SERVICE MANUAL

Viewlex 1600
16mm Projector

M-43 (MI–35043) (60Hz, 120V) Sound Speed Only
M-43S (MI–35043A) (60Hz, 120V) Sound/Silent Speed
M-81S (MI–35181A) (60Hz, 120V) Sound/Silent Speed-Stop On Frame

Viewlex Audio Visual, Inc.

LC 000060

PRICE: $10.00 PER COPY

TABLE OF CONTENTS

Page

TECHNICAL DATA

Power Requirements

350 Watts, 120 Volts, 60 Hz

Projection Lamp Type

EJL 24 Volts, 200 Watts

Exciter Lamp Type

BAK 4-volt

Fuse (Amplifier) F1

1-1/2 Ampere Slo-Blo

Fuse, F301

1-1/2 Ampere Slo-Blo

Amplifier

15 Watts, 8-ohms

Transistor Complement

Q1	2N4124	Q7	RCA 40361
Q2	2N4124	Q8	RCA 40362
Q3	2N4124	Q101	2N3054
Q4	2N4124	Q102	2N3054
Q5	2N5209	Q103	2N3054
Q6	2N4123		

Diode Complement	Part No.
CR1	52101000
CR2	C8840000
CR3	C8840000

Dimensions

Width – 15"
Depth – 11-1/8"
Height – 14-7/8" Handle Up
Height 13-1/8" Handle Down

Weight

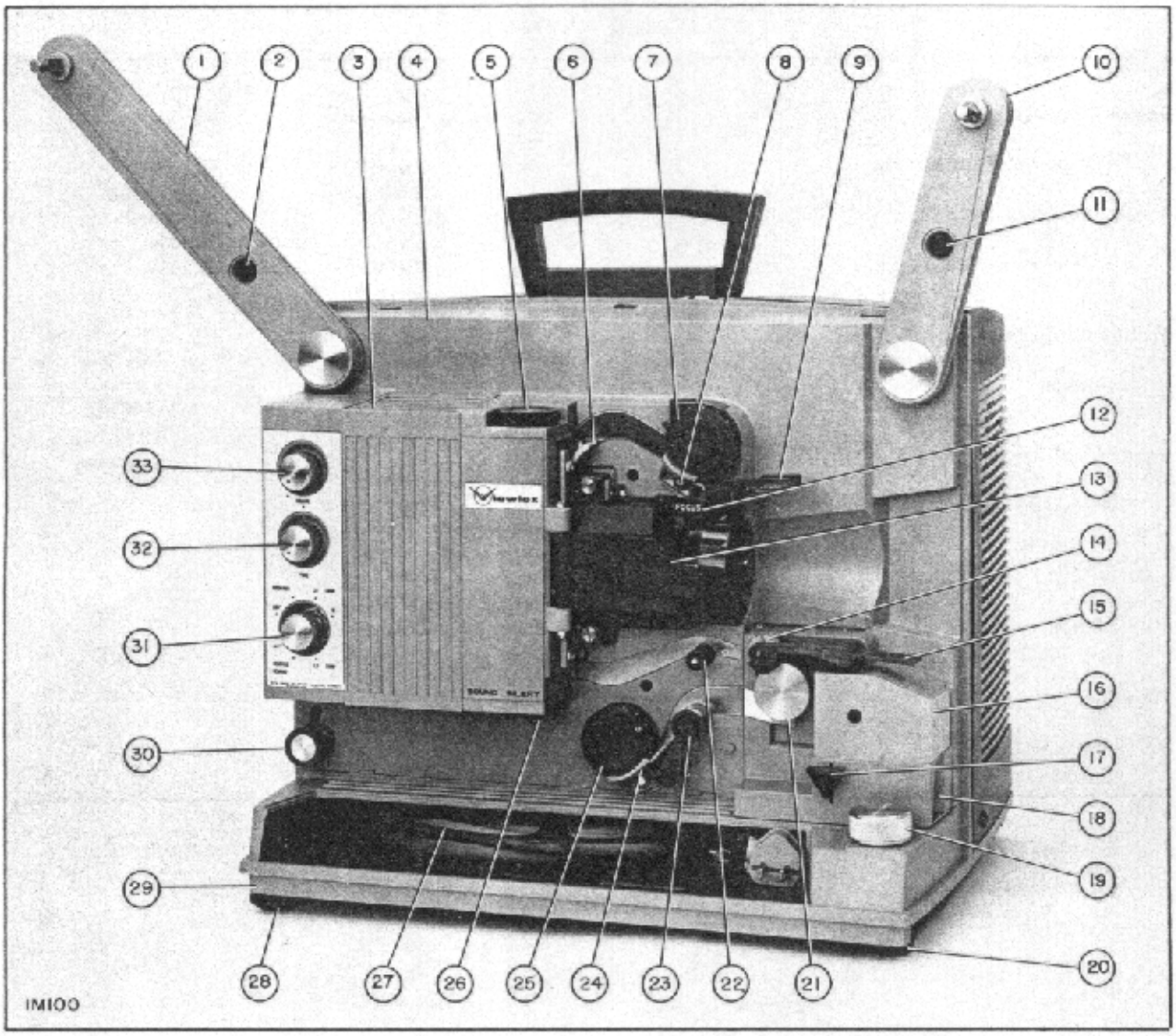
36 Lbs.

INTRODUCTION

This instruction book contains service data covering the following projectors:

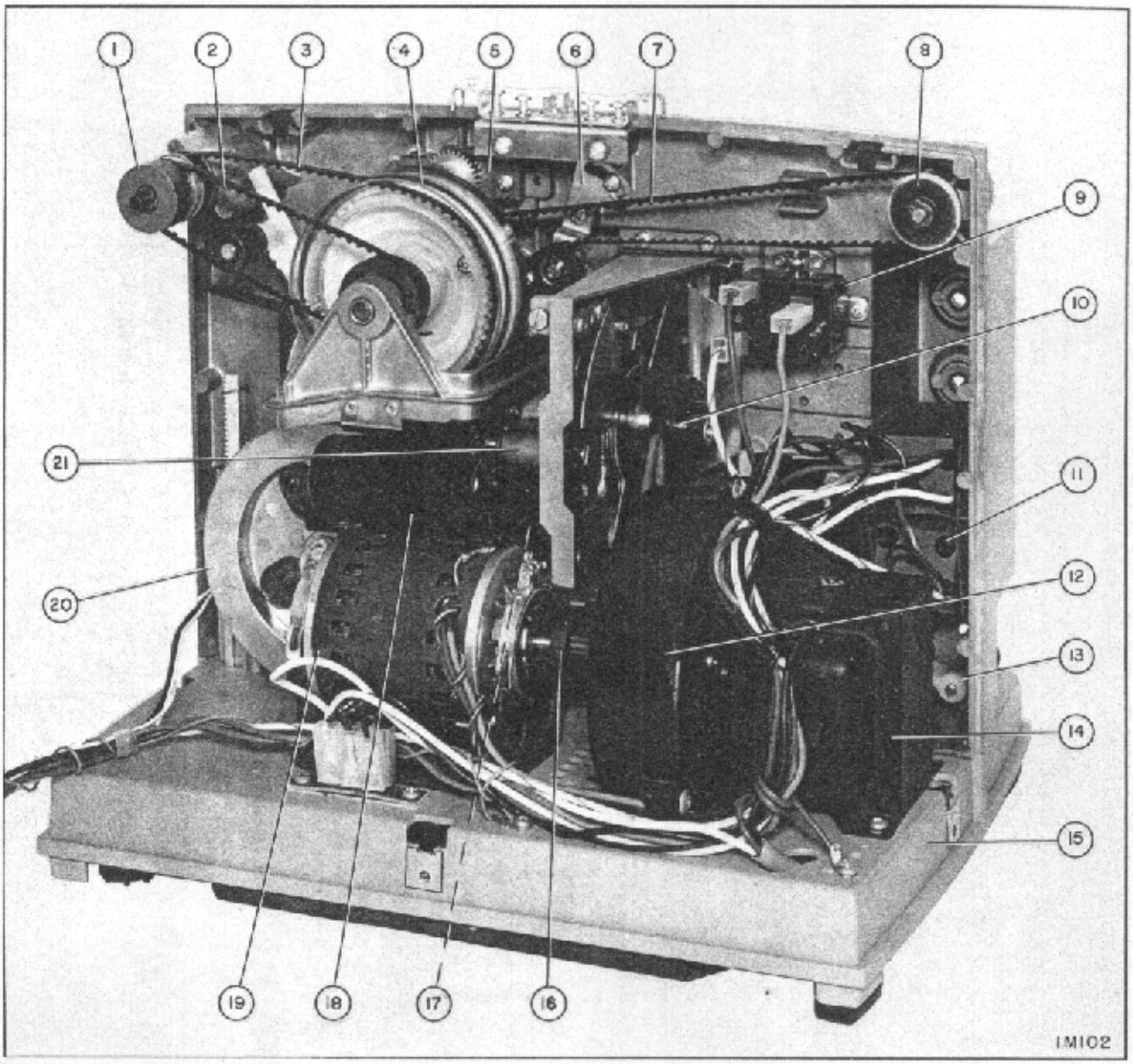
MI-35043, 120V, 60Hz, Sound Speed Only
MI-35043A, 120V, 60Hz, Sound/Silent Speed
MI-35181A, 120V, 60Hz, Sound/Silent Speed-Stop on Frame

The information and instructions contained in this service manual include technical data, removal and replacement procedures, operational checks and adjustments, belt replacement and adjustment, cleaning and lubrication, standard and special tools, and servicing aids for both the projector and safe threader. Also a wiring diagram, printed circuit board component layout, and an amplifier schematic are provided.



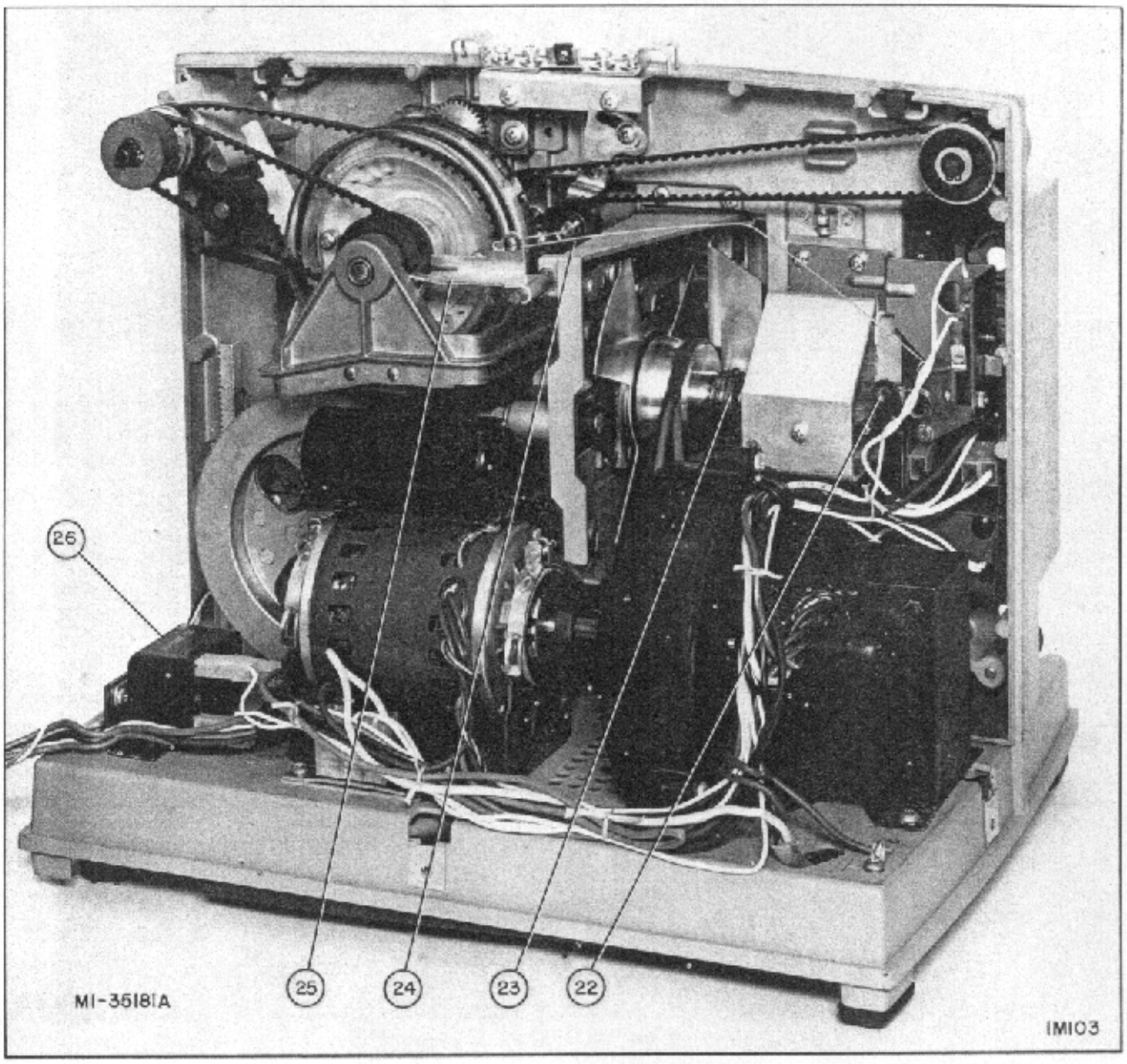
	Page		Page		Page
1. Take-up Reel Arm	30	13. Lens Gate Assembly	8	25. Lower Sprocket	21
2. Take-up Reel Arm Release	30	14. Pressure Roller	15	26. Sound/Silent Selector (MI-35043A & MI-35181A)	22
3. Lamphouse Cover	6	15. Pressure Roller Arm	15		
4. Main Frame	60	16. Exciter Lamp Cover	10	27. Take-up Reel	
5. Framing Knob	45	17. Film Cutter	12	28. Foot Pad	60
6. Film Shoe	9	18. Film Cutter Slot	12	29. Base Assembly	60
7. Upper Sprocket	21	19. Tilt Control	56	30. Snubber Roller	55
8. Upper Sprocket Shoe	21	20. Foot Pad	60	31. Function Switch	53
9. Rewind Lever	19	21. Sound Drum	16	32. Tone Control	14
10. Supply Reel Arm	30	22. Upper Guide Pulley	13	33. Volume Control	14
11. Supply Reel Arm Release	30	23. Damper Assembly	17		
12. Focus Lever	9	24. Lower Sprocket Shoe	21		

Figure 1. 16MM Projector, Front View (Cover Removed).



	Page		Page
1. Pulley Assemblies – Reverse and Rewind	28,29	10. Cam Pulley Assembly	35,36
2. Reverse Belt	72	11. Function Switch	53
3. Rewind Belt	72	12. Blower Housing	26
4. Fluid Clutch	23	13. Snubber Assembly	55
5. Drive Gear Assembly	27	14. Power Transformer	19
6. Belt Tension Assembly	33	15. Base Assembly	60
7. Forward Drive Belt	72	16. Drive Pulley	51
8. Torque Limiter Clutch	32	17. Lower Sprocket Drive Belt	49
9. Motor Starting Relay (MI-35043 and MI-35043A)	52	18. Motor Starting Capacitor	51
		19. Motor	51
		20. Flywheel	16
		21. Framing Plate	44

Figure 2. Models 35043 and 35043A Rear View (Internal)



	Page
22. Stop on Frame Trip Mechanism	38
23. Stop on Frame Clutch	40
24. Reel Brake Link	38
25. Reel Brake	38
26. Motor Starting Relay (MI-35181A)	52

Figure 3. MI-35181A Rear View (Internal)

REMOVAL AND REPLACEMENT PROCEDURES

The following paragraphs contain information and instructions to remove, disassemble, and replace the various component parts, assemblies, and subassemblies comprising the projector. When replacing a particular part or assembly, perform only the specific procedures to permit removal or replacement of the defective part. In some cases, special tools are required to reassemble the parts or to perform the proper adjustment. Do not force the assembly of any part. It should not be necessary to alter any replacement part to be assembled.

FRONT COVER ASSEMBLY

1. Remove front cover by rotating knob counterclockwise.
2. To remove latch, hold knob and remove screw. Note position of slot in latch.
3. Remove latch and push knob out of cover.
4. To replace knob, place knob drag in slot of knob.
5. Install knob into cover and rotate to engage tab in cover slot.
6. Place latch over protruding keys on knob. Position edge of slot approximately 1/16 of an inch from edge of key on knob.
7. Hold knob and latch firmly while tightening screw.
8. Adjust position of latch (1/16" spacing) if necessary to get proper fit of cover to projector.

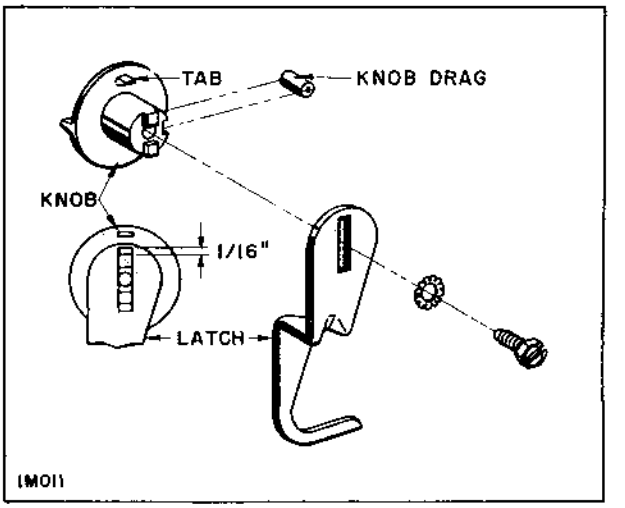


Figure 4

PARTS LIST

Part No.	Description
FRONT COVER ASSEMBLY	
C7108503	FRONT COVER-COMPLETE
A8144001	KNOB DRAG
B3415003	KNOB
B3414001	LATCH
A0106113	SCREW 6-32 x .50 LONG
A3610109	LOCK WASHER #8
IB-8027652	PROJECTOR INSTRUCTION LABEL
IB-8027661	LAMP INSTRUCTION LABEL

LAMPHOUSE COVER

1. Remove lamphouse cover by pulling out at bottom.
2. Remove shield (4) by removing two screws (A).
3. When reinstalling shield, position toward the rear of the projector before tightening screws. This will assure clearance with lamp bracket.

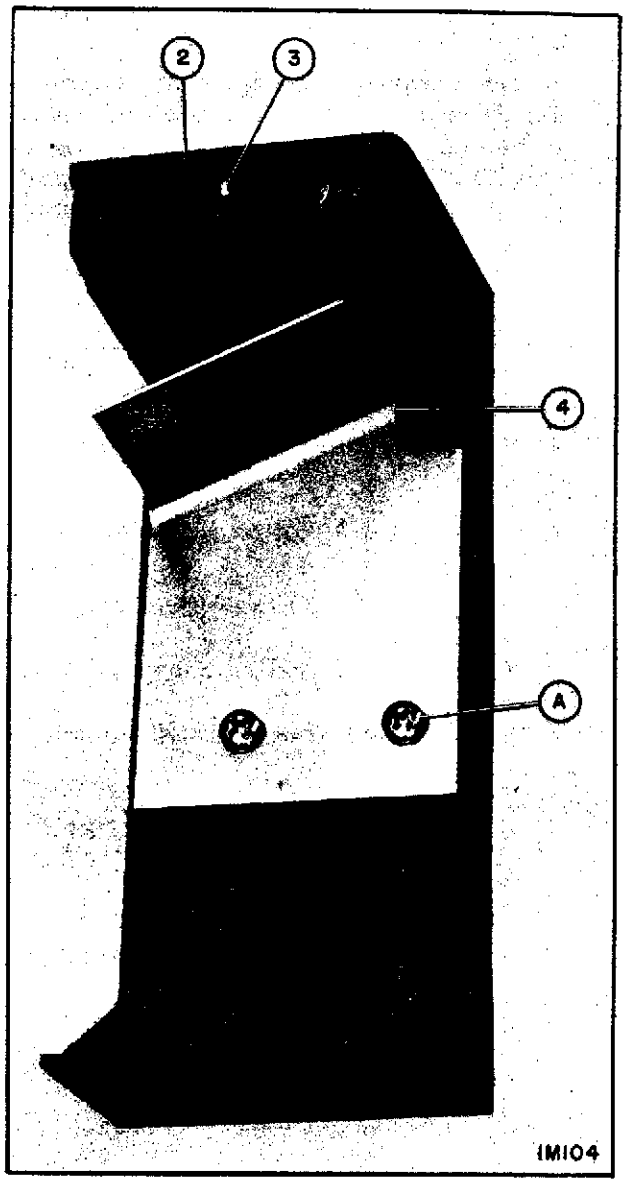


Figure 5

PARTS LIST

Illus. No.	Part No.	Description
LAMPHOUSE COVER		
1	B1863501	LAMPHOUSE COVER COMPLETE
2	D2470001	LAMPHOUSE COVER
3	A8137001	BALL AND STUD
4	A8661001	SHIELD
A	A4702121	SCREW #6–32 X 0.25

PROJECTION LAMP, SOCKET AND MOUNTING PLATE

1. Remove lamphouse cover by pulling out at bottom.
2. To remove projection lamp (1) lift ejection lever (C) beneath lamp.

CAUTION

When handling lamp, touch only the base or rim of reflector. Clean finger prints from reflector and lamp with isopropyl alcohol.

3. To remove lamp mounting plate (2), remove three screws (A) and disconnect socket leads with pliers.
4. To reinstall lamp mounting plate, reverse above procedure.
5. To install lamp, hold lamp by base and rotate lamp until pins align with slot in socket. Press lamp fully into socket.
6. Reinstall lamphouse cover.

Figure 6

Figure 7

PARTS LIST

Illus. No.	Part No.	Description
PROJECTION LAMP, SOCKET, AND MOUNTING PLATE		
1	B1858001	LAMP 200W, 24V, TYPE EJL
2	B1859501	LAMP MOUNTING PLATE AND SOCKET MI-35043 & MI-35043A
2	B1859502	LAMP MOUNTING PLATE AND SOCKET MI-35181A
A	A7234111	SCREW #6-32 x 0.25 FLAT HEAD
B	A0751402	CATCH SPRING – LAMPHOUSE COVER
C		LAMP EJECTION LEVER

LENS GATE ASSEMBLY

NOTE: Lens gate can be disassembled without removing from projector.

1. To remove lens gate, loosen locknuts (F) and back out pivot screws (E) to free gate. (Figure 8.)

2. Disassemble lens gate as shown in figure 9. Apply a light coat of grease to barrel before reassembly into gate.

CAUTION

When installing a reassembled lens gate onto projector, close gate very carefully and check for interference of film shoe with side rails on aperture. Turn adjusting screws (5) counterclockwise to allow shoe to clear left hand rail.

3. Sight through lens gate barrel (with lens removed) and center film shoe opening vertically over aperture opening by tightening or loosening upper and lower pivot screws as required.

4. Adjustment screw (C) should be adjusted so that lower film shoe block (13) is held in a vertical position.

5. Refer to film shoe adjustment procedures for final adjustment (page 63).

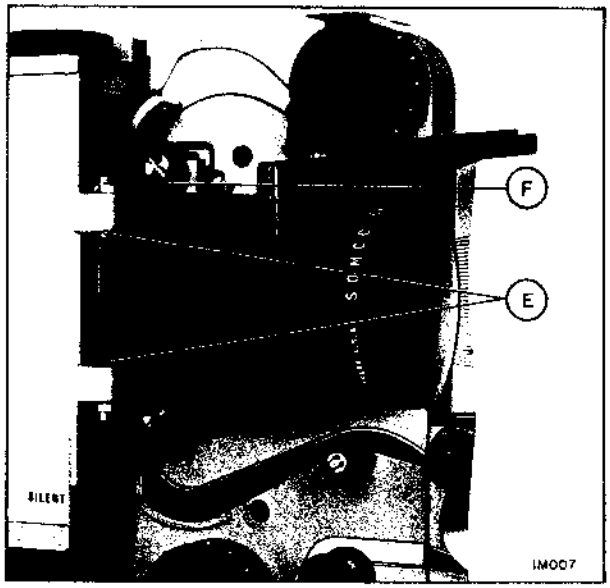


Figure 8

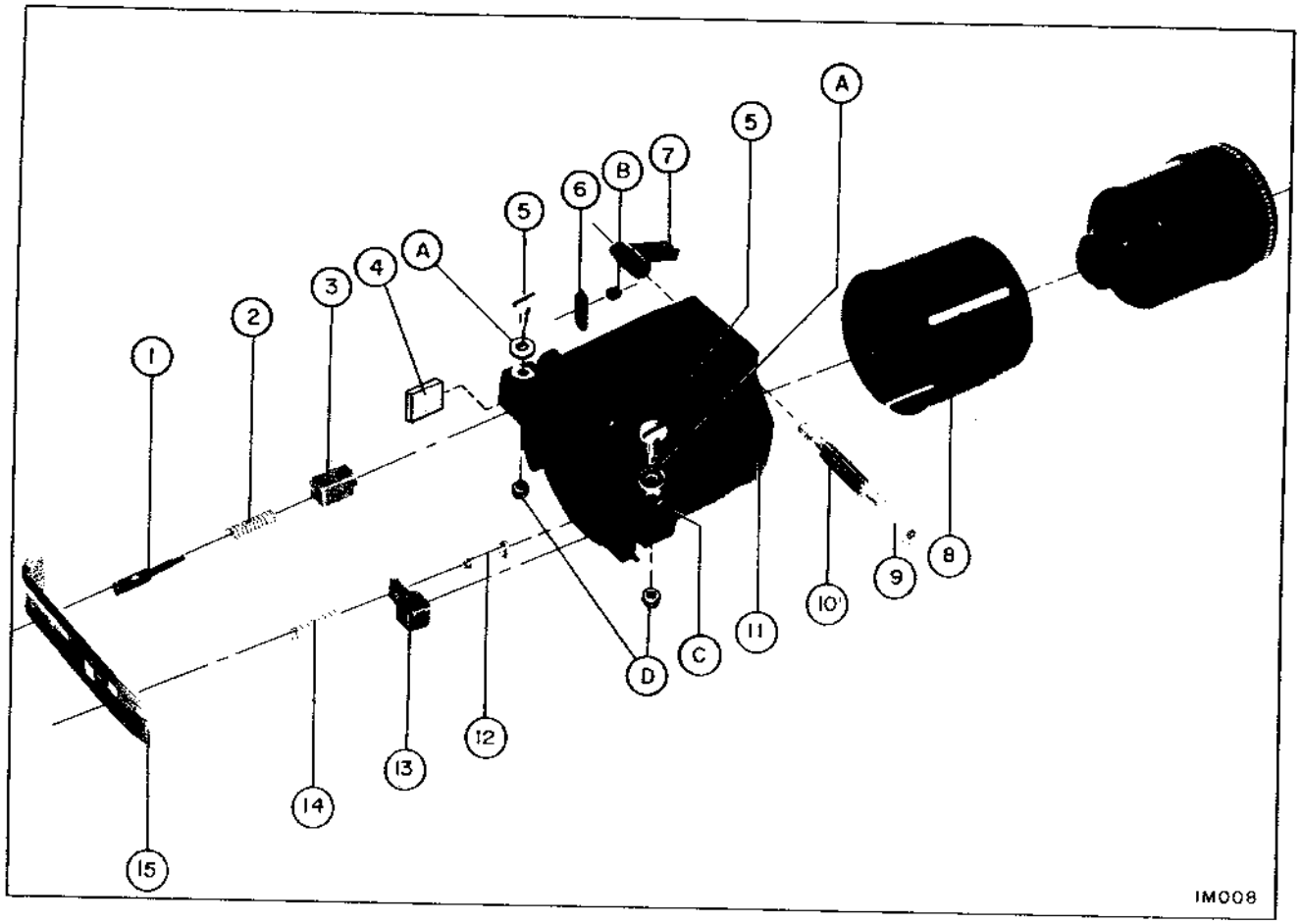


Figure 9

PARTS LIST

Illus. No.	Part No.	Description
		LENS GATE ASSEMBLY
1	B4690001	PIN-PRESSURE SHOE
2	A4071004	SPRING – FILM SHOE
3	A4061001	BLOCK – UPPER ADJUSTING
4	A4307004	PAD CORK
5	B4689001	SCREW – BLOCK ADJUSTING
6	A3500001	CAM
7	B0004002	LEVER
8	B0046001	BARREL
9	A8097001	BUSHING
10	B0020001	PINION GEAR
11	D2477004	LENS GATE
12	A4065001	SHOE MOUNTING SCREW
13	B3214001	LOWER ADJUSTING BLOCK
14	A4071003	SPRING – FILMSHOE
15	C5644001	FILM SHOE
A	A8035001	SPRING WASHER
B	A1181005	LOCKNUT
C	A8099012	ALLEN SET SCREW #4-40 (5PER PACKAGE)
D	A1181004	LOCKNUT
E	A3502002	PIVOT SCREW
F	A5821002	LOCKNUT # 10-32

SOUND OPTIC LENS AND EXCITER LAMP

NOTE: The adjustment of the sound optic lens is very critical, therefore, it should not be removed or adjusted unless it is known to be defective or out of adjustment. Periodically clean the lens (in place) with a Q-Tip or lens tissue and lens cleaning fluid.

To remove sound optic lens proceed as follows:

1. Open exciter lamp cover (3). If necessary, remove cover by lifting off hinge pin.
2. Remove exciter lamp (2) by lifting up and turning counterclockwise.
3. Loosen screw (A) in sound optic clamp (4).
4. Slide lens (1) out of clamp.
5. Reverse above procedures to reassemble.
6. Refer to sound optical lens adjustment procedures, and readjust lens, if necessary. (See page 65).

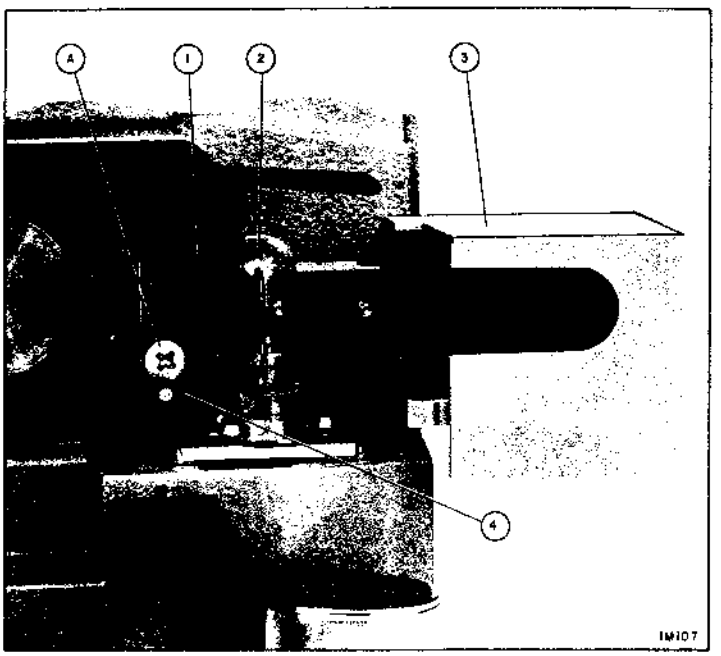


Figure 10

SOLAR CELL AND EXCITER LAMP SOCKET

1. Perform rear cover removal procedures (page 14).
2. Perform flywheel and sound drum removal procedures (page 23).
3. To remove solar cell (5) disconnect leads from terminal strip TB 302 on rear of sound head casting. Note location of leads. Solar cell is attached to the casting with cement. Carefully pry solar cell loose and remove old cement from casting.
4. To replace solar cell, apply a thin coat of white silicone rubber cement (GE-RTV-102) to casting and solar cell.
5. Center solar cell on casting extension so that end of cell extends 1/32 of an inch past end of bracket. Secure in place with solar cell clip for 8 hours.

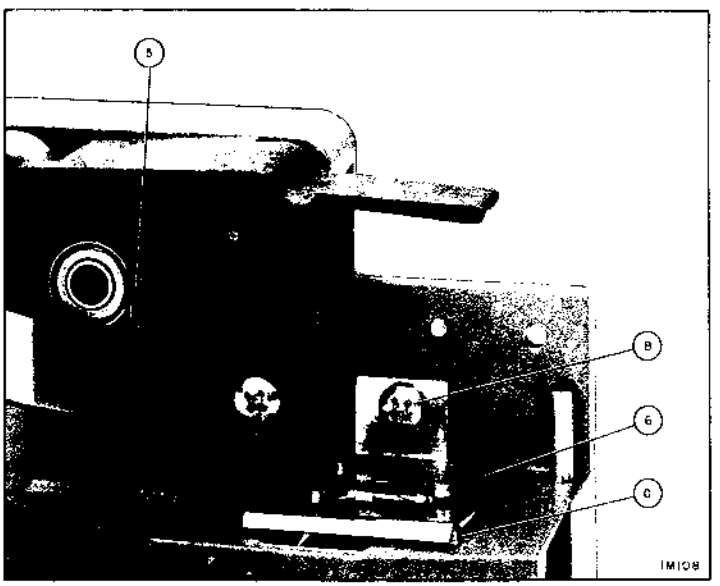


Figure 11

CAUTION

Install clip carefully to avoid touching active area in center of solar cell.

6. Connect leads to proper terminals on terminal strip TB 302 (figure 12).

7. To remove exciter lamp socket (6), open exciter lamp cover and remove from hinge pin.

8. Remove exciter lamp (2) (figure 10).

9. Remove screw (B) (figure 11).

10. Disconnect lead from terminal strip TB 302 at rear of sound head casting. Note location of lead.

11. Remove socket.

12. When installing socket, make certain that shim (C) is in place under front lip of socket. Install screw (B) and press rear edge of socket down against casting while tightening. (Figure 11).

13. Reverse removal procedures.

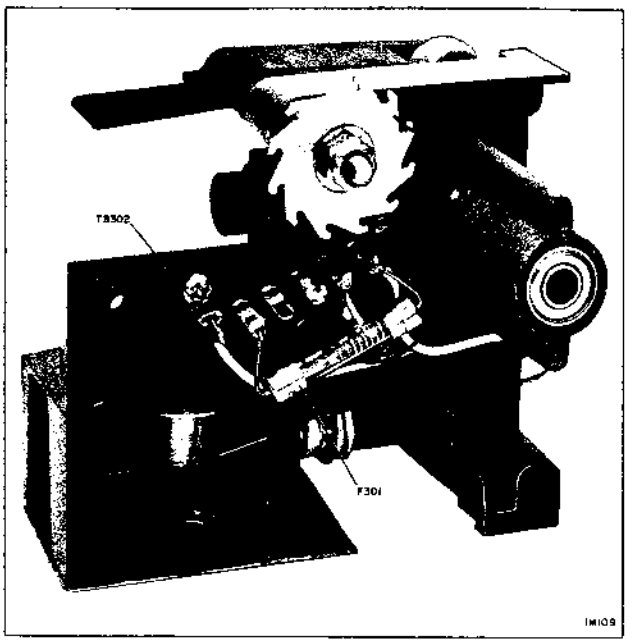


Figure 12

SOUND HEAD ASSEMBLY

1. Perform rear cover removal procedures (page 14).

2. Perform flywheel removal procedures. Remove sound drum and set it aside so it will not be damaged. (See page 23).

3. Perform steps 1-8 in tilt mechanism disassembly procedure to expose lower mounting screw on sound head.

4. Separate leads from other leads feeding amplifier. Remove any cable clamps or ties.

5. Remove four mounting screws (A) and (B) from rear of assembly and remove assembly (figure 13).

6. To remove terminal strip TB302, note location of wires and unsolder. Remove attaching screws at each end.

7. To reassemble, reverse above procedures. Follow flywheel replacement procedures carefully.

   NOTE: Shorter screws (B) go in front mounting holes.

8. Dress leads under small clamp on tilt extrusion to avoid damage to wires in tilt rack gear teeth. Dress fuse F301 to avoid shorts.

PARTS LIST

Illus. No.	Part No.	Description
		SOUND OPTIC LENS AND EXCITER LAMP
1	B2028001	SOUND OPTIC LENS
2	B2398002	EXCITER LAMP, TYPE BAK
3	A8112502	EXCITER LAMP COVER (WITH LENS)
3	A8112503	EXCITER LAMP COVER FOR SAFE THREADER (WITH LENS)
4	A8517001	CLAMP
5	B0369001	SOLAR CELL
6	B2019002	EXCITER LAMP SOCKET
A	A4702102	SCREW #8-32 x .38 LONG
B	A4702101	SCREW #8-32 x .25 LONG
C	A2105001	SHIM – SOCKET
D	A4702114	SCREW #8-32 x .31 LONG
TB302	A0181024	TERMINAL STRIP
	A4702015	SCREW FOR ABOVE #6-32
F301	A8413110	FUSE 125V. 2A. SLO-BLOW

FILM CUTTER ASSEMBLY

1. Perform rear cover removal procedures (page 14).
2. Perform sound head removal procedures (page 11).
3. To remove film cutter arm (3) remove nut (D) and shoulder screw (G). Note position of bow washer and lockwasher for reassembly.
4. Slide arm out through front of casting.
5. To remove springs (2) and (6), and cutter plate, (1) remove screws (A), washers (B), and nuts (C).
6. When reassembling, position arm spring (6) to hold cutter arm against top of slot in casting.
7. Make certain that arm pivot screw is fully seated into mounting slot so that knob does not interfere with casting when depressed.
8. Reverse above procedures to reassemble.

