

KS-16789, L1 READER REQUIREMENTS AND ADJUSTING PROCEDURES

1. GENERAL

1.01 This section covers the KS-16789, L1 reader.

1.02 Reference shall be made to Section 020-010-711 covering general requirements and definitions for additional information necessary for the proper application of the requirements listed herein.

1.03 The KS-16789, L1 reader is used for reading the 35mm traffic register films used in the KS-14776 traffic register camera. The reader, shown in Fig. 1 and 2, consists of a projector, two reflecting mirrors, and a viewing screen mounted in a cabinet. The 6-volt projection lamp operates through a transformer from the 120-volt, 60-cycle supply.

1.04 Before starting work on the reader, disconnect the reader from the ac supply by removing the plug of the power cord from the socket.

1.05 When not in use, cover the reader with the plastic dust cover furnished.

1.06 The method of operating the reader is covered in Part 4 as a matter of information.

1.07 Requirements 2.07, 2.08, and 2.09 should be checked with the eyes approximately 18 inches from the viewing screen and in line with the center point of the screen. To facilitate eye alignment with the center point, adjust the front legs of the reader.

2. REQUIREMENTS

2.01 *Cleaning*

(a) Both glass plates of the film holder (Fig. 1) shall be cleaned daily prior to using the reader.

(b) The following parts (Fig. 1 and 2) shall be cleaned monthly.

Reflecting Mirrors

Viewing Screen Assembly (front and back surfaces only)

Reflector

Projection Lens

Condensing Lens

(c) The external surfaces of the cabinet and projector shall be cleaned when necessary.

Gauge by eye.

(d) Both surfaces of the fresnel lens and the inner surfaces of the screen and the backing plate (viewing screen assembly Fig. 2) shall be cleaned only when absolutely necessary.

Gauge by eye.

2.02 *Mounting of Parts:* All parts shall be securely mounted in the cabinet.

Gauge by feel, taking care not to put the fingers on optical surfaces of mirrors, lenses, and viewing screen assembly.

2.03 *Movement of Vertical Scanning Lever:*

The force required to move the vertical scanning lever in either direction from any position shall be

Min 250 grams

Max 450 grams

Use No. 79B gauge.

To check this requirement, apply the finger of the gauge to the vertical portion of the scanning lever.

