SERVICE INSTRUCTIONS

Sears

AUTOMATIC DUAL SPEED 8-MM PROJECTOR

MODELS 584.92000 AND 584.92010

PART NO. 70479 PRINTED IN U.S.A. NOVEMBER 1965

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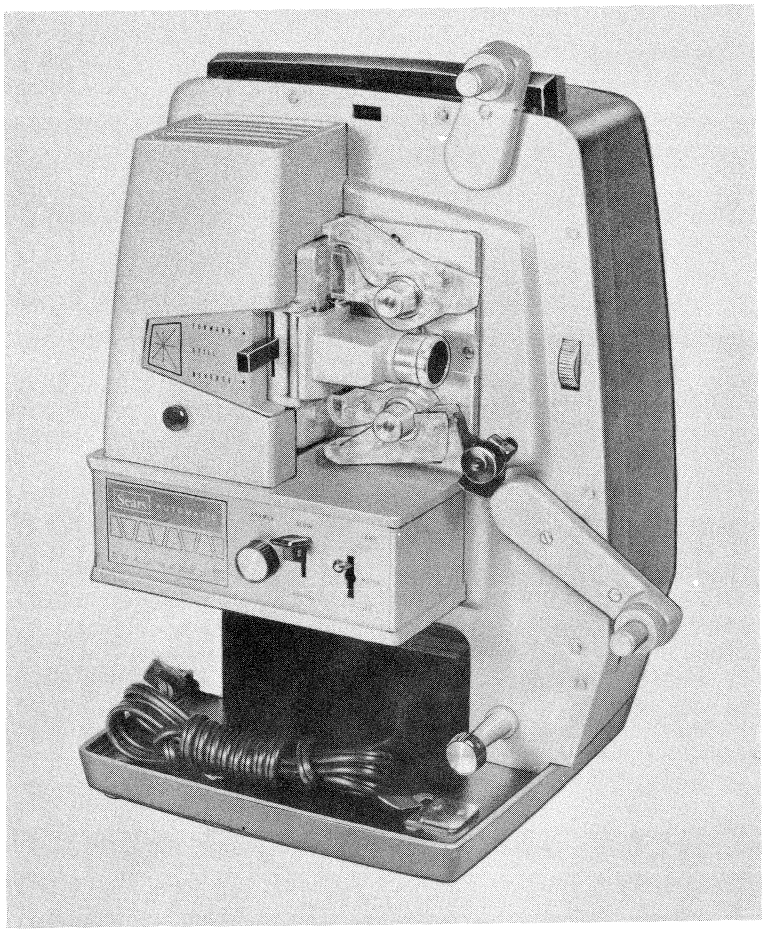


Sears Automatic Dual Speed 8-mm Projector, Model 584.92000

FEATURE DESCRIPTION LIST

Color	forest green and gold
Type of film	super 8-mm
Projector operation	forward-still-reverse
Still projection filter	perforated metal
Type of framer	screw knob
Projection lamp	type DJL, 120-volts, 160-watts, with metal reflector
Projection lens	1-in. f/1.6 (p/n 020448) for P200 17-27 mm f/1.6 (p/n 020244) for P201
Loopformer system	self-latching
Operating voltage	120-volts, 60-cycles
Tilt device	spring-loaded foot; lock knob
Special features	slow motion-normal control knob; film trimmer mounted on base

Introduction

GENERAL.

This manual has been prepared to aid in servicing the Sears Automatic Super 8-mm Projectors, Models 584.92000 (P200) and 584.92010 (P201). Except for the difference in projection lenses used, these projectors are identical in all respects. The Model P200 is equipped with a standard 1-inch f/1.6 lens, while the Model P201 projector has a 17-27 mm f/1.6 Varizoom lens. An illustrated Parts Catalog is included at the rear of this manual to identify replacement parts and to aid the serviceman in the disassembly, reassembly and adjustment 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 manual.

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

NOTE

The slight curl of the film leader, resulting from its being wound on the film reel, is essential for proper automatic threading of the projector. If this curl is lacking, the film leader must be pulled between thumb and index finger while bending the film at a sharp angle so that a slight curl is produced. Excessive curl should be avoided.

a. The operator depresses the upper loopformer (4), which pivots to position A. This actuates a linkage system which automatically pivots the lower loopformer (10) to position A. A spring-loaded latch, to which the take-up idler (14) is attached, locks the loopformers 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 by placing the Off-Motor-Lamp switch in the Motor position, the Forward-Reverse lever in Forward and the speed lever in Normal; then 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 loopformer (4) keeps the film on the sprocket (3), the sprocket advances the film past the roller (5) and through the passage between the loopformer and upper bracket (6). The upper loopformer 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 loopformer (10), it turns upward and passes through the passage between the loopformer and lower bracket (11), where it is guided to the take-up sprocket (12). The film then passes out through the opening (13).

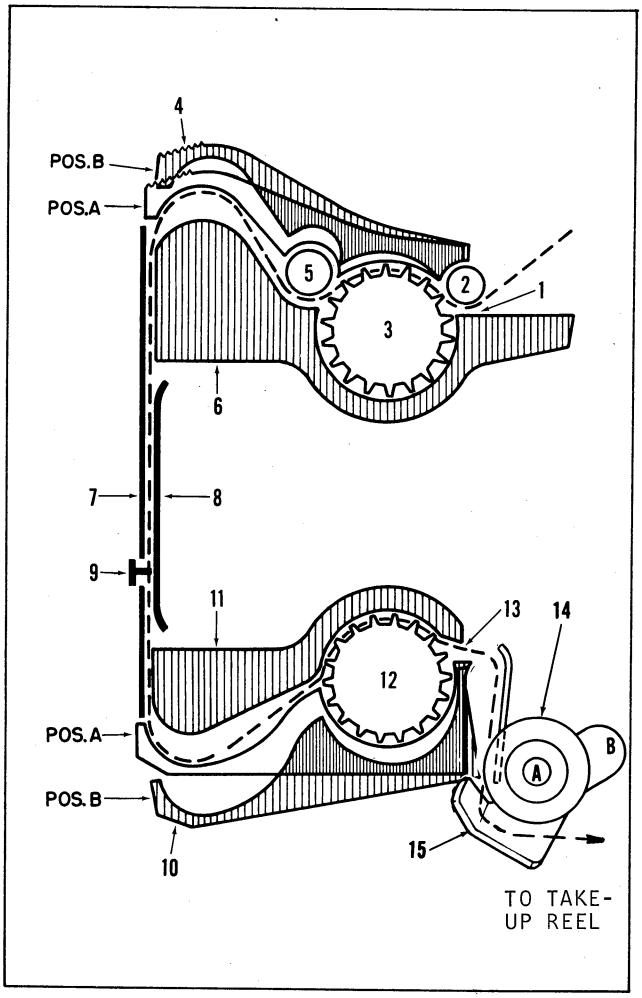


Figure A. Autoload Theory View

e. The film guide (15) directs the film to the take-up reel where the toothed hub engages the film perforations and begins to take up the film. When the film leader is fully engaged on the reel hub, it is only necessary to place the Off-Motor-Lamp switch in the Lamp position to begin projection.

SPECIAL MAINTENANCE PRECAUTIONS.

The removal and installation of projector parts is comparatively simple and, for the most part, requires only the tools normally available in most repair shops (retaining ring pliers, Bristol setscrew wrenches, assorted screwdrivers and hex socket wrenches, etc.). Where required, special tools and gages are clearly noted in the instructions and illustrated in Figure B. Bristol setscrew wrenches required are listed below.

When repairing equipment, be sure that the work table surface is clean. As parts are removed, group them in an orderly fashion to avoid confusion during reassembly. Clean dirt and old lubricant from parts (except electrical components) by washing them in a pan of solvent. Hardened film emulsion can be removed from film path parts by using alcohol and a wooden implement (toothpick or orange stick). Do not use a knife or other metal tool to scrape film emulsion from film path components.

Some nameplates are furnished with a protective backing which must be removed with a tweezers. The adhesive backing must be brushed with solvent (Bell & Howell Specification No. 1933) or trichlorethylene (Specification No. 1385) to activate the adhesive. When the adhesive is tacky, press nameplate carefully but firmly into place. Wipe off excessive adhesive with a clean cloth.

After the projector has been repaired, reassembled and adjusted, perform the inspections and test procedures outlined in the Final Test section to insure satisfactory projector operation.

During reassembly, be sure to lubricate parts as noted in the service instructions. If possible, use only recommended Bell & Howell lubricants as listed below. If Bell & Howell lubricants are not immediately available, use only the best grades of ball bearing grease and projector oil obtainable from local commercial outlets.

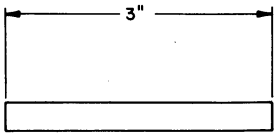
Grease (Bell & Howell Specs. 1516, 1956 and 1980).
Oil (Bell & Howell Spec. 1543).

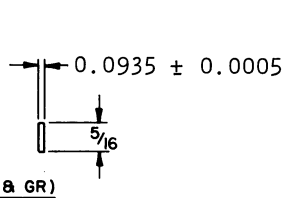
BRISTOL SETSCREW WRENCHES REQUIRED FOR MAINTENANCE

Setscrew Size	No. of Flutes	B & H Part Number	
		Handle	Wrench
No. 4-40NC	6	G1271-F1	G1271-X2
No. 6-32NC	6	STK3852-B	STK3863-B
No. 8-32NC	6	G165-F1	G165-X2

NOTE: Wrench G165-F3 is required to tighten setscrew in tool handles.

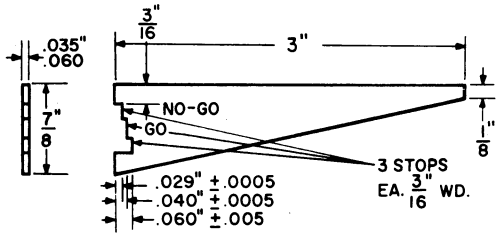
TOOLS WHICH CAN BE "SHOP-MADE"





MATERIAL: GA STK-(HON & GR)

LENS CARRIER SETTING GAGE



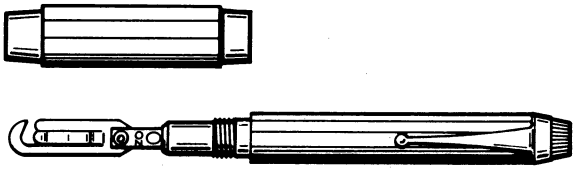
SHUTTLE TOOTH
PROTRUSION GAUGE

TOOLS WHICH CAN BE PURCHASED

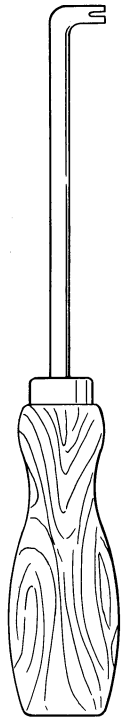
INSERT THIS LIP BETWEEN
LOOP FORMER AND SPROCKET

SPROCKET CLEARANCE
SETTING GAGE

BELL & HOWELL NO. S-012600-34N4

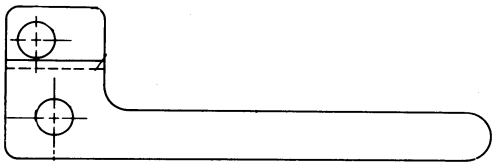


"POSTALETTE" 0 TO 8 OZ. SCALE
(AVAILABLE FROM EXACTWEIGHT SCALE
COMPANY, COLUMBUS, OHIO)



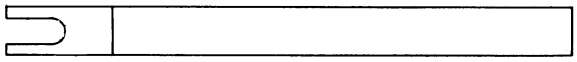
SHUTTLE BENDING TOOL

BELL & HOWELL NO. SER356-1-FX1



SHUTTLE TOOTH CENTERING TOOL

BELL & HOWELL NO. SER356-1-N1



DRIVE PINION CLEARANCE GAGE

BELL & HOWELL NO. SER356-2-N1

Figure B. Special Tools

Disassembly Procedure

1. GENERAL DISASSEMBLY INSTRUCTIONS.

a. Before beginning the disassembly procedures, be sure to disconnect the projector from the power source and remove the projection lamp and lens. Wrap the lamp and lens in tissue paper and place them on a shelf to protect them from possible damage.

b. If repairs require the replacement of electrical items (lamp socket, motor or switch), refer to the wiring diagram (Figure L) as an aid to wire identification, and unsolder or disconnect wires as necessary.

c. 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 removed.

d. When attaching parts (screws, nuts, etc.) are removed, reassemble them loosely to the removed part or to the tapped casting to prevent loss.

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

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

b. The framer knob (15) cannot be disassembled until the control housing (11) has been removed from the main plate.

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

a. The lamp baffle (7) and control link bracket (23) are riveted to the main plate. Do not remove these parts unless obviously in need of replacement.

b. When setscrew (10) is loosened, the take-up roller (11) and film guide (12) can be slipped from the lock lever stud protruding through the main plate. The film guide requires adjustment and should only be removed if the guide and/or roller are in need of replacement.

c. Note the manner in which the ends of the tension spring (19) are engaged before disassembling control link parts.

4. REMOVAL OF PARTS IN FIGURE 3. Remove the 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 (32). 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 (33).

c. Removal of screw (2) will permit the disassembly of spindle parts (6 through 10) from the feed reel arm assembly. Removal of screw (15) will permit the disassembly of spindle parts (19 through 23) from the take-up reel arm assembly.

d. Removal of the two retaining rings (30) will permit the disassembly of the bearings (31) and the reel arm supports (32 and 33). The tension springs (36), cam washers (37) and the steel balls (38) will fall from position when the bearings (31) are withdrawn from the casting.

