

SERVICE MANUAL

ST-1200HD

ELMO CO., LTD.

Nagoya, Japan

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I N I T I O

For better understanding and efficient use of this manual, may we call your attention to the following points.

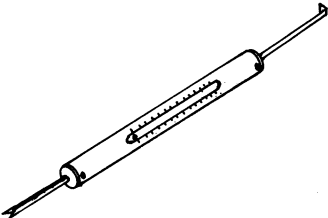
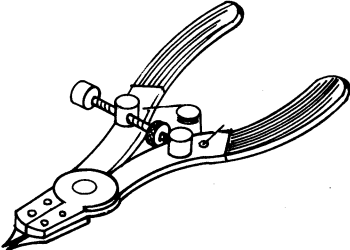
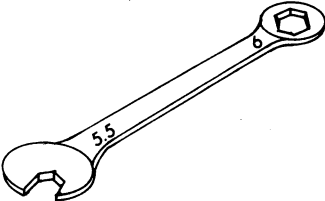
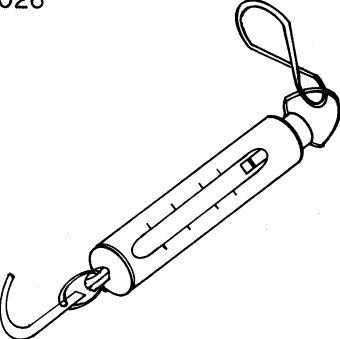
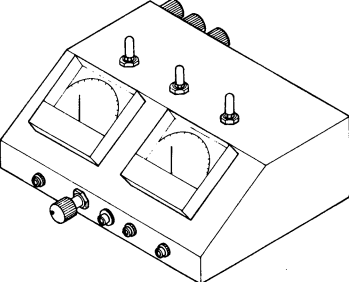
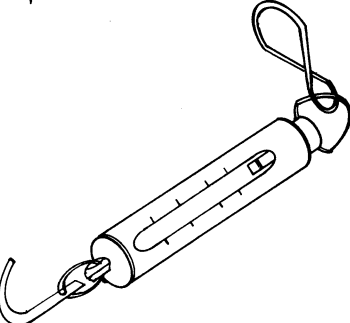
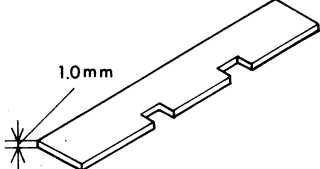
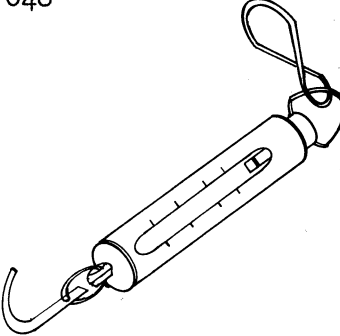
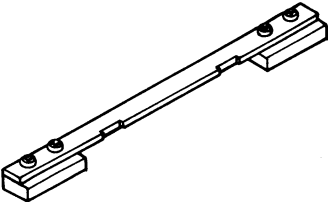
1. Read the IV chapter "Disassembly & Reassembly Notes" thoroughly so that you may become familiar with the ST-1200HD.
2. Also refer to the parts list No.148 for the ST-1200HD when detaching the parts from the projector.
3. The disassembly procedure in the IV chapter is described in the following way.
 - 1) Detaching large parts of complete assembly from the projector.
 - 2) Detaching small parts from the complete assembly in order.
4. This book gives a full detail of the adjustment points for reassembling the projector.

This shows you how to find out the parts to be replaced and the troubles caused by insufficient adjustment. This has a flow chart for common troubles and their relating check points to find out the cause of trouble quickly and exactly.
5. The pages to be referred relating to the prospective troubles are shown in the III chapter "Trouble Table".

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I. Special tools, Test films and Grease/Oil

I-I Special Tools			
C043		Name	
		Bar spring scale 110 g	
		Reference page	
		13, 21, 27, 29 30 and 68	
P006		Name	
		Stop ring pliers	
		Reference page	
		17	
P025		Name	
		Pad roller lever spanner, the subtense 5.5mm	
		Reference page	
		65	
P026		Name	
		Bar spring scale 500g	
		Reference page	
		31 and 65	
P045		Name	
		Resistor box 8 ohm 40W	
		Reference page	
		69, 70, 71, 72 73 and 75	
P046		Name	
		Bar spring scale 2Kg	
		Reference page	
		13	
P047		Name	
		Claw protrudent length gauge for 8mm projectors	
		Reference page	
		13	
P048		Name	
		Bar spring scale 1Kg	
		Reference page	
		13	
P049		Name	
		Aperture plate attaching gauge	
		Reference page	
		21	

I. Special tools, Test films and Grease/Oil

I-2 Test films

Code No.	Film Name	Reference Page
P027	Prest film	69,70,71,72,77
P050	Kodak positive film with magnetic coat	70
P051	S-8 optical frequency response, 400Hz	73
P052	S-8 optical frequency response, 3 KHz	73
P053	S-8 optical frequency response, 4 KHz	73 and 75
P054	Resolving power, Type S	19 and 21

I-3 Grease/Oil

The mark  shown in figures tells you a point to be lubricated and the letters A, B, C, D and E in the mark show you grease and oil used in the projector by referring to the following table. We recommend to use the same grease and oil to keep the projector in the original condition.

		Name
	A	DAPHNE 44
	B	VEEDOL 20-40
	C	ALVANIA GREASE 2
	D	ALUMINUM GREASE 1
	E	MOLYKOTE EP

II. Tolerance

Items	Tolerance	Measurement Conditions
Transporting speed, forward/reverse	24 $\pm$ 1 fps 18 $\pm$ 1 fps	Load film and run, and measure the speed after 5 minutes.
Claw spring I pressure Claw spring II pressure	850- 900g 450- 500g	See page 13
Pressure of pressure plate	60 - 70g	With a bar spring scale (C043)
Pressure of film side pressing spring	30 - 35g	See page 21
Framing movement	Upward 5 : Downward 5	See page 15
Unsteady picture, forward/reverse	Vertical; max. 3mm Horizontal; max. 3mm	24 fps/Test film (P054)/ Screen image is 50cm in width
Pressure of pad roller	170 - 200g	See page 65
Forward taking-up Reverse tension	50 - 60g 40 - 50g	See pages 27 and 30
Rewinding speed	Max. 100 sec.	Time for rewinding 400ft. film
Applied voltage of projection lamp	H...14.3-15V L...12.3-13V	Applying regulated input voltage, measure voltage across trans. terminal
Life of lamp	50 hours	At High position
Center illuminance Corners illuminance	Min. 800 lx Min. 440 lx	With illuminometer/at High position
Insulation resistance	Min. 2 M ohm	With 500V megger
Noise	Max. 60 phon	24 fps/load film
Film scratch	Make a loop film of posi-film (black) and run 10 times. The film should not be scratched harmfully.	
Bias current of erase head	120 - 140mA	See page 50
Bias current of recording head	350-400microA	See page 49
S/N	Min. 45 dB	See page 72
Erasing effect	Min. 40 dB	See page 72

II. Tolerance

Items	Tolerance	Measurement Conditions
Distortion	4.5 %	See page 72
Continuous power Maximum power	12 W 15 W	
Amplifier Gain: Optical playback Magnetic playback (Main) Magnetic playback (Sub)	89 ± 2 dB 98 ± 2 dB 103 ± 2 dB	f=400Hz/Input 2mV (sin wave)/10V r.m.s. of out put voltage from 8 ohm dummy (adjustment by VR) f=400Hz/Input 0.1mV (sin wave)/ turn VR fully clockwise - do -
Wow Flutter: JIS CCIR	0.3 % 0.55 %	See page 77

III. Trouble Table

	Troubles	Reference Page
FILM TRANSPORTATION	Unsteady picture (upward-downward)	11, 13, 15, 19
	Unsteady picture (rightward-leftward)	13, 19, 21, 23
	Unsteady picture (when reverse projection)	65, 81
	Picture lean	21
	Picture slipping off right or left	21
	Picture trail - Shutter flow	15
	Loop is unable to be made - Film flow	13, 15, 11
	Upper loop is getting short (forward projection)	25
	Upper loop is getting short (Reverse projection)	27
	Lower loop is getting short	30
	Lower loop is difficult to be made	37
	Lower loop is difficult to be made (optical)	65, 76
	Film transportation noise	11, 13
	Adjustment of frame line position is unable	15
AUTO-THREAD	Locking of auto-thread is unable	17, 23, 81
	Releasing of auto-thread is unable	17, 23, 81, 87
	Click noise when releasing auto-thread	23
	Fuse-breaking when releasing auto-thread	9
	Film gets caught in auto-threading	23
TAKE-UP & REWINDING	Take-up and rewinding are unable	9
	Rewinding stops halfway	27
	Rewinding speed is slow	25, 27, 29
	Releasing of rewinding mechanism is unable	31
	Take-up is unable (forward)	29, 31
	Take-up is unable (reverse)	25, 31
	Film take-up slack (in forwarding)	30
	Film take-up slack (in reversing)	27
	Play of front arm is large	25
	Locking of front arm is unable	25
	Play of rear arm is large	29
	Locking of rear arm is unable	29
PROJECTION LAMP & LENS	Lamp does not light	85, 91
	Lamp does not become OFF	85
	Switching of H - L is unable	85, 91
	Unsteady lighting	90
	Lamp knob does not click	85
	Optical axis slipping off	19, 21
	Uneven focus	19
	Out of focus sometimes	19
	Uneven illuminance	90
	Picture is dark	33, 90
	It is difficult to replace lamp	90

III. Trouble Table

	Troubles	Reference Page
MOTOR SECTION	Motor does not run	83, 89
	Motor does not stop	83
	Switching of forward and reverse is unable	83, 89
	Speed is slow, unsteady	11, 35
	Roar is large	88
	Motor knob movement is heavy	81, 83
	Motor does not start rapidly (50 Hz)	87
	Projector does not synchronize with R-1, SR-1	9
STILL PROJ.	Threading knob does not operate	9
	1 fps projection is unable	33, 83
	Film burns in 1 fps projection	33
	Click for speed change (24/18) does not operate	35
S O U N D	No sound is reproduced	46
	No sound is reproduced (magnetic)	47
	Poor sound quality (magnetic)	56, 67, 68, 69
	Small sound (magnetic playback)	56, 67, 68, 69
	Recording is unable	49, 67, 68
	Double recording is unable	50, 67, 68
	Erasing is unable	50, 67, 68
	No sound is reproduced (optical)	47, 67, 75
	Poor sound quality (optical playback)	56, 67, 75
	Small sound (optical playback)	56, 67, 75
	Exciter lamp does not light	48, 87
	Howling (optical playback)	56
	Mic. input does not function	51
	AUX IN does not function	52
	No sound from monitor jack (yellow)	53
	No sound from monitor jack (green)	53
	High frequency is difficult to be reproduced	33, 69, 75
	Oscillation when transferring sound to another track	55
	Normal sound is not reproduced rapidly	39, 40, 41
	Noise	54, 75
	Wow, Flutter	78, 79, 9, 17, 31, 63, 69, 88
	Level meter does not swing	52
OTHERS	Film burns frequently	90
	Film is scratched	17, 19, 21
	Machine noise is loud or abnormal	11, 19, 25, 35, 88, 90
	Pilot lamp (P201, P202) does not light	87
	Light Emitting Diode (LE201, LE202) does not light	87

IV. Disassembly of Machine Frame Sction

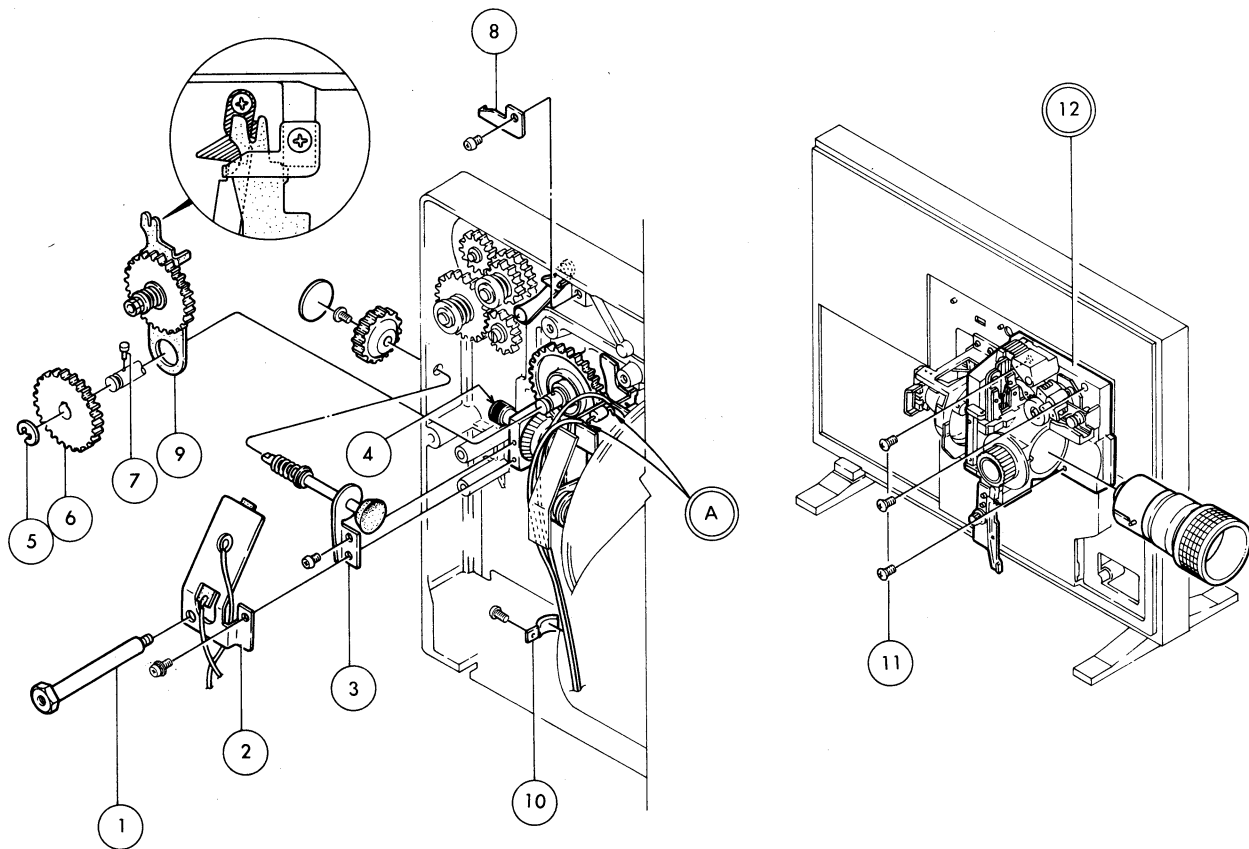


Fig 1

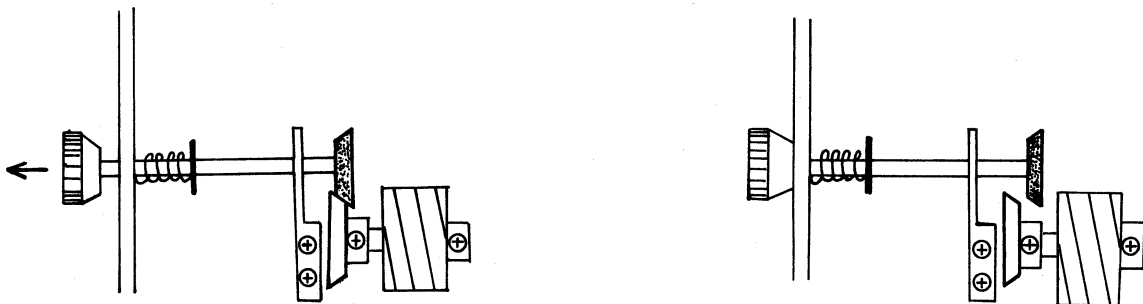


Fig 2

IV. Disassembly & Reassembly Notes

1. Machine Frame Section

Replacing Machine Frame Assembly

A. Disassembly

1. Unsolder two wires, Fig.1-(A).
2. Remove the parts from Fig.1-1 to 12 in order.

* Notes: a) It is unnecessary to unsolder the wires connected to Fig.1-2.
b) It is unnecessary to remove a knob, Fig.1-3.

B. Reassembly Notes

Reassemble in the reverse way of the disassembly procedure, giving your careful attention to the under facts.

- Poor operation (incorrect position) of (2) and (4);
The projector does not synchronize with the R-1, SR-1.
- Incorrect position of (3);
The machine frame does not operate when turning a threading knob.
- Defective (6) and (9);
No operation of take-up and rewinding, and Wow-Flutter
- Mis-connection of wires, (A);
The breaking of F201(8V side fuse) when auto-thread's being released

1. Attach the (2) in place where the clearance between (2) & (4) is at about 1mm. After attaching, make sure the reedswitch on (2) operates at the rate of 1 time per 1 fps with a tester.
2. Attach the (3) in place where the (3) engages to a threading roller I and manual transportation can be performed only when the (3) is pulled out toward in front of the projection. Refer to Fig.2.
3. Refer to the "Forward-Reverse Switching Mechanism" on page 31 for adjustment of the (9).
4. Solder a blue wire to (+) side of the diode and the other red wire to (-) side. If you solder them in the wrong way, the 3A fuse on 8V power side shall be broken when releasing auto-thread.

IV. Disassembly of Machine Frame Section

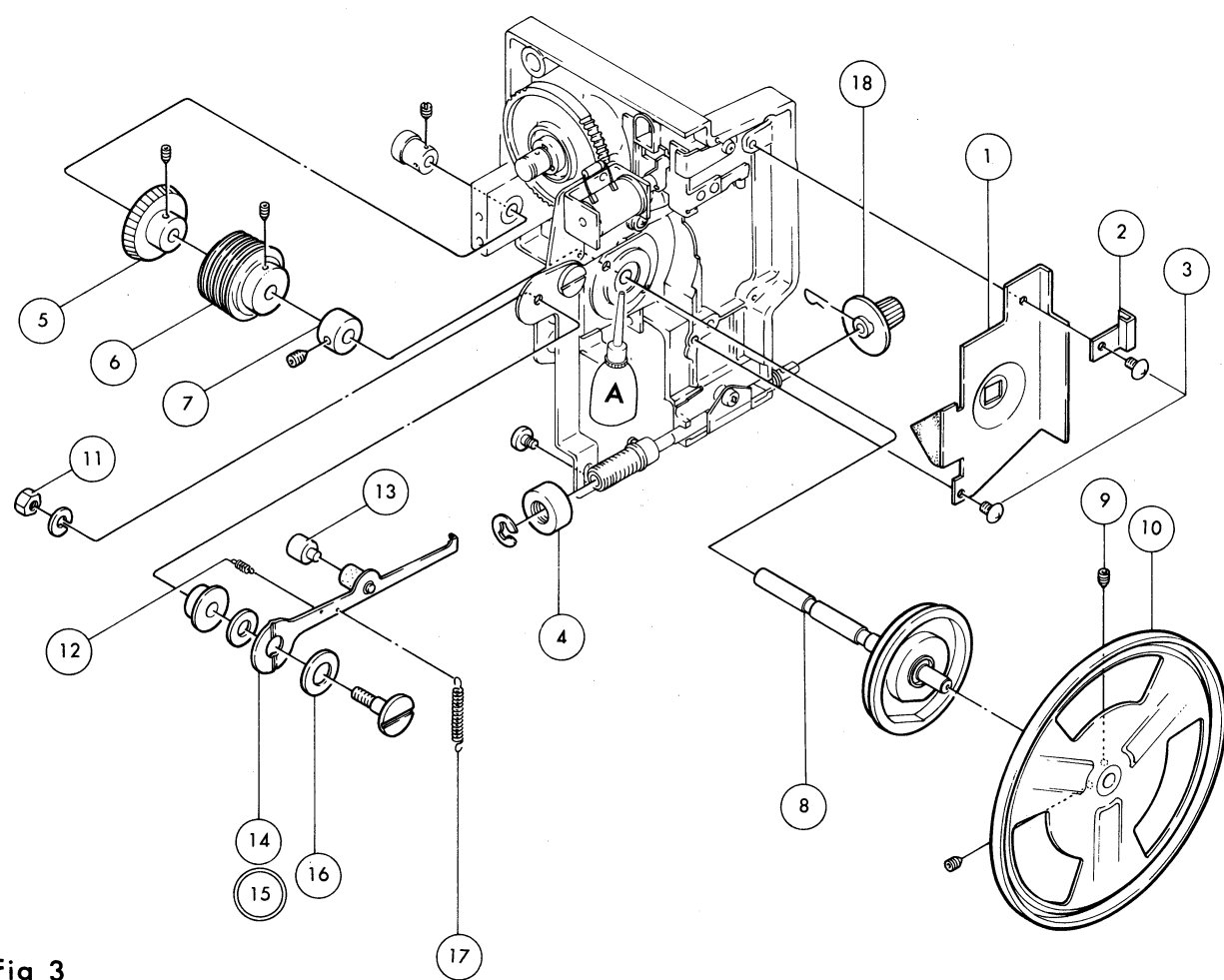


Fig 3

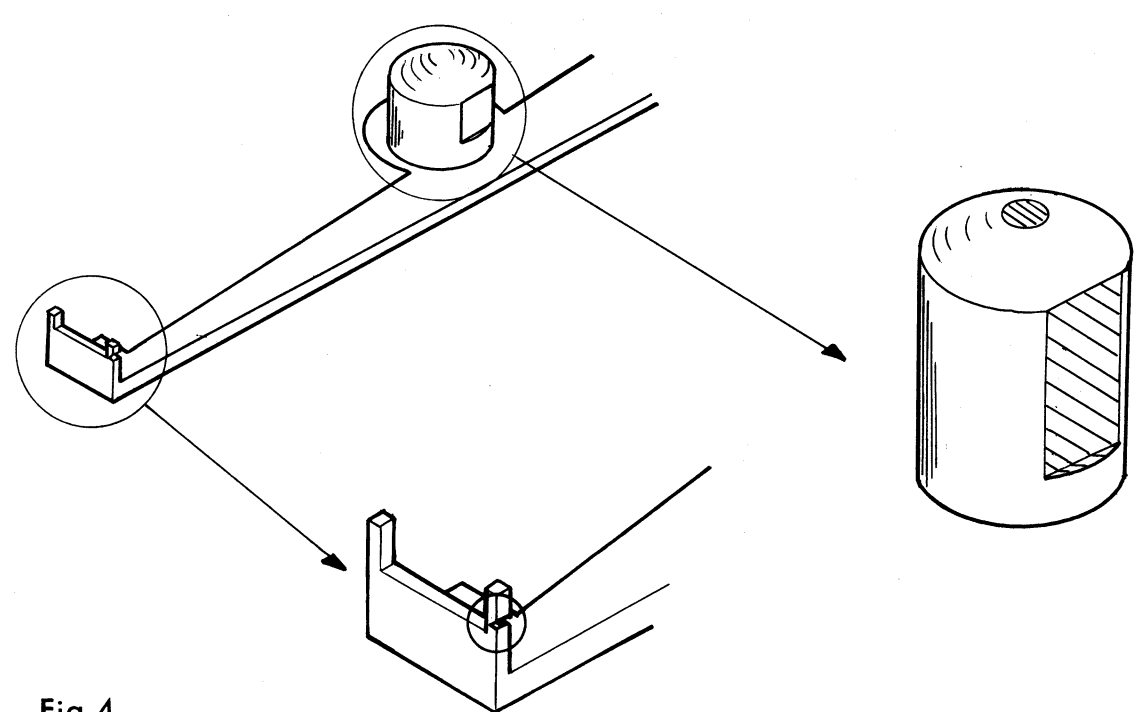


Fig 4

IV. Disassembly & Reassembly Notes

1. Machine Frame Section (cont'd)

Replacing Cam Assembly (8), Claw Assembly ((15)) and Shutter (17)

A. Disassembly ... Refer to the Fig.3.

1. Loosen (9)x2 and remove (10).
2. Remove (3)x2 and take off (1) and (2).
3. Remove (12) and (17).
4. Remove (11) and take off ((15)).
5. Loosen the screws of (5)(6)(7) and pull out (8).

B. Reassembly Notes

B-1 Cam Assembly, (8)

- Play between the (8) and the bearing metal;
Unsteady picture upward-downward & Film flow
- Flaws on the (8);
Loud machine noise
- Uneven rotation of the (8);
Slow speed & Wow-Flutter
- Flaws on the (6); Wow-Flutter

1. Check flaws on the shaft and cam part of the (8).
2. Attach (8)(5)(6)(7) to the machine frame simultaneously as follows.
Adjust the attaching position of (6) & (7) so that there may be no play of the (8) toward the bearing metal in the machine frame in every direction, and the (8) can rotate smoothly without unevenness.
Fix the (5) slightly. After attaching the machine frame assembly to the projector and then adjusting the correlation position between the (5) & the threading knob (Ref.B-2 on page 9), tighten the screw of (5).
3. You may use a threading knob (P/No.4P43486) for the FPA projector to the cam shaft, and your adjustment and reassembly works followed become easy.

B-2 Claw Assembly, ((15))

1. If the claw or claw pin are worn-out as shown in Fig.4, replace them.
 - Unsteady picture upward-downward
 - Loud transportation noise

IV. Disassembly of Machine Frame Section

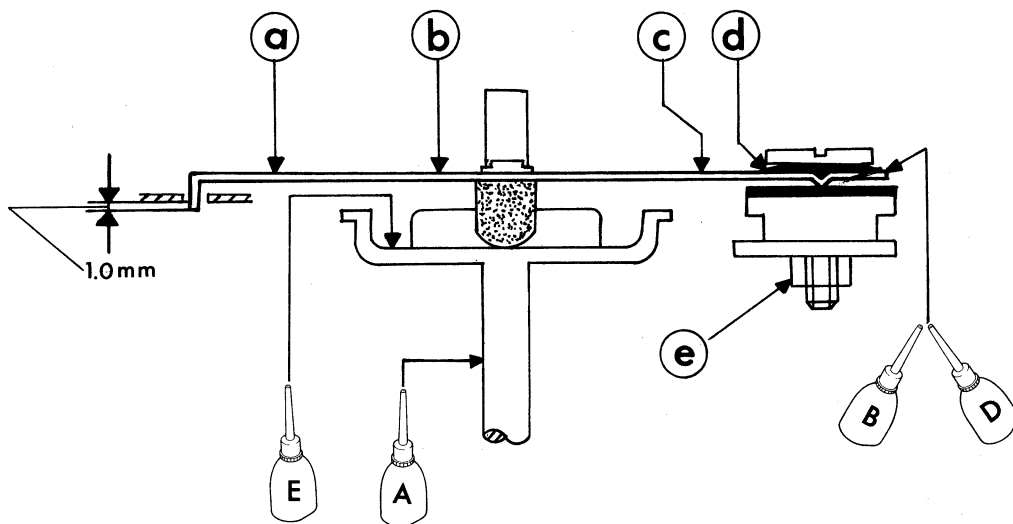


Fig 5

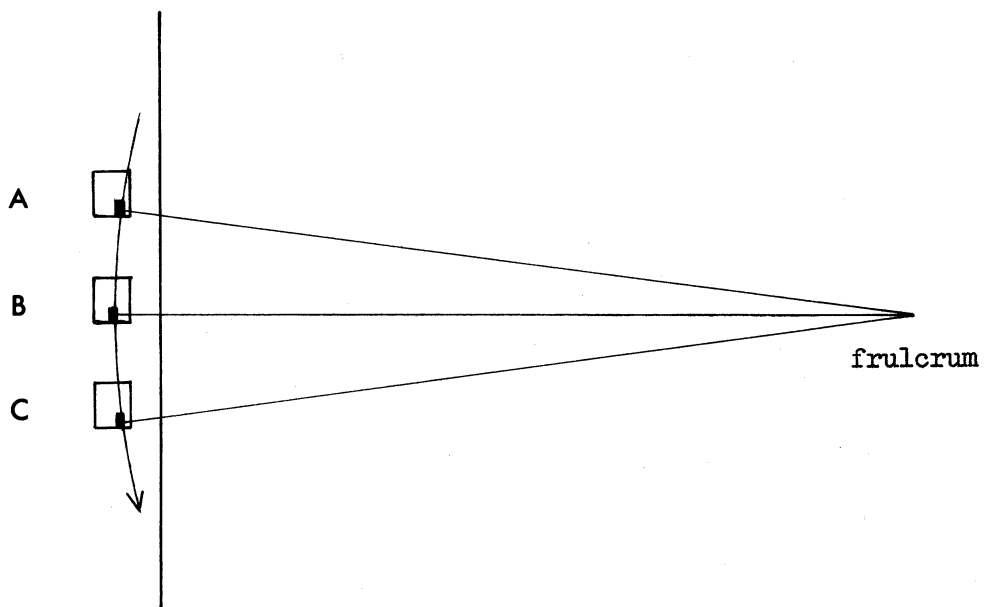


Fig 6

Fig. 6-A: beginning of forward
 B: halfway
 C: end of forward

IV. Disassembly & Reassembly Note

1. Machine Frame Section (cont'd)

B-2. Claw Assembly (cont'd)

2. Attach the claw to the machine frame.

Adjust spring pressure of a claw braking spring (Fig.5-d).

☐ Unsteady picture upward-downward

☐ Loud transportation noise

Prior to this adjustment, and before attaching both the claw springs I & II (Fig.3-17 & 12), make sure that the claw pin (Fig.3-13) contacts closely to the bottom of the cam by the pressure of the braking spring. If not contact, bend "c" point of Fig.5.

