Film-Tech

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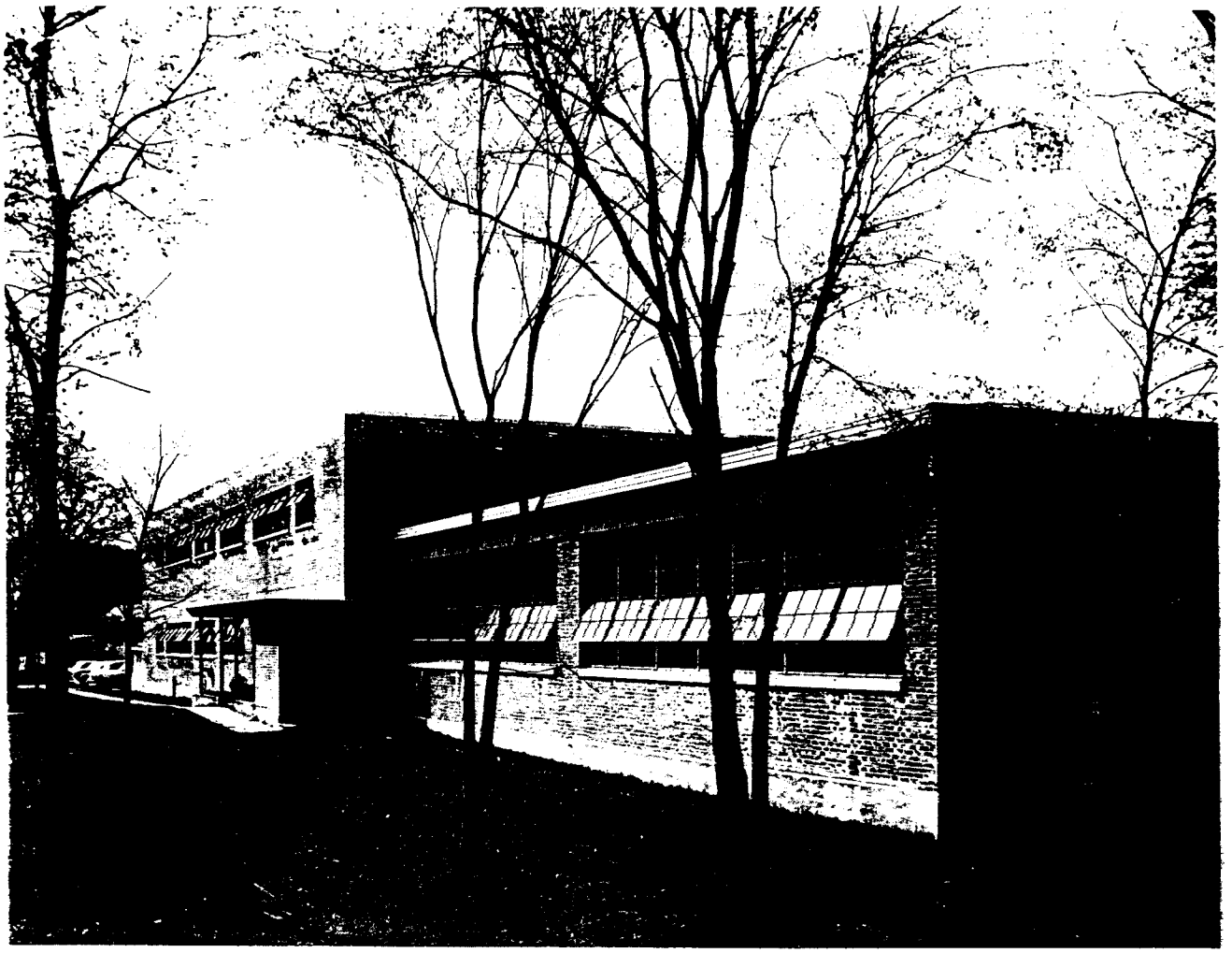
SIMPLEX®
X-L

Projector Mechanism
Instruction Manual

GPL Division – GENERAL PRECISION, Inc.

September 1, 1960
1000



Simplex X-L projectors, formerly manufactured in the Bloomfield, N. J. plant of the International Projector Corporation, will now be produced by the GPL Division - General Precision, Inc., in its modern factory in Pleasantville, N. Y.

GPL Division - General Precision, Inc., a subsidiary of the General Precision Equipment Corporation, which has been associated with the International Projector Corporation for over thirty-five years, has excellent production and engineering facilities. GPL Division, therefore, is capable of maintaining international leadership in the field of motion picture projectors, and providing theatre owners with the finest equipment at the lowest cost.

The competence of our distributors, The National Theatre Supply Company, to advise in emergencies, to install new Simplex equipment, and to deliver genuine Simplex parts, is known to exhibitors throughout the world.

"BETTER PROJECTION PAYS"

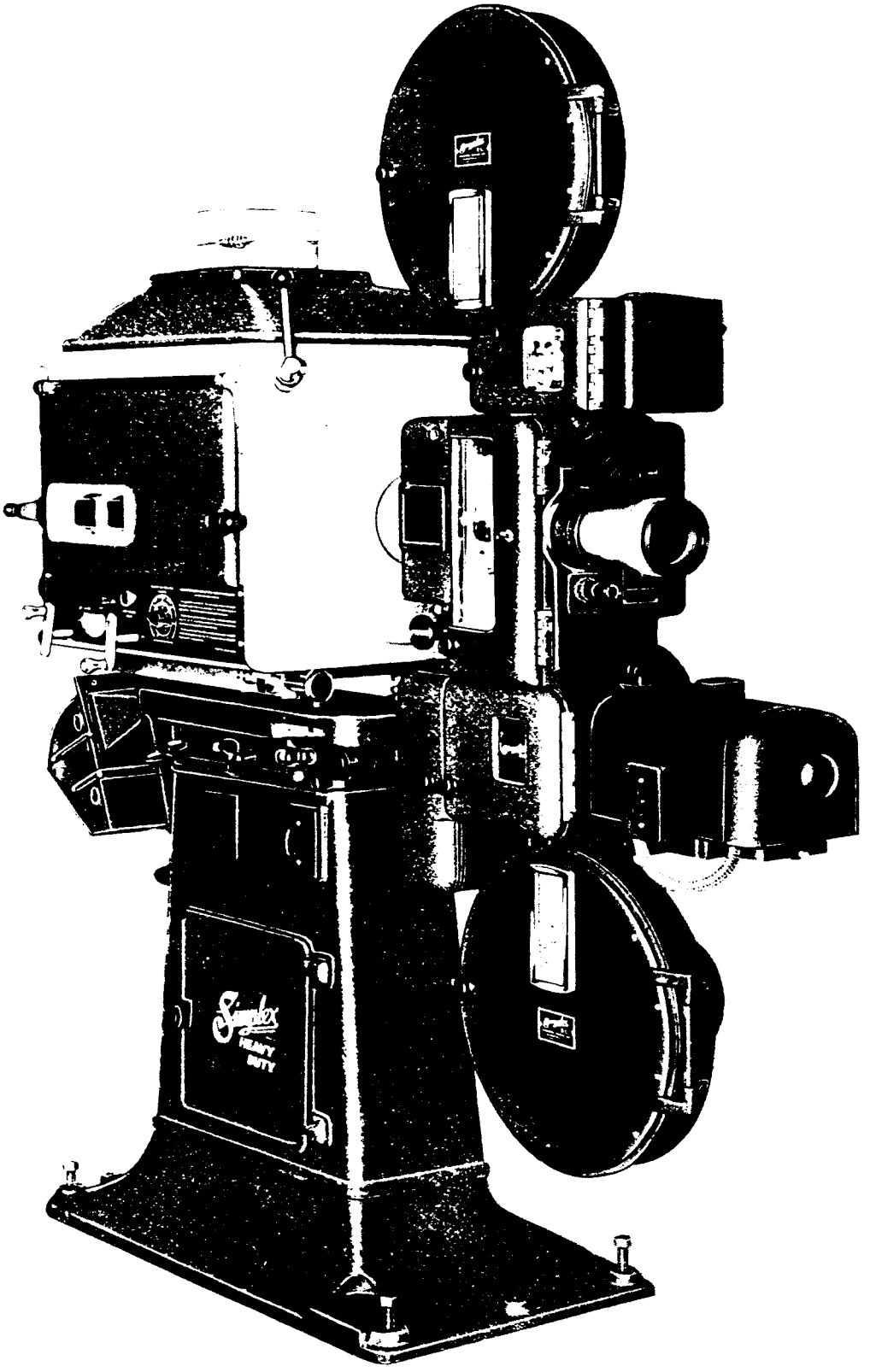


Figure 1-1

X-L Projection Equipment

FOREWORD

The Simplex X-L Projector combines rugged construction with ease of operation to provide theater owners with a superior mechanism, engineered to the high standards set for Simplex products.

The following design features illustrate why the Simplex X-L Projector is able to give continuously excellent performance throughout its long operating life:

Unit Design: Unit method of design simplifies part replacement and maintenance. All units may be quickly removed and replaced. Components within a particular unit are just as easily handled.

Soundhead: Although the Simplex X-L Projector was designed for use with the Simplex Soundhead, other soundheads may be used without loss of quality.

Main Drive and Idler Gear Assemblies: The main drive and idler gear assemblies are easily installed, insure proper driving from the soundhead, and are adjustable.

Optics: An adjustable conical shutter, positioned close to the picture aperture, provides very high light-efficiency. The lens holder will accommodate projector lenses up to four inches in diameter. Lens adapters are supplied to mount currently available lenses. An eight-power telescope, adjustable at eye level and mounted on the projector, permits easy focusing of the picture.

Film Compartment: The film compartment door is hinged, has rounded corners, and is finished in white baked enamel to simplify cleaning.

Gear Compartment: The gear compartment has a removable cover, rounded corners, and a gray enamel interior finish with facilitates cleaning.

Main Frame: The main frame forms a unit with the base, top, and front that is noteworthy for its simplicity and strength.

Feed Sprockets: The upper and lower feed sprockets, having twenty-four teeth each, reduce shaft speeds to prolong operating life, permit smoother wrap-around, and lessen the danger of splice breakage. The pad rollers are made of lightweight nylon.

Film Trap: The film trap has been modified to conform with the new curved gate. Tension pads have been replaced with pressure straps. The trap is quickly removed for cleaning and repair and is easily replaced.

Film Trap Curved Gate: The curved gate, together with the film trap, controls the movement of the film past the aperture by five different tension settings. Gate curvature provides compensation for heat-induced warping of the film at the aperture, thus insuring a sharper image on the screen. The gate is easily removed, cleaned, and replaced.

Intermittent Movement: The intermittent sprocket is adjustable, making absolute alignment possible. A high-speed intermittent movement, which is interchangeable with the standard movement, is available and may be used with this projector.

Lubrication: A Spray-O-Matic lubrication system, employing a gear-driven oil pump, completely lubricates all moving parts. The moving parts in the gear compartment are visible through the glass panel in the full-vision oil-sealed cover. The intermittent movement lubricates itself by pump action. It is also lubricated by the Spray-O-Matic system. An oil level indicator on the external oil gauge permits a visual check of the oil level.

Cooling: The projector is shipped from the factory with an air-cooled system for indoor operation. A conversion kit accompanies the projector, should it be necessary to use water cooling.

This manual should be studied carefully by installation personnel, all projectionists and maintenance personnel, so that preventive maintenance routines may be established. Intelligent handling and proper maintenance of the X-L Projector will result in a minimum time loss due to repairs, and in a longer operating life.

TABLE OF CONTENTS

TABLE OF CONTENTS CONTINUED

TABLE OF CONTENTS CONTINUED

LIST OF ILLUSTRATIONS

LIST OF ILLUSTRATIONS CONTINUED

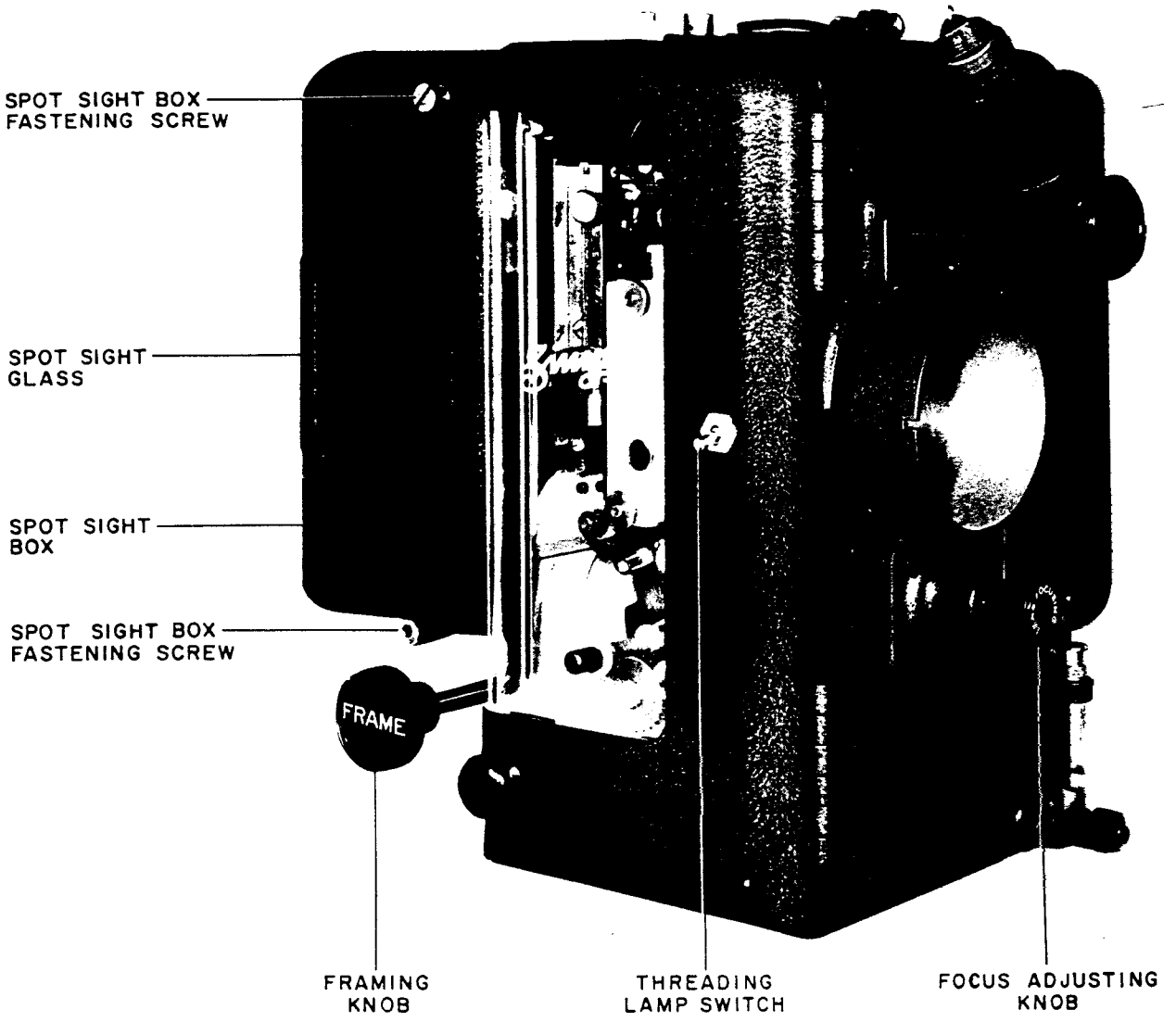


Figure 1-2

Film Side, Gate Closed

SECTION I

INSTALLATION

A. GENERAL

Each projector is carefully tested and inspected before leaving the factory. Unless subjected to particularly severe handling during shipping, the projector will operate perfectly when installed. The following recommendations should be studied carefully prior to installation. The sound system, arc lamps, pedestals, and power conversion equipment should be installed according to the instruction books furnished with these units.

1. Unpacking

The Simplex Projector is shipped in a sturdy cardboard carton. The required accessories are shipped with the projector. The top of the shipping carton is clearly marked, and there are no special instructions needed to remove the Projector and its accessories. However, the projector should be thoroughly inspected after it has been removed from the carton, and all foreign matter, which may have entered in transit, should be removed.

