HANDBOOK

SERVICE INSTRUCTIONS
WITH
ILLUSTRATED PARTS LIST
FOR
SEVENTY SERIES MOVIEPAK
SUPER-8
AUTOMATIC CARTRIDGE PROJECTORS

FAIRCHILD
INDUSTRIAL PRODUCTS
A DIVISION OF FAIRCHILD CAMERA AND INSTRUMENT CORPORATION

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FAIRCHILD INDUSTRIAL PRODUCTS
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TABLE OF CONTENTS

TABLE OF CONTENTS (cont)

FAIRCHILD
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LIST OF ILLUSTRATIONS

LIST OF ILLUSTRATIONS (cont)

LIST OF TABLES

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SECTION I

INTRODUCTION AND DESCRIPTION

1.1 INTRODUCTION

This manual contains operation and service information for the MoviePak Seventy Series cartridge projectors (see Figure 1-1). This series of projectors is designed for use with the Movie-Pak Seventy-10 and MoviePak Seventy-20 automatic endless loop cartridges for showing Super 8 magnetic sound film on rear and front projection.

The manual is divided into eight sections. Thorough familiarity with the contents of each of these sections is suggested before attempting service on the subject equipment.

1.2 SECTION CONTENT

I. Introduction and listing of leading particulars.

II. Operational checkout with an explanation of the functional steps covering cartridge insertion, projector starting, running and shut down. Control functions are described.

III. Theory of operation covering the fundamentals of the film transport, optical and audio systems.

IVA. Routine maintenance procedures not requiring significant disassembly of the equipment.

IVB. Covers preventative maintenance procedures and instructions for disassembly for access to the internal mechanisms for further service and adjustment.

V. Adjustment procedures and specifications for complete service and overhaul.

VI. Troubleshooting charts cover cause and effect relationships with specific recommendations as to suggested up-dating revisions.

VII. Illustrated, isometric, diagrams and parts lists covering the Seventy-21; Seventy-31 and Seventy-41 projectors and MoviePak Seventy-10 and Seventy 20 cartridges.

VIII. Illustrated, isometric diagrams and parts lists covering the Seventy-07 projector.

Appendix A

Covers film loading of Seventy-10 and Seventy-20 cartridges.

Appendix B

Covers film treatments and programming procedures for automatic stop.

1.3 BASIC SPECIFICATIONS

Table 1-1 lists the basic specifications for the Seventy-21, Seventy-31 and Seventy-41 projectors.

Table 1-2 lists the basic specifications for the MoviePak Seventy-10 and Seventy-20 cartridges.

Table 1-3 lists the basic specifications for the Seventy-07 projector.

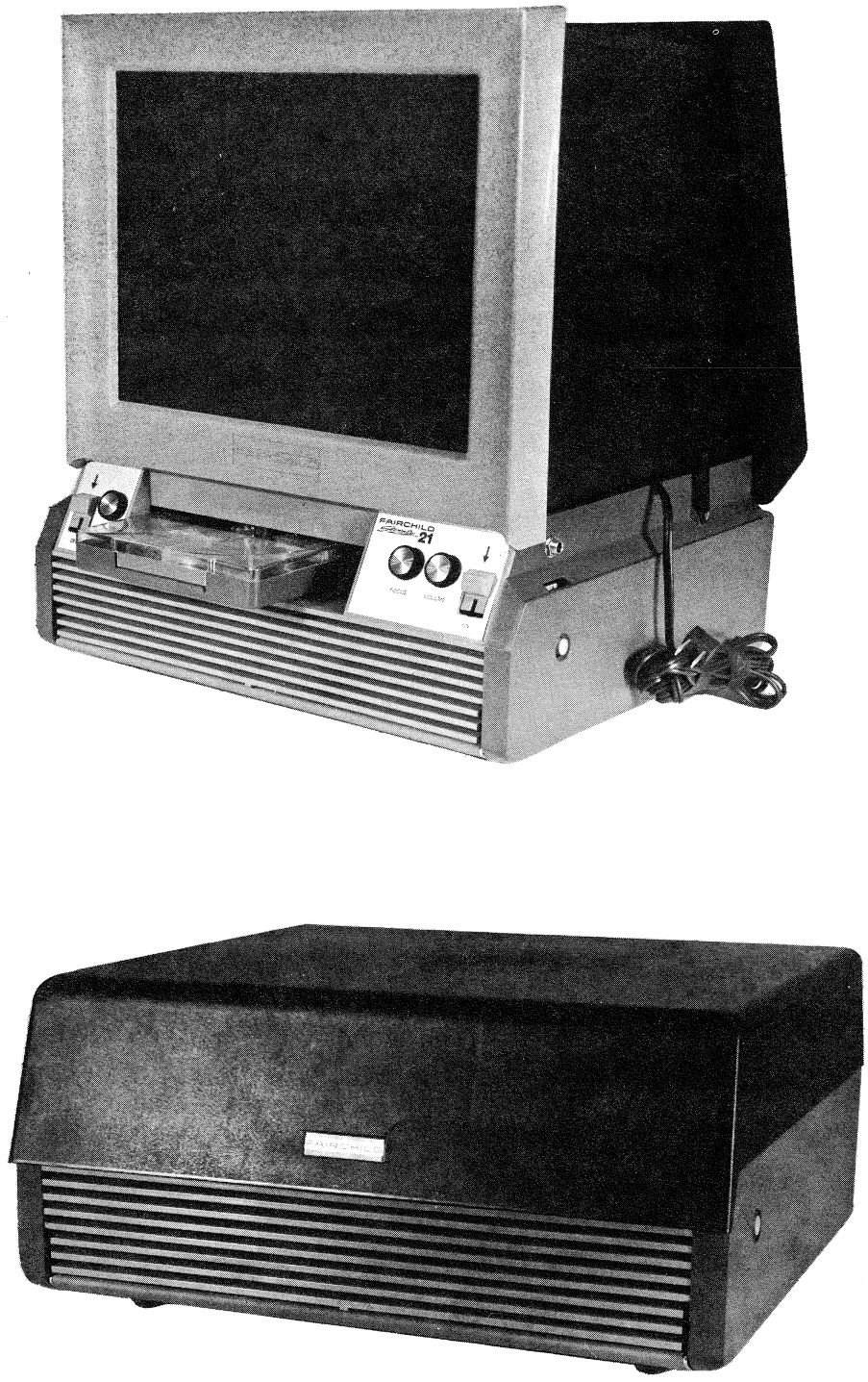

Figure 1-1. Fairchild Seventy-21 Projector

TABLE 1-1

PROJECTOR SPECIFICATIONS

Dimensions	
Seventy-21	16-1/2 in. W x 14 in. D x 7 in. H closed 16-1/2 in. W x 17 in. D x 18 in. H open
Seventy-31	16-1/2 in. W x 15-1/2 in. D x 18-1/2 in H
Seventy-41	18 in. W x 20-1/8 in. D x 20-1/8 in. H
Screen Size	
Seventy-21, 31	9 in. x 12 in. Polacoat
Seventy-41	12 in. x 16 in. Polacoat
Lamp 19V, 80W, 25-hour	Quartz-halogen dichroic EKG Fairchild Code #799-01
Lamp, long life 19V, 80W, 150-hour	Fairchild Code #799-03
Projection Speed	24 frames per second
Film	Super 8
Sound	Magnetic ANSI std. PH22. 164 + 18 frame sound synch
Lens	10mm f1. 1
Fuse	2-Amp, Slo-Blo, 3AG
Amplifier	Plug-in 3 Watt I. C. Output
Speaker	2 in. x 10 in. permanent magnet, 16 ohms
Jack	1/4 in. phone-speaker or headset
Power	115 volts, 60 Hz, 150 Watts

TABLE 1-2

CARTRIDGE SPECIFICATIONS

MoviePak Seventy-10	
Dimensions:	9-1/16" long x 6 1/2" wide x 1-1/8" high
Capacity:	200 feet (10 minutes) of color film
Material:	High impact polystyrene
Film:	Super 8mm, magnetic sound ANSI PH 22-164-1969
Rewinding:	Self rewinding, endless loop
MoviePak Seventy-20	
Dimensions:	10" long x 8" wide x 1-1/8" high
Capacity:	400 feet (20 minutes) of color film
Material:	High-impact polystyrene
Film:	Super 8mm, magnetic sound, (ANSI) std.
Rewinding:	Self-rewinding, endless loop

TABLE 1-3

PROJECTOR SPECIFICATIONS - SEVENTY-07

Dimensions	14 in. W x 18-1/2 in. D x 5-1/2 in. H (Closed) 14 in. W x 20-1/2 in. D x 17-1/2 in. H (Open)
Screen Size	8-1/4 in. x 11-1/4 in. **Polacoat**
Lamp, **19V, 80W, 25-Hour**	Quartz-halogen dichroic EKG Fairchild Code #799-01
Lamp, long life 19V, 80W, 150-hour	Fairchild Code #799-03
Projection Speed	24 Frames per second
Film	Super 8
Sound	Magnetic ANSI std. PH22.164 + 18 frame sound synch
Lens	10mm fl.1
Fuse	2-Amp, Slo-Blo, 3AG
Amplifier	Plug-in 3 Watt I.C. Output
Speaker	2 in. x 10 in. permanent magnet, 16 ohms
Jack	1/4 in. phone-speaker or headset
Power	115 Volts, 60 Hz, 150 Watts

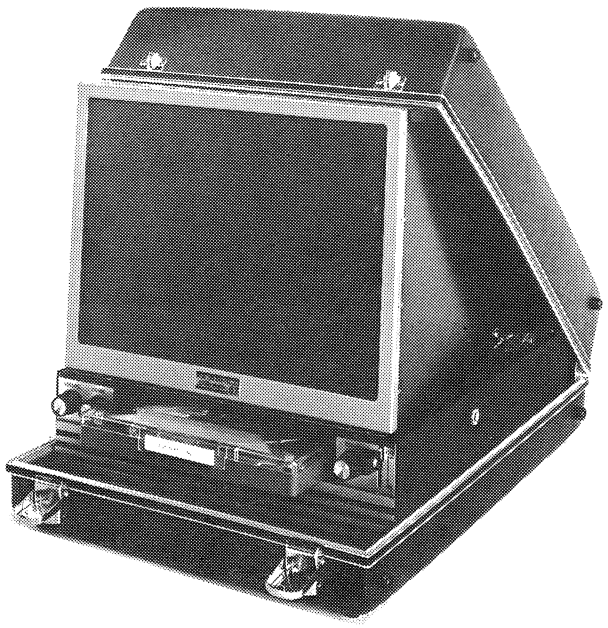

Figure 1-2. Fairchild Seventy-07 Projector

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SECTION II

OPERATING FUNCTIONS

Set up the equipment as outlined in the applicable user manual. Proper operation is evidenced by the presentation of the film pictorial and recorded audio information in a normal manner on the rear screen. Should malfunction occur, refer first to the trouble shooting section (section VI) for possible causes. Before making repairs review the adjustment procedures of section V.

CAUTION

Note air louvers in bottom of unit (see figure 2-1). Do not block air ventilation as damage to the equipment may occur. Do not stand unit on soft material that will block ventilation. If the projector is to be used in other than the standard enclosure, as often used during conventions or displays, be sure that the enclosure will provide adequate ventilation for cooling. It is recommended that a closed environment should contain air vents and possibly a blower to remove hot air.

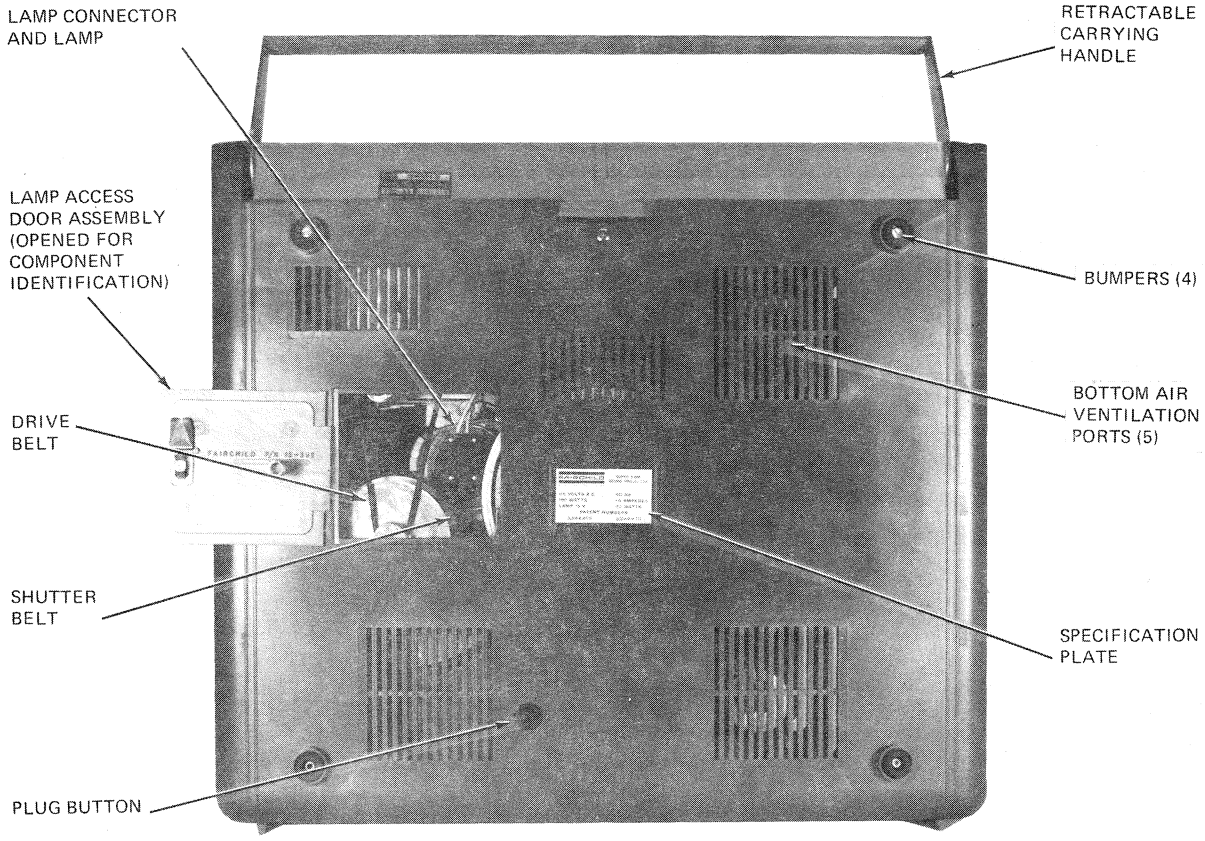


Figure 2-1. Bottom View of Seventy-21 MoviePak Portable Projector

To understand the sequence of events for normal operation observe the mechanical functions as described. The following steps are sequenced through when operating the projector: (see figure 2-2 to visualize the mechanisms).

2.1 ON FUNCTION

2.1.1 Step 1 Lamp Mirror

Set up the projector and plug into 115-Volt, 60Hz power source. Insert the cartridge parallel to the casting surface and biased to the casting wall. (Left side of the projector as seen from the front). During this slide-in motion, the lamp mirror assembly is cammed upward (via a wire form) by the front surface of the cartridge, and then falls back in place as the cartridge lamp opening passes the lamp mirror.

2.1.2 Step 2 Release Link

Sliding the cartridge further, the release link is cammed downward out of the way of the front edge of the cartridge by a release spring.

2.1.3 Step 3 Pinch Roller Bracket

As the cartridge is sliding towards the end of its travel, the pinch roller bracket cam surface is contacted, by the front of the cartridge causing the pinch roller assembly to be cammed upwards by rotating on its shaft to its stand-by position. Linked to the pinch roller assembly, through a pinch roller spring and link, is the ON shaft assembly which is also rotated to its stand-by position. In this stand-by position the ON link is now in position for activation.

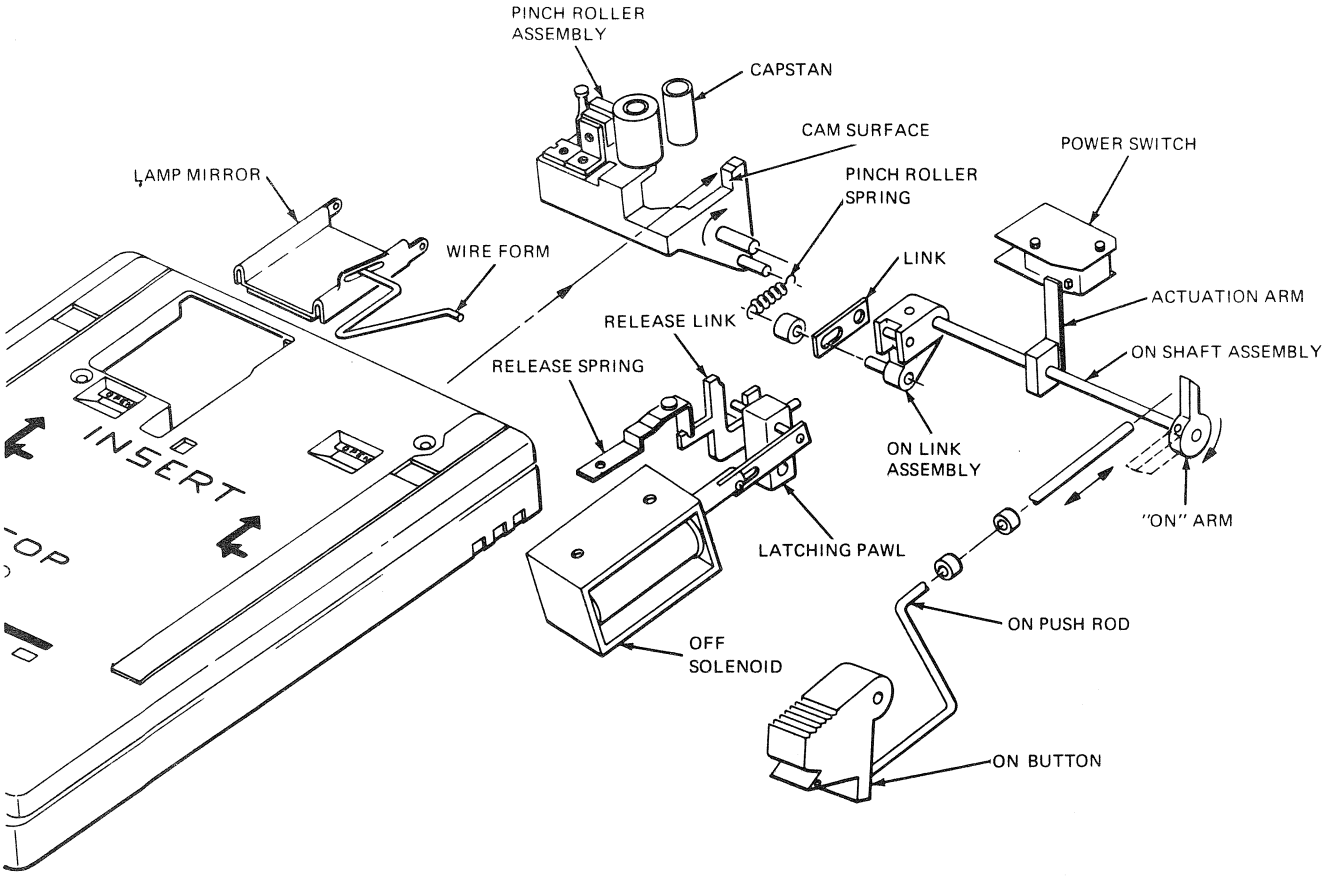


Figure 2-2. "ON" MECHANISM (Shown rotated to stand-by status)

2.1.4 Step 4 ON Button

The ON button is pushed down thus moving the ON push rod forward against the ON arm which in turn rotatably presses the pinch roller in contact with the film and capstan via the pinch roller spring. At the same time the actuator arm spring presses against the power micro switch to energize the motor, amplifier, and lamp.

2.1.5 Step 5 Latch

The ON mechanism is latched in place by means of the latching pawl. Firm pressure on ON button should be maintained.

CAUTION

Depending on the film sensor position, the transient period before latch-up can be up to two seconds in length. If latch-up does not occur within this time a malfunction exists. DO NOT keep repressing the "ON" button. Establish cause of malfunction. (refer to sections 3.6, 3.7, and 5.20).

2.1.6 Step 6 Release Link

Upon latching-in the release link rotates, following the latching pawl forward, and enters a notch in the cartridge to its engaged condition.

2.1.7 Step 7 ON

With power now ON the film is transported in a normal manner with an automatically established film loop between the intermittent motion at the aperture and the continuous motion at the capstan. (For theory of operation of establishment and maintenance of the sound synch loop, refer to section 3.6.2.)

2.2 OFF FUNCTION

The projector can be shut down by one of three modes:

A. Activating the OFF push button.
B. Having the film programmed for automatic OFF operation.
C. Withdrawing the cartridge.

The end result of either of these actions results in essentially an identical OFF mode as follows.

2.2.1 A. OFF Button

Depressing the OFF push button causes the OFF push rod to slide forward and through a rotatable link interfere with the normal in-and-out motion of the claw assembly thus causing mismetering of the film and loss of the slack loop. The loss of the slack loop in turn causes the OFF solenoid to activate; pulling the latching pawl forward; out of engagement with the ON link assembly; thus releasing the ON link to its stand-by condition. In the stand-by condition the power switch is deactivated. (refer to section 3.7 for detailed theory).

2.2.2 B. Automatic

Automatic stop is accomplished by closing off the perforations of a section of the film (refer to appendix B for procedure) which inhibits the claw from proper metering, thus causing the loss of the slack loop and again results in activation of the OFF solenoid as in A above.

2.2.3 C. Cartridge Removal

By withdrawing the cartridge, the release link (which entered a notch in the cartridge as noted in section 2.1.6) is tripped which in turn pulls back on the latching pawl, disengaging from the ON link assembly. The ON link assembly rotates back to a stand-by condition, deactivating the power switch.

Further extraction of the cartridge permits the pinch roller assembly (by means of a spring force) to swing back down (approximately 90°) to the full OFF position. The ON shaft assembly, being coupled to the pinch roller assembly also is returned to its full down position.

2.3 FUNCTIONS OF OPERATING CONTROLS

2.3.1 ON Button

Activates the ON push rod which latches up the ON mechanism as described in section 2.1.4 and 2.1.5.

NOTE

An interlock is provided such that the projector may not be turned on unless a cartridge has been inserted and seated in place. With no cartridge in place, the ON shaft assembly is held in its down position (shown dotted in figure 2-2) and activation of the ON button will cause the ON push rod to by-pass the arm resulting in no action.

2.3.2 Volume Control

A 10k potentiometer controls the audio output to the built in speaker. Remote speakers or headsets are controlled by this potentiometer when plugged into the 1/4 in. phone jack on the right side of the projector.

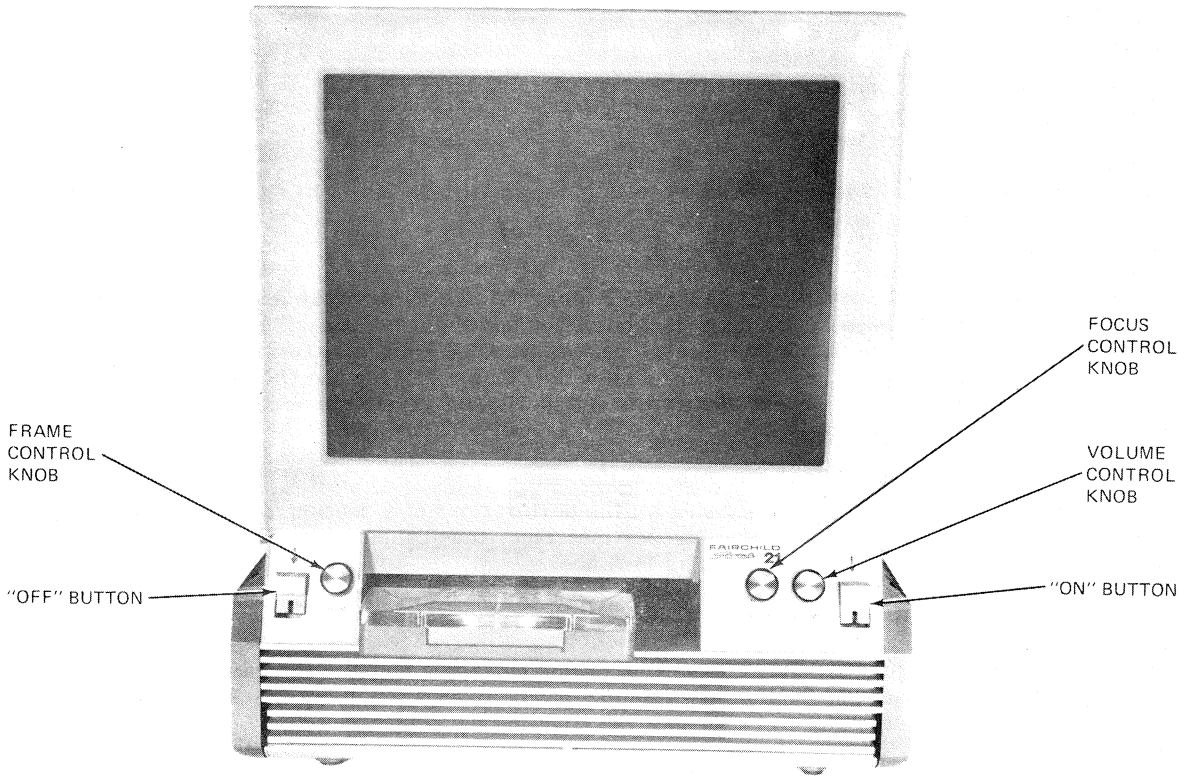


Figure 2-3. Operating Controls

NOTE

Plugging in a phone plug will disconnect the internal speaker. An external speaker or headset of less than 16 ohms should not be used or damage to the amplifier may result.

2.3.3 Focus Control

Controls the focus of the picture by means of a flexible shaft connected to the lens hold down assembly via a threaded mount. A full rotation is sufficient to focus through all necessary ranges. The focus control is limited to approximately 300° of rotation by means of an adjustable limit collar.

2.3.4 Framing Control

Controls the vertical positioning of the picture in the aperture (or screen frame) by means of a flexible shaft connected to the claw mounting bracket via a threaded mounting. The approximate 300° rotation provides a minimum of ±5% framing range. The nominal centering and range is limited by an adjustable collar.

NOTE: The Seventy-07 projector uses a straight shaft with threaded mounting to the claw mounting bracket.

2.3.5 OFF Button (Seventy-21/31/41 Projectors with Mechanical OFF Control).

Activates the OFF push rod to shut down the projector as described in section 3.7.

2.3.6 OFF Function (Seventy-21/31/41 Projectors with Electrical OFF Control).

The electrical OFF control eliminates mechanical claw retraction to activate the OFF mechanisms as used on earlier Seventy Series Projectors. The OFF lever now depresses a microswitch located directly beneath the rear of the lever which activates the OFF solenoid and related electrical and mechanical linkages as described in Para. 2.5.1. (Ref: Fig. 3-4 Electrical System).

2.4 ON FUNCTION (Seventy-07 Projector)

2.4.1 ON-OFF Control Lever (Seventy-07 Projector)

The control lever serves two functions -- both ON and OFF control. When the control lever is pressed DOWN, it mechanically moves the ON push rod forward against the ON arm. (Figure 2-2 Service Manual). This in turn rotates and presses the pinch roller into contact with the film and capstan via the pinch roller spring. At the same time, the actuator arm spring presses against the power micro switch to energize the motor, amplifier, and the lamp. When the control lever is released, the ON push rod and the control lever are returned to neutral full UP position by spring force.

NOTE: Refer to the Service Handbook (Figure 2-2 ON Mechanism Diagram). Functions are identical except as indicated in Para. 2.4.1 (not shown on diagram).

2.5 OFF FUNCTION (Seventy-07 Projector)

2.5.1 ON-OFF Control Lever

NOTE: Refer to Figure 3-4, Electrical System Diagram and Section V for Adjustments.

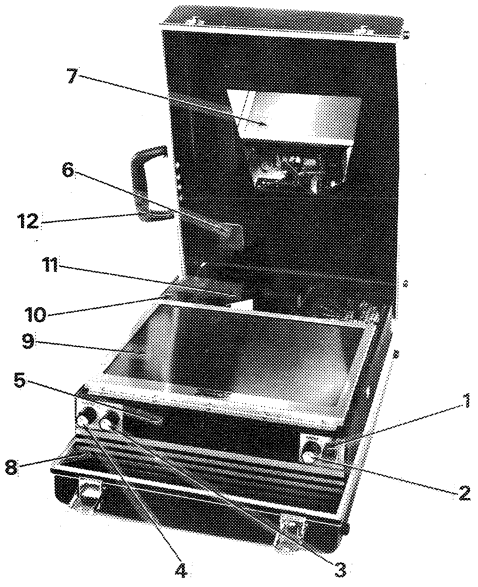
When the control lever is pressed to the RIGHT (OFF), contact is made with a micro switch button. The switch contacts close a circuit which is connected in parallel to the sensor micro switch circuit that activates the OFF solenoid, pulling the latching pawl forward (out of engagement with the ON link assembly), thus releasing the ON link to its stand-by condition. In the stand-by

condition, the power switch is deactivated. When the control lever is released, it is returned to neutral position by spring force and the OFF micro switch contacts return to (normally open) position.

NOTE: Reference Figure 2-4 for control identification.

CAUTION: The projector is designed to be supported on its four legs only on a flat surface. If the surface is not flat, the bottom of the case may be distorted and interference with the internal mechanism may result.

CAUTION: Projector Cooling System. The projector is internally cooled by an axial flow fan with an air exit louvre located at the rear of the mechanism. Precaution should be taken to prevent blocking cooling air flow.

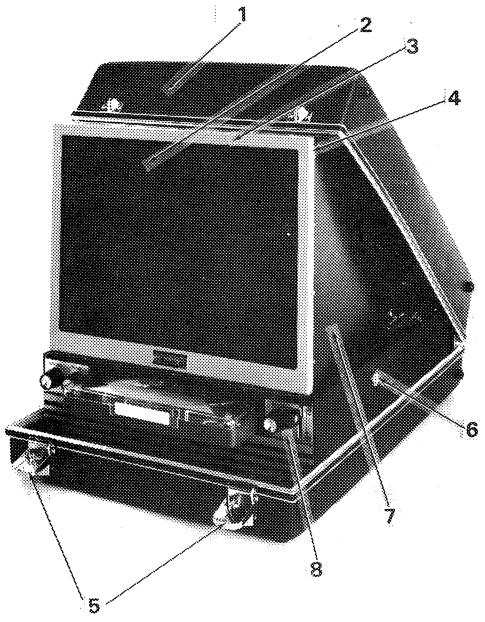


CONTROLS

1. "ON" and "OFF" control lever
2. Focus control knob
3. Framing control knob
4. Volume control knob

COMPONENTS

5. Cartridge operating and storage well
6. Spare lamp storage bracket
7. Third mirror
8. Line cord storage compartment
9. Felt pad (hidden under bezel)
10. Projector identification plate
11. First and Second mirror assembly
12. Carrying Handle



COMPONENTS

1. Projector Cover
2. Projection Screen
3. Projection Screen Bezel
4. Top Light Shield
5. Cover Release Latches
6. External Earphone Jack
7. R.H. Light Shield
8. Control Panel

Figure 2-4
Model Seventy-07 Portable Projector

SECTION III
THEORY OF OPERATION

This section discusses the operating principles of the Seventy Series projectors to the extent necessary to provide the serviceman with a firm background for proper servicing of the projectors. Differences between models are covered herein and in appended service bulletins. Operational mechanisms are essentially similar.

Figure 3-2 is a simplified isometric diagram of the functional components of the projector. As shown in the figure, the projection system consists of an audio system, an optical system (see figure 3-1), an endless loop film cartridge, and a film transport system.

3.1 AUDIO SYSTEM

In the audio system, sound is detected from the magnetic track of the film by the sound head and is then amplified by a two-stage, two-transistor, preamplifier driving an integrated circuit power amplifier; the output of which is fed to a permanent magnet speaker.

3.2 OPTICAL SYSTEM

In the optical system the film is transported intermittently by means of the claw, and the light from the projection lamp is reflected by a lamp mirror to the film image at the aperture. The aperture image is projected, by means of a 10mm f1. 1 lens to three mirrors (which rotate the image 90°), and display it on a rear screen. The light path is interrupted by a rotating two bladed shutter below the lamp mirror resulting in a flicker frequency of 48 cycles per second (nominal).

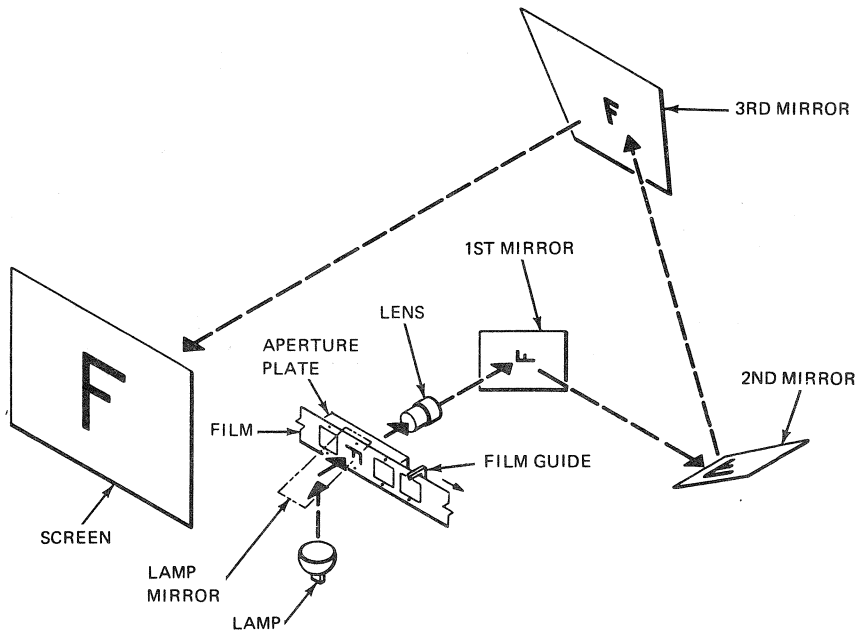


Figure 3-1. Optical System

3.3 ENDLESS LOOP CARTRIDGE

The film in the cartridge is spliced into an endless loop (head connected to tail) such that the film coming from the inner diameter of the bundle is returned to the outer diameter of the bundle. (The linear quantity of film exiting and the linear quantity of the film returning to the film bundle must be equal.) Due to the difference in radii between the inner and outer diameters of the film bundle, a film take up tension is generated at the outer layer as it tends to go at a higher velocity than the inner layer.

3.4 FILM PATH

Progressing through the bundle (see figure 3-2); the film is taken from the inner diameter (1); past a corner snubber in the cartridge (2); past the aperture, with its motion transported intermittently by a claw (3); around a slack loop controlled by the film sensor (4); past the sound scanning head where the motion is now linear due to the capstan drive (5) and then returns to the outer layer on the reel (6).

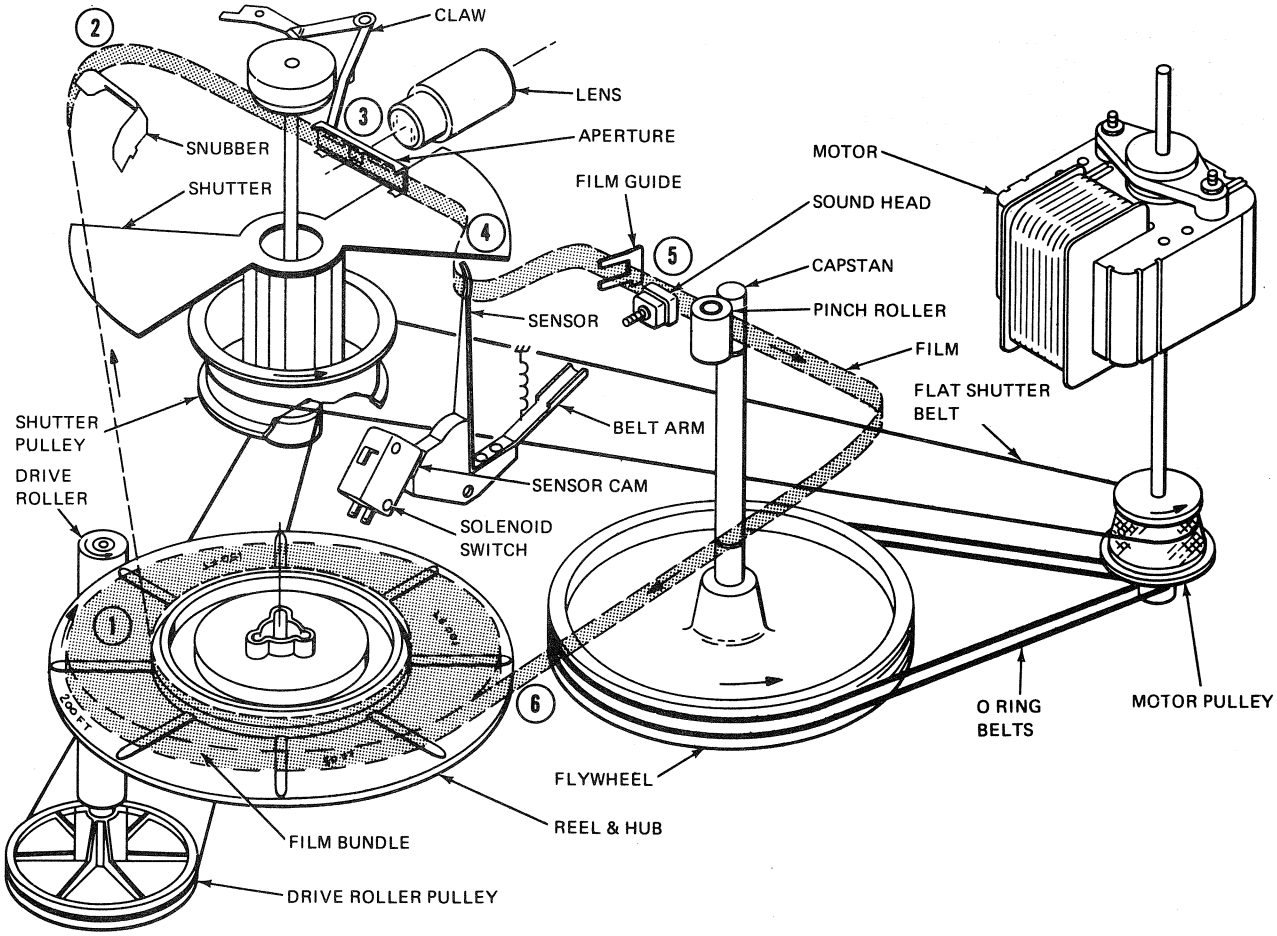


Figure 3-2. Functional Diagram

3.5 DRIVE SYSTEM

The drive system (see figure 3-2) consists of a shaded pole motor which drives the flywheel and capstan at a constant speed via a pair of "0" ring drive belts. The motor also drives (by means of a flat belt and a pair of cone shaped pulleys) the intermittent mechanism made up of a conventional cam and claw. The speed of the cam drive is regulated by the position of the flat belt on the motor and shutter (cam) pulleys. This belt position is controlled by means of a belt arm pivotably linked to the spring loaded sensor which senses loop size and position. In addition, auxiliary power, taken from the shutter pulley by means of an "0" ring belt, is fed to the film reel in the cartridge, via a drive roll pulley and frictional drive roller.

3.6 FILM TRANSPORT

The film transport system (see figure 3-2) is essentially a closed loop servo system both for the film bundle in the cartridge and the film being transported through the machine.

3.6.1 Film Supply

Film is pushed up and out of the film bundle by means of the drive roller which causes the reel to rotate such that there is a slight overdrive of the film at the inner (1) diameter (i.e. the tangential velocity of the hub is greater than the nominal linear velocity of the film). This overdrive pushes the film out due to the friction between the film and the reel hub. Self-servoing is accomplished by the fact that an abnormal backwards force of the film (Due for instance to the film contacting the cartridge wall) will tend to un-cinch the film from the hub; thus reducing the frictional force between the film and the hub; hence reducing the drive to the exiting film. (A wire form in the cartridge aids in lifting film up and away from the hub).

3.6.2 Sensor-Servo Operation

When the projector is first turned ON the film is essentially in a straight path between the aperture and capstan. In this position the sensor (in contact with the film) is toward the rear of the mechanism causing the belt arm to push the flat shutter belt downward towards its higher speed operation point (larger diameter on motor pulley). The capstan nominally transports the film at a 4 inch per second (24fps) linear speed. The intermittent claw, (with the flat belt in this lower position,) transports the film at a rate higher (approximately +5%) than this nominal value. Due to the higher speed of the intermittent claw a slack loop (4) is slowly formed.

As this loop is formed, the belt having a natural (pre-set) bias to run upward, and the belt arm being spring loaded upward, permits the belt to travel upward towards a slower speed position. This travel is in proportion to the sensor motion (forward) in response to the growing loop size and position. When the loop reaches a size equivalent to its +18 frame sound synch position, the nominal speed of the intermittent claw is matched to the nominal speed of the capstan. Normal operation commences.

3.7 LOOP MONITORING

The application of power to the projector to permit it to be "latched" into normal operation (refer to section 2.1.5) is also controlled by the sensor (see figures 2-2 and 3-2). A solenoid micro switch, which rides the sensor cam, is activated (applying D.C. power from the amplifier to the "OFF" solenoid) only when the sensor is in its end-range positions. At start-up when the sensor is rearward, the "OFF" solenoid is energized, inhibiting the latch-up of the "ON" link assembly by the latching pawl. Once a slack loop is established and the sensor moves forward (maximum of 2 seconds) the solenoid micro switch opens, releasing the ON solenoid, permitting latch-up and normal operation.

Conversely, if the slack loop is lost (refer to section 2.2) the sensor moves back, tripping the solenoid micro switch, powering the OFF solenoid, thus shutting down the projector. By this means, the sensor acts as a monitor of proper operation and will shut down (or not permit latch-up) of the projector to guard against film damage. For further protection the solenoid micro switch is operated at both extremes of sensor position (full back and full forward) and projector shut down will occur for both loss of slack loop or excessive slack loop. (Excessive slack loop in the sensor compartment of the cartridge may cause jamming and consequent damage to the film). Excessive slack loop can occur only under unusual operating conditions such as a film break between the intermittent and the capstan, or rupture of both flywheel belts.

From the above, it can be seen that activation of the OFF button as described in section 2.2.1 will provide a means for "losing" the slack loop resulting in a shut-down of the projector.

3.8 ELECTRICAL SYSTEM

Primary 115-volt power is applied (see figure 3-3), via a power micro switch (refer to section 2.1.4) and fuse to the shaded pole motor former which is a combination auto-transformer and isolation transformer.

A portion of the 115-volt motor primary is tapped to deliver 18.5 volts to the lamp. The motor secondary delivers 16.9 volts AC to the amplifier board. An AC/DC power supply section on the amplifier converts this 16.9 volts to a D.C. level which is used both for the audio amplifier and for D.C. power to the latch OFF solenoid.

3.9 DRIVE SYSTEM (Seventy-07 Projector)

NOTE: Refer to (Figure 3-2) Functional Diagram. (Note the following exception not shown.)

3.9.1 The 707-02 projector utilizes a single flat belt drive from the motor drive cone to the flywheel-capstan drive. (The motor drive cone and flywheel are designed to accommodate this flat belt.)

3.9.2 The drive system (see Figure 3-2) consists of a shaded pole motor which drives the flywheel and capstan at a constant speed via a single flat drive belt. The motor also drives (by means of a flat belt and a pair of cone shaped pulleys) the intermittent mechanism made up of a conventional cam and claw. The speed of the cam drive is regulated by the position of the flat belt on the motor and shutter (cone) pulleys. This belt position is controlled by means of a belt arm pivotably linked to the spring loaded sensor which senses loop size and position. In addition, auxiliary power, taken from the shutter pulley by means of an "O" ring belt is fed to the film reel in the cartridge, via a drive roll pulley and frictional drive roller.

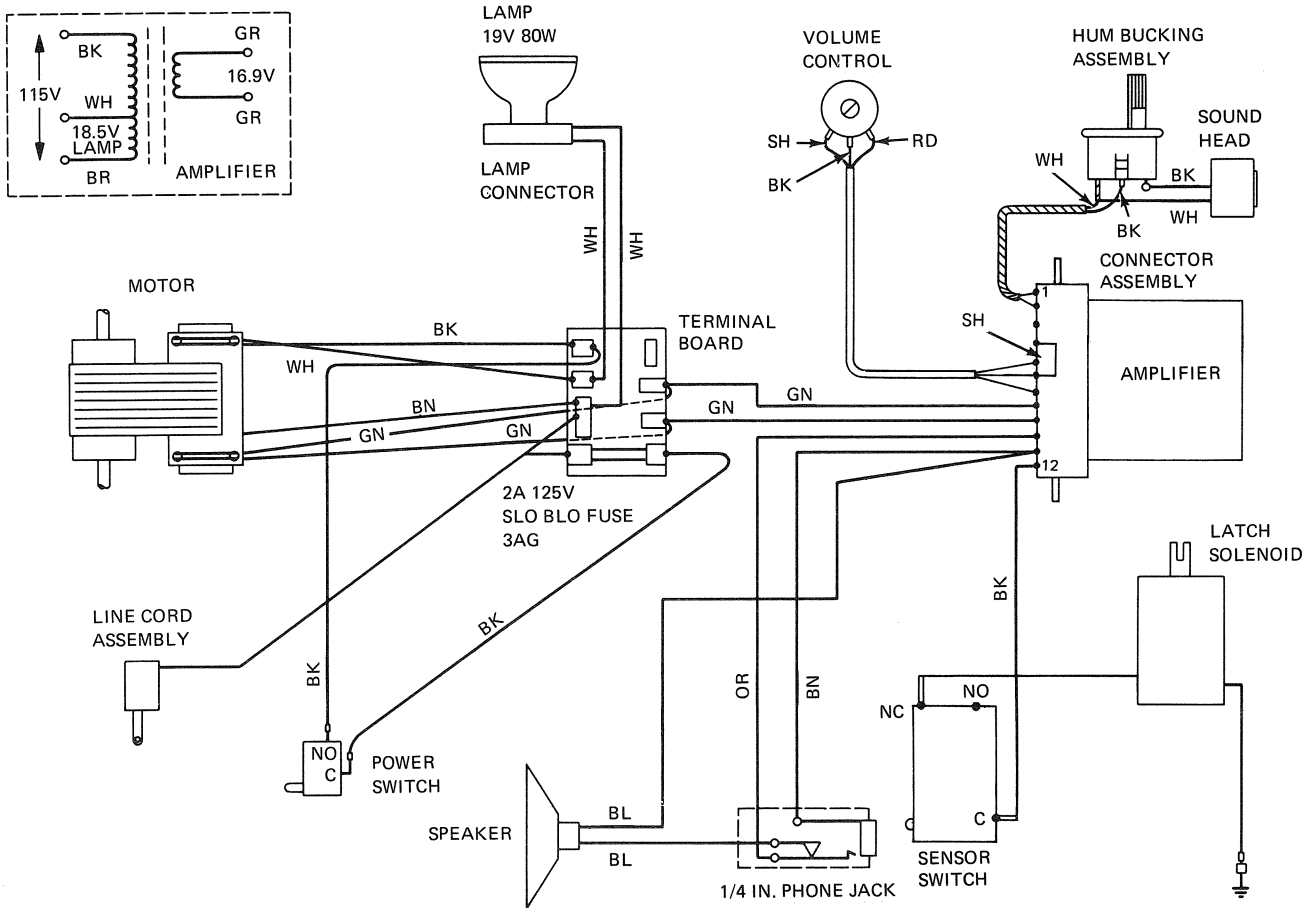


Figure 3-3. Electrical System
Seventy 21/31/41 Projectors with
mechanical OFF control

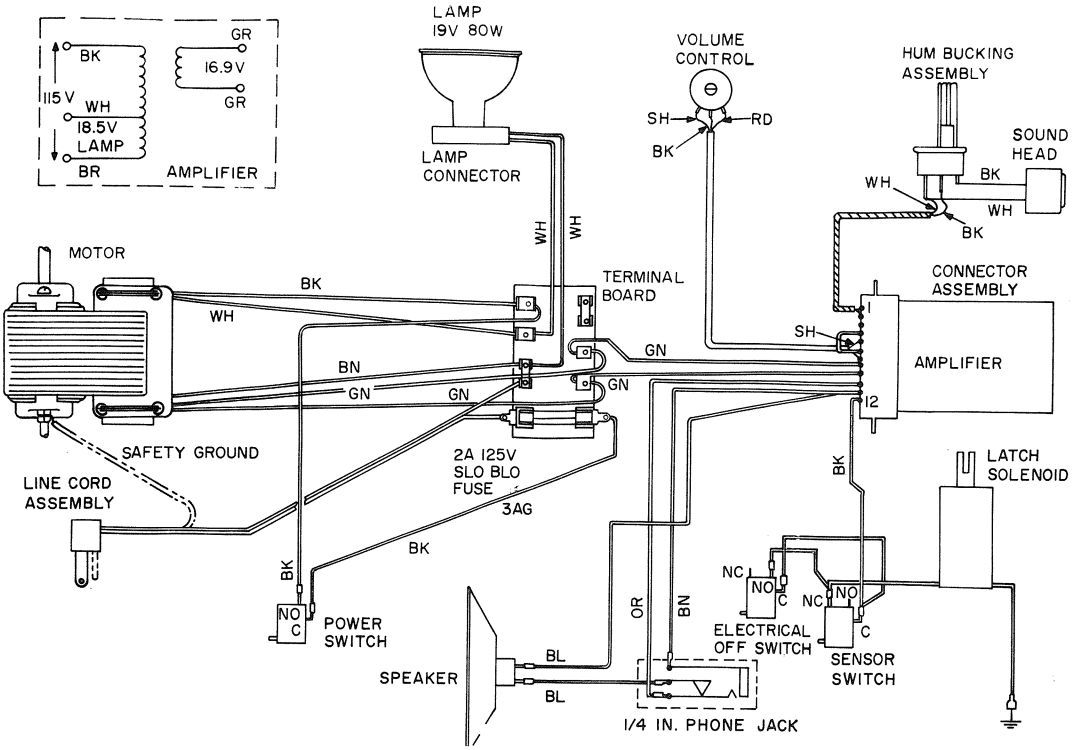


Figure 3-4. Electrical System - Seventy-21/31/41
with electrical OFF control

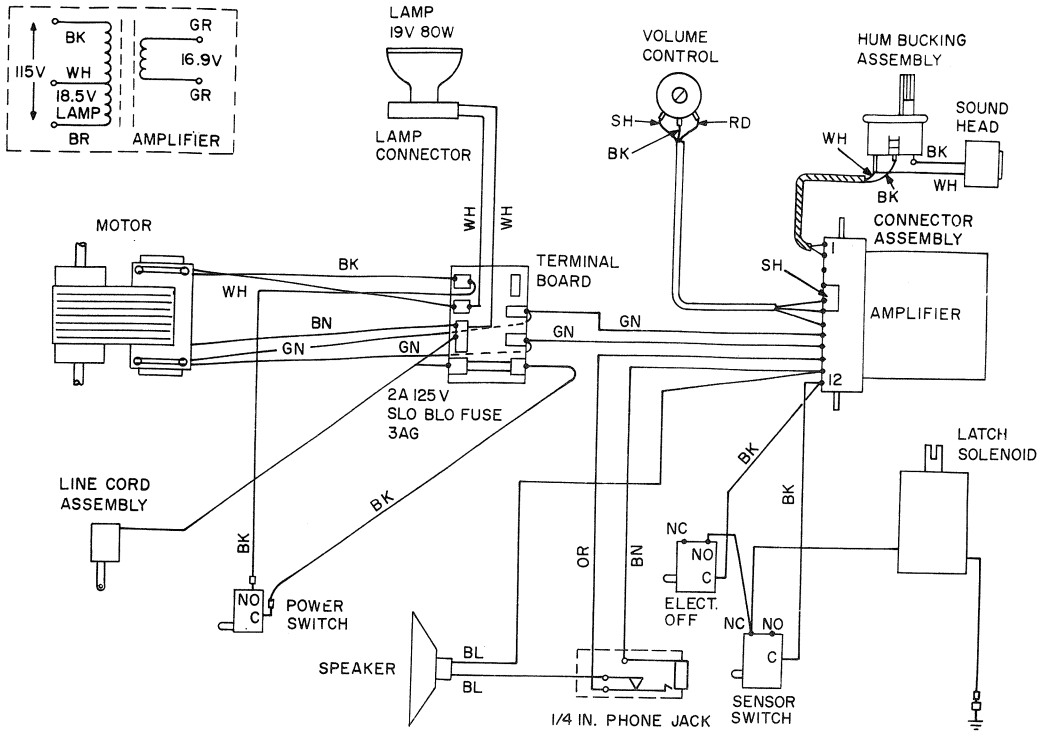


Figure 3-5. Electrical System
Seventy-07 Projector

SECTION IVA

MAINTENANCE - ROUTINE

This section contains maintenance instructions and disassembly procedures for the Fairchild Seventy Series projectors.

IVA Routine Inspection and Maintenance

Component parts sould be visually inspected for defects which may impair the use or functioning of the projector. Components should be inspected for breakage, dirt accumulation, wear, misalignment or poor fit. Refer to Section V for adjustments. A "Service" Inspection is recommended at not more than 12 - month intervals.

4. 1 LAMP REPLACEMENT

The projection lamp can be reached through the bottom of the lamp access door assembly (see Figure 2 - 1). Perform the following procedures.

A. Disconnect the projector from AC power source. Stand the projector either up - side - down or with the bottom vertical.

B. Remove the lamp access door assembly by turning the door lock pointer 1/4 turn counter-clockwise (use small screwdriver), and lift straight outward. (Swing hinged door outward-Seventy-07 Projector)

WARNING

Before grasping the lamp, allow the lamp to cool if the projector has been operating just prior to lamp burnout

C. Remove the lamp connector and lamp by pulling straight outward and away from flywheel. Note that the lamp retaining (expansion) spring will deflect out of the way. Lift straight outward. (Gently deflecting flywheel belt to the left side with finger or a soft tool is recommended during extraction or insertion.)