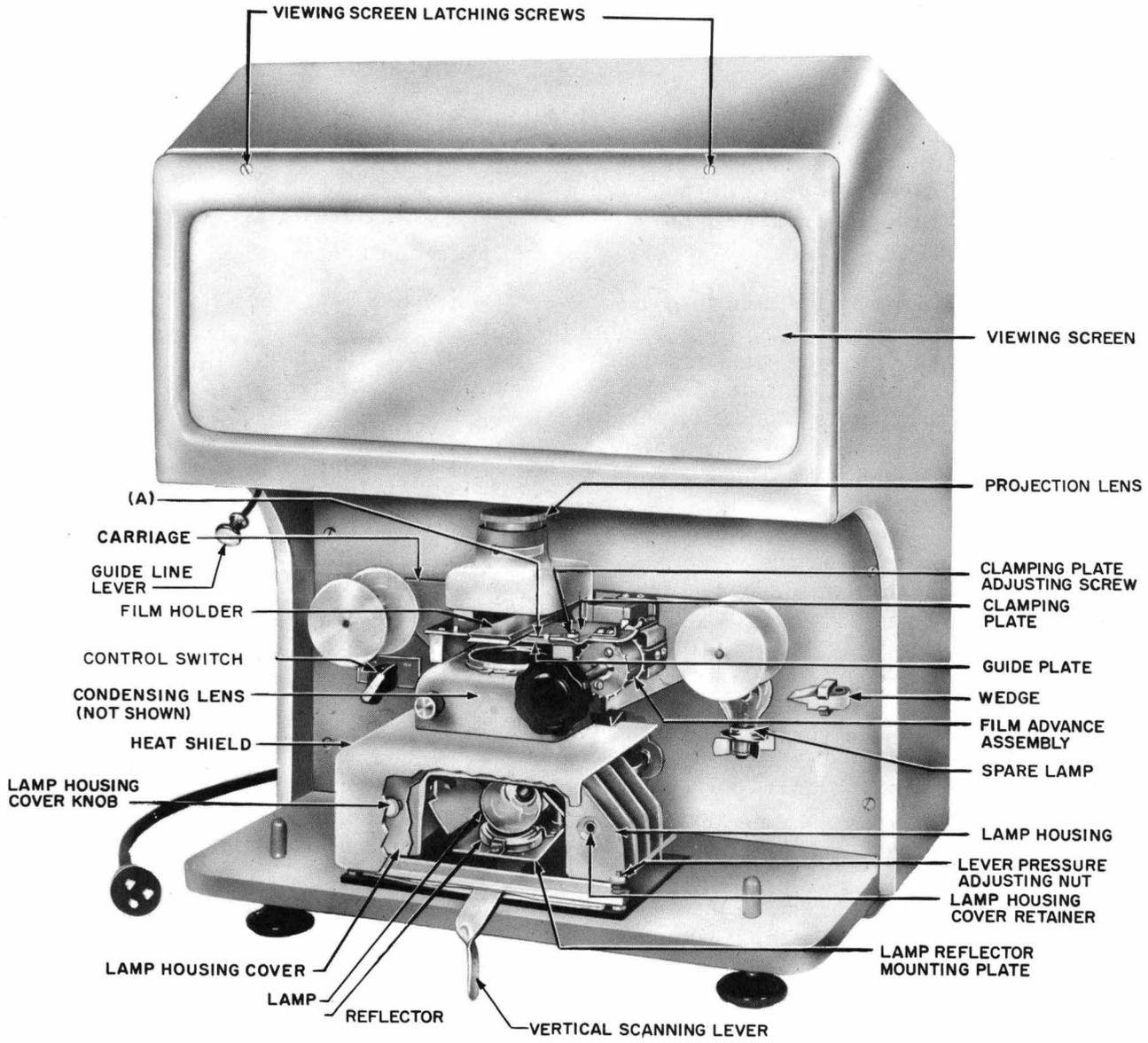


Fig. 1 - KS-16789, L1 Reader

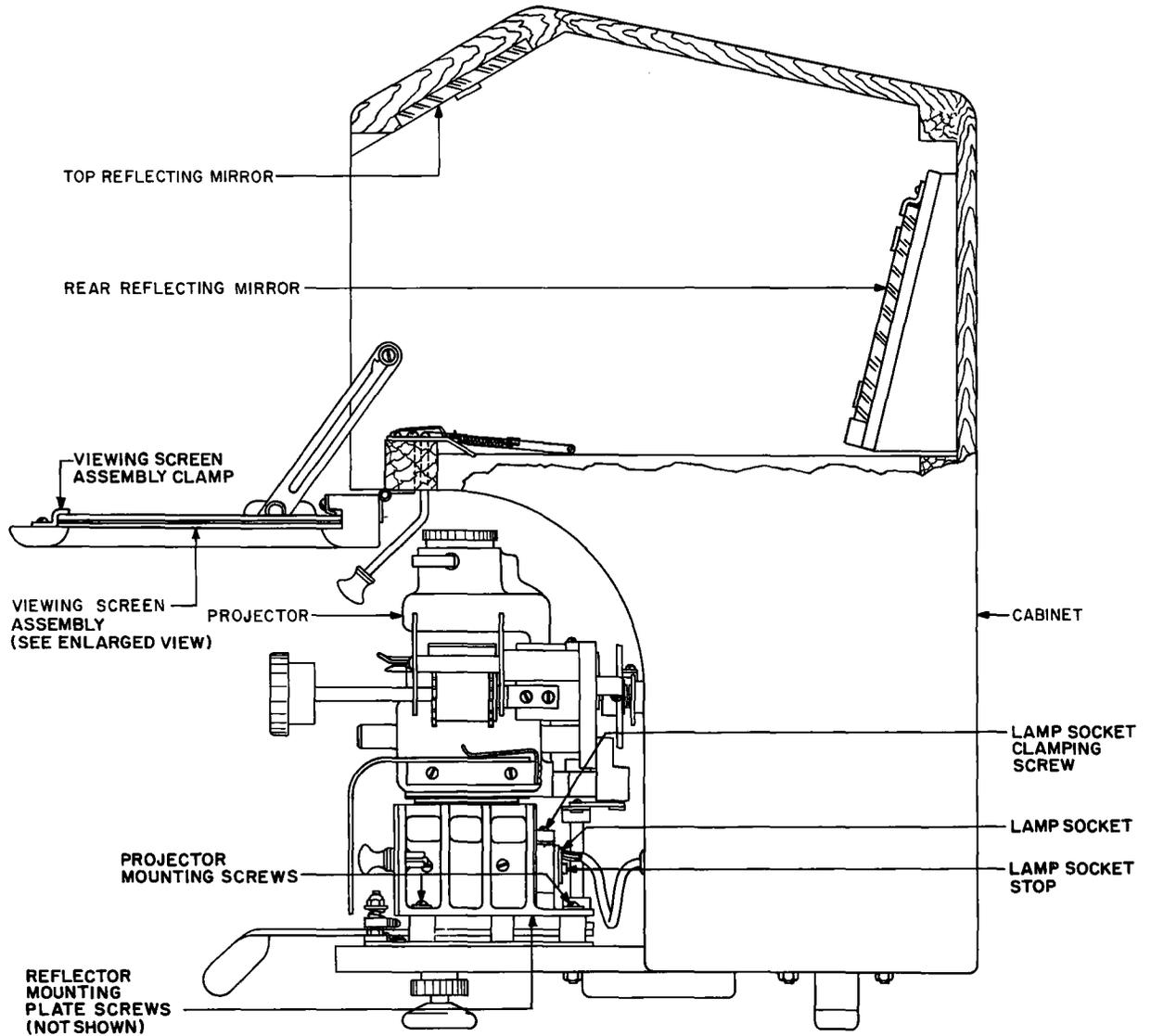
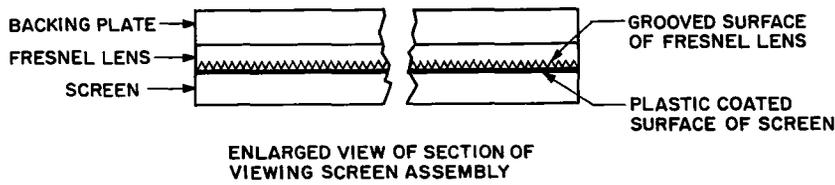


Fig. 2 - KS-16789, LI Reader - View Showing Reflecting Mirrors and Viewing Screen Assembly

2.04 Separation Between Clamping and Guide Plates: Fig. 1(A) — With the clamping plate in the lowered position, the separation between the clamping and guide plates shall be

- Min 0.010 inch
- Max 0.015 inch

Use No. 74D gauge.

To check this requirement, insert the full length of the gauge between the plates at a point adjacent to the film holder.

2.05 Clamping Plate Spring Tension: The tension of the clamping plate spring shall be sufficient to hold the plate reliably in either the raised or lowered position.

Gauge by eye and feel.

2.06 Freedom of Movement of Film Advance Assembly

- (a) The film advance assembly shall rotate in either direction without bind.

Gauge by feel.

- (b) The film advance assembly shaft shall move from its innermost to its outermost position without bind.

Gauge by eye.

2.07 Illumination of Viewing Screen: With no film in the film holder, the following requirements shall be met.

- (a) The intensity of illumination of the viewing screen shall diminish slightly and uniformly from the central portion to each side of the screen.