2. Tools and Accessories

The following tools and accessories are furnished with each Projector:

1 G-2083 Simplex Oil Can
1 P-1395 Wrench, Hex. #8 Socket Cap Screw
2 G-2229 Transformers
1 P-2710 Wrench, Hex. #6 Socket Cap Screw
1 P-2711 Wrench, Hex. #10 Socket Cap Screw
1 P-2712 Wrench, Hex. #1/4 Socket Cap Screw
1 P-2713 Gem Oiler #1709 (1/2 pint)
1 P-2725 Wrench, Hex. #6 Set Screw
1 P-2726 Wrench, Set Screw #6 Bristol

The above tools and accessories will be needed to make adjustments and replacements. Keep them in a safe, accessible place in the projection room.

B. MOUNTING

1. General

a. On Simplex Sound Mechanism

1) Use the furnished screws to fasten the mechanism mounting bar to the bottom of the projector. The oil pan is not required.

2) Bolt the projector and mechanism bar to the sound mechanism, making the connection finger tight.

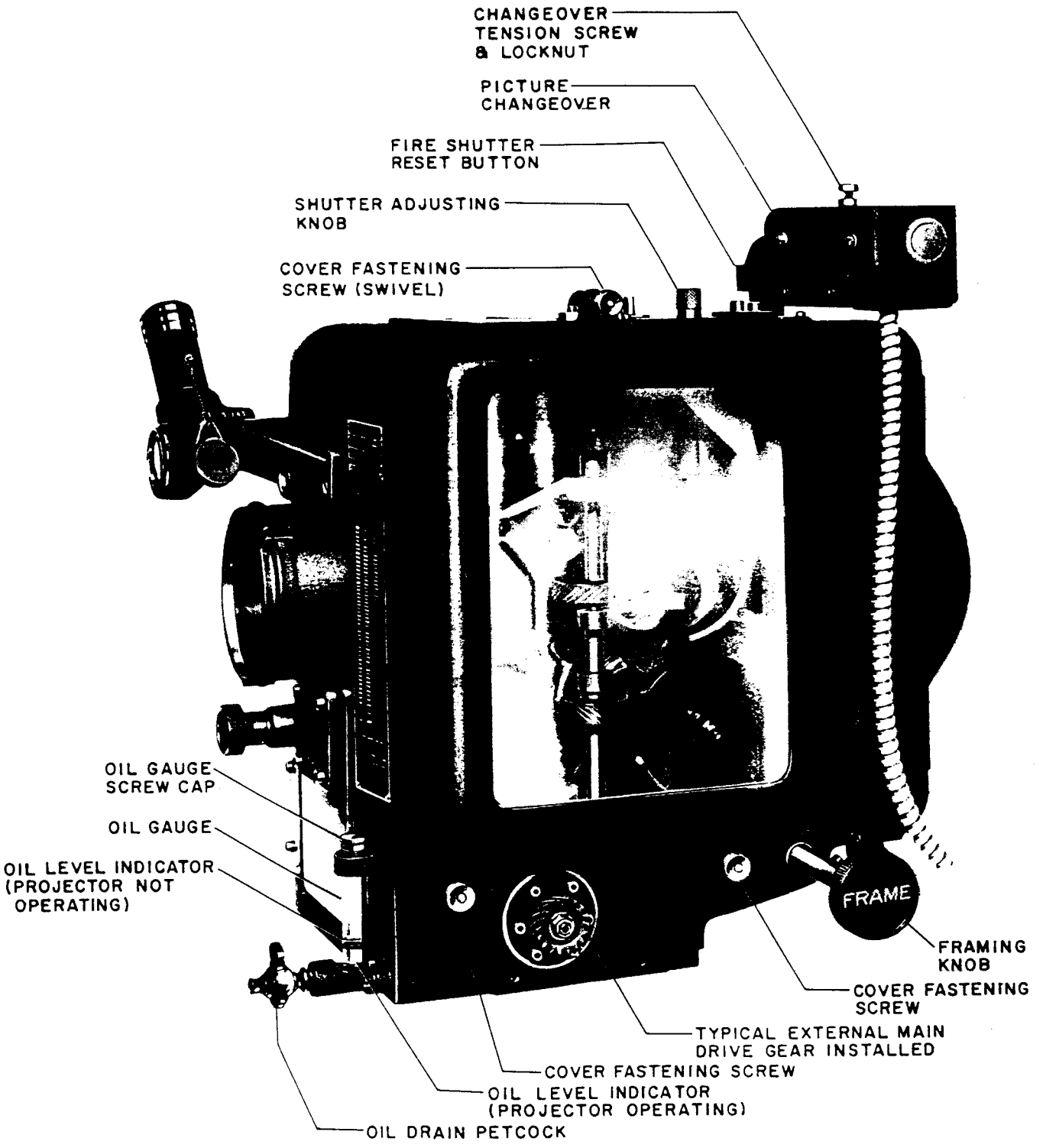


Figure 1-3

Gear Side, Cover Closed

3) Use the mechanism bar adjusting screw on the front of the sound mechanism to position the projector, so that the main drive and idler gear assembly does not interfere with the main drive gear on the sound mechanism.

4) Reposition the projector, after the main drive and idler gear assembly is installed (paragraph 2. below), to obtain proper gear mesh, then tighten the mechanism bar mounting bolts securely.

CAUTION

Do not tighten the mechanism mounting bar bolts more than is needed to secure them properly. Overtightening, which may bend the bar, should be avoided.

b. On Other Types of Sound Mechanism

1) Mount the projector on the sound mechanism as previously described. The oil pan is not required.

NOTE

The main drive and idler gear assembly, paragraph E below, will drive the projector properly without the use of shims.

2) When the sound mechanism includes a device to adjust the position of the projector for proper drive, the mounting bolts should be finger tight until the main drive and idler gear assembly has been installed. Tighten these bolts when the projector is positioned, as stated in paragraph 2. below.

2. Main Drive and Idler Gear Assembly

The projector is driven from the soundhead through the main drive and idler gear assembly. A number of these assemblies are available, and the projector can be used with a variety of soundheads.

a. Simplex Four Star and X-L Sound Mechanisms, Westrex 800 and SH-1000 Soundheads (G-2086)

RCA PA-24, PS-26, ML-1023 to ML-1032 Soundheads (G-2130), RCA ML-1040 to ML-1077, ML-9030 to ML-9077 Soundheads (G-2086), Western Electric TA-7400 Reproducer Sets (G-2129). (See figure 1-4.)

1) Remove locknut (A) and washer (B) from the projector and retain.

2) Remove protector (C) and tag (D) from the projector and discard.

3) Make sure that the drive shaft key (E) remains in its slot in the shaft.

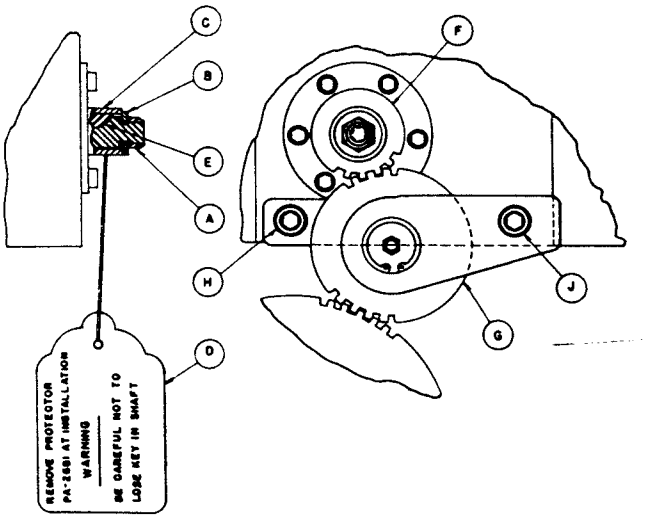


FIGURE 1-4

Main Drive and Idler Gear Installation
Simplex Sound Mechanism, RCA, W.E.
TA-7400, Westrex 800, SH-1000

4) Slide the external main horizontal drive gear (F) on the shaft from which the protector (C) was removed, with its hub toward the projector and its keyway in exact alignment with key (E). Secure, using washer (B) and locknut (A).

5) Position the idler gear bracket assembly (G) on the projector with its gear in mesh with Gear (F) and the sound mechanism main drive gear so that its mounting holes are aligned with the mounting holes in the projector.

6) Install fastening screws (H) and (J) finger tight. Note the difference in length of the two screws furnished with some assemblies and install accordingly.

7) Adjust the idler gear bracket assembly (G) until there is a barely noticeable backlash between its idler gear, gear (F) and the sound mechanism main drive gear, at the tightest point of mesh of all gears.

8) Tighten screws (H) and (J) securely.

9) Turn the projector over by hand to check for proper mesh and readjust if necessary.

b. Motiograph SH-7500 Soundhead (G-2069)

Western Electric TA-7500 Reproducer Set (G-2069). (See Figure 1-5.)

1) Remove the soundhead cover and the soundhead main drive gear at (A) and discard. Retain key at (B).

2) Position the intermediate gear, sprocket and bracket assembly (D) with the three H-2727 Screws (E) finger tight.

3) Place drive chain (F) around the chain sprocket of (D).

4) Slide the main drive gear (A) on shaft, in place of the gear removed in paragraph a. above. Align the main drive gear keyway with the key (B). Align gear (A) with the gear of (D) and tighten set screw (C) securely.

5) Adjust (D) to obtain slight backlash between the meshing gears, then tighten screws (E) securely.

6) Remove locknut (G) and washer (H) from the projector and retain.

7) Remove protector (I) and tag (K) from the projector and discard. Retain drive shaft key (J).

8) Slide three P-2842 Shims (M) on the shaft and insert key (J) in its keyway in the shaft.

9) Place the drive chain (F) around the main drive sprocket (L) and slide this sprocket on the drive shaft with its hub toward the projector and its keyway aligned with key (J).

10) Check alignment of sprocket (L) with the sprocket on (D). Use as many P-2842 Shims (M) as required to obtain exact alignment and fasten sprocket securely, using washer (H) and locknut (G).

NOTE

Exact alignment of the two chain sprockets is necessary to insure smooth operation of the drive.

11) Slide P-2838 Roller (P) on P-2839 (N) and mount on idler roller bracket (R) using the H-3707 Set Screw (Q).

12) Mount the idler roller bracket (R) on the soundhead using two H-3306 Washers (T) and two H-2711 Screws (S) adjusted finger tight.

13) Adjust (R) to take the slack out of Chain (F) and tighten screws (S) securely.

NOTE

Periodically apply a light coating of graphite to the chain.

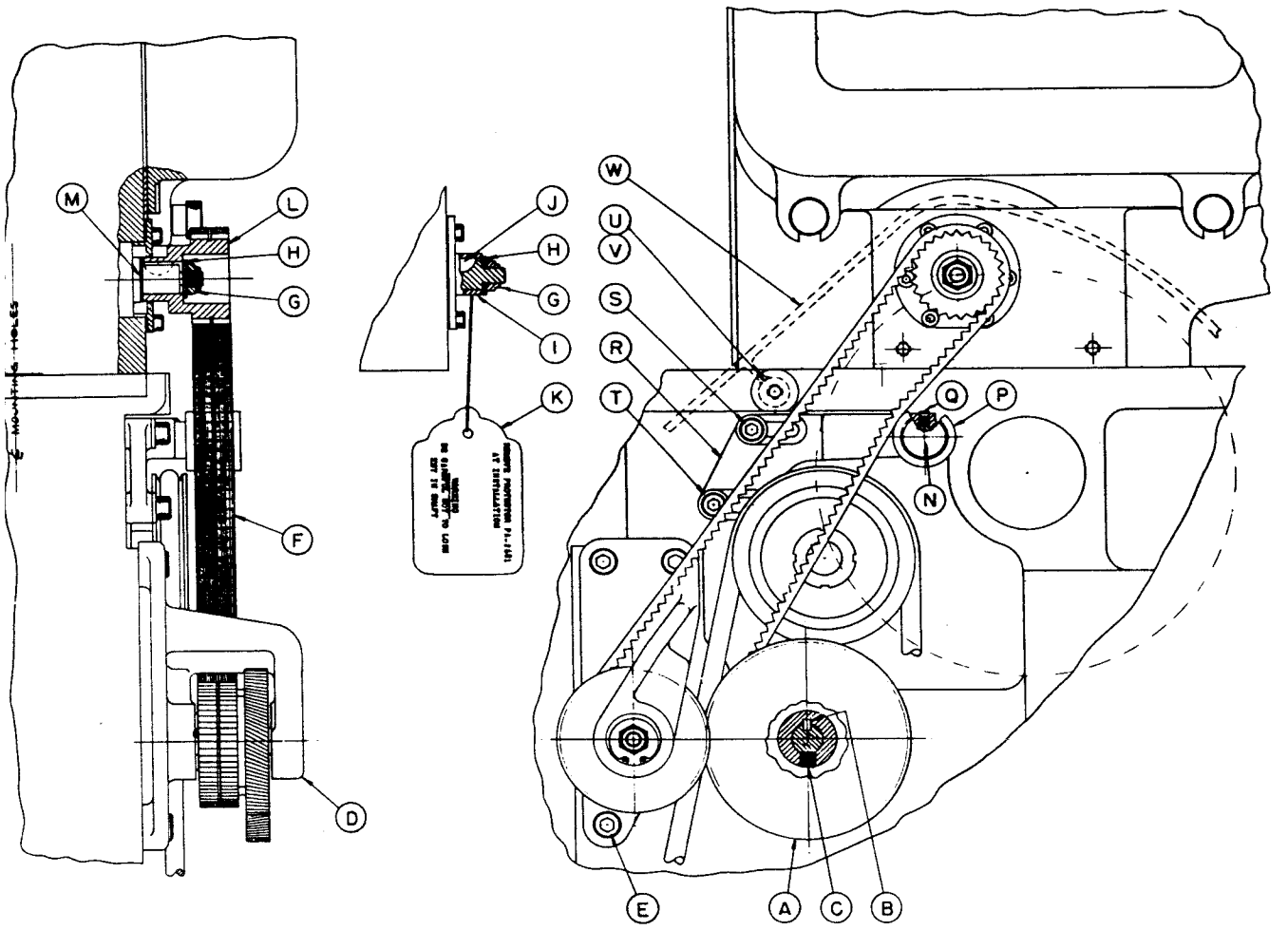


FIGURE 1-5

Main Drive and Idler Gear Installation
Motiograph SH-7500, W.E. TA-7500

14) Install the soundhead cover (W), fastening with screws (U) and (V) that were used with the former cover.

c. Western Electric 206 and 208 Type Reproducer Sets (G-2149) (See figure 1-6.)

1) Cut the framing knob shaft (A) of the projector 1/2 inch from the main frame on the gear side, so that it will not interfere with the reproducer set flywheel. Smooth the end of the shaft and discard the framing knob.

2) Remove locknut (B) and washer (C) from the projector and retain.

3) Remove protector (D) and tag (E) from the projector and discard.

