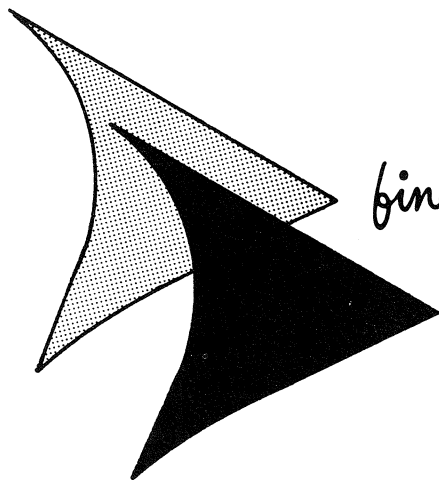


SERVICE INSTRUCTIONS

DESIGN 245BAY AND BAJ PROJECTOR



finer products through imagination

Bell & Howell

**GENERAL SERVICE DEPT.
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CHICAGO 45, ILLINOIS**



Figure A. Design 245 Autoload 8-mm Projector

Introduction

GENERAL.

This manual has been prepared to aid in servicing the Bell & Howell Design 245 BAY and BAJ Autoload 8-mm Movie Projector. 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, 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.

Basically, the two projectors covered by these instructions are similar, particularly in the design and construction of the internal mechanisms. However, because the BAJ is designed for over-seas use, a variable speed motor is used, which requires a speed control and a switch for 50 or 60 cycle current. It is distinguished by its control housing (Figure 1) and its motor, blower fan and speed control assembly (Figure 4).

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 B.)

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).

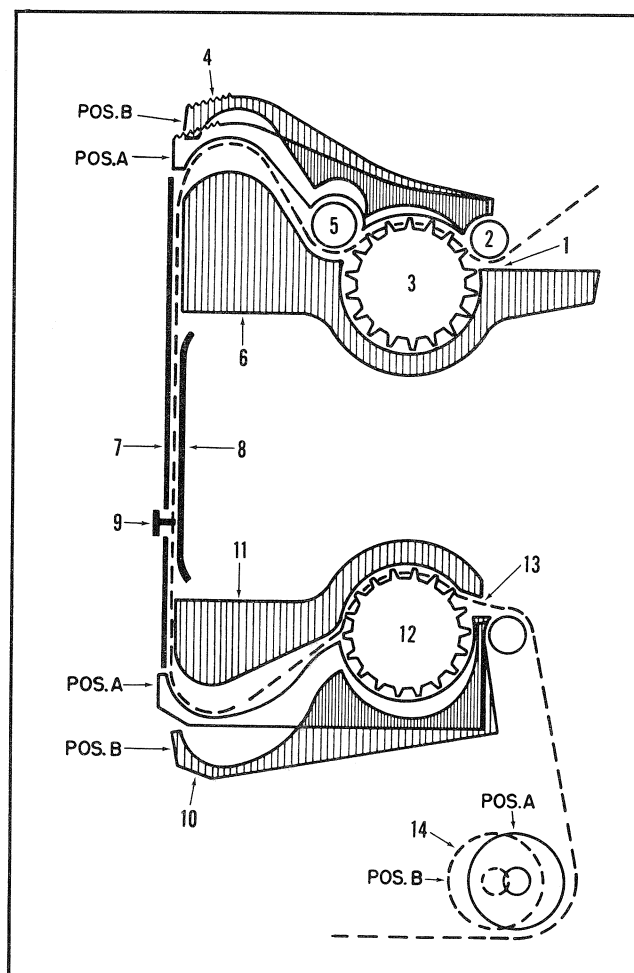


Figure B. Film Path - Self-Threading Procedure

SERVICE INSTRUCTIONS

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.

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 adjust-

ment procedures listed in the instructions.

When lubricating projector parts during reassembly, it is recommended that only Bell & Howell grease (Spec. 1956) and oil (Spec. 1543) 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 C.

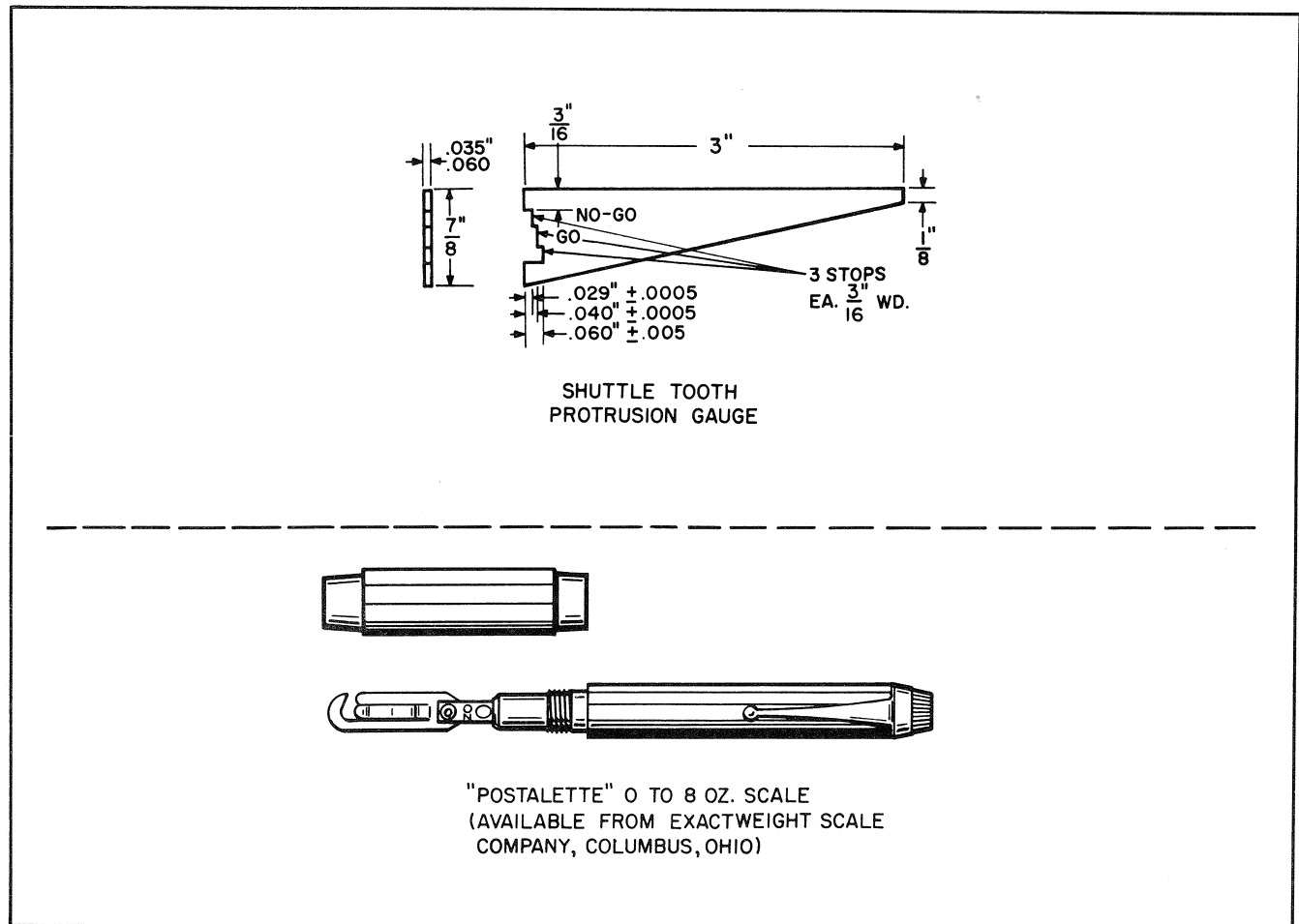


Figure C. Special Tools

Disassembly

1. GENERAL INSTRUCTIONS.

a. When optical parts, such as the projection lamp and lens, are removed from a 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. The integral studs of the rewind shield (21) are heat sealed to secure the shield to the base. Do not attempt to remove this shield unless actually in need of replacement.

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 (5 through 9) which are secured by screw (2). The spur gear (4) can be lifted from the gear stud of the feed reel arm support assembly (33).

b. Loosen setscrew (10) and remove spur gear (11), shaft assembly (12) and torque spring (13). Note the manner in which spring (13) is installed.

c. Removal of 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 (34).

d. Loosen setscrew (24) to disassemble the spur gear (25) and take-up arm spur gear and shaft assembly (26) from the mechanism plate.

e. Removal of two retaining rings (31) will permit the disassembly of the bearings (32) and reel arm supports (33 and 34). The tension springs (37), cam washers (38 and 39) and steel balls (40) will fall from position when the bearings (32) are withdrawn from the casting.

