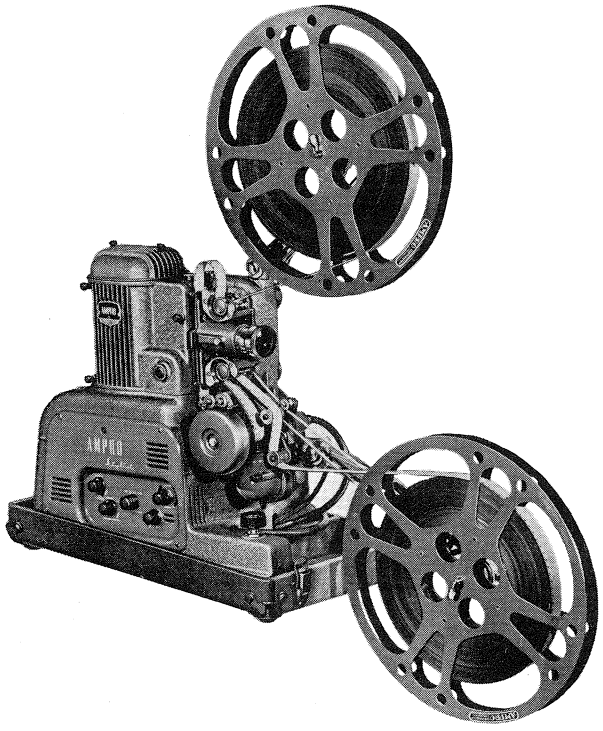
Service Manual

AMPRO STYLIST
AMPRO PREMIER-10
AMPRO PREMIER-20
AMPRO PREMIER-30



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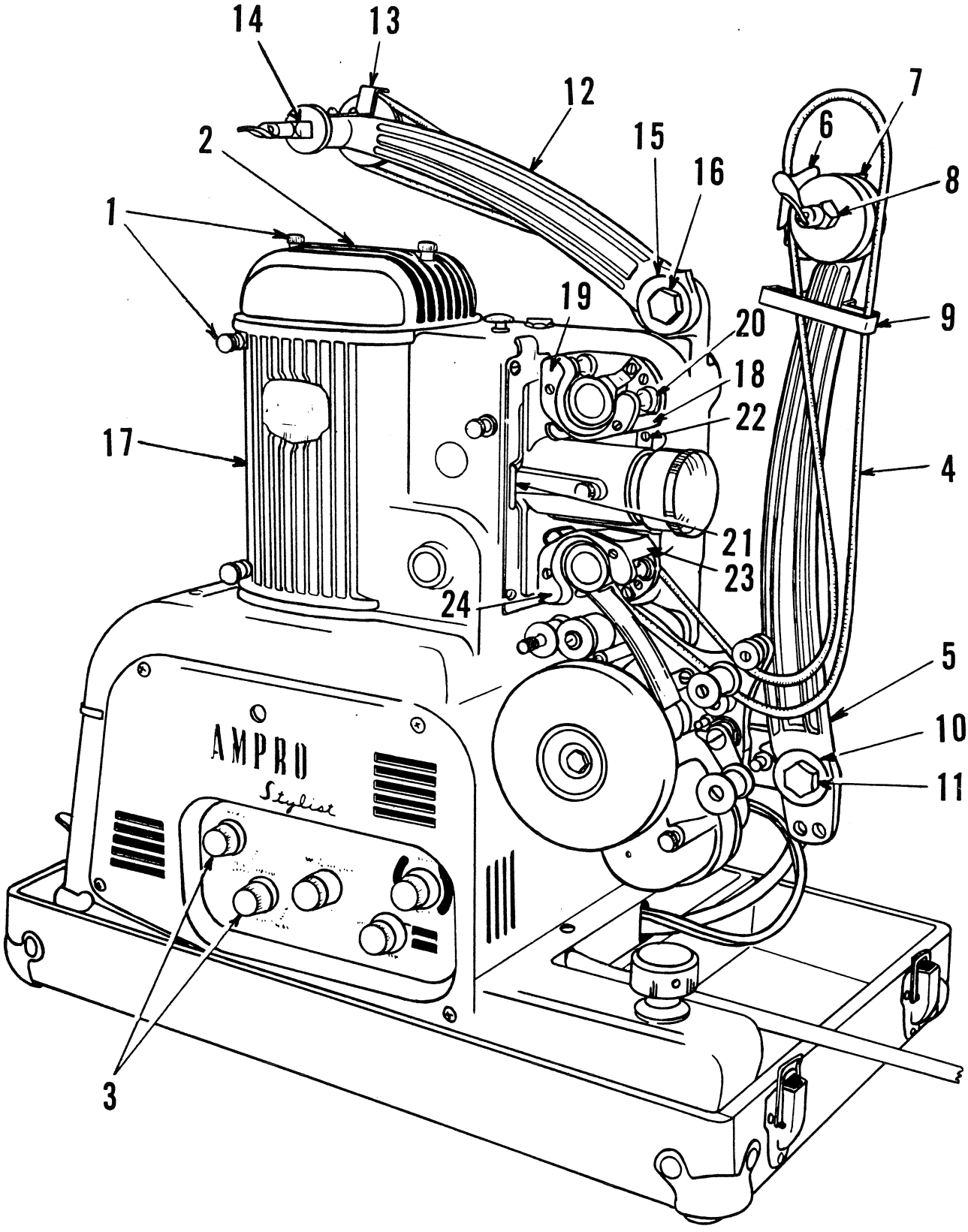


Figure 1 - OPERATING SIDE

INTRODUCTION

It is the purpose of this manual to describe in considerable detail the servicing of the Ampro Stylist. The material is divided into four sections as follows: Cleaning and General Inspection, Trouble-shooting, Service Proceedures, Parts List.

When servicing a projector it is recommended that the equipment be first cleaned and inspected, as per Sec. I, because many irregularities in performance are due to improper care of the equipment, thereby permitting the collection of foreign materials at critical points in the unit. If inspection exposes irregularities in performance, the causes of which are not obvious, then reference should be made to the Trouble & Remedy Table (Sec. II). Section II is cross referenced to Section III so that the correct service proceedure can be easily located and applied.

This manual has been prepared to serve as a guide and "time saver" for the trained service technician. It is not recommended that persons not skilled in this trade attempt to perform major repair operations on the equipment. Such attempts usually result in losses of time and money in excess of the cost of having the work performed by a skilled serviceman and frequently do not result in a first class repair.

SECTION I

Cleaning and General Inspection

A. CLEANING (See Fig. 1)

1. External or Readily Detachable Parts

   a. Case - Blow dust out of the case with compressed air or invert the unit and clean the inside of the bottom section of the case with a brush. Exterior may be waxed if desired.

   b. Film Path - Remove pressure shoe assembly (21) and clean shoe and mounting parts with a cloth dampened with carbon tetrachloride. Clean the aperture plate - deposits of dirt and emulsion may be removed from the notches for the side tension spring with a toothpick or cleaning brush. Take out the two screws which hold each of the sprocket shoe covers (19 & 24) in place and remove the covers. Pull off the eight guide rollers (20) and wash them in carbon tetrachloride. Push the follower roller assembly away from the sprocket and blow out any dust or other foreign material. Run the projector and brush the sprocket teeth and sprocket body.

> WARNING! Always hold the cleaning brush at a right angle to the axis of the sprocket to prevent it from being drawn between the sprocket and the shoe.

Wipe the guide roller pins with a cloth dampened with carbon tetrachloride. Wipe the upper and lower guideways (13 & 15 Fig. 5). Remove the film guide rollers (4 & 22 Fig. 5) and the pressure and tension rollers (17 & 28 Fig. 5) and wash them in carbon tetrachloride. Wipe the shafts and apply a drop of Amproil to each before replacing the rollers.

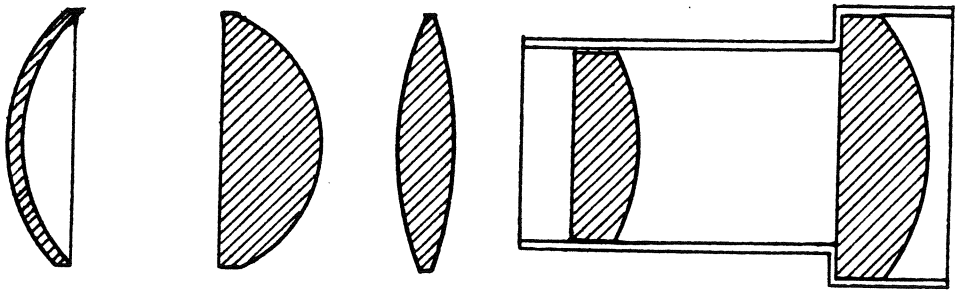


Figure 2 — PROJECTION OPTICS

c. Optical Systems

(1) Projection Lens - Clean the exposed surfaces of the lens elements with lens cleaner. If the inner surfaces are dirty see Sec. III-A-6 for instructions.

(2) Condensing Lens Assembly - Remove the front cover assembly and take out the condensing lenses. If lens cleaner and tissue will not remove spots soak the lenses in carbon tetrachloride and rub with a fairly course cloth.

NOTE: If Carbon tetrachloride has been used, dry the lens and clean with lens cleaner, otherwise a grey film may be left on the lens.

If you are not familiar with the assembly of this unit see Sec III-A-6 for disassembly and reassembly instructions. Wipe the reflector with lens tissue.

(3) Sound Optical System (1 Fig. 5) - Fold a piece of lens tissue over a toothpick and use it to clean the exposed lens surfaces. Do not remove the lens system unless tests of the equipment indicate that such an operation is necessary, in which case refer to Sec. III-A-3 before proceeding.

d. Reel Belts and Spindles - While the projector is running, wipe the belts, spindles and spindle pulleys with a course cloth.

e. Housings - Wipe with cloth dampened with carbon tetrachloride.

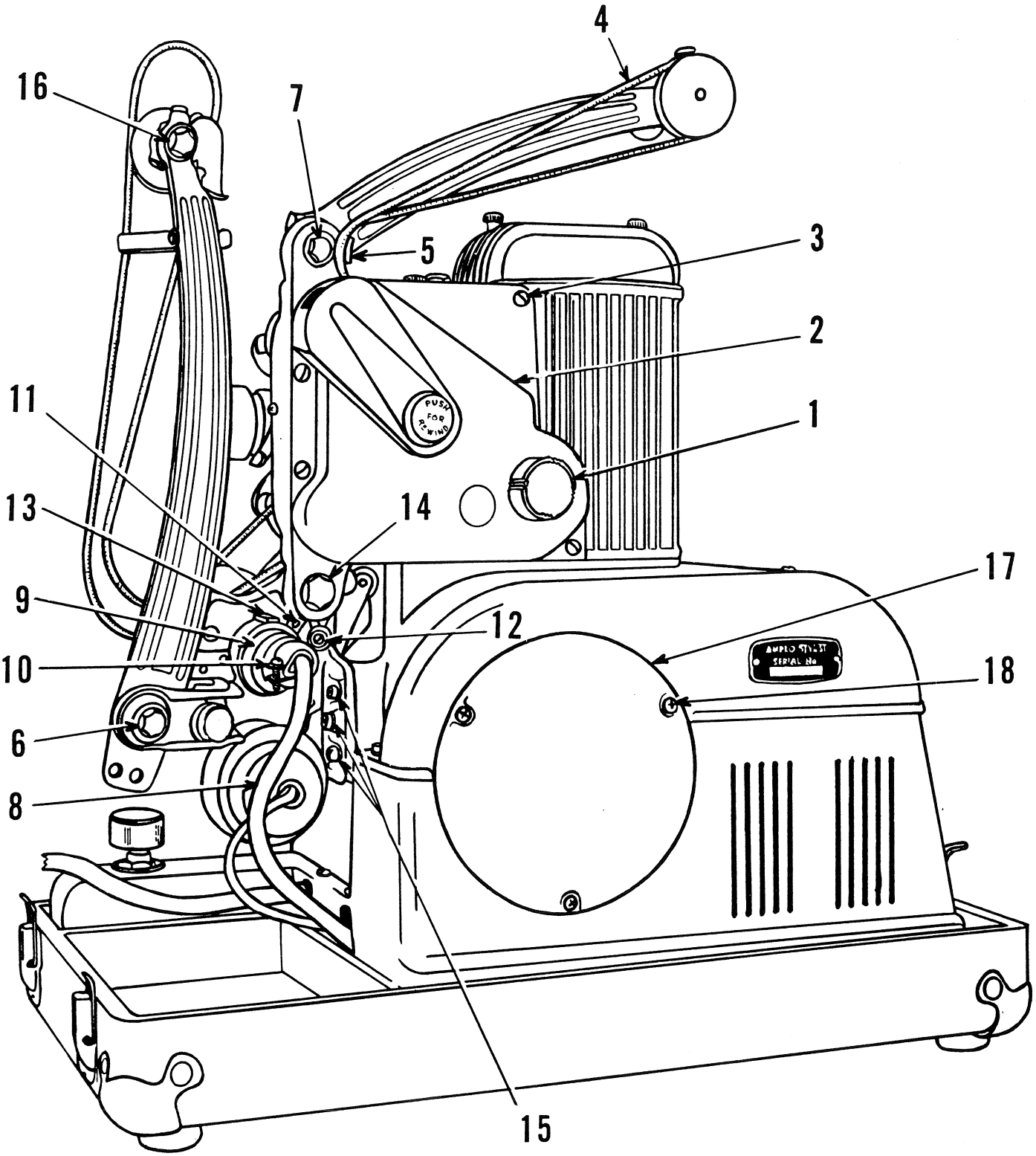


Figure 3 - LEFT HAND SIDE

f. Cables - Wipe with a cloth - Clean terminals by rubbing with a course cloth dampened with carbon tetrachloride.

2. Internal Parts

a. Intermittent Compartment (See Fig. 4) - Remove the front cover and run the drive belt off of the front edge of the pulley. Loosen the setscrew located in the hub of the drive pulley assembly (2) and pull off the pulley. Take out the two screws (4) which hold the shuttle shield (3) and remove the shield. Take out the two screws (6) that hold the vertical camshaft bearing assembly (5) in place and remove the bearing assembly. Pull out the shuttle oil pad (11).

Wipe out the shuttle compartment and check the shuttle lubrication. Wash the oil pad and shuttle shield in carbon tetrachloride. Dry the pad and install it in the unit, then place three drops of oil on the pad in a straight line directly below the shuttle (the purpose of this is to prevent the pad from removing oil from the shuttle).

Install the vertical camshaft bearing assembly (5) but do not tighten the retaining screws (6). Tap the bearing carrier lightly at the same time turning the shutter control knob. When the bearing has been properly aligned, tighten the screws and saturate the bearing oil wick with Amproil. Wipe the pulley and complete assembly operations.

b. Gear Compartment (See Fig. 3) - Loosen the setscrew in the shutter control knob (1) and remove the knob. Take out the four screws (3) which hold the rear cover (2) in place and remove the cover. If the mechanism is very dirty it should be disassembled for cleaning (See Sec. III-A-6). Remove any surplus oil that may have accumulated in the bottom of the mechanism. Wipe the gears with a cloth saturated with Amproil, this can be accomplished easily with the mechanism operating at slow speed, but guard against getting fingers or loose ends of the cloth caught in the gear train.

c. Fan and Fan Housing (See Fig. 3) - Remove the three screws (18) which hold the fan cover (17) in place and remove the cover. If compressed air is available start the projector motor and direct a stream of air into the fan and around the housing to blow out the accumulation of dust. If compressed air is not available remove the fan and wash it; brush the dirt out of the fan housing and then wipe it with a clean cloth.

d. Motor and Motor Controls (See Fig. 6) - Take off the "volume" and "tone" control knobs and remove the four screws which attach the control panel (8) to the base. Push the panel downward and tilt it outward at the top, then lift the panel upward and outward away from housing.

If the contact edge of the rheostat winding (10) is not bright, polish it with 5/0 sandpaper. Check the governor contacts (28) - if they are dirty clean them with a few strokes of a magneto file and then wash them with carbon tetrachloride. Wipe off any dust around the motor housing.

B. INSPECTION

1. General

In all references made in this manual to tests or service operations requiring the use of film it is understood that the film is to be in good condition and of known picture and sound quality. The 16mm version of the Academy Test Reel or material of similar nature will be satisfactory for use in all operations described in this section. With the exception of takeup and rewind tests all other tests can be performed using a 400' reel of film. It is recommended that approximately 1600' of used film be kept on hand for testing the takeup and rewind.

2. Inspection Without Film

Check all exposed screws in order to be sure that they are tight. Check cables for frayed spots and cable terminals for loose connections or damaged contacts. Start the projector and check for rattles, squeaks or other unusual noises. Turn on the lamp and check for screen brilliance, even distribution of light and freedom from color bands. Operate the framer, tilt, and speed control.

Turn the speed control as far as it will go in the direction marked "Sound", then check the speed of the shutter control knob. The correct speed is 1440 R.P.M. ±2%.

> NOTE: If 60 cycle AC power is available, a stroboscope disc having 5 light and 5 dark blades may be attached to the shutter control knob and used to check the speed. If this disc is viewed in light from a small mazda lamp, a neon lamp, or a flourescent lamp it will appear to be stationary. When the pattern drifts in the direction of rotation of the knob the machine is running too fast, when it drifts in the opposite direction the speed is too slow (See Sec. III-A-5 for governor adjustment).

Connect the speaker to the amplifier and turn on the amplifier. Adjust the volume control to approximately the 3 o'clock position and check for ringing or crackling noises from the speaker. Check for noisy operation of volume and tone controls.

3. Film Handling

Thread the projector using a 400' reel of good film. While threading the projector check operation of all reel locks, operating levers, and sprocket followers. Start the projector and check the passage of film through the projector, paying particular attention to feed and takeup tension, proper rotation of all film guide rollers, film slap, weaving of the film in the sound head and any unusual noises. Rethread with 1600' of film (200 on feed and 1400 on T.U. reel) and check takeup at end of reel - check rewind.

4. Picture Quality

Thread the projector with film and focus the picture on a screen. Check for sharpness of the picture, double image and trailer ghost.

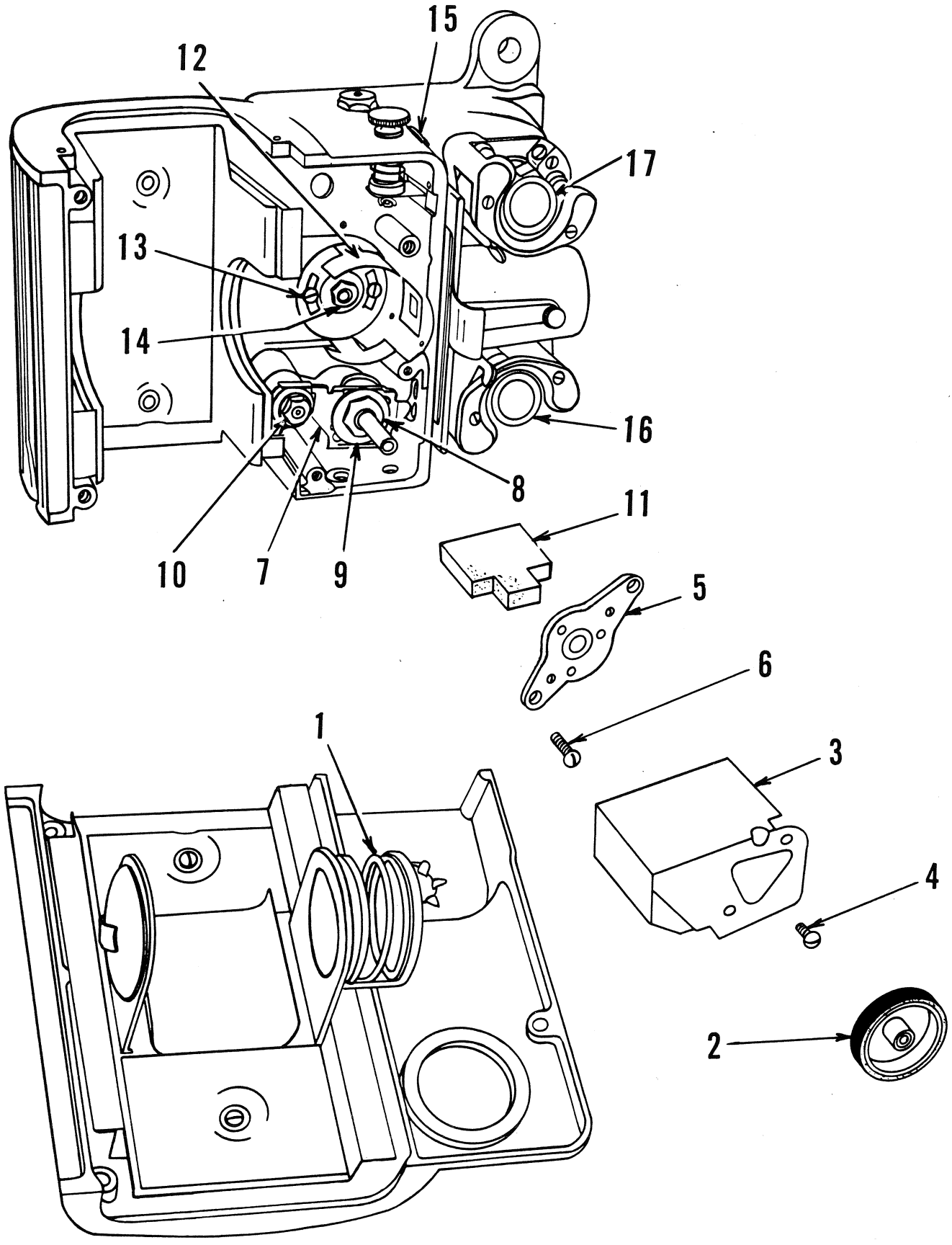


Figure 4 - MECHANISM (Exploded view)

Adjust the framer so that the frame line is visible and check for picture jump. Check for side shake or weave.

5. Sound Quality

Adjust the volume control to a satisfactory listening level and check sound for crispness, wow, and flutter. Check operation of the tone control. Advance the volume control to the point where distortion is just audible and check for normal output, speaker rattle and buzzing of speaker case hardware. Reduce voltage applied to projector to 105 volts and advance volume control to check reserve gain.

SECTION II

Trouble Shooting

TROUBLE AND REMEDY TABLE

It would be practically impossible to compile a list of all of the things which could happen to a motion picture projector and effect its operation. The purpose of this table is to tabulate the most commonly encountered difficulties. This table supplements the "Operator's Trouble Shooting Guide" which is a part of the instruction manual. Generally, troubles due to operational errors will not be listed because it is assumed that the service man is thoroughly familiar with troubles of that type.

A. FILM HANDLING TROUBLES (Test film must be in good condition)

TROUBLE	PROBABLE CAUSE	REMEDY
1. Takeup reel does not revolve	Belt shifter does not shift belt to T.U. pulley	See Sec. III-A-2
	Damaged T.U. belt	Replace
	T.U. belt catches on bent belt guard or shifter	Inspect and repair or replace damaged part
	Loose setscrew on T.U. sprocket pulley	Tighten
	Takeup pulley loose on takeup spindle	Replace spindle assembly
	Bent takeup spindle	Replace
2. Takeup reel won't takeup a full 2000' reel	Worn or stretched takeup belt	Replace or shorten
	Worn takeup sprocket pulley	Replace See Sec. III-A-6
	Worn takeup spindle pulley	Replace spindle assembly See Sec. III-A-2

TROUBLE	PROBABLE CAUSE	REMEDY
3. Takeup reel pulls film through takeup sprocket (400' reel)	Reel arm in wrong position	See operating instructions
	Takeup belt has been cut too short in attempted repair	Replace
	Use of wrong takeup belt	Replace with correct part
4. Takeup reel jerks	Worn takeup belt	Replace
	Bent belt guard rubs on takeup reel	Straighten
	Worn takeup sprocket pulley	Replace See Sec. III-A-2
	Worn takeup spindle pulley	Replace spindle assembly
5. Rewind won't operate	Worn rewind belt	Replace
	Rewind clutch broken or jammed	Repair See Sec. III-A-6
	Bent feed spindle	Repair See Sec. III-A-1
	Bent or loose belt guards	Repair
	Rewind belt not crossed	Cross belt
6. Upper loop not maintained	Bent feed spindle	Replace See Sec. III-A-1
	Rewind clutch engaged or jammed	See operating instructions
		Repair clutch See Sec. III-A-6
	Feed Sprocket loose on shaft	Tighten setscrew
7. Lower loop not maintained	Pressure shoe not seating properly	Adjust See Sec. III-A-6
	Worn intermittent	Repair See Sec. III-A-6
	Intermittent improperly timed	Repair See Sec. III-A-6
	Excessive gate pressure applied to " green" film	Reduce gate pressure See Sec. III-A-6

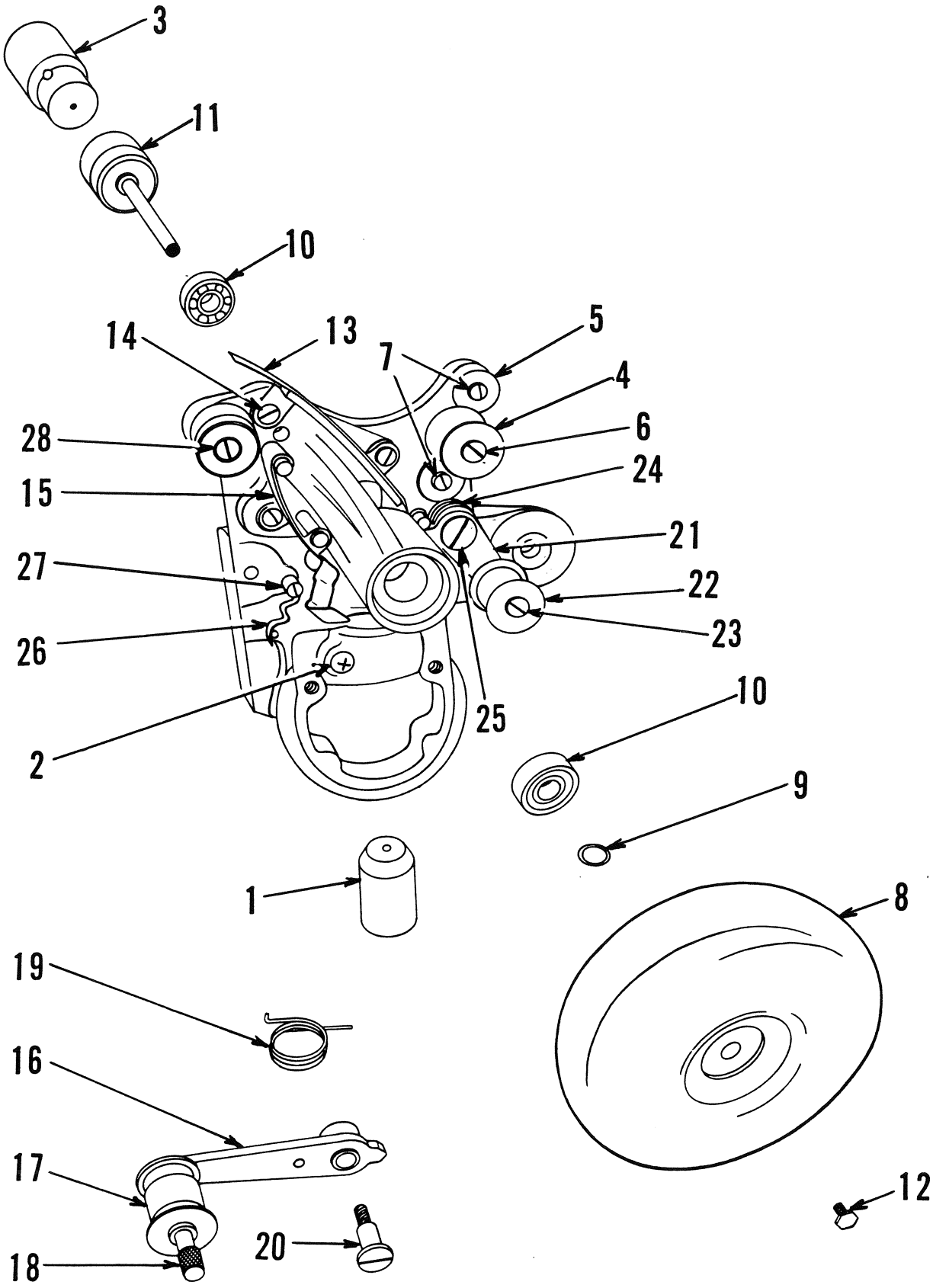


Figure 5 - SOUND HEAD (Exploded view)

TROUBLE	PROBABLE CAUSE	REMEDY
8. Film scratch	Worn part or dirty film tracks	Locate source with small loop of film threaded as follows (1) Feed sprocket (2) Takeup sprocket (3) Film gate (4) Takeup sprocket and sound head Clean or replace part causing trouble
9. Film slitting (Starts at bad splice)	Upper guideway completely worn out	Replace See Sec. III-A-3
10. Film tearing	Wrong takeup belt	Replace with proper part
11. Excessive film slap	Worn intermittent	Repair See Sec. III-A-6
12. Clicking noise (film picking)	Damaged sprocket teeth	Replace sprocket

B. PICTURE TROUBLES (Test film must be in good condition)

1. Picture jump (w/green film)	Excessive gate pressure	Reduce gate pressure See Sec. III-B-5
2. Picture jump (w/used film)	Insufficient gate pressure Worn aperture plate or pressure shoe Worn intermittent	Increase gate pressure Replace See Sec. III-A-6 Repair See Sec. III-A-6
3. Sidesway (weave)	Worn or bent side tension spring	Replace See Sec. III-A-6
4. In and out of focus (R.H. side only)	Worn or bent side tension spring	Replace See Sec. III-A-6
5. In and out of focus (Random)	Loose projection lens element Sticking pressure shoe Worn aperture plate or pressure shoe	Tighten retainer Adjust Replace
6. Poor focus and halo	Dirty projection lens Lens element installed backwards	Clean Assemble correctly
7. Streaks outside of picture area	Optical black scrapped off of back of pressure shoe or associated parts	Retouch with optical black

TROUBLE	PROBABLE CAUSE	REMEDY
8. Streaks near edges of picture	Shutter out of line laterally	Realign See Sec. III-A-6
9. Vertical bands of color in picture	Old lamp Condensing lenses or reflector improperly installed Lamp not centered with optical system	Replace Adjust
10. Streaks above or below ends of vertical lines in picture (Trailer Ghost)	Shutter out of time	Retime See Sec. III-A-6
11. Faint supplementary images of horizontal lines in picture (Double image)	Intermittent requires adjustment	Repair See Sec. III-A-6
12. Nicks in edge of projected image	Damaged framer plate	Replace

C. SOUND AND AMPLIFIER TROUBLES

1. No sound, tubes do not light	Blown fuse Defective switch Loose connection	Replace Replace See Sec. III-A-4 Repair See Sec. III-A-4
2. No sound, tubes light, exciter lamp does not light, hiss from speaker	Burned out exciter lamp Damaged tube (50C5)	Replace Check tubes
3. No sound from film, no hiss from speaker, exciter lamp does not light	Reversed polarity on Direct Current	Rotate line cord plug in power outlet
4. No sound from film, no hiss from speaker exciter lamp lights	Broken speaker cable Tube has failed Other amplifier troubles	Repair Check tubes Remove amplifier and service See Sec. III-A-4
5. Low volume and excessive hum	Damaged 50C5 Bad filter condenser	Check tubes Replace See Sec. III-A-4

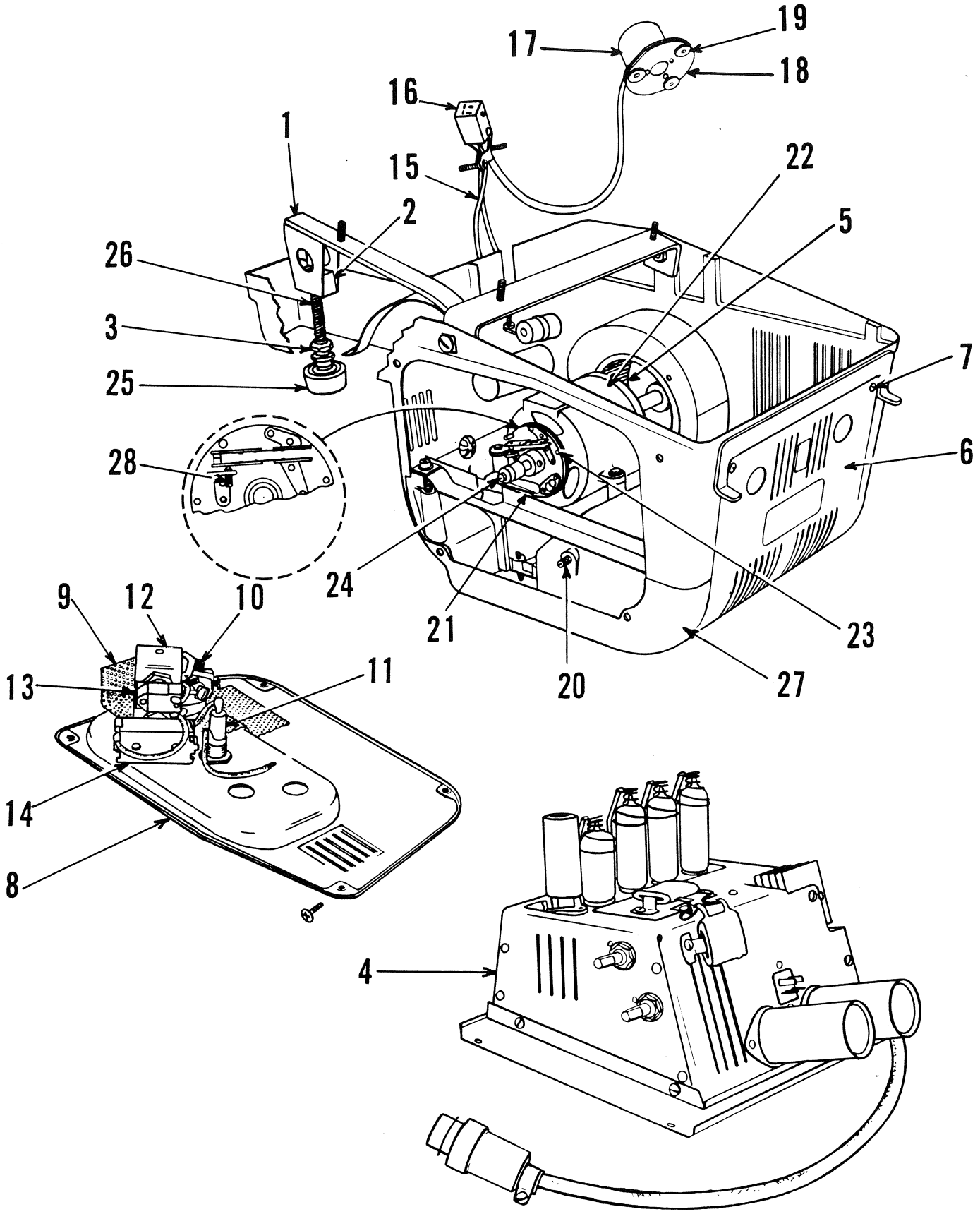


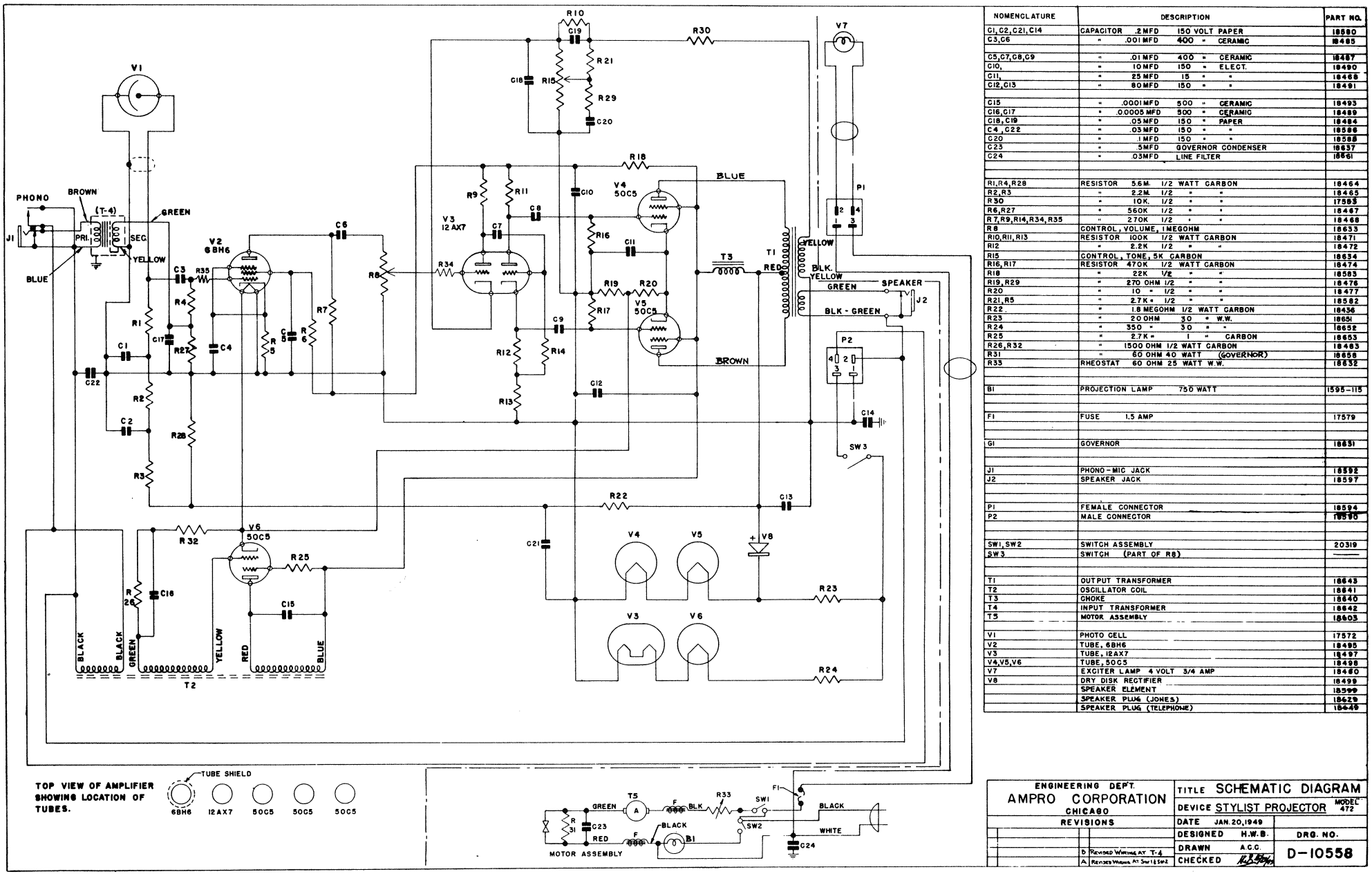
Figure 6 - BASE (Exploded view)

TROUBLE	PROBABLE CAUSE	REMEDY
6. Low volume	Damaged tubes	Check tubes
	Low line voltage	Check
	Exciter lamp not properly installed	Check
	Bad condenser (C-1, 2 or 21)	Replace
7. Low volume, weak highs	Dirty sound optical system	Clean
8. Normal volume, excessive hum	Heater to cathode leakage 50C5 or 12AX7	Check tubes
9. Hash at sound speed only	Sticking governor brush	Repair or replace
	Dirty governor contacts	Clean
	C-14 or C-24 open	Replace
10. Hash at silent or sound speed	Sticking motor brush	Repair or replace
	Dirty or worn commutator	Repair See Sec. III-A-5
11. Microphonics	Damaged exciter lamp	Isolate faulty part and replace
	Damaged photocell	
	Damaged tube	
	Loose contact in PEC cable connector	
12. Shock from mike plug	C-14 or C-24 connected to wrong side of line	Correct wiring
	Amplifier is wet	Clean and dry out
13. Light intermittent shock from projector	Condenser discharge characteristic of AC-DC equipment	Safe - no remedy
14. Heavy continuous shock from projector	Grounded wiring	Repair
	Carbon dust in motor	Clean
15. Pitch of sound nearly correct - no highs	Sound optical system is dirty or out of focus	Clean and focus See Sec. III-B-3
16. Pitch of sound correct - no lows	Open coupling condenser	Replace

TROUBLE	PROBABLE CAUSE	REMEDY
17. Pitch of sound too high	Motor running too fast	Adjust governor See Sec. III-A-5
18. Pitch of sound too low	Motor running too slow	Adjust governor
		Check motor brushes
		Clean governor contacts
	Sound optical system dirty or out of focus	Clean and focus
	Low line voltage	Check voltage
19. Pitch of sound suddenly increases or decreases	Dirty or sticking governor contacts	Clean
	Sliver of copper between governor slip rings	Remove
	Sticking motor brush	Repair
20. Pitch of sound changes slowly (wows)	Worn guideways	Replace See Sec. III-A-3
	Guideways out of alignment	Adjust See Sec. III-A-3
	Worn sound drum	Replace
	Slipping drive belt	Replace
21. Pitch of sound changes rapidly (flutter)	Dirty or worn sound drum bearings	Clean or replace
	Damaged takeup belt	Replace
	Pressure or tension rollers sticking	Repair or replace
22. 24 cycle buzz accompanies sound	Lower guideway set too far to the left	Adjust See Sec. III-B-2
	Edge guide worn	Replace lower guideway
23. Scratching and popping noise accompanies sound	Lower guideway set too far to the right	Adjust See Sec. III-B-2
	Broken film edge spring	Replace guideway

D. MISCELLANEOUS TROUBLES

1. Excessive vibration	Bent motor shaft	Replace armature
	Loose part caught in fan	Remove
	Damaged governor	Replace



NOMENCLATURE	DESCRIPTION	PART NO.
C1, C2, C21, C14	CAPACITOR .2 MFD 150 VOLT PAPER	18580
C3, C6	" .001 MFD 400 " CERAMIC	18485
C5, C7, C8, C9	" .01 MFD 400 " CERAMIC	18487
C10,	" 10 MFD 150 " ELECT.	18490
C11,	" 25 MFD 15 " "	18468
C12, C13	" 80 MFD 150 " "	18491
C15	" .0001 MFD 500 " CERAMIC	18493
C16, C17	" .00005 MFD 500 " CERAMIC	18489
C18, C19	" .05 MFD 150 " PAPER	18484
C4, C22	" .03 MFD 150 " "	18586
C20	" .1 MFD 150 " "	18588
C23	" .5 MFD GOVERNOR CONDENSER	18637
C24	" .03 MFD LINE FILTER	18661
R1, R4, R28	RESISTOR 5.6 M. 1/2 WATT CARBON	18464
R2, R3	" 2.2 M. 1/2 " "	18465
R30	" 10 K. 1/2 " "	17585
R6, R27	" 560 K 1/2 " "	18467
R7, R9, R14, R34, R35	" 270 K 1/2 " "	18468
R8	CONTROL, VOLUME, 1 MEGOHM	18633
R10, R11, R13	RESISTOR 100 K 1/2 WATT CARBON	18471
R12	" 2.2 K 1/2 " "	18472
R15	CONTROL, TONE, 5 K CARBON	18634
R16, R17	RESISTOR 470 K 1/2 WATT CARBON	18474
R18	" 22 K 1/2 " "	18583
R19, R29	" 270 OHM 1/2 " "	18476
R20	" 10 " 1/2 " "	18477
R21, R5	" 2.7 K " 1/2 " "	18582
R22	" 1.8 MEGOHM 1/2 WATT CARBON	18436
R23	" 20 OHM 30 " W.W.	18651
R24	" 350 " 30 " "	18652
R25	" 2.7 K " 1 " CARBON	18653
R26, R32	" 1500 OHM 1/2 WATT CARBON	18483
R31	" 60 OHM 40 WATT (GOVERNOR)	18658
R33	RHEOSTAT 60 OHM 25 WATT W.W.	18632
B1	PROJECTION LAMP 750 WATT	1595-115
F1	FUSE 1.5 AMP	17579
G1	GOVERNOR	18631
J1	PHONO-MIC JACK	18592
J2	SPEAKER JACK	18597
P1	FEMALE CONNECTOR	18594
P2	MALE CONNECTOR	18590
SW1, SW2	SWITCH ASSEMBLY	20319
SW3	SWITCH (PART OF R8)	—
T1	OUTPUT TRANSFORMER	18643
T2	OSCILLATOR COIL	18641
T3	CHOKE	18640
T4	INPUT TRANSFORMER	18642
T5	MOTOR ASSEMBLY	18603
V1	PHOTO CELL	17572
V2	TUBE, 6BH6	18495
V3	TUBE, 12AX7	18497
V4, V5, V6	TUBE, 50C5	18498
V7	EXCITER LAMP 4 VOLT 3/4 AMP	18460
V8	DRY DISK RECTIFIER	18499
	SPEAKER ELEMENT	18599
	SPEAKER PLUG (JONES)	18629
	SPEAKER PLUG (TELEPHONE)	18648

ENGINEERING DEPT.
AMPRO CORPORATION
CHICAGO

REVISIONS

b Revised Wiring at T-4
A Revised Values at SW1 & SW2

TITLE SCHEMATIC DIAGRAM
DEVICE STYLIST PROJECTOR MODEL 472
DATE JAN. 20, 1949
DESIGNED H.W.B.
DRAWN A.C.G.
CHECKED
DRG. NO. D-10558

Figure 7 - SCHEMATIC DIAGRAM

TROUBLE	PROBABLE CAUSE	REMEDY
2. Squeaking noises	Takeup belt	Oil or use "Door Ease" Replace belt and/or sprocket pulley
	Sprocket rubbing on follower roller	Align Sprocket See Sec. III-A-6
3. Rattling noise	Loose shutter	Tighten
	Loose shuttle	Repair See Sec. III-A-6
	Condensing lenses installed backwards	Install properly
4. Whinning noise	Loose fan	Tighten
5. Drive belt comes off	Belt guard improperly adjusted or missing	Install properly
	Worn pulleys (tapered or crown worn off)	Replace
	Mechanism binding	Check and adjust
6. Short projection lamp life	Line voltage exceeds lamp voltage	Supply correct lamp
	Operation below silent speed	Operate at correct speed
	Loose fan	Tighten
	Obstruction in air ducts	Remove

SECTION III

Service Procedures

GENERAL: This section will describe the complete disassembly of the projector, however, it is seldom necessary to completely dismantle the unit. The construction is such that in most cases removal of covers and a few sub-assemblies will provide access to any of the parts. These instructions are based on the use of micrometers, calipers, and other standard shop tools; if a large volume of repair work is to be done, contact the Factory Service Division for information about special tools and fixtures.

A. DISASSEMBLY AND REPAIR

1. Feed Reel Arm Assembly (See Fig. 1)

a. Removal - Take off the cap nut (7 Fig. 3) and guard (5 Fig. 3). Disconnect the rewind belt (4 Fig. 3) and unscrew the reel arm stud (16). Remove the arm (12), washer, stud and friction washer (15).

b. Disassembly - Remove the two screws which hold the belt guard (13) in place. Take out the brakeshoe cap, the spring and the brake shoe. Drive out the tapered pin which attaches the rewind pulley to the spindle (14), and remove the spindle and washers. If it is necessary to remove the bushings, push them out with an arbor press or support one end of the boss on a block bored to the O.D. of the bushing and drive out the bushings with a bearing extractor punch. To remove the reel lock finger from the spindle, use a 1/16" pin punch to drive out the pin.

NOTE: Remove the punch from the spindle carefully or the reel lock spring will eject the finger and checkball with considerable force.

c. Repair and Reassembly - If the spindle is bent, replace it with a new part. Spindle and pulley are supplied as a unit to simplify assembly. When installing the spindle, place a washer over the spindle, then insert it in the bearings. Use spacing washers between bearing and pulley as required to reduce the endplay to .005" - .007". If the brake shoe is worn, replace it. Do not attempt to stretch the spindle brake spring: This spring and shoe apply friction to the spindle shaft to provide sufficient load for the rewind clutch so that the clutch will remain engaged at the start of rewinding. If the spring is stretched, there is considerable danger that the feed tension will be too high and the film sprocket holes will be damaged. Spindle bearings have a very long life and require replacement only if they are worn in such a way as to cause the spindle to whip during rewinding. When installing the arm assembly, be sure that the friction washer is placed on the stud with the convex side of the washer toward the head of the stud. Tighten the stud enough so that the arm will remain in any position in which it is placed, but do not tighten the stud tighter than is necessary.

2. Takeup Reel Arm Assembly (See Fig. 1)

a. Removal - Disconnect takeup belt (4). Take off the cap nut (6 Fig. 3) and unscrew reel arm stud (11).

b. Disassembly - Remove arm (5), washer, stud (11), and friction washer (10). Take out two screws and lockwashers which hold the takeup belt retainer (9). Unscrew the brake shoe cap (7) and take out the spindle, brake spring and brake shoe. Hold the spindle (8) by the square section with a parallel jaw wrench and remove the cap nut (16 Fig. 3). Remove the face washer and the spacing washers and pull out the spindle assembly. . Remove the takeup loose pulley and the belt shifter assembly (6). See Par. 1-b of this section for removal of reel lock finger. If it is necessary to remove the bushing, press it out with an arbor press or support

the arm on a block bored to the Outside Diameter of the bushing, and drive out the bushing with a bearing extractor punch.

c. Repair and Reassembly - If the spindle is bent, or the takeup pulley is loose on the spindle, replace the spindle assembly. If the brake shoe is worn or sticking, the film will not be rewound with the proper tension and the shoe should be replaced. When installing the spindle, use spacing washers as required between the end of the bushing and the face washer to reduce the play to .005" -.007". If the spindle wobbles in the bushing during normal operation, replace the bushing. Press the new bushing in with an arbor press and drill the hole for the brake shoe after the bushing has been installed. When installing the reel arm assembly, be sure that the friction washer (10) is placed on the stud (11) with the convex side of the washer toward the head of the stud. Tighten the stud enough so that the arm will remain in any position in which it is placed, but do not tighten the stud more than is necessary.

3. Sound Head Assembly (See Fig. 3)

a. Removal - Remove takeup reel arm assembly as per Par. 2-a of this section. Remove the three screws which hold the exciter lamp socket assembly (do not lose the three socket spacers). Slide back the photocell socket insulator (10). Unscrew the ringnut (9) and remove the photocell socket and the photocell. Take out the three fillister head screws (15) which attach the sound head to the base. Take out the sound head mounting stud (14) and lift off the sound head.

NOTE: A shim washer may be used between the sound head boss and the boss on the mechanism head.

b. Disassembly (See Fig. 5)

(1) Upper Guideway - Take out the two screws (14) and remove the guideway assembly (13).

(2) Flywheel and Sound Drum Assembly - Loosen the flywheel retaining screw (12) about 2 turns. Hold the flywheel (8) and tap the head of the screw with a light hammer in order to free the flywheel from the tapered sound drum shaft (11), then remove the retaining screw and the flywheel.

Loosen the two setscrews (13 Fig. 3) and slide the P.E.C. shield assembly out of the sound head sub-assembly. Push the sound drum (11) out thru the hole for the P.E.C. shield. Remove the sound drum bearings (10).

(3) Lower Guideway Assembly - Remove the guideway adjusting screw (12 Fig. 3) and washer. Loosen the locking screw (11 Fig. 3) and pull the guideway assembly (15) and aligning stud off the sound head. Remove the guideway aligning spring and separate the guideway from the aligning stud.

(4) Pressure Roller Arm Assembly and Film Roller Assem-

bly - Unscrew the pressure roller knob (18) and remove the pressure roller assembly (17) and spacing washers. Should it be necessary to remove the pressure roller arm subassembly (16), remove the pressure roller catch retaining screw (27) and the pressure roller catch (26). Take out the pressure roller arm pivot (20).

NOTE: Support the arm while removing the pivot or the thrust from the pressure roller arm spring (19) may push the pivot out of line and damage the threads. Lift out the pressure roller arm assembly (16) and separate the pressure roller arm spring (19) from the arm.

Take out the film roller retaining screw and plain washer, then remove the film roller assembly (28), spacing washer and film roller aligning spring.

(5) Film Guide Rollers - Remove the film tension equalizer pivot (25) and lift off the film tension equalizer assembly (21) and spring (24). Take out the film guide roller retaining screw (23) and remove the film guide roller (22) and spacing washer. Take out the guide roller stud (6) and remove the guide roller (4) and takeup belt guide roller. Take out the two takeup belt guide roller studs (7) and remove the takeup belt guide rollers (5).

(6) Sound Optical System (1) - Break the seal on the sound optical system retaining screw (2) and loosen the screw. Insert the end of a small screwdriver in the slot in the sound optical system clamp and expand the clamp. Slide the optical system out of the sound head. Do not attempt to disassemble the optical system. If the inner surfaces of the lenses are dirty, or the system is damaged, send it to an Authorized Service Station for repair.

c. Repair and Reassembly (See Fig. 5)

(1) Upper Guideway Assembly (13) - If the supporting ribs for the film are worn down so that there is danger of either sound track or picture area coming in contact with the recessed portion of the guideway, replace the part.

NOTE: Abrasions on the portion of the guideway adjacent to the picture area are usually due to warped film rather than worn supporting ribs.

(2) Flywheel and Sound Drum Assembly - Check the sound drum shaft assembly (11) for worn spots on the drum and bending of the shaft.

NOTE: Check the flywheel (8) for runout with an indicator. Tool marks on the rim of the flywheel may produce an optical illusion that it is wobbling.

Wash the sound drum bearings (10) in a mixture of 1/2 carbon tetrachloride and 1/2 Amproil, then immerse them in Amproil and drain them on a blotter for 10 minutes (open

side down). If cleaning will not remove the rough spots in the bearings, replace them. Use spacing washers (9) between the outside bearing and the flywheel to reduce the endplay to not more than .003".

(3) Lower Guideway Assembly (15) - Check supporting ribs as per sub. par. (1), also check for wear in the fixed edge guide and make sure that the side tension spring is not worn or sticking. Replace the guideway if badly worn. Place the aligning spring over the aligning stud and install the guideway on the sound head. Install the adjusting screw (12 Fig. 3) and washer. See Par. B-2 for final alignment of this part.

(4) Pressure Roller Arm Assembly and Film Roller Assembly - Check rollers for flat spots and replace if any flats are present. Clean the pressure roller spindle, and apply 2 drops of Amproil to the bearings in the pressure roller (17), then install roller, washer, and knob (18). If the pressure roller arm assembly has been removed, install the pressure roller arm spring (19) on the hub of the arm assembly. Be sure that the end of the spring is placed in the hole in the arm, then place the arm assembly in position, place the end of the spring against the pressure roller catch stud and press upward and forward on the arm assembly until the hole in the hub is in line with the tapped hole for the pivot. Place a drop of oil on the pivot (20) and then install it on the sound head. Install the pressure roller catch (26) and retaining screw (27).

Clean and oil the film roller stud, then install the film roller aligning spring and washer. Place the film roller assembly (28) on the stud and push it in against the spring. Push the pressure roller arm assembly forward then install the film roller retaining screw, using enough spacing washers between the screw and the roller to center the roller between the pressure roller flanges.

(5) Film Guide Rollers - Inspect the rollers for flat spots worn in the body of the roller and cuts in the flanges. If either type of wear is found, replace the roller. Clean all studs and lubricate them with Amproil before assembly.

(6) Sound Optical System - Clean external surfaces of the lenses with a piece of cotton or lens tissue, dampened with lens cleaner or alcohol. Hold the unit in front of a bright light and look thru it from the end adjacent to the exciter lamp. A narrow, sharply defined, and evenly illuminated beam of light should be seen. If the beam is hazy, or unevenly illuminated send the unit to the factory or an Authorized Service Station for repair.

4. Amplifier Assembly (See Fig. 3)

a. Removal - Tip the projector backwards so that it rests on the back of the lamphouse and the rear edge of the case bottom. Take off the three nuts and washers on the bottom of the case

and remove the bottom. Slide back the photocell insulator (10) and unscrew the ringnut on the photocell receiver (9). Pull out the receiver and remove the photocell. Take off the volume and tone control knobs and remove the control panel. Take out the four screws which hold the amplifier to the projector base. Partially remove the amplifier, then disconnect the power connector (16 Fig. 6) and complete the removal of the amplifier.

b. Servicing (See Fig. 7) - It is beyond the scope of this manual to describe in detail the servicing of a multi-stage vacuum tube amplifier. The components of the amplifier are readily accessable, therefore, disassembly and reassembly instructions are not necessary. Lead dressing is not critical.

The fastest service procedure is to first check all socket voltages, (see following table) and replace any parts causing non-standard voltages. Connect a properly terminated audio-frequency oscillator to the photocell receptacle thru a .05 mfd. capacitor and 10 megohm resistor connected in series to #1 pin of the socket. #2 pin is ground and the shield for the capacitor and resistor should be connected to it. Use a cathode-ray oscillascope to trace the signal thru the amplifier.

SOCKET VOLTAGE TABLE

Pin	GBH6	12AX7	50C5 (V-4&5)	50C5 (V-6)
1	G. 0	PT2 + 55	K. + 7.2	K + 6.2
2	K. + .75	GT2 0	G.1 0	G.1.- 4
3	H. 0	KT2 + 75	H	H
4	H.+6.2D.C.	H	H	H
5	P. + 40	H	G1 0	G1 - 4
6	G2 + 40	PTI + 75	G2 + 115	G2 + 87
7	G3 + .75	GT1 + .5	P + 120	P + 115
8		KT1 22		
9		HM N.C.		

All voltages measured to ground with 20,000 ohms/volt meter.

Line voltage 115 volts 60 cycles A.C. A 10% variation in voltages is permissable.

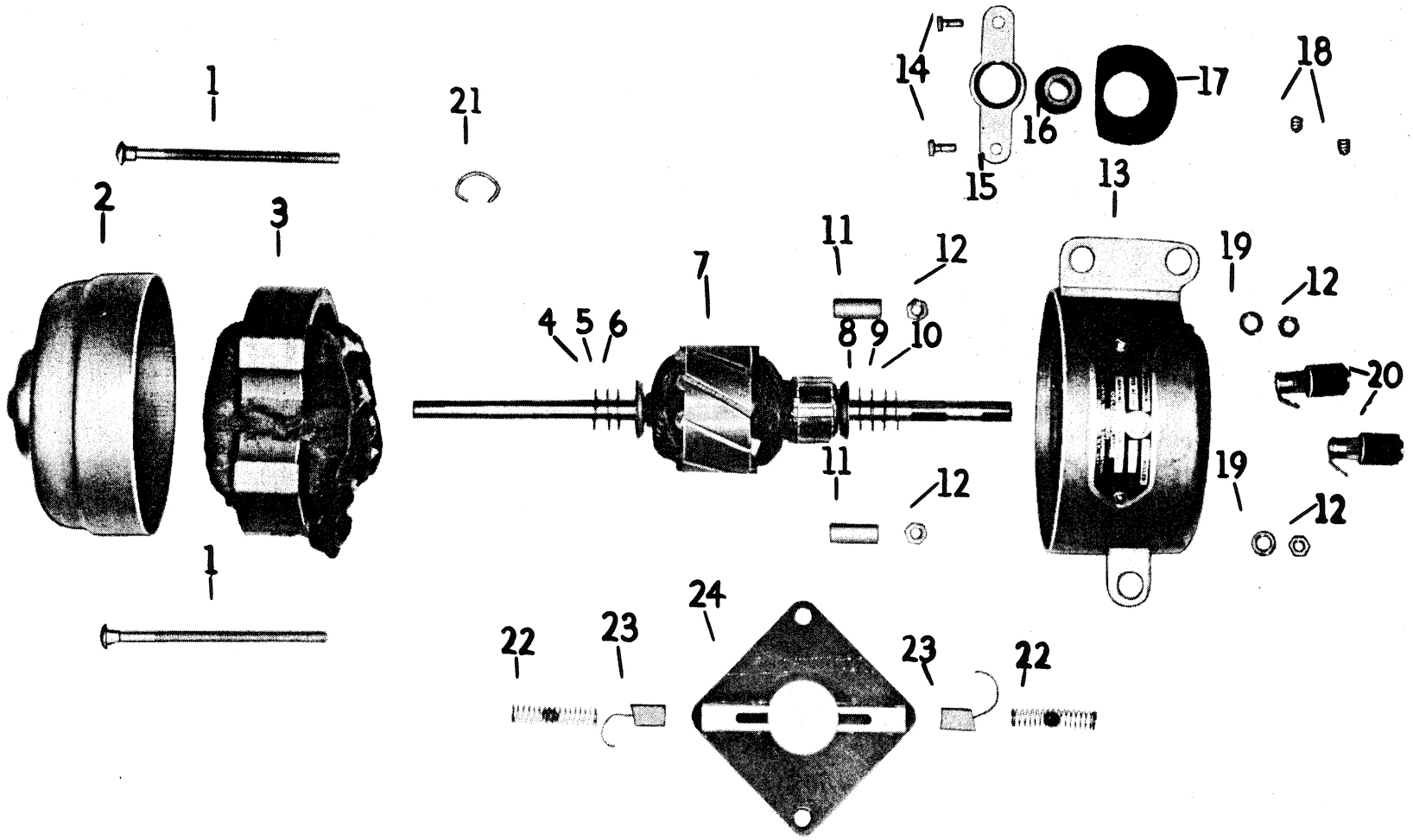


Figure 8 - MOTOR (Exploded view)

5. Motor Assembly (See Fig. 6)

a. Removal - Remove projector base and control panel as per par. 4-a. Take off the front cover of the projector and remove the drive belt. Disconnect the four motor leads (code terminals & leads). Take out the three screws which hold the fan housing cover in place and remove the fan. Take out the three screws which hold the motor in place and remove the three plain washers, bushings, sleeves and fibre washers. Lift the motor out of the base.

b. Disassembly (See Fig. 8) - Loosen the two setscrews which hold the motor pulley in place and remove the pulley. Loosen the two setscrews which hold the governor in place and remove the governor and brushes. Remove the two tie bolt nuts (12) and lockwashers (19) and the staple (21). Separate the rear case assembly (2) from the commutator end housing (13). Code the motor brush holder (24) and leads and mark the brush holder and fields for alignment.

> NOTE: The preceeding coding and marking instructions will prevent a crossover of leads and reversal of the brush holder which would cause the motor to run backwards.

Remove the nuts (12) which hold the brush holder assembly (24) in place and lift off the holder assembly. Remove the armature assembly (7) and the washers (4, 5, 6, 8, 9 & 10). Disconnect the pigtails from the brushes (23) and springs (22). If it is necessary to remove the field assembly (3), lift off the brush plate spacers (11) and remove the tie bolts (1). If it is necessary to remove the motor commutator end bearing (16), remove the two rivets (14), the bearing retainer (15) and oil wick (17). If it is necessary to remove the governor brush holders (20), loosen the two setscrews (18) and push out the holders.

c. Repair & Reassembly - Check the commutator for eccentricity, if it is out of round, turn it in a lathe and then undercut it to a depth of .015" - .020". Be careful not to leave any thin sections of mica along the edges of the segments. Check the windings electrically with a "growler" or measure the resistance across diametrically opposite segments while revolving the armature. The resistance should be constant within 2 ohms and have a value of 13-15 ohms. If the armature is damaged, replace it. Resistance measurements are not of much value in testing the field coils except for the purpose of checking continuity. If the field coils overheat or the insulation is charred, replace the complete field assembly. Replace the motor brushes if they are worn down to a length of less than 1/4". If the commutator end bearing (16) is worn so that the armature shaft is loose, replace the bearing and oil wick. If the rear bearing is worn, replace the complete rear case assembly (2). Clean all parts with carbon tetrachloride before reassembling and soak the oil wicks with Amproil. Before installing the brushes, check to be sure that they slide freely in the holders. Tap the edges of the bearing shells after assembly to be sure that the self centering bearings are properly aligned and that the armature revolves freely.

Clean the governor contacts with a magneto file, if they are badly burned, send the governor to an Authorized Service Station for replacement with a rebuilt unit. Sand the governor sliprings with 5/0 sandpaper. NEVER USE EMORY PAPER.

When installing the motor in the projector, make sure that the fibre washers are placed between the motor and the projector casting and that the grommets are not crushed.

When installing the governor, push it onto the shaft as far as possible, then back it off 1/32" before tightening the setscrews.

Use a tachometer or stroboscope disc to check the speed of the projector. Tighten the setscrew (28 Fig. 6) to speed up the motor. Loosen the setscrew to slow down the motor.

6. Mechanism

a. Removal - Take out the three cover screws (1 Fig. 1) and lift off the front cover assembly (17 Fig. 1). Remove the two cover screws which hold the lamp house cover (2 Fig. 1) in place and remove the cover. Take out the projection lamp. Remove the two screws and lift out the heat shields. Run the drive belt off over the front edge of the drive pulley assembly (2 Fig. 4), loosen the setscrew in the pulley hub and remove the pulley. Take out the two screws (4 Fig. 4) and remove the shuttle shield (3 Fig. 4). Take out the two screws (6 Fig. 4) and remove the vertical camshaft bearing assembly (5 Fig. 4). Take out the shuttle oil pad (11 Fig. 4) and remove the two hex. nuts and lockwashers located in the shuttle compartment. Take out the #10-24 round head screw located in the left rear corner of the lamphouse.

Take off the shutter adjusting knob (1 Fig. 3), take out the four screws (3 Fig. 3) which hold the rear cover (2 Fig. 3) in place and lift off the cover. Remove the two hex. nuts and lockwashers which hold the mechanism to the base.

Remove the takeup belt and take out the sound head mounting stud (14 Fig. 3). Lift the mechanism off the base.

b. Disassembly

(1) Projection Optics (See Fig. 2) - Push the condensing lens spacing spring toward the reflector and remove the front condensing lens, then remove the spring. Take out the rear condensing lens. Push the reflector toward the retaining spring and lift the reflector out of the holder. Do not remove the condensing lens holder from the front cover unless it is damaged; it is prealigned and will require realignment if removed.

Unscrew the projection lens retaining rings and remove the lens elements.

(2) Sprocket Shoe Assemblies and Lens Holder Assem. - Take out the binder head screws which hold the film strippers

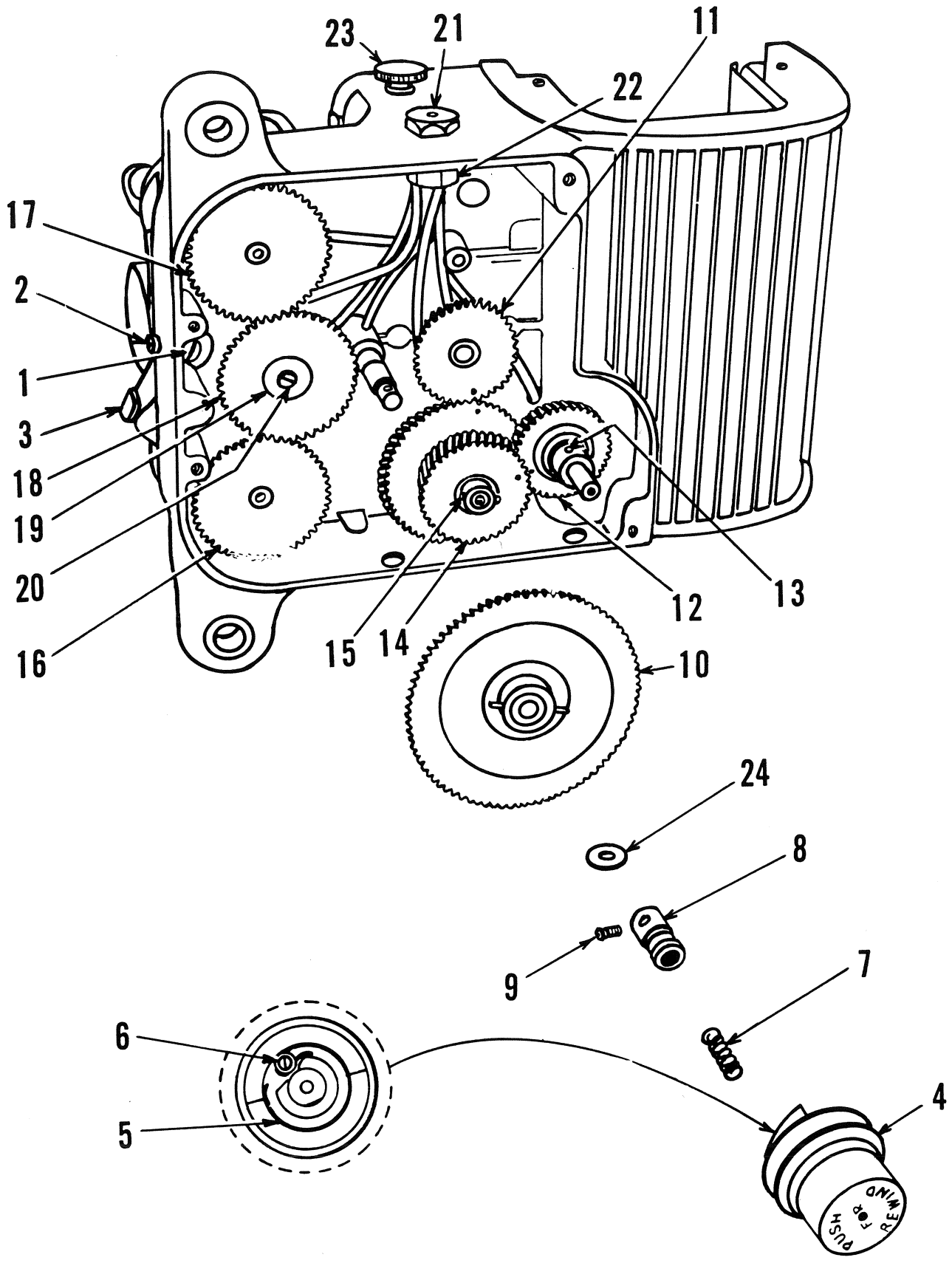


Figure 9 - MECHANISM (Exploded view)

to the sprocket shoes and remove the strippers. Take out the two fillister head screws located between the stripper retaining screws and the sprocket shoe guide rollers. Take out the four screws located between the lens holder and the sprocket shoes and remove the lensholder gibs, the lensholder, the gate lever, and the gate lever shoe. Push back on the feed sprocket shoe follower and remove the feed sprocket shoe assembly. Push back on the takeup sprocket shoe follower and remove the takeup sprocket shoe assembly.

Remove the two screws which hold each of the sprocket shoe covers (19 & 24 Fig. 1) in place and remove the covers. Remove the sprocket shoe guide rollers and follower roller assemblies.

Remove the pressure shoe assembly from the lens holder, then take out the two screws which hold the pressure shoe adjusting plate to the mounting plate and separate the parts. Remove the two pressure shoe retaining screws and take off the pressure shoe sub-assembly and the upper and lower springs.

Remove the binder head screws which hold the pressure shoe retaining springs to the lens holder and remove the springs. Take out the screw and washer which hold the lens tension spring assembly in place and remove the spring assembly.

(3) Sprocket Assemblies & Associated Parts - Take out the setscrew in the feed sprocket assembly (17 Fig. 4) and remove the sprocket. Remove the setscrew from the film sprocket collar and take off the collar and spacing washers.

Remove the takeup sprocket screw, neoprene washer and takeup sprocket assembly (16 Fig. 4). Remove the setscrew from the takeup sprocket pulley and remove the pulley and spacing washers.

(4) Shuttle Assembly and Interrupter Shutter Assembly (See Fig. 4) - Remove the front cover, drive pulley, shuttle shield and vertical camshaft bearing as per par. 6-a. Remove the shutter retaining nut (14) and the shutter assembly (12). Remove the interrupter shutter shaft washer and spacing washers.

Remove the vertical cam nut (8) and vertical cam shoulder washer (9). Remove the lateral cam nut (10) and washer. Rotate the mechanism and remove the shuttle assembly (7).

WARNING! Do not wedge the claw in the slot in the aperture plate - the claw is very hard and will break instead of bending.

Pull the lateral cam assembly off of the cam shaft and remove the lateral cam spacer. Do not attempt to remove the vertical cam - it is not a detachable service part.

(5) Rewind Clutch Assembly and Large Intermediate Gear Assembly (See Fig. 9) - Remove the rear cover as per par. 6-a and lift the rewind belt off of the rewind clutch.

Insert the blade of a small screwdriver in the slot in the rewind clutch (4) and lift the end of the rewind clutch snap ring at the same time pulling the clutch away from the mechanism. Remove the rewind clutch release spring (7).

Remove the large intermediate gear collar screw (9) and pull off the large intermediate gear collar (8). Pull off the large intermediate gear assembly (10).

(6) Sprocket Gear Assemblies and Small Intermediate Gear Assemblies (See Fig. 9). - Pull out the feed sprocket gear assembly (17) and takeup sprocket gear assembly (16). Remove the screw (20) and washer (19) from the end of the small intermediate sprocket gear assembly (18) and remove the gear and spacing washer.

(7) Camshafts and Shutter Gear (See Fig. 9) - Rotate the gear train until the timing marks on the Camshaft gears and shutter gear are aligned - the large end of the tapered pins (13 & 15) which hold the camshaft gears (12 & 14) will now be as shown. Rotate the vertical camshaft gear (14) 1/2 turn and drive out the tapered pin (15). Push the camshaft out of the bearing and remove the gear. Pull out the shutter gear assembly (11). Support the hub of the lateral camshaft gear assembly on a " V" block and drive out the tapered pin (13). Remove the gear and the shaft.

(8) Aperture Plate Assembly and Framing Plate Assembly (See Fig. 4) - Take out the five screws which hold the aperture plate to the mechanism sub-assem. and remove the aperture plate assem. Remove the cotter key from the end of the framing knob and unscrew the framing knob. Lift out the framing plate.

(9) Bushings - Remove the bushings by pressing them out with an arbor press. Always support the bearing boss when removing or inserting bushings.

c. Repair & Reassembly

(1) Projection Optics - Place a machinist's square on the bottom edge of the front cover and check to be sure that the condensing lens holder is square with the cover. If it is not square, remove the heat shield and loosen the two condensing lens holder retaining screws - position the holder properly and tighten the screws. Place a flat steel bar on the inner face of the front cover and use the square to determine that the condensing lens holder and reflector holder are square in that plane. If they are bent, straighten them. Clean the condensing lenses and reflector and install them as indicated in Fig. 2. Be sure that the rear condensing lens is properly seated in the holder and is not tipped up on the retaining detent.

Clean all surfaces of the projection lens elements with lens tissue or lens cleaning cloth dampened with lens cleaner. Reassemble as per Fig. 2. Be sure that the elements are properly seated in the barrel before tightening the retaining rings. If the optical black is chipped off of the inside of the lens barrel, refinish it and allow it to dry completely before installing the lens elements.

(2) Framing Plate Assembly and Aperture Plate Assembly - Wash the framing plate in carbon tetrachloride and wash the channel in which it slides. Check for nicks or burrs in the aperture piercing and replace the plate if any are found (due to the great magnification of the aperture in projection, attempts to remove burrs are complicated and usually unsuccessful). Install the framing plate, framing plate spring, framing plate knob and cotter key. Run the plate up and down with the framing knob to be sure that it slides freely in the channel. If the plate sticks, check for burrs on the edge of the plate and grit in the channel.

Check the aperture plate for wear of the film supporting rails adjacent to the claw slot. If the rails are worn down to within .005" of the relief, replace the plate assembly. Check the side tension spring for grooves at the film line. If the spring is grooved, replace it. Make sure that the edge of the side tension spring is either at a right angle to the film plane or inclined toward the optical axis at the outer edges. If the side tension springs are inclined outward, the picture may go in and out of focus. Install the aperture plate. If an aperture centering tool is not available, use calendar film or a loop of title film to align the aperture (by centering the projected image within the aperture) before tightening the retaining screws.

(3) Bushings - If the sprocket shaft bushings are worn so that the clearance between shaft and bushing exceeds .004", replace the bushings. If the clearance between the shutter shaft and bushing exceeds .004" replace the bushing. If the clearance between the camshafts and bushings exceeds .002", replace the bushings. Use an arbor press to insert the bushings. Support the bearing boss while pressing in the bushings. When installing camshaft bushings use an arbor long enough to guide the two bushings and the spacer. Burnish the bushings to size after installing. In the case of the camshaft bushings, fit them rather snugly to the shafts and run in the shafts before completing assembly.

Remove the oil well cap (21 Fig. 9) and oil well strainer, then squirt oil thru each tube and make sure that it flows out thru each bearing and onto the large and small intermediate gear studs. If oil does not flow into the bearings check for plugged tubes. Either replace the oil well pad or clean the old one with carbon tetrachloride. Hold the oil well (22 Fig. 9) with a wrench while tightening the cap in order to avoid damaging the oil tubes.

(4) Sprocket Gear Assemblies and Small Intermediate Sprocket

Gear Assembly - Wash all gears with a grease solvent and check for damaged teeth or excessive shaft wear. Replace any damaged assembly. Place a spacer washer over the feed sprocket gear shaft, oil the shaft and insert the shaft in the bearing. Install another washer and the film sprocket collar. Push the gear and collar together to remove end play and tighten the setscrew on the flat on the shaft.

Install the takeup sprocket gear assembly and takeup sprocket pulley in the same manner.

Place a spacing washer on the small intermediate sprocket gear stud, oil the stud, and place the gear on the stud. If the face of the gear hub is more than .005" below the end of the stud, remove the gear and add spacing washers to move the gear outward to this position. Install the retaining screw and washer. Rotate the gear train and check for binding (usually caused by dirt or chips not removed in cleaning operation).

(5) Shutter Gear Assembly and Shutter - Wash the shutter gear assembly in grease solvent and check for damaged teeth or excessive shaft wear. Replace a worn or damaged part. Oil the shaft and insert it into the bushing. Install the shutter shaft washer and enough spacing washers to reduce the endplay to .003" - .005". Install the shutter assembly and retaining nut.

NOTE: Should it be necessary to change the shutter, see parts list for correct part.

(6) Camshafts - Wash the camshafts and gears in grease solvent and check for damaged gears or worn shafts. Check the lateral cam assembly for flat spots. Replace any damaged parts. Check the vertical cam for flat spots at the points having the shortest radii of curvature. Replace if worn. See parts list for correct part.

Place a .010" spacing washer on the vertical camshaft and insert the shaft in the bearing. Measure the distance from the face of the cam to the face of the mechanism (finished surface upon which front cover bears). Use spacing washers as required to make the distance from the cam to the face of the mechanism .533" ± .002". Place a .010" spacing washer on the opposite end of the shaft. Turn the cam so that it faces the lamphouse and install the gear with the larger hole for the tapered pin as indicated in Fig. 9. Slip the tapered pin in place and check for endplay. Use spacing washers as required to reduce the endplay to .001" - .003". When the correct combination of washers has been selected, remove the gear and the washers and place them together for future installation.

Place a .010" spacing washer on the lateral camshaft, oil the shaft and insert in the bearing. Install the lateral cam spacer and the lateral cam assembly. Measure the distance

from the face of the lateral cam to the face of the mechanism. Use spacing washers as required to locate the cam within .001" of the same distance as the vertical cam is located from the face of the mechanism. Rotate the lateral cam so that it faces the vertical cam, then install the lateral cam gear with the larger hole for the tapered pin as indicated in Fig. 9. Insert the tapered pin and check for endplay in the shaft. Add spacing washers as required in order to reduce the endplay to .001" - .003". When the correct combination of washers has been selected, support the gear hub on a "V" block and drive home the pin.

Position the vertical camshaft so that about 1/16" of shaft extends thru the bushing and the cam faces the lateral cam. Turn the shutter gear so that the center of a blade is approximately over the center of the aperture. Rotate the lateral camshaft so that the cam faces the vertical cam. Install the preselected combination of spacing washers on the vertical camshaft. Slip the vertical camshaft gear into position making sure that the timing marks on the gear match the timing marks on the shutter gear and lateral cam gear. Push the vertical camshaft thru the bore in the vertical cam gear and insert the tapered pin. Drive the pin home.

Check the timing of the projector. If it has been properly assembled, it will comply with the following requirements.

(a) the lobes of the cams face each other.

(b) lines drawn thru the centers of the cam pins and the centers of their respective shafts will be parallel.

(c) a line bisecting the shutter blades will be parallel to the lines thru the camshafts and cam pins.

(7) Large Intermediate Sprocket Gear Assembly and Rewind Clutch Assembly - Clean the parts with grease solvent. Check the gear for damaged teeth and scored bore. Replace if worn or damaged. Place a spacing washer on the large intermediate gear stud and oil the stud. Install the gear, collar and screw. Check for endplay - if endplay exceeds .005" add spacing washers between the gear and the boss.

Check the rewind clutch assembly for damaged clutch dogs or release spring. Check pulley groove for wear.

Check the position of the end of the release spring (See 5 Fig. 9) with respect to the groove in the clutch dog. The spring should be approximately 1/8" ahead of the bottom of the groove. If the rewind clutch releases during the rewinding process, decrease the distance between the release spring and the clutch dog by loosening the spring retaining screw (6 Fig. 9) and retarding the spring. If the rewind clutch does not release at the end of the rewinding process, increase the distance between the spring and the clutch dog.

Place three drops of oil in the bore in the clutch, then in-

sert the coil spring in the end of the large intermediate gear collar and push the clutch over the collar.

(8) Sprocket Shoes and Lens Mount - Clean all metal parts with carbon tetrachloride. Do not clean plastic parts with carbon tetrachloride. They may develope a grey haze which is difficult to remove. Inspect the sprocket guide rollers for wear. Replace any worn rollers - if the follower rollers are worn, replace the follower roller assembly. Wind up the sprocket follower roller springs 1/2 turn when installing. Assemble both sprocket shoes with the exception of the film stripper.

Install the takeup sprocket on the projector. Install the lower lens holder gib and screws but do not tighten the screws.

Clean and inspect the pressure shoe parts - if the pressure shoe rails are worn down at any point to within .010" of the relief, replace the pressure shoe sub-assembly. Replace weak or broken springs. Assemble the pressure shoe assembly with the weaker spring on the upper stud. Apply a light film of grease to the ways on the lens holder.