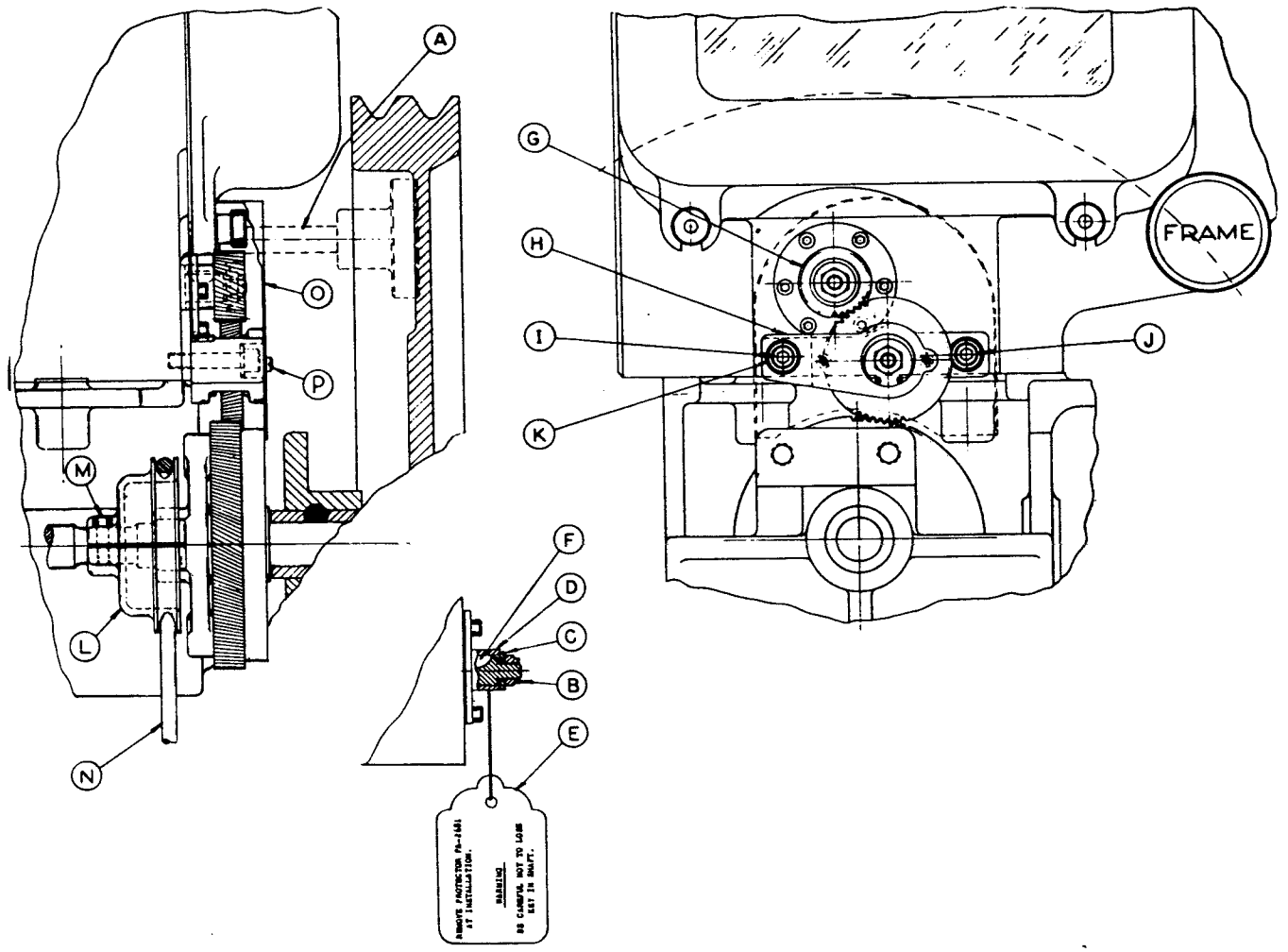


FIGURE 1-6

Main Drive and Idler Gear Installation
W.E. 206, 208

4) Make sure that the drive shaft key (F) remains in the keyway in the shaft.

5) Slide the external main horizontal drive gear (G) on the shaft, from which protector (D) was removed, with its hub toward the projector and its keyway in exact alignment with key (F). Secure using washer (C) and locknut (B).

6) Position the idler gear bracket assembly (H) on the projector with its gear in mesh with gear (G) and the reproducer set main drive gear, and so that its mounting holes are in line with the mounting holes on the projector.

7) Install washers (D) and the P-1566 Fastening Screw (J) finger tight.

8) Adjust the idler gear bracket assembly (H) so that there is slight backlash between its idler gear (G), and the reproducer set main drive gear, at the tightest point of mesh.

9) Tighten screws (I) and (J) securely.

10) Mount the split pulley (L) on the reproducer set main drive shaft (relieved portion) with the two halves in alignment, and adjust the two P-1528 Fastening Screws (M) finger tight.

CAUTION

The split pulley (L) is used only with the W-18 lower Magazine equipped with W-46 Takeup.

11) Install the round leather takeup belt (N), previously used, with its length adjusted as required.

12) Align the split pulley (L) with the pulley on the lower magazine and tighten screws (M) securely.

13) Position the gear cover assembly (O) and fasten securely with the two P-1538 Screws (P).

CAUTION

Before removing the gear compartment cover, rotate the framing knob so that the intermittent flywheel is at its highest position. The cover can usually be removed, if it is slid upward carefully almost to the intermittent flywheel and then angled. Otherwise, it will be necessary to loosen the reproducer set flywheel and slide it away from the projector slightly.

d. Western Electric Universal Base (G-2180) (See figure 1-7.)

1) Remove locknut (A) and washer (B) from the projector and retain.

2) Remove protector (C) and tag (D) from the projector and discard.

3) Make sure that the drive shaft key (E) remains in its slot in the shaft.

4) Slide the driven coupling fork (F) on the shaft from which protector (C) was removed, with its hub toward the projector and its keyway in exact alignment with key (E).

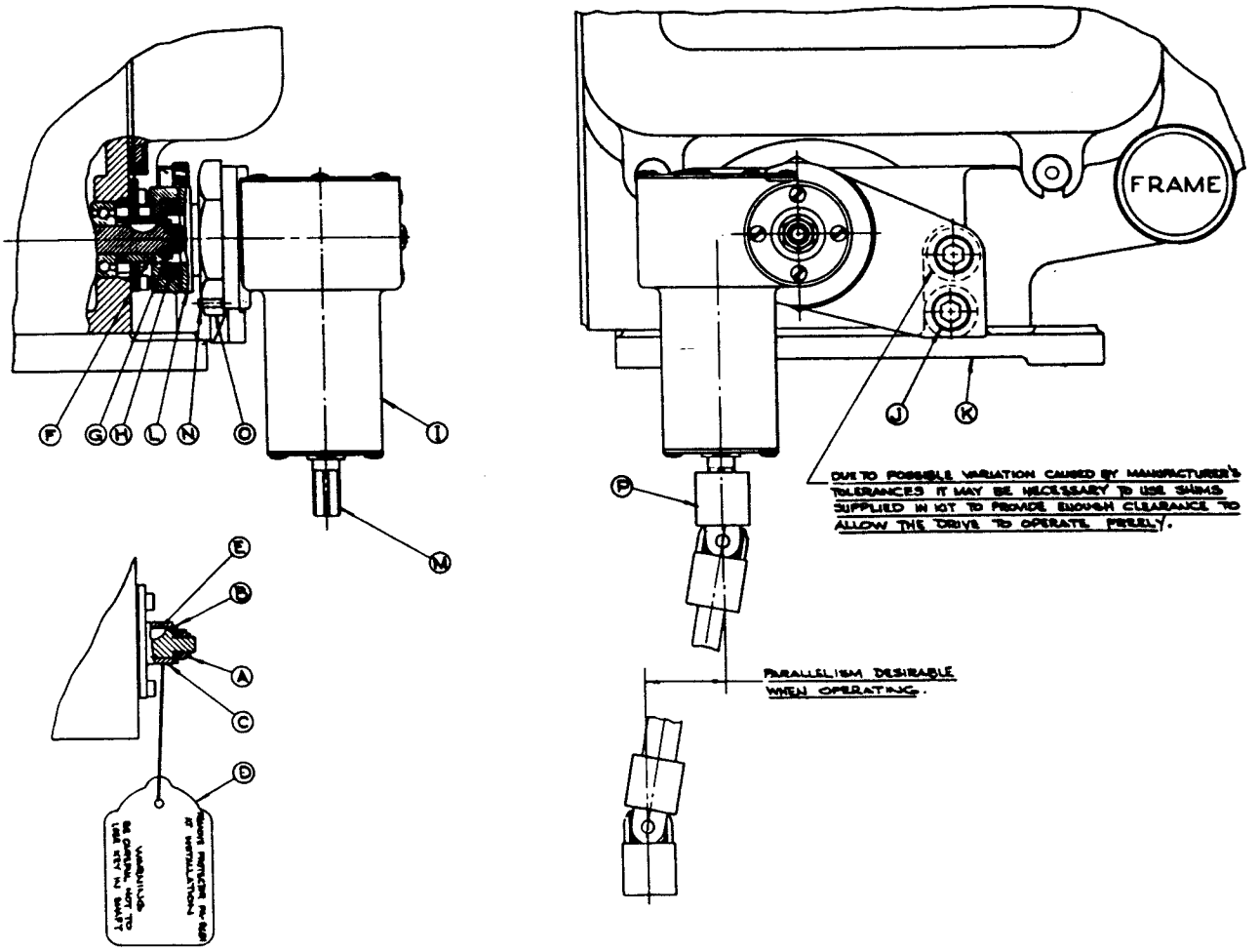


FIGURE 1-7

Main Drive Installation--Western Electric
Universal Base

5) Slide spacer (G) on shaft and secure, using washer (B) and locknut (A).

6) Position the coupling block (H) on the driven coupling fork (F).

7) Position the gear box (I) so that its driving coupling fork (L) is in alignment with the coupling block (H) and its two mounting holes are also in alignment with the tapped holes in the #700-A Adapter. Insert fastening screws (J) and tighten securely.

NOTE

There should be just enough clearance between the coupling block (H) and coupling forks (F) and (L) for smooth, quiet operation. If there is any binding, use shim washers, between #700-A Adapter and the gear box (I).

8) Loosen the set screw (N) in the large locknut (O), then loosen locknut (O) and turn the gear box (I) so that the shaft (M) is vertical. Tighten nut (O) and set screw (N).

NOTE

Shaft (M) should be vertical so that both ends of the flexible drive shaft are parallel. When the projection angle exceeds 25°, the universal base bracket should be tilted and the gear box (H) turned until the maximum angle at which the shaft (M) is vertical is obtained. Then adjust the legs of the universal base to the required projection angle.

9) Connect drive shaft (P) to shaft (M) and tighten set screws securely.

e. Century R2 and R6 and Westrex Master Soundheads (G-2195) (See figure 1-8.)

1) Remove the three stabilizer assembly fastening screws on the operating side and withdraw the assembly.

2) Loosen the motor coupling set screw (A) at the motor end.

3) Remove the four vertical shaft-bearing housing-fastening screws (C) and take out the vertical shaft with its bearings, housings and motor coupling.

4) Remove the knurled knob (D) from the horizontal shaft (E).

5) Remove the four horizontal shaft-bearing housing-fastening screws (G) and take out the horizontal shaft (E) with its bearings, housings, and gears.

6) Remove collar (H), washers (J), and slide bearing and housing (K) from shaft.

7) Replace gear (L) on the horizontal shaft with the G-2192 Drive Gear and fasten with the P-1367 Screw (M).

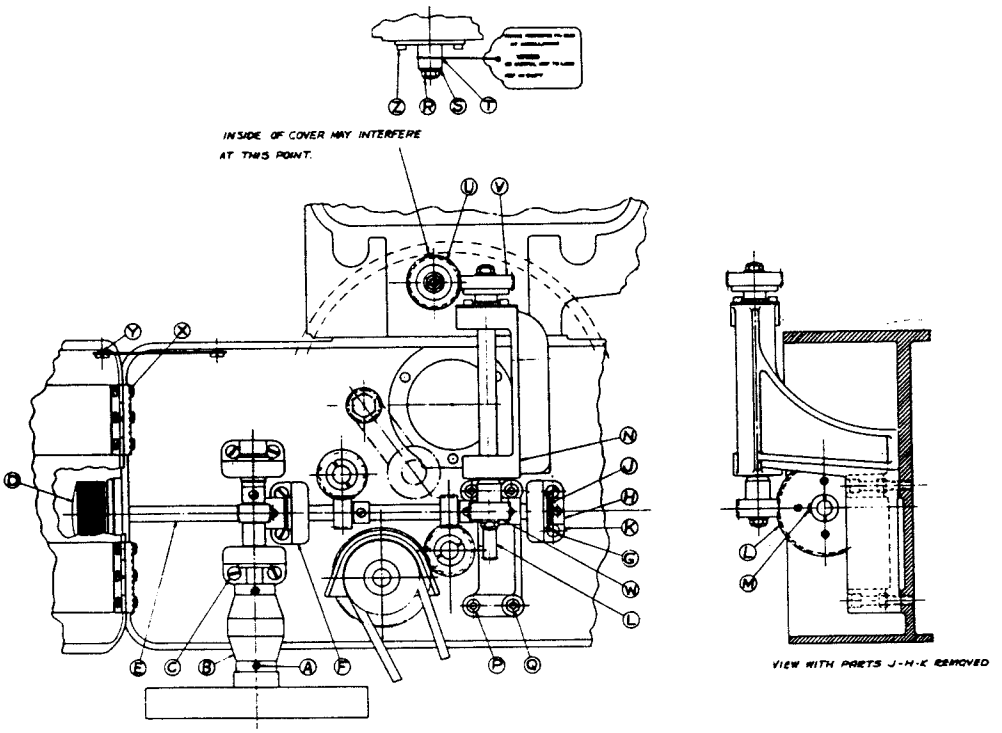


FIGURE 1-8

Main Drive Installation--Century R-2 & R-6
Westrex Master

8) Replace bearing and housing (K), washers (J) and collar (H) and fasten collar.

9) Mount the X-L Projector on the soundhead and remove the locknut (R) and washer (S) and retain.

10) Remove the protector (T) and attached tag and discard.

11) Make sure that the key remains in its keyway in the shaft.

12) Slide the P-2979 Gear (U) on the shaft, from which protector (T) was removed, with its keyway in exact alignment with the key and fasten with washer (S) and locknut (R).

13) Position the G-2195 Drive Adapter (N) with gears (U) and (V) meshed, the two H-1536 Screws (P), and the two H-1537 Screws (Q) finger tight.

14) Position the horizontal shaft (E), modified as in paragraph 7) above, with mating gears meshed and the four fastening screws (G) finger tight.

NOTE

The horizontal shaft must be slid into position carefully to avoid damage to the gears.

15) Slide knob (D) on the shaft and fasten.

16) Position the vertical shaft (B) with the mating gears in mesh, the four fastening screws (C) finger tight, the motor coupling and motor shaft in alignment, and tighten the set screw (A).

17) Raise the drive adapter (N) so that its lower gear (W) is on the center line of the horizontal shaft (E); adjust this shaft and the position of the X-L Projector so that gears (U) and (V) and gears (L) and (W) are properly meshed with just perceptible backlash, and tighten the four fastening screws (P) and (Q) and the projector fastening screws.

18) Adjust the horizontal shaft (E) and the vertical shaft (B) so that there is just perceptible backlash between the mating gears and tighten the four fastening screws (C).

NOTE

It may be necessary to repeat paragraphs 17) and 18) successively to obtain smooth, quiet operation. It may also be necessary to adjust the motor.

19) Mount the stabilizer assembly and fasten.

20) If there is interference between the soundhead door on the non-operating side and the projector drive gear (U), elongate the holes in hinge (X) and raise the door.

NOTE

If may be necessary to elongate the holes in the door latch and to replace the shoulder screw (Y) by the P-2682 Shoulder Screw so that the link will not bind.

21) If the soundhead door strikes one of the bearing plate fastening screws (Z), file the door as required.

3. Upper Magazine

a. Simplex X-L Magazine (See figure 2-3.)

The fire rollers are included with this magazine and a film observation light and switch provided.

1) Remove the access plate on the back of the magazine bracket.

2) Remove the unconnected wire from the slot in the top of the projector and pass through the hole in the bottom of the magazine bracket. It may be necessary to loosen the cover plate on the top of the projector.

3) Mount the magazine on the projector and fasten with the screws supplied.

4) Connect the wire to the switch on the access plate and replace the plate.

NOTE

The upper magazine-door has two positions to accommodate it to projector tilt angles.

b. Reel End Alarm (See figure 1-9.)

With each Simplex X-L Upper Magazine a P-2736 Screw and flange is supplied so that any reel alarm having a 3/8-27 thread may be used. The installation is as follows:

1) Compress P-1970 Friction Spring Knob and hold.

2) Remove P-1910 Adjusting Screw and discard.

3) Substitute P-2736 Screw and assembly.

4) Release P-1970 Friction Spring Knob and adjust as required for desired friction.

5) Install the reel end alarm in accordance with instructions furnished with the unit.

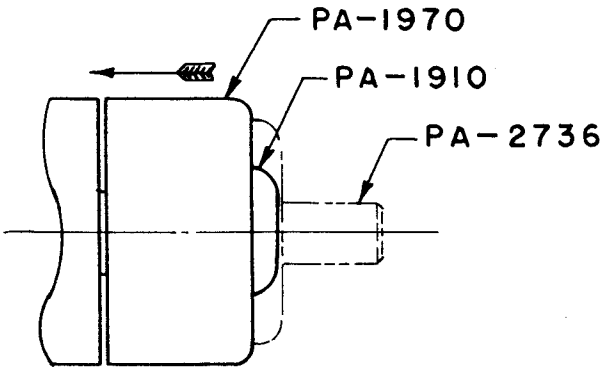


FIGURE 1-9

Reel End Alarm Adapter Installation

c. Other Types of Magazines (See figure 1-10.)

