USE OF MICROFILM DOCUMENTS AND VIEWERS

CONTENTS

1. GENERAL INFORMATION

1.1 Definition

1.11 Microfilm aperture card - a "computer card" measuring 3-1/4" wide, 7-3/8" long, containing an aperature or window of 35 mm film. The window contains one sheet or page of a document.

1.12 Microfiche - a piece of film usually measuring 4" x 6" containing many sheets or pages of a document.

1.2 Standard Drawings

1.21 E.F.I. Orders

1.211 Standard T, J, H, and ED drawings will be provided on microfilm aperture cards. SD, CCED, and Job or Base T drawings as well as the CCS and DCS documents will be provided on paper.

1.22 T.C.E. Orders

1.221 The Operating Company Engineering Organization has an option to specify whether the standard T, J, H, & ED drawings be provided on paper or on microfilm aperture cards.

1.23 T drawings for 1A technology products, such as the 1A Processor for ESS, will be furnished to the field on microfiche but not listed in the 099 spec. These T drawings are point to point manufacturing wiring lists and contain no notes, sketches, or other information normally required by the Installer. (Installer information is on the J and ED drawings.) The T drawings are furnished as an aid in troubleshooting and are NOT to be turned over to the wire chief after the job is completed.

1.24 When a standard drawing is issued by a PECC, the original tracing is photographed by a precision 35 mm camera. This photographic negative is called a microfilm silver and is used as a "master" to produce diazo negatives which are sent to Installation in aperture cards as shown in Figure 1. Standard drawings are sent to Installation from Hawthorne or Kearny in accordance with the chart below.

Second Suffix of Order No.	Specification No.	Reproduction Shop
A-J	001-099	Hawthorne
all	300-999	Hawthorne
K-Z	001-099	Kearny
all	100-299	Kearny

1.241 Information on aperture cards produced at Hawthorne will be in the format shown in Figure 1.

1.242 Information on aperture cards produced at Kearny will be in the format shown in Figure 2.

1.25 The information shown in the title strip of the aperture cards in Figures 1 and 2 is self explanatory and is identical to the information that is shown on the select ticket of a paper print. A manufacturing serial number is assigned to each aperture card. All the drawings for one Order Number are in continuous numerical sequence by the serial number. This serialization (5-6 digits) of drawings permits all the drawings associated with a particular order to be mechanically sorted for shipment. This serial number can also be used by Installation for filing purposes. The right side or correct side of the aperture card is the side which contains a recognizable standard drawing number in the "drawing and sheet number" portion of the title strip. The reverse side of the aperture card may contain some printing in the title strip which will be meaningless.

1.26 A one to one correspondence exists between sheets of paper drawings and microfilm aperture cards. Paper prints are produced from the microfilm aperture cards now being provided to Installation.

1.261 The practices that apply to the reading and format of paper drawings apply to drawings used on microfilm. The blank area of the card which has the punched information may be used for notes. For example, the numbers of the relevant figures shown on a particular sheet can be noted during analyzation for later reference.

1.27 All aperture cards will have negative images (light lines on a dark background) and will be free of scratches, foreign material, stains, or defects which make drawing information illegible.

1.271 If Installation receives a drawing (microfilm or paper) which is illegible or of poor quality, the manufacturing location responsible for producing the drawing (see Paragraph 1.23) should be notified and requested to replace the drawing immediately. For drawings produced at Kearny, call 8-223 (201) 344-2487. For drawings produced at Hawthorne, call 8-354 (312) 494-3800.

1.3 File Maintenance

1.31 When microfilm drawings are received they should be verified with the shipping ticket to ascertain that all sheets have been received, just as with paper prints. Once the file has been checked, a diagonal line should be drawn across the top of the card deck with a felt tipped pen. This will make it easier to refile cards and provide a quick visual check that all cards are filed correctly.

1.32 Index cards (3" X 5") may be used on end to separate the ED, H, J, and T drawings. Several extra cards should be kept with the file for use as markers to show where drawings were removed. This makes refiling easier and, if the Installer removing the drawing shows his name on the card, makes it possible for someone else needing the drawing to find it.

1.33 It is imperative that the Installers replace all cards in the file when they are finished using them. These cards are small and can be easily misplaced.

2. R-4523 LARGE DESK TOP MICROFILM VIEWER - OPERATION AND MAINTENANCE

The R-4523 Viewer is used on a desk or table top at jobs, or stages of a job, which require a significant amount of referencing drawings such as the analyzation stage of a job involving several hundred frames or manweeks.

2.1 Operating Features of the R-4523 Viewer - The operating features of the R-4523 are shown in FIG. 3 and are described below:

2.11 Screen - The drawing is projected onto and read off of the screen.

2.12 ON-OFF Switch - The R-4523 is powered by 120 Volts AC 60 Hz and is turned on or off by the use of this switch.

2.13 Hi-Lo Intensity Switch - The difference in intensity (brightness) offered by the Hi and Lo positions is minimal. It is recommended that the viewer lamp be operated on the low intensity position to increase lamp life.

2.14 Microfilm Carrier - The carrier consists of two pieces of ground glass which open automatically for insertion of the microfilm between them when the handle is pulled towards the user. The handle is also used for maneuvering the carrier in order to view different areas of the drawing.

2.141 The carrier is large enough to hold two cards at once by overlapping them. This feature can be used for analysis using T drawings by putting the card with Table D, "Location of Figures and Options", in the back of the carrier. It is then possible to determine which sheets are needed and reference them without removing the index.

2.15 Focus Control Knob - By rotating this knob clockwise or counter-clockwise, the image is brought into focus on the screen.

2.16 Microfilm Carrier Carriage - The microfilm carrier slides "in and out" on grooves in the carrier carriage. The carrier carriage, in turn, slides sideways on the tracks built into the viewer base.

2.2 Operation of the R-4523 Viewer

2.21 Plug power cord into any 120V AC grounded outlet.

2.22 Using the microfilm carrier handle, pull the carrier towards you until the upper glass flat opens automatically. Take the aperture card with right side up (see Paragraph 1.25) and with the title strip edge of the card towards you, insert it between the glass flats and against the back edge.

2.23 Set the ON-OFF switch to the "On" position.

2.24 Set the Hi-Lo intensity switch to the "Lo" position.

2.25 Push the carrier back into the viewer until an image appears, centered on the screen. It may be necessary to push the carrier handle sideways for the image to appear.

2.26 Turn focus control knob clockwise or counterclockwise until the image is sharp.

NOTE: Do not pull focus control knob towards you; focus control shaft may disengage from lens (see Paragraph 2.322).

2.27 Various areas of the drawing can be viewed by moving the microfilm carrier in and out and sideways.

2.3 Field Maintenance of the R-4523 Viewer

2.31 Cleaning

2.311 Screen - Surface dust can be removed with a soft, lintless cloth. Screen may also be washed with mild soap and water. Use a soft cloth or cellulose sponge, rinse and blot dry. To remove the screen for cleaning, grasp lift tab, (on bottom of screen) lift up, swing out and remove.

CAUTION: WHEN REMOVING, CLEANING AND REINSERTING, HANDLE THE SCREEN VERY CAREFULLY BY THE EDGES. FINGERPRINTS ON THE COATED (REVERSE) SIDE ARE VIRTUALLY IMPOSSIBLE TO REMOVE.

To reinsert the screen reverse the procedure used to remove the screen.

2.312 Microfilm Carrier Glass - To remove the microfilm carrier for cleaning push the carrier in all the way. At the rear of the viewer (Figure 4) lift up the aluminum hinge plate with one hand and with the other hand turn the carrier stop screw out until none of the threads are projecting beneath the carrier carriage. Go to the front of the viewer and pull the carrier completely out.

CAUTION: HANDLE CAREFULLY TO AVOID BREAKAGE.

Fingerprints and smudges can be removed with a non-abrasive glass cleaner and tissue. To reinsert carrier, simply slide carrier into groves on carrier and push all the way back. Be sure to go to the rear of the viewer and retighten the carrier stop screw.

2.313 Two mirrors will be exposed if the screen is removed. Cleaning is NOT recommended since the surfaces are easily scratched.

2.32 Replacing Components

2.321 Lamp - Set ON-OFF switch to OFF and disconnect power cord from the outlet. Push microfilm carrier to the rear. Carefully tilt viewer backwards until it rests on its back. Using a coin (or a screwdriver) loosen screw and remove lamp cover door (Figure 5). On the inside of the lamp cover door is a spare bulb. Remove the bulb from its holder. Raise the cover plate, (Figure 6) push lever to eject lamp, grasp and remove.

WARNING: PERMIT LAMP TO COOL BEFORE TOUCHING.

Return ejection lever to its original position before inserting new bulb.

CAUTION: HANDLE REPLACEMENT LAMP WITH ITS WRAPPER TO AVOID FINGERPRINTS ON THE GLASS.

Fingerprints can be etched in by heat and cause premature lamp failure. Install new lamp by pushing into socket until firmly seated. Lower the cover plate, replace lamp cover down and tighten screw. Carefully return viewer to its upright position and reconnect power cord. Notify your Supervisor that you replaced the bulb so he can order another spare bulb. (Installation Ordering No. 23452307).

2.322 Lens - If during normal use of the viewer you should happen to pull out on the focus control knob, it is possible that the focus control shaft could become disengaged from the lens unit. If this happens, remove the screen (Paragraph 2.311) pull back on the focus control knob (spring loaded) and lift up on the lens unit until you see the small hole in the front of the lens unit (Figure 7). With the small hole facing you, lower the lens unit and engage the pin on the end of the focus control shaft with the hole in the front of the lens unit. It may be necessary to manipulate lens unit and focus control shaft slightly to achieve proper engagement. Release the focus control knob and reinsert screen.

2.4 Handling the R-4523 Viewer

2.41 The R-4523 Viewer is a precision optical instrument; please handle the unit and all component parts with care.

3. R-4524 PORTABLE DUAL PURPOSE MICROFILM VIEWER - OPERATION AND MAINTENANCE

The R-4524 Viewer is a lightweight viewer designed to be used at the Installer's work location by using the universal clamp to attach it to the framework. By detaching the universal clamp, the viewer can be used on a desk or table top as a conventional viewer. The Installer can use the area immediately below and in front of the blue plastic filter as a temporary storage area for microfilm cards.