D. Hold the lamp connector in one hand and with the other hand pull the lamp from the connector.

E. Install the new lamp by pushing it into the lamp connector. Position the lamp and lamp connector into the lamp receptacle and press in until the lamp "snaps" in place and is captured and held by the lamp expansion spring (See Figure 5 - 2) around the perimeter of the lamp. Position the connector parallel to the access door opening as shown in Figure 2 - 1.

F. Replace the lamp access door and lock by rotating pointer 1/4 turn clockwise. (Be sure spring on door clears the belt.)

NOTE

When closed, the pressure spring on the lamp access door will make contact with the bottom of the lamp connector to prevent dislodging of the lamp during shipping and storage.

4. 2 LENS CHANGE

4. 2. 1 Lens Removal

A. If the projector is completely assembled, raise the screen bezel to its upright position for access to the lens area.

B. If a cartridge is being stored in the storage tray, remove it. Remove lamp storage door and spare lamp, if stored. (See Figures 4-1 and 4-2) Seventy-21 only.

C. Lift the snap lock button on the first mirror assembly. With an upward motion and pulling slightly to the left rear corner of the projector, lift out the first mirror assembly (this mirror assembly is directly in front of the lens).

NOTE: Later production projectors utilize a threaded thumb screw in place of the snaplock button described above. To remove the Mirror Assembly, turn the thumb screw counter clockwise until threads are disengaged, then lift the Mirror Assembly upward and out.

D. Lift the felt pad in the cartridge well in the rear left corner to permit access to the lens-release-finger recess in the storage tray.

E. Raise the blue spring of the focus link assembly (see Figure 4-2) with your finger, then slide the lens toward the rear of the projector.

4.2.2 Lens Installation

A. Raise the release tab with your forefinger as in paragraph 4.2.1 step E. Note the groove located on the lens barrel and the counter bored hole located in the lens groove. The hole should face upward when inserting lens into place.

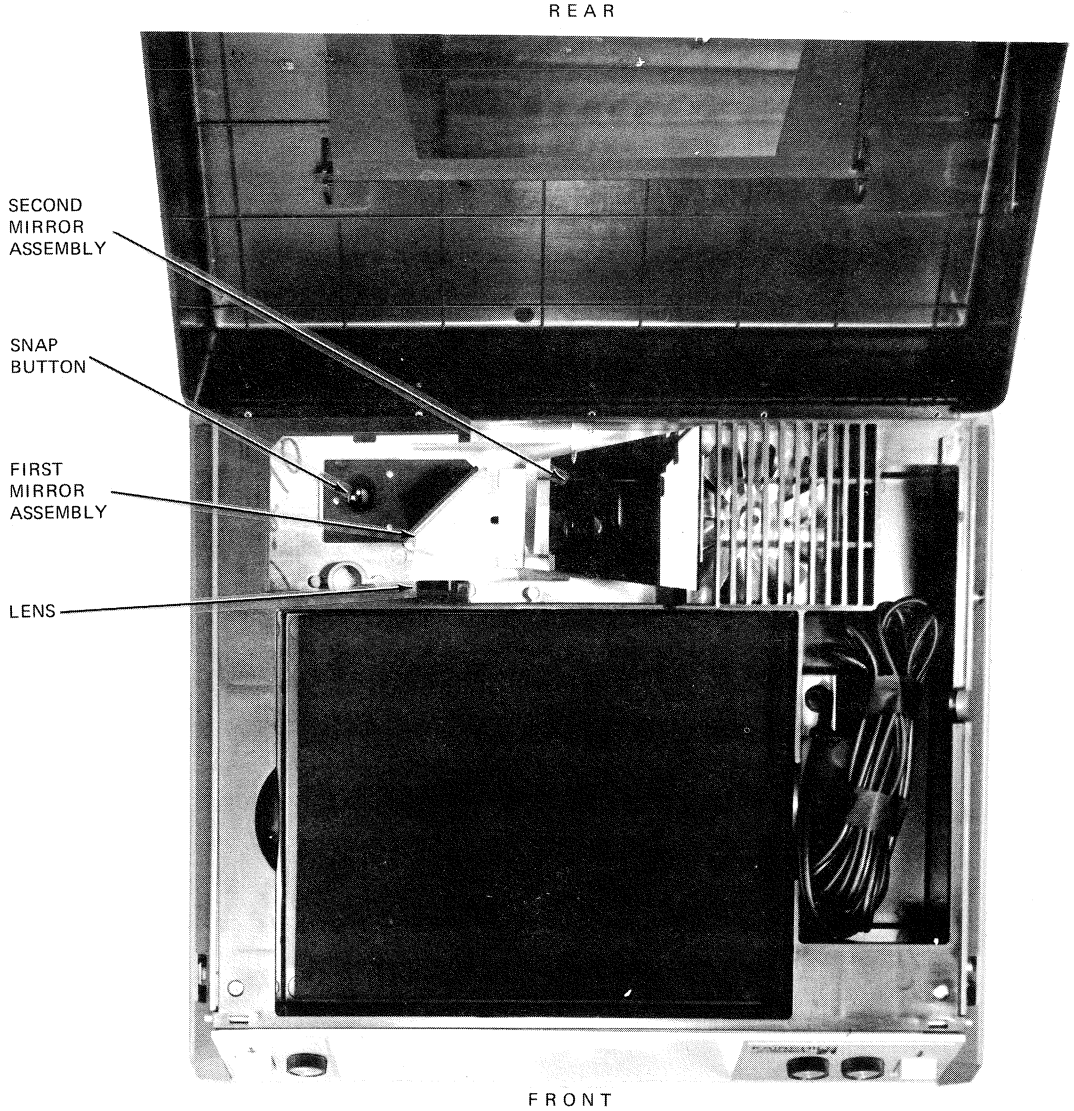


Figure 4-1. Seventy-21, Lamp Storage Door Assembly Removed

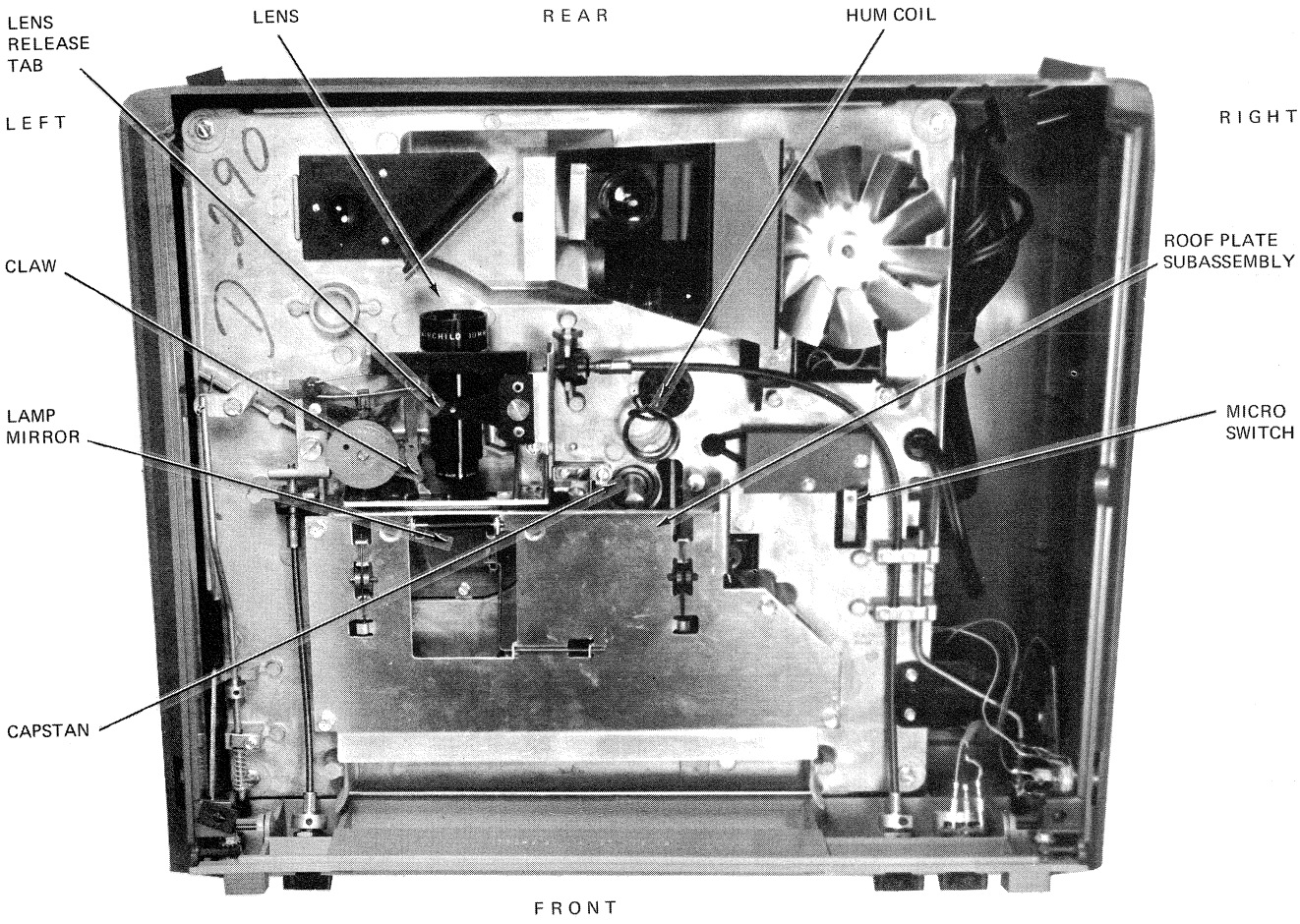


Figure 4-2. Seventy-21, Storage Tray and Lid Assembly Removed

B. Slide the lens into position, then release the tab.

C. Slide the lens forward and/or backward to engage the lens release tab into the lens groove.

D. After the groove is "locked in", rotate the lens slightly to capture (snap) the release tab into the lens groove bored hole.

E. Install the first mirror assembly using the three guide pins for alignment. Press the lock button down.

F. While watching the lens, rotate the FOCUS control knob. The lens should move axially forward and back as the FOCUS knob is turned.

NOTE: Procedures of Paragraph 4.2 apply to Seventy-21 and Seventy-07. Models Seventy-31 and 41 require disassembly of top screen assembly for lens access. Procedure thereafter is identical.

TABLE 4-1

Common Hand Tools Suggested

* 3/16 in. nut driver	* .072 in. Bristol wrench
* 1/4 in. nut driver	* .096 in. Bristol wrench
* 5/16 in. nut driver	Tru-arc applicator #E0150
1/2 in. open end wrench	Tru-arc applicator #PR0120
* Phillips screw driver	Tru-arc plier (Waldes) #51520
* Straight blade screw driver	Tru-arc plier (Waldes) #M1520
Needle nose plier	Tru-arc plier (Waldes) #M1540
5/32 in. Allen wrench	6 in. common steel scale
* .060 in. Bristol wrench	

* Items included in Fairchild kit No. 1.

4.3 MIRROR ALIGNMENT

If the projected image on the rear screen is not nominally centered the following procedure should be followed.

4.3.1 Second Mirror Alighment

NOTE

Before performing adjustment check that mirror assembly is properly seated in its groove in the casting. (If not properly seated, image will be shifted to left so dark edge appears on right side). If not, slide upwards to "snap" in casting groove.

A. Remove plastic plug button (see figure 2-1) from bottom of case.

B. Insert film cartridge and start projector. (Use S. M. P. T. E. test film)

C. While the projector is running insert a 5/16 inch nut driver through the case hole (plastic plug removed) to the adjusting nut. (See figure 4-3).

D. Turn adjusting nut until picture is centered left to right on the screen (left-right adjustment). Stop projector, reinsert plug button.

4.3.2 Third Mirror Alignment

If image is shifted up or down and cannot be corrected with framing control or a dark edge appears on bottom or top of screen.

A. Insert cartridge and start projector. Center framing range.

B. While the projector is running turn the adjusting screw on the projector storage tray and lid assembly (see figure 6, item 8) until the picture is centered top to bottom on the screen. If picture is too high tilt the mirror further toward the screen by rotating adjustment screw counterclockwise. (On 70-31 adjusting screw is located behind plug button at top rear of unit.) Stop projector.

C. Later production Seventy-21 Projectors utilize P/N 15-A257 3rd Mirror Strap and Bracket Assembly for support and alignment adjustment. (Ref. Figure 6, Section 7).

To align the 3rd Mirror with this assembly:

1. Loosen the (2) adjustment plate nuts (Figure 6, Index 21).

2. While the projector is running, adjust the picture vertical position by raising or lowering the angle of the 3rd Mirror via the support strap mounting on the projector cover assembly.

3. When correct location has been set, tighten the adjustment plate nuts. (Figure 6, Index 21)

4. Re-check picture location and re-adjust as required.
   NOTE: Picture location should always be checked with the cover assembly resting on the upper light shield.

4.3A MIRROR ALIGNMENT (Seventy-07 Projector)

NOTE: These mirrors are contained in the mirror assembly located at the rear of the mechanism and behind the lens. Both mirrors have been factory set to provide correct location. Design of this assembly permits repositioning the mirrors for projection on a front screen arrangement. The second (large) mirror normally is positioned at a detent stop for projection on the projector rear screen. To position the mirrors for front screening, grasp the tab provided near the top of the 2nd mirror, and pivot the mirror assembly toward the left side of the projector until it locks into its detent position.

4.3A.1 Second Mirror Alignment

A. If the projected image on the rear screen is not nominally centered, the following procedure should be followed:

Insert film cartridge and start projector (use SMPTE test film).

B. Left-right adjustment

Turn adjustment nut (Figure 4-5, Item 3) to position the picture left or right on the screen.

4.3A.2 First Mirror Alignment

If the image is shifted up or down and cannot be corrected with framing control, or a dark edge appears on bottom or top of screen;

A. Insert test cartridge and start the projector. Center the framing range with framing control knob.

B. Vertical alignment - Turn adjustment nuts (Figure 4-5. Item 7) to raise or lower picture on the screen.

C. Picture Tilt Alignment - Turn adjustment nuts (Figure 4-5, Item 4) to align the picture parallel to screen upper or lower borders.

4.3A.3 Third Mirror Alignment

The third mirror located and affixed on the inside of the projector cover has been factory set to establish correct vertical picture location on the screen. No adjustment is required.

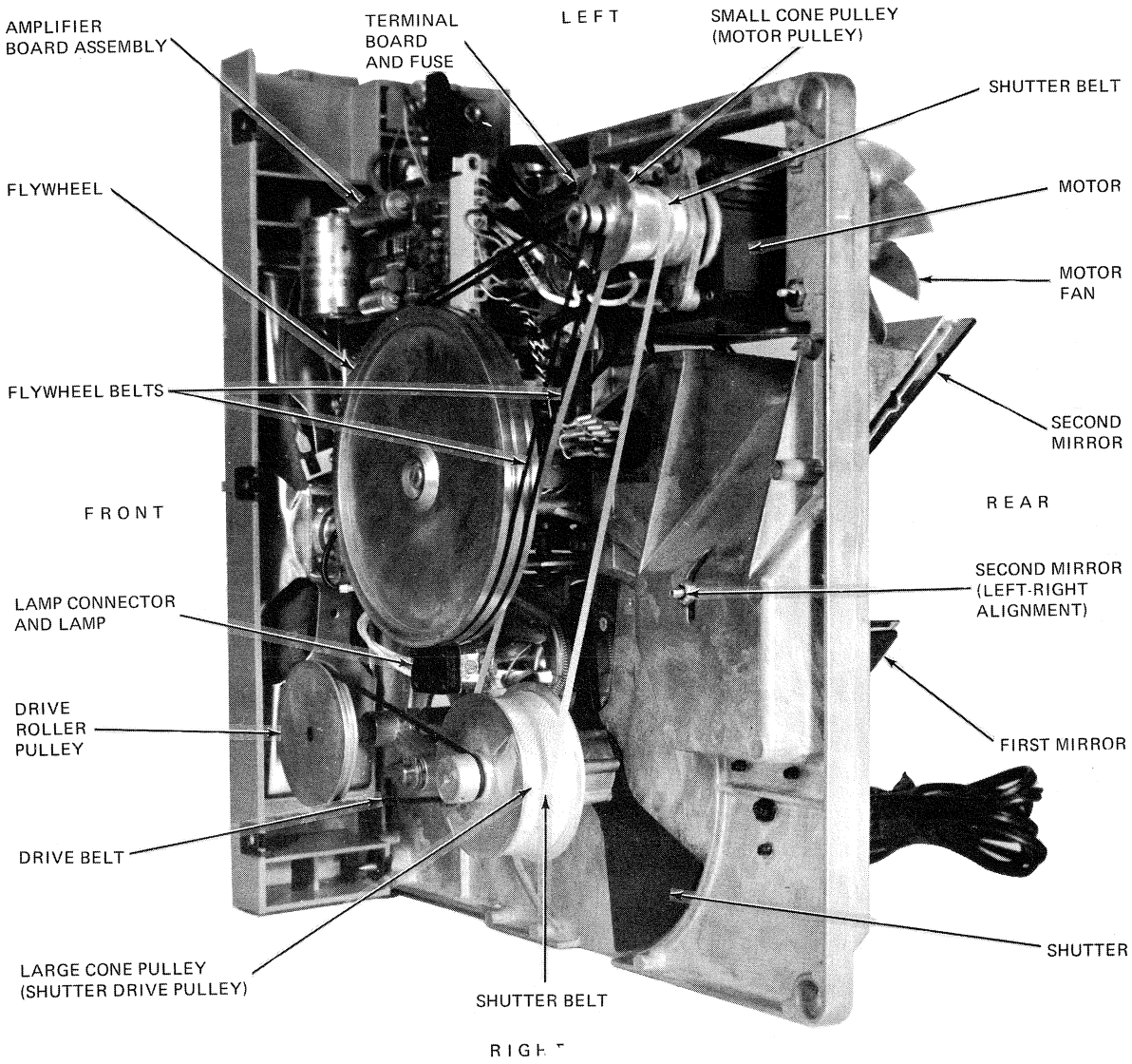


Figure 4-3. Adjustment Points, Bottom View

NOTE

In some model Seventy-21 units the adjusting screw and suspension cord is replaced by a flat suspension band. In this case, loosen the two clamping screws on the band adjusting plate and slide band forward or backward to raise or lower the picture (respectively).

4.4 FUSE REPLACEMENT

A. Refer to figure 4-3 or 5-1 which shows the internal 2-Amp, 3AG, Slo-Blo fuse located on the terminal board. This fuse provides protection against current overload to the projector.

Cause for fuse failure should be determined before replacing.

B. Replace this fuse if it is blown as a result of current overloads. For access to the fuse disassemble the projector to the stage shown in figure 4-4 by the procedure outlined in section IVB.

4.5 CLEANING

During any cleaning of the machine, the film cartridge should be removed. Since the working parts of the projector are enclosed and protected, a minimum of cleaning care will maintain the efficiency and appearance of the equipment. Perform the following cleaning procedures.

4.5.1 Projector Case

Cleaning with a mild spraying agent such as Walco Staticlean is recommended. A non-abrasive, soft, lint-free cloth and a mild solution of soap and water may be used. Perform the following procedure.

A. Wipe case clean with a soft non-abrasive cloth and clear water.

B. Air dry in a dust free place.

C. Heavy grease marks may be removed by using an ammonia base detergent (such as Ajax or Mr. Clean spray cleaners).

D. Rinse, wipe dry with non-abrasive cloth, air dry.

CAUTION

Do not use abrasive cleansers, harsh detergents, or solvents. Take care to prevent water or solution spillage into the projector mechanism.

4.5.2 Projector Screen

Seventy Series Projectors are equipped with a new type, high contrast, Polacoat Projection Screen.

It is suggested that you exercise care to prevent making or scratching the screen surface as this damage may not be repairable and will be noticeable during viewing.

The following procedures apply to care and cleaning the surface of this new screen.

A. For routine cleaning, use a mild soap and water solution. Wipe with a soft, lint-free, non-abrasive cloth. Pat dry with a soft absorbent cloth.

NOTE

Detergent or other chemical based cleaners are not recommended as they may attack the screen surface coating and render the screen unusable.

B. Dry soil marks (i.e., pencil marks, chalk marks) can be removed by gently using an art gum eraser. Then clean the screen as discussed in Procedure A above.

C. Wax pencil marks can be removed by using a small amount of light mineral oil with a non-abrasive cloth or lens tissue and rubbing gently.

D. Slight scuff or scratch marks may be sealed over with a light application of refined mineral oil.

4.5.3 Aperture Area (Cartridge).

A. Remove the cleaning brush stored in the line cord storage compartment (see figure 4-1). Clean the aperture area of the cartridge by inserting the brush into the cartridge well and brushing lightly.

B. Seventy-21:
To gain access to the aperture area, lift the felt pad in the cartridge storage compartment by grasping the upper left hand corner and folding it diagonally clear of the lamp mirror opening. Raise the exposed lamp mirror bracket with the cleaning brush shank (handle) and brush out the aperture opening and surrounding area.

C. Seventy-31 and others:
With the end of the brush shank or a soft tool reach in the cartridge slot and lift the lamp mirror. Holding it up, brush out the aperture area.

CAUTION

When the cleaning is completed, check and be certain the lens mirror (under spring tension) returns to its original position.

4.5.4 Projector Lens

Remove the lens from the projector in accordance with paragraph 4.2.1. Clean the optical surfaces with fine optical lens tissue or a standard lens cleaning fluid, or equivalent, and replace lens in accordance with paragraph 4.2.2.

CAUTION

Harsh cloths, solvents, or abrasive cleaners will damage the optical surface of the lens beyond repair.

4.5.5 Projector Mirrors

The projectors are equipped with front surface mirrors and must be cleaned with a quality lens cleaning fluid (Eastman Kodak, or equivalent) and fine optical lens tissue. The surface of the coated mirrors is subject to scratching and damage from body oils (such as finger prints) and must be kept free from any abrasive material or household cleanser. Wash the mirrors with Eastman Kodak lens cleaning fluid, or a mild solution of soap and water applied with a fine optical lens tissue or a very soft non-abrasive, lint free cloth. Air dry in a dust free place.

CAUTION

Do not use household cleansers. They may contain abrasive material. Do not use detergents. They may be harsh and damage the mirror surface.

4.5.6 Film Cleaning

Many conventional film cleaning solutions contain solvents which will dissolve the adhesive that bonds the magnetic stripe to the film or attack protective film coatings. Use film cleaners that will not affect the magnetic sound track. Fairchild recommends Film Kare manufactured by Vacuumate and used in accordance with the instructions recommended by Vacuumate. To maintain general outward appearance of the cartridge, a mild detergent and a soft, damp cloth may be used. Wipe cartridge case dry, then air dry in a dust free place.

CAUTION

Do not allow cartridge case cleaning solution to drip onto film.

4.6 SHIPPING

Prepare the projector for storage or shipping by use of factory shipping cartons as follows:

A. Wrap the projector in a polyethylene bag to protect it from dust.

B. Place the projector with shipping accessories in the shipping carton as supplied by Fairchild. Shipment in other than this approved packaging may cause serious damage to the projector.

IVB Service Inspection and Maintenance

NOTE

Service inspection, maintenance, and lubrication should be performed only by a Fairchild Service Dealer as partial disassembly is necessary for access to the mechanisms.

To perform service inspection and maintenance the projector should be disassembled to its "operating unit" stage as shown in the figure 4-4 by means of the procedure of section 4. 10. In this stage of disassembly the projector may be operated and tested normally with access to all adjustments and test points.

NOTE

Do not remove grill assembly or roof plate assembly.

CAUTION

After operating unit is disassembled add rear "dummy" legs to prevent damage to projector. Care should be exercised that hands, loose clothing, etc, are kept clear of moving parts to prevent injury.

4.7 LUBRICATION

The projector is factory lubricated for over 500 hours of operation. When required apply the lubricants specified below.

CAUTION

Lubricant on the belt drive system will cause the belt to slip and reduce film flow. Film burns or jams may result. Lubricant on nearby moving parts may be thrown onto the belt system unless care in application is taken.

BEARINGS: Using a small hypo type oiler, apply two drops of oil (Aero Shell No. 12, or equivalent) to the bearings of the motor, cams, pawl latch pin, pawl and the shutter drive shaft. Use SAE 30 non detergent oil on the claw pivot and oilite bearings. A light graphite grease may be applied to non rotating (oscillating) parts.

4.8 BELT REPLACEMENT

The projector should be disassembled to the extent noted above. Removing or replacing the belts is accomplished by carefully removing the belts by stretching and slipping over the pulleys. Clean pulleys with alcohol before replacing belts.

4.9 CLEANING

4. 9. 1 Sound Head, Capstan, Pinch Roller

Cleaning of these items can be done with a good quality sound head cleaner (Liquid) available at Hi-Fi stores.

4. 9. 2 Belts

Wipe with clean alcohol and dry. Do not permit residue to contaminate belts.

4. 9. 3 Pulleys

Wipe with clean alcohol and dry.

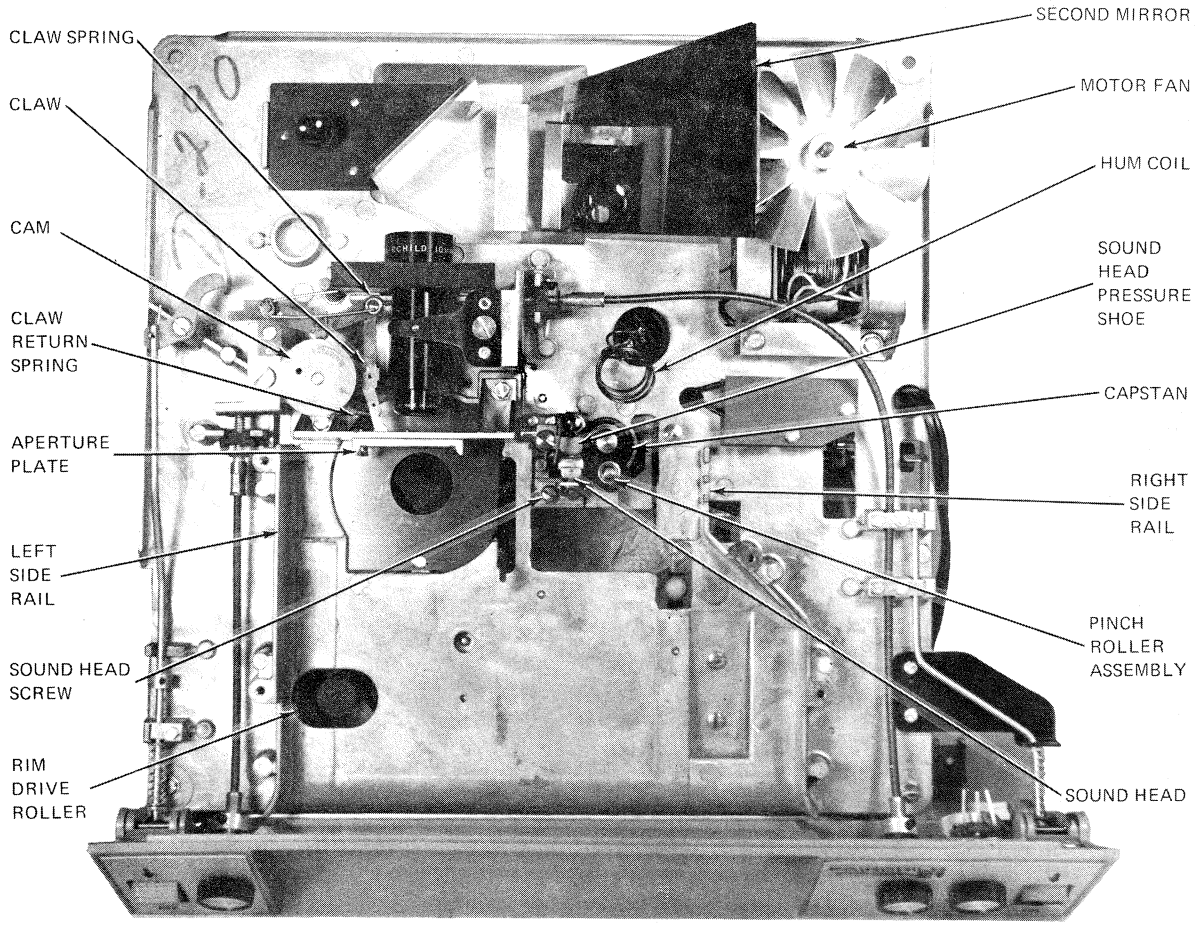


Figure 4-4. Operating Unit Assembly (Shown with roof plate removed)

4.10 DISASSEMBLY – OPERATING UNIT ASSEMBLY

No repair procedures are applicable to parts. Replace all parts which are defective. Refer to Section VII for identification of parts to be replaced. Refer to Section V for adjustment and alignment procedures. Note the following special instructions.

NOTE

When replacing assemblies that effect alignment, be sure to mark the exact mounting location of the assembly before removing. (refer to section V).

To remove the main operating unit from the case to gain access for adjustment (or repair) of components perform the following procedures.

NOTE

Assembly is the reverse of disassembly unless otherwise specified. Note and mark the length of screws removed. Improper reinstallation can cause damage.

A. To remove the top assembly (storage tray and lid assembly, figure 1, item 6) and the screen bezel assembly, (item 16) from the projector, remove three Phillips head screws (item 18) from the rear of the projector lid, two Phillips head screws (item 18) from the storage tray, and one binding head screw (item 19) from the lid support assembly.

B. Lift the entire top assembly (consisting of storage tray and lid assembly, and screen bezel assembly) from the case. Carefully slide the line cord through the storage tray and lid assembly.

NOTE

The screen bezel assembly (item 16) may be removed from the top assembly by deflecting the plastic bezel outward, at its base, to free it from the pivot pins (figure 6, item 16).

CAUTION

If the bezel is removed from the top assembly the lid and storage tray must be carefully folded to prevent damage to the third mirror.

C. Set the top assembly aside in a safe place. The operating unit and case assembly (figure 1, item 1) as well as the storage tray and lid assembly, and the screen bezel assembly are now readily accessible. The partially disassembled operating unit assembly, at this point, is similar to figure 4-2. Most Series Seventy models use this basic subassembly. Refer now to figure 2.

D. Remove two grille hex screws (items 10 and 15).

E. Remove two casting hex screws (items 10 and 11).

F. Remove two foot hex screws (items 13 and 14) and one countersunk screw (item 12). (Note its length is shorter).

G. Remove lamp door (item 3).

H. Disconnect phone jack wires noting color code position.

CAUTION

Insulate jack wires or damage to the amplifier will result if shorted. Alternate procedure is to dismount jack (figure 3 sheet 2, item 65).

CAUTION

The external phone jack should be mounted in the case not hanging free. If the jack is loose, and connected to its wires, cover with a plastic bag, and fasten it with a rubber band or tape to keep it from touching ground. Apply caution if testing. The jack must not be allowed to short against the chassis of the projector. A direct short will damage the amplifier.

I. The operating unit is now free to remove from the case. To remove grasp rear of casting and front grille. Lift rear casting point (item 9) free of post (item 8) and gently move assembly forward and out of case (item 4).

J. Remove handle (Seventy-21) by slightly deflecting arm (figure 1, items 3 and 4) outward from grille mounting post.

CAUTION

To prevent damage to mechansim install "dummy" legs on rear of casting (positions 10 and 11). Operating unit is now as shown in figure 4-4 with roof plate in place. Full operation and testing may be performed on this assembly.

4.11 DISASSEMBLY - OPERATING UNIT ASSEMBLY (Seventy-07 Projector)

Repair procedures are not applicable to parts. Replace all parts which are defective. Refer to Section VIII for identification or parts to be replaced. Refer to Section V for adjustment and alignment procedures.

NOTE

When replacing assemblies that affect alignment, be sure to mark the exact mounting location of the assembly before removing (refer to Section V).

To remove the main operating unit from the case to gain access for adjustment (or repair) of components, perform the following procedures.

NOTE

Assembly is the reverse of disassembly unless otherwise specified. Note and mark the length of screws removed. Improper reinstallation can cause damage. (Refer to Figure 1 for parts location and identification.)

A. Open the projector cover.

B. Raise the screen and bezel assembly to vertical position.

C. Remove four (4) mounting screws from the Top Plate Assembly (Figure 1, Index 8).

D. Lower the screen and bezel assembly to the stored position, then remove the Top Plate by lifting straight up.

E. Remove the two (2) Top Plate hex mounting posts (Figure 1, Index 9) from the mechanism base plate (rear).

F. Remove two (2) screws from the top corners of control plate (Figure 2, Index 75).

G. Lift mechanism straight up and out of case assembly.

H. Install four (4) mounting legs (special tool P/N 15-T-12) in the rear mounting holes of the mechanism to support the unit during servicing.

CAUTION

When removing the Bezel and Top Plate Assembly and removing the mechanism assembly, do not handle the front surfaced mirrors and prevent scratching these mirrors. Scuffs or scratches on these surfaces are irrepairable.

NOTE

Refer to Section V for assembly installation alignment instructions.

4.12 DISASSEMBLY - CONTROL PLATE AND GRILLE ASSEMBLY

NOTE

Refer to paragraph 4.11 for prior disassembly of operating unit from case.

A. Remove two (2) wires connected to speaker voice coil terminals.

B. Remove the Volume, Focus and ON-OFF Control Lever knobs. (Leave framing control knob on shaft.) Remove Volume Control and Focus Control flex shaft retaining nuts.

C. Loosen the set screw on the framing control shaft collar (Figure 2, Index 56).

D. Remove the framing shaft by turning counter-clockwise to unscrew from the framing bracket, then slide the shaft out.

E. Remove volume control potentiometer and focus control from control plate.

F. Remove (4) screws (Figure 2, Index 23) mounting control plate to grille. Remove the control plate.

G. Remove (2) screws (Figure 1, Index 12) mounting the grille to the mechanism casting plate. Remove the grille. Refer to (Paragraph 4-13, Items B and C) removal of the ON rod for access to the RH grille mounting screw.

NOTE

Refer to Section V for assembly installation alignment instructions.

4.13 DISASSEMBLY - ON-OFF CONTROL LEVER ASSEMBLY

NOTE

See paragraph 4.11 for prior disassembly of operating unit from case.

The following disassembly procedure is outlined due to the inaccessibility of the (RH) grille assembly and (front) ON-OFF lever assembly mounting screw.

Do not bend or force the ON rod for screw access.

A. Remove the ON-OFF lever control knob.

B. Remove ON lever pivot screw (not shown) (Spring Figure 2, Item 41 and Washer Figure 2, Item 48).

C. Slide the ON rod forward through front bearing and remove through front opening in the control plate.

NOTE

Spring will fall free. Store for reassembly.

D. Remove the wire connectors from the OFF micro switch terminals.

E. Remove (2) control lever assembly mounting screws. Lift out the assembly.

NOTE

Refer to Section V for assembly installation and adjustment instructions.

1. Positioning Tab
2. Second Mirror
3. Picture Left-Right Adjustment
4. Picture Tilt Adjustment
5. First Mirror
6. Thumb Screw
7. Picture Vertical Adjustment
8. Locating Pins

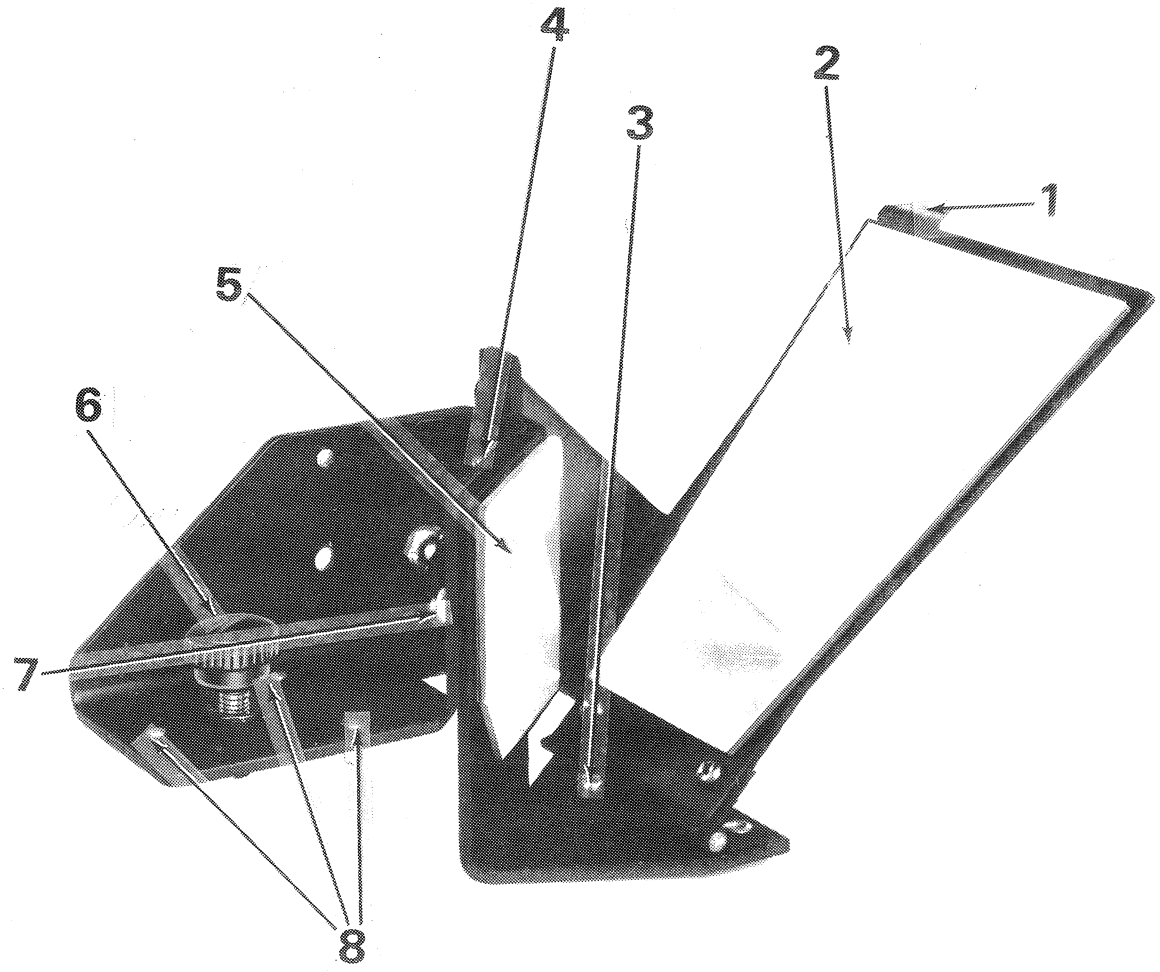


Figure 4-5. Mirror Assembly

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SECTION V
ADJUSTMENTS

This section provides the adjustments and procedures necessary for proper operation of the Seventy Series projectors. Differences between the projectors are noted as they occur and in subsequent bulletins. Power should be disconnected except where mandatory. To perform adjustments unit should be disassembled as outlined in section 4. 10 through step C or J as required.

NOTE

Due to projector design, the following adjustments are to be performed using film made with ANSI standard picture-to-sound separation of +18 frames. SMPTE (Society of Motion Picture and Television Engineers) test film is recommended for picture alignment.

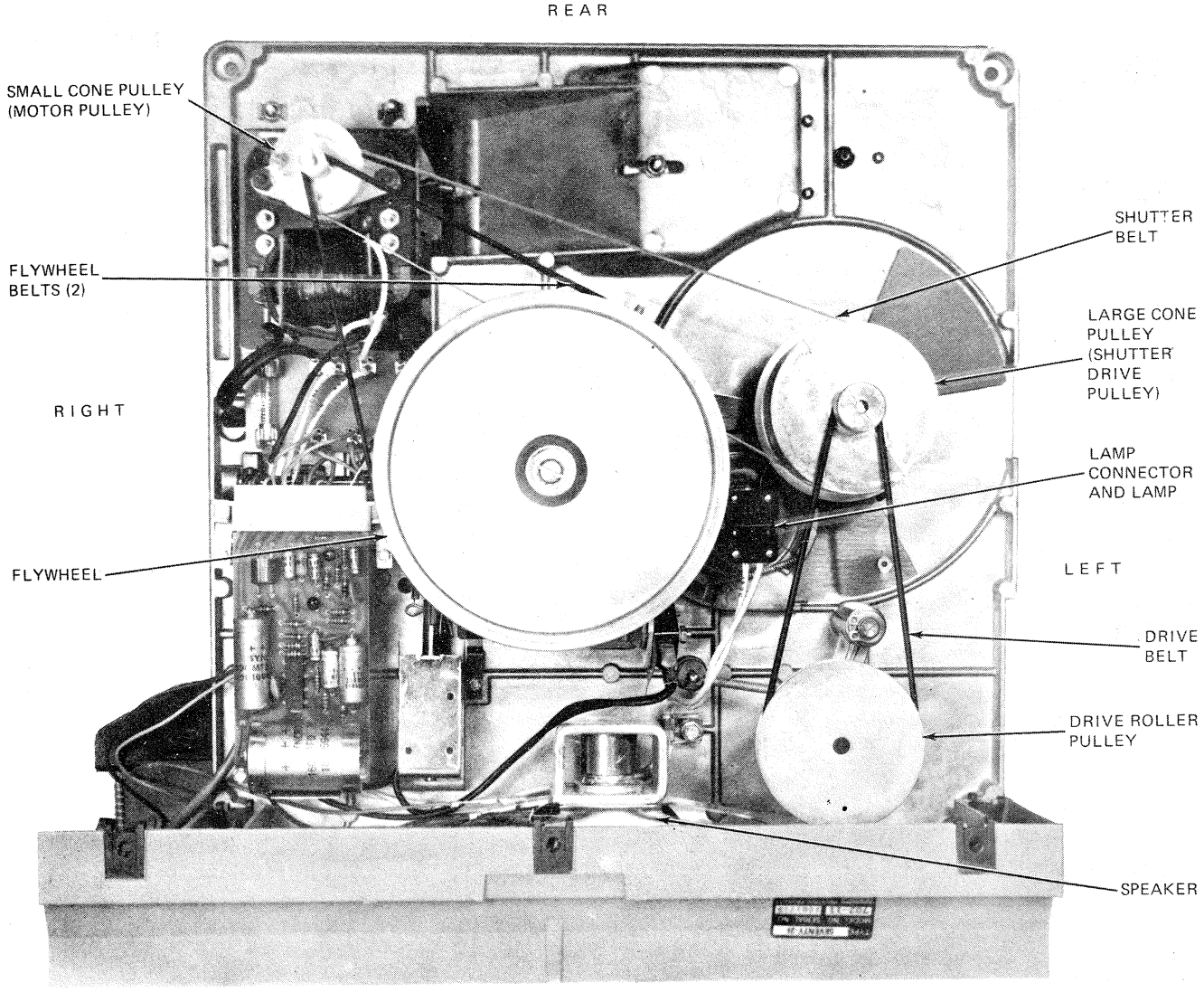


Figure 5-1. Seventy-21, Bottom View, Carrying Case Removed

5.1 MIRROR ALIGNMENT

The same procedures of section (4. 3) apply to align the second (left-right) and third (up-down) mirrors, for proper rear projection.

5.2 HUM COIL

Operating the unit with an unrecorded film and taking care not to disturb the coiled portion of the hum coil, bend and gently twist the base leads of the hum coil assembly (with the volume turned up) until minimum hum is achieved (hum adjustment). See figure 3, item 14, hum coil assembly, and refer to figures 4-2 and 4-4.

NOTE

All sound lead wires (black and white twisted wires) should be dressed away (kept away) from the 115-volt AC lines as much as possible, when the projector is adjusted for hum. The hum will be reduced to its lowest audible level without AC interference resulting from proximity of the line wires.

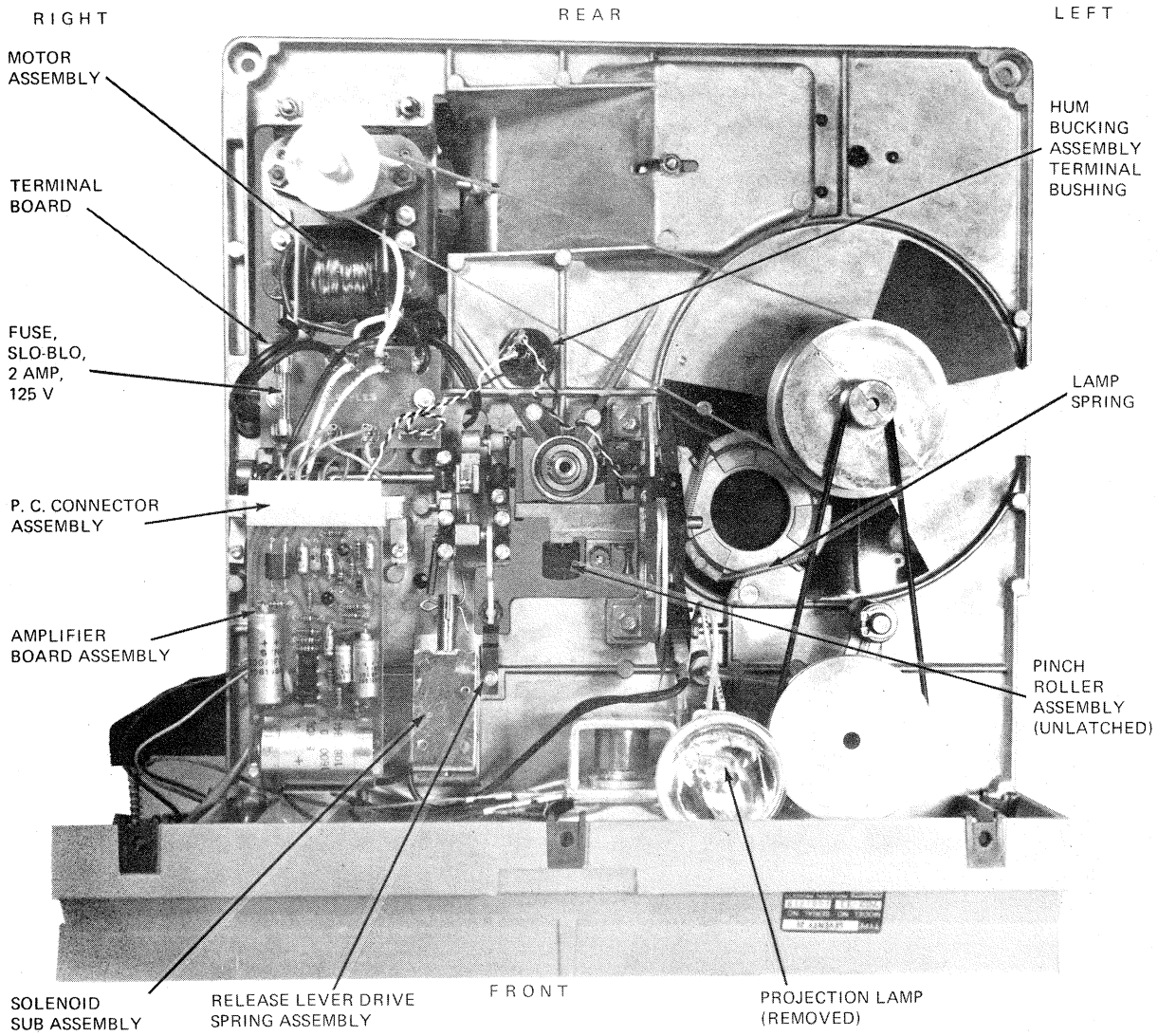


Figure 5-2. Bottom View, Flywheel Removed

TABLE 5-1

SPECIAL TOOLS AND EQUIPMENT

Fairchild Part No.	Description
15-T10	1. Cartridge 70-10 with SMPTE focus and framing test film.
15-T11	2. Cartridge 70-20 with typical film with +18 frame sound separation, Buzz Track and no sound.
15-T12	3. * "Dummy" casting legs, two required.
15-T17	4. * ** Sensor Gage
15-T13	5. ** Special roof plate assembly with sound head area cut out.
15-T16	6. ** .089 aperture plate shim
15-T18	7. ** Lens plug gage
Commercial	8. ** Square
15-T14	9. Special 70-10 cartridge with cut out in sound head area.
15-T15	10. Sound alignment film.
Commercial	11. 0/1000 gram scale, beam type
Commercial	12. 0/500 gram scale, beam type
Commercial	13. 0/250 gram scale, beam type
Commercial	14. 0/100 gram scale, beam type
Commercial	15. 0/30 gram scale, beam type
Commercial	16. 0/15 gram scale, beam type

*Items included in Fairchild tool kit No. 1
**Items included in Fairchild tool kit No. 2

5.3 SOUND HEAD ADJUSTMENT (ALIGNMENT)

NOTE

The break-away gram force (and return force) measurements and adjustments on all components described in this and subsequent paragraphs should only be made if the component is damaged, removed, or replaced, The proper adjustment procedure is given for information purposes only in the event a component has been removed or replaced by the operator. The figures given are in agreement with Fairchild's experience and recommendation.

A. Remove the roof plate subassembly (figure 3, sheet 2, item 2) from the operating unit assembly (by removing the four hexagonal washer head screws) (figure 3, sheet 2, item 54). The partially disassembled operating unit assembly, at this point, is similar to figure 4-4. (For reassembly and adjustment of roof plate refer to paragraph 5.23).

B. Install special cut out roof plate subassembly. (Fairchild P/N 15-T13)

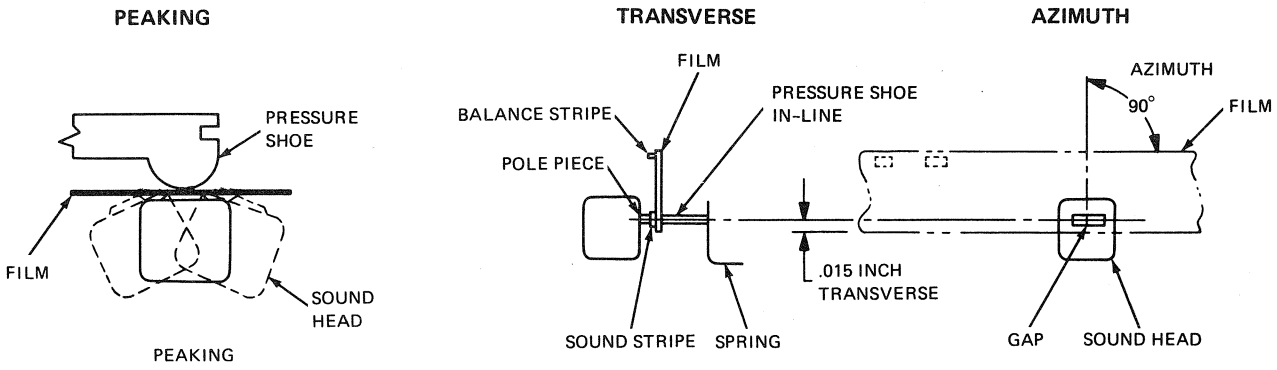


Figure 5-3. Sound Head Alignment

NOTE

Correct azimuth positioning of sound head (90°) corresponds to adjusting for high frequency response (and correct peak) of the sound head. Tighten sound head nut (figure 4, sheet 2, item 24) if loosened to make azimuth and transverse track adjustment. Sound head nut should not be loosened unless head requires replacement.

C. Perform the following steps as required:

1. Rough align head to shoe.
2. Set forked guide forward, insure that film tracks on guide, and check and set pressure shoe lift off approximately .020 (refer to section 5.6). Check that forked guide clears head.
3. Measure shoe pressure and set to 40 ± 5 grams if necessary. (Refer to section 5.4).
4. Insert cartridge with clear striped film, no sound. Turn unit on. Use mirror to align shoe to film stripe. (See figure 5-3).
5. With the same cartridge adjust hum level, if required (refer to section 5.2).
6. Check head track location (transverse) with buzz track signal cartridge. Align as necessary up down (transverse) tighten head locking nut and recheck signal. Head gap must have perpendicular azimuth position (visually) before locking nut. (see figure 5-3).
7. Check shoe to head line up. Readjust if necessary.
8. Use Audio Cartridge and set wrap of head (peaking) by rotating bracket (figure 4, sheet 2, item 15) with tool in bracket notch after slightly loosening clamp screw (item 23). Lock clamp screw.

5.4 SOUND HEAD PRESSURE SHOE

Spring pressure measured at the slot in the pressure shoe (directly backward) should be 40 ± 5 grams. Adjust force by bending spring item 81, figure 4, sheet 1 if necessary. Align sound head pressure shoe (figure 4, sheet 1, item 79) by gently bending (up or down) to line up with the pole piece on the sound head. See figure 5-3 and 5-4.

CAUTION

If pressure shoe tension is too high it can cause excessive wear on the pole piece of the sound head. If pressure shoe tension is too low it can cause flutter and low volume.

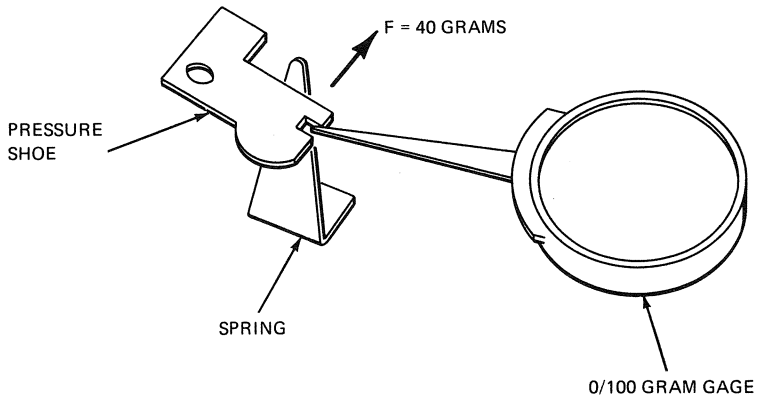


Figure 5.4. Sound Head Pressure Shoe Force

5.5 PINCH ROLLER

Check pinch roller break-away force as follows:

A. Remove cartridge and disconnect power line cord from power source.

B. Remove the roof plate (figure 3, sheet 2, item 2) by removing the four hex screws (figure 3, sheet 2, item 54) and lifting from the mechanical subassembly.

