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1944

# TM 11-390

WAR DEPARTMENT TECHNICAL MANUAL

*U.S. Dept. of Army*

## SIGNAL LAMP EQUIPMENTS EE-80 AND EE-80-A



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WAR DEPARTMENT TECHNICAL MANUAL

TM 11-390

*This manual supersedes TM 11-390, 25 February 1943, including C1, 7 January 1944,  
and TB 11-390-1, 23 June 1944.*

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SIGNAL LAMP  
EQUIPMENTS  
EE-80 AND  
EE-80-A



WAR DEPARTMENT • 23 SEPTEMBER 1944

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WAR DEPARTMENT,  
WASHINGTON 25, D. C., 23 September 1944.

TM 11-390, Signal Lamp Equipments EE-80 and EE-80-A, is published for the information and guidance of all concerned.

[A.G. 300.7 (29 Aug. 44).]

BY ORDER OF THE SECRETARY OF WAR:

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

OFFICIAL:

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

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For explanation of symbols, see FM 21-6.

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## DESTRUCTION NOTICE

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**WHY**—To prevent the enemy from using or salvaging this equipment for his benefit.

**WHEN**—When ordered by your commander.

**HOW**—1. Smash—Use sledges, axes, handaxes, pickaxes, hammers, crowbars, heavy tools.

2. Cut—Use axes, handaxes, machetes.

3. Burn—Use gasoline, kerosene, oil, flame throwers, incendiary grenades.

4. Explosives—Use firearms, grenades, TNT.

5. Disposal—Bury in slit trenches, fox holes, other holes. Throw in streams. Scatter.

## USE ANYTHING IMMEDIATELY AVAILABLE FOR DESTRUCTION OF THIS EQUIPMENT

**WHAT**—1. Smash—Key and key box, lamp, lamp socket, spare lamps, reflectors, filters, clear lens, lamp housing, front and rear sights, gears, worms and gear housings.

2. Cut—Lamp cable and key cable. Tear out all wiring.

3. Burn—Tripod legs, wooden chest, leg and chest straps, Technical Manuals, and all records or written messages.

4. Bend—Louvre and support rod.

5. Bury or scatter—Where possible, and time permits, bury all debris or dispose of it in streams or other bodies of water.

## DESTROY EVERYTHING

## SAFETY NOTICE

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Signal Lamp Equipment EE-80-( ) is a precision instrument. Handle it with care. After it is plugged into the power source, be careful when using the telegraph key. Place your fingers only on the key knob of the telegraph key.

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This manual supersedes TM 11-390, 25 February 1943, including C1, 7 January 1944,  
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SECTION I  
DESCRIPTION

I. General (figs. 1 and 2).

Signal Lamp Equipment EE-80-( ) is a portable light-signaling ap-

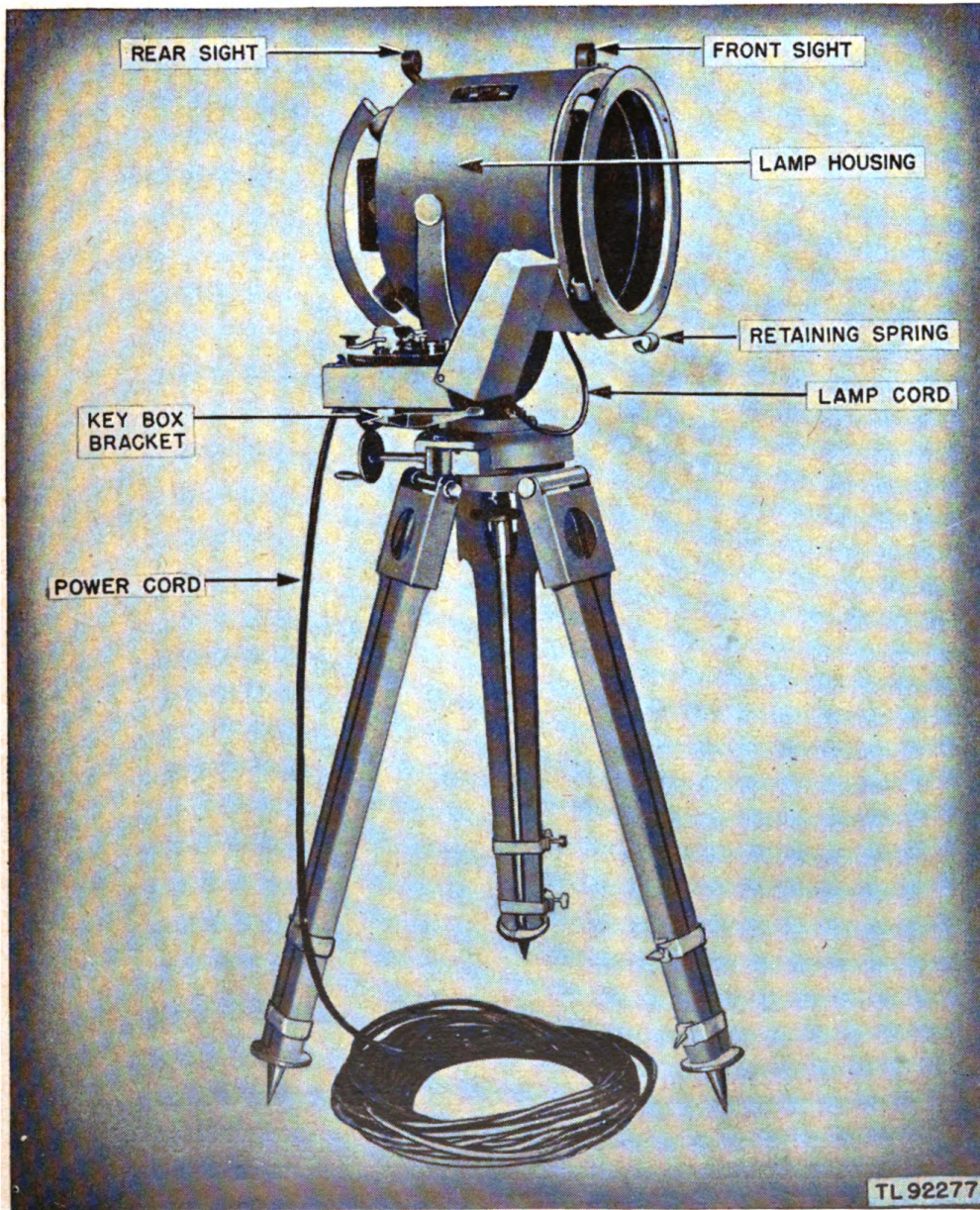


Figure 1. Signal Lamp Equipment EE-80-( ), side view.

paratus used at harbor defense and coastal signal stations for communicating with vessels and intervisible signal stations. Since it is portable, it is suitable for use in temporary as well as fixed harbor installations. Messages or signals are transmitted by means of white, red, or green

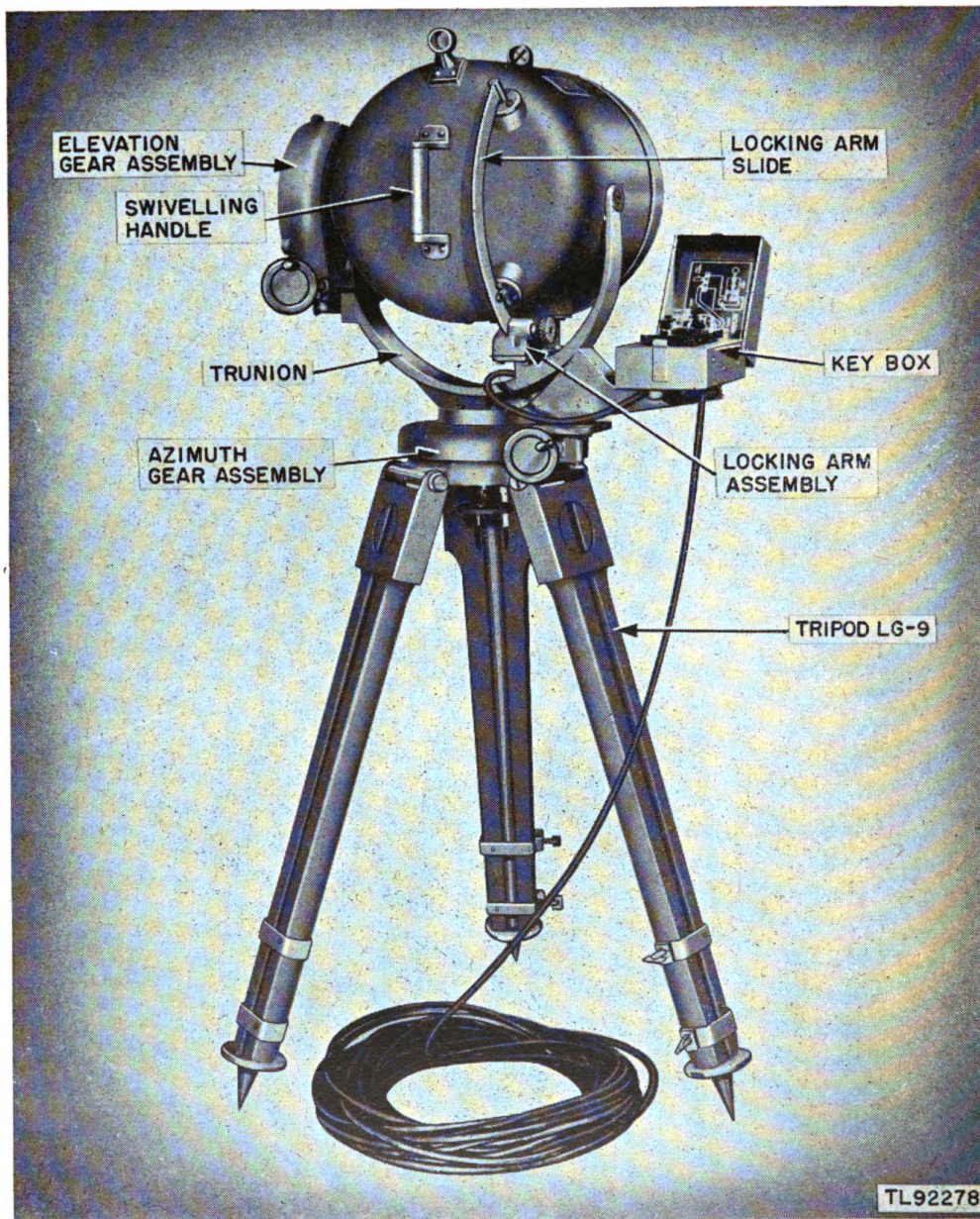


Figure 2. Signal Lamp Equipment EE-80-( ), back view.

light flashes which are controlled by operating a key in the lamp circuit. Depending on the height of the equipment above the ground, the range of effective communication may extend from 7 miles in the daytime to 45 miles at night. A code speed of 5 words per minute should be used for most effective reception. Operating power may be furnished by any



source of alternating or direct current of 110 to 120-volts with an output of at least 450-watts. Signal Lamp Equipment EE-80-( ) will be used when reference is made to both Signal Lamp Equipments EE-80 and EE-80-A.