3.1 Operating Features of the R-4524 Viewer - The operating features of the R-4524 are shown on Figure 8 and are described below:

3.11 ON-OFF Switch - The R-4524 is powered by 120 volts AC, 60 Hz and is turned on or off by the use of this switch.

3.12 Focus Lever - By moving this lever, the image is brought into focus on the screen.

3.13 Film Carriage - The microfilm is supported by the film carriage.

3.14 Loading Slot - The microfilm is manually fed into this slot until it reaches a drive roller.

3.15 Carriage Control Knob - By rotating this knob, clockwise or counterclockwise, the drive rollers are engaged to move the microfilm image horizontally. By pushing or pulling on the carriage control knob, the drawing image is moved vertically.

3.16 Screen - The surface at the rear of the viewer on which the drawing image appears.

3.17 Elevator Control - By using this control the angle of viewing can be adjusted to any of ten positions when the viewer is sitting on a flat surface. It also provides access to the interior of the viewer for maintenance.

3.18 Quick Connect Coupler - The coupler provides a means of quickly attaching or detaching the universal clamp.

3.19 Universal Clamp - The quick adjusting C clamp and attached gooseneck provide a means of using the viewer at the Installer's work location.

3.2 Operation of the R-4524 Viewer

3.21 Plug the power cord into any 120 V A.C. grounded outlet and turn the viewer "ON".

WARNING: UNPLUG WHEN NOT IN USE

3.22 Pull out on the carriage control knob until the carriage protrudes 2" to 2-1/2".

3.23 Take the microfilm right side up (see Paragraph 1.25) and with the title strip edge of the card towards you insert the card into the loading slot until it reaches a drive roller.

3.24 Turn the carriage control knob (clockwise if you inserted the card from the right side of the viewer) to "pull" the microfilm into the viewing plane. The drawing can be scanned by pushing and pulling on the carriage control knob while turning the knob clockwise and counterclockwise.

3.25 The image can be focused by adjusting the focus lever located on the right side of the viewer, opposite the ON-OFF switch.

3.26 When the viewer is sitting on a desk or table top, the viewing angle can be adjusted by squeezing the two tabs of the elevation control together and lifting up. When the viewer is in the desired position, release the elevator control. This feature is especially useful when standing while reading off the viewer located on a table.

3.27 To use the viewer at or near the work location, depress the sleeve on the quick connect coupler and insert the male end of the universal clamp into the coupler. Release the sleeve and test the universal clamp to make sure it is connected to the viewer.

3.28 Clamp the viewer to the framework bending the gooseneck to position the viewer. The gooseneck is not capable of holding the viewer straight out but is designed to hang the viewer. Select a horizontal or vertical part of the framework such that the viewer will naturally hang at the desired height.

3.29 When using the viewer on a desk or table top, the universal clamp should be disconnected by depressing the sleeve of the quick connect coupler and removing the universal clamp.

3.3 Field Maintenance of the R-4524 Viewer

3.31 Cleaning

3.311 The external surfaces of the viewer should be dusted occasionally with a dry soft lintless cloth. Be careful not to scratch the blue filter.

3.312 The film carriage can be removed by a slight additional pull on the carriage control knob. Clean the glass and drive rollers with a soft lintless cloth, dampened if necessary. Replace the carriage in the reader. An extra push is required to get the carriage started into position.

3.32 Replacing Lamp

3.321 Access to the lamp can be gained by squeezing the tabs of the elevator control and lifting up and swinging the viewer back onto the table top. Remove the lamp by pushing it in towards the base of the socket, turning it counterclockwise, and then pulling it straight out of its socket.

3.322 Clean the reflector (Figure 9) and exposed surface of the condenser with a soft lintless cloth.

3.323 A spare bulb is included in the bulb compartment (Figure 9). The lamp is a 12 volt, automotive lamp, G.E. 1004 or equivalent. Obtain a replacement for the spare bulb at a local automobile parts store or service station.

3.324 Holding the new lamp so that its locating pins will engage the slots in the socket, push the lamp into the socket and turn it clockwise to lock it in place.

3.325 Because lamps vary, it may be necessary to change the lamp position to obtain the most uniform screen illumination. Note that a locating finger, extending from the socket mounting bracket, is seated in one of five notches in the base. To change the lamp position, pull upward on the end of the socket so that the finger clears the notch and then rotate the socket to move the finger to a new notch position. Turn on the switch and observe the screen; then quickly move the finger to the other notches, observing the screen illumination at each position, setting the finger in the notch which provides the most uniform screen illumination. If none of the notch positions provides satisfactory illumination, remove the lamp, rotate it 180 degrees, and replace it in the socket. Repeat the illumination check. If it is still unacceptable, install another lamp.

3.326 Return the viewer to its normal upright operating position.

3.4 Handling the R-4524 Viewer

3.41 The R-4525 Viewer is ruggedly constructed. It is, however, a precision optical instrument so handle the unit and all component parts with care.

4. R-4551 LIST 1 LARGE DESK TOP MICROFILM VIEWER - OPERATION AND MAINTENANCE

4.1 The R-4551 Viewer is used on a desk or table top at jobs or stages of a job, which require a significant amount of referencing drawings such as the analyzation stage of a job involving several hundred frames or manweeks.

4.2 Operating Features of the R-4551 List 1 Viewer - The operating features of the R-4551 List 1 are shown on Figure 10 and are described below:

4.21 ON-OFF Switch - The R-4551 List 1 is powered by 120 volts A.C., 60 Hz. The ON-OFF switch is the toggle switch located on the right side of the viewer.

4.22 Focus Control Knob - Maximum degree of image sharpness is controlled by rotating the knob on the left side of the viewer.

4.23 Film Carriage - The microfilm card is supported by the scanning plate and pivot assembly located on top and right side of the viewer.

4.24 Film Carriage Handle - By lifting up or lowering this handle, the glass plates which hold the aperture card in place are opened or closed.

4.25 Screen - The screen is the glass plate located on the front of viewer on which the drawing image appears. Reflection from windows or light fixtures may be eliminated by reversing screen.

4.26 Scanning lever - By moving this lever various portions of the microfilm card will be directly under the lens thereby enabling the user to scan across the drawing.

4.3 Operation of the R-4551 List 1 Viewer

4.31 Plug the power cord into any grounded 120 volt AC, 60 Hz outlet.

4.32 Using the microfilm carriage handle, pull up until upper glass plate is fully extended. Insert microfilm aperture card right side up (see Paragraph 1.25) under lens. Lower microfilm carriage handle to full compression.

4.33 Set the ON-OFF Switch to the "ON" position.

4.34 Adjust the scanning lever until an image appears on screen.

4.35 Rotate focus control knob clockwise or counterclockwise until the image on the screen is sharp.

4.36 Various areas of the drawing can be viewed by moving the pivot assembly.

4.4 Field Maintenance of the R-4551 List 1 Viewer

4.41 Cleaning

4.411 Screen - Either side of the screen may be cleaned with a damp cloth or with a mild soap and water.

> CAUTION: DO NOT USE ANY SOLVENT CLEANER ON THE SCREEN UNLESS IT IS KNOWN TO BE SAFE, BECAUSE SOME CLEANERS (WINDEX FOR EXAMPLE) WILL CREATE SPOTS AND POCK MARKS IN THE PLASTIC SURFACE. ABRASIVES SHOULD NOT BE USED.

To remove screen, pull rubber front cabinet edge molding--starting at the bottom of the two sides--away from the cabinet. Do not remove from top edge. Loosen top three clamp screws which hold the screen in place. Remove the bottom clamping bracket. Slide screen down and out. To replace, insert screen into position, being careful not to fingermark same. Be sure screen is snug against top bracket. Tighten top bracket screws. Replace bottom bracket and screws. Press side rubber cabinet edging back into place.

4.412 Glass Flats - Either the upper or lower flat may be removed by sliding it out of position and replaced by pushing it back into position. Note that there should be a flat strip under each clip as a bearing surface for the glass. Fingerprints and smudges can be removed with a non-abrasive glass cleaner and tissue.

4.413 Mirror - One mirror will be exposed if the screen is removed. Cleaning is NOT recommended since the surface is easily scratched. If it is absolutely necessary, remove dust with a camels hair brush or by brushing lightly with a wad of absorbent cotton. Stubborn spots or finger marks should be removed with a good mirror cleaner.

4.42 Replacing Components

4.421 Lamps - The lamp should be replaced when illumination has been reduced to an objectionable degree by bulb blackening or when dark streaks or spots appear on the screen. To change the lamp, turn the lamp off and allow it to cool. Disconnect power plug from outlet. Remove the lamphouse cover by grasping the two chrome knobs and pulling. Remove the lamp by turning it counterclockwise. Replace with a No. 1503 Lamp (G.E., Westinghouse, etc.) held so the notch at the edge of the ring is at the top. Check to see that all three slots in the lamp base and the three socket pins coincide, press the lamp to the rear without tilting, and turn it clockwise. Be sure all three pins are fully engaged. Replace the lamp cover.

4.5 Handling the R-4551, List 1 Viewer - The R-4551, List 1 Viewer is a precision optical instrument; please handle the unit and all component parts with care.

5. R-4551 LIST 2 LARGE DESK TOP MICROFILM VIEWER

The R-4551 Viewer is used on a desk or table top at jobs, or stages of a job, which require a significant amount of referencing drawings such as, the analyzation stage of a job involving several hundred frames or manweeks.

5.1 Operating Features of the R-4551 List 2 Viewer - The operating features of the R-4551 List 2 are shown on Figure 11 and are described below:

5.11 ON-OFF Switch - The R-4551 List 2 is powered by 120 volts A.C., 60 Hz and is turned on or off by use of this switch.

5.12 Focus Control Knob - Maximum degree of image sharpness is controlled by rotating this knob.

5.13 Film Carriage - The microfilm card is supported by the card holder assembly and is inserted into the right side of film holder.

