

**KODAK**

**AUTO-FOCUS**

**ENLARGER**

**MODEL E**

**EASTMAN KODAK COMPANY • Rochester 4, N. Y.**

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**The Kodak Auto-Focus Enlarger Model E** accommodates any film or plate negative up to 5 x 7 inches. Maximum magnification is 4 diameters, or  $3\frac{3}{4} \times 5\frac{1}{16}$  inches from a 24 x 36mm negative and 20 x 28 inches from a 5 x 7-inch negative.

For color printing it allows normal use of materials which are highly light-sensitive, with minimum danger of fog from stray light, and permits location of negatives in approximately the same field of illumination to guard against color wedging in the final color print.

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# Unpacking and Assembling

## TO UNPACK

1. Detach the counterbalance UPRIGHTS mounted to the underside of the case cover.
2. Unpack the contents of the large corrugated carton.
3. Remove the U-shaped cleats and slide out, on the cleat tracks, the assembled BELLOWS, FRAME, and UPPER CASTING. Remove the cleat fastened to the assembly by the four packing bolts.
4. Remove the cleats that hold the PAPER HOLDER and lift out the paper holder.
5. Remove the cleats that hold the BASE and lift the base from the case.
6. Unfasten and remove the COUNTERBALANCE strapped to the bottom of the case.
7. Remove and unpack the remaining cartons in the packing case.

## TO ASSEMBLE

1. Place the upper casting on top of the lower, and insert the two front bolts (four bolts are found in the accessory carton). Place the BRACKET attached to the counterbalance uprights over the rear holes of the upper and lower castings and insert the two rear bolts.
2. Slide the counterbalance over the top ends of the counterbalance uprights, chain attachment upward.
3. Insert the ends of the counterbalance uprights in the holes in the PULLEY bracket and attach the bracket to the top of the upper casting with the screws provided. Place the chain over the pulley and attach it to the counterbalance.
4. Place the paper holder on the base of the enlarger and level it, using a spirit level, by adjusting the TURN BOLTS in the front feet of the base.
5. Put the GROUND GLASS (etched side down) on the ledge inside the frame. Place the SANDBLASTED GLASS on the four wooden supports on the top of the frame. Now place the HEAT-ABSORBING GLASS on the metal brackets. Attach the VENTILATOR to the REFLECTOR. Screw the lamp into the socket in the reflector and put the reflector on top of the frame. Secure the reflector to the frame by means of the two catches. Connect the FOOT SWITCH cord to an electrical outlet.
6. Place the heavy cover glass in the NEGATIVE HOLDER and slide the holder into the opening in the frame.