Place the gate lever shoe in the slot in the lens holder. Mesh the stud on the gate lever in the hole in the shoe. Place the lens holder on the mechanism with the lower way in the channel formed by the lower gib and the takeup sprocket shoe. Mesh the rear stud on the gate lever in the hole in the gate lever eccentric pivot and press the lens holder assembly against the mechanism.

Install the feed sprocket shoe assembly and tighten all gib retaining screws. Loosen the pressure shoe retaining screws and center the pressure shoe in the channel in the aperture plate, then tighten the screws.

(9) Sprockets - Clean the sprockets with carbon tetrachloride and check for damaged or worn teeth and worn flanges. Replace worn sprockets.

Install the feed sprocket and line up the flanges with the flanges on the guide roller, then tighten the setscrews on the flat on the shaft. Install the film stripper and make sure that it does not rub on the sprocket.

Install a spacing washer on the takeup sprocket shaft. Temporarily install the takeup sprocket, grommet, and retaining screw and check the sprocket alignment with the guide rollers. Add spacing washers as required, then tighten the takeup sprocket screw. Check to be sure that the sprocket grommet is functioning, then install the film stripper.

(10) Shuttle Assembly - Clean the shuttle, clamp block and pivot with carbon tetrachloride. Inspect the shuttle gibs for wear. If they are not worn more than .005", they can be honed flat. Inspect the claw teeth for wear. If they are not cut

more than .010" - .012", they can be honed. Replace shuttle assembly if worn beyond limits indicated.

Use a #20 Medium India Stone to hone gibs and claw. The claw teeth are in effect three gear teeth, therefore, they must all be honed an equal amount. After the shuttle gibs have been honed to a smooth surface, support one gib on an anvil and peen the opposite gib at the points where it is formed out from the main shuttle frame - check to make sure that the gibs are parallel.

Install the shuttle on the lateral cam with the claw pointing toward the lamphouse. Rotate the mechanism and check the fit. The gibs should fit snugly on the cam but should not bind. After the lateral gibs have been fitted, install the shuttle in the proper position and fit the vertical gibs. Temporarily install the shuttle retaining nuts and washers, vertical camshaft bearing, drive pulley, and belt. Run the mechanism and check for excessive noise. If excessive noise is encountered, apply pressure to the rear lateral gib. If the noise disappears, the shuttle is not properly fitted to the lateral cam. Press downward on the shuttle, if the noise disappears, the shuttle is not properly fitted to the vertical cam. When the shuttle is adjusted properly the mechanism should be quiet and should also be free enough so that the shutter control knob will continue to rotate for 40-50 degrees after it has been given a quick snap.

Thread the projector with a film known to be in good condition and run the projector for about five minutes. Check for the following conditions:

(a) Film Slap

(b) Strike (vibration of pressure shoe)

(c) Double Image

(d) Trailer Ghost

(e) Picture Jump

Stop the projector and remove the shuttle and make the following adjustments if required.

(a) Film Slap - hone the bottom surface of the center tooth of the claw.

(b) Strike - check for spots on the edges of the claw (except bottom of center and lower teeth) where claw has contacted film. Hone claw at any contact points except as noted.

(c) Double Image - hone the bottom surface of the top tooth of the claw.

(d) Trailer Ghost - loosen the two screws that hold the

interrupter shutter in position and advance or retard shutter as required.

(e) Picture Jump - hone the bottom surface of the lower tooth of the claw. Also check gate pressures as per par. B, and centering of pressure shoe.

After all adjustments are made, place a thin coat of "Lubriplate" on the cams, install the oil pad and install the camshaft bearing and shuttle shield. Saturate the camshaft bearing wick with Amproil.

7. Control Panel and Tilt Assembly (See Fig. 6)

a. Removal & Disassembly - Remove the tone and volume control knobs and take out the four screws that hold the control panel assembly (8) to the projector base. Press the control panel downward and then tilt it out at the top and lift it away from the projector base. It is seldom necessary to disconnect the wiring as components can be removed and replaced without disconnecting more than two or three leads.

Invert the projector and remove the three nuts and washers which hold it to the case base. Lift off the base. Rotate the tilt knob (25) until the tilt screw (26) has been unscrewed from the tilt nut (2). Remove the locknuts from the tilt pivot screws and remove the screws, sleeves and spring washers. Lift out the tilt frame. Remove the tilt knob (25) and tilt screw bushing (3).

b. Repair & Reassembly (See Fig. 6) - Check the motor switch (13) and lamp switch (14). Clean the contact and winding of the rheostat (10). Check the connections to the fuse holder (11).

Check the threads on the tilt screw and in the tilt nut. Damaged threads can frequently be repaired by chasing with the proper die or tap. Check the tilt frame for bends and straighten if bent. When installing the tilt pivot screws, be sure that they are tight enough to lock the spacers in position.

8. Idler Assembly

a. Removal - Take off the hex. nut which holds the idler and belt guide in place. Remove the guide and the idler and spring.

b. Repair & Reassembly - Wash the idler and idler pivot with carbon tetrachloride. Soak the idler in Amproil to saturate the wick located inside of the roller. Wipe the roller, then check to be sure that the idler slides freely on the stud. Install the spring, idler assembly, and belt guard. Place the belt guide in a horizontal position and install the retaining nut. Check the guide for alignment with the motor pulley.

9. Speaker Assembly

a. Removal - Unsolder the leads to the speaker receptacle. Remove the four nuts, lockwashers and washers which hold the

speaker in place. Lift out the speaker and the grille.

b. Repair - Check the speaker for cone damage and rattles at high volume - check the grille to be sure that it is not bent in against the speaker. Check for loose case hardware and tighten any loose parts.

B. FINAL ADJUSTMENTS

1. Photocell Shield Assembly (See Fig. 5)

Place the sound optical system (1) in the holder and install the exciter lamp. Thread the projector, turn on the amplifier and position the optical system to obtain a narrow beam of light on the film and at a right angle to the direction of film travel. Remove the film. Tip the projector over backwards so that it rests on the rear of the case and the back of the lamphouse. Insert the photocell shield assembly (3) and rotate it so that the beam from the sound optical system passes thru the hole in the shield without touching the edges of the hole. Tighten the two setscrews (13 Fig. 3).

2. Lower Guideway Assembly

The lateral position of the lower guideway assembly (15 Fig. 5) determines the alignment of the sound track with the beam from the sound optical system. The following procedure produces an approximate adjustment permitting focusing of the sound optical system as described in sub. par. 3. After focusing the sound optical system, repeat the procedure to obtain exact alignment.

Thread the projector with a loop of " buzz track" film. Connect the speaker and turn on the amplifier. Loosen the guideway locking setscrew (11 Fig. 3) and rotate the adjusting screw (12 Fig. 3) to position the film over the scanning beam. Two types of " buzz track" are in general usage - one type produces two tones of equal volume when properly aligned; the other type produces a low frequency tone when misaligned in one direction, a higher frequency tone when misaligned in the opposite direction and only film noise when properly aligned.

If " buzz track" film is not available, use a standard sound film and adjust for maximum signal and minimum noise. If such film is positioned too far to the left, a 24 cycle buzz will be produced by the frame lines. If it is positioned too far to the right, noise is produced by scratches on the edge of the film adjacent to the sound track.

3. Sound Optical System (See Fig. 5)

Thread the projector with a loop of constant frequency film (5000 or 7000 C.P.S.). Connect the speaker and turn on the amplifier and projector. Connect an output meter or oscillascope across the speaker terminals. Loosen the sound optical clamping screw (2) and insert the bit of a screwdriver or a small wedge in the slot in the sound optical clamps so that the optical system can be moved easily. Start the projector and raise or lower the optical

system and rotate it to obtain maximum output and best possible wave form. Remove the wedge and tighten the clamping screw.

4. Screen Illumination (See Fig. 6)

   Thread the projector with calendar film or other film on which the framing is correct. Focus the picture and frame it correctly. Remove the film and check the screen illumination near the edges of the projected field. Adjust the lamp adjusting screw (20) to balance the light at the edges of the field.

5. Gate Pressure (See Fig. 9)

   Thread and start the projector. Loosen the fillister head screw (2). Rotate the gate lever eccentric pivot (1) while holding down the gate lever (3). Move the lensmount forward as far as it will go, then rotate the eccentric to move the lensmount toward the aperture. Set the eccentric to apply the minimum amount of gate pressure required to obtain a steady picture. When the pressure is adjusted properly, it should be possible to grasp the film by the edges at a point 1/2" - 3/4" above the aperture and push it downward thru the aperture without any tendency of the film to buckle.

SECTION IV

Assembly Parts List

CONTRACT UNIT ASSEMBLY STYLIST PROJECTOR

MODEL 472

This parts list contains a listing of all procurable parts of the Ampro Stylist Projector.

Parts are listed in the reverse order of assembly. Part names are indented to show the relationship between assembly, sub-assembly and detail part. For example; if an assembly is listed and the following items are indented one column more than the assembly, then the parts are components of the assembly. Attaching parts (screws, nuts, washers etc.) are indented the same number of columns as the parts which they serve to attach.

Item No.	Fig. No.	Part No.	Quantity Required	NOMENCLATURE 1 2 3 4 5 6 7 8 9
		1628	1	Brush, Aperture
		1635	1	Reel, Film 400'
		14116	1	Nut, Wing #10-32
		16635	1	Lens, Proj. 2" E.F.
		16826	1	Book, Instruction
		18351	1	Fuse, 1½ Amp. (Pkg. of 5, #17579)
		19833	1	Oil, Proj., 1 oz. in bottle
		2020	1 oz.	Oil, Proj. in bulk
		20312	1	Cable Assembly, Speaker
		18629	1	Plug, Speaker Cable (2 prong male)
		18649	1	Plug, Speaker Cable (phone type)
		18457	40'	Cable, Speaker, 40' lg.
		20314	1	Proj. in Case Assembly
		20313	1	Speaker & Case Assem., Stylist
		18628	1	Grille, Speaker
		18599	1	Speaker, 8" (R.C.A.)
		1679	4	Washer, Lock #8 Ext.
		1453	4	Nut, Hex. #8-32
		18630	1	Receptacle, Speaker
		14982	2	Screw, Wood, Rd. Hd. #6x3/8 Stl. MP
		18567	1	Clamp, Cable
		14525	1	Screw, Sheet Metal Slotted Hex. Hd. #8x1/4 Type " Z"
		16850	1	Case, Proj. Carrying
		20386	2	Leg. Assem., Proj. Case
		18672	1	Bumper, Proj. Case Leg
		20429	1	Leg. Assem., Proj. Case
		18672	1	Bumper, Proj. Case Leg
		14115	1	Screw, Reel Retaining
		14114	3	Washer, Plain
		14767	3	Nut, Hex. #10-24
		1687	3	Washer, lock #10 Ext.
		16931	1	Sheet, Instruction
2	1	11602-2	1	Cover, Lamphouse

Item No.	Fig. No.	Part No.	Quantity Required	NOMENCLATURE 1 2 3 4 5 6 7 8 9
1	1	16720	2	Screw, Cover
		1595-115	1	Lamp, Proj. 750 Watt
1	6	20311	1	Tilt Assembly, Proj.
		12767	1	Pin, Tilt Nut
2	6	12766	1	Nut, Tilt Screw
		13753	1	Bracket, Tilt Anchor
		14936	2	Rivet, Tub. Truss Hd. 1/8x1/4
		12798	3	Stud, Tilt Assem. Mtg.
		13754	1	Support, Tilt Anchor Bracket
		15028	1	Spring, Tilt Takeup
		14988	2	Rivet, Solid, Truss Hd. 1/8x7/16
		13755	1	Support, Tilt Pivot
3	6	12766	2	Sleeve, Tilt Pivot
		13111	2	Washer, Spring
		14767	2	Nut, Hex #10-24
		14944	2	Screw, Bd. Hd. #10-24 x 5/8"
		18670	1	Button, Plug
		17830-1	2	Knob, Control
3	1	17830	2	Knob, Control (Supplied with #8-32x5/32 setscrew)
		17572	1	Cell, Photo Electric
		12540	3	Spacer, Exciter Lamp Socket
		14610	3	Screw, Fil. Hd. #4-36 x 3/8
		18460	1	Lamp, Exciter, 4 Volt, 3/4 Amp.
4	6	20334	1	Amplifier Unit Assembly
		18495	1	Tube, 6BH6
		18497	1	Tube, 12AX7
		18498	3	Tube, 50C5
		18657	1	Shield, Tube Cover
		20335	1	Cover Assem., Amplifier
		13761	1	Plate, Amplifier Bottom
		18529	4	Grommet, Rubber
		11538	4	Washer, Plain, Fibre
		12785	4	Spacer, Bottom Plate
		1752	8	Washer, Plain
		14942	4	Rivet, Tub. Oval Hd. 1/8x1/2 Stl. N.P.
		13760	1	Cover, Amplifier
		1486	4	Screw, Sheet Metal Bd. Hd. #6x1/4
8	3	20336	1	Cable Assem., P.E.C.
9	3	12734	1	Insulator, P.E.C. Socket
10	3	18555	1	Clamp, Cable
		17567	1	Socket, P.E.C.
		17597	25"	Cable, P.E.C. 25" Long
		18656	1	Clamp, Cable
		14519	1	Screw, Rd. Hd. #6-32x1/4 Stl. N.P.
		18592	1	Jack, Phono. Mic.
		14669	1	Nut, Hex 3/8-32
		18553	1	Washer, Plain, Fibre
		18554	1	Washer, Extruded Fibre
		18586	1	Capacitor, .03 mfd. 150 V, Paper
		18642	1	Transformer, Input
		1487	2	Screw, Sheet Metal Bd. Hd. #2x1/4

Item No.	Fig. No.	Part No.	Quantity Required	NOMENCLATURE 1 2 3 4 5 6 7 8 9
		14967	2	Nut, Speed #2-56 Flat Type
		18633	1	Control, Volume
		14854	1	Nut, Hex 3/8-32 Washer Type
		18634	1	Control, Tone
		14854	1	Nut, Hex 3/8-32 Washer Type
		18640	1	Choke, Filter
		14519	2	Screw, Rd. Hd. #6-32x1/4" Stl. N.P.
		14968	2	Nut, Speed #6-32 " U" Type
		18643	1	Transformer, Output
		14519	2	Screw, Rd. Hd. #6-32x1/4" Stl. N.P.
		14968	2	Nut, Speed #6-32 " U" Type
		18643	1	Transformer, Output
		18597	1	Jack, Speaker
		18553	1	Washer, Plain, Fibre
		18554	1	Washer, Extruded Fibre
		14669	1	Nut, Hex 3/8-32
		20337	1	Platform Assembly, Tube
		18641	1	Coil, Oscillator
		1452	1	Nut, Hex #6-32
		20338	1	Board Assem., Resistor
		18464	3	Resistor, 5.6 megohms 1/2 watt carbon
		18465	2	Resistor, 2.2 megohms 1/2 watt carbon
		17553	1	Resistor, 10K ohms, 1/2 watt carbon
		18467	2	Resistor, 560K ohms, 1/2 watt carbon
		18468	5	Resistor, 270K ohms, 1/2 watt carbon
		18471	3	Resistor, 100K ohms, 1/2 watt carbon
		18472	1	Resistor, 2200 ohms, 1/2 watt carbon
		18474	2	Resistor, 470K ohms, 1/2 watt carbon
		18476	2	Resistor, 270 ohms, 1/2 watt carbon
		18477	1	Resistor, 10 ohms, 1/2 watt carbon
		18483	2	Resistor, 1500 ohms, 1/2 watt carbon
		18582	2	Resistor, 2700 ohms, 1/2 watt carbon
		18583	1	Resistor, 22K ohms, 1/2 watt carbon
		18436	1	Resistor, 1.8 megohms, 1/2 watt carbon
		18484	2	Capacitor, .05 mfd. 150 V paper
		18485	2	Capacitor, .001 mfd. 400 V Ceramic
		18486	1	Capacitor, 25 mfd. 15 V Electrolytic
		18487	4	Capacitor, .01 mfd. 400 V Ceramic

Item No.	Fig. No.	Part No.	Quantity Required	NOMENCLATURE 1 2 3 4 5 6 7 8 9
		18489	2	Capacitor, .0005 mfd. 500 V Ceramic
		18490	1	Capacitor, 10 mfd. 125 V Electrolytic
		18580	3	Capacitor, .2 mfd. 150 V Paper
		18585	1	Capacitor, .1 mfd. 150 V Paper
		18586	1	Capacitor, .03 mfd. 150 V Paper
		18635	1	Board, Terminal
		1486	2	Screw, Sheet Metal Bd. Hd. #6x1/4 Stl. Blk. Ox.
		20339	1	Platform Sub-Assembly, Tube
		18493	1	Capacitor, .0001 mfd. 500 V Ceramic
		18653	1	Resistor, 2700 ohm, 1 watt carbon
		13748	2	Bracket, Terminal Board
		1475	2	Rivet, Tub. Truss Hd. .085x1/8
		18522	3	Socket, Tube 7-Pin
		18593	1	Lug, Solder, Shakeproof
		18524	3	Clamp, Tube
		1477	2	Rivet, Tub. Oval Hd. .085x3/32
		1475	1	Rivet, Tub. Truss Hd. .085x1/8
		14978	3	Eyelet, Brass .089 dia. x .156
		18655	1	Socket, Tube, 7-Pin Floating
		14971	2	Eyelet, Brass, .115 Dia. x .295 lg.
		18523	1	Socket, Tube, 9-Pin
		18526	1	Clamp, Tube
		1477	1	Rivet, Tub. Oval Hd. .085x3/32
		14978	1	Eyelet, Brass .089 Dia. x .156
		13759	1	Platform, Tube
		14729	3	Washer, Plain
		12540	3	Spacer
		14531	3	Screw, Sheet Metal Rd. Hd. #4x3/8
		14703	1	Washer, Lock #6 Internal
		1452	1	Nut, Hex #6-32
		20340	1	Chassis Assembly, Amplifier
		17593	3	Grommet, Rubber
		18580	1	Capacitor, .2 mfd. 150 V Paper
		18499	1	Rectifier, Dry Disc
		14865	1	Screw, Bd. Hd. #6-32x1-1/4" Stl. W.N.P.
		14703	1	Washer, Lock #6 Internal
		1452	1	Nut, Hex #6-32
		18491	2	Capacitor, 80 mfd. 150 V Electrolytic
		18494	2	Plate, Capacitor Mtg.
		14759	4	Rivet, Tub. Truss Hd. 1/8x5/32
		13816	1	Shield, Input Transformer
		18651	1	Resistor, 20 ohms, 30 watt, wire wound
		18652	1	Resistor, 350 ohm, 30 watt, wire wound
		1486	4	Screw, Sheet Metal Bd. Hd. #6x1/4

Item No.	Fig. No.	Part No.	Quantity Required	NOMENCLATURE 1 2 3 4 5 6 7 8 9
		18590	1	Plug, Male, 4 Terminal
		18593	1	Lug, Solder, Shakeproof
		1474	2	Rivet, Tub. Oval Hd. 1/8 x 1/8
		1767	2	Eyelet, Brass
		1474	8	Rivet, Tub. Oval Hd. 1/8 x 1/8
		13763	1	Chassis, Amplifier
		14824	4	Screw, Bd. Hd. #8-32x1/4
4	1	15020	1	Belt, Takeup
5	1	20323	1	Arm Assembly, Takeup Reel
		1288	1	Cap, Brake Shoe
		1512-A	1	Spring, Spindle Brake
		1294	1	Shoe, Brake
6	1	19646	1	Shifter Assembly, Belt
7	1	16852	1	Pulley, Takeup Loose
8	1	20377	1	Spindle Assembly, Takeup Reel
		13521	1	Finger, Reel Lock
		12538	1	Pin, Reel Lock Finger
		1624	1	Ball, Reel Lock Finger
		1515	1	Spring, Reel Lock
		1236	1	Washer, Plain
		16588-3	A.R.	Washer, Plain
		16588-5	A.R.	Washer, Plain
16	3	1233	1	Nut, Cap
		20324	1	Arm Sub-Assem., Takeup Reel
		16588-10	1	Washer, Plain
9	1	13742	1	Retainer, Takeup Belt
		14541	2	Washer, Lock #4 External
		14934	2	Screw, Sheet Metal Bd. Hd. #4x1/4
		1299	1	Bushing, Takeup Reel Arm
6	3	14987	1	Nut, Cap, 1/4-28
		1332	1	Washer, Reel Arm Stud
10	1	1331	1	Washer, Reel Arm Tension
11	1	12640	1	Stud, Reel Arm
4	3	15029	1	Belt, Rewind
5	3	13818	1	Support, Rewind Belt
12	1	20325	1	Arm Assem., Feed Reel
13	1	13927	1	Guard, Reel Belt
		14120	2	Screw, Bd. Hd. #4-36x1/8 Stl. Chr. Pl.
		1288	1	Cap, Brake Shoe
		15030	1	Spring, Spindle Brake
		1294	1	Shoe, Brake
14	1	20376	1	Spindle Assem., Feed Reel
		1552-A	1	Pin, Taper #5/0x1/2
		1335	2	Washer, Plain
		13521	1	Finger, Reel Lock
		12538	1	Pin, Reel Lock Finger
		1624	1	Ball, 5/32 dia. Steel
		1515	1	Spring, Reel Lock
		20326	1	Arm Sub-Assem., Feed Reel
		1243	2	Bushing, Oilite
7	3	14987	1	Nut, Cap 1/4-28
		1332	1	Washer, Reel Arm Stud

Item No.	Fig. No.	Part No.	Quantity Required	NOMENCLATURE 1 2 3 4 5 6 7 8 9
15	1	1331	1	Washer, Reel Arm Tension
16	1	12640	1	Stud, Reel Arm
		20322	1	Sound Assembly Unit
		16841	1	Cover, Exciter Lamp
		16720	2	Screw, Cover
1	5	16504	1	Optical System, Sound
2	5	14611	1	Screw, Phillips Fil. Hd. #6-32x1/2
3	5	20392-2	1	Shield Assembly P.E.C.
13	3	1401	2	Screw, Hdlss. Set #8-32x3/16
4	5	16865-1	1	Roller, Film Guide
5	5	12536	1	Roller, Takeup Belt Guide
6	5	12609	1	Stud, Guide Roller
5	5	12536	2	Roller Takeup Belt Guide
7	5	12610	2	Stud, Takeup Belt Guide Roller
8	5	11663-1	1	Flywheel, Sound Drum
9	5	16534-3	A.R.	Washer, Plain
		16534-5	A.R.	Washer, Plain
		16534-10	A.R.	Washer, Plain
10	5	16854	2	Bearing, Ball
11	5	20384	1	Shaft Assem., Sound Drum
12	5	14127	1	Screw, Phillips Truss Hd. #5-40x1/4 Stl. Light Statuary Bronze
13	5	19518	1	Guideway Assem., Upper Film
14	5	1295	2	Screw, Bd. Hd. #4-36x3/16
		12516	1	Stud, Guideway Aligning
		1445	1	Screw, Bd. Hd. #4-36x1/4
15	5	20399	1	Guideway Assem., Lower Film
		16509	1	Spring, Guideway Aligning
		1642	1	Washer, Burr
12	3	14528	1	Screw, Fil. Hd. #4-36x5/16
11	3	14979	1	Screw, Hdlss. Set #6-32x1/4 Socket
16	5	20397	1	Arm Assem., Pressure Roller
17	5	19504	1	Roller Assem., Pressure
18	5	12512	1	Knob, Pressure Roller
		16514	1	Washer, Plain
		20396	1	Arm Sub-Assem., Pressure Roller
19	5	16513	1	Spring, Pressure Roller Arm
20	5	12091	1	Pivot, Pressure Roller Arm
21	5	20391	1	Equalizer Assem., Film Tension
22	5	16856	1	Roller, Film Guide
		1309-15	1	Washer, Plain
23	5	1295	1	Screw, Bd. Hd. #4-36x3/16
		19455	1	Arm Assem. Film Tension Equalizer
24	5	16507	1	Spring, Film Tension Equalizer
25	5	12812	1	Pivot, Film Tension Equalizer
26	5	13523	1	Catch, Pressure Roller
27	5	1230	1	Screw, Special Fil. Hd.
28	5	19508	1	Roller Assem., Film
		16514	1	Washer, Plain
		16508	1	Spring, Film Roller Aligning
		1309-15	1	Washer, Plain
		1295	1	Screw, Bd. Hd. #4-36x3/16

Item No.	Fig. No.	Part No.	Quantity Required	NOMENCLATURE 1 2 3 4 5 6 7 8 9
		20349	1	Head Sub-Assem., Sound
		12510	1	Knob, Reel Arm Lock
		16511	1	Spring, Reel Arm Lock
		12509	1	Pin, Reel Arm Lock
14	3	12817	1	Stud, Sound Head Mtg.
		14976	A.R.	Washer, Shim
		14768	3	Washer, Lock #10 Int.
15	3	14510	3	Screw, Fil. Hd. #10-32x5/8
17	1	20333	1	Cover, Assem., Front
		1615-C	1	Lens, Front Condensing
1	4	1505	1	Spring, Condensing Lens Spacing
		1615-B	1	Lens, Rear Condensing
		1617	1	Reflector
		13806	1	Shield, Front Inner Heat
		12549	2	Spacer, Front Heat Shield
		1642	2	Washer, Burr
		1464	2	Screw, Sheet Metal Bd. Hd. #4x1/2
		19993	1	Holder Sub-Assem., Condensing Lens
		14604	2	Screw, Fil. Hd. #8-32x1/4
		16745	1	Button, Plug
		18625	1	Nameplate, Front Cover
		1479	2	Screw, Drive Rd. Hd. #0x3/16
1	1	16720	3	Cover, Screw
1	3	16808	1	Knob, Control (Shutter Adj.)
2	3	13750	1	Cover, Rear
3	3	14785	4	Screw, Bd. Hd. #6-32x1/4
2	4	12978	1	Pulley Assem., Drive
		1404	1	Screw, Hdlss. Set #10-32x3/16
3	4	13609	1	Shield, Shuttle
4	4	14519	2	Screw, Rd. Hd. #6-32x1/4
5	4	1986	1	Bearing Assem., Vertical Camshaft
		1769	1	Plug, Felt
6	4	1433	2	Screw, Rd. Hd. #6-32x1/2
7	4	19193	1	Shuttle Assembly
8	4	1212	1	Nut, Vertical Cam
9	4	1292	1	Washer, Vertical Cam Shoulder
		1677	1	Washer, Lateral Cam
11	4	16644	1	Pad, Shuttle Oil
		13805	1	Shield, Rear Inner Heat
		13803	1	Shield, Assem., Rear Heat
		1642	2	Washer, Plain
		1464	2	Screw, Sheet Metal Rd. Hd. #4x1/2
		13030	1	Stripper, Film
		1295	1	Screw, Bd. Hd. #4-36x3/16
18	1	20341	1	Shoe Assem., Feed Sprocket
19	1	16830	1	Cover, Feed Sprocket Shoe
		14990	2	Screw, Fil. Hd. #4-36x1/4
20	1	12616	4	Roller, Sprocket Shoe Guide
		19774	1	Follower Assem., Feed Sprocket
		1520	1	Spring, Feed Sprocket Follower
		20343	1	Shoe Sub-Assem., Feed Sprocket
		1405	2	Screw, Fil. Hd. #4-36x1/4

Item No.	Fig. No.	Part No.	Quantity Required	NOMENCLATURE 1 2 3 4 5 6 7 8 9
		1427	1	Screw, Fil. Hd. #4-36x1/2
21	1	20306	1	Shoe Assem., Pressure
		13746	1	Plate, Pressure Shoe Mtg.
		1230	2	Screw, Special Fil. Hd.
		13813	1	Plate, Pressure Shoe Adjusting
		14989	2	Screw, Bd. Hd. #2-56x5/64
		15025	1	Spring, Pressure Shoe Upper
		15026	1	Spring, Pressure Shoe Lower
		20372	1	Shoe Sub-Assem., Pressure
		1367	1	Spring, Proj. Lens Holder
		20305	1	Holder Assem., Proj. Lens
		13747	2	Spring, Film Pressure Shoe Retaining
		14710	2	Screw, Bd. Hd. #4-40x3/16 Stl. Chr. Pl.
		20379	1	Spring Assem., Proj. Lens Tension
		13198	1	Washer, Plain
		14709	1	Screw, Fil. Hd. #4-40x1/8 Stl. Chr. Pl.
		12548	1	Screw, Proj. Lens Lock
		11656-1	1	Holder, Proj. Lens
1	9	12791	1	Pivot, Gate Lever Eccentric
2	9	1409	1	Screw, Fil. Hd. #6-32x3/16
3	9	20364	1	Lever Assembly, Gate
		1366	1	Shoe, Gate Lever
22	1	13037	2	Gib, Lens Holder
		13030	1	Stripper, Film
		1295	1	Screw, Bd. Hd. #4-36x3/16
23	1	20342	1	Shoe Assem., Takeup Sprocket
24	1	16831	1	Cover, Takeup Sprocket Shoe
		14990	2	Screw, Fil. Hd. #4-36x1/4"
		12616	4	Roller, Sprocket Shoe Guide
		19771	1	Follower Assem., Takeup Sprocket
		1521	1	Spring, Takeup Sprocket Follower
		20344	1	Shoe Sub-Assem., Takeup Sprocket
		1405	2	Screw, Fil. Hd. #4-36x1/4
		1427	1	Screw, Fil. Hd. #4-36x1/2
15	4	20432	1	Plate Assembly, Aperture
		1357	1	Spring, Film Edge
		1228	1	Washer, Film Edge Spring
		14586	1	Screw, Fil. Hd. #2-56x1/8
		14621	5	Screw, Oval Hd. #4-63x3/16
4	9	20309	1	Clutch Assem., Rewind
5	9	15024	1	Spring, Rewind Clutch Release
		14533	1	Washer, Lock #2 Ext.
6	9	14873	1	Screw, Bd. Hd. #2-65x1/4
		14742	1	Washer, Plain
		1530	1	Ring, Rewind Clutch Snap
7	9	1558	1	Spring, Rewind Clutch Release
8	9	12786	1	Collar, Lge. Intermed. Sprocket Gear
9	9	1298	1	Screw, Lge. Intermed. Sprocket Gear
10	9	20328	1	Gear Assem., Lge. Intermed. Sprocket
12	4	19968	1	Shutter Assem., Interrupter (Thru serial #105470)
12	4	20443	1	Shutter Assem., Interrupter (After serial #105470)

Item No.	Fig. No.	Part No.	Quantity Required	NOMENCLATURE 1 2 3 4 5 6 7 8 9
		1337	1	Disc. Interrupter Shutter Drive
13	4	14567	2	Screw, Bd. Hd. #4-36x1/8"
		13963	1	Shutter, Interrupter (pt. of #19968 Assem.)
		13448	1	Shutter, Interrupter (pt. of #20443 Assem.)
		1363	1	Washer, Interrupter Shutter Shaft
		1651	1	Washer, Thrust
14	4	1209	1	Nut, Interrupter Shutter
11	9	19289	1	Shaft Assem., Interrupter Shutter
12	9	19279	1	Shaft Assem., Lateral Cam
		1313-10	2	Washer, Plain
13	9	1553	1	Pin, Taper #5/0 x 7/16"
		19978	1	Cam Assem., Lateral
		12940	1	Spacer, Lateral Cam
10	4	1290	1	Nut, Lateral Cam
		1313-3	A.R.	Washer, Plain
		1313-4	A.R.	Washer, Plain
		1313-10	A.R.	Washer, Plain
14	9	19280	1	Shaft Assem., Vertical Cam (Thru serial #105470)
14	9	20496	1	Shaft Assem., Vertical Cam (After serial #105470)
15	9	1553	1	Pin, Taper #5/0 x 7/16"
		1313-3	A.R.	Washer, Plain
		1313-4	A.R.	Washer, Plain
		1313-10	A.R.	Washer, Plain
ORDER PTS. REQ'D.			1	Base & Mechanism Assem., Projector
5	6	18627	1	Fan
6	6	20327	1	Cover Assem., Tube
7	6	14991	4	Screw, Phillips Bd. Hd. #6-32x1/4
8	6	20318	1	Panel Assembly, Control
9	6	13772	1	Shield, Rheostat Heat
10	6	18632	1	Rheostat
		14998	2	Washer, Plain
		16535	1	Washer, Plain
		14997	1	Nut, Hex 3/8-32
		18452	1	Terminal, Electrical
		18663	1	Terminal, Electrical
		17579	1	Fuse, $1\frac{1}{2}$ Amp.
11	6	18556	1	Post, Fuse Extractor
12	6	20319	1	Switch Assembly
13	6	16932	1	Switch, Motor
14	6	16933	1	Switch, Lamp
		16535	1	Washer, Plain
		14997	1	Nut, Hex. 3/8-32
		18638	1	Panel, Control
		14991	4	Screw, Phillips Bd. Hd. #6-32x1/4"
		18646	1	Belt, Drive
15	6	20381	1	Cable Assembly, Amplifier
16	6	18594	1	Socket, Female Cable
17	6	19407	1	Cover, Assembly, Exciter Lamp Socket
18	6	20281	1	Socket Assembly, Exciter Lamp
19	6	17593	3	Grommet, Rubber

Item No.	Fig. No.	Part No.	Quantity Required	NOMENCLATURE 1 2 3 4 5 6 7 8 9
		18671	1	Connector, Wire
		20380	1	Cord Assem. Power
		13146	1	Clamp Cable
		14863	1	Screw, Bd. Hd. #6-32x3/8
		1452	1	Nut, Hex #6-32
		14703	1	Washer, Lock #6 Int.
		18661	1	Capacitor, Line Filter
		1452	1	Nut, Hex #6-32
		14703	1	Washer, Lock #6 Int.
		14863	1	Screw, Bd. Hd. #6-32x3/8
		20375	1	Socket Assembly, Proj. Lamp
		20291	1	Seat Assembly, Lamp Socket
		1642	2	Washer, Burr
		1445	2	Screw, Rd. Hd. #4-36x1/4
		20382	1	Lead Assem., Proj. Lamp
		18662	1	Terminal, Electrical
		20383	1	Lead Assem., Proj. Lamp
		18662	1	Terminal, Electrical
		18663	1	Terminal, Electrical
		1611	1	Socket, Proj. Lamp
		1534	4	Spring
		14905	4	Washer, Plain
		12755	4	Screw, Lamp Socket Assem. Mtg.
20	6	12754	1	Screw, Lamp Adjusting
		17631	21"	Tubing, Insulation #14 in Bulk
		18658	1	Resistor, Governor
		14863	2	Screw, Bd. Hd. #6-32x3/8
		14940	2	Nut, Speed #6-32 Type " U"
		20321	1	Idler Assembly
		15019	1	Spring, Tension Idler Arm
21	6	13862	1	Guide, Drive Belt
		14742	1	Washer, Plain
		14795	1	Nut, Self Locking #10-32 (Elastic Stop)
		12778	1	Stud, Idler
		18637	1	Capacitor, Governor
		14703	1	Washer, Lock #6 Int.
		14519	1	Screw, Rd. Hd. #6-32x1/4
22	6	20320	1	Motor Unit Assembly
23	6	18631	1	Governor
		18650	2	Brush Assem., Governor
24	6	12979	1	Pulley Assem., Motor
		1414	2	Screw, Hdlss. Set #6-32x1/8
		18603	1	Motor Assembly
1	8	18755	2	Bolt, tie #8-32x2 3/4"
2	8	18741	1	Case Assem., Rear
3	8	18746	1	Field Assem.
4	8	18749	1	End Play Washer, Spring
5	8	18750	A.R.	End Play Washer, .0097" Steel
6	8	18751	A.R.	End Play Washer, .0/2" Diaphragm Cloth
7	8	18748	1	Armature Assem.
8	8	18752	A.R.	End Play Washer, 1/32" Insul. Board

Item No.	Fig. No.	Part No.	Quantity Required	NOMENCLATURE 1 2 3 4 5 6 7 8 9
9	8	18753	A.R.	End Play Washer, .0/0 Insul. Board
10	8	18754	A.R.	End Play Washer, .005" Brass
11	8	18757	2	Spacer, Brush Plate
12	8	14598	4	Nut, Tie Bolt #8-32
13	8	18762	1	Housing Assem. Comm. End.
14	8	18766	2	Rivet
15	8	18765	1	Retainer, Comm. End Bearing
16	8	18763	1	Bearing, Motor Comm. End.
17	8	18764	1	Wick, Comm. End Bearing
18	8	14535	2	Screw, Hdlss. Set #6-32x3/16" Cup Pt.
19	8	18756	2	Washer, Lock, #8
20	8	18747	2	Holder Assem., Gov. Brush
21	8	18761	1	Staple
22	8	18760	2	Spring, Motor Brush
23	8	18759	2	Brush, Motor
24	8	18758	1	Holder Assem., Motor Brush
		14945	3	Screw, Hex. Hd. #6-32x5/8
		1752	3	Washer, Plain
		17871	3	Bushing, Motor Mtg. (Rubber)
		12779	3	Sleeve, Motor Mtg.
		14881	3	Washer, Plain Fibre
17	3	13751	1	Cover, Fan Housing
18	3	14991	3	Screw, Phillips Rd. Hd. #6-32x1/2
25	6	16808	1	Knob, Control (Tilt)
26	6	20398	1	Screw, Assem., Tilt
		12761	1	Screw, Tilt
		15012	1	Ring, Tilt Screw Retaining
		14902-2	A.R.	Washer, Plain
		14902-3	A.R.	Washer, Plain
		14902-4	A.R.	Washer, Plain
		14902-10	A.R.	Washer, Plain
		12760	1	Bushing, Tilt Screw
		12768	1	Nut, Tilt Screw Bushing
		*18677	1	Nameplate, Serial No.
		1479	2	Screw, Drive Rd. Hd. #0x3/16
		12645	4	Stud, Mech. Hsg. Mtg.
27	6	20317	1	Base Sub-Assem., Proj.
		14965	1	Pin, Grooved 3/16x3/8
		14966	1	Pin, Grooved, 3/16x1" (Driv-Lok)
		13994	1	Ring, Fan Inlet
		1475	2	Rivet, Tub. Truss Hd. .085x1/8
		1482	1	Screw, Sheet Metal Rd. Hd. #4x3/16 Type "Z"
		14946	4	Screw, Phillips Fil. Hd. #10-24x1"
		20433-1	1	Base, Proj. Lower Section
		14654	1	Screw, Rd. Hd. #10-24x1"
		1454	4	Nut, Hex. #10-32x1"
		14768	4	Washer, Lock #10 Int.
		20330	1	Mechanism Assembly
16	4	19470	1	Sprocket Assem., Film Takeup
		17594	1	Washer, Neoprene
		16414	1	Washer, Plain

*Available Only upon certification of loss and Serial No. of equipment.

Item No.	Fig. No.	Part No.	Quantity Required	NOMENCLATURE 1 2 3 4 5 6 7 8 9
		12596	1	Screw, Takeup Sprocket
		1313-10	1	Washer, Plain
		12600	1	Pulley, Sprocket (Takeup)
		1401	1	Screw, Hdlss. Set #8-32x3/16
16	9	19531	1	Gear Assem., Takeup Sprocket
		1313-5	1	Washer, Plain
		1313-32	2	Washer, Plain
17	4	19469	1	Sprocket Assem., Feed
		1404	1	Screw, Hdlss. Set #10-32x3/16
		1313-10	1	Washer, Plain
		12921	1	Collar, Film Sprocket
		1401	1	Screw, Hdlss. Set #8-32x3/16
17	9	19003	1	Gear Assem., (Feed) Sprocket
		1313-5	1	Washer, Plain
		1313-32	2	Washer, Plain
18	9	19002	1	Gear Assem., Small Intermed. Sprocket
19	9	1750	1	Washer, Plain
20	9	1297-A	1	Screw, Special
		1313-5	1	Washer, Plain
		1313-32	1	Washer, Plain
		13625	1	Washer, Plain (lge. Intermed. Stud)
21	9	1278	1	Cap, Oil Well
		1774	1	Strainer, Oil Well
22	9	20238	1	Well Assem., Oil
		1769	1	Plug, Felt
		1987	1	Plate Assem., Framing
		1501	1	Spring, Framing Plate
23	9	1248	1	Knob, Framing
		1550	1	Pin, Cotter, 1/16x3/8
		20331	1	Housing Assem., Mechanism
		1201-A1	1	Bushing, Interrupter Shutter Shaft
		12622-3	4	Bushing, Camshaft
		12627	1	Spacer, Lateral Camshaft Bushing
		12623	1	Spacer, Vertical Camshaft Bushing
		1213-A1	2	Bushing, Film Sprocket Shaft
		12684	1	Stud, Lge. Intermed. Sprocket Gear
		1225	2	Dowel

Audio-Visual Equipment

SERVICE INSTRUCTIONS AND PARTS LIST

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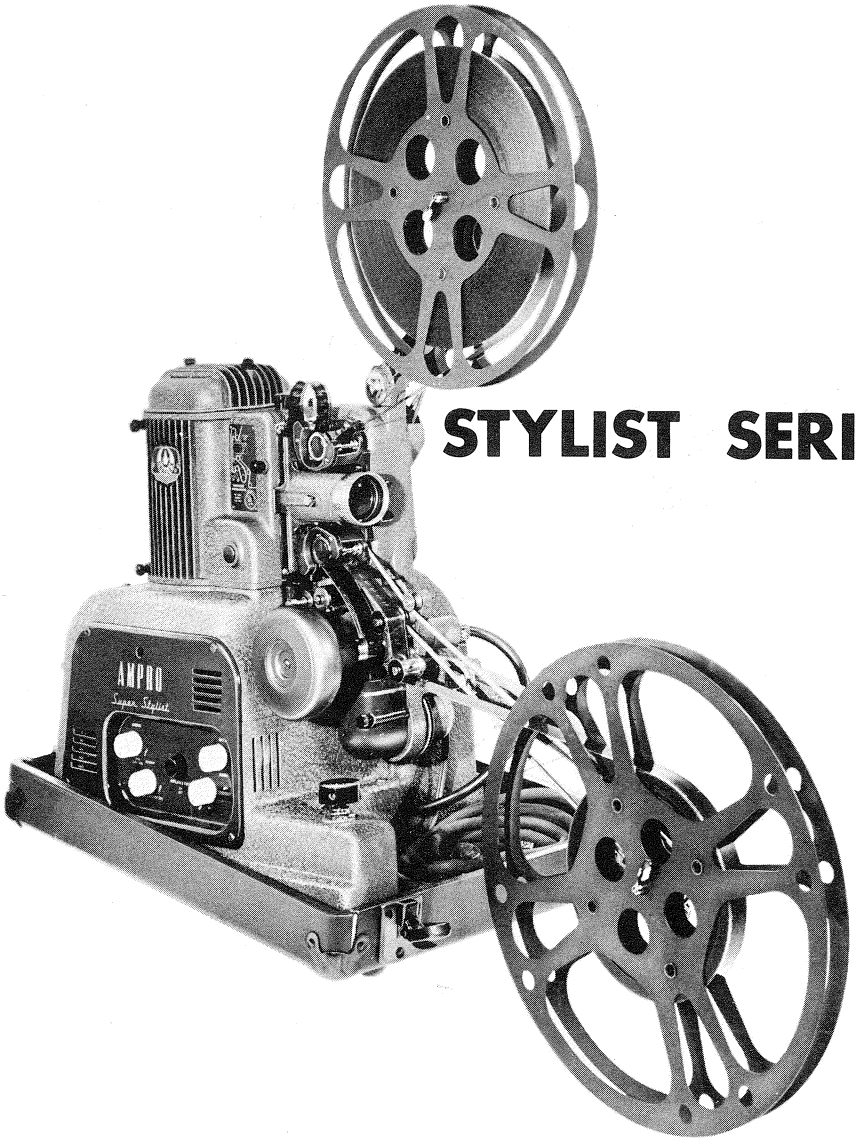


STYLIST SERIES PROJECTORS

TABLE OF CONTENTS

INTRODUCTION - This manual has been prepared as a guide for service and maintenance for all Ampro Stylist Projectors. Illustrations referenced in the text, are typical of the complete Stylist series; minor differences between models are not illustrated. The manual is divided into four sections as follows:

Section I	Cleaning and General Inspection
Section II	Troubleshooting
Section III	Service Proceedures
Section IV	Illustrated Parts List

RECOMMENDATIONS - First, projector should be cleaned and inspected, as per Section I. Irregularities in performance are generally due to inadequate protective maintenance. If inspection reveals irregularities in performance, the causes of which are not obvious, refer to Trouble and Remedy Table (Section II). Section II is cross referenced to Section III so that correct service proceedures may be readily located and applied.

NOTE: It is recommended only skilled persons make major repairs on this equipment.

SECTION I

Cleaning and General Inspection

A. CLEANING (See Figure 1)

1. External or Readily Detachable Parts

a. Case - Remove dust from inside of case with compressed air or brush, if necessary invert unit to remove dust from bottom section. Exterior surfaces of case may be waxed.

b. Film Path - Remove pressure shoe assembly (21), clean shoe and mounting parts with a cloth dampened with carbon tetracloride. Clean aperture plate, removing deposits of dirt and emulsion from notches of side tension springs with toothpick or brush. Remove four screws securing sprocket shoe covers (19 & 24) and remove covers. Remove eight guide rollers (20) and wash rollers in carbon tetracloride. Lift follower roller assembly away from sprocket and blow out dust or other foreign material. Start projector, brush sprocket teeth and sprocket body.

CAUTION: Hold brush at right angle to the axis of sprocket to prevent brush from being drawn between sprocket and shoe.

Wipe guide roller pins with cloth dampened with carbon tetracloride. Wipe upper and lower guideways (Figure 4-13 & 15). Remove film guide rollers (4 & 22), pressure and tension rollers (17 & 28) and wash in carbon tetracloride. Wipe and apply drop of Amproil to each shaft before reassembling rollers.

c. Optical System

(1) Projection Lens - Clean exposed surfaces of lens elements with lens cleaner.

(2) Condensing Lens Assembly - Remove front cover assembly and disassemble condensing lenses. If lens cleaner and tissue will not remove spots, soak lenses in carbon tetracloride and rub with a cloth.

NOTE: If carbon tetracloride has been used, dry lens and clean with lens cleaner, to prevent formation of grey film.

(3) Sound Optical System (1) - Fold lens tissue over toothpick and clean exposed lens surfaces. Do not remove lens system unless tests of equipment indicate such necessity. If removal of lens system is necessary, refer to Section III-A-3 before proceeding.

d. Reel Belts and Spindles - While projector is running, wipe belts, spindles and spindle pulleys with a cloth.

e. Housings - Wipe with cloth dampened with carbon tetracloride.

f. Cables - Clean terminals by rubbing with a cloth dampened with carbon tetracloride.

2. Internal Parts

a. Intermediate Compartment (Figure 3) - Remove front cover and run drive belt off from edge of pulley. Loosen set screw located in hub of drive pulley assembly (2) and remove pulley. Remove two screws (4) securing shuttle shield (3) and remove shield. Remove two screws (6) securing vertical camshaft bearing assembly (5) and remove bearing assembly. Remove shuttle oil pad (11).

Clean shuttle compartment and check shuttle lubrication. Wash oil pad and shuttle shield in carbon tetracloride. Dry oil pad and install in unit. Apply three drops of Amproil on oil pad in a straight line directly below the shuttle, preventing absorbtion of oil from shuttle.

Install vertical camshaft bearing assembly (5) but do not tighten retaining screw (6). Tap bearing carrier lightly and simultaneously turn shutter control knob. When bearing has been properly aligned, tighten retaining screw (6) and saturate bearing oil wick with Amproil. Wipe pulley and proceed to reassemble.

b. Gear Compartment (Figure 2) - Loosen setscrew in shutter control knob (1) and remove knob. Remove four screws (3) securing rear cover (2) and remove cover. If mechanism is dirty see Section III-A-6, for disassembly. Remove surplus oil in bottom of mechanism. Use cloth, saturated with Amproil, to wipe gears. This can easily be accomplished while operating mechanism at slow speed.

WARNING: Do not allow fingers or loose ends of cloth to engage in gear train.

c. Fan and Fan Housing (Figure 2) - Remove three screws (18) securing fan cover (17) and remove cover. If compressed air is available, start projector motor, direct stream of air into the fan and around housing to remove accumulated dust. If compressed air is not available, disassemble and wash fan; brush dirt from fan housing and wipe with clean cloth.

d. Motor and Motor Controls (Figure 5) - Remove "volume" and "tone" control knobs. If fuse post is attached to panel, it is not necessary to remove "Motor-Lamp" and "Sound-Silent" control knobs. If

there is a space between fuse post and panel, remove "Motor-Lamp" and "Sound-Silent" control knobs. Remove four screws securing control panel (8) to base. Pull top of panel forward and lift up and away from projector. In all units having serial numbers above 108001, rheostat and switch assembly are mounted on bracket secured to base by three screws. Remove three screws and remove bracket.

If contact edge of rheostat winding (10) is not bright, polish contact edge with 5/0 sandpaper. Check governor contacts (28), if dirty, clean (use a magneto file and wash with carbon tetracloride). Remove dust from motor housing.

B. INSPECTION

1. General

Film used in tests or service operations must be in good condition and of known picture and sound quality. The 16 mm version of Academy Test Reel or 400' of film of similiar nature is satisfactory, except for takeup and rewind tests. It is recommended that approximately 1600' of used film be kept on hand for take-up and rewind tests.

2. Inspection Without Film

Check all exposed screws, making sure they are tight. Check cables for frayed spots and terminals for loose connections or damaged contacts. Start projector and check for rattles, squeeks, or other unusual noises. Turn lamp on and check for screen brilliance, even distribution of light and freedom from color bands. Operate framer, tilt and speed control. Turn speed control as far as it will go in the direction of "Sound", check speed of shutter control knob. The correct speed is 1440 R.P.M. ± 2%.

NOTE: If 60 cycle AC power is available, a stroboscope disc having 5 light and 5 dark blades may be attached to shutter control knob and used to check speed. If disc is viewed in light from small mazda, neon, or flourescent lamp, it will appear to be stationary. When pattern drifts in the direction of rotation of knob, machine is running too fast; when pattern drifts in opposite direction, speed is too slow (see Section III-A-5 for governor adjustment).

Connect speaker to amplifier and turn amplifier on. Adjust volume control to approximately the three o'clock position and check for ringing or crackling noise from speaker. Check for noisy operation of volume and tone controls.

3. Thread projector with 400' of good film, making sure reel, operating levers, and sprocket followers are operating properly. Start projector and check passage of film thru projector, observing feed and take-up tension, proper rotation of all film guide rollers, film slap, weaving of film in sound head or any unusual noises. Rethread with 1600' of film (200' on feed and 1400' on take-up reel) and check take-up at end of reel. Check rewind.

4. Picture Quality

Thread projector with film and focus picture on screen. Check sharpness of picture, double images and trailer ghost. Adjust framer so that frame line is visable and check for picture jump. Check for side shake or weave.

5. Sound Quality

Adjust volume control to satisfactory listening level and check for sound crispness, wow, and flutter. Check operation of tone control. Advance volume control to point where distortion is just audible and check for normal output, speaker rattle and buzzing of speaker case hardware. Reduce voltage applied to projector to 105v and advance volume control to check reserve gain.

SECTION II

Trouble Shooting

NOTE: It would be practically impossible to compile a list of all of the things which could happen to a motion picture projector and effect its operation. The purpose of this table is to tabulate the most commonly encountered difficulties. This table supplements the "Operator's Trouble Shooting Guide" which is a part of the instruction manual. Generally, troubles due to operational errors will not be listed because it is assumed that the service man is thoroughly familiar with troubles of that type.

A. FILM HANDLING TROUBLES (Test film must be in good condition)

TROUBLE	PROBABLE CAUSE	REMEDY
1. Take-up reel does not revolve	Belt shifter does not shift belt to take-up pulley	See Sec. III-A-2
	Take-up belt damaged	Replace
	Take-up belt catches on bent belt guard or shifter	Inspect and repair or replace damaged part
	Set screw loose on take-up sprocket pulley	Tighten
	Take-up pulley loose on take-up spindle	Replace spindle assembly
	Take-up spindle bent	Replace
2. Take-up reel will not take up full 2000' reel	Take-up belt worn or stretched	Replace or shorten
	Take-up sprocket pulley worn	Replace, see Sec. III-A-6
	Take-up spindle pulley worn	Replace spindle assembly, see Sec. III-A-2
3. Take-up reel pulls film through take-up sprocket (400' reel)	Reel arm in wrong position	See operating instructions
	Take-up belt cut too short in attempted repair	Replace
	Wrong take-up belt	Replace
4. Take-up reel jerks	Take-up belt worn	Replace
	Belt guard bent and rubs on take-up reel	Straighten
	Take-up sprocket pulley worn	Replace, see Sec. III-A-2
	Take-up spindle pulley worn	Replace spindle assembly
5. Rewind will not operate	Rewind belt worn	Replace
	Rewind clutch broken or jammed	Repair, see Sec. III-A-6
	Belt guards bent or loose	Repair
	Feed spindle bent	Repair, see Sec. III-A-1
	Rewind belt not crossed	Cross belt
6. Upper loop not maintained	Feed spindle bent	Replace, see Sec. III-A-1
	Rewind clutch engaged or jammed	See operating instructions
		Repair clutch, see Sec. III-A-6
	Feed Sprocket loose on shaft	Tighten set screw

TROUBLE	PROBABLE CAUSE	REMEDY
7. Lower loop not maintained	Pressure shoe not seating properly	Adjust, see Sec. III-A-6
	Intermittent worn	Repair, see Sec. III-A-6
	Intermittent improperly timed	Repair, see Sec. III-A-6
	Excessive gate pressure applied to "green" film	Reduce gate pressure, see Sec. III-A-6
8. Film scratch	Worn part or dirty film tracks	Locate source with small loop of film threaded as follows: (1) Feed sprocket (2) Take-up sprocket (3) Film gate (4) Take-up sprocket and sound head
		Clean or replace part causing trouble
9. Film slitting (starts at bad splice)	Upper guideway completely worn out	Replace, see Sec. III-A-3
10. Film tearing	Wrong take-up belt	Replace with proper belt
11. Excessive film slap	Intermittent worn	Repair, see Sec. III-A-6
12. Clicking noise (film picking)	Sprocket teeth damaged	Replace sprocket

B. PICTURE TROUBLES (Test film must be in good condition)

1. Picture jump (w/green film)	Excessive gate pressure	Reduce gate pressure, see Sec. III-B-5
2. Picture jump (w/used film)	Gate pressure insufficient	Increase gate pressure
	Aperture plate or pressure shoe worn	Replace, see Sec. III-A-6
	Intermittent worn	Repair, see Sec. III-A-6
3. Sidesway (weave)	Side tension spring worn or bent	Replace, see Sec. III-A-6
4. In and out of focus (r.h. side only)	Side tension spring worn or bent	Replace, see Sec. III-A-6
5. In and out of focus (random)	Projection lens element loose	Tighten retainer
	Pressure shoe sticks	Adjust
	Aperture plate or pressure shoe worn	Replace
6. Poor focus and halo	Projection lens dirty	Clean
	Lens element installed backwards	Assemble correctly
7. Streaks outside of picture area	Optical black worn from back of pressure shoe or associated parts	Retouch with optical black
8. Streaks near edges of picture	Shutter out of line laterally	Realign, see Sec. III-A-6

TROUBLE	PROBABLE CAUSE	REMEDY
9. Vertical bands of color in picture	Lamp old Condensing lenses or reflector improperly installed Lamp not centered with optical system	Replace Adjust
10. Streaks above or below ends of vertical lines in picture (trailer ghost)	Shutter out of time	Retime, see Sec. III-A-6
11. Faint supplementary images of horizontal lines in picture (double image)	Intermittent requires adjustment	Repair, see Sec. III-A-6
12. Nicks in edge of projected image	Framer plate damaged	Replace

C. SOUND AND AMPLIFIER TROUBLES

1. No sound, tubes do not light	Fuse blown Switch defective Connection loose	Replace Replace, see Sec. III-A-4 Repair, see Sec. III-A-4
2. No sound, tubes light, exciter lamp does not light, hiss from speaker	Exciter lamp burned out 50C5 tube damaged	Replace Check tubes
3. No sound from film, no hiss from speaker, exciter lamp does not light	Reversed polarity on direct current Super Stylist connected to D.C.	Rotate line cord plug in power outlet A.C. model only
4. No sound from film, no hiss from speaker exciter lamp lights	Speaker cable broken Tube failed Other amplifier troubles	Repair Check tubes Remove amplifier and service, see Sec. III-A-4
5. Low volume and excessive hum	Output tubes damaged Filter condenser bad	Check tubes Replace, see Sec. III-A-4
6. Low volume	Tubes damaged Low line voltage Exciter lamp not properly installed Filter condenser damaged in PEC supply	Check tubes Check Check
7. Low volume, weak highs	Sound optical system dirty	Clean
8. Normal volume excessive hum	Heater to cathode leakage 50C5 or 12AX7	Check tubes

TROUBLE	PROBABLE CAUSE	REMEDY
9. Hash at sound speed only	Governor brush sticks	Repair or replace
	Governor contacts dirty	Clean
	Chassis or line bypasses open	Replace
10. Hash at silent or sound speed	Motor brush sticks	Repair or replace
	Commutator dirty or worn	Repair, see Sec. III-A-5
11. Microphonics	Exciter lamp damaged	Isolate faulty part and replace
	Photocell damaged	
	Tube damaged	
	Loose contact in PEC cable connector	
12. Shock from mike plug	Line bypass capacitor connected to wrong side of line	Correct wiring
	Amplifier is wet	Clean and dry out
13. Light intermittent shock from projector	Condenser discharge characteristic of A.C.-D.C. equipment	Safe - no remedy
14. Heavy continuous shock from projector	Wiring grounded	Repair
	Carbon dust in motor	Clean
15. Pitch of sound nearly correct - no highs	Sound optical system dirty or out of focus	Clean and focus, see Sec. III-B-3
16. Pitch of sound correct - no lows	Coupling condenser open	Replace
17. Pitch of sound too high	Motor running too fast	Adjust governor, see Sec. III-A-5
18. Pitch of sound too low	Motor running too slow	Adjust governor
		Check motor brushes
		Clean governor contacts
	Sound optical system dirty or out of focus	Clean and focus
	Line voltage low	Check voltage
19. Pitch of sound suddenly increases or decreases	Governor contacts dirty or sticking	Clean
	Sliver of copper between governor slip rings	Remove
	Motor brush sticks	Repair
20. Pitch of sound changes slowly (wows)	Guideways worn	Replace, see Sec. III-A-3
	Guideways out of alignment	Adjust, see Sec. III-A-3
	Sound drum worn	Replace
	Drive belt slips	Replace

TROUBLE	PROBABLE CAUSE	REMEDY
21. Pitch of sound changes rapidly (flutter)	Sound drum bearings worn or dirty	Clean or replace
	Take-up belt damaged	Replace
	Pressure or tension rollers stick	Repair or replace
22. 24 cycle buzz accompanies sound	Lower guideway set too far left	Adjust, see Sec. III-B-2
	Edge guide worn	Replace lower guideway
23. Scratching and popping noise accompanies sound	Lower guideway set too far right	Adjust, see Sec. III-B-2
	Film edge spring broken	Replace guideway

D. MISCELLANEOUS TROUBLES

1. Excessive vibration	Motor shaft bent	Replace armature
	Loose part caught in fan	Remove
	Governor damaged	Replace
2. Squeaking noises	Take-up belt	Oil or use "Door Ease"
		Replace belt and/or sprocket pulley
	Sprocket rubbing on follower roller	Align sprocket, see Sec. III-A-6
3. Rattling noise	Shutter loose	Tighten
	Shuttle loose	Repair, see Sec. III-A-6
	Condensing lenses installed backwards	Install properly
4. Whinning noise	Fan loose	Tighten
5. Drive belt comes off	Belt guard improperly adjusted or missing	Install properly
	Pulleys worn (tapered or crown worn off)	Replace
	Mechanism binding	Check and adjust
6. Short projection lamp life	Line voltage exceeds lamp voltage	Supply correct lamp
	Operation below silent speed	Operate at correct speed
	Fan loose	Tighten
	Obstruction in air ducts	Remove

SECTION III

Service Procedures

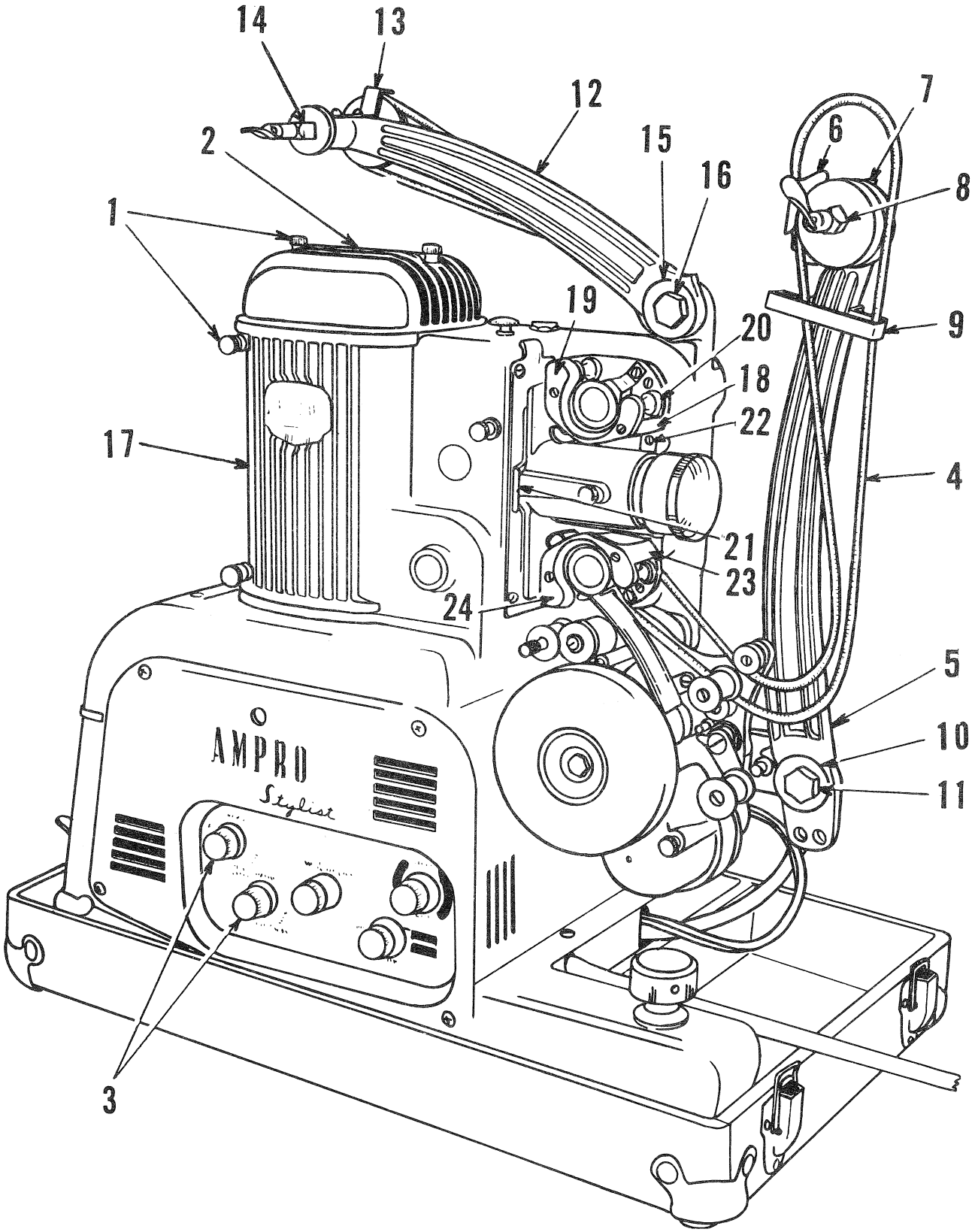


Figure 1. PROJECTOR (Right Side)

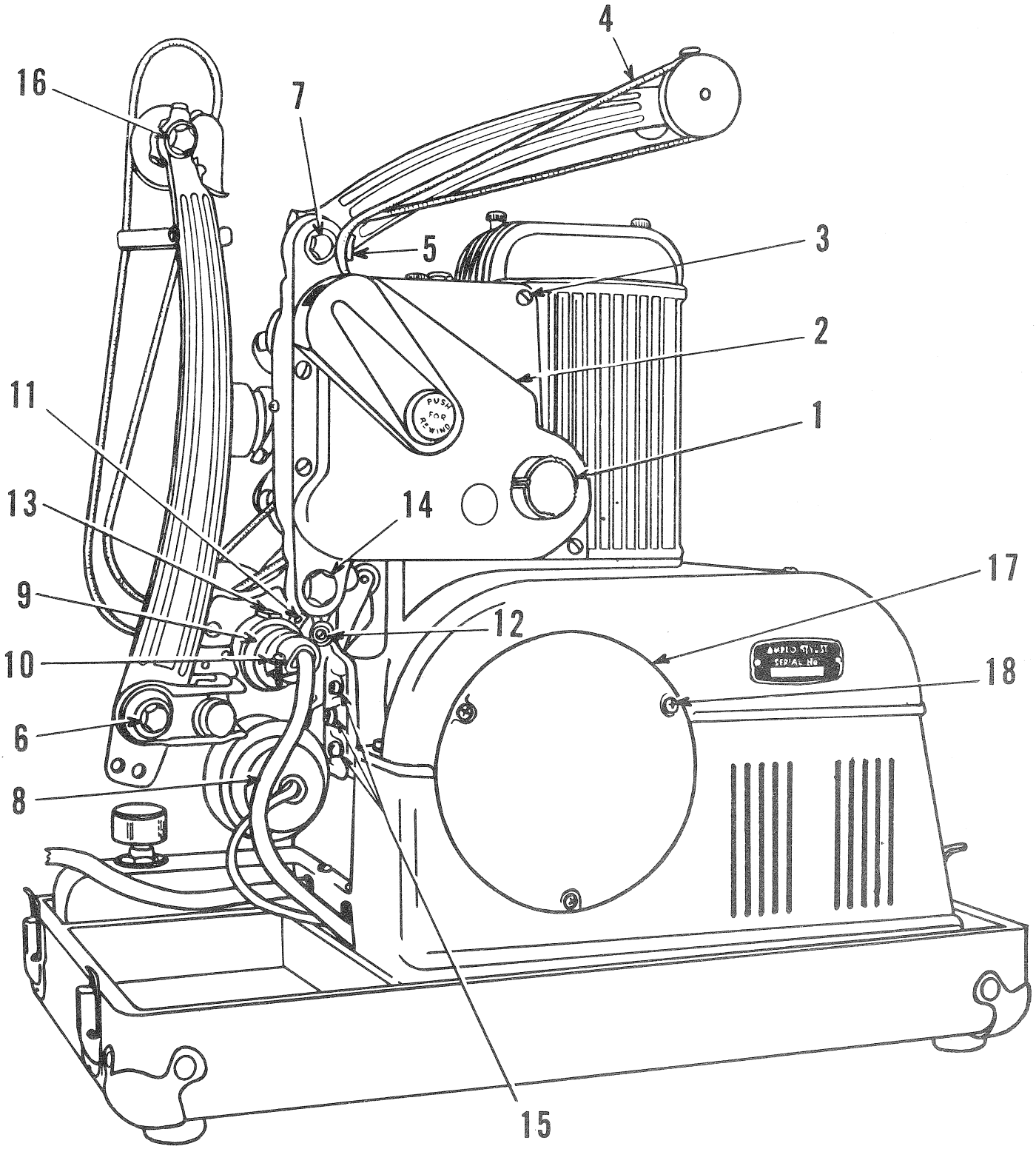


Figure 2. PROJECTOR (Left Side)

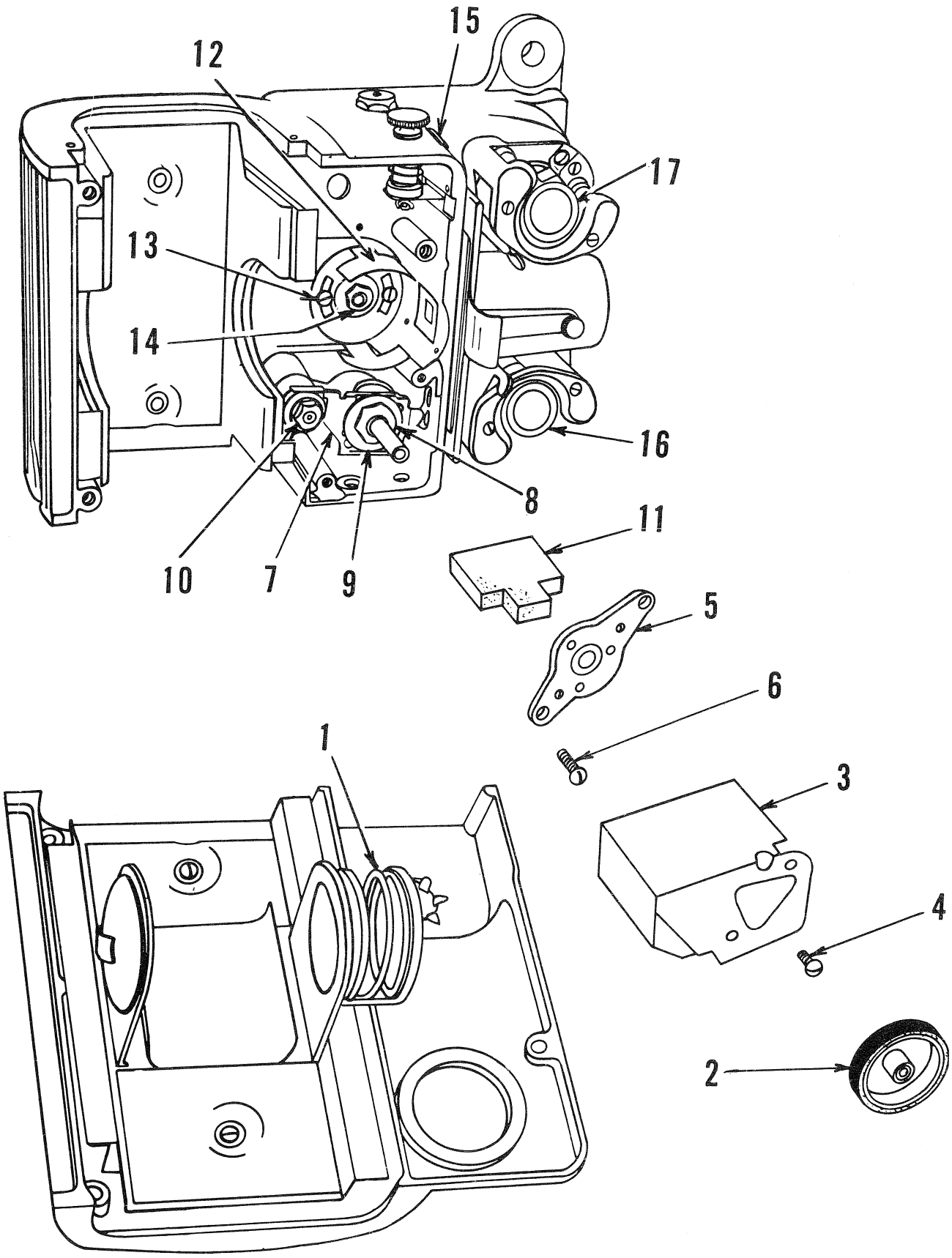


Figure 3. MECHANISM & FRONT COVER

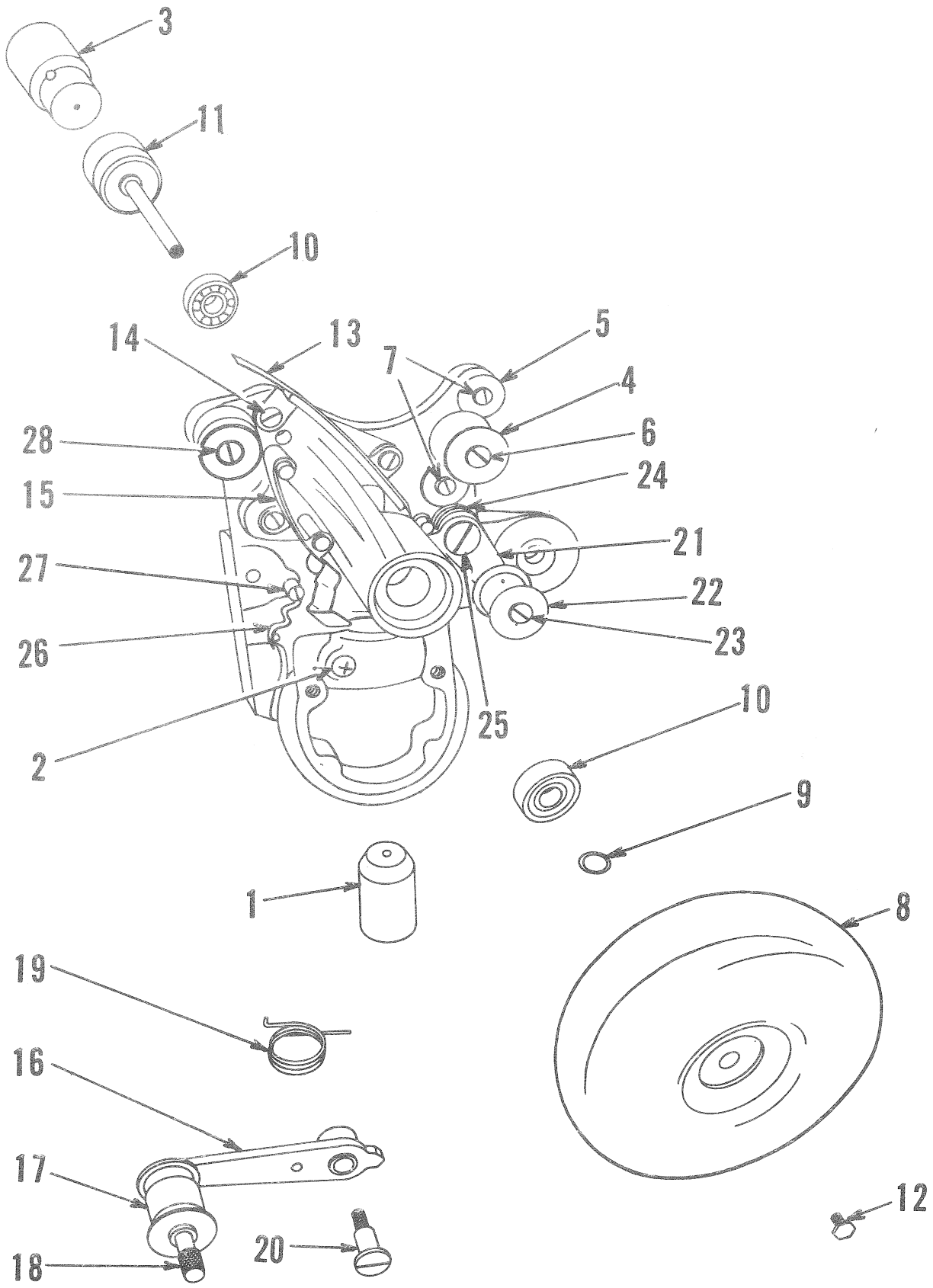


Figure 4. SOUND HEAD

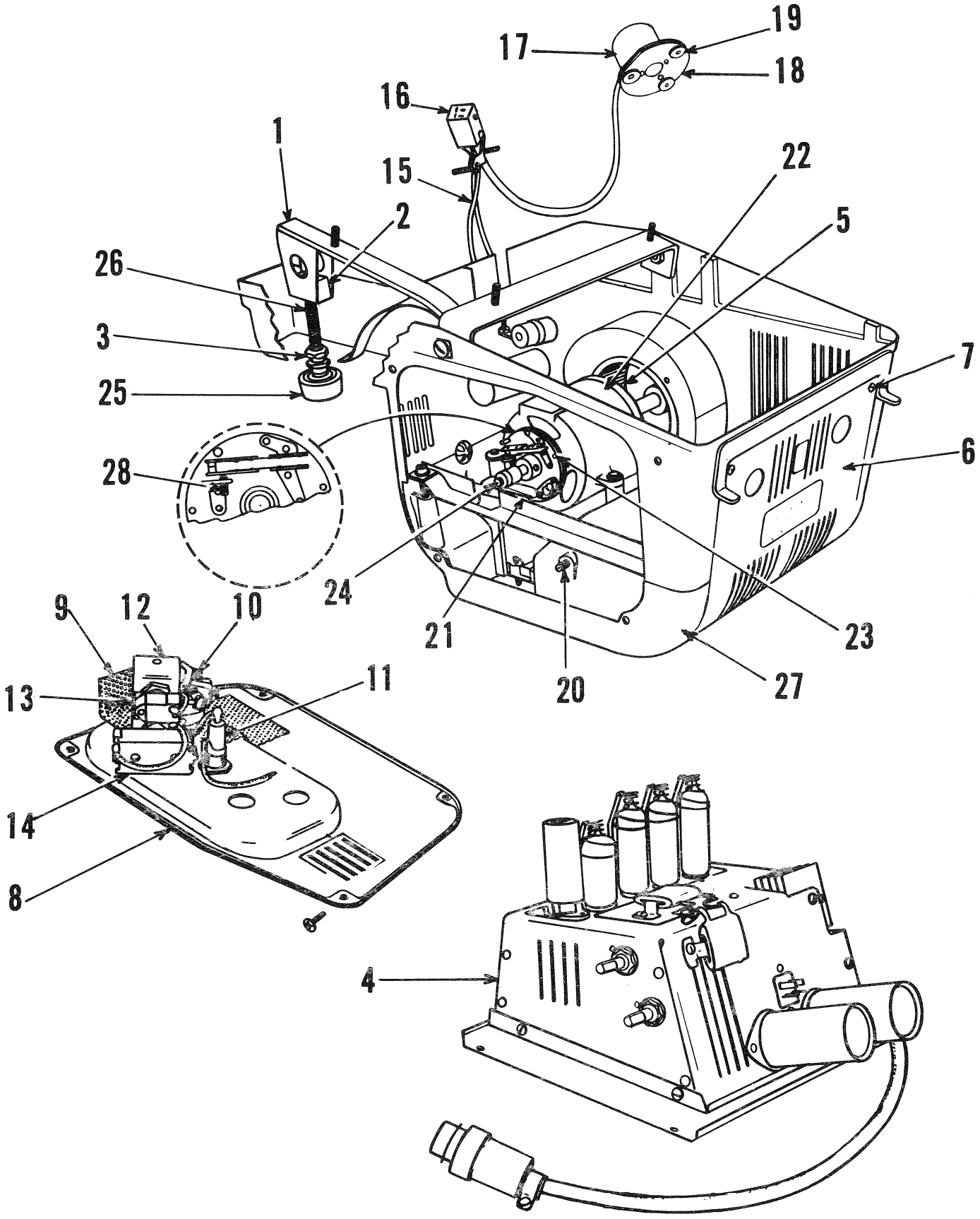
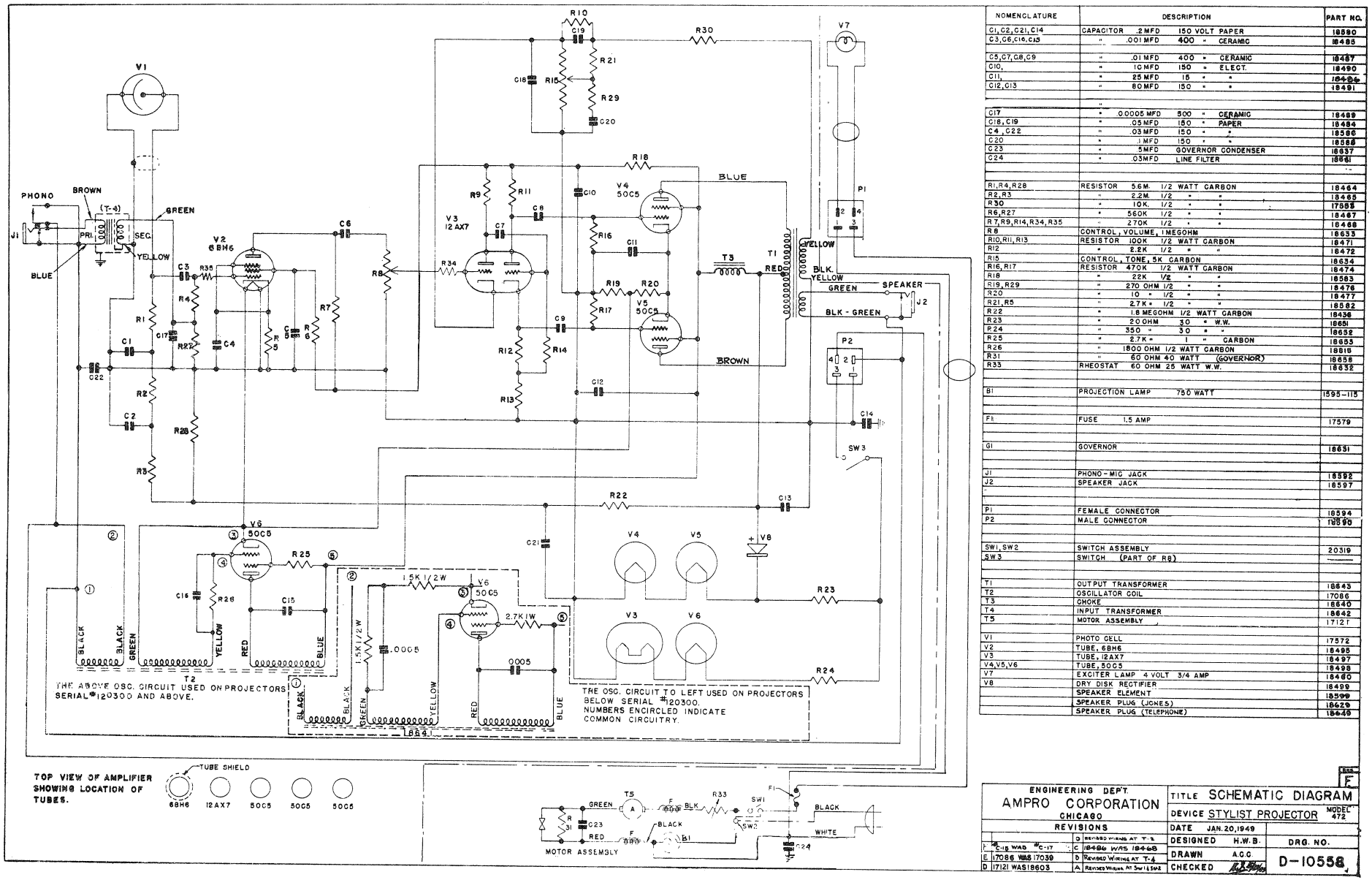