* The spring pressure: 60-90g measured with a bar spring scale (C043)

3. Attach both the claw springs I & II (Fig.3-17 & 12).

Adjust the spring pressure of them.

☐ Unsteady picture upward-downward

☐ Loud transportation noise

Measure the spring pressure of them at "b" point of Fig.5.

* Claw spring I (Fig.3-17): 850-900g measured with the scale (P046)

* Claw spring II (Fig.3-12): 450-500g measured with the scale (P048)

4. Adjust the protrudent length of the tip of claw from the aperture plate surface.

☐ Too long; Unsteady picture owing to the claw's catching film

☐ Too short; Film flow (Loop is unable to be made)

To adjust, bend "a" point of Fig.5 so that the tip protrudes from the AP surface at 1.0mm without inclination of the claw. Use a gauge(P047).

5. Adjust the attaching position of the claw.

Unsteady picture rightward-leftward

Put a white leader film on the aperture plate and when the tip of the claw enters into a perforation, the tip should never touch the sides of the perforation during forward and reverse projection wherever a framing knob (Fig.3-18) stays.

For this adjustment, adjust the attaching position of the claw with a nut (Fig.5-e). Refer to Fig.6.

IV. Disassembly of Machine Frame Section

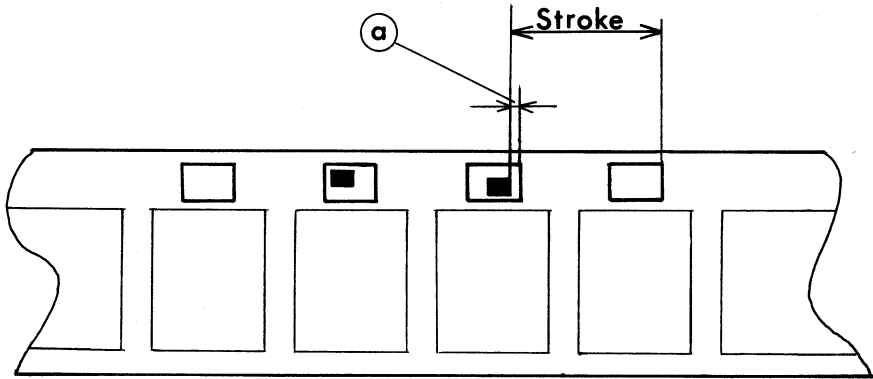


Fig 7

Beginning of transportation

End of transportation

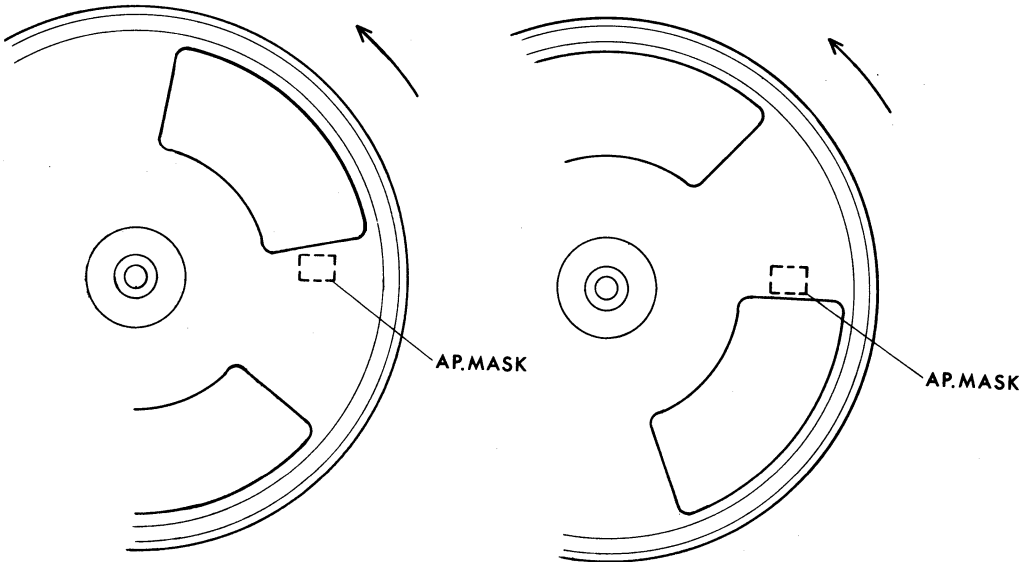


Fig 8

IV. Disassembly & Reassembly Notes

1. Machine Frame Section (cont'd)

B-2. Claw Assembly (cont'd)

6. Adjust a stroke of the claw.

- ☐ Unsteady picture upward-downward
- ☐ Film flow

If a stroke of the claw is shorter than a pitch of the perforation, it causes mis-film-transportation ——— Replace the cam.

Turn the threading knob a few turns to transport the film.

Make sure that there is clearance between the tip and perforation, when the tip of the claw is about to transport it. Refer to Fig.7-a.

7. Framing adjustment; Unable to adjust the frame line

Put the film (P054) on the aperture plate. Turn the framing knob (Fig.3-18) fully clockwise. Turn the threading knob and note the film position (frame line position).

Next turn the framing knob fully counterclockwise and note the film position.

Compare the former film position with the later.

Distance between aperture mask line and frame line should be equal when turning the framing knob either fully clockwise or counterclockwise. For adjustment, change the position of a framing screw (Fig.3-4).

B-3. Shutter, (17)

- ☐ Incorrect position of the shutter; Shutter flows (Picture trails).
- ☐ Flaws on shutter or deflection; Flutter

1. Attach the shutter to see that it covers the aperture mask whenever the claw transports film. Refer to Fig.8.

2. After attaching the machine frame to the projector, check the shutter position again as following procedure.

Load the film and turn the motor knob to still projection.

Turn the threading knob in forward direction and observe a picture.

In this case, it is normal that the picture does not move. If picture moves just before going out, change the shutter position in forward projection direction. If picture moves just after appearing, move the shutter in reverse projection direction.

IV. Disassembly of Machine Frame Section

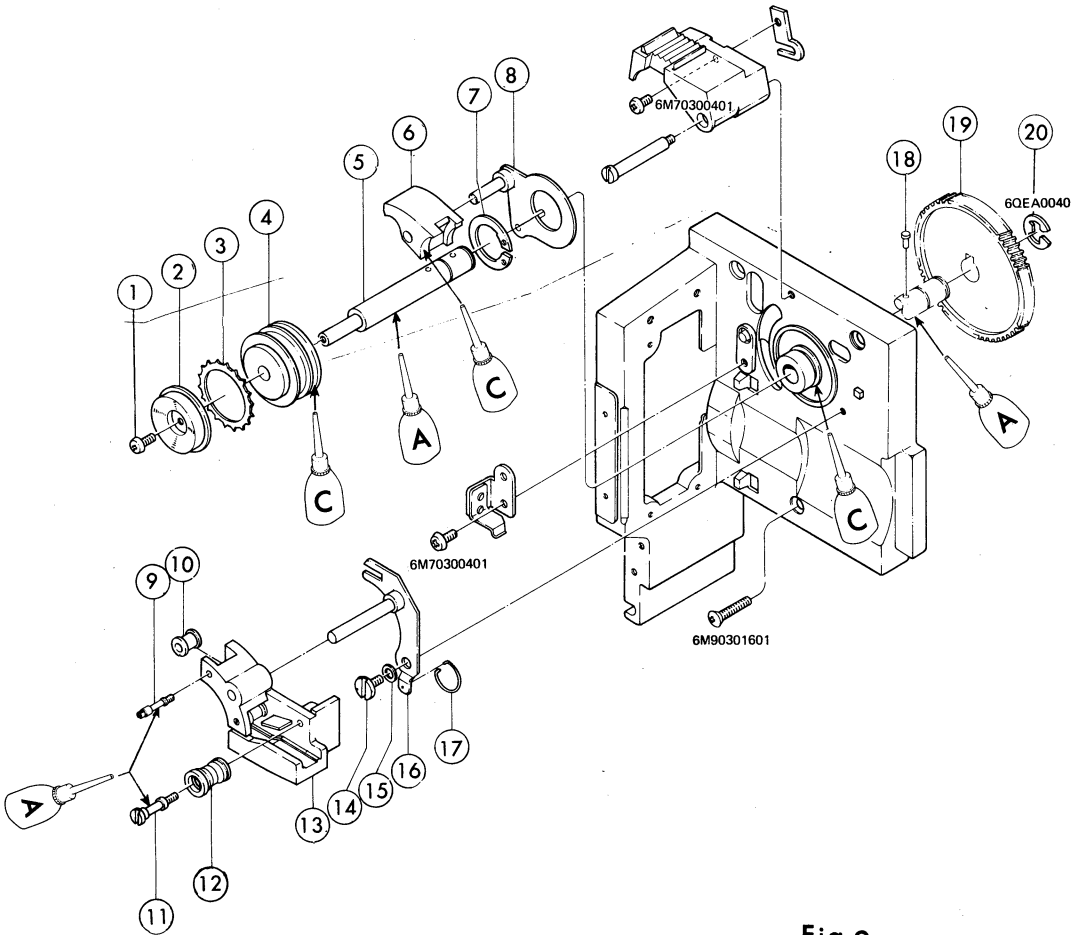


Fig 9

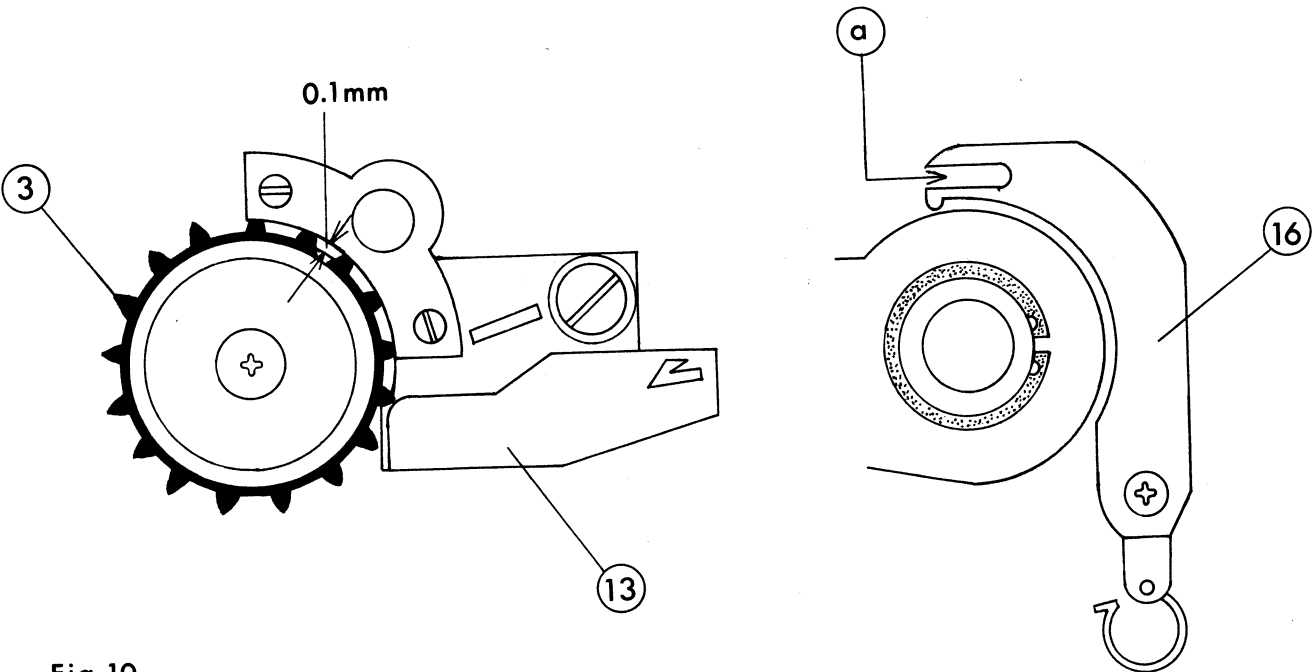


Fig 10

IV. Disassembly & Reassembly Notes

1. Machine Frame Section (cont'd)

Replacing The 1st Sprocket, 1st Sprocket Shoe Assembly and 1st Sprocket Gear

A. Disassembly Refer to Fig.9.

1. Remove (20) and take off (18)(19).
2. Pull out (1-8) and (9-13) simultaneously.
3. Remove (14) and take off (15)(16)(17).
4. Remove a lever II spring (illustrated on P6-10 of parts list) and take off (8) with a stop-ring pliers (P006).

B. Reassembly Notes

- | | | |
|---|---|-------------------------------|
| — Defective operation of (8); | — | Unable to lock auto-thread |
| | | Unable to release auto-thread |
| — Flaws on (3) or its burrs; | | |
| — Flaws or uneven turning of (4)(10)(12); | — | Film scratch |
| — Misadjustment of (16); | | |
| — Defective (19); | — | Wow-Flutter |
| | | No turning of 1st sprocket |

1. Attach (8) with (7) and hang the lever II spring. Make sure that the (8) moves smoothly.
2. Attach (16)(17) with (14)(15).
3. Check no flaws on (3)(4) and attach them to the (15).
4. Attach an assembly part (fram 1 to 5) and (6)(13) to the machine frame simultaneously.
Apply a touch of "Alvania Grease 2" to the contact point of ditch of (4) & (13).
Apply a touch of "Daphne #44" to (9)(11) to turn (10)(12) smoothly.
5. Check no flaws on (19) and attach it with (20).
6. Adjust the attaching position of 1st sprocket shoe assembly, (13) so that the clearance between the bottom land of super sprocket, (3) and the (13) may be at about 0.1mm. The adjustment point is "a" of Fig.10.

IV. Disassembly of Machine Frame Section

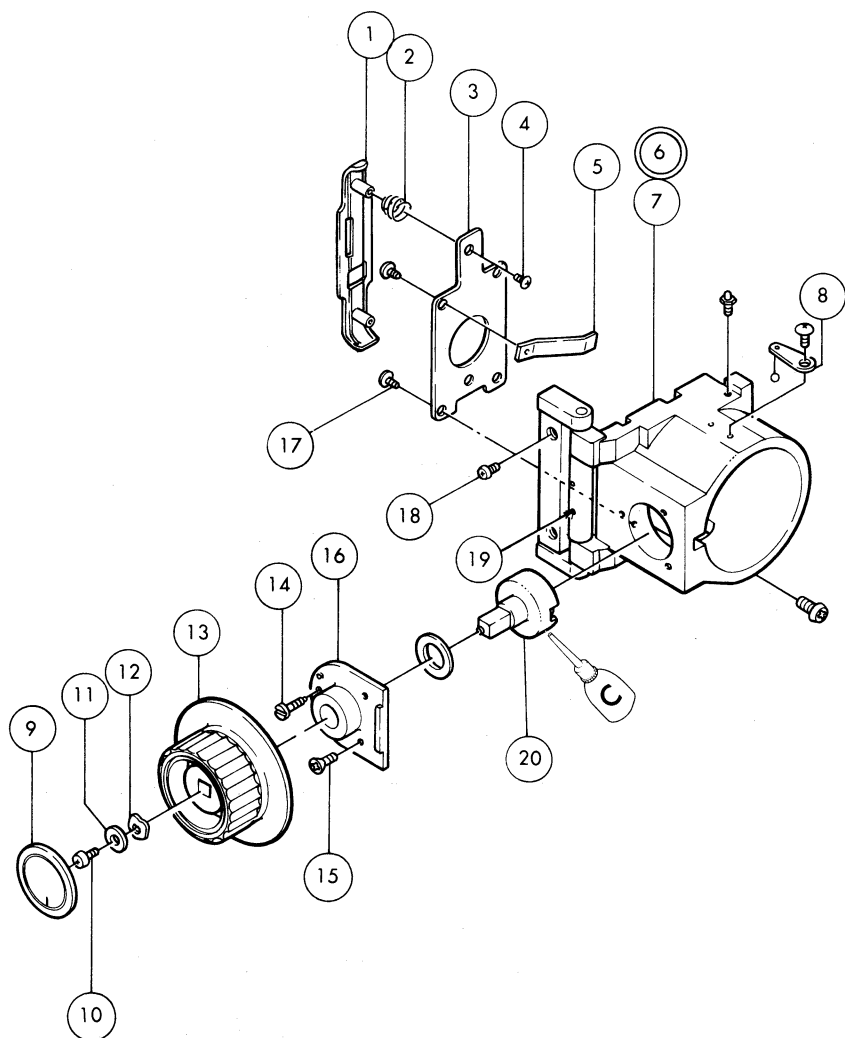


Fig 11

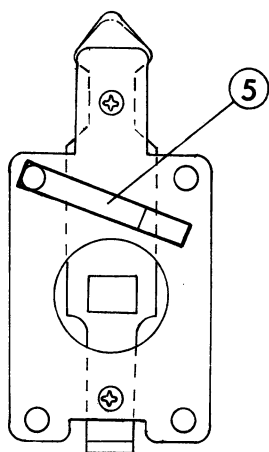


Fig 12

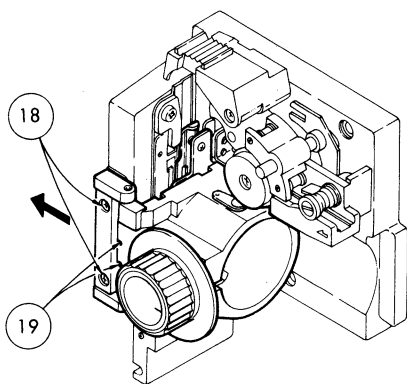


Fig 13

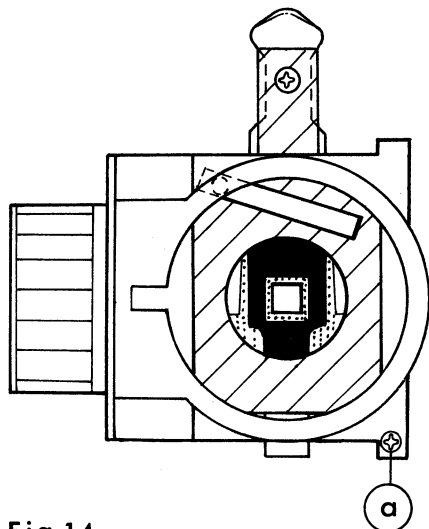


Fig 14

IV. Disassembly & Reassembly Notes

1. Machine Frame Section (cont'd)

Replacing The Lens Holder Assembly, ((6))

A. Disassembly Refer to Fig.11.

1. Remove (18)x2 and detach ((6)) from the machine frame.
2. Remove other parts, referring to Fig.11. Note that the (9) is glued with "Cemedine #575".

B. Reassembly Notes

- | | | |
|---|------------------------------|--|
| — | Flaws and burrs on (1); | Film scratch |
| — | Distortion of (1); | Out of focus at times. Film flaw |
| — | Incorrect pressure of (2); | — weak: Unsteady picture |
| | | — storong: Film scratch |
| — | Incorrect position of (3); | — Optical axis is out of order. |
| | | — Noise caused by claw's touching to (1) |
| — | Incorrect position of ((6)); | — Uneven focus |

1. After checking no flaws and no distortion of (1), attach it with the (2) to the (3).
2. Attach (3)(5) with (17)x4 to (7). The attaching position of (5) is shown in Fig.12.
3. Attach other parts, referring to Fig.11.
Apply a touch of "Alvania Grease 2" to a contact surface of (16) & (20).
Become aware of difference between (14) and (15).
4. Attach ((6)) in accordance with the following procedure.
As pressing ((6)) in the direction of arrow in Fig.13, attach it with (18)x2 temporarily. As observing as shown in Fig.14, adjust the position of (3) and (19)x2 so that an aperture mask can exist at the center of pressure plate mask. And tighten (18)x2.
5. After attaching machine frame to the base frame, project "Resolving power film, type S (P054)" to check whether unevenness in focus appears or not. If appeared, adjust it with a screw, Fig.14-a.

IV. Disassembly of Machine Frame Section

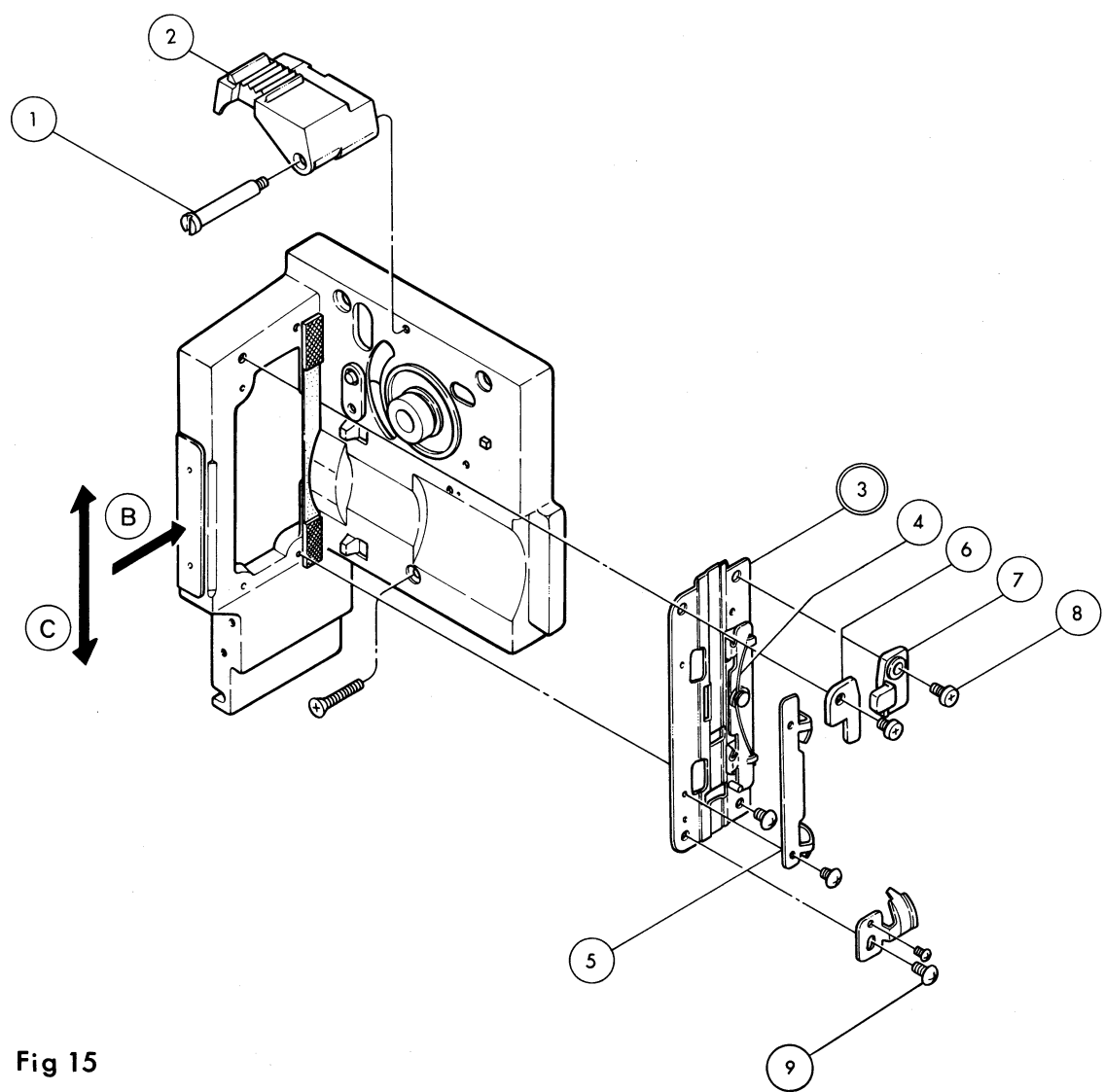


Fig 15

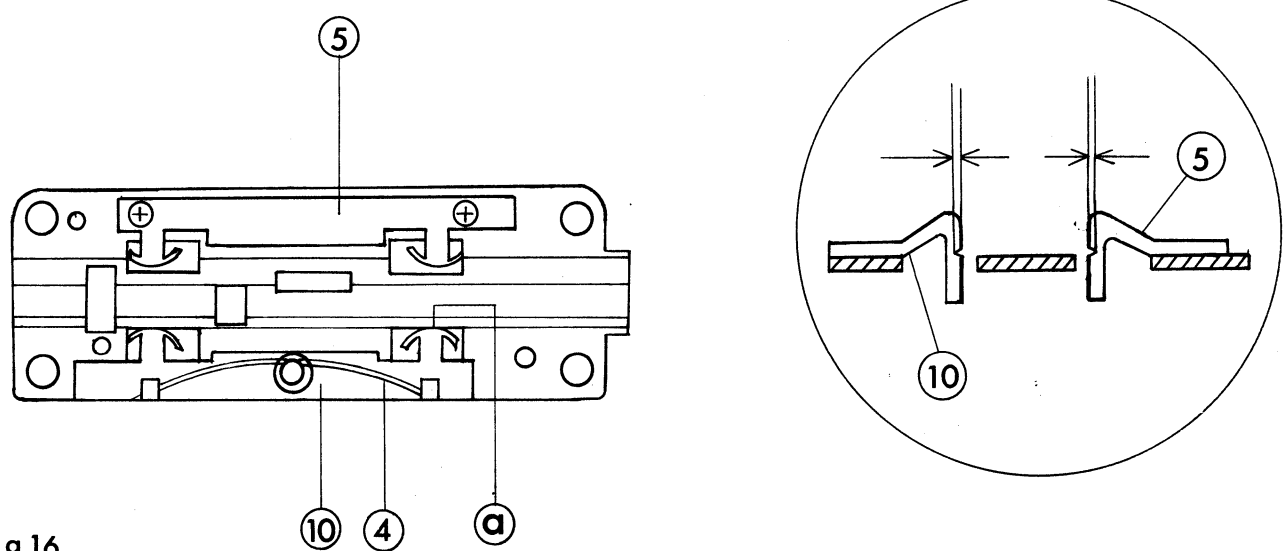


Fig 16

IV. Disassembly & Reassembly Notes

1. Machine Frame Section (cont'd)

Replacing The Aperture Plate, ((3))

A. Disassembly Refer to Fig.15.

1. Remove the 1st sprocket and 1st sprocket shoe (P-17).
2. Remove (1) and detach (2).
3. Remove (9)x4 and detach ((3)).

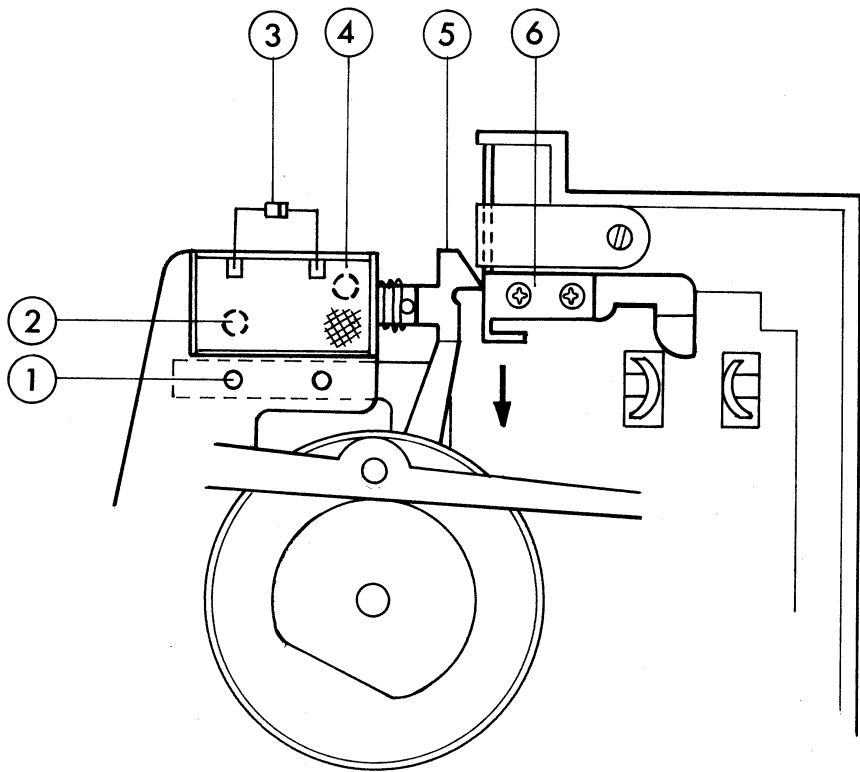
B. Reassembly Notes

- Flaws on a surface of ((3)) rail; Film scratch
- Insufficient pressure of (4); Unsteady picture rightward-leftward
- Incorrect position of (5);
 - Unsteady picture
 - Picture lean
 - Picture slipping off right or left
- Worn (5); Unsteady picture

1. Before attaching ((3)) to the machine frame, check the following points.
Check no flaws on the rail surface of ((3)).
Make sure that (5)(10) are not worn as shown in Fig.16.
Adjust the spring pressure of Fig.16-4 in the range of 30 - 35g.
Measure it at a point (a) of Fig.15 with a bar spring scale (C043).
2. Attach (5) of Fig.16 in place where no picture lean and slipping off right and left appear, using the resolving power film (P054).
3. Use a gauge (P049) for attaching ((3)) as shown in Fig.15.
As pressing the ((3)) in "B" direction, attach it in place where the four screw holes of ((3)) can exactly meet to four screw holes of the machine frame (how to locate the ((3)) in "C" direction).