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

a. Before disassembling sprocket and loopformer parts, note carefully the manner in which sprocket gear retaining springs (1) and spring ratchets (2) are installed so that they can be reassembled in the same manner. Carefully remove the springs (1) and disassemble parts (2 through 9) from the rear of the two sprocket shafts.

b. Loosen screws (12) and (16) until they are free of their tapped holes in the mechanism casting. Grasp upper loopformer (13) and loopformer bracket assembly (17) between thumb and fingers and withdraw this group, the sprocket and shaft included, from the mechanism casting.

c. In similar fashion, loosen screws (19) and (21) until they are free of their tapped holes in the mechanism casting. Grasp lower loopformer bracket (20) and its loopformer assembly (22) between thumb and fingers and withdraw this group, sprocket and shaft included, from the mechanism casting.

d. The retaining spring (25), retainer plate (26) and pressure plate (27) can be removed from the lens carrier (29) without disassembling the carrier from the mechanism casting. Swing open the lens carrier

and grasp the top and bottom ears of the pressure plate between thumb and forefinger of the right-hand. Press the upper end of the retainer plate away from the lens carrier casting, disengaging the plate and retaining spring from the pins in the casting. Remove the pressure plate parts.

e. To remove the lens carrier (29), the hinge pins (28) must be pried out.

f. If aperture plate parts (30 through 35) are removed, note the manner in which side tension spring (32) and arm (33) are assembled.

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

a. Disengage the drive belt from the drive rollers (14) and (15). Remove the screws (1) and the roller bracket assembly (2) with low speed drive roller (5) installed. Remove the retaining ring (3) to free the roller (5) and washers (4). Do not remove screw (7) from the roller bracket (2) or it will be necessary to readjust this screw.

b. Drive roller (15) is accessible for replacement and can be disassembled from its mounting stud by removing the retaining ring (13). Note the flat washers (14) on either side of the roller. To replace the inner drive roller (14), it will be necessary to remove the two screws (8) and the spring loading bracket (9); then remove the retaining ring (10) and withdraw the pulley mounting bracket assembly (11) from the projector.

c. Make certain that the forward-still-reverse knob has been removed from the safety shutter on the operating side of the projector main plate. Note the manner in which the legs of the pivot spring (17) are engaged; then remove the pivot screw (16) and pivot spring (17). Loosen the screw which retains the front end of the safety shutter (19) to the mechanism casting just behind the aperture opening and lift out the safety shutter.

d. Remove the two screws (20), the shutter washer (21), the shutter assembly (22), and the in-out cam (23). Except for replacement of the shutter tension springs (22A), do not attempt to disassemble the shutter.

e. Rotate the manual knob (42) while inspecting the fit of the cam shoes (29) on the pull-down cam (37). The cam shoes must fit snugly, but without binding. If the fit is too tight or too lose, the cam shoes must be replaced. Remove the Sems nut (24) and disassemble the pivot screw (25), spring tension washer (26), shuttle and framing lever assembly (27) and sleeve spacer (28) from the shuttle pivot bracket (35), disengaging the upper end of the shuttle from the pull-down cam (37) and the lower end from the framer shaft protruding from the main plate. Loosen the setscrew (36) and withdraw the pull-down cam (37) and thrust washer (38) from the main shaft.

f. Remove the Sems nut (24) from the pivot stud (30). Note the manner in which the legs of the torsion spring (32) are engaged; then disassemble the pivot stud (30), spring tension washer (31), torsion spring (32) and speed change lever assembly (33) from the projector.

g. Loosen setscrews (39) and (41) so that the drive pinion (44) and manual knob (42) are loose on the main shaft. Pry retaining ring (40) from its groove in the main shaft and press the shaft toward the rear of the projector until the manual knob can be slipped from the shaft; then withdraw the shaft toward the front of the projector, removing the drive pinion (44) and friction washer (45) in the process.

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

a. When removing the motor (16) note the manner in which vibration damper parts (14) and (15) are assembled.

b. Screws (23) are used to adjust the linkage for proper automatic threading and should not be loosened or removed.

c. If the base is damaged, replace the base complete, with film cutter and rubber feet assembled.

Reassembly Procedure

8. 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. as noted) and oil (Specification No. 1543) or the best available commercial grades of ball bearing grease or projector oil.

9. REASSEMBLY OF PARTS IN FIGURE 6. Reassemble parts in reverse order of disassembly, observing the following special precautions.

a. If base (31) is damaged, replace complete base assembly with cutter and feet installed. If screw (29) should strip out of its tapped hole, use screw P/N 22044 to reinstall rubber foot (30).

b. Install the lever assemblies (21) and (22) to the main plate as shown in Figure E. These levers and the loopformers must be properly adjusted (paragraph 11) to insure trouble-free automatic threading.

c. Assemble the drive pulley (10) to the motor shaft with the hub of the pulley toward the end of the shaft. Assemble the blower fan assembly (7) to the motor shaft with the fan hub facing toward the pulley. Do not tighten the setscrews (6) and (9) at this time. Insert screws (13) through the motor (16) and install a vibration damper (15) on each pair of screws. Lift the motor up into position, guiding the screws through the four holes in the uprights of the sub-base (25). Install the remaining two vibration dampers (15) over the protruding ends of the screws and secure the motor with the four bushings (14).

d. The distance from the outside motor mounting surface of the sub-base uprights to the face of the drive pulley (10) should be no less than 1-1/8 inch. Position the pulley accordingly and tighten its setscrew (9) securely. Visually center the blower fan (7) in the cast well of the sub-base and tighten its setscrew (6) securely. Temporarily loop the drive belt (8) around the pulley before installing the blower housing cover (5).

LUBRICATION CHART

ITEM	LUBRICATION
Friction discs (3-8, 3-21)	Grease (Spec. 1980) both faces.
Spur gears (3-7, 3-20)	Grease (Spec. 1980) teeth and face.
Reel arm supports (3-32, 3-33)	Grease (Spec. 1956) all gear studs and around sleeve bearings (3-31).
Gear mounting plate (3-35)	Grease (Spec. 1956) all gear studs.
Lever and stud assembly (4-6)	Grease (Spec. 1956) gear stud.
Lens carrier (4-29)	Grease (Spec. 1956) lens bore.
Pulley mounting bracket (5-11)	Grease (Spec. 1516) drive roller studs.
Washer (5-26)	Grease (Spec. 1956) both faces.
Shuttle (5-27)	Grease (Spec. 1956) keyhole slot.
Pull-down cam (5-37)	Grease (Spec. 1956) shoe contact surface.
Framer shaft (5-47)	Grease (Spec. 1956) shaft threads.

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

a. Assemble the friction washer (45) to the main shaft (43) and lightly oil the rear end of the shaft. Insert end of shaft through the bearing in the short cast arm of the mechanism casting, assemble the drive pinion (44), hub to the right, to the shaft, and insert the shaft through the bearing in the long cast arm. Press the shaft toward the rear of the mechanism plate until the front end of the shaft clears the cut-out at the front edge of the mechanism plate. Hold the manual knob (42) in this cut-out and slide the main shaft forward until it engages the knob. Tighten the knob setscrew just enough to hold, and assemble the retaining ring (40) to the main shaft groove so that the friction washer (45) is captured against the bearing in the short cast arm. Temporarily tighten the drive pinion setscrew (39) just enough to hold.

b. Tap the knob end of the main shaft with a hard rubber mallet to seat the retaining ring (40) flush against the knob side of the recess wall. Assemble the thrust washer (38) onto the main shaft. Note that one face of the pull-down cam (37) has an identification dot (shallow indent). Install the cam on the main shaft with this dot facing the main shaft knob. Although the pull-down cam (37) has two tapped holes for setscrews, only one setscrew (36) is used. Position the cam so that the identification mark (Figure C) is at the bottom, below the main shaft. Dip the setscrew (36) in shellac and insert it into the setscrew hole which now is facing you (the tapped hole furthest from the main plate). Tighten the setscrew securely, and wipe excess shellac from surface of cam.

c. Loosen setscrew in the manual knob (42) and visually center the knob in the main plate cut-out. There must be sufficient clearance on either side of the knob to eliminate any binding of the knob against the main plate. Tighten the setscrew (41) securely and turn the main shaft. The shaft must turn freely with no binding or high spots. If binding does occur, tap the shaft lightly to free it up.

d. The shuttle pivot bracket (35) is triangular in shape and has one hole with a threaded protrusion which accepts the retaining screw (34). Hold the bracket with its smooth face against the long cast arm of the mechanism casting and insert the screw (34) through the hole closest to the main plate, turning it finger tight into the threaded protrusion. Assemble torsion spring (32) and spring tension washer (31) to pivot stud (30) and insert the threaded end of the stud through the pivot hole in the speed change lever assembly (33). Lift the lever assembly up into place, guiding the long arm at the bottom of the lever through the slot in the main plate. Insert threaded end of pivot stud (30) through the pivot bracket (35) and the long cast arm of the mechanism casting and secure all parts with the Sems nut (24). Hook the long bent finger of the torsion spring (32) underneath the long cast arm and the short bent finger below the notch in the rear edge of the speed change lever (33).

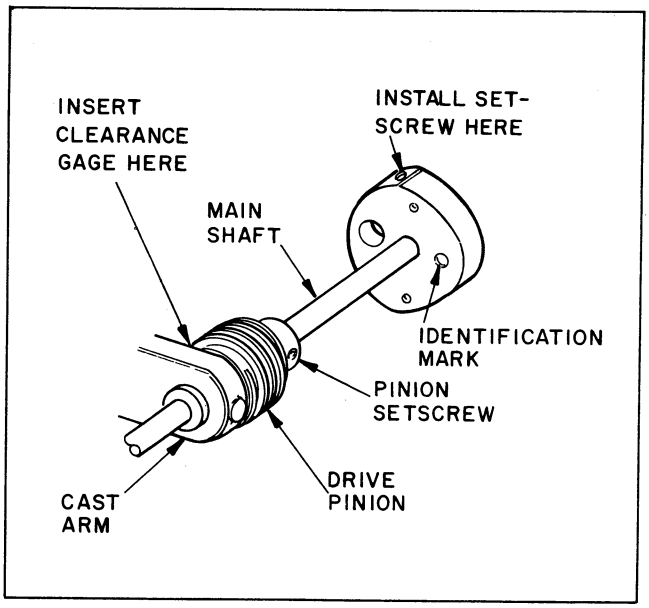


Figure C. Installing Pull-Down Cam and Drive Pinion

e. Apply a light film of grease to the key hole slot in the framing lever of the shuttle (27) and to both faces of the spring tension washer (26). Assemble the washer to pivot screw (25) with the bowed face against the shoulder of the screw. Assemble the shuttle and framing lever assembly (27) and then the sleeve spacer (28) to the screw and insert the threaded end of the screw through the remaining hole in the pivot bracket (35). Engage the keyhole at the lower end of the framing lever with the end of the framer shaft, and secure the parts loosely with the Sems nut (24). Tighten pivot bracket attaching screw (34) securely.

f. Lightly grease the pull-down cam (37) where the shoes will make contact. With the shuttle and pull-down cam in a horizontal position, insert the cam shoes (29) between the cam and the shuttle openings. Note that any combination of cam shoes (two white, two black, or one of each) may be used to obtain the proper fit. Turn the manual knob one full revolution in either direction; fit must be snug without binding. If too loose or too tight, correct the condition by selecting a suitable combination of cam shoes. Then finish securing the shuttle to the bracket (35) by tightening the Sems nuts (24) securely.

g. Install the in-out cam (23) so that its holes line up with those in the pull-down cam and the high section of its rim is toward the shuttle. Add the shutter (22) with the open side of the shutter away from the cams and the two screw holes lined up with those in the cams. Install the shutter washer (21), align holes, and install the two screws (20). Before tightening the screws, hold the manual knob firmly and remove excess play in the in-out cam, shutter and washer by rotating these parts counterclockwise against the two screws; then tighten the screws securely. Turn the manual knob in both directions to make certain that all parts rotate freely and without binding. Now remove the drive pinion setscrew (39) and insert the

drive pinion clearance gage (Figure B) between the drive pinion and the face of the bearing in the short cast arm. Rotate the main shaft until the manual pull-down cam is at the position shown in Figure C; then rotate the drive pinion until its setscrew hole is aligned with the identification mark on the pull-down cam. Dip the setscrew in shellac and, while pressing the drive pinion and manual knob toward one another, install and tighten the setscrew securely. Remove the clearance gage.

h. Assemble the safety shutter assembly (19) to the projector. The safety shutter must locate on shoulder of the pivot screw (16) with the front end of the assembly inserted through the mechanism plate. Install the spring (17) around the shoulder of the pivot screw (16) and turn the screw tightly into the tapped hole of the pivot stud (30). Cross the legs of the spring and engage them in the slotted ears of the safety shutter bracket. Secure the front end of the safety shutter by installing and tightening screw (18). Move the forward-reverse lever through all three positions to make certain that the lever moves freely and locks in each position. Place the lever in the "still" (center) position and visually check the centering of the perforated heat filter with the aperture opening. Adjust for centering and minimum amount of play by bending the legs of the pivot spring and moving safety shutter mounting plate up or down as necessary. Be sure to tighten screw (18) securely after adjusting.

i. Lightly grease the studs of the pulley mounting bracket (11) and install a washer (13) on each stud. Apply a light film of grease to each stud and install the drive rollers (14) and (15) and remaining washers (13) to the studs, securing these parts with the retaining rings (12). Check to make sure that the rollers spin freely and smoothly. Assemble the spring loading bracket assembly (11) to the pulley mounting bracket assembly with the two screws (8). Line up the edges of both brackets and tighten the screws enough to hold. Lightly oil the end of the pulley mounting bracket shaft and insert the shaft through the bearing hole in the safety shutter assembly. One drive roller must be on each side of the slow motion shutter pulley. Install the retaining ring (10) to secure pulley mounting bracket and engage the drive belt with the motor pulley and the two drive rollers.

j. Assemble the low speed roller (5) and washers (4) to the stud of the roller bracket assembly (2) and secure with the retaining ring (3). Assemble the bracket to the speed change lever assembly (33) with the two screws (1). Tighten the two screws finger tight. Refer to paragraph 21 for roller adjustment procedures.