4. REMOVAL OF PARTS IN FIGURE 3. Remove parts, as necessary, in their indexed order of disassembly.

5. REMOVAL OF PARTS IN FIGURE 4. Remove parts, as necessary, in their indexed order of disassembly. Note the manner in which the cam follower (31) on speed spring (33) bears against the thrust washer (19).

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

a. Note the manner in which springs (11 and 12) 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 (17) which attach the upper and lower loop former assemblies (18 and 19) also serve as shafts for the film rollers (20).

c. The spring (28C), retainer plate (28D), and pressure plate (28E) can be removed from the lens carrier subassembly (28) without disassembling the carrier from the mechanism plate. Swing open the lens carrier, and grasp the top and bottom of the pressure plate (28E) between the thumb and forefinger of the right hand. Press the upper end of the retainer plate (28D) away from the lens carrier casting to disengage the retainer plate and spring (28C) from the pins in the casting. To remove the lens carrier subassembly (28F), the hinge pins (27) must be pried out.

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

a. One of the drive roller assemblies (7) is exposed and can be serviced quite easily. To gain access to the inner roller, remove retaining ring (4),

and lift the assembled pulley mounting bracket assembly (9) and roller parts (5 through 8) from the projector.

b. To free the safety shutter and bracket assembly (15), remove the pivot screw (10), pivot spring (11), knob screw (12), "forward-still-reverse" knob (13),

and screw (14). Note manner in which legs of pivot spring (11) are engaged.

c. Note carefully the engagement of cam shoes (27) with surface of pulldown cam (31) before disassembling the shutter (18), shuttle and framing lever assembly (26), or pulldown cam (31).

Reassembly and Adjustments

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. 1956 as noted) and oil (Spec. 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, noting the following special precautions.

a. Hold the drive pinion (31) in position between the two cast ears of the mechanism plate while installing the framer shaft assembly (30). Note that the hub pinion (31) must face in the direction shown in Figure 6. Tighten setscrew (29) just enough to hold.

b. Assemble shutter washer (17), shutter (18), in-out cam (19), and pulldown cam (27) with screws (16). Select any combination of white and/or black cam shoes (23) for proper fit on cam (27). 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 (23) in place while assembling shuttle and framing lever assembly (22) to pulldown cam (27). Install thrust washer (28) over end of framer shaft; then hold the assembled shutter and shuttle in position while pressing the framer shaft into place. Insert a 0.002-inch feeler gauge between the washer (32) and the bearing which is pressed into the cast arm of the mechanism plate. Press the shutter and framer shaft knob toward one another until the feeler gauge is held in place; then tighten the pulldown cam setscrews (26) securely, and remove feeler gauge.

c. Assemble the pivot (20) and spring washer (21) to the shuttle and framing lever assembly (22), sliding the eccentric washer (24) and shuttle spacer (25) onto the pivot before inserting the threaded end of the pivot shaft through cast arm of mechanism plate.

TABLE I. LUBRICATION

ITEM	LUBRICATION
Rollers (item 23, Figure 1)	Apply grease (1956) to roller shafts with brush.
Spur gear (item 4, Figure 2)	Apply grease (1956) to face of gear before installing washer (item 5, Figure 2).
Spur gears (items 6 and 20, Figure 2)	Apply grease (1956) to both faces of each gear.
Gear and shaft assemblies (items 12 and 26, Figure 2)	Apply grease (1956) between faces of bearings (item 32, Figure 2) and faces of gears.
Reel arm supports (items 33 and 34, Figure 2)	Apply grease (1956) between supports and mechanism plate.
Bearing balls (item 40, Figure 2)	Speck of grease on each bearing ball.
Projector gear train, complete	After gears are assembled, apply grease (1544) with brush to entire gear train for one revolution of the gears.

d. Engage the crossed legs of the pivot spring (11) with the groove in a spring stud protruding from the safety shutter and bracket assembly (15), and install pivot screw (10) so that loop of spring slips around the shoulder of the screw.

e. Assemble drive rollers (7) and spring-loading bracket assembly (3) to the pulley mounting bracket assembly (9), and secure the pulley bracket to the safety shutter and bracket assembly with retaining ring (4). Place the "forward-still-reverse" knob (13) in the center ("still") position. With the spring-loading bracket screws (2) loose, insert a 0.062-inch (± 0.015 inch) shim between the upper drive roller rim (7A) and the outer rim of the shutter (18). While maintaining a light pressure on the roller against the shim, tighten the two spring loading bracket screws (2) securely. Withdraw the shim. Test the operation of the assembled parts as instructed in paragraph 19.

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

a. If the lens mount catch (38) 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 (33) and spring (32) to the aperture plate assembly (24). 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 (29 and 31) and film guide (30).

c. Assemble the spring (28C), retainer plate (28D), and pressure plate (28E). 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 (28F). Release the pressure on the parts, guiding the retainer plate and spring as necessary to engage the pins protruding from the lens carrier casting.

d. Assemble the sprockets and loop formers (17 through 26) to the mechanism plate. The short spring (12) is located just behind the upper sprocket and engages a hole in the mechanism plate and the upper end of the mechanism plate linkage. Install the bushing (14), trip lever assembly (15), and spacer (16), and hook the long spring (11) between the trip lever and a hole in the mechanism plate just behind the motor.

e. The mechanism plate linkage is secured at one point by two binding head screws (36) located on a diagonal just to the right of the trip lever. Loosen these two screws, and move the protruding shaft of the trip lever toward the rear of the mechanism plate so that the loop formers open. Grasp the upper and lower loop formers with thumb and forefinger just in front of the lamp housing, and hold them in a closed position. Adjust the linkage so that the upper end of

the trip lever engages an ear of the linkage, locking the linkage in place. Tighten screws (35) securely, and check the operation of the trip lever several times.

f. Install gears (6 and 7) on their sprocket shafts. Position drive pinion (31, Figure 6) so that pinion teeth are centered at bottom of sprocket gear (6), and tighten drive pinion setscrew securely.

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

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

a. If replaced, dowel pin (17) must be pressed in flush to 0.005 below outer face of L.H. pulley (18).

b. Assemble the pulley halves (16 and 18), drive belt (14) and blower fan (13), with setscrew loose, to motor shaft before securing the motor in place with screws (7).

c. The face of the blower fan should be centered in the fan housing when tightening setscrew (12). Refer to Figure D for wiring connections.

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

a. Engage the drive belt (7) around the drive pulley and the two drive rollers before securing the motor in place with the screws (9). The motor fan (8) should also be in position.

b. The face of the blower fan (6) should be centered in the blower fan housing when the setscrew (5) is tightened. The blower housing cover (4) is merely pressed down into place with notches in the cover engaging studs screwed into the blower fan housing. Make sure seal (3) is properly placed.

c. Refer to Figure E for wiring connections.

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

a. Assemble the reel arm supports (33 and 34), bearings (32), cam washers (38 and 39), tension springs (37), and gear mounting plate (36) to the mechanism plate with the screw (35) tightened just enough to hold all parts together. Insert a steel ball (40) between each cam washer and the detent hole in the mechanism plate, and hold all parts firmly together while tightening screw (35) securely. Install the two retaining rings (31) in the grooves of the bearings (32).

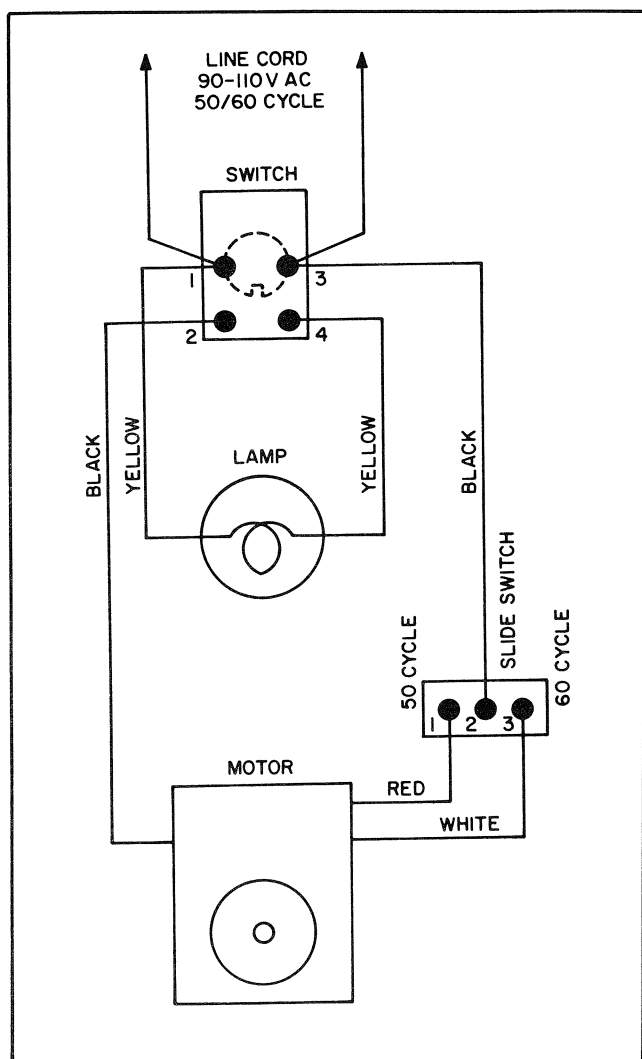


Figure D. Wiring Diagram (BAJ)

b. Install gears (17, 18, and 26) into take-up reel arm support assembly (34), and lubricate gears as instructed in Table I. Install gears (4 and 12) into feed reel arm support assembly (33), 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 (34), 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 (5 through 9), using new spring washer (9), into feed reel arm (3), and install screw (2). Insert the torque spring (13) into place within reel arm so that it will apply tension to gear and shaft (12). Install assembled reel arm to reel arm support (33), rotating the shaft of feed gear (13) until the teeth of the spur gear (6) mesh with those of its mating gear. Install and tighten screw (1).

