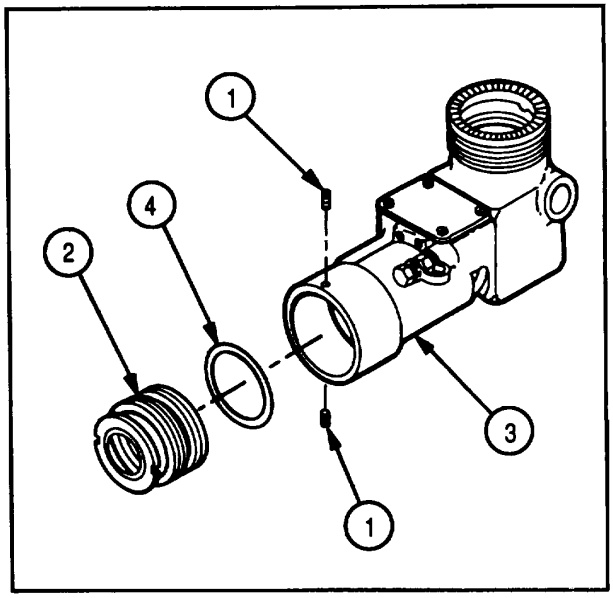
WARNING

Use adhesives, cleaning solvents, and sealing compounds in well-ventilated area away from open flame. Adhesives, cleaning solvents, and sealing compounds are harmful to skin and clothing, can burn easily, and may give off harmful vapor.

REMOVAL/DISASSEMBLY

1 Remove two setscrews (1) and eyepiece assembly (2) from elbow (3) using tubular spanner wrench (7597668).

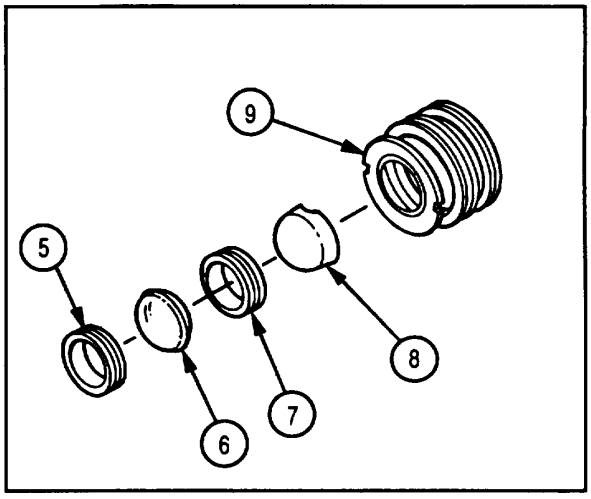
2 Remove preformed packing (4) and discard.



NOTE
Steps 3 and 4 are written and illustrated for disassembly of eyepiece assembly.

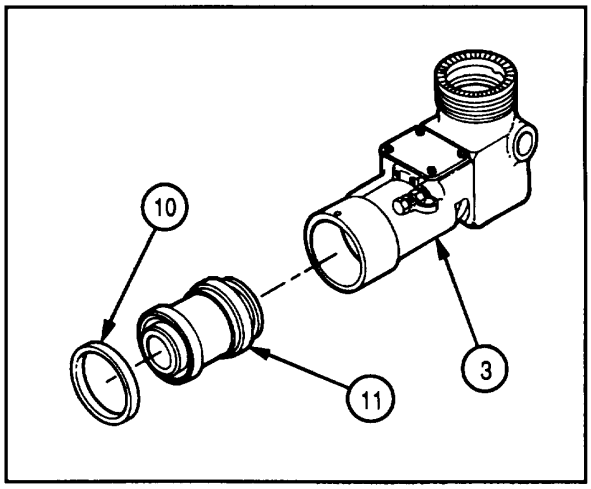
3 Remove retainer (5) using tubular spanner wrench (7597651).

4 Carefully remove lens (6), spacer (7), and lens (8) from cell (9).



5 Remove externally threaded ring (10), using tubular spanner wrench (7597673).

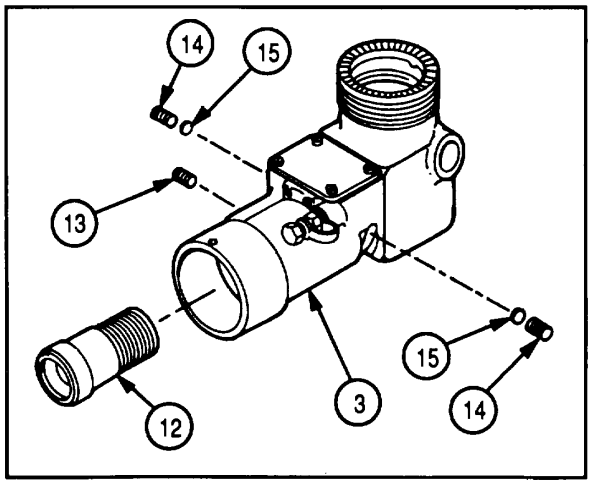
6 Carefully remove cell assembly (11) from elbow (3) to avoid damaging prisms.



7 Measure and record depth of cell assembly (12).

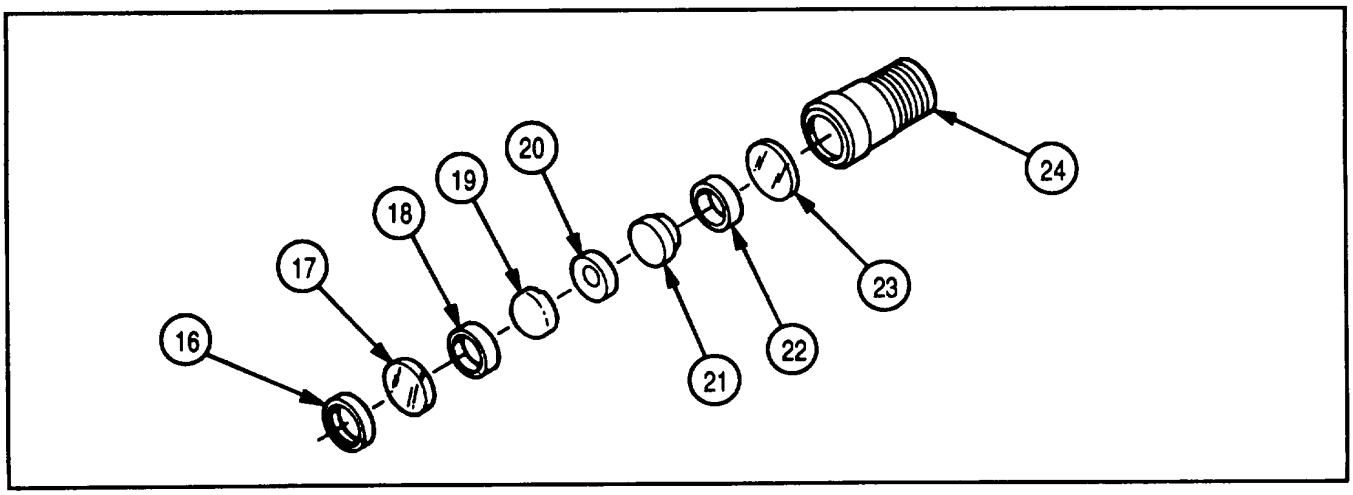
8 Remove setscrew (13), two setscrews (14), and two plain solid disks (15).

9 Remove cell assembly (12) from elbow (3) using tubular spanner wrench (7597644).



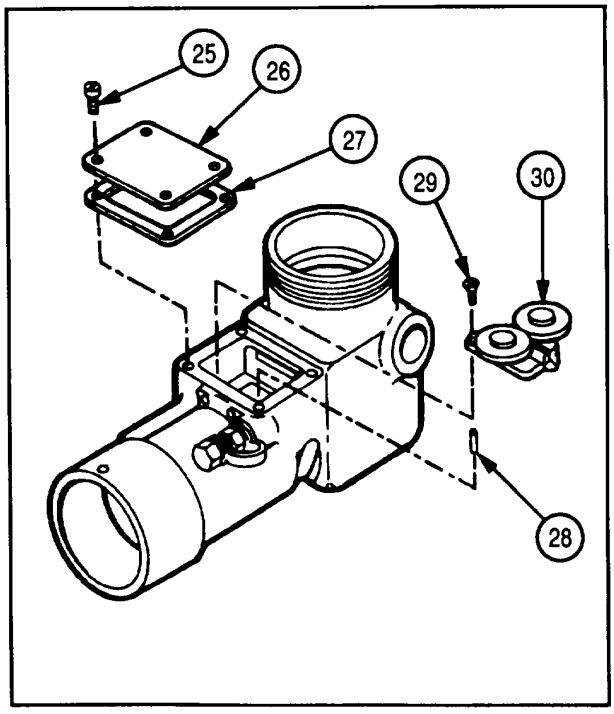
2-15. MAINTENANCE OF ELBOW ASSEMBLY, EYEPIECE ASSEMBLY, AND OPTICAL INSTRUMENT CELL ASSEMBLY (CONT).

REMOVAL/DISASSEMBLY (CONT)



NOTE
Step 10 is written and illustrated for disassembly of cell assembly.

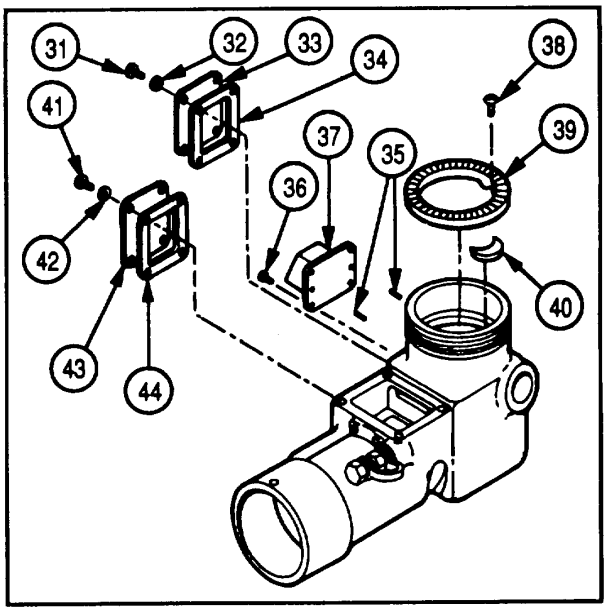
10 Remove retainer (16), lens (17), spacer (18), lens (19), spacer (20), lens (21), spacer (22), and lens (23) from cell assembly (24) using tubular spanner wrench (7597644).



11 Remove four screws (25), access cover (26), and gasket (27).

NOTE
Remove pin (28) only if damaged.

12 Remove four capscrews (29) and gear assembly (30). Remove pin (28) only if damaged.



13 Remove four screws (31), four lockwashers (32), access cover (33), and gasket (34).

14 Remove pins (35) only if damaged.

15 Remove four screws (36), prism (37), and two pins (35).

16 Remove screw (38) and clutch half (39). Discard screw.

17 Using small wood dowel, carefully remove observation window (40).

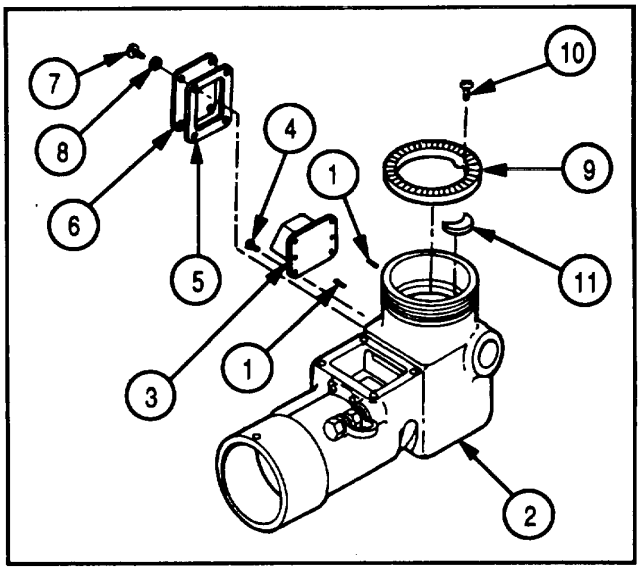
18 Remove four screws (41), four lockwashers (42), access cover (43), and gasket (44).

CLEANING

Clean all parts per TM 9-254.

REPAIR

Repair is by replacement of authorized parts as required. Refer to appendix B.



REASSEMBLY/INSTALLATION

1 If removed, install two pins (1) in elbow (2).

2 Install prism (3) and four screws (4).

3 Install gasket (5), access cover (6), four new lockwashers (7), and four screws (8).

4 Install clutch half (9) and new screw (10). Stake screw. Refer to TM 9-254.

5 Apply sealing compound (item 10, appx C) to edge of observation window (11).

6 Install observation window (11) and remove excess sealing compound.

2-15. MAINTENANCE OF ELBOW ASSEMBLY, EYEPIECE ASSEMBLY, AND OPTICAL INSTRUMENT CELL ASSEMBLY (CONT).

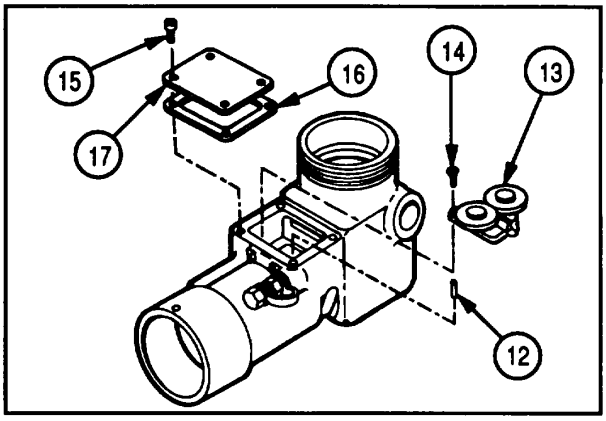
REASSEMBLY/INSTALLATION (CONT)

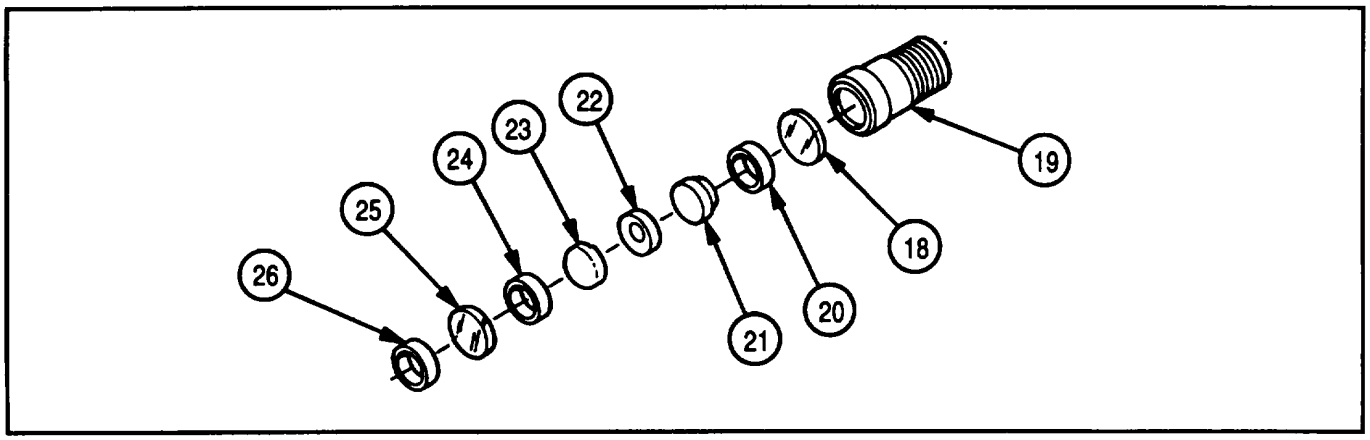
7 If removed, install pin (12).

8 Install gear assembly (13) and four capscrews (14).

9 Apply sealing compound (item 10, appx C) under head of four screws (15).

10 Install gasket (16), access cover (17), and four screws (15).





NOTE

Steps 11 thru 19 are written and illustrated for reassembly of cell assembly.

11 Install lens (18) in cell (19) with convex surface to rear of cell.

12 Install spacer (20).

13 Install lens (21) with greater convex surface to rear of cell (19).

14 Install spacer (22).

15 Install lens (23) with greater convex surface to front of cell (19).

16 Install spacer (24).

17 Install lens (25) with convex surface to front of cell (19).

18 Apply sealing compound (item 10, appx C) to threads of retainer (26).

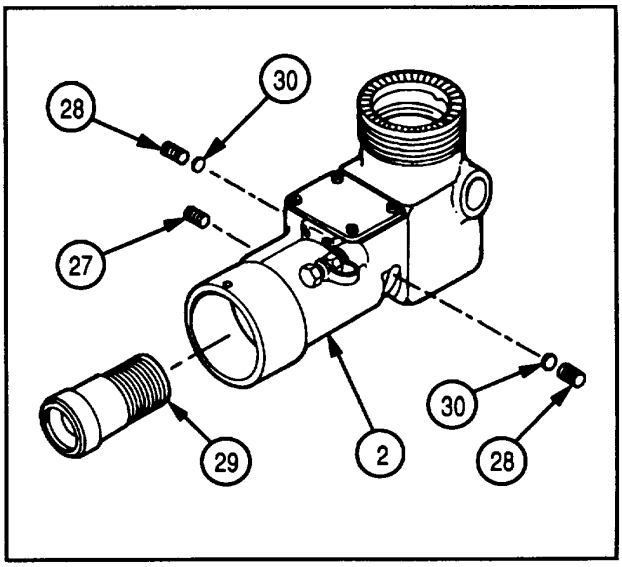
19 Install retainer (26) in cell (19) using tubular spanner wrench (7597644).

20 Apply sealing compound (item 10, appx C) to threads of setscrew (27) and two setscrews (28).

21 Install cell assembly (29) (to recorded depth taken in Step 7 of disassembly) in elbow (2) using tubular spanner wrench (7597644).

22 Install two plain solid disks (30) and two setscrews (28).

23 Install setscrew (27) until flush.



24 Carefully install cell assembly (31) in elbow (2).

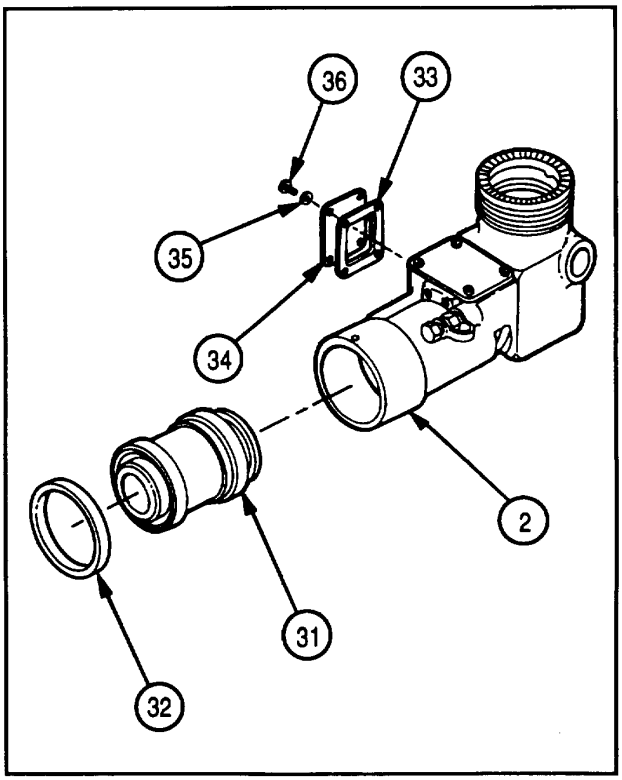
25 Apply sealing compound (item 10, appx C) to threads of externally threaded ring (32).

NOTE

Do not overtighten externally threaded ring. Cell assembly must rotate freely.

26 Install externally threaded ring (32) in elbow (2) using tubular spanner wrench (7597673).

27 Install gasket (33), access cover (34), four new lockwashers (35), and four screws (36).

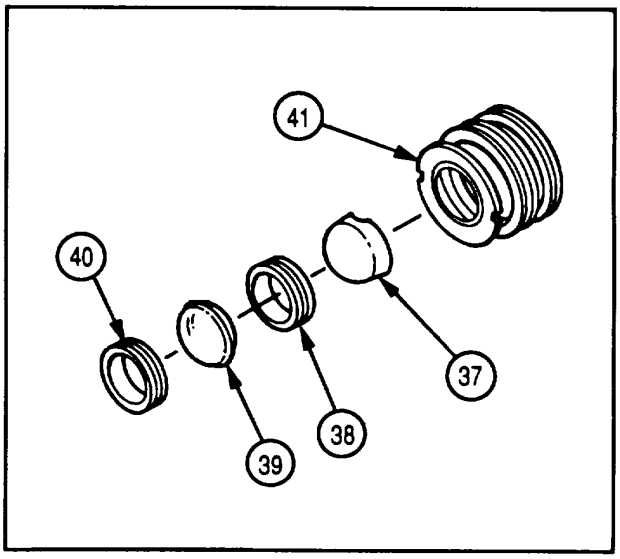


2-15 MAINTENANCE OF ELBOW ASSEMBLY, EYEPIECE ASSEMBLY, AND OPTICAL INSTRUMENT CELL ASSEMBLY (CONT).

REASSEMBLY/INSTALLATION (CONT)

NOTE
Step 28 is written and illustrated for reassembly of eyepiece assembly.

28 Install lens (37), spacer (38), lens (39), and retainer (40) in cell assembly (41) using tubular spanner wrench (7597651).

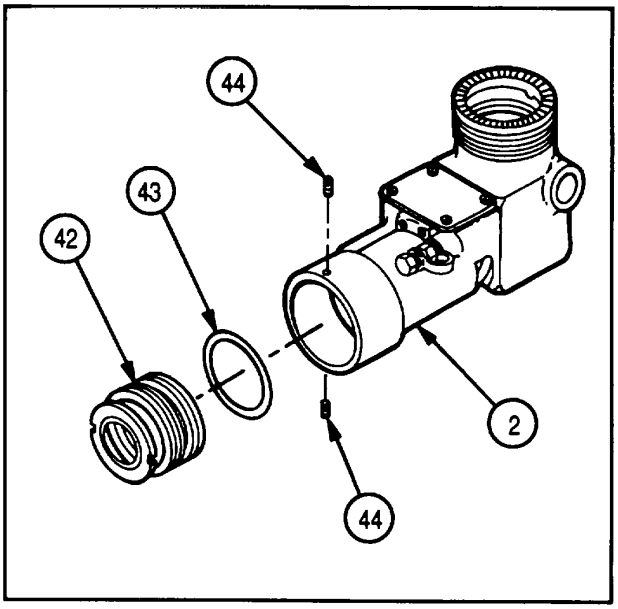


29 Inject sealing compound (item 10, appx C) into four sealing holes using hand injection gun in eyepiece assembly (42).

30 Apply a coat of silicone compound (item 11, appx C) to new preformed packing (43).

31 Install new preformed packing (43) to eyepiece assembly (42) and install in elbow (2) using tubular spanner wrench (7597668).

32 Install two setscrews (44) in elbow (2).



Section VI. GENERAL SUPPORT FINAL INSPECTION PROCEDURES

2-16. GENERAL.

a. This section describes and illustrates the final inspection procedures for the M115 panoramic telescope. A final inspection will be performed prior to returning the M115 panoramic telescope to the supply system.

b. If the M115 panoramic telescope inspected fails to meet the required standards, ensure that the maintenance authorized at the applicable level has been performed correctly.

2-17. M115 PANORAMIC TELESCOPE FINAL INSPECTION INSTRUCTIONS.

This task covers:
a. Setting up azimuth testing fixture
b. Visual inspection
c. Eyepiece focus
d. Parallax adjustment
e. Image tilt adjustment
f. Parallelism of reticle and image
g. Collimation
h. Plumb travel and line of sight travel
i. Elevation mechanism backlash
j. Deflection errors (800 mil steps) and backlash (deflection mechanism) inspections
k. Level travel and lift inspection
l. Counter operation and adjustment
m. Torque inspection
n. Illumination inspection
o. Purging and charging

INITIAL SETUP

Test Equipment
- Adapter fixture with reflecting mirror (figure B-25, item 1)
- Azimuth test fixture (figure B-25, item 2)
- Collimator telescope (5549108)
- Dioptometer (7680631)
- Precision level (7686087)
- Surface gage (GGG-G-17)
- Telescope holder (6121110)
- Telescope holder (11738294)

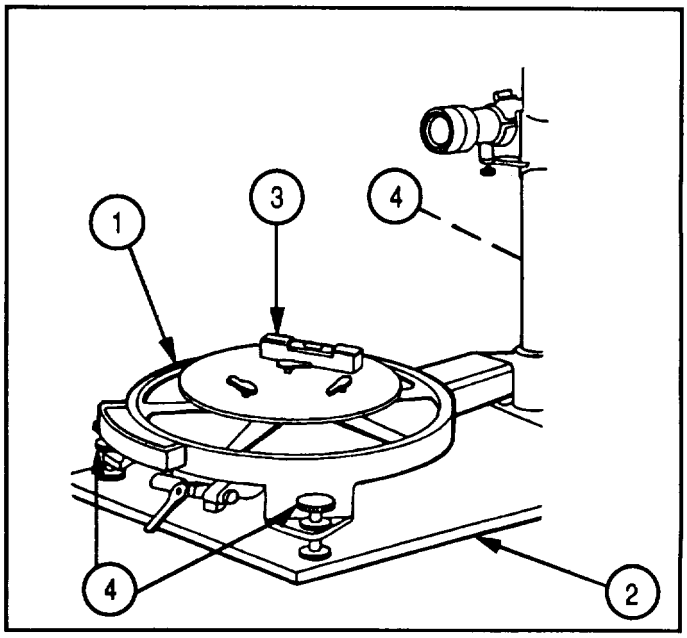
Tools and Special Tools
- Tool kit, electronic: system maintenance (SC 5180-95-CL-B29)
- Torque adapter (8599917)
- Torque adapter (8213929)
- Torque adapter (8599920)
- Torque adapter (8213928)
- Torque adapter (figure 4, appx D)
- Torque wrench (GGG-W-686)
- Reticle adjusting wrench (figure 8, appx D)

Materials/Parts
- Sealing compound (item 10, appx C)
- Silicone compound (item 11, appx C)
- Tape (item 13, appx C)

References
- TM 9-254
- TM 750-116

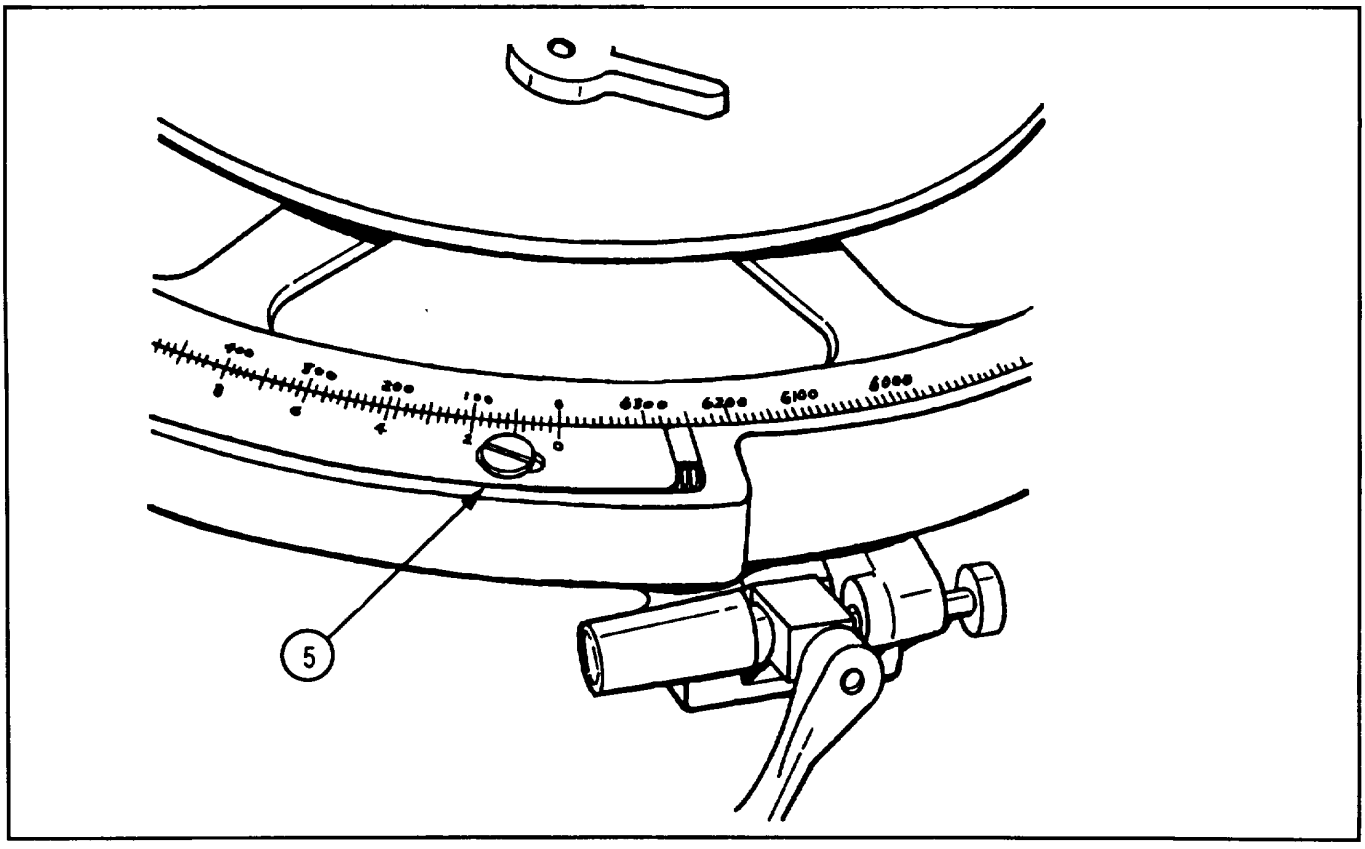
2-17. M115 PANORAMIC TELESCOPE FINAL INSPECTION INSTRUCTIONS (CONT).

SETTING UP AZIMUTH TESTING FIXTURE



1 Install azimuth testing fixture (1) on test stand (2) at a height suitable for operation.

2 Level azimuth testing fixture (1) in all planes using precision level (3) and three adjusting leveling screws (4).

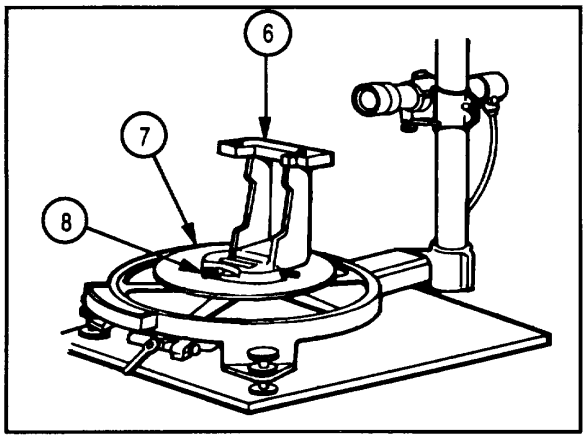


3 Set azimuth ring (5) so "0" graduation marks coincide and lock in this position.

NOTE

Make sure adapter fixture is level.

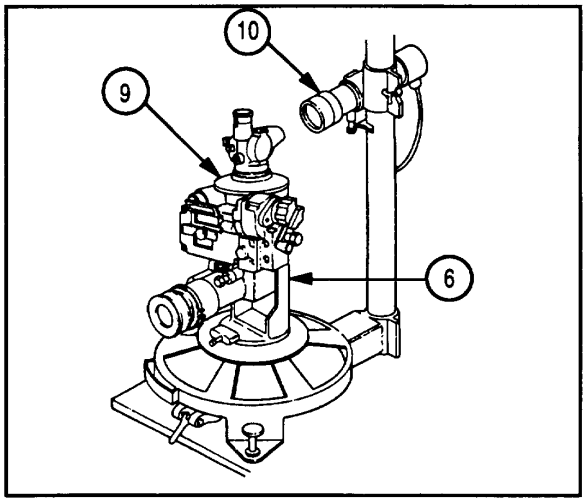
4 Position adapter fixture (6) without reflecting mirror on adapter support plate (7). Do not secure in place at this time. Lightly clamp adapter fixture to adapter support plate with three cam locks (8).



5 Position Ml 15 panoramic telescope (9) on adapter fixture (6). Do not bolt Ml 15 panoramic telescope to adapter fixture at this time.

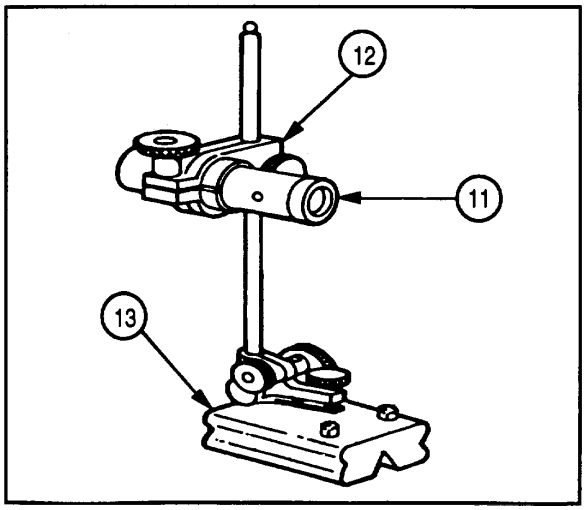
6 Position projector collimator (10) at a height so the lines of sight of M115 panoramic telescope (9) and projector collimator coincide. Clamp projector collimator securely.

7 Remove Ml15 panoramic telescope (9).



8 Install collimator telescope (11) to telescope holder (12).

9 Install telescope holder (12) to surface gage (13).



2-17. M115 PANORAMIC TELESCOPE FINAL INSPECTION INSTRUCTIONS (CONT).

SETTING UP AZIMUTH TESTING FIXTURE (CONT)

10 Set surface gage (13) on adapter fixture (6).

11 Adjust height of collimator telescope holder (12) so reticle crossline intersection is superimposed between collimator telescope (11) and projector collimator (10). Secure height of telescope holder.

12 Suspend a plumbline off to one side of projector collimator (10).

13 Install parallax shield (14) to collimator telescope (11).

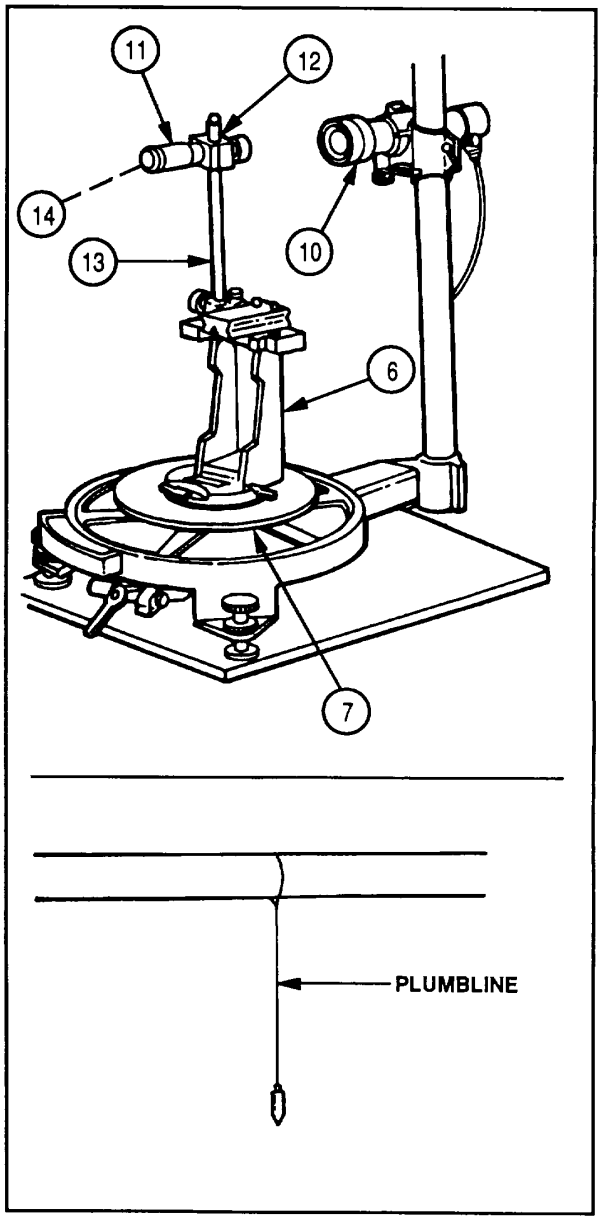
14 Turn surface gage (13) and revolve collimator telescope (11) until the vertical reticle line is superimposed on plumbline. Lock collimator telescope securely.

15 Remove plumbline and parallax shield (14).

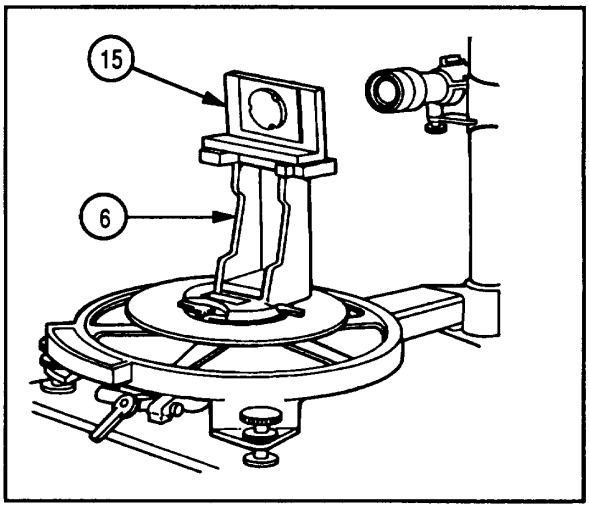
16 Position surface gage (13) so line of sight is obtained with projector collimator (10) and collimator telescope (11).

17 Rotate projector collimator (10) until vertical reticle line coincides with preplumbed reticle of collimator telescope (11).

18 Lock projector collimator (10) in this position and remove gage (13) from adapter fixture (6).



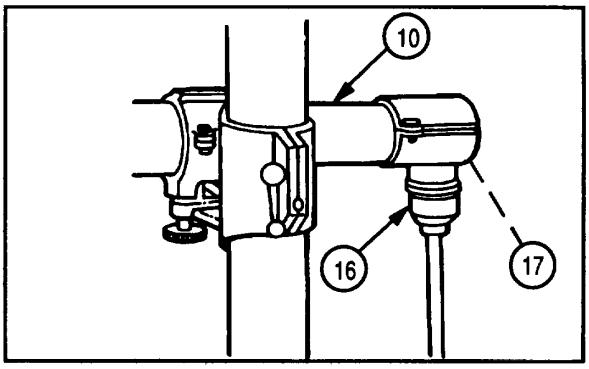
19 Install reflecting mirror assembly (15) on adapter fixture (6) making certain that keyway is firmly seated against locating pins.



20 Remove light source (16) from projector collimator (10).

21 Unscrew and remove frosted glass (17) from eyepiece end of projector collimator (10).

22 Set projector collimator objective cell assembly to infinity.



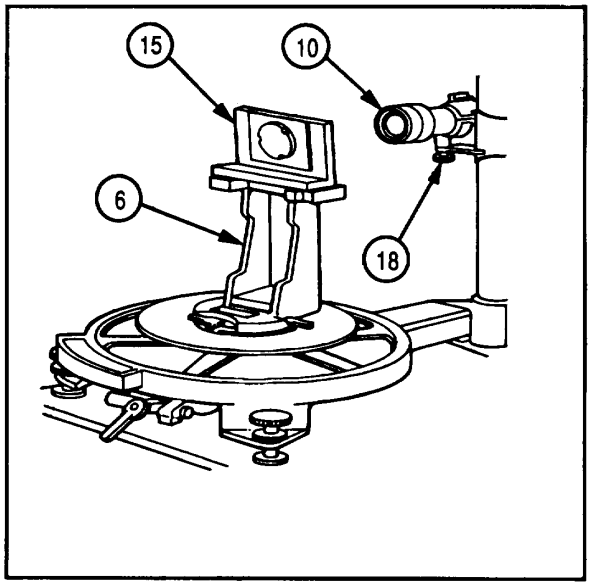
23 Look through and focus projector collimator (10).

24 Tilt in both elevation and depression, using holder screw (18), until the test reticle is reflected in the reflecting mirror assembly (15) and is superimposed upon itself.

NOTE

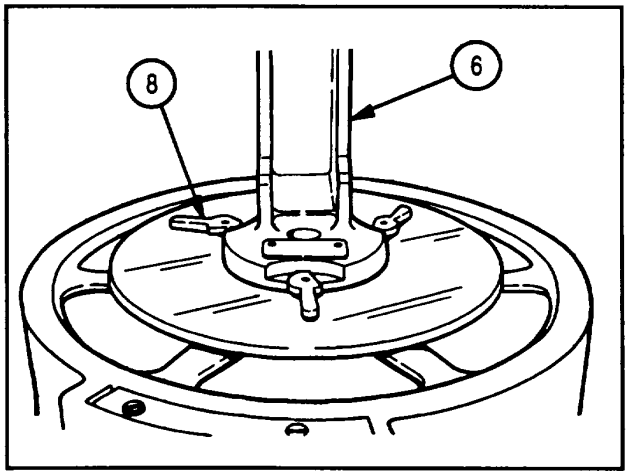
Make sure mirror assembly does not move away from pins.

25 If reflected image is not superimposed in azimuth, slightly shift adapter fixture (6) to correct.



2-17. M115 PANORAMIC TELESCOPE FINAL INSPECTION INSTRUCTIONS (CONT).

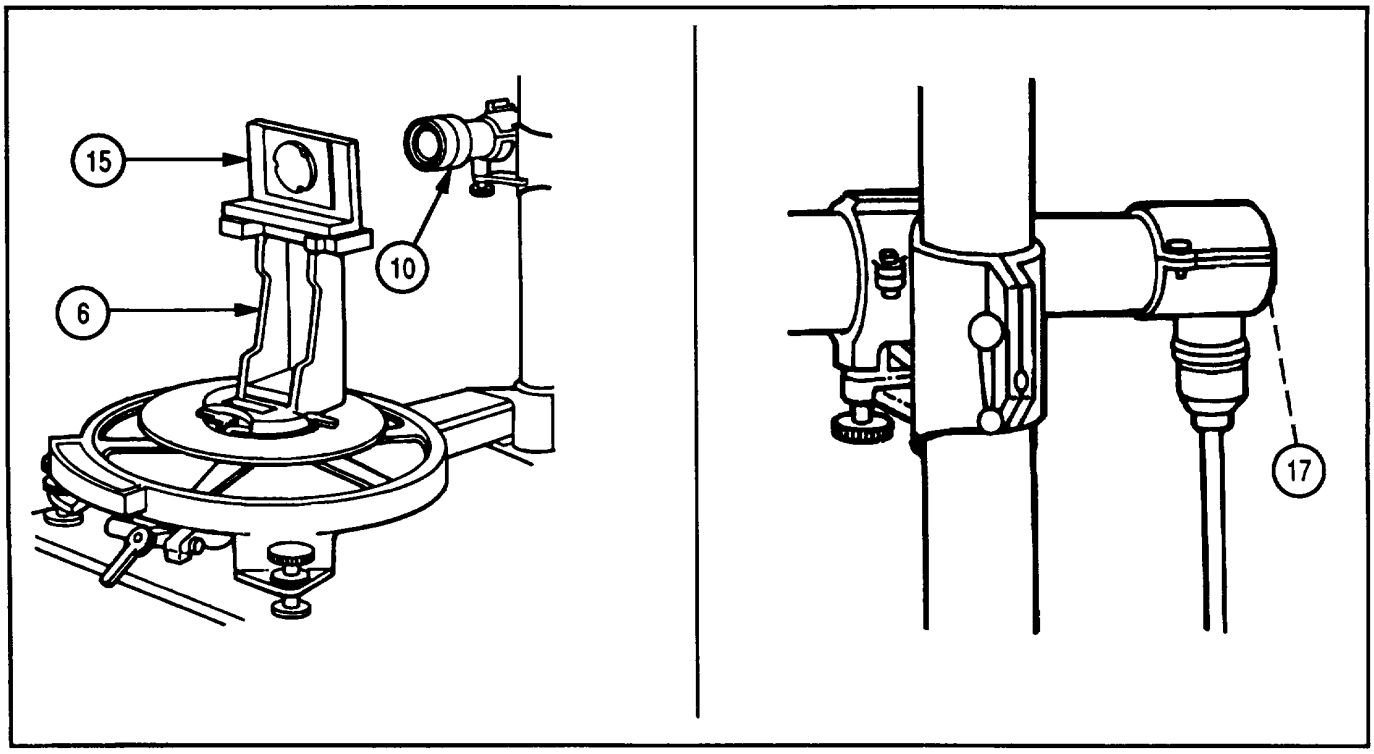
SETTING UP AZIMUTH TESTING FIXTURE (CONT)



26 When auto collimation is completed, clamp adapter fixture (6) securely with three cam locks (8).

27 Recheck auto collimation.

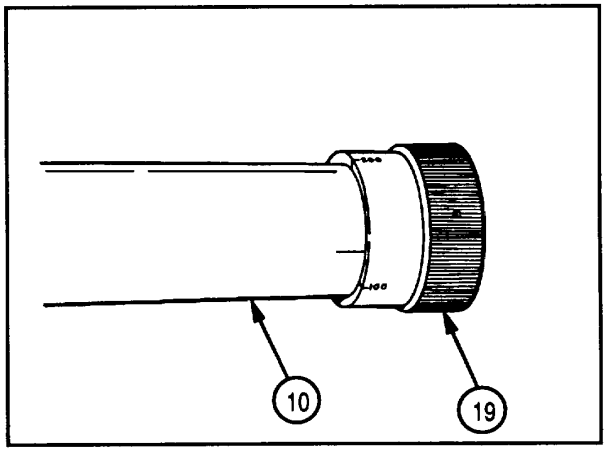
28 Repeat steps 23 thru 27 if required.



29 Remove reflecting mirror assembly (15) from adapter fixture (6).

30 Install frosted glass (17) to eyepiece end of projector collimator (10).

31 Set parallax distance to 130 meters ± 10 meters by rotating objective (19) on projector collimator (10).



VISUAL INSPECTION

1 Check that all screws and lockwashers are present and tight.

2 Check that mounting surfaces are clean and free of nicks and burrs.

3 Check that M115 panoramic telescope is free of dirt, corrosion, and foreign matter.

4 Check that paint is not chipped.

5 Check that all parts are present and free of damage.

EYEPIECE FOCUS

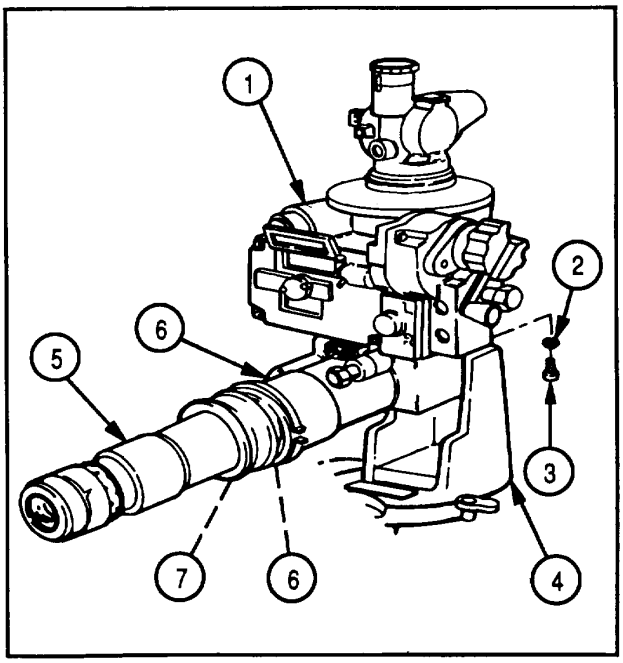
1 Install M115 panoramic telescope (1), four washers (2), and four screws (3) on adapter fixture (4).

2 Using dioptometer (5), check reticle focus for optimum focus of minus 0.75 to minus 1.0 diopter.

3 If adjustment is required, remove two setscrews (6) and rotate eyepiece (7) until optimum focus is achieved.

4 Apply sealing compound (item 10, appx C) to threads of setscrews (6).

5 Install two setscrews (6).



2-17. M115 PANORAMIC TELESCOPE FINAL INSPECTION INSTRUCTIONS (CONT).

PARALLAX ADJUSTMENT

1 Check for allowable parallax of 0.15 mil using preset target of 130 meters ± 10 meters. If parallax exceeds limit, go to step 2.

2 Remove three setscrews (1) and head assembly (2), rotating head assembly counterclockwise.

3 Scribe a coinciding line on worm gear assembly (3) from cover (4).

4 Rotate deflection knob (5) to gain access to setscrew (6) through cover (4).

5 Remove setscrew (6) and turn objective cell (7) a small amount in either direction.

6 Temporarily install head assembly (2) and observe parallax. Adjust objective cell as required.

7 Apply sealing compound (item 10, appx C) to threads of setscrews (6).

8 Aline scribe marks on cover (4) and worm gear assembly (3) and install setscrew (6).

9 Install head assembly (2).

10 Using torque wrench and torque adapter (figure 4, appx D), tighten head assembly (2) to 80.00 in.-lb (9.04 N-m).

11 Apply sealing compound (item 10, appx C) to threads of three setscrews (1).

12 Install three setscrews (1).

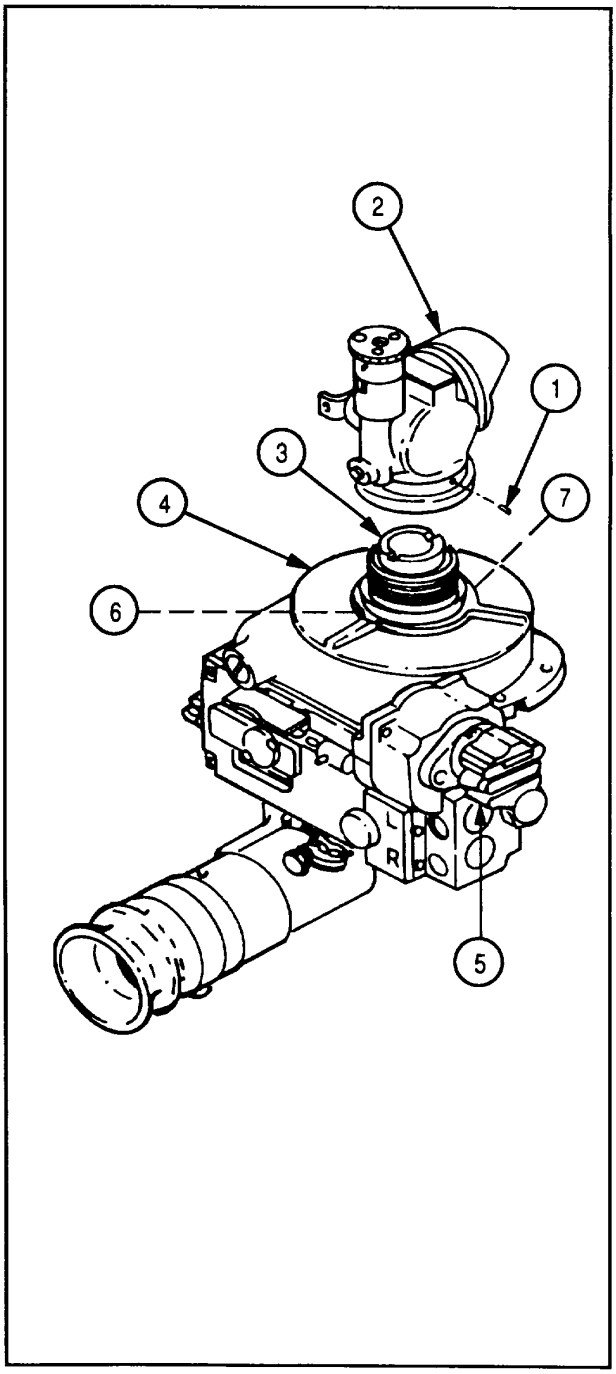
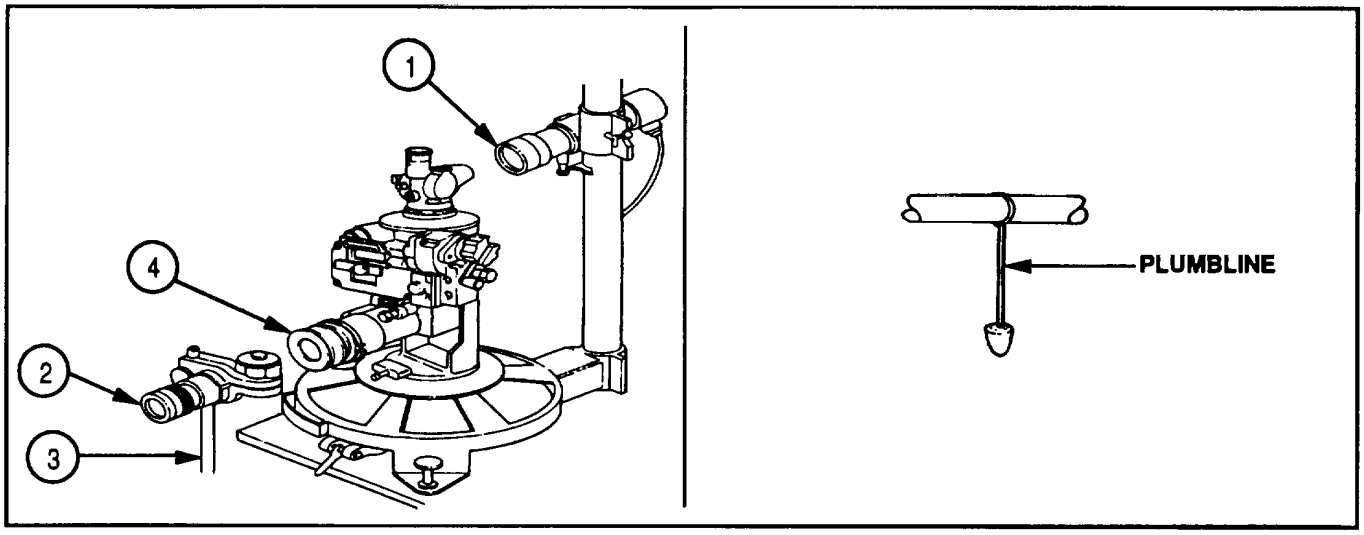


IMAGE TILT ADJUSTMENT



1 Suspend plumbline in front of projector collimator (1).

2 Install dioptometer (2) in telescope holder (3) and adjust so dioptometer faces eyeshield (4).

3 Install a parallax shield on eyeshield (4).

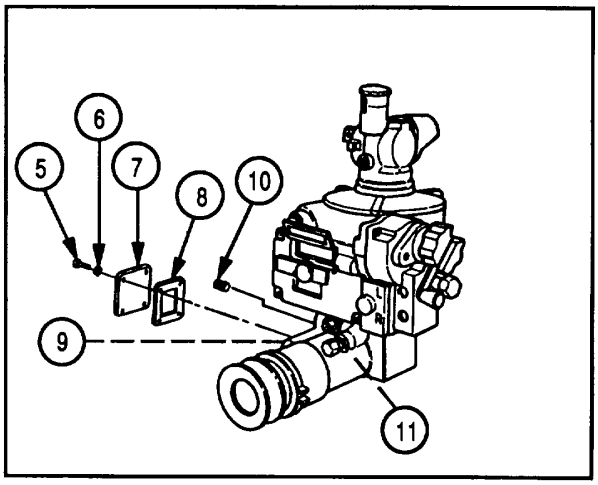
4 Sight through dioptometer (2), directly on to plumbline and revolve dioptometer, in telescope holder (3), until vertical line is superimposed on plumbline and secure telescope holder.

5 Position dioptometer (2) directly in front of eyeshield (4).

6 Image of vertical line must be within 1 degree (17.78 mils) as seen through dioptometer (2) and as measured on test reticle projector collimator (1).

7 If required measurement cannot be met, remove four screws (5), four lockwashers (6), access cover (7), and gasket (8) to gain access to optic cell assembly (9).

8 Remove setscrew (10) from plug hole next to access cover (8) to gain access to three setscrews (11).



2-17. M115 PANORAMIC TELESCOPE FINAL INSPECTION INSTRUCTIONS (CONT).

IMAGE TILT ADJUSTMENT (CONT)

NOTE

• Rotate deflection knob to gain access to each setscrew.

• Azimuth ring may be rotated to aline reticles and avoid optic cell assembly movement.

9 While rotating deflection knob (12), loosen three setscrews (11) on retaining ring of optic cell assembly (9).

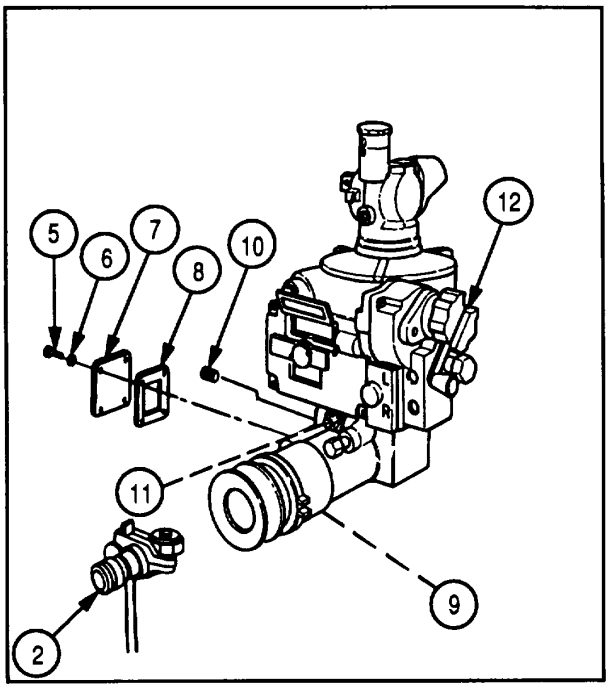
10 Rotate optic cell assembly (9) by hand, until image is plumb when sighting through dioptometer (2).

11 Tighten three setscrews (11).

12 Apply sealing compound (item 10, appx C) to threads of setscrew (10).

13 Install setscrew (10) in plug hole until flush.

14 Install gasket (8), access cover (7), four lockwashers (6), and four machine screws (5).



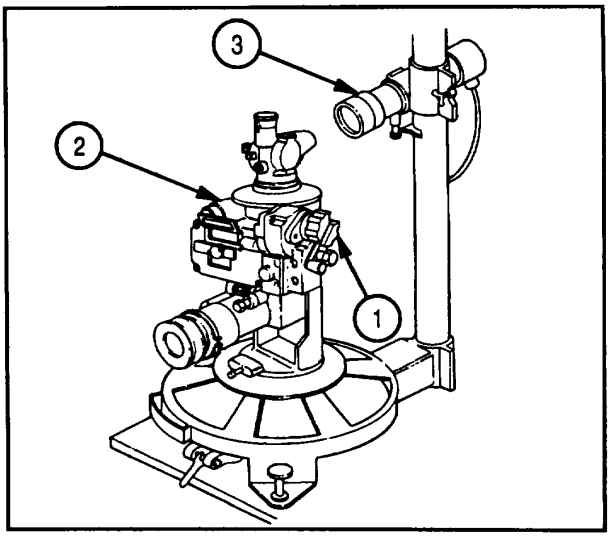
PARALLELISM OF RETICLE AND IMAGE

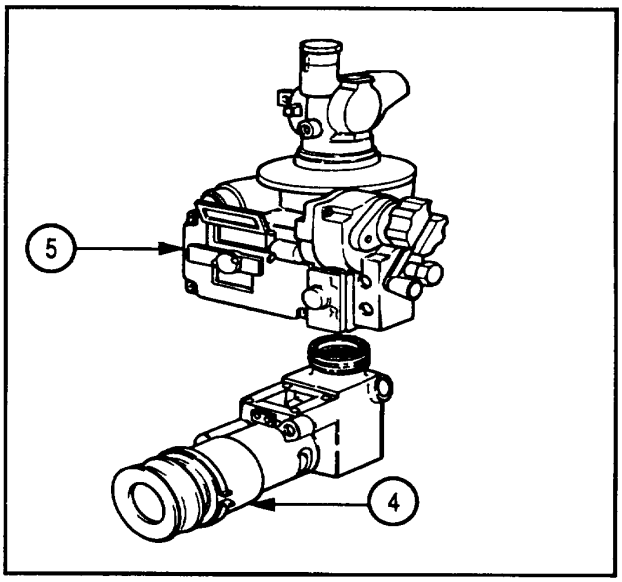
1 Perform image tilt adjustment. Refer to page 2-65.

NOTE

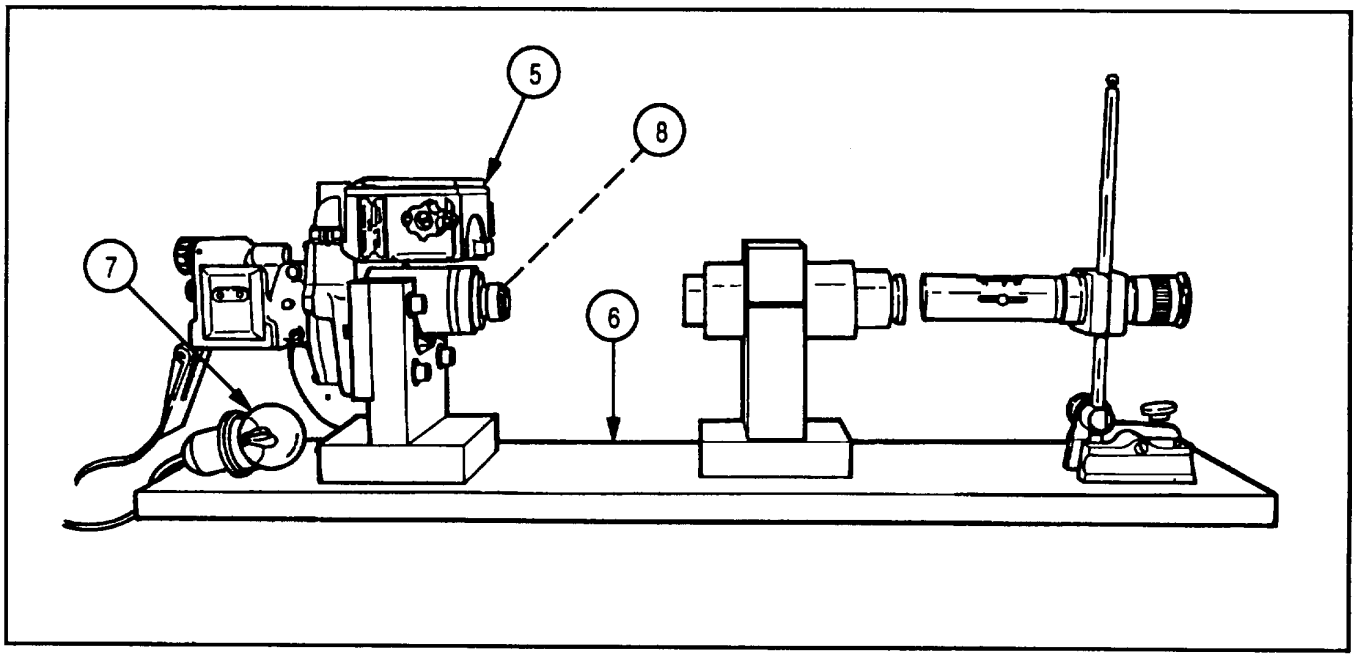
Make sure numbers in projector collimator are right side up.

2 Rotate deflection knob (1) until reticle of M115 panoramic telescope (2) line coincides with reticle of projector collimator (3). The opposite extremity should place reticles in coincidence within 30 minutes (9.5 mils) of arc as measured on projector collimator (3). If specified tolerance is not met, go to step 3.





3 Remove elbow assembly (4) from telescope housing (5). Refer to page 2-19.

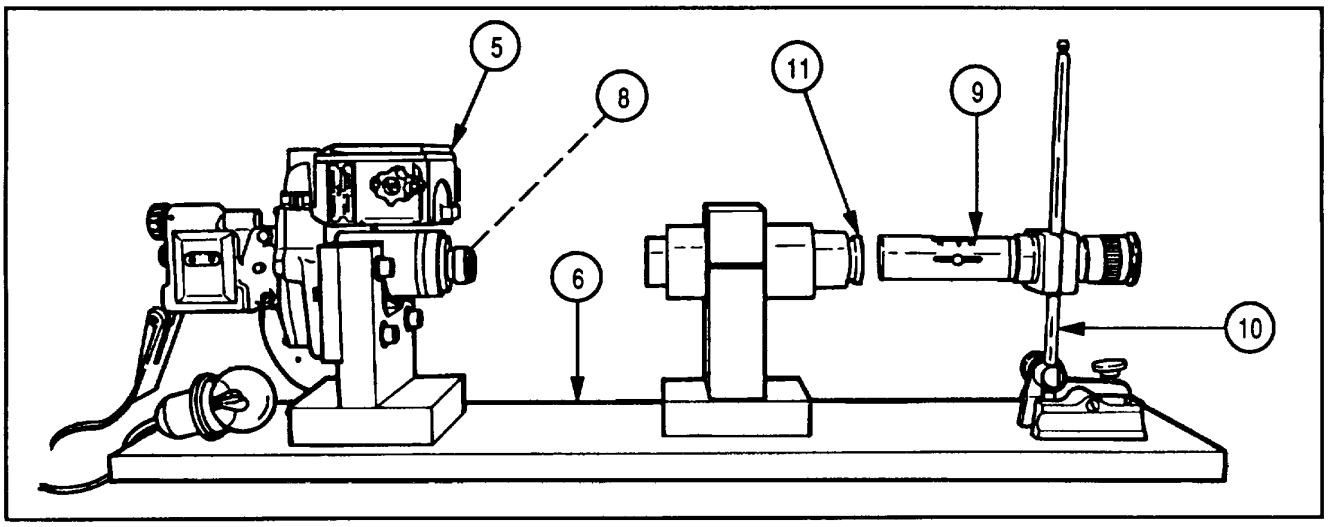


4 Install telescope housing (5) on reticle alinement fixture (6). Install light source (7).

5 Remove externally threaded retainer ring (8).

2-17. M115 PANORAMIC TELESCOPE FINAL INSPECTION INSTRUCTIONS (CONT).

PARALLELISM OF RETICLE AND IMAGE (CONT)



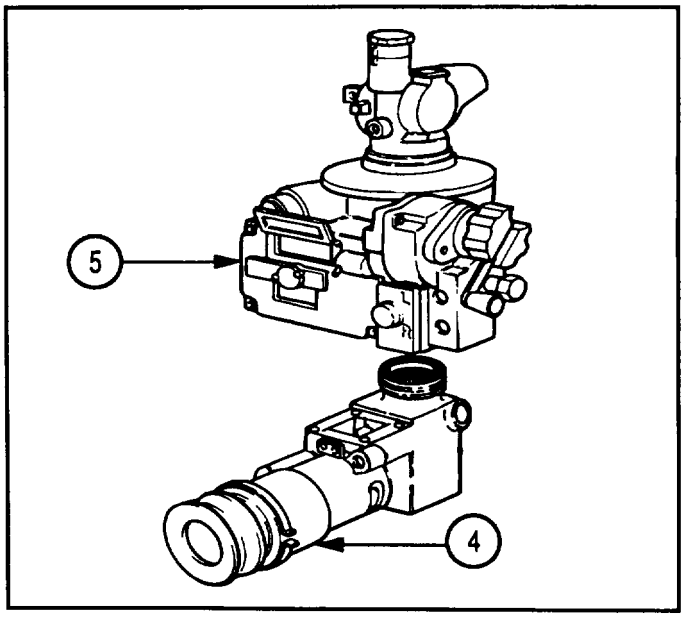
6 Install dioptometer (9) in telescope holder (10). Adjust to height of reticle alinement fixture eyepiece (11) and plumb dioptometer reticle to a plumbline.

7 Sight through dioptometer (9) and turn M115 panoramic telescope reticle using reticle adjusting wrench (figure 8, appx D) until telescope reticle is aligned with dioptometer reticle.

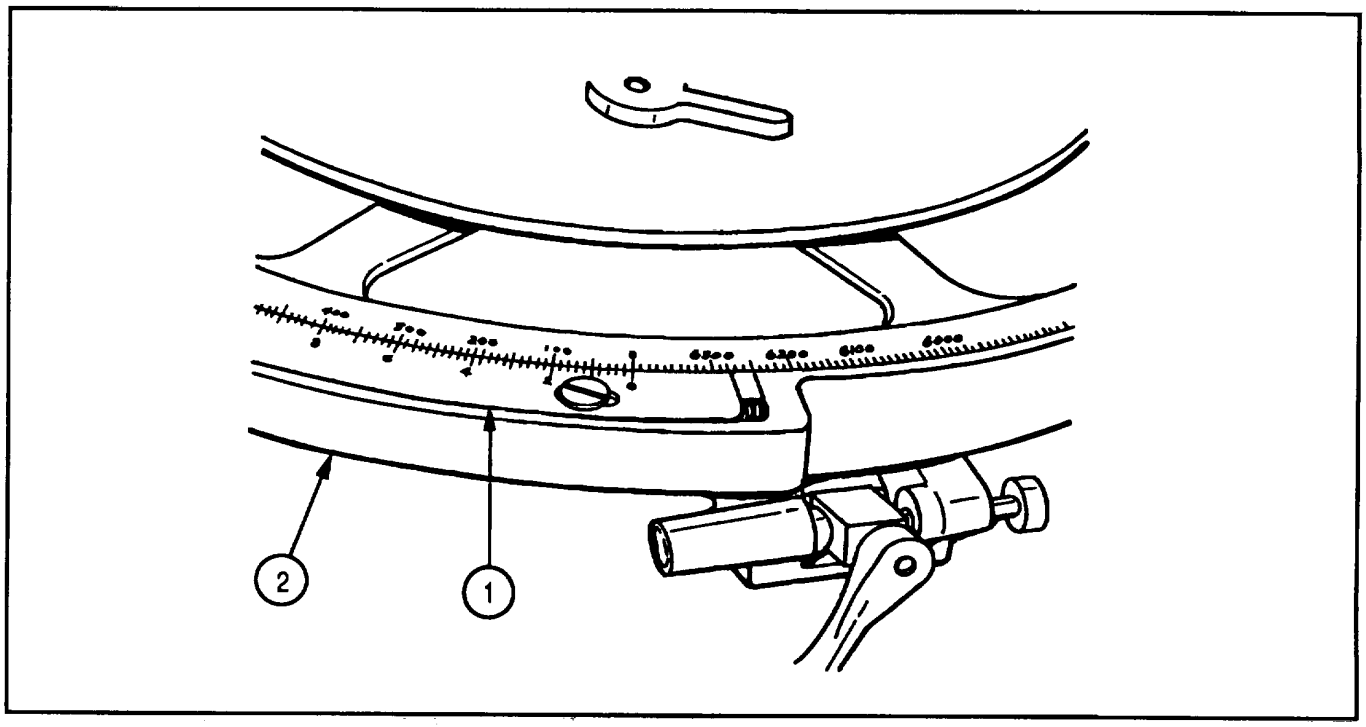
8 Install and tighten externally threaded ring (8). Recheck to be sure that reticle is still alined with dioptometer reticle.

9 Remove telescope housing (5) from reticle alinement fixture (6).

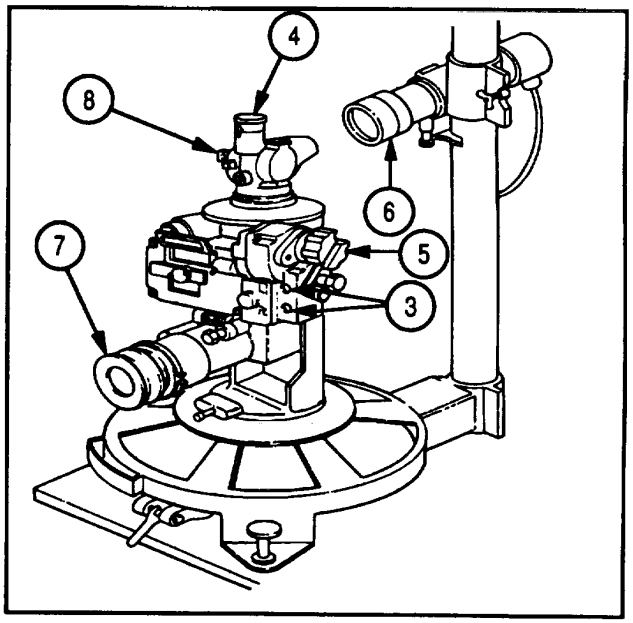
10 Reinstall elbow assembly (4) on telescope housing (5). Refer to page 2-19.



COLLIMATION



1 Set azimuth ring (1) to "0" coincidence on azimuth testing fixture (2).



2 Set gunner's aid counter (3) to 00-00 detent.

3 Rotate elevation knob (4) and deflection knob (5) until telescope reticle is in coincidence with projector collimator (6) while sighting through eyepiece (7). Both open sight (8) and index on elevation knob (4) should indicate zero position. If not, go to step 4.

2-17. M115 PANORAMIC TELESCOPE FINAL INSPECTION INSTRUCTIONS (CONT).

COLLIMATION (CONT)

4 Loosen three screws (9) and position micrometer (10) so that index (11) points to "0". Tighten three screws (9).

5 Loosen two screws (12) and position open sight (8) to "0". Tighten two screws (12).

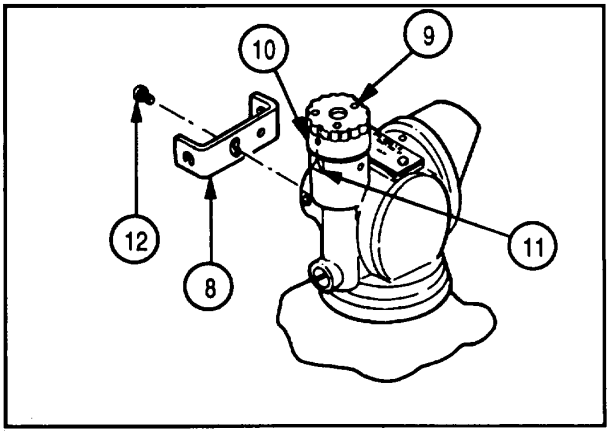
6 Check that deflection counter (13) registers 3200 mils. If not, go to step 7.

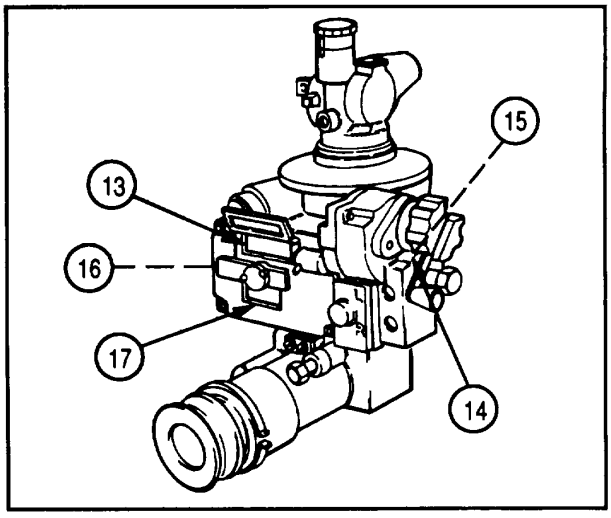
7 Remove cap (14) and insert screwdriver into slotted key (15).

8 Push in and rotate screwdriver until deflection counter registers 3200 mils.

9 Install cap (14).

10 Rotate reset counter knob (16) until reset counter (17) registers 3200 mils.





PLUMB TRAVEL AND LINE OF SIGHT TRAVEL

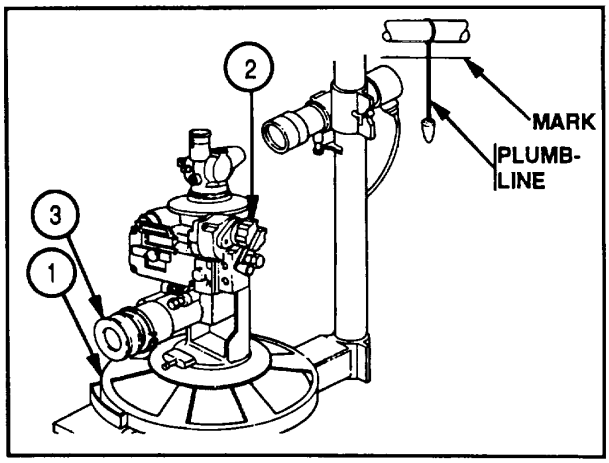
1 Collimate telescope. Refer to page 2-69.

2 Suspend plumbline to one side of azimuth testing fixture (1).

3 Rotate deflection knob (2) to sight onto plumbline.

4 Install a parallax shield in eyepiece (3).

5 Place a mark on wall behind plumbline, intersecting reticle line.



6 Measure distance from head assembly (4) to mark on wall in inches (centimeters).

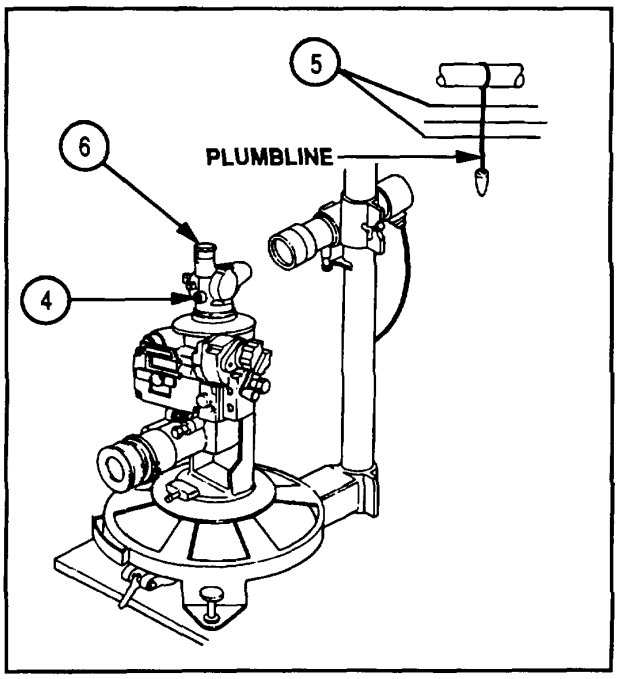
7 Multiply distance in step 6 by 0.30350 (tangent of 300 mils).

8 Place tape (5) (item 14, appx C), above and below mark, at distance determined in step 7.

9 Rotate elevation knob (6) from stop-to-stop. Reticle must follow plumbline within 0.5 mil. Line of sight must elevate, or depress, no less than 300 mils.

10 If plumb travel is not within limits, replace prism assembly. Refer to page 2-50.

11 If line of sight travel is not within limits, adjust elevation knob. Refer to page 2-71.



ELEVATION MECHANISM BACKLASH

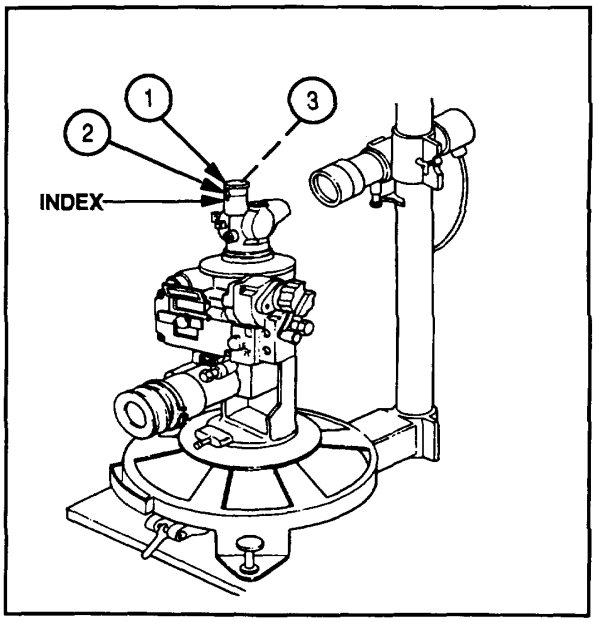
1 Aline reticles by turning elevation knob (1), clockwise, without overtravel.

2 Check that micrometer (2) is zeroed.

3 If not, loosen three screws (3) and turn micrometer (2) so that index points to "0". Tighten three screws.

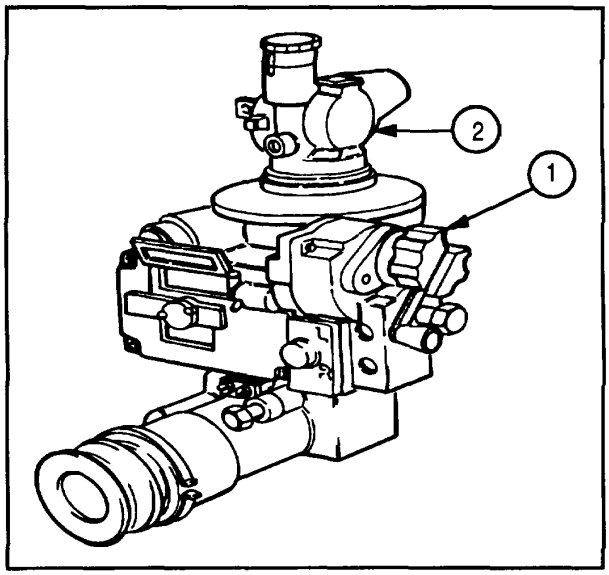
4 Rotate elevation knob (1), counterclockwise, at least a half turn, and return clockwise with no overtravel to aline index to zero.

5 If reticles are not within 5.0 mils, adjust head assembly. Refer to page 2-57.



2-17. M115 PANORAMIC TELESCOPE FINAL INSPECTION INSTRUCTIONS (CONT).

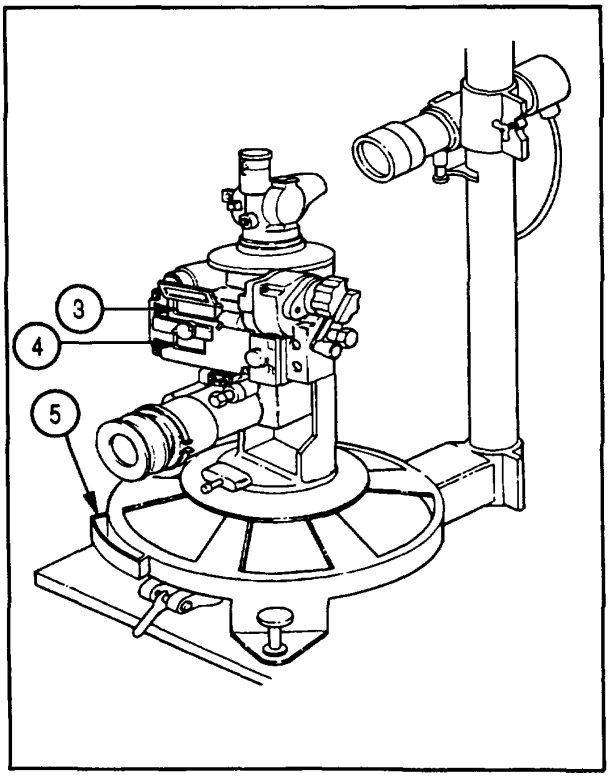
DEFLECTION ERRORS (800 MIL STEPS) AND BACKLASH (DEFLECTION MECHANISM) INSPECTIONS



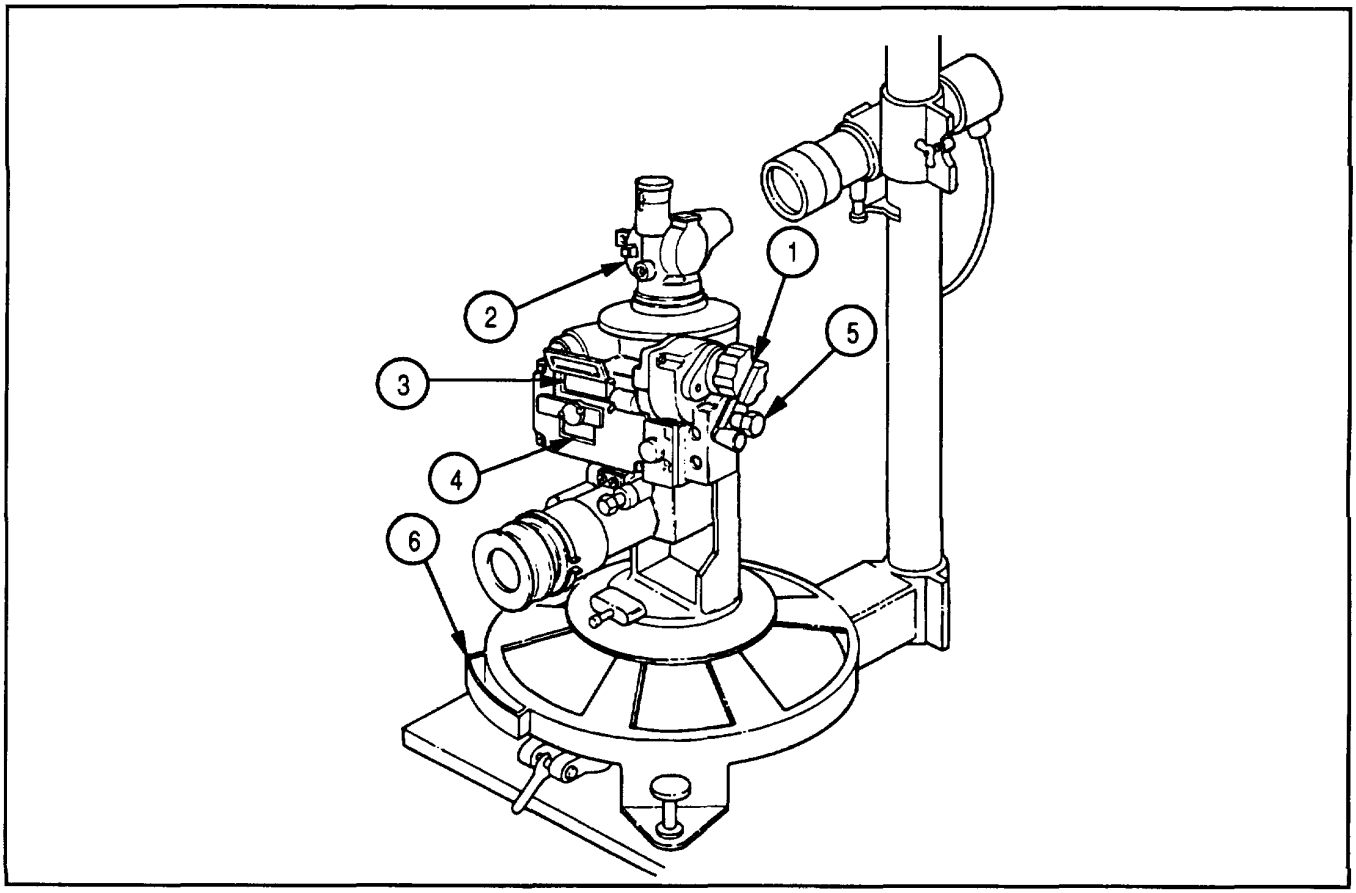
1 Rotate deflection knob (1) until head assembly (2) makes 2 full revolutions.

NOTE

- Deflection error and backlash combined must not exceed 1.5 mil between positive and negative error. Total error, excluding backlash, between deflection counter (3) and reset counter (4) reading, for any one number, must not exceed 0.5 mil.
- Backlash in deflection mechanism must not exceed 1.0 mil when read on azimuth counter (5) and 1.25 mils on reset counter (4).



2 Collimate telescope. Refer to page 2-69.



3 Rotate azimuth fixture ring (6), counterclockwise, to 800 mils.

4 Rotate deflection knob (1), clockwise, until reticles coincide. If coincidence point is overtraveled, rotate deflection knob, counterclockwise, one-half turn past coincidence point and repeat this step.

5 Deflection counter (3) should increase by 800 mils $\pm$ 1.0 mil and reset counter (4) should increase by 800 mils $\pm$ 1.0 mil. Record readings.

6 Rotate deflection knob (1) approximately one full revolution clockwise. Rotate deflection knob slowly, counterclockwise, until panoramic reticle coincides with collimator projector reticle. Record readings. Be careful not to overtravel coincidence point. If coincidence point is passed, repeat.

7 Difference between readings in steps 5 and 6 is amount of backlash and must not exceed 0.5 mil when read on azimuth counter (5) and 0.75 mil on reset counter (4).

8 Rotate azimuth fixture ring (6), counterclockwise, to 1600 mils.

9 Repeat steps 3 thru 7. Deflection counter (3) and reset counter (4) should indicate 4800 mils.

10 Repeat steps 3 thru 7 above, every 800 mils, until head assembly (2) completes 2 full revolutions.

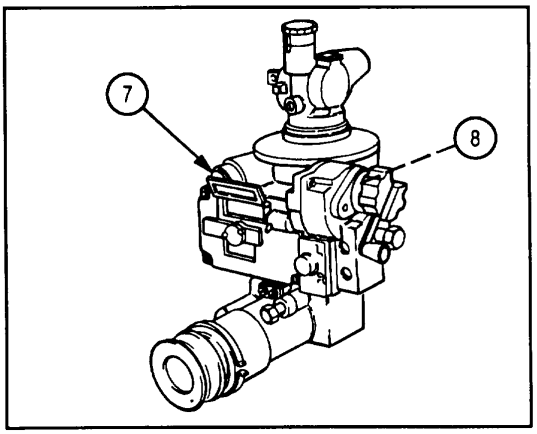
11 Replace deflection counter (3) if readings exceed tolerance in step 7. Refer to page 2-42.

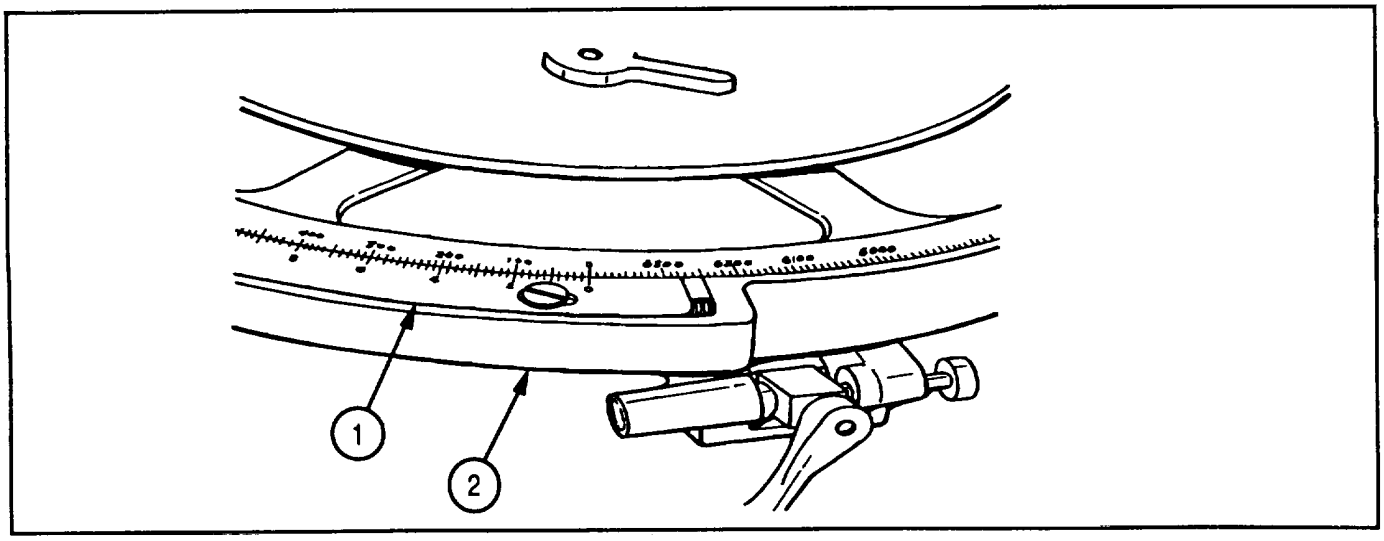
12 Replace reset counter (4) if readings exceed tolerance in step 7. Refer to page 2-42.

2-17. M115 PANORAMIC TELESCOPE FINAL INSPECTION INSTRUCTIONS (CONT).

DEFLECTION ERRORS (800 MIL STEPS) AND BACKLASH (DEFLECTION MECHANISM) INSPECTIONS (CONT)

13 If backlash in deflection mechanism exceeds tolerance, adjust plug (7) or retainer (8). Check for binding or loose gear trains. Refer to page 2-28.





NOTE

- **LEVEL TRAVEL**

Line of sight shall not deviate in elevation from a horizontal target line by more than ± 1.0 mil (total excursion of 2 mils) when head is rotated through at least 2 full revolutions of travel.

- **LIFT**

Displacement of the horizontal line of sight, due to reversing direction of head rotation, shall not exceed 0.5 mil while observing reticle.

1 Set azimuth ring (1) to "0" coincidence on azimuth testing fixture (2).

2 While sighting through eyepiece (3), rotate deflection knob (4) and elevation knob (5), until reticle coincides with projector collimator (6).

3 Rotate azimuth ring (1) 800 mils, counterclockwise.

4 Rotate deflection knob (4), clockwise, until reticles coincide.

5 Check that line of sight does not deviate from horizontal by more than 1.0 mil.

6 Rotate deflection knob (4), clockwise, approximately one-half revolution while observing reticle.

7 Rotate deflection knob (4) slowly, counterclockwise, until reticles coincide.

8 Check that line of sight changes no more than 0.5 mil from reading in step 5.

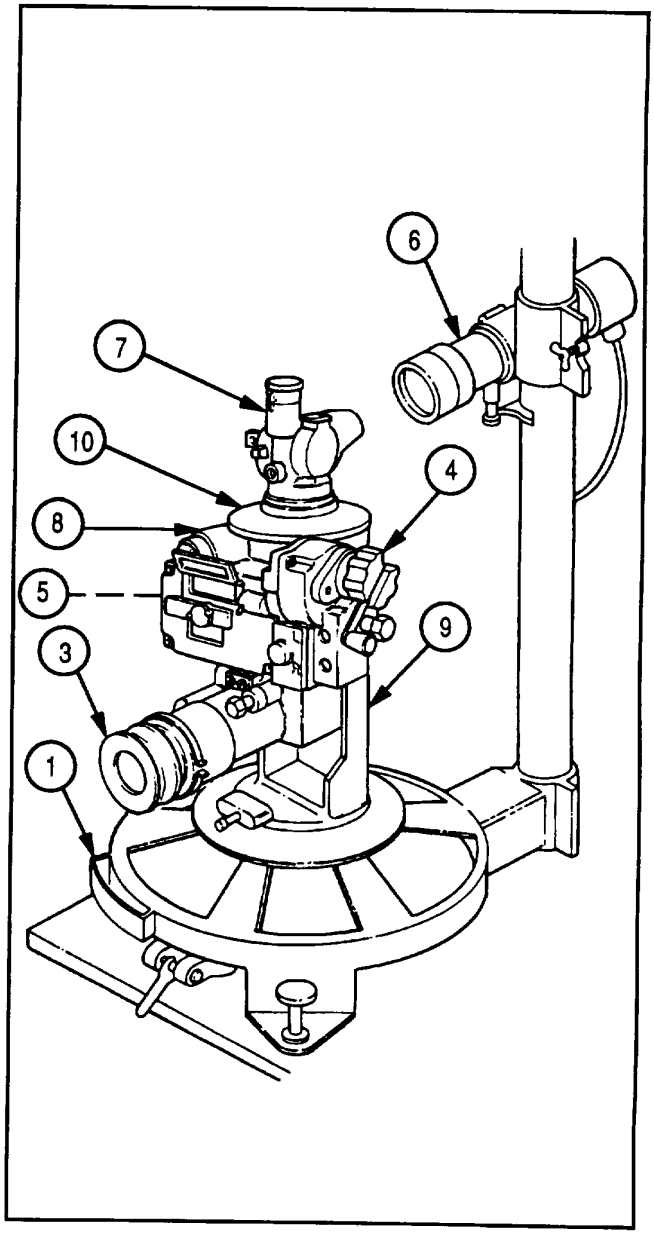
9 Repeat steps 3 thru 8 until head assembly (7) has made 2 full revolutions.