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

a. If the lens carrier catch (37) was removed for replacement, tap the 0.095-inch diameter rivet holes in the mechanism casting with a No. 4-40NC thread. Fasten the new catch in place with two No. 4-40 by 1/4-inch binding head screws, part no. 30243.

b. Place the aperture plate (35) on the work bench with the stud up and away from you. Assemble the side tension arm (33) over the stud with the tension arm prongs down and into the aperture plate slots. Assemble the spring (32) with the center loop toward you and the ends of the springs entering the holes in the side tension arm. Place the loop opening of the spring into the stud groove and press the spring in until it seats. The side tension arm should exert a tension of 2-1/2 inch-ounces minimum to 3 inch-ounces maximum. Check by pressing the side tension arm to the limit of its travel and slowly releasing the arm against the stem of a fixed tension gage. It may be necessary to adjust side tension spring (32) as shown in Figure D until proper tension is obtained. Then assemble aperture plate loosely to the mechanism plate with the two screws (34). Line up aperture opening and tighten the two screws securely. The aperture plate must be flush against the back edge of the casting. Assemble the guide rail (31) loosely to the aperture plate with two screws (30). Hold guide rail vertical with the fingers and push the rail forward so that both ears are against the sides of the slots in the aperture plate; then tighten the screws securely.

c. Apply a light film of grease to the lens bore of the lens carrier (29) and across the steel locking ball. Hold the lens carrier in position between the ears of the mechanism casting and insert the hinge pins (28); pressing them firmly into place. Insert the lens carrier setting gage (Figure B) between the fingers of the lens carrier catch (37) and close the lens carrier so that it bears against the gage. Slip a thin strip of paper down behind the lens carrier at the point where the lip of the adjusting setscrew (38) protrudes through the main plate. Turn the setscrew in a bit at a time until it first grips the paper. Remove the setting gage and paint exposed threads of setscrew with shellac. Check to see that the carrier swings open easily and that it latches firmly in the closed position. If necessary, bend the ends of the lens carrier catch (37) to insure positive latching.

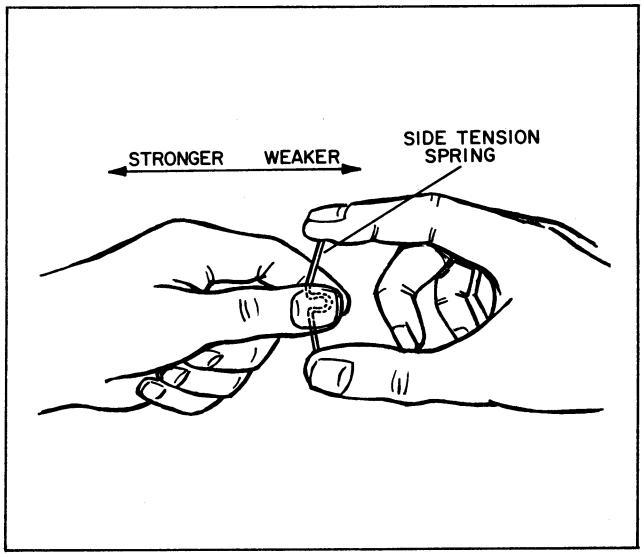


Figure D. Adjusting Tension of Aperture Plate Spring

d. Hold the retainer plate (26) with the formed tabs facing up. Assemble the pressure plate spring (25) over the retainer plate with the elongated hole toward the narrow end of the plate, and engage the tabs of the spring with the slots at the ends of the plate. Assemble the pressure plate (27) to the spring and retainer plate, engaging the notched ear of the pressure plate with the notched end of the retainer plate. Compress this entire assembly and install it to the lens carrier with the slotted end of the pressure plate at the top. Lock in place over the boss at the top and bottom of the carrier while locating the carrier dowel pins in the holes of the retainer plate and spring.

e. Preassemble the lower threading mechanism as follows. Insert the idler roller (23), small diameter end toward head of screw (21), between the ears of the loopformer and against the loopformer stop pin. Insert the screw (21) through loopformer and roller and install the washer (24) over the end of the screw. Place the sprocket assembly (10) in the cavity of loopformer and trap the sprocket by placing loopformer bracket (20) over the end of the screw (21). Install a friction washer (11) over the sprocket shaft and down against the rear flange of the sprocket and apply a drop or two of oil to the sprocket shaft. Lift this assembled group up into position, guiding the sprocket shaft through the bearing hole in the mechanism casting. Install and tighten the screws (19) and (21) just enough to hold all parts in place. Note that the pin of the lower loopformer assembly (22) must be inserted through a hole in the mechanism casting to engage a notch in the latch lever (5, Figure E) behind the mechanism casting.

f. Preassemble the upper threading mechanism as follows. Install the roller (18) on the pin of the upper loopformer bracket (17). Place the sprocket assembly (10) in the cavity of the loopformer bracket and assemble the upper loopformer (13) to the bracket, trapping the sprocket and the roller (18). Hold the flanged roller (14), flange toward head of screw (12), between the ears of the loopformer, and install the screw (12). The screw must pass through the outer ear of the loopformer, the flanged roller, the inner ear of the loopformer, the washer (15) and the ear of the loopformer bracket, in that order. Insert screw (16) through its hole in the loopformer bracket. Install the friction washer (11) down over the sprocket shaft and down against the rear flange of the sprocket and apply a drop or two of oil to the sprocket shaft. Lift this assembled group up into position, guiding the sprocket shaft through the bearing hole in the mechanism casting. Note that the pin of the upper latch lever (Figure E) must enter a hole in the back of the upper loopformer. Install washer (11A) on sprocket shaft and tighten screws (12) and (16) lightly.

g. Tighten the upper threading mechanism screws (12) and (16) securely. Insert the lip of the setting gage (S-012600-34N1, Figure B) over the teeth of the lower sprocket. Press the lower loopformer bracket down lightly against the setting spacer while tightening the lower threading mechansim screws (19) and (21).

h. Lightly grease the gear stud of the gear lever and stud assembly (6) and secure the gear (8) to the stud with the retaining ring (7). Assemble the sprocket gear (9) to the upper sprocket shaft with the three gear

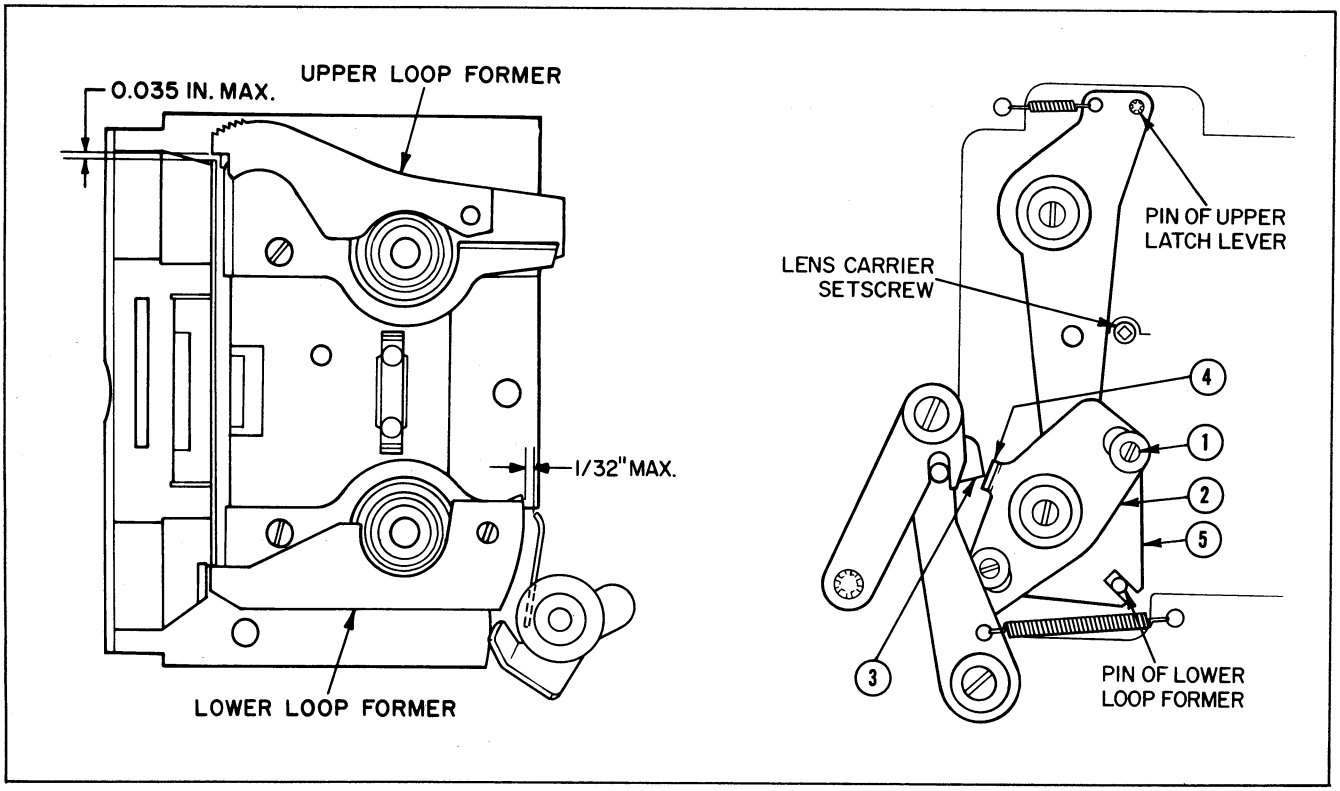


Figure E. Adjusting Trip Levers and Loopformers

projections facing out. Install the assembled gear lever assembly (6) over the sprocket shaft and over the projections of the gear (9). Assemble the outer sprocket gear (4) to the upper sprocket shaft, engaging its three projections to those of the inner gear. Install the spacer washer (3), spring ratchet (2) and retaining spring (1), with the short end of the spring engaged in the slot of the shaft.

i. Assemble the sprocket gear (9) to the lower sprocket shaft, with the three gear projections facing out. Install the outer sprocket gear (5) to the shaft, engaging its three projections with those of the inner gear. Install spacer washer (3), spring ratchet (2), and retaining spring (1), with the short end of the spring engaged in the slot of the sprocket shaft.

j. Hold the loopformers in closed position. Loosen linkage lever adjusting screws (1, Figure E) and rotate lever (2) until its ear (4) is engaged and flush with the tip of the idler stud release lever (3). Tighten screws (1) securely and release the loopformers. The lip of the upper loopformer must not spring more than 0.035-inch away from the upper edge of the aperture plate when in the normal closed position. If the gap is greater than 0.035-inch, it may be necessary to loosen the screws holding the lower loopformer and bracket and shift these parts slightly to decrease the gap. If this is done, be sure to recheck the clearance between the lower sprocket and loopformer bracket as instructed in step g, preceding.

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

a. Assemble the reel arm supports (32) and (33), bearings (31), cam washers (37), tension springs (36), and gear mounting plate (35) to the mechanism plate with the screw (34) tightened just enough to hold all parts together. Insert a steel ball (38) between each cam washer and the detent hole in the mechanism plate, and hold all parts firmly together while tightening screw (34) securely. Install the two retaining rings (30) in the grooves of the bearings (31).

b. Install gears (17), (18) and (26) into take-up reel arm support assembly (33), and lubricate gears as instructed in Lubrication Chart, page 6. Install gears (4) and (13) into feed reel arm support assembly (32), and lubricate gears as instructed in Lubrication Chart, page 6.

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 (33), 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 (32), rotating the shaft of feed gear (13) until the teeth of the spur gear (7) mesh with those of its mating gear. Install and tighten screw (1).

e. Install spur gears (12) and (25) onto their shafts, Use a feeler gage to maintain 0.003 inch end play between the bearings (31) and the gears. Tighten setscrews (11) and (24).

f. Lubricate the entire gear train as instructed in Lubrication Chart, page 6.

13. REASSEMBLY OF PARTS IN FIGURE 2. Reassemble parts in reverse order of disassembly, observing the following special precautions.

a. Insert the stripped ends of the power cord (24) up through the hole in the sub-base. One power cord lead connects to the center terminal of the Off-Motor-Lamp switch, while the other lead is joined with the motor lead and yellow lamp lead at the closed end connector (4A, Figure 6) at the motor mounting screw. Gage the length of lead required; then assemble the strain relief bushing (25, Figure 2) over the cord and into the sub-base opening.

b. Insert the stud of the control link assembly (21) through the hole in the control link bracket (23) while engaging the hook-like rear end of the control link with the notch in the end of the speed change lever (33, Figure 5). Secure the control link stud with the retaining ring (20, Figure 2); then engage the ends of the tension spring (19) between the ears of the control link and control link bracket.

c. Assemble the tension spring (18) to the tilt shaft (17) and insert the shaft up through the hole in the projector base. Secure the shaft with the retaining ring (16). Assemble the lock knob (14) to the tilt lock shaft (15) with the setscrew (13). Press down on the base to retract the tilt shaft and foot assembly and screw the lock shaft into place until the tilt shaft is held securely.

d. Lightly grease the stud of the lever and stud assembly (21, Figure 6). Assemble the film guide (12, Figure 2) and roller (11) and install these assembled parts on the guide lever stud. Rotate film guide counterclockwise until the upper formed tip is 1/32-inch or less from the front end of lower loopformer and tighten setscrew (10) securely.

14. REASSEMBLY OF PARTS IN FIGURE 1. Reassemble parts in reverse order of disassembly, observing the following special precautions.

a. Assemble the Off-Motor-Lamp switch (20) to the switch mounting plate (18) with one switch nut (19) on either side of the plate. Position the mounting plate against the tapped bosses on the inside of the control housing (11) with the toggle extending through the hole in the housing and secure the mounting plate with the two screws (17).

b. Assemble the washer (16) to the framer knob (15) and insert the hub of the knob through its opening in

the control housing. From the back of the housing, assemble the tension washer (14), bowed face in, and flat washer (13) over the hub of the control knob and secure all parts with the retaining ring (12).

c. Make wiring connections to the Off-Motor-Lamp switch (20) as shown in the wiring diagram, Figure L. Lift the control housing up into position against the main plate, guiding the end of the control link (21, Figure 2) through the Slow-Normal slot and engaging the hub of the framer knob with the framer shaft protruding from the main plate. When the housing is seated, install and tighten the four screws (10), shifting the housing as necessary so that none of the controls are binding. Attach the slow motion knob (9) to the protruding end of the control link with the screw (8).

d. The installation of remaining Figure 1 parts requires no special instructions. Do not install the covers on the projector until all inspections and adjustments have been made.