5.14 Scan Control Knob - Different portions of the drawing may be viewed by rotating this knob.

5.15 Screen - The screen is the surface in the front of the viewer on which the drawing image appears.

5.2 Operation of the R-4551 List 2 Viewer

5.21 Plug the power cord into a grounded 120 volt AC, 60 Hz outlet and turn ON-OFF Switch to "ON".

5.22 Insert microfilm card as far as possible into card feed located on right side of viewer.

5.23 Adjust the card holder assembly by means of the scan control knob until an image appears on the screen. Scan the film horizontally by rotating the "Scan" knob clockwise or counterclockwise and scan it vertically by moving the "Scan" knob in or out.

5.24 Rotate focus control knob clockwise or counterclockwise until the image is sharp on the screen.

5.3 Field Maintenance of the R-4551 List 2 Viewer

5.31 Cleaning

5.311 Screen - Dirt, dust and smudges on the screen can be removed by wiping with a clean, dry cloth (front only).

5.312 Glass flats - To clean the aperture glass flats, first remove carrier from unit. Clean the glass surfaces with lens tissue. Return the film carrier to the unit being sure that the carrier is engaged by the spring loaded retaining clips at the sides of the throat.

5.313 Mirrors - Remove the bezel containing the viewing screen by removing the two screws at the underside of the bezel. Pull the bezel forward and up, lifting the pins in the top of the bezel out of the slots in the case, being careful not to spread bezel allowing the glass screen to fall out.

Remove lint and dust on the mirrors by blowing air on the mirrors or gently brushing with a camels hair brush. Do not wipe with a cloth.

The objective lens may be wiped with lens tissue by reaching around the smaller mirror and down to the lens. It is possible to locate the objective lens by looking into the larger mirror. Care should be exercised so that the smaller mirror is not touched inadvertently.

5.32 Replacing Components

5.321 Lamp - Turn unit off and remove AC plug from receptacle. Lay reader on its left side with the bottom toward you. Remove two screws holding lamp access plate. Remove plate with lamp and lenses by pulling straight out. Remove lamp by rotating counterclockwise. The spacing of the pins around the lamp socket and the slots in the lamp base are not symmetrical and the lamp will go in one way only. (The two pins closest together are nearest the condenser lens and match the two closest slots in the lamp base). Install the new lamp and rotate clockwise to lock in position. Reinstall lamp access plate.

5.322 The condenser lens should be wiped with a clean, dry cloth each time a lamp is replaced.

5.323 With the lamp removed reflector may be cleaned by breathing on it and gently wiping with clean soft cloth.

5.4 Handling the R-4551 List 2 Viewer

The R-4551 List 2 Viewer is a precision optical instrument; please handle the unit and all component parts with care.

6. R-4551 LIST 3 LARGE DESK TOP MICROFILM VIEWER - OPERATION AND MAINTENANCE

The R-4551 Viewer is used on a desk or table top at jobs, or stages of a job, which require a significant amount of referencing drawings such as the analyzation stage of a job involving several hundred frames or manweeks.

6.1 Operating Features of the R-4551 List 3 Viewer - The operating features of the R-4551 List 3 are shown on Figure 12 and are described below:

6.11 HIGH-OFF-LOW Switch - The R-4551 List 3 is powered by 120 volts AC, 60 Hz and is turned on or off by the use of this switch.

6.12 Focus Control Knob - Maximum degree of image sharpness is obtained by rotating this knob.

6.13 Load and Lock Switch - By pressing this switch to the "Load" position, the aperture card can be placed in the film carriage as described above. By pressing this switch to the "Lock" position the aperture card is firmly locked in place.

6.14 Film Carriage - The microfilm card is loaded in this slot.

6.15 Screen - The screen is the glass surface on the front of the viewer on which the drawing image appears.

6.2 Operation of the R-4551 List 3 Viewer

6.21 Plug the power cord into a grounded 120 V AC, 60 Hz outlet and set "HIGH-OFF-LOW" intensity switch to the desired intensity.

6.22 Set "Load and Lock" Switch to load.

6.23 Insert microfilm card into the film carriage right side up (see Paragraph 1.25) with the title strip down. Full image of drawing should appear on screen. Set "Load and Lock" switch to the "lock" position.

NOTE: To remove card switch "Load and Lock" switch to load.

6.24 Rotate focus control knob clockwise or counterclockwise until the image is sharp on the screen.

6.3 Field Maintenance of the R-4551 List 3 Viewer

6.31 Cleaning

6.311 Screen - The screen should never be removed for cleaning. Never touch the dull side of the screen with any solvents, alcohol or abrasive. To clean the exposed side of the screen, use a mild soap solution or glass cleaner on the smooth side only.

6.312 Mirror -

CAUTION: NEVER RUB ANY MIRROR SURFACE! MIRROR SHOULD NOT REQUIRE CLEANING BUT MAY NEED TO BE DUSTED.

6.32 Replacing Components

6.321 Lamp - Allow lamp to cool before removing. Disconnect power plug from outlet. Remove two screws holding the lamp access door located on right top rear.

In removing the lamp, pull it straight out. Replace with new lamp making sure not to touch it with your fingers. (Replace with Micro Design type F.C.S.T., Sylvania type F.D.W. or General Electric type F.C.S.). Replace the access door and the two hold down screws.

CAUTION: IN REPLACING THE SCREWS DO NOT OVER TIGHTEN AS THEY STRIP EASILY.

6.4 Handling the R-4551 List 3 Viewer

The R-4551 List 3 Viewer is a precision optical instrument; please handle the unit and all component parts with care.

7. R-4551 LIST 4 LARGE DESK TOP MICROFILM VIEWER - OPERATION AND MAINTENANCE (ALSO CODED R-4369.)

The R-4551 Viewer is used on a desk or table top at jobs or stages of a job, which require a significant amount of referencing drawings such as the analyzation stage of a job involving several hundred frames or manweeks.

7.1 Operating Features of the R-4551 List 4 - The operating features of the R-4551 List 4 are shown on Figure 13 and are described below:

7.11 ON-OFF Switch - The R-4551 List 4 is powered by 120 V, 60 Hz and is turned on or off by means of this switch. There are four intensity settings.

7.12 Focus Control Knob - Maximum degree of sharpness is obtained by rotating this knob on the lower front center panel.

7.13 Film Carriage - The microfilm card is loaded between the two glass flats when the film carriage is pulled forward to its open position.

7.14 Screen - The glass surface on the front of the viewer which the drawing image appears.

7.2 Operation of the R-4551 List 4 Viewer

7.21 Plug power cord into a grounded 120 V AC, 60 Hz outlet and turn ON-OFF switch to ON.

7.22 Pull microfilm carrier to its greatest extended position. Upper glass assembly will raise automatically. Insert microfilm card right side up (see Paragraph 1.25) with the title strip edge nearest you. Push carrier in. Upper glass assembly will lower automatically. DO NOT FORCE GLASS DOWN BY HAND.

7.23 Turn the ON-OFF Switch to desired intensity (one of four settings).

7.24 Pull carrier out to read upper parts of microfilm and vice-versa. Slide carrier to left to view right side of microform and vice-versa.

7.25 When desired subject appears on screen turn front focusing dial to right or left to obtain clearest screen image.

7.3 Field Maintenance of the R-4551 List 4 Viewer

7.31 Cleaning

7.311 Screen - Remove screw at each side of screen retaining strip. Remove strip. Slowly pull screen out at bottom and allow it to drop from upper channel. When replacing screen in opening be CAREFUL . . . DO NOT OVERTIGHTEN SCREWS.

7.312 Glass Flats - Remove screen as described above. Reach inside, remove retaining clips, lift out upper glass assembly by the hinge bar. Lower carrier assembly will now slide out front of reader. Clean the glass surfaces with lens tissue. Replace carrier by reversing procedure.

7.313 Mirror - Because the mirrors are completely enclosed, periodic cleaning is unnecessary. However, when cleaning is desired, either blow off settled dust or brush it off with a photographic lens brush. DO NOT RUB THE MIRROR SURFACES.

7.32 Replacing Components

7.321 Lamp - Turn reader off and disconnect power. ALLOW OLD LAMP TO COOL. Open rear door and pull back retaining leaf spring just enough to allow for removal of lamp. Change lamps. Replace in a similar manner.

7.4 Handling the R-4551 List 4 Viewer - The R-4551 List 4 Viewer is a precision optical instrument; please handle the unit and all component parts with care.

8. R-4582 HANDHELD MICROFILM VIEWER - OPERATION AND MAINTENANCE

The R-4582 Viewer is designed to be used on CN and small job applications where the amount of drawing reference is minimal. It is also intended to be used for drawing verification purposes.

8.1 Operating Features of the R-4582 Viewer

The operating features of the R-4582 are shown in Figure 14 and are described below:

8.11 Focus Control - By turning the lens while holding the viewer to the eye, the image is brought into focus.

8.12 Film Carriage - The film is inserted into this slot until the desired portion of the film is under the lens.

8.13 Black Fibre Light Shield - By swinging this shield to the left or right, the user can look into the viewer with one eye and keep the unused eye open.

8.2 Operation of the R-4582 Viewer

8.21 With the title strip or header strip of the microfilm facing the user and right side up, insert the microfilm into the film carriage until the desired portion of the film is under the lens.

8.22 Turn the lens in or out until the image seen by holding the lens in front of the user's eye is in focus. Be careful not to turn the lens all the way out.

> CAUTION: TO AVOID INJURY TO EYE, DO NOT FOCUS LENS DIRECTLY TOWARD SUN.

8.23 If the user is more comfortable keeping both eyes open while viewing a drawing, swing the black fibre light shield to the left or right until it blocks light from the unused eye.

8.3 Maintenance of the R-4582 Viewer

8.31 Clean plastic components with a mild liquid detergent only. Use of cleaning fluid may destroy the plastic.

8.32 The exposed lens surfaces are hard coated with an anti-reflection coating. Even with this protection the lens requires care and careful cleaning. The use of lens cleaning tissue or a soft camel's hair brush is recommended. Care should be exercised to keep fingerprints off the lens.