10 If level travel exceeds tolerance specified on page 2-74, check mounting surfaces of M115 panoramic telescope (8) and adapter fixture (9) for dirt, nicks, or burrs. If none of above conditions exist, adjust optic cell assembly. Refer to page 2-50.

CAUTION

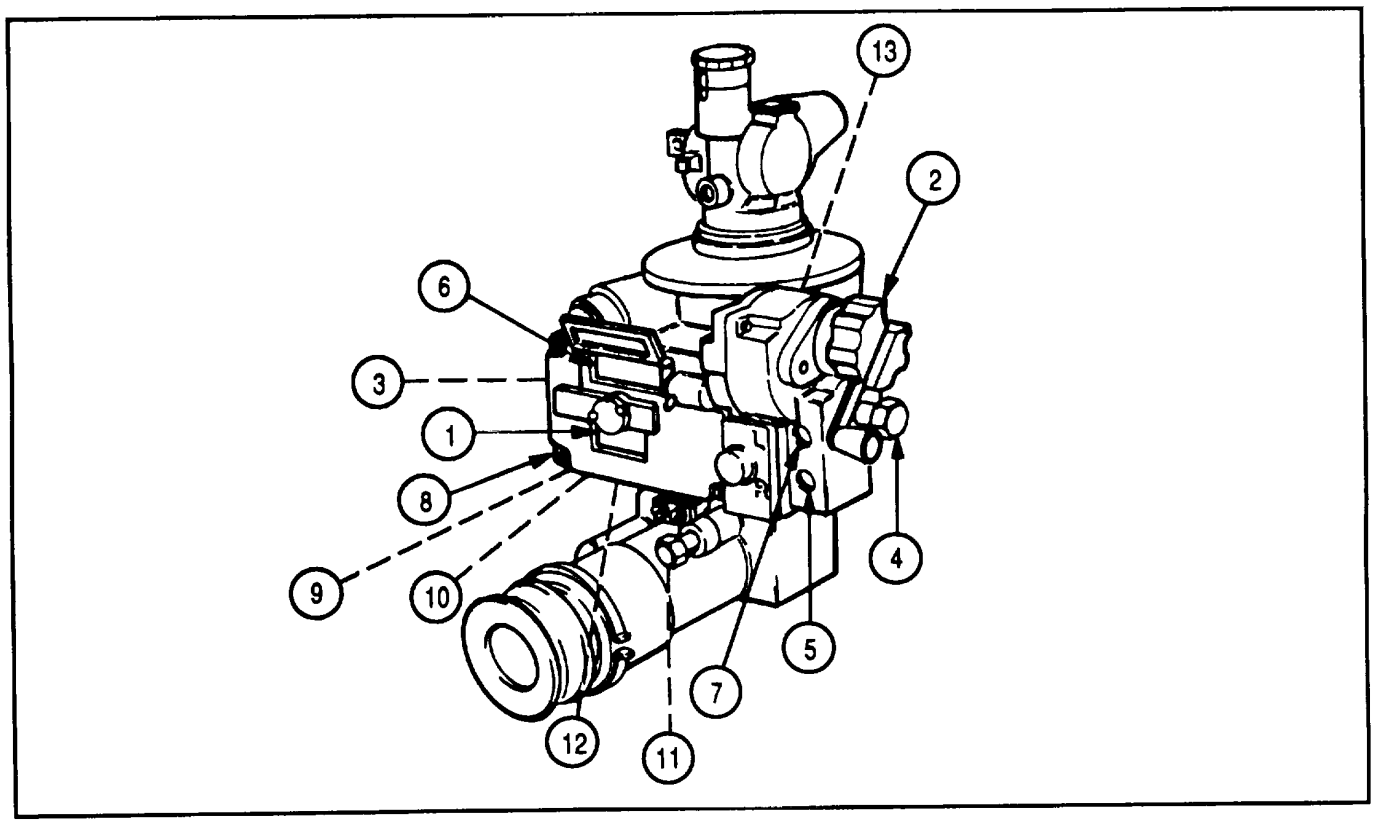
Overtightening of plugs will cause binding in deflection mechanism.

11 Check lift tolerance. If lift exceeds tolerance specified on page 2-74, loosen setscrews and tighten plugs in cover (10).



2-17. M115 PANORAMIC TELESCOPE FINAL INSPECTION INSTRUCTIONS (CONT).

COUNTER OPERATION AND ADJUSTMENT



1 Reset counter (1) must follow when deflection knob (2) is rotated.

2 Push in and rotate reset knob (3) to return reset counter (1) to 3200 mils.

3 If requirements in steps 1 and 2 cannot be met, replace reset counter. Refer to page 2-42.

4 Rotate gunner's aid knob (4) 50 mils in window (5) and note that deflection counter (6) increases 50 mils.

5 Rotate gunner's aid knob (4) 50 mils in window (7) and note that deflection counter (6) decreases 50 mils.

6 If requirements of steps 1 and 2 cannot be met, replace gunner's aid counters (5 and 7). Refer to page 2-42.

7 Set both counters to "00".

8 If the displays are not centered in the counter windows, remove overlay assembly (8). Refer to page 2-42.

9 Remove setscrews (9 and 10) and adjust setscrews (11 and 12) to center displays. Install setscrews (9 and 10) and overlay assembly (8). Refer to page 2-42.

10 If requirements of steps 7 and 8 cannot be met, replace gunner's aid counters (5 and 7) and differential gear (13). Refer to page 2-42.

TORQUE INSPECTION

1 Using torque adapter (8599917) and torque wrench, check that running torque of deflection knob (1) is 3.00 to 8.00 in.-lb (0.45 to 0.90 N-m) in both directions.

2 If requirements in step 1 cannot be met, remove deflection knob (1). Refer to page 2-28.

3 Remove cap assembly (2) and associated shims. Refer to page 2-28.

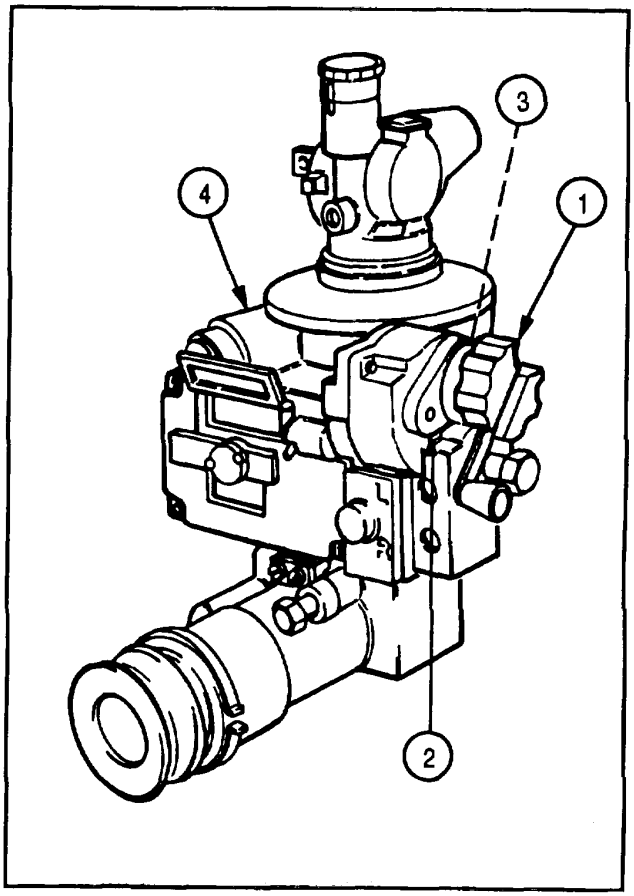
4 Temporarily install deflection knob (1), torque adapter, and torque wrench.

5 Adjust retainer (3) until required torque in step 1 is achieved.

6 Scribe a line on retainer (3) and housing (4). Back out retainer (3) and apply small amount of sealing compound (item 10, appx C) and turn in retainer (3) to scribe marks.

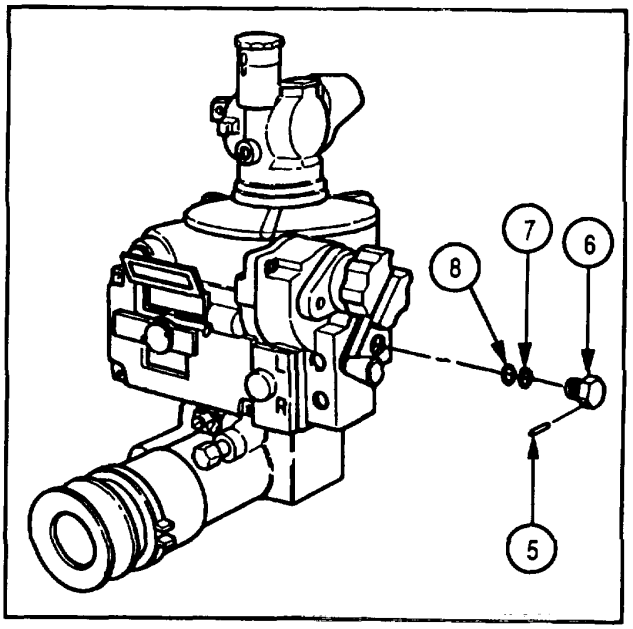
7 Install cap assembly (2). Refer to page 2-28.

8 Install deflection knob (1). Refer to page 2-28.



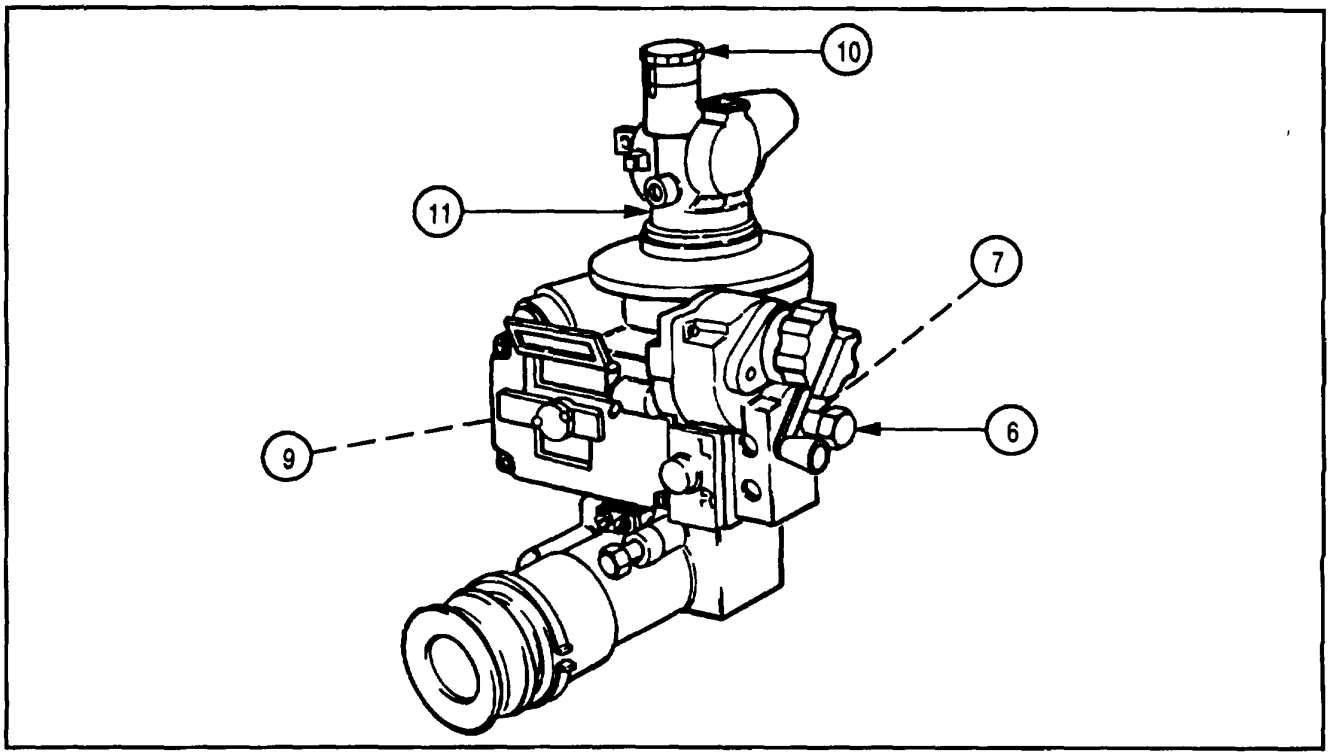
9 Remove pin (5), gunner's aid knob (6), shim(s) (7), and seal (8).

10 Apply silicone compound (item 11, appx C) to inside diameter of seal (8), and sealing compound (item 10, appx C) to outside diameter of seal (8). Reinstall seal (8), shim(s) (7), gunner's aid knob (6), and pin (5).



2-17. M115 PANORAMIC TELESCOPE FINAL INSPECTION INSTRUCTIONS (CONT).

TORQUE INSPECTION (CONT)



11 Using torque adapter (8213929) and torque wrench, check that running torque of gunner's aid knob (6) is 1.00 to 4.00 in.-lb (0.11 to 0.45 N-m) in both directions.

12 Add or remove shim(s) (7) until required torque is achieved.

13 Using torque adapter (8599920) and torque wrench on reset counter knob (9), check that running torque is no more than 2.50 in.-lb (0.28 N-m).

14 If torque requirement is not met in step 13, check gearing and rotation for smooth movement.

15 Using torque adapter (8213928) and torque wrench, check that elevation knob (10) running torque is 0.50 to 2.50 in.-lb (0.06 to 0.28 N-m).

16 Disassemble micrometer portion of head assembly (11). Refer to page 2-22. Adjust retainer (12) until required torque is achieved.

ILLUMINATION INSPECTION

1 Reticle markings must be clearly defined.

2 With power applied, all counters must be illuminated. If not, check overlay assembly containing LEDs and light rod for cracks, breaks, or misalinement. Refer to page 2-42.

PURGING AND CHARGING

Purge and charge M115 panoramic telescope. Refer to TM 750-116.

Section VII. PREEMBARKATION INSPECTION PROCEDURES

2-18. GENERAL.

a. Fire control instruments must be inspected for outward appearance, mechanical condition, and proper operation.

b. Instruments must approach new equipment standards of operation and appearance. The workmanship and quality must reflect the highest standards obtainable.

2-19. SPECIFIC INSTRUCTIONS. Fire control instruments must conform to the following specifications for overseas shipment:

a. Condition of Optical Element. Lenses, prisms, reticles, and windows must be free from dirt, scratches, pits, and chips that will affect optical performance of the instrument.

b. Functioning of Mechanical Parts. Mechanical parts must operate smoothly without binding or rough motion. Parts must be free from grit and must be properly lubricated.

c. Illumination. Counter dials must illuminate properly.

d. General Appearance and Condition of the Instruments.

(1) All parts of the instruments must be present and free from defects.

(2) Paint must cover all specified surfaces. Repaint if painted surfaces show signs of damage.

(3) All optics must be free from any internal dirt and moisture. Excessive dirt or moisture indicates a breakdown in sealing and is cause for rejection of the instrument.

(4) All scales must be easily read. All numbers and divisions must be clearly defined.

(5) All warning labels must be present and legible.

(6) Any fire control instrument failing to meet the requirements of the final inspection is unsatisfactory for overseas shipment.

CHAPTER 3
M139 ELBOW TELESCOPE

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

3-1. COMMON TOOLS AND EQUIPMENT. Refer to page 2-1.

3-2. SPECIAL TOOL AND SUPPORT EQUIPMENT. Refer to page 2-1.

3-3. REPAIR PARTS. Refer to page 2-1.

Section II. INITIAL INSPECTIONS

3-4. GENERAL.

a. Inspection is performed primarily to determine the following:

(1) Completeness.

(2) The nature of unserviceability.

(3) The work, repair parts, and supplies required to return the materiel to serviceability.

(4) That the work in process is being performed properly.

(5) That completed work complies fully with serviceability standards.

b. The M139 elbow telescope is considered serviceable when:

(1) It is complete and properly performs its intended function.

(2) All modification work orders (MWO's) have been applied.

(3) All defects disclosed by the inspection have been corrected.

c. DA Form 2408-5 and DA Form 2409 list applicable MWO's.

3-5. CATEGORIES OF INSPECTION. Categories of inspection define responsibilities:

a. An initial inspection of the M139 elbow telescope is performed immediately on receipt for maintenance. This inspection will determine the amount and type of work to be performed.

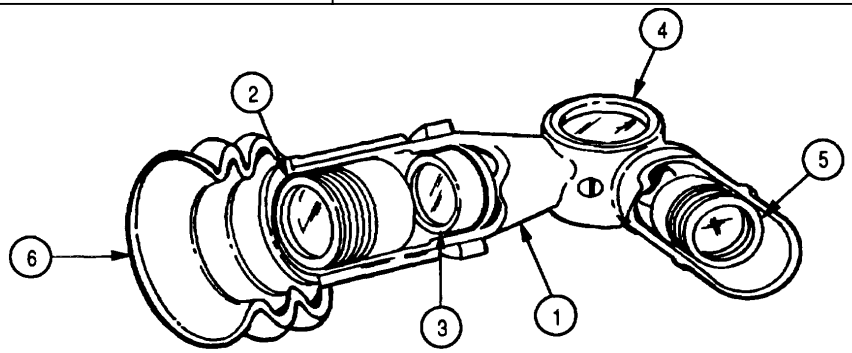
b. A final inspection of the M139 elbow telescope is performed after repairs have been completed to ensure that the item meets serviceability standards.

3-5. CATEGORIES OF INSPECTION (CONT).

c. Table 3-1 lists initial inspection procedures for the M139 elbow telescope. Final inspection procedures are located on page 3-18.

d. Preembarkation inspection procedures are located on page 3-29.

Table 3-1. INITIAL INSPECTION-M139 ELBOW TELESCOPE



Item No.	Item To be Inspected	Procedure
1	M139 Elbow Telescope	Inspect for signs of mistreatment, such as dents, scuff marks, bare spots, and missing parts Check for collimation and foreign matter Refer to p 3-24.
2	Eyepiece Assembly	Check for moisture and foreign matter Look for broken, cracked, or chipped glass.
3	Reticle Cell Assembly	Check for moisture and foreign matter and that reticle is illuminated when M36 instrument light is attached.
4	Cover Assembly	Check that cover assembly is secure and plate is legible.
5	Objective Cell Assembly	Check for moisture and foreign matter, and that parallax does not exceed 0.1 mil at 125 meters.
6	Eyeshield	Check for cracks, splits, and rubber deterioration.

Section III. TROUBLESHOOTING

3-6. TROUBLESHOOTING PROCEDURES.

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

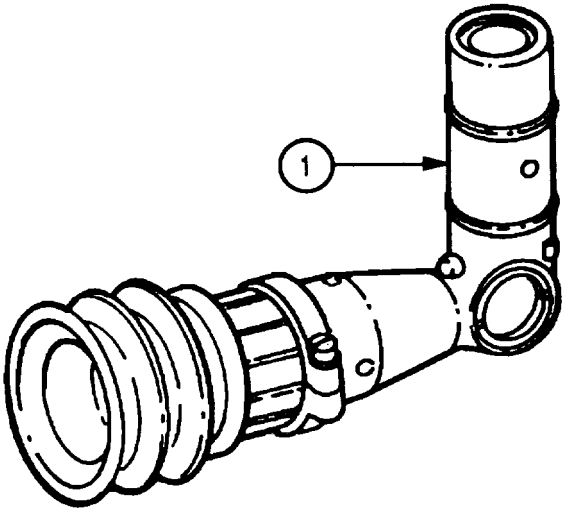
b. There are no direct support troubleshooting instructions. The general support troubleshooting table lists the common malfunctions which may be found during maintenance of the M139 elbow telescope. Refer to page 3-4. Perform the tests/inspections and corrective actions in the order listed.

c. This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions.

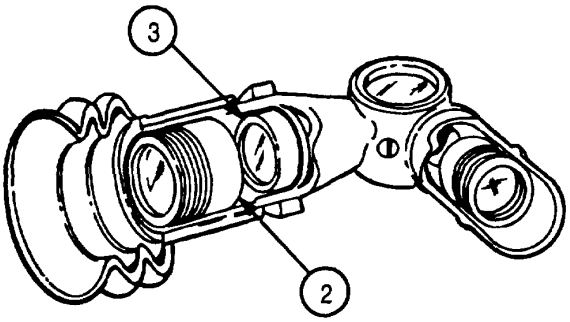
GENERAL SUPPORT SYMPTOM INDEX

3-6. TROUBLESHOOTING PROCEDURES (CONT).

Table 3-2. GENERAL SUPPORT TROUBLESHOOTING

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
   **M139 ELBOW TELESCOPE**
1. M139 ELBOW TELESCOPE (1) IS NOT COLLIMATED. Check on test fixture. Collimate. Refer to page 3-24.
2. M139 ELBOW TELESCOPE (1) HAS MOISTURE OR FOREIGN MATTER. Observe visually. a. Purge. Refer to TM 750-116. b. Disassemble, clean, and reassemble. Refer to page 3-7.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION



EYEPIECE ASSEMBLY

3. EYEPIECE ASSEMBLY (2) HAS MOISTURE, FOREIGN MATTER, OR IS CHIPPED.

Observe visually.

a. Purge. Refer to TM 750-116.

b. Disassemble, replace defective parts, clean, and reassemble. Refer to page 3-12.

RETICLE CELL ASSEMBLY

4. RETICLE CELL ASSEMBLY (3) HAS MOISTURE OR FOREIGN MATTER.

Observe visually.

a. Purge. Refer to TM 750-116.

b. Disassemble, clean, and reassemble. Refer to page 3-15.

5. RETICLE CELL ASSEMBLY (3) DOES NOT ILLUMINATE.

Step 1. Check that reticle cell assembly is positioned correctly.

Rotate until slot in cell is alined opposite window.

Step 2. Check that reticle is positioned correctly in cell.

a. Disassemble and clean. Refer to page 3-15.

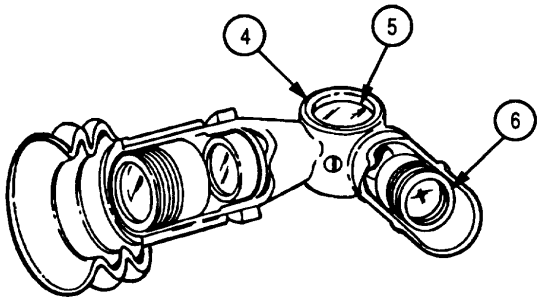
b. Reassemble and correctly position reticle in cell. Refer to page 3-7.

3-6. TROUBLESHOOTING PROCEDURES (CONT).

Table 3-2. GENERAL SUPPORT TROUBLESHOOTING (cont)

TM 9-1240-400-34&P

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION



COVER ASSEMBLY

6. COVER ASSEMBLY (4) IS NOT SECURED PROPERLY.

   Check for looseness.

   Tighten cover assembly. Refer to page 3-7.

7. PLATE (5) ON COVER ASSEMBLY IS NOT LEGIBLE.

   Observe visually.

   Replace plate. Refer to page 3-7.

OBJECTIVE CELL ASSEMBLY

8. OBJECTIVE CELL ASSEMBLY (6) HAS MOISTURE OR FOREIGN MATTER.

   Observe visually.

   a. Purge. Refer to TM 750-116.

   b. Disassemble, clean, and reassemble. Refer to page 3-16.

9. PARALLAX EXCEEDS 0.1 MIL AT 125 METERS.

   Observe visually.

   Adjust objective cell assembly. Refer to page 3-19.

Section IV. DIRECT SUPPORT MAINTENANCE

There are no Direct Support maintenance procedures for the M139 Elbow Telescope.

Section V. GENERAL SUPPORT MAINTENANCE PROCEDURES

3-7. MAINTENANCE OF M139 ELBOW TELESCOPE.

This task covers: **a.** ***Disassembly*** **b.** ***Cleaning*** **c.** ***Repair*** **d.** ***Reassembly***

INITIAL SETUP:

Tools and Special Tools
Tool kit, electronic: system maintenance (SC 5180-95-CL-B29)

Materials/Parts
Lockwasher (MS35338-138)
Sealing compound (item 10, appx C)

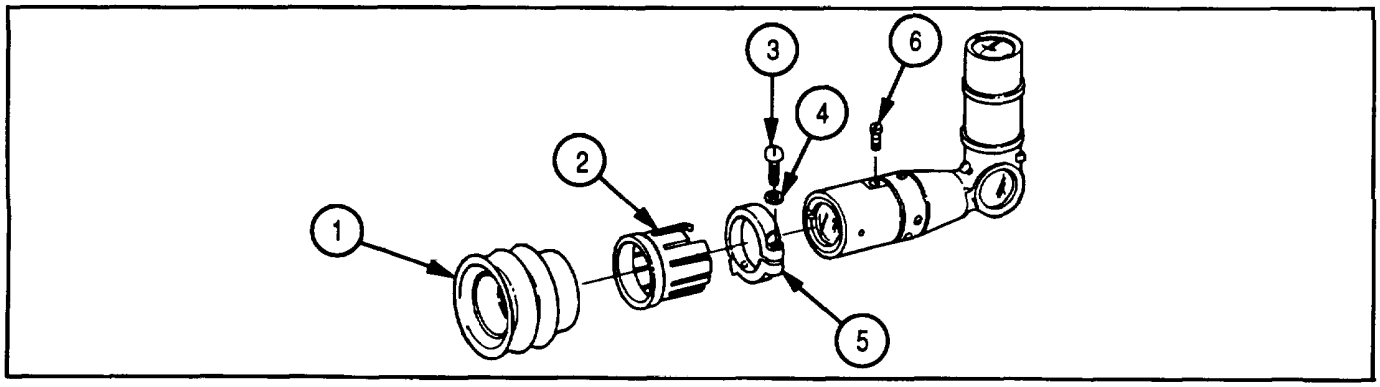
References
TM 9-254
TM 750-116

Equipment Conditions
M139 elbow telescope removed from M110A2 howitzer (TM 9-2350-304-20-2)

General Safety Instructions

WARNING

Use adhesives, cleaning solvents, and sealing compounds in well-ventilated area away from open flame. Adhesives, cleaning solvents, and sealing compounds are harmful to skin and clothing, can burn easily, and may give off harmful vapor.



DISASSEMBLY

1 Remove eyeshield (1) and telescope adapter (2).

2 Remove screw (3) and lockwasher (4).

3 Remove loop clamp (5).

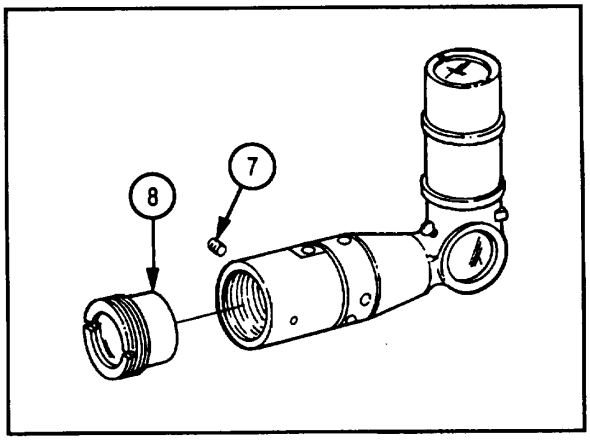
4 Remove purging screw (6).

3-7. MAINTENANCE OF M139 ELBOW TELESCOPE (CONT).

DISASSEMBLY (CONT)

5 Remove setscrew (7).

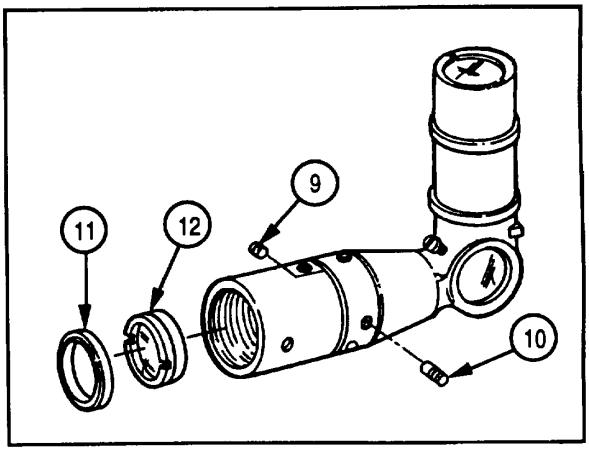
6 Remove eyepiece assembly (8).



7 Remove setscrew (9) and four setscrews (10).

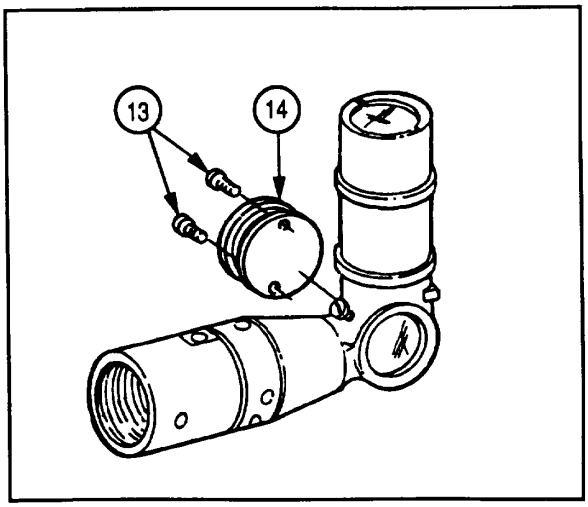
8 Remove externally threaded ring (11).

9 Remove reticle assembly (12).



10 Remove two screws (13).

11 Remove cover (14).



12 Put finger on cushioning pad (15) and hold prism (16) in place.

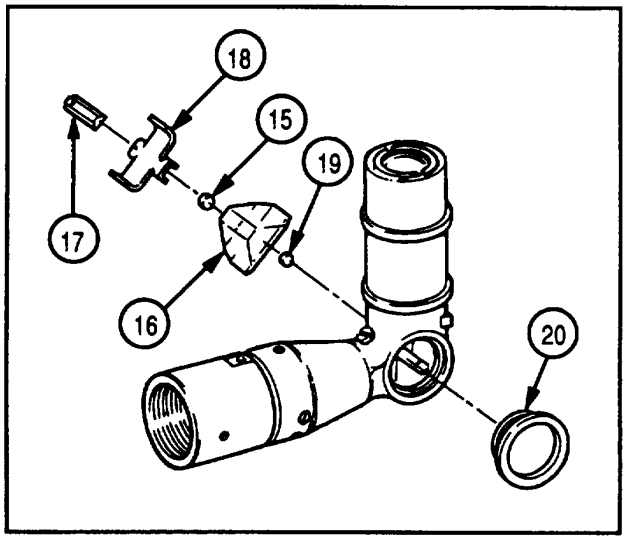
13 Slowly remove spring tension clip (17).

14 Remove optical element holder (18).

15 Remove cushioning pad (15).

16 Remove prism (16) and cushioning pad (19).

17 Remove access cover (20).

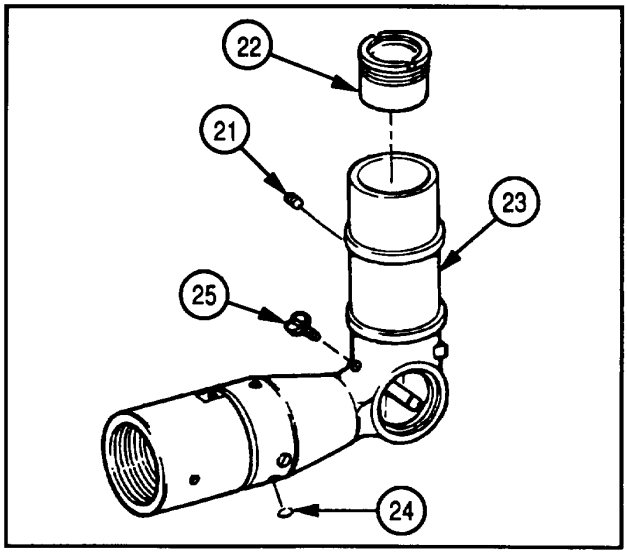


18 Remove setscrew (21).

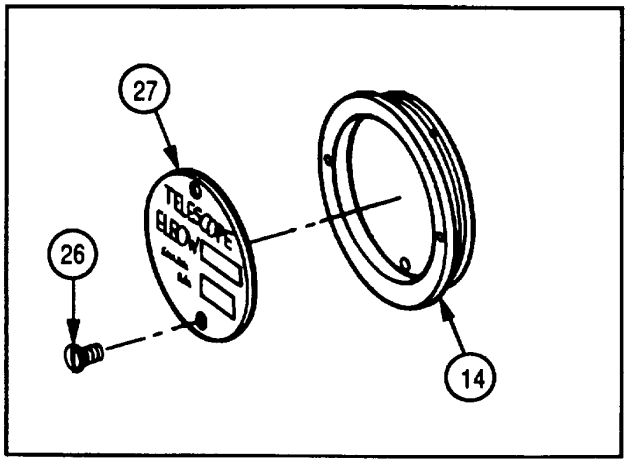
19 Remove objective cell assembly (22) from body (23).

20 Remove two observation windows (24) only if damaged.

21 Remove screw (25).



22 Remove two screws (26) and identification plate (27) from cover (14).



3-7. MAINTENANCE OF M139 ELBOW TELESCOPE (CONT).

CLEANING

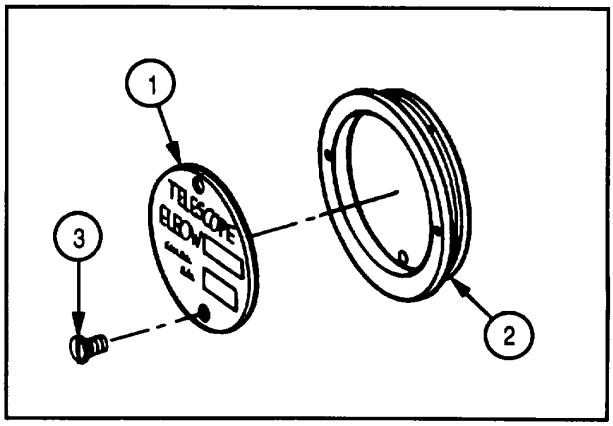
Clean all parts per TM 9-254.

REPAIR

1 Eyepiece assembly is a repairable assembly; refer to page 3-12.
2 Reticle assembly is a repairable assembly; refer to page 3-15.
3 Objective cell assembly is a repairable assembly; refer to page 3-16.
4 Repair is by replacement of authorized parts as required. Refer to appendix B.

REASSEMBLY

1 Install identification plate (1) on cover (2) using two screws (3).



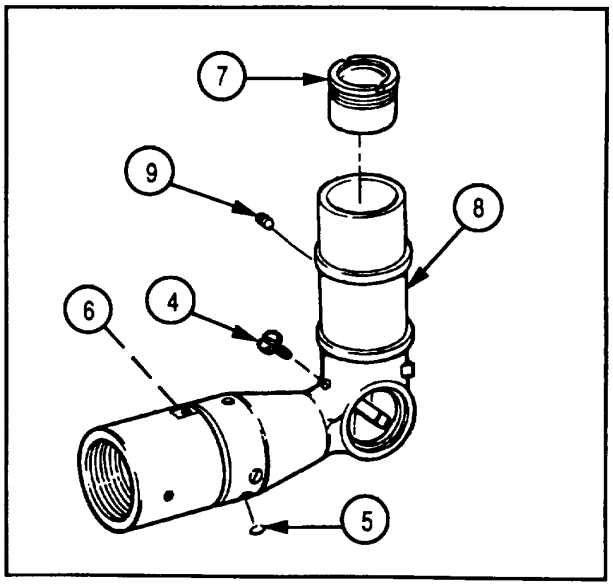
2 Install screw (4).

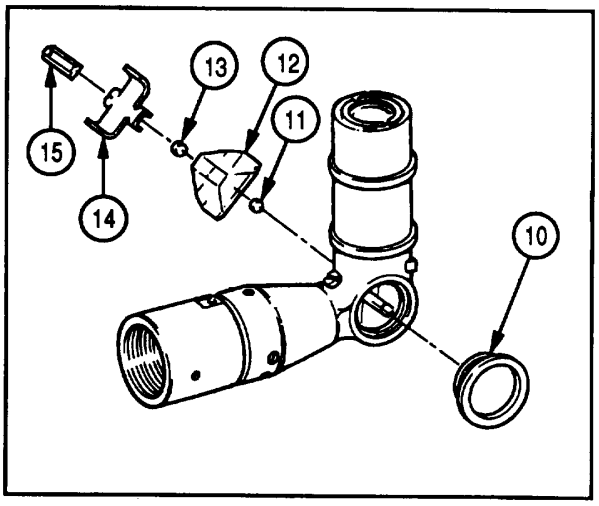
3 Install window (5) and observation window (6). Apply sealing compound (item 10, appx C) to outside edges.

4 Install objective cell assembly (7) in body (8).

NOTE
Setscrew will be tightened during parallax inspection, and adjustment will take place in final inspection procedures.

5 Install setscrew (9), but do not tighten.



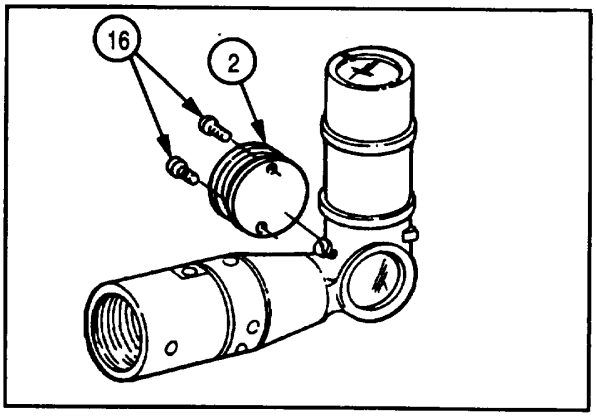


6 Install access cover (10).

7 Install cushioning pad (11) and prism (12).

8 Install cushioning pad (13).

9 Install optical element holder (14) and spring tension clip (15).

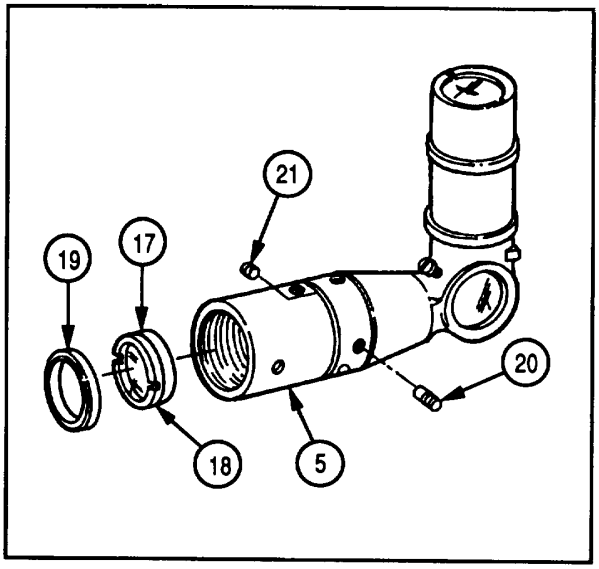


10 Apply a 1/16-in. bead of sealing compound (item 10, appx C) in recess of cover (2) and install.

11 Apply sealing compound (item 10, appx C) under heads of two screws (16) and install.

12 Install reticle assembly (17) with slot (18) in cell opposite observation window (5).

13 Install externally threaded ring (19) and tighten just enough to keep reticle assembly from being loose.



NOTE

Screws will be tightened during reticle plumb/collimation inspection, and adjustment will take place in final inspection procedures.

14 Install four setscrews (20), but do not tighten.

15 Install setscrew (21), but do not tighten.

3-7. MAINTENANCE OF M139 ELBOW TELESCOPE (CONT).

REASSEMBL Y (CONT)

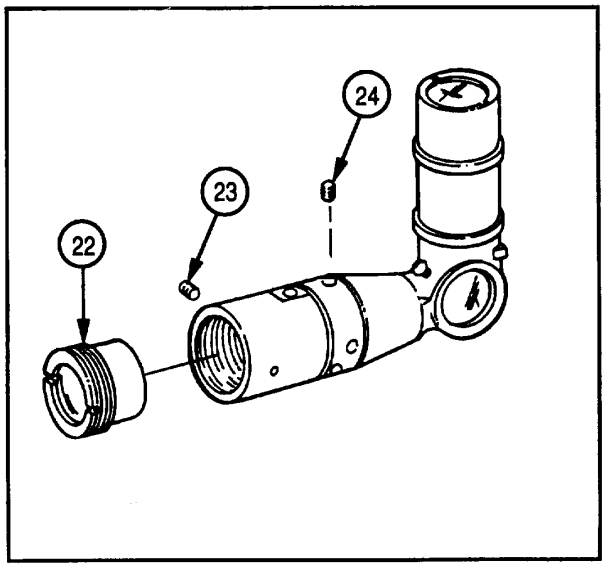
16 Install eyepiece assembly (22).

17 Install setscrew (23), but do not tighten.

NOTE

Refer to final inspection procedures for adjustment and alinement of reticle cell assembly and objective cell assembly. Adapter, screw, lockwasher, eyeshield adapter, and eyeshield will be installed after final inspection procedures. Purging screw will be tightened after final purging.

18 Install purging screw (24), but do not tighten.



3-8. MAINTENANCE OF EYEPIECE ASSEMBLY.

This task covers: **a. *Disassembly*** **c. *Repair***
b. *Cleaning* **d. *Reassembly***

INITIAL SETUP:

Tools and Special Tools
Tool kit, electronic: system maintenance (SC 5180-95-CL-B29)

Materials/Parts
Sealing compound (item 10, appx C)

References
TM 9-254
TM 750-116

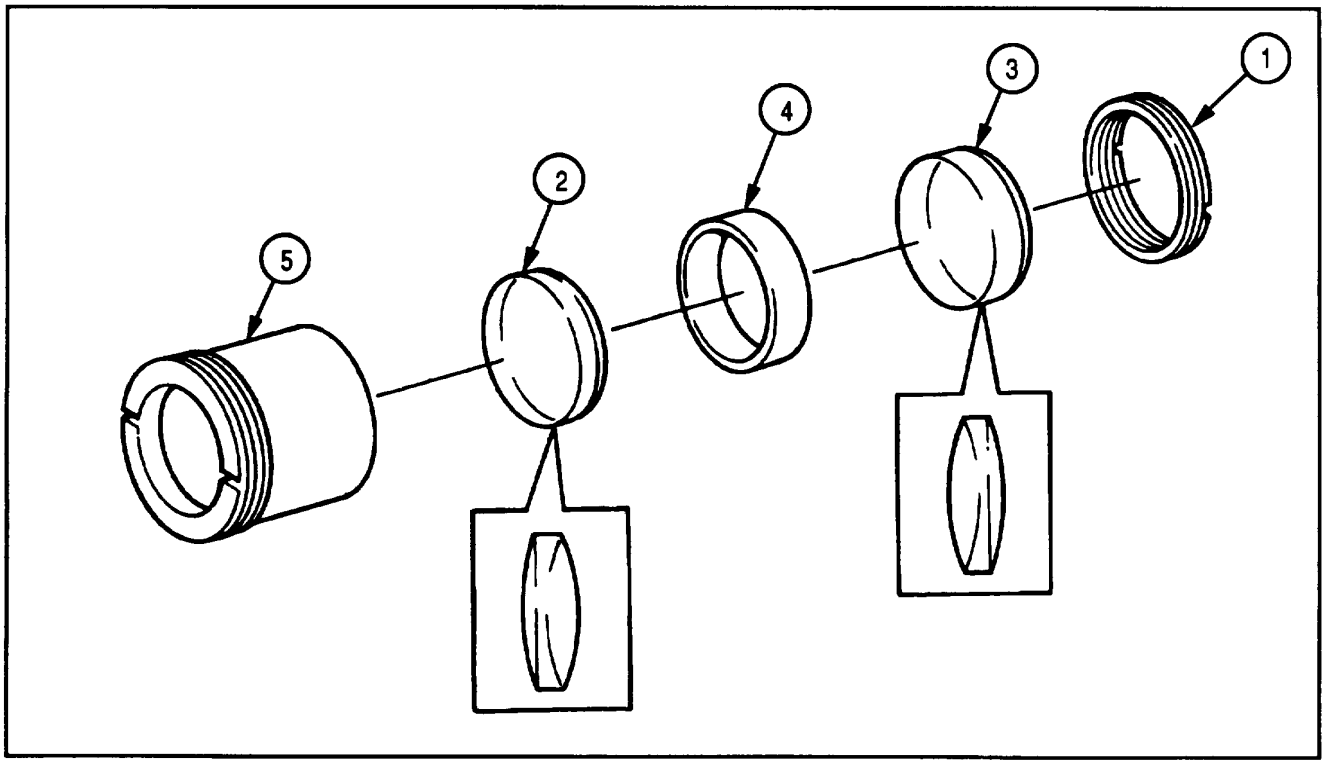
Equipment Conditions
3-7 Eyepiece assembly removed

General Safety Instruction

WARNING

Use adhesives, cleaning solvents, and sealing compounds in well-ventilated area away from open flame Adhesives, cleaning solvents, and sealing compounds are harmful to skin and clothing, can burn easily, and may give off harmful vapor.

DISASSEMBLY



1 Remove externally threaded ring (1).

2 Press on eye lens (2) until field lens (3), spacer (4), and eye lens (2) are removed from cell assembly (5).

CLEANING

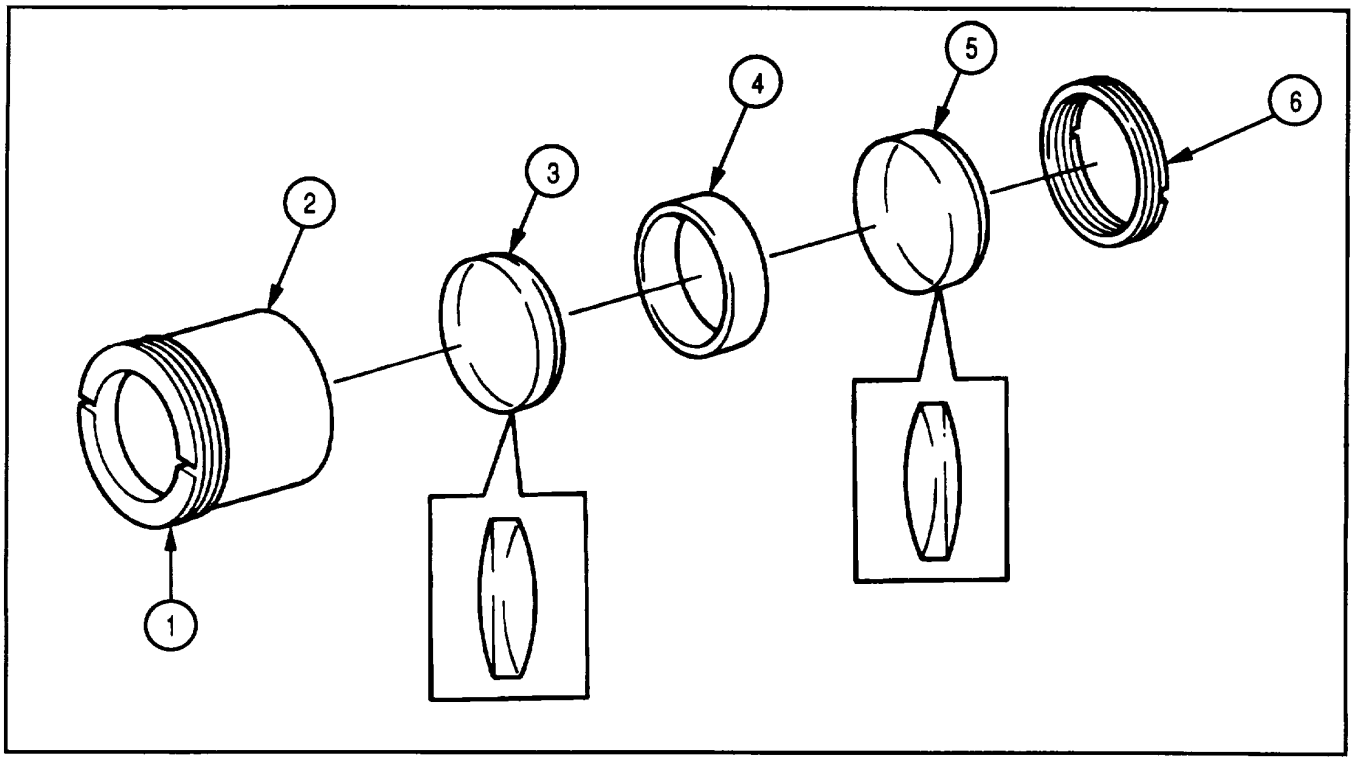
Clean all parts per TM 9-254.

REPAIR

Repair is by replacement of authorized parts as required. Refer to appendix B.

3-8. MAINTENANCE OF EYEPIECE ASSEMBLY (CONT).

REASSEMBLY



1 Apply a 1/16-in. bead of sealing compound (item 10, appx C) to inside front (1) of cell assembly (2).

NOTE
For reassembly, lenses are to be positioned as shown in illustration.

2 Position lens (3) on spacer (4).

3 Position cell (2) over lens (3) and spacer (4). Press down carefully.

4 Turn cell (2) over and press down carefully on spacer (4) until lens (3) is seated in cell assembly (2).

5 Install field lens (5).

6 Install externally threaded ring (6) and tighten until lens (3), spacer (4), and field lens (5) are correctly seated. Do not overtighten.

7 Apply a small amount of sealing compound (item 10, appx C) in slots of externally threaded ring (6).

3-9. MAINTENANCE OF RETICLE CELL ASSEMBLY.

This task covers: **a.** ***Disassembly*** **b.** ***Cleaning*** **c.** ***Repair*** **d.** ***Reassembly***

INITIAL SETUP:

Tools and Special Tools
Tool kit, electronic: system maintenance (SC 5180-95-CL-B29)

Materials/Parts
Sealing compound (item 10, appx C)

References
TM 9-254
TM 750-116

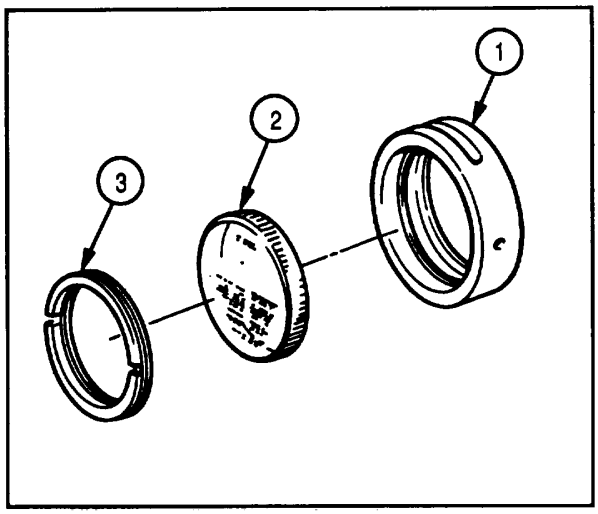
Equipment Conditions
3-7 Reticle assembly removed

General Safety Instructions

WARNING

Use adhesives, cleaning solvents, and sealing compounds in well-ventilated area away from open flame Adhesives, cleaning solvents, and sealing compounds are harmful to skin and clothing, can burn easily, and may give off harmful vapor.

DISASSEMBLY



1 Scribe a line on cell (1) parallel to horizontal line in reticle (2) crosshair. Remove sealing compound from slots in externally threaded ring (3).

2 Remove externally threaded ring (3).

3 Press reticle (2) out of cell (1).

CLEANING

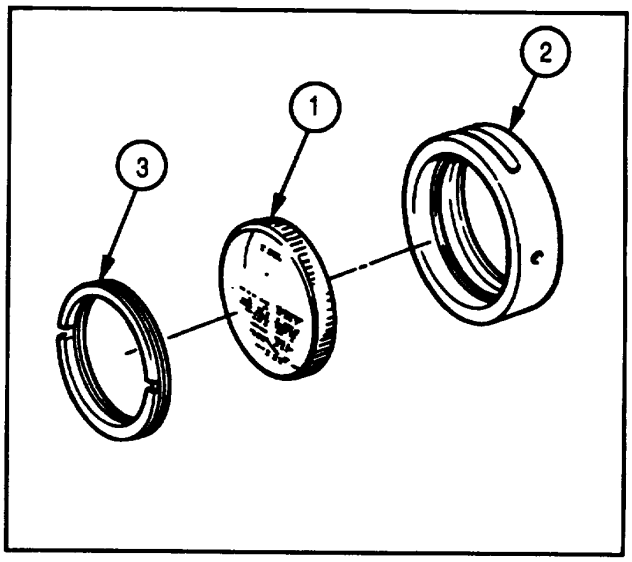
Clean all parts per TM 9-254.

REPAIR

Repair is by replacement of authorized parts as required. Refer to appendix B.

3-9. MAINTENANCE OF RETICLE CELL ASSEMBLY

REASSEMBLY



1 Install reticle (1) in cell (2) with etched side toward externally threaded ring (3), and aline horizontal line on reticle (1) with scribe mark on cell (2).

2 Install externally threaded ring (3) and apply a small amount of sealing compound (item 10, appx C) in slots.

3-10. MAINTENANCE OF OBJECTIVE CELL ASSEMBLY.

This task covers: **a.** ***Disassembly*** **c.** ***Repair***
b. ***Cleaning*** **d.** ***Reassembly***

INITIAL SETUP:

Tools and Special Tools
Tool kit, electronic: system maintenance (SC 5180-95-CL-B29)

Materials/Parts
Sealing compound (item 10, appx C)

References
TM 9-254

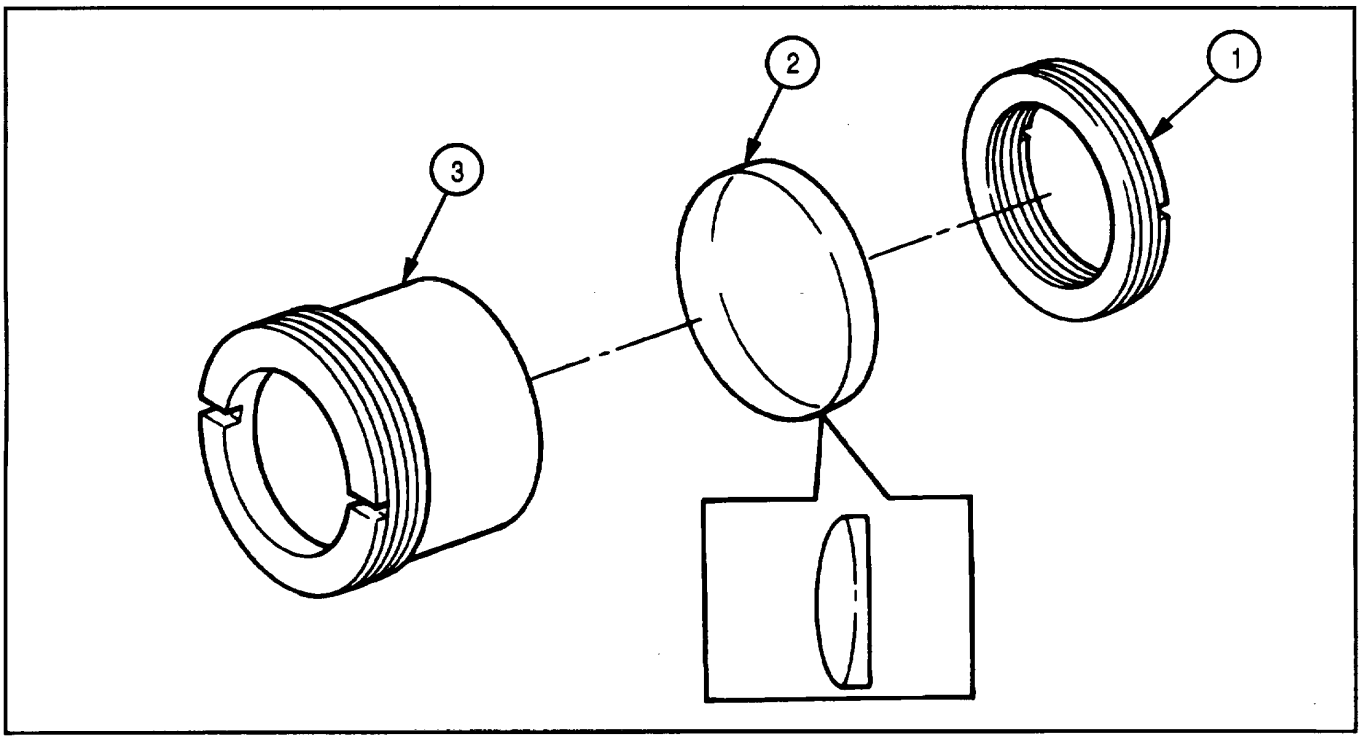
Equipment Conditions
3-7 Objective cell assembly removed

General Safety Instructions

WARNING

Use adhesives, cleaning solvents, and sealing compounds in well-ventilated area away from open flame. Adhesives, cleaning solvents, and sealing compounds are harmful to skin and clothing, can burn easily, and may give off harmful vapor.

DISASSEMBLY



1 Remove sealing compound from slots in externally threaded ring (1) and remove ring.

2 Remove objective lens (2) from cell assembly (3).

CLEANING

Clean all parts per TM 9-254.

REPAIR

Repair is by replacement of authorized parts as required. Refer to appendix B.

REASSEMBLY

1 Apply a 1/16-in. bead of sealing compound (item 10, appx C) to inside recess of cell (3).

2 Install objective lens (2).

3 Install externally threaded ring (1).

4 Apply a small amount of sealing compound (item 10, appx C) to slots in externally threaded ring (1).

Section VI. GENERAL SUPPORT FINAL INSPECTION PROCEDURES

3-11. GENERAL.

a. This section describes and illustrates the final inspection of the M139 elbow telescope. A final inspection will be performed prior to returning the M139 elbow telescope to the using unit or to the supply system.

b. If the M139 elbow telescope inspected fails to meet the required standards, ensure that all maintenance authorized at the applicable level has been performed correctly.

3-12. FINAL INSPECTION INSTRUCTIONS.

This task covers:

a. Visual inspection
b. Eyepiece assembly focus inspection and adjustment
c. Setting up and adjusting telescope test fixture
d. Mounting M139 elbow telescope on telescope test fixture
e. Parallax inspection and adjustment
f. Reticle plumb/collimation inspection and adjustment
g. Illumination inspection
h. Purging and charging

INITIAL SETUP:

Tools and Special Tools
Tool kit, electronic: system maintenance (SC 5180-95-CL-B29)
Injection gun, hand (7648117)

Materials/Parts
Sealing compound (item 10, appx C)

Reference
TM 9-254

General Safety Instructions

WARNING

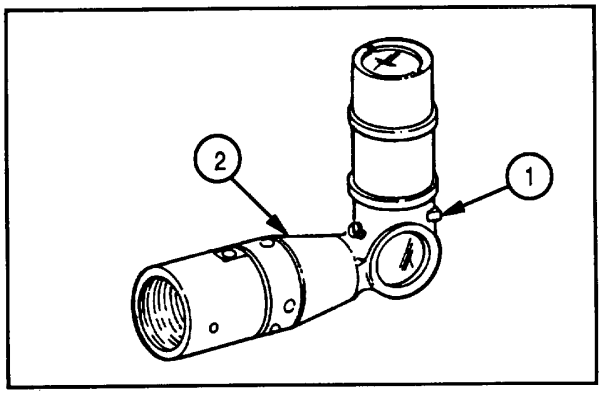
Use adhesives, cleaning solvents, and sealing compounds in well-ventilated area away from open flame. Adhesives, cleaning solvents, and sealing compounds are harmful to skin and clothing, can burn easily, and may give off harmful vapor.

VISUAL INSPECTION

1 Check that all screws are present.

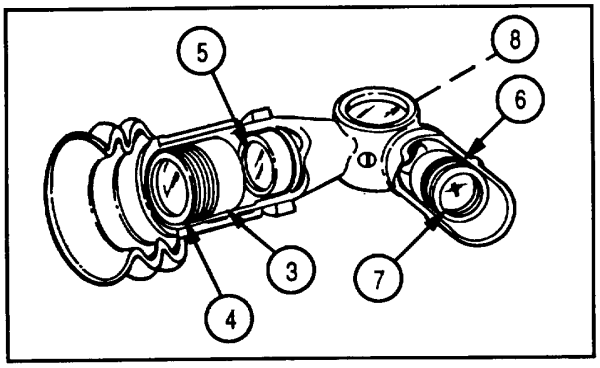
2 Check that mounting surface (1) is clean and free of nicks and burrs.

3 Check that M139 elbow telescope (2) is free of dirt and foreign matter, that all parts are present, and that paint is not chipped.



4 Look through eyepiece assembly (3) and check that there is no dirt or moisture on lenses (4) and reticle assembly (5).

5 Look through optical instrument cell assembly (6) and check that no dirt or moisture is present on lens (7) or optical instrument prism (8).

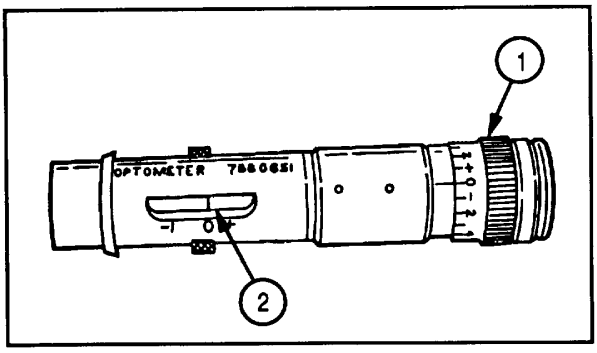


EYEPIECE ASSEMBLY FOCUS INSPECTION AND ADJUSTMENT

1 Position M139 elbow telescope on flat surface.

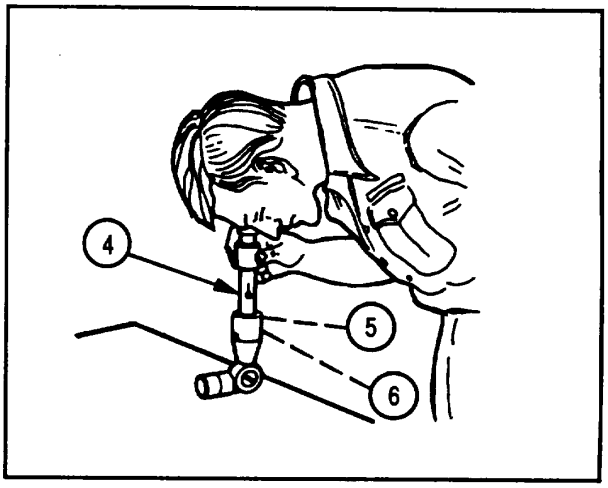
2 Focus dioptometer eyepiece (1) until reticle is sharp.

3 Set dioptometer range scale (2) at minus 0.75 to minus 1.0.



3-12. FINAL INSPECTION INSTRUCTIONS (CONT).

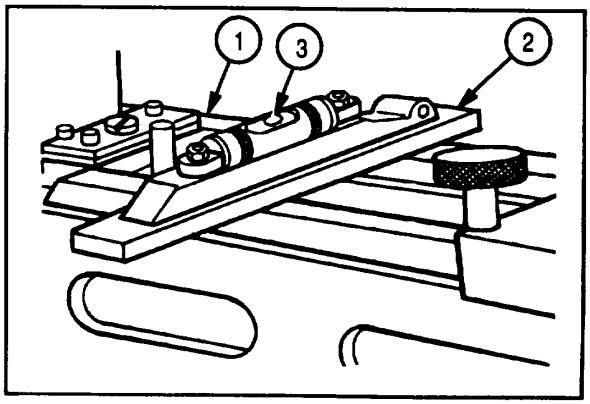
EYEPIECE ASSEMBLY FOCUS INSPECTION AND ADJUSTMENT (CONT)



4 Place dioptometer (4) over eyepiece assembly (5).

5 If minus 0.75 to minus 1.0 cannot be obtained, move eyepiece assembly (5) in or out until reticle (6) is at its sharpest point.

SETTING UP AND ADJUSTING TELESCOPE TEST FIXTURE

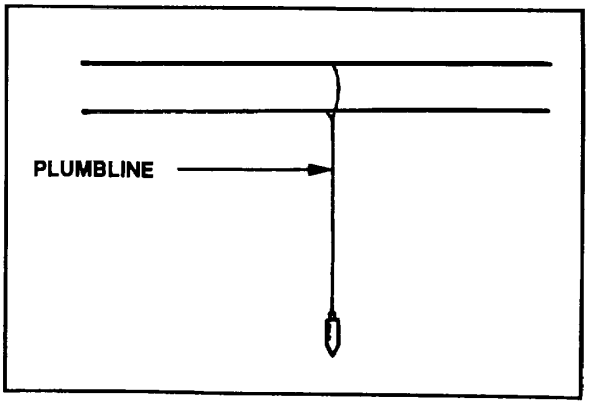


1 Secure telescope test fixture (1) on an adjustable test stand of suitable height.

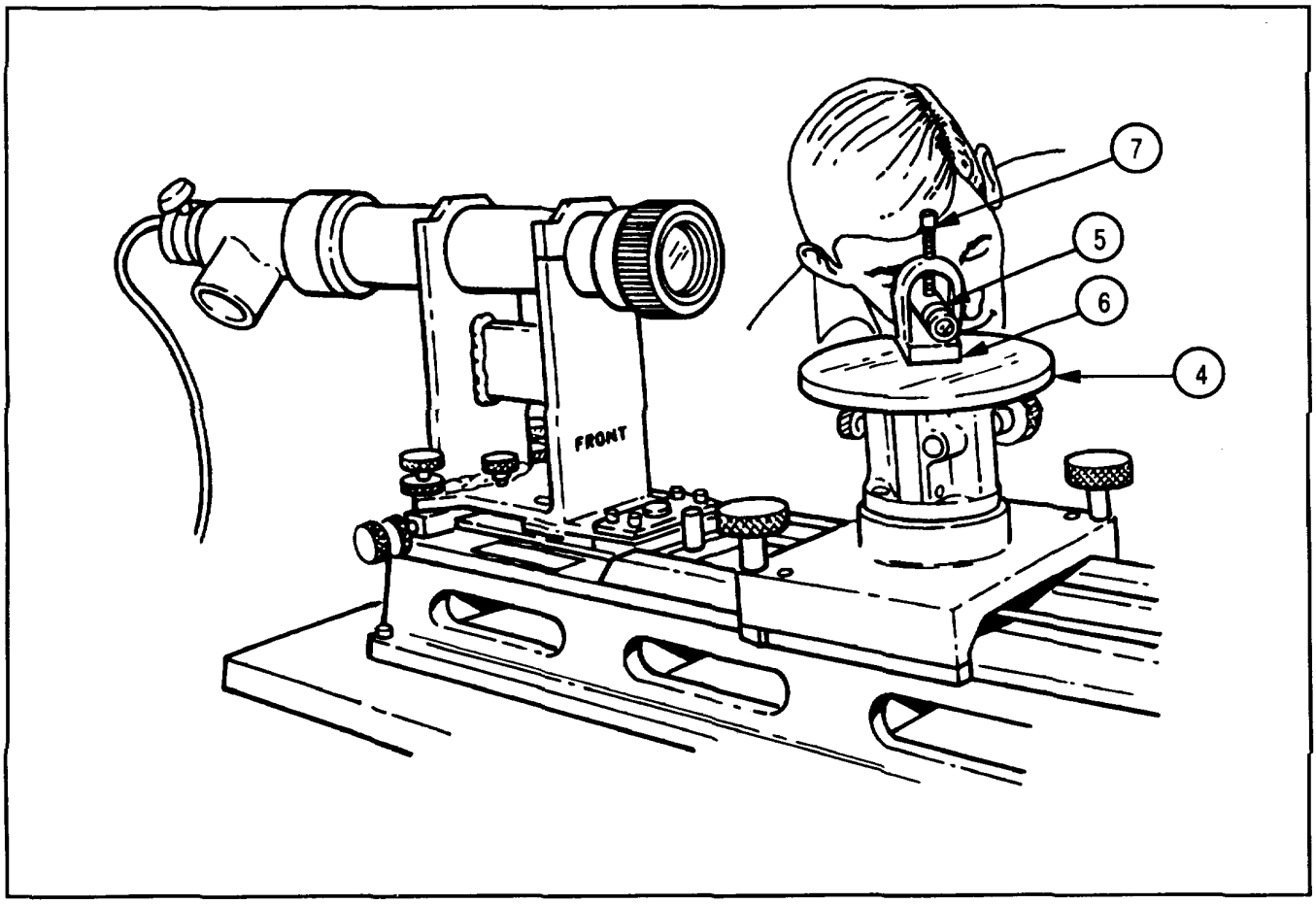
2 Position precision level (2) on telescope test fixture (1).

3 Adjust telescope test fixture (1) until level bubble (3) is centered.

4 Remove precision level (2).



5 Hang a plumbline at a convenient distance.



6 Install support (4) on telescope test fixture (1).

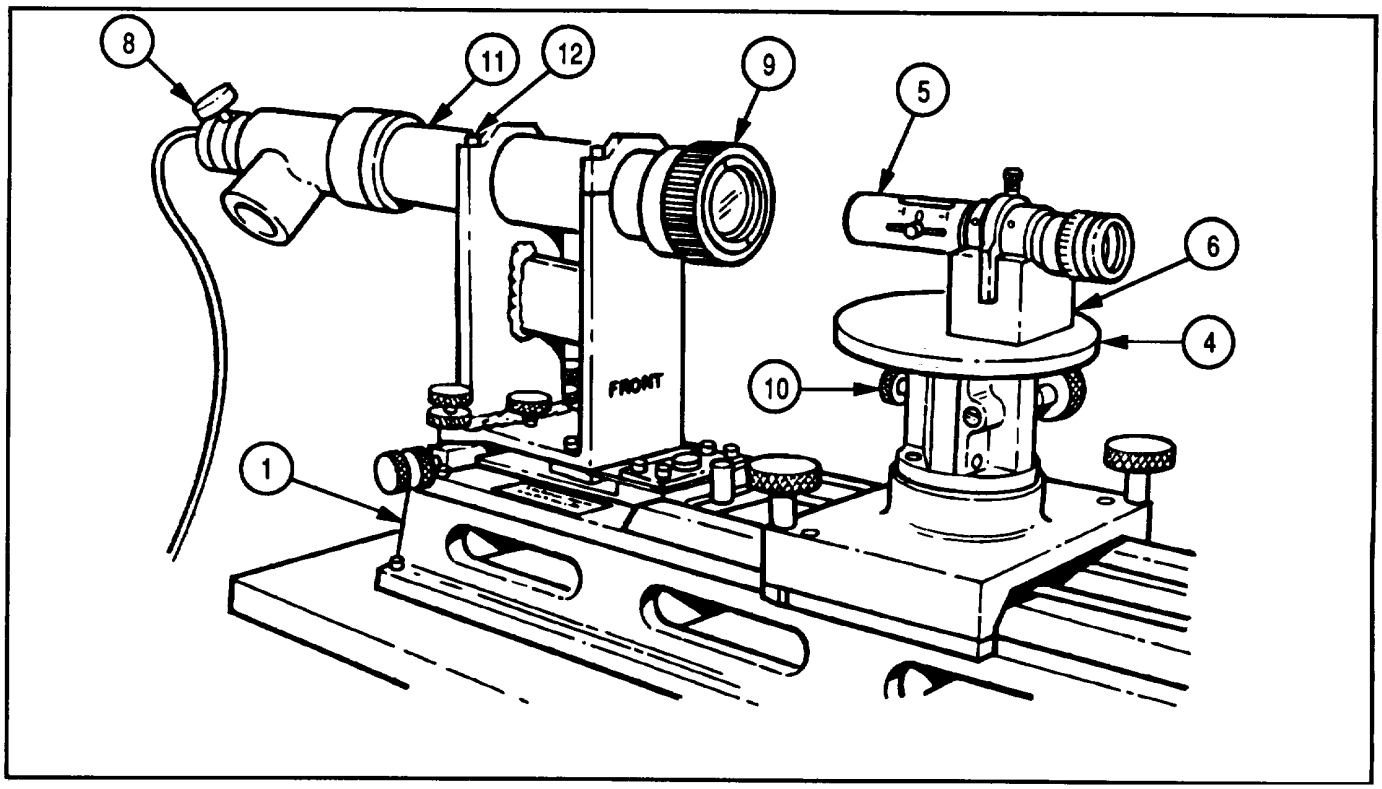
7 Mount dioptometer (5) in V-block (6) and position on support (4) on telescope test fixture (1).

8 Aline vertical crosshair in dioptometer with plumbline.

9 Tighten screw (7).

3-12. FINAL INSPECTION INSTRUCTIONS (CONT).

SETTING UP AND ADJUSTING TELESCOPE TEST FIXTURE (CONT)



NOTE

Check that vertical line of crosshair in dioptometer is still alined with plumbline. If not, realine dioptometer.

10 Turn on light switch (8).

11 Set collimator projector objective (9) to infinity.

12 Loosen lock knob (10). Raise or lower support (4) until axis of dioptometer is the same height as collimator projector (11). Tighten lock knob (10).

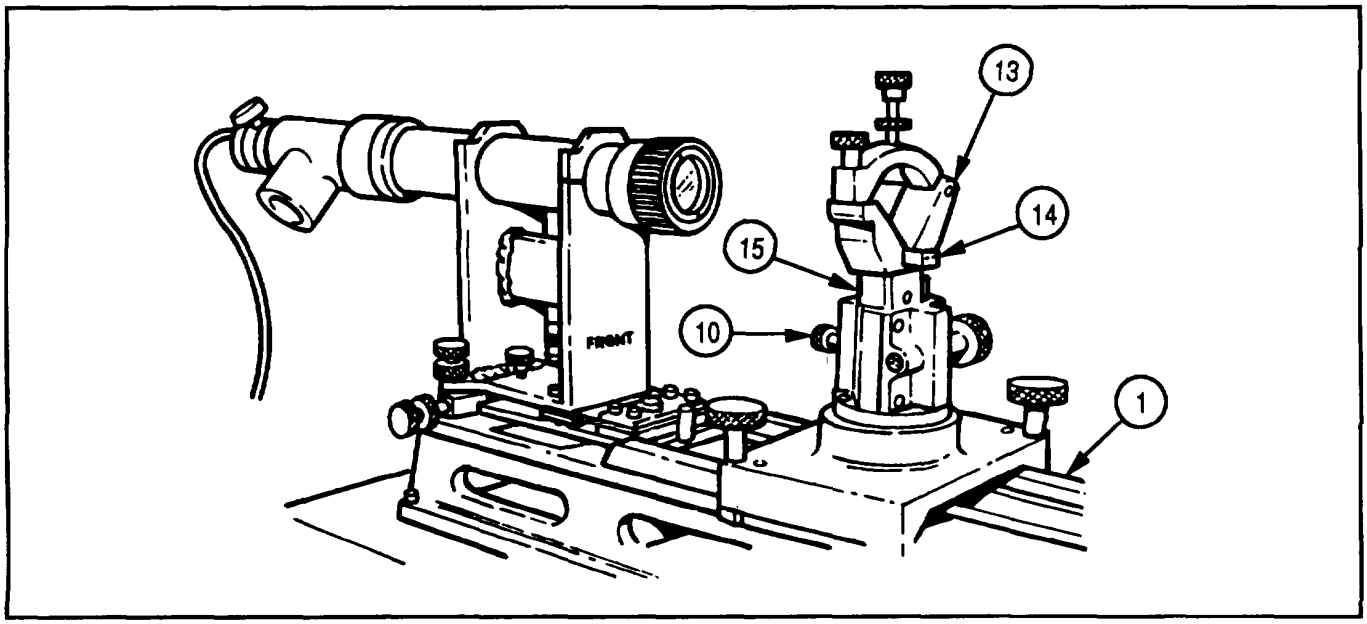
13 Loosen four screws (12) and rotate collimator projector (11) until center horizontal line of collimator projector reticle is plumb with horizontal line of dioptometer (5).

14 Tighten four screws (12) and check that horizontal line of collimator projector reticle and horizontal line of dioptometer (5) are plumb. If not, repeat step 13.

15 Remove V-block (6) and dioptometer (5).

16 Loosen lock knob (10).

17 Remove support (4) from telescope test fixture (1).



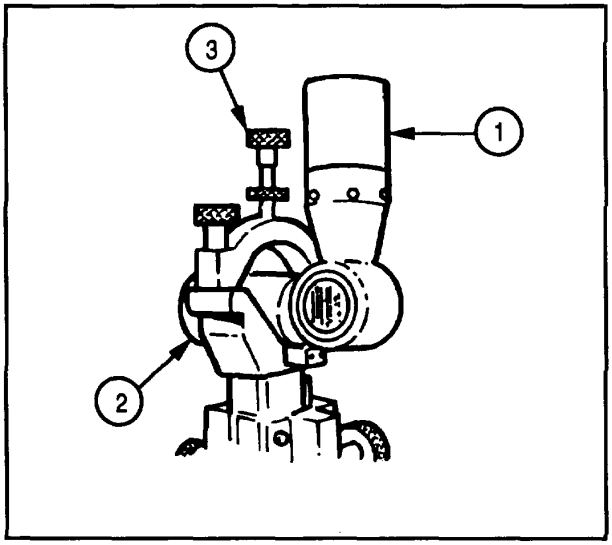
18 Install support and alinement assembly (13) on telescope test fixture (1).

19 Install Al block (14) on support and alinement assembly (13).

20 Install number 7 gage (15) under the Al block (14) as illustrated.

21 Tighten lock knob (10).

MOUNTING M139 ELBOW TELESCOPE ON TELESCOPE TEST FIXTURE

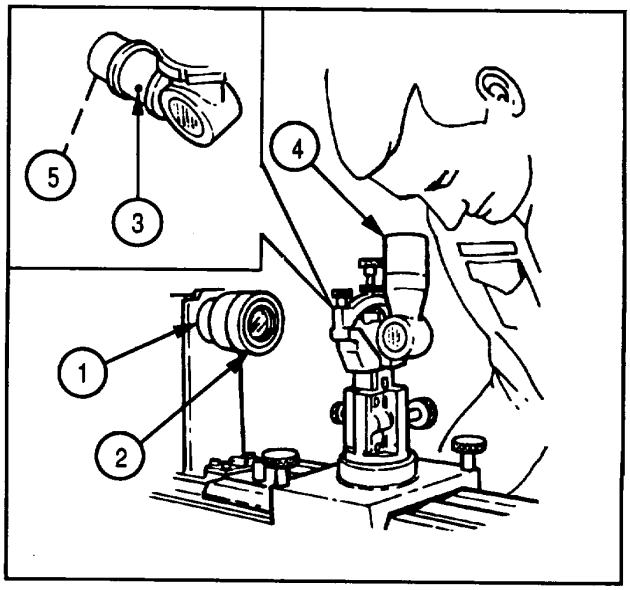


1 Install M139 elbow telescope (1) in support and alinement assembly (2).

2 Tighten screw (3), but do not overtighten.

3-12. FINAL INSPECTION INSTRUCTIONS (CONT).

PARALLAX INSPECTION AND ADJUSTMENT



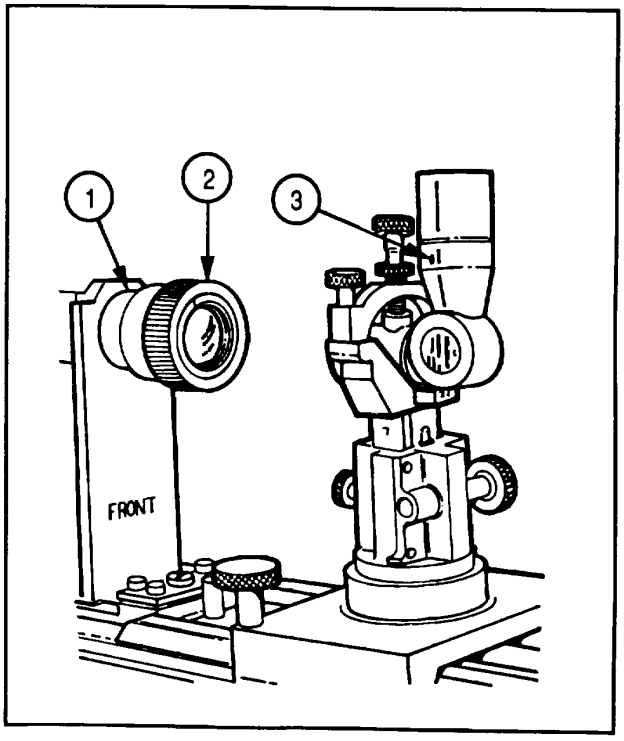
1 Set parallax distance to 250 ± 10 meters on collimator projector (1) by rotating objective end (2).

2 Remove setscrew (3).

3 Look through M139 elbow telescope (4). Screw objective cell assembly (5) in or out until parallax is 0.1 mil or less in the center of the field of view.

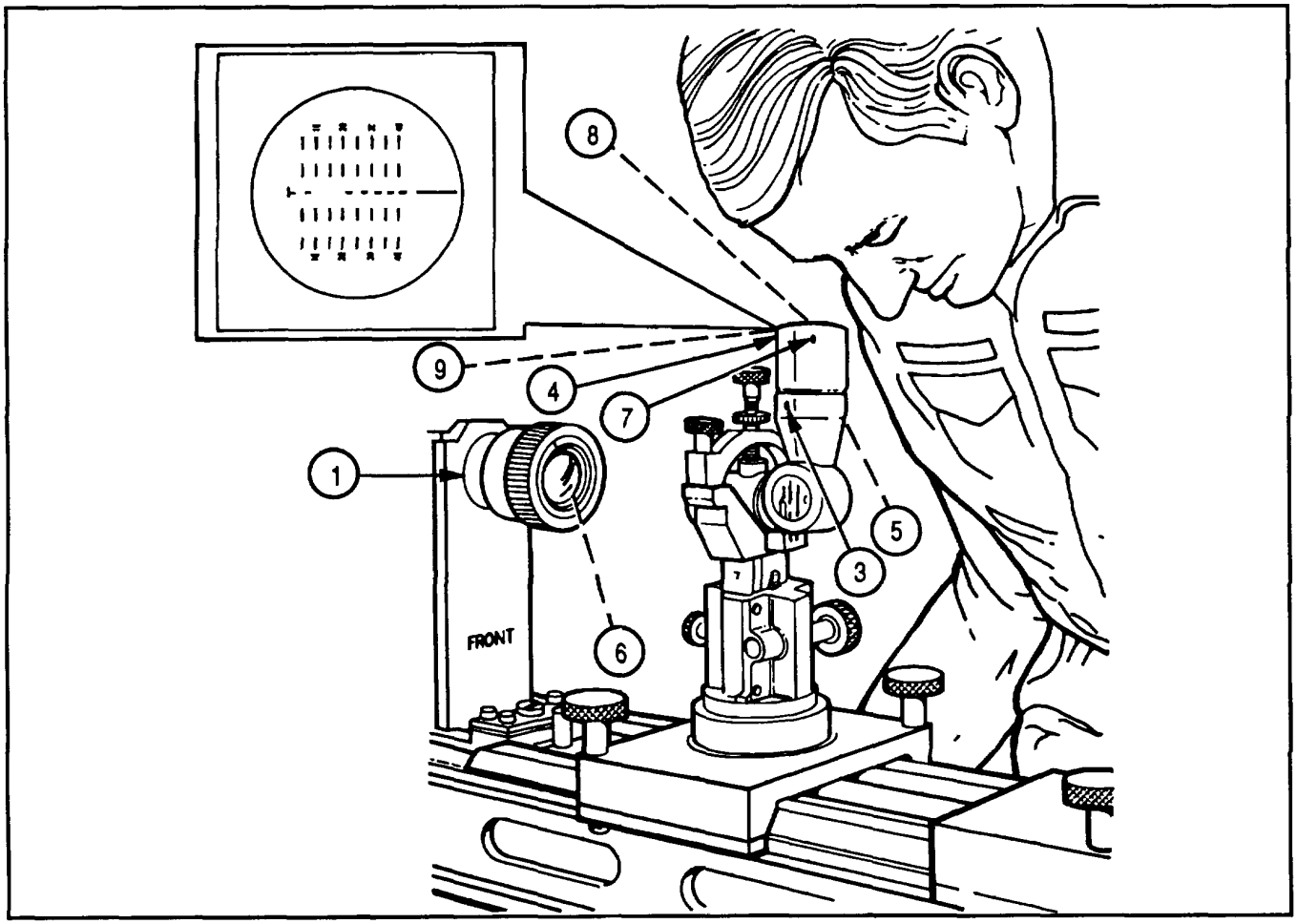
4 Install setscrew (3).

RETICLE PLUMB/COLLIMATION INSPECTION AND ADJUSTMENT



1 Set parallax distance to 250 + 10 meters on collimator projector (1) by rotating objective end (2).

2 Remove one of four setscrews (3) securing reticle.



NOTE

Etching which reads "8 IN. HOW. M110A1 (MILS)" on the M139 elbow telescope reticle must be positioned at the top.

3 Look through the M139 elbow telescope (4) and rotate reticle (5) with scribe through screw hole until the N line is superimposed on the verticle line (6) of collimator projector (1) within 0.5 mil.

4 If reticle (5) does not rotate freely, remove setscrew (7) and eyepiece assembly (8). Loosen retaining ring (9). Install eyepiece assembly and setscrew (7).

5 Adjust remaining three setscrews (3) securing reticle by rotating with scribe until the N line in reticle of the M139 elbow telescope (4) is superimposed on the vertical line (6) of collimator projector (1) reticle within 0.5 mil.

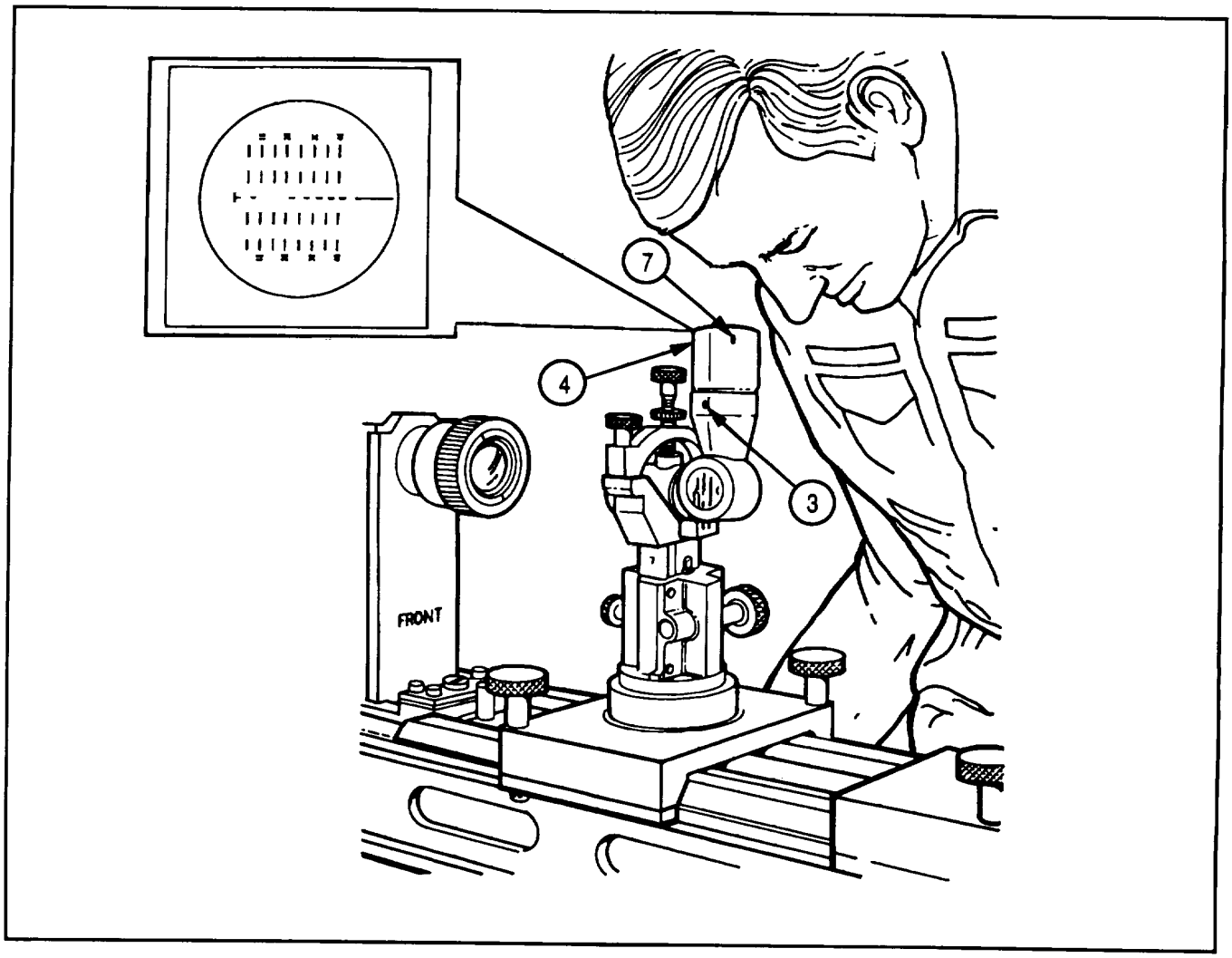
6 Remove setscrew (7) and eyepiece assembly (8), and tighten retaining ring (9).

7 Install setscrew (3).

8 Install eyepiece assembly (8). Install setscrew (7) and tighten.

3-12. FINAL INSPECTION INSTRUCTIONS (CONT).

RETICLE PLUMB/COLLIMATION INSPECTION AND ADJUSTMENT (CONT)



9 Check to see that reticle is still superimposed. If not, repeat steps 2 thru 8.

10 Check collimation of each of three remaining setscrews (3) securing reticle by performing steps 2 thru 9.

11 Tighten four setscrews (3) and apply sealing compound (item 10, appx C) over tops of four setscrews.

12 Remove setscrew (7).

13 Adjust focus of eyepiece assembly with dioptometer. Refer to page 3-19.

14 Remove M139 elbow telescope (4) from support and alinement assembly.

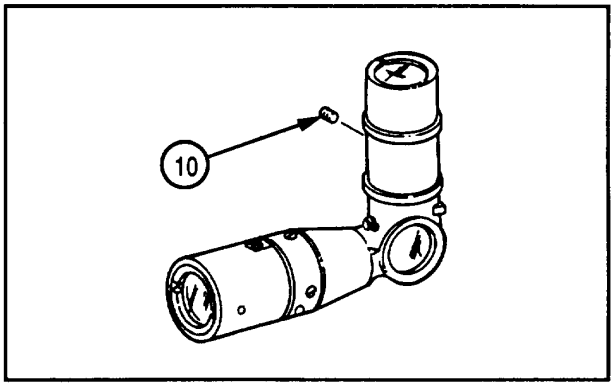
15 Remove setscrew (10).

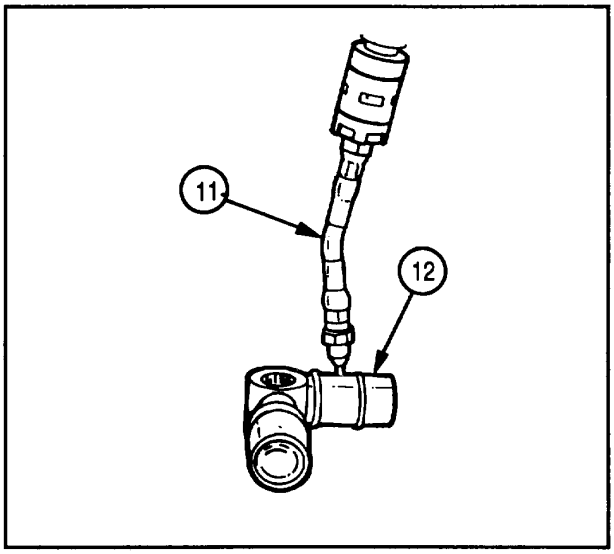
16 Install hand injection gun with appropriate adapter (11) in objective end of body (12) and apply sealing compound (item 10, appx C).

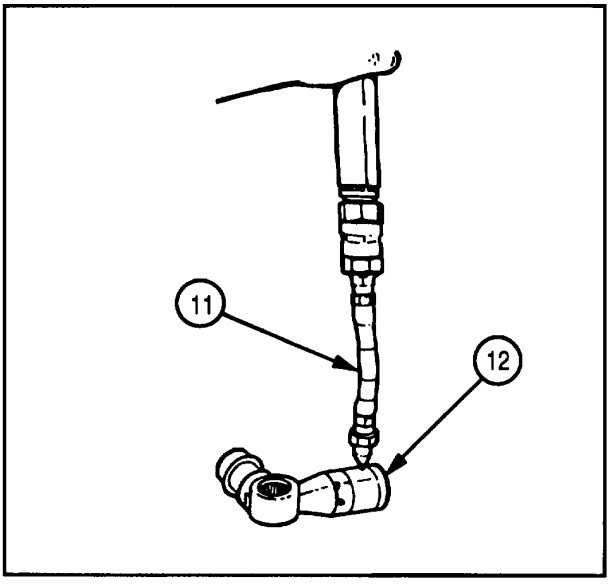
17 Remove hand injection gun and adapter (11).

18 Install hand injection gun with appropriate adapter (11) in eyepiece end of body (12) and apply sealing compound (item 10, appx C).