## 2. Difference between Signal Lamp Equipments EE-80 and EE-80-A

The only difference between Signal Lamp Equipments EE-80 and EE-80-A is the signal lamp unit mounted on Tripod LG-9. Signal Lamp Equipment EE-80 is equipped with Signal Lamp M-124 and Lamps LM-20 and LM-21. Signal Lamp Equipment EE-80-A is equipped with Signal Lamp M-283 and Lamps LM-51 or LM-51-A and LM-60 or LM-60-A. The key box assemblies on Signal Lamp M-124 and M-283 differ slightly in construction. Signal Lamps M-124 and M-283 are interchangeable. Lamps LM-20 and LM-21 can be used only with Signal Lamp M-124 and Lamps LM-51, LM-51-A, LM-60, and LM-60-A can be used only with Signal Lamp M-283. It is recommended that when Signal Lamp M-124 becomes defective it be replaced with Signal Lamp M-283. New procurements have been only for Signal Lamp Equipment EE-80-A.

## 3. List of Components of Signal Lamp Equipment EE-80-( )

- a. Tripod LG-9.
- b. Chest CH-24.
- c. Signal Lamp M-283 (for Signal Lamp Equipment EE-80-A).
- d. Signal Lamp M-124 (for Signal Lamp Equipment EE-80).
- e. Lamps LM-20 and LM-21 (used only with Signal Lamp M-124).
- f. Lamps LM-51, LM-51-A, LM-60, and LM-60-A (used only with Signal Lamp M-283).

*Note.* Lamps LM-51-A and LM-60-A will be supplied with new procurements of Signal Lamp Equipment EE-80-A.

- g. Filters MC-121 and MC-122.
- h. Stake GP-8 (supplied only with new procurements of Signal Lamp Equipment EE-80-A).

## 4. Chest CH-24

Chest CH-24 is a wooden box used for transporting Signal Lamp Equipment EE-80-( ). The chest is 44¾ inches long, 26¼ inches wide and has a depth of 26 inches. It has a hinged lid and a carrying handle. The chest is fitted with compartments, supports, and straps for the support and storage of the equipment during transportation.

## 5. Signal Lamp M-283

Signal Lamp M-283 is a component of Signal Lamp Equipment

EE-80-A but may be used to replace Signal Lamp M-124 of Signal Lamp Equipment EE-80. Signal Lamp M-283 consists of a key assembly and lamp housing assembly.

## 6. Key Assembly for Signal Lamp M-283

a. **KEY BOX.** The key box is mounted on a cast-aluminum bracket attached to the trunnion on the lamp housing (fig. 3). Two screws, one on each end of the bracket, attach the key box to the bracket. The key box contains telegraph Key J-47 and its complete circuit. Inside the key-box base are located Capacitor CA-171 and the terminal strip for the lamp and power cords.

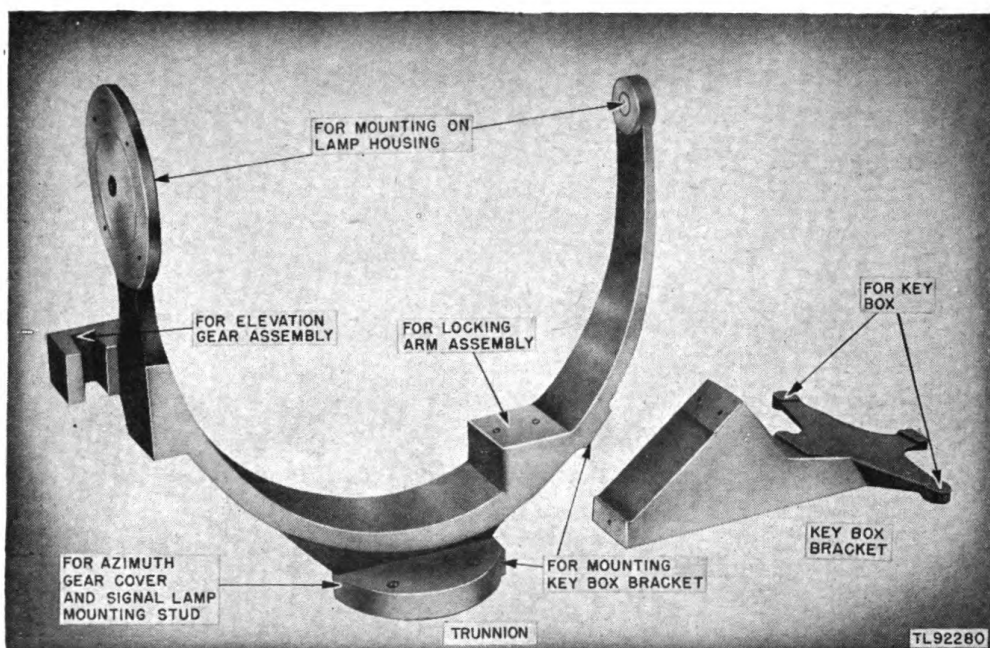


Figure 3. Trunnion and key box bracket.

(1) *Outer key cover* (fig. 4). The outer cover completely covers the key box. It is hinged to the rear of the key box by two cotter pins. It protects Key J-47 when the equipment is not in operation. The catch spring on the front of the key box holds the outer key cover closed.

(2) *Inner key cover.* An inner key cover, which fits between the key box base and the telegraph-key base, protects the key and contacts when the equipment is in operation. To remove and replace the inner key cover, remove the key knob of Key J-47 and loosen the key mounting screws.

(3) *Key J-47.* Key J-47 is mounted to the key-box base by four screws. It consists of two binding posts and a metal spring tongue mounted on a phenolic plate.

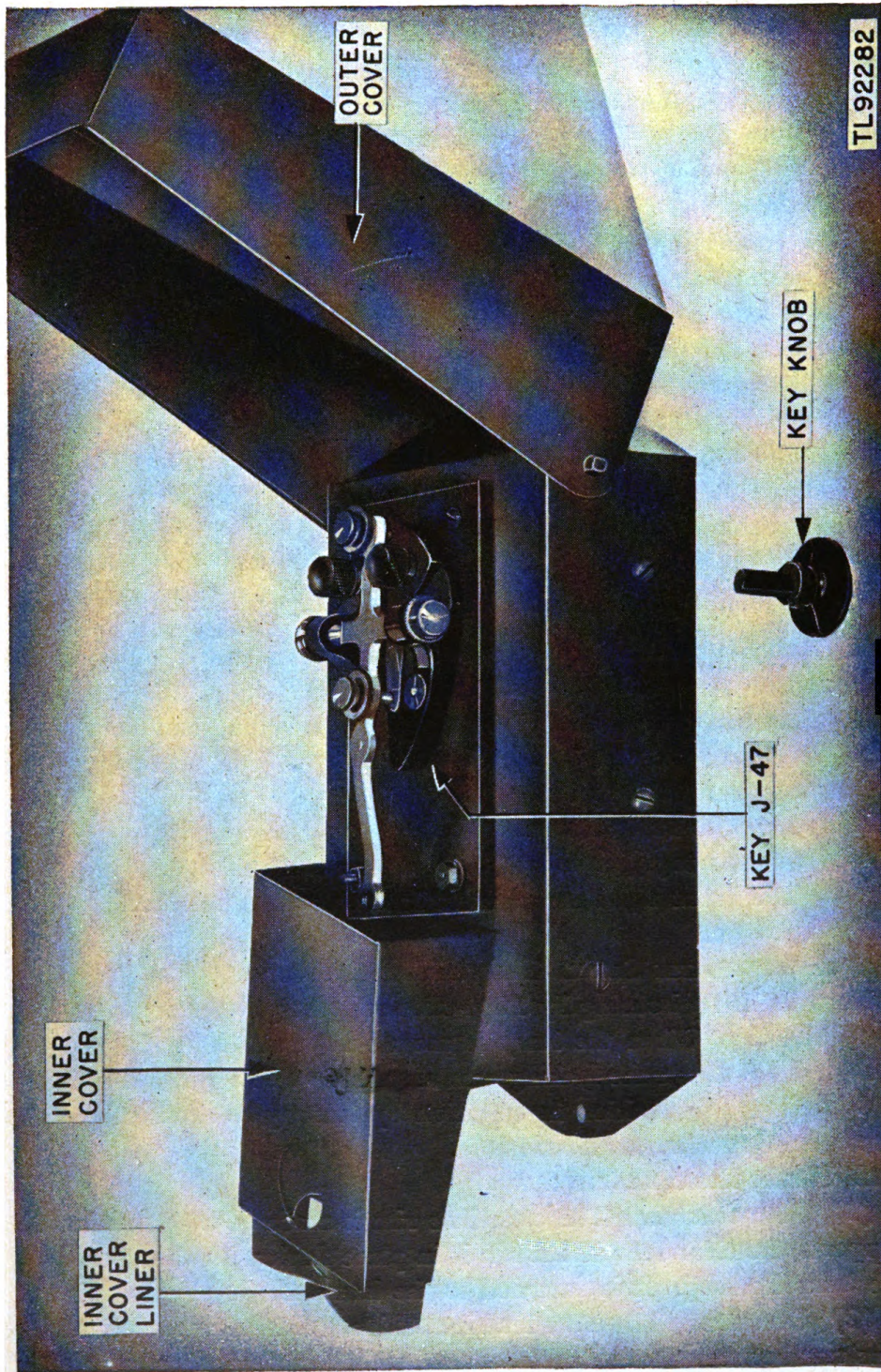


Figure 4. Key box, cover open.

(4) *Capacitor CA-171*. Capacitor CA-171 is a 2-mf capacitor connected across the two terminal binding posts of Key J-47 and located on the under side of the key box base.

*b. LAMP CORD*. The lamp cord is a 2-conductor, rubber-covered cord, 36 inches long. The cord connects the terminal strip in the key box to the lamp socket, thus carrying the current from the key box to the lamp.

*c. POWER CORD*. The power cord is a 2-conductor, rubber-covered cord, 75 feet long with a plug and socket connection at one end for connection to the 115-volt power source and connections on the other end for connecting to the terminal strip in the key box.