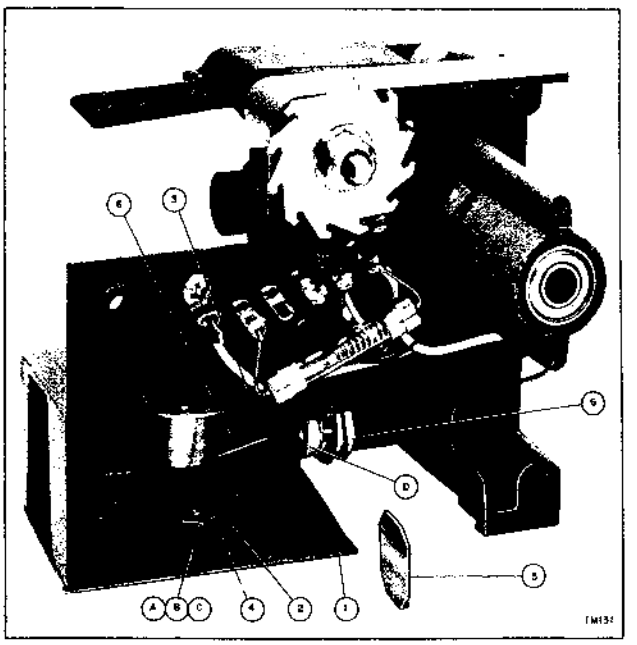


Figure 13

PARTS LIST

Illus. No.	Part No.	Description
	FILM CUTTER ASSEMBLY	
1	B4686001	FILM CUTTER
2	A8089001	GUIDE SPRING
3	B0088502	FILM CUTTER ARM WITH KNOB
4	A2555005	PAD – CORK 1/2 x 1 INCH
5	A8185001	CHUTE ATTACHES TO BASE
6	A8664001	ARM SPRING
A	A7466409	SCREW #6-32 x .25 FLAT HEAD
B	A3611407	LOCKWASHER #6
C	A7435104	NUT #6-32
D	A7435104	NUT #6-32
E	A3610107	LOCKWASHER #6
F	A3750001	SPRING WASHER
G	A8516001	SHOULDER SCREW # 6-32

UPPER GUIDE PULLEY

1. Remove retaining ring (A) and slide pulley (1) from shaft (B).

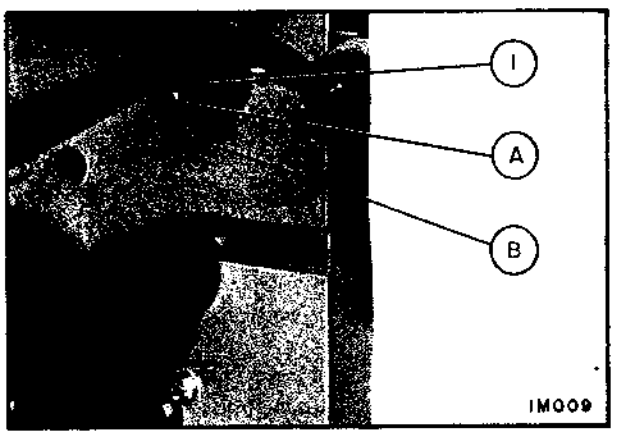


Figure 14

PARTS LIST

Illus. No.	Part No.	Description
	UPPER GUIDE PULLEY	
1	A4079001	FILM GUIDE PULLEY
A	A3605003	RETAINING RING
B	A4078001	SHAFT (PRESSED INTO MAIN FRAME)

REAR COVER ASSEMBLY

CAUTION

Unplug power cord before removing rear cover.

1. Remove center screw (A) and cover (2).
2. Loosen four screws (B) in handle bracket.
3. Remove three screws (G) and washers (H) from bottom edge of cover (not shown).
4. Loosen setscrews in TONE and VOLUME knobs. (VOLUME know only on MI35181A).(See figure 1, items 32 and 33).
5. Remove cover and set aside. Do not put excessive strain on harness wiring.
6. To remove rear cover completely, remove cable clamp at amplifier chassis and very carefully disconnect following wires from terminals:

E 7 – WHITE E14 – RED J101-2-WHITE
E10 – WHITE E15 – RED GROUND SCREW-GREEN
E11 – BLUE/WHITE J101-1 – BLACK (SHIELD)
E12 – BLUE E22 – WHITE JUMPER

7. Reverse above procedures for reassembly. Feed control shafts through panel carefully to avoid pushing grommets out of position.

NOTE: Handle grommets should be positioned inside of handle bracket so that handle pin does not cut grommet.

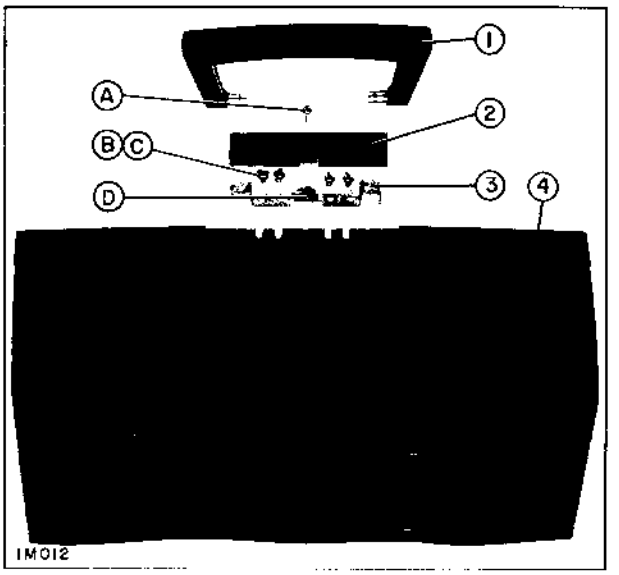


Figure 15

PARTS LIST

Illus. No.	Part No.	Description
		REAR COVER ASSEMBLY
1	B3416003	HANDLE
2	B3413003	HANDLE BRACKET COVER
3	B3412001	HANDLE BRACKET
4	R5713000	COVER WITH FOAM PAD
	D4849001	KNOB – TONE & VOLUME MI-35043 & MI-35043A
	A8141033	SET SCREW FOR ABOVE # 6-32
	D4849004	KNOB – TONE MI-35181A
	D4849005	KNOB – VOLUME MI-35181A
	A8141013	SET SCREW FOR ABOVE #4-40
	A4307004	FOAM PAD
A	A0106105	SCREW #6-32 x .38 LONG
B	A4702107	SCREW #8-32 x .625 LONG
C	A3618405	LOCKWASHER #8
D	A0303014	SPEED NUT-TINNERMAN
	A0290009	GROMMET – HANDLE
	A8133001	GROMMET – CONTROL SHAFTS
	A8655003	SCREW #8-32 x .50 LONG (cover mtg.)
	A9784605	FLAT WASHER #8 (cover mtg.)

PRESSURE ROLLER ARM

1. Perform rear cover removal procedures (page 14).

2. Rotate tilt control until projector is fully tilted.

3. Remove exciter lamp cover (page 10).

4. Hold pressure roller arm (1) and remove locknut (A).

5. Remove tension disc (6) and tension spring (5). Note position of spring for reassembly.

6. Slide arm (1) and spring (4) out of sound head.

7. To remove roller, press shaft out of arm. Shaft is pressed in from rear side of arm and must be pressed out from the front.

8. To reassemble, position roller in arm and press pin into arm from the rear.

9. To reassemble arm, slide spring (4) onto shaft and insert shaft into casting.

10. Install tension spring (5) onto shaft with straight end toward casting. Position end under boss protruding from casting to the right of the shaft.

11. Install tension disc (6) with teeth pointing counterclockwise.

12. Install locknut and tighten until arm is approximately 1/32 of an inch from the sound head casting.

13. Rotate hooked end of spring counterclockwise and hook onto disc at about the one o'clock position.

14. Install exciter lamp cover.

15. Refer to buzz track adjustment for final adjustment procedure (page 64).

16. Install rear cover.

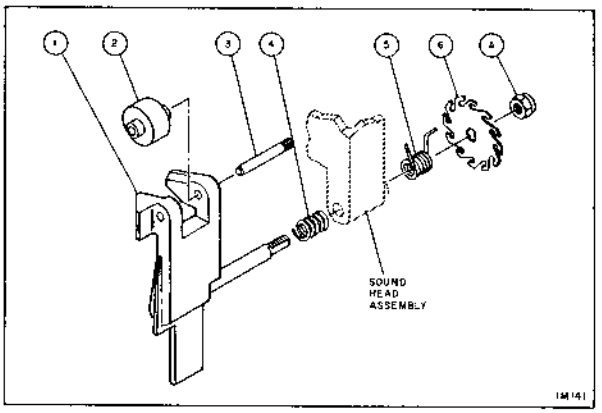


Figure 16

PARTS LIST

Illus. No.	Part No.	Description
PRESSURE ROLLER ARM		
1	D2478501	PRESSURE ROLLER ARM
2	B2086501	PRESSURE ROLLER
3	A8155001	PRESSURE ROLLER SHAFT
4	A8126001	SPRING
5	B0027001	TENSION SPRING
6	A8159001	TENSION DISC
A	A5442016	LOCKNUT # 10-32

FLYWHEEL AND SOUND DRUM ASSEMBLY

1. Perform rear cover removal procedures (page 14).

2. Remove exciter lamp cover by pivoting open lifting from hinge pin.

3. Hold sound drum and remove locknut (B) and washer (F).

4. Loosen setscrew (D) and remove flywheel (4), spacers (A), and spring (5).

5. Slide sound drum (1) and spacer (2) out of sound head.

6. To remove bearing spacer (6), loosen setscrews (E) and slide spacer and bearings out of casting.

   NOTE: When reinstalling bearings, slide sound drum shaft through bearings to align them with the base.

7. Position spacer (6) so that front bearing is flush with casting. Tighten setscrews (E). Do not over tighten setscrews.

8. Slide long spacer (2) onto sound drum and install through bearings.

9. Install spacers (A) onto shaft with spring (5) between them.

10. Install flywheel.

11. Install washer (F) and locknut (B). Tighten nut and back off 1-1/2 turns.

    NOTE: Over tightening the locknut may damage bearings or sound drum.

12. Tighten setscrew (D).

13. Refer to Wow and Flutter adjustment procedures (page 64).

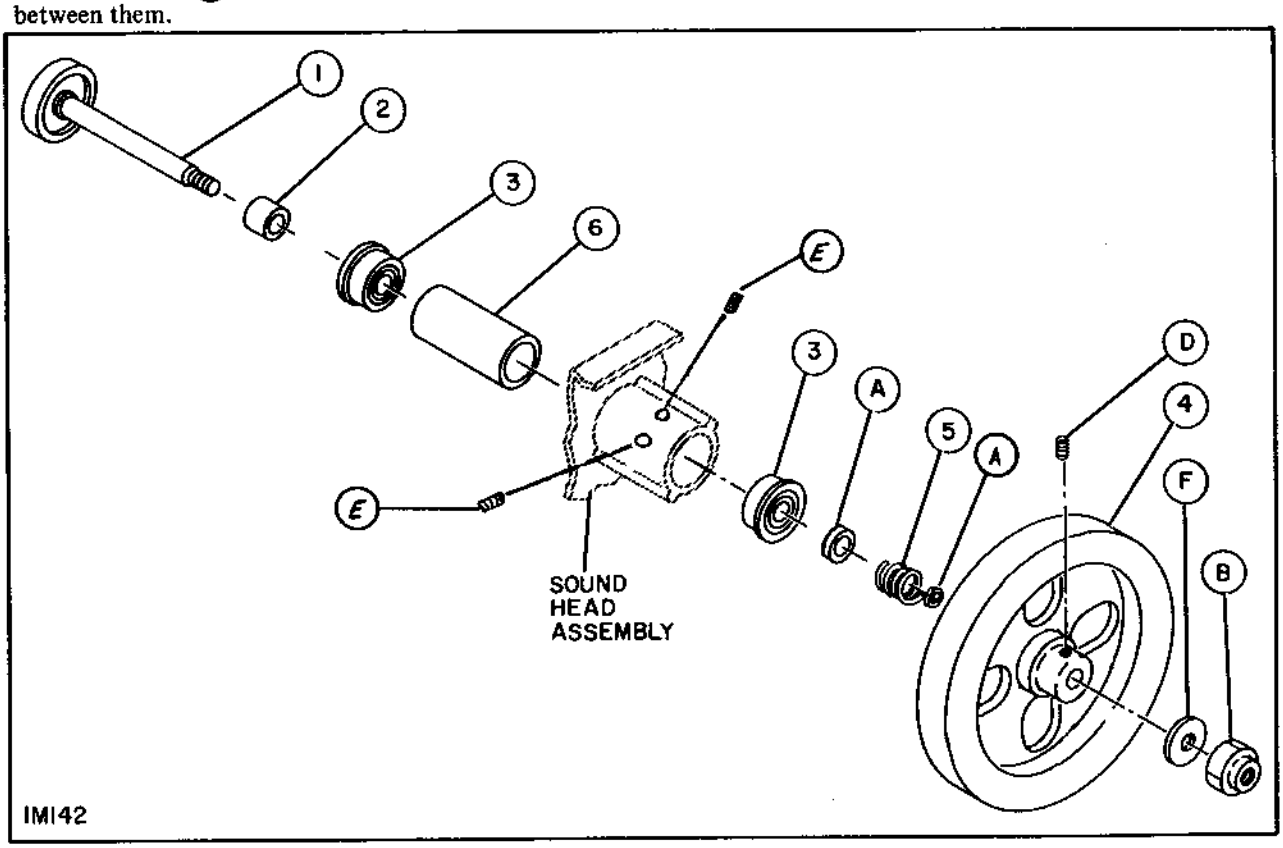


Figure 17

PARTS LIST

Illus. No.	Part No.	Description
FLYWHEEL AND SOUND DRUM ASSEMBLY		
1	C8429501	SOUND DRUM
2	A8057001	SPACER
3	A8157002	BEARING
4	C8458502	FLYWHEEL
5	A8160001	SPRING
6	A8121001	BEARING SPACER
A	A8057002	SPACER
B	A5442016	LOCKNUT # 10-32
C	A8158001	NYLON SPACER
D	A5789771	SETSCREW #8-32 x .25
E	A8539423	SETSCREW #6-32 x .25
F	A2278106	FLATWASHER #10

TENSION DAMPER ASSEMBLY

1. To remove tension arm (1) loosen setscrew (A) and slide arm from shaft (figure 18).

2. To remove roller, remove retaining ring (D). When installing roller onto shaft, place washers (B) on each end and place deeper cavity end of roller on shaft first.

3. To remove damper assembly from projector, perform rear cover and flywheel removal procedures (page 14 and 23).

4. Remove nut (C) on front of frame and remove assembly from rear of projector.

5. To disassemble damper, remove retaining ring (F) and slide rotor (4) out of sleeve (3).

6. Remove nut (H) to remove spring (6).

7. For proper operation, the gap between the rotor and the sleeve should be filled with silicone fluid. If this fluid is removed for any reason, the damper should be refilled during reassembly. Apply a thin coat of silicone fluid to the outside diameter of the rotor and slide it slowly into the sleeve. Work assembly several times to distribute fluid. A properly filled damper, after being deflected, will return to its normal position in one to two seconds. Improper damper operation can cause wow in the sound.

8. When reassembling damper, make certain that flat on shaft of rotor (4) and one of cutouts on sleeve (3) are aligned.

9. Install spring locking washer (5) and tension spring 6 . Make certain that flat on spring locking washer engages flat on rotor shaft.

10. Install nut (H) and tighten.

11. Insert rotor into sleeve so that end of spring engages hole in retaining ring (E). Rotate ring until spring locking washer (5) just contacts clockwise side of cutout in sleeve. (When viewed from the rear).

12. Install damper into projector and tighten nut just enough to hold damper in place.

13. Install tension arm and tighten setscrew to flat of shaft. Leave approximately 1/32 of an inch clearance between roller and frame.

14. Rotate entire assembly until roller is positioned as shown.

15. Tighten nut while holding assembly in this position.

16. Reinstall flywheel and rear cover.

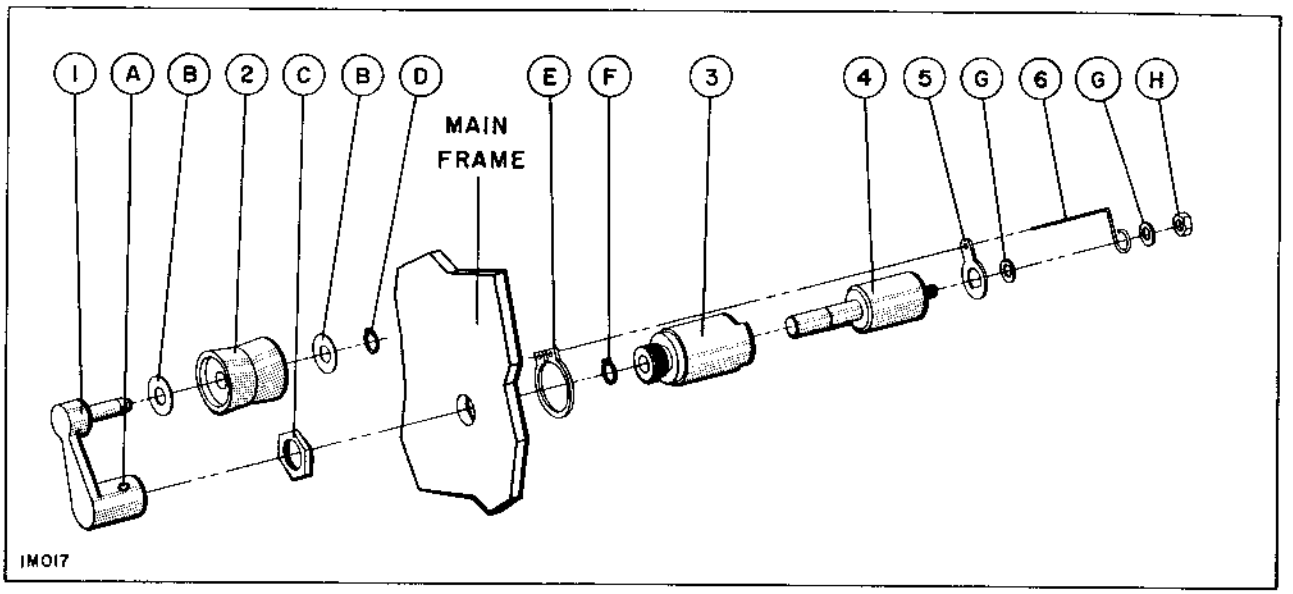


Figure 18

PARTS LIST

Illus. No.	Part No.	Description
TENSION DAMPER ASSEMBLY		
1	C8461501	DAMPER ASSEMBLY
2	B0096502	TENSION ARM & ROLLER
3	B0095502	TENSION ARM
4	A8530001	ROLLER
5	B0093001	SLEEVE
6	B0094001	ROTOR
7	A8528001	SPRING LOCKING WASHER
8	A8529001	TENSION SPRING
A	A8141032	SETSCREW #6-32 x .25 LONG
B	A6391017	WASHER – THIN
C	A9149106	NUT
D	A9373002	RETAINING RING
E	A9373015	RETAINING RING
F	A9373003	RETAINING RING
G	A3271022	FLAT WASHER #4
H	A7435103	NUT # 4-40
	A4705008	SILICONE FLUID

POWER TRANSFORMER

1. Perform rear cover removal procedures (page 14).
2. To remove transformer (1) from base, remove four mounting screws (A).
3. Note location of each lead and disconnect all leads.
4. To install transformer, reverse above procedures. Note that there is a lockwasher under one of the mounting screws.

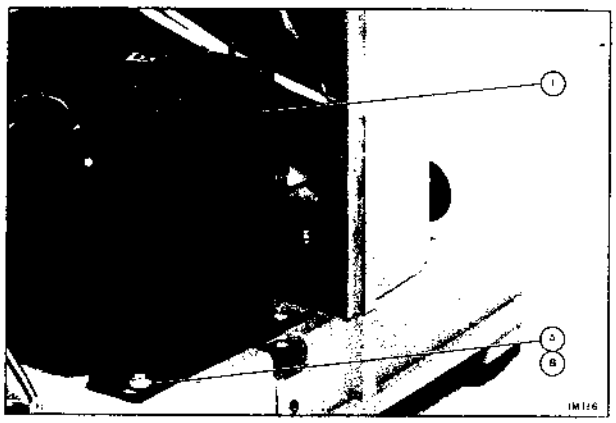


Figure 19

PARTS LIST

Illus. No.	Part No.	Description
POWER TRANSFORMER		
1	B1841001	TRANSFORMER
A	A4702102	SCREW # 8-32 x .38
B	A3610109	LOCKWASHER # 8

REWIND LEVER ASSEMBLY

1. Perform rear cover removal procedures (page 14).
2. Perform Main Shaft Support and Fluid Clutch Removal Procedures. (Page 23).
3. Remove screw (B), rewind arm (4), and spring (3).
4. Remove screw (A), slide knob (1), and lever (2) out of casting. (Figure 21).
5. To remove roller (5) remove retaining ring (C).

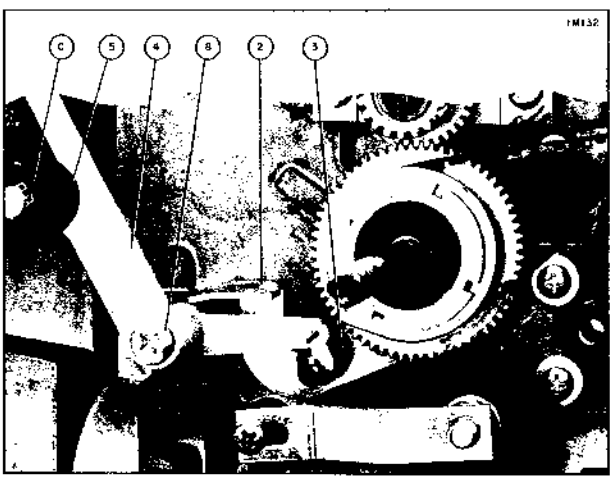


Figure 20

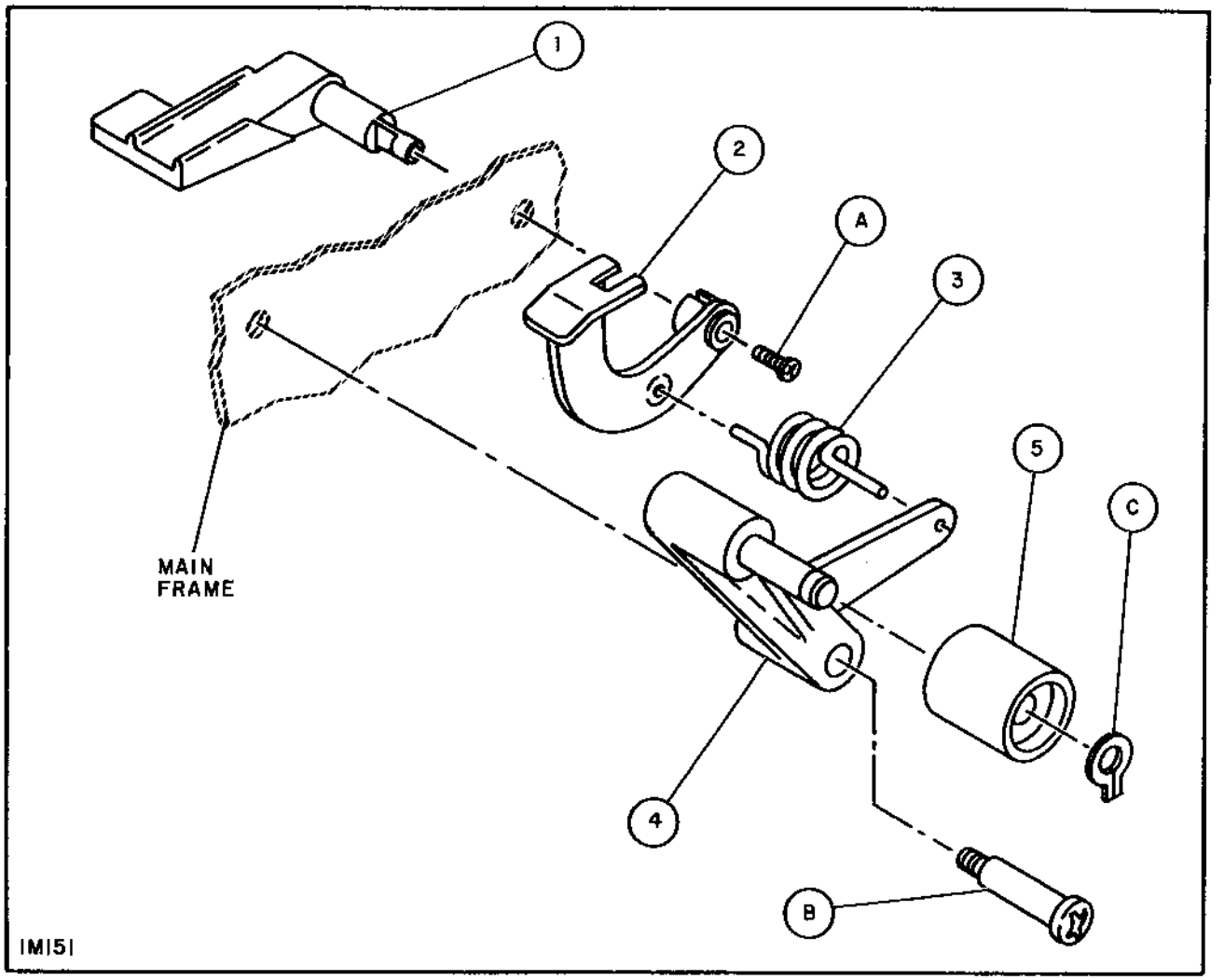


Figure 21

PARTS LIST

Illus. No.	Part No.	Description
REWIND LEVER ASSEMBLY		
1	B0010502	REWIND KNOB
2	B0008001	LEVER
3	A8553001	HELICAL SPRING
4	C5683502	ARM AND SHAFT ASSEMBLY
5	A8068002	ROLLER
A	A0154105	SCREW # 4-40 x .25
B	A8519001	SCREW
C	B0366006	RETAINING RING
D	A5983018	FLAT WASHER # 4

SPROCKET SHOE ASSEMBLY

UPPER

1. Perform rear cover removal procedures (page 14).
2. Perform Main Shaft Support and Fluid Clutch removal procedures (page 23).
3. From rear of projector,push in and hold sprocket shoe pin (4) with sprocket shoe pin remover while removing C-washer (A) and shoe (2). If replacing shoe only, continue to hold pin and replace shoe and C-washer.
4. Remove sprocket shoe pin and spring from frame.
5. To replace sprocket shoe reverse removal procedures.

LOWER

1. Perform rear cover removal procedures (page 14).
2. Insert end of sprocket shoe pin remover tool under motor and past reverse puck assembly. Rotate tool and engage sprocket shoe pin. Push pin in and hold. If replacing shoe only, continue to hold pin and replace shoe and C-washer.
3. Remove pin and spring from frame.
4. To replace sprocket shoe, reverse removal procedures.

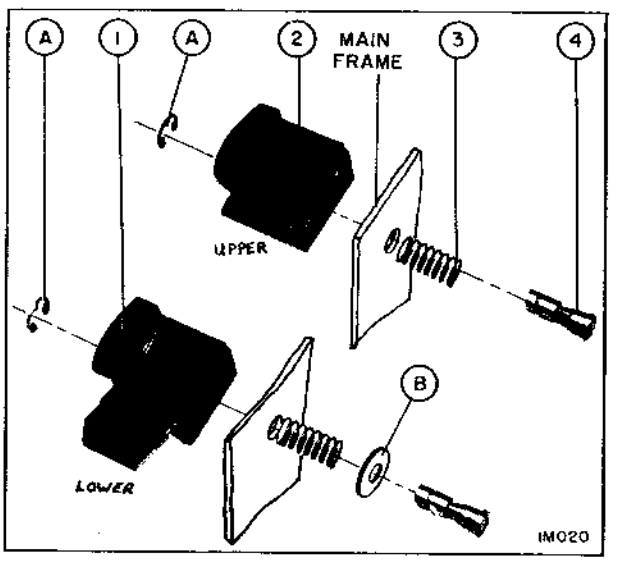


Figure 22

PARTS LIST

Illus. No.	Part No.	Description
UPPER AND LOWER SPROCKET SHOE ASSEMBLIES		
1	B3403002	LOWER SPROCKET SHOE
2	B5630002	UPPER SPROCKET SHOE
3	A0022003	SPRING
4	A8015002	PIN
A	A3605006	C-WASHER

BELT SHIFTER ASSEMBLY MI-35043A and MI-35181A

1. Perform rear cover removal procedures.

2. On MI-35043A, slide drive belt off drive pulley and pull out of belt shifter fork.

3. On MI-35181A, loosen setscrews (C) in slide block (2) and lift out fork (1) and spring shim (7).

all models

4. To remove slide bracket (3), remove two mounting screws (A).

5. To remove selector shaft (4) loosen setscrews (B) in selector knob (6) and slide shaft out of frame. Note position of spring (5) for reassembly.

6. To disassemble fork from block (2) loosen setscrews and slide fork out of block. Note position of spring shim for reassembly.

7. To reassemble, slide selector shaft through frame while holding spring and knob in position. Tighten knob setscrews onto flat part of shaft.

8. Spring ends should engage holes in selector arm and main frame.

9. MI-35043A – Install fork and shim spring into block and slide bracket and tighten setscrews. Fork should protrude about 3/32 of an inch from bottom of assembly. Install assembly into projector. Make certain that the pin protruding from the block engages the slot in the selector shaft arm. Do not tighten mounting screws (A).

10. MI-35043A – Slide drive belt through shifter fork and over cam pulley. Align drive belt with center of fork. Position shifter assembly so that belt is centered in fork. Tighten slide bracket mounting screws.

11. MI-35181A – Install slide bracket (3) (less block and fork) into projector. Do not tighten screws (A).

12. MI-35181A – Install slide block and spring shim into slide bracket engaging block pin into slot in selector shaft arm.

13. MI-35181A – Install fork over belt and through holes in slide block. Fork should protrude about 3/32 of an inch from bottom of assembly. Tighten setscrews (C).

14. MI-35181A – Position entire assembly so that belt is centered in fork. Tighten screws (A).

all models

15. Check for proper operation of belt shifter. Turn on projector and shift belt from sound to silent speed. Reposition assembly if necessary.

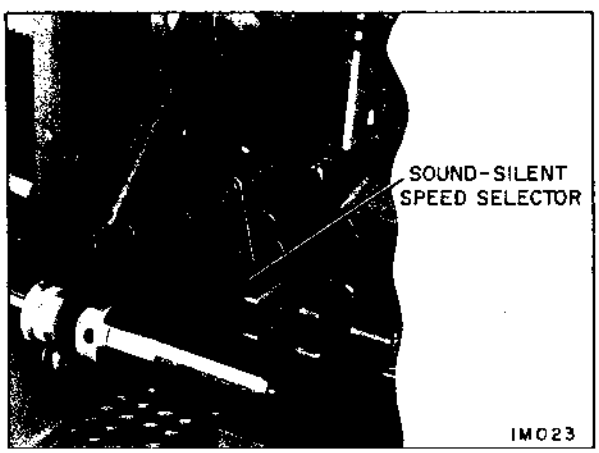


Figure 23

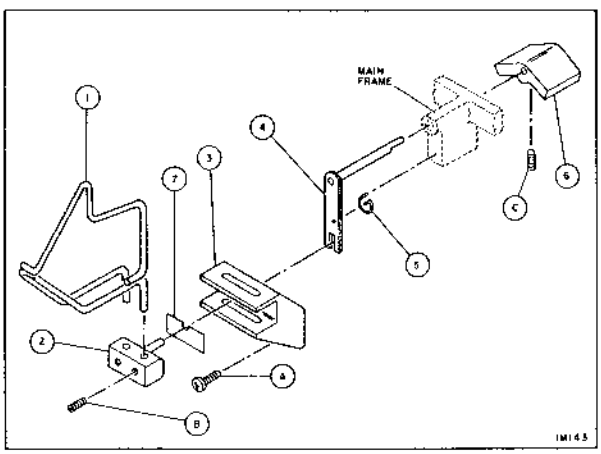


Figure 24

PARTS LIST

Illus. No.	Part No.	Description
	BELT SHIFTER ASSEMBLY	
1	B1896501	FORK
2	B3216501	SLIDE BLOCK
3	B3213001	SLIDE BRACKET
4	B1862501	SELECTOR SHAFT
5	A8096002	SPRING
6	B2185501	SELECTOR KNOB
7	A2100001	SPRING SHIM
A	A4702114	SCREW # 8-32 x .31
B	A8141033	SETSCREW # 6-32 x .25
C	A8141033	SETSCREW # 6-32 x .25

MAIN SHAFT SUPPORT AND FLUID CLUTCH

1. Perform rear cover removal procedures (page 14).

2. Remove four mounting screws (D) from main shaft support (7). Hold down slightly on spring extending from support while removing from projector. This will prevent loosening of felt pad (8). On MI-35181A remove reel brake shoe from claw travel adjustment screw.

3. Remove reverse drive belt (13).

4. Remove rewind belt (12).

5. Remove heavy retaining ring (G) (figure 26).

6. Remove reverse pulley (6).

7. Remove thin retaining ring (C).

8. Remove fluid clutch (5).

   NOTE: The fluid clutch is a sealed unit; therefore, no attempt should be made to service it. However, the clutch locking faces, (10) and (11) may be replaced by prying off with a thin bladed tool. New locking faces are installed by snapping into place.

9. To remove rewind drag clutch (4), remove retaining ring (B), slide off forward drive belt, and remove drag clutch.

10. To remove main sprocket shaft assembly, loosen setscrew in sprocket (1) and slide shaft clear of frame and lower sprocket drive belt (on back side of gear).