19 Remove hand injection gun and adapter (11).

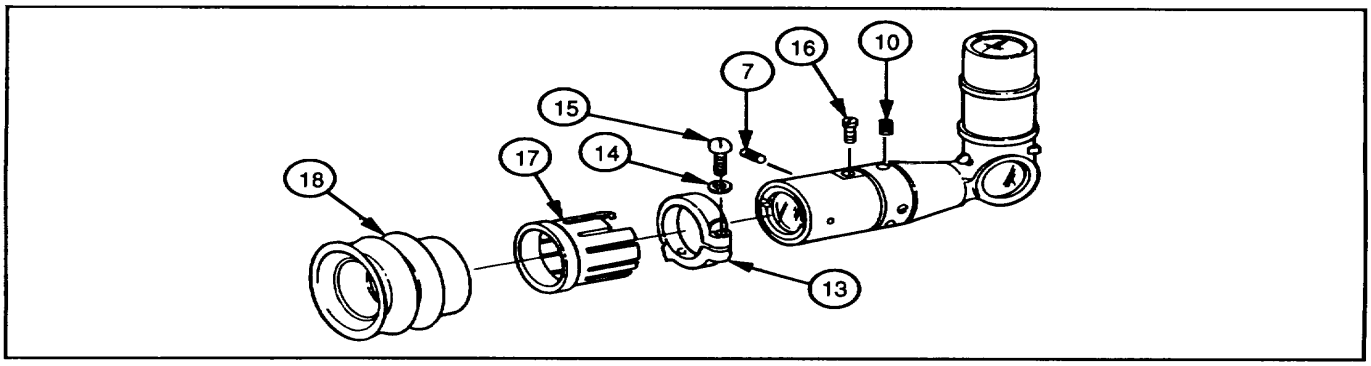






3-12. FINAL INSPECTION INSTRUCTIONS (CONT).

RETICLE PLUMB/COLLIMATION INSPECTION AND ADJUSTMENT (CONT)



20 Install setscrews (7) and (10). Apply sealing compound (item 10, appx C) over top of setscrews (7) and (10).

21 Install adapter (13) with slot over windows.

22 Install lockwasher (14) and machine screw (15).

23 Install purging screw (16).

24 Install eyeshield adapter (17) and eyeshield (18).

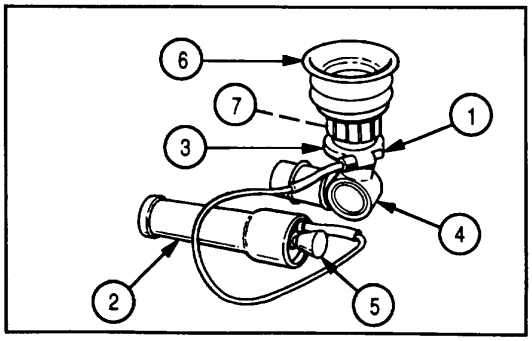
25 Apply sealing compound (item 10, appx C) over tops of all setscrews.

ILLUMINATION INSPECTION

1 Position adapter (1) on M36 instrument light (2) in adapter (3) of M139 elbow telescope (4).

2 Turn on M36 instrument light switch (5).

3 Take into dark area and look through eyeshield (6). Reticle (7) should be illuminated.



PURGING AND CHARGING

Purge and charge M139 elbow telescope. Refer to TM 750-116.

Section VII. PREEMBARKATION INSPECTION PROCEDURES

3-13. GENERAL.

a. Fire control instruments must be inspected for outward appearance, mechanical condition, and proper operation.

b. Instruments must approach new equipment standards of operation and appearance. The workmanship and quality must reflect the highest standards obtainable.

3-14. SPECIFIC INSTRUCTIONS. Fire control instruments must conform to the following specifications for overseas shipment:

a. Condition of Optical Elements. Lenses, prisms, reticles, and windows must be free from dirt, scratches, pits, and chips that will affect optical performance of the instrument.

b. Functioning of Mechanical Parts. Mechanical parts must operate smoothly without binding or rough motion. Parts must be free from grit and must be properly lubricated.

c. Illumination. Counter dials must illuminate properly.

d. General Appearance and Condition of the Instruments.

(1) All parts of the instruments must be present and free from defects.

(2) Paint must cover all specified surfaces. Repaint if painted surfaces show signs of damage.

(3) All optics must be free from any internal dirt and moisture. Excessive dirt or moisture indicates a breakdown in sealing and is cause for rejection of the instrument.

(4) All scales must be easily read. All numbers and divisions must be clearly defined.

(5) All warning labels must be present and legible.

(6) Any fire control instrument failing to meet the requirements of the final inspection is unsatisfactory for overseas shipment.

CHAPTER 4
M138 TELESCOPE MOUNT

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

4-1. COMMON TOOLS AND EQUIPMENT. Refer to page 2-1.

4-2. SPECIAL TOOLS AND SUPPORT EQUIPMENT. Refer to page 2-1.

4-3. REPAIR PARTS. Refer to page 2-1.

Section II. INITIAL INSPECTIONS

4-4. GENERAL.

a. Inspection is performed primarily to determine the following:

(1) Completeness.

(2) The nature of unserviceability.

(3) The work, repair parts, and supplies required to return the materiel to serviceability.

(4) That the work in process is being performed properly.

(5) That completed work complies fully with serviceability standards.

b. The M138 telescope mount is considered serviceable when:

(1) It is complete and properly performs its intended function.

(2) All modification work orders (MWO's) have been applied.

(3) All defects disclosed by the inspection have been corrected.

c. DA Form 2408-5 and DA Form 2409 list applicable MWO's.

4-5. CATEGORIES OF INSPECTION. Categories of inspection define responsibilities:

a. An initial inspection of the M138 telescope mount is performed immediately on receipt for maintenance. This inspection will determine the amount and type of work to be performed.

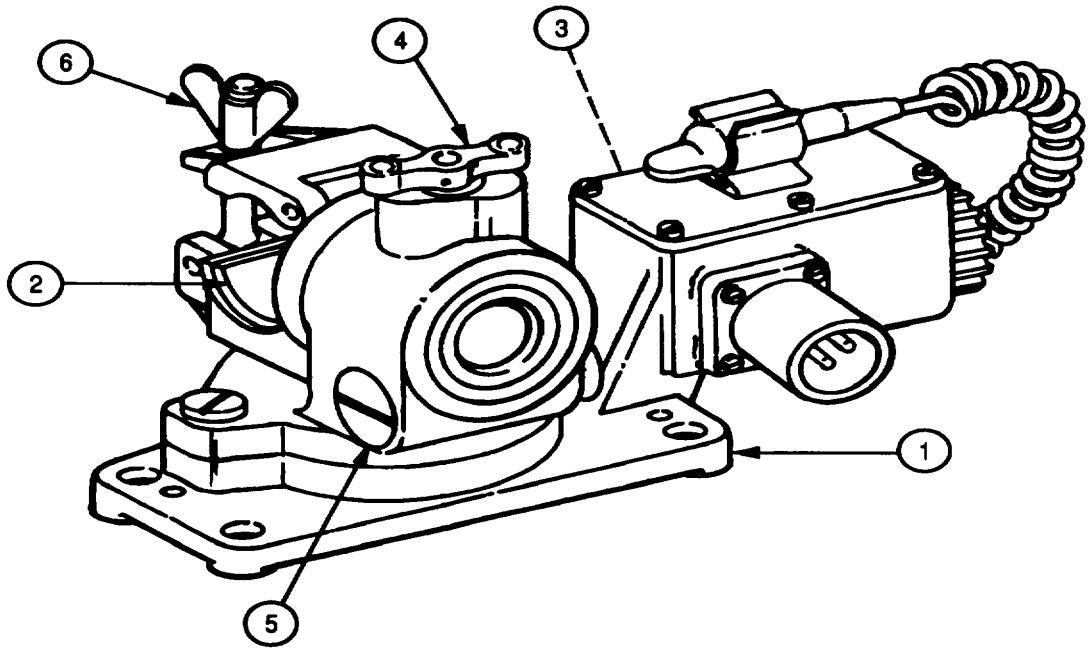
b. A final inspection of the M138 telescope mount is performed after repairs have been completed to ensure the item meets serviceability standards.

c. Table 4-1 lists initial inspection procedures for the M138 telescope mount. Final inspection procedures are located on page 4-20.

d. Preembarkation inspection procedures are located on page 4-29.

4-5. CATEGORIES OF INSPECTION (CONT).

Table 4-1. INITIAL INSPECTION-M138 TELESCOPE MOUNT



Item No.	Item To Be Inspected	Procedure
1	M138 Telescope Mount	Inspect for good overall appearance with all parts securely tightened in place:
2	Mounting Surface	Inspect for cleanliness and freedom from nicks and burrs.
3	Identification Plate	Inspect for legibility.
4,5	Elevation Locking Lever	(1) With lever in locked position, a torque of 5.00 and Elevation Worm Shaft in.-lb (0.56 N-m) applied to worm will not change alinement of M139 elbow telescope. (2) With lever released, worm shall move socket 444.45 mils above and below center position.
6	Eyebolt Assembly	Must lock and hold M139 elbow telescope or fabricated bushing.

Section III. TROUBLESHOOTING

4-6. TROUBLESHOOTING PROCEDURES.

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

b. The direct support troubleshooting table lists the common malfunctions which may be found during maintenance of the M138 telescope mount. Refer to page 4-4. There are no general support troubleshooting instructions. Perform the tests/inspections and corrective actions in the order listed.

c. This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions.

DIRECT SUPPORT SYMPTOM INDEX

4-6. TROUBLESHOOTING PROCEDURES (CONT).

Table 4-2. DIRECT SUPPORT TROUBLESHOOTING

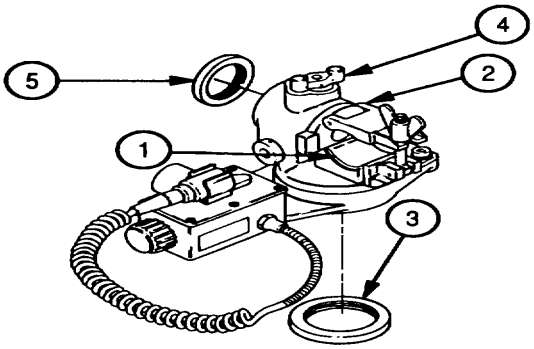
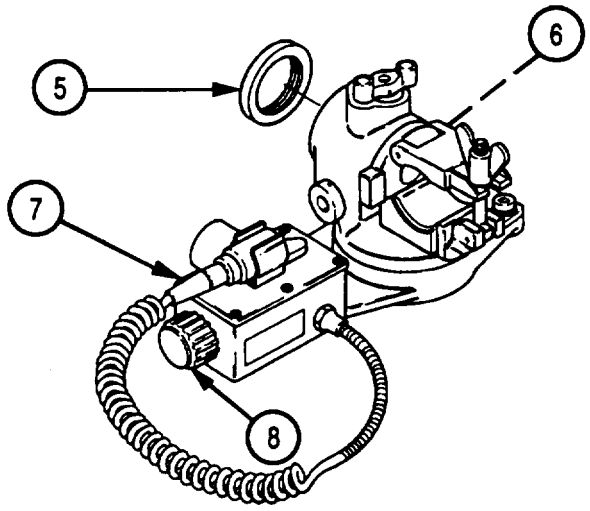
MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
   **MOUNTING SURFACE** 1. MOUNTING SURFACE (1) AND LOCKING CLAMP (2) DO NOT SEAT M139 TELESCOPE CORRECTLY. Observe visually. a. Remove nicks and burrs. Refer to TM 9-254. b. Repair support assembly. Refer to p 4-11. **ADAPTER ASSEMBLY** 2. M139 TELESCOPE DOES NOT HOLD ALINEMENT IN DEFLECTION. Check locking torque. a. Torque deflection lock. Refer to page 4-26. b. Tighten adapter nut (3). 3. M139 TELESCOPE DOES NOT HOLD ALINEMENT WITH LEVER (4) LOCKED. Check for loose adjusting nut (5). Adjust nut (5). Refer to page 4-6.

Table 4-2. DIRECT SUPPORT TROUBLESHOOTING

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION



4. WORM (6) DOES NOT MOVE TELESCOPE SOCKET 444.45 MILS ABOVE OR BELOW CENTRAL POSITION WITH LEVER (4) UNLOCKED.

   a. Check for binding.

      Repair adapter assembly. Refer to page 4-6.

   b. Check for loose adjusting nut (5).

      Adjust nut (5). Refer to page 4-6.

EXTENSION LIGHT

5. LIGHT (7) DOES NOT OPERATE.

   Observe visually.

      a. Check shroud assembly. Refer to page 4-13.

      b. Check for break in wire.

6. LIGHT INTENSITY DOES NOT CHANGE WHEN RHEOSTAT KNOB (8) IS ADJUSTED.

   Observe visually.

      Repair bracket assembly. Refer to page 4-13.

Section IV. DIRECT SUPPORT MAINTENANCE

4-7. MAINTENANCE OF M138 TELESCOPE MOUNT

This task covers:

a. Disassembly
b. Cleaning
c. Repair
d. Reassembly

INITIAL SETUP:

Tools and Special Tools
Tool kit, electronic: system maintenance (SC 5180-95-CL-B29)
Adjustable spanner wrench (7597708)
Torque converter (figure 6, appx D)

Materials/Parts
Aircraft grease (item 8, appx C)
Sealing compound (item 10, appx C)
Self-locking screw (NAS1352-3LL8P)

References
TM 9-254

Equipment Conditions
M138 telescope mount removed from M110 A2 howitzer (TM 9-2350-30420-2)

General Safety Instructions

WARNING

Use adhesives, cleaning solvents, and sealing compounds in well ventilated area away from open flame. Adhesives, cleaning solvents, and sealing compounds are harmful to skin and clothing, can burn easily, and may give off harmful vapor

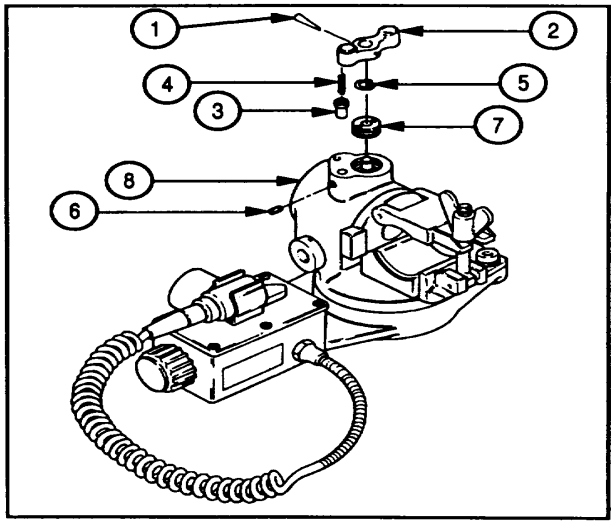
DISASSEMBLY

1 Remove pin (1) from manual control lever (2).

NOTE
Detent plunger is spring-loaded.

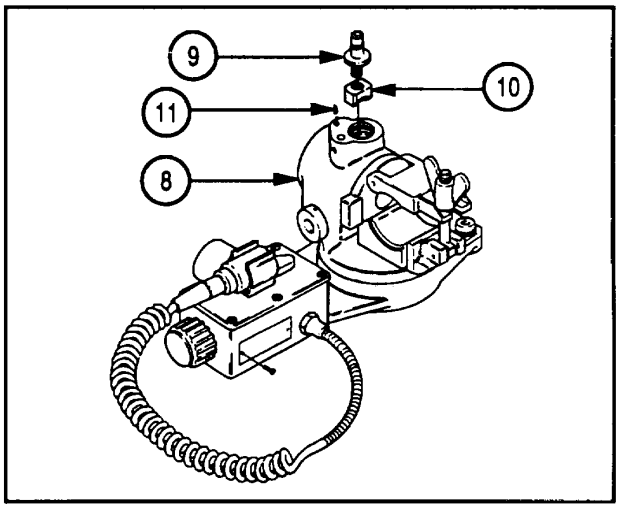
2 Remove manual control lever (2), detent plunger (3), spring (4), and retaining ring (5).

3 Remove setscrew (6) using adjustable spanner wrench. Remove externally threaded ring (7) from adapter (8).



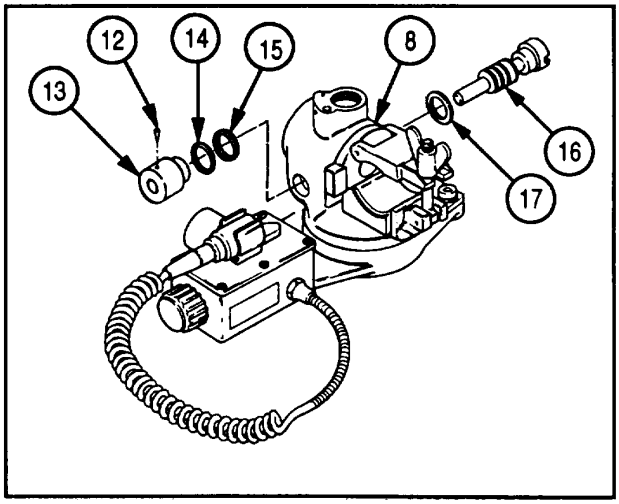
4 Remove shaft (9) and receptacle (10) from adapter (8).

5 Remove pin (11) only if damaged.



6 Remove tapered pin (12), collar (13), spacer (14), and shim (15), if present.

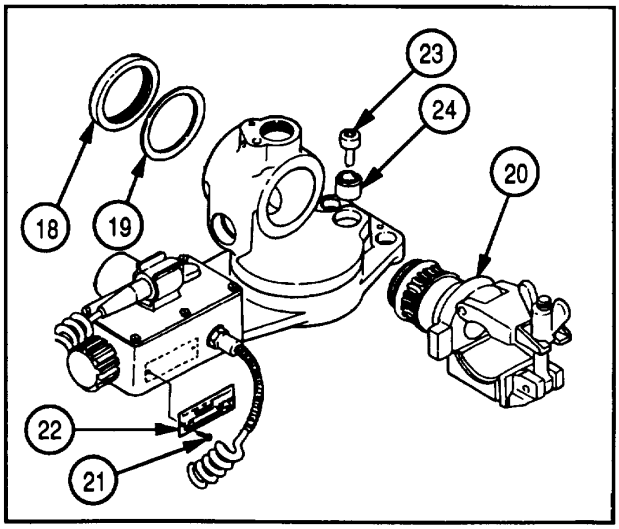
7 Remove worm shaft (16) and spacer (17) from adapter (8) by turning worm shaft (16) counterclockwise.



8 Using adjustable spanner wrench, remove plain round nut (18), shim (19), and support assembly (20).

9 Remove two screws (21) and identification plate (22).

10 Remove and discard self-locking screw (23) and control cam (24).

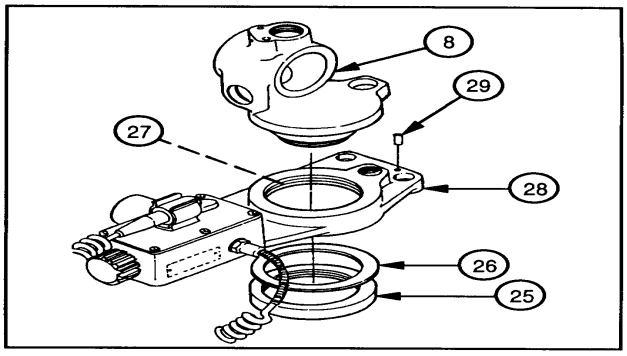


4-7. MAINTENANCE OF M138 TELESCOPE MOUNT (CONT).

DISASSEMBLY (CONT)

11 Using adjustable spanner wrench, remove plain round nut (25), shims (26 and 27), if present, and adapter (8) from bracket assembly (28).

12 Remove pin (29).



CLEANING

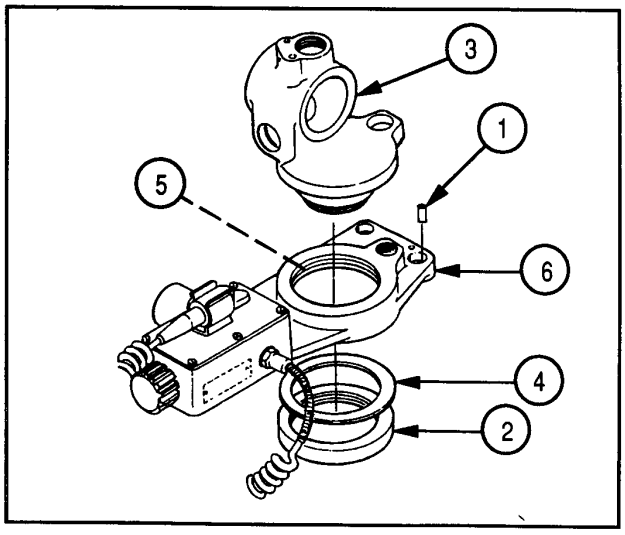
Clean all parts per TM 9-254.

REPAIR

1 Support assembly is a repairable assembly; refer to page 4-11.

2 Bracket assembly is a repairable assembly; refer to page 4-13.

3 Repair is by replacement of authorized parts as required. Refer to appendix B.



REASSEMBLY

1 Install pin (1).
2 Apply sealing compound (item 10, appx C) to threads of plain round nut (2).

3 Using adjustable spanner wrench, install adapter (3), shims (4 and 5) if removed, and plain round nut (2) to bracket assembly (6).

4 Apply a light coat of aircraft grease (item 8, appx C) to support assembly (7).

5 Using adjustable spanner wrench, install support assembly (7), shim (8) if removed, and plain round nut (9).

6 Install setscrew (10) in adapter (3).

7 Install identification plate (11) and two screws (12).

8 Install control cam (13) and new self-locking screw (14).

9 Apply a light coat of aircraft grease (item 8, appx C) to worm shaft (15).

10 Install worm shaft (15) and spacer (16), meshing gears.

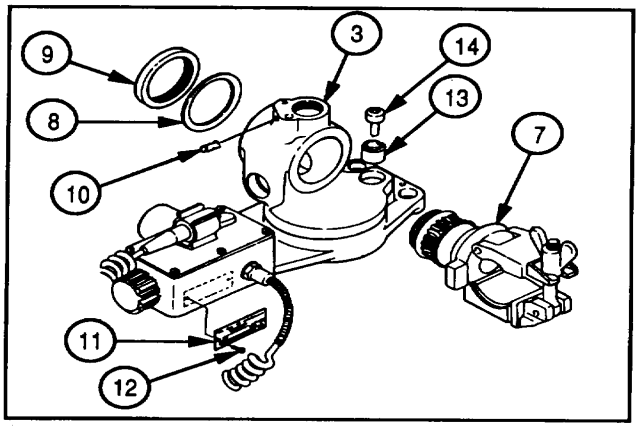
11 Install shim (17) if removed, spacer (18) and collar (19) to worm shaft (15).

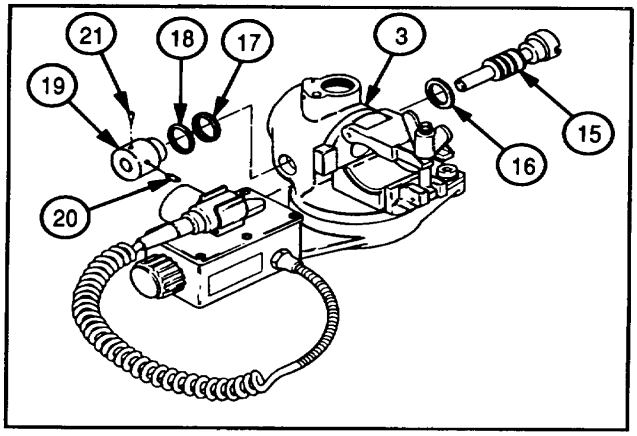
12 Install setscrew (20) in collar (19), leaving worm shaft (15) to turn without binding.

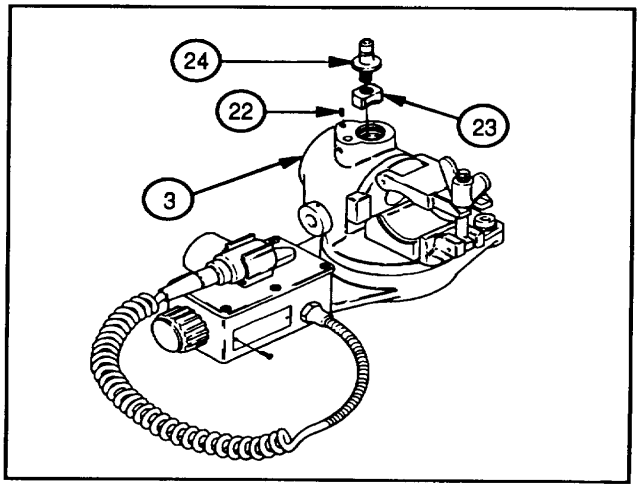
13 If necessary, drill and ream collar (19) and install tapered pin (21). Remove setscrew (20). Refer to TM 9-254.

14 If removed, install pin (22).

15 Install receptacle (23) and shaft (24) in adapter (3).

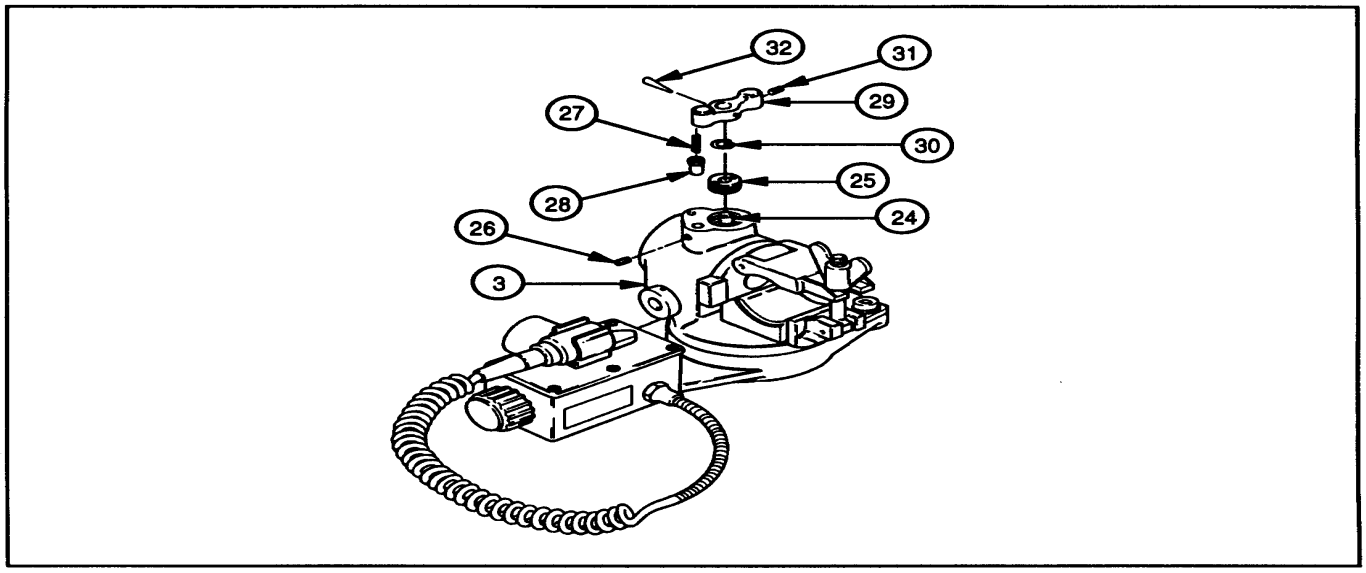






4-7. MAINTENANCE OF M138 TELESCOPE MOUNT (CONT).

REASSEMBLY (CONT)



16 Apply sealing compound (item 10, appx C) to threads of externally threaded ring (25).

17 Install externally threaded ring (25) in adapter (3). Torque shaft (24) counterclockwise to 15.0 in.-lb (1.7 N-m) using adjustable spanner wrench and torque converter (figure 6, appx D).

18 Apply sealing compound (item 10, appx C) to threads of setscrew (26).

19 Install setscrew (26) in adapter (3).

20 Install spring (27) and detent plunger (28) in manual control lever (29).

21 Install retaining ring (30) and manual control lever (29) on shaft (24). Leave manual control lever (29) in detent position.

22 Temporarily install setscrew (31) in manual control lever (29) and secure to shaft (24).

23 If necessary, drill and ream manual control lever (29) for pin (32). Refer to TM 9-254.

24 Install pin (32).

25 Remove setscrew (31).

4-8. MAINTENANCE OF SUPPORT ASSEMBLY.

This task covers:

a. Disassembly
b. Cleaning
c. Repair
d. Reassembly

INITIAL SETUP:

Tools and Special Tools
Tool kit, electronic: system maintenance

Materials/Parts
Lockwasher (4) (MS35333-71)

References
TM 9-254

Equipment Conditions
4-6 Support assembly removed from M138 telescope mount

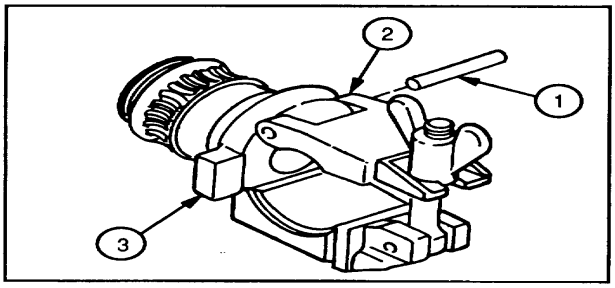
General Safety Instructions
(SC 5180-95-

WARNING

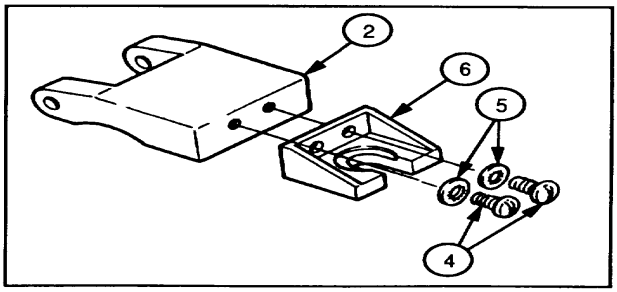
Use adhesives, cleaning solvents, and sealing compounds in well ventilated area away from open flame. Adhesives, cleaning solvents, and sealing compounds are harmful to skin and clothing, can burn easily, and may give off harmful vapor.

DISASSEMBLY

1 Remove straight pin (1) and clamp bracket (2) from mechanical housing (3).

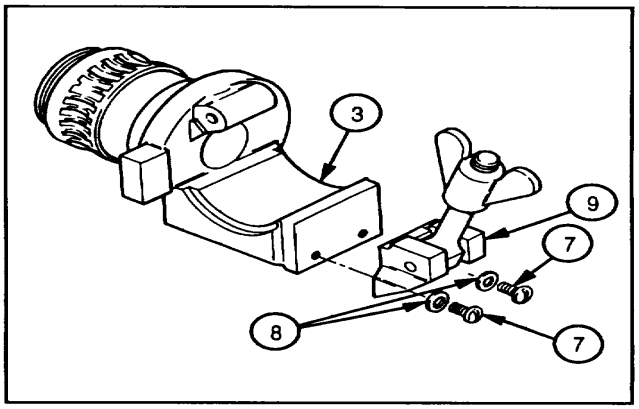


2 Remove two screws (4), two lockwashers (5), and bracket (6) from clamp bracket (2).



4-8. MAINTENANCE OF SUPPORT ASSEMBLY (CONT).

DISASSEMBLY (CONT)



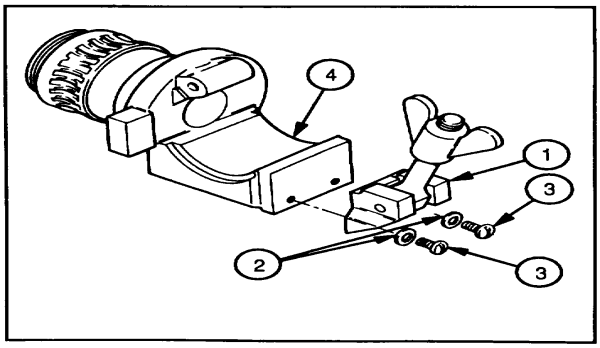
3 Remove two screws (7), two lockwashers (8), and headed toggle pin (9) from mechanical housing (3).

CLEANING

Clean all parts per TM 9-254.

REPAIR

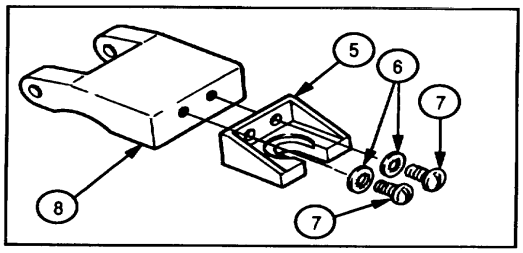
Repair is by replacement of authorized parts as required. Refer to appendix B.



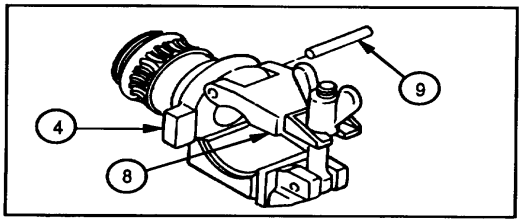
REASSEMBLY

1 Install headed toggle pin (1), two new lockwashers (2), and two screws (3) on mechanical housing (4).

2 Install bracket (5), two new lockwashers (6), and two screws (7) on clamp bracket (8).



3 Install clamp bracket (8) and pin (9) on mechanical housing (4).



4-9. MAINTENANCE OF BRACKET ASSEMBLY AND INSTRUMENT LIGHT.

This task covers:

a. Disassembly
b. Cleaning
c. Repair
d. Reassembly

INITIAL SETUP:

Tools and Special Tools
Tool kit, electronic: system maintenance

Materials/Parts
Adhesive (item 1, appx C)
Gasket (8587489)
Lockwasher (6) (MS35333-69)
Lockwasher (4) (MS35338-135)
Sealing compound (item 10, appx C)
Solder (item 12, appx C)
Soldering flux (item 6, appx C)

References
TM 9-254

Equipment Conditions
4-6 Bracket assembly removed from M138 telescope mount

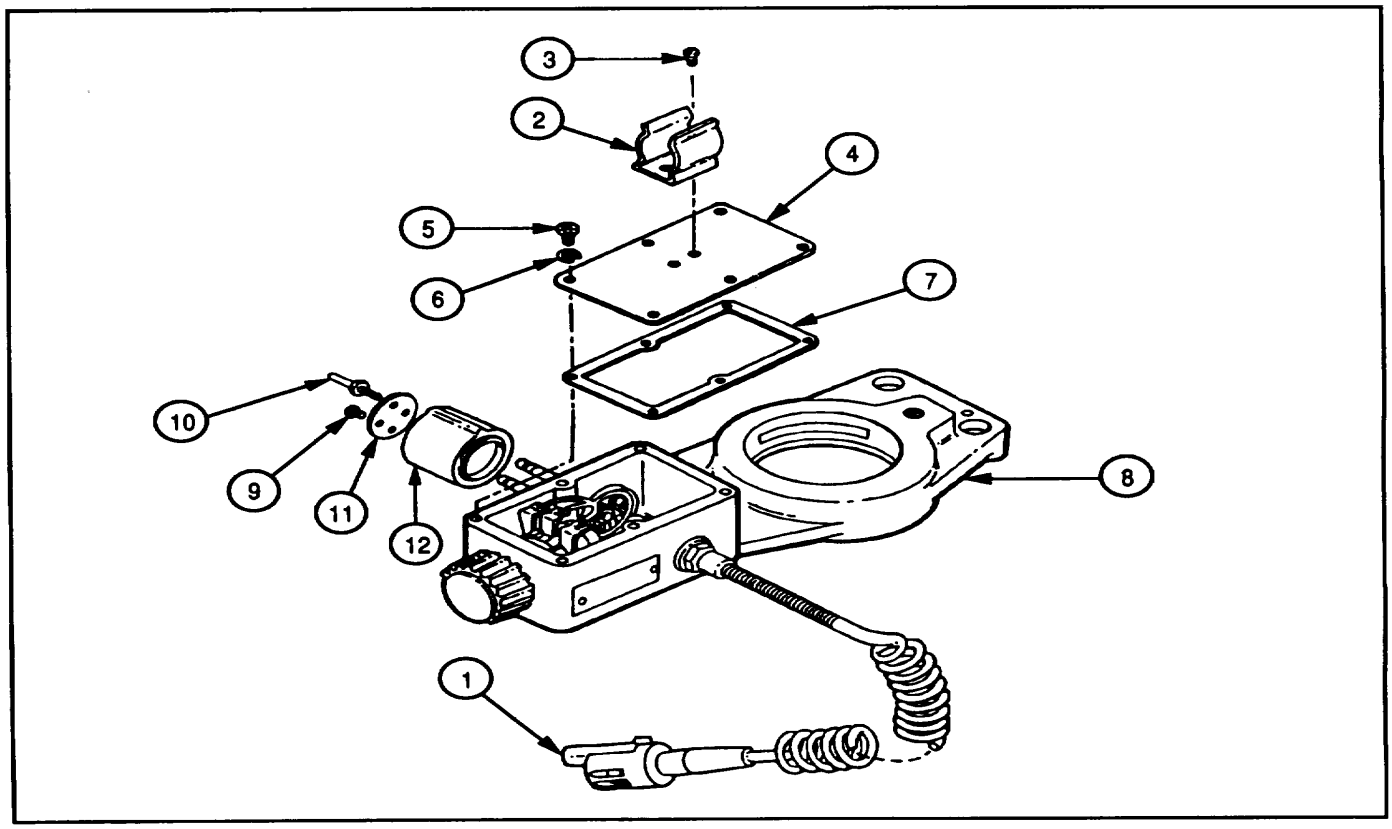
General Safety Instructions (SC 5180-95-CL-B20)

WARNING

Use adhesives, cleaning solvents, and sealing compounds in well-ventilated area away from open flame. Adhesives, cleaning solvents, and sealing compounds are harmful to skin and clothing, can burn easily, and may give off harmful vapor.

4-9. MAINTENANCE OF BRACKET ASSEMBLY AND INSTRUMENT LIGHT (CONT).

DISASSEMBLY



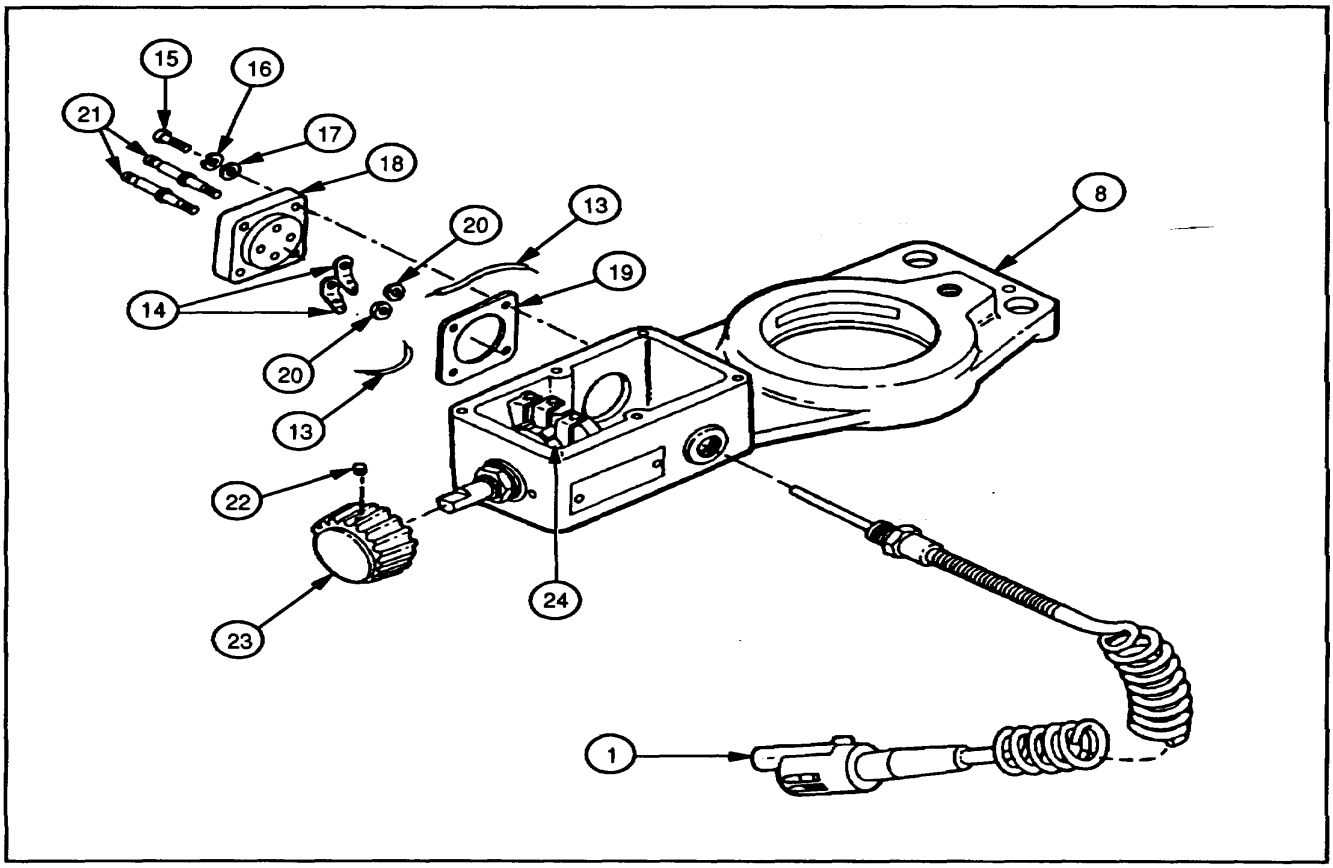
1 Remove instrument light (1) from spring tension clip (2).

2 Remove two screws (3) and spring tension clip (2) from cover (4), only if damaged.

3 Remove six screws (5), six lockwashers (6), cover (4), and gasket (7) from bracket (8). Discard gasket.

4 Remove screw (9) and headless shoulder pin (10) from electrical plate (11).

5 Remove electrical plate (11) from receptacle shell (12) and remove receptacle shell (12) from bracket (8).



6 Unsolder two electrical wires (13) from two terminal lugs (14).

7 Remove four capscrews (15), four lockwashers (16), four washers (17), bushing insulator (18), and gasket (19) from bracket (8).

8 Remove two plain hexagon nuts (20), two terminal lugs (14), and two electrical contacts (21) from bushing insulator (18).

9 Remove setscrew (22) and knob (23) from variable resistor (24).

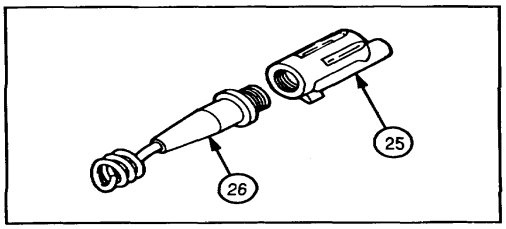
10 Unsolder instrument light (1) from variable resistor (24).

11 Remove instrument light (1) from bracket (8).

4-9. MAINTENANCE OF BRACKET ASSEMBLY AND INSTRUMENT LIGHT (CONT).

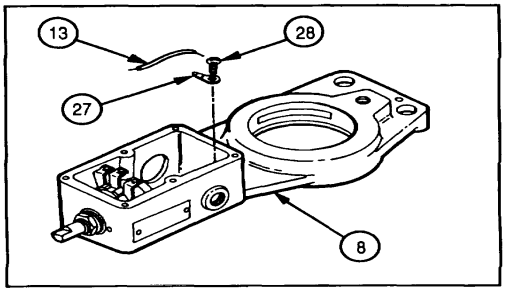
DISASSEMBLY (CONT)

12 Remove electronic component (25) from socket (26).

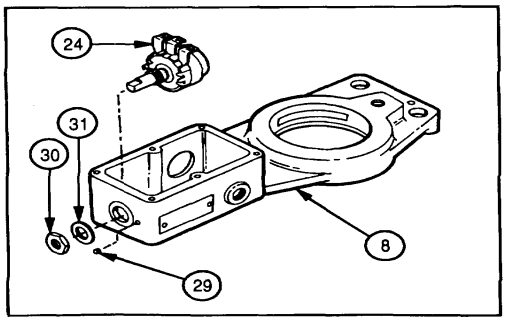


13 Unsolder electrical wire (13) from terminal lug (27).

14 Remove screw (28) and terminal lug (27) from bracket (8).



15 Remove setscrew (29), nut (30), washer (31), and variable resistor (24) from bracket (8).



CLEANING

Clean all parts per TM 9-254.

REPAIR

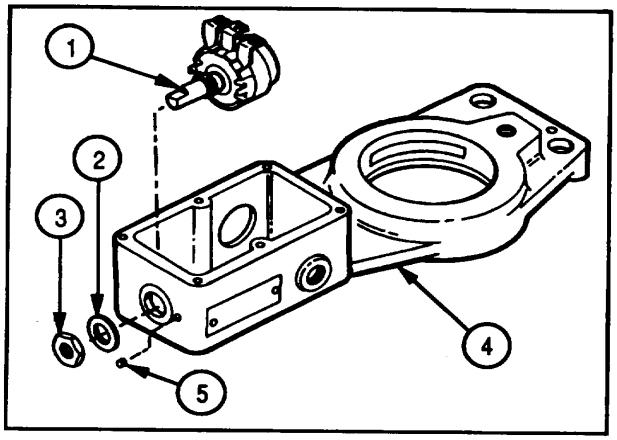
Repair is by replacement of authorized parts as required. Refer to appendix B.

REASSEMBLY

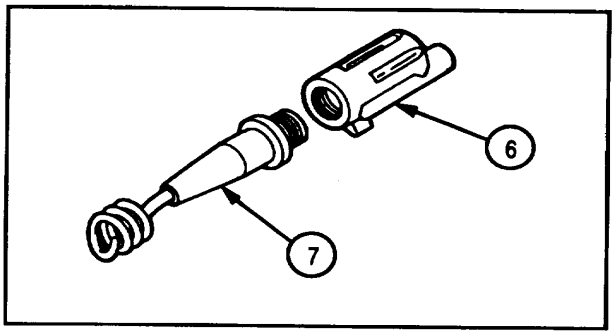
1 Install variable resistor (1), washer (2), and nut (3) in bracket (4).

2 Apply sealing compound (item 10, appx C) to threads of setscrew (5).

3 Position variable resistor (1) with solder lugs up and install setscrew (5).

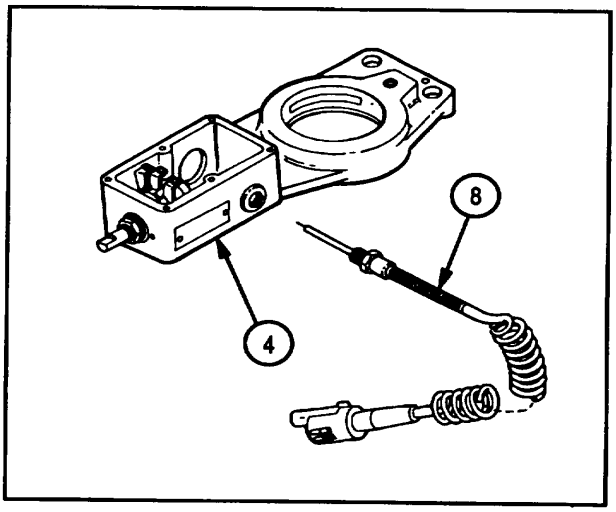


4 Install electrical component (6) on socket (7).



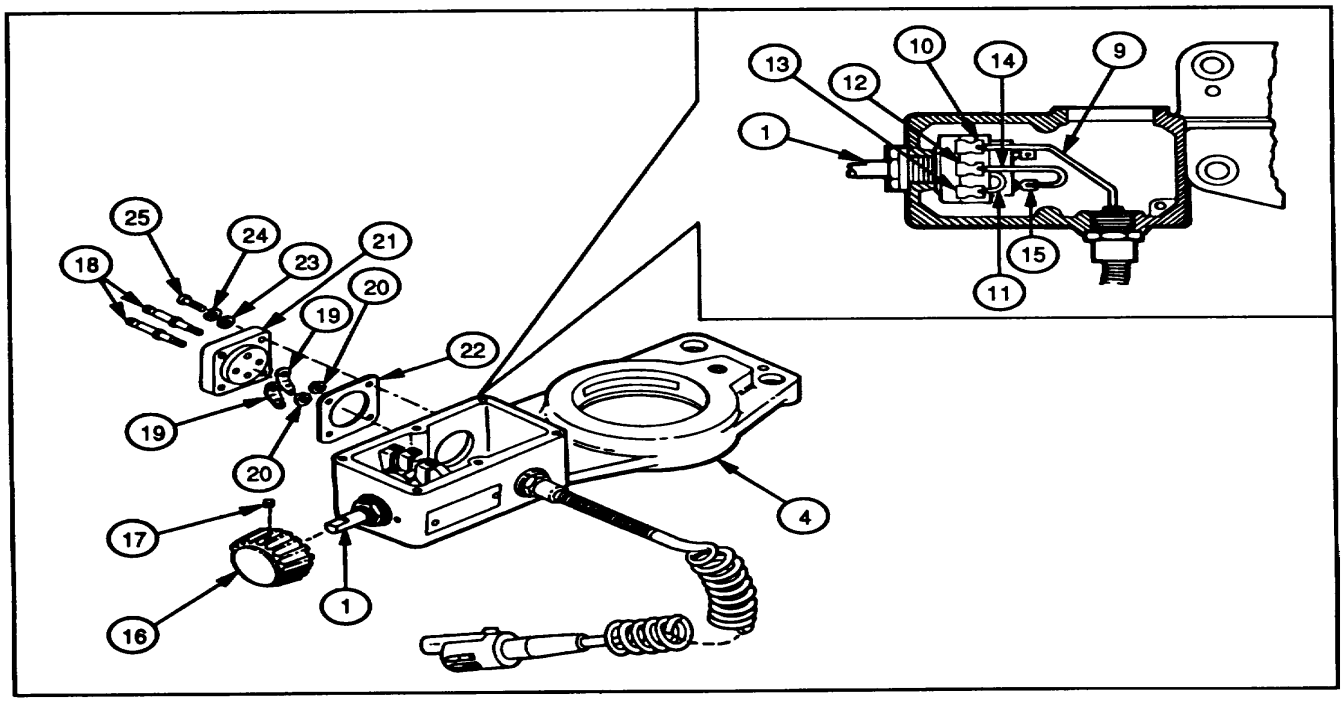
5 Apply sealing compound (item 10, appx C) to threads of instrument light (8).

6 Install instrument light (8) in bracket (4).



4-9. MAINTENANCE OF BRACKET ASSEMBLY AND INSTRUMENT LIGHT (CONT).

REASSEMBL Y (CONT)



7 Using solder (item 12, appx C), and soldering flux (item 6, appx C), solder lead (9) to terminal (10) of variable resistor (1).

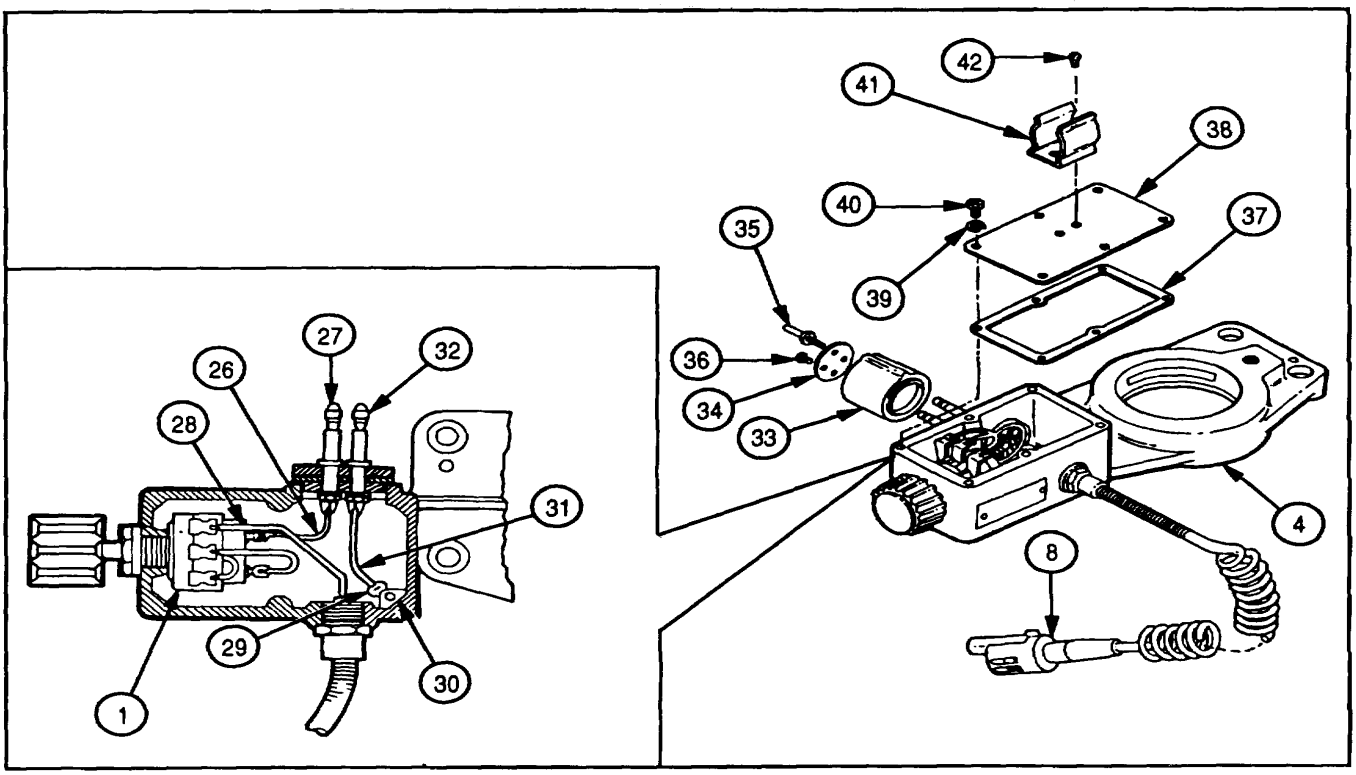
8 Using solder (item 12, appx C), and soldering flux (item 6, appx C), solder black lead (11) to terminal (12) and terminal (13) of variable resistor (1). Trim to fit.

9 Using solder (item 12, appx C), and soldering flux (item 6, appx C), solder black lead (14) to terminal (12) and terminal (15) of variable resistor (1). Trim to fit.

10 Install knob (16) and setscrew (17) on shaft of variable resistor (1).

11 Install two electrical contacts (18), two terminal lugs (19), and two plain hexagon nuts (20) on bushing insulator (21).

12 Install bushing insulator (21), gasket (22), four washers (23), four new lockwashers (24), and four capscrews (25) on bracket (4).



13 Using solder (item 12, appx C), and soldering flux (item 6, appx C), solder black wire (26) to positive (+) contact (27) and terminal lug (28) on variable resistor (1). Trim to fit.

14 Install terminal lug (29) and screw (30).

15 Using solder (item 12, appx C), and soldering flux (item 6, appx C), solder white wire (31) to negative (-) contact (32) and terminal lug (29). Trim to fit.

16 Apply sealing compound (item 10, appx C) to shell receptacle (33).

17 Install shell receptacle (33), electrical plate (34), headless shoulder pin (35), and screw (36) on bracket (4).

18 Apply adhesive (item 1, appx C) to new gasket (37).

19 Install new gasket (37), cover (38), six new lockwashers (39), and six screws (40) on bracket (4).

20 If removed, install spring tension clip (41) and two screws (42) on cover (38).

21 Install instrument light (8) in spring tension clip (41).

Section V. GENERAL SUPPORT MAINTENANCE

There are no general support maintenance procedures for the M138 Telescope Mount.

Section VI. GENERAL SUPPORT FINAL INSPECTION PROCEDURES

4-10. GENERAL.

a. This section describes and illustrates the final inspection procedures for the M138 telescope mount. A final inspection will be performed prior to returning the M138 telescope mount to the using unit or to the supply system.

b. If the M138 telescope mount inspected fails to meet the required standards, ensure that the maintenance authorized at the applicable level has been performed correctly.

4-11. FINAL INSPECTION INSTRUCTIONS.

This task covers:
a. *Assembly and alinement of V-block adapter assembly*
b. *Setting up V-block adapter assembly*
c. *Visual inspection*
d. *Deflection locking torque*
e. *Deflection adjusting range*
f. *Elevation locking torque*
g. *Elevation adjusting range*
h. *Telescope locking clamp*
i. *Instrument light*

INITIAL SETUP

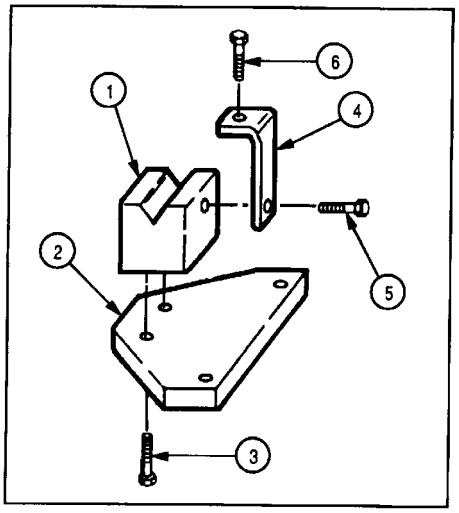
Test Equipment
Collimator telescope (5549108)
Dial indicator (63052-48B)
Height gage (585818)
Plate (7901769)
Surface plate (10539031-1)
Test target (figure 8, appx D)

Tools and Special Tools
Tool kit, electronic: system maintenance (SC 5180-95-CL-B29)
Base (figure 11, appx D)
Bushing adapter (figure 5, appx D)
Clamp (figure 11, appx D)
Fixture plate (figure 11, appx D)
Torque adapter (figure 1, appx D)
Torque adapter (figure 2, appx D)
Torque adapter (figure 3, appx D)
Torque wrench (GGG-W-686)
V-block (figure 11, appx D)

Materials/Parts
Screw, 10-24 x 1/2 (3)
Screw, 10-24 x 3/8
Dowel pin, 1 in. (2)

References
TM 9-254

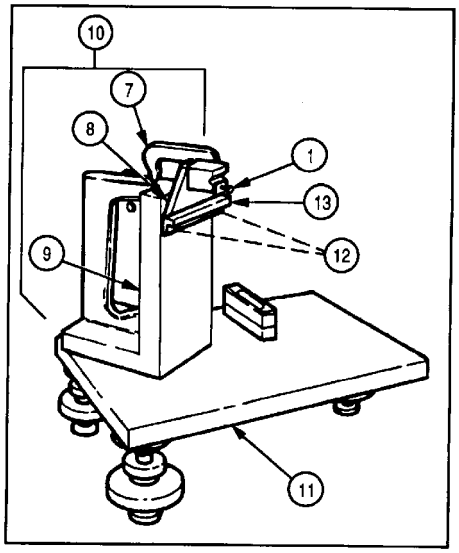
ASSEMBLY AND ALINEMENT OF V-BLOCK ADAPTER ASSEMBLY



1 Secure V-block (1) (figure 11, appx D) to base (2) (figure 11, appx D) with two 10-24 x ½ screws (3).

2 Secure clamp (4) (figure 11, appx D) to V-block (1) with 10-24 x 3/8 screw (5).

3 Install 10-24 x 1/2 screw (6) in top of clamp (4).

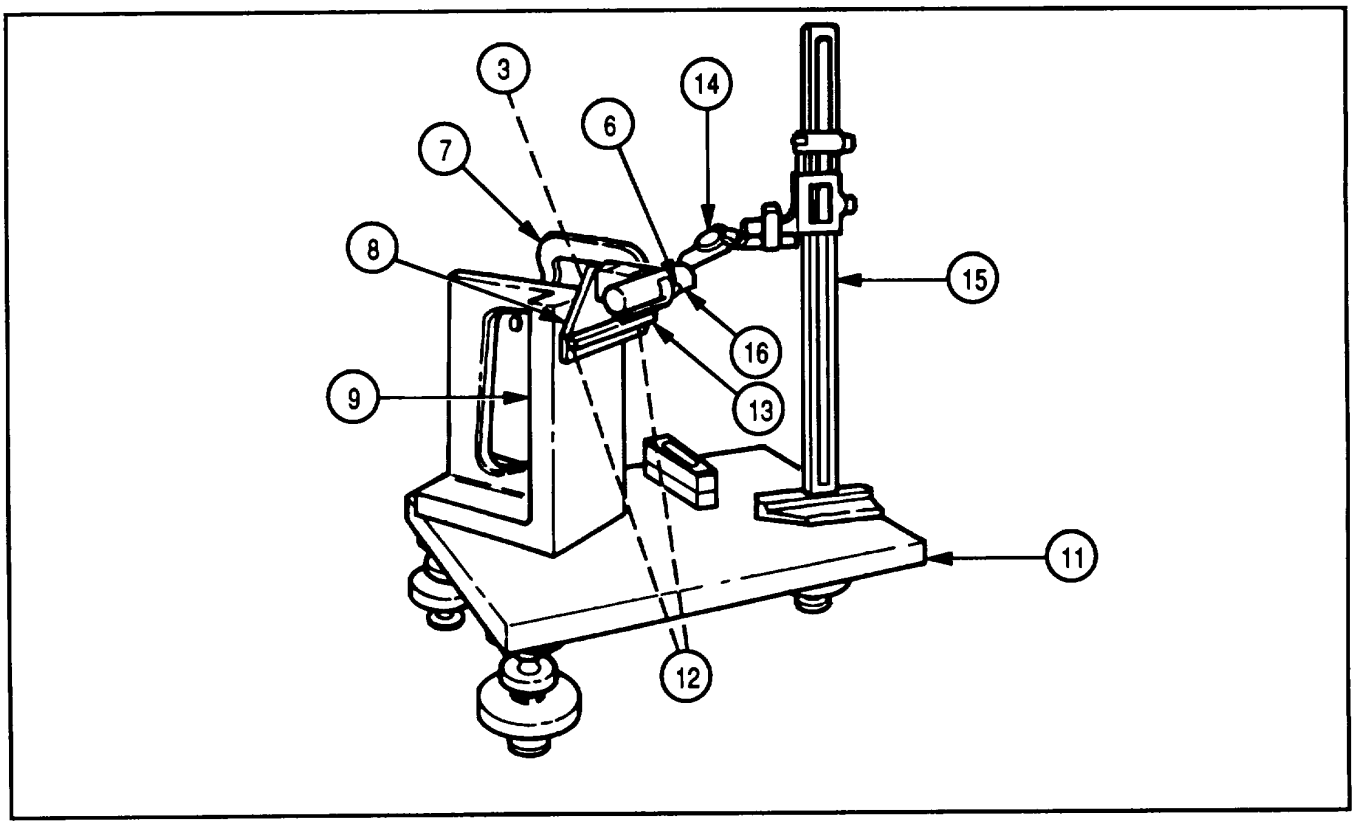


4 With V-block (1) in upward position, use C-clamp (7) to secure V-block adapter (8) to plate (9).

5 Install V-block adapter assembly (10) on leveled surface plate (11) and insert two 1.00-in. (2.54-cm) dowel pins (12) in the 0.25-in. (0.64-cm) holes. Place a 6.00-in. (15.24-cm) parallel bar (13) across two dowel pins (12).

4-11. FINAL INSPECTION INSTRUCTIONS (CONT).

ASSEMBLYAND ALINEMENT OF V-BLOCK ADAPTER ASSEMBLY (CONT)



6 Install dial indicator (14) to vernier height gage (15), to indicate a true horizontal plane, within 0.001 TIR, along the top surface of parallel bar (13). Loosen C-clamp (7), if necessary, to move V-block adapter (8).

7 Place 1.00-in. (2.54 cm) diameter dowel pin (16), 6.00 in. (15.24 cm) long, on V-block (1) and secure by tightening screw (6).

8 Loosen two screws (3). Tap lightly on dowel pin (16) until it indicates horizontal to parallel bar (13) within 0.001 in. (0.025 mm). Tighten two screws (3) and recheck dowel pin (16) to make sure V-block (1) did not move.

9 Recheck parallel bar (13) by using dial indicator (14), attached to vernier height gage (15), to indicate a true horizontal plane, within 0.001 TIR, along the top surface of parallel bar (13). Loosen C-clamp (7) to remove V-block adapter (8).

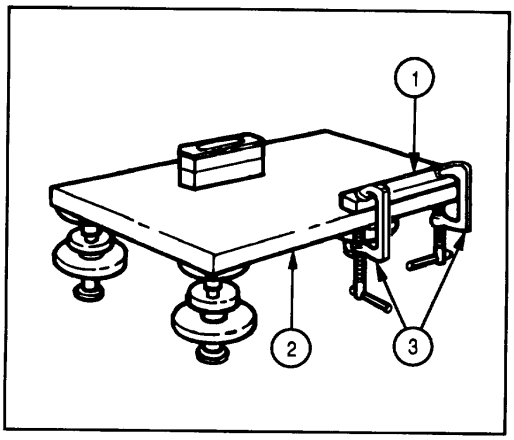
10 Remove V-block adapter (8) from plate (9).

11 Remove plate (9) from surface plate (11).

12 Remove two dowel pins (12) from V-block adapter (8).

SETTING UP V-BLOCKADAPTER ASSEMBLY

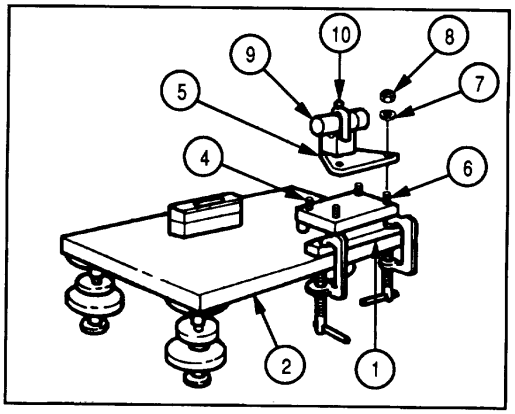
1 Secure parallel bar (1) to left side and rear edge of leveled surface plate (2) using two C-clamps (3).



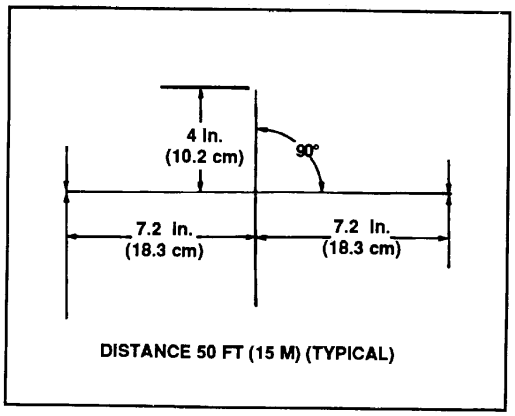
2 Place fixture plate (4) (figure 11, appx D) on surface plate (2), flush to parallel bar (1), and next to rear edge.

3 Secure V-block adapter (5) using two studs (6), two washers (7), and two nuts (8) on left side of fixture plate (4).

4 Place collimator telescope (9) on V-block adapter (5) and plumb the vertical reticle line to a plumbline. Secure collimator telescope (9) in this position by tightening screw (10).



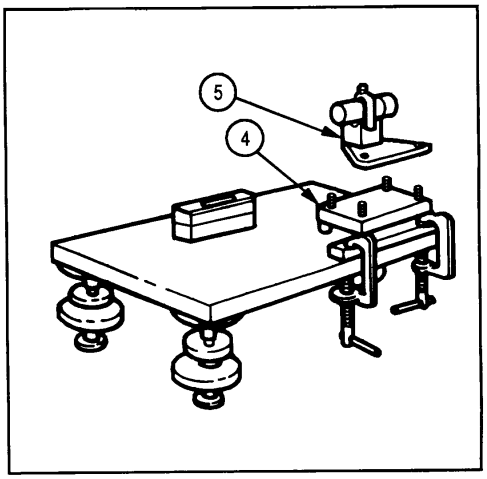
5 Position test target (figure 8, appx D) at a distance of 50 ft (15 m) and superimpose the crosslines of test target to reticle of collimator telescope.



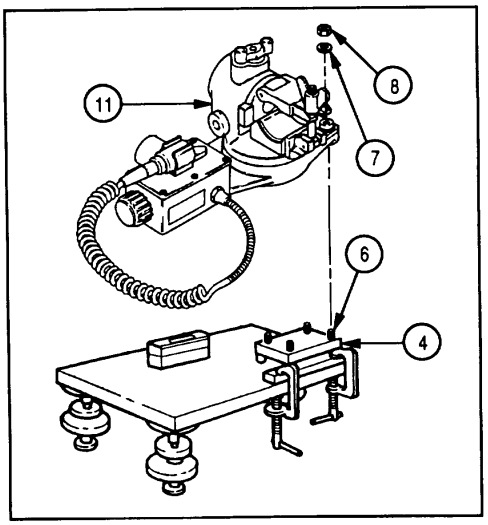
4-11. FINAL INSPECTION INSTRUCTIONS (CONT).

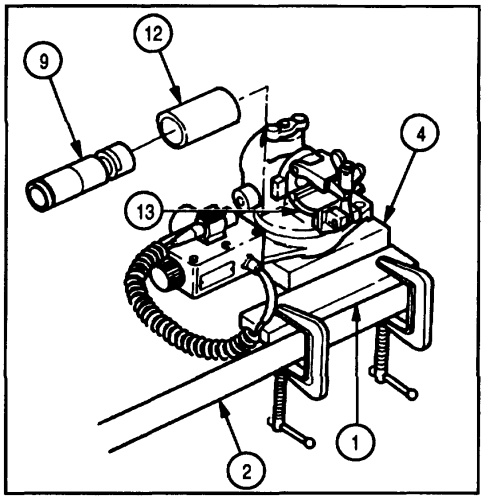
SETTING UP V-BLOCK ADAPTER ASSEMBLY (CONT)

6 Remove V-block adapter (5) from fixture plate (4).



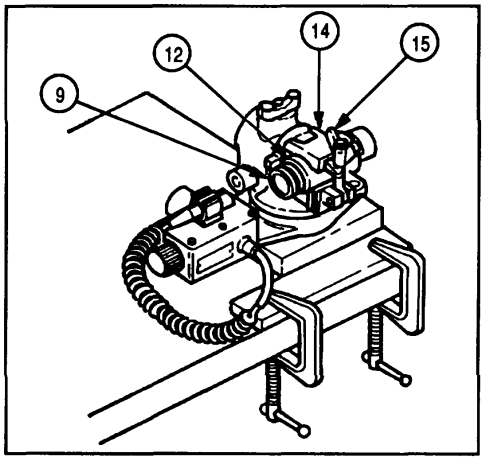
7 Install M138 telescope mount (11) on fixture plate (4) using four studs (6), four washers (7), and four nuts (8).





8 Insert collimator telescope (9) in bushing adapter (12) (figure 5, appx D) and install in telescope mount socket (13).

9 Realine fixture plate (4) by adjusting fixture plate on surface plate (2), flush to parallel bar (1), and next to rear edge.



10 Rotate collimator telescope (9) until reticle line coincides with vertical line of test target.

11 Secure bushing adapter (12) with telescope locking clamp (14) and eyebolt assembly (15).

VISUAL INSPECTION

1 Inspect exterior of the Mi38 telescope mount for overall appearance as an indication of the severity of service it has been subjected to. Check for damaged, loose, or missing parts.

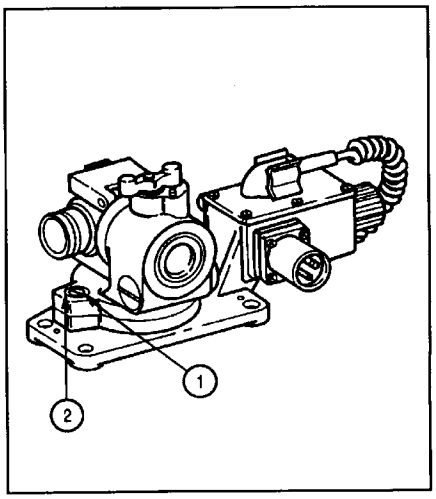
2 Inspect exterior painted surfaces of the M138 telescope mount for scratches and areas from which paint may have loosened or flaked, leaving areas exposed.

4-11. FINAL INSPECTION INSTRUCTIONS (CONT).

DEFLECTION LOCKING TORQUE

1 Use torque adapter (figure 2, appx D) and torque wrench to apply a torque of 30.00 in.-lb (3.39 N-m), clockwise, to capscrew (1).

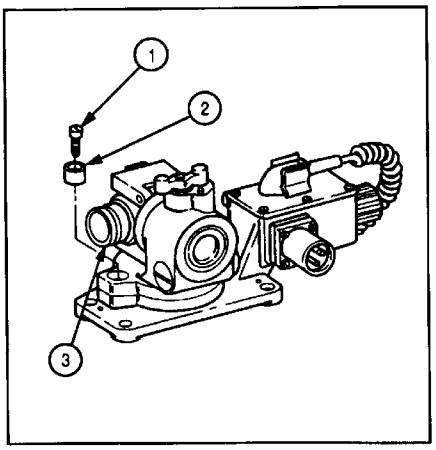
2 Use torque adapter (figure 1, appx D) and torque wrench to apply a torque of 4.00 in.-lb (0.45 N-m) to eccentric plug (2). The line of sight of the collimator telescope shall not change.



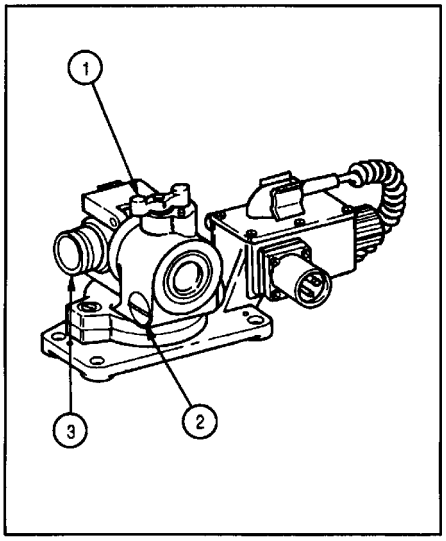
DEFLECTION ADJUSTING RANGE

1 Loosen screw (1).

2 Rotate eccentric plug (2) to move the collimator telescope (3) through a range of 12 mils, either side of center, as indicated by the reference markings at each end, or the horizontal line of the test target.



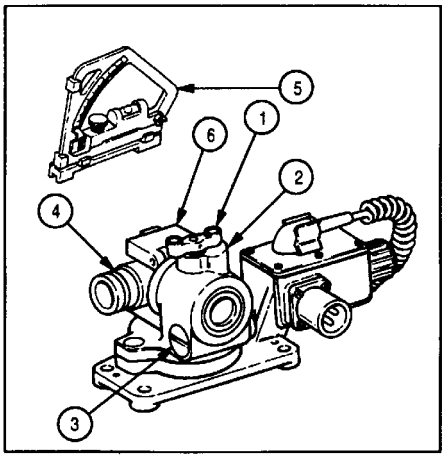
ELEVATION LOCKING TORQUE



1 Using torque wrench with torque adapter (figure 3, appx D), check torque resistance of lever (1). A torque of 15.00 in.-lb (1.69 N-m), applied counterclockwise, shall not move lever from the detent position.

2 With lever (1) in detent position, use torque adapter (figure 1, appx D) with torque wrench to apply a torque of 5.00 in.-lb (0.56 N-m) to worm (2). The line of sight of the collimator telescope (3) shall not change.

ELEVATION ADJUSTING RANGE



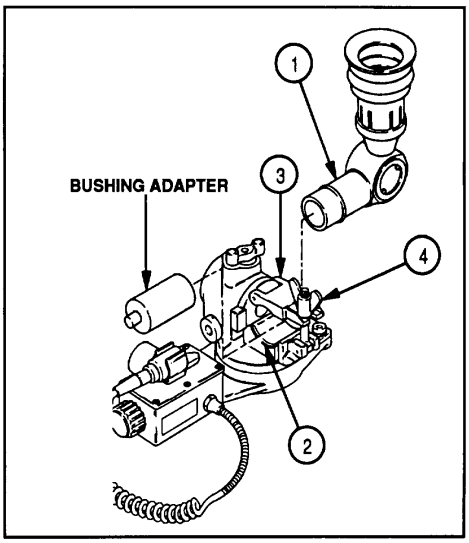
1 Turn lever (1) clockwise to pin (2) to release worm (3).

2 Rotate worm (3) to elevate and depress collimator telescope (4) at least 25 degrees (444.45 mils) as measured by gunner's quadrant (5), held by hand on parallel bar on top of locking clamp (6).

4-11. FINAL INSPECTION INSTRUCTION (CONT)

TELESCOPE LOCKING CLAMP

Position bushing adapter (figure 5, appx D), or elbow telescope M139 (1), in telescope mount socket (2) and close telescope locking clamp (3). Bushing adapter, or elbow telescope (1) should lock securely when locked in place with telescope locking clamp (3) and eyebolt assembly (4).



INSTRUMENT LIGHT

1 Inspect instrument light (1) for defective wiring or damaged parts.

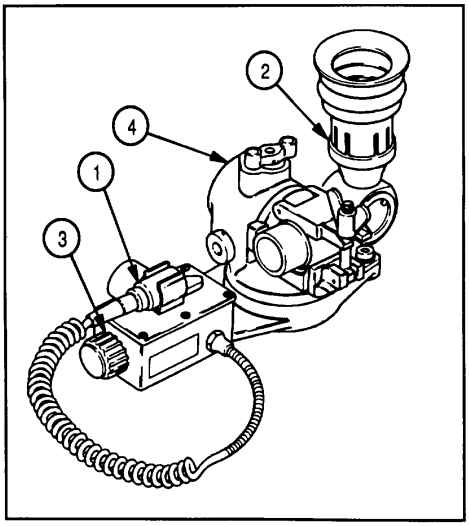
2 Test illumination in a darkened area using 24-volt d.c. power supply.

3 Connect instrument light (1) to elbow telescope (2).

4 Turn variable resistor knob (3), to maximum and minimum point, for light intensity variation.

5 LED should provide adequate illumination for easy legibility of the elbow telescope reticle.

6 Remove M138 telescope mount (4) from surface plate.



Section VII. PREEMBARKATION INSPECTION PROCEDURES

4-12. GENERAL.

a. Fire control instruments must be inspected for outward appearance, mechanical condition, and proper operation.
b. Instruments must approach new equipment standards of operation and appearance. The workmanship and quality must reflect the highest standards obtainable.

4-13. SPECIFIC INSTRUCTIONS.

Fire control instrument must conform to the following specifications for overseas shipment.

a. Functioning of Mechanical Parts. Mechanical parts must operate smoothly without binding or rough motion. Parts must be free from grit and must be properly lubricated.

b. Illumination. The extension light must illuminate properly.

c. General Appearance and Condition of the Instruments.

(1) All parts of the instruments must be present and free from defects.

(2) Paint must cover all specified surfaces. Repaint if painted surfaces show signs of damage.

(3) Any fire control instrument failing to meet the requirements of the final inspection is unsatisfactory for overseas shipment.

(4) All warning labels must be present and legible.

CHAPTER 5
M137 TELESCOPE MOUNT

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

5-1. COMMON TOOLS AND EQUIPMENT. **Refer to page 2-1.**

5-2. SPECIAL TOOLS AND SUPPORT EQUIPMENT. **Refer to page 2-1.**

5-3. REPAIR PARTS. **Refer to page 2-1.**

Section II. INITIAL INSPECTIONS

5-4.GENERAL.

a. Inspection is performed primarily to determine the following: (1) Completeness.

(2) The nature of unserviceability.

(3) The work, repair parts, and supplies required to return the materiel to serviceability.

(4) That the work in process is being performed properly.

(5) That completed work complies fully with serviceability standards.

b. The M137 telescope mount is considered serviceable when:

(1) It is complete and properly performs its intended function.

(2) All modification work orders (MWO's) have been applied.

(3) All defects disclosed by the inspection have been corrected.

c. DA Form 24085 and DA Form 2409 list applicable MWO's.

d. Mount must be installed on the howitzer or on cross-leveling fixture to perform inspection.

5-5. CATEGORIES OF INSPECTION. Categories of inspection define responsibilities:

a. An initial inspection of the M137 telescope mount is performed immediately on receipt for maintenance. This inspection will determine the amount and type of work to be performed.

b. A final inspection of the M137 telescope mount is performed after repairs have been completed to ensure that the item meets serviceability standards.

5-5. CATEGORIES OF INSPECTION (CONT).

c. Table 5-1 lists initial inspection procedures for the M137 telescope mount. Final inspection procedures are located on page 5-52.

d. reembarkation inspection procedures are located on page 5-70.

Table 5-1. INITIAL INSPECTION-M137 TELESCOPE MOUNT

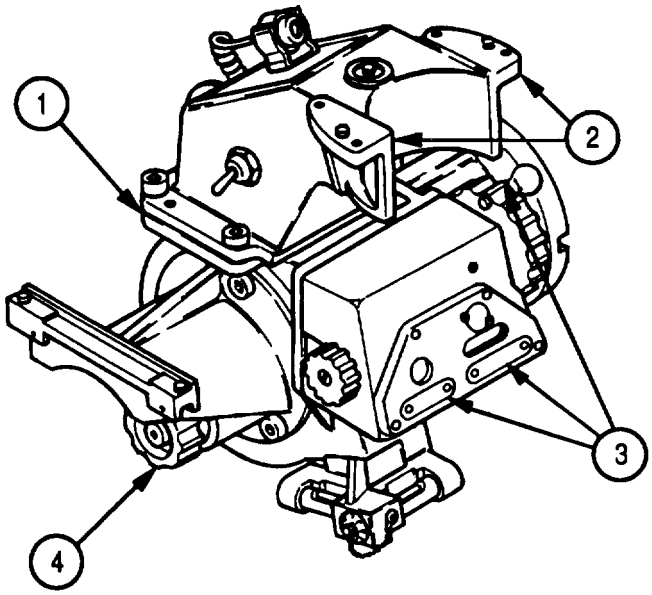
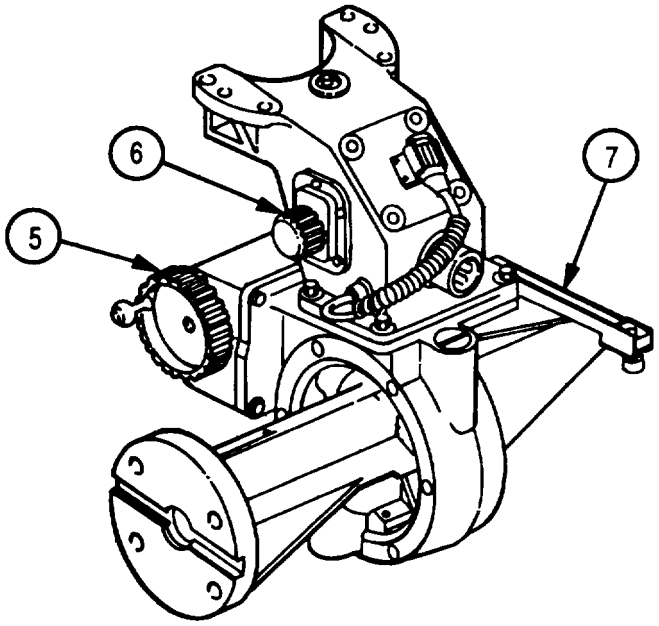
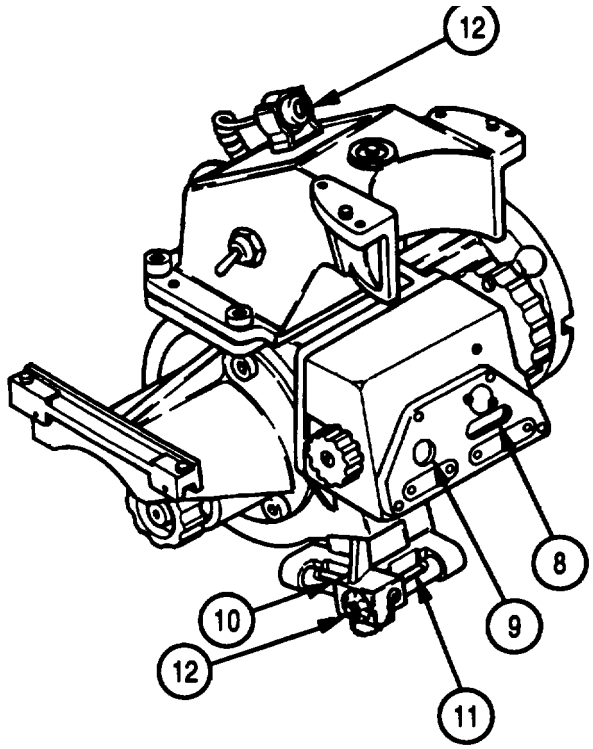
ITEM NO.	ITEM T0 BE INSPECTED	PROCEDURE
		
all parts	1 M137 Telescope Mount	Inspect for good overall appearance with securely tightened in place. Check that electrical wiring is free of cuts, nicks, and general deterioration.
free of burrs	2 Mounting Surfaces and corrosion.	Inspect for burrs and corrosion; must be
clearly	3 Decal and Identification Plates	Inspect for legibility; must be legible and defined.
must turn	4 Cross-Level Assembly	Rotate cross-level assembly knob. It smoothly with less than 11.00 in.-lb (1.24 N-m) torque. Backlash must not exceed 1.0 mil. The mount must travel freely through an angle of 20 degrees (355.6 mils) to the right and 20 degrees (355.6 mils) to the left. The mount must make cant (cross-level) corrections left and right as follows:

Table 5-1. INITIAL INSPECTION--M137 TELESCOPE MOUNT (CONT)

ITEM NO.	ITEM T0 BE INSPECTED	PROCEDURE
		Quadrant Elevation (mils) / Cant Angle (mils) / Correction (mils) / Tolerance (mils) 500 / 177.8 / 96.1 / 0.5 800 / 177.8 / 180.5 / 1.0 1000 / 177.8 / 271.9 / 2.0
		
	5	Elevation Assembly Rotate elevation assembly knob. It must turn smoothly with less than 13.00 in.-lb (1.47 N-m) torque. Backlash must not exceed 0.5 mil. With elevation knob rotated through full range the line of sight shall not deviate from plumb by more than 1.0 mil. With the mount elevated in 200 mil increments between zero and 1200 mils, elevation error must not exceed 1.0 mil.
	6	Variable Resistor Knob Rotate knob. It must turn smoothly with less than 2.0 in.-lb (0.23 N-m) torque.
	7	Level Bar Must be parallel to the plane of locating keyway within 2.1 mil.

5-5. CATEGORIES OF INSPECTION (CONT).

Table 5-1. INITIAL INSPECTION-Mi37 TELESCOPE MOUNT (CONT)

ITEM NO.	ITEM T0 BE INSPECTED	PROCEDURE
number of		
	8	Elevation Counter Operate mount through 1333 mils elevation and minus 89 mils depression. Counter must be accurate within 0.5 mils as read on the gunner's quadrant. Counter numbers must be alined within 1/6 in. (1.59 mm).
	9	Correction Counter Counter must add or subtract an equal mils (5 and 9) from the elevation counter. The correction counter must be accurate within 0.2 mil at the plus and minus 2, 5, and 9 mil settings. Counter numbers must be alined within 1/16 in. (1.59 mm).
	10, 11	Elevation and Cross-Level Vials Elevation bubble and cross-level bubble must be centered within 1 graduation for each vial.
	12	Lights Must illuminate sufficiently to clearly define markings on counters and level vials.

Section III. TROUBLESHOOTING

5-6. TROUBLESHOOTING PROCEDURES.

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

b. The direct support troubleshooting table 5-2 lists the common malfunctions which may be found during maintenance of the M137 telescope mount. Perform the tests/inspections and corrective actions in the order listed.

c. The general support troubleshooting table 5-3 lists the common malfunctions which may be found during maintenance of the M137 telescope mount. Perform the tests/inspections and corrective actions in the order listed.

d. This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions.

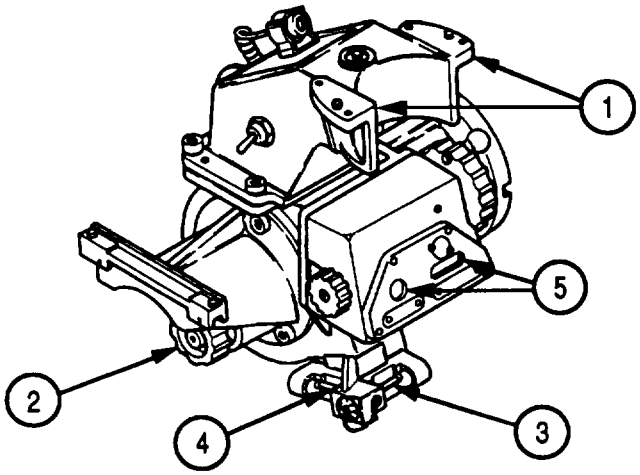
DIRECT SUPPORT SYMPTOM INDEX

Troubleshooting
Procedure
(Page)

5-6. TROUBLESHOOTING PROCEDURES (CONT).

Table 5-2. DIRECT SUPPORT TROUBLESHOOTING

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION



MOUNTING SURFACES

1. MOUNTING SURFACES (1) DO NOT SEAT MI15 TELESCOPE CORRECTLY.
   Observe visually.
   Remove burrs and clean mounting surfaces. Refer to TM 9-254.

CROSS-LEVEL ASSEMBLY

2. CROSS-LEVEL CONTROL (2) IS ERRATIC AND ROUGH DURING MOVEMENT.

   a. Check for worn worm shaft.
      Replace worm shaft. Refer to page 5-29.

   b. Check for worn gears in gear sector.
      Replace gear sector. Refer to page 5-40.

3. CROSS-LEVEL CONTROL (2) EXCEEDS 1.0 MIL BACKLASH.

   a. Check for worn bearings.
      Replace bearings. Refer to page 5-29.

Table 5-2. DIRECT SUPPORT TROUBLESHOOTING (CONT)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

b. Check for worn worm shaft assembly. Refer to page 5-29.
Replace worm shaft assembly. Refer to page 5-29.

4. CROSS-LEVEL CONTROL (2) REQUIRES TORQUE IN EXCESS OF 11.00 IN.-LB (1.24 N-m) TO ROTATE.

a. Check V-bearing tightness.

Adjust torque. Refer to page 5-29.

b. Check for worn worm shaft and/or bearings.

Replace worm shaft and/or bearings. Refer to page 5-29.

LEVEL ASSEMBLY

5. CROSS-LEVEL BUBBLE (3) OR ELEVATION LEVEL BUBBLE (4) DOES NOT CENTER WITHIN 1 GRADUATION.

Observe visually.

Adjust level vials (3 and 4). Refer to page 5-25.

6. NO ILLUMINATION IN LEVEL VIALS (3 AND 4).

Observe visually.

a. Replace burned out LEDs. Refer to page 5-25.

b. Replace defective variable resistor. Refer to page 5-25.

c. Clean or replace defective lens caps. Refer to page 5-25.

COVER ASSEMBLY

7. NO ILLUMINATION IN COUNTERS (5).

Observe visually.

a. Replace burned out electronic component. Refer to page 5-20.

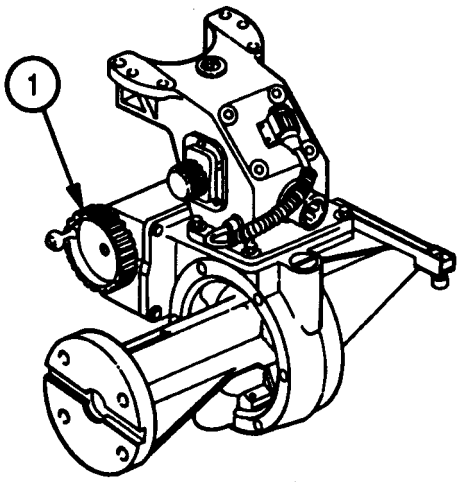
b. Replace defective variable resistor. Refer to page 5-20.

5-6. TROUBLESHOOTING PROCEDURES (CONT).

GENERAL SUPPORT SYMPTOM INDEX

Table 5-3. GENERAL SUPPORT TROUBLESHOOTING

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION



ELEVATION ASSEMBLY

1. ELEVATION CONTROL (1) IS ERRATIC AND ROUGH DURING MOVEMENT.

   a. Check for worn worm shaft assembly.

      Replace worm shaft assembly. Refer to page 5-46.

   b. Check for worn gears in gear sector.

      Replace worn gears. Refer to page 5-46.

Table 5-3. GENERAL SUPPORT TROUBLESHOOTING (CONT)

	MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
2.	ELEVATION CONTROL (1) EXCEEDS 0.5 MIL BACKLASH.
	a. Check for loose or worn bearings.
	Replace bearings. Refer to page 540.
	b. Check for worn worm shaft assembly.
	Replace worm shaft assembly. Refer to page 5-40.
3.	ELEVATION CONTROL (1) REQUIRES TORQUE IN EXCESS OF 13.00 IN.-LB (1.47 N-m) TO ROTATE.
	a. Check V-bearing tightness.
	Adjust torque. Refer to page 5-59.
	b. Check for worn worm shaft and/or bearings.
	Replace worm shaft and/or bearings. Refer to page 540.

Section IV. DIRECT SUPPORT ,MAINTENANCE

5-7. MAINTENANCE OF M137 TELESCOPE

This task covers:

a. Disassembly
b. Cleaning
c. Repair
d. Reassembly

INITIAL SETUP:

Tools and Special Tools
Tool kit, electronic: system maintenance (SC 5180-95-CL-B29)

Materials/Parts
Adhesive (item 4, appx C)
Lockwasher (7) (MS35333-73)

References
TM 9-254
TM 750-116

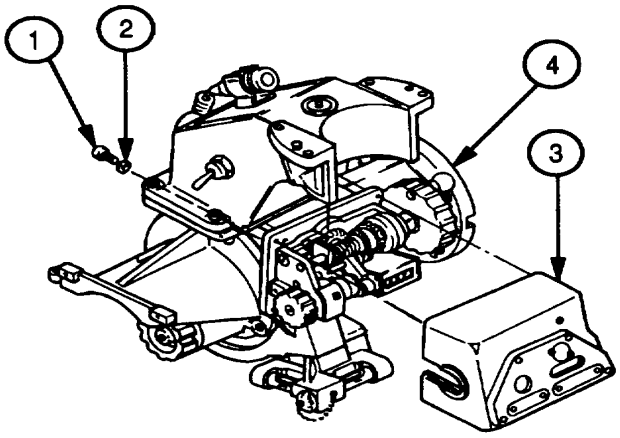
Equipment Conditions
M137 telescope mount removed from M11 A2 howitzer (TM 9-2350-304-10)

General Safety Instructions

WARNING

Use adhesives, cleaning solvents, and sealing compounds in well-ventilated area away from open flame. Adhesives, cleaning solvents, and sealing compounds are harmful to skin and clothing, can burn easily, and may give off harmful vapor.