C. Position the pinch roller (figure 4, sheet 2, item 16) against the capstan (figure 4, sheet 1, item 89) by rotating up the pinch roller bracket subassembly (figure 4, sheet 2, item 17) from horizontal to vertical position and latching in place by depressing the ON button or ON link (figure 4, sheet 2, item 47).

D. Place one end of the gram scale into the pinch roller opening (top) and pull directly towards the front of the machine to measure the first break-away force. This should be a minimum of 450 grams of force, to a maximum of 700 grams.

5.6 FILM GUIDE

If the film guide (figure 4, sheet 1, item 82) is ever replaced or disturbed perform the following procedure.

A. Position the film guide so that when the sound head (figure 4, sheet 2, item 21) matches up to the pressure shoe (figure 4, sheet 1, item 79) the pressure shoe is displaced backwards approximately 20 thousandths of an inch (push-off).

B. Move the film guide to the right side of the projector, to increase push-off, and vice-versa, by loosening the two screws (figure 4, sheet 1, item 122) which mount the film guide. (Bending is permissible - do not allow guide to touch sound head.)

5.7 APERTURE PLATE – MOVABLE GUIDES

On the aperture plate (figure 4, sheet 1, item 50) the movable guide on the left side should measure a break-away force of 5 to 15 grams. The movable guide on the right side should measure a break-away force of 25 to 35 grams. If adjustment is necessary, increase or decrease force by bending leaf spring portion of guide. (See fig. 5-5)

5.8 APERTURE PLATE – POSITION

NOTE

Right and left orientation of the aperture plate is with the projector facing the operator as shown in figure 4-4, and with the roof plate assembly removed.
If the aperture has not been changed, alignment can be re-established by scribing the main casting for location before loosening the mounting screws.

A. Use an . 089 inch thick shim and a square. Loosen aperture plate screws.

B. Place shim in aperture plate between the fixed and movable spring guides.

C. Bank one edge of the square against the left casting wall and the other against the capstan (figure 4, sheet 1, item 89). See figure 4-4 and figure 5-5.

D. Slide the aperture plate and shim against the square.

E. Position the aperture such that the aperture opening is in line (left to right) with the lens optical axis ±. 002. This alignment can be set by the use of a lens plug gage seating in the lens "vees" and entering the aperture. Tighten the aperture plate screws.

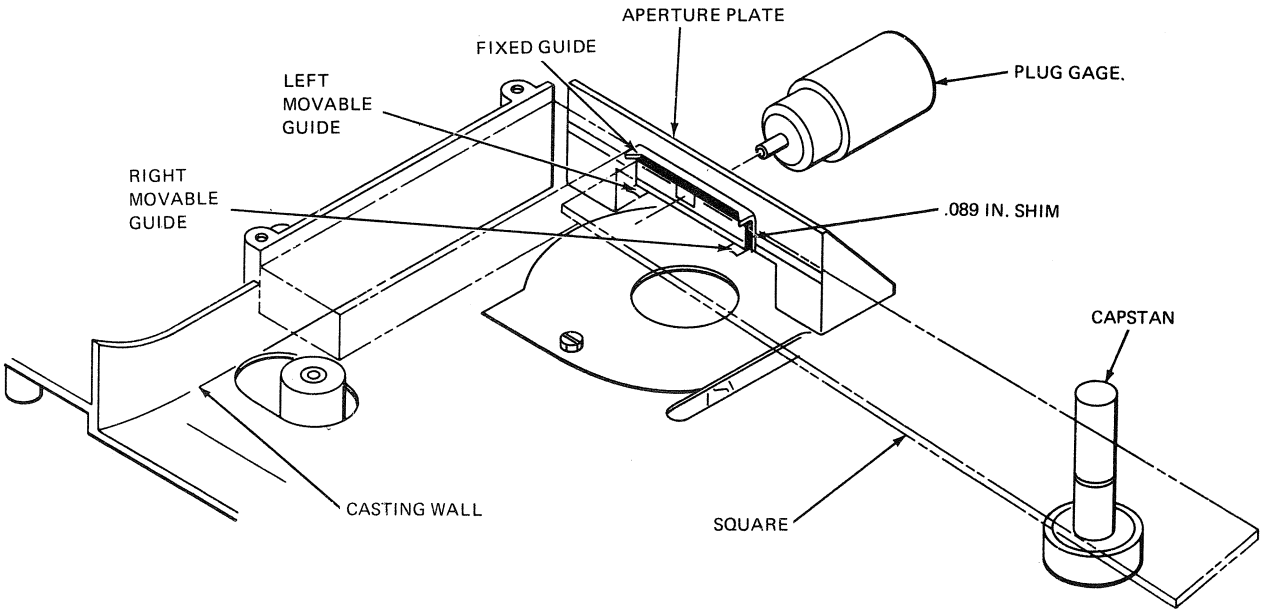


Figure 5-5. Aperture Plate Position

5.9 STOP POST

The stop post (figure 4, sheet 1, item 39) positions the rearward location of the cartridge. This post should be positioned with zero to 5 thousandths clearance to the front of the cartridge when the left front of the cartridge is seated flush against the aperture plate (figure 4, sheet 1, item 50) casting.

5.10 IN-OUT CLAW SPRING

The in-out claw spring (figure 4, sheet 1, item 75) is located directly behind the cam (figure 4, sheet 1, item 6). See figure 4-4. The claw spring resembles a safety pin and its force is directed from a stationary casting post, around the claw pivot to the eyelet of the pull down claw, pushing the in-out claw forward against the cam. This return (rearward or back pressure) force should be 325 grams ± 25 grams.

To Measure:

A. Line up the zero index mark on the cam to coincide with the claw in/out follower (figure 4, sheet 1, item 74).

B. With the point of a 500 gram beam scale in the pull-down claw eyelet lift the in-out follower 1/32 inch from the cam surface by pushing the eyelet towards the rear of the unit. Reducing pressure on the gram gage note at what value the follower starts to return towards the cam. This measurement is back pressure or claw spring force.

5.11 PULL-DOWN CLAW RETURN SPRING

The pull-down claw return spring (figure 4, sheet 1, item 115) is located between the cam and the aperture plate. See figure 4-4. The pull-down claw return spring is a coil spring which has one end mounted stationary to the lug (figure 4, sheet 1, item 88) and the other end mounted on the pull-down claw approximately 90° to its axis. The resultant force is 100 grams ±25 grams. (See figure 5-6).

To Measure:

A. Line up the zero index mark on the cam to coincide with claw in/out follower. Measure the force oriented in a direction (90°) across the projector (parallel to the aperture) towards the right hand side of the projector, the measurement taken to the left opposite the crescent shape pull-down notch in the claw arm (vicinity of the return spring mounting). This measurement is side pressure or claw return spring force.

5.12 CLAW PENETRATION

Claw penetration (into the film perforations) should be between .035 and .040 inch measured at the right claw tooth. Desired claw penetration is achieved by setting the cam such that the claw is in the half pull down position and shifting the claw adjusting plate (figure 4, sheet 1, item 73) forward or backward via the adjusting binding head screw (figure 4, sheet 1, item 123). Penetration is measured from the claw tips to the aperture plate rails with a feeler gauge or common fixed inch scale (see figure 5-6).

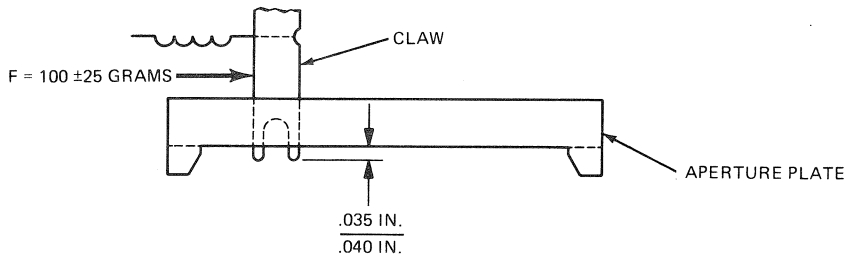


Figure 5-6. Claw Penetration

5.13 CLAW PIVOT

If claw assembly (figure 4, sheet 1, item 74) is replaced position retaining ring (figure 4, sheet 1, item 76) such that spring washer (figure 4, sheet 1, item 77) is compressed to within . 010/. 015 inch of full compression.

5.14 FRAME AND FOCUS CONTROL

Check frame and focus control knob adjustments as follows:

Remove the first mirror assembly (figure 3, sheet 2, item 11) and project on a screen or similar light background when performing FRAME or FOCUS setting adjustment. The projected picture size must be the same as the size of the rear screen on the seventy model being adjusted. Use only film that has a sound stripe and balance stripe to ensure equal focus condition.

NOTE

The FRAME control knob (located on the left side of the projector front panel) adjusts the projected picture up and down (left and right, looking at aperture) due to possible printing errors. The FOCUS control knob (located on the right side of the projector front panel) adjusts the lens forward or backward relative to the aperture to sharpen the picture by changing the back focal distance of the projector lens to the aperture.

A. Loosen set screw (figure 3, sheet 2, item 61) of limit collar (figure 3, sheet 2, item 4) on shaft (figure 3, sheet 2, item 36) for FRAME control (figure 3, sheet 2, item 37) for FOCUS control.

B. Leave the collar loose and turn the FRAME (or FOCUS) control knob until the picture is centered in the aperture (or clearly focused if adjusting for FOCUS control).

CAUTION

The screw thread on the flexible framing shaft (figure 3, sheet 2, item 36) has a large range and damage to the claw, aperture plate, and cam can occur if the rough position of the claw is not centered (during its full travel) in the aperture plate guide before making the final limit adjustment to the range limit collar.
The same is true for the focus flexible shaft. In this case the blue spring finger (figure 4, sheet 1, item 28) should be roughly positioned at 90° to the lens optical axis before making the range limit adjustment.

NOTE

If the projector lens is replaced the focus through condition may have to be reset to ensure proper picture focus. If the picture shifts from left to right when focusing a loose lens condition may exist. To correct a loose lens condition, remove the lens by lifting up on the blue spring of the focus link assembly (figure 4, sheet 1, item 28) in accordance with paragraph (4.2.1). Press down slightly on the spring before replacing the lens in acoordance with paragraph (4.2.2).

C. After the picture is centered (or clearly focused if adjusting for FOCUS control) position the collar with the set screw facing directly upright on the shaft and tighten the set screw. (Observe that rotation of the control will now be limited by the collar screw interfering with a plastic rib on the grille).

NOTE

Adjustment of the framing collar and set screw will require adjustment of the OFF button. Refer to paragraph 5.15. FRAME setting moves the claw (which changes the FRAME or picture location on the screen). Movement of the claw setting necessitates readjustment of the setting for the OFF button because both FRAME and OFF are dependent on the claw setting.

5.15 OFF BUTTON

Check OFF button adjustment as follows:

NOTE

If the claw tip is just withdrawn from the aperture plate claw insert guide when the OFF button is depressed and the claw is in its maximum penetration position (half pull down position) NO adjustment should be necessary.

A. Loosen set screw (figure 3, sheet 1, item 60) on collar (figure 3, sheet 1, item 29) on shaft (figure 3, sheet 1, item 30).

B. Depress OFF button until the claw tips (figure 4, sheet 1, item 74) are retracted in the claw insert guide (figure 4, sheet 1, item 50) by means of pawl (rotate cam such that claw is in maximum penetration position) (figure 4, sheet 2, item 93). (The crescent shaped hole in the claw will just begin to appear at the back of the aperture plate.)

NOTE

This is the mechanical push rod device which disengages the claw from the film causing the projector to mismeter; the film sensing arm (sensor) cam trips the micro switch; the projector turns OFF. (see section 2.2.1 and 3.7).

C. Push the collar (figure 3, sheet 2, item 29) tightly against the stop in casting (located directly in front of the collar) and tighten the set screw (figure 3, sheet 2, item 60).

CAUTION

Improper setting of the collar can cause damage if the claw is allowed to be shifted out of its guide in the aperture plate.

D. Keeping the OFF button depressed rotate the fan blade (figure 4, sheet 1, item 107) or cam to ascertain that maximum claw withdrawal has been set.

NOTE

If the framing lever is disturbed by adjustment of the framing collar and set screw the OFF button must be readjusted.

5.16 LATCH PAWL

A. Latch Pin. The pin that protrudes from the pawl assembly (figure 4, sheet 2, item 51) and engages with the "ON" link assembly (figure 4, sheet 2, item 44) should protrude .196 ± .003 from pawl casting wall.

B. Unlatch Force. The force required to unlatch the ON mechansim should be between 250 and 800 grams. This force is measured by first latching up the ON mechanism (with no AC power). Then using a 0/1000 gram gage, through the main casting hole just above the pawl, apply a force directly towards the front of the unit at the cross pin that goes through the pawl casting.

5.17 ACTUATION ARM ASSEMBLY

If the main shaft assembly (figure 4, sheet 2, item 43) is disturbed or replaced the actuation arm assembly (figure 4, sheet 2, item 46) a blue leaf spring, which is mounted by a set screw (figure 4, sheet 2, item 49) should be located as shown in figure 2-2. That is, when the projector is turned ON, the blue leaf spring must come in contact with the micro switch button. Perform the following procedures.

A. While the projector is ON pull the blue leaf spring of the actuation arm assembly (figure 4, sheet 2, item 46) directly forward toward the front of the projector, disengaging it from the micro switch button.

B. Measure the distance of travel the blue leaf spring must cover before the projector turns OFF.

C. If overtravel (against the button) of the blue leaf spring is not 20 thousandths of an inch (measured back from the button of the micro switch) adjust it to that value by loosening the set screw (figure 4, sheet 2, item 49), repositioning and tightening.

5.18 SENSOR MICRO SWITCH

Sensor micro switch should be positioned such that the body of the switch (figure 4, sheet 2, item 56) is spaced .035/.040 from the operating cam surface (figure 4, sheet 2, item 53). Adjustment is made by loosening two mounting nuts (figure 4, sheet 2, item 57) and sliding switch body toward or away from cam.(see fig 5-8).

NOTE

If this adjustment is required it is suggested that the existing sensor bracket assembly (P/N 15-A180) be replaced with type used in current models. (S/N J003040 and up). Current type can be identified by the included angle on the sensor cam surface (figure 4, sheet 2, item 53) which is reduced to 13 degrees from 20 degrees (included angle of radial surface referenced to pivot). See figure 5-7, 5-8.

5.19 STATIC SENSOR FORCE

The force of the sensor return spring (figure 4, sheet 2, item 56) should be 5 to 8 grams When the sensor is in the synch position as shown in figure 5-7.

To Measure:

A. Disengage shutter belt (figure 3, sheet 1, item 38).

B. With a 15 gram scale placed at the arc of the sensor (figure 4, sheet 2, item 53) push backward, toward the rear of the unit to the nominal sync position. (Use sensor gauge for position). The force at this position should be 5 to 8 grams, adjustable by stretching or replacing the spring (figure 4, sheet 2, item 60).

5.20 SENSOR SERVO ADJUSTMENT

NOTE

Before proceding with these adjustments the sensor micro switch (refer to section 5.18) and sensor static force (refer to section 5.19) adjustments must be made. The procedures outlined in this section presume replacement of the sensor assembly as specified in the note of section 5.18.

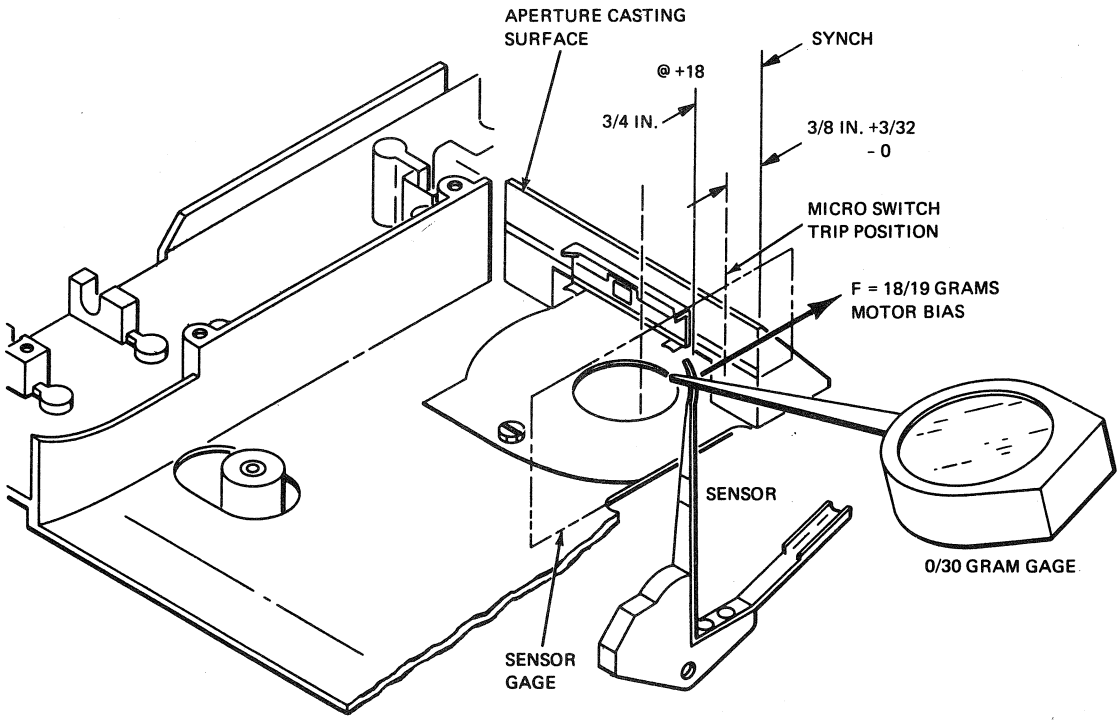


Figure 5-7. Sensor Micro Switch

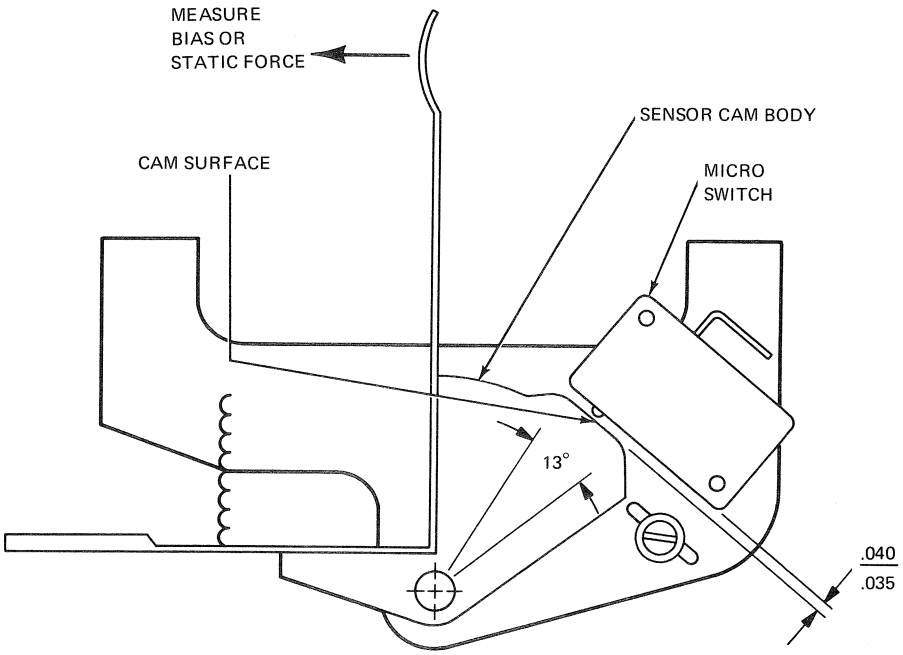


Figure 5-8. Sensor Adjustment

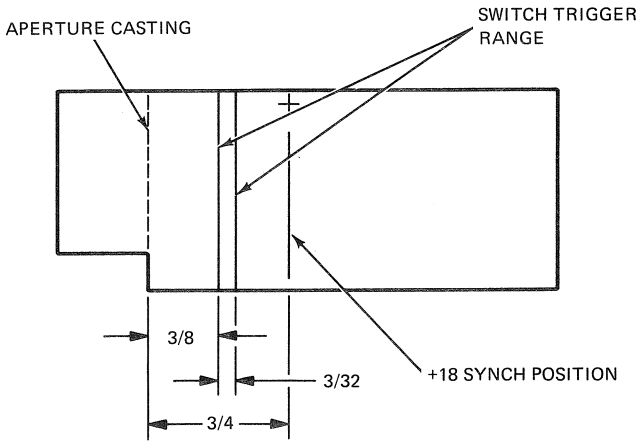


Figure 5-9. Sensor Gauge (full scale)

5.20.1 Motor Bias - Sensor Servo

A. Remove the roof plate (figure 3, sheet 2, item 2) by removing the four screws (figure 3, sheet 2, item 54) and lifting from mechanical assembly.

B. Insert sensor special gauge (See figure 5-9) between aperture plate (figure 4, sheet 1, item 50) and casting.

C. Plug line cord into 115 volt receptacle.

D. Place tip of 30 gram scale against arc of sensor arm (figure 4, sheet 2, item 53). With 30 gram scale in place, depress "ON" lever to start projector (Note projector will remain on as long as pressure against sensor arm is maintained in central position.) (See figure 5-7)

E. Move sensor arm with 30 gram scale towards rear of unit until sensor arm lines up with + mark on sensor gauge. This is the nominal sync position.

F. Holding the position of step E, a bias force of 16 to 18 grams should be read on scale; if not, procede to step G.

G. To achieve the 16 to 18 gram reading, set motor bias by adjusting spring loaded screw (figure 4, sheet 1, item 118) on motor casting (figure 4, sheet 1, item 7) clockwise to increase and counterclockwise to decrease this bias.

NOTE

Bias is the tilting of the motor to make the shutter drive (flat) belt tend always to ride up the knurled cone pulleys (towards slow speed operation) causing the sensor arm to engage and follow the film, creating a loop, while maintaining proper sound sync at the nominal, +18 frames. A quick check of the motor bias and static bias may be made by starting the projector with an unloaded cartridge and noting the time it takes (while holding the ON button down) the sensor to ride from its full rear to its full front positions. This time will be from 1/2 to 2 seconds for normal operation.

5.20.2 Sensor Micro Switch Adjustment

With unit set per steps A, B, C of section 5.20.1, procede as follows:

A. Move sensor arm (figure 4, sheet 2, item 53) manually towards the rear of the unit. Observe that the unit trips off when the sensor arm passes between the two red lines on the sensor gauge. If it does, the micro switch is set properly, if not, procede to step B.

B. Loosen locking screw slightly (figure 4, sheet 2, item 62) on the micro switch assembly (figure 4, sheet 2, item 54).

C. Rotate micro switch assembly in slot as required to meet step A. Tighten screw.

D. Repeat step A; if step A is met, no further adjustment is required. If not, repeat step B as required.

E. Recheck motor bias 5.20.1 and adjust if necessary.

NOTE

If adjustment of micro switch is difficult, recheck per section 5.18.

5.21 SENSOR AXIAL CLEARANCE

The axial play of the sensor cam assembly (figure 4, sheet 2, item 53) on its mounting bracket (figure 4, sheet 2, item 52) shall be .005/.010 as determined by the position of the retaining ring (figure 4, sheet 2, item 61).

5.22 DRIVE ROLLER

Check drive roller return force as follows:

A. Place one end of a 0/250 gram scale against the right side of the drive roller (figure 4, sheet 2, item 1) itself.

B. Pull toward the left side of the projector as far as possible (until a physical limit is felt). The return force (at break-away from stop) should be 200 $\pm$ 25 grams, measured at the point the drive roller starts to return (when pressure is lessened on the gram scale).

5.23 ROOF PLATE SUBASSEMBLY

For reassembly and adjustment of the roof plate subassembly (figure 3, sheet 2, item 2), perform the following procedures:

A. Position the roof plate subassembly down on the casting with its locating holes over the screw positions in the casting.

B. Install the four hex washer head screws (figure 3, sheet 2, item 54) loosely, favoring the left-most position by pushing the roof plate subassembly snugly to the left.

C. Slide a cartridge in position on the projector against the aperture plate (figure 4, sheet 1, item 50) and hold against the left side of the cartridge positioning flange on the operating unit assembly casting.

D. While holding the cartridge in place, position the roof plate subassembly forward until the molded guide rollers (figure 3, sheet 2, item 6) begin to rise.

NOTE

Rollers should rise approximately 10 to 15 thousandths of an inch. This indicates the guide rollers are resting on the front edge of the recess for guide rollers in the cartridge top applying inward pressure.

E. Check that the side guide roller located on the right side of the roof plate subassembly is broken away slightly (from left-hand pressure of the cartridge).

F. When both forward-to-rear pressure is correct as in step D and left-hand pressure is correct as in step E, above, tighten the four hex washer head screws maintaining the roof plate subassembly positioning.

G. Check by sliding the cartridge in and out. The guide rollers should be applying the sufficient pressure to "snap" the cartridge forward and to the left against the guide rails, the aperture plate, and the forward stop post.

5.24 SHUTTER ASSEMBLY

If the shutter assembly (figure 4, sheet 1, item 65) is disturbed or removed, the set screw (figure 4, sheet 1, item 66) should line up on a flat which is located on the cam shaft. An end play of 3 thousandths to 6 thousandths of an inch should be maintained between the cam shaft and the pulley.

5.25 MOTOR PULLEY

If the motor pulley (figure 4, sheet 1, item 8) is removed, it must be repositioned with the two flywheel belts (figure 3, sheet 1, item 47) riding parallel to the grooves with unit running.

5.26 DRIVE ROLLER ARM

The axial play at the drive roller arm assembly (figure 4, sheet 2, item 2) should be .005/.010 adjusted by positioning retaining ring (figure 4, sheet 2, item 129).

5.27 DRIVE ROLLER SHAFT

Drive roller shaft (figure 4, sheet 2, item 1) and pulley (figure 4, sheet 2, item 3) when reassembled in arm assembly (figure 4, sheet 2, item 2) shall have .003/.008 axial play determined by the pulley position.

TABLE 5-2

SUMMARY OF ADJUSTMENTS

Section Reference	Description	Value
5.4	Pressure shoe force	40 ± 5 grams
5.5	Pinch roller force	450/700 grams
5.6	Film Guide	.020 inch lift off
5.7	Aperture movable guides left right	 10 ± 5 grams 30 ± 5 grams
5.8	Aperture plate location	.089 inch ± .001 from capstan. In line ± .002 with optical axis.
5.9	Stop post	.000/.005 inch clearance
5.10	Claw force In-Out Pull-down	 325 ± 25 grams 100 ± 25 grams
5.12	Claw penetration	.030/.040 inch
5.13	Claw pivot	.010/.015 inch compressed
5.14	Framing	± 5% min.
5.14	Focus	Through focus
5.15	OFF Limit	Claw withdrawn flush
5.16	Latch Pawl	.196 inch ± .003
5.17	Actuation arm	.020 inch overtravel
5.19	Static sensor force	5 to 8 grams
5.20.1	Motor bias	16/18 grams
5.20.2	Sensor micro switch	3/8 inch min 15/32 inch max
5.22	Drive roller force	200/± 25 grams
5.24	Shutter pulley	.003/.006 inch axial play
5.26	Drive roller arm	.005/.010 inch axial play
5.27	Drive roller shaft	.003/.008 inch axial play
5.28	Sensor micro switch	.035/.040 inch space

5.28 AMPLIFIER SERVICING

The amplifier used in the Fairchild Series Seventy MoviePak projectors contains two basic sections. The first consists of two NPN transistor stages forming a high gain, frequency compensating preamplifier. The second section is a two-watt monolithic integrated circuit power amplifier. These two sections are joined in the system by way of the volume control. The amplifier drives either an internal 16-ohm speaker or external earphones (16 ohms minimum impedance).

5.28.1 Troubleshooting

Standard practices may be used to troubleshoot the amplifier. Care must only be exercised in that B+ is the common return for the speaker and any accidental short to ground with the speaker leads or phone jack will cause serious damage to the amplifier. In case of trouble, make visual inspection of all associated wiring to and from the amplifier board including the volume control and ear phone jack. Refer to figure 3-3 for wires and colors or figure 5-10 and 5-11 for schematic and component layout (see also figure 5).

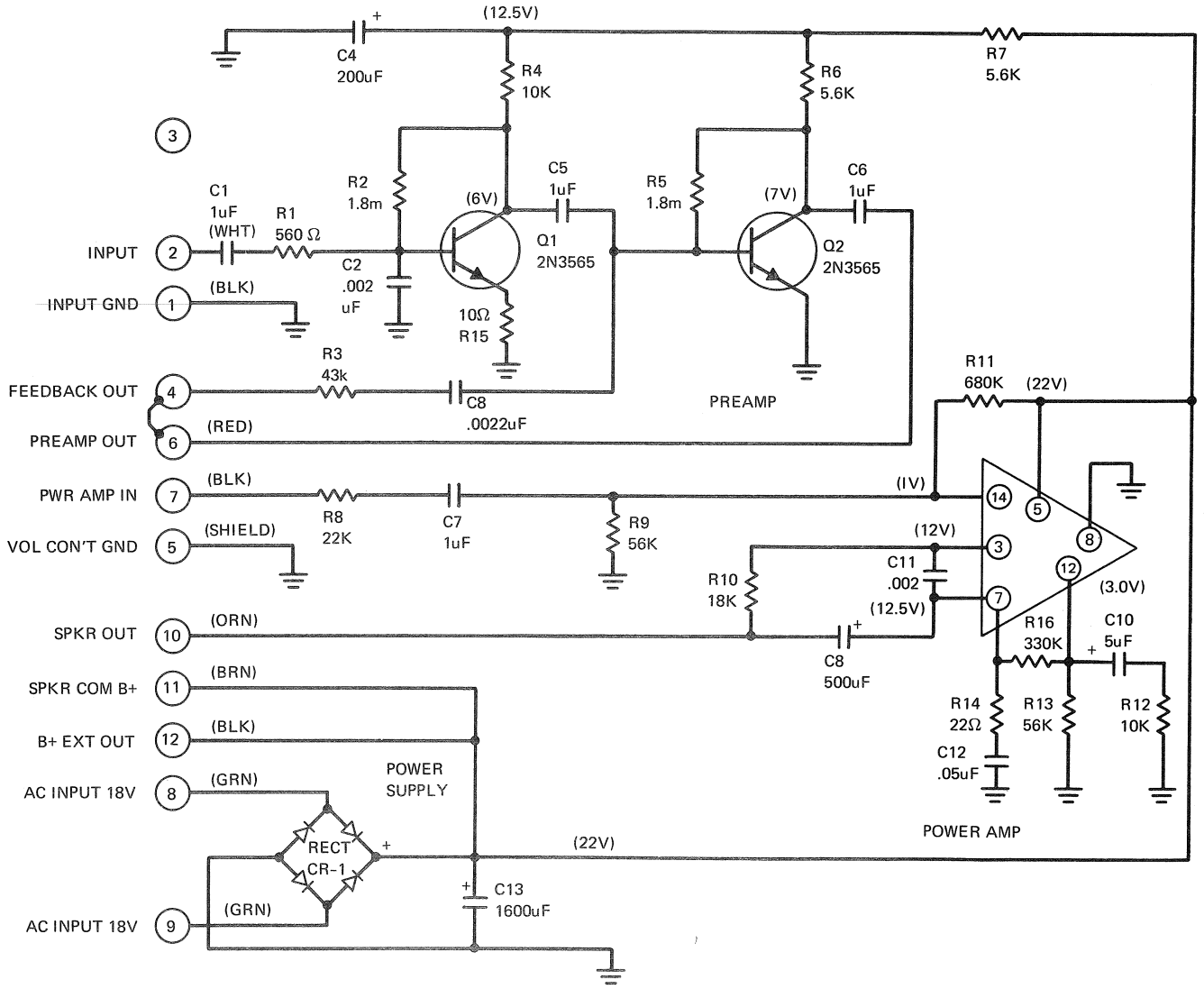
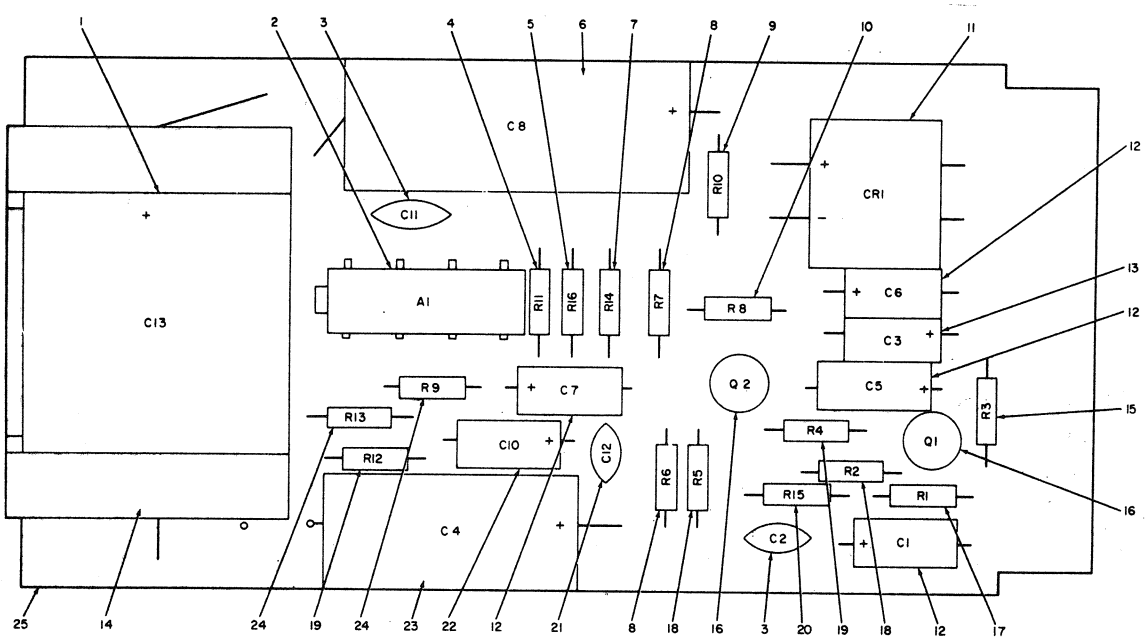
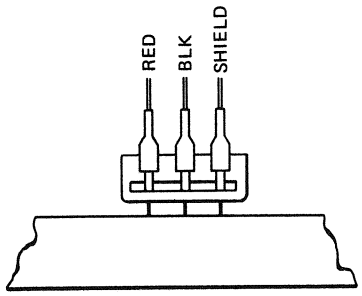
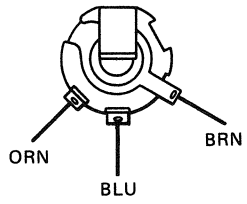


Figure 5-10. Schematic Amplifier





VOLUME CONTROL
TOP VIEW



PHONE JACK
REAR VIEW

NOTE:

ALL VOLTAGE MEASUREMENTS TAKEN AT 117 V AC LINE, USING 20,000 Ω IV V.O.M. NEG. COM. CONNECTED TO NEG. TERM OF C13

Figure 5-11. Amplifier Components

5.28.2 General Localizing

To quickly localize an audio fault the following method may be used. With no film pak inserted, activate the "ON" switch (micro switch) in front of motor (figure 4, sheet 1, item 106) by hand. Turn volume control (figure 3, sheet 2, item 26) full clockwise (maximum volume). Grasp metal blade of screwdriver with hand and tap and scratch red wire terminal of volume control. A low click and hum should be present in speaker. If not, trouble is probably in the output stage of amplifier circuit, speaker wiring or earphone jack wiring. If click and hum is heard in above step, touch either end of C5 with screwdriver blade. Again a click or hum should be heard in speaker. If not, problem is in the Q2 circuit, volume control wiring or feedback jumper pins 4 and 6 of amplifier board.

If click or hum is heard in step above, touch negative end of C1 with screwdriver, click or hum should again be heard. If not Q1 circuit is at fault.

If click and hum is heard in all above steps, check wiring of pins 1 and 2 of amplifier board and trace back to play back head.

CAUTION

Do not use ohmmeter in head circuit as head will be permanently magnetized. For further trouble shooting, refer to figure 5-10 for voltage points, transistor connections, power amplifier voltages and power supply.

A signal generator may also be used at any of the above mentioned points instead of screwdriver. If so, connect the ground end of signal generator to pin 1 of the amplifier board, also adjust output of generator so as not to overdrive stages. If the output IC stage is suspected, voltages around the IC will also indicate trouble. Usually B+ (22v) will appear at other than pin 5, or the nominal 12 volts at pin 3 will be abnormally high or low. See trouble shooting chart for possible trouble. (Refer to section VI).

5.28.3 Amplifier Testing Setup

A. The amplifier may be tested in an external test setup shown in figure 5-12.

B. The amplifier may be tested in the projector in the following manner.

1. Carefully remove the hum bucking coil (figure 3, sheet 1, item 14). Be careful not to deform coil and note its exact position in the machine.

2. Place a 16-ohm resistor into the earphone jack (wired as shown in figure 5-12).

3. Connect a 1000:1 divider across pins 1 and 2 of the amplifier board as per figure 5-12.

4. To operate machine without film pack, manually depress power switch (micro switch figure 4, sheet 1, item 106).

5.28.4 Amplifier Performance

CAUTION

Be sure volume control is full CCW (minimum) and that power 18 VAC or 22 volts DC is "OFF" before plugging amplifier into test setup.

A. DC TEST

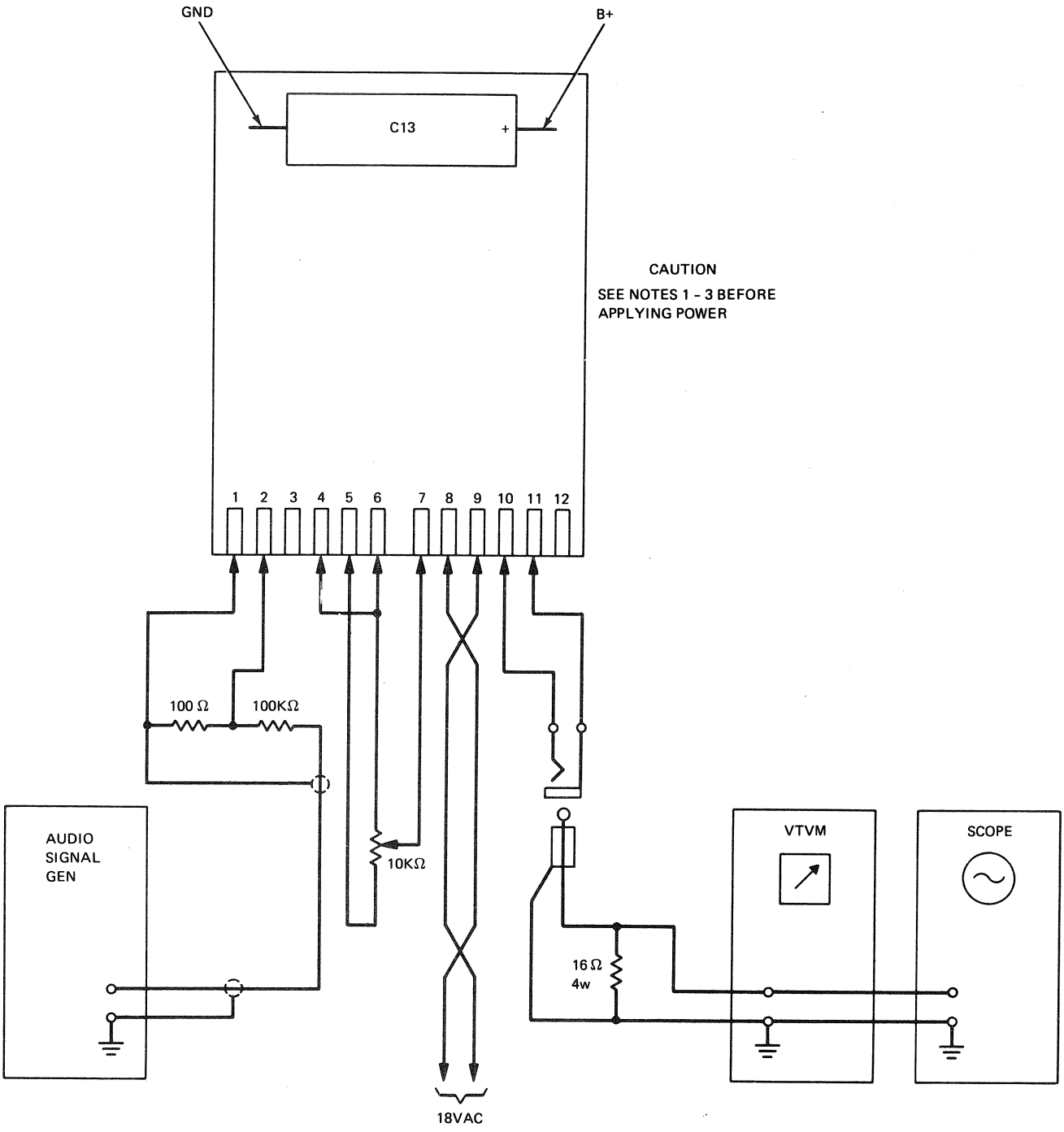
With amplifier in test setup, turn power "ON" measure B+ (across C13) this should be between 20 and 24 volts.

B. GAIN

Adjust signal generator to 1 KHZ and zero output. Turn volume control full CW (maximum) slowly adjust generator output until output of amplifier is 4V across 16-ohm resistor (this is 1-watt output) measure generator output, this reading should be between .1 and .2 volts.

NOTE

.1 to .2 volts generator output through the 1000:1 divider equals 100 to 200 uv to amplifier input.



NOTE

1. No house or external GNDS on test equipment
2. 18 VAC must be isolated from line.
3. Only point of house GND is GND end of C13.
4. In lieu of 18 VAC. The amplifier may be supplied with 22 volts D. C. across C13 between B+ and GND.

Figure 5-12. Amplifier Test Setup

TABLE 5-3

TECHNICAL DATA-AMPLIFIER

Ohmmeter readings can be made on the transistors and rectifier to determine if they are damaged (+ or - indicates ohmmeter polarity).

Transistors	Measuring Point	Read (Ohms)
Q 1 and Q 2	+B to C-	12 ohm (nom)
	+B to E-	12 ohm (nom)
	-B to C+	200K or more
	-B to E+	200K or more
	±E to ±C	6K or more
Recitifier (measured on board unplugged)	+ Pin 8 to B+ (C13)	2K
	+ Pin 9 to B+ (C13)	2K
	- Pin 8 to B+ (C13)	20K or more
	- Pin 9 to B+ (C13)	20K or more
Output IC	± Pin 1 to Gnd.	Infinity
	± Pin 3 to Gnd.	5K or more
	- Pin 3 to Gnd.	3K
	+ Pin 5 to Gnd.	10K or more
	+ Pin 7 to Gnd.	10K or more
	- Pin 7 to Gnd.	10K or more
	± Pin 8 to Gnd.	0 Ohm
	+ Pin 12 to Gnd.	4K
	- Pin 12 to Gnd.	20K or more
	+ Pin 14 to Gnd.	4K
	- Pin 14 to Gnd.	20K or more

In an emergency almost any good grade silicon NPN transistor having a beta of 100 or better may be used in the preamp.

C. MAXIMUM OUTPUT

With volume adjusted as in step above increase generator output until clipping of output sine wave just starts. This should give meter reading of 5.6 volts or more (5.6 v at 16 ohm = 2 w).

D. FREQUENCY RESPONSE

Adjust 1 KHZ signal input to obtain .7 volts amplifier output. (.7v = ODB). Switch generator to 100 HZ. Output should be minimum +11 DB, maximum +15DB above .7v (ODB). Switch generator to 5 KHZ. Output shall be minimum -5DB, maximum ODB referenced to .7 (ODB).

E. NOISE

Short terminals (pins 1 and 2) directly on amplifier space board. Noise voltage on VTVM should be less than 100 MV. (some extremely high gain amplifiers may have slightly higher noise output).

5.28.5 Amplifier Replacement

There are at present two amplifier board configurations and two mating connectors in use. These can be interchanged as follows. One amplifier board has a metal pin at the connector end to prevent the board from seating too deeply into a solder type (green) PC board connector. The second amplifier type has no pin, but its corners are clipped to allow seating into a crimp type (white) connector.

If the wide board is to be used in the white connector, remove the metal pin and file or cut the corners to fit into the connector. The depth of seating is controlled by the depth of corner cutout. If the corner cut board is to be used in the green connector, means must be made to line up the pins and to keep the board from slipping sideways. Also a means of keeping the board from seating too deeply into the connector must be used.

NOTE

If field replacement of the amplifier (figure 3, sheet 1, item 28) is required in a unit with the "green" solder type connector the connector-harness assembly (figure 3, sheet 1, item 10) should be replaced with a "white" crimp type assembly.

5.29 CARTRIDGE

Adjustments to cartridge apply to all sizes unless otherwise noted.

5.29.1 Pressure Pad

Force required to lift the pressure pad away from its seat in the cartridge should be between 75 and 150 grams measured with a 0/250 gram scale on each rail directly opposite the pressure pad spring.

5.29.2 Snubber Spring

The space between the curved portion of the snubber spring and the cartridge front wall should be 3/32 ± 1/32. Note that straight section of spring must clear plastic boss by 1/16 inch minimum.

NOTE: REFER TO SECTION VIII FOR PARTS IDENTIFICATION (SEVENTY-07 PROJECTOR)

5.30 GRILLE AND CONTROL PLATE INSTALLATION

The grille and control plate assembly installation procedure is the reverse of disassembly (refer Paragraph 4.12) using the following dimensional alignment procedure: (Seventy-07)

A. Mount the grille to the mechanism casting plate holding a 1/16" clearance to the casting front edge. Center the grille to the casting, then tighten screws (Figure 1, Index 12).

B. Mount the control plate to the grille while aligning the (4) case mounting screw holes in the control plate and grille. Install and tighten (4) screws. (Figure 2, Index 23)

NOTE

If a new grille is being installed, the (4) grille to control plate mounting screw holes may not be located in the grille. Align the grille and control plate via the case mounting screw holes, then spot drill (4) holes.

5.31 ON-OFF CONTROL LEVER ASSEMBLY INSTALLATION

Installation of the ON-OFF Control Lever Assembly is the reverse of disassembly (refer to Paragraph 4-13), using the following alignment procedure: (Seventy-07)

A. Before tightening the assembly mounting screws (Figure 1, Index 12 and Figure 2, Index 47), align the control lever to provide equal side clearance of the lever in the control plate slot.

B. Hold this position, then tighten the mounting screws.

C. Install the ON Rod and ON Lever.

NOTE

The OFF micro switch mounting to the assembly is held by (2) screws. No adjustment is provided for micro switch placement. When replacing the switch, tighten the mounting screws firmly; however, DO NOT over tighten as the switch may be damaged.

5.32 MECHANISM ASSEMBLY TO CASE ASSEMBLY (ALIGNMENT) (Seventy-07)

Installation of this assembly is the reverse of disassembly (refer to Paragraph 4.11) with the following alignment notations.

A. Install (2) lockwashers (Figure 1, Index 11) and (2) hex mounting posts (Figure 1, Index 9) and leave loose.

B. Before tightening the (2) rear mechanism casting hex mounting posts, hold the mechanism firmly toward the rear of the case, then tighten posts.

C. Install front mounting screws (Figure 2, Index 75).

5.33 BEZEL AND TOP PLATE ASSEMBLY (Seventy-07)

Installation of this assembly is the reverse of disassembly (refer to Paragraph 5.30) with the following alignment notations.

A. Install the Bezel and Top Plate Assembly with the Top Plate front flange over-lapping the control panel edge and the right and left hand cover flanges over lapping the mechanism light shields.

B. Install (4) Top Plate mounting screws and tighten.

NOTE: Check to be certain that the external phone jack terminal insulators are in place before installing the Top Plate. The jack must not be permitted to short against the mechanism chassis. A direct short will damage the amplifier.

5.34 ON-OFF CONTROL LEVER TO MICRO SWITCH ADJUSTMENT (Seventy-07)

A. The lever arm clearance to the micro switch button should be 1/32" when the arm is in neutral position.

B. If required, adjust this clearance by bending the lever arm slightly.

5.35 FRAME AND FOCUS CONTROL (Seventy-07)

Check frame and focus control knob adjustments as follows:

Remove the mirror assembly (Figure 2, Index 26) by loosening thumb screw, then lift mirror assembly out. Project on a screen or similar light background when performing FRAME or FOCUS setting adjustment. The projected picture size must be the same as the size of the rear screen on the "Seventy" model being adjusted. Use only film that has a sound stripe and balance stripe to ensure equal focus condition.

The FRAME control knob (located on the left side of the projector front panel) provides adjustment of the projected picture up and down (left and right at aperture) due to possible printing errors. The FOCUS control knob (located on the right side of the projector front panel) provides adjustment for the lens to FOCUS the picture.

A. Loosen set screw (Figure 2, Item 56) of limit collar (Figure 2, Item 55) for FRAME control, and (Figure 2, Item 61) for FOCUS control.

B. Leave the collar loose and turn the FRAME (or FOCUS) control knob until the picture is centered in the aperture (or clearly focused if adjusting for FOCUS control).

CAUTION

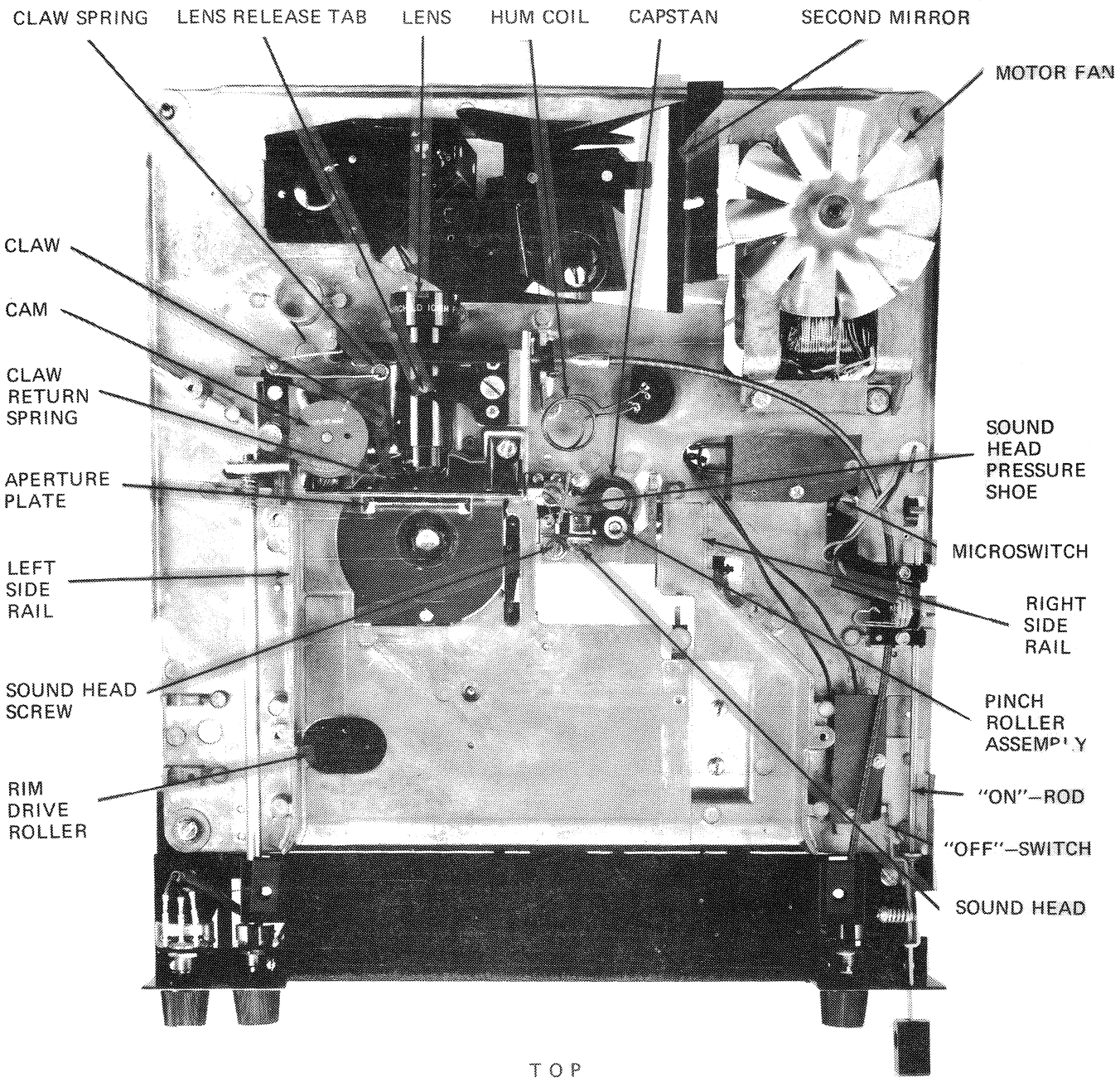
The screw thread on the framing shaft (Figure 2, Item 51) has a large range and damage to the claw, aperture plate, and cam can occur if the rough position of the claw is not centered (during its full travel) in the aperture plate guide before making the final limit adjustment to the range limit collar.

The same is true for the focus flexible shaft. In this case, the blue spring finger on the focus link assembly should be roughly positioned at 90° to the lens optical axis before making the range limit adjustment.

NOTE

If the projector lens is replaced, the focus through condition may have to be reset to ensure proper picture focus. If the picture shifts from left to right when focusing a loose lens condition may exist. To correct a loose lens condition, remove the lens by lifting up on the blue spring of the focus link assembly in accordance with paragraph 4.2.1. Press down slightly on the spring before replacing the lens in accordance with paragraph 4.2.2.

C. After the picture is centered (or clearly focused if adjusting for FOCUS control), position the collar with the set screw facing directly upright on the shaft and tighten the set screw. Observe that rotation of the control will now be limited by the collar screw interfacing with a metal tab on the control plate.