Gauge by eye from the position described in 1.07.

- (b) No streaks or spots shall be projected on the viewing screen.

Gauge by eye from the position described in 1.07.

2.08 Quality of Image on Viewing Screen: With a processed film of satisfactory quality in the film holder and properly focused on

the viewing screen, all register numerals projected on the screen shall be legible.

Gauge by eye from the position described in 1.07.

2.09 Reflection of External Lighting in Viewing Screen: There shall be no reflections of external lighting in the viewing screen which cause difficulty in reading the projected numerals.

Gauge by eye from the position described in 1.07.

2.10 Alignment of Filament and Filament Image: Fig. 3(A) — When viewed through the projection lens, the separation between the adjacent parallel legs of the filament and filament image shall be approximately one-third the width of the leg of the filament.

Gauge by eye.

To check this requirement, remove the projector from the cabinet as covered in 3.06(2). Observe the relation between the filament and filament image with the eye directly over the projection lens.

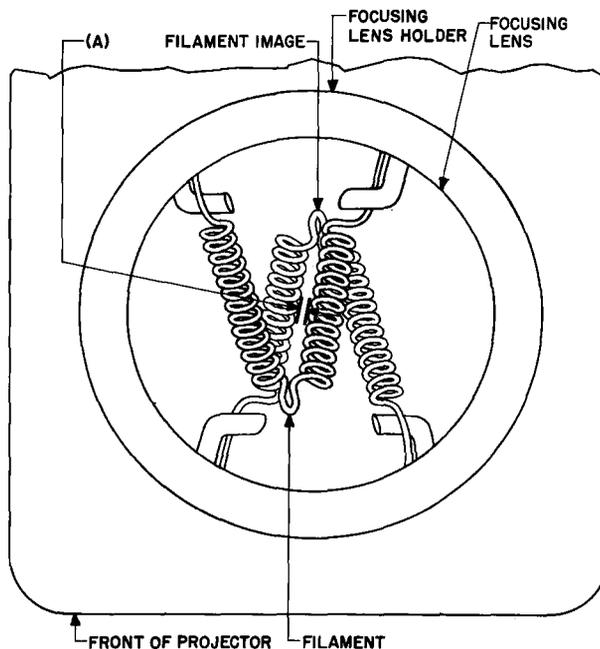


Fig. 3 — Alignment of Filament and Image of Filament in Reflector As Viewed Through Focusing Lens

3. PROCEDURES

3.001 *List of Tools, Gauges, and Materials*

CODE OR SPEC. NO.	DESCRIPTION
TOOLS	
417A	1/4 and 3/8-inch Hex. Open Double-End Flat Wrench
R-2959	1/16-inch Allen Wrench
R-2961	0.050-inch Allen Wrench
—	3-inch Cabinet Screwdriver
—	No. 2 Truarc Pliers, 90 degree Bent Tip, Waldes Kohinoor, Inc
GAUGES	
74D	Gauge
79B	0-1000 Gram Push-Pull Tension Gauge
MATERIALS	
KS-2423	Cloth
KS-7860	Petroleum Spirits
KS-14666	Cloth
—	Cotton Swabs (obtain locally)
—	Guildcraft Lens Spray Cleaner
—	Detergent, Dreft or equivalent (obtain locally)

3.002 In handling the film holder, mirrors, lens, and viewing screen assembly, take care to avoid putting the fingers on the optical surfaces.

3.01 *Cleaning* (Reqt 2.01)

(1) **Film Holder:** The film holder consists of two glass plates separated by an 0.008-inch shim and held in position by a spring directly above the upper plate. To clean the surfaces of the glass plates proceed as follows.