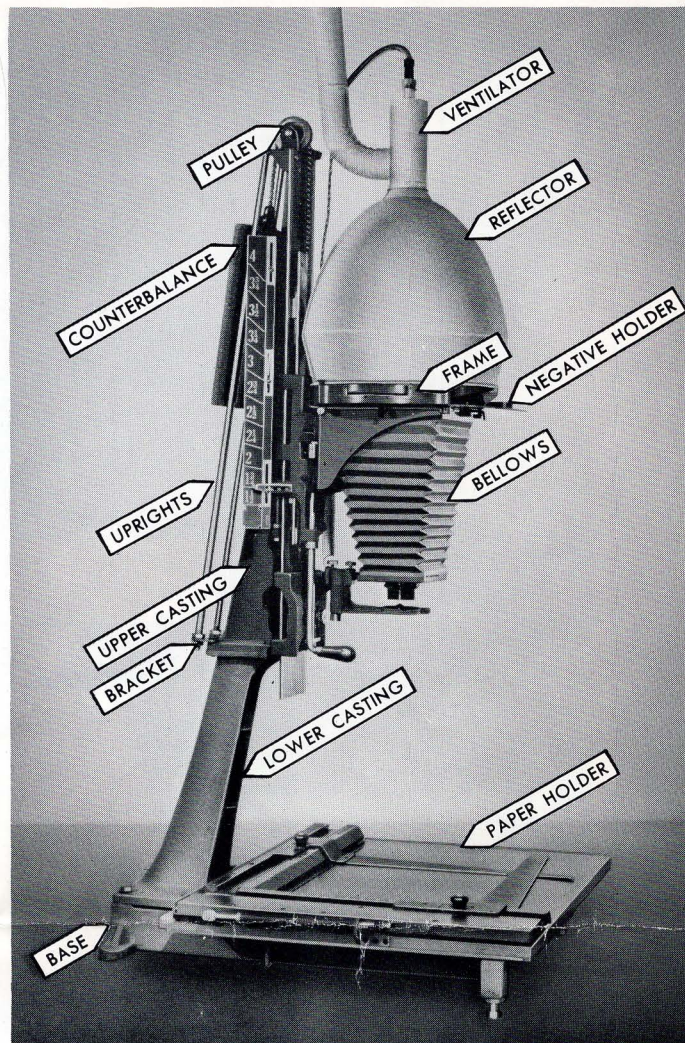


Figure 1

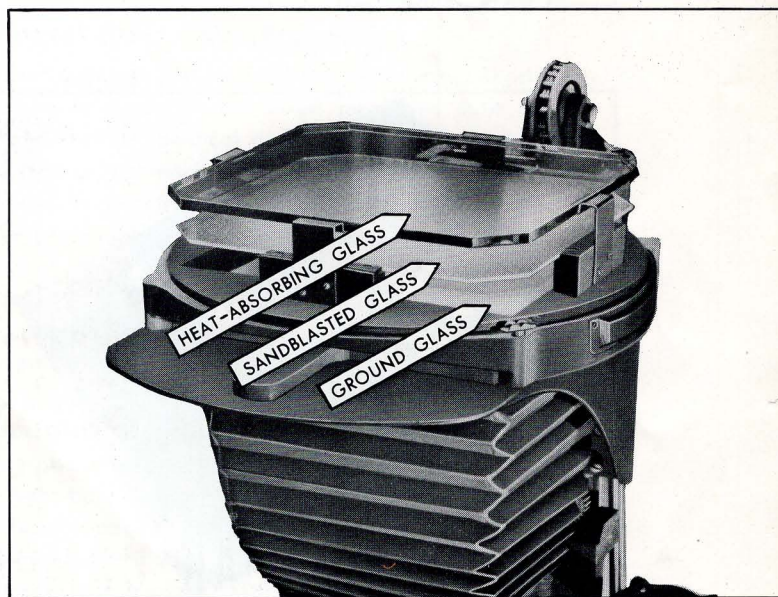


Figure 2

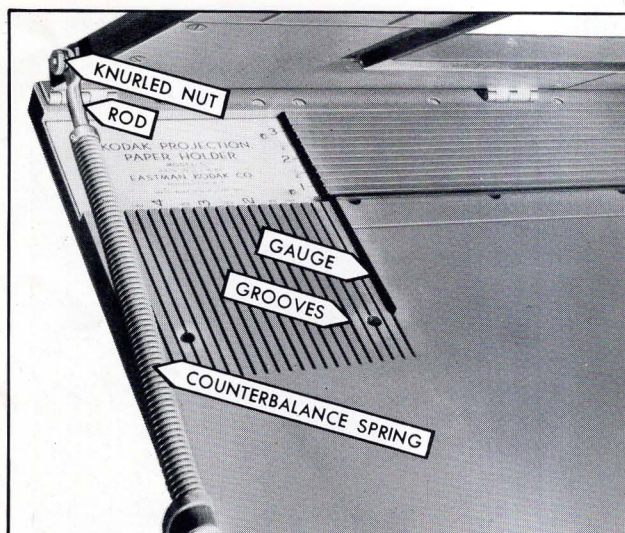


Figure 3

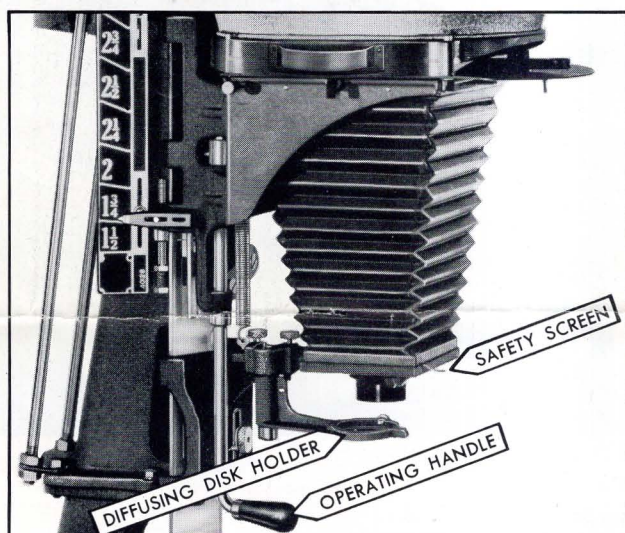


Figure 4

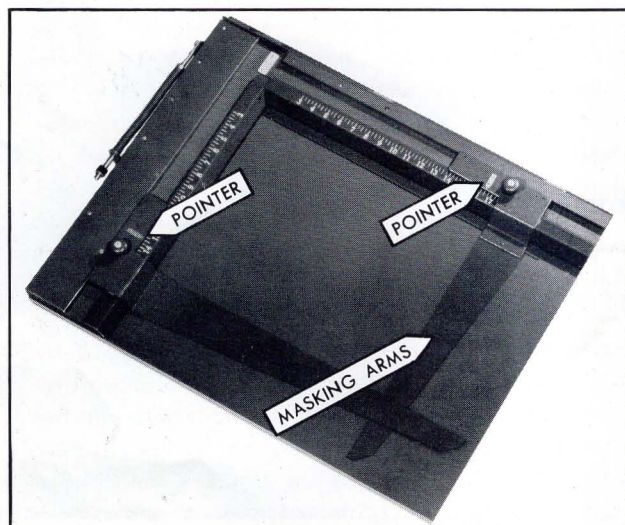


Figure 5

### Projection Lamp Required

When the enlarger is to be used on a 110- to 120-volt electric current, it should be fitted with a General Electric No. 302, 500-watt, opal photo-enlarging lamp. For use on a 230- to 250-volt electric current, a General Electric No. 3020, 500-watt, opal photo-enlarging lamp is required. To check the illumination, see page 5.