11. To remove shaft support bearing (9) remove retaining ring (F) in bearing recess.

12. To reassemble, reverse removal procedures.

13. If sprocket has been removed or loosened, refer to sprocket timing procedures.

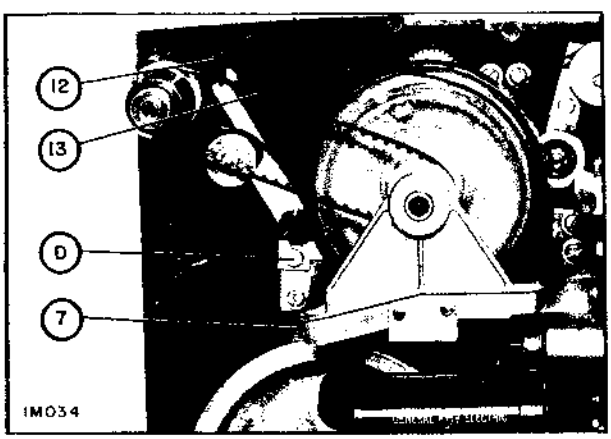


Figure 25

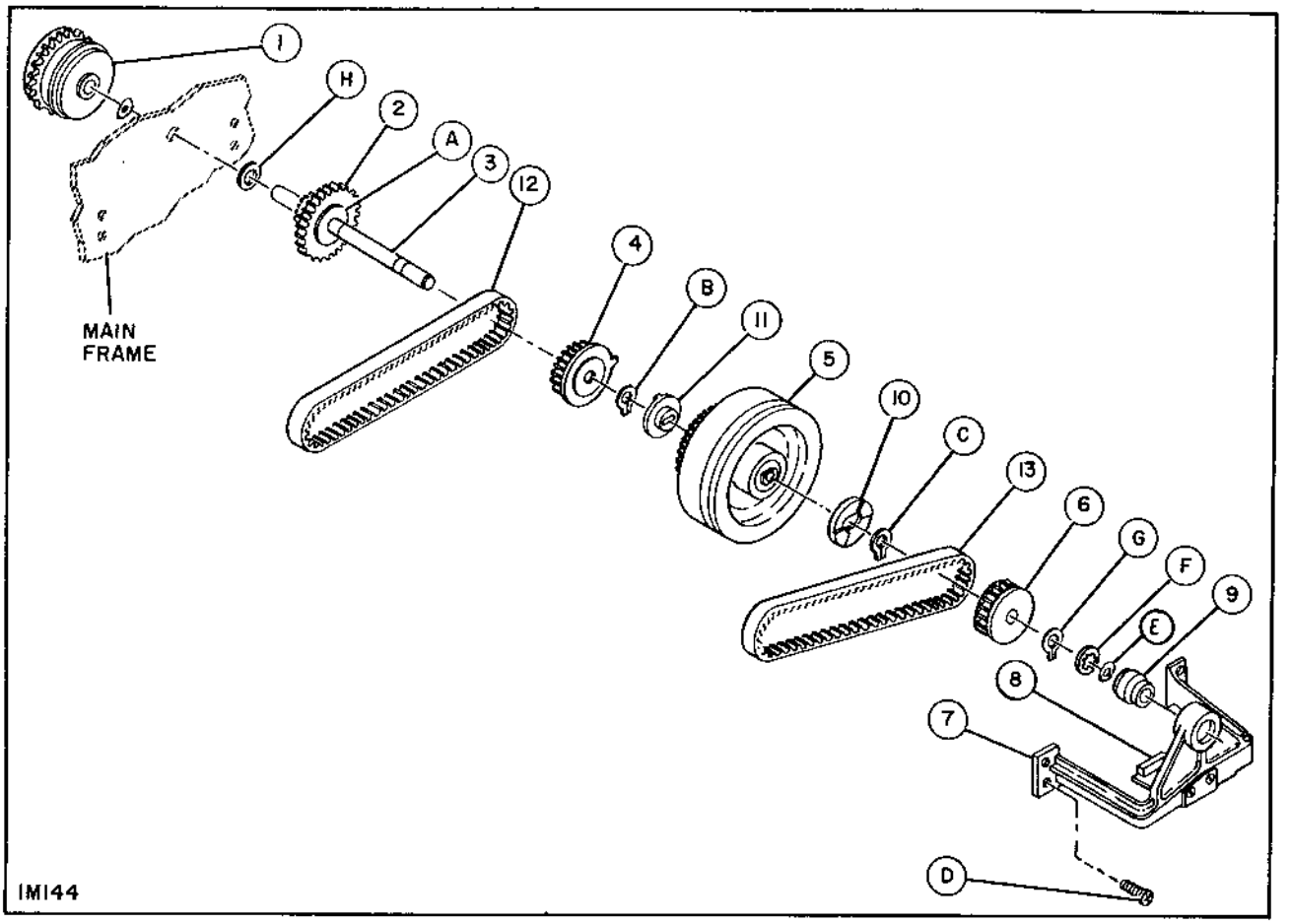


Figure 26

PARTS LIST

Illus. No.	Part No.	Description
MAIN SHAFT SUPPORT AND FLUID CLUTCH		
1	D4836503	SPROCKET
	A8141045	SETSCREW FOR ABOVE # 8-32 x .25
2	C8403501	GEAR
3	B3406502	GEAR AND SHAFT ASSEMBLY
4	C8463501	REWIND DRAG CLUTCH
5	C5834504	FLUID CLUTCH
6	C8462501	REVERSE PULLEY
7	C7100502	MAIN SHAFT SUPPORT ASSEMBLY
8	A4102001	DRAG PAD
9	A4100001	BEARING
10	B2100002	CLUTCH LOCKING FACE
11	B2100001	CLUTCH LOCKING FACE
12	B3164012	REWIND BELT
13	B3164011	REVERSE BELT
A	A8032002	SPACER
B,C	B0366007	RETAINING RING
D	A4702103	SCREW # 8-32 x .50
E	A4103001	NYLON WASHER
F	B4846007	RETAINING RING
G	A3899005	RETAINING RING
H	A6391026	WASHER

REWIND DRAG CLUTCH

1. To remove rewind drag clutch, perform steps 1 through 9 of Main Shaft Support and Fluid Clutch removal procedures (page 23).

2. To disassemble clutch, remove spanner nut (6) and slide off items (2) through (5) (figure 28).

   NOTE: Make certain that all parts of the drag clutch assembly are clean and free of any grease or oil before reassembling.

3. Assemble clutch and install onto shaft.

4. Install retaining ring.

5. Perform "Rewind Drag Clutch" adjustment procedure (page 67).

6. Reverse steps 1–8 of Main Shaft Support and Fluid Clutch removal procedures (page 23).

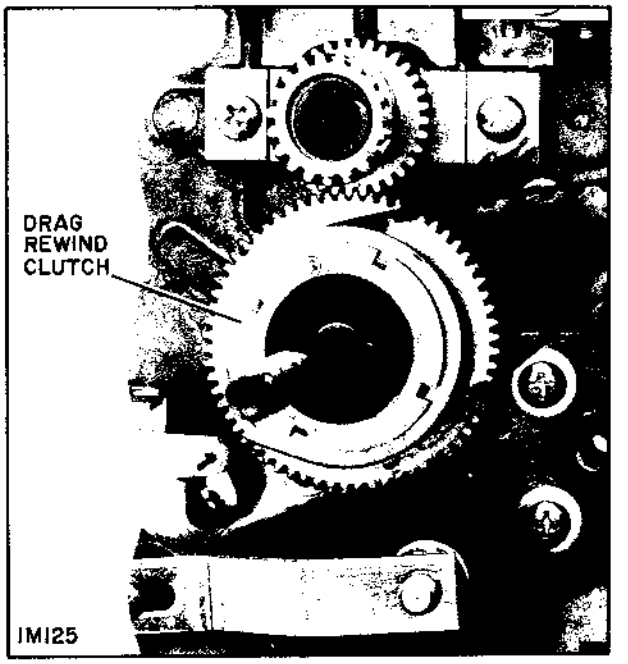


Figure 27

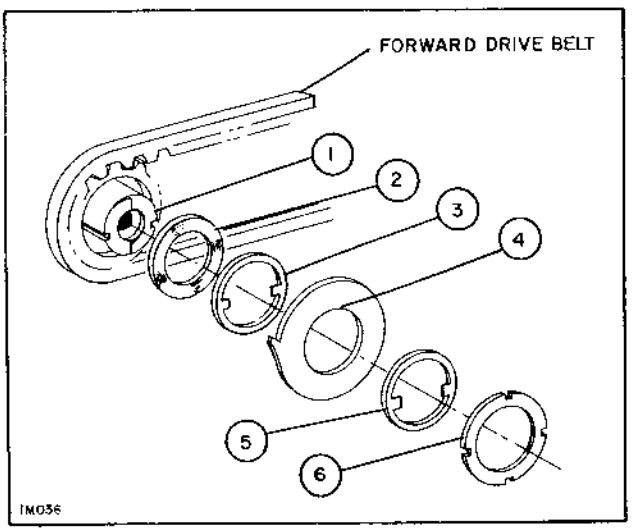


Figure 28

PARTS LIST

Illus. No.	Part No.	Description
REWIND DRAG CLUTCH		
1	A8527001	PULLEY
2	A8533001	SPRING WASHER
3	A8535002	CLUTCH FACE – THICK FIBER
4	A8532001	CLUTCH FACE – STEEL
5	A8535001	CLUTCH FACE – THIN FIBER
6	A8534001	SPANNER NUT

BLOWER HOUSING ASSEMBLY

1. Perform Rear Cover removal procedures (page 14).

2. Perform Power Transformer removal procedures. Do not disconnect leads. (See page 19).

3. MI-35181A – Perform steps 6 through 9 of Stop on Frame Mechanism disassembly (page 38).

4. To remove cover (2) remove nut (C), washer (B), and screws (E) and (F).

5. To remove impeller (3), remove retaining ring (G) from end of motor shaft.

   NOTE: On MI-35043A and MI-35181A, it may be necessary to loosen motor driver pulley and slide pulley to the left to permit removal of retaining ring (H). Mark position of pulley on shaft before loosening.

6. Remove retaining ring (H) from impeller and slide impeller out of blower housing.

7. To remove blower housing (1), remove nut (A), washer (B), and screw (E) (beneath base).

8. To replace impeller and blower housing, reverse removal procedures.

9. MI-35043A and MI-35181A – Reposition motor pulley to its proper location. (See pg. 73.)

   NOTE: Make certain that impeller does not touch cover when motor is running and belt is shifted.

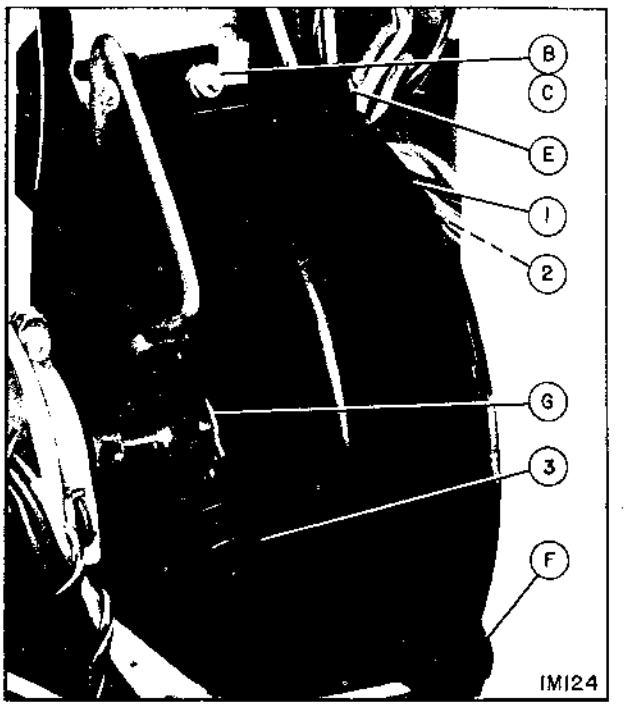


Figure 29

PARTS LIST

Illus. No.	Part No.	Description
BLOWER HOUSING ASSEMBLY		
1	D2849001	BLOWER HOUSING ASSEMBLY
2	C8866001	BLOWER COVER
3	C8867002	IMPELLER
4	A2065001	SPACER
A	A7435104	NUT #6-32
B	A2278104	FLAT WASHER #6-32
C	A7435104	NUT #6-32
D	A4702004	SCREW #6-32 x .62
E	A4702102	SCREW #8-32 x .38
F	A0305155	SCREW
G	A3899005	RETAINING RING
H	A3899008	RETAINING RING
J	A1154002	CLAMP

DRIVE GEAR ASSEMBLY

1. Perform rear cover removal procedures.(Page 14).
2. If necessary, perform fluid clutch removal. (Page 23).
3. Remove screws (A) from mounting plate and remove gear assembly.
4. To disassemble gear from plate, loosen setscrew (B) and slide shaft out of plate.
5. To reassemble, reverse removal procedures.
6. When reassembling, make certain that all parts are installed in the proper sequence. Use a .003 inch tolerance gauge to obtain proper end play.
7. Use gauge(part no. A9105000)to adjust gear mesh with sprocket gear. Install assembly to frame and insert screws. Do not tighten. Insert gauge pin between the two gears on their centerline. Press gear into mesh against gauge and tighten screws (A) to 18 inch-pounds of torque.

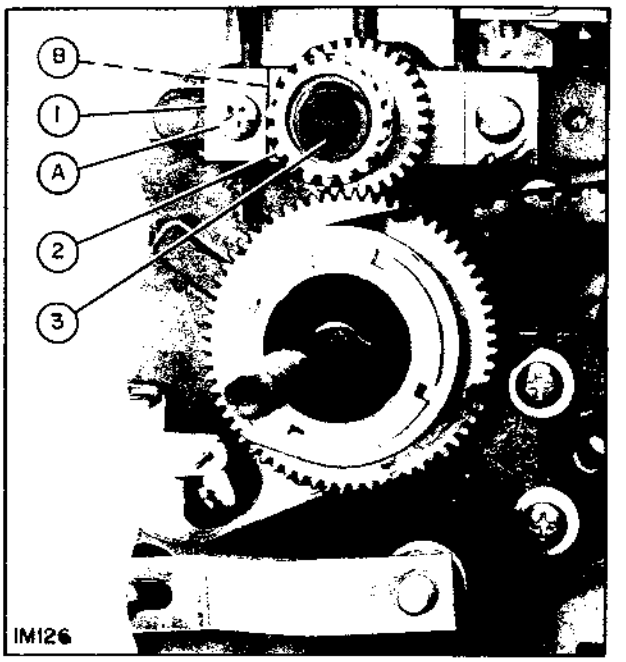


Figure 30

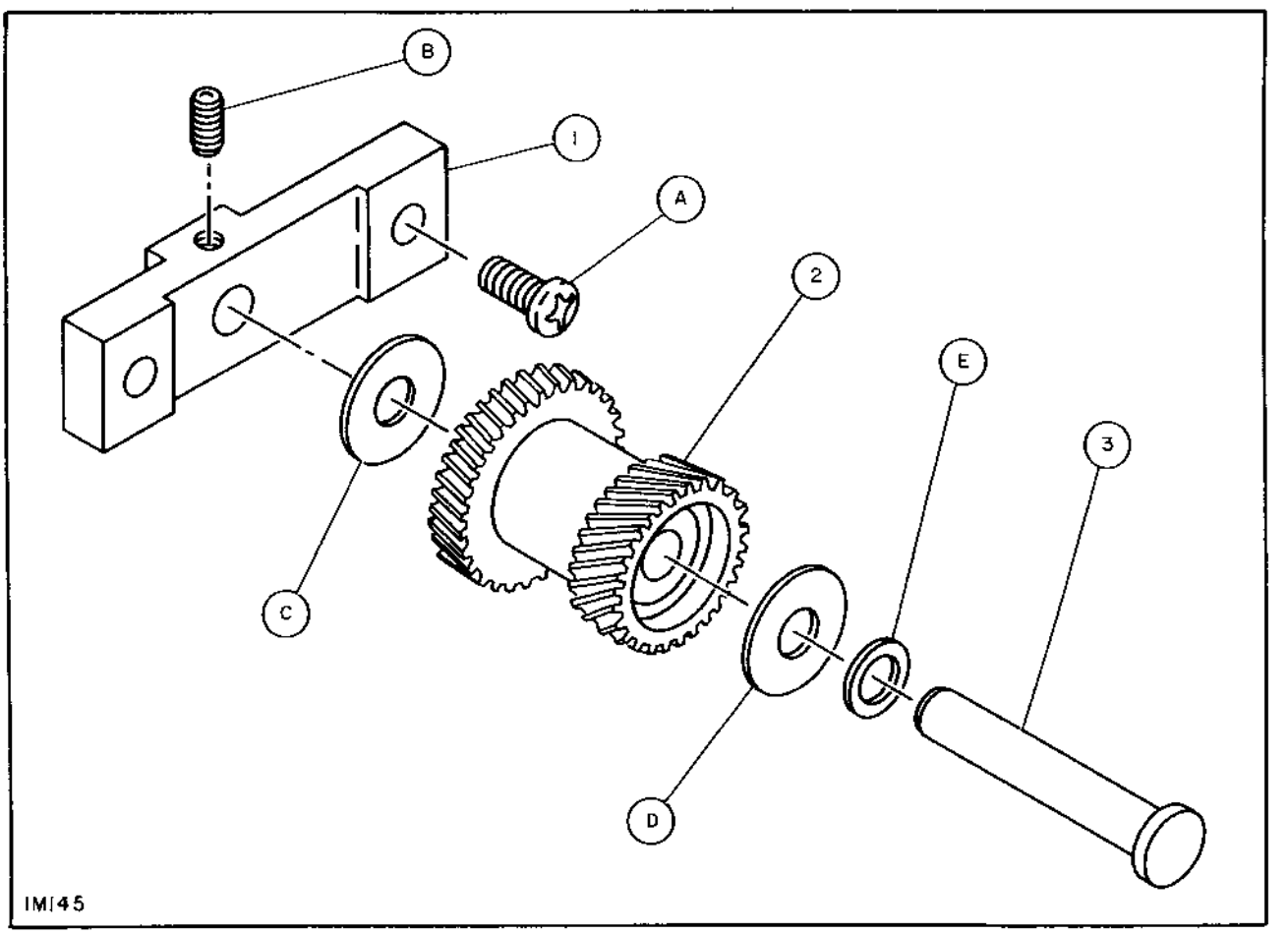


Figure 31

PARTS LIST

Illus. No.	Part No.	Description
DRIVE GEAR ASSEMBLY		
1	A4104001	MOUNTING PLATE
2	B1822501	GEAR ASSEMBLY
3	A8575001	SHAFT
A	A4702103	SCREW #8-32 x .50
B	A8099045	SETSCREW #8-32 x .25
C	A6391031	WASHER – THIN STEEL
D	A8078001	WASHER
E	A3271016	WASHER NYLATRON

REWIND PULLEY-CLUTCH ASSEMBLY

1. Perform rear cover removal procedures (page 14).
2. Remove retaining ring (C) and spring washer (B) from end of shaft (figure 33).
3. Remove belts from both pulley assemblies and remove pulleys from shaft.
4. To remove shaft, refer to front reel arm removal.
5. To disassemble rewind pulley clutch assembly, remove hex nut (A) and slide off items (1) through (8) from pulley (9).
6. To reassemble, reverse above procedures.

   NOTE: Clean all clutch parts (1 through 8) before reassembly.
7. Install retaining ring (C) so that spring washer (B) is slightly compressed.
8. Refer to "Rewind Capability Adjustment" for final adjustment (page 67).

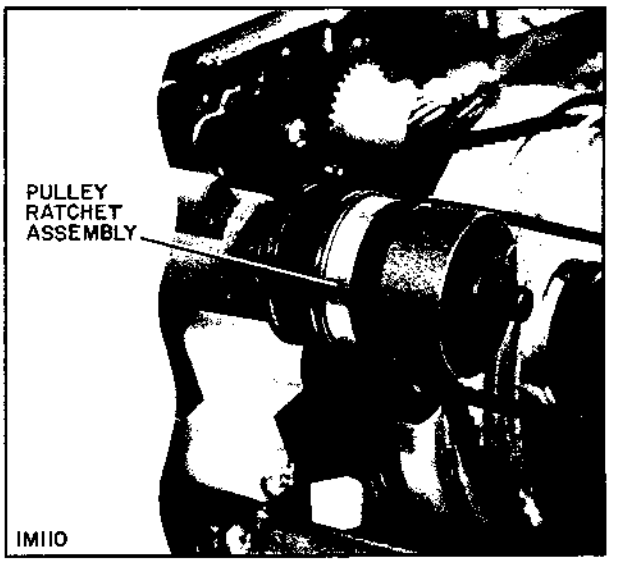


Figure 32

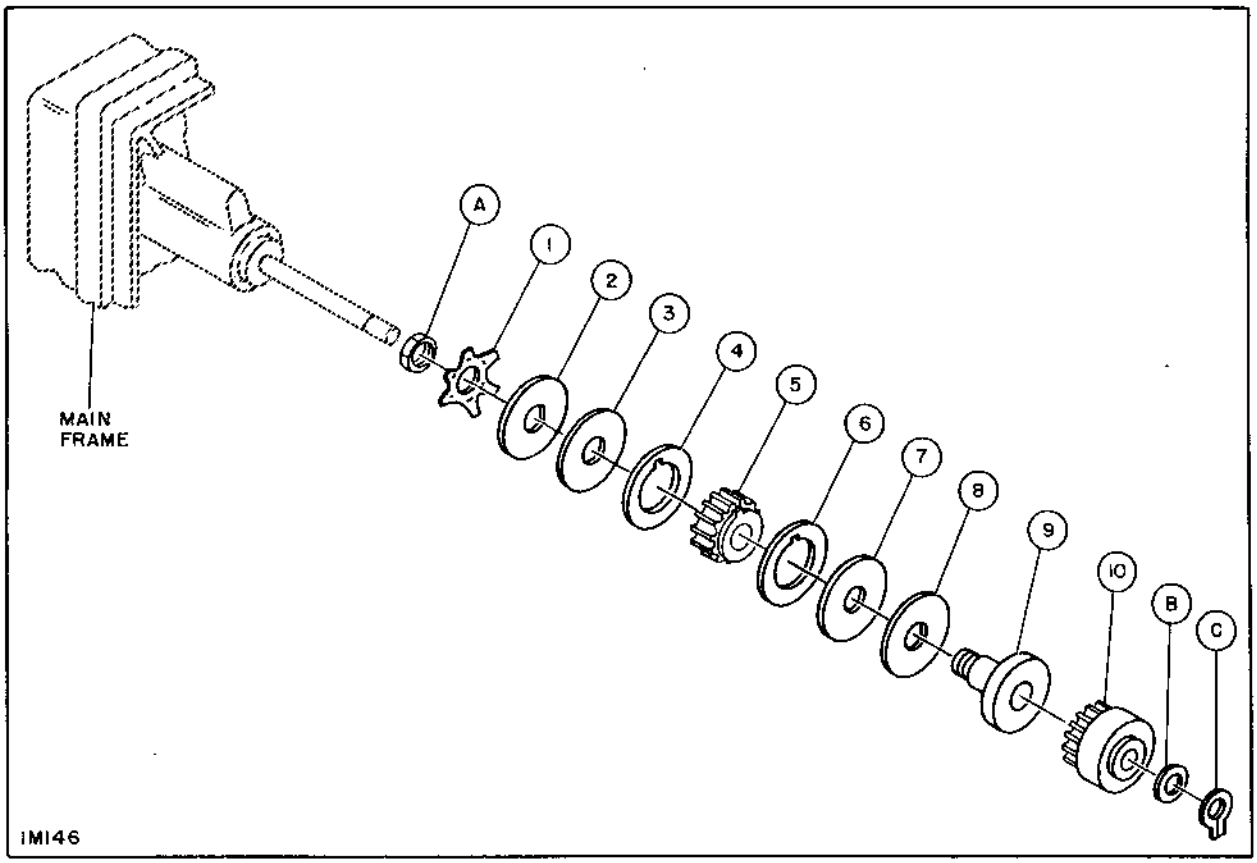


Figure 33

PARTS LIST

Illus. No.	Part No.	Description
REWIND PULLEY/CLUTCH ASSEMBLY		
1	A8077001	BOW WASHER
2	A8603001	SPACER
3	A8604001	BEARING
4	A8594001	FLANGE – HUB
5	B1825002	PULLEY
6	A8594001	FLANGE – HUB
7	A8604001	BEARING
8	A8603002	SPACER
9	B1836502	PULLEY ASSEMBLY
10	A8634501	REVERSE PULLEY ASSEMBLY
A	A9158129	NUT
B	A0423001	SPRING WASHER
C	A3899004	RETAINING RING

REEL ARM ASSEMBLY

NOTE: Disassembly of the front and rear reel arm is basically the same; therefore only the front reel arm assembly is shown and discussed. The parts list contains parts for both arms. The front and back half of each reel arm, if either is defective, should be replaced as a set. Machining of the arm is done as an assembly. Interchanging the halves of two arms could result in mis-alignment of screw or bearing holes.

1. Raise arm to operate position. (Refer to Figure 34).

2. Remove screws (A) on rear of arm, remove front half and internal parts (5), (7), (8), and (10). (Figure 35).

3. To remove shaft (1), spacer (2), and gear (6), loosen setscrew (C) and separate assembly. When reassembling, tighten setscrew onto flat of shaft.

4. To remove gear and shaft (13) from front arm, refer to Pulley-Clutch disassembly procedures. (Page 28).

5. To remove gear and shaft (13) from rear arm, refer to Torque Limiter disassembly procedures. (Page 32).

6. To remove reel arm from projector, remove screws (B) from retainer (12). Note position of slots in retainer for reassembly.

7. To remove bearings (4) and (9), press out from outside of arm. Apply uniform pressure to the outer diameter of the bearing.

8. To install bearing, press into arm from inside. Note that bearing in front half of arm has a protruding inner race while rear bearing races are flush.

9. To reassemble arm to projector, install retainer in proper position and tighten screws. Make certain that spacer washer (11) is still in position.

10. Refer to applicable assembly procedures from steps 4 or 5 to reassemble gear and shaft (13).

11. To reassemble arm, hold arm in horizontal position. Install spring (7) into rear of arm with protruding tab of spring positioned toward pawl slot.

12. Install pawl with long end toward retainer and flat side to bottom of slot.

13. Install belt (5) and button (8) into front half of arm.

14. Engage belt onto gear in rear half of arm and assemble arm.

15. Install screws (A) in rear of arm.

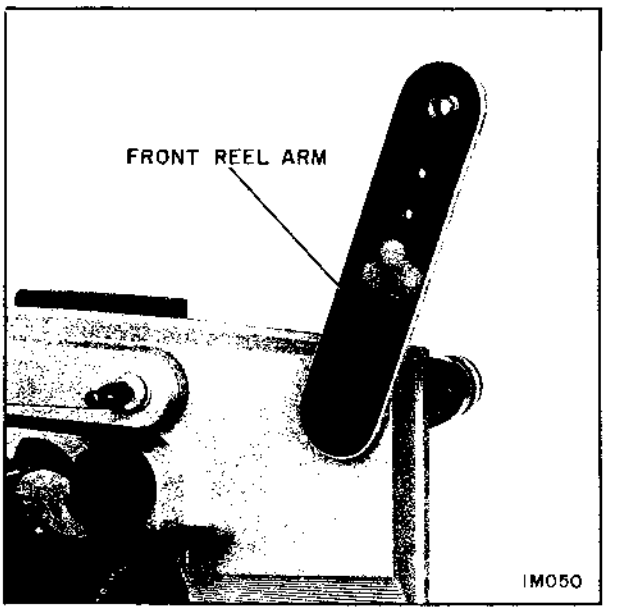


Figure 34

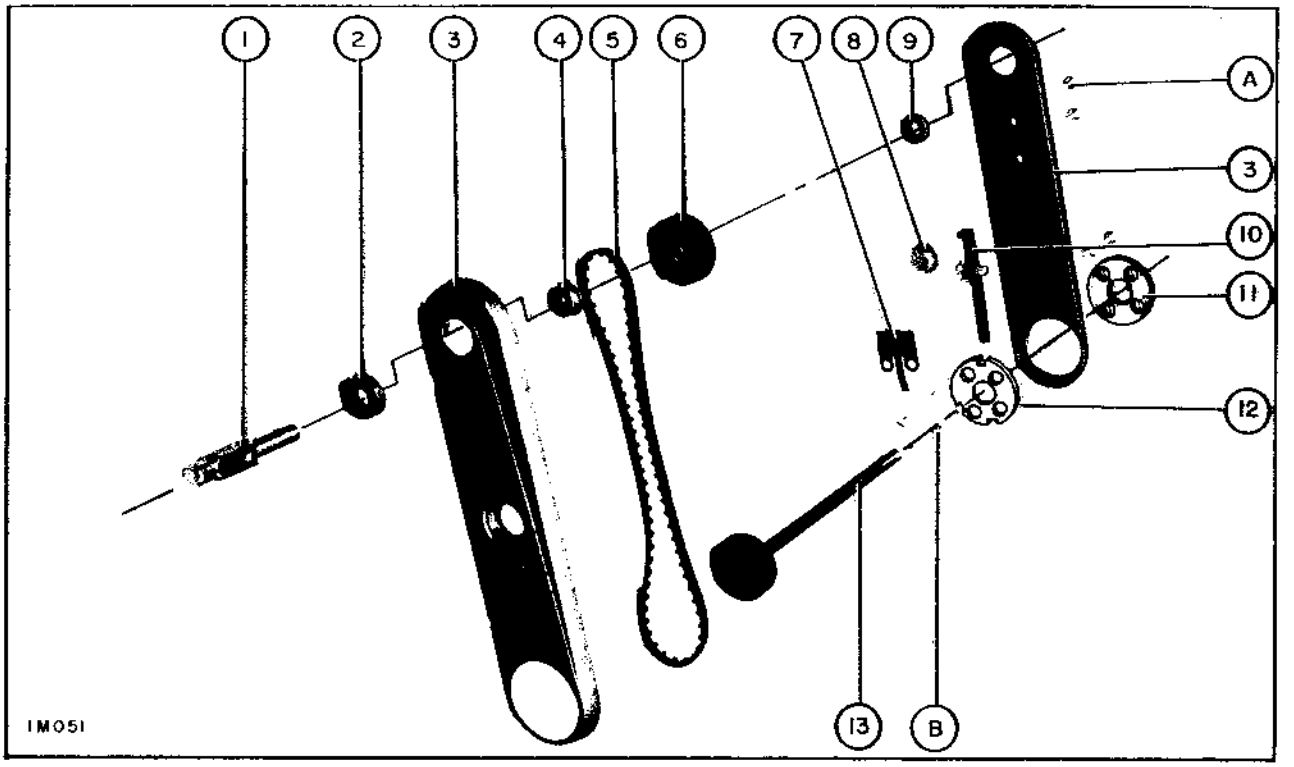


Figure 35

PARTS LIST

Illus. No.	Part No.	Description
		REEL ARM ASSEMBLY
1	A3985501	REEL ARM SHAFT (FRONT AND REAR)
2	A8011001	SPACER
3	C5547504	FRONT REEL ARM (MATING PAIR)
3	D1022504	REAR REEL ARM (MATING PAIR)
4	B3165001	BEARING (FRONT HALF)
5	B3164002	BELT-FRONT ARM
5	B3164001	BELT-REAR ARM
6	C5687502	GEAR
7	A8642001	SPRING
8	A3515003	BUTTON
9	B3165002	BEARING – (BACK HALF)
10	B3163502	PAWL ASSEMBLY
11	A4054003	SPACER WASHER (FRONT AND REAR)
12	B0039001	RETAINER (FRONT AND REAR)
13	B2266505	GEAR & SHAFT (FRONT)
13	B2265503	GEAR & SHAFT (REAR REEL ARM)
A	A7108008	SCREW #8-32 x .50 FLATHEAD
B	A7234002	SCREW #4-40 x .38 FLATHEAD
C	A8141034	SETSCREW #6-32 x .25
D	A3660001	TRIM DISC.

TORQUE LIMITER (REAR REEL ARM)

1. Perform rear cover removal procedures (page 14).

2. Remove retaining ring (1) from groove (A) and carefully slide items (2) through (10) from shaft. Do not overstress retaining ring.

3. To remove gear and shaft (13) remove retaining ring (11) from groove (B) and remove washer (12). Perform steps 1 and 2 of rear reel arm removal procedures. Remove gear and shaft from frame.

4. To reassemble, follow illustration closely. Install flange (8) with countersunk holes facing out toward balls.

5. Apply a small amount of grease to balls to hold in place during assembly.

6. Make certain that retaining rings are not overstressed and are firmly seated in shaft grooves.

7. Slide forward drive belt into position over torque limiter pulley. It may be necessary to release belt tension assembly to do this. See belt tension assembly (forward drive belt) procedures (page 33).

8. Reinstall rear cover.

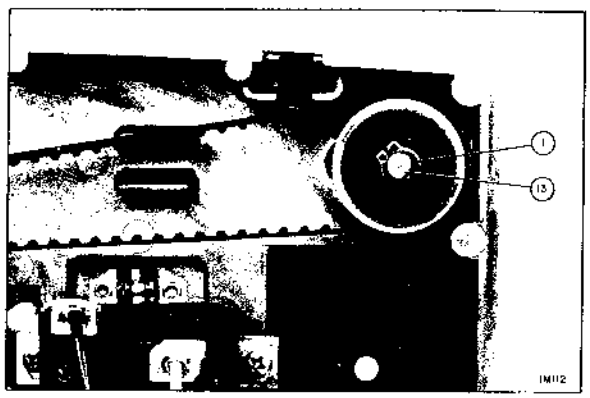


Figure 36

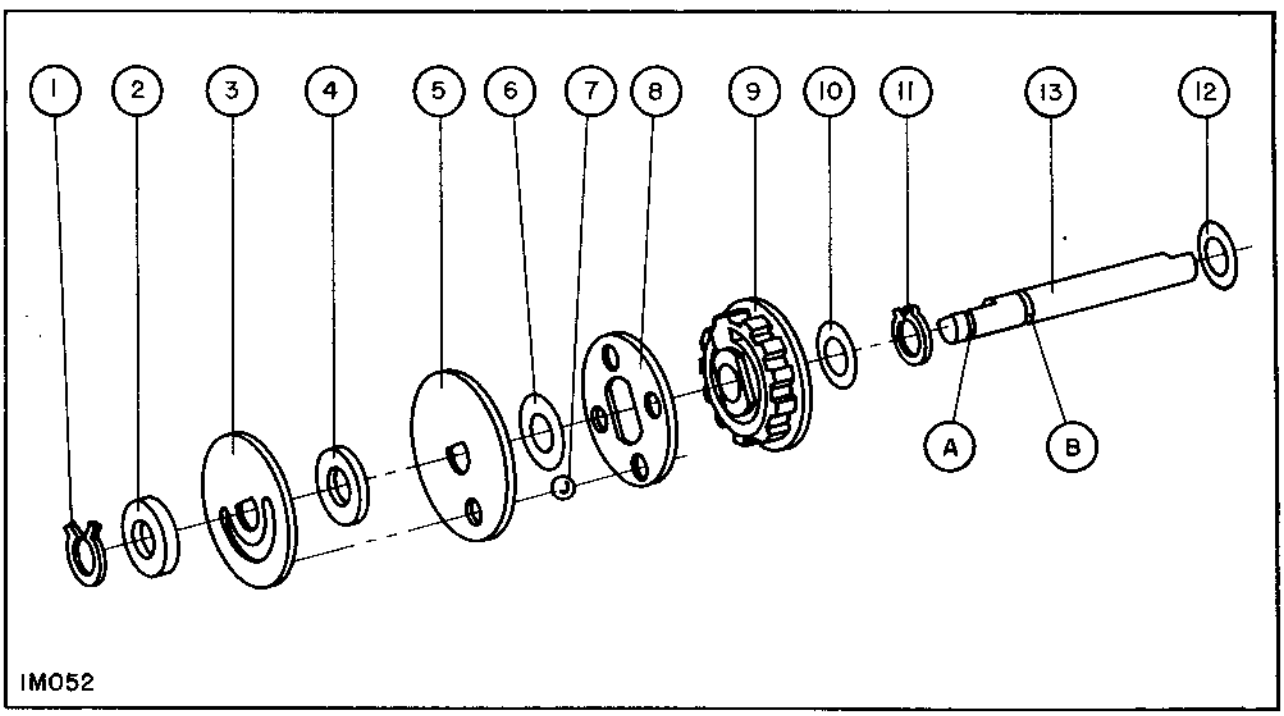


Figure 37

PARTS LIST

Illus. No.	Part No.	Description
	TORQUE LIMITER	
1	A3899004	RETAINING RING
2	A8572002	SPACER
3	A8569002	SPRING DISC
4	A8572002	SPACER
5	A8568001	BALL RETAINER
6	A5983025	WASHER – STEEL
7	A6757043	BALL
8	A8567001	FLANGE
9	C5687002	PULLEY
10	A6391045	WASHER – BLUE STEEL
11	A3899004	RETAINING RING
12	A6391045	WASHER - BLUE STEEL
13	B2265503	SHAFT

BELT TENSION ASSEMBLY (FORWARD DRIVE BELT)

1. Perform rear cover removal procedures (page 14).
2. Remove locking screw (A) and pivot screw (B) and tension assembly.
3. To remove roller (3) remove retaining ring (C).
4. To replace, reverse removal procedures. Position roller under lower side of belt.
5. Adjust belt tension so that moderate pressure at center of belt causes about 1/2 of an inch deflection. Tighten mounting screws.

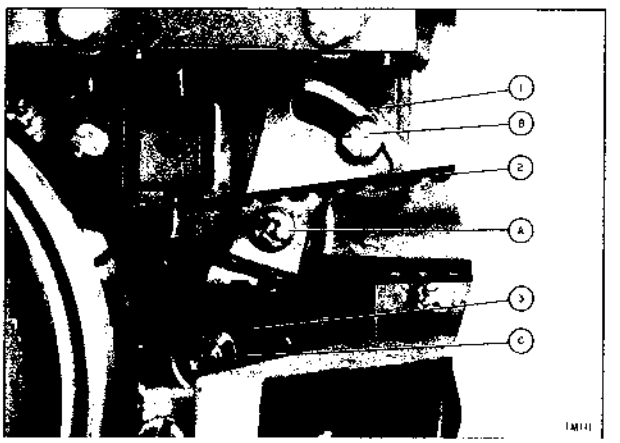


Figure 38

PARTS LIST

Illus. No.	Part No.	Description
	BELT TENSION ASSEMBLY (FORWARD DRIVE BELT)	
1	C5699502	BRACKET AND SHAFT ASSEMBLY
2	B3164010	BELT – FORWARD DRIVE
3	A3152001	ROLLER
A/B	A4702101	SCREW #8-32 x .25
C	A4106001	RETAINING RING

FIRST IDLER GEAR AND BRACKET

1. Perform rear cover removal procedures (page 14).

2. Perform Fluid Clutch and Main Shaft Support removal procedures (page 23).

3. Remove screw (F) and shaft support bracket (4)

4. Remove nuts (E) from idler shaft.

5. Remove gear (2) and washers (C) and (D). To remove bearings, press out of gear.

6. To remove bracket (1), remove screws (B) and washers (A). Slide bracket down and out.

   NOTE: Position of bracket is very critical. Improper positioning will result in damage to idler gear or bearings.