- (a) Grasp the edges of both glass plates and gently pull them outward from the projector.
- (b) Wipe both surfaces of each plate with a clean KS-2423 cloth moistened with lens spray cleaner. Polish the surfaces with a clean, dry KS-2423 cloth.
- (c) After cleaning both plates, remount the film holder so that the shim attached to one of the plates is against the other plate

and the inner ends of the bevelled edges are adjacent to each other.

(2) *Reflecting Mirrors*

- (a) Using the 3-inch cabinet screwdriver, disengage the viewing screen latching screws and lower the screen to the horizontal position.
- (b) Wipe the surfaces of the mirrors with a clean KS-2423 cloth moistened with lens spray cleaner. Polish the surfaces with a clean, dry KS-2423 cloth.
- (c) Swing the viewing screen frame upward and engage the latching screws.

(3) **Viewing Screen Assembly:** (Fig. 2) — If only the front and back surfaces of the viewing screen assembly are to be cleaned, proceed as covered in (a) through (c). If it is necessary to clean the fresnel lens and the inner surfaces of the screen and backing plate, proceed as covered in (d) through (j).

Cleaning Front and Back Surfaces of Viewing Screen Assembly

- (a) Using the 3-inch cabinet screwdriver, disengage the viewing screen latching screws and lower the viewing screen to the horizontal position.
- (b) Wipe the back surface of the viewing screen assembly (backing plate) with a clean KS-2423 cloth moistened with lens spray cleaner. Polish the surface with a clean, dry KS-2423 cloth.

Caution: *Avoid any excess of lens spray cleaner on the KS-2423 cloth which might flow to the inner surfaces of the screen or backing plate.*

- (c) Swing the screen upward and engage the latching screws. Clean the front surface as covered in (b).

Cleaning Fresnel Lens and Inner Surfaces of Screen and Backing Plate

- (d) Lower the viewing screen to the horizontal position as covered in (a).

(e) Remove the viewing screen assembly clamp screws, using the 3-inch cabinet screwdriver, and remove the clamps.

(f) Remove the viewing screen assembly from the frame and place it on a flat surface covered with several clean KS-14666 cloths to prevent scratching the assembly. Separate the parts of the assembly noting the position of the plastic-coated surface of the screen with reference to the fresnel lens.

(g) Clean the inner surfaces of the screen and the backing plate as covered in (b).

(h) Wipe both surfaces of the fresnel lens with a clean cotton swab moistened with lens spray cleaner, taking care to wipe the grooved surface of the lens along the grooves. Then similarly polish the surfaces with a clean, dry cotton swab.

(i) To remount the screen assembly, proceed as follows. Place the screen on the KS-14666 cloths with the plastic-coated surface upward if this surface was adjacent to the fresnel lens or downward if it was away from the lens [see (f)]. Place the fresnel lens on the screen so that the grooved surface of the lens is against the screen and the notch is at the lower right corner. Then place the backing plate on the lens. Handling the screen assembly by its edges, mount the assembly in the frame so that the notch in the fresnel lens is at the right front corner. Remount the clamps and tighten the clamp screws.

(j) Clean the front and back surfaces of the screen as covered in (b) and (c) if necessary.

(4) Lenses

(a) **Projection Lens:** Unscrew the projection lens (counterclockwise) and remove it from the projector. Wipe both surfaces of the lens with a clean KS-2423 cloth moistened with lens spray cleaner. Polish the lens with a clean, dry KS-2423 cloth. Remount the lens.

(b) **Condensing Lens:** Remove the film holder as covered in (1)(a). Remove the heat shield and lamp housing cover by care-

fully pulling them outward from the projector. Remove the lamp by pushing it inward and then turning it counterclockwise to disengage it from the socket. Wipe the upper and lower surfaces of the lens with a clean cotton swab moistened with lens spray cleaner. Polish the lens with a clean, dry cotton swab. Remount the parts in reverse order of removal.

(5) **Reflector:** Remove the heat shield, lamp housing cover, and the lamp as covered in (4)(b). Wipe the reflector with a clean cotton swab moistened with lens spray cleaner. Polish the reflector with a clean, dry cotton swab. Remount the parts in reverse order of removal.