With the exception that Massachusetts requires the use of Kit G-2183, one G-2108 Magazine Adapter Kit is required per projector. The letters in figure 1-10 refer to similar letters in parentheses in the following installation procedure:

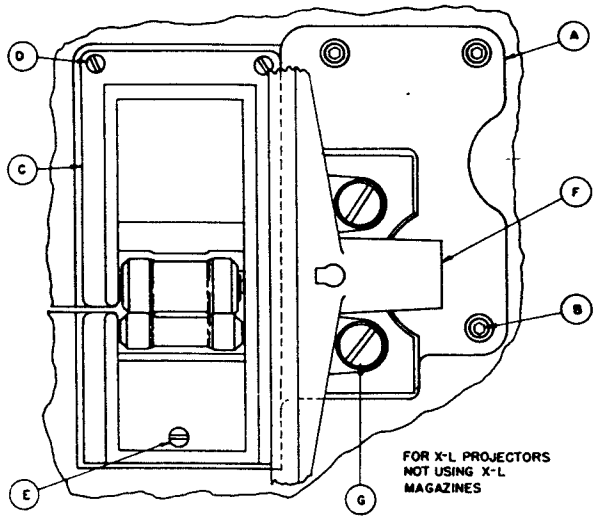


FIGURE 1-10

Simplex U-18 Magazine Adapter Installation

1) Position the P-1839 Adapter Plate on the top of the projector with its four clearance holes in alignment with the four tapped holes in the projector and the radial cutout as shown.

NOTE

Be sure that the wires in the slot in the top of the projector do not interfere with mounting the plate.

2) Fasten with four P-1430 Screws.

3) Position the G-2112 Roller Holder Assembly on (A) with its three clearance holes in alignment with the three tapped holes in (A).

4) Fasten with two H-1533 Screws at one end.

5) Fasten with one H-1503 Screw at the other end.

6) Position the upper magazine on (C) with its two clearance holes in alignment with the two tapped holes (C).

7) Fasten with two H-1531 Screws.

4. Transformer (See figure 1-11.)

The G-2229 Transformer furnishes power for the framing and threading lamps in the projector and the observation light in the Simplex X-L Upper Magazine. It should be mounted on the projector pedestal in a convenient location and the connections made as shown.

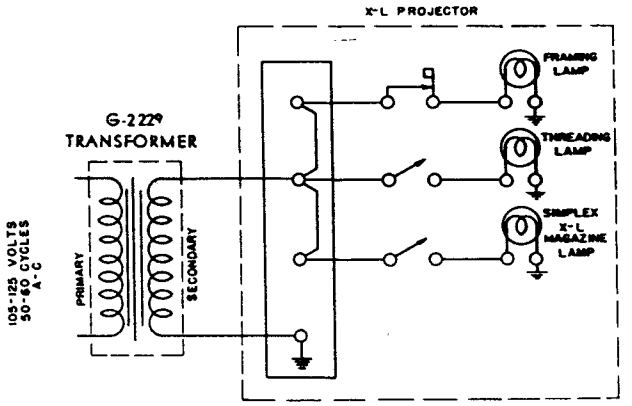


FIGURE 1-11

Light Transformer and Lamp Schematic

5. Picture Changeover (See figure 1-12.)

While the projector is equipped with an a-c picture changeover, connections should be made as shown. D-c changeovers are available.

The substitution should be made as described in Section IV, paragraph J.

6. Light Shield (See figure 1-13.)

Mount a light shield, heat shield or similar device on the plate at the rear of the projector, if required by the particular type of arc lamp used.

7. Projection Lens

Lens adapter kits, that permit the use of all current types of lenses, including the 4-inch diameter lens, are available. The installation procedures follow:

a. All Types of Lenses

1) Loosen the lens holder clamping and locking screws (figure 1-13) and turn the focus adjusting knob (figure 1-2) so that the lens holder is in mid-position.

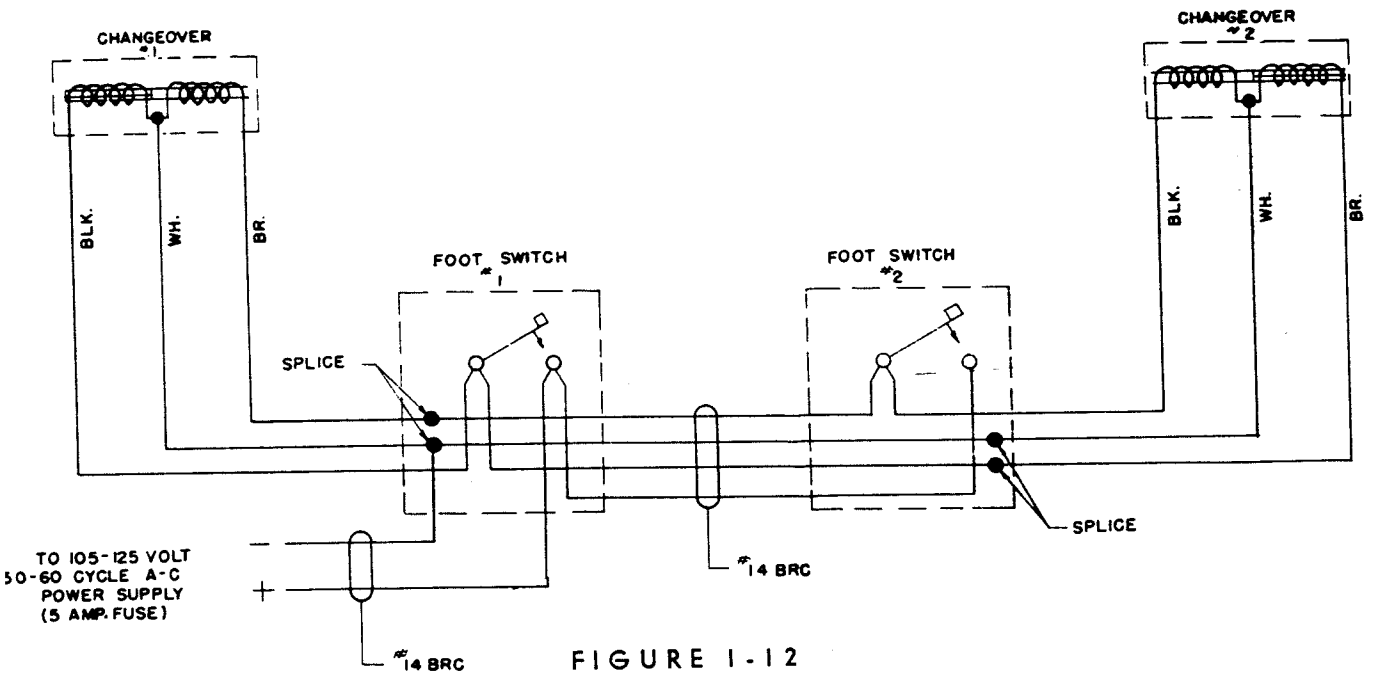


FIGURE 1-12

Picture Changeover Schematic

2) Install the lens adapter kit and projection lens (refer to paragraphs b., c., or d. below) as determined by the particular projection lens to be used. When an anamorphic lens is used, refer to paragraph e. below.

3) Start the arc lamp and the projector.

4) Move the lens and adapter or the lens in the adapter, as required, so that the picture aperture is focused on the screen and tighten the lens holder clamping screw.

NOTE

Open and close the film trap gate to make sure that the light shield on the rear of the lens adapter just enters the film trap gate when it is closed and does not strike the film trap gate in its extreme open position.

5) Tighten the lens holder locking screw.

6) Loosen the lens stop ring clamping screw and slide the stop ring over the lens or lens adapter.

7) Align the stop ring location pin with the slot in the front of the lens holder, press the stop ring against the lens holder and tighten the stop ring clamping screw.

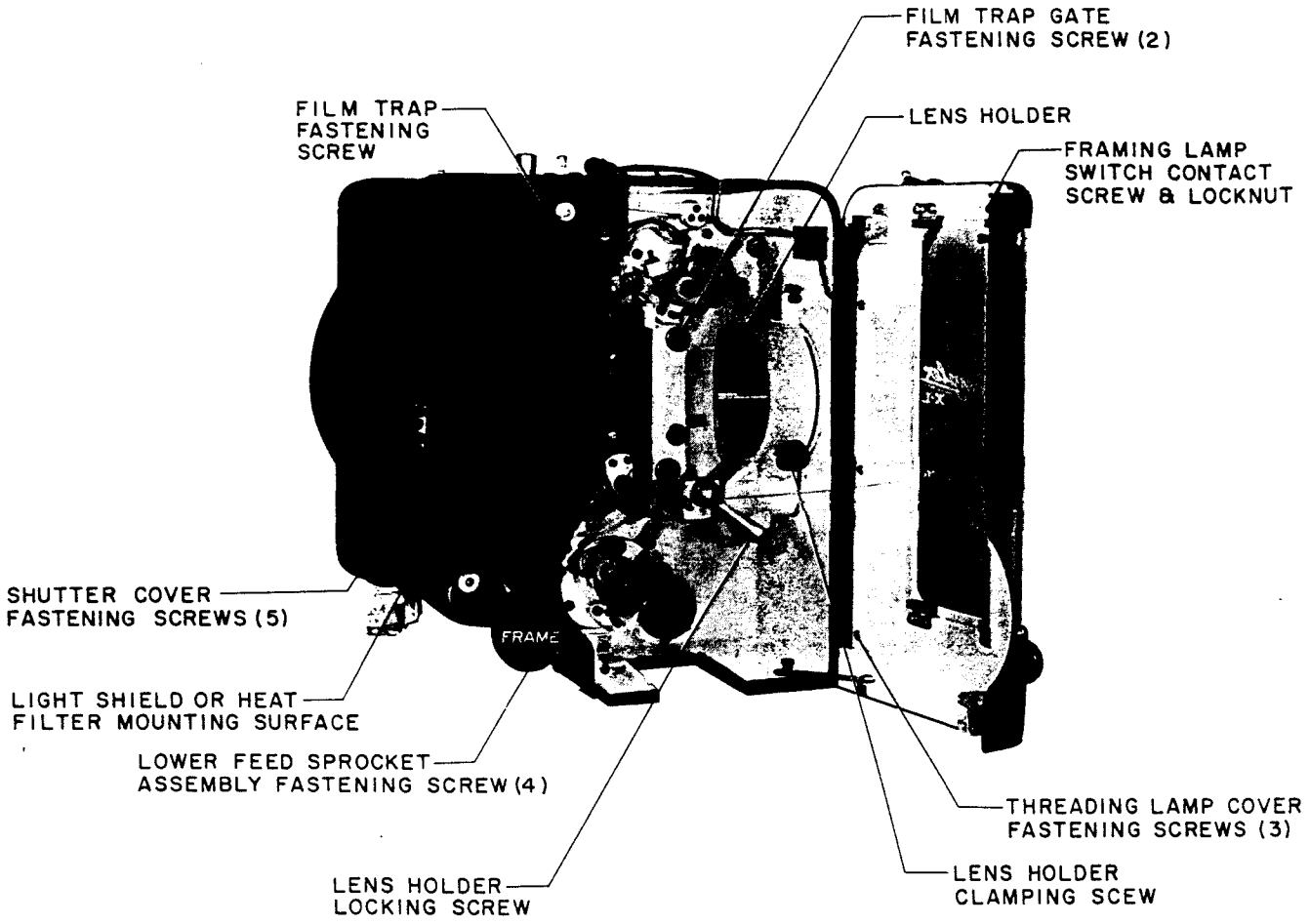


Figure 1-13

Film Side, Film Compartment Gate Open

NOTE

It is important that the lens stop ring be installed properly so that the projection lens, in its adapter, may be removed for cleaning and so that it may be reinstalled without the necessity of refocusing the picture on the screen.

b. Four Inch Diameter Lenses--All Focal Lengths (See figure 1-14.)

1) Loosen the lens adapter clamping screw and tighten the lens adapter expansion screw sufficiently so that the lens slides readily into the adapter with its shoulder against the lens adapter.

2) Loosen the expansion screw and tighten the clamping screw sufficiently to hold the lens in position.

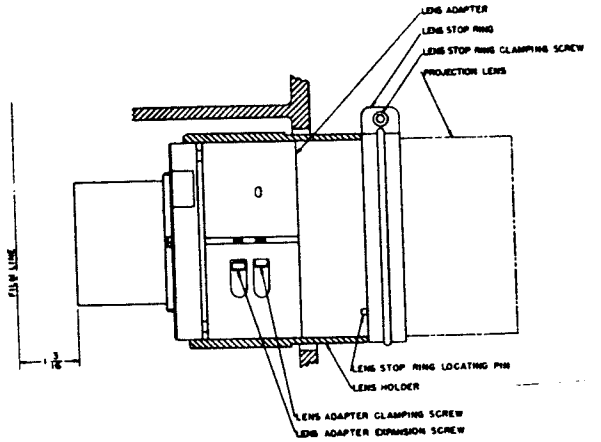


FIGURE 1-14

Lens Adapter Installation--4" Diameter Lenses

3) Slide the lens adapter into the lens holder until the rear of the light shield is 1-3/16 inches from the film line.

NOTE

It will be convenient to remove the film trap gate per Section IV, paragraph B, 1 to make this measurement. When the film trap gate is reinstalled make sure that the light shield does not interfere with its operation.

4) Follow the instructions in preceding paragraph a. to focus the picture aperture, and complete the installation.

c. 2-25/32 Inch Diameter Lenses--All Focal Lengths (See figure 1-15.)

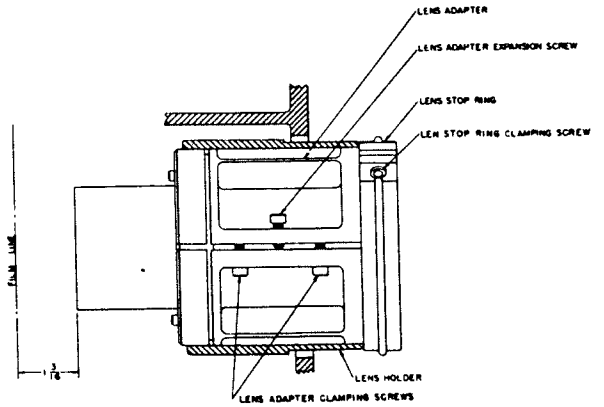


FIGURE 1-15

Lens Adapter Installation--2-25/32" Diameter Lenses

1) Loosen the lens stop ring clamping screw and remove the stop ring from the lens adapter.

2) Loosen the two lens adapter clamping screws and tighten the lens adapter expansion screw sufficiently so that the lens slides readily into the adapter.

3) Position the lens temporarily midway in the adapter, loosen the lens adapter expansion screw and tighten the clamping screw sufficiently to hold the lens in position.

4) Slide the adapter into the lens holder until the rear of the light shield is 1-3/16 inches from the film line.

NOTE

It will be convenient to remove the film trap gate (Section IV), paragraph B, 1, to make this measurement. When the film trap gate is reinstalled make sure that the light shield does not interfere with its operation.

5) Follow the instructions in preceding paragraph a. to focus the picture aperture, and complete the installation.

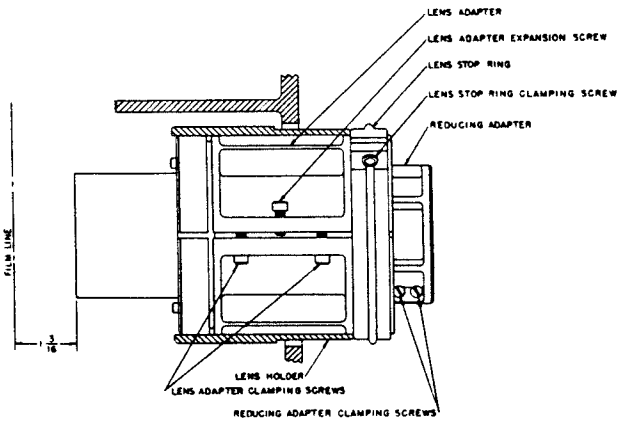


FIGURE 1-16

Lens Adapter Installation--2.031", 2.118", 2.125" Diameter Lenses

d. 2.031, 2.118 and 2.125 Inch Diameter Lenses--All Focal Lengths (See figure 1-16.)

1) Loosen the lens stop ring clamping screw and remove the stop ring from the lens adapter.

2) Loosen the reducing adapter clamping screws sufficiently so that the lens slides readily into the reducing adapter.

3) Position the lens midway in the reducing adapter and tighten the clamping screws sufficiently to hold the lens in position.

4) Loosen the two lens adapter clamping screws and tighten the lens adapter expansion screw sufficiently so that the reducing adapter, with the lens, slides into the lens adapter readily.

5) Position the reducing adapter midway in the lens adapter temporarily, loosen the expansion screen and tighten the clamping screws sufficiently to hold the reducing adapter in position.

6) Slide the lens adapter into the lens holder until the rear of the light shield is 1-3/16 inches from the film line.