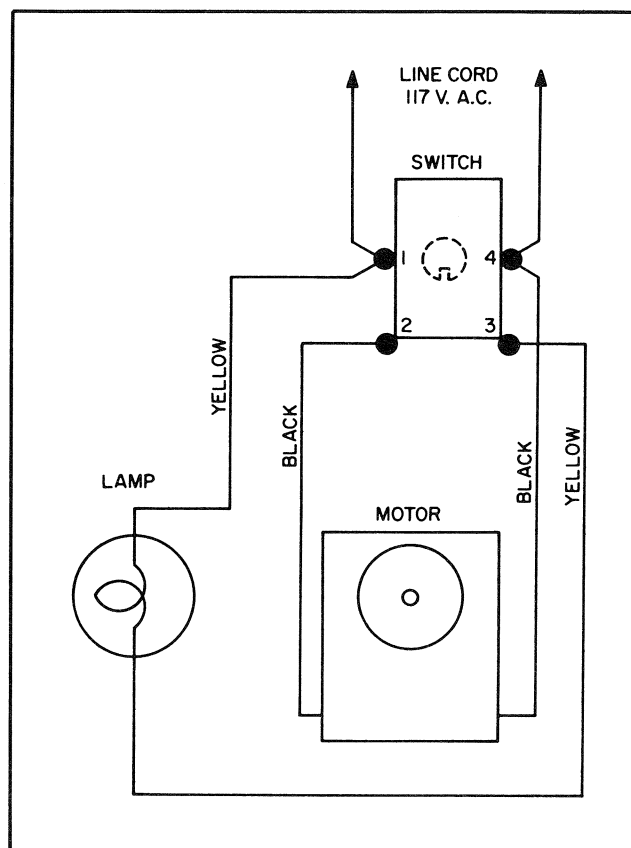


Figure E. Wiring Diagram (BAY)

e. Install gear (25) onto the shaft of the take-up gear (26). Using a feeler gauge, maintain 0.003 inch clearance between the bearing (32) and spur gear (25). Tighten setscrew (24) securely into groove of take-up gear shaft.

f. Install spur gear (11), onto the shaft of the feed gear (12). Use feeler gauge to maintain 0.003-inch end play between bearing (32) and spur gear (11). Tighten setscrew (10).

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

14. 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. Note that the lamphouse ball stud (8A) is threaded. If the lamphouse cover (8) appears loose, turn the ball stud in (clockwise) slightly. If lamphouse cover will not lock in place, unscrew the ball stud a turn or two and check the installation.

15. 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 F. The method of checking take-up torque is illustrated in Figure F; to measure re-wind 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).

16. 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 C. 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 (30, figure 6) 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 24, Figure 6), 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.

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

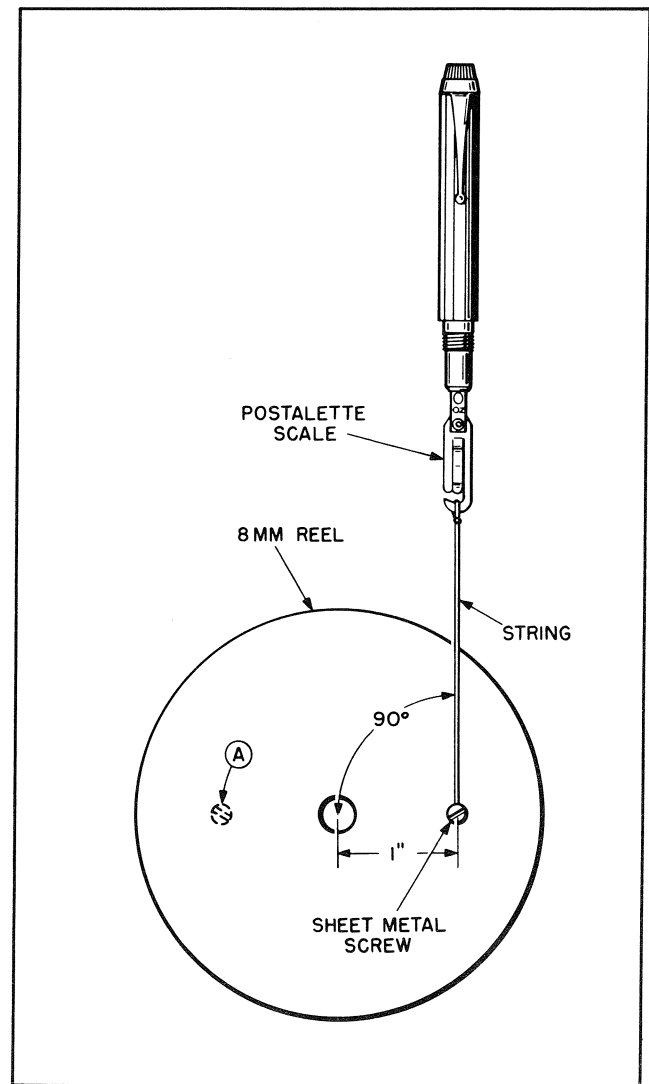


Figure F. Checking Reel Arm Torque

c. Note the binding head screw in the elongated hole at the bend or "knee" of the framing lever (22, Figure 6). Loosen this screw and shift the shuttle bracket arm (Figure 6) 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.



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

Final Test

18. 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 BAY projector is to be operated only from a 115-volt ac, 60-cycle power source.

19. 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. Proper operation of the fire shutter is controlled by the clearance between the upper drive roller (7, Figure 6) and the rim of the shutter (18). The nominal clearance is 0.062 inch (± 0.015 inch). If the fire shutter tends to clear the aperture opening before the shutter 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 lever in the "still" position and loosen bracket screws (2, Figure 6). Insert shim stock of proper thickness between drive roller and rim of shutter and, while maintaining light pressure on roller, tighten screws (2) securely.

20. 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 35, Figure 5). 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.

21. 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 17, 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 21, and adjust if necessary.

Trouble Shooting

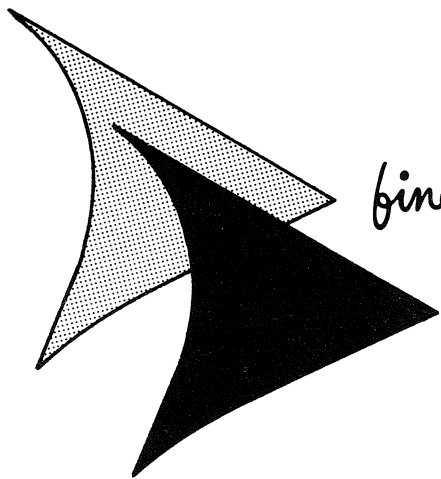
TROUBLE	PROBABLE CAUSE	REMEDY
Projector inoperative with switch in the MOTOR or LAMP position	<ol style="list-style-type: none"> 1. No electrical power 2. Loose drive pulley 3. Broken drive belt 4. Defective switch or wiring 	<ol style="list-style-type: none"> 1. Check power source. 2. Tighten pulley setscrew. 3. Replace belt. 4. Check circuit.
Picture flicker	<ol style="list-style-type: none"> 1. Drive roller assemblies not adjusted properly 2. Defective drive belt pulley 3. Dirt, wear or binding 	<ol style="list-style-type: none"> 1. Readjust as instructed in paragraph 19. 2. Replace drive belt pulley. 3. Clean and repair or adjust gearing as instructed in paragraph 13.
Film scratches	<ol style="list-style-type: none"> 1. Excessively dirty film channel parts (sprockets, guides, etc.) 2. Worn pressure and aperture plates (28E and 34, Figure 5) 3. Worn or damaged film guide (30, Figure 5) 	<ol style="list-style-type: none"> 1. Clean projector thoroughly. 2. Replace if worn or marred. 3. Replace film guide.
Jumpy picture	<ol style="list-style-type: none"> 1. Loss of film loop due to damaged film 2. Green film 3. Shuttle tooth worn 4. Misaligned shuttle tooth 5. Grooves worn in film guide (30, Figure 5) 	<ol style="list-style-type: none"> 1. Inspect and splice as required. 2. Run film through projector two or three times to age the film. 3. Replace shuttle assembly (22, Figure 6). 4. Adjust and align shuttle as instructed in paragraph 16. 5. Replace film guide.
Soft focus	<ol style="list-style-type: none"> 1. Dirty projection lens 2. Lens mount out of alignment 3. Loose lens mount catch (38, Figure 5) 	<ol style="list-style-type: none"> 1. Clean projector lens. 2. Readjust as instructed in paragraph 21. 3. Reset tension by bending catch carefully.