IV. Disassembly of Machine Frame Section

In the normal projection



In the auto-threading condition

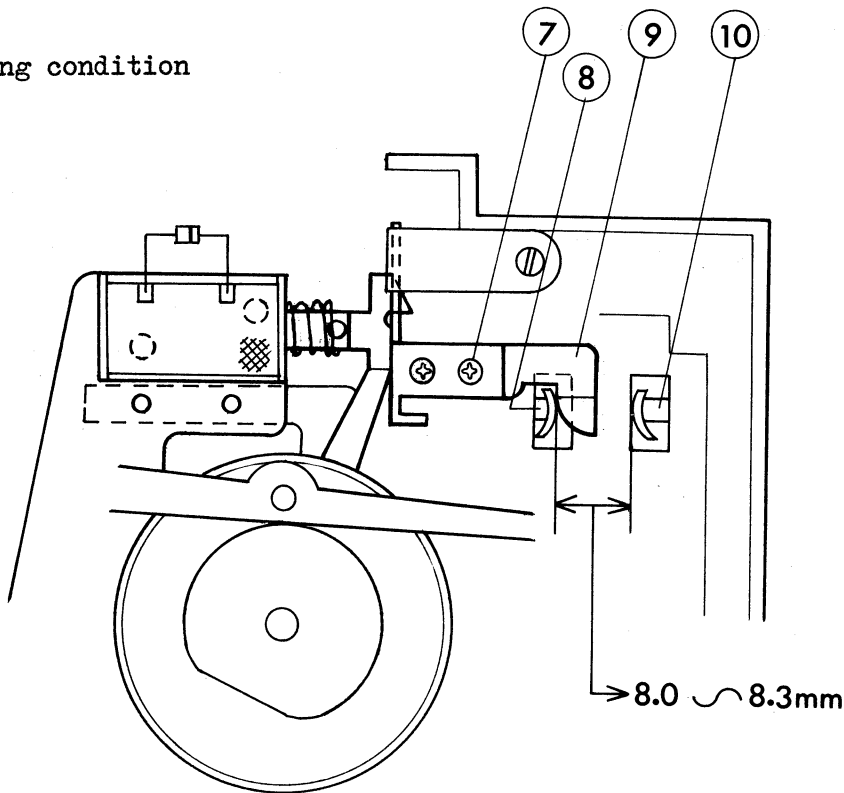


Fig 17

IV. Disassembly & Reassembly Notes

1. Machine Frame Section (cont'd)

Replacing The Solenoid Assembly, (4), Solenoid Lever, (5) and Side Presser Opening Lever, (9)

A. Disassembly Refer to Fig.17.

1. Remove (1)x2 and take off (5).
2. Remove (2)x2 and take off (4).

B. Reassembly Notes

- Defective (3); Click noise developes when auto-thread is released.
- Defective operation of (4); Unable to release the auto-threading
- Defective (5); Unable to lock the auto-threading
- Incorrect position of (4)(5); Unable to lock the auto-threading or
unable to release the auto-threading
- Incorrect position of (9); — Film strikes in auto-threading.
— Unsteady picture rightward-leftward

1. When a loop former is depressed, the (6) of Fig.17 moves in the direction of arrow.

Adjust the (5) position with (1)x2 so that when the loop former is pushed down fully, the (5) tip is caught by (6) and the projector is ready for the auto-threading.

2. During auto-threading, the (8) is depressed by (9). In this case, the clearance between (8) & (9) should be 8.0 - 8.3mm as shown in Fig.17. For this adjustment, use (7)x2.

IV. Disassembly of Take-up & Rewinding Mechanism

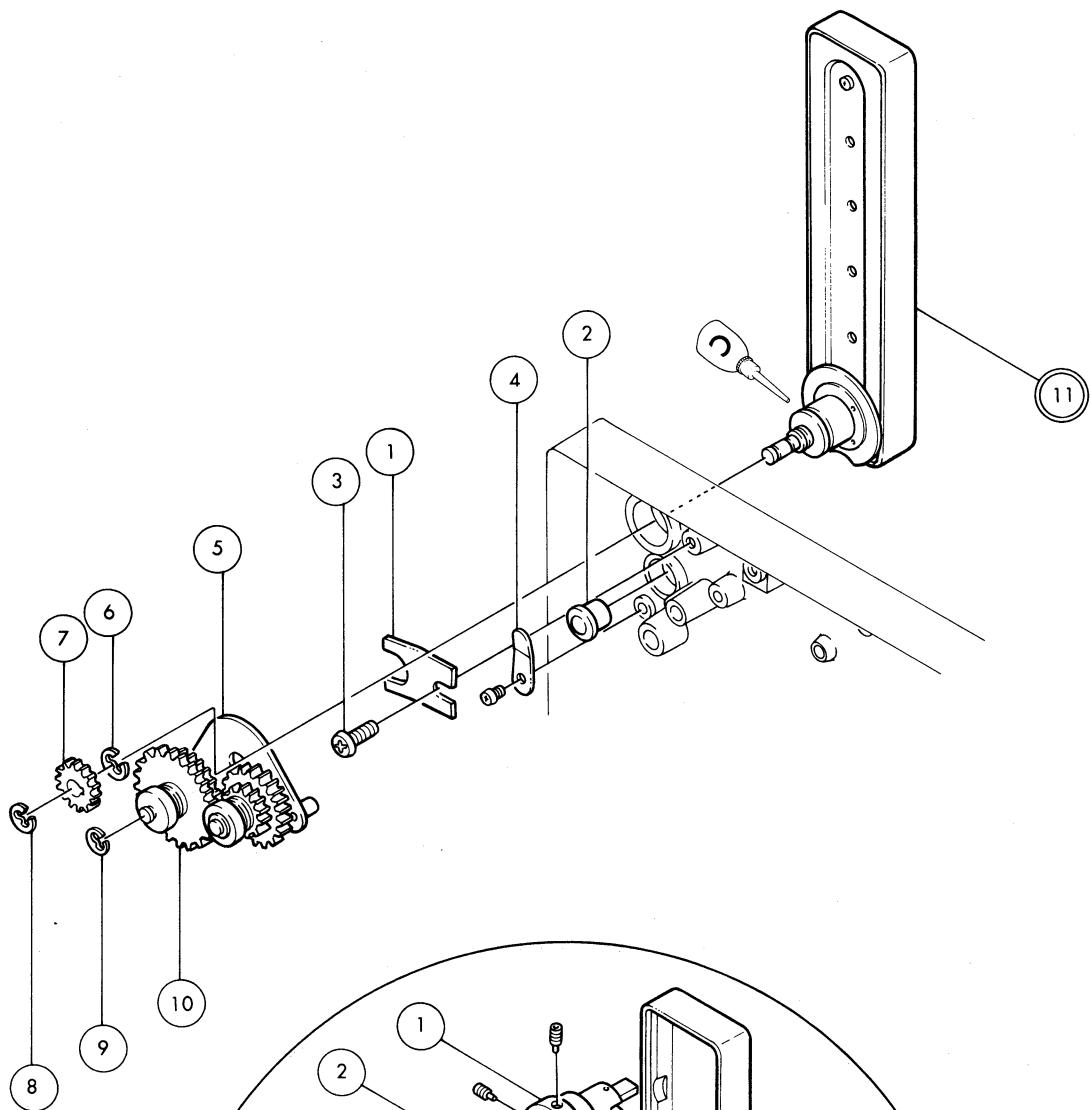


Fig 18

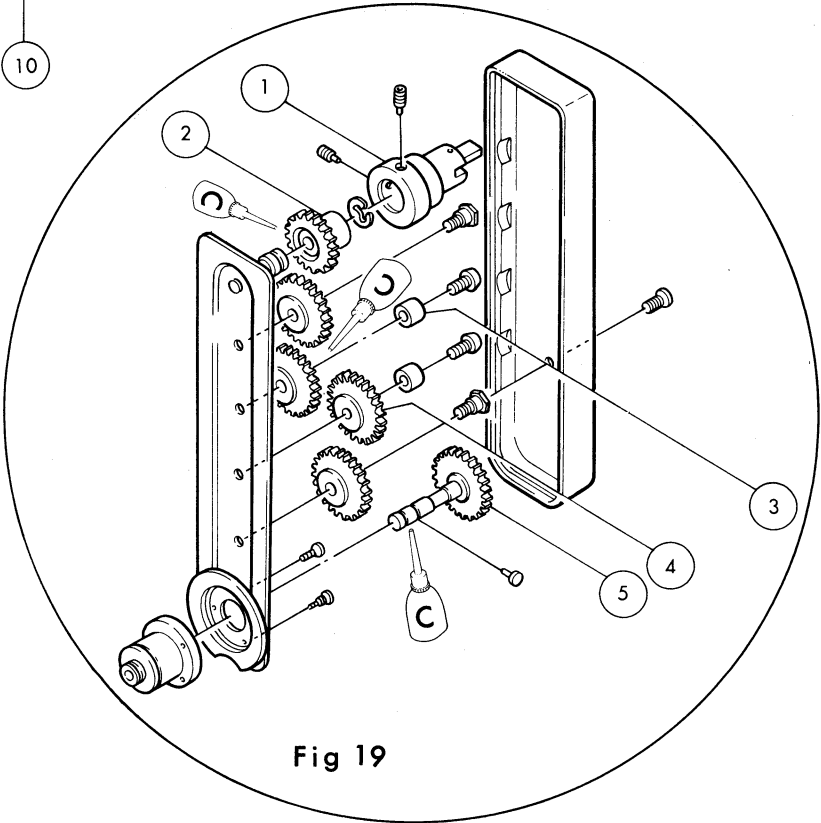


Fig 19

IV. Disassembly & Reassembly Notes

2. Take-up & Rewinding Mechanism

Replacing The Front Arm Assembly, ((11))

A. Disassembly Refer to Fig.18.

1. Remove (9) and take out (10).
2. Remove (8) and take out (7).
3. Remove (6) and take out (5).
4. Remove (3) and (1), and then pull out ((11)).

B. Reassembly Notes

- └ Defective (1); There is a play between Front arm and body.
- └ Malfunction of (2), (4); Front arm won't lock.

1. Follow the reverse way of the Disassembly steps.

Front Arm Assembly

A. Disassembly Refer to Fig.19.

B. Reassembly Notes

- └ Defective (2)(4)(5) — (1) won't rotate;
 - Upper film loop is shortened during forward projection.
 - Film can't be taken up during reverse projection.
- └ Insufficient lubrication between (2)(4)(5) and its shafts;
 - Speed in rewinding is slow.
 - Noise

1. Refer to Fig.19 when disassembling/reassembling.
2. Apply "Alvania Grease 2" to every gear and shaft to ensure the smooth rotation.

IV. Disassembly of Take-up & Rewinding Mechanism

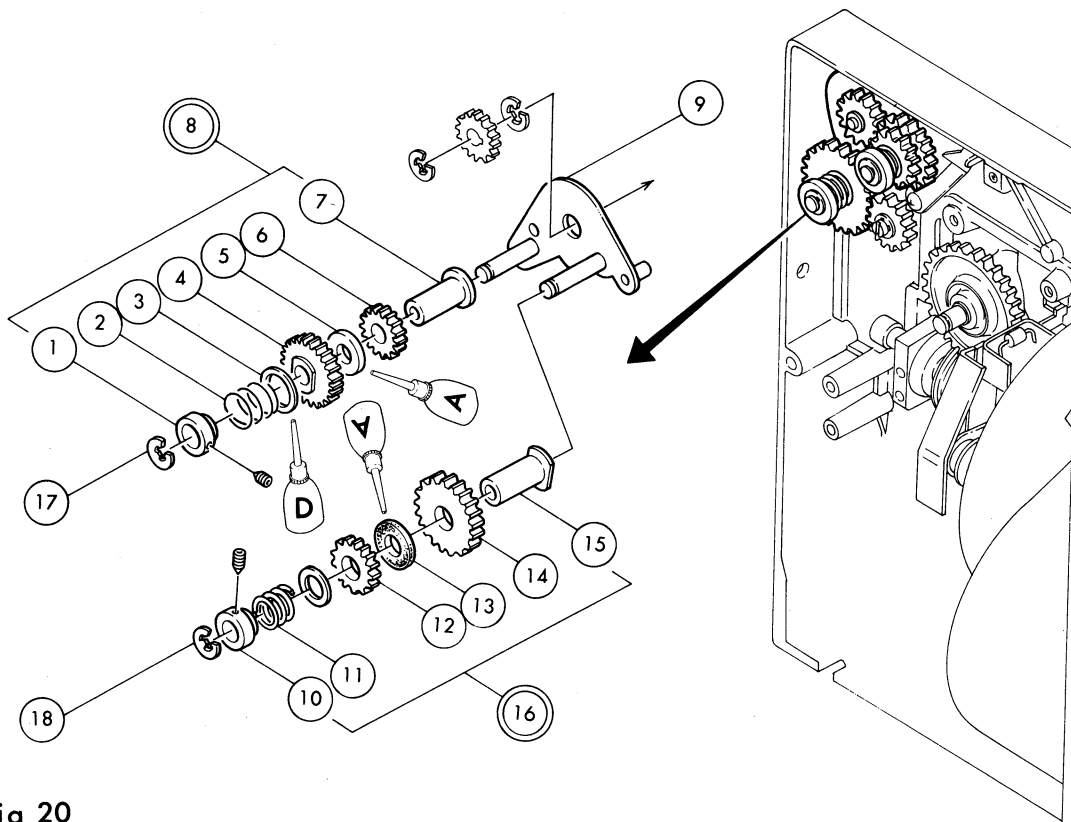


Fig 20

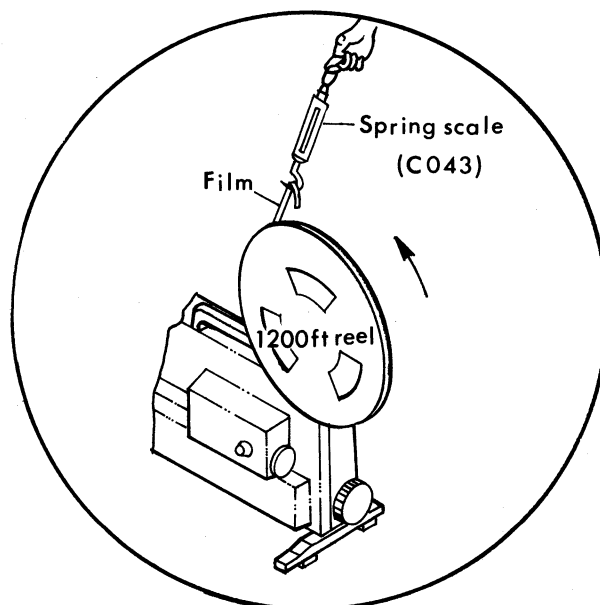


Fig 21

IV. Disassembly & Reassembly Notes

2. Take-up & Rewinding Mechanism (cont'd)

Rewind Gear I Assembly, ((8))

A. Disassembly Refer to Fig.20.

1. Remove (17) and detach ((8)) from (9).
2. Disassemble, referring Fig.20.

B. Reassembly Notes

Faulty assembly of ((8)) — Insufficient take-up tension on reverse;
Film is loosened.
— Excessive take-up tension on reverse;
Upper film loop is shortened.

1. Follow the reverse way of the Disassembly steps.

Note : a) Apply oil (Daphne #44) to the both sides of (5).

b) Apply "Aluminum Grease 1" to the both sides of (3).

c) Make sure that shaft of (9) and (7) rotate smoothly.

2. To adjust the rewind tension of front arm, get proper spring pressure of (2), moving the position of (1).

Measurement (Refer to Fig.21) : 40-50g at the core of a 1200ft empty reel
Use a spring scale (C043).

Rewind Gear II Assembly, ((16))

A. Disassembly Refer to Fig.20.

1. Remove (18), and detach (16) from (9).
2. Refer to Fig.20 for disassembling the rest.

B. Reassembly Notes

Faulty assembling of ((16)) — Rewind tension is insufficient;
Speed in rewind is slow.
— Projector stops in mid-way on rewind.
— Rewind tension is uneven

1. Follow the reverse way of the Disassembly steps.

Note : a) Shaft of (9) and (15) must rotate smoothly.

b) Apply oil (Daphne #44) to both sides of (13).

2. While fully pushing (11) by (10), fix (10).

IV. Disassembly of Take-up & Rewinding Mechanism

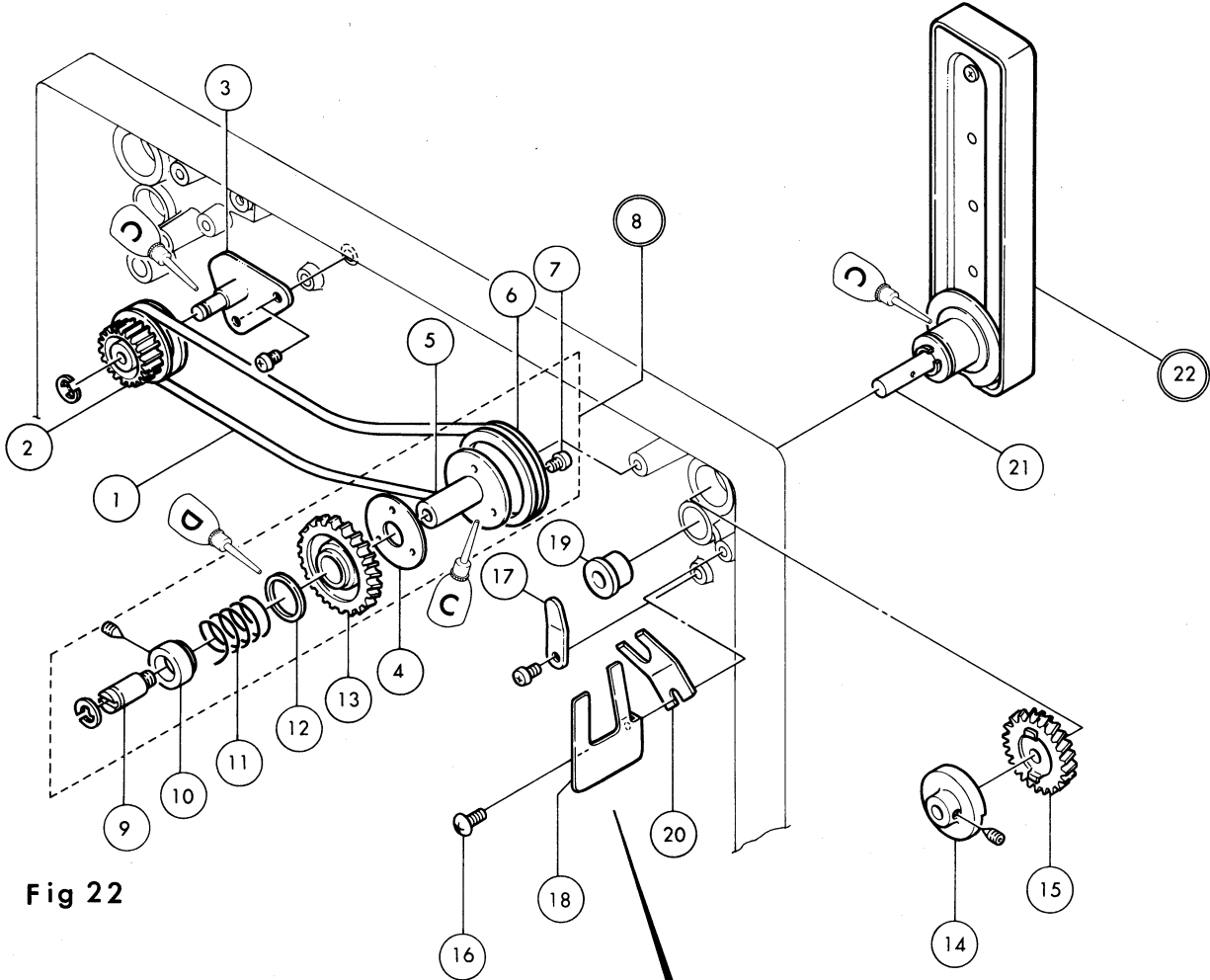


Fig 22

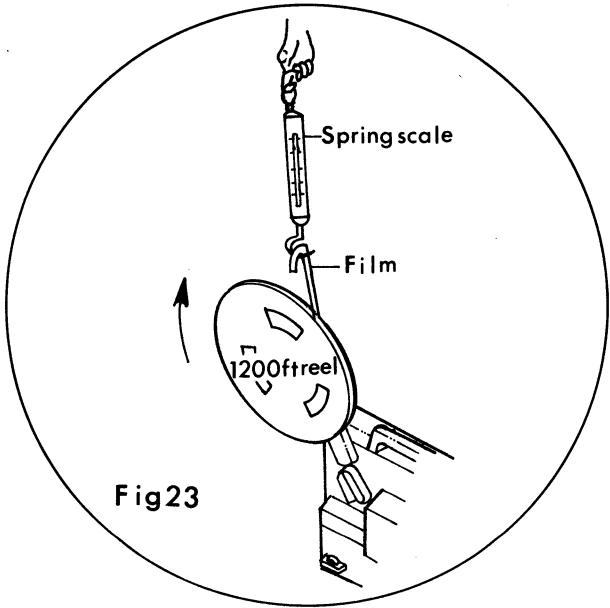


Fig23

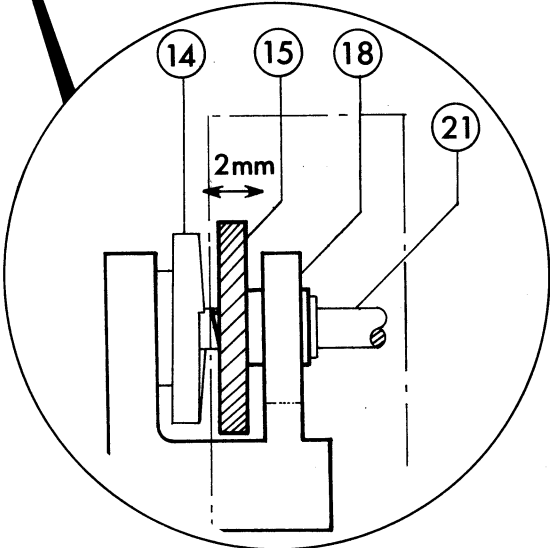


Fig 22-A

IV. Disassembly & Reassembly Notes

2. Take-up & Rewinding Mechanism (cont'd)

Replacing The Rear Arm Assembly, ((22))

A. Disassembly Refer to Fig.22.

1. Remove (16) and take out (18), (20).
2. Remove (14) and (15), and pull out ((20)).
3. For disassembling ((22)), refer to the procedure of Front Arm Disassembly/Reassembly on page 25.

B. Reassembly Notes

- Faulty position adjustment of (14)(15)(18);
 - No take-up
 - Speed in rewind is slow.
- Defective (17)(19); There is a play between Rear arm and body.
- Defective (20); Rear arm won't lock.

1. Follow the reverse way of the Disassembly steps.

Note : Fig.22-A is called the take-up & rewinding mechanism. In the combination of a clutch (Fig.22-15) and the pressure of (18), claws of (14) and (15) will engage on film take-up and they will release on film rewind.

With this unique mechanism, the efficiency in rewinding is remarkably improved.

2. (15) should move along the shaft (21) smoothly. Adjust the position of (14) so that the moved distance of (15) may be about 2mm.

Refer to Fig.22-A.

3. To adjust the rear arm tension on rewind, get proper pressure of (18), moving position of (18).

Measurement (Refer to Fig.23) : 20-30g at the core of an empty 1200ft reel. Use a spring scale (C043).

IV. Disassembly & Reassembly Notes

2. Take-up & Rewinding Mechanism (cont'd)

Rear Pulley 4, ((8)), Take-up Belt 2, (1) and Pulley 3, (2)

A. Disassembly Refer to Fig.22.

1. Remove (9) and take out ((8)).
2. For disassembling ((8)), refer to Fig.22.

B. Reassembly Notes

Faulty adjustment of ((8))

- Insufficient take-up tension;
Film is loosened.
- Excessive take-up tension;
Lower film loop is shortened. Wow-Flutter
- Unevenness in take-up tension; Wow-Flutter

1. Follow the reverse way of the Disassembly steps.

Note : a) When attaching (6) to (5), the head of screw (7) should not jut out from the surface of (5).

b) Apply "Alvania Grease 2" to the contacting surface between (4)&(5).

c) Apply "Alvania Grease 2" to both sides of (5).

d) Make sure that (9) and (5) rotate smoothly.

2. For adjustment of take-up tension of rear arm, move the position of (10) to obtain adequate spring pressure of (11).

Measurement : The tension should be 50-60g at the core of empty 1200ft reel. Use a spring scale (C043).

3. Make sure that the shaft of (3) and (2) rotate smoothly.

4. To replace (1), remove (2) or ((8)).

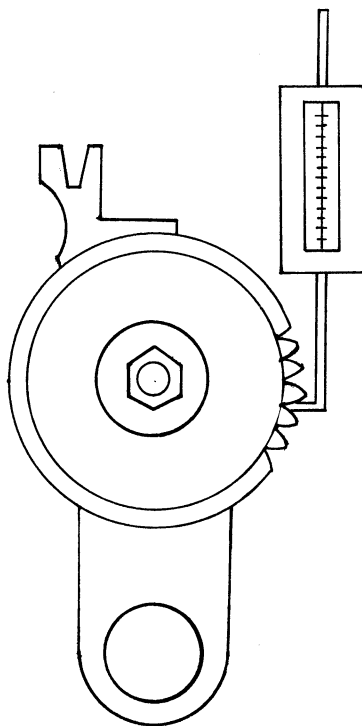


Fig 24

IV. Disassembly & Reassembly Notes of 2. Take-up & Rewinding Mechanism

Forward-Reverse Switching Mechanism

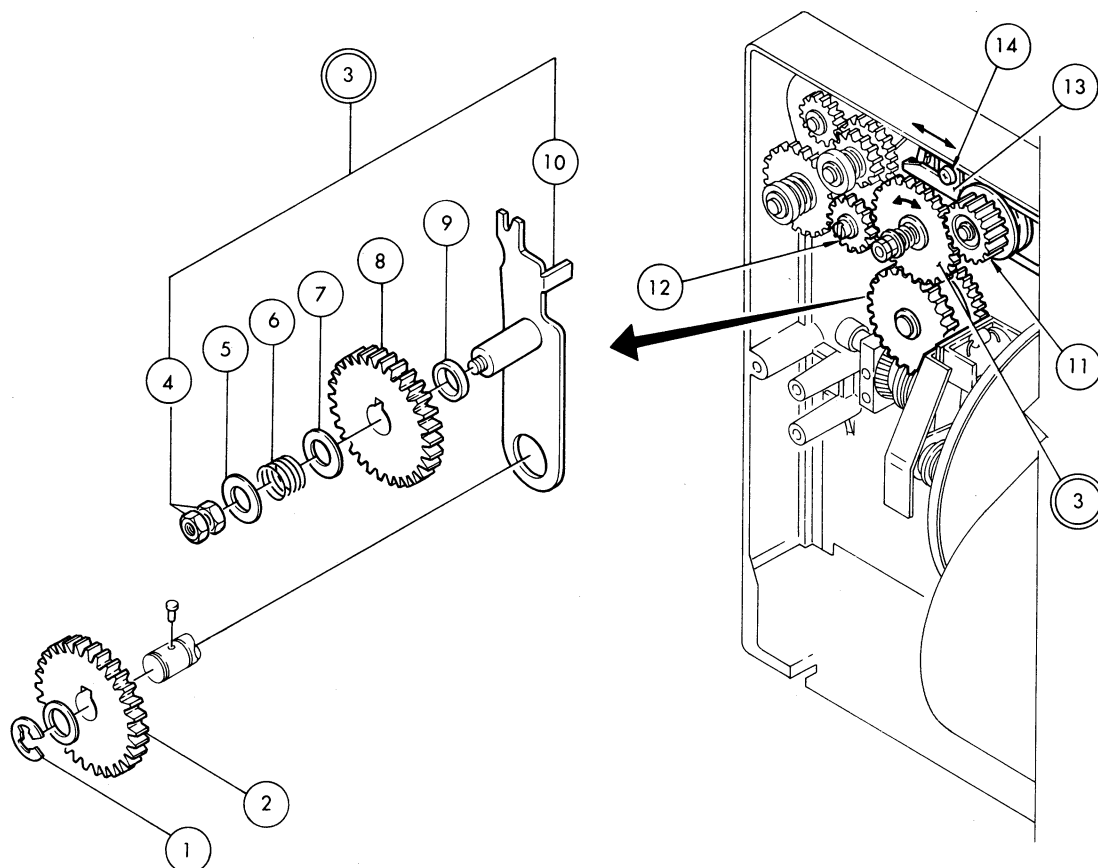


Fig 25

A. Disassembly Refer to Fig.25.

1. Remove (1)(2) and take out ((3)).
2. Disassemble the rest, referring to Fig.25.

B. Reassembly Notes

- Breakage of (2)(8); No take-up on both Forward/Reverse
- Faulty pressure adjustment of (6) — Insufficient;
Rewind won't release.
- Excessive;
F/R switch won't go smoothly.
- Slippage of (6) is uneven — Unevenness in take-up; Wow-Flutter

1. Apply "Alvania Grease 2" to the shaft of (10) and make sure that (8) rotates smoothly.
2. Apply "Aluminum Grease 1" to both sides of (7). Adjust the position of (4) so that the pressure of (6) may be 70-100g.
3. Fix the position of (13) in place so that (8) and (11) can engage on Forward, and (8) and (12) can engage on Reverse and Rewind respectively.