FIGURE 5. Base



NOMENCLATURE	DESCRIPTION	PART NO.
C1, C2, C21, C14	CAPACITOR .2 MFD 150 VOLT PAPER	18580
C3, C6, C16, C15	" .001 MFD 400 " CERAMIC	18485
C5, C7, C8, C9	" .01 MFD 400 " CERAMIC	18487
C10,	" 10 MFD 150 " ELECT.	18490
C11,	" 25 MFD 15 " "	18494
C12, C13	" 80 MFD 150 " "	18491
C17	" 0.0005 MFD 500 " CERAMIC	18488
C18, C19	" .05 MFD 150 " PAPER	18484
C4, C22	" .03 MFD 150 " "	18586
C20	" .1 MFD 150 " "	18585
C23	" .5 MFD GOVERNOR CONDENSER	18637
C24	" .03 MFD LINE FILTER	18661
R1, R4, R28	RESISTOR 5.6 M. 1/2 WATT CARBON	18464
R2, R3	" 2.2 M. 1/2 " "	18465
R30	" 10 K. 1/2 " "	17583
R6, R27	" 560 K 1/2 " "	18467
R7, R9, R14, R34, R35	" 270 K 1/2 " "	18468
R8	CONTROL, VOLUME, 1 MEGOHM	18633
R10, R11, R13	RESISTOR 100 K 1/2 WATT CARBON	18471
R12	" 2.2 K 1/2 " "	18472
R15	CONTROL, TONE, 5 K CARBON	18634
R16, R17	RESISTOR 470 K 1/2 WATT CARBON	18474
R18	" 22 K 1/2 " "	18583
R19, R29	" 270 OHM 1/2 " "	18476
R20	" 10 " 1/2 " "	18477
R21, R5	" 2.7 K " 1/2 " "	18582
R22	" 1.8 MEGOHM 1/2 WATT CARBON	18436
R23	" 20 OHM 30 " W.W.	18651
R24	" 350 " 30 " "	18652
R25	" 1 " 2.7 K " CARBON	18653
R26	" 1800 OHM 1/2 WATT CARBON	18818
R31	" 60 OHM 40 WATT (GOVERNOR)	18658
R33	RHEOSTAT 60 OHM 25 WATT W.W.	18632
B1	PROJECTION LAMP 750 WATT	1595-115
F1	FUSE 1.5 AMP	17579
G1	GOVERNOR	18631
J1	PHONO-MIC JACK	18592
J2	SPEAKER JACK	18597
P1	FEMALE CONNECTOR	18594
P2	MALE CONNECTOR	18590
SW1, SW2	SWITCH ASSEMBLY	20319
SW3	SWITCH (PART OF R8)	
T1	OUTPUT TRANSFORMER	18643
T2	OSCILLATOR COIL	17086
T3	CHOKE	18640
T4	INPUT TRANSFORMER	18642
T5	MOTOR ASSEMBLY	17121
V1	PHOTO CELL	17572
V2	TUBE, 6BH6	18495
V3	TUBE, 12AX7	18497
V4, V5, V6	TUBE, 50C5	18498
V7	EXCITER LAMP 4 VOLT 3/4 AMP	18480
V8	DRY DISK RECTIFIER	18499
	SPEAKER ELEMENT	18599
	SPEAKER PLUG (JONES)	18629
	SPEAKER PLUG (TELEPHONE)	18648

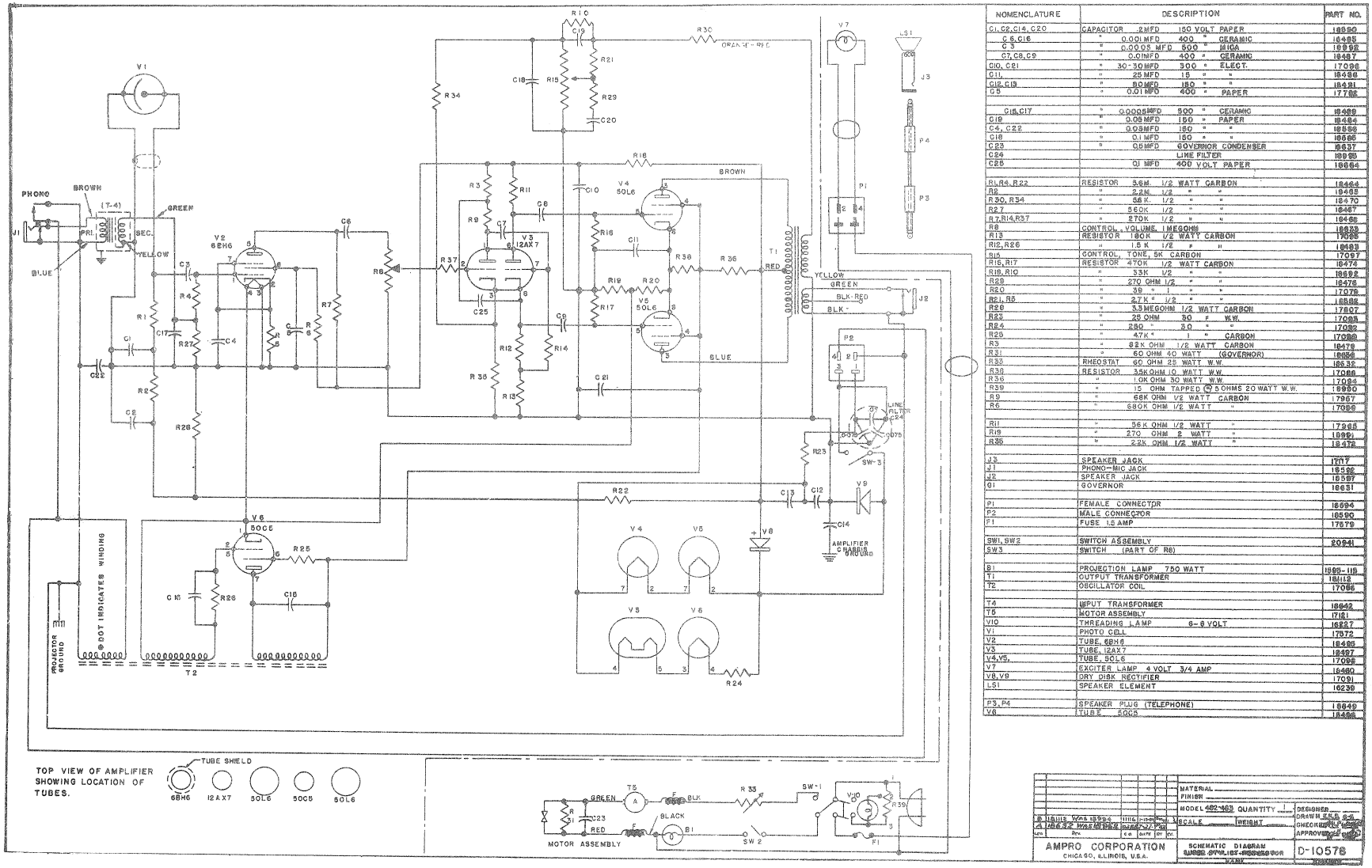
ENGINEERING DEPT.
AMPRO CORPORATION
CHICAGO

REVISIONS

	D	REVISED WIRING AT T-5
C-15 WAS #C-17	C	18484 WAS 18468
E 17086 WAS 17039	B	REVISED WIRING AT T-4
D 17121 WAS 18603	A	REVISED WIRING AT SW 1, 2 & 3

TITLE	SCHEMATIC DIAGRAM
DEVICE	STYLIST PROJECTOR MODEL 472
DATE	JAN. 20, 1949
DESIGNED	H.W.B.
DRAWN	A.G.C.
CHECKED	
DRG. NO.	D-10558
REV.	F

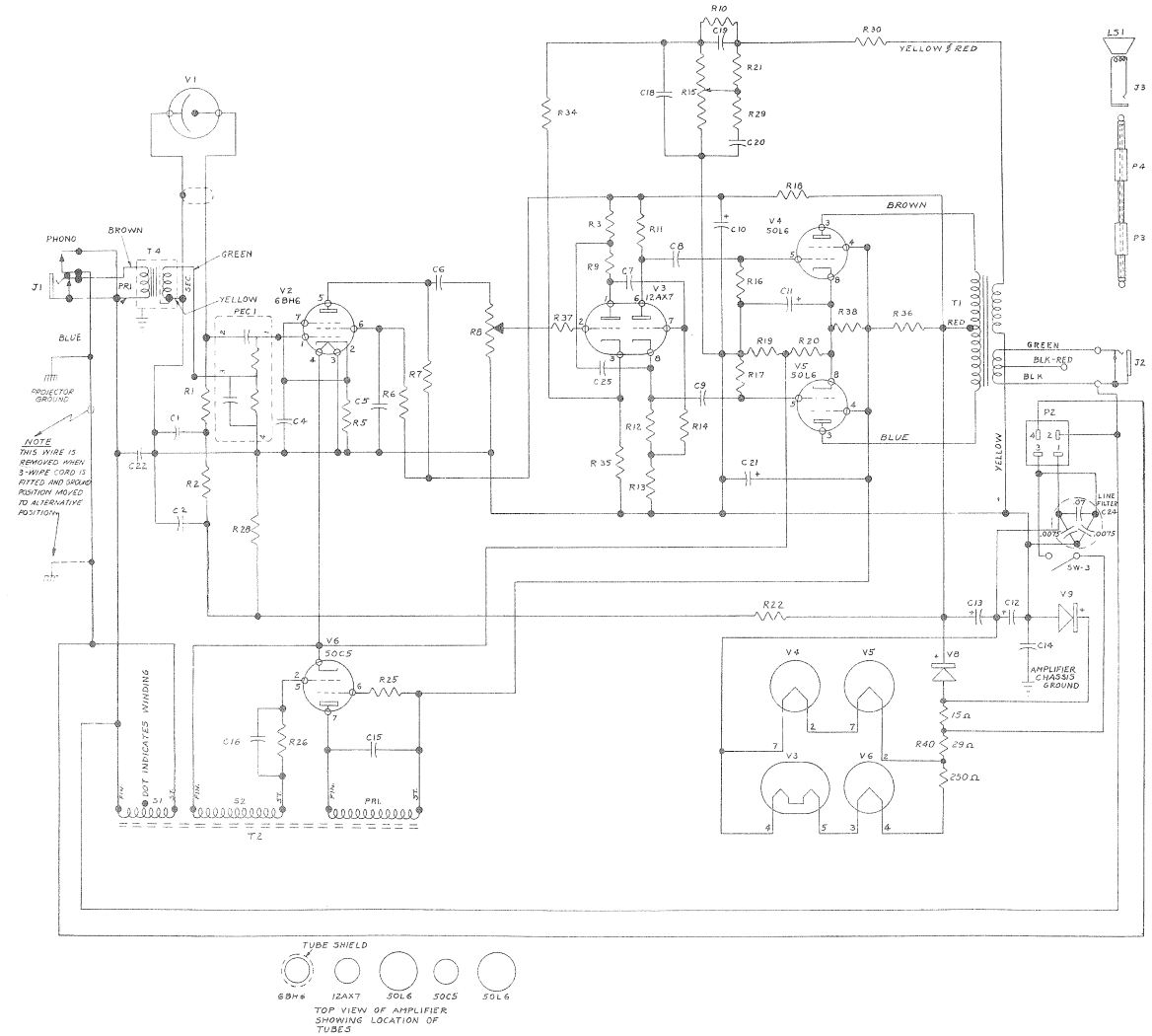
Figure 6A. SCHEMATIC DIAGRAM-EARLY STYLIST & EARLY STYLIST DELUXE



NOMENCLATURE	DESCRIPTION	PART NO.
C1, C2, C14, C20	CAPACITOR .2 MFD 150 VOLT PAPER	18880
C 6, C16	" 0.001 MFD 400 " CERAMIC	16485
C 3	" 0.0005 MFD 500 " MICA	18898
C7, C8, C9	" 0.01 MFD 400 " CERAMIC	18487
C10, C21	" 30-30 MFD 300 " ELECT.	17096
C11	" 25 MFD 15 " "	18488
C12, C13	" 50 MFD 150 " "	18491
C5	" 0.01 MFD 400 " PAPER	17782
C15, C17	" 0.0005 MFD 500 " CERAMIC	18489
C19	" 0.05 MFD 150 " PAPER	18484
C4, C22	" 0.03 MFD 150 " "	18886
C18	" 0.1 MFD 150 " "	18885
C23	" 0.6 MFD GOVERNOR CONDENSER	19837
C24	LINE FILTER	18893
C25	.01 MFD 400 VOLT PAPER	18884
R1, R4, R22	RESISTOR 3.6M 1/2 WATT CARBON	18464
R8	" 2.2M 1/2 " "	18468
R30, R34	" 56K 1/2 " "	18470
R27	" 560K 1/2 " "	18467
R7, R14, R37	" 270K 1/2 " "	18466
R6	CONTROL, VOLUME, 1 MEGOHM	18833
R13	RESISTOR 180K 1/2 WATT CARBON	17085
R12, R26	" 1.5K 1/2 " "	18483
R15	CONTROL, TONE, 5K CARBON	17097
R16, R17	RESISTOR 470K 1/2 WATT CARBON	18474
R18, R10	" 33K 1/2 " "	18892
R29	" 270 OHM 1/2 " "	18476
R20	" 39 " 1 " "	17078
R21, R5	" 2.7K " 1/2 " "	18482
R28	" 3.3 MEGOHM 1/2 WATT CARBON	17807
R23	" 25 OHM 30 " W.W.	17095
R24	" 250 " 30 " "	17092
R25	" 47K " 1 " CARBON	17080
R3	" 82K OHM 1/2 WATT CARBON	18479
R31	" 50 OHM 40 WATT (GOVERNOR)	18054
R33	RHEOSTAT 60 OHM 25 WATT W.W.	18832
R30	RESISTOR 35K OHM 10 WATT W.W.	17086
R36	" 10K OHM 50 WATT W.W.	17084
R39	" 15 OHM TAPPED @ 5 OHMS 20 WATT W.W.	18900
R9	" 68K OHM 1/2 WATT CARBON	17967
R6	" 680K OHM 1/2 WATT "	17089
R11	" 56K OHM 1/2 WATT "	17965
R19	" 270 OHM 2 WATT "	18891
R35	" 22K OHM 1/2 WATT "	18478
J3	SPEAKER JACK	1217
J1	PHONO-MIC JACK	18526
J2	SPEAKER JACK	18527
G1	GOVERNOR	18631
P1	FEMALE CONNECTOR	18594
P2	MALE CONNECTOR	18590
F1	FUSE 1.5 AMP	17679
SW1, SW2	SWITCH ASSEMBLY	20941
SW3	SWITCH (PART OF R6)	
B1	PROJECTION LAMP 750 WATT	1869-115
T1	OUTPUT TRANSFORMER	18413
T2	OSCILLATOR COIL	17096
T4	INPUT TRANSFORMER	18842
T6	MOTOR ASSEMBLY	17181
V10	THREADING LAMP 6-8 VOLT	16527
V1	PHOTO CELL	17572
V2	TUBE, 6BH6	18483
V3	TUBE, 12AX7	18497
V4, V5,	TUBE, 50L6	17099
V7	EXCITER LAMP 4 VOLT 3/4 AMP	16480
V8, V9	DRY DISK RECTIFIER	17091
LS1	SPEAKER ELEMENT	16235
P3, P4	SPEAKER PLUG (TELEPHONE)	18849
V6	TUBE 50C5	18498

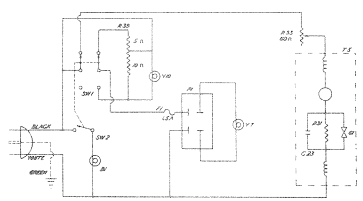
MATERIAL			
FINISH			
MODEL 402-403	QUANTITY 1	DESIGNED	
SCALE	WEIGHT	DRAWN E.S.B. 8-5	
		CHECKED	
		APPROVED	
AMPRO CORPORATION CHICAGO, ILLINOIS, U.S.A.	SCHEMATIC DIAGRAM SUPER STYLIST-PROFESSIONAL	D-10578	

Figure 6B. SCHEMATIC DIAGRAM-EARLY SUPER STYLIST

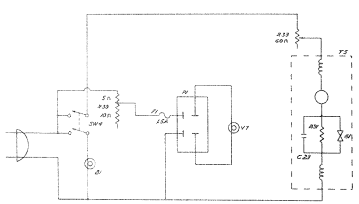


V6	Tube 50C5
P3, P4	Tube 50C5
LS1	Speaker plug (telephone)
	Speaker
	R181110-P1 12 in. (used on model 512)
	R16239-P1 10 in. (used on model 510)
	R181365-P1 8 in. (used on model 508)
	37246-P1 8 in. (used on model 568)
V8, V9	37117 Rectifier (dry disc)
V7	38386-P1 Exciter lamp, 4 v, 3/4 amp.
V4, V5	R17098 Tube 50L6
V3	R18497 Tube 12AX7
V2	R18495 Tube 6BH6
V1	R17572 Photo cell
V10	R16203 Threading lamp, 6-8 v
T5	37290-P1 Motor
T4	R18642 Input transformer
T2	R17086 Oscillator coil
T1	R181162 Output transformer
B1	R1595-115 Projection lamp, 750 w
PEC1	37115 Printed electronic circuit, 560k ohm., 5.6 meg., at 1/10 w, 1000 mmf., 500 mmf., 500 v
SW3	Switch (part of R8)
SW1, SW2	Switch assembly
	R181236-G1 Models 512, 510 & current 508
	R181242-G1 Models 568 & early 508
F1	410-5 Fuse, 1.5 amp.
P2	R18590 Plug (male)
P1	R18594 Socket (female)
G1	R18631 Governor
J2	R18597 Jack (speaker)
J1	R18592 Jack (phono-mic)
J3	Jack (speaker)
	R181111 Model 512
	R17117 Model 510, 508 & 568
R5	402-22-2-2 Resistor, 2.2k ohm., 1/2 w, carbon
R19	404-27-1-2 Resistor, 270 ohm., 2 w, carbon
R11	402-56-3-2 Resistor, 56k ohm., 1/2 w, carbon
R40	37118 Resistor, 15 ohm., 10 w-29 ohm., 5 w-250 ohm., 7-1/2 w
R6	402-68-4-2 Resistor, 680k ohm., 1/2 w, carbon
R9	402-68-3-2 Resistor, 68k ohm., 1/2 w, carbon
R39	R18990 Resistor, 15 ohm., tapped at 5 ohm., 20 w, ww
R36	R17094 Resistor, 1000 ohm., 30 w, ww
R38	R17088 Resistor, 3.5k ohm., 10 w, ww
R33	R181371 Rheostat, 70 ohm., 25 w, ww
R31	R18658 Resistor (governor), 60 ohm., 40 w
R3	402-82-3-2 Resistor, 82k ohm., 1/2 w, carbon
R25	403-47-2-3 Resistor, 4.7k ohm., 1 w, carbon
R28	402-33-5-2 Resistor, 3.3 meg., 1/2 w, carbon
R21, R35	402-27-2-2 Resistor, 2.7k ohm., 1/2 w, carbon
R20	403-39-0-2 Resistor, 39 ohm., 1 w, carbon
R29	402-27-1-2 Resistor, 270 ohm., 1/2 w, carbon
R18, R10	402-33-3-2 Resistor, 33k ohm., 1/2 w, carbon
R16, R17, R37	402-47-4-2 Resistor, 470k ohm., 1/2 w, carbon
R15	R181238 Tone control, 5k ohm., carbon
R12, R26	402-15-2-3 Resistor, 1.5k ohm., 1/2 w, carbon
R13	402-18-4-2 Resistor, 180k ohm., 1/2 w, carbon
R8	R181240 Volume control, 1 meg.
R7, R14	402-27-4-2 Resistor, 270k ohm., 1/2 w, carbon
R30, R34	402-56-2-2 Resistor, 5.6k ohm., 1/2 w, carbon
R2	402-22-5-2 Resistor, 2.2 meg., 1/2 w, carbon
R1, R22	402-56-5-2 Resistor, 5.6 meg., 1/2 w, carbon
C24	R18993 Capacitor (line filter)
C23	R18637 Capacitor (governor condenser), 0.5 mfd.
C18, C25	R18585 Capacitor, 0.1 mfd., 150 v, paper
C4, C22	R18586 Capacitor, 0.03 mfd., 150 v, paper
C19	R18484 Capacitor, 0.05 mfd., 150 v, paper
C15	R18489 Capacitor, 0.0005 mfd., 500 v, ceramic
C5	37119 Capacitor, 0.01 mfd., 200 v, paper
C12, C13	R18491 Capacitor, 80 mfd., 150 v, electrolytic
C11	R18486 Capacitor, 25 mfd., 115 v, electrolytic
C10	R17096 Capacitor, 30-30 mfd., 300 v, electrolytic
C21	
C7, C8, C9	R18487 Capacitor, 0.01 mfd., 400 v, ceramic
C6, C16	R18485 Capacitor, 0.001 mfd., 400 v, ceramic
C1, C2, C14, C20	R18580 Capacitor, 0.2 mfd., 150 v, paper

Models 512, 510 & Current 508



Model 568



Early Model 508

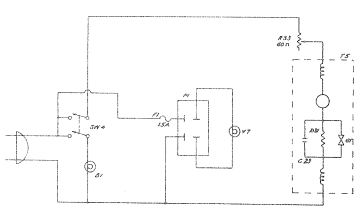


Figure 6C. SCHEMATIC DIAGRAM - Models 512, 510, 508 & 568

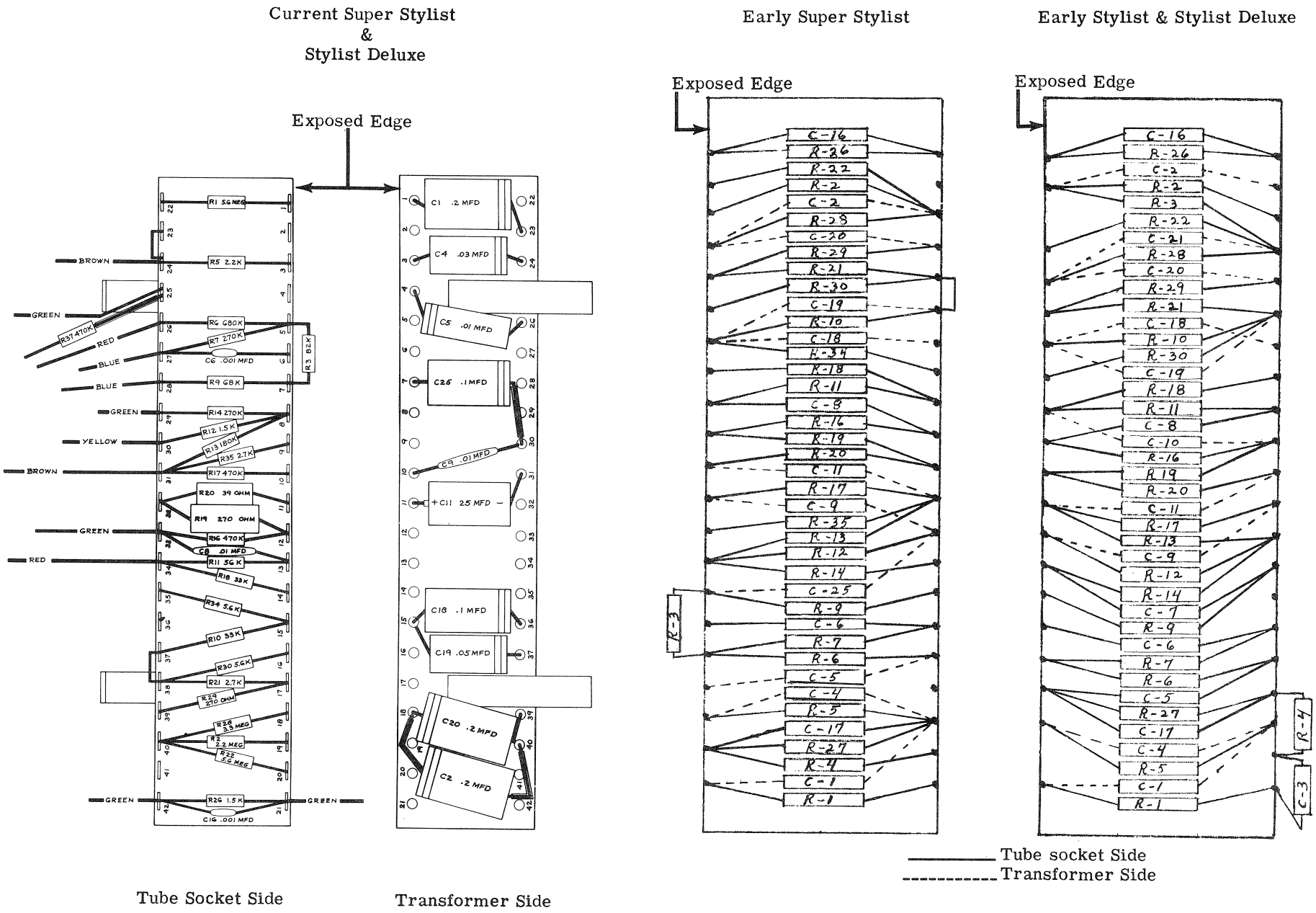


Figure 6D. TERMINAL BOARDS

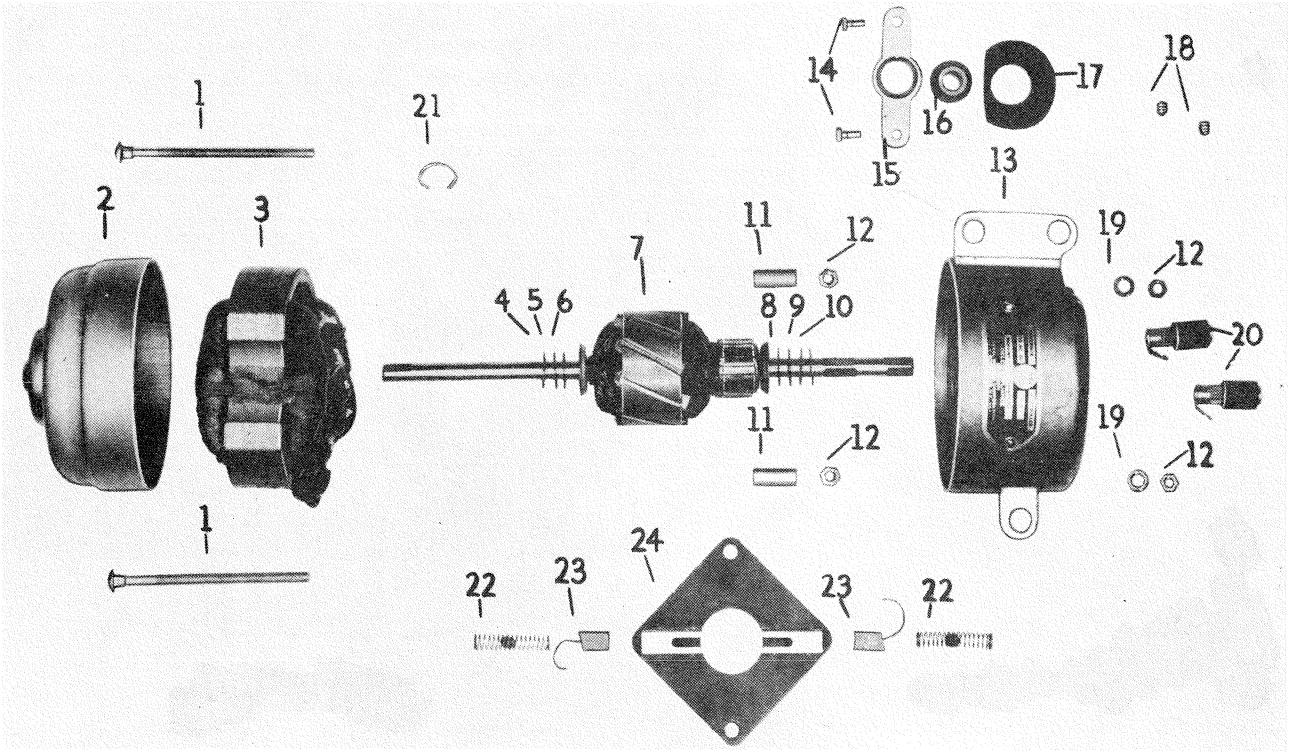


Figure 7. DELCO MOTOR

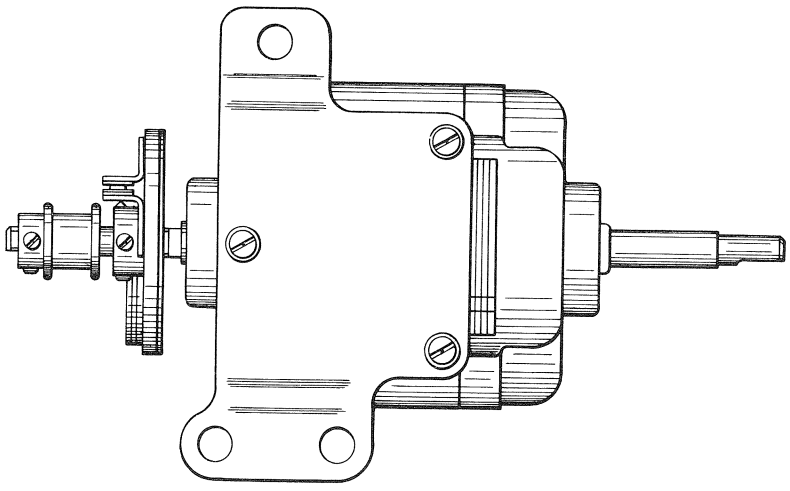


Figure 8. BODINE MOTOR WITH BRACKET

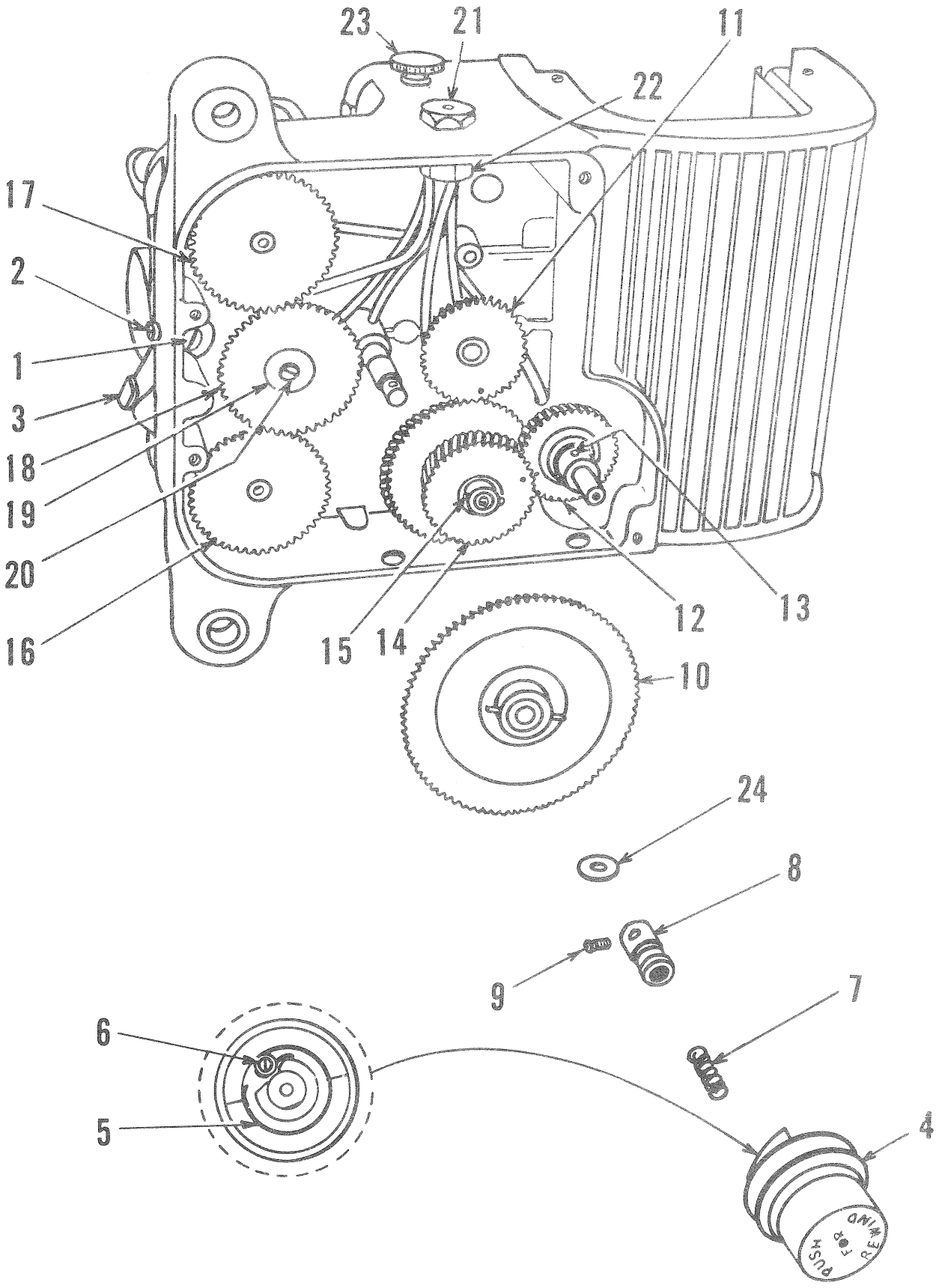


Figure 9. MECHANISM

GENERAL: This section will describe the complete disassembly of the projector, however, it is seldom necessary to completely dismantle the unit. The construction is such that in most cases removal of covers and a few subassemblies will provide access to any of the parts. These instructions are based on the use of micrometers, calipers and other standard shop tools.

A. DISASSEMBLY AND REPAIR

1. Feed Reel Arm Assembly (See Figure 1)

a. Removal - Remove cap nut (Figure 2-7) and guard (Figure 2-5). Disconnect rewind belt (Figure 2-4) and unscrew reel arm stud (16). Remove arm (12), washer, stud and friction washer (15).

b. Disassembly - Remove two screws securing belt guard (13). Remove brake shoe cap, spring and brake shoe. Drive out taper pin which attaches rewind pulley to spindle (14). Remove spindle and washers. To remove reel lock finger from spindle, use a 1/16" pin punch to drive out pin.

NOTE: Remove punch from spindle carefully or reel lock spring will eject finger and check ball with considerable force.

c. Repair and Reassembly - If spindle is bent, replace spindle assembly. When installing spindle, place washer over spindle and insert spindle through bearings. Use spacer washers (as required) between bearing and pulley to reduce end play to .005"-.007". If necessary, replace worn brake shoe. Do not attempt to stretch spindle brake spring. Brake shoe spring and brake shoe apply friction to spindle shaft to provide sufficient load for rewind clutch so clutch will remain engaged at start of rewind. If spring is stretched, there is considerable danger that feed tension will be too high and film sprocket holes will be damaged. If spindle bearing in arm is worn, replace feed reel arm subassembly.

NOTE: Worn spindle bearing will cause spindle to whip during rewind.

When installing arm assembly, be sure friction washer is placed on stud with convex side toward head of stud. Tighten stud so arm will remain in any position in which it is placed.

NOTE: Do not tighten stud more than necessary.

2. Take-Up Reel Arm Assembly (See Figure 1)

a. Removal - Disconnect take-up belt (4). Remove cap nut (Figure 2-6) and unscrew reel arm stud (11). Remove arm (5), washer, stud (11) and friction washer (10).

b. Disassembly - Remove take-up belt retainer (9) secured by two screws and lockwashers. Remove brake shoe cap (7), spring and brake shoe. Remove cap nut (Figure 2-16), face washer, spacing washers and spindle assembly, Remove take-up pulley and belt shifter assembly (6). See Par. 1-b of this section for removing reel lock finger.

c. Repair and Reassembly - If spindle is bent or take-up pulley is loose on spindle, replace spindle assembly. If necessary replace brake shoe. Film will not rewind with proper tension if brake shoe is worn or sticking. When installing spindle, use spacer washers (as required) between end of bushing and face washer to reduce end play to .005"-.007". If spindle wobbles in bushing during normal operation, replace take-up arm subassembly. When installing reel arm assembly, be sure friction washer (10) is placed on stud (11) with convex side toward head of stud. Tighten stud so arm will remain in any position in which it is placed.

NOTE: Do not tighten stud more than necessary.

3. Sound Head Assembly (See Figure 2)

a. Removal - Remove take-up reel arm assembly as Par. 2-a of this section. Remove three screws securing exciter lamp socket assembly (Do not lose three socket spacers). Slide back photocell socket insulator (10). Unscrew ring nut (9) and remove photocell socket and photocell. Remove three fillister head screws (15) securing sound head to the base. Remove sound head mounting stud (14) and remove sound head.

NOTE: Shim washers may be used between sound head boss and boss on mechanism head.

b. Disassembly (See Figure 4)

(1) Upper Guideway - Remove two screws (14) and guideway assembly (13).

(2) Flywheel and Sound Drum Assembly - Loosen flywheel retaining screw (12) approximately two turns. Hold flywheel (8) and tap head of screw with light hammer to free flywheel from tapered sound drum shaft (11). Remove retaining screw and flywheel. Loosen two set screws (Figure 2-13) and slide P.E.C. shield assembly from sound head subassembly. Push sound drum (11) thru hole for P.E.C. shield. Remove sound drum bearings (10).

(3) Lower Guideway Assembly - Remove guideway adjusting screw (Figure 2-12) and washer. Loosen locking screw (Figure 2-11) and remove guideway assembly (15) and aligning stud from sound head. Remove guideway aligning spring and separate guideway from the aligning stud.

(4) Pressure Roller Arm Assembly and Film Roller Assembly - Unscrew pressure roller knob (18), remove pressure roller assembly (17) and spacer washers. Should it be necessary, remove pressure roller arm subassembly (16), remove pressure roller catch retaining screw (27), pressure roller catch (26) and pressure roller arm pivot (20).

NOTE: Support arm while removing pivot or thrust from pressure roller arm spring (19) may push pivot out of line and damage threads. Remove pressure roller arm assembly (16) and separate pressure roller arm spring (19) from arm.

Remove film roller retaining screw, plain washer, film roller assembly (28), spacer washer and film roller aligning spring.

(5) Film Guide Rollers - Remove film tension equalizer pivot (25), film tension equalizer assembly (21) and spring (24). Remove film guide roller retaining screw (23), film guide roller (22) and spacer washer. Remove guide roller stud (6), guide roller (4) and take-up belt guide roller. Remove take-up belt guide roller studs (7) and take-up belt guide rollers (5).

(6) Sound Optical System (1) - Break seal on sound optical system retaining screw (2) and loosen screw. Insert end of small screwdriver in slot in sound optical system clamp and expand clamp. Slide optical system (1) out of sound head. Do not attempt to disassemble optical system. If inner surfaces of lenses are dirty, or system is damaged, send to nearest Graflex Service Department for repair.

c. Repair and Reassembly (See Figure 4)

(1) Upper Guideway - If supporting ribs on upper guideway (13) are worn so that there is danger of either sound track or picture area coming in contact with recessed portion of guideway, replace guideway.

NOTE: Abrasions on portion of guideway adjacent to the picture area are usually due to warped film rather than worn supporting ribs.

(2) Flywheel and Sound Drum Assembly - Check sound drum shaft assembly (11) for bent shaft and worn spots on drum. Check flywheel (8) for run-out with an indicator. Wash sound drum bearings (10) in mixture of 1/2 carbon tetracloride and 1/2 Amproil. After washing, immerse bearings in Amproil and place bearings on blotter for 10 minutes (open side down). If cleaning will not remove rough spots in bearings, replace bearings. Use spacer washers (9) between outside bearing and flywheel to reduce end play to not more than .003".

NOTE: Tool marks on rim of flywheel may produce an optical illusion that flywheel is wobbling.

(3) Lower Guideway Assembly (15) - Check supporting ribs on lower guideway assembly as per sub par. (1). Check for wear in the fixed edge of guide and make sure tension spring is not worn or sticking. Replace guideway if badly worn. Place aligning spring over aligning stud and install guideway on sound head. Install adjusting screw (Figure 2-12) and washer. See Par. B-2 for final alignment.

(4) Pressure Roller Arm Assembly and Film Roller Assembly - Check rollers for flat spots and replace roller if flat spots are present. Clean pressure roller spindle and apply two drops of Amproil to bearings in pressure roller (17). Install roller, washer and knob (18). If pressure roller arm assembly has been removed, install pressure arm spring (19) on hub of arm assembly, making sure end of spring is located in hole in arm. Place arm assembly in position, placing end of spring against pressure roller catch stud and pressing upward and forward on arm assembly until hole in hub is in line with tapped hole for the pivot. Place drop of oil on pivot (20) and install pivot on sound head. Install pressure roller catch (26) and retaining screw (27).

Clean and oil film roller stud. Install film roller aligning spring and washer. Place film roller assembly (28) on stud and push forward against the spring. Push pressure roller arm assembly forward and install film roller retaining screw. Use spacer washers between screw and roller to center roller between the pressure roller flanges.

(5) Film Guide Rollers - Inspect rollers for flat spots worn in body of roller and cuts in the flanges. Clean all studs and lubricate studs with Amproil before assembly.

(6) Sound Optical System - Clean external surfaces of lenses with cotton or lens tissue, dampened with lens cleaner or alcohol. Hold unit in front of bright light and look thru unit from the end adjacent to the exciter lamp. A narrow, sharply defined, and evenly illuminated beam of light should be seen. If the beam is hazy or unevenly illuminated send unit to nearest Graflex Service Department for repair.

4. Amplifier Assembly (See Figure 2)

a. Removal - Tip projector backwards so projector rests on back portion of lamphouse and rear edge of case bottom. Remove three nuts and washers on bottom of case and remove bottom. Slide back the photocell insulator (10) and unscrew ring nut on photocell receiver (9). Pull out receiver and remove photocell. Remove four screws (Figure 5-7) securing amplifier cover (6) and remove cover. If necessary, remove 50L6 tubes from amplifier (4). Remove control knobs and remove control panel. Remove four screws securing amplifier to projector base. Partially remove amplifier and disconnect power connector (16). Remove amplifier.

b. Servicing - It is beyond the scope of this manual to describe in detail the servicing of a multistage vacuum tube amplifier. The components of the amplifier are readily accessable, therefore disassembly and reassembly instructions are not necessary. Lead dressing is not critical.

The fastest service proceedure is to first check all socket voltages, (see following tables) and replace any parts causing nonstandard voltages. Connect a properly terminated audio-frequency oscillator to the photocell receptacle thru a .05 mfd. capacitor and 10 megohm resistor connected in series to #1 pin of the socket. #2 pin is ground and the shield for the capacitor and resistor should be connected to it. Use a cathode-ray oscilloscope to trace the signal thru the amplifier.

All voltages measured to common B- circuit with 20,000 ohms/volt meter.

Line voltage 115 volts 60 cycles A.C. A 10% variation in voltages is permissable.

SOCKET VOLTAGE TABLE (EARLY STYLIST)

PIN	6BH6		12AX7		50C5 (V-4 & 5)		50C5 (V-6)	
1	G	0	PT2	55	K	7.2	K	6.2
2	K	.75	GT2	0	G1	0	G1	-4
3	H	0	KT2	75	H		H	
4	H	6.2 D.C.	H		H		H	
5	P	40	H		G1	0	G1	-4
6	G2	40	PTI	75	G2	115	G2	87
7	G3	.75	GT1	.5	P	120	P	115
8			KT1	22				
9			HM	N.C.				

SOCKET VOLTAGE TABLE (EARLY SUPER STYLIST)

PIN	6BH6		12AX7		50C5		50L6	
1	G		PT2	81	K	6.3	NC	
2	K	1.5	GT2		G1	-5	H	
3	H		KT2	0.85	H		P	210
4	H	6.3 D.C.	H		H		G2	210
5	P	55	H		G1		G1	
6	G2	60	PT1	135	G2	91	NC	
7	G3		GT1		P	120	H	
8			KT1	72			K	10
9			HM					

SOCKET VOLTAGE TABLE (CURRENT SUPER STYLIST & STYLIST DELUXE)

PIN	6BH6		12AX7		50C5		50L6	
1	G		PT2	105	K	6.3	NC	
2	K	1.5	GT2		G1	-16	H	
3	H		KT2	0.85	H		P	230
4	H	6.3 D.C.	H		H		G2	135
5	P	72	H		G1	-16	G1	
6	G2	58	PT1	156	G2	100	NC	
7	G3		GT1	50	P	140	H	
8			KT1	78			K	10.9
9			HM					

5. Motor Assembly

NOTE: Delco motor (Figure 7) is no longer available and is replaced by Bodine motor (Figure 8). Replacement parts for Delco motor are exhausted and will require replacing with Bodine motor.

a. Removal - Remove projector base and control panel as per Par. 4-a. Remove front cover and drive belt. Disconnect motor leads (code terminals and leads). Remove fan housing cover secured by three screws and remove fan. Remove three motor screws, motor, washers, sleeves, etc.

b. Disassembly

(1) Delco Motor (Figure 7) - Loosen set screws on pulley and governor and remove pulley and governor. Remove motor brush caps and brush spring contact spacers. Remove motor brush and spring assemblies. Remove two tie bolt nuts (12), lockwashers (19), tie bolt (1) and staple (21). Separate rear case assembly (2) from commutator and housing (3). Note location of spacer washers (4, 5, 6, 8, 9 & 10) as they must be located in same order when reassembled. If necessary, remove motor commutator and bearing (16) by removing two rivets (14), bearing retainer (15) and oil wick (17). If necessary, remove motor brush and governor brush holders by loosening clamp screws and slide holder from housing.

(2) Bodine Motor (Figure 8) - Remove bracket secured by three screws and using Figure 7 as a guide, proceed as per Par. (1).

c. Repair and Reassembly (Delco & Bodine) - Check commutator for eccentricity; if out of round, turn commutator on lathe and undercut to depth of .015" - .020". Do not leave any thin sections of mica along edges of segments. Check windings electrically with "growler" or measure resistance across diametrically opposite segments while revolving armature. Resistance should be constant within 2 ohms and have value of 13-15 ohms. Check motor for worn parts and replace if necessary.

NOTE: When ordering parts for repair, refer to Part List (Figure 25). Clean all parts with carbon tetrachloride before reassembly and soak oil wicks with Amproil. Brushes must slide freely in holders. Tap edges of bearing shells after assembly to assure self centering bearings are properly aligned and armature revolves freely. If brush holder assemblies have been removed, sight through holder and rotate holder so sides of broached holes (parallel to axis of the commutator) are properly aligned with commutator segments.

Clean governor contacts with magneto file. If governor contacts are badly burned, replace with rebuilt governor. Sand governor sliprings with 5/0 sandpaper. NEVER USE EMORY PAPER.

When installing governor; push governor on shaft as far as possible, then back governor off 1/32" before tightening set screws.

6. Mechanism

a. Removal - Remove three cover screws (Figure 1-1) and lift off front cover assembly (Figure 1-17). Remove two cover screws securing lamp house cover (Figure 1-2) and remove cover. Remove projection lamp. Remove two screws and lift out heat shields. Run drive belt off over front edge of drive pulley assembly (Figure 3-2), loosen set screw in pulley hub and remove pulley. Remove two screws (Figure 3-4) and remove shuttle shield (Figure 3-3). Remove two screws (Figure 3-6) and remove vertical camshaft bearing assembly (Figure 3-5). Remove shuttle oil pad (Figure 3-11) and remove two hex. nuts and lockwashers located in shuttle compartment. Remove #10-24 round head screw located in left rear corner of lamphouse. Remove shutter adjusting knob (Figure 2-1). Remove four screws (Figure 2-3) securing rear cover (Figure 2-2) and remove cover. Remove two hex. nuts and lockwashers securing mechanism to base. Remove take-up belt, sound head mounting stud (Figure 2-14) and lift mechanism from base.

b. Disassembly

(1) Condensing Optics - Push condensing lens spacing spring toward reflector. Remove front condensing lens and spring. Remove rear condensing lens. Push reflector toward retaining spring and lift reflector from holder. Do not remove condensing lens holder from front cover unless holder is damaged. Holder is prealigned and will require realignment if removed.

(2) Sprocket Shoe Assemblies and Lens Holder Assembly - Remove binding head screws securing film strippers to sprocket shoes and remove strippers. Remove two fillister head screws located between stripper retaining screws and sprocket shoe guide rollers. Remove four screws located between lens holder and sprocket shoes and remove lensholder gibs, lensholder, gate lever and gate lever shoe. Push back on feed sprocket shoe follower and remove feed sprocket shoe assembly. Push back on take-up sprocket shoe follower and remove take-up sprocket shoe assembly.

Remove two screws securing each sprocket shoe cover (Figure 1-19 & 24) and remove covers. Remove sprocket shoe guide rollers and follower roller assemblies.

Remove pressure shoe assembly from lens holder. Remove two screws securing pressure shoe adjusting plate to mounting plate and separate parts. Remove two pressure shoe retaining screws. Remove pressure shoe subassembly, upper and lower springs.

Remove binding head screws securing pressure shoe retaining springs to lens holder and remove springs. Remove screw and washer securing lens tension spring assembly and remove spring assembly.

(3) Sprocket Assemblies and Associated Parts - Remove set screw in feed sprocket assembly (Figure 3-17) and remove sprocket. Remove set screw from film sprocket collar, collar and spacer washers. Remove take-up sprocket screw, neoprene washer and take-up sprocket assembly (Figure 3-16). Remove set screw from take-up sprocket pulley, remove pulley and spacer washers.

(4) Shuttle Assembly and Interrupter Shutter Assembly (See Figure 3) - Remove front cover, drive

pulley, shuttle shield and vertical camshaft bearing as per Par. 6-a. Remove shutter retaining nut (14) and shutter assembly (12). Remove interrupter shutter shaft washer and spacer washer.

Remove vertical cam nut (8) and vertical cam shoulder washer (9). Remove lateral cam nut (10) and washer. Rotate mechanism and remove shuttle assembly (7).

WARNING: Do not wedge claw in slot in aperture plate. Claw is very hard and will break instead of bending.

Remove lateral cam assembly from cam shaft and remove lateral cam spacer. Do not attempt to remove vertical cam. It is not a detachable service part.

(5) Rewind Clutch Assembly and Large Intermediate Gear Assembly (See Figure 9) - Remove rear cover as per Par. 6-a and lift rewind belt from rewind clutch.

Insert small screwdriver blade in slot in rewind clutch (4) and lift end of rewind clutch snap ring and at the same time pull clutch away from mechanism. Remove rewind clutch release spring (7).

Remove large intermediate gear collar screw (9), large intermediate gear collar (8) and large intermediate gear assembly (10).

(6) Sprocket Gear Assemblies and Small Intermediate Gear Assemblies (See Figure 9) - Remove feed sprocket gear assembly (17) and take-up sprocket gear assembly (16). Remove screw (20) and washer (19) from end of small intermediate sprocket gear assembly (18) and remove gear and spacer washer.

(7) Camshafts and Shutter Gear (See Figure 9) - Rotate gear train until timing marks on camshaft gears and shutter gear are aligned. Large end of taper pins (13 & 15) securing camshaft gears (12 & 14) will now be as shown. Rotate vertical camshaft gear (14) 1/2 turn and drive out taper pin (15). Push camshaft out of bearing and remove gear. Remove shutter gear brake (used on later models) and remove shutter gear assembly (11). Support hub of lateral camshaft gear assembly on "V" block and drive out taper pin (13). Remove gear and shaft.

(8) Aperture Plate Assembly and Framing Plate Assembly (See Figure 3) - Remove five screws securing aperture plate to mechanism subassembly. Remove cotter key from end of framing knob and unscrew framing knob. Lift out framing plate.

c. Repair and Reassembly

(1) Condensing Optics - Place machinist's square on bottom edge of front cover, making sure condensing lens holder is square with cover. If holder is not square with cover, remove heat shield and loosen two condensing lens holder retaining screws. Position holder properly and tighten screws. Place flat steel bar on inner face of front cover and use that square to determine if condensing lens holder and reflector holder are square in plane. If bent, straighten. Clean condensing lenses and reflector and reassemble in front cover assembly. Be sure rear condensing lens is properly seated in holder and is not tipped up on retaining detent.

(2) Framing Plate Assembly and Aperture Plate Assembly - Wash framing plate in carbon tetrachloride and wash channel in which it slides. Check for nicks or burrs in aperture piercing and replace plate if any are found (due to great magnification of aperture in projection, attempts to remove burrs are complicated and usually unsuccessful). Install framing plate, framing plate spring, framing plate knob and cotter key. Run plate up and down with framing knob making sure plate slides free in channel. If plate sticks, check for burrs on edge of plate and grit in channel.

Check aperture plate for wear of film supporting rails adjacent to claw slot. If rails are worn within .005" of relief, replace plate assembly. Check side tension spring for grooves at film line. Replace spring if grooved. Make sure edge of side tension spring is either at right angle to film plane or inclined toward optical axis at outer edges. If side tension springs are inclined outward, picture may go in and out of focus. Install aperture plate. If an aperture centering tool is not available, use calendar film or loop of title film to align aperture (by centering projected image with aperture) before tightening retaining screws.

(3) Oil Well Assembly - Remove oil well cap (Figure 9-21) and oil well strainer. Squirt oil thru each bearing onto large and small intermediate gear studs. If oil does not flow into bearings, check tubes for being plugged, air locks and for being properly sealed on both ends. Clean oil pad with carbon tetrachloride or replace oil pad. Hold oil well (Figure 9-22) with wrench while tightening cap to avoid damaging oil tubes.

(4) Sprocket Gear Assemblies and Small Intermediate Sprocket Gear Assembly - Wash all gears with grease solvent and check for damaged teeth or excessive shaft wear. Replace any damaged assembly. Place spacer washer over feed sprocket gear shaft, oil shaft and insert shaft in bearing. Install washer and film sprocket collar. Push gear and collar together to remove end play and tighten set screw on flat of shaft.

Install take-up sprocket gear assembly and take-up sprocket pulley in same manner.

Place spacer washer on small intermediate sprocket gear stud, oil stud and place gear on stud. If face of gear hub is more than .005" below end of stud, remove gear and add spacer washers to move gear outward to this position. Install retaining screw and washer. Rotate gear train and check for binding (usually caused by dirt or chips not removed in cleaning operation).

(5) Shutter Gear Assembly and Shutter - Wash shutter gear assembly in grease solvent and check for damaged teeth or excessive shaft wear. Replace worn or damaged parts. Oil shaft and insert into bushing. Install shutter shaft washer and spacer washers to reduce end play to .003"-.005". Install shutter assembly and retaining nut. If brake shoe length is worn less than .030", replace brake assembly.

(6) Camshafts - Wash camshafts and gears in grease solvent and check for damaged gears or worn shafts. Check lateral cam assembly for flat

spots. Replace any damaged parts. Check vertical cam for flat spots at points having shortest radii of curvature and replace if worn. See parts list for correct part.

Place .010" spacer washer on vertical camshaft and insert shaft into bearing. Measure distance from face of cam to face of mechanism (finished surface upon which front cover bears). Use spacer washers (as required) to make distance from cam to face of mechanism .533"±.002". Place .010" spacer washer on opposite end of shaft. Turn cam toward lamphouse and install gear with larger hole for taper pin as indicated in Figure 9. Insert taper pin in place and check for end play. Use spacer washers (as required) to reduce end play to .001"-.003". When correct combination of washers has been selected, remove gear and washers and place together for future installation.

Place .010" spacer washer on lateral camshaft, oil shaft and insert in bearing. Install lateral cam spacer and lateral cam assembly. Measure distance from face of lateral cam to face of mechanism. Use spacer washer (as required) to locate cam within .001" of same distance as vertical cam is located from face of mechanism. Rotate lateral cam so that it faces the vertical cam. Install lateral cam gear with larger hole for taper pin as indicated in Figure 9. Insert taper pin and check for end play in shaft. Add spacer washers (as required) to reduce end play to .001"-.003". When correct combination of washers has been selected support gear hub on "V" block and drive home taper pin.

Position vertical camshaft so that approximately 1/16" of shaft extends thru bushing and cam faces lateral cam. Turn shutter gear so center of a blade is approximately over center of aperture. Rotate lateral camshaft so cam faces vertical cam. Install preselected combination of spacer washers on vertical camshaft. Slip vertical camshaft gear into position making sure timing marks on gear match timing marks on shutter gear and lateral cam gear. Push vertical camshaft thru bore in vertical cam gear, insert taper pin and drive taper pin home.

Check timing of projector. If properly assembled, it will comply with the following requirments.

(a) Lobes of cams face each other.

(b) Lines drawn thru centers of cam pins and centers of their respective shafts will be parallel.

(c) A line bisecting shutter blades will be parallel to lines thru camshafts and cam pins.

(7) Large Intermediate Sprocket Gear Assembly and Rewind Clutch Assembly - Clean parts with grease solvent. Check gear for damaged teeth and scored bore. Replace if worn or damaged. Place spacer washer on large intermediate gear stud and oil stud. Install gear, collar and screw. If end play exceeds .005", add spacer washers between gear and boss.

Check rewind clutch assembly for damaged clutch dogs or release spring. Check pulley grooves for wear.

Check position end of release spring (See Figure 9-5) with respect to groove in clutch dog. Spring should be approximately 1/8" ahead of bottom of groove. If rewind clutch releases during the rewinding process, decrease distance between release spring and clutch dog by loosening spring retaining screw (Figure 9-6) and retard spring. If rewind clutch does not release at end of rewinding process, increase distance between spring and clutch dog.

Place three drops of oil in bore in clutch, insert coil spring in end of large intermediate gear collar and push clutch over collar.

(8) Sprocket Shoes and Lens Mount - Clean all metal parts with carbon tetrachloride. Do not clean plastic parts with carbon tetrachloride. They may develope a grey haze which is difficult to remove. Inspect sprocket guide rollers for wear. Replace worn rollers. If follower rollers are worn, replace follower roller assembly. Wind sprocket follower roller springs 1/2 turn when installing. Assemble both sprocket shoes with exception of film stripper.

Install take-up sprocket on projector. Install lower lens holder gib and screws but do not tighten screws.

Clean and inspect pressure shoe parts. If pressure shoe rails are worn within .010" of relief, replace pressure shoe subassembly. Replace weak or broken springs. Assemble pressure shoe assembly with weaker spring on upper stud. Apply light film of grease to the way on lens holder.

Place gate lever shoe in slot in lens holder. Mesh stud on gate lever in hole in shoe. Place lens holder on mechanism with lower way in channel formed by lower gib and take-up sprocket shoe. Mesh rear stud on gate lever in hole in gate lever eccentric pivot and press lens holder assembly against mechanism.

Install feed sprocket shoe assembly and tighten all gib retaining screws. Loosen pressure shoe retaining screws and center pressure shoe in channel in aperture plate and tighten screws.

(9) Sprockets - Clean sprockets with carbon tetrachloride and check for damaged or worn teeth and flanges. Replace worn sprockets.

Install feed sprocket, line up flanges with flanges on guide roller and tighten set screws on flat on shaft. Install film stripper making sure it does not rub on sprocket.

Install spacer washer on take-up sprocket shaft. Temporarily install take-up sprocket, grommet, and retaining screw and check sprocket alignment with guide rollers. Add spacer washers (as required) and tighten take-up sprocket screw. Be sure sprocket grommet is functioning and install stripper.

(10) Shuttle Assembly - Clean shuttle, clamp block and pivot with carbon tetrachloride. Inspect shuttle gibs for wear. If gibs are worn more than .005", they can be honed flat. Inspect claw teeth for wear. If claw teeth are not cut more than .010"-.012", they can be honed. Replace shuttle assembly if worn beyond limits indicated.

Use #20 Medium India Stone to hone gibs and claw. Claw teeth are in effect three gear teeth, therefore, they must all be honed equally. After shuttle gibs have been honed to a smooth surface,

support one gib on anvil and peen opposite gib at points where formed out from main shuttle frame. Check to make sure gibs are parallel.

Install shuttle on lateral cam with claw pointing toward lamphouse. Rotate mechanism and check fit. Gibs should fit snugly on cam but should not bind. After lateral gibs have been fitted, install shuttle in proper position and fit vertical gibs. Temporarily install shuttle retaining nuts, washers, vertical camshaft bearing, drive pulley and belt. Run mechanism and check for excessive noise. If excessive noise is encountered, apply pressure to rear lateral gib. If noise disappears, shuttle is not properly fitted to lateral cam. Press downward on shuttle; if noise disappears, shuttle is not properly fitted to vertical cam. When shuttle is adjusted properly, the mechanism should be quiet and should also be free enough so shutter control knob will continue to rotate for 40-50 degrees after given quick snap.

Thread projector with a film known to be in good condition and run projector for about five minutes. Check for following conditions:

(a) Film Slap
(b) Strike (vibration of pressure shoe)
(c) Double Image
(d) Trailer Ghost
(e) Picture Jump

Stop projector, remove shuttle and make required adjustment as indicated below:

(a) Film Slap - Hone bottom surface of center tooth of claw.

(b) Strike - Check for spots on edges of claw (except bottom of center and lower teeth) where claw has contacted film. Hone at any contact points except as noted.

(c) Double Image - Hone bottom surface of top tooth of claw.

(d) Trailer Ghost - Loosen two screws securing interrupter shutter in position and advance or retard shutter as required.

(e) Picture Jump - Hone bottom surface of lower tooth of claw. Check gate pressures as per Par. B and centering of pressure shoe.

After all adjustments are made, place thin coat of "Lubriplate" on cams, install oil pad, camshaft bearing and shuttle shield. Saturate camshaft bearing wick with Amproil.

7. Control Panel and Tilt Assembly (See Figure 5)

a. Removal and Disassembly

(1) Control Panel and Control Sub-Panel Assembly - Remove four control knobs and remove four screws securing panel in place. Pull top of panel outward until it clears fuse post and lift upward and away from projector. Remove three screws securing control sub-panel assembly to casting and remove panel.

(2) Tilt Assembly - Invert projector and remove three nuts and washers securing tilt assembly to case base. Lift off base. Rotate tilt knob (25) until tilt screw (26) has been unscrewed from tilt nut (2). Remove lockwashers from tilt pivot screws and spring washers. Lift out tilt frame. Remove tilt knob (25) and tilt screw bushing (3).

b. Repair and Reassembly (See Figure 5) - Check motor switch (13) and lamp switch (14). Clean contact and winding of rheostat (10). Check connections to fuse holder (11).

Check threads on tilt screw and tilt nut. Damaged threads can frequently be repaired by chasing with proper die or tap. Check tilt frame for bends and straighten if bent. When installing tilt pivot screws, be sure screws are tight enough to lock spacers in position.

8. Idler Assembly

a. Removal - Remove hex. nut securing idler and belt guide in place. Remove guide, idler and spring.

b. Repair and Reassembly - Wash idler and idler pivot with carbon tetrachloride. Soak idler in Amproil to saturate wick located inside roller. Wipe roller. Be sure idler slides free on stud. Install spring, idler assembly and belt guard. Place belt guide in horizontal position and install retaining nut. Check guide for alignment with motor pulley.

9. Speaker Assembly

a. Removal - Unsolder leads to speaker receptacle. Remove four nuts, lockwashers and washers securing speaker in place. Lift out speaker and grill.

b. Repair - Check speaker for cone damage and rattles at high volume. Be sure grill is not bent in against speaker. Check for loose case hardware and tighten any loose parts.

B. FINAL ADJUSTMENTS

1. Photocell Shield Assembly (See Figure 4)

Place sound optical system (1) in holder and install exciter lamp. Thread projector, turn on amplifier and position optical system to obtain a narrow beam of light on film at a right angle toward directionof film travel. Remove film. Tip projector backwards so projector rests on rear of case and back of lamphouse. Insert photocell shield assembly (3) and rotate shield assembly so beam from sound optical system passes thru hole in shield without touching edges of hole. Tighten two set screws (Figure 2-13).

2. Lower Guideway Assembly

Lateral position of lower guideway assembly Figure 4-15) determines alignment of sound track with beam from sound optical system. The following procedure produces an approximate adjustment permitting focusing of the sound optical system as per sub. Par. 3. After focusing sound optical system, repeat procedure to obtain exact alignment.

Thread projector with loop of "buzz track" film. Connect speaker and turn on amplifier. Loosen guideway locking set screw (Figure 2-11) and rotate adjusting screw (Figure 2-12) to position film over scanning beam. Two types of "buzz track" are in general usuage. One type produces two tones of equal volume when properly aligned; the other type produces a low frequency tone when misaligned in one direction, a higher frequency tone when mis-

aligned in opposite direction and only film noise when properly aligned.

If "buzz track" film is not available, use standard sound film and adjust for maximum signal and minimum noise. If such film is positioned too far to the left, a 24 cycle buzz will be produced by frame lines. If positioned too far to the right, noise is produced by scratches on edge of film adjacent to the sound track.

3. Sound Optical System (See Figure 4)

Thread projector with loop of constant frequency film (5000 or 7000 C.P.S.). Connect an output meter or oscilloscope across speaker terminals. Loosen sound optical clamping screw (2) and insert blade of screwdriver in slot in sound optical clamps so optical system can be moved easily. Start projector, raise or lower optical system and rotate optical system to obtain maximum output and best possible wave form. Remove screwdriver and tighten clamping screw.

4. Screen Illumination (See Figure 5)

Thread projector with calendar film or film on which the framing is correct. Focus picture and frame picture correctly. Remove film and check screen illumination near edges of projected field. Adjust lamp adjusting screw (20) to balance light at edges of field.

5. Gate Pressure (See Figure 9)

Thread and start projector. Loosen fillister head screw (2). Rotate gate lever eccentric pivot (1), while holding down gate lever (3). Move lensmount forward as far as it will go, rotate eccentric to move lensmount toward aperture. Set eccentric to apply minimum amount of gate pressure required, to obtain a steady picture. When pressure is adjusted properly, it should be possible to grasp film by edges at a point 1/2"-3/4" above the aperture and push it downward thru the aperture without any tendency of the film to buckle.

SECTION IV

ILLUSTRATED PARTS LIST

INTRODUCTION

The Group Assembly Parts Lists are listed in disassembly order. The list divides the components into major assemblies, their subassemblies and parts. By the use of indented columns, the relationship of the assemblies to the subassemblies and parts is obtained.

The column titled "Figure and Index No." contains the index number in disassembly order of the items illustrated. Do not use the figure or index number in correspondence--specify the catalog or part number and name. Finish should also be included where specified.

The column titled "nomenclature" (including numbered columns) lists item nomenclature on the Graflex drawing. The assembly in the column marked "3" will be a component of the first assembly which preceded it in the column marked "2" etc. The code "NP" will indicate that this part is "not procurable" and that the "next higher assembly" (NHA) should be ordered. The code "AR" is used for bulk items when an indefinite amount may or may not be used "as required. The code "LP" is used when an item may be "locally purchased."

NOTE: REPLACEMENT PARTS SHOULD BE ORDERED AS FOLLOWS:

1. ITEMS BEARING CATALOG NUMBER FORWARD TO:
   GRAFLEX, INC.
   3750 MONROE AVE.
   ROCHESTER 3, NEW YORK

2. ITEMS BEARING PART NUMBER FORWARD TO:
   CINESOUND SERVICE CORPORATION
   420 WEST 45th STREET
   NEW YORK 36, NEW YORK

3. ALWAYS SPECIFY FINISH WHEN GIVEN IN DESCRIPTION OF ITEM.

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
	37294-G2	PROJECTOR OUTFIT - SUPER STYLIST "12", Model 512. . . .	1	
	Ref.	PROJECTOR OUTFIT - SUPER STYLIST "12", Model 483. . . .	Ref.	
	R200006-G1	. Speaker and Case Assembly (Cat. 3622) Figure 1	1	200006
	Cat. 3496	. Kit - Maintenance NOTE: See below for individual listing . .	1	
	Cat. 3604	. Lens - Projection, 2 in. f/1.6 (p/n 38427-P1).	1	622
	Ref.	. Projector Complete (Figure 2)	1	

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Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
	37294-G1	PROJECTOR OUTFIT - SUPER STYLIST "10", Model 510. . . .	1	
	Ref.	PROJECTOR OUTFIT - SUPER STYLIST "10", Model 482. . . .	Ref.	
	37294-G3	PROJECTOR OUTFIT - SUPER STYLIST "8", Model 508	1	
	Ref.	PROJECTOR OUTFIT - SUPER STYLIST "8", Model 484	Ref.	
	37294-G5	PROJECTOR OUTFIT - STYLIST DELUXE, Model 568	1	
	37294-G4	PROJECTOR OUTFIT - STYLIST DELUXE, Model 548	Ref.	
	Ref.	PROJECTOR OUTFIT - STYLIST DELUXE, Model 472	Ref.	
	Cat. 3496	. Kit - Maintenance NOTE: See below for individual listing . . .	1	
	Cat. 3604	. Lens - Projection, 2 in. f/1.6 (p/n 38427-P1).	1	622
	Cat. 3662	. Reel - Film (400 ft.) p/n R604-R	1	604-R
	37245-G2	. Cable Assembly - Speaker (40 ft.) Cat. 3449.	1	657
	R181216	. . Plug - Cable (phone type).	2	181216
	Ref.	. . Cable - Speaker.	NP	NHA
	Ref.	. Projector Complete (Figure 2)	1	

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Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
	Cat. 3496	Kit - Maintenance (p/n R626-G1)	Ref.	626
	Cat. 3494	. Amproil (1 oz.) 37296	1	994
	Cat. 3497	. Brush - Aperture (p/n 38426)	1	679
	Cat. 3498	. Fuse (5 per box) 1-1/2 amp. - p/n R691	1	691

==========

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
1	R200006-G1	SPEAKER AND CASE ASSEMBLY (Cat. 3622).	Ref.	200006
	Ref.	SPEAKER AND CASE ASSEMBLY (no longer available, replace with p/n R200006-G1).	Ref.	20990
	37245-G1	. Cable Assembly - Speaker (50 ft.) Cat. 3645.	1	648
	R181216	. . Plug - Cable (phone type).	2	181216
	Ref.	. . Cable - Speaker.	NP	NHA
-1	R20982-G1	. Nut Assembly - Reel	1	20982
	Cat. 3493	. Reel - Film (1600 ft.) p/n R616-R	1	616-R
-2	R181110-P1	. Speaker (12 in.)	1	181110
	Attaching Parts			
-3	200-8HH	. Nut - Machine, #8-32, hex., steel, Nickel Plate P-27	4	1453
-4	220-8L	. Washer - Lock, External type, for #8 screw, Shakeproof type 11, Cat. 1108-00, steel, Black Oxide S-7	4	1679
-5	R14242	. Washer - Flat	4	14242
	R14975	. Screw - Machine (Rosette Head) available replacement for Speaker and Case Assembly 20990	4	14975
	---***---			
	R17133	. Grille - Speaker (available replacement for Speaker and Case Assembly 20990)	1	17133

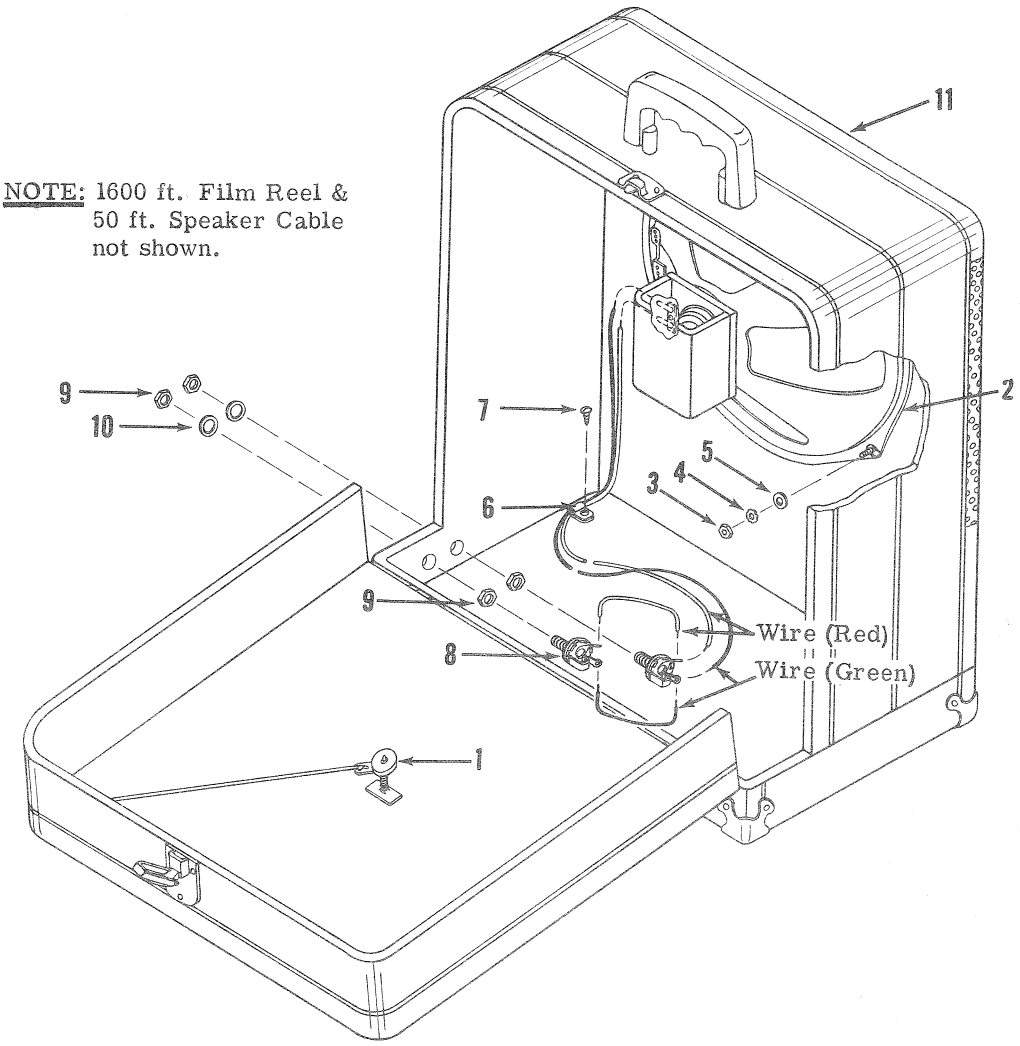


Figure 1. SPEAKER AND CASE ASSEMBLY

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
1-6	R18567	Clamp - Cable	1	18567
	Attaching Part			
-7	151-8-6L	Screw - Wood, 3/8 in. lg., #8, round head, steel, Black Oxide S-7	1	14752
	---***---			
	Ref.	Staple	AR	L.P.
	Ref.	Wire, No. 22 AWG 7/30 stranded tinned copper with 1/64 wall plastic insulation, approved for 90°C., cotton or rayon braid and lacquer finish. Belden Mfg. Co.	AR	L.P.
-8	R181111	Jack - Speaker	2	181111
	Attaching Parts			
-9	R14997	Nut - Machine (special)	4	14997
-10	R16535	Washer - Flat	2	16535
	---***---			
-11	R161271-G1	Case Assembly (less speaker) replaces p/n 161154	1	161271
	Ref. 161154	Case Assembly (less speaker) Replace with p/n R161271-G1	Ref.	161154

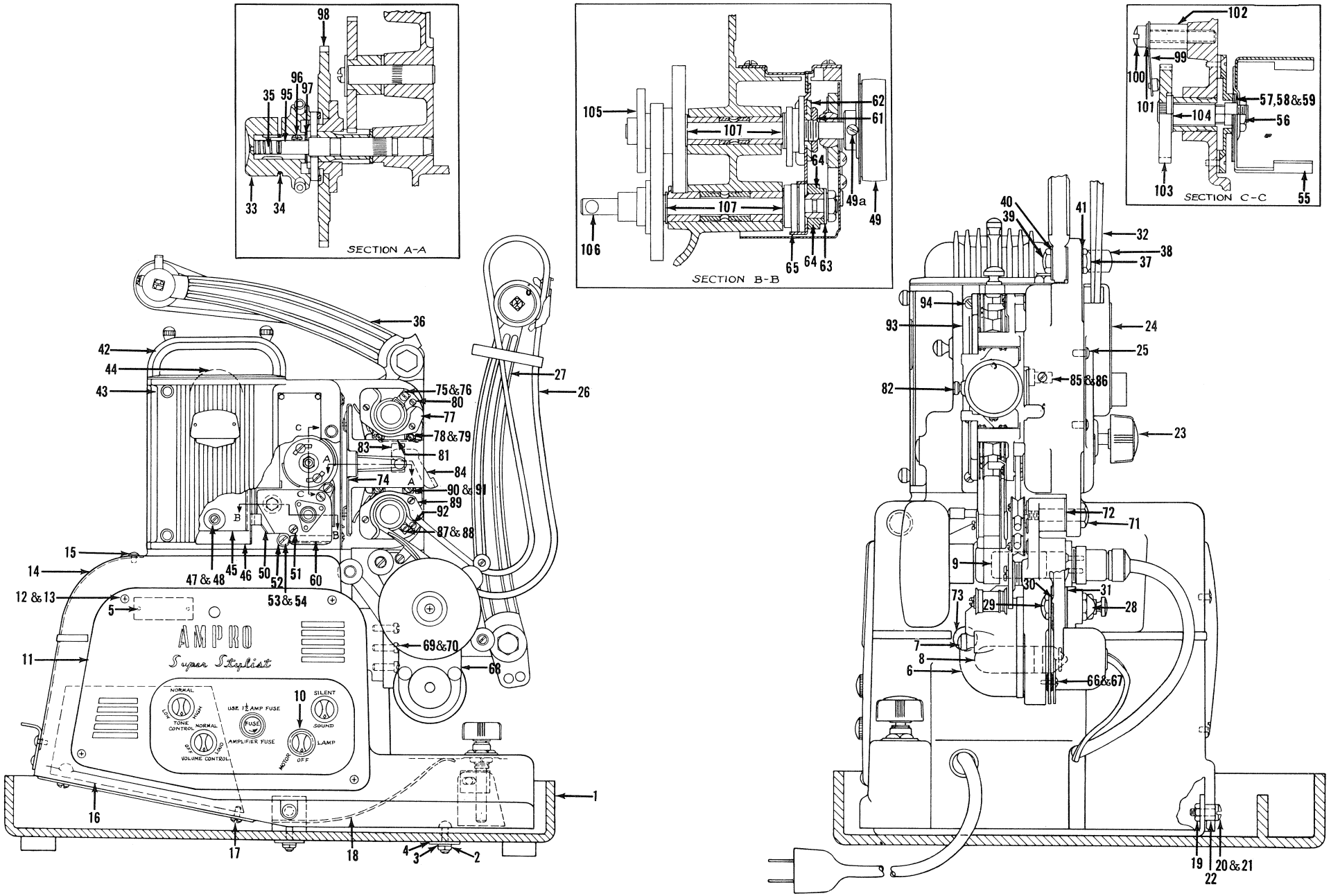


Figure 2. PROJECTOR COMPLETE

NOTE: The Parts List illustrates and indexes the Super Stylist 12, Model 512. Similar parts for other models follow immediately in the list.