*d. GROUND WIRE*. An 8-foot length of No. 12 flexible wire serves as a ground lead from the key box to Stake GP-8. The ground wire will be supplied with new procurements of Signal Lamp Equipment EE-80-A and will come attached to the key box of Signal Lamp M-283. Any sufficient length of No. 12 flexible wire will suffice if an earlier model of Signal Lamp Equipment EE-80-( ) is used. Connect the wire to the body of the key box in any suitable manner. Connect the other end to any suitable ground rod.

## 7. Lamp Housing Assembly for Signal Lamp M-283

*a. LAMP HOUSING*. The lamp housing is a cast-aluminum body. Mounted on its outside are the front and rear sights, the locking arm slide, clear lens assembly, retaining spring, swivelling handle, and trunnion. Mounted on the inside of the lamp housing are the reflector, louvre, and lamp receptacle.

*b. FRONT AND REAR SIGHTS*. The front and rear sights, made of cast brass, are used together to zero in the beam of the signal lamp on the target. The front sight is the cross-hair type and the rear sight is the peep-sight type.

*c. LOCKING ARM SLIDE*. The stainless-steel locking arm slide is fastened to the lamp housing by three-slide support plates that screw on the lamp housing. When the lamp is moved in elevation, the locking arm slide slides through the locking arm assembly. The signal lamp can then be locked in any position in elevation by turning clockwise the locking screw on the locking arm assembly.

*d. CLEAN LENS ASSEMBLY*.

(1) *Clear-lens rim*. The clear-lens rim is made of cast-aluminum and supports the clear lens and holds it in place flush with the open face of the lamp housing. It is fastened to the lamp housing by four bolts.

(2) *Clear lens*. The clear lens is cushioned in the groove of the clear-lens rim between the rim asbestos pad and two screw asbestos pads. The clear lens protects the inside of the lamp housing.

*e. RETAINING SPRING*. The retaining spring is a brass spring, fastened by two screws to the bottom of the lamp housing. It projects out in front of the lamp housing to hold the filter in place.

f. **SWIVELLING HANDLE.** The swivelling handle is fastened to the rear of the lamp housing by four screws and is used to rotate the lamp in azimuth and elevation manually.

g. **TRUNNION.** The trunnion is U-shaped. It is bolted through a hole at each end of the U to the lamp housing, thus allowing the lamp to swing in elevation. The azimuth gear cover is bolted to the base of the trunnion. The mounting stud is bolted through the inside of the gear cover to the base of the trunnion. The elevation gear assembly is bolted to the disk end of the trunnion. The locking arm assembly and the key box bracket are bolted to the opposite arm of the trunnion from the elevation gear assembly.

(1) *Locking arm assembly.* The locking arm assembly is bolted to the trunnion. The locking arm slide attached to the lamp housing slides through the locking arm assembly. By turning the locking screw clockwise, the signal lamp can be locked in its proper position of elevation. Turning the screw counterclockwise loosens the locking arm assembly's hold on the locking arm slide and the lamp can then be moved in elevation either manually or mechanically as desired.

(2) *Elevation gear assembly.* The elevation gear assembly is mounted on the disk end of the trunnion. It consists of a worm gear and housing and a worm assembly and hand wheel. Through the use of the elevation gear assembly the up and down movement of the lamp can be mechanically controlled.

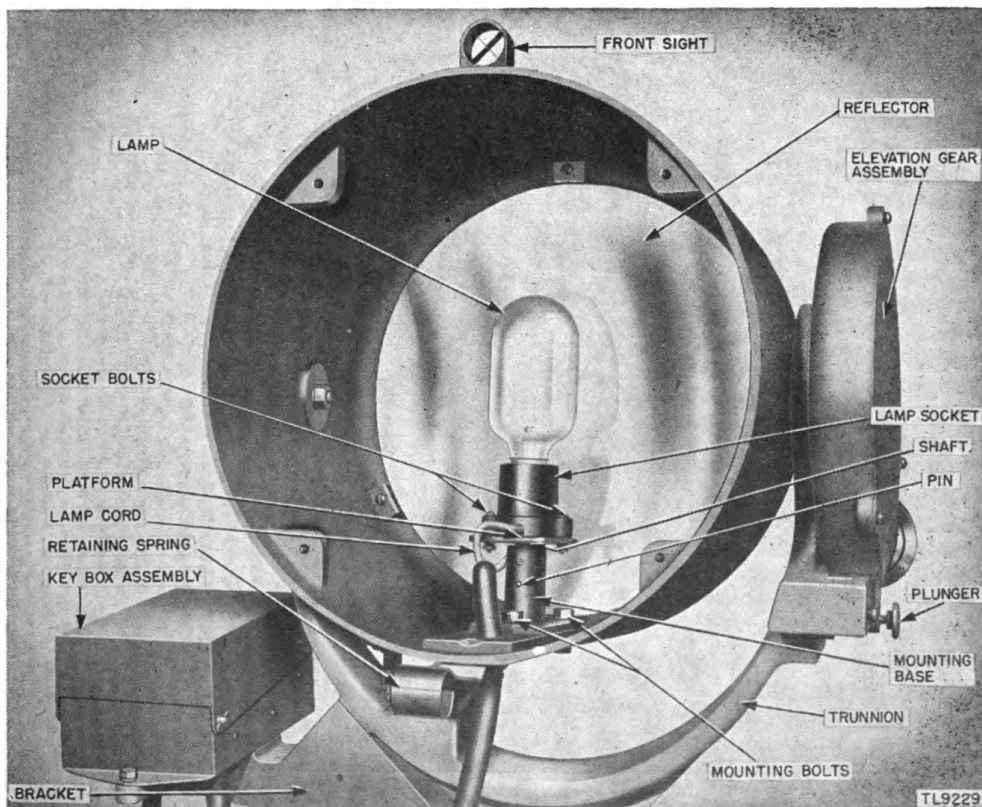


Figure 5. Inside of lamp housing of Signal Lamp M-283.

(3) *Key-box bracket.* The key-box bracket is bolted to the trunnion on the opposite arm from the disk end. The key box is bolted to the key-box bracket. The ground wire is usually connected to one of the cap screws which mount the key box on the key-box bracket.

*h. REFLECTOR.* The rhodium reflector is mounted in the rear of the inside of the lamp housing. It is held in place by three retaining clips and screws (see fig. 5).

*i. LOUVRE.* The louvre consists of three concentric rings of black cold-rolled steel. It is mounted on a strip of steel which extends across the face of the lamp housing and is connected by a screw at each end to the clear lens rim. This strip acts as a vertical support for the louvre and is located so that it is directly in front of the lamp filament.

*j. LAMP RECEPTACLE.* The lamp is set in a plastic socket which is mounted on a shafted platform. The shafted platform is pinned to the lamp mounting. The height of this platform above the base of the lamp housing is fixed at the factory as a step in the prefocusing of the lamp.

## 8. Signal Lamp M-124 (fig. 6).

Signal Lamp M-124 differs from Signal Lamp M-283 as follows:

- a. REFLECTORS.* The reflector is made of glass.
- b. LAMP SOCKET.* The lamp socket is made of porcelain and is

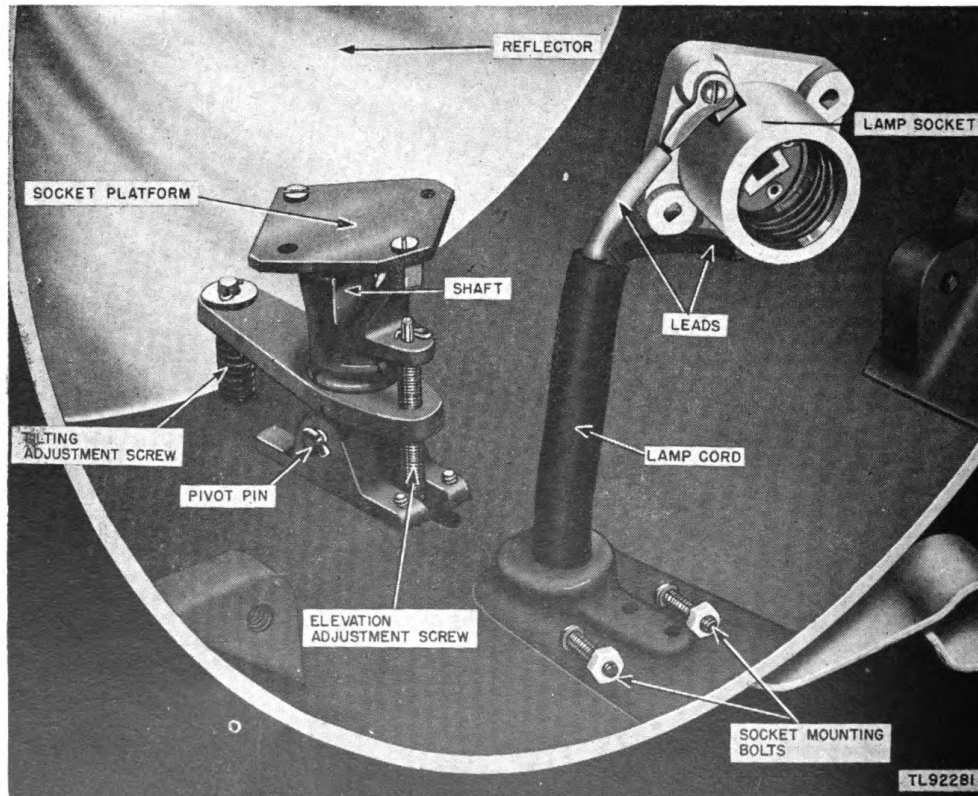


Figure 6. Signal Lamp M-124, socket removed from platform.

mounted on the socket platform by two bolts. The platform can be raised or lowered by the front focus-adjustment screw or tilted backward or forward by the rear focus-adjustment screw. These screws protrude through the bottom of the lamp housing and are adjusted from outside the housing.

*c.* LEADS. The leads to the lamp socket terminate in terminal lugs which are connected to the socket contacts by screws.

*d.* LOUVRE. There are two concentric rings of cold-rolled steel mounted on a vertical support rod.

*e.* KEY. The key is a telegraphic type key and is not shielded from the other metal parts of the key box.

*f.* REAR SIGHT. The rear sight can be moved to the right or left by a screw adjustment at the side of the sight. This enables the operator to line the sights with the focused beam.