Top View

Figure 5-13. Seventy-07 Projector Mechanism Assembly
(Shown with roof plate removed)

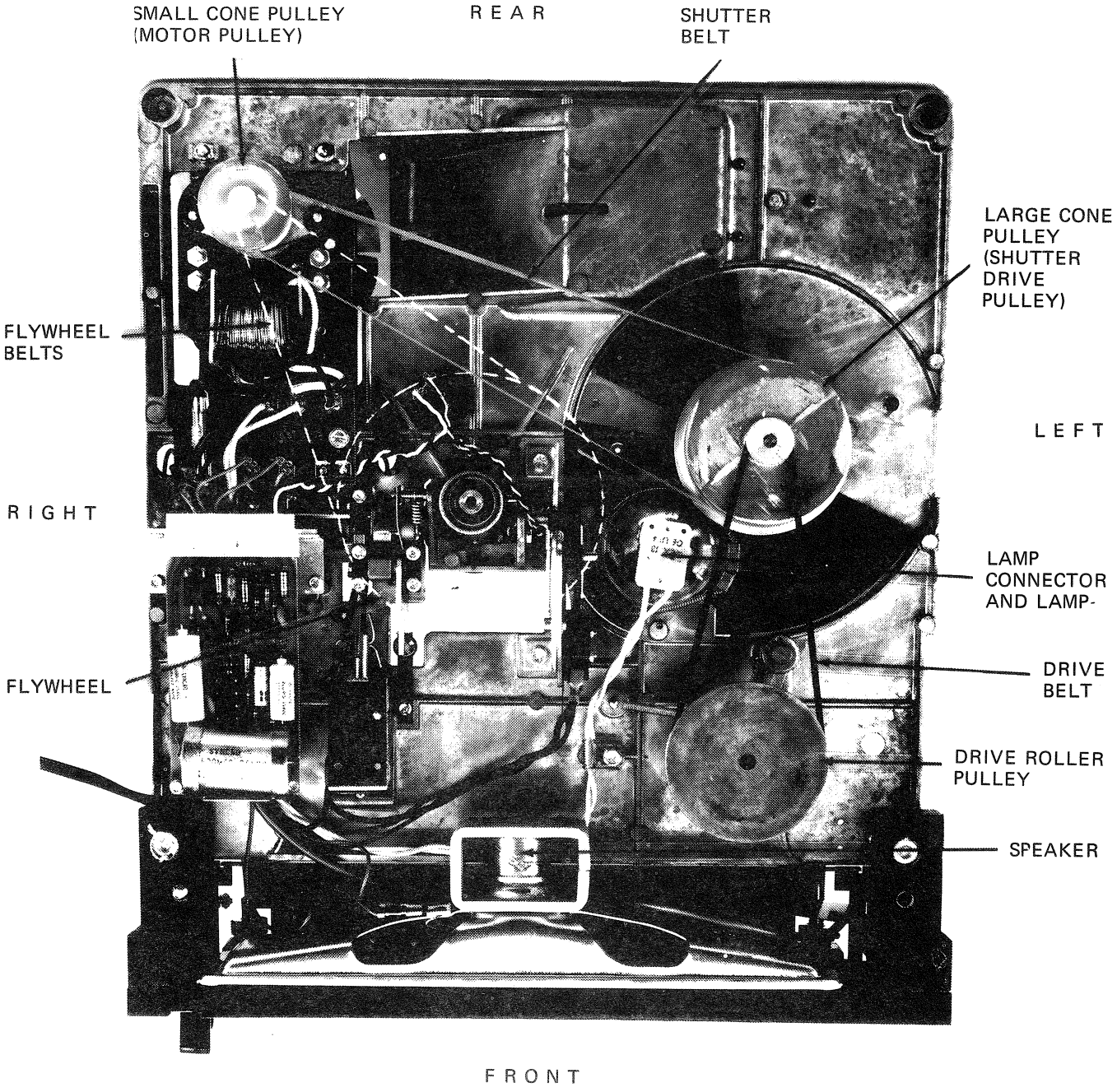


Figure 5-14. Seventy-07 Operating Unit Assembly, Bottom View

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SECTION VI
TROUBLESHOOTING

GENERAL

Specific troubles and their probable causes and remedies are listed in the troubleshooting charts, see figures 3-3, 5-3, 5-4, and 5-5, the wiring and schematic diagrams, and Section VII when parts replacement is required.

** Indicates items related to production design changes which may be changed in the field during normal service.

TABLE 6-1

MECHANICAL TROUBLESHOOTING

TROUBLE	PROBABLE CAUSE	REMEDY
ON-Marginal.	Stiff on-rod spring	**Replace (figure 3, items 43 and 49). (see service bulletin 70-1 item 2)
	Belt bias marginal correct loop forms very slowly.	Adjust. (Section 5. 20. 1)
	Sensor microswitch will not be activated in spite of correct loop size.	**Replace with smaller angle cam. (figure 4, sheet 1, item 53). P/N 15-A180. (Section 5. 20. 2)
Film appears to roll and streak, chattering noise.	Film passed above sensor. No loop will be formed. Picture moves up on screen.	**Adjust and reshape sensor (insert cartridge front end down.) Replace cam (above). (see service bulletin 70-100 and section 5. 18)
		Claw pulled out of aperture assy. Insert and adjust limit collar. (Section 5. 15)
No turn on, latches but does not run.	Power on microswitch is not actuated. (no light or noise.)	Adjust actuation arm. (figure 4, sheet 2, item 46). (Section 5. 17)
ON button jammed down without cartridge.	Sticky bearing on rod guidance.	**Replace with black (figure 3, item 49) front bearing. (see service bulletin 70-1 item 2)
On ll not latch projector works ok while holding on.	Incorrect sensor adjustment or latch pin location has shifted.	Adjust. Relocate and secure. (figure 4, sheet 2, item 51) (Sections 5. 20 and 5. 16)
	Pinch roller spring mounting pin loose.	Replace pinch roller assembly (figure 4, sheet 2, item 17)

TABLE 6-1 (cont)

MECHANICAL TROUBLESHOOTING

TROUBLE	PROBABLE CAUSE	REMEDY
Projector starts but does not stay on.	Mismetering; aperture plate spring guides bent down.	Adjust or replace guides, (section 5.7) or replace aperture plate (section 5.8) (figure 4, sheet 1, item 50).
	Mismetering; no rim drive.	Check and replace drive belt. (figure 3, sheet 1, item 46). Check spring force (Section 5.22).
	Sensor microswitch (figure 4, sheet 2, item 56), maladjusted.	Adjust for correct shut off. (Section 5.20.2)
OFF - Slow or intermittent	Loop will disappear but microswitch will not be actuated.	High bias force (Section 5.20.1). Sensor deflects, adjust microswitch. (Section 5.20.2)
No shut off.	Defective amplifier, no D.C.	Replace amplifier board assembly (figure 3, sheet 1, item 28). (Section 5.28)
	Defective solenoid.	Replace solenoid (figure 4, sheet 2, item 68).
Film jamming.	Use of other than "S" splice.	Resplice film (Service bulletin 70.2 and Section 8.2).
	Poor or worn splice.	Resplice film (Section A.2).
	Dirty film.	Clean film.
	Improper clearance loop.	Reset clearance loop. (Section A.1)
	Damaged cartridge.	Replace cartridge.
	Broken or missing belts.	Replace belts. (figure 3, sheet 1, items 38, 46, or 47). (Refer to Section 5.20.1 to readjust).
Noisy cartridges.	Film rattles against cartridge top.	**Add velvet damper strip to cartridge top. (Service bulletin 70-100).
Cartridge does not insert.	Lamp mirror actuator rod is out of slot. Mirror has dropped down.	Return rod (figure 3, sheet 1, item 5) to slot.
Picture jumps from side to side (jitters).	Cartridge pressure pad spring weak or out of position.	Increase pressure or install new spring (figures 9 and 10, item 5). (Section 5.29).

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TABLE 6-2

OPTICAL TROUBLESHOOTING

TROUBLE	PROBABLE CAUSE	REMEDY
Focus poor right to left.	Pressure pad spring deformed or derailed in cartridge or (figure 9 and 10, item 5). Low force.	Relocate or adjust/replace. (Section 5.29).
Image toward right.	2nd mirror (figure 4, sheet 1, item 70) dislocated from groove in casting.	**Push mirror back up into groove position. (Service bulletin 70-100 item 25). Adjust from below with 5/16 hex nut driver. (Section 4.3.1)
Image up-down shifted.	3rd mirror dislocated. 1st mirror not tightly seated.	Adjust framing. Seat first mirror. Adjust 3rd mirror in corner. (Section 4.3.2).
Picture tilts.	First mirror not seated.	Snap first mirror (figure 3, sheet 2, item 11) into place.
Picture tilts more than 2 °.	Second mirror out of slot.	Place second mirror mounting subassembly (figure 4, sheet 1, item 70) in slot on base plate and adjust. (Section 4.3.1).
Light spot on screen.	Light baffle (figure 1, item 22) on lens out of place.	Reposition.
	Felt in storage tray is folded back.	Lie felt flat (figure 6, item 2).
Milky focus.	Dirt on lens and/or mirrors.	Clean lens and/or mirrors. (Section 4.2.1).
	Excessive bleeding due to defective lens.	Replace lens (figure 3, sheet 1, item 45). (Section 4.2.1).
No focus or control.	Lens focus link assembly not seated in slot on lens.	Seat focus link assembly (figure 4, sheet 1, item 28) in slot. (Section 4.2.2).
	Focusing collar misadjusted.	Readjust (Section 5.14).
No picture; sound normal.	Projection lamp dropped out of socket.	Reinsert lamp (figure 3, sheet 2, item 42). (Section 4.1).
	Dirty or loose lamp connector pins.	Replace lamp connector (figure 3, sheet 2, item 18).
	Motor winding open.	Replace motor (figure 4, sheet 1, item 9). (Refer to section 5.20.1 if replaced).
	Lamp mirror hung up.	Check return spring (figure 3, sheet 2, item 3), or actuator rod (figure 3, sheet 2, item 5). Snap mirror down.

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TABLE 6-3

AUDIO TROUBLESHOOTING

TROUBLE	PROBABLE CAUSE	REMEDY
No sound; picture normal.	Broken leads between amplifier board assembly and speaker.	Make continuity checks, resolder or replace wire assembly.
	Defective amplifier board assembly (figure 3, sheet 1, item 28).	Replace amplifier board assembly. (Section 5.28).
Poor Sound.	Poor sound on film.	Use SMPTE test cartridge known to have good sound.
	Pressure shoe misaligned.	Align pressure shoe (figure 4, sheet 1, item 79) to pole piece of sound head. (Section 5.4).
	Insufficient spring force on pressure shoe.	Adjust spring force. (figure 4, sheet 1, item 81). (Section 5.4).
	Pinch roller spring mounting pin loose.	Replace pinch roller assembly (figure 4, sheet 2, item 17).
Hum level too high.	Hum coil out of position.	Adjust hum coil. (figure 3, sheet 1, item 14). (Section 5.2).
	Defective sound head.	Replace head (figure 4, sheet 2, item 21). (Section 5.3).
Sound synchronization	Film synchronization incorrect on film.	Sound to image separation must be +18 frames.
	Bias adjustment incorrect.	Adjust bias. (Sections 5.20.1 and 5.20.2).
Intermittent sound.	Sound stops - hiss and noise audible. Loose head wires - will work ok if unit is opened and wires moved.	**Solder head wires to push terminals (figure 3, item 12). Do not adjust sound head. (Service bulletin 70-1 item 3).
Sound quality varies with same cartridge if reinserted.	Film hangs up on guide fork (figure 4, sheet 1, item 82) or marginal adjustment.	Clean guide fork, pressure shoe location and force. Adjust head. (Sections 5.3 thru 5.6).
Fluttering sound unit shuts down.	Flywheel loose. (figure 3, sheet 1, item 63, 69).	**Use nylon and flat washer below screw. (Service bulletin 70-1, item 4).
Wow or slow speed.	Flywheel rubs bottom of case.	**Replace flywheel screw with Allen screw and nylon washer. (Service bulletin 70-1, item 4).

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ILLUSTRATED PARTS LIST

for

SEVENTY-21 MOVIEPAK PORTABLE

SEVENTY-31 MOVIEPAK MINICONSOLE

and

SEVENTY-41 MOVIEPAK CONSOLE

AUTOMATIC CARTRIDGE 8-MM FILM PROJECTORS

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SECTION V11

ILLUSTRATED PARTS LIST

This section contains the complete parts list separated into figures by assemblies and keyed to associated illustrations by figure and index numbers. The relation of each part to tis next higher assembly is shown either by indention (paragraph) or by figure cross-reference notes (paragrapn 7-2).

7.1 INDENTION

7.1.1 Parts are indented to indicate item relationship or next higher assembly. The nomenclature of each assembly is followed in the list by the nomenclature of its component indented one column to the right. This indention indicates the relationship of the component to the assembly. To determine the next higher assembly of a part or assembly, note the column in which the first word of the nomenclature appears. The first item directly above, which appears one column to the left is the next higher assembly.

7.2 CROSS-REFERENCES

7.2.1 The notation "(See figure___for detail breakdown)" following the description of a part number indicates that further breakdown of the part will be shown on the figure noted.

7.2.2 The notation "(See item ___, figure ___ for next higher assembly following the description of a part number indicates that the correct assembly relationship of the part will be shown on the figure and index number noted.

7.3 UNITS PER ASSY

7.3.1 The quantity shown in this column represents the units required for one next higher assembly, subassembly, or sub-subassembly. The abbreviation "AR" (as required) is used when the quantity required must be determined when the parts are installed. The abbreviation "REF" (reference) indicates that this item has been previously listed under its next higher assembly. The "(See Item ___, figure ___ for next higher assembly)" notation in the description of the item will indicate the figure and index number at which the units per assembly can be determined.

7.4 MODEL NUMBER REFERENCE BREAKDOWN

All Fairchild Audio Visual Equipment is classified by a model number. This number will be located on the projector serial number plate of each projector. The type of model, version, and revision of that model is coded into the model number. The following breakdown sub-divides sample model numbers to provide you with the code and identification of these numbers.

The digits preceding the dash (-) designates the Projector Type.
i.e., 702 - = Seventy-21 Projector
703 - = Seventy-31 Projector

The first digit following the dash (-) designates the Projector Version.

i.e., 702-1 = Seventy-21 (115v 60HZ standard Version)
703-2 = Seventy-31 (115v 50HZ Version)

NOTE: Some model numbers contain (3) digits following the dash (-). In this instance the first (2) digits following the dash (-) designates the Projector Version.
702-112 = Seventy-21 (240v 50HZ Remote Control Version)

The last digit of the numbers following the dash (-) designates the Projector Modification or Revision.
i.e., 702-11 = Seventy-21 (115v 60HZ) 1st Modification or Revision
703-22 = Seventy-31 (115v 50HZ) 2nd Modification or Revision

7.5 USABLE ON CODE

7.5.1 This column indicates code number (s) and letter for parts or assemblies that have been revised or modified after original publication of this manual.

7.5.2 The code number identifies the projector model modification number in which the part or assembly was originally installed and in which the part of assembly may be used as a direct replacement (Ref. Proj. Model Modification Breakdown 7.4).

CODE

0 = Projector Model Modification (First Production Projectors) Number 0

1 = Projector Model Modification Number 1

2 = Projector Model Modification Number 2

3 = Projector Model Modification Number 3

Subsequent model modification following this publication will be described in Service Bulletins. Reference for interchangeability or obsoletion will be made based on the usable on code system published herein.

7.5.3 The code letter (following the code number (s) indicated interchangeability of the part or assembly into earlier projector models either as a direct replacement, interchangeability with replacement of related parts, or not interchangeable on earlier projector models.

Code Letter

A Direct replacement part or assembly

B Interchangeable on earlier models with replacement of related parts or assemblies as specified.

C Not interchangeable on earlier models

D Interchangeable in earlier assemblies as listed only.

E Obsolete part or assembly

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FIG. & INDEX NO.	NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
1-	15-M702-11	MOVIEPAK PORTABLE, Model Seventy-21 . . .	1	
	15-A188	. PORTABLE ASSEMBLY	1	1, A
	15-M702-12	MOVIEPAK PORTABLE (Seventy-21)	1	
	15-A188-1	. PORTABLE ASSEMBLY	1	2, A
	15-M702-13	MOVIEPAK PORTABLE (Seventy-21).	1	
	15-A188-2	. PORTABLE ASSEMBLY	1	3, A
-1	15-A161	. . OPERATING UNIT ASSEMBLY . . . . . (See figure 2 for detail breakdown)	1	1, A
	15-A161-1	. . OPERATING UNIT ASSY.	1	2, A
	15-A161-2	. . OPERATING UNIT ASSY.	1	3, A
	15-A173	. . HANDLE ASSEMBLY.	1	
-2	15-466	. . . HANDLE	1	
-3	15-345-1	. . . CASE HANDLE ARM, RH	1	
-4	15-345-2	. . . CASE HANDLE ARM, LH	1	
-5	Com'l.	. . . SCREW, Flat head, Phillips type . . . . . black nickel, No. 6-32 by 3/8 in. lg.	4	
-6	15-A214	. . STORAGE TRAY AND LID ASSEMBLY . . . (See figure 6 for detail breakdown)	1	
-7	15-A209	. . LAMP STORAGE DOOR ASSEMBLY.	1	
	9-244	. . . LATCH, Door	1	
	15-394	. . . DOOR, Lamp storage	1	
-8	15-355	. . DECAL, Left	1	
	15-A258	. . 3rd MIRROR AND STRAP ASSY. . . . . REF; 15-A258 is similar to 15-A168 except for mounting. (See figure 6 for detail breakdown)	1	3, B
	15-A168	. . 3rd MIRROR ASSEMBLY.	1	
-9	15-A191	. . . 3rd MIRROR PLATE ASSEMBLY	1	
	15-181	. . . . BUMPER, Mirror	2	
	15-334	. . . . PLATE, 3rd Mirror	1	
	9-325-3	. . . . PIN, Cotter	1	
-10	15-321	. . . 3rd MIRROR	1	
-11	9100-492	. . . TAPE, Foam	2	
-12	9-330-4	. . . TAPE, Scotch, dual surface	3	
-13	15-356	. . DECAL, Right	1	
-14	15-425	. . NAMEPLATE, Cover.	1	
-15	15-398	. . KNOB, Portable control	3	
-16	15-A177	. . SCREEN BEZEL ASSEMBLY . . . . . (See figure 7 for detail breakdown)	1	
-17	9-030-52	. . NAMEPLATE-PORTABLE.	1	
-18	9-320-4	. . SCREW, Oval Phillips head, No. 8 by . . . . 3/4 in. lg. stl, Type AB chpl	5	
-19	Com'l.	. . SCREW, Binding head, 6-32 by 5/16 in. lg. . black nickel finish	1	
-20	9-251-1	. . BUTTON, Plug	1	
-21	9-255-1	. . INSERT, EXPANSION	1	
-22	15-446	. . BAFFLE, Light	1	
-23	9-330-4	. . TAPE, SCOTCH, DUAL SURFACE	2	
-24	9100-556	. CLEANING BRUSH	1	

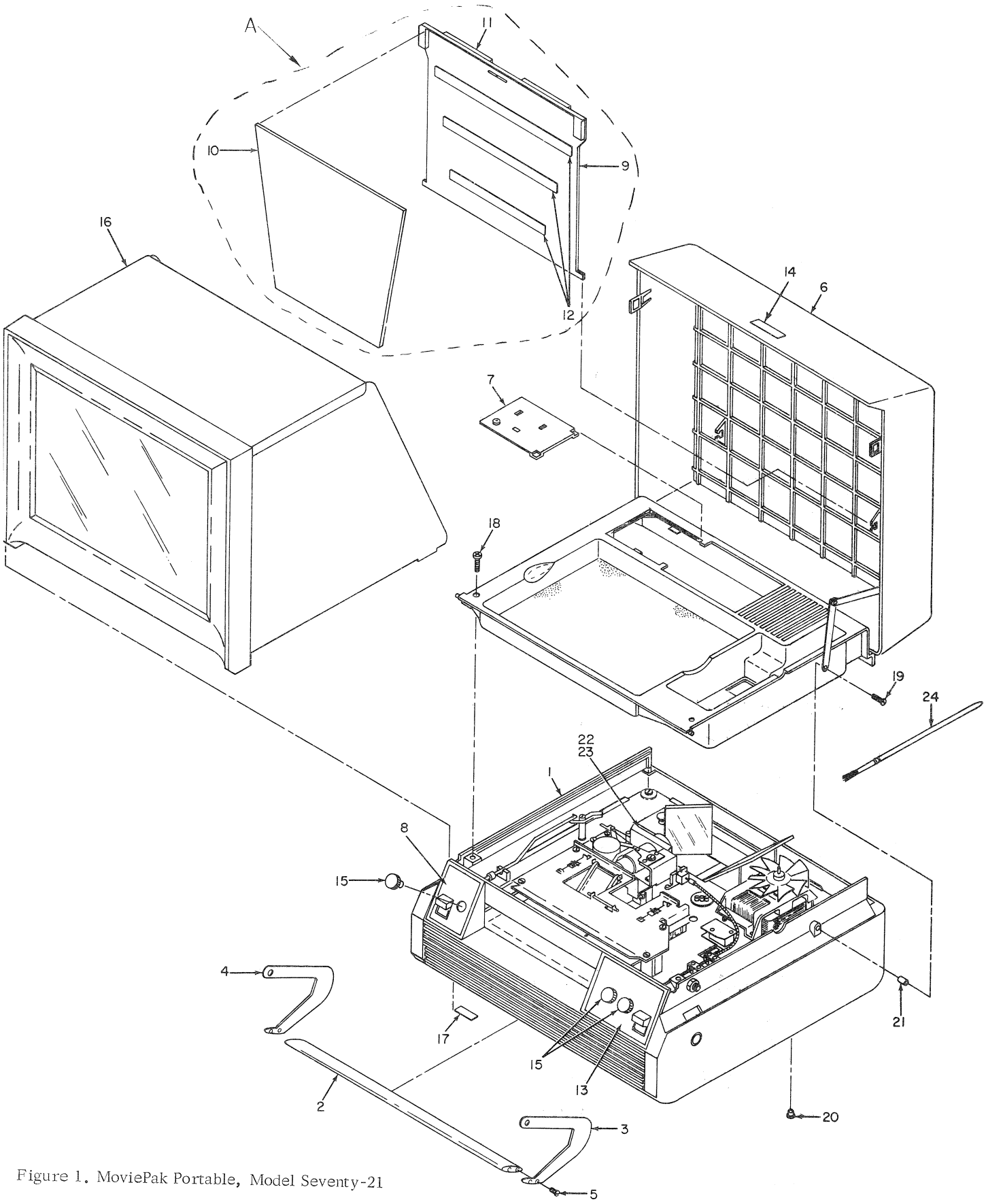

Figure 1. MoviePak Portable, Model Seventy-21

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FIG. & INDEX NO.	NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
2-	15-A161	OPERATING UNIT ASSEMBLY (See item 1, 8, 11, figures 1 and 8 for next higher assemblies)	REF	1, A
	15-A161-1	OPERATING UNIT ASSY.	1	2, A
	15-A161-2	OPERATING UNIT ASSY.	1	3, A
	15-A187	. CASE SUBASSEMBLY	1	
-1	15-402	. . SPECIFICATION PLATE	1	
-2	9-250	. . SPEED NUT, U-type (Tinnerman No. C18551-8A-4)	3	
-3	15-A216	. . DOOR ASSEMBLY, Lamp access	1	
	9-244	. . . LATCH, Door	1	
	15-395	. . . DOOR, Lamp access	1	
	15-435	. . . PLATE, Lamp specification	1	
	9-138-8	. . . SPRING	1	
-4	15-393	. . CASE, Carrying	1	
	15-465	. . LABEL	1	
-5	9-291-1	. . PALNUT, On-sert, No. 8	1	
-6	15-392	. . LATCH, Molded	2	
-7	9-314-2	. . SCREW, Hex. Wash. head, slotted, No. 25 self-tapping by 0.38 in. lg, stl	4	
-8	15-415	. . POST, Case support (bonded in place)	1	
-9	15-A163	. MECHANICAL ASSEMBLY (See figure 3 for detail breakdown)	1	
	15-A163-1	MECHANICAL ASSY.	1	2, A
	15-A163-2	MECHANICAL ASSY.	1	3, A
-10	9-321-2	. SCREW, Hex. Wash. head, slotted, Type AB, thread cutting, No. 8 by 1/2 in. lg, stl	3	
-11	9-321-6	. SCREW, Hex. Wash. head, slotted, Type AB, thread cutting, No. 8 by 1.00 in. lg, stl	1	
-12	9-320-2	. SCREW, Oval Phillips head, No. 8 by 1/2 in. lg, stl, Type AB, Chrome plt	1	
-13	9-321-5	. SCREW, Hex. Wash. head, slotted, Type AB, thread cutting, No. 8 by 7/8 in. lg. stl	2	
-14	9-334	. BUMPER	2	
-15	Com'l.	. WASHER, Lock, No. 8	4	
-16	9-330-5	. TAPE, DUAL SURFACE	1	
3-	15-A163	MECHANICAL ASSEMBLY (See item 9, figure 2 for next higher assembly	REF	
	15-A163-1	MECHANICAL ASSY.	1	2, B
	15-A163-2	MECHANICAL ASSY.	1	3, B
	15-A129	. ROOF PLATE ASSEMBLY	1	
-1	15-A164	. . LAMP MIRROR ASSEMBLY	1	
	15-318	. . . LAMP MIRROR	1	
	15-196	. . . PLATE, Mirror	1	
	9-330-4	. . . TAPE, Scotch, dual surface	2	
-2	15-A222	. . ROOF PLATE SUBASSEMBLY	1	
	15-197	. . . ROOF PLATE	1	
	15-202	. . . ROLLER	1	
	15-416	. . . SPRING	1	
	9-125-5	. . . EYELET	2	
-3	15-198	. . SPRING	1	
-4	15-199	. . PIN	1	
-5	15-200	. . ROD, Actuator	1	
-6	15-202	. . ROLLER	2	
-7	15-203	. . SPRING	2	
-8	9-199-1	. . RING, Retaining (Truarc 5144-9)	2	
-9	15-A134	. MECHANICAL SUBASSEMBLY (See figure 4 for detail breakdown)	1	
	15-A134-1	. MECHANICAL SUB-ASSY.	1	2, B
	15-A134-2	. MECHANICAL SUB-ASSY.	1	3, B

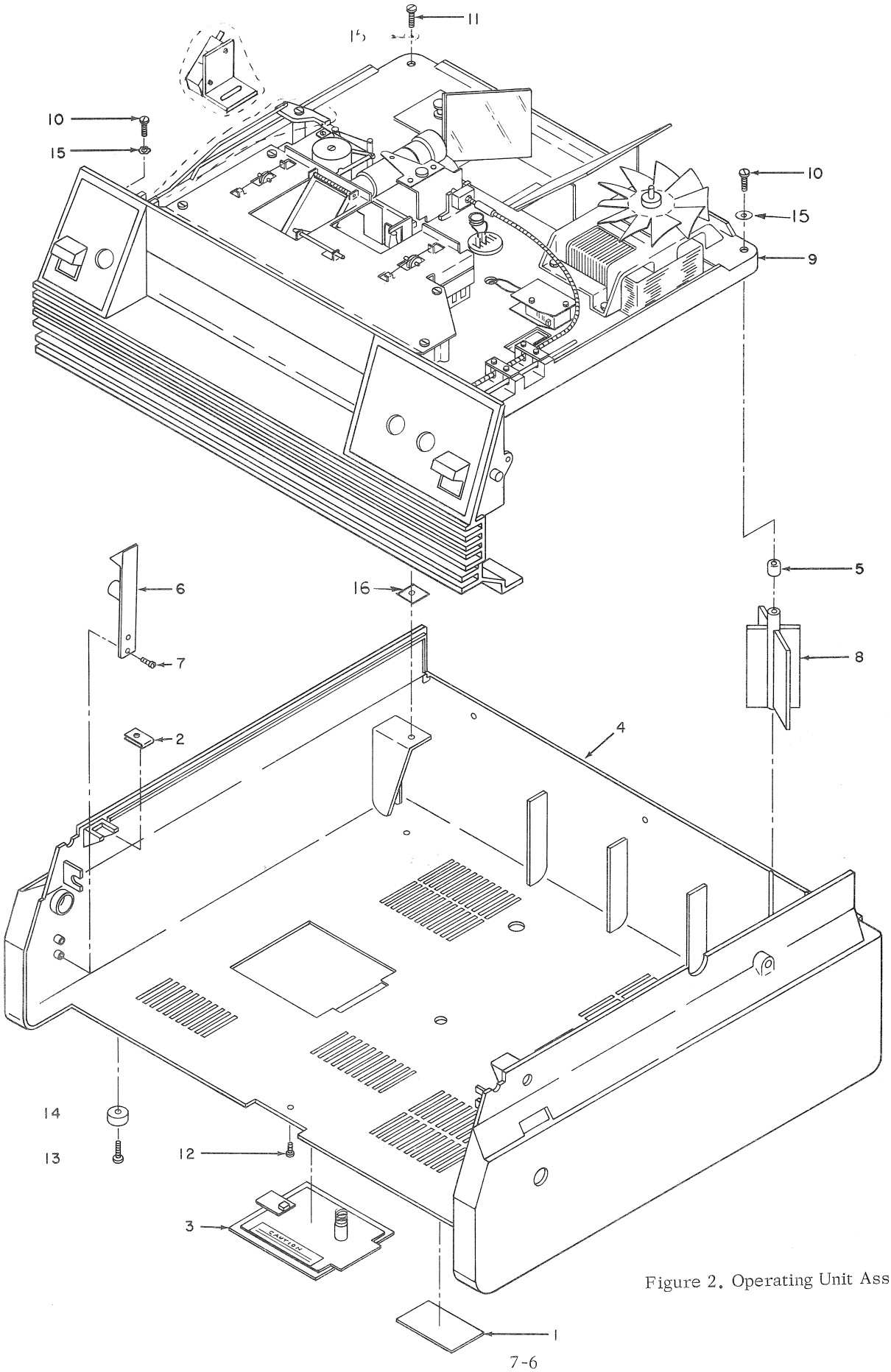

Figure 2. Operating Unit Assembly

FIG. & INDEX NO.	NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
3-10	15-A162	. CONNECTOR ASSEMBLY, PC	1	
	15-A162-1	. CONNECTOR ASSY., PC	1	2, 3, C
	15-A189	. . CONNECTOR SUBASSEMBLY	1	
	15-536	. . . BRACKET, Receptacle	1	
	9-389-1	. . . CONNECTOR	1	
	9-129-7	. . . EYELET SE412	2	
	9-236-1	. . CONNECTOR (Malco 12100-4)	3	
	9-206-2	. . TERMINAL, Crimp type (ETC AA41731)	4	D
	9-206-1	. . TERMINAL, Crimp type (ETC M-4172T)	2	
	9-263-1	. . TERMINAL, Crimp type (Malco 52A110-2)	2	
	9-390	. . TERMINAL, Crimp type (Molex)	11	
	9-246-1	. . BEARING, Shaft	2	
	9-206-3	. . TERMINAL, CRIMP TYPE (15-A162-1 Assy only)	1	D
-11	15-A185	. FIRST MIRROR ASSEMBLY	1	
	15-319	. . FIRST MIRROR	1	
	15-A197	. . FIRST MIRROR SUBASSEMBLY	1	
	15-368	. . . BRACKET, Small mirror mtg	1	
	9-217	. . . PLUNGER	1	
	9-218	. . . GROMMET	1	
	9-142-4	. . . GROOVE PIN	3	
	9-330-4	. . TAPE, Scotch, dual surface	2	
	15-A192	. HUM BUCKING ASSEMBLY	1	
-12	9-209	. . TAP ADAPTOR (AMP 61045-2)	1	
-13	9-207	. . BUSHING, Terminal (Heyco DC87-3-1, -T101-D)	1	
-14	15-A194	. . COIL ASSEMBLY	1	
	9-206-2	. . . TERMINAL, Crimp type (ETC AA-4173T)	2	
	15-411	. . . COIL, Hum bucking	1	
	15-A224	. TERMINAL BOARD ASSEMBLY	1	
-15	9-185	. . TERMINAL BOARD	1	
-16	15-A211	. . WIRE ASSEMBLY, 7 inches	1	
	9-206-2	. . . TERMINAL, Crimp type (ETC AA - 4173T)	2	
-17	15-A212	. . WIRE ASSEMBLY, 6 inches	1	
	9-206-2	. . . TERMINAL, Crimp type (ETC AA -4173T)	2	
-18	9-159	. . . LAMP, Connector	1	
	15-A166	. GRILLE ASSEMBLY	1	
-19	15-322	. . GRILLE	1	
-20	9-370	. . SPEED NUT, U-Type (Tinnerman)	5	
-21	9-314-4	. . SCREW, Hex. Wash. face, thread cutting. No. 25, Self-tapping by 1/2 in. lg. stl	2	
-22	9-291-1	. . PALNUT, On-sert	2	
-23	9-319-1	. . PIN, Spirol 1/8 by 1 in. lg.	2	
-24	15-358M	. . KNOB-ON-OFF	2	
	9-083-10	. . . PIN, Roll	1	
-25	9-161	. . SPEAKER	1	
-26	9-202	. . POTENTIOMETER, Volume control (Centralab 10K ± 20% C2)	1	
-27	15-A213	. . WIRE ASSEMBLY, 19 inches	1	
	9-263-1	. . . TERMINAL, Crimp type (Malco 52A110-2)	1	
	9-206-2	. . . TERMINAL, Crimp type (ETC AA 4173T)	1	
-28	15-A148	. AMPLIFIER BOARD ASSEMBLY (See figure 5 for detail breakdown)	1	
-29	15-201	. COLLAR	1	1, A
-30	15-207	. SHAFT	1	1, A
-31	15-A219	. LINE CORD ASSEMBLY (Use with 9-162)	1	
	9-206-2	. . TERMINAL, Crimp type (ETC AA 4173T)	2	
	9-364	. . CORD	1	
	9100-605	. . LINE CORD, 3 wire (Use with 9100-487-2)	1	
-32	15-224	. SHAFT	1	
-33	15-225	. BRACKET	1	

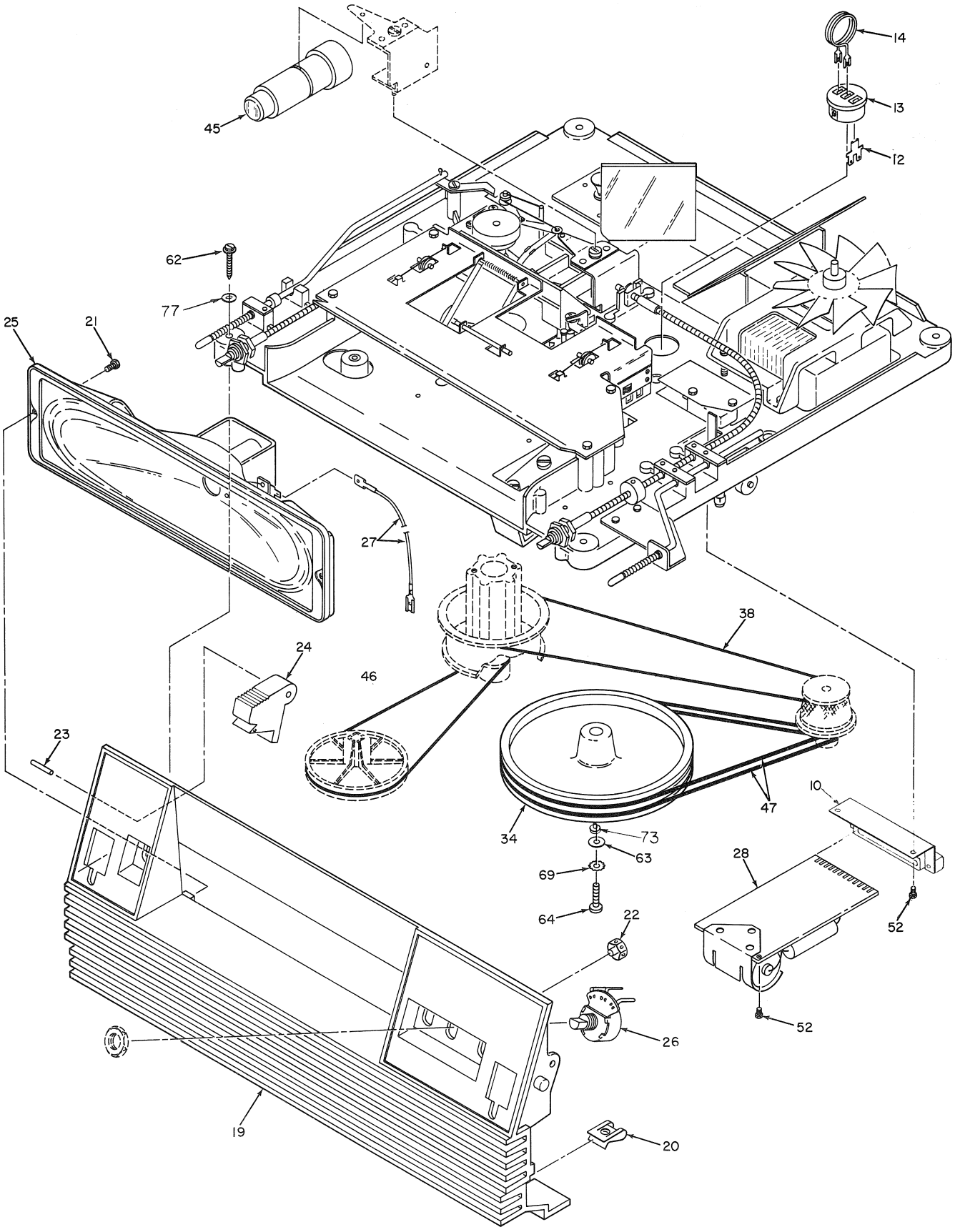

Figure 3. Mechanical Assembly (Sheet 1)

FIG. & INDEX NO.	NUMBER	DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
3-34	15-271	FLYWHEEL	1	
-35	15-295	RETAINER	2	
-36	15-362-1	FLEXSHAFT, Framing	1	
-37	15-362-2	FLEXSHAFT, Focusing	1	
-38	15-390	BELT, Shutter	1	
-39	15-391	RETAINER	1	1, A
-40	15-410	SHAFT CAP	2	
-41	15-418	STOP, Focus and framing	2	
-42	9-131	LAMP, EKG 19V, 80W	1	
-43	15-460	SPRING	2	
-44	15-461	BEARING (Use with 15-A163-1 and -2 only)	1	
-45	9-140-1	LENS, Projection	1	
	9-140-2	LENS, Projection (Interchangeable with 9-140-1)	1	
-46	9-141-1	BELT, Drive	1	
-47	9-141-2	BELT, Flywheel	2	
-48	9-162	BUSHING, Strain relief	1	
	9100-487-2	BUSHING (See Item 31)	1	
-49	9-246-1	BEARING	2	
-50	9-256-1	BEARING, flange	1	
-51	9-262-1	PRONG, Lock (Waldes 5139-12)	2	
-52	9-316-1	SCREW, Hex. Wash. head, No. 4-40 by 1/4 in. lg, stl (10 Req. in 15-A163-1 and 2)	9	
-53	9-317-1	SCREW, Hex. Wash. head, No. 6-32 by 1/4 in. lg, stl	1	
-54	9-317-2	SCREW, Hex. Wash. head, No. 6-32 by 0.38 in. lg, stl	4	
-55	9-339-2	CLAMP, Cable	1	
-56	9-340	LUG, Ground	1	
-57	9-341	LUG, Flat	2	
-58	9-325-3	PIN, Cotter (Used in 15-A134 only)	1	1, A
-59	Com'l.	WASHER, Flat, No. 5	3	
-60	Com'l.	SETSCREW, Multi-spline No. 4-40 by 1/8 in. lg. (Used in 15-A134 only)	1	1, A
-61	Com'l.	SETSCREW, Multi-spline No. 4-40 by 3/8 in. lg.	2	
-62	9-321-6	SCREW, Hex. Wash. head, slotted thread cutting No. 8 by 1.0 in. lg, stl, Type AB	2	
-63	Com'l.	WASHER, Flat, No. 10	1	
-64	Com'l.	SCREW, Binding head, No. 10-32 by 1/2 in. lg.	1	
-65	9-203	PHONE, Jack	1	
-66	9-243	FUSE, Slo-Blo (Little Fuse 313002) 2 amps, 125 volts	1	
-67	Com'l.	SCREW, Self-tapping, hex. wash. head, No. 4-40 by 1/4 in. lg.	4	
-68	Com'l.	SCREW, Slotted hex. hd, type 23, No. 6 by 3/8 in. lg.	2	
-69	Com'l.	WASHER, No. 10, Lock, external tooth	1	3, C
-70	9100-472	INSULATOR	1	3, B
-71	9-510	SWITCH	1	3, B
-72	15-545	"OFF" BRACKET	1	3, B
-73	9-416	SHOULDER WASHER	1	2, A
-74	9-316-1	SCREW, No. 4-40, Hex. Wash. head	2	2, 3, C
-75	9-316-4	SCREW, No. 4-40, Hex. Wash. head	2	2, 3, C
-76	9-330-5	TAPE (1" x 1")	2	
-77	Com'l.	LOCKWASHER, No. 8, external tooth	2	3, A

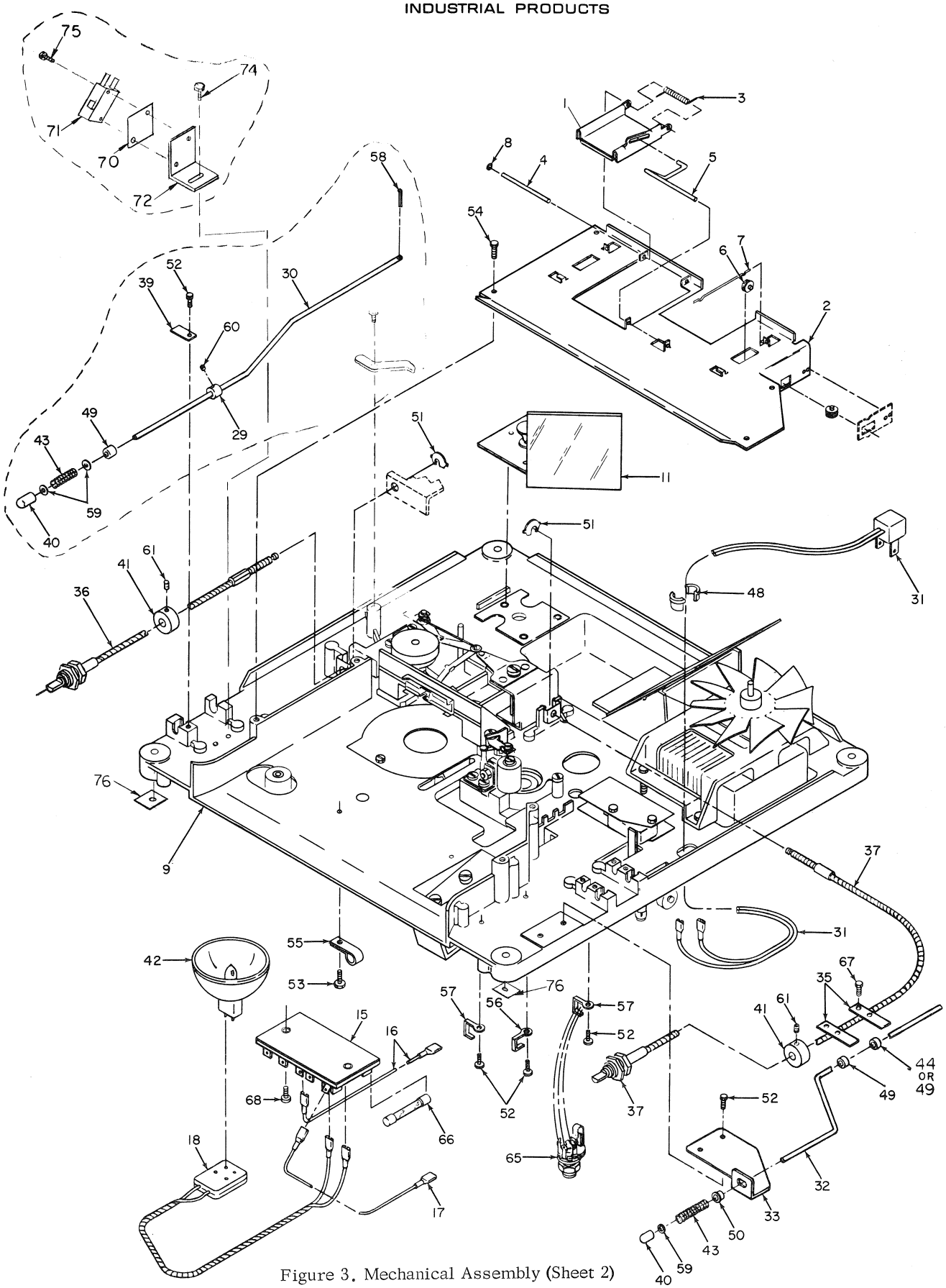

Figure 3. Mechanical Assembly (Sheet 2)

FAIRCHILD
INDUSTRIAL PRODUCTS

FIG. & INDEX NO.	NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
4-	15-A134	MECHANICAL SUBASSEMBLY (See Item 9, figure 3 for next higher assembly)	REF	
	15-A134-1	MECHANICAL SUB ASSY.	1	2, B
	15-A134-2	MECHANICAL SUB ASSY.	1	3, B
	15-A123	. DRIVE ROLLER ASSEMBLY	1	
-1	15-A122	. . DRIVE ROLLER ASSEMBLY	1	
	15-161	. . . SHAFT, Drive roll	1	
-2	15-A147	. . DRIVE ROLLER ARM ASSEMBLY	1	
	15-278M	. . ARM, Drive roller	1	
	9-134	. . . BEARING sleeve	1	
	9-166-1	. . . BEARING nylon insert	2	
-3	15-274	. . PULLEY, Drive roller	1	
-4	9-377-1	. . WASHER, Nylon	1	
-5	Com'l.	. . SETSCREW, Multiple spline, cup point, No. 6-32 by 0.19 in. lg	1	
-6	15-A124	. CAM ASSEMBLY	1	1, A
	15-177	. . CAM, Radial	1	
	15-178	. . CAM, In-Out	1	D
	15-152	. . CAM SHAFT	1	
	9-154-4	. . PIN, Roll	1	D
-6	15-A287	. CAM SHAFT ASSY. (Use with P/N 15-A153-1 Claw Assy only)	1	2, B
	15-152	. . CAM SHAFT	1	
	15-177	. . RADIAL CAM	1	
	15-535	. . IN-OUT CAM	1	D
-6	15-A288	. CAM SHAFT ASSY. (Use with P/N 15-A153-1 Claw Assy and p/n 15-A266 Pulley Assy only)	1	3, B
	15-501	. . CAM SHAFT	1	D
	15-177	. . RADIAL CAM	1	[illegible]
	15-535	. . IN-OUT CAM	1	D
	15-A125	. MOTOR ASSEMBLY	1	
-7	15-266C	. . BRACKET, Motor mtg.	1	
-8	15-273M	. . PULLEY, Cone	1	
-9	9-147	. . MOTOR	1	
-10	9-170-1	. . ISOLATOR, Rubber	2	
-11	Com'l.	. . SETSCREW, Multiple spline, cup point	1	
-12	Com'l.	. . NUT, Hex, No. 6-32	4	
-13	Com'l.	. . WASHER, Lock, No. 6	4	
-14	Com'l.	. . SCREW, Fillister head, No. 6-32 by 2-1/2 in. lg	4	
	15-A138	. PINCH ROLLER BRACKET ASSEMBLY	1	
-15	15-A139	. . HEAD MOUNT BRACKET ASSEMBLY	1	
	15-072	. . . BRACKET, Head mount	1	
	15-073	. . . PIN, Head mount	1	
-16	15-A157	. . PINCH ROLLER ASSEMBLY	1	
	15-A118	. . . ROLLER ASSEMBLY	1	
	15-352	. . . . SLEEVE, Pinch roller	1	
	15-353	. . . RETAINER, Bearing	1	
	15-021	. . . BEARING, Ball	1	
-17	15-A190	. . PINCH ROLLER BRACKET SUBASSEMBLY	1	
	15-069	. . . POST, Guide	1	
	15-277	. . . BRACKET, Pinch roller	1	
	15-354	. . . SHAFT, Pinch roller	1	
	9-335-1	. . . PIN, Groove	1	
-18	15-389	. . SPRING, Pinch roller pressure	1	
-19	15-292	. . LOCK, Arm link	1	
-20	9-128-2	. . WASHER, Spring tension	1	
-21	9-146	. . SOUND HEAD	1	
-22	9-130-1	. . GRIP RING (Waldes 5555-12)	2	
-23	Com'l.	. . SCREW, Pan head, sst, No. 6-32 by 1/4 in. lg	1	
-24	Com'l.	. . NUT, Hexagon, sst, No. 6-32	1	

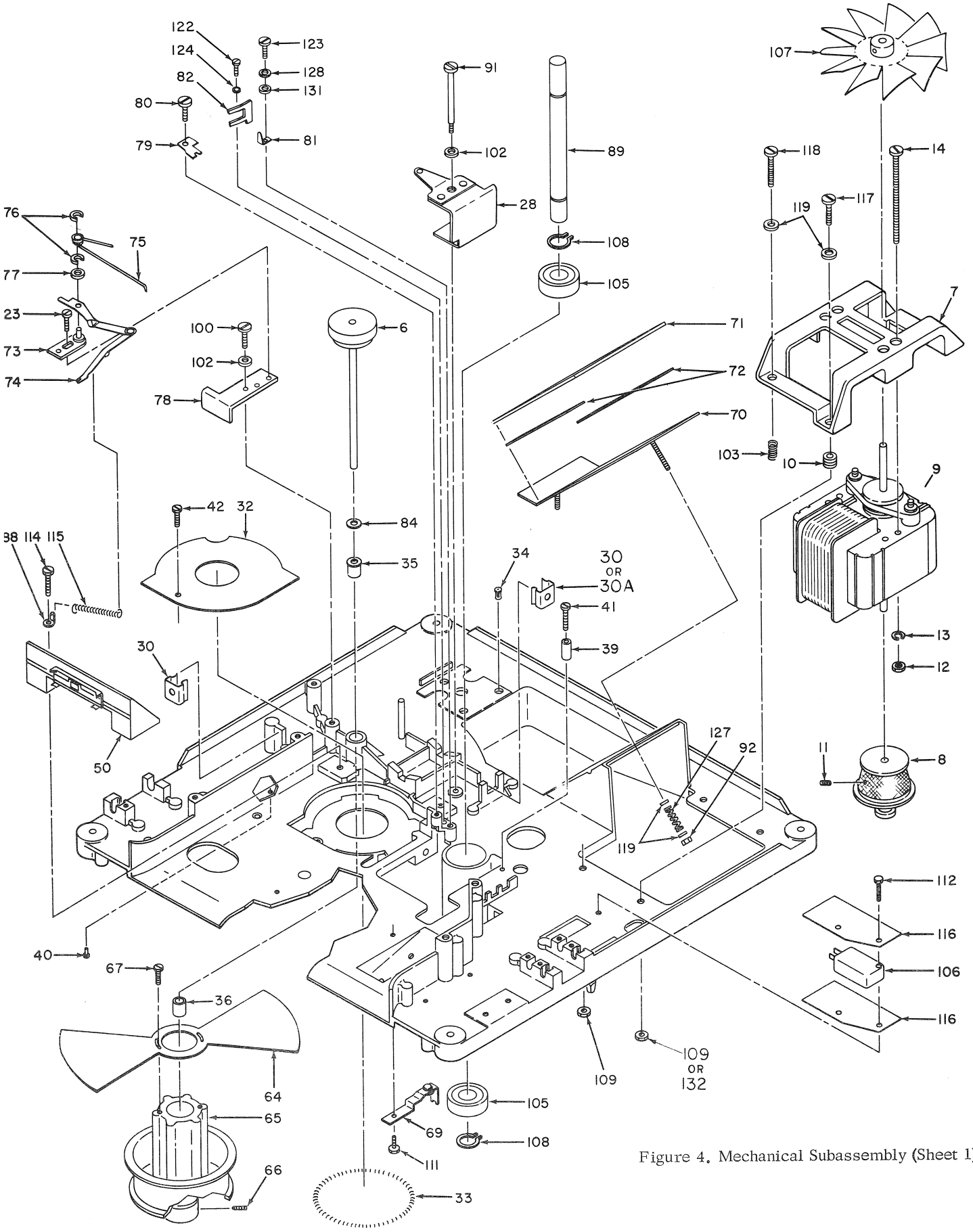

Figure 4. Mechanical Subassembly (Sheet 1)