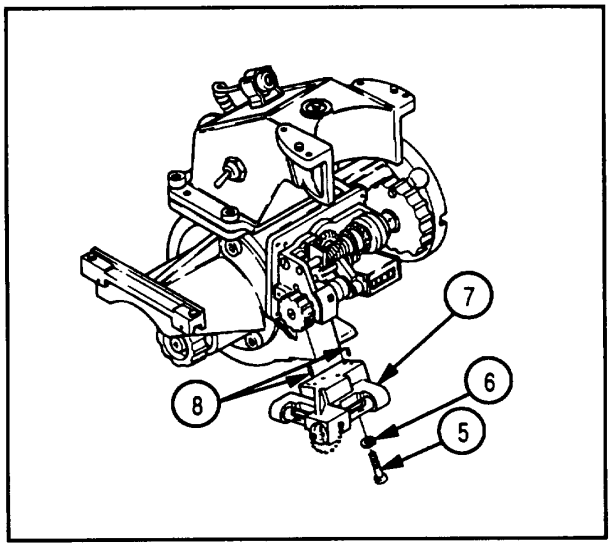
DISASSEMBLY



1 Remove four capscrews (1), four lockwashers (2), and cover assembly (3) from mount subassembly (4).

2 Remove three capscrews (5), three lockwashers (6), and level assembly (7).

3 Remove two pins (8) only if damaged.



CLEANING

Clean all parts per TM 9-254.

REPAIR

1 Cover assembly is a repairable assembly; refer to page 5-19.

2 Level assembly is a repairable assembly; refer to page 5-24.

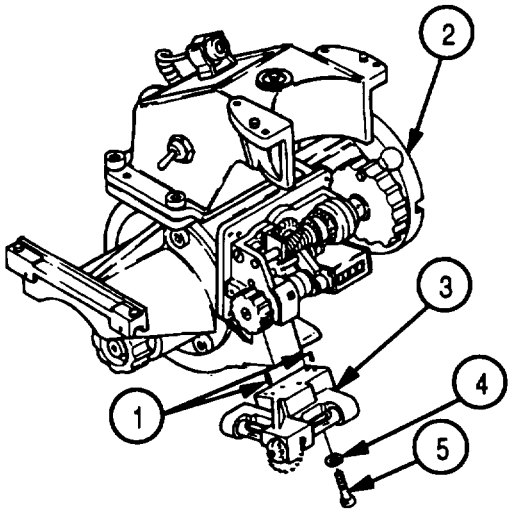
3 Repair is by replacement of authorized parts as required. Refer to appendix B.

REASSEMBLY

1 If two pins (1) were removed, drill and ream for pins 0.25 in. (6.35 mm) deep in mount subassembly (2).

2 Drive in two pins (1).

3 Install level assembly (3) on two pins (1) with three new lockwashers (4) and three capscrews (5).



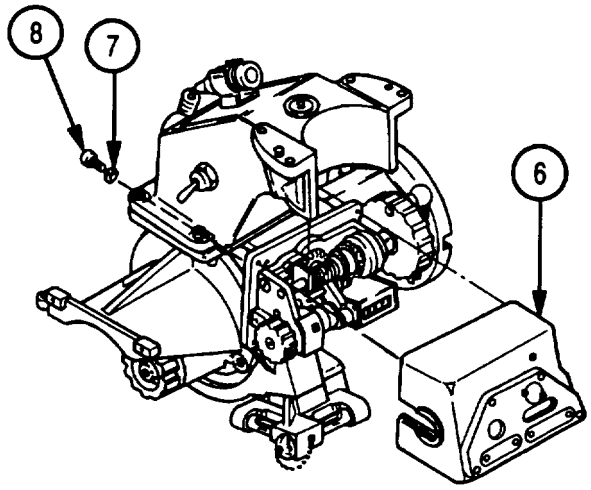
5-7. MAINTENANCE OF M137 TELESCOPE MOUNT ASSEMBLY (CONT).

REASSEMBLY (CONT)

4 Apply adhesive (item 4, appx C) to edges of cover assembly (6).

5 Install cover assembly (6), four new lockwashers (7), and four capscrews (8).

6 Purge in accordance with TM 750-116.



5-8. MAINTENANCE OF UPPER TELESCOPE

This task covers:

a. Disassembly
b. Cleaning
c. Repair
d. Reassembly

INITIAL SETUP:

Tools and Special Tools
Tool kit, electronic: system maintenance (SC 5180-95-CL-B29)

Materials/Parts
Adhesive (item 2, appx C)
Grease (item 9, appx C)
Lockwasher (12) (MS35333-70)
Sealing compound (item 10, appx C)
Solder (item 12, appx C)
Soldering flux (item 6, appx C)

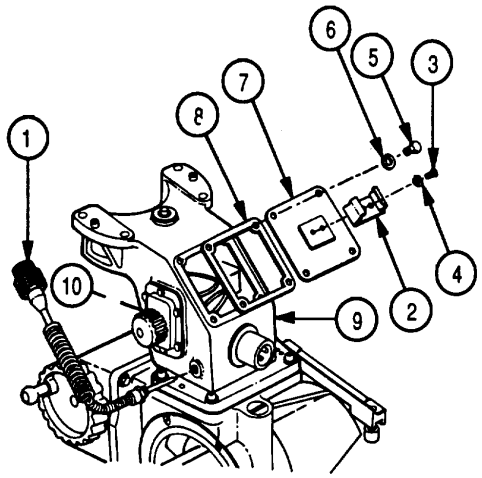
References
TM 9-254

General Safety Instructions

WARNING

Use adhesives, cleaning solvents, and sealing compounds in well-ventilated area away from open flame. Adhesives, cleaning solvents, and sealing compounds are harmful to skin and clothing, can burn easily, and may give off harmful vapor.

DISASSEMBLY

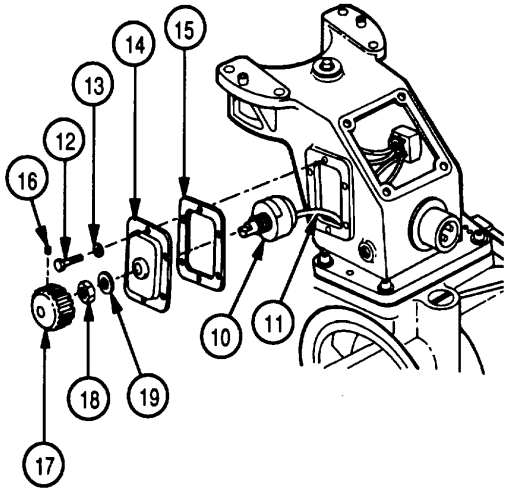


1 Disconnect extension light (1) from spring tension clip (2).

2 Remove two screws (3), two lockwashers (4), and spring tension clip (2).

3 Remove four capscrews (5), four lockwashers (6), access cover (7), and gasket (8) from housing (9).

4 Unsolder extension light (1) from variable resistor (10) and remove from housing (9).



5 Unsolder electrical wire (11) from variable resistor (10).

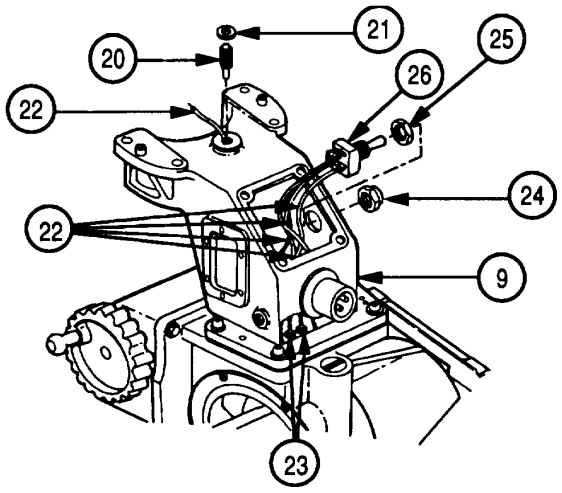
6 Remove six capscrews (12), six lockwashers (13), access cover (14), and gasket (15) with variable resistor (10) attached.

7 Remove setscrew (16) and knob (17) from variable resistor (10).

8 Remove nut (18), washer (19), and variable resistor (10) from access cover (14).

5-8. MAINTENANCE OF UPPER TELESCOPE MOUNT ASSEMBLY (CONT).

DISASSEMBLY (CONT)



9 Remove contact assembly plunger (20) and nonmetallic seal (21) from housing (9) and unsolder electrical wire (22).

10 Unsolder two electrical wires (22) from two electrical contacts (23).

11 Remove boot (24), hexagon nut (25), and toggle switch (26) from housing (9) with electrical wires (22) attached.

12 Unsolder electrical wires (22) from toggle switch (26).

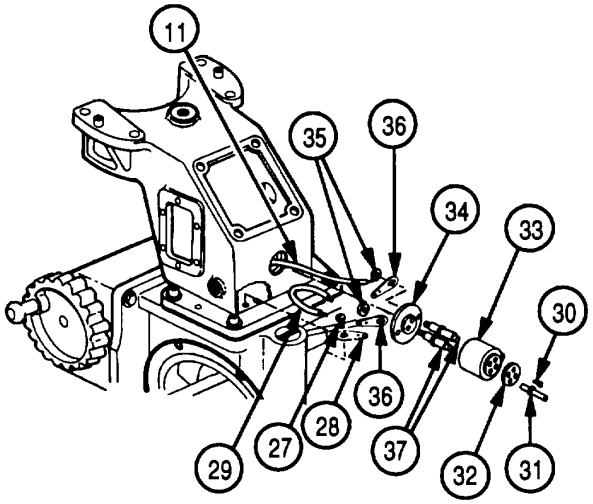
13 Remove screw (27) and terminal lug (28) and unsolder electrical wire (29).

14 Remove screw (30), headless shouldered pin (31), elevating plate (32), and electrical shell (33) from bushing insulator (34).

15 Unscrew and remove bushing insulator (34) and attached parts as a unit.

16 Unsolder and remove electrical wires (29) and (11).

17 Remove two hexagon nuts (35), two terminal lugs (36), and two electrical contacts (37).



CLEANING

Clean all parts per TM 9-254.

REPAIR

1 Extension light is a repairable assembly; refer to page 5-17.

2 Repair is by replacement of authorized parts as required. Refer to appendix B.

REASSEMBLY

1 Apply sealing compound (item 10, appx C) to threads of bushing insulator (1).

2 Install bushing insulator (1) in housing (2) with holes for two electrical contacts (3) on top and bottom position.

3 Install two electrical contacts (3), two terminal lugs (4), and two hexagon nuts (5) in bushing insulator (1).

4 Using solder (item 12, appx C), and soldering flux (item 6, appx C), solder electrical wire (6) to terminal lug (7) and lower electrical contact (3), and electrical wire (8) to upper electrical contact (3). Trim to fit.

5 Install terminal lug (7) and screw (9) in housing (2).

6 Install electrical shell (10), elevating plate (11), pin (12), and screw (13) in bushing insulator (1).

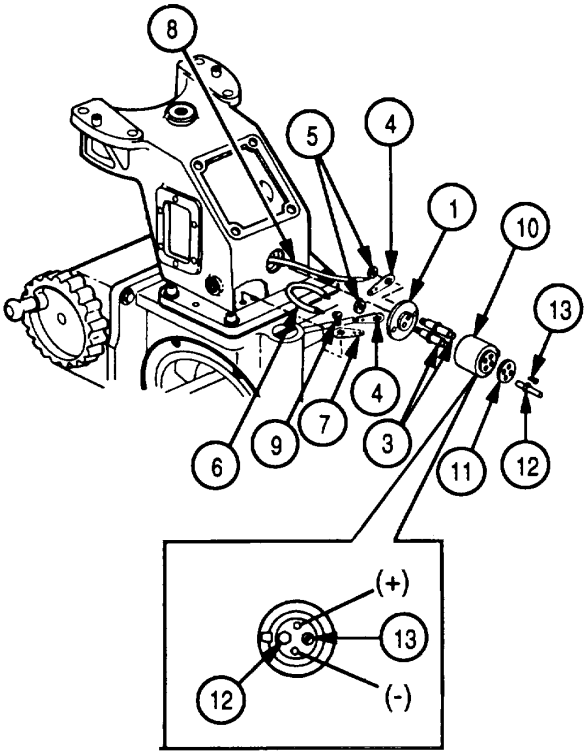
7 Apply sealing compound (item 10, appx C) to threads of toggle switch (14).

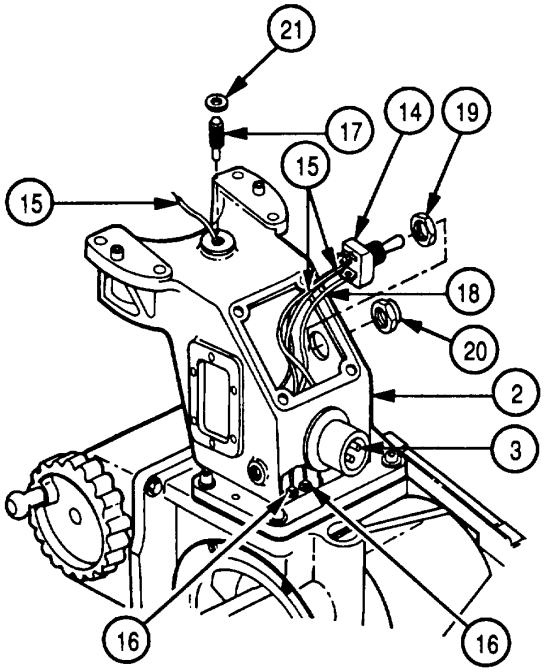
8 Using solder (item 12, appx C), and soldering flux (item 6, appx C), solder three electrical wires (15) to one side of toggle switch (14), and two electrical contacts (16) and contact assembly plunger (17), and electrical wire (18) to other side of toggle switch (14) and upper electrical contact (3). Trim to fit.

9 Install toggle switch (14), hexagon nut (19), and boot (20) to housing (2).

10 Apply adhesive (item 2, appx C) to nonmetallic seal (21).

11 Install nonmetallic seal (21) and contact assembly plunger (17).

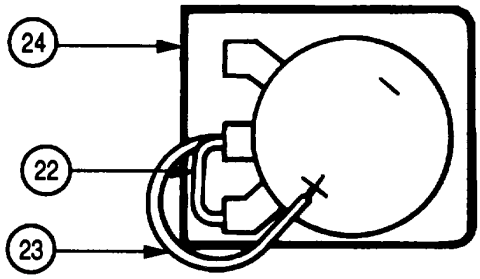




5-8. MAINTENANCE OF UPPER TELESCOPE MOUNT ASSEMBLY (CONT).

REASSEMBLY (CONT)

12 Using solder (item 12, appx C), and soldering flux (item 6, appx C), solder electrical wire (22) to center and right terminals, and electrical wire (23) to center terminal and right lug of variable resistor (24).

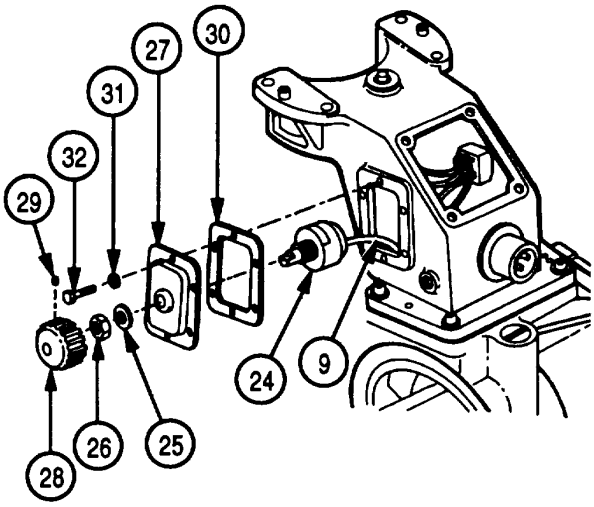


13 Install variable resistor (24), washer (25), and nut (26) to access cover (27).

14 Install knob (28) and setscrew (29) to shaft of variable resistor (24).

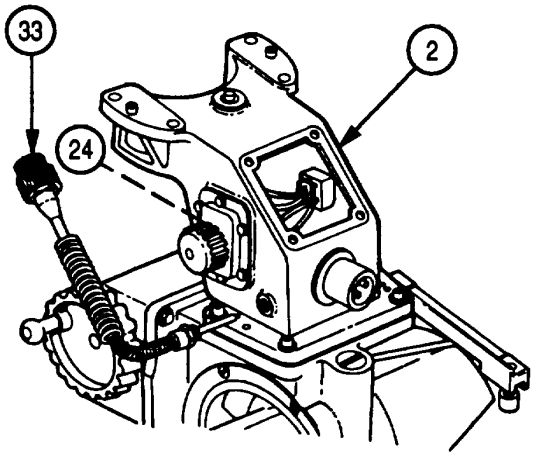
15 Install gasket (30), access cover (27), six new lockwashers (31), and six capscrews (32) to housing (2).

16 Using solder (item 12, appx C), and soldering flux (item 6, appx C), solder wire (9) to left lug of variable resistor (24). Trim to fit.



17 Install extension light (33) in housing (2).

18 Using solder (item 12, appx C), and soldering flux (item 6, appx C), solder extension light wire to left terminal of variable resistor (24). Refer to step 12.



19 Apply a coat of adhesive (item 2, appx C) to one side of gasket (34).

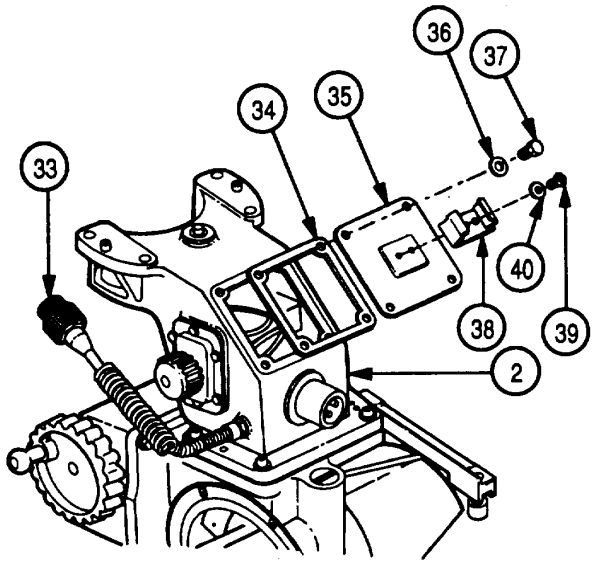
20 Install gasket (34) to access cover (35).

21 Apply a coat of grease (item 9, appx C) to other side of gasket (34).

22 Install access cover (35), four new lockwashers (36), and four screws (37) to housing (2).

23 Install spring tension clip (38), two new lockwashers (39), and two screws (40) to access cover (35).

24 Attach extension light (33) to spring tension clip (38).



5-9. MAINTENANCE OF EXTENSION LIGHT ASSEMBLY

This task covers:

a. Disassembly **c. Repair**
b. Cleaning **d. Reassembly**

INITIAL SETUP:

Tools and Special Tools
Tool kit, electronic: system maintenance (SC 5180-95-CL-B29)

Materials/Parts
Sealant adhesive (item 5, appx C)

References
TM 9-254

Equipment Conditions
5-13 Extension light removed from M137 telescope mount upper assembly housing.

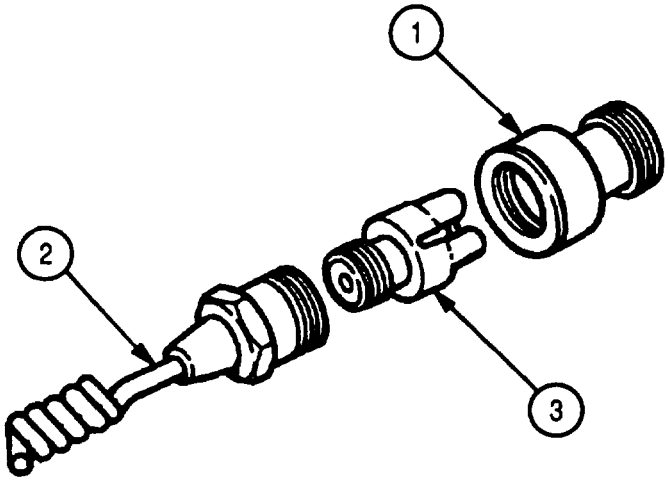
General Safety Instructions

WARNING

Use adhesives, cleaning solvents, and sealing compounds in well-ventilated area away from open flame. Adhesives, cleaning solvents, and sealing compounds are harmful to skin and clothing, can burn easily, and may give off harmful vapor.

5-9. MAINTENANCE OF EXTENSION LIGHT ASSEMBLY (CONT).

DISASSEMBLY



NOTE

Extension light can be disassembled while installed on M137 telescope mount upper assembly housing.

1 Remove optic cell assembly adapter (1) from light extension (2).
2 Remove light assembly (3) from light extension (2).

CLEANING

Clean all parts per TM 9-254.

REPAIR

Repair is by replacement of authorized parts as required. Refer to appendix B.

REASSEMBLY

1 Install light assembly (3) in light extension (2).
2 Apply sealant adhesive (item 5, appx C) to base of optic cell assembly.
3 Install optic cell assembly (1) to light extension (2).

5-10. MAINTENANCE OF COVER ASSEMBLY

This task covers:

a. Disassembly
b. Cleaning
c. Repair
d. Reassembly

INITIAL SETUP:

Tools and Special Tools

Tool kit, electronic: system maintenance (SC 5180-95-CL-B29)
Tubular spanner wrench, 11/1 6 and 45/64 (7597638)

Materials/Parts

Felt strip (2) (8261867)
Lockwasher (4) (MS35333-69)
Lockwasher (2) (MS35333-70)
Sealant adhesive (item 5, appx C)
Sealing compound (item 10, appx C)
Solder (item 12, appx C)
Soldering flux (item 6, appx C)

References

TM 9-254
TM 750-116

Equipment Conditions

5-10 Cover assembly removed from M137 telescope mount assembly

General Safety Instructions

WARNING

Use adhesives, cleaning solvents, and sealing compounds in well-ventilated area away from open flame. Adhesives, cleaning solvents, and sealing compounds are harmful to skin and clothing, can burn easily, and may give off harmful vapor.

DISASSEMBLY

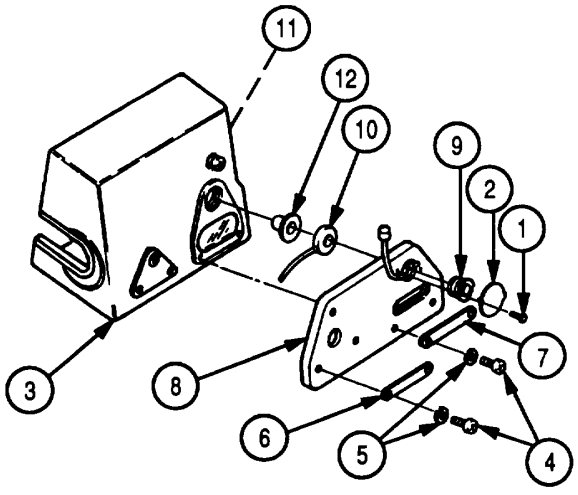
1 Remove two screws (1) and protective dust cap (2) from cover (3).

2 Remove four screws (4), four lockwashers (5), and identification plates (6 and 7) from cover (3).

3 Pull wire with lamp base through to the front of the electronic component (8).

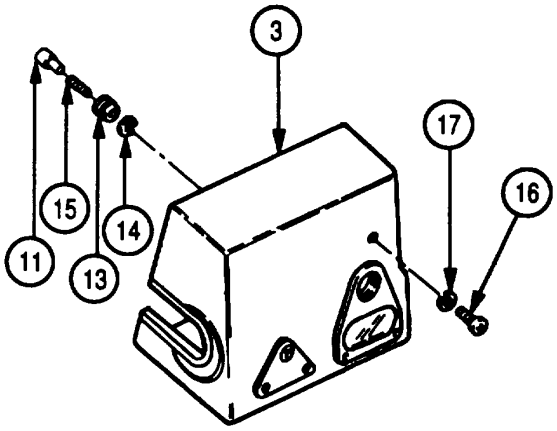
4 Using tubular spanner wrench, unscrew ring (9) and remove electronic component (8) from cover (3).

5 Unsolder electrical lead (10) from electrical contact (11), and remove electrical lead (10) and lens cap (12) from cover (3).



5-10. MAINTENANCE OF COVER ASSEMBLY (CONT).

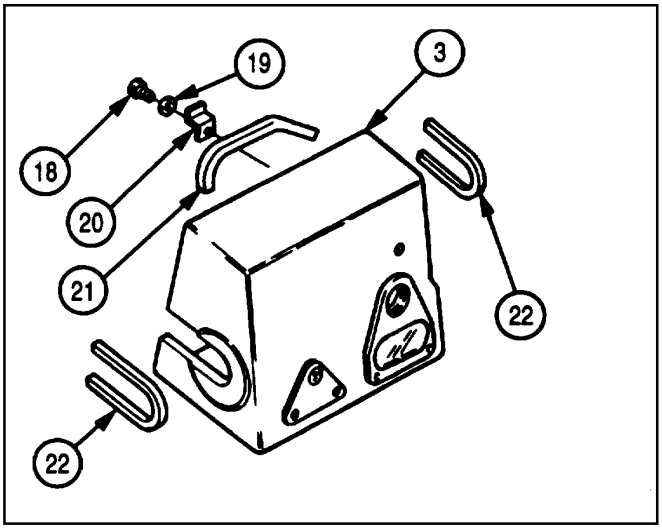
DISASSEMBLY (CONT)



6 Remove bushing insulator (13) from cover (3).

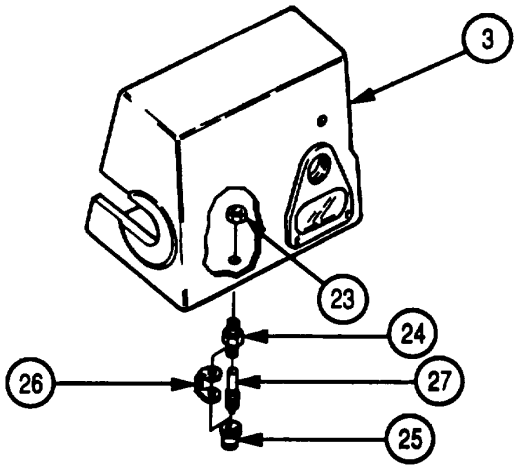
7 Remove retaining ring (14), spring (15), and electrical contact (11) from bushing insulator (13).

8 Remove screw (16) and lockwasher (17) from cover (3).



9 Remove screw (18), lockwasher (19), double angle bracket (20), and light conductor (21) from cover (3).

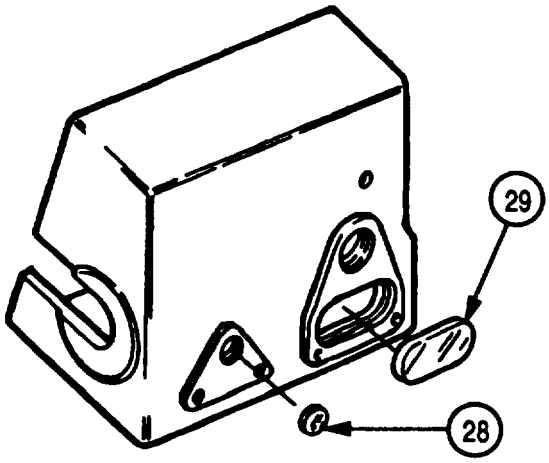
10 Remove two felt strips (22) from cover (3).



11 Remove hexagon nut (23) and valve stem (24) from cover (3).

12 Remove pneumatic valve cap (25), retaining strap (26), and valve core (27) from valve stem (24).

13 Carefully remove observation windows (28 and only if damaged.



CLEANING

Clean all parts per TM 9-254.

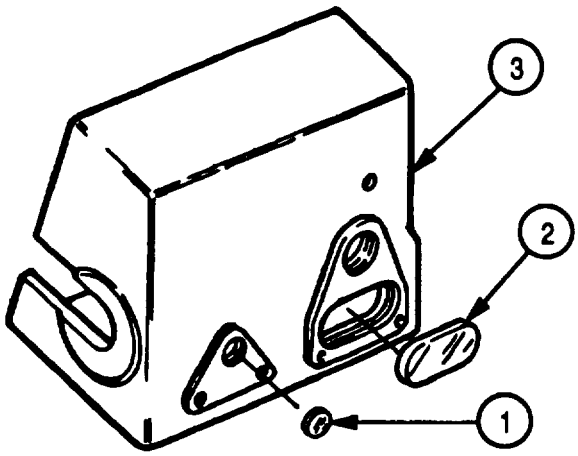
REPAIR

1 If cover is broken, damaged, or missing, repair is by replacement of next higher assembly.
2 Repair is by replacement of authorized parts as required. Refer to appendix B.

REASSEMBLY

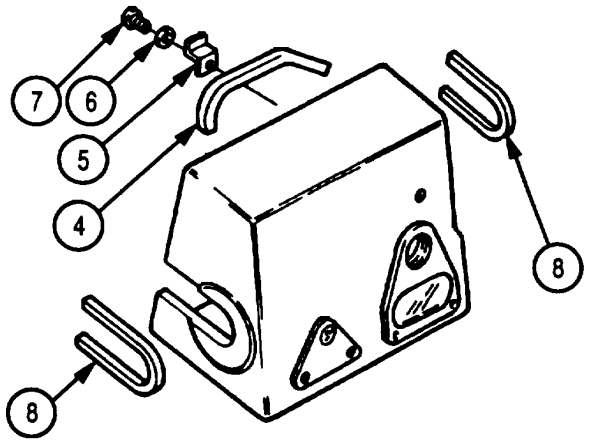
1 If removed, apply sealing compound (item 10, appx C) to edges of observation windows (1 and 2).

2 Install observation windows (1 and 2) in cover (3). Remove excess sealing compound.



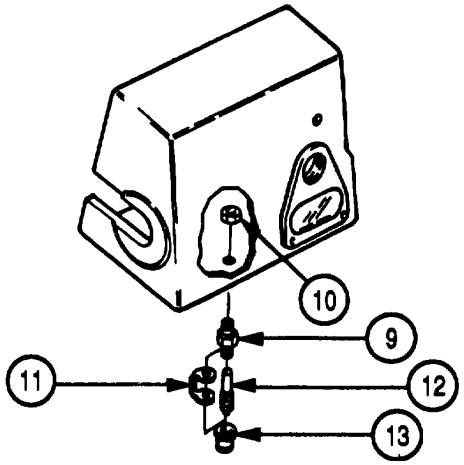
5-10. MAINTENANCE OF COVER ASSEMBLY (CONT).

REASSEMBL Y (CONT)



3 Install light conductor (4), double angle bracket (5), new lockwasher (6), and screw (7).

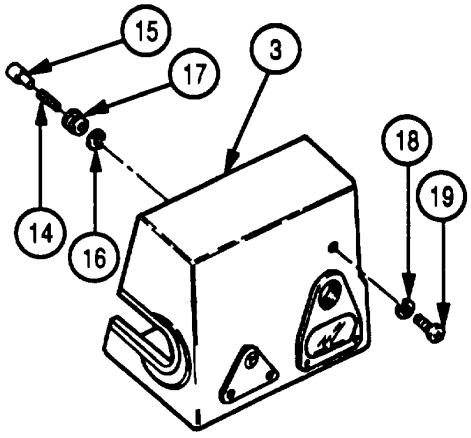
4 Install two new felt strips (8).



5 Apply sealing compound (item 10, appx C) to threads of valve stem (9) and hexagon nut (10).

6 Install retaining strap (11), valve stem (9), and hexagon nut (10).

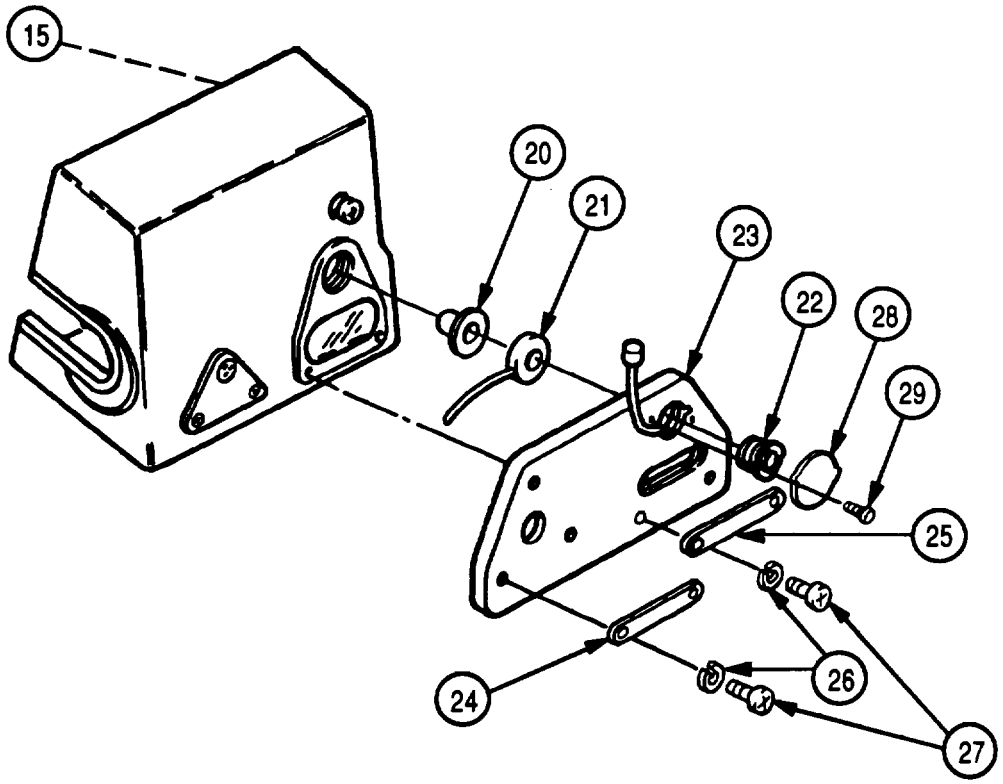
7 Install valve core (12) in valve stem (9) and install pneumatic valve cap (13).



8 Install spring (14), electrical contact (15), and retaining ring (16) in bushing insulator (17).

9 Install bushing insulator (17) in cover (3).

10 Install new lockwasher (18) and screw (19) in cover (3).



11 Apply sealant adhesive (item 5, appx C) to lens cap (20), electrical lead (21), and threads of ring (22).

12 Pull wire with lamp base through to the front of the electronic component (23).

13 Install lens cap (20), electrical lead (21), and electronic component (23).

14 Install identification plates (24 and 25) and loosely secure with four new lockwashers (26) and four screws (27).

15 Using tubular spanner wrench, install ring (22) in cover (3).

16 Insert lamp base portion of electronic component (23) into electrical lead (21). Position wire in recessed area to accommodate protective dust cap (28).

17 Cut and strip contact wire to correct length. Using solder (item 12, appx C), and soldering flux (item 6, appx C), solder contact wire to electrical contact (15).

18 Install and secure protective dust cap (28) with two screws (29).

19 Apply sealant adhesive (item 5, appx C) to outer edge of protective dust cap (28).

20 Tighten four screws (27).

21 Purge in accordance with TM 750-116.

5-11. MAINTENANCE OF LEVEL ASSEMBLY

This task covers:

a. Disassembly
b. Cleaning
c. Repair
d. Reassembly

INITIAL SETUP:

Tools and Special Tools
Tool kit, electronic: system maintenance (SC 5180-95-CL-B29)
Tubular spanner wrench, 11/16 and 45/64 (7597638)

Materials/Parts
Sealing compound (item 10, appx C)
Solder (item 12, appx C)
Soldering flux (item 7, appx C)

References
TM 9-254
TM 9-2350-304-20-2

Equipment Condition
5-11 Level assembly removed from M137 telescope mount assembly

General Safety Instructions

WARNING

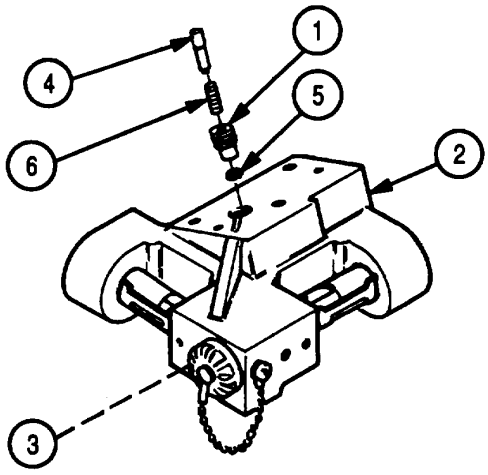
Use adhesives, cleaning solvents, and sealing compounds in well-ventilated area away from open flame. Adhesives, cleaning solvents, and sealing compounds are harmful to skin and clothing, can burn easily, and may give off harmful vapor.

DISASSEMBLY

1 Carefully remove bushing insulator (1) from bracket (2).

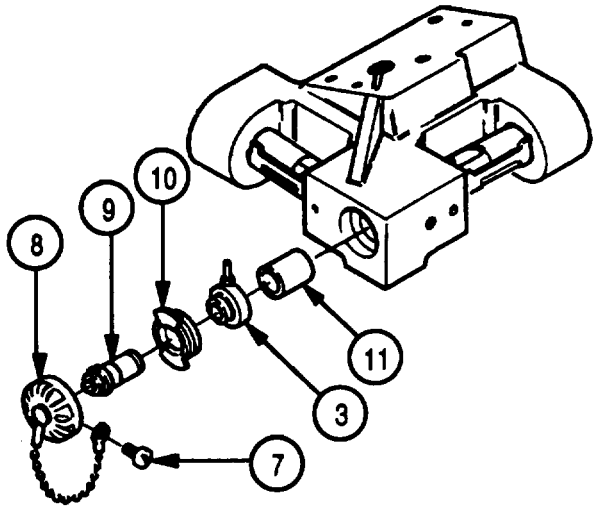
2 Unsolder electrical lead (3) from electrical contact (4).

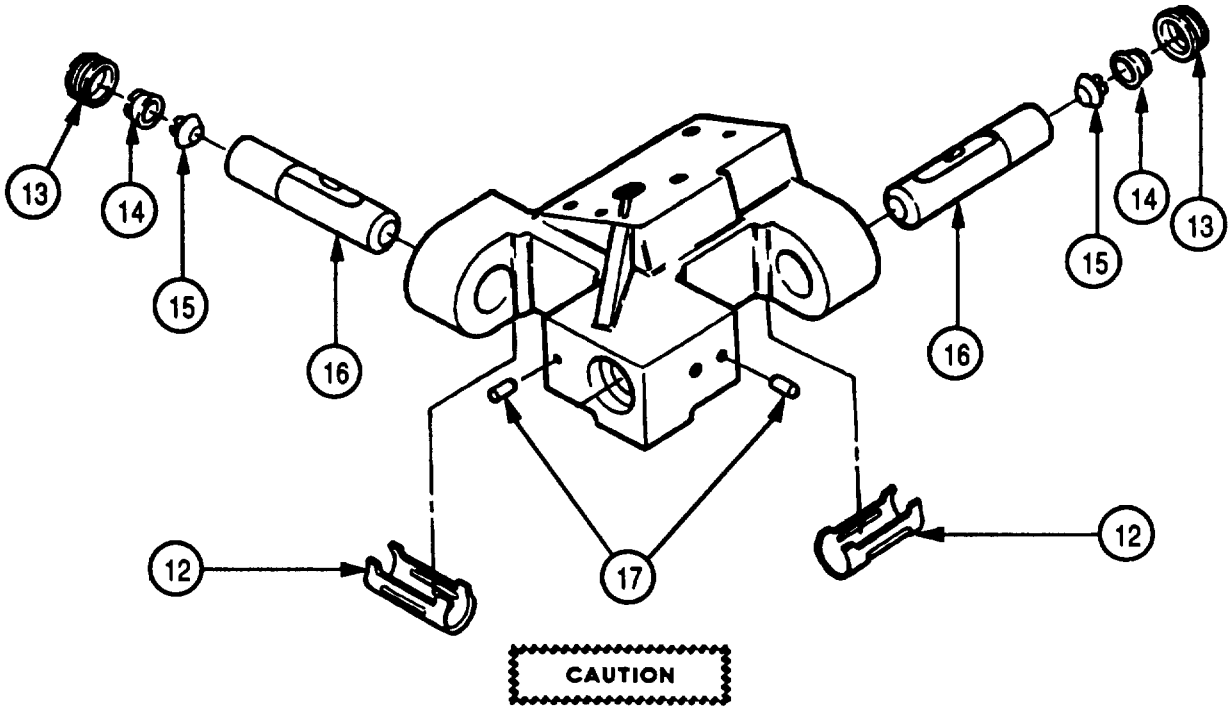
3 Remove retaining ring (5), electrical contact (4), and spring (6) from bushing insulator (1).



4 Remove screw (7), electrical cover (8), and LED (9) from ring (10).

5 Using tubular spanner wrench, remove ring (10), electrical lead (3), and light lens (11).





Never snap level vial covers off level vials.

6 Remove two level vial covers (12) by removing two externally threaded rings (13), two eccentric rings (14), two eccentrics (15), and slide out two level vials (16).

7 Remove two pins (17) only if damaged.

5-11. MAINTENANCE OF LEVEL ASSEMBLY (CONT).

CLEANING

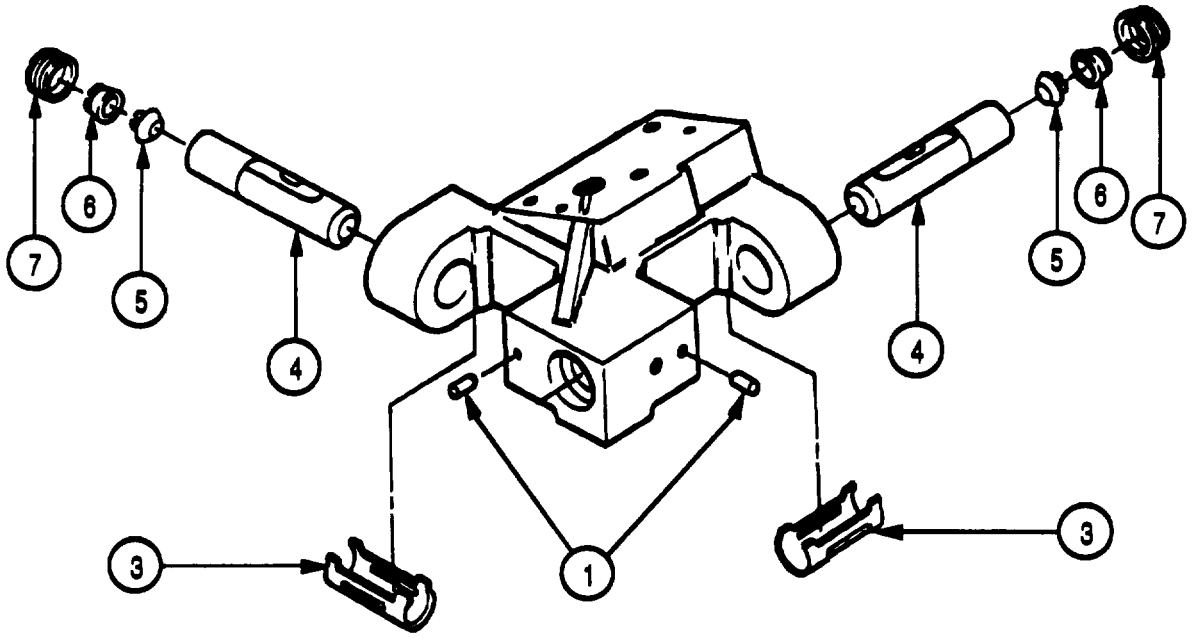
Clean all parts per TM 9-254.

REPAIR

1 If bracket is broken, damaged, or missing, repair is by replacement of next higher assembly.

2 Repair Is by replacement of authorized parts as required. Refer to appendix B.

REASSEMBLY



CAUTION

Never snap level vial covers on to level vials.

1 If two pins (1) were removed, drill and ream bracket (2) and drive in two pins (1). Refer to TM 9-254.

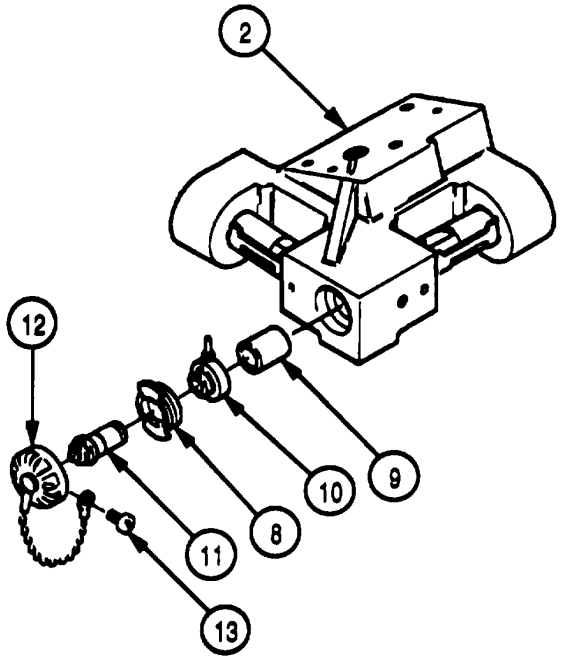
2 Position two level vial covers (3) in bosses of bracket (2) and slide two level vials (4) in bracket (2) through level vial covers (3).

3 Install two eccentrics (5), two eccentric rings (6), and two externally threaded rings (7).

4 Apply sealing compound (item 10, appx C) to ring (8).

5 Using tubular spanner wrench, Install light lens (9), electrical lead (10), and ring (8) to bracket (2). Thread wire through cavity.

6 Install LED (11), electrical cover (12), and screw (13).



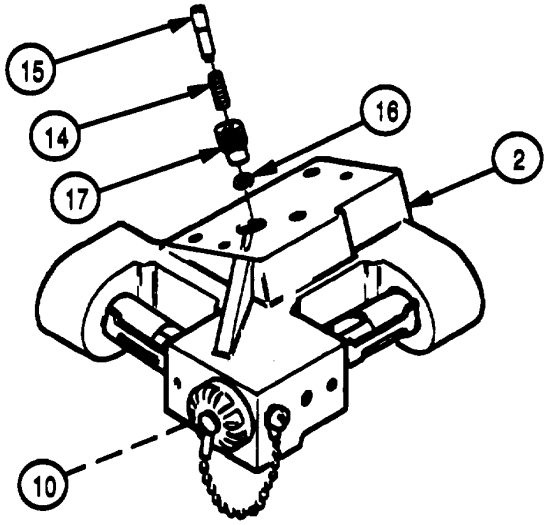
7 Install spring (14), electrical contact (15), and retaining ring (186) in bushing Insulator (17).

8 Using solder (item 12, appx C), and soldering flux (Item 6, appx C), solder trimmed wire from electrical lead (10) to electrical contact (15).

9 Apply sealing compound (Item 10, appx C) to threads of bushing Insulator (17).

10 Install bushing Insulator (17) In bracket (2).

11 Level vehicle and adjust level vials. Refer to TM 9-2350-304-20-2.



5-12. MAINTENANCE OF TELESCOPE MOUNT SUBASSEMBLY LOWER ASSEMBLY.

This task covers:

a. Disassembly **c. Repair**
b. Cleaning **d. Reassembly**

INITIAL SETUP:

Tools and Special Tools
Tool kit, electronic: system maintenance (SC 5180-95-CL-B29)
Adjustable spanner wrench (8284045)

Materials/Parts
Aircraft grease (item 8, appx C)
Sealing compound (item 10, appx C)
Self-locking nut (8215831)
Solder (item 12, appx C)
Soldering flux (item 6, appx C)

References
TM 9-254
TM 9-2350-304-10

Equipment Conditions
5-13 M137 telescope mount use assembly disassembled

General Safety Instructions

WARNING

Use adhesives, cleaning solvents, and sealing compounds in well-ventilated area away from open flame. Adhesives, cleaning solvents, and sealing compounds are harmful to skin and clothing, can bum easily, and may give off harmful vapor.

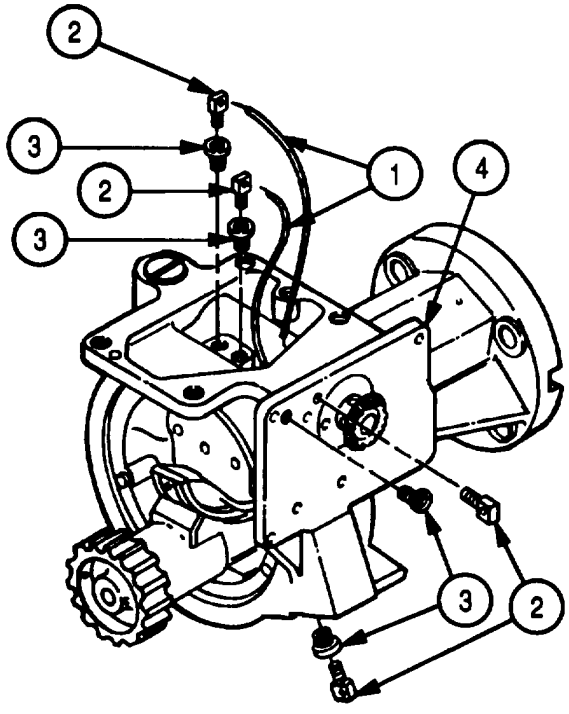
DISASSEMBLY

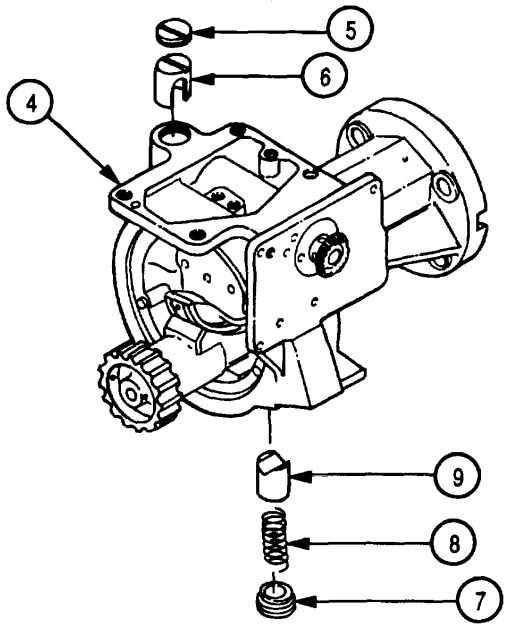
NOTE

M137 telescope mount upper assembly housing shown removed for clarity.

1 Unsolder two electrical wires (1) and remove from four electrical contacts (2).

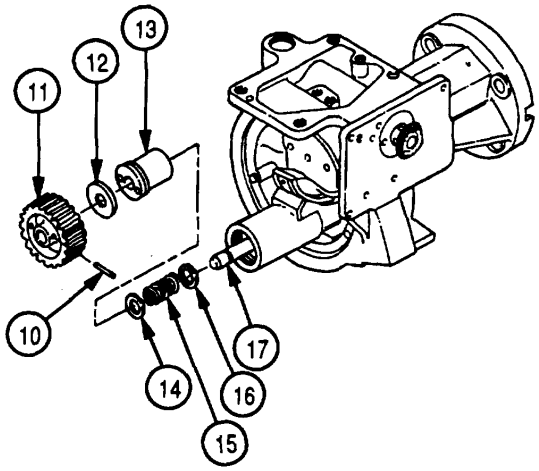
2 Remove four electrical contacts (2) and four bushing insulators (3) from housing (4).





3 Remove plug (5) and detent plunger (6) from housing (4).

4 Remove plug (7), spring (8), and V-bearing (9).



5 Drive out tapered pin (10) from knob (11).

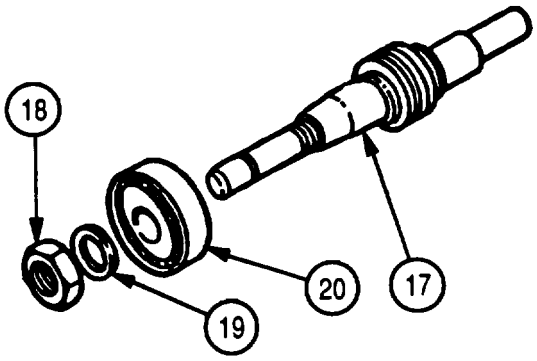
6 Using adjustable spanner wrench, remove knob (11), nonmetallic washer (12), ring (13), nonmetallic washer (14), spring (15), and nonmetallic washer (16) from worm shaft (17).

7 Remove worm shaft (17) with attached parts.

5-12. MAINTENANCE OF TELESCOPE MOUNT SUBASSEMBLY LOWER ASSEMBLY (CONT).

DISASSEMBLY (CONT)

8 Remove self-locking nut (18), thrust washer (19), and bearing (20) from worm shaft (17).



CLEANING

Clean all parts per TM 9-254.

REPAIR

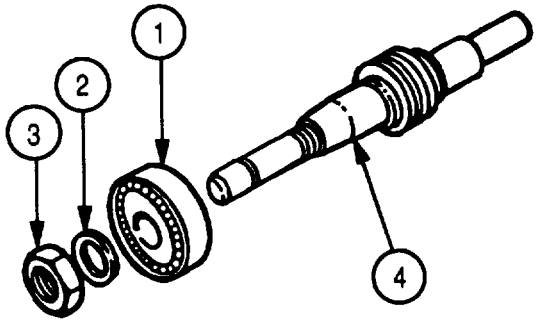
Repair is by replacement of authorized parts. Refer to appendix B.

REASSEMBLY

NOTE

Apply a light coat of aircraft grease (item 8, appx C) to all moving parts.

1 Install bearing (1), thrust washer (2), and new self-locking nut (3) to worm shaft (4).



2 Install worm shaft (4) in housing (5).

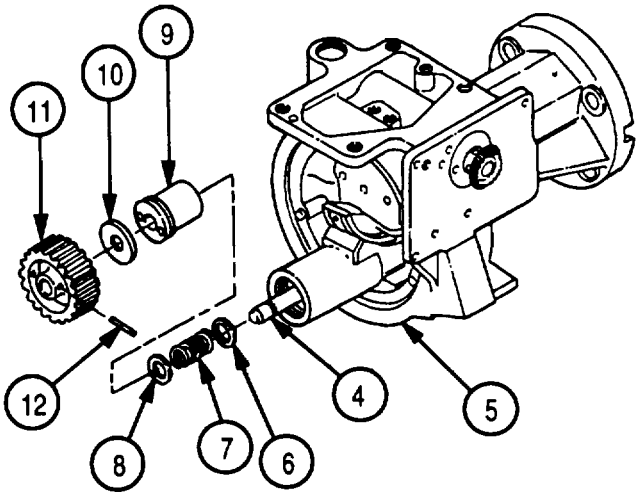
3 Install nonmetallic washer (6), spring (7), and nonmetallic washer (8) on worm shaft (4).

4 Apply sealing compound (item 10, appx C) to threads of ring (9).

5 Using adjustable spanner wrench, install ring (9) in housing (5).

6 Install nonmetallic washer (10) and knob (11).

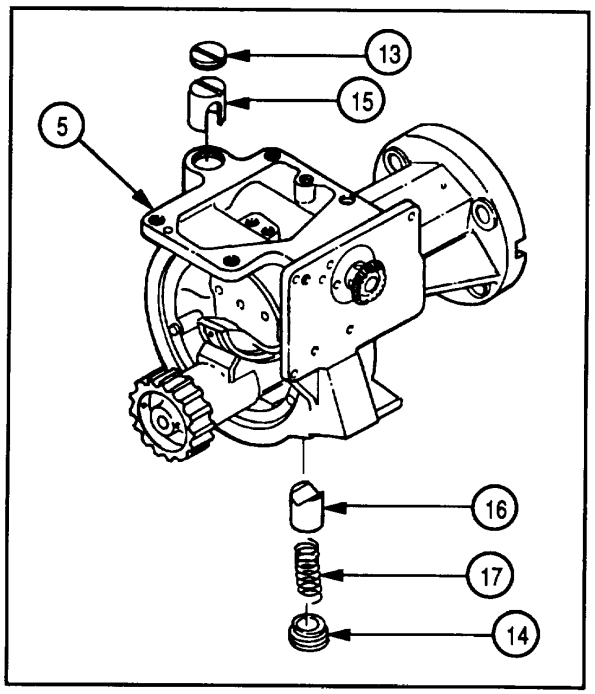
7 If necessary, drill and ream knob (11) and worm shaft (4). Install tapered pin (12). Refer to TM 9-254.



8 Apply sealing compound (item 10, appx C) to threads of plugs (13 and 14).

9 Install detent plunger (15) and plug (13).

10 Install V-bearing (16), spring (17), and plug (14) in housing (5).



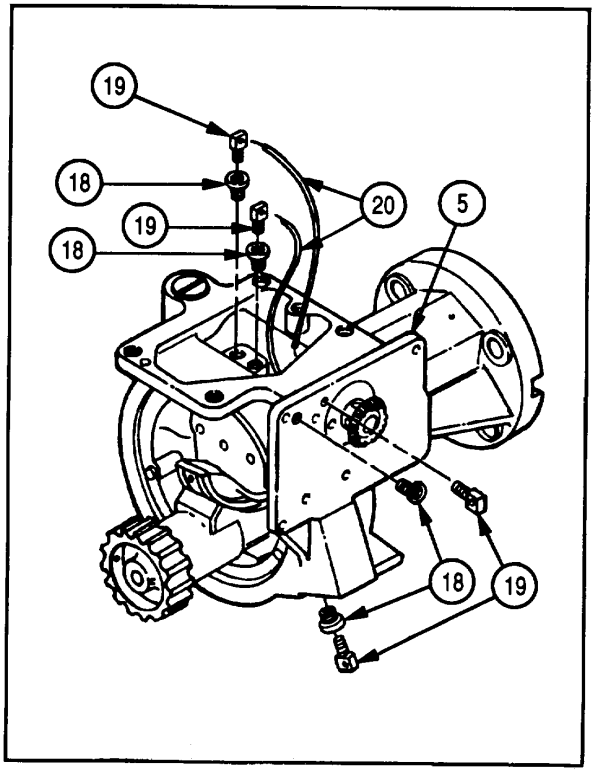
11 Apply sealing compound (item 10, appx C) to external threads of four bushing insulators (18).

12 Install four bushing insulators (18) and four electrical contacts (19) in housing (5).

13 Using solder (item 12, appx C) and soldering flux (item 6, appx C), solder two wires (20) to four electrical contacts (19). Trim to fit.

14 Apply sealing compound (item 10, appx C) to wires where they enter housing (5).

15 Use boresight target to correct backlash. Refer to TM 9-2350-304-10.



5-13. MAINTENANCE OF TELESCOPE MOUNT

This task covers:

a. Disassembly
b. Cleaning
c. Repair
d. Reassembly

INITIAL SETUP:

Tools and Special Tools
Tool kit, electronic: system maintenance (SC 5180-95-CL-B29)

References
TM 9-254

General Safety Instructions

WARNING

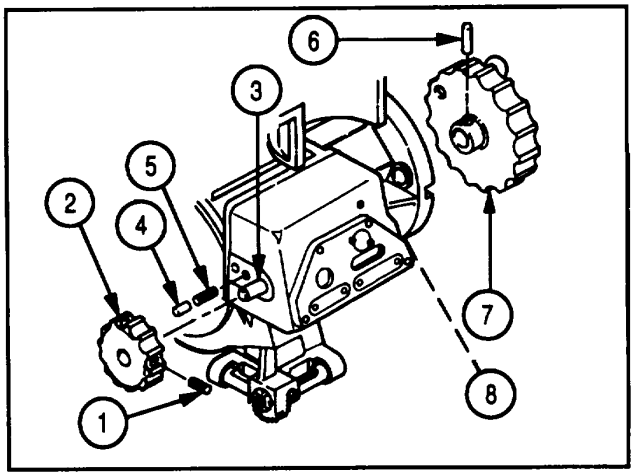
Use adhesives, cleaning solvents, ventilated area away from open flame. Adhesives, cleaning solvents, and sealing compounds are harmful to skin and clothing, can burn easily, and may give off harmful vapor.

DISASSEMBLY

1 Remove setscrew (1) and knob (2) from shaft (3).

2 Remove detent plunger (4) and spring (5).

3 Drive out tapered pin (6) and remove knob (7) from shaft (8).



CLEANING

Clean all parts per TM 9-254.

REPAIR

Repair is by replacement of authorized parts. Refer to appendix B.

REASSEMBLY

1 Install knob (7).

2 If necessary, drill and ream knob assembly (7) and shaft (8). Install tapered pin (6). Refer to TM 9-254.

3 Install spring (5) and detent plunger (4).

4 Install knob (2) and setscrew (1) on shaft (3).

Section V. GENERAL SUPPORT MAINTENANCE

5-14. MAINTENANCE OF M137 TELESCOPE MOUNT ASSEMBLY AND BRACKET ASSEMBLY.

This task covers:

a. Disassembly
b. Cleaning
c. Repair
d. Reassembly

INITIAL SETUP:

Tools and Special Tools
Tool kit, electronic: system maintenance (SC 5180-95-CL-B29)

Materials/Parts
Lockwasher (4) (MS35333-75)
Lockwasher (3) (FF-W-100)

References
TM 9-254

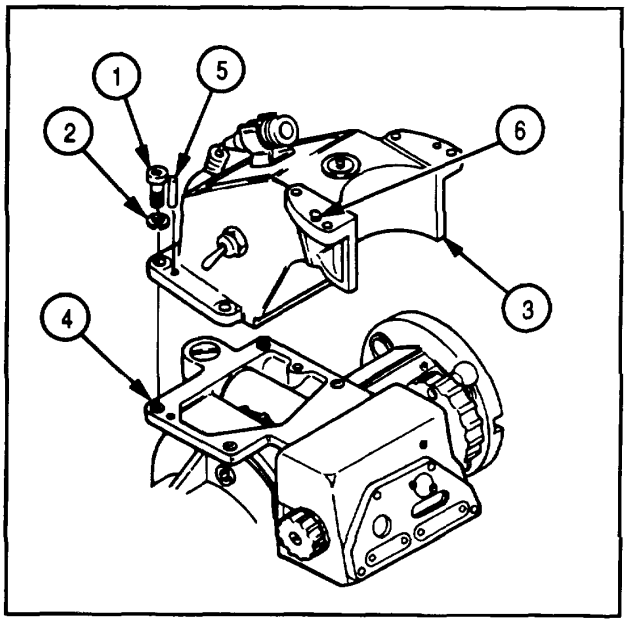
Equipment Conditions
M137 telescope mount removed from M110A2 howitzer (TM 9-2350-304-10)

General Safety Requirements

WARNING

Use adhesives, cleaning solvents, and sealing compounds in well-ventilated area away from open flame. Adhesives, cleaning solvents, and sealing compounds are harmful to skin and clothing, can bum easily, and may give off harmful vapor.

DISASSEMBLY



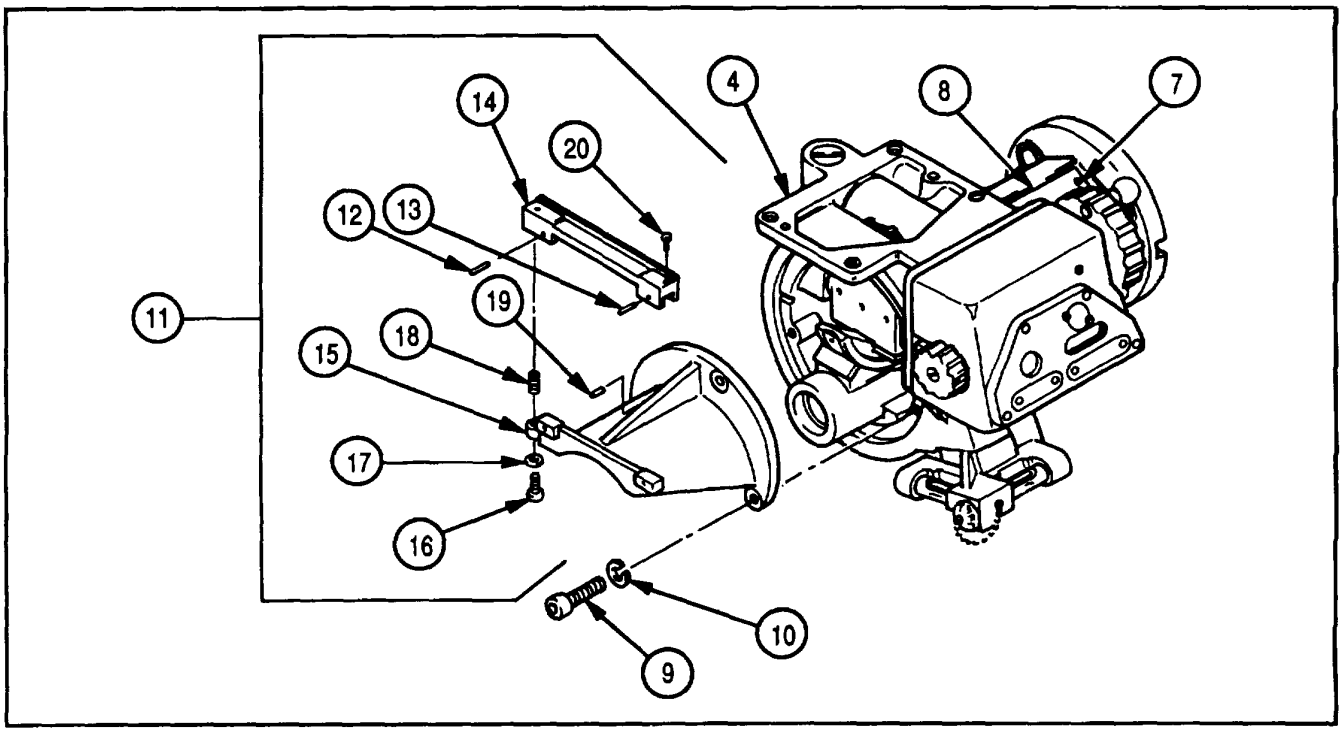
1 Remove four capscrews (1), four lockwashers (2), and M137 upper telescope mount (3) from mount subassembly (4).

2 Remove two pins (5) only if damaged.

3 Remove two pins (6) only if damaged.

5-14. MAINTENANCE OF M137 TELESCOPE MOUNT ASSEMBLY AND BRACKET ASSEMBLY (CONT).

DISASSEMBLY (CONT)



4 Remove two screws (7) and identification plate (8).

5 Remove three capscrews (9), three lockwashers (10), and bracket assembly (11) from mount subassembly (4).

NOTE

Steps 6 thru 8 are written and illustrated for the disassembly of the bracket assembly.

6 Remove pin (12), pin (13), and mount telescope bar (14) from bracket (15).

7 Remove capscrew (16), convex washer (17), and spring (18) from mount telescope bar (14).

8 Remove pin (19) and pin (20) only if damaged.

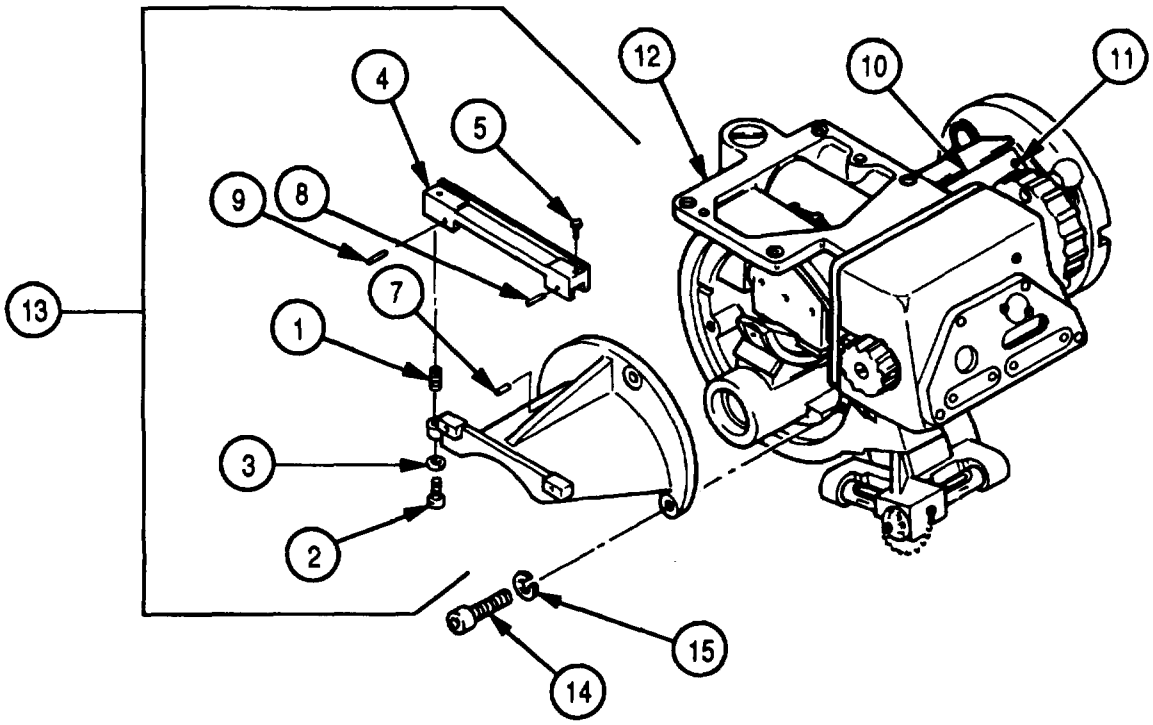
CLEANING

Clean all parts per TM 9-254.

REPAIR

Repair is by replacement of authorized parts as required. Refer to appendix B.

REASSEMBLY



NOTE

If disassembled, adjust level bar. Refer to page 5-56.

1 Install spring (1), capscrew (2), and convex washer (3) to mount telescope bar (4).

2 If removed, install headed straight pin (5) in mount telescope bar (4) and flush peen bottom.

3 If removed, drill and ream bracket (6) and drive in pin (7). Refer to TM 9-254.

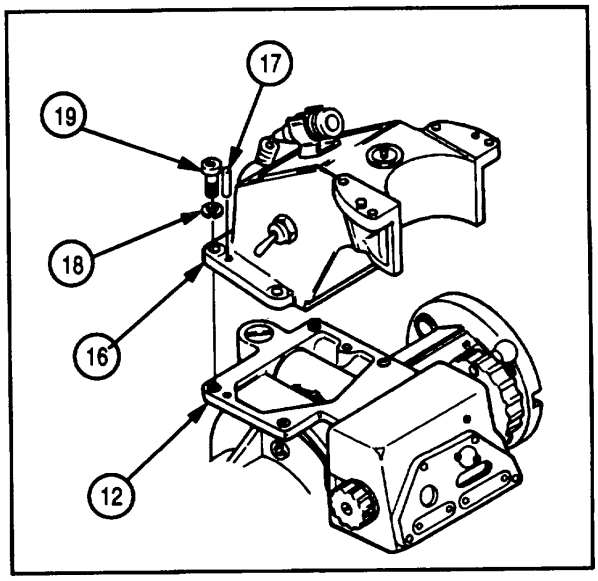
4 Install mount telescope bar (4) and drill and ream holes for pin (8) and pin (9).

5 Drive in two pins (8 and 9).

6 Install identification plate (10) and two screws (11) to mount subassembly (12).

7 Install bracket assembly (13) to housing with three capscrews (14) and three lockwashers (15).

5-14. MAINTENANCE OF M137 TELESCOPE MOUNT ASSEMBLY AND BRACKET REASSEMBL Y (CONT)



8 If removed, drill and ream upper telescope mount (16) and mount subassembly (12) for two pins (17). Refer to TM 9-254.

9 Drive in two pins (17) in mount subassembly (12).

10 Install M137 telescope mount upper assembly (16), four new lockwashers (18), and four capscrews (19) to mount subassembly (12).

5-15. MAINTENANCE OF UPPER TELESCOI

This task covers:

a. Disassembly
b. Cleaning
c. Repair
d. Reassembly

NITIAL SETUP:

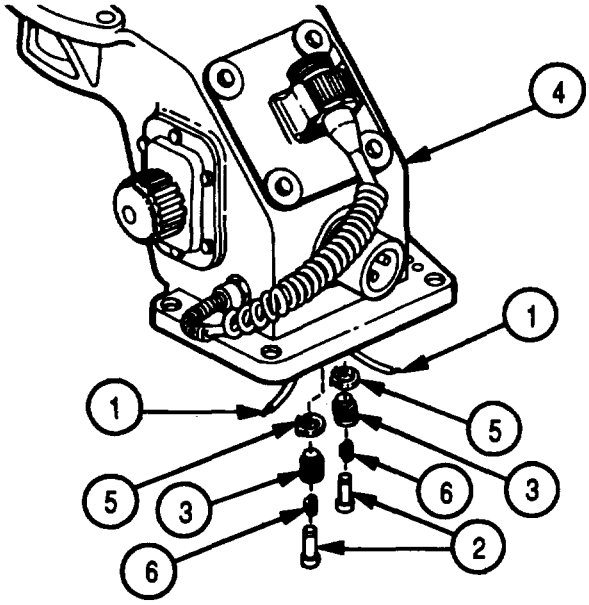
Tools and Special Tools
Tool kit, electronic: system maintenance (SC 5180-95-CL-B29)
Materials/Parts
Sealing compound (item 10, appx C)
Solder (item 12, appx C)
Soldering flux (item 6, appx C)
References
TM 9-254
Equipment Conditions
5-34 M137 upper telescope mount removed from mount assembly

General Safety Instructions

WARNING

Use adhesives, cleaning solvents, and sealing compounds in well-ventilated area away from open flame. Adhesives, cleaning solvents, and sealing compounds are harmful to skin and clothing, can burn easily, and may give off harmful vapor.

DISASSEMBLY



1 Unsolder two electrical wires (1) from two electrical contacts (2).

2 Remove two bushing insulators (3) from upper telescope mount housing (4).

3 Remove two retaining rings (5), two electrical contacts (2), and two springs (6) from bushing insulators (3).

CLEANING

Clean all parts per TM 9-254.

REPAIR

Repair is by replacement of authorized parts as required. Refer to appendix B.

REASSEMBLY

1 Install two springs (6), two electrical contacts (2), and two retaining rings (5) in bushing insulators (3).

2 Apply sealing compound (item 10, appx C) to threads of two bushing insulators (3).

3 Install two bushing insulators (3) in upper telescope mount housing (4) until bushing insulators (3) are flush with surface.

4 Using solder (item 12, appx C), and soldering flux (item 6, appx C), solder two electrical wires (1) to two electrical contacts (2).

5-16. MAINTENANCE OF TELESCOPE MOUNT SUBASSEMBLY LOWER ASSEMBLY.

This task covers:

a. Disassembly
b. Cleaning
c. Repair
d. Reassembly

INITIAL SETUP:

Tools and Special Tools
Tool kit, electronic: system maintenance (SC 5180-95-CL-B29)

Materials/Parts
Aircraft grease (item 7, appx C)
Aircraft grease (item 8, appx C)
Felt (2) (8261843)
Lockwasher (11) (MS35333-73)
Preformed packing (8587449-7)
Sealing compound (item 10, appx C)

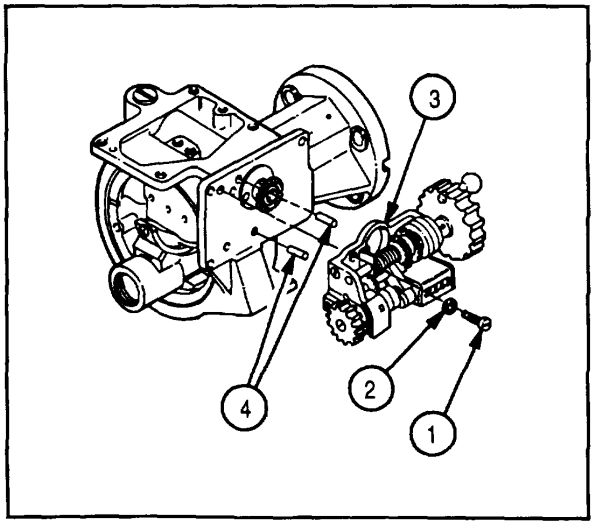
References
TM 9-254

Equipment Conditions
M137 telescope mount removed from M11 A2 howitzer (TM 9-2350-304-10)
5-19 Cover assembly removed
5-24 Level assembly removed
5-34 M137 telescope mount assembly removed

WARNING

General Safety Instructions
Use adhesives, cleaning solvents, and sealing compounds in well-ventilated area away from open flame. Adhesives, cleaning solvents, and sealing compounds are harmful to skin and clothing, can burn easily and may give off harmful vapor.

DISASSEMBLY



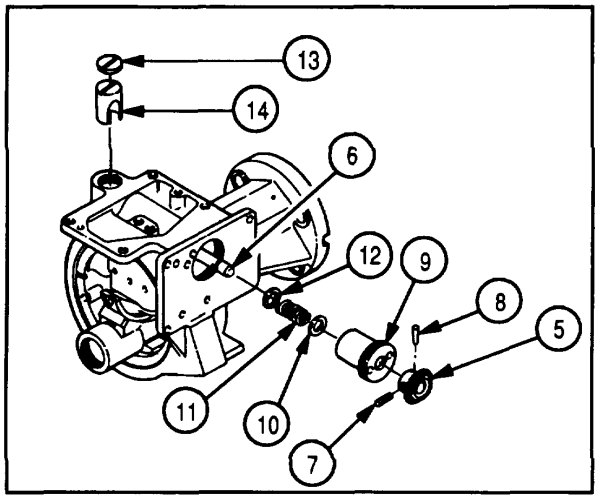
1 Remove three capscrews (1), three lockwasher, (2), and telescope mount subassembly (3).

2 Remove two pins (4) only if damaged.

3 If necessary, scribe a line on bevel gear (5) and worm shaft (6) to aid reassembly. Remove setscrew (7), tapered pin (8), and bevel gear (5) from worm shaft (6).

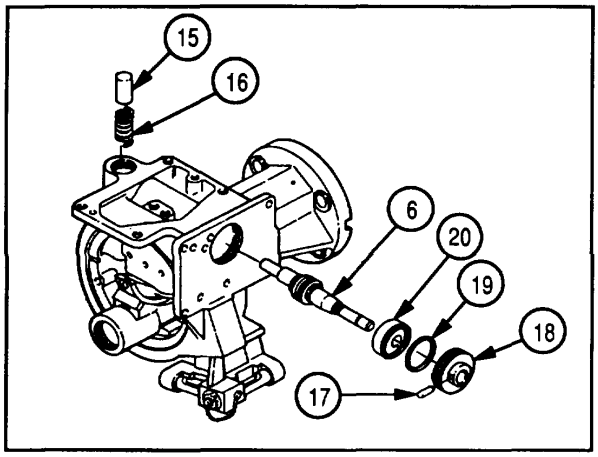
4 Using adjustable spanner wrench, remove retainer (9), nonmetallic washer (10), spring (11), and nonmetallic washer (12).

5 Remove plug (13) and detent plunger (14).



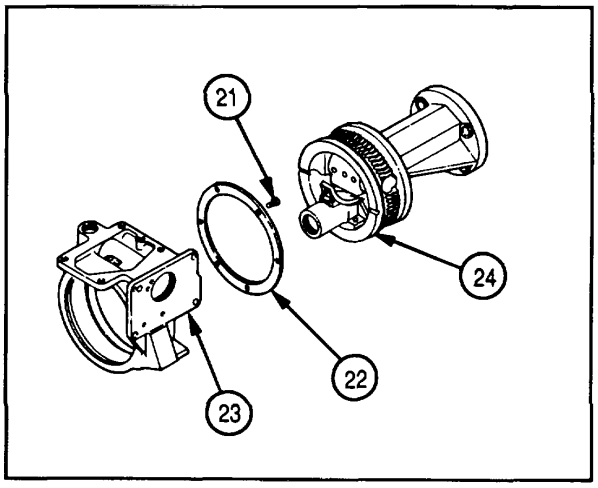
6 Remove worm shaft (6), detent plunger (15), and spring (16).

7 Remove pin (17), retainer (18), preformed packing (19), and bearing (20) from worm shaft (6). Discard preformed packing.



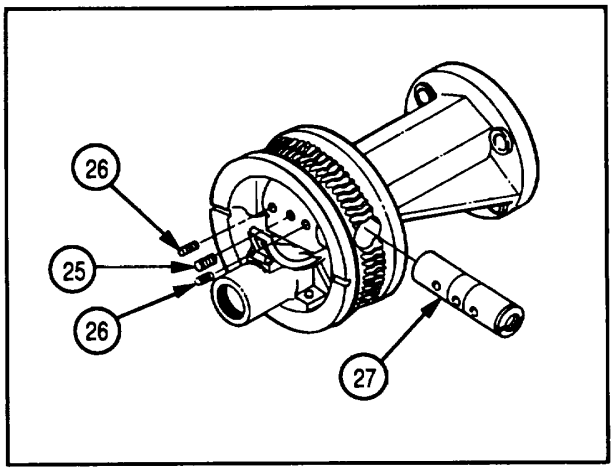
8 Remove six screws (21) and ring spacer (22).

9 Separate housing (23) and ring assembly (24).



5-16. MAINTENANCE OF TELESCOPE MOUNT SUBASSEMBLY LOWER ASSEMBLY (CONT).

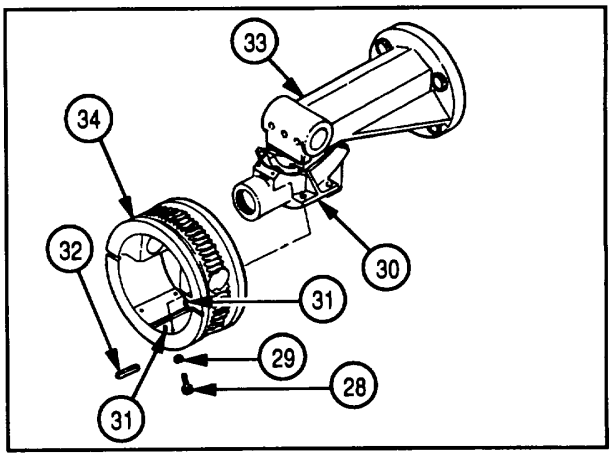
DISASSEMBL Y (CONT)



NOTE

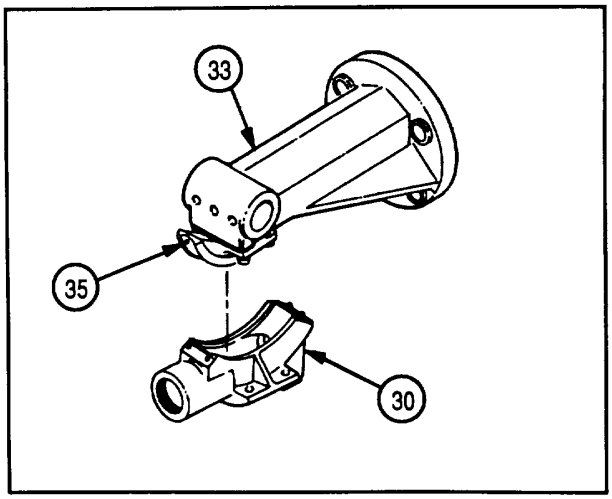
Pivot may be difficult to remove. A 5/8 x 11 threaded hole in pivot will aid removal.

10 Remove setscrew (25), two setscrews (26), and pivot (27).



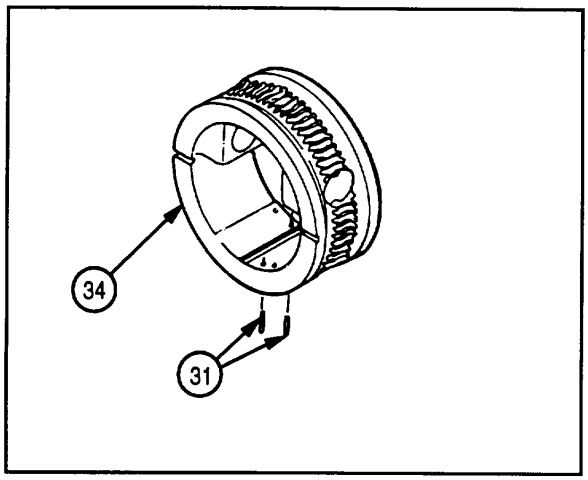
11 Remove four capscrews (28) and four lockwashers (29).

12 Lift support housing (30) off of two pins (31) and remove key (32), support housing, and bracket (33) from gear (34).

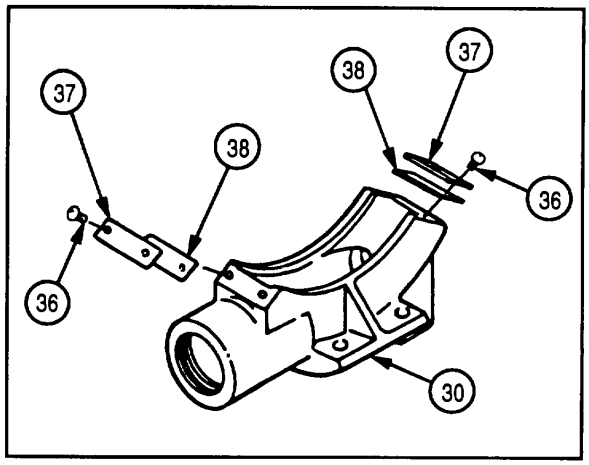


13 Separate support housing (30) from bracket (33) and attached gear (35).

14 Remove two pins (31) from gear (34) only if damaged.



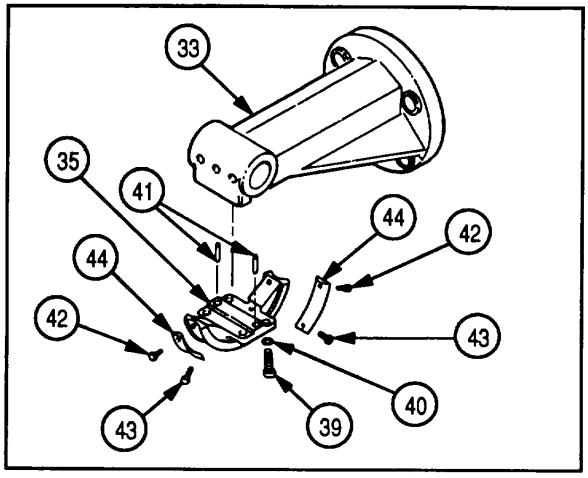
15 Remove four screws (36), two plates (37), and two felts (38) from support housing (30).



16 Remove four capscrews (39), four lockwashers (40), and gear (35) from bracket (33).

17 Remove two pins (41) only if damaged.

18 Remove two screws (42), two screws (43), and two stops (44) from gear (35).



5-16. MAINTENANCE OF TELESCOPE MOUNT SUBASSEMBLY LOWER ASSEMBLY (CONT).

CLEANING

Clean all parts per TM 9-254.

REPAIR

1 If housing is broken, damaged, or missing, repair is by replacement of next higher assembly.

2 Repair is by replacement of authorized parts as required. Refer to appendix B.

REASSEMBLY

NOTE

Apply a light coat of aircraft grease (item 8, appx C) to all moving parts.

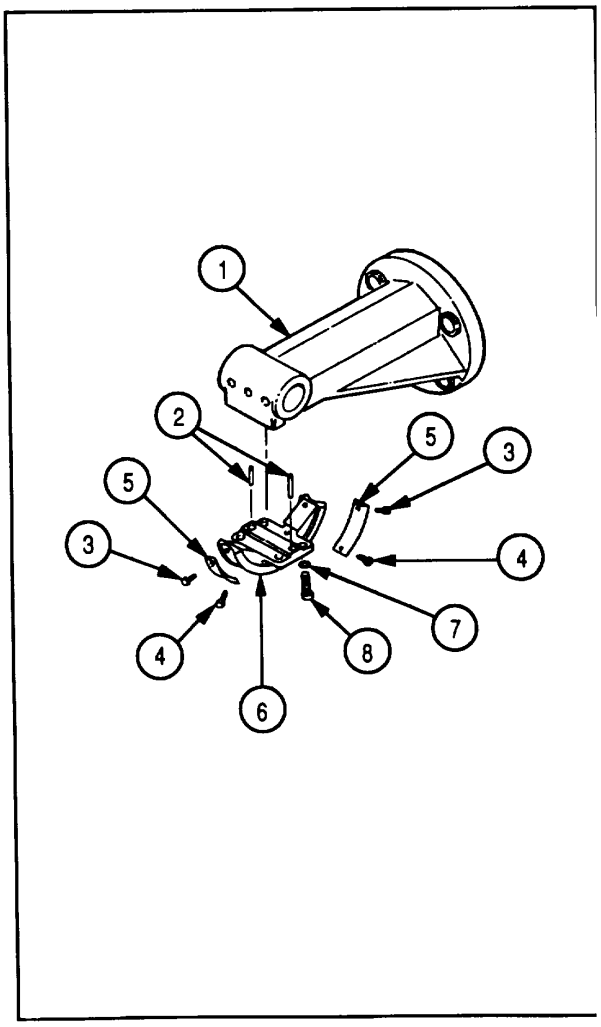
1 If removed, drill and ream bracket (1) and drive in two pins (2). Refer to TM 9-254.

2 Apply sealing compound (item 10, appx C) to threads of two screws (3) and two screws (4).

3 Install two stops (5), two screws (3), and two screws (4) to gear (6).

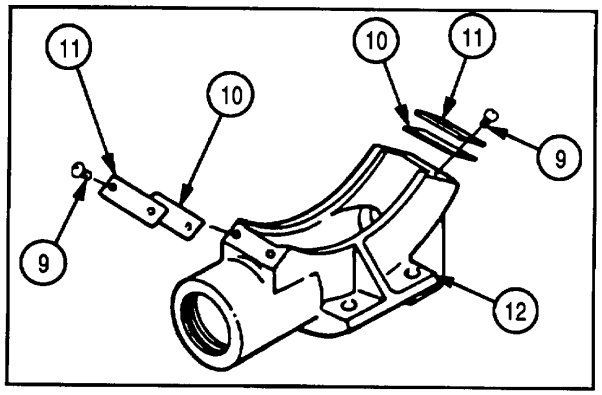
4 Install gear (6), four new lockwashers (7), and four capscrews (8) on bracket (1).

5 Apply sealing compound (item 10, appx C) to heads of screws (3 and 4) and capscrews (8) after tightening.

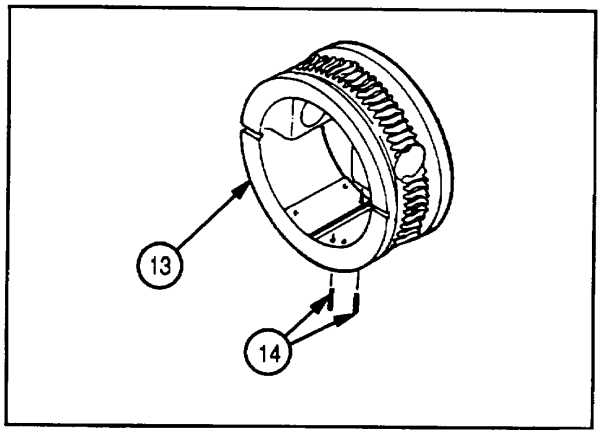


6 Apply sealing compound (item 10, appx C) to threads of four screws (9).

7 Install two new felts (10), two plates (11), and four screws (9) to support housing (12).



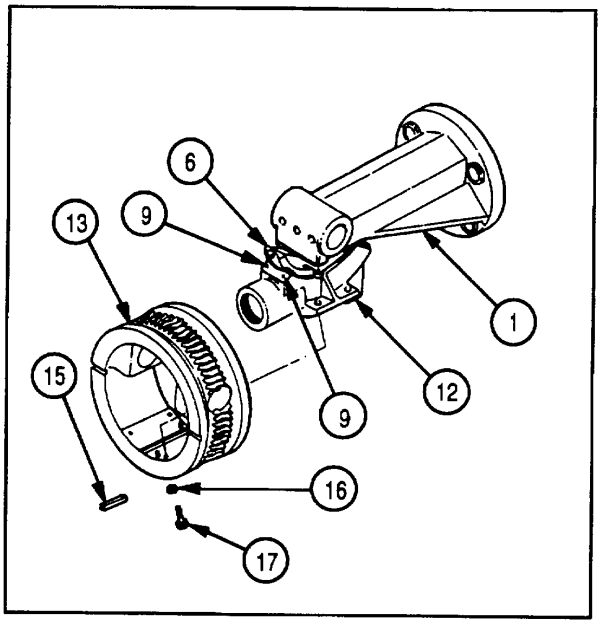
8 If removed, drill and ream gear (13) and drive in two pins (14). Refer to TM 9-254.



9 Install key (15). Hold support housing (12) against gear (6) and install gear (13) over gear and support housing with attached bracket (1).

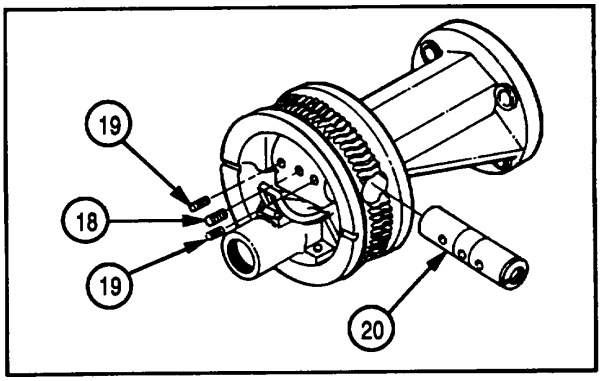
10 Secure support housing (12), to gear (13) using four new lock-washers (16) and four capscrews (17).

11 Apply sealing compound (item 10, appx C) to heads of four screws (9) and four capscrews (17) after tightening.



5-16. MAINTENANCE OF TELESCOPE MOUNT SUBASSEMBLY LOWER ASSEMBLY (CONT).

REASSEMBLY (CONT)

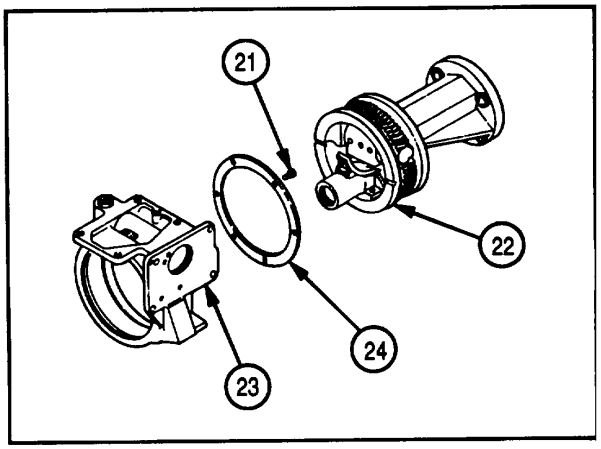


12 Apply sealing compound (item 10, appx C) to threads of capscrew (18) and two setscrews (19).

NOTE

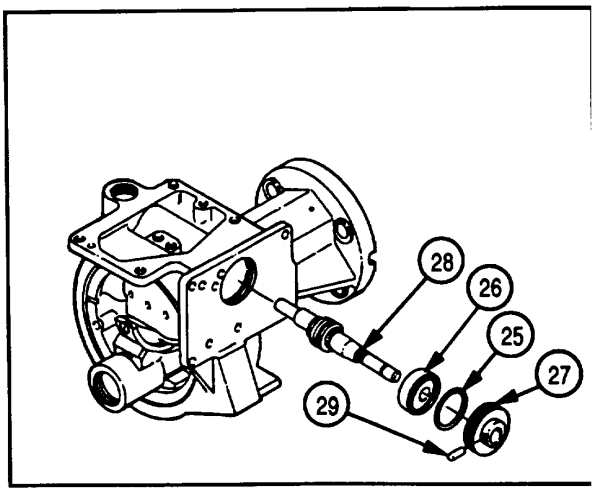
Ensure setscrew holes in pivot and bracket are properly aligned.