9. R-4680 DUAL LENS DESK TOP MICROFILM VIEWER - OPERATION AND MAINTENANCE

The R-4680 Viewer is used on jobs involving a significant amount of analyzation. It has two lenses, one of which allows the user to see all or most of the drawing, the other which enlarges a portion of the drawing for easy study.

9.1 Operating Features of the R-4680 Viewer - The operating features of the R-4680 Viewer are shown in FIG. 15 and are described below:

9.11 Upper Housing - The upper housing covers the screen and shields out most of the light in the room. It holds the top mirror, which reflects the image from the lens onto the viewing surface.

9.12 Screen - The screen is a textured aluminum viewing surface. The drawing image is projected onto the screen.

9.13 Focus Sleeves - The focus sleeves are located in the sliding lens mount and hold the lenses. Turning the focus sleeve clockwise or counterclockwise adjusts the lens to focus a sharp image on the viewing surface.

9.14 Index Scales - When the viewer is used with microfiche, the index scales help locate the particular page the user needs. As the user faces the viewer, the scales on the left are for microfiche in a 7 X 14 array and the scales on the right are for a 7 X 9 array.

9.15 Film Carrier - The carrier consists of two pieces of ground glass which open automatically for insertion or removal of the microfilm when the handle is pulled towards the user. The handle is also used for maneuvering the carrier in order to view different areas of the drawing.

9.16 OFF-ON-HIGH Switch - The R-4680 is powered by 117 Volts AC, 50/60 Hz and is turned on and off by this switch. The "HIGH" setting offers a brighter light intensity. Note that the average lamp life is **1200** hours on the "ON" setting and 500 hours in the "HIGH" position, so it is recommended that the "ON" setting be used as much as possible.

9.17 Dual Lenses - The R-4680 has lenses of 12.5X and 21X magnifications. The low power 12.5X lens allows the user to see all or most of the drawing. After the desired figure, option, table, notes, etc., have been located, the high power 21X lens can be used to enlarge that portion of the drawing for easier analysis. The low power lens is also useful for analyzing leads which extend beyond the viewing area of the 21X lens. These long leads can be traced without having to move the drawing and possibly lose track of the lead.

9.2 Operation of the R-4680 Viewer

9.21 Put the power cord into the back of the viewer, then plug the cord into any 120V AC outlet.

9.22 Set the OFF-ON-HIGH Switch to "ON".

9.23 Pull the film carrier out until the upper glass plate comes up. Take the aperture card with the right side up (see PAR. 1.25) and with the title strip edge of the card towards you, insert it between the glass flats. The card should touch the back and right edges of the carrier as you face it.

9.24 Push in the carrier. The glass plates will close. Manuever the carrier until the drawing image appears. Various areas of the drawing can be viewed by moving the carrier in and out and sideways.

9.25 Turn the focus sleeves until the image is sharp and clear. Note that the lenses can be tipped slightly, so a slight downward pressure should be exerted while focusing to assure that the lens remains level.

9.26 To change lenses, lift the focus sleeve of the lens in use and slide the lens mount in the direction of the arrow on the lens mount.

9.27 To remove the aperture card, pull the handle of the carrier towards you until the glass plate opens and the carrier stops. Put a finger lightly on the center of the card and drag it toward you without touching the film or the glass plates. Pick up the card and refile it.

9.3 Field Maintenance of the R-4680 Viewer

9.31 Cleaning

9.311 External Surfaces - Clean all external surfaces of the unit with warm water and a mild detergent. A good commercial cleaner may also be used. Use a soft lint-free cloth when wiping unit dry.

9.312 Top Mirror and Screen - Use a camel hair brush or a lens tissue to clean dust particles from these components. Avoid touching them after cleaning so the surfaces will not be smudged with fingerprints. Glass cleaner and tissue may be used to remove smudges.

9.313 Carrier Glass - To remove top glass assembly, pull the carrier out until the top glass opens. Lift the rear of the glass up slightly by grasping both sides of the plate. Pull it forward. Use a camel hair brush or a lens tissue to clean dust particles from the glass surfaces. Avoid excessive handling when replacing the top glass assembly, by reversing the above procedure, so that the surfaces will not be smudged with fingerprints. Glass cleaner and tissue may be used to remove smudges.

9.314 Lenses - Use a camel hair brush to remove dust particles. Use a soft lint-free cloth or lens tissue to clean the surfaces of the lenses. Be careful not to touch the lenses as fingerprints will smudge the surfaces and possibly cause a blurred image on the screen.

9.32 Lamp Replacement

9.321 Turn the OFF-ON-HIGH switch to OFF and unplug the power cord in the back of the viewer. Place the reader on its back and open the light source access panel by turning the black door latch with a screwdriver. See FIG. 16. Note that when the light source access panel is removed, an interlock switch breaks electric contact to the unit to prevent accidental shock or injury if the power cord has inadvertently been left connected.

9.322 Reach into the unit and push down on the lamp ejector to free the lamp from its socket.

CAUTION:	MAKE SURE LAMP HAS COOLED BEFORE TOUCHING WITH FINGERS AS SEVERE BURNS CAN RESULT FROM TOUCHING THE HOT LAMP.

Remove the old lamp. Holding the new lamp by its base, push it into the socket. Care should be taken to avoid touching the bulb or the inside of the lamp reflector as fingerprints affect the quality of the image on the screen and the life of the lamp.

9.323 It is recommended that a spare bulb be kept available at all times. One can be obtained from Stockkeeping with Installation Ordering No. 23468001.

9.4 Handling the R-4680 Viewer

9.41 The R-4680 Viewer is a precision optical instrument. Please handle the unit and all component parts with care.

→Indicates new or changed information.

Attachment:
Figures 1 thru 16 on pages 13 thru 21.

Engineering Planning Manager
Common Installation and Services

Reason for Reissue:

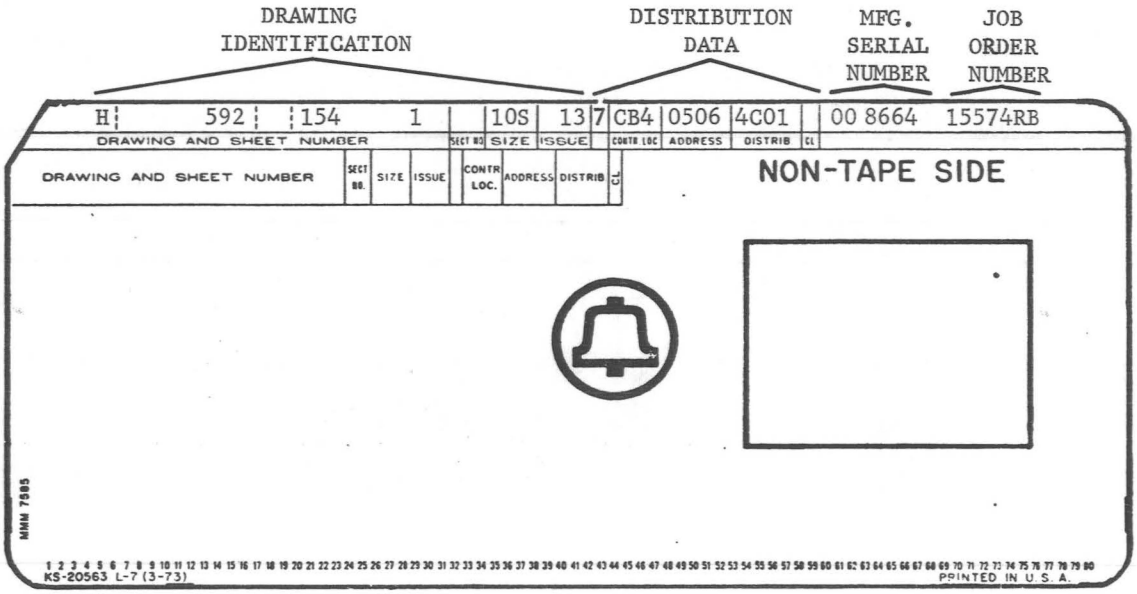
1) Paragraph 1.23 on 1A Technology product wiring diagrams added.

2) Information in former Paragraphs 1.23 - 1.291 rearranged as Paragraphs 1.24 - 1.271. No paragraphs deleted.

3) Title of Paragraph 7 changed to indicate that the R-4551 List 4 Viewer is also coded as an R-4369.

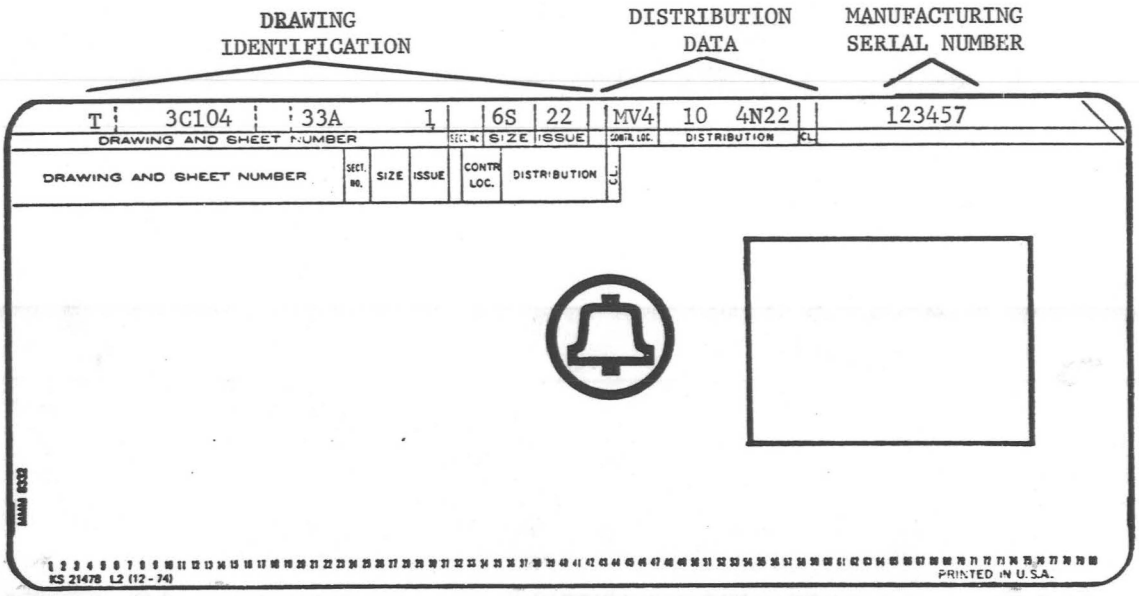
4) Paragraph 9 on the use of the R-4680 Viewer added. Figures 15 and 16 added to show this viewer.