### Range of Print Sizes

The masking arm scales on the paper holder provide for making prints (with margins) ranging in size from 3 x 3 inches to 17½ x 20½ inches. Larger prints can be made by detaching the counterbalance spring, raising the masking arms, and pinning the printing paper to the enlarging easel.

*Note:* To remove the counterbalance spring, raise the masking arms, remove the knurled nut on the end of the rod, and remove the rod end from the stud.

## Operation

### Black-and-White Enlargements

The enlarger is now ready for use and although the general operation of the enlarger is the same for either black-and-white or color work, the requirements of the enlarger in each of these fields is somewhat different. When black-and-white negatives are to be enlarged, the exact position of the negative in the negative holder is not important and the negative holder itself may be shifted somewhat to position the image. However, for the more exacting requirements of color work, the position of the negative in the negative holder and the position of the negative holder in the enlarger are of prime importance.

### Place and Center a Negative in the Negative Holder

The negative should be placed with the emulsion side down between the fixed sheet of glass and the cover glass. If the negative is placed with the top of the image toward the holder handle, the bottom of the projected image will be toward the front of the enlarger and make masking of the negative easier.

The cover glass need not be used with glass negatives. Insert the negative holder in the opening in the frame.

### Set the Enlarger, the Masking Arms, and the Margin Gauge

To set the enlarger for a definite size enlargement, turn the OPERATING HANDLE toward the lens and raise or lower the projector, by means of a direct up or down movement of the handle, to the desired position. Lock the handle by turning it away from the lens.

To set the masking arms of the enlarging easel for a specific print size, lower the hinged frame and slide each arm in or out until the POINTER of the arm is at the proper place on the scale.

To set the margin gauge, raise the hinged frame of the easel and fit the gauge in the cleated grooves for the width margin desired on the print.

### Position the Paper Holder, Mask the Negative, and Make the Exposure

Set the LENS OPENING scale for its largest opening to permit projecting the brightest negative image possible onto the paper holder for positioning and masking.

Place the white card, packed with the equipment, in the paper holder. Raise the SAFETY SCREEN, just enough to clear the light beam; step on the foot switch, and position the enlarging easel so that the projected negative image is framed as desired.

Any white light or undesirable parts of a negative image that fall on the enlarging easel may be cut out by means of the MASK SLIDES. The front and side slides are controlled by handles; the back slide by a KNURLED KNOB.

Set the lens opening (an opening of  $f/8$  or  $f/11$  is recommended for an average negative).

Lift up the hinged arms of the enlarging easel and, after removing the white card, insert the printing paper. Lower the hinged arms.

Step on the foot switch for the length of time required to expose the paper correctly.

Note: If it is necessary to check the position of a projected negative image after the printing paper has been inserted in the paper holder, lower the safety screen before stepping on the foot switch.

### To Use a Diffusing Disk

Three diffusing disks can be obtained for use with the enlarger. Each provides a different degree of diffusion. Slip the disk to be used into the swivel DIFFUSING DISK HOLDER, printed collar down. Swing the diffusing disk holder into position under the lens.

When the No. 1 disk is used, the holder should be swung into position under the lens for all of an exposure.

The No. 2 or No. 3 disk, however, may be used for all or part of an exposure. The ratio of one-third of the expo-

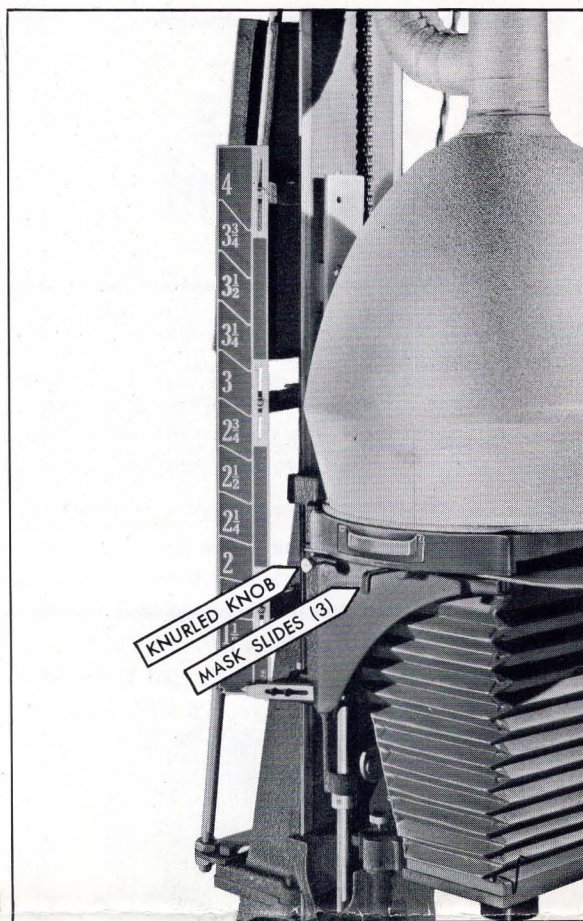


Figure 6

sure with the disk to two-thirds without is recommended. That portion of the exposure to be made with the disk should always be made first.