## 9. Tripod LG-9 (fig. 7).

Tripod LG-9 consists of an azimuth gear, gear mounting, and ball bearing mounted on three legs. The legs are of wooden construction in three pieces. The two outside wooden pieces are troughed out to allow the third round piece to slide between them when adjusting the height of the tripod. Two thumbscrews mounted on leg clasps are loosened to allow adjustment of the length of the legs of the tripod. The legs may be extended from 36 inches to 60 inches in length. Metal foot points protect ends of the wooden legs and help to keep the equipment from sliding when in operating position. The three legs are each bolted to metal hinges which allow the legs to be spread to any desired angle from the perpendicular. The legs are strapped together with a canvas strap when the unit is not in use.

## 10. Stake GP-8

Stake GP-8 will be furnished as a component part of new procurements of Signal Lamp Equipment EE-80-( ). Personnel having models of Signal Lamp Equipment EE-80-( ) which do not have the ground rod furnished may secure Stake GP-8 through the proper supply channels. Stake GP-8 is a steel rod, 18 inches long, with a driving head and means for attaching ground leads (see par. 17).

## 11. Lamps

*a.* LAMPS LM-20 AND LM-21. Lamps LM-20 and LM-21 are part of Signal Lamp Equipment EE-80 and cannot be fitted into the socket of Signal Lamp Equipment EE-80-A. Six Lamps LM-20 and LM-21 come packed in the lamp compartment of Chest CH-24.

*b.* LAMPS LM-51, LM-60, LM-51-A, AND LM-60-A. These lamps are used with Signal Lamp Equipment EE-80-A. The newer models of Signal Lamp Equipment EE-80-A are equipped with six each of Lamps

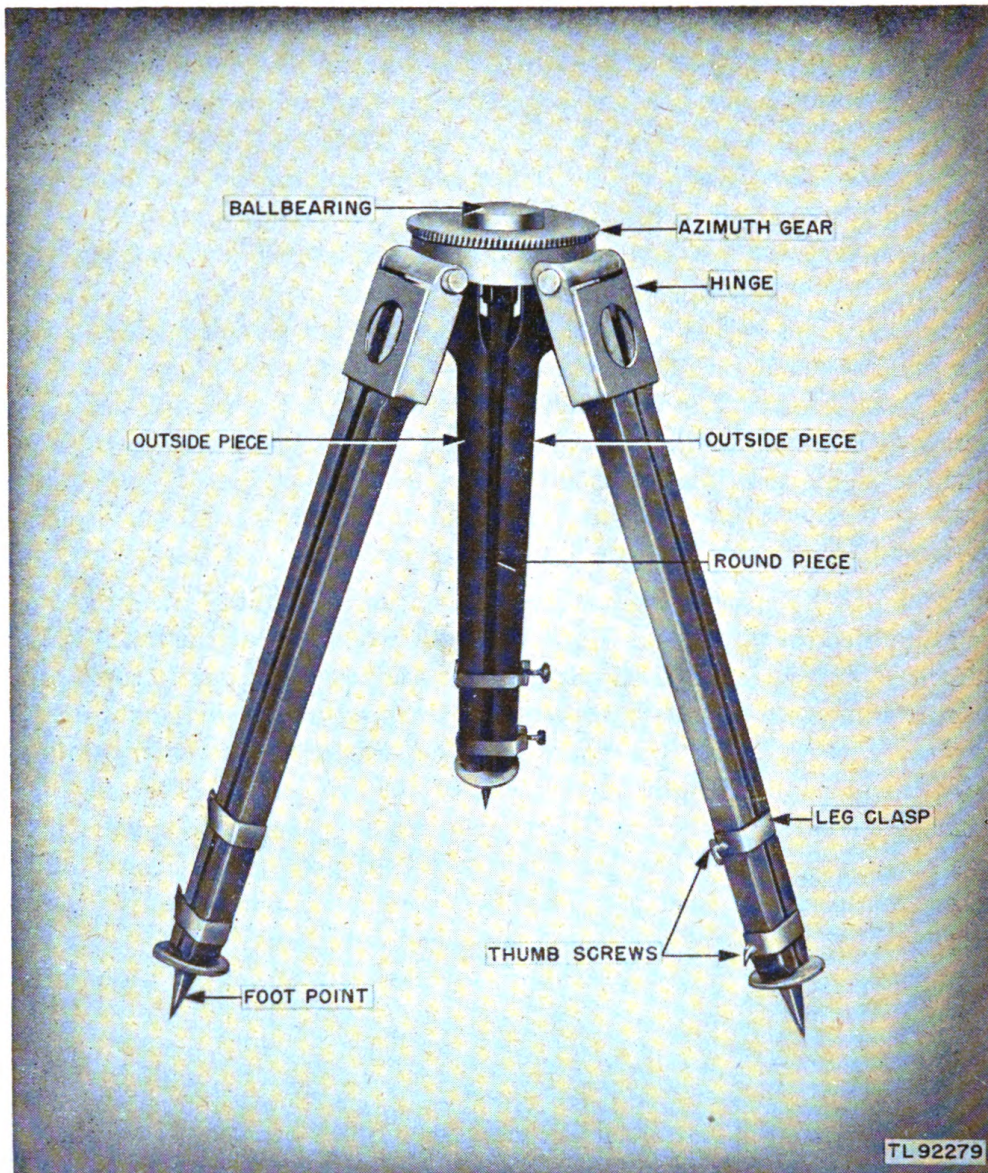


Figure 7. Tripod LG-9.

LM-51-A and LM-60-A. Older models of Signal Lamp Equipment EE-80-A were equipped with six each of Lamps LM-51 and LM-60.

c. WATTAGE.

<i>Lamp</i>	<i>Watts</i>	<i>Lamp</i>	<i>Watts</i>
LM-20 .....	250	LM-60 .....	250
LM-21 .....	400	LM-51-A .....	165
LM-51 .....	400	LM-60-A .....	100

**12. Filters**

Filters MC-121 (green) and MC-122 (red) come packed in the filter compartments of Chest CH-24. They come complete in frames for mounting on the clear-lens rim of the lamp housing (see par. 16).



## SECTION II

### INSTALLATION AND OPERATION

#### 13. Lay-out of Chest CH-24

Signal Lamp Equipment EE-80-( ) is constructed and packed to simplify the installation and operation of the equipment (see fig. 8).

a. Signal Lamp M-283 or M-124 is stored in the bottom of the chest with the lens down. A slotted wood block to protect the front sight is provided at the end of the chest. The mounting stud is held in place by a wood-block lock. Padded blocks in the bottom of the chest and on the inside of the lid protect the lamp housing assembly and prevent it from shifting in the chest during transportation.

b. Tripod LG-9 is stored in a horizontal position at the back of the chest and is held in place by two chest straps. Stake GP-8 will be stored with the tripod on new procurements.

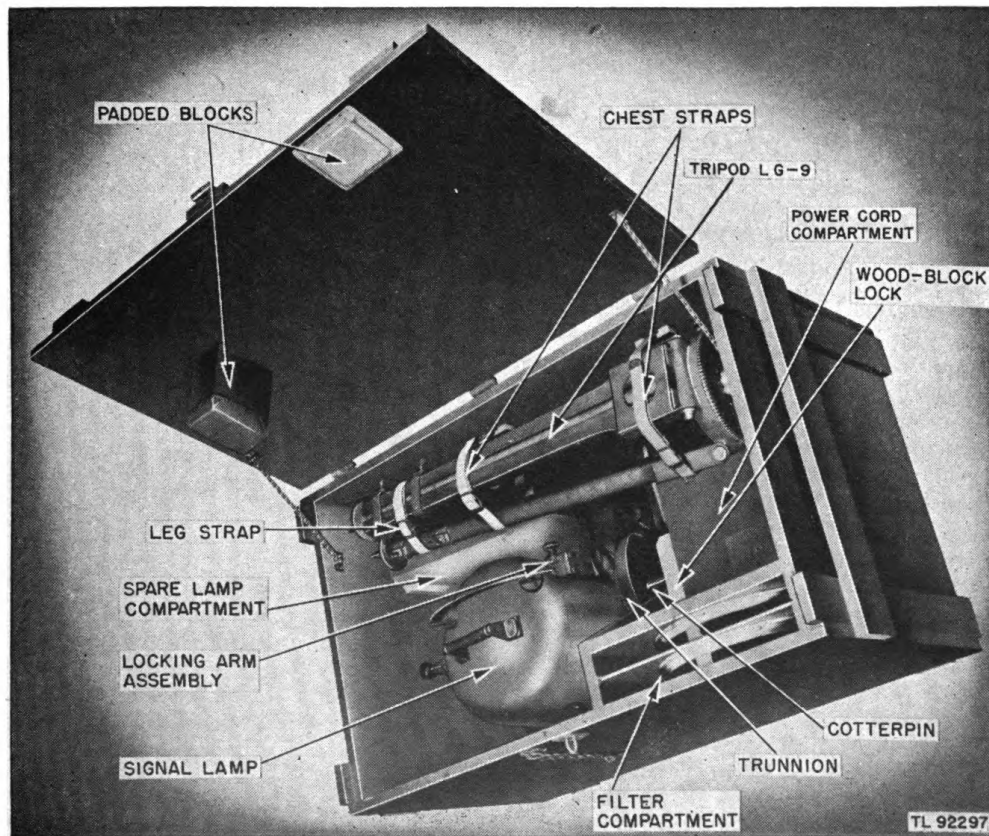


Figure 8. Lay-out of Chest CH-24.

c. Special compartments are provided for the storage of spare lamps, Filters MC-121 and MC-122, and the power cord.

#### 14. Setting up Tripod LG-9

- a. Unfasten the leg and chest straps.
- b. Remove the tripod and Stake GP-8 from the chest.
- c. Place the tripod position by spreading the legs to the desired angle. Extend the legs to the desired height by loosening the two thumbscrews on each leg and extending the center pieces of each leg.
- d. Tighten the thumbscrews to hold the center pieces clamped in position.



Figure 9. Placing signal lamp on Tripod LG-9.