5) Minor changes made to correct spelling and grammatical errors.



FACE

Fig. 1—KS-20563 L-7 Hawthorne Distribution Card (Green)



FACE

Fig. 2—KS-21478 L2 Kearny Distribution Card (Green)

FIG. 3: R-4523 LARGE DESK TOP MICROFILM VIEWER

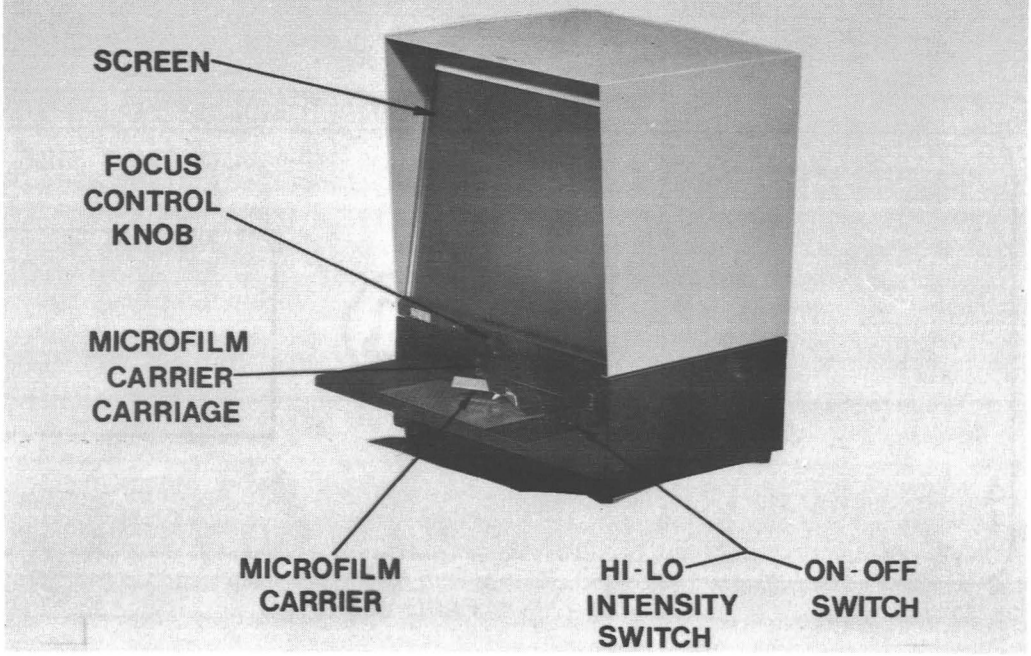


FIG.4: MICROFILM CARRIER GLASS REMOVAL-R 4523 VIEWER