### Color Projections

When matrices are to be printed from color-separation negatives, each of the three negatives must receive illumination of identical distribution. This can be accomplished only if each of the negatives in its turn is positioned in exactly the same location in the enlarger. Therefore, place each negative successively under the clip of the negative carrier so that it is in contact with the three registration pins. The respective images will be projected on the easel in the same area with each negative receiving identical illumination.

It is possible, with careful workmanship, to obtain reasonable registration of matrices from color-separation negatives. The three negatives may be registered over a light box, taped firmly together, and trimmed on two adjacent edges. Place each negative in the negative carrier so that it is held by the clip with the trimmed edges touching the registration pins. Providing that magnification is not excessive, this method will yield matrices of reasonably accurate registration.

# Reducing Attachment

A REDUCING ATTACHMENT, available as an accessory, greatly increases the scope of the enlarger.

By means of the attachment, a negative image may be reduced to less than half the original diameter, printed the same size, or enlarged to less than  $1\frac{1}{2}$  diameters.

## To Attach the Reducing Attachment

First remove the lens board and lens from the enlarger by loosening the screws that hold the board in place. Do not remove the screws. Attach the board and lens to the lower end of the reducer BELLOWS.

Unscrew the knurled BINDING SCREWS and slide the reducer onto the end of the enlarger BED PLATE, as far as it will go. The paper holder will have to be moved to allow this to be done. Tighten the binding screws to hold the reducer in place.

Raise and attach the top of the reducer bellows to the bottom of the enlarger bellows.

If a projected image is to be reduced less than  $\frac{1}{4}$  diameter or enlarged  $1\frac{1}{8}$ ,  $1\frac{1}{4}$ , or  $1\frac{3}{8}$  diameters, the small scale supplied with the reducing attachment must be attached to the bottom of the enlarger scale.

## To Adjust the Scale on the Attachment

With the enlarger set at the  $2\frac{1}{2}$  mark, put a negative in the negative holder. Loosen the KNURLED SCREW on the front of the reducer SUPPORT and run the support to the bottom of the reducer BED PLATE. Focus the image on the paper holder by a slight up-and-down movement of the reducer support and lock the support in place. Loosen the three screws on the reducer SCALE and slide the scale up or down until the  $2\frac{1}{2}$  mark is opposite the INDICATOR. Tighten the three screws.

## To Operate the Reducer

The reducer scale has two sets of figures. The lower half of the scale from  $1\frac{1}{8}R$  to  $2\frac{3}{4}$  is for reducing. The 1-to-1 position is at the line I, midway between E and R. The upper half of the scale from  $1\frac{1}{8}E$  to  $1\frac{1}{2}$  is for making enlargements less than  $1\frac{1}{2}$  diameters.

To operate the reducer, loosen the knurled screw on the reducer support and slide the support to the bottom of the bed plate.

Set the scale indicators of both the enlarger and the reducer at the number indicating the reduction desired. For example: To get a  $2\frac{1}{2} \times 3\frac{1}{2}$ -inch print from a 5 x 7-inch negative (a two-times reduction), the enlarger indicator

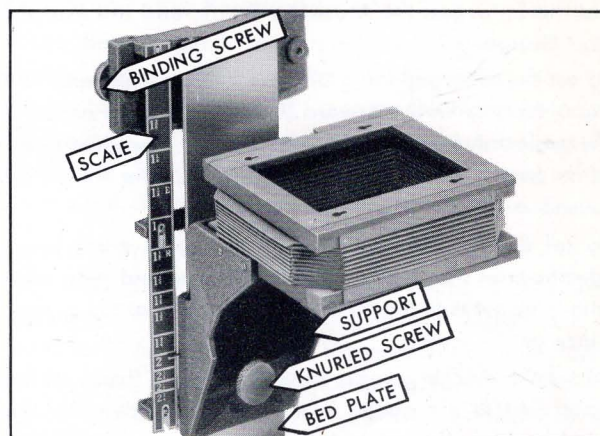


Figure 7

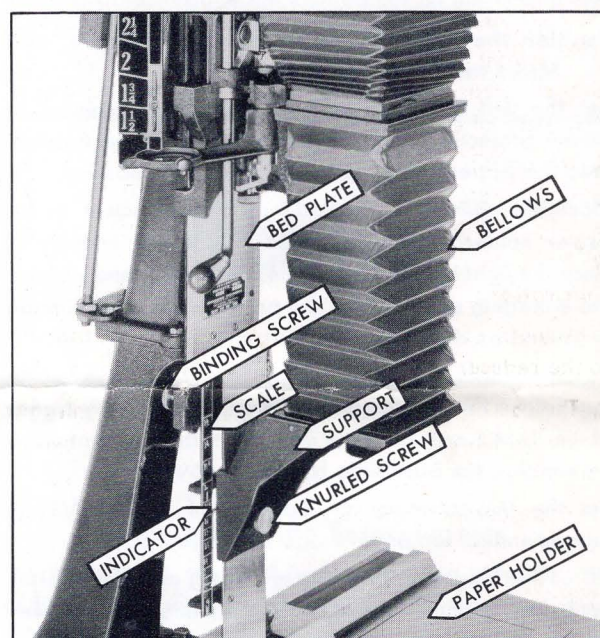


Figure 8

would have to be set at 2 on the enlarger scale; the reducer indicator would have to be set at 2 on the lower half of the reducer scale.