13 Install pivot (20), capscrew (18), and two setscrews (19).



14 Apply sealing compound (item 10, appx C) to threads of six screws (21).

15 Join gear assembly (22) and housing (23). Install ring spacer (24) and six screws (21).



16 Apply a coat of aircraft grease (item 7, appx C) to new preformed packing (25).

17 Install bearing (26), new preformed packing (25) and retainer (27) on worm shaft (28).

18 If necessary, drill and ream retainer (27) and worm shaft (28). Install pin (29). Refer to TM 9-254.

19 install spring (30) and detent plunger (31).

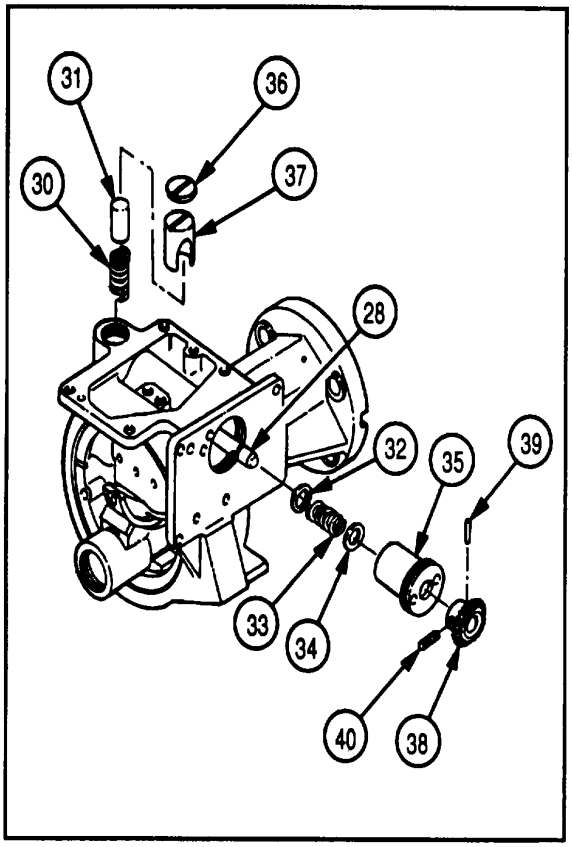
20 Install worm shaft (28), nonmetallic washer (32), spring (33), nonmetallic washer (34).

21 Apply sealing compound (item 10, appx C) to threads of retainer (35). Install retainer (35) using adjustable spanner wrench.

22 Apply sealing compound (item 10, appx C) to plug (36).

23 Install detent plunger (37) and plug (36).

24 Install bevel gear (38), tapered pin (39), and setscrew (40) to worm shaft (28).

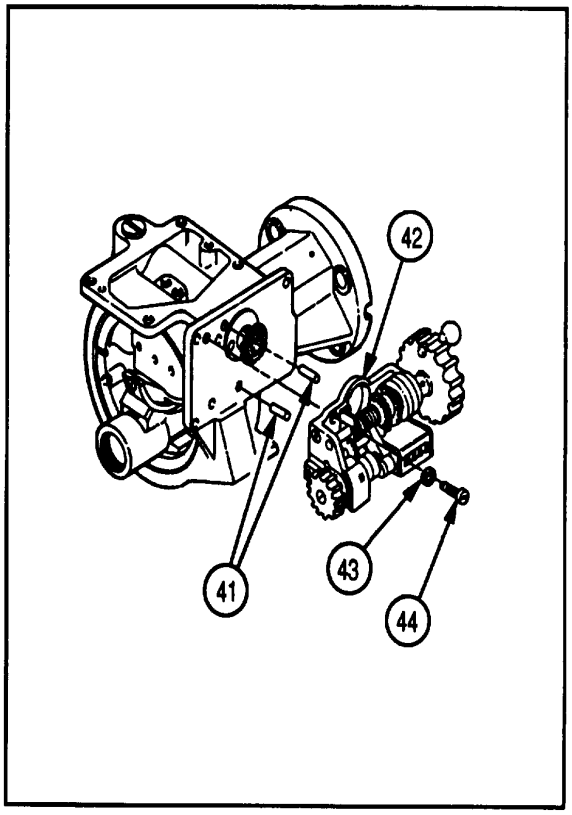


25 If removed, install two pins (41).

NOTE

Level vials should be near level and telescope mount assembly should be at mid-travel.

26 Install telescope mount subassembly (42), three new lockwashers (43), and three capscrews (44).



5-17. MAINTENANCE OF TELESCOPE MOUNT SUBASSEMBLY AND BASE ASSEMBLY.

This task covers:

a. Disassembly **c. Repair**
b. Cleaning **d. Reassembly**

INITIAL SETUP:

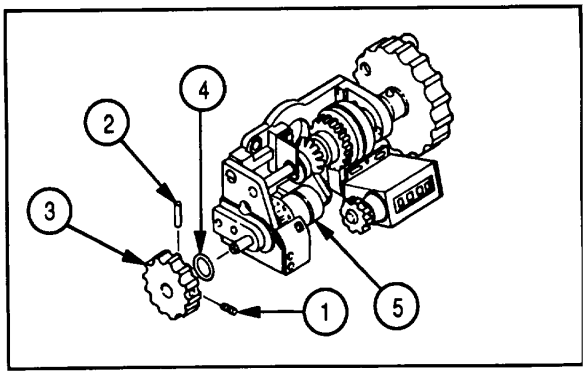
Tools and Special Tools
Tool kit, electronic: system maintenance (SC 5180-95-CL-B29)
Materials/Parts
Aircraft grease (item 7, appx C)
Aircraft grease (item 8, appx C)
Preformed packings (?) (8635806)
Sealing compound (item 10, appx C)
References
TM 9-254
Equipment Conditions
5-40 Telescope mount subassembly removed

General Safety Instructions

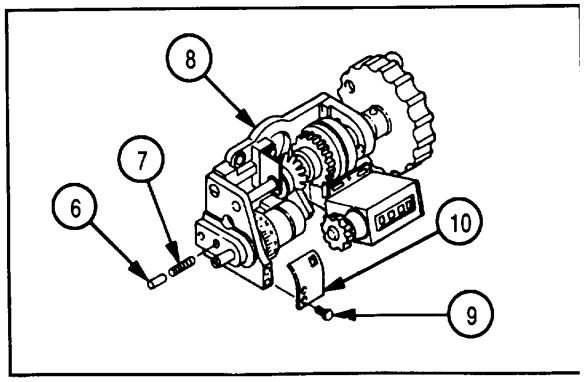
WARNING

Use adhesives, cleaning solvents, and sealing compounds in well-ventilated area away from open flame. Adhesives, cleaning solvents, and sealing compounds are harmful to skin and clothing, can burn easily, and may give off harmful vapor.

DISASSEMBLY



1 Remove setscrew (1), pin (2), knob (3), and preformed packing (4) from differential assembly (5). Discard preformed packing.



2 Remove detent plunger (6) and spring (7) from base assembly (8).

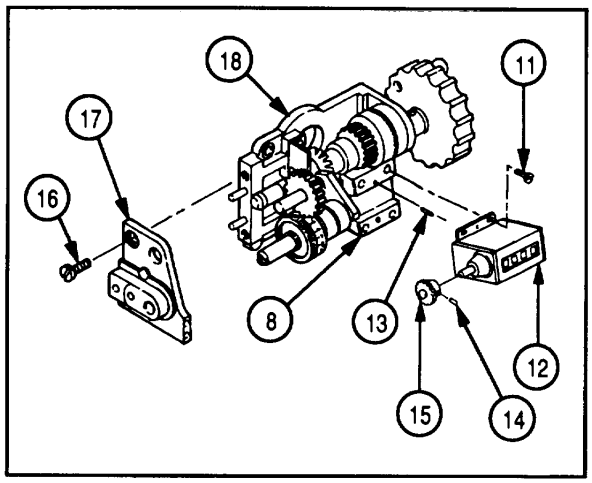
3 Remove two screws (9) and telescope shield (10).

4 Remove four screws (11) and rotating counter (12) from base assembly (8).

5 Remove two pins (13) only if damaged.

6 Remove tapered pin (14) and gear (15) from rotating counter (12).

7 Remove two screws (16) and adapter (17) from base (18).



8 Remove two screws (19) and bracket (20) from base (18) with differential assembly (5) and pivot (21) attached.

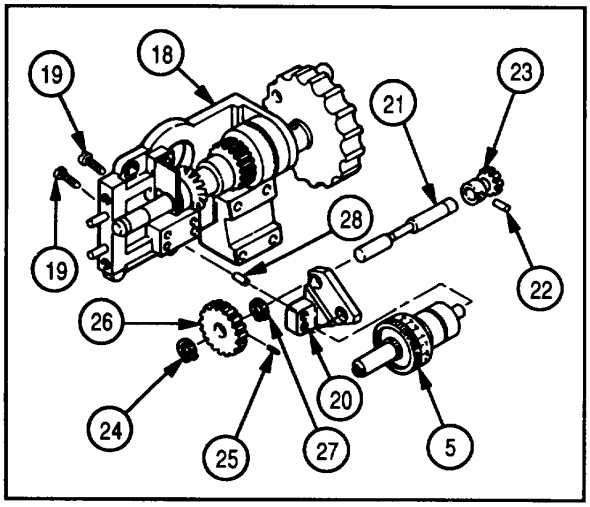
9 Remove differential assembly (5) from bracket (20).

10 Remove tapered pin (22) and spur gear (23) from pivot (21).

11 Remove pivot (21) from bracket (20).

12 Remove retaining ring (24), tapered pin (25), spur gear (26), and retaining ring (27) from pivot (21).

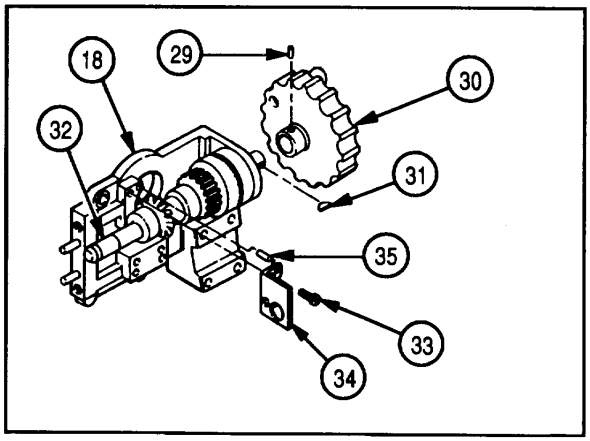
13 Remove two pins (28) only if damaged.



14 Remove tapered pin (29), knob assembly (30), and key (31) from pivot (32).

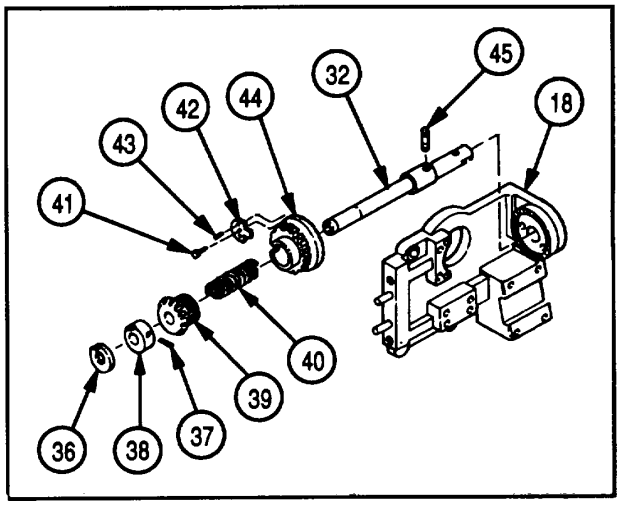
15 Remove two screws (33) and bracket (34) from base (18).

16 Remove pin (35) only if damaged.



5-17. MAINTENANCE OF TELESCOPE MOUNT SUBASSEMBLY AND BASE ASSEMBLY (CONT).

DISASSEMBLY (CONT)

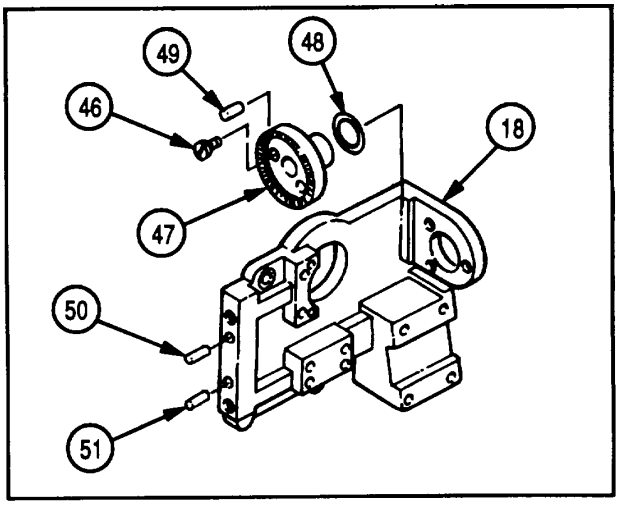


17 Remove pivot (32) and components as a unit from base (18).

18 Remove 16 rings (36), tapered pin (37), and dial stop (38) from pivot (32).

19 Remove bevel gear (39), spring (40), screw (41), key (42), two pins (43), and cluster gear (44) from pivot (32).

20 Remove pin (45) from pivot (32).



21 Remove three screws (46), bevel gear (47), and preformed packing (48) from base (18). Discard preformed packing.

22 Remove pin (49) only if damaged.

23 Remove pin (50) and pin (51) only if damaged.

CLEANING

Clean all parts per TM 9-254.

REPAIR

1 If adapter is broken or damaged, repair is by replacement of next higher assembly.

2 If base is broken or damaged, repair is by replacement of next higher assembly.

3 Repair is by replacement of authorized parts as required. Refer to appendix B.

REASSEMBLY

NOTE

Apply a light coat of aircraft grease (item 8, appx C) to all moving parts.

1 If removed, drill and ream base (1) and drive in pin (2) and pin (3). Refer to TM 9-254.

2 Apply coat of aircraft grease (item 7, appx C) to new preformed packing (4).

3 Install new preformed packing (4) in bevel gear (5).

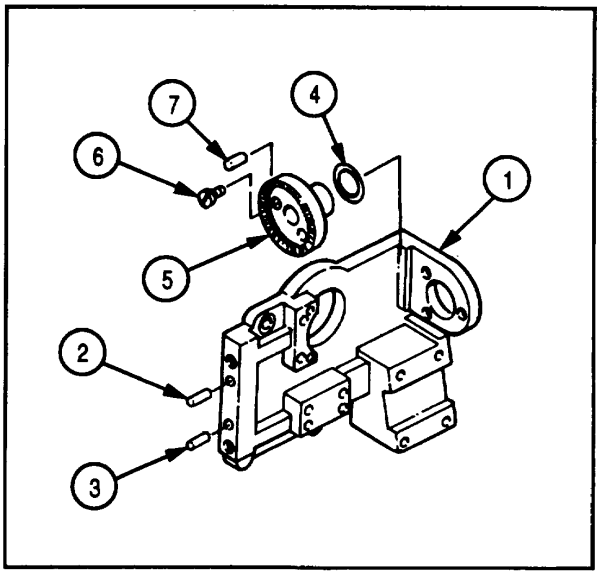
4 Install bevel gear (5) and three screws (6) to base (1).

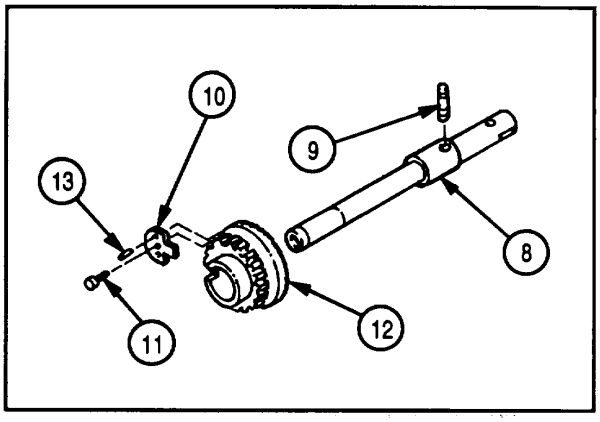
5 If removed, drill and ream bevel gear (5) and base (1) and drive in pin (7). Refer to TM 9-254.

6 If necessary, drill and ream pivot (8) and drive in pin (9). Refer to TM 9-254.

7 Install key (10) and screw (11) in cluster gear (12).

8 If necessary, drill and ream key (10) and cluster gear (12). Drive in two pins (13). Refer to TM 9-254.



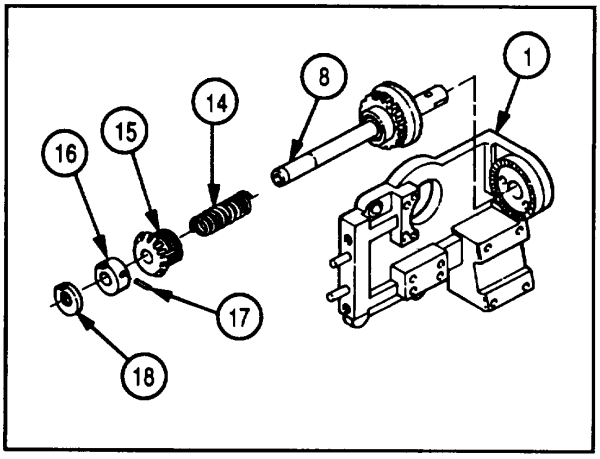


9 Install spring (14) and bevel gear (15) on pivot (8).

10 Install pivot (8) in base (1).

11 If necessary, drill and ream dial stop (16). Install dial stop against bevel gear (15) and install tapered pin (17). Refer to TM 9-254.

12 Install 16 rings (18) on pivot (8).



5-17. MAINTENANCE OF TELESCOPE MOUNT SUBASSEMBLY AND BASE ASSEMBLY (CONT).

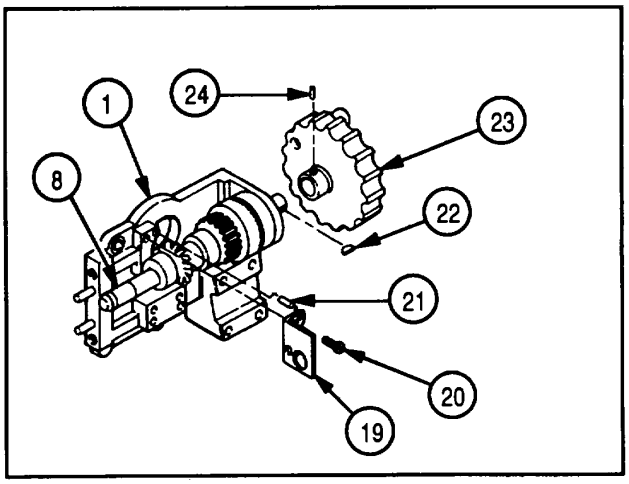
REASSEMBLY (CONT)

13 Install bracket (19) and two screws (20).

14 If removed, drill and ream bracket (19) and base (1), and drive in pin (21). Refer to TM 9-254.

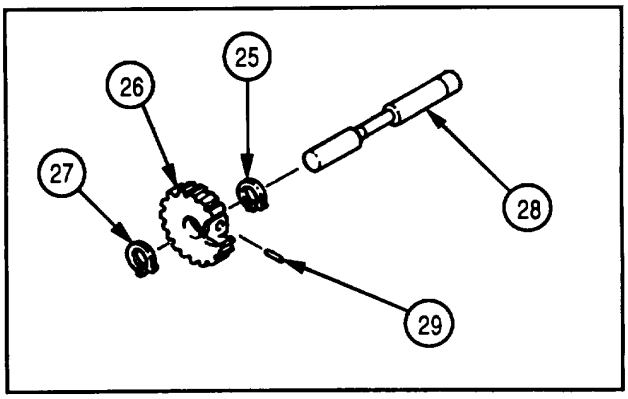
15 Install key (22) and knob assembly (23) on pivot (8).

16 If necessary, drill and ream knob assembly (23) and pivot (8). Drive in tapered pin (24). Refer to TM 9-254.



17 Install retaining ring (25), spur gear (26), and retaining ring (27) on pivot (28).

18 If necessary, drill and ream spur gear (26) and pivot (28). Drive in tapered pin (29). Refer to TM 9-254.



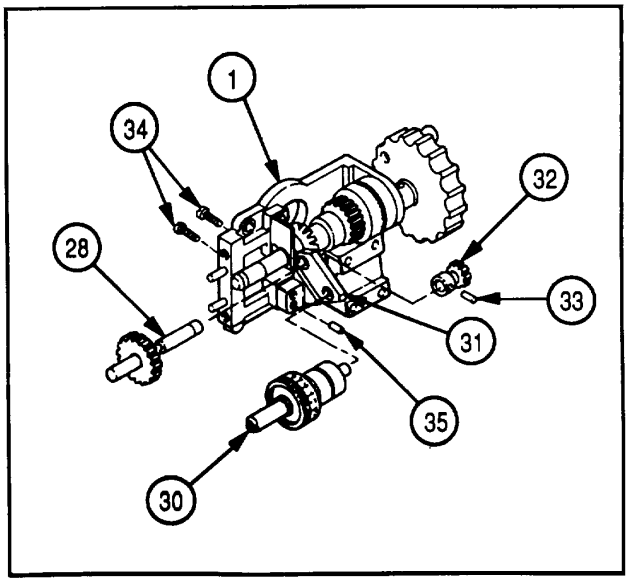
19 Install pivot (28) and differential assembly (30) through bracket (31).

20 Install spur gear (32) on pivot (28), meshing gears.

21 If necessary, drill and ream spur gear (32) and pivot (28). Drive in tapered pin (33). Refer to TM 9-254.

22 Install bracket (31) with installed parts and two screws (34).

23 If removed, drill and ream bracket (31) and base (1). Drive in two pins (35). Refer to TM 9-254.



24 Apply sealing compound (item 10, appx C) under heads of two screws (36).

25 Install two screws (36) and adapter (37) on base (1).

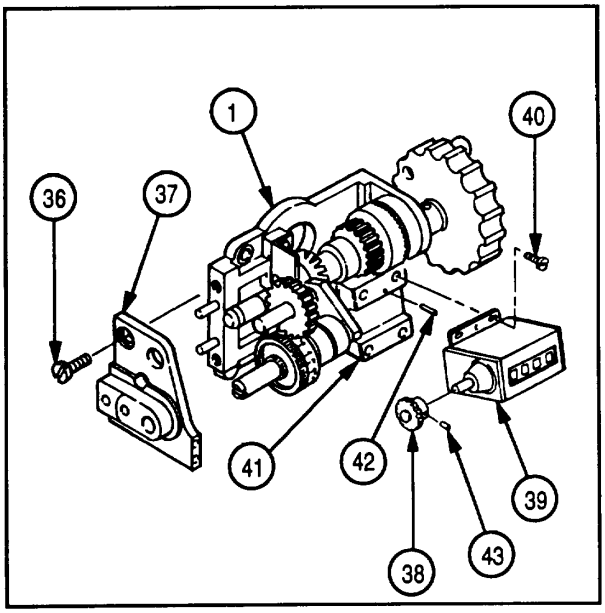
26 Install gear (38) on rotating counter (39).

27 Apply sealing compound (item 10, appx c) under heads of four screws (40).

28 If necessary, drill and ream base assembly (41). Drive in two pins (42). Refer to TM 9-254.

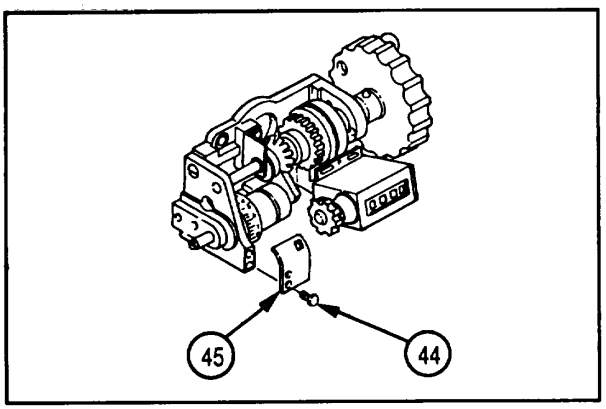
29 Install rotating counter (39) and four screws (40) to base assembly (41).

30 Aline gear (38). If necessary, drill and ream gear and rotating counter (39). Drive in tapered pin (43). Refer to TM 9-254.



31 Apply sealing compound (item 10, appx C) to threads of two screws (44).

32 Install telescope shield (45) and two screws (44).

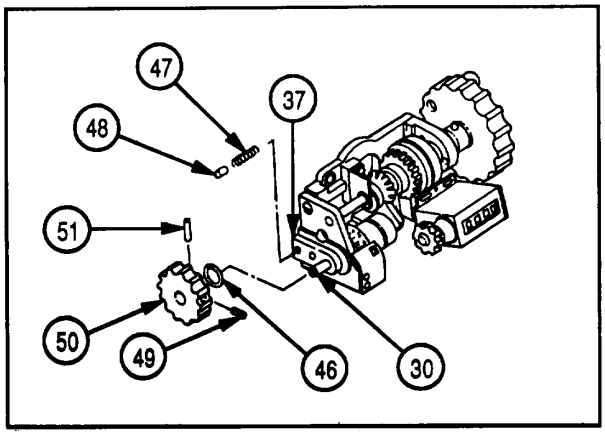


33 Apply aircraft grease (item 6, appx C) to new preformed packing (46) and install.

34 Install spring (47) and detent plunger (48) in adapter (37).

35 Apply sealing compound (item 10, appx C) to threads of setscrew (49).

36 Install knob (50), pin (51), and setscrew (49) on shaft of differential assembly (30).



Section VI. GENERAL SUPPORT FINAL INSPECTION PROCEDURES

5-18. GENERAL.

a. This section describes and illustrates the final inspection procedures for the M137 telescope mount. A final inspection will be performed prior to returning the M137 telescope mount to the using unit or to the supply system.

b. If the M137 telescope mount inspected fails to meet the required standards, ensure that the maintenance authorized at the applicable level has been performed correctly.

5-19. FINAL INSPECTION INSTRUCTIONS.

This task covers:

a Setting up and adjusting cross-leveling fixture
b Visual inspection
c Mounting M137 telescope mount on cross-leveling fixture
d Inspecting and adjusting level bar
e Checking and adjusting level vials
f Checking and adjusting cross-level knob torque and backlash
g Checking and adjusting elevation knob torque and backlash
h Checking and adjusting counter and stop assembly
i Checking and adjusting correction counter dial
j Checking and adjusting elevation and correction counters alinement
k Checking M137 telescope mount accuracy
l Adjustment of top surface
m Checking M137 telescope mount cant correction
n Checking illumination of M137 telescope mount
o Checking M137 telescope mount rigidity

INITIAL SETUP

Test Equipment
Cross-leveling fixture (item 3, figure B-25)
Gunner's quadrant (8228867)
Precision level (7686087)
Spring tester (item 4, figure B-25
Test fixture adapter (item 6, figure B-25))

Tools and Special Tools
Tool kit, electronic: system maintenance (SC 5180-95-CL-B29)
Spanner wrench (8284045)
Torque adapter (8213490)
Torque adapter (8599909)
Torque wrench (GGG-W-686)

Materials/Parts
Adhesive (item 4, appx C)
Aircraft grease (item 8, appx C)
Sealing compound (item 10, appx C)

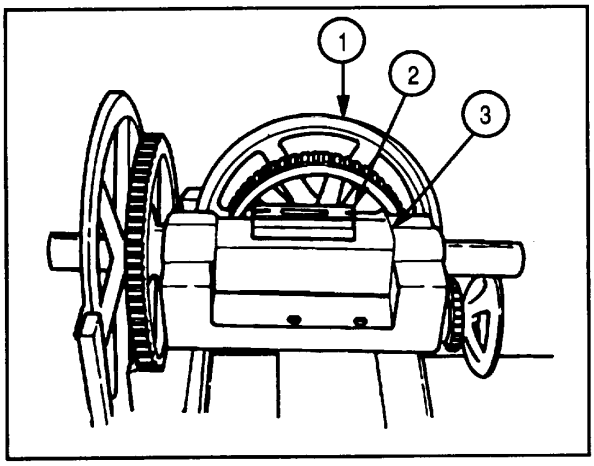
References
TM 9-254

General Safety Instructions

WARNING

Use adhesives, cleaning solvents, and sealing compounds in well-ventilated area away from open flame. Adhesives, cleaning solvents, and sealing compounds are harmful to skin and clothing, can bum easily, and may give off harmful vapor.

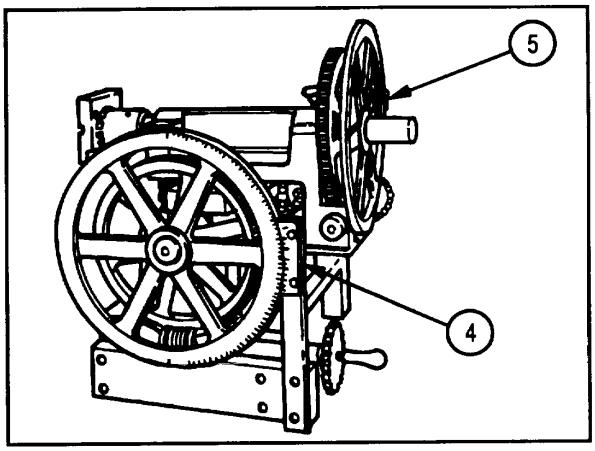
SETTING UP AND ADJUSTING CROSS-LEVELING FIXTURE



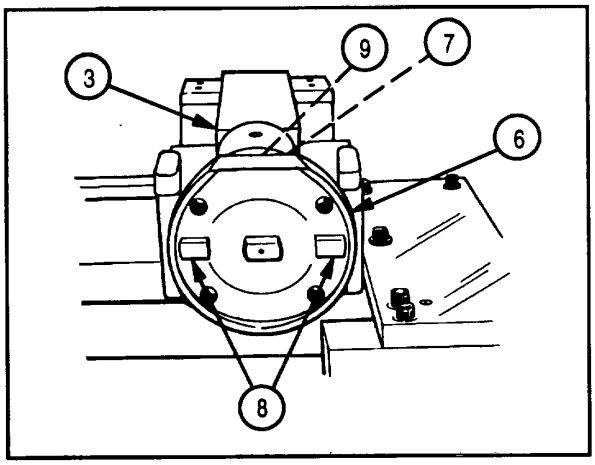
1 Secure cross-leveling fixture (1) on a solid stand bolted to the floor.

2 Place precision level (2) on square shaft (3), perpendicular to axis of rotation, and center bubble.

3 Place precision level (2) on square shaft (3), parallel to axis of rotation.



4 Set cant vernier scale (4) and elevation vernier scale (5) to "0".



5 Install test fixture adapter (6) on cross-leveling shaft end (7). Make sure adapter keys (8) are parallel to top of square shaft (3) within 0.1 mil.

6 Tighten setscrew (9) lightly.

5-19. FINAL INSPECTION INSTRUCTIONS (CONT).

SETTING UP AND ADJUSTING CROSS-LEVELING FIXTURE (CONT)

7 Place precision level (2) on adapter keys (8). Make sure precision level bubble is centered.

8 Tighten setscrew (9) and re-level cross-level and adapter keys.

9 Rotate precision level (2) 180 degrees from original position, and check that precision level bubble is centered.

VISUAL INSPECTION

1 Check that all screws and lockwashers are present and tight.

2 Check that all mounting surfaces are clean and free of nicks and burrs.

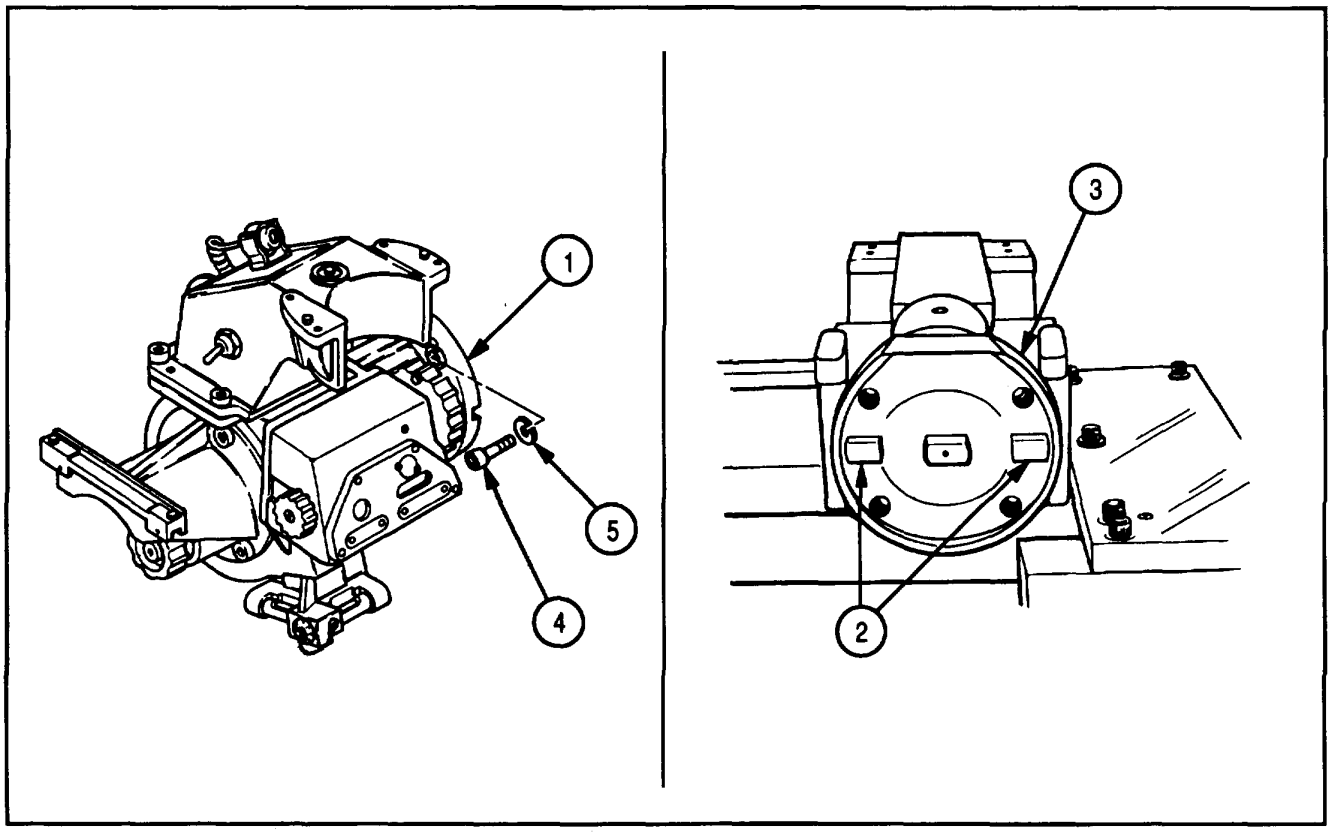
3 Check that M137 telescope mount is free of dirt, corrosion, and foreign matter.

4 Check that M137 telescope mount paint is not chipped.

5 Check that all M137 telescope mount parts are present.

6 Check for broken, frayed, or deteriorated insulation on extension light.

MOUNTING M137 TELESCOPE MOUNT ON CROSS-LEVELING FIXTURE

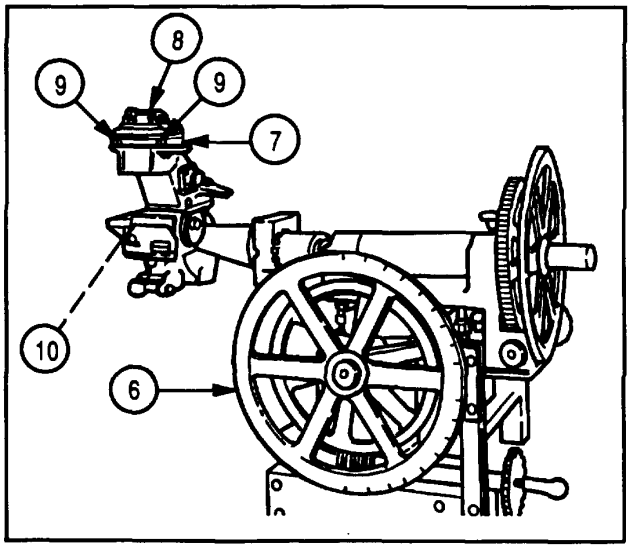


1 Install telescope mount (1) on adapter keys (2) of test fixture adapter (3).

2 Install four capscrews (4) and four lockwashers (5) and tighten evenly.

3 Check that cross-leveling fixture (6) is level. Re-level as required.

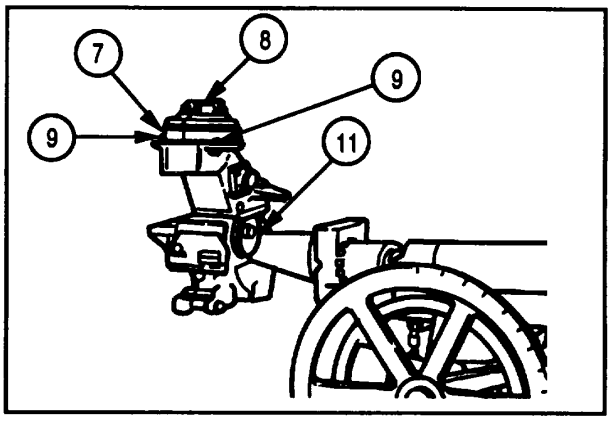
4 Level the top surface of the upper telescope mount subassembly using parallel bar (7) and precision level (8) positioned against locating pins (9). Surface should be horizontal within 0.5 mil. Use cross-level knob (10) to level M137 telescope mount.



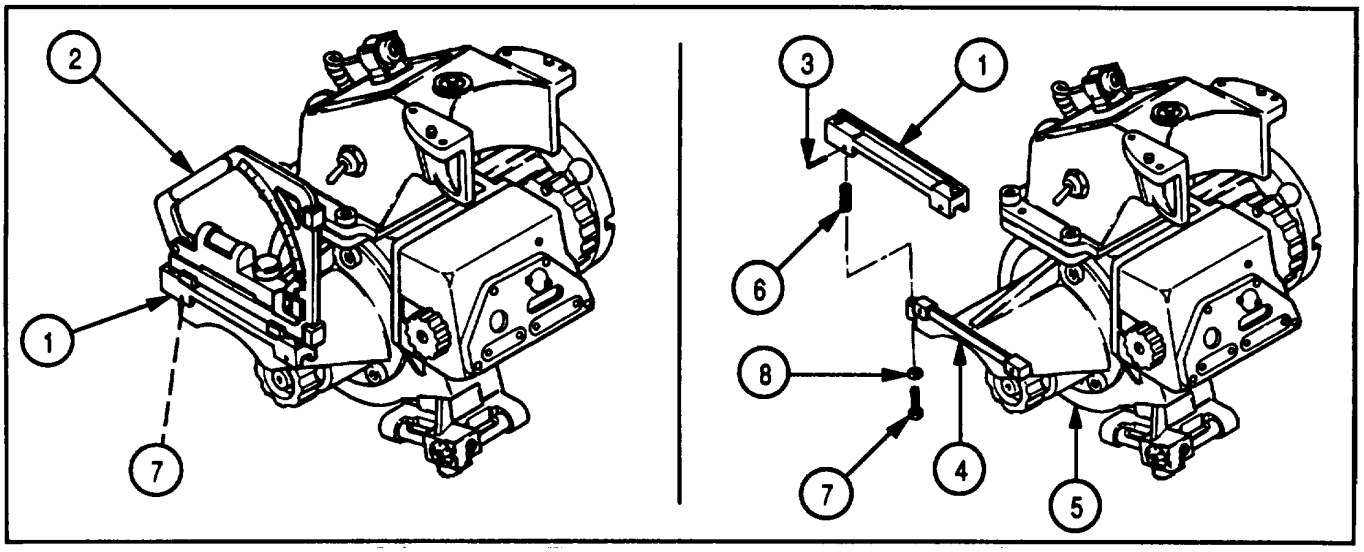
5-19. FINAL INSPECTION INSTRUCTIONS (CONT).

MOUNTING M137 TELESCOPE MOUNT ON CROSS-LEVELING FIXTURE (CONT)

5 Position parallel bar (7) on top surface of upper telescope mount subassembly at right angles to locating pins (9). Level the top surface of the upper telescope mount subassembly using the precision level (8) positioned on top of parallel bar (7). Surface should be horizontal in this plane within 0.5 mil. Use elevation knob (11) to level M137 telescope mount.



INSPECTING AND ADJUSTING LEVEL BAR



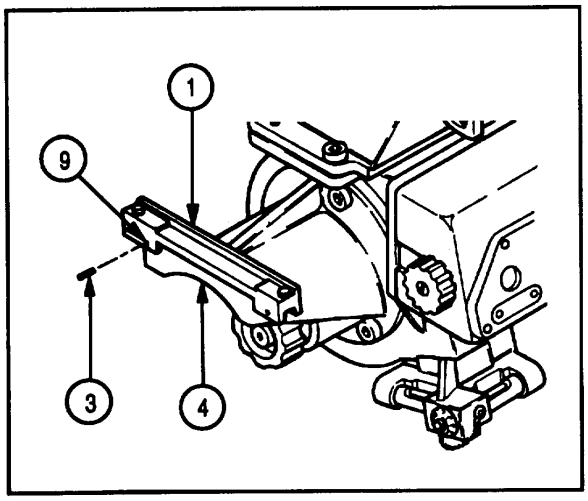
1 Check level bar (1) by placing gunner's quadrant (2) on level bar (1). If reading is within 0.2 mil of zero elevation, bar does not need adjustment. If reading is not within 0.2 mil of zero elevation, bar must be adjusted. Refer to steps 2 thru 5.

2 Carefully remove pin (3) from level bar (1) and bracket (4) with bracket removed from M137 telescope mount (5).

3 Place spring (6) between level bar (1) and bracket (4), and secure with capscrew (7) and convex washer (8).

4 With the cross-level and elevation test fixture and M137 telescope mount level in both directions, place the gunner's quadrant (2) on level bar (1) and perform an end-for-end test on the quadrant. Adjust capscrew (7) for zero elevation as read on gunner's quadrant.

5 If necessary, drill and ream a new hole (9) in level bar (1) and bracket (4) for pin (3). Insert pin using punch.



CHECKING AND ADJUSTING LEVEL VIALS

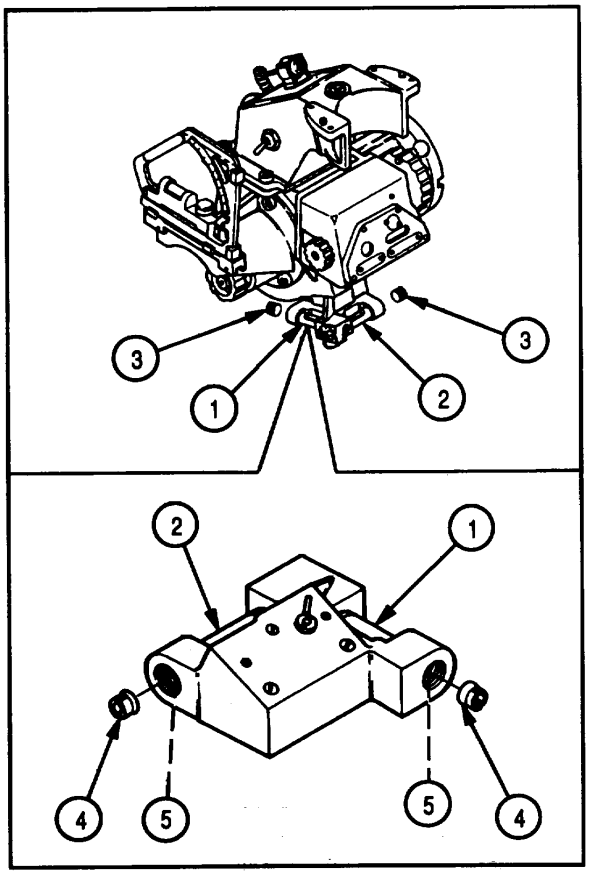
1 Check that bubbles are centered within the width of 1 graduation in the elevation (1) and cross-level (2) vials. If not centered, proceed to adjusting level vials. Refer to steps 2 thru 5.

2 With the telescope mount level in both directions, loosen externally threaded rings (3).

3 Adjust two eccentric rings (4), and two eccentrics (5) using a screwdriver, or fabricated two piece eccentric tool and screwdriver, and center bubble in cross-level vial (2) and elevation level vial (1). Refer to TM 9-254.

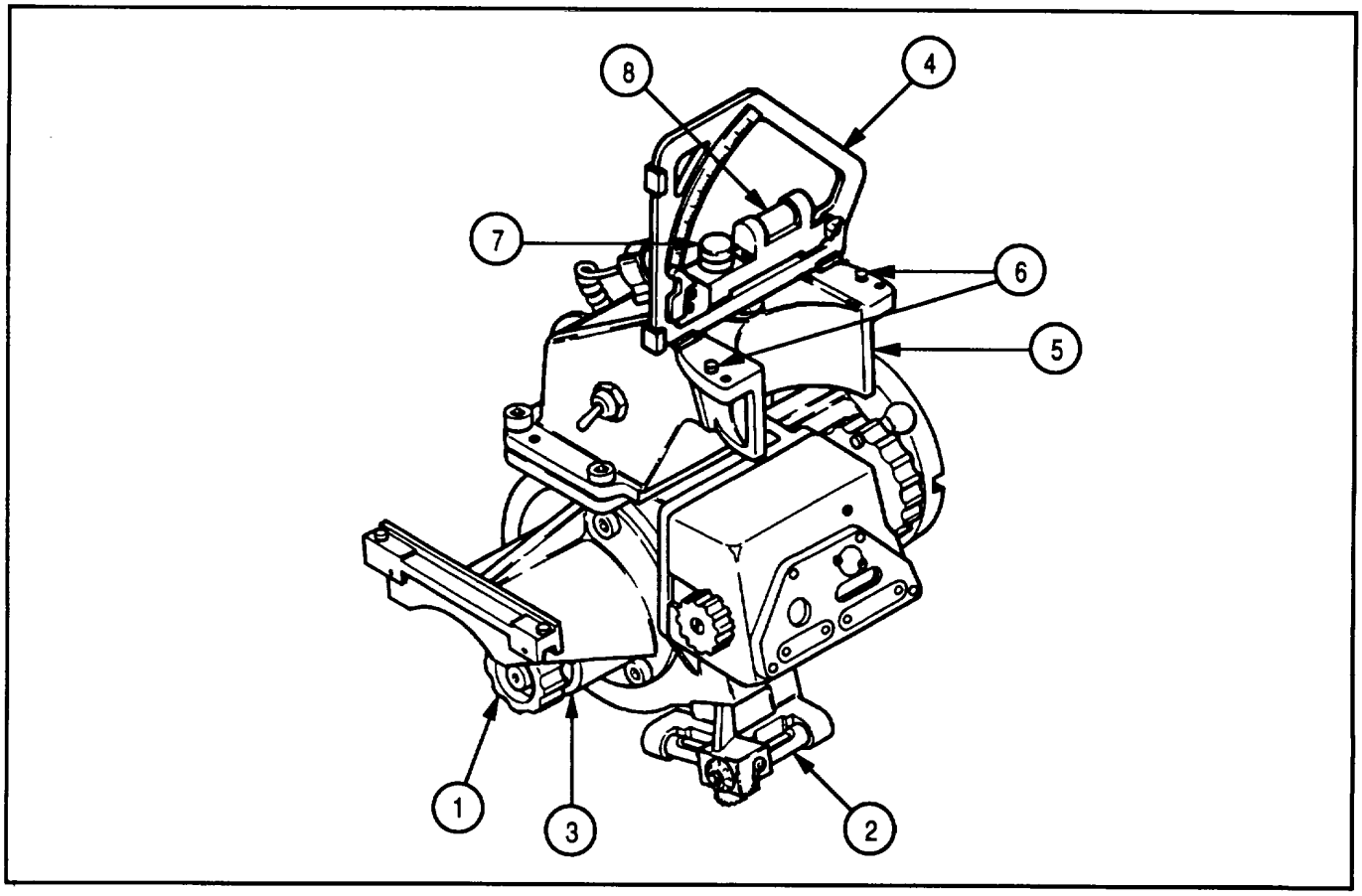
4 Apply sealing compound (item 10, appx C) to threads of two externally threaded rings (3).

5 Tighten two externally threaded rings (3).



5-19. FINAL INSPECTION INSTRUCTIONS (CONT).

CHECKING AND ADJUSTING CROSS-LEVEL KNOB TORQUE AND BACKLASH



1 Using torque wrench and torque adapter (8213490), measure the torque required to turn cross-level knob (1). The torque shall be 5.00 to 11.00 in.-lb (0.56 to 1.24 N-m). If not, adjust according to adjustment procedure. Refer to step 8.

2 Rotate cross-level knob (1) in one direction to center bubble of cross-level vial (2).

3 Scribe a line on boss (3) and knob (1).

4 Place gunner's quadrant (4), with end-for-end correction applied, on top mounting surface of M137 telescope mount (5), parallel to two locating pins (6). Rotate gunner's quadrant knob (7) to center bubble of level vial (8). Record knob reading of gunner's quadrant (4).

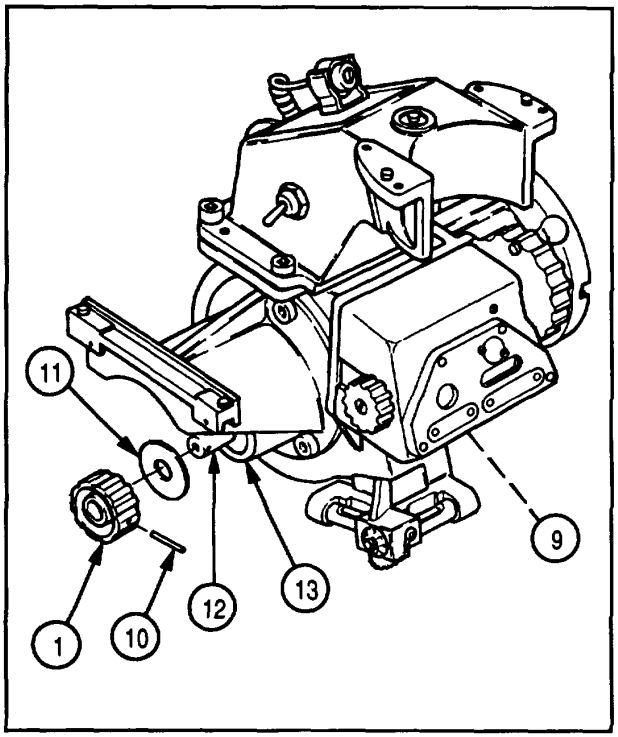
5 Continue rotation of the cross-level knob (1) in the same direction for one-quarter turn, reverse direction and continue back to the intersection of the two scribed lines with no override. Check if bubble of level vial (8) of gunner's quadrant (4) is centered. If not, rotate gunner's quadrant knob (7) of gunners quadrant (4) to center bubble. Note knob reading. Backlash shall not exceed 1.0 mil as read from gunner's quadrant (4).

6 Adjust elevation machine thread plug (9) using a screwdriver. Check the torque or backlash and if still excessive, proceed to step 7.

7 Remove tapered pin (10), knob (1), and nonmetallic washer (11) from worm shaft (12).

8 Adjust externally threaded ring (13) using spanner wrench (8284045) to adjust torque or backlash.

9 Install nonmetallic washer (11) and knob (1) on worm shaft (12) and secure with tapered pin (10).

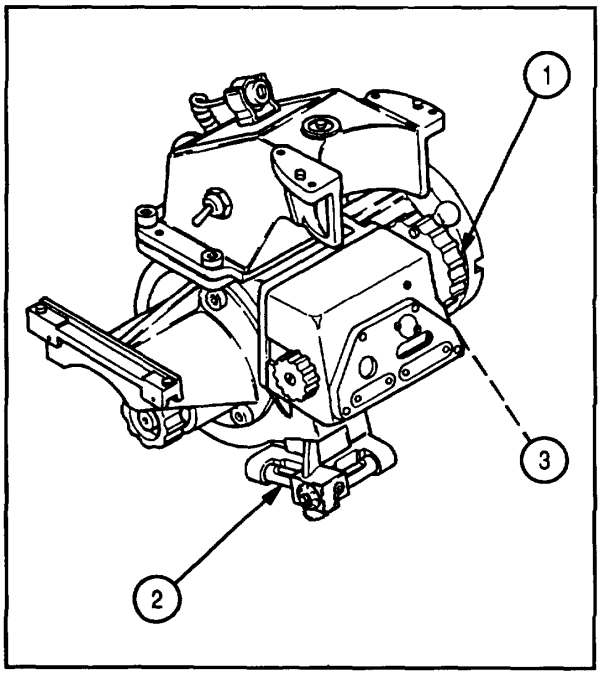


CHECKING AND ADJUSTING ELEVATION KNOB TORQUEAND BACKLASH

1 Using torque wrench and torque adapter (8599909), measure the torque required to turn elevation knob (1). The torque shall be between 5.00 and 13.00 in.-lb (0.57 and 1.47 N-m). If not, adjust according to adjustment procedure. Refer to step 6.

2 Rotate elevation knob (1) in one direction to center bubble in elevation vial (2).

3 Scribe a line on boss (3) and elevation knob (1).

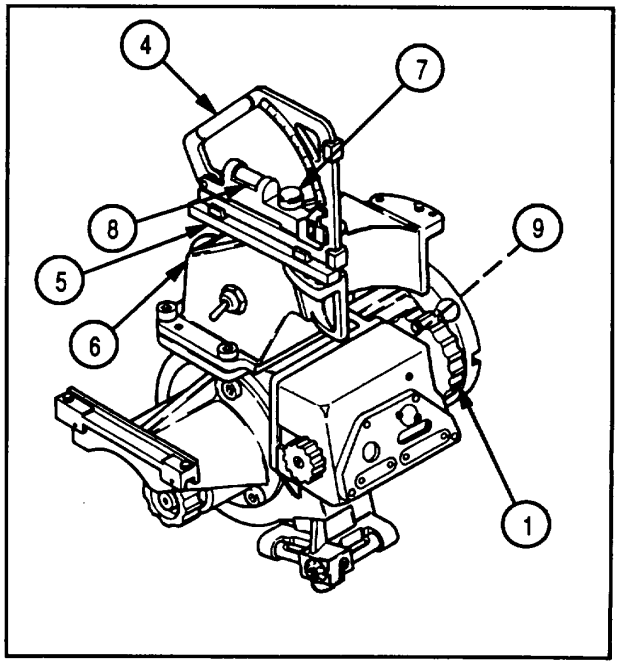


5-19. FINAL INSPECTION INSTRUCTIONS (CONT)

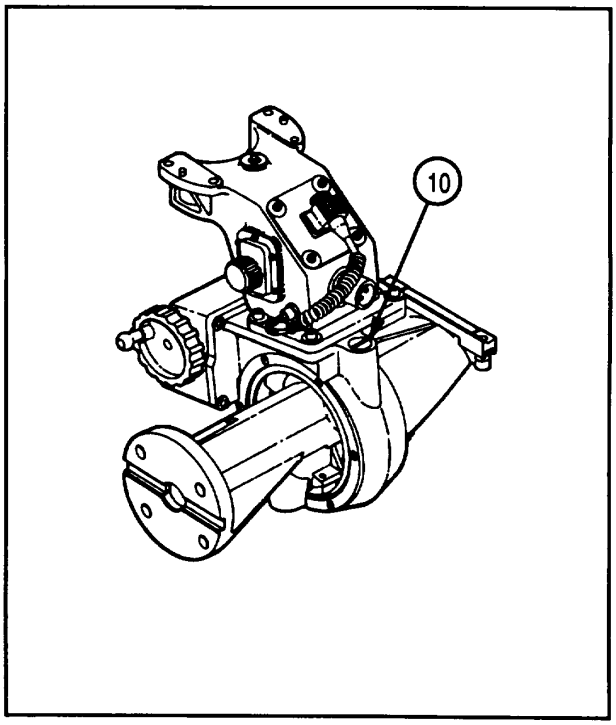
CHECKING AND ADJUSTING ELEVATION KNOB TORQUE AND BACKLASH (CONT)

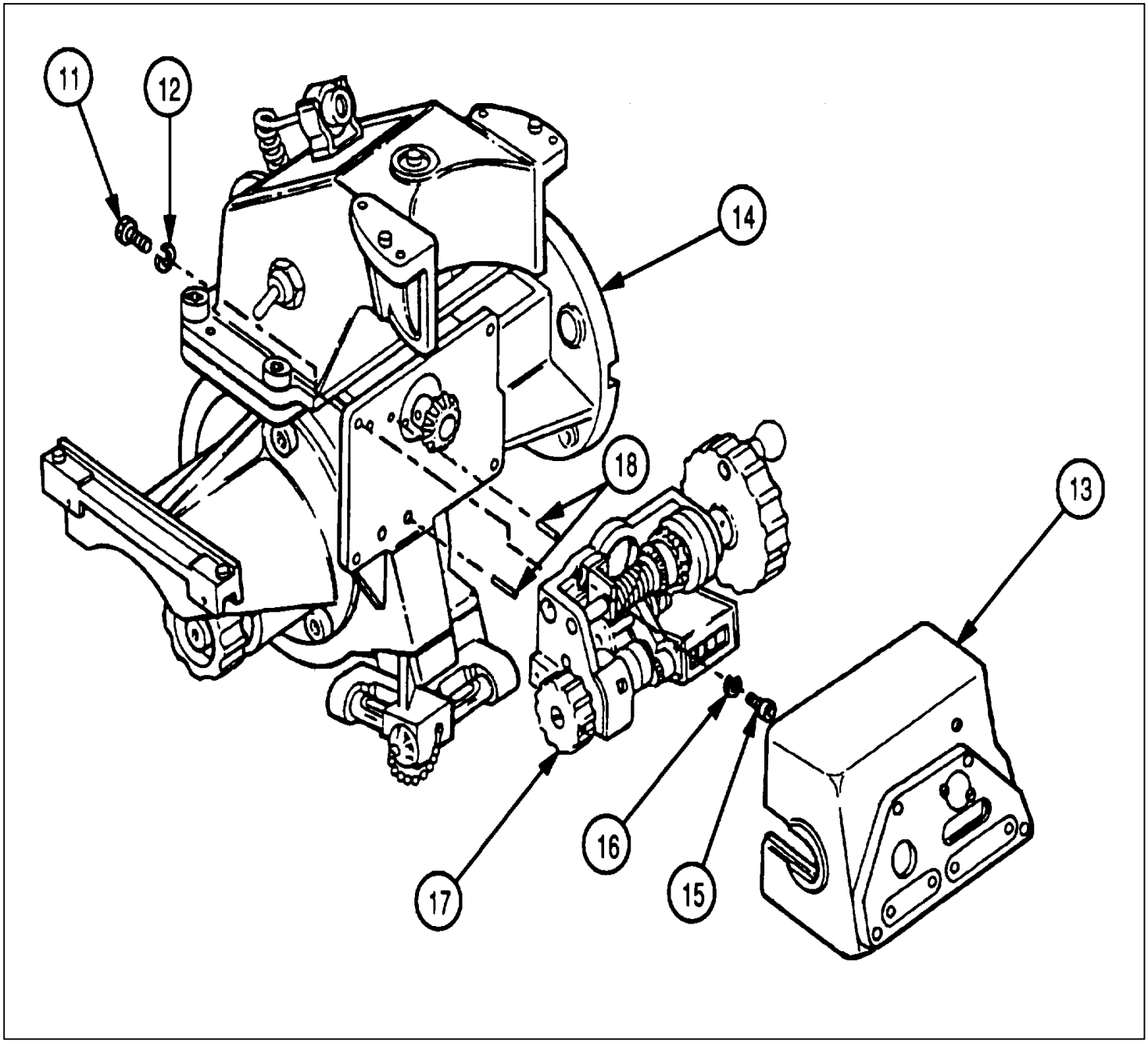
4 Place gunner's quadrant (4), on parallel bar (5) with end-for-end correction applied, on upper assembly (6). Rotate gunner's quadrant knob (7) to center bubble of level vial (8). Record reading of gunner's quadrant (4).

5 Continue rotation of elevation knob (1) in the same direction for at least one-half turn, reverse direction and continue back to the intersection of the two scribed lines (9) with no over-travel. Check to see if bubble of level vial (8) of gunner's quadrant (4) is centered. If not, rotate gunner's quadrant knob (7) of gunner's quadrant (4) to center bubble of level vial (8). Backlash shall not exceed 0.5 mil as read from gunner's quadrant (4).



6 Adjust elevation machine thread plug (10) using a screwdriver. Check the torque or backlash and if still excessive, proceed to step 7.





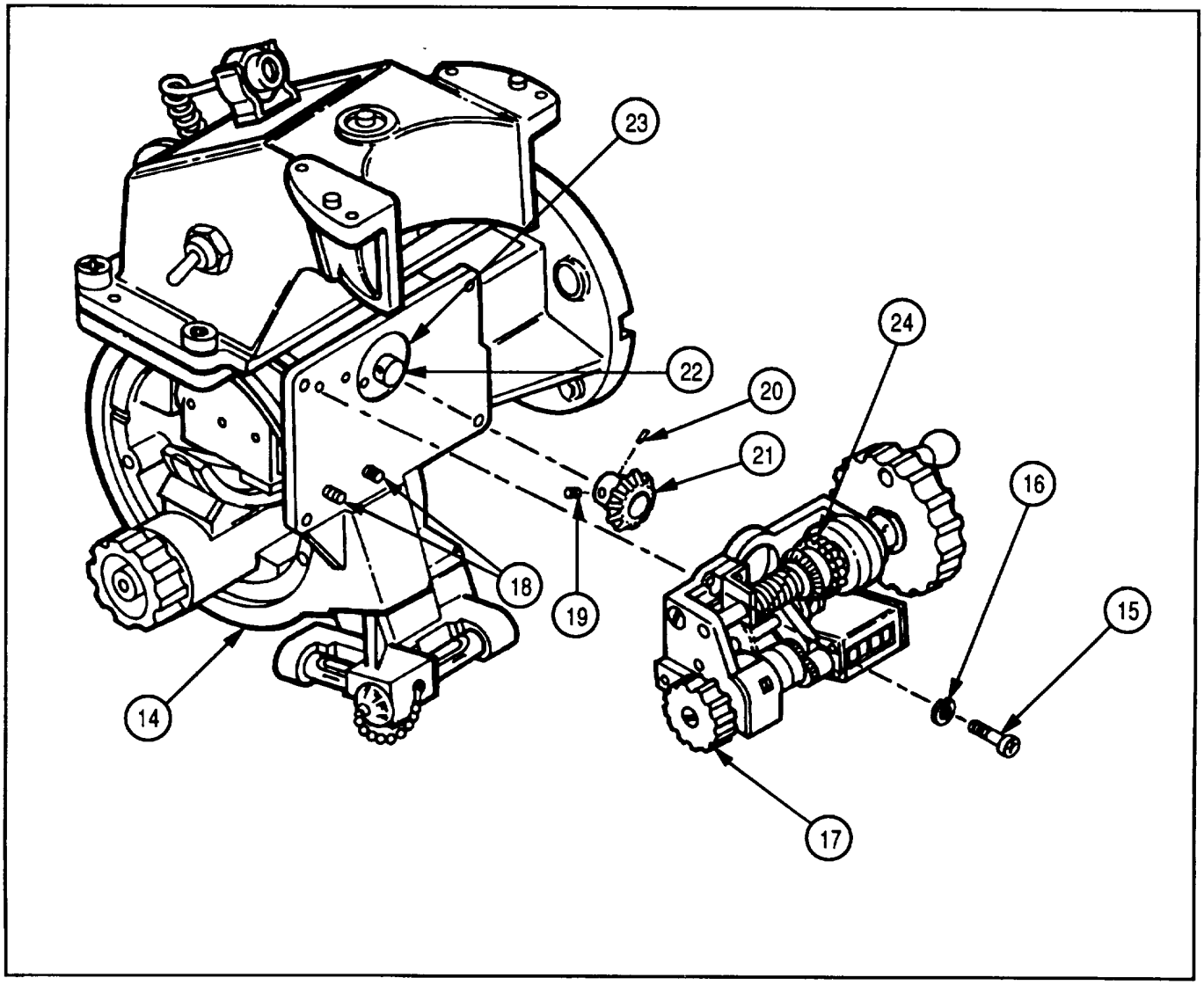
7 Remove four screws (11) and four lockwashers (12) from cover assembly (13).

8 Carefully remove cover assembly (13) from housing (14).

9 Remove three capscrews (15) and three lockwashers (16) that secure telescope mount subassembly (17) to housing (14).Remove telescope mount subassembly. Do not remove two pins (18) unless damaged.

5-19. FINAL INSPECTION INSTRUCTIONS (CONT).

CHECKING AND ADJUSTING ELEVATION KNOB TORQUE AND BACKLASH (CONT)



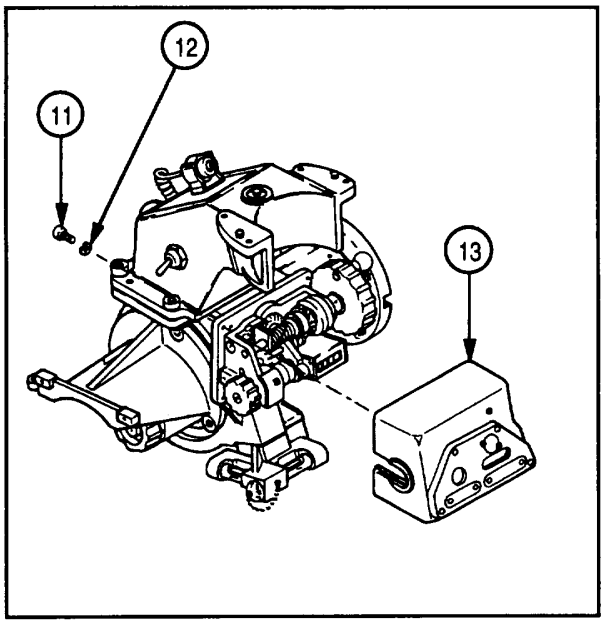
10 Loosen setscrew (19), drive out tapered pin (20), and remove bevel gear (21) from worm shaft (22).

11 Adjust optical retainer (23) using spanner wrench to adjust torque or backlash.

12 Install bevel gear (21) on worm shaft (22) with setscrew (19) and pin (20).

13 Install telescope mount subassembly (17) over two pins (18) in housing (14). Carefully mesh bevel gear (21) and gear (24) and check for 0.001 in. (0.025 mm) maximum backlash. 14 Install three lockwashers (16) and three capscrews (15).

14. Install three lockwashers (16) and three capscrews (15).



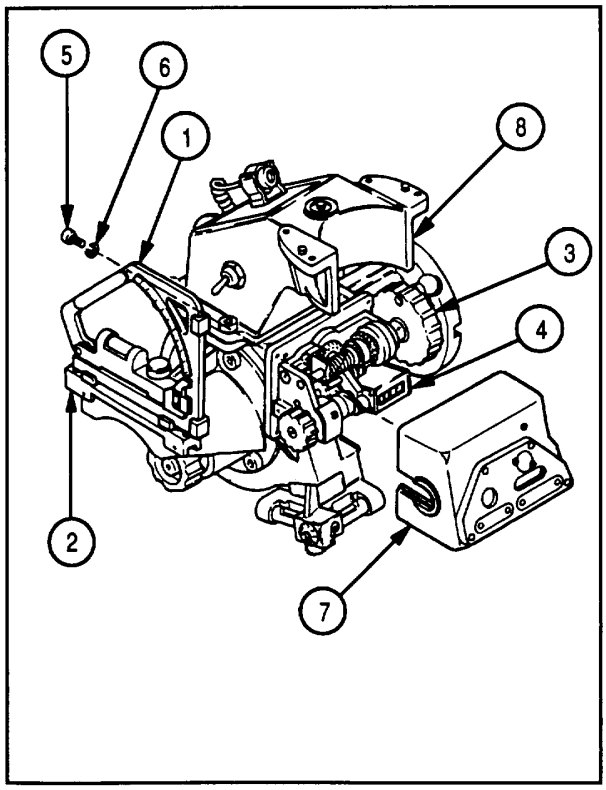
15 Coat gears with aircraft grease (item 8, appx C).

16 Apply a coat of adhesive (item 4, appx C) to edge of cover assembly (13).

17 Install cover assembly (13), four lockwashers (12), and four screws (11).

18 Recheck torque and backlash. Refer to step 1.

CHECKING AND ADJUSTING COUNTER AND STOP ASSEMBLY



1 With M137 telescope mount and fixture level, and the correction counter at zero, place gunner's quadrant (1) on level bar (2).

2 Rotate elevation knob (3) to obtain an elevation of 1333 mils and then a depression of 89 mils (9911) as read on elevation counter (4). The counter reading shall be within 1.0 mil of the angle indicated by gunner's quadrant (1). If not, proceed to step 3.

3 Remove four screws (5) and four lockwashers (6) from cover assembly (7).

4 Remove cover assembly (7) from housing (8).

5 Determine whether elevation or depression meets minimum travel (elevation 1333 mils or depression 9911 mils) by rotating elevation knob (3) to limits of travel, and measuring with gunner's quadrant (1).

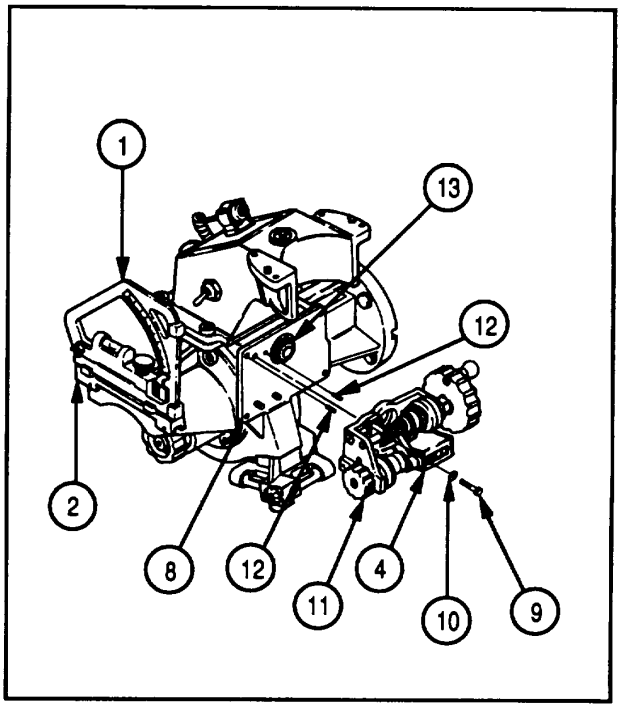
5-19. FINAL INSPECTION INSTRUCTIONS (CONT).

CHECKING AND ADJUSTING ELEVATION KNOB TORQUE AND BACKLASH (CONT)

6 Remove three capscrews (9) and three lockwashers (10) that secure telescope mount subassembly (11) to housing (8). Remove telescope mount subassembly (11). Do not remove two pins (12) unless damaged.

7 Place gunner's quadrant (1) on level bar (2) and rotate bevel gear (13) until minimum travel (elevation 1333 mils and depression 89 mils (9911)), as read on elevation counter (4), can be met. Ensure that slight overtravel (one or two gear teeth) is obtained.

8 With telescope mount subassembly rotated clockwise to a stop, install telescope mount subassembly (11) and secure with three lock- washers (10) and three capscrews (9).

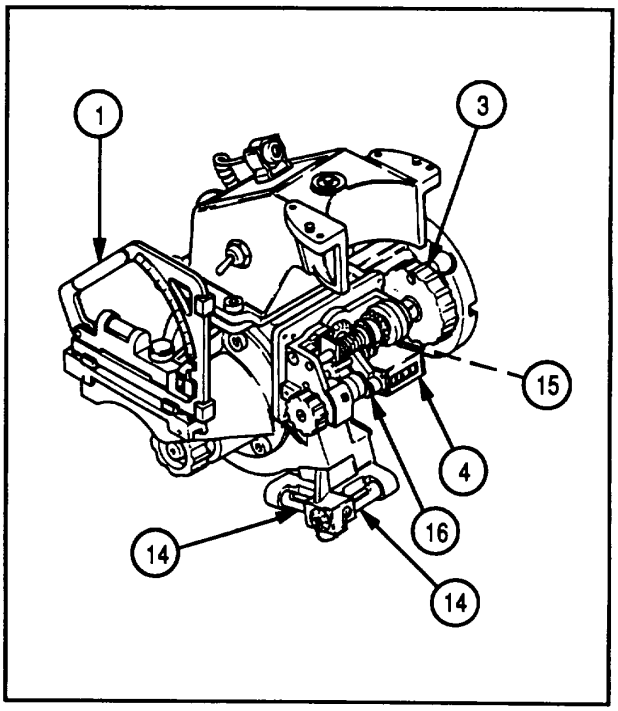


9 Check that elevation counter (4) readings at elevation of 1333 mils and depression of minus 89 mils are within 1.0 mils of the angle indicated by gunner's quadrant (1).

10 Level M137 telescope mount using elevation and cross-level vials (14). Check that elevation counter (4) indicates "0000".

11 If required, loosen four screws (15), pull elevation counter (4) back and rotate gear (16) to set elevation counter to "0000". Tighten four screws (15).

12 Recheck elevation knob (3) travel. Adjust travel as required by repeating steps 5 thru 9.

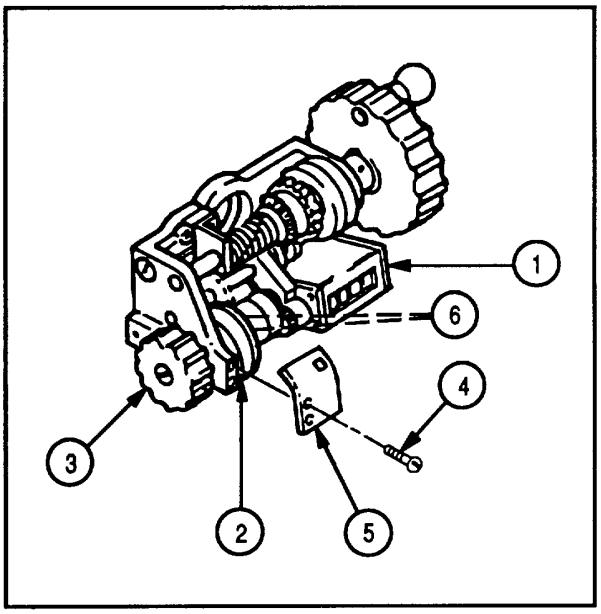


CHECKING AND ADJUSTING CORRECTION COUNTER DIAL

1 With M137 telescope mount level and elevation counter (1) set to "0000", check that correction counter (2) is set to "0" when correction knob (3) is rotated nine clicks from either stop position. If not, proceed to step 3.

2 Remove two screws (4) and telescope mount shield (5) to gain access to two setscrews (6) in correction counter (2).

3 To position correction counter (2), loosen two setscrews (6), obtain setting "0" in telescope mount shield (5), then tighten two setscrews (6).



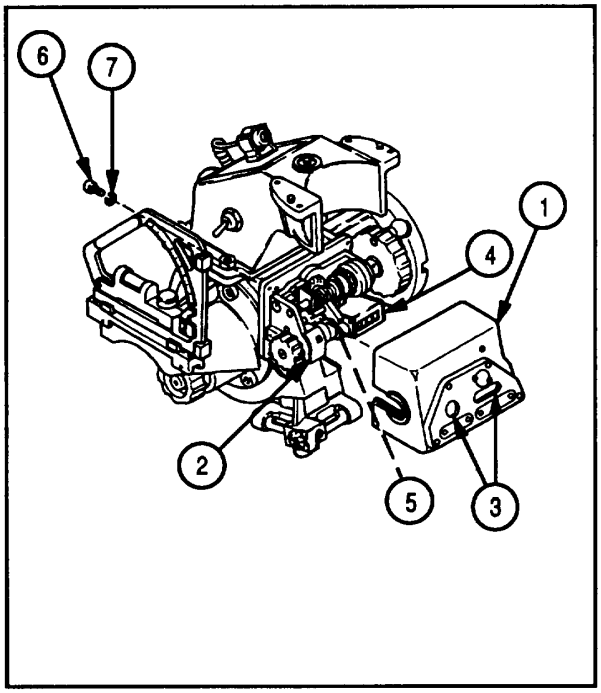
CHECKING AND ADJUSTING ELEVATION AND CORRECTION COUNTERS ALINEMENT

1 With cover assembly (1) in place over telescope mount subassembly (2), check that zeros (top, side, and bottom) appear through two observation windows (3) within 1/16 in. (1.6 mm).

2 If required, remove elevation counter (4) and pins (5), then relocate and reassemble with next larger pins.

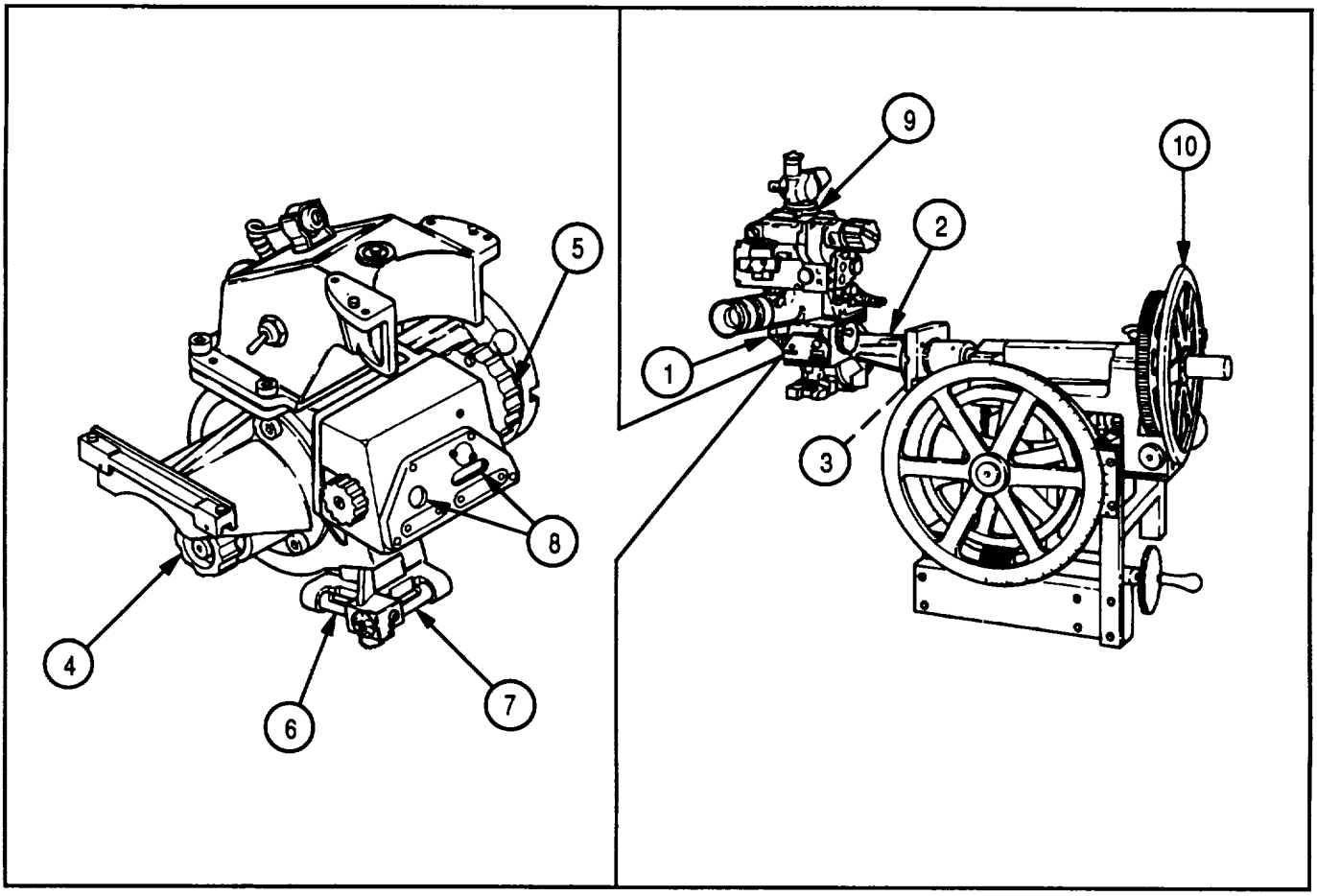
3 Apply a coat of adhesive (item 4, appx C) to edge of cover assembly (1).

4 Replace cover assembly (1) and secure with four screws (6) and four lockwashers (7).



5-19. FINAL INSPECTION INSTRUCTIONS (CONT).

CHECKING M137 TELESCOPE MOUNT ACCURACY



1 Place M137 telescope mount (1) on adapter (2) and secure with four capscrews (3). Turn cross-level knob (4) and elevation knob (5) and center the bubble in each level vial (6) and (7). The elevation and correction counters (8) should be at zero.

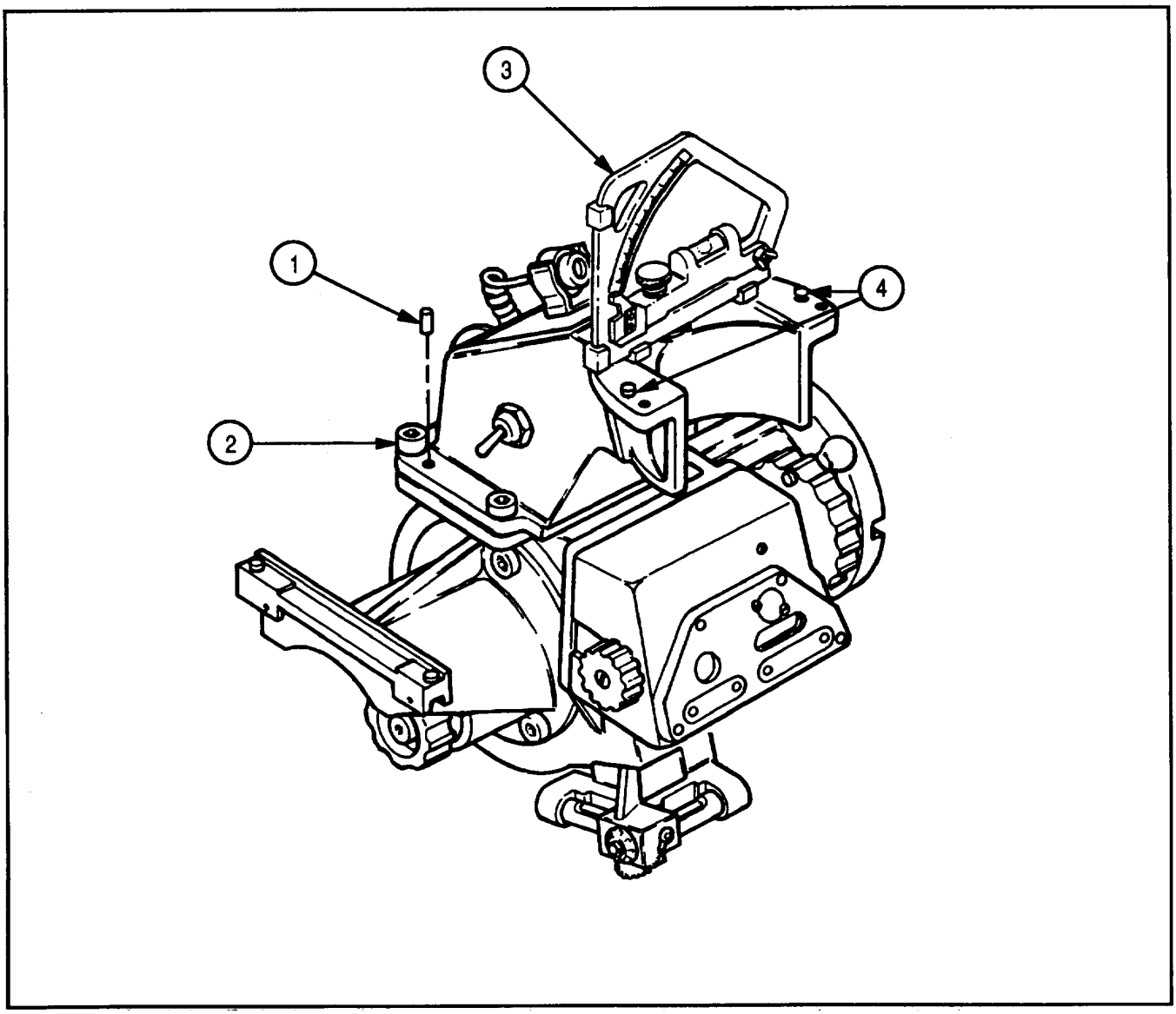
2 Suspend a plumbline 30 feet (9 m) in front of the panoramic telescope in line with the test target.

3 With M137 telescope mount and cross level and elevation test fixture leveled in both directions, place M115 panoramic telescope (9) on top surface of M137 telescope mount (1).

4 Aline the vertical line of the telescope with the plumbline and vertical line of the test target.

5 Rotate elevation knob (5) of M137 telescope mount to its extreme clockwise position, simultaneously rotating the elevation fixture wheel (10) keeping the line of sight on target. Rotate elevation knob (5) of M137 telescope mount to its extreme counterclockwise position and repeat steps 2 thru 4. The line of sight, when viewing through the M115 panoramic telescope (9), shall not deviate from the plumbline by more than 0.5 mil as read on test target at any point of the elevation or depression travel. Adjust cross level vial (7) to meet above standard.

ADJUSTMENT OF TOP SURFACE



1 Drive out two plain tapered pins (1) and loosen four capscrews (2).

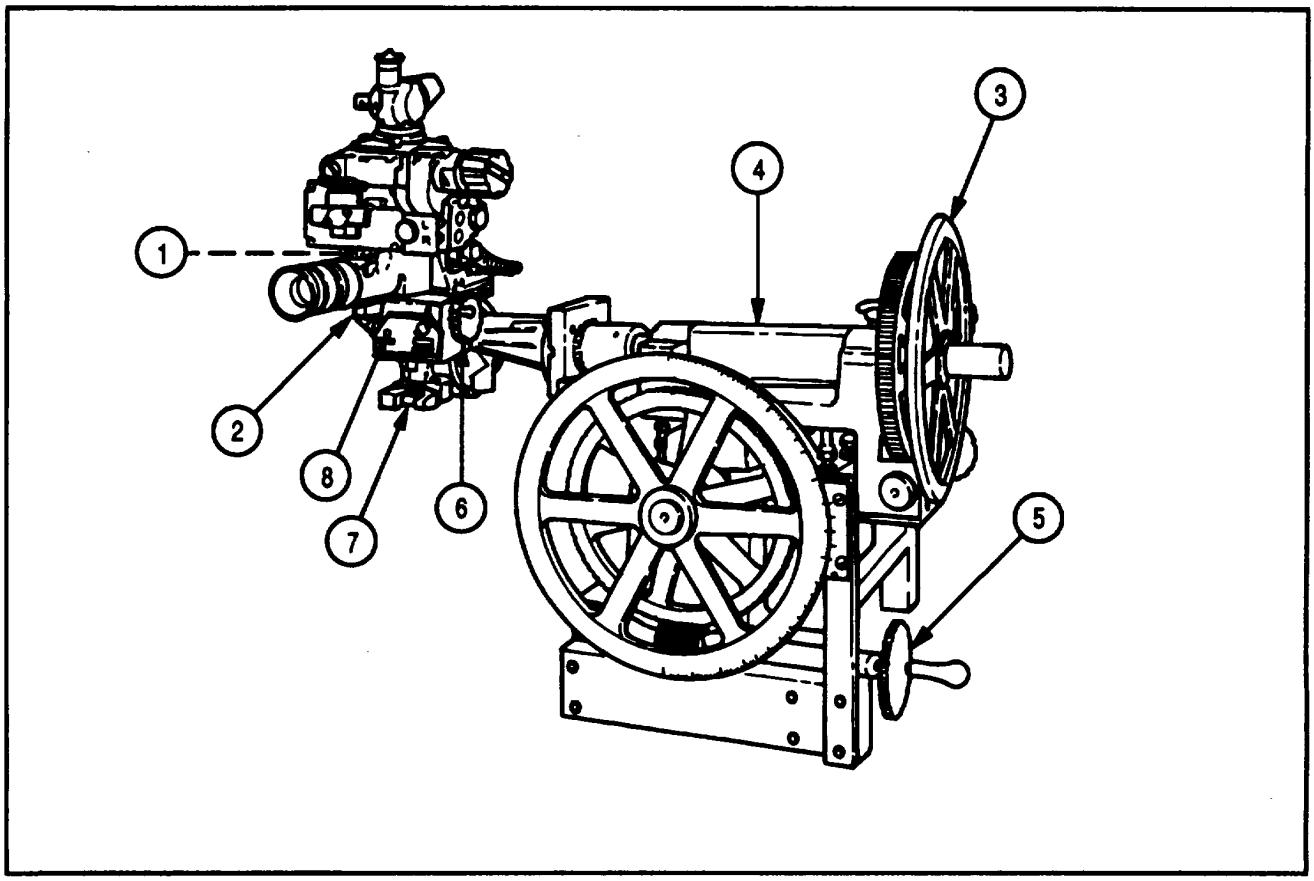
2 Set gunner's quadrant (3) one-half turn past zero and return to zero and place on top surface of M137 telescope mount, parallel to the two locating pins (4).

3 With the fixture and M137 telescope mount level in both directions, adjust upper subassembly and tighten four capscrews (2) so that top surface is level within 0.5 mil as read on gunner's quadrant (3).

4 If necessary, drill and ream two new holes and insert two tapered pins (1) using punch.

5-19. FINAL INSPECTION INSTRUCTIONS (CONT).

CHECKING M137 TELESCOPE MOUNT CANT CORRECTION



1 Set 500 mils into gunner's quadrant (1) and place on level bar (2).

2 Rotate handwheel (3) for 500 mil depression.

3 Set 177.8 mils into gunner's quadrant (1) and place on top surface of cross-leveling fixture (4).

4 Rotate lower handwheel (5), to the right, to 177.8 mil cant angle.

5 Rotate elevation knob (6) and center bubble in cross-level vial (7).

6 Correction counter (8) should read 96.1 ± 0.5 mils.

7 Repeat steps 4 thru 7, checking cant to the left.

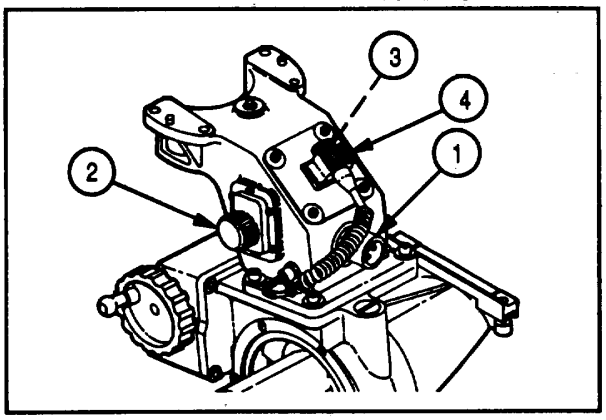
8 Repeat steps 4 thru 8 for 800 and 1000 mil elevation. Connection should be 180.5 + 1.0 mils and 271.9 ± 2.0 mils respectively.

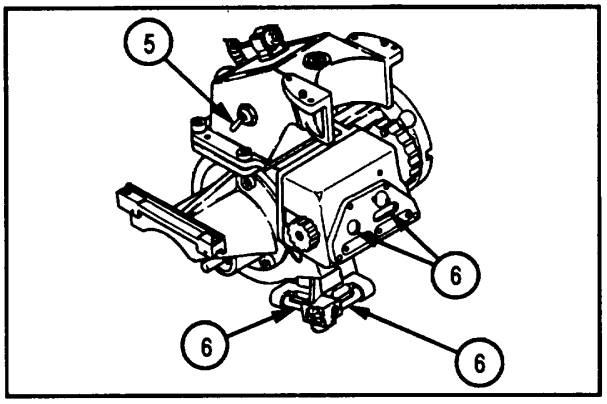
CHECKING ILLUMINATION OF M137 TELESCOPE MOUNT

1 Perform the illumination inspection with M137 telescope mount in a darkened area and connected to any suitable 24-volt d.c. power sup- ply.

2 With 24 volts d.c. applied to the M137 telescope mount power source connector (1), turn variable resistor knob (2) between minimum and maximum illumination and observe that lamp (3) in extension light (4) brightens and dims.

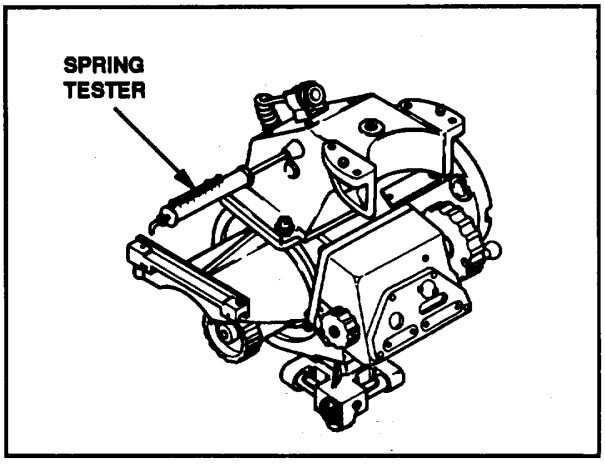
3 Place toggle switch (5) to ON and observe that vial and counter lights (6) illuminate. The illumination shall be sufficient for level vial markings and counter numbers to be clearly defined. Place toggle switch (5) to OFF.





CHECKING M137 TELESCOPE MOUNT RIGIDITY

Apply a 20.0-lb (9.1-kg) load with spring tester gage to right side of upper assembly. Release load and record. Repeat on left side of upper assembly. Movement shall not exceed 0.25 mils at 0 mils, 0.75 mils at 800 mils, 1.75 mils at 1100 mils, and 3.50 mils at 1333 mils. If requirements cannot be met, check for loose components.



Section VII. PREEMBARKATION INSPECTION PROCEDURES

5-20. GENERAL.

a. Fire control instruments must be inspected for outward appearance, mechanical condition, and proper operation.

b. Instruments must approach new equipment standards of operation and appearance. The workmanship and quality must reflect the highest standards obtainable.

5-21. SPECIFIC INSTRUCTIONS. Fire control instruments must conform to the following specifications for overseas shipment:

a. *Condition of Optical Element.* Lenses, prisms, reticles, and windows must be free from dirt, scratches, pits, and chips that will affect optical performance of the instrument.

b. *Functioning of Mechanical Parts.* Mechanical parts must operate smoothly without binding or rough motion. Parts must be free from grit and must be properly lubricated.

c. *Illumination.* Counter dials must illuminate properly.

d. *General Appearance* and *Condition of the Instruments.*

(1) All parts of the instruments must be present and free from defects.

