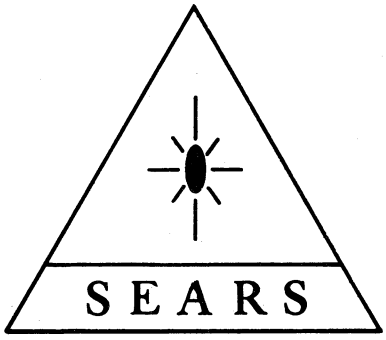
SERVICE INSTRUCTIONS

SEARS SUPER AUTOMATIC 8 MM PROJECTOR

DESIGN NO. 9270A AND 9271AY



PART NO. 70446 PRINTED IN U.S.A. MARCH 1964

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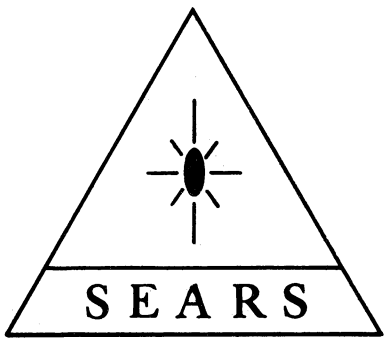

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Introduction

GENERAL.

This manual has been prepared to aid in servicing the Sears Automatic 8-mm Movie Projectors, Design 9270A and 9271AY. An illustrated Parts Catalog is included at the rear of the manual to identify replacement parts and to aid the serviceman in the disassembly, reassembly, repair, adjustment, and testing of the projector.

All parts in the exploded view illustrations in the Parts Catalog section are indexed in their suggested order of removal. Where disassembly and reassembly of parts is quite obvious, no attempt has been made to elaborate on the removal and installation of such parts. When making specific projector repairs, the serviceman must use his own judgment in eliminating unnecessary steps of procedure.

In the disassembly and reassembly instructions, illustrations referred to by number (Figure 1, Figure 2, etc.) are those located in the Parts Catalog section. Those referred to by letter (Figure A, Figure B, etc.) will be found in the instruction portion of the book.

PRINCIPLES OF AUTO-LOAD THREADING. (Figure A.)

a. The operator depresses the upper loop former (4), which pivots to position A. This actuates a linkage system which automatically pivots the lower loop former (10) to position A. A spring-loaded latch, to which the take-up idler (14) is attached, locks the loop formers in position A and, at the same time, shifts the take-up idler (14) to position A.

b. The end of the film leader is trimmed with the cutter mounted on the projector base. The projector is started and the cut end of the leader is inserted into opening (1). The film must be pushed past the roller (2) and against the sprocket (3) where a sprocket tooth can engage a perforation. This starts the self-threading cycle.

c. Since the loop former (4) keeps the film on the sprocket (3), the sprocket advances the film past the roller (5) and through the passage between the loop former and upper bracket (6). The upper loop former guides the film downward between the aperture plate (7) and pressure shoe (8). When the film reaches the shuttle (9), the shuttle tooth engages a perforation and assists in transporting the film.

d. When the film reaches the lower loop former (10), it turns upward and passes through the passage between the loop former and lower bracket (11), where it is guided to the take-up sprocket (12). The film then passes out through the opening (13).

e. After 20 to 24 inches of film have passed through the projector film path, the operator stops the projector, threads the film under the guide rollers, and inserts the loose end of the film in the take-up reel. When idler roller (14) is pressed back to position B, the spring-loaded latch is released and loop formers (4 and 10) automatically return to open position B.

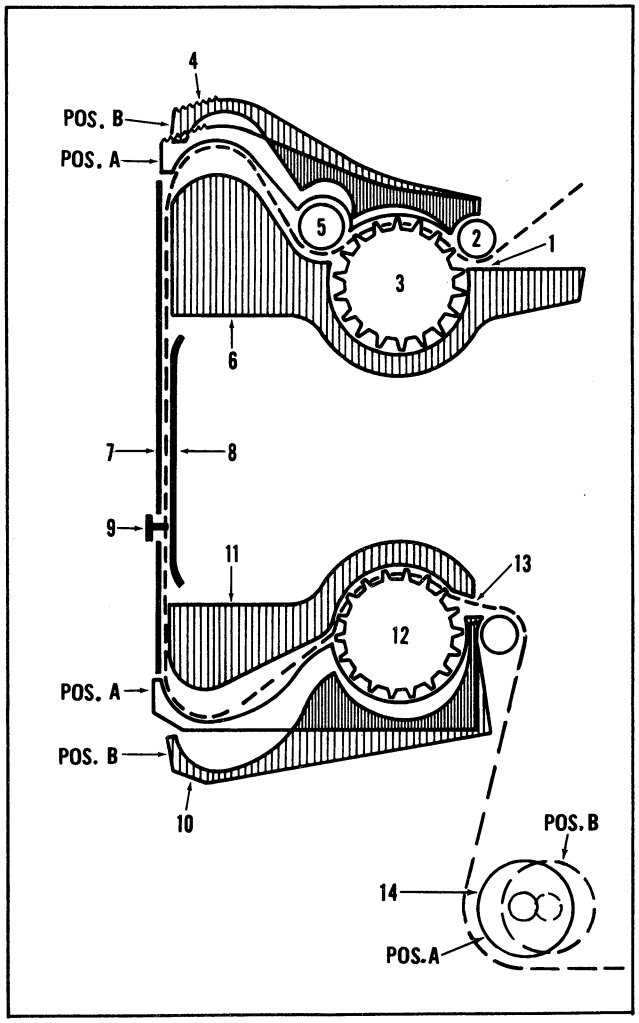

Figure A. Film Path-Self-Threading Procedure

SPECIAL MAINTENANCE PRECAUTIONS.

For the most part, disassembly and reassembly of the projector is comparatively simple. However, be sure to note the special precautions and adjustment procedures listed in the instructions.

When lubricating projector parts during reassembly, it is recommended that only Bell & Howell grease (Spec. 1956) and oil (Spec. 310) be used.

If Bell & Howell lubricants are not immediately available, use only the best grades of ball-bearing grease and projector oil which are commercially available.

Special tools and fixtures required for the proper repair and adjustment of the projector are illustrated in Figure B.

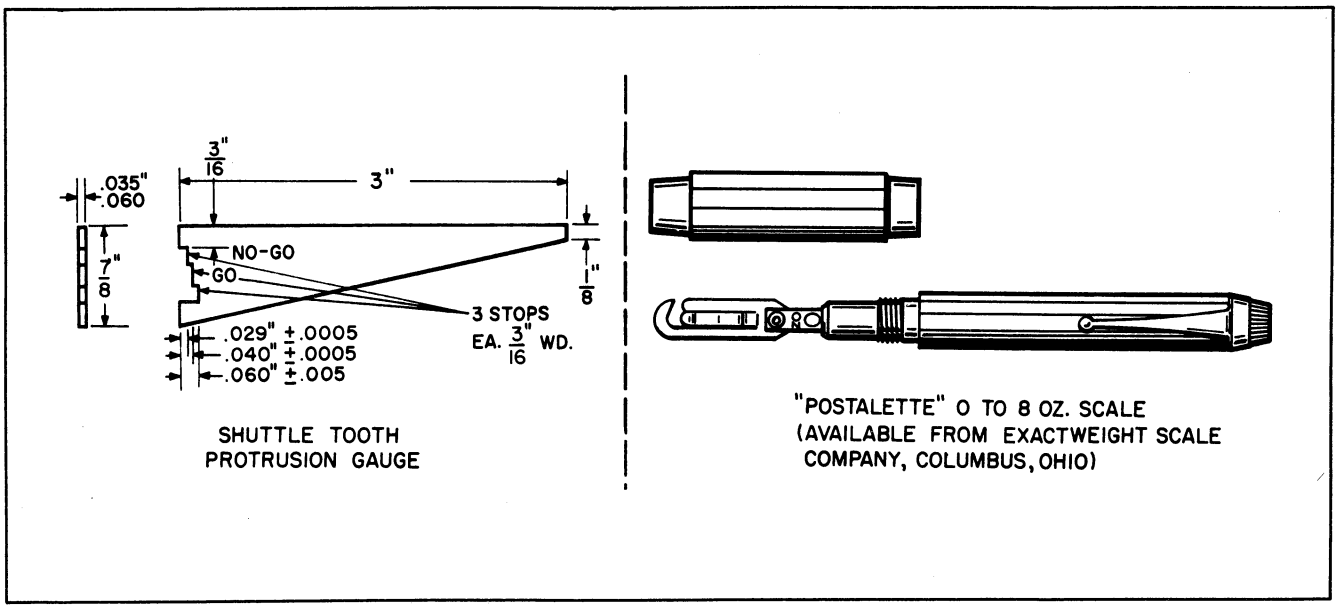

Figure B. Special Tools

Disassembly

1. GENERAL INSTRUCTIONS.

a. When optical parts, such as the projection lamp and lens, are removed from the projector, wrap them in tissue paper to protect them from possible damage.

b. When removing riveted parts for replacement, the old rivet must be drilled out of the casting. Use a drill equal to or slightly smaller than, the diameter of the rivet to be installed.

c. When repairing projectors, remember that cleanliness of surroundings and orderliness of disassembled parts is very important. When attaching parts (screws, nuts, washers) are removed, reattach them, loosely, to the removed part of the casting to prevent loss.