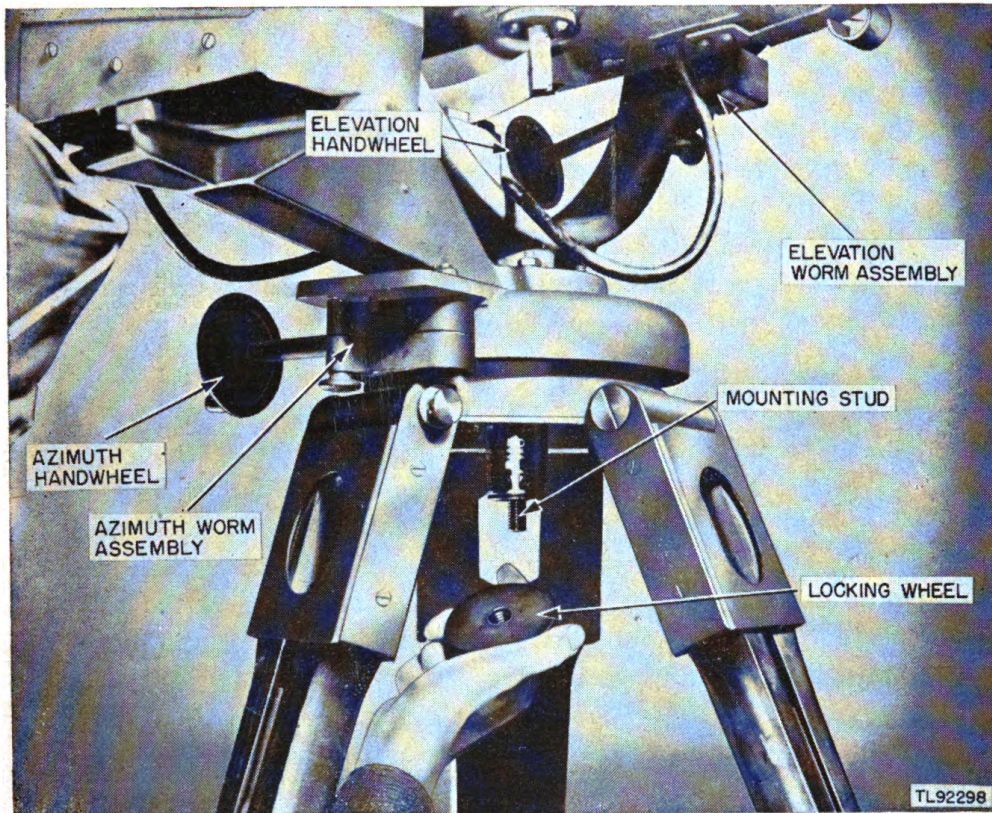


Figure 10. Top of Tripod LG-9, showing mounting stud in place.

### 15. Setting up Signal Lamp M-283 or M-124

- a. Open the wood-block lock.
- b. Loosen locking arm assembly by turning locking screw counter-clockwise.
- c. Raise trunnion.
- d. Remove cotter pin from mounting stud.
- e. Unscrew locking wheel.
- f. Lower trunnion to its former position.
- g. Tighten the locking arm assembly.
- h. Grasp the signal lamp by the swivelling handle and remove signal lamp and power cord from chest. Be sure the azimuth worm is disengaged (see fig. 9).
- i. Place the signal lamp on Tripod LG-9.
- j. Replace locking wheel on mounting stud which now extends below the tripod platform (see fig. 10).
- k. Insert cotter pin in mounting stud.
- l. Drive ground rod into ground adjacent to Signal Lamp Equipment EE-80-( ) and connect grounding wire from key box to ground rod.
- m. Plug power cord into 115-volt power supply. Signal Lamp Equipment EE-80-( ) is now completely assembled and ready for operation.

## 16. Mounting Filter MC-121 or MC-122 (fig. 11).

- a. Remove Filter MC-121 (green) or MC-122 (red) from the compartment in Chest CH-24.
- b. Align the hole in the right bottom support strap with the shoulder of the lower right mounting bolt on the front of the clear-lens rim.
- c. In like manner, align the hole in the left bottom support strap with the bolt on the lower left side of the clear-lens rim.
- d. Press down on retaining spring, allowing the filter assembly to snap into position.

## 17. Grounding Set

New procurements of Signal Lamp Equipment EE-80-A include a Stake GP-8 and an 8-foot length of grounding wire which is attached to the key box. If a ground rod and wire are not provided with the equipment in use, any suitable wire and rod may be used. The ground wire should be fastened under the cap screw at one end of the key box. The other end of the ground wire should be fastened securely to the binding post on side of ground rod.

*Note.* Drive the ground rod into the dampest ground available to its full length. Be sure that all paint or grease is removed from the ground rod and that connec-

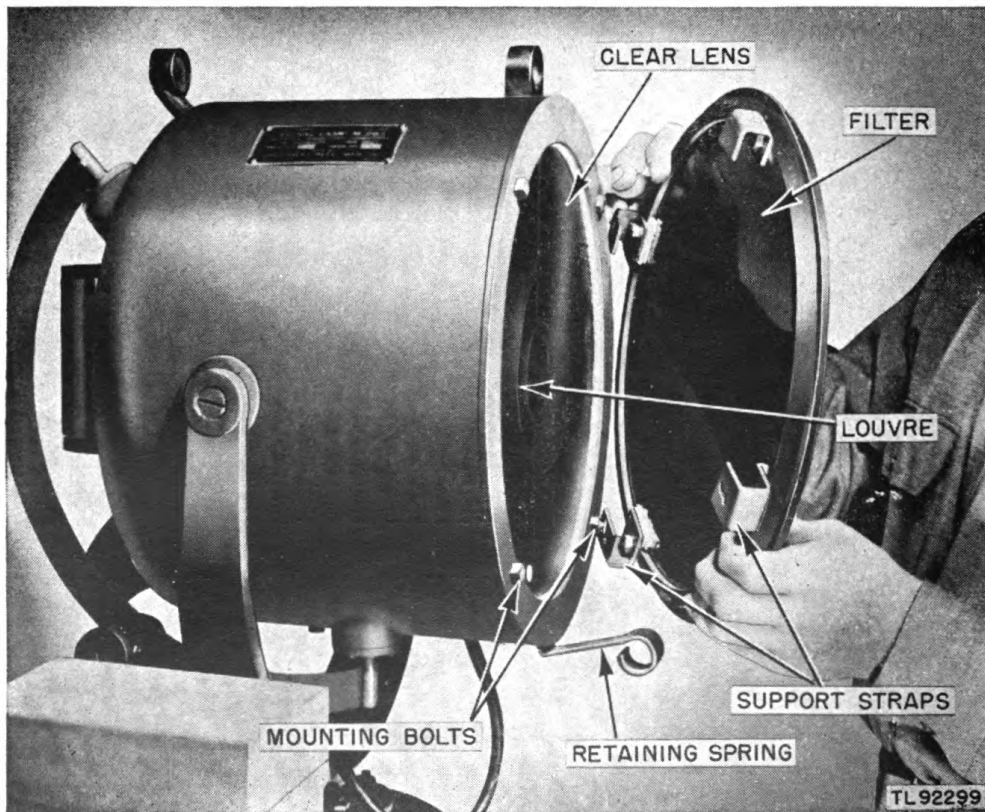


Figure 11. Mounting of filter

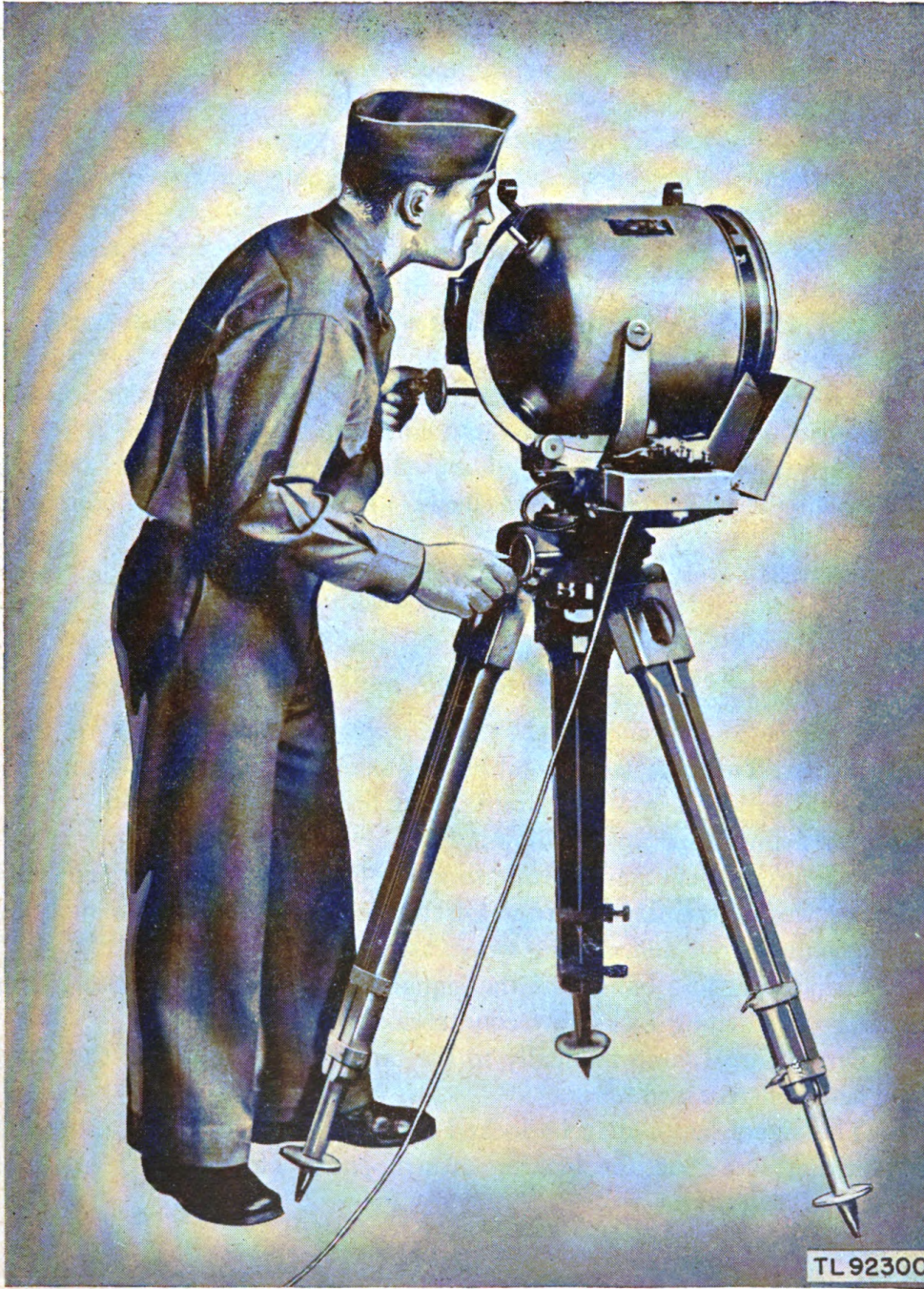


Figure 12. Mechanical operation of Signal Lamp Equipment EE-80-( ).

tions of the ground wire to the rod and the key box are tight and offer the lowest possible resistance to ground.