IV. Disassembly of Clutch Mechanism

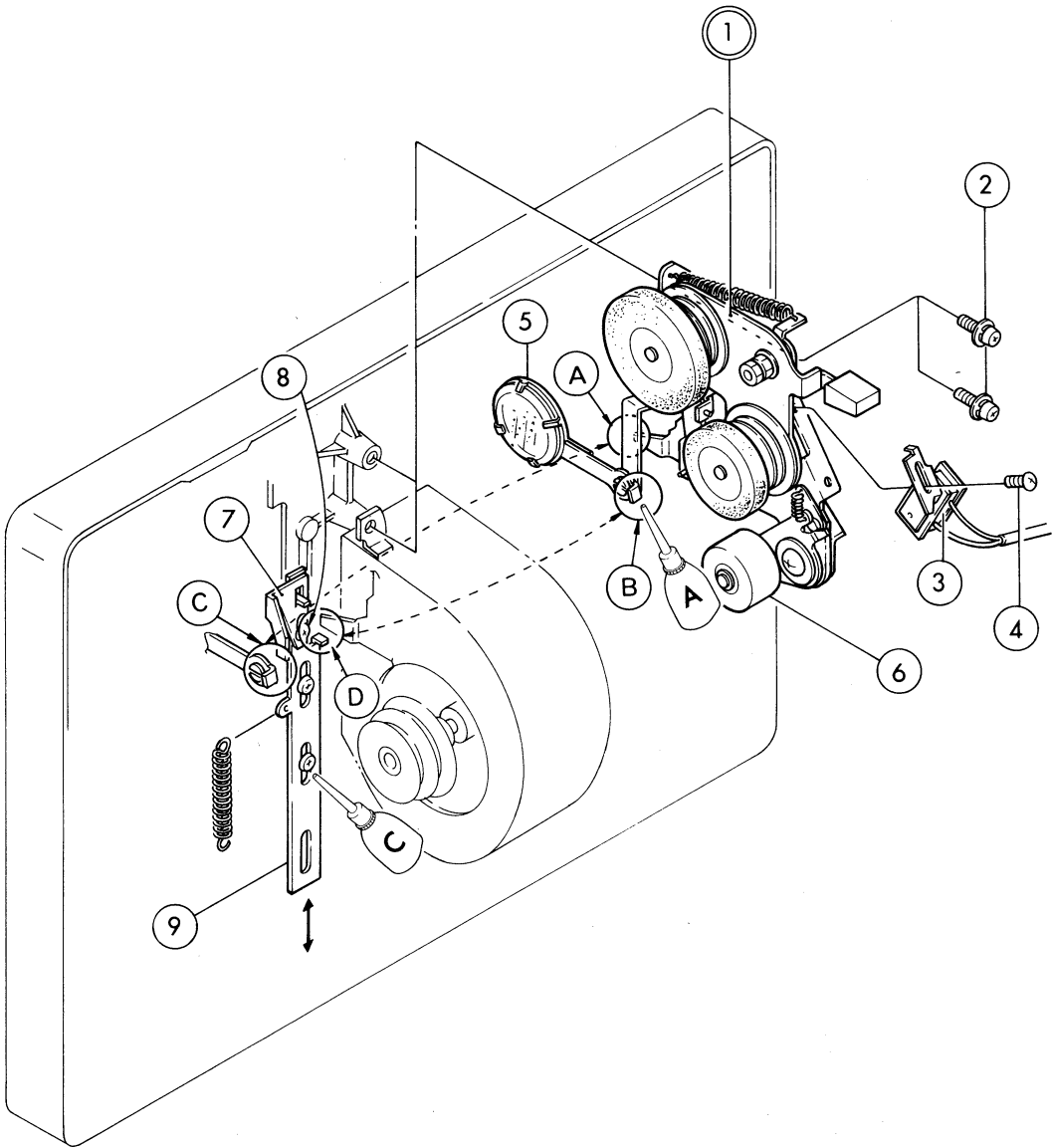


Fig 26

IV. Disassembly & Reassembly Notes

3. Clutch Mechanism

Replacing The Clutch Assembly, ((1))

A. Disassembly Refer to Fig.26.

1. Take out two drive belts.
2. Remove (4) and take out (3).
3. Remove (2)x2 and take out ((1)).

B. Reassembly Notes

- No interlock at points (A)(B); Unable to make 1 fps projection
- Faulty adjustment at points (B)(C) —
 - (5) won't move up; Dim screen
 - (5) won't move down;
Film is damaged by heat
on 1 fps projection.
- Malfunction of (3) — Frequency response at 24 fps is affected;
Difficult to playback high frequency area
- Faulty rotation of (6) — Drive belt III shake; Wow-Flutter

1. Push in ((1)) to the base frame. Make sure that points (A)(D) and points (B)(C) interlock respectively and fix ((1)) by (2)x2.
2. Make sure that (5) moves away from the light path when motor switch is turned to F or R. If not, loosen (8) and adjust the position of (7), moving (7) vertically. Besides, make sure that (5) shield the light when motor switch is turned to "Off" or "Still" position.
3. Adjust the position of (3) and fix it by (4) so that the switch is to be pushed when running at 24 fps and to be released at 18 fps.
The switch (3) is designed to change the bias current according as you record sound at 18 fps or 24 fps.
4. Hang two drive belts in position without twist of them.

IV. Disassembly of Clutch Mechanism

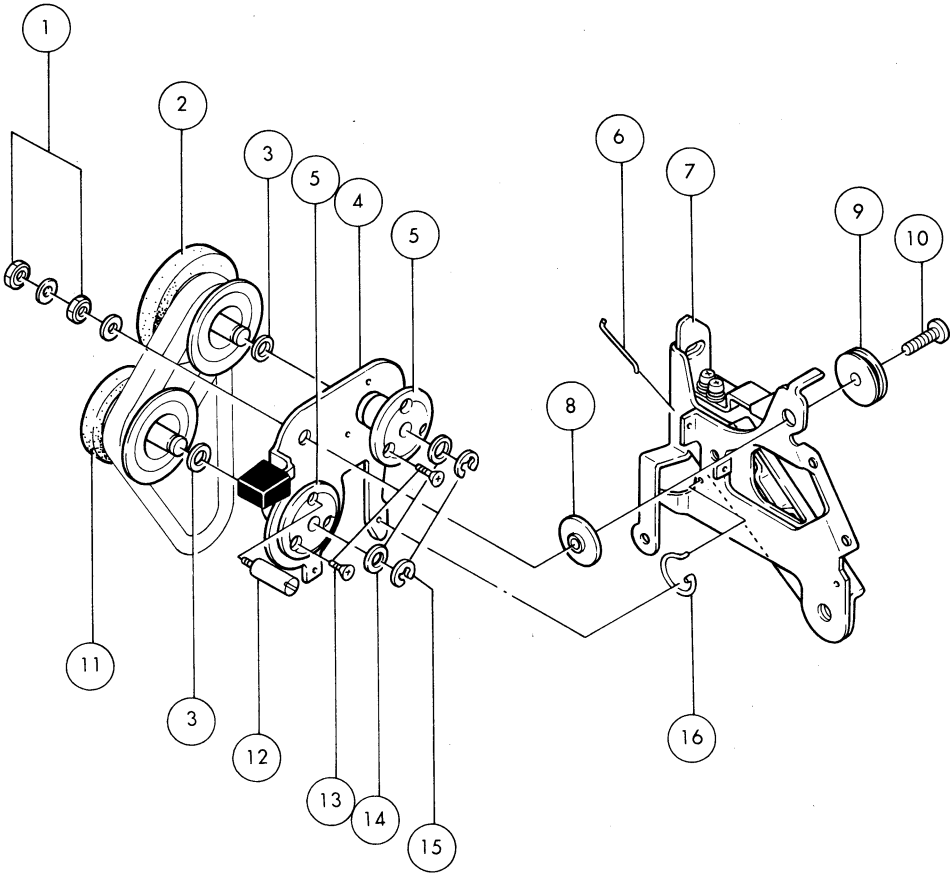


Fig 27

IV. Disassembly & Reassembly Notes

3. Clutch Mechanism (cont'd)

Clutch Assembly

A. Disassembly Refer to Fig.27.

1. Stretch the bend of (6) and pull out it.
2. Remove (1) and detach (4) from (7).
3. Disassembly the rest, referring to Fig.27.
4. The replacement of (2) or (11) can be done without detaching (7) from the base frame, only by removing (15). At this time, be sure not to drop (3)(14).

B. Reassembly Notes

- | | |
|---|----------------------------|
| — Oil sticks to (2)(11); — | Speed is slow or unstable. |
| — Insufficient lubrication of (5); — | Wow-Flutter |
| — Scratch on (2)(11); — | |
| — Play between (2)&(5) and (11)&(5); — | Wow-Flutter, Noise |
| — Defective (6); Malfunction of projection speed selector | |

1. Follow the reverse way of the Disassembly steps.
2. When attaching (2) (11), make sure that both (2)(11) have no scratch. Both (2) (11) should rotate smoothly.
3. The play between (2)&(5) and (11)&(5) should be less than 0.05mm respectively. For adjustment change the washers (3)(14).

IV. Disassembly of Flywheel Section

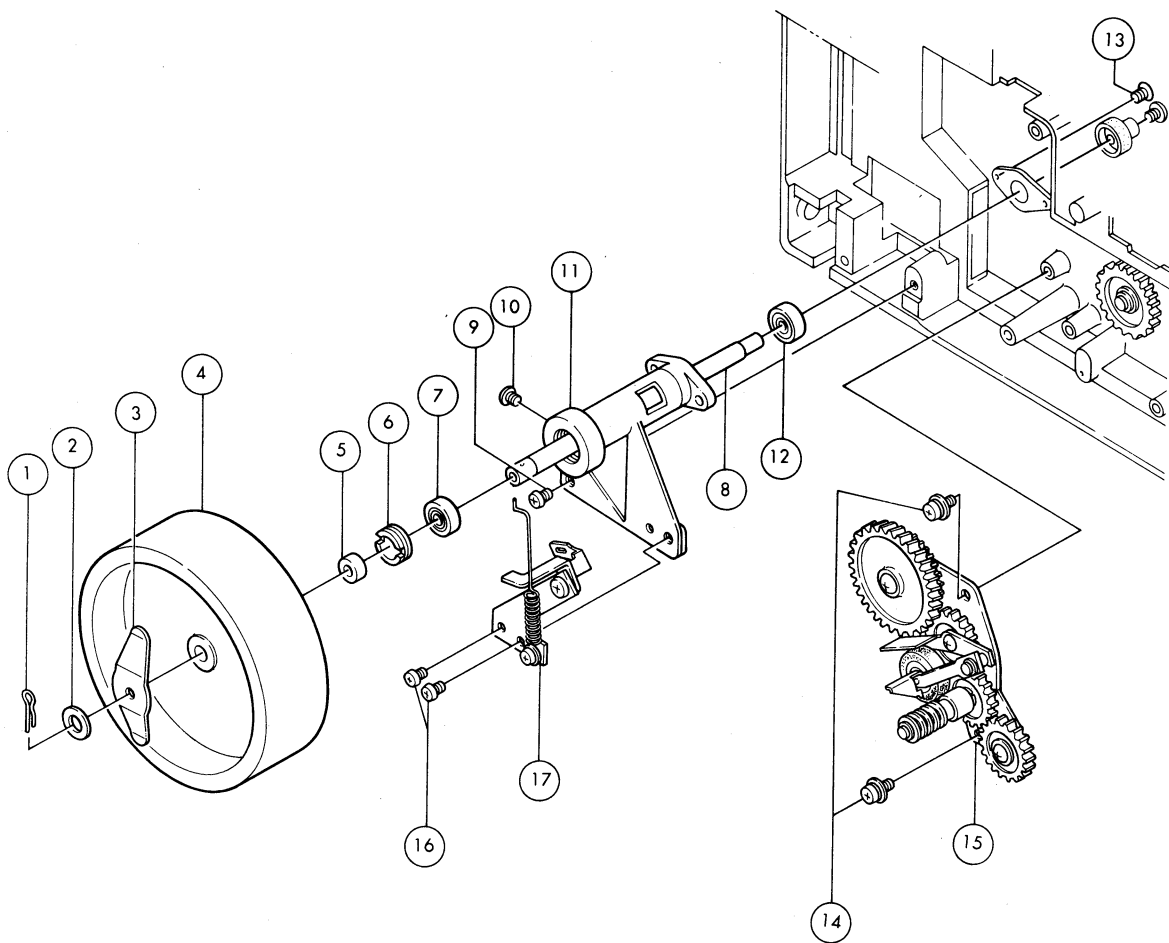


Fig 28

IV. Disassembly & Reassembly Notes

4. Flywheel Section

Flywheel Holder (10)

A. Disassembly Refer to Fig.28.

1. Remove the machine frame assembly. (Refer to page 9)
2. Remove (1) and take out (2)(3)(4)(5) together.
3. Remove (14)x2 and take out (15).
4. Remove (16)x2 and take out (17).
5. Remove the head base plate assembly. (Refer to page 63)
6. Remove (9) and (13)x2 and take out (11).
7. Loosen 10) and remove (6), and then pull out (8) together with (7).

B. Reassembly Notes

- | | |
|---|--|
| — Excessive spring pressure of (3); Lower film loop is hardly kept. | |
| — Defective (7); | |
| — Excessively tightened (6); | |
| — Play of (8); | |
| — Deflection or eccentricity of (4); | |
- Wow-Flutter

1. Follow the reverse way of the Disassembly steps.
2. Tighten (6) so that (8) may rotates smoothly without having any play between (8) and (11). And fix the position of (6) by (10).

IV. Disassembly of Flywheel Section

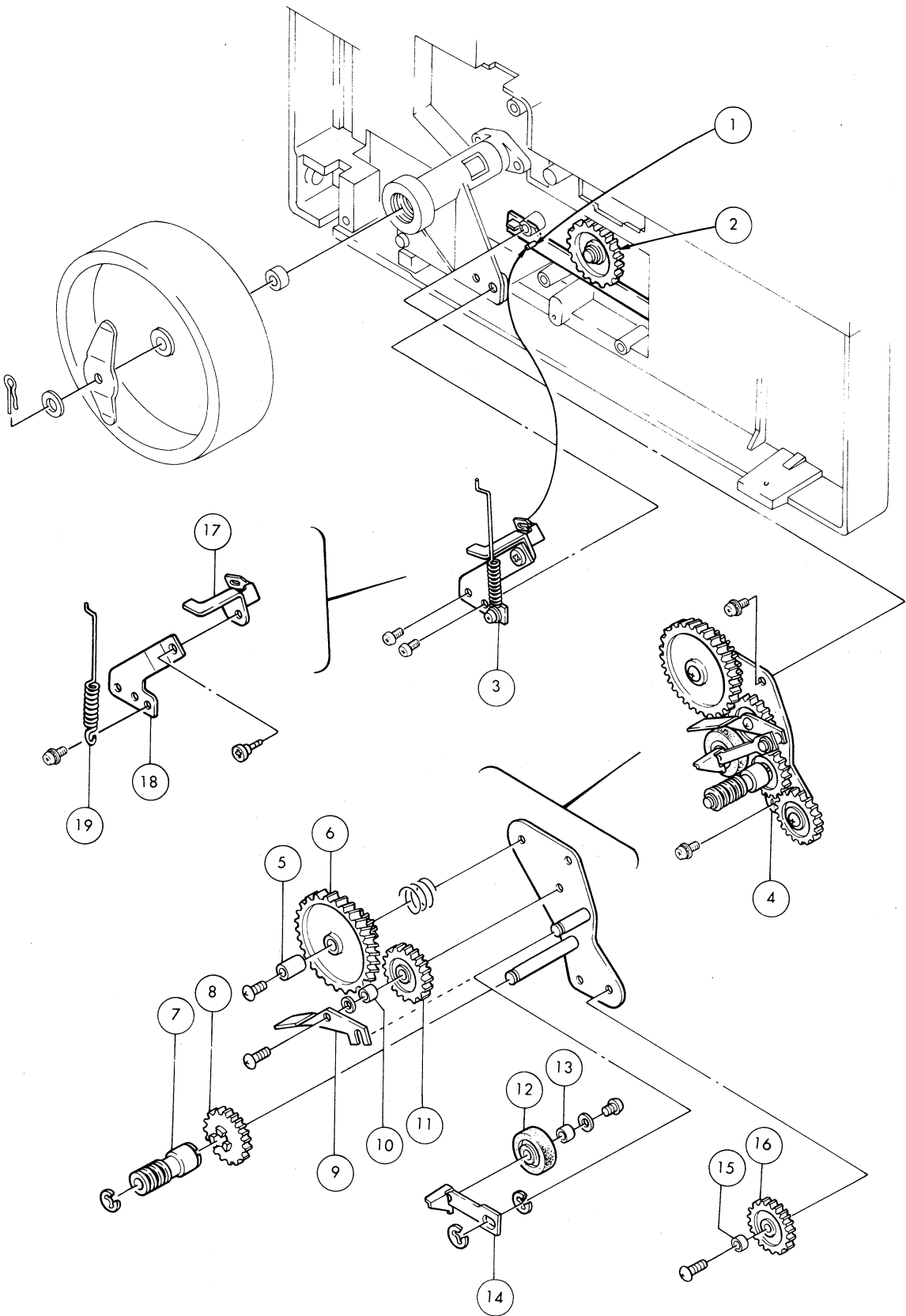


Fig 29

IV. Disassembly & Reassembly Notes

4. Flywheel Section (cont'd)

Middle Gear Holder (4), Setlever Holder Assembly (3)

A. Disassembly Refer to Fig.29.

1. Detach (3)(4) from the base frame (Refer to page 37).
2. For disassembling the rest, refer to Fig.29.

B. Reassembly Notes

— (6)(8)(11)(16) rotate unevenly or have scratch; Wow-Flutter
— Faulty position adjustment of (12); Sound won't rise rapidly. Wow-Flutter

1. Follow the reverse way of the Disassembly steps.

Note : Don't apply any grease or oil to gears. Wow-Flutter may be caused by lubrication.

2. Attach (4), watching the engagement of (4) and (2).
3. Attach (3), watching the interlocking of the pin of (1) and (17).
4. Hang (19) on the left hand side of (17).
5. Make sure that the roller of (12) touches both of (7) and the sound drum shaft, and that they rotate smoothly on forward. At the same time, (19) should move along with the worm gear of (7).
6. Make sure that (19) pushes up (14) and that (12) is separated from the sound drum shaft & (7) in about 5sec after projection is started at 18 fps.
7. The above mechanism is called as "Rapid Starting Mechanism" and the detailed explanation is available in the following page.

IV-5. Rapid Starting Mechanism

The sound drum begins to run by motor power not by film power as soon as the motor switch is turned ON.

That secures sound begins to instantly be played back on normal sound quality condition.

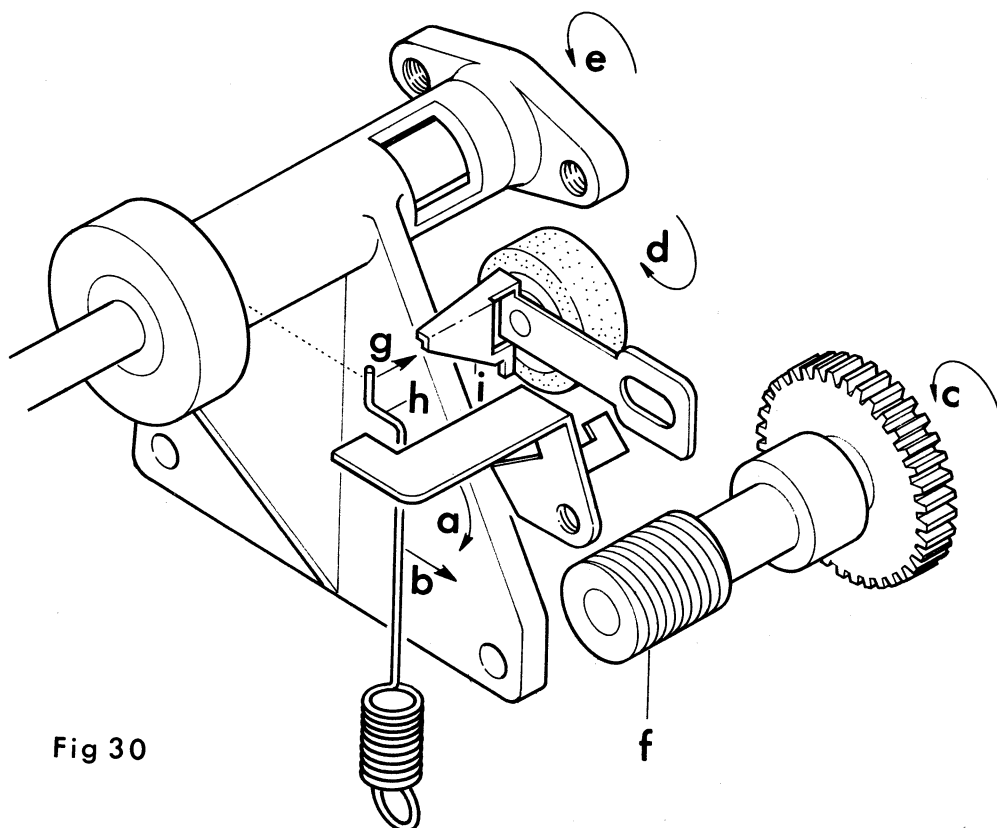


Fig 30

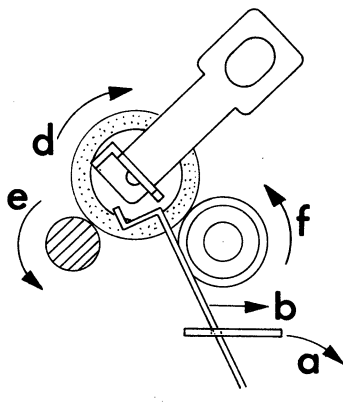


Fig 31

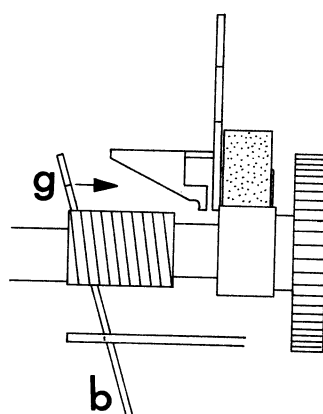


Fig 32

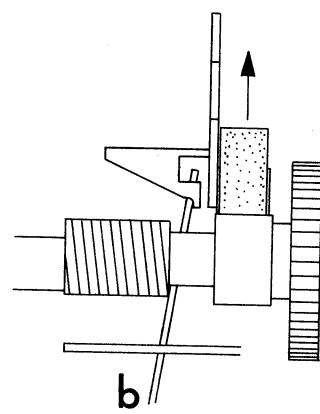


Fig 33

Figs.31&32 show the beginning of projection.

Fig.33 shows a state of normal projection.
("b" pushes up "d")

IV-5. Rapid Starting Mechanism

Parts Name in Figs.30, 31, 32, 33, 34 and their movement

a ... Setlever

It moves in the direction of arrow when motor switch is turned to F.

b ... Flywheel Drive Spring

It always pushes in the direction of arrow.

c ... Mid. Gear (3)

It turns in the direction of arrow when motor switch is turned to F.

d ... Idler Roller ... Ditto

e ... Sound Drum Shaft ... Ditto

f ... Flywheel Drive Screw

g ... Moving direction of "b"

h ... This part of "b" pushes up "i".

i ... Inclined part of "d"

j ... Attaching screw of "b"

k ... Attaching screw of holder "a"

A. Action Analysis

When the motor switch is turned to F, (c)(d)(e) turn in the direction of arrow respectively. At the same time, (a)(b) move in the direction of arrow respectively, and (b) engages with (f) and in result (b) moves in the direction of (g).

While (b) engages with (f), (e) is forced to rotate. After (h) pushes up (i) and (d) is separated from (e), (e) continues to run without help of the motor power but with help of film power.

B. Adjustment (malfunction of rapid starting mechanism)

1. Disconnect the power supply. Remove the flywheel. Turn the motor switch to F and turn (e) by hand. (d) should stick to (e) and brake the rotation of (e). If not, oil may be attached to (e)(d) or malfunction of (d).
2. Bend (b)(i) so that (d) can not touch with (e)(f) during projection.
3. Adjust the position of (b) by (j) if (b) does not push up (d) along with (f) or (b) returns in the mid-way.
4. Adjustment of (j)
Loosen (j) to release (b) free. Adjust the position of (a) by screws (k) as per Fig.30. Detach (b) from (a) and fix (b) by screw (j) as per Fig.34-b2, and hang (b) to (a).

Check the function of mechanism, running the projector. For the fine adjustment, bend (b) or change the position of (a)(b) by (k)(j).

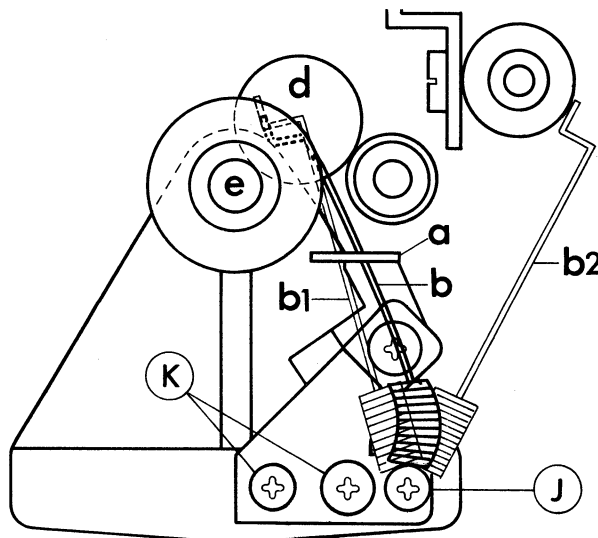


Fig 34

IV. Disassembly of The Second Sprocket Section

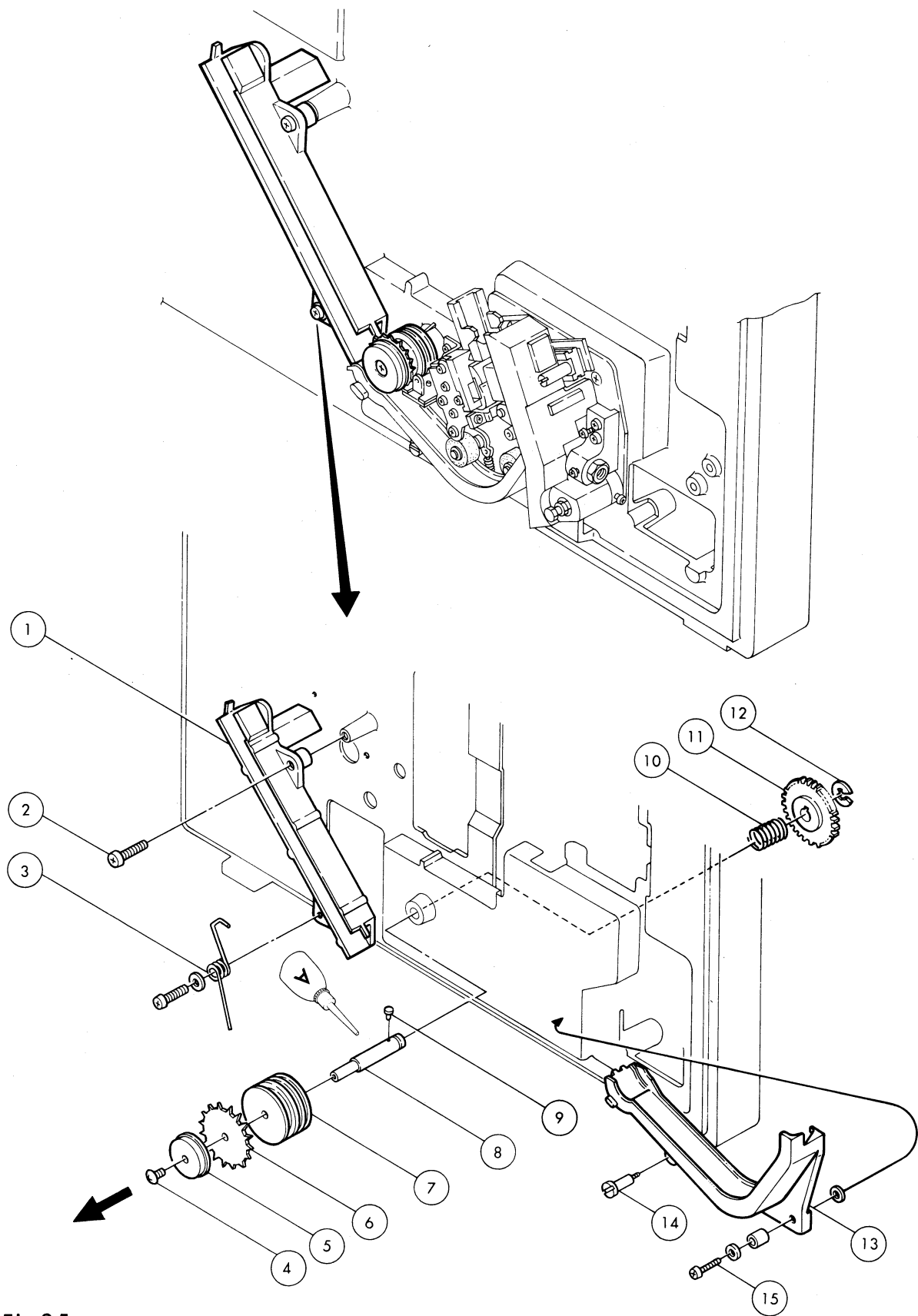


Fig 35

IV. Disassembly & Reassembly Notes

6. The Sccond Sprocket Section

A. Disassembly Refer to Fig.36.

1. Remove (2)x2 and take out (1).
2. Remove (14)(15) and take out (13).
3. Remove (4), pulling the sprocket towards yourself. And take out (5)(6)(7) together.