2. REMOVAL OF PARTS IN FIGURE 1. Remove parts as necessary in their indexed order of disassembly, noting the following special precautions.

a. To remove the front cover assembly (1), the catch button (1C) must be pressed downward to release the cover catch (1B) from the slot in the mechanism plate.

b. Nameplates are cemented in place. Pry up carefully with a knife blade and use paint thinner on cement.

c. The removal of the framer knob (41) is not necessary when the removal of the control housing is required, nor is it possible because of the design. Any attempt to remove this knob first will result in damage to the knob.

d. The take-up drive roller (23) cannot be removed without first loosening the setscrew (24) and sliding off both the roller and the film guide (25).

3. REMOVAL OF PARTS IN FIGURE 2. Remove parts, as necessary, in their indexed order of disassembly, noting the following special precautions.

a. Removal of screw (1) will permit the withdrawal of the feed reel arm assembly (3) and the assembled spindle parts (6 through 10) which are secured by screw (2). The spur gear (4) can be lifted from the gear stud of the feed reel arm support assembly (31). Note the manner in which spring (5) is installed.

b. Removal of the two screws (14) will permit the withdrawal of the take-up reel arm assembly (16) and the assembled spindle parts (19 through 23) which are secured by screw (15). The three spur gears (17 and 18) can be lifted from the gear studs of the take-up reel arm support assembly (32).

c. The reel spindle assemblies (10 and 23) can be disassembled by removing the plugs (10C and 23C) and withdrawing the springs and keys. Note the manner in which the springs (10A and 23A) are installed.

d. Removal of the two retaining rings (29) will permit the disassembly of the bearings (30) and the reel arm supports (31 and 32). The tension springs (35), cam washers (36) and the steel balls (37) will fall from position when the bearings (30) are withdrawn from the casting.

4. REMOVAL OF PARTS IN FIGURE 3. Remove parts, as necessary, in their indexed order of disassembly. Note that hubs of pulley (14) and blower fan (8) face toward one another. Be careful not to bend fan blades during removal.

5. REMOVAL OF PARTS IN FIGURE 4. Remove parts, as necessary, in their indexed order of disassembly, noting the following special precautions.

a. Note the manner in which springs (9 and 10) are hooked into place so that they can be properly reinstalled. The return linkage staked to the rear of the mechanism plate must not be removed.

b. The pin screws (14) which attach the upper and lower loop former assemblies (16 and 17) also serve as shafts for the film rollers (18).

c. The spring (27), retainer plate (28) and the pressure plate (29) can be removed from the lens carrier assembly (30) without removing the carrier from the mechanism plate. Swing open the lens carrier, grasp the top and bottom of the pressure plate (29) between the thumb and forefinger of the right hand. Press the upper end of the retainer plate (28) away from the lens carrier casting to disengage the retainer plate and spring (27) from the pins of the casting. To remove the lens carrier assembly (30), the hinge pins (26) must be pried out.

d. Inspect the aperture plate (36) and film guide (32) carefully for signs of scratches or scoring on surfaces which contact the film. Fine abrasions can usually be removed by polishing with a fine crocus cloth.

6. REMOVAL OF PARTS IN FIGURE 5. Remove parts, as necessary, in their indexed order of disassembly, noting the following special precautions.

a. One of the drive roller assemblies (6) is exposed and can be serviced quite easily. To gain access to the inner roller, remove retaining ring (9), and lift the assembled pulley mounting bracket assembly (3), and roller parts (4 through 8) from the projector.

b. To free the safety shutter and bracket assembly (25), remove the pivot screw (20), pivot spring (21), screw (22), Forward-Still-Reverse knob (23) and the screw (24). Note the manner in which the legs of the pivot spring (21) are engaged before disassembling these parts.

c. Note carefully the engagement of cam shoes (35) with the surface of the pulldown cam (46) before disassembling the shutter (28), shuttle and framing lever assembly (32) or pulldown cam (46).

Reassembly and Adjustments

7. GENERAL INSTRUCTIONS.

a. When the reassembly procedure includes the staking of rivets or other parts, all riveting and staking should be done first to avoid the possibility of damage to other parts. Be sure to support the casting solidly before riveting or staking.

b. Parts which must be lubricated during reassembly are listed in the following lubrication table. Lubricate sparingly, and wipe away excess lubricant with a lint-free cloth. Use only Bell & Howell grease (Specification No. 1956 as noted) and oil (Spec. 310) or the best available commercial grades of ball bearing grease or projector oil.

8. REASSEMBLY OF PARTS IN FIGURE 5. Reassemble parts in reverse order of disassembly, noting the following special precautions.

a. Screw framer shaft (33) into mechanism plate (58) and install retaining ring (34) to groove in shaft (33). Hold the drive pinion (52) in position between the two cast ears of the mechanism plate while installing the main shaft assembly (49). Note that the hub of pinion (52) must face in the direction shown in Figure 5. Tighten setscrew (48) just enough to hold.

b. Assemble shutter washer (27), shutter (28), in-out cam (29), and pulldown cam (46) with screws (26). Select any combination of white and/or black cam

Table I. Lubrication

ITEM	LUBRICATION
Roller (item 23, Figure 1)	Apply grease (1956) to roller shaft with brush
Spur gear (item 4, Figure 2)	Apply grease (1956) to face of gear
Spur gears (items 7 and 20, Figure 2)	Apply grease (1956) to both sides
Gear and shaft assemblies (items 13 and 26, Figure 2)	Apply grease (1956) between faces of bearings (item 30, Figure 2) and faces of gears
Reel arm supports (items 31 and 32, Figure 2)	Apply grease (1956) between supports and mechanism plate.
Bearing balls (item 37, Figure 2)	Speck of grease on each ball.
Motor pulley (item 14, Figure 3)	Apply oil (310) between pulley and motor shaft
Lens carrier (item 30, Figure 4)	Apply grease (1956) to the fine focus cam
Projector gear train, complete	After gears are assembled, apply grease (1956) with brush to entire gear train for one revolution of the gears.

shoes (35) for proper fit on cam (46). The white cam shoe is thicker than the black. Use two white shoes for minimum cam spacing, two black shoes for maximum cam spacing and one of each for median spacing. Hold cam shoes (35) in place while assembling shuttle and framing lever assembly (32) to pulldown cam (46). Install thrust washer (47) over end of main shaft; then hold the assembled shutter and shuttle in position while pressing the main shaft into place. Insert a 0.002-inch feeler gauge between the washer (53) and the bearing which is pressed into the cast arm of the mechanism plate. Press the shutter and main shaft knob toward one another until the feeler gauge is held in place; then tighten the pulldown cam setscrews (45) securely, and remove feeler gauge. Engage lower end of shuttle with groove in framer shaft (33).

c. Assemble the adjusting screw (17) and lock nut (16) to the roller bracket assembly (19) and fasten the bracket to the speed change lever (42) with the two screws (18). Assemble low speed roller (12) to bracket with flat washer (11) and retaining ring (10).

d. Install washer (31) on pivot (30) and insert the threaded end of pivot shaft through shuttle (32), eccentric washer (36), torsion spring (37), speed change lever (42), spacer (43) and cast arm of mechanism plate. Install pivot nut (44) loosely. Engage forked lower end of speed change lever with bent arm of the speed control link (41); then tighten nut (44). Note that the small hook of torsion spring (37) hooks around the leading edge of the speed change lever while the larger hook engages the underside of the cast arm of the mechanism plate.

e. Assemble rollers (6 and 7) to the pulley mounting bracket (3) with washers (5) and retaining rings (4). Insert pivot stud of mounting bracket through bearing hole of safety shutter (25) and secure with retaining ring (9). Fasten spring loading bracket (2) to pulley mounting bracket with screws (1). Hold safety shutter in position while installing pivot screw (20) and spring (21). Cross the legs of the pivot spring and engage spring ends with the groove in a spring stud protruding from the safety shutter. Screw (26) is installed in the upper corner of the lamp house casting on the front side of the mechanism plate. Install Forward-Reverse knob (23) with screw (22).

f. With screws (1) loose and knob (23) in the "Still" (center) position, insert a 0.062 inch shim between the upper drive roller (6) and the rim of the shutter. Press lightly against the roller to hold the shim in place while tightening screw (1); then withdraw the shim. Final adjustment is outlined in paragraph 17.