If a projected image is *not* sharp, it may be necessary to move the reducer support up or down slightly. Tighten the knurled screw to hold the lens in the desired position. The operating handle of the enlarger can be operated more easily when the reducing attachment is used, if the reducer support is lowered to the bottom of the reducer bed plate.

Owing to variation in the focal length of lenses supplied for the enlarger, the graduations on the lower scale of the reducer can be only approximate. The final position of the indicator, when a negative image is focused, may be slightly above or below a specific scale marking.

Due to the concentration of light, a smaller lens opening is needed for reducing than is required for enlarging.

# Care

## Cleaning

1. The enlarger must be kept free of grit and dust, particularly those parts which come in contact with the negative or paper. Carefully wipe all these parts with a soft, clean, lintless cloth.
2. The lens cells should be kept screwed together tightly and the lens must be screwed tightly into the lens board.
3. The front and rear surfaces of the lens should be cleaned occasionally with Kodak Lens Cleaning Paper or a piece of clean, soft linen.
4. The surface of the cam on which the roller travels must be kept clean.
5. Keep the counterbalance uprights clean at all times.

## Lubrication

1. A touch of paraffin should be applied occasionally to the reducer bed plates.
2. The cam roller and other moving parts of the enlarger should be lubricated occasionally with a drop or two of light oil.
3. Occasionally apply a drop of thin oil to each counterbalance upright.

# Service

## To Check the Illumination

Lay the white card, packed with the equipment, on the paper holder. Pull out the front and side mask slides and turn back the rear slide with its knurled knob control, to permit the maximum amount of light to pass through the enlarger lens. Set the diaphragm of the enlarger lens at  $f/8$ . Raise the safety screen by its handle, and step on the foot switch. If the illumination on the paper is not even, adjust the lamp as follows: Unscrew the set-screw beneath the locking collar and turn the collar to the right to loosen it. Raise or lower the tube to which the lamp is attached until the best possible illumination is

secured. Lock the tube in place by turning the locking collar to the left. Tighten the setscrew.

## To Check the Focus

Remove the negative holder, and place a negative (emulsion side down) between the fixed sheet of glass and the cover glass. Insert the holder in the frame and project the negative image onto the white card placed in the paper holder.

If the projected image cannot be brought into focus, check the focus marks at the two points indicated in the illustration (Fig. 11). If the lower mark is not in line with the matching mark on the check nut collar, loosen the check nut, and turn the knurled nut just below it to the right or left. Tighten the check nut when the marks are directly in line.

If the upper focus mark is not in line with the matching mark on the bar that projects through the metal plate, loosen the check nut back of the plate, and turn the screw beneath the nut to the right or left to line up the marks. Tighten the check nut.

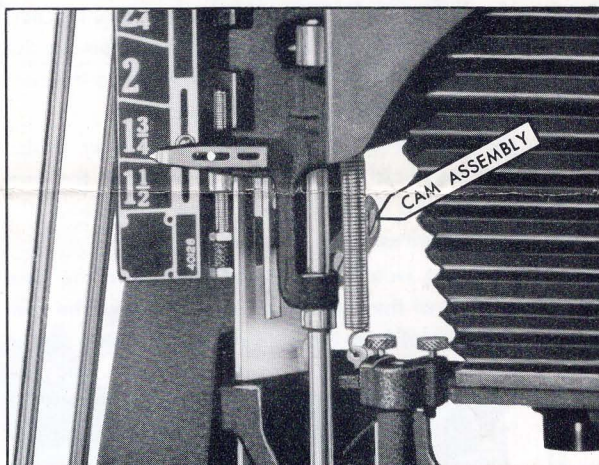


Figure 9

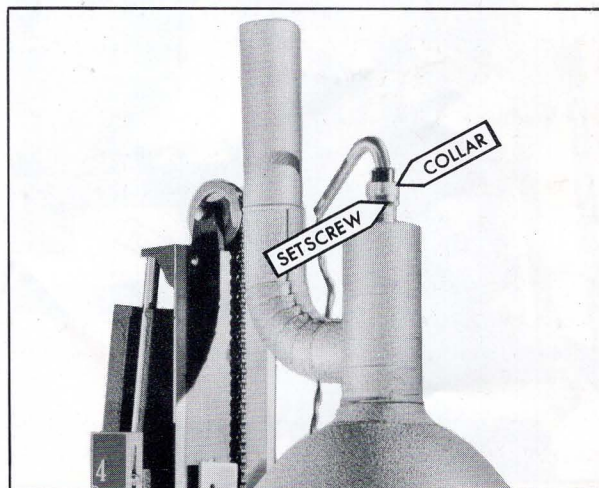


Figure 10

### Negative Holder Glass

To replace the fixed negative holder glass, remove the screws from the four retaining strips.