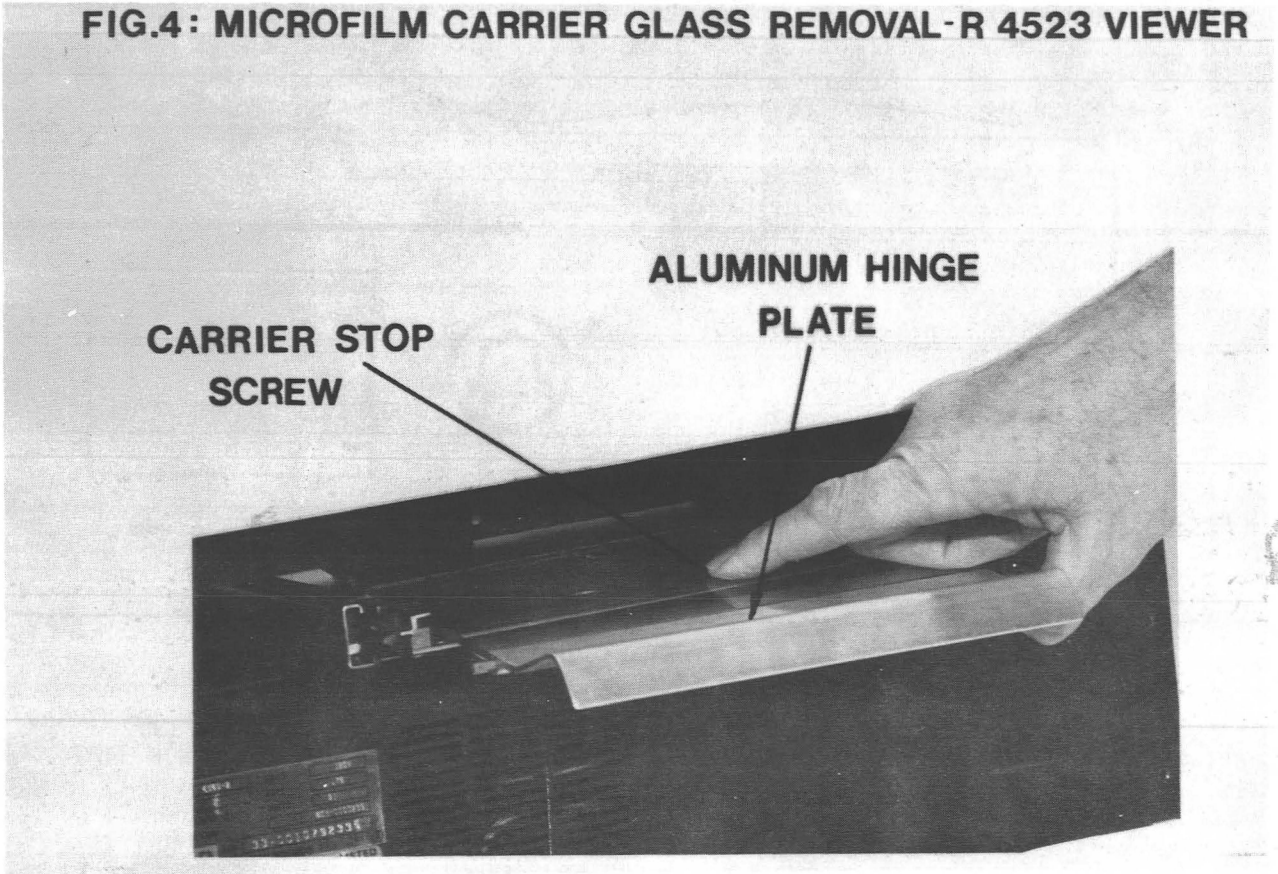


FIG.5 LAMP ACCESS -R-4523 VIEWER

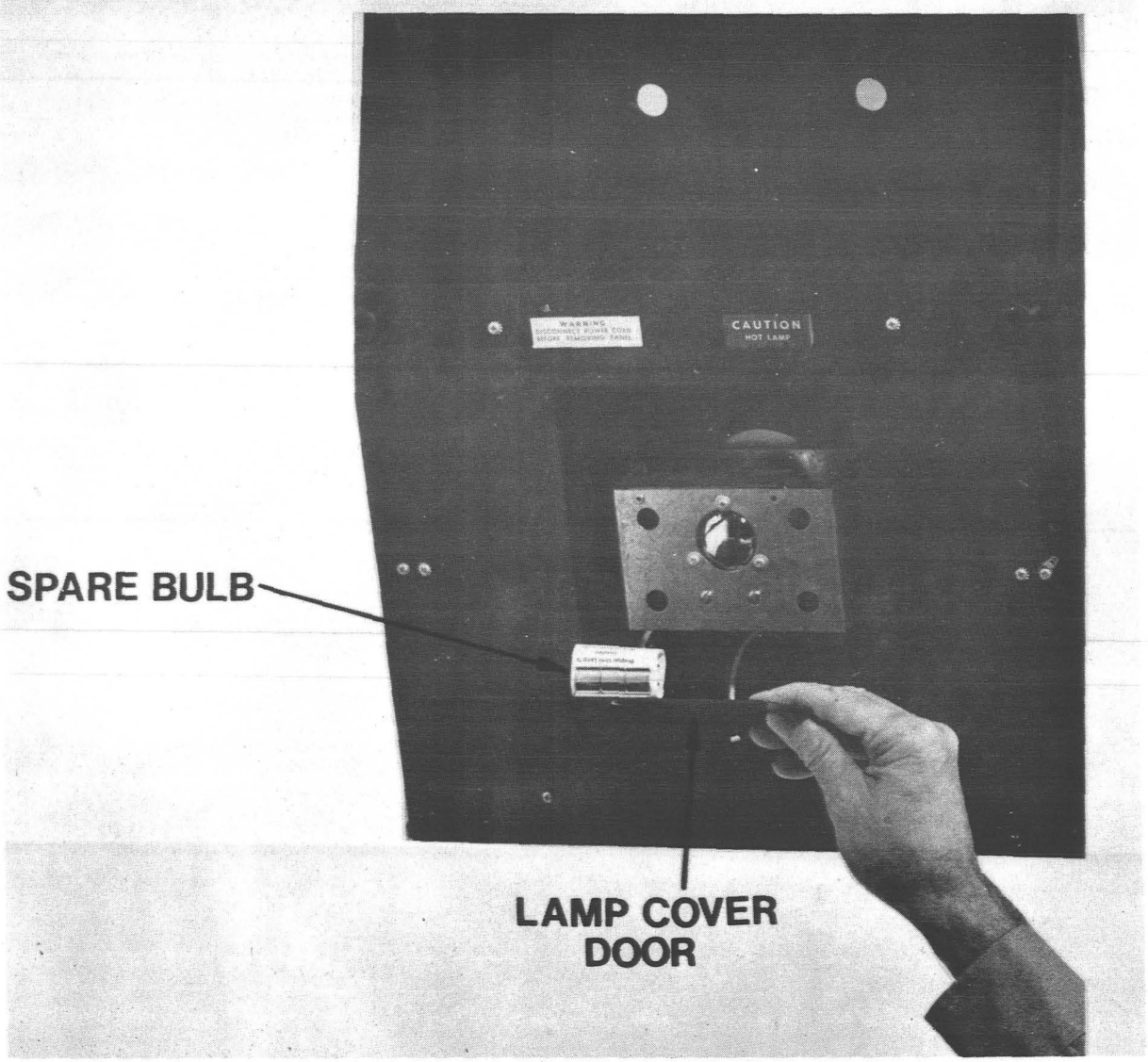


FIG.6: LAMP ACCESS-R-4523 VIEWER

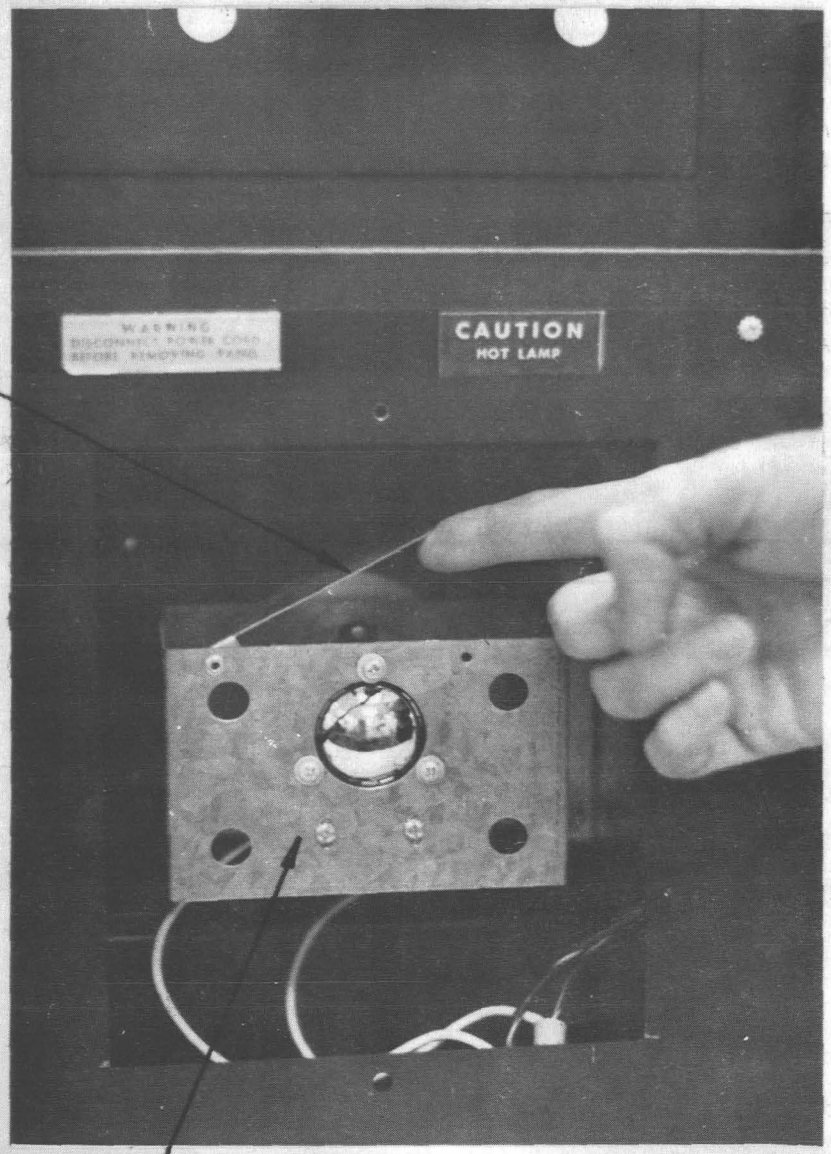


FIG.7: LENS UNIT RE-ENGAGEMENT-R-4523 VIEWER

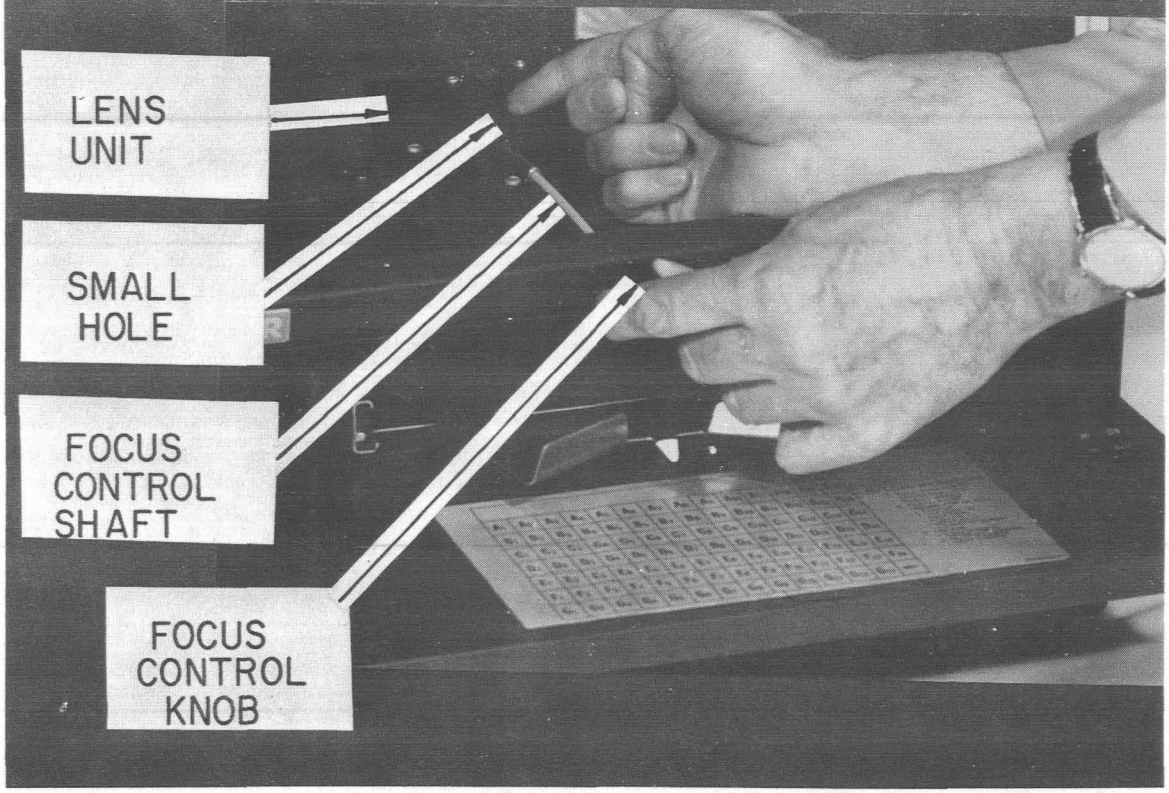


FIG.8: R-4524 PORTABLE MICROFILM VIEWER

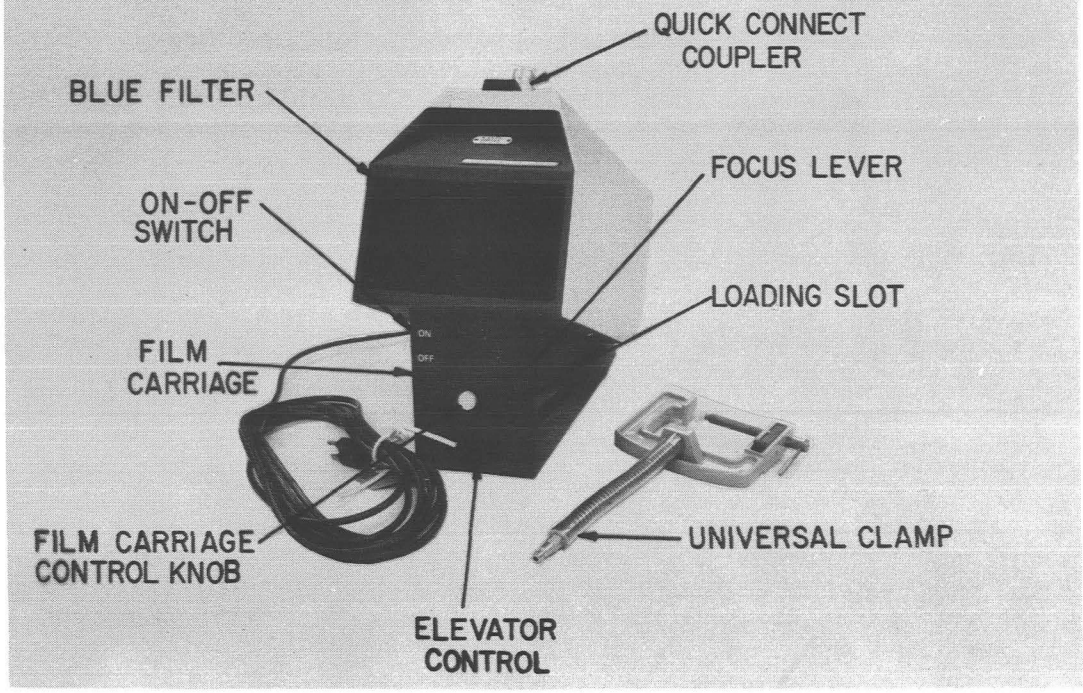