7. To install and position bracket, install screws (B) and washers (A). Do not tighten screws.

8. Slide mesh simulator gauge onto bracket shaft.

9. Position gauge and bracket so that gauge just touches both the worm gear and the upper sprocket gear.

10. Tighten mounting screws (B) and recheck fit of gauge at top and bottom. Gauge should rotate with slight binding. Tighten mounting screws to 24-inch-pounds.

11. Remove mesh gauge.

12. Install washer (C), bearings (3), gear (2), and washer (D) onto shaft.

13. Install first nut (E) onto shaft and hand tighten. Back off nut 1/6 of a turn. Hold in this position and lock with second nut. Tighten second nut securely.

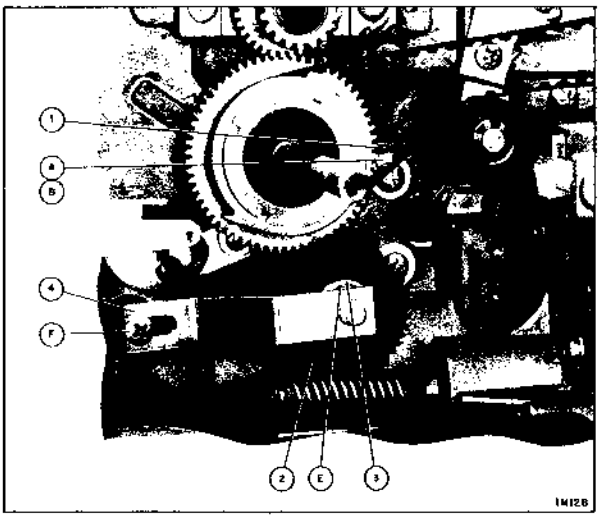


Figure 39

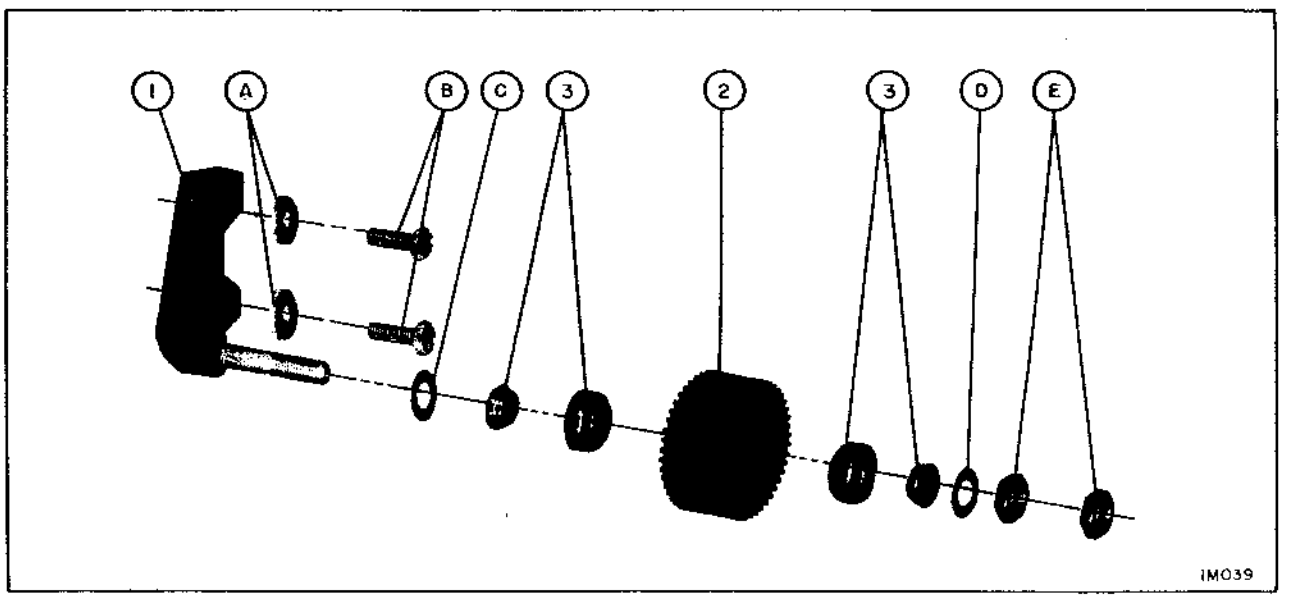


Figure 40

PARTS LIST

Illus. No.	Part No.	Description
FIRST IDLER GEAR AND BRACKET		
1	A8049504	FIRST IDLER BRACKET
2	A8219001	GEAR – FIRST IDLER
3	A8029001	BEARING
4	A8083001	SHAFT SUPPORT BRACKET
A	A5983020	FLAT WASHER
B	A4702104	SCREW #8-32 x .62
C/D	A8046006	FLAT WASHER (5/PKG.)
E	A9149059	NUT 1/4 – 32
F	A4702144	SCREW #8-32 x .31

CAM PULLEY ASSEMBLY MI-35043

1. Perform rear cover removal procedures (page 14).
2. Slide drive belt from cam pulley.
3. Perform lamp mounting plate removal procedures. It is not necessary to disconnect lamp socket leads.
4. Loosen two number 8 setscrews in cam pulley and slide pulley from worm shaft. Be careful not to lose spacer washers from worm shaft.
5. Remove screws (A) from cam (1) and remove items (1), (B), (2), (3), and (4).
6. To ensure proper alignment of all parts, reassembly should be done on Part No. A9014000 tool shaft.
7. Align holes, insert and tighten screws.
8. To reassemble, reverse removal procedures 1 through 4. Use caution in fitting the cam between the claw rails to avoid damaging the claw or felt lubrication pad.
9. Refer to claw protrusion adjustment procedures and adjust claw as necessary (page 69).

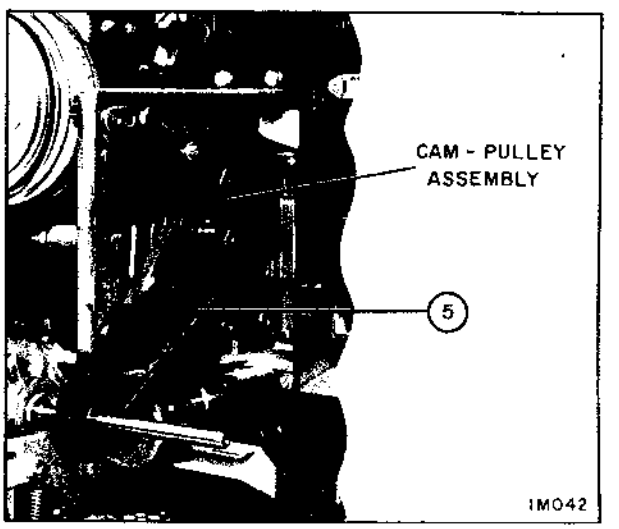


Figure 41

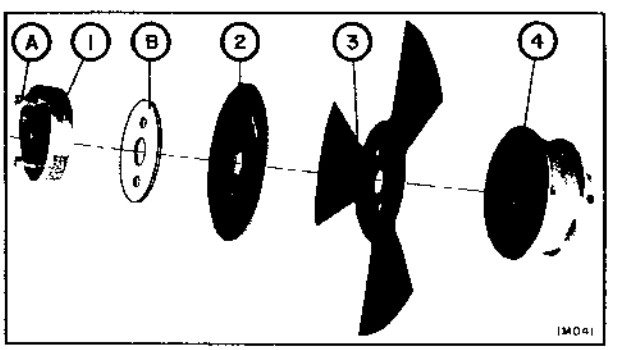


Figure 42

CAM PULLEY ASSEMBLY MI-35043A

1. Perform cam hanger removal procedures. Be careful not to lose spacer washers from worm shaft (page 42).
2. Perform steps 5 through 7 of Cam Pulley assembly removal procedures (MI-35043) (page 35).
3. To reassemble, reverse removal procedures.
4. Refer to claw adjustment and upper sprocket timing procedures (pages 66 and 68).

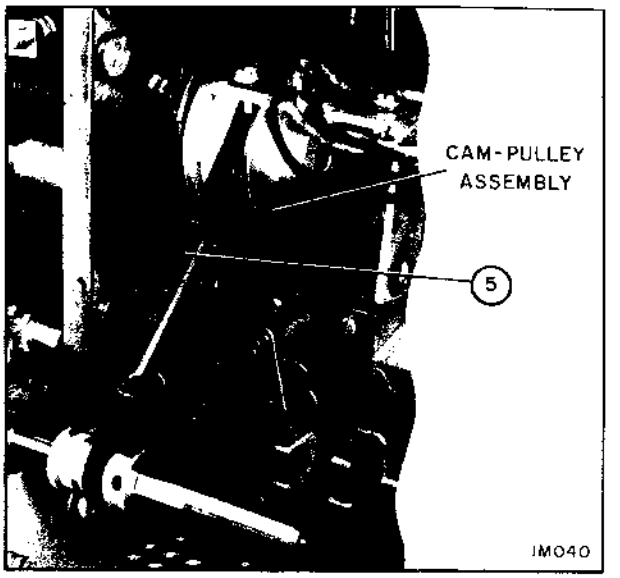


Figure 43

CAM PULLEY ASSEMBLY (MI-35181A)

1. Perform rear cover removal procedures (page 14).
2. Perform steps 7 through 10 of stop on frame mechanism disassembly (page 38).
3. Perform cam hanger assembly removal steps 2 through 10 (page 42).
4. Perform steps 5 through 7 of cam-pulley assembly removal procedures (MI-35043) (page 35).
5. To reassemble, reverse removal procedures. Note that there are two flats on the worm shaft.
6. Refer to claw adjustment procedures (page 68).

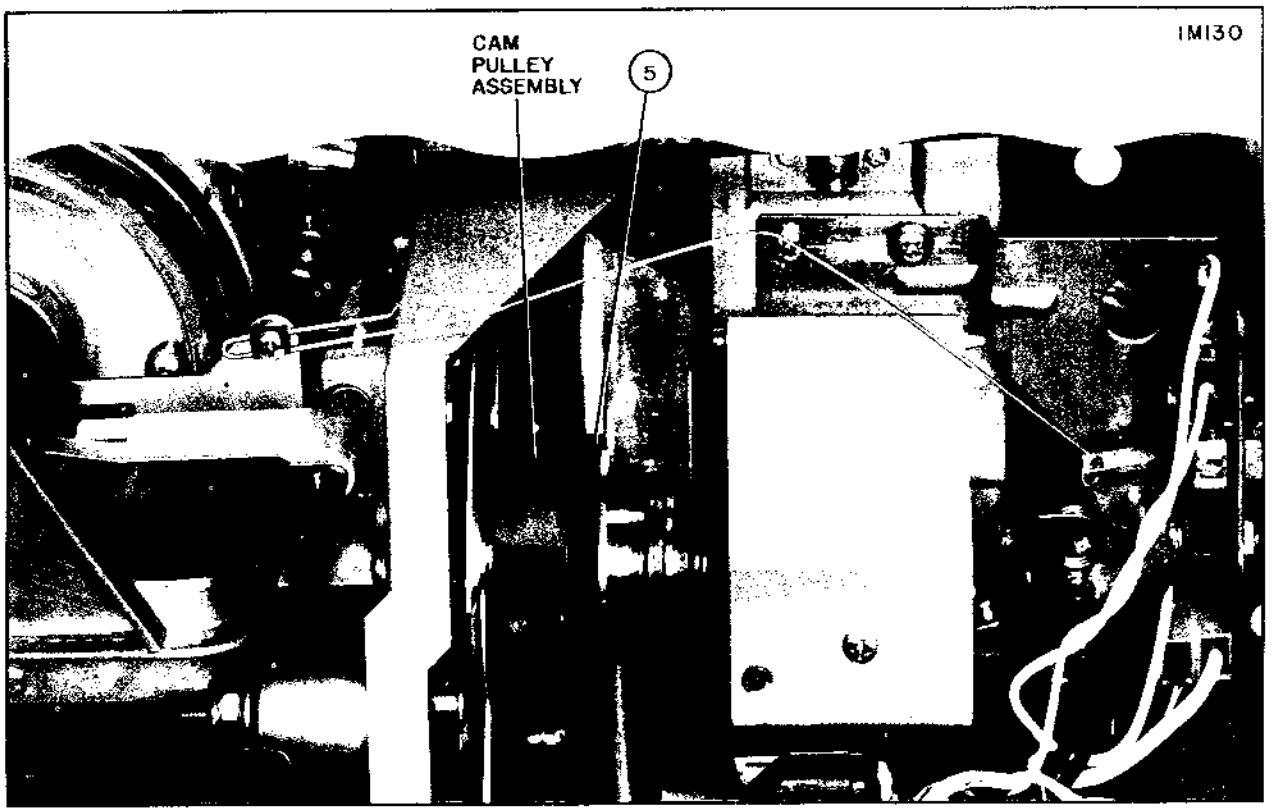


Figure 44

PARTS LIST

Illus. No.	Part No.	Description
	CAM PULLEY ASSEMBLY	
1	B2274001	CONSTANT DIAMETER CAM
2	C8415001	IN-OUT CAM
3	B2161001	SHUTTER
4	B1871002	DRIVE PULLEY MI-35043
4	B1829001	DRIVE PULLEY MI-35043A
4	B1910001	PULLEY ASSEMBLY WITH BUSHINGS MI-35181A
4	B1821001	CAM MOUNTING DISC, MI-35181A
5	A8682001	DRIVE BELT
A	A8030002	SCREW #6-32 x .188 SLOT HEAD MI-35043 MI-35043A
A	A8030001	SCREW #6-32 x .188 SLOT HEAD MI-35181A
B	A8113001	NYLON SPACER
C	A8141057	SETSCREW #10-32, MI-35181A
C	A8099047	SETSCREW #8-32 MI-35043 MI-35043A

BACKPLATE ASSEMBLY

1. Perform rear cover removal procedures (page 14).
2. To remove lens gate loosen locknuts on pivot screws and back out screws to free gate.
3. Refer to lamp mounting plate removal procedure. Lamp socket leads need not be disconnected (page 7).
4. Perform cam hanger removal procedures (page 42).
5. Loosen setscrews on belt shifter knob (MI-35043A and MI-35181A).
6. Remove four mounting screws (A).
7. Slide back plate out of projector.
8. When replacing back plate, torque the mounting screws to 23 inch-pounds.
9. To remove flare (2) and shield (3), remove mounting screws (B).

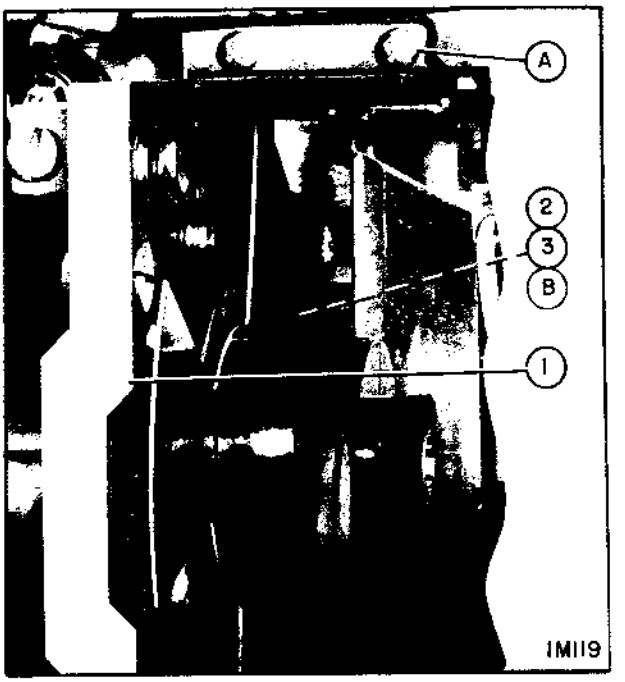


Figure 45

PARTS LIST

Illus. No.	Part No.	Description
	BACKPLATE ASSEMBLY	
1	R5711001	BACKPLATE CASTING
2	B2097002	FLARE
3	A8656001	SHIELD
A	A4702103	SCREW #8-32 x .50
B	A8154102	SCREW #6-32 x .25

STOP ON FRAME MECHANISM

1. Perform rear cover removal procedures. (Page 14).

2. Disconnect leads from microswitch S3 (7). Note location for reassembly.

3. Loosen screw (A) on reel brake (1) and remove wire link (2). (Figure 47).

4. Remove control knob (3), from front of unit. (Figure 48).
5. Remove two screws (B) from lever support (4), disconnect spring (5), and remove support.

6. To disassemble lever support (4), remove screws (C), insulation (16), switch (7), and shaft assembly (6). (Figure 48).

7. Remove lamphouse cover.

8. Perform lamp mounting bracket removal procedures 1 through 3. Leads need not be disconnected.

9. Remove (3) screws (D) from inside lamphouse which mounts the latch and shield assembly.

10. Remove latch and shield assembly. Hold shield in upright position, tilt assembly to the rear, and turn to the left while lifting out.

11. To disassemble latch and shield assembly, remove C–washer (E) and pivot shaft (9). Note position of thrust washers (F) for reassembly.

12. Remove cam stop latch plate (10).

13. To remove heat shield link (11), press out through lever (12). To reassemble, see illustration for proper position.

14. To remove shield assembly (13), loosen setscrews (G) in collar and remove from link. To reassemble, see illustration for proper position.

15. To remove drive arm (14), remove screws (L), and washers (J) and (K).

NOTE: If steps 13, 14, or 15 have been performed, it will be necessary to adjust the position of drive arm (14) (after reassembly is complete) so that heat shield is centered over flare opening when projector is in the "still" mode of operation.

16. To remove cam stop (15), hold nut and remove screw (L). After reassembly, adjust cam stop so that forward end of cam-stop latch plate (just beneath stop on frame clutch) clears larger diameter section of clutch by at least 1/16 of an inch.

17. To reassemble, reverse above procedures.

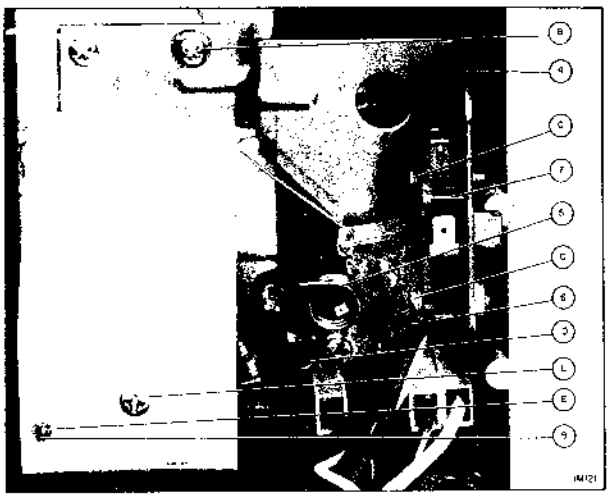


Figure 46

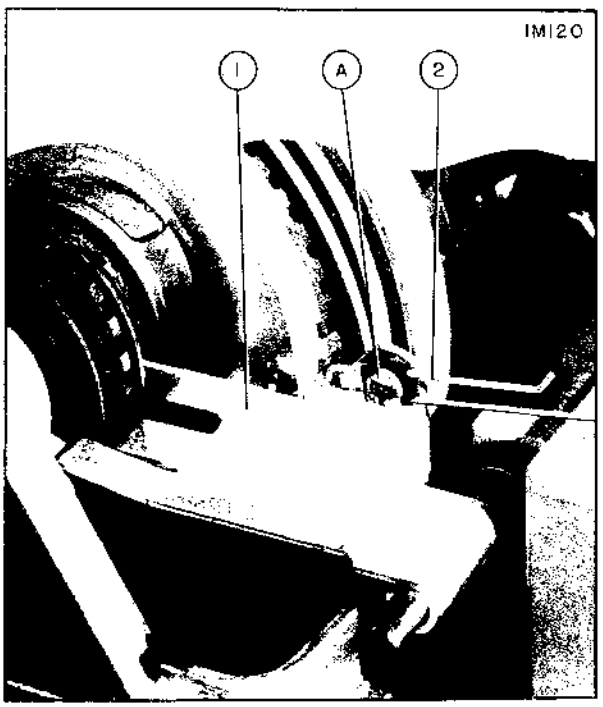


Figure 47

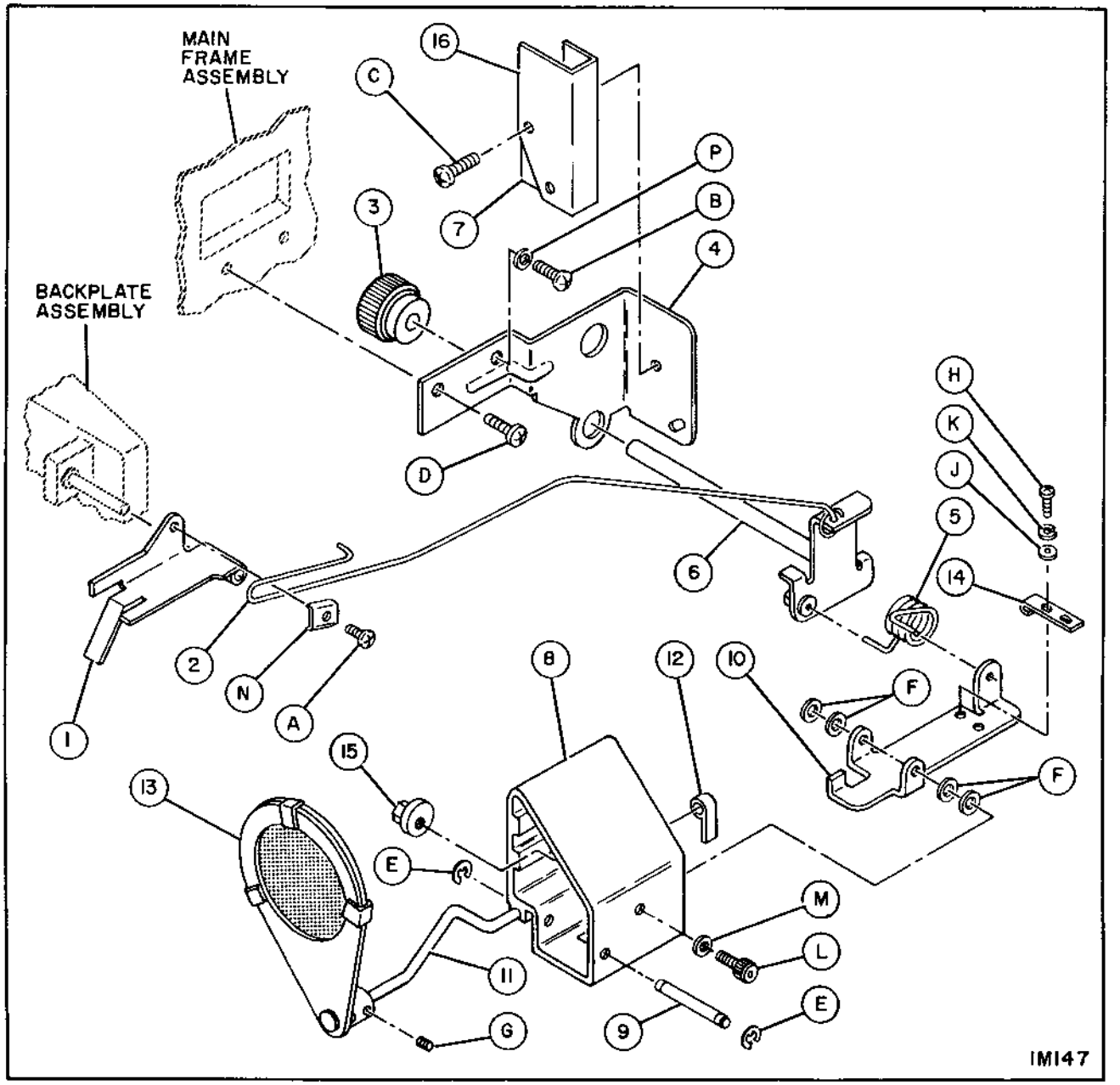

MAIN
FRAME
ASSEMBLY
BACKPLATE
ASSEMBLY
16
C
7
P
B
4
3
D
H
K
J
5
14
6
2
N
A
I
8
12
10
F
F
15
13
E
M
L
11
G
9
E
IM147

Figure 48

PART LIST

Illus. No.	Part No.	Description
		STOP ON FRAME MECHANISM
1	A2040001	REEL BRAKE SHOE
2	B1897001	WIRE LINK
3	D4849002	KNOB
4	C8483001	LEVER SUPPORT
5	A2034001	DRIVE SPRING
6	A2032001	SHAFT ASSEMBLY
7	A8544001	MICRO SWITCH 53
8	B1869001	LATCH SUPPORT
9	A2033001	PIVOT SHAFT
10	B1892001	CAM STOP LATCH
11	B1891001	HEAT SHIELD LINK
12	A2050001	LEVER
13	A2028501	SHIELD ASSEMBLY
14	A2037001	DRIVE ARM
15	A8892002	CAM STOP
16	A2090001	INSULATION
A	A4702602	SCREW-BRAKE SHOE #4-40 x .38
B	A4702003	SCREW #6-32 x .50
C	A0104117	SCREW #4-40 x .75
D	A4702003	SCREW #6-32 x .50
E	A9373001	RETAINING RING
F	A2038001	THRUST WASHER
G	A8141011	SETSCREW #4-40 x .112
H	A0102103	SCREW #2-56 x .19
J	A9784103	FLAT WASHER #4
K	A3610105	LOCK WASHER #4 EXT. TOOTH
L	A0311113	SCREW #6-32 x .50
M	A9784104	FLAT WASHER #6
N	A2064001	RETAINER
P	A9784103	FLAT WASHER #4

STOP ON FRAME CLUTCH

1. Perform Stop on Frame Mechanism removal steps 1, 2, 3, 4, 5, 7, 8, 9, and 10 (page 38).
2. Remove locknut (1) (figure 49).
3. Remove drive bushing (2), drive spring (3), and drive plate assembly (4), (5), and (6).
4. To disassemble drive plate assembly, remove screws (A).
5. Remove thrust washers (B), (C), (D), and (E) roller separator (7) and inner race (5).
6. To remove pulley assembly (10), loosen (4) mounting screws in hanger (see hanger assembly).
7. Tighten claw travel adjustment screw 10 turns. This will allow sufficient clearance for pulley to be removed. Slide pulley from worm shaft.
8. To reassemble, reverse assembly procedures.

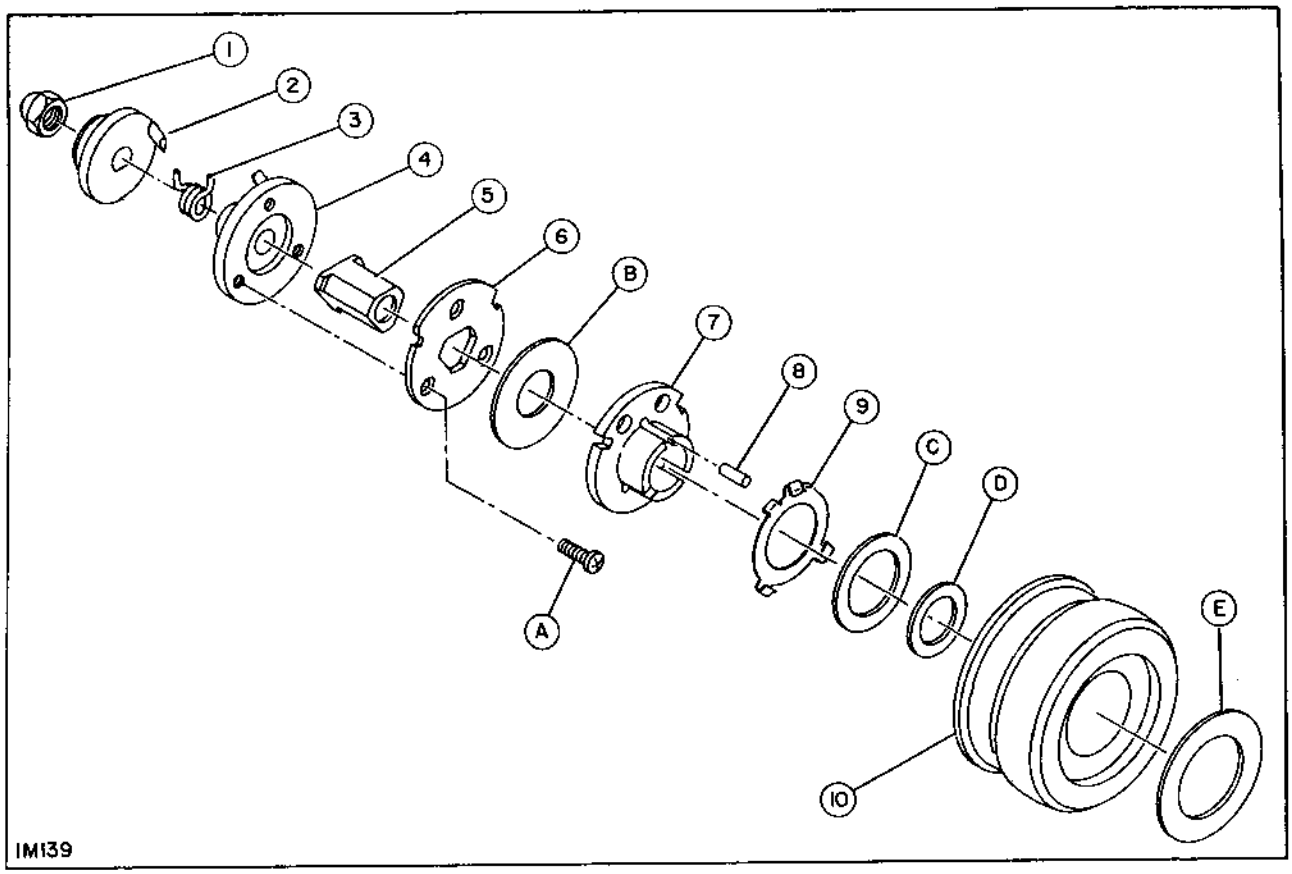


Figure 49

PARTS LIST

Illus. No.	Part No.	Description
STOP ON FRAME CLUTCH		
1	A5442016	LOCKNUT #10-32
2	A8673001	DRIVE BUSHING
3	A2034001	DRIVE SPRING
4	A8674001	DRIVE PLATE
5	A8631001	INNER RACE
6	B1835001	SHAFT STOP
7	B1819001	ROLLER SEPARATOR
8	A8586001	ROLLER
9	B1820001	SPRING
10	B1910001	PULLEY ASSEMBLY (WITH BUSHINGS)
A	A0102102	SCREW #2-56 x .19
B	A8587002	THRUST WASHER
C	A8587003	THRUST WASHER
D	A8587004	THRUST WASHER
E	A8587001	THRUST WASHER

CAM HANGER ASSEMBLY

1. Perform rear cover removal procedures (page 14).

2. Perform Main Shaft Support and Fluid Clutch removal procedures (page 23).

3. Perform First Idler Gear removal procedures 1-4 (page 34).

4. Slide drive belt from drive pulley (MI-35043 and MI-35043A) (page 51).

   NOTE: Prior to removing the cam hanger, mark the position of the hanger on the back plate. This mark will provide a reference point to start the claw travel adjustment.

5. On MI-35181A perform steps 7 through 10 of stop on frame disassembly procedures (page 38)

6. Loosen two setscrews in cam-shutter assembly.

7. Remove four hanger mounting screws (B).

8. On MI-35181A, loosen two screws in belt tension assembly (forward drive belt), lift belt from tension pulley, and swing belt tension assembly to a raised position. This will allow additional clearance for removal of the hanger assembly.

9. Remove C-washer (C) from claw travel adjustment screw (F) and remove screw and spring washer (G).

10. Move hanger assembly to the left, cam shutter assembly to the right, separate the two assemblies and remove from projector. Be careful not to lose spacers from worm shaft.

11. To reassemble, reverse above procedures.

CAUTION

Be careful when installing the cam assembly to avoid damage to the felt oiler pad on claw assembly.

12. Refer to claw adjustment and upper sprocket timing procedures (pages 66 and 68).

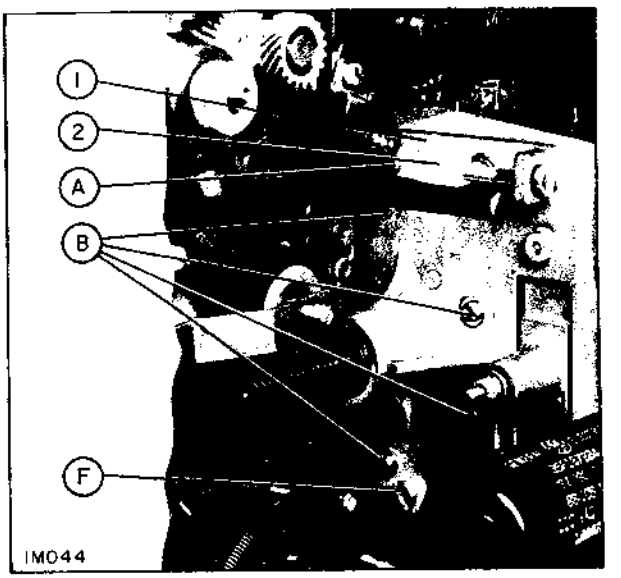


Figure 50

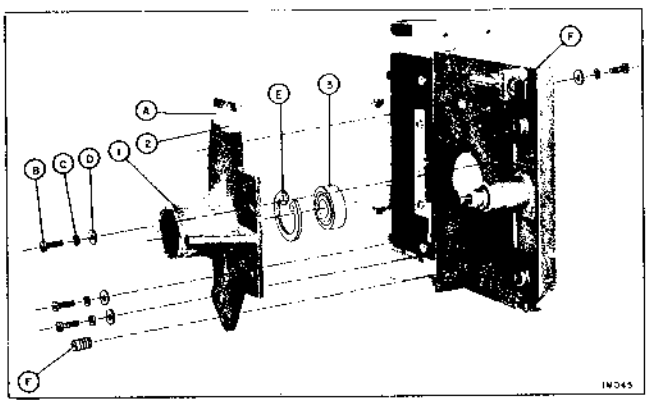


Figure 51

PARTS LIST

Illus. No.	Part No.	Description
CAM HANGER ASSEMBLY		
1	B0056502	HANGER
2	A6086001	LINK
3	A3856001	BEARING
A	A3605403	C–WASHER
B	A4702002	SCREW #6-32 x .38
C	A3605406	C–WASHER
D	A2278104	FLATWASHER #6
E	B0355713	RETAINING RING
F	A3578001	SHOULDER SCREW MI-35043 & MI-35043A
F	A2041001	SHOULDER SCREW MI-35181A
G	A6211004	SPRING WASHER
H	A8649001	PIN

WORM GEAR SHAFT AND CAM HANGER ASSEMBLY

1. Perform rear cover removal procedures (page 14).
2. Perform cam hanger removal procedures (page 42).
3. Remove retaining ring (D) from rear end of worm shaft and spacer (C).

   NOTE: Worm gear bearings are preloaded with spring (3). Apply slight pressure to end of worm shaft while removing retaining ring.
4. Remove worm shaft (1), washers (A), spring (3), and bearing (2).
5. Rear bearing is mounted in hanger with loctite bearing mount. Remove retaining ring (B) from bore and carefully drive bearing out with a large diameter tool which touches only the outer race (7/8" dia). Use Tool P/N B9219000 for reassembly.