(6) **External Surfaces of Cabinet and Projector:** Dip a clean KS-2423 cloth in a mixture of a detergent such as Dreft and water consisting of 1 teaspoonful of detergent to 1 quart of clean water. Remove excess moisture from the cloth. Wipe the external surface of the cabinet and projector with the moistened cloth. Then wipe the surfaces with a clean, dry KS-2423 cloth.

Caution: When cleaning the viewing screen frame, avoid any excess liquid on the KS-2423 cloth which might flow to the inner surfaces of the screen or backing plate.

3.02 Mounting of Parts (Reqt 2.02)

(1) Tighten all loose mounting screws and nuts using the screwdriver or wrench required.

3.03 Movement of Vertical Scanning Lever (Reqt 2.03)

(1) Using the No. 417A wrench, turn the lever pressure adjusting nuts clockwise to increase the force to move the lever and counterclockwise to decrease the force. Turn both nuts approximately the same amount.

3.04 Separation Between Clamping and Guide Plates (Reqt 2.04)

(1) If the requirement is not met, loosen the clamping plate adjusting screw locknut with the No. 417A wrench. Using the R-2961 wrench, turn the adjusting screw clockwise to increase the separation and counterclockwise

to decrease the separation. Securely tighten the locknut and recheck the requirement.

3.05 Clamping Plate Spring Tension
(Reqt 2.05)

- (1) If the requirement is not met, replace the spring.

3.06 Freedom of Movement of Film Advance Assembly (Reqt 2.06)

- (1) If the requirement is not met, remove the projector from the cabinet as covered in (2) and the film advance assembly from the projector as covered in (3). Clean the parts as covered in (4).

(2) **Removing Projector From Cabinet:** Remove the projector mounting screws located adjacent to the front and rear cooling fins, using the 3-inch cabinet screwdriver. Remove the lamp cord plug from its socket. Carefully remove the projector from the cabinet.

(3) **Removing Film Advance Assembly From Projector**

- (a) Using the R-2959 wrench, loosen the setscrew in the cam at the rear of the projector. Slide the cam and associated gear off the shaft.
- (b) Remove the retaining ring adjacent to the shaft bearing, using the No. 2 Truarc pliers.
- (c) Using the 3-inch cabinet screwdriver, remove the two screws adjacent to the shaft which mount the spring housing.
- (d) Remove the shaft and associated parts from the front of the projector. Remove the spring from the shaft. If the spring is defective, replace it.
- (e) Using the No. 2 Truarc pliers, remove the retaining ring in the front of the sprocket assembly.
- (f) Disengage the sprocket assembly mounting screws from the sprocket mounting bushing using the 3-inch cabinet screwdriver. Slide the sprocket assembly toward the knob, holding the assembly together with the screws. Remove the Woodruff key. Slide the remaining parts of the assembly toward the knob.

(4) **Cleaning Parts:** Clean the shaft, the shaft bearing in the projector frame, and the spring with a clean KS-2423 cloth moistened with KS-7860 petroleum spirits. Then wipe the parts with a clean, dry KS-2423 cloth.

(5) **Remounting Parts:** Remount the film advance assembly parts in reverse order of removal. When remounting the sprocket assembly, make sure that the teeth of the front and rear sprocket are in alignment. Also make sure that the detent spring mounted on the gear engages the cam and that the retaining pawl engages the gear when the assembly is in its outermost position.

3.07 Illumination of Viewing Screen
(Reqt 2.07)

- (1) If the requirement is not met, clean the film holder, mirrors, lenses, and viewing screen assembly as covered in 3.01. If, after cleaning the requirement is not met, replace the lamp. If after replacing the lamp, the requirement still is not met, check requirement 2.10.