Note : If you try to remove (4) without pulling the sprocket towards yourself, (11) and Mid. Gear II (Fig.29-16), which engages with each other, may be damaged.

B. Reassembly Notes

— Scratch or eccentricity of (6)(7); — Wow-Flutter
— Scratch of (8)(11); —

1. Follow the reverse way of the Disassembly steps.

Note : Take care not to scratch (6)(7)(8)(11).

IV. Disassembly of Amplifier

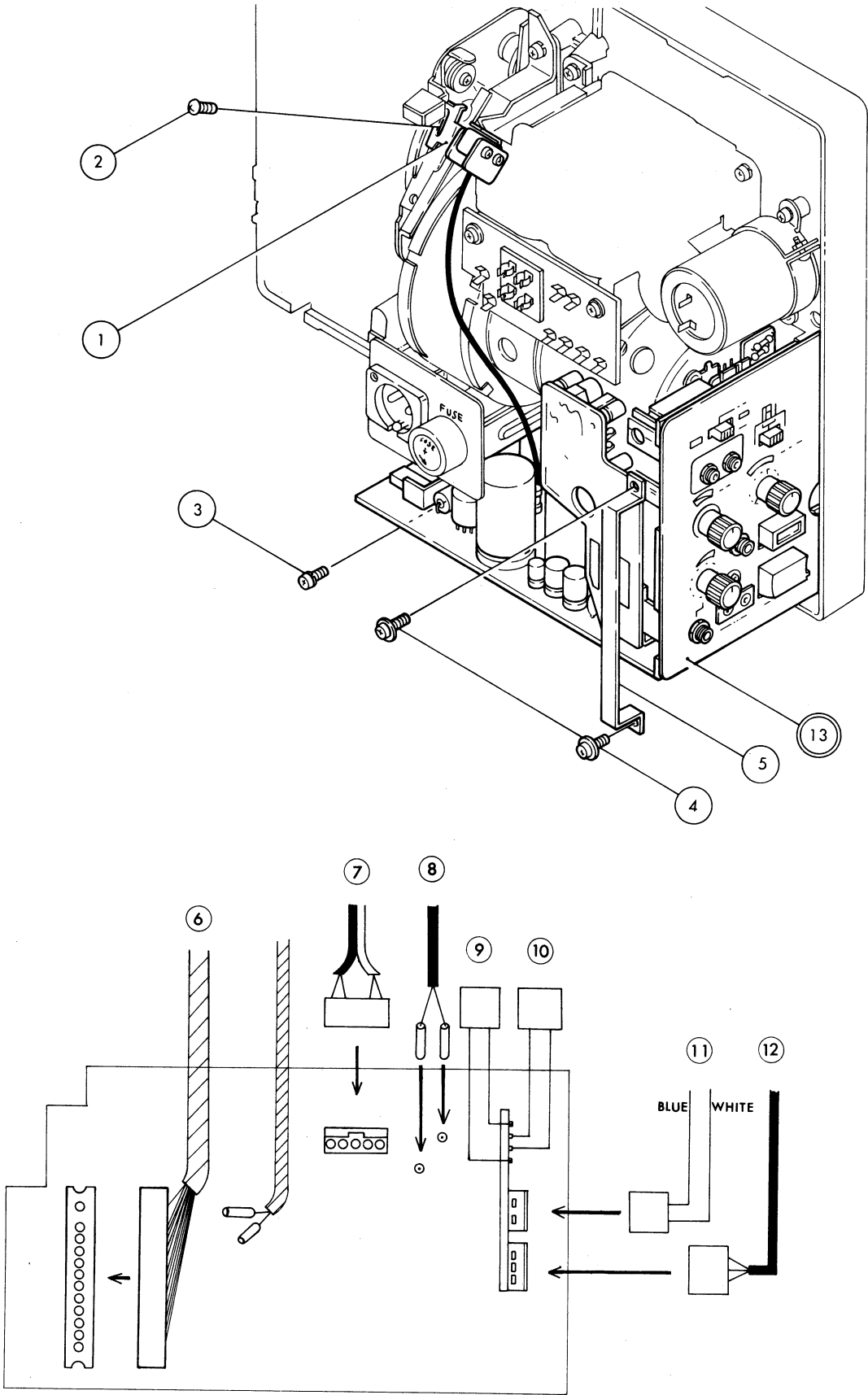


Fig 36

IV. Disassembly & Reassembly Notes

7. Amplifier

Replacing The Amplifier ((13))

A. Disassembly Refer to Fig.36.

1. Pull out volume and tone control knobs.
2. Remove (2) and take out (1).
3. Remove (3) and (4)x2. And disconnect from (6) to (12), slightly pulling out ((13)) towards yourself.

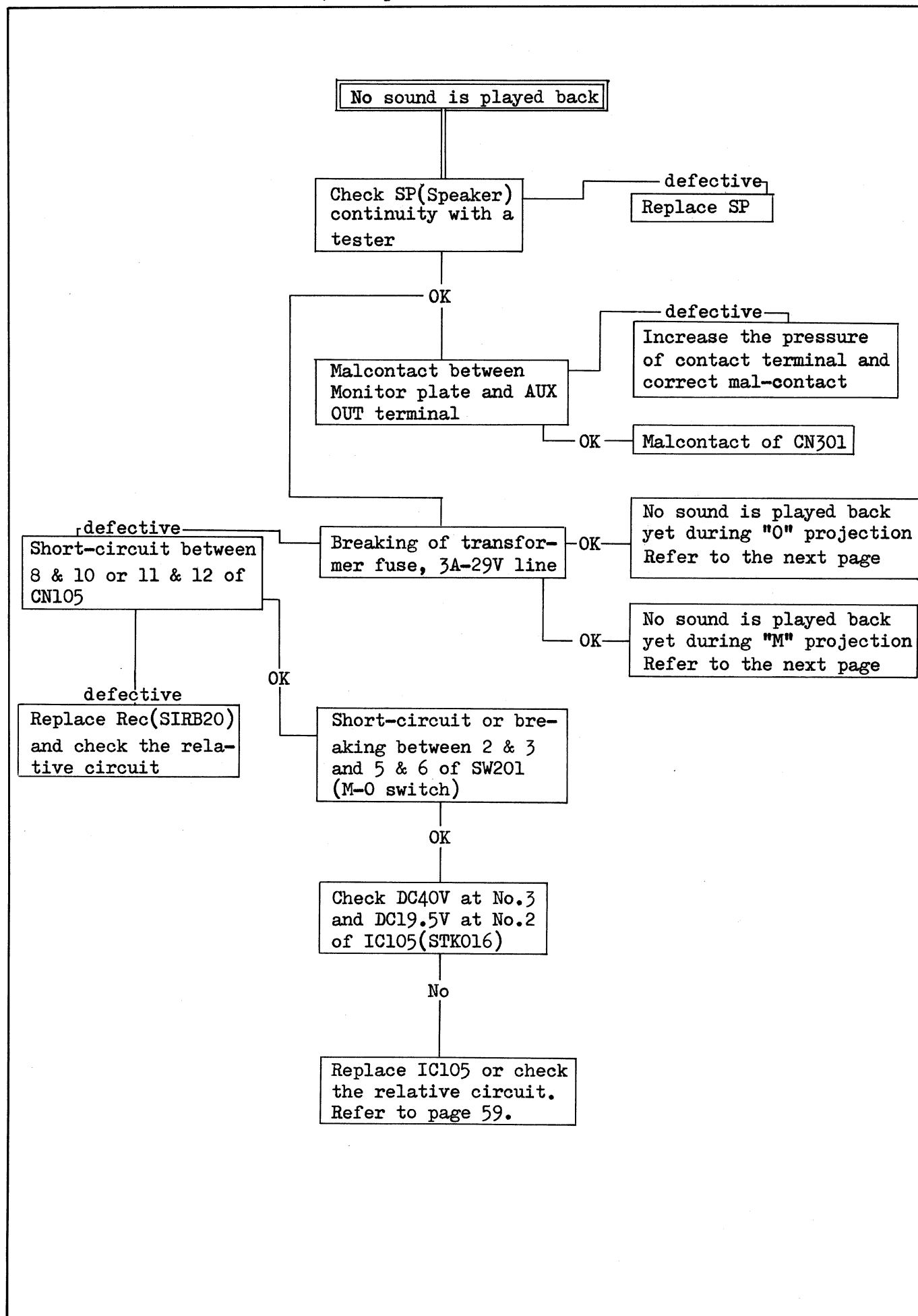
B. Reassembly Notes

1. Follow the reverse way of the Disassembly steps.

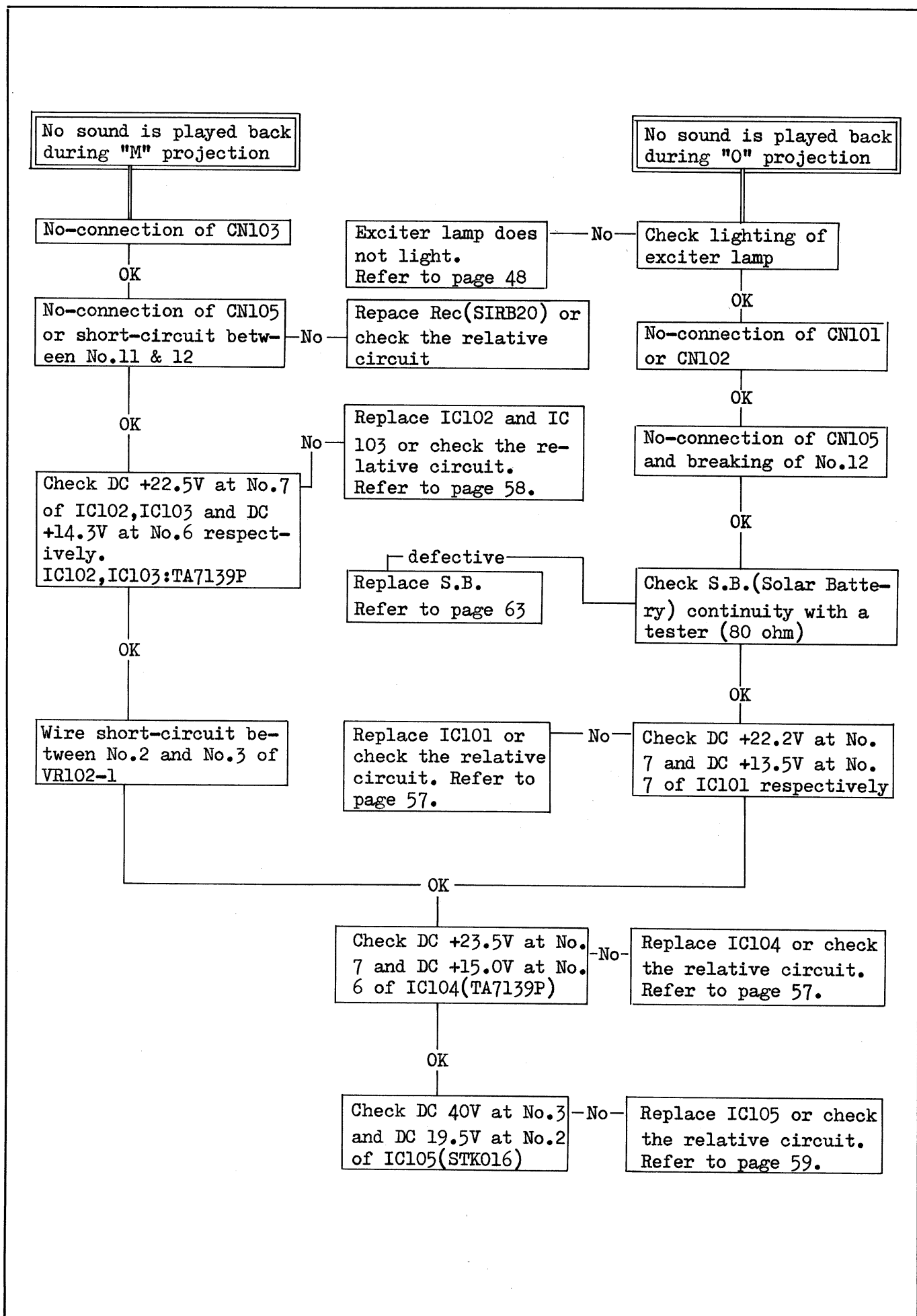
Note : a) Since space between The Head Switch Circuit Board (P/No.4E31091) and Rear Cover Attaching Plate (P/No.P412633) is so limited, be sure that they each do not contact with the other.

- b) Fig.36-7 ... from Combination head type B (for recording)
 - 8 ... from Solar batter
 - 9 ... from L.E.D. (Track 1 indication)
 - 10 ... from L.E.D. (Track 2 indication)
 - 11 ... Blue wire ... from M-0 switch (SW201)
 - 11 ... White wire ... from Recording indication lamp(PL202)
 - 12 ... from Combination head type B (for irasing)

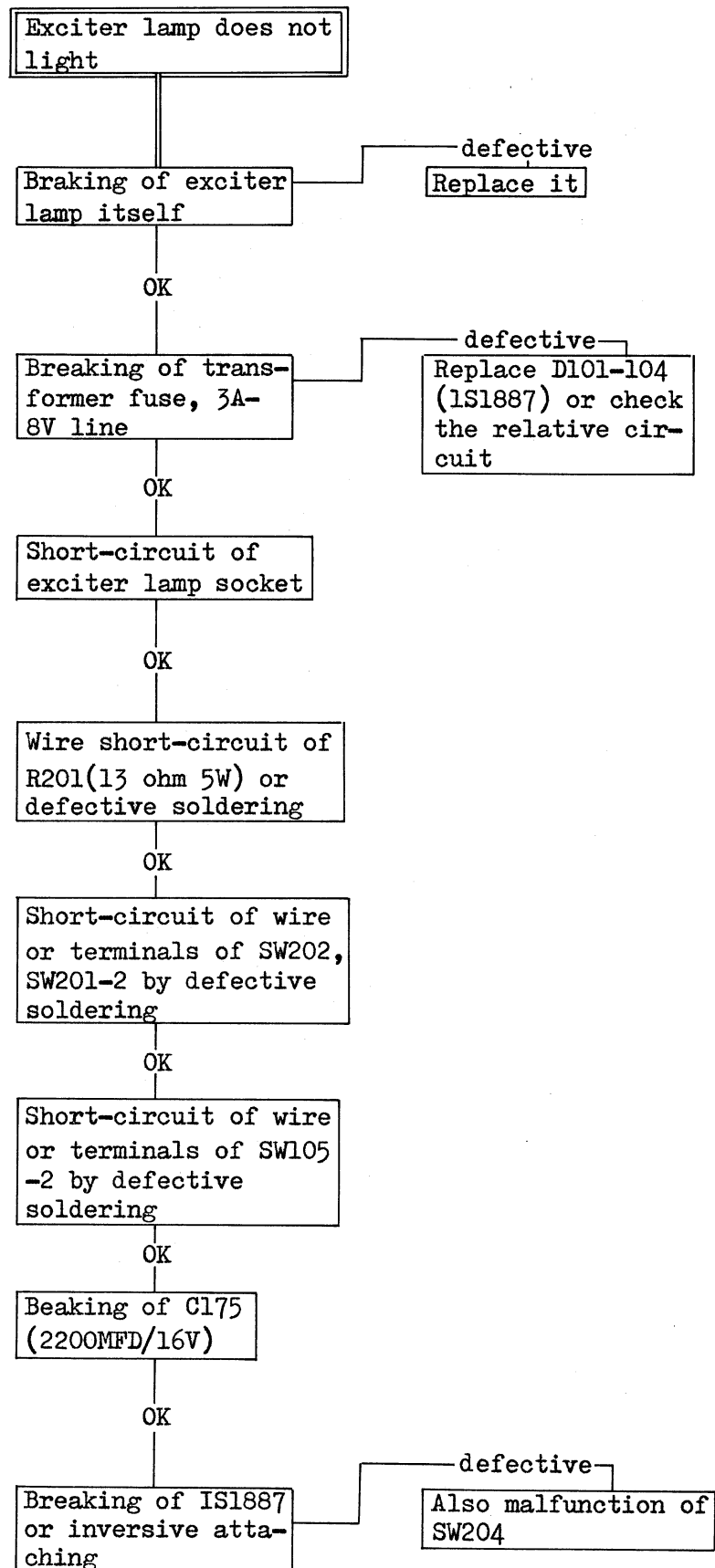
IV-7. Amplifier



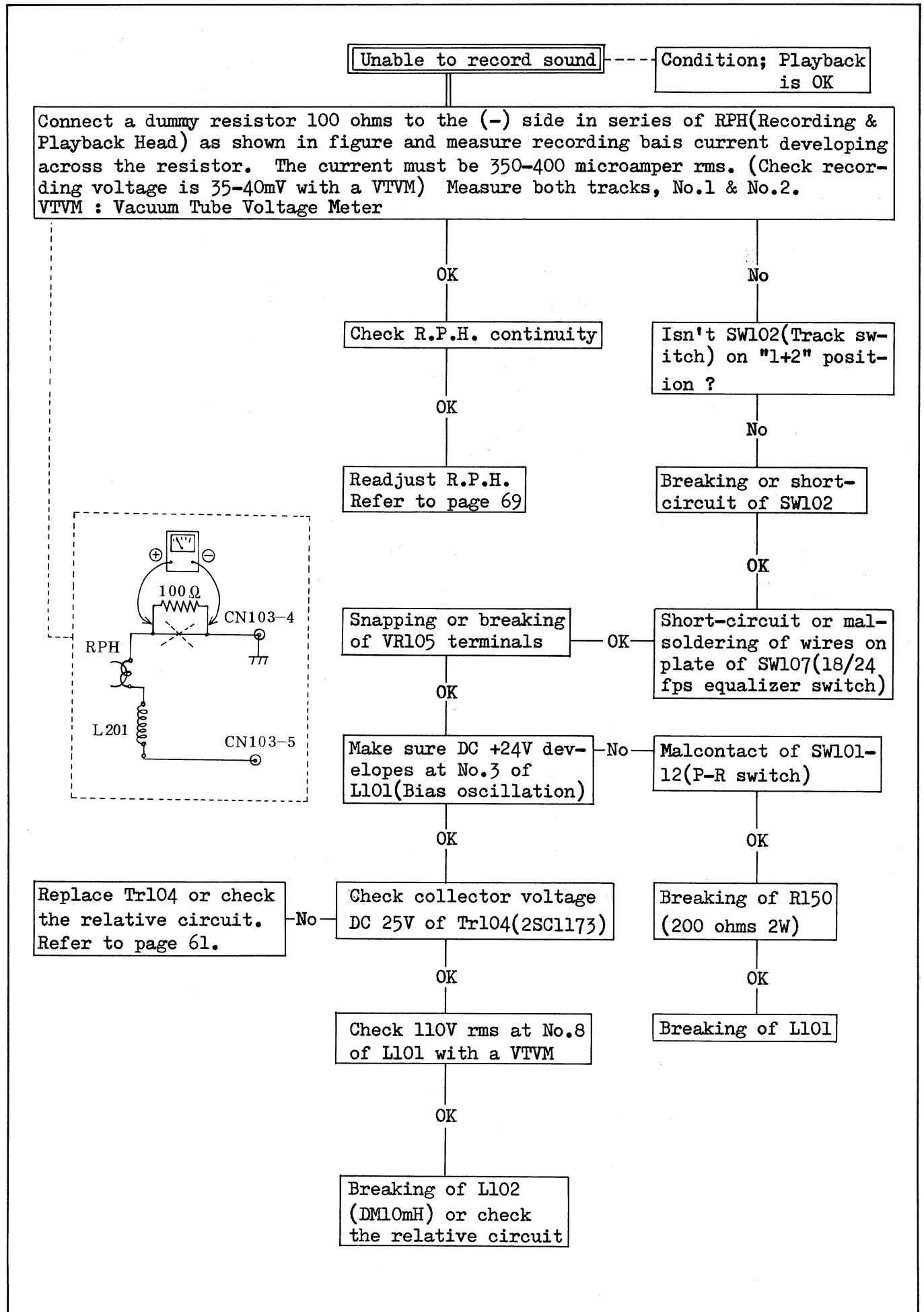
IV-7. Amplifier



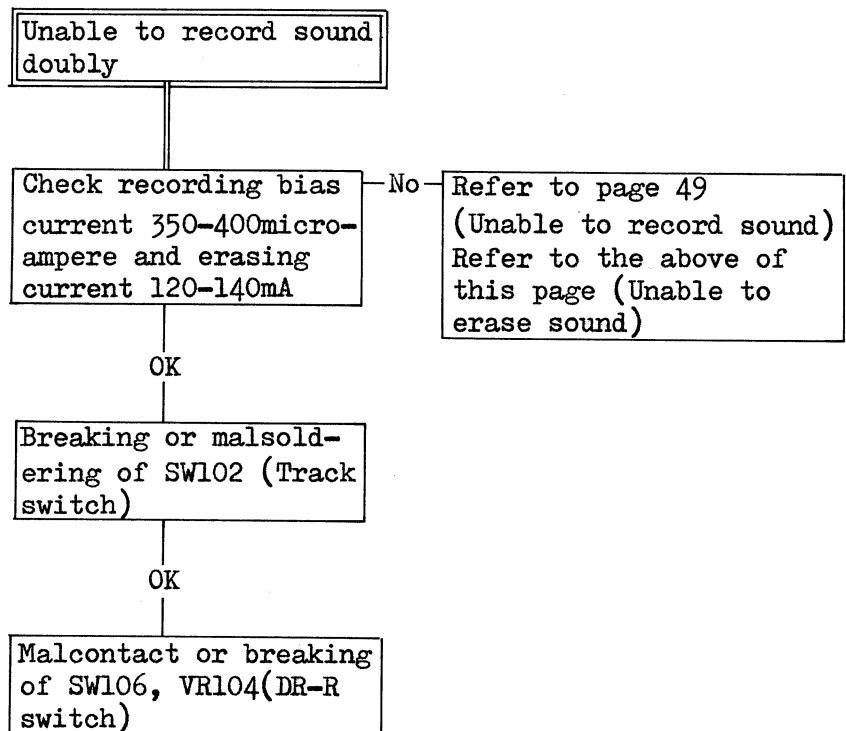
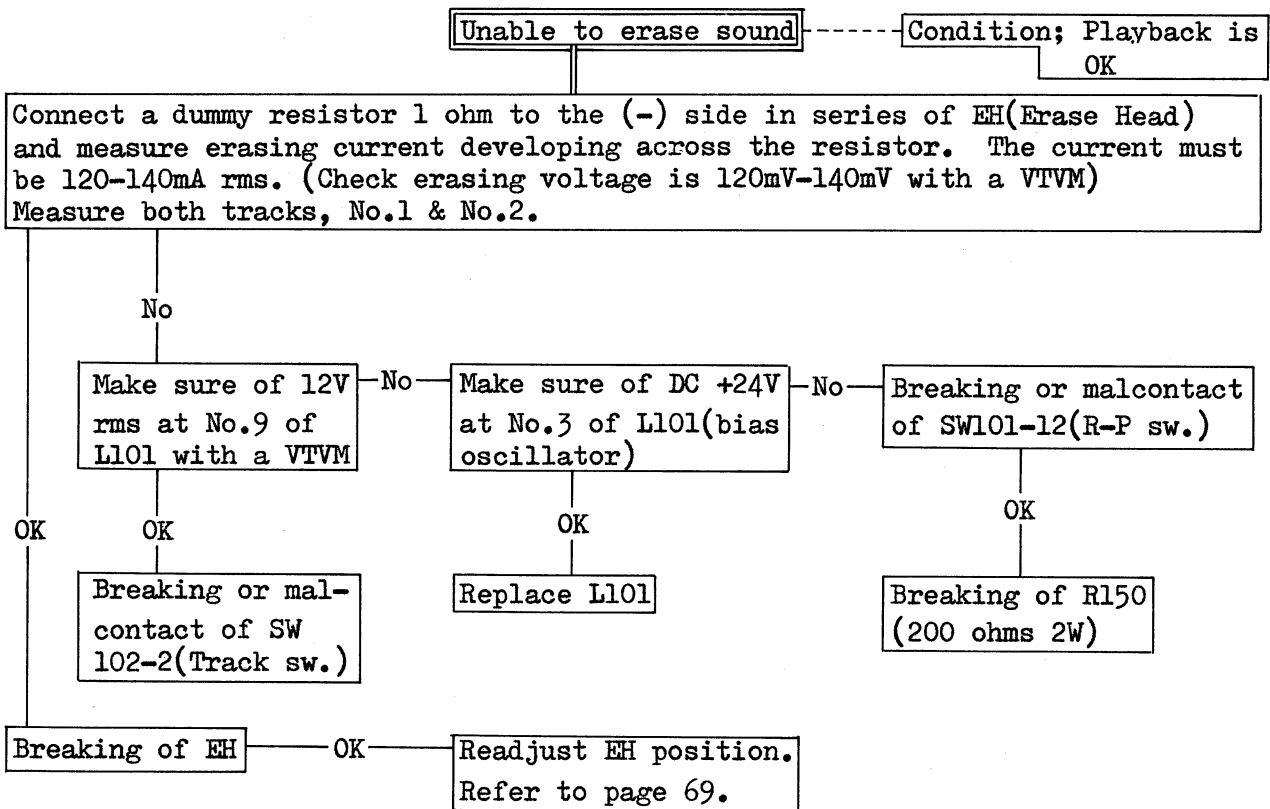
IV-7. Amplifier



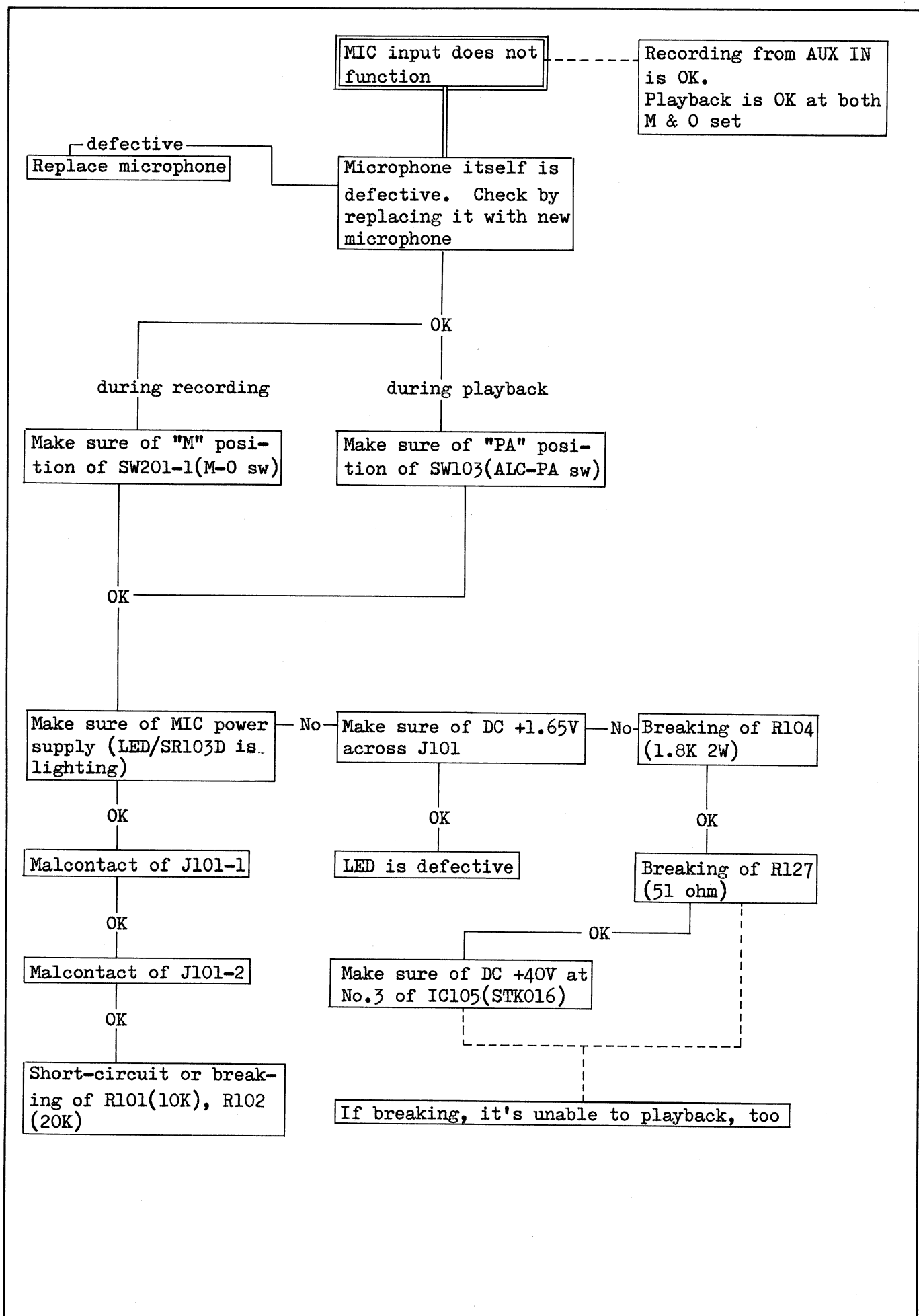
IV-7. Amplifier



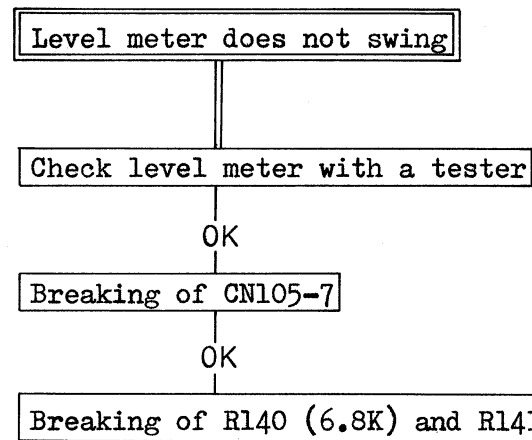
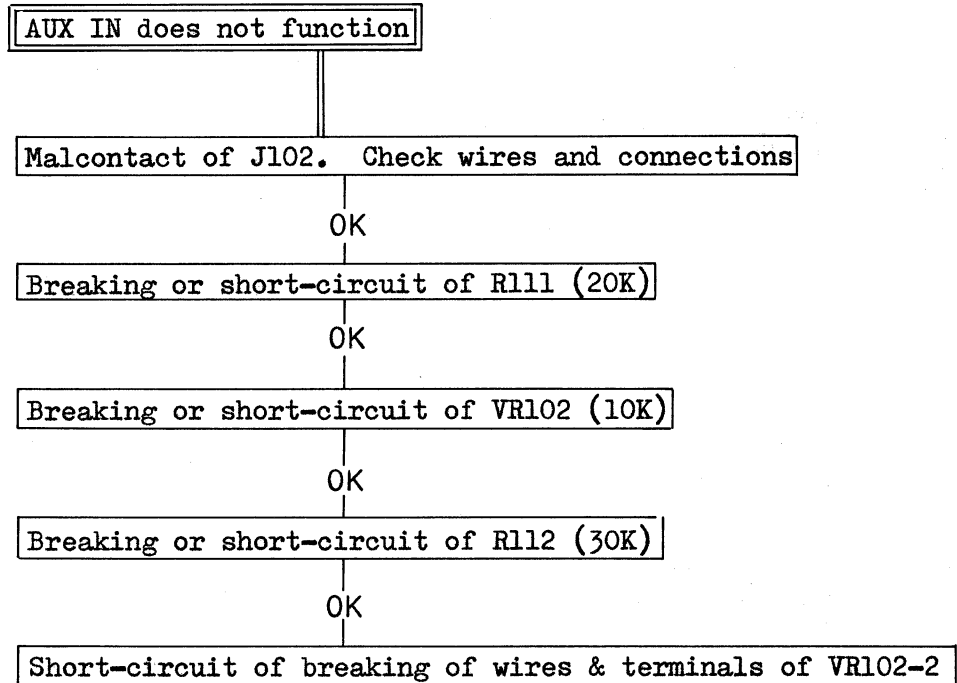
IV-7. Amplifier