FIG. & INDEX NO.	NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
4-25	Com'l.	. . WASHER, Flat, sst, No. 6	2	
-26	Com'l.	. . WASHER, Lock, external tooth, bronze, nickel pl, No. 6	1	
-27	Com'l.	. . SCREW, Binding head, No. 2-56 by 0.19 in. lg	1	
-28	15-A146	. FOCUS LINK ASSEMBLY	1	
	15-090	. . PIN, Drive	1	
	15-091	. . ARM, Focusing	1	
	15-360	. . BRACKET, Focusing arm	1	
	9-230-1	. . RIVET, (Chobert)	2	
	15-A150	. BASE PLATE SUBASSEMBLY	1	
-29	15-088	. . BASE PLATE	1	
-30	9-242	. . RETAINER, Nut, speed grip (Tinnerman C30801-1024-4)	1	
-30A	9-396	. . RETAINER, Nut	1	
-31	15-164	. . SHAFT	1	
-32	15-443	. . LIGHT SHIELD, Lamp	1	
-33	15-388	. . SPRING, Lamp	1	
-34	9-211	. . SPEED CLIP, Tubular (Tinnerman C 2733-100-4)	3	
-35	9-184-1	. . BEARING, Sleeve	1	
-36	9-153	. . BEARING, Ball	1	
-37	9-204-2	. . PIN, Groove	1	
-38	9-291-2	. . PALNUT, On-sert	1	
-39	15-442	. . ECCENTRIC	1	
-40	9-376-1	. . RIVET, 0.126 dia by 0.187 in. lg	2	
-41	Com'l.	. . SCREW, Fillister head, No. 4-40 by 5/8 in. lg	1	
-42	Com'l.	. . SCREW, Slotted hex. hd, type 23 No. 4-40 by 1/4 in. lg	1	
	15-A151	. SHAFT ASSEMBLY, On	1	
-43	15-110	. . SHAFT	1	
-44	15-A156	. . LINK ASSEMBLY	1	
	15-287M	. . . LINK	1	
	9-204-3	. . . PIN, Groove	1	
	9-142-5	. . . PIN, Groove	1	
-45	15-440	. . BEARING, Self-aligning	2	
-46	15-A155	. . ACTUATION ARM ASSEMBLY	1	
	15-269	. . . HUB	1	
	15-270	. . . ARM	1	
-47	15-293M	. . ARM	1	
-48	9-319-2	. . PIN, Spirol 1/16 dia by i/2 in. lg	2	
-49	Com'l.	. . SETSCREW, Multiple spline, cup pt., No. 4-40 by 1/8 in. lg	1	
-50	15-A152	. APERTURE PLATE ASSEMBLY	1	
	15-125M	. . APERTURE PLATE	1	
	15-126	. . INSERT, Claw	1	
	15-303	. . GUIDE, Moveable	1	
	9-129-2	. . EYELET	2	
-51	15-A154	. PAWL ASSEMBLY	1	
	15-289	. . PAWL	1	
	9-248-1	. . PIN, Roll	1	
	9-154-3	. . PIN, Roll	1	
	15-A180	. SENSING FINGER ASSEMBLY	1	
-52	15-A149	. . SENSING FINGER BRACKET ASSEMBLY	1	
	15-154	. . . PIVOT	1	
	9-158-1	. . . NUT, Hex, No. 4-40 self locking	1	
	15-285	. . . BRACKET	1	
-53	15-A121	. . SENSING ARM ASSEMBLY	1	
	9100-353	. . . SPRING	1	
	15-157	. . . ARM	1	
	15-263	. . . CAM	1	
	9-155-3	. . . SCREW, Drive, No. 2 by 0.187 in. lg, Type U	2	

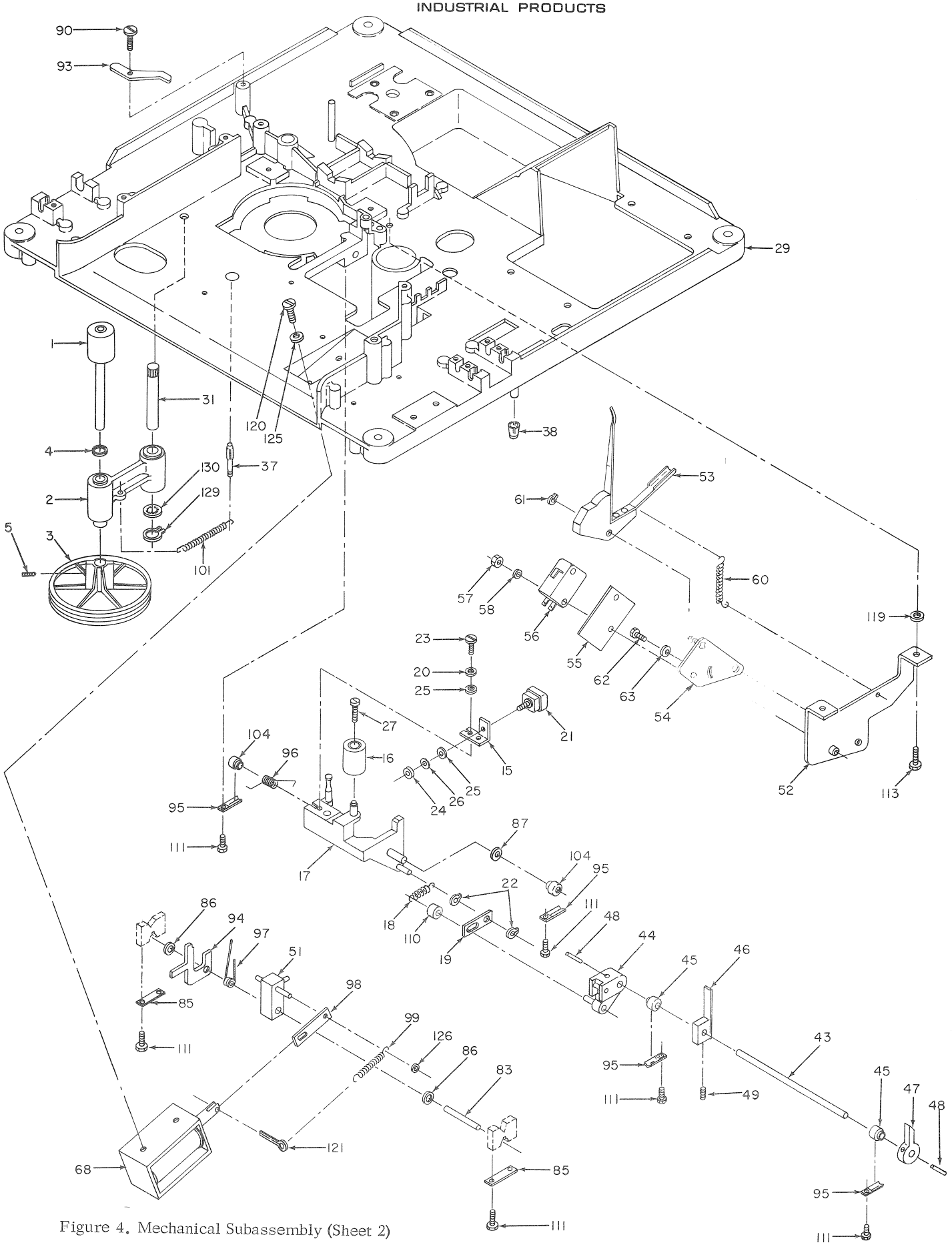

Figure 4. Mechanical Subassembly (Sheet 2)

FIG. & INDEX NO.	NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
4-	9-155-2	. . . SCREW, Drive No. 2 by 1/8 in. lg, Type U	2	
	15-A186	. . SWITCH ASSEMBLY	1	
-54	15-A286	. . . SENSOR SWITCH PLATE SUB ASSY	1	
-55	9100-472	. . . INSULATOR	1	
-56	9-173	. . . SWITCH, Sensor, 3A, 125vac	1	
-57	Com'l.	. . . NUT, Hexagon, No. 2-56	2	
-58	Com'l.	. . . WASHER, Lock, spring, No. 2	2	
-59				
-60	15-441	. . SPRING	1	
-61	9-130-2	. . GRIP RING (Waldes 5555G-19)	1	
-62	Com'l.	. . SCREW, Pan head, No. 4-40 by 1/4 in. lg	1	
-63	Com'l.	. . WASHER, Flat, No. 4	1	
	15-A181	. PULLEY ASSEMBLY, Large cone	1	2, A
	15-A266	. PULLEY ASSY - LARGE CONE (use with P/N 15-A288 Cam Shaft only)	1	3, B
-64	15-159	. . SHUTTER	1	
-65	15-246	. . PULLEY, Large cone	1	
-65	15-246	. . PULLEY, LARGE CONE (without locking screw flange) (used in 15-A266 only)	1	3, D
-66	Com'l.	. . SETSCREW, Multiple spline, cup pt, No. 4-40 by 0.19 in. lg	1	
-67	Com'l.	. . SCREW, Self-tapping, slotted hex head, No. 4-40 by 1/4 in. lg Type 23	2	
-68	15-A198	. SOLENOID SUBASSEMBLY	1	1, A
-68	15-A198-1	. SOLENOID SUB ASSY.	1	2,3, C
	9-163-2	. . SOLENOID	1	
	9-206-2	. . TERMINAL, Crimp type (ETC AA4173T)	2	
	9-206-3	. . TERMINAL, Crimp type (used in 15-A198-1 only)	1	3, D
-69	15-A221	. RELEASE LEVER DRIVE SPRING ASSEMBLY	1	
	15-412	. . SPRING	1	
	9-315-2	. . RIVET, Nylon, 0.16 dia by 1/4 in. lg	1	
	9-189-2	. . RING, Circular push-on (Waldes 5115-15)	1	
	15-A165	. SECOND MIRROR ASSEMBLY	1	
-70	15-A183	. . SECOND MIRROR MOUNTING SUBASSEMBLY	1	
	15-365	. . . MOUNT, Mirror	1	
	9-167-1	. . . STUD, No. 6-32-2A by 0.88 in. lg	1	
	9-167-2	. . . STUD, No. 6-32-2A by 1.0 in. lg	1	
-71	15-320	. . SECOND MIRROR	1	
-72	9-330-4	. . TAPE, Scotch, dual surface	2	
	15-A193	. CLAW ASSEMBLY	1	1, A
	15-A193-1	. CLAW ASSEMBLY	1	3, A
	15-149	. . . PIN, Framing link	1	
-73	15-A160	. . PLATE, Adjusting	1	
	15-311	. . . PIN, Guide	1	
	15-308	. . . PLATE, Adjusting	1	
-74	15-A153	. . CLAW SUBASSEMBLY	1	1, E
-74	15-A153-1	. . CLAW SUB ASSY.	1	3, A
	15-189	. . . CLAW, In-Out	1	
	15-193	. . . CLAW, Radial (used in 15-A153-1 only)	1	D
	15-193-1	. . . CLAW, Radial (used in 15-A153 only)	1	D
	15-188	. . . FOLLOWER, In-Out	1	
	15-223	. . . FOLLOWER, Radial	1	
	9-128-3	. . . WASHER, Spring tension	2	
	9-129-1	. . . EYELET SE65	1	
-75	15-239	. . SPRING	1	
-76	9-130-1	. . GRIP RING (Waldes 5555-12)	2	
-77	9-128-4	. . WASHER, Spring tension	1	

FIG. & INDEX NO.	NUMBER	DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
4-78	15-A159	. FRAMING LINK ASSEMBLY, Stationary	1	
	9-158-1	. . NUT, Hex, No. 4-40 self locking	1	
	15-307	. . FRAMING LINK, Stationary	1	
-79	15-070	. PRESSURE SHOE	1	
-80	15-071	. SCREW, Pressure shoe, No. 4-40	1	
-81	15-074	. SPRING, Pressure shoe	2	
-82	15-082	. GUIDE, Film	1	
-83	15-124	. PIN	1	
-84	9-374	. WASHER, 0.188 id by 0.375 od by . . . . . 0.005 in. thk	1	
-85	15-166	. RETAINER, Pawl	2	
-86	15-184-1	. WASHER, Nylatron, 0.189 id by 0.31 od . . . by 0.30 in., thk	2	
-87	15-184-2	. WASHER, Nylatron, 0.189 id by 0.31 od . . . by 0.074 in. thk.	1	
-88	9-378	. LUG	1	
-89	15-195	. CAPSTAN	1	
-90	15-204	. SCREW, Shoulder, No. 6-32 by 0.59 . . . . . in. lg, stl (15-A134 only)	1	1, A
-91	15-238	. SCREW, Shoulder, No. 6-32 by 1.52 . . . . . in. lg, stl	1	
-92	9-169-1	. NUT, No. 6-32 (Elastic stop)	2	
-93	15-240	. PAWL (15-A134 only)	1	1, A
-94	15-290	. LEVER, Release	1	
-95	15-296	. RETAINER, Bearing	4	
-96	15-439	. SPRING, Pinch roller retainer	1	
-97	15-438	. SPRING, Pawl bias	1	
-98	15-309	. LINK, Solenoid	1	
-99	15-310	. SPRING, Solenoid retainer	1	
-100	15-371	. SCREW, Shoulder, No. 6-32 by 0.56 . . . . . in. lg, stl	1	
-101	15-444	. SPRING, Drive puck	1	
-102	9-128-1	. WASHER, Spring tension	2	
-103	9-138-1	. SPRING, Compression, motor	2	
-104	15-440	. BEARING, Spherical	2	
-105	9-149	. BEARING, Ball	2	
-106	9-172	. SWITCH	1	
-107	9-329	. BLADE, Fan	1	
-108	9-157-2	. RING, Retaining (Truarc 5100-37)	1	
-109	9-169-1	. NUT, No. 6-32 (Elastic stop)	4	2, A
-110	9-246-1	. BEARING, Nylon	1	
-111	9-316-1	. SCREW, Hex. Wash. head, No. 4-40 by . . . . 1/4 in. lg, stl	9	
-112	9-316-4	. SCREW, Hex. Wash. head, No. 4-40 by . . . . 0.63 in. lg, stl	2	
-113	9-317-1	. SCREW, Hex. Wash. head, No. 6-32 by . . . . 1/4 in. lg, stl	2	
-114	Com'l.	. SCREW, Hex. Wash. head, slotted, No. 6-32, . Type 23 by 0.38 in. lg, stl	2	
-115	9-183-1	. CLAW, Spring	1	
-116	15-445	. INSULATOR, Switch	2	
-117	Com'l.	. SCREW, Slotted hex head, No. 6-32 by . . . . 5/8 in. lg.	2	
-118	Com'l.	. SCREW, Slotted hex head, No. 6-32 by . . . . 7/8 in. lg.	2	
-119	Com'l.	. WASHER, Flat, No. 6	4	
	Com'l.	. USE AN960-66 For Motor Mtg.	2	
-120	Com'l.	. SCREW, Binding head, No. 6-32 by . . . . . 1/4 in. lg.	2	

FIG. & INDEX NO.	NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
4-121	9-326-3	. PIN, Cotter	1	
-122	Com'l.	. SCREW, Binding head, No. 2-56 by 1/4 in. lg.	2	
-123	Com'l.	. SCREW, Binding head, No. 4-40 by 1/4 in. lg.	2	
-124	Com'l.	. WASHER, Lock, internal tooth, No. 2	2	
-125	Com'l.	. WASHER, Lock, internal tooth, No. 6	2	
-126	9-130-3	. GRIP RING (Truarc G5555-9)	1	
-127	9-138-3	. SPRING, Compression	2	
-128	Com'l.	. WASHER, Lock, internal tooth, No. 4	1	
-129	9-130-4	. GRIP RING (Truarc 5555-31)	1	
-130	Com'l.	. WASHER, Flat, 5/16	1	
-131	Com'l.	. WASHER, Flat, No. 4	1	
-132	Com'l.	. NUT, 6-32 hex	2	3, C

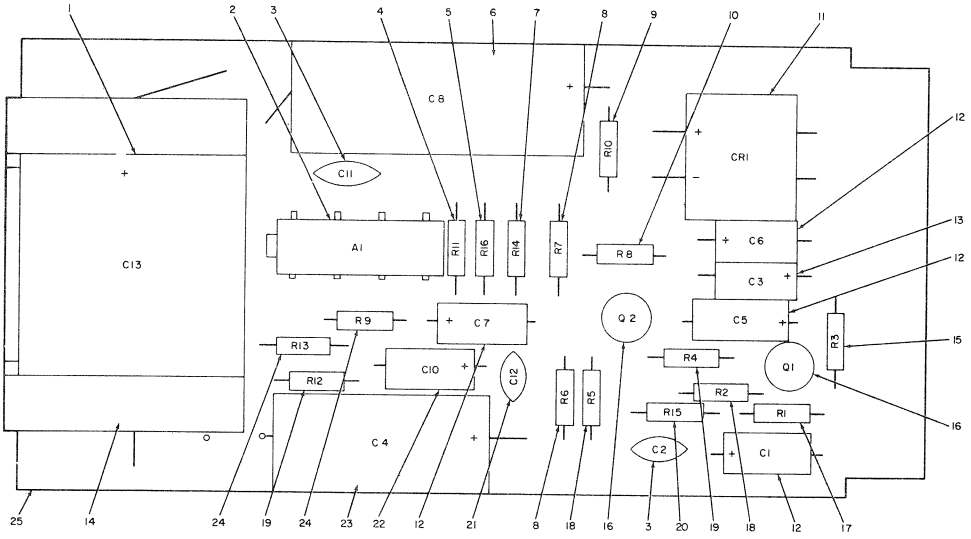

Figure 5. Amplifier Board Assembly

FIG. & INDEX NO.	NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
5-	15-A148	AMPLIFIER BOARD ASSEMBLY (See item 28, figure 3 for next higher assembly)	REF	
-1	9-177-1	. CAPACITOR, (C13) Fixed, 1600uf, 35v (Synchro EMW 3252-1600-35)	1	
-2	9-160	. AMPLIFIER, (A1) Audio, 27v, 10A, 2W (General Electric PA237)	1	
-3	9-181	. CAPACITOR (C2, C11) Fixed, 0.0022uf, 1 kv (Centralab DD222-002-1000) . . .	2	
-4	RC07GF684K	. RESISTOR (R11), Fixed, composition, 680 k ohms, ± 10%, 1/4W	1	
-5	RC07GF334K	. RESISTOR, (R16) Fixed, Composition, 3300 k ohms, ± 10%, 1/4W	1	
-6	9-177-2	. CAPACITOR, (C8), Fixed, 500 uf, 20V (Synchro EMW1644-500-20)	1	
-7	RC07GF220K	. RESISTOR (R14), Fixed, Composition 22 ohms, ±10%, 1/4W	1	
-8	RC07GF562K	. RESISTOR (R6, R7), Fixed, Composition 5.6 ohms, ±10%, 1/4W	2	
-9	RC07GF183K	. RESISTOR, (R10), Fixed, Composition, 18k ohms, ±10%, 1/4W	1	
-10	RC07GF223K	. RESISTOR, (R8), Fixed, Composition, 22k ohms, ±10%, 1/4W	1	

FIG. & INDEX NO.	NUMBER	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
5-11	9-174	. RECTIFIER (CR1) Bridge, 50V PIV, 35V, 1A DC, 10A recurrent peak (Power Components MMB05S)	1	
-12	9-176-1	. CAPACITOR (C1, C5 thru C7), Fixed, 1.0uf, 15V (Synchro EMMW109-1-70)	4	
-13	9-180	. CAPACITOR, (C3) Fixed, 0.0022uf, 200V (Sprague 192P22292)	1	
-14	15-133	. BRACKET, Capacitor	1	
-15	RC07GF433K	. RESISTOR (R3), Fixed, Composition, 43k ohms, ±5%, 1/4W	1	
-16	9-175	. TRANSISTOR (Q1, Q2), High gain, NPN (Fairchild Semiconductor 2N3565)	2	
-17	RC07GF561K	. RESISTOR (R1), Fixed, Composition, 560 ohms, ±10%, 1/4W	1	
-18	RC07GF185K	. RESISTOR (R2, R5), Fixed, Composition, 1.8M ohms, ±10%, 1/4W	2	
-19	RC07GF103K	. RESISTOR (R4, R12), Fixed, Composition 10k ohms, ±10%, 1/4W	2	
-20	RC07GF100K	. RESISTOR (R15), Fixed, Composition, 10 ohms, ±10%, 1/4W	1	
-21	9-182	. CAPACITOR (C12), Fixed, 0.05uf, 20V (Centralab UK20-503)	1	
-22	9-176-2	. CAPACITOR (C10), Fixed, 5uf, 70V (Synchro EMMW23)	1	
-23	9-177-3	. CAPACITOR (C4), Fixed, 200uf, 15V (Synchro EMW1228-200-15)	1	
-24	RC07GF563K	. RESISTOR (R9, R13), Fixed, Composition, 56k ohms, ±10%, 1/4W	2	
-25	15-283	. AMPLIFIER BOARD	1	

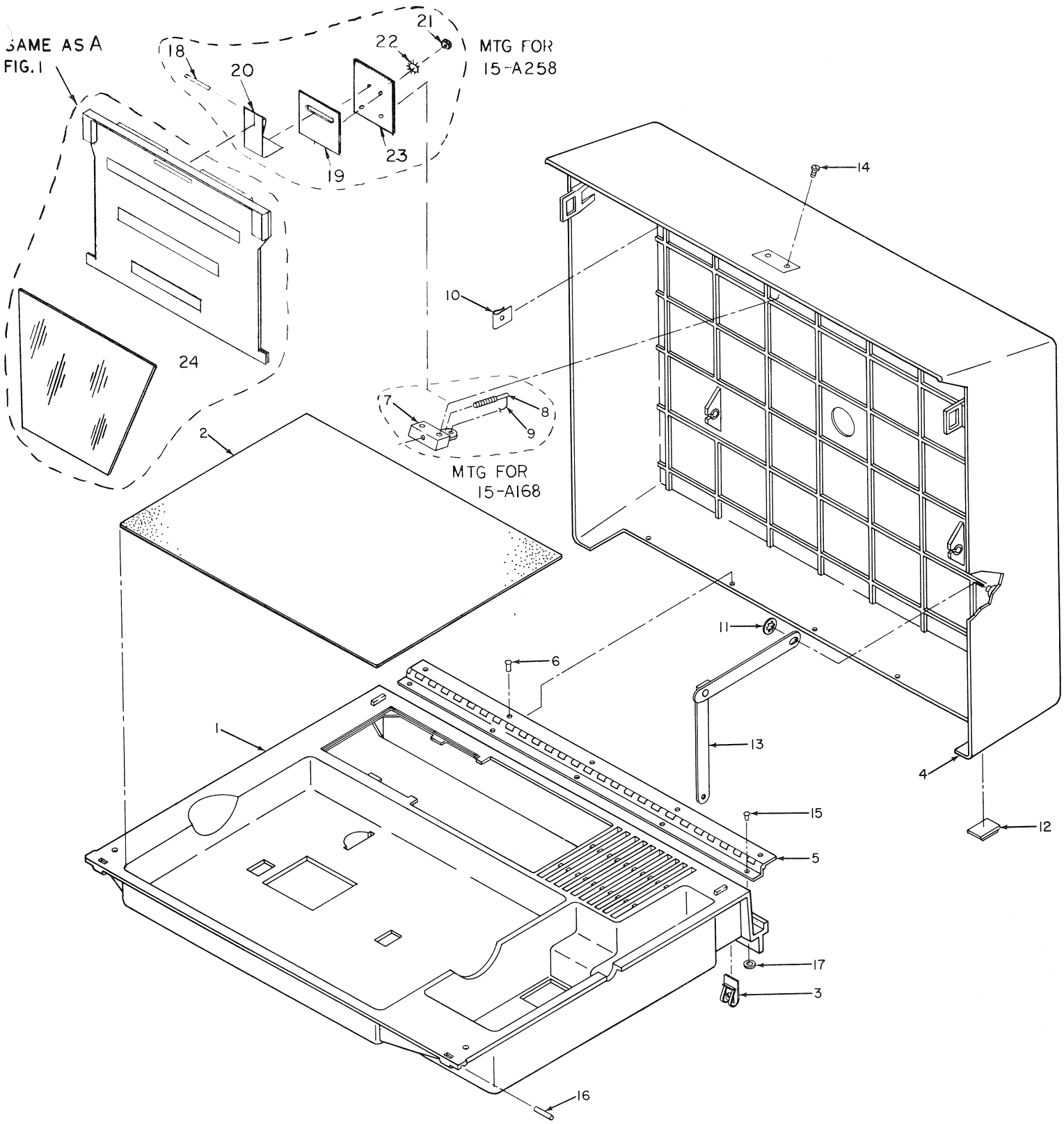

Figure 6. Storage Tray and Lid Assembly

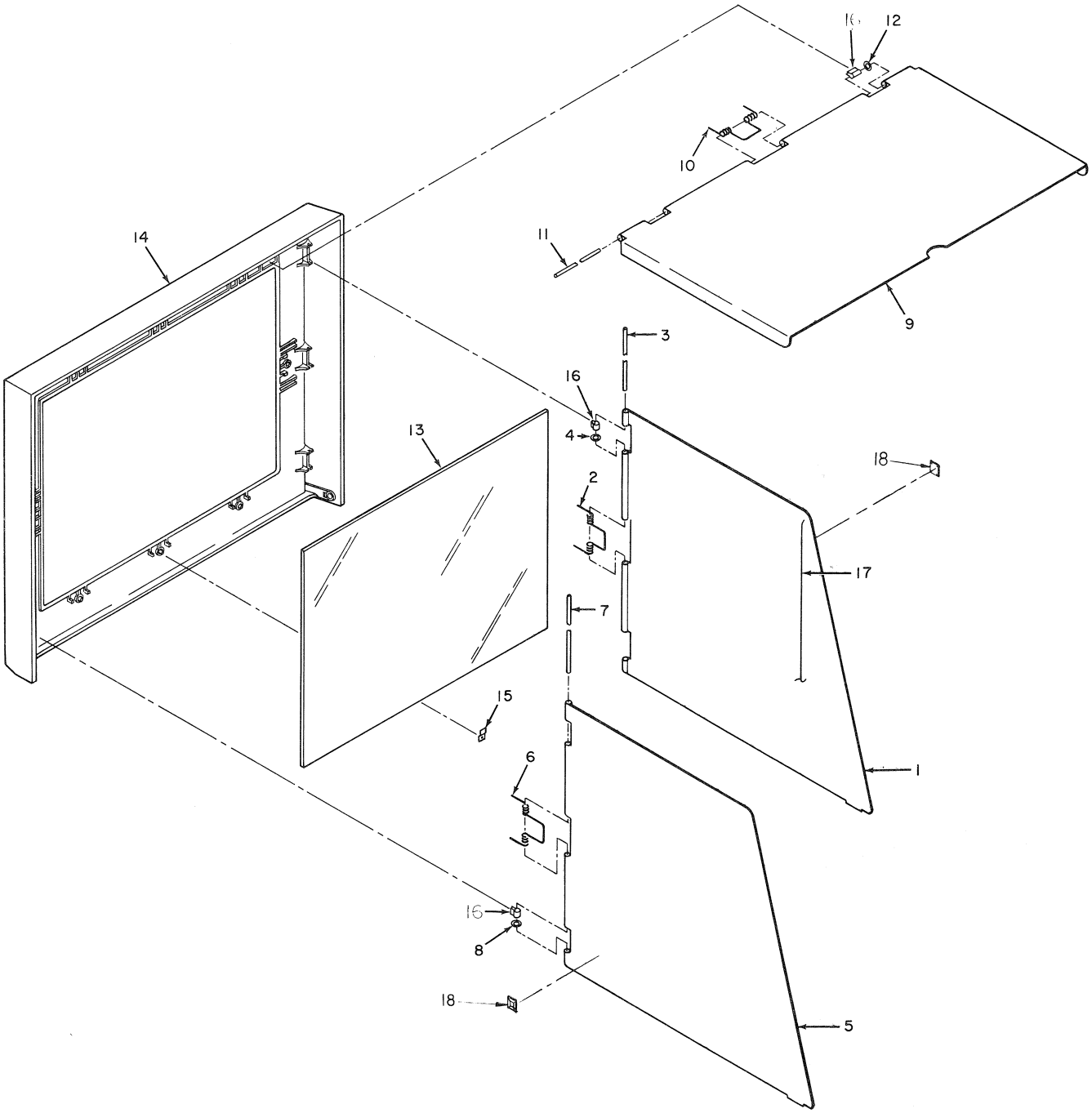

Figure 7. Screen Bezel Assembly

FIG. & INDEX NO.	NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
6-	15-A214	STORAGE TRAY AND LID ASSEMBLY . . . . . (See item 6, figure 1 for next higher assembly)	REF	
	15-A174	. STORAGE TRAY ASSEMBLY	1	
-1	15-316	. . STORAGE TRAY	1	
-2	15-347	. . FELT, Light trap	1	
-3	9-370	. . SPEED NUT, U-Type	3	
	15-A203	. COVER ASSEMBLY	1	
	15-A167	. . COVER SUBASSEMBLY	1	
-4	15-353	. . . LID, Case	1	
-5	15-405	. . . HINGE, Bezel	1	
-6	9-368	. . . RIVET, 0.093 dia by 0.218 in. lg, stl. . .	5	
	15-A218	. . BRACKET ASSEMBLY, 3rd mirror adjusting	1	
-7	15-407	. . . BRACKET, 3rd mirror adjusting	1	
-8	15-408	. . . SCREW, Adjusting, sst. No. 10-32 by . . 0.69 stud, 1-1/4 in. lg	1	
-9	9-375-1	. . LINE, Nylon	1	
-10	9-245	. . SPEED CLIP-U-Type (Tinnerman . . . . . C21465-014-4)	2	
-11	9-189-1	. . RING, Push-on (Waldes 5115-25)	1	
-12	9-367-1	. . BUMPER, Self-sticking	2	
-13	15-A220	. . LID SUPPORT ASSEMBLY, Riveted	1	
-14	Com'l.	. . SCREW, Flat head, No. 4-40 by 0.38 in. lg.	2	
-15	9-230-2	. RIVET, 0.095 dia by 1/4 in. lg. al	5	
-16	15-401	. PIVOT PIN, Bezel	2	
-17	Com'l.	. WASHER, Flat, No. 2 0.100 ID by 1/4 OD . . . by 0.020 in. thk	5	
	15-A258	. 3rd MIRROR AND STRAP ASSY.	1	3, B
-18	15-406-3	. PIN, STRAP.	1	D
	15-A257	. STRAP AND BRACKET ASSY.	1	1, B
-19	15-469	. . PLATE, 3rd mirror adjusting	1	
-20	15-470	. . STRAP, Third Mirror	1	
-21	Com'l.	. . HEX NUT, No. 4-40	2	
-22	Com'l.	. . LOCKWASHER, Int. Tooth No. 4	2	
-23	15-A249	. . PLATE RETAINER ASSY.	1	D
-24	15-A168	. . THIRD MIRROR ASSY. (See figure 1 for . . detail parts)	1	
7-	15-A177	SCREEN BEZEL ASSEMBLY (See item 16, ... figure 1 for next higher assembly)	REF	
	15-A171	. LIGHT SHIELD, Left assembly	1	
-1	15-364-2	. . LIGHT SHIELD, Side, LH	1	
-2	15-339	. . SPRING, Light shield	1	
-3	15-406-2	. . HINGE PIN, ...	1	
-4	Com'l.	. . WASHER, Flat, No. 2	2	
	15-A170	. LIGHT SHIELD, Right assembly	1	
-5	15-364-1	. . LIGHT SHIELD, Side, rh	1	
-6	15-339	. . SPRING, Light shield	1	
-7	15-406-2	. . HINGE PIN, Light shield	1	
-8	Com'l.	. . WASHER, Flat	2	
	15-A169	. LIGHT SHIELD, Top assembly	1	
-9	15-363	. . LIGHT SHIELD, Top	1	
-10	15-336	. . SPRING, Light shield	1	
-11	15-406-1	. . PIN, Hinge	1	
-12	Com'l.	. . WASHER, Flat, No. 2	2	
-13	15-324	. SCREEN, Plexiglass	1	
-14	15-325	. BEZEL	1	
-15	9-205	. SPEEDNUT, Screen (Tinnerman C14837-017-4)	8	
-16	9-245	. SPEED CLIP, U-Type (Tinnerman . . . . . C21465-014-4)	9	
-17	9-375-2	. LINE, Wing stop	1	E
-18	9-367-1	. BUMPER, Self Stick	2	3, A

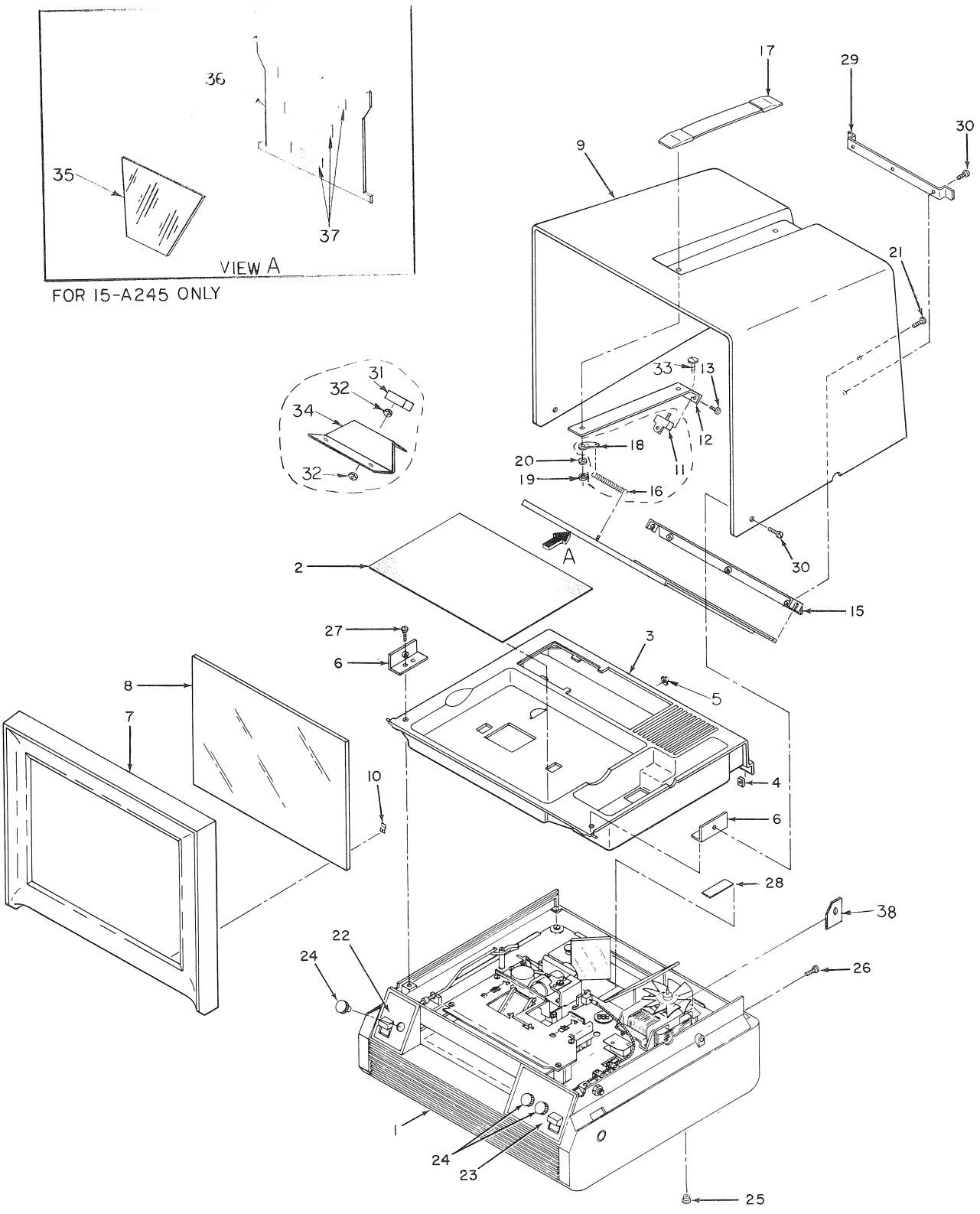

Figure 8. MoviePak Miniconsole, Model Seventy-31

FIG. & INDEX NO.	NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
8-	15-M703-10	MOVIEPAK MINICONSOLE MODEL SEVENTY-31	1	
	15-A227	. MINI-CONSOLE ASSEMBLY	1	
	15-M703-11	MOVIEPAK MINICONSOLE MODEL SEVENTY-31	1	
	15-A247	. MINI-CONSOLE ASSEMBLY	1	1, B
	15-M703-12	MOVIEPAK MINICONSOLE MODEL SEVENTY-31	1	
	15-A247-1	. MINI-CONSOLE ASSEMBLY	1	2, B
	15-M703-13	MOVIEPAK MINICONSOLE MODEL SEVENTY-31	1	
	15-A247-2	. MINICONSOLE ASSY. MODEL SEVENTY-31 .	1	3, B
-1	15-A161	. . OPERATING UNIT ASSEMBLY . . . . . (See figure 2 for detail breakdown)	1	
-1	15-A161-1	. . OPERATING UNIT ASSY.	1	2, A
-1	15-A161-2	. . OPERATING UNIT ASSY.	1	3, A
	15-A217	. . STORAGE TRAY ASSEMBLY MINICONSOLE	1	
-2	15-347	. . . FELT, Light Trap	1	
-3	15-426	. . . STORAGE TRAY, Mini-console.	1	
-4	9-370	. . . SPEED NUT, U-Type	3	
-5	9-379-2	. . . NUTSERT	3	
-6	15-A225	. . BRACKET ASSEMBLY	2	
	15-422	. . . BRACKET, Mini-console	1	
	9-379-2	. . . NUTSERT	1	
	15-A230	. . COVER and BEZEL ASSEMBLY.	1	O, E
	15-A246	. . COVER and BEZEL ASSEMBLY.	1	3, B
	15-A239	. . . COVER and BEZEL SUBASSEMBLY . . .	1	
-7	15-325	. . . . BEZEL	1	
	9-330-4	. . . . . TAPE, Dual Surface	4	
-8	15-324	. . . . SCREEN	1	
-9	15-421	. . . . COVER, Mini-console	1	
-10	9-205	. . . . SPEED NUT, Screen	8	
	15-A223	. . . BRACKET ASSEMBLY, Third mirror Adv	1	O
-11	15-A218	. . . . THIRD MIRROR ADJ. BKT. ASSEMBLY (See figure 6 for detail breakdown)	1	O
-12	15-424	. . . . BRACKET, Mirror adjusting.	1	
-13	Com'l.	. . . . SCREW, Binding head, No. 4-40 by 3/8 in. lg	2	
-15	15-A231	. . . BRACKET ASSEMBLY, Mirror pivot. . .	1	
	9-379-2	. . . . NUTSERT	3	
-16	9-183-6	. . . SPRING	1	O
-17	9-362	. . . HANDLE	1	
-18	9-393	. . . LUG	1	O
-19	Com'l.	. . . NUT, Hexagon, No. 10-32	2	
-20	Com'l.	. . . WASHER, Lock, split ring, No. 10. . . .	2	
-21	Com'l.	. . . SCREW, Binding head, Phillips, ... No. 6-32 by 3/8 in. lg	3	
-22	15-355	. . DECAL, Left	1	
-23	15-357	. . DECAL, Right	1	
-24	15-398	. . KNOB, Control	3	
-25	9-251-1	. . PLUG, Button	2	
-26	9-320-4	. . SCREW, OVAL Phillips head, No. 8 by . . . 3/4 in. lg. stl type AB	3	
-27	9-321-5	. . SCREW, Thread cutting, No. 8 by . . . . . 7/8 in. lg. stl type AB	2	
-28	9-030-53	. . NAMEPLATE-Console	1	
-29	15-429	. . BRACKET, Line cord	1	
-30	Com'l.	. . SCREW, Bind, HD, Phillips, nickel finish, . No. 6-32 by 3/8 in. lg	5	
	15-A244	. . . BRACKET ASSY, THIRD MIRROR ADJ. .	1	3, B
	15-424	. . . . BRACKET, MIRROR ADJ. . . . . (See Item 12)	1	
-31	15-462	. . . . 3rd MIRROR ADJ. BLOCK	1	

FIG. & INDEX NO.	NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
8-32	9-143	. . . . . ELASTIC STOP NUT	2	
	Com'l.	. . . . BINDING HD SCR, No. 4-40 x 3/8 in. lg. (See Item 14)		
-33	Com'l.	. . . . 10-32 x 1-3/4 in. lg Phillips . . . . . Round head screw	1	
-34	15-A243	. . . . BRACKET ASSY, THIRD MIRROR . . .	1	
	15-A245	. . . THIRD MIRROR ASSY.	1	3,B
-35	15-321	. . . . THIRD MIRROR	1	D
-36	15-334	. . . . PLATE, THIRD MIRROR	1	D
-37	9-330-4	. . . . TAPE, DUAL SURFACE	24"	D
-38	15-510	. . BUTTON STOP	1	
9-	C15-M700-10	CARTRIDGE ASSEMBLY 200 - Foot	1	
	15-A201	. CARTRIDGE TOP ASSEMBLY	1	
-1	15-383	. . TOP, Cartridge	1	
-2	15-378-2	. . RIB, Clip	4	
-3	15-437	. . STRIPPER	1	
	15-A202	. CARTRIDGE BASE ASSEMBLY.	1	
-4	15-374	. . SPRING, Inlet	1	
-5	15-375	. . SPRING, Pressure pad	1	
-6	15-376	. . PAD, Pressure.	1	
-7	15-382	. . BASE, Cartridge	1	
-8	15-387	. SLEEVE, Shipping	1	
-9	15-340	. REEL	1	
-10	15-377	. POST, Center	1	E
-11	9-166-2	. NYLINER	1	E
-12	Com'l.	. SCREW, Self-tapping, flat head, ... type 25, No. 4-24 by 5/8 in. lg, single flute	3	
-13	15-377-8	. POST (Replaces 15-377 & 9-166-2)	1	A
10-	C15-M700-20	CARTRIDGE ASSEMBLY, 400-Foot	1	
	15-A199	. CARTRIDGE TOP ASSEMBLY	1	
-1	15-373	. . TOP, Cartridge	1	
-2	15-378-1	. . RIB, Clip	4	
-3	15-420-2	. . STRIPPER	1	
	15-A200	. CARTRIDGE BASE ASSEMBLY.	1	
-4	15-374	. . SPRING, Inlet	1	
-5	15-375	. . SPRING, Pressure pad	1	
-6	15-376	. . PAD, Pressure.	1	
-7	15-372	. . BASE, Cartridge	1	
-8	15-386	. SLEEVE, Shipping	1	
-9	15-350	. REEL	1	
-10	15-377	. POST, Center	1	E
-11	9-166-2	. NYLINER	1	E
-12	Com'l.	. SCREW, Self-tapping, flat head, type . . . . . 25, No. 4-24 by 5/8 in. lg, single	5	
-13	15-377-8	. POST (Replaces 15-377 & 9-166-2)	1	A

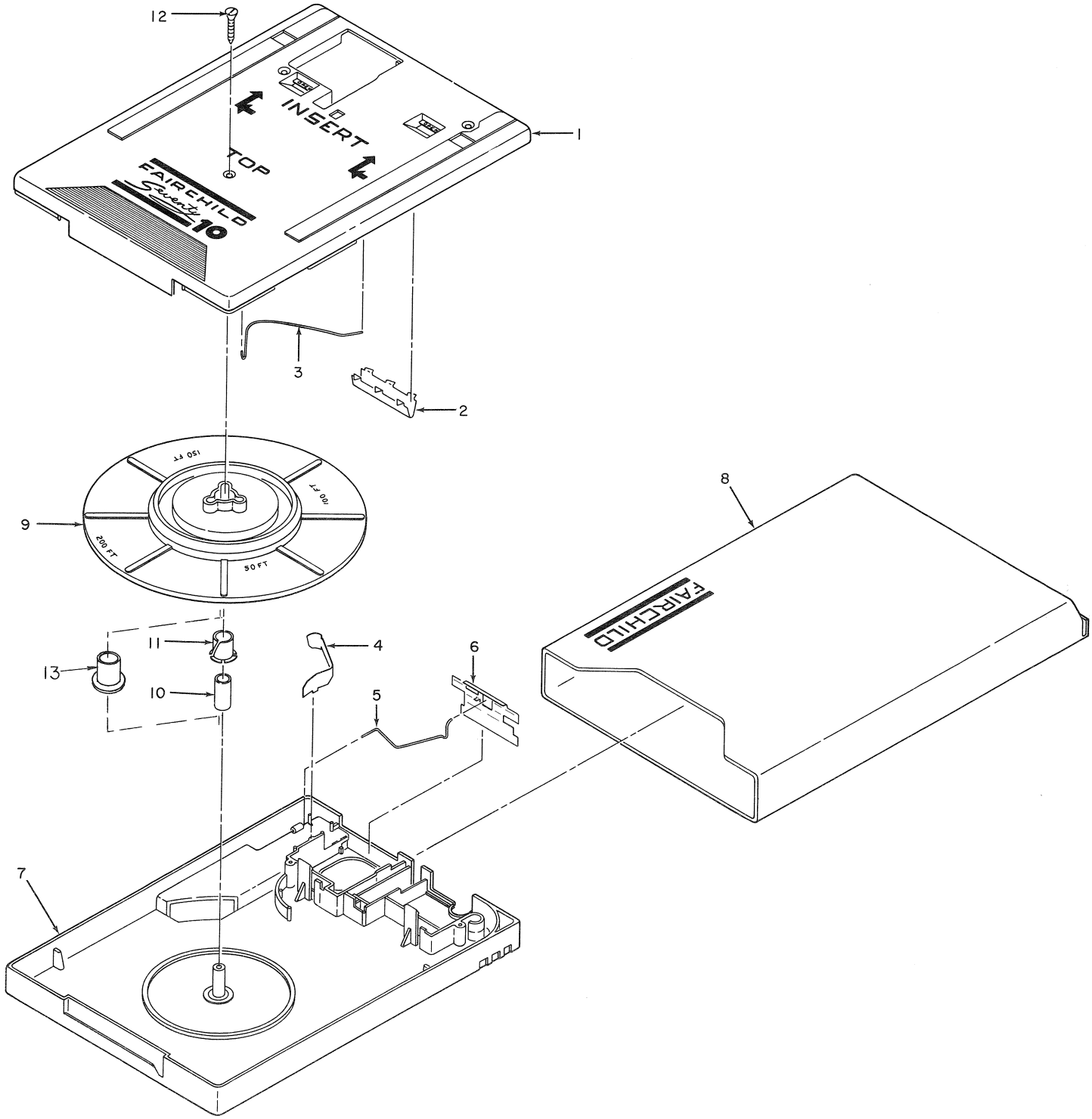

Figure 9. Cartridge Assembly, 200-Foot

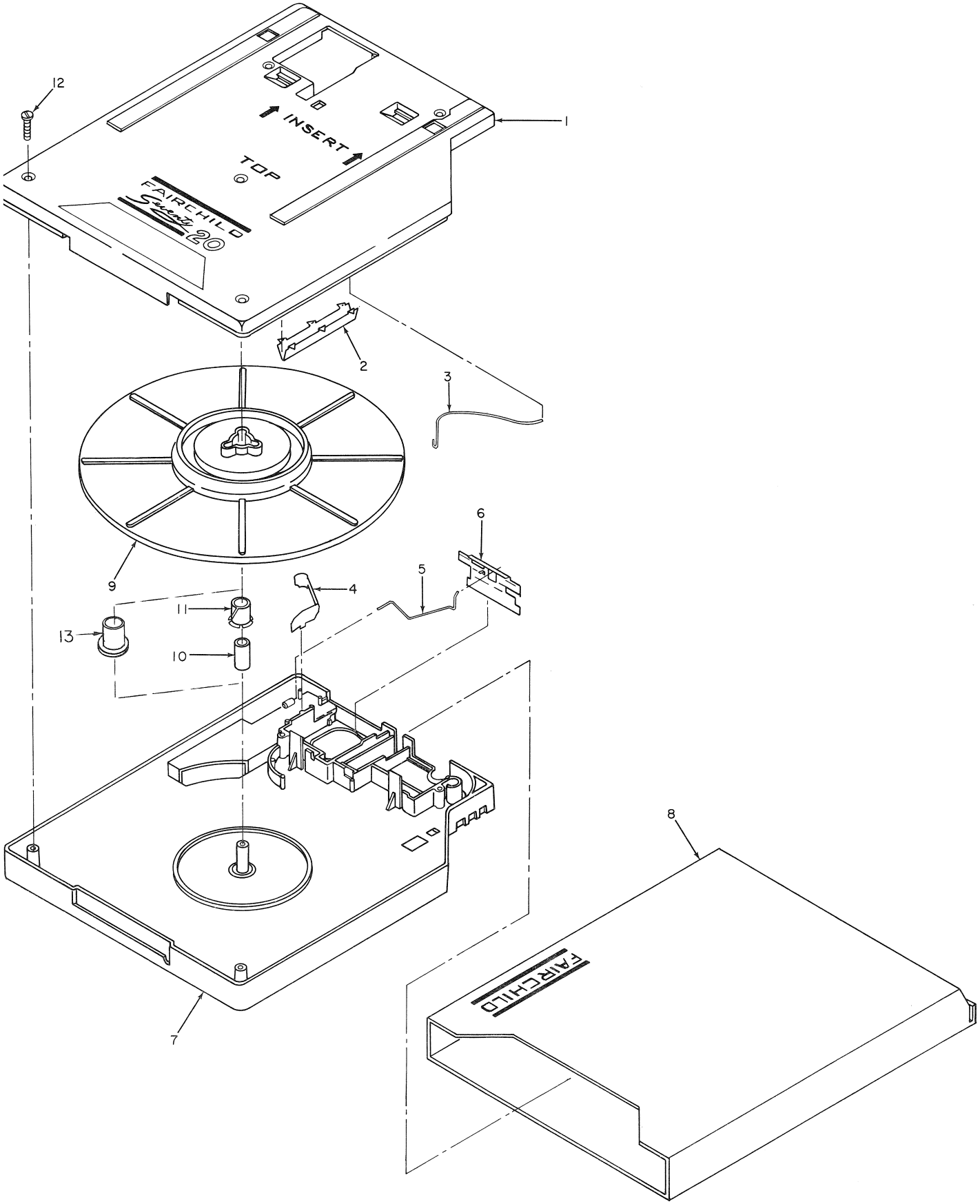

Figure 10. Cartridge Assembly, 400-Foot

FIG. & INDEX NO.	NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
11-	15-M704-10	CONSOLE ASSEMBLY, MODEL SEVENTY-41 . .	1	
	15-A255	. CONSOLE ASSEMBLY	1	
	15-M704-12	CONSOLE ASSY, MODEL SEVENTY-41	1	
	15-A255-1	. CONSOLE ASSY.	1	2, A
	15-M704-13	CONSOLE ASSY, MODEL SEVENTY-41	1	
	15-A255-2	. CONSOLE ASSY.	1	3, A
-1	15-A161	. . OPERATING UNIT ASSEMBLY . . . . . (See figure 2 for detail breakdown)	1	
-1	15-A161-1	. . OPERATING UNIT ASSY.	1	2, A
-1	15-A161-2	. . OPERATING UNIT ASSY.	1	3, A
	15-A217	. . STORAGE TRAY ASSEMBLY	1	
-2	15-347	. . . FELT, Light Trap	1	
-3	15-426	. . . STORAGE TRAY	1	
-4	9-370	. . . SPEED NUT, U-Type	3	
-5	9-379-2	. . . NUTSERT	3	
-6	15-A225	. . BRACKET ASSEMBLY	2	
	15-422	. . . BRACKET, Console	1	
	9-379-2	. . . NUTSERT (Avdel 9505-06)	1	
	15-A254	. . CONSOLE CASE AND SCREEN ASSEMBLY .	1	
	15-A254-1	. . CONSOLE CASE AND SCREEN ASSY.	1	3, B
	15-A252	. . . THIRD MIRROR ASSEMBLY	1	O
-7	15-A250	. . . . PLATE SUBASSEMBLY	1	D
	15-A253	. . . . . BRACKET	1	D
	15-477	. . . . . PLATE	1	D
	9-421	. . . . . HINGE, Slip pin	2	D
	9-428	. . . . . RIVET, Semi-tubular, blk nickel . . plated, 0.145 dia by 3/8 in. lg	6	D
-8	15-472	. . . . THIRD MIRROR	1	
-9	15-478	. . . . RETAINER, Third mirror	1	
-10	Com'l.	. . . . SCREW, Wood, round hd. Phillips . . No. 6 by 1/2 in. lg	2	
	15-A256	. . . CONSOLE CASE SUBASSEMBLY	1	
	15-A256-1	. . . CONSOLE CASE SUBASSEMBLY	1	
-11	15-473	. . . . HANDLE, Plate	1	
-12	15-474	. . . . GRILLE, Air vent	2	
-13	15-476	. . . . CONSOLE CASE ASSEMBLY	1	
-14	15-479	. . . . HINGE, Door	1	
-15	9-183-6	. . . . SPRING, Extension (Lee Spring . . . . LE-022B-6)	1	
-16	9-421	. . . . HINGE, Slip pin (Ludwig 3218)	2	O
-17	9-422	. . . . EYELET (Stimpson A1736)	2	
-18	9100-557	. . . . CLIP, Cleaning brush . . . . . (Augat 6008-23AN)	1	
-19	Com'l.	. . . . SCREW, Wood, round head, No. 2 by . 1/4 in. lg	2	
-20	9-378	. . . . LUG (Zierick 324)	2	
-21	9100-474	. . . . WASHER, Finishing, brass, nickel . . plated, No. 6 csk, 0.448 od by 0.167 id by 0.102 in. thk	4	
-22	9100-A31	. . . . HANDLE ASSEMBLY (Philadelphia . . Handle 291-D-140)	1	
-23	Com'l.	. . . . NUT, Plain, Hexagon, No. 6-32 . . .	4	O
-24	Com'l.	. . . . SCREW, Oval hd, Phillips, nickel. . . plated, No. 6-32 by 5/8 in. lg	4	
-25	Com'l.	. . . . SCREW, Wood, truss head, No. 4 by . 3/8 in. lg	12	
-26	Com'l.	. . . . WASHER, Lock, external tooth, ... No. 6	4	O
-27	15-236	. . . SCREEN	1	
-28	15-425	. . . NAMEPLATE	1	
-29	9-143	. . . NUT, Self-locking, stl, No. 10-32 . . . . (Elastic Stop Nut 22NM-02)	1	
-30	9-330-6	. . . TAPE, Double coated 16 in. lg . . . . . (3M 4032)	AR	