15. FINAL INSPECTION.

a. Open the film gate and manually rotate the main shaft knob while watching the movement of the shuttle. The shuttle tooth should travel in the center of the shuttle slot. If necessary, bend the shuttle carefully to insure that the shuttle tooth does not touch either side of the slot. (Refer to paragraph 18.)

b. With the projector grounded, plug the line cord into the 110 to 120 volts outlet. With the Off-Motor-Lamp switch in the "motor" position, run the projector in "forward" while applying grease to the gear train with a brush. Be very careful not to get grease on the drive belt or the motor pulley. After greasing and with the projector still running, apply naphtha to the drive belt and pulley with a brush to remove any grease or oil from these parts; then blow dry with a low-pressure jet of compressed air.

c. With the lens removed, film gate open and projector running in forward direction, move the forward-reverse lever to "still" (center) position. The safety shutter must drop in front of aperture opening at the very moment that the motor stops running. Repeat the same check by moving the forward-reverse lever to "reverse" position and then to "still" position. At the same time, check to make certain that the mechanism (drive rollers and sprockets) begin to drive just before the safety shutter clears the aperture opening. Turn off projector and, if necessary, adjust safety shutter operation as instructed in paragraph 20.

d. With the film gate closed, check to make certain that there is no play in the lens carrier. If necessary, bend the lens carrier spring catch with a pliers to eliminate play.

e. Check all the attaching screws and nuts to make certain that they are tightened securely and visually check the projector for missing parts. Pick up the unit, turn it over and shake it to make sure no loose parts are lying in the mechanism.

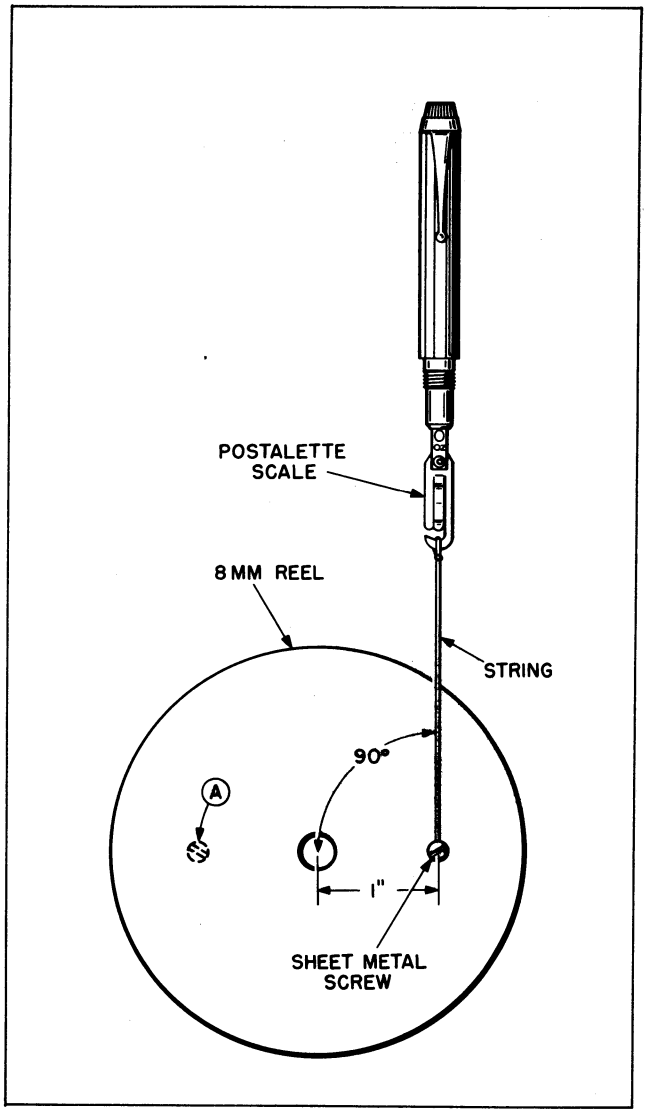


Figure F. Checking Reel Spindle Torque

f. Check to make sure that all leadwire connections are secure by tugging gently on the leadwire near the terminal connection, and see that all leads are properly dressed out of the way of moving parts.

g. Make final projector adjustments as outlined in paragraphs 16 through 21. Then make a final test of projector operation as outlined in Final Test section.

16. SPINDLE TORQUE ADJUSTMENT. Spindle torque can be measured with a zero to eight-ounce Postalette scale and a modified 8-mm film reel as shown in Figure F. Note that the scale must be held vertically, directly above the screw in the reel, for a proper torque reading.

a. With the projector grounded and the line cord plugged into the 110 to 120 volts a-c outlet, swing both reel arms up to the operating position. Install the modified film reel on the take-up reel spindle and place the projector switch in the "motor" position.

Engage Postalette scale with string loop and, holding the scale as shown in Figure F, press the forward-reverse lever up to the "forward" position. Proper torque (at the point where the spindle and film reel do not turn) should be 4.5 to 5-inch-ounces. Torque can be adjusted by tightening (to increase) or loosening (to decrease) the screw at the back of the reel arm support (Figure G).

b. Place forward-reverse lever in "still" (center) position and transfer the modified film reel to the feed reel spindle. Note that the screw in the film reel must now be at position A. Engage Postalette scale with spring loop and, holding the scale as shown in Figure F, press the forward-reverse lever down to the "reverse" position. Proper torque (at this point where the spindle and film reel do not turn) should be 5.5 to 6-inch-ounces. Torque can be adjusted by tightening (to increase) or loosening (to decrease) the screw at the back of the reel arm support (Figure G).

17. LAMP SOCKET ALIGNMENT. As illustrated in Figure H, the lamp socket is secured with three screws. The screws for the lamp socket are inserted through over-sized holes in the main plate; thus, when all screws are loosened slightly, the socket can be rotated to obtain full and even light through the aperture opening.

a. Rotate the manual knob until the shutter clears the aperture opening. Install the projection lamp, aligning the key on the lamp base with the key slot in the socket and pressing down firmly on top of lamp until it is seated.

b. Install the projection lens and switch on the projector. Focus the lens until the image of the aperture is sharp on the screen and note whether a dark area is evident at the top or bottom of the image.

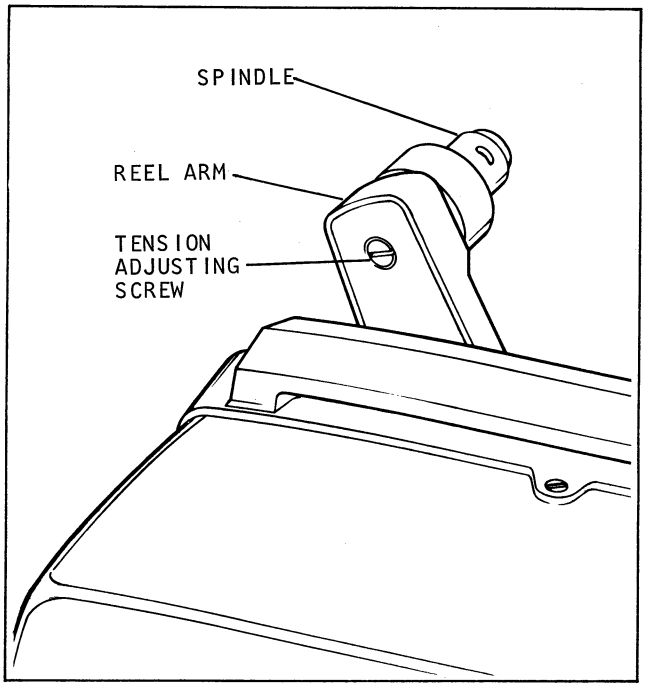


Figure G. Adjusting Reel Spindle Torque

c. If dark area was noted, switch off the projector and loosen the lamp socket screws just enough to permit the lamp socket to be rotated. A dark area at the top of the aperture image indicates that light is projecting at a slightly upward angle. With the blade end of a screwdriver, apply a slight amount of pressure against the bottom edge of the rear upper screw, thereby rotating the lamp socket slightly clockwise.

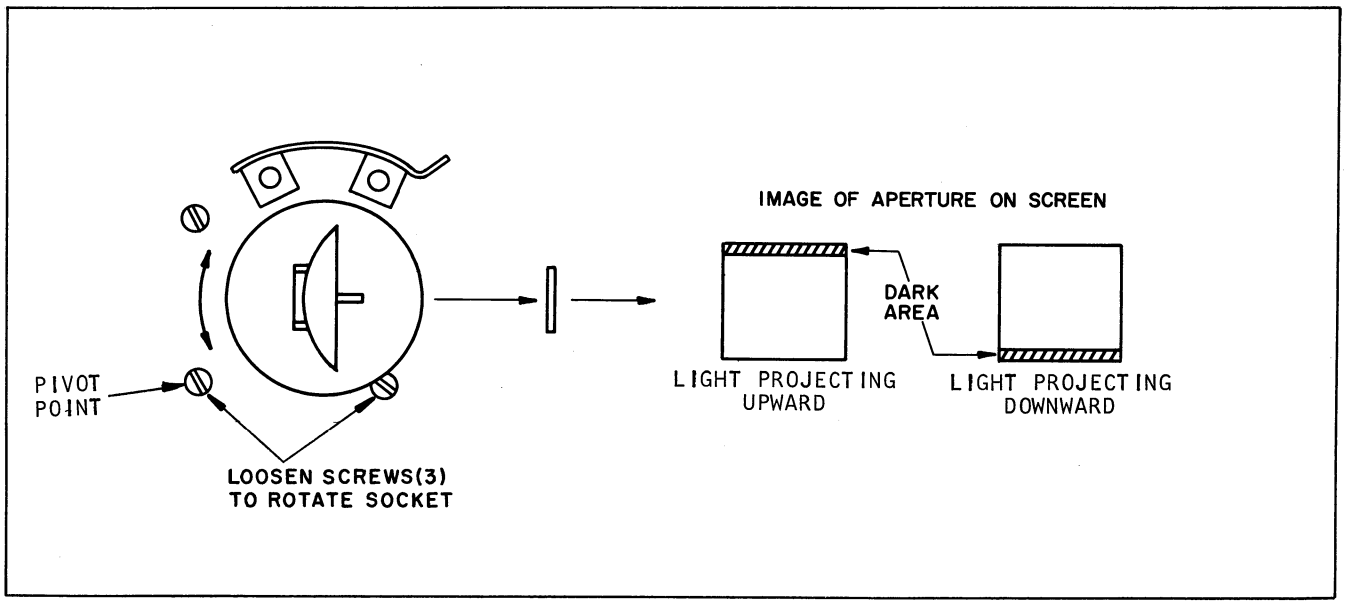


Figure H. Lamp Socket Alignment

d. If the dark area appeared at the bottom of the aperture image, it indicates that the light is projecting at a slightly downward angle. In that case, apply pressure to the upper edge of the rear upper screw, rotating the lamp socket counterclockwise.

e. It may be necessary to repeat the adjustment several times, switching on the lamp between adjustments to check the image. When the aperture image appears fully and evenly lighted, tighten all lamp socket screws securely, watching the image to make certain that the socket does not move out of alignment. Then switch off the projector and install the lamphouse.

18. SHUTTLE TOOTH ADJUSTMENT. Excessive or inadequate protrusion of the shuttle teeth will result in improper film transport during operation. Proper shuttle tooth protrusion is checked with the shuttle tooth Go-No-Go gage shown in Figure B. Proceed as follows.

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

b. Rotate the main shaft knob until the shuttle teeth reach the approximate center of the downstroke.

c. Place the notched edge of the shuttle protrusion gage against the aperture plate with the deepest notch positioned directly over the shuttle teeth.

d. While holding the gage lightly but firmly against the aperture plate, slide the gage slowly downward. If the shuttle teeth catch against the "Go" step of the gage, the teeth are protruding too far beyond the surface of the aperture plate. If the teeth pass the "Go" step of the gage but fail to catch against the "No-Go" step, the teeth are not protruding far enough. Also, note, if shuttle teeth are protruding an equal amount.

e. To adjust shuttle tooth protrusion, remove the lamphouse and lamp and rotate the manual knob until the shuttle teeth are at the center of the "up" stroke. Insert the shuttle bending tool through the opening in casting, just forward of the lamp socket, and engage the slot of the tool with the shuttle tooth arm. Note, in Figure J, that the bending tool should engage the arm in the annealed (shiny) area. To increase the height of shuttle teeth above the aperture plate surface, move the handle of the tool away from the projector main plate; to decrease height, move handle toward main plate. If shuttle teeth are protruding unevenly (one tooth protruding more than the other), the bending tool can be raised or lowered, thereby twisting the shuttle tooth arm slightly.