9. REASSEMBLY OF PARTS IN FIGURE 4. Reassemble parts in reverse order of disassembly, observing the following special precautions.

a. If the lens mount catch (40) was removed for replacement, the 0.095-inch-diameter rivet holes should be tapped with a No. 4-40NC thread tap. Reinstall the catch with two No. 4-40 binder head screws part number 30243.

b. Assemble the side tension arm (35) and spring (34) to the aperture plate assembly (36). Note that the loop of the spring encircles the aperture plate stud and the spring legs enter the holes at the top and bottom of the side tension arm. Hold the aperture plate in position against the casting so that the shuttle tooth is approximately in the center of the slot, and install the four screws (31 and 33) and film guide (32).

c. Assemble the spring (27), retainer plate (28), and pressure plate (29). Compress these parts, and engage the upper and lower slots of the pressure plate with the cast ears at top and bottom of lens carrier subassembly (30). Release the pressure on the parts, guiding the retainer plate and spring as necessary to engage the pins protruding from the lens carrier casting. Be sure retainer plate is under the pin protruding from the left side of the lens carrier.

d. Assemble the sprockets and loop former (14 through 25) to the mechanism plate. The short spring (10) is located just behind the upper sprocket gear and the long spring (9) just behind the motor.

e. Loosen the two linkage screws (38) located just to the right of the trip lever (11), and move the protruding shaft of the trip lever toward the rear of the mechanism plate until the loop formers open. Hold the loop formers in a closed position with one hand and adjust the linkage so that the upper end of the trip lever engages an ear of the linkage, locking the linkage in place. Tighten the screws (38) securely and recheck trip lever operation several times.

f. Install gears (4 and 5) on their sprocket shafts. Note that the upper sprocket gear engages the drive pinion (item 52, Figure 5) located on the framer shaft. Position this pinion so that the pinion teeth are centered at the bottom of the sprocket gear, and tighten the drive pinion setscrew securely.

g. Thread the end of a 6-inch length of 8 mm film one inch beyond upper sprocket and hook a 0 to 10 lb. spring scale to end of film strip. Pull film steadily straight toward front of projector while watching spring scale. Sprocket must turn or ratchet at 2 to 5 pounds on scale. Lower sprocket must ratchet at 1-1/2 to 5 pounds. Bend flat spring (2, Figure 4) to increase or decrease tension.

10. REASSEMBLY OF PARTS IN FIGURE 3. Reassemble parts in reverse order of disassembly, noting the following special precautions.

a. When using Bell & Howell motor #010493, use screws #26923. When using motor #012096, use screws #36689.

b. Install drive pulley (14) and blower fan (8) on motor shaft with hubs facing one another. Then lift the motor into position, engaging the drive belt (9) with the pulley before installing the motor screws (10).

c. Position the drive pulley directly below the upper pulleys, using a metal straight edge if necessary to insure that belt is vertical during operation. Then tighten setscrew (13) securely.

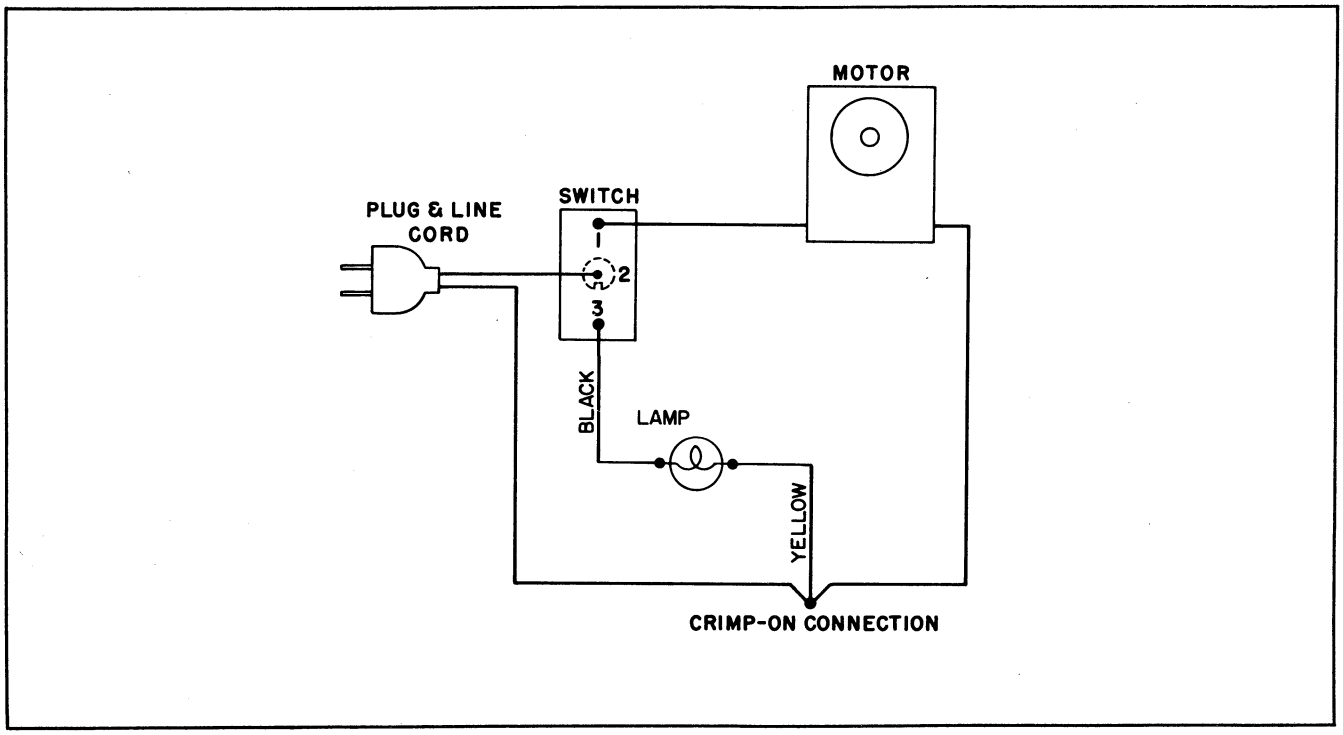

Figure C. Wiring Diagram

d. Make certain that the blower fan (8) is centered in the fan housing before tightening the setscrew (7). Rotate fan manually to make sure that blades do not touch casting. Then install blower housing cover (6).

e. Make all necessary wiring connections as shown in the wiring diagram, Figure C.

11. REASSEMBLY OF PARTS IN FIGURE 2. Reassemble parts in reverse order of disassembly noting the following special precautions.

a. Assemble the reel arm supports (31 and 32), bearings (30), cam washers (36), tension springs (35), and gear mounting plate (34) to the mechanism plate with the screw (33) tightened just enough to hold all parts together. Insert a steel ball (37) between each cam washer and the detent hole in the mechanism plate, and hold all parts firmly together while tightening screw (33) securely. Install the two retaining rings (29) in the grooves of the bearings (30).

b. Install gears (17, 18, and 26) into take-up reel arm support assembly (32), and lubricate gears as instructed in Table I. Install gears (4 and 13) into feed reel arm support assembly (31), and lubricate gears as instructed in Table I.

c. Assemble take-up spindle parts (19 through 23), using new spring washer (22), into take-up reel arm (16), and install screw (15). Install assembled reel arm to reel arm support (32), rotating the shaft of the take-up gear (26) until the teeth of the spur gear (20) mesh with those of its mating gear. Install and tighten the screws (14).

d. Assemble feed spindle parts (6 through 10), using new spring washer (9), into feed reel arm (3), and install screw (2). Insert the torque spring (5) into place within reel arm so that it will apply tension to gear and shaft (13). Install assembled reel arm to reel arm support (31), rotating the shaft of feed gear (13) until the teeth of the spur gear (7) mesh with those of its mating gear. Install and tighen screw (1).

e. Install spur gears (12 and 25) onto their shafts. Use a feeler gauge to maintain 0.003 inch end play between the bearings (30) and the gears. Tighten setscrews (11 and 24).

f. Lubricate the entire gear train as instructed in Table I.