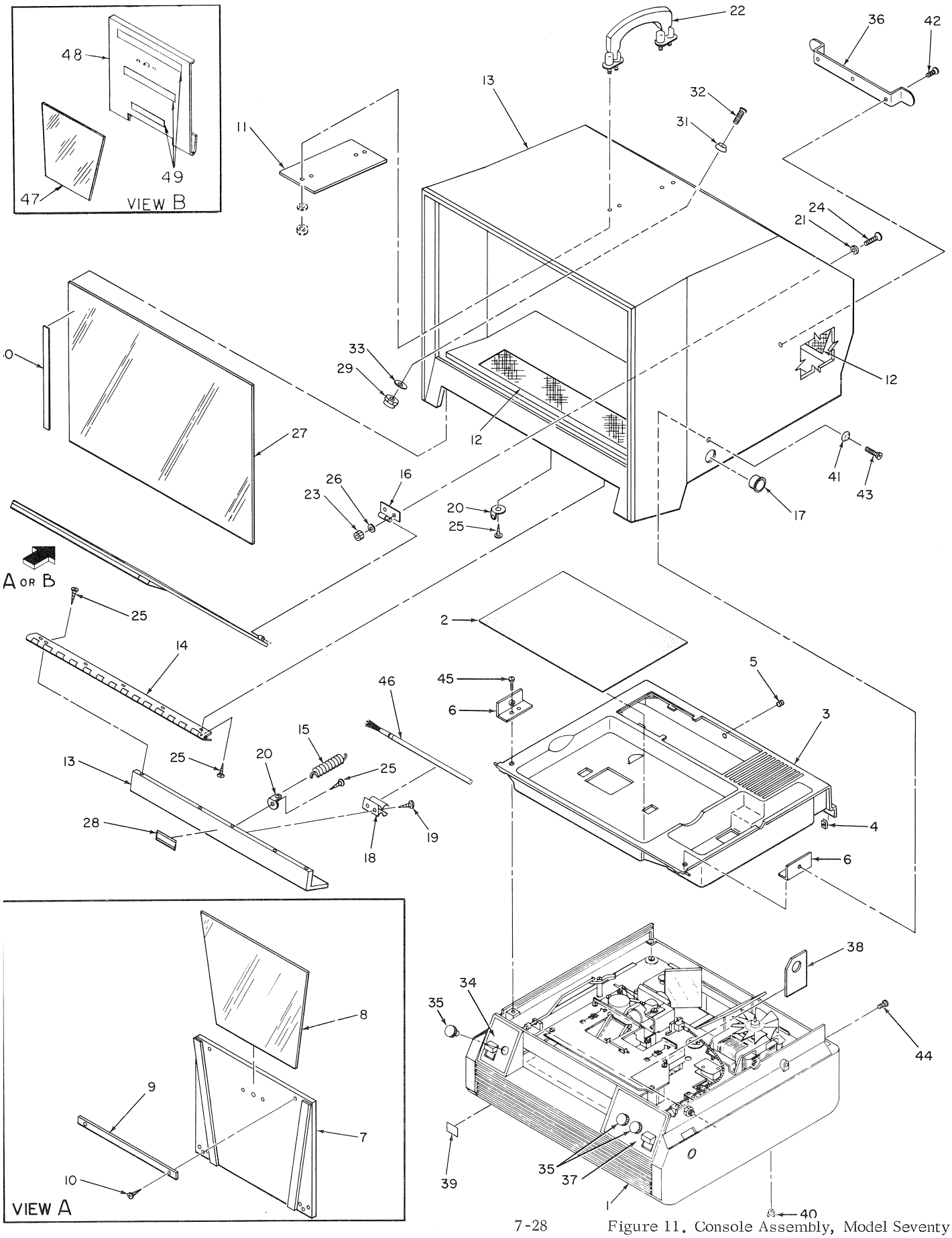

Figure 11. Console Assembly, Model Seventy-41

FIG. & INDEX NO.	NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
11-31	9-429	. . . WASHER, Finishing, stl, nickel plated . . No. 10 csk, 0.59 od by 0.292 id by 0.107 in. thk	1	
-32	Com'l.	. . . SCREW, Oval hd, Phillips, nickel . . . . plated, No. 10-32 by 1 in. lg	1	
-33	Com'l.	. . . WASHER, Flat, 0.500 od by 0.200 . . . . id by 0.026 in. thk	1	
-34	15-355	. . DECAL, Left	1	
-35	15-398	. . KNOB, Control	3	
-36	15-429	. . BRACKET, Line cord	1	
-37	15-475	. . DECAL, Right	1	
-38	15-510	. . BUTTON, Stop	1	
-39	9-030-57	. . NAMEPLATE	1	
-40	9-251-1	. . PLUG, Button, nylon (Heyman P-500)	1	
-41	9100-474	. . WASHER, Finishing, brass, nickel plated . No. 6 csk, 0.448 od by 0.167 id by by 0.102 in. thk	2	
-42	Com'l.	. . SCREW, Bind. hd, Phillips, blk nickel . . . plated, No. 6-32 by 9/16 in. lg	3	
-43	Com'l.	. . SCREW, Oval head, Phillips, bright . . . . nickel plated, No. 6-32 by 1-1/4 in. lg	2	
-44	9-320-4	. . SCREW, Oval head, Phillips, stl . . . . . No. 8 by 3/4 in. lg, type AB	3	
-45	9-321-5	. . SCREW, Thread cutting, stl, No. 8 by . . . 7/8 in. lg, type AB	2	
-46	9100-56	. CLEANING BRUSH	1	
	15-A294	. . . THIRD MIRROR ASSY.	1	3,B
	15-A253-1	. . . . THIRD MIRROR ADJ. BKT. ASSY. . . .	1	D
-47	15-472-1	. . . . THIRD MIRROR	1	D
-48	15-556	. . . . THIRD MIRROR PLATE	1	D
	9-129-9	. . . . EYELET	2	D
-49	9-330-4	. . . . TAPE, DOUBLE COATED 27"	1	D
	9-379-2	. . . . NUTSERT	4	D

FAIRCHILD
INDUSTRIAL PRODUCTS

ILLUSTRATED PARTS LIST

for

PROJECTOR ASSEMBLY

Model 707 - 02

FAIRCHILD
INDUSTRIAL PRODUCTS
A DIVISION OF FAIRCHILD CAMERA AND INSTRUMENT CORPORATION

FIG. & INDEX NO.	NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
1-	R15-A300	PROJECTOR ASSEMBLY, Model 707-02	1	
-1	15-A295	. CASE ASSEMBLY	1	
	15-569-1	. . DOOR, Lamp access	1	
	15-A296	. . BRACKET, Mounting assembly	1	
	15-A297	. . BRACKET, Mounting assembly	1	
	15-484	. . LAMP and Door retainer	1	
	15-562	. . BRACE, Handle	1	
	9-520-1	. . SPACER, Lid stop	1	
	9-244	. . LATCH	1	
-2	15-A262-2	. MECHANICAL ASSEMBLY (See figure 2 for detail breakdown)	1	
-3	15-A275	. BLACK BEZEL ASSEMBLY	1	
-4	15-526	. LIGHT BAFFLE, Felt	1	
-5	15-561	. LIGHT BAFFLE, Left (See Fig. 2 for detail)	1	
-6	15-560	. LIGHT BAFFLE, Right (See Fig. 2 for detail)	1	
-7	9-330-6	. TAPE	1	
-8	Com'l.	. SCREW, Pan head 10-24 by 3/8 in. lg.	4	
-9	15-523	. SPACER	2	
-10	Com'l.	. SLOTTED SET SCREW, 10-24 by 1-1/2 in. lg.	2	
-11	Com'l.	. LOCKWASHER, External tooth, No. 10	2	
-12	Com'l.	. SCREW, Pan head 10-24 by 2 in. lg.	2	
-13	15-497	. MIRROR THIRD	1	
-14	9-330-4	. TAPE, Scotch, dual surface	1	
-15	15-496	. SCREEN	1	
-16	9100-556	. CLEANING BRUSH	1	
-17	15-534	. LAMP PLATE	1	
-18	9-524-1	. CLIP, Cleaning brush	1	
-19	15-567	. LIGHT BAFFLE, Handle	1	
-20	15-525	. DECAL, Volume (See Fig. 2 for detail)	1	
-21	15-524	. DECAL, ON-FOCUS (See Fig. 2 for detail)	1	
-22	9100-349	. KNOB, On-Off (See Fig. 2 for detail)	1	
-23	9-486	. KNOB, Control (See Fig. 2 for detail)	3	

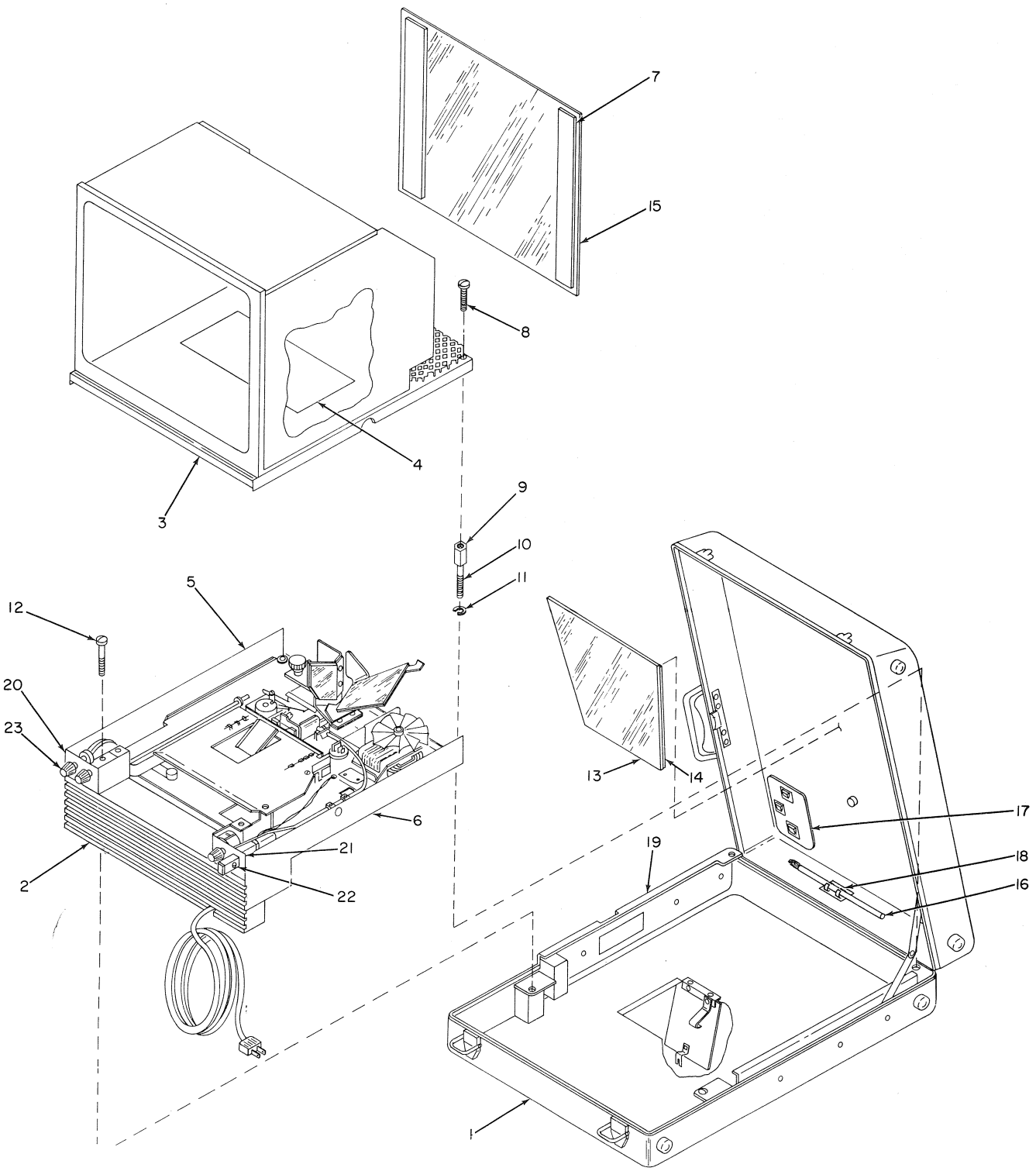

Figure 1. Projector Assembly, Model 707-02

FAIRCHILD
INDUSTRIAL PRODUCTS
A DIVISION OF FAIRCHILD CAMERA AND INSTRUMENT CORPORATION

FIG. & INDEX NO.	NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
2-	15-A262-2	MECHANICAL ASSEMBLY (See Item 2, Figure 1 for next higher assembly)	REF.	
	15-A129	. ROOF PLATE ASSEMBLY	1	
-1	15-A164	. . LAMP MIRROR ASSEMBLY	1	
	15-318	. . . LAMP MIRROR	1	
	15-196	. . . PLATE, Mirror	1	
	9-330-4	. . . TAPE, Scotch, dual surface	2	
-2	15-A222	. . ROOF PLATE SUBASSEMBLY	1	
	15-197	. . . ROOF PLATE	1	
	15-202	. . . ROLLER	1	
	15-416	. . . SPRING	1	
	9-125-5	. . . EYELET	2	
-3	15-198	. . SPRING	1	
-4	15-199	. . PIN	1	
-5	15-200	. . ROD, Actuator	1	
-6	15-202	. . ROLLER	2	
-7	15-203	. . SPRING	2	
-8	9-199-1	. . RING, Retaining (Truarc 5144-9)	2	
	15-A192	. HUM BUCKING ASSEMBLY	1	
-9	9-209	. . TAP ADAPTOR (AMP 61045-2)	1	
-10	9-207	. . BUSHING, Terminal (Heyco DC87-3-1, -T101-D)	1	
-11	15-A194	. . COIL ASSEMBLY	1	
	9-206-2	. . . TERMINAL, Crimp type (ETC AA-4173T)	2	
	15-411	. . . COIL, Hum bucking	1	
	15-A224	. TERMINAL BOARD ASSEMBLY	1	
-12	9-165	. . TERMINAL BOARD	1	
-13	15-A211	. . WIRE ASSEMBLY, 8 inches No. 6a	1	
	9-206-2	. . . TERMINAL, Crimp type (ETC AA-4173T)		
-14	15-A212	. . . WIRE ASSEMBLY, 6 in.	1	
-15	9-159	. . . LAMP, Connector	1	
	15-A273	. GRILLE ASSEMBLY	1	
	9-330-4	. . TAPE, Scotch, dual surface	1	
-16	15-507	. . GRILLE (use with 15-A219)	1	
	15-507-1	. . GRILLE (use with 15-558 or 9-100-605)	1	
-17	15-508	. . LIGHT BAFFLE	1	
-18	15-554	. . SPEAKER MOUNT BLOCK, Right	1	
-19	15-555	. . SPEAKER MOUNT BLOCK, Left	1	
-20	9-161	. . SPEAKER	1	
-21	Com'l.	. . STAPLE, 1/2 in. (Senco black)	4	
-22	9-478	. . RETAINING NUT, (Self retaining)	2	
-23	Com'l.	. . WOOD SCREW, Truss head No. 4 by 3/8 in. lg.	2	
-24	15-A148	. AMPLIFIER BOARD ASSEMBLY (See figure 4 for detail breakdown)	1	
-25	15-A299	. CONNECTOR ASSEMBLY, PC	1	
	15-A189	. . CONNECTOR SUB ASSEMBLY	1	
	15-356	. . . BRACKET, Receptacle	2	
	9-389-1	. . . CONNECTOR	1	
	9-129-1	. . . EYELET	2	
	9-236-1	. . CONNECTOR (Malco 12100-4)	3	
	9-206-2	. . TERMINAL, Crimp type (ETC AA 4173T)	5	
	9-206-1	. . TERMINAL, Crimp type (ETC 4172T)	2	
	9-263-1	. . TERMINAL, Crimp type (Malco 52A110-2)	2	
	9-390	. . TERMINAL, Crimp type (Molex)	12	
	15-A272-1	. MIRROR ASSEMBLY	1	
-26	15-A278	. . FIRST MIRROR ASSEMBLY	1	
	15-520	. . . FIRST MIRROR PLATE	1	
	9-040-6	. . . STUD	3	

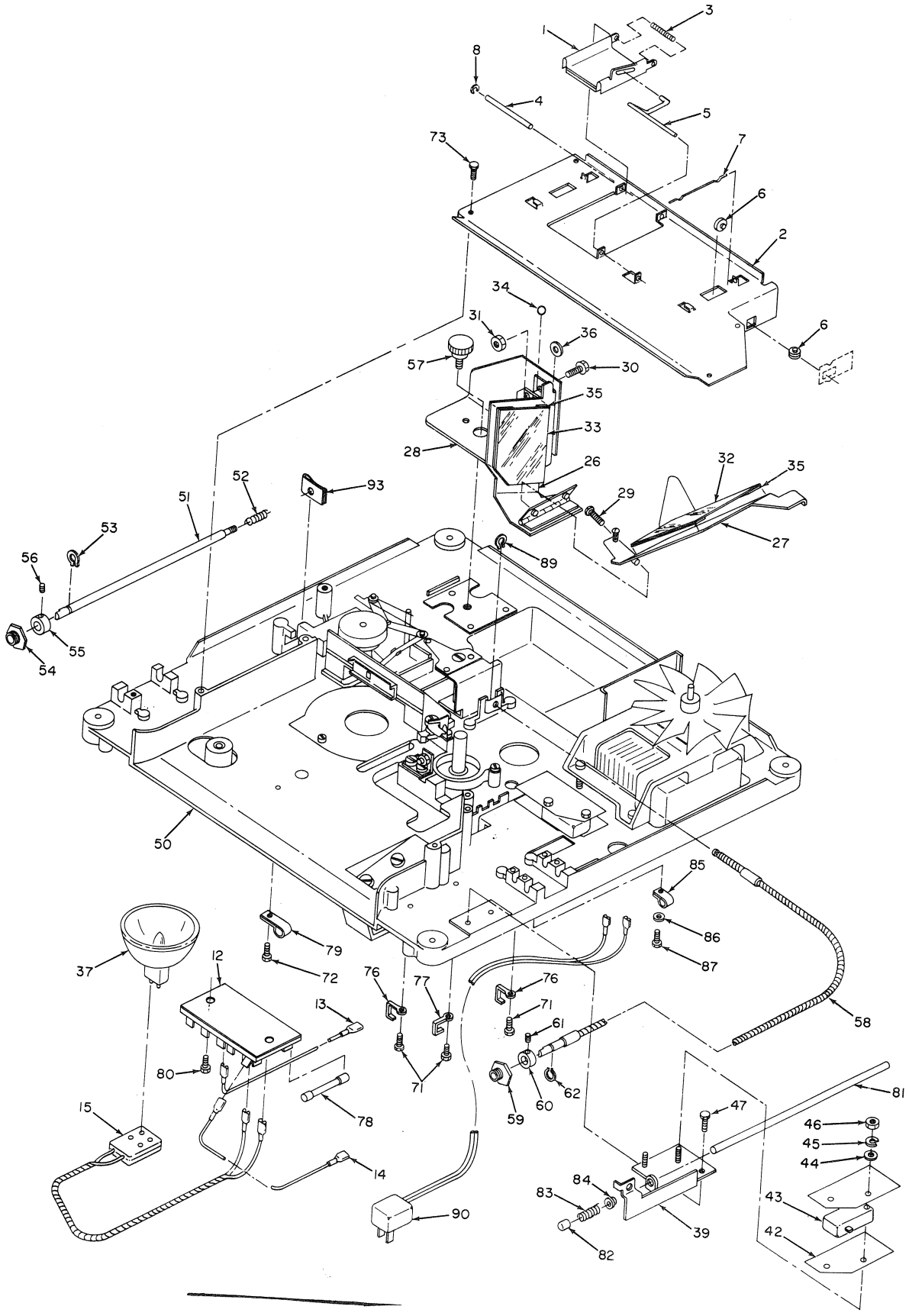

Figure 2. Mechanical Assembly (Sheet 1)

FIG. & INDEX NO.	NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
-27	15-A270	. . SECOND MIRROR PLATE ASSEMBLY	1	
	15-488	. . . SECOND MIRROR BRACKET	1	
	9-158-1	. . . NUT	1	
-28	15-A272-1	. . MIRROR BRACKET ASSEMBLY	1	
	15-486	. . . FIRST and SECOND MIRROR MOUNTING BRACKET	1	
	9-142-4	. . . PIN, Groove		
-29	Com'l.	. . SCREW, Binding head No. 4-40 by 1/4 in. lg.	3	
-30	Com'l.	. . SCREW, Hex. Wash. head No. 6-32 by 7/16 in. lg.	1	
-31	9-169-1	. . NUT, Elastic Stop	1	
-32	15-489	. . SECOND MIRROR	1	
-33	15-490	. . FIRST MIRROR	1	
-34	9-487	. . BALL, Spherical	1	
-35	9-330-4	. . TAPE, Scotch, dual surface	1	
-36	15-231-1	. . WASHER, Teflon	1	
-37	9-131	. LAMP	1	
-38	9-140-1	. LENS, Projection (Interchangeable with 9-140-2)	1	
	15-A283	. ON BRACKET ASSEMBLY	1	
-39	15-A285	. . ON BRACKET SUBASSEMBLY	1	
-40	15-495	. . ON LEVER	1	
-41	9-138-1	. . SPRING	1	
-42	15-445	. . INSULATOR, Switch	2	
-43	9-172	. . SWITCH	1	
-44	Com'l.	. . WASHER, Flat No. 2	2	
-45	Com'l.	. . WASHER, Lock, No. 2	2	
-46	Com'l.	. . NUT, Hex. No. 2	2	
-47	Com'l.	. . SCREW, Slotted hex. hd., type 23 No. 4 by 1/4 in. lg.	1	
-48	AN960-4	. . WASHER, Flat, No. 4	1	
-49	9-169-2	. . NUT, Elastic Stop	1	
-50	15-261-2	. MECHANICAL SUB ASSEMBLY (See figure 3 for detail breakdown)	1	
-51	15-440	. FRAMING SHAFT	1	
-52	9-138-9	. SPRING	1	
-53	9-247-2	. CRESCENT RING	1	
-54	9-504	. BUSHING	1	
-55	15-418	. STOP	1	
-56	Com'l.	. . SET SCREW, Multi-spline 4-40 by 3/8 in. lg.	2	
-57	9-518	. KNOB, Thumb Screw	1	
-58	15-362-4	. FLEXIBLE SHAFT, Focus	1	
-59	9-504	. . BUSHING	1	
-60	15-418	. . STOP	1	
-61	Com'l.	. . SET SCREW, Multi-Spline 4-40 by 3/8 in. lg.	1	
-62	9-247-2	. . CRESCENT RING	1	
-63	9-202	. CONTROL, Volume	1	
-64	15-557M	. FLYWHEEL	1	
-65	15-390	. BELT, Shutter	1	
-66	15-483	. BELT, Flywheel	1	
-67	9-141-1	. BELT, Drive roller	1	
-68	15-553	. RETAINER, Phone jack	1	
-69	9-203	. JACK, Phone	1	
-70	9-300-383	. WASHER, Fibre	1	
-71	9-316-1	. SCREW, Hex. Wash. head, No. 4-40 by 1/4 in. lg.	8	
-72	9-317-1	. SCREW, Hex. Wash. head, No. 6-32 by 1/4 in. lg.	1	
-73	9-317-2	. SCREW, Hex. Wash. head, No. 6-32 by 0.38 in. lg.	4	
-74	9-520-2	. WASHER, Nylon	1	
-75	Com'l.	. SCREW, Pan head No. 10-24 by 2 in. lg.	2	

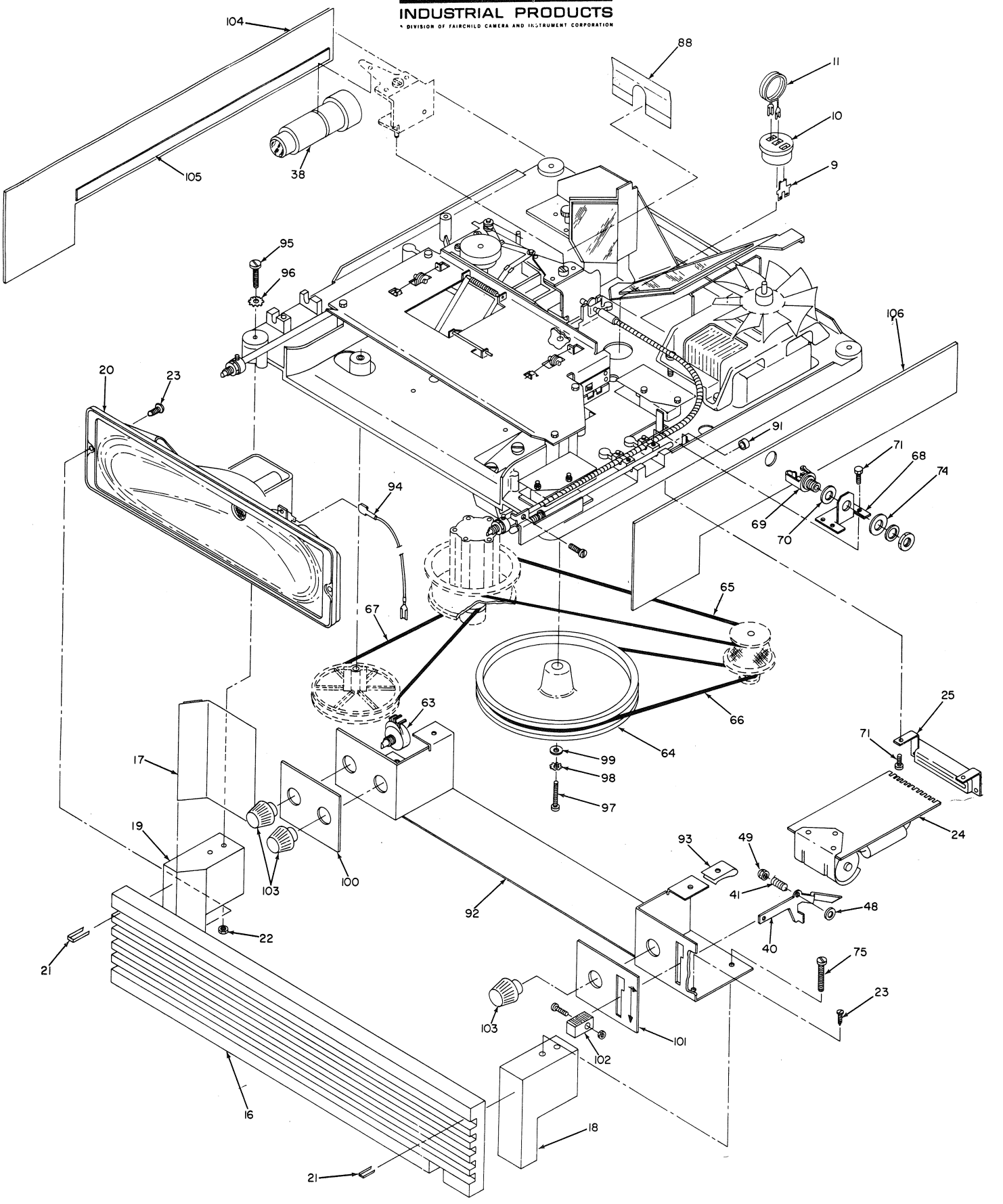

Figure 2. Mechanical Assembly (Sheet 2)

FIG. & INDEX NO.	NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
-76	9-341	. LUG, Flat	2	
-77	9-340	. LUG, Ground	1	
-78	9-243	. FUSE, Slo-Blo, 2 amps, 125 volts	1	
-79	9-339-2	. CLAMP, Cable	1	
-80	Com'l.	. SCREW, Slotted hex. head, type 23, No. 6 by 3/8 in. lg.	2	
-81	15-500	. SHAFT, ON	1	
-82	15-410	. SHAFT CAP	1	
-83	9-138-2	. SPRING	1	
-84	9-256-1	. BEARING, Flange	1	
-85	9-339-3	. CLAMP, Cable (use with 15-A219)	1	
	9-339-4	. CLAMP, Cable (use with 9-100-605)	1	
	9-339-5	. CLAMP, Cable (use with 15-558)	1	
-86	9-338-2	. WASHER	1	
-87	Com'l.	. SCREW, Slotted hex. head, No. 4 by 1/4 in. lg.	1	
-88	15-446	. LIGHT SHIELD	1	
-89	9-262-1	. PRONG LOCK	1	
-90	15-A219	. LINE CORD, 2 wire	1	
	15-558	. LINE CORD, 3 wire (optional)	1	
	9-100-605	. LINE CORD, 3 wire (optional)	1	
-91	9-246-1	. BEARING, On Shaft	1	
-92	15-513-1	. CONTROL PANEL	1	
-93	9-505	. SPEEDNUT	1	
-94	15-A298	. WIRE ASSEMBLY	1	
-95	Com'l.	. SCREW, Pan head No. 10-24 by 1-1/2 in. lg.	2	
-96	Com'l.	. LOCKWASHER, External tooth No. 10	1	
-97	Com'l.	. SCREW, Hex. socket smooth cap. No. 10-32 by 1/2 in. lg.	1	
-98	Com'l.	. LOCKWASHER, Split No. 10	1	
-99	Com'l.	. WASHER, Flat No. 10	1	
-100	15-525	. DECAL, Volume (refer to 15-A300 figure 1, Item 20)	1	
-101	15-524	. DECAL, On, focus (refer to 15-A300 figure 1, Item 21)	1	
-102	9-100-349	. KNOB, On-Off (refer to 15-A300 figure 1, Item 22)	1	
-103	9-486	. KNOB, Control (refer to 15-A300 figure 1, Item 23)	3	
-104	15-561	. LIGHT BAFFLE, Left (refer to Figure 1, Item 5)	1	
-105	9-330-4	. TAPE, Scotch dual surface	1	
-106	15-560	. LIGHT BAFFLE, Right (refer to Figure 1, Item 6)	1	

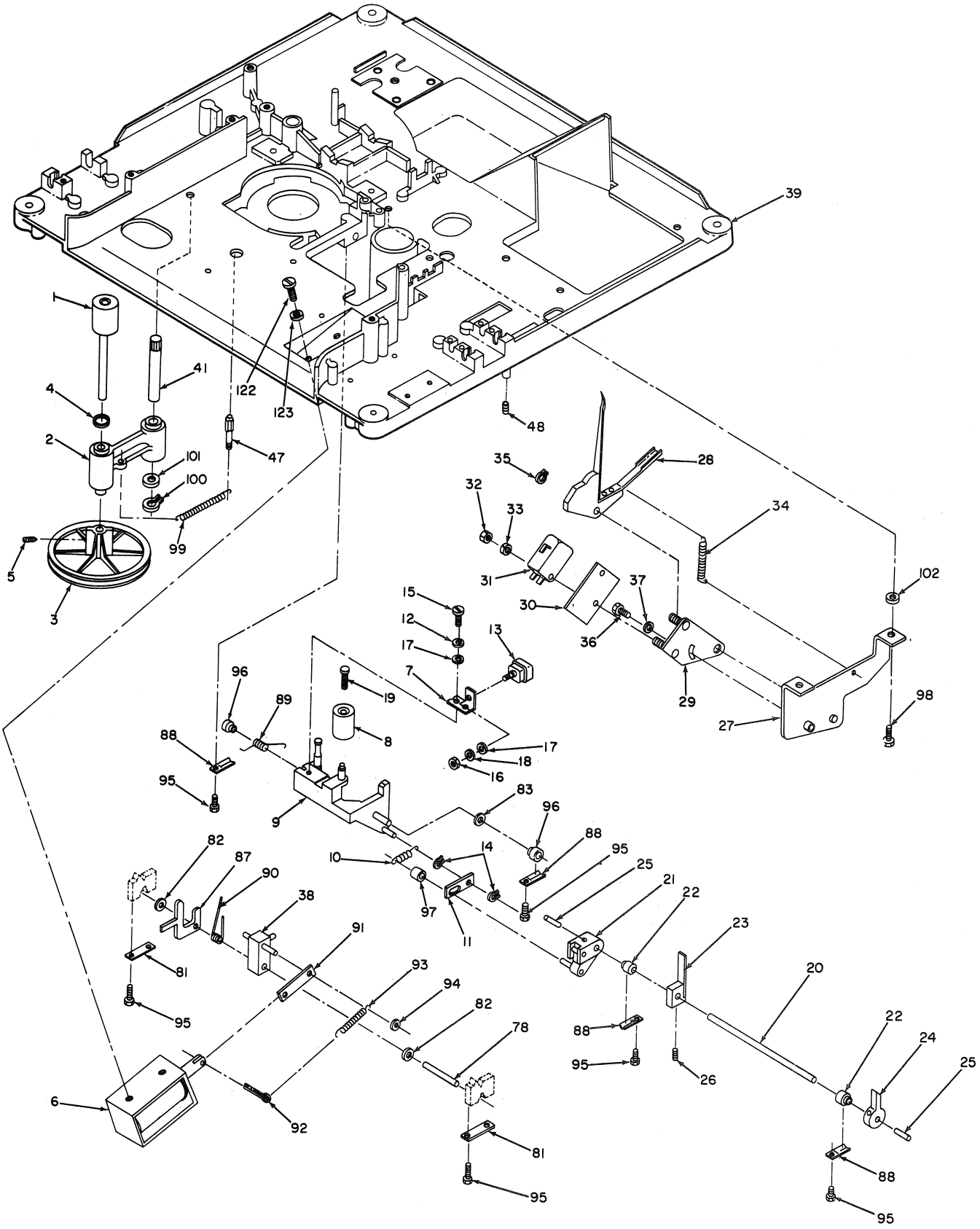

Figure 3. Mechanical Subassembly (Sheet 1)

FIG. & INDEX NO.	NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
3-	15-A261-2	MECHANICAL SUBASSEMBLY (See Item 50, figure 2 for next higher assembly)	REF	
	15-A123	. DRIVE ROLLER ASSEMBLY	1	
-1	15-A122	. . DRIVE ROLLER ASSEMBLY	1	
		. . . SHAFT, Drive roll	1	
-2	15-A147	. . DRIVE ROLLER ARM ASSEMBLY	1	
-3	15-274	. . PULLEY, Drive roller	1	
-4	9-377-1	. . WASHER Nylon	1	
-5	Com'l.	. . SETSCREW, Multiple Spline, cup point, No. 6-32 by 0.19 in. lg.		
-6	15-A198	. SOLENOID SUBASSEMBLY	1	
	9-163-2	. . SOLENOID	1	
	9-206-2	. . TERMINAL, Crimp type (ETC AA4173T)	2	
	9-206-3	. . TERMINAL, Crimp type	1	
	15-A138	. PINCH ROLLER BRACKET ASSEMBLY	1	
-7	15-A139	. . HEAD MOUNT BRACKET ASSEMBLY	1	
	15-072	. . . BRACKET, Head mount	1	
	15-073	. . . Pin, Head mount	1	
-8	15-A157	. . PINCH ROLLER ASSEMBLY	1	
	15-A118	. . . ROLLER ASSEMBLY	1	
	15-352	. . . . SLEEVE, Pinch roller	1	
	15-353	. . . RETAINER, Bearing	1	
	15-021	. . . BEARING, BALL	1	
-9	15-A190	. . PINCH ROLLER BRACKET SUBASSEMBLY	1	
	15-069	. . . POST, Guide	1	
	15-277	. . . BRACKET, Pinch roller	1	
	15-354	. . . SHAFT, Pinch roller	1	
	9-335-1	. . . PIN, Groove	1	
-10	15-389	. . SPRING, Pinch roller pressure	1	
-11	15-292	. . LOCK, Arm link	1	
-12	9-128-2	. . WASHER, Spring tension	1	
-13	9-146	. . SOUND HEAD	1	
-14	9-130-1	. . GRIP RING (Waldes 5555-12)	2	
-15	Com'l.	. . SCREW, Pan head No. 6-32 by 1/4 lg. Non. Mag.	1	
-16	Com'l.	. . NUT, Hexagon, sst, No. 6-32 Non. Mag.	1	
-17	Com'l.	. . WASHER, Flat, sst, No. 6 Non. Mag.	2	
-18	Com'l.	. . WASHER, Lock, external tooth, bronze, nickle pl. No. 6, Non. Mag.	1	
-19	Com'l.	. . SCREW, Binding head, No. 2-56 by 0.19 in. lg.	1	
	15-A151	. SHAFT ASSEMBLY, ON	1	
-20	15-110	. . SHAFT	1	
-21	15-A156	. . LINK ASSEMBLY	1	
		. . . LINK	1	
		. . . PIN, Groove	1	
		. . . PIN, Groove	1	
-22	15-440	. . BEARING, Self-aligning	2	
-23	15-A155	. . ACTUATION ARM ASSEMBLY	1	
	15-269	. . . HUB	1	
	15-270	. . . ARM	1	
-24	15-293M	. . ARM	1	
-25	9-319-2	. . PIN, Spiral 1/16 dia. by 1/2 in. lg.	2	

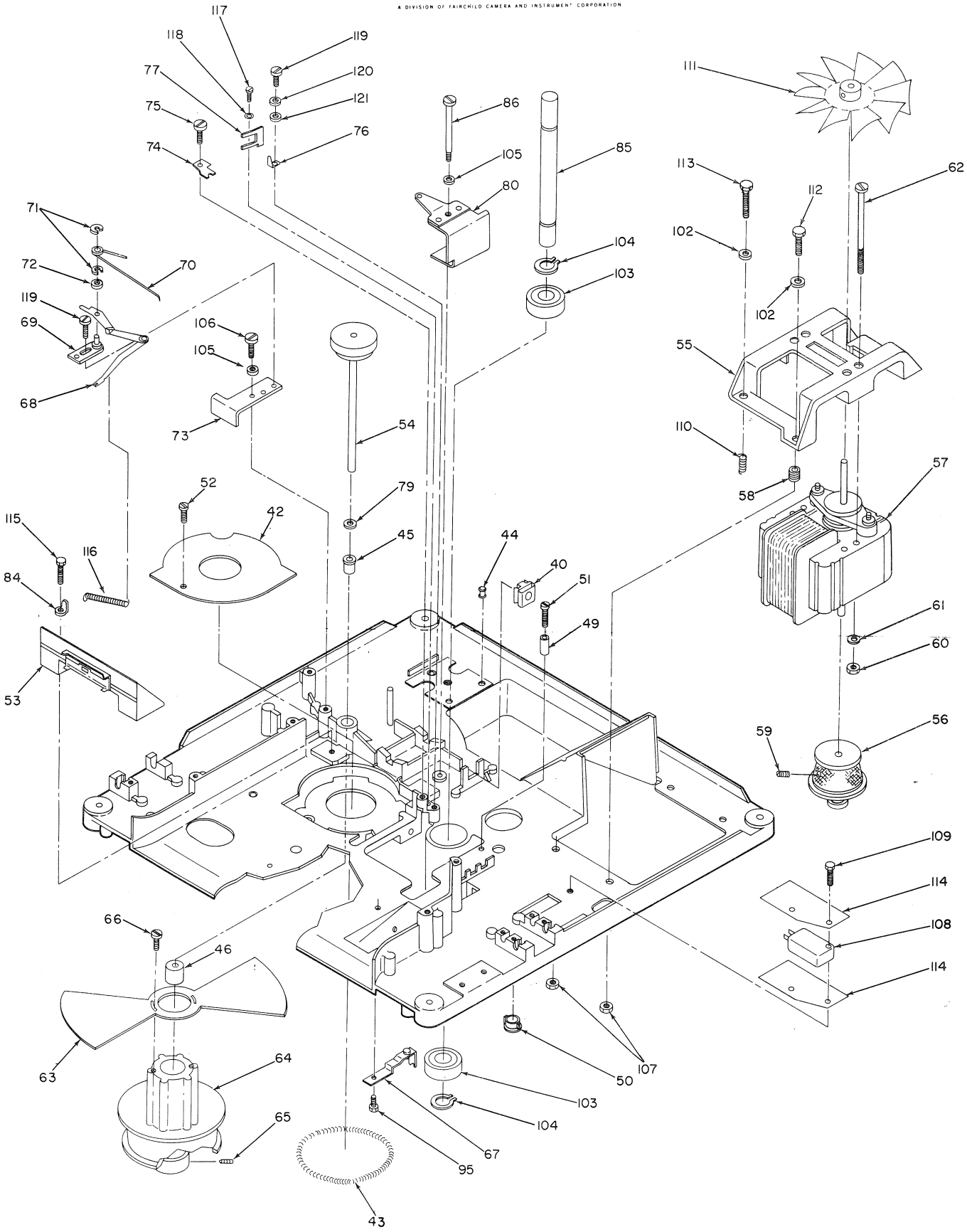

Figure 3. Mechanical Subassembly (Sheet 2)

FIG. & INDEX NO.	NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
-26	Com'l.	. . SETSCREW		
	15-A180	. SENSING FINGER ASSEMBLY	1	
-27	15-A149	. . SENSING FINGER BRACKET ASSEMBLY	1	
	15-154	. . . PIVOT	1	
	9-158-1	. . . NUT, HEX, No. 4-40 Self-locking	1	
	15-285	. . . BRACKET	1	
-28	15-A-121	. . SENSING ARM ASSEMBLY	1	
	9100-353	. . . SPRING		
	15-157	. . . ARM	1	
	15-263	. . . CAM	1	
	9-155-3	. . . SCREW, Drive, No. 2 by 0.187 in. lg. Type U		
	15-A186	. . Switch ASSEMBLY	1	
-29	15-A286	. . . SENSOR PLATE	1	
-30	9100-472	. . . INSULATOR	1	
-31	9-173	. . . SWITCH, Sensitive, 3A, 125vac	1	
-32	Com'l.	. . . NUT, Hexagon, No. 2-56	2	
-33	Com'l.	. . . WASHER, LOCK, Spring No. 2	2	
-34	15-441	. . SPRING	1	
-35	9-130-2	. . GRIP RING (Waldes 5555G-19)	1	
-36	Com'l.	. . SCREW, Pan head, No. 4-40 by 1/4 in. lg.	1	
-37	Com'l.	. . WASHER, Flat No. 4	1	
-38	15-A154	. PAWL ASSEMBLY	1	
	15-289	. . PAWL	1	
	9-248-1	. . Pin, ROLL	1	
	9-154-3	. . Pin. ROLL	1	
	15-A150	. BASE PLATE SUB-ASSEMBLY	1	
-39	15-088	. . BASE PLATE	1	
-40	9-396	. . RETAINER, NUT speed grip	1	
-41	15-164	. . SHAFT	1	
-42	15-443	. . LIGHT SHIELD, lamp	1	
-43	15-388	. . SPRING, lamp	1	
-44	9-211	. . SPEED CLIP, Tubular (Tinnerman C2733-100-4)	3	
-45	9-184-1	. . BEARING, Sleeve	1	
-46	9-153	. . BEARING, Ball	1	
-47	9-204-2	. . PIN, Groove	1	
-48	9-519-1	. . FASTNER, Flush self clinching	1	
-49	15-442	. . ECCENTRIC	1	
-50	9-531	. . SNAP BUSHING	1	
-51	Com'l.	. . SCREW, Fillister head, No. 4-40 by 5/8 in. lg.	1	
-52	Com'l.	. . SCREW, slotted hex. hd. type 23 No. 4-40 by 1/4 in. lg.	1	
-53	15-A52	. APERTURE PLATE ASSEMBLY	1	
	15-125M	. . APERTURE PLATE	1	
	15-126	. . INSERT, CLAW	1	
	15-303	. . GUIDE, Moveable	1	
	9-129-2	. . EYELET	2	
-54	15-A288	. CAM ASSEMBLY	1	
	15-177	. . CAM, Radial	1	
	15-535	. . CAM, In-Out	1	
	15-501	. . CAM SHAFT	1	
	15-A265	. MOTOR ASSEMBLY	1	
-55	15-266C	. . BRACKET, Motor mtg.	1	
-56	15-502	. . PULLEY, Cone	1	
-57	9-147	. . MOTOR	1	
-58	9-170-1	. . ISOLATOR, Rubber	2	
-59	Com'l.	. . SETSCREW, Multiple spline, cup point 4-40 by 3/16 lg.	1	
-60	Com'l.	. . NUT, HEX, No. 6-32	4	
-61	Com'l.	. . WASHER, Lock, No. 6	4	
-62	Com'l.	. . SCREW, Fillister head, No. 6-32 by 2-1/2 in. lg.	4	
	15-A266	. PULLEY ASSEMBLY, Large cone	1	

FIG. & INDEX NO.	NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
-63	15-159	. . SHUTTER	1	
-64	15-246	. . PULLEY, Large cone	1	
-65	Com'l.	. . SETSCREW, Multiple spline, cup pt., 4-40 by 3/16 in. lg.	1	
-66	Com'l.	. . SCREW, Self-tapping, slotted hex head, No. 4-40 by 1/4 in. lg. Type 23	1	
-67	15-A221	. RELEASE LEVER DRIVE SPRING ASSEMBLY	1	
	15-412	. . SPRING	1	
	9-315-2	. . RIVET, Nylon 0.16 dia. by 1/4 in. lg.	1	
	9-189-2	. . RING, Circular push-on (Waldes 5115-15)	1	
	15-A193-1	. CLAW ASSEMBLY	1	
-68	15-A153-1	. . CLAW SUBASSEMBLY	1	
	15-189	. . CLAW, In-Out	1	
	15-193	. . . CLAW, Radial	1	
	15-188	. . . FOLLOWER, In-Out	1	
	15-223	. . . FOLLOWER, Radial	1	
	9-128-3	. . . WASHER, Spring tension	2	
	9-129-1	. . . EYELET SE65	1	
-69	15-A160	. . PLATE, Adjusting	1	
	15-311	. . . PIN, Guide	1	
	15-308	. . . PLATE, Adjusting	1	
-70	15-239	. . SPRING	1	
-71	9-130-1	. . GRIP RING (Waldes 5555-12)	2	
-72	9-128-4	. . WASHER, Spring Tension	1	
-73	15-A159-1	. FRAMING LINK ASSEMBLY, stationary	1	
	9-158-1	. . NUT, Hex, No. 4-40 self locking	1	
	15-307	. . FRAMING LINK, stationary	1	
	9-158-1	. . NUT, Hex, No. 4-40 self locking	1	
	15-307	. . FRAMING LINK, stationary	1	
-74	15-070	. PRESSURE SHOE	1	
-75	15-071	. SCREW, Pressure shoe, No. 4-40	1	
-76	15-074	. SPRING, Pressure shoe	2	
-77	15-082	. GUIDE, Film	1	
-78	15-124	. PIN	1	
-79	9-374	. WASHER, 0.188 id by 0.375 od by 0.005 in. thk.	1	
-80	15-A146	. FOCUSING ARM ASSEMBLY	1	
	15-090	. . PIN, Drive	1	
	15-091	. . ARM FOCUSING	1	
-81	15-166	. RETAINER, Pawl	2	
-82	15-184-1	. WASHER, Nylatron, 0.189 id by 0.31 od by 0.30 in. thk.	2	
-83	15-184-2	. WASHER, Nylatron, 0.189 id by 0.31 od by 0.074 in. thk.	1	
-84	9-378	. LUG	1	
-85	15-505	. CAPSTAN	1	
-86	15-238	. SCREW, Shoulder, No. 6-32 by 1.52 in. lg. stl.	1	
-87	15-290	. LEVER, Release	1	
-88	15-296	. RETAINER, Spherical	4	
-89	15-439	. SPRING, Pinch roller retainer	1	
-90	15-438	. SPRING, Pawl bias	1	
-91	15-309	. LINK, Solenoid	1	
-92	9-326-3	. PIN, Cotter	1	
-93	15-310	. SPRING, Solenoid retainer	1	
-94	9-130-3	. GRIP RING (Truarc G5555-9)	1	
-95	9-316-1	. SCREW, Hex, Wash. head No. 4-40 by 1/4 in. lg. stl.	9	
-96	15-440	. BEARING, Spherical	2	
-97	9-246-1	. BEARING, Nylon	1	
-98	9-317-1	. SCREW, Hex, Wash. head No. 6-32 by 1/4 in. lg., stl.	2	
-99	15-444	. SPRING, Drive puck	1	
-100	9-130-4	. GRIP RING (Truarc 5555-31)	1	
-101	Com'l.	. WASHER, Flat 5/16	1	
-102	Com'l.	. WASHER, Flat, No. 6	3	

FIG. & INDEX NO.	NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
-103	9-149	. BEARING, Ball	2	
-104	9-157-2	. RING, Retaining (Truarc 5100-37)	2	
-105	9-128-1	. WASHER, Spring tension	2	
-106	15-371	. SCREW, Shoulder, No. 6-32 by 0.56 in. lg. stl.	1	
-107	9-169-1	. NUT, No. 6-32 (Elastic stop)	4	
-108	9-172	SWITCH	1	
-109	9-316-4	. SCREW, Hex. Wash. head, No. 4-40 by 0.63 in. lg. stl.	2	
-110	9-138-1	. SPRING, Compression, motor	1	
-111	9-329	. BLADE, Fan	1	
-112	Com'l.	. SCREW, Slotted hex head, No. 6-32 by 5/8 in. lg.	2	
-113	Com'l.	. SCREW, Slotted hex head, No. 6-32 by 7/8 in. lg.	2	
-114	15-445	. INSULATOR, Switch	2	
-115	Com'l.	. SCREW, Hex Wash. head, Slotted, No. 6-32, Type 23 by 3/8 in. lg.	2	
-116	9-183-1	. CLAW, Spring	1	
-117	Com'l.	. SCREW, Binding head, No. 2-56 by 1/4 in. lg.	2	
-118	Com'l.	. WASHER, Lock, internal tooth, No. 2	2	
-119	Com'l.	. SCREW, Binding head, No. 4-40 by 1/4 in. lg.	2	
-120	Com'l.	. WASHER, Lock, internal tooth No. 4	1	
-121	Com'l.	. WASHER, Flat, No. 4	1	
-122	Com'l.	. SCREW, Binding head, No. 6-32 by 1/4 in. lg.	2	
-123	Com'l.	. WASHER, Lock, internal tooth, No. 6	2	

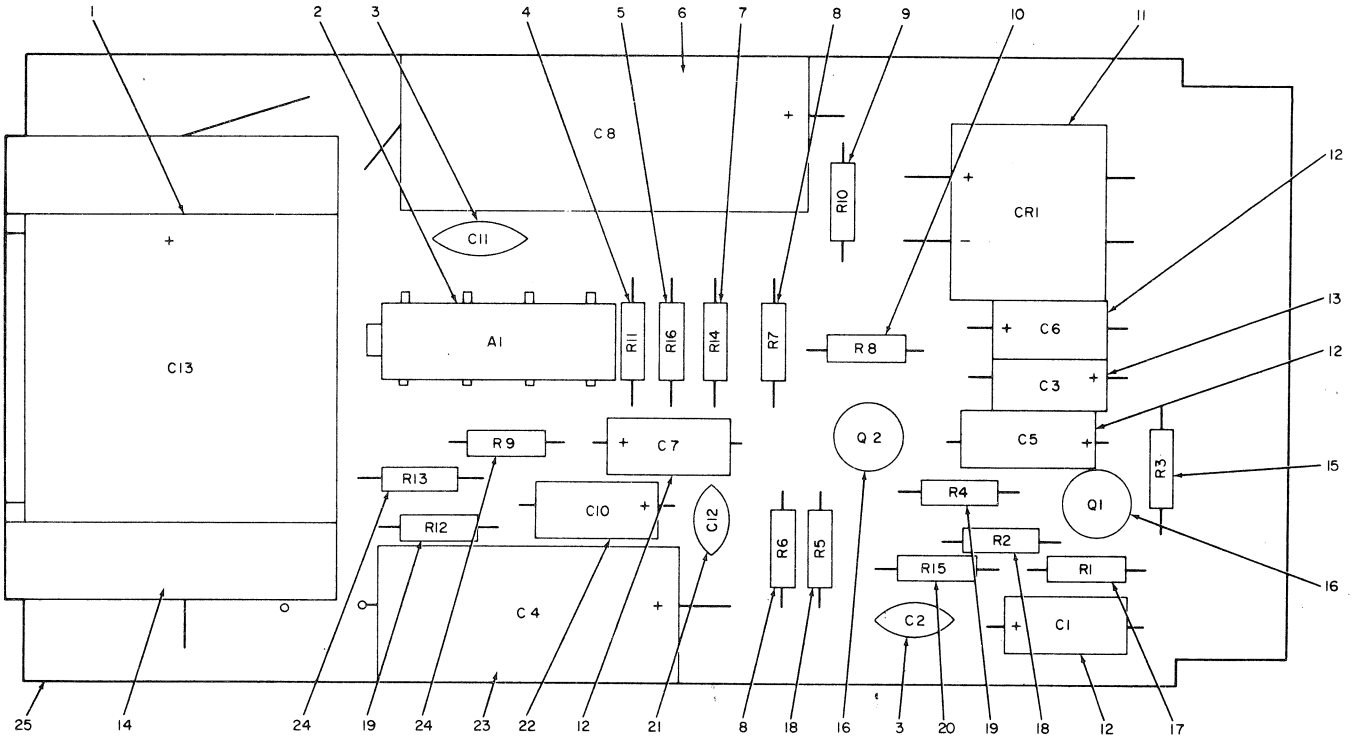

Figure 4. Amplifier Board Assembly

FIG. & INDEX NO.	NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
4-	15-A148	AMPLIFIER BOARD ASSEMBLY (See item 24, figure 2 for next higher assembly)	REF	
-1	9-177-1	. CAPACITOR, (C13) Fixed, 1600uf, 35v (Synchro EMW 3252-1600-35)	1	
-2	9-160	. AMPLIFIER, (A1) Audio, 27v, 10A, 2W (General Electric PA237)	1	
-3	9-181	. CAPACITOR (C2, C11) Fixed, 0.0022uf, 1 kv (Centralab DD222-002-1000) ...	2	
-4	RC07GF684K	. RESISTOR (R11), Fixed, composition, 680 k ohms, ± 10%, 1/4W	1	
-5	RC07GF334K	. RESISTOR, (R16) Fixed, Composition, 3300 k ohms, ± 10%, 1/4W	1	
-6	9-177-2	. CAPACITOR, (C8), Fixed, 500 uf, 20V (Synchro EMW1644-500-20)	1	
-7	RC07GF220K	. RESISTOR (R14), Fixed, Composition 22 ohms, ±10%, 1/4W	1	
-8	RC07GF562K	. RESISTOR (R6, R7), Fixed, Composition 5.6 ohms, ±10%, 1/4W	2	
-9	RC07GF183K	. RESISTOR, (R10), Fixed, Composition, 18k ohms, ±10%, 1/4W	1	
-10	RC07GF223K	. RESISTOR, (R8), Fixed, Composition, 22k ohms, ±10%, 1/4W	1	

FIG. & INDEX NO.	NUMBER	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
4-11	9-174	. RECTIFIER (CR1) Bridge, 50V PIV, 35V, 1A DC, 10A recurrent peak (Power Components MMB05S)	1	
-12	9-176-1	. CAPACITOR (C1, C5 thru C7), Fixed, 1.0uf, 15V (Synchro EMMW109-1-70)	4	
-13	9-180	. CAPACITOR, (C3) Fixed, 0.0022uf, 200V (Sprague 192P22292)	1	
-14	15-133	. BRACKET, Capacitor	1	
-15	RC07GF433K	. RESISTOR (R3), Fixed, Composition, 43k ohms, ±5%, 1/4W	1	
-16	9-175	. TRANSISTOR (Q1, Q2), High gain, NPN (Fairchild Semiconductor 2N3565)	2	
-17	RC07GF561K	. RESISTOR (R1), Fixed, Composition, 560 ohms, ±10%, 1/4W	1	
-18	RC07GF185K	. RESISTOR (R2, R5), Fixed, Composition, 1.8M ohms, ±10%, 1/4W	2	
-19	RC07GF103K	. RESISTOR (R4, R12), Fixed, Composition 10k ohms, ±10%, 1/4W	2	
-20	RC07GF100K	. RESISTOR (R15), Fixed, Composition, 10 ohms, ±10%, 1/4W	1	
-21	9-182	. CAPACITOR (C12), Fixed, 0.05uf, 20V (Centralab UK20-503)	1	
-22	9-176-2	. CAPACITOR (C10), Fixed, 5uf, 70V (Synchro EMMW23)	1	
-23	9-177-3	. CAPACITOR (C4), Fixed, 200uf, 15V (Synchro EMW1228-200-15)	1	
-24	RC07GF563K	. RESISTOR (R9, R13), Fixed, Composition, 56k ohms, ±10%, 1/4W	2	
-25	15-283	. AMPLIFIER BOARD	1	

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APPENDIX A

CARTRIDGE LOADING

The cartridge to be used (Seventy-10 or Seventy-20) is determined by the amount of film footage required for the filmed program. Film lengths of up to 200 feet may be loaded into the Seventy-10, and the Seventy-20 has a capacity of 400 feet. There are no limitations on the minimum length. However, if a film sequence is very short (less than 50 feet for example) it may be advantageous to use a few duplicate sequences in the same cartridge loading. This procedure would increase overall film footage in the cartridge and provide extended film life.