CAUTION

The shuttle tooth arm must be bent carefully, and in small amounts, checking between each bending operation until shuttle tooth height is properly established.

f. Carefully rest the projector on its back surface (lens pointing up) and open film gate. Set the framer

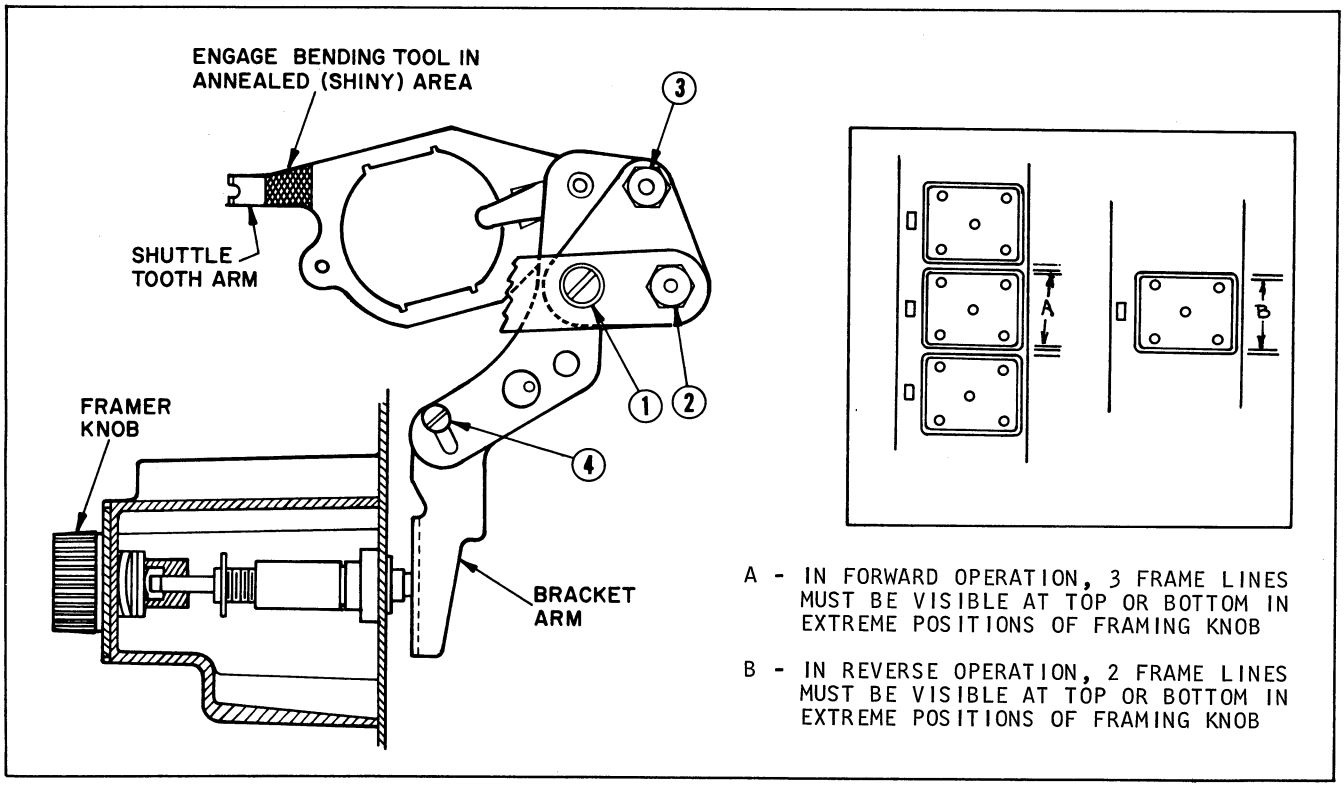


Figure J. Adjusting the Shuttle

knob in the extreme clockwise position and turn the manual knob until the shuttle teeth are at the extreme top and out position. With a magnifying glass, check to make certain that the teeth are centered in the slot. To adjust shuttle centering, refer to Figure J and loosen the screw (1) and hex nut (2), leaving hex nut (3) tight. Engage the 3/8-inch diameter holes of the shuttle tooth centering tool (Figure B) with the two hex nuts (2) and (3) and, while viewing the shuttle teeth through the magnifying glass, move the tool handle up or down until shuttle teeth are centered. Tighten the screw (1) and then the hex nut (2) to lock the adjustment.

19. PICTURE FRAMING ADJUSTMENT. The framing mechanism must be adjusted to permit maximum picture framing in either direction.

a. Thread the projector with a loop of test film and run the projector in the forward direction.

b. Rotate the framer knob to extreme clockwise position and then to extreme counterclockwise position. The camera frame line of adjacent frames must be visible as noted in Figure J when framing knob is at extreme positions.

c. To adjust picture framing, loosen screw (4) at the knee of the shuttle framing lever (Figure J) and shift the shuttle bracket arm up or down, as necessary, to center the frame in the aperture. Tighten the screw securely without disturbing the position of the bracket arm, and recheck picture framing.

20. SAFETY SHUTTER ADJUSTMENT. The rubber drive rollers which drive the shutter pulley must make contact and begin driving the mechanism (in forward and in reverse) before the safety shutter clears the aperture opening. With the back cover removed and the projector line cord 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 the safety shutter carefully as the lever is moved from the "still" position to either of the operating positions.

b. Proper operation of the safety shutter is controlled by the clearance between the upper drive roller and the rim of the shutter (Figure K). The nominal clearance is 0.062 ± 0.015-inch. If, when operating in reverse, the safety shutter tends to clear the aperture opening before the shutter begins to revolve, this clearance should be increased toward the high (0.077-inch) tolerance limit. If, when operating in forward, the safety shutter clears the aperture opening too soon, the clearance should be reduced toward the lower (0.047-inch) tolerance limit.

c. To adjust, place the lever in the "still" (center) position and loosen the two screws which attach the spring loading bracket to the pulley mounting bracket. Insert shim stock of the desired thickness (to increase or decrease nominal clearance of 0.062 inch) between upper drive roller and rim of shutter. While maintaining a light pressure on the roller, tighten the two loading bracket screws securely.

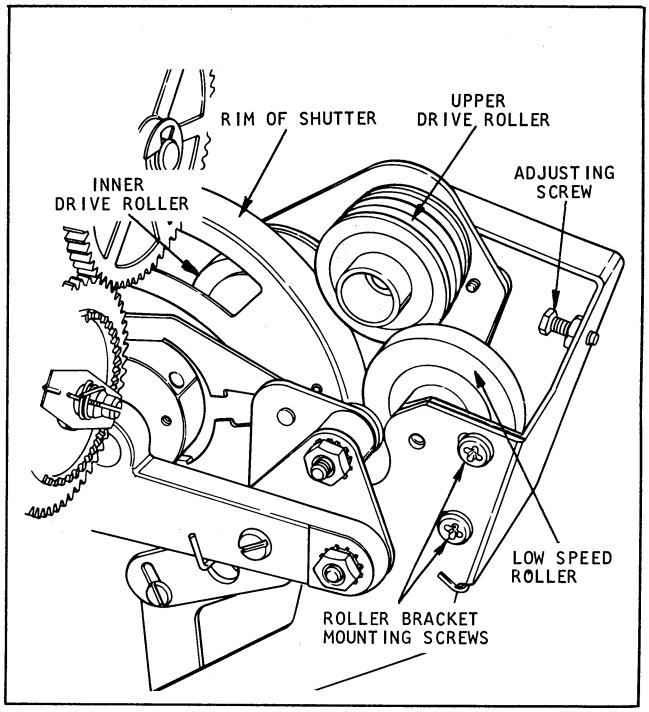


Figure K. Safety Shutter Adjustment

d. Retest safety shutter operation and readjust, if necessary, by changing the thickness of the shim stock inserted between roller and shutter rim.

21. SLOW MOTION ROLLER ADJUSTMENT.

a. Connect projector to 110-volts power source and position projector controls as follows: projector "on" but lamp "off," forward-reverse lever in "still" (center) position; speed control knob counterclockwise to slow speed position; slow motion knob down in slow motion position.

b. Refer to Figure K. With the two bracket screws loosened slightly, push the slow motion roller toward the main plate until the rubber rim bears against the rim of the shutter to start rotation of the shutter. Hold the slow motion roller at this spot while tightening the upper bracket screw. Now press down on the back end of the slow motion roller bracket until the rubber rim of the slow motion roller no longer contacts the hub of the upper drive roller. Hold bracket in this position while tightening the lower bracket screw securely.

c. With projector running in slow motion position, move forward-reverse lever from "still" to "reverse" position and back several times. Shutter must not turn when lever is returned to the still position. If it does, loosen the lower bracket screw and push down on slow motion roller bracket until shutter stops moving.

d. Switch projector to forward position. The shutter must rotate. If it does not rotate, the slow motion roller is too far from the hub of the upper drive roller and step b, preceding, must be repeated. With the projector in forward, slow speed, slow motion position, the tachometer reading at the manual knob should be 400 to 450 rpm. Repeat steps b and c if necessary.

e. With the projector running in forward, slow speed and slow motion, turn out the adjusting screw (Figure K) with an open-end wrench until the head of the screw makes contact with the edge of the spring loading bracket. Continue turning the screw out, a bit at a time, until the inner drive roller is disengaged from the inside rim of the shutter. Then tighten the adjusting screw lock nut securely.

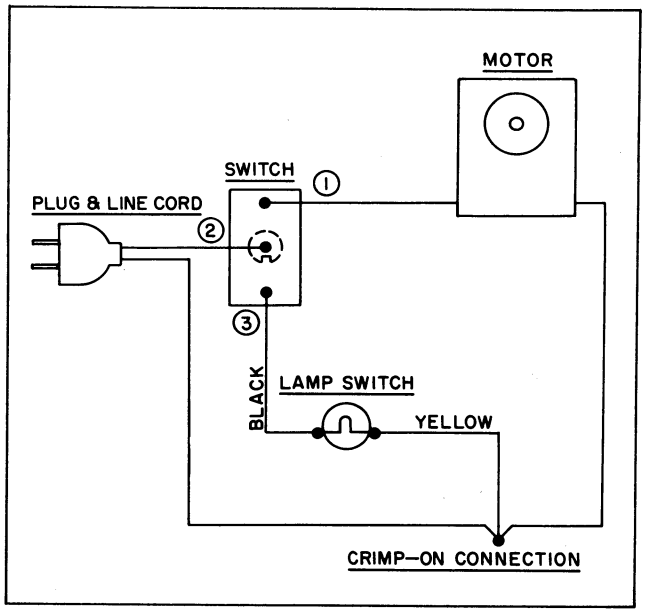


Figure L. Projector Wiring Diagram

Final Test

22. GENERAL INSTRUCTIONS.

This section contains specific tests to be performed to insure 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 trouble shooting and servicing. Note that the projector is to be operated only from a 115-volts a-c, 60-cycles power source.

23. INSPECTION PROCEDURE.

a. Visually inspect the projector for missing parts. Pick up the projector, turn it over, and shake it to make sure that no loose parts are inside.

b. Check attaching screws and nuts for tightness, and tighten if necessary.

c. Check to see that all leadwires are properly dressed out of the way and that all solderless connectors are securely pressed onto their lugs.

d. Press on the ends of the sprocket shafts to check for end play. Sprockets must be under spring tension and springs must not be loose.

e. Open and close the lens carrier to make certain that it latches securely in place. If necessary, bend the fingers of lens carrier catch (37, Figure 4) to increase the tension.

f. Check the manual knob shaft for a slight amount of end play. Rotate manual knob to check the fit of the cam shoes. Cam shoes should fit snugly but without binding, and proper fit is obtained by selecting the appropriate combination of shoes (two black, two white, or one of each).

g. With MOTOR-LAMP switch in MOTOR position, speed control knob in "slow speed" position, and slow motion knob in "slow motion" position, move direction lever back and forth several times between "still" and "reverse." Shutter must not rotate when lever is in "still" position. Switch lever to "forward" operation. Shutter now must rotate. Refer to paragraph 21 for adjustment.

24. 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. Operate the projector, first in the forward direction and then in reverse. Watch the action of the safety shutter and the drive rollers against the shutter rim as the lever is moved from the "still" position to either of the operating positions. If necessary, adjust drive rollers as instructed in paragraph 20.

25. OPTICAL ALIGNMENT TEST. The alignment of the optical axis of the projection lens in the vertical plane is held to a 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 (see Figure E). 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.

26. 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 (Figure G) slightly to apply additional tension.

c. If the film fails to maintain its loop above or below the aperture, check shuttle tooth protrusion as described in paragraph 18, 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 25, and adjust if necessary.

e. With projector running "forward" at low speed position of speed knob, check rpm of manual knob with a tachometer. Speed should register between 870 and 910 rpm. Turn speed knob to high speed position. Speed at manual knob should show an increase of 300 rpm minimum to 400 rpm maximum above the noted low-speed reading.

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 motor pulley.	2. Tighten pulley setscrew.
	3. Broken drive belt.	3. Replace belt.
	4. Defective switch or wiring.	4. Check switch and circuitry.
Picture flicker.	1. Drive roller assemblies not adjusted properly.	1. Readjust as instructed in paragraphs 20 and 21.
	2. Defective drive belt pulley.	2. Replace drive belt pulley.
	3. Dirt, wear or binding in gearing.	3. Clean and repair or adjust gearing as instructed in reassembly instructions.
Film scratches.	1. Excessively dirty film channel parts (sprockets, guides, etc.)	1. Clean projector thoroughly.
	2. Worn pressure and aperture plates (27 and 35, Figure 4)	2. Replace if worn or marred.
	3. Worn or damaged film guide rail (31, Figure 4)	3. Replace film guide rail.
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 (30, Figure 5).
	4. Misaligned shuttle tooth.	4. Adjust and align shuttle as instructed in paragraph 18.
	5. Grooves worn in film guide rail (31, Figure 4).	5. Replace film guide rail.
Soft focus.	1. Dirty projection lens.	1. Clean projector lens.
	2. Lens mount out of alignment.	2. Readjust as instructed in paragraph 25.
	3. Loose lens mount catch (37, Figure 4).	3. Reset tension by bending catch carefully.
Autothreading not operating properly.	1. Loopformer linkage improperly adjusted or binding.	1. Realign loopformers and reset linkage (paragraph 11).
	2. Loopformers not releasing.	2. Linkage binding or springs stretched or broken on linkage.