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
2	R20964-G2	PROJECTOR COMPLETE - SUPER STYLIST "12", Model 512 .	Ref.	
	Ref.	PROJECTOR COMPLETE - SUPER STYLIST "12", Model 483 (replaced by Model 512).	Ref.	20964-1
	R20964-G1	PROJECTOR COMPLETE - SUPER STYLIST "10", Model 510 .	Ref.	
	Ref.	PROJECTOR COMPLETE - SUPER STYLIST "10", Model 482 (replaced by Model 510).	Ref.	20964
	R20964-G3	PROJECTOR COMPLETE - SUPER STYLIST "8", Model 508 . .	Ref.	
	Ref.	PROJECTOR COMPLETE - SUPER STYLIST "8", Model 484 (replaced by Model 508).	Ref.	200015
	R20964-G5	PROJECTOR COMPLETE - STYLIST DELUXE, Model 568 . . .	Ref.	
	R20964-G4	PROJECTOR COMPLETE - STYLIST DELUXE, Model 548 (replaced by Model 568).	Ref.	
	Ref.	PROJECTOR COMPLETE - STYLIST DELUXE, Model 472 (replaced by Model 548).	Ref.	20947
-1	R161272-G1	. Case Assembly - Carrying, Models 512 and 483 (Cat. 3976) .	1	161272
	Ref.	. Speaker and Case Assembly, Models 510 and 482 (Figure 3) .	1	
	Ref.	. Speaker and Case Assembly, Models 508 and 484 (Figure 4) .	1	
	Ref.	. Speaker and Case Assembly, Models 548, 568 and 472 (Fig. 5).	1	
	Attaching Parts			
-2	200-10HA	. Nut - Machine, #10-24, hex., steel, Cadmium Plate P-21 . .	3	14767
-3	R1687	. Washer - Lock, Ext. type, #10, (8, 10 or 12 teeth optional) . . .	3	1687
-4	35473-P42H	. Washer - Flat, 0.875 od 0.812 id 0.625 thk steel Nickel P-27 . .	3	14114
	---***---			
	Ref.	. Plate - Serial Number, not available for replacement.	Ref.	
	Attaching Part			
-5	120-0-3H	. Screw - Drive, 3/16 in. lg., #0, round head, Parker Kalon type U, Nickel Plate P-27	2	1479
	---***---			
-6	R16235-P1	. Cover - Exciter Lamp	1	16235
	Attaching Part			
-7	R16720	. Screw - Cover (special).	2	16720
	---***---			
-8	38386-P1	. Lamp - Exciter	1	18460
-9	R17572	. Cell - Photo Electric	1	17572
-10	R181241	. Knob - Control.	4	181241
-11	R161330-P1	. Panel - Control, Models 512, 510, 508, 484, 483 and 482	1	161330
	R161329-P1	. Panel - Control, Models 568, 548 and 472	1	161329
	Attaching Parts			
-12	110-6R4	. Screw - Machine, 1/4 in. lg., #6-32, straight side binding Phillips head, Brown Enamel L-71.	4	14991
-13	R161228	. Grommet - Rubber	4	161228
	---***---			
-14	R20959-G1	. Cover Assembly - Amplifier Tube, Models 512, 510, 508, 568, 484, 483 and 482	1	20959
	R20959-G2	. Cover Assembly - Amplifier Tube, Models 548 and 472. . . .	1	20327
	Attaching Part			
-15	110-6R4	. Screw - Machine, 1/4 in. lg., #6-32, straight side binding Phillips head, Brown Enamel L-71.	4	14991
	---***---			
-16	37278-G1	. Amplifier Assembly (AC) Figure 6. Models 512, 510, 508, 568 and replacement for Models 484, 483, 482, 548 and 472	1	
	NOTE: Refer to pages thru for amplifier assemblies 20952 and 20334 manufactured by Ampro.			
	Attaching Part			
-17	110-8-4A	. Screw - Machine, 1/4 in. lg., #8-32, straight side binding head, slotted, steel, Cadmium Plate P-21	4	14824
	---***---			

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
2-18	R20311-G1	. Tilting Assembly.	1	20311
	Attaching Parts			
-19	200-10HA	. Nut - Machine, #10-24, hex., steel, Cadmium Plate P-21 . .	2	14767
-20	110-10-10H	. Screw - Machine, 5/8 in. lg., #10-24, straight side binding head, slotted, steel, Nickel Plate P-27	2	14944
-21	R13111	. Washer - Spring	2	13111
-22	R12776	. Sleeve - Pivot	2	12776
	---***---			
-23	R16808	. Knob - Control.	1	16808
	170-8-6A	. . Screw - Set, 3/8 in. lg., #8-32, slotted headless, cup point, steel, Cadmium Plate P-21	1	
-24	R13750-P1	. Cover - Mechanism Housing	1	13750
	Attaching Part			
-25	110-6R4	. Screw - Machine, 1/4 in. lg., #6-32, straight side binding Phillips head, steel, Brown Enamel L-71	4	14991
	---***---			
-26	R15020	. Belt - Take-up.	1	15020
-27	R20939-G1	. Arm Assembly - Take-up Reel (Figure 7)	1	20939
	Attaching Parts			
-28	R14987	. Nut - Cap	1	14987
-29	R12640	. Stud - Reel Arm	1	12640
-30	R1331	. Washer - Reel Arm Tension	1	1331
-31	R1332	. Washer - Reel Arm Stud	1	1332
	---***---			
-32	R15029	. Belt - Rewind	1	15029
-33	R20309-G1	. Clutch Assembly - Rewind (Figure 8).	1	20309
	Attaching Part			
-34	R1530	. Ring - Snap	1	1530
	---***---			
-35	R1558	. Spring - Rewind Clutch Release.	1	1558
-36	R20940-G1	. Arm Assembly - Feed Reel (Figure 9)	1	20940
	Attaching Parts			
-37	R14987	. Nut - Cap	1	14987
-38	R13818	. Support - Rewind Belt.	1	13818
-39	R12640	. Stud - Reel Arm	1	12640
-40	R1331	. Washer - Reel Arm Tension	1	1331
-41	R1332	. Washer - Reel Arm Stud	1	1332
	---***---			
-42	R190010-G1	. Cover Assembly - Lamphouse (Figure 10)	1	190010
-43	R20333-G1	. Cover Assembly - Front (Figure 11)	1	20333
-44	R1595-115	. Lamp - Projector, 750w, DDB (750T12P)	1	LP1595-115
-45	R13805-P1	. Heat Shield - Inner Rear	1	13805
-46	R13803-G1	. Heat Shield Assembly - Rear	1	13803
	Attaching Parts			
-47	R1464	. Screw - Sheet Metal, 1/2 in. lg., #4, round head, type "Z". .	2	1464
-48	R1642	. Washer - Flat	2	1642
	---***---			
-49	R12978-G1	. Pulley Assembly - Drive	1	12978
-49a	170-8-3A	. . Screw - Set, 3/16 in. lg., #8-32, slotted headless, steel Cadmium Plate P-21	1	1401
-50	R13609	. Shield - Shuttle	1	13609
	Attaching Part			
-51	102-6-4A	. Screw - Machine, 1/4 in. lg., #6-32, round head, slotted, steel, Cadmium Plate P-21.	2	14519
	---***---			
-52	R1986-G1	. Bearing Assembly - Vertical Cam Shaft	1	1986
	Attaching Parts			
-53	102-6-8A	. Screw - Machine, 1/2 in. lg., #6-32, round head, slotted, steel, Cadmium Plate P-21.	2	1433
-54	221-6L	. Washer - Lock, Internal type, for #6 screw, Shakeproof type 12, Cat. 1206, steel, Black Oxide S-7.	2	14703
	---***---			

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
2-55	R20443-G1	Shutter Assembly - Interrupter (Figure 12)	1	20443
	Attaching Part			
-56	R1209	Nut - Interrupter Shutter Assembly.	1	1209
	---***---			
-57	R14312	Washer - Bakelite	1	14312
-58	R1651	Washer - Flat, .005 in. thk.	AR	1651
-59	R14902-3	Washer - Flat, .003 in. thk.	AR	14902-3
-60	R16644	Pad Shuttle - Oil	1	16644
	R17005-31	Shim - Shuttle Pad, 1/32 in. thk.	AR	17005-31
	R17005-62	Shim - Shuttle Pad, 1/16 in. thk.	AR	17005-62
-61	R1212	Nut - Vertical Cam	1	1212
-62	R1292	Washer - Vertical Cam Shoulder	1	1292
	R1290	Nut - Lateral Cam, NOTE: Part of Shaft Assembly - Lateral Cam see p/n R190042-G1 Shaft Assembly for procurement	Ref.	1290
-63	R1677	Washer - Lateral Cam	1	1677
	R19193-G1	Shuttle Assembly	1	19193
-64	R19380-G1	. Pivot Assembly - Shuttle	NP NHA	19380
-65	R13608	. Shuttle.	NP NHA	13608
-66	R14610	Screw - Machine, 3/8 in. lg., #4-36, fillister head.	3	14610
-67	32090-P23	Spacer - Grommet.	3	12540
-68	R20946-G1	Sound Head Assembly (Figure 13) Models 512, 510, 508, 484, 483 and 482	1	20946-1
	R20946-G2	Sound Head Assembly (Figure 13) Models 568, 548 and 472	1	20946
	Attaching Parts			
-69	R14510	Screw - Machine, 5/8 in. lg., #10-32, fillister head	3	14510
-70	221-10A	Washer - Lock, Internal type, for #10 screw, Shakeproof type 12, Cat. 1210, steel, Cadmium Plate P-21.	3	14768
-71	R12817	Stud - Sound Head	1	12817
-72	R14976	Washer - Flat	AR	14976
	---***---			
-73	R18670	Plug - Button	1	18670
-74	R20306-G1	Shoe Assembly - Pressure (Figure 14).	1	20306
-75	38373	Stripper - Film	1	13030
	Attaching Part			
-76	R1295	Screw - Machine, 3/16 in. lg., #4-36, binding head	1	1295
	---***---			
-77	R20973-G1	Shoe Assembly - Feed Sprocket (Figure 15)	1	20973
	Attaching Parts			
-78	R14610	Screw - Machine, 3/8 in. lg., #4-36, fillister head.	2	14610
-79	R13037	Gib - Lens Holder	1	13037
-80	R1427	Screw - Machine, 1/2 in. lg., #4-36, fillister head.	1	1427
	---***---			
-81	R1367	Spring - Projector Lens Holder.	1	1367
-82	R20305-G1	Holder Assembly - Projection Lens (Figure 16)	1	20305
-83	R1366	Shoe - Gate Lever	1	1366
-84	R20364-G1	Lever Assembly - Gate	1	20364
-85	R12791	Pivot - Gate Lever Eccentric	1	12791
	Attaching Part			
-86	110-6R4	Screw - Machine, 1/4 in. lg., #6-32, straight side binding Phillips head, Brown Enamel L-71.	1	14991
	---***---			
-87	38373	Stripper - Film	1	13030
	Attaching Part			
-88	R1295	Screw - Machine, 3/16 in. lg., #4-36, binding head.	1	1295
	---***---			
-89	R20974-G1	Shoe Assembly - Take-up Sprocket (Figure 17)	1	20974
	Attaching Parts			
-90	R14610	Screw - Machine, 3/8 in. lg., #4-36, fillister head.	2	14610
-91	R13037	Gib - Lens Holder	1	13037
-92	R1427	Screw - Machine, 1/2 in. lg., #4-36, binding head	1	1427
	---***---			

Figure and Index No.	Part Number	1 2 3 4 5 6 Nomenclature	Qty.	Ampro p/n
2-93	R20432-G1	. Plate Assembly - Aperture (Figure 18) Models 512, 510, 508, 484, 483 and 482	1	20432-1
	R20432-G2	. Plate Assembly - Aperture (Figure 18) Models 568, 548 and 472	1	20432
	Attaching Part			
-94	R14621	. Screw - Machine, 3/16 in. lg., #4-36, truss head	5	14621
	---***---			
-95	R12786	. Collar - Intermediate Sprocket Gear	1	12786
	Attaching Part			
-96	R1298	. Screw - Machine	1	1298
	---***---			
-97	R14742	. Washer - Flat	1	14742
-98	R20328-G1	. Gear Assembly - Intermediate Sprocket	1	20328
	R12801	. . Pin - Drive	2	12801
-99	R20808-G1	. Brake Assembly - Shutter Gear.	1	20808
	Attaching Parts			
-100	106-8-14L	. Screw - Machine, 7/8 in. lg., #8-32, oval fillister head, slotted, steel, Black Oxide S-7.	1	14652
-101	221-8A	. Washer - Lock, Internal type, for #8 screw, Shakeproof type 12, Cat. 1208, steel, Cadmium Plate P-21	1	14849
-102	R12781	. Sleeve - Spacer	1	12781
-103	R20592-G1	. Shaft Assembly - Interrupter Shutter	1	20592
-104	R1651	. Washer - Flat	1	1651
-105	R190043-G1	. Shaft Assembly - Vertical Cam (Figure 19) Used on Projectors bearing Serial No. 129701 and up.	1	190043
	R20496-G1	. Shaft Assembly - Vertical Cam (Figure 19A) Used on Projectors bearing Serial No. below 129701	1	20496
-106	R190042-G1	. Shaft Assembly - Lateral Cam (Figure 20) Used on Projectors bearing Serial No. 129701 and up.	1	190042
	R19279-G1	. Shaft Assembly - Lateral Cam (Figure 20A) Used on Projectors bearing Serial No. below 129701	1	19279
-107	R1313-3	. Washer - Flat, .003 in. thk.	AR	1313-3
	R1313-4	. Washer - Flat, .004 in. thk.	AR	1313-4
	R1313-10	. Washer - Flat, .010 in. thk.	AR	1313-10
	Ref.	. Base & Mechanism Assembly (Figure 21)	Ref.	

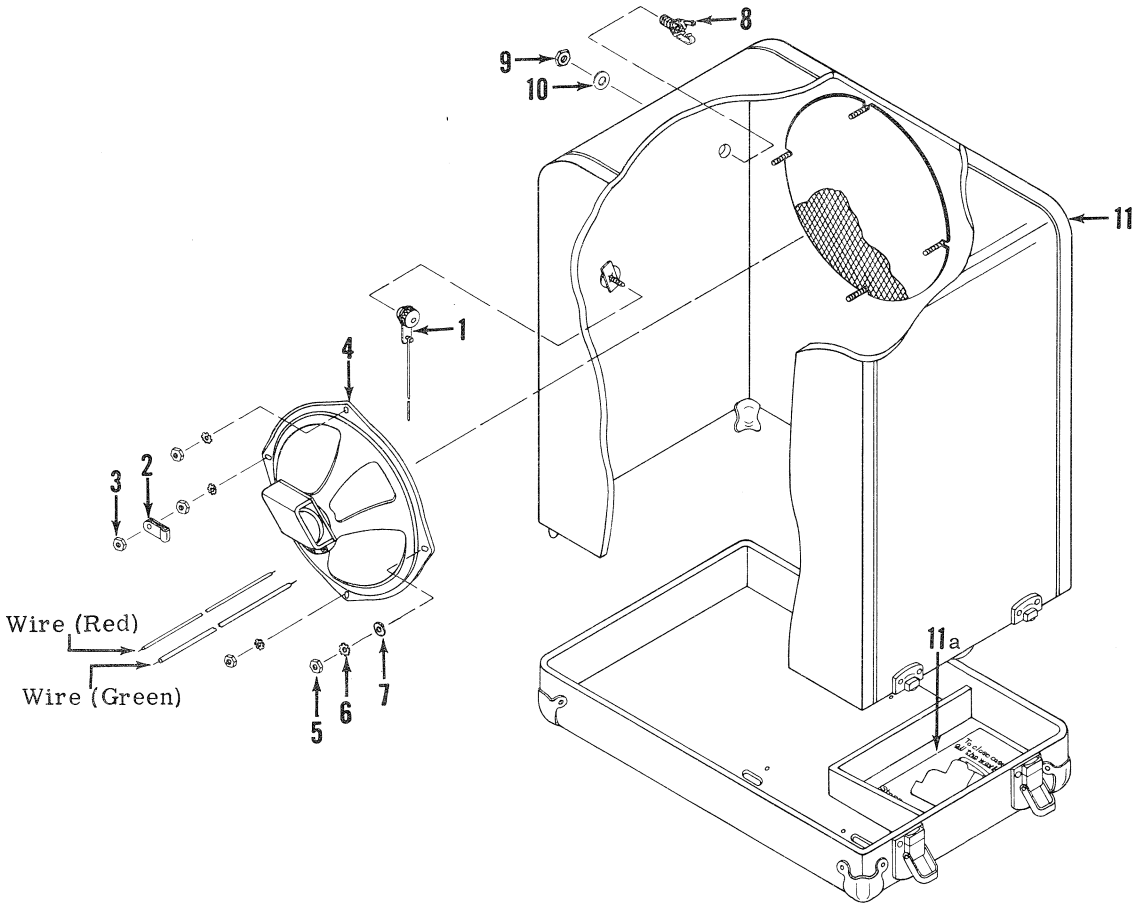


Figure 3. SPEAKER AND CASE ASSEMBLY

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
3	37235-G1	SPEAKER AND CASE ASSEMBLY (Cat. 3975) Replaces p/n 200004 and 20965)	Ref.	
	Ref.	SPEAKER AND CASE ASSEMBLY, no longer available.	Ref.	20965
	R17118	. Grille - Speaker, available replacement for Speaker and Case Assembly 20965	1	17118
-1	R20982-G1	. Nut Assembly - Reel.	1	20982
-2	R18567	. Clamp - Cable	1	18567
	Attaching Part			
-3	200-8HH	. Nut - Machine, #8-32, hex., steel, Nickel Plate P-27	1	1453
	---***---			
-4	R16239-P1	. Speaker (10 in.)	1	16239
	Attaching Parts			
-5	200-8HH	. Nut - Machine, #8-32, hex., steel, Nickel Plate P-27	4	1453
-6	220-8L	. Washer - Lock, External type, for #8 screw, Shakeproof type 11, Cat. 1108-00, steel, Black Oxide S-7	4	1679
-7	R14242	. Washer - Flat	4	14242
	---***---			
	Ref.	. Wire, No. 22 AWG 7/30 stranded tinned copper with 1/64 wall plastic insulation, approved for 90°C., cotton or rayon braid and lacquer finish. Belden Mfg. Co. . . .	AR	L.P.
-8	R17117	. Jack - Speaker.	1	17117
	Attaching Parts			
-9	R14997	. Nut - Machine (special)	1	14997
-10	R16535	. Washer - Flat	1	16535
	---***---			
-11	R161269-G1	. Case Assembly (less speaker) replaces p/n 17120.	1	161269
-11a	R16931	. . Instruction Sheet	1	16931

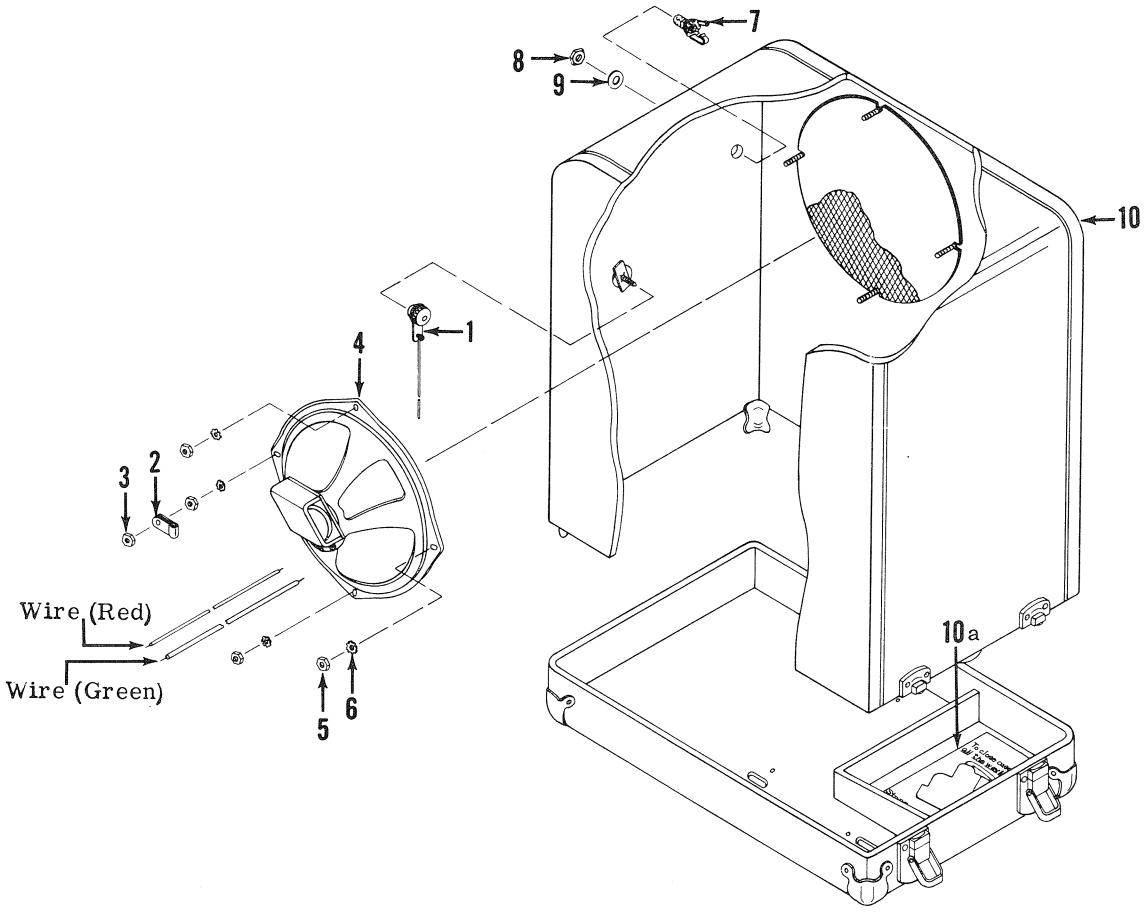


Figure 4. SPEAKER AND CASE ASSEMBLY

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
4	37235-G2	SPEAKER AND CASE ASSEMBLY (Cat. 3977) Replaces p/n 200013	Ref.	
-1	R20982-G1	. Nut Assembly - Reel	1	20982
-2	R18567	. Clamp - Cable	1	18567
	Attaching Part			
-3	200-8HH	. Nut - Machine, #8-32, hex., steel, Nickel Plate P-27	1	1453
	---***---			
-4	R181365-P1	. Speaker (8 in.)	1	181365
	Attaching Parts			
-5	200-8HH	. Nut - Machine, #8-32, hex., steel, Nickel Plate P-27	4	1453
-6	220-8L	. Washer - Lock, External type, for #8 screw, Shakeproof type 11, Cat. 1108-00, steel, Black Oxide S-7	4	1679
	---***---			
	Ref.	. Wire, No. 22 AWG 7/30 stranded tinned copper with 1/64 wall plastic insulation, approved for 90°C., cotton or rayon braid and lacquer finish. Belden Mfg. Co.	AR	L.P.
-7	R17117	. Jack - Speaker	1	17117
	Attaching Parts			
-8	R14997	. Nut - Machine (special)	1	14997
-9	R16535	. Washer - Flat	1	16535
	---***---			
-10	R161270-G1	. Case Assembly (less speaker)	1	161270
-10a	R16931	. . Instruction Sheet	1	16931

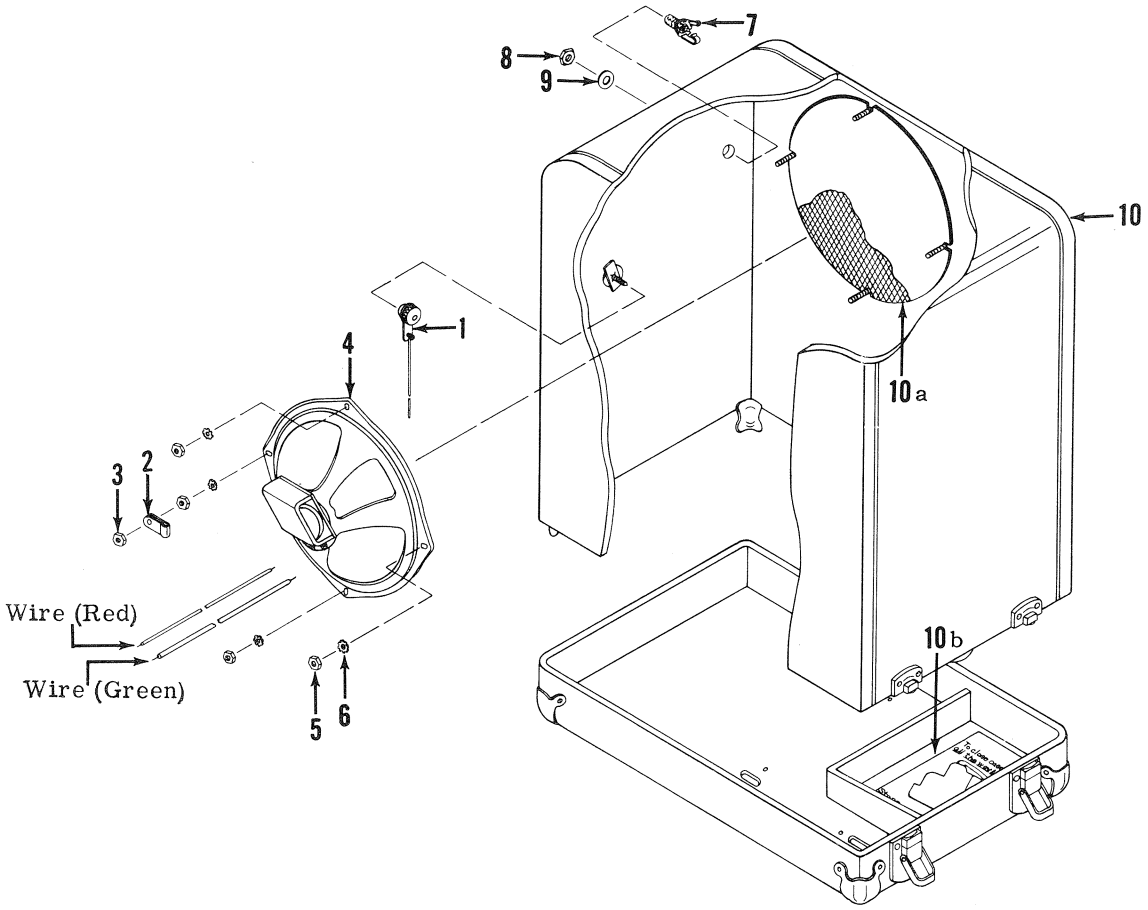
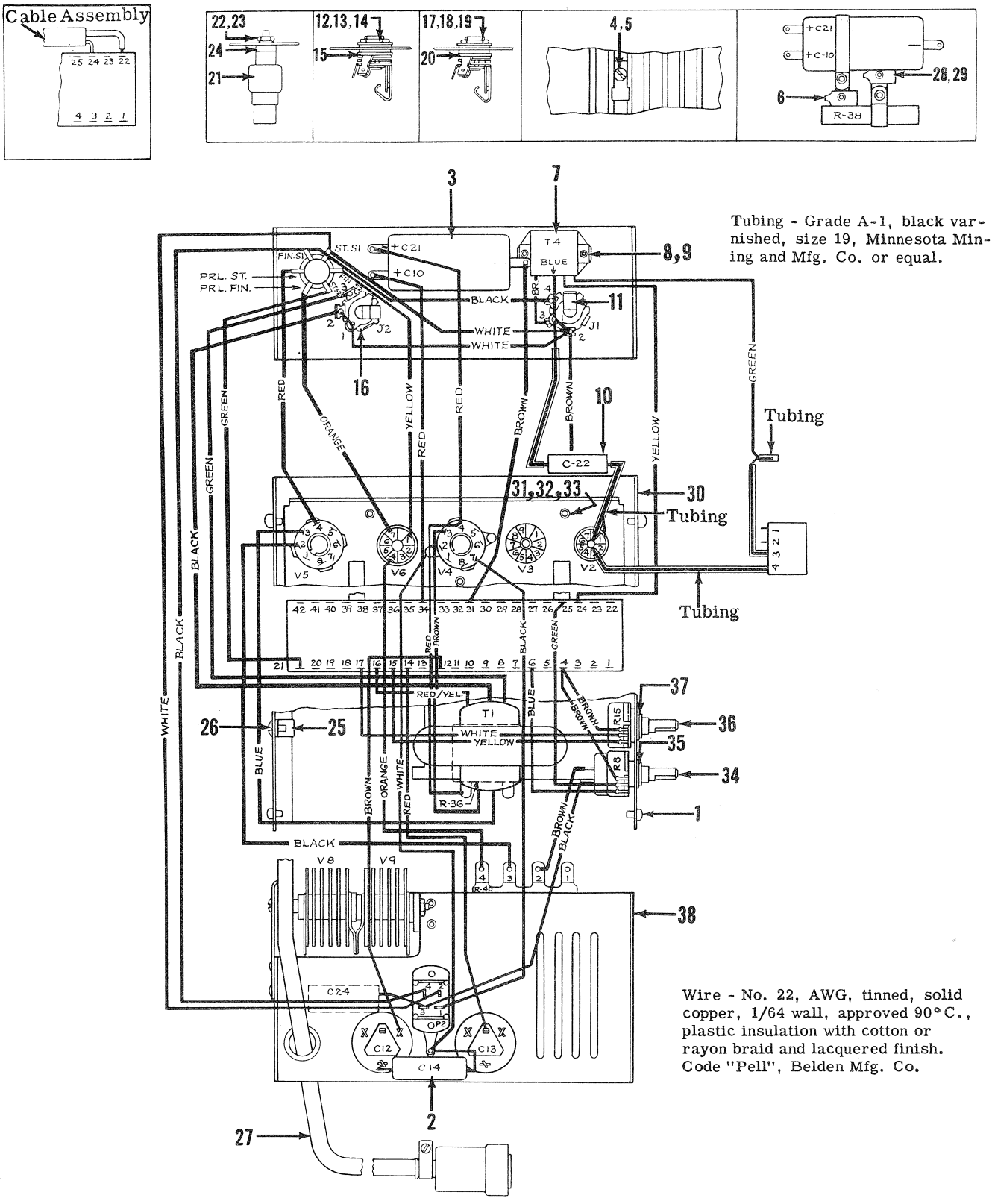


Figure 5. SPEAKER AND CASE ASSEMBLY

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
5	37235-G3	SPEAKER AND CASE ASSEMBLY (Cat. 3473) Replaces p/n 20938 Ref.		
-1	R20982-G1	. Nut Assembly - Reel	1	20982
-2	R18567	. Clamp - Cable	1	18567
	Attaching Part			
-3	200-8HH	. Nut - Machine, #8-32 hex., steel, Nickel Plate P-27	1	1453
	---***---			
-4	37246-P1	. Speaker (8 in.) Replaces p/n 18599.	1	
	Ref.	. Speaker (8 in.) Replaced by 37246-P1	NP	18599
	Attaching Parts			
-5	200-8HH	. Nut - Machine, #8-32, hex., steel, Nickel Plate P-27	4	1453
-6	220-8L	. Washer - Lock, External type, for #8 screw, Shakeproof type 11, Cat. 1108-00, steel, Black Oxide S-7	4	1679
	---***---			
	Ref.	. Wire, No. 22 AWG 7/30 stranded tinned copper with 1/64 wall plastic insulation, approved for 90°C., cotton or rayon braid and lacquer finish. Belden Mfg. Co.	AR	L.P.
-7	R17117	. Jack - Speaker.	1	17117
	Attaching Parts			
-8	R14997	. Nut - Machine (special)	1	14997
-9	R16535	. Washer - Flat	1	16535
	---***---			
-10	R16228-G1M	. Case Assembly	1	
-10a	R17128-P1	. . Grille - Speaker.	1	17128
-10b	R16931	. . Instruction Sheet	1	16931
	Ref.	. . Case Assembly (less grille)	NP NHA	16228



Tubing - Grade A-1, black varnished, size 19, Minnesota Mining and Mfg. Co. or equal.

Wire - No. 22, AWG, tinned, solid copper, 1/64 wall, approved 90°C., plastic insulation with cotton or rayon braid and lacquered finish. Code "Pell", Belden Mfg. Co.

Figure 6. AMPLIFIER ASSEMBLY (AC)

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty. Ref.	Amprop/n
6	37278-G1	AMPLIFIER ASSEMBLY (AC)	Ref.	
	R18657	. Shield, Tube Cover	1	18657
	R18495	. Tube, 6BH6	1	18495
	R18497	. Tube, 12AX7	1	18497
	R18498	. Tube, 50C5	1	18498
	R17098	. Tube, 50L6-GT	2	17098
	R20949-G1	. Cover Assembly - Amplifier	1	20949
	Attaching Part			
-1	121-6R4A	. Screw - Self Tapping, 1/4 in. lg., #6, binding (pan) Phillips head, Parker Kalon type "Z", steel, Cadmium Plate P-21	4	14773
	---***---			
-2	R18580	. Capacitor, 0.2 mfd., 150v., paper	1	18580
-3	R17096	. Capacitor, 30-30 mfd., 250v., dry electrolytic	1	17096
	Attaching Parts			
-4	102-6-4A	. Screw - Machine, 1/4 in. lg., #6-32, round head, slotted, steel, Cadmium Plate P-21.	1	14519
-5	37293	. Clip	1	
-6	R14117	. Nut - Speed, #6-32, type "U", Tinnerman Products Inc. p/n C8092-632-27	1	14117
	---***---			
-7	R18642-P1	. Transformer - Input.	1	18642
	Attaching Parts			
-8	121-2-4A	. Screw - Self Tapping, 1/4 in. lg.,#2, binding (pan) head, Parker Kalon type "Z", slotted, steel, Cadmium Plate P-21	2	1487
-9	202-1-2S	. Nut - Speed, Tinnerman Products Inc. p/n C7886-008-27, Oil Dip.	2	14967
	---***---			
-10	R18586	. Capacitor, .03 mfd., 150v., paper.	1	18586
-11	R18592	. Jack - Phono Mic	1	18592
	Attaching Parts			
-12	R14669	. Nut - Machine (special)	1	14669
-13	221-616L	. Washer - Lock,Internal type, for 3/8 in. dia. screw, Shakeproof type 12, Cat. 1220, steel, Black Oxide S-7	1	16523
-14	R18553	. Washer - Flat	1	18553
-15	R18554	. Washer - Extruded	1	18554
	---***---			
-16	R18597	. Jack - Speaker.	1	18597
	Attaching Parts			
-17	R14669	. Nut - Machine (special)	1	14669
-18	221-616L	. Washer - Lock, Internal type, for 3/8 in. screw, Shakeproof type 12, Cat. 1220, steel, Black Oxide S-7.	1	16523
-19	R18553	. Washer - Flat	1	18553
-20	R18554	. Washer - Extruded	1	18554
	---***---			
-21	R17086-P1	. Coil - Oscillator.	1	17086
	Attaching Parts			
-22	200-6HA	. Nut - Machine, #6-32, hex., steel, Cadmium Plate P-21	1	
-23	221-6L	. Washer - Lock, Internal type, for #6 screw, Shakeproof type 12, Cat. 1206, Black Oxide S-7	1	14703
-24	31824	. Spacer	1	
	---***---			
-25	R18656	. Clamp - Cable	1	18656
	Attaching Part			
-26	102-6-4A	. Screw - Machine, 1/4 in. lg., #6-32, round head, slotted, steel, Cadmium Plate P-21	1	14519
	---***---			
-27	R20336-G1	. Cable Assembly - P.E.C. (Figure 6A)	1	20336
-28	102-6-4A	. Screw - Machine, 1/4 in. lg., #6-32, round head, slotted, steel, Cadmium Plate P-21.	1	14519
-29	R14117	. Nut - Speed, #6-32, type "U", Tinnerman Products Inc. p/n C8092-632-27	1	14117

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
6-30	37280-G1	Terminal Board & Platform Assembly (Figure 6B)	1	
	Attaching Parts			
-31	121-4-6A	. Screw - Self Tapping, 3/8 in. lg., #4, binding (pan) head, Parker Kalon type "Z", slotted, steel, Cadmium Plate P-21 . .	3	
-32	R14729	. Washer - Flat	3	14729
-33	32090-P23	. Spacer - Grommet	3	12540
	---***---			
-34	37283-G1	. Control Assembly - Volume	1	
	R181240	. . Control - Volume	NP	NHA181240
	Attaching Part			
-35	R14854	. Nut - Machine (3/8-32 washer type)	1	14854
	---***---			
-36	37284-G1	. Control Assembly - Tone	1	
	R181238	. . Control - Tone	NP	NHA181238
	Attaching Part			
-37	R14854	. Nut - Machine (3/8-32 washer type)	1	14854
	---***---			
-38	37279-G1	. Chassis Complete (Figure 6C)	1	

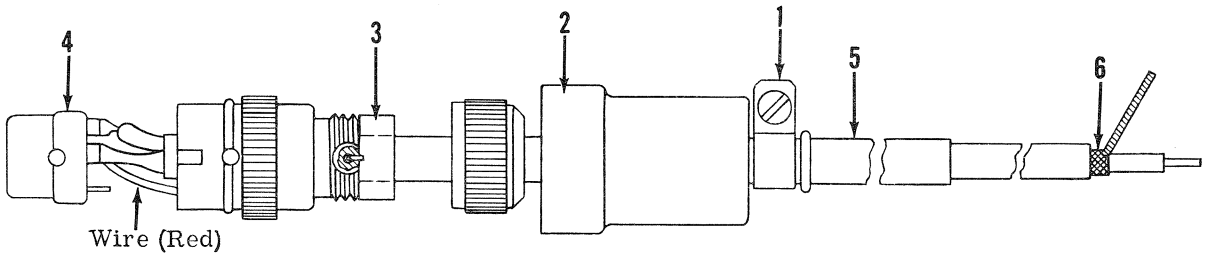


Figure 6A. CABLE ASSEMBLY - P.E.C.

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
6A	R20336-G1	CABLE ASSEMBLY - P.E.C.	Ref.	20336
-1	R18555	. Clamp - Cable	1	18555
	102B6-8H	. . Screw - Machine, 1/2 in. lg., #6-32, round head, slotted, brass, Nickel Plate P-27	1	
-2	R12734	. Insulator - Socket	1	12734
-3	37796	. Washer - Socket	1	
	Ref.	. Wire, No. 22 AWG 7/30 stranded tinned copper with 1/64 wall plastic insulation, approved for 90°C., cotton or rayon braid and lacquer finish. Belden Mfg. Co. . . .	1	L.P.
-4	R17567-P2	. Socket - Cable	1	17567
-5	37795	. Tubing, Extruded vinyl, 105°C. grade, brown, type 400, Natvar Corp.	1	
-6	R18850	. Cable - P.E.C.	1	18850

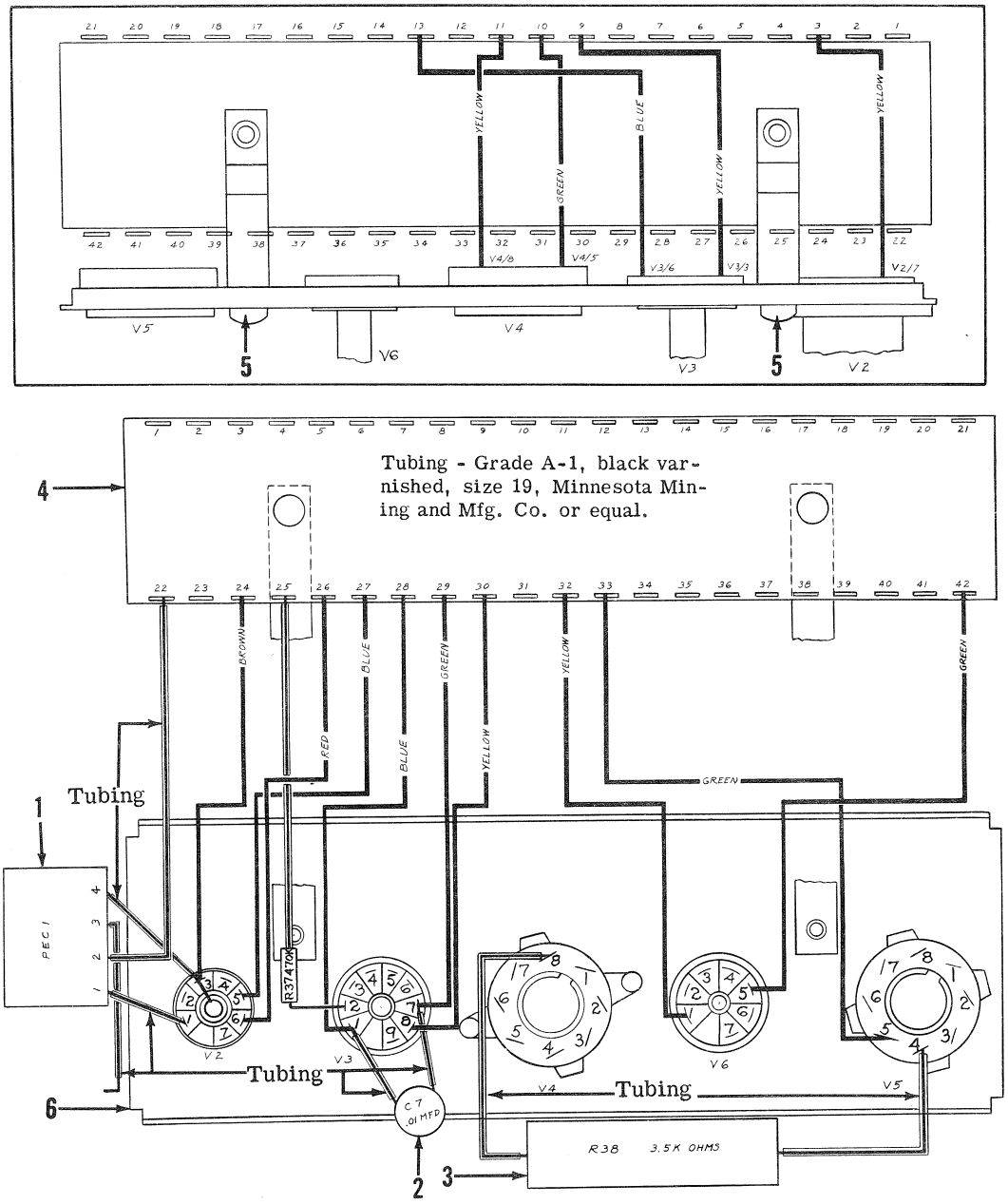
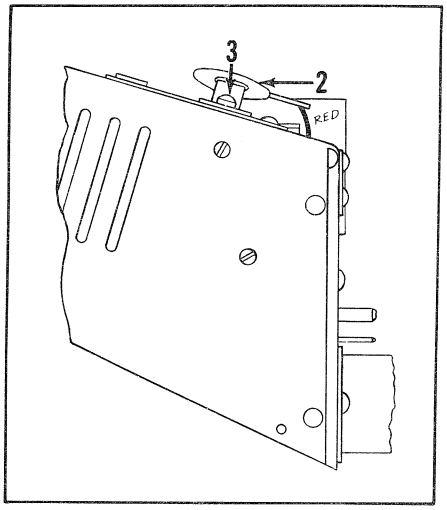
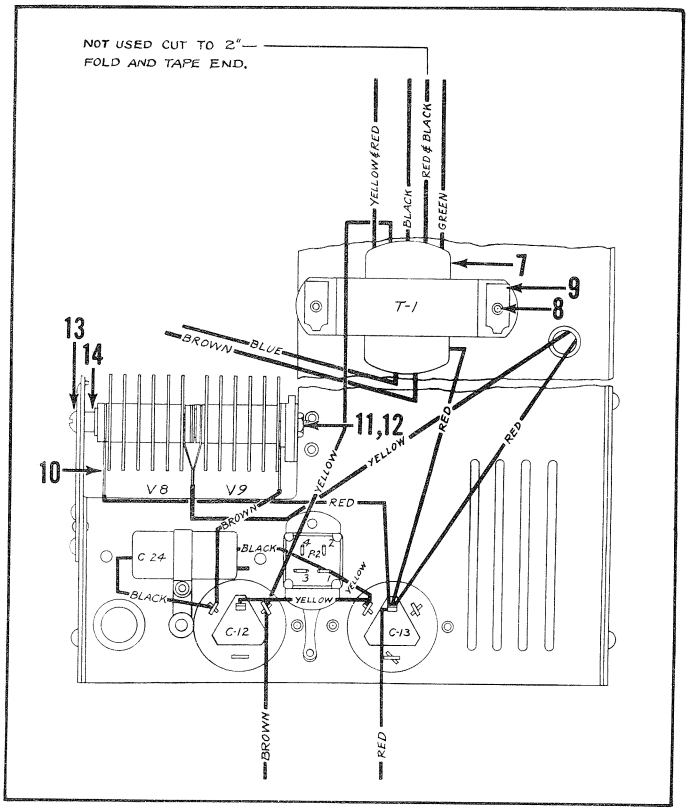


Figure 6B. TERMINAL BOARD AND PLATFORM ASSEMBLY

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
6B	37280-G1	TERMINAL BOARD & PLATFORM ASSEMBLY . . . . . .Ref.		
-1	37115	. Circuit - Electronic	1	
-2	R18487	. Capacitor, 0.01 mfd., 400v., disc ceramic dielectric	1	18487
-3	R17088	. Resistor, 3.5k ohms., 10w, wire wound	1	17088
-4	37282-G1	. Board Complete - Terminal (Figure 6D)	1	
	Attaching Part			
-5	121-6R4A	. Screw - Machine, 1/4 in. lg., #6, binding (pan) Phillips head, Parker Kalon type "Z", steel, Cadmium Plate P-21. .	2	14773
	---***---			
-6	37281-G1	. Platform Complete - Tube (Figure 6E).	1	





Wire - No. 22 AWG solid tinned copper with 1/64 wall plastic insulation , approved for 90° C., cotton or rayon braid and lacquer finish. Code "Pell" Belden Mfg. Co. or equal.

NOTE: Cut off alignment lug on "V8" rectifier before assembly to "V9" rectifier to prevent grounding of V8 and V9.

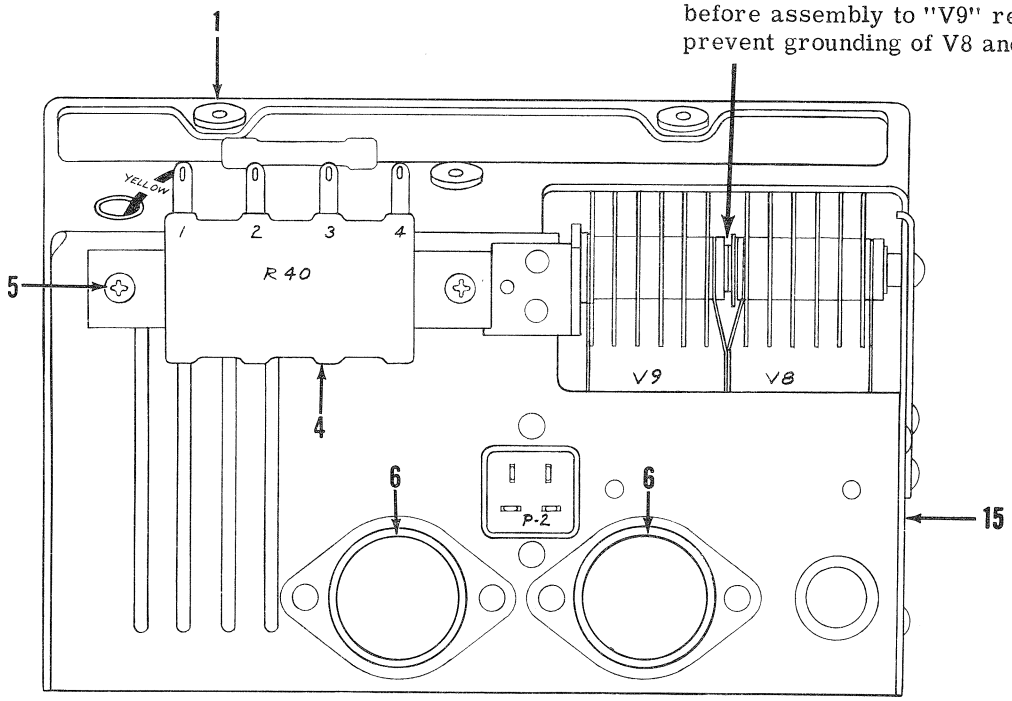


Figure 6C. CHASSIS COMPLETE

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
6C	37279-G1	CHASSIS COMPLETE	Ref.	
-1	265-2	. Grommet - Rubber, Western Rubber Co., p/n G1268	3	17593
-2	R17094	. Resistor, 1000 ohm., 30w, wire wound	1	17094
	Attaching Part			
-3	121-6R4A	. Screw - Self Tapping, 1/4 in. lg., #6, binding (pan) Phillips head, Parker Kalon type "Z", steel, Cadmium Plate P-21	2	14773
	---***---			
-4	37118	. Resistor, ceramic, three section type, resistances, first section - 15 ohms., 10w, second section - 29 ohms., 5w, third section - 250 ohms., 7.5w, Tech - Ohm Resistor Corp.	1	
	Attaching Part			
-5	121-6R12A	. Screw - Self Tapping, 3/4 in. lg., #6, binding (pan) Phillips head, Parker Kalon type "Z", steel, Cadmium Plate P-21	2	
	---***---			
-6	R18491	. Capacitor, 80 mfd., 150v., electrolytic	2	18491
-7	R181162-P1	. Transformer - Output	1	181162
	Attaching Parts			
-8	102-6-4A	. Screw - Machine, 1/4 in. lg., #6-32, round head, slotted, steel, Cadmium Plate P-21	2	14519
-9	R14117	. Nut - Speed, #6-32, type "U", Tinnerman Products Inc., p/n C8092-632-27	2	14117
	---***---			
-10	37117	. Rectifier, selenium type, Federal Telephone & Radio Cat. 6H250AE	2	
	Attaching Parts			
-11	200-6HA	. Nut - Machine, #6-32, hex., steel, Cadmium Plate P-21	1	
-12	221-6L	. Washer - Lock, Internal type, for #6 screw, Shakeproof type 12, Cat. 1206, Black Oxide S-7	1	14703
-13	37198	. Screw - Machine (special)	1	
-14	32090-P8	. Spacer	1	
-15	R200018-G1	. Chassis Assembly	1	200018
	R18993	. . Capacitor (line filter)	1	18993
	Attaching Parts			
	R14760	. . Rivet - Tubular, 0.187 in. lg., 0.125 in. dia., oval head, steel, Cadmium Plate P-21	1	14760
	R14729	. . Washer - Flat	1	14729
	---***---			
	R18494	. . Plate - Capacitor, Magnavox Co. p/n 281021-G1	2	18494
	Attaching Part			
	R14760	. . Rivet - Tubular, 0.187 in. lg., 0.125 in. dia., oval head, steel, Cadmium Plate P-21	3	14760
	---***---			
	R18590	. . Plug - Chassis, four contact male plug with angle brackets, Cinch Jones Mfg. Co., Cat. P-304-AB	1	18590
	Attaching Parts			
	R14760	. . Rivet - Tubular, 0.187 in. lg., 0.125 in. dia., oval head, steel, Cadmium Plate P-21	1	14760
	30363-P12A	. . Rivet - Hollow, 0.125 in. lg., 0.123 dia., oval head, brass, Cadmium Plate P-21	1	1474
	---***---			
	R18593	. . Lug - Solder, 6 lug, Shakeproof Cat. 2103	1	18593
	R131314	. . Bracket - Rectifier (Outside)	1	131314
	R131316	. . Bracket - Rectifier (Inside)	1	131316
	Attaching Part			
	30363-P12A	. . Rivet - Hollow, 0.125 in. lg., 0.123 in. dia. oval head, brass, Cadmium Plate P-21	4	1474
	---***---			
	R13763-1	. . Chassis - Amplifier	NP	NHA13763-1

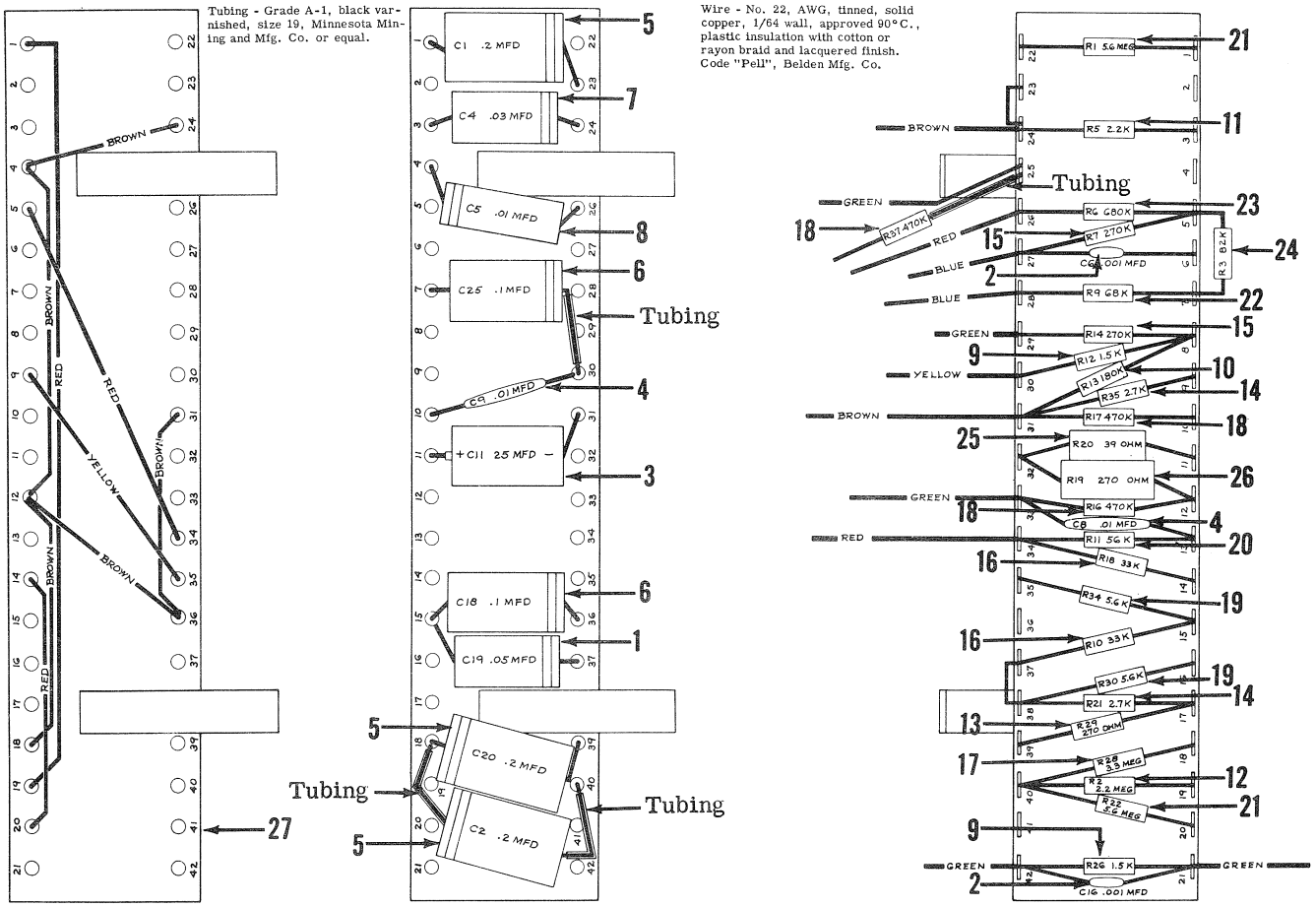


Figure 6D. BOARD COMPLETE - TERMINAL

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
6D-	37282-G1	BOARD COMPLETE - TERMINAL	Ref.	
-1	R18484	. Capacitor, .05 mfd., 150v., paper	1	18484
-2	R18485	. Capacitor, .001 mfd., 400v., ceramic	2	18485
-3	R18486	. Capacitor, 25 mfd., 15v., electrolytic	1	18486
-4	R18487	. Capacitor, .01 mfd., 400v., ceramic	2	18487
-5	R18580	. Capacitor, .2 mfd., 150v., paper	3	18580
-6	R18585	. Capacitor, .1 mfd., 150v., paper	2	18585
-7	R18586	. Capacitor, .03 mfd., 150v., paper	1	18586
-8	37119	. Capacitor, .01 mfd., 200v., paper	1	
-9	402-15-2-3	. Resistor, 1/2 w, 1.5k ohm., ±5% tol., carbon	2	18483
-10	402-18-4-2	. Resistor, 1/2 w, 180k ohm., ±10% tol., carbon	1	17095
-11	402-22-2-2	. Resistor, 1/2 w, 2.2k ohm., ±10% tol., carbon	1	18472
-12	402-22-5-2	. Resistor, 1/2 w, 2.2 meg., ±10% tol., carbon	1	18465
-13	402-27-1-2	. Resistor, 1/2 w, 270 ohm., ±10% tol., carbon	1	18476
-14	402-27-2-2	. Resistor, 1/2 w, 2.7k ohm., ±10% tol., carbon	2	18582
-15	402-27-4-2	. Resistor, 1/2 w, 270k ohm., ±10% tol., carbon	2	18468
-16	402-33-3-2	. Resistor, 1/2 w, 33k ohm., ±10% tol., carbon	2	18692
-17	402-33-5-2	. Resistor, 1/2 w, 3.3 meg., ±10% tol., carbon	1	17807
-18	402-47-4-2	. Resistor, 1/2 w, 470k ohm., ±10% tol., carbon	3	18474
-19	402-56-2-2	. Resistor, 1/2 w, 5.6k ohm., ±10% tol., carbon	2	18470
-20	402-56-3-2	. Resistor, 1/2 w, 56k ohm., ±10% tol., carbon	1	17965
-21	402-56-5-2	. Resistor, 1/2 w, 5.6 meg., ±10% tol., carbon	2	18464
-22	402-68-3-2	. Resistor, 1/2 w, 68k ohm., ±10% tol., carbon	1	17957
-23	402-68-4-2	. Resistor, 1/2 w, 680k ohm., ±10% tol., carbon	1	17099
-24	402-82-3-2	. Resistor, 1/2 w, 82k ohm., ±10% tol., carbon	1	18479
-25	403-39-0-2	. Resistor, 1 w, 39 ohm., ±10% tol., carbon	1	17079
-26	404-27-1-2	. Resistor, 2 w, 270 ohm., ±10% tol., carbon	1	18991
-27	37248-G1	. Board Assembly	NP	NHA

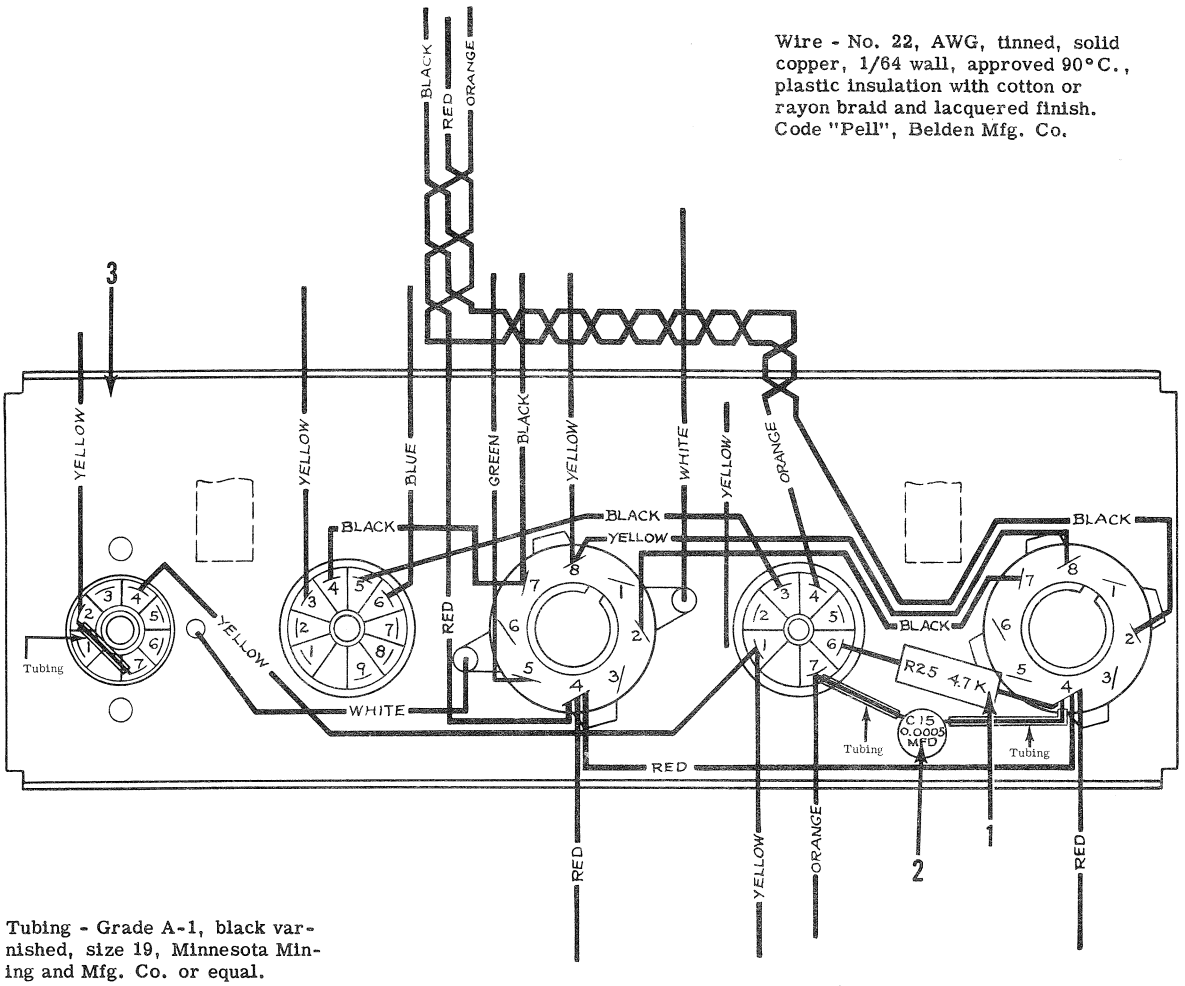


Figure 6E. PLATFORM COMPLETE - TUBE

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
6E	37281-G1	PLATFORM COMPLETE - TUBE . . . . . .Ref.		
-1	403-47-2-3	. Resistor, 1w, 4700 ohms., ±5% tol., carbon	1	17090
-2	R18489	. Capacitor, .0005 mfd., 500v., disc ceramic dielectric	1	18489
-3	37125-G1	. Platform Assembly (see figure 6F for piece part procurement)	NP	NHA

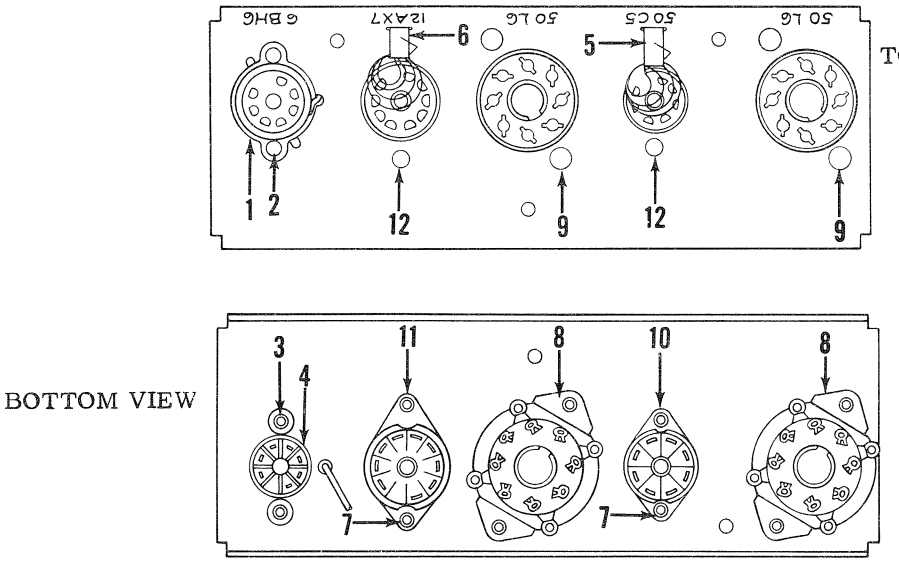


Figure 6F. PLATFORM ASSEMBLY

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
6F	37125-G1	PLATFORM ASSEMBLY (see index 3, figure 6E)	Ref.	
-1	37295-G1	. Base Assembly - Slotted Shield	1	
	Attaching Parts			
-2	33560-P36A	. Rivet - Hollow, 0.156 in. lg., 0.123 dia., oval head, brass, Cadmium Plate P-21	2	
-3	33500-P31A	. Washer - Flat, 0.250 in. OD, 0.127 in. ID, 0.032 in. thick, steel, Cadmium Plate P-21	2	
	---***---			
-4	37113	. Socket - Tube (7 pin) black bakelite, rubber mounted with tube shield base, large center shield, American Phenolic Corp. Cat. 147-502	1	
-5	R18524	. Clamp - Mini Spring Tube (20C) tube type 50C5, Staver Mfg. Co.	1	18524
-6	R18526	. Clamp - Mini Spring Tube (24C) tube type 12AX7, Staver Mfg. Co.	1	18526
	Attaching Part			
-7	261-4	. Eyelet, United Shoe Machinery Corp. p/n SE-35.	2	14978
	---***---			
-8	R18824	. Socket - Tube, (Octal) 4 lug clinch on, socket - 1-5/16 in. mounting center, pierced style, American Pheonlic Corp. Cat. 168-015	2	18824
	Attaching Part			
-9	30363-P12A	. Rivet - Hollow, 0.125 in. lg., 0.123 in. dia., oval head, brass, Cadmium Plate P-21	4	1474
	---***---			
-10	R18522	. Socket - 7 Contact Miniature Tube, bottom mount type, black power casting w/spring brass contact (hot tin dipped), Cinch Corp.	1	18522
-11	R18523	. Socket - 9 Contact Miniature Tube, bottom mount type, black power casting, w/spring brass contact (hot tin dipped), Cinch Corp.	1	18523
	Attaching Part			
-12	R1475	. Rivet - Hollow, 0.125 in. lg., 0.083 in. dia., truss head, brass, Cadmium Plate P-21	2	1475
	---***---			
	R131313	. Platform - Tube	NP	NHA131313

Use the following parts list as a guide when ordering replacement parts for Amplifiers (20952 and 20334) manufactured by Ampro Corp. Cinesound Service Corp. will supply all parts, or an equal substitute for items listed.

NOTE: Where an item is common to Graflex and Ampro, the part number of the former is given with a reference to the Ampro number.

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
	Ref.	AMPLIFIER ASSEMBLY (AC) Replaced by 37278-G1	Ref.	20952
	R18657	. Shield - Tube Cover	1	18657
	R18495	. Tube, 6BH6	1	18495
	R18497	. Tube, 12AX7	1	18497
	R18498	. Tube, 50C5	1	18498
	R17098	. Tube, 50L6	2	17098
	R20949-G1	. Cover Assembly - Amplifier	1	20949
	Attaching Part			
	121-6R4A	. Screw - Self Tapping, 1/4 in. lg., #6, binding (pan) Phillips head, Parker Kalon type "Z", steel, Cadmium Plate P-21	4	14773
	---***---			
	R20336-G1	. Cable Assembly (see Figure 6A)	1	20336
	R18656	. Clamp - Cable	1	18656
	Attaching Part			
	102-6-4A	. Screw - Machine, 1/4 in. lg., #6-32, round head, slotted, steel, Cadmium Plate P-21	1	14519
	---***---			
	R18592	. Jack - Phono Mic	1	18592
	Attaching Parts			
	R14669	. Nut - Machine (special)	1	14669
	221-616L	. Washer - Lock, Internal type, for 3/8 in. dia. screw, Shakeproof type 12, Cat. 1220, steel, Black Oxide S-7	1	16523
	R18553	. Washer - Flat (fibre)	1	18553
	R18554	. Washer - Flat (extruded fibre)	1	18554
	---***---			
	R18597	. Jack - Speaker	1	18597
	Attaching Parts			
	R14669	. Nut - Machine (special)	1	14669
	221-616L	. Washer - Lock, Internal type, for 3/8 in. dia. screw, Shakeproof type 12, Cat. 1220, steel, Black Oxide S-7	1	16523
	R18553	. Washer - Flat (fibre)	1	18553
	R18554	. Washer - Flat (extruded fibre)	1	18554
	---***---			
	R18580	. Capacitor, .2 mfd., 150v., paper	1	18580
	R17086-P1	. Coil - Oscillator	1	17086
	Attaching Parts			
	200-6HA	. Nut - Machine, #6-32, hex., steel, Cadmium Plate P-21	2	1452
	221-6L	. Washer - Lock, Internal type, for #6 screw, Shakeproof type 12, Cat. 1206, Black Oxide S-7	2	14703
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	R17088	Resistor, 3.5k ohms., 10w, wire wound	1	17088
	Attaching Parts			
	102-6-4A	. Screw - Machine, 1/4 in. lg., #6-32, round head, slotted, steel, Cadmium Plate P-21	1	14519
	R14117	. Nut - Speed, #6-32, type "U", Tinnerman Products Inc. p/n C8092-632-27	1	14117
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Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
	R17096	. Capacitor, 30-30 mfd., 250v., electrolytic	1	17096
	Attaching Parts			
	102-6-4A	. Screw - Machine, 1/4 in. lg., #6-32, round head, slotted, steel, Cadmium Plate P-21.	1	14519
	R14117	. Nut - Speed, #6-32, type "U", Tinnerman Products Inc. p/n C8092-632-27	1	14117
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	R18642-P1	. Transformer - Input	1	18642
	Attaching Parts			
	121-2-4A	. Screw - Self Tapping, 1/4 in. lg., #2, binding (pan) head, Parker Kalon type "Z", slotted, steel, Cadmium Plate P-21	2	1487
	202-1-2S	. Nut - Speed, Tinnerman Products, Inc. p/n C7886-008-27, Oil dip	2	14967
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	R20950-G1	. Platform Assembly - Tube	1	20950
	R20951-G1	. . Board Assembly - Resistor	1	20951
	R18484	. . . Capacitor, .05 mfd., 150v., paper	1	18484
	R18485	. . . Capacitor, .001 mfd., 400v., ceramic	2	18485
	R18486	. . . Capacitor, 25 mfd., 15v., electrolytic	1	18486
	R18487	. . . Capacitor, .01 mfd., 400v., ceramic	2	18487
	R18489	. . . Capacitor, .0005 mfd., 500v., disc ceramic dielectric	1	18489
	R17782	. . . Capacitor, .01 mfd., 400v., paper	1	17782
	R18580	. . . Capacitor, .2 mfd., 150v., paper	3	18580
	R18664	. . . Capacitor, .1 mfd., 400v., paper	1	18664
	R18586	. . . Capacitor, .03 mfd., 150v., paper	2	18586
	R18585	. . . Capacitor, .1 mfd., 150v., paper	1	18585
	R18992	. . . Capacitor, .0005 mfd., 500v., mica dielectric	1	18992
	402-56-5-2	. . . Resistor, 1/2 w, 5.6 meg., ±10% tol., carbon	3	18464
	402-22-5-2	. . . Resistor, 1/2 w, 2.2 meg., ±10% tol., carbon	1	18465
	402-56-4-2	. . . Resistor, 1/2 w, 0.56 meg., ±10% tol., carbon	1	18467
	402-15-2-3	. . . Resistor, 1/2 w, 1.5k ohm., ±5% tol., carbon	2	18483
	402-27-4-2	. . . Resistor, 1/2 w, 270k ohm., ±10% tol., carbon	2	18468
	402-56-2-2	. . . Resistor, 1/2 w, 5.6 k ohm., ±10% tol., carbon	2	18470
	402-22-2-2	. . . Resistor, 1/2 w, 2.2k ohm., ±10% tol., carbon	1	18472
	402-47-4-2	. . . Resistor, 1/2 w, 470k ohm., ±10% tol., carbon	3	18474
	402-27-1-2	. . . Resistor, 1/2 w, 270 ohm., ±10% tol., carbon	1	18476
	403-39-0-2	. . . Resistor, 1 w. 39 ohm., ±10% tol., carbon	1	17079
	402-33-5-2	. . . Resistor, 1/2 w, 3.3 meg., ±10% tol., carbon	1	17807
	404-27-1-2	. . . Resistor, 2 w, 270 ohm., ±10% tol., carbon	1	18991
	402-27-2-2	. . . Resistor, 1/2 w, 2.7k ohm., ±10% tol., carbon	2	18582
	402-33-3-2	. . . Resistor, 1/2 w, 33k ohm., ±10% tol., carbon	2	18692
	402-56-3-2	. . . Resistor, 1/2 w, 56k ohm., ±10% tol., carbon	1	17965
	402-68-3-2	. . . Resistor, 1/2 w, 68k ohm., ±10% tol., carbon	1	17957
	402-18-4-2	. . . Resistor, 1/2 w, 180k ohm., ±10% tol., carbon	1	17095
	402-68-4-2	. . . Resistor, 1/2 w, 680k ohm., ±10% tol., carbon	1	17099
	402-82-3-2	. . . Resistor, 1/2 w, 82k ohm., ±10% tol., carbon	1	18479
	R18635	. . . Board - Terminal	NP NHA	18635
	Attaching Part			
	121-6R4A	. . Screw - Self Tapping, 1/4 in. lg., #6, binding (pan) Phillips head, Parker Kalon type "Z", steel, Cadmium Plate P-21	2	14773
	R20954-G1	. . Platform Subassembly - Tube	1	20954
	R18489	. . . Capacitor, .0005 mfd., 500v., disc ceramic dielectric	1	18489
	R18487	. . . Capacitor, .01 mfd., 400v., ceramic	1	18487
	403-47-2-3	. . . Resistor, 1 w, 4700 ohms, ±5% tol., carbon	1	17090
	R200024	. . . Platform Assembly - Riveted	NP NHA	200024
	R13748	. . . . Bracket - Terminal Board	2	13748
	Attaching Part			
	R1475	. . . . Rivet - Hollow, 0.125 in. lg., 0.083 dia., truss head, brass, Cadmium Plate P-21	2	1475
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Figure and Index No.	Part Number	1 2 3 4 5 6 Nomenclature	Qty.	Ampro p/n
	R18522	. . . . Socket - 7 Contact Miniature Tube, bottom mount type, black power casting w/spring brass contact (hot tin dipped) Cinch Corp.	1	18522
	R18524	. . . . Clamp - Mini Spring Tube (20C), tube type 50C5, Staver Mfg. Co.	1	18524
	Attaching Part			
	30363-P12A	. . . . Rivet - Hollow, 0.125 in. lg., 0.123 dia., truss head, brass, Cadmium Plate P-21	2	1474
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	R18523	. . . . Socket - 9 Contact Miniature Tube, bottom mount type, black power casting, w/spring brass contact (hot tin dipped) Cinch Corp.	1	18523
	R18526	. . . . Clamp - Mini Spring Tube (24C), tube type 12AX7, Staver Mfg. Co.	1	18526
	Attaching Part			
	30363-P12A	. . . . Rivet - Hollow (same as above).	2	1474
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	R18824	. . . . Socket - Tube (Octal) 4 lug clinch on. socket - 1-5/16 in. mounting center, pierced style, American Pheonlic Corp. Cat. 168-015.	2	18824
	Attaching Part			
	R1475	. . . . Rivet - Hollow, 0.125 in. lg., 0.083 in. dia., truss head, brass, Cadmium Plate P-21.	4	1475
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	R18655	. . . . Socket - Tube, 7 pin floating type, American Pheonlic Corp. p/n 147-955	1	18655
	Attaching Part			
	261-3	. . . . Eyelet, E. B. Stimpson Co. p/n A840	2	14971
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	R131313	. . . . Platform - Tube.	NP	NHA131313
	Attaching Parts			
	121-4-6A	. Screw - Self Tapping, 3/8 in. lg., #4, binding (pan) head, Parker Kalon type "Z", steel, Cadmium Plate P-21 .	3	
	R14531	. Screw - Self Tapping NOTE: Use 121-4-6A for replacement .	Ref.	14531
	R14729	. Washer - Flat.	3	14729
	32090-P23	. Spacer - Grommet	3	12540
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	R20953-G1	. Chassis Assembly.	1	20953
	265-2	. . Grommet - Rubber, Western Rubber Co. p/n G1268	3	17593
	R18491	. . Capacitor, 80 mfd., 150v., electrolytic.	2	18491
	R17092	. . Resistor, 250 ohm., 300w, w/mounting bracket	1	17092
	R17094	. . Resistor, 1000 ohm., 30w, wire wound	1	17094
	Attaching Part			
	121-6R4A	. . Screw - Self Tapping, 1/4 in. lg., #6, binding (pan) Phillips head, Parker Kalon type "Z", steel, Cadmium Plate P-21.	3	14773
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	R181162-P1	. . Transformer - Output	1	181162
	Attaching Parts			
	102-6-4A	. . Screw - Machine, 1/4 in. lg., #6-32, round head, slotted, steel, Cadmium Plate P-21.	2	14519
	R14117	. . Nut - Speed, #6-32, type "U", Tinnerman Products Inc. p/n C8092-632-27.	2	14117
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	R17093	. . Resistor, 25 ohm., 30w, w/mounting bracket	1	17093
	Attaching Part			
	121-6R4A	. . Screw - Self Tapping, 1/4 in. lg., #6, binding (pan) Phillips head, Parker Kalon type "Z", steel, Cadmium Plate P-21	2	14773
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	R13816	. . Shield	1	13816

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
	R17091	. . Rectifier, dry disc, selenium type, Sarkes Tarzian Inc. Model 250MA	2	17091
	Attaching Parts			
	200-6HA	. . Nut - Machine, #6-32, hex., steel, Cadmium Plate P-21 (used with machine screw 37198)	1	1452
	200-8HH	. . Nut - Machine, #8-32, hex., steel, Nickel Plate P-27 (used with machine screw R141010)	1	1453
	220-6L	. . Washer - Lock, External type, for #6 screw, Shakeproof type 11, Cat. 1106-00, steel, Black Oxide S-7 (used with machine screw 37198)	1	
	220-8L	. . Washer - Lock, External type, for #8 screw, Shakeproof type 11, Cat. 1108-00, steel, Black Oxide S-7 (used with machine screw R141010)	1	1679
	37198	. . Screw - Machine (special) 2-7/8 in. lg., #6-32 (replaces p/n R141010)	1	
	R141010	. . Screw - Machine (special) 2-7/8 in. lg., #8-32 (no longer available) replace with screw 37198 and nut 220-6L	Ref.	141010
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	R181240	. . Control - Volume (for replacement, order index 34 fig. 6)	Ref.	181240
	Attaching Part			
	R14854	. . Nut - Machine (3/8-32 washer type)	1	14854
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	R181238	. . Control - Tone	1	181238
	Attaching Part			
	R14854	. . Nut - Machine (3/8-32 washer type)	1	14854
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	R200018-G1	. . Chassis Assembly - Riveted	1	200018
	R18993	. . . Capacitor (line filter)	1	18993
	Attaching Part			
	R14760	. . . Rivet - Tubular, 0.187 in. lg., 0.125 in. dia., oval head, steel, Cadmium Plate P-21	1	14760
	R14729	. . . Washer - Flat	1	14729
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	R18494	. . . Plate - Capacitor	2	18494
	Attaching Part			
	R14760	. . . Rivet - Tubular, 0.187 in. lg., 0.125 in. dia., oval head, steel, Cadmium Plate P-21	3	14760
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	R18590	. . . Plug - Chassis, four contact male plug with angle brackets, Cinch Jones Mfg. Co. Cat. P-304-AB	1	18590
	Attaching Parts			
	R14760	. . . Rivet - Tubular, 0.187 in. lg., 0.125 in. dia., oval head, steel, Cadmium Plate P-21	1	14760
	30363-P12A	. . . Rivet - Hollow, 0.125 in. lg., 0.123 in. dia., truss head, brass, Cadmium Plate P-21	1	1474
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	R18593	. . . Lug - Solder, 6 lug, Shakeproof Cat. 2103	1	18593
	R131314	. . . Bracket - Rectifier (Outside)	1	131314
	R131316	. . . Bracket - Rectifier (Inside)	1	131316
	Attaching Part			
	30363-P12A	. . . Rivet - Hollow, 0.125 in. lg., 0.123 in. dia., truss head, brass, Cadmium Plate P-21	4	1474
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	R13763-1	. . . Chassis - Amplifier	NP	NHA13763-1