12. REASSEMBLY OF PARTS IN FIGURE 1. Reassemble parts in reverse order of disassembly, but do not install the back cover (7) until all final projector adjustments have been made.

13. ADJUSTING TAKE-UP AND REWIND TORQUE. The take-up torque of the rear (take-up) spindle should measure 1 to 3-1/2 inch-ounces; the rewind torque of the front (feed) spindle should measure 3 to 6 inch-ounces. Torque can be measured with a 0 to 8 ounce Postalette scale and a modified 8-mm film reel as shown in Figure D. The method of checking take-up torque is illustrated in Figure D; to measure rewind torque, the film reel must be rotated so that the sheet metal screw is at position A, with the scale held directly above the screw. Torque can be increased or decreased by either tightening or loosening the respective screw (2 or 15, Figure 2).

14. ADJUSTING SHUTTLE TOOTH PROTRUSION. Excessive or inadequate protrusion of the shuttle tooth will result in improper film transport during operation. Proper shuttle tooth protrusion is checked with the shuttle tooth protrusion gauge shown in Figure B. Proceed as follows:

a. Set the framer knob in the approximate center of its travel range, and swing open the lens carrier.

b. Rotate the main shaft knob (51, Figure 5) until the shuttle teeth reach the approximate center of the downstroke.

c. Place the base (notched edge) of the gauge against the aperture plate with the deepest notch positioned directly over the shuttle teeth.

d. Holding the base of the gauge firmly against the aperture plate, slowly slide the gauge downward. If the shuttle teeth catch against the "go" step of the gauge, the teeth are protruding too far beyond the surface of the aperture plate. If the teeth pass the "go" step of the gauge but fail to catch against the "no go" step, the teeth are not protruding far enough.

e. Shuttle tooth protrusion is adjusted by bending the shuttle arm carefully to obtain the desired protrusion (0.034 inch). A bending tool S-35975 F-1-D may be used.

f. When the shuttle tooth protrusion has been properly adjusted, check the position of the shuttle teeth in relation to the sides of the slot in the aperture plate. By means of the eccentric washer (item 36, Figure 5), the shuttle teeth can be shifted toward one side or the other of the slot. The teeth must be adjusted so that they enter the center of the film perforations.

15. ADJUSTING PICTURE FRAMING. The framing mechanism must be adjusted to permit maximum picture framing in either direction. Proceed as follows:

a. Turn the framing knob carefully from extreme clockwise to extreme counterclockwise position, counting the number of revolutions of the knob. Then turn the knob back to midposition.

b. Thread the projector with film known to be in correct frame. Start projector and focus picture on screen.

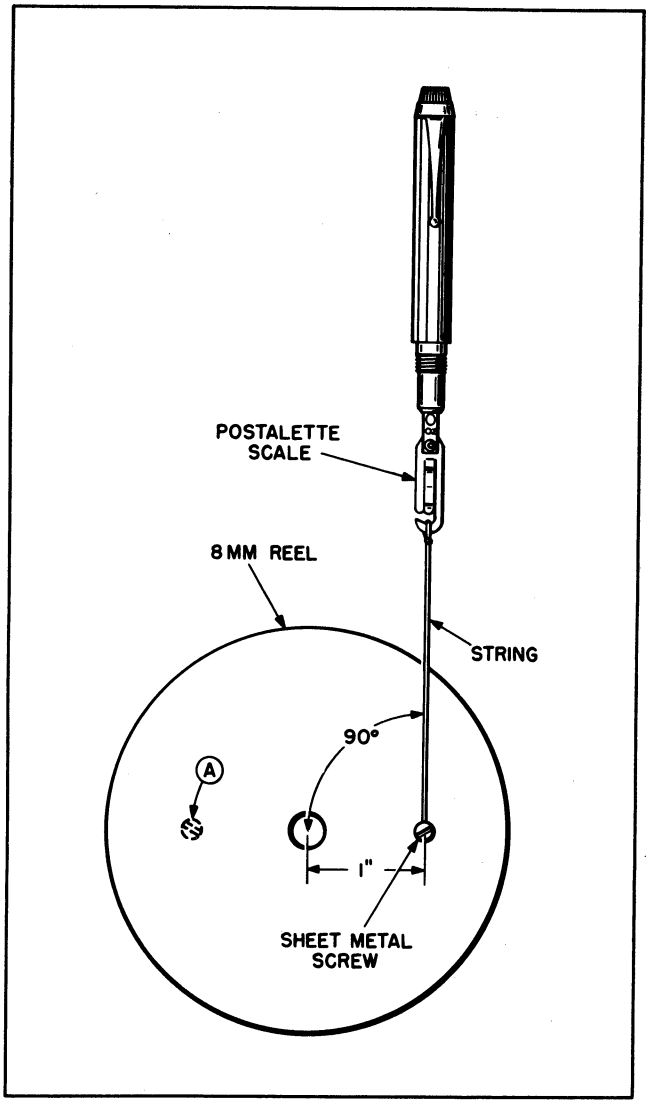

Figure D. Checking Reel Arm Torque

c. Note the binding head screw in the elongated hole at the bend or "knee" of the framing lever (32, Figure 5). Loosen this screw and shift the shuttle bracket arm (Figure 5) up or down, as necessary, to center the frame in the aperture. Then tighten binding head screw securely without disturbing the position of the bracket arm.

CAUTION

Keep hands and tools away from the motor fan while adjusting the framing lever.

Final Test

16. GENERAL INSTRUCTIONS.

This section contains specific tests to be performed to ensure that the projector is in proper working order. Tests will also serve to indicate the possible trouble or malfunction in the projector so that time can be saved in troubleshooting and servicing. Note that the projector is to be operated only from a 115-volt ac, 60-cycle power source.

17. SAFETY SHUTTER OPERATION TEST. It is important that the drive rollers, which drive the shutter pulley, make contact and begin driving the mechanism (either in forward or reverse) before the fire shutter clears the aperture opening. With the back cover removed and the projector connected to the power source, switch on the projector. This test is to be made without film.

a. Operate the projector, first in the forward direction and then in the reverse direction. Watch carefully as the lever is moved from the "still" position to either of the operating positions.

b. If the fire shutter clears the aperture opening before the shutter begins to revolve, the clearance between the drive rollers and edge of shutter pulley must be readjusted, as follows.

c. Proper operation of the safety shutter is controlled by the clearance between the upper drive roller (6, Figure 5) and the rim of the shutter. The nominal clearance is 0.062 inch (±0.015 inch). If the safety shutter (25) tends to clear the aperture opening before the shutter (28) begins to revolve when operating in reverse, this clearance should be increased toward the high (0.077 inch) tolerance. If the same thing happens when operating in forward, this clearance should be reduced toward the lower (0.047 inch) tolerance. To adjust, place the Forward-Reverse lever in the "still" position and loosen screws (1, Figure 5). Insert shim stock of proper thickness between drive roller (6) and rim of shutter and, while maintaining light pressure on the roller, tighten screws (1) securely.

d. Place the Slow Motion lever in "slow motion" position. Loosen lock nut (16, Figure 5) and adjust screw (17) until rollers (6 and 7) are just disengaged from the rim of the shutter (28). Then tighten lock nut (16) securely.

18. OPTICAL ALIGNMENT TEST. The alignment of the optical axis of the projection lens in the vertical plane is held to very close tolerances in the machining of the lens mount pivot. However, alignment in a horizontal plane is subject to possible variation, and provision has been made for adjusting the lens carrier accordingly. Check alignment as follows:

a. Thread the projector with resolution test film, roll title film, or other film known to have good resolution at the edges of the frame.

b. Project and focus the picture on a matte-surface screen. If the picture is "soft" along either edge, remove the back cover to gain access to the adjusting setscrew (item 37, Figure 4). This setscrew bears against the machined surface of the lens carrier and determines the angular relationship between the optical axis and the aperture plate.

c. Turn adjusting setscrew in or out to obtain equal sharpness of the image along both sides of the picture. If the lens carrier is far out of alignment, it may be necessary to refocus the picture during the alignment procedure.

19. OPERATIONAL TEST. Thread the projector with film, using a full reel, and run the projector to check for proper operation. Check the following items during the test.

a. Listen for unusual noises that may indicate insufficient lubrication.

b. If film should spill from the feed reel during operation, it may be necessary to tighten screw (2, Figure 2) slightly to apply additional tension.

c. If the film fails to maintain its loop above or below the aperture, check the shuttle tooth protrusion as described in paragraph 14, and readjust if necessary.

d. If the projected image appears soft at the edges, check the alignment of the optical axis as instructed in paragraph 18, and adjust if necessary.