### Bellows

Remove the reflector and lift out the heat-absorbing glass, the sandblasted glass, and the ground glass. Remove the four screws that hold the reflector base to the negative holder plate. Remove the reflector base and remove the four screws that hold the negative holder plate to the upper bellows frame holder. Remove the negative holder plate and the four masks. Remove the four screws that hold the bellows to the lower bellows frame holder. Remove the six screws that hold the bellows to the upper bellows frame holder and remove the bellows. Replace the bellows by reversing the above instructions.

### Foot Switch

Remove the four back plate screws and remove the back plate. Untape the wiring connections and note the manner in which they are connected so that they may be replaced in the same manner. Disconnect the reflector cord and the extension cord from the switch wires and slide the back plate off. Unscrew the cord bushing nuts that hold the cord bushings to the back plate. Remove the foot switch pin that holds the foot switch lever to the foot switch base. Lift out the foot switch lever.

Remove the foot lever spring. Remove the four switch plate screws that hold the mechanical switch to the foot switch base. Lift out the switch plate and switch and disconnect the two wires.

Unscrew the foot switch lever stop screw from the hole in the front part of the foot switch base. Remove the foot switch lever stop nut from the foot switch lever stop screw.

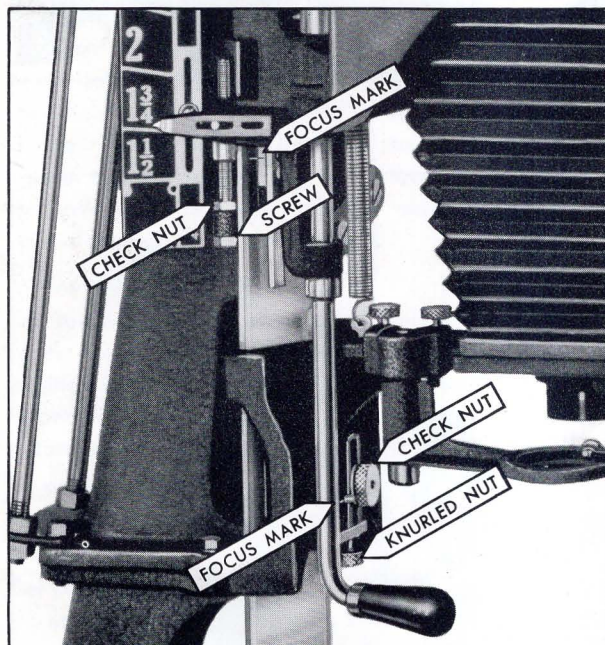


Figure 11

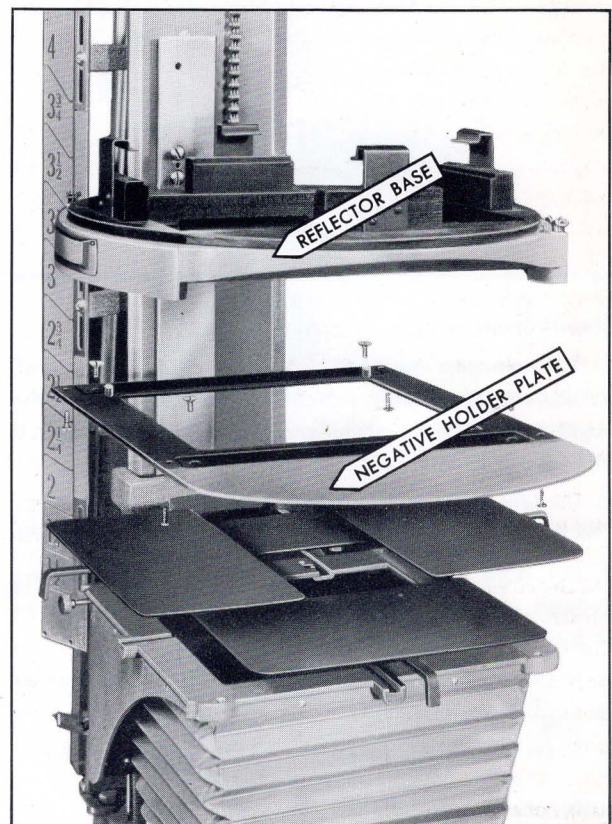


Figure 12

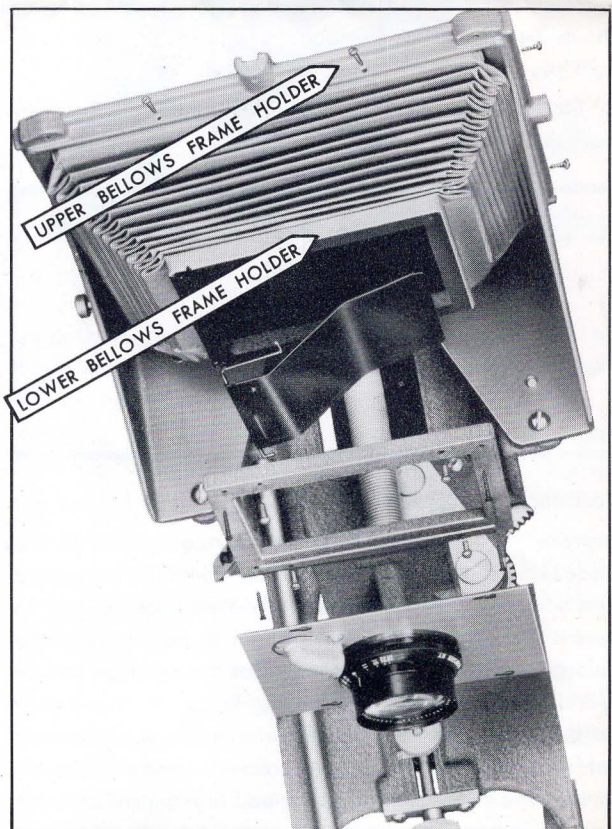


Figure 13

To reassemble the foot switch, connect the two wires to the binding posts of the switch. Replace the switch plate on the foot switch base in such a manner that the switch wires are toward the rear of the base. Fasten the assembly to the base with the four switch screws. Insert the end of the foot switch lever between the jaws on the back part of the foot switch base and start the foot switch pin through one hole in the base and one hole in the foot switch lever. Insert the foot switch pin through one hole in the base and one hole in the foot switch lever.

Insert the ends of the foot lever spring in the depressions in the bottom of the base, with the spring loops facing in. Push the switch pin through the spring loops and through the opposite holes in the foot switch lever and the foot switch base. Insert the two cord bushings in the openings in the back plate and fasten the bushings in the openings with the two nuts. Insert the reflector cord and extension cord ends through the proper bushing, as noted in figure 15. Strip, splice, solder, tape and connect the two switch wires with the reflector and extension cord wires. Attach the back plate to the foot switch base with the four back plate screws. Turn the foot switch lever stop screw nut onto the foot switch lever stop screw and insert the screw down in the threaded opening in the front of the foot switch base. Adjust the stop screw and nut so that the foot switch can be depressed only as far as is necessary to light the lamp.