SERVICE INSTRUCTIONS

TROUBLE	PROBABLE CAUSE	REMEDY
Auto-threading not operating properly	<ol style="list-style-type: none"> 1. Loop former linkage improperly adjusted or binding 2. Loop formers not releasing 	<ol style="list-style-type: none"> 1. Realign loop formers and reset linkage (paragraph 10, step e). 2. Linkage binding or springs stretched or broken on linkage.
<p>Film spills</p> <p>Fails to take up or rewind</p>	<ol style="list-style-type: none"> 1. Insufficient tension on feed spindle 1. Defective drive belt 2. Worn rim on drive roller 3. Drive rollers not adjusted properly 	<ol style="list-style-type: none"> 1. Adjust, paragraph 21, step b. 1. Replace belt. 2. Replace rim (7A, Figure 6). 3. Readjust as instructed in paragraph 19.
Noisy	<ol style="list-style-type: none"> 1. Loose attaching parts 2. Gearing dry 	<ol style="list-style-type: none"> 1. Tighten as necessary. 2. Lubricate as necessary.

PARTS CATALOG

DESIGN 245BAY AND BAJ PROJECTOR



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Bell & Howell

**GENERAL SERVICE DEPT.
7125 N. KIMBALL AVE.
CHICAGO 45, ILLINOIS**

Replacement Parts

The following pages illustrate and list by part number and part name all replacement parts of the Design 245 BAY and 245 BAJ Autoload 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.

When ordering replacement parts be sure to check the Usable on Code column to make certain that the part in question is applicable to the particular model of projector being serviced. The code letters indicate that a specific part is applicable only to a certain model.

Code A - Design 245 BAY
Code B - Design 245 BAJ

Exploded view diagram of a Model BAJ electronic device. The diagram shows the main housing (1) and various internal components and mounting hardware. Key parts include:

- 1**: Main housing
- 2**: Mounting bracket
- 3**: Mounting bracket
- 4**: Mounting bracket
- 5**: Mounting bracket
- 6**: Mounting bracket
- 7**: Mounting bracket
- 8**: Mounting bracket
- 9**: Transformer
- 10**: Capacitor
- 11**: Capacitor
- 12**: Mounting bracket
- 13**: Mounting bracket
- 14**: Mounting bracket
- 15**: Mounting bracket
- 16**: Mounting bracket
- 17**: Mounting bracket
- 18**: Mounting bracket
- 19**: Mounting bracket
- 20**: Mounting bracket
- 21**: Mounting bracket
- 22**: Mounting bracket
- 23**: Mounting bracket
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- 25**: Mounting bracket
- 26**: Mounting bracket
- 27**: Mounting bracket
- 28**: Mounting bracket
- 29**: Mounting bracket
- 30**: Mounting bracket
- 31**: Mounting bracket
- 32**: Mounting bracket
- 33**: Mounting bracket
- 34**: Mounting bracket
- 35**: Mounting bracket
- 36**: Mounting bracket
- 37**: Mounting bracket
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- 39**: Mounting bracket
- 40**: Mounting bracket
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- 42**: Mounting bracket
- 43**: Mounting bracket
- 44**: Mounting bracket
- 45**: Mounting bracket
- 46**: Mounting bracket
- 47**: Mounting bracket
- 48**: Mounting bracket
- 49**: Mounting bracket
- 50**: Mounting bracket

An inset diagram shows the internal wiring and component layout for the Model BAJ, with parts labeled 40 through 46.

FIG. & INDEX	PART	DESCRIPTION	UNITS	PER ON	USABLE
1-1	011115	COVER ASSY, Front	1		
-1A	19025	. RIVET, Front cover catch	1		
-1B	26321	. CATCH, Front cover	1		
-1C	26320	. BUTTON, Front cover catch	1		
-1D	33739	. NAMEPLATE, Autoload	1		
-2	33734	SCREW, Threading knob plate	2		
-3	33738	PLATE, Cover, threading knob	1		
-4	29065	SCREW, Hex head self threading	4		
-5	30029	SCREW, Hex head self threading	2		
-6	14175	WASHER, Lock	2		
-7	33704	COVER, Back	1		
-8	011116	COVER ASSY, Lamphouse	1		
-8A	34941	. STUD, Ball	1		
-9	33140	. NAMEPLATE, Lamphouse cover	1		
-10	26329	SCREW, Hex head self-tapping	2		
-11	34784	WASHER	2		
-12	32478	BAFFLE, Lamp	1		
-13	32350	SCREW, Rd head sems	2		
-14	3637	NUT, Plain hex	2		
-15	011089	BRACKET ASSY, Lamphouse cover	1		
-16	32136	SCREW, Round head	3		
-17	011312	SOCKET AND BRACKET ASSY, Lamp	1		
-18	30648	RIVET, Tubular	2		
-19	30628	CUTTER, Film	1		
-20	010177	BRACKET ASSY, Film cutter	1		
-21	30663	SHIELD, Rewind	1		
-22	20808	RING, Retaining (guide roller).	2		
-23	30662	ROLLER, Film guide	2		
-24	20415	NUT, Hex (switch)	1		
-25	32974	SETSCREW, Frame knob	1		
-26	34943	KNOB, Frame	1		
-27	33936	INSERT, Frame knob	1		
-28	35543	NAMEPLATE, Projector	1		
-29	30093	RIVET, Carrying handle	2		
-30	17632	WASHER, Flat	2		
-31	30659	HANDLE, Carrying	1		
-32	010169	KNOB ASSY, Tilt	1		
-33	22113	RING, Retaining (tilt shaft)	1		
-34	010187	SHAFT AND FOOT ASSY, Tilt	1		
-35	28145	SPRING, Tilt shaft	1		
-36	26170	RIVET, Rubber foot	2		
-37	26135	FOOT, Rubber	2		
-38	34957	CORD, Power	1		
-39	22464	BUSHING, Strain relief	1		
-40	33936	INSERT, Frame knob	1		
-41	33935	KNOB, Frame	1		
-42	33932	WASHER, Felt	1		
-43	32002	SCREW	2		
-44	35588	HOUSING, Control	1		
-45	33931	WASHER	1		
-46	34539	RING, Retaining	1		
-47	35585	NAMEPLATE, Projector	1		
-48	29144	RIVET	2		
-49	35586	NAMEPLATE, Switch	1		
-50	32961	SWITCH	1		

FIG. & INDEX	PART NO.	DESCRIPTION	UNITS							USABLE
			1	2	3	4	5	6	7	

2-1	23822	SCREW, Binding head	1							1
-2	32861	SCREW, Tension adjusting	1							1
-3	010195	ARM AND BEARING ASSY, Feed reel	1							1
-4	29706	GEAR, Spur	1							1
-5	29726	SPACER, Tension adjusting	1							1
-6	29723	GEAR, Spur	1							1
-7	29725	DISC, Friction	2							2
-8	29724	WASHER, Spring	1							1
-9	010062	SPINDLE ASSY, Feed	1							1
-10	29192	SETSCREW	1							1
-11	35176	GEAR, Spur	1							1
-12	010189	GEAR AND SHAFT ASSY, Feed arm	1							1
-13	32979	SPRING, Torque	1							1
-14	23822	SCREW, Binding head	2							2
-15	32861	SCREW, Tension adjusting	1							1
-16	010196	ARM AND BEARING ASSY, Take-up	1							1
-17	29706	GEAR, Spur	1							1
-18	29707	GEAR, Spur	2							2
-19	29726	SPACER, Tension adjusting	1							1
-20	29723	GEAR, Spur	1							1
-21	29725	DISC, Friction	2							2
-22	29724	WASHER, Spring	1							1
-23	010062	SPINDLE ASSY, Take-up	1							1
-24	29192	SETSCREW	1							1
-25	30203	GEAR, Spur	1							1
-26	010190	GEAR AND SHAFT ASSY, Take-up	1							1
-27	20808	RING, Retaining	1							1
-28	010179	GEAR ASSY, Large	1							1
-29	21736	RING, Retaining	1							1
-30	29706	GEAR, Spur	1							1
-31	29744	RING, Retaining	2							2
-32	34705	BEARING	2							2
-33	09569	SUPPORT ASSY, Feed reel arm	1							1
-34	09568	SUPPORT ASSY, Take-up arm	1							1
-35	80147	SCREW, Binding head	1							1
-36	05631	PLATE ASSY, Gear mounting	1							1
-37	30238	SPRING, Reel arm tension	2							2
-38	29736	WASHER, Cam (feed arm)	1							1
-39	32948	WASHER, Cam (take-up arm)	1							1
-40	145	BALL, Steel	4							4
-41	26081	SWITCH, Toggle (LAMP-MOTOR-OFF)	1							1