Trouble Shooting

TROUBLE	PROBABLE CAUSE	REMEDY
Projector inoperative with switch in the MOTOR or LAMP position	1. No electrical power	1. Check power source.
	2. Loose drive pulley	2. Tighten pulley setscrew.
	3. Broken drive belt	3. Replace belt.
	4. Defective switch or wiring	4. Check circuit.
Picture flicker	1. Drive roller assemblies not adjusted properly	1. Readjust as instructed in paragraph 17.
	2. Defective drive belt pulley	2. Replace drive belt pulley.
	3. Dirt, wear or binding	3. Clean and repair or adjust gearing as instructed in paragraph 11.
Film scratches	1. Excessively dirty film channel parts (sprockets, guides, etc.)	1. Clean projector thoroughly.
	2. Worn pressure and aperture plates (29 and 36, Figure 4)	2. Replace if worn or marred.
	3. Worn or damaged film guide (32, Figure 4)	3. Replace film guide.
Jumpy picture	1. Loss of film loop due to damaged film	1. Inspect and splice as required.
	2. Green film	2. Run film through projector two or three times to age the film.
	3. Shuttle tooth worn	3. Replace shuttle assembly (32, Figure 5).
	4. Misaligned shuttle tooth	4. Adjust and align shuttle as instructed in paragraph 14.
	5. Grooves worn in film guide (32, Figure 4)	5. Replace film guide.
Soft focus	1. Dirty projection lens	1. Clean projector lens.
	2. Lens mount out of alignment	2. Readjust as instructed in paragraph 18.
	3. Loose lens mount catch (40, Figure 4)	3. Reset tension by bending catch carefully.

TROUBLE	PROBABLE CAUSE	REMEDY
Auto-threading not operating properly	1. Loop former linkage improperly adjusted or binding	1. Realign loop formers and reset linkage (paragraph 9, step e).
	2. Loop formers not releasing	2. Linkage binding or springs stretched or broken on linkage.
Film spills	1. Insufficient tension on feed spindle	1. Adjust, paragraph 19, step b.
Fails to take up or rewind	1. Defective drive belt	1. Replace belt.
	2. Worn rim on drive roller	2. Replace rim (8, Figure 5).
	3. Drive rollers not adjusted properly	3. Readjust as instructed in paragraph 17.
Noisy	1. Loose attaching parts	1. Tighten as necessary.
	2. Gearing dry	2. Lubricate as necessary.

Replacement Parts

The following pages illustrate and list by part number and part name all replacement parts of the Design 9270A and 9271AY Automatic 8-mm. Projectors. Since the illustrations are arranged in the suggested order of disassembly, they will serve as an aid to the repairman during disassembly and reassembly of the projector. Be sure to check footnotes which appear on some pages for special instructions regarding replacement procedures.

ACCESSORIES

9270A

#010497 - 400 FT. 8-mm. REEL

#020248 - 1 inch f 1.6 LENS

9271AY

010497 - 400 FT. 8-mm. REEL

020244 - 17-27mm. f 1.6 LENS (VARIZOOM)

FIG. & INDEX NO.	PART NO.	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY
		COVERS AND LAMP	
1-1	06188	COVER ASSEMBLY, Front	1
-1A	29144	. RIVET, Tubular (front cover catch)	1
-1B	26321	. CATCH, Front cover	1
-1C	32361	. BUTTON, Catch (front cover)	1
-1D	36743	. NAMEPLATE, Cover, "Sears"	1
-1E	36748	. NAMEPLATE, Cover, "Automatic 8mm Projector"	1
-2	010716	SUPPORT ASSEMBLY, Film reel	1
-3	06190	COVER ASSEMBLY, Lamphouse	1
-3A	36733	. NAMEPLATE, Forward - Reverse	1
-3B	010283	. SCREW & KNOB ASSEMBLY, Lamphouse	1
-4	33201	LAMP, Super Tru-flector, T-12, DFC	1
-5	29065	SCREW, No. 4-40 hex head (back cover)	8
-6	33194	Screw, No. 6-32 self threading (back cover)	2
-7	06189	COVER ASSEMBLY, Back	1
-7A	29144	. RIVET, Tubular (back cover)	1
-7B	33073	. SPRING, Handle	1
-8	33051	HANDLE, Carrying	1
-9	36725	SCREW, (control housing)	4
-10	36705	KNOB	1
-11	36831	SCREW	1
-12	36738	HOUSING, Control	1
-13	36741	NAMEPLATE	1
-14	36739	NAMEPLATE	1
-15	33197	SCREW, Hex head (switch plate)	2
-16	32136	SCREW, No. 6-32 hex head	3
-17	011969	SOCKET AND BRACKET ASSEMBLY, Lamp	1
-18	30226	RIVET	2
-19	32478	BAFFLE, Lamp	1
-20	26906	NUT	2
-21	399016	SCREW	2
-22	010682	BRACKET ASSEMBLY, Lamphouse cover mounting	1
-23	30662	ROLLER, Take-up drive	1
-24	33072	SCREW, No. 6-40 set	1
-25	33117	GUIDE, Film	1
-26	30136	BUSHING, Strain relief	1
-27	010492	CORD ASSEMBLY, Terminal and plug	1
-28	20415	NUT, Hex (switch)	1
-29	33024	PLATE, Switch	1
-30	33070	SWITCH, Toggle	1
-31	36714	KNOB, Tilt	1
-32	33038	SHAFT, Locking screw	1
-33	22113	RING, Retaining (tilt shaft)	1
-34	010187	TILT SHAFT AND FOOT ASSEMBLY	1
-35	28145	SPRING, Tilt	1
-36	33106	SCREW, Fillister head, self threading	1
-37	26135	FOOT, Rubber	1
-38	34539	RING, Retaining	1
-39	33931	WASHER, Flat	1
-40	35349	WASHER, BOWED SPRING	1
-41	36740	KNOB, Framer	1
-42	35348	WASHER, Flat	1