NOTE

Refer to Section VII, Illustrated Parts List in conjunction with the following procedures. Cartridges are illustrated in figures 9 and 10. In addition, figure I illustrates the cartridges in a simplified form. All item references (in parentheses) are to figures 9 and 10 unless other wise specified.

A.1 LOADING

A. Remove the screws (12) that hold the cover (8) in place; depress the locking detent tabs (figure I, item B) to release cover from cartridge base (G).

B. Remove the reel assembly (F) from the cartridge base (G) and set it on a flat surface.

C. It is recommended that the reel be held in a horizontal position for film loading. However, vertical loading can be accomplished provided care is taken to prevent film from spilling off the reel.

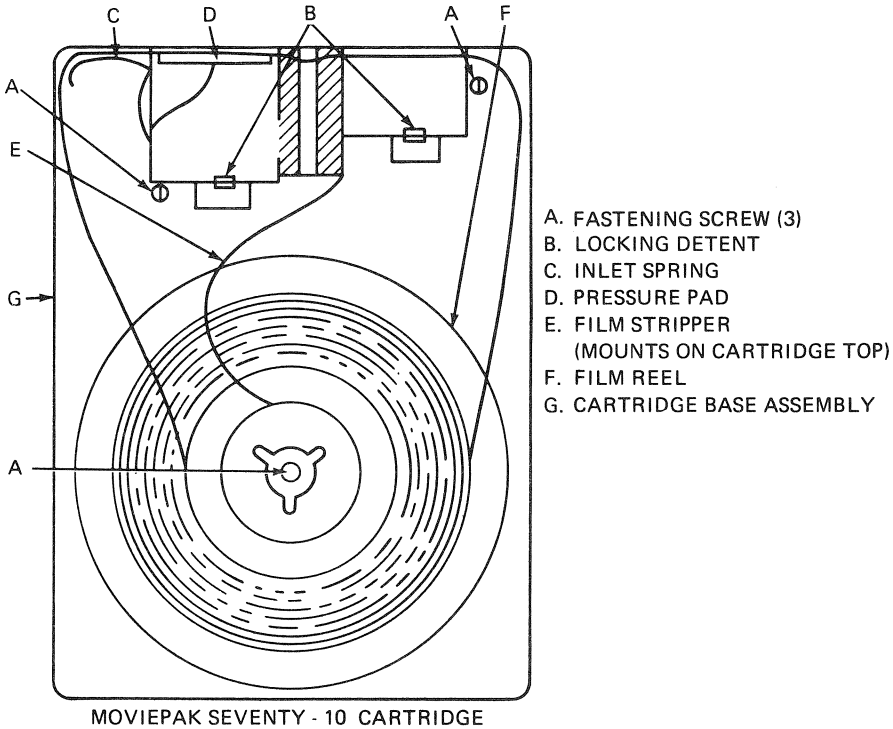


Figure I. MoviePak Seventy-10 Cartridge

NOTE

To prevent film spilling and to secure the film in place dur-
the winding operation, mount a second reel over the first.
A disc of cardboard or similar material with a cut-out to
fit the raised hub base on the open side of the reel will also
prevent film spilling during the loading procedure.
The reel spindle hole will adapt to any Super 8mm spindle
as found on home projectors, film editors, etc, if the ny-
liner (11) is removed from the center post (10). The spin-
dle is utilized as a holder.

D. Starting with the head end of the film, fastened to the hub of the reel (F) with masking tape, turn the reel clockwise and wind all the film onto the reel. Perforations must face away from reel flange side, magnetic sound stripe must face the hub of the reel.

CAUTION

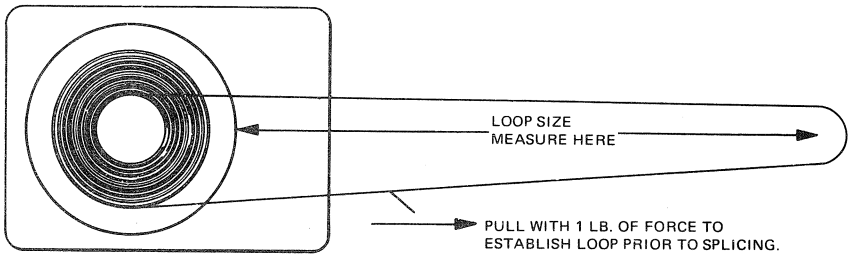
Do not tape or fasten film end to sloping side of reel hub.
Adhesive residues on this surface can cause film jamming
and breakage during cartridge operation. Turn reel clock-
wise until entire film is wound on reel.

NOTE

Check and be certain that sound stripe faces the reel hub.

E. Lift the head end of the film from the cartridge reel hub and draw out approximately 8-10 inches (as measured from the end of the cartridge). See figure II.

FILM LOADING INSTRUCTIONS
MOVIEPAK SEVENTY-10 AND SEVENTY-20 CARTRIDGE



FILM LOOP CHART

Film Footage	Loop Size in Inches
50	8
100	11
150	14
200	18
250	23
300	29
350	35
400	43

Figure II. MoviePak Seventy-10 and Seventy-20 Cartridge Film Loop Chart

F. Hold the film bundle down on the reel with the palm of your hand. Pull the outer layer of film (trailer end) with approximately one pound of force. Prevent the inner layers of film from slipping on the reel hub as you complete setting the bundle tension. See figure II.

G. Trim off all but about 12 inches of trailer, then unwind enough outside layers of film from the bundle to permit forming a loop of the proper size. Refer to the film loop chart (see figure II) to determine the correct loop length.

CAUTION

If the film loop is too tight the projector will have to labor to move the film. Irregular film movement with sound speed variation or torn perforations and film breakage will result. If the film loop is too loose the film will not take up on the film bundle.

NOTE

If the film requires Auto-Stop film preparation perform the operations in accordance with paragraph A. 4.

H. Using Eastman Kodak Presstape, Baia, or a similar splicer providing an "S" cut film joint, dry splice the leader and trailer ends of the film to each other.

CAUTION

Check and be certain there are no twists in the loop and splice in accordance with paragraph A. 2. Recheck loop size in accordance with figure II.

I. After completion of the dry splice (in accordance with paragraph A. 2) ascertain the correct film loop size (see figure II, film loop chart). Thread the film (starting from the head end) in accordance with paragraph A. 3.

A.2 SPLICING

CAUTION

CORRECT SPLICING TECHNIQUE IS VERY IMPORTANT FOR PROPER OPERATION OF THE PROJECTOR. AN "S" OR OFFSET TYPE DRY SPLICE MUST BE USED. DO NOT USE A WET SPLICE, OR A STRAIGHT SPLICE. SPLICE TAPE MUST NOT OVERLAP OR BE FOLDED OVER THE FILM EDGE. THERE MUST BE NO SPLICES CLOSER THAN TWELVE INCHES OF EACH OTHER.

NOTE

Before splicing ensure that the proper loop is set in accordance with paragraph A. 1, step G, and check to be certain there are no twists in the loop.

NOTE

The procedure that follows is based on an "S" cut splicing machine and Super 8mm Presstape two-piece mylar splicing materials. See figure III. Standard Eastman Kodak Super 8 splicer may be modified to provide and "S" splice or a BAIA "S" splicer may be used.

A. Raise the cutting knife handle.

B. Place one film strip on the base so that the film perforations are over the three pins (two fixed, one movable) to the left of the marked center line, with the end of the film extending beyond the center line. Trim film by lowering the cutting knife and remove trim.

C. Place the other film strip, same side up, (without twists) over the three pins to the right of the center line with the end of the film strip extending beyond the center line. Trim film by lowering cutting knife and remove trim.

D. Remove one of the tapes from the package. Apply the tape over the center cut by placing the tape perforations over the four fixed pins with the center line of the tape over the cut side of the film.

E. Holding the left side of the tape down, carefully pull off the right paper flap. Apply finger pressure to the tape to seal it to the film.

F. Holding the right side of the film down, carefully pull off the left paper flap. Apply finger pressure to the tape to seal it to the film. Press the tape down around the pins.

G. Turn the film over to apply tape to the other side, and repeat steps d, e, and f above.

CAUTION

The cut line of the film must fit over the center line of the splicer.

H. Rub the tape briskly with the flat surface of a fingernail to ensure a lasting splice.

I. Take up the loop by laying the reel flat, holding the inside layers of film on the reel, and turning the outside film bundle in a clockwise direction until the loop is reduced in size for threading into the cartridge.

A.3 FILM THREADING

A. After a good "S" type dry splice has been made in accordance with paragraph A. 2, install the reel in the cartridge base.

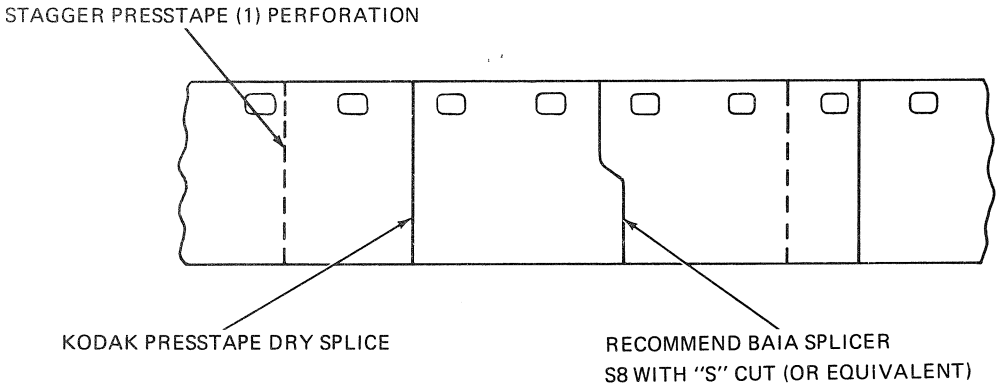


Figure III. Film Splicing

CAUTION

Check and be certain that the center post (figure 9 and 10, item 10) and nyliner (figure 9 and 10, item 11) are in place on the reel spindle. Refer to the exploded views of the cartridge and the parts list (section VII) in conjunction with the procedures below.

NOTE

Film threading is shown simplified in figure I. Reference should be made to both figure I and figure 9 for procedures pertaining to Seventy-10 and figure I and figure 10 for procedures pertaining to Seventy-20.

B. Starting with the inside end-of-film loop, thread around the inlet spring (figure 9 or 10, item 4; figure I, item C), between cartridge and pressure pad (figure 9 or 10, item 6: figure I, item D), along inside front of cartridge to outside of film bundle.

C. Replace cartridge top (figure 9 or 10, item 1) by positioning top at rear of cartridge base assembly (figure I, item G) and at detent openings.

CAUTION

Before pressing cartridge top (figure 9 or 10, item 1) into locked position, depress film at pressure pad (figure 9 or 10, item 6; figure I, item D) and capstan openings to prevent film from being jammed between cartridge base and top.

D. Press down on the cartridge top (figure 9 or 10, item 1) until locking detent's (figure I, item B) lock.

E. Move film along pressure pad (figure 9 or 10, item 6; figure I, item D) and capstan opening to be certain that film travel is not obstructed.

F. Secure top in place with screws (figure 9 or 10, item 12).

CAUTION

Screws are required for proper operation. Do not depend on plastic detents.

A.4 AUTO-STOP FILM PREPARATION

A. Run the projector with film to the preselected stopping point. Manually turn the unit off by depressing the OFF button.

NOTE

Auto-Stop sensing by the projector takes place at the aperture plate and the aperture pressure pad area of the cartridge. The projector will turn OFF when film with blocked perforations pass through this area of the projector.

B. Remove the cartridge from the projector.

C. Pull out a loop (approximately 8 inches of film) from the area of the cartridge aperture pressure pad.

D. Use Eastman Kodak Presstape dry splicing material, or equivalent. Invert the splice so that splice perforation holes are opposite the film perforation holes. Apply one splice to the emulsion side of the film. See figure IV.

CAUTION

Do not wrap splice around the film edges as this material will interfere with film travel and may cause the film to jam or break.

E. Retract the loop by feeding the film back into the aperture pressure pad area toward the outer film diameter on the reel while turning the reel clockwise.

NOTE

The reel can be turned through the reel drive opening on the under side of the cartridge.

CAUTION

The film must be fully retracted to normal position in the cartridge before inserting the cartridge into the projector.

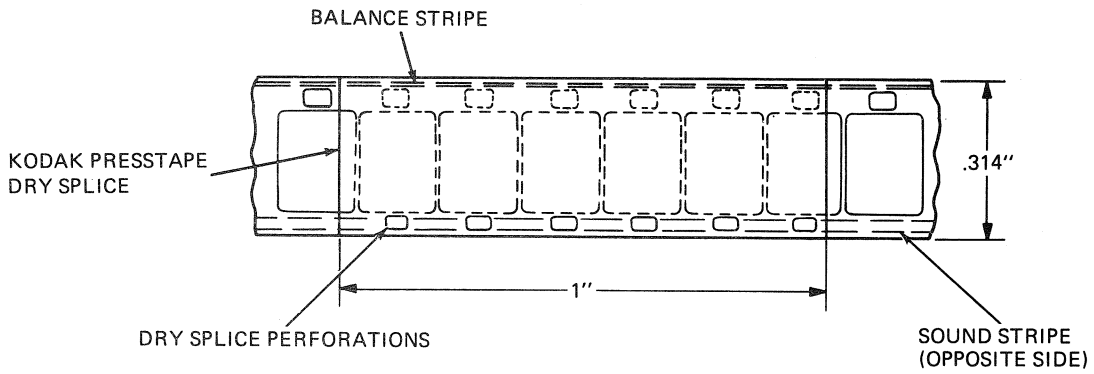


Figure IV. Auto-Stop Film Preparation

APPENDIX B

FILM TREATMENT TECHNIQUES

B.1 GENERAL

In most cases, users will obtain preloaded cartridges from a distributor, dealer, laboratory, or customer producer. The following instructions are provided for users who have occasion to repair or replace their own films. Films must be pre-stripped before loading to ensure maximum film life. In addition, it is recommended that films be treated by the Vacuumate No-En or equivalent process to ensure maximum film life.

Such treatment is mandatory for all film over 200 feet in length. The seventy-20 cartridge can be loaded with up to 400 feet of standard 6 mil color or black-and-white super 8 film. Longer lengths of thin base or Estar film can be accommodated. Smaller lengths may be loaded if desired.

NOTE

Laboratories may use these instructions as a guide to prepare their films for loading.

NOTE

Untreated positive print film stock can be shown several hundred times before serious deterioration. Treated positive film can be shown several thousand times. Reversal film stock will exhibit shorter film life.

B.2 TYPE OF PRINT

As noted above, best performance and longest film life will be obtained with positive print stock in preference to reversal film stock. The latter should be used for pilot program demonstrations or record purposes only. Reversal film emulsion tends to crack in cartridge operation and film life may be as short as 100 to 500 showings. Release prints should be produced by reduction printing from a 16mm internegative. In general, contact prints from a multiple rank Super 8mm internegative do not provide satisfactory resolution, color rendition, or picture steadiness. However, some experienced laboratories have produced prints of good quality by contact printing.

CAUTION

Prints must be made in "B" wind position only, that is, a magnetic sound stripe on the base side (not on emulsion side) located at the edge of the film opposite the film perforations.

B.3 FILM TREATMENT

In Super 8mm continuous loop magnetic sound cartridge operation, it is not necessary to apply scratch preventatives since adjacent film layers are in contact only at the magnetic sound stripe area. During operation of continuous loop-type cartridges, each layer of film moves with respect to its adjacent layer. Thus, slippage occurs constantly. Ideally, the friction between layers should be kept at a minimum. Excess friction will cause rapid wear, film breakage, and film jam. Causes of excess friction are improper film treatment, lack of deburring of film edges after slitting, dirt and dust, untreated film, poorly made splices, and the omission of a sound stripe. Film having a sound stripe slide only in the sound stripe area thus presenting less surface tends to develop less friction, electro-static charge and scratches. There are three common types of film treatments:

A. Surface coating with extreme hard lacquer-type chemical.

B. Surface coating with wax based chemicals.

C. Vacuumate No-En process.

D. Audio-Lub

NOTE

The purpose of film treatments in Super 8mm sound cartridge operation is primarily to maintain film flexibility (reducing emulsion or film cracking) and to reduce film friction in the endless loop bundle. This becomes extremely important with cartridge film loads in excess of 200 feet (such as MoviePak Seventy-20).

B.4 LAQUER-TYPE TREATMENT

If not applied with extreme smoothness the process will result in a rough surface with high friction between layers. Too heavy an application may reduce flexibility and lead to cracking or may result in "peeling" or "powdering" with resultant increase in friction and/or film scratching due to the particles (which may also become visible on the screen). Surface hardening by lacquer type or chemical treatments may be harmful rather than helpful since a harder emulsion and film is more liable to crack or break in cartridge operation.

B.5 SURFACE LUBRICATION

Wax, oil, or other chemicals will reduce friction and be of assistance only if applied with extreme precision. Excessive application will cause the layers of film to adhere to each other or will result in a wax buildup in the cartridge. In either case performance film life will be degraded.

B.6 VACUUMMATE NO-EN PROCESS

The process removes water content from the film and replaces it with other chemicals which will not evaporate during projection. A surface and edge polishing process is used which removes friction-causing film roughness created in slitting or processing. These steps result in smooth surfaces with low friction and with film that retains high flexibility during operation.

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SERVICE BULLETIN NO. 70-14

EQUIPMENT AFFECTED
SEVENTY SERIES PROJECTORS

DATE 6-15-74
EFFECTIVE IMMEDIATELY

SUBJECT
CART-REEL PROJECTOR OPERATION

MODELS AFFECTED
ALL CART-REEL MODELS

GENERAL

The new Fairchild Cart-Reel Projectors combine all the advantages of a cartridge loaded projector and the capabilities of Reel-to-Reel operation.

The cartridge consists of two Piggy-Back reels within a cartridge configuration. To differentiate this new cartridge from the Endless Loop Cartridge, the name Cart-Reel Pak has been introduced.

Both the Cart-Reel Pak and the Endless Loop Cartridge can be used with the Cart-Reel Projector.

The reel-to-reel configuration of the Cart-Reel Pak permits (besides the regular play and freeze frame operation) a fast rewind for search and instant replay. The endless loop cartridge permits only regular play and freeze frame operation.

To accomplish this dual function, the standard endless loop projector underwent the following changes:

1. The drive roller assembly (Rim Drive) was altered to provide a positive drive for the endless loop cartridge function and a slip clutch drive for the Cart-Reel operation.

2. A drive disengagement system was added to permit freeze frame and rewind operation.

3. A rewind assembly was incorporated to provide fast rewind.

4. A Mode Selector Arm with associated assembly was added to permit the selection of FORWARD - FREEZE - REPLAY.

5. A temperature reduction system was added to reduce the temperature at the film aperture area therefore preventing film burn-out.

6. An electronic logic system was incorporated to control the electric ON-OFF and Freeze Frame functions selected or sensed by various microswitches within the projector.

OPERATING FUNCTIONS

While the majority of the operating functions of the Cart-Reel Projector are identical to those of the endless loop projector, the following paragraphs explain the operating functions of the aforementioned changes.

CHANGE 1

As the Cart-Reel Pak is inserted into the cartridge well of the projector, it disengages the Drive Roller from its positive drive mode, lifts the pinch roller bracket assembly to its standby position, and opens the Cartridge Switch SW5.

The selection of positive drive or clutch drive is accomplished by having different rim drive channels in either cartridge base, i.e., the Cart-Reel Pak base or the endless loop cartridge.

The sloped channel of the Cart-Reel Pak base forces the drive roller puck downward and thereby disengages the drive roller puck from its positive drive mode. Contrarily, the channel of the endless loop cartridge base is somewhat deeper and therefore bypasses the clutch cover of the drive roller, thus allowing the drive roller to remain in the positive drive mode.

The purpose of the clutched drive roller is to drive the take up reel (lower reel) during the forward mode. Since the diameter of the film bundle on the reel hub increases with the footage of film wound on the hub, the film speed of the "take up" would increase as well. To compensate for this variation, the clutch slips when the film speed of the take up exceeds the consistent film speed of the film supplied by the capstan.

CHANGE 2

Upon selection of either Freeze Frame or Replay, the freeze frame solenoid is energized, thereby activating the drive disengagement system which in turn causes the Drive Roller to be disengaged from the take up reel. The Claw Assembly is to be held in a retracted position preventing the claw from penetrating the film perforation. At the same time the pinch roller solenoid is de-energized which causes the pinch roller to be released from the capstan.

CHANGE 3

The moment the selector is moved into the rewind position, the drive puck of the rewind assembly engages the supply reel driving it in the reverse direction at approximately ten times the speed of forward drive.

CHANGE 4

The mode selector arm controls the freeze frame microswitch and the mechanical engagement of the rewind puck to the supply reel. Three identified detent positions keep the selector arm in the chosen mode until disengaged. The Cart-Reel Pak cannot be removed from the projector while the selector arm is in the rewind position.

CHANGE 5

A supply of air is provided by the motor fan and directed to the film aperture area by means of an air pipe assembly and an air duct. The air pipe assembly consists of some flex tubing, an air collector pipe, and an air projector. The air duct is part of the top plate which, in turn, is part of the bezel assembly. One dichroic filter (heat filter) covering the lamp aperture opening, and one dichroic lamp mirror help to reduce the amount of heat at the film aperture area.

CHANGE 6

The electronic logic system consists of a logic board assembly located under the audio amplifier, two solenoids, and several sensing or micro switches. Power for this system is taken from the amplifier power supply.

The logic board assembly in turn consists of a relay (RY-1), a transistor flip-flop circuit (Q-4 and Q-5), a sensitive trigger latch circuit (Q-1 and Q-2), and a signal inverting sensor (Q-3) controlled by the voltage across the freeze frame solenoid.

The schematic in Fig. 1 shows the logic system with the parts outside the dotted lines being external to the logic board.

CIRCUIT DESCRIPTION

There are three versions of this Control Logic Circuitry. The schematic (Fig. 1) shows the circuit and pin connections for the first model (C15-A459). The circuit diagram (Fig. 2) shows the present plug in board (C15-A597) and a future board (C20-A110). Both of these last boards are plug in types and only the pin connections are different. For simplicity, all reference is made to Figure 1.

In figure 1, the transistors Q1 and Q2 form a very sensitive latch circuit. A very small current pulse triggered by one of the "OFF" sensor switches will cause the transistor Q2 to conduct which, in turn, will force transistor Q1 to conduct as well. The moment the transistors become conductive, RY1 is shorted to ground, thereby de-energizing the relay RY1, opening the contacts.

Resistor R2 is necessary to keep the base of transistor Q2 at ground potential while the capacitor C1 assures that no switch "ON" pulse will cause Q2 to conduct. Capacitor C5 was added to prevent switch "ON" pulses and/or noise spikes in the B+ line which could trigger the circuit and lead to unwanted projector switch-off, while C2 and C4 function as RF by-pass capacitors.

A monostable flip-flop circuit is formed by the transistors Q4 and Q5.

Transistor Q5 is forward-biased by resistor R9 through the solenoid windings SOL2 and ground. In this mode, transistor Q5 is conducting, permitting current to pass through Q5 and the pinch roller solenoid winding which energizes the solenoid and causes the pinch roller to engage with the capstan. During this time transistor Q4 remains reverse-biased by resistor R4 and does not conduct.

As soon as the freeze frame switch SW1 is closed, transistor Q4 is biased forward through resistor R8 to ground. Now, Q4 is conducting and energizing the freeze action solenoid SOL1 which draws the claw and reel drive puck from the film. At the same time, transistor Q5 is biased OFF, because the B+ voltage across the solenoid winding SOL1 will also appear on the base of transistor Q5. Q5 will cease to conduct and solenoid SOL2 will be de-energized permitting the pinch roller to disengage from the capstan. The diodes D1 and D3 in this circuit protect the transistors from damage due to counter-EMF pulses developed by the solenoid.

Transistor Q3, acting as an inverting sensing amplifier, is activated and can become operative only when the Freeze mode is chosen by the Freeze Frame Selector Switch SW1. Only then will B+ appear across Q3. Resistor R5 keeps the transistor biased "OFF" as long as switch SW2 remains open. As soon as switch SW2 is closed, grounding pin 3, transistor Q3 conducts, causing a pulse to pass through R3 which in turn triggers the latch curcuit (Q1 & Q2) to become conductive.

In addition, the latch circuit may also be triggered by a positive pulse appearing at Pin 2, by way of the loop sensor switch SW3. This positive pulse is supplied by the timing circuit, consisting of R10 and C3. The moment the pinch roller solenoid SOS2 is energized, capacitor C3 will be charged through R10, thereby creating a positive potential at the junction of C3 and R10 and also on one side of loop sensor switch SW3. Diode D2 discharges capacitor C3 as soon as the solenoid SOL2 is de-energized to arm the timing circuit again.

The relay's normally open contacts are closed when B+ is applied to Pin 8 of the control board. Resistor R1 is used to reduce the 24 volts DC to 12 volts DC and at the same time to limit the current when the latch circuit (Q1 & Q2) is shunting relay RY1.

OPERATION

"ON"

When the "ON" push button is depressed, it closes the contacts of the momentary "ON SWITCH" (Fig. 3 & 4) which enables electric power to be supplied to the motor windings. The motor winding is provided with secondary windings which supply the required voltage levels for the projection lamp and amplifier board.

A power supply on the amplifier board converts AC to DC and provides B+ (+24 volts) for the amp & control board. The B+ energizes relay RY1 and also causes transistor Q5 to conduct as long as the function selector lever is in the Forward mode. As a result, the contacts of the energized relay RY1 will close, and the conducting transistor Q5 will energize the pinch roller solenoid SOL2.

Since the contacts of relay RY1 are wired parallel to the momentary "ON" switch, electric power to the motor winding is maintained after the "ON" push button is released. The pinch roller solenoid SOL2 keeps the pinch roller engaged with the capstan as long as transistor Q5 is conducting.

FREEZE

When the projector function lever is moved to the "FREEZE" position, the Freeze Frame Selector Switch SW1, which is mounted on the chassis, is activated. This switch shorts pin 5 to ground and turns the transistors Q4 On and Q5 Off. At the same time, the speaker is disconnected.

Due to transistor Q5 being switched off, the pinch roller solenoid de-energizes and consequently releases the pinch roller from the capstan. Transistor Q4, now being conductive, energizes the freeze frame solenoid SOL1, which removes the reel drive puck from the cartridge take up reel and the claw from the film.

REWIND

As the projector function lever is moved to the "REWIND" position, it moves through the "FREEZE" mode position thereby switching the entire projector into the freeze mode as described in the preceding paragraph. In addition, the function lever engages a high speed rewind puck to the supply reel which now rewinds the film from the take up reel onto the supply reel. Since the speaker is disconnected, no audio can be heard during rewind.

LOOP SENSOR

When the projector is switched on while the function selector is in the FORWARD mode, or if the function selector is moved to the FORWARD mode while the projector is switched on, the transistor Q5 becomes conductive and thereby will charge capacitor C3 through resistor R10 (in addition to energizing solenoid SOL2).

Voltage across C3 will gradually rise and therefore also on the loop sensor switch SW3. If, within four seconds, no proper film loop develops (which would cause the loop sensor switch SW3 to open) the developed voltage across C3 will be large enough to cause transistor Q2 to conduct thereby turning the latch circuit on and automatically de-energizing relay RY1 to switch off the projector.

FILM REWIND

When the projector is in the rewind position and the film is fully rewound, the loop sensing arm acts as switch SW2 which is shorted to ground by means of an electrical conductive foil which has been applied to the film. The sensing arm is connected to pin 3 of the logic board, and, when grounded, causes Q3 to conduct, thereby turning the latch circuit ON and, consequently, switches the projector off.

MALFUNCTION

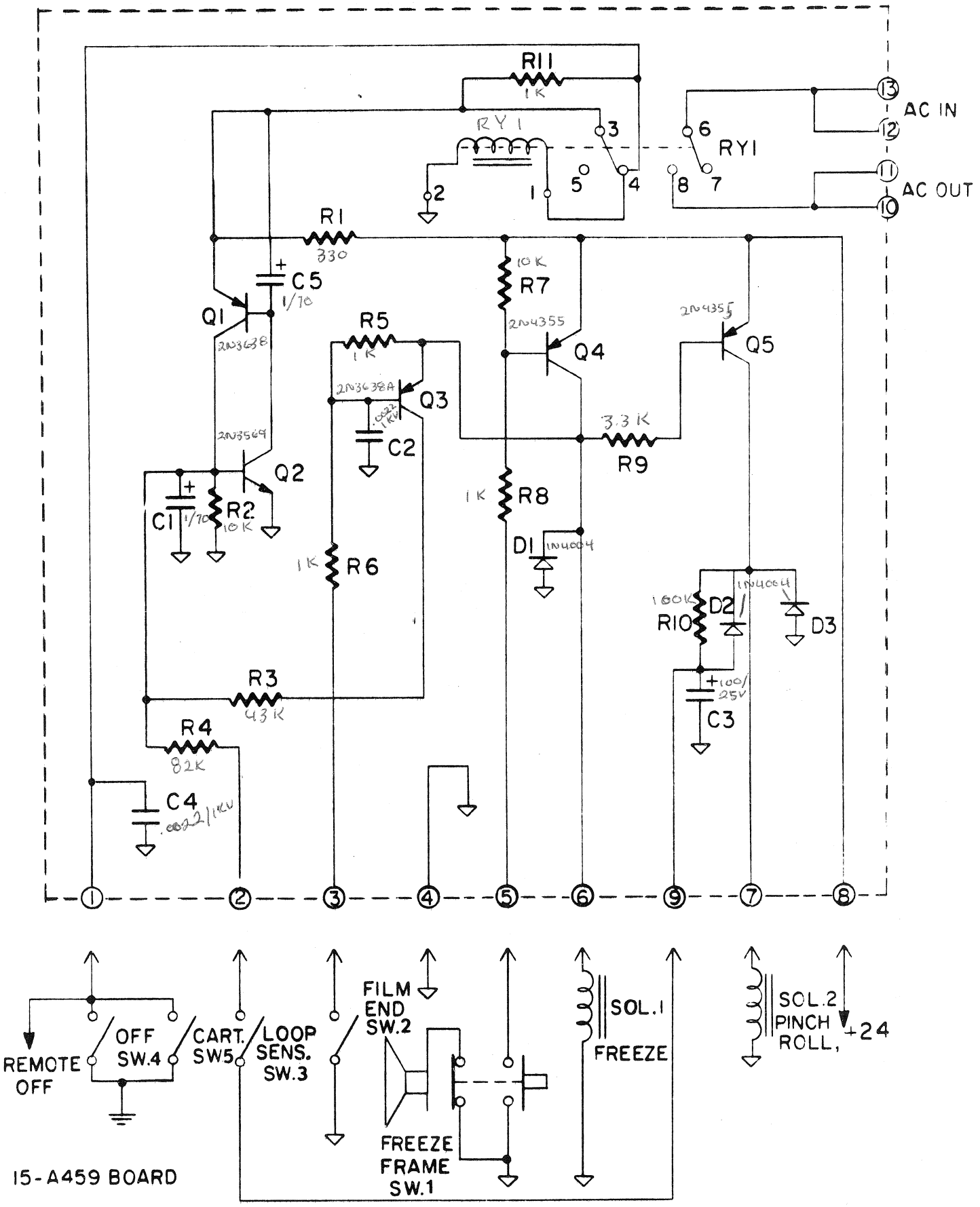
If for any reason the film tightens, breaks, or develops an excessively large loop, the sensor arm will move to its end position, permitting the sensor switch SW3 to close. This in turn will switch ON the latch circuit as described in Loop Sensor paragraph. Since capacitor C3 is fully charged during normal operation, there will be no delay in the switchoff function.

OFF

When the "OFF" push button is depressed, a ground is applied by the momentary OFF switch SW4 to pin 1 of the logic board. This places a short across the winding of relay RY1 and causes the relay to de-energize and open its contacts. The opened contacts will remove the power from the motor winding and consequently from the projector.

CARTRIDGE SWITCH

The cartridge switch SW5 is wired parallel to the "OFF" switch SW4 and connects pin 1 of the logic board to ground if the cartridge is removed. The sequence of the OFF functions is identical to the previous paragraph. If there is no cartridge in the projector and the "ON" button is depressed, the projector will run only as long as the "ON" button is depressed. In this case the relay RY1 will not be energized.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RY1
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AC OUT
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R1
330
10K
R7
C5
1/70
Q1
2N3638
2N4355
Q4
2N4355
Q5
R5
1K
2N3638A
Q3
.022 1KV
C2
3.3K
R9
2N3569
Q2
1K
R8
C1
1/70
R2
10K
D1
1N4004
1K
R6
160K
R10
D2
1N4004
D3
+100/25V
C3
R3
43K
R4
82K
C4
.0022/1KV
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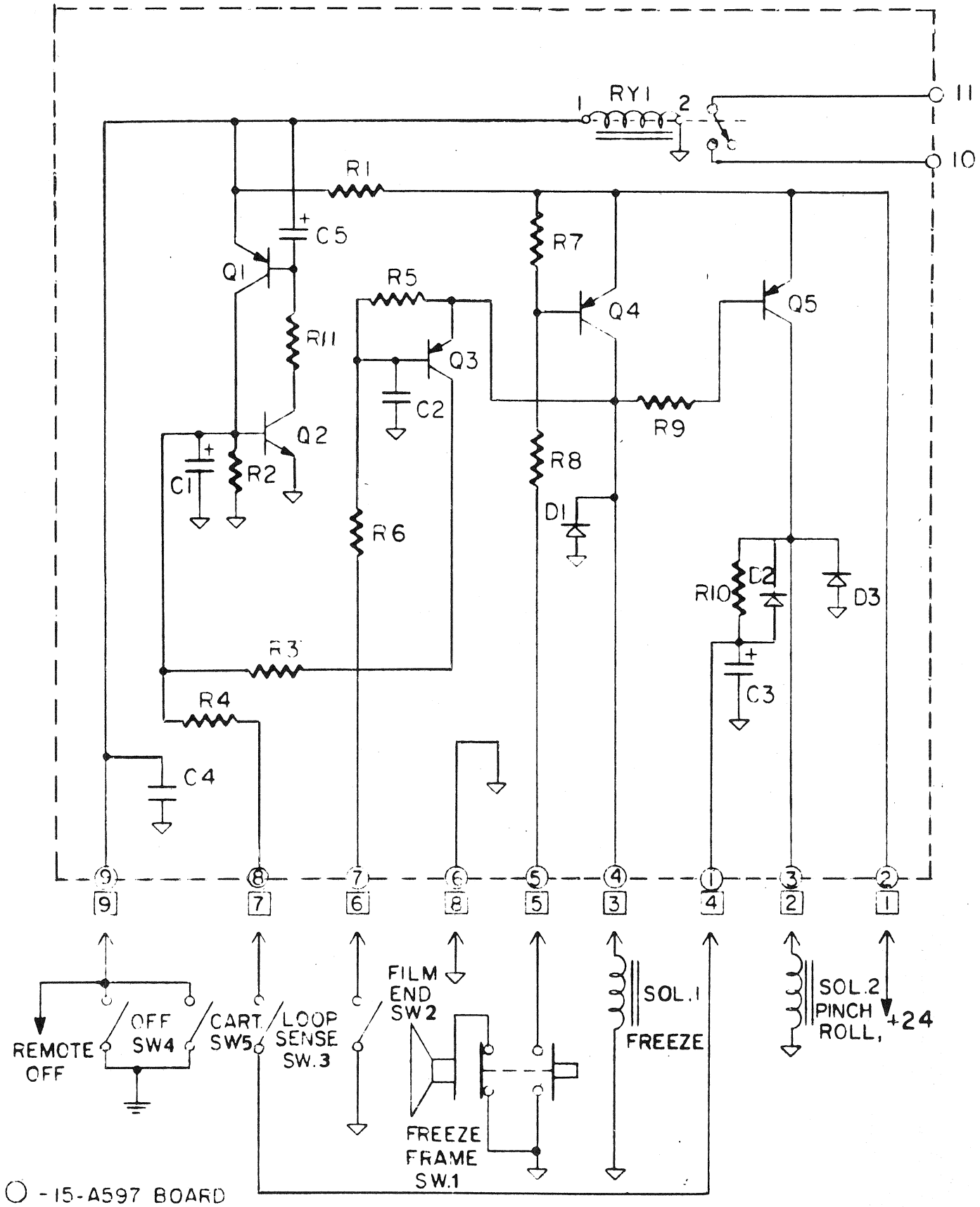
REMOTE OFF
OFF SW.4
CART. SW5
LOOP SENS. SW.3
FILM END SW.2
FREEZE FRAME SW.1
SOL.1
FREEZE
SOL.2
PINCH ROLL,
+24
15-A459 BOARD

FIG. 1


RY1
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R1
C5
Q1
R11
R5
Q3
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R7
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Q2
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D1
R6
R10
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D3
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REMOTE OFF
OFF SW4
CART SW5
LOOP SENSE SW.3
FILM END SW2
FREEZE FRAME SW.1
SOL.1 FREEZE
SOL.2 PINCH ROLL,
+24
○ - 15-A597 BOARD
□ - 20-A110 BOARD (NEW)

FIG. 2

NOTES:

1. ALL PART NUMBERS ARE FOR REFERENCE ONLY.
2. FOR 220V-50Hz, BLACK MOTOR WIRE TO UNUSED TERMINAL ON B9-185. FOR 240V-50Hz, RED MOTOR WIRE TO UNUSED TERMINAL ON B9-185. HOT MOTOR WIRE TO BE SAME AS BLACK WIRE ON B9-147.
3. FOR 220V-50Hz OR 240V-50Hz USE A9-243-1 @ HOT A9-243
4. FOR 115V-50Hz & 60Hz USE LINE CORD A15-A398 WITH WIRES CONNECTED AS SHOWN.
5. FOR 220V/240V-50Hz USE LINE CORD A15-A435 WITH WIRES CONNECTED AS SHOWN.

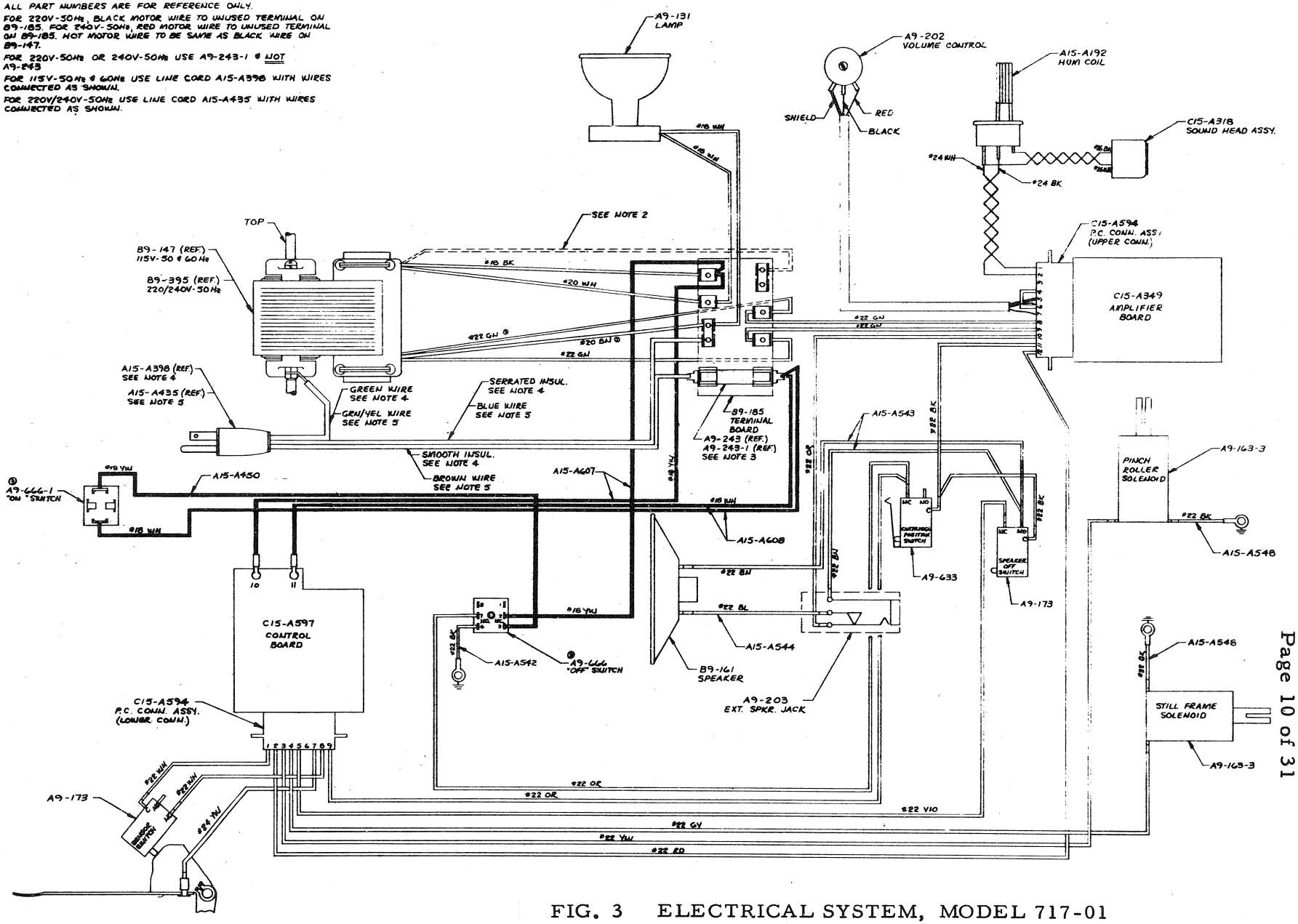

FIG. 3 ELECTRICAL SYSTEM, MODEL 717-01

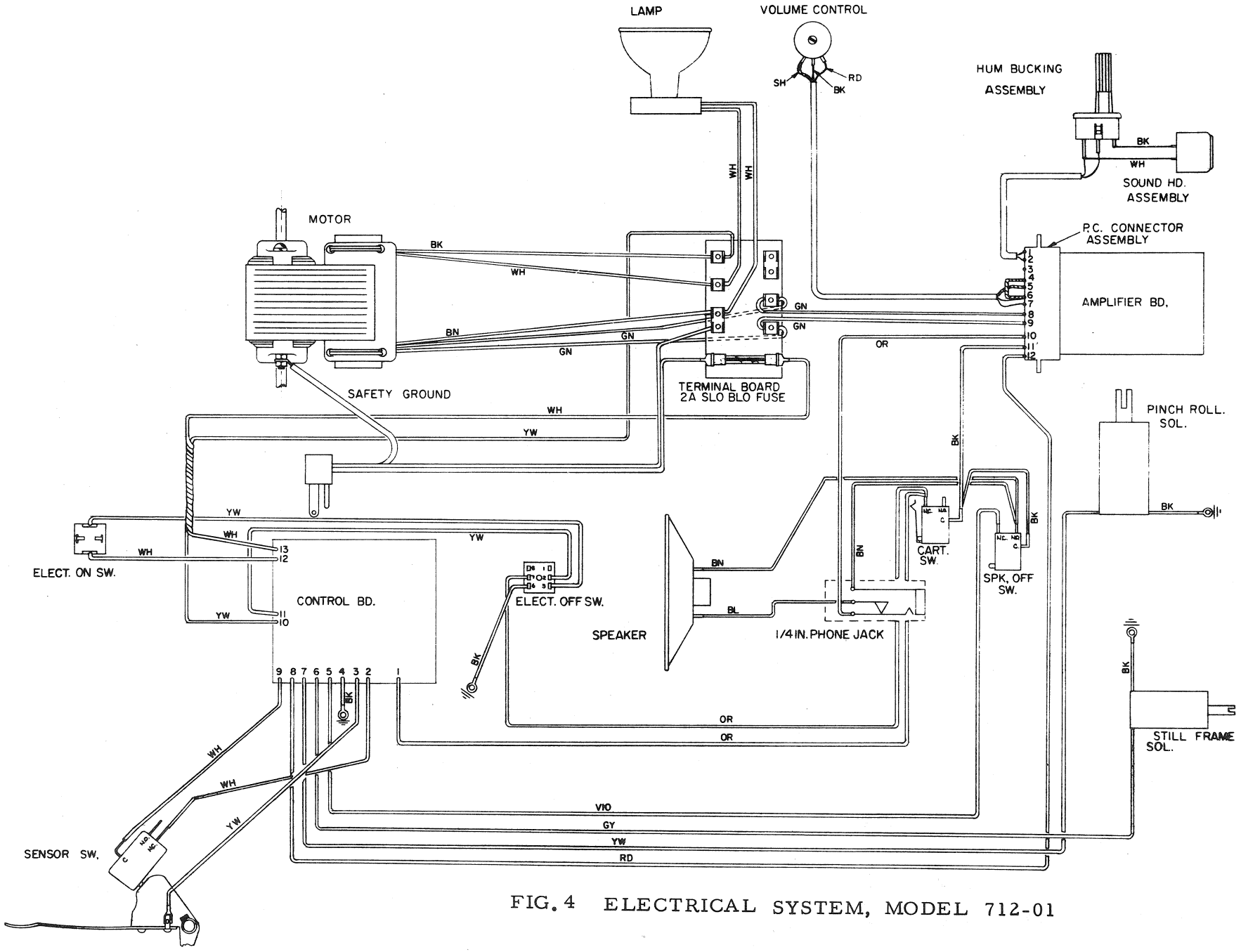

FIG. 4 ELECTRICAL SYSTEM, MODEL 712-01

ADJUSTMENTS

While all adjustments described in the standard Seventy Series Service Manual apply also to the Cart-Reel type projector, three additional adjustments have to be made if required.

Two of those adjustments apply only to the Cart-Reel Projector, while the third applies to all "Electric On" and Cart-Reel Projectors.

1. Drive Puck Assembly

The drive puck in the positive drive position (not depressed) should have a height of .340"-.355" above the plane of the casting (Fig. 5).

The height of the puck has a direct relationship to the disengagement of the positive drive and to the torque of the slip clutch. It should be checked and, if required, adjusted after replacing the clutch cover or the whole drive roller assembly. The adjustment is done by positioning the Grip Ring (Item 27, Fig. 12). A spacer (Item 56, Fig. 12) may be required between drive roll assembly (Item 2, Fig. 12) and pivot shaft (Item 24, Fig. 12) to compensate for excessive play. The static clutch torque should read 60 - 150 grams and can be tested with the Fairchild Test Gauge 15-T-700-50, available from Fairchild.

Note: Special attention should be given to the replacement of the clutch cover of the drive puck. Due to the tight fit of the cover, the mechanical assembly has to be removed from the case, and the drive roll arm assembly (Item 2, Fig. 12) supported while pressing the clutch cover in place.

2. Rewind Assembly

The rewind puck should have a height of .790"-.810" above the "Y" axis of the base casting (Fig. 6).

The puck location during the forward and freeze mode should be .045"-.075" in reference to the left rail, to be measured .500" above the "Y" axis of the base casting. To adjust the height, loosen set screw (Item 34, Fig. 12) and raise or lower rewind puck to correct height and tighten set screw. To achieve correct puck location, loosen screws (Item 35, Fig. 12) and position the rewind puck assembly in correct location and tighten screws.

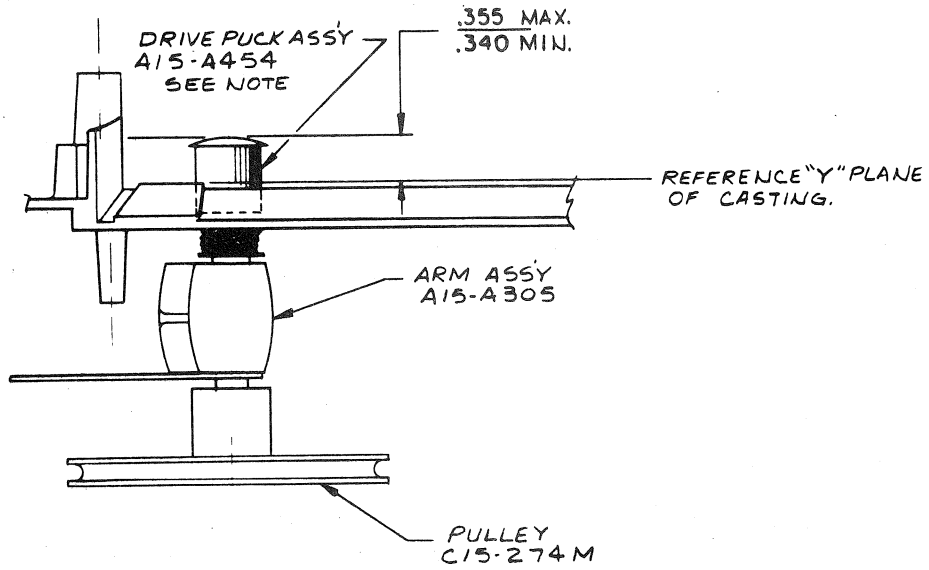

FIG. 5

NOTE:
DRIVE PUCK IN POSITIVE DRIVE
AND EXTENDED TO ITS MAX. HEIGHT.

NOTE:
PUCK LOCATION .075 MAX. / .045 MIN. TO BE MEASURED AT .500 HIGH POINT ABOVE "Y" AXIS.

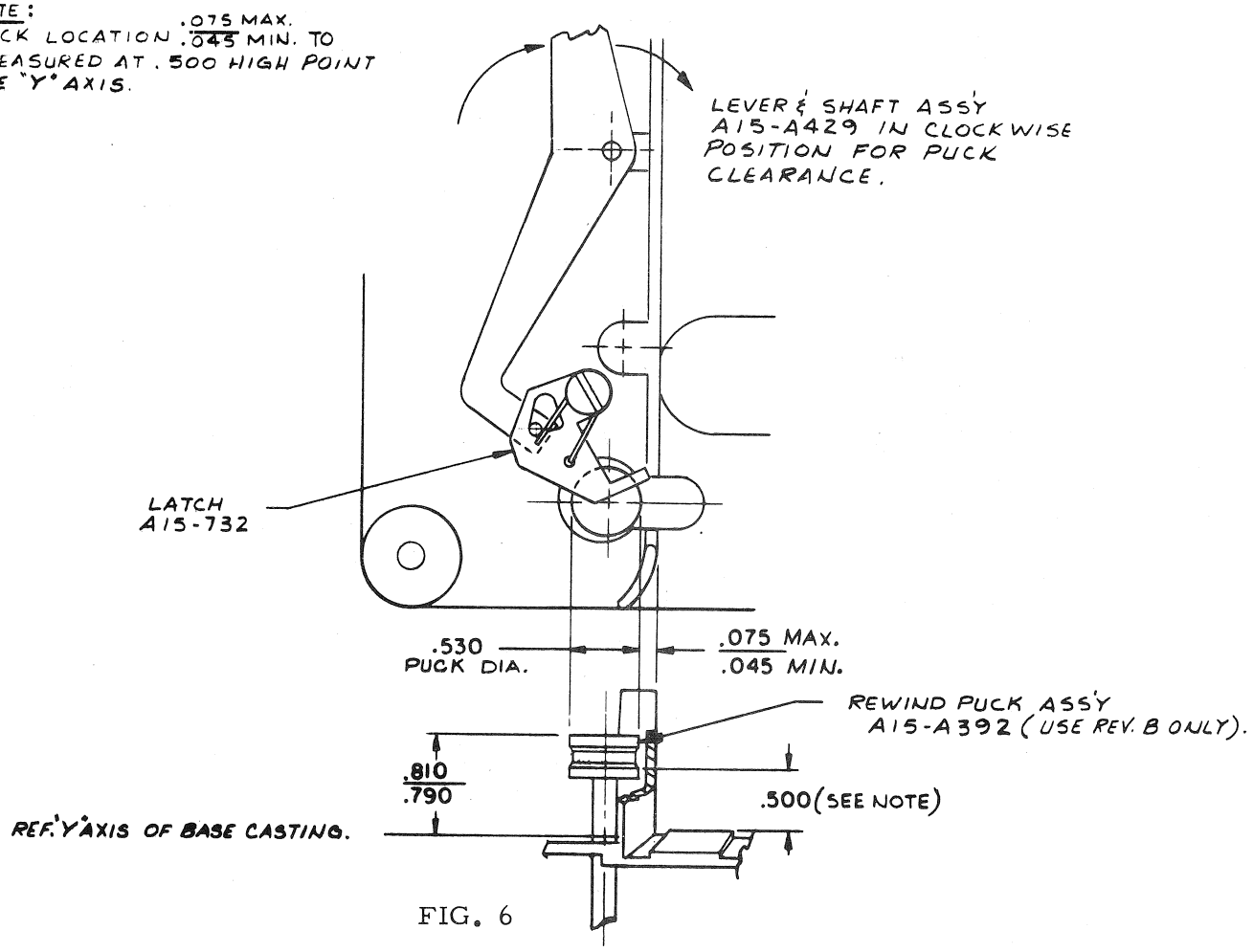

FIG. 6

3. Pinch Roller Solenoid

The energized pinch roller solenoid draws the plunger into the solenoid housing, forcing the linked pinch roller bracket to engage the pinch roller to the capstan.