TROUBLE	PROBABLE CAUSE	REMEDY
Film spills.	1. Insufficient tension on feed spindle.	1. Adjust, paragraph 16.
Fails to take-up or rewind.	1. Defective drive belt.	1. Replace belt.
	2. Worn rim on drive roller.	2. Replace roller (18, Figure 5).
	3. Drive rollers not adjusted properly.	3. Readjust as instructed in paragraphs 20 and 21.
Noisy.	1. Loose attaching parts.	1. Tighten as necessary.
	2. Gearing dry.	2. Lubricate as necessary.
Projected pictures not bright enough.	1. Proector lamp dirty.	1. Clean lamp.
	2. Wrong lamp used.	2. Use Type DJL 120V, 160W, lamp only.
	3. Lamp socket out-of-alignment.	3. Align lamp socket (paragraph 17).
Pictures not framing properly.	1. Framer shaft disengaged from shuttle.	1. Engage framer shaft with keyhole slot in shuttle.
	2. Shuttle framing lever out-of-adjustment.	2. Adjust framing lever (paragraph 19).
During slow motion operation, shutter continues to rotate when direction lever is moved from reverse to still.	1. Slow motion roller out-of-adjustment.	1. Adjust slow motion roller (paragraph 21).
Shutter does not rotate during slow motion-forward operation.	1. Slow motion roller out-of-adjustment.	1. Adjust slow motion roller (paragraph 21).

Replacement Parts

The following pages illustrate and list by part name and number, all the replacement parts of Sears Automatic Dual Speed 8-mm Projectors, Models 584.92000 and 584.92010. Since the parts lists and 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 for special instructions regarding replacement procedures.

NOTE: Refer to the Bristol Wrench Chart on page 2 for proper wrenches required for removal of the fluted socket setscrews illustrated in these parts lists.

FIG. & INDEX NO.	PART NO.	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
		PROJECTOR COVERS AND LAMP		
1-1	010413	COVER ASSEMBLY, Front (includes item 22)	1	
-1A	30226	. RIVET, Tubular, 0.123 inch diameter	1	
-1B	26321	. CATCH, Cover	1	
-1C	32361	. BUTTON, Cover release	1	
-1D	010386	. STUD ASSEMBLY, Reel storage	1	
-1E	700710	. WASHER, Lock	1	
-1F	39459	. COVER, Front (order complete cover assembly)	NP	
-2	29065	SCREW, Hex head tapping, 4-40 by 1/2 inch	8	
-3	33194	SCREW, Fillister head tapping, 6-32 by 1 inch	2	
-4	010419	COVER ASSEMBLY, Back, complete	1	
-4A	29144	. RIVET, Tubular, 0.123 inch diameter	1	
-4B	33073	. SPRING, Handle	1	
-4C	39460	. COVER, Back (order complete cover assembly)	NP	
-5	33051	HANDLE, Carrying	1	
-6	010379	LAMPHOUSE ASSEMBLY (Includes item 23)	1	
-6A	010283	. SCREW AND KNOB ASSEMBLY, Lamphouse	1	
-7	39224	LAMP, Projection	1	
-8	36831	SCREW, Pan head, 2-56 by 1/8 inch	1	
-9	36705	KNOB, Slow motion	1	
-10	36725	SCREW, Pan head tapping, 6-20 by 7/16 inch	4	
-11	39462	HOUSING, Control	1	
-12	34539	RING, Retaining, external, 0.375 inch ID	1	
-13	33931	WASHER, Flat	1	
-14	35349	WASHER, Tension	1	
-15	36740	KNOB, Framer	1	
-16	35348	WASHER	1	
-17	33197	SCREW, Recessed fillister head, 6-32 by 3/8 inch	1	
-18	33024	PLATE, Switch mounting	1	
-19	20415	NUT, Thin hex, 15/32-32	2	
-20	33070	SWITCH, Off-Motor-Lamp	1	
-22	39391	NAMEPLATE, Front cover	1	
-23	39392	NAMEPLATE, Lamphouse	1	
-24	39390	NAMEPLATE, Control housing (side)	1	
-25	39393	NAMEPLATE, Control housing (front)	1	
-26	39225	NAMEPLATE, Lamp type	1	

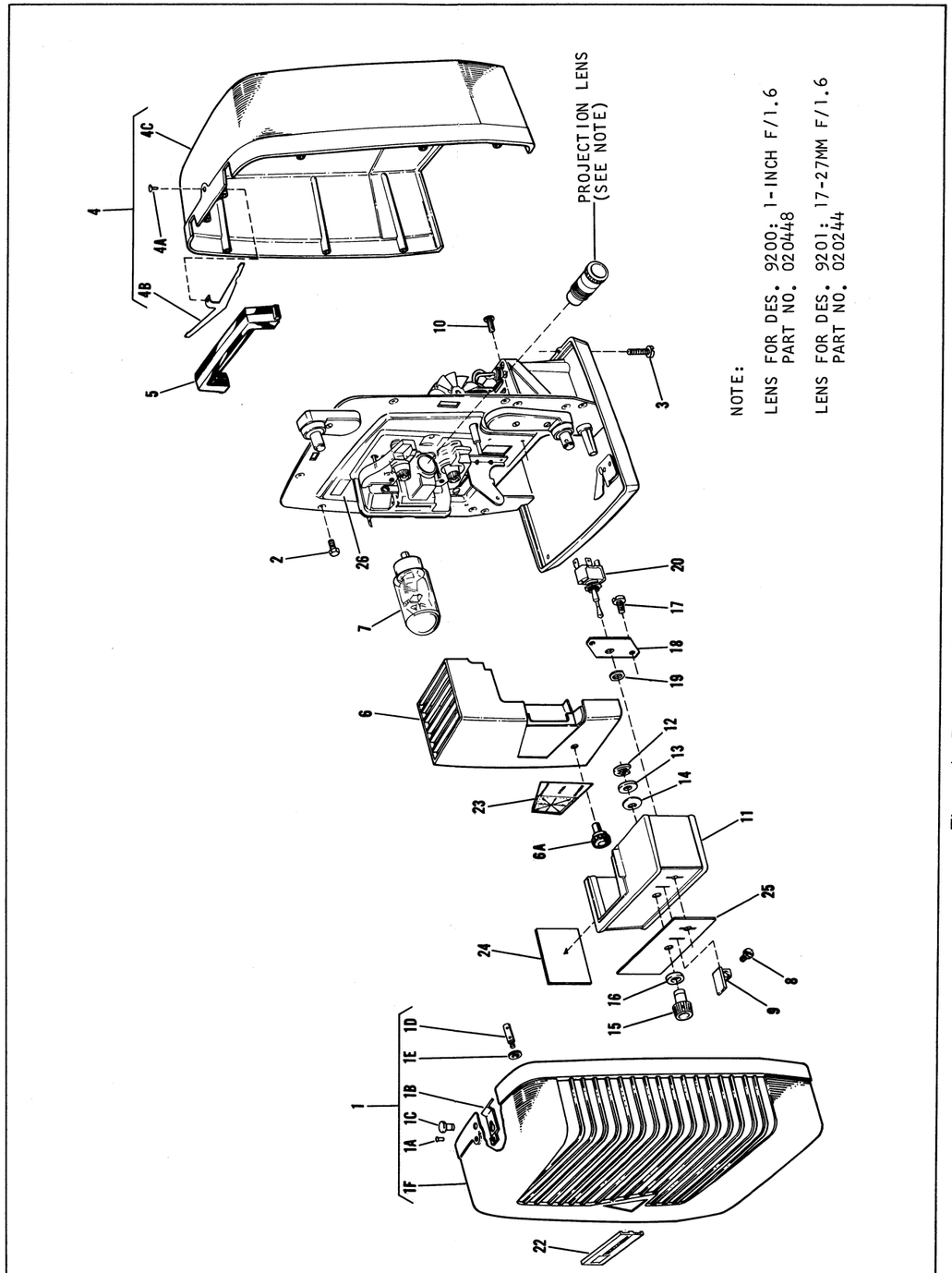


Figure 1. Projector Covers and Lamps

FIG. & INDEX NO.	PART NO.	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
		LAMPHOUSE AND MAIN FRAME PARTS		
2-1	30714	SCREW, Fillister head, 2-56 by 1/8 inch	1	
-2	33057	KNOB, Forward-Reverse	1	
-3	26906	NUT AND WASHER, Sems, 6-32	2	
-4	399016	SCREW, Binding head, 6-32 by 0.312 inch	2	
-5	010682	BRACKET ASSEMBLY, Lamphouse	1	
-6	30226	RIVET, Tubular, 0.123 inch diameter	2	
-7	32478	BAFFLE, Lamp	1	
-8	32136	SCREW, Round head, 6-32 by 1/4 inch	3	
-9	011312	SOCKET ASSEMBLY, Projection lamp	1	
-10	33072	SETSCREW, Fluted socket cup point, 6-40 by 3/16 inch	1	
-11	30662	ROLLER, Take-up	1	
-12	33117	GUIDE, Film	1	
-13	36769	SETSCREW, Fluted socket cup point, 8-32 by 1/4 inch	1	
-14	36714	KNOB, Tilt shaft lock	1	
-15	33038	SHAFT, Tilt lock	1	
-16	22113	RING, Retaining, 0.219 inch ID (WKI 5133-31)	1	
-17	010187	SHAFT AND FOOT ASSEMBLY, Tilt	1	
-18	28145	SPRING, Tension	1	
-19	36722	SPRING, Control link tension	1	
-20	32865	RING, Retaining, external bowed E, 0.188 inch ID	1	
-21	05845	LINK AND STUD ASSEMBLY, Control	1	
-22	29144	RIVET, Tubular, 0.123 inch diameter	2	
-23	36702	BRACKET, Control link	1	
-24	010492	CORD ASSEMBLY, Power	1	
-25	30136	BUSHING, Strain relief	1	

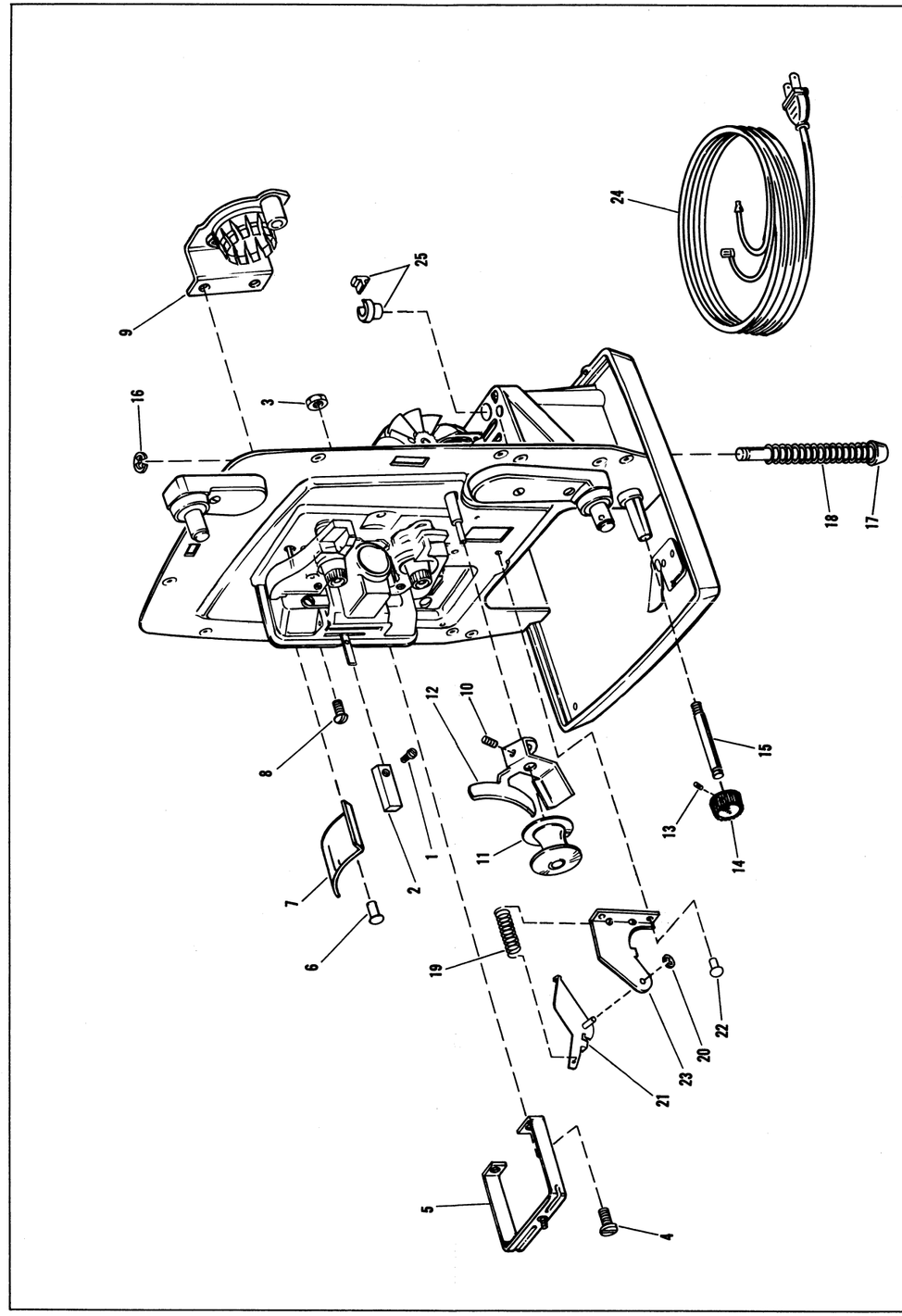


Figure 2. Lamphouse and Main Frame Parts

FIG. & INDEX NO.	PART NO.	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
		REEL ARMS AND GEARS		
3-1	23822	SCREW, Binding head, 5-40 by 0.203 inch	1	
-2	32861	SCREW, Truss head, 3-48 by 0.265 inch	1	
-3	012621	ARM AND BEARING ASSEMBLY, Feed	1	
-4	29706	GEAR, Spur	1	
-5	32979	SPRING, Torque	1	
-6	29726	SPACER, Spindle tension	1	
-7	35579	GEAR, Spur	1	
-8	35580	DISC, Friction	2	
-9	29724	WASHER, Spring tension	1	
-10	010374	SPINDLE ASSEMBLY, Film reel	1	
-11	29192	SETSCREW, Fluted socket cup point, 4-40 by 1/8 inch	1	
-12	35176	GEAR, Spur	1	
-13	010189	GEAR AND SHAFT ASSEMBLY, Feed arm	1	
-14	23822	SCREW, Binding head, 5-40 by 0.203 inch	2	
-15	32861	SCREW, Truss head, 3-48 by 0.265 inch	1	
-16	012622	ARM AND BEARING ASSEMBLY, Take-up	1	
-17	29707	GEAR, Spur	2	
-18	29706	GEAR, Spur	1	
-19	29726	SPACER, Spindle tension	1	
-20	35579	GEAR, Spur	1	
-21	35580	DISC, Friction	2	
-22	29724	WASHER, Spring	1	
-23	010374	SPINDLE ASSEMBLY, Film reel	1	
-24	29192	SETSCREW, Fluted socket cup point, 4-40 by 1/8 inch	1	
-25	30203	GEAR, Spur	1	
-26	010190	GEAR AND SHAFT ASSEMBLY, Take-up arm	1	
-27	21736	RING, Retaining, 0.207 inch ID (IRRC 1000-25)	3	
-28	34718	GEAR, Spur	2	
-28A	34718	GEAR, Spur (see item 4-8)	1	
-29	33154	WASHER, Flat	2	
-30	29744	RING, Retaining, external, 0.562 inch ID	2	
-31	34705	BEARING, Flanged	2	
-32	012401	SUPPORT ASSEMBLY, Feed arm	1	
-33	012402	SUPPORT ASSEMBLY, Take-up arm	1	
-34	30165	SCREW, Truss head, 5-40 by 3/16 inch	1	
-35	011458	PLATE ASSEMBLY, Gear mounting	1	
-36	39099	SPRING, Reel arm tension	2	
-37	29736	WASHER, Cam	2	
-38	1261	BALL, Steel	4	