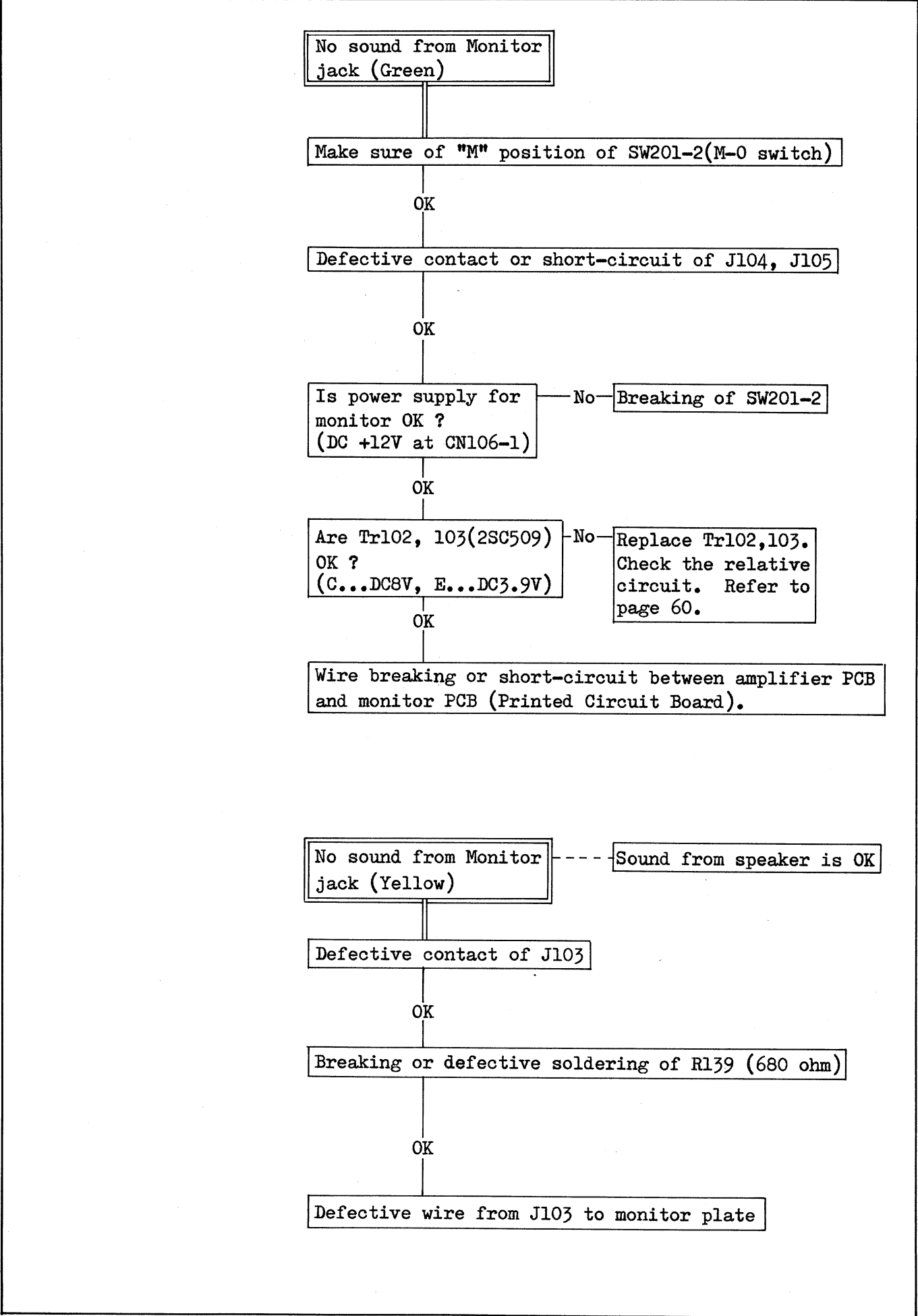
IV-7. Amplifier



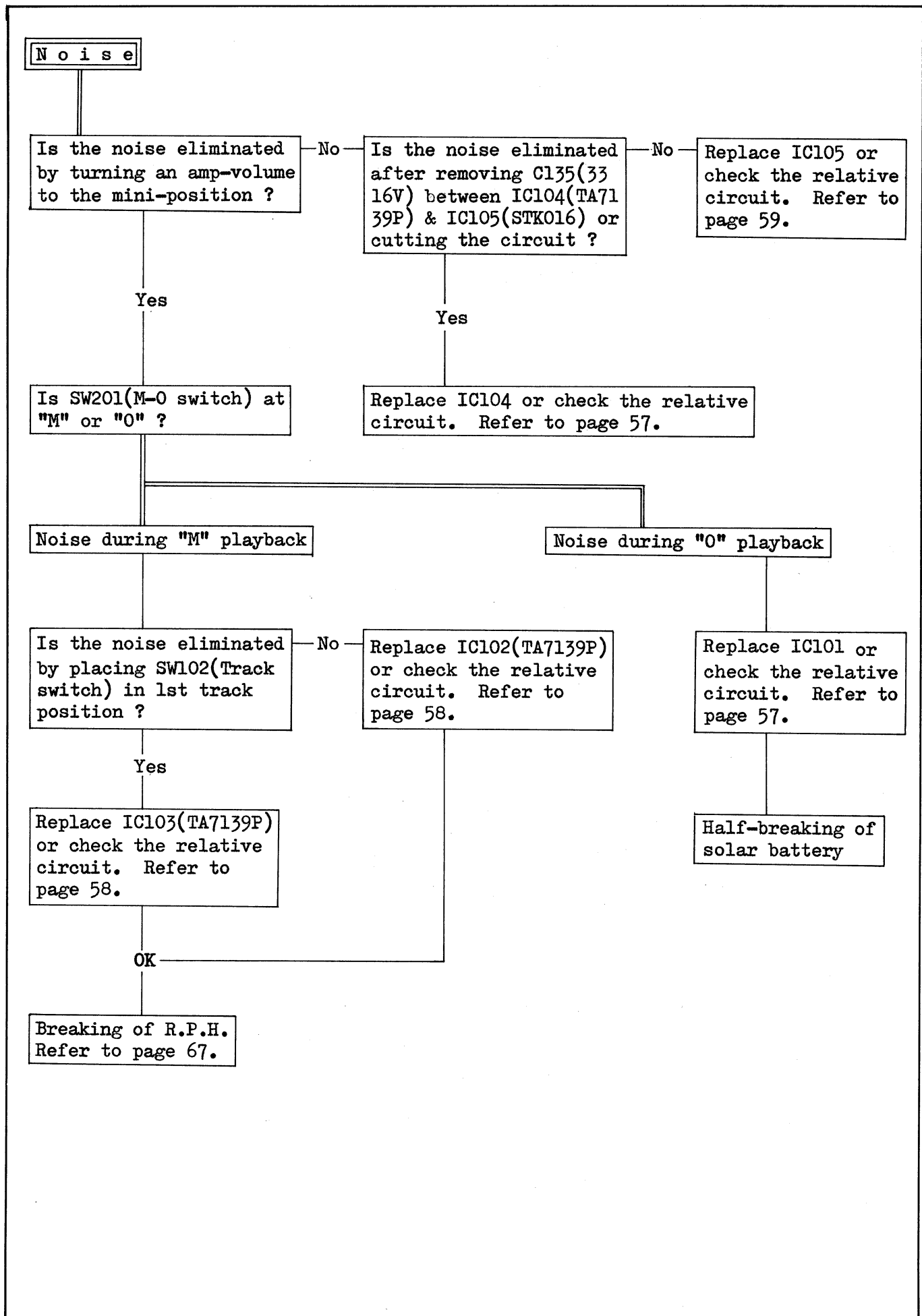
IV-7. Amplifier



IV-7. Amplifier



IV - 7. Amplifier



IV-7. Amplifier

Oscillation when transferring sound (Input level -6 VU to another track at 0 VU)

Widen space between a bias wire (from VR104, No.2 to SW102-5) and a wire (between SW101-3 & SW101-5) as wide as possible

OK

Breaking or short-circuit of L105, L106 (10 mH)

OK

Check Tr102, Tr103(2SC509)
C...DC +8V, E...DC +3.9V

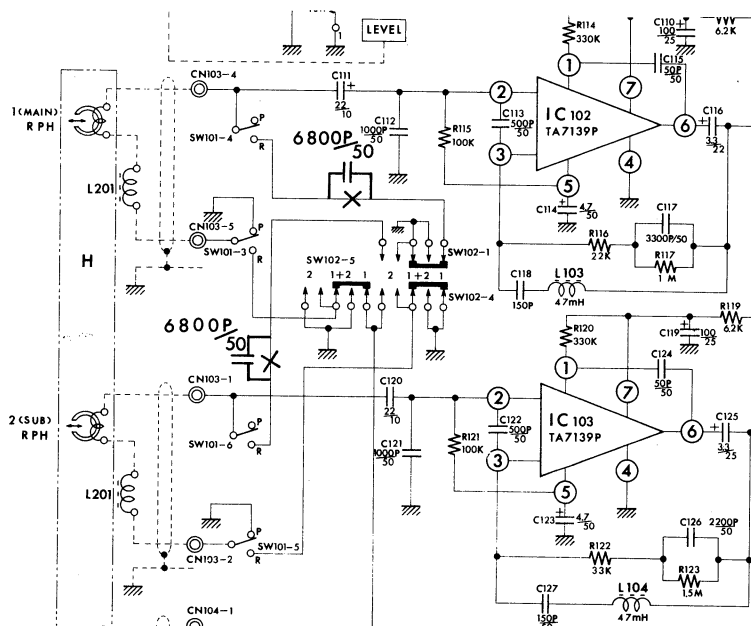
No

No sound from monitor jack (Green). Refer to page 53.

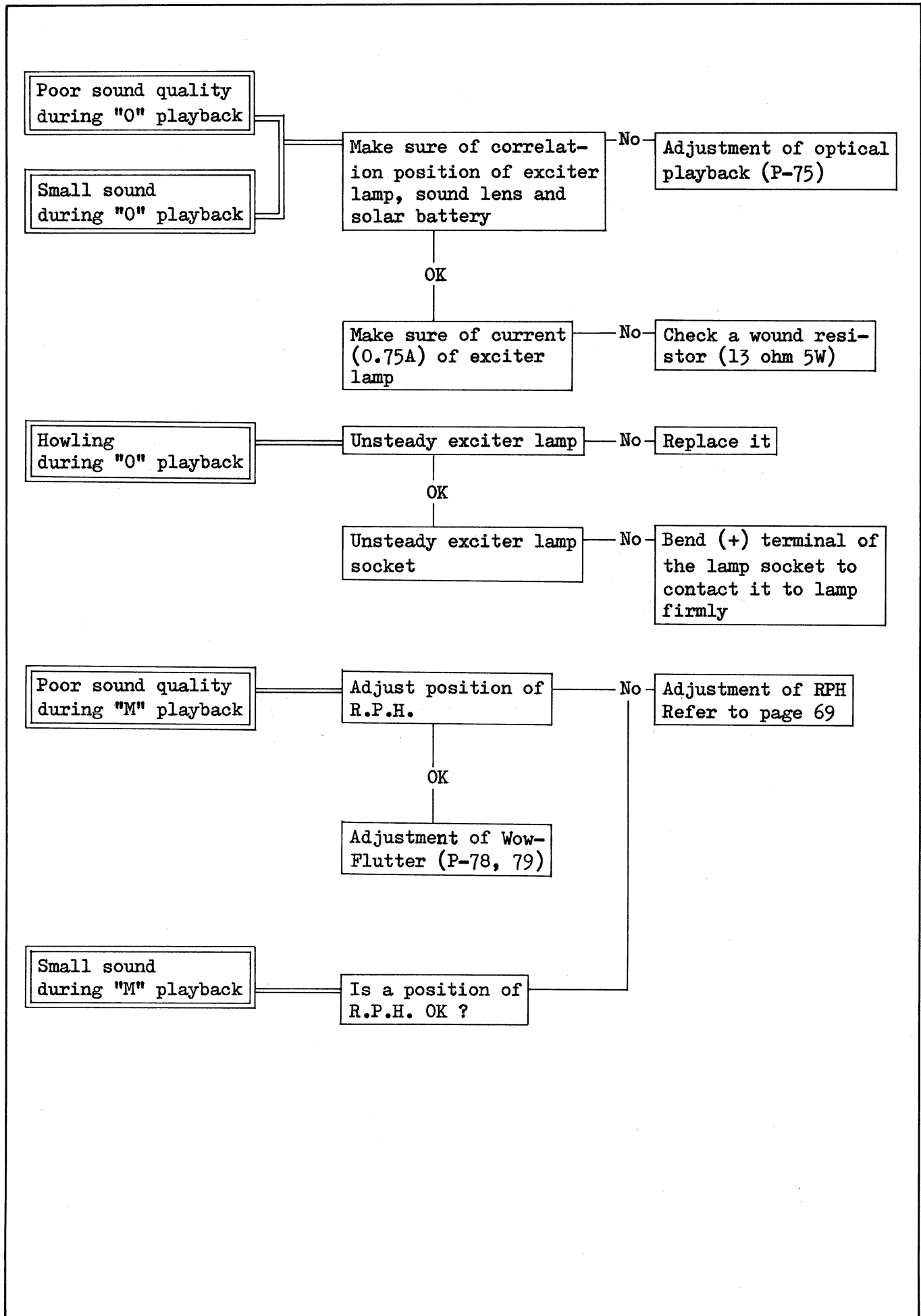
OK

Replace R.P.H.

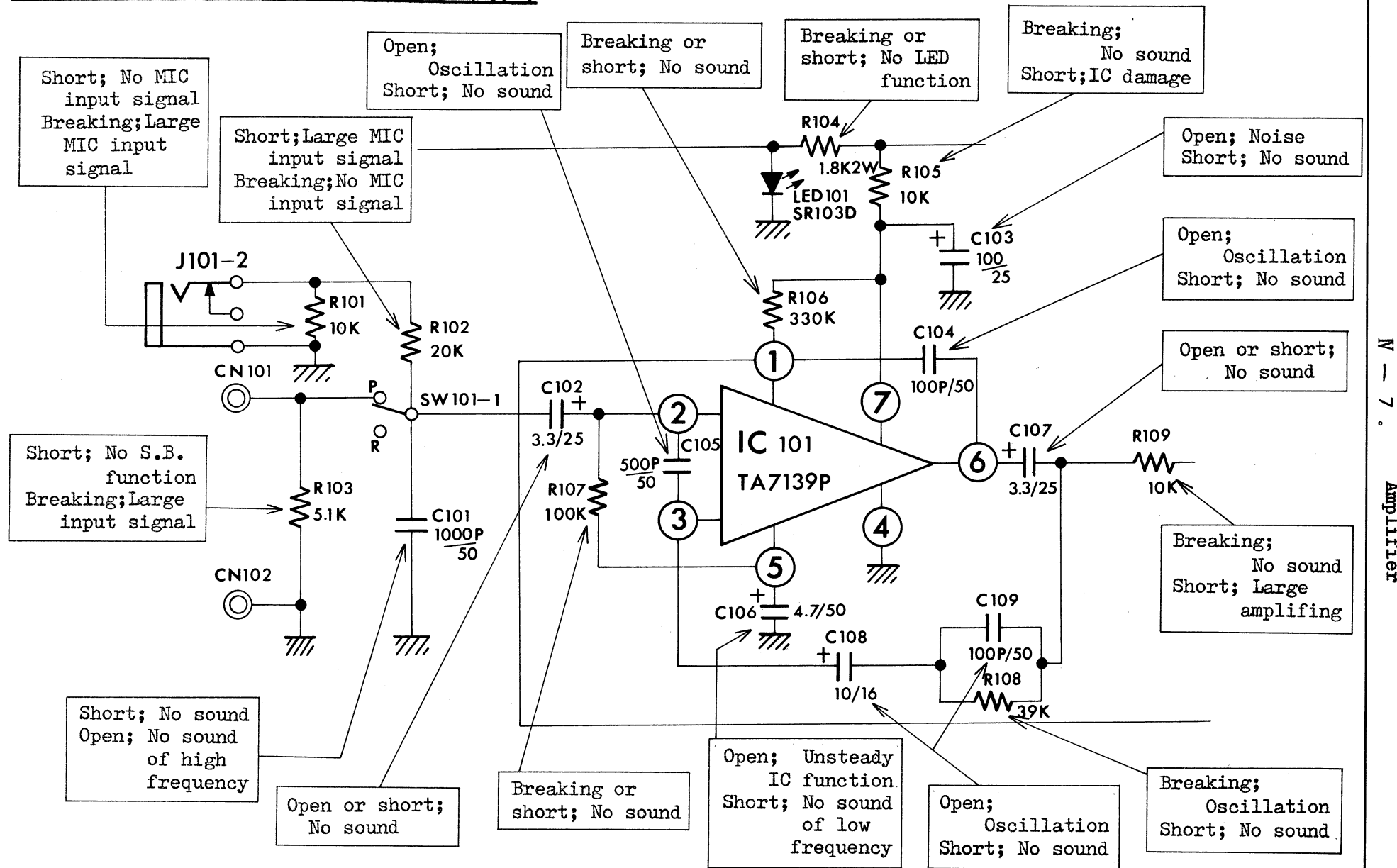
If connection is not as following schema(6800PF/50V added), repair an amplifier after applying the capacitor



IV-7. Amplifier

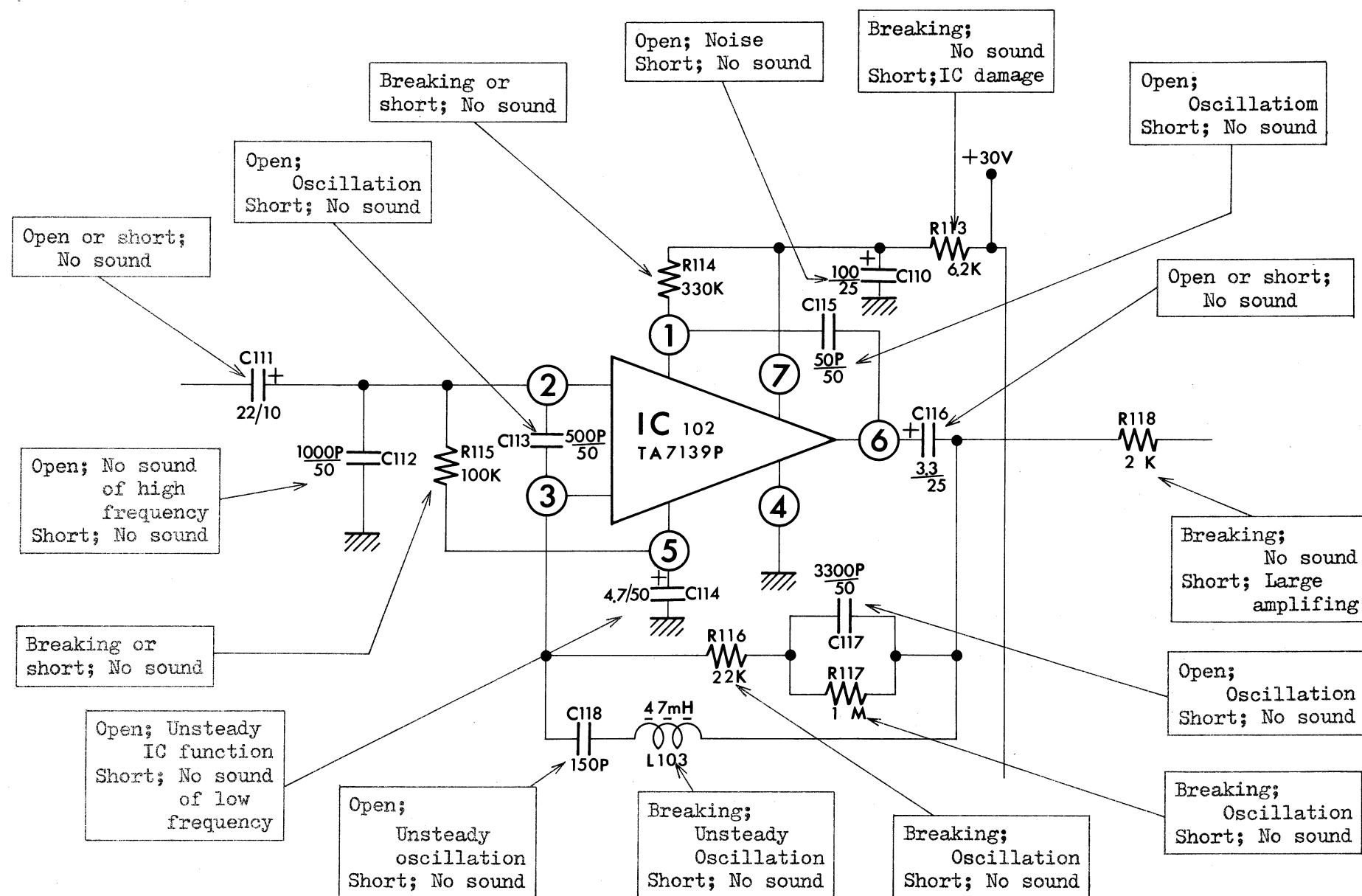


The relative circuit to IC101, IC104 (TA7139P)



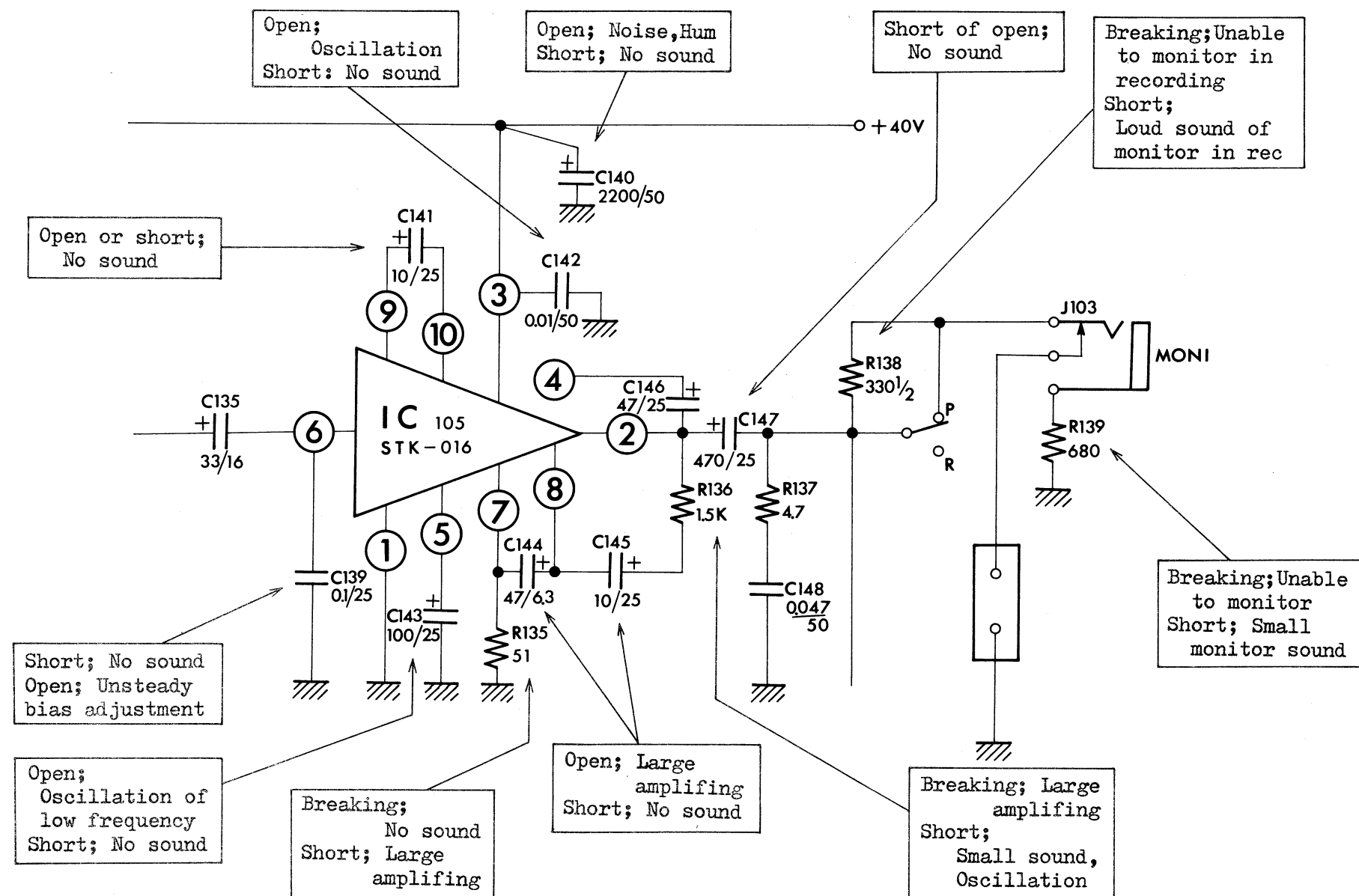
* "No sound" means that the amplifier is unable to play back sound.