FIG.9: LAMP REPLACEMENT
R-4524 VIEWER

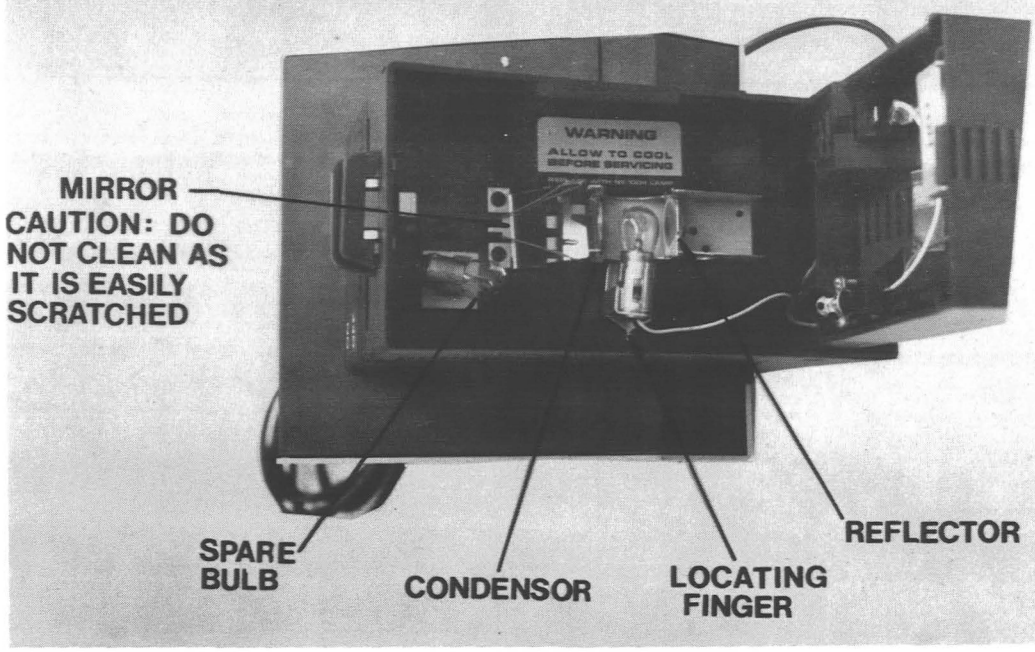


FIG. 10: R-4551 LIST 1 LARGE DESK TOP MICROFILM VIEWER

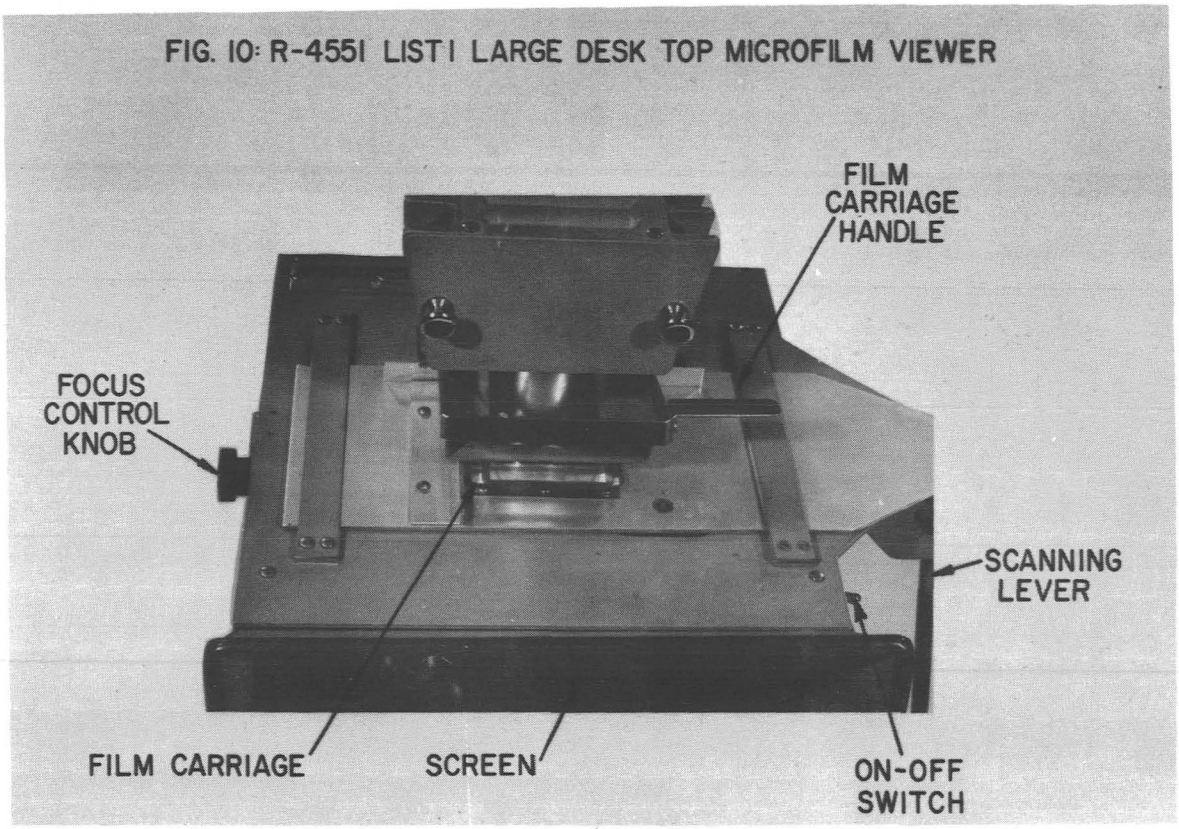


FIG.11 R-4551 LIST 2 LARGE DESK TOP MICROFILM VIEWER

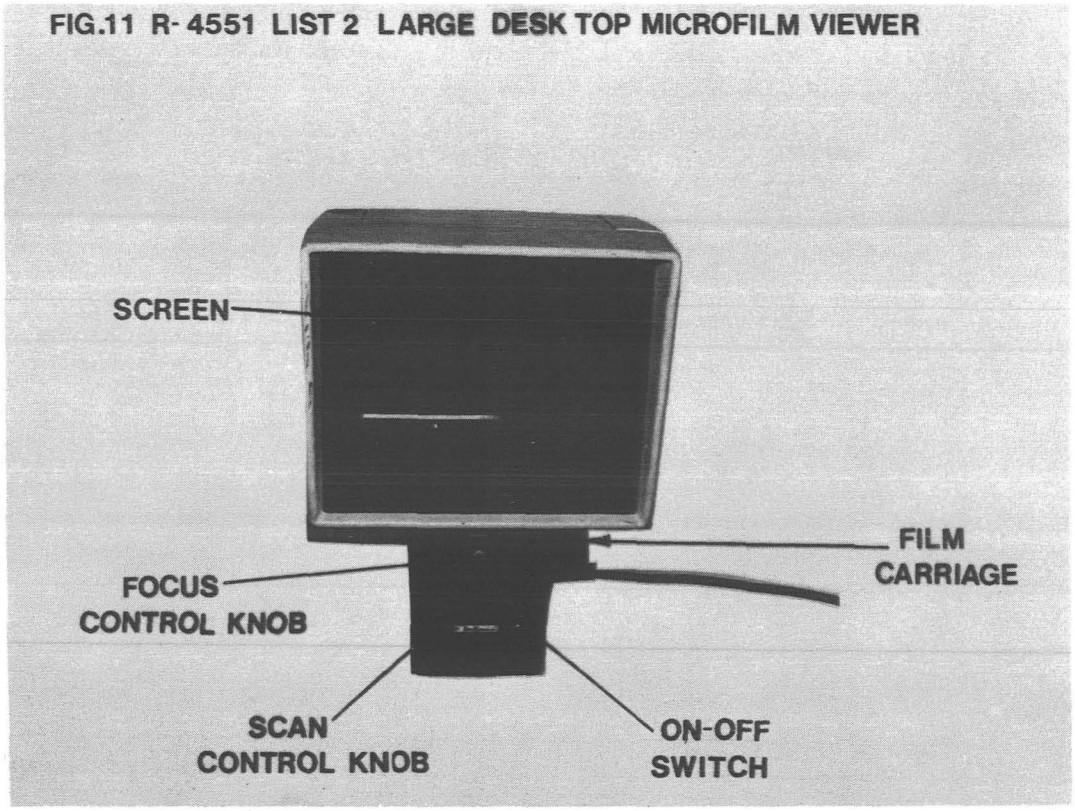


FIG.12: R-4551 LIST3 LARGE DESK TOP MICROFILM VIEWER

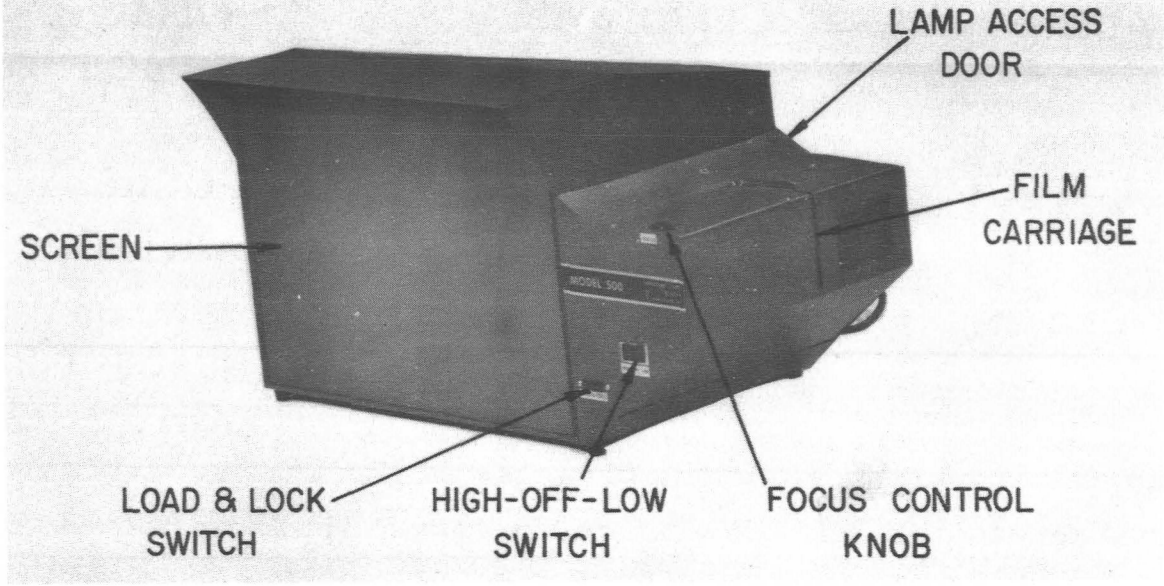