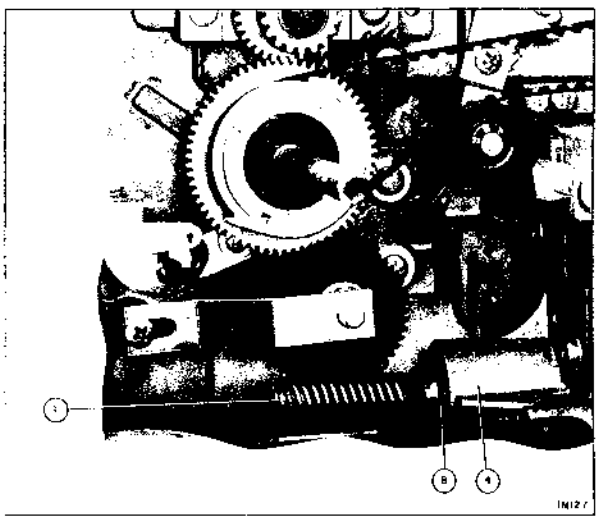


Figure 52

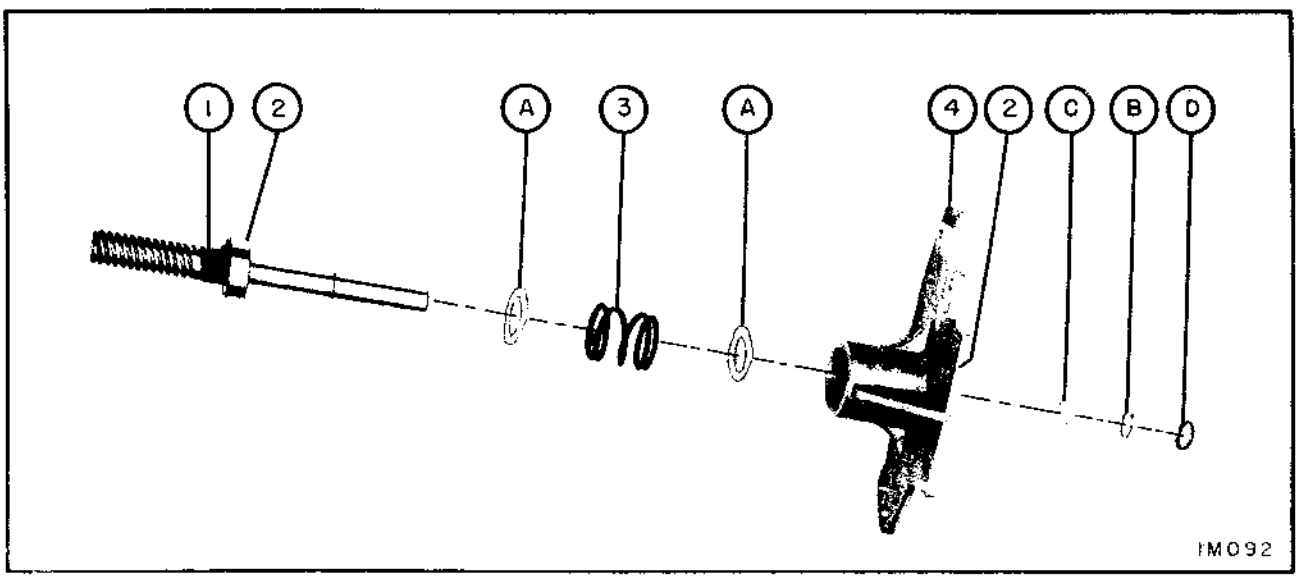


Figure 53

PARTS LIST

Illus. No.	Part No.	Description
WORM GEAR ASSEMBLY		
1	B0024003	WORM GEAR MI-35043A
1	B1812001	WORM GEAR MI-35181A
2	A3856001	BEARING
3	B4662001	SPRING
4	B0056502	HANGER
A	A8046003	WASHER
B	B0355713	RETAINING RING
C	A8214001	SPACER
D	B0366008	RETAINING RING

FRAMING PLATE ASSEMBLY

1. Perform rear cover removal procedures. (Page 14).
2. Perform cam-pulley removal procedures. (Pages 35, 36).
3. Perform step 2 of Framing Beam removal procedure. (Page 45).
4. Perform Claw Assembly removal procedures. (Page 46).
5. Remove shoulder screws (2), spring washers (A), and flat washers (B) from framing plate.
6. Remove framing plate (1).
7. To remove eccentric pin (3) remove locknut (G), spring washer (F), and flat washers (D) and (E).

   NOTE: Clean eccentric pin and bushing and lubricate with silicone fluid. The pin and both ends of the bushing should be coated with fluid.

8. To replace eccentric pin, replace pin, washers and locknut. Tighten nut until spring washer is completely compressed. Then back off one turn. Rotate pin to position shown in illustration.
9. To replace framing plate, install screws and washers removed in step 6. Plate should slide with a force of 2-1/2 to 5 pounds. It may be necessary to add or remove thin flat washers (D) to obtain proper drag.
10. To reassemble, reverse above procedures 1–8.

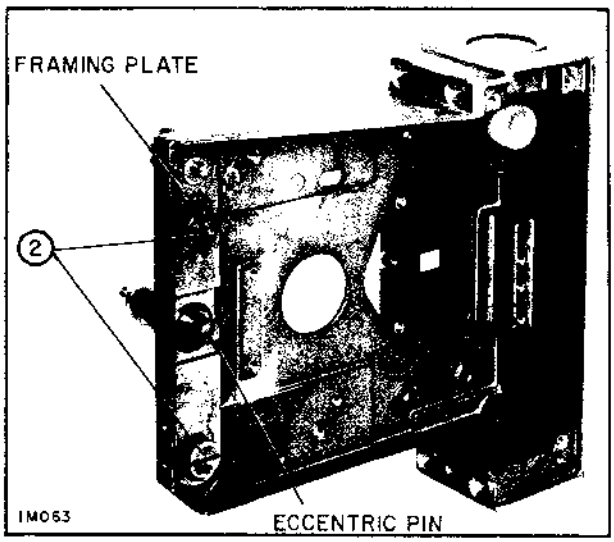


Figure 54

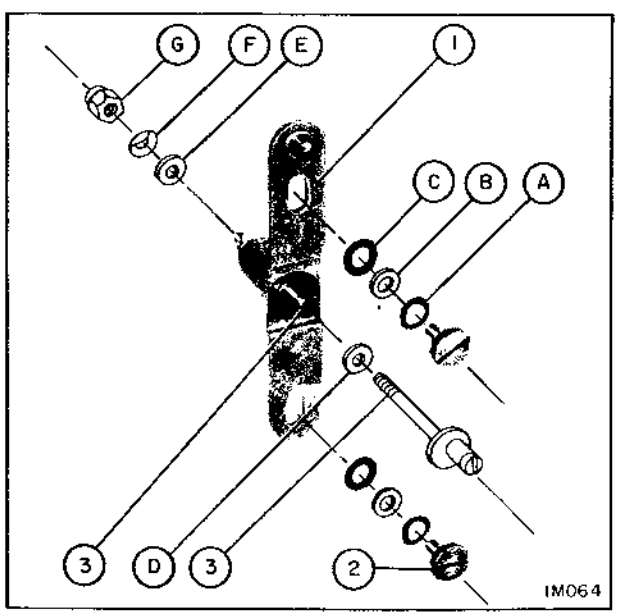


Figure 55

PARTS LIST

Illus. No.	Part No.	Description
FRAMING PLATE ASSEMBLY		
1	B0019501	FRAMING PLATE
2	A4031001	SHOULDER SCREW
3	B2307001	ECCENTRIC PIN
A	A0423001	SPRING WASHER
B	A8046005	FLAT WASHER
C	A6391045	FLAT WASHER – THIN
D	A6391017	FLAT WASHER – THIN
E	A2278405	FLAT WASHER – #8
F	A8035001	SPRING WASHER
G	A5442013	LOCKNUT – # 8-32
	A4705005	SILICONE FLUID LUBRICANT

FRAMING BEAM ASSEMBLY

1. Perform rear cover removal procedures (page 14).
2. Remove shoulder screw (A) and slide beam (1) out of backplate. It will be necessary to rotate shutter to remove framing beam.
3. To remove framing knob (2), remove C–washers (C) and unscrew knob from nut (3).
4. To install framing knob, reverse step 3.
5. To replace framing beam, reverse step 2.
6. Adjust framing knob until nut (3) is centered between C–washers (C).
7. Install test film, turn on projector, and focus image.
8. Observe framing. If framing is not centered, turn off projector and back off screw (A) 1/4-turn. Recheck framing. Repeat as necessary to obtain centered framing range.
9. Reinstall rear cover.

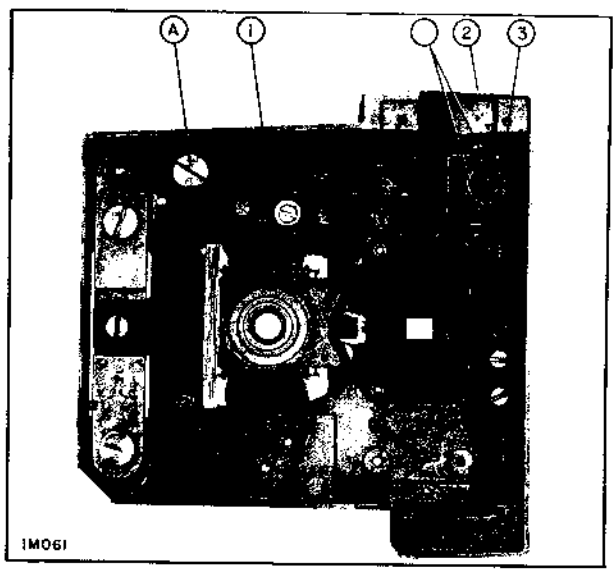


Figure 56

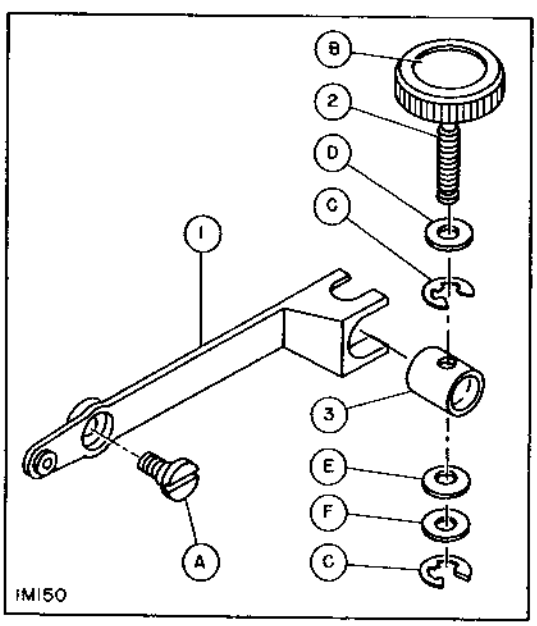


Figure 57

PARTS LIST

Illus. No.	Part No.	Description
FRAMING BEAM ASSEMBLY		
1	C8421501	FRAMING BEAM
2	B2376504	KNOB
3	A8135001	FRAMING NUT
A	A3579001	ECCENTRIC SHOULDER SCREW
B	A3660006	TRIM DISC
C	A3605407	C–WASHER
D	A2278109	FLAT WASHER
E	A6211010	SPRING WASHER
F	A6391026	THIN WASHER

CLAW ASSEMBLY

1. Perform cam pulley assembly removal procedures. (pages 35 and 36).
2. Loosen setscrews (A) on claw collar and slide claw (4) from eccentric pin.

CAUTION

In removing or installing the claw, be careful not to damage aperture with claw teeth.

3. Remove claw from projector. Be careful not to lose in-out spring (6).
4. To check cam-claw assembly for proper torque, refer to claw torque adjustment (page 68).
5. When reinstalling the claw, position eccentric slot at the one o'clock position as shown to prevent damage to the aperture.
6. Reverse steps 1 & 2 to reassemble.
7. Refer to claw adjustment and upper sprocket timing procedures. (Pages 66 and 68).

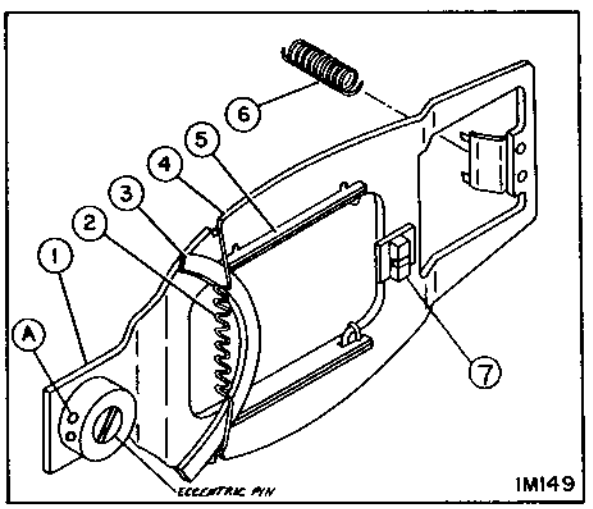


Figure 58

PARTS LIST

Illus. No.	Part No.	Description
	CLAW ASSEMBLY	
1*	D2456508	CAM-CLAW ASSEMBLY
2	A8043001	OIL PAD SPRING
3	A8637001	FELT OIL PAD
4	D2455505	CLAW BODY
5	AA010501	RAIL KIT CONTAINING FOLLOWING 4 ITEMS
	A3584001	RAIL
	A3584005	RAIL
	A8033001	SHIM
	A8033002	SHIM
6	A8012002	SPRING, IN-OUT
	B0709014	HEAVY OIL (FOR PAD)
	A8125002	GREASE (IN-OUT CAM)
7	B2347002	FOLLOWER

* Cam-claw assembly comes equipped with single speed pulley from MI-35043. For use in other models, replace pulley. See steps 5, 6 & 7 of Cam Pulley disassembly procedures MI-35043 (page 35).

APERTURE PLATE ASSEMBLY

NOTE: The aperture can be completely disassembled without removing from backplate.

1. To remove left-hand (fixed) rail (2) remove screws (D) (figure 59).
2. When reassembling rail, make certain that it is butted against the raised portion of the aperture.
3. To remove right-hand rail (movable) (3) and associated parts, remove screws (G).
4. To remove aperture from backplate, perform backplate removal procedures. Remove screws (B) and (D).
5. To replace aperture, reverse removal procedures.

PARTS LIST

Illus. No.	Part No.	Description
	APERTURE PLATE ASSEMBLY	
1	C8433502	APERTURE ASSEMBLY
2	B4672001	RAIL – LEFT HAND
3	B4671001	RAIL – RIGHT HAND
4	A3524002	SPRING
5	A3521002	RETAINER
6	A8543001	SPRING
A	A8183001	NUT PLATE
B	A8154102	SCREW
C	A8174001	STUD
D	A0216835	SCREW #6-32 x .31 TRUSS HEAD
E	A8536001	BUSHING 2/PKG.
F	A8046002	WASHER 2/PKG.
G	A0104107	SCREW #4-40

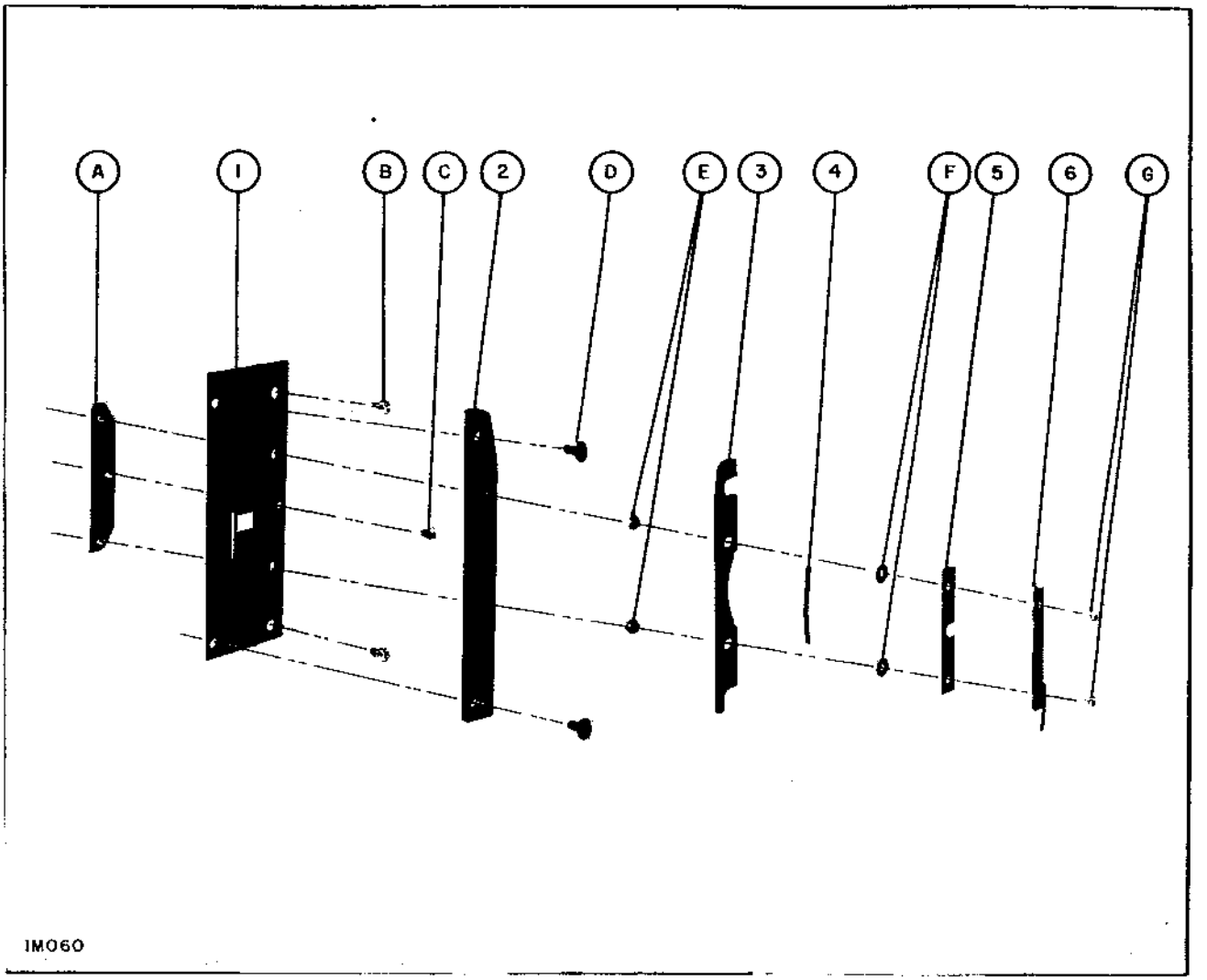


Figure 59

LOWER SPROCKET AND REVERSE PUCK ASSEMBLY

1. Perform rear cover removal procedures (page 14).

2. Perform flywheel and sound drum removal procedures. (Page 23).

3. Remove retaining ring (F), washers (C), (D) and (E), and slide puck arm (7) and gear (4) from shaft (3) (figure 61).

4. To disassemble puck, loosen setscrew (B) and remove puck (8) and washers (A).

5. To remove gear (5) from shaft (6) press shaft out of gear.

6. To remove shaft and lower sprocket, loosen setscrew (G) in sprocket, slide belt from shaft and remove shaft.

7. To reassemble, reverse removal procedures.

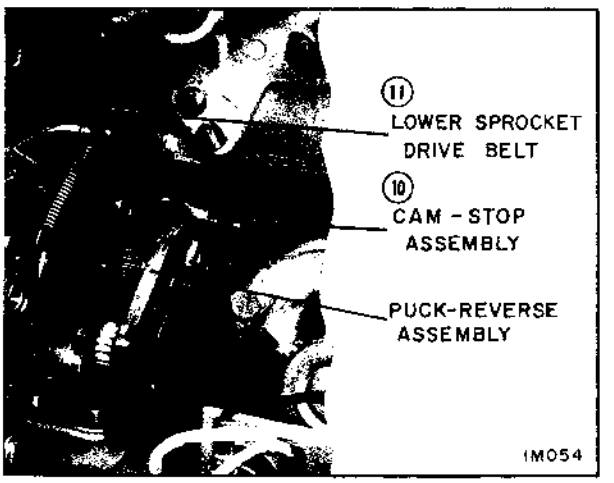


Figure 60

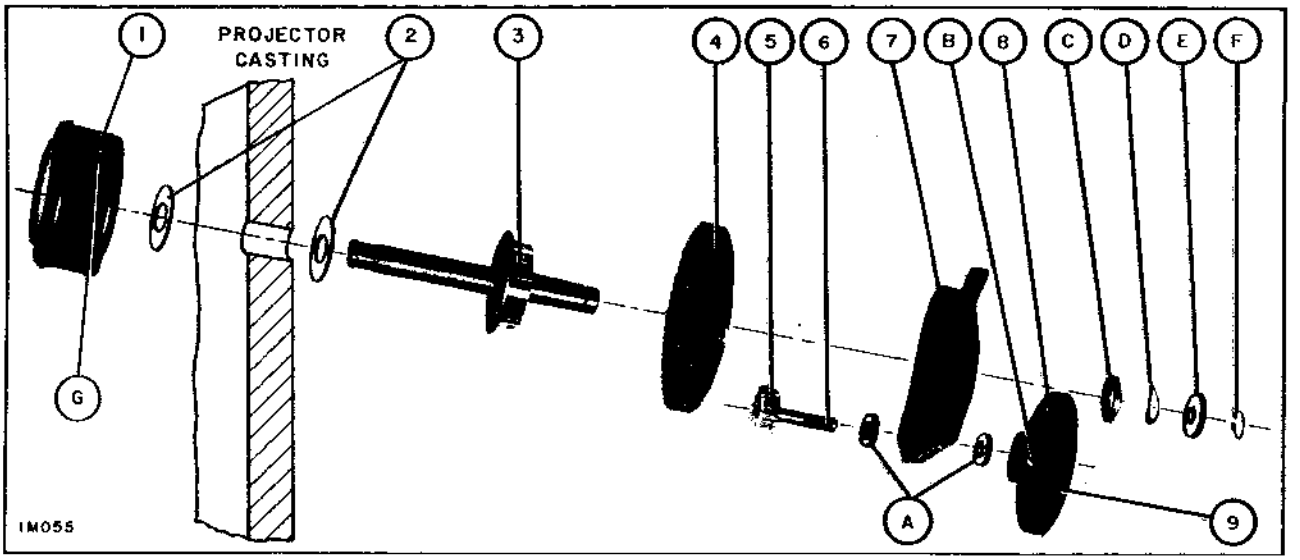


Figure 61

PARTS LIST

Illus. No.	Part No.	Description
LOWER SPROCKET AND REVERSE PUCK ASSEMBLY		
1	D4836503	SPROCKET
2	A6391026	SPACER
3	B2177501	SHAFT ASSEMBLY
4	B2198001	GEAR
5	A3646001	GEAR
6	A3640001	SHAFT
7	C8468501	PUCK ARM AND BUSHING
8	B3222001	PUCK
9	A8021001	RING – RUBBER
10	A8892002	CAM – STOP NUT
11	B3164004	BELT – LOWER SPROCKET DRIVE
A	A6391017	FLAT WASHER – THIN STEEL
B	A8099033	SETSCREW #6-32 x .25
C	A6391026	FLAT WASHER – THIN STEEL
D	A6211010	SPRING – WASHER
E	A5983006	FLAT WASHER – THICK
F	B0366007	RETAINING RING
G	A8099045	SETSCREW #8-32 x .25

LOWER SPROCKET BELT TENSIONER ASSEMBLY

1. Perform rear cover removal procedures (page 14).
2. Perform flywheel and sound drum removal procedures (page 23).
3. Disconnect spring (2) from bracket (1).
4. Remove cam stop nut (5) and slide belt tensioner from shaft.
5. To remove roller (4), remove E-ring (A).
6. To remove bracket (1), remove screws (B).
7. To reassemble, reverse above procedures.

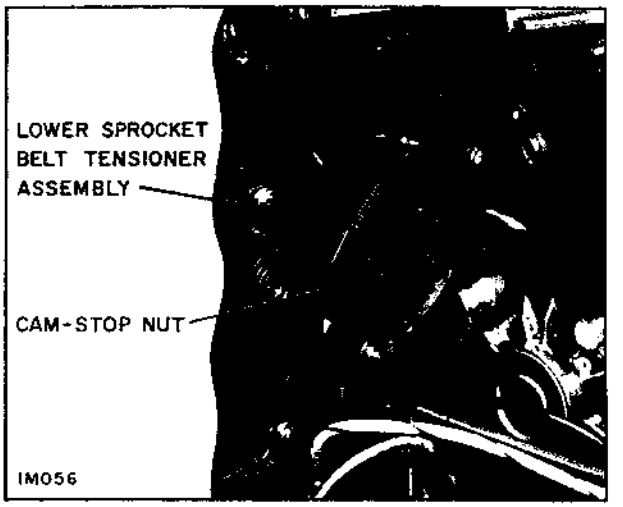


Figure 62

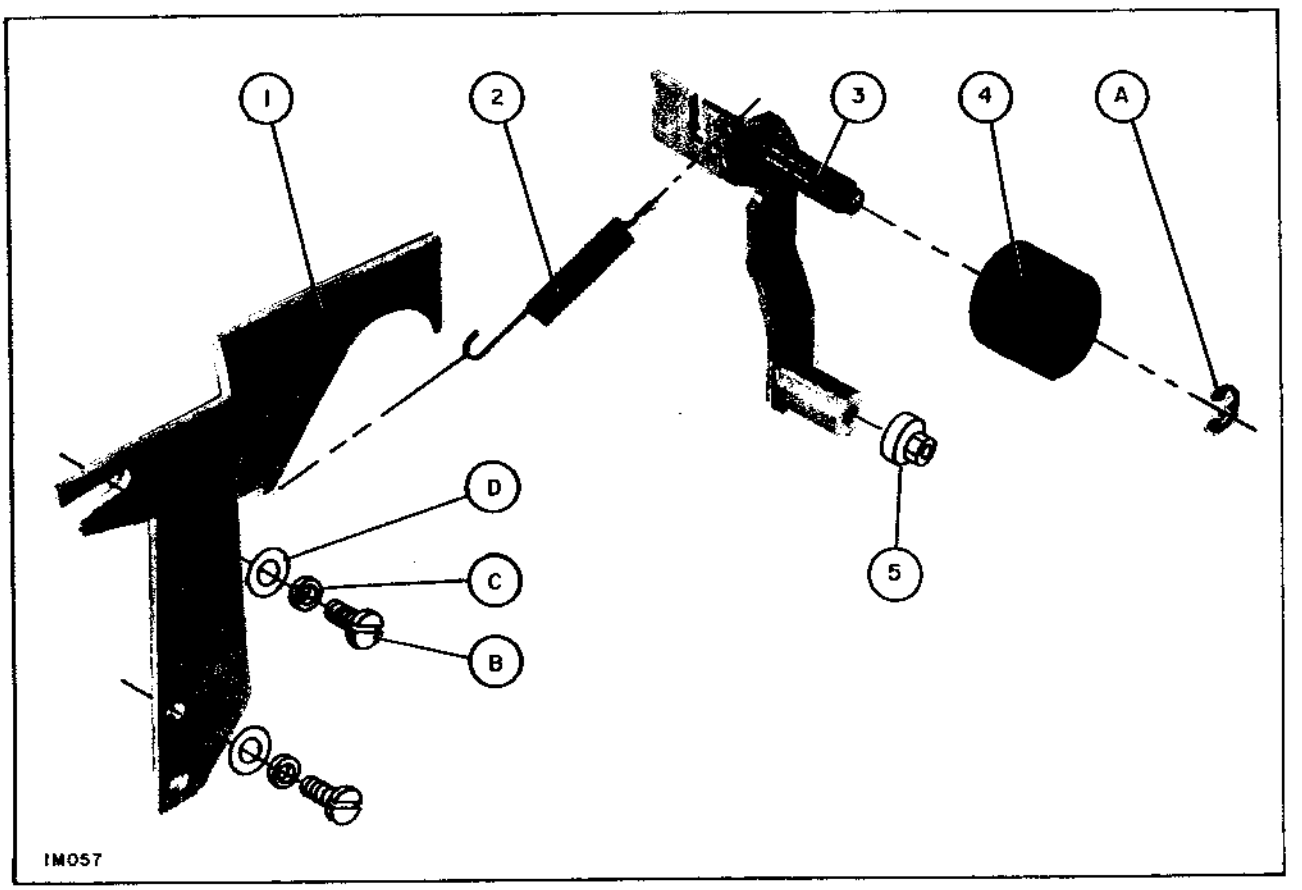


Figure 63

PARTS LIST

Illus. No.	Part No.	Description
LOWER SPROCKET BELT TENSIONER ASSEMBLY		
1	B0018002	BRACKET
2	A8142001	SPRING
3	B0017502	ARM & SHAFT ASSEMBLY
4	A8145001	ROLLER
5	A8892002	CAM STOP NUT
A	A3605006	E-RING
B	A4702102	SCREW #8-32 x .38

MOTOR AND STARTING CAPACITOR

1. Perform rear cover removal procedures (page 14).
2. Perform steps 1 through 5 of blower housing removal procedures (page 26).
3. Disconnect motor leads from terminal strip TB301, function switch S-301 and motor starting relay. Disconnect ground lead from screw in base. Note location of leads for reassembly.
4. To remove motor from mounting cradle, loosen screws in clamp at each end of motor. Remove clamps and motor (1).
5. To remove entire motor assembly, mark position of cradle on base and remove two screws (A) from underside of base.

   NOTE: Motor may be removed and replaced without removing mounting cradle.

6. To remove starting capacitor (3), snap out of bracket with screwdriver and remove leads.
7. To remove pulley (2), loosen setscrew (B).
8. To reassemble, position cradle on base at its original location and reverse removal procedures.

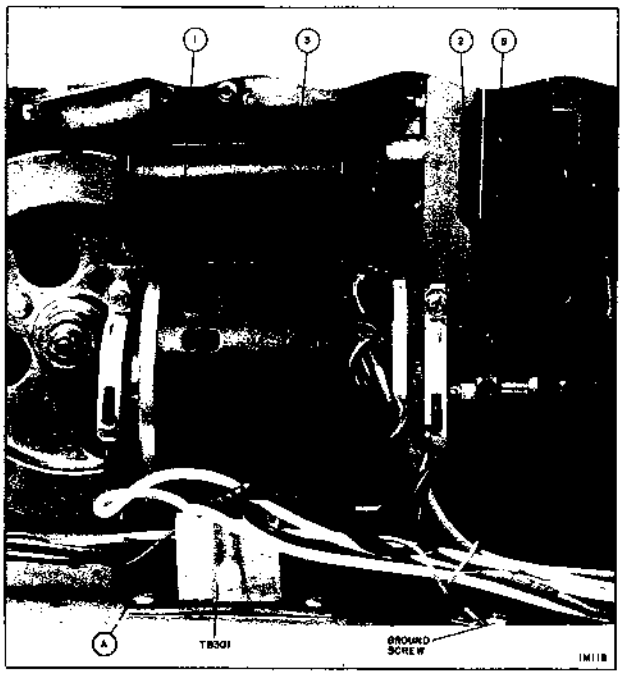


Figure 64

PARTS LIST

Illus. No.	Part No.	Description
MOTOR AND STARTING CAPACITOR		
1	C8420501	MOTOR
2	B1868001	PULLEY MI-35043A, MI-35181A
2	A8166003	PULLEY MI-35043
3		MOTOR STARTING CAPACITOR
A	A8523303	SETSCREW
B	A8099045	SETSCREW #8-32 x .25 (MOTOR PULLEY)

MOTOR STARTING RELAY

1. Perform rear cover removal procedures (page 14).

2. Disconnect leads from relay terminals.

gray	Terminal 2
white/violet	Terminal 3
violet	Terminal 4

3. Remove relay mounting screws (A) and relay (1).

4. To reassemble, reverse above procedures.

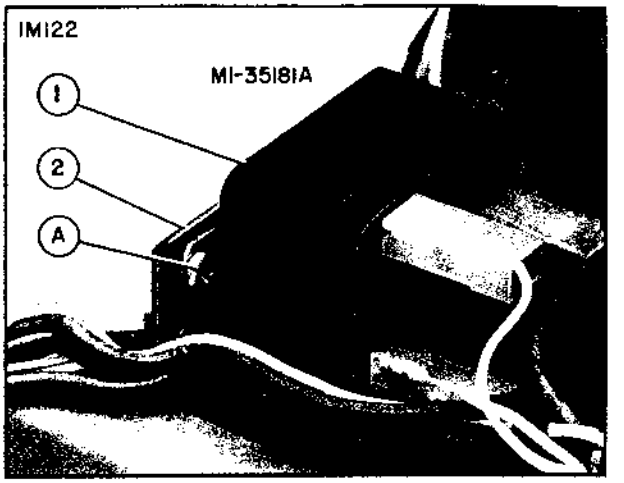


Figure 65

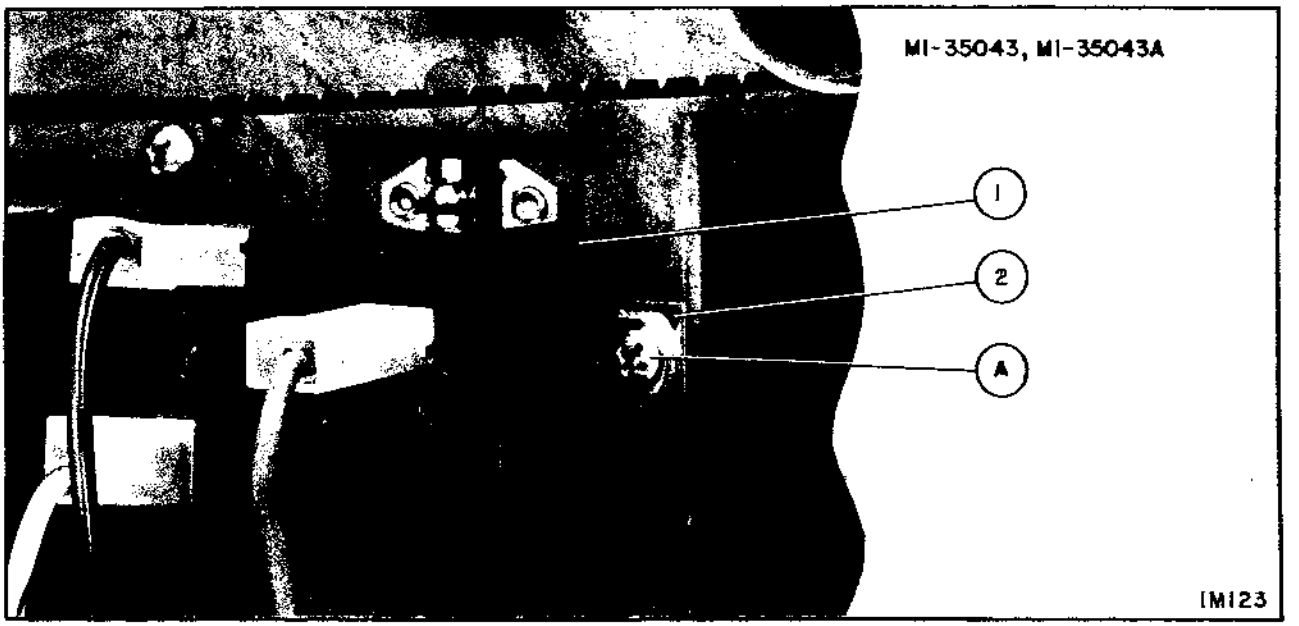


Figure 66

PARTS LIST

Illus. No.	Part No.	Description
MOTOR STARTING RELAY		
1	B0038001	K301 MOTOR STARTING RELAY 115V, 50/60 HERTZ
2	A8120001	RELAY BRACKET MI-35043, MI-35043A
2	A2042001	RELAY BRACKET MI-35181A
A	A4702001	SCREW #6-32 x .25

FUNCTION SWITCH

1. Perform rear cover removal procedure (page 14).
2. Loosen setscrew on function switch knob and remove knob.
3. Remove nut from switch.
4. Perform step 2 of power transformer removal procedure (page 19).
5. On MI-35181A, perform steps 2 through 5 of stop on frame disassembly procedure (page 38).
6. Remove switch from projector.
7. Disconnect leads.
8. To reassemble, refer to lead location information and reverse removal procedures.

Lead Locations	S301 terminal	lead
1st section	B	black (motor)
	D	red (motor)
	1	White-violet (relay terminal 3)
	2	White (TB301)
2nd section	2C	White-blue (Amplifier E11)
	21	Blue-white (transformer)
	32	Violet (relay terminal 4)
3rd section	3A	Black-yellow (transformer)
	3C	Black-white (transformer)
	3D	White (transformer)
	32	Black - (Powercord)
	31	White (lamp socket)

NOTE: Terminal 32 (2nd section) and 32 (3rd section) are connected internally.