The relative circuit to IC102, IC103 (TA7139P)

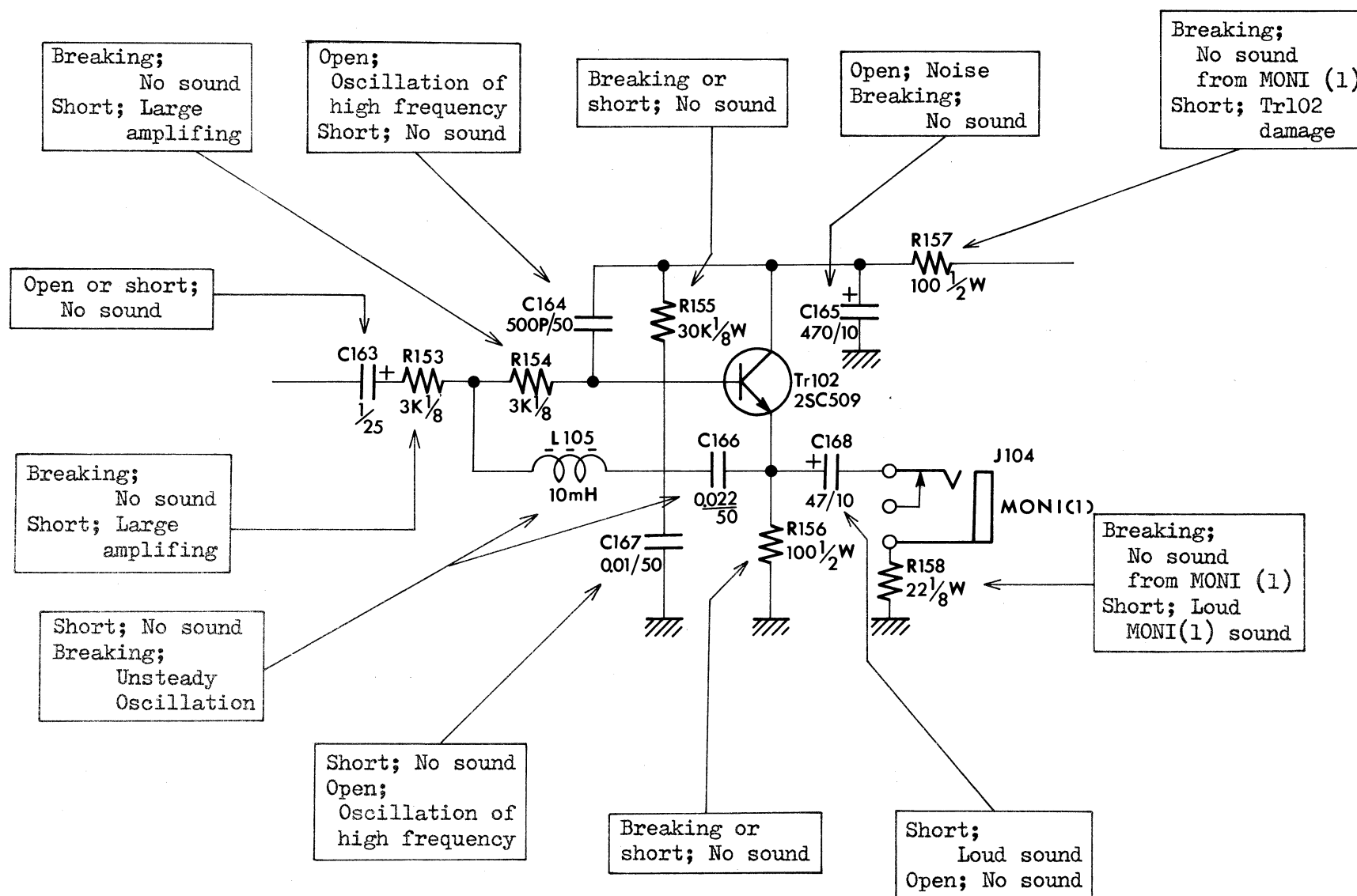


* "No sound" means that the amplifier is unable to play back sound.

The relative circuit to IC105 (STK-016)

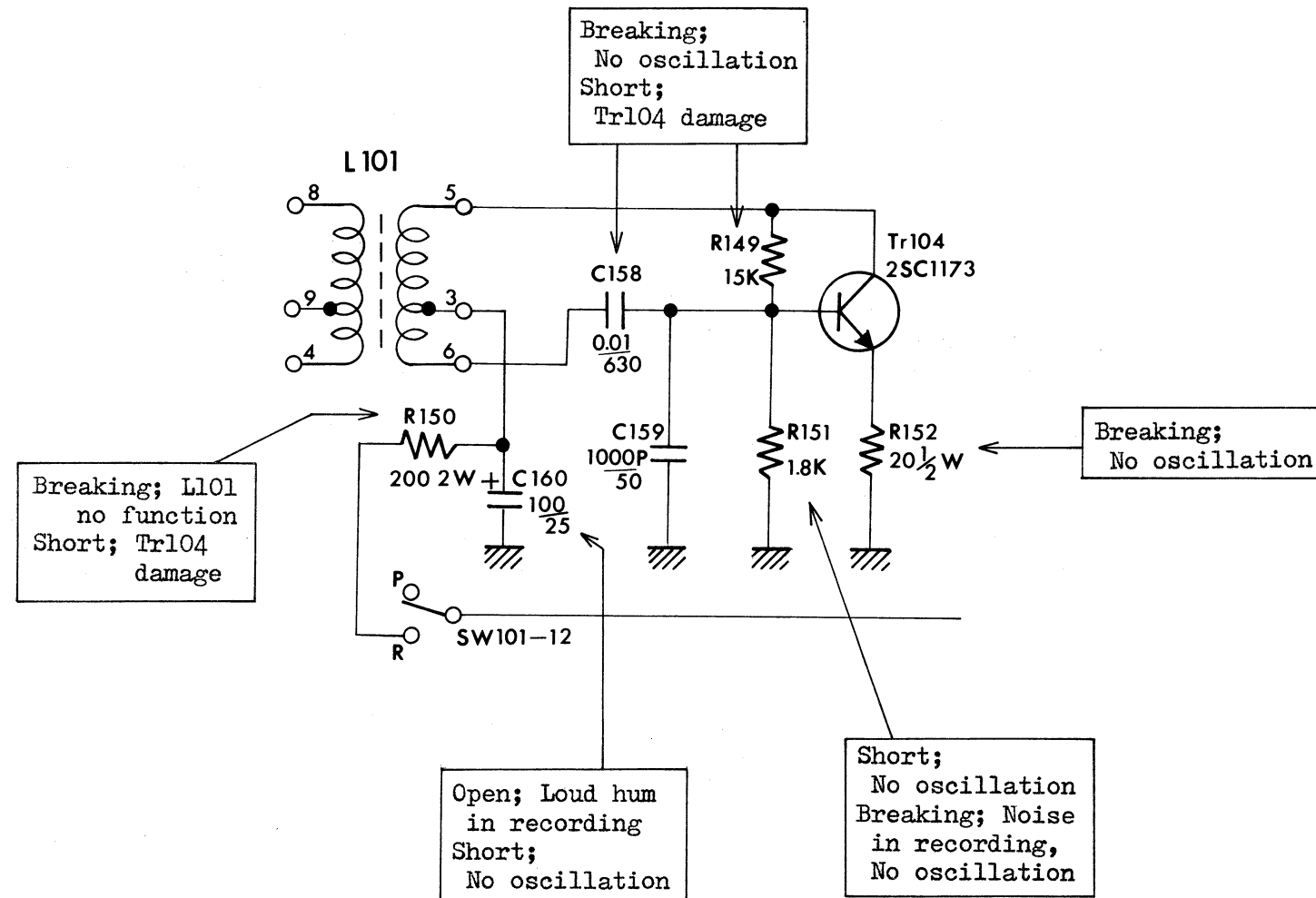


The relative circuit to Tr102, Tr103 (2SC509)



* "No sound" means that the amplifier is unable to play back sound.

The relative circuit to Tr104 (2SC1173)



IV-7. Amplifier

IV-8. Disassembly of The Head Base Plate Assembly

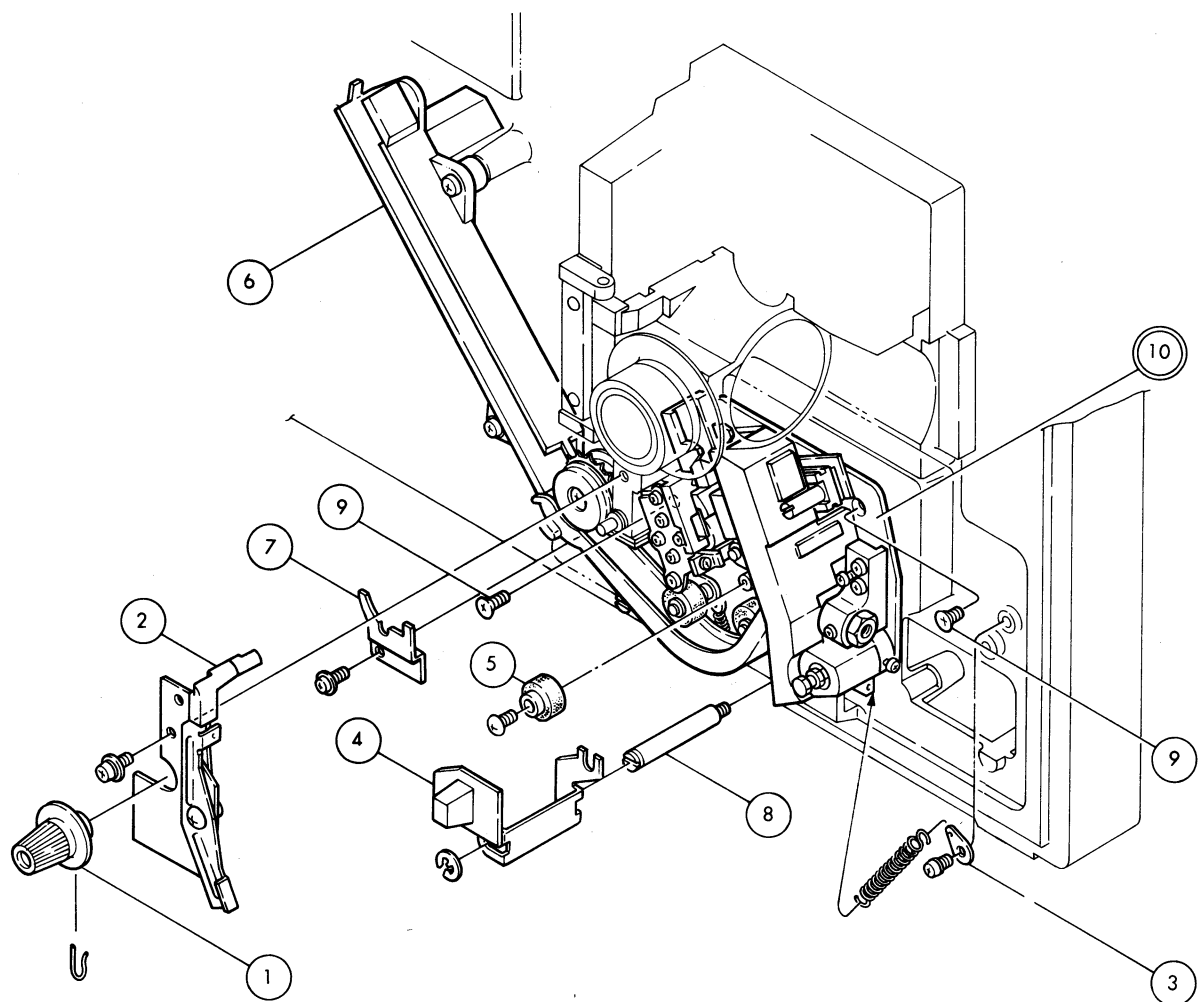


Fig 37

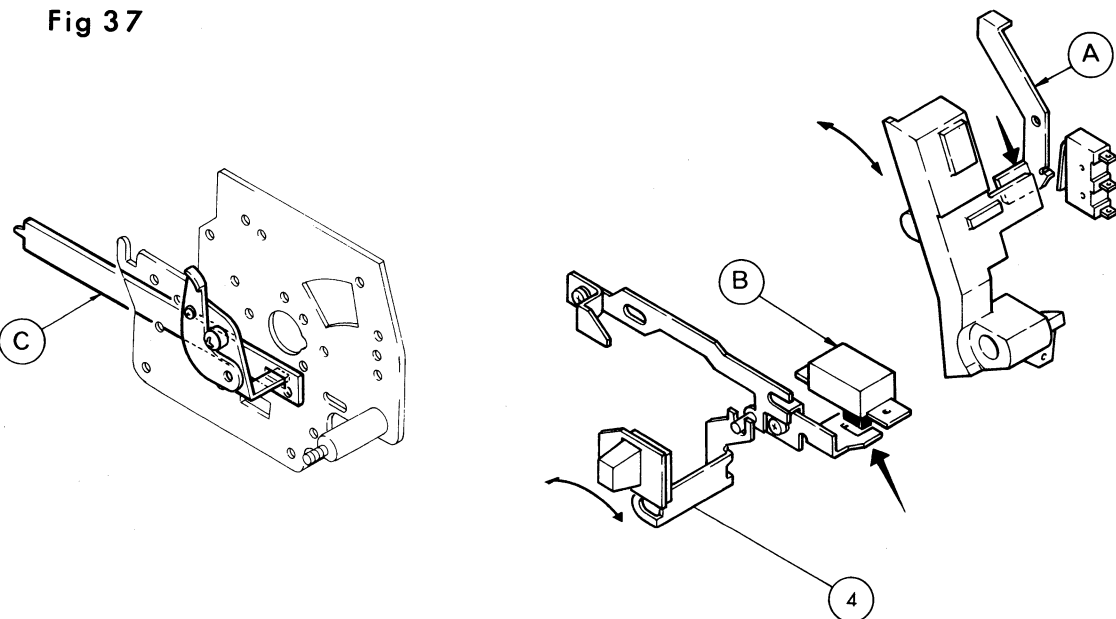


Fig 38

IV. Disassembly & Reassembly Notes

8. The Head Base Plate Assembly

The Head Base Plate Assembly ((10))

A. Disassembly Refer to Fig.37.

1. Take out the amplifier. (Refer to page 45)
2. Remove the machine cover.
3. Remove the exciter lamp.
4. Remove the parts in order of numbering in Fig.37.

Note : a) If you unsolder the wires connected to Sound Head & Erase Head and move a solar battery, you can replace the Head Base Plate Assembly without moving the amplifier.

b) When replacing the solar battery, refer to the above procedure.

B. Reassembly Notes

Eccentricity or scratch of (5); Wow-Flutter

1. Follow the reverse way of the Disassembly steps.
2. Make sure the following three points;
 - (A) of Fig.38 is connected with the Pad Roller Lever (Parts List, 8-70).
 - (B) of Fig.38 is connected with the M-O Switch Link I(Parts List, 8-61).
 - (C) of Fig.38 is connected with the Reverse Lever II (Parts List, 8-51).
3. Adjust the position of the 2nd Sprocket Film Guide by (7) so that the guide can near to the 2nd Sprocket as close as possible, but they each do not touch with the other.

IV-8. Disassembly of The Head Base Plate Assembly

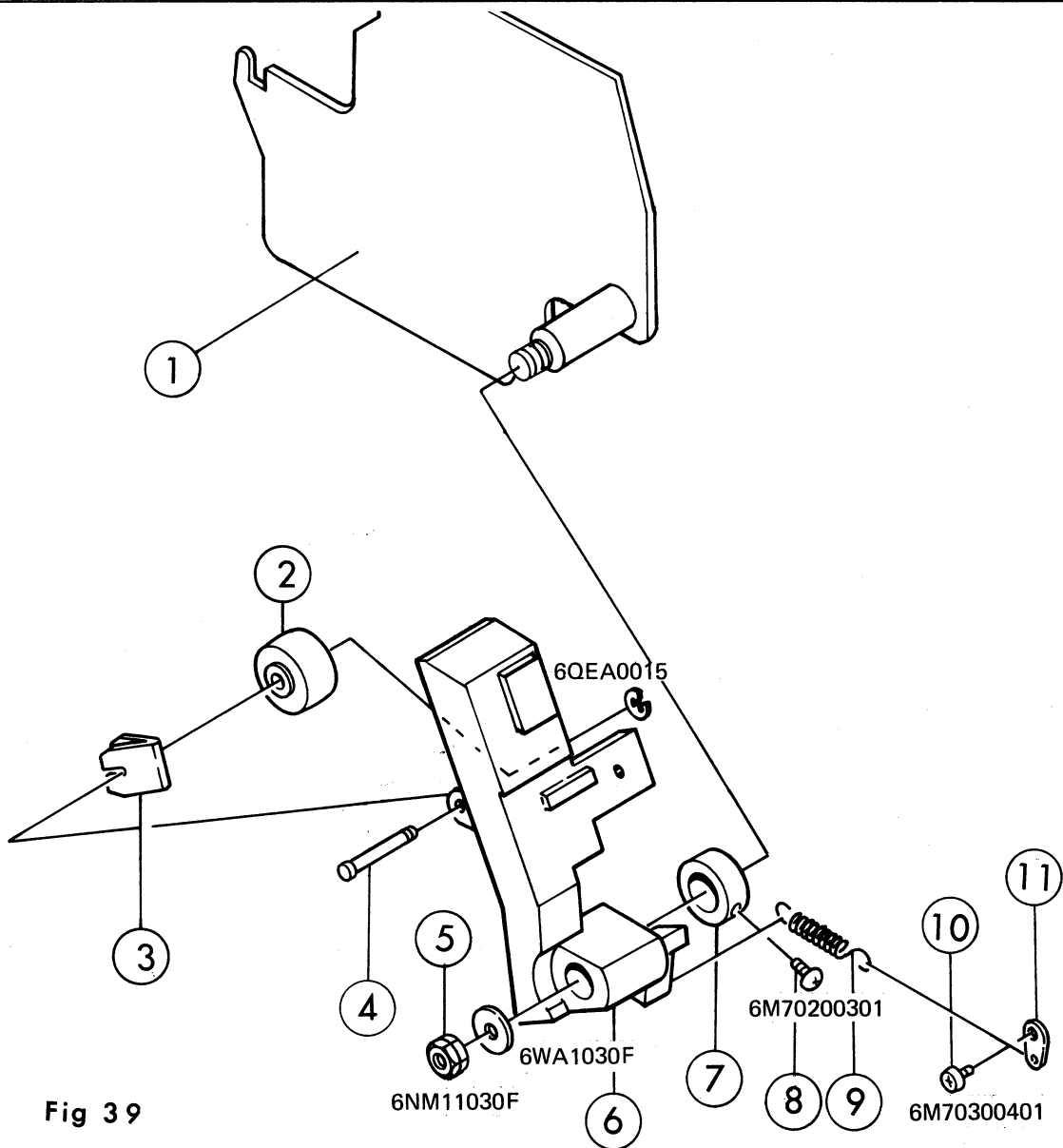


Fig 39

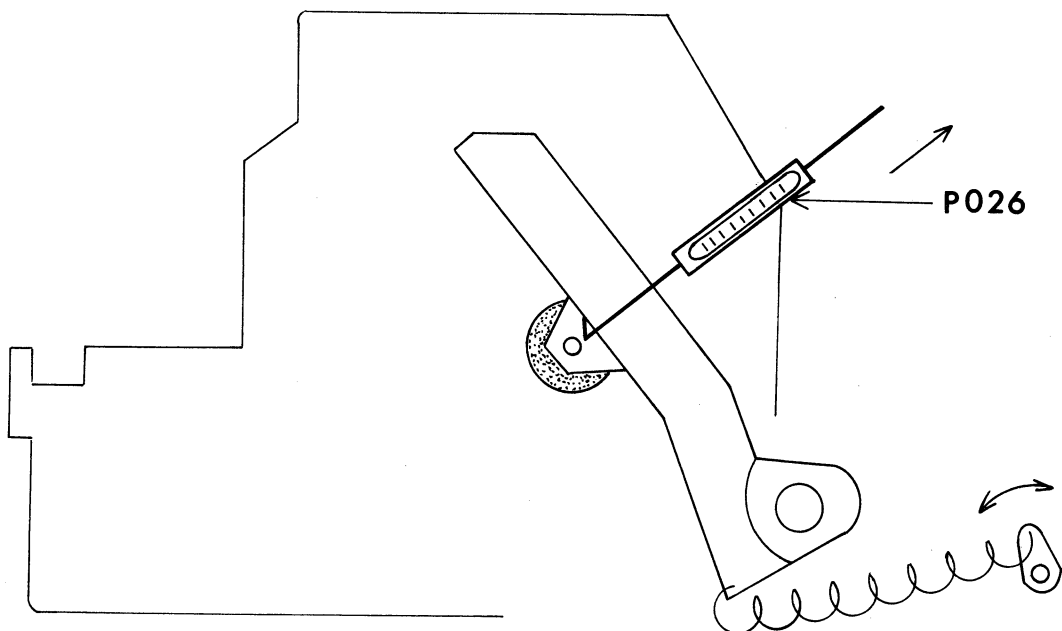


Fig 40

IV-8. Disassembly & Reassembly Notes

8. The Head Base Plate Assembly (cont'd)

A. Disassembly Refer to Fig.39.

1. Remove (5) and (11), and detach (6) from (1).
Note : When removing (5), use a spanner (P025).
2. Disassemble the rest, referring to Fig.39.

B. Reassembly Notes

- | | |
|--------------------------------------|--|
| — Uneven rotation or scratch of (2); | — Wow-Flutter |
| — Insufficient pressure of (3); | — Lower film loop is hardly kept on optical playback |
| — Excessive pressure of (3); | — Wow-Flutter |
| — Insufficient pressure of (9); | — Lower film loop is hardly kept on optical playback |
| — Excessive pressure of (9); | — Wow-Flutter |
| — Faulty movement of (6); | — When the motor switch is OFF, there should be a gap between Fig.39-2 and the sound drum. If not, film jumping may occur. |

1. Follow the reverse way of the Disassembly steps.
Note : a) Make sure that (2) has no scratch and rotates smoothly.
b) Adjust the pressure of (3) so that a slight brake is applied to (2) all the time.
2. Fix the position of (7) by (8) so that (2) may not touch the side of the Head Film Guide (Fig.41-17).
3. Fix (6) by (5). Make sure that there is no play between (6) and the shaft, and (6) turns smoothly.
4. Adjust the pressure of (9) at 170 - 200g, moving (11) in the direction of arrow.

Measurement : As running the projector, measure the pressure as shown in Fig.40. Use a spring scale (P026).

IV-8. Disassembly of The Head Base Plate Assembly

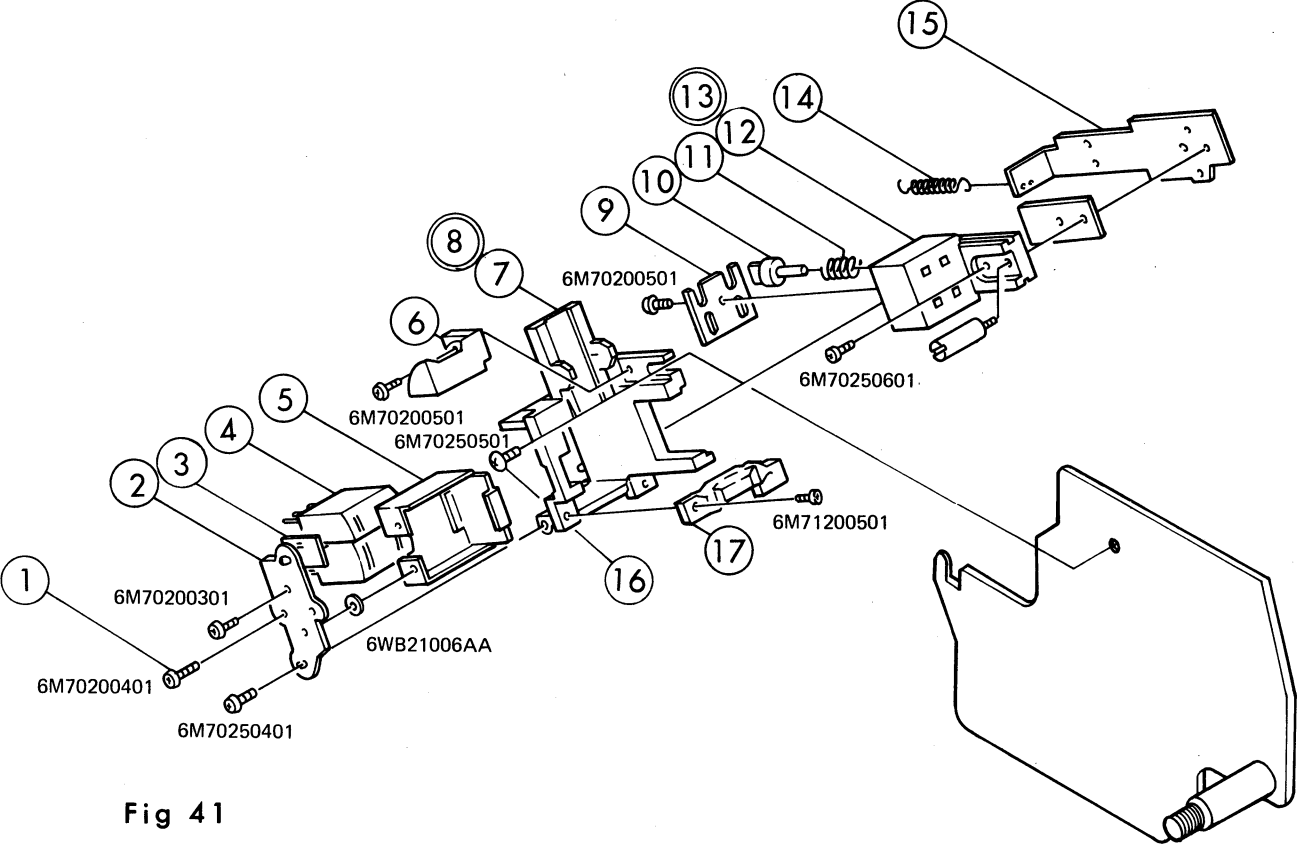


Fig 41

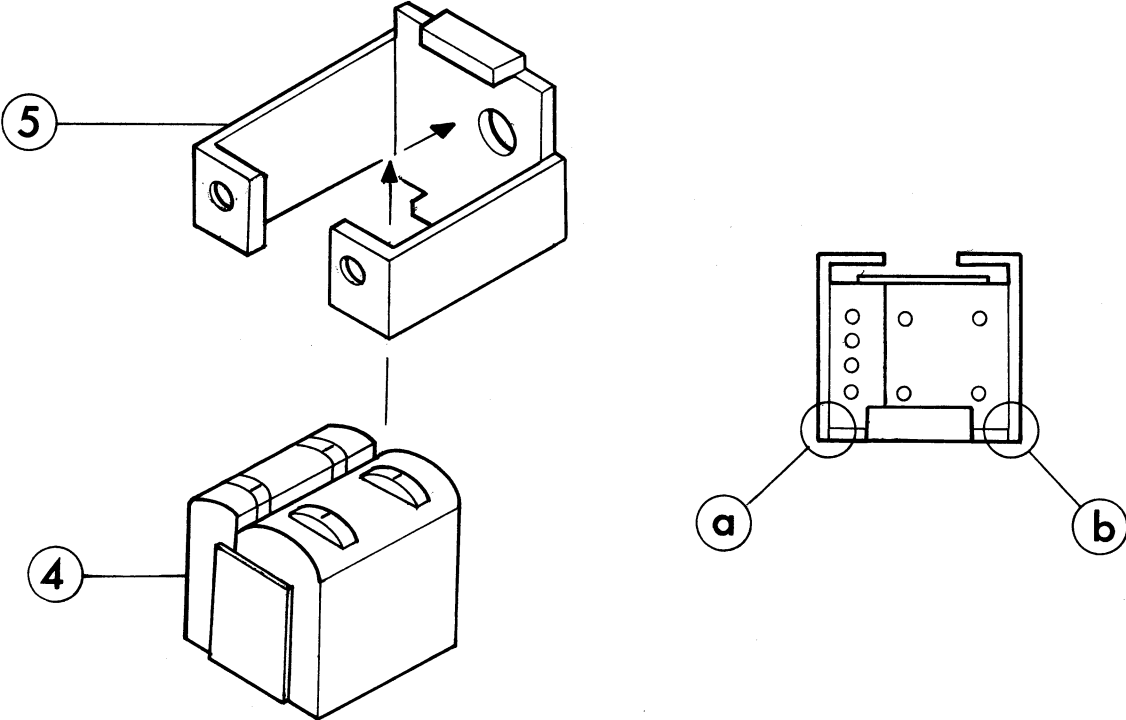


Fig 42

IV. Disassembly & Reassembly Notes

8. The Head Base Plate Assembly (cont'd)

Head Holder Assembly ((8))

A. Disassembly Refer to Fig.41.

1. Remove (14).
2. Remove (16)x3 and take out ((8))((13)).
3. For disassembly of ((8)), refer to Fig.41.

B. Reassembly Notes

- Defective (4); Magnetic recording/playback/erasing are faulty.
- Faulty position of (17); Film runs off the path (Film runs on (17)).

1. Glue (3) to (4) by "Cemendine 575" just under the screw holes of (1)x2.
2. To attach (4) to (5), pushing (4) in the direction of arrow in Fig.42, apply "Cemendine 575" to point Fig.42-a and "Alon Alpha" to point Fig.42-b respectively.

3. Attach (17) to (7). (Refer to Fig.43)

Make sure that the distance "L" (a-c) and "L'" (b-c) is equal by using vernier calipers.

4. Attach (1)(2)(3)(4) to (7).

Put a film on the Head Holder Assembly as shown in Fig.43. Adjust the position of head by screws (d)(e)(f), aligning the two head gaps with the magnetic stripes (Track 1 & 2). And tighten (e)(f).