REEL ARMS AND GEARS

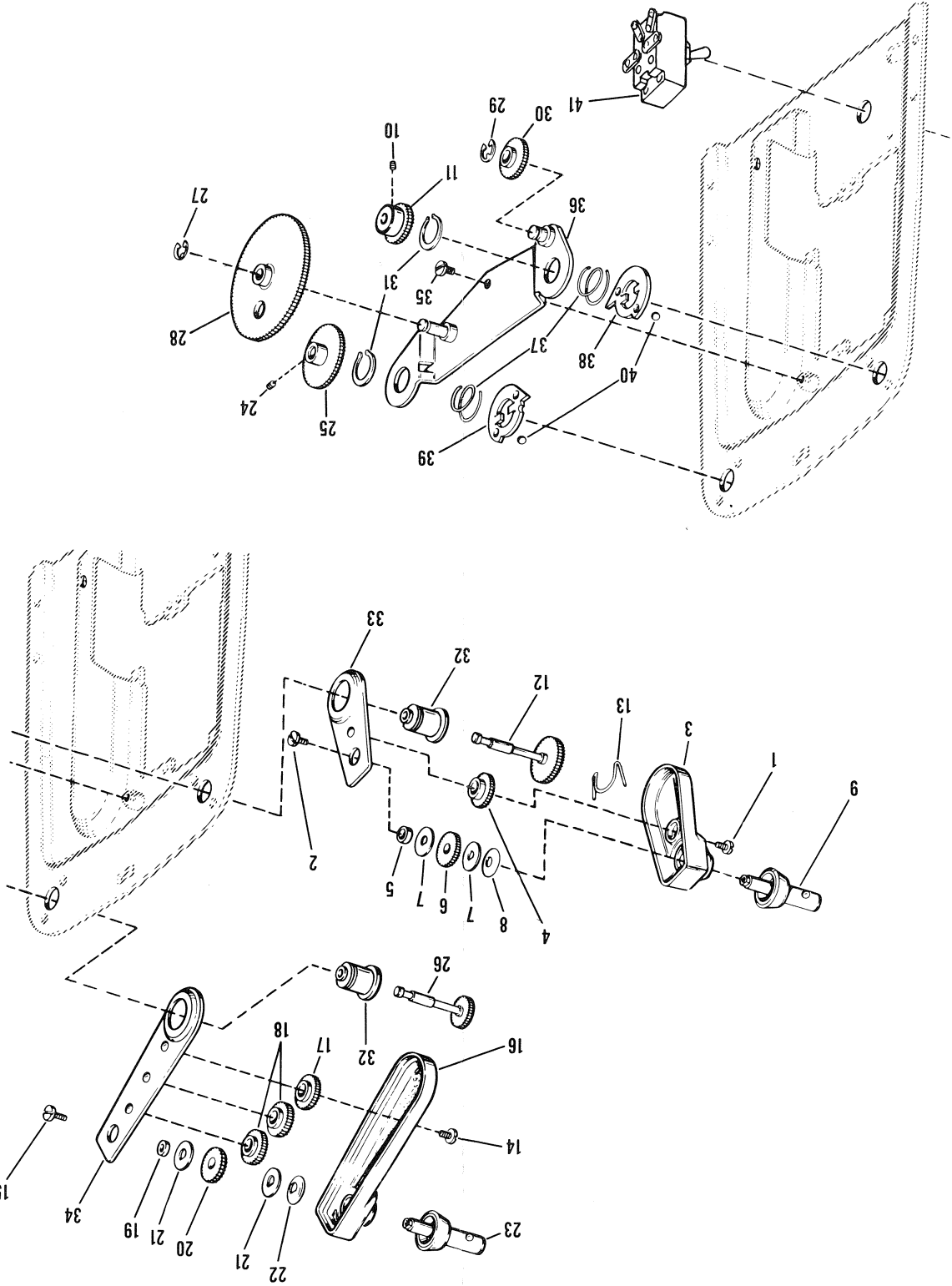


Figure 2. Reel Arms and Gears

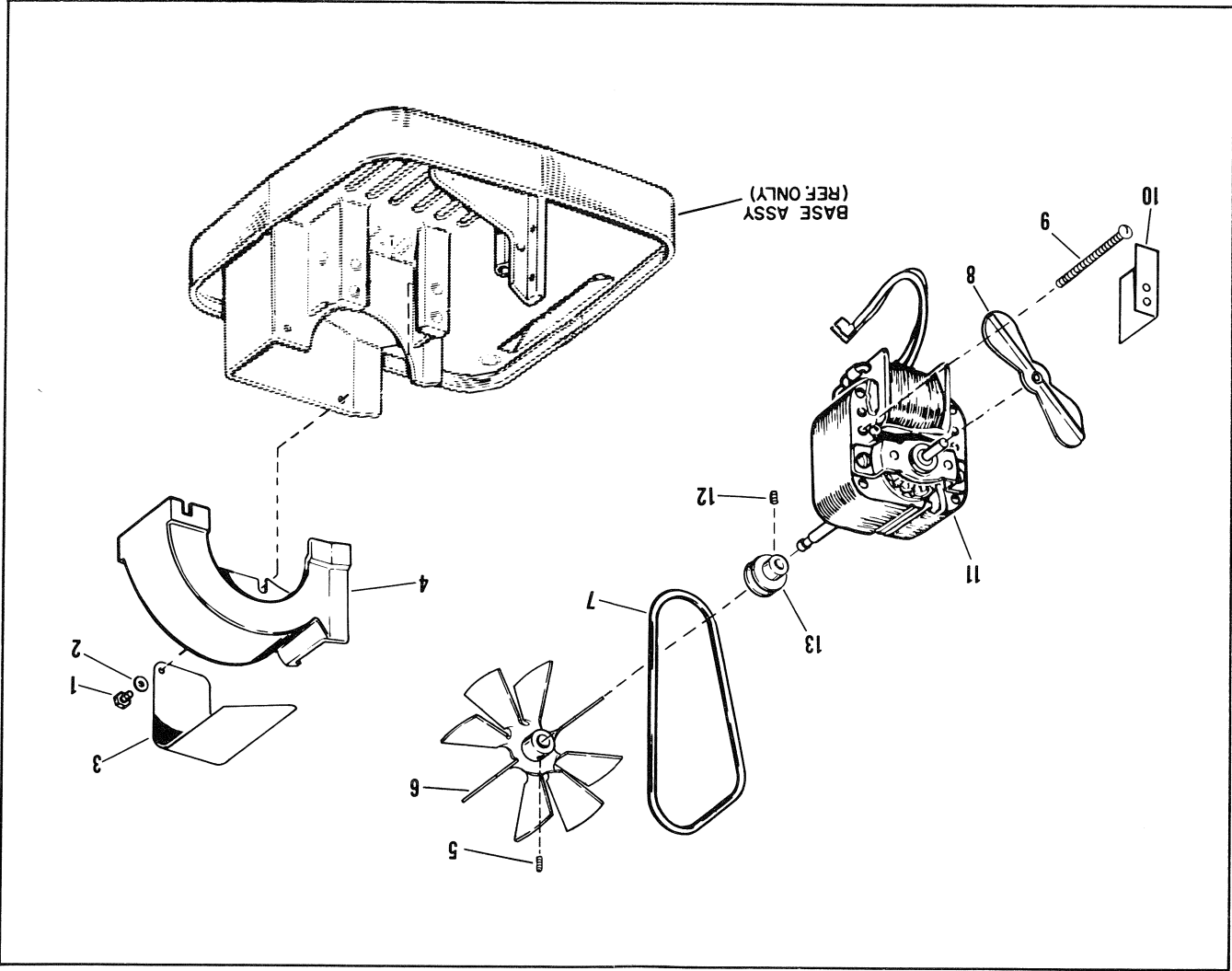


Figure 3. Motor and Blower Fan

FIG. & INDEX	PART NO.	DESCRIPTION	1 2 3 4 5 6 7							UNITS PER ON	USABLE

MOTOR AND BLOWER FAN (BAY)