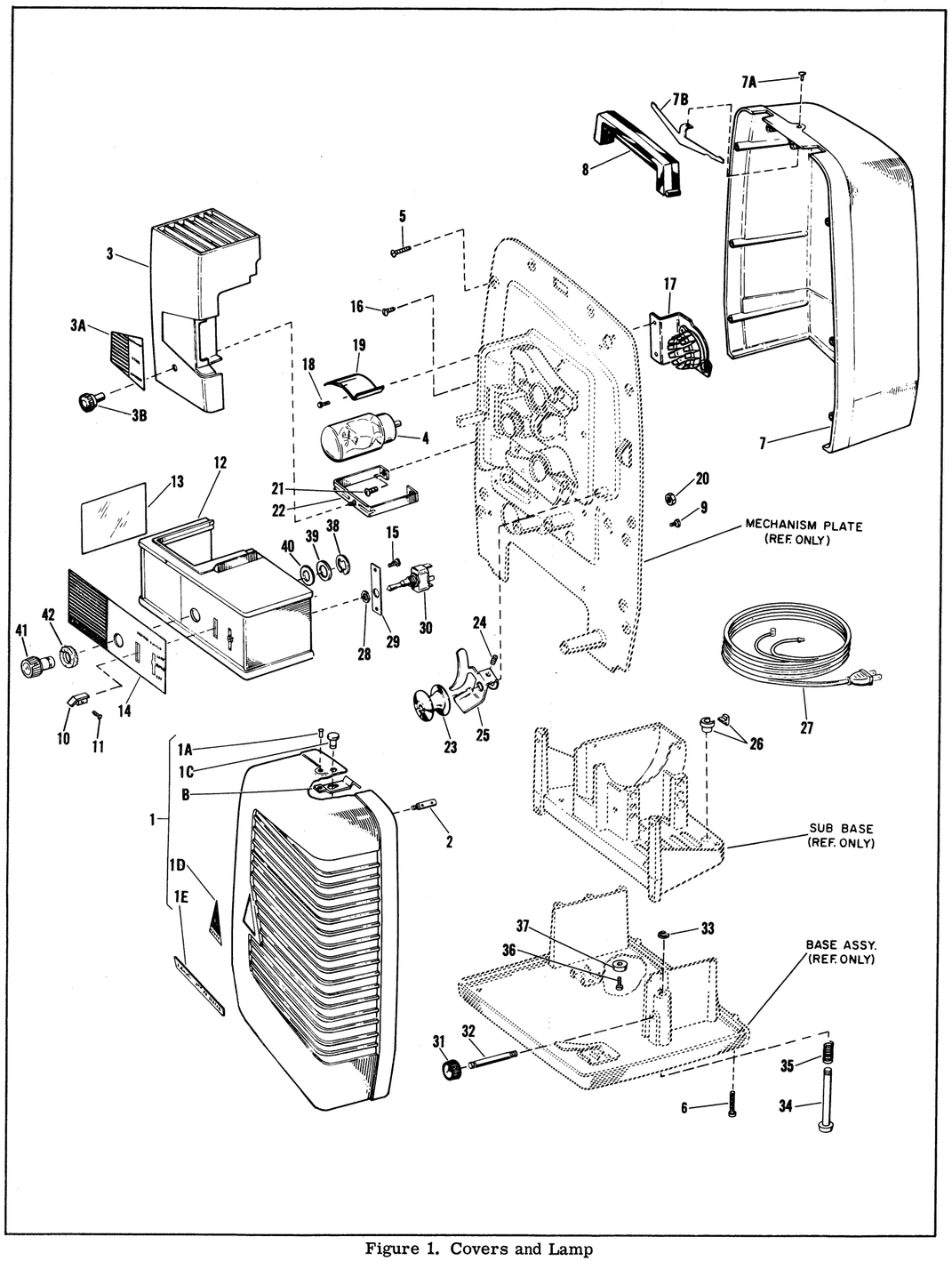

Figure 1. Covers and Lamp

FIG. & INDEX NO.	PART NO.	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY
		REEL ARMS AND GEARS	
2-1	23822	SCREW, Binding head	1
-2	32861	SCREW, Tension adjusting	1
-3	05641	ARM ASSY, Feed reel	1
-4	29706	GEAR, Spur	1
-5	32979	SPRING, Torque	1
-6	29726	SPACER, Tension adjusting	1
-7	35579	GEAR, Spur	1
-8	35580	DISC, Friction	2
-9	29724	WASHER, Spring	1
-10	010935	SPINDLE ASSY, Feed reel	1
-10A	7477	. SPRING	1
-10B	9350	. KEY	1
-10C	12143	. PLUG	1
-10D	33664	. SPINDLE	1
-11	29192	SETSCREW	1
-12	35176	GEAR, Spur	1
-13	010189	SHAFT ASSY, Feed arm	1
-14	23822	SCREW, Binding head	2
-15	32861	SCREW, Tension adjusting	1
-16	05642	ARM ASSY, Take-up reel arm	1
-17	29707	GEAR, Spur	2
-18	29706	GEAR, Spur	1
-19	29726	SPACER, Tension adjusting	1
-20	35579	GEAR, Spur	1
-21	25580	DISC, Friction	2
-22	29724	WASHER, Spring	1
-23	010935	SPINDLE ASSY, Take-up reel	1
-23A	7477	. SPRING	1
-23B	9350	. KEY	1
-23C	12143	. PLUG	1
-23D	33664	. SPINDLE	1
-24	29192	SETSCREW	1
-25	30203	GEAR, Spur	1
-26	010190	SHAFT ASSY, Take-up arm	1
-27	21736	RING, Retaining	3
-28	34718	GEAR, Spur	3
-28A	33154	WASHER, Flat	2
-29	29744	RING, Retaining	2
-30	34705	BEARING	2
-31	010779	SUPPORT ASSY, Feed reel arm	1
-32	010998	SUPPORT ASSY, Take-up reel arm	1
-33	30165	SCREW, Binding head	1
-34	011458	PLATE ASSY, Gear mounting	1
-35	30238	SPRING, Reel arm tension	2
-36	29736	WASHER, Cam	2
-37	145	BALL, Steel	4

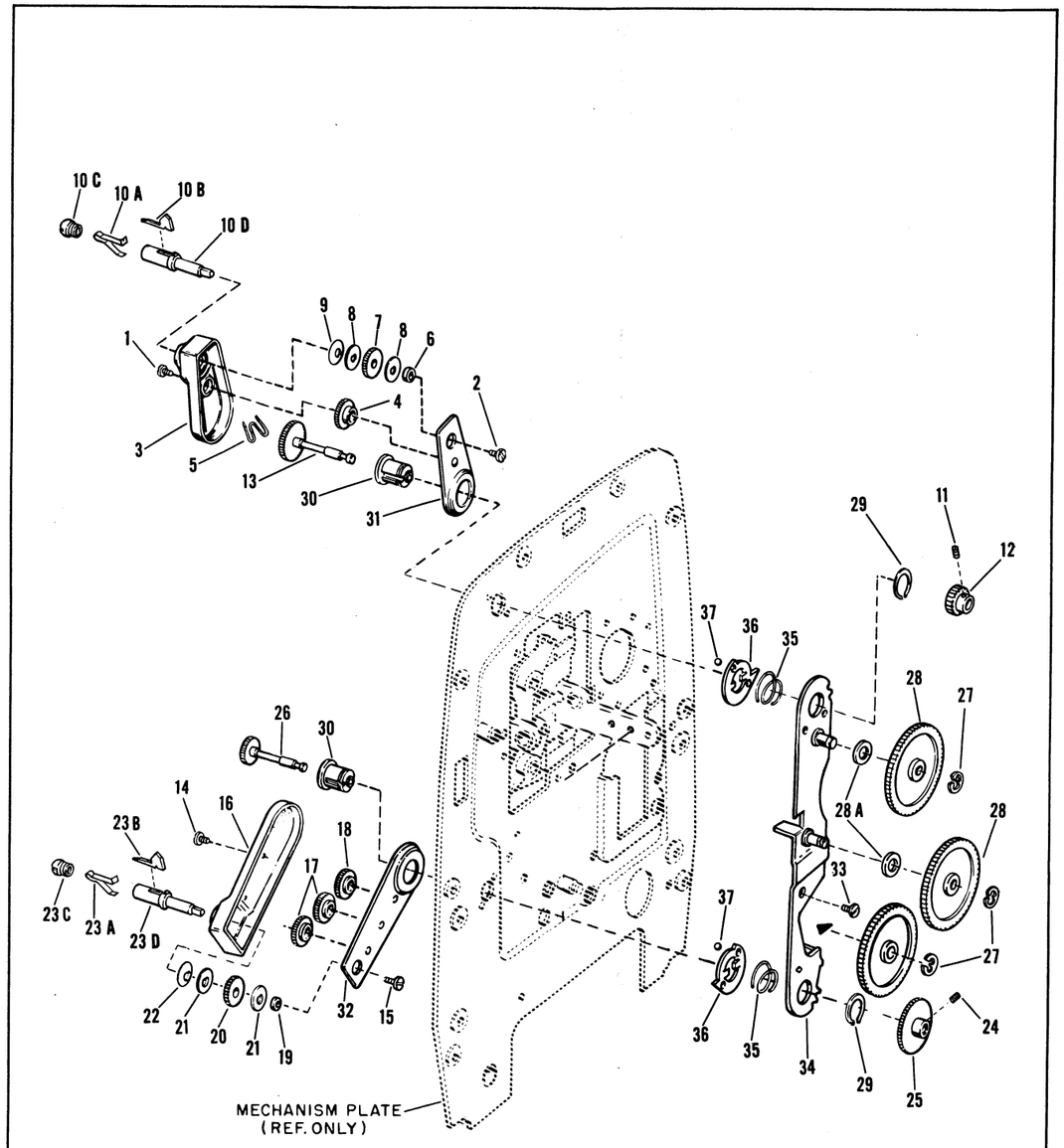

Figure 2. Reel Arms and Gears

FIG. & INDEX NO.	PART NO.	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY
		MOTOR AND BLOWER FAN	
3-1	26329	SCREW, Slotted hex head self tapping	2
-2	29065	SCREW, Slotted hex head self tapping	1
-3	34784	WASHER, Flat	3
-4	83286	CLIP, Cable	1
-5	82794	CONNECTOR, Closed end	1
-6	35595	COVER, Blower housing	1
-7	32974	SETSCREW, Blower fan	1
-8	012169	FAN, Blower	1
-9	32858	BELT, Drive	1
-10	26923	SCREW, Motor mounting (see NOTE A)	4
-10	36689	SCREW, Motor mounting (see NOTE A)	4
-11	36690	DAMPER, Vibration	4
-12	32726	BUSHING, Motor	4
-13	12498	SETSCREW, Pulley	1
-14	34622	PULLEY, Drive	1
-15	012096	MOTOR, Drive (see NOTE A)	1
-15	010493	MOTOR, Drive (see NOTE A)	1
-16	32485	FAN, Motor	1