3.08 Quality of Image on Viewing Screen
(Reqt 2.08)

- (1) If the requirement is not met, check requirement 2.09. If this requirement is met, clean the film holder, mirrors, lenses, and viewing screen as covered in 3.01. If after cleaning the requirement still is not met, check requirement 2.07.

3.09 Reflection of External Lighting in Viewing Screen (Reqt 2.09)

- (1) If the requirement is not met, relocate the reader to eliminate objectionable reflections. If this is not practical or effective, remove the viewing screen assembly from the cabinet as covered in 3.01(3)(d) through (3)(f). Reverse the screen so that the plastic-coated surface faces outward. Reassemble and remount the viewing screen assembly as covered in 3.01(3)(i). Clean the viewing screen as covered in 3.01(3)(a) through (3)(c).

3.10 Alignment of Filament and Filament Image (Reqt 2.10)

- (1) If the requirement is not met, remove the heat shield and lamp housing cover from the projector.

(2) Using the 3-inch cabinet screwdriver, loosen the lamp socket clamping screw (Fig. 2). Push the lamp socket against its stop. While holding the socket in this position, securely tighten the clamping screw.

(3) Using the 3-inch cabinet screwdriver, loosen the reflector mirror mounting plate screws so that they hold the plate lightly. Manually shift the plate to meet the requirement. Securely tighten the screws and recheck the requirement.

(4) Remount the projector in the cabinet and insert the lamp cord plug in the socket.

4. METHOD OF OPERATING KS-16789 READER

4.01 Preparation of Reader: Insert the plug of the power cord into a 120-volt 60-cycle ac outlet. Operate the control switch to HI. If in using the reader, it is desired to reduce the brightness of the image, rotate the control switch to the MED (medium) or LOW (low) position.

4.02 Loading Film in Reader

(a) **General:** Load all film in reader with the dull side up. Start film from normal cameras at left side of reader and film from upside-down cameras at the right side. See local instructions for identifying film.

(b) Move clamping plate on projector to raised position.

(c) Pull outer disc off left spindle for normal film or right spindle for upside-down film. Place roll or reel of film on the spindle so that when the film is inserted between the glass plates of the film holder the dull side will be up. Then remount the disc on the spindle.

(d) Pass the film between the glass plates and under the clamping plate making sure that the film perforations engage the film advance sprockets. Lower the clamping plate.

4.03 Positioning and Focusing Image on Viewing Screen: The following procedures should be performed with the operator's eyes approximately 18 inches from the viewing screen and in line with the center point of the screen.

To facilitate eye alignment with the center point adjust the front legs of the reader.

(a) **Centering Image Horizontally:** With the vertical scanning lever in its midposition, push the film advance knob inward, then turn it until the image is centered on the screen. Release the knob. Jiggle the knob slightly to insure that the retaining pawl engages the gear on the inner end of the shaft. This is essential in order to obtain proper indexing when advancing the film.

(b) **Focusing Image:** Rotate the projection lens holder until maximum image sharpness is obtained.

(c) Positioning Image Vertically

(1) The viewing screen is wide enough for projection of a full horizontal row of ten registers. However, the height of the screen accommodates only five rows simultaneously. A complete frame of the film includes 15 rows of registers and the designation strip.

(2) To scan the complete frame, move the vertical scanning lever to the right or left as required to project the designation strip and desired rows of registers. A complete frame can be scanned in a minimum of four steps (positions of the scanning lever). If desired, the top or bottom edge of the screen or the central guide line of the screen may be used as reference lines in reading individual rows by positioning the image accordingly. To project the central guide line on the screen, push in the guide lever located below the left corner of the screen.

4.04 Advancing Film: To advance the film one frame, turn the film advance knob in either direction to its next indexed position.

4.05 Spliced Film

(a) To pass a splice in the film through the film holder, increase the separation between the glass plates of the film holder using the wedge mounted next to the spare lamp. Insert the wedge between the bevelled edges of the glass plates.

(b) After passing the splice between the film holder, remove the wedge and recenter the image as covered in 4.03(a).