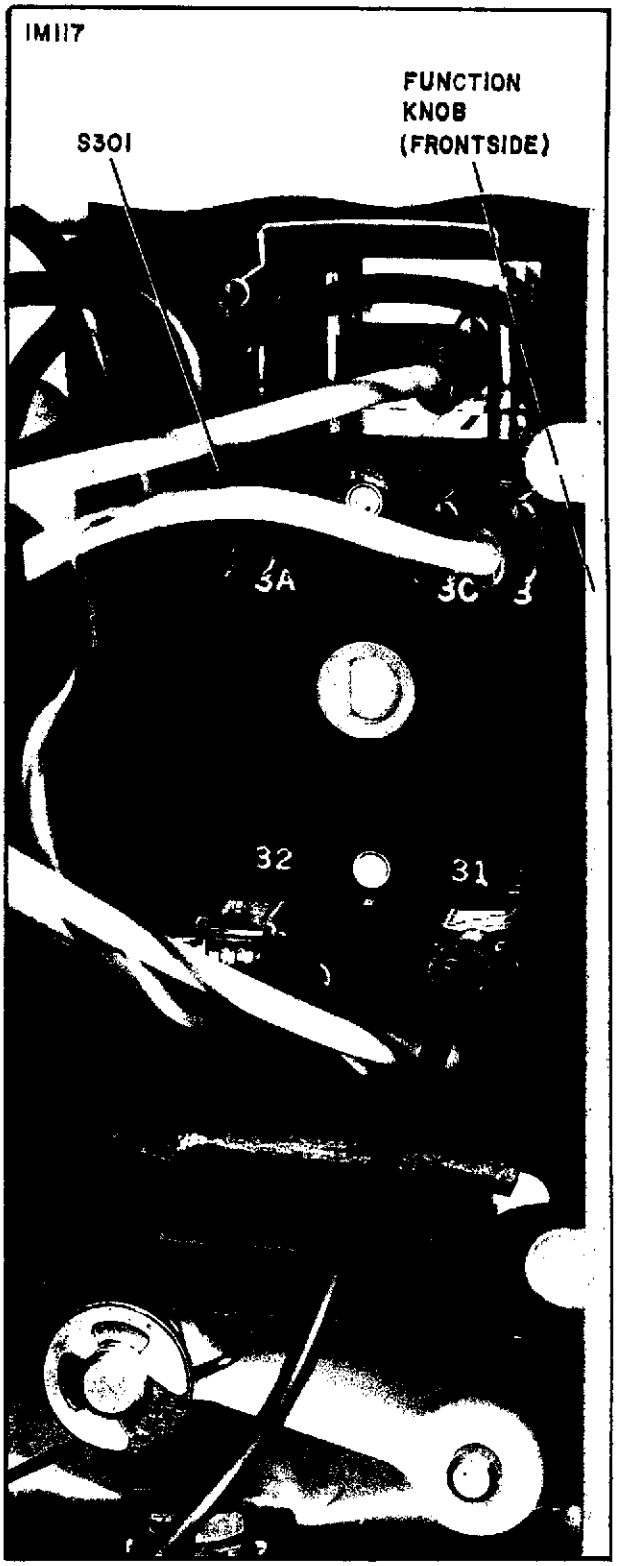


Figure 67

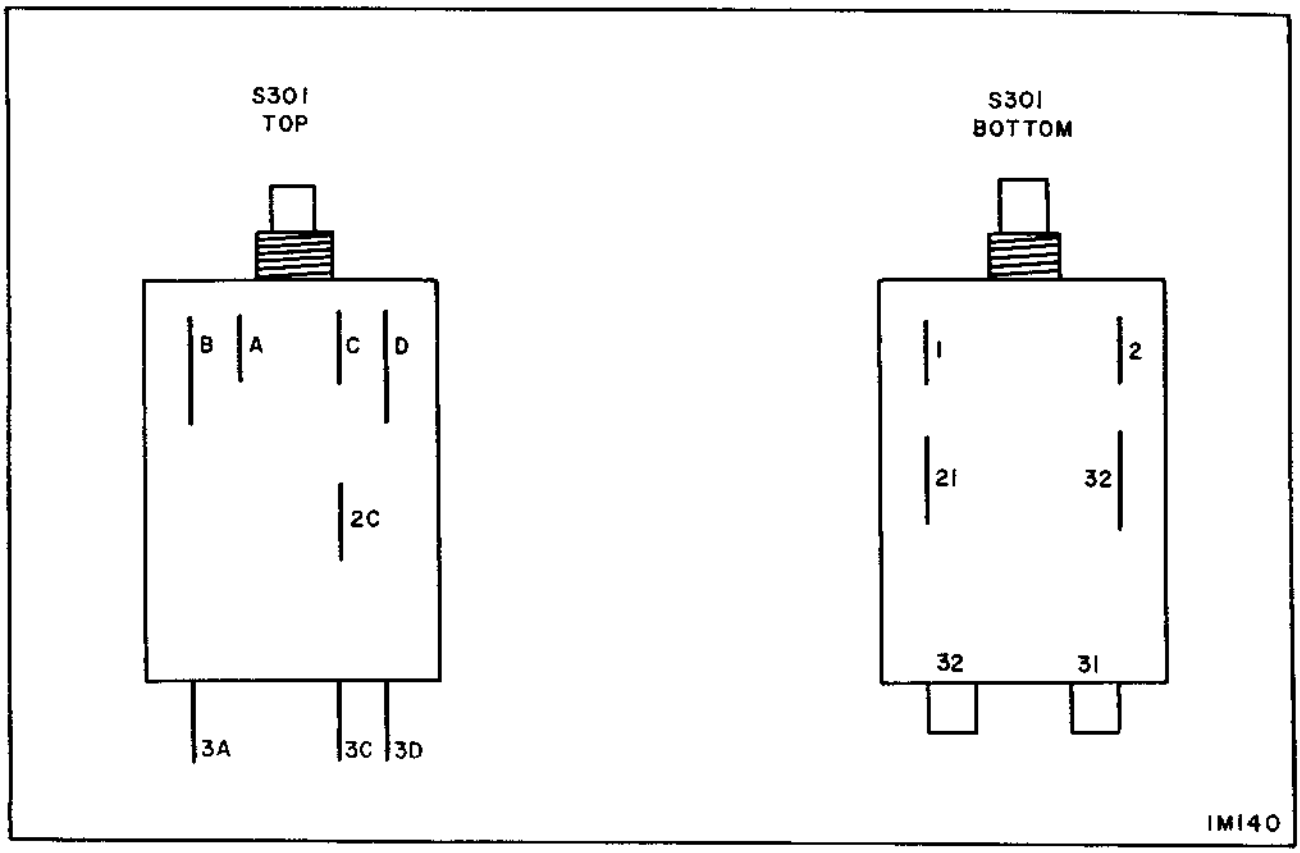


Figure 68

PARTS LIST

Illus. No.	Part No.	Description
FUNCTION SWITCH		
S301	B1861001 D4849002 A8141033	FUNCTION SWITCH KNOB, FUNCTION SETSCREW – KNOB #6-32 x .25

SNUBBER ROLLER ASSEMBLY

1. Perform steps 1 through 6 of the function switch removal procedure (page 53).
2. Loosen setscrew (B) and pull snubber shaft through frame.
3. Remove retaining ring (D).
4. Remove washer (C) and spring (5).
5. Remove arm (3) from shaft (6).
6. To remove snubber (1) from shaft (4), remove retaining ring (A).
7. When reassembling allow about 1/32 to 1/16 of an inch clearance between snubber roller and frame.

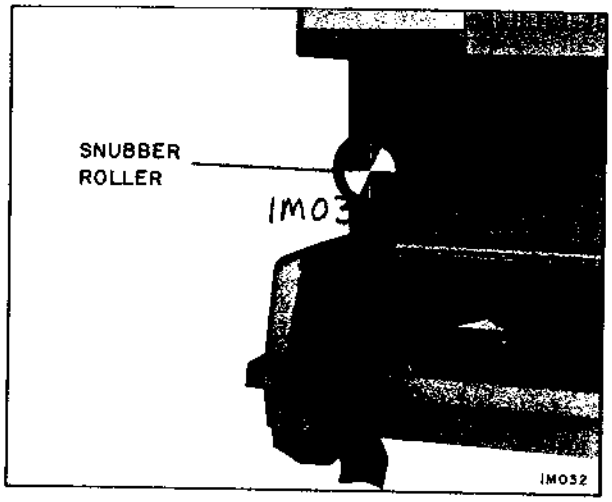


Figure 69

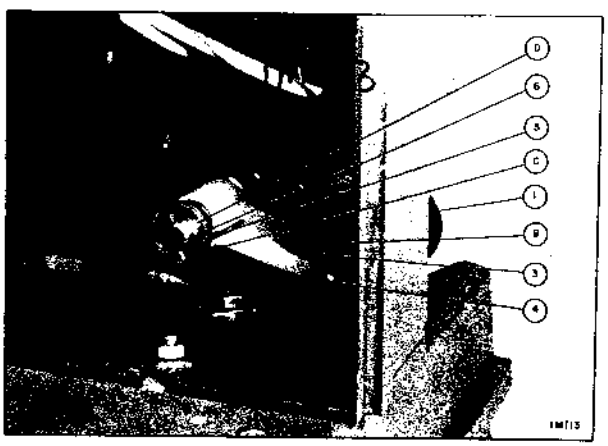


Figure 70

PARTS LIST

Illus. No.	Part No.	Description
SNUBBER ROLLER ASSEMBLY		
1	A4084001	SNUBBER ROLLER
2	A3660007	TRIM DISC
3	B3404502	SNUBBER ARM
4	B4679001	SNUBBER SHAFT
5	A8143001	SPRING
6	A8108002	SHAFT – SNUBBER ARM
A	B0366005	RETAINING RING
B	A8141031	SETSCREW #6-32 x .31
C	A5983024	FLATWASHER
D	A3605107	RETAINING RING

TILT MECHANISM ASSEMBLY

1. Perform rear cover removal procedures (page 14).
2. Remove retaining ring (F) from top of rack.
3. Turn tilt knob (1) until rack and foot assembly (7) is completely out of projector.
4. Remove screw (B) in retainer (5).
5. Remove screws (C) in retainer (6).
6. Remove gear and shaft assembly (4).
7. Remove screws (E) and (G) from extrusion (9).
8. Loosen setscrew (J) in knob (1) and remove knob.
9. Remove retaining ring (A) from worm (3) and remove worm.
10. To reassemble, reverse above procedures.

NOTE: Reassemble extrusion (9) with clamp (H) toward front of projector. Purpose of clamp is to hold sound head wiring in position in front of extrusion. Be careful not to pinch wires under extrusion.

NOTE: Position retainer (6) for minimum backlash between rack, and mating gear without excessive binding.

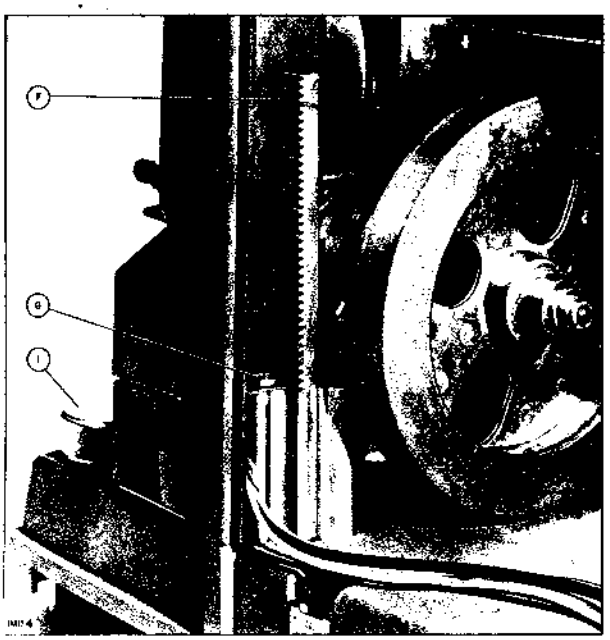


Figure 71

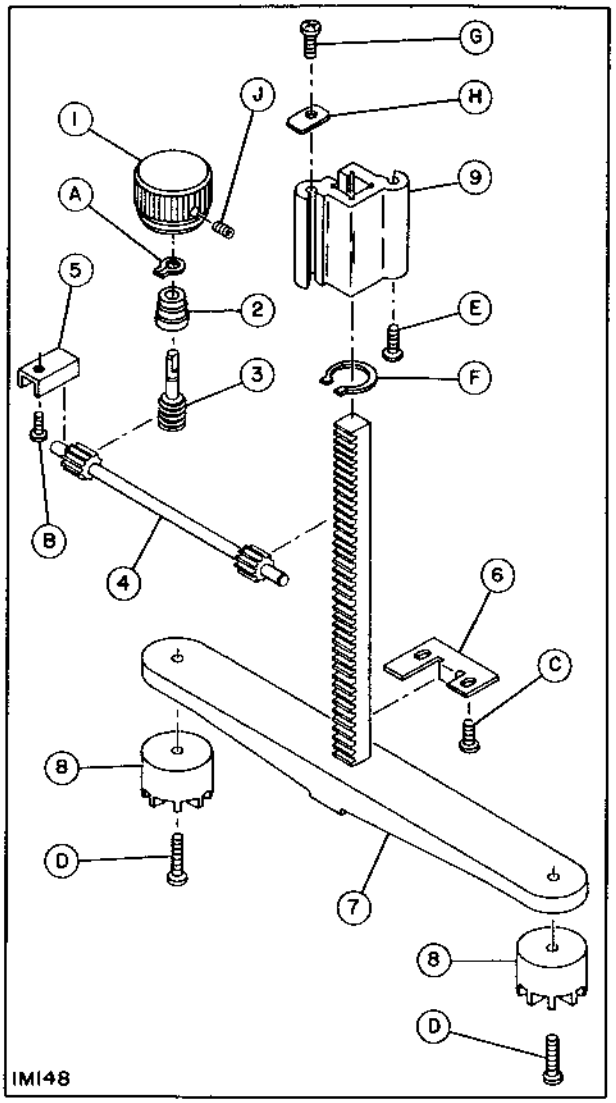


Figure 72

PARTS LIST

Illus. No.	Part No.	Description
	TILT MECHANISM ASSEMBLY	
1	D4849003	KNOB
2	A8122001	BUSHING (STAKED INTO BASE CASTING)
3	A4023001	WORM
4	B4698502	GEAR & SHAFT ASSEMBLY
5	A8119001	RETAINER
6	A8597001	RETAINER
7	C7065504	RACK & FOOT
8	A4034001	PAD
9	B0016001	EXTRUSION
A	A8013004	RETAINING RING
B/C	A4702114	SCREW #8-32 x .31
D	A3603461	SCREW #8-32 SELF TAPPING
E	A4702103	SCREW #8-32 x .50
F	A9373010	RETAINING RING
G	A4702101	SCREW #8-32 x .25
H	A8659001	CLAMP
J	A8141033	SETSCREW # 6-32 x .25

SPEAKER AND AMPLIFIER ASSEMBLY

1. Perform rear cover removal procedures (page 14).
2. To remove speaker, disconnect leads and remove 4 mounting nuts.
3. To remove amplifier, remove mounting screws and cable clamp.
4. To lift printed circuit board for service, remove 4 mounting screws, shield, and disconnect Q103 leads from board.

Q103 C	E13
Q103 B	(right)-E9
Q103 E	(left)-E8

PARTS LIST

Illus. No.	Part No.	Description
	SPEAKER AND AMPLIFIER ASSEMBLY	
C101	B2014112	.0039 MF, 200v
C102	A9154155	1.0 MF, 50v
C103	A9154115	1.0 MF, 6v
CR1	52101000	DIODE TYPE IN 4731A ZENER
CR2	C8840001	BRIDGE RECTIFIER
CR3	C8840002	BRIDGE RECTIFIER
F1	A0157109	FUSE – TYPE 3AG 1.5 AMP SLO-BLO
J101	A7792005	JACK – MICROPHONE
J102	A7792005	JACK – SPEAKER
Q101	C8841001	TRANSISTOR 2N3054
Q102	C8841001	TRANSISTOR 2N3054
Q103	C8841001	TRANSISTOR 2N3054
R101	D0235010	VOLUME CONTROL – 10K (MI-35043, MI-35043A)
R101	B1804001	VOLUME/TONE CONTROL (MI-35181A ONLY)
R102	D0235011	TONE CONTROL 5K (MI-35043, MI-35043A)
C1	A9154025	25 MF, 6v
C2	A8695036	15 MF, 25v
C3	A8695036	15 MF, 25v
C4	A8695029	50 MF, 25v

C5	A9154025	25 MF, 6v
C7	A1022025	0.22 MF, 10v
C8	A0130021	100 MF, 10v
C9	A3418002	500 MF, 25v
C10	A8695036	15 MF, 35v
C11	A0195143	220 PF, 500v
C12	A8695029	50 MF, 25v
C13	A0195135	100 PF, 500v
C14	A0130021	100 MF, 10v
C15	A8696001	500 MF, 50v
C16	A3418002	500 MF, 25v
C17	A3418012	500 MF, 15v
C18	C5856016	1000 MF, 50v
E1-E23	C0797003	TERMINAL
E101-E104	A9061002	TERMINAL LUG #6
Q1	A8798006	TRANSISTOR 2N4124
Q2	A8798002	TRANSISTOR 2N4124
Q3	A8798002	TRANSISTOR 2N4124
Q4	A8798002	TRANSISTOR 2N4124
Q5	A8798004	TRANSISTOR 2N5209
Q6	A8798005	TRANSISTOR 2N4123
Q7	A8662001	TRANSISTOR
Q8	A8662002	TRANSISTOR
R1	A5730071	5600 OHMS 10%, 1/2 W
R2	A5730073	8200 OHMS 10%, 1/2 W
R3	A5730082	47000 OHMS 10%, 1/2 W
R4	A5730066	2200 OHMS 10%, 1/2 W
R5	A5730061	820 OHMS 10%, 1/2 W
R6	A5730192	24000 OHMS 5%, 1/2 W
R8	A5730076	15000 OHMS 10%, 1/2 W
R9	A5730073	8200 OHMS 10%, 1/2 W
R10	A5730078	22000 OHMS 10%, 1/2 W
R11	A5730062	1000 OHMS 10%, 1/2 W
R12	A5730082	47000 OHMS 10%, 1/2 W
R13	A5730065	1800 OHMS 10%, 1/2 W
R14	A5730055	270 OHMS 10%, 1/2 W
R15	A5730061	820 OHMS 10%, 1/2 W
R16	A5730068	3300 OHMS 10%, 1/2 W
R17	A5730062	1000 OHMS 10%, 1/2 W
R18	A5730084	68000 OHMS 10%, 1/2 W
R19	A5730196	36000 OHMS 5%, 1/2 W
R20	A5730070	4700 OHMS 10%, 1/2 W
R21	A5730062	1000 OHMS 10%, 1/2 W
R22	A5730070	4700 OHMS 10%, 1/2 W
R23	A5730061	820 OHMS 10%, 1/2 W
R24	C2272014	VARIABLE 500 OHMS TEMP. COMP.
R25	A5730154	620 OHMS 5%, 1/2 W
R26	A5730059	560 OHMS 10%, 1/2 W
R27	A5730054	220 OHMS 10%, 1/2 W
R28	A5730054	220 OHMS 10%, 1/2 W
R29,R30	A3022009	WIREWOUND .51 OHMS, 5%
R31	A5731052	150 OHMS 10%, 1 W
R32	A5731044	33 OHMS 10%, 1/2 W
	SPEAKER	
	C8428001	SPEAKER 4 x 8 IN., 12 OHMS
	A5946003	EYELET
	A8655002	SCREW #6-32 x .50
	A0327102	NUT #6-32
	TRANSISTOR MOUNTING	
	A0106113	SCREW #6-32 x .50
	A2278104	WASHER #6
	A7435104	NUT #6-32
	A4702001	SCREW PC. BOARD MOUNTING #6-32 x .31
	A8541001	SHIELD – MIKE JACK
	B0091001	SHIELD – PC. BOARD COVER
	A0106107	SCREW #6-32 x .50

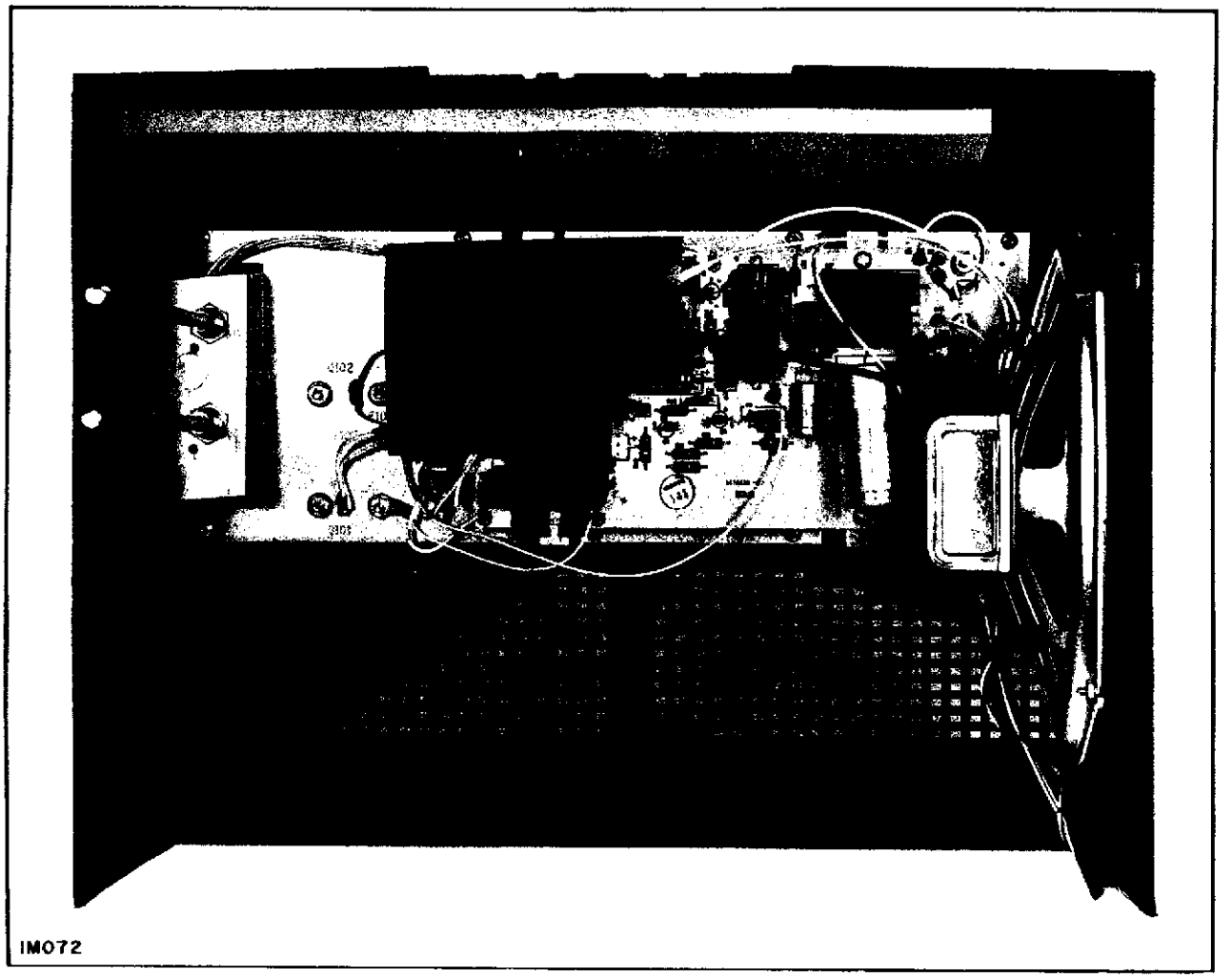


Figure 73

PARTS LIST

Illus. No.	Part No.	Description
		MISCELLANEOUS PARTS
1	C8448001	FILM GUIDE TO LENS GATE
2	A4073002	SPRING – LENS GATE LATCH
3	A8514002	STRIPPER – UPPER SPROCKET
4	A2070001	SHIELD – UPPER SPROCKET
	A4702601	SCREW FOR ABOVE #4-40 x .25
5	B3042002	BEARING – UPPER SPROCKET
6	A7234203	SCREW – FOCUS ADJUSTMENT #8-32 x .50
7	C8448004	FILM GUIDE – SOUND HEAD
8	C8448003	FILM GUIDE TO LOWER SPROCKET
9	B3042004	BEARING – LOWER SPROCKET
10	A8014001	SHIELD – LOWER SPROCKET
11	C8448002	FILM GUIDE TO SOUND HEAD
12	D2471002	REEL HOLDER
13	A4128001	PAD RIGHT REAR
13A	A4128002	PAD LEFT REAR
14	C8431503	POWER CORD
15	B1864001	ESCUTCHEON MI-35043, MI-35043A
16	B1899001	ESCUTCHEON MI-35181A
17	A8657002	ESCUTCHEON MI-35043
17	A8657001	ESCUTCHEON MI-35043A, MI-35181A
18	B3042005	BEARING – REEL ARM DRIVE SHAFT – 3 PLACES
19	A8245501	MAIN FRAME
20	R5708001	BASE
21	B4681501	BUSHING – SAFE THREADER DETENT
	B4681003	DETENT SPRING FOR ABOVE
	A8233501	CHAIN FOR SAFE THREADER
22	B0455003	NO. 8 SPRING NUT
TB301	B0029501	TERMINAL STRIP
	A4702114	SCREW FOR ABOVE #8-32 x .31

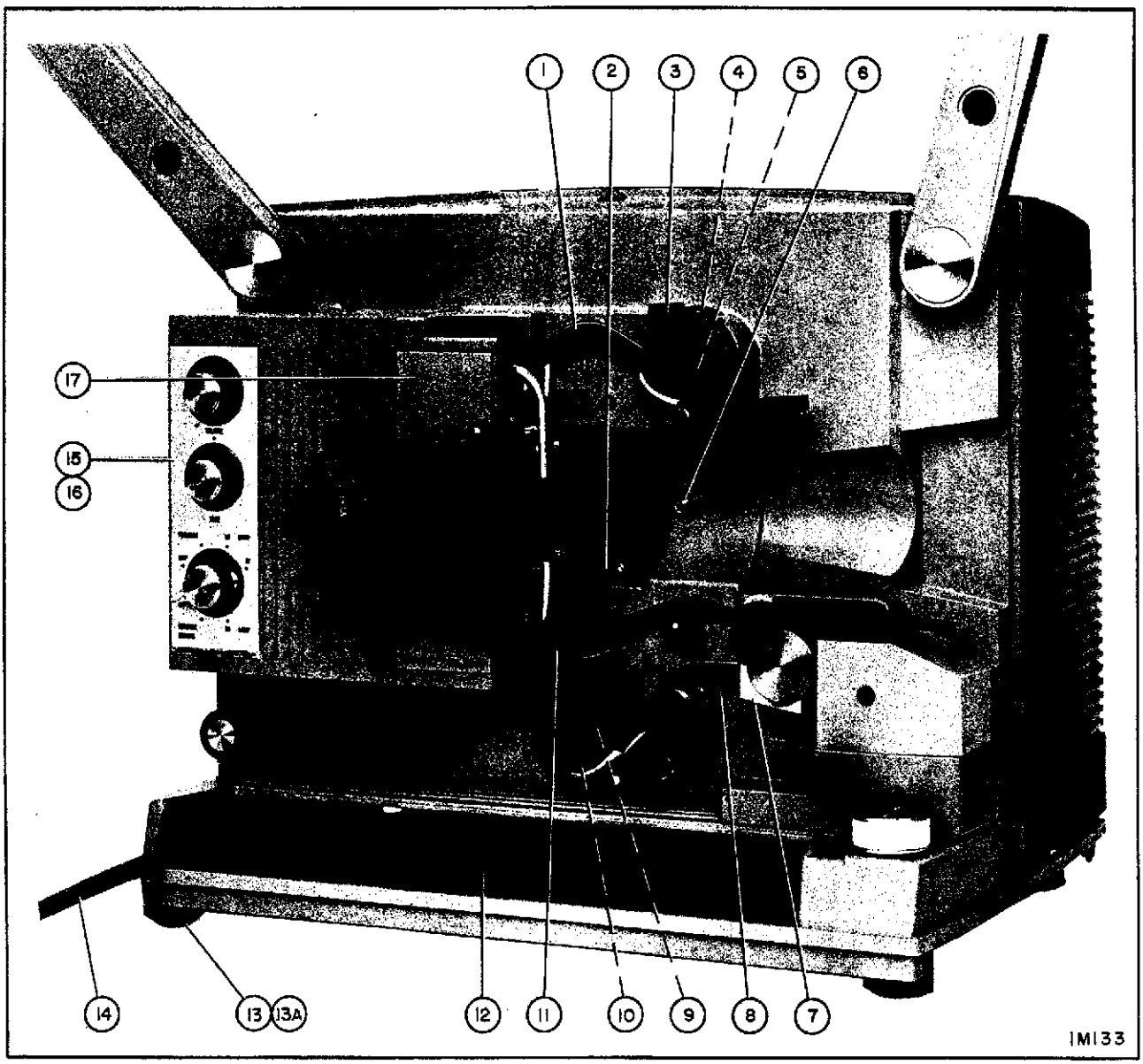


Figure 74

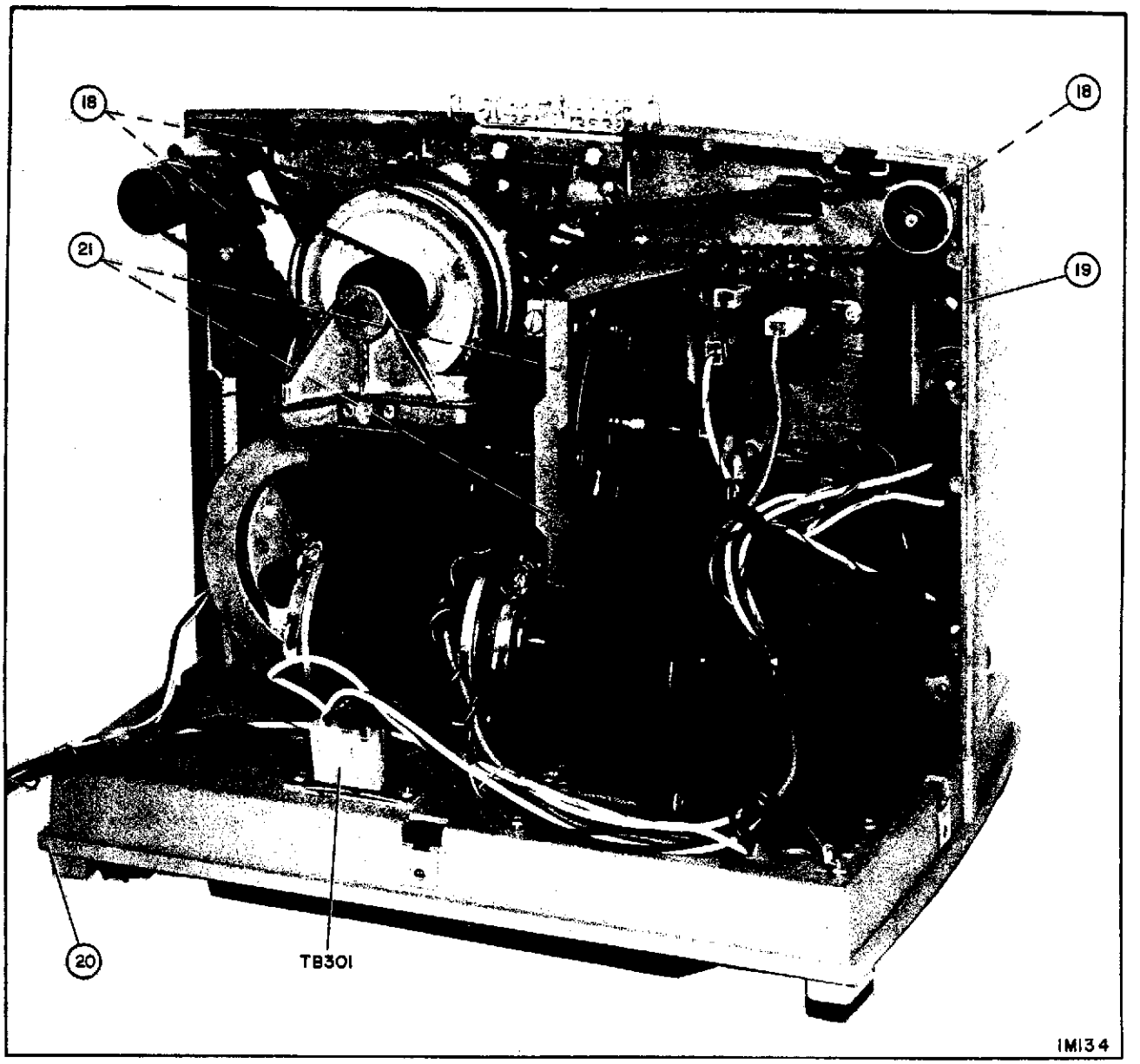


Figure 75

OPERATIONAL CHECKS AND ADJUSTMENTS

FILM SHOE AND LATERAL FOCUS ADJUSTMENT

NOTE: Before adjusting the lateral focus and framing using SMPTE Registration 16 Test Film, perform steps 1 through 4.

1. Make certain that the fixed side-rail is properly butted against the runner on the aperture plate and check that mounting screws are tight.
2. Adjust lateral adjustment screws on lens gate until the film shoe is lightly and uniformly touching the edge of the fixed side-rail.
3. Rotate lateral adjustment screws counterclockwise approximately 1/2 turn.
4. With no film in projector and lens gate closed, turn function switch to FORWARD LAMP and sight down between film shoe and aperture plate. Check that thin raised guide on left side of film shoe is aligned directly over the thin raised guide on aperture plate as shown below. Adjust lateral adjustment screw until alignment is obtained at Point (A)

NOTE: When visually checking the alignment at Point A of the raised guide on the film shoe with the raised guide on the aperture plate, make certain that the film shoe makes contact with the aperture plate the entire length of the film shoe. If this is not found to be the case, replace the film shoe and/or aperture plate.

5. Install SMPTE Registration 16 Test Film and turn on projector.
6. Observe screen and adjust for proper focus and framing.
7. If mask or shadow appears on right side of projected picture, recheck lateral adjustment made in Step 4.
8. On side of projector adjacent to lens gate assembly, adjust focusing screw until numbers on either side of the picture are clearly focused.
9. Turn off projector and remove Registration film.

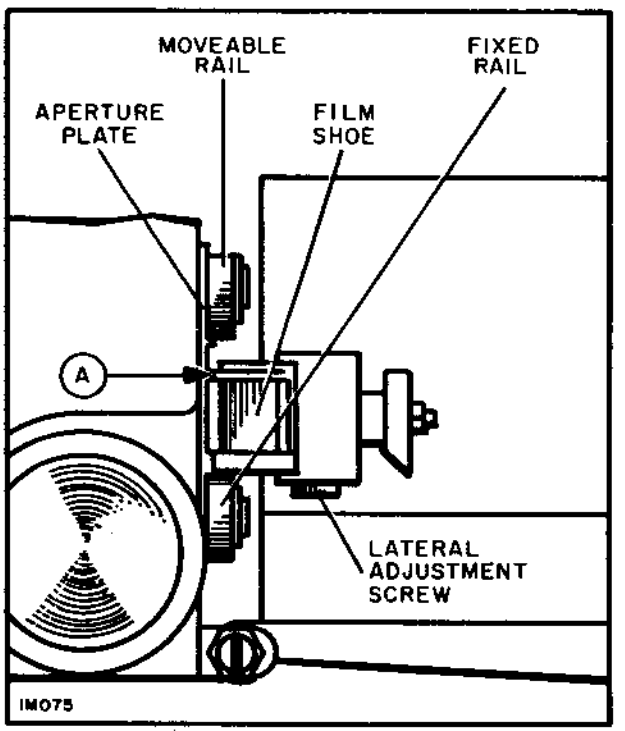


Figure 76

APERTURE PLATE MOVEABLE RAIL ADJUSTMENT

To check and adjust the side pressure of the aperture plate moveable rail, perform the following procedures:

1. To check adjustment while installed on projector, open lens gate assembly.
2. Position gauge (Model N-300) to engage movable rail 1/2-inch below aperture opening and check force required to start rail moving. The proper force is between 90 and 130 grams.

proper force is between 90 and 130 grams.

3. If force is more or less than specified, bend or straighten the moveable rail helper spring as required, then replace and recheck.

NOTE: The force of the movable rail can also be checked and adjusted on aperture plate with plate removed from the projector.

FLUTTER AND WOW ADUSTMENT

When the flywheel or sound drum is removed, it is necessary to adjust the position of the flywheel for minimum flutter and wow. If flutter and wow meters are not available, the following alternate method can be used.

1. Install a 3000 cycle Flutter Test Film on Projector (SMPTE - ASA PH-22.43).
2. Set TONE control for midrange.
3. Place function switch to FORWARD position and allow film speed to stabilize.
4. Listen to tone output for chirping or warbling and adjust VOLUME control for desired level.

   NOTE: If a chirping or a warbling sound is present in output, perform Rear Cover Removal Procedures, but do not disconnect leads from Projector. Perform either step 5 or 6.
5. When chirping is present, stop Projector (loosen set-screw in flywheel) and tighten nut on sound drum shaft a 1/4 turn. Start Projector and listen to tone. Repeat until tone is constant.
6. When warbling is present, stop Projector, Loosen setscrew on flywheel hub and then loosen locknut on sound drum a 1/4 turn. It may be necessary to rotate flywheel on shaft to cause flywheel to move back. Start Projector and listen to tone. Repeat until tone is constant.
7. When adjustment is completed tighten setscrew, replace rear cover, and remove test film.

BUZZ TRACK ADJUSTMENT

When the sound pressure roller is properly adjusted, no high or low frequency tone will be present in the output of the amplifier. To adjust the sound pressure roller, perform the following procedures:

1. Install buzz track film SMPTE ASA Z22.57-1947 in projector.
2. Adjust VOLUME control to midscale.
3. With Projector running, listen for a high or low frequency tone in the output.

   NOTE: If either tone is present in the output, perform Rear Cover Removal Procedures, if necessary, but do not disconnect leads from Projector.
4. When a high frequency tone is present, rotate nut (1) on pressure roller arm shaft counter-clockwise until tone is quieted.
5. When a low frequency tone is present, rotate nut (1) on pressure roller arm shaft clockwise until tone is quieted.

   NOTE: When adjustment is complete, with projector running, press in on sound pressure roller arm. A high frequency tone should be heard in the output. Pulling out on the pressure roller arm should cause a low frequency tone. Release arm, no tone should be present.
6. Shut off projector, remove buzz track film, and replace rear cover.