FIG.13 : R-4551 LIST 4 LARGE DESK TOP MICROFILM VIEWER

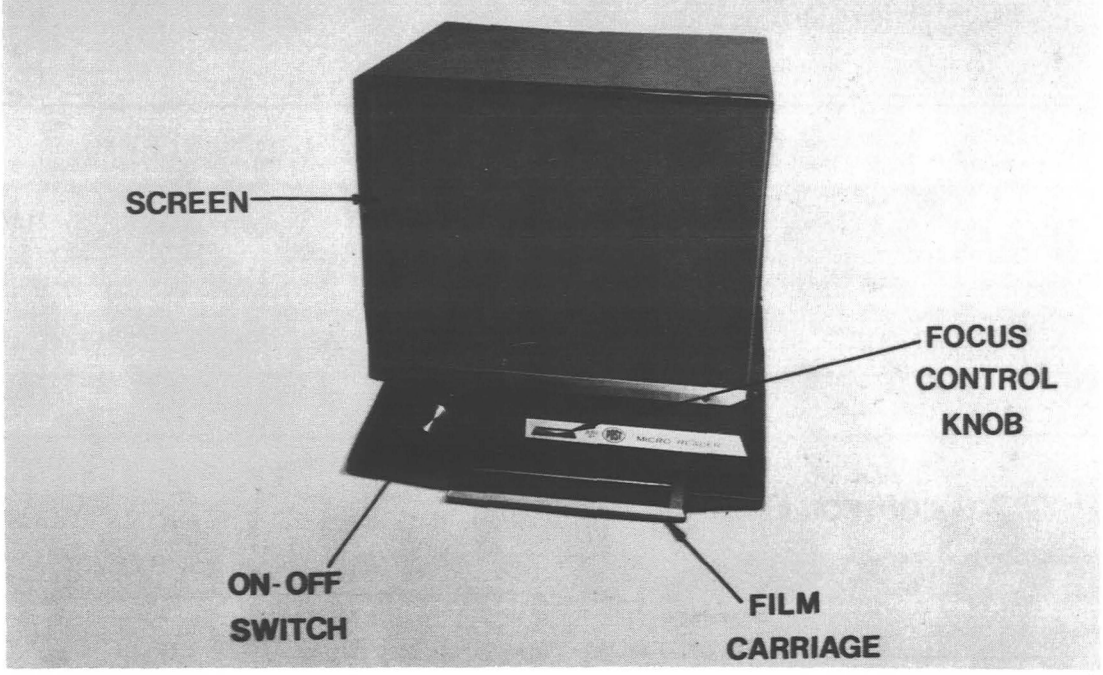
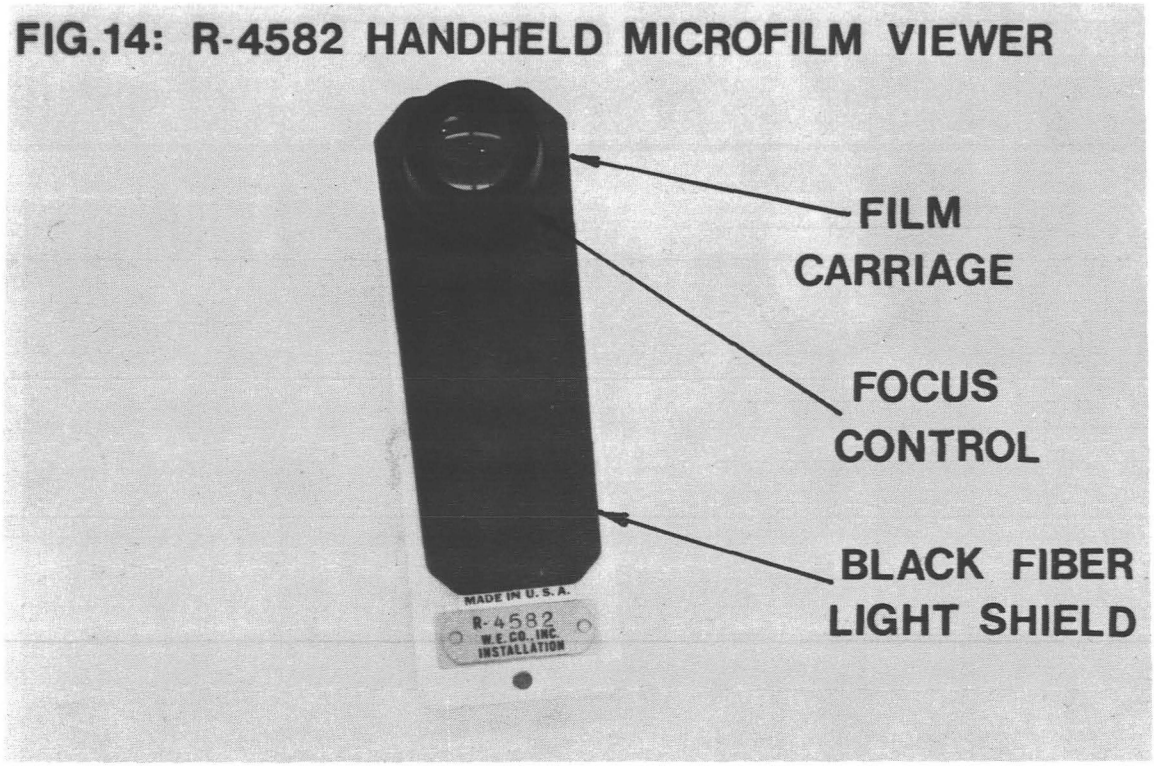


FIG.14: R-4582 HANDHELD MICROFILM VIEWER



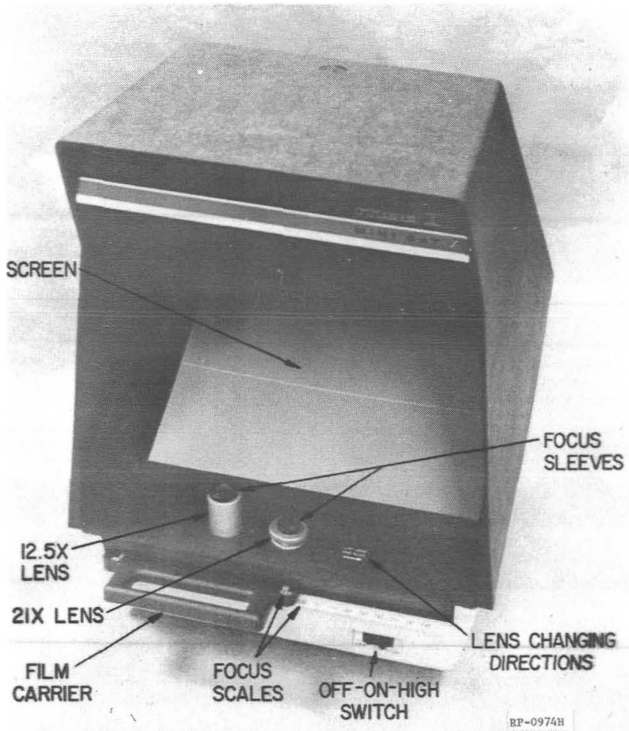


FIG. 15: R-4680 DUAL LENS LARGE MICROFILM VIEWER

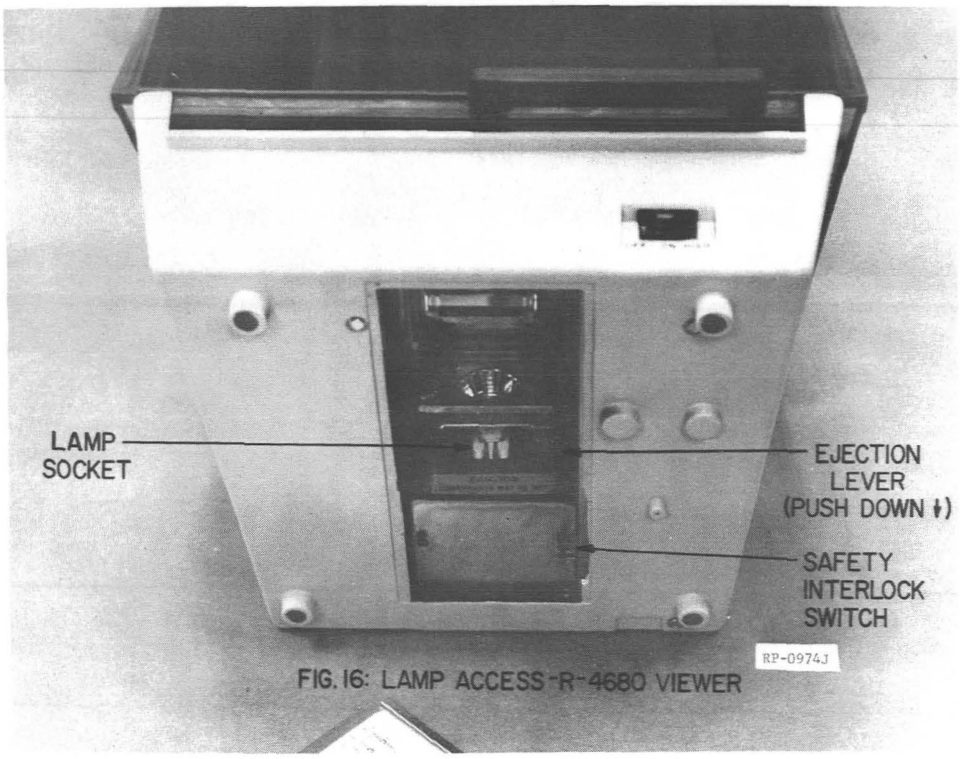


FIG. 16: LAMP ACCESS-R-4680 VIEWER