### **18. Mechanical Operation of Signal Lamps M-283 and M-124 (fig. 12).**

Signal Lamps M-283 and M-124 can be operated mechanically to lay a beam on the target. Directions for mechanical operation follow:

- a.* Disengage the locking arm assembly.
- b.* Loosen the locking wheel.
- c.* Pull out plunger on elevation worm assembly and move worm assembly upward.
- d.* Turn elevation gear handwheel until worm meshes with the elevation worm gear and the plunger snaps into correct position.
- e.* Pull out plunger on azimuth worm assembly and move worm assembly inward.
- f.* Turn azimuth gear handwheel until worm meshes with the azimuth worm gear and the plunger snaps into correct position.
- g.* Turn the handwheels to govern elevation rotation and azimuth rotation of the signal lamp. Direct beam to target with aid of front and rear sights.

*Note.* Locking arm assembly should be disengaged when the elevation gear is operated. Locking wheel should be loosened when the azimuth gear is operated.

### **19. Manual Operation of Signal Lamps M-283 and M-124**

Signal Lamps M-283 and M-124 can be operated manually to lay a beam on a target. To make large rotations in azimuth and elevation quickly, manual operation is more desirable than mechanical operation. Directions for manual operation follow:

- a.* Disengage elevation worm assembly by pulling plunger out and allowing worm assembly to drop. Disengage azimuth worm assembly by pulling plunger out and moving worm assembly to the right.
- b.* Grip swivelling handle of the signal lamp and loosen locking arm assembly by turning lockscrew counterclockwise.
- c.* Direct signal lamp manually to the target with the aid of the front sight and the rear sight.
- d.* The signal lamps may be locked at the proper elevation by turning the locking screw on the locking arm assembly clockwise. It may be rotated in azimuth at will.

### **20. Signaling**

Messages or signals are transmitted by means of light flashes which are controlled by operating telegraph Key J-47.

- a.* Open telegraph key box by raising the cover. Light flashes are produced by pressing down on the key knob which completes the circuit between the lamp and the source of power.

*Caution:* Place fingers only on the key knob of the telegraph key.  
It is possible to get a shock from a poorly grounded key box.

*b.* For more efficient signaling, signal lamps should be operated in batteries of two or three. In this manner, red, green, and white light beams can be flashed together or one after another in rapid succession.

## **21. Packing for Transportation**

*a.* Disconnect the power cord from the power source and arrange it in a coil about 1 foot in diameter. Replace in power cord compartment in Chest CH-24.

*b.* Remove ground wire from its connection on Stake GP-8.

*c.* Close key box cover.

*d.* Replace Filters MC-121 and MC-122 in filter compartment of Chest CH-24.

*e.* Remove cotter pin and locking wheel from mounting stud.

*f.* Tighten locking arm assembly.

*g.* Disengage azimuth worm assembly.

*h.* Lift signal lamp out of Tripod LG-9 and replace in chest, lens down.

*i.* Unlock locking arm assembly to raise trunnion.

*j.* Return locking wheel to mounting stud.

*k.* Replace cotter pin in mounting stud.

*l.* Close wood-block lock over the mounting stud.

*m.* Loosen thumbscrews on legs of tripod and retract the center pieces of each leg.

*n.* Bring legs of tripod together and buckle strap around them.

*o.* Place tripod and ground rod in position in Chest CH-24 and secure tripod and ground rod to chest by tightening the two straps around them.

*p.* Close lid of Chest CH-24. Push hasp down over staple and secure with padlock.

## SECTION III

### FUNCTIONING OF PARTS

#### 22. Optical Beam

The optical beam is produced by an incandescent filament in the lamp. A paraboloidal reflector (glass on Signal Lamp M-124, rhodium on Signal Lamp M-283) tends to concentrate the light in a narrow focused beam.

#### 23. Louvre

The louvre prevents the escape of stray light by blocking the light rays which leave the incandescent filament at an angle to the beam (see fig. 13). This makes the lamp difficult to observe from points on either side of the focused beam and serves to restrict the intelligence conveyed by the signal to those for whom it is intended. The material of the louvre is nonreflective to light rays.

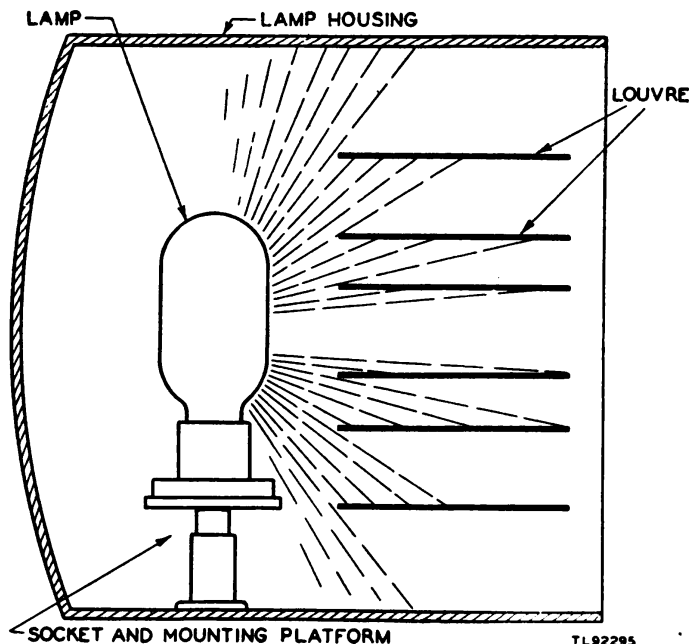


Figure 13. Functioning of louvre.

#### 24. Filters

Signal Lamp Equipment EE-80-( ) may be operated with the clear lens or with red or green filters which are mounted in front of the clear



lens assembly of the lamp. The choice of using either one or the other of the filters or no filter at all will be determined by the tactical situation. When the clear lens is used without a filter, the light beam is a white light. White light is visible at greater distances than colored light.

## 25. Electrical Circuits (fig. 14).

*a.* **POWER SOURCE.** An a-c or d-c power source of 110-120 volts is required for operation of the key and lamp circuit of Signal Lamps M-124 and M-283. It may be supplied by any Signal Corps power unit with the proper a-c or d-c voltage, or commercial power may be used if available.

*b.* **POWER CORD.** The power cord connects the power source to the key box.

*c.* **LAMP CORD AND LAMP.** The lamp cord connects to two terminals in the key box on one end and to the lamp-socket terminals on the other. It carries a current to the filament of the signal lamp.

*d.* **KEY J-47.** Two binding posts on Key J-47 are connected in series with the circuit of the lamp filament. A metal spring tongue connects to one binding post. When this tongue is depressed by touching the key knob, a contact point on the tongue makes contact with a silver insert in the molded key base. The silver insert is connected electrically to the second binding post by a metal connecting strip lying along the left inner side of the key base. Depressing the key knob thus completes the circuit to the signal-lamp filament and causes the lamp to light as long as the key remains depressed.

*e.* **CAPACITOR CA-171.** Capacitor CA-171 protects the key circuit by limiting the current surges from the power line. The capacitor is connected across the two binding posts on the key. It is located under the key box. Continuous burning of the lamp when the key is open may be caused by a shorted Capacitor CA-171. If such shortage occurs, replace the capacitor.

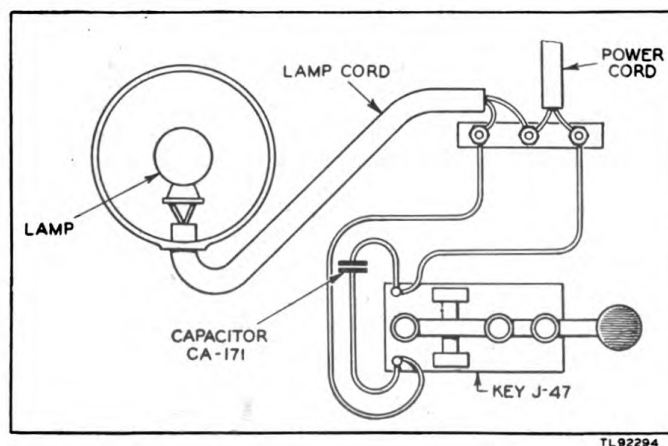


Figure 14. Signal Lamp Equipment EE-80-( ), cording diagram.

## SECTION IV

# MAINTENANCE

*Note.* Unsatisfactory performance of this equipment will be reported immediately on W.D., A.G.O. Form No. 468. If this form is not available see TM 38-250.

### 26. Lubrication

#### a. RECOMMENDED LUBRICANTS.

Symbol	Standard nomenclature	Specification
WB2.....	Grease, general purpose, No. 2.....	U. S. Army No. 2-108
PS.....	Oil, lubricating, preservative, special.....	U. S. Army No. 2-120
SD.....	Solvent, dry cleaning.....	Federal No. P-S-661a

*Note.* Army Regulation 850-20 prohibits the use of leaded gasoline as a cleaning fluid under any conditions.

#### b. SIGNAL LAMP M-124 OR M-283.

(1) *Elevation gear assembly* (fig. 15). (a) Remove the three screws which hold the plate on the elevation gear housing and remove the plate.

(b) Clean the worm gear and worm with dry-cleaning solvent (SD).

(c) Apply coat of general-purpose grease No. 2 (WB2) to worm gear and worm with a small brush after each 512 operating hours or every 2 months, whichever occurs first.

(2) *Elevation and azimuth worm-locking plungers and pivot pins.* Remove the plungers and pivot pins and apply 3 or 4 drops of special preservative lubricating oil (PS) every 128 operating hours or every 2 weeks, whichever occurs first.

(3) *Elevation and azimuth-handwheel bearing.* Apply 3 or 4 drops of special preservative lubricating oil (PS) every 128 hours or every 2 weeks, whichever occurs first.

(4) *Trunnion bearings.* Apply 3 or 4 drops of special preservative lubricating oil (PS) every 128 operating hours or every two weeks, whichever occurs first.

(5) *Locking arm assembly.* Apply 3 or 4 drops of special preservative lubricating oil (PS) every 128 operating hours or every 2 weeks, whichever occurs first.

(6) *Azimuth worm.* (a) Remove Signal Lamp M-283 or M-124 from Tripod LG-9.

(b) Pull out the worm-locking plunger to gain access to the worm.