(2) Paint must cover all specified surfaces. Repaint if painted surfaces show signs of damage.

(3) All optics must be free from any internal dirt and moisture. Excessive dirt or moisture indicates a breakdown in sealing and is cause for rejection of the instrument.

(4) All scales must be easily read. All numbers and divisions must be clearly defined.

(5) All warning labels must be present and legible.

(6) Any fire control instrument failing to meet the requirements of the final inspection is unsatisfactory for overseas shipment.

APPENDIX A
REFERENCES

A-1. SCOPE. This appendix lists all technical manuals, forms, supply catalogs, and miscellaneous publications referenced in this manual.

A-2. TECHNICAL MANUALS.

TM 9-254 ..... General Maintenance Procedures for Fire Control Materiel

TM 9-1290-322-34&P ..... Direct Support and General Support Maintenance Manual Including Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools) for Sight Infinity: 8635466 (NSN 1240000564854)

TM 9-2350-304-10 ..... Operator's Manual for Howitzer, Heavy, Self-Propelled: 8-inch, M11 OA2 (2350010414590)

TM 9-2350-304-20-2 ..... Unit Maintenance Manual for Howitzer, Heavy, Self-Propelled: 8 inch, M11 A2 (2350010414590)

TM 9-2350-304-24P-2 ..... Unit, Direct Support, and General Support Maintenance Repair Parts and Special Tools List for Howitzer, Heavy, Self-Propelled: 8inch, Ml1 OA2 (2350010414590)

TM 750-116 ..... General Procedures for Purging and Charging of Fire Control Instruments

TM 750-244-6 ..... Procedures for Destruction of Tank-Automotive Equipment to Prevent Enemy Use (U.S. Army Tank-Automotive Command)

A3. FORMS.

DA Form 2028 ..... Recommended Changes to Publications & Blank Forms

DA Form 2028-2 ..... Recommended Changes to Equipment Technical Publications

DA Form 2408-5 ..... Equipment Modification Record

DA Form 2409 ..... Equipment Maintenance Log

SF 368 ..... Product Quality Deficiency Report (QDR)

A4. SUPPLY CATALOGS.

SC 5180-95-CL-B29 ..... Tool Kit, Electronic: System Maintenance

A-5. MISCELLANEOUS PUBLICATIONS.

CTA 8-100	Army Medical Department Expendable/Durable Items
CTA 50-970	Expendable/Durable Items (Except Medical, Class V, Repair Parts, and Heraldic Items)
DA PAM 738-750	The Army Maintenance Management System (TAMMS)
FM 21-11	First Aid for Soldiers
SB 740-95-700	Storage Serviceability Standards for ARRCOM Materiel for Fire Control Items

APPENDIX B
DIRECT AND GENERAL SUPPORT MAINTENANCE
REPAIR PARTS AND SPECIAL TOOLS LIST

Section I. INTRODUCTION

B-1. SCOPE. This RPSTL lists and authorizes spares and repair parts required for performance of direct support and general support maintenance of the fire control instruments. It authorizes the requisitioning, issue, and disposition of spares, repair parts, and special tools as indicated by the Source, Maintenance, and Recoverability (SMR) codes.

B-2. GENERAL. In addition to Section I, Introduction, this Repair Parts and Special Tools List is divided into the following sections:

a. *Section II. Repair Parts List* . A list of spares and repair parts authorized by this RPSTL for use in the performance of maintenance. The list also includes parts which must be removed for replacement of the authorized parts. Parts lists are composed of functional groups in ascending alphanumeric sequence, with the parts in each group listed in ascending figure and item number sequence. Bulk materials are listed by item name in FIG BULK at the end of the section.

b. *Section III. Special Tools List.* Reference Maintenance Allocation Chart (MAC), TM 9-2350-304-20-2.

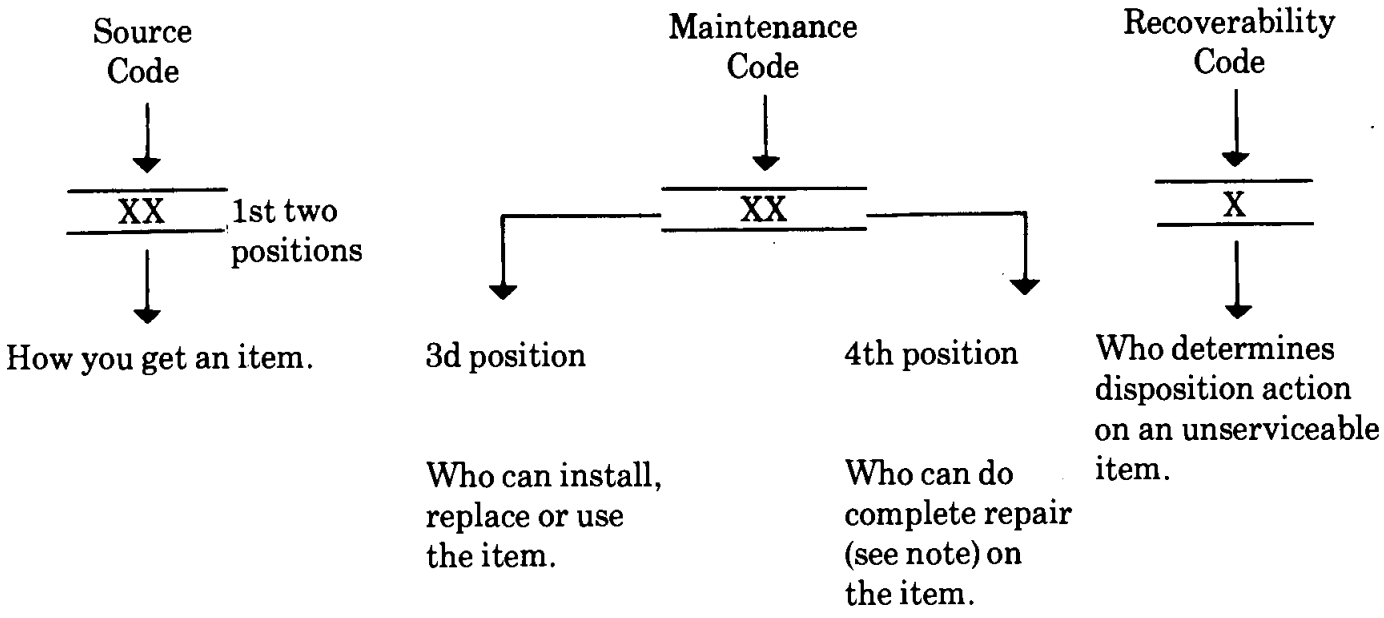
c. *Section IV. Cross-reference Indexes.* A list, in National Item Identification Number (NIIN) sequence, of all National stock numbered items appearing in the listings, followed by a list in alphanumeric sequence of all part numbers appearing in the listing. National stock numbers and part numbers are cross-referenced to each illustration figure and item number appearance. The figure and item number index lists figure and item numbers in alphanumeric sequence and cross-references NSN, CAGEC, and part numbers.

B-3. EXPLANATION OF COLUMNS (SECTIONS II AND III).

a. *ITEM NO. (Column (1)).* Indicates the number used to identify items called out in the illustration.

b. *SMR CODE (Column (2)).* The Source, Maintenance, and Recoverability (SMR) code is a 5-position code containing supply/requisitioning information, maintenance level authorization criteria, and disposition instruction, as shown in the following breakout:

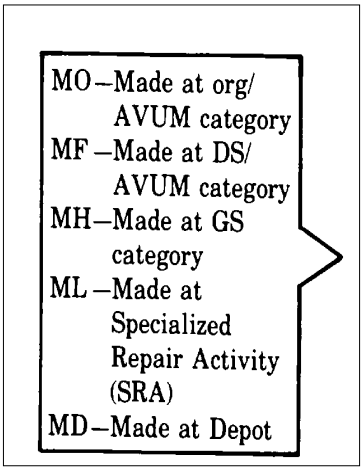
B-3. EXPLANATION OF COLUMNS (SECTIONS II AND III) (cont).



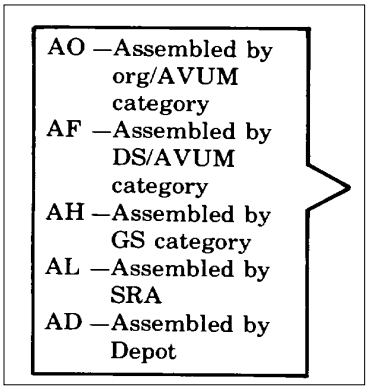
*Complete Repair: Maintenance capacity, capability, and authority to perform all corrective maintenance tasks of the "Repair" function in a use/user environment in order to restore serviceability to a failed item.

(1) *Source Code.* The source code tells you how to get an item needed for maintenance, repair, or overhaul of an end item/equipment. Explanations of source codes follow:

CODE	EXPLANATION
PA PB PC PD PE PF PG	Stocked items; use the applicable NSN to request/requisiton items with these source codes. They are authorized to the level indicated by the code entered in the 3d position of the SMR code. **NOTE: Items coded PC are subject to deterioration.
KD KF KB	Items with these codes are not to be requested/requistioned individually. They are part of a kit which is authorized to the maintenance level indicated by the 3d position of the SMR code. The complete kit must be requisitioned and applied.



Items with these codes are not to be requested/ requisitioned individually. They must be made from bulk material which is identified by the part number in the DESCRIPTION AND USABLE ON CODE (UOC) column and listed in the Bulk Material group of the repair parts list in the RPSTL. If the item is authorized to you by the 3d position code of the SMR code, but the source code indicates it is made at a higher level, order the item from the higher level of maintenance.



Items with these codes are not to be requested/requisitioned individually. The parts that made up the assembled item must be requisitioned or fabricated and assembled at the level of maintenance indicated by the source code. If the 3d position code of the SRM code authorizes you to replace the item, but the source code indicates the item is assembled at a higher level, order the item from the higher level of maintenance.

XA-Do not requisition an "XA"-coded item. Order its next higher assembly. (Also, refer to the NOTE below.)

XB- If an "XB" item is not available from salvage, order it using the CAGEC and part number given.

XC-Installation drawing, diagram, Instruction sheet, field service drawing, that is identified by manufacturer's part number.

XD-Item is not stocked. Order an "XD"-coded item through normal supply channels using the CAGEC and part number given, If no NSN is available.

NOTE

Cannibalization or controlled exchange, when authorized, may be used as a source of supply for items with the above source codes, except for those source coded "XA" or those aircraft support items restricted by requirements of AR 750-1.

(2) *Maintenance Code.* Maintenance codes tell you the level(s) of maintenance authorized to USE and REPAIR support items. The maintenance codes are entered in the third and fourth positions of the SMR code as follows:

B-3. EXPLANATION OF COLUMNS (SECTIONS II AND III) (cont).

(a) The maintenance code entered in the third position tells you the lowest maintenance level authorized to remove, replace, and use an item. The maintenance code entered in the third position will indicate authorization to one of the following levels of maintenance.

CODE	APPLICATION/EXPLANATION
C	Crew or operator maintenance done within unit or aviation unit maintenance.
O	Unit or aviation unit level can remove, replace, and use the item.
F	Direct support or aviation intermediate level can remove, replace, and use the item.
H	General support level can remove, replace, and use the item.
L	Specialized repair activity can remove, replace, and use the item.
D	Depot level can remove, replace, and use the item.

(b) The maintenance code entered in the fourth position tells whether or not the item is to be repaired and identifies the lowest maintenance level with the capability to do complete repair (i.e., perform all authorized repair functions). (NOTE: Some limited repair may be done on the item at a lower level of maintenance, if authorized by the Maintenance Allocation Chart (MAC) and SMR codes.) This position will contain one of the following maintenance codes.

CODE	APPLICATION/EXPLANATION
O	Unit or aviation unit is the lowest level that can do complete repair of the item.
F	Direct support or aviation intermediate is the lowest level that can do complete repair of the Item.
H	General support is the lowest level that can do complete repair of the item.
L	Specialized repair activity Is the lowest level that can do complete repair of the item.
D	Depot is the lowest level that can do complete repair of the item.
Z	Nonreparable. No repair is authorized.
B	No repair is authorized. (No parts or special tools are authorized for the maintenance of the "B" coded item). However, the item may be re-conditioned by adjusting, lubricating, etc., at the user level.

(3) *Recoverability Code.* Recoverability codes are assigned to items to indicate the disposition action on unserviceable items. The recoverability code is entered in the fifth position of the SMR code as follows:

RECOVERABILITY CODE	APPLICATION/EXPLANATION
Z	Nonreparable item. When unserviceable, condemn and dispose of the item at the level of maintenance shown in 3d position of SMR code.
0	Reparable item. When uneconomically reparable, condemn and dispose of the item at the unit or aviation unit level.
F	Reparable item. When uneconomically reparable, condemn and dispose of the item at the direct support or aviation intermediate level.
H	Reparable item. When uneconomically reparable, condemn and dispose of the item at the general support level.
D	Reparable item. When beyond lower level repair capability, return to depot. Condemnation and disposal of item not authorized below depot level.
L	Reparable item. Condemnation and disposal not authorized below Specialized Repair Activity (SRA).
A	Item requires special handling or condemnation procedures because of specific reasons (e.g., precious metal content, high dollar value, critical material, or hazardous material). Refer to appropriate manuals/directives for specific instructions.

c. *NSN (Column (3)).* The National stock number for the item is listed in this column.

d. *CAGEC (Column (4)).* The Contractor and Government Entity Code (CAGEC) is a 5-digit numeric code which is used to identify the manufacturer, distributor, or Government agency, etc., that supplies the item.

e. *PART NUMBER (*Column (5)). Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards, and inspection requirements to identify an item or range of items.

NOTE

When you use an NSN to requisition an item, the item you receive may have a different part number from the part ordered. (The parts are interchangeable.)

f. *DESCRIPTION AND USABLE ON CODE (UOC) (Column (6)).* This column includes the following information:

(1) The Federal item name and, when required, a minimum description to identify the item.

B-3. EXPLANATION OF COLUMNS (SECTIONS II AND III) (cont).

(2) The physical security classification of the item is indicated by the parenthetical entry which is a physical security classification abbreviation, e.g., Phy Sec Cl (C)-Confidential, Phy Sec Cl (S)-Secret, Phy Sec Cl (T)-Top Secret.

(3) Items that are included in kits and sets are listed below the name of the kit or set.

(4) Spare/repair parts that make up an assembled item are listed immediately following the as sembled item line entry. When a separate figure lists the complete breakdown of an assembly/subassembly, a note "See figure for breakdown" is shown.

(5) Part numbers for bulk materials are referenced in this column in the line item entry for the item to be manufactured/fabricated.

(6) When the item is not used with all serial numbers of the same model, the effective serial numbers are shown on the last line(s) of the description (before UOC).

(7) The usable on code, when applicable (see paragraph 5, Special Information).

(8) Special Tools List section-Reference Maintenance Allocation Chart (MAC) TM 9-2350-304-20.

(9) The statement "END OF FIGURE" appears just below the last item description in Column 5 for a given figure in Section II.

g. *QTY (Column (7)).* The QTY (quantity per figure column) indicates the quantity of the item used in the breakout shown on the illustration figure, which is prepared for a functional group, subfunctional group, or an assembly. A 'V" appearing in this column in lieu of a quantity indicates that the quantity is variable and the quantity may vary from application to application.

B-4. EXPLANATION OF COLUMNS (SECTION IV).

a. *National Stock Number (NSN) Index.*

(1) *STOCK NUMBER Column.* This column lists the NSN by National Item Identification Number (NIIN) sequence. The NIIN consists of the last nine digits of the NSN (i.e., 5305-01-674-1467). NSN / NIIN

When using this column to locate an item, ignore the first 4 digits of the NSN. However, the complete NSN should be used when ordering items by stock number.

(2) *FIGURE Column.* This column lists the number of the figure where the item is identified/located. The figures are in numerical order in Section II and Section III.

(3) *ITEM Column.* The item number identifies the item associated with the figure listed in the adjacent Figure column. This item is also identified by the NSN listed on the same line.

b. *Part Number Index.* Part numbers in this index are listed by part number in ascending alphanumeric sequence (i.e., vertical arrangement of letter and number combination which places the first letter or digit of each group in order A thru Z, followed by the numbers 0 thru 9 and each following letter or digit in like order).

(1) *CAGEC Column.* The Contractor and Government Entity Code (CAGEC) is a 5-digit numeric code used to identify the manufacturer, distributor, or Government agency, etc., that supplies the item.

(2) *PART NUMBER Column.* Indicates the primary number used by the manufacturer (individual, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards, and inspection requirements to identify an item or range of items.

(3) *STOCK NUMBER Column.* This column lists the NSN for the associated part number and manufacturer identified in the PART NUMBER and CAGEC columns to the left.

(4) *FIGURE Column.* This column lists the number of the figure where the item is identified/located in Sections II and IIII.

(5) *ITEM Column.* The item number is that number assigned to the item as it appears in the figure referenced in the adjacent figure number column.

c. *Figure and Item Number Index.*

(1) *FIGURE Column.* This column lists the number of the figure where the item is identified/located in Sections II and III.

(2) *ITEM Column.* The item number is that number assigned to the item as it appears in the figure referenced in the adjacent figure number column.

(3) *STOCK NUMBER Column.* This column lists the NSN for the item.

(4) *CAGEC Column.* The Contractor and Government Entity Code (CAGEC) is a 5-digit numeric code used to identify the manufacturer, distributor, or Government agency, etc., that supplies the item.

(5) *PART NUMBER Column*. Indicates the primary number used by the manufacturer (individual, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards, and inspection requirements to identify an item or range of items.

B-5. SPECIAL INFORMATION.

a. *Assembly Instructions.* Detailed assembly instructions for items source coded to be assembled from component spare/repair parts are found in Chapter 2 and Chapter 3. Items that make up the assembly are listed immediately following the assembly item entry or reference is made to an applicable figure.

B-5. SPECIAL INFORMATION (cont).

b. *Index Numbers.* Items which have the word BULK in the figure column will have an index number shown in the item number column. This index number is a cross-reference between the National Stock Number/Part Number Index and the bulk material list in Section II.

B-6. HOW TO LOCATE REPAIR PARTS.

a. *When National Stock Number or Part Number is Not Known:*

(1) First Using the table of contents, determine the assembly group or subassembly group to which the item belongs. This is necessary since figures are prepared for assembly groups and subassembly groups, and listings are divided into the same groups.

(2) *Second.* Find the figure covering the assembly group or subassembly group to which the item belongs.

(3) *Third.* Identify the item on the figure and use the Figure and Item Number Index to find the NSN.

b. *When National Stock Number or Part Number is Known:*

(1) *First.* Using the National Stock Number or the Part Number Index, find the pertinent National Stock Number or Part Number. The NSN index is in National Item Identification Number (NIIN) sequence (see B-4.a.(1)). The part numbers in the Part Number index are listed in ascending alphanumeric sequence (see B-4.b.). Both indexes cross-reference you to the illustration figure and item number of the item you are looking for.

(2) *Second.* After finding the figure and item number, verify that the item is the one you are looking for, then locate the item number in the repair parts list for the figure.

B-7. ABBREVIATIONS. Not applicable.

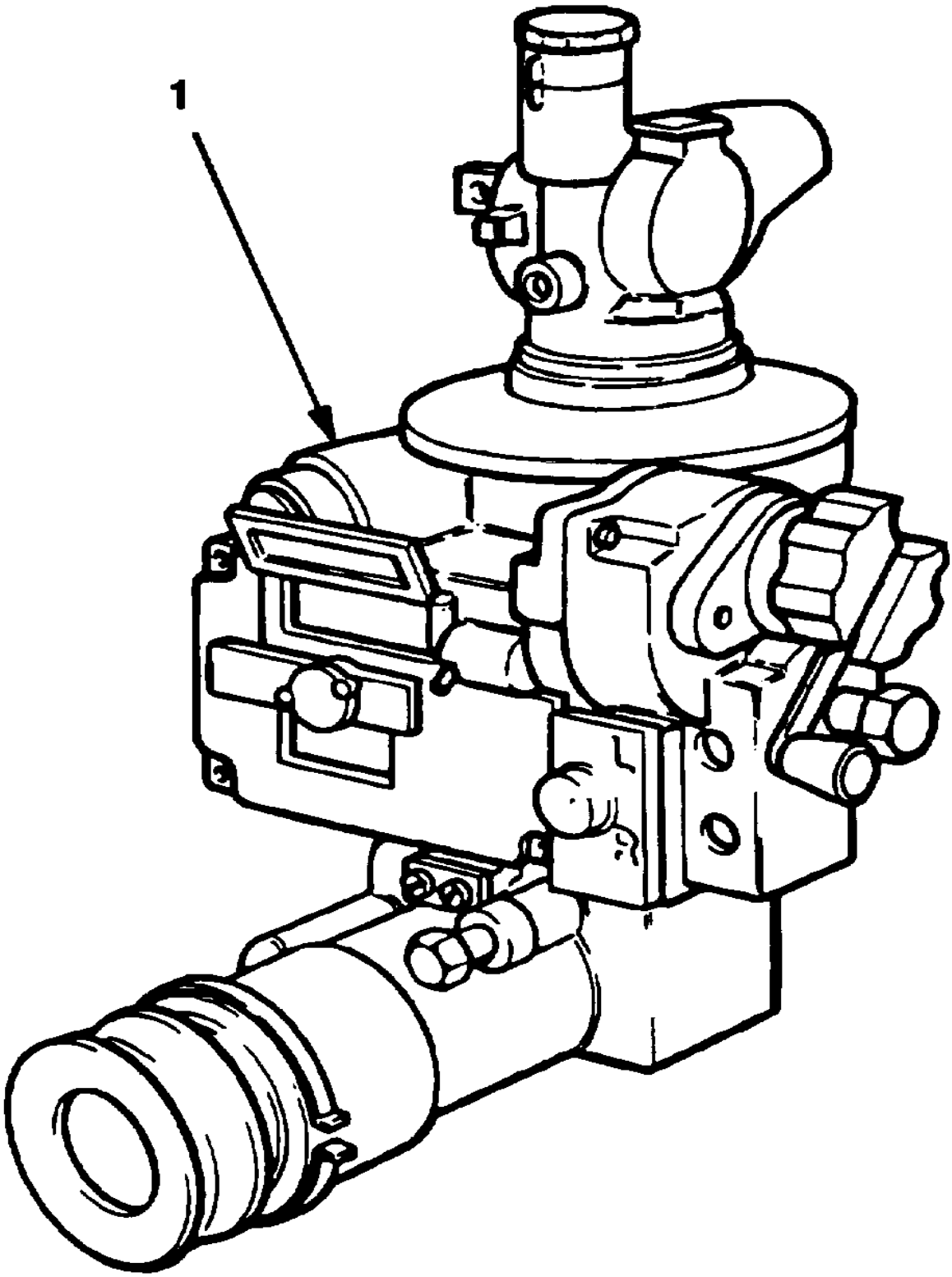


Figure B-1. Telescope, Panoramic, M115 8587340 (Assembled View).

(1) ITEM NO	(2) SMR	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 0101 FIG.B-1 TELESCOPE,PANORAMIC,M115 8587340 (ASSEMBLED VIEW)	
1	PAOHH	1240-00-895-9186	19200	8587340	TELESCOPE, PANORAMIC, M115.....	1

END OF FIGURE

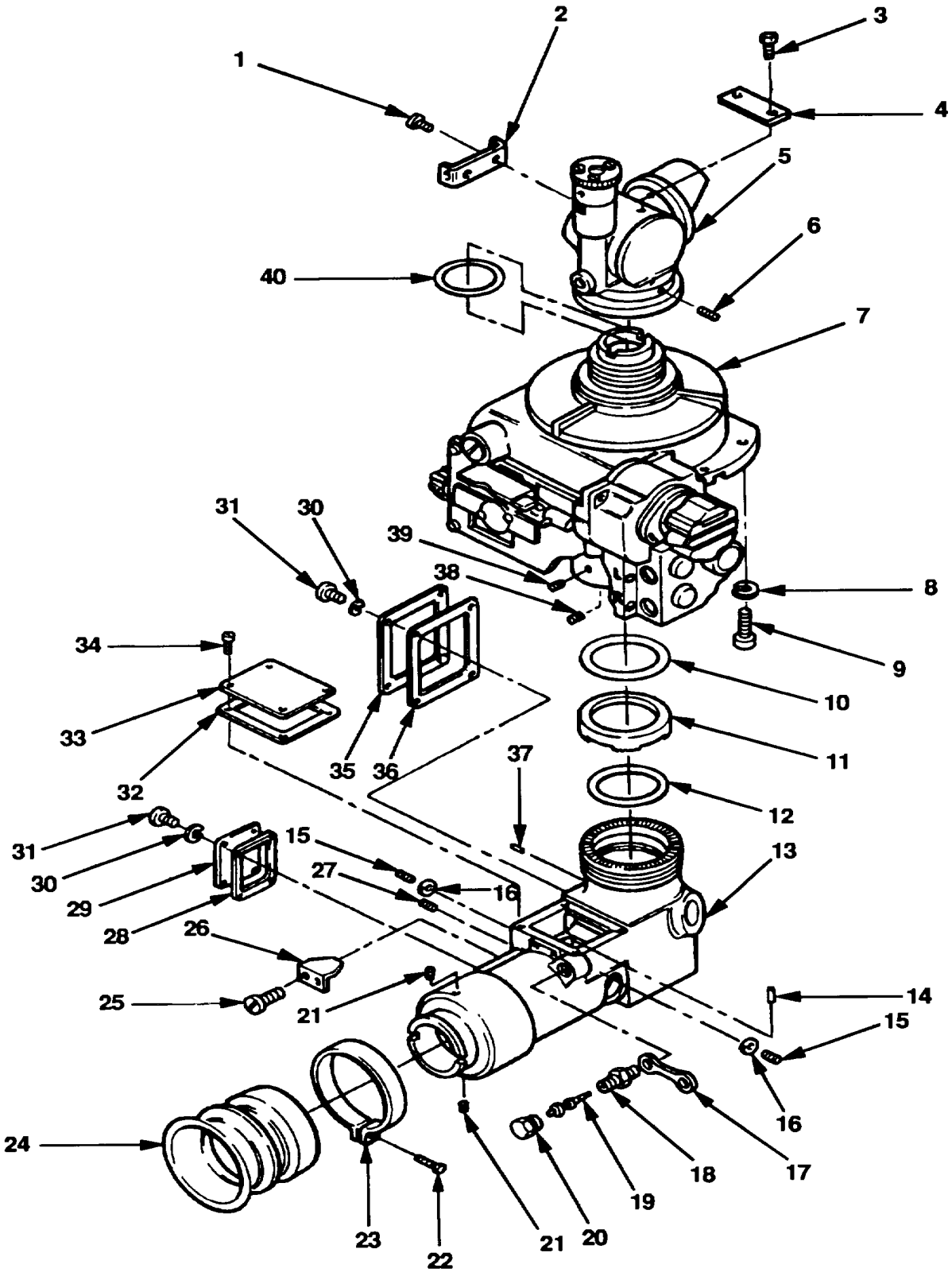


Figure B-2. Telescope, Panoramic, M115 8587340.

(1) ITEM NO	(2) SMR	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 0101	
					FIG.B-2 TELESCOPE,PANORAMIC,M115	
					8587340	
1	PAFZZ	5305-00-054-6651	96906	MS51957-27	SCREW, MACHINE	2
2	PAFZZ	1240-00-463-4644	19200	11730191	SIGHT, OPEN	1
3	PAHZZ	5305-00-054-5635	96906	MS51957-1	SCREW, MACHINE	2
4	PAHZZ	9905-00-310-0758	19200	8587506	PLATE, IDENTIFICATION	1
5	AHHHH		19200	8587416	HEAD ASSEMBLY, SEE	1
				FIG. B-3	FOR BREAKDOWN	
6	PAHZZ	5305-00-717-6950	96906	MS51963-9	SETSCREW	3
7	XAHHH		19200	8587534	BODY ASSEMBLY, SEE	1
				FIG. B-4	FOR BREAKDOWN	
8	PACZZ	5310-00-974-6623	96906	MS35338-140	WASHER, LOCK	4
9	PACZZ	5305-00-988-7839	96906	MS16995-65	SCREW, CAP, SOCKET HEAD	4
10	PAHZZ	5310-00-846-4647	19200	8587441	WASHER, SPRING TENSION	1
11	PAHZZ	3010-00-896-2243	19200	8587376	CLUTCH HALF, POSITIVE	1
12	PAHZZ	5330-00-845-5641	19200	8587449-5	PACKING, PREFORMED	1
13	XAHHH		19200	8587402	ELBOW ASSEMBLY, SEE	1
				FIG. B-7	FOR BREAKDOWN	
14	PAHZZ	5315-00-807-7684	96906	MS16555-603 HEADLESS	PIN, STRAIGHT,	2
15	PAFZZ	5305-00-719-5381	96906	MS51963-24	SETSCREW	2
16	PAFZZ	5340-00-087-2729	19200	8619986	DISK, SOLID, PLAIN	2
17	PAFZZ	5340-00-464-4792	19200	10516567	STRAP, RETAINING	1
18	PAFZZ	4820-00-114-1096	96906	MS51607-1	VALVE STEM, PURGING	1
19	PAOZZ	2640-00-060-3543	96906	MS51377-2	VALVE CORE	1
20	PAOZZ	1015-01-235-0223	19200	8200055	CAP, AIR VALVE	1
21	PAFZZ	5305-00-717-6949	96906	MS51963-10	SETSCREW	2
22	PAOZZ	5305-00-057-0523	96906	MS51958-27	SCREW, MACHINE	1
23	PAOZZ	5340-00-847-6251	19200	8587448	CLAMP, LOOP	1
24	PAOZZ	1240-00-846-4649	19200	8587345	EYESHIELD, OPTICAL	1
25	PAFZZ	5305-00-054-5646	96906	MS51957-12	SCREW, MACHINE	2
26	PAFZZ	5340-00-915-5720	19200	8587493	STOPP	1
27	PAFZZ	5305-00-865-9516	96906	MS51029-48	SETSCREW	1
28	PCFZZ	5330-00-877-5492	19200	8587519	GASKET	1
29	PAFZZ	5340-01-157-9394	19200	8587518	COVER, ACCESS	1
30	PAFZZ	5310-00-550-3715	96906	MS35333-70	WASHER, LOCKK	8
31	PAFZZ	5305-00-054-5648	96906	MS51957-14	SCREW, MACHINE	8
32	PAHZZ	5330-00-846-8636	19200	8587419	GASKET	1
33	PAHZZ	5340-01-156-0279	19200	8587420	COVER, ACCESS	1
34	PAHZZ	5305-00-770-2533	96906	MS51959-13	SCREW, MACHINE	4
35	PAFZZ	5340-01-156-0278	19200	8587418	COVER, ACCESS	1
36	PCFZZ	5330-00-846-6616	19200	8587417	GASKET	1
37	PAHZZ	5315-00-939-1146	96906	MS16555-605	PIN, STRAIGHT, HEADLESS	2
38	PAHZZ	5305-00-724-5396	96906	MS51964-9	SETSCREW	1
39	PAHZZ	5305-00-716-7921	96906	MS51974-8	SETSCREW	3
40	PAHZZ	5330-00-846-6879	19200	8587449-2	PACKING, PREFORMED	1

END OF FIGURE

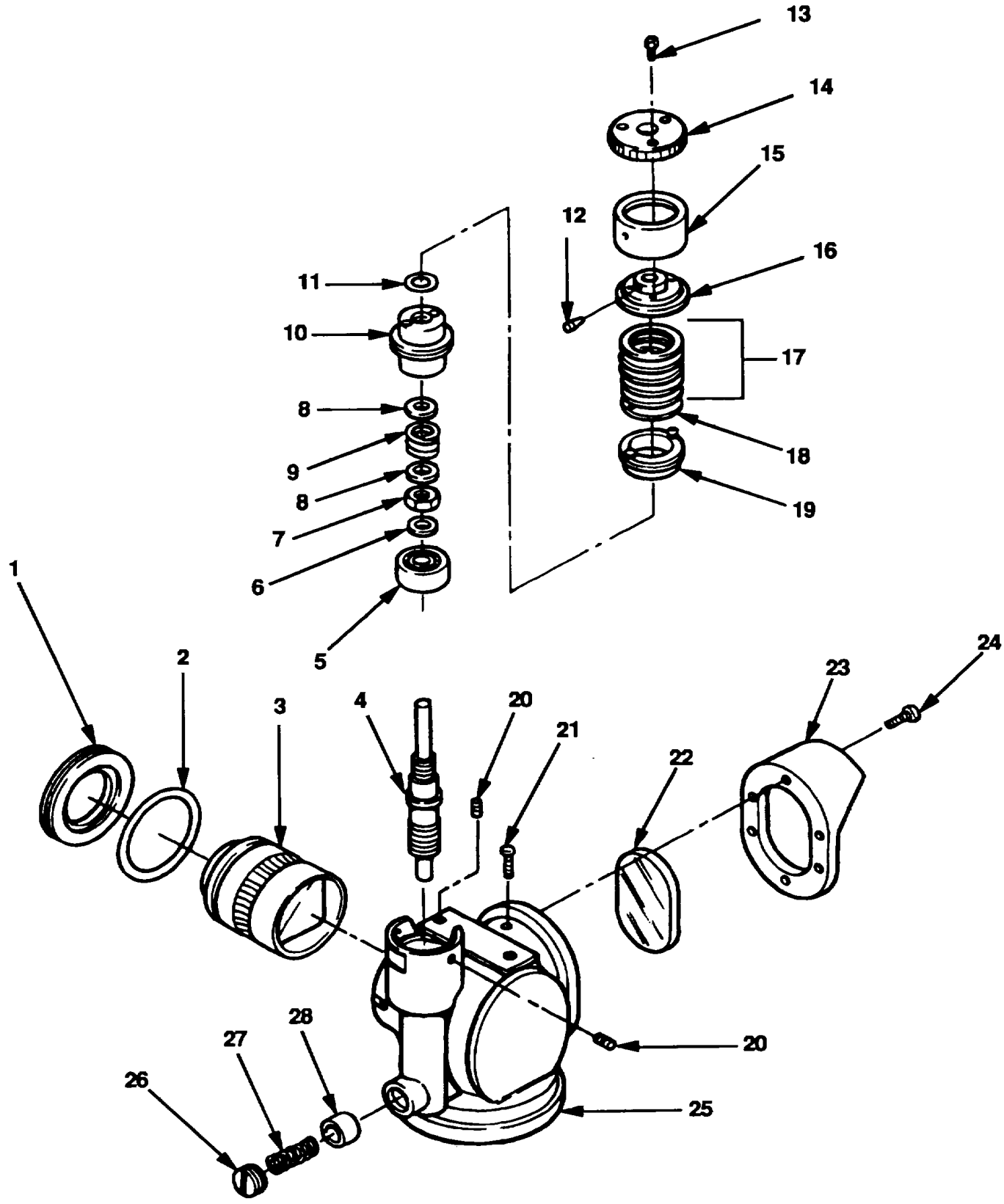


Figure B-3. Head Assembly 8587416.

(1) ITEM NO	(2) SMR	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 010101	
					FIG.B-3 HEAD ASSEMBLY 8587416	
1	PAHZZ	5365-00-893-5244	19200	8587514	RING, EXTERNALLY THREADED	1
2	PAHZZ	5330-00-143-8759	19200	8587449-4	PACKING, PREFORMED	1
3	PAHZZ	6650-00-756-3760	19200	8624901	CELL ASSEMBLY, OPTIC	1
4	PAHZZ	3040-00-851-1012	19200	8587362	WORM SHAFT	1
5	PAHZZ	3110-01-166-9642	19200	8587371	BEARING, BALL, ANNULAR	1
6	PAHZZ	5310-00-846-8640	19200	8587369	WASHER, FLAT	1
7	PAHZZ	5310-01-157-9366	19200	8587370	NUT, SELF-LOCKING, HEX	1
8	PAHZZ	5310-00-392-6983	28569	7090-4	WASHER, NON-METALLIC	2
9	PAHZZ	5360-00-899-2162	19200	8587368	SPRING, HELICAL, COMP	1
10	PAHZZ	1240-00-052-4041	19200	8587365	RETAINER, HOLDER	1
11	PAHZZ	5330-00-845-5642	19200	8587397-1	PACKING, PREFORMED	1
12	PAHZZ	5315-01-213-5557	21450	426785	PIN, TAPERED, PLAIN	1
13	PAHZZ	5305-00-057-0498	96906	MS51958-2	SCREW, MACHINE	3
14	PAHZZ	5355-01-157-0583	19200	8587361	KNOB	1
15	PAHZZ	5355-00-898-6798	19200	8587410	MICROMETER	1
16	PAHZZ	5340-00-052-3946	19200	8587433	ADAPTER, MICROMETER	1
17	PAHZZ	5310-00-504-9929	19200	5049929	WASHER, KEY	6
18	PAHZZ	5310-00-504-9930	19200	5049930	WASHER, KEYY	1
19	PAHZZ	3120-01-157-0666	19200	8587364	ADAPTER ASSEMBLY	1
20	PAHZZ	5305-00-285-4687	21450	588608	SETSCREW	5
21	PAOZZ	5305-00-857-5190	19200	10555157-16	SCREW, MACHINE	1
22	PAHZZ	5355-00-846-4789	19200	8261695	WINDOW, OBSERVATION	1
23	PAHZZ	9340-01-155-9342	19200	8587366	FRAME, OBSERVATION WINDOW	1
24	PAHZZ	5305-00-054-5636	96906	MS51957-2	SCREW, MACHINE	6
25	PAHZZ	1240-01-209-8383	19200	8587360	HEAD, ROTATING	1
26	PAHZZ	5365-00-278-5325	19200	5039406	PLUG, MACHINE THREAD	1
27	PAHZZ	5360-00-899-2159	19200	8587372	SPRING, HELICAL COMP	1
28	PAHZZ	3120-00-080-9562	96906	MS35689-1	BEARING, V	1

END OF FIGURE

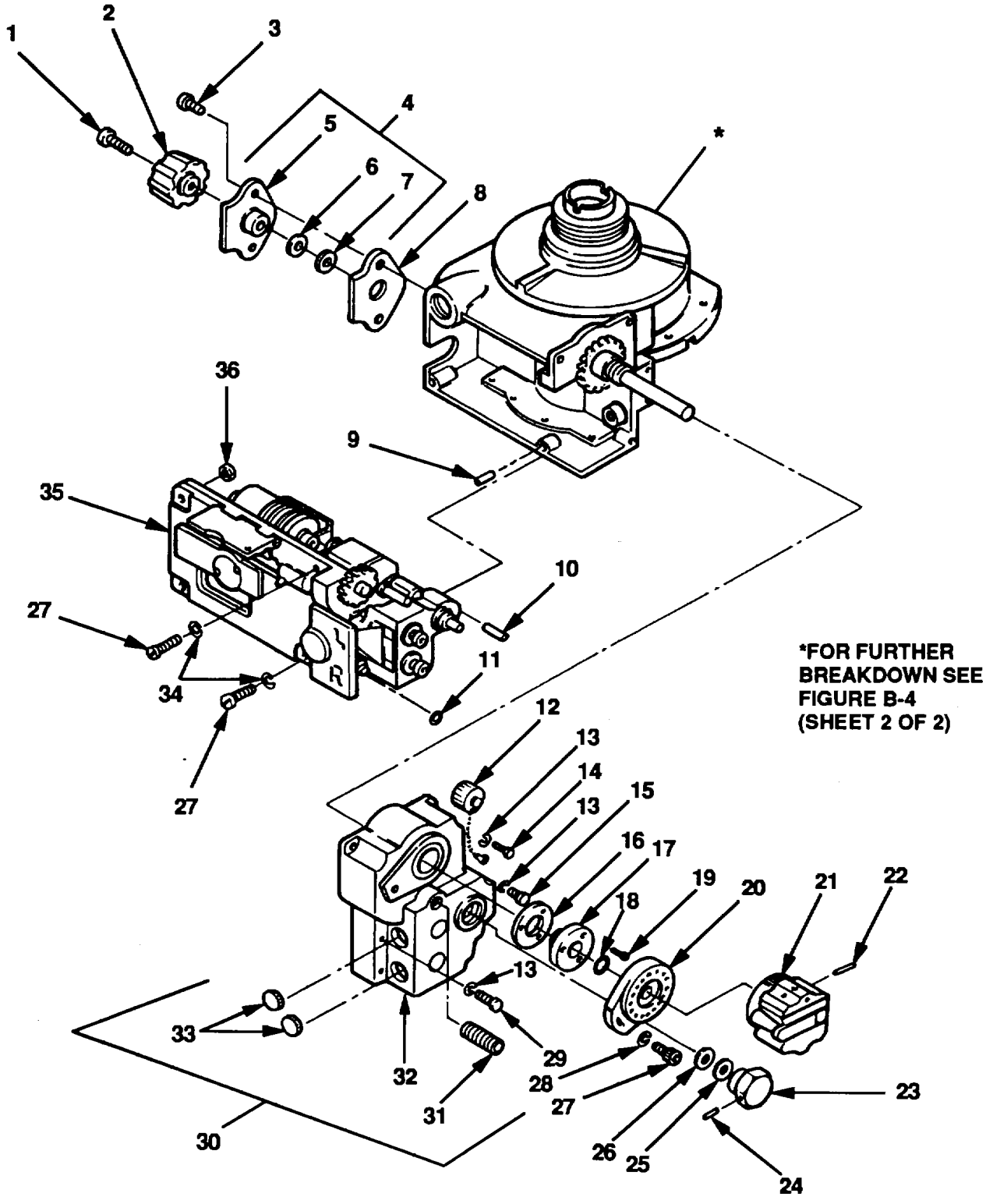


Figure B-4. Body Assembly 8587534, Cover Assembly 10541411, and Telescope Subassembly 10541428- Partial Exploded View (Sheet 1 of 2).

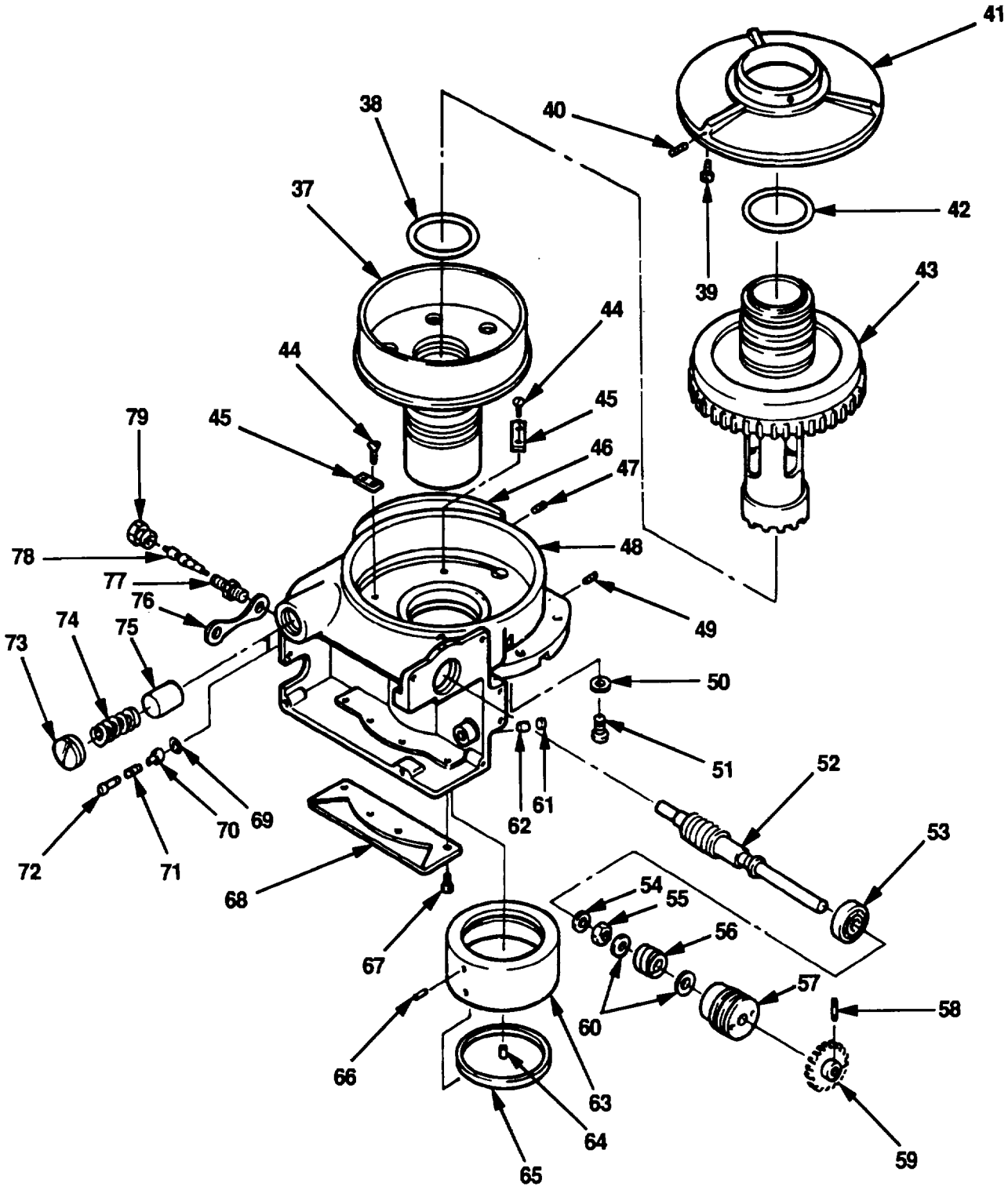


Figure B-4. Body Assembly 8587534, Cover Assembly 10541411, and Telescope Subassembly 10541428 - Partial Exploded View (Sheet 2 of 2).

(1) ITEM NO	(2) SMR	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUPS 010102,01010203,AND 01010204 FIG.B-4 BODY ASSEMBLY 8587534,COVER ASSEMBLY 10541411,AND TELESCOPE SUBASSEMBLY 10541428	
1	PAFZZ	5305-00-959-2710	96906	MS35190-203	SCREW, MACHINE	1
2	PAFZZ	5355-00-898-9908	19200	8215762	KNOB	1
3	PAHZZ	5305-00-889-3116	96906	MS35206-213	SCREW, MACHINE	2
4	PAHHH	5340-00-832-5499	19200	10541411	COVER ASSEMBLYY	1
5	XAHZZ		19200	10540483	COVER	1
6	PAHZZ	5330-00-752-7783	19200	8587397-3	PACKING, PREFORMED	1
7	PAHZZ	5330-01-134-8758	19200	10540478	RETAINER, PACKING	1
8	PCHZZ	5330-00-891-5651	19200	8587473	GASKET	1
9	PAHZZ	5315-00-052-9301	96906	MS16556-619	PIN, STRAIGHT, HEADLESS	1
10	PAHZZ	5315-00-848-7829	96906	MS16556-602	PIN, STRAIGHT, HEADLESS	2
11	PAHZZ	5310-00-052-0275	19200	10553377	SPACER	7
12	PAFZZ	5340-00-944-8036	19200	10541481	CAP, ASSEMBLY	1
13	PAFZZ	5310-00-933-8118	96906	MS35338-135	WASHER, LOCKK	7
14	PAFZZ	5305-00-054-5649	96906	MS51957-15	SCREW, MACHINE	1
15	PAHZZ	5305-00-054-5650	96906	MS51957-16	SCREW, MACHINE	4
16	PCHZZ	5330-00-928-9452	19200	10540479	GASKET	1
17	PAHZZ	3120-00-133-6379	19200	10540484	BEARING, SLEEVE	1
18	PAHZZ	5300-00-845-5643	19200	8587397-2	PACKING, PREFORMED	1
19	PAHZZ	5305-00-889-3118	96906	MS35206-203	SCREW, MACHINE	3
20	PAFZZ	9515-00-936-5397	19200	10540482	PLATE, METAL	1
21	PAFZZ	5355-00-898-6791	19200	8587348	KNOB ASSEMBLY	1
22	PAFZZ	5315-00-082-4858	96906	MS16556-621	PIN, STRAIGHT, HEADLESS	1
23	PAHZZ	5355-00-927-3400	19200	10540481	KNOB	1
24	PAHZZ	5315-00-807-7957	96906	MS16555-608	PIN, STRAIGHT, HEADLESS	1
25	PAHZZ	5365-00-177-4092	19200	10559199-1	SHIM (0.004)	V
25	PAHZZ	5365-00-177-4093	19200	10559199-2	SHIM (0.006)	V
25	PAHZZ	5365-00-177-4091	19200	10559199-3	SHIM (0.008)	V
26	PAHZZ	5330-00-944-8040	19200	10540480	SEAL	1
27	PAFZZ	5305-00-990-6381	96906	MS16995-19	SCREW, CAP, SOCKET HE	3
28	PAFZZ	5310-00-616-3555	96906	MS35333-71	WASHER, LOCK	1
29	PAHZZ	5305-00-054-5653	96906	MS51957-19	SCREW, MACHINE	2
30	PAHHH	1240-01-156-0313	19200	10541428	TELESCOPE SUBASSEMBLY	1
31	PAHZZ	5365-00-782-9876	19200	10541484	SLEEVE SPECIAL	1
32	XAHZZ		19200	10541416	COVER	1
33	PAHZZ	1240-00-898-9907	19200	7660566	WINDOW, OBSERVATION	2
34	PAHZZ	5310-00-929-6395	96906	MS35338-136	WASHER, LOCK	4
35	XAHHH		19200	8587468	ADAPTER ASSEMBLY, SEE FIG. B-6 FOR BREAKDOWN	1
36	PAHZZ	5310-00-052-0276	19200	10553376	SPACER	4
37	PAHZZ	1290-01-157-0669	19200	8587392	SUPPORT	1
38	PAHZZ	5330-00-846-4650	19200	8587449-6	PACKING, PREFORMED	1

(1) ITEM NO	(2) SMR	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
39	PAHZZ	1240-01-206-0145	19200	8587389	PLUG ASSEMBLY	3
40	PAHZZ	5305-01-179-7806	21450	588611	SETSCREWW	3
41	PAHZZ	5340-00-993-4905	19200	8587388	COVER	1
42	PAHZZ	5330-00-845-5639	19207	8587449-1	PACKING, PREFORMED	1
43	PAHHH	1240-01-205-0369	19200	8587400	WORM ASSEMBLY, OPTIC, SEE FIG. B-5 FOR BREAKDOWN	1
44	PAHZZ	5305-00-766-2422	96906	MS51959-1	SCREW, MACHINE	4
45	PAHZZ	5365-01-209-1794	19200	8587507	SPACER, PLATEE	2
46	MHHZZ	81349	MILW76	WIRE LW-C-20	MAKE FROM WIRE P/N MILW16878-5	2
47	PAHZZ	5305-00-051-4495	96906	MS51973-17	SETSCREW	3
48	XAHZZ		19200	8587497	BODY	1
49	PAHZZ	5305-00-719-5329	96906	MS51963-20	SETSCREW	2
50	PAHZZ	5365-00-993-4899	19200	8587411	INSULATOR	1
51	PAHZZ	5940-00-993-4901	19200	8587412	CONTACT	1
52	PAHZZ	3040-00-894-4431	19200	8587413	WORM SHAFT	1
53	PAHZZ	3110-00-554-6085	19200	8293172	BEARING, BALL, ANNULAR	1
54	PAHZZ	5310-00-820-2210	19200	7674690	WASHER, THRUST	1
55	PAHZZ	5310-00-892-6816	96906	MS21044C5	NUT, SELF-LOCKING, HEX	1
56	PAHZZ	5360-00-846-6610	19200	7659439	SPRING, HELICAL COMP	1
57	PAHZZ	1240-01-157-0763	19200	8587415	RETAINER, OPTICAL EL	1
58	PAHZZ	5315-00-187-3226	96906	MS24692-27	PIN, TAPERED, PLAIN	1
59	PAHZZ	3020-00-977-1244	19200	10541427	GEAR, SPUR	1
60	PAHZZ	5310-00-846-4632	19200	8215753	WASHER, NONMETALLIC	2
61	PAHZZ	5305-00-865-9516	96906	MS51029-48	SETSCREW	1
62	PAHZZ	5305-00-899-2165	19200	7660571	SETSCREW	1
63	XAHZZ		19200	8587373	COLLAR	1
64	PAHZZ	5315-00-949-3909	96906	MS16556-603	PIN, STRAIGHT, HEADLESS	2
65	PAHZZ	5310-00-993-4896	19200	8587374	NUT, PLAIN, ROUND	1
66	PAHZZ	5305-00-716-7932	96906	MS51974-2	SETSCREW	4
67	PAHZZ	5305-00-770-2579	96906	MS51959-15	SCREW, MACHINE	4
68	XAHZZ		19200	8587494	GUIDE	1
69	PAHZZ	5365-00-804-6895	80205	NAS51-12	RING, RETAINING	1
70	PAHZZ	5970-00-850-4337	19200	8587328	INSULATOR, BUSHING	1
71	PAHZZ	5360-00-899-2164	19200	8587326	SPRING, HELICAL, COMP	1
72	PAHZZ	5999-00-895-9191	19200	8587327	CONTACT, ELECTRICAL	1
73	PAFZZ	5365-00-893-5886	19200	8587460	PLUG, MACHINE THREAD	1
74	PAFZZ	5360-00-848-8660	19200	8587474	SPRING, HELICAL, COMP	1
75	PAHZZ	5340-00-927-7290	19200	8587432	PLUNGER	1
76	PAFZZ	5340-00-464-4792	19200	10516567	STRAP, RETAINING	1
77	PAFZZ	4820-00-114-1096	96906	MS51607-1	VALVE STEM, PURGING	1
78	PAOZZ	2640-00-060-3543	96906	MS51377-2	VALVE COREE	1
79	PAOZZ	1015-01-235-0223	19200	8200055	CAP, AIR VALVE	1

END OF FIGURE

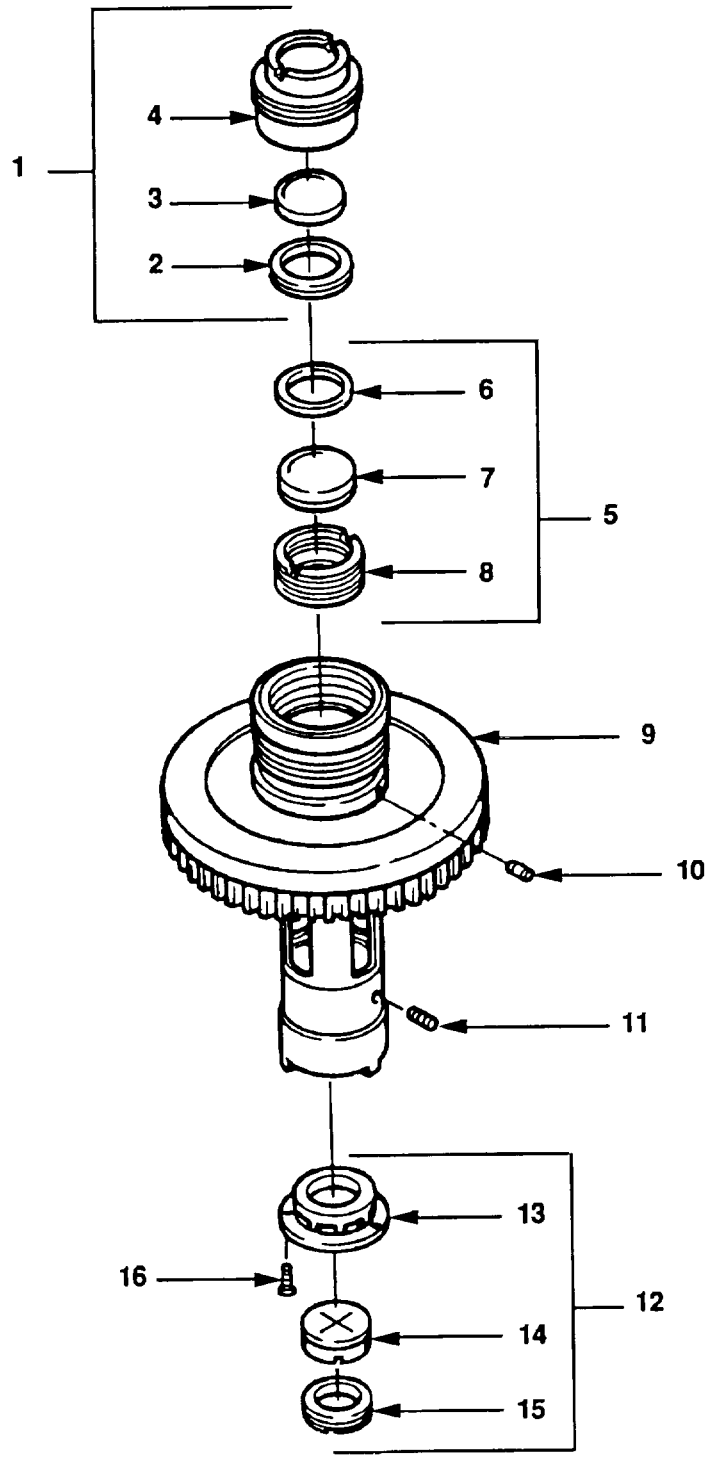


Figure B-5. Worm Assembly, Optical Instrument 8587400, Cell Assembly, Optical Instrument Collective 8587297, Cell Assembly, Optical Instrument Objective 8587296, and Reticle Assembly 8587375 - Exploded View.

SECTION II

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUPS 01010201, 0101020101, AND 0101020103 FIG.B-5 WORM ASSEMBLY, OPTICAL INSTRUMENT 8587400, CELL ASSEMBLY, OPTICAL INSTRUMENT COLLECTIVE 8587297, CELL ASSEMBLY, OPTICAL INSTRUMENT OBJECTIVE 8587296, AND RETICLE ASSEMBLY 8587375	
1	AHHHH		19200	8587297	CELL ASSEMBLY, OPTICAL INSTRUMENT COLLECTIVE	1
2	PAHZZ	1240-00-851-9689	19200	8587357	. . CELL, OPTICAL ELEMENT	1
3	PAHZZ	6650-00-899-5144	19200	8587316	. . LENS, OPTICAL INSTRUMENT.....	1
4	PAHZZ	1240-01-204-5974	19200	8587358	. .CELL, OPTICAL ELEMENT	1
5	AHHHH		19200	8587296	CELL ASSEMBLY, OPTICAL INSTRUMENT OBJECTIVE.....	1
6	PAHZZ	6650-00-899-5145	19200	8587317	. . RETAINER.....	1
7	PAHZZ	5365-00-899-7643	19200	8587352	. . LENS.....	1
8	PAHZZ	1240-00-135-4549	19200	8587353	. . CELL, OPTICAL ELEMENT	1
9	XAHZZ	3020-01-159-2222	19200	8587393	GEAR, WORM WHEEL	1
10	PAHZZ	5305-00-724-5793	96906	MS51964-18	SETSCREW	1
11	PAHZZ	5305-00-716-7921	96906	MS51974-8	SETSCREW	1
12	AHHHH		19200	8587375	RETICLE ASSEMBLY.....	1
13	PAHZZ	3020-00-898-6801	19200	8587378	. . GEAR, SPUR.....	1
14	PAHZZ	6650-00-898-4215	19200	8587447	. . CELL ASSEMBLY, OPTICAL INSTRUMENT	1
15	PAHZZ	5365-00-846-4747	19200	8587356	. . RETAINER.....	1
16	PAHZZ	5305-00-701-5230	96906	MS51960-8	SCREW, MACHINE	3
					END OF FIGURE	

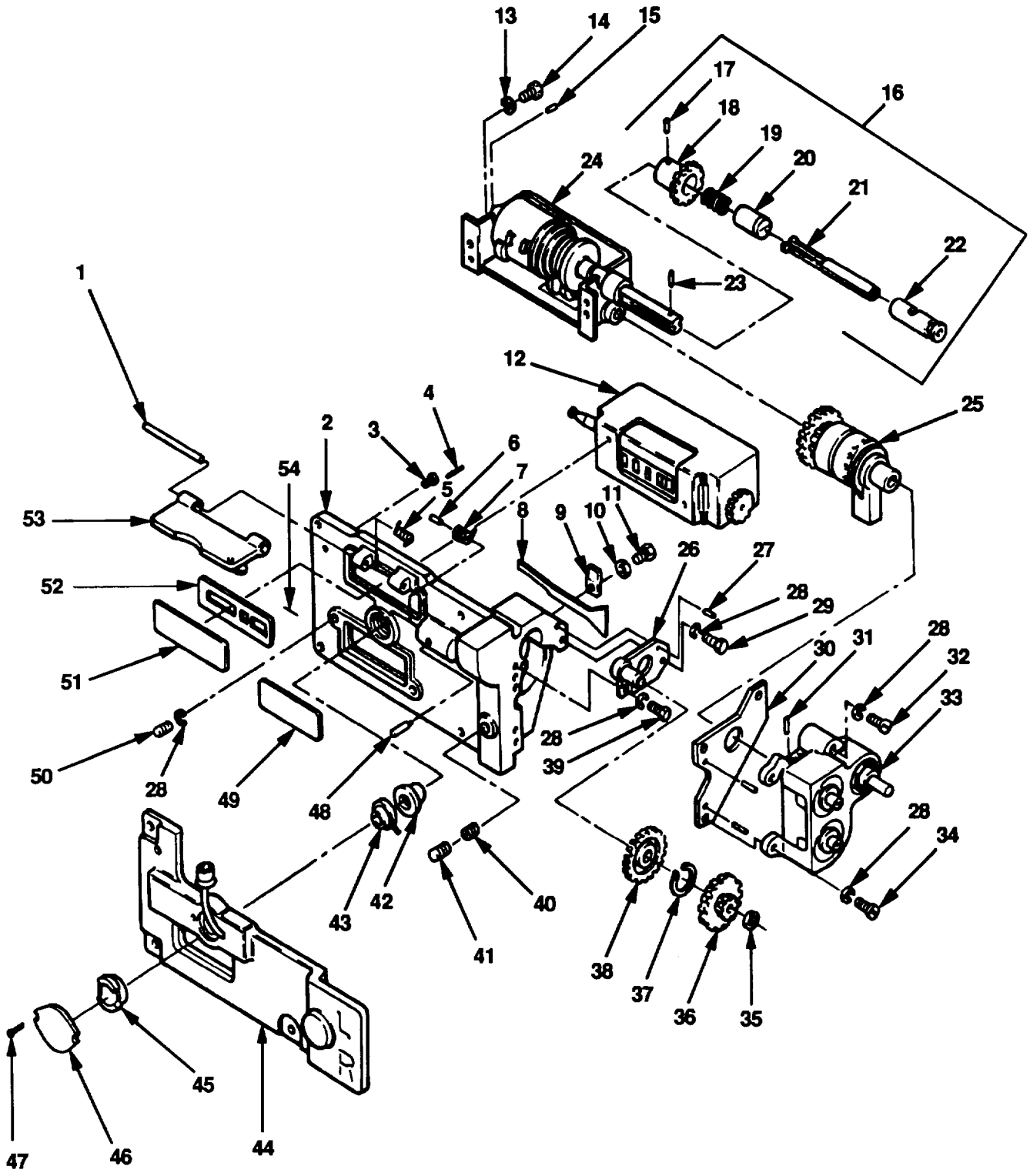


Figure B-6. Adapter Assembly 8587468 and Counter Assembly 8587453.

SECTION II

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUPS 01010202 AND 0101020201 FIG.B-6 ADAPTER ASSEMBLY 8587468 AND COUNTER ASSEMBLY 8587453	
1	PBFZZ	5315-00-927-3399	19200	8215936	PIN, STRAIGHT, HEADLESS	1
2	XAHZZ		19200	8587496	ADAPTER	1
3	PAHZZ	5365-00-847-6253	19207	8262092	PLUG, MACHINE THREAD	1
4	PAHZZ	5315-00-850-4341	19200	7660591	PIN, SHOULDER, HEADLESS	1
5	PAFZZ	5360-00-849-2973	19200	8587478	SPRING, HELICAL, TORSION	1
6	PAFZZ	5340-00-898-6797	19200	8587472	PLUNGER, DETENT	1
7	PAFZZ	5360-00-893-6095	19200	8262100	SPRING, HELICAL, COMP	1
8	PAHZZ	6695-00-944-8066	19200	10539232	LIGHT CONDUCTOR, INS	1
9	PAHZZ	5340-00-328-5635	19200	7660575	STRAP, RETAINING	1
10	PAHZZ	5310-00-928-2690	96906	MS35338-134	WASHER, LOCK	1
11	PAHZZ	5305-00-054-5636	96906	MS51957-2	SCREW; MACHINE	1
12	PAHZZ	6680-00-907-0737	19200	8587543	COUNTER, ROTATING	1
13	PAHZZ	5310-00-929-6395	96906	MS35338-136	WASHER, LOCK	2
14	PAHZZ	5305-00-054-6651	96906	MS51957-27	SCREW, MACHINE	2
15	PAHZZ	5315-00-949-3909	96906	MS16556-603	PIN, STRAIGHT, HEADLESS	2
16	AHHHH		19200	8587453	COUNTER ASSEMBLY	1
17	PAHZZ	5315-00-187-3226	96906	MS24692-27	. . PIN, TAPERED, PLAIN	1
18	PAHZZ	3020-007846-6882	19200	8587455	. . GEAR, SPUR	1
19	PAHZZ	5360-00-179-1391	19200	10547435	. . SPRING, HELICAL, COMP	1
20	PAHZZ	3010-00-898-4216	19200	8587456	. . CLUTCH HALF, POSITIVE	1
21	PAHZZ	3040-00-898-6799	19200	8587475	. . SHAFT, STRAIGHT	1
22	PAHZZ	3040-00-896-2247	19200	8587454	. . GEARSHAFT, SPUR	1
23	PAHZZ	5315-00-089-4942	21450	505257	. . PIN, STRAIGHT, HEADLESS	1
24	PAHZZ	6680-00-896-9049	19200	8215837	. . COUNTER, ROTATING	1
25	PAHZZ	3040-00-027-2615	19200	8587531	DIFFERENTIAL GEAR, U	1
26	PAHZZ	1240-01-156-0314	19200	8587450	PLATE, RIVETED, ASSEM	1
27	PAHZZ	5315-00-848-7829	96906	MS16556-602	PIN, STRAIGHT, HEADLESS	4
28	PAHZZ	5310-00-933-8118	96906	MS35338-135	WASHER, LOCK	7
29	PAHZZ	5305-00-054-5648	96906	MS51957-14	SCREW, MACHINE	1
30	PAHZZ	1240-01-146-7722	19200	7660428	PLATE, GEAR ASSEMBLY	1
31	PAHZZ	5315-00-060-4760	96906	MS16556-606	PIN, STRAIGHT, HEADLESS	1
32	PAHZZ	5305-00-054-5654	96906	MS51957-20	SCREW, MACHINE	1
33	PAFZZ	3040-01-339-0478	19200	9360111	HOUSING, MECHANICAL	1
34	PAHZZ	5305-00-054-5651	96906	MS51957-17	SCREW, MACHINE	2
35	PAHZZ	5365-00-432-3584	96906	MS16624-5018-1	RING, RETAINING	1
36	PAHZZ	3020-00-052-3971	19200	8587470	GEAR CLUSTER	1
37	PAHZZ	5365-00-899-5141	19200	8262101	RING, RETAINING	1

SECTION II

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
38	PAHZZ	3020-00-052-4059	19200	8587469	GEAR, SPUR	1
39	PAHZZ	5305-00-054-5647	96906	MS51957-13	SCREW, MACHINE	1
40	PAHZZ	5305-00-899-2165	19200	7660571	SETSCREW	1
41	PAHZZ	5305-00-865-9516	96906	MS51029-48	SETSCREW	1
42	PAHZZ	6210-00-896-2246	19200	8215819	LENS, LIGHT	1
43	PAHZZ	5995-00-050-5969	19200	10543306-6	LEAD, ELECTRICAL	1
44	PAFZZ	5999-01-301-5468	19200	12599274	OVERLAYY	1
45	PAHZZ	5365-00-898-4222	19200	8247732	RING, EXTERNALLY THREADED	1
46	PAFZZ	5340-01-287-1464	19200	12599292	CAP, PROTECTIVE, DUST	1
47	PAFZZ	5305-00-941-3538	96906	MS35275-201	SCREW, MACHINE	2
48	PAHZZ	5340-00-764-1669	19200	8262098	POST, MECHANICAL-MEC	1
49	PAHZZ	5355-00-847-2697	19200	8262104	WINDOW, OBSERVATION	1
50	PAHZZ	5305700-057-0509	96906	MS51958-12	SCREW, MACHINE	2
51	PAHZZ	5355-00-847-2698	19200	8262105	WINDOW, OBSERVATION	1
52	PAHZZ	1240-00-116-3421	19200	7660596	MASK	1
53	PAFZZ	5340-01-293-2136	19200	12599352	DOOR, ACCESS	1
54	PAHZZ	9525-00-116-3429	19200	8262091	INDEXX	1

END OF FIGURE

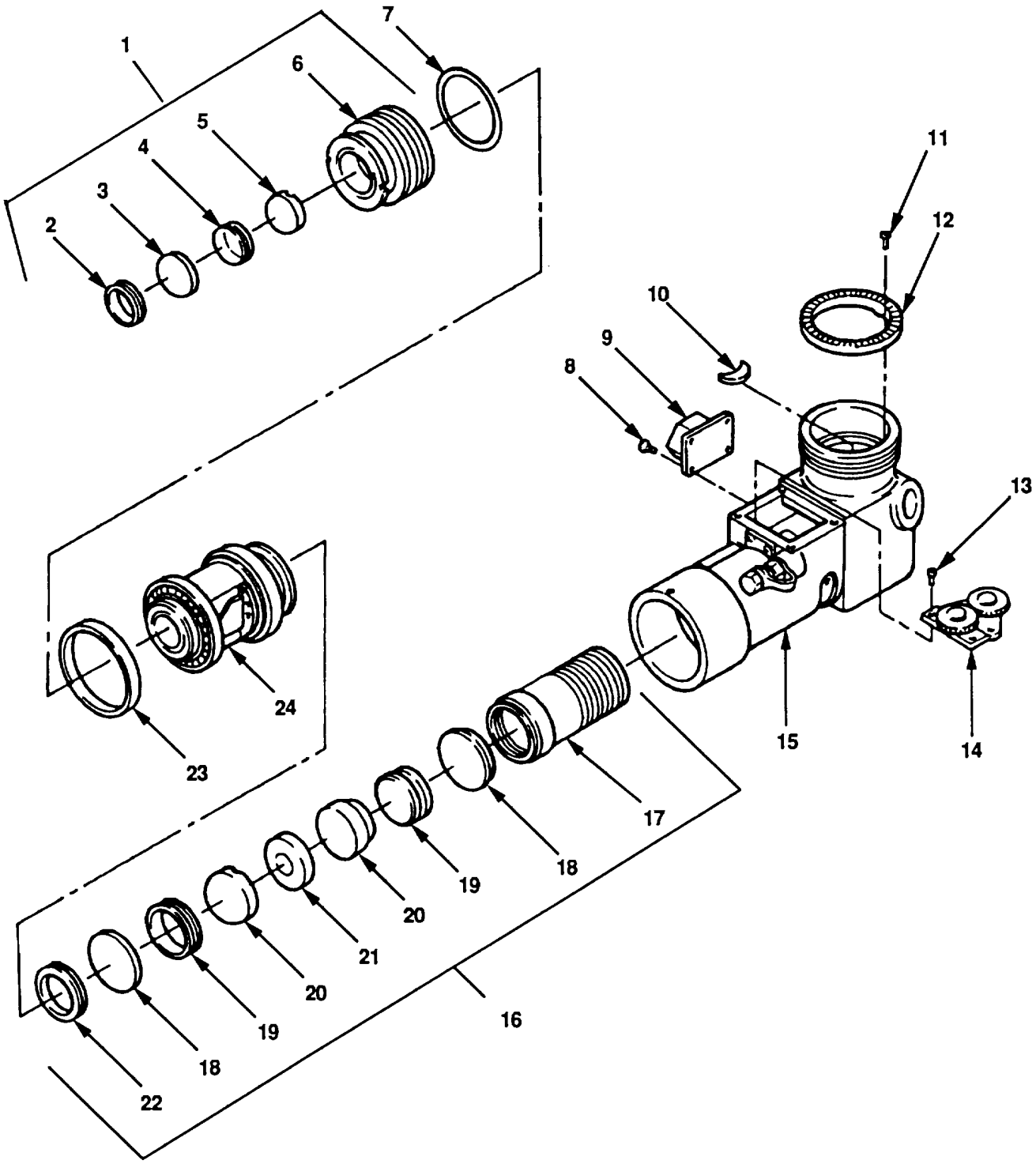


Figure B-7. Elbow Assembly 8587402, Eyepiece Assembly 8587408, and Cell Assembly, Optical Instrument 8587540.

SECTION II

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUPS 010103, 01010301, AND 01010302 FIG.B-7 ELBOW ASSEMBLY 8587402, EYEPIECE ASSEMBLY 8587408, AND CELL ASSEMBLY, OPTICAL INSTRUMENT 8587540	
1	AHHHH		19200	8587408	EYEPIECE ASSEMBLY	1
2	PAHZZ	1240-00-848-8658	19200	8587343	. . RETAINER, OPTICAL ELEMENT	1
3	PAHZZ	6650-00-504-9914	19200	5049914	. . LENS, OPTICAL INSTRUMENT	1
4	PAHZZ	1240-01-213-1231	19200	8587386	. . SPACER, OPTICAL ELEMENT	1
5	PAHZZ	6650-00-504-9915	19200	5049915	. . LENS, OPTICAL INSTRUMENT	1
6	PAHZZ	1240-00-899-6319	19200	8587354	. . CELL, OPTICAL ELEMENT	1
7	PAHZZ	5330-00-845-5640	19200	8587449-3	PACKING, PREFORMED	1
8	PAHZZ	5305-00-054-5649	96906	MS51957-15	SCREW, MACHINE	4
9	PAHZZ	6650-00-896-2250	19200	8587444	PRISM, OPTICAL INSTRUMENT	1
10	PAHZZ	9330-01-213-1226	19200	8587414	WINDOW, OBSERVATION	1
11	PAHZZ	5305-00-639-4759	96906	MS35249-3	SCREW, MACHINE	1
12	PAHZZ	3010-00-898-4220	19200	8587377	CLUTCH HALF, POSITIVE	1
13	PAHZZ	5305-00-068-5276	96906	MS16995-9	SCREW, CAP, SOCKET HE	4
14	PAHZZ	3020-01-157-0667	19200	8587387	GEAR CLUSTER	1
15	XAHZZ		19200	8587351	ELBOW	1
16	AHHHH		19200	8587540	CELL ASSEMBLY, OPTICAL INSTRUMENT	1
17	PAHZZ	1240-01-212-8576	19200	8587355	. . CELL, OPTICAL ELEMENT	1
18	PAHZZ	6650-00-848-9892	19200	8587319	. . LENS, OPTICAL INSTRUMENT	2
19	PAHZZ	1240-01-213-1230	19200	8587385	. . SPACER, OPTICAL ELEMENT	2
20	PAHZZ	6650-00-891-9850	19200	8587318	. . LENS, OPTICAL INSTRUMENT ELEMENT	2
21	PAHZZ	1240-01-204-5981	19200	8587342	. . SPACER, OPTICAL ELEMENT	1
22	PAHZZ	1240-01-204-5983	19200	8587344	. . RETAINER, OPTICAL ELEMENT	1
23	PAHZZ	5365-00-052-4060	19200	8587341	RING, EXTERNALLY THR	1
24	PAHZZ	6650-00-896-2248	19200	8587309	CELL ASSEMBLY, OPTIC	1
					END OF FIGURE	

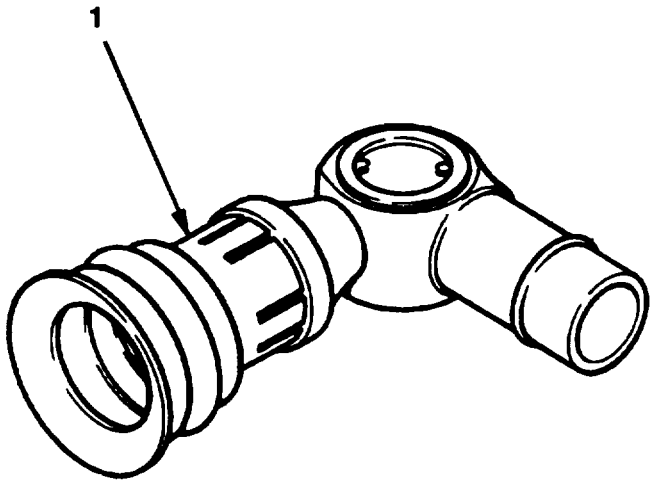


Figure B-8. Telescope, Elbow, M139 10556120 (Assembled View).

SECTION II

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 0102 FIG.B-8 TELESCOPE, ELBOW, M139 10556120 (ASSEMBLED VIEW)	
1	PAOHH	1240-00-328-5631	19200	10556120	TELESCOPE, ELBOW, M139. ..... END OF FIGURE	1

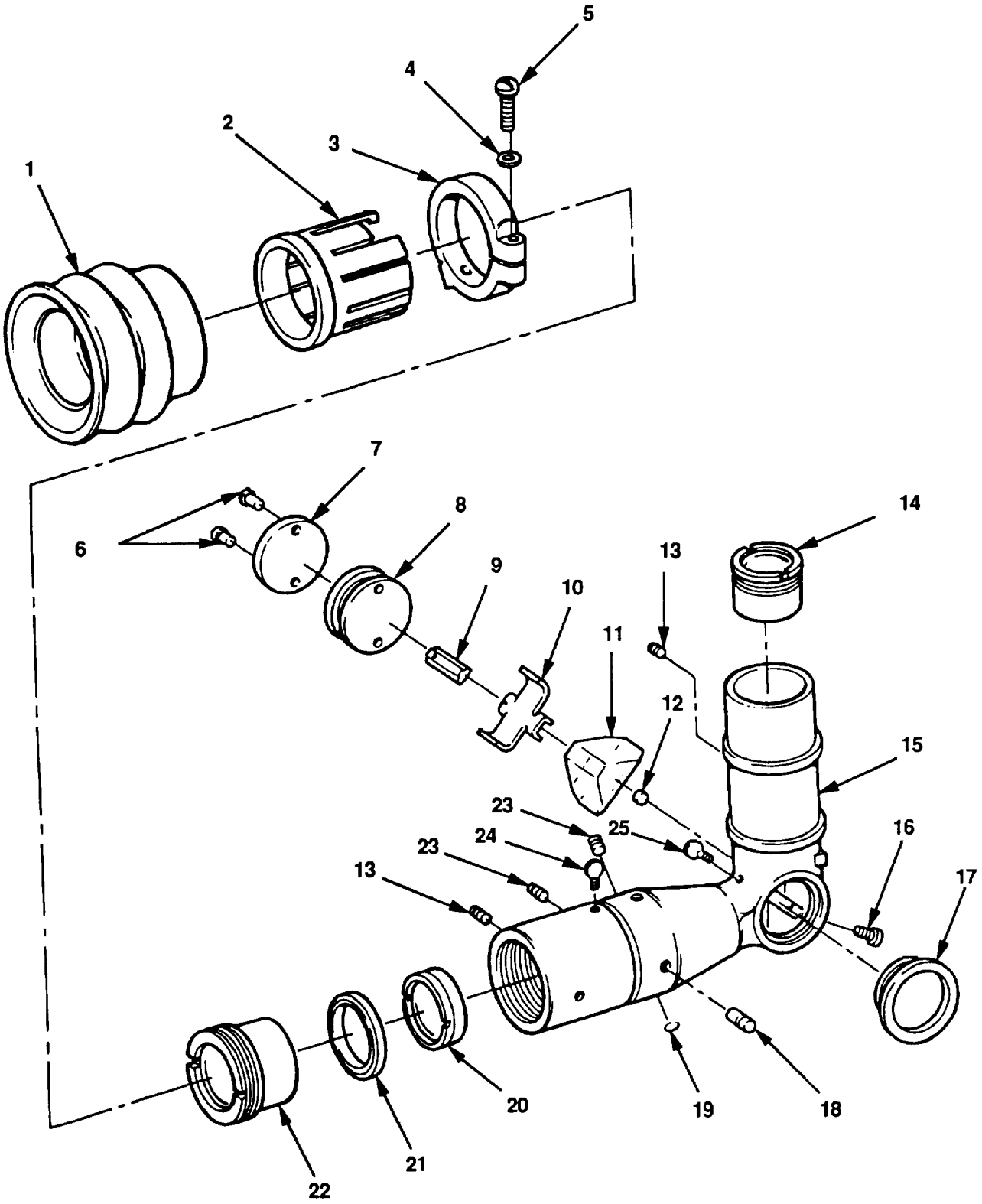


Figure B-9. Telescope, Elbow, M139 10556120.

SECTION II

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 0102 FIG.B-9 TELESCOPE, ELBOW, M139 10556120	
1	PAOZZ	1240-00-613-5751	19200	6135751	EYESHIELD, OPTICAL I	1
2	PAOZZ	1240-00-613-5750	19200	6135750	ADAPTER, TELESCOPE	1
3	PAHZZ	5340-00-763-7795	19200	7637795	CLAMP, LOOP.....	1
4	PAHZZ	5310-00-933-8120	96906	MS35338-138	WASHER, LOCK	1
5	PAHZZ	5305-00-050-9231	96906	MS51957-65	SCREW, MACHINE.....	1
6	PAHZZ	5305-00-054-5635	96906	MS51957-1	SCREW, MACHINE.....	2
7	PAHZZ	9905-00-328-5634	19200	10556121	PLATE, IDENTIFICATION.....	1
8	PAHZA	5365-01-053-0627	19200	10556122	PLUG, MACHINE THREAD.....	1
9	PAHZZ	5340-00-503-7821	19203	5037821	CLIP, SPRING TENSION.....	1
10	PAHZZ	1240-00-503-7820	19200	5037820	HOLDER, OPTICAL ELEM.....	1
11	PAHZZ	6650-00-503-6234	19200	5036234	PRISM, OPTICAL INSTR	1
12	PAHZZ	8140-00-503-2820	19200	5032820	PAD, CUSHIONING	2
13	PAHZZ	5305-00-638-1081	98810	13957-1	SETSCREW	2
14	AHHHH		19200	6139343	CELL ASSEMBLY, OPTIC, SEE FIG. B-12 FOR BREAKDOWN	1
15	XAHZZ		19200	7690840	BODY.....	1
16	PAHZZ	5305-00-760-3848	88044	MS35191-207	SCREW MACHINE.....	2
17	PAHZZ	5340-00-759-6333	19200	7596333	COVER, ACCESS	1
18	PAHZZ	5305-00-724-3439	96906	MS51031-33	SETSCREW	4
19	PAHZZ	9340-00-503-5616	19200	5035616	WINDOW, OBSERVATION	2
20	AHHHH		19200	11748290	RETICLE, ASSEMBLY, SEE	1
					FIG. B-11 FOR BREAKDOWN.	
21	PAHZZ	5365-00-285-7927	19200	5045968	RING, EXTERNALLY THR	1
22	AHHHH		19200	6139342	EYEPIECE, ASSEMBLY, SEE.....	1
					FIG. B-10 FOR BREAKDOWN	
23	PAHZZ	5305-00-068-1654	96906	MS51031-8	SETSCREW	2
24	PAOZZ	5305-00-085-3706	19200	10555157-1	SCREW, MACHINE.....	1
25	PAOZZ	5305-00-857-5190	19200	10555157-16	SCREW, MACHINE.....	1
					END OF FIGURE	

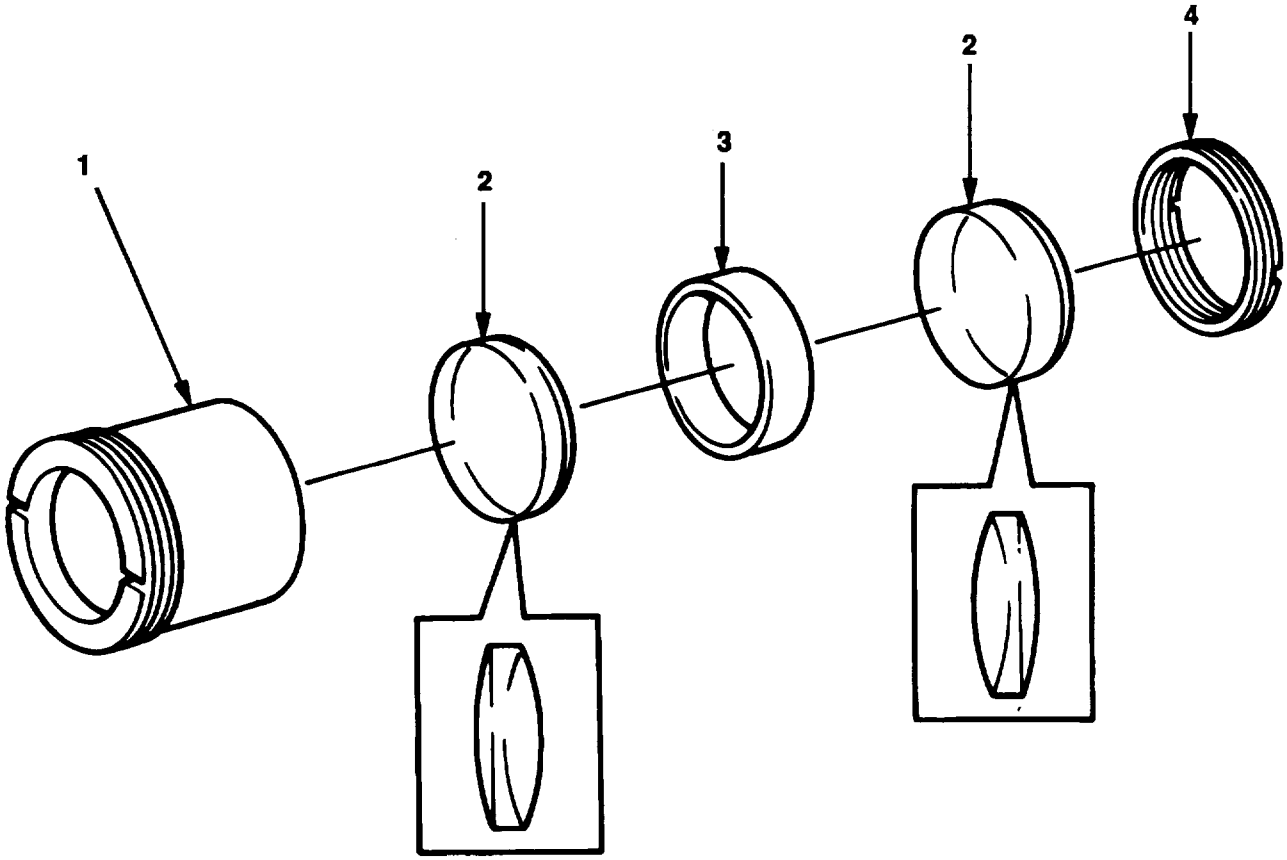


Figure B-10. Eyepiece Assembly 6139342.

SECTION II

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 010201 FIG.B-10 EYEPIECE ASSEMBLY 6139342	
1	PAHZZ	1240-00-613-6408	19200	6136408	CELL, OPTICAL ELEMENT	1
2	PAHZZ	6650-00-504-5960	19200	5045960	LENS, OPTICAL INSTRUMENT	2
3	PAHZZ	6650-00-504-5961	19200	5045961	SPACER, OPTICAL ELEM.....	1
4	PAHZZ	5365-00-285-7901	19200	5045959	RING, EXTERNALLY THREADED	1
					END OF FIGURE	

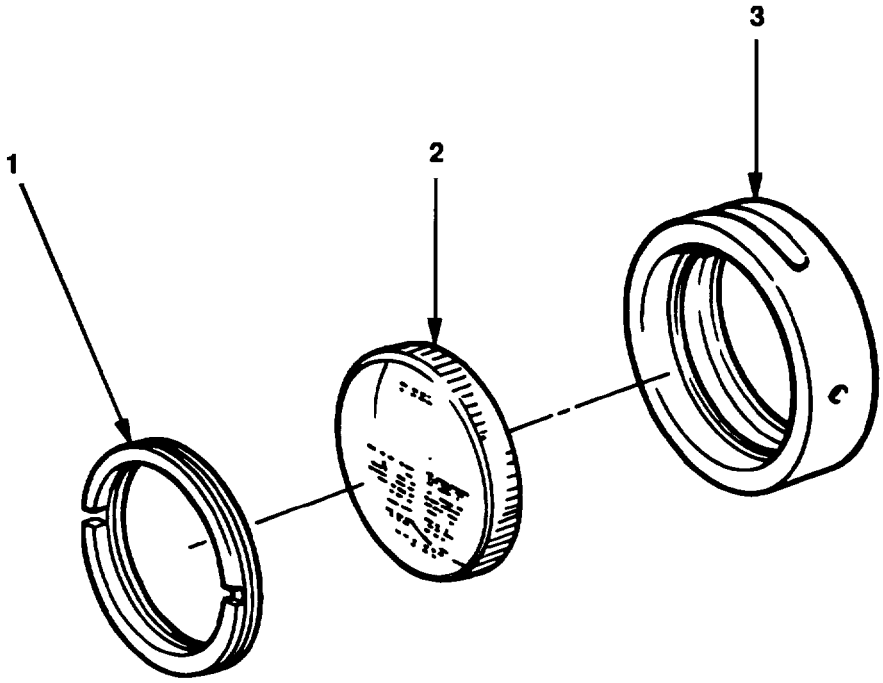


Figure B-11. Reticle Cell Assembly 11748290.

SECTION II

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 010202 FIG.B-11 RETICLE CELL ASSEMBLY 11748290	
1	PAHZZ	5365-00-292-3620	19200	5045966	RING, EXTERNALLY THREADED	1
2	PAHZZ	6650-00-328-5632	19200	11748291	RETICLE, OPTICAL INSTRUMENT.....	1
3	PAHZZ	1240-00-757-9883	19200	7579883	CELL, OPTICAL ELEMENT.....	1
					END OF FIGURE	

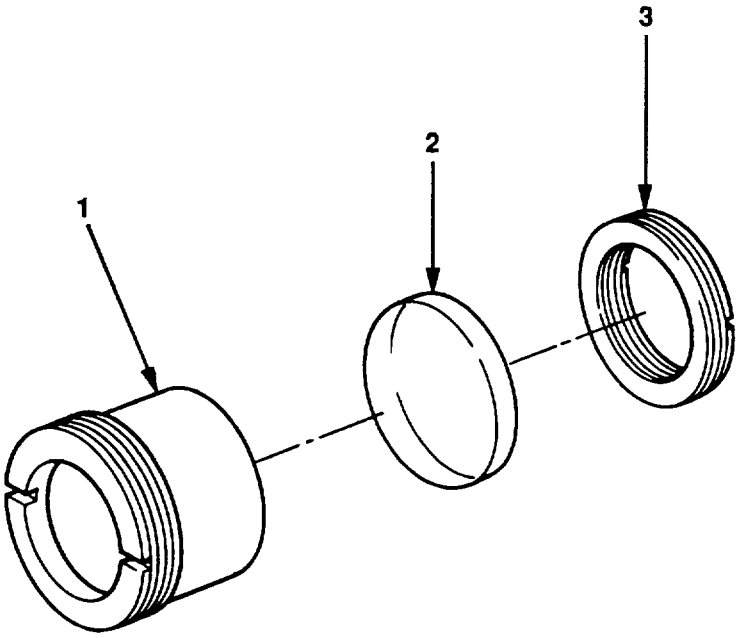


Figure B-12. Cell Assembly, Objective 6139343.