NOTE A: When Bell & Howell motor # 012096 is used, screws # 36689 must be used. With purchased motor # 010493, use screws # 26923.
012096 MOTOR (ALUMINUM ROTOR)
010493 MOTOR (BRASS/COPPER ROTOR)

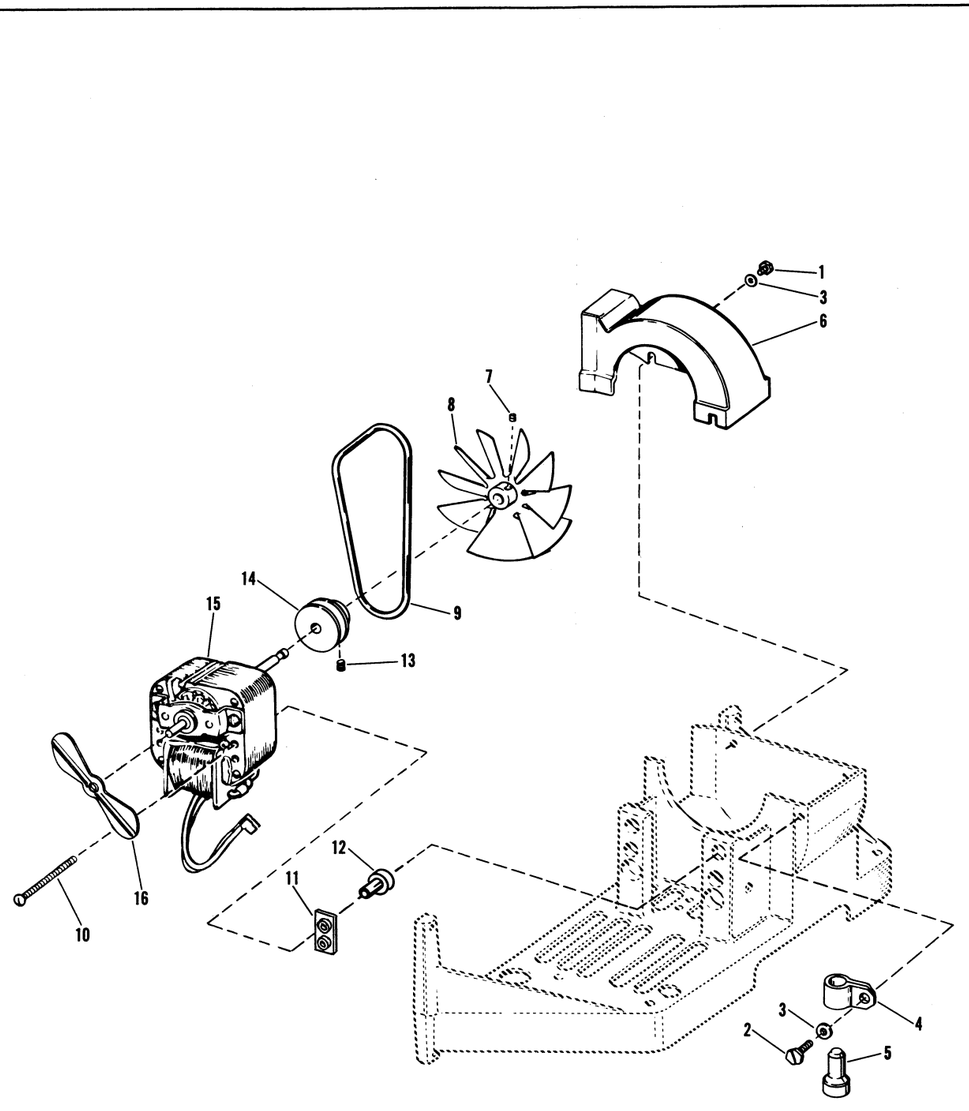

Figure 3. Motor, Fan, and Speed Control

FIG. & INDEX NO.	PART NO.	DESCRIPTION	UNITS PER ASSY
		1 2 3 4 5 6 7	
		SPROCKETS, LOOP FORMERS AND LENS CARRIER	
4-1	35181	SPRING	2
-2	35184	SPRING, Ratchet	2
-3	35186	WASHER	2
-4	33153	GEAR	1
-5	35177	GEAR	3
-6	26085	WASHER, Thrust	1
-7	30667	WASHER, Friction	1
-8	011459	LEVER AND STUD ASSY, Drive gear	1
-9	30650	SPRING, Trip roller assembly	1
-10	30651	SPRING, Lever return	1
-11	011297	IDLER STUD AND TRIP LEVER ASSEMBLY	1
-12	010694	LOCK LEVER AND STUD ASSEMBLY, Actuator	1
-13	30165	SCREW	2
-14	30612	SCREW, Pin	2
-15	30643	PIN, Lever (part of items 16 and 17)	2
-16	011457	LOOP FORMER ASSEMBLY, Upper	1
-17	010637	LOOP FORMER ASSEMBLY, Lower	1
-18	30611	ROLLER, Film	1
-19	37266	ROLLER, FILM, TAPERED	1
-20	30613	WASHER, Spacer	2
-21	30625	ROLLER, Upper loop former	1
-22	34580	SCREW, Binding head machine	2
-23	011319	BRACKET ASSEMBLY, Upper loop former	1
-24	33588	BRACKET, Lower loop former	1
-25	011454	SPROCKET ASSEMBLY	2
-26	26030	PIN, Hinge (lens carrier)	2
-27	34960	SPRING	1
-28	33937	PLATE, Retainer	1
-29	33680	PLATE, Pressure	1
-30	05643	CARRIER SUBASSEMBLY, Lens	1
-31	30621	SCREW, Truss head machine	2
-32	30626	GUIDE, Film	1
-33	30620	SCREW, Truss head machine	2
-34	28067	SPRING, Side tension	1
-35	30639	ARM, Side tension	1
-36	011114	PLATE ASSEMBLY, Aperture	1
-37	30634	SETSCREW (Lens mount adjusting)	1
-38	35956	SCREW, Binding head (linkage adjusting)	2
-39	26642	RIVET, Tubular (lens mount catch)	2
-40	30615	CATCH, Lens mount	1