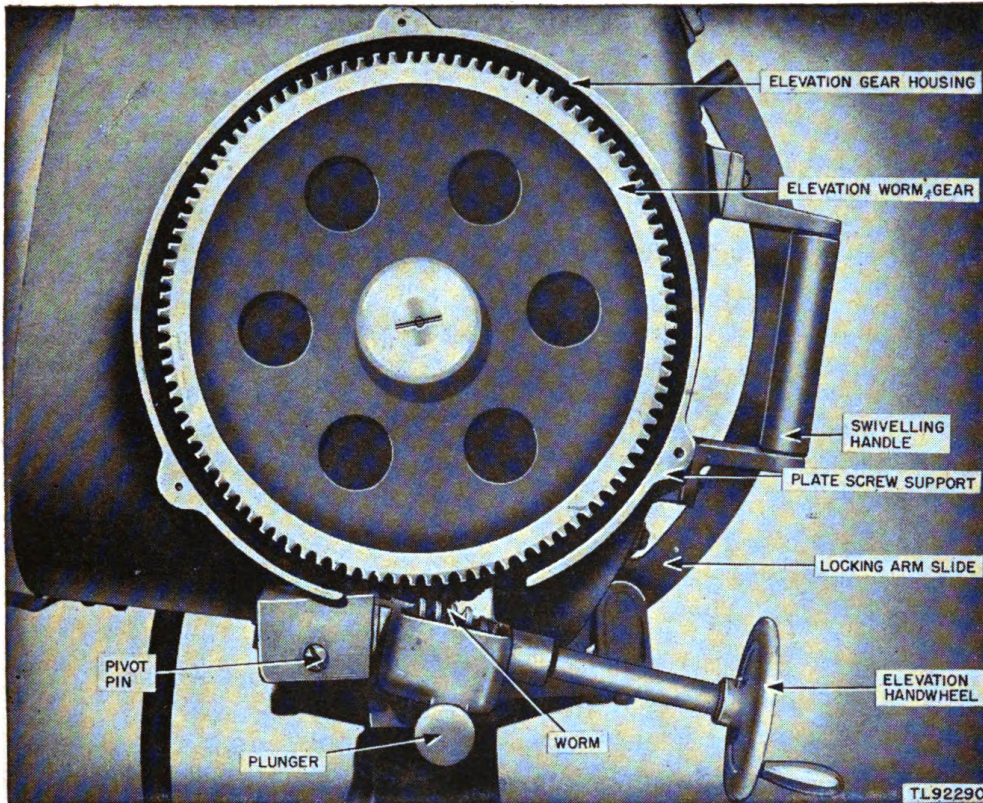


Figure 15. Elevation gear assembly, disengaged, cover plate removed.

(c) Clean with dry-cleaning solvent (SD).

(d) Coat teeth of worm with general purpose grease No. 2 (WB2) every 512 operating hours or every 2 months, whichever occurs first.

(7) *Mounting stud and threads.* (a) Remove lamp from tripod.

(b) Clean mounting stud and threads with dry-cleaning solvent (SD).

(c) Apply a light coating of general purpose grease No. 2 (WB2) every 512 operating hours or every 2 months, whichever occurs first.

c. TRIPOD LG-9.

(1) *Azimuth gear.* (a) Clean with dry-cleaning solvent (SD).

(b) Apply coat of general purpose grease No. 2 (WB2) to the gear teeth every 512 operating hours or every 2 months, whichever occurs first.

(2) *Ball bearing.* (a) Clean with dry-cleaning solvent (SD).

(b) Apply a heavy coating of general purpose grease No. 2 (WB2) to the bearing every 512 operating hours or every 2 months, whichever occurs first.

*Note.* Some models of Signal Lamp Equipment EE-80-( ) are equipped with a sealed bearing which requires no lubrication, because the grease is sealed in at the factory.

(3) *Leg joints.* Apply 3 or 4 drops of special preservative lubricating oil (PS) to the hinged bearings every 128 operating hours or every 2 weeks, whichever occurs first.

(4) *Leg clamping screws.* Apply 3 or 4 drops of special preservative lubricating oil (PS) to the thread of the screws every 128 operating hours or every 2 weeks, whichever occurs first.

## 27. Moistureproofing and Fungiproofing Signal Lamp M-283

*Note.* Unless otherwise noted, the following procedures apply also for Signal Lamp M-124.

*a. GENERAL.* The operation of Signal Corps equipment in tropical areas where temperature and relative humidity are extremely high requires special attention. The following items represent problems which may be encountered in operation:

(1) Capacitors fail.

(2) Hook-up wire and cable insulation break-down. Fungus growth accelerates deterioration.

(3) Moisture forms electrical leakage paths on terminal boards and insulating strips, causing flash-overs.

*b. TREATMENT.* A moistureproofing and fungiproofing treatment has been devised, which if properly applied, provides a reasonable degree of protection against fungus growth, insects, corrosion, salt spray, and moisture. The treatment involves the use of a moisture- and fungi-resistant varnish applied with a spray gun and brush. Refer to TB SIG 13, Moistureproofing and Fungiproofing Signal Corps Equipment, for a detailed description of the varnish-spray method of moistureproofing and fungiproofing.

• *Caution:* Varnish spray may have toxic effects if inhaled. To avoid inhaling spray, use respirator if available; otherwise, fasten cheesecloth or other cloth material over nose and mouth.

*c. STEP-BY-STEP INSTRUCTIONS (fig. 16).*

(1) *Preparation.* (a) Make all repairs and adjustments necessary for the proper operation of the equipment.

(b) Clean all dirt, dust, rust, fungus, oil, grease, etc., from the equipment to be processed.

(2) *Disassembly.* (a) Disconnect the plug from the power supply.

(b) Loosen the four screws and remove the clear lens assembly from the lamp housing.

(c) Remove the lamp from the socket.

(d) Mark the position of the socket on the supporting platform, and remove the screws holding the socket to the platform. This will help keep the proper lamp focus.

(e) Disconnect the socket leads, and pull the wires through the hole in the bottom of the lamp housing.

(f) Remove the U type clamp holding the power cord to the key-box bracket.

(g) Remove the key box from the key-box bracket by unscrewing the two cap screws.

(h) Uncover the key box and unscrew the key knob.

(i) Loosen the four screws of the key base from the underside of the key box. Slide the inner key cover off and replace the key knob.

*Note.* There is no inner key cover in the key box of Signal Lamp M-124.

(j) Disconnect the leads from the key binding posts, and screw down the binding-post caps ①.

*Note.* If treating Signal Lamp M-124, remove four screws on key base and remove key.

(k) Remove the key ② and the capacitor ② from the key box.

(3) *Masking.* (a) Mask the contacts of the key and the key adjustment screw ③.

*Note.* Mask the contacts on underside of key on Signal Lamp M-124.

(b) Starting at the terminal strip in the key box mask about 6 inches of all rubber-covered leads ④.

(c) Mask the contacts of the power-cord plug ⑤.

(d) Mask 6 inches of power cord at the plug end ⑤.

(e) Mask the terminal screws and mouth of the lamp socket. (This step is unnecessary if socket is porcelain.)

(f) Mask the terminals of the key leads ⑥.

(4) *Drying.* Dry the key box, key, inner-key cover, plug, and socket at 160° F for 2 to 3 hours. Do not place the entire coil of the power cord in the heating oven.

(5) *Varnishing.* (a) Apply three coats of moistureproofing and fungi-proofing varnish with spray gun and brush.

(b) Spray the inside and the underside of the key box, including the paper diagram.

(c) Spray the inner key cover ⑦ including the paper liner ⑧.

(d) Spray the top and bottom of the key ⑨.

(e) Spray the plug.

(f) Spray the lamp socket. (Do not apply varnish if the socket is porcelain.)

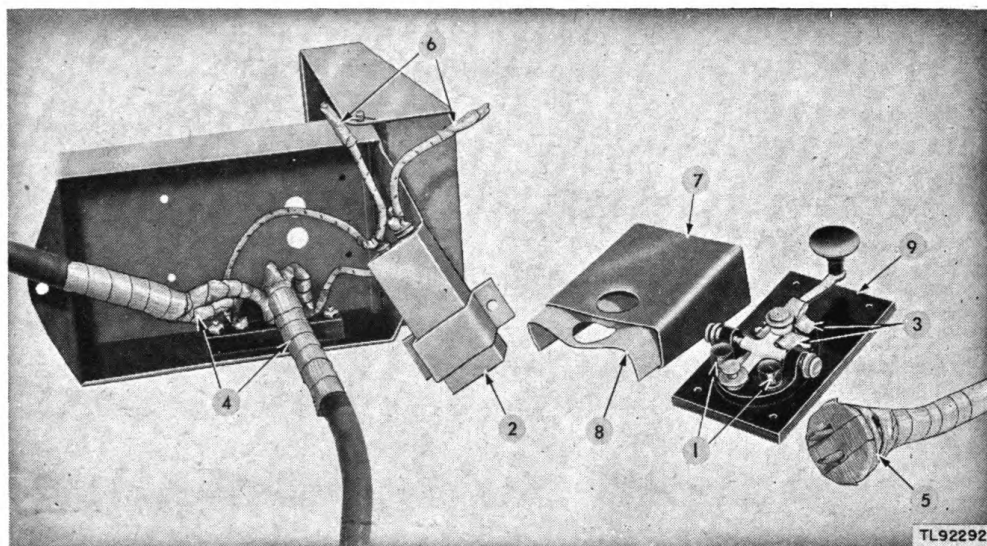
(g) Using a small brush, coat the top of the lamp socket platform in the lamp housing.

(6) *Reassembly.* (a) Remove all masking tape.

(b) Reassemble the equipment, replacing the lamp socket on the platform in the exact location indicated by the marks made before disassembly. Check the focusing of the beam and the alignment of the sights in a dark tunnel, or at night, over a distance of at least 400 feet (see pars. 28 and 29). Test the operation of the equipment.

(7) *Marking.* Mark the equipment with "MFP" and the date of treatment.

*Example:* MFP—1 August 1944.



*Figure 16. Key box and power-cord plug prepared for moistureproofing and fungiproofing.*

## 28. Focus Adjustment of Signal Lamp M-124

It is necessary to adjust the beam focus of Signal Lamp M-124 each time the lamp bulb is changed or the focus adjustment screws are moved out of position. Perform the following steps to adjust the focus:

*a.* Set Signal Lamp M-124 in operating position on Tripod LG-9. Connect the power cord to its power source.

*b.* Depress the key and aim the beam on some object 400 feet or more from the lamp.

*c.* Looking through the front and rear sights, adjust the elevation of the bulb by turning the front adjustment screw. This raises or lowers the socket platform on the shaft. Adjust the elevation until the beam is at the same elevation as the line of sight.

*d.* Adjust the distance of the lamp bulb from the reflector by turning the rear adjustment screw. This tilts the upper end of the shaft forward or backward. The bottom end of the shaft is held stationary by the pivot pin, which extends through the shaft and two mounting brackets. If this disturbs the elevation adjustment made in *c* above, repeat the elevation adjustment.