NOTE

It will be convenient to remove the film trap gate per Section IV, paragraph B, 1 to make this measurement. When the film trap gate is reinstalled make sure that the light shield does not interfere with its operation.

7) Follow the instructions in paragraph 1) above to focus the picture aperture, and complete the installation.

e. Anamorphic Lens

1) When other than a 4" diameter projection lens is used, the anamorphic lens should be attached to the projection lens using the adapter furnished by the lens manufacturer. Install the combination in the lens holder as described in preceding paragraphs c. and d.

2) When a 4" diameter projection lens is used, a support is required for the anamorphic lens. It is supplied as the G-2335 Lens Mounting Kit and should be installed in accordance with the instructions supplied with the kit.

f. Projection Lens Removal

1) Loosen the lens holder clamping screw (figure 1-13) and withdraw the projection lens and adapter as a unit.

2) The lenses may be cleaned without removing the projection lens from its adapter, or changing its position in the adapter.

3) To reinstall the projection lens and adapter, when its position has not been changed in the adapter, slide the adapter into the lens holder, align the lens stop ring pin with the slot in the lens holder, press the lens stop

ring against the lens holder, and tighten the lens holder clamping screw. It should be necessary to refocus the picture on the screen, if the removal and replacement are carefully carried out.

4) If the projection lens is to be replaced, the procedure for the lens adapter used should be followed.

8. Special Aperture Plates

Aperture plates, for the several screen ratios, may be ordered. Undersize plates are used with either flat or curved screens.

C. INSPECTION

1. Remove the film trap gate (figure 2-3)(Section IV, paragraph B, 1.) inspect the film runners for dirt, grit or other foreign material, and clean with a cloth.

2. Remove the film trap (figure 2-3) (Section IV, paragraph C, 1.) inspect pressure straps and lateral guide rollers for dirt, grit or other foreign material, and clean with a cloth.

3. Inspect the entire film compartment carefully for operation of pad rollers and film trap gate. Be sure all parts are clean.

4. Turn the projector over by hand and observe operation on both film and gear sides. It should turn freely and smoothly.

D. INITIAL LUBRICATION (See figures 1-3, 1-17, 1-18.)

NOTE

When the Simplex X-L Projector is used in drive-in theatres, the oil gauge is mounted at the rear of the Projector and the oil filter is located in the rear of the gear compartment, instead of as shown in figures 2-1, 2-2.

1. Set the black oil level indicator ring on the oil sight gauge as shown in figure 1-17 or 1-18. The drain plug in the oil gauge must be tight.

NOTE

When the projection angle is not exactly as shown in the chart, select the nearest angle, and raise or lower this ring to conform to the actual projection angle.

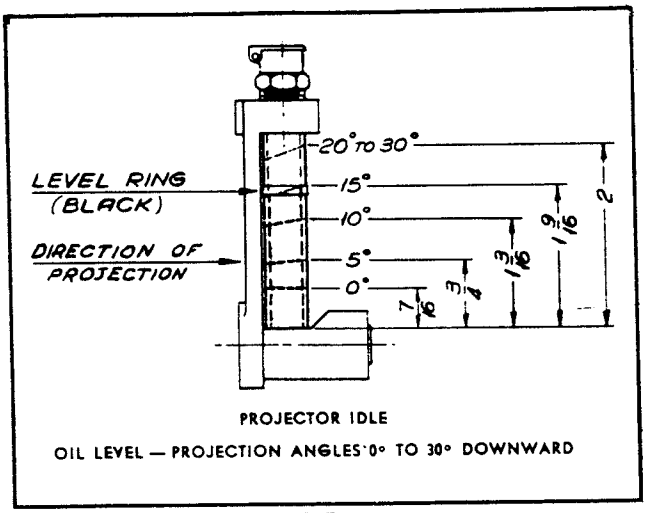


FIGURE 1-17

Oil Level--Projection Angles 0° to 30° Downward

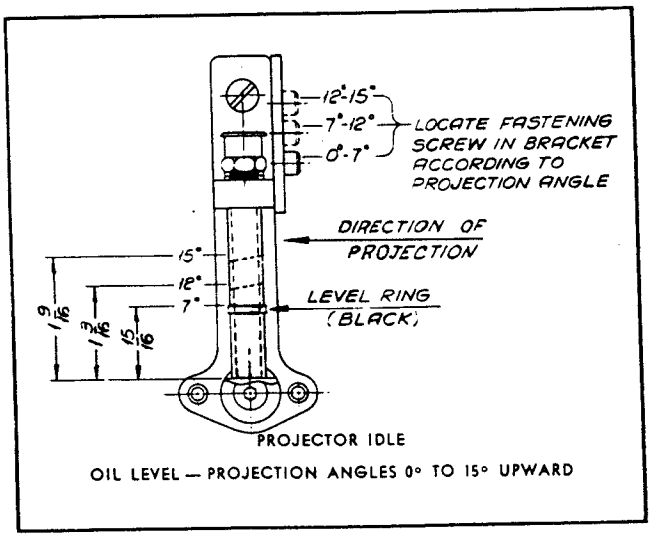


FIGURE 1-18

Oil Level--Projection Angles 0° to 15° Upward

2. Raise the sleeve around the shutter adjusting knob and, using it as a funnel, pour Simplex Projector Oil into the mechanism until the oil level is at the black indicator ring.

NOTE

When the Simplex Magnetic Soundhead is mounted on the projector, this sleeve will be accessible upon removal of the flywheel compartment cover of the soundhead.

CAUTION

If this oil level is exceeded, there may be leakage around the main horizontal drive gear shaft and bearing on the gear side of the projector. Only genuine Simplex projector oil should be used. Any other oil may cause serious operating difficulties and will void the factory guarantee.

3. Start the projector and run for at least one minute. Check for an oil splash on the gear compartment cover glass.

4. Turn the projector over by hand and observe operation on both film and gear sides. It should turn freely and smoothly.

CAUTION

Remove the gear compartment cover only when absolutely necessary and only after releasing all three cover fastening screws. Before replacing the cover, wipe all oil from the cover gasket and the mating surface on the projector. Any oil remaining on these surfaces will provide an oil creepage path after the cover is fastened. Tighten all three cover fastening screws (see figure 1-3.) equally and finger tight, just enough to form an oil-tight seal.

E. INITIAL OPERATION

1. Start the projector and observe operating performance, particularly with respect to lubrication and the main drive and idler gear assembly.

2. There should be an oil splash on the gear compartment cover and a steady, light flow of oil, (just more than a drip) from the oil tube just above the intermittent gear. (See figure 2-2.)

3. If gear whine is apparent, adjust the main drive and idler gear assembly for minimum gear whine, while the projector is running.

NOTE

While some gear whine may be noticed initially, it should disappear after a few hours of operation. Since the projectors have been "run-in" carefully at the factory, no "run-in" period is required after installation.

4. Thread a suitable film in the projector as follows: (See figure 2-2.)

a. With the film compartment door open, turn the projector by hand until one of the four index lines on the intermittent shaft collar coincides with the red index line on the intermittent outboard bearing bracket. The intermittent sprocket will then be at rest and in proper position for threading.

b. Set the framing knob (figure 1-2) in central position.

c. Open the upper and lower feed sprocket pad rollers.

d. Open the film trap gate by rotating film trap gate Operating Level toward the rear of the projector.

e. Thread with the film in frame at the framing aperture above the film trap (figure 4-3) and with upper and lower loops as shown.

NOTE

The framing lamp (figure 4-4) lights automatically when the film compartment door is open, thus, simplifying proper framing.

f. As threading progresses, close the upper feed sprocket pad rollers, the film trap gate (by pressing the film trap gate release lever in the direction of gate closure and downward about 45 degrees), and the lower feed sprocket pad rollers.

g. Check for proper threading and close the film compartment door.

5. Strike the arc, start the projector, observe the picture on the screen, and adjust the focus, in accordance with the following paragraph.

F. PICTURE FOCUS (figure 1-2)

1. General

The screen scope, when ordered, is shipped with the projector. It should be mounted on the projector and should be installed as shown, using the bolts supplied. The screen scope is a valuable aid in obtaining exact focus of the picture on the screen. It has an eight-power lens which brings the picture to one-eighth of the throw from the projector. Since its field is naturally

restricted, only a portion of the picture is visible in the screen scope. The procedure for using the screen scope follows:

a. Turn the knurled ring near the eye-piece until the clearest picture is obtained. This procedure is the same as adjusting a telescope to the eye. There is an index line and a scale which may be used to allow each projectionist to reset the scope as needed.

b. Readjust the projection lens by means of the lens focusing knob, as needed, until the sharpest picture, as viewed through the screen scope, is obtained.

CAUTION

Before attempting to focus the picture on the screen, the screen scope must be adjusted to suit the observer's eye or it will be impossible to obtain the sharpest possible picture on the screen.

2. Shutter Adjustment (See figure 2-2.)

a. The shutter is set at the factory at 84°, when used in conjunction with a standard movement. Since the projector is shipped with a standard movement, no adjustment should be necessary. The picture should be checked for "travel ghost", and, if necessary, the shutter adjusting knob should be turned to eliminate the ghosting. When a high-speed intermittent movement is used for indoor or drive-in operations, the shutter should be set initially at about 60°, and the picture checked for travel ghost as follows:

1) Loosen the four screws which secure the shutter blades and make a rough setting at or near 60°.

2) Run the projector with film and check for ghost. If ghost appears, the shutter blades should be opened until the ghost disappears.

3) If no ghost appears, close the blades until the first trace of ghost appears, then open them until it disappears. This is the correct shutter opening.

4) Tighten the four screws.

NOTE

The shutter range is from 47° through 92° and it may be adjusted through that range, depending on light requirements and the type of intermittent movement that is used.

3. Film Trap Tension (See figure 2-3.)

a. Set the film trap tension knob for minimum tension (extreme counter-clockwise position).

b. The film trap tension was accurately adjusted at the factory. If absolutely necessary, and to obtain a steady picture, the trap tension knob may be turned clockwise, one position at a time, while the film is running.

CAUTION

Always adjust for the minimum tension that gives a steady picture. Excessive tension not only increases wear on parts, but in extreme cases may cause torn sprocket holes and film breakage.

SECTION II

OPERATION

A. GENERAL

The projectionist should become thoroughly familiar with the following instructions before actually starting regular operation of the projector. The operating procedure is extremely simple. All parts are readily accessible for cleaning and ample space around the parts promotes rapid, easy threading.

B. BEFORE THE SHOW

1. Examine each sprocket daily and remove foreign material carefully.

2. Inspect the film magazine fire rollers daily and remove any foreign material thoroughly.

3. Clean the film compartment daily with a clean cloth.

NOTE

The baked white enamel finish inside the projector, the round corners and the accessibility of all parts simplify this extremely necessary duty.

4. Clean the projection lens with lens tissue. The method of removal and replacement is described in Section I, paragraph B, 7, f.

5. Clean the spot sight box periodically.

NOTE

The spot sight box may be removed as a unit or the glass removed separately, after opening the film compartment door, by depressing the glass slightly and sliding it toward the front of the projector.

6. Check the oil level daily and add Simplex Projector Oil, as required, (Section I, paragraph D.) to maintain the proper level.

7. Turn the projector over by hand each day to check operation and to make sure that it turns freely and smoothly.

8. Run the projector for a short while to check lubrication and overall performance. By the time the Projector reaches high speed, there should be an oil splash on the gear compartment cover glass.