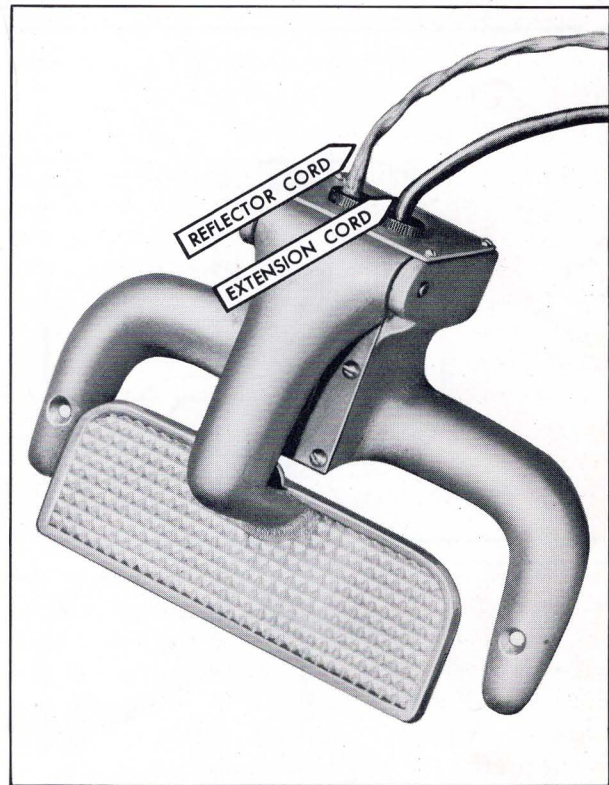


Figure 14

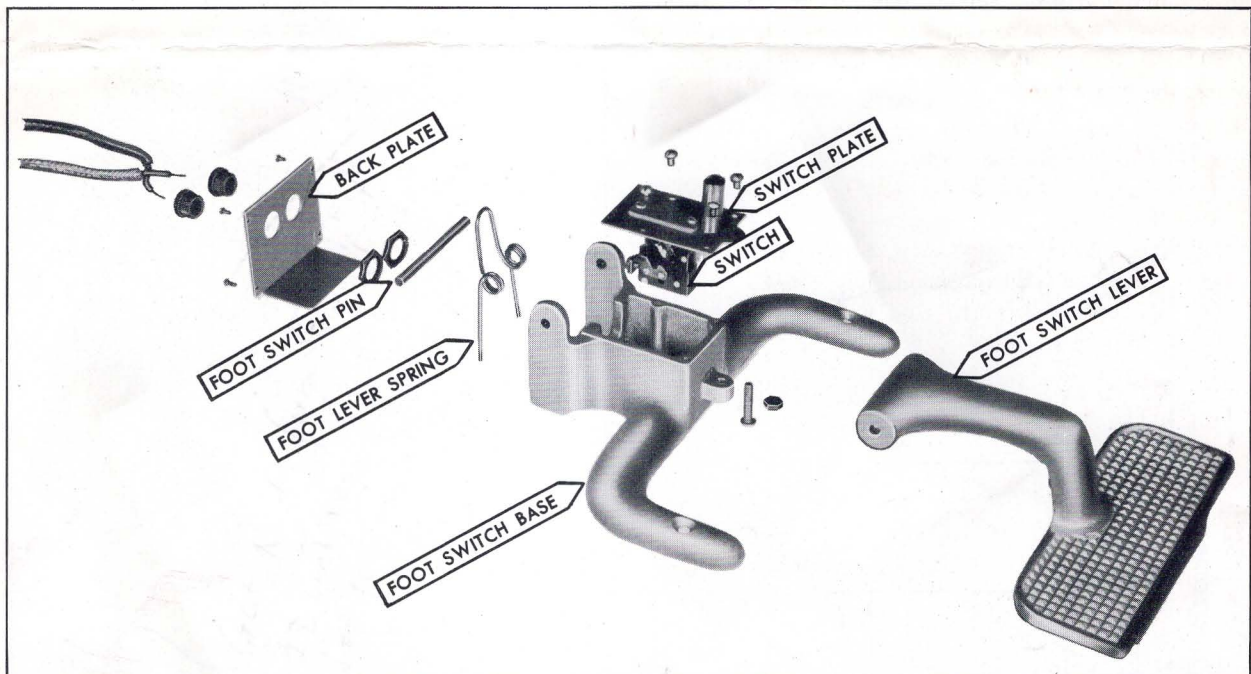