*e.* Repeat the adjustment outlined in *d* above until the proper focus has been achieved.

*f.* Proper focus has been obtained when the beam illuminates the smallest obtainable spot at a distance of 400 feet or **more**.

g. Adjust the position of the rear sight by turning the lateral adjustment screw until the sights line up at a point in the center of the illuminated spot.

## 29. Focus Adjustment of Signal Lamp M-283

a. **FACTORY PREFOCUS.** Signal Lamp M-283 is prefocused at the factory so that no focusing adjustment is ordinarily necessary in the field. The bulb has two fins which fit into the slots in the lamp sockets so that the filament cannot be located in an unfocused position. The socket is mounted on a shafted platform, the shaft of which is held in a fixed vertical position in relation to the socket mounting base by a setscrew and tapered pin (see fig. 17).

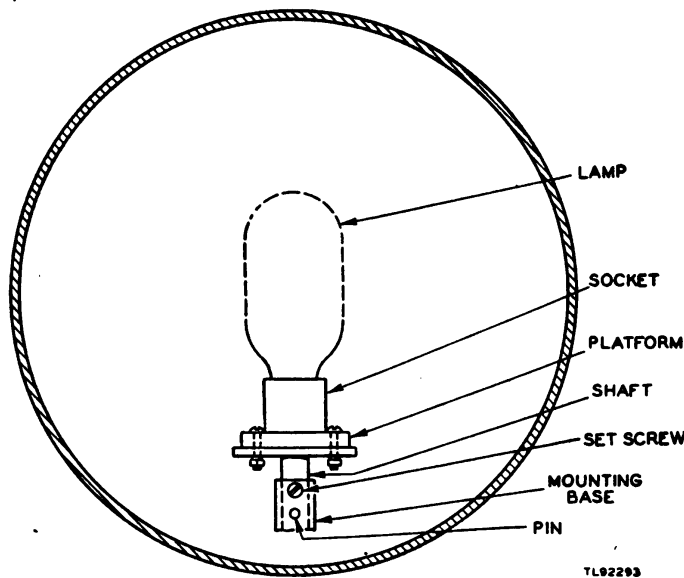


Figure 17. Signal Lamp M-283, lamp mounting.

b. **SIDELINE ADJUSTMENT.** The socket is bolted to the socket platform by two bolts. The bolts go through slotted holes and, if necessary, it is possible to adjust the position of the socket laterally by loosening these bolts and moving the socket. If the bolts are kept tight at all times no refocusing will be required. If refocusing does become necessary, the clear lens assembly must be removed for adjustment. Proceed as described in paragraph 28a. Depress the key and aim the beam at some object at least 400 feet away. Continue lateral adjustments of socket until the focused beam meets the requirements for proper focus as outlined in paragraph 28f and is aligned with the sights. Tighten the bolts securely when the proper focus is obtained.

### 30. Replacing Lamps

*Note.* The shape of the beam and the beam alignment will change slightly as the lamps are changed due to slight variations in the filaments of different lamps.

*a. GENERAL.* If no light flashes occur when the key is worked and the power cord is connected to the power source, check to see if the power cord is plugged securely into a live circuit. Check lamp cord and power cord for breaks. Check lamps visually to see if the filament is broken. If the filament is broken replace with spare lamp from the spare lamp compartment in Chest CH-24.

*b. LAMPS LM-20 AND LM-21.* To replace these lamps remove clear lens assembly and unscrew lamp from socket. Replace by screwing new Lamp LM-20 or LM-21 into socket and check focus.

*c. LAMPS LM-51, LM-51-A, LM-60, AND LM-60-A.* To replace these lamps remove clear lens assembly. Grip the lamp firmly and make a quarter turn counterclockwise until it lifts out of the socket. Place the new lamp in the socket with the smaller fin on the base of the lamp to the front. Press down and make a quarter turn clockwise.

### 31. Replacing Reflectors

*a. GENERAL.* The glass reflector on Signal Lamp M-124 may be broken by a severe jar. The metal reflector on Signal Lamp M-283 will very seldom need replacing. However, if the surface is damaged, replacement of the reflector will be necessary.

*b. PROCEDURE.* (1) Loosen four screws on clear lens assembly and remove assembly from lens housing. Do not take the four screws out of the assembly.

(2) Remove the lamp from the socket.

(3) Remove the three reflector retaining screw clips.

(4) Lift the reflector over the lamp socket mounting.

(5) Place new reflector in position.

*Caution:* Do not place fingers on reflector surface or scratch surface in passing reflector over socket.

(6) Screw on reflector retaining clips.

*Caution:* Do not allow screw driver to slip off the screws and scratch surface of the reflectors.

(7) Replace lamp and clean lens assembly.

### 32. Cleaning Reflectors

*a. GENERAL.* The reflector may become dusty or dirty due to improper handling. Fingerprints may smudge the surface. The reflector should be handled as little as possible.

*b. GLASS REFLECTOR IN SIGNAL LAMP M-124.*

(1) Brush dust from the reflector surface, using a camel's hair or other soft brush.



*Note.* Brush PH-70; (Signal Corps stock No. 8270). Brush PH-70-A (Signal Corps stock No. 8270A), or the brush (Signal Corps stock No. 6Z1402) that is a part of Tool Equipment TE-46 may be used.

(2) Soak fine absorbent cotton in ammonia water (Signal Corps stock No. 6G21) or any other suitable window cleaning fluid and rub very gently on the surface.

(3) Using dry absorbent cotton, rub gently on the surface until dry.

*c.* METAL REFLECTOR IN SIGNAL LAMP M-283.

(1) Brush dust from reflector, using a camel's hair or other soft brush. (See note in *b* above.)

(2) Soak fine absorbent cotton in ether and apply to surface of reflector.

(3) Make a paste out of a fine rouge or whiting and, using the same cotton pad as in paragraph (2) above, rub very gently on the surface until dry.

SECTION V

SUPPLEMENTARY DATA

33. Maintenance Parts List for Signal Lamp Equipment EE-80-A

a. SIGNAL LAMP M-283.

Ref. symbol	Signal Corps stock No.	Name of part and description	Quan. per unit	Running spares	Orgn. stock	3d ech.	4th ech.	5th ech.	Depot stock
Fig. 3.....	6B818A/B1.....	BRACKET: key box; cast aluminum; dwg SC-D-768-C; 8 lbs.; 1.5 cu ft; (supports key); Greenway Reflector Mfg. Co.	1				*	*	*
Fig. 16.....	3D171.....	CAPACITOR CA-171: 2-mf, 200-v d-c; 1.5 lbs; 0.05 cu ft; (limits line surge); WE Co., No. 147 A.	1				*	*	*
Fig. 2.....	6B818A/H4.....	GEAR HOUSING ASSEMBLY: dwg SC-D-7903, item 70; dwg SC-D-773; includes gear housing, handle, handwheel, plunger, shaft (dwg SC-D-733, item 6); spring (dwg SC-D-733, item 7); worm, and accessory hardware.	1					*	*
	3E7160-23.....	GROUND LEAD: dwg SC-D-15882; 8 ft; 1-conductor; No. 12 A.W.G.; Terminal TM-11 on one end, Patton-MacGuire terminal No. 2050 on other end.	1				*	*	*
Fig. 4.....	3Z3447.....	KEY J-47: telegraph; per dwg SC-D-2836; 1 lb; 0.015 cu ft.	1				*	*	*

Fig. 11.....	6B818A/L1.....	LENS: glass; clear; dwg SC-D-769-E; 3 lbs; 0.035 cu ft; Pirits Plate.	1	*	*	*	*	*
Fig. 5.....	6B818A/R2.....	REFLECTOR: mirror; metal; rhodium-plated; 12½" diam; 0.5 lb; 0.035 cu ft; Wendel, Inc.	1	*	*	*	*	*
	6B818A/P11.....	PAD: asbestos; 1¼" x ¾" x ⅛"; dwg SC-D-772-D, item 40; 1 oz; 0.001 cu ft; (reflector); Greenway.	3	*	*	*	*	*
	6B818A/P5.....	PAD: asbestos sleeving; 5/16" ID, 38½" long; dwg SC-D-791, item 9; (lens); 6 oz; 0.005 cu ft; Greenway.	1	*	*	*	*	*
Fig. 5.....	6B818A/S3.....	RECEPTACLE: lamp; 1 lb; 0.25 cu ft; GE No. 292380.	1	*	*	*	*	*
Fig. 1.....	6B818A/S1.....	SIGHT: front; cast brass; dwg SC-D-7903, item 21; dwg SC-D-798; 1 lb; 0.003 cu ft; Greenway.	1	*	*	*	*	*
Fig. 1.....	6B818A/S2.....	SIGHT: rear; cast brass; dwg SC-D-7903, item 23; dwg SC-D-7905, 1 lb; 0.003 cu ft; Greenway.	1	*	*	*	*	*
Fig. 1.....	6B818A/S10.....	SPRING: retaining; bronze; dwg SC-D-7903, item 14; dwg SC-D-770; 1 lb; 0.003 cu ft; (holds filter frame); Greenway.	1	*	*	*	*	*

\* Indicates stock available.

b. MISCELLANEOUS PARTS OF SIGNAL LAMP EQUIPMENT EE-80-A.

Ref. symbol	Signal Corps stock No.	Name of part and description	Quan. per unit	Running spares	Orgn. stock	3d ech.	4th ech.	5th ech.	Depot stock
Fig. 11	6B421	FILTER MC-121: green; in frame; dwg SC-D-791-C; 3 lbs; 0.035 cu ft; Corning.	1			*	*	*	*
Fig. 11	6B422	FILTER MC-122: red; in frame; dwg SC-D-790-E; 3 lbs; 0.035 cu ft; Corning.	1			*	*	*	*
	6B551A	LAMP LM-51-A: 165-w.	1	5		*	*	*	*
	6B560A	LAMP LM-60-A: 100-w.	1	5		*	*	*	*
	6B818A/P11	PAD: asbestos; 1 1/4" x 3/4" x 1/8"; dwg SC-D-772, item 40; (additional for filters); 1 oz; 0.001 cu ft; Greenway.	8			*	*	*	*
	6B818A/P5	PAD: asbestos sleeving; 5/16" ID, 38 1/2" long; dwg SC-D-791, item 9; (additional for filters); 6 oz; 0.005 cu ft; Greenway.	2			*	*	*	*
	2A3308	STAKE GP-8.	1						*
Fig. 7	6B1109	TRIPOD LG-9: dwg SC-D-792-D; 35 lbs; 2 cu ft; Greenway.	1						*

\* Indicates stock available.

★ U. S. Government Printing Office: 1944—608605.