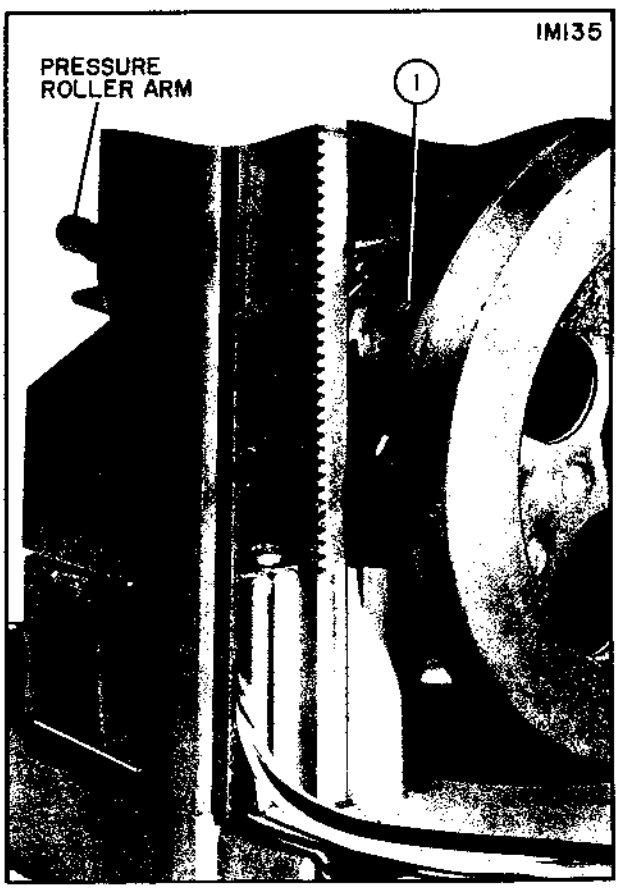


Figure 77

SOUND OPTICAL LENS ADJUSTMENT

The sound optic lens is adjusted for focus and azimuth at the factory. The focus and azimuth are critical adjustments and require the use of special tools. Should it be necessary to readjust the lens, perform the following procedures:

> **NOTE:** In order to get an accurate voltage indication when adjusting the sound optic lens, perform the Buzz Track Adjustment. (Page 64).

1. Perform Rear Cover Removal Procedures, but do not disconnect leads from Projector. (Page 14).
2. Install a 7000 Cycle Focusing and Azimuth Test Film (SMPTE ASA PH-22-42) in Projector.
3. Connect leads of a low reading AC voltmeter across speaker voice coil.
4. Open and remove exciter lamp cover by lifting up.
5. Install Spanner Wrench on to sound optic lens as shown.
6. Loosen screw on sound optic bracket to allow lens to be rotated.
7. Set VOLUME control for maximum and TONE control for midrange.
8. Place function switch to FORWARD position.
9. Using Spanner Wrench, simultaneously adjust azimuth (rotate) and focus (move horizontally) for a voltage peak indication of 10 volts.
10. Tighten setscrew and ensure that meter indication does not change.
11. Recheck Buzz Track Adjustment and then recheck azimuth and focus for proper voltage indication. (Page 64).
12. Disconnect voltmeter, power cord, replace rear cover, and unthread test film.

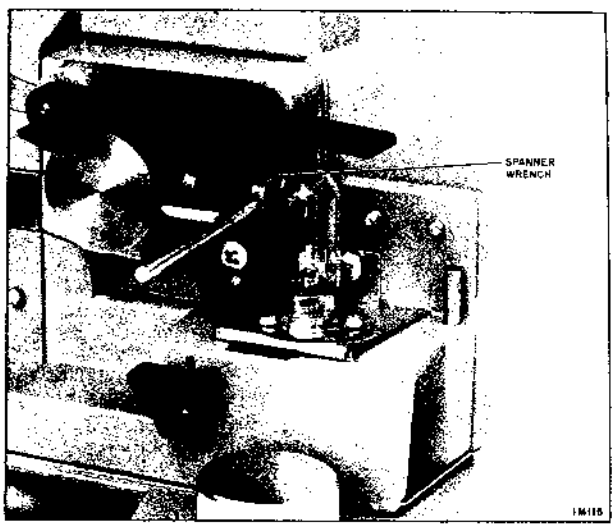


Figure 78

UPPER SPROCKET TIMING ADJUSTMENT

NOTE: Anytime the projector is disassembled for service or the First Idler Gear or the Upper Sprocket is removed, the timing of the Upper Sprocket should be checked and adjusted.

To adjust the timing of the upper sprocket, perform the following procedures:

1. Remove lamphouse cover and projection lamp.
2. Open lens gate.
3. Rotate shutter until the claw is protruding through the top of slot as shown in figure A. The shutter should be covering the lower half of the aperture opening.
4. Pull upper sprocket out (away from projector) to ensure that all end play is at the front end of bushing.
5. Loosen setscrew and place a 0.005 inch shim between the sprocket and bushing.
6. Rotate sprocket until any tooth points toward projection on the sprocket shoe as shown in figure B.
7. Tighten setscrew securely, check for end play,(There should be no end play in sprocket shaft when shim is in place) and remove shim.
8. Replace projection lamp, and lamphouse cover.

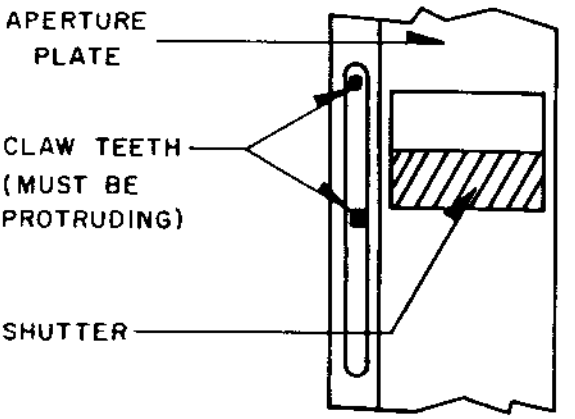


FIGURE A

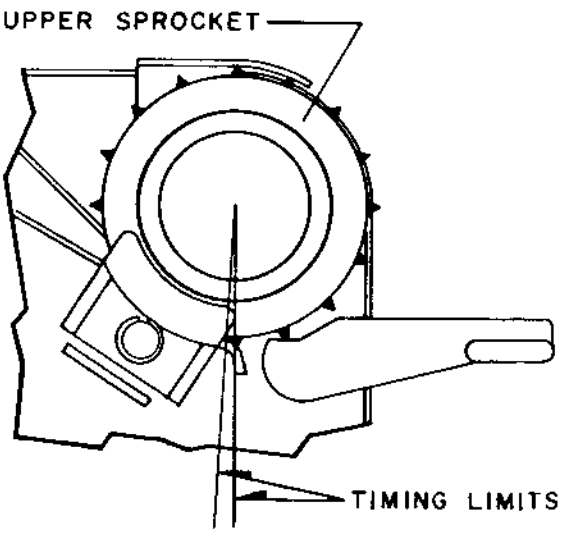


FIGURE B

IM082

Figure 79

REWIND DRAG CLUTCH ADJUSTMENT

To adjust the rewind drag clutch, perform the following procedures:

1. Raise take-up reel arm.
2. Raise rewind lever and rotate shaft on take-up reel arm counterclockwise until lip of slip clutch plate engages flange on rewind arm as shown. Attach torque wrench to reel shaft.
3. Using torque wrench check torque of drag clutch. The proper torque is between 5 and 9 inch-ounces.

   NOTE: If the torque is less than 8 or more than 11, tighten or loosen torque adjusting nut to obtain required torque.

4. Remove torque wrench and replace rear cover.

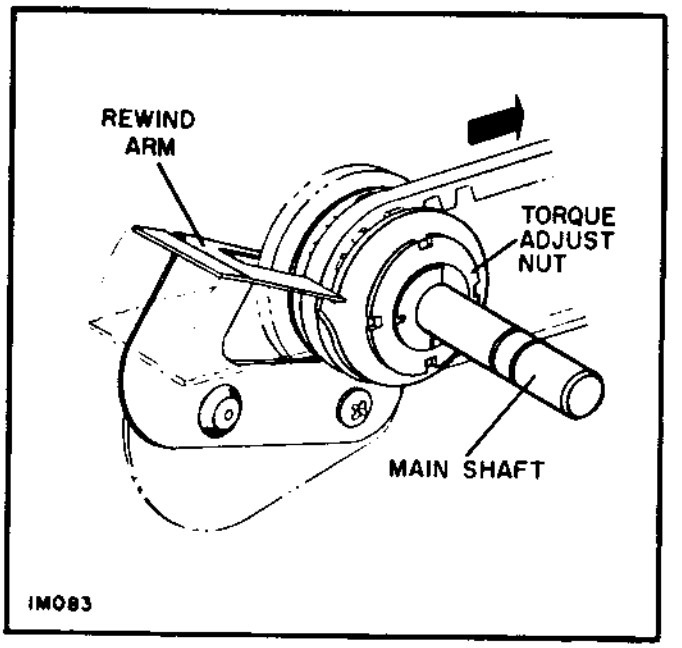


Figure 80

REWIND CAPABILITY ADJUSTMENT

To adjust the rewind clutch, perform the following procedures:

1. Perform Rear Cover Removal Procedures, but do not disconnect wires from rear cover (page 14).
2. Plug in power cord.
3. Raise front reel arm to operate position.
4. Place Rewind lever in rewind (UP) position.
5. Mount a 2200 foot reel of film on the supply (front) reel arm. Turn on Projector and run approximately 200 feet of this film onto the take-up reel.
6. Place projector into the rewind mode. The supply reel *must* accelerate up to speed and completely rewind the film.
7. If slippage of the rewind clutch is apparent, a slight amount of additional tension is permitted by adjusting the torque adjusting nut.

CAUTION

Torque should be set no higher than 8 in. lb. This may be checked with torque screwdriver.

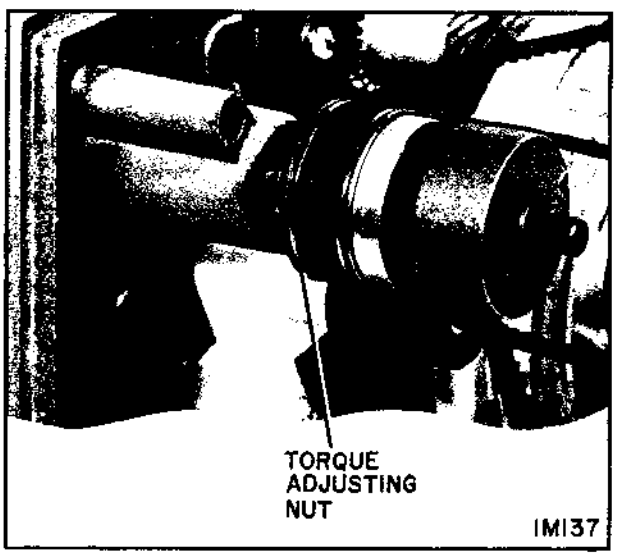


Figure 81

INTERMITTENT CLAW ASSEMBLY ADJUSTMENTS

Claw Torque Adjustment

To adjust the torque of the claw on the constant diameter cam, perform the following procedures:

> **NOTE:** If the Pulley, Cams, and Shutter Assembly and Claw Assembly are not already removed, perform the applicable procedures.

1. Slide claw assembly over constant diameter cam with claw facing away from pulley.

   > **NOTE:** The pivot pin that the end of the in-out spring engages must be positioned through the fixture just far enough to engage the end of the in-out spring.

2. Assemble Cam-Pulley Assembly, Shutter, and Claw Assembly together and place on claw torque test fixture as shown. Make sure that in-out spring is attached to claw body and engages pivot pin on fixture.

3. Back outer setscrew on pulley out of pulley about 1/8 of an inch.

4. Attach adapter to torque wrench and install over end of pulley and slowly rotate clockwise. Proper torque indication should be between 8 and 23 inch–ounces. Torque will vary with rotation between these values.

   > **NOTE:** If torque is less than 8 inch-ounces, remove claw from fixture. Insert a shim, from Rail Replacement Kit (A3584000) Part No. under one of the rails on the claw body. To install new rails or add or remove shims from under rails, clip wire at one end of rail and slide end of rail off claw body. Replace rails by holding in place and secure with wire 0.20 diameter x 1.00 inch long. Replace assembly on torque fixture and check torque. If steel rails or cams have been replaced, install claw and cam-pulley assembly in to projector and run in for 2 hours. Then remove and recheck torque.

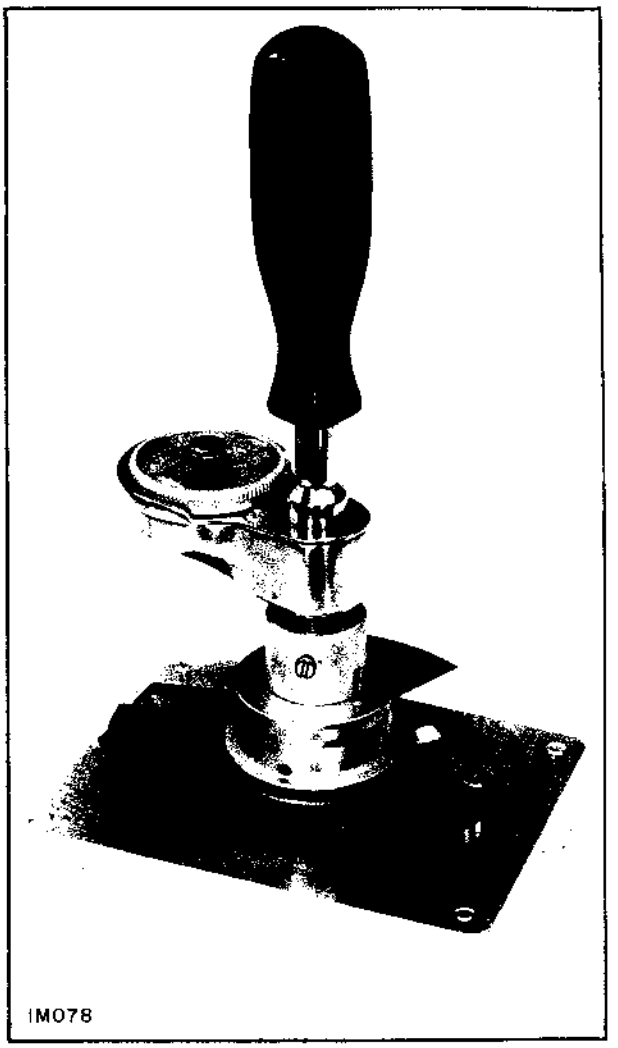


Figure 82

Claw Protrusion Adjustment

1. Perform Claw Lateral Position Procedures (page 71).
2. From rear of projector, rotate drive pulley until teeth on claw protrude through aperture plate and are positioned approximately half-way down in its travel.
3. Insert Protrusion Gauge into top of aperture plate, as shown with HIT side out.
4. Slide gauge down through aperture plate. Gauge should just hit claw teeth. If claw is misadjusted, perform following steps.
5. On eccentric pin shaft, move claw assembly in or out as needed and simultaneously slide gauge up and down until gauge just hits teeth.
6. Lock one setscrew and turn gauge around exposing CLEAR and slide gauge past claw. When properly adjusted, claw teeth will clear the gauge.
7. Tighten other setscrew and recheck HIT and CLEAR and recheck Lateral position.
8. Perform Claw Travel Adjustment Procedures (below).

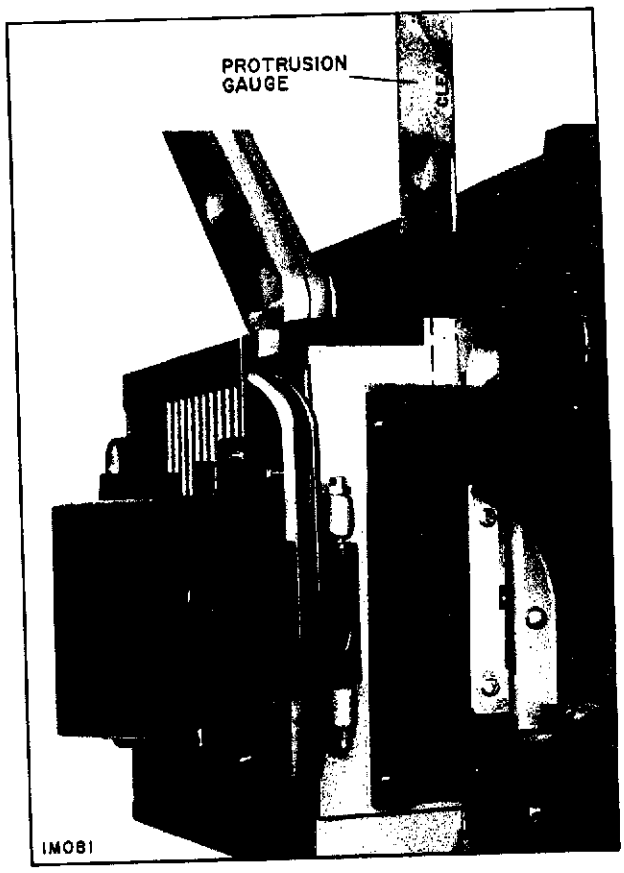


Figure 83

Claw Travel Adjustment

To adjust the travel of the claw, perform the following procedures:

1. Perform Rear Cover Removal Procedures (page 14).

   NOTE: Prior to performing the Claw-Travel Adjustment, perform the framing equalization as per steps 2 and 3.

2. Open lens gate and while looking through aperture opening, rotate drive pulley by turning blower impeller until shutter blade covers lower half of aperture opening and the claw teeth protrudes through top of claw travel slot.
3. Rotate the framing knob until the lower edge of the upper claw is in line with the upper edge of the aperture opening.
4. Place take-up reel arm in operating position.
5. Remove left-hand rail from aperture plate.
6. Install Claw Travel Gauge with knurled screws provided with travel gauge as shown in illustration.
7. Engage pawl of travel gauge shaft on upper claw tooth. Make certain that the shutter blade still covers the lower half of aperture opening. It may be necessary to pull pawl down to engage claw tooth.
8. Loosen knurled thumb screw on side of travel gauge and rotate outer ring to zero gauge.
9. Rotate drive pulley by turning blower impeller counterclockwise until claw moves to bottom of claw travel slot. At this point of claw travel, the shutter blade should be covering the upper half of the aperture plate opening. Proper claw travel should be .2990 (± .0005) (Minimum .2985 - Nominal .2990 - Maximum .2995)

NOTE: If the claw travel is more or less than specified in step 9, perform the following steps:

10. Loosen three lock screws (3) on front of Cam-Hanger Plate and one lock screw (2) on shutter side of back plate assembly. Do not loosen excessively.

11. If claw travel was less than .2990 (± .0005), rotate claw travel screw (1) clockwise. *(Approximately 1/2 turn of the claw travel screw is equal to .001 inch of claw travel).* Rezero and recheck claw travel after each adjustment of the claw travel screw.

12. When proper claw travel is obtained, retighten screws loosened in step 8 and recheck claw travel.

13. Remove claw travel gauge and replace left-hand rail on aperture plate. Make certain that rail lies firmly against raised side of runner on aperture plate. Recheck lateral position of the claw.

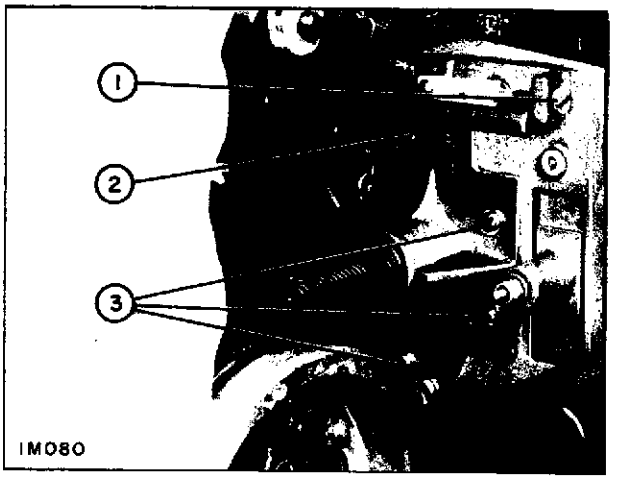


Figure 84

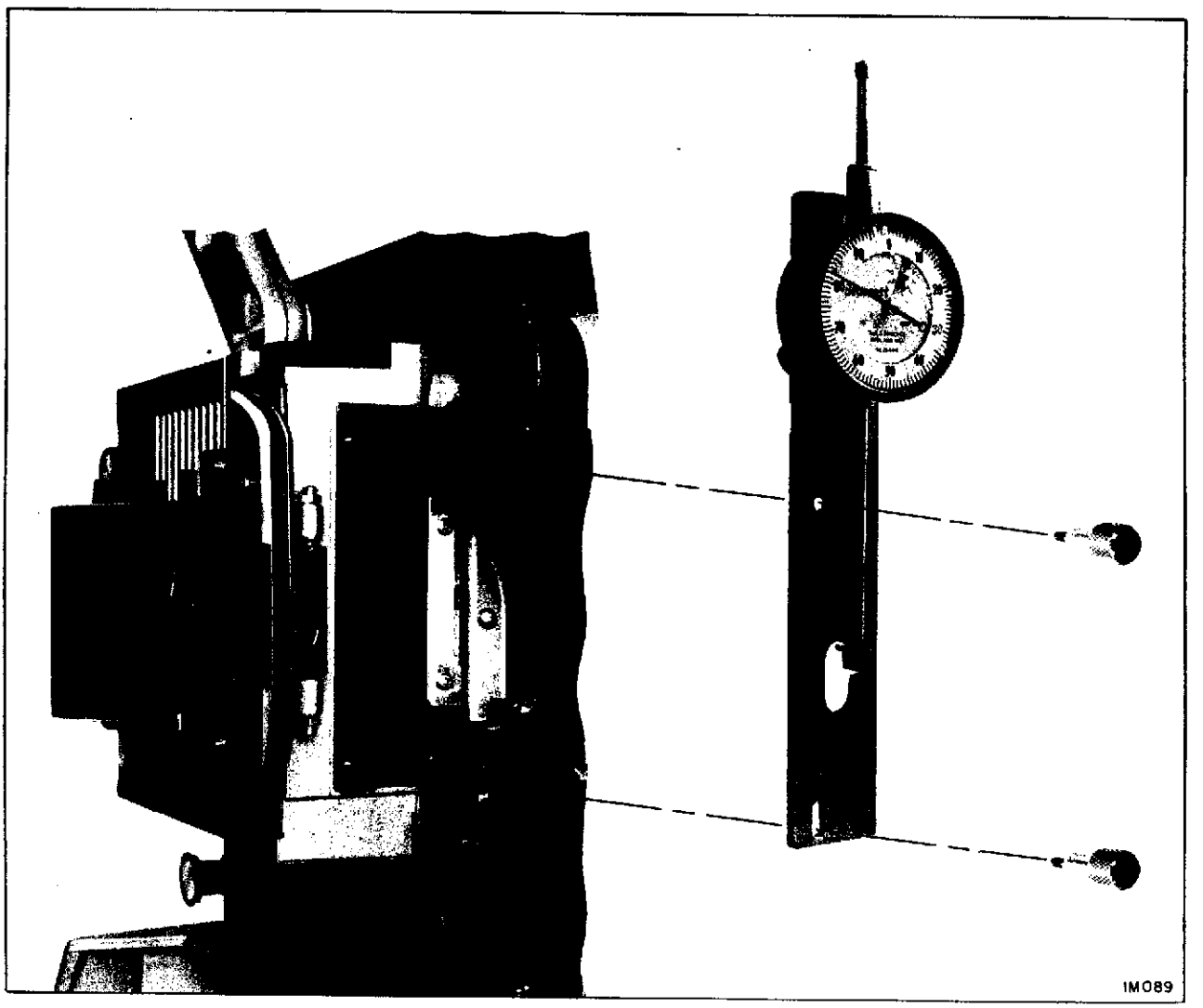


Figure 85

Claw Lateral Position Adjustment

1. Perform Rear Cover Removal Procedures (page 14).
2. Open lens gate and if necessary, unthread film from upper sprocket and push film forward.
3. From the rear of the projector, rotate drive pulley until teeth on claw protrude through aperture plate and are positioned at the top of the downward travel.
4. Slide thin side of claw lateral gauge between claw teeth and edge of lefthand rail. Gauge should pass freely.
5. Reverse gauge and insert thick side between claw teeth and edge of lefthand rail. Gauge should stick.
6. If claw lateral position needs adjusting, perform following steps.
7. On claw assembly, loosen setscrews (1) just enough to allow eccentric pin to turn.
8. Insert thin side of gauge between claw teeth and lefthand rail.
9. Insert screwdriver in eccentric pin (2) and turn clockwise until claw presses firmly enough against gauge to hold gauge in place.
10. Slowly turn eccentric pin counterclockwise until gauge drops out by its own weight.
11. Perform Claw Protrusion adjustment Procedures. (page 69).

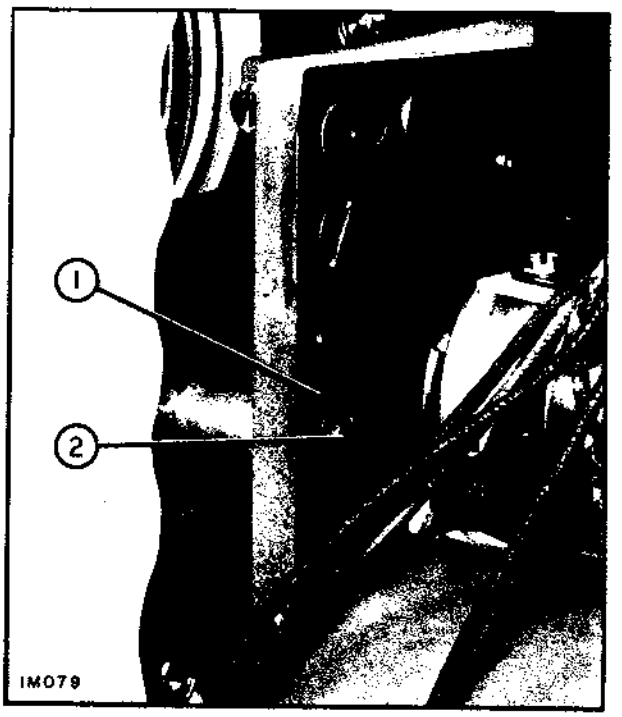


Figure 86

BELT REPLACEMENT AND ADJUSTMENT

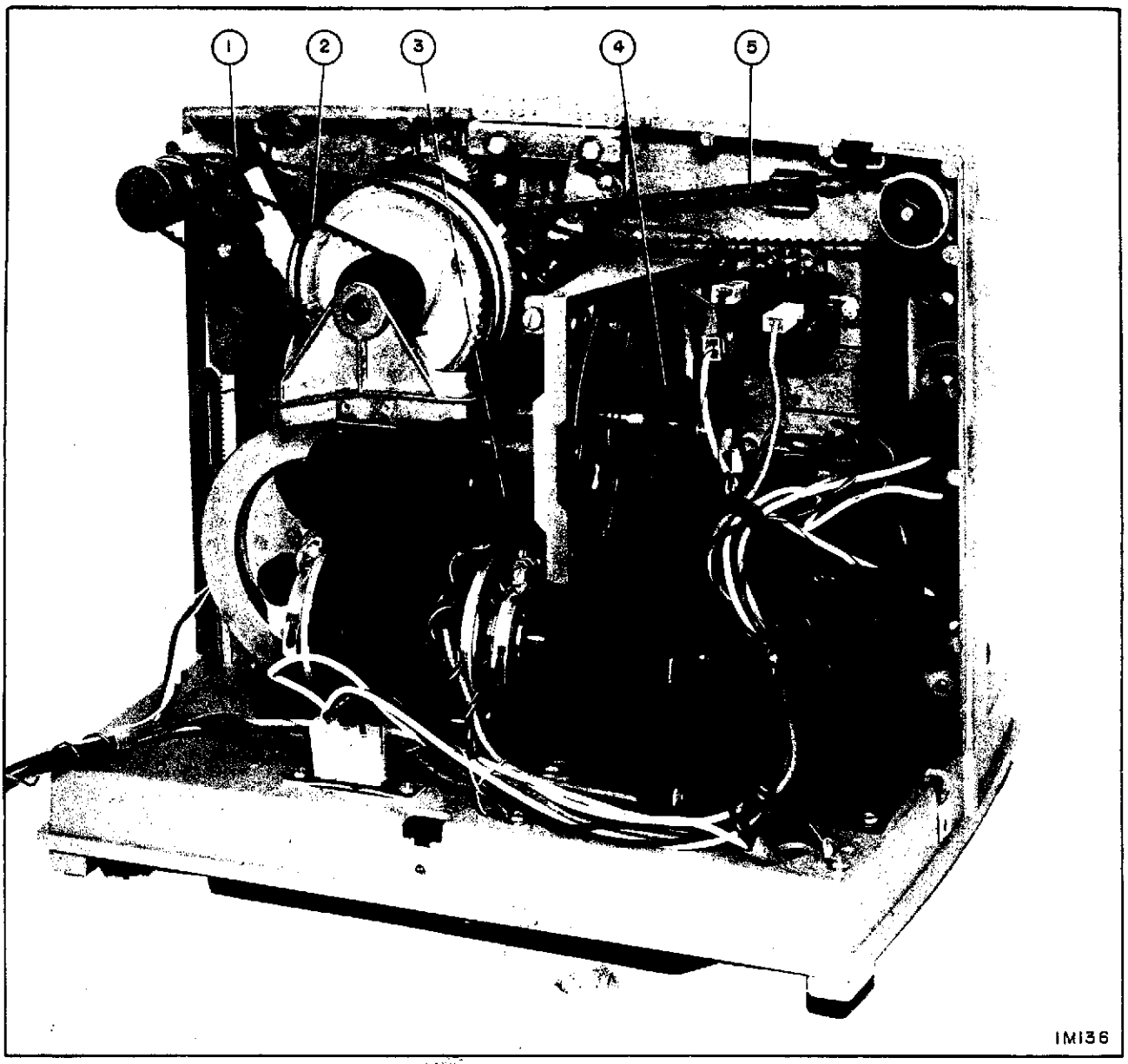


Figure 87

REPLACEMENT BELTS

Symbol	Part No.	Description
1	B3164012	BELT – REWIND
2	B3164011	BELT – REVERSE
3	B3164004	BELT – LOWER SPROCKET DRIVE
4	B3164010	BELT – DRIVE, 60 HERTZ
5	B8682001	BELT – FORWARD DRIVE
Not Shown	B3164002	BELT – REEL ARM FRONT
Not Shown	B3164001	BELT – REEL ARM REAR

DRIVE BELT

To replace the drive belt, perform the following procedures:

1. Perform Rear Cover Removal Procedures (page 14).
2. Perform steps 1-4 of blower housing removal procedures (page 26).
3. Slide drive belt off cam-pulley and through belt shifter.
4. Slide belt through blower assembly and over impeller.
5. To install new drive belt, reverse removal procedures.
6. Check belt tension at a point midway between the two pulleys. A force of one lb. should deflect the belt 1/4 in.
7. Adjust tension by loosening motor mounting screws and shifting motor toward or away from projector frame. Keep motor shaft parallel to worm shaft.

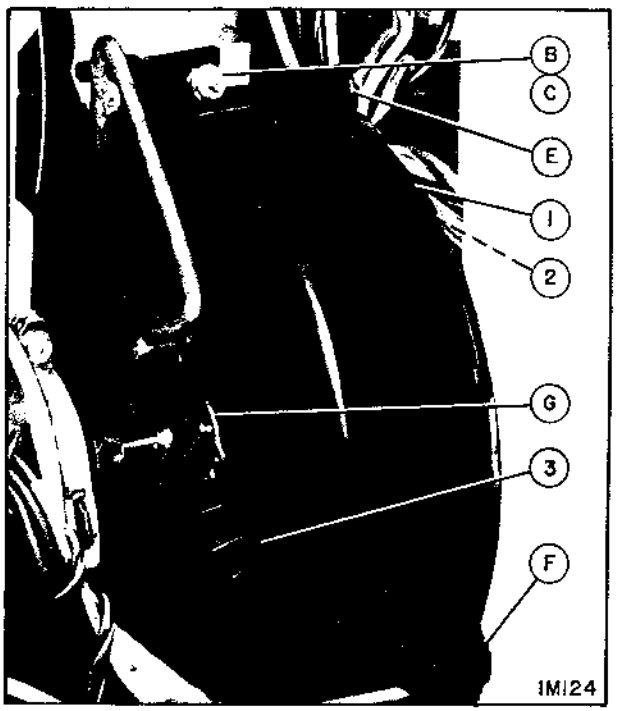


Figure 88

FORWARD DRIVE BELT

To replace and adjust the tension of the forward drive belt, perform the following procedures:

1. Perform Rear Cover Removal Procedures (page 14).
2. Perform Main Shaft Support and Fluid Clutch Removal Procedures (page 23).

   NOTE: Do not disassemble the rewind drag clutch when removing or replacing belt.

3. Loosen tension assembly locking screw (A) and pivot screw (B).
4. Slide forward drive belt (2) from rear reel pulley and remove belt.
5. Install new belt as shown.
6. Adjust tension assembly until firm finger pressure at (2) causes approximately 1/2-inch deflection in belt. Tighten pivot screw (B) and tension assembly locking screw (A).
7. Replace parts removed in steps 1 and 2.

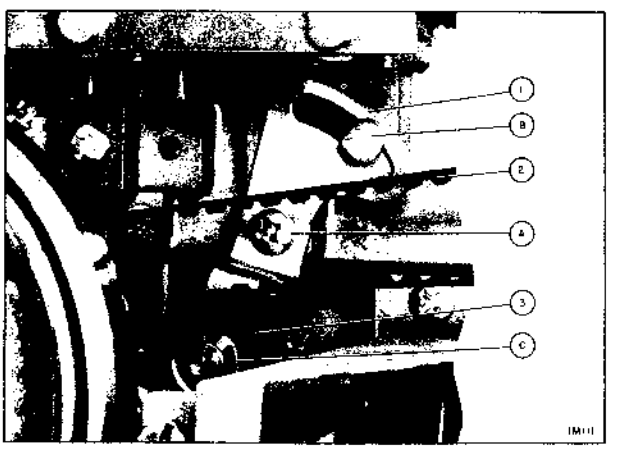


Figure 89

LOWER SPROCKET DRIVE BELT

To replace the lower sprocket drive belt, perform the following procedures:

1. Perform Rear Cover Removal Procedures. (Page 14).
2. Perform Main Shaft Support and Fluid Clutch Removal Procedures. (Page 23).
3. Perform Flywheel Removal Procedures. (Page 16).
4. Perform First Idler Gear Removal Procedures. (Page 34).
5. Perform Puck-Reverse Assembly Removal Procedures. (Page 48).
6. Perform Forward Drive Belt Removal Procedures. (Page 33).
7. Remove one screw from drive gear and loosen the other. Lift gear assembly out of the way.
8. Lift sprocket drive belt (F) from gear on lower sprocket shaft, belt tensioner, around worm gear, and over upper sprocket drive gear.
9. Install new belt.
10. See step 6 of drive gear assembly for adjustment of drive gear mesh.
11. Replace parts removed in steps 1 through 6.

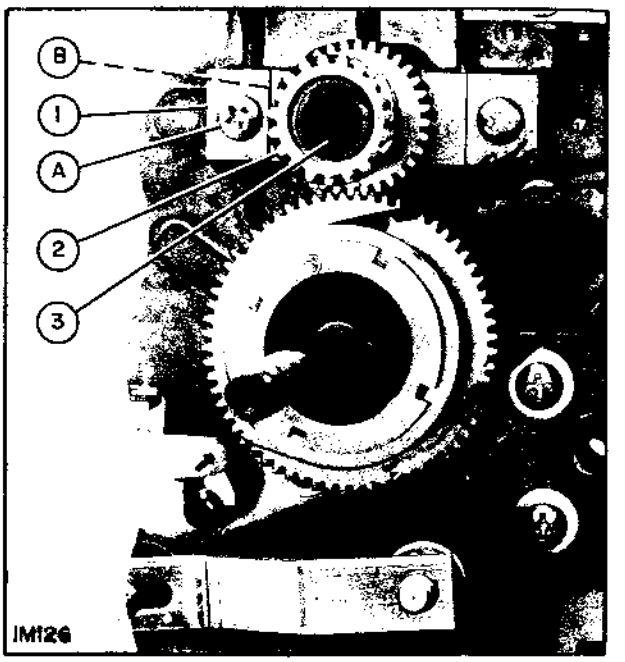


Figure 90

REVERSE DRIVE AND REWIND BELT

To replace either the reverse drive or the rewind belt or both, perform the following procedures.