3-1	30237	SCREW, Hex head self tapping.	2								
-2	26329	WASHER	2								
-3	32498	SEAL, Blower housing	1								
-4	32123	COVER, Blower housing	1								
-5	32974	SETSCREW, Blower fan	1								
-6	34639	FAN, Blower	1								
-7	32858	BELT, Drive	1								
-8	32485	FAN, Motor	1								
-9	30030	SCREW, Motor mounting	2								
-10	26163	BARRIER, Switch	1								
-11	30676	MOTOR, Projector	1								
-12	12498	SETSCREW, Motor pulley	1								
-13	33589	PULLEY, Motor drive	1								

FIG. & INDEX	PART NO.	DESCRIPTION	UNITS	USABLE
		1 2 3 4 5 6 7	PER ASSY	ON CODE

MOTOR AND BLOWER FAN (BAJ)

4-1	30237	SCREW, Hex head self tapping	2	
-2	32498	SEAL, Blower housing	1	
-3	32123	COVER, Blower housing	1	
-4	32974	SETSCREW, Fluted socket	1	B
-5	32486	FAN, Motor	1	B
-6	32767	WASHER, Spring	1	B
-7	26923	SCREW, Round head	4	B
-8	32271	BARRIER, Switch	1	B
-9	32726	BUSHING, Motor	4	B
-10	33189	BUSHING, Rubber	4	B
-11	33188	DAMPER, Vibration	2	B
-12	32974	SETSCREW	1	
-13	34639	FAN, Blower	1	
-14	32858	BELT, Drive	1	
-15	12498	SETSCREW, Motor pulley	1	
-16	32140	HALF PULLEY, Drive (right half)	1	B
-17	33	PIN, Dowel	1	B
-18	010285	HALF PULLEY ASSY, Drive (left half)	1	B
-19	33622	WASHER, Thrust	1	B
-20	21736	RING, Retaining	1	B
-21	35583	MOTOR, Projector	1	B
-22	34283	INSERT, Speed control knob	1	B
-23	12636	SETSCREW, Speed control knob	1	B
-24	34284	KNOB, Speed control	1	B
-25	20808	RING, Retaining	2	B
-26	32653	SETSCREW, Socket head	1	B
-27	32146	CAM, Speed control	1	B
-28	34359	SHAFT, Speed control	1	B
-29	32161	RIVET	2	B
-30	30778	FOLLOWER, Cam	1	B
-31	29248*	NUT, Speed	1	B
-32	32621	SPRING, Speed	1	B

Note * NUT (32) is attached 3/16 inch above notch in spring (33) to eliminate vibration and noise.

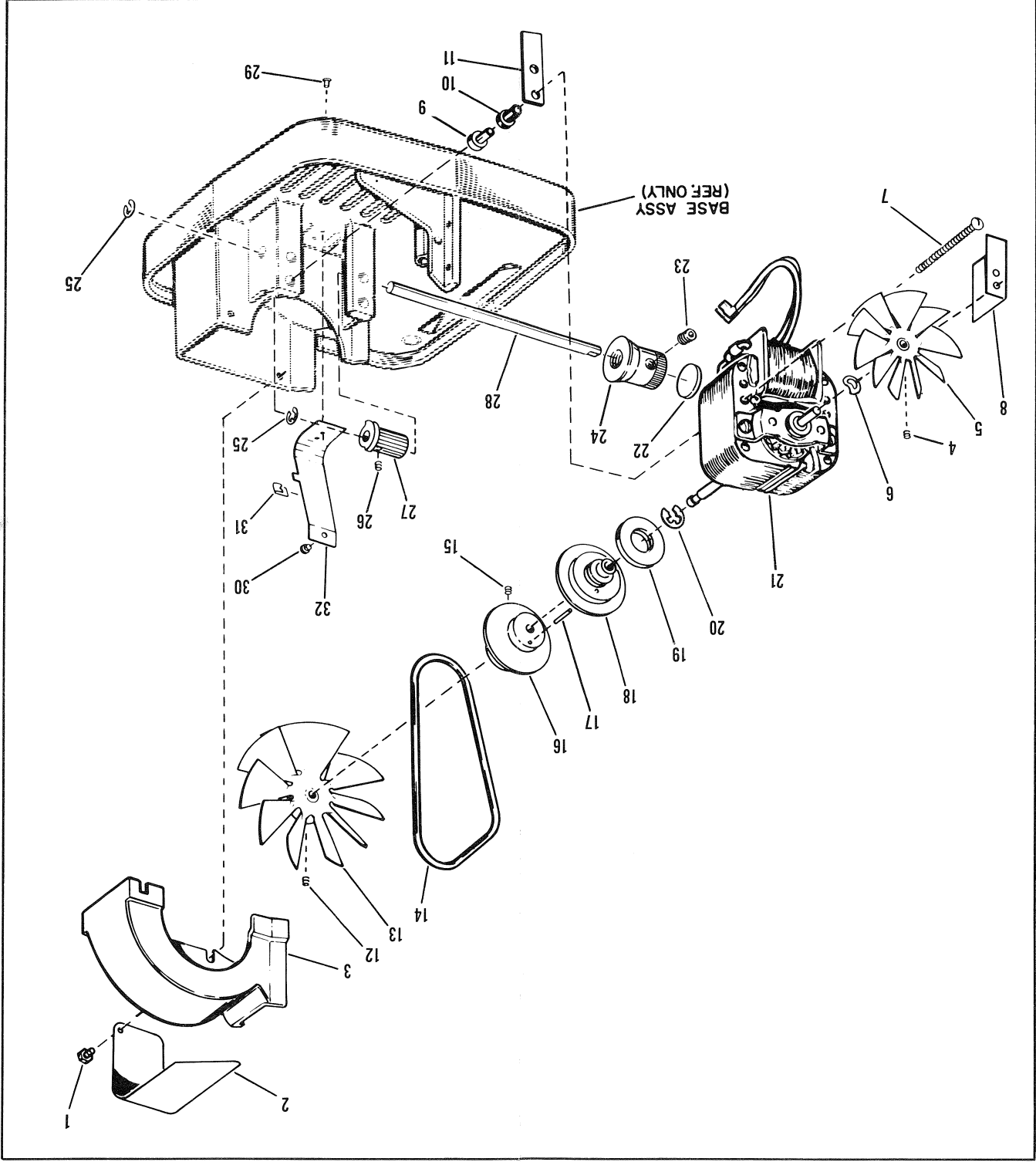


Figure 4. Motor, Fan and Speed Control

FIG. & INDEX	PART NO.	DESCRIPTION	UNITS ON ASSY	USABLE CODE
1	2	3	4	5
6	7	8	9	10

5-1	35181	SPRING, Sprocket	2	
-2	30667	WASHER, Friction	1	
-3	31015	WASHER, Friction	1	
-4	35184	SPRING, Ratchet	2	
-5	35186	WASHER, Spacer	2	
-6	33153	GEAR, Sprocket	1	
-7	35177	GEAR, Sprocket	3	
-8	21736	RING, Retaining	1	
-9	34718	GEAR, Drive	1	
-10	011459	LEVER AND STUD ASSY, Driver gear	1	
-11	30650	SPRING, Trip roller lever	1	
-12	30651	SPRING, Lever return	1	
-13	32624	RIVET, Tubular	1	
-14	32623	BUSHING, Trip lever	1	
-15	010178	LEVER ASSY, Trip	1	
-16	30633	SPACER, Trip lever	1	
-17	30612	SCREW, Pin	2	
-18	011457	LOOP FORMER ASSY, Upper	1	
-19	010637	LOOP FORMER ASSY, Lower	1	
-20	30611	ROLLER, Film	2	
-21	30613	WASHER, Spacer	2	
-22	30625	ROLLER, Upper loop former	1	
-23	34580	SCREW, Binding head	2	
-24	011319	BRACKET ASSY, Upper loop former	1	
-25	33588	BRACKET ASSY, Lower loop former	1	
-26	011454	SPROCKET ASSY, Film	2	
-27	26030	PIN, Hinge (lens carrier)	2	
-28	011314	CARRIER ASSY, Lens	1	
-28A	35187	SPRING, Focusing knob	1	
-28B	32202	KNOB, Focusing	1	
-28C	34960	SPRING, Tension	1	
-28D	33937	PLATE, Retainer	1	
-28E	33680	PLATE, Pressure	1	
-28F	011313	CARRIER SUB ASSY, Lens	1	
-29	30621	SCREW, Truss head	2	
-30	30626	GUIDE, Film	1	
-31	30620	SCREW, Truss head	2	
-32	28067	SPRING, Side tension	1	
-33	30639	ARM, Side tension	1	
-34	011114	PLATE ASSY, Aperture	1	
-35	30634	SCREW, Lens mount adjusting	1	
-36	30619	SCREW, Trip linkage	2	
-37	26642	RIVET, Lens mount catch	2	
-38	30615	CATCH, Lens mount	1	