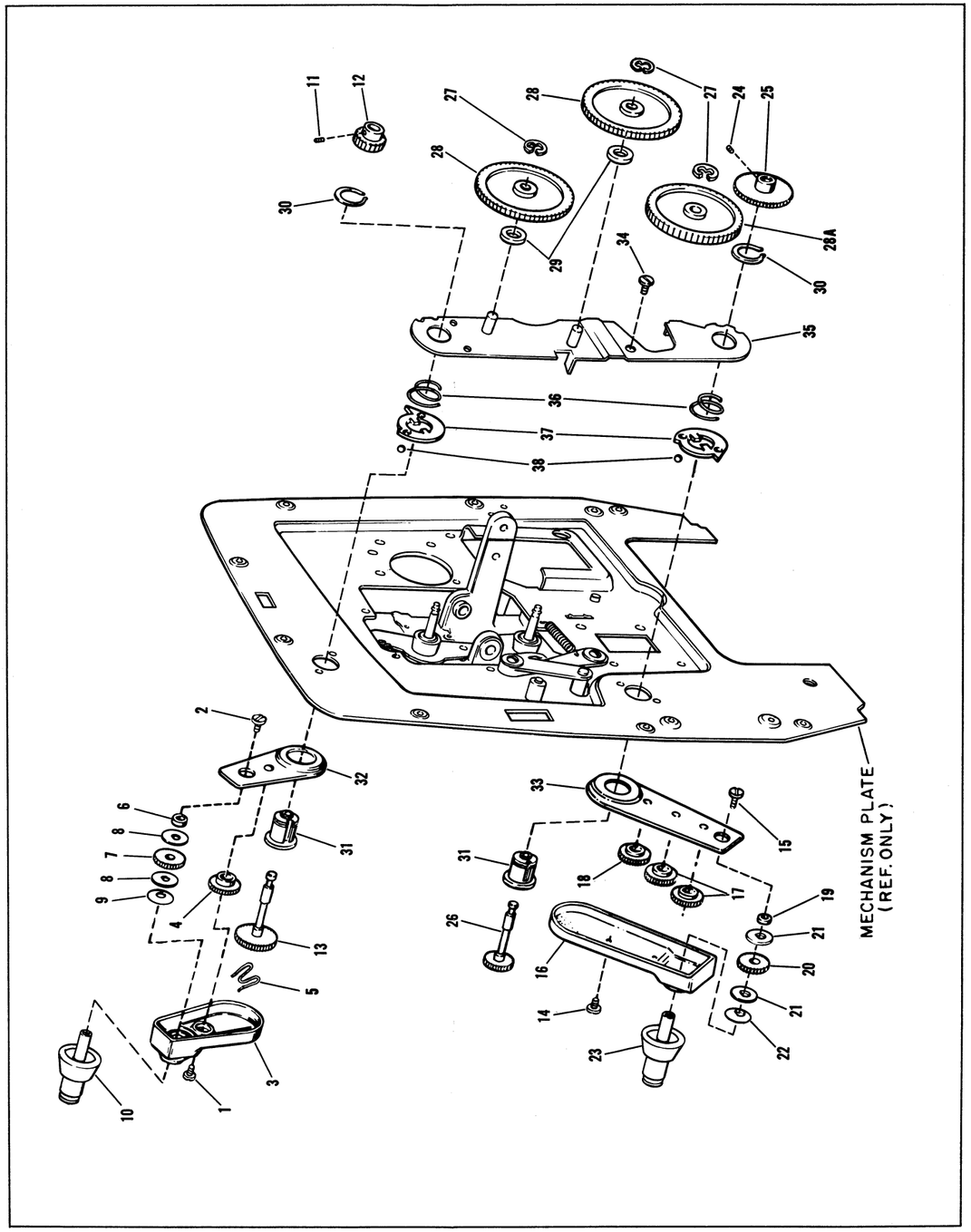


Figure 3. Reel Arms and Gears

FIG. & INDEX NO.	PART NO.	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
		LOOPFORMERS, SPROCKETS AND GEARS		
4-1	35181	SPRING, Sprocket gear retaining	2	
-2	35184	RATCHET, Spring	2	
-3	35186	WASHER, Spacer	2	
-4	33153	GEAR, Sprocket, upper drive outer	1	
-5	35177	GEAR, Sprocket, lower drive outer	1	
-6	011459	LEVER AND STUD ASSEMBLY, Gear	1	
-7	21736	RING, Retaining, 0.207 inch ID (IRRC 1000-25) (see item 3-27)	REF	
-8	34718	GEAR, Spur (see item 3-28A)	REF	
-9	39005	GEAR, Sprocket, inner	2	
-10	012583	SPROCKET AND SHAFT ASSEMBLY	2	
-11	26085	WASHER, Friction	2	
-11A	30667	WASHER, Friction (upper drive only)	1	
-12	30612	SCREW, Pin type, 3-48NC	1	
-13	39015	LOOPFORMER, Upper	1	
-14	39237	ROLLER, Flanged	1	
-15	30613	WASHER, Flat	1	
-16	39383	SCREW, Pan head, 5-40 by 1 inch	1	
-17	010274	BRACKET ASSEMBLY, Upper loopformer	1	
-18	30625	ROLLER, Guide	1	
-19	39383	SCREW, Pan head, 5-40 by 1 inch	1	
-20	39018	BRACKET, Lower loopformer	1	
-21	39028	SCREW, Pin type, 3-48NC	1	
-22	010275	LOOPFORMER ASSEMBLY, Lower	1	
-23	37266	ROLLER, Tapered	1	
-24	30613	WASHER, Flat	1	
-25	39795	SPRING, Pressure plate retaining	1	
-26	39797	PLATE, Retainer	1	
-27	39798	PLATE, Pressure	1	
-28	26030	PIN, Hinge, lens carrier	2	
-29	010375	CARRIER ASSEMBLY, Lens, complete	1	
-30	30621	SCREW, Truss head, 3-48 by 3/16 inch	2	
-31	39796	RAIL, Film guide	1	
-32	28067	SPRING, Side tension	1	
-33	30639	ARM, Side tension	1	
-34	30620	SCREW, Truss head, 3-48 by 1/8 inch	2	
-35	010346	PLATE ASSEMBLY, Aperture	1	
-36	26642	RIVET, Tubular, 0.089 inch diameter	2	
-37	30615	CATCH, Lens carrier	1	
-38	39254	SETSCREW, Nyloc, fluted socket oval point, 6-32 by 1/4 inch	1	
-39	37961	SPRING, Linkage tension, upper	1	
-40	30650	SPRING, Linkage tension, lower	1	

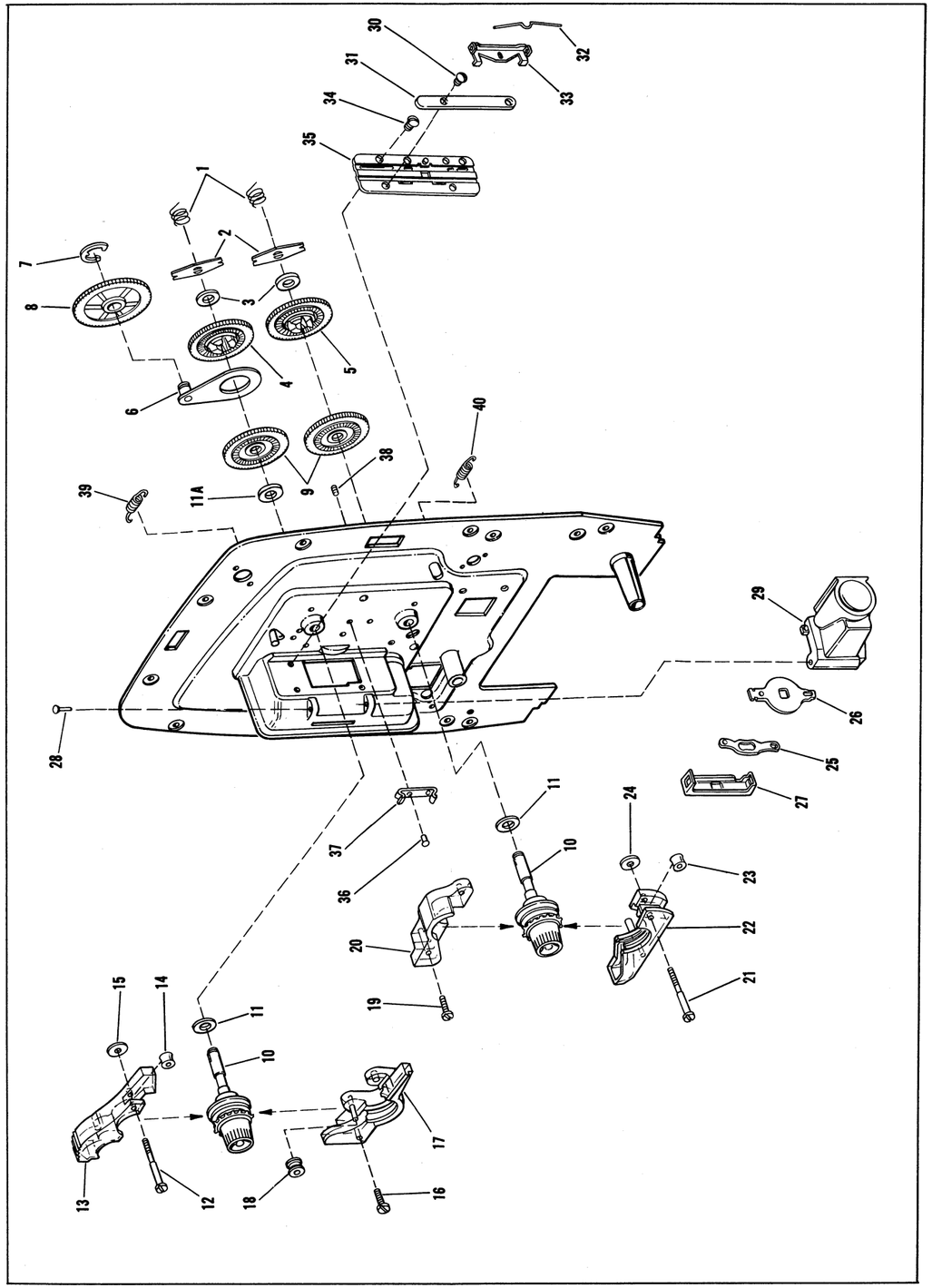


Figure 4. Loopformers, Sprockets and Gears

FIG. & INDEX NO.	PART NO.	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
		SHUTTER, SHUTTLE AND DRIVE MECHANISM		
5-1	80147	SCREW, Phillips binding head, 5-40 by 3/16 inch	2	
-2	012625	BRACKET ASSEMBLY, Low speed roller	1	
-3	27322	RING, Retaining, special	1	
-4	32172	WASHER, Flat	2	
-5	012624	ROLLER ASSEMBLY, Drive, low speed	1	
		(NOTE: Do not attempt to replace drive roller rubber rim separately.)		
-6	83447	NUT, Plain hex, 5-40	1	
-7	39376	SCREW, Hex head, 5-40 by 1/2 inch	1	
-8	27641	SCREW, Fillister head, 3-48 by 1/8 inch	2	
-9	010181	BRACKET ASSEMBLY, Spring loading	1	
-10	25715	RING, Retaining, external bowed, 0.145 inch ID	1	
-11	010278	BRACKET ASSEMBLY, Pulley mounting	1	
-12	27322	RING, Retaining, special	2	
-13	32172	WASHER, Flat	4	
-14	011791	ROLLER ASSEMBLY, Drive (include one of item 5-15A)	1	
-15	012086	ROLLER ASSEMBLY, Drive (include one of item 5-15A)	1	
		(NOTE: Do not attempt to replace drive roller rubber rim separately.)		
-16	29472	SCREW, Pivot	1	
-17	32169	SPRING, Safety shutter pivot	1	
-18	34656	SCREW, Round head Sems, 6-32 by 1/4 inch	1	
-19	010378	SHUTTER ASSEMBLY, Safety	1	
-20	30551	SCREW, Fillister head, 3-48 by 1/4 inch	2	
-21	35305	WASHER, Shutter	1	
-22	010364	SHUTTER ASSEMBLY, Slow motion	1	
-22A	39468	. SPRING, Shutter tension	3	
-23	39382	CAM, In-Out	1	
-24	26906	NUT AND WASHER, Sems, 6-32	2	
-25	39011	SCREW, Pivot	1	
-26	39027	WASHER, Spring tension	1	
-27	010421	SHUTTLE AND FRAMING LEVER ASSEMBLY	1	
-28	39012	SPACER, Sleeve	1	
-29	32947	SHOE, Cam, white (see Note A)	AR	
-29	33712	SHOE, Cam, black (see Note A)	AR	
-30	39010	STUD, Pivot	1	
-31	39377	WASHER, Spring tension	1	
-32	39375	SPRING, Torsion	1	
-33	010377	LEVER ASSEMBLY, Speed change	1	
-34	36842	SCREW, Pan head, 6-32 by 3/8 inch	1	
-35	39013	BRACKET, Shuttle pivot	1	
-36	36765	SETSCREW, Fluted socket cup point, 6-32 by 1/4 inch	1	
-37	39030	CAM, Pull-down	1	
-38	26085	WASHER, Thrust	1	
-39	12498	SETSCREW, Fluted socket cup point, 6-32 by 1/8 inch	1	
-40	26131	RING, Retaining, external crescent, 0.219 inch ID	1	
-41	80591	SETSCREW, Fluted socket cup point, 6-32 by 3/16 inch	1	
-42	33040	KNOB, Manual, main shaft	1	
-43	33039	SHAFT, Main	1	
-44	39004	PINION, Drive	1	
-45	30667	WASHER, Friction	1	
-46	21736	RING, Retaining, Type E (IRRC 1000-25)	1	
-47	39384	SHAFT, Framer	1	

NOTE A: Use any combination of black and/or white cam shoes to obtain proper fit on pull-down cam.