1. Perform Rear Cover Removal Procedures. (Page 14).
2. Remove Main Shaft Support. Refer to Main Shaft Support and Fluid Clutch Removal Procedures. (Page 23).
3. Remove reverse drive belt by rotating drive pulley and sliding belt over edge of pulley.
4. Remove rewind belt by sliding belt off rewind roller and fluid clutch.
5. To replace either belt, reverse removal procedures.

FRONT AND REAR REEL ARM BELTS

To remove and replace the front and rear reel arm belts, refer to the Reel Arm, Shaft, and Gear Assembly Removal Procedures and perform the applicable procedures. (Page 30).

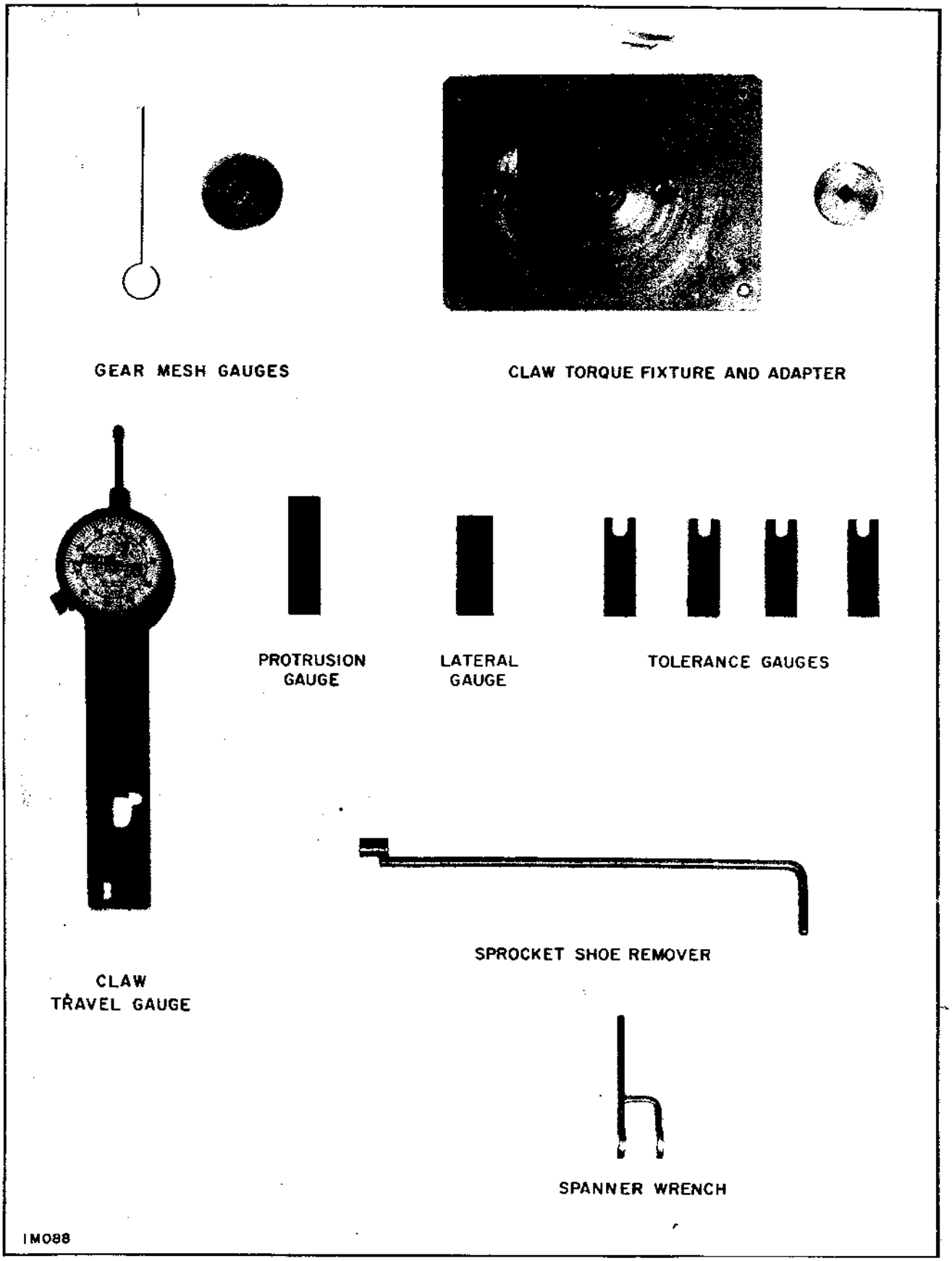

GEAR MESH GAUGES
CLAW TORQUE FIXTURE AND ADAPTER
PROTRUSION GAUGE
LATERAL GAUGE
TOLERANCE GAUGES
CLAW TRAVEL GAUGE
SPROCKET SHOE REMOVER
SPANNER WRENCH
IM088

Figure 91

STANDARD AND SPECIAL TOOLS

To aid the maintenance personnel in servicing the 16 MM Projector, the following list of standard hand tools, are recommended but not supplied. In addition, a list of the special tools, test fixtures, and guages required to perform the various removal, replacement, alignment, and adjustment procedures necessary to maintain the Projector are provided. These special tools can be procured, under the stock numbers given below.

Standard Tools Required But Not Supplied

Tool	Manufacturer	VLX Part No.	Mfr. Part Number	Purpose
Retaining Ring Pliers	Waldes	AA 012001	5100-25	Remove and install spring-type retaining rings.
C-Washer Applicators	Waldes	AA013001 AA013002 AA013003	E-9, E-12, and XE-31	Install C-Washers.
Hand Crimping Tool	Amp	AA014001		Install terminals on leads.
Allen Wrench (Modified)	Allen Head	AA015001	Size 7/64	To adjust optic lens assembly.
Allen Wrenches (Regular)	Allen Head	AA015502	Assorted Sizes	To remove and replace gears, pulleys, etc. and perform various adjustments.
Allen Wrenches (long handle)		AA015503		
Torque Screw Driver	Richmont Products Cleco Div. Reed Roller Belt Co.	AA016501	CAL. 30 RO ROTO TORQ	To torque first idler gear bracket.
Torque Wrench	Snap-on Tool Co.	AA017001	TQS-025-FU	Used to torque claw body on constant diameter cam.
Pressure Gauge	P. K. Neuses	AA018001	N-300	Used to adjust side pressure of moveable rail on aperture plate assembly.

Special Tools

Part No.	Description
AA011	Complete Set of Tools in this list.
B9215001	Gauge – Tolerance – 0.002 in. thick
B9215002	Gauge – Tolerance – 0.003 in. thick
B9215003	Gauge – Tolerance – 0.005 in. thick
B9215004	Gauge – Tolerance – 0.010 in. thick
C9416501	Fixture and Adapter – Claw Torque (See Standard Tools for torque wrench)
B9219501	Spring Compressor – Worm Gear
B9216001	Gauge – Claw protrusion (.035-.040 inch)
B9218001	Gauge – Claw Lateral
C9421501	Gauge – Claw Travel
C9415501	Spanner Wrench - Sound Optic Lens
B9221501	Remover – Sprocket Shoe
A9015001	Clip – Solar Cell Mounting
A9014001	Shaft – Pulley-Clutch, Shutter, Cam Assembler
A9096001	Gauge – Gear Mesh (Slug)
B9270501	Gauge – Gear Mesh (Pin)

CLEANING AND LUBRICATION

CLEANING

If the Projector is to give consistently good performance, it must be kept clean at all times. Every time the Projector is put into operation after a long storing period or whenever the parts appear dirty, the following points should be dusted with a soft lint-free cloth or a camel's-hair brush:

1. Projection Lens
2. Projection Lamp
3. Aperture Plate
4. Sound Optic Lens

Periodically, the items listed above should be inspected and thoroughly cleaned as follows:

CAUTION

Do not use any of the following products as cleaning agents for cleaning the projector parts.

1. Carbon Tetrachloride
2. Acetone
3. Toluol
4. Benzol
5. Trichlore
6. Triclene
7. MEK
8. Freon

a. Clean the upper and lower sprockets with a bristle brush moistened with isopropyl alcohol. Make sure that all dust and emulsion deposits are removed from sprocket teeth.

b. Open lens gate and clean the claw teeth, aperture plate, and film shoe with a bristle brush and soft cloth moistened with isopropyl alcohol.

c. Clean the sound drum with a soft cloth moistened with isopropyl alcohol.

d. Clean the pressure roller with a soft cloth moistened with isopropyl alcohol.

e. Remove the projection lamp and clean with lens paper or a soft lint-free cloth moistened with isopropyl alcohol.

f. Clean sound optic lens with lens tissue or a Q-Tip with lens cleaning fluid.

After 1000 hours of operation or at the annual preventive maintenance check period whichever occurs first or whenever the Projector is being serviced, a thorough inspection should be made of all bushings, bearings, belts, and other moving parts for excess dirt and signs of wear. Excessively dirty areas should be cleaned and lubricated. For the recommended types of lubricants, refer to Table 1. Worn or defective parts should be replaced and the necessary alignment and adjustment procedures performed.

LUBRICATION

The 16 MM Projector is designed to, under normal operating conditions, operate for 1000 hours between lubrications. Table 1 contains a list of the lubrication points, the type of lubricant to be used, and in some cases the amount of lubricant. Before relubricating any parts, the parts should be cleaned of dirt and old lubricants.

Table 1. Lubrication Chart

Lubrication Point	Lubricant	Interval
Drive Gear Assembly	Light Grease	Light Smear every 1000 hours or when re-assembling parts
Upper Sprocket Drive Gear	Same as above	Light Smear every 1000 hours or when re-assembling parts
Block/Side, Speed Selector	Same as above	Light Smear every 1000 hours or when re-assembling parts

Table 1. Lubrication Chart (Continued)

Lubrication Point	Lubricant	Interval
Felt Oiler on Claw body	Gulf Semi Fluid "D" Part No. B0709000	3 drops every 1000 hours, once a year, or when servicing. Replace when dirty.
All non bearinged shafts	SAE 30 Motor Oil (acid free)	1 to 2 drops every 1000 hours or once a year
Motor	SAE 30 Motor Oil	1 drop every 1000 hours or once a year
Film Shoe Pins (Lens Gate Assembly)	Light Non gumming oil (SAE 10 Motor Oil)	Light film every 1000 hours or when reassembling parts
Sound Pressure Roller	SAE 10 Motor Oil	1 to 2 drops every 1000 hours or once a year
Tension/Damper Assembly	Silicone fluid, Part No. A4705000	Re-saturate entire orifice every 1000 hours or when reassembling parts.
Rewind-puck Gear	Light Grease	Very light smear every 1000 hours or when assembling parts.
In/Out Cam	Grease Part No. A8125000	Clean cam thoroughly and light smear every 1000 hours or when assembling parts.
Constant Diameter Cam	SAE 30 Motor Oil	Do not clean with solvents Do not lay on absorbent material – Let soak in SAE 30 oil if part is removed from assembly.
Eccentric Pin	Silicone Fluid Part No. A4705000	Complete coating when assembling parts into framing plate
First Idler Gear and Worm Gear	Heavy Grease Part No. A1997000	Light Smear every 1000 hours or when reassembling parts
Tilt Mechanism Worm and Gears	Heavy Grease	Light Smear every 1000 hours or when reassembling parts

SERVICING AIDS

Since the 16 MM Projector is primarily a mechanical device, improper operation can easily be detected either visably or audibly during the running of a film. The following information and instructions have been prepared to aid maintenance personnel in trouble-shooting and maintaining the Projector. The information is presented to provide the technician with a logical sequence of checks to localize the cause of a given trouble to a specific area and the suggested corrective action necessary to restore the Projector to operating condition.

Projector

Sympton	Probable Cause	Correction
Weak Sound	Dust on optic lens Dust on solar cell Exciter lamp defective Solar Cell loose or out of position Defective amplifier Pressure roller arm bent or misadjust	Clean Clean Replace Reposition and glue Repair or replace Repair or adjust (Refer to Buzz Track Adjustment)
No Sound	Cable plugged into speaker jack Exciter lamp burned out Amplifier defective Solar cell loose or out of position Microphone Plug in jack Fuse blown on amplifier assembly	Remove plug Replace Repair or replace Reposition and glue Remove plug Replace and repair amplifier
Distorted Sound	Dirty optic lens Dirty or defective colar cell Pressure roller arm bent or misadjusted	Clean Clean or replace Repair and adjust (Refer to Buzz Track Adjustment)
Unsteady Sound (Wow or flutter)	Film not threaded properly Sound drum dirty Pressure roller dirty or binding on shaft Damper arm out of position or binding Damper roller binding on shaft Locknut on sound drum shaft not adjust properly Puck assembly dragging on flywheel	Rethread Clean drum Clean and lubricate Readjust Clean and lubricate Readjust (Refer to removal procedures) Readjust (Refer to removal procedures)
No picture	Projection lamp burned out, missing, or not seated properly in socket Defective function switch	Replace or install correctly Replace
Lose Both Loops	Worm or defective sprocket shoes Reel arm shafts binding Improper reels Upper sprocket loose on shaft	Replace Repair Replace Tighten sprocket
Loses Lower Loop	Broken sprocket holes Bad splice Film binding in lens gate Dirty Claw Claw travel extremely low	Cut out and splice film Resplice Check for thick splices or adjustment of rails Clean dirt and emulsion from teeth Adjust (Refer to Claw Travel Adjustment)

Projector (Continued)

Sympton	Probable Cause	Correction
Improper Takeup (Forward)	Reel arm shafts binding or gears loose on shafts Forward drive belt adjusted too tight or too loose Drag pad on main shaft support missing or worn	Repair or tighten gears Readjust (Refer to Forward Belt Replacement) Replace pad
Improper Takeup (Forward and Reverse)	First Idler gear not adjusted for proper backlash Gears loose on reel arm shafts	Readjust (Refer to removal procedures Check and tighten
Film spills off Supply (Front) Reel	Ratchet assembly binding on rewind clutch	Replace rewind clutch (Refer to Pulley/Ratchet Assembly Removal)
Clicking Noise in Rewind	Ratchet assembly binding on reverse takeup drive.	Replace ratchet plate, hub liner, or hub pulley of rewind clutch (Refer to Pulley/Ratchet Assembly Removal)
Film Noise	Claw travel excessive Film shoe out of adjustment	Adjust claw for travel, protrusion, and lateral position. Adjust film shoe (Refer to Film Shoe Adjustment)
Mechanical Noise	Check Cam Torque (Too loose) Check overall Projector	Perform Claw Torque Adjustment
Picture Unsteady (Weave or Jitter)	Claw misadjusted (Travel low) Dirty Claw Film Shoe misadjusted Dirt in aperture assembly Right hand rail binding or insufficient pressure Film shoe pins dirty or lower block misadjusted Lens gate not latched securely Defective film Improper film threading Claw Cam worn	Check Claw for travel, protrusion, and lateral position Clean Claw teeth Adjust film shoe (Refer to Film Shoe Adjustment) Clean aperture assembly Clean and check pressure Clean and adjust (Refer to Lens Gate Assembly) Check lens gate latch. Check film Check threading Check claw torque (Refer to Claw Torque Adjustment)
Picture indistinct or illumination low	Projection lens dirty Projection lamp defective Low line voltage	Clean Replace Check line voltage
Film Scratched	Film rails dirty, damaged, or out of adjustment Aperture plate dirty or damaged Guide roller dirty or dragging Pressure roller dirty or binding Emulsion hardened on film shoe Emulsion hardened on sprocket shoes	Clean, replace, or adjust rails. (Refer to Aperture Plate Assembly Removal) Clean or replace Clean and lubricate Clean or replace Clean Clean

Projector (Continued)

Symptom	Probable Cause	Correction
Improper Rewind	Rewind belt worn or oil on belt Rewind clutch out of adjustment Rewind drag clutch out of adjustment Gears loose on front reel arm shafts. Excessive drag in rear reel arm assembly	Replace Adjust (Refer to Rewind Adjustment) Check and tighten Check shafts and belt tension
Improper film take-up at sound drum in REVERSE	Oil or grease on surface of Puck-Reverse drive pulley tire. Puck-reverse drive pulley tire worn. Puck-reverse drive pulley does not engage flywheel hub. Sound drum shaft binding Lower sprocket loose on shaft	Clean surface of tire and flywheel with alcohol Replace tire Check and readjust (Refer to Puck-Reverse Removal Procedures) Adjust locknut on Sound drum shaft. (Refer to Sound Drum and Flywheel removal) Tighten sprocket
High hum in amplifier	Defective filter capacitor C16, C17, C18	Change filter capacitor

Safe Threader

Symptom	Probable Cause	Correction
Leader wraps around upper sprocket, instead of entering threading track.	Excessive curl on end of leader.	Make sure that leader does not have excessive curl. If curling is apparent, replace or straighten leader.
Film jams in gate area	Film shoe cam misadjusted.	Adjust for proper clearance. Tighten nut and back off 2-1/4 turns.
Leader hits sound optical lens and stops threading operation.	Space between exciter lamp cover and sound drum too large	Adjust gap between exciter lamp cover and sound drum for .018 inch to .036 inch. A slight relocation of the exciter lamp cover pivot pin either to the right or left will make the gap adjustment. The movement of the pivot pin may be made with pliers or a gentle tapping.
Threading operation stops after leader has passed by sound drum	Incorrect film shoe pressure.	Adjust setscrew "C" on bottom of lens gate assembly. (This increase of pressure is at the bottom end of the film shoe).

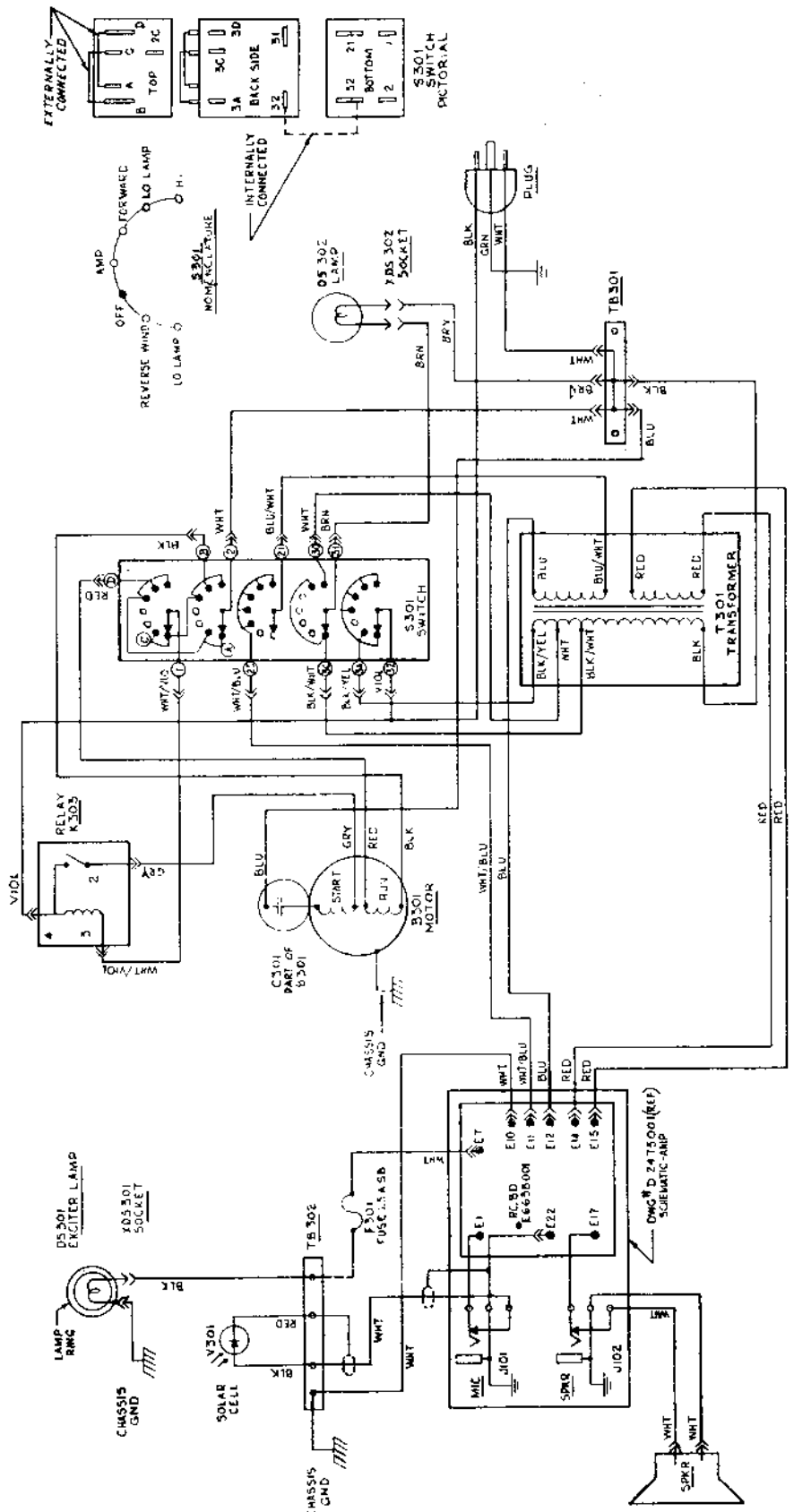
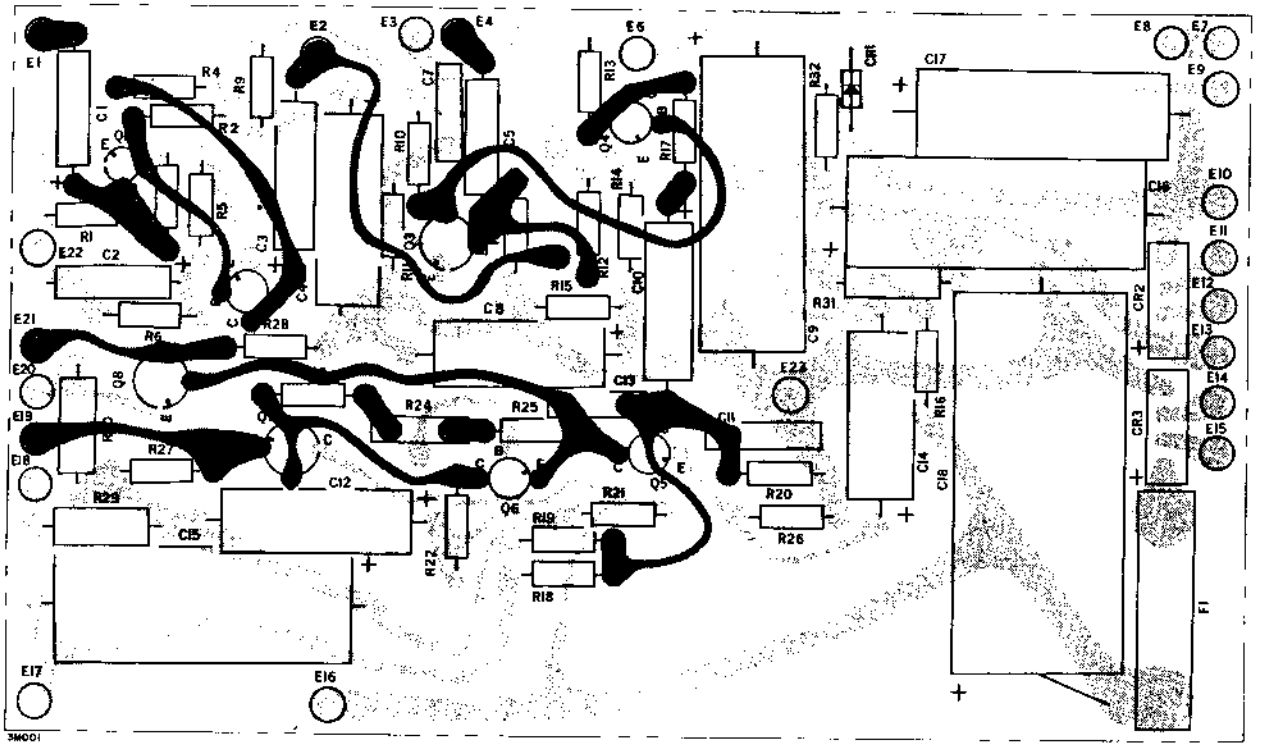
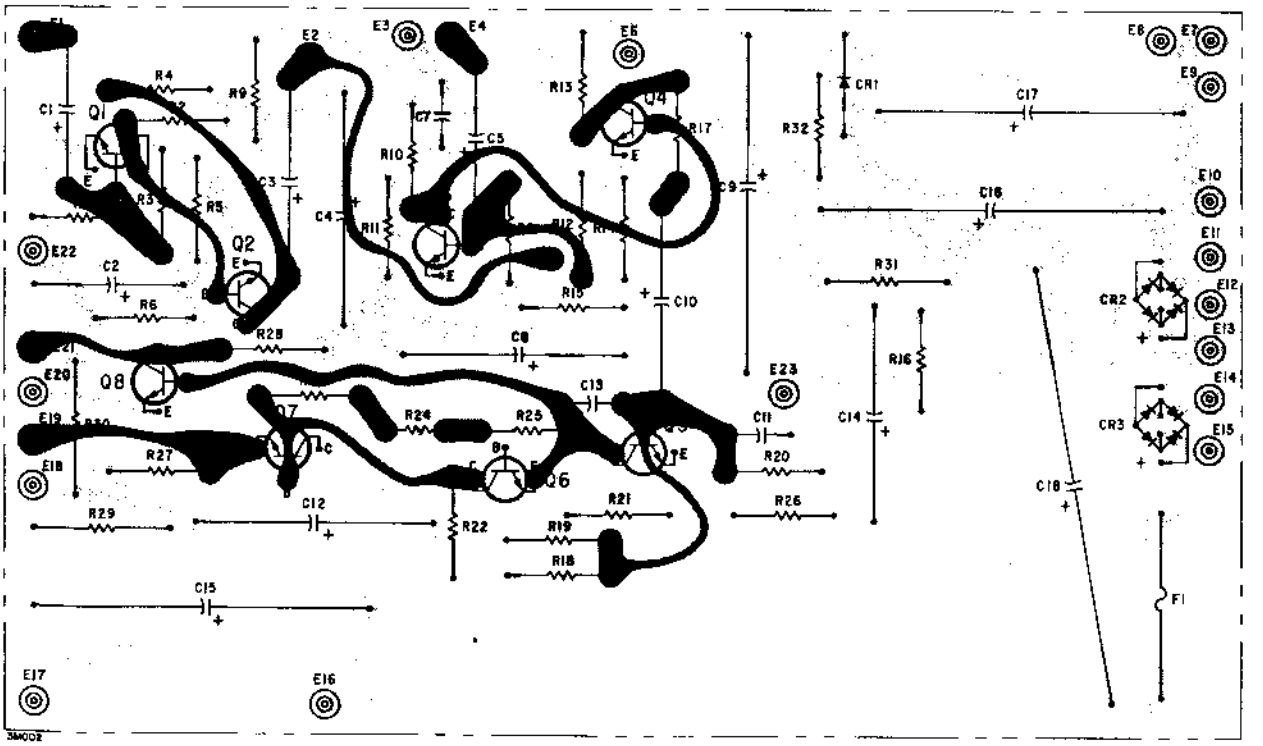


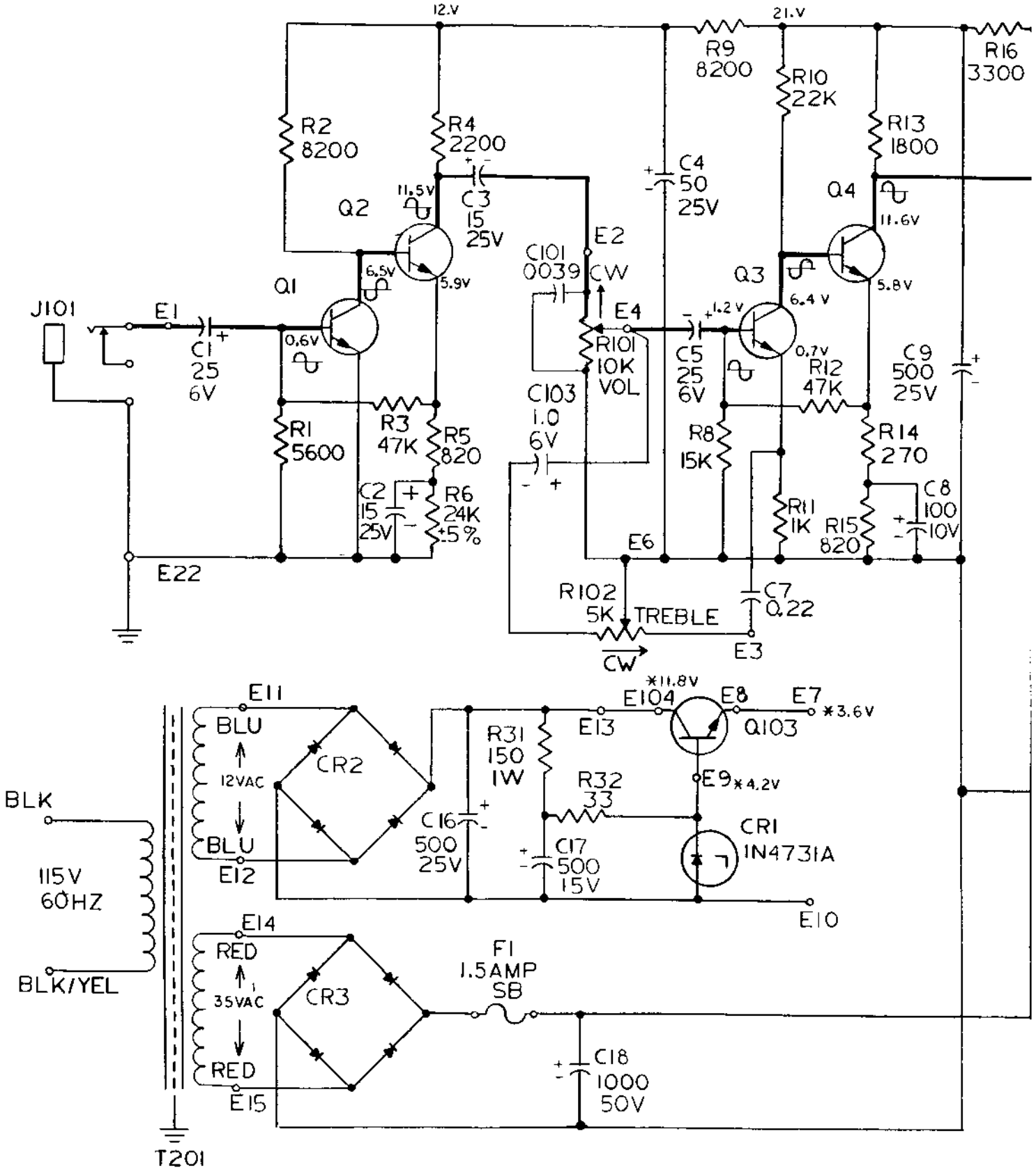
Figure 92. Projector Wiring Diagram

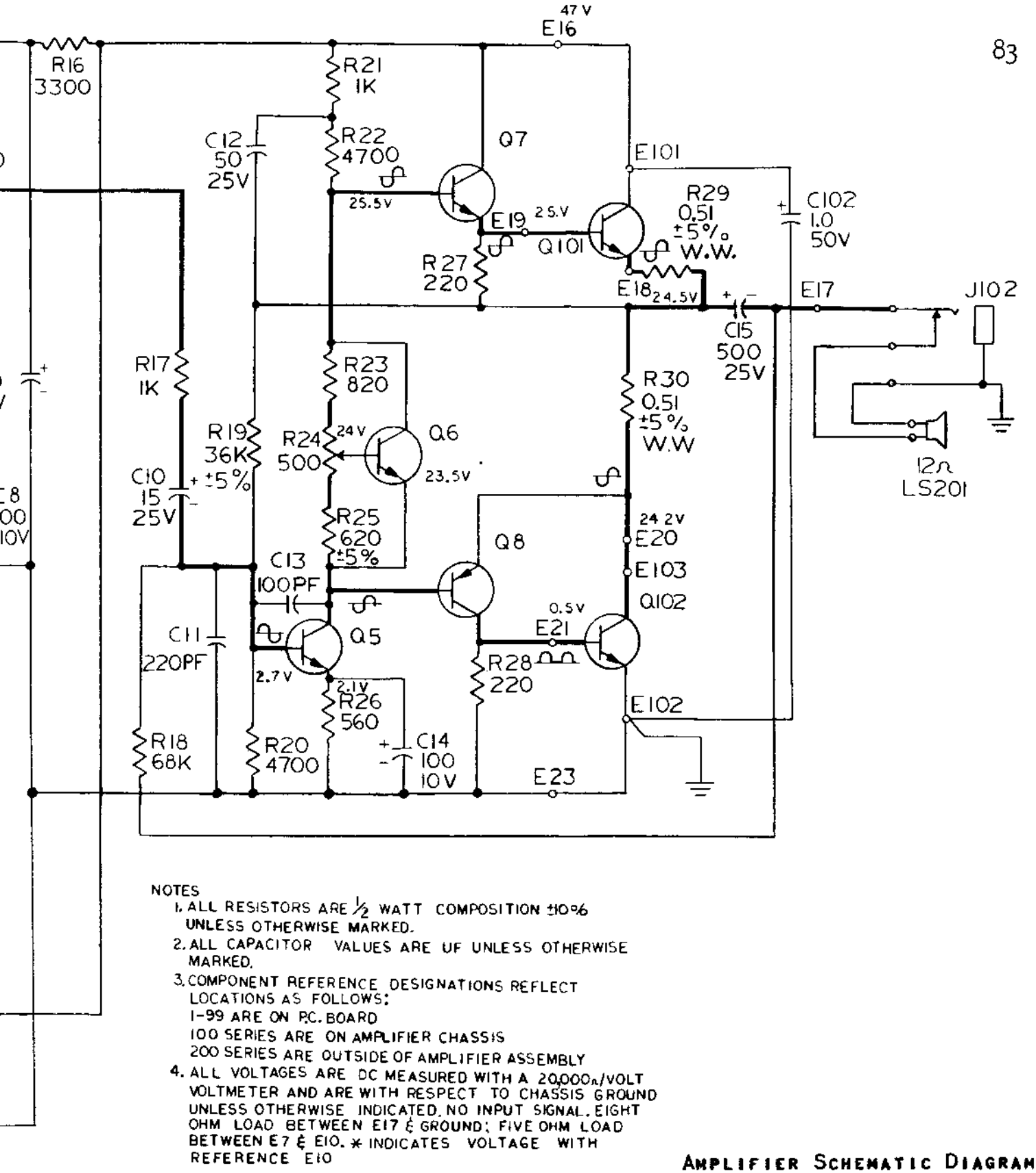


AMPLIFIER BOARD, COMPONENT LOCATION



AMPLIFIER BOARD, SCHEMATIC/WIRING DIAGRAM


12.V
21.V
R9
8200
R16
3300
R10
22K
R2
8200
R4
2200
C3
15
25V
R13
1800
C4
50
25V
Q2
11.5V
Q4
11.6V
E2
C101
0039
CW
6.5V
5.9V
Q1
Q3
6.4 V
5.8V
J101
E1
C1
25
6V
0.6V
1.2 V
0.7V
E4
R101
10K
VOL
C5
25
6V
R12
47K
C9
500
25V
C103
1.0
6V
R1
5600
R3
47K
R5
820
R8
15K
R14
270
C2
15
25V
R6
24K
±5%
R11
1K
R15
820
C8
100
10V
E6
E22
R102
5K
TREBLE
C7
0.22
CW
E3
E11
*11.8V
E104
E8
E7
*3.6V
BLU
12VAC
BLU
E12
CR2
R31
150
1W
E13
Q103
R32
33
E9 *4.2V
C16
500
25V
C17
500
15V
CR1
IN4731A
E10
BLK
115V
60HZ
BLK/YEL
E14
RED
35VAC
RED
E15
CR3
F1
1.5AMP
SB
C18
1000
50V
T201



NOTES

1. ALL RESISTORS ARE ½ WATT COMPOSITION ±10% UNLESS OTHERWISE MARKED.
2. ALL CAPACITOR VALUES ARE UF UNLESS OTHERWISE MARKED.
3. COMPONENT REFERENCE DESIGNATIONS REFLECT LOCATIONS AS FOLLOWS:
   1-99 ARE ON P.C. BOARD
   100 SERIES ARE ON AMPLIFIER CHASSIS
   200 SERIES ARE OUTSIDE OF AMPLIFIER ASSEMBLY
4. ALL VOLTAGES ARE DC MEASURED WITH A 20,000Ω/VOLT VOLTMETER AND ARE WITH RESPECT TO CHASSIS GROUND UNLESS OTHERWISE INDICATED. NO INPUT SIGNAL. EIGHT OHM LOAD BETWEEN E17 & GROUND; FIVE OHM LOAD BETWEEN E7 & E10. * INDICATES VOLTAGE WITH REFERENCE E10

AMPLIFIER SCHEMATIC DIAGRAM

Figure 93. Amplifier Schematic Diagram

INDEX

F

G

I

L

M

O

P

R

S

S

T

U

W