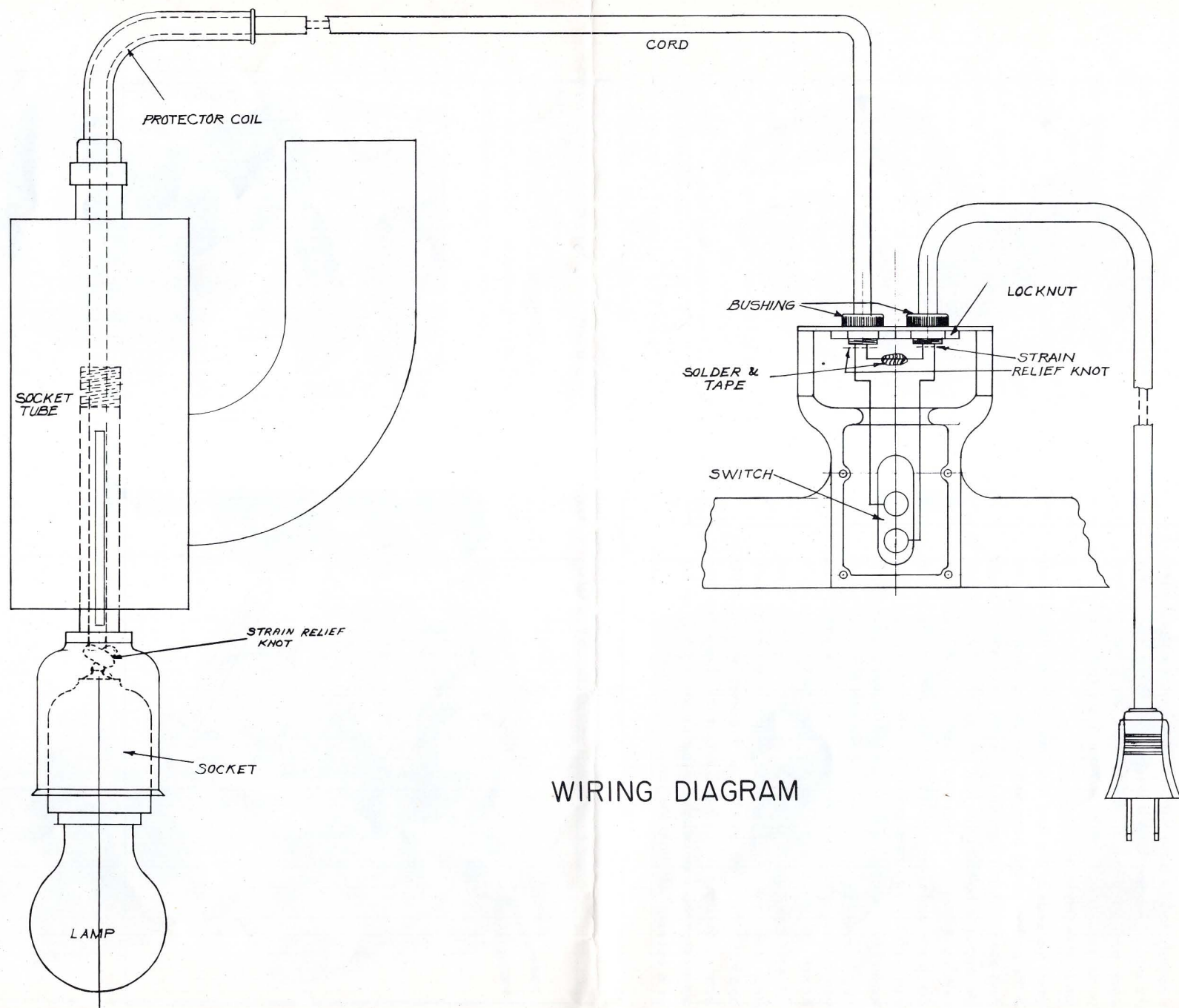


Figure 15



WIRING DIAGRAM

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