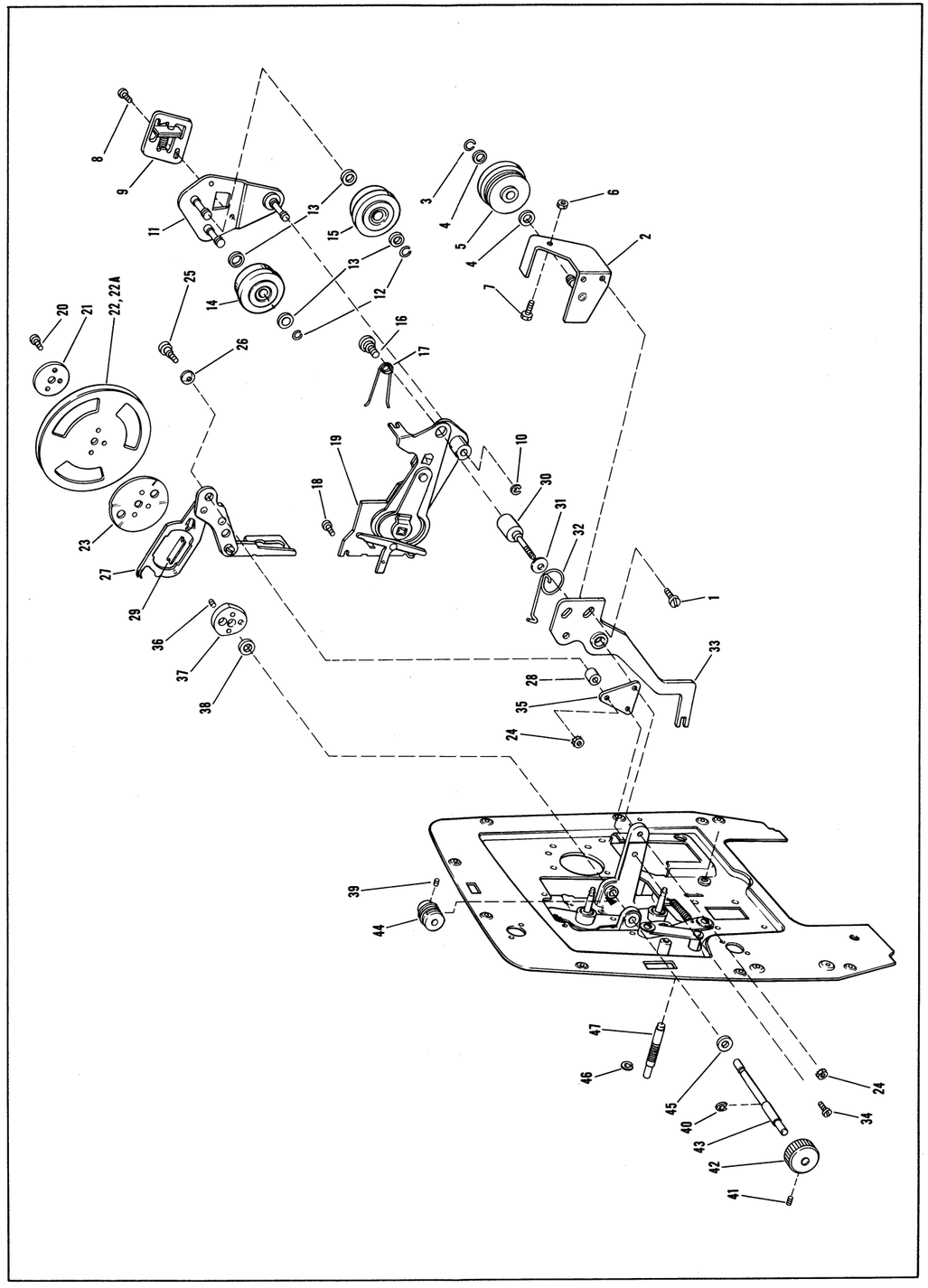


Figure 5. Shutter, Shuttle and Drive Mechanism

FIG. & INDEX NO.	PART NO.	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
		MOTOR, FANS AND BASE		
6-1	30237	SCREW, Hex head tapping, 4-40 by 1/4 inch	1	
-2	29065	SCREW, Hex head tapping, 4-40 by 1/2 inch	1	
-3	34784	WASHER, Flat	1	
-4	83286	CLAMP, Leadwire	1	
-4A	82794	CONNECTOR, Leadwire, closed end	1	
-5	35595	COVER, Blower housing	1	
-6	32974	SETSCREW, Fluted socket cup point, 8-32 by 1/8 inch	1	
-7	012169	FAN ASSEMBLY, Blower	1	
-8	32858	BELT, Drive	1	
-9	12498	SETSCREW, Fluted socket cup point, 6-32 by 1/8 inch	1	
-10	34622	PULLEY, Drive	1	
-11	32974	SETSCREW, Fluted socket cup point, 8-32 by 1/8 inch	1	
-12	32486	FAN, Motor	1	
-13	36689	SCREW, Round head, 6-32 by 1.562 inch	4	
-14	32726	BUSHING, Motor	4	
-15	36690	DAMPER, Vibration	4	
-16	012377	MOTOR ASSEMBLY, 60 cycle	1	
-17	29065	SCREW, Hex head tapping, 4-40 by 1/2 inch	4	
-18	08158	MAIN PLATE AND MECHANISM ASSEMBLY	1	
-18A	700816	. RIVET, Tubular, 0.123 inch diameter	1	
-18B	32652	. RIVET, Tubular, 0.123 inch diameter	2	
-18C	08156	. PLATE ASSEMBLY, Mechanism	1	
-18D	08154	. PLATE ASSEMBLY, Main	1	
-19	30165	. SCREW, Truss head, 5-40 by 3/16 inch	2	
-20	24153	. WASHER, Flat	1	
-21	010376	. LEVER AND STUD ASSEMBLY, Take-up guide	1	
-22	010694	. LEVER AND STUD ASSEMBLY, Lock	1	
-23	35956	. SCREW, Pan head Sems, 3-48 by 0.187 inch	2	
-24	33108	SCREW, Hex head tapping, 6-32 by 1 inch	4	
-25	33006	SUB-BASE, Projector	1	
6-	010420	BASE ASSEMBLY, Projector, complete	1	
-26	30648	. RIVET, Tubular, 0.099 inch diameter	2	
-27	39023	. CUTTER, Film	1	
-28	33105	. RIVET, Tubular, 0.123 inch diameter	1	
-29	33106	. SCREW, Fillister head tapping, 6-32 by 5/8 inch	1	
-30	26135	. FOOT, Rubber	2	
-31	39461	. BASE, Projector (order complete base assembly)	NP	

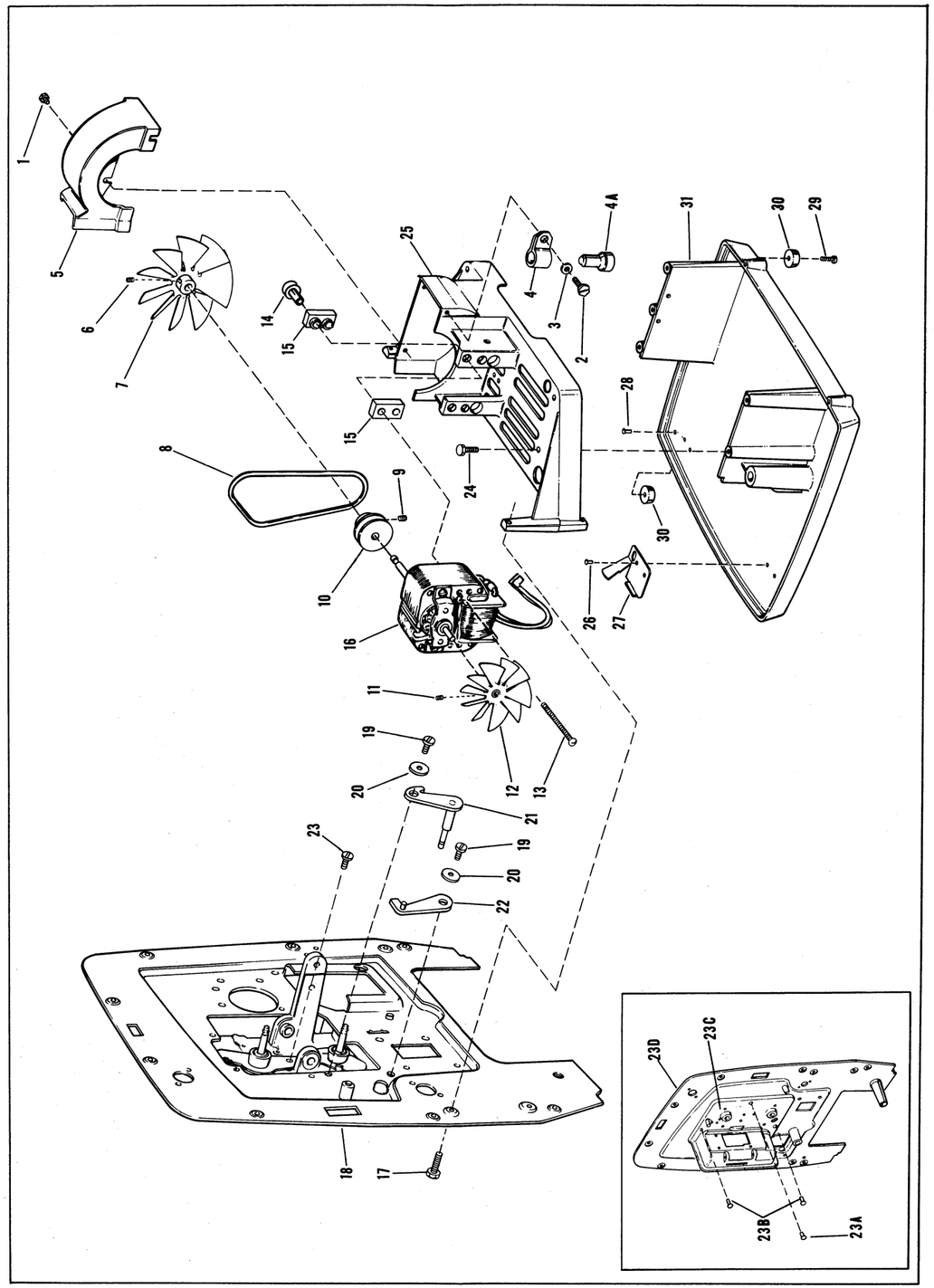


Figure 6. Motor Fans and Base

NUMERICAL INDEX OF PARTS
(Note added part numbers at end of list)

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010346	4-35
010364	5-22
010374	3-10, 3-23
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30165	3-34, 6-19
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30237	6-1
30551	5-20
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30615	4-37
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30621	4-30
30625	4-18
30639	4-33
30648	6-26
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32136	2-8
32169	5-17
32172	5-4, 5-13
32361	1-1C
32478	2-7
32486	6-12
32726	6-14
32858	6-8
32861	3-2, 3-15
32865	2-20
32947	5-29
32974	6-6, 6-11
32979	3-5
33006	6-25
33024	1-18
33038	2-15
33039	5-43
33040	5-42
33051	1-5
33057	2-2
33070	1-20
33072	2-10
33073	1-4B
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33106	6-29
33108	6-24
33117	3-12
33153	4-4
33154	3-29
33194	1-3
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35349	1-14
35579	3-7, 3-20
35580	3-8, 3-21
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35956	6-23
36689	6-13
36690	5-15
36702	2-23
36705	1-9
36714	2-14
36722	2-19
36725	1-10
36740	1-15
36765	5-36
36769	2-13
36831	1-8
36842	5-34
37266	4-23
37961	4-39
39004	5-44
39005	4-9
39010	5-30
39011	5-25
39012	5-28
39013	5-35
39015	4-13
39018	4-20
39023	6-27
39027	5-26
39028	4-21
39030	5-37
39099	3-36
39224	1-7
39225	1-26
39237	4-14
39254	4-38
39375	5-32
39376	5-7
39377	5-31
39382	5-23
39383	4-16, 4-19
39384	5-47
39390	1-24
39391	1-22
39392	1-23
39393	1-25
39459	1-1F
39460	1-4C
39461	6-31
39462	1-11
39468	5-22A
39795	4-25
39796	4-31
39797	4-26
39798	4-27
80147	5-1
80591	5-41
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83286	6-4
83447	5-6
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08156	6-18C
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