Minimum line voltage to latch up the solenoid (plunger pulled all the way into the solenoid housing) should be 100-105 volts. If the solenoid plunger is seated correctly, the solenoid springs (Fig. 7) should be expanded by .030-.050".

If neither condition is met, readjust solenoid by untightening screws (Item 42, Fig. 12) of mounting bracket (Item 7, Fig. 12) and reposition solenoid to meet specifications of Fig. 7.

Note: To provide a reliable and accurate 100-105 volt source, it is recommended to employ a variable transformer (such as Radio Shack #273-043 or Superior Electric Model 116B) and an AC voltmeter for 115V - 2% (such as RCA line monitor WV-120A).

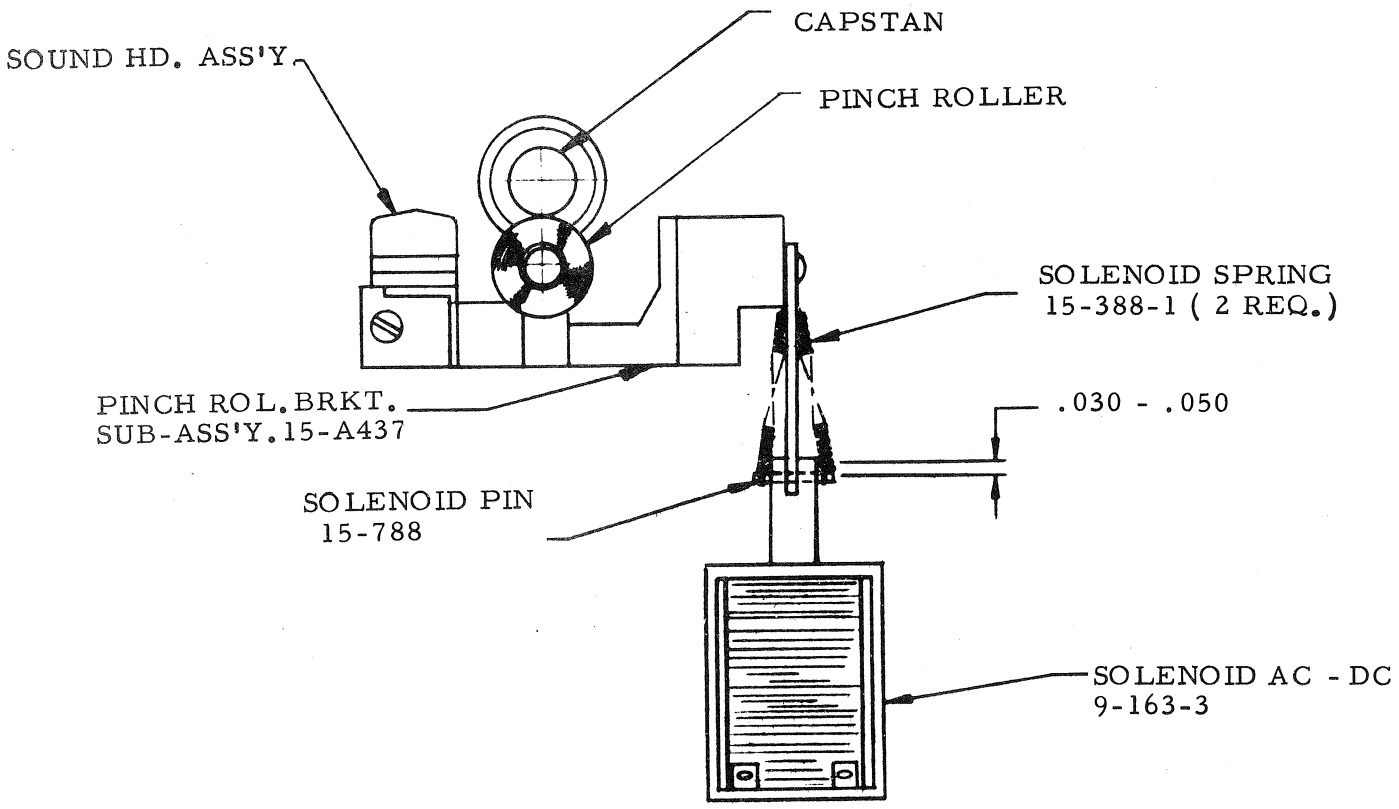

FIG. 7

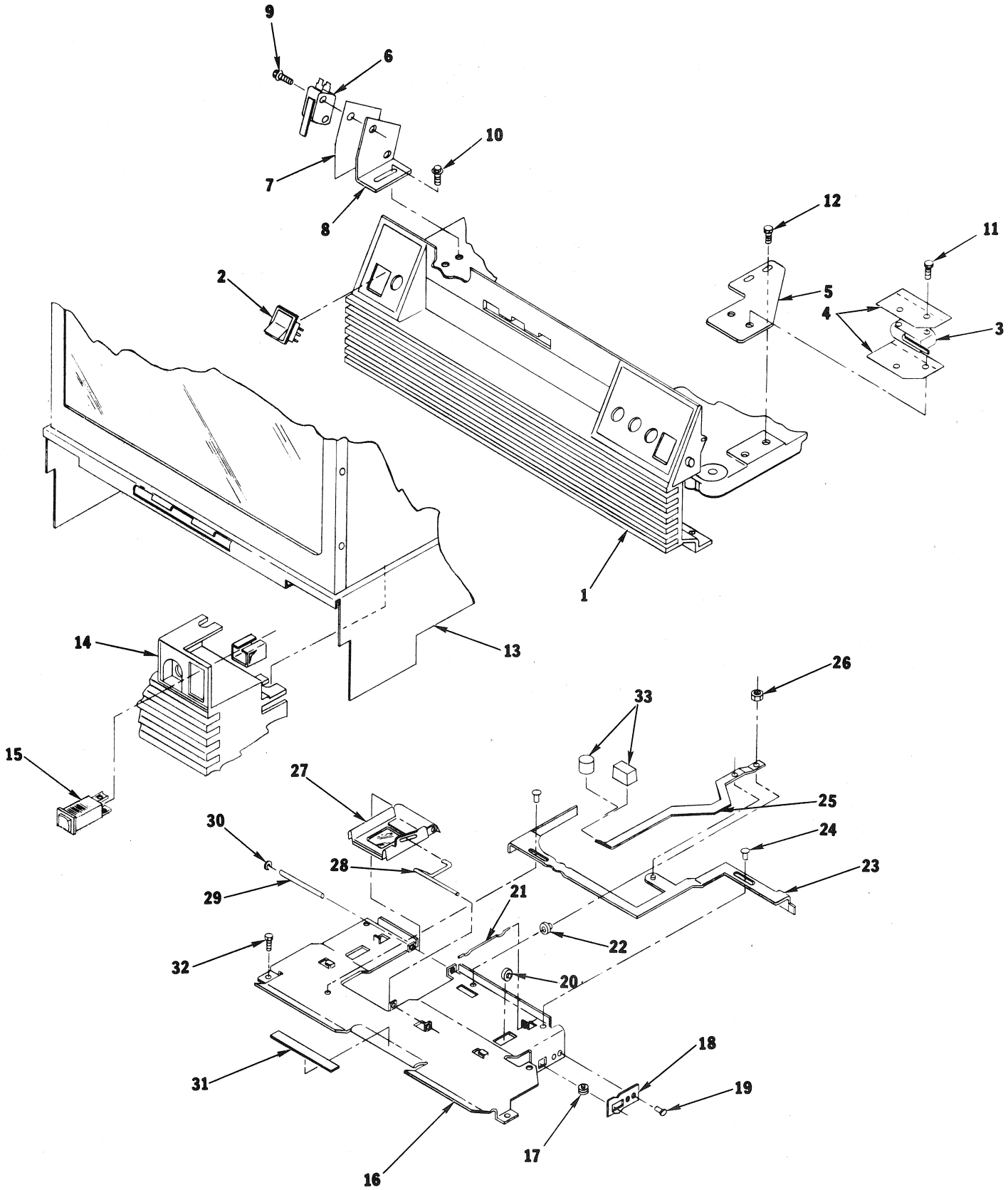
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FIG. 8

Fig. #	Item #	Part Number	Description	Units Per Assy	Comments
8	1	D15-A580-1	Grille Assy (21, 31, 37)	1	
	2	A9-681	Switch, ON & OFF	2	Used in 712-02 713-02
	3	A9-510	Switch,	1)	
	4	A15-445	Insulator, Switch	2)	
	5	A15-826	Bracket, ON	1)	
	6	A9-510	Switch,	1)	Switches for
	7	A9100-472	Insulator, Switch	1)	21, 31, 37
	8	A15-545	Bracket, OFF	1)	Only
	9	A9-316-4	#4-40 Tap-Tite Screw	2)	
	10	A9-316-1	#4-40 Tap-Tite Screw	2)	
	11	A9-316-4	#4-40 Tap-Tite Screw	2)	
	12	A9-316-1	#4-40 Tap-Tite Screw	2)	
	13	D15-A503	Bezel Assy	1)	
	14	B15-A273	Grille Assy	1)	07 Only
	15	A9-666 and	Switch, OFF	1)	
		A9-666-1	Switch, ON	1)	
	16	C15-197-3	Roof Plate	1	
	17	A15-202	Roller	1	
	18	A15-416	Roof Plate Roller Spring	1	
	19	A9-129-5	Eyelet	2	
	20	A15-202	Roller	2	
	21	A15-20-3	Spring	2	
	22	A15-707	Spacer, Selector	1	
	23	A15-A428	Selector, Link Assy	1	
	24	A9-254-3	Shoulder Rivet	2	
	25	A15-764	Selector Arm	1	
	26	A9-169-2	Elastic Stop Nut	1	
	27	A15-A164-1	Lamp Mirror Assy	1	
	28	A15-200-1	Activator Rod	1	
	29	A15-586	Pin, Mirror	2	
	30	A9-199-1	Reinforced "E" Ring	2	
	31	A9-660	Teflon Tape	1	
	32	A9-317-1	#6-32 Tap-Tite Screw	4	
	33	A9-652	Knob, Round Push ON	1	
		B15-873	Knob, Push ON	1	07 Only

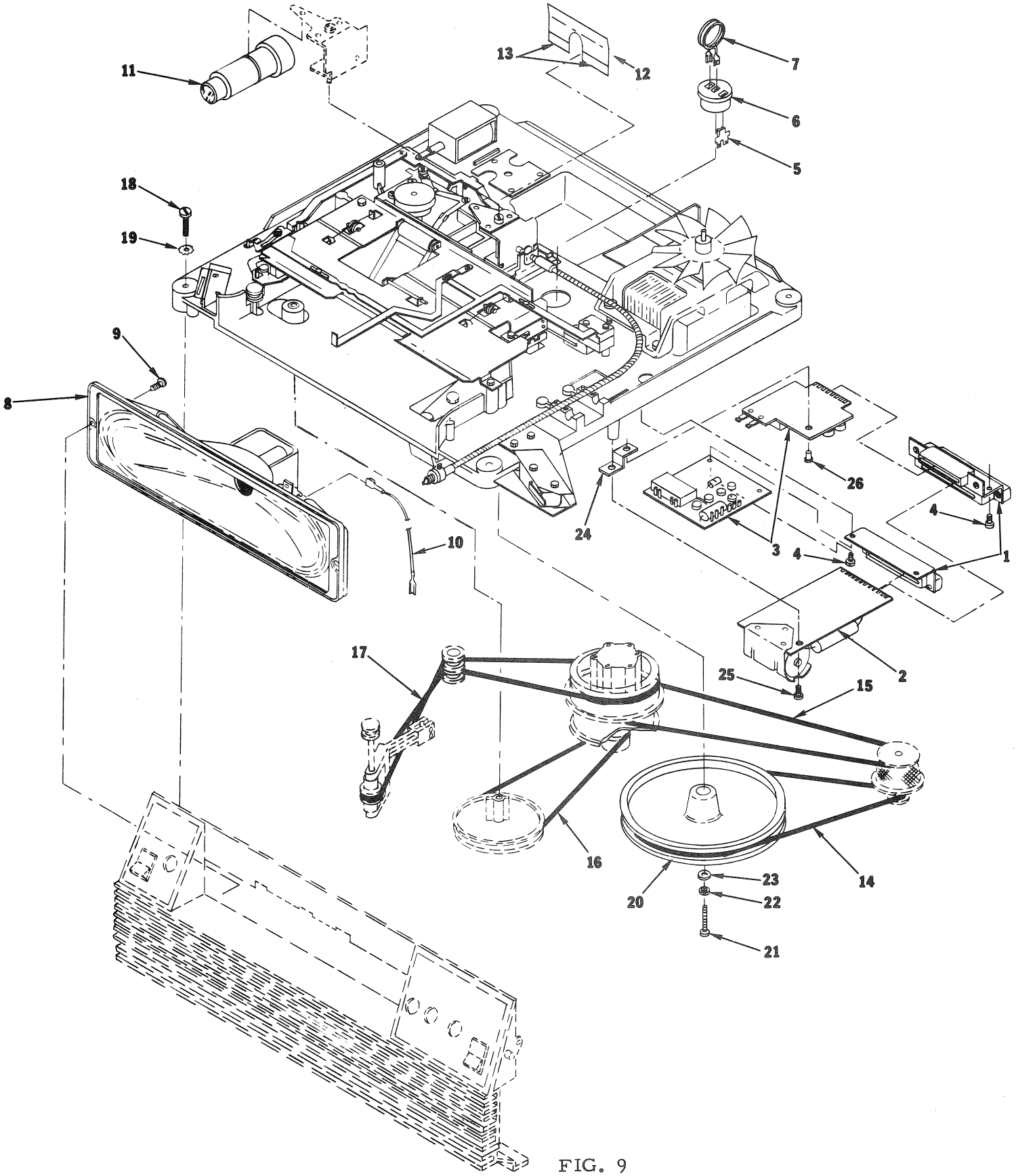

FIG. 9

Fig. #	Item #	Part Number	Description	Units Per Assy	Comments
9	1	C15-A162-3	PC Connector Assy	1	
		A15-A595	PC Connector Assy.	1	For 15-A597&20-A110
	2	C15-A349	2W Amplifier Assy	1	
		C15-A323	Amplifier Brd Assy	1	Navy Units Only
	3	C15-A459	Control Brd Assy	1	
		C15-A597	Control Brd Assy	1)	For 15-A595 Conn.
		20-A110	Control Brd Assy	1)	Assy
	4	A9-316	#4-40 Tap-Tite Screw	2	
	5	A9-209	Tap Adaptor	1	
	6	A9-207	Hum Buck, Terminal Bushing	1	
	7	A15-A194	Erg Wiring Sub Assy	1	
	8	B9-161	Speaker, 2X10	1	
	9	A9-314-4	Screw, Thread Cut Type #25	2	
		A9-321-2	Screw, Thread Cut, Type A #8 HexHd	2	
	10	A15-A213	Wire Assy 10-1/2 in.	1	
	11	B9-140	Lens - Projection	1	
	12	A15-446	Light Baffle	1	
	13	A9-330-4	Tape, Dual Surface	2	.50X.62
	14	B15-483	Flywheel Belt	1	
	15	B15-390	Belt, Shutter	1	
	16	B9-141-1	"O" Ring	1	
	17	B9-141-3	"O" Ring	1	
	18	Commercial	#10-24X1"Lg Pan Hd Screw	2	07 only
		A9-321-6	Screw Thread Cut T Type A #8 HexHd	2	21 only
	19	Commercial	#10 Ext'l Tooth L'Wash	2	07 only
		Commercial	#8 Ext'l Tooth L'Wash	2	21 only
	20	A15-557M	Flywheel	1	
	21	Commercial	#10-32X1/2Lg HdXSockHd Cap Screw	1	
	22	Commercial	#10 Split L'Wash	1	
	23	Commercial	#10 Flat Wash (AN960-10L)	1	
	24	A15-917	Bracket, PC Board	1	
	25	A9-316-1	#4-40 Tap-Tite Screw	1	
	26	A9-129-9	Eyelet	1	

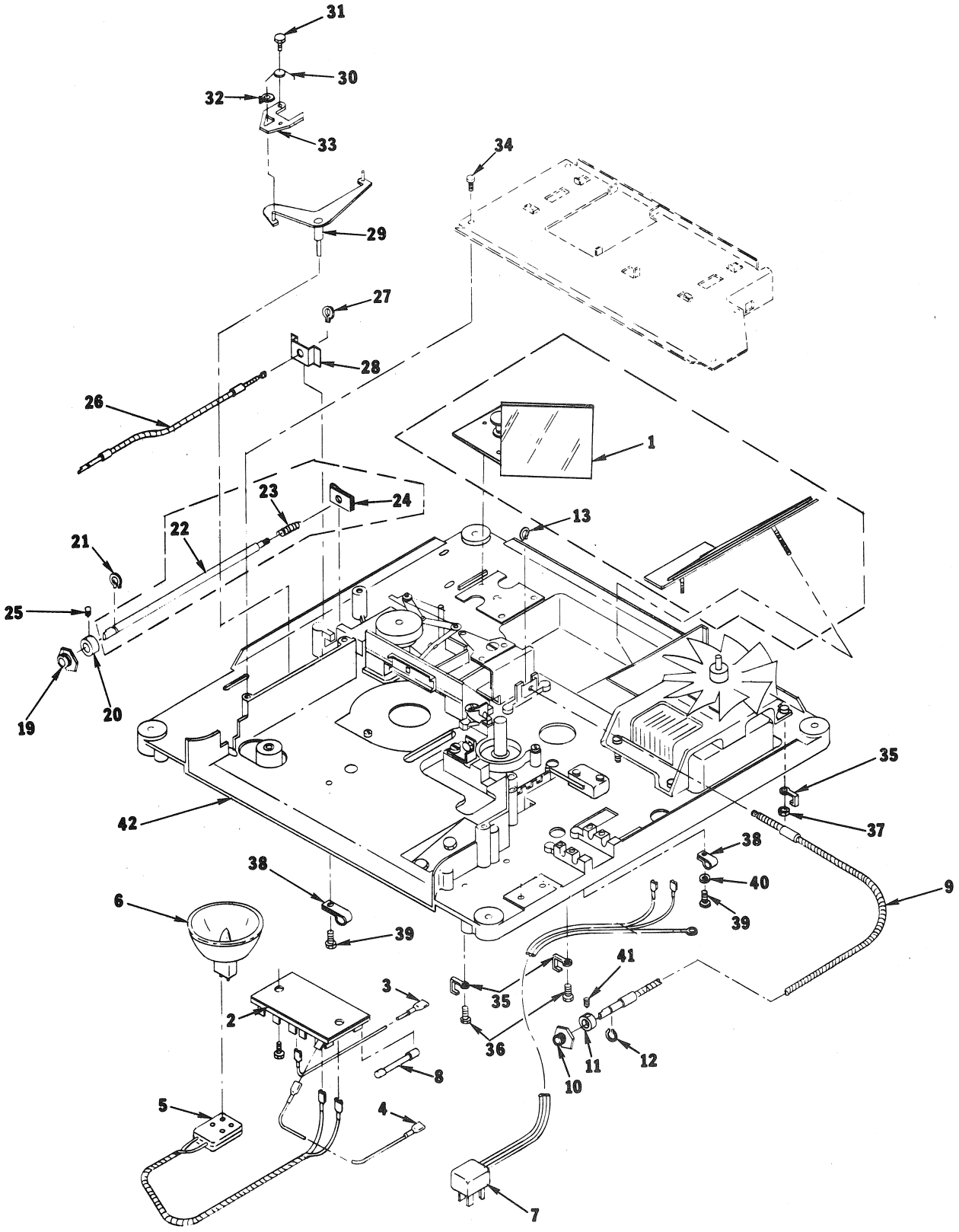
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FIG. 10

Fig. #	Item #	Part Number	Description	Units Per Assy	Comments
10	1	A15-A185	First Mirror Assy	1	
	2	B9-185	Terminal Board	1	
	3	A9-206-2	#22 Green	2	
	4	A9-206-4	Terminal #18 Yel 6-1/2"Lg	1	
		A9-206-2	Terminal #18 Yel 12"Lg	1	
	5	A9-159	Socket, Lamp	1	
	6	B9-131	Lamp	1	
	7	A15-A398	3-Wire Line Cord Assy	1	
	8	A9-243	Fuse	1	
	9	B15-362-2	Flex Shaft Framing & Focussing	1	
	10	A9-504	Panel Bushing	1	
	11	A15-418	Framing & Focus Stop	1	
	12	A9-247-2	Crescent Ring	1	
	13	A9-262-1	Prong Lock	1	
	14			)	
	15			)	Not Applicable
	16			)	This Illustration
	17			)	
	18			)	
	19	A9-504	Panel Bushing	1	
	20	A15-418	Framing & Focus Stop	1	
	21	A9-247-2	Crescent Ring	1)	
	22	A15-540	Framing Shaft	1)	07 Units Only
	23	A9-138-9	Spring	1)	
	24	A9-505	"U" Nut	1)	
	25	Commercial	#4-40X3/8 Multi-Spline Set Screw	1	
	26	B15-362-2	Flex Shaft Framing & Focus	1	
	27	A9-262-1	Prong Lock	1	
	28	A9-242	"U" Type Nut Retainer	1	
	29	A15-A429	Lever & Shaft Assy	1	
	30	A15-696	Spring, Latch	1	
	31	A15-703	Shoulder Screw	1	
	32	A9-130-1	Grip Ring	1	
	33	A15-732	Latch	1	
	34	A9-317-1	#6-32" Tap-Tite Screw	4	
	35	A9-341	Lug Flat	3	
	36	A9-316-1	#4-40 Tap-Tite	2	
	37	Commercial	#6-32 Hex Nut	1	
	38	A9-339-2	Cable Clamp	1	
	39	A9-317-1	#6-32 Tap-Tite Screw	2	
	40	Commercial	#6 Flat Washer	1	
	41	Commercial	#4-40X3/8 Multi-Spline Set Screw	1	
	42	R15-A495	Mech Sub Assy 707-16	1	
		R15-A587	Mech Sub Assy 702, 703, 704, 737	1	

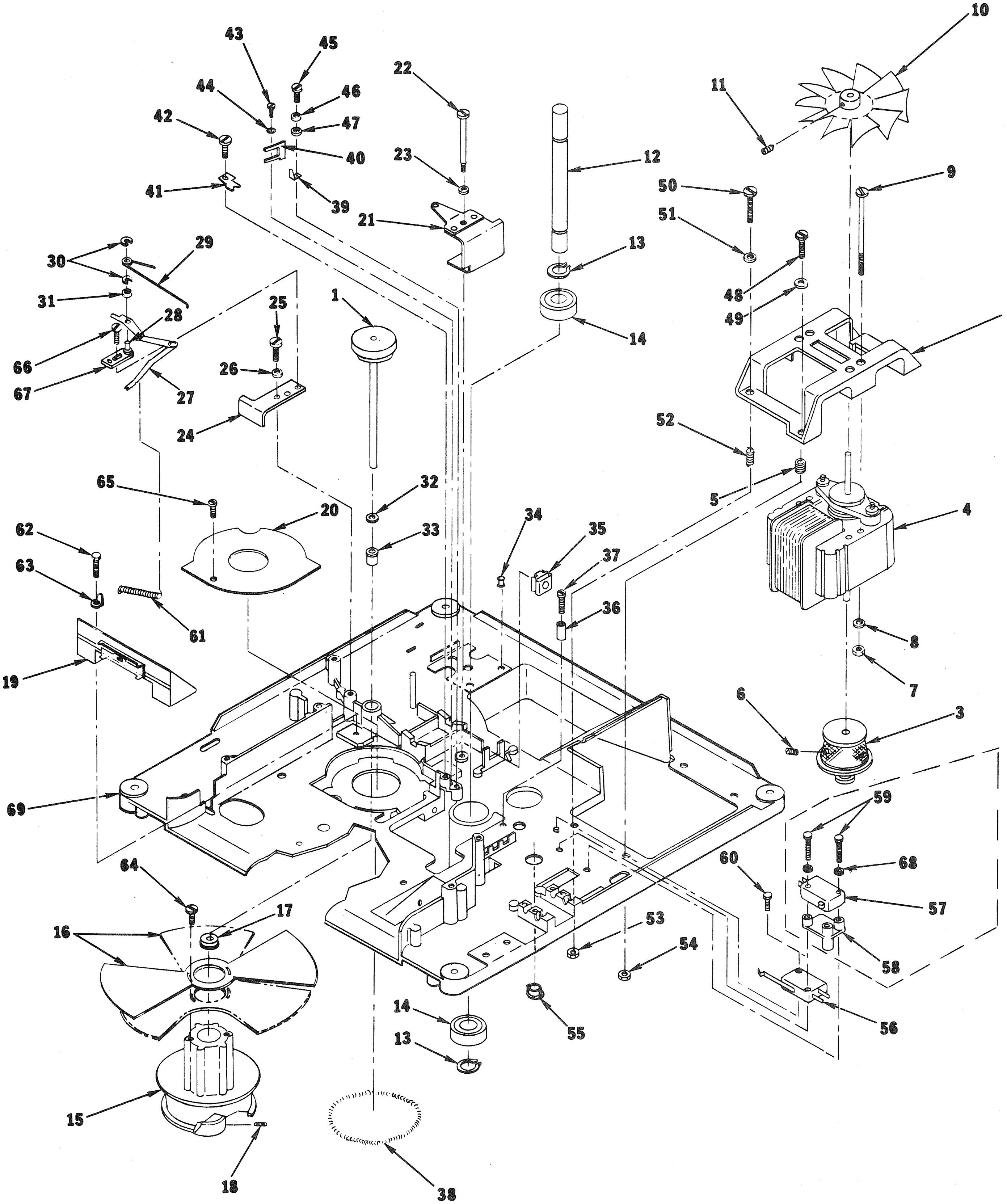
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FIG. 11

Fig. #	Item #	Part Number	Description	Units Per Assy	Comments
11	1	A15-A288	Cam Shaft Assy	1	Use with A15-A153-1
		15-501	Cam Shaft	1	
		15-177	Radial Cam	1	
		15-535	IN-OUT Cam	1	
		B15-A265	Motor Assembly	1	
	2	C15-266C	Motor Mtg Casting	1	
	3	A15-502	Small Cone Pulley	1	
	4	B9-147	Motor	1	
	5	A9-170-1	Insulator, Rubber	2	
	6	Commercial	#4-40X.19 Lg Cup Pt Bristol Socket Head Set Screw	1	
	7	Commercial	#6-32 Hex Nut	4	
	8	Commercial	#6 Internal Tooth L'Wash	4	
	9	Commercial	#6-32X2.50 Lg Fillister Hd Screw	4	
	10	B9-329	Fan	1	
	11	Commercial	#3-32 Cup Pt MultiSpline SocktHdScrew	1	
	12	A15-505	Capstan	1	
	13	A9-157-2	Truarc Retaining Ring	2	
	14	A9-149	Bearing, Ball	2	
	15	A15-A430	Large Cone Pulley Assy	1	
	16	B15-585	Shutter (3 Bladed)	1	
	17	A9-153	Bearing, Ball	1	
	18	Commercial	#4-40X3/16Lg Oval Point Bristol Multi-Spline Set Screw	1	
	19	C15-A152	Aperture Plate Assy	1	
	20	B15-443	Lamp Light Shield	1	
	21	B15-A146	Focusing Arm Assy	1	
	22	A15-238	Shoulder Screw	1	
	23	A9-128-1	Spring Washer	1	
	24	A15-A159-1	Stat Fram Link Assy	1	
	25	A15-371	Shoulder Screw Farm	1	
	26	A9-128-3	Spring Washer	1	
	27	A15-A153-1	Claw Assy	1	
	28	A15-149	Framing Link Pin	1	
	29	B15-239	Spring	1	
	30	A9-130-1	Grip Ring	2	
	31	A9-128-4	Spring Washer	1	
	32	A9-374	Washer	1	
	33	A9-184-3	Bushing	1	
	34	A9-211	Tubular Clip	3	
	35	A9-396	Nut Retainer Speed Grip	1	
	36	A15-442	Eccentric	1	
	37	Commercial	#4-40X5/8 Lg Fil Hd Screw	1	
	38	A15-388	Spring, Lamp	1	
	39	A15-074	Pressure Spring	2	

Fig. #	Item #	Part Number	Description	Units Per Assy	Comments
11	40	A15-082	Guide, Film	1	
	41	A15-070	Pressure Shoe	1	
	42	A15-071	Pressure Shoe Mtg Screw	1	
	43	Commercial	#2-56X1/4 Bind Hd Screw	2	
	44	Commercial	#2 External Tooth L'Wash	2	
	45	Commercial	#4-40X1/4 Bind Hd Screw	1	
	46	Commercial	#4 Internal Tooth L'Wash	1	
	47	Commercial	#4 Flat Washer	1	
	48	Commercial	#6-32X5/8 Lg Slotted Hex Washer Head Screw	2	
	49	Commercial	Flat Washer AN960-6L (ID .149 OD .375 Thk .016)	2	
	50	Commercial	#6-32X7/8 Slot Hex Wash Hd Screw	2	
	51	Commercial	#6 Flat Washer	2	
	52	A9-138-1	Spring	2	
	53	A9-169-1	Hex Nut	2	
	54	Commercial	#6-32 Hex Nut	2	
	55	A9-634-1	Bushing Open/Closed	1	
	56	A9-633	Switch - Elec ON	1	
	57	A9-173	Sensing Finger Switch	1	
	58	A15-735	Spacer, Switch	1	
	or 59	Commercial	#4-40X1-3/8 Pan Hd Screw	2	
	60	A9-316-4	#4-40 Tap-Tite Screw	2	
	61	A9-183-1	Extension Spring (Lee)	1	
	62	Commercial	#6X7/16 Type #23 Slotted Hex Wash Hd Screw	1	
	63	A9-378	Lug	1	
	64	Commercial	#4-40X1/4 Type #23 Slotted Hex Hd Self Tap Screw	2	
	65	Commercial	#4-40X1/4 Type #23 Slotted Hex Hd Self Tap Screw	1	
	66	Commercial	#4-40X1/4 Bind Hd Screw	1	
	67	A15-709	Framing Link	1	
	68	Commercial	#4 Spring Lock Washer	2	
	69	D15-150	Base Plate Sub Assy	1	
		D15-A150-1	Base Plate Sub Assy	1	

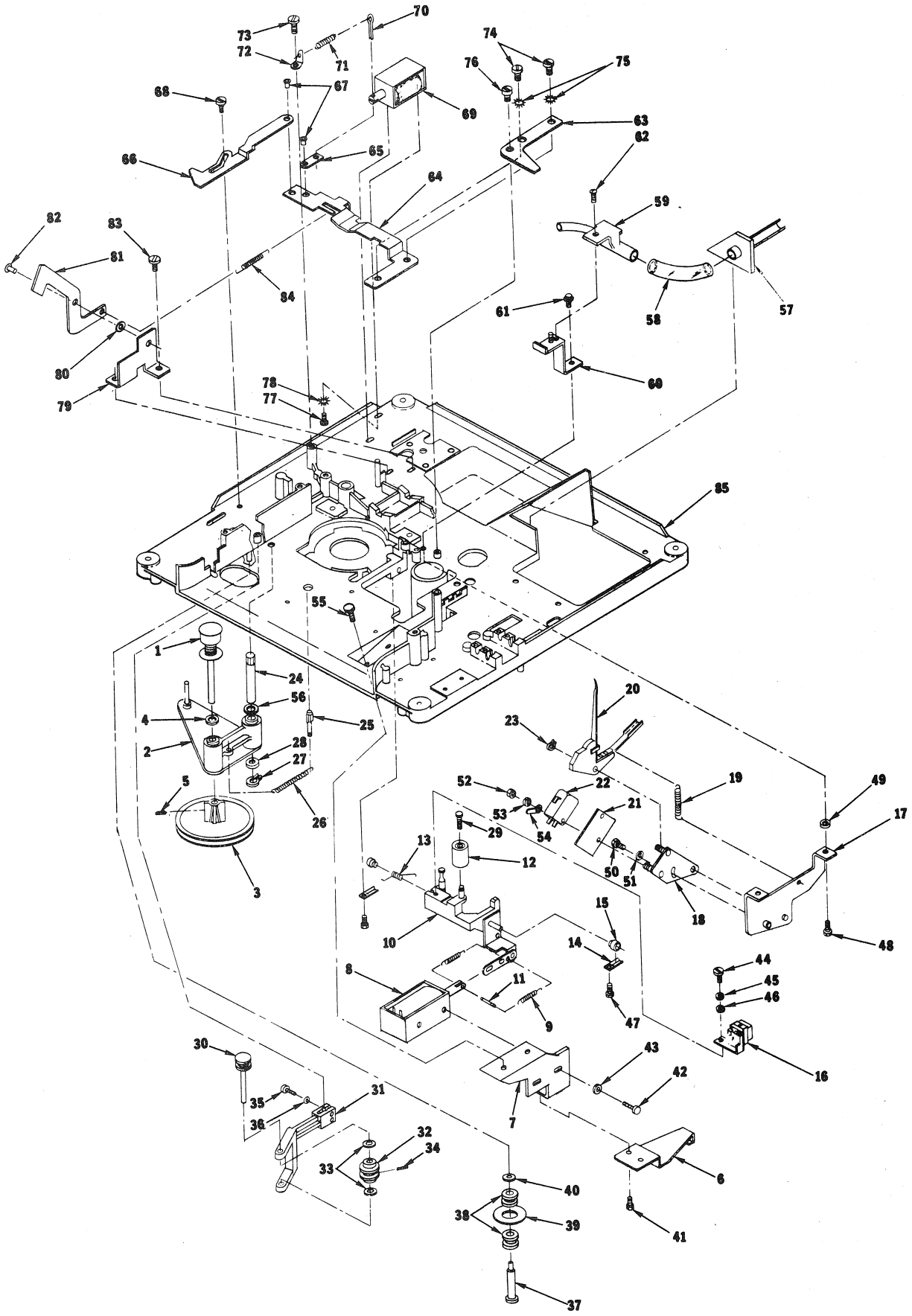
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FIG. 12

Fig. #	Item #	Part Number	Description	Units Per Assy	Comments
12	1	A15-A454	Puck Drive Assy	1	
	2	B15-A305	Drive Roll Arm Assy	1	
	3	C15-274M	Drive Roll Pulley	1	
	4	A9100-266	Washer, Nylatron	1	
	5	Commercial	#6-32X.19 Lg Multi-Spline NU Cup Pt Set Screw	1	
	6	A15-787	Retainer, Solenoid Plunger	1	
	7	B15-779	Solenoid Mtg Bracket	1	
	8	A9-163-3	Solenoid, AC-DC	1	
	9	A15-388-1	Spring	2	
	10	C15-A437	Pinch Roll Bkt Sub Assy	1	
	11	A15-788	Pin, Solenoid	1	
	12	A15-A157	Pinch Roller Assy	1	
	13	B15-439	Spring, Bracket, Return	1	
	14	A15-296	Retainer, Bearing	2	
	15	A15-440	Bearing, Self-Align	2	
	16	C15-A318	Sound Hd Mount Assy	1	
	17	A15-A149	Sensing Finger Bracket Assy	1	
	18	A15-A286	Sensor Switch Plate Sub Assy	1	
	19	A15-441	Spring, Sensor	1	
	20	A15-A490	Sensing Assy	1	
	21	A9100-472	Insulator - Paper	1	
	22	A9-173	Sensor Switch	1	
	23	A9-130-2	Grip Ring	1	
	24	A15-164	Pivot Shaft	1	
	25	A9-204-2	Groove Pin	1	
	26	A15-444	Spring, Drive Puck	1	
	27	A9-130-4	Grip Ring	1	
	28	Commercial	5/16 Flat Washer	1	
	29	Commercial	#2-56X.19 Lg Bind Hd Screw	1	
	30	A15-A392	Rewind Puck Assy	1	
	31	A15-A475	Rewind Bkt Assy	1	
	32	A15-725	Pulley, Lever Arm	1	
	33	A9-374	Washer	2	
	34	Commercial	#4-40X1/8 Lg Multi Spline Set Screw	1	
	35	Commercial	#4-40X1/8 Lg Multi Spline Cap Screw	2	
	36	Commercial	#4 Spring Lock Washer	2	
	37	A15-765	Shoulder Screw - Idlers	1	
	38	A15-427	Idler Assembly	2	
	39	A15-841-1	Washer, Nylon	1	
	40	A15-846	Flat Washer	1	
	41	A9-316-1	#4-40 Tap-Tite Screw	2	
	42	A9-317-8	#6-32 Tap-Tite Screw	2	
	43	Commercial	#6 Flat Washer	2	
	44	Commercial	#6-32X1/4 Pan Hd Screw	1	

Fig. #	Item #	Part Number	Description	Units Per Assy	Comments
12	45	Commercial	#6 Flat Washer	1	
	46	A9-128-2	Spring Washer	1	
	47	A9-316-1	#4-40 Tap-Tite	2	
	48	A9-317-1	#6-32 Tap-Tite	2	
	49	Commercial	#6 Flat Washer	2	
	50	Commercial	#4-40X1/4 Pan Hd Screw	1	
	51	Commercial	#4 Flat Washer	1	
	52	Commercial	#2-56 Hex Nut	2	
	53	Commercial	#2 Split L'Washer	2	
	54	A9-663	Ground Lug	1	
	55	A9-317-1	#4-40 Tap-Tite Screw	2	
	56	A15-841-2	Washer, Nylon	1	
	57	A15-A417	Fan Air Collection Assy	1	
	58	A9-554-1	Tubing, Plastic	1	
	59	A15-A416	Aperture Air Pipe Assy	1	
	60	A15-A472	Brace Assy	1	
	61	Commercial	#6-32 x 3/16 Lg Slotted Hex Hd Scr	1	
	62	A9-316-I	#4-40 Tap-Tite Screw	1	
	63	A15-588	Lever Arm	1	
	64	B15-A312	Lever, Still Frame Sub Assy	1	
	65	A15-577	Link, Solenoid	1	
	66	B15-575	Link, Still Frame	1	
	67	A9-129-11	Eyelet	2	
	68	A15-371	Shoulder Screw Framing	1	
	69	A9-163-3	Solenoid, AC-DC	1	
	70	A9-326-3	Cotter Pin, .094 Dia	1	
	71	A15-876	Spring, Solenoid Return	1	
	72	A9-378	Lug	1	
	73	Commercial	#6-32 x 1/4 Lg Pan Hd Screw	1	
	74	Commercial	#6-32 x 3/8 Lg Bind Hd Screw	2	
	75	Commercial	#6 External Tooth L'Wash	2	
	76	A15-371	Shoulder Screw	1	
	77	Commercial	#6-32 x 1/4 Lg Pan Hd Screw	2	
	78	Commercial	#6 External Tooth L'Wash	2	
	79	A15-574	Bracket, Still Frame	1	
	80	A15-231-2	Washer, Teflon	1	
	81	A15-580	Claw, Detent	1	
	82	A9-129-9	Eyelet	1	
	83	Commercial	#4-40 x 3/16 Lg Bind Hd Screw	2	
		Commercial	#4 Flat Washer (.250 OD x .125 ID x .032 Thick)	2	
	84	A15-620	Spring, Claw Detent	1	
	85	R15-088	Base Casting	1	Rev. R or later

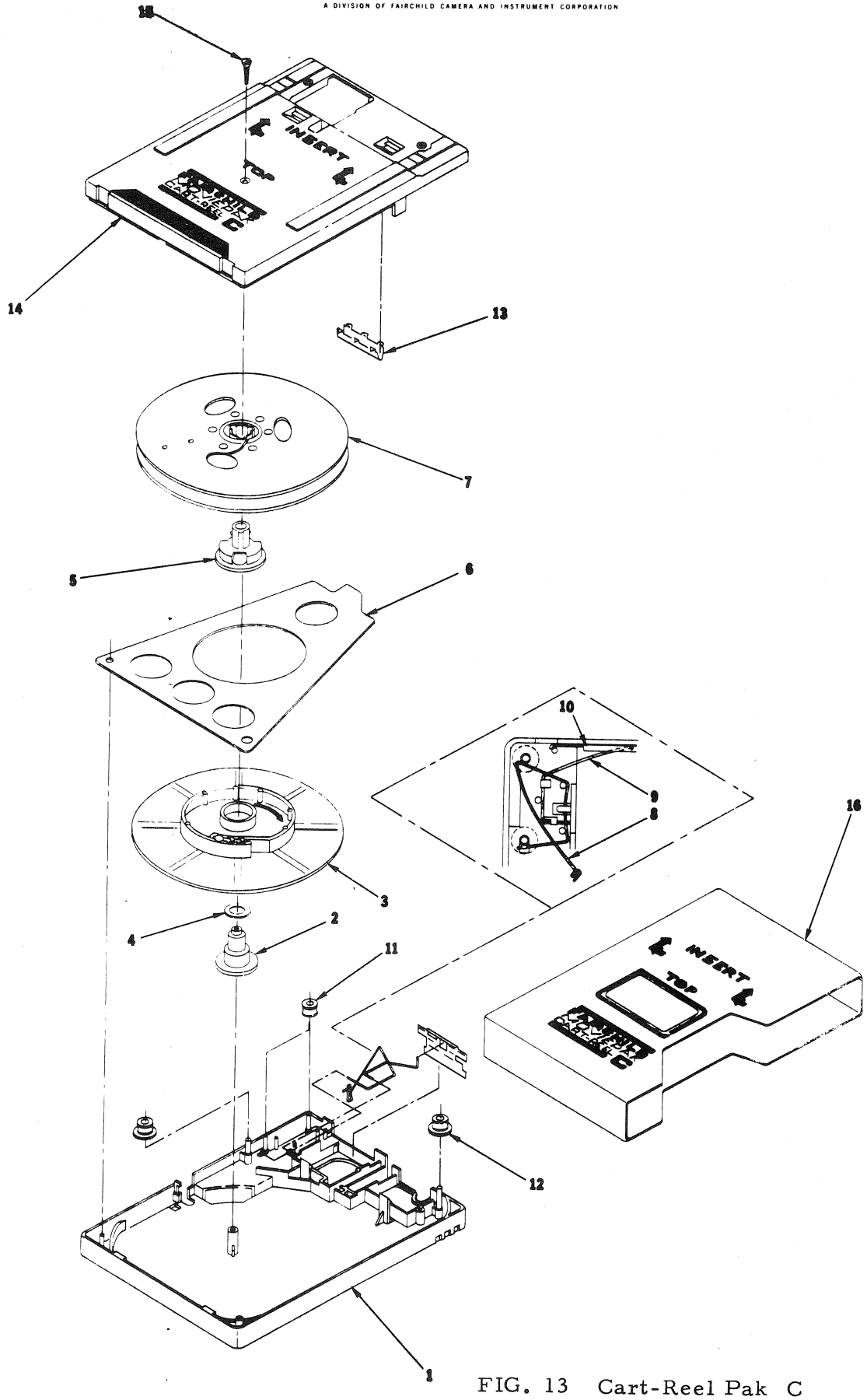

FIG. 13 Cart-Reel Pak C

Fig. #	Item #	Part Number	Description	Units Per Assy	Comments
13		D15-M700-40	Cartridge Assy "C"	1	
	1	D15-711	Cartridge, Base	1	
	2	A15-791	Insert	1	
	3	C15-795	Reel "C"	1	
	4	A15-827	Spacer, Teflon	1	
	5	B15-792	Adaptor	1	
	6	A15-828	Separator "C"	1	
	7	15-M799-45	Kodak Reel 220 Ft.	1	For Reference Only
	8	B15-810	Spring, Snubber	1	
	9	B15-772	Spring, Pressure Pad	1	
	10	B15-376	Pressure Pad	1	
	11	A15-798	Roller	2	
	12	A15-796	Roller, Flanged	2	
	13	A15-378-2	Rib Clip	1	
	14	D15-710	Cartridge, Top	1	
	15	Commercial	#4-24 x 1" Lg Type 25 Phillips Flat Head Self Tapping Screw	1	
	16	A15-842	Shipping Sleeve	1	
14		D15-M700-50	Cartridge Assy "D"	1	
	1	D15-721	Base, Cartridge	1	
	2	A15-791	Insert	1	
	3	C15-793	Reel "D"	1	
	4	A15-827	Spacer, Teflon	1	
	5	B15-792	Adaptor	1	
	6	A15-783	Separator	1	
	7	15-M799-46	Kodak Reel 400 Ft.	1	For Reference Only
	8	B15-810	Snubber Spring	1	
	9	B15-772	Spring, Pressure Pad	1	
	10	B15-376	Pressure Pad	1	
	11	A15-798	Roller	2	
	12	A15-796	Roller, Flanged	2	
	13	A15-378-1	Rib, Clip	1	
	14	D15-720	Cartridge, Top	1	
	15	Commercial	#4-24 x 5/8 Long Type 25 Phillips Flat Head Self Tapping	3	
	16	A15-811	Shipping Sleeve	1	

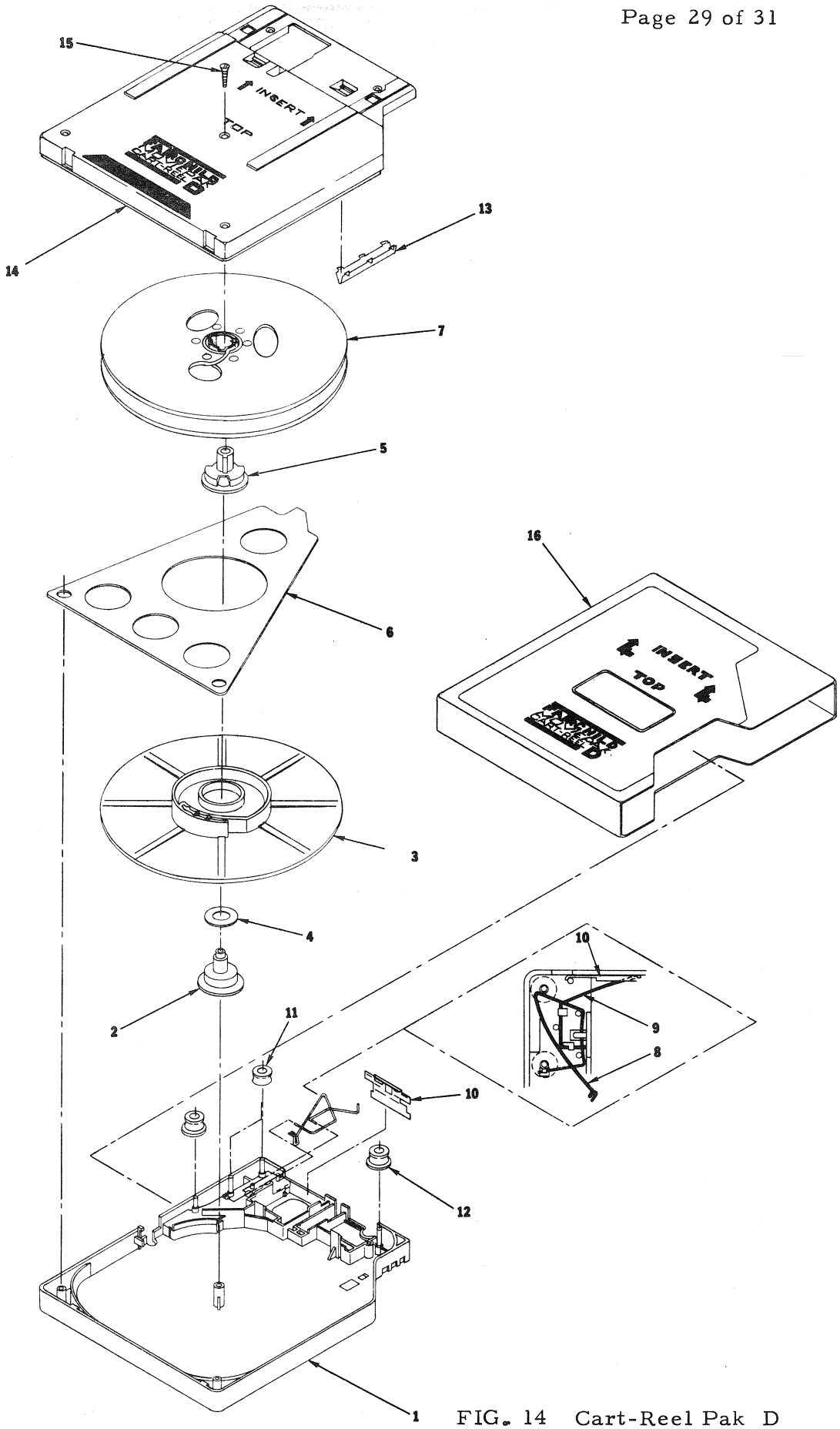

FIG. 14 Cart-Reel Pak D

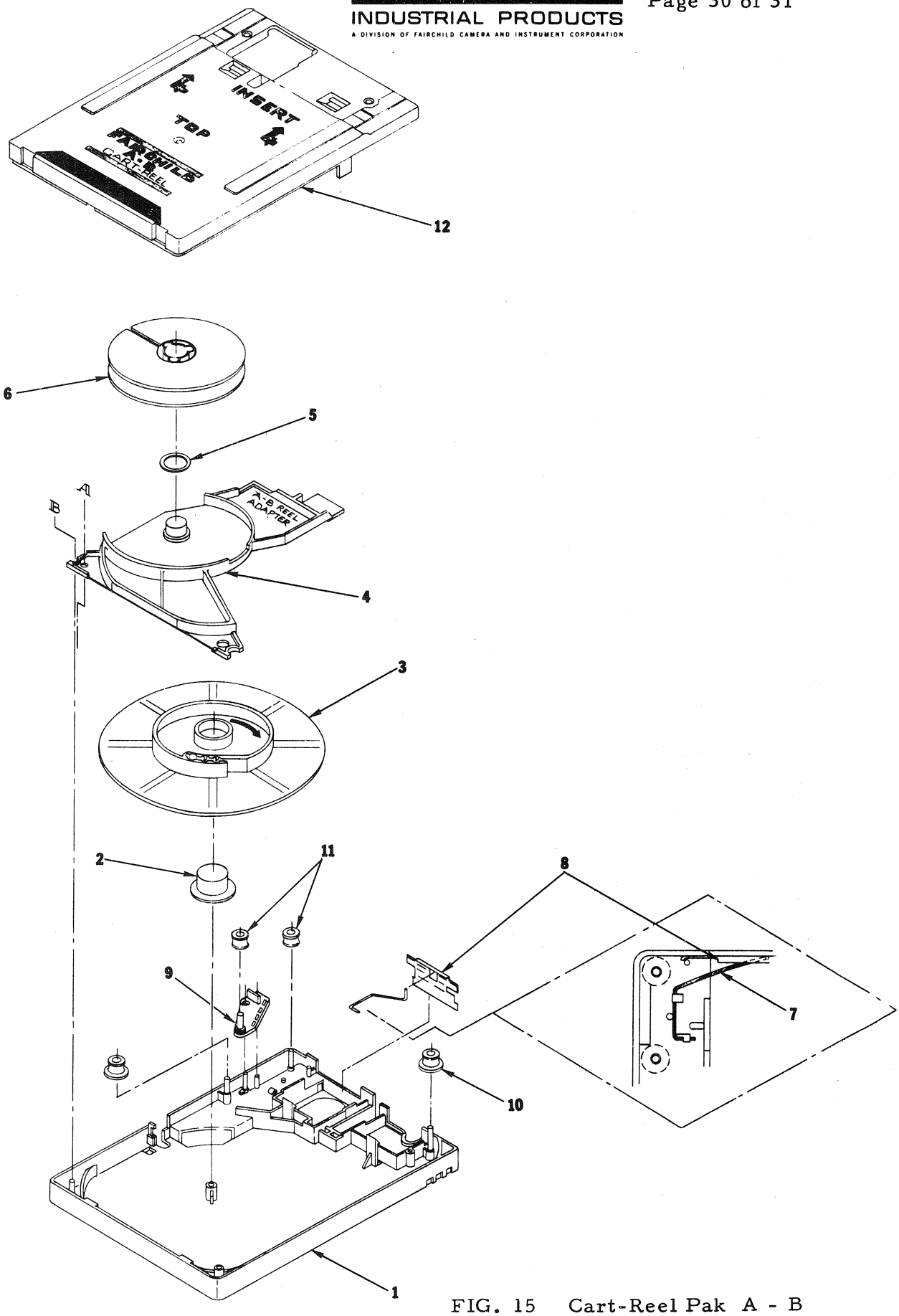

FIG. 15 Cart-Reel Pak A - B

Fig. #	Item #	Part Number	Description	Units Per Assy	Comments
15		D15-M700-60	Cartridge Assy "A-B"	1	
	1	D15-711	Cart-Reel Base	1	
	2	A15-888	Insert	1	
	3	C15-795	Take Up Reel	1	
	4	D15-891	A-B Reel Adaptor	1	
	5	A15-231-3	Washer, Teflon		
	6	Com'l - A	50 Ft. Stand. Super 8 Return Spool	1	For Reference Only
		- B	100 Ft. Kodak Reel	1	"
	7	B15-772	Pressure Pad Spring	1	
	8	B15-376	Pressure Pad	1	
	9	A15-892	Roller Adaptor	1	
	10	A15-889	Flanged Roller	2	
	11	A15-890	Roller	2	
	12	D15-710-1	A-B Cart-Reel Top	1	