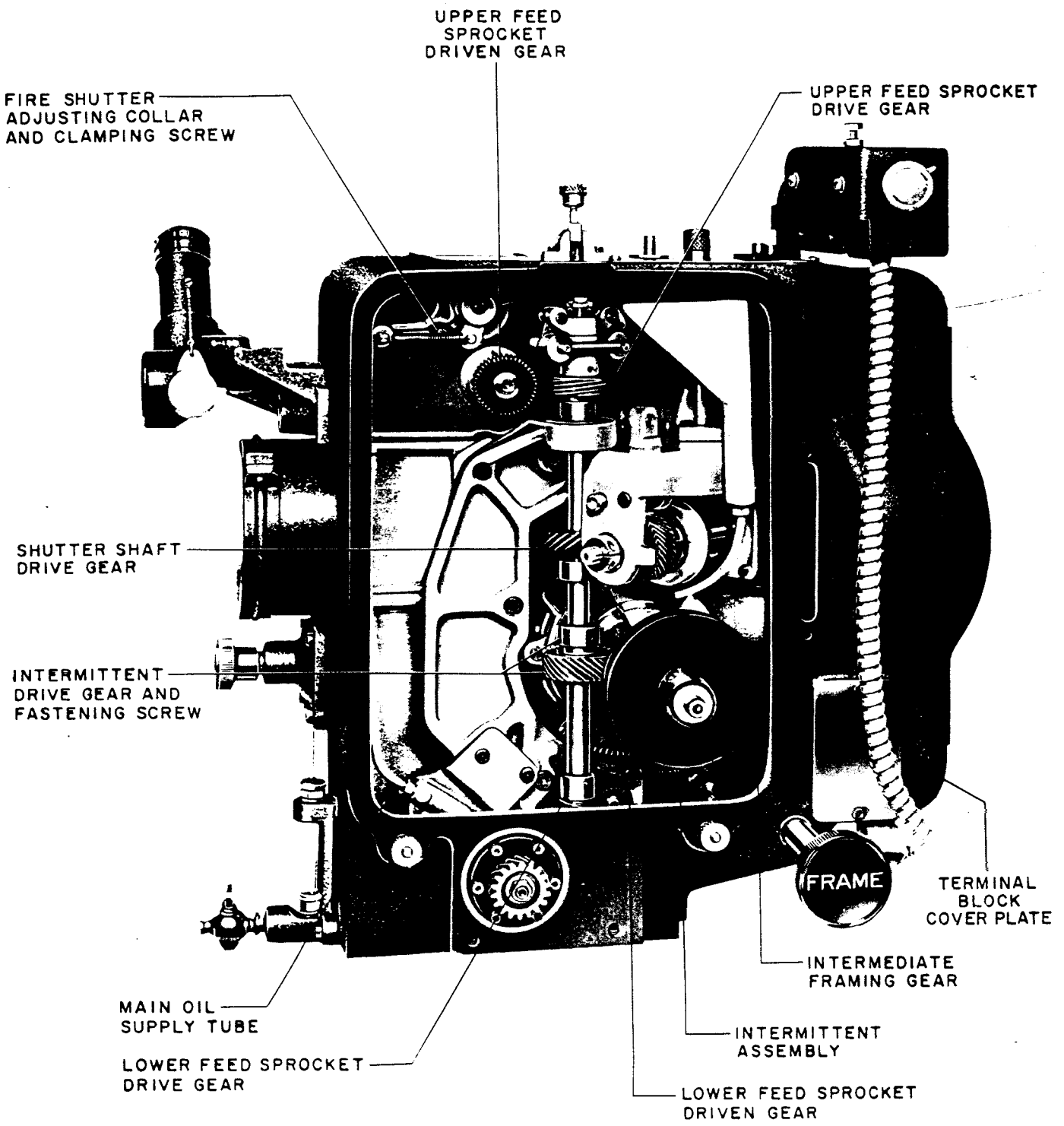


Figure 2-1

Gear Side, Gear Compartment Cover Removed

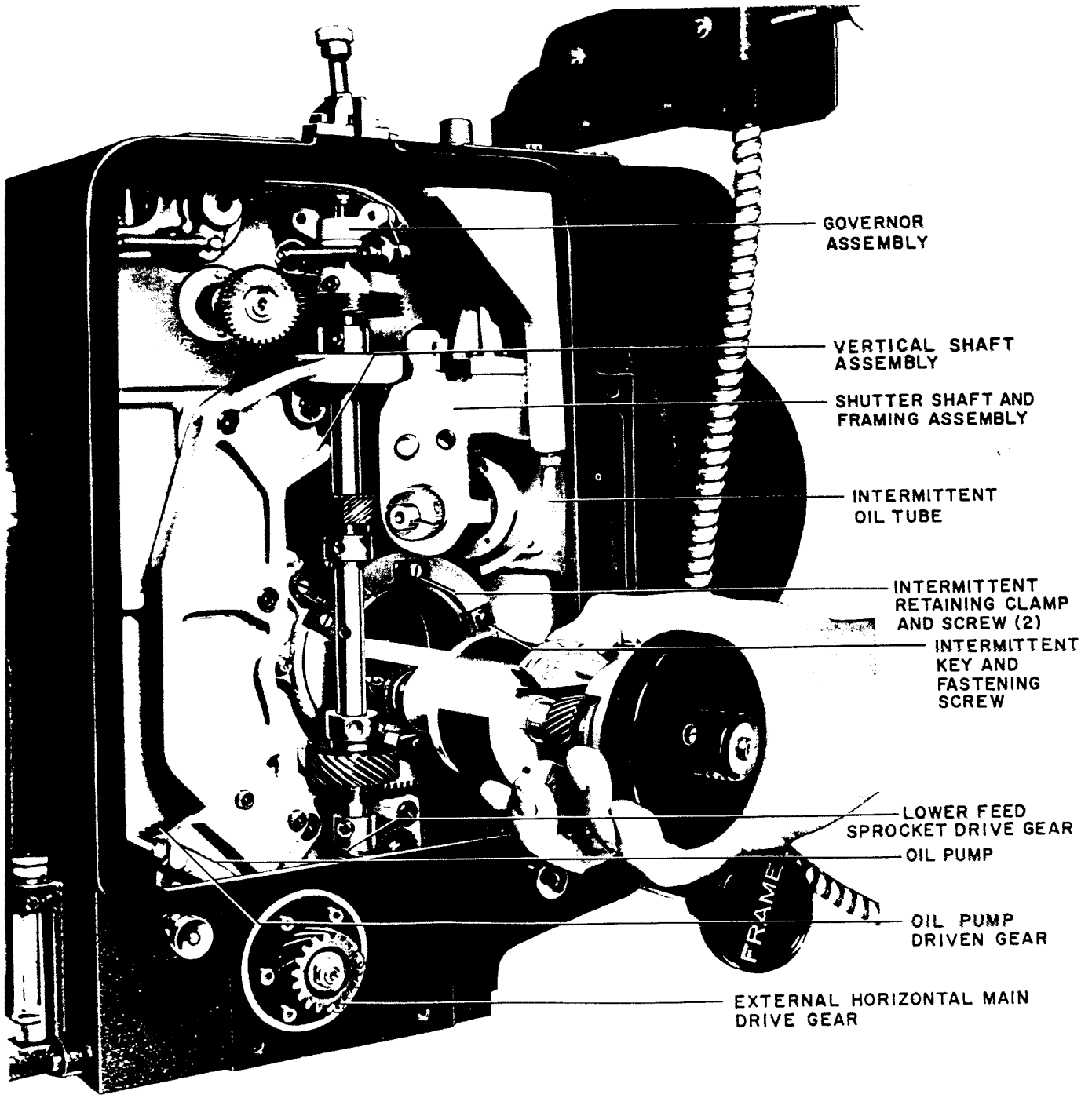


Figure 2-2

Gear Side, Gear Compartment Cover Removed and Showing Oil Pump

C. STARTING THE SHOW

1. Thread the projector. (Refer to Section I, paragraph E, 4.)

2. Start the projector, make picture and sound changeover, and check the running of the film.

3. Rotate the framing knob, if required, for proper framing.

4. If required, adjust the shutter control knob to eliminate picture "ghosts".

5. Check the picture focus and adjust, as needed, according to Section I, paragraph F.

D. DURING THE SHOW

1. Observe the instructions in paragraph C above for each reel, making sound and picture changeover at the cues.

2. Clean the film trap gate and the film trap after each reel.

3. If the fire shutter is tripped during a reel, be sure to depress the fire shutter reset button (figure 1-2) to reset the fire shutter, after remedial action for the shutter tripping has been taken.

4. Check the oil level five minutes after the Projector is stopped, and add Simplex Projector Oil to raise the oil level to the indicated level on the indicator. Section I, paragraph D, gives oiling instructions.

E. END OF SHOW

1. As soon as the projector is stopped (after the last reel), inspect the projector to insure its operational readiness for the next show.

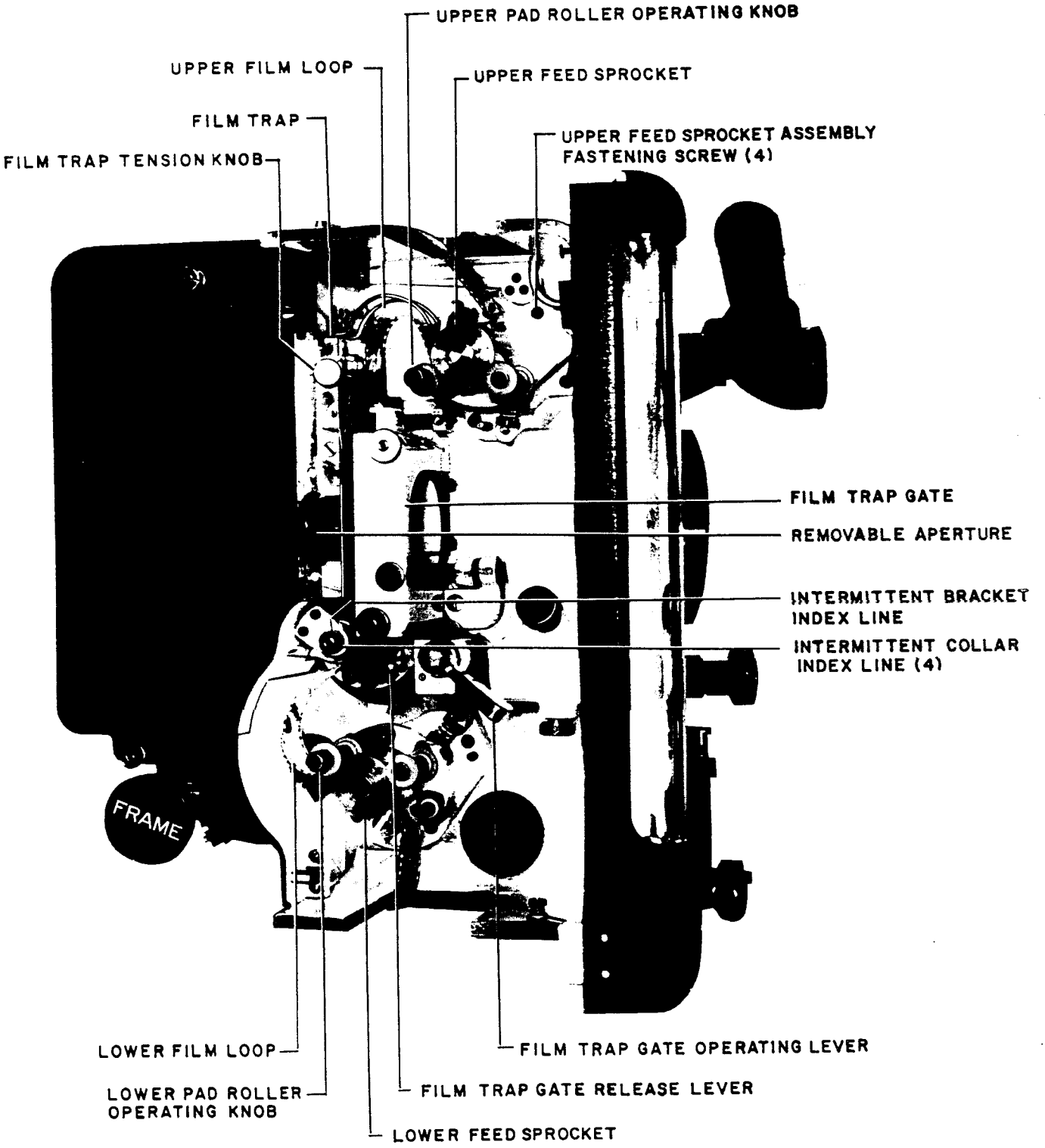


Figure 2-3

Film Side, Film Threaded

SECTION III

MAINTENANCE

A. GENERAL

A careful inspection of the entire projector should be made annually. Adjustments and replacements should be made as soon as possible, as outlined in Section IV.

B. LUBRICATION (See figures 1-3 and 2-2.)

1. Remove the drain plug or open the drain petcock and drain all the oil annually.

2. Refill with Simplex Projector Oil. (Refer to Section I, paragraph D.)

C. SPROCKETS

1. Examine each sprocket carefully for wear, undercutting and/or looseness.

2. Replace sprockets, as needed, according to Section IV, paragraph F., 3; I, 2. or L., 2.

3. Check the alignment of the intermittent sprocket and film trap guide. (Refer to Section IV, paragraph F., 4.)

D. PAD ROLLERS

1. Check the sprocket pad rollers for grooves, flat spots, and/or binding.

2. Clean the rollers carefully and adjust to relieve binding, or, if required, replace them. (Refer to Section IV, paragraph I, 4. or L, 4.)

3. Check pad roller adjustment according to Section IV, paragraph I, 4. f, or L, 4. f.

E. FASTENING SCREWS

1. Check all screws and similar parts. If necessary, tighten with wrenches supplied.

F. FILM TRAP GATE

1. Check the film runners for wear. Remove foreign material by cleaning. (Refer to Section IV, paragraph B, 1. or B, 2.)

2. Examine the intermittent tension shoe for wear and foreign matter. Clean carefully or replace. (Refer to Section IV, paragraph B, 2.)

3. Check the alignment of the intermittent tension shoe and the intermittent sprocket according to Section IV, paragraph B, 3.

4. Check the film trap gate for smooth operation. Clean the operating mechanism. (Refer to Section IV, paragraph B, 4.)

G. FILM TRAP

1. Examine the guide rollers for grooves and binding. Clean carefully, adjust or replace according to Section IV, paragraph C, 2.

2. Check the pressure straps for wear and foreign material. Clean and replace, if needed. (Refer to Section IV, paragraph C, 4.)

SECTION IV

ADJUSTMENTS AND REPLACEMENTS

A. GENERAL

When adjustments and needed replacements are made, according to the maintenance routines described in Section III, excellent performance will be obtained at all times. Adjustments are quickly accomplished, and replacements performed, as all units and components are readily removed. Adjustments and replacements described below may be made by qualified projection room personnel. All other repairs or replacements, which may be required at long intervals, should be made at an authorized Simplex repair shop.

B. FILM TRAP GATE ASSEMBLY

1. Film Trap Gate Assembly Removal (See Figure 1-13.)

   a. Open the film compartment door.

   b. Unfasten the upper and lower film trap gate fastening nuts.

   c. Remove the gate.

   d. Install the replacing gate and refasten the nuts.

2. Intermittent Tension Shoe Replacement (See Figure 4-1.)

   a. Remove the film trap gate. (Refer to Section IV, paragraph B, 1.)

   b. Remove the intermittent tension shoe fastening screw.

   c. Replace parts, as required, and reassemble with the larger radius of the outer tension shoe uppermost. For projectors using wide perforation film, the word Front on the tension shoe must be visible after the door is installed.

   d. Reinstall the film trap gate. (Refer to Section IV, paragraph B, 1.)

3. Intermittent Tension Shoe and Intermittent Sprocket Alignment

   a. Place a straight edge across the outboard face of the intermittent sprocket and the outer face of the tension shoe.

   b. Loosen the tension shoe fastening screw and slide the tension shoe, as needed, for exact alignment. Tighten the fastening screw securely.

4. Film Trap Gate Operating Lever Adjustment (See figure 4-4.)

The film trap gate should close completely when the latch is released. If movement of the operating lever in a counterclockwise direction further closes the film trap gate, additional spring tension should be obtained as follows:

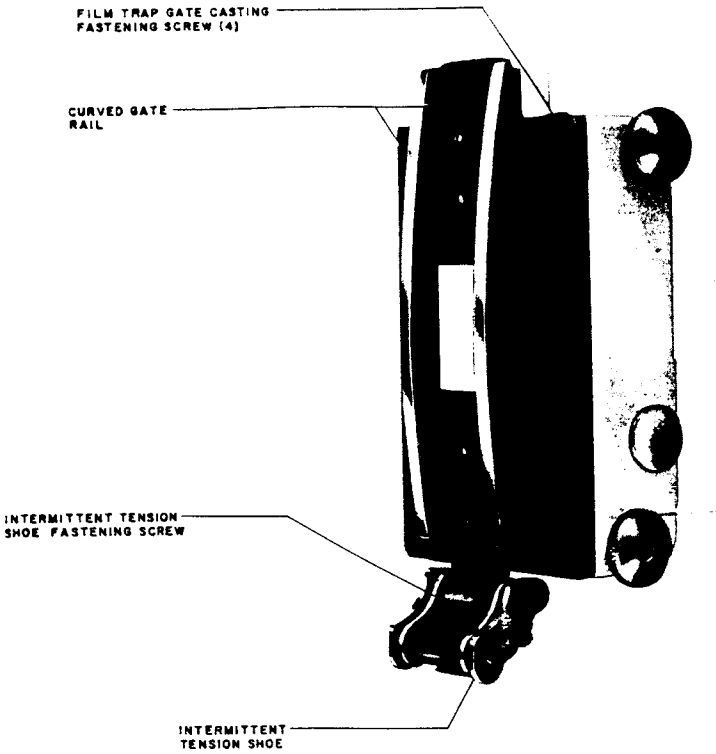


Figure 4-1

Film Trap Gate, Rear View

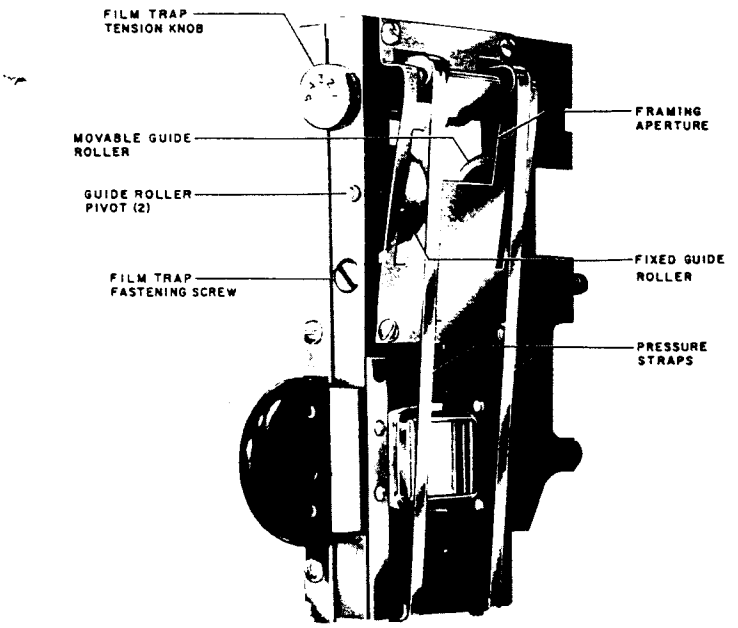


Figure 4-2

Film Trap

a. Remove the projector lens. (Refer to Section I, paragraph 7.)

b. Remove the film trap gate. (Refer to Section IV, paragraph B, 1.)

c. Insert a pin in one of the holes in the spring tension collar on the operating lever shaft and loosen the locking screw in the bottom of the operating lever assembly bracket.

d. Rotate the collar counterclockwise by means of the pin, until the next hole is engaged by the locking screw as it is tightened.

e. Reinstall the film trap gate and check closure.

f. Repeat the adjustment procedure until proper tension is obtained.

C. FILM TRAP ASSEMBLY

1. Film Trap Assembly Removal (See figure 1-13.)

a. Remove the film trap gate. (Section IV, paragraph B, 1.)

b. Loosen the single captive film trap fastening screw, remove the film trap and make sure that the contacting surface on the main frame and the film trap are clean.

c. Slide the replacing film trap in so that it registers with the two dowel pins on the main frame. Depress the fire shutter reset button (figure 1-2) at the same time, and securely tighten the captive screw.

CAUTION

It is necessary that the reset button be depressed while the film trap is being installed. Otherwise, the fire shutter stop pin (figure 4-4) on the film trap will strike the fire shutter and make it inoperative until the film trap is properly installed.

d. Operate the reset button a few times to make sure that the fire shutter is functioning correctly.

e. Check the alignment of the film trap and the intermittent sprocket according to Section IV, paragraph F, 4.

2. Film Trap Guide Roller Replacement (See figure 4-3.)

a. Remove the film trap. (Refer to Section IV, paragraph C, 1.)

b. Loosen the two guide roller pivot set screws, one at each end of the film trap casting.

c. Slide the guide roller pivots out of the casting and remove the guide rollers and spring, from the rear of the casting.

d. Replace parts, and reassemble.

e. Reinstall the film trap. (Refer to Section IV, paragraph C, 1.)

3. Heat Shield Replacement

a. Remove the Film Trap. (Refer to Section IV, paragraph C, 1.)

b. Remove the two heat-shield assembly fastening screws and the assembly.

c. Replace parts, reassemble and reinstall the film trap. (Refer to Section IV, paragraph C, 1.)