SPROCKETS, LOOP FORMERS & LENS CARRIER

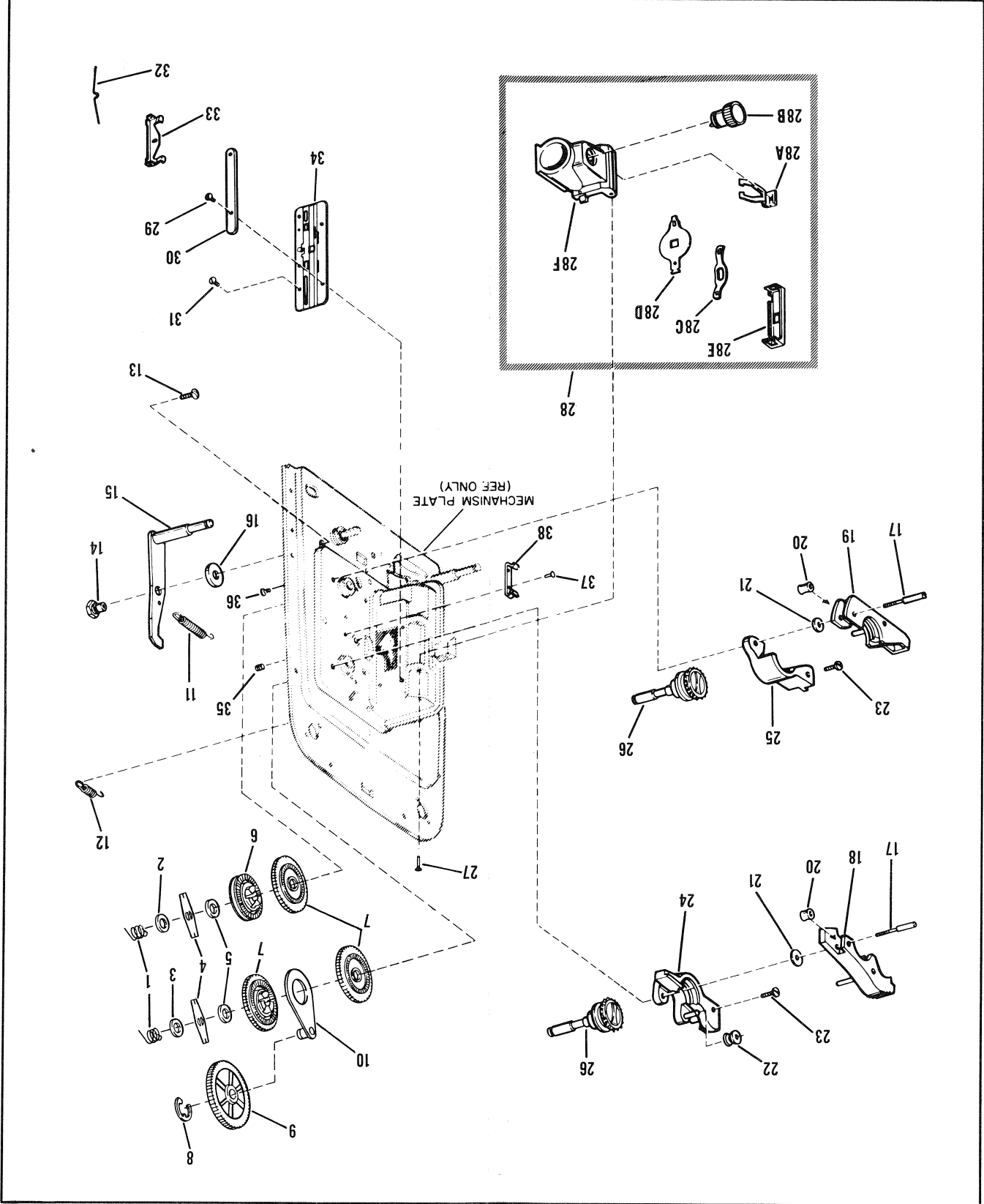
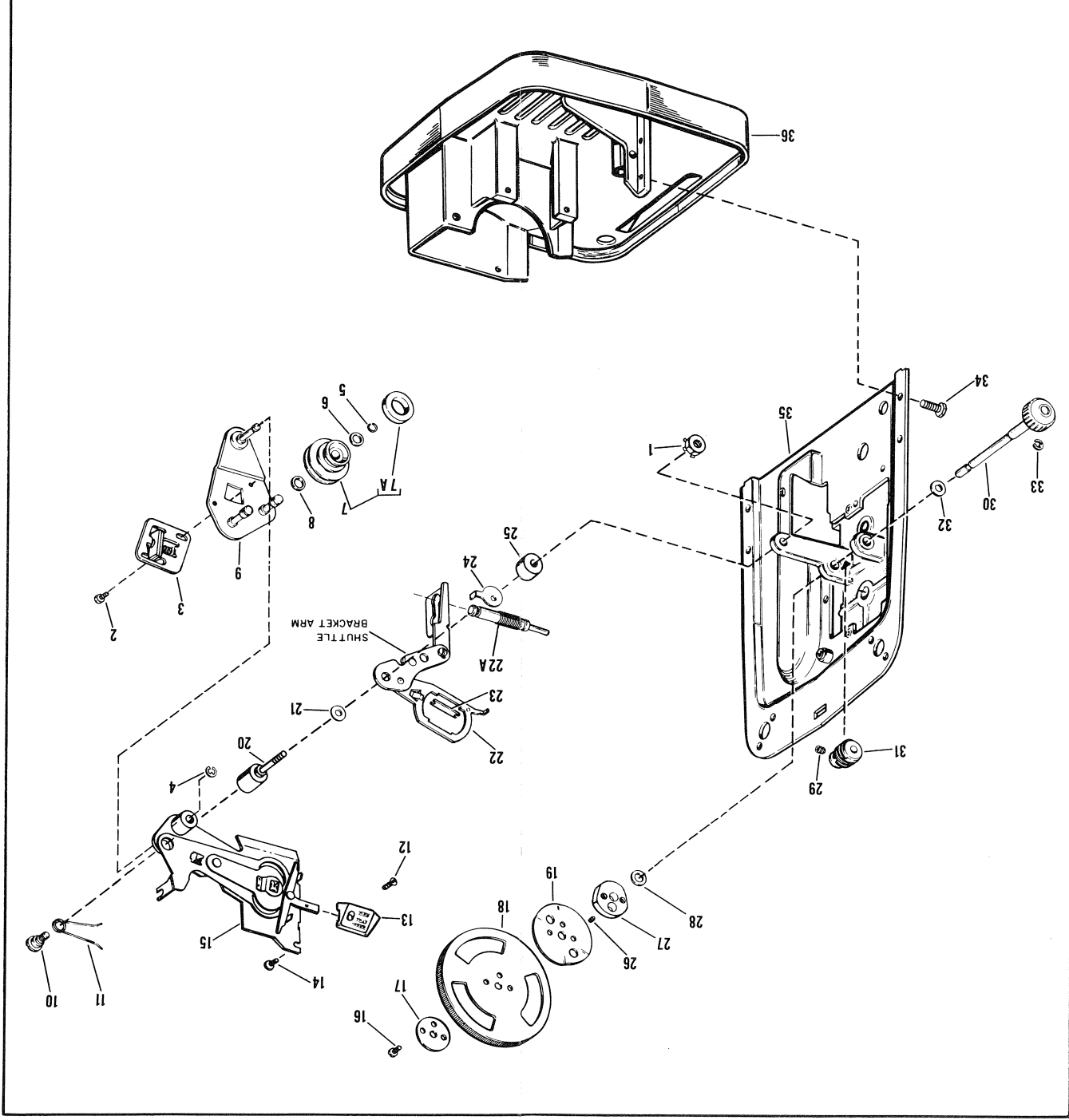