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
	R20334-G1	AMPLIFIER ASSEMBLY (AC-DC) No longer available, replace with 37278-G1. See note below	Ref.	20334
	R18657	. Shield - Tube Cover	1	18657
	R18495	. Tube, 6BH6	1	18495
	R18497	. Tube, 12AX7	1	18497
	R18498	. Tube, 50C5	3	18498
	R20335-G1	. Cover Assembly - Amplifier	1	20335
	Attaching Part			
	121-6R4A	. Screw - Self Tapping, 1/4 in. lg., #6, binding (pan) Phillips head, Parker Kalon type "Z", steel, Cadmium Plate P-21	4	14773
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	R20336-G1	. Cable Assembly (see Figure 6A)	1	20336
	R18656	. Clamp - Cable	1	18656
	Attaching Part			
	102-6-4A	. Screw - Machine, 1/4 in. lg., #6-32, round head, slotted, steel, Cadmium Plate P-21	1	14519
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	R18592	. Jack - Phono Mic	1	18592
	Attaching Parts			
	R14669	. Nut - Machine (special)	1	14669
	221-616L	. Washer - Lock, Internal type, for 3/8 in. dia. screw, Shakeproof type 12, Cat. 1220, steel, Black Oxide S-7	1	16523
	R18553	. Washer - Flat (fibre)	1	18553
	R18554	. Washer - Flat (extruded fibre)	1	18554
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	R18597	. Jack - Speaker	1	18597
	Attaching Parts			
	R14669	. Nut - Machine (special)	1	14669
	221-616L	. Washer - Lock, Internal type, for 3/8 in. dia. screw, Shakeproof type 12, Cat. 1220, steel, Black Oxide S-7	1	16523
	R18553	. Washer - Flat (fibre)	1	18553
	R18554	. Washer - Flat (extruded fibre)	1	18554
	---***---			
	R17086	. Coil - Oscillator	1	17086
	Attaching Parts			
	200-6HA	. Nut - Machine, #6-32, hex., steel, Cadmium Plate P-21	2	1452
	221-6L	. Washer - Lock, Internal type, for #6 screw, Shakeproof type 12, Cat. 1206, Black Oxide S-7	2	14703
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	R18643	. Transformer - Output	1	18643
	Attaching Parts			
	102-6-4A	. Screw - Machine, 1/4 in. lg., #6-32, round head, slotted, steel, Cadmium Plate P-21	2	14519
	R14117	. Nut - Speed, #6-32, type "U", Tinnerman Products Inc. p/n C8092-632-37	2	14117
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	R18642-P1	. Transformer - Input	1	18642
	Attaching Parts			
	121-2-4A	. Screw - Self Tapping, 1/4 in. lg., #2, binding (pan) head, Parker Kalon type "Z", slotted, steel, Cadmium Plate P-21	2	1487
	202-1-2S	. Nut - Speed, Tinnerman Products Inc., p/n C7886-008-27, Oil Dip	2	14967
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Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
	R181240	. Control - Volume (for replacement, order index 34, fig. 6). .	Ref.	181240
	Attaching Part			
	R14854	. Nut - Machine, (3/8-32 washer type).	1	14854
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	R181239	. Control - Tone.	1	181239
	Attaching Part			
	R14854	. Nut - Machine, (3/8-32 washer type).	1	14854
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	R18640	. Choke - Filter	1	18640
	Attaching Part			
	102-6-4A	. Screw - Machine, 1/4 in. lg., #6-32, round head, slotted, steel, Cadmium Plate P-21.	2	14519
	R14117	. Nut - Speed, #6-32, type "U", Tinnerman Products Inc. p/n C8092-632-27	2	14117
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	R20337-G1	. Platform Assembly - Tube	1	20337
	R20338-G1	. . Board Assembly - Resistor	1	20338
	R18484	. . . Capacitor, .05 mfd., 150v., paper	2	18484
	R18485	. . . Capacitor, .001 mfd., 400v., ceramic.	3	18485
	R18486	. . . Capacitor, .25 mfd., 15v., electrolytic	1	18486
	R18487	. . . Capacitor, .01 mfd., 400v., ceramic	4	18487
	R18489	. . . Capacitor, .0005 mfd., 500v., disc ceramic dielectric .	1	18489
	R18490	. . . Capacitor, 10 mfd., 150v., electrolytic	1	18490
	R18580	. . . Capacitor, .2 mfd., 150v., paper	3	18580
	R18585	. . . Capacitor, .1 mfd., 150v., paper	1	18585
	R18586	. . . Capacitor, .03 mfd., 150v., paper.	1	18586
	402-56-5-2	. . . Resistor, 1/2 w, 5.6 meg., ±10% tol., carbon	3	18464
	402-22-5-2	. . . Resistor, 1/2 w, 2.2 meg., ±10% tol., carbon	2	18465
	402-10-3-2	. . . Resistor, 1/2 w, 10k ohm., ±10% tol., carbon	1	17553
	402-56-4-2	. . . Resistor, 1/2 w, 0.56 meg., ±10% tol., carbon.	1	18467
	402-27-4-2	. . . Resistor, 1/2 w, 270k ohm., ±10% tol., carbon.	2	18468
	402-10-4-2	. . . Resistor, 1/2 w, 0.10 meg., ±10% tol., carbon.	4	18471
	402-22-2-2	. . . Resistor, 1/2 w, 2.2k ohm., ±10% tol., carbon.	1	18472
	402-47-4-2	. . . Resistor, 1/2 w, 470k ohm., ±10% tol., carbon.	2	18474
	402-27-1-2	. . . Resistor, 1/2 w, 270 ohm., ±10% tol., carbon	1	18476
	402-39-0-2	. . . Resistor, 1 w, 39 ohm., ±10% tol., carbon	1	181179
	402-27-2-2	. . . Resistor, 1/2 w, 2.7k ohm., ±10% tol., carbon.	1	18582
	402-22-3-2	. . . Resistor, 1/2 w, 22k ohm., ±10% tol., carbon.	1	18583
	402-18-5-2	. . . Resistor, 1/2 w, 1.8 meg., ±10% tol., carbon	1	18436
	402-18-2-2	. . . Resistor, 1/2 w, 1800 ohm., ±10% tol., carbon.	1	18815
	402-15-5-2	. . . Resistor, 1/2 w, 150k ohm., ±10% tol., carbon.	1	181423
	402-39-2-2	. . . Resistor, 1/2 w, 3.9k ohm ±10% tol., carbon	1	181424
	R18635	. . . Board - Terminal	NP NHA	18635
	Attaching Part			
	121-6R4A	. . Screw - Self Tapping, 1/4 in. lg., #6, binding (pan) Phillips head, Parker Kalon type "Z", steel, Cadmium Plate P-21.	2	14773
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	R18586	. . Capacitor, .03 mfd., 150v., paper	1	18586
	R20339-G1	. . Platform Subassembly - Tube	1	20339
	R18485	. . . Capacitor, .001 mfd., 400v., ceramic.	1	18485
	402-27-4-2	. . . Resistor, 1/2 w, 270k ohm., ±10% tol., carbon.	2	18468
	403-27-2-3	. . . Resistor, 1 w, 2700 ohm., ±5% tol., carbon.	1	18653
	R200022	. . . Platform Assembly - Riveted	NP NHA	200022
	R13748	. . . . Bracket - Terminal Board	2	13748
	Attaching Part			
	R1475	. . . . Rivet - Hollow, 0.125 in. lg., 0.083 dia., truss head, brass, Cadmium Plate P-21	2	1475
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Figure and Index No.	Part Number	Nomenclature	Qty.	Ampro p/n
	R18522	Socket - 7 Contact Miniature Tube, bottom mount type, black power casting w/spring brass contact (hot tin dipped) Cinch Corp.	3	18522
	R18524	Clamp - Mini Spring Tube (20C), tube type 50C5, Staver Mfg. Co.	3	18524
	R18593	Lug - Solder 6 lug, Shakeproof Cat. 2103	1	18593
	Attaching Part			
	R1475	Rivet - Hollow, 0.125 in. lg., 0.083 in. dia., truss head, brass, Cadmium Plate P-21	3	1475
	261-4	Eyelet, United Shoe Machinery Corp. p/n SE-35	3	14978
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	R18523	Socket - 9 Contact Miniature Tube, bottom mount type, black power casting, w/spring brass contact (hot tin dipped) Cinch Corp.	1	18523
	R18526	Clamp - Mini Spring Tube (24C), tube type 12AX7, Staver Mfg. Co.	1	18526
	Attaching Part			
	R1475	Rivet - Hollow, 0.125 in. lg., 0.083 in. dia. truss head, brass, Cadmium Plate P-21	1	1475
	261-4	Eyelet, United Shoe Machinery Corp p/n SE-35	1	14978
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	R181427	Socket - 7 Pin Type	1	181427
	Attaching Parts			
	260-3	Eyelet, American Brass Co. p/n 2250	1	141395
	R161341	Grommet - Rubber, Lavelle Rubber Co. p/n 800	1	161341
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	R131363	Platform - Tube.	NP NHA	131363
	Attaching Parts			
	121-4-6A	Screw - Self Tapping, 3/8 in. lg., #4, binding (pan) head, Parker Kalon type "Z", slotted, steel, Cadmium Plate P-21	3	
	R14531	Screw - Self Tapping, NOTE: Use 121-4-6A for replacement	Ref.	14531
	R14729	Washer - Flat	3	14729
	32090-P23	Spacer - Grommet.	3	12540
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	R20340-G1	Chassis Assembly - Amplifier	1	20340
	265-2	Grommet - Rubber	3	17593
	R18491	Capacitor, 80 mfd., 150v., electrolytic.	2	18491
	R18580	Capacitor, 0.2 mfd., 150v., paper	1	18580
	R18651	Resistor, 30 w, 20 ohm., wire wound w/mounting brackets	1	18651
	R18652	Resistor, 30 w, 350 ohm., wire wound w/mounting brackets	1	18652
	Attaching Part			
	121-6R4A	Screw - Self Tapping, 1/4 in. lg., #6, binding (pan) Phillips head, Parker Kalon type "Z", steel, Cadmium Plate P-21	4	14773
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	R13816	Shield	1	13816
	R18499	Rectifier, dry disc	1	18499
	Attaching Parts			
	200-6HA	Nut - Machine, #6-32, hex., steel, Cadmium Plate P-21	1	1452
	221-6L	Washer - Lock, Internal type, for #6 screw, Shakeproof type 12, Cat. 1206, steel, Black Oxide S-7	1	14703
	110-6-24A	Screw - Machine, 1-1/2 in. lg., #6-32, straight side binding head, slotted, steel, Cadmium Plate P-21.	1	14484
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	R200027-G1	Chassis Assembly - Riveted	1	200027
	R18494	Plate - Capacitor	2	18494
	Attaching Part			
	R14760	Rivet - Tubular, 0.187 in. lg., 0.125 in. dia., oval head, steel, Cadmium Plate P-21	4	14760
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Figure and Index No.	Part Number	1 2 3 4 5 6	Nomenclature	Qty.	Ampro p/n
	R18590	. . .	Plug - Chassis, four contact male plug with angle brackets, Cinch Jones Mfg. Co. Cat. P-304-AB . . .	1	18590
	Attaching Part R14760	. . .	Rivet - Tubular, 0.187 in. lg., 0.125 in. dia., oval head, steel, Cadmium Plate P-21	2	14760
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	R18593	. . .	Lug - Solder, 6 lug, Shakeproof Cat. 2103	1	18593
	R13763	. . .	Chassis - Amplifier	NP NHA	13763

NOTE: REPLACEMENT PARTS SHOULD BE ORDERED AS FOLLOWS:

1. ITEMS BEARING CATALOG NUMBER FORWARD TO:
   GRAFLEX, INC.
   3750 MONROE AVE.
   ROCHESTER 3, NEW YORK

2. ITEMS BEARING PART NUMBER FORWARD TO:
   CINESOUND SERVICE CORPORATION
   420 WEST 45th STREET
   NEW YORK 36, NEW YORK

3. ALWAYS SPECIFY FINISH WHEN GIVEN IN DESCRIPTION OF ITEM.

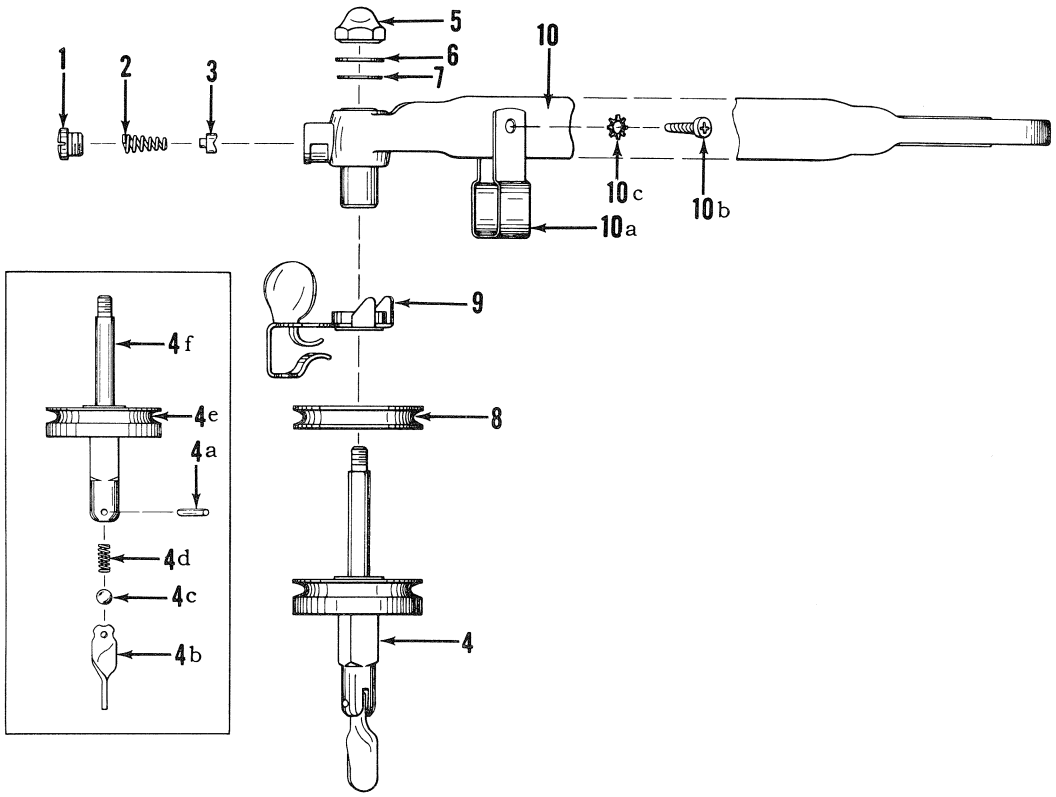


Figure 7. ARM ASSEMBLY - TAKE-UP REEL

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
7	R20939-G1	ARM ASSEMBLY - TAKE-UP REEL	Ref.	20939
-1	R1288	. Cap - Brake	1	1288
-2	R1512-A	. Spring - Take-up Spindle Brake	1	1512-A
-3	R1294	. Shoe - Brake	1	1294
-4	R19933-G1	. Spindle Assembly - Take-up Reel	1	19933
-4a	38256	. . Pin - Reel Lock Finger	1	12538
-4b	38257	. . Finger - Reel Lock	1	13521
-4c	300-7	. . Ball - Steel, 5/32 dia.	1	1624
-4d	38255-P1	. . Spring - Reel Lock	1	1515
-4e	R12967	. . Pulley - Take-up (press fit)	NP NHA	12967
-4f	R12608	. . Spindle - Take-up Reel	NP NHA	12608
	Attaching Parts			
-5	R1233	. Nut - Cap	1	1233
-6	R1236	. Washer - Flat	1	1236
-7	R16588-3	. Washer - Flat, .003 in. thk.	AR	16588-3
	R16588-5	. Washer - Flat, .005 in. thk.	AR	16588-5
	R16588-10	. Washer - Flat, .010 in. thk.	AR	16588-10
	---***---			
-8	R12602	. Pulley - Take-up	1	12602
-9	R19646-G1	. Shifter Assembly - Take-up Belt	1	19646
-10	R20324-G1	. Arm Subassembly - Take-up	1	20324
-10a	R13742	. . Retainer - Take-up Belt	1	13742
	Attaching Parts			
-10b	121-4R5H	. . Screw - Self Tapping, 5/16 in. lg., #4 binding (pan) Phillips head, Parker Kalon Type "Z", steel, Nickel Plate P-27	2	14934
-10c	220-4L	. . Washer - Lock, External type, for #4 screw, Shakeproof type 11, Cat. 1104-00, steel, Black Oxide S-7	2	14541
	---***---			
	R1299	. . Bushing - Oilite	NP NHA	1299
	R11659-1	. . Arm - Take-up Reel	NP NHA	11659-1

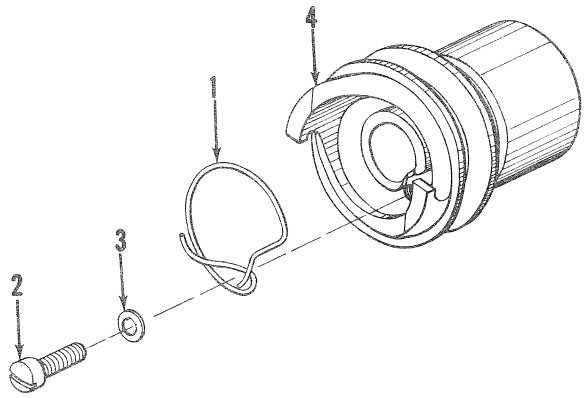


Figure 8. CLUTCH ASSEMBLY - REWIND

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
8	R20309-G1	CLUTCH ASSEMBLY - REWIND	Ref.	20309
-1	R15024	. Spring - Rewind Clutch Release	1	15024
		Attaching Parts		
-2	106-3-4A	. Screw - Machine, 1/4 in. lg., #3-48, oval fillister head, slotted, steel, Cadmium Plate P-21	1	14593
-3	R141228	. Washer - Flat	1	141228
-4	R16832-1	. Clutch - Rewind	1	16832-1

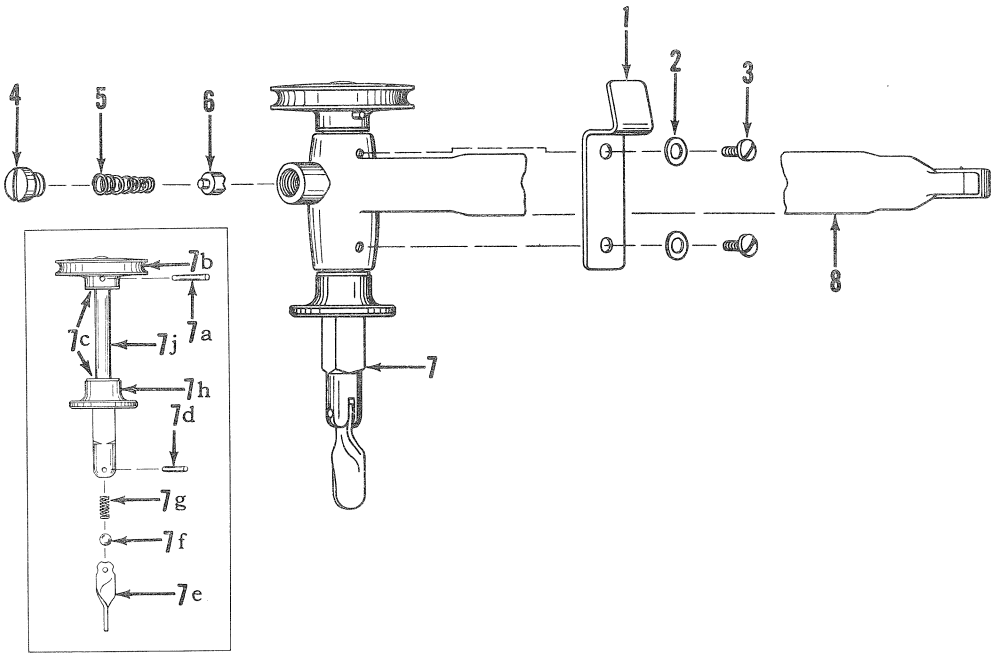


Figure 9. ARM ASSEMBLY - FEED REEL

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
9	R20940-G1	ARM ASSEMBLY - FEED REEL	Ref.	20940
-1	R13927	. Guard - Feed Reel Belt	1	13927
	Attaching Parts			
-2	R1295	. Screw - Machine, 3/16 in. lg., #4-36, binding head	2	1295
-3	R1460	. Washer - Flat	2	1460
	---***---			
-4	R1288	. Cap - Brake	1	1288
-5	R15030	. Spring - Spindle Brake	1	15030
-6	R1294	. Shoe - Brake.	1	1294
-7	R19624-G1	. Spindle Assembly - Feed Reel	1	19624
-7a	R1552-A	. . Pin - Taper #5/0, 7/16 in. lg., steel	1	1552-A
-7b	R12603	. . Pulley - Rewind (drilled and reamed in assembly)	NP NHA	12603
-7c	R1335	. . Washer - Flat.	2	1335
-7d	38256	. . Pin - Reel Lock Finger.	1	12538
-7e	38257	. . Finger - Reel Lock.	1	13521
-7f	300-7	. . Ball - Steel, 5/32 dia.	1	1624
-7g	38255-P1	. . Spring - Reel Lock	1	1515
-7h	R12966	. . Collar - Feed Spindle (press fit)	NP NHA	12966
-7j	R12607	. . Spindle - Feed	NP NHA	12607
-8	R20326-G1	. Arm Subassembly - Feed Reel	1	20326

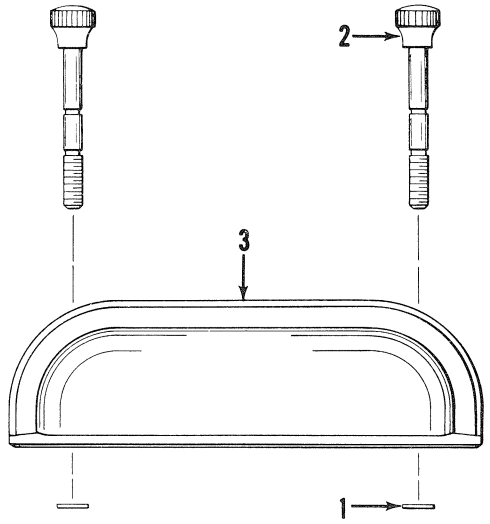
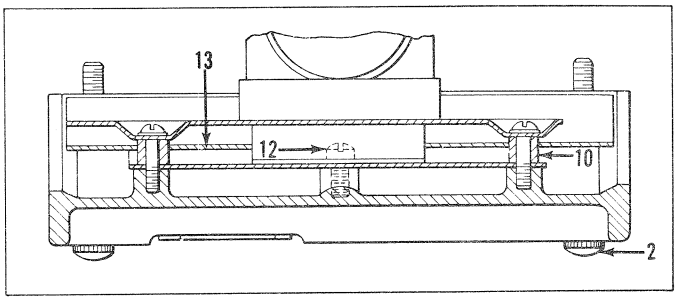


Figure 10. COVER ASSEMBLY - LAMPHOUSE

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
10	R190010-G1	COVER ASSEMBLY - LAMPHOUSE	Ref.	190010
-1	251-9A	. Ring - Retaining, Truarc type E, Waldes Kohinoor, Inc. Cat. 5133-15, steel, Zinc Plate or Cadmium Plate P-21 optional	2	15038
-2	R16720	. Screw - Cover (special)	2	16720
-3	R11602-2	. Cover - Lamphouse	1	11602-2

NP - Non Procurable
NHA - Next Higher Assembly



SECTION A-A

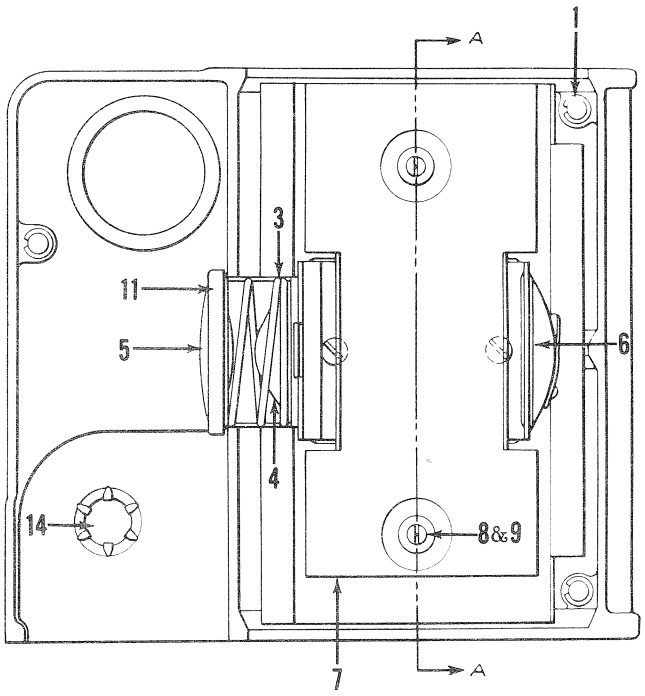


Figure 11. COVER ASSEMBLY - FRONT

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
11	R20333-G1	COVER ASSEMBLY - FRONT	Ref.	20333
-1	251-9A	. Ring - Retaining, Truarc type E, Waldes Kohinoor Inc., Cat. 5133-15, steel, Zinc Plate or Cadmium Plate P-21 optional	3	15038
-2	R16720	. Screw - Cover (special)	3	16720
-3	R1505	. Spring - Condensing Lens Spacing	1	1505
-4	R1615-B	. Lens - Rear Condensing	1	1615-B
-5	R1615-C	. Lens - Front Condensing	1	1615-C
-6	R1617	. Reflector	1	1617
-7	R13806	. Shield - Front Inner Heat	1	13806
	Attaching Parts			
-8	R1464	. Screw - Sheet Metal, 1/2 in. lg., #4, round head, type "Z"	2	1464
-9	R1642	. Washer - Flat	2	1642
	---***---			
-10	R12549	. Spacer - Front Heat Shield	2	12549
-11	R19993-G1	. Holder Assembly - Condensing Lens	1	19993
	Attaching Part			
-12	106-8-4L	. Screw - Machine, 1/4 in. lg., #8-32, oval fillister head, slotted, steel, Black Oxide S-7	1	14604
	---***---			
-13	R13804-G1	. Shield Assembly - Front Heat	1	13804
	R18698-P1	. Plate - Name (GRAFLEX)	1	18698
	Attaching Part			
	120-0-3H	. Screw - Drive, 3/16 in. lg., #0, round head, Parker Kalon type U, steel, Nickel Plate P-27	2	1479
	---***---			

Figure and Index No.	Part Number	1 2 3 4 5 6 Nomenclature	Qty.	Ampro p/n
	37241-P1	. Plate - Instruction (metal)	1	
	Ref.	. Plate - UL (no longer available, replace with 37241-P1S)	Ref.	16747
	37241-P1S	. Plate - Instruction (adhesive backing) replacement for UL plate p/n 16747	1	
	Attaching Part			
	120-00-2H	. Screw - Drive, 1/8 in. lg., #00, Parker Kalon type U, steel, Nickel Plate P-27	4	1465
	---***---			
11 -14	R16745	. Plug - Button	1	16745
	R11601-5	. Cover - Front	1	11601-5

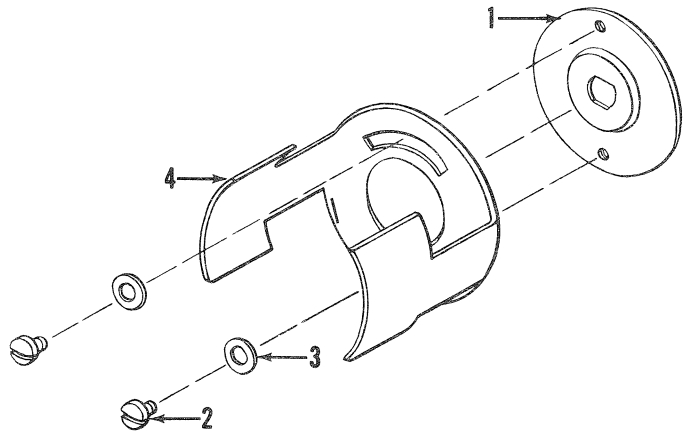


Figure 12. SHUTTER ASSEMBLY - INTERRUPTER

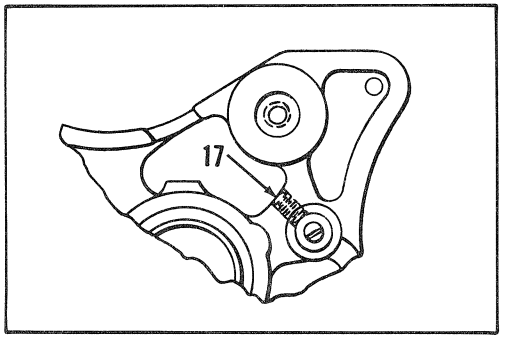
Figure and Index No.	Part Number	1 2 3 4 5 6 Nomenclature	Qty.	Ampro p/n
12	R20443-G1	SHUTTER ASSEMBLY - INTERRUPTER	Ref.	20443
-1	R1337	. Disc - Interrupter Shutter Drive	1	1337
	Attaching Parts			
-2	R14567	. Screw - Machine, 1/8 in. lg., #4-36, binding head	2	14567
-3	R14109	. Washer - Flat	2	14109
	---***---			
-4	R13448	. Shutter - Interrupter	1	13448

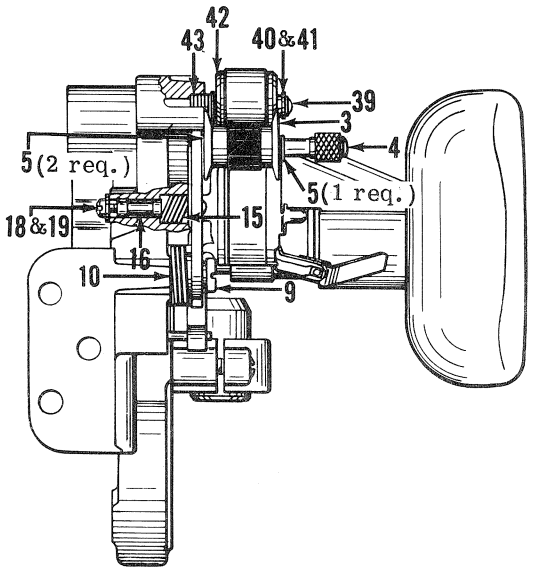
NOTE: REPLACEMENT PARTS SHOULD BE ORDERED AS FOLLOWS:

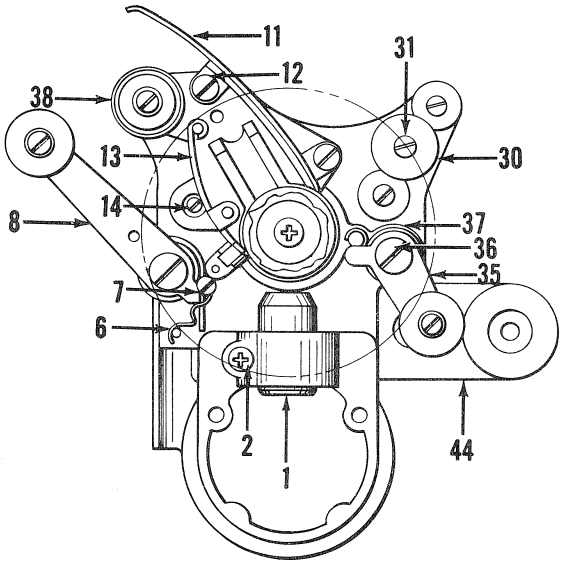
1. ITEMS BEARING CATALOG NUMBER FORWARD TO:
   GRAFLEX, INC.
   3750 MONROE AVE.
   ROCHESTER 3, NEW YORK

2. ITEMS BEARING PART NUMBER FORWARD TO:
   CINESOUND SERVICE CORPORATION
   420 WEST 45th STREET
   NEW YORK 36, NEW YORK

3. ALWAYS SPECIFY FINISH WHEN GIVEN IN DESCRIPTION OF ITEM.







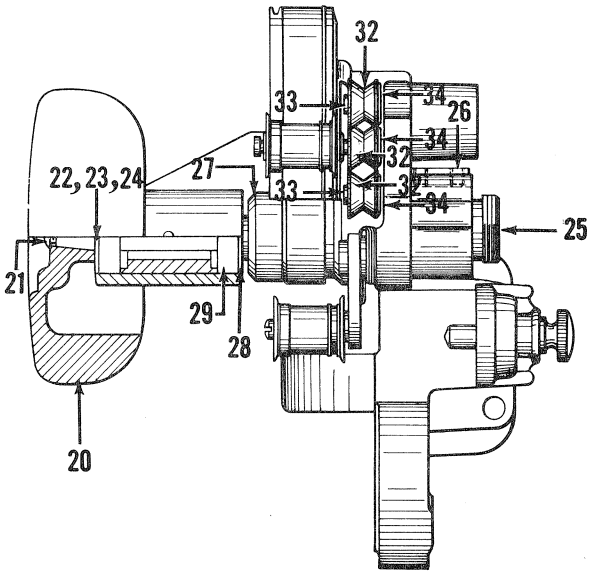


Figure 13. SOUND HEAD ASSEMBLY

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
13	R20946-G1	SOUND HEAD ASSEMBLY, Used on Models 512, 510, 508, 484, 483 and 482	Ref.	20946-1
	R20946-G2	SOUND HEAD ASSEMBLY, Used on Models 568, 548 and 472	Ref.	20946
-1	R16504-G1	. Optical System - Sound	1	16504
	Attaching Part			
-2	106-6R8L	. Screw - Machine, 1/2 in. lg., #6-32, oval fillister, Phillips head, steel, Black Oxide S-7	1	14611
	---***---			
-3	R19504-G1	. Roller Assembly - Pressure	1	19504
	Attaching Parts			
-4	R12512	. Knob - Pressure Roller	1	12512
-5	R16514	. Washer - Flat	3	16514
	---***---			
-6	R13523	. Catch - Pressure Roller Arm	1	13523
	Attaching Part			
-7	R1230	. Screw - Machine (special)	1	1230
	---***---			
-8	R20396-G1	. Arm Assembly - Pressure Roller Arm	1	20396
	Attaching Part			
-9	R12091	. Pivot - Pressure Roller	1	12091
	---***---			
-10	R16513	. Spring - Pressure Roller	1	16513
-11	R19518-G1	. Guideway Assembly - Upper	1	19518
	Attaching Part			
-12	R1295	. Screw - Machine, 3/16 in. lg., #4-36, binding head	2	1295
	---***---			
-13	R200029-G1	. Guideway Assembly - Lower, (Used with assembly R20946-G1)	1	200029
	R20399-G1	. Guideway Assembly - Lower, (Used with assembly R20946-G2)	1	20399
	Attaching Part			
-14	R1445	. Screw - Machine, 1/4 in. lg., #4-36, round head	1	1445
	---***---			
-15	R16509	. Spring - Guideway Aligning	1	16509
-16	R12516	. Stud - Guideway Aligning	1	12516
	Attaching Part			
-17	171D6-4L	. Screw - Set, 1/4 in. lg., #6-32, headless hex. socket type, flat point, steel, Black Oxide S-7	1	
	171E6-4L	. Screw - Set, same as above, except half dog point. Replaced by 171D6-4L	Ref.	14979
-18	R14528	. Screw - Machine, 5/16 in. lg., #4-36, fillister head	1	14528
-19	R1642	. Washer - Flat	1	1642
	---***---			
-20	R11663-1	. Flywheel - Sound Drum	1	11663-1
	Attaching Part			
-21	112-5R4	. Screw - Machine, 1/4 in. lg., #5-40, truss, Phillips head, steel, Brown Enamel L-71	1	14127
	---***---			
-22	R16534-3	. Washer - Flat, .003 in. thk.	AR	16534-3
-23	R16534-5	. Washer - Flat, .005 in. thk.	AR	16534-5
-24	R16534-10	. Washer - Flat, .010 in. thk.	AR	16534-10
-25	R20392-2-G1	. Shield Assembly - Photocell	AR	20392-2
	Attaching Part			
-26	170-8-3A	. Screw - Set, 3/16 in. lg., #8-32, slotted headless, cup point, steel, Cadmium Plate P-21	2	1401
	---***---			
-27	R20384-G1	. Shaft Assembly - Sound Drum	1	20384
-28	R16534-5	. Washer - Flat	AR	16534-5
-29	38155	. Bearing - Ball, Fafnir Bearing Co. p/n 36KDFS-57511	2	161158
-30	R12637	. Roller - Film Guide	1	12637
	Attaching Part			
-31	R12609	. Stud - Guide Roller	1	12609
	---***---			

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
13-32	R12536	. Roller - Take-up Belt Guide	3	12536
	Attaching Part			
-33	R12610	. Stud - Take-up Belt Guide Roller	2	12610
		---***---		
-34	R14030	. Washer - Flat	3	14030
-35	R19456-G1	. Equalizer Assembly - Film Tension	1	19456
	R1295	. . Screw - Machine, 3/16 in. lg., #4-36, binding head	1	1295
	R1309-15	. . Washer - Flat.	1	1309-15
	R12637	. . Roller - Film Guide	1	12637
	R19455-G1	. . Arm Assembly - Film Tension Equalizer	1	19455
	Attaching Part			
-36	R12091	. Pivot - Pressure Roller Arm	1	12091
		---***---		
-37	R16507	. Spring - Film Tension Equalizer	1	16507
-38	R19508-G1	. Roller Assembly - Film.	1	19508
	Attaching Parts			
-39	R1295	. Screw - Machine, 3/16 in. lg., #4-36, binding head	1	1295
-40	R1309-15	. Washer - Flat	1	1309-15
-41	R1309-10	. Washer - Flat, .010 in. thk.	AR	1309-10
		---***---		
-42	R16514	. Washer - Flat	1	16514
-43	R16508	. Spring - Film Roller Aligning	1	16508
-44	R20349-G1	. Head Sub Assembly - Sound	1	20349

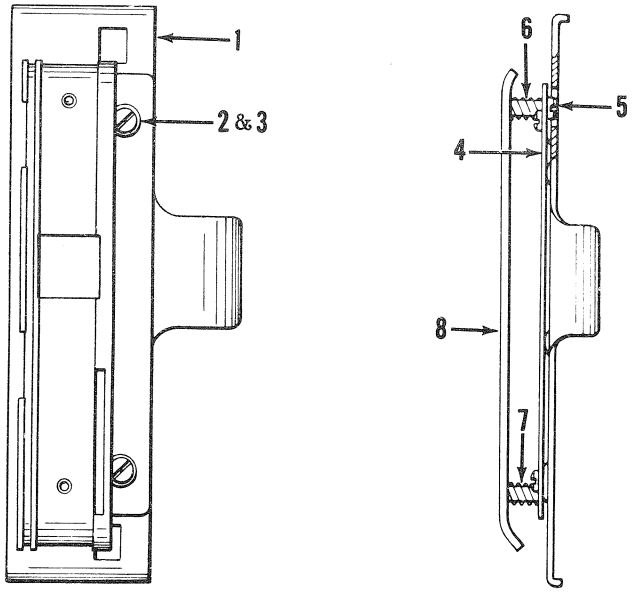


Figure 14. SHOE ASSEMBLY - PRESSURE

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
14	R20306-G1	SHOE ASSEMBLY - PRESSURE	Ref.	20306
-1	R13746	. Plate - Pressure Shoe Mounting	1	13746
	Attaching Parts			
-2	38279	. Screw - Machine, 3/32 in. lg., #2-56, bind. hd., slotted, steel	2	14989
-3	224R7H	. Washer - Spring, Shakeproof Style 3, p/n 3502-02-01, phosphor bronze, Nickel Plate P-27. Replaces R13589	2	
	R13589	. Washer - Spring, Replaced by 224R7H	Ref.	13589
		---***---		
-4	R13813	. Plate - Shoe Adjusting	1	13813
	Attaching Parts			
-5	R1230	. Screw - Machine (special).	2	1230
		---***---		
-6	38332	. Spring - Pressure Shoe, Upper	1	15025
-7	38331	. Spring - Pressure Shoe, Lower.	1	15026
-8	R20372-G1	. Shoe Subassembly - Pressure.	1	20372

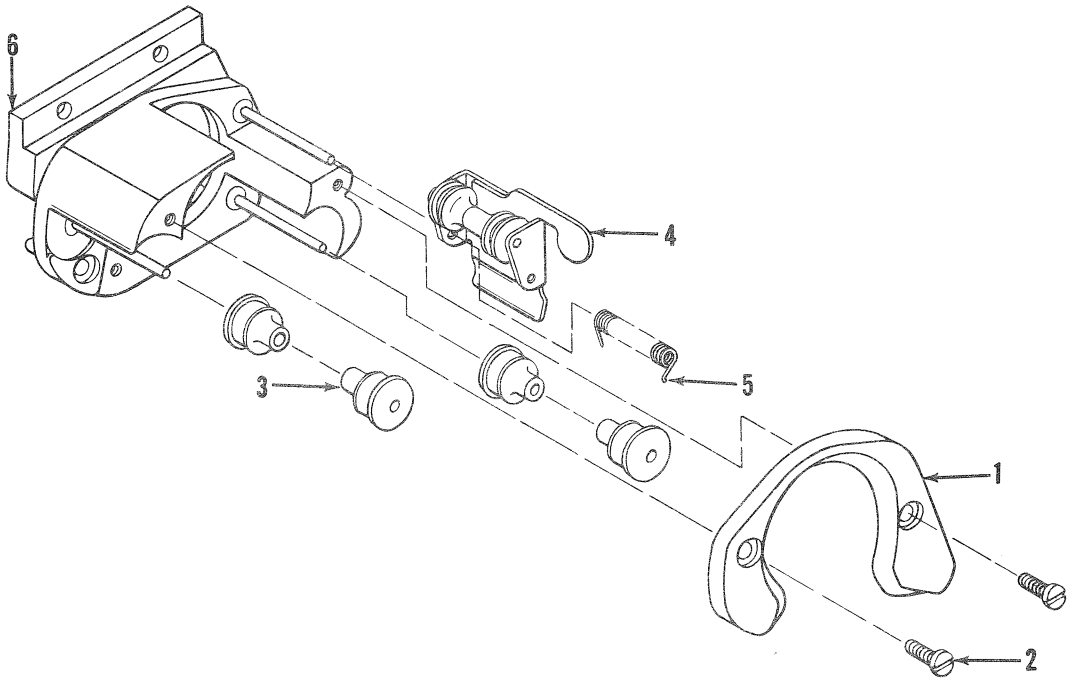


Figure 15. SHOE ASSEMBLY - FEED SPROCKET

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
15	R20973-G1	SHOE ASSEMBLY - FEED SPROCKET	Ref.	20973
-1	R16234-1	. Cover - Feed Sprocket Shoe.	1	16234-1
	Attaching Part			
-2	R14990	. Screw - Machine, 1/4 in. lg., #4-36, fillister head	2	14990
	---***---			
-3	38360	. Roller - Sprocket Shoe Guide	4	12616
-4	38353-G1	. Follower Assembly - Feed Sprocket	1	19774
-5	38358	. Spring - Feed Sprocket Follower	1	1520
-6	R20971-1	. Shoe Subassembly - Feed Sprocket	1	20971-1

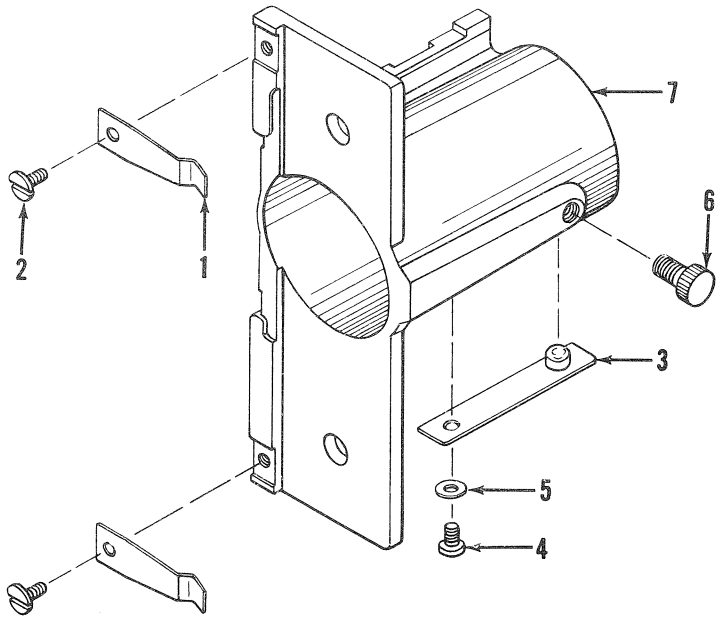


Figure 16. HOLDER ASSEMBLY - PROJECTION LENS

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
16	R20305-G1	HOLDER ASSEMBLY - PROJECTION LENS	Ref.	20305
-1	38270	. Spring - Pressure Shoe Retaining.	2	13747
	Attaching Part			
-2	110-4-3A	. Screw - Machine, 3/16 in. lg., #4-40, straight side binding head, slotted, steel, Cadmium Plate P-21(see substitute screw 116-4-2H below)	2	14710
	116-4-2H	. Screw - Machine, 1/8 in. lg., #4-40, pan head, slotted,steel, Nickel Plate P-27 (may be substituted for 110-4-3A) .	2	
	---***---			
-3	38239-G1	. Spring Assembly - Projection Lens	1	20379
	Attaching Parts			
-4	106-4-2H	. Screw - Machine, 1/8 in. lg., #4-40, oval fillister head, slotted, steel, Nickel Plate P-27 (see substitute screw 116-4-2H below).	1	14709
	116-4-2H	. Screw - Machine, 1/8 in. lg., #4-40, pan head, slotted, steel, Nickel Plate P-27 (may be substituted for 106-4-2H) .	1	
-5	R13198	. Washer - Flat	1	13198
	- -***---			
-6	38269	. Screw - Machine (special).	1	12548
-7	R11656-1	. Holder - Projection Lens	1	11656-1

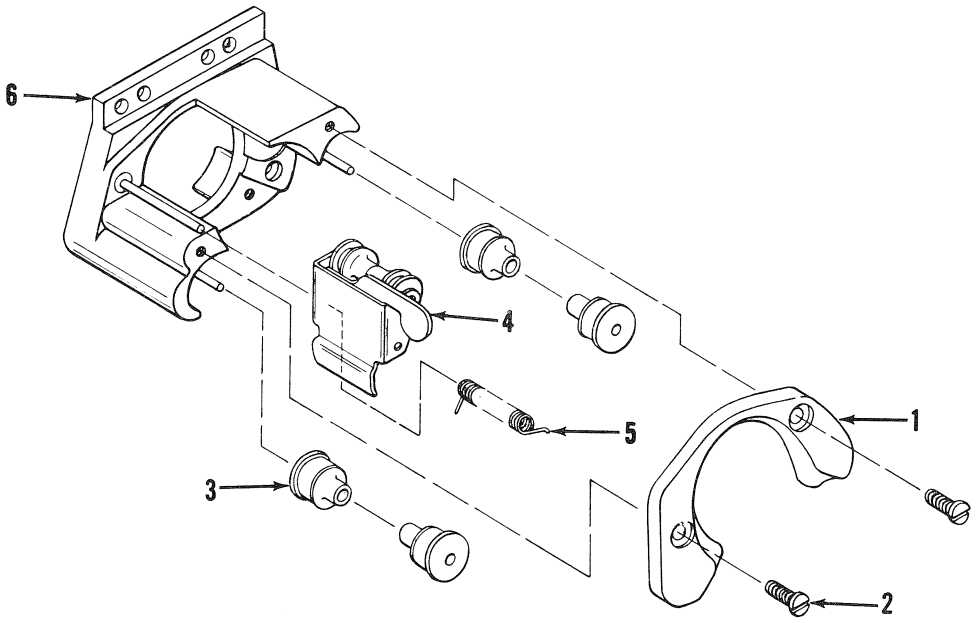


Figure 17. SHOE ASSEMBLY - TAKE-UP SPROCKET

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
17	R20974-G1	SHOE ASSEMBLY - TAKE-UP SPROCKET	Ref.	20974
-1	R16233-1	. Cover - Take-up Sprocket Shoe.	1	16233-1
	Attaching Part			
-2	R14990	. Screw - Machine, 1/4 in. lg., #4-36, fillister head.	2	14990
	---***---			
-3	38360	. Roller - Sprocket Shoe Guide	4	12616
-4	R19771-G1	. Follower Assembly - Feed Sprocket	1	19771
-5	R1521	. Spring - Take-up Sprocket Follower	1	1521
-6	R20972-1	. Shoe Subassembly Take-up Sprocket	1	20972-1

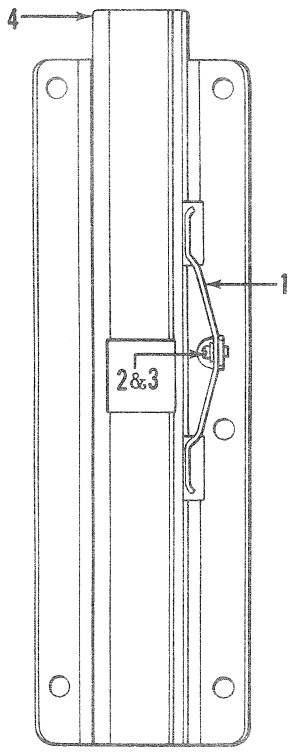


Figure 18. PLATE ASSEMBLY - APERTURE

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
18	R20432-G1	PLATE ASSEMBLY - APERTURE.	Ref.	20432-1
	R20432-G2	PLATE ASSEMBLY - APERTURE.	Ref.	20432
-1	38348-P1	. Spring - Film Edge (used with assembly R20432-G1)	1	1357-2
	R1357-P1	. Spring - Film Edge (used with assembly R20432-G2)	1	1357
	Attaching Parts			
-2	106-2-2H	. Screw - Machine, 1/8 in. lg., #2-56, oval fillister head, slotted, steel, Nickel Plate P-27.	1	14586
-3	R1228	. Washer - Flat	1	1228
		---***---		
-4	R13860-P1	. Plate - Aperture.	1	13860

NOTE: REPLACEMENT PARTS SHOULD BE ORDERED AS FOLLOWS:

1. ITEMS BEARING CATALOG NUMBER FORWARD TO:
   GRAFLEX, INC.
   3750 MONROE AVE.
   ROCHESTER 3, NEW YORK

2. ITEMS BEARING PART NUMBER FORWARD TO:
   CINESOUND CORPORATION
   420 WEST 45th STREET
   NEW YORK 36, NEW YORK

3. ALWAYS SPECIFY FINISH WHEN GIVEN IN DESCRIPTION OF ITEM.

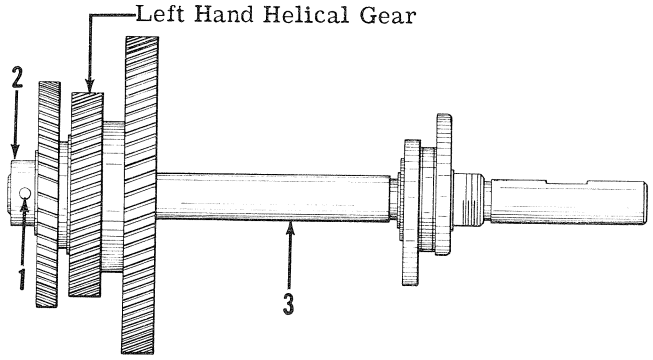


Figure 19. SHAFT ASSEMBLY - VERTICAL CAM

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
19	R190043-G1	SHAFT ASSEMBLY - VERTICAL CAM (used on projectors bearing Serial No. 129701 and up).	Ref.	190043
-1	30663-P1	. Pin - Taper, #5/0, 7/16 in. lg., stainless steel.	1	1553
-2	R190040-G1	. Gear Assembly - Vertical Cam Shaft.	NP	NHA190040
-3	R20497-G1	. Shaft Subassembly - Vertical Cam	NP	NHA 20497
	R20577-G1	. . Cam Assembly - Vertical	NP	NHA 20577
	R1304-A	. . Counterbalance - Cam	NP	NHA1304-A
	R12729	. . Shaft - Vertical Cam	NP	NHA 12729

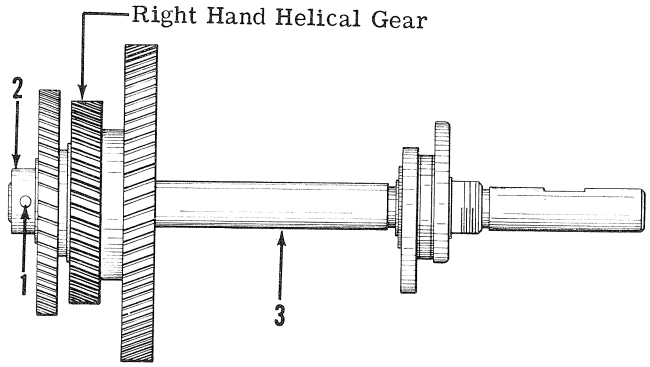


Figure 19A. SHAFT ASSEMBLY - VERTICAL CAM

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
19A	R20496-G1	SHAFT ASSEMBLY - VERTICAL CAM (used on projectors bearing Serial No. below 129701)	Ref.	20496
-1	30663-P1	. Pin - Taper, #5/0, 7/16 in. lg., stainless steel.	1	1553
-2	R19281-G1	. Gear Assembly - Vertical Cam.	NP	NHA 19281
-3	R20497-G1	. Shaft Subassembly.	NP	NHA 20497
	R20577-G1	. . Cam Assembly - Vertical	NP	NHA 20577
	R1304-A	. . Counterbalance - Cam	NP	NHA1304-A
	R12729	. . Shaft - Vertical Cam	NP	NHA 12729

NP - Non Procurable
NHA - Next Higher Assembly

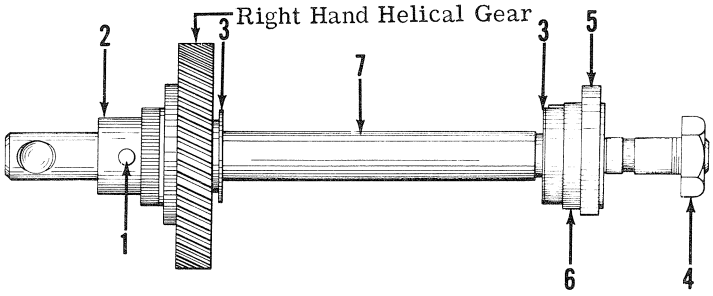


Figure 20. SHAFT ASSEMBLY - LATERAL CAM

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
20	R190042-G1	SHAFT ASSEMBLY - LATERAL CAM (used on projectors bearing Serial No. 129701 and up	Ref.	190042
-1	30663-P1	. Pin - Taper, #5/0, 7/16 in. lg., stainless steel.	1	1553
-2	R190041-G1	. Gear Subassembly - Lateral Cam.	NP	NHA190041
-3	R1313-10	. Washer - Flat	2	1313-10
-4	R1290	. Nut - Lateral Cam.	1	1290
-5	R20576-G1	. Cam Assembly - Lateral	1	20576
-6	R12940	. Spacer - Lateral Cam	1	12940
-7	R12634	. Shaft - Lateral Cam	NP	NHA 12634

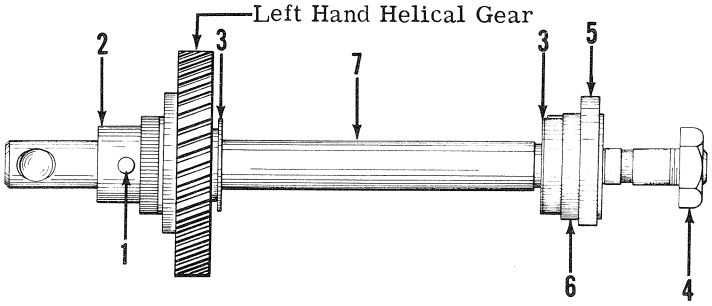


Figure 20A. SHAFT ASSEMBLY - LATERAL CAM

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
20A	R19279-G1	SHAFT ASSEMBLY - LATERAL CAM (used on projectors bear- Serial No. below 129701)	Ref.	19279
-1	30663-P1	. Pin - Taper, #5/0, 7/16 in. lg., stainless steel.	1	1553
-2	R19906-G1	. Gear Subassembly - Lateral Cam.	NP	NHA 19906
-3	R1313-10	. Washer - Flat	2	1313-10
-4	R1290	. Nut - Lateral Cam.	1	1290
-5	R20576-G1	. Cam Assembly - Lateral	1	20576
-6	R12940	. Spacer - Lateral Cam	1	12940
-7	R12634	. Shaft - Lateral Cam	NP	NHA 12634

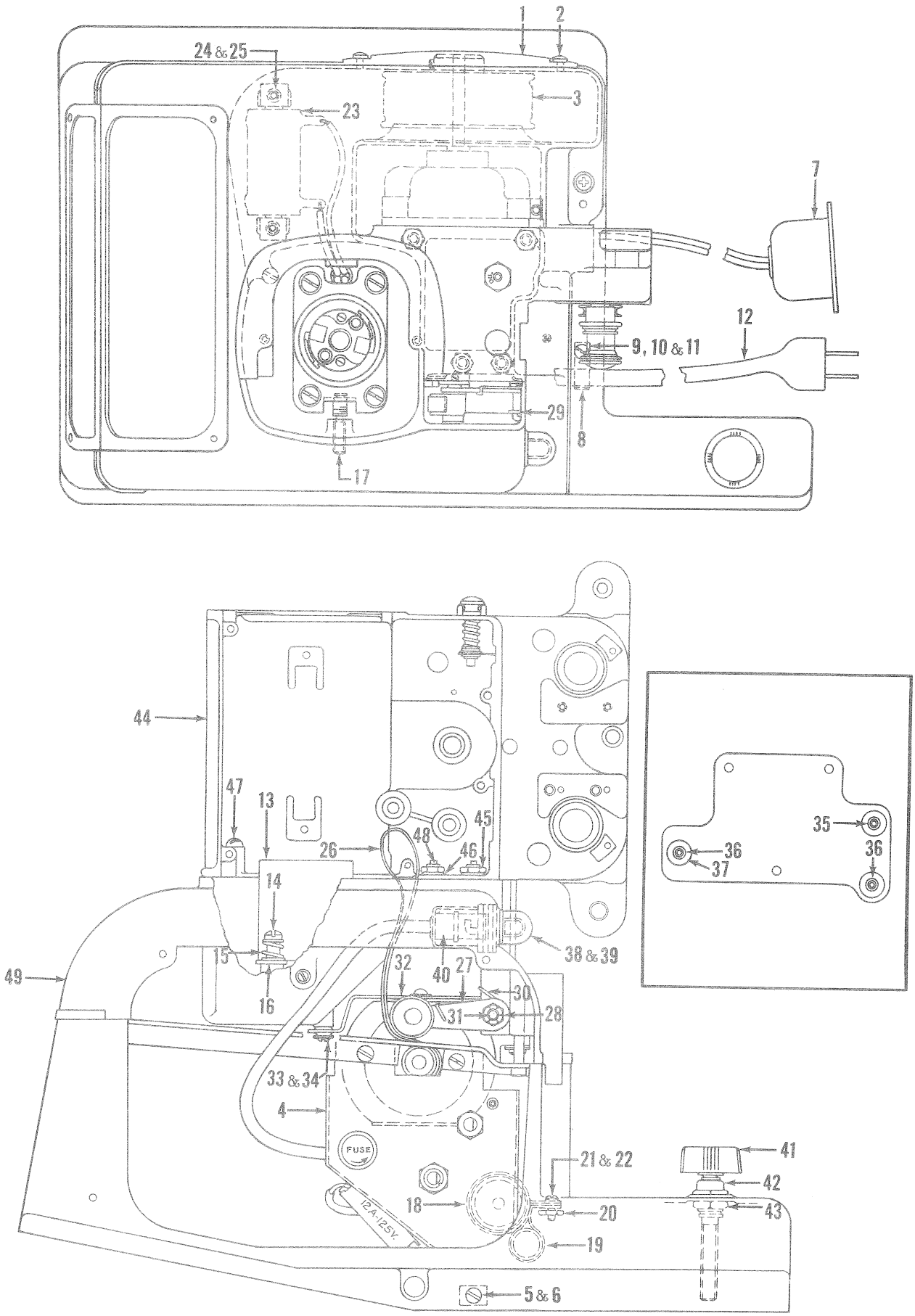
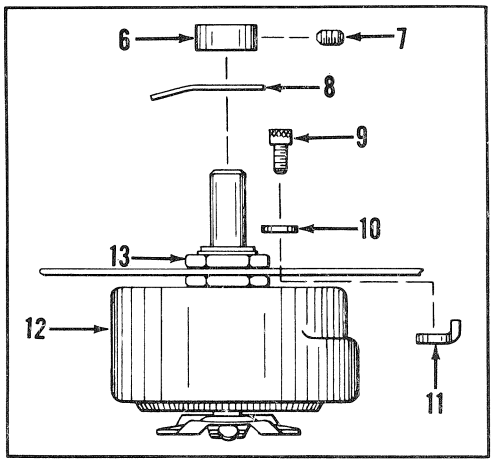


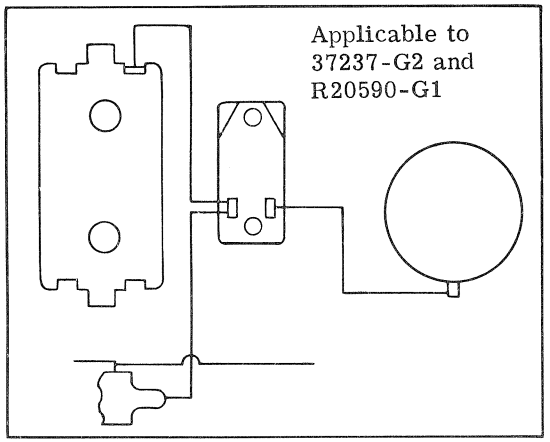
Figure 21. BASE AND MECHANISM ASSEMBLY

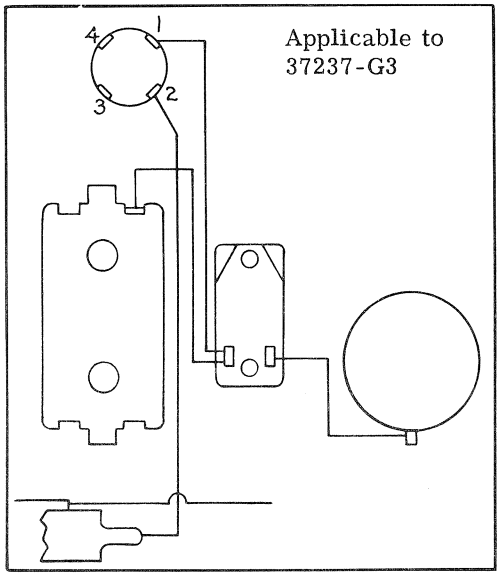
Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
21	Ref.	BASE AND MECHANISM ASSEMBLY	Ref.	
-1	R13751-P1	. Cover - Fan	1	13751
	Attaching Part			
-2	110-6R4	. Screw - Machine, 1/4 in. lg., #6-32, straight side binding Phillips head, steel, Brown Enamel L-71	3	14991
	---***---			
-3	R18627-P1	. Fan - Projector	1	18627
-4	37237-G1	. Panel Assembly - Sub Control (Figure 22) Models 512, 510 and 508 having 10w AC amplifier, Bodine motor and threading light	1	
	37237-G2	. Panel Assembly - Sub Control (Figure 22) Model 548 having 4w AC-DC amplifier and Bodine motor.	1	
	37237-G3	. Panel Assembly - Sub Control (Figure 22) Models 508 (less threading light) and 568 having 10w AC amplifier and Bodine motor	1	
	R20960-G1	. Panel Assembly - Sub Control (Figure 22) Model 484 (less threading light), Models 483 and 482 (with threading light), having 10w AC amplifier and Delco motor	1	20960
	R20590-G1	. Panel Assembly - Sub Control (Figure 22) Model 472 having 4w AC-DC amplifier and Delco motor	1	20590
	Attaching Parts			
-5	110-6-6H	. Screw - Machine, 3/8 in. lg., #6-32, straight side binding head, slotted, steel, Nickel Plate P-27.	3	14863
-6	R14332	. Nut - Speed, for #6-32 screw, type "J", Tinnerman Products Inc. p/n C8020-632-4	3	14332
	---***---			
	R18671	. Connector - Wire, Ideal Industries p/n E-1	1	18671
-7	R20381-G1	. Cable Assembly - Amplifier (Figure 23)	1	20381
-8	267-4	. Clamp - Cable, Richco Plastics p/n E-5 (replaces p/n 13146).	1	
	Attaching Parts			
-9	200-6HA	. Nut - Machine, #6-32, hex., steel, Cadmium Plate P-21.	1	1452
-10	221-6L	. Washer - Lock, Internal type, for #6 screw, Shakeproof type 12, Cat. 1206, Black Oxide S-7	1	14703
-11	110-6-6H	. Screw - Machine, 3/8 in. lg., #6-32, straight side binding head, slotted, steel, Nickel P-27	1	14863
	---***---			
-12	R20380-G1	. Cord Assembly - Power	1	20380
	R18663	. . Terminal - Wire, Aircraft Marine Products Cat. 32418	1	18663
	No Number	. . Cord Subassembly - Power	NP	NHA
-13	R20375-G1	. Socket Assembly - Projection Lamp (Figure 24)	1	20375
	Attaching Parts			
-14	R12755	. Screw - Machine (special).	4	12755
-15	R1534	. Spring - Socket Assembly	4	1534
-16	R14905	. Washer - Flat	4	14905
	---***---			
-17	R12754	. Screw - Machine (special).	1	12754
-18	R18637	. Capacitor - Governor (includes clamp for mounting)	1	18637
-19	R18661	. Capacitor - Line Filter (includes clamp for mounting) Used on Models 548 and 472 having 4w AC-DC amplifier.	1	18661
	Attaching Parts			
-20	200-6HA	. Nut - Machine, #6-32, hex., steel, Cadmium Plate P-21.	1	1452
-21	221-6L	. Washer - Lock, Internal type, for #6 screw, Shakeproof type 12, Cat. 1206, Black Oxide S-7	1	14703
-22	110-6-6H	. Screw - Machine, 3/8 in. lg., #6-32, straight side binding head, slotted, steel, Nickel Plate P-27	1	14863
	---***---			
	Ref.	. Tubing (resistor leads) black fibre glass tubing Natvar Code 35, Nema Code BC2, vinyl coated, 1500 volts, AVG, Natvar Corp	AR	L.P.

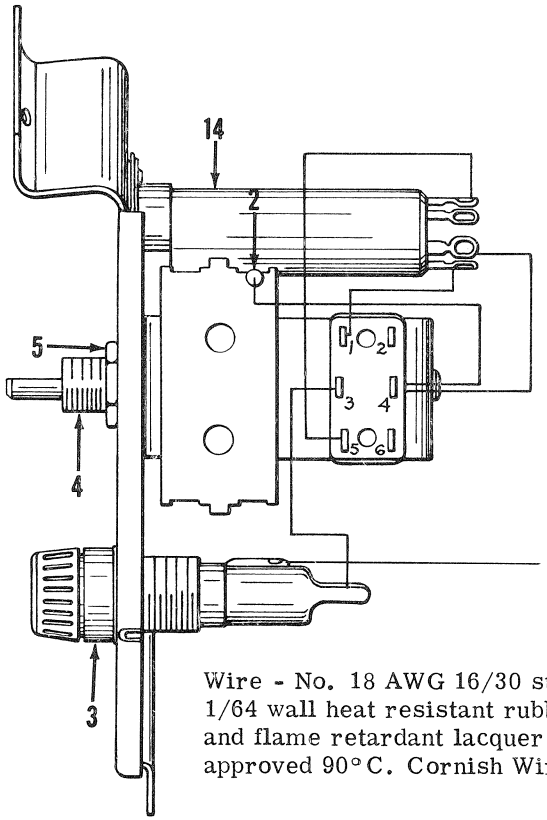
NP - Non Procurable
NHA - Next Higher Assembly

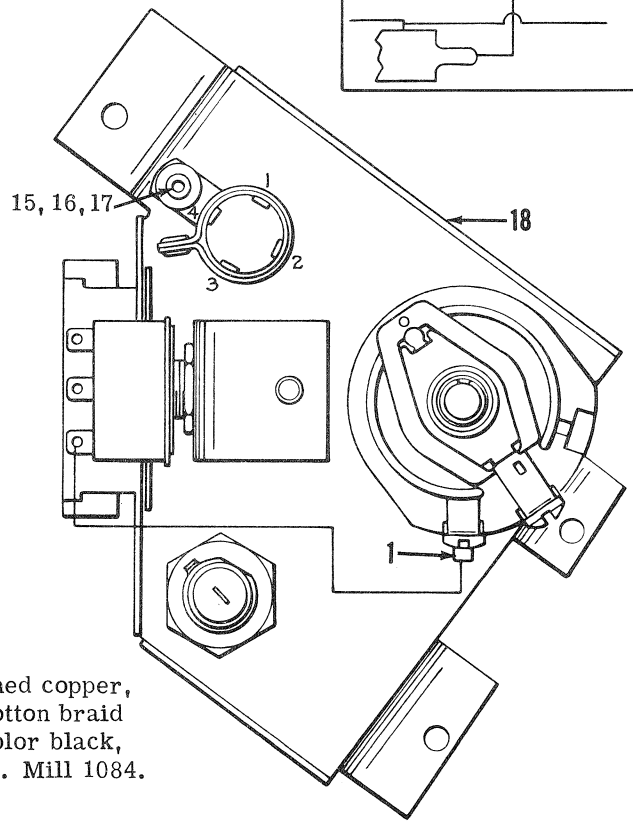
Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
21-23	R18658	. Resistor - Governor	1	18658
	Attaching Parts			
-24	121-6-6A	. Screw - Self Tapping, 3/8 in. lg., #6, binding (pan) head, Parker Kalon type "Z", slotted, steel, Cadmium Plate P-21	2	14570
-25	R14940	. Nut - Speed, for #6-32 screw, type "U", Tinnerman Products Inc. p/n C-6452-632-051-17	2	14940
	---***---			
-26	R18646	. Belt - Drive	1	18646
-27	R20321-G1	. Idler Assembly - Tension	1	20321
	R13862	. Guide - Drive Belt (no longer used on models manufactured by Graflex)	1	13862
	Attaching Parts			
-28	R14795	. Nut - Self Locking, #10-32, Elastic Stop Nut Corp.p/n 22-MO2	1	14795
-29	R14742	. Washer - Flat	1	14742
	---***---			
-30	R15019	. Spring - Tension Idler Arm	1	15019
-31	R12778	. Stud - Idler	1	12778
-32	Ref.	. Motor Assembly (Bodine) Figure 25	Ref.	
	Ref.	. Motor Assembly (Delco) Refer to Parts List 25	Ref.	
	Attaching Parts			
-33	102-6R6A	. Screw - Machine , 3/8 in. lg., #6-32, round Phillips head, steel, Cadmium Plate P-21 (Bodine motor mounting)	3	
	R14945	. Screw - Machine, 5/8 in. lg., #6-32, hex. head (Delco motor mounting)	3	14945
-34	R1752	. Washer - Flat	3	1752
-35	37288	. Sleeve - Grommet (Bodine motor mounting)	1	
	R12779	. Sleeve - Grommet (Delco motor mounting)	3	12779
-36	37543	. Spacer - Grommet (Bodine motor mounting)	2	
-37	37511	. Grommet - Rubber, Atlantic India Rubber Works, Inc. p/n 382 (Bodine motor mounting)	3	
	R17871	. Bushing - Rubber (Delco motor mounting)	3	17871
	R14881	. Washer - Flat (Delco motor mounting)	6	14881
	---***---			
-38	R17112	. Shield - Lamp	1	17112
-39	38393	. Lamp - Pilot, Mazda #44, 6-8 volts, bayonet base, G. E. Co.	1	16203
	Ref.	. Tubing (threading lamp socket leads) black fibre glass, Natvar Code 35, Nema Code BC2, vinyl coated, 1500 volts, AVG, Natvar Corp.	AR	L.P.
	245-2	. Plug - Button, Brown Wrinkle L-70 (used on models not having threading lamp)	1	
-40	R16227	. Socket - Threading Lamp	1	16227
-41	R16808	. Knob - Tilt	1	16808
-42	R20398-G1	. Screw Assembly- Tilt (Figure 26)	1	20398
	Attaching Part			
-43	R12768	. Nut - Machine (special)	1	12768
	---***---			
-44	R20979-G1	. Mechanism Assembly (Figure 27)	1	20979
	Attaching Parts			
-45	R1454	. Nut - Machine (special)	4	1454
-46	221-10A	. Washer - Lock, Internal type, for #10 screw, Shakeproof type 12, Cat. 1210, steel, Cadmium Plate P-21	4	14768
-47	102-10-16A	. Screw - Machine, 1 in. lg., #10-24, round head slotted, steel, Cadmium Plate P-21	1	14654
	---***---			
-48	R12645	. Stud - Mechanism Assembly Mounting	4	12645
-49	Ref.	. Base Assembly (Figure 28)	Ref.	











Wire - No. 18 AWG 16/30 stranded tinned copper, 1/64 wall heat resistant rubber, soft cotton braid and flame retardant lacquer coating, color black, approved 90°C. Cornish Wire Co., Inc. Mill 1084.

Figure 22. PANEL ASSEMBLY - SUB CONTROL

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
22	37237-G1	PANEL ASSEMBLY - SUB CONTROL	Ref.	
	37237-G2	PANEL ASSEMBLY - SUB CONTROL	Ref.	
	37237-G3	PANEL ASSEMBLY - SUB CONTROL	Ref.	
	R20960-G1	PANEL ASSEMBLY - SUB CONTROL	Ref.	20960
	R20590-G1	PANEL ASSEMBLY - SUB CONTROL	Ref.	20590
-1	37763	. Terminal - Wire (rheostat) NOTE: Used in Production only (machine crimped), for replacement use R18663	Ref.	
	R18663	. Terminal - Wire, Aircraft Marine Products p/n 32418	1	18663
-2	R18452	. Terminal - Wire (switch) Thomas & Betts Co., p/n A-33	1	18452
	410-5	. Fuse, 1 1/2 amp. Littelfuse p/n 31201-5	1	L.P. 17579
-3	R18556	. Post - Fuse	1	18556
-4	R181236-G1	. Switch Assembly (used with 37237-G1 and 20960-G1)	1	181236
	R181242-G1	. Switch Assembly (used with 37237-G2, 37237-G3, and 20590-G1	1	181242
	R181161	. . Switch - Motor, DPDT, 3 amp., 125v., AC or DC (used with R181236-G1)	1	181161
	R16932	. . Switch - Motor, SPST, 3 amp., 125v., AC or DC (used with R181242-G1	1	16932
	R16933	. . Switch - Lamp, SPST, 12 amp., 125v., AC or DC	1	16933
	Attaching Part			
-5	R14997	. Nut - Machine (special)	1	14997
	---***---			
-6	R161333	. Spacer - Knob (used with 20960-G1 and 20590-G1)	1	161333
	Attaching Part			
-7	171D6-3	. Screw - Set, 3/16 in. lg., #6-32, headless hex. socket type, flat point, steel	1	141387
	---***---			
-8	R161334	. Arm - Stop (used with 20960-G1 and 20590-G1)	1	161334
-9	R161335	. Screw - Adjusting (used with 20960-G1 and 20590-G1)	1	161335
-10	R161336	. Washer - Flat (used with 20960-G1 and 20590-G1)	1	161336
-11	R161337	. Nut - Adjusting (used with 20960-G1 and 20590-G1)	1	161337
-12	R181371	. Rheostat, Model D, 70 ohm., 25w	1	181371
	Attaching Part			
-13	R14997	. Nut - Machine (special)	1	14997
	---***---			
-14	R18990	. Resistor (used with 37237-G1, 37237-G3 and 20960-G1	1	18990
	Attaching Parts			
-15	R14760	. Rivet - Hollow, 0.1875 in. lg., 0.125 in. dia., oval head, steel, Cadmium Plate P-21.	1	14760
-16	R14405	. Washer - Flat	1	14405
-17	221-6L	. Washer - Lock, Internal type, for #6 screw, Shakeproof type 12, Cat. 1206, Black Oxide S-7	1	14703
	---***---			
-18	R13480	. Panel - Sub Control	1	13480

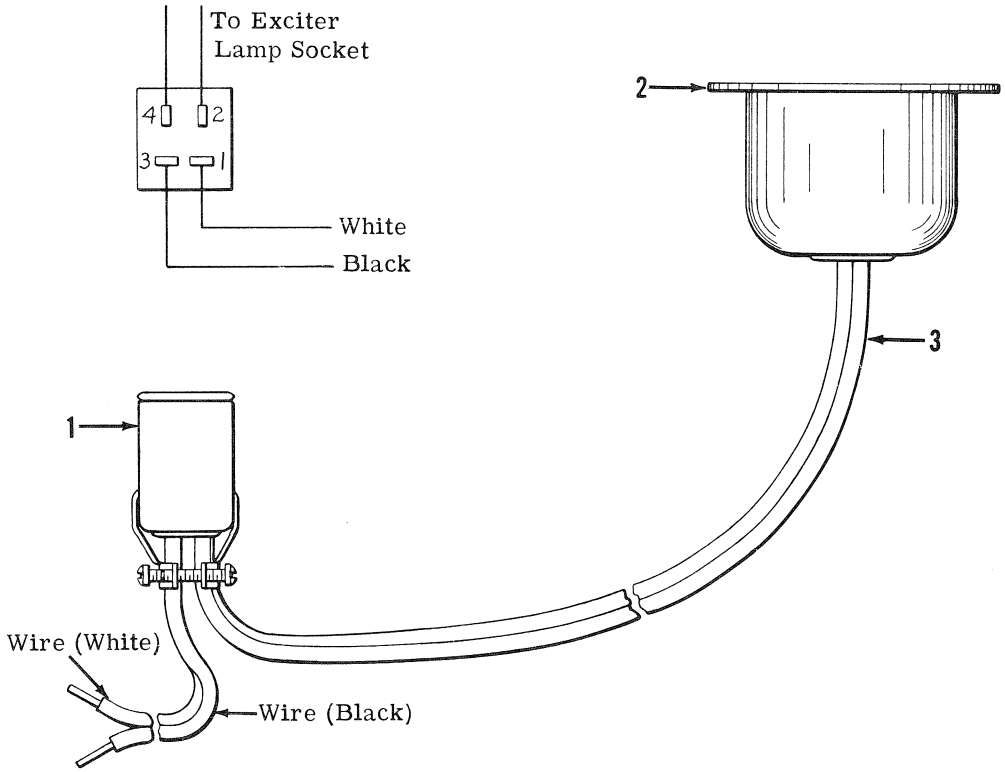


Figure 23. CABLE ASSEMBLY - AMPLIFIER

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
23	R20381-G1	CABLE ASSEMBLY - AMPLIFIER	Ref.	20381
	Ref.	. Wire - No. 18 AWG 16/30 stranded tinned copper, 1/64 wall heat resistant rubber, soft cotton braid and flame retardant lacquer coating, approved 90°C. Cornish Wire Co., Inc., Mill 1084	AR	L.P.
-1	R18594	. Socket - Cable, (female) Cinch Jones Cat. S-304-CCT	1	18594
-2	R19407-G1	. Cover Assembly - Exciter Lamp	1	19407
-3	R20281-G1	. Socket Assembly - Exciter Lamp (Figure 23A).	1	20281

L.P. - Local Purchase
AR - As required

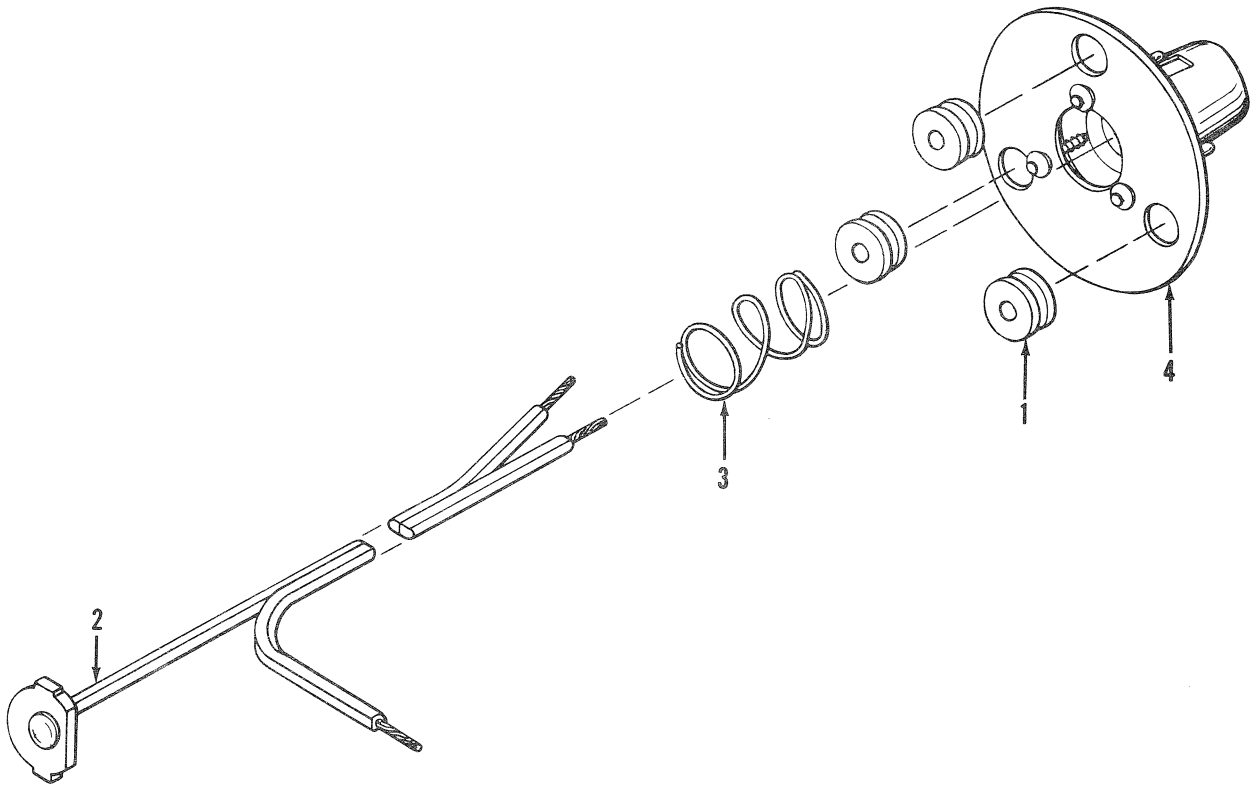


Figure 23A. SOCKET ASSEMBLY - EXCITER LAMP

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
23A	R20281-G1	SOCKET ASSEMBLY - EXCITER LAMP	Ref.	20281
-1	265-2	. Grommet - Rubber, Western Rubber Co. p/n G1268.	3	17593
-2	R20282-G1	. Cord Assembly - Exciter Lamp.	1	20282
	261-8	. . Eyelet	NP	NHA 18529
	R17540-B	. . Washer - Flat.	NP	NHA17540-B
	Ref.	. . Wire.	NP	NHA
-3	38372-P1	. Spring - Exciter Lamp	1	17540-C
-4	38364-G1	. Socket Subassembly - Exciter Lamp	1	19145
	38367	. . Pin - Exciter Socket	NP	NHA17540-D
	38366-P1	. . Spring - Exciter Socket Pin	NP	NHA17540-E
	38365	. . Plate - Exciter Socket	NP	NHA13506-1
	38368-G1	. . Sleeve Assembly - Exciter Lamp Socket.	NP	NHA 19144
	260-4	. . . Eyelet	NP	NHA 1767
	38369-P1	. . . Sleeve - Exciter Lamp.	NP	NHA17540A1

NP - Non Procurable
NHA - Next Higher Assembly

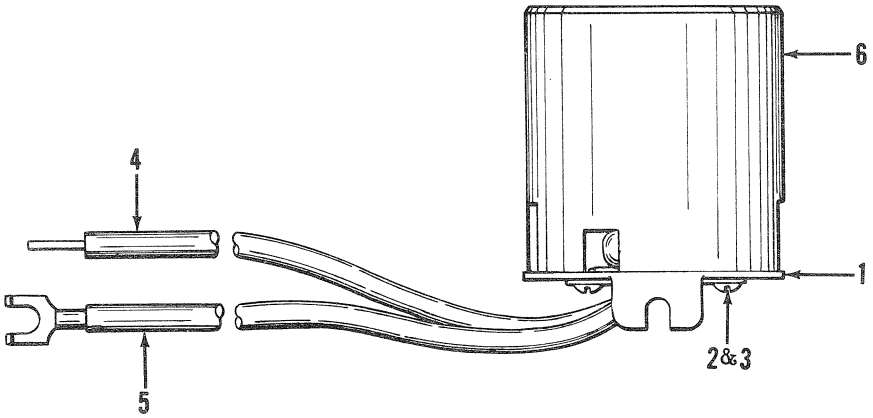


Figure 24. SOCKET ASSEMBLY - PROJECTION LAMP

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
24	R20375-G1	SOCKET ASSEMBLY - PROJECTION LAMP	Ref.	20375
-1	R20291-G1	. Seat Assembly - Lamp	1	20291
	Attaching Parts			
-2	R14694	. Screw - Machine, 5/16 in. lg., #4-36, round head	2	14694
-3	220-4L	. Washer - Lock, External type, for #4 screw, Shakeproof type 11, Cat. 1104-00, steel, Black Oxide S-7	2	14541
	---***---			
-4	R20382-G1	. Lead Assembly - Lamp	1	20382
	R18662	. . Terminal - Wire, Aircraft Marine Products Inc. p/n 34261	1	18662
	Ref.	. . Wire - Lead, No. 16 AWG 26/30 stranded tinned copper, felted and impregnated insulation, 0.130 in. dia., color white, Rockbestos Products Corp	AR	L.P.
-5	R20383-G1	. Lead Assembly - Lamp	1	20383
	R18662	. . Terminal - Wire, Aircraft Marine Products Inc. p/n 34261	1	18662
	R18663	. . Terminal - Wire, Aircraft Marine Products Inc. p/n 32418	1	18663
	Ref.	. . Wire - Lead, No. 16 AWG 26/30 stranded tinned copper, felted and impregnated insulation, 0.130 in. dia., color white, Rockbestos Products Corp.	AR	L.P.
-6	R1611	. Socket - Lamp, American Pheonolic Corp. p/n 98-8	1	1611

AR - As Required
L.P. - Local Purchase

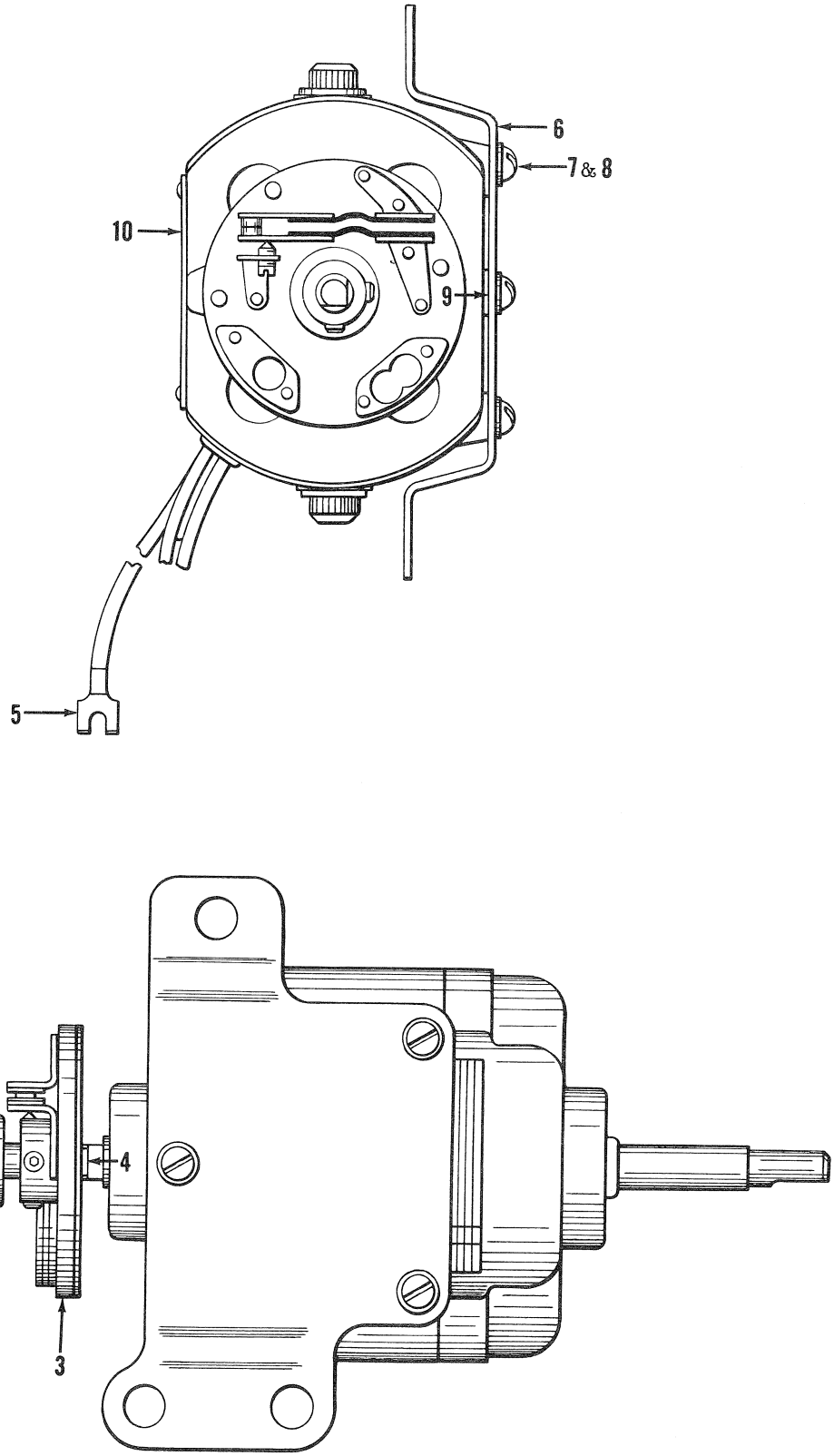


Figure 25. MOTOR ASSEMBLY (BODINE)

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
25	37291-G1	MOTOR ASSEMBLY (Bodine)	1	
	Ref.	MOTOR ASSEMBLY (Delco) See note below	Ref.	20983
-1	R120008	. Pulley - Motor NOTE: Also used with Delco motor	1	120008
	Attaching Part			
-2	171-6-2A	. Screw - Set, 1/8 in. lg., #6-32, headless hex. socket type, cup point, steel, Cadmium Plate P-21 NOTE: Also used with Delco motor	2	14780
	---***---			
-3	R18631	. Governor - Electric NOTE: Also used with Delco motor	1	18631
-4	37287-P1	. Brush - Governor (Bodine)	2	
-5	37763	. Terminal - Wire NOTE: Used in Production only (machine crimped) for replacement use R18663	Ref.	
	R18663	. Terminal - Wire, Aircraft Marine Products Inc. p/n 32418 NOTE: Also used with Delco motor	1	18663
-6	37289-P1	. Bracket - Motor	1	
	Attaching Parts			
-7	102-6-4A	. Screw - Machine, 1/4 in. lg., #6-32, round head, slotted, steel, Cadmium Plate P-21	3	14519
-8	221-6L	. Washer - Lock, Internal type, for #6 screw, Shakeproof type 12, Cat. 1206, Black Oxide S-7	3	14703
-9	30473-P16	. Washer - Flat, 0.281 in. OD, 0.147 in. ID, 0.010 in. thk., brass	1	
	---***---			
-10	37290-P1	. Motor (Bodine)	1	
	37290-P2	. . Armature Complete, Bodine Electric Co. p/n 19234	1	
	37290-P3	. . Field Coils - Set	1	
	37290-P4	. . Shield (brush end) Bodine Electric Co. p/n 19237	1	
	37290-P5	. . Shield (tops of brush end) Bodine Electric Co. p/n V308	1	
	37290-P6	. . Brush - Commutator, Bodine Electric Co. p/n V337	2	
	37290-P7	. . Spring - Brush, Bodine Electric Co. p/n N-2605	2	

NOTE: Delco motors and replacement parts have been exhausted (except indexes 1, 2, and 3, figure 25) and it will be necessary to replace with Bodine motors. When making this replacement, proceed as follows:

1. Remove the following from Delco motor; set screw, motor pulley and governor (indexes 1, 2, and 3, figure 25). NOTE: These items to be assembled to Bodine motor.