4. Pressure Strap Replacement

a. Unscrew the film trap fastening screw which is located below and in line with the numbered pressure strap tension knob. Carefully remove the trap.

b. Turn the pressure strap tension knob to the number 1 position.

c. Unscrew the two screws at the bottom of the trap.

d. Unscrew the two screws on the top of the pressure strap arms, and remove the two pressure straps.

e. Make the replacement and tighten the four pressure strap screws.

f. Reinstall the film trap. (Refer to Section IV, paragraph C, 1.)

5. Threading Guide Removal

If it becomes necessary to remove the threading guide, do the following:

a. Remove the film trap. (Refer to Section IV, paragraph C, 1.)

b. Unscrew the four threading guide screws in any convenient order and remove the threading guide.

c. Position the replacing threading guide and redrive the four screws removed in step 2.

d. Replace the film trap. (Refer to Section IV, paragraph C, 1.)

D. FIRE SHUTTER ADJUSTMENT

1. Remove the spot sight box. (Refer to Section IV, paragraph G, 1.)

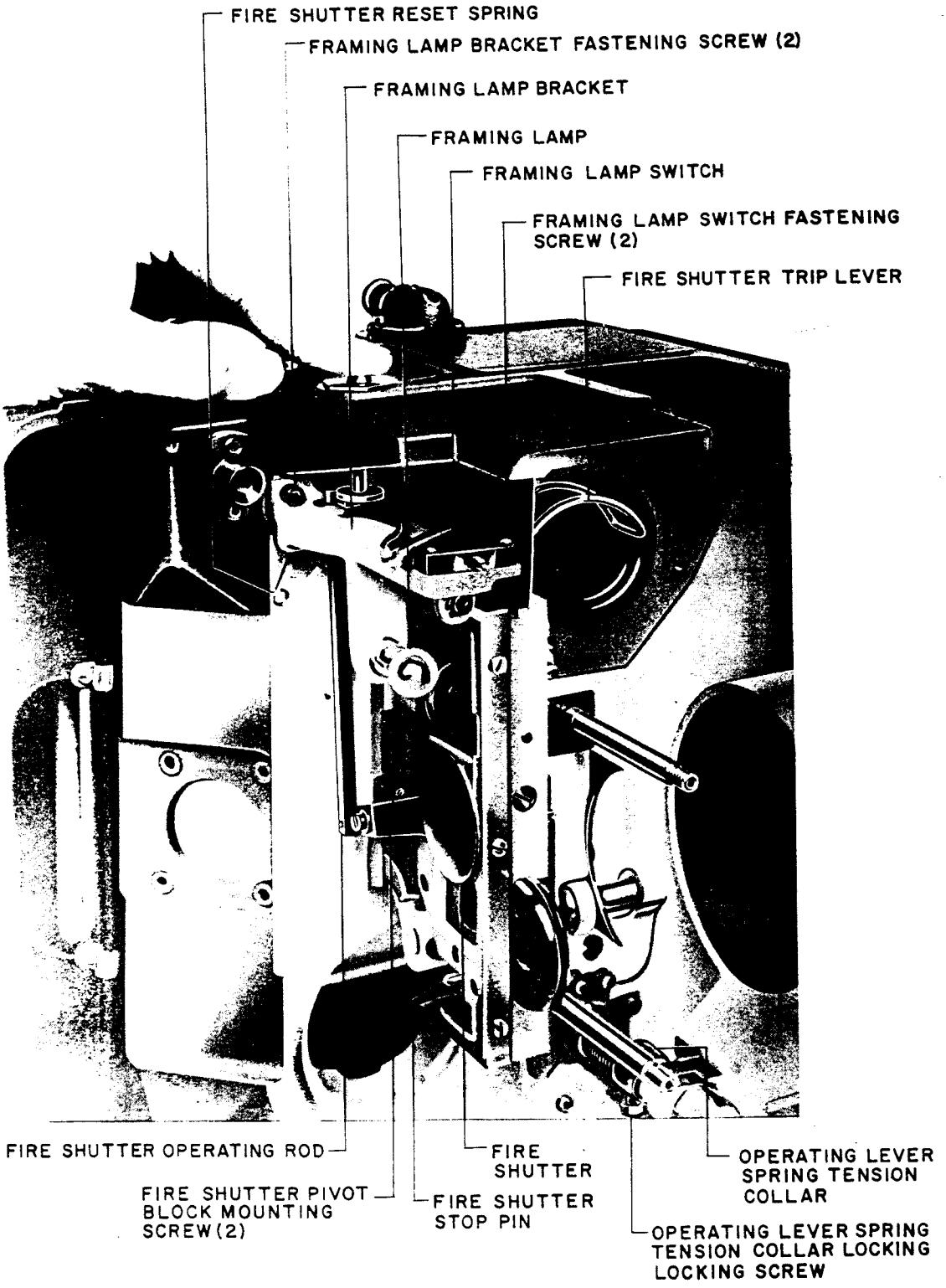


Figure 4-3

Film Side, Fire Shutter Shown

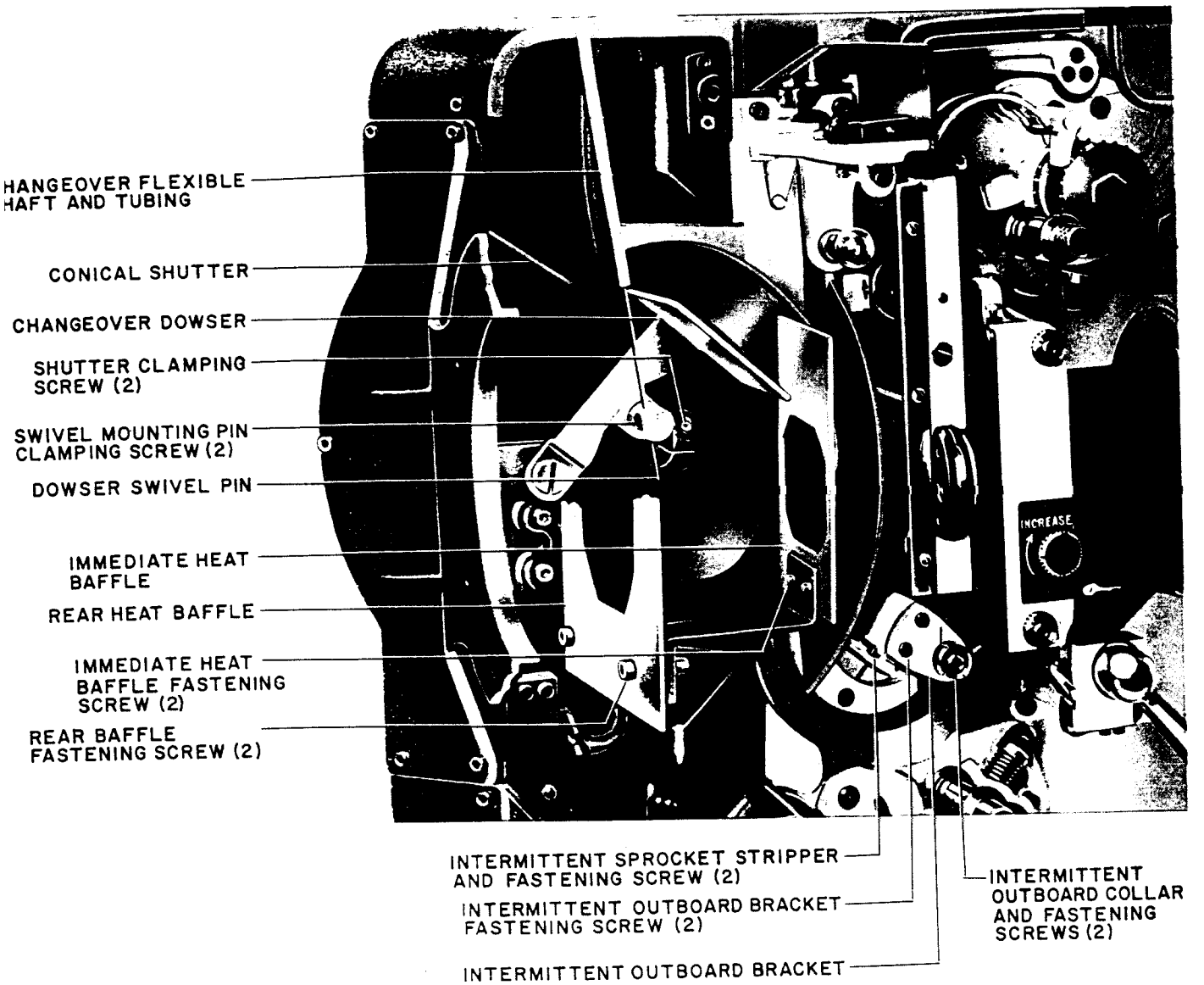


Figure 4-4

Film Side, Dowser Shown

2. With the fire shutter closed and against its stop on the rear of the film trap (figure 4-4), loosen the two fire shutter operating arm adjustment plate fastening screws until it just clears the top of the fire shutter operating rod. Tighten the two fastening screws.

3. Remove the gear compartment cover.

4. Hold the governor in its operating position by hand.

5. Loosen the fire shutter adjusting collar fastening screw (figure 2-1), and rotate the adjusting collar until the bottom of the fire shutter just clears the top of the picture aperture. Tighten the fastening screws.

6. Check the operation of the fire shutter by holding the governor in operating position and releasing. Readjust if necessary.

7. Depress the fire shutter reset button to check its operation, then reassemble.

E. HEAT BAFFLE REPLACEMENT (See figure 4-5.)

1. Remove the spot sight box. (Refer to Section IV, paragraph G, 1.)

2. Remove the heat baffle fastening screws from the rear or the intermediate baffle, as required, and the baffles.

3. Replace parts and reassemble.

F. INTERMITTENT ASSEMBLY

1. Intermittent Assembly Replacement (See figures 2-1 and 2-2.)

a. Open film trap gate. (See figure 2-3.)

b. Turn the framing knob (figure 1-3) to the extreme counterclockwise position (gear side).

c. Set the shutter adjusting knob (figure 1-2) in mid-position.

d. Remove the gear compartment cover (figure 1-3) and make sure that no foreign material is deposited in the compartment while the cover is off.

e. Rotate the vertical shaft until the intermittent drive gear fastening screw is accessible. Remove the screw and slide the gear downward.

f. Loosen the two intermittent retaining clamp fastening screws on the framing cam and rotate the clamps to clear the intermittent case.

g. Withdraw the intermittent assembly from the gear compartment, taking care not to strike the intermittent oil feed tube just above the intermittent.

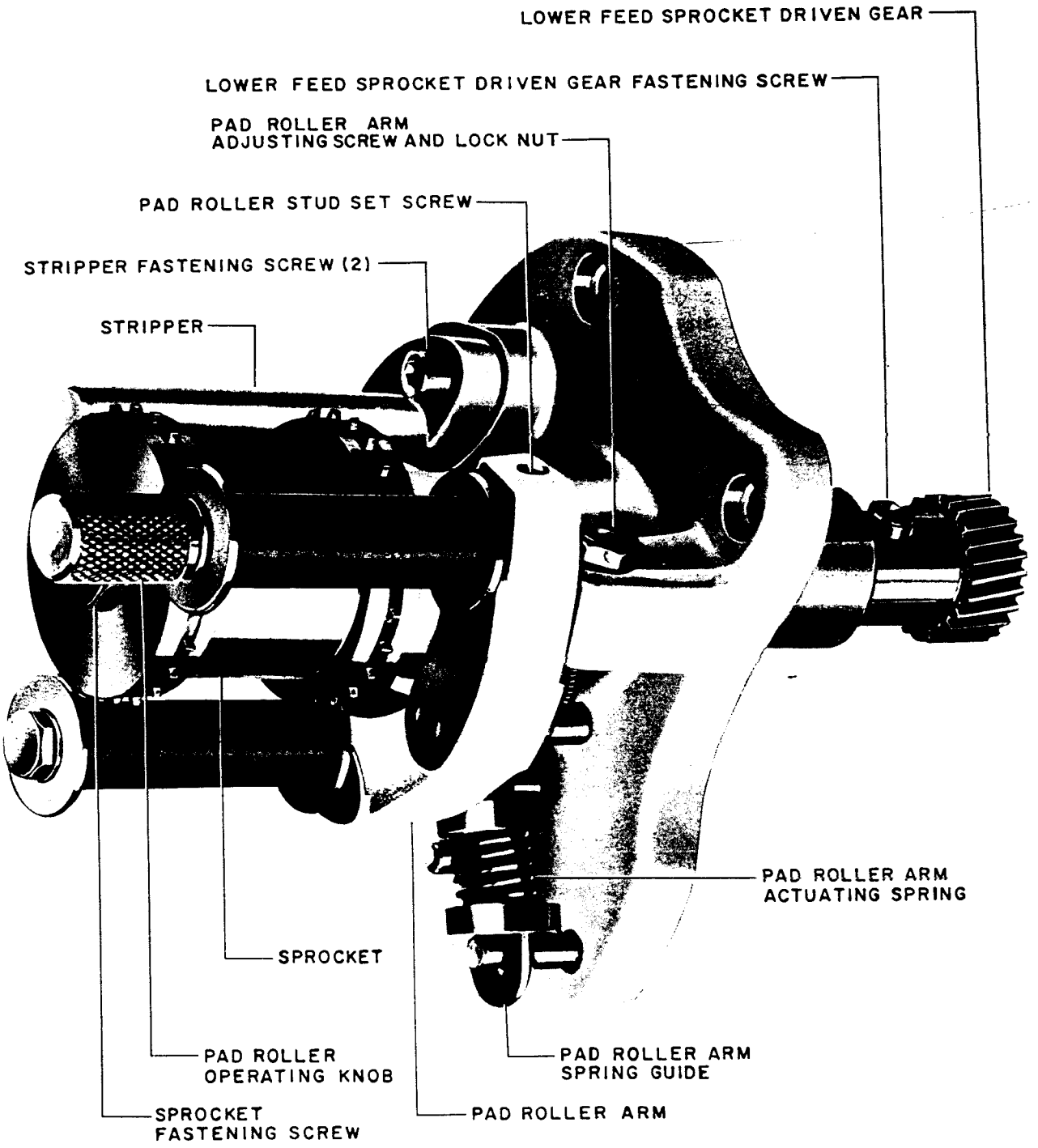


Figure 4-5

Lower Feed Sprocket Assembly

h. Slide the replacing intermittent into position as the keyway in the case is aligned with the key in the framing cam.

i. Rotate the intermittent retaining clamps to retain the intermittent and tighten the fastening screws securely.

j. Remove the spot sight box (Section IV, paragraph G, 1.), and then depress the fire shutter reset button (figure 1-2) so that the fire shutter clears the picture aperture. Then time the shutter according to the following paragraph:

k. Align the intermittent sprocket with the film trap. (Refer to Section IV, paragraph F, 4.)

NOTE

There is no change in the procedure outlined above, when the high-speed intermittent movement is used in place of the standard movement, except that the shutter opening should be set according to Section I, paragraph P.

2. Timing (See figure 4-5.)

a. Rotate the shutter counterclockwise (from rear of projector) until its leading edge is exactly in line with the upper edge of the picture aperture (aperture just completely blocked).

b. Rotate the intermittent flywheel until the intermittent sprocket turns clockwise and one of the four index lines on the outboard bearing collar is in alignment with the index line on the outboard bearing casting (figure 2-3).

c. Continue to rotate the flywheel in the same direction until the intermittent sprocket just begins to move.

d. Reverse the rotation of the flywheel until the sprocket stops, then turn the flywheel counterclockwise until the start of rotation of the sprocket is felt.

e. Continue to rotate the flywheel (paragraph d.) until the precise point at which the sprocket is about to move, and retain that setting.

f. Raise the intermittent drive gear and rotate it tooth by tooth until it meshes with the intermittent driven gear. At the same time, the mounting hole in the drive gear and in the shaft should be in alignment.

CAUTION

Do not rotate the vertical shaft or intermittent driven gear.

g. Insert the fastening screw and tighten securely.