SECTION II

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 010203 FIG.B-12 CELL ASSEMBLY, OBJECTIVE 6139343	
1	PAHZZ	1240-00-613-6409	19200	6136409	CELL, OPTICAL ELEMENT	1
2	PAHZZ	6650-00-504-5963	19200	5045963	LENS, OPTICAL INSTRUMENT	1
3	PAHZZ	5365-00-597-8890	19200	5045965	RING, EXTERNALLY THREADED	1
					END OF FIGURE	

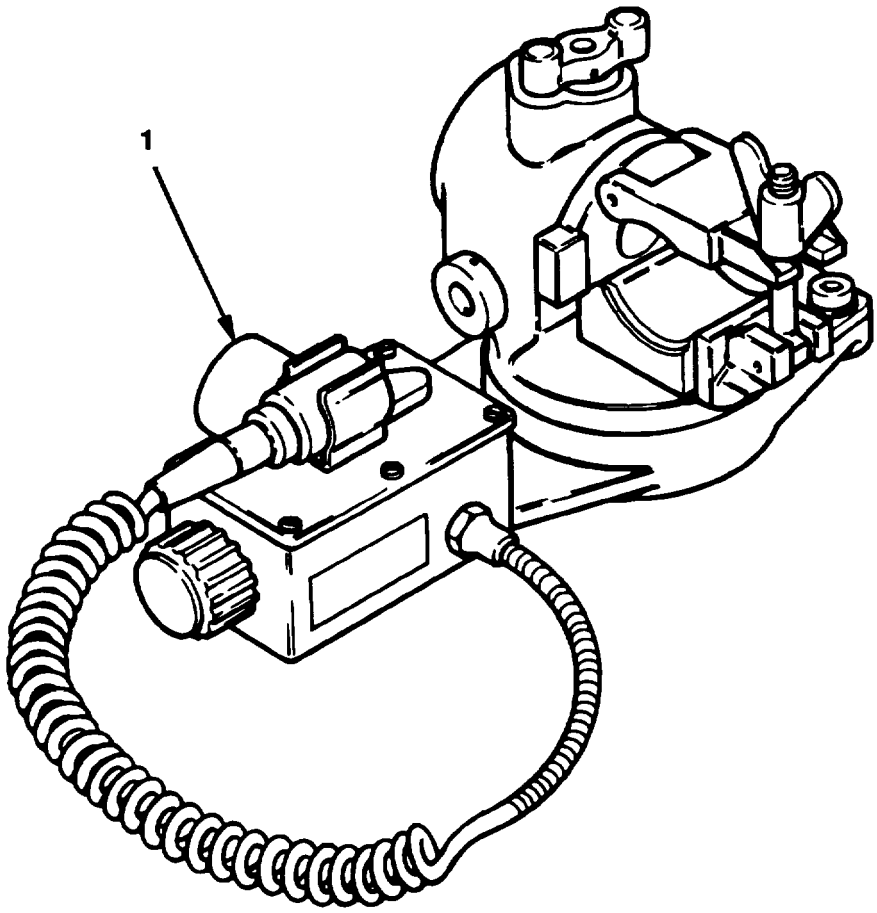


Figure B-13. Mount, Telescope, M138 8587500
(Assembled View)

SECTION II

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 0104 FIG.B-13 MOUNT, TELESCOPE, M138 8587500 (ASSEMBLED VIEW)	
1	PAOFF	1240-00-896-2240	19200	8587500	MOUNT, TELESCOPE, M138.....	1
					END OF FIGURE	

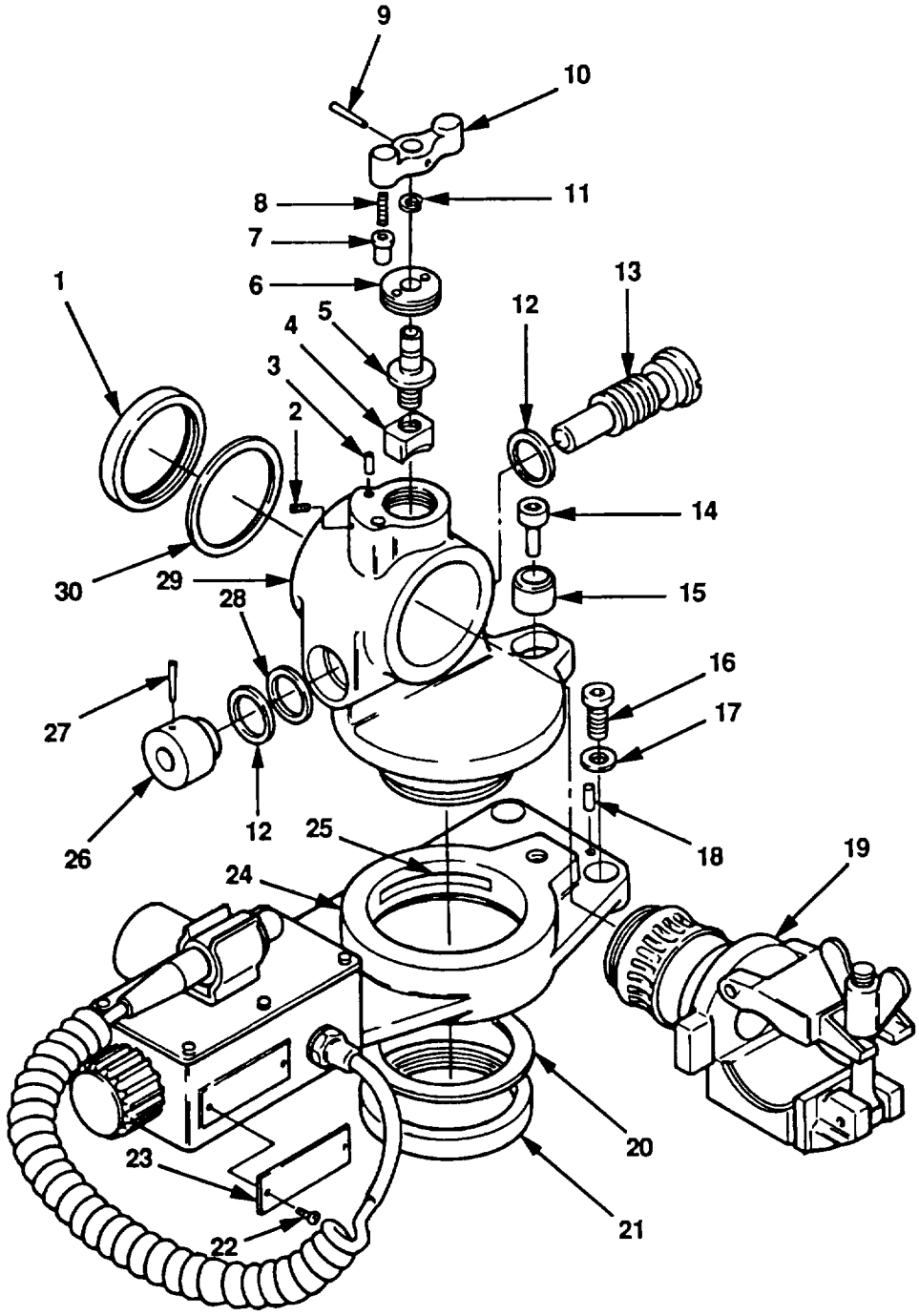


Figure B-14. Mount, Telescope, M138 8587500.

SECTION II

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 0104 FIG.B-14 MOUNT, TELESCOPE, M138 8587500	
1	PAFZZ	5310-00-852-3688	19207	8587403	NUT, PLAIN, ROUND	1
2	PAFZZ	5305-00-051-4497	96906	MS51973-19	SETSCREW	1
3	PAFZZ	5315-00-338-5074	96906	MS9105-54	PIN, STRAIGHT, HEADLESS	1
4	PAFZZ	5325-00-898-6807	21450	8587401	RECEPTACLE, POSITIVE	1
5	PAFZZ	3040-00-848-9888	19200	8587482	SHAFT, SHOULDERED	1
6	PAFZZ	5365-00-899-6938	19200	8587483	RING, EXTERNALLY THR	1
7	PAFZZ	5340-00-859-5990	19200	8587426	PLUNGER, DETENT	1
8	PAFZZ	5360-00-899-2163	19200	8587425	SPRING, HELICAL, COMP	1
9	PAFZZ	5315-00-187-3241	96906	MS24692-54	PIN	1
10	PAFZZ	3040-00-898-6805	19200	8587481	LEVER, MANUAL CONTROL	1
11	PAFZZ	5365-00-298-6564	96906	MS16624-4025	RING, - RETAINING	1
12	PAFZZ	5365-00-882-6032	19200	8587532	SPACER, RING	2
13	PAFZZ	3040-00-899-7644	19200	8587484	WORM SHAFT	1
14	PAFZZ	5305-00-781-1100	80205	NAS1352-3LL8P	SCREW, SELF-LOCKING	1
15	PAFZZ	5340-00-898-6809	19200	8587407	CAM, CONTROL	1
16	PAOZZ	5305-00-978-9380	96906	MS16997-61	SCREW, CAP, SOCKET HE	4
17	PAOZZ	5310-00-933-8121	96906	MS35338-139	WASHER, LOCKK	4
18	PAFZZ	5315-00-851-2285	96906	IS16555-328	PIN, STRAIGHT, HEADLESS	1
19	AFFFF		19200	8587515	SUPPORT ASSEMBLY, SEE FIG. B-15 FOR BREAKDOWN	1
20	PAFZZ	5365-01-153-8461	19200	11785359	SHIMI	V
21	PAFZZ	5310-00-823-8768	19200	8587486	NUT, PLAIN, ROUND	1
22	PAFZZ	5305-00-054-5637	96906	MS51957-3	SCREW, MACHINE	2
23	PAFZZ	9905-01-204-5826	19200	8587409	PLATE, IDENTIFICATION	1
24	XAFFF		19200	8587517	BRACKET ASSEMBLY, SEE FIG. B-16 FOR BREAKDOWN	1
25	PAFZZ	5365-01-158-6144	19200	11785460	SHIM	V
26	PAFZZ	3040-00-849-2968	19200	8587404	COLLAR, SHAFT	1
27	PAFZZ	5315-00-187-3259	96906	M-IS24692-87	PIN, TAPERED, PLAIN	1
28	PAFZZ	5365-01-160-3445	19200	11785461	SHII	V
29	XAFZZ		19200	8587480	ADAPTER	1
30	PAFZZ	5365-01-153-8462	19200	11785358	SHIM	V
					END OF FIGURE	

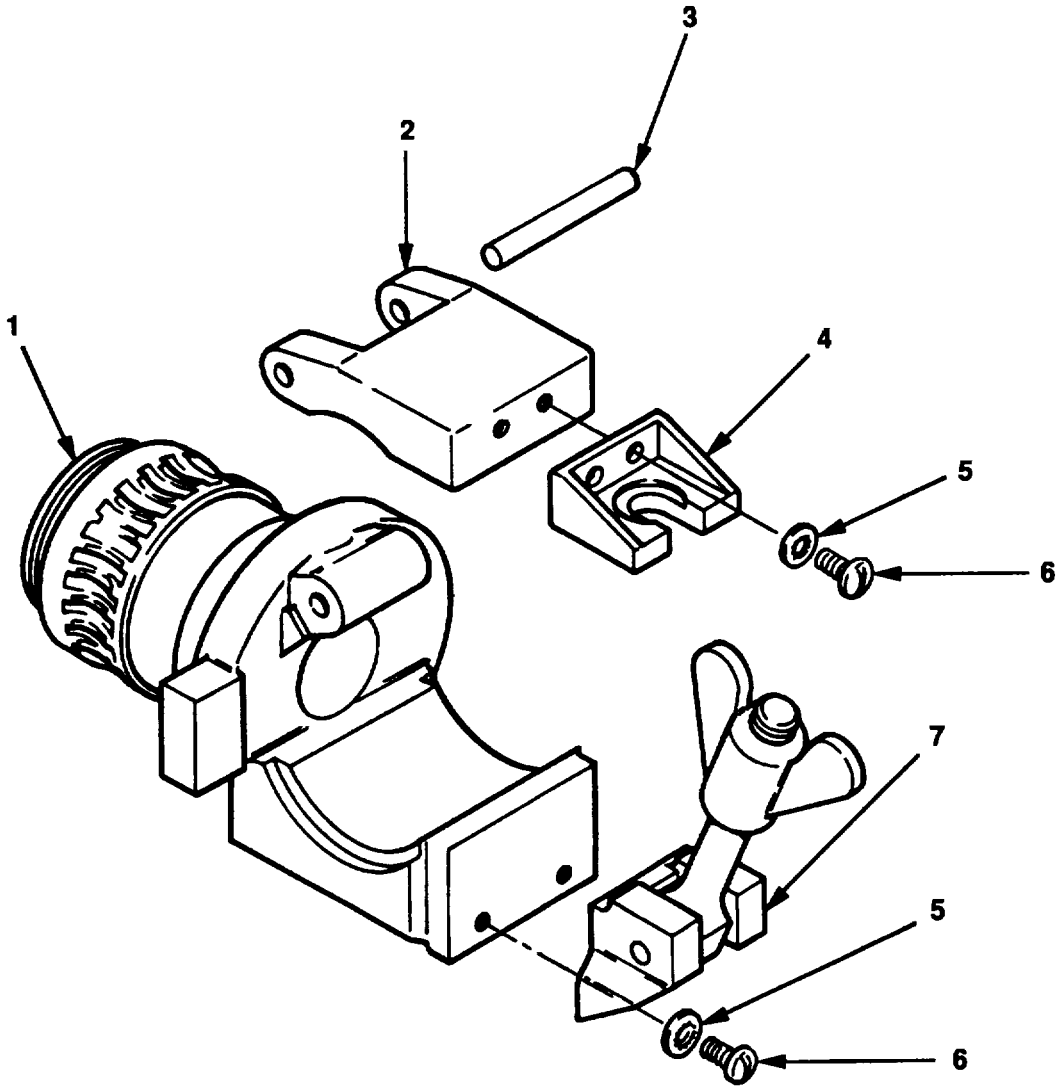


Figure B-15. Support Assembly 8587515.

SECTION II

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 010401 FIG.B-15 SUPPORT ASSEMBLY 8587515	
1	PAFZZ	3040-00-858-6334	19200	8587479	HOUSING, MECHANICAL	1
2	PAFZZ	5340-00-862-2698	19200	8587485	BRACKET, CLAMP	1
3	PAFZZ	5315-01-217-0938	21450	586546	PIN, STRAIGHT HEADLESS	1
4	PAFZZ	5340-01-209-1787	19200	10541421	BRACKET, ANGLE	1
5	PAFZZ	5310-00-616-3555	96906	MS35333-71	WASHER, LOCKK	4
6	PAFZZ	5305-00-054-6651	96906	MS51957-27	SCREW, MACHINE	4
7	PAFZZ	5315-00-928-3815	19200	10541419	PIN, TOGGLE, HEADED	1
					END OF FIGURE	

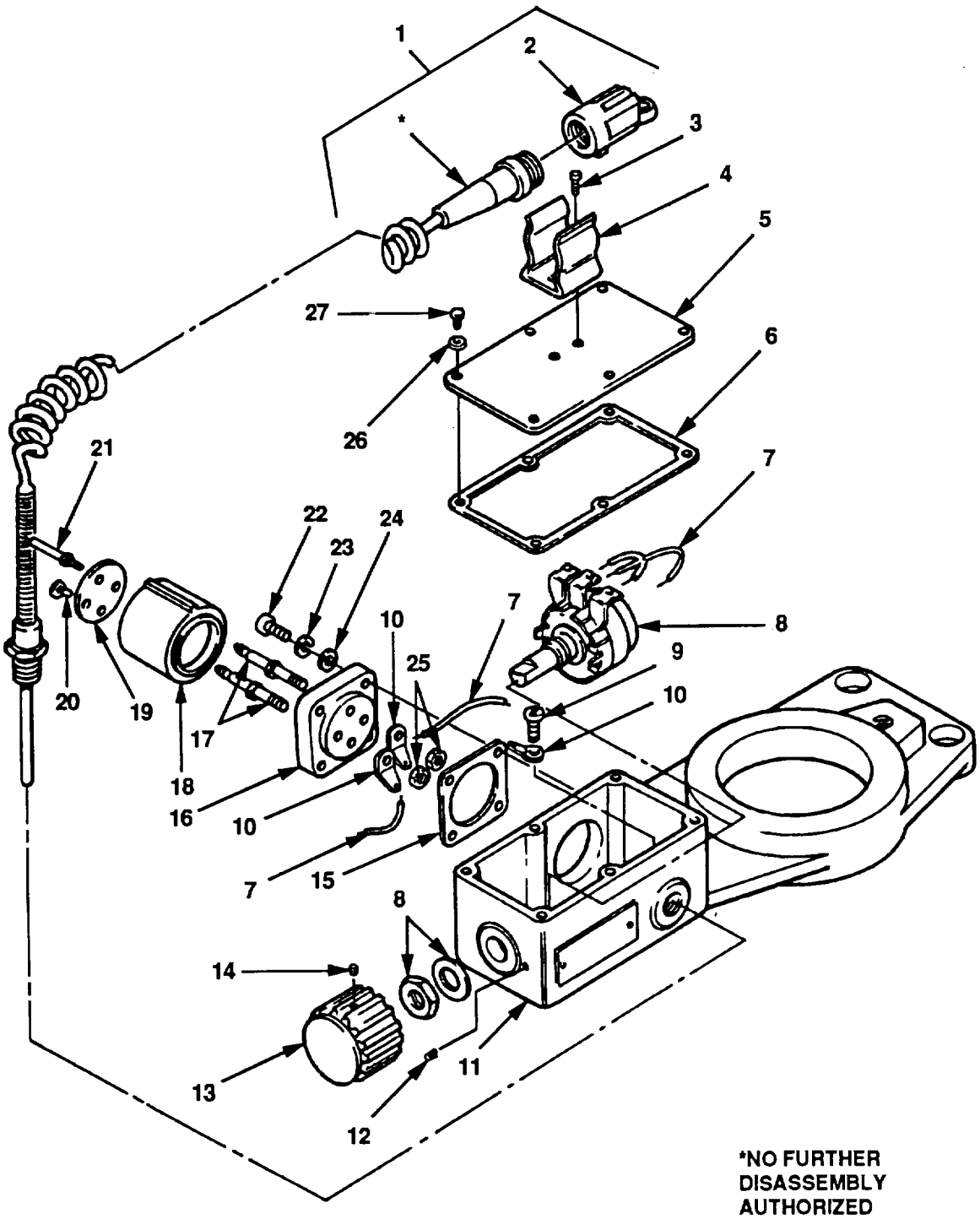


Figure B-16. Bracket Assembly 8587517 and Light, Instrument 8587322.

SECTION II

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUPS 010402 AND 01040201 FIG.B-16 BRACKET ASSEMBLY 8587517 AND LIGHT, INSTRUMENT 8587322	
1	PAFFF	6695-00-854-4482	19200	8587322	LIGHT, INSTRUMENT	1
2	PAOZZ	5999-01-295-8138	19200	12599289	. . ELECTRONIC COMPONENT	1
3	PAFZZ	5305-00-054-5644	96906	MS51957-11	SCREW, MACHINE	2
4	PAFZZ	5340-00-882-8825	19200	8287274	CLIP, SPRING TENSION	1
5	XAFZZ		19200	8587488	COVER	1
6	PAFZZ	5330-00-863-3200	19200	8587489	GASKET	1
7	MFFZZ		81349	LWC20-7JO	WIRE, ELECTRICAL, MAKE FROM WIRE P/N LW-C20/7/JO	V
8	PAFZZ	5905-00-933-6805	19200	8572203	RESISTOR, VARIABLE, W	1
9	PAFZZ	5305-00-059-8247	96906	MS35214-22	SCREW, MACHINE	1
10	PAFZZ	5940-00-827-2953	96906	MS77068-2	TERMINAL, LUG	3
11	XAFZZ		19200	8587487	BRACKET	1
12	PAFZZ	5305-00-724-5876	96906	MS51031-46	SETSCREW	1
13	PAFZZ	5355-00-847-6260	19200	8615879	KNOB	1
14	PAFZZ	5305-00-851-2287	96906	MS51023-18	SETSCREW	1
15	PAFZZ	5330-00-893-6696	19200	8616084	GASKET	1
16	PAFZZ	5970-00-753-0516	19200	8624900	INSULATOR, BUSHING	1
17	PAFZZ	5999-00-895-6493	19200	8267787	CONTACT, ELECTRICAL	2
18	PAFZZ	1290-00-191-3302	19204	7064587	SHELL RECEPTACLE	1
19	PAFZZ	5999-00-042-5355	19200	7660438	PLATE, ELECTRICAL	1
20	PAFZZ	5305-00-207-7468	96906	MS35214-16	SCREW, MACHINE	1
21	PAFZZ	5315-00-753-0514	19200	8624898	PIN, SHOULDER, HEADLESS	1
22	PAFZZ	5305-00-905-1650	80205	NAS1352CO4-10	SCREW, CAP, SOCKET HEAD	4
23	PAFZZ	5310-00-933-8118	81349	MS35338-135	WASHER, LOCK	4
24	PAFZZ	5310-00-595-6211	96906	MS15795-803	WASHER, FLAT	4
25	PAFZZ	5310-00-410-3017	96906	MS35649-245T	NUT, PLAIN, HEXAGON	2
26	PAFZZ	5310-00-543-4652	96906	MS35333-69	WASHER, LOCK	6
27	PAFZZ	5305-00-054-5637	96906	1SS551957-3	SCREW, MACHINE	6
					END OF FIGURE	

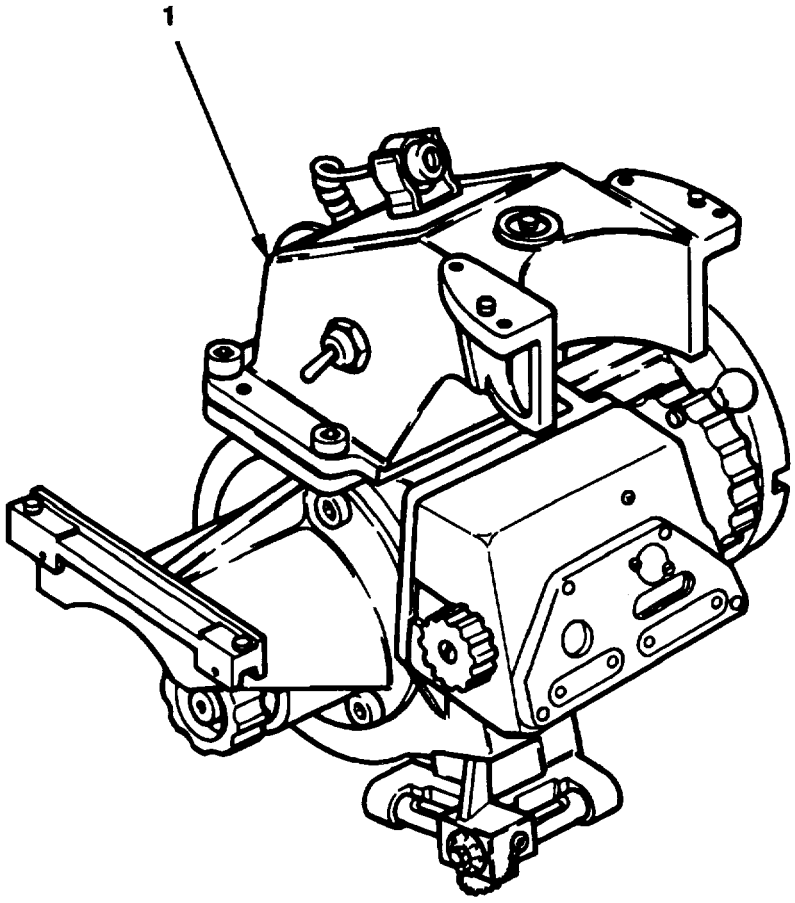


Figure B-17. Mount, Telescope, M137 8587295 (Assembled View).

SECTION II

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 0105 FIG.B-17 MOUNT, TELESCOPE, M137 8587295 (ASSEMBLED VIEW)	
1	PAOHH	1240-00-895-6492	19200	8587295	MOUNT, TELESCOPE, M137	1
					END OF FIGURE	

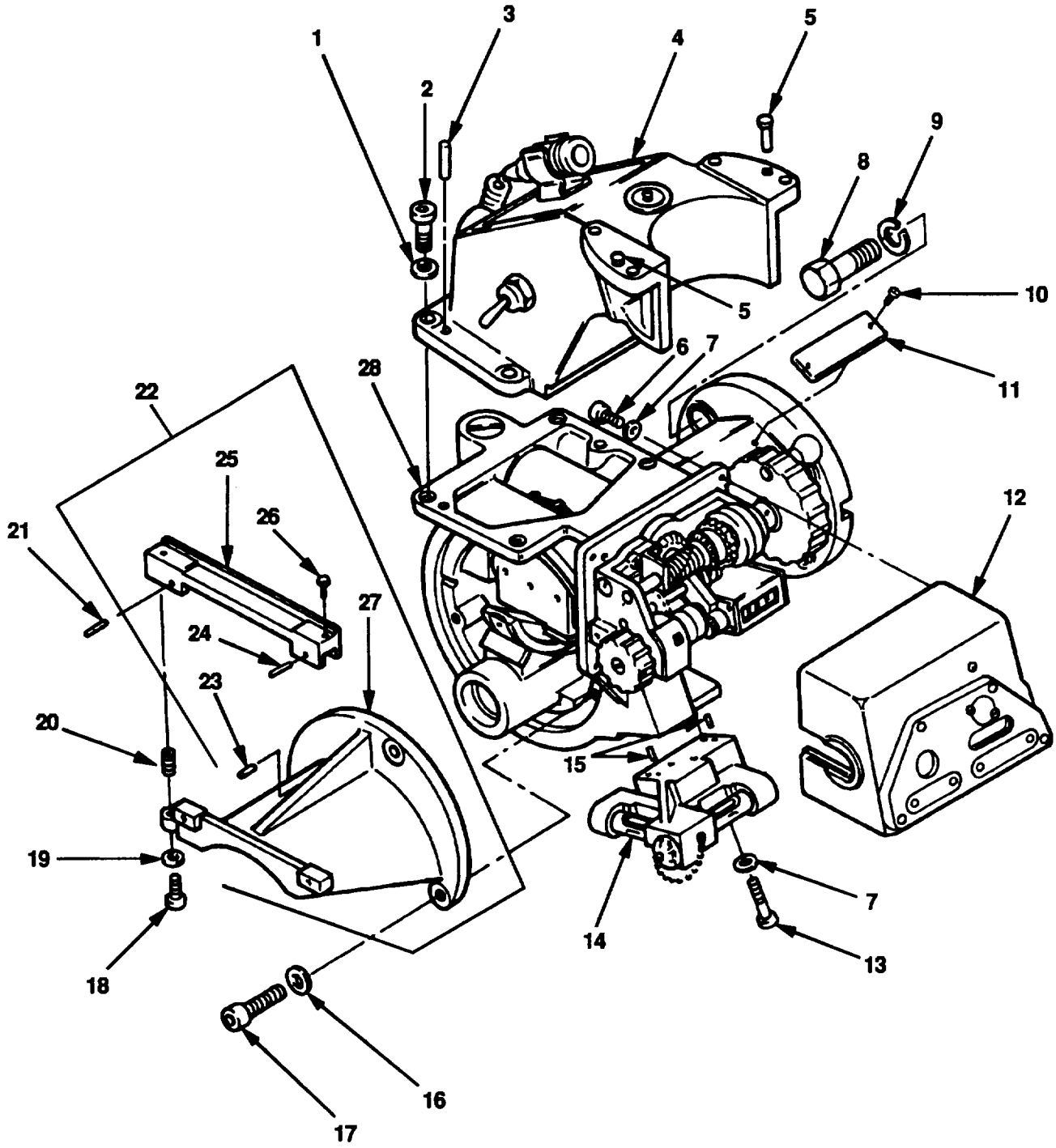


Figure B-18. Mount, Telescope, M137 8587295 and Bracket Assembly 8261935.

SECTION II

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUPS 0105 AND 010501 FIG.B-18 MOUNT, TELESCOPE, M137 8587295 AND BRACKET ASSEMBLY 8261935	
1	PAHZZ	5310-00-178-8631	96906	MHS35333-75	WASHER, LOCK	4
2	PAHZZ	5305-00-988-7838	96906	MS16995-64	SCREW, CAP, SOCKET HEAD	4
3	PAHZZ	5315-00-682-1733	96906	MS16555-646	PIN, STRAIGHT, HEADLESS	2
4	XAHHH		19200	8572223	MOUNT SUBASSEMBLY, UPPER TELESCOPE SEE FIG. B-19 FOR BREAKDOWN	1
5	PAHZZ	5320-01-147-5379	19200	8587538	RIVET, TUBULAR	2
6	PAFZZ	5305-00-989-3119	96906	MS16995-37	SCREW, CAP, SOCKET HEAD	4
7	PAFZZ	5310-00-543-5933	96906	MS35333-73	WASHER, LOCK	7
8	PAOZZ	5305-00-781-5215	96906	MS35308-421	SCREW, CAP, HEXAGON HEAD	4
9	PAOZZ	5310-00-933-8778	96906	MS35338-143	WASHER, LOCK	4
10	PAHZZ	5305-00-057-0511	96906	MHS51958-14	SCREW, MACHINE	2
11	PAHZZ	9905-00-300-7909	19200	8572240	PLATE, IDENTIFICATION	1
12	XAFFF	19200	8261800	COVER	ASSEMBLY, SEE FIG. B-20 FOR BREAKDOWN	1
13	PAFZZ	5305-00-068-5406	96906	MS16996-15	SCREW, CAP, SOCKET HEAD	3
14	AFFFF		19200	8572243	LEVEL ASSEMBLY, SEE FIG. B-21 FOR BREAKDOWN	1
15	PAFZZ	5315-00-889-2518	96906	MS16556-628	PIN, STRAIGHT, HEADLESS	2
16	PAHZZ	5310-00-543-2740	81348	FF-W-100	WASHER, LOCK	3
17	PAHZZ	5305-00-988-7614	96906	MS16995-50	SCREW, CAP, SOCKET HEAD	3
18	PAHZZ	5305-00-068-5406	96906	MS16996-15	SCREW, CAP, SOCKET HEAD	1
19	PAHZZ	5310-00-550-0845	19200	8261989	WASHER, CONVEX	1
20	PAHZZ	5360-00-530-5978	19200	8261990	SPRING, HELICAL COMP	1
21	PAHZZ	5315-00-889-2518	96906	MS16556-628	PIN, STRAIGHT, HEADLESS	1
22	AHHHH		19200	8261935	BRACKET ASSEMBLY	1
23	PAHZZ	5315-00-889-2518	96906	MS16556-628	. . PIN, STRAIGHT, HEADLESS	1
24	PAHZZ	5315-00-889-3103	96906	MS9390-300	. . PIN, STRAIGHT, HEADLESS	1
25	PAHZZ	6650-01-145-3416	19200	8261953	. . BAR, TELESCOPE, MOUNT	1

SECTION II

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
26	PAHZZ	5315-01-146-4879	19200	8261988	. . PIN, STRAIGHT, HEADED	1
27	PAHZZ	5340-00-052-4057	19200	8261936	. . BRACKET, MOUNTING	1
28	XAHHH		19200	8572222	MOUNT SUBASSEMBLY, TELESCOPE, LOWER ASSEMBLY SEE FIG. B-22 FOR BREAKDOWN	1

END OF FIGURE

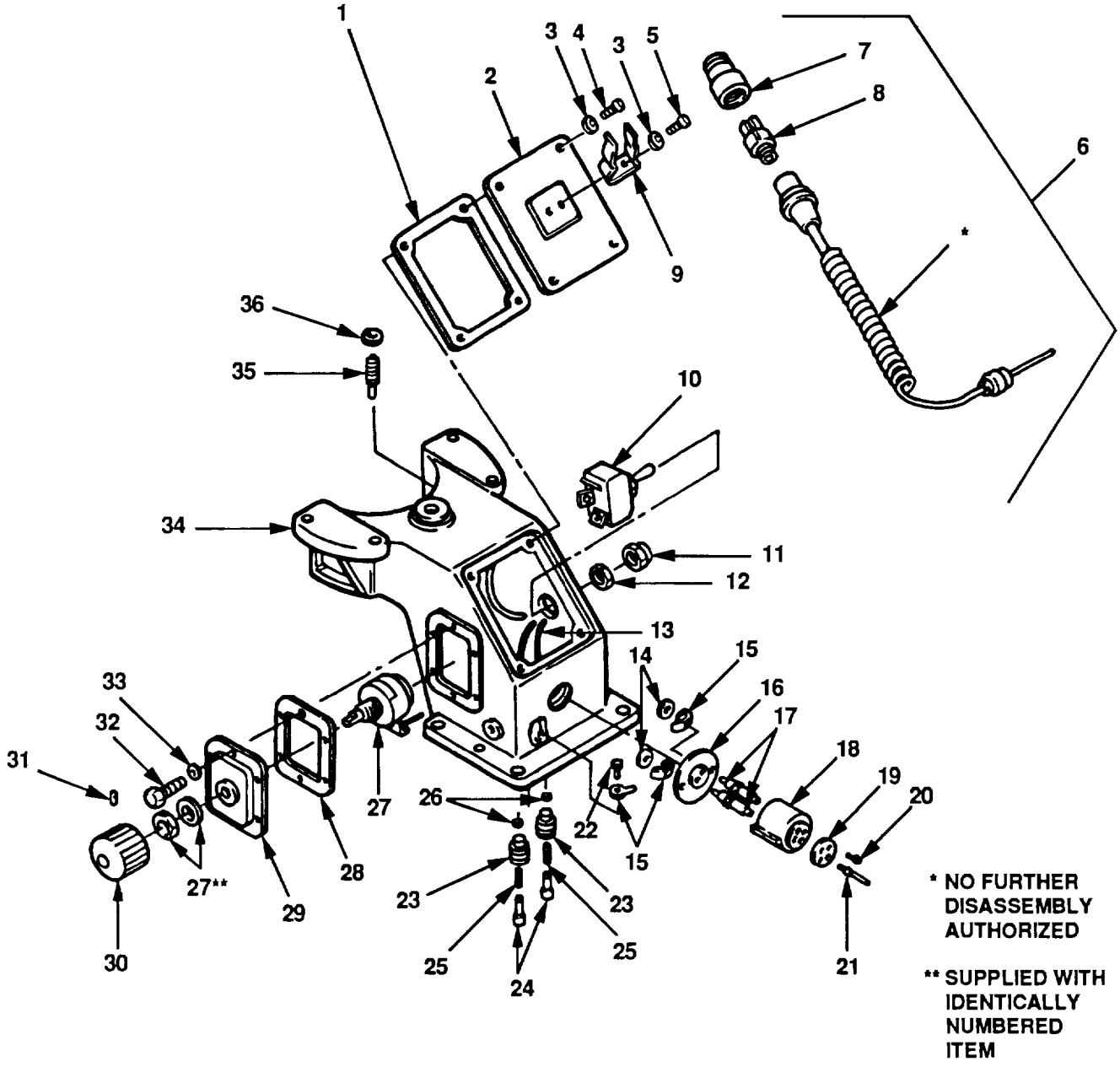


Figure B-19. Mount Subassembly, Upper Telescope 8582223 and Light, Extension 8587510.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 010502 FIG.B-19 MOUNT,SUBASSEMBLY,UPPER TELESCOPE 8582223 AND LIGHT,EXTENSION 8587510	
1	PAFZZ	5330-00-845-9516	19200	8587302	GASKET	1
2	PAFZZ	5340-01-146-4813	19200	8261809	COVER, ACCESS	1
3	PAFZZ	5310-00-550-3715	96906	MS35333-70	WASHER, LOCK	6
4	PAFZZ	5305-00-959-0379	96906	MS16995-10	SCREW, CAP, SOCKET HEAD	4
5	PAFZZ	5305-00-054-5646	96906	MS51957-12	SCREW, MACHINE	2
6	PAFFF	6230-00-918-8642	19200	8587510	LIGHT, EXTENSION	1
7	PAFZZ	1240-01-297-6837	19200	12599287	CELL ASSEMBLY, OPTIC	1
8	PAOZZ	6220-01-305-7210	19200	12599294	LIGHT ASSEMBLY, INDI	1
9	PAFZZ	5340-00-845-7371	19200	8587445	CLIP, SPRING TENSION	1
10	PAFZZ	5930-00-655-1516	96906	MS35058-24	SWITCH, TOGGLE	1
11	PAFZZ	5930-00-539-7013	81349	M5423/02-01	BOOT, DUST AND MOUNT	1
12	PAFZZ	5310-01-156-7514	19207	12309110-2	NUT, PLAIN, HEXAGON	1
13	MFFZZ		81349	M16878/17BG E9	WIRE, ELECTRICAL, MAKE FROM WIRE P/N LW-C20/7/J9	V
14	PAFZZ	5310-00-934-9746	96906	MS35649-245	NUT, PLAIN, HEXAGON	2
15	PAFZZ	5940-00-177-7973	96906	MS77067-1	TERMINAL, LUG	3
16	PAFZZ	5970-00-753-0515	19200	8624897	INSULATOR, BUSHING	1
17	PAFZZ	5999-00-895-6493	19200	8267787	CONTACT, ELECTRICAL	2
18	PAFZZ	1290-00-191-3302	19204	7064587	SHELL, ELECTRICAL	1
19	PAFZZ	5999-00-042-5355	19200	7660438	PLATE MOUNT, ELEVATING	1
20	PAFZZ	5305-00-207-7468	96906	MS35214-16	SCREW, IMACHINE	1
21	PAFZZ	5315-00-753-0514	19200	8624898	PIN, SHOULDER, HEADLESS	1
22	PAFZZ	5305-00-637-5884	96906	MS35214-12	SCREW, MACHINE	1
23	PAHZZ	5970-00-850-4337	19200	8587328	INSULATOR, BUSHING	2
24	PAHZZ	5999-00-895-9191	19200	8587327	CONTACT, ELECTRICAL	2
25	PAHZZ	5360-00-899-2164	19200	8587326	SPRING, HELICAL, COMP	2
26	PAHZZ	5365-00-804-6895	80205	NAS51-12	RING, RETAINING	2
27	PAFZZ	5905-00-933-6805	19200	8572203	RESISTOR, VARIABLE, W	1
28	PAFZZ	5330-00-850-4338	19200	8587300	GASKET	1
29	PAFZZ	5340-01-145-5527	19200	8587301	COVER, ACCESS	1
30	PAFZZ	5355-00-847-6260	19200	8615879	KNOB	1
31	PAFZZ	5305-00-851-2287	96906	MS51023-18	SETSCREW	1
32	PAFZZ	5305-00-068-5276	96906	MS16995-9	SCREW, CAP, SOCKET HEAD	6
33	PAFZZ	5310-00-550-3715	96906	MS35333-70	WASHER, LOCK	6
34	XAHZZ		19200	8572224	HOUSING	1
35	PAFZZ	5999-00-883-1451	19200	10547986	PLUNGER, CONTACT ASSEMBLY	1
36	PAFZZ	5330-00-073-8016	19200	10547039	SEAL, NONMETALLIC RO	1
					END OF FIGURE	

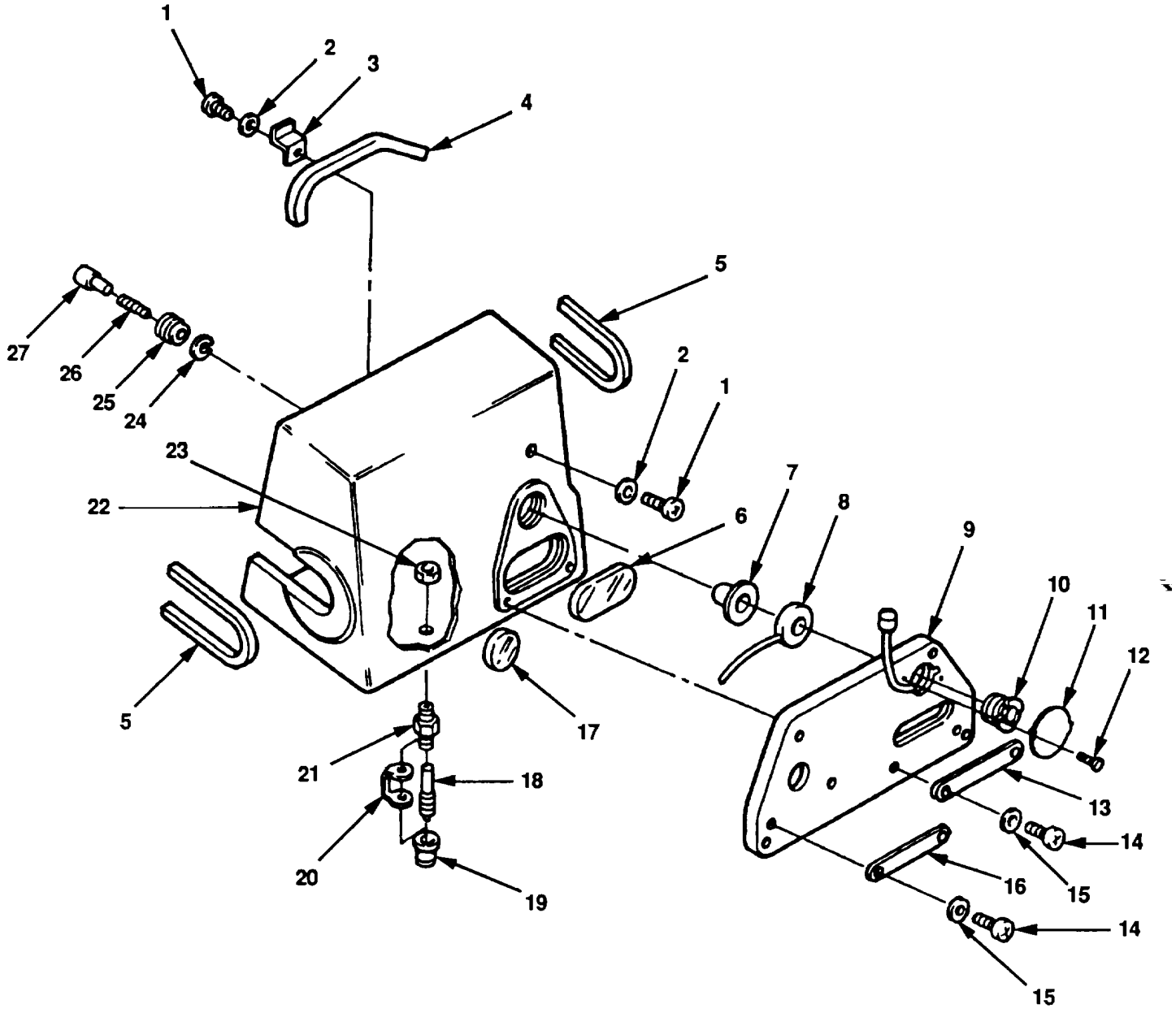


Figure B-20. Cover Assembly 8261800.

SECTION II

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) TM QTY
					GROUP 010503 FIG.B-20 COVER ASSEMBLY 8261800	
1	PAFZZ	5305-00-054-5647	96906	MS51957-13	SCREW, MACHINE	2
2	PAFZZ	5310-00-550-3715	96906	MS35333-70	WASHER, LOCK	2
3P	PAFZZ	5340-00-846-6676	19200	8261871	BRACKET, DOUBLE ANGLE	1
4	PAFZZ	6695-00-845-9515	19200	8261870	LIGHT CONDUCTOR, INS	1
5	PAFZZ	8305-00-935-6393	19200	8261867	FELT STRIP	2
6	PAFZZ	5355-00-845-9518	19200	8261872	WINDOW, OBSERVATION	1
7	PAFZZ	6210-00-896-2246	19200	8215819	CAP, LENS	1
8	PAFZZ	5995-00-050-5969	19200	10543306-6	LEAD, ELECTRICAL	1
9	PAFZZ	5999-01-295-8139	19200	12599273	ELECTRONIC COMPONENT	1
10	PAFZZ	5365-00-898-4222	19200	8247732	RING, EXTERNALLY THR	1
11	PAFZZ	5340-01-287-1464	19200	12599292	CAP, PROTECTIVE, DUST	1
12	PAFZZ	5305-00-941-3538	96906	MS35275-201	SCREW, MACHINE	2
13	PAFZZ	9905-00-012-2972	19200	8247758	PLATE, IDENTIFICATION	1
14	PAFZZ	5305-00-054-5639	96906	MS51957-5	SCREW, MACHINE	4
15	PAFZZ	5310-00-543-4652	96906	MS35333-69	WASHER, LOCK	4
16	PAFZZ	9905-00-012-2973	19200	8247759	PLATE, IDENTIFICATION	1
17	PAFZZ	5355-00-845-9517	19200	8261873	WINDOW, OBSERVATION	1
18	PAOZZ	2640-00-060-3543	96906	MS51377-2	VALVE CORE	1
19	PAOZZ	1650-00-222-4525	96906	MS20813-1	CAP, PNEUMATIC VALVE	1
20	PAFZZ	5340-00-464-4792	19200	10516567	STRAP, RETAINING	1
21	PAFZZ	4820-00-114-1096	96906	MS51607-1	VALVE STEM, PURGING	1
22	XAFZZ		19200	8261801	COVER	1
23	PAFZZ	5310-00-782-9877	19200	8635803	NUT, HEXA GON	1
24	PAFZZ	5365-00-804-6895	80205	NAS51-12	RING, RETAINING	1
25	PAFZZ	5970-00-850-4337	19200	8587328	INSULATOR, BUSHING	1
26	PAFZZ	5360-00-899-2164	19200	8587326	SPRING, HELICAL, COMP	1
27	PAFZZ	5999-00-895-9191	19200	8587327	CONTACT, ELECTRICAL	1
					END OF FIGURE	

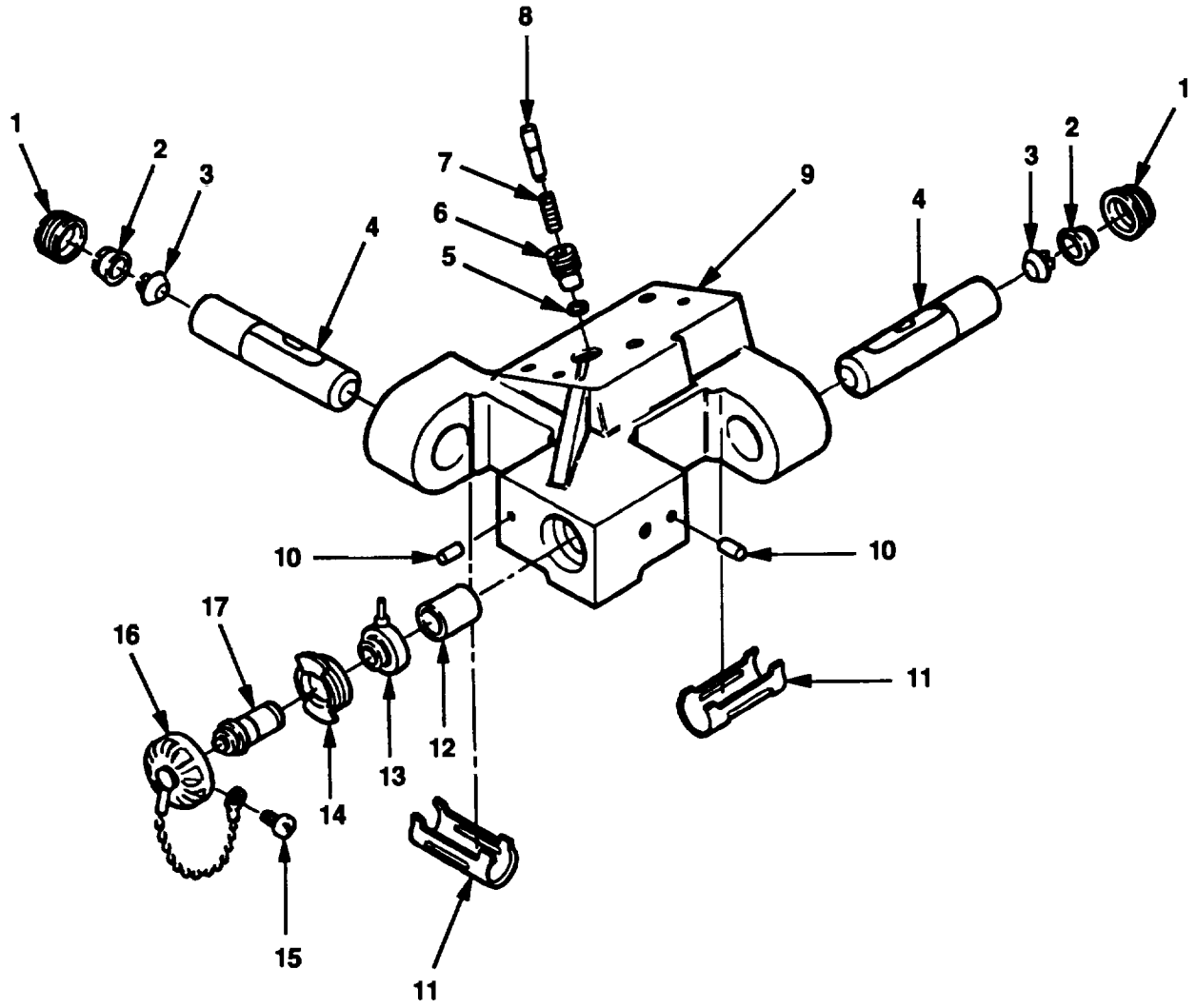


Figure B-21. Level Assembly 8572243.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 010504 FIG.B-21 LEVEL ASSEMBLY 8572243	
1	PAFZZ	5365-00-848-8664	19200	8615973	RING, EXTERNALLY THR	2
2	PAFZZ	1240-00-895-6495	19200	8215790	HOLDER, OPTICAL ELEMENT	2
3	PAFZZ	3040-00-895-6496	19200	8215789	CAM, CONTROL	2
4	PAFZZ	1290-00-692-1493	19200	8202183	LEVEL, FIRE CONTROL	2
5	PAFZZ	5365-00-804-6895	80205	NAS51-12	RING, RETAINING	1
6	PAFZZ	5970-00-850-4337	19200	8587328	INSULATOR, BUSHING	1
7	PAFZZ	5360-00-899-2164	19200	8587326	SPRING, HELICAL, COMP.....	1
8	PAFZZ	5999-00-895-9191	19200	8587327	CONTACT, ELECTRICAL	1
9	XAFZZ		19200	8572241	BRACKET	1
10	PAFZZ	5315-01-204-4270	19200	544104	PIN, STRAIGHT, HEADLESS.....	2
11	PAFZZ	6680-00-896-2239	19200	8215835	COVER, LEVEL VIAL	2
12	PAFZZ	6210-00-896-2245	19200	8587321	LENS, LIGHT	1
13	PAFZZ	5995-00-050-5969	19200	10543306-6	LEAD, ELECTRICAL.....	1
14	PAFZZ	5365-00-898-4222	19200	8247732	RING, EXTERNALLY THR	1
15	PAFZZ	5305-00-054-5646	96906	MS51957-12	SCREW, MACHINE	1
16	PAFZZ	5935-00-175-5966	19200	10559863	COVER, ELECTRICAL CO.....	1
17	PAOZZ	5980-01-289-5274	19207	12360905-2	LIGHT EMITTING DIODE.....	1
					END OF FIGURE	

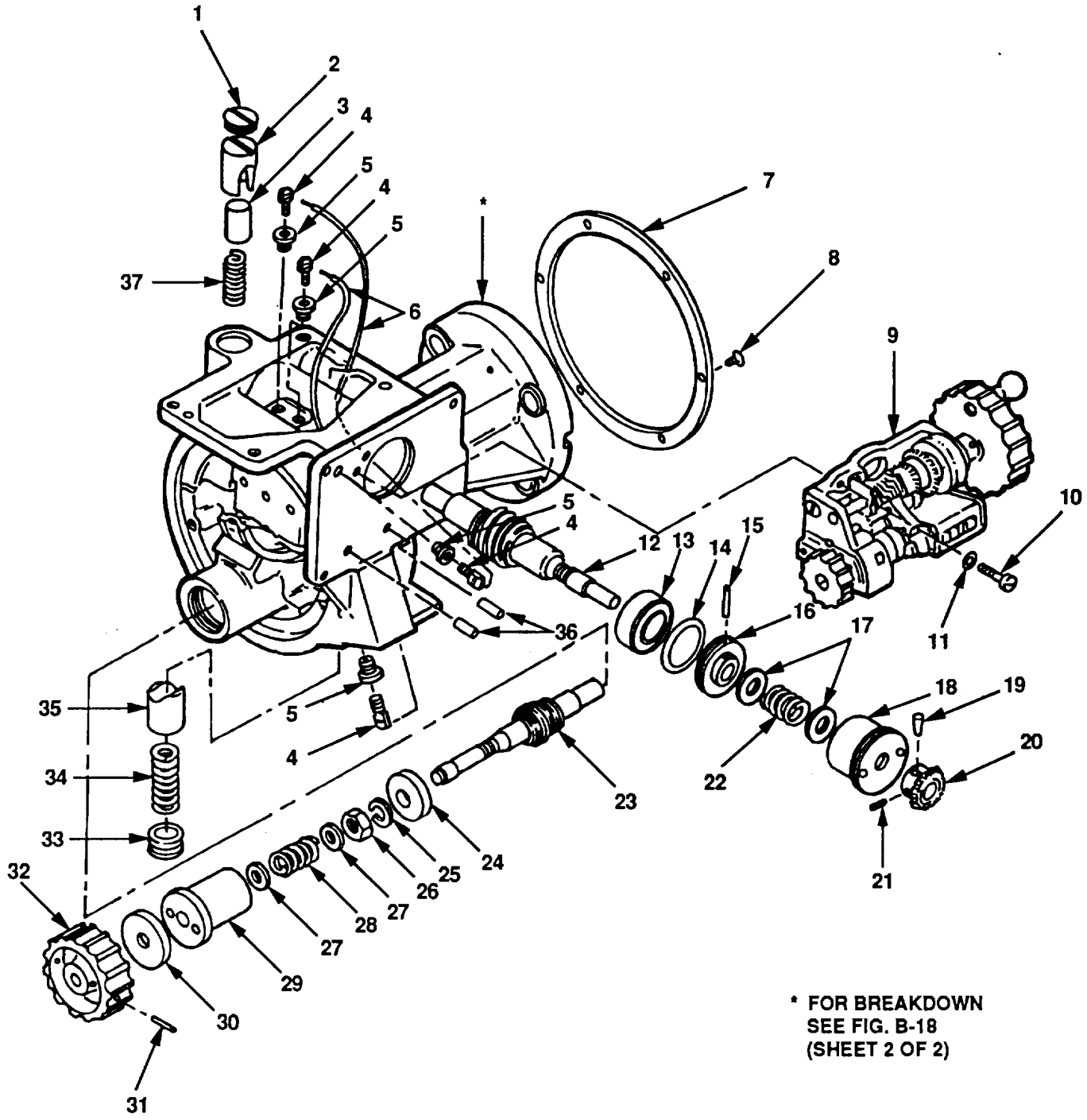


Figure B-22. Mount Subassembly, Telescope, Lower Assembly 8572222 (Sheet 1 of 2).

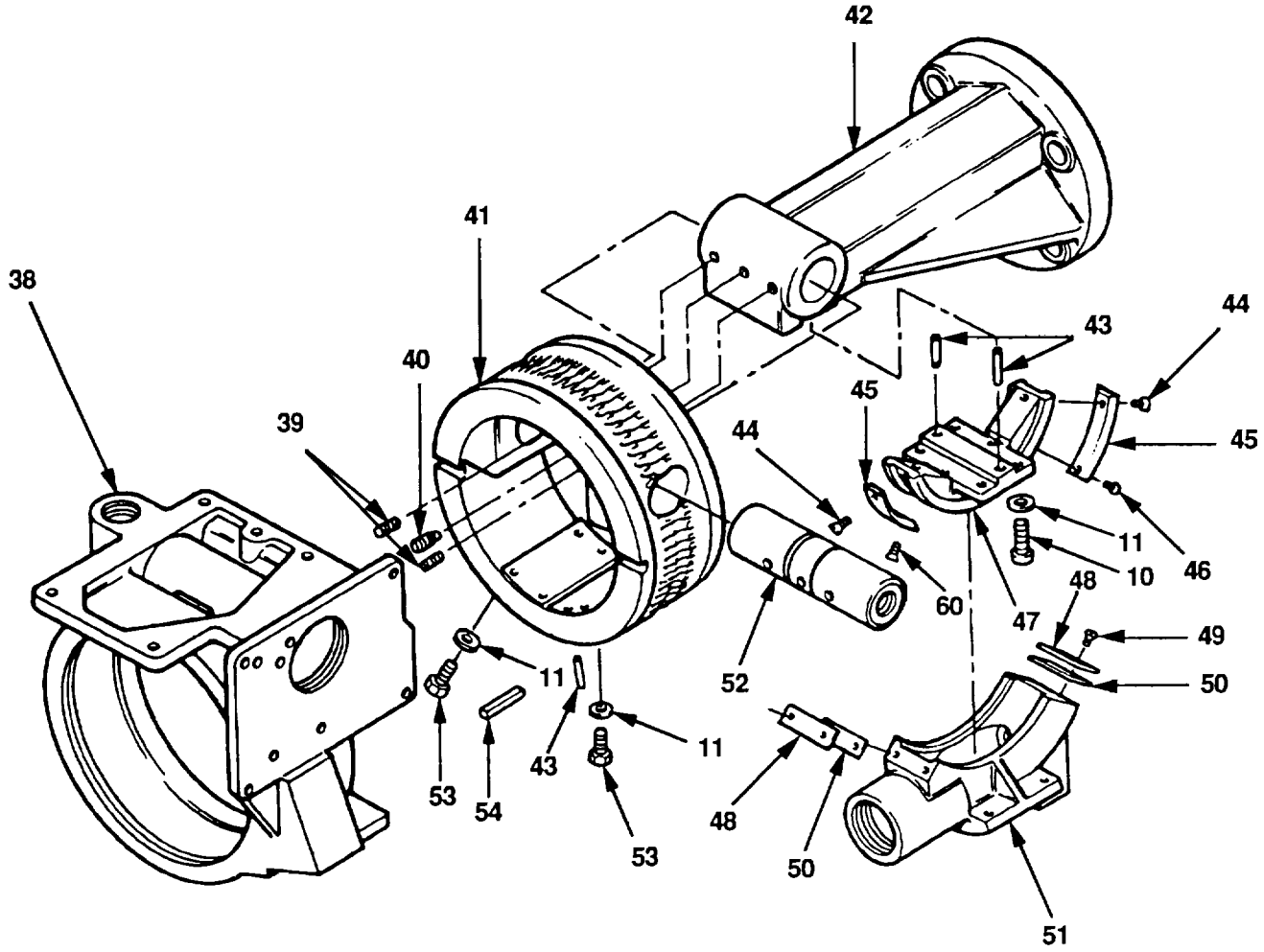


Figure B-22. Mount Subassembly, Telescope, Lower Assembly 8572222 (Sheet 2 of 2).

SECTION II

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 010505 FIG.B-22 MOUNT SUBASSEMBLY, TELESCOPE,LOWER ASSEMBLY 8572222	
1	PAFZZ	5365-00-278-5309	19200	5036245	PLUG, MACHINE THREAD	1
2	PAFZZ	5340-00-063-0275	19200	8262139	PLUNGER, DETENT	1
3	PAHZZ	5340-00-059-5838	19200	8262140	PLUNGER, DETENT	1
4	PAFZZ	5999-00-895-9190	19200	8587330	CONTACT, ELECTRICAL	4
5	PAFZZ	5970-00-851-1574	19200	8587329	INSULATOR, BUSHING	4
6	MFFZZ		81349	M16878/17BG E9	WIRE, ELECTRICAL, MAKE FROM WIRE P/N M16878/17BGE9	V
7	PAHZZ	5365-01-145-3734	19200	826181S	SPACER, RING	1
8	PAHZZ	5305-00-774-9613	96906	MS51960-46	SCREW, MACHINE	6
9	XAHHH		19200	8261802	TELE MNT SUB ASSY, SEE FIG. B-23 FOR BREAKDOWN	1
10	PAHZZ	5305-00-959-1909	96906	MS16996-11	SCREW, CAP, SOCKET HEAD	7
11	PAHZZ	5310-00-543-5933	96906	MS35333-73	WASHER, LOCK	11
12	PAHZZ	3040-00-846-6675	19200	8262132	WORM SHAFT	1
13	PAHZZ	3110-00-156-5022	19200	8587303	BEARING, BALL, ANNULAR	1
14	PAHZZ	5330-00-125-3947	19200	8537449-7	PACKING, PREFORMED	1
15	PAHZZ	5315-00-078-0112	96906	HS16556-608	PIN, STRAIGHT, HEADLESS	1
16	PAHZZ	5310-00-115-0639	19200	10555861	RETAINER	1
17	PAHZZ	5310-00-845-7368	19200	8587305	WASHER, NON-ETALLIC	2
18	PAHZZ	5340-00-228-1631	19200	10555860	RETAINER, OPTICAL	1
19	PAFZZ	5315-00-187-3258	96906	MS24692-84	PIN, TAPERED, PLAIN	1
20	PAHZZ	3020-00-845-9514	19200	8261823	GEAR, BEVEL	1
21	PAHZZ	5305-00-852-3731	96906	IMS51023-28	SETSCREW	2
22	PAHZZ	5360-00-899-2902	19200	8587308	SPRING, HELICAL, COMP	1
23	PAFZZ	3040-00-846-6880	19200	8261817	WORM SHAFT	1
24	PAFZZ	3110-00-849-2970	19200	8215832	BEARING, BALL, ANNULAR	1
25	PAFZZ	5310-00-845-7369	19200	8215833	WASHER, THRUST	1
26	PAFZZ	5310-00-895-9189	19200	8215831	NUT, SELF-LOCKING HEAD	1
27	PAFZZ	5310-00-845-7367	19200	8215830	WASHER, NON-METALLIC	2
28	PAFZZ	5360-00-899-3100	19200	8215829	SPRING, HELICAL, COMP	1
29	PAFZZ	5365-01-148-1288	19200	3215834	RING, EXTERNALLY THR	1
30	PAFZZ	5310-00-846-7494	19207	8261845	WASHER, NONMETALLIC	1
31	PAFZZ	5315-00-187-3232	96906	11S24692-36	PIN, TAPERED, PLAIN	1
32	PAFZZ	5355-00-893-6092	19200	8261815	KNOB	1
33	PAFZZ	5365-00-134-3385	19200	10539221	PLUG, MACHINE THREAD	1
34	PAFZZ	5360-00-899-2158	19200	8261882	SPRING, HELICAL, COMP	1
35	PAFZZ	3120-00-833-6794	96906	MS35689-7	BEARING, V	1
36	PAHZZ	5315-00-825-1207	96906	MS16555-627	PIN, STRAIGHT, HEADLESS	2
37	PAHZZ	5360-00-899-2901	19200	8262138	SPRING, HELICAL, COMP	1

SECTION II

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
38	XAHZZ		19200	8261793	HOUSING	1
39	PAHZZ	5305-00-724-5812	96906	MS51964-65	SETSCREW	2
40	PAHZZ	5305-00-059-2490	96906	MS51976-46	SETSCREW	1
41	PAHZZ	3020-01-147-3918	19200	8261796	GEAR, WORM WHEEL	1
42	PAHZZ	5340-00-019-4575	19200	8261884	BRACKET, ANGLE	1
43	PAHZZ	5315-00-968-3509	96906	MS16556-640 PIN	STRAIGHT, HEADLESS	4
44	PAHZZ	5305-00-763-7822	96906	MS51959-14	SCREW, MACHINE	2
45	PAHZZ	9535-00-059-5836	19200	8261844	STOP	2
46	PAHZZ	5305-00-768-0336	96906	MS51959-17	SCREW, MACHINE	2
47	PAHZZ	3020-00-063-0276	19200	8261805	SEGMENT GEAR	1
48	PAHZZ	3110-01-145-3733	19200	8261842	PLATE, RETAINING, BEA	2
49	PAHZZ	5305-00-770-2579	96906	MS51959-15	SCREW, MACHINE	4
50	PAHZZ	5330-00-895-9187	19200	8261843	FELT, PREFORMED	2
51	PAHZZ	1240-00-052-4037	19200	8261799	HOUSING, SUPPORT	1
52	PAHZZ	3040-01-145-3415	19200	8261851	SHAFT, SHOULDERED	1
53	PAHZZ	5305-00-988-7608	96906	MS16995-36	SCREW; CAP, SOCKET HEAD	4
54	PAHZZ	5315-00-895-9188	19200	8587325	KEY, MACHINE	1

END OF FIGURE

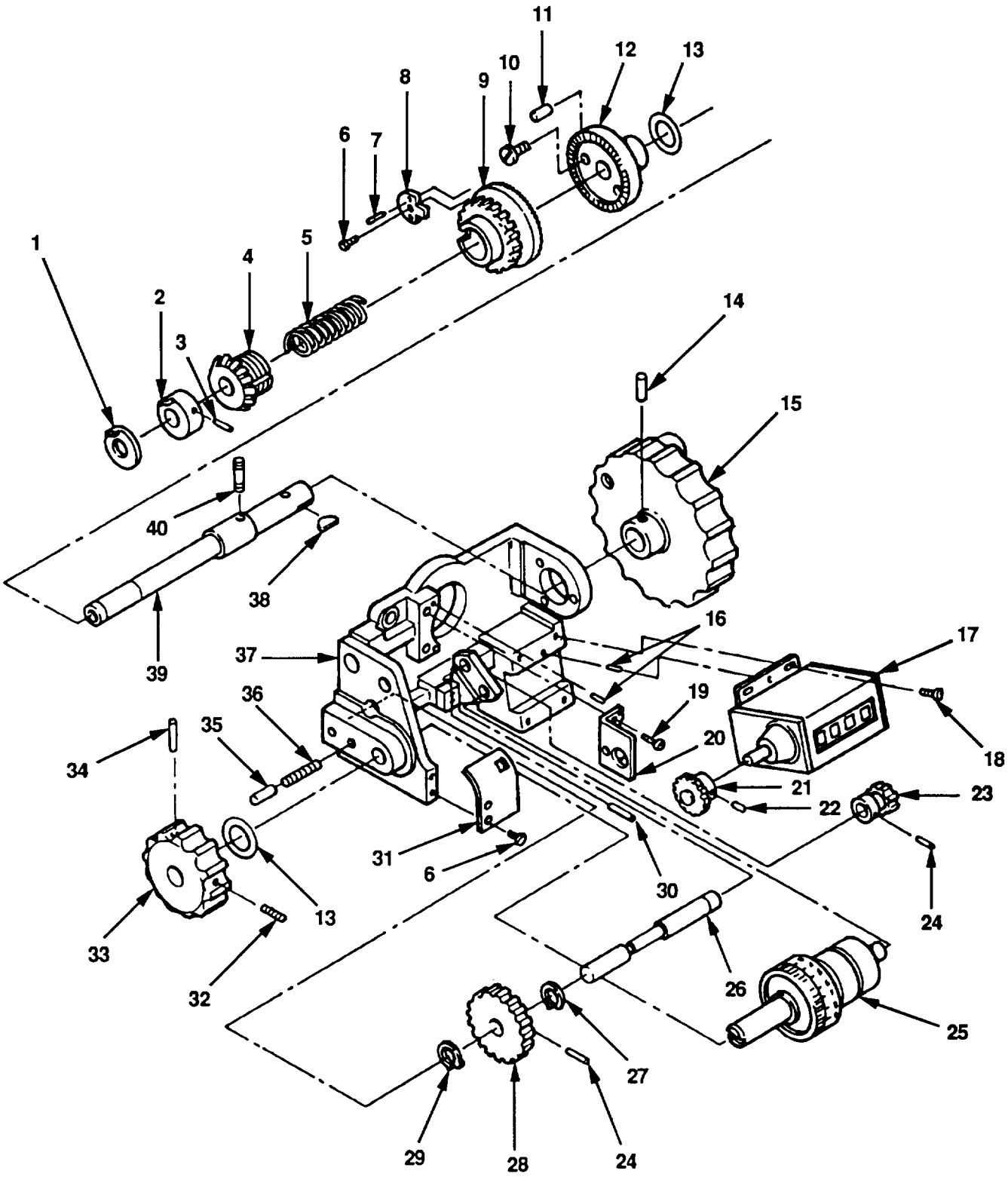


Figure B-23. Telescope Mount Subassembly 8261802.

SECTION II

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 01050501 FIG.B-23 TELESCOPE MOUNT SUBASSEMBLY 8261802	
1	PAHZZ	5310-00-413-4382	19200	8261858	RING, MT, TELESCOPE	16
2	PAHZZ	5355-01-205-4014	19200	8261857	STOP, DIAL	1
3	PAHZZ	5315-00-187-3245	96906	MS24692-60	PIN, TAPERED, PLAIN	1
4	PAHZZ	3020-01-207-1940	19200	8261822	GEAR BEVEL	1
5	PAHZZ	5360-01-213-1217	19200	8261855	SPRING, HELICAL, COMP	1
6	PAHZZ	5305-00-054-5637	96906	MS51957-3	SCREW	3
7	PAHZZ	5315-01-213-1215	19200	8587536	PIN, STRAIGHT, HEADLESS	2
8	PAHZZ	5315-01-207-5730	19200	8261856	KEY, MACHINE	1
9	PAHZZ	3020-01-210-6298	19200	8261807	GEAR CLUSTER	1
10	PAHZZ	5305-00-763-7822	96906	MS51959-14	SCREW, MACHINE	3
11	PAHZZ	5315-00-338-5074	96906	MS9105-54	PIN, STRAIGHT, HEADLESS	1
12	PAHZZ	3010-01-205-0032	19200	8261821	CLUTCH, POSITIVE	1
13	PAHZZ	5330-00-949-3890	19200	8635806	PACKING, PREFORMED	2
14	PAFZZ	5315-00-187-3258	96906	MS24692-84	PIN, TAPERED, PLAIN	1
15	PAFZZ	5340-00-707-1260	19200	8261819	KNOB ASSEHIBLY	1
16	PAHZZ	5315-00-060-4776	96906	MS16556-604	PIN, STRAIGHT, HEADLESS	4
17	PAHZZ	6680-00-914-4715	19200	8261839	COUNTER, ROTATING	1
18	PAHZZ	5305-00-054-5638	96906	MS51957-4	SCREW, MACHINE	4
19	PAHZZ	5305-00-768-0336	96906	MS51959-17	SCREW, MACHINE	2
20	PAHZZ	5340-01-213-1227	19200	8261359	BRACKET, ANGLE	1
21	PAHZZ	3020-00-921-7343	19200	8261828	GEAR	1
22	PAHZZ	5315-00-187-3216	96906	MS24692-3	PIN, TAPERED, PLAIN	1
23	PAHZZ	3020-01-209-2098	19200	8261825	GEAR, SPUR	1
24	PAHZZ	5315-00-187-3228	96906	MS24692-30	PIN, TAPERED, PLAIN	2
25	PAHZZ	3040-00-929-3582	19200	8261806	DIFFERENTIAL ASSEMBLY	1
26	PAHZZ	3040-01-216-2715	19200	8261860	SHAFT, SHOULDERED	1
27	PAHZZ	5365-00-550-5937	96906	4MS16632-4025	RING, RETAINING	2
28	PAHZZ	3020-01-208-8511	19200	8261826	GEAR, SPUR	1
29	PAHZZ	5365-00-298-6564	96906	MS16624-4025	RING, RETAINING	1
30	PAHZZ	5315-00-822-4740	96906	MS16556-627	PIN, STRAIGHT, HEADLESS	2
31	PAHZZ	6650-01-145-3418	19200	8261862	SHIELD, TELESCOPE MO	1
32	PAFZZ	5305-00-531-1773	96906	MS51023-50	SETSCREW	1
33	PAFZZ	5355-00-052-4062	19200	8261865	KNOB	1
34	PAFZZ	5315-00-187-3232	96906	MS24692-36	PIN, TAPERED, PLAIN	1
35	PAFZZ	5340-00-435-2572	19200	8261863	PLUNGER, DETENT	1
36	PAFZZ	5360-00-177-3877	19200	8261864	SPRING, HELICAL, COMP	1
37	XAHHH		19200	8587537	BASE ASSEMBLY, SEE FIG B-24 FOR BREAKDOWN	1

SECTION II

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
38	PAHZZ	5315-00-616-5516	96906	MS35756-4	KEY. WOODRUFF	1
39	PAHZZ	3040-01-213-1232	19200	8261824	SHAFT. SHOULDERED.....	1
40	PAHZZ	5315-00-052-9300	96906	MS16556-630	PIN, STRAIGHT HEADLESS	2
					END OF FIGURE	

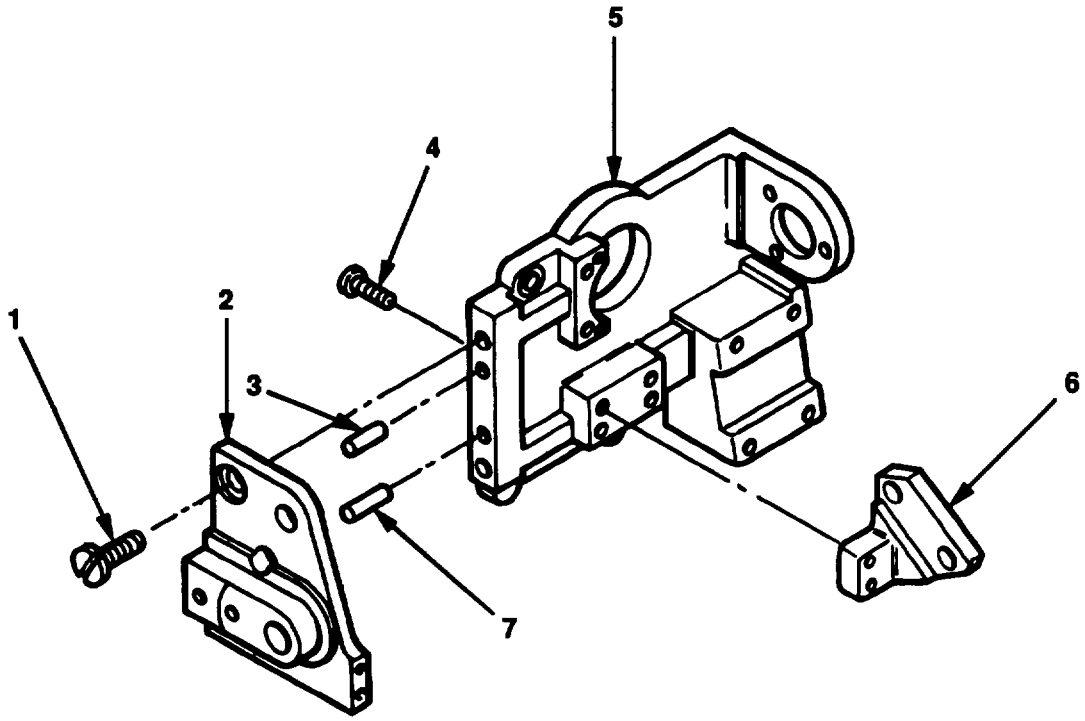


Figure B-24. Base Assembly 8587537.

SECTION II

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 0105050101 FIG.B-24 BASE ASSEMBLY 8587537	
1	PAHZZ	5305-00-050-9229	96906	MS51957-63	SCREW, MACHINE	2
2	XAHZZ		19200	8261834	ADAPTER	1
3	PAHZZ	5315-00-889-2518	96906	M16556-628	PIN, STRAIGHT, HEADLESS	2
4	PAHZZ	5305-00-054-5651	96906	MS51957-17	SCREW, MACHINE	2
5	XAHZZ		19200	8261803	BASE.....	1
6	PAHZZ	5340-01-209-3709	19200	8261827	BRACKET, MOUNTING.....	1
7	PAHZZ	5315-00-052-9300	96906	MS16556-630	PIN, STRAIGHT, HEADLESS	1
					END OF FIGURE	

SECTION II

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 9999 FIG.BULK	
1	PAEZZ	6145-00-889-1062	81349	LW-C20/7/J0	WIRE,ELEC INSUL,GEN ..... V PURPOSE, COPPER, CNDCTR SIZE 24,7 STRND MIN,JACKTED.BLK	
2	PAHZZ	6145-00-583-3789	81349	M16878/17BG E9	WIRE,ELEC INSUL,GEN ..... V PURPOSE,COPPER.CNDCTR SIZE 24,7 STRAND MIN,JACKETED,WHT	
3	PAHZZ	6145-01-003-5322	81349	MILW16878-5	WIRE, ELECTRICAL..... V END OF FIGURE	

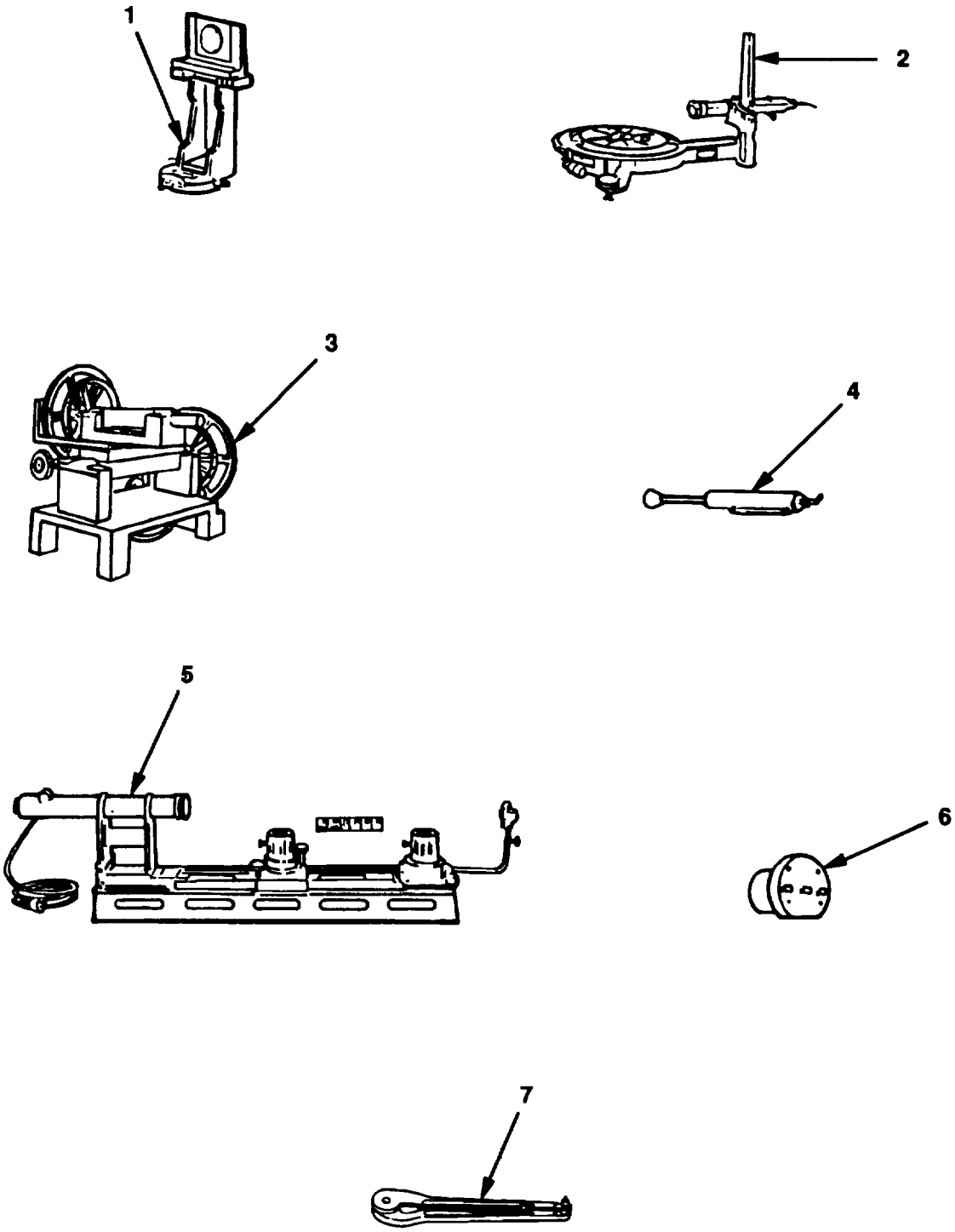


Figure B-25. Special Tools.

Section III.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 9500 FIB.B-25 SPECIAL TOOLS	
1	PAHZZ	4931-00-801-6861	19200	8213899	ADAPTER, FIXTURE	1
2	PEHZA	4931-00-769-1596	19200	7691596	FIXTURE, TELESCOPE T...	1
3	PEHZZ	4931-00-508-5484	19200	7681019	FIXTURE, CROSSLEVELING.....	1
4	PAFZZ	6635-00-790-0733	11710	719-20MRP	TESTER, SPRING RESIL	1
5	PEHZZ	4931-00-508-5434	19200	7197944	TEST FIXTURE, TELESCOPE	1
6	PEHZZ	4931-00-884-7752	19200	8213745	FIXTURE, TELESCOPE T...	1
7	PAHZZ	5120-00-394-5416	55974	QC70028-1	WRENCH, SPANNER	1
					END OF FIGURE	

CROSS- REFERENCE-INDEXES
NATIONAL STOCK NUMBER INDEX

STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
9905-00-012-2972	B-20	13	5305-00-054-6651	B-2	1
9905-00-012-2973	B-20	16		B-6	14
5340-00-019-4575	B-22	42		B-15	6
3040-00-027-2615	B-6	25	5305-00-057-0498	B-3	13
5999-00-042-5355	B-16	19	5305-00-057-0509	B-6	50
	B-19	19	5305-00-057-0511	B-18	10
5995-00-050-5969	B-6	43	5305-00-057-0523	B-2	22
	B-20	8	5305-00-059-2490	B-22	40
	B-21	13	9535-00-059-5836	B-22	45
5305-00-050-9229	B-24	1	5340-00-059-5838	B-22	3
5305-00-050-9231	B-9	5	5305-00-059-8247	B-16	9
5305-00-051-4495	B-4	47	2640-00-060-3543	B-2	19
5305-00-051-4497	B-14	2		B-4	78
5310-00-052-0275	B-4	11		B-20	18
5310-00-052-0276	B-4	36	5315-00-060-4760	B-6	31
5340-00-052-3946	B-3	16	5315-00-060-4776	B-23	16
3020-00-052-3971	B-6	36	5340-00-063-0275	B-22	2
1240-00-052-4037	B-22	51	3020-00-063-0276	B-22	47
1240-00-052-4041	B-3	10	5305-00-068-1654	B-9	23
5340-00-052-4057	B-18	27	5305-00-068-5276	B-7	13
3020-00-052-4059	B-6	38		B-19	32
5365-00-052-4060	B-7	23	5305-00-068-5406	B-18	13
5355-00-052-4062	B-23	33		B-18	18
5315-00-052-9300	B-23	40	5330-00-073-8016	B-19	36
	B-24	7	5315-00-078-0112	B-22	15
5315-00-052-9301	B-4	9	3120-00-080-9562	B-3	28
5305-00-054-5635	B-2	3	5315-00-082-4858	B-4	22
	B-9	6	5305-00-085-3706	B-9	24
5305-00-054-5636	B-3	24	5340-00-087-2729	B-2	16
	B-6	11	5315-00-089-4942	B-6	23
5305-00-054-5637	B-14	22	4820-00-114-1096	B-2	18
	B-16	27		B-4	77
	B-23	6		B-20	21
5305-00-054-5638	B-23	18	5310-00-115-0639	B-22	16
5305-00-054-5639	B-20	14	1240-00-116-3421	B-6	52
5305-00-054-5644	B-16	3	9525-00-116-3429	B-6	54
5305-00-054-5646	B-2	25	5330-00-125-3947	B-22	14
	B-19	5	3120-00-133-6379	B-4	17
	B-21	15	5365-00-134-3385	B-22	33
5305-00-054-5647	B-6	39	1240-00-135-4549	B-5	8
	B-20	1	5330-00-143-8759	B-3	2
5305-00-054-5648	B-2	31	3110-00-156-5022	B-22	13
	B-6	29	5935-00-175-5966	B-21	16
5305-00-054-5649	B-4	14	5360-00-177-3877	B-23	36
	B-7	8	5365-00-177-4091	B-4	25
5305-00-054-5650	B-4	15	5365-00-177-4092	B-4	25
5305-00-054-5651	B-6	34	5365-00-177-4093	B-4	25
	B-24	4	5940-00-177-7973	B-19	15
5305-00-054-5653	B-4	29	5310-00-178-8631	B-18	1
5305-00-054-5654	B-6	32	5360-00-179-1391	B-6	19

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STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
5315-00-187-3216	B-23	22	6650-00-504-5963	B-12	2
5315-00-187-3226	B-4	58	6650-00-504-9914	B-7	3
	B-6	17	6650-00-504-9915	B-7	5
5315-00-187-3228	B-23	24	5310-00-504-9929	B-3	17
5315-00-187-3232	B-22	31	5310-00-504-9930	B-3	18
	B-23	34	4931-00-508-5434	B-25	5
5315-00-187-3241	B-14	9	4931-00-508-5484	B-25	3
5315-00-187-3245	B-23	3	5360-00-530-5978	B-18	20
5315-00-187-3258	B-22	19	5305-00-531-1773	B-23	32
	B-23	14	5930-00-539-7013	B-19	11
5315-00-187-3259	B-14	27	5310-00-543-2740	B-18	16
1290-00-191-3302	B-16	18	5310-00-543-4652	B-16	26
	B-19	18		B-20	15
5305-00-207-7468	B-16	20	5310-00-543-5933	B-18	7
	B-19	20		B-22	11
1650-00-222-4525	B-20	19	5310-00-550-0845	B-18	19
5340-00-228-1631	B-22	18	5310-00-550-3715	B-2	30
5365-00-278-5309	B-22	1		B-19	3
5365-00-278-5325	B-3	26		B-19	33
5305-00-285-4687	B-3	20		B-20	2
5365-00-285-7901	B-10	4	5365-00-550-5937	B-23	27
5365-00-285-7927	B-9	21	3110-00-554-6085	B-4	53
5365-00-292-3620	B-11	1	6145-00-583-3789	BULK	2
5365-00-298-6564	B-14	11	5310-00-595-6211	B-16	24
	B-23	29	5365-00-597-8890	B-12	3
9905-00-300-7909	B-18	11	1240-00-613-5750	B-9	2
9905-00-310-0758	B-2	4	1240-00-613-5751	B-9	1
1240-00-328-5631	B-8	1	1240-00-613-6408	B-10	1
6650-00-328-5632	B-11	2	1240-00-613-6409	B-12	1
9905-00-328-5634	B-9	7	5310-00-616-3555	B-4	28
5340-00-328-5635	B-6	9		B-15	5
5315-00-338-5074	B-14	3	5315-00-616-5516	B-23	38
	B-23	11	5305-00-637-5884	B-19	22
5310-00-392-6983	B-3	8	5305-00-638-1081	B-9	13
5120-00-394-5416	B-25	7	5305-00-639-4759	B-7	11
5310-00-410-3017	B-16	25	5930-00-655-1516	B-19	10
5310-00-413-4382	B-23	1	5315-00-682-1733	B-18	3
5365-00-432-3584	B-6	35	1290-00-692-1493	B-21	4
5340-00-435-2572	B-23	35	5305-00-701-5230	B-5	16
1240-00-463-4644	B-2	2	5340-00-707-1260	B-23	15
5340-00-464-4792	B-2	17	5305-00-716-7921	B-2	39
	B-4	76		B-5	11
	B-20	20	5305-00-716-7932	B-4	66
8140-00-503-2820	B-9	12	5305-00-717-6949	B-2	21
9340-00-503-5616	B-9	19	5305-00-717-6950	B-2	6
6650-00-503-6234	B-9	11	5305-00-719-5329	B-4	49
1240-00-503-7820	B-9	10	5305-00-719-5381	B-2	15
5340-00-503-7821	B-9	9	5305-00-724-3439	B-9	18
6650-00-504-5960	B-10	2	5305-00-724-5396	B-2	38
6650-00-504-5961	B-10	3	5305-00-724-5793	B-5	10

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5305-00-724-5812	B-22	39	5340-00-845-7371	B-19	9
5305-00-724-5876	B-16	12	3020-00-845-9514	B-22	20
5330-00-752-7783	B-4	6	6695-00-845-9515	B-20	4
5315-00-753-0514	B-16	21	5330-00-845-9516	B-19	1
	B-19	21	5355-00-845-9517	B-20	17
5970-00-753-0515	B-19	16	5355-00-845-9518	B-20	6
5970-00-753-0516	B-16	16	5310-00-846-4632	B-4	60
6650-00-756-3760	B-3	3	5310-00-846-4647	B-2	10
1240-00-757-9883	B-11	3	1240-00-846-4649	B-2	24
5340-00-759-6333	B-9	17	5330-00-846-4650	B-4	38
5305-00-760-3848	B-9	16	5365-00-846-4747	B-5	15
5340-00-763-7795	B-9	3	5355-00-846-4789	B-3	22
5305-00-763-7822	B-22	44	5360-00-846-6610	B-4	56
	B-23	10	5330-00-846-6616	B-2	36
5340-00-764-1669	B-6	48	3040-00-846-6675	B-22	12
5305-00-766-2422	B-4	44	5340-00-846-6676	B-20	3
5305-00-768-0336	B-22	46	5330-00-846-6879	B-2	40
	B-23	19	3040-00-846-6880	B-22	23
4931-00-769-1596	B-25	2	3020-00-846-6882	B-6	18
5305-00-770-2533	B-2	34	5310-00-846-7494	B-22	30
5305-00-770-2579	B-4	67	5330-00-846-8636	B-2	32
	B-22	49	5310-00-846-8640	B-3	6
5305-00-774-9613	B-22	8	5355-00-847-2697	B-6	49
5305-00-781-1100	B-14	14	5355-00-847-2698	B-6	51
5305-00-781-5215	B-18	8	5340-00-847-6251	B-2	23
5365-00-782-9876	B-4	31	5365-00-847-6253	B-6	3
5310-00-782-9877	B-20	23	5355-00-847-6260	B-16	13
6635-00-790-0733	B-25	4		B-19	30
4931-00-801-6861	B-25	1	5315-00-848-7829	B-4	10
5365-00-804-6895	B-4	69		B-6	27
	B-19	26	1240-00-848-8658	B-7	2
	B-20	24	5360-00-848-8660	B-4	74
	B-21	5	5365-00-848-8664	B-21	1
5315-00-807-7684	B-2	14	3040-00-848-9888	B-14	5
5315-00-807-7957	B-4	24	6650-00-848-9892	B-7	18
5310-00-820-2210	B-4	54	3040-00-849-2968	B-14	26
5315-00-822-4740	B-23	30	3110-00-849-2970	B-22	24
5310-00-823-8768	B-14	21	5360-00-849-2973	B-6	5
5315-00-825-1207	B-22	36	5970-00-850-4337	B-4	70
5940-00-827-2653	B-16	10		B-19	23
5340-00-832-5499	B-4	4		B-20	25
3120-00-833-6794	B-22	35		B-21	6
5330-00-845-5639	B-4	42	5330-00-850-4338	B-19	28
5330-00-845-5640	B-7	7	5315-00-850-4341	B-6	4
5330-00-845-5641	B-2	12	3040-00-851-1012	B-3	4
5330-00-845-5642	B-3	11	5970-00-851-1574	B-22	5
5330-00-845-5643	B-4	18	5315-00-851-2285	B-14	18
5310-00-845-7367	B-22	27	5305-00-851-2287	B-16	14
5310-00-845-7368	B-22	17		B-19	31
5310-00-845-7369	B-22	25	1240-00-851-9689	-B-5	2

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5310-00-852-3688	B-14	1
5305-00-852-3731	B-22	21
6695-00-854-4482	B-16	1
5305-00-857-5190	B-3	21
	B-9	25
3040-00-858-6334	B-15	1
5340-00-859-5990	B-14	7
5340-00-862-2698	B-15	2
5330-00-863-3200	B-16	6
5305-00-865-9516	B-2	27
	B-4	61
	B-6	41
5330-00-877-5492	B-2	28
5365-00-882-6032	B-14	12
5340-00-882-8825	B-16	4
5999-00-883-1451	B-19	35
4931-00-884-7752	B-25	6
5315-00-889-2518	B-18	15
	B-18	21
	B-18	23
	B-24	3
5305-00-889-3116	B-4	3
5305-00-889-3118	B-4	19
5330-00-891-5651	B-4	8
6650-00-891-9850	B-7	20
5365-00-893-5244	B-3	1
5365-00-893-5886	B-4	73
5355-00-893-6092	B-22	32
5360-00-893-6095	B-6	7
5330-00-893-6696	B-16	15
3040-00-894-4431	B-4	52
1240-00-895-6492	B-17	1
5999-00-895-6493	B-16	17
	B-19	17
1240-00-895-6495	B-21	2
3040-00-895-6496	B-21	3
1240-00-895-9186	B-1	1
5330-00-895-9187	B-22	50
5315-00-895-9188	B-22	54
5310-00-895-9189	B-22	26
5999-00-895-9190	B-22	4
5999-00-895-9191	B-4	72
	B-19	24
	B-20	27
	B-21	8
6680-00-896-2239	B-21	11
1240-00-896-2240	B-13	1
3010-00-896-2243	B-2	11
6210-00-896-2245	B-21	12
6210-00-896-2246	B-6	42
6210-00-896-2246	B-20	7
3040-00-896-2247	B-6	22
6650-00-896-2248	B-7	24
6650-00-896-2250	B-7	9
6680-00-896-9049	B-6	24
6650-00-898-4215	B-5	14
3010-00-898-4216	B-6	20
3010-00-898-4220	B-7	12
5365-00-898-4222	B-6	45
	B-20	10
	B-21	14
5355-00-898-6791	B-4	21
5340-00-898-6797	B-6	6
5355-00-898-6798	B-3	15
3040-00-898-6799	B-6	21
3020-00-898-6801	B-5	13
3040-00-898-6805	B-14	10
5340-00-898-6809	B-14	15
1240-00-898-9907	B-4	33
5355-00-898-9908	B-4	2
5360-00-899-2158	B-22	34
5360-00-899-2159	B-3	27
5360-00-899-2162	B-3	9
5360-00-899-2163	B-14	8
5360-00-899-2164	B-4	71
	B-19	25
	B-20	26
	B-21	7
5305-00-899-2165	B-4	62
	B-6	40
5360-00-899-2901	B-22	37
5360-00-899-2902	B-22	22
5360-00-899-3100	B-22	28
5315-00-899-3103	B-18	24
5365-00-899-5141	B-6	37
6650-00-899-5144	B-5	3
6650-00-899-5145	B-5	6
1240-00-899-6319	B-7	6
5365-00-899-6938	B-14	6
5365-00-899-7643 -	B-5	7
3040-00-899-7644	B-14	13
5305-00-905-1650	B-16	22
6680-00-907-0737	B-6	12
6680-00-914-4715	B-23	17
5340-00-915-5720	B-2	26
6230-00-918-8642	B-19	6
3020-00-921-7348	B-23	21
5315-00-927-3399	B-6	1
5355-00-927-3400	B-4	23
5340-00-927-7290	B-4	75

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STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
5310-00-928-2690	B-6	10	5365-01-145-3734	B-22	7
5315-00-928-3815	B-15	7	5340-01-145-5527	B-19	29
5330-00-928-9452	B-4	16	5340-01-146-4813	B-19	2
3040-00-929-3582	B-23	25	5315-01-146-4879	B-18	26
5310-00-929-6395	B-4	34	1240-01-146-7722	B-6	30
	B-6	13	3020-01-147-3918	B-22	41
5905-00-933-6805	B-16	8	5320-01-147-5379	B-18	5
	B-19	27	5365-01-148-1288	B-22	29
5310-00-933-8118	B-4	13	5365-01-153-8461	B-14	20
	B-6	28	5365-01-153-8462	B-14	30
5310-00-933-8120	B-9	4	9340-01-155-9342	B-3	23
5310-00-933-8121	B-14	17	5340-01-156-0278	B-2	35
5310-00-933-8778	B-18	9	5340-01-156-0279	B-2	33
5310-00-934-9746	B-19	14	1240-01-156-0313	B-4	30
8305-00-935-6393	B-20	5	1240-01-156-0314	B-6	26
9515-00-936-5397	B-4	20	5310-01-156-7514	B-19	12
5315-00-939-1146	B-2	37	5355-01-157-0583	B-3	14
5305-00-941-3538	B-6	47	3120-01-157-0666	B-3	19
	B-20	12	3020-01-157-0667	B-7	14
5340-00-944-8036	B-4	12	1290-01-157-0669	B-4	37
5330-00-944-8040	B-4	26	1240-01-157-0763	B-4	57
6695-00-944-8066	B-6	8	5310-01-157-9366	B-3	7
5330-00-949-3890	B-23	13	5340-01-157-9394	B-2	29
5315-00-949-3909	B-4	64	5365-01-158-6144	B-14	25
	B-6	15	3020-01-159-2222	B-5	9
5305-00-959-0379	B-19	4	5365-01-160-3445	B-14	28
5305-00-959-1909	B-22	10	3110-01-166-9642	B-3	5
5305-00-959-2710	B-4	1	5305-01-179-7806	B-4	40
5315-00-968-3509	B-22	43	5315-01-204-4270	B-21	10
5310-00-974-6623	B-2	8	9905-01-204-5826	B-14	23
3020-00-977-1244	B-4	59	1240-01-204-5974	B-5	4
5305-00-978-9380	B-14	16	1240-01-204-5981	B-7	21
5310-00-982-6816	B-4	55	1240-01-204-5983	B-7	22
5305-00-988-7608	B-22	53	3010-01-205-0032	B-23	12
5305-00-988-7614	B-18	17	1240-01-205-0369	B-4	43
5305-00-988-7838	B-18	2	5355-01-205-4014	B-23	2
5305-00-988-7839	B-2	9	1240-01-206-0145	B-4	39
5305-00-989-3119	B-18	6	3020-01-207-1940	B-23	4
5305-00-990-6381	B-4	27	5315-01-207-5730	B-23	8
5310-00-993-4896	B-4	65	3020-01-208-8511	B-23	28
5365-00-993-4899	B-4	50	5340-01-209-1787	B-15	4
5940-00-993-4901	B-4	51	5365-01-209-1794	B-4	45
5340-00-993-4905	B-4	41	3020-01-209-2098	B-23	23
6145-01-003-5322	BULK	3	5340-01-209-3709	B-24	6
5365-01-053-0627	B-9	8	1240-01-209-8383	B-3	25
5330-01-134-8758	B-4	7	3020-01-210-6298	B-23	9
3040-01-145-3415	B-22	52	1240-01-212-8576	B-7	17
6650-01-145-3416	B-18	25	5315-01-213-1215	B-23	7
6650-01-145-3418	B-23	31	5360-01-213-1217	B-23	5
3110-01-145-3733	B-22	48	9330-01-213-1226	B-7	10