Figure 5. Sprockets, Loop Formers and Lens Carrier

FIG. &	INDEX	PART	DESCRIPTION	UNITS	PER	ON	CODE
NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.
1	2	3	4	5	6	7	8

QTY	DESCRIPTION	UNIT	PRICE	AMOUNT	TAX	TOTAL
1	NUT AND LOCKWASHER		26906	26906		26906
1	SCREW, Filler head		27641	27641		27641
2	BRACKET ASSY, Spring loading		010181	203762		203762
1	RING, Retaining (safety shutter)		27515	27515		27515
2	RING, Retaining (drive roller)		27322	54644		54644
2	WASHER, Flat		32172	64344		64344
7	ROLLER ASSY, Drive		010667	74769		74769
2	RIM, Drive roller		27313	54626		54626
2	WASHER, Flat		32172	64344		64344
9	BRACKET ASSY, Pulley mounting		010278	92482		92482
1	SCREW, Pivot		29472	29472		29472
1	SPRING, Pivot		32169	32169		32169
1	SCREW, Forward-Reverse knob		30714	30714		30714
1	SCREW, Forward-Reverse		32348	32348		32348
1	SCREW, Safety shutter		32136	32136		32136
1	SHUTTER ASSY, Safety		05632	5632		5632
1	SCREW, Shutter retaining		30551	30551		30551
1	WASHER, Shutter		29175	29175		29175
1	SHUTTER		32417	32417		32417
1	CAM, In-out		29040	29040		29040
1	PIVOT		32117	32117		32117
1	WASHER, Spring		30800	30800		30800
22	SHUTTLE AND FRAMING LEVER ASSY		011093	2441586		2441586
1	SHAF, Frame knob		33920	33920		33920
1	SHAF, Frame knob		33929	33929		33929
23	SHOE, Cam (white)	(Note A)	32947	757881		757881
23	SHOE, Cam (black)	(Note A)	33712	775376		775376
24	WASHER, Eccentric		27835	668040		668040
25	SPACER, Shuttle		30745	768625		768625
26	SETSCREW, Pulldown cam		80591	2053366		2053366
27	CAM, Pulldown		29184	726984		726984
28	WASHER, Thrust		26085	674380		674380
29	SETSCREW, Drive pinion		12498	322442		322442
30	SHAFT ASSY, Frame		010448	266120		266120
31	PINION, Drive		33196	842996		842996
32	WASHER, Friction		30667	776232		776232
33	RING, Retaining		26131	659403		659403
34	SCREW, Hex head		29065	647540		647540
35	PLATE ASSY, Mechanism					
36	BASE, Projector		33586	818016		818016
36	BASE, Projector		32729	741444		741444

Figure 6. Shutter and Shuttle Mechanism



SUPPLEMENT NO. 1

DESIGN 245 PROJECTORS

NOTE: USE THIS SUPPLEMENT TOGETHER WITH
INSTRUCTION BOOK NO. 70418 DATED MARCH
1962, TO SERVICE THE 245PAY PROJECTOR

finer products through imagination

Bell & Howell
PHOTO SALES COMPANY

GENERAL SERVICE DEPT.
7125 N. KIMBALL AVE.
CHICAGO 45, ILLINOIS

This Supplement, used in conjunction with the basic Instruction Book (Part No. 70418), will provide the necessary repair and parts replacement information for the Design 245PAY Projector and, in addition, indicates all part number changes reflected in current production models of the 245BAY and 245BAJ projectors covered by the basic book. The 245PAY projector is identical to the 245BAY, except as noted in this Supplement. All repair and adjustment information for the 245BAY will apply to the 245PAY. It is recommended that the parts lists of your basic Instruction Book be marked to indicate the changes and additions noted herein.

IN FIGURE 1:

Item 1-2; Change screw part no. from 33734 to 38320 (all models).

Item 1-4; Add part no. 37411 screw for use on Design 245PAY only.

Item 1-5; Change screw part no. from 30029 to 38308 (all models).

Items 1-8, 1-8A, 1-8B; Note that lamphouse cover assembly, part no. 011116, is used on Design 245BAY and 245BAJ projectors through Serial No. 75,100. Refer to figure A, this Supplement, for lamphouse cover parts used in all 245PAY projectors and in 245BAY/BAJ projectors above Serial No. 75,100.

Items 1-10, 1-11; These parts are used to attach the lamp baffle (item 1-12) on early model 245 projectors. On current production units, the lamp baffle is attached with rivets, part no. 30226.

Items 1-13, 1-14, 1-15; Note that these parts are required only on projectors equipped with lamphouse cover assembly no. 011116 (up through Serial No. 75,100). In current production units, the lamphouse catch (figure A) engages a slot in the projector mechanism plate.

Item 1-17; Add part no. 011969 lamp socket assembly for use in 245BAY and 245PAY projectors above Serial No. BB47701.

Items 1-24, 1-25; Note that the two-piece film cutter is used only on early model 245 projectors. Add one-piece film cutter, part no. 36115, for current production models.

Item 1-28; Add part no. 37413 nameplate for use on 245PAY projectors only.

Item 1-31; Change handle part no. from 30659 to 36103.

IN FIGURE 2:

Item 2-6; Change spur gear part no. from 29723 to 35579 (all models).

Item 2-7; Change friction disc part no. from 29725 to 35580 (all models).

Item 2-20; Change spur gear part no. from 29723 to 35579 (all models).

Item 2-21; Change friction disc part no. from 29725 to 35580 (all models).

Item 2-28; Change gear assembly part no. from 010179 to 35919 (all models).

IN FIGURE 3:

Item 3-4; Change cover part no. from 32123 to 35595 (all models).

Item 3-6; Change blower fan part no. from 34639 to 012169 (all models).

Item 3-8; Add ten-bladed motor fan, part no. 32486, for use on 245PAY projector. The fan is secured by a setscrew, part no. 32974, and is identical to the fan used on 245BAJ projectors (see parts list figure 4, item 5).

Item 3-11; Note that motor no. 30676 is used only on 245BAY projectors up through Serial No. 75,400. Add motor no. 012050 for 245BAY projectors above Serial No. 75,400 and motor no. 012392 for use on all 245PAY projectors.

Item 3-12; Add part no. 32136 pulley screw for use on 245PAY projectors only.

Item 3-13; Note that pulley no. 33589 is used only on 245BAY projectors up through Serial No. 75,400 (those equipped with motor no. 30676, item 3-11). Add pulley no. 36564 for 245BAY projectors above Serial No. 75,400 and pulley no. 37412 for use on all 245PAY projectors.

IN FIGURE 4:

Item 4-3; Change cover part no. from 32123 to 35595.

Items 4-10, 4-11; Note that these items are no longer available and have been replaced by a one-piece vibration damper, part no. 36690.

Item 4-13; Change blower fan part no. from 34639 to 012169.

Item 4-16; Change half pulley part no. from 32140 to 38296.

IN FIGURE 5:

Item 5-20; In all current projectors, the film roller in the upper loop former (18) still bears part no. 30611. However, a tapered roller (part no. 37266) now is being used in the lower loop former (19) of all projectors. Install this roller with the tapered end toward the main mechanism plate.

Item 5-28; The complete lens carrier assembly, part no. 011314, is no longer available and has been replaced on all current production models by part no. 05213 lens carrier assembly (without focus knob). It should be noted, however, that the focusing knob spring (28A) and focusing knob (28B) are still available

as replacement parts for lens carrier assembly no. 011314.

Item 5-28F; Lens carrier subassembly, part no. 011313 is no longer available. If this casting is in need of replacement, replace with the complete lens carrier assembly, part no. 05213.

Item 5-36; Change screw part no. from 30619 to 35956 (all models).

IN FIGURE 6:

Item 6-14; Change screw part no. from 32136 to 34656 (all models).

Item 6-26; Change setscrew part no. from 80591 to 36763 (all models).

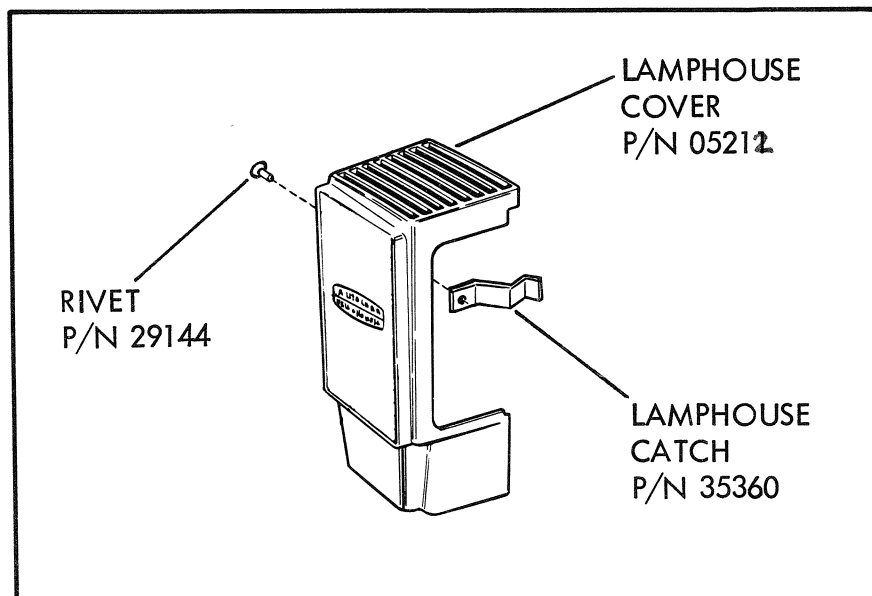


Figure A. Current Lamphouse Parts