3. Intermittent Sprocket Replacement (See figure 4-5.)

a. Remove the film trap gate (Section IV, paragraph B, 1.) and the film trap (Section IV, paragraph C, 1.).

b. Turn the framing knob clockwise (film side) until the stripper fastening screw is accessible. Remove the screw and the stripper.

c. Turn the projector so that one of the index lines on the outboard bearing collar is in alignment with the index line on the outboard bearing casting and retain this setting.

d. Remove the intermittent sprocket fastening screw and nut.

e. Loosen the two outboard bearing thrust collar fastening screws and remove the collar.

f. Remove the two outboard bearing bracket fastening screws and the bracket.

g. Remove the intermittent sprocket.

h. Slide the replacing sprocket on the shaft, being sure that the "Simplex" trademark is readable when viewed from the outboard end of the shaft.

i. Position the outboard bracket with two fastening screws finger tight.

j. Adjust the bracket as required, so that the bearing is precisely centered with respect to the intermittent shaft and tighten the fastening screws.

k. Fasten the intermittent sprocket to the shaft with the fastening screw and nut.

l. Slide the outboard collar on the shaft with one of its index lines in alignment with the index line on the outboard bearing casting.

m. Pull the sprocket forward and at the same time, press the collar inward so that there is just perceptible end play.

n. Tighten collar fastening screws securely and check for just perceptible end play.

o. Reinstall the film trap (Refer to Section IV, paragraph C, 1.), and align the film trap and the intermittent sprocket as described below.

p. Reinstall the film trap door (Refer to Section IV, paragraph B, 1.).

q. Align the film tension shoe with the intermittent sprocket if necessary, (Refer to Section IV, paragraph B, 6.).

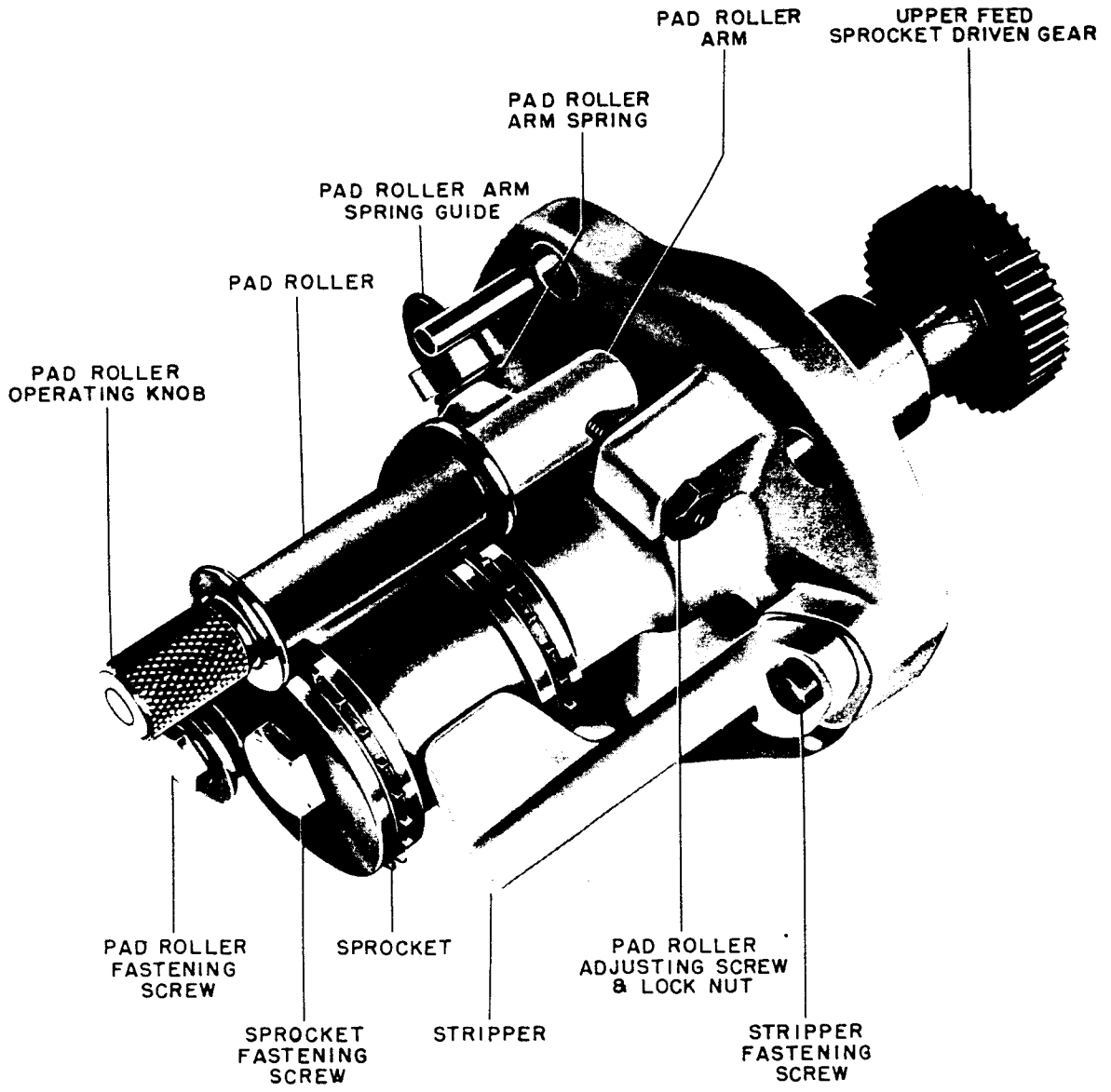


Figure 4-6

Upper Feed Sprocket Assembly

4. Intermittent Sprocket and Film Trap Alignment

a. Loosen the intermittent sprocket fastening screw and slide the sprocket on the shaft as required until the sprocket is flush with a straight edge placed on the outside face of the lower feed sprocket.

b. Tighten the sprocket fastening screw securely.

NOTE

Gauge No. T1-9096, which is special equipment, may be used to align the intermittent sprocket. This is done by loosening the intermittent sprocket, substituting the gauge for the trap, adjusting the outer face of the sprocket teeth until they contact the inside face of the gauge, and then tightening the intermittent sprocket screw.

G. LAMP REPLACEMENT

1. Framing Lamp (See figures 1-2 and 4-4.)

a. Loosen the upper captive spot sight box fastening screw, remove the lower knurled fastening nut and the spot sight box.

b. Replace the lamp and the spot sight box.

2. Threading Lamps (See figure 1-13.)

a. Remove the three threading lamp cover fastening screws, inside the film compartment door, and the cover.

b. Replace the lamps and the cover.

3. Magazine Lamp

a. When Simplex X-L Magazines are used, remove the access plate fastening screws and the access plate from the rear of the magazine bracket.

b. Replace the lamp and the plate.

H. LAMP SWITCH REPLACEMENT

1. Framing Lamp Switch (See figure 4-4.)

a. Remove the spot sight box. (Refer to Section IV, paragraph G, 1.)

b. Unsolder the switch lead.

c. Remove the four switch fastening screws with an offset screw driver, and the switch.

d. Install the replacing switch with the contact pin toward the front and resolder the lead.

e. Adjust the switch contact screw (figure 1-13) on the film compartment door as follows so that the light is off when the door is closed and on when the door is open. Be sure connections to the light supply transformer have been made properly.

1) Loosen the switch contact screw locknut inside the film compartment door.

2) Turn the contact screw clockwise approximately two turns, and close the door. The light should remain lighted.

3) Readjust this contact screw so that the light is off when the door is completely closed, and tighten the locknut securely.

2. Threading Lamp Switch (See figures 1-2 and 1-13.)

a. Remove the three threading lamp cover fastening screws inside the film compartment door and the cover.

b. Unsolder switch lead, replace switch, resolder lead and replace access plate.

I. LOWER FEED SPROCKET ASSEMBLY

1. Lower Feed Sprocket Assembly Removal (See figure 1-13.)

a. Remove the four feed sprocket assembly fastening screws and withdraw the assembly from the film compartment.

NOTE

Be sure that the neoprene gasket is in the groove in the sprocket assembly casting.

b. Reinstall the assembly with the four fastening screws finger tight.

c. Position the assembly so that there is slight backlash between the meshing gears. The four mounting holes in the casting are sufficiently oversize to permit this adjustment.

d. Tighten the fastening screws securely, check backlash and readjust, if necessary.

2. Lower Feed Sprocket Replacement (See figure 4-6.)

a. Remove one feed sprocket stripper fastening screw, loosen the other, and rotate the stripper to clear the sprocket.

b. Open the pad rollers.

c. Remove the hexagonal sprocket fastening screw on the outboard end of the feed sprocket shaft and slide the sprocket from the shaft. Be sure that the spring washer and the flat washer remain on the shaft.

d. Slide the replacing sprocket on the shaft with the key pin and keyway in alignment, and secure with the sprocket fastening screw.

e. Insert the stripper fastening screw and tighten both screws.

3. Lower Feed Sprocket Driven Gear Replacement (See figure 4-6.)

a. Remove the lower feed sprocket assembly (Section IV, paragraph I, 1.).

b. Remove the gear fastening screw and slide the gear from the shaft.

c. Slide the replacing gear on the shaft, insert the fastening screw, position the gear to have slight end play, and tighten the screw securely.

d. Reinstall the sprocket assembly and adjust for backlash (Section IV, paragraph I, 1.).

4. Lower Feed Sprocket Pad Roller Assembly Replacement (See figure 4-6.)

a. Remove the sprocket assembly as a unit (Section IV, paragraph I, 1.).

b. Open the pad rollers; compress the actuating spring on the sprocket assembly so that the small hole in the forked spring guide is accessible, and pass a pin (a paper clip is satisfactory) through this hole to relieve the spring tension.

c. Remove the pad roller, assembly fastening screw, and pad roller assembly.

d. Loosen the pad roller stud set screw(s) in the pad roller arm bracket and remove the pad roller on rollers as required.

e. Replace parts as necessary; reassemble, and remove the pin.

f. Position the pad roller arm adjusting screw on the sprocket assembly casting so that, with two thicknesses of film between the sprocket and pad rollers, both pad rollers just rotate. Be sure that the adjusting screw locknut is then tightened securely.

g. Reinstall the sprocket assembly and adjust for backlash. (Section IV, paragraph I, 1.)

J. PICTURE CHANGEOVER

1. Replacement (See figure 1-2.)

a. Remove all connections to the changeover.

b. Remove spot sight box. (Section IV, paragraph G, 1.)

c. Loosen the two swivel mounting pin fastening screws on the dowser (figure 4-5) and withdraw the flexible shaft from the hole in this pin.

d. Remove the two changeover fastening screws and the changeover.

e. Position the changeover replacement on the bracket as the flexible shaft and protective tubing are slid through the hole in the top of the projector. Replace the two changeover screws.

f. Reconnect the wires. (See figure 1-12.)

g. Insert the flexible shaft in the hole in the swivel pin on the dowser; adjust by the following paragraph, and secure with the fastening screws.

NOTE

Form the protecting tube over the flexible shaft to avoid unnecessary friction in operation and to prevent interference with the dowser.

2. Adjustment (See figure 4-5.)

a. Loosen the two swivel mounting pin fastening screws and position the flexible shaft in the pin so that the dowser rests on the dowser stop plate with just enough pressure to prevent any bounce that might uncover the lower portion of the aperture. The dowser must be completely clear of this aperture when the dowser is in the upper position. Tighten the two fastening screws.

b. Adjust the changeover tension screw (See figure 1-2.) for the minimum tension that will hold the dowser in up position while the projector is running, and check operation.

K. SHUTTER REPLACEMENT (See figure 4-5.)

1. Remove the spot sight box. (Refer to Section IV, paragraph G, 1.)

2. Loosen the two swivel mounting pin fastening screws on the dowser and withdraw the flexible shaft from the hole in this pin.

3. Remove the five rear cover fastening screws and the cover.

4. Loosen the two shutter clamping screws and remove the shutter.

5. Set the shutter adjusting knob (figure 1-2) in mid-position.

6. Manually turn the projector in the direction of normal rotation until one of the four index lines on the intermittent outboard bearing collar is aligned with the index line on the outboard bearing bracket. (See figure 2-3.)

7. Continue to turn the projector until the intermittent sprocket begins to move.

8. Reverse the rotation until the intermittent sprocket stops; then turn in the normal direction until the sprocket starts to rotate.

9. Continue to turn the projector as in step 8. above, until the precise point at which the sprocket is about to move is obtained; retain that setting.

10. Slide the replacing shutter on the shaft to the shaft bearing, set so that its leading edge (counterclockwise rotation from the rear of the projector) is exactly in line with the upper edge of the picture aperture (aperture completely blocked) and tighten the two shutter clamping screws securely.

11. Complete the reassembly.

NOTE

When a new adjustable shutter is installed, the procedures outlined in Section I, paragraph F, 2., should be followed to obtain the correct shutter opening.

L. UPPER FEED SPROCKET ASSEMBLY

1. Upper Feed Sprocket Assembly Removal (See figure 2-3.)

a. Remove the four feed sprocket assembly fastening screws and withdraw the assembly as a unit from the film compartment.

NOTE

Be sure that the neoprene gasket is in the groove in the sprocket assembly casting.

b. Reinstall the assembly with the four fastening screws finger tight.

c. Position the assembly so that there is slight backlash between the meshing gears. The four holes in the assembly bracket are sufficiently oversize to permit this adjustment.

d. Tighten the fastening screws securely, check backlash, and readjust, if necessary.

2. Upper Feed Sprocket Replacement (See figure 4-7.)

a. Remove one feed sprocket stripper fastening screw, loosen the other, and rotate the stripper to clear the sprocket.

b. Open the pad rollers.

c. Remove the hexagonal sprocket fastening screw on the outboard end of the feed sprocket shaft, and slide the sprocket from the shaft.

d. Slide the replacing sprocket on the shaft with the key pin and keyway in alignment and secure with the sprocket fastening screw.

e. Insert the stripper fastening screw and tighten both screws.

3. Upper Feed Sprocket Driven Gear Replacement (See figure 4-7.)

a. Remove the gear compartment cover.

b. Remove the gear fastening screw and slide the gear from the shaft.

c. Slide the replacing gear on the shaft, insert the fastening screw, position the gear to have slight end play, and tighten the screw securely.

d. Check backlash between drive and driven gears and adjust as required. (Refer to Section IV, paragraph L, 1.)

e. Replace the cover, subject to Section I, paragraph M, 4.

4. Upper Feed Sprocket Pad Roller Assembly Replacement (See figure 4-7.)

a. Remove the feed sprocket assembly as a unit. (Refer to Section IV, paragraph L, 1.)

b. Open the pad rollers, compress the actuating spring on the sprocket assembly so that the small hole in the forked spring guide is accessible, and pass a pin (a paper clip is satisfactory) through this hole to relieve the spring tension.

c. Remove the pad roller assembly fastening screw and pad roller assembly.

d. When the pad roller operating knob has a set screw, loosen the set screw, remove the knob and the pad roller(s).

NOTE

When the pad roller operating knob does not have a set screw, loosen the associated pad roller stud set screw, remove the stud from the pad roller arm and the pad roller(s) from the stud. Remove the other pad roller(s) in the same manner.

e. Replace as necessary, reassemble and remove the pin. Be sure that any spacing washers remain on the stud and that the pad roller(s) are centered with respect to the sprocket.

M. OIL LINE FEED LEAD REVERSAL (drive-in theater operation)

1. Remove the gear box door.

2. Remove the compression nut, compression bushing, and the oil and filter tube from the left-hand side of the oil tube connector.

3. Reconnect the parts removed, (as described in 2. above) on the right-hand side and tighten.

4. Replace the gear compartment door. (Refer to Section I, paragraph D, 4.)

N. INSTALLATION OF THE WATER-COOLED HEAT SHIELD

1. Remove the spot sight box from the main frame by loosening the fastening screw and nut. Remove the terminal strip cover from the gear side of the mechanism and set aside.

2. Loosen the film trap fastening screw, lift the automatic fire shutter, and remove the curved trap with its air-cooled heat shield assembly. (Refer to Section IV, paragraph C.)

3. Remove the air-cooled heat shield by removing the two screws which fasten it to the trap. Set the air-cooled heat shield aside.

4. Position the water-cooled heat shield; align the holes in the shield with the holes in the trap, and join the shield and the trap with the two screws removed in step 3.

5. Reinstall the trap with water-cooled heat shield. (Refer to Section IV, paragraph C, 1.)

CAUTION

Revolve the shutter slowly while installing the trap and make sure that the shutter clears the tubing between the shield and the connecting block.

6. Fasten the connecting block to the rear of the main frame with a screw.

7. Position the connecting block cover over the opening in the main frame and fasten it with a screw provided with the kit.

NOTE

The water-cooled shield should fit snugly against the aperture plate, so that maximum heat transfer takes place. Be certain that the aperture plate is flat where it contacts the water-cooled shield.

8. Connect the water supply to the connections provided at the bottom of the connecting box.

NOTE

In using the water-cooled kit, it will be necessary to substitute the terminal strip supplied with the kit, for the terminal strip used for air-cooled operation.

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