2. Order Bodine motor assembly 37291-G2 (refer to parts list below).

Part Number	Nomenclature 1 2 3 4 5 6	Qty.
37291-G2	MOTOR ASSEMBLY (Bodine) NOTE: Replacement assembly for projectors having Delco motors. Includes indexes 4 through 10, figure 25 and the following items listed.	1
37288	. Sleeve - Grommet (Ref. index 35, figure 21)	1
37543	. Spacer - Grommet (Ref. index 36, figure 21)	2
37511	. Grommet - Rubber (Ref. index 37, figure 21)	3

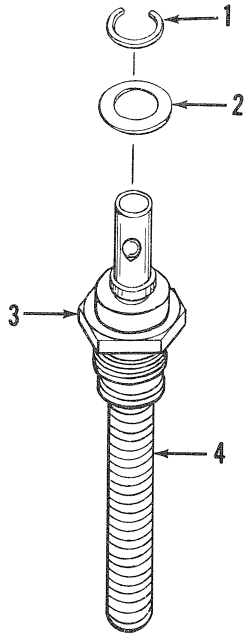


Figure 26. SCREW ASSEMBLY - TILT

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
26	R20398-G1	SCREW ASSEMBLY - TILT	Ref.	20398
- -1	250-5	. Ring - Retaining, Waldes Kohinoor Inc., Cat. 5100-31, steel	1	15012
-2	R14902-2	. Washer - Flat, .002 in. thk.	AR	14902-2
	R14902-3	. Washer - Flat, .003 in. thk.	AR	14902-3
	R14902-4	. Washer - Flat, .004 in. thk.	AR	14902-4
	R14902-10	. Washer - Flat, .010 in. thk.	AR	14902-10
-3	R12760	. Bushing - Tilt Screw	1	12760
-4	R12761	. Screw - Tilt	1	12761

NOTE: REPLACEMENT PARTS SHOULD BE ORDERED AS FOLLOWS:

1. ITEMS BEARING CATALOG NUMBER FORWARD TO:
   GRAFLEX, INC.
   3750 MONROE AVE.
   ROCHESTER 3, NEW YORK

2. ITEMS BEARING PART NUMBER FORWARD TO:
   CINESOUND CORPORATION
   420 WEST 45th STREET
   NEW YORK 36, NEW YORK

3. ALWAYS SPECIFY FINISH WHEN GIVEN IN DESCRIPTION OF ITEM.

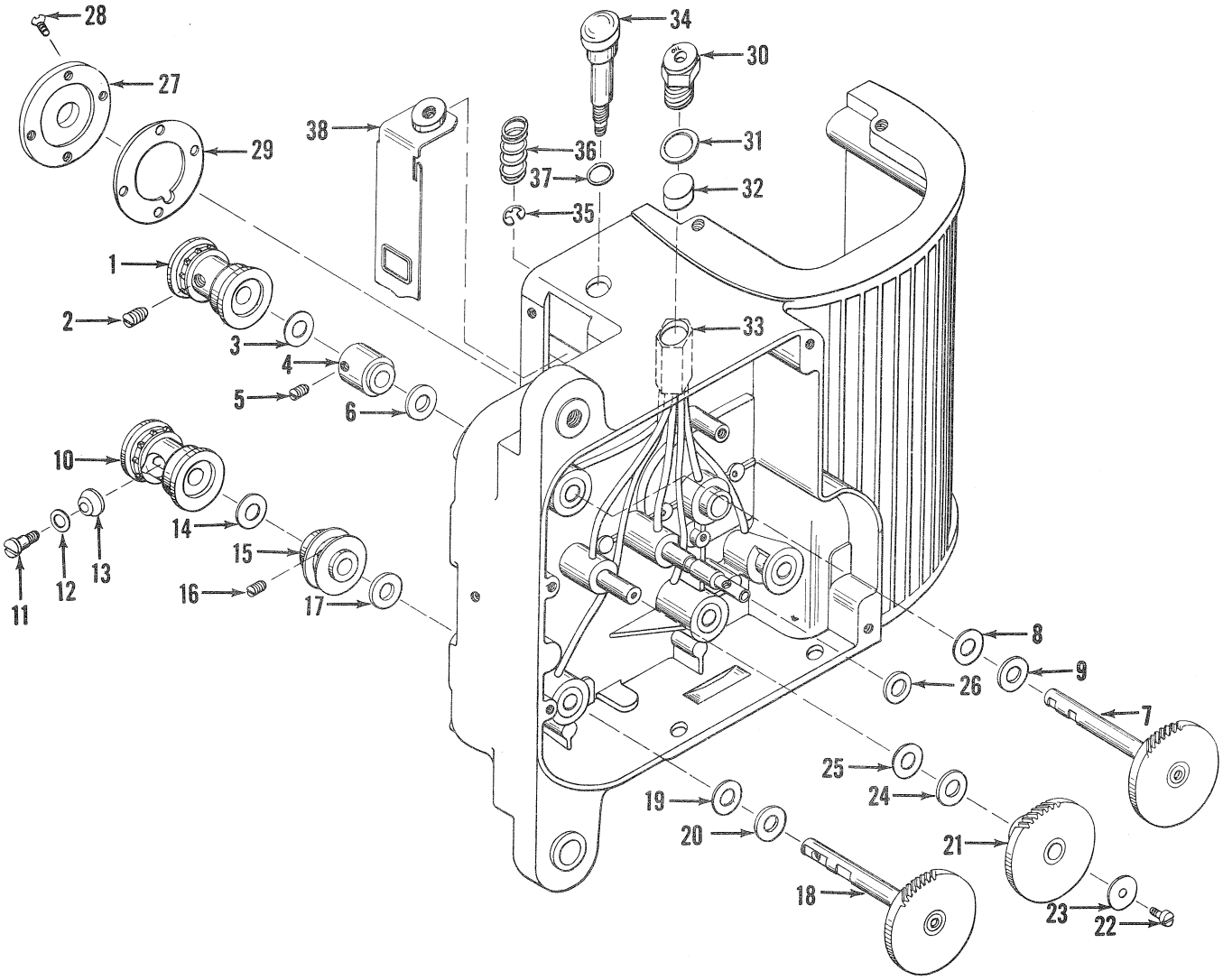


Figure 27. MECHANISM ASSEMBLY

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
27	R20979-G1	MECHANISM ASSEMBLY	Ref.	20979
-1	R20975-G1	. Sprocket Assembly - Film (Feed)	1	20975
	Attaching Part			
-2	R1404	. Screw - Set, 3/16 in.lg., #10-32, slotted headless, cup point steel	1	1404
	---***---			
-3	R1313-10	. Washer - Flat, .010 in. thk.	AR	1313-10
-4	R12921	. Collar - Film Sprocket Shaft	1	12921
	Attaching Part			
-5	170-8-3A	. Screw - Set, 3/16 in. lg., #8-32, slotted headless, cup point, steel, Cadmium Plate P-21		1401
	---***---			
-6	35473-P30	. Washer - Flat, 0.500 in. OD, 0.256 in. ID, 0.032 in. thk., steel	1	1313-32
-7	R19003-G1	. Gear Assembly - Feed Sprocket	1	19003
-8	R1313-5	. Washer - Flat, .005 in. thk.	AR	1313-5
-9	35473-P30	. Washer - Flat, 0.500 in. OD, 0.256 in. ID, 0.032 in. thk., steel	1	1313-32
-10	R20976-G1	. Sprocket Assembly - Film (Take-up)	1	20976
	Attaching Parts			
-11	R12596	. Screw - Machine (special)	1	12596
-12	R16514	. Washer - Flat	1	16514
-13	R17594	. Washer (neoprene)	1	17594
	---***---			

Figure and Index No.	Part Number	1 2 3 4 5 6 Nomenclature	Qty.	Ampro p/n
27-14	R1313-3	. Washer - Flat, .003 in. thk.	AR	1313-3
	R1313-5	. Washer - Flat, .005 in. thk.	AR	1313-5
	R1313-10	. Washer - Flat, .010 in. thk.	AR	1313-10
-15	R12600	. Pulley - Film Sprocket	1	12600
	Attaching Part			
-16	170-8-3A	. Screw - Set, 3/16 in. lg., #8-32, slotted headless, cup point, steel, Cadmium Plate P-21.	1	1401
	---***---			
-17	35473-P30	. Washer - Flat, 0.500 in. OD, 0.256 in. ID, 0.032 in. thk., steel	1	1313-32
-18	R19531-G1	. Gear Assembly - Take-up Sprocket.	1	19531
-19	R1313-5	. Washer - Flat, .005 in. thk.	AR	1313-5
-20	35473-P30	. Washer - Flat, 0.500 in. OD, 0.256 in. ID, 0.032 in. thk., steel	1	1313-32
-21	R19002-G1	. Gear Assembly - Small Intermediate Sprocket	1	19002
	Attaching Parts			
-22	R1297-A	. Screw - Machine (special).	1	1297-A
-23	R1750	. Washer - Flat	1	1750
	---***---			
-24	R1313-5	. Washer - Flat, .005 in. thk.	AR	1313-5
-25	35473-P30	. Washer - Flat, 0.500 in. OD, 0.256 in. ID, 0.032 in. thk., steel	1	1313-32
-26	R13625	. Washer - Flat	1	13625
-27	R13482-1	. Plate - Shutter Shaft Oil Seal	1	13482-1
	Attaching Part			
-28	R14589	. Screw - Machine, 1/4 in. lg., #4-36, flat head	4	14589
	---***---			
-29	R16997	. Gasket - Shutter Oil Seal	1	16997
-30	R1278	. Cap - Oil Well	1	1278
-31	R14323	. Washer - Flat	1	14323
-32	R1774	. Strainer - Oil	1	1774
-33	37297-G1	. Well Assembly - Oil.	1	20238
	R1769	. . Plug - Felt	1	1769
	Ref.	. . Tubing - Well, Turbo Varnish, ASTM (NEMA) Grade B-A-1 William Brand and Co., Inc.	AR	L.P.
	R1277	. . Well - Oil	1	1277
-34	R19476-G1	. Knob Assembly - Framing	1	19476
	Attaching Parts			
-35	251-9A	. Ring - Retaining, Truarc type E, Waldes Kohinoor Inc. Cat. 5133-15 , zinc or Cadmium Plate P-21.	1	15038
-36	R1501	. Spring - Framing Plate	1	1501
-37	R1457	. Washer - Flat	1	1457
	---***---			
-38	R1987-G1	. Plate Assembly - Framing	1	1987
	R20331-G1	. Housing Assembly - Mechanism.	1	20331

NOTE: REPLACEMENT PARTS SHOULD BE ORDERED AS FOLLOWS:

1. ITEMS BEARING CATALOG NUMBER FORWARD TO:
   GRAFLEX, INC.
   3750 MONROE AVE.
   ROCHESTER 3, N.Y.

2. ITEMS BEARING PART NUMBER FORWARD TO:
   CINESOUND SERVICE CORPORATION
   420 WEST 45th STREET
   NEW YORK 36, NEW YORK

3. ALWAYS SPECIFY FINISH WHEN GIVEN IN DESCRIPTION OF ITEM.

NOTE: Projectors not having threading lamp will require button plug 245-2, brown wrinkle L-70.

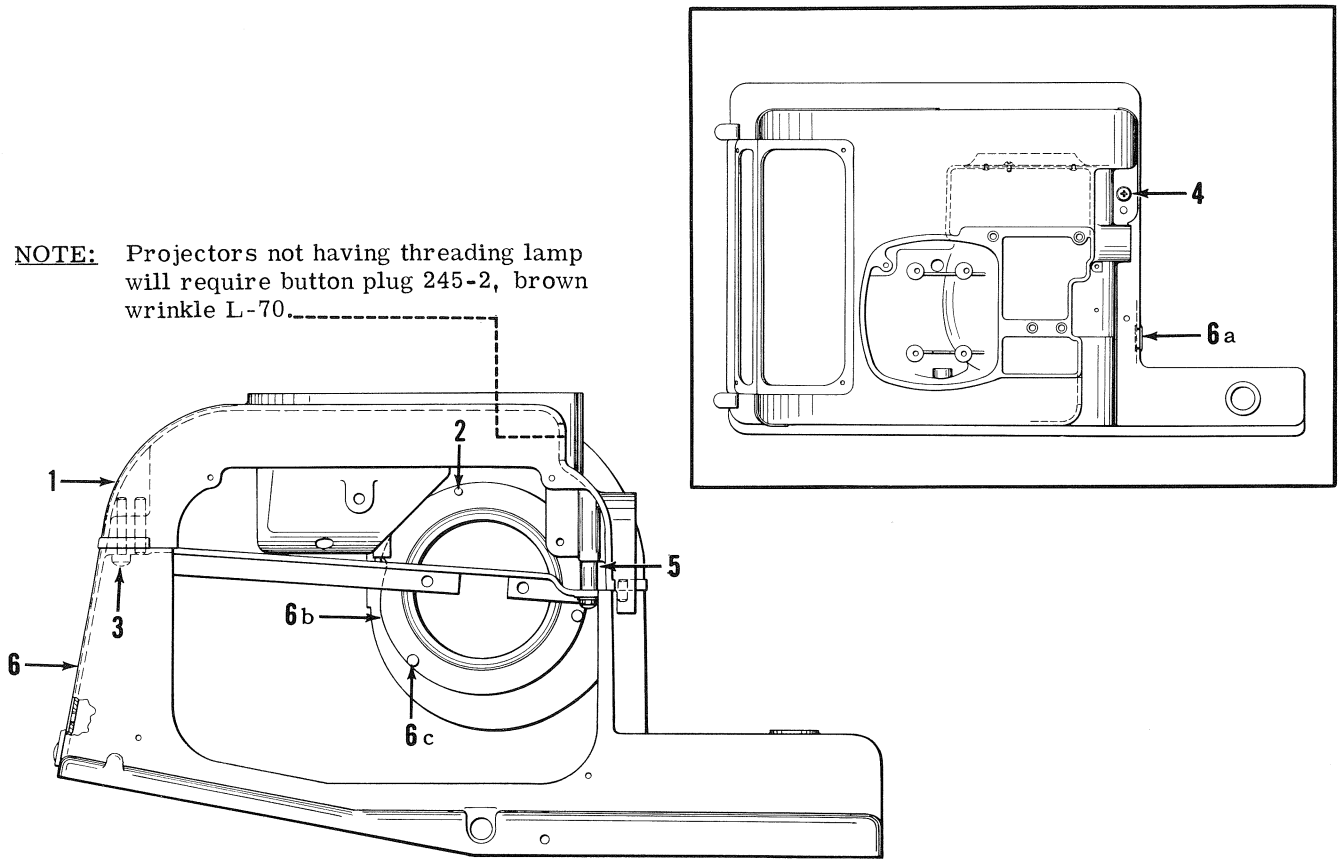
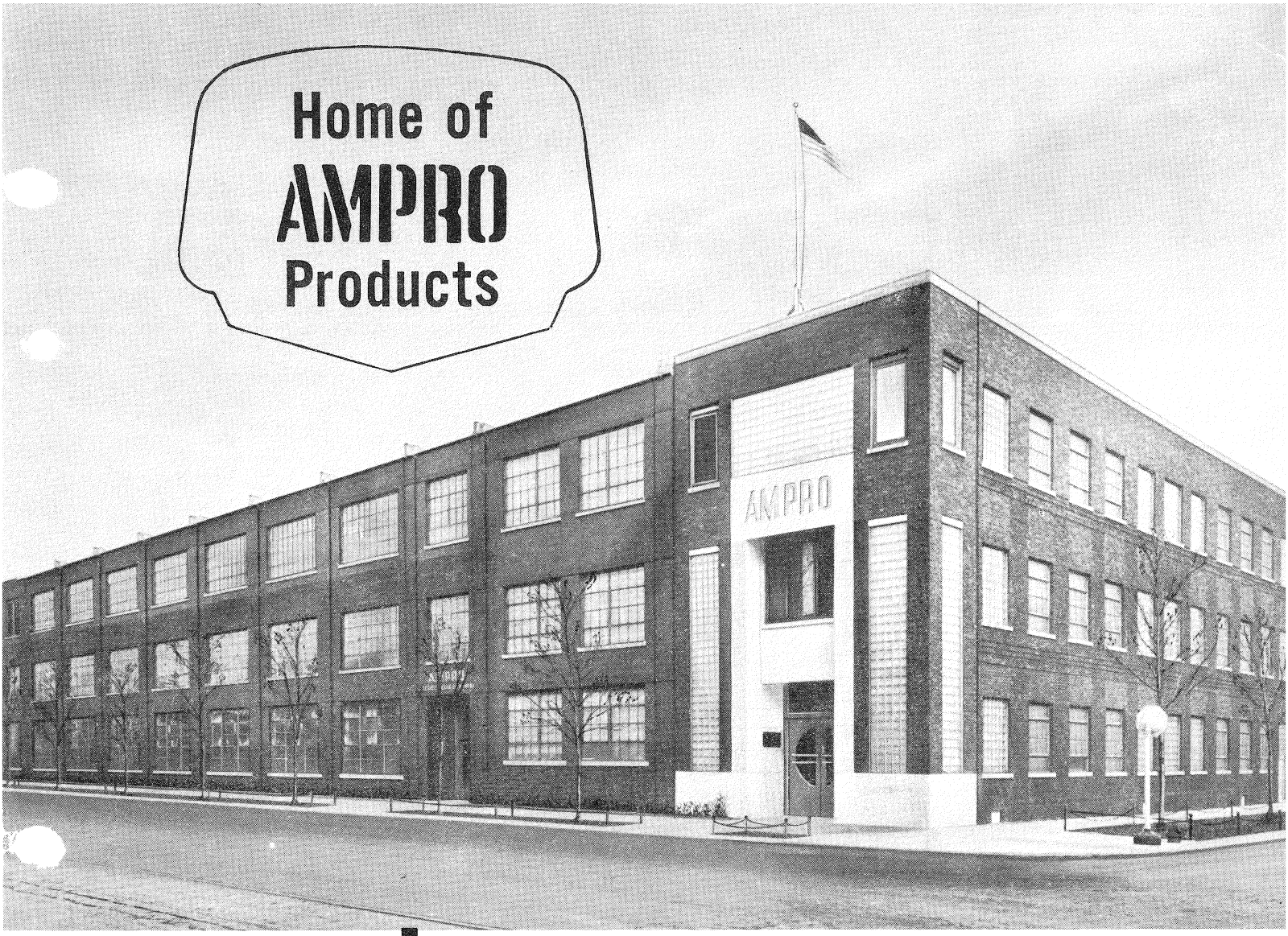


Figure 28. Base Assembly

Figure and Index No.	Part Number	Nomenclature 1 2 3 4 5 6	Qty.	Ampro p/n
28	R20958-G1	BASE ASSEMBLY (All models)	1	20958
	Ref.	BASE ASSEMBLY (Model 484) No longer available, replace with R20958-G1.	Ref.	200016
	Ref.	BASE ASSEMBLY (Models 483 and 482) No longer available, replace with R20958-G1	Ref.	20958
	Ref.	BASE ASSEMBLY (Model 472) No longer available, replace with R20958-G1	Ref.	20317
-1	R11660-2G1S	. Base Subassembly - Upper	1	
	R14965	. . Pin - Groove	NP	NHA 14965
	R14966	. . Pin - Driv Lok	NP	NHA 14966
	R11660-2	. . Base - Upper	NP	NHA11660-2
	Attaching Parts			
-2	R1482	. Screw - Self Tapping, 3/16 in. lg., #4, round head, Parker Kalon type "Z", slotted, steel, Cadmium Plate P-21	1	1482
-3	R14946	. Screw - Machine (Sems fastener type) 1 in. lg., #10-24, fillister Phillips head, steel, Cadmium Plate P-21	3	14946
-4	R14946	. Screw - Machine (same as above except Bronze Wrinkle F-3)	1	14946
-5	R12892	. Spacer - Base	1	12892
	---***---			
-6	R20433-2G1S	. Base Subassembly, Lower - Second	1	
-6a	R14355	. . Eyelet, E. B. Stimpson Co., Cat. A-556, brass	1	14355
-6b	R13994	. . Ring - Fan Inlet.	1	13994
	Attaching Part			
-6c	R1475	. . Rivet - Hollow, 0.125 in. lg., 0.083 in. dia., truss head, brass, Cadmium Plate P-21	2	1475
	---***---			
	R20433-2G1	. . Base Subassembly, Lower - First	NP	NHA20433-2
	R14761	. . . Rivet - Stop	NP	NHA 14761
	R13809	. . . Stop - Projector Tilt	NP	NHA 13809
	R11661	. . . Base - Lower	NP	NHA 11661

WHEN ORDERING ALWAYS SPECIFY FINISH WHEN GIVEN IN DESCRIPTION OF ITEM.

Home of AMPRO Products



Home Office and Ampro Plant No. 1
2835 North Western Avenue
Chicago 18, Illinois

Ampro Service Department
and Plant No. 2
240 East Ontario Street
Chicago 11, Illinois

AMPRO

INDEX

AMPRO CORPORATION

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Chicago 18, Illinois

A-10-20-30

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SUPPLEMENT I TO PREMIER SERIES SERVICE MANUAL

SUBJECT - PREMIER 40 PROJECTOR

PURPOSE - This supplement is to be added to the Premier Series Manual in order to provide a comprehensive manual covering the whole series of projectors. Since the Premier 40 is closely allied with the Premier 20 and Premier 30 projectors, it is only necessary to make reference to the applicable material in the original manual in order to provide the proper service information on the Premier 40 projector.

HOW TO USE - Each paragraph of the Premier Series Manual which dealt with the cleaning, inspection, troubles and remedies or service procedures for a specific part or group of parts included a reference such as (P-10), (P-20), (P-20 & 30) or (ALL), immediately following the paragraph heading, which indicated the model or models to which the paragraph applied. The applicable references for the Premier 40 model are as follows:

MAJOR UNIT	REFER TO PAR. MARKED
Feed Reel Arm Assem.	(ALL)
Takeup Reel Arm Assem.	(ALL)
Sound Head Assem.	(P-30)
Amplifier Assem.	(P-30)
Motor Assem.	(ALL)
Mechanism Unit	(ALL)
Timing the Intermittent and Shutter	Fig. 16A (P-10 & 20)
Lensmount and Aperture	(P-20 & 30)
Projection Lamp Socket Assem.	(ALL)
Tilt Assem.	(ALL) and (P-10 & 20)

INTRODUCTION

For several years, the finest Ampro sound projectors using incandescent lamps as light sources, have been designated as the "PREMIER" models. These projectors incorporate such features as still picture, reverse, two speeds and 12-15 watt amplifiers.

Since all three models have the same basic features, many users own two or all three models, therefore it seemed advisable to combine the service information in a single manual.

The models were specifically designated as the "Premier-10", "Premier-20", and "Premier-30", however many servicemen have abbreviated these designations to P-10, P-20, and P-30, For the readers convenience these abbreviations (set in bold face type) will be used throughout the manual in the following manner:

A paragraph titled "Repair of Lensmount (P-10)" will contain information applicable to the Premier-10 model only.

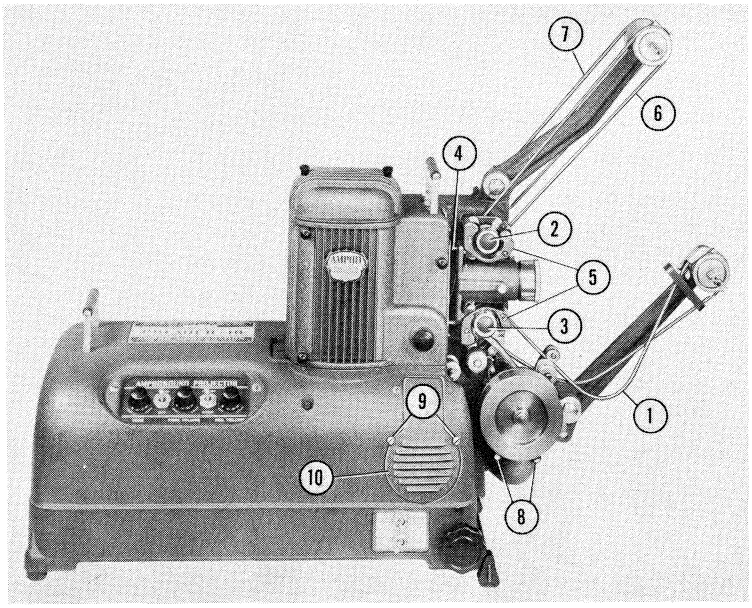
A paragraph titled "Repair of Lensmount (P-20 and 30)" will apply to Premier-20 and Premier-30 models only.

A paragraph titled "Repair of Sprocket Shoes (ALL) will apply to Premier-10, Premier-20 and Premier-30 models.

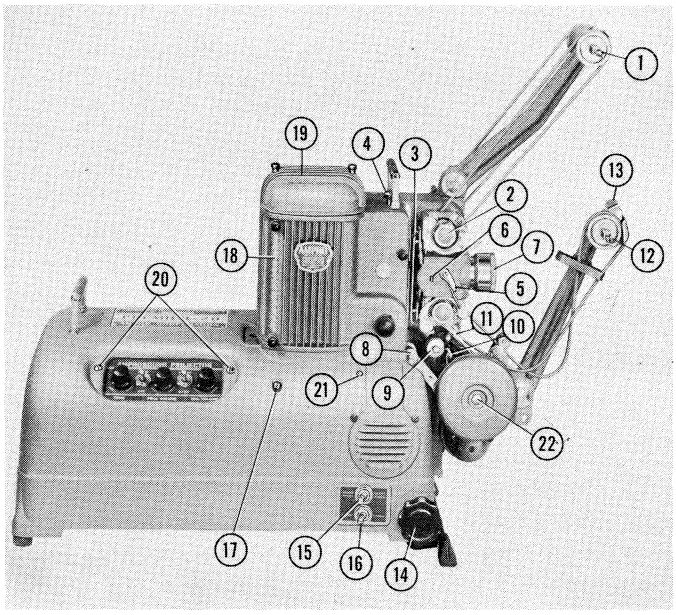
It is understood that such consolidation of information indicates only, that because of the similarity of construction, the same general service procedure applies. It is not to be construed as meaning that the respective parts are necessarily identical in material, dimension, and finish, and are therefore interchangeable. Should a condition of interchangeability exist it will be so indicated in Section IV (Parts List).

In order to avoid the confusion which results from a series of almost but not exactly identical illustrations, the illustrations used are typical of the general construction of one or more models. Minor variations in fastening and detail parts will be indicated in the text rather than in the illustrations.

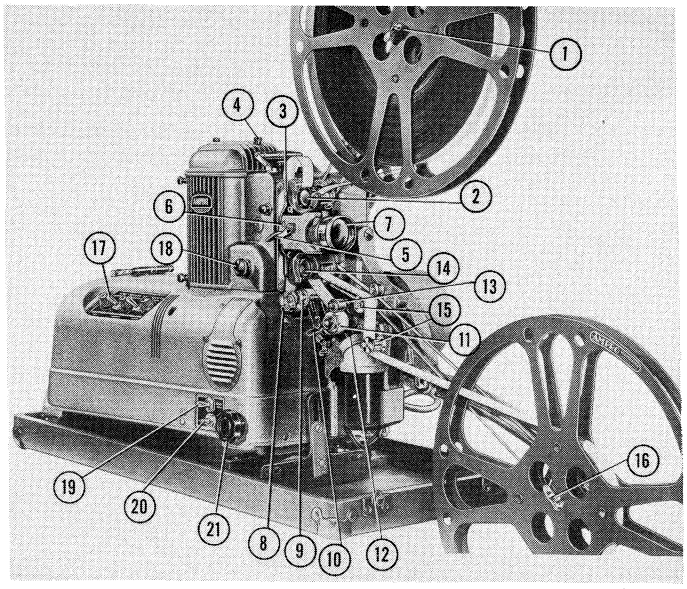
This manual has been prepared to serve as a guide and "time saver" for the trained service technician. It is <u>not recommended</u> that persons <u>not skilled</u> in this trade attempt to perform major repair operations on the equipment. Such attempts usually result in losses of time and money in excess of the cost of having the work performed by a skilled serviceman and frequently do not result in a first class repair.



A—PREMIER-10



B—PREMIER-20



C—PREMIER-30

FIGURE 1—PREMIER SERIES PROJECTORS

SECTION I

Cleaning and General Inspection

A. CLEANING

1. External and Readily Accessible Parts.

   a. Cases - Brush out the cases or use compressed air to blow out dust. Use a damp cloth to remove spots. Fabricoid covers can be polished with shoe polish or waxed.

   b. Film Path (See Fig. 1).

      (1) Sprockets and Sprocket Shoes (ALL) - Remove the two screws which hold the sprocket shoe covers (A-5) in place and pull off the covers. Remove the four rollers from each shoe and wash them in carbon tetrachloride. Wipe the spindles. Push back the follower roller assemblies by opening the film gate and blow out any dust. Run the projector and brush the sprocket teeth and supporting ribs.

> NOTE: It is advisable to hold the cleaning brush at a right angle to the axis of the sprocket so that the brush will not be drawn into the sprocket.

      (2) Film Gate (P-10) (See Fig. 1-A) - Open the film gate and insert the cleaning brush from the top. Brush the gate out thoroughly. Check for a collection of dirt or emulsion around the side tension spring. Clean with a toothpick or other small piece of wood. If caked emulsion cannot be removed in this manner, then refer to Sec. III A-9 for instructions on removal of the lensmount and pressure shoe.

      (3) Film Gate (P-20 and P-30) (See Fig. 1 B and C) - - Swing the gate lever (5) forward and release the gate latch (6). Open the gate and brush the aperture plate and pressure shoe. Clean out any dirt around the side tension spring.

      (4) Soundhead Assembly (ALL) (See Fig. 1) - Remove the pressure roller (B-8) and tension roller (B-9). Clean the rollers with carbon tetrachloride and wipe the spindles. Wipe the lower guideway (B-10) and remove any dirt from the slot through which the side tension spring passes. Clean the sound drum with a cloth dampened with carbon tetrachloride. Be sure that no lint is left on the edge of the drum. Wipe the upper guideway (B-11) on P-10 and 20. Remove the sound drum roller (C-13) on P-30 and clean the roller and

spindle in the same manner as the pressure and tension rollers. Fold a piece of lens tissue over a toothpick and wipe the exposed surfaces of the lens elements. If tests indicate that dust has collected inside of the sound optical system, refer to Sec. III A-3 for the correct service procedure.

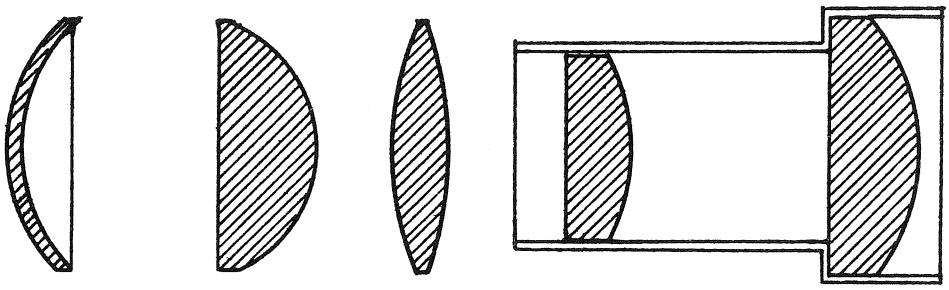


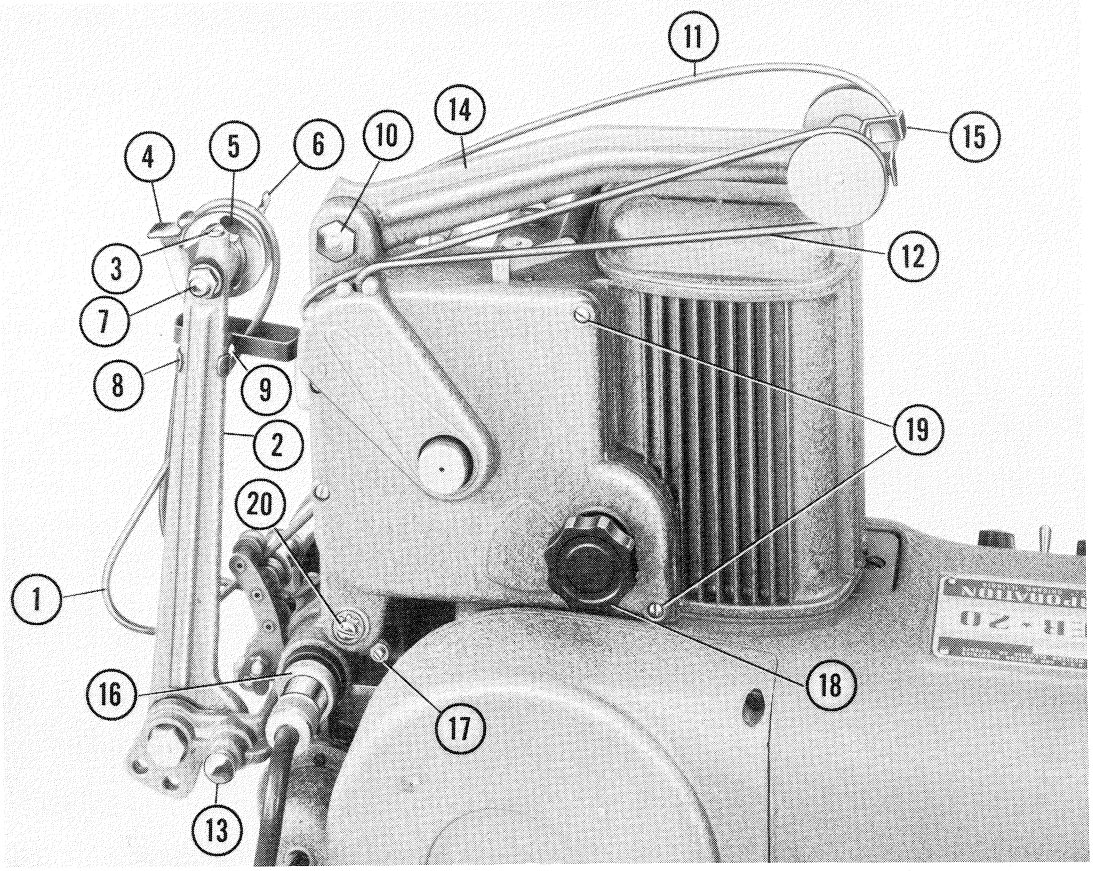
Figure 2 — PROJECTION OPTICS

c. Projection Optics (ALL) (See Fig. 2) - Remove the three front cover screws and remove the front cover (18 Fig. 1-B). Push the front condensing lens toward the rear lens then lift the front lens out of the holder. Remove the spring and rear condensing lens. Clean the lenses with lens tissue. If spots cannot be removed, immerse the lens in carbon tetrachloride and rub with a fairly coarse cloth.

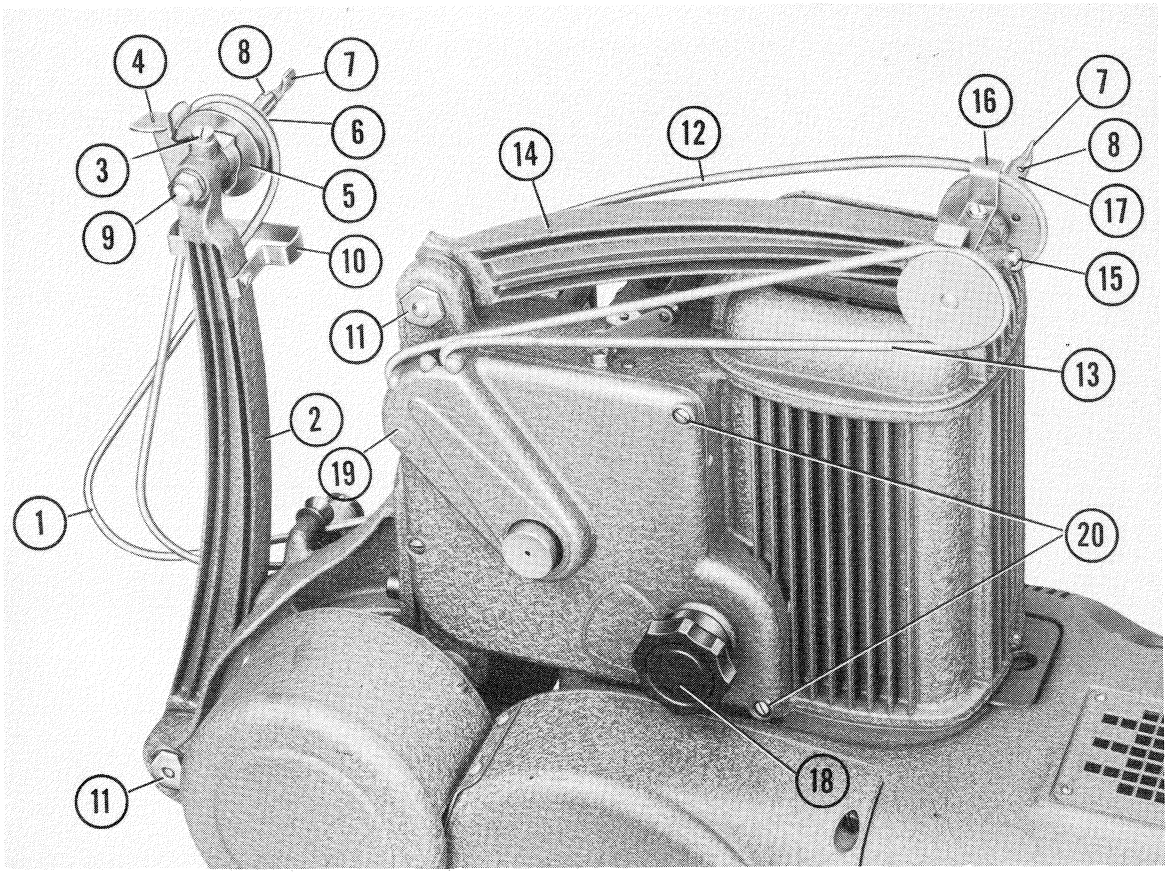
NOTE: If carbon tetrachloride has been used, dry the lens and then clean with lens cleaner, otherwise a grey film may be left on the lens.

Clean the reflector with lens tissue.

Clean the exposed surfaces of the projection lens elements with tissue dampened with lens cleaner. If the inner surfaces of the elements are dirty, see Sec. III A-9 for disassembly and reassembly instructions



A—L.H. SIDE PREMIER-10 & 20



B—L.H. SIDE PREMIER-30

FIGURE 3

d. Reel Belts and Spindles (ALL) (See Fig. 1) - Run the projector in the "Forward" direction and wipe the takeup belt (A-1) and feed belt (A-6) with a soft cloth. Switch to "Reverse", push in the rewind clutch and wipe the rewind belt (A-7). Note operation of the clutches in the spindles (C-1 and 16). If the clutches rattle or the spindles jerk, pour carbon tetrachloride in the space between the clutch cup and pulley to wash out any dirt. Apply three drops of Amproil around the edge.

e. Housings (ALL) - Wipe with a cloth dampened with carbon tetrachloride.

f. Speaker and Cables (ALL) - Clean the speaker case in the same manner as the projector case. Clean the cable connectors with a coarse cloth - corroded spots can be cleaned with fine sandpaper. Cables can be cleaned with any household detergent and water.

2. INTERNAL PARTS

a. Intermittent Compartment (ALL) (See Fig. 4) - Remove the front cover from the projector. Run the drive belt over the front edge of the drive clutch (1) (the end of the belt may be hooked over the end of the pressure roller knob to keep it from coming off of the motor pulley). Loosen the setscrew (2) in the drive clutch and pull off the clutch assembly. Remove the spacing washer (3). Remove the two screws (5) which hold the shuttle shield (4) in place and remove the shield. Take out the two screws (9) and lockwashers (8) (P-30 ONLY) and remove the vertical camshaft bearing assembly (6). Pull out the shuttle oil pad (15).

Wipe out the shuttle compartment. Wash the oil pad (15) and shuttle shield (4) in carbon tetrachloride. Dry the oil pad and replace it in the projector, then place three drops of Amproil in a straight line directly below the shuttle (10). Check to be sure that the intermittent is properly lubricated.

Saturate the oil wick (7) with Amproil and put a drop of oil on the camshaft, then install the vertical camshaft bearing assembly (6) but do not tighten the retaining screws. Rotate the shutter control knob (18 Fig. 3) while tightening the retaining screws (9). Tap the bearing carrier lightly to be sure that it is properly aligned. Install the remaining parts.

b. Gear Compartment (ALL) (See Fig. 3 and 5) - Loosen the setscrew in the shutter control knob (18) and remove the knob. Take out the four screws (19 Fig. 3-A) and lift off the rear cover (19 Fig. 3-B). If the mechanism is dirty it should be disassembled for cleaning (See Sec. III A-9), Wipe out any oil that may have collected in the bottom of the housing. Wipe the gears with a cloth dampened with Amproil. This can be done while the projector is operating at silent speed providing you are careful not to allow fingers or the cloth to be caught in the gear train.

3. Fan and Fan Housing (ALL) - Remove the screw which attaches the amplifier bottom cover to the fan housing. On Premier 30 remove flywheel cover (1 Fig. 9-A). Take out the three screws which hold the fan housing to the amplifier housing and remove the fan housing. Wash the housing and the scroll reverser with carbon tetrachloride. Place a drop of Amproil on the reverser pivot and check to make sure that the reverser does not rub on the housing. Wash the fan with carbon tetrachloride.

4. Motor and Governor (ALL) - Remove the two screws (9 Fig. 1-A) and the governor cover (10 Fig. 1-A). If the governor contact surfaces (Governor is 1 Fig. 7-A) are light grey, do not disturb them. If they are dirty, file them with a magneto file (See Sec. III B-1 for speed adjustment if points have been filed). On the Premier 10 and 20 remove the amplifier bottom cover to expose the motor. On the Premier 30 remove the motor guard. Use compressed air to blow dust out of the motor compartment (See Fig. 6).

B. INSPECTION

1. GENERAL

In all references made in this manual to tests or service operations requiring the use of film, it is understood that the film is to be in good condition and of known picture and sound quality. The 16mm version of the Academy Test Reel or material of similar nature will be satisfactory for use in all operations described in this section. With the exception of takeup and rewind tests, all other tests can be performed using a 400' reel of film. It is recommended that approximately 1600' of used film be kept on hand for testing the takeup and rewind.

2. INSPECTION WITHOUT FILM

Check all exposed screws in order to be sure that they are tight. Check cables for frayed spots and cable terminals for loose connections or damaged contacts. Start the projector and check for rattles, squeaks or other unusual noises. Turn on the lamp and check for screen brilliance, even distribu-

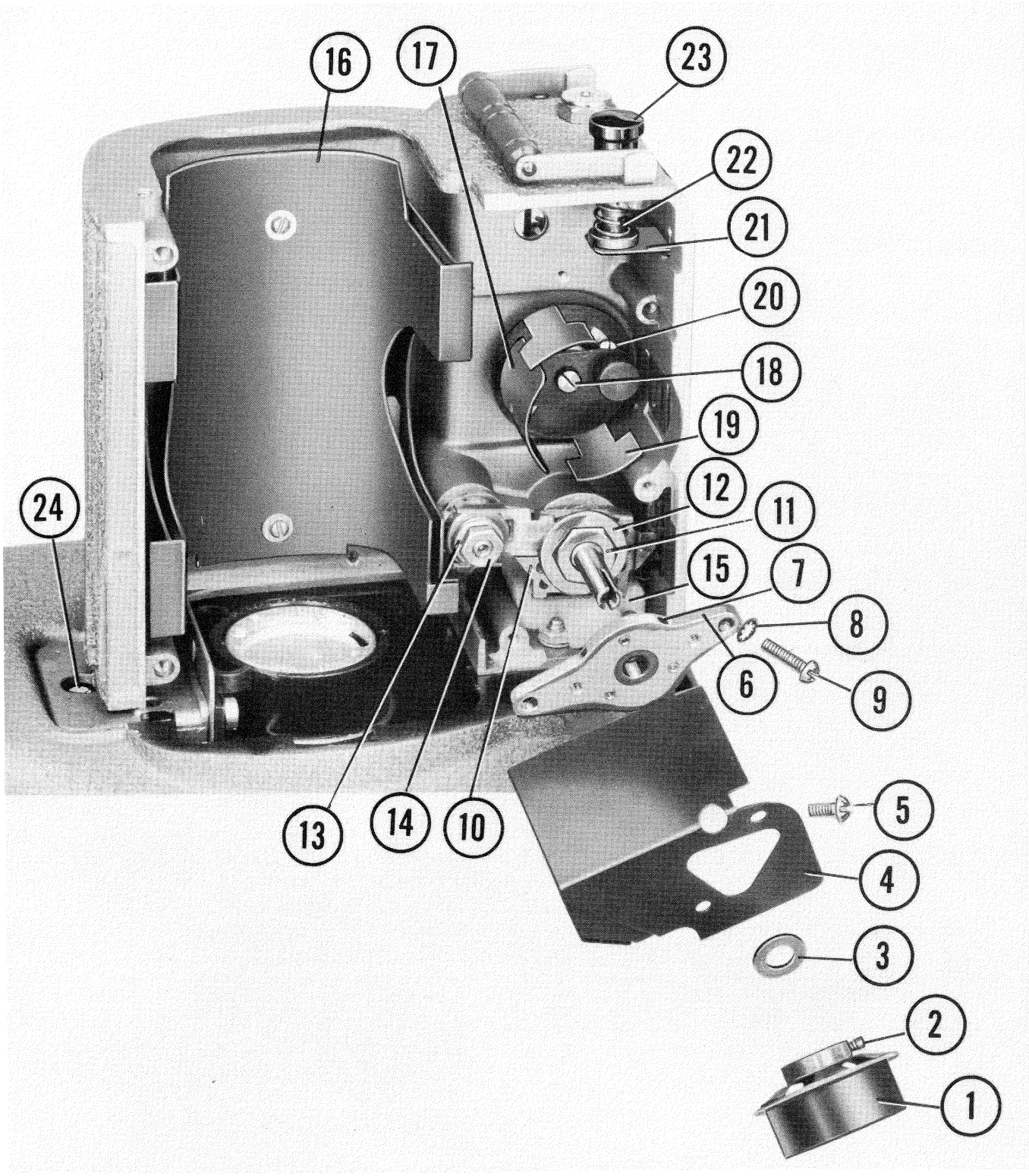


FIGURE 4—INTERMITTENT COMPARTMENT

tion of light and freedom from color bands. Operate the framer, tilt, and speed control switch and reversing switch.

Switch to sound speed and check the speed of the shutter control knob, the correct speed is 1440 R.P.M. ± 2%.

Switch to silent speed and check speed. The correct speed (16 F.P.S.) is 960 R.P.M., however, many users who photograph their own films will prefer a speed of 1050 - 1100 R.P.M. If the equipment is used for time and motion study work, the customer will require either 16 F.P.S. (960 F.P.M.) or 1000 F.P.M.

If the speed is not correct, see Sec. III B-1 for speed adjustment procedure.

Connect the speaker to the amplifier and turn on the amplifier. With "Projector Volume" control on Premier 10 and 20 retarded, check for microphonic tube or photocell. Advance volume control to 3 o'clock position and check for noisy exciter lamp (P-10 AND 20) and microphonic tubes or photocell (P-30). Check volume and tone controls for noisy operation.

3. FILM HANDLING - Thread the projector with film - while threading, check the operation of the gate lever, sprocket shoe followers and all idlers. Run the projector in the "Forward" direction and check the passage of the film through the projector. Check the feed and takeup tension, operation of all idlers, and takeup at end of 2000' reel. Check for film slap and weaving of the film on the lower guideway.

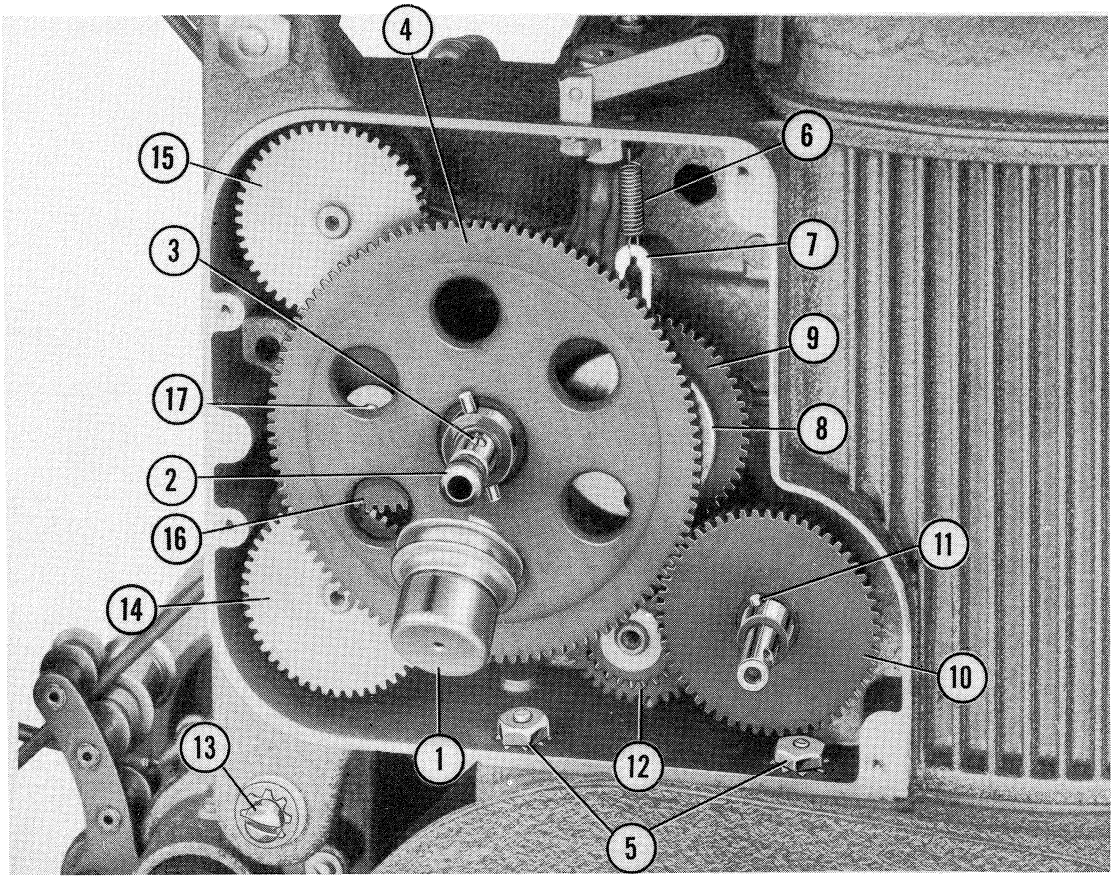
   Switch to "Reverse" and check film tension and film slap. Check operation of belt shifter. Remove film from projector and check operation of rewind with 2000' of film.

4. PICTURE QUALITY

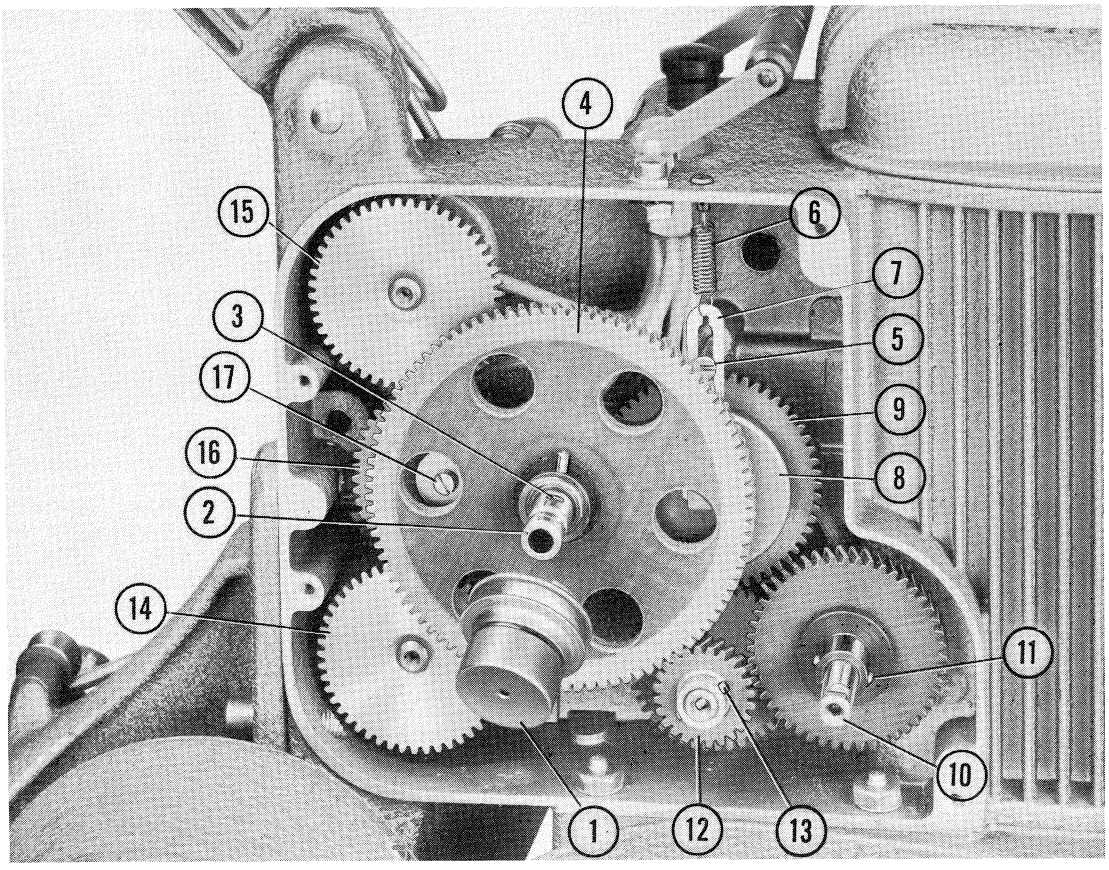
   Thread the projector with film and focus the picture on the screen. Check for sharpness of focus, double image and trailer ghost. Adjust the framer so that the frame line appears on the screen and check for picture jump. Check for "sideshake" or weave. Turn the still picture knob and check the single frame projection. Reverse the projector and repeat these tests.

5. SOUND QUALITY.

   Adjust the volume control to a satisfactory listening level and check sound for crispness, wow, and flutter. Check operation of the tone control. Advance the volume control to the point where distortion is just audible and check for normal output, speaker rattle and buzzing of speaker case hardware. Reduce voltage applied to projector to 105 volts and advance volume control to check reserve gain. Connect a microphone or phonograph to the unit and check operation of the "mic" volume control. Check operation of the P.E.C. control on P-10 AND 20.

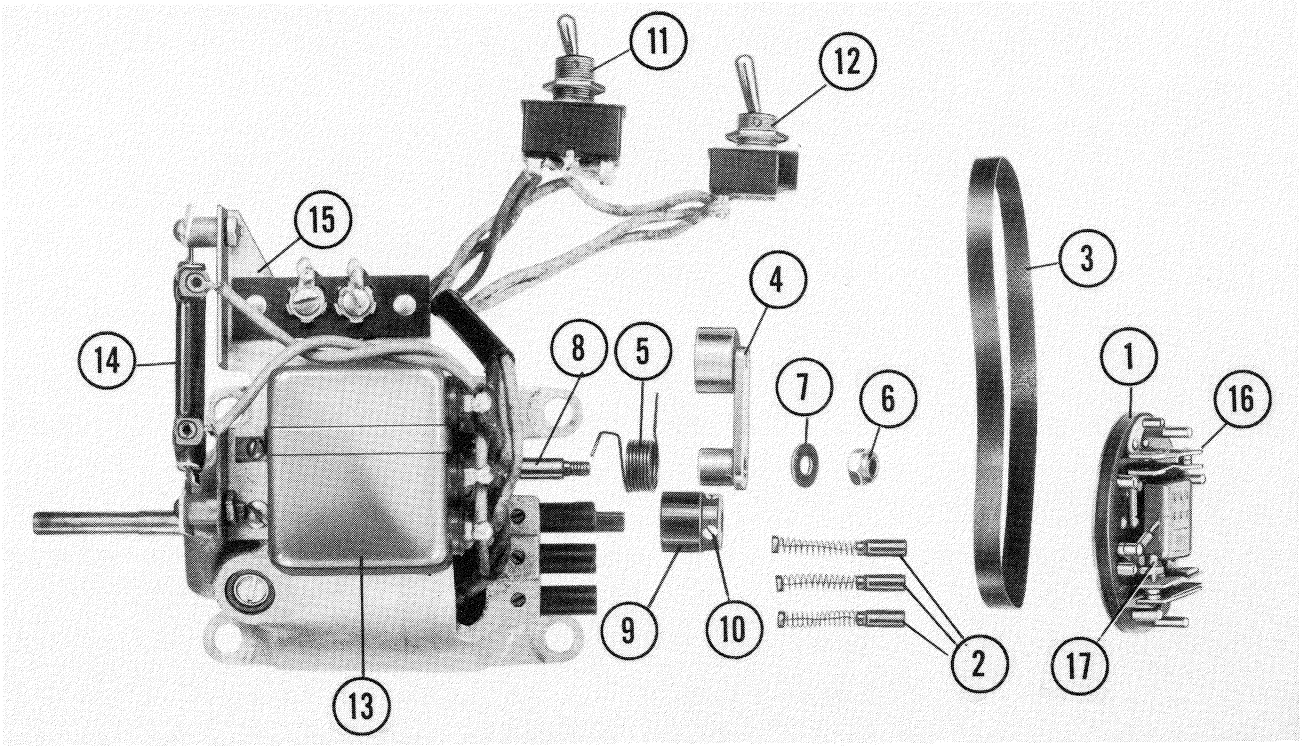


A—GEARING (P-10 & 20)

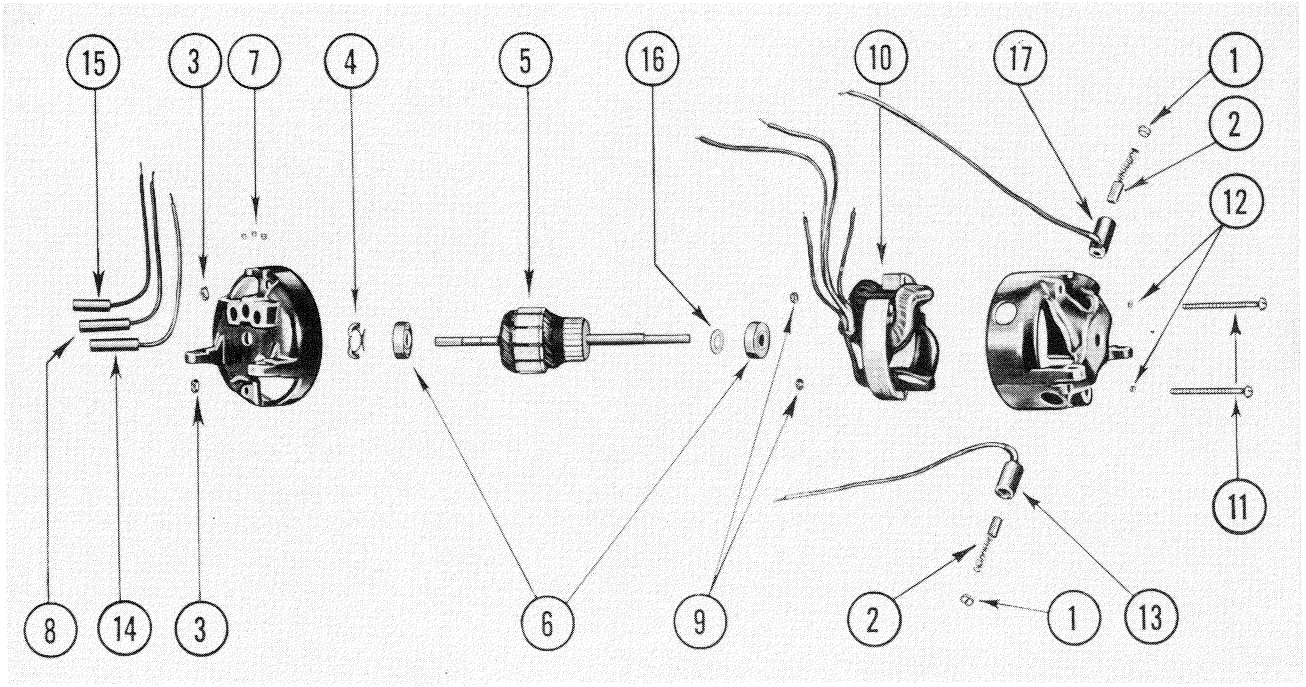


B—GEARING (PREMIER-30)

FIGURE 5—GEAR COMPARTMENTS



A—MOTOR UNIT ASSEMBLY



B—MOTOR

FIGURE 7—MOTOR CONSTRUCTION

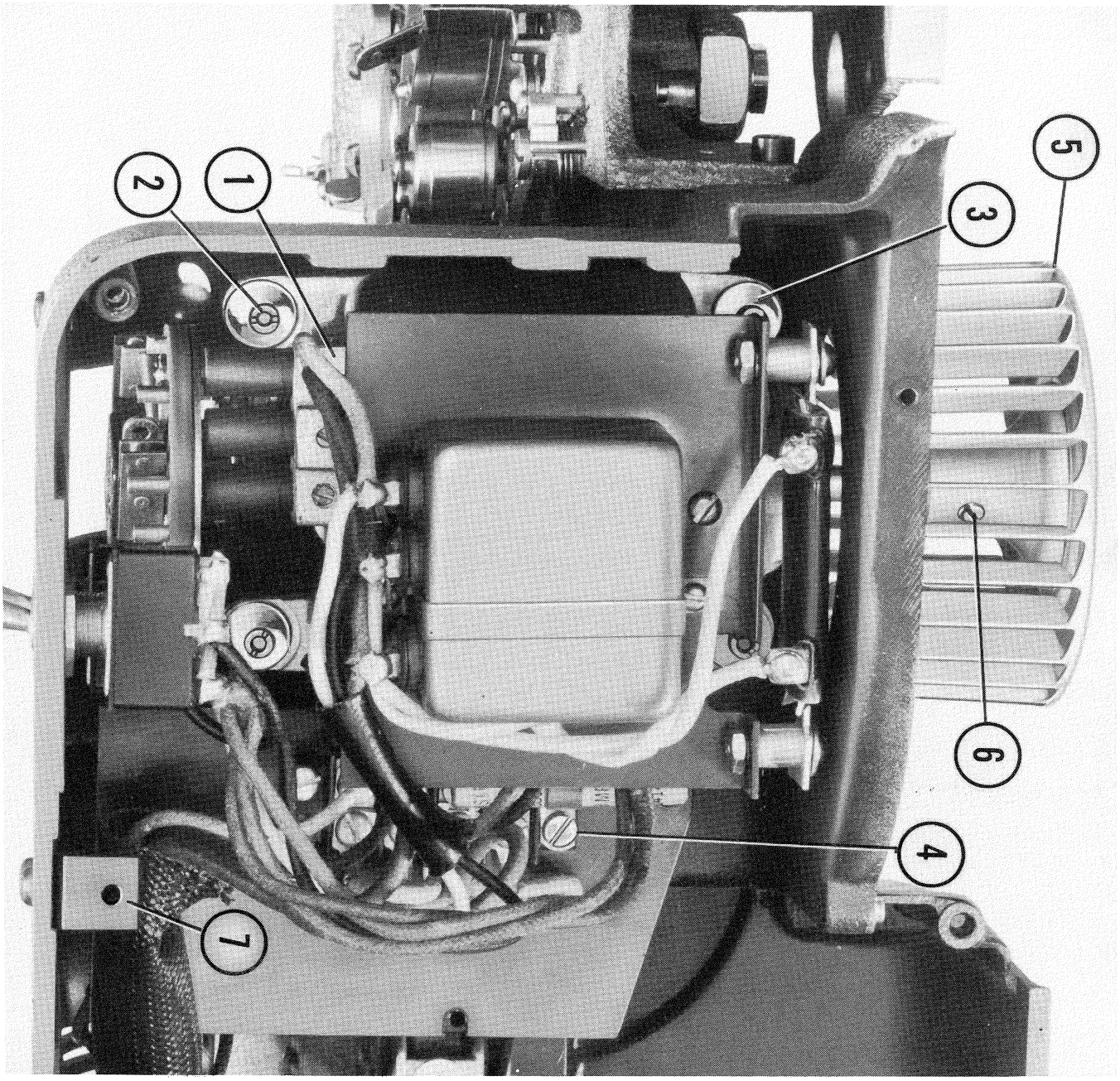


FIGURE 6—MOTOR (MOUNTED)

SECTION II

Trouble and Remedy Table

It would be practically impossible to compile a list of all of the things which could happen to a motion picture projector and effect its operation. The purpose of this table is to tabulate the most commonly encountered difficulties. This table supplements the "Operator's Trouble Shooting Guide" which is a part of the instruction manual. Generally, troubles due to operational errors will not be listed because it is assumed that the service man is thoroughly familiar with troubles of that type.

A. FILM HANDLING TROUBLES (Test film must be in good condition)

TROUBLE	MODELS	PROBABLE CAUSE	REMEDY
1. Cannot open or close gate	(P-10)	Gate lever disengaged from eccentric	Assemble correctly, See Sec. III A-9
2. Sprocket shoes do not open with gate	(P-10)	Loose or missing striker plate	Tighten or replace. See Sec. III A-9
3. Cannot close gate	(P-20-30)	Hanger return spring broken or unhooked	Replace or repair See Sec. III A-9
4. Takeup reel does not revolve	(ALL)	Belt shifter does not shift belt to takeup pulley	See Sec. III A-2
		Damaged takeup belt	Replace
		Takeup belt or reel catches on belt guard	Repair or replace guard
		Loose setscrew in takeup sprocket pulley	Tighten, See Sec. III A-9
		Takeup clutch slipping	Clean and oil or replace
5. Takeup reel won't takeup full 2000' reel	(ALL)	Worn or stretched takeup belt	Replace or shorten
		Worn takeup sprocket pulley	Replace, See Sec. III A-9
		Worn takeup spindle pulley	Replace
6. Film spills off takeup reel when operating in reverse	(ALL)	Takeup clutch jammed	Clean or replace spindle assembly
7. Film spills off feed reel during projection	(ALL)	Feed spindle clutch dirty or jammed	Clean or replace See Sec. III A-1
8. Film won't rewind when operating in reverse	(ALL)	Feed belt catching on belt guard	Straighten or replace guard
		Feed spindle clutch dirty or worn out	Clean or replace
		Worn or stretched feed belt	Shorten or replace
9. Film pulls through feed sprocket when operating in reverse	(ALL)	Feed belt has been shortened too much or wrong belt	Replace
		Worn feed sprocket pulley	Replace, See Sec. III A-9
10. Reels jerk	(ALL)	Worn reel belts	Replace
		Worn sprocket pulleys	Replace
		Dirty spindle clutches	Clean
11. Rewind won't operate	(ALL)	Worn rewind belt	Replace
		Bent feed spindle	Replace
		Takeup belt shifter bent	Repair
		Rewind clutch jammed	Repair or replace, See Sec. III A-9
12. Upper loop not maintained - forward operation	(ALL)	Bent feed spindle	Replace
		Feed sprocket loose on shaft	Tighten
13. Upper loop not maintained - reverse operation	(ALL)	Excessive gate pressure	Adjust, See Sec. III B-7
		Worn intermittent	Repair, See Sec. III A-9
		Worn feed sprocket pulley	Replace
14. Lower loop not maintained - forward operation	(ALL)	Pressure shoe not seating properly	Adjust, See Sec. III B-7
		Worn intermittent	Repair
		Loose takeup sprocket tooth ring	Replace the sprocket

TROUBLE	MODELS	PROBABLE CAUSE	REMEDY
15. Pressure roller arm won't stay back (loss of lower loop in reverse operation) operation)	(ALL)	Broken pressure roller arm catch	Replace, See Sec. III A-3 or 4
		Pressure roller arm catch improperly adjusted	Adjust, See Sec. III A-3 or 4
16. Film scratch	(ALL)	Worn part or dirty film tracks	Locate source with small loop of film threaded as follows: (1) feed sprocket (2) takeup sprocket (3) film gate (4) takeup sprocket and sound head. Clean or replace part causing trouble.
17. Film slitting (starts at bad splice)	(P-10-20)	Upper guideway completely worn out	Replace, See Sec. III A-3
18. Film Tearing	(ALL)	Wrong takeup belt	Replace
19. Excessive film slap	(ALL)	Worn intermittent	Repair, See Sec. III A-9
20. Excessive film slap (green film only)	(ALL)	Excessive gate pressure	Reduce gate pressure See Sec. III B-7
21. Clicking noise (film picking)	(ALL)	Damaged sprocket teeth	Replace sprocket, See Sec. III A-9
22. Still picture button won't operate	(ALL)	Loose cover screws	Tighten

B. PICTURE TROUBLES (test film must be in good condition)

TROUBLE	MODELS	PROBABLE CAUSE	REMEDY
1. Picture jump (w/green film)	(ALL)	Excessive gate pressure	Reduce, See Sec. III B-7
2. Picture jump (w/used film)	(ALL)	Insufficient gate pressure	Increase, See Sec. III B-7
		Worn aperture plate or pressure shoe	Replace, See Sec. III A-9
		Worn intermittent	Repair, See Sec. III A-9
3. Sidesway (weave)	(ALL)	Worn or bent side tension spring	Replace, See Sec. III A-9
4. In and out of focus (R.H. side only)	(ALL)	Worn or bent side tension spring	Replace
5. In and out of focus (random)	(ALL)	Loose projection lens element	Tighten
		Sticking pressure shoe	Adjust, See Sec. III A-9
		Worn aperture plate or pressure shoe	Replace
6. Poor focus and halo	(ALL)	Dirty projection lens	Clean
		Lens element installed backwards	Assemble correctly
7. Excessive flicker (silent speed)	(ALL)	Running too slow	Adjust governor, See Sec. III B-1
8. Intermittent flicker	(ALL)	Safety shutter is revolving (governor cup disconnected from link)	Repair, See Sec. III A-9
9. Streaks outside of picture area	(ALL)	Optical black scrapped off of back of pressure shoe or associated parts	Retouch with optical black

TROUBLE	MODELS	PROBABLE CAUSE	REMEDY
10. Streaks near edges of picture area	(ALL)	Shutter out of alignment - Laterally	Realign, See Sec. III A-9
11. Vertical bands of color in picture	(ALL)	Lamp near end of life	Replace
		Condensing lens or reflector improperly installed	Install properly
		Lamp not centered with optical system	Adjust
12. Poor illumination at top or bottom of screen	(ALL)	Lamp elevation incorrect	Adjust, See Sec. III B-6
		Loose condensing lens holder	Adjust and tighten, See Sec. III A-9
13. Streaks above or below ends of vertical lines in picture (trailer ghost)	(ALL)	Shutter out of time	Retime, See Sec. III A-9
14. Faint supplementary images of horizontal lines in picture (Double Image)	(ALL)	Intermittent requires adjustment	See Sec. III A-9
15. Nicks in edge of projected image	(ALL)	Damaged framer plate	Replace
16. Film buckles on stills	(ALL)	Safety shutter sticking	Repair

C. SOUND AND AMPLIFIER TROUBLES

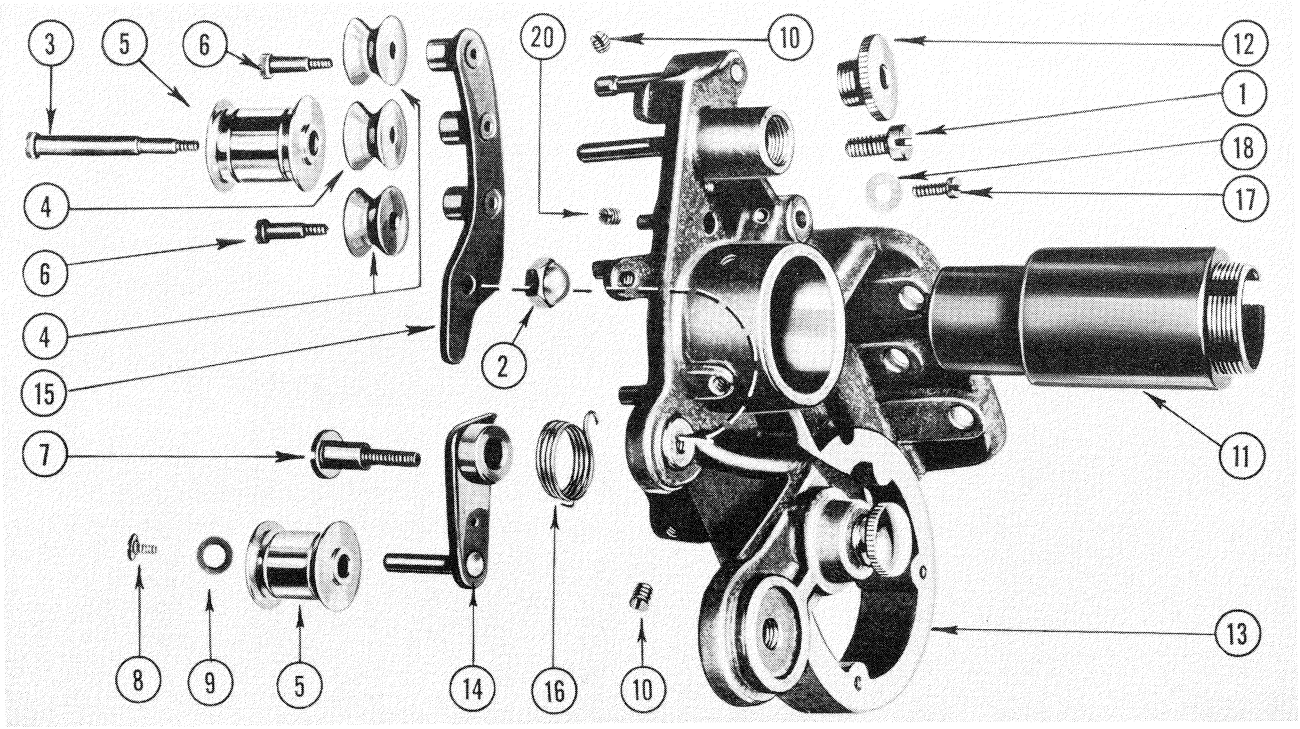
TROUBLE	MODELS	PROBABLE CAUSE	REMEDY
1. No sound from film, hiss from speaker, exciter lamp lights	(ALL)	Broken P.E.C. cable	Repair
		Shorted decoupler in P.E.C. supply circuit	Replace, See Sec. III A-5,6,&7.
		Broken speaker cable	Repair
2. No sound from film, no hiss from speaker, exciter lamp lights	(ALL)	Wrong plugs on speaker cable	Replace
	(P-10-20)	Shorted output transformer tuning condenser	Replace
	(ALL)	Damaged tubes	Replace
3. Low volume	(ALL)	Damaged tubes	Replace
	(ALL)	Exciter lamp not properly inserted in socket	Insert properly
	(P-30)	Photocell and exciter housing loose	Tighten retaining screws, See Sec. III A-4
	(P-30)	Dirty soundhead mirror or mirror misaligned	Clean or adjust, See Sec. III B-3
	(ALL)	Low line voltage	Check
4. Low volume, weak highs	(ALL)	Dirty sound optical system or out of focus	Clean and focus, See Sec. III B-5
	(P-30)	Photocell and exciter housing loose	Tighten retaining screws
5. Normal volume, excessive hum	(ALL)	Heater to cathode leakage - input tubes	Replace
6. Hum and distortion	(ALL)	Damaged 6V6 tube	Replace
		Damaged filter condensers	Replace
	(P-10-20)	Grounded heater wiring	Repair

TROUBLE	MODELS	PROBABLE CAUSE	REMEDY
7. Crackle	(ALL)	Sticking motor brush	Repair, See Sec. III A-8
		Sticking governor brush	Repair, See Sec. III A-8
		Tube shield missing	Replace
		Dirty governor contacts	Repair
8. Crashing noise not affected by volume con.	(ALL)	Defective tube in either of last two stages	Replace
9. Microphonics	(ALL)	Damaged exciter lamp	Replace
		Damaged input tube	Replace
		Damaged photocell	Replace
		Loose connector in P.E.C. socket	Replace socket
		Photocell coupler touching chassis	Dress to clear chassis
10. Shock (heavy continuous)	(ALL)	Grounded wiring	Check
11. Shock (light intermittent)	(P-30)	Capacitor discharge (C-26)	Reverse polarity at either line cord connection
12. Pitch of sound nearly correct - no highs	(ALL)	Dirty sound optical system	Clean
13. Pitch of sound correct - no lows	(ALL)	Open coupling condenser	Replace
14. Pitch of sound too low	(ALL)	Sound optical system out of focus	Focus, See Sec. III B-5
		Projector running slow	Adjust governor
15. Pitch of sound suddenly increases or decreases	(ALL)	Dirty or sticking governor contacts	Clean
		Sliver of copper between governor slip rings	Remove
		Sticking motor brush	Repair
16. Pitch of sound changes slowly (wows)	(ALL)	Worn guideways	Replace, See Sec. III A-3 or 4
		Guideways out of alignment	Adjust
		Damaged sound drum	Replace
		Slipping drive belt	Replace
		Dirty sound drum bearings	Clean or replace if required
		Loose sound head	Align and tighten
17. Pitch of sound changes rapidly (Flutter)	(ALL)	Damaged takeup belt	Replace
		Dirty or worn sound drum bearings	Clean or replace
		Pressure or tension rollers sticking	Clean
		Pressure roller arm sticking	Clean
18. 24 Cycle buzz accompanies sound	(ALL)	Lower guideway set too far to the left	Adjust, See Sec. III B-4
		Edge guide worn (lower guideway)	Replace guideway
19. Scratching or popping noise accompanies sound	(ALL)	Lower guideway set too far to the right	Adjust
		Side tension spring worn out (lower guideway)	Replace guideway
20. Distortion - increasing as tone control is turned towards maximum treble position	(P-10-20)	C-10 shorted	Replace
21. Oscillation	(P-30)	Careless repairman reversed output transformer leads	Correct wiring to reverse phase of feedback

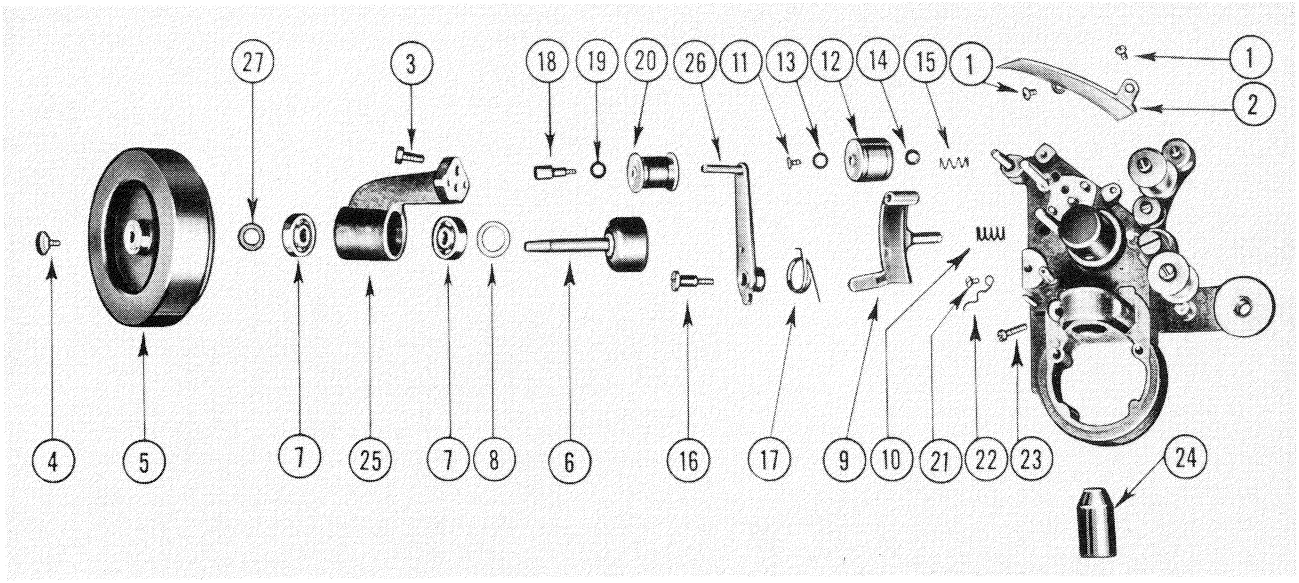
TROUBLE	MODELS	PROBABLE CAUSE	REMEDY
22. Short exciter lamp life	(P-30)	R-37 shorted out or off value	Replace
23. Moaning sound when "mic volume" control is switched off	(P-10 & 20)	Defective 6J7 tube	Replace
		Mic. volume control shield missing	Replace

D. MISCELLANEOUS TROUBLES

TROUBLE	MODELS	PROBABLE CAUSE	REMEDY
1. Excessive vibration	(ALL)	Bent motor shaft	Replace armature
		Loose part caught in fan	Remove
		Damaged governor	Replace
2. Squeaking noise	(ALL)	Takeup belt	Oil or use "Door Ease"
		Worn takeup spindle pulley	Replace spindle assembly
		Worn takeup sprocket pulley	Replace
		Sprocket rubbing on follower roller	Realign sprocket
3. Rattling noise	(ALL)	Loose shutter	Tighten
		Loose or bent safety shutter	Repair
		Loose shuttle	Repair, See Sec. III A-9
		Condensing lens installed backwards	Install properly, See Figure 2
4. Whining noise	(ALL)	Loose fan	Tighten
		Fan scroll reverser is bent	Straighten
5. Drive belt comes off	(ALL)	Worn pulleys (tapered or crown worn off)	Replace
		Excessive mechanism load	Check safety shutter clutch, camshaft bearings, and vertical camshaft - Repair
6. Short projection lamp life	(ALL)	Line voltage exceeds lamp voltage	Supply correct lamp
		Silent speed set below 16 F.P.S.	Adjust, See Sec. III B-1
		Loose fan	Tighten
		Fan scroll reverser sticking	Free
		Obstruction in air ducts	Remove



A—L.H. SIDE



B—R.H. SIDE

FIGURE 8—SOUND HEAD ASSEMBLY (P-10 & 20)

SECTION III

Service Procedures

GENERAL The complete disassembly of the mechanical portions of the projector will be described in this section, however, it is seldom necessary to completely dismantle the projector, the construction is such that in most cases removal of covers and a few sub-assemblies will provide access to any of the parts. These instructions are based on the use of micrometers, calipers and other standard shop tools; if a large volume of repair work is done, contact the Factory Service Division for information about special tools and fixtures.