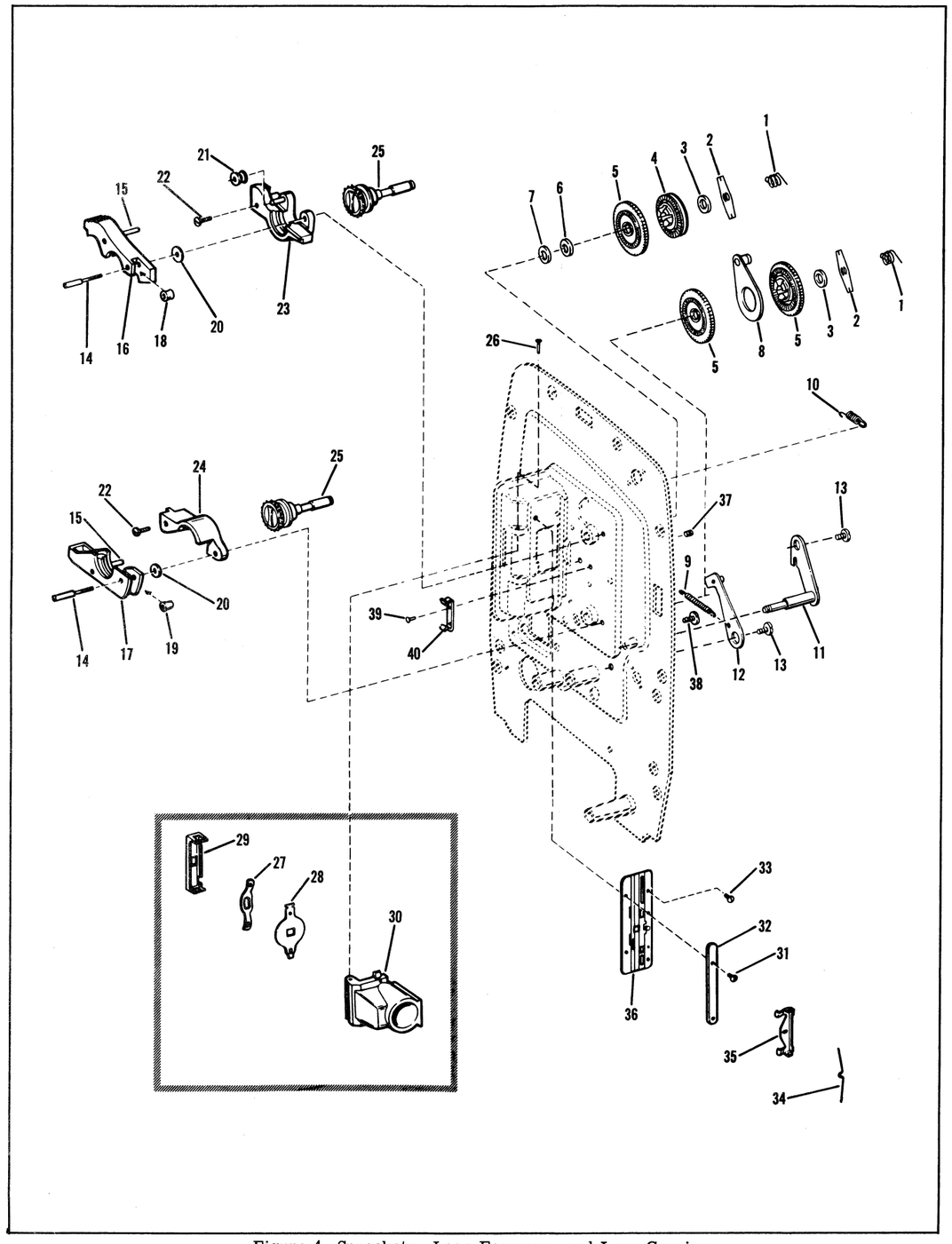

Figure 4. Sprockets, Loop Formers, and Lens Carrier

FIG. & INDEX NO.	PART NO.	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY
		SHUTTER AND SHUTTLE MECHANISM	
5-1	27641	SCREW, Fil-hd	2
-2	010181	BRACKET ASSY, Spring loading	1
-3	010278	BRACKET ASSY, Pulley mounting	1
-4	27322	RING, Retaining, drive roller	2
-5	32172	WASHER, Flat	4
-6	011791	ROLLER ASSY, Drive (includes one of item 8)	1
-7	012086	ROLLER ASSY, STEP Drive (includes one of item 8)	1
-8	27313	. RIM, Drive roller	2
-9	25715	RING, Retaining	1
-10	27322	RING, Retaining	1
-11	32172	WASHER, Flat	2
-12	011793	ROLLER ASSY, Low speed	1
-13	27313	. RIM, Roller	1
-14	80147	SCREW	1
-15	35938	BRACKET GUIDE	1
-16	83447	NUT, Lock	1
-17	35334	SCREW, Roller adjusting	1
-18	80147	SCREW, Fil-hd	2
-19	05666	BRACKET ASSY, Roller	1
-20	29472	SCREW, Pivot	1
-21	32169	SPRING, Pivot	1
-22	30714	SCREW, Fillister head	1
-23	33057	KNOB, Pivot lever (Forward-still-reverse)	1
-24	32126	SCREW, Round head	1
-25	05841	SAFETY SHUTTER AND BRACKET ASSEMBLY	1
-26	30551	SCREW, Fillister head machine	2
-27	35305	WASHER, Shutter	1
-28	05669	SHUTTER ASSY	1
-29	29040	CAM, In-out	1
-30	32117	PIVOT	1
-31	30800	WASHER, Spring	1
-32	05842	SHUTTLE AND FRAMING LEVER ASSEMBLY	1
-33	33159	SHAFT, Framer	1
-34	21736	RING, Retaining	1
-35	(See Note A)	SHOE, Cam	2
-36	35319	WASHER, Eccentric	1
-37	35318	SPRING, Torsion	1
-38	36722	SPRING	1
-39	32865	E RING	1
-40	29144	RIVET	2
-41	05845	SPEED CONTROL LINK	1
-42	05667	LEVER ASSY, Speed change	1
-43	35317	SPACER, Shuttle	1
-44	26906	NUT AND LOCK WASHER	1
-45	80591	SETSCREW, Bristol head	2
-46	29184	CAM, Pulldown	1
-47	26085	WASHER, Thrust	1
-48	12498	SCREW, Socket head	1
-49	33039	SHAFT ASSEMBLY, Main	1
-50	80591	SCREW, Cup point	1
-51	33040	KNOB, Main shaft	1
-52	33196	PINION, Drive	1
-53	30667	WASHER, Friction	1
-54	26131	RING, Retainer	1
-55	29065	SCREW, Hex head machine	4
-56	33108	SCREW, Hex head self threading	5
-57	33006	SUB-BASE, Projector	1
-58	NPN	PLATE ASSEMBLY, Stud, linkage and mechanism	1
-59	06191	BASE ASSY	1
-59A	30648	RIVET, Film cutter and guide	2
-59B	36115	CUTTER, Film	1
-59C	33105	RIVET, Rubber foot	1
-59D	26135	FOOT, Rubber	1
-59E	36731	BASE, Projector	1

NOTE A: Select any combination of cam shoes # 32947 and/or # 33712 to obtain proper fit on cam.

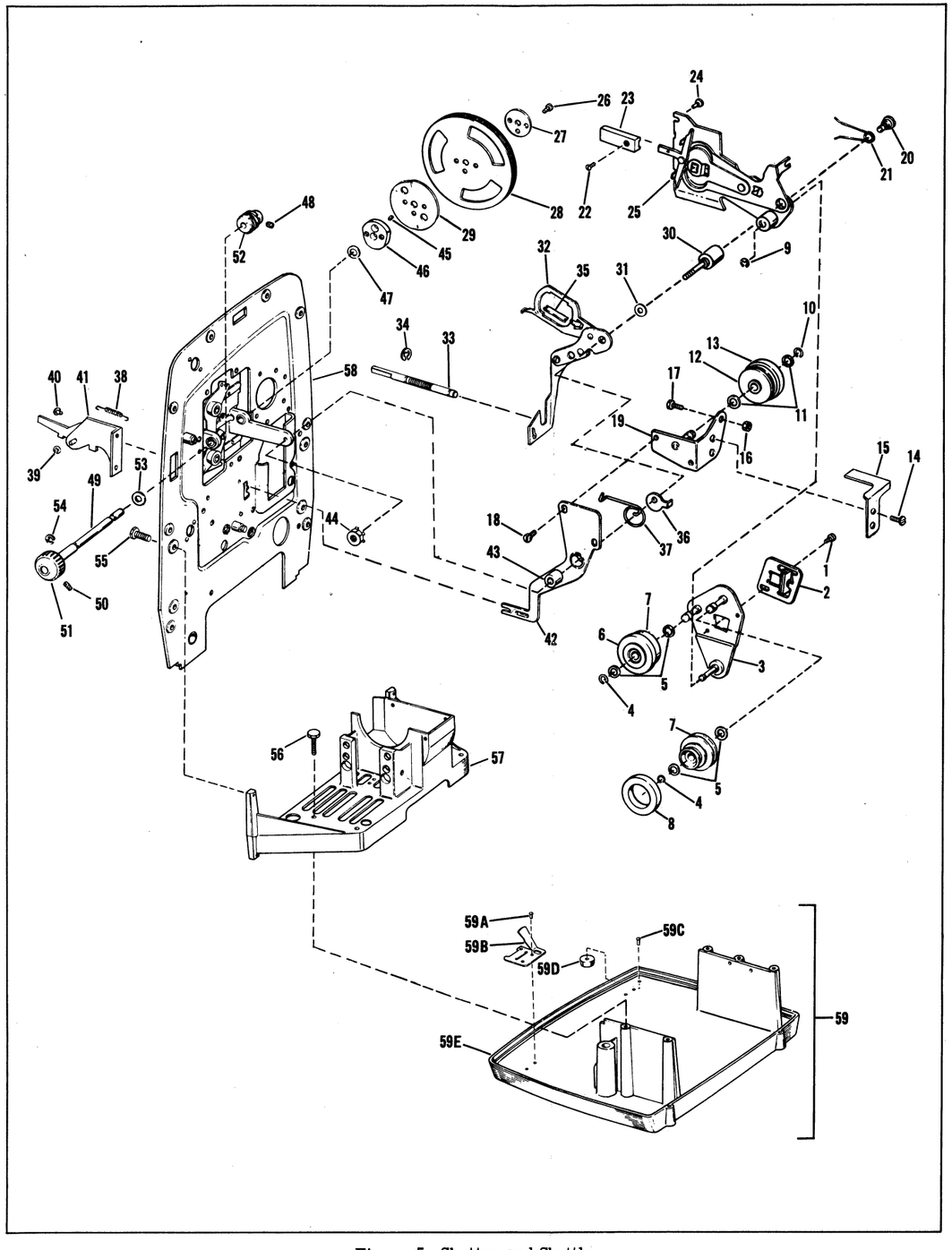

Figure 5. Shutter and Shuttle