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5340-01-213-1227	B-23	20			
1240-01-213-1230	B-7	19			
1240-01-213-1231	B-7	4			
3040-01-213-1232	B-23	39			
5315-01-213-5557	B-3	12			
3040-01-216-2715	B-23	26			
5315-01-217-0938	B-15	3			
1015-01-235-0223	B-2	20			
	B-4	79			
5340-01-287-1464	B-6	46			
	B-20	11			
5980-01-289-5274	B-21	17			
5340-01-293-2136	B-6	53			
5999-01-295-8138	B-16	2			
5999-01-295-8139	B-20	9			
1240-01-297-6837	B-19	7			
5999-01-301-5468	B-6	44			
6220-01-305-7210	B-19	8			
3040-01-339-0478	B-6	33			

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
81348	FF-W-100	5310-00-543-2740	B-18	16
81349	LW-C20/7/J0		BULK	1
81349	LWC20-7J0		B-16	7
81349	M1LW16878-5	6145-01-003-5322	BULK	3
81349	M1LW76		B-4	46
96906	MS15795-803	5310-00-595-6211	B-16	24
96906	MS16555-328	5315-00-851-2285	B-14	18
96906	MS16555-603	5315-00-807-7684	B-2	14
96906	MS16555-605	5315-00-939-1146	B-2	37
96906	MS16555-608	5315-00-807-7957	B-4	24
96906	MS16555-627	5315-00-825-1207	B-22	36
96906	MS16555-646	5315-00-682-1733	B-18	3
96906	MS16556-602	5315-00-848-7829	B-4	10
			B-6	27
96906	MS16556-603	5315-00-949-3909	B-4	64
			B-6	15
96906	MS16556-604	5315-00-060-4776	B-23	16
96906	MS16556-606	5315-00-060-4760	B-6	31
96906	MS16556-608	5315-00-078-0112	B-22	15
96906	MS16556-619	5315-00-052-9301	B-4	9
96906	MS16556-621	5315-00-082-4858	B-4	22
96906	MS16556-627	5315-00-822-4740	B-23	30
96906	MS16556-628	5315-00-889-2518	B-18	15
			B-18	21
			B-18	23
			B-24	3
96906	MS16556-630	5315-00-052-9300	B-23	40
			B-24	7
96906	MS16556-640	5315-00-968-3509	B-22	43
96906	MS16624-4025	5365-00-298-6564	B-14	11
			B-23	29
96906	MS16624-5018-1	5365-00-432-3584	B-6	35
96906	MS16632-4025	5365-00-550-5937	B-23	27
96906	MS16995-10	5305-00-959-0379	B-19	4
96906	MS16995-19	5305-00-990-6381	B-4	27
96906	MS16995-36	5305-00-988-7608	B-22	53
96906	MS16995-37	5305-00-989-3119	B-18	6
96906	MS16995-50	5305-00-988-7614	B-18	17
96906	MS16995-64	5305-00-988-7838	B-18	2
96906	MS16995-65	5305-00-988-7839	B-2	9
96906	MS16995-9	5305-00-068-5276	B-7	13
			B-19	32
96906	MS16996-11	5305-00-959-1909	B-22	10
96906	MS16996-15	5305-00-068-5406	B-18	13
			B-18	18
96906	MS16997-61	5305-00-978-9380	B-14	16
96906	MS20813-1	1650-00-222-4525	B-20	19
96906	MS21044C5	5310-00-982-6816	B-4	55
96906	MS24692-27	5315-00-187-3226	B-4	58
			B-6	17
96906	MS24692-3	5315-00-187-3216	B-23	22

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96906	MS24692-30	5315-00-187-3228	B-23	24
96906	MS24692-36	5315-00-187-3232	B-22	31
			B-23	34
96906	MS24692-54	5315-00-187-3241	B-14	9
96906	MS24692-60	5315-00-187-3245	B-23	3
96906	MS24692-84	5315-00-187-3258	B-22	19
			B-23	14
96906	MS24692-87	5315-00-187-3259	B-14	27
96906	MS35058-24	5930-00-655-1516	B-19	10
96906	MS35190-203	5305-00-959-2710	B-4	1
96906	MS35191-207	5305-00-760-3848	B-9	16
96906	MS35206-203	5305-00-889-3118	B-4	19
96906	MS35206-213	5305-00-889-3116	B-4	3
96906	MS35214-12	5305-00-637-5884	B-19	22
96906	MS35214-16	5305-00-207-7468	B-16	20
			B-19	20
96906	MS35214-22	5305-00-059-8247	B-16	9
96906	MS35249-3	5305-00-639-4759	B-7	11
96906	MS35275-201	5305-00-941-3538	B-6	47
			B-20	12
96906	MS35308-421	5305-00-781-5215	B-18	8
96906	MS35333-69	5310-00-543-4652	B-16	26
			B-20	15
96906	MS35333-70	5310-00-550-3715	B-2	30
			B-19	3
			B-19	33
			B-20	2
96906	MS35333-71	5310-00-616-3555	B-4	28
			B-15	5
96906	MS35333-73	5310-00-543-5933	B-18	7
			B-22	11
96906	MS35333-75	5310-00-178-8631	B-18	1
96906	MS35338-134	5310-00-928-2690	B-6	10
96906	MS35338-135	5310-00-933-8118	B-4	13
			B-6	28
			B-16	23
96906	MS35338-136	5310-00-929-6395	B-4	34
			B-6	13
96906	MS35338-138	5310-00-933-8120	B-9	4
96906	MS35338-139	5310-00-933-8121	B-14	17
96906	MS35338-140	5310-00-974-6623	B-2	8
96906	MS35338-143	5310-00-933-8778	B-18	9
96906	MS35649-245	5310-00-934-9746	B-19	14
96906	MS35649-245T	5310-00-410-3017	B-16	25
96906	MS35689-1	3120-00-080-9562	B-3	28
96906	MS35689-7	3120-00-833-6794	B-22	35
96906	MS35756-4	5315-00-616-5516	B-23	38
96906	MS51023-18	5305-00-851-2287	B-16	14
			B-19	31
96906	MS51023-28	5305-00-852-3731	B-22	21
96906	MS51023-50	5305-00-531-1773	B-23	32

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96906	MS51029-48	5305-00-865-9516	B-2	27
			B-4	61
			B-6	41
96906	MS51031-33	5305-00-724-3439	B-9	18
96906	MS51031-46	5305-00-724-5876	B-16	12
96906	MS51031-8	5305-00-068-1654	B-9	23
96906	MS51377-2	2640-00-060-3543	B-2	19
			B-4	78
			B-20	18
96906	MS51607-1	4820-00-114-1096	B-2	18
			B-4	77
			B-20	21
96906	MS51957-1	5305-00-054-5635	B-2	3
			B-9	6
96906	MS51957-11	5305-00-054-5644	B-16	3
96906	MS51957-12	5305-00-054-5646	B-2	25
			B-19	5
			B-21	15
96906	MS51957-13	5305-00-054-5647	B-6	39
			B-20	1
96906	MS51957-14	5305-00-054-5648	B-2	31
			B-6	29
96906	MS51957-15	5305-00-054-5649	B-4	14
			B-7	8
96906	MS51957-16	5305-00-054-5650	B-4	15
96906	MS51957-17	5305-00-054-5651	B-6	34
			B-24	4
96906	MS51957-19	5305-00-054-5653	B-4	29
96906	MS51957-2	5305-00-054-5636	B-3	24
			B-6	11
96906	MS51957-20	5305-00-054-5654	B-6	32
96906	MS51957-27	5305-00-054-6651	B-2	1
			B-6	14
			B-15	6
96906	MS51957-3	5305-00-054-5637	B-14	22
			B-16	27
			B-23	6
96906	MS51957-4	5305-00-054-5638	B-23	18
96906	MS51957-5	5305-00-054-5639	B-20	14
96906	MS51957-63	5305-00-050-9229	B-24	1
96906	MS51957-65	5305-00-050-9231	B-9	5
96906	MS51958-12	5305-00-057-0509	B-6	50
96906	MS51958-14	5305-00-057-0511	B-18	10
96906	MS51958-2	5305-00-057-0498	B-3	13
96906	MS51958-27	5305-00-057-0523	B-2	22
96906	MS51959-1	5305-00-766-2422	B-4	44
96906	MS51959-13	5305-00-770-2533	B-2	34
96906	MS51959-14	5305-00-763-7822	B-22	44
			B-23	10
96906	MS51959-15	5305-00-770-2579	B-4	67
			B-22	49

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
96906	MS51959-17	5305-00-768-0336	B-22	46
			B-23	19
96906	MS51960-46	5305-00-774-9613	B-22	8
96906	MS51960-8	5305-00-701-5230	B-5	16
96906	MS51963-10	5305-00-717-6949	B-2	21
96906	MS51963-20	5305-00-719-5329	B-4	49
96906	MS51963-24	5305-00-719-5381	B-2	15
96906	MS51963-9	5305-00-717-6950	B-2	6
96906	MS51964-18	5305-00-724-5793	B-5	10
96906	MS51964-65	5305-00-724-5812	B-22	39
96906	MS51964-9	5305-00-724-5396	B-2	38
96906	MS51973-17	5305-00-051-4495	B-4	47
96906	MS51973-19	5305-00-051-4497	B-14	2
96906	MS51974-2	5305-00-716-7932	B-4	66
96906	MS51974-8	5305-00-716-7921	B-2	39
			B-5	11
96906	MS51976-46	5305-00-059-2490	B-22	40
96906	MS77067-1	5940-00-177-7973	B-19	15
96906	MS77068-2	5940-00-827-2653	B-16	10
96906	MS9105-54	5315-00-338-5074	B-14	3
			B-23	11
96906	MS9390-300	5315-00-899-3103	B-18	24
81349	M16878/17BGE9		B-19	13
			B-22	6
		6145-00-583-3789	BULK	2
81349	M5423/02-01	5930-00-539-7013	B-19	11
80205	NAS1352-3LL8P	5305-00-781-1100	B-14	14
80205	NAS1352C04-10	5305-00-905-1650	B-16	22
80205	NAS51-12	5365-00-804-6895	B-4	69
			B-19	26
			B-20	24
			B-21	5
55974	QC70028-1	5120-00-394-5416	B-25	7
19200	10516567	5340-00-464-4792	B-2	17
			B-4	76
			B-20	20
19200	10539221	5365-00-134-3385	B-22	33
19200	10539232	6695-00-944-8066	B-6	8
19200	10540478	5330-01-134-8758	B-4	7
19200	10540479	5330-00-928-9452	B-4	16
19200	10540480	5330-00-944-8040	B-4	26
19200	10540481	5355-00-927-3400	B-4	23
19200	10540482	9515-00-936-5397	B-4	20
19200	10540483		B-4	5
19200	10540484	3120-00-133-6379	B-4	17
19200	10541411	5340-00-832-5499	B-4	4
19200	10541416		B-4	32
19200	10541419	5315-00-928-3815	B-15	7
19200	10541421	5340-01-209-1787	B-15	4
19200	10541427	3020-00-977-1244	B-4	59
19200	10541428	1240-01-156-0313	B-4	30

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
19200	10541481	5340-00-944-8036	B-4	12
19200	10541484	5365-00-782-9876	B-4	31
19200	10543306-6	5995-00-050-5969	B-6	43
			B-20	8
			B-21	13
19200	10547039	5330-00-073-8016	B-19	36
19200	10547435	5360-00-179-1391	B-6	19
19200	10547986	5999-00-883-1451	B-19	35
19200	10553376	5310-00-052-0276	B-4	36
19200	10553377	5310-00-052-0275	B-4	11
19200	10555157-1	5305-00-085-3706	B-9	24
19200	10555157-16	5305-00-857-5190	B-3	21
			B-9	25
19200	10555860	5340-00-228-1631	B-22	18
19200	10555861	5310-00-115-0639	B-22	16
19200	10556120	1240-00-328-5631	B-8	1
19200	10556121	9905-00-328-5634	B-9	7
19200	10556122	5365-01-053-0627	B-9	8
19200	10559199-1	5365-00-177-4092	B-4	25
19200	10559199-2	5365-00-177-4093	B-4	25
19200	10559199-3	5365-00-177-4091	B-4	25
19200	10559863	5935-00-175-5966	B-21	16
19200	11730191	1240-00-463-4644	B-2	2
19200	11748290		B-9	20
19200	11748291	6650-00-328-5632	B-11	2
19200	11785358	5365-01-153-8462	B-14	30
19200	11785359	5365-01-153-8461	B-14	20
19200	11785460	5365-01-158-6144	B-14	25
19200	11785461	5365-01-160-3445	B-14	28
19207	12309110-2	5310-01-156-7514	B-19	12
19207	12360905-2	5980-01-289-5274	B-21	17
19200	12599273	5999-01-295-8139	B-20	9
19200	12599274	5999-01-301-5468	B-6	44
19200	12599287	1240-01-297-6837	B-19	7
19200	12599289	5999-01-295-8138	B-16	2
19200	12599292	5340-01-287-1464	B-6	46
			B-20	11
19200	12599294	6220-01-305-7210	B-19	8
19200	12599352	5340-01-293-2136	B-6	53
98810	13957-1	5305-00-638-1081	B-9	13
21450	426785	5315-01-213-5557	B-3	12
19200	5032820	8140-00-503-2820	B-9	12
19200	5035616	9340-00-503-5616	B-9	19
19200	5036234	6650-00-503-6234	B-9	11
19200	5036245	5365-00-278-5309	B-22	1
19200	5037820	1240-00-503-7820	B-9	10
19203	5037821	5340-00-503-7821	B-9	9
19200	5039406	5365-00-278-5325	B-3	26
19200	5045959	5365-00-285-7901	B-10	4
19200	5045960	6650-00-504-5960	B-10	2
19200	5045961	6650-00-504-5961	B-10	3

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
19200	5045963	6650-00-504-5963	B-12	2
19200	5045965	5365-00-597-8890	B-12	3
19200	5045966	5365-00-292-3620	B-11	1
19200	5045968	5365-00-285-7927	B-9	21
19200	5049914	6650-00-504-9914	B-7	3
19200	5049915	6650-00-504-9915	B-7	5
19200	5049929	5310-00-504-9929	B-3	17
19200	5049930	5310-00-504-9930	B-3	18
21450	505257	5315-00-089-4942	B-6	23
19200	544104	5315-01-204-4270	B-21	10
21450	586546	5315-01-217-0938	B-15	3
21450	588608	5305-00-285-4687	B-3	20
21450	588611	5305-01-179-7806	B-4	40
19200	6135750	1240-00-613-5750	B-9	2
19200	6135751	1240-00-613-5751	B-9	1
19200	6136408	1240-00-613-6408	B-10	1
19200	6136409	1240-00-613-6409	B-12	1
19200	6139342		B-9	22
19200	6139343		B-9	14
19204	7064587	1290-00-191-3302	B-16	18
			B-19	18
28569	7090-4	5310-00-392-6983	B-3	8
11710	719-20MRP	6635-00-790-0733	B-25	4
19200	7197944	4931-00-508-5434	B-25	5
19200	7579883	1240-00-757-9883	B-11	3
19200	7596333	5340-00-759-6333	B-9	17
19200	7637795	5340-00-763-7795	B-9	3
19200	7659439	5360-00-846-6610	B-4	56
19200	7660428	1240-01-146-7722	B-6	30
19200	7660438	5999-00-042-5355	B-16	19
			B-19	19
19200	7660556	1240-00-898-9907	B-4	33
19200	7660571	5305-00-899-2165	B-4	62
			B-6	40
19200	7660575	5340-00-328-5635	B-6	9
19200	7660591	5315-00-850-4341	B-6	4
19200	7660596	1240-00-116-3421	B-6	52
19200	7674690	5310-00-820-2210	B-4	54
19200	7681019	4931-00-508-5484	B-25	3
19200	7690840		B-9	15
19200	7691596	4931-00-769-1596	B-25	2
19200	8200055	1015-01-235-0223	B-2	20
			B-4	79
19200	8202183	1290-00-692-1493	B-21	4
19200	8213745	4931-00-884-7752	B-25	6
19200	8213899	4931-00-801-6861	B-25	1
19200	8215753	5310-00-846-4632	B-4	60
19200	8215762	5355-00-898-9908	B-4	2
19200	8215789	3040-00-895-6496	B-21	3
19200	8215790	1240-00-895-6495	B-21	2
19200	8215819	6210-00-896-2246	B-6	42

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19200	8215819	6210-00-896-2246	B-20	7
19200	8215829	5360-00-899-3100	B-22	28
19200	8215830	5310-00-845-7367	B-22	27
19200	8215831	5310-00-895-9189	B-22	26
19200	8215832	3110-00-849-2970	B-22	24
19200	8215833	5310-00-845-7369	B-22	25
19200	8215834	5365-01-148-1288	B-22	29
19200	8215835	6680-00-896-2239	B-21	11
19200	8215837.	6680-00-896-9049	B-6	24
19200	8215936	5315-00-927-3399	B-6	1
19200	8247732	5365-00-898-4222	B-6	45
			B-20	10
			B-21	14
19200	8247758	9905-00-012-2972	B-20	13
19200	8247759	9905-00-012-2973	B-20	16
19200	8261695	5355-00-846-4789	B-3	22
19200	8261793		B-22	38
19200	8261796	3020-01-147-3918	B-22	41
19200	8261799	1240-00-052-4037	B-22	51
19200	8261800		B-18	12
19200	8261801		B-20	22
19200	8261802		B-22	9
19200	8261803		B-24	5
19200	8261805	3020-00-063-0276	B-22	47
19200	8261806	3040-00-929-3582	B-23	25
19200	8261807	3020-01-210-6298	B-23	9
19200	8261809	5340-01-146-4813	B-19	2
19200	8261815	5355-00-893-6092	B-22	32
19200	8261817	3040-00-846-6880	B-22	23
19200	8261818	5365-01-145-3734	B-22	7
19200	8261819	5340-00-707-1260	B-23	15
19200	8261821	3010-01-205-0032	B-23	12
19200	8261822	3020-01-207-1940	B-23	4
19200	8261823	3020-00-845-9514	B-22	20
19200	8261824	3040-01-213-1232	B-23	39
19200	8261825	3020-01-209-2098	B-23	23
19200	8261826	3020-01-208-8511	B-23	28
19200	8261827	5340-01-209-3709	B-24	6
19200	8261828	3020-00-921-7348	B-23	21
19200	8261834		B-24	2
19200	8261839	6680-00-914-4715	B-23	17
19200	8261842	3110-01-145-3733	B-22	48
19200	8261843	5330-00-895-9187	B-22	50
19200	8261844	9535-00-059-5836	B-22	45
19207	8261845	5310-00-846-7494	B-22	30
19200	8261851	3040-01-145-3415	B-22	52
19200	8261855	5360-01-213-1217	B-23	5
19200	8261856	5315-01-207-5730	B-23	8
19200	8261857	5355-01-205-4014	B-23	2
19200	8261858	5310-00-413-4382	B-23	1
19200	8261859	5340-01-213-1227	B-23	20

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19200	8261860	3040-01-216-2715	B-23	26
19200	8261862	6650-01-145-3418	B-23	31
19200	8261863	5340-00-435-2572	B-23	35
19200	8261864	5360-00-177-3877	B-23	36
19200	8261865	5355-00-052-4062	B-23	33
19200	8261867	8305-00-935-6393	B-20	5
19200	8261870	6695-00-845-9515	B-20	4
19200	8261871	5340-00-846-6676	B-20	3
19200	8261872	5355-00-845-9518	B-20	6
19200	8261873	5355-00-845-9517	B-20	17
19200	8261882	5360-00-899-2158	B-22	34
19200	8261884	5340-00-019-4575	B-22	42
19200	8261935		B-18	22
19200	8261936	5340-00-052-4057	B-18	27
19200	8261953	6650-01-145-3416	B-18	25
19200	8261988	5315-01-146-4879	B-18	26
19200	8261989	5310-00-550-0845	B-18	19
19200	8261990	5360-00-530-5978	B-18	20
19200	8262091	9525-00-116-3429	B-6	54
19207	8262092	5365-00-847-6253	B-6	3
19200	8262098	5340-00-764-1669	B-6	48
19200	8262100	5360-00-893-6095	B-6	7
19200	8262101	5365-00-899-5141	B-6	37
19200	8262104	5355-00-847-2697	B-6	49
19200	8262105	5355-00-847-2698	B-6	51
19200	8262132	3040-00-846-6675	B-22	12
19200	8262138	5360-00-899-2901	B-22	37
19200	8262139	5340-00-063-0275	B-22	2
19200	8262140	5340-00-059-5838	B-22	3
19200	8267787	5999-00-895-6493	B-16	17
			B-19	17
19200	8287274	5340-00-882-8825	B-16	4
19200	8293172	3110-00-554-6085	B-4	53
19200	8572203	5905-00-933-6805	B-16	8
			B-19	27
19200	8572222		B-18	28
19200	8572223		B-18	4
19200	8572224		B-19	34
19200	8572240	9905-00-300-7909	B-18	11
19200	8572241		B-21	9
19200	8572243		B-18	14
19200	8587295	1240-00-895-6492	B-17	1
19200	8587296		B-5	5
19200	8587297		B-5	1
19200	8587300	5330-00-850-4338	B-19	28
19200	8587301	5340-01-145-5527	B-19	29
19200	8587302	5330-00-845-9516	B-19	1
19200	8587303	3110-00-156-5022	B-22	13
19200	8587305	5310-00-845-7368	B-22	17
19200	8587308	5360-00-899-2902	B-22	22
19200	8587309	6650-00-896-2248	B-7	24

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
19200	8587316	6650-00-899-5144	B-5	3
19200	8587317	6650-00-899-5145	B-5	6
19200	8587318	6650-00-891-9850	B-7	20
19200	8587319	6650-00-848-9892	B-7	18
19200	8587321	6210-00-896-2245	B-21	12
19200	8587322	6695-00-854-4482	B-16	1
19200	8587325	5315-00-895-9188	B-22	54
19200	8587326	5360-00-899-2164	B-4	71
			B-19	25
			B-20	26
			B-21	7
19200	8587327	5999-00-895-9191	B-4	72
			B-19	24
			B-20	27
			B-21	8
19200	8587328	5970-00-850-4337	B-4	70
			B-19	23
			B-20	25
			B-21	6
19200	8587329	5970-00-851-1574	B-22	5
19200	8587330	5999-00-895-9190	B-22	4
19200	8587340	1240-00-895-9186	B-1	1
19200	8587341	5365-00-052-4060	B-7	23
19200	8587342	1240-01-204-5981	B-7	21
19200	8587343	1240-00-848-8658	B-7	2
19200	8587344	1240-01-204-5983	B-7	22
19200	8587345	1240-00-846-4649	B-2	24
19200	8587348	5355-00-898-6791	B-4	21
19200	8587351		B-7	15
19200	8587352	5365-00-899-7643	B-5	7
19200	8587353	1240-00-135-4549	B-5	8
19200	8587354	1240-00-899-6319	B-7	6
19200	8587355	1240-01-212-8576	B-7	17
19200	8587356	5365-00-846-4747	B-5	15
19200	8587357	1240-00-851-9689	B-5	2
19200	8587358	1240-01-204-5974	B-5	4
19200	8587360	1240-01-209-8383	B-3	25
19200	8587361	5355-01-157-0583	B-3	14
19200	8587362	3040-00-851-1012	B-3	4
19200	8587364	3120-01-157-0666	B-3	19
19200	8587365	1240-00-052-4041	B-3	10
19200	8587366	9340-01-155-9342	B-3	23
19200	8587368	5360-00-899-2162	B-3	9
19200	8587369	5310-00-846-8640	B-3	6
19200	8587370	5310-01-157-9366	B-3	7
19200	8587371	3110-01-166-9642	B-3	5
19200	8587372	5360-00-899-2159	B-3	27
19200	8587373		B-4	63
19200	8587374	5310-00-993-4896	B-4	65
19200	8587375		B-5	12
19200	8587376	3010-00-896-2243	B-2	11

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
19200	8587377	3010-00-898-4220	B-7	12
19200	8587378	3020-00-898-6801	B-5	13
19200	8587385	1240-01-213-1230	B-7	19
19200	8587386	1240-01-213-1231	B-7	4
19200	8587387	3020-01-157-0667	B-7	14
19200	8587388	5340-00-993-4905	B-4	41
19200	8587389	1240-01-206-0145	B-4	39
19200	8587392	1290-01-157-0669	B-4	37
19200	8587393	3020-01-159-2222	B-5	9
19200	8587397-1	5330-00-845-5642	B-3	11
19200	8587397-2	5330-00-845-5643	B-4	18
19200	8587397-3	5330-00-752-7783	B-4	6
19200	8587400	1240-01-205-0369	B-4	43
21450	8587401		B-14	4
19200	8587402		B-2	13
19207	8587403	5310-00-852-3688	B-14	1
19200	8587404	3040-00-849-2968	5B-14	26
19200	8587407	5340-00-898-6809	B-14	15
19200	8587408		B-7	1
19200	8587409	9905-01-204-5826	B-14	23
19200	8587410	5355-00-898-6798	B-3	15
19200	8587411	5365-00-993-4899	B-4	50
19200	8587412	5940-00-993-4901	B-4	51
19200	8587413	3040-00-894-4431	B-4	52
19200	8587414	9330-01-213-1226	B-7	10
19200	8587415	1240-01-157-0763	B-4	57
19200	8587416		B-2	5
19200	8587417	5330-00-846-6616	B-2	36
19200	8587418	5340-01-156-0278	B-2	35
19200	8587419	5330-00-846-8636	B-2	32
19200	8587420	5340-01-156-0279	B-2	33
19200	8587425	5360-00-899-2163	B-14	8
19200	8587426	5340-00-859-5990	B-14	7
19200	8587432	5340-00-927-7290	B-4	75
19200	8587433	5340-00-052-3946	B-3	16
19200	8587441	5310-00-846-4647	B-2	10
19200	8587444	6650-00-896-2250	B-7	9
19200	8587445	5340-00-845-7371	B-19	9
19200	8587447	6650-00-898-4215	B-5	14
19200	8587448	5340-00-847-6251	B-2	23
19207	8587449-1	5330-00-845-5639	B-4	42
19200	8587449-2	5330-00-846-6879	B-2	40
19200	8587449-3	5330-00-845-5640	B-7	7
19200	8587449-4	5330-00-143-8759	B-3	2
19200	8587449-5	5330-00-845-5641	B-2	12
19200	8587449-6	5330-00-846-4650	B-4	38
19200	8587449-7	5330-00-125-3947	B-22	14
19200	8587450	1240-01-156-0314	B-6	26
19200	8587453		B-6	16
19200	8587454	3040-00-896-2247	B-6	22
19200	8587455	3020-00-846-6882	B-6	18

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
19200	8587456	3010-00-898-4216	B-6	20
19200	8587460	5365-00-893-5886	B-4	73
19200	8587468		B-4	35
19200	8587469	3020-00-052-4059	B-6	38
19200	8587470	3020-00-052-3971	B-6	36
19200	8587472	5340-00-898-6797	B-6	6
19200	8587473	5330-00-891-5651	B-4	8
19200	8587474	5360-00-848-8660	B-4	74
19200	8587475	3040-00-898-6799	B-6	21
19200	8587478’	5360-00-849-2973	B-6	5
19200	8587479	3040-00-858-6334	B-15	1
19200	8587480		B-14	29
19200	8587481	3040-00-898-6805	B-14	10
19200	8587482	3040-00-848-9888	B-14	5
19200	8587483	5365-00-899-6938	B-14	6
19200	8587484	3040-00-899-7644	B-14	13
19200	8587485	5340-00-862-2698	B-15	2
19200	8587486	5310-00-823-8768	B-14	21
19200	8587487		B-16	11
19200	8587488		B-16	5
19200	8587489	5330-00-863-3200	B-16	6
19200	8587493	5340-00-915-5720	B-2	26
19200	8587494		B-4	68
19200	8587496		B-6	2
19200	8587497		B-4	48
19200	8587500	1240-00-896-2240	B-13	1
19200	8587506	9905-00-310-0758	B-2	4
19200	8587507	5365-01-209-1794	B-4	45
19200	8587510	6230-00-918-8642	B-19	6
19200	8587514	5365-00-893-5244	B-3	1
19200	8587515		B-14	19
19200	8587517		B-14	24
19200	8587518	5340-01-157-9394	B-2	29
19200	8587519	5330-00-877-5492	B-2	28
19200	8587531	3040-00-027-2615	B-6	25
19200	8587532	5365-00-882-6032	B-14	12
19200	8587534		B-2	7
19200	8587536	5315-01-213-1215	B-23	7
19200	8587537		B-23	37
19200	8587538	5320-01-147-5379	B-18	5
19200	8587540		B-7	16
19200	8587543	6680-00-907-0737	B-6	12
19200	8615879	5355-00-847-6260	B-16	13
			B-19	30
19200	8615973	5365-00-848-8664	B-21	1
19200	8616084	5330-00-893-6696	B-16	15
19200	8619986	5340-00-087-2729	B-2	16
19200	8624897	5970-00-753-0515	B-19	16
19200	8624898	5315-00-753-0514	B-16	21
			B-19	21
19200	8624900	5970-00-753-0516	B-16	16

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
19200	8624901	6650-00-756-3760	B-3	3
19200	8635803	5310-00-782-9877	B-20	23
19200	8635806	5330-00-949-3890	B-23	13
19200	9360111	3040-01-339-0478	B-6	33

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FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
B-1	1	1240-00-895-9186	19200	8587340
B-2	1	5305-00-054-6651	96906	MS51957-27
B-2	2	1240-00-463-4644	19200	11730191
B-2	3	5305-00-054-5635	96906	MS51957-1
B-2	4	9905-00-310-0758	19200	8587506
B-2	5		19200	8587416
B-2	6	5305-00-717-6950	96906	MS51963-9
B-2	7		19200	8587534
B-2	8	5310-00-974-6623	96906	MS35338-140
B-2	9	5305-00-988-7839	96906	MS16995-65
B-2	10	5310-00-846-4647	19200	8587441
B-2	11	3010-00-896-2243	19200	8587376
B-2	12	5330-00-845-5641	19200	8587449-5
B-2	13		19200	8587402
B-2	14	5315-00-807-7684	96906	MS16555-603
B-2	15	5305-00-719-5381	96906	MS51963-24
B-2	16	5340-00-087-2729	19200	8619986
B-2	17	5340-00-464-4792	19200	10516567
B-2	18	4820-00-114-1096	96906	MS51607-1
B-2	19	2640-00-060-3543	96906	MS51377-2
B-2	20	1015-01-235-0223	19200	8200055
B-2	21	5305-00-717-6949	96906	MS51963-10
B-2	22	5305-00-057-0523	96906	MS51958-27
B-2	23	5340-00-847-6251	19200	8587448
B-2	24	1240-00-846-4649	19200	8587345
B-2	25	5305-00-054-5646	96906	MS51957-12
B-2	26	5340-00-915-5720	19200	8587493
B-2	27	5305-00-865-9516	96906	MS51029-48
B-2	28	5330-00-877-5492	19200	8587519
B-2	29	5340-01-157-9394	19200	8587518
B-2	30	5310-00-550-3715	96906	MS35333-70
B-2	31	5305-00-054-5648	96906	MS51957-14
B-2	32	5330-00-846-8636	19200	8587419
B-2	33	5340-01-156-0279	19200	8587420
B-2	34	5305-00-770-2533	96906	MS51959-13
B-2	35	5340-01-156-0278	19200	8587418
B-2	36	5330-00-846-6616	19200	8587417
B-2	37	5315-00-939-1146	96906	MS16555-605
B-2	38	5305-00-724-5396	96906	MS51964-9
B-2	39	5305-00-716-7921	96906	MS51974-8
B-2	40	5330-00-846-6879	19200	8587449-2
B-3	1	5365-00-893-5244	19200	8587514
B-3	2	5330-00-143-8759	19200	8587449-4
B-3	3	6650-00-756-3760	19200	8624901
B-3	4	3040-00-851-1012	19200	8587362
B-3	5	3110-01-166-9642	19200	8587371
B-3	6	5310-00-846-8640	19200	8587369
B-3	7	5310-01-157-9366	19200	8587370
B-3	8	5310-00-392-6983	28569	7090-4
B-3	9	5360-00-899-2162	19200	8587368
B-3	10	1240-00-052-4041	19200	8587365

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FIGURE AND ITEM NUMBER INDEX

FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
B-3	11	5330-00-845-5642	19200	8587397-1
B-3	12	5315-01-213-5557	21450	426785
B-3	13	5305-00-057-0498	96906	MS51958-2
B-3	14	5355-01-157-0583	19200	8587361
B-3	15	5355-00-898-6798	19200	8587410
B-3	16	5340-00-052-3946	19200	8587433
B-3	17	5310-00-504-9929	19200	5049929
B-3	18	5310-00-504-9930	19200	5049930
B-3	19	3120-01-157-0666	19200	8587364
B-3	20	5305-00-285-4687	21450	588608
B-3	21	5305-00-857-5190	19200	10555157-16
B-3	22	5355-00-846-4789	19200	8261695
B-3	23	9340-01-155-9342	19200	8587366
B-3	24	5305-00-054-5636	96906	MS51957-2
B-3	25	1240-01-209-8383	19200	8587360
B-3	26	5365-00-278-5325	19200	5039406
B-3	27	5360-00-899-2159	19200	8587372
B-3	28	3120-00-080-9562	96906	MS35689-1
B-4	1	5305-00-959-2710	96906	MS35190-203
B-4	2	5355-00-898-9908	19200	8215762
B-4	3	5305-00-889-3116	96906	MS35206-213
B-4	4	5340-00-832-5499	19200	10541411
B-4	5		19200	10540483
B-4	6	5330-00-752-7783	19200	8587397-3
B-4	7	5330-01-134-8758	19200	10540478
B-4	8	5330-00-891-5651	19200	8587473
B-4	9	5315-00-052-9301	96906	MS16556-619
B-4	10	5315-00-848-7829	96906	MS16556-602
B-4	11	5310-00-052-0275	19200	10553377
B-4	12	5340-00-944-8036	19200	10541481
B-4	13	5310-00-933-8118	96906	MS35338-135
B-4	14	5305-00-054-5649	96906	MS51957-15
B-4	15	5305-00-054-5650	96906	MS51957-16
B-4	16	5330-00-928-9452	19200	10540479
B-4	17	3120-00-133-6379	19200	10540484
B-4	18	5330-00-845-5643	19200	8587397-2
B-4	19	5305-00-889-3118	96906	MS35206-203
B-4	20	9515-00-936-5397	19200	10540482
B-4	21	5355-00-898-6791	19200	8587348
B-4	22	5315-00-082-4858	96906	MS16556-621
B-4	23	5355-00-927-3400	19200	10540481
B-4	24	5315-00-807-7957	96906	MS16555-608
B-4	25	5365-00-177-4091	19200	10559199-3
B-4	25	5365-00-177-4092	19200	10559199-1
B-4	25	5365-00-177-4093	19200	10559199-2
B-4	26	5330-00-944-8040	19200	10540480
B-4	27	5305-00-990-6381	96906	MS16995-19
B-4	28	5310-00-616-3555	96906	MS35333-71
B-4	29	5305-00-054-5653	96906	MS51957-19
B-4	30	1240-01-156-0313	19200	10541428
B-4	31	5365-00-782-9876	19200	10541484

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FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
B-4	32		19200	10541416
B-4	33	1240-00-898-9907	19200	7660556
B-4	34	5310-00-929-6395	96906	MS35338-136
B-4	35		19200	8587468
B-4	36	5310-00-052-0276	19200	10553376
B-4	37	1290-01-157-0669	19200	8587392
B-4	38	5330-00-846-4650	19200	8587449-6
B-4	39	1240-01-206-0145	19200	8587389
B-4	40	5305-01-179-7806	21450	588611
B-4	41	5340-00-993-4905	19200	8587388
B-4	42	5330-00-845-5639	19207	8587449-1
B-4	43	1240-01-205-0369	19200	8587400
B-4	44	5305-00-766-2422	96906	MS51959-1
B-4	45	5365-01-209-1794	19200	8587507
B-4	46		81349	MILW76
B-4	47	5305-00-051-4495	96906	MS51973-17
B-4	48		19200	8587497
B-4	49	5305-00-719-5329	96906	MS51963-20
B-4	50	5365-00-993-4899	19200	8587411
B-4	51	5940-00-993-4901	19200	8587412
B-4	52	3040-00-894-4431	19200	8587413
B-4	53	3110-00-554-6085	19200	8293172
B-4	54	5310-00-820-2210	19200	7674690
B-4	55	5310-00-982-6816	96906	MS21044C5
B-4	56	5360-00-846-6610	19200	7659439
B-4	57	1240-01-157-0763	19200	8587415
B-4	58	5315-00-187-3226	96906	MS24692-27
B-4	59	3020-00-977-1244	19200	10541427
B-4	60	5310-00-846-4632	19200	8215753
B-4	61	5305-00-865-9516	96906	MS51029-48
B-4	62	5305-00-899-2165	19200	7660571
B-4	63		19200	8587373
B-4	64	5315-00-949-3909	96906	MS16556-603
B-4	65	5310-00-993-4896	19200	8587374
B-4	66	5305-00-716-7932	96906	MS51974-2
B-4	67	5305-00-770-2579	96906	MS51959-15
B-4	68		19200	8587494
B-4	69	5365-00-804-6895	80205	NAS51-12
B-4	70	5970-00-850-4337	19200	8587328
B-4	71	5360-00-899-2164	19200	8587326
B-4	72	5999-00-895-9191	19200	8587327
B-4	73	5365-00-893-5886	19200	8587460
B-4	74	5360-00-848-8660	19200	8587474
B-4	75	5340-00-927-7290	19200	8587432
B-4	76	5340-00-464-4792	19200	10516567
B-4	77	4820-00-114-1096	96906	MS51607-1
B-4	78	2640-00-060-3543	96906	MS51377-2
B-4	79	1015-01-235-0223	19200	8200055
B-5	1		19200	8587297
B-5	2	1240-00-851-9689	19200	8587357
B-5	3	6650-00-899-5144	19200	8587316

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FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
B-5	4	1240-01-204-5974	19200	8587358
B-5	5		19200	8587296
B-5	6	6650-00-899-5145	19200	8587317
B-5	7	5365-00-899-7643	19200	8587352
B-5	8	1240-00-135-4549	19200	8587353
B-5	9	3020-01-159-2222	19200	8587393
B-5	10	5305-00-724-5793	96906	MS51964-18
B-5	11	5305-00-716-7921	96906	MS51974-8
B-5	12		19200	8587375
B-5	13	3020-00-898-6801	19200	8587378
B-5	14	6650-00-898-4215	19200	8587447
B-5	15	5365-00-846-4747	19200	8587356
B-5	16	5305-00-701-5230	96906	MS51960-8
B-6	1	5315-00-927-3399	19200	8215936
B-6	2		19200	8587496
B-6	3	5365-00-847-6253	19207	8262092
B-6	4	5315-00-850-4341	19200	7660591
B-6	5	5360-00-849-2973	19200	8587478
B-6	6	5340-00-898-6797	19200	8587472
B-6	7	5360-00-893-6095	19200	8262100
B-6	8	6695-00-944-8066	19200	10539232
B-6	9	5340-00-328-5635	19200	7660575
B-6	10	5310-00-928-2690	96906	MS35338-134
B-6	11	5305-00-054-5636	96906	MS51957-2
B-6	12	6680-00-907-0737	19200	8587543
B-6	13	5310-00-929-6395	96906	MS35338-136
B-6	14	5305-00-054-6651	96906	MS51957-27
B-6	15	5315-00-949-3909	96906	MS16556-603
B-6	16		19200	8587453
B-6	17	5315-00-187-3226	96906	MS24692-27
B-6	18	3020-00-846-6882	19200	8587455
B-6	19	5360-00-179-1391	19200	10547435
B-6	20	3010-00-898-4216	19200	8587456
B-6	21	3040-00-898-6799	19200	8587475
B-6	22	3040-00-896-2247	19200	8587454
B-6	23	5315-00-089-4942	21450	505257
B-6	24	6680-00-896-9049	19200	8215837
B-6	25	3040-00-027-2615	19200	8587531
B-6	26	1240-01-156-0314	19200	8587450
B-6	27	5315-00-848-7829	96906	MS16556-602
B-6	28	5310-00-933-8118	96906	MS35338-135
B-6	29	5305-00-054-5648	96906	MS51957-14
B-6	30	1240-01-146-7722	19200	7660428
B-6	31	5315-00-060-4760	96906	MS16556-606
B-6	32	5305-00-054-5654	96906	MS51957-20
B-6	33	3040-01-339-0478	19200	9360111
B-6	34	5305-00-054-5651	96906	MS51957-17
B-6	35	5365-00-432-3584	96906	MS16624-5018-1
B-6	36	3020-00-052-3971	19200	8587470
B-6	37	5365-00-899-5141	19200	8262101
B-6	38	3020-00-052-4059	19200	8587469

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FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
B-6	39	5305-00-054-5647	96906	MS51957-13
B-6	40	5305-00-899-2165	19200	7660571
B-6	41	5305-00-865-9516	96906	MS51029-48
B-6	42	6210-00-896-2246	19200	8215819
B-6	43	5995-00-050-5969	19200	10543306-6
B-6	44	5999-01-301-5468	19200	12599274
B-6	45	5365-00-898-4222	19200	8247732
B-6	46	5340-01-287-1464	19200	12599292
B-6	47	5305-00-941-3538	96906	MS35275-201
B-6	48	5340-00-764-1669	19200	8262098
B-6	49	5355-00-847-2697	19200	8262104
B-6	50	5305-00-057-0509	96906	MS51958-12
B-6	51	5355-00-847-2698	19200	8262105
B-6	52	1240-00-116-3421	19200	7660596
B-6	53	5340-01-293-2136	19200	12599352
B-6	54	9525-00-116-3429	19200	8262091
B-7	1		19200	8587408
B-7	2	1240-00-848-8658	19200	8587343
B-7	3	6650-00-504-9914	19200	5049914
B-7	4	1240-01-213-1231	19200	8587386
B-7	5	6650-00-504-9915	19200	5049915
B-7	6	1240-00-899-6319	19200	8587354
B-7	7	5330-00-845-5640	19200	8587449-3
B-7	8	5305-00-054-5649	96906	MS51957-15
B-7	9	6650-00-896-2250	19200	8587444
B-7	10	9330-01-213-1226	19200	8587414
B-7	11	5305-00-639-4759	96906	MS35249-3
B-7	12	3010-00-898-4220	19200	8587377
B-7	13	5305-00-068-5276	96906	MS16995-9
B-7	14	3020-01-157-0667	19200	8587387
B-7	15		19200	8587351
B-7	16		19200	8587540
B-7	17	1240-01-212-8576	19200	8587355
B-7	18	6650-00-848-9892	19200	8587319
B-7	19	1240-01-213-1230	19200	8587385
B-7	20	6650-00-891-9850	19200	8587318
B-7	21	1240-01-204-5981	19200	8587342
B-7	22	1240-01-204-5983	19200	8587344
B-7	23	5365-00-052-4060	19200	8587341
B-7	24	6650-00-896-2248	19200	8587309
B-8	1	1240-00-328-5631	19200	10556120
B-9	1	1240-00-613-5751	19200	6135751
B-9	2	1240-00-613-5750	19200	6135750
B-9	3	5340-00-763-7795	19200	7637795
B-9	4	5310-00-933-8120	96906	MS35338-138
B-9	5	5305-00-050-9231	96906	MS51957-65
B-9	6	5305-00-054-5635	96906	MS51957-1
B-9	7	9905-00-328-5634	19200	10556121
B-9	8	5365-01-053-0627	19200	10556122
B-9	9	5340-00-503-7821	19203	5037821
B-9	10	1240-00-503-7820	19200	5037820

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FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
B-9	11	6650-00-503-6234	19200	5036234
B-9	12	8140-00-503-2820	19200	5032820
B-9	13	5305-00-638-1081	98810	13957-1
B-9	14		19200	6139343
B-9	15		19200	7690840
B-9	16	5305-00-760-3848	96906	MS35191-207
B-9	17	5340-00-759-6333	19200	7596333
B-9	18	5305-00-724-3439	96906	MS51031-33
B-9	19	9340-00-503-5616	19200	5035616
B-9	20		19200	11748290
B-9	21	5365-00-285-7927	19200	5045968
B-9	22	19200	6139342	
B-9	23	5305-00-068-1654	96906	MS51031-8
B-9	24	5305-00-085-3706	19200	10555157-1
B-9	25	5305-00-857-5190	19200	10555157-16
BULK	1		81349	LW-C20/7/JO
BULK	2	6145-00-583-3789	81349	M16878117BGE9
BULK	3	6145-01-003-5322	81349	MILW16878-5
B-10	1	1240-00-613-6408	19200	6136408
B-10	2	6650-00-504-5960	19200	5045960
B-10	3	6650-00-504-5961	19200	5045961
B-10	4	5365-00-285-7901	19200	5045959
B-11	1	5365-00-292-3620	19200	5045966
B-11	2	6650-00-328-5632	19200	11748291
B-11	3	1240-00-757-9883	19200	7579883
B-12	1	1240-00-613-6409	19200	6136409
B-12	2	6650-00-504-5963	19200	5045963
B-12	3	5365-00-597-8890	19200	5045965
B-13	1	1240-00-896-2240	19200	8587500
B-14	1	5310-00-852-3688	19207	8587403
B-14	2	5305-00-051-4497	96906	MS51973-19
B-14	3	5315-00-338-5074	96906	MS9105-54
B-14	4		21450	8587401
B-14	5	3040-00-848-9888	19200	8587482
B-14	6	5365-00-899-6938	19200	8587483
B-14	7	5340-00-859-5990	19200	8587426
B-14	8	5360-00-899-2163	19200	8587425
B-14	9	5315-00-187-3241	96906	MS24692-54
B-14	10	3040-00-898-6805	19200	8587481
B-14	11	5365-00-298-6564	96906	MS16624-4025
B-14	12	5365-00-882-6032	19200	8587532
B-14	13	3040-00-899-7644	19200	8587484
B-14	14	5305-00-781-1100	80205	NAS1352-3LL8P
B-14	15	5340-00-898-6809	19200	8587407
B-14	16	5305-00-978-9380	96906	MS16997-61
B-14	17	5310-00-933-8121	96906	MS35338-139
B-14	18	5315-00-851-2285	96906	MS16555-328
B-14	19		19200	8587515
B-14	20	5365-01-153-8461	19200	11785359
B-14	21	5310-00-823-8768	19200	8587486
B-14	22	5305-00-054-5637	96906	MS51957-3

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FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
B-14	23	9905-01-204-5826	19200	8587409
B-14	24		19200	8587517
B-14	25	5365-01-158-6144	19200	11785460
B-14	26	3040-00-849-2968	19200	8587404
B-14	27	5315-00-187-3259	96906	MS24692-87
B-14	28	5365-01-160-3445	19200	11785461
B-14	29		19200	8587480
B-14	30	5365-01-153-8462	19200	11785358
B-15	1	3040-00-858-6334	19200	8587479
B-15	2	5340-00-862-2698	19200	8587485
B-15	3	5315-01-217-0938	21450	586546
B-15	4	5340-01-209-1787	19200	10541421
B-15	5	5310-00-616-3555	96906	MS35333-71
B-15	6	5305-00-054-6651	96906	MS51957-27
B-15	7	5315-00-928-3815	19200	10541419
B-16	1	6695-00-854-4482	19200	8587322
B-16	2	5999-01-295-8138	19200	12599289
B-16	3	5305-00-054-5644	96906	MS51957-11
B-16	4	5340-00-882-8825	19200	8287274
B-16	5		19200	8587488
B-16	6	5330-00-863-3200	19200	8587489
B-16	7		81349	LWC20-7J0
B-16	8	5905-00-933-6805	19200	8572203
B-16	9	5305-00-059-8247	96906	MS35214-22
B-16	10	5940-00-827-2653	96906	MS77068-2
B-16	11		19200	8587487
B-16	12	5305-00-724-5876	96906	MS51031-46
B-16	13	5355-00-847-6260	19200	8615879
B-16	14	5305-00-851-2287	96906	MS51023-18
B-16	15	5330-00-893-6696	19200	8616084
B-16	16	5970-00-753-0516	19200	8624900
B-16	17	5999-00-895-6493	19200	8267787
B-16	18	1290-00-191-3302	19204	7064587
B-16	19	5999-00-042-5355	19200	7660438
B-16	20	5305-00-207-7468	96906	MS35214-16
B-16	21	5315-00-753-0514	19200	8624898
B-16	22	5305-00-905-1650	80205	NAS1352C04-10
B-16	23		81349	MS35338-135
B-16	24	5310-00-595-6211	96906	MS15795-803
B-16	25	5310-00-410-3017	96906	MS35649-245T
B-16	26	5310-00-543-4652	96906	MS35333-69
B-16	27	5305-00-054-5637	96906	MS51957-3
B-17	1	1240-00-895-6492	19200	8587295
B-18	1	5310-00-178-8631	96906	MS35333-75
B-18	2	5305-00-988-7838	96906	MS16995-64
B-18	3	5315-00-682-1733	96906	MS16555-646
B-18	4		19200	8572223
B-18	5	5320-01-147-5379	19200	8587538
B-18	6	5305-00-989-3119	96906	MS16995-37
B-18	7	5310-00-543-5933	96906	MS35333-73
B-18	8	5305-00-781-5215	96906	MS35308-421

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FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
B-18	9	5310-00-933-8778	96906	MS35338-143
B-18	10	5305-00-057-0511	96906	MS51958-14
B-18	11	9905-00-300-7909	19200	8572240
B-18	12		19200	8261800
B-18	13	5305-00-068-5406	96906	MS16996-15
B-18	14		19200	8572243
B-18	15	5315-00-889-2518	96906	MS16556-628
B-18	16	5310-00-543-2740	81348	FF-W-100
B-18	17	5305-00-988-7614	96906	MS16995-50
B-18	18	5305-00-068-5406	96906	MS16996-15
B-18	19	5310-00-550-0845	19200	8261989
B-18	20	5360-00-530-5978	19200	8261990
B-18	21	5315-00-889-2518	96906	MS16556-628
B-18	22		19200	8261935
B-18	23	5315-00-889-2518	96906	MS16556-628
B-18	24	5315-00-899-3103	96906	MS9390-300
B-18	25	6650-01-145-3416	19200	8261953
B-18	26	5315-01-146-4879	19200	8261988
B-18	27	5340-00-052-4057	19200	8261936
B-18	28		19200	8572222
B-19	1	5330-00-845-9516	19200	8587302
B-19	2	5340-01-146-4813	19200	8261809
B-19	3	5310-00-550-3715	96906	MS35333-70
B-19	4	5305-00-959-0379	96906	MS16995-10
B-19	5	5305-00-054-5646	96906	MS51957-12
B-19	6	6230-00-918-8642	19200	8587510
B-19	7	1240-01-297-6837	19200	12599287
B-19	8	6220-01-305-7210	19200	12599294
B-19	9	5340-00-845-7371	19200	8587445
B-19	10	5930-00-655-1516	96906	MS35058-24
B-19	11	5930-00-539-7013	81349	M5423/02-01
B-19	12	5310-01-156-7514	19207	12309110-2
B-19	13		81349	M16878/17BGE9
B-19	14	5310-00-934-9746	96906	MS35649-245
B-19	15	5940-00-177-7973	96906	MS77067-1
B-19	16	5970-00-753-0515	19200	8624897
B-19	17	5999-00-895-6493	19200	8267787
B-19	18	1290-00-191-3302	19204	7064587
B-19	19	5999-00-042-5355	19200	7660438
B-19	20	5305-00-207-7468	96906	MS35214-16
B-19	21	5315-00-753-0514	19200	8624898
B-19	22	5305-00-637-5884	96906	MS35214-12
B-19	23	5970-00-850-4337	19200	8587328
B-19	24	5999-00-895-9191	19200	8587327
B-19	25	5360-00-899-2164	19200	8587326
B-19	26	5365-00-804-6895	80205	NAS51-12
B-19	27	5905-00-933-6805	19200	8572203
B-19	28	5330-00-850-4338	19200	8587300
B-19	29	5340-01-145-5527	19200	8587301
B-19	30	5355-00-847-6260	19200	8615879
B-19	31	5305-00-851-2287	96906	MS51023-18

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FIGURE AND ITEM NUMBER INDEX

FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
B-19	32	5305-00-068-5276	96906	MS16995-9
B-19	33	5310-00-550-3715	96906	MS35333-70
B-19	34		19200	8572224
B-19	35	5999-00-883-1451	19200	10547986
B-19	36	5330-00-073-8016	19200	10547039
B-20	1	5305-00-054-5647	96906	MS51957-13
B-20	2	5310-00-550-3715	96906	MS35333-70
B-20	3	5340-00-846-6676	19200	8261871
B-20	4	6695-00-845-9515	19200	8261870
B-20	5	8305-00-935-6393	19200	8261867
B-20	6	5355-00-845-9518	19200	8261872
B-20	7	6210-00-896-2246	19200	8215819
B-20	8	5995-00-050-5969	19200	10543306-6
B-20	9	5999-01-295-8139	19200	12599273
B-20	10	5365-00-898-4222	19200	8247732
B-20	11	5340-01-287-1464	19200	12599292
B-20	12	5305-00-941-3538	96906	MS35275-201
B-20	13	9905-00-012-2972	19200	8247758
B-20	14	5305-00-054-5639	96906	MS51957-5
B-20	15	5310-00-543-4652	96906	MS35333-69
B-20	16	9905-00-012-2973	19200	8247759
B-20	17	5355-00-845-9517	19200	8261873
B-20	18	2640-00-060-3543	96906	MS51377-2
B-20	19	1650-00-222-4525	96906	MS20813-1
B-20	20	5340-00-464-4792	19200	10516567
B-20	21	4820-00-114-1096	96906	MS51607-1
B-20	22		19200	8261801
B-20	23	5310-00-782-9877	19200	8635803
B-20	24	5365-00-804-6895	80205	NAS51-12
B-20	25	5970-00-850-4337	19200	8587328
B-20	26	5360-00-899-2164	19200	8587326
B-20	27	5999-00-895-9191	19200	8587327
B-21	1	5365-00-848-8664	19200	8615973
B-21	2	1240-00-895-6495	19200	8215790
B-21	3	3040-00-895-6496	19200	8215789
B-21	4	1290-00-692-1493	19200	8202183
B-21	5	5365-00-804-6895	80205	NAS51-12
B-21	6	5970-00-850-4337	19200	8587328
B-21	7	5360-00-899-2164	19200	8587326
B-21	8	5999-00-895-9191	19200	8587327
B-21	9		19200	8572241
B-21	10	5315-01-204-4270	19200	544104
B-21	11	6680-00-896-2239	19200	8215835
B-21	12	6210-00-896-2245	19200	8587321
B-21	13	5995-00-050-5969	19200	10543306-6
B-21	14	5365-00-898-4222	19200	8247732
B-21	15	5305-00-054-5646	96906	MS51957-12
B-21	16	5935-00-175-5966	19200	10559863
B-21	17	5980-01-289-5274	19207	12360905-2
B-22	1	5365-00-278-5309	19200	5036245
B-22	2	5340-00-063-0275	19200	8262139

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FIGURE AND ITEM NUMBER INDEX

FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
B-22	3	5340-00-059-5838	19200	8262140
B-22	4	5999-00-895-9190	19200	8587330
B-22	5	5970-00-851-1574	19200	8587329
B-22	6		81349	M16878/17BGE9
B-22	7	5365-01-145-3734	19200	8261818
B-22	8	5305-00-774-9613	96906	MS51960-46
B-22	9		19200	8261802
B-22	10	5305-00-959-1909	96906	MS16996-11
B-22	11	5310-00-543-5933	96906	MS35333-73
B-22	12	3040-00-846-6675	19200	8262132
B-22	13	3110-00-156-5022	19200	8587303
B-22	14	5330-00-125-3947	19200	8587449-7
B-22	15	5315-00-078-0112	96906	MS16556-608
B-22	16	5310-00-115-0639	19200	10555861
B-22	17	5310-00-845-7368	19200	8587305
B-22	18	5340-00-228-1631	19200	10555860
B-22	19	5315-00-187-3258	96906	MS24692-84
B-22	20	3020-00-845-9514	19200	8261823
B-22	21	5305-00-852-3731	96906	MS51023-28
B-22	22	5360-00-899-2902	19200	8587308
B-22	23	3040-00-846-6880	19200	8261817
B-22	24	3110-00-849-2970	19200	8215832
B-22	25	5310-00-845-7369	19200	8215833
B-22	26	5310-00-895-9189	19200	8215831
B-22	27	5310-00-845-7367	19200	8215830
B-22	28	5360-00-899-3100	19200	8215829
B-22	29	5365-01-148-1288	19200	8215834
B-22	30	5310-00-846-7494	19207	8261845
B-22	31	5315-00-187-3232	96906	MS24692-36
B-22	32	5355-00-893-6092	19200	8261815
B-22	33	5365-00-134-3385	19200	10539221
B-22	34	5360-00-899-2158	19200	8261882
B-22	35	3120-00-833-6794	96906	MS35689-7
B-22	36	5315-00-825-1207	96906	MS16555-627
B-22	37	5360-00-899-2901	19200	8262138
B-22	38		19200	8261793
B-22	39	5305-00-724-5812	96906	MS51964-65
B-22	40	5305-00-059-2490	96906	MS51976-46
B-22	41	3020-01-147-3918	19200	8261796
B-22	42	5340-00-019-4575	19200	8261884
B-22	43	5315-00-968-3509	96906	MS16556-640
B-22	44	5305-00-763-7822	96906	MS51959-14
B-22	45	9535-00-059-5836	19200	8261844
B-22	46	5305-00-768-0336	96906	MS51959-17
B-22	47	3020-00-063-0276	19200	8261805
B-22	48	3110-01-145-3733	19200	8261842
B-22	49	5305-00-770-2579	96906	MS51959-15
B-22	50	5330-00-895-9187	19200	8261843
B-22	51	1240-00-052-4037	19200	8261799
B-22	52	3040-01-145-3415	19200	8261851
B-22	53	5305-00-988-7608	96906	MS16995-36

CROSS REFERENCE INDEXES

FIGURE AND ITEM NUMBER INDEX

FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
B-22	54	5315-00-895-9188	19200	8587325
B-23	1	5310-00-413-4382	19200	8261858
B-23	2	5355-01-205-4014	19200	8261857
B-23	3	5315-00-187-3245	96906	MS24692-60
B-23	4	3020-01-207-1940	19200	8261822
B-23	5	5360-01-213-1217	19200	8261855
B-23	6	5305-00-054-5637	96906	MS51957-3
B-23	7	5315-01-213-1215	19200	8587536
B-23	8	5315-01-207-5730	19200	8261856
B-23	9	3020-01-210-6298	19200	8261807
B-23	10	5305-00-763-7822	96906	MS51959-14
B-23	11	5315-00-338-5074	96906	MS9105-54
B-23	12	3010-01-205-0032	19200	8261821
B-23	13	5330-00-949-3890	19200	8635806
B-23	14	5315-00-187-3258	96906	MS24692-84
B-23	15	5340-00-707-1260	19200	8261819
B-23	16	5315-00-060-4776	96906	MS16556-604
B-23	17	6680-00-914-4715	19200	8261839
B-23	18	5305-00-054-5638	96906	MS51957-4
B-23	19	5305-00-768-0336	96906	MS51959-17
B-23	20	5340-01-213-1227	19200	8261859
B-23	21	3020-00-921-7348	19200	8261828
B-23	22	5315-00-187-3216	96906	MS24692-3
B-23	23	3020-01-209-2098	19200	8261825
B-23	24	5315-00-187-3228	96906	MS24692-30
B-23	25	3040-00-929-3582	19200	8261806
B-23	26	3040-01-216-2715	19200	8261860
B-23	27	5365-00-550-5937	96906	MS16632-4025
B-23	28	3020-01-208-8511	19200	8261826
B-23	29	5365-00-298-6564	96906	MS16624-4025
B-23	30	5315-00-822-4740	96906	MS16556-627
B-23	31	6650-01-145-3418	19200	8261862
B-23	32	5305-00-531-1773	96906	MS51023-50
B-23	33	5355-00-052-4062	19200	8261865
B-23	34	5315-00-187-3232	96906	MS24692-36
B-23	35	5340-00-435-2572	19200	8261863
B-23	36	5360-00-177-3877	19200	8261864
B-23	37		19200	8587537
B-23	38	5315-00-616-5516	96906	MS35756-4
B-23	39	3040-01-213-1232	19200	8261824
B-23	40	5315-00-052-9300	96906	MS16556-630
B-24	1	5305-00-050-9229	96906	MS51957-63
B-24	2		19200	8261834
B-24	3	5315-00-889-2518	96906	MS16556-628
B-24	4	5305-00-054-5651	96906	MS51957-17
B-24	5		19200	8261803
B-24	6	5340-01-209-3709	19200	8261827
B-24	7	5315-00-052-9300	96906	MS16556-630
B-25	1	4931-00-801-6861	19200	8213899
B-25	2	4931-00-769-1596	19200	7691596
B-25	3	4931-00-508-5484	19200	7681019

CROSS REFERENCE INDEXES

FIGURE AND ITEM NUMBER INDEX

FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
B-25	4	6635-00-790-0733	11710	719-20MRP
B-25	5	4931-00-508-5434	19200	7197944
B-25	6	4931-00-884-7752	19200	8213745
B-25	7	5120-00-394-5416	55974	QC70028-1

APPENDIX C
EXPENDABLE AND DURABLE ITEMS LIST
Section I. INTRODUCTION

C-1. SCOPE. This appendix lists expendable and durable items that you will need to operate and maintain the fire control equipment. This listing is for informational purposes only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, expendable items (except Medical, Class V Repair Parts, and Heraldic Items).

C-2. EXPLANATION OF COLUMNS.

a. *Column (1)-Item Number.* This number is assigned to the entry in the listing for referencing when required.

b. *Column (2)-Level*. This column identifies the lowest level of maintenance that requires the listed item.

F Direct Support Maintenance
H General Support Maintenance c.

c. *Column (3)-National Stock Number.* This is the national stock number assigned to the item; use it to request or requisition the item.

d. *Column (4)-Description.* Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the Contractor and Government Entity Code (CAGEC) in parentheses, followed by the part number.

e. *Column (5)-Unit of Measure (U/M)/Unit of Issue (U/I).* This measure is expressed by a two-character alphabetical abbreviation (e.g., EA, IN, PR). If the unit of measure differs from the unit of issue as shown in the Army Master Data File (AMDF), requisition the lowest unit of issue that will satisfy your reC-1

Section II. EXPENDABLE AND DURABLE ITEMS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION PART NUMBER AND CAGE	(5) UNIT OF MEAS
1	F	8040-00-832-6173	ADHESIVE: (81348) MMM-A-121	TU
2	F	8040-00-262-9011	ADHESIVE: (81348) MMM-A-1617	PT
3	H	8040-01-036-3771	ADHESIVE: (81348) MMM-A-134	EA
4	F	8040-00-851-0211	ADHESIVE: (81348) MIL-A-46106	TU
5	F	8040-00-117-8510	ADHESIVE, SEALANT: silicone RTV, noncorrosive (81349) MIL-A-46146	TU
6	F	3439-00-009-8808	FLUX, SOLDERING: (81349) MIL-F-14256 1 -qt. can	QT
7	H	9150-00-985-7243	GREASE, AIRCRAFT: Grease, aircraft instrument, corrosion and water resistant (81349) MIL-G-4343	TU
8	F	9150-00-119-9291	GREASE, AIRCRAFT: Corrosion resistant grease (81349) MIL-G-23827 2-oz. tube	TU
9	F	9150-00-965-2408	GREASE: (19200) 88635799	TU
10	F	8030-00-275-8115	SEALING COMPOUND: (81349) MIL-S-1 1030	PT
11	F	6850-00-880-7616	SILICONE COMPOUND: (81349) MIL-S-8660	TU

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION PART NUMBER AND CAGE	(5) UNIT OF MEAS
12	F	3439-00-269-9610	SOLDER: Tin alloy (81348) QQ-S-571	LB
13	H	7510-00-266-6712	TAPE: Masking, pressure sensitive (19203) 8783476	RL

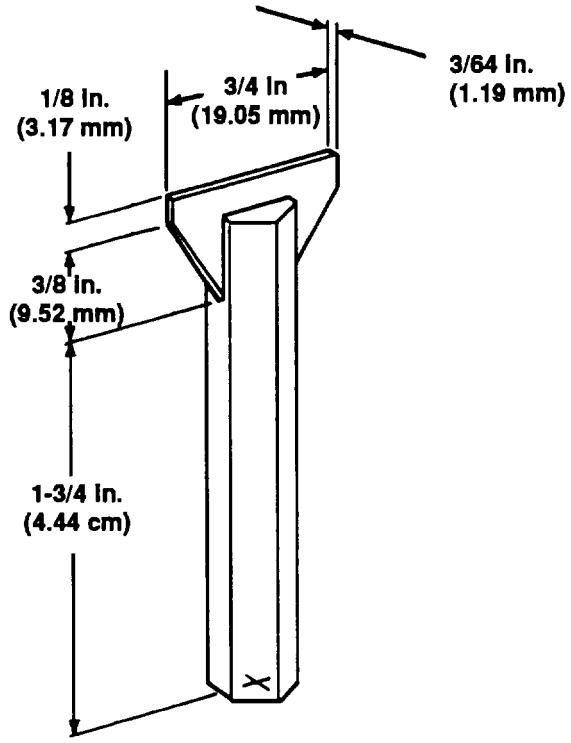
APPENDIX D
ILLUSTRATED LIST OF MANUFACTURED ITEMS

D-1. INTRODUCTION.

a. This appendix includes complete instructions for making items authorized to be manufactured or fabricated at direct support and general support maintenance.

b. All bulk materials needed for manufacture of an item are listed by part number or specification number in a tabular list on the illustration.

D-2. MANUFACTURED ITEMS ILLUSTRATIONS.

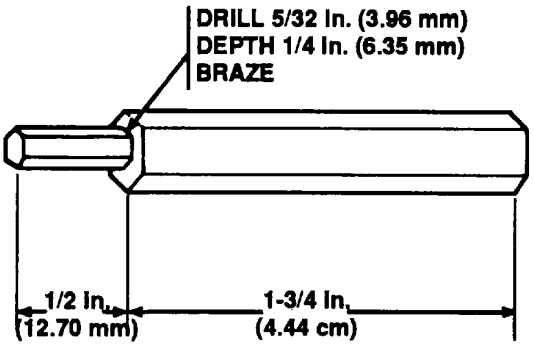


NOTES

1. Fabricate from:
   Hex steel stock 5/16-in. (7.93-mm) NSN (...)
   CAGEC (..) PN (...)
2. Remove burrs and sharp edges.

Figure 1. Torque Adapter.

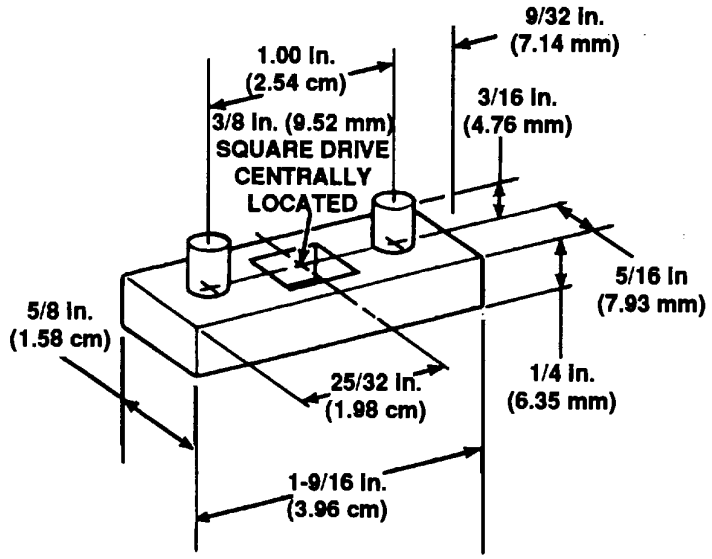
D-2 MANUFACTURED ITEMS ILLUSTRATIONS (CONT).



NOTES

1. Fabricate from:
   Hex steel stock 5/16-in. (7.93-mm) NSN (...) CAGEC (...) PN (...)
   Hex steel stock 5/32-in. (3.96-mm) NSN (...) CAGEC (...) PN (...)
2. Remove burrs and sharp edges.

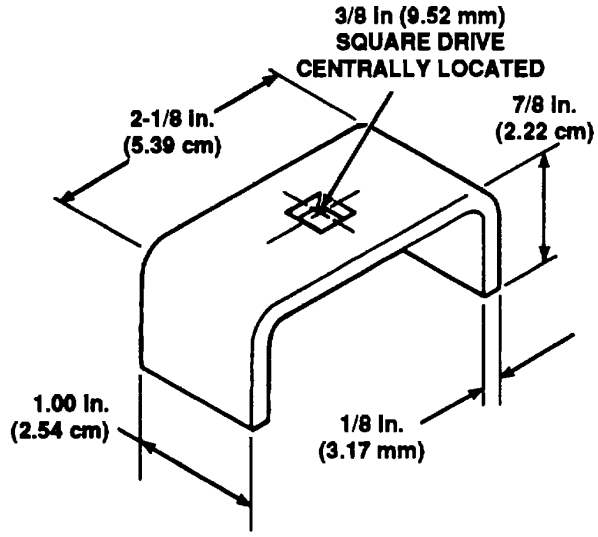
Figure 2. Torque Adapter.



NOTES

1. Fabricate from:
   Steel 1/4-in. (6.35-mm) NSN (...) CAGEC (...) PN (...)
   Pins 3/16-in. (4.76-mm) diameter by 7/16 in. (11.11 mm) long NSN (...) CAGEC (...) PN (...)
2. Remove burrs and sharp edges.

Figure 3. Torque Adapter.

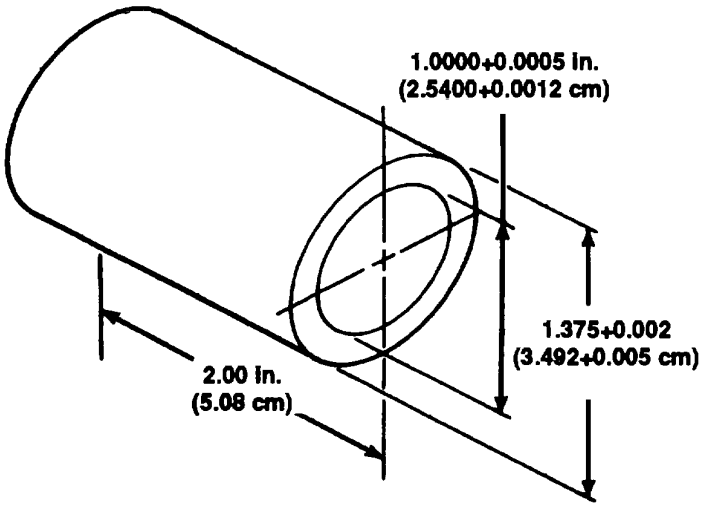


NOTES

1. Fabricate from:
   Steel 118-In. (3.17-mm)

   NSN (...)
   CAGEC (...) PN (...)
2. Remove burrs and sharp edges.

Figure 4. Torque Adapter.



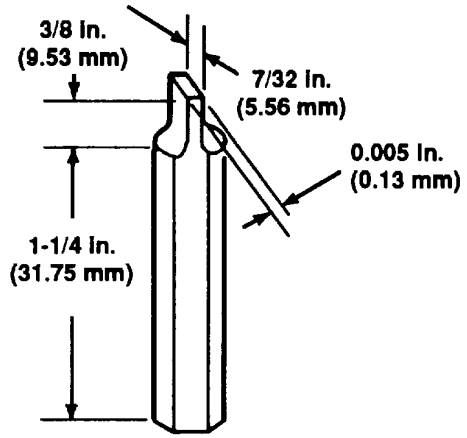
NOTES

1. Fabricate from:
   Brass

   NSN (...)
   CAGEC (...) PN (...)
2. Remove burrs and sharp edges.

Figure 5. Bushing Adapter.

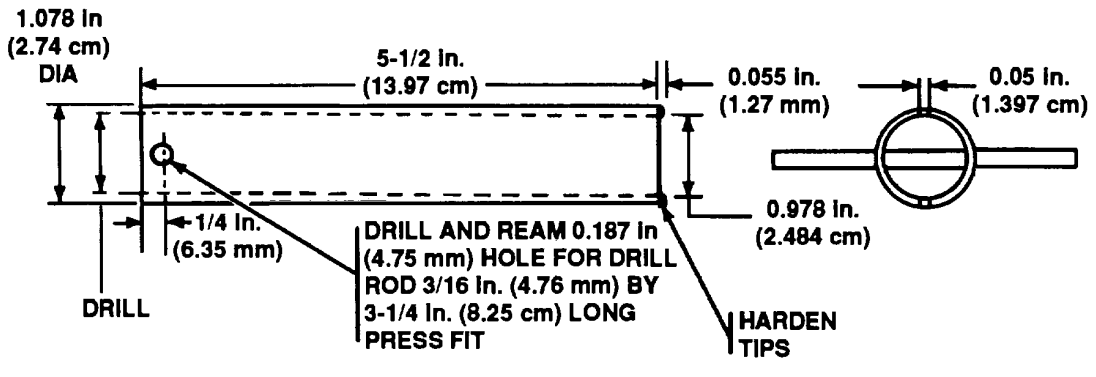
D-2. MANUFACTURED ITEMS ILLUSTRATIONS (CONT).



NOTES

1. Fabricate from:
   Hex steel stock 5/16-in. (7.93-mm) NSN (...)
   CAGEC (...) PN (...)
2. Remove burrs and sharp edges.

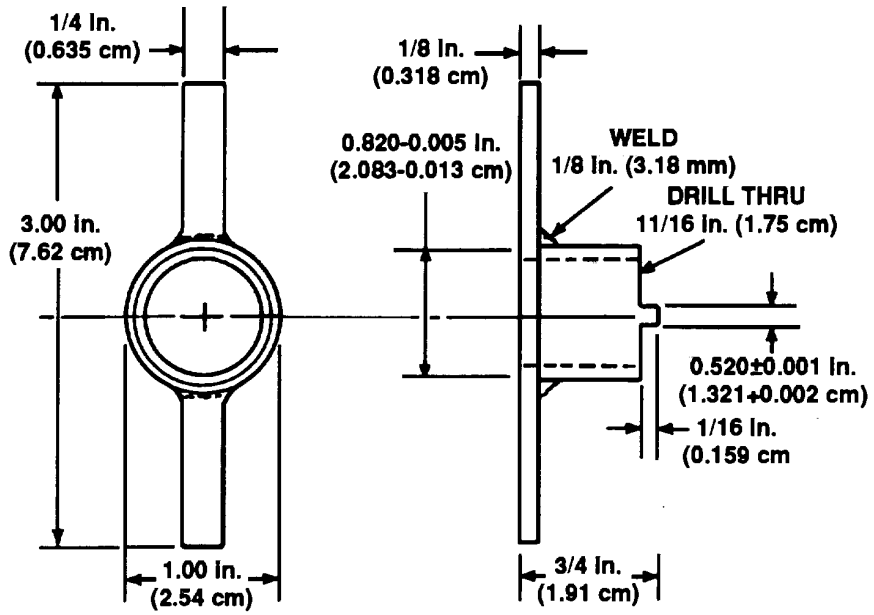
Figure 6. Torque Converter.



NOTES

1. Fabricate from:
   Steel NSN (...)
   CAGEC (...) PN (...)
2. Remove burrs and sharp edges.

Figure 7. Fabricated Wrench.



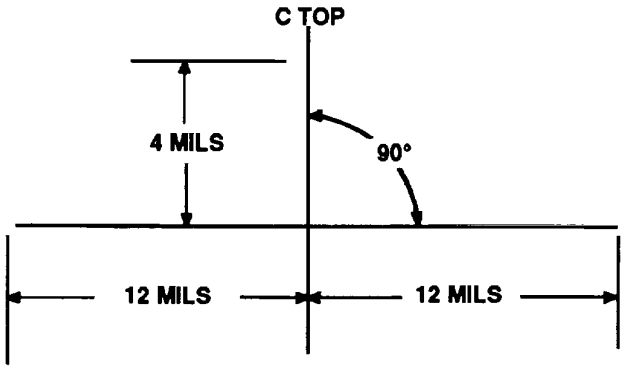
NOTES

1. Fabricate from:
   Steel 4140, HT 40-45RC

   NSN (...)
   CAGEC (...) PN (...)

2. Remove burrs and sharp edges.

Figure 8. Fabricated Wrench.



NOTES

1. Fabricate from:
   (...)

   NSN (...)
   CAGEC (...) PN (...)

2. MIL SIZE = $\frac{\text{TARGET DISTANCE (in inches)}}{1000}$

Figure 9. Test Target.

D-2 MANUFACTURED ITEMS ILLUSTRATIONS (CONT).

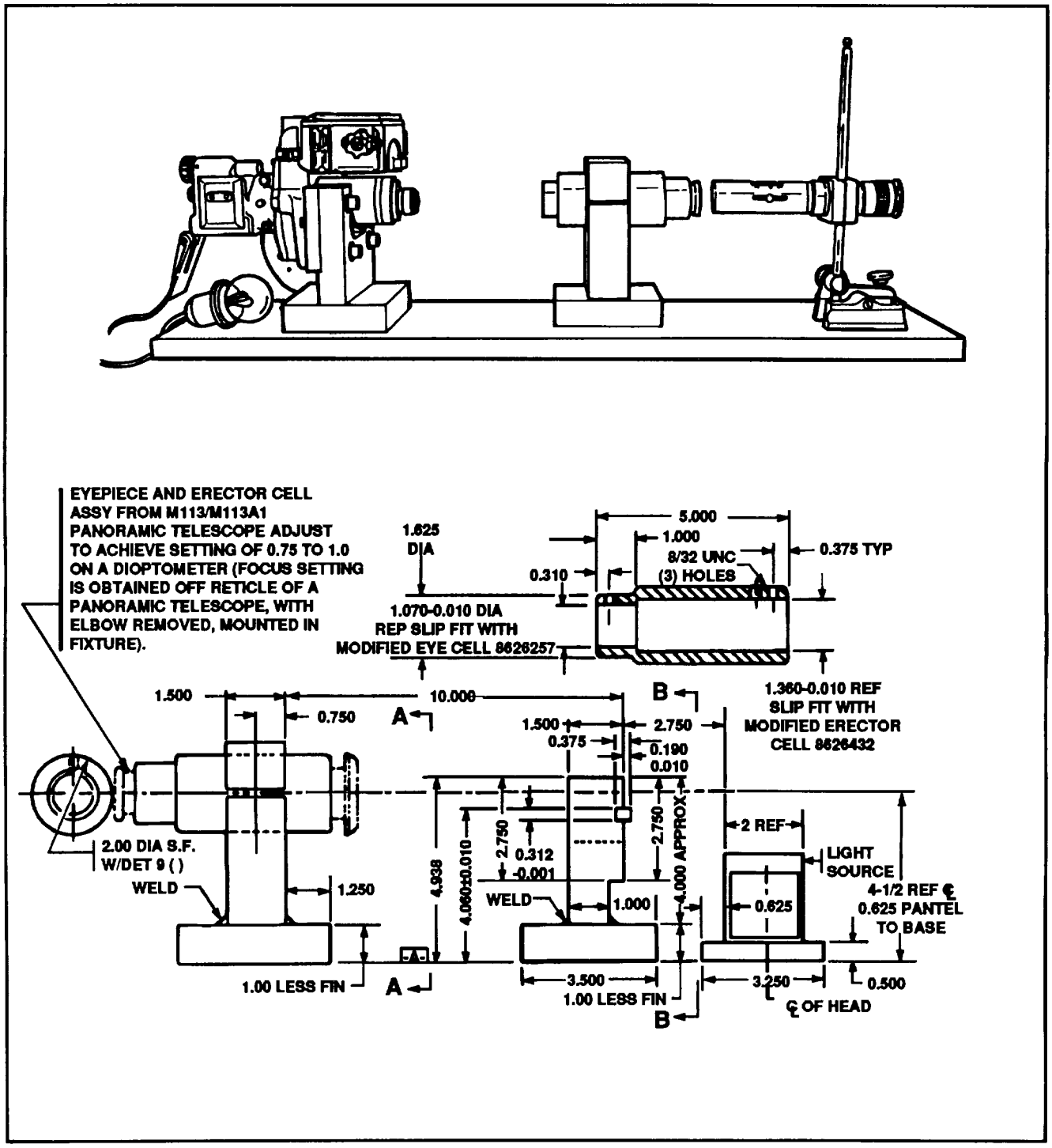
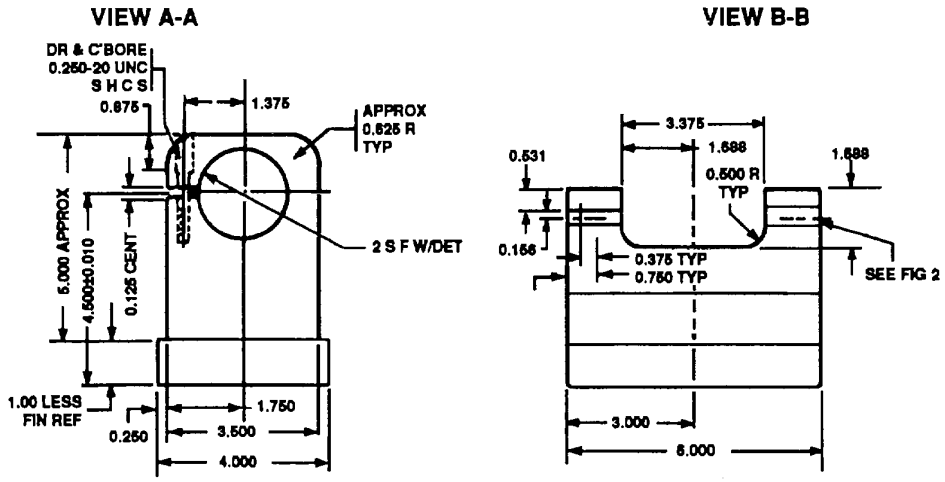


Figure 10. Reticle Ali7ement Fixture (1 of 2).



NOTES

1. Fabricate holders from:
   Steel 1.000-in. (2.540-cm) NSN (...)
   CAGEC (...) PN (...)
   Steel 1.500-in. (3.810-cm) NSN (...)
   CAGEC (...) PN (...)
2. Fabricate holder keys from:
   Steel 0.312 x 0.375-in (0.792 x 0.953-cm) NSN (...)
   CAGEC (...) PN (...)
3. Weld in accordance with MIL-W-6858.
4. Eyepiece and erector cell assembly from M115 panoramic telescope.
5. All tolerances are + 0.0005 in. (0.0013 cm) unless otherwise marked.
6. All dimensions on figures are in inches. Metric conversions are listed in table below.

METRIC CONVERSIONS	
IN.	CM
2.000	5.080
1.500	3.810
0.750	1.905
10.000	25.400
1.070 - 0.010	7.718 - 0.025
5.000	12.700
1.000	2.540
0.375	0.953
3.500	8.890
3.250	8.255
2.750	6.985
1.360 - 0.010	3.454 - 0.025
1.250	3.175
1.000	2.540
4.938	12.543
4.060 + 0.010	10.312+0.025

METRIC CONVERSIONS	
IN.	CM
0.500	1.270
2.750	6.985
4.000	10.000
6.000	15.24
3.000	7.62
1.688	4.287
3.375	8.572
0.250	0.635
0.750	4.445
4.500+0.10	11.430+0.254
0.125	0.317
0.875	2.222
1.375	3.492
2.000	5.080
0.156	0.396
0.531	1.348

Figure 10. Reticle Alinement Fixture (2 of 2).

D-2. MANUFACTURED ITEM ILLUSTRATIONS (CONT).

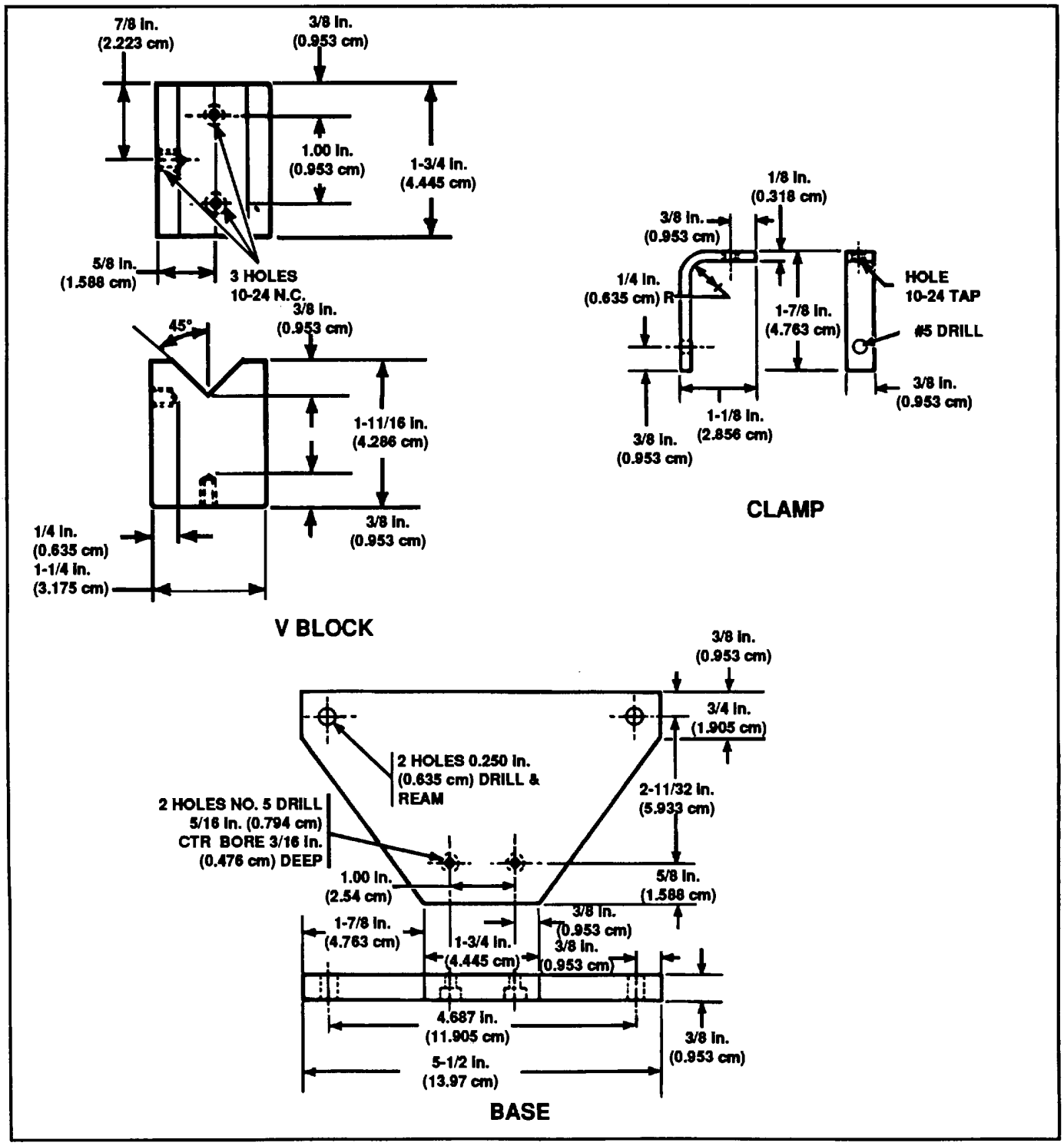
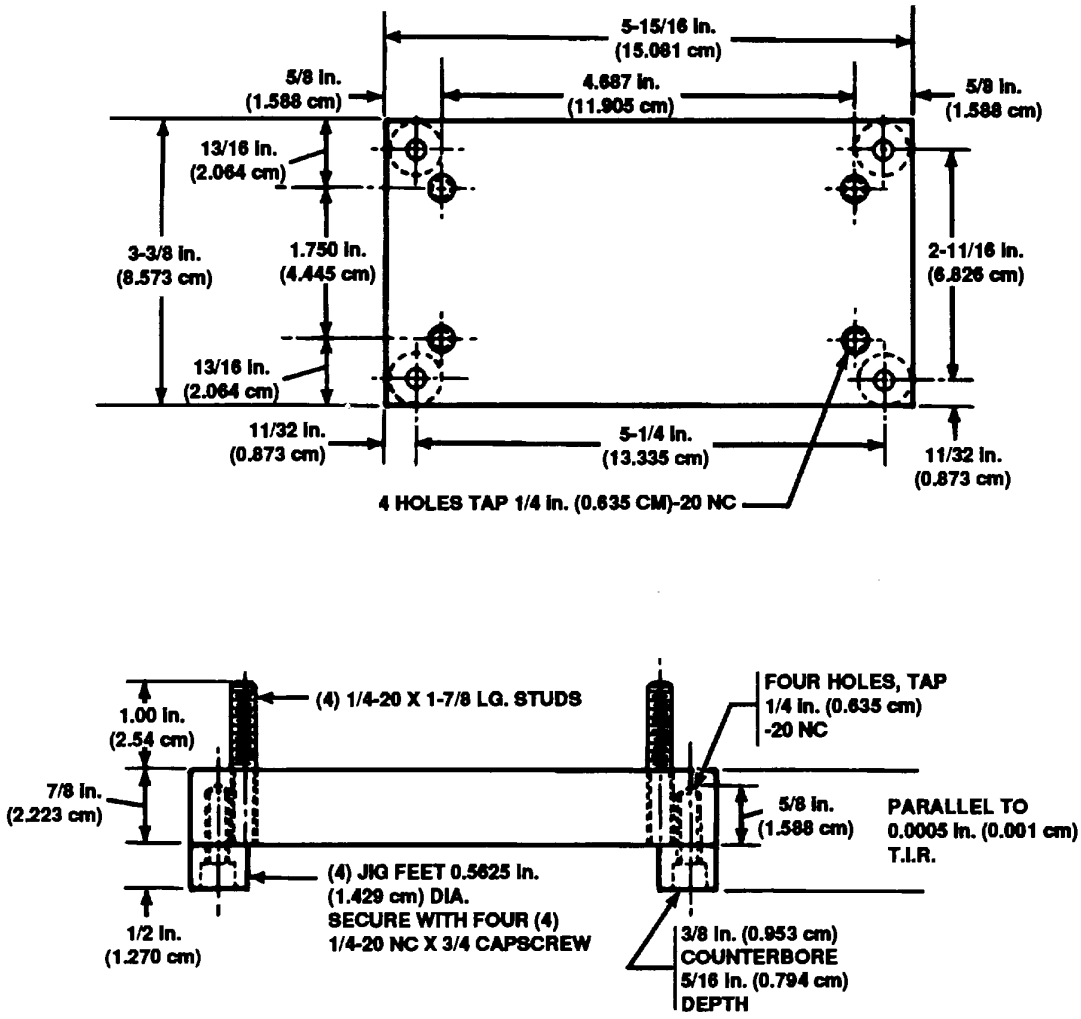


Figure 11. V-block Adapter Assembly (1 of 2).



FIXTURE PLATE

NOTES

1. Fabricate V-block, V-block adapter, and clamp from:
   Steel (...) NSN (...)
   CAGEC (...) PN (...)

2. Fabricate fixture plate from:
   Steel (...) NSN (...)
   CAGEC (...) PN (...)

Figure 11. V-block Adapter Assembly (2 of 2).

ALPHABETICAL INDEX (CONT)

ALPHABETICAL INDEX (CONT)

ALPHABETICAL INDEX (CONT)

ALPHABETICAL INDEX (CONT)

ALPHABETICAL INDEX (CONT)

By Order of the Secretary of the Army:

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

Official:

MILTON H. HAMILTON
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THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches

1 Meter = 100 Centimeters = 1,000 Millimeters = 39.37 Inches

1 Kilometer = 1,000 Meters = 0.621 Miles

SQUARE MEASURE

1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches

1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet

1 Sq Kilometer = 1,000,000 Sq Meters = 0.386 Sq Miles

CUBIC MEASURE

1 Cu Centimeter = 1,000 Cu Millimeters = 0.06 Cu Inches

1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces

1 Liter = 1,000 Milliliters = 33.82 Fluid Ounces

TEMPERATURE

5/9 (°F -32) = °C

212° Fahrenheit is equivalent to 100° Celsius

90° Fahrenheit is equivalent to 32.2° Celsius

32° Fahrenheit is equivalent to 0° Celsius

9/5 C° +32 = F°

WEIGHTS

1 Gram = 0.001 Kilograms = 1,000 Milligrams = 0.035 Ounces

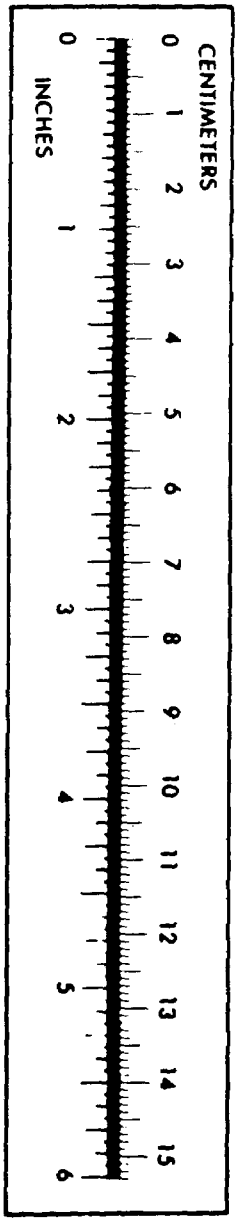
1 Kilogram = 1,000 Grams = 2.2 Lb.

1 Metric Ton = 1,000 Kilograms = 1 Megagram = 1.1 Short Tons

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds Per Square Inch	Kilopascals	6.895
Miles Per Gallon	Kilometers Per Liter	0.425
Miles Per Hour	Kilometers Per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds Per Square Inch	0.145
Kilometers Per Liter	Miles Per Gallon	2.354
Kilometers Per Hour	Miles Per Hour	0.621



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