A. DISASSEMBLY, REPAIR AND REASSEMBLY

1. FEED REEL ARM ASSEMBLY (ALL) (See Fig. 3-A)

a. Removal Disconnect the reel belts (11 and 12) at the junction points. Take off the reel arm stud nut (10) and unscrew the reel arm stud. Lift off the reel arm assembly (14). Separate the stud, washer, and tension washer from the arm.

b. Disassembly - Take out the two screws which hold the belt guard (15) to the arm. On Premier 30 model, also remove the brake cap (15 Fig. 3 B), the spring and the brake shoe. Drive out the tapered pin which attaches the rewind pulley to the spindle and remove the pulley, the spindle and the spacing washers. If it is necessary to remove the bushings, press them out with an arbor press or support one end of the bearing boss on a block bored to the O.D. of the bushing and drive them out using a bearing extractor punch. If the reel lock finger requires replacement, use a 1/16" pin punch to drive out the retaining pin.

> NOTE: Be careful in removing the punch from the spindle or the reel lock spring will eject the finger and check-ball with considerable force.

c. Repair and Reassembly - If the spindle is bent, replace it with a new part. If the clutch slips or locks, try immersing it in carbon tetrachloride and revolving the pulley; if dirt washes out, dry and relubricate the clutch. If cleaning does not correct the trouble, replace the spindle assembly. Reel arm bushings have a very long life and will require replacement only if the spindle whips during rewinding. When replacing bushings, drill and tap the holes for the belt guard screws after the bushings have been inserted. When installing the spindle, place a spacing washer on the shaft and insert the spindle into the bearings. Use spacing washers as required between the bushing and the rewind pulley in order to reduce the end play to .005" to .007", then drive in the tapered pin which locks the rewind pulley to the shaft. On the Premier 30, replace the brake shoe if it is badly worn. Do not stretch the brake spring as this would increase the film feed tension.

When installing the arm on the projector, be sure that the tension washer is placed on the stud with the convex side of the washer toward the head of the stud. Place a light film of grease on the stud and faces of the arm. Tighten the stud enough so that the arm will remain in any position in which it is placed, but do not tighten more than is necessary. Hold the stud while tightening the stud nut or the reel arm tension will be affected.

When replacing reel belts with screw type ends. turn the ends backwards about two turns before joining them, otherwise the belts will unscrew under tension.

2. TAKEUP REEL ARM ASSEMBLY (ALL) (See Fig. 3-B)

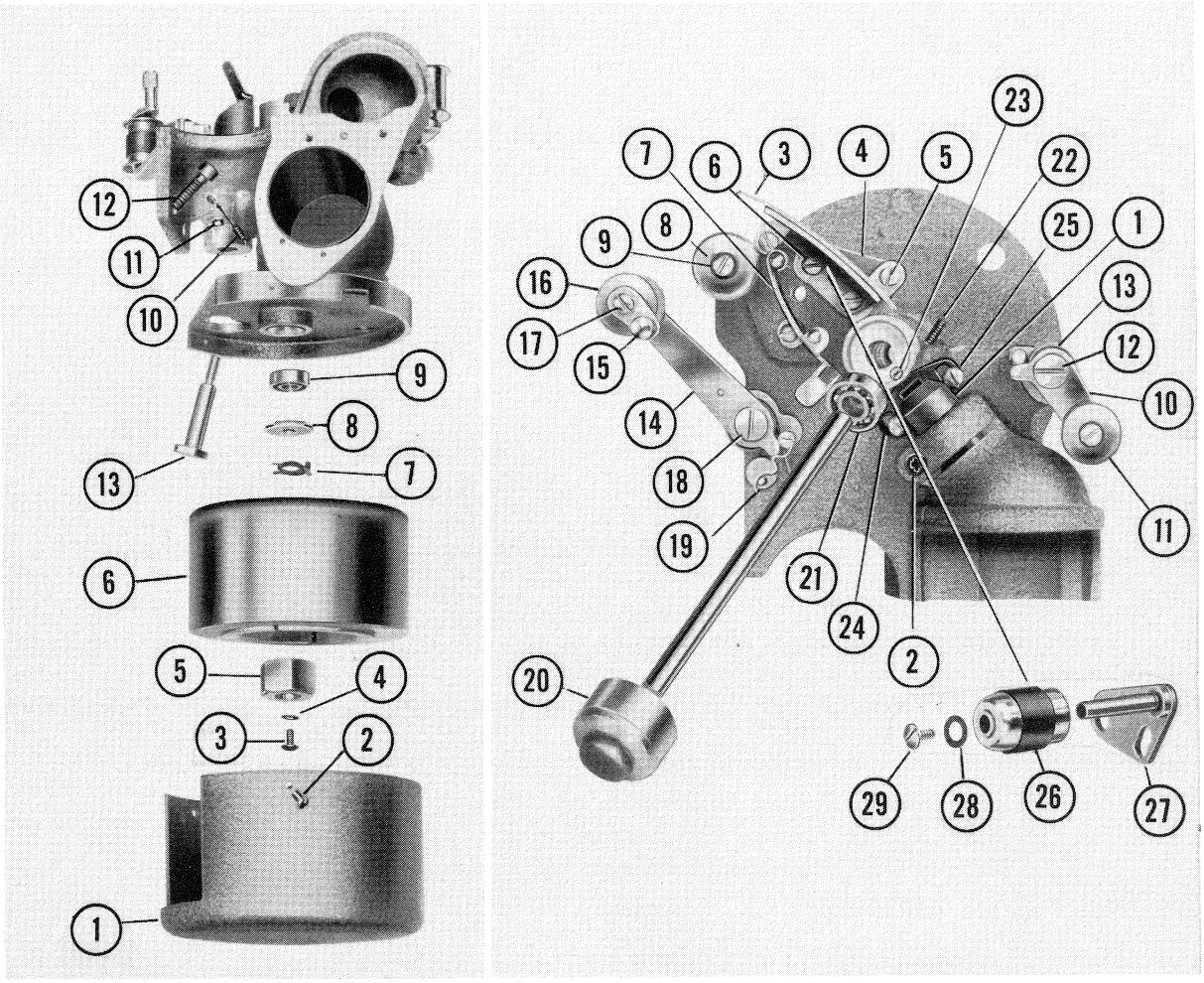
a. Removal Disconnect the takeup belt (1) at the junction point. Take off the reel arm stud nut (11) and unscrew the reel arm stud. Lift off the reel arm and separate the stud, washer and tension washer.

b. Disassembly - Take out the brake cap screw (3) and remove the brake spring and brake shoe. Remove the cap nut (9), plain washer and spacing washers. Pull out the takeup spindle (6) and remove the loose pulley (5) and the belt shifter assembly (4). If it is necessary to remove the spindle bushing, press it out with an arbor press or support the boss on a block bored to the O.D. of the bushing and drive out the bushing with a bearing extractor punch. If the reel lock finger (7) is broken, drive out the lock pin (8) with a 1/16" pin punch.

> NOTE! Be careful in removing the punch from the spindle or the reel lock spring will eject the finger and check-ball with considerable force.

c. Repair and Reassembly - If the spindle is bent, replace it with a new part. If the spindle clutch slips or locks, immerse it in carbon tetrachloride and rotate the pulley. Dry the clutch and relubricate. If this does not correct the trouble, replace the spindle assembly. Check the pulley groove for wear and replace the spindle assembly if the groove is worn. Usually it is advisable to replace the loose pulley at the same time. If the spindle wobbles during normal operation, replace the bushing, Press in the bushing with an arbor press and use a #1 drill to drill the clearance hole for the brake shoe. Check the belt shifter for abnormal bends and straighten or replace if required. Straighten or replace a bent belt guard (10).

Place a drop of oil on the outside of the spindle bushing and install the belt shifter and loose pulley. Oil the spindle and insert it into the bushing. Use spacing washers between the end of the bushing and the threaded end of the spindle to reduce the end play to .005" - .007". Check after face washer and nut have been installed.



A—L.H. SIDE

B—R.H. SIDE

FIGURE 9—SOUND HEAD ASSEMBLY (P-30)

Place the tension washer on the reel arm stud with the convex side of the washer against the head of the stud. Put a film of grease on the stud and on the faces of the reel arm, then insert the stud into the arm. Install the flat washer and screw the stud into the sound head or bracket. Check to be sure that the reel arm lock pin (13 Fig. 3-A) enters the holes in the reel arm. Occasionally the reel arm support on a Premier 10 or 20 will be bent so that the pin does not engage properly, in which case the support should be straightened before the arm is permanently attached. Tighten the reel arm stud enough to hold the reel arm in any position in which it is placed, then install the unit. Hold the stud with a wrench while tightening the nut or the tension will be affected.

3. SOUND HEAD ASSEMBLY (P-10 AND 20)

a. Removal (See Fig. 3-A) - Take off the takeup reel arm assembly as per paragraph 2. Remove the three screws (21) which hold the exciter lamp socket assembly to the sound head and remove the socket assembly - Do Not Lose The Spacers!. Unscrew the photocell ringnut (16) and remove the photocell. Take out the sound head to mechanism screw (20), lockwasher and plain washer. Take out the three screws which attach the soundhead to the amplifier housing and lift off the sound head.

b. Disassembly (See Fig. 8)

(1) Upper Guideway Assembly - Take out the two screws (B-1) and lift off the guideway (B-2).

(2) Sound Drum Assembly - Take out the two retaining screws (A-1 and B-3) and slip the sound drum assembly off of the dowels and remove it from the head. Loosen the capscrew (B-4) about two turns. Hold the flywheel (B-5) and tap the head of the capscrew with a light hammer in order to free the flywheel from the tapered shaft. Remove the screw and separate the flywheel (B-5) and spacing washer (B-27) from the rest of the assembly. Push out the sound drum shaft assembly (B-6) and remove the felt washer (B-8) used on early Premier 10 only). Remove the sound drum bearings (B-7).

(3) Lower Guideway Assembly - Loosen the setscrew (A-20) and remove the guideway adjusting screw (A-17) and washer (A-18). Pull out the guideway (B-9) and remove the spring (B-10).

NOTE!. The guideway can be removed by taking off the flywheel, as per sub-paragraph (2), to provide clearance without removing the sound drum bracket and sound drum.

(4). Pressure Roller Arm Assembly and Film Roller Assembly - Unscrew the pressure roller knob (B-18) and spacing washer (B-19). Pull off the pressure roller (B-20). Should

it be necessary to remove the pressure roller arm sub-assembly (B-26), take out the catch retaining screw (B-21) and remove the catch (B-22). Support the pressure roller arm (B-26) while removing the pivot (B-16) in order to prevent the thrust from the spring (B 17) from damaging the threads. Take out the screw (B-11) and remove washer (B-13), tension roller (B-12), washer (B-14) and spring (B-15).

(5) Sound Optical System - Loosen the clamping screw (B-23). Insert a wedge in the slot in the sound optical clamp and remove the sound optical system (B-24).

(6) Takeup Guide Assembly - Remove the cap nut (A-2) and lift off the guide assembly. Take out the film guide roller stud (A - 3) and remove the guide roller (A - 5) and belt guide roller (A - 4). Take out the two belt guide roller studs (A-6) and remove the rollers (A-4).

(7) Photocell Shield Assembly - DO NOT REMOVE UNLESS DAMAGED - Loosen the two setscrews (A-10) and pull out the photocell shield assembly (A-11).

(8) Film Tension Equalizer Assembly - Remove the pivot (A-7) equalizer assembly, and spring (A-16). Take out the screw (A-8) and remove the washer (A-9) and guide roller (A-5).

c. Repair and Reassembly (See Figure 8)

(1) Upper Guideway Assembly - If the supporting ribs for the film are worn down so that there is danger that either the sound track or picture area may come in contact with the guideway, replace the guideway.

NOTE: Abrasions on the portion of the guideway adjacent to the picture area are usually due to warped film rather than worn supporting ribs.

(2) Sound Drum Assembly - Check the sound drum for worn spots and check for a bent shaft. Replace if worn or bent.

NOTE: If you suspect that the shaft is bent, check the face of the flywheel for runout with an indicator - tool marks may produce an optical illusion that it is wobbling.

Wash the bearings (B-7) in a mixture of 1/2 carbon tetrachloride and 1/2 Amproil, then immerse them in Amproil and drain them on a blotter for 10 minutes (open side down). If cleaning does not remove rough spots, replace the bearing. When reassembling, use spacing washers (B-27) to reduce the endplay to not more than .003".

(3) Lower Guideway Assembly - Check supporting rails as per sub-paragraph (1), also check for wear in the fixed edge guide and make sure that the side tension spring is not worn or sticking. Replace if badly worn. Place the spring (B-10) over the guideway stud and install the parts on the head. Install the adjusting screw (A-17) and washer (A-18). See paragraph B-4 for final adjustment.

(4) Pressure Roller Arm and Film Tension Roller - Clean the rollers and check for flat spots. Replace if worn. Clean the spindle on the pressure roller arm (B-26). Place two drops of Amproil in the bearings in the pressure roller (B-20) then place the roller on the shaft and install the washer (B-19) and pressure roller knob (B-18). If the arm has been removed from the head, place the spring (B-17) on the hub of the arm with the end of the spring inserted in the hole in the arm. Clean and oil the stud (B-16), then place the arm in position with the end of the spring against the pressure roller catch stud. Push up and forward on the arm until the hole in the hub is aligned with the tapped hole in the head, then insert the stud and tighten it before releasing the pressure against the arm. Install the catch (B-22) and retaining screw (B-21).

Clean the tension roller stud. Place two drops of Amproil on the bearings in the tension roller. Slide the spring (B-15), washer (B-14) and tension roller (B-12) onto the shaft. Swing the pressure roller arm forward and determine how many spacing washers (B-13) will be required to center the tension roller between the flanges of the pressure roller. Install the washers and the screw (B-11).

(5) Sound Optical System - Clean the external surfaces of the lenses with a piece of cotton or lens tissue, dampened with lens cleaner or alcohol. Hold the unit in front of a bright light and look through it from the end adjacent to the exciter lamp. A narrow, sharply defined and evenly illuminated beam of light should be seen. If the beam is hazy, or unevenly illuminated send the unit to the factory or an Authorized Service Station for repair.

Insert the optical system in the clamp - See Sec. III B-5 for adjustment.

(6) Film Tension Equalizer Assembly - Inspect the guide roller (A-5) for flat spots worn in the body of the roller and cuts in the flanges. If either type of wear is found, replace the roller. Clean the spindle and apply two drops of Amproil. Install the guide roller (A-5), washer (A-9) and screw (A-8). Place the spring (A-16) on the hub of the arm with the end of the spring inserted in the hole in the arm. Clean and oil the pivot (A-7), then hook the end of the spring over the stop stud in the soundhead and push the arm assembly into position so that the hole in the hub is aligned with the tapped hole in the head. Install the stud (A-7).

(7) Takeup Guide Assembly - Inspect the film guide roller as per sub-paragraph (6). Clean the studs and apply 2 drops of oil to each. Clean the belt guide rollers and replace any that are worn. Assemble the rollers on the bracket and place the bracket on the end of the stud (A-7). Install the cap nut (A-2).

(8) Photocell Shield Assembly - Clean the shield with a soft cloth, check the threads. If the bakelite sleeve shows only one pair of indentations from setscrews, remove the setscrews (A-10) and slip the shield into the soundhead; line up the indentations in the sleeve with the holes for the setscrews and install and tighten the setscrews. If the screw marks are not clearly defined, insert the shield in the soundhead, turn on the amplifier and position the sleeve so that the light beam from the sound optical system passes through the hole in the shield and the shield does not rub on the sound drum.

4. SOUND HEAD ASSEMBLY (P-30).

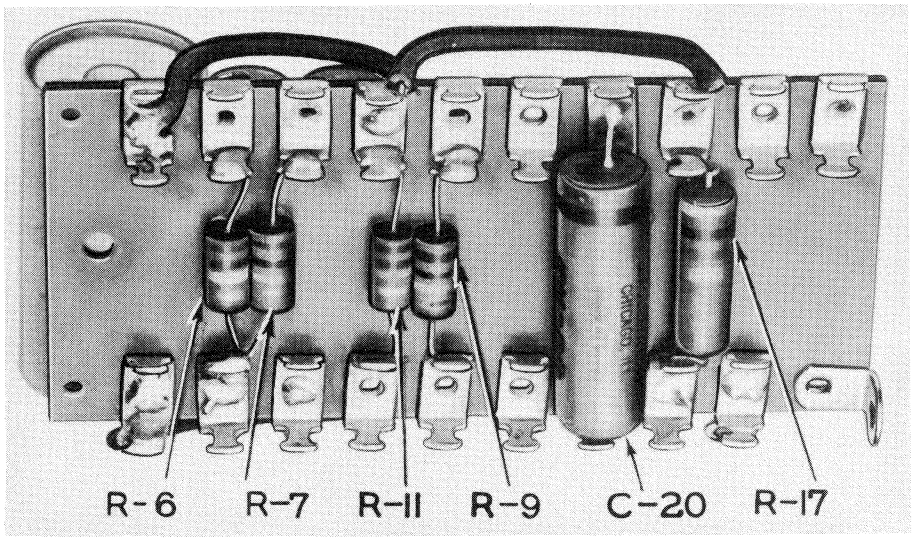
a. Removal - (See Fig. 9) - Remove the projector from the base. Unscrew the two thumbscrews and remove the photocell and exciter housing. Remove the takeup belt. Remove the flywheel cover (A-1) and flywheel (A-6). Remove the sound head to mechanism stud (A-13). On early models use an offset "Allen Wrench" to remove the three sound head to mechanism screws (A-12). On later models, pull out the steel liner from the photocell compartment and insert a long "Allen Wrench" through the access holes.

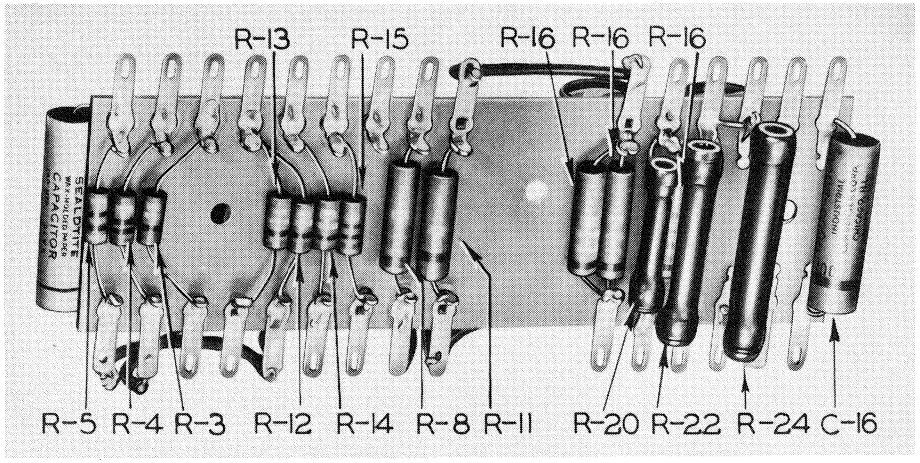
b. Disassembly

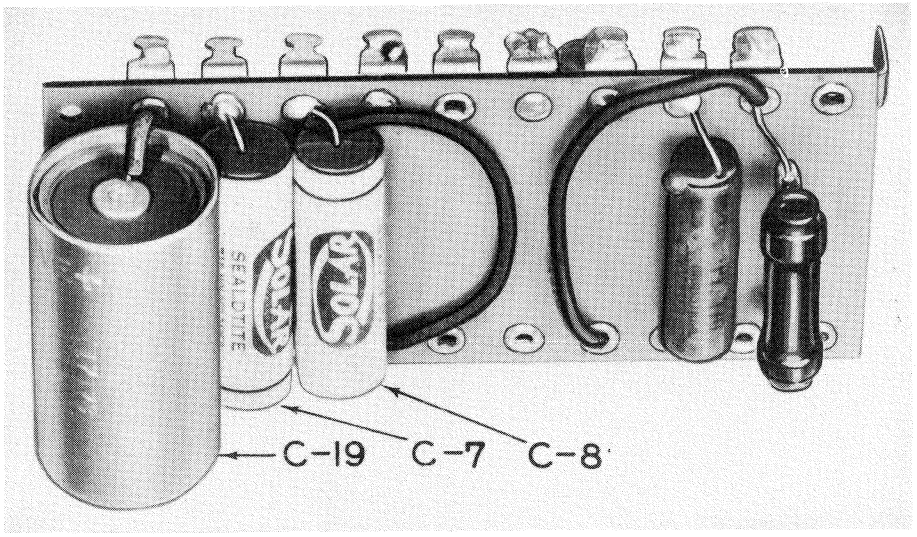
(1) Upper Guideway Assembly or Sound Drum Follower Roller Assembly - The initial run was equipped with an upper guideway assembly (B-3) and mounting pad (B-4). Remove the two screws (B-6) and lift off the pad and guideway. Remove the two screws (B-5) and separate the pad (B-4) from the guideway (B-3). Later models were equipped with the sound drum follower roller assembly (B-26, 27, 28, 29) which were held in place by the two screws (B-6). Remove the screws and lift off the follower assembly. Remove the screw (B-29) and separate the washer (B-28) and roller (B-26) from the bracket (B-27).

(2) Sound Drum Assembly - Since the flywheel cover (A-1) and flywheel (A-6) were removed prior to removal of the head, it is only necessary to remove the loading washer (A-7), shoulder washer (A-8) and slip the sound drum assembly (B-20) out of the bearings (B-21 and A-9).

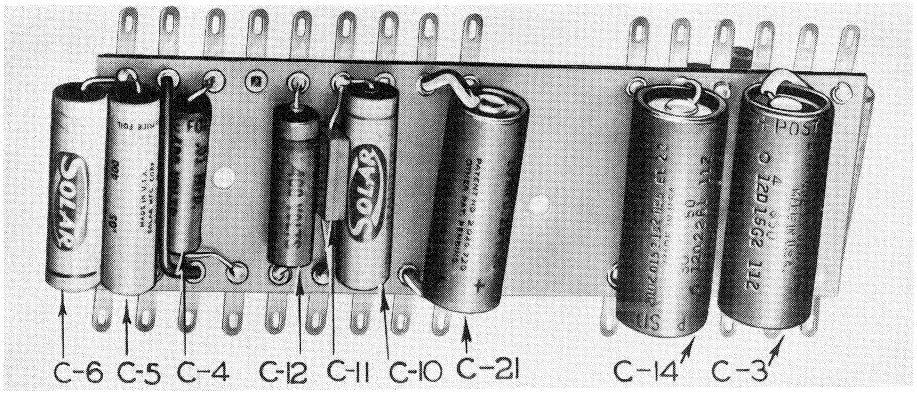
(3) Lower Guideway Assembly - Loosen the setscrew (A-10) and remove the adjusting screw (A-11) and washer. Pull off the guideway (B-7) and remove the spring.







B—SMALL RESISTOR BOARD



A—LARGE RESISTOR BOARD

FIGURE 10—RESISTOR BOARDS (P-10 & 20)

(4) Pressure Roller Arm Assembly (B 14) and Tension Roller (B-8) - Remove and disassemble in the same manner as described in Paragraph 3 (P-10 and 20).

(5) Sound Optical System - Loosen the clamping screw (B-2) and slip out the optical system (B-1).

(6) Tension Equalizer Arm Assembly - Take out the pivot (B-12) and remove the arm assembly (B 10). Separate the spring (B-13) from the arm assembly. Take out the retaining screw and remove the guide roller (B-11).

(7) Light Mask - Take out the two screws (B-25) and remove the mask (B 24).

(8) Mirror Assembly - Remove the setscrew (B-22) and sound drum bearing (B 21). Push the mirror stud (B-23) out through the bore for the R.H. sound drum bearing.

c. Repair and Reassembly.

(1) Upper Guideway Assembly or Sound Drum Follower Roller Assembly - Check the upper guideway in the same manner described in Paragraphs 3-c-1 (P-10 AND 20). If the guideway is worn, replace it with the follower roller assembly.

Check the follower roller (B-26) for flat spots. Replace if worn. Clean the spindle and place two drops of Amproil on the spindle, then install the roller, washer, and screw. When installing the roller assembly on the soundhead, position the roller approximately 1/16" from the sound drum.

(2) Sound Drum Assembly - Check the sound drum for worn spots and the shaft for bends. Replace if worn or bent. Clean the bearings in the same manner described in Paragraph 3-C-2. If the mirror has been disturbed, do not replace it until the mirror has been readjusted (See Paragraph B-3). Install the bearings and the sound drum. Place the shoulder washer (A-8) and thrust washer (A-7) on the shaft and snap a battery clip or other small clamp over the shaft in order to hold it in place until the sound head has been installed on the projector and the lower guideway has been adjusted.

(3) Lower Guideway Assembly - Clean and inspect in the same manner described in Paragraph 3-c-3. See Paragraph B-4 for final adjustment.

(4) Pressure Roller Arm Assembly and Tension Roller - Clean, lubricate and assemble as per Paragraph 3-c-4.

(5) Sound Optical System - Clean as per Paragraph 3-c-5. Insert and place in approximately the correct position and tighten the clamping screw (B-2) just enough to hold it in place.

(6) Tension Equalizer Arm Assembly - Check the roller for flat spots or cuts in the flanges. Replace if worn. Clean

and oil the spindle, then install the roller, washer and screw. Place the spring (B-13) on the hub of the arm with the end of the spring inserted in the hole in the arm. Hook the other end of the spring over the stop stud and push the arm assembly into position. Insert and tighten the pivot screw (B-12).

(7) Mirror Assembly - Use lens tissue dampened with lens cleaner or alcohol to clean the mirror. See Paragraph B-3 for final adjustment.

(8) Light Mask - After the mirror and sound optical system have been adjusted, place the mask in position and install the two retaining screws. Slide the mask into a position where it does not intercept the light beam from the mirror and tighten the retaining screws.

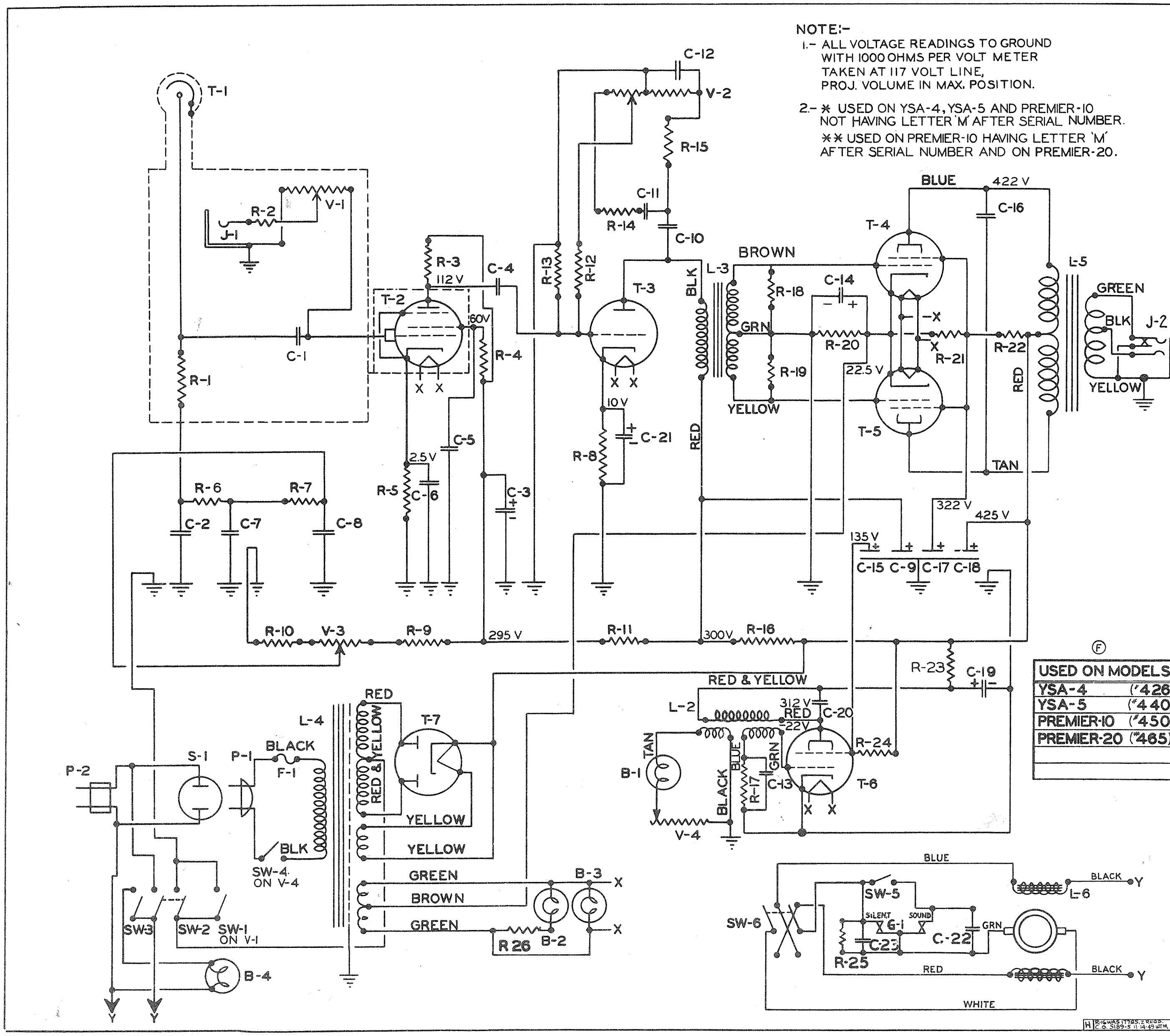
5. AMPLIFIERS

GENERAL- The amplifiers used in the Premier series projectors are of conventional three stage type. The input stage consists of a high gain pentode stage. The Premier 10 and 20 units use a triode driver stage; the Premier 30 uses a twin triode phase invertor. The output stage consists of push-pull 6V6's. The tone controls are of the inverse feedback type.

Socket voltages are either marked on the schematic or listed in an accompanying table. The resistance of the meter used in making the measurements is indicated on the schematic. If a meter having a higher resistance is used, the voltages measured across high resistance circuits will be higher than those indicated. If the meter has a lower resistance, the measured voltages will be lower. Voltages measured with a meter of the same resistance as the one used for making the measurements indicated on the schematics, should be within 10% of the indicated voltage. The high resistances used in photocell circuits make it virtually impossible to obtain a useful measurement of polarizing voltage with a meter having a resistance less than 10-20 megohms. Theoretically no current flows in the circuit when the cell is removed, therefore, a microammeter can be connected in the circuit where the filter network connects to the voltage divider and the filter capacitors can be checked for leakage in this manner. Point to point resistance measurements will detect damaged resistors in these circuits.

The most satisfactory test procedure is to connect an audio frequency oscillator to the amplifier input and then check waveform and voltage at each grid and plate using a VTVM and oscillascope. Since the volume controls on the Premier 30 are of the interstage type, it is advisable to turn the control to maximum and adjust the input level with the oscillator attenuator, this will avoid the possibility of overdriving the input tubes.

An R. F. oscillator is used to supply power for the exciter lamp. Contrary to radio practice, the frequency of oscillation is not particularly critical. Since a tungsten lamp is the oscillator



MARK	DESCRIPTION	PART NO.
B-1	EXC.LAMP-6V-1A	17772
B-2	DIAL " Nº 51	18195
B-3	THDG " Nº 51	18195
B-4	PROJ. "	1595-115
C-1	.005 MFD.300V	17514
C-2	.05 " 400 V	17751
C-3	4 " 450 V	17778
C-4	.01 " 300 V	17782
C-5	.05 " 400 V	17751
C-6	.05 " 400 V	17751
C-7	.05 " 400 V	17751
C-8	.05 " 400 V	17751
C-9	30 " 350 V	18064
C-10	.05 " 600 V	17893
C-11	.00017 " 300 V	17783
C-12	.01 " 300 V	17782
C-13	.005 " 300 V	17514
C-14	30 " 50 V	17779
C-15	10 " 300 V	18064
C-16	.0005 "2000 V	17784
C-17	10 " 350 V	18064
C-18	40 " 500 V	18064
C-19	15 " 450 V	17673
C-20	.0005 " 2000 V	17784
C-21	16 " 25 V	18172
C-22	.5 " 400 V	17767
C-23	.25 " 400 V	17767
F-1	1.5AMP. FUSE	17579
G-1	2 SPEED GOV'R	18134
J-1	INPUT JACK	18083
J-2	OUTPUT JACK	18084
L-2	OSCILLATOR CL.	18387
L-3	DRIVER TRANSF.	18388
L-4	POWER "	18385
L-5	OUTPUT "	18386
L-6	MOTOR *	18336
L-6	MOTOR **	18347
P-1	CONV. PLUG	18125
P-2	LINE CONNECT'R	17682

MARK	DESCRIPTION	PART NO.
R-1	3.5MEG Ω .5WATT	17807
R-2	.5 " Ω .5 "	17814
R-3	200000Ω .5 "	17556
R-4	1 MEG Ω .5 "	17558
R-5	3000Ω .5 "	17804
R-6	250000Ω .5"	18075
R-7	250000 Ω .5"	18075
R-8	1200 Ω 1 "	17550
R-9	100000 Ω .5"	18073
R-10	15000 Ω .5"	18072
R-11	2000 Ω 1 "	17552
R-12	250000 Ω .5 "	18075
R-13	200000 Ω .5"	17556
R-14	1MEG Ω .5 "	17558
R-15	250000 Ω .5"	18075
R-16	12000Ω 2 "	18686
R-17	4000Ω 1 "	17699
R-18	50000Ω .5"	17555
R-19	50000Ω .5	17555
R-20	342Ω 5 "	17749
R-21	100000Ω 1 "	17786
R-22	15000Ω 10 "	17748
R-23	2800Ω 5 "	17747
R-24	46000Ω 10 "	17938
R-25	* 100Ω 40"	18000
R-26	5Ω 2"	18391
R-25	** 50Ω 40"	18383
S-1	CONV. RECPT'CL.	18081
SW-1	PART OF V-1	
SW-2	START-STOP SW.	17714
SW-3	PROJ. LAMP SW.	17718
SW-4	PART OF V-4	
SW-5	SPEED CHG. SW.	17716
SW-6	REVERSE SW.	17713
T-1	PHOTO CELL	17572
T-2	6J7-6J7GT	18107
T-3	6J5-6J5GT	17934
T-4	6V6-6V6GT	17788
T-5	6V6-6V6GT	17788
T-6	6V6-6V6GT	17788
T-7	5Z4-5Z4GT	17701
V-1	MIC. CONTROL 2 MEG Ω	17763
V-2	TONE CONTROL 4 MEG Ω	17762
V-3	P.E.C. CONTROL 100 000 Ω	18069
V-4	PROJ. VOL. CONT. 15 Ω	17937

ENGINEERING DEP'T
AMPRO CORPORATION
CHICAGO

REVISIONS

A	CHOKE COIL REMVD. 1-28-42	D	CHG'D. B-4, C-1, C-13, C-18
B	CORRECTION ON DIAGRAM, R-6 WAS R-5, R-25 WAS 50W	PER	E-62, E-462 4-26-44
C	C-10 WAS PT. Nº 17751 C.O.E.181 9-1-43	E	R-25 WAS ACROSS C-22-1.B
G	REFER C.O. #1957-3 1-7-47	F	TABLE ADDED C.O.E.-907 11-20-45

TITLE SCHEMATIC DIAGRAM
DEVICE AMPRO PROJECTOR MODEL-YSA-465
DATE 7-20-42 SCALE —
ENGINEER T.R.N.
DRAWN BY W.H.S.
CHECKED BY T.R.N.
DRG. NO. D-10530

FIGURE 11—SCHEMATIC DIAGRAM (P-10 & 20)

load, and its resistance varies considerably with temperature, current measurements are a more reliable indication of performance than are voltage measurements.

6. AMPLIFIER ASSEMBLY (P-10 AND 20)

a. Removal - Remove the front cover and take out the lamp terminal guard. Disconnect the two lamp leads. Remove the governor cover (10 Fig. 1-A) and remove the screw (21 Fig. 1-B) which holds the threading lamp in place. Remove the two screws (20 Fig. 1-B) which hold the control panel brackets in place. Invert the projector and remove the bottom cover. Disconnect the motor leads. Take out the screws which hold the amplifier in place and lift out the amplifier. If the amplifier is to be completely detached from the projector, remove the three screws which hold the exciter lamp socket and unscrew the photocell connector ring nut.

b. Servicing

Removal of the nameplate and amplifier bottom cover will make the amplifier accessible for voltage measurements and replacement of many parts. Refer to Fig. 10 for layout of the resistor board assemblies and to Fig. 11 for schematic diagram of the wiring.

7. AMPLIFIER ASSEMBLY (P-30)

a. Removal - Remove the projector from the case base. Loosen the setscrews and remove the control knobs. Remove the fuse post cap and fuse. Pull the converter switch plug out of the socket. Unscrew the two thumbscrews which hold the photocell and exciter lamp housing and separate the housing from the sound head. Place the projector on its side and remove the four screws which hold the amplifier in place. Pull the amplifier part way out of the housing and disconnect the 6 prong plug, then remove the amplifier.

b. Servicing - Remove the four screws which hold the bottom cover in place. Refer to Fig. 12 for layout of components and to Fig. 13 for schematic diagram. Use an adaptor cord to operate the amplifier on the bench or drop it in place in the amplifier housing and connect it to regular projector circuits.

8. MOTOR ASSEMBLY (ALL)

a. Removal (See Fig. 6) - Take off the amplifier cover (P-10 AND 20) or motor shield (P-30). Remove the fan housing and take off the fan (5). Disconnect the motor from the terminal board. Take off the hex nuts which hold the motor control switches in place and remove the switches. Take the drive belt off of the drive clutch. Take off the four sleeve nuts (2) and washers (3). Lift out the motor. Be careful not to lose the motor mounting grommets.

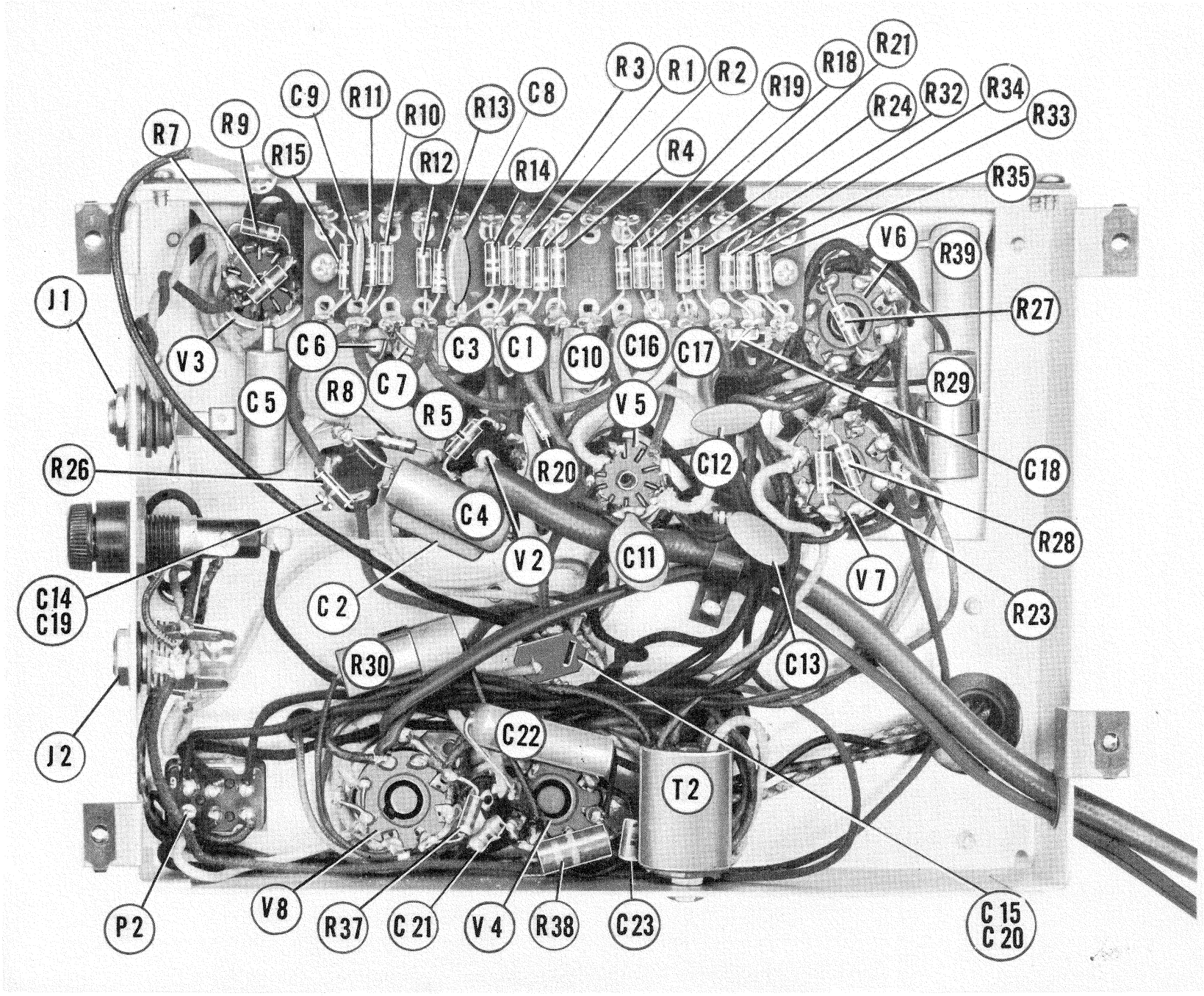
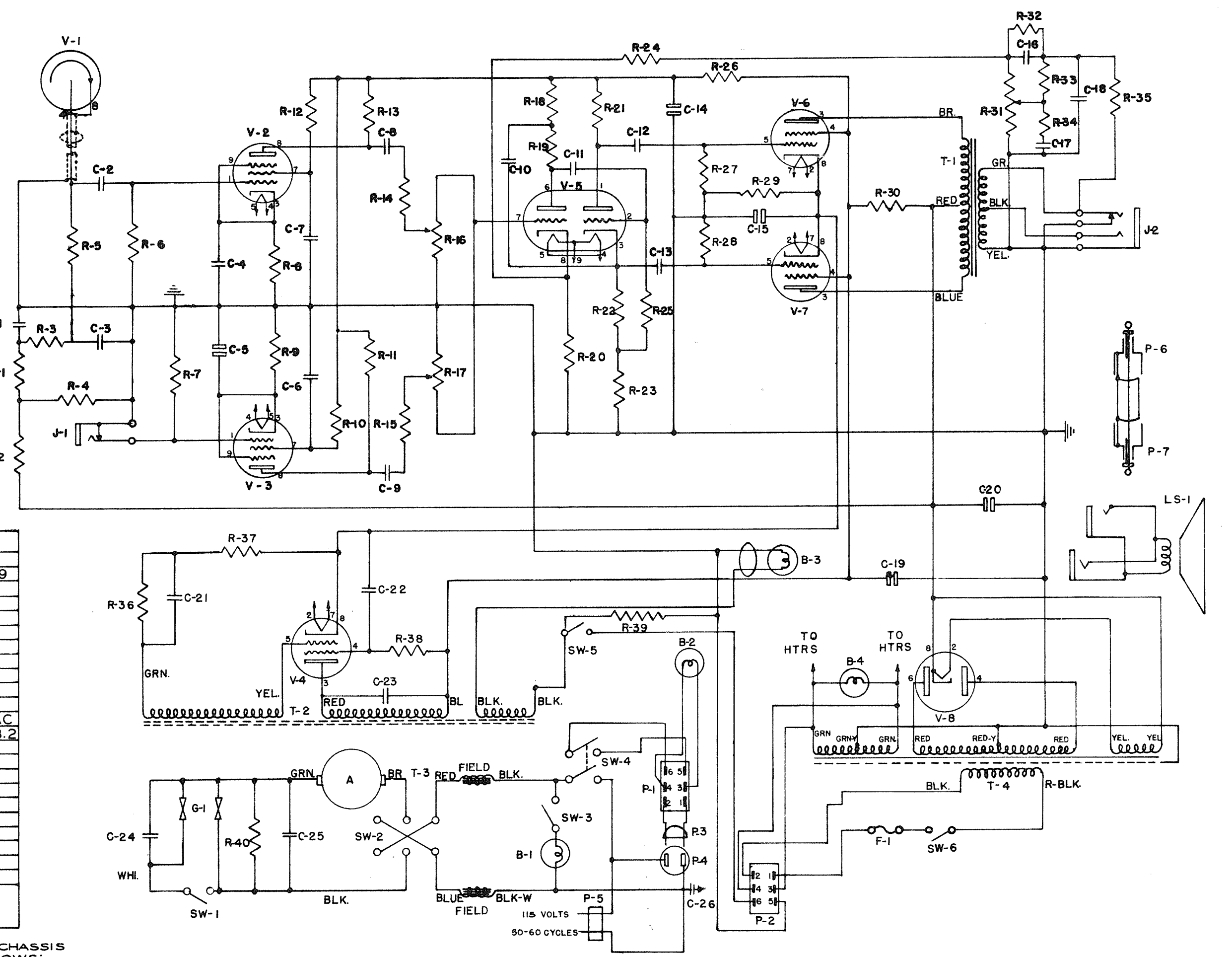


FIGURE 12—AMPLIFIER ASSEMBLY (P-30)



AVERAGE VOLTAGE TABLE									
TUBE	PIN								
	1	2	3	4	5	6	7	8	9
V-2			DC	AC	AC		DC	DC	
NO SIG			1.5	3.2	3.2		50	30	
FULL SIG			1.4	3.2	3.2		46	28	
V-3			DC	AC	AC		DC	DC	
NO SIG			.7	3.2	3.2		26	38	
FULL SIG			.6	3.2	3.2		25	37	
V-4		AC	DC	DC			AC	DC	
NO SIG	0	3.2	308	168			3.2	21	
FULL SIG	0	3.2	290	178			3.2	25	
V-5	DC	DC	DC	AC	AC	DC	DC	DC	AC
NO SIG	242	80	88	3.2	3.2	139	0	1.0	3.2
V-6		AC	DC	DC	DC	DC	AC	DC	
NO SIG	0	3.2	346	313	0	86.5	3.2	21	
FULL SIG	0	3.2	332	294	-5		3.2	25	
V-7		AC	DC	DC	DC		AC	DC	
NO SIG	0	3.2	343	313	0		3.2	21	
FULL SIG	0	3.2	331	294	-14		3.2	25	
V-8				AC		AC		DC	
NO SIG				295		295		350	
FULL SIG				292		292		339	
JUNC'N R_1 R_2 R_4	78V. MAX. 78V. NOM. 60V. MIN.			SEE NOTE 4					

1. ALL VOLTAGES MEASURED TO CHASSIS GROUND WITH METERS AS FOLLOWS:
2. A. DC VOLTS-VT VOLTMETER 10 MEG RESISTANCE
   B. AC VOLTS-AC VOLTMETER 500 O.P.V. OR MORE
3. LINE VOLTAGE 115V. 60 CPS.
4. VOLTAGE AT PEC DIVIDER MUST NOT EXCEED 105V. UNDER MOST SEVERE CONDITION WHICH IS WARM-UP SURGE AT 125V. LINE.

MARK	PART NO.	DESCRIPTION
C-1,3,17	18580	CAPACITOR-.2 MFD. 150 VOLT PAPER
C-2	18852	" .0005 " 500 " MICA
C-4,18	18484	" .05 " 150 " PAPER
C-5	18486	" 25 " 15 " ELEC.
C-6,7,22	17782	" .01 " 400 " PAPER
C-8,9,11,12,13	18487	" .01 " 400 " CERAMIC
C-10	18664	" .1 " 400 " PAPER
C-14	18828	" 20 " 350 " ELEC. BANK-I
C-19	18828	" 20 " 350 " ELEC. BANK-I
C-15	18829	" 40 " 25 ELEC. BANK-II
C-20	18829	" 20 " 450 " ELEC. BANK-II
C-16	18585	" .1 " 150 " PAPER
C-21,23	18830	" .0001 " 600 " PAPER
C-24	17767	" .5 " 400 " OIL-FILLED } BANK III
C-25	17767	" .25 " 400 " OIL-FILLED } BANK III
C-26	18832	" .03 " 600 " PAPER MET. CAN
R-1,3,7,10	18465	RESISTOR - 2.2 MEG. 1/2 W. CARBON
R-2	18818	" 3.9 MEG. 1/2 W. CARBON
R-4	18584	" 1.0 MEG. 1/2 W. CARBON
R-5,6	18464	" 5.6 MEG. 1/2 W. CARBON
R-8,36	18815	" 1800 OHM. 1/2 W. CARBON
R-9	18814	" 1200 OHM. 1/2 W. CARBON
R-11	18467	" 560 K OHM. 1/2 W. CARBON
R-12	18813	" 1.2 MEG. 1/2 W. CARBON
R-14,15,19	18471	" 100 K OHM. 1/2 W. CARBON
R-16	18823	CONTROL-VOL 1 MEG. CARBON (WITH-SWITCH)
R-17	18822	" -MIKE 4 MEG. CARBON NO-SWITCH
R-18	17557	RESISTOR-150 K OHM. 1/2 W. CARBON
R-20	18472	" 2200 OHM. 1/2 W. CARBON
R-21	17957	" 68 K OHM. 1/2 W. CARBON
R-22,37	17811	" 1500 OHM. 1/2 W. CARBON
R-23	18816	" 120 K OHM. 1/2 W. CARBON
R-24,35	18466	" 3300 OHM. 1/2 W. CARBON
R-13,25	18729	" 390 K OHM. 1/2 W. CARBON
R-26	18470	" 5600 OHM. 1/2 W. CARBON
R-27,28	18474	" 470 K OHM. 1/2 W. CARBON
R-29	18817	" 170 OHM. 5 W. WIRE WOUND
R-30	18827	" 700 OHM 5 W. WIRE WOUND
R-31	18821	CONTROL-TONE 5000 OHM CARBON (WITH SW.)
R-32	18692	RESISTOR - 33 K OHM. 1/2 W. CARBON
R-33	18582	" 2700 OHM. 1/2 W. CARBON
R-34	18476	" 270 OHM. 1/2 W. CARBON
R-38	18819	" 56 K OHM. 2 W. CARBON
R-39	18831	" 20 OHM. 5 W. WIRE WOUND
R-40	18383	" 50 OHM. 40 W. WIRE WOUND
B-1	1595-115	LAMP - PROJECTION 750 W
B-2	18195	" - THREADING G.E. #51
B-3	18807	" - EXCITER 4 V. 3/4 AMP.
B-4	18195	" - PANEL G.E. # 51
F-1	18796	FUSE 1.5 AMP. (SLO-BLO)
G-1	18793	GOVERNOR
J-1	18597	JACK-PHONO-MIC.
J-2	18768	JACK-SPEAKER
LS-1	18820	SPEAKER
P-1	18528	SOCKET-CABLE
P-2	18527	PLUG-MALE
P-3	18804	PLUG-CONVERTOR
P-4	18798	RECEPTACLE-CONVERTOR
P-5	17682	CONNECTOR-LINE
P-6,7	18022	PLUG-SPEAKER
SW-1	18455	SWITCH-SPEED, S.P.S.T. 3 AMP.-250 V
SW-2	18454	SWITCH-REVERSE, D.P.D.T. 3 AMP.-250V
SW-3	18802	SWITCH-LAMP-S.P.S.T. 10 AMP.
SW-4	18801	SWITCH-MOTOR, D.P.S.T. 10 AMP.
SW-5	18823	SWITCH-EXC.-LAMP-(ON R-16) NORM. OPEN
SW-6	18821	SWITCH-AMP. (ON R-31) NORM. CLOSED

T-1	18791	TRANSFORMER-OUTPUT
T-2	18641	COIL-OSCILLATOR
T-3	18792	MOTOR
T-4	18790	TRANSFORMER-POWER
V-1	18812	TUBE-PHOTO CELL TYPE 930
V-2,3	18797	" 5879
V-4,6,7	17788	" 6V6-GT OR 6V6
V-5	18497	" 12AX7
V-8	17701	" 5Z4

LET.	REVISION	C.O.	DATE	BY	CK
C	ADDED VOLT TABLE	6885	1-2-50		
B	C-15 WAS 20 MFD, R-1 WAS ...				
A	PT. 18852 WAS PT. 17754	6915-2			

AMPRO CORPORATION
CHICAGO ILLINOIS U.S.A.

MATERIAL
FINISH
MODEL 480 QUANTITY 1
SERIAL NO. NEXT ASSEM.
SCALE WEIGHT
DESIGNED
DRAWN G.S.
CHECKED
APPROVED

DIAGRAM -
PREMIER-30 SCHEMATIC
NAME

D-10563
PART NO.

D-10563

FIGURE 13—SCHEMATIC DIAGRAM (P-30)

b. Disassembly and Repair (See Fig. 7) - Remove the governor (A-1), governor brushes (A-2), drive belt (A-3) and motor pulley (A-9). Take off the nut (A-6) or take out idler arm pivot and remove the idler assembly (A-4) and spring (A-5). Take out the screws which hold the condenser bracket assembly (A-15) to the motor frame.

Take off the two tie rod nuts (B-3) and pull off the motor cap. Remove the armature (B-5). Take off the brush caps (B-1) and remove the brushes (B-2). Generally it will not be necessary to disassemble the motor beyond this point.

Check the armature with a growler or check across diametrically opposite segments with an ohmeter. Check the concentricity of the commutator and turn if necessary. Undercut to a depth of .015" - .020". Check the motor bearings (B 6) and wash and relubricate. If rough spots are noted after cleaning, the bearings should be replaced.

9. MECHANISM UNIT

a. Removal (ALL) - Remove the front cover assembly, drive clutch assembly (1 Fig. 4), shuttle shield (4 Fig. 4) and vertical camshaft bearing assembly (6 Fig. 4). Remove the shutter control knob (18 Fig. 3-B), rear cover screws (20 Fig. 3-B) and rear cover (19 Fig. 3-B). Remove the soundhead to mechanism stud or screw (13 Fig. 5-A). Take off the two hex nuts (5 Fig. 5-A) on the left hand side of the mechanism and the two corresponding nuts in the shuttle compartment. Take out the screw in the lower left rear corner of the lamphouse and lift off the mechanism.

b. Disassembly

(1) Front Cover Assembly (ALL) - Push the front condensing lens toward the rear lens and lift out the front condensing lens. Remove the spacing spring and the rear condensing lens. Push the reflector back out of the recess in the holder and remove it. Do not remove the condensing lens holder unless it is damaged as it has been prealigned at the factory. Should removal be necessary, take out the two two screws and washers which hold the heat shield in place and remove the shield. Take out the two screws which hold the condensing lens mount in place and remove it.

(2) Sprockets and Sprocket Shoes (ALL) (See Fig. 14-A) - Take off the film strippers. Loosen the setscrew in the feed sprocket and pull off the sprocket. Remove the screw and snubber from the takeup sprocket and pull off the takeup sprocket. Remove the sprocket shoe retaining screw (6) and the two retaining screws adjacent to the lensmount and lift off the feed sprocket shoe. Remove the corresponding screws in the takeup sprocket shoe and remove it. Take out the two sprocket shoe cover screws (3) and remove the sprocket shoe cover (2). Pull off the four rollers (4) and pull off the sprocket follower assemblies (5 and 21) and separate the springs.

(3) Lensmount Assembly and Aperture Plate (P-10) (See Fig. 14-B) - Take out the four screws which hold the lensmount gibs in place and take off the gibs. Lift out the lensmount and lift off the friction spring. Separate lensmount shoe and the gate lever. Take out the four screws (1) and lift off the sprocket shoe striker plates (not shown) and the pressure shoe assembly. Take out the two screws (3) which hold the pressure shoe assembly together and separate the pressure shoe (4), mounting plate (5) and booster spring (6). Take out the screw (7) and remove the lens retaining spring assembly (8). Take out the six screws and remove the aperture plate from the mechanism head.

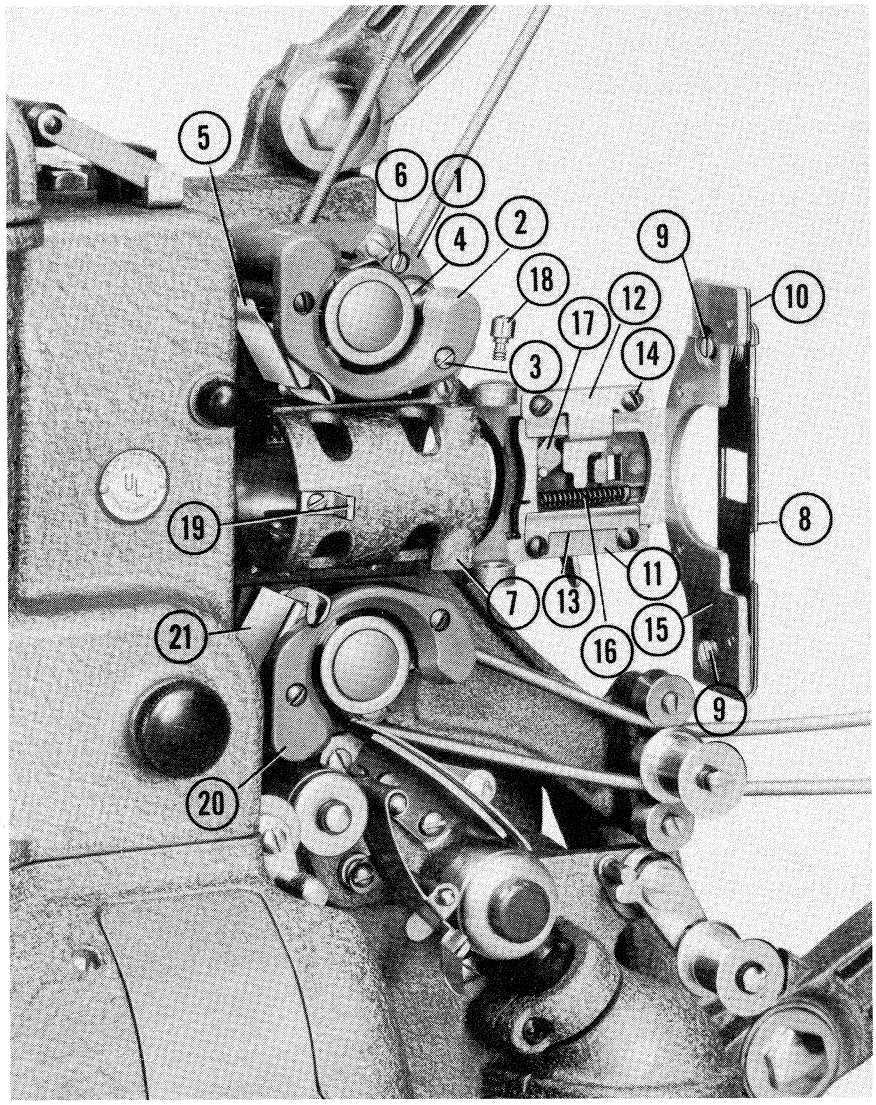
(4) Lensmount Assembly (P-20 AND 30) (See Fig. 14-A) - Insert a screwdriver through the oval access holes in the right hand side of the lensmount and take out the four screws which hold the lensmount to the mechanism. Slip the lensmount off of the dowel and remove the lensmount. Take out the two pivot screws (18) and separate the carrier assembly from the lensmount. Take out the screw which holds the catch (19) to the lensmount and remove the catch. Take out the four screws (14) which hold the gibs (13) and tongue (12) in place. Lift the hanger (15) out of the carrier (11) and disengage the return spring (16). Take out the two screws (9) and lift off the pressure shoe (8) and springs. If it is necessary to remove the adjusters (10), take out the four screws which hold them in place. Take out the screws which hold the aperture plate in place and remove it.

(5) Rewind clutch and Large Intermediate Gear Assembly (ALL) (See Fig. 5) - Lift up on the end of the rewind clutch snap ring and pull off the rewind clutch (1). Remove the retaining screw (3) and pull off the rewind clutch bushing (2). Remove the thrust washer and pull off the large intermediate gear (4).

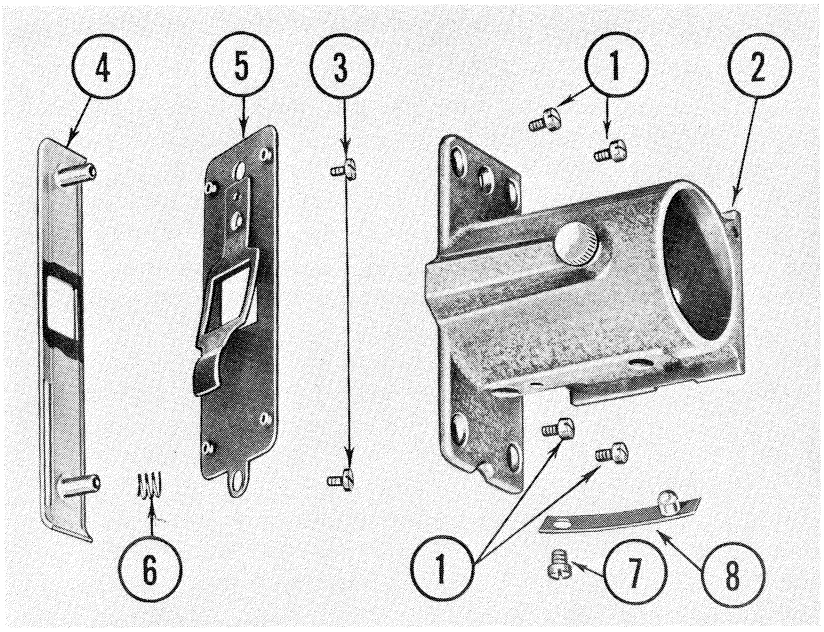
(6) Safety Shutter, Shutter and Shutter Gear (ALL) (See Fig. 4 and 5) - Remove the safety shutter retaining screw (18 Fig. 4) and lockwasher. Lift off the safety shutter (17 Fig. 4). Take off the shutter retaining nut and remove the interrupter shutter (19 Fig. 4) and thrust washers. Remove the two shutter adjusting screws (20 Fig. 4) and separate the shutter from the drive disc.

Remove the safety shutter stop screw (5 Fig. 5-B), the stop link (7 Fig. 5-B) and spring (6 Fig. 5-B). Pull out the governor cup assembly (8 Fig. 5-B) and remove the shutter gear assembly (9 Fig. 5-B).

(7) Sprocket Gears and Pulleys (ALL) (See Fig. 5) - Loosen the setscrews in the sprocket pulleys and remove the pulleys and spacing washers. Pull out the takeup sprocket gear (14) and feed sprocket gear (15). Remove the screw (17) and washer which hold the small sprocket intermediate gear (16) in place and remove the gear.



A—GATE AND SPROCKET SHOES (P-20 & 30)



B—LENS MOUNT (P-10)

FIGURE 14—FILM GATE PARTS

(8) Intermittent Unit (ALL) (See Fig. 4 and 5) - Take off the drive clutch assembly (1 Fig. 4), shuttle shield (4 Fig. 4) and vertical camshaft bearing assembly (6 Fig. 4). Remove the vertical cam nut (11 Fig. 4) and shoulder washer (12 Fig. 4). Remove the lateral cam nut (14 Fig. 4) and washer (13 Fig. 4). Take out the shuttle (10 Fig. 4). Support the lateral camshaft on a "Vee" block and drive out the tapered pin (11 Fig. 5-B). Drive out the tapered pin (13 Fig. 5-B) and remove the camshaft gears (10 and 12 Fig. 5-A. Pull the camshafts out from the right hand side of the mechanism. Pull the lateral cam assembly off of the shaft.

c. Repair and Reassembly

(1) Safety Shutter, Shutter and Shutter Gear (ALL) (See Fig. 4 and 5-B) - Wash the shutter gear (9 Fig. 5-B) in grease solvent. Check the gear teeth and make sure that the governor shoes slide freely in the slots in the face of the gear. Check for play between the shaft and the bearing - replace the bearing if play exceeds .007". Oil the shutter gear shaft and insert the shaft in the bearing (use spacing washers as required to reduce the endplay to .003" - .005"). Install the shutter (19 Fig. 4) and retaining nut.

Wash the governor cup (8 Fig. 5-B) and the shaft and insert it in the shutter gear quill. Turn the cup so that the clip is on top, then place a spacing washer on the R.H. end of the shaft and install the safety shutter (17 Fig. 4) with the blade toward the lamphouse. Install the lockwasher and retaining screw (18 Fig. 4). Install the safety shutter spring (6 Fig. 5-B), link (7 Fig. 5-B) and stop screw (5 Fig. 5-B). Rotate the governor cup and check the angle of travel. If the cup travels more than 90^{o} in either direction, the safety shutter will be sluggish. Bend the stop screw upward to limit the travel.

(2) Intermittent Unit (ALL) (See Fig. 15) - Check the camshafts for play in the bearings. If play exceeds .001", replace the bearings. Check the camshafts for wear or scoring. If worn replace them. Light score marks can usually be removed by polishing with crocus cloth. Check the vertical cam for flat spots at points 7 and 8, replace if worn. Check the lateral cams for wear at points 9 and 10, replace if worn. Inspect the shuttle gibs for wear. If they are not worn more than .005" they can be honed flat. Check the claw teeth for wear, if they are not cut more than .010" - .012" they can be honed.

NOTE'. If any odd numbered surface is honed, all odd numbered surfaces must be honed proportionately. The same condition applies to even numbered surfaces.

Check the fit of the pivot bushing (12) in the clamp block (11). This should be a light push fit. These parts are supplied with the shuttle as a selected assembly. Attempts to interchange parts will seldom be successful.

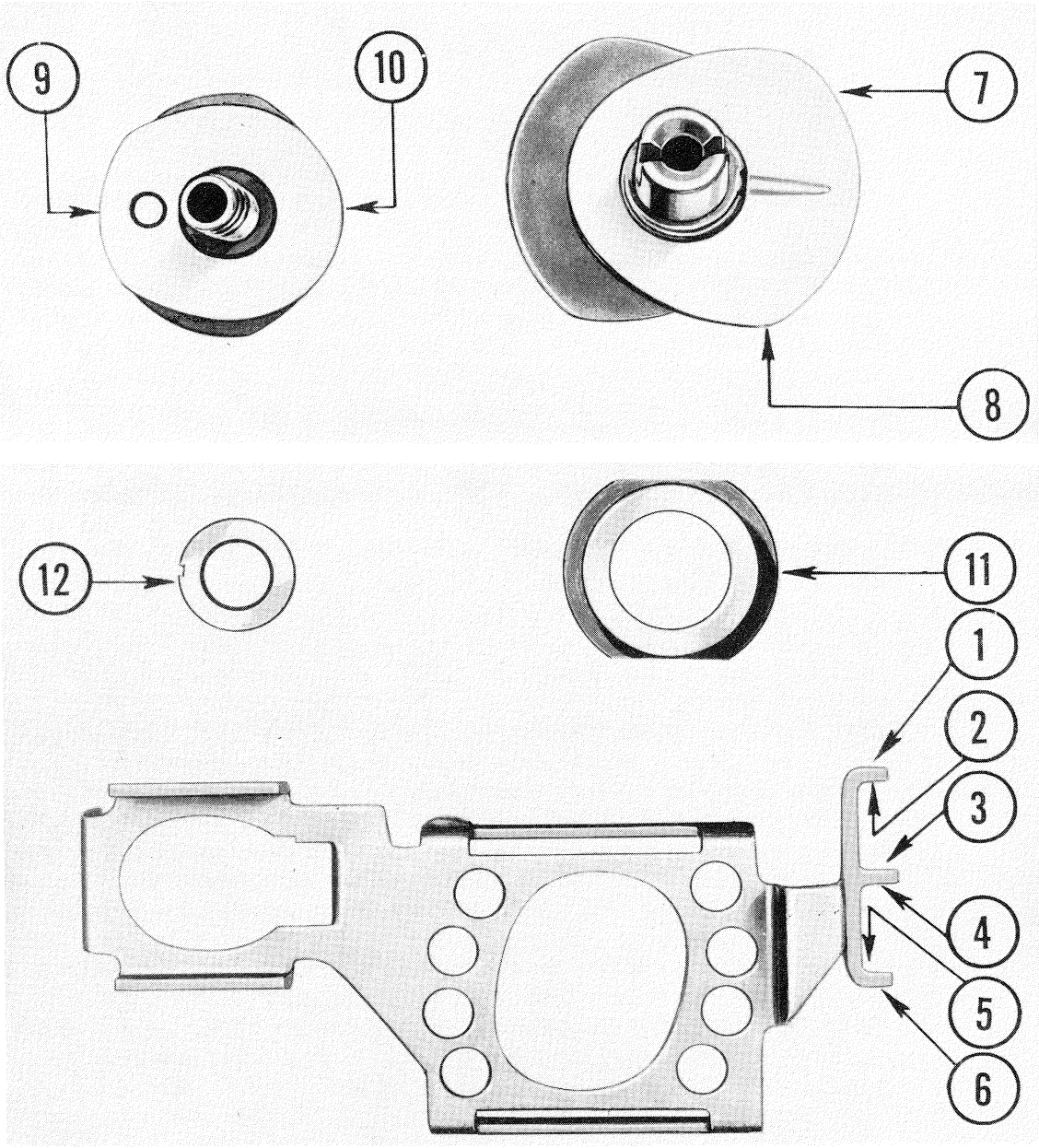
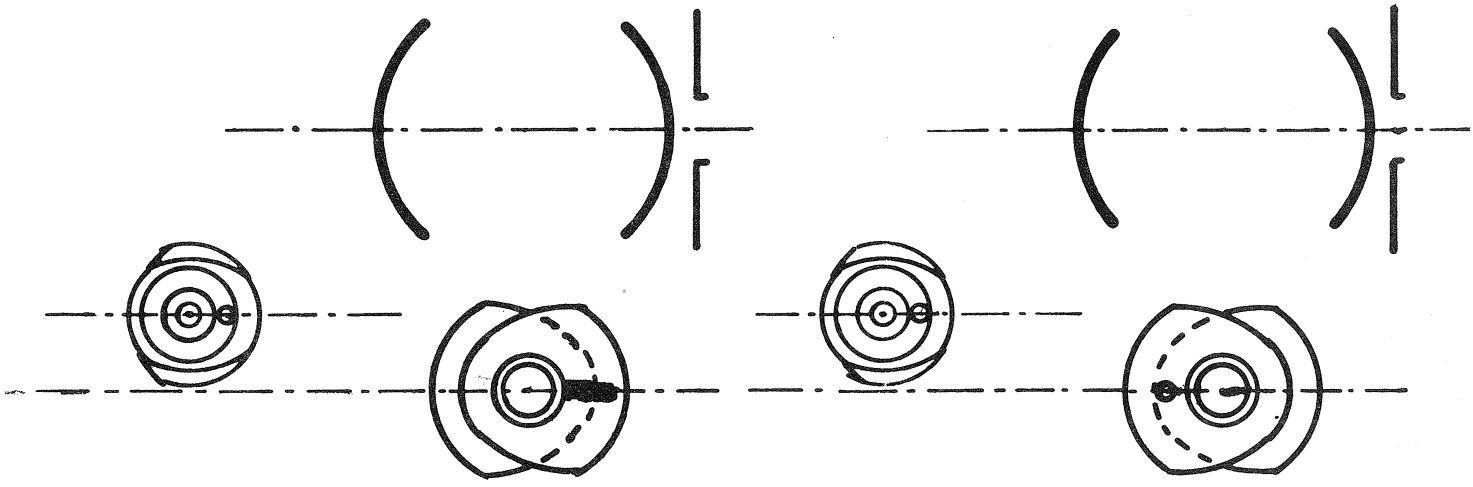


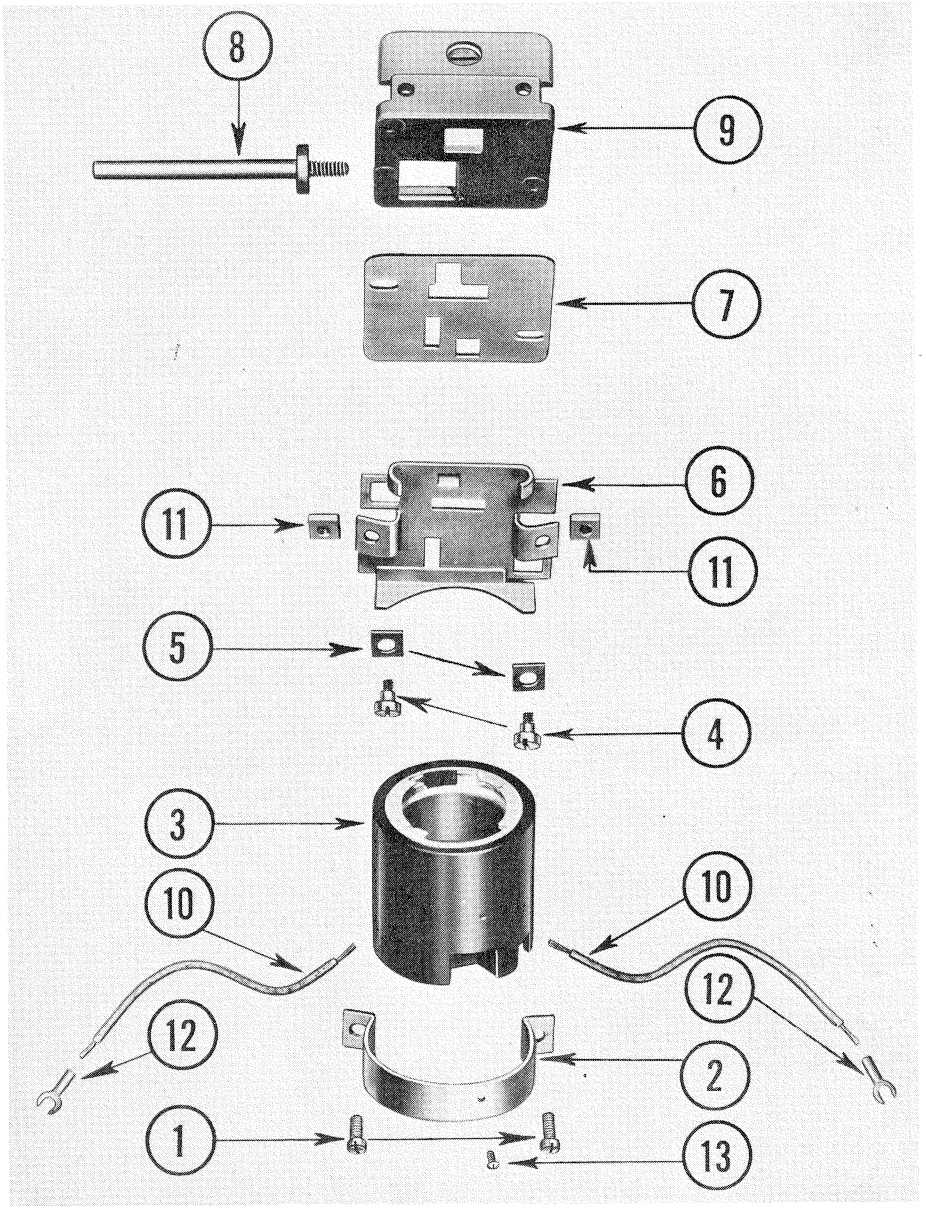
FIGURE 15—INTERMITTENT PARTS



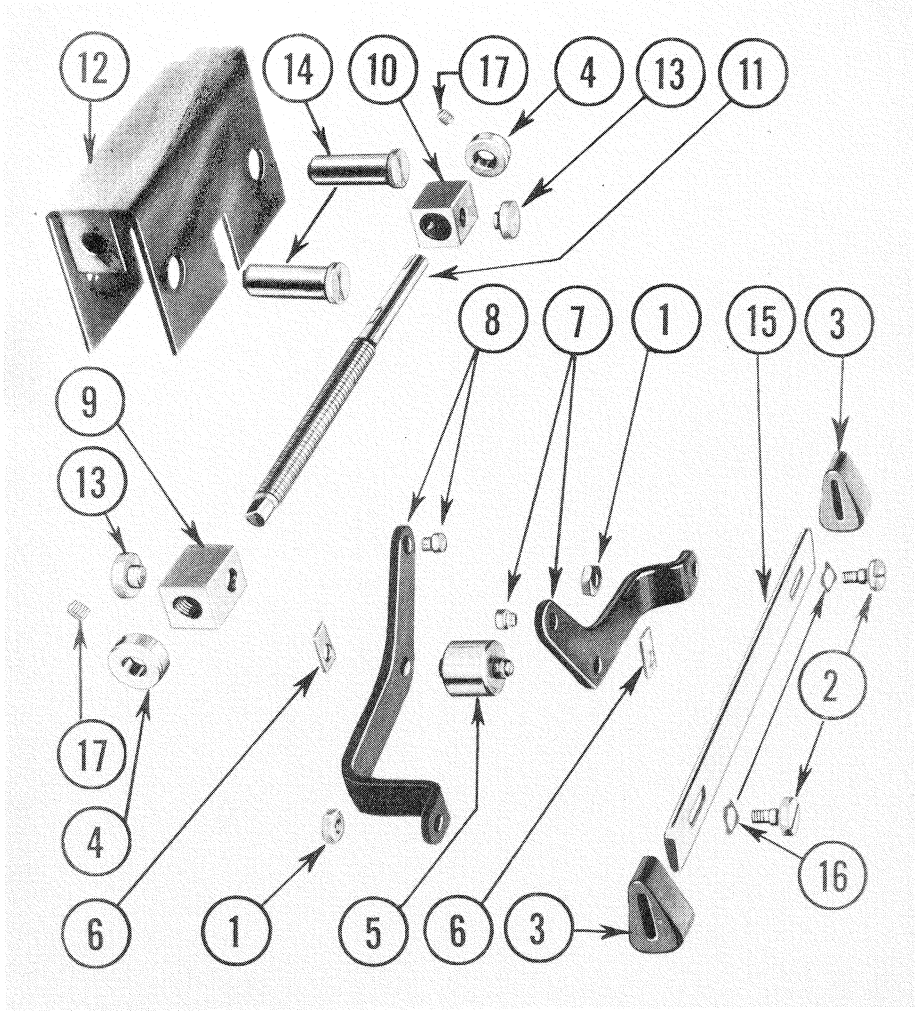
A—(P-10 & 20)

B—(P-30)

FIGURE 16—TIMING



A—LAMP SOCKET ASSEMBLY



B—TILT ASSEMBLY

FIGURE 17—LAMP SOCKET & TILT

If the bearings have been replaced, burnish them to a tight fit. Temporarily install the camshafts and gears (using plenty of oil) and run them in to obtain a good fit. Remove the shafts, clean and relubricate.

Place a .010" spacing washing on the vertical camshaft and insert it in the bearing. Measure the distance from the face of the cam to the face of the mechanism (surface upon which the front cover bears). Use spacing washers as required to make the distance .533" ± .002". Use enough spacing washers on the left hand end of the shaft to reduce the endplay to .001" - .003" and pin the gear in place. Refer to Fig. 16 for timing.

Place a .010" spacing washer on the lateral camshaft and insert it in the bearing. Measure the distance from the face of the cam to the face of the mechanism and use spacing washers to locate the cam within .001" of the final location of the vertical cam. Use spacing washers on the left hand end of the shaft to reduce the endplay to .001", then time with vertical cam and shutter as per Fig. 16 and pin the lateral cam gear in place.

Fit the shuttle to the lateral clamp block (11 Fig. 15) so that the clamp block is a push fit in the gibs. Peen the gibs if necessary to close them and then hone them and check for parallelism. Install the shuttle on the lateral cams with the claw facing the back of the lamphouse and check for fit. The shuttle should fit snugly on the cams but should not bind. If it is loose, support one gib on a block and peen the other gib at the point where it is formed out from the shuttle body. Hone the faces of the gibs to restore parallelism and obtain the proper fit on the cams. Install the shuttle in the regular position and check the fit of the vertical gibs on the vertical cam. Peen and hone as necessary. Install the lateral cam washer and lateral cam nut. If the mechanism tightens up when the lateral cam nut is tightened, hone the face of the clamp block (11 Fig. 15). If endplay is present in the assembly, hone the pivot bushing (12 Fig. 15). Be sure the lateral cam washer is flat. Install the vertical cam shoulder washer and vertical cam nut. Run the mechanism at sound speed and check for noise. If noise is present, press forward on the rear lateral gib; if the noise stops the shuttle is loose on the lateral cams. Press down on the shuttle, if the noise stops the shuttle is loose on the vertical cam. Press in on the face of the clamp block, if the noise stops there is too much endplay in the shuttle pivot or lateral camshaft.

Thread the projector with film and run it for about 5 minutes in each direction. Check for the following:

(a) Film Slap
(b) Strike (vibration of the pressure shoe)
(c) Double Image
(d) Trailer Ghost
(e) Picture Jump

Correct as follows:

Condition	Direction	Correction (See Fig. 15)
Slap	Forward	Stone claw at point 4
Slap	Reverse	Stone claw at point 3
Strike	Either	Stone off any bright spots at points other than those numbered
Double Image	Forward	Stone claw at point 2
Double Image	Reverse	Stone claw at point 5
Jump	Forward	Stone claw at point 6
Jump	Reverse	Stone claw at point 1
Trailer Ghost	Either	Loosen shutter retaining screws and advance or retard shutter as required

When all adjustments have been made, place a film of "Lubriplate" on the shuttle and cams.

(3) Sprocket Gears and Pulleys (ALL) (See Fig. 5) - Wash the sprocket shafts and gears in grease solvent. Check the shafts and gears for wear. Place a spacing washer over the feed sprocket shaft (15 Fig. 5-B), oil the shaft and insert it in the bearing. Clean the sprocket pulleys and replace if worn. Place a spacing washer on the feed sprocket shaft and install the pulley. Push the gear and pulley together in order to remove the endplay, then tighten the setscrew down against the flat on the shaft. Install the takeup sprocket gear (14 Fig. 5 - B) in the same manner.

Place a spacing washer on the small sprocket intermediate gear stud and install the gear (16 Fig. 5-B). If the face of the gear is more than .005" below the end of the stud, add spacing washers behind the gear. Install the plain washer and retaining screw (17 Fig. 5-B).

(4) Rewind Clutch and Large Intermediate Gear (ALL) (See Fig. 5-B) - Wash the large intermediate gear (4) in grease solvent. Check for damaged teeth and scored bore. Light scoring can be corrected by reaming. If the bore is badly damaged or the teeth are damaged, replace the gear. Place a spacing washer on the gear stud, oil the stud and install the gear. Install the rewind clutch bushing (2) and check the gear for endplay. If endplay exceeds .005" install additional spacing washers between the gear and the boss. Install the bushing retaining screw (3). Wash the rewind clutch assembly and check the pulley groove for

wear and the clutch dogs for burrs. Replace the clutch if the groove is worn. Burrs may be removed from the dogs by filing.

Install the clutch, rewind belt, rear cover and shutter control knob.

(5) Lensmount and Aperture (P-20 AND 30) (See Fig. 14-A) - Check the aperture plate for worn film rails, particularly in the area adjacent to the claw slot. Replace if worn enough so that there is danger of the film coming in contact with the relieved portions of the aperture plate. Check the side tension spring for grooving. Replace if worn. When replacing the side tension spring, be sure that the faces of the spring are either at a right angle to the film channel or inclined in toward it. Install the aperture plate using an aperture centering tool for alignment or if the tool is not available, use a loop of calendar film or a roll title to center the image in the aperture before tightening the retaining screws.

Clean the parts of the lensmount. Check the pressure shoe for wear and place it on a surface plate and check for straightness. Replace if worn or bent. Place the stiffer of the pressure shoe springs on the stud at the end of the pressure shoe adjacent to the claw slot when assembling the pressure shoe to the hanger. Place a thin coat of "Lubriplate" on all sliding surfaces before assembling the hanger and carrier. Install the carrier (11) on the lensmount. Install the catch (19) and check its action. It may be bent slightly if necessary to insure that the carrier will be held firmly against the lensmount.

Place the lensmount on the guide dowel. Insert one blade of a small machinist square in the lensmount. Place the other blade firmly against the film channel and tilt the lensmount until its bore is normal to the plane of the film channel. Tighten the retaining screws.

Loosen the four screws which hold the pressure shoe adjusters (10) to the hanger. Thread the projector; close the gate and start the projector. Grip the adjusters with a pair of long nose pliers and shift the adjusters back and forth until quietest operation is obtained, then tighten the four screws. See paragraph B-7 for gate pressure adjustment.

(6) Lensmount and Aperture (P-10) (See Fig. 14-B) - See paragraph (5) for repair and reassembly of aperture plate.

Check the pressure shoe for wear and replace if there is danger of the film coming in contact with the recessed portions of the plate. Check the plate for flatness and replace if bent. Check the pressure shoe mounting plate to be sure that it is straight and straighten if necessary. Place the booster spring (6) over the lower stud on the

pressure shoe and install the mounting plate (5) and screws (3). Place the pressure shoe assembly on the lensmount (2). Install the striker plates (not shown) and the retaining screws (1).

Place a thin coat of "Lubriplate" on all sliding surfaces. Place the lensmount friction spring in the slot in the upper guide. Place the lensmount shoe in the slot in the back of the lensmount. Mesh the stud in the gate lever in the hole in the shoe and place the group of parts on the mechanism head. Mesh the rear stud on the gate lever with the gate lever eccentric and press the unit into position. Install the friction gibs and the four screws which hold them in place. See paragraph B-7 for gate pressure adjustment.

(7) Sprockets and Sprocket Shoes (ALL) - Clean all rollers and replace any that are worn. If the follower rollers are worn, replace the follower assembly. Wind up the follower assembly springs 1/2 turn when installing. Install the sprocket shoes.

Clean the sprockets and replace if teeth are worn or flanges cut. Line up the feed sprocket with the follower rollers and tighten the setscrew down against the flat on the shaft. Install the stripper. Install the takeup sprocket and use spacing washers to line up the sprocket with the follower rollers, then install the snubber and retaining screw.

(8) Front Cover Assembly & Projection Lens (ALL) - Use a square to check alignment of the condensing lens holder with the face of the front cover. If the holder is bent, replace it. Install the lenses as shown in Fig. 2. If the projection lens is dirty, remove the retaining rings and take out the lenses. Touch up any bright spots in the barrel with optical black. Reassemble as per Fig. 2.

10. PROJECTION LAMP SOCKET ASSEMBLY (ALL) (See Fig. 17-A)

a. Removal - Take off the mechanism head as per paragraph 9-a. Disconnect the lamp leads. Take out the two screws which hold the assembly to the amplifier housing and remove the socket assembly.

b. Disassembly - Take out the two screws (1) and nuts (11), and remove the socket (3) and strap (2). Remove the screw (13) and separate the strap from the socket. Take out the two shoulder screws (4) and remove the spring washers (5) and remove the vertical adjusting plate (6) and elevator plate (7). Unscrew the horizontal adjusting screws (8).

c. Repair and Reassembly - Check the operation of the bracket sub-assembly (9). If the threads are stripped, replace the part. Clean all metal parts. Check the socket for burned contacts or weakened contact spring. Replace if damaged. In-

stall the horizontal adjusting screw, then install the two adjusting plates, the spring washer and the shoulder screws (4). Install the socket and strap.

11. TILT ASSEMBLY (ALL) (See Fig. 17-B)

a. Removal

(1) (P-10 AND 20) Take off the amplifier bottom cover. Remove the tilt knob. Take out the three oval head screws which hold the tilt assembly to the amplifier housing.

(2) (P-30) Remove the projector case bottom and motor shield. Turn the tilt knob to elevate the tilt as far as possible. Take off the cap screw which holds the tilt lock in place. Take off the tilt knob and remove the two oval head screws which fasten the tilt to the amplifier housing. Take off the hex nut which holds the tilt lock pivot in place. Lift the tilt mechanism out of the amplifier housing.

b. Disassembly (ALL) - On Premier 10 and 20, remove the nuts (1), the shoulder screws (2) and spring washers (16). Lift off the tilt bar (15) (these parts are not used in Premier 30). Take out the two tilt leg stops (14) and pry off the tilt keys (6). Loosen the setscrews (17) in the tilt collars (4) and remove the collars. Slide the tilt screw sideways so that the short end of the screw (11) clears the hole in the shroud (12). Pull the tilt legs (7 and 8) and the balance of the operating mechanism out of the shroud. Separate the parts.

c. Repair and Reassembly (ALL) - Check the threads on the tilt screw (11) and in the tilt nuts (9 and 10). Damaged threads can sometimes be salvaged by retapping or chasing with a die. If the threads cannot be repaired, replace the part. Wash the screw and nuts, and after drying, apply a thin coat of light grease. Remove the staking flare from the ends of the tilt pivot (5). Reassemble the parts and after installing the tilt keys (6), rivet the ends of the tilt pivot (5). If the rubber feet (3) are worn or distorted, replace them.

When replacing the tilt in the Premier 30, note that there is a flat on the hub of the tilt lock pivot. When the tilt is elevated to maximum height, this flat bears against one of the tilt legs and locks the pivot so that the retaining nut can be tightened.

B. FINAL ADJUSTMENTS

1. Speed Adjustment (ALL) (See Fig. 7-A) - Remove the governor cover. Start the projector, switch to "Forward" and "Sound Speed". Check the speed of the shutter control knob. It should be 1440 R.P.M. + 2%. If speed is not correct, disconnect the projector from the power supply and proceed as follows:

a. Test tension of governor contact springs (16). The stiffer set controls the sound speed.

b. If speed is low, tighten the setscrew (17) which controls tension on stiffer set of springs.

c. If speed is high, loosen the setscrew (17) which controls the tension on the stiffer set of springs.

> NOTE! If 60 cycle AC power is available, a stroboscope disc having 5 light blades and 5 dark blades may be attached to the shutter control knob and used to check the speed. If the disc is viewed in light from a small mazda lamp, a neon lamp, or a fluorescent lamp, the pattern will appear to be stationary when the speed is correct. If the speed is high, the pattern will drift in the direction of shaft rotation. If the speed is low, the pattern will drift in the opposite direction.

After the sound speed has been adjusted, switch to "Silent Speed" and check the speed of the shutter control knob. At 16 F.P.S. the shaft speed will be 960 R.P.M., however, many users prefer a slightly higher speed. Speeds between 1050 and 1100 R.P.M. will generally be satisfactory. If the speed is not within these limits, proceed as follows:

a. Test tension of governor contact springs (16). The weaker set controls the silent speed of the projector.

b. If speed is low, tighten the setscrew (17).

c. If speed is high, loosen the setscrews (17).

2. Photocell Shield Assembly (P-10 AND 20) (See Fig. 8-A) - If the sleeve adjustment has been disturbed, loosen the two setscrews (10). Block up the front of the projector so that you can see the hole in the shield (11). Rotate the shield so that the light beam from the sound optical system enters the hole in the sleeve without touching the edges. Check to be sure that the sleeve has not been pushed in far enough to rub on the sound drum, then tighten the setscrews (10).

3. Mirror Adjustment (P-30) (See Fig. 9-B) - Remove the sound drum (20) and bearing (21). Loosen the setscrew (22). Disconnect the exciter lamp leads from the amplifier and connect them to one half of the 6.3 volt winding on a separate power transformer. Connect an output meter across the output of the amplifier. Rotate the mirror mounting stud (23) and move it in or out as necessary in order to obtain maximum output from the amplifier. Check visually to be sure that no part of the light beam from the sound optical system is overshooting the mirror.

4. Lower Guideway Assembly (ALL)

a. (P-10 AND 20) (See Fig. 8) - The lateral position of the lower guideway assembly (9 Fig. 8-B) determines the alignment of the sound track with the beam from the sound optical system. The following procedure produces an approximate adjustment

permitting focusing of the sound optical system as described in sub-paragraph 5. After focusing the sound optical system, repeat the procedure to obtain exact alignment.

Thread the projector with a loop of "buzz track" film. Connect the speaker and turn on the amplifier. Loosen the guideway locking setscrew (20 Fig. 8-A) and rotate the adjusting screw (17 Fig. 8-A) to position the film over the scanning beam. Two types of "buzz track" are in general usage - one type produces two tones of equal volume when properly aligned; the other type produces a low frequency tone when misaligned in one direction, a higher frequency tone when misaligned in the opposite direction and only film noise when properly aligned.

If "buzz track" film is not available, use a standard sound film and adjust for maximum signal and minimum noise. If such film is positioned too far to the left, a 24 cycle buzz will be produced by the frame lines. If it is positioned too far to the right, noise is produced by scratches on the edge of the film adjacent to the sound track.

b. (P-30) (See Fig. 9) - Remove the projector from the case base. Remove the flywheel cover (A-1) and flywheel (A-6). Snap a battery clip or small clamp over the sound drum shaft to hold it in place. Thread the projector with film as per preceeding paragraph. Loosen locking screw (A - 10) and position by means of adjusting screw (A-11).

5. Sound Optical System (ALL) - Thread the projector with a loop of constant frequency film (5000 or 7000 C.P.S.). Connect the speaker and turn on the amplifier and projector. Connect an output meter or oscillascope across the speaker terminals. Loosen the sound optical clamping screw and insert the bit of a screwdriver or a small wedge in the slot in the sound optical clamp so that the optical system can be moved easily. Start the projector and raise or lower the optical system and rotate as necessary in order to obtain maximum output.

6. Screen Illumination (ALL) - Clean all projection optics. Thread the projector with a test film and frame the picture. Remove film and focus the image of the aperture on the screen. Rotate the horizontal lamp adjusting screw to obtain even side to side distribution of light. Rotate the vertical lamp adjusting screw (24 Fig. 4) to obtain even top to bottom distribution. If a light meter is available, use vertical and horizontal adjusting screws to balance the illumination in the four corners of the screen (on a 3' x 4' screen measure corner illumination in about 6" from the corner).

If it is desired to quantitatively measure the light output of the projector, proceed in the following manner:

a. Replace the screen with a piece of paper.

b. Project an image of the aperture about 30" - 35" high.

c. Outline the image of the aperture on the screen. Divide the image into 4 vertical segments of equal width and 3 horizontal segments of equal width, thereby obtaining 12 rectangles of equal area. Mark the center of each rectangle.

d. Connect the projector to a voltage regulator and connect a voltmeter across the line cord at the female end.

e. Operate the projector at "Sound Speed". Adjust the line voltage to equal the rated voltage of the lamp.

f. Measure the light intensity with a laboratory type foot-candle meter which has been corrected to the color sensitivity curve of the eye. Measurements should be made at the center of each rectangle and recorded:

> NOTE: The use of Cine type light meters is not recommended. Usually they are not designed for this specific purpose and may not produce accurate readings if the color temperature, ratio of light to dark periods (shutter characteristic), or the shutter speed is changed.

g. Compute the arithmetical average of the twelve readings. Multiply the area of the projected image (in square feet) by the average reading. The product is the light output in lumens.

h. Repeat the test with each of 5 other lamps of the same voltage and wattage. The average of the 6 results so obtained is the light output of the projector using an average projection lamp.

7. Gate Pressure

a. (P-10) - Thread the projector with film. Loosen the filister head screw on the front surface of the mechanism. Rotate the eccentric to move the lensmount forward or backward. Adjust for the minimum pressure which results in a steady picture. Tighten filister head screw before releasing pressure on the eccentric, otherwise the gate operating mechanism may become disengaged. When the gate pressure is correct, it should be possible to grasp the film 1/2" to 3/4" above the aperture and push it down through the aperture without any film buckling.

b. (P-20 AND 30) (See Fig. 14-A) - Thread the projector with film. Loosen the two screw (14) which hold the pressure shoe adjusting tongue (12) and push the tongue toward the pivots. Close the carrier, hold the gate lever and start the projector. Allow the gate lever to swing forward until the picture becomes steady. When the pressure has been increased sufficiently, push the gate lever to the front and open the gate. Tighten the screws (14).

Check the gate pressure in the same manner as described in the preceding paragraph.

SECTION IV

GROUP ASSEMBLY PARTS LIST

This parts list contains a listing of all procurable parts in the Premier 10, Premier 20 and Premier 30 Ampro Projectors.

Parts are listed in the reverse order of assembly. Part names are indented to show the relationship between assembly, sub-assembly and detail parts. For example, if an assembly is listed and the following items are indented one column more than the assembly, then the parts are components of the assembly. Attaching parts (screws, nuts, washers, etc.) are listed in the same column as the part which they serve to attach.

Wherever the same part number appears on the same line in two or more columns it indicates that the part is interchangeable for that specific application in the models for which it is listed.

Descriptions of screws, nuts, washers, etc. are the correct descriptions for the parts used in the Premier-30 model. In most cases the part described will be similar to the corresponding part used in the other two models except for finish or type of head. There has been a gradual trend toward the use of "Phillips" and "Allen" head screws in place of slotted beads; this of course, necessitates new part numbers even though the three types of screws may be physically interchangeable.

Reference	Premier-10 Part Number	Premier-20 Part Number	Premier-30 Part Number	DESCRIPTION 1 2 3 4 5 6 7 8 9
		19784	480-S	Speaker Unit in Carton
	16677	16677	16946	Carton - Speaker Shipping
	616-R	616-R	616-R	Reel - Film, 1600'
	658	658	658	Cable Assem. - Speaker 50'
	18022	18022	18022	Plug - Speaker
	17623	17623	17623	Cable - Speaker, in Bulk
	955	955	955	Cord Assem. - Power, 10'
	1613	1613	1613	Connector - Female Cap Cord
	1619-10	1619-10	1619-10	Cord & Plug Set - 10'
	Note 1	19801	649	Speaker Assembly
		11607-1	11607-1	Grille - Speaker
		17922	17922-2	Screen - Grille
		16641	18820	Speaker - 12" Deluxe
		14515	14515	Screw - Rosette Hd. #8-32 x $1\frac{1}{4}$ Stl. F-111
		14697	14697	Nut - #8-32
		16646	16646	Case - Speaker
	19574			Speaker Assembly
	17929-1			Case - Speaker
	17929			Case - Speaker as purchased
	13614			Bracket - Reel Strap
	1483			Pin - Speaker Case Nameplate
	17939			Nameplate - Speaker Case
	17943			Medallion - Speaker
	17927			Screen - Speaker Grill
	17923			Grill - Speaker
	14515			Screw - Speaker Mounting
	1462			Washer - Speaker Mounting Screw
	1679			Lock Washer - Speaker Mounting Screw
	1453			Nut - Speaker Mounting Screw
	19575			Speaker Sub-Assembly
	14596			Screw - Speaker to Board
	1462			Washer - Speaker to Board Screw
	1679			Lock Washer - Speaker to Board
	1453			Nut - Speaker to Board Screw
	17929-A-1			Board - Speaker Mounting
	16641			Speaker (Also see #19998)

Reference	Premier-10 Part Number	Premier-20 Part Number	Premier-30 Part Number	DESCRIPTION
	19998			Speaker Element Assembly
	19593			Jack Assembly - Speaker
	17732			Jack - Speaker
	17732			Jack - Speaker
	18030			Speaker
	18257			Cone and Voice Coil
	19741	19782	480-P	Projector Unit in Carton - Premier-30
	17647	17647	16958	Carton - Proj. Shipping
	679	679	679	Brush - Aperture
	996	996	996	Glove - Lamp
	17948	17948	15044	Belt - Takeup
	622	622	622	Lens - Projection
	Not std.	997	997	Cloth - Lens Polishing
	Equip.	998	998	Cleaner - Lens, Bottled
	691	691	694	Fuse - $1\frac{1}{2}$ Amp. (Pkg. of 5) (SLO-BLO Type for P-30 only)
	17772	17772	18807	Lamp - Exciter, 4 volt, 3/4 Amp.
	994	994	994	Oil - Proj., 1 oz.
	1639	1639	1639	Carton - Oil Bottle
	2020	2020	2020	Oil - Bulk
	1626	1626	1626	Bottle - Oil, 1 oz. capacity
			20473)	
			Note 2)	Projector Unit in Case Assem.
			16988	Tag - Tilt Lock Instruction
			20597	Cradle Assem. - Proj. Tilt
			20596	Cradle Sub. Assem. - Tilt
			13485	Rail - Tilt Cradle
			13486	Support - Tilt Spring
			13487	Support - Tilt Anchor
			13488	Plate - Projector Front Wear
			13489	Plate - Projector Rear Wear
			13878-A	Pivot - Projector Tilt
			20593	Anchor Assem. - Tilt
			13484	Yoke - Tilt Anchor
			13880	Anchor - Projector Tilt
			14309	Screw - Bd. Hd. #10-32 x 7/8

Reference	Premier-10 Part Number	Premier-20 Part Number	Premier-30 Part Number	DESCRIPTION 1 2 3 4 5 6 7 8 9
			14114	Washer - Plain
			14768	Washer - Lock #10 Int.
			14239	Nut - Hex #10-32
			20589	Spring Assem. - Tilt
			14308	Rivet - Solid Rd. Hd. 1/8 x 3/8
			14309	Screw - Bd. Hd. #10-32 x 7/8
			14114	Washer - Plain
			14768	Washer - Lock #10 Int.
			1454	Nut - Hex #10-32
			13878	Pivot Assem. - Projector Tilt
			14309	Screw - Bd. Hd. #10-32 x 7/8
			14114	Washer - Plain
			14768	Washer - Lock #10 Int.
			1454	Nut - Hex #10-32
			13451	Plate - Proj. Case Wear Front
			1447	Screw - Wood Rd. Hd. #8-x 1-1/4"
			14310	Screw - Rd. Hd. #8-32 x 2"
			14114	Washer - Plain
			14849	Washer - Lock #8 Int.
			1453	Nut - Hex #8-32
			13481	Plate - Proj. Case Wear Rear
			14311	Screw - Rd. Hd. #8-32 x 1-3/4"
			14114	Washer - Plain
			14849	Washer - Lock #8 Int.
			1453	Nut - Hex #8-32
			16992	Instruction Sheet - Case Closure
			18625	Nameplate - Case
			14140	Screwnail - #15 x 3/8
			16960	Case - Projector
			18836	Cushion - Projector Shock
	16608			Case - Projector (Black)
	16645	16645		Case - Projector (Luggage Type)
	13615	13615		Plate - Projector Case Wear
	16697	16697		Handle - Projector Case
	16698	16698		Loop - Projector Case Handle
	16665	16665		Bolt - Proj. Case Cover Latch

Reference	Premier-10 Part Number	Premier-20 Part Number	Premier-30 Part Number	DESCRIPTION
	16591	16591		Nut - Proj. Case Bottom Bumper
	16590	16590		Bumper - Proj. Case Bottom
	16592	16592		Bumper - Proj. Case Upper
			20594	Latch Assem. - Projector Shipping
			16633	Washer - Spring
			14562	Washer - Lock #1/4" Int.
			121360	Screw - Latch Pivot
			16999-1	Knob - Shipping Latch
			121359	Screw - Latch Anchor
			14838	Washer - Plain
			14656	Washer - Lock 5/16" Int.
			14317	Washer - Plain
			14318	Nut - Hex 5/16-24
			12865	Screw - Tilt Bar Pivot
			13879	Hanger - Projector Tilt
			14314	Pin - Grooved, 1/8 x 3/8" Type 4
			14849	Washer - Lock #8 Int.
			14870	Screw - Bd. Hd. #8-32 x 3/8"
	19810	19786	20450	Projector Assembly - Premier
1B-19	11602-1	11602-2	11602-2	Cover - Lamphouse
	1681	16720	16720	Screw - Cover
			15038	Ring - Retaining
	1595-115	1595-115	1595-115	Lamp - Projection 750 Watt
	17772	17772	18807	Lamp - Exciter, 4 volt 3/4 amp.
	17572	17572	18812	Cell - Photo-electric
1A-10	13039	13574	13574	Cover - Governor
1A-9	1491-SB	14746	14746	Screw - Bd. Hd. #6-32 x 3/16"
			18835	Insulator - A.C. Line
			13056	Bracket
			14703	Washer - Lock #6 Int.
			14519	Screw - Rd. Hd. #6-32 x 1/4"
			14849	Washer - Lock #8 Int.
			14558	Screw - Rd. Hd. #8-32 x 1/4"
1B-14	17845	16724	16724	Knob - Tilt
			13475	Strike - Tilt Spring
17B	19950	19454	20448	Tilt Assembly - Projector
17B-4	12927	12927	12927	Collar - Tilt Screw

Reference	Premier-10 Part Number	Premier-20 Part Number	Premier-30 Part Number	DESCRIPTION
17B-17	1404	1404	14139	Screw - Set
17B-6	13942	13942	13942	Key - Tilt Leg Pivot
17B-5	12924	12924	12924	Pivot - Tilt Leg
17B-8	19951-L	19459	19459	Leg Assem. - L.H. Tilt
17B-7	19951-R	19474	19474	Leg Assem. - R.H. Tilt
17B-10	12922-L	12922-L	12922-L	Nut - L.H. Tilt
17B-9	12922-R	12922-R	12922-R	Nut - R.H. Tilt
17B-11	12929	12929	12929	Screw - Tilt
17B-12	13931	13585	13585	Shroud - Tilt
17B-3,15	19958	19460		Bar Assem. - Tilt
17B-3	17729	16723		Foot - Tilt Bar
17B-15	13956	13584		Bar - Tilt
17B-2	12928	12092		Screw - Tilt Bar Pivot
17B-16	13119	13119		Washer - Tilt Bar Pivot Spring
17B-1	1454	1454		Nut - Tilt Bar Pivot
17B-14	12923	12923	12901	Stop - Tilt Leg
	14563	14563	14563	Screw - Oval Hd. #8-32 x 3/8"
			121361	Sleeve - Latch Pivot Screw
			16523	Washer - Lock 3/8" Ext.
			14318	Nut - Hex 5/16"-24
9A-1			13446	Guard - Flywheel
9A-2	(See Amp.	(See Amp.	14710	Screw - Bd. Hd. #4-40 x 3/16"
	(Assem.	(Assem.	17830	Knob - Control
9A-6	See Sd. Hd.	See Sd. Hd.	11678-1	Flywheel - Sound Drum
9A-7			14151	Washer - Sound Drum Bearing
9A-5			12880	Nut - Flywheel Clamp
9A-4			1642	Washer - Plain
9A-3			14127	Screw - Phillips Truss Hd. #5-40 x 1/4"
			13447	Shield - P.E.C.
12-			20475	Amplifier Assem. - Premier-30
			20647	Cover Assem. - Amplifier Housing
			1752	Washer - Plain
			12243	Spacer
			18529	Grommet
			14189	Screw - Phillips Bd. Hd. #6-32 x 5/8"
			14117	Nut - Speed
			14996	Screw - Sheet Met. Phillips Bd. Hd. #4- x 1/4"
			18714	Shield - Tube

Reference	Premier-10 Part Number	Premier-20 Part Number	Premier-30 Part Number	DESCRIPTION
			17701	Tube - 5Z4
			17788	Tube - 6V6
			18497	Tube - 12AX7
			18797	Tube - #5879
			18796	Fuse - 3AG Glass, 1½ Amp. (Slo-Blo)
			18195	Lamp - Miniature
			20466	Housing Assem. - P.E.C. & Exc. Lamp
			18850	Cable - P.E.C. Shielded
			19144	Sleeve Assem. - Exc. Lamp Socket
			17593	Grommet - Rubber
			18259	Eyelet - Brass
			16944	Screw - Cover
			15038	Ring - Retaining
			18656	Clamp - Cable
			1752	Washer - Plain
			14153	Screw - Phillips - Phillips Bd. Hd. #6-32 x 1/2"
			17634	Grommet - Rubber
			20493	Panel Assem. - Potentiometer
			18833	Socket - Panel Lamp
			14187	Screw - Phillips Sheet Met. Bd. Hd. #8 x 1/4"
			18821	Control - Tone
			14854	Nut - 3/8" Washer Type
			18822	Control Mic. Volume
			14854	Nut - 3/8" Washer type
			18823	Control - Proj. volume
			14854	Nut - 3/8" Washer type
			13888	Panel - Potentiometer
			14773	Screw - Sheet Met. Phillips Bd. Hd. #6 x 1/4"
			20494	Board Assem. - Terminal
			17782	Capacitor - .01 mfd. 400 V. Paper
			18484	Capacitor - .05 mfd. 150 V. Paper
			18487	Capacitor - .01 mfd. 400 V. Ceramic
			18580	Capacitor - .02 mfd. 150 V. Paper
			18585	Capacitor - .1 mfd. 150 V. Paper
			18664	Capacitor - .1 mfd. 400 V. Paper
			17557	Resistor - 150 K ohm 1/2 W.
			17957	Resistor - 68 K ohm 1/2 W.
			18465	Resistor - 2.2 meg. 1/2 W.
			18466	Resistor - 3300 ohm 1/2 W.

Reference	Premier-10 Part Number	Premier-20 Part Number	Premier-30 Part Number	DESCRIPTION 1 2 3 4 5 6 7 8 9
			18467	Resistor - 560 K ohm 1/2 W.
			18471	Resistor - 100 K ohm 1/2 W.
			18476	Resistor - 270 ohm 1/2 W.
			18582	Resistor - 2700 ohm 1/2 W.
			18584	Resistor - 1.0 meg. 1/2 W.
			18692	Resistor - 33 K ohm 1/2 W.
			18729	Resistor - 390 K ohm 1/2 W.
			18813	Resistor - 1.2 meg. 1/2 W.
			18818	Resistor - 3.9 meg. 1/2 W.
			18839	Board - Terminal
			14773	Screw - Sheet Met. Phillips Bd. Hd. #6 x 1/4"
			20492	Platform Assem. - Amplifier Tube
			18546	Tubing - #20 Insulation
			18852	Capacitor - .0005 mfd. 500 V. Mica
			18484	Capacitor - .05 mfd. 150 V. Paper
			18486	Capacitor - 25 mfd. 15 V. Electrolytic
			18487	Capacitor - .01 mfd. 400 V. Ceramic
			18828	Capacitor - 20 x 20 mfd. 350 V. Electrolytic
			17811	Resistor - 1500 ohm 1/2 watt
			18464	Resistor - 5.6 meg. 1/2 W.
			18465	Resistor - 2.2 meg. 1/2 W.
			18470	Resistor - 5600 ohm 1/2 W.
			18472	Resistor - 2200 ohm 1/2 W.
			18474	Resistor - 470 K ohm 1/2 W.
			18729	Resistor - 390 K ohm 1/2 W.
			18814	Resistor - 1200 ohm 1/2 W.
			18815	Resistor - 1800 ohm 1/2 W.
			18816	Resistor - 120 K ohm 1/2 W.
			18831	Resistor - 20 ohm 5 watt wire wound
			18817	Resistor - 170 ohm 5 watt wire wound
			1474	Rivet - Tub. oval hd. 1/8 x 1/8"
			18523	Socket - Tube 9 pin
			18526	Clamp - Tube
			1475	Rivet - Tub. Truss Hd. .085 x 1/8
			14978	Eyelet - Brass

Reference	Premier-10 Part Number	Premier-20 Part Number	Premier-30 Part Number	DESCRIPTION
			18523	Socket - Tube 9 pin
			18706	Base - Miniature Socket Shield
			1475	Rivet - Tub. Truss hd. .085 x 1/8"
			18824	Socket - Octal
			1474	Rivet - Tub. Oval Hd. 1/8 x 1/8"
			13721	Bracket - Terminal Board Mtg.
			1474	Rivet - Tub. Oval hd. 1/8 x 1/8"
			18834	Mounting Plate - Capacitor
			1474	Rivet - Tub. Oval Hd. 1/8 x 1/8"
			1767	Eyelet - Brass
			13896	Platform - Tube
			1752	Washer - Plain
			12243	Spacer
			18529	Grommet
			14185	Screw-Phillips Sheet Met. Bd. Hd. #6 x 1/2"
			20495	Chassis Assem. - Amplifier
			18546	Tubing - #20 Insulation
			18593	Terminal - Wire
			17782	Capacitor - .01 mfd. 400 V. Paper
			18829	Capacitor - 20 mfd. 450 V. 40 mfd. 25 V. Elec.
			18830	Capacitor - .0001 mfd. 600 V. Paper
			17811	Resistor - 1500 ohm 1/2 Watt
			18815	Resistor - 1800 ohm 1/2 Watt
			18819	Resistor - 56 K ohm 2 Watt
			18791	Transformer - Output
			14187	Screw - Sheet Met. Phillips Bd. Hd. #8 x 1/4"
			18790	Transformer - Power
			14187	Screw - Phillips Sheet Met. Bd. Hd. #8 x 1/4"
			18556	Post - Fuse Extractor
			18768	Jack - Speaker
			16523	Washer - Lock 3/8" Int.
			14854	Nut - 3/8" Washer type

Reference	Premier-10 Part Number	Premier-20 Part Number	Premier-30 Part Number	DESCRIPTION
12-T-2			18641	Coil - Oscillator
			1452	Nut - Hex #6-32
			18597	Jack
			18553	Washer - Fibre Plain
			18554	Washer - Fibre Extruded
12-P2			18527	Plug - Chassis, 6 prong
			14759	Rivet - Tub. Truss Hd. 1/8 x 5/32"
			18827	Resistor - 700 ohm 5 watt wire wound
			14759	Rivet - Tub. Truss hd. 1/8 x 5/32"
			18824	Socket - Tube, octal
			1474	Rivet - Tub. Oval Hd. 1/8 x 1/8"
			18834	Mounting Plate - Capacitor
			1474	Rivet - Tub. Oval Hd. 1/8 x 1/8"
			13890	Chassis - Amplifier
			14849	Washer - Lock #8
			14512	Screw - Rd. Hd. #8-32
			1436	Screw - Hdless. Set #10-32
1A-9	1491-SB	14746		Screw - Governor Cover
1A-10	13039	13574		Cover - Governor
	14584	14584		Screw - Tube Guard Mtg.
	1436	1436		Set Screw - Tube Guard Mtg.
	19657	19793		Guard Assembly - Tube
	14600	14600		Screw - Tube Guard Spring
	1778	1778		Retainer - Tube Guard Spring
	1572	1572		Spring - Tube Guard Spring
	13912	19794		Guard - Tube
	1772	1772		Shield - Proj. Lamp Terminal
	14512	14512		Screw - Amplifier Housing Cover
	14525	14525		Screw - Amplifier Housing Cover
	1679	1679		Lock Washer
	19699	19699		Cover Assembly - Amplifier Housing
1B-21	1428	1428		Screw - Threading Lamp to Amplifier Housing
1B-20	14563	14563		Screw - Operating Panel to Amplifier Housing
	14610	14610		Screw - Exciter Lamp Socket to Sound Head
	12540	12540		Spacer - Exciter Lamp Socket
	1413	1413		Screw - Amplifier Mtg.
	14704	14704		Screw - Amplifier Mtg.
	1679	1679		Lock Washer - Amplifier Mtg. Screw

Reference	Premier-10 Part Number	Premier-20 Part Number	Premier-30 Part Number	DESCRIPTION
	19650	19406		Amplifier Assembly (P-10-20)
	17830	17830		Knob - Control
	17718	17718		Switch - Projection Lamp
	18197	18197		Terminal - Electrical
	17714	17714		Switch - Motor
	18197	18197		Terminal - Electrical
	16656	16656		Panel - Operating
	13905	13905		Plate - Operating Panel
	1482	1482		Screw - Volume Control Shield Mtg.
	13951	13951		Shield - Volume Control
	1482	1482		Screw - P.E. Section Shield
	13612	13612		Shield - Photo Cell Section
	19589	19407		Cover Assem. - Ex. Lamp Socket
	18107	18107		Tube - 6J7
	17934	17934		Tube - 6J5
	17788	17788		Tube - 6V6
	17701	17701		Tube - 5Z4
	17579	17579		Fuse - Amplifier
	18195	18195		Lamp - Threading
	18195	18195		Lamp - Operating Panel
	19548	19548		Socket Assem. - Ex. Lamp
	19146-17	19146-17		Cord Assem. - Exciter Lamp
	17593	17593		Grommet - Exciter Lamp Socket
	1437	1437		Screw - Panel Lamp Socket Mtg.
	14545	14545		Washer - Panel Lamp Socket Mtg. Screw
	1687	1687		Washer - Lamp Socket Mtg. Screw Lock
	19935			Socket Assembly - Panel Lamp
	17840	18392-1		Socket - Panel Lamp
		18391		Resistor - Panel Lamp
	13146	13146		Clamp - Photo Cell Cable
	19659	19659		Cable Assembly - Photo Cell
	17567	17567		Socket - Photo Cell
	17597-26	17597-26		Cable - Photo Cell
	14536	14536		Set Screw - Photo Cell Socket
	17634	17634		Grommet - Photo Cell Cable
	17857	17857		Cable - Photo Cell

Reference	Premier-10 Part Number	Premier-20 Part Number	Premier-30 Part Number	DESCRIPTION
	17638-29	17638-29		Sleeve - Insulating
	17884-1	17884-1		Socket - Threading Lamp
	17555	17555		Resistor - 50,000 ohms 1/2 Watt
	14603	14603		Screw - Resistor Board Mtg.
	1679	1679		Lock Washer - Resistor Board Mtg. Screw
	1453	1453		Nut - Resistor Board Mtg. Screw
	1482	1482		Screw - Resistor Board Bracket
	13954	13954		Bracket - Resistor Board
	19655	19655		Board Assembly - Resistor
	17751	17751		Capacitor .05 mfd. 400 v.
	17514	17514		Capacitor .005 mfd. 300 v.
	17673	17673		Capacitor 15 mfd. 450 v.
	17784	17784		Capacitor .0005 mfd. 2000 v.
	18075	18075		Resistor 250,000 ohm 1/2 Watt
	18073	18073		Resistor 100,000 ohm 1/2 Watt
	18072	18072		Resistor 15,000 ohm 1/2 Watt
	17699	17699		Resistor 1,000 ohm 1 Watt
	17747	17747		Resistor 2,800 ohm 5 Watt
	17646-3	17646-3		Sleeve - Insulating
	19955	19955		Board Assem. - Resistor Terminal
	14625	14625		Screw - Resistor Board Mtg.
	19653	19653		Board Assembly - Resistor
	17751	17751		Capacitor .05 mfd. 400 v.
	17778	17778		Capacitor 4 mfd. 450 v.
	17779	17779		Capacitor 30 mfd. 50 v.
	17782	17782		Capacitor .01 mfd. 300 v.
	17783	17783		Capacitor .00017 mfd. 300 v.
	17784	17784		Capacitor .0005 mfd. 2000 v.
	17893	17893		Capacitor .05 mfd. 600 v.
	18172	18172		Capacitor 16 mfd. 25 v.

Reference	Premier-10 Part Number	Premier-20 Part Number	Premier-30 Part Number	DESCRIPTION 1 2 3 4 5 6 7 8 9
	17550	17550		Resistor 1200 ohm 1 W.
	17552	17552		Resistor 2000 ohm 1 W.
	17556	17556		Resistor 200,000 ohm 1/2 W.
	17558	17558		Resistor 1 Megohm 1/2 W.
	17748	17748		Resistor 15,000 ohm 10 W.
	17749	17749		Resistor 342 ohm 5 W.
	17556	17556		Resistor 200,000 ohm 1/2 W.
	17785	17785		Resistor 23,000 ohm 1 W.
	17786	17786		Resistor 100,000 ohm 1 W.
	17804	17804		Resistor 3000 ohm 1/2 W.
	17938	17938		Resistor 46,000 ohm 10 W.
	18075	18075		Resistor 250,000 ohm 1/2 W.
	19654	19654		Board Assem. Resistor Terminal
	14605	14605		Screw - Receptacle Housing Mtg.
	16519	16519		Nut - Receptacle Hsg. Mtg. Screw
	19652	19408		Housing Assem. - Receptacle
	19562	19562		Clip Assem. - Grid
	17843	17843		Clip - Grid
	17514	17514		Capacitor .005 mfd. 300 v.
	17751	17751		Capacitor .05 mfd. 400 v.
	17807	17807		Resistor 3.5 megohm 1/2 W.
	17814	17814		Resistor 1/2 megohm 1/2 W.
	18125	18125		Cord - Converter Switch
	19090	19409		Housing Sub-Assem. - Receptacle
	16535	16535		Washer - P.C. Control
	18069	18069		Control - Photo Cell
	16655	16712		Nameplate - Receptacle Hsg.
	16535	16535		Washer - Speaker Jack
	16658	16715		Nameplate - Speaker Jack
	16523	16523		Lock Washer - Speaker Jack
	18084	18084		Jack - Speaker
	16535	16535		Washer - Mic. Jack
	16657	16714		Nameplate - Mic. Jack

Reference	Premier-10 Part Number	Premier-20 Part Number	Premier-30 Part Number	DESCRIPTION
	16523	16523		Lock Washer - Mic. Jack
	18083	18083		Jack - Mic.
	1482	1482		Screw - Terminal Strip. Mtg.
	14541	14541		Lock Washer - Terminal Strip Screw
	17781	17781		Strip Terminal
	17833	17833		Post - Fuse Extractor
	17682	17682		Receptacle - Power Cord
	18317	18317		Terminal - Electrical
	1482	1482		Screw - Converter Receptacle
	18081	18081		Receptacle - Converter
	11917-1	11917-2		Housing - Receptacle
	19126	19126		Amplifier Sub-Assembly
	14527	14527		Screw - Oscillator
	1453	1453		Nut - Oscillator Coil Screw
	1679	1679		Lock Washer - Oscillator Coil Nut
	17739	17739		Spacer - Oscillator Coil
	19956	19956		Coil Assembly - Oscillator
	18387	18387		Coil - Oscillator
	18064	18064		Capacitor - Filter Pack
	1452	1452		Nut - Output Trans. Mtg.
	1678	1678		Lock Washer - Trans. Mtg.
	14525	14525		Screw - Transformer Mtg.
	18386	18386		Transformer - Output
	14525	14525		Screw - Driver Trans. Mtg.
	18388	18388		Transformer - Driver
	14525	14525		Screw - Power Trans. Mtg.
	18385	18385		Transformer - Power
	18385	18385		Transformer - Filament
	1445	1445		Screw - Operating Panel Bracket Mtg.
	14541	14541		Lock Washer - Operating Panel Bracket Screw

Reference	Premier-10 Part Number	Premier-20 Part Number	Premier-30 Part Number	DESCRIPTION
	14538	14538		Nut - Operating Panel Bracket Screw
	13949	13949		Bracket - Operating Panel
	16523	16523		Lock Washer - Mic. Control
	17763	17763		Control - Microphone Volume
	16523	16523		Lock Washer - Tone Control
	17762	17762		Control - Tone
	16523	16523		Lock Washer - Volume Control
	1571	1571		Washer - Lead
	17937	17937		Control - Projector Volume
	14577	14577		Screw - Tube Socket Assem. Mtg.
	1750	1750		Washer - Tube Socket Mtg. Screw
	17592	17592		Grommet - Tube Socket Mtg.
	14538	14538		Nut - Tube Socket Mtg. Screw
	1460	1460		Washer - Tube Socket Mtg. Screw
	19595	19595		Socket Assembly - 6J7 Tube
	17766	17766		Grommet - Rubber
	17765	17765		Socket - 6J7 Tube
	17593	17593		Washer - Tube Socket (as req.)
	17539	17539		Ring - Tube Socket Retaining
	17935	17935		Socket - 6J5 Tube
	17775	17775		Socket - 6V6 Tube
	17706	17706		Socket - 5Z4 Tube
	19643	19643		Chassis Assem. - Amplifier
8A & B, 9A&B	19862	19792	Note 3	Sound Unit Assem.
8B-24, 9B-1	16504	16504	16504	Optical System - Sound
8B-23, 9B-2	14611	14611	14611	Screw - Phillips Fil. Hd. #6-32 x 1/2"
8B-2, 9B-3	19518	19518	Note 4	Guideway - Upper Film
8B-1, 9B-5	1295	1295		Screw - Upper Guideway Mtg.
			14150	Screw - Bd. Hd. #4-40 x 5/16 Stl. N.P.
			20575	Follower Assem. - Sound Drum
9B-26			20598	Roller Assem. - Sound Head Film Guide
9B-27			20599	Pad Assem. - Sound Head Film Guide Roller
9B-28			16514	Washer - Plain
9B-29			1295	Screw - #4-36 x 3/16" Bd. Hd.
			1642	Washer - Plain
9B-6			14150	Screw - #4-40 x 5/16" Bd. Hd.

Reference	Premier-10 Part Number	Premier-20 Part Number	Premier-30 Part Number	DESCRIPTION
	19512	19795		Sound Drum Assembly
8B-4	12547	12547		Screw - Flywheel Retaining
8B-5	12504	12504		Flywheel - Sound Drum
8B-27	16534-10	16534-10		Washer - Flywheel Thrust
8B-7	16503	16503		Bearing - Sound Drum Shaft
8B-25	19893	19426		Bracket Assembly - Sound Drum
8B-6	19510	19510		Shaft Assembly - Sound Drum
8B-3, 8A-1	14571	14571		Screw - Sound Drum Bracket Mtg.
8A-11	19521	19521		Shield Assembly - Photo Cell
8A-10	1401	1401		Set Screw - Photo Cell Shield
1A-8	1681	16720		Screw - Exciter Lamp Cover
	11502-1	19275		Cover - Exciter Lamp Cover
9A-9, 9B-21			16935	Bearing - Ball
9A-8			12881	Washer - Sound Drum Bearing
9B-20			20480	Shaft Assem. - Sound Drum
			1457	Washer - Plain
8B-9, 9B-7	19515	19515	Note 5	Guideway Assem. - Lower Film
8B-10	16509	16509	16509	Spring - Guideway Aligning
8A-17, 9A-11	14528	14528	12879	Screw - Guidway Aligning
8A-20, 9A-10	1403	1403	14979	Screw - Set
8A-18	1642	1642		Washer - Lower Guideway Aligning
8B-12, 9B-8	19508	19508	19508	Roller Assem. - Film
8B-14	16514	16514	16514	Washer - Plain
8B-15	16508	16508	16508	Spring - Film Roller Aligning
8B-13	1309-15	1309-15	1309-15	Washer - Plain
	1309-10	1309-10	1309-10	Washer - Plain (as req'd.)
8B-11, 9B-9	1295	1295	1295	Screw - Bd. Hd. #4-36 x 3/16"
	19517	19456	19456	Equalizer Assem. - Film Tension
8A-5, 9B-11	12637	12637	12637	Roller - Film Guide
8A-9	1309-15	1309-15	1309-15	Washer - Plain
8A-8	1295	1295	1295	Screw - Bd. Hd. #4-36 x 3/16"
8A-14, 9B-10	19516	19455	19455	Arm Assem. - Film Tension Equalizer
8A-16	16507	16507	16507	Spring - Film Tension Equalizer
8A-7, 9B-12	12612	12089	12091	Pivot - Film Tension Equalizer
8B-22, 9B-19	13523	13523	13523	Catch - Pressure Roller Arm
8B-21	1230	1230	1230	Screw - Special Fil. Hd.

Reference	Premier-10 Part Number	Premier-20 Part Number	Premier-30 Part Number	DESCRIPTION
9B-24			13459	Baffle - Light
9B-25			14710	Screw - Bd. Hd. #4-40 x 3/16" Stl. Chr. Pl.
	19509	19458	20498	Arm Assem. - Pressure Roller
8B-20, 9B-16	19504	19504	19504	Roller Assem. - Pressure
8B-18, 9B-15	12512	12512	20332	Knob Assem. - Pressure Roller
			14744	Washer - Lock #4 - Int.
9B-17			14710	Screw - Bd. Hd. #4-40 x 3/16"
8B-19	1309-15	1309-15	16514	Washer - Plain
8B-26, 9B-14	19505	19457	20499	Arm - Sub. Assem. Pressure Roller
8B-17	16513	16513	16513	Spring - Pressure Roller Arm
8B-16, 9B-18	12646	12091	12091	Pivot - Pressure Roller Arm
9B-23			20491	Mirror Assem. - Sound Optic
9B-22			14321	Screw - Hdlss. Set Hex Socket #4-40 x 1/8"
	19639	19453		Guide Assem. - Takeup
8A-3	12609	12609		Stud-Takeup Guide Roller
8A-5	12637	12637		Roller - Takeup Film Guide
8A-6	12610	12610		Stud - Takeup Belt Guide Roller
8A-7	12536	12536		Roller - Takeup Belt Guide
8A-15	19638	19452		Bracket Assem. - Takeup Guide
8A-2	1450	1450		Nut - Takeup Guide Assem. Mtg.
8A-11	19521	19521		Shield Assem. - Photocell
8A-10	1401	1401		Screw - Set
8A-13	19827	19796	20477	Head - Sub. Assem. - Sound
	1687	1687	14768	Washer - Lock #10
9A-12	14510	14510	14628	Screw - Sound Head to Amp.
9A-13	14511	14511	12817	Stud - Sound Hd. Mtg.
	14545	14545	14976	Washer - Shim
	14545	14545		Washer - Sound Head Mounting Screw
	1687	1687		Washer - Lock
3A-20	14511	14511		Screw - Sound Head to Mech. Housing
	14510	14510		Screw - Sound Head to Amp. Housing
1A-1	17948	17948	15044	Belt - Takeup
3A-2	19520	19790	20465	Arm Assem. - Takeup Reel
3A-3	1288	1288	1288	Cap - Brake
	1512-A	1512-A	1512-A	Spring - Spindle Brake
	1294	1294	1294	Shoe - Brake
3A-4	19646	19646	19646	Shifter Assem. - Takeup Belt

Reference	Premier-10 Part Number	Premier-20 Part Number	Premier-30 Part Number	DESCRIPTION
3A-5	12602	12602	12602	Pulley - Takeup Loose
3B-6	19647	19647	19647	Spindle Assem. - Takeup Reel
3B-7	13521	13521	13521	Finger - Reel Lock
3B-8	12538	12538	12538	Pin - Reel Lock Finger
	1624	1624	1624	Ball - 5/32" Dia. Steel
	1515	1515	1515	Spring - Reel Lock
	1236	1236	1236	Washer - Plain (as req'd)
	16588-3	16588-3	16588-3	Washer - Plain (as req'd)
	16588-5	16588-5	16588-5	Washer - Plain
	16588-10	16588-10	16588-10	Washer - Plain
	1335	1335	1335	Washer - Fibre
3B-9	1233	1233	1233	Nut - Cap #8-32
	19937	19791	20324	Arm - Sub. Assem. Takeup Reel
3B-10	13070	13581	13742	(Retainer - Takeup Belt
			14541	(Washer - Lock
3A-9	1435	1435	14934	Note 6 (Screw - Retainer
	13032	13590		(Washer - Takeup Belt Retainer
	1299-1	1299-1	1299	Bushing - Takeup Reel Arm
	12639	12090		Spacer - Takeup Belt Retainer
	14632	14756		Nut - Belt Retainer Screw
3B-11	1272	1272	14987	Nut - Cap. 1/4 - 28
	1332	1332	1332	Washer - Reel Arm Stud
	1331	1331	1331	Washer - Reel Arm Tension
	12640	12640	12640	Stud - Reel Arm
1A-6	17946	17946	1763	Note 7 Belt - Feed
1A-7	17947	17947	15029	Belt - Rewind
3B-14	19109	19788	20464	Arm Assem. - Feed Reel
3B-15			1288	Cap - Brake
3B-16	13693	13693	13693	Guard - Belt
			1460	Washer - Plain
	1295	1295	1295	Screw - Bd. Hd. #4 - 36 x 3/16"
3B-17	19658	19658	19658	Spindle Assem. - Feed Reel
3B-7	13521	13521	13521	Finger - Reel Lock
3B-8	12538	12538	12538	Pin - Reel Lock Finger
	1624	1624	1624	Ball - 5/32" Dia. Steel
	1515	1515	1515	Spring - Reel Lock
	19108	19789	20326	Arm Sub Assem. - Feed Reel
	1243	1243	1243	Bushing - Oilite
	12599	12599		Spacer - Feed Spindle Bearing

Reference	Premier-10 Part Number	Premier-20 Part Number	Premier-30 Part Number	DESCRIPTION
3B-11	12642	12642	12642	Nut - Reel Arm Stud
	1332	1332	1332	Washer - Reel Arm Stud
	1331	1331	1331	Washer - Reel Arm Tension
	12640	12640	12640	Stud - Reel Arm
			20478	Bracket Assem. - Takeup Reel Arm
			12637	Roller - Film Guide
			12536	Roller - Takeup Belt Guide
			12609	Stud - Film Guide Roller
			12536	Roller - Takeup Belt Guide
			12610	Stud - Takeup Belt Guide Roller
3A-13	12510	12510	12510	(Knob - Reel Arm Lock
	16511	16511	16511	Note 8 (Spring - Reel Arm Lock
	12509	12509	12509	(Pin - Reel Arm Lock
			11676-1	Bracket - Takeup Reel Arm
			14145	Screw - Cap Socket Hd. 1/4 - 28 x 1/2"
			14146	Screw - Phillips Oval Hd. 1/4 - 28 x 5/8"
1B-18	19804	19797	20644	Cover Assem. - Front
	1615-C	1615-C	1615-C	Lens - Front Condenser
	1615-B	1615-B	1615-B	Lens - Rear Condenser
	1505	1505	1505	Spring - Condenser Lens Spacing
	1617	1617	1617	Reflector
	1375	1375	13458	Shield - Front Inner Heat
	12549	12549	12549	Spacer - Front Heat Shield
	1642	1642	1642	Washer - Burr
	1464	1464	1464	Screw - Sheet Metal Rd. Hd. #4 x 1/2"
	19993	19993	19993	Holder Assem. - Condenser Lens
	1347	1347	13457	Shield Assem. - Front Heat
	14604	14604	14604	Screw - Fil. Hd. #8-32 x 1/4"
	19802	19799		Cover Sub-Assem. - Front
			18625	Nameplate - Front Cover
			1479	Screw - Drive Rd. Hd. #0 x 3/16"
			16747	Label - Underwriters
			1465	Screw - Drive Rd. Hd. #00 x 1/8"
	1291	1291	1291	Collar - Drive Clutch Release Knob
	1685	1685	1685	Knob - Drive Clutch Release
			11601-4	Cover - Front
	1681	16720	16720	Screw - Cover
			15038	Ring - Retaining

Reference	Premier-10 Part Number	Premier-20 Part Number	Premier-30 Part Number	DESCRIPTION 1 2 3 4 5 6 7 8 9
3A-18	16606	16722	16722	Knob - Shutter
3B-19	11952-2	11952-7	11952-7	Cover - Rear
3A-19	1421	1421	1421	Screw - Fil. Hd. #6-32 x 5/8" Brass. Chrome Plate
4-1	19439	19439	19439	Clutch Assem. - Drive
4-2	12989	12989	12989	Screw - Set. Drive Clutch
4-3	1313-32	1313-32	1313-32	Washer - Plain
4-4	13609	13609	13609	Shield - Shuttle
4-5	14519	14519	14519	Screw - Rd. Hd. #6-32 x 1/4" Stl.
4-6	1986	1986	1986	Bearing Assem. - Vertical Cam Shaft
4-7	1769	1769	1769	Plug - Felt
4-8			14703	Washer - Lock #6 Int.
4-9	1433	1433	1433	Screw - Rd. Hd. #6-32 x 1/2 Stl.
4-10	19193	19193	19193	Shuttle Assem.
4-11	1212	1212	1212	Nut - Vertical Cam Shoulder
4-12	1292	1292	1292	Washer - Vertical Cam Shoulder
4-13	1677	1677	1677	Washer - Lateral Cam
4-15	16644	16644	16644	Pad - Shuttle Oil
	1346	1346		Shield Assem. - Rear Heat
4-16	1374	1374	13456	Shield - Rear Heat
	1642	1642	1642	Washer - Burr
	1464	1464	1464	Screw - Sheet Met. Rd. Hd #4 x 1/2"
	13030	13030	13030	Stripper - Film
	1295	1295	14621	Screw - Stripper Mtg.
14A-1	19066	19773	20341	Shoe Assem. - Feed Sprocket
14A-2	11922-1	11922-2	16830	Cover - Feed Sprocket Shoe
14A-3	14612	14528	14990	Screw - Fil. Hd. #4-36 x 1/4"
14A-4	12616	12616	12616	Roller - Sprocket Shoe Guide
14A-5	19064	19774	19774	Follower Assem. - Feed Sprocket
	1520	1520	1520	Spring - Feed Sprocket Follower
	19062	19775	20343	Shoe Sub-Assem. - Feed Sprocket
	1405	1405	14990	Screw - Fil. Hd.
14A-6	1427	1427	1427	Screw - Fil. Hd.
	13037			Gib - Projection Lens Holder
	1367			Spring - Projection Lens Holder
14-B	19669			Holder Assembly - Projection Lens
	14593			Screw - Follower Yoke Striker

Reference	Premier-10 Part Number	Premier-20 Part Number	Premier-30 Part Number	DESCRIPTION
	13022			Striker - Follower Yoke
	19152			Shoe Assembly - Pressure
14B-1	1230			Screw - Pressure Shoe Mtg. Plate
	19154			Plate Assembly - Pressure Shoe Mtg.
14B-6	1519			Spring - Pressure Shoe Booster
14B-4	19153			Shoe Sub-Assembly - Pressure
14B-2	1954			Holder Sub-Assembly - Proj. Lens
	12548			Screw Projection Lens Lock
14B-7	1411			Screw - Lens Detent. Spring
14B-8	1952			Spring Assem. - Lens Detent.
	1159-3			Holder - Projection Lens
	1366			Shoe - Gate Lever
	1991			Lever Assembly - Gate
	1409			Screw - Gate Lever Pivot Set
	1276			Pivot - Gate Lever Excentric
		19897	19897	Mount Assem. - Projection Lens
14A-8		19768	19768	Shoe Assem. - Pressure
		1573	1573	Spring - Pressure Shoe Upper
		1569	1569	Spring - Pressure Shoe Lower
14A-9		1230	1230	Screw - Pressure Shoe Mount
14A-10		13571	13571	Plate - Pressure Shoe Upper Adjusting
		13589	13589	Washer - Spring
		14711	14711	Screw - Bd. Hd. #2-56 x 1/8" Stl. Chr. Pl.
		13572	13572	Plate - Pressure Shoe Lower Adjust.
		13589	13589	Washer - Spring
		14711	14711	Screw - Bd. Hd. #2-56 x 1/8"
		19766	19766	Carrier Assem. - Pressure Shoe
14A-12		13564	13564	Tongue - Gate Adjusting
14A-13		13634	13634	Gib - Pressure Shoe Carrier
14A-14		14740	14740	Screw - Rd. Hd. #4-40 x 1/8"
14A-15		13636	13636	Hanger - Pressure Shoe

Reference	Premier-10 Part Number	Premier-20 Part Number	Premier-30 Part Number	DESCRIPTION
14A-16		1564	1564	Spring - Hanger Return
1B-5		13633	13633	Lever - Retractor
14A-17		19888	19888	Shaft Assem. - Retractor
		14744	14744	Washer - Lock #4 Internal
		14710	14710	Screw - Bd. Hd. #4-40 x 3/16"
14A-11		11606-1	11606-1	Carrier - Pressure Shoe
14A-18		12656	12656	Pivot - Pressure Shoe
14A-7		19769	19769	Holder Sub. Assem. Projection Lens
		13630	13630	Lever - Projection Lens Clamp
		12654	12654	Pivot - Lens Clamp Lever
14A-19		13631	13631	Latch - Pressure Shoe Carrier
		1422	1422	Screw - Rd. Hd. #3-48 x 1/8"
		13629	13629	Clamp - Projection Lens
		1475	1475	Rivet - Tub. Oval Hd. 3/32 x 1/8"
		1678	1678	Washer - Lock #6 External
		1432	1432	Screw - Rd. Hd. #6-32 x 3/8"
	13030	13030	13030-1	Stripper - T.U. Sprocket Film
	1295	1295	14530	Screw - Flat Hd. #4-36 x 1/4" Brass. Chr. Pl.
14A-20	19067	19770	20643	Shoe Assem. - Takeup Sprocket
	11923-1	11923-2	16831	Cover - Takeup Sprocket Shoe
	14612	14528	14990	Screw - Fil. Hd. #4-36 x 1/4"
	12616	12616	12616	Roller - Sprocket Shoe Guide
14A-21	19065	19771	19771	Follower Assem. - T.U. Sprocket
	1521	1521	1521	Spring - T.U. Sprocket Follower
	19063	19772	20344-1	Shoe Sub-Assem. Takeup Sprocket
	1405	1405	14990	Screw - Fil. Hd. #4-36 x 1/4" Stl. Lt. Stat. Br.
	1427	1427	1427	Screw - Fil. Hd. #4-36 x 1/2" Stl. Chrome
1C-3	19198	19198	20432	Plate Assem. Aperture
	1357	1357	1357	Spring - Film Edge
	1228	1228	1228	Washer - Film Edge Spring
	14586	14586	14586	Screw. Fil. Hd. #2-56 x 1/8"
	1295	1295	14621	Screw - Aperture Plate Ret.
5A-1, 5B-1	19684	19684	19684	Clutch Assem. - Rewind
	1530	1530	1530	Ring - Rewind Clutch Snap
5A-2, 5B-2	12604	12604	12604	Collar - Large Intermed. Sprocket Gear
5A-3, 5B-3	1298	1298	1298	Screw - Lge. Intermed. Sprocket Gear
	14742	14742	14742	Washer - Plain
5A-4, 5B-4	19830	19830	20451	Gear Assem. - Large Intermediate

Reference	Premier-10 Part Number	Premier-20 Part Number	Premier-30 Part Number	DESCRIPTION
5B-5	1262	1262	1262	Screw - Safety Shutter Stop
5A-6, 5B-6	1504	1504	1504	Spring - Safety Shutter Stop Link
5A-7, 5B-7	13043	13043	13043	Link - Safety Shutter Stop
4-17	1994-3	1994-3	1994-3	Shutter Assem. - Safety
4-18	1208	1208	1208	Screw - Safety Shutter Retaining
	14541	14541	14541	Washer - Lock #4 External
	1309-10	1309-10	1309-10	Washer - Plain, Fibre
5A-8, 5B-8	19182	19182	19182	Shaft Assem. - Safety Shutter
	1309-15	1309-15	1309-15	Washer - Plain, Fibre
4-19	19069	19069	20459	Shutter Assem. - Interrupter
	1337	1337	1337	Disc. - Interrupter Shutter Drive
4-20	14567	14567	14567	Screw - Bd. Hd. #4-36 x 1/8"
	13964	13964	13882	Shutter - Interrupter
	1363	1363	1363	Washer - Interrupter Shutter Shaft
	1651	1651	1651	Washer - Thrust, Fibre
	1209	1209	1209	Nut - Interrupter Shutter
5A-9, 5B-9	19021	19021	19021	Shaft Assem. - Interrupter Shutter
5B-10	19676	19676	20453	Shaft Assem. - Lateral Cam
5A-11, 5B-11	1553	1553	1553	Pin - Taper #5/0 x 7/16" Ground
	1313-10	1313-10	1313-10	Washer - Plain
4-14	1290	1290	1290	Nut - Lateral Cam
15-9, 10	19139	19139	20580	Note 9 Cam Assem. Matched Lateral
	1313-3	1313-3	1313-3	Washer - Plain)
	1313-4	1313-4	1313-4	Washer - Plain) as req'd.
	1313-10	1313-10	1313-10	Washer - Plain)
5A-12, 5B-12	19622	19622	20455	Shaft Assem. Vertical Cam
5B-13	1554	1554	1553	Pin - Taper #5/0 x 7/16" ground
	1313-3	1313-3	1313-3	Washer - Plain)
	1313-4	1313-4	1313-4	Washer - Plain) as req'd.
	1313-10	1313-10	1313-10	Washer - Plain)
	1313-10	1313-10	1313-10	Washer - Plain
	19813	19401	20468	Housing Assem. - Fan
	19811	19811	20484	Reverser Assem. - Fan Scroll
	1540	1540	1540	Key - Fan Scroll Reverser
			13450	Bracket - Amplifier Mtg.
			1678	Washer - Lock #6 Ext.

Reference	Premier-10 Part Number	Premier-20 Part Number	Premier-30 Part Number	DESCRIPTION
			14147	Screw - Phillips Bd. Hd. #6-32 x 3/8"
			14916	Nut - Hex #6-32
	19812	19402	20467	Housing - Sub. Assem. Fan
			13449	Plate - Fan Housing
			14113	Screw - Phillips Bd. Hd. #4-40 x 1/8"
	14584	14584	14584	Screw - Fil. Hd. #8-32 x 1-1/2"
	14652	14652	14652	Screw - Fil. Hd. #8-32 x 7/8"
	19808	19400	20461	Housing Assem. - Amplifier
6-5	19036	19036	20482	Fan Assem. - Cooling
6-6			14123	Screw, Hdlss. Hex. Socket Set #10-32 x 1/4"
	16654	16710	16945	Nameplate - Main (Available only upon certification of loss of serial number)
	14559	14559	14304	Screw - Drive Rd. Hd. #0 x 1/8"
			13454	Vent - Amplifier Housing
			14559	Screw - Sheet Met. Rd. Hd. #2 x 3/16"
			13450	Bracket - Amplifier Mtg.
			1678	Washer - Lock #6 Ext.
			14147	Screw - Phillips Bd. Hd. #6-32 x 3/8"
			14916	Nut - Hex #6-32
			18195	Lamp - Miniature
			20483	Harness Assem. - Projector
			16953	Clamp - Cable
			14932	Screw - Sheet Met. Hd. #8 x 1/2 Type A
			18446	Tubing - #0 Insulation
			18528	Connector - Female, 6-contact
			18843	Cord - Convertor
			18798	Receptacle - Female
			18800-1	Socket - Threading Lamp
			17638	Tubing - #4 Insulation
			1613-A	Cover - Terminal
			18846	Tubing - 5/8" I.D. Ins. 6" lg.
			18783	Tubing - 5/8" I.D. Ins. 7" lg.
			18825	Terminal - Electrical
			18826	Terminal - Electrical
			20479	Plate Assem. - Lamp Terminal

Reference	Premier-10 Part Number	Premier-20 Part Number	Premier-30 Part Number	DESCRIPTION
			18663	Terminal - Wire
			17631	Tubing - #14 Insulation
			18832	Capacitor - Line Filter
			17733	Terminal Strip - 4 lug Barrier
			14570	Screw - She. Met. #6 x 3/8 Type Z
			18801	Switch - Motor D.P.S.T.
			18802	Switch - Lamp S.P.S.T.
			16985	Panel - Operating
			13893	Plate - Operating Panel
			20469	Housing Assem. - Receptacle
			18811	Nameplate - Receptacle Hsg.
			1475	Rivet - Tub. Truss Hd. .085 x 1/8"
			17682	Receptacle - Electrical
			1428	Screw - Oval Hd. #4-36 x 3/8"
			14563	Screw - Oval Hd. #8-32 x 3/8"
			14558	Screw - Rd. Hd. #8-32 x 1/4"
			14977	Screw - Bd. Hd. #6-32 x 1/2"
			16518	Speed Nut - #6-32 Flat Type
			14849	Washer - Lock #8 Int.
			14703	Washer - Lock #6 Int.
			14519	Screw - Rd. Hd. #6-32 x 1/4"
17A	19629	19403	20462	Mount Assem. - Projection Lamp
17A-12	18034	18034	18826	Terminal - Wire
			18662	Terminal - Wire
17A-3	1611	1611	1611	Socket - Projection Lamp
17A-13	14559	14559	14559	Screw - Sh. Met. Rd. Hd. #2 x 3/16"
	19628	19404	19404	Bracket Assem. - Proj. Lamp
17A-6	13110	13110	13110	Seat - Lamp Socket
17A-2	13112	13112	13112	Strap - Proj. Lamp Socket
17A-1	14571	14571	14571	Screw - Fil. Hd. #8-32 x 3/8"
17A-11	1424	1424	1424	Nut - Square #8-32
17A-7	13163	13163	13163	Plate - Vert. Lamp Adj.
17A-4	12107	12107	12107	Screw - Socket Seat Shoulder
17A-5	13111	13111	13111	Washer - Spring
17A-8	12975	12975	12975	Screw - Horizontal Lamp Adj.

Reference	Premier-10 Part Number	Premier-20 Part Number	Premier-30 Part Number	DESCRIPTION
17A-9	19627	19405	19405	Bracket - Sub. Assem. Proj. Lamp
	1405	1405	14990	Screw - Fil. Hd. #4-36 x 1/4"
	1993	1993	20221	Handle Assem. - Carrying
	1451	1451	1451	Nut - Hex #8-32
	1679	1679	1679	Washer - Lock #8 Ext.
			14852	Screw - Fil. Hd. #8-32 x 3/8"
	16659	16716	16716	Nameplate - Motor Control
	16532	16532	16532	Washer - Plain
7A	Note 10	19411	20449	Motor Unit Assembly
7A-1	18134	18134	18793	Governor - Electrical
7A-2	1707	1707	1707	Brush - Assem. Governor
7A-3	18348	18348	18348	Belt - Drive
7A-4	19665	19475	19475	Idler Assembly
7A-5	1579	1579	15010	Spring - Idler
7A-6		14795	14795	Nut - Self-locking #10-32
7A-7		1677	1677	Washer - Plain
7A-8	12960	12095	12095	Stud - Idler
7A-9	12085	12085	12085	Pulley - Motor
7A-10	1401	1401	1401	Screw - Hdlss. Set #8-32 x 3/16"
7A-11	17713	17713	18454	Switch - Reverse
7A-12	17716	17716	18455	Switch - Speed
			17626	Tubing - #2 Insulation
			17631	Tubing - #14 Insulation
7A-13	17767	17767	17767	Capacitor - Governor
	1482	1482	1482	Screw - Sheet Met. Rd. Hd. #4 x 3/16"
			17631	Tubing - #14 Ins. (2 pcs. 5")
7A-14	18000	18383	18383	Resistor - Governor
			14703	Washer - Lock #6 Int.
			1693	Washer - Plain
			1435	Screw - Rd. Hd. #6-32 x 5/8"
			1452	Nut - Hex #6-32
	19717	19410		Bracket Assem. - Capacitor
			13892	Bracket - Capacitor
			14519	Screw - Rd. Hd. #6-32 x 1/4"
	17111	17111	18663	Terminal - Electrical
7B	18336	18347	18792	Motor Assembly

Reference	Premier-10 Part Number	Premier-20 Part Number	Premier-30 Part Number	DESCRIPTION
7B-5	SM-3003	18353	SM-2101	Armature
7B-10	SM-4000	18354	18354	Field
7B-6	SM-3001	SM-3001	SM-3001	Bearing
7B-1	SM-1016	SM-1016	SM-1016	Cap - Brush
7B-2	SM-1019	16729	16729	Brush Assembly
7B-3	1453	1453	1453	Nut - Motor Cap Screw
7B-11	14661	14661	14661	Screw - Motor
7B-12	1426	1426	1426	Set Screw - Brush Holder
7B-13	SM-1002	SM-1002	SM-1002	Holder - Brush, Left Hand
7B-17	SM-1009	SM-1009	SM-1003	Holder - Brush, Right Hand
7B-4	SM-1015	SM-1015	SM-1015	Spring - Bearing Loading
	SM-1001	11634-1	11634-1	Housing - Motor
	SM-2001	11635-1	11635-1	Cap - Motor Housing
6-3	1752	1752	1752	Washer - Plain
	17871-1	17871-1	17871	Bushing - Motor Mounting
	1236	1236	1236	Washer - Plain
6-2	12965	12965	12965	Nut - Sleeve
	12682	12682	12682	Stud - Motor Mounting
	12645	12645	12645	Stud - Mech. Housing Mounting
	11603-1	11603-3	11603-6	Housing - Amplifier
	14654	14654	14654	Screw - Rd. Hd. #10-24 x 1"
5A-5	1454	1454	1454	Nut - Hex #10-32
	1687	1687	14768	Washer - Lock #10 Int.
	Not stocked - order parts as required			Mechanism Assembly
1A-3	19532	19470	20470	Sprocket Assem. - Takeup
	1313-10	1313-10	1313-10	Washer - Plain
	12596	12596	12596	Screw - Takeup Sprocket
	17594	17594	17594	Washer - Neoprene
	16514	16514	16514	Washer - Plain
1A-2	19010	19469	19469	Sprocket Assem. - Feed
	1313-10	1313-10	1313-10	Washer - Plain
	1404	1404	14139	Screw - Hdless Socket Set #10-32 x 3/16"
	12600	12600	12600	Pulley - Sprocket
	1401	1401	1401	Screw - Hdless. Set #8-32 x 3/16"
	1313-5	1313-5	1313-5	Washer - Plain
	1313-32	1313-32	1313-32	Washer - Plain
5A-14, 5B-14	19531	19531	19531	Gear Assem. - Takeup Sprocket
	1401	1401	1401	Screw - Hdlss. Set #8-32 x 3/16"

Reference	Premier-10 Part Number	Premier-20 Part Number	Premier-30 Part Number	DESCRIPTION 1 2 3 4 5 6 7 8 9
	1313-5	1313-5	1313-5	Washer - Plain
	1313-32	1313-32	1313-32	Washer - Plain
5A-15, 5B-15	19003	19003	19003	Gear Assem. - Feed Sprocket
5A-16, 5B-16	19002	19002	19002	Gear Assem. Small Inter. Sprocket
	1313-5	1313-5	1313-5	Washer - Plain (as req'd.)
	1313-32	1313-32	1313-32	Washer - Plain
5A-17, 5B-17	1297-A	1297-A	1297-A	Screw - Special
	1750	1750	1750	Washer - Plain
	1313-32	1313-32	13625	Washer - Plain
	1993	1993	20221	Handle Assem. - Carrying
	1451	1451	1451	Nut - Hex. #8-32
	1679	1679	1679	Washer - Lock #8 External
			14852	Screw - Fil. Hd. #8-32 x 3/8"
	1278	1278	1278	Cap - Oil Well
	1774	1774	1774	Strainer - Oil
	19840	19840	19840	Well Assem. - Oil
			14323	Washer - Plain
4-21	1987	1987	1987	Plate Assem. - Framing
4-22	1501	1501	1501	Spring - Framing Plate
4-23	1248	1248	19476	Knob - Assem. Framing
			1457	Washer - Plain
			15038	Ring - Retaining
	1550	1550		Pin - Framing Knob Ret.
	19805	19777	20488	Housing Assem. - Mechanism
	1201-A1	1201-A1	1201-A1	Bushing - Int. Shutter Shaft
	12622-3	12622-3	12622-3	Bushing - Cam Shaft
	12627	12627	12627	Spacer - Lat. Cam Shaft Bushing
	12623	12623	12623	Spacer - Vert. Cam Shaft Bushing
	1213-A1	1213-A1	1213-A1	Bushing - Film Sprocket Shaft
	12684	12684	12684	Stud - Lge. Inter. Sprocket Gear

Note 1 - #19574 (Black case)
#19801 (Luggage type case - see P-20)

Note 2 - #20473 used after Serial #132321
#20589 and allied parts used prior to Serial #132321

Note 3 - #20476-1 used through Serial #132400
#20476 used after Serial #132400

Note 4 - #20646 used through Serial #130300. Use #20575 for replacement.

Note 5 - #20646 used through Serial #132400
#20485 used after Serial #132400

Note 6 - Not pt. of assemblies #19937 or 19791

Note 7 - #17946 interchangeable with #1763

Note 8 - These items are parts of soundhead assembly on Premier-10 and Premier-20

Note 9 - #20580 and #19139 are interchangeable

Note 10 - Original equipment used #19762. All were modified to #19440 (with idler). Units having serial numbers suffixed with letter "M" are equipped with #19411 (see P-20 col. for pts.)