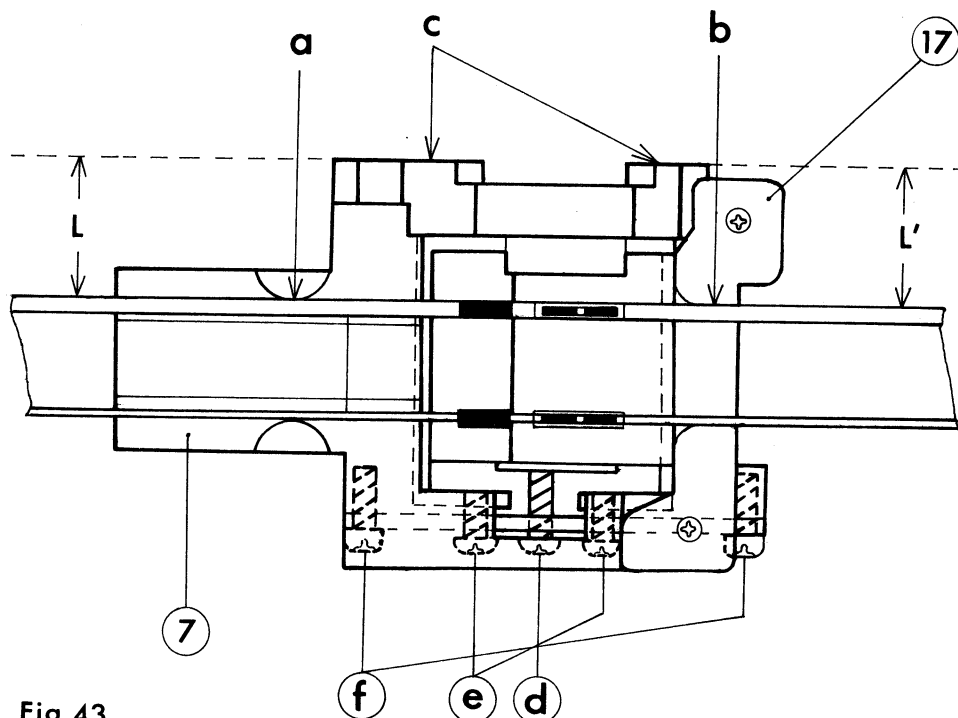


Fig 43

IV. Disassembly & Reassembly Notes

8. The Head Base Plate Assembly (cont'd)

The Head Presser Assembly ((13))

A. Disassembly Refer to Fig.41.

B. Reassembly Notes

- └ Malfunction of (10); Faulty recording and playback sound
- └ Faulty pressure adjustment of (11); Wow-Flutter, Low output

1. To reassemble, refer to Fig.41. Make sure that (10) moves smoothly. The pressure of (11) should be at 15 - 20g. For measurement, use a spring scale (C043).
2. When attaching the Head Holder Assembly ((8)) and Head Presser Assembly ((13)), push them in the direction of arrow in the Fig.44.

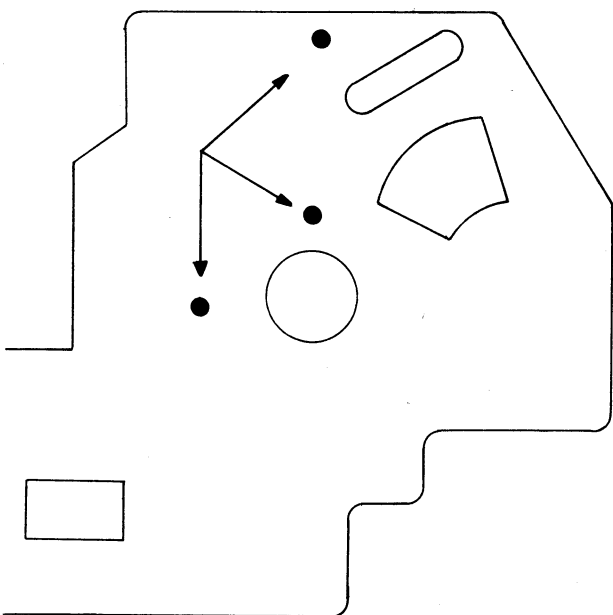


Fig 44

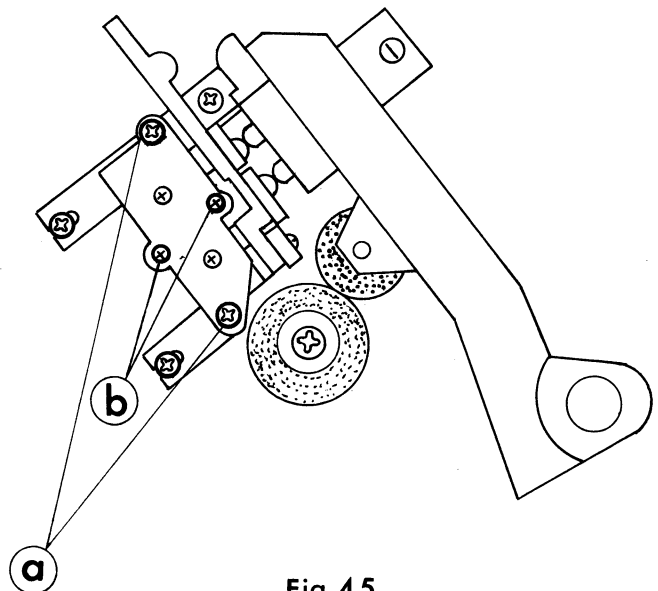


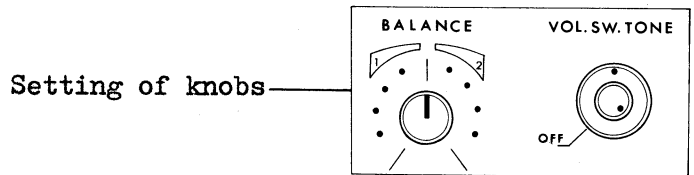
Fig 45

IV-8. The Head Base Plate Assembly

Magnetic Adjustment

A. Head position adjustment (Playback)

Test film Prest film (acetate base) (P027)
3 KHz signal is recorded at 18 fps
Testing equipment Vacuum Tube Voltage Meter (VTVM)
Resistor box (8 ohm 20W) (P045)

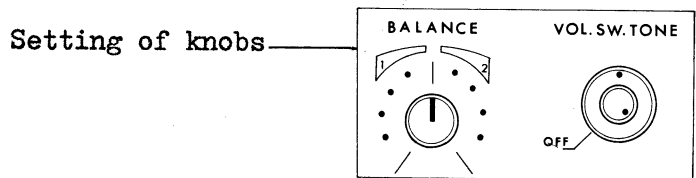


1. Refer to the step 4 of the Head Holder Assembly on page 67. Adjust the position of head tentatively. Make fine adjustment of head position by (a)x2, (b)x2, while observing the meter. Fix the position by (a)x2 where the maximum output on both tracks 1 and 2 is obtained.

Output More than 10V

B. Cancel coil position adjustment

Testing equipment..... VTVM, Resistor box (P045)



1. Turn the motor and lamp switches to "ON" position.
Adjust the position of cancel coil, observing the meter.

Track 1 Less than 400mV

Track 2 Less than 600mV

IV-8. The Head Base Plate Assembly

C. Recording test (Rated output, Frequency response)

C-1. Rated output ... More than 12W

Test film Polyester base Kodak sound posi-film(P050)
Acetate base Prest film (P027)

Testing equipment Oscillator
Vacuum Tube Voltage Meter (VTVM)
Resistor box (8 ohm 20W) (P045)

1. Splice 1m each of both polyester and acetate base films to make a loop film.
Adjust the input level at 0 VU by the AUX control knob, for recording 400Hz signal.
As shown in Fig.46, record 400Hz and 2 KHz signals on both tracks 1 and 2 without changing the position of AUX control knob.
2. Play back the 400Hz signal. Make sure that the output is more than 11V when the volume knob is turned fully clockwise.
3. Adjust the output level at 3V, while playing back 400Hz signal, by turning the volume knob counterclockwise. And make sure that the output of 2 KHz signal is more than 2V on both tracks 1 and 2. If not sufficient, readjust the position of head, referring to page 69.

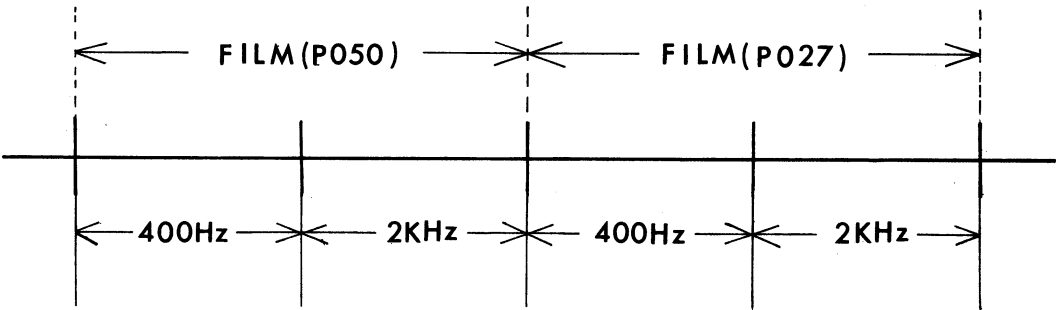


Fig 46

IV-8. The Head Base Plate Assembly

C. Recording test

C-2. Frequency response

Test film Acetate base Prest film (P027)

Testing equipment Oscillator

Vacuum Tube Voltage Meter (VTVM)

Resistor box (8 ohm 20W) (P045)

1. Adjust the input level at 0 VU by AUX control knob, for recording 400Hz signal.

And record signals of 400Hz, 200Hz, 2 KHz and 4 KHz respectively at 18 fps without changing the position of AUX control knob.

2. Adjust the output level at 0 dB on VTVM by volume control knob, while playing back 400Hz signal.

Read the output level of other signals without touching the knob. As shown in Fig.47, when basing level of 400Hz output, the output level should be within ± 4 dB at from 200Hz to 2 KHz signals and it should be within -10 dB at 4 KHz signal.

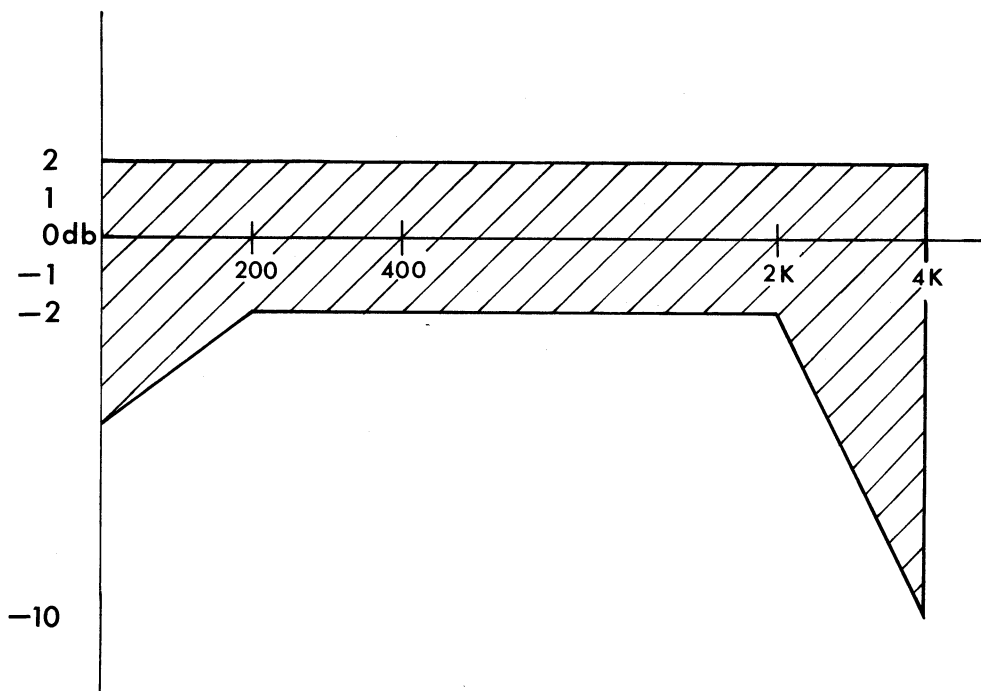


Fig 47

IV-8. The Head Base Plate Assembly

D. Distortion, Irasing Effect, S/N ratio

D-1. Distortion Less than 4.5%

Test film Acetate base Prest film (P027)

Testing equipment Oscillator
Distortion meter
Resistor box (8 ohm 20W) (P045)

1. Record the 400Hz signal at 0 VU by adjusting AUX control knob.
2. As playing back the recorded film, adjust the output level at 10V by volume control knob.

Read the distortion value on the distortion meter.

D-2. Irasing effect More than -40 dB (Weighting)

S/N ratio More than -45 dB (Weighting)

Test film Acetate base Prest film (P027)

Testing equipment Oscillator
Distortion meter
Resistor box (8 ohm 20W) (P045)

1. Record 400Hz signal at the level of 0 VU, and reverse the film halfway.
And record no signal at AUX volume minimum position to erase the signal.
2. Play back the film. Adjust the output at 10V by the volume control knob, and read the output level of irased portion of film on distortion meter to check the erasing effect.
3. Keep the position of volume control knob. Stop the projector and remove the film from the path.
Run the projector and read the level on the distortion meter to check the S/N ratio.

IV-8. The Head Base Plate Assembly

Optical Adjustment

A. Frequency response

Test film Super 8 frequency response film 400Hz(P051)
3 KHz(P052)
4 KHz(P053)

Testing equipment Vacuum Tube Voltage Meter (VTVM)
Resistor box (8 ohm 20W) (P045)

1. Pass the film for 400Hz. Play back 400Hz signal, and adjust the output at 0 dB by the volume control knob.
Play back 3 KHz and 4 KHz respectively, and read the output with VTVM without touching the knob.
As shown in Fig.48, the output should be within -8 dB at 3 KHz and it should be within -15dB at 4 KHz.

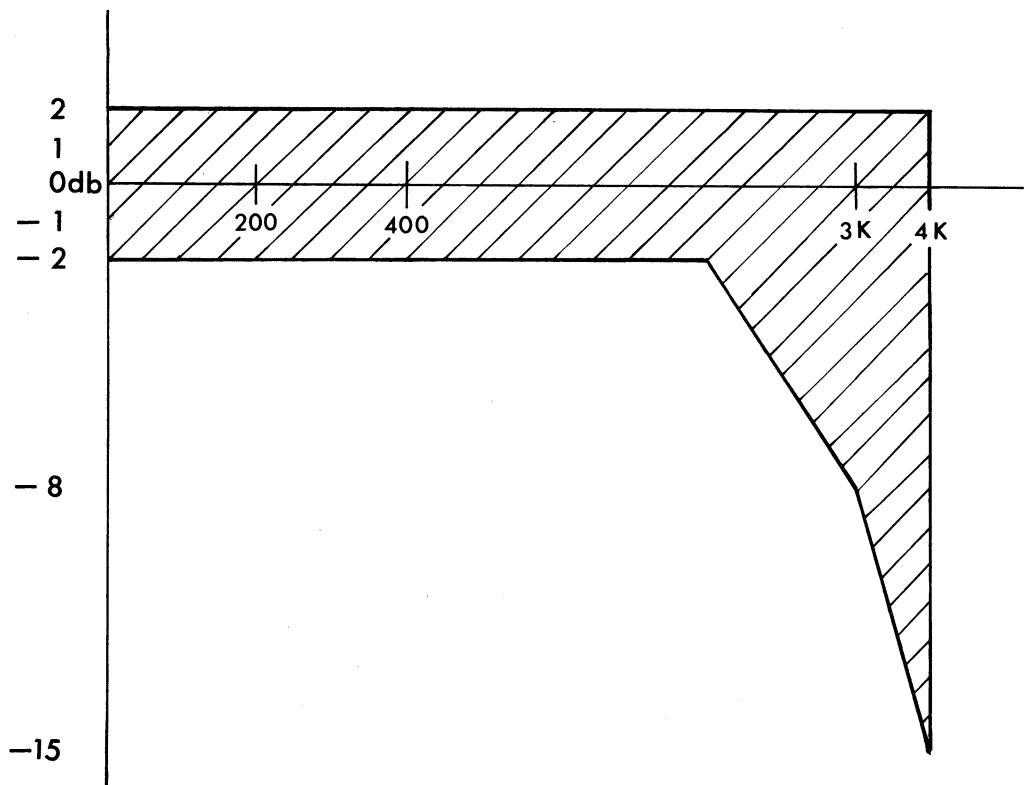


Fig 48

IV-8. The Head Base Plate Assembly

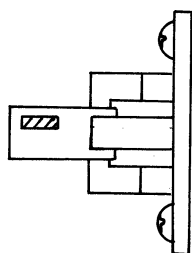


Fig 49

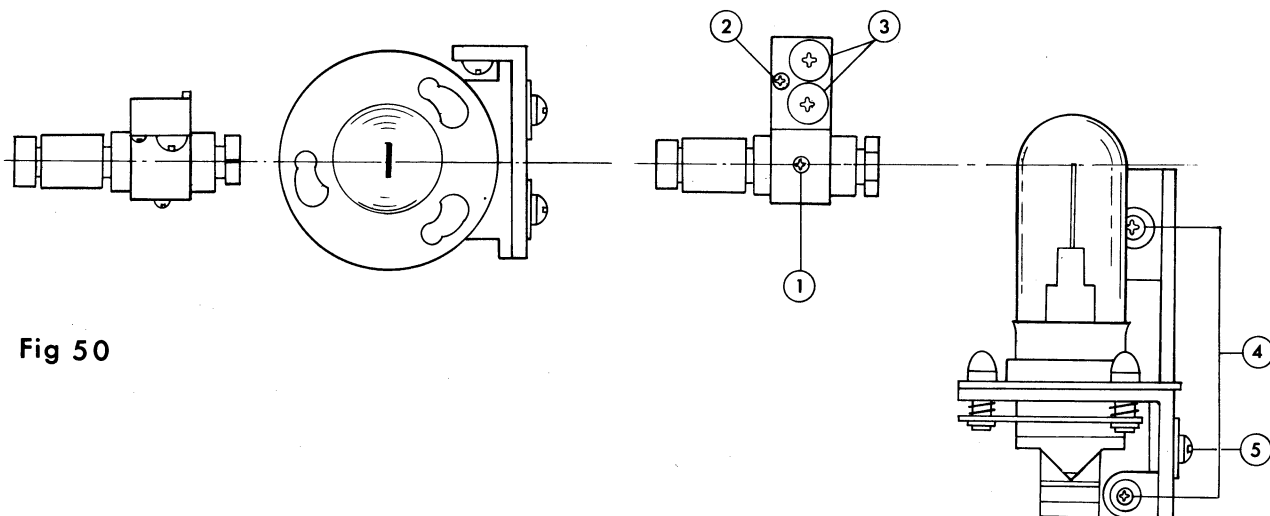


Fig 50

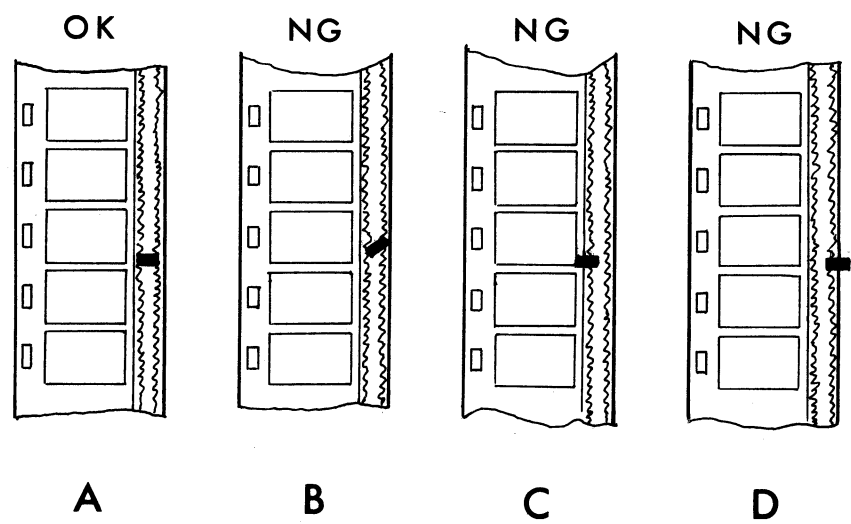


Fig 51

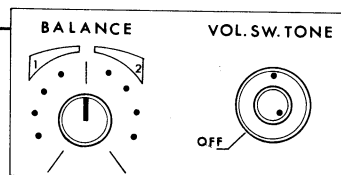
IV-8. The Head Base Plate Assembly

B. Solar Battery, Sound Lens and Exciter Lamp position Adjustmnet

Test film Super-8 frequency response film 4 KHz(P053)

Testing equipment Vacuum Tube Voltage Meter (VTVM)
Resistor box (8 ohm 20W)(P045)

Setting of knobs



1. Remove the sound drum and turn on the exciter lamp. Adjust the position of sound lens tentatively by screw (2)(3) of Fig.50 to focus the scanning beam on the solar battery as shown in Fig.49.
2. Attach the sound drum. Adjust the position of exciter lamp so that the axis of the lamp filament is aligned with the light axis of sound lens as shown in Fig.50.
3. Load the film and play back the signal, turning the volume control fully clockwise.
4. Loosen (1) and move the sound lens little by little in forward and backward, and tighten or loosen (2) (3) to obtain maximum output.

Output ... More than 8V

Note: Make sure that scanning beam through the sound lens is properly focused on the sound track as per Fig.51-A.

Fig.51-B ... Frequency response at high frequency range is badly affected.

Fig.51-C, 51-D ... Sound quality and output are badly affected, and noise may be increased.

IV-8. The Head Base Plate Assembly

Tension Mechanism

A. Disassembly Refer to Fig.52.

B. Reassembly Notes

— Faulty rotation of (5); — Wow-Flutter
 — Faulty pressure adjustment of (7)(12); — Film loop is hardly kept on optical playback.

1. Assemble the parts, referring to Fig.52.

Note : a) Make sure that (5) rotates smoothly.

b) Make sure that (2)(8) move smoothly without unevenness.

2. (8) touches the M-0 Switch Lever Assembly (Parts list page 8-66).

Bend the (8) and the lever so that the pressure of the (12) changed by the switchover of M-0 switch which should work smoothly.

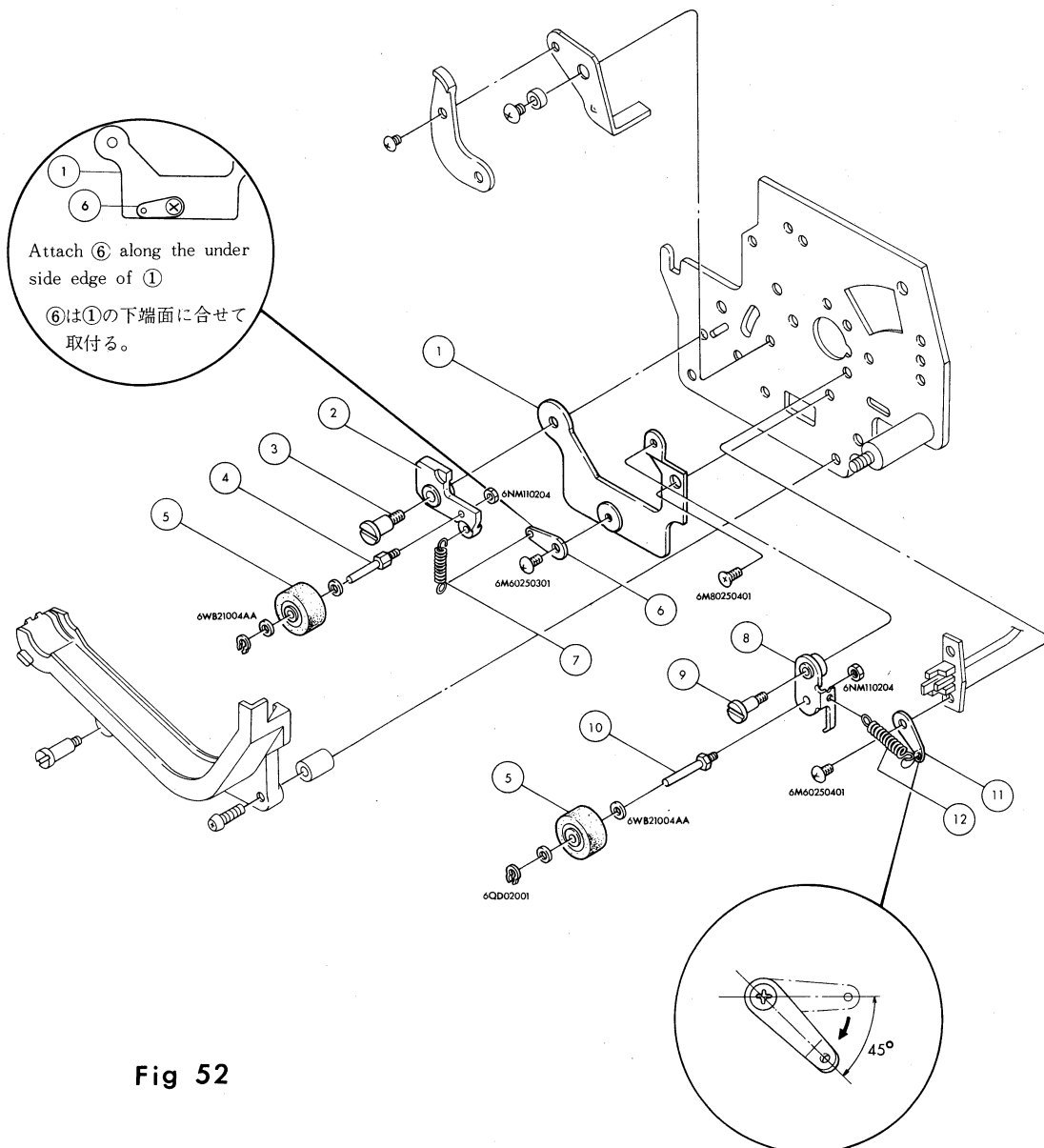


Fig 52

IV-8. The Head Base Plate Assembly

Wow-Flutter

Wow-Flutter is the frequency-modulation (of playback signal) being caused by speed fluctuation of film running on the sound head.

The slow fluctuation is called as "Wow" (under 6Hz) and fast fluctuation is called as "Flutter" (6 - 200Hz).

Measurement

Test film Prest film (nonrecorded film)(P027)

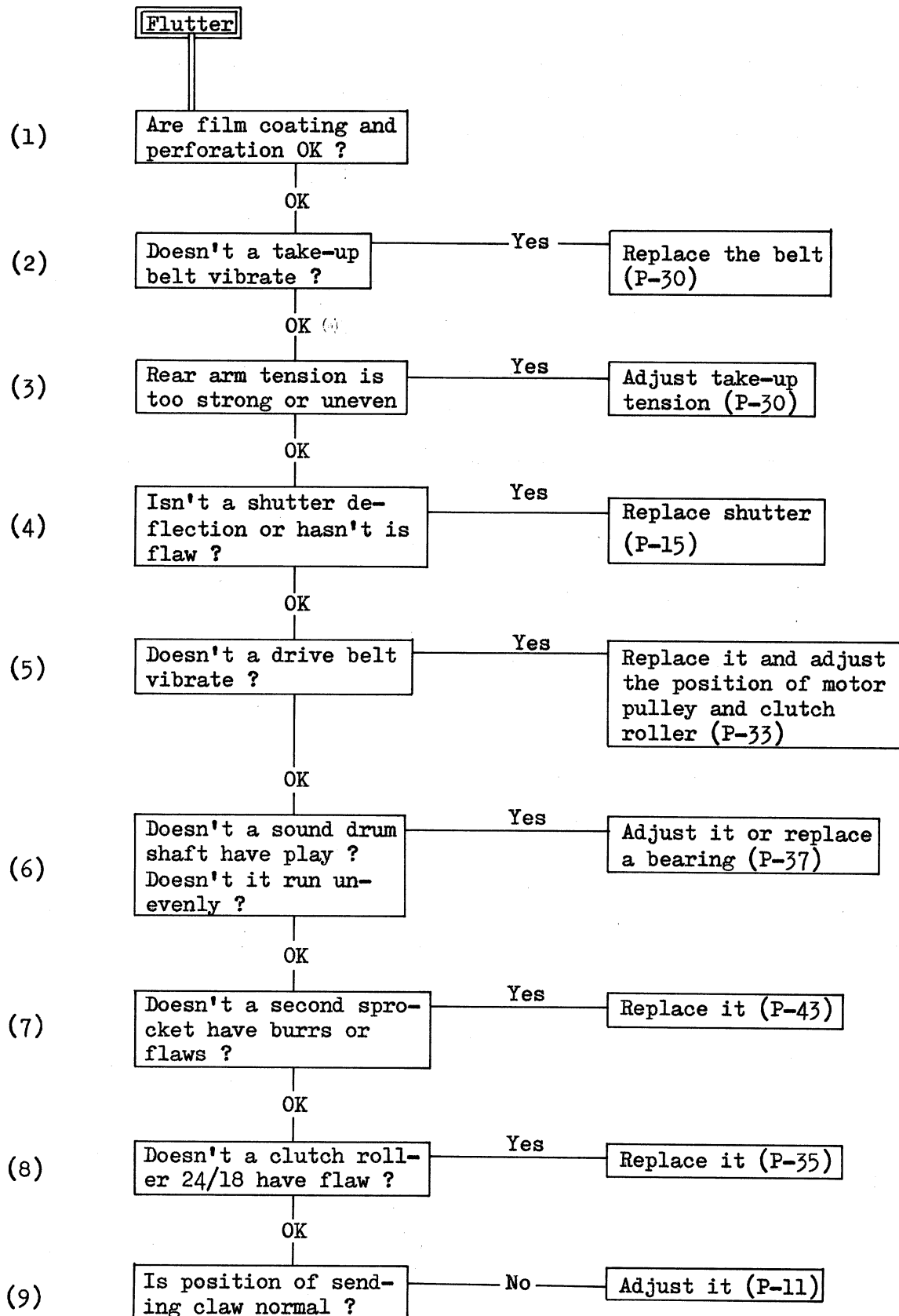
Testing equipment Wow-Flutter Meter

1. Record the 3 KHz signal at 18fps, adjusting the input level at 0 VU by the AUX control knob.
2. Play back the recorded signal and read the numerical value on weighted range of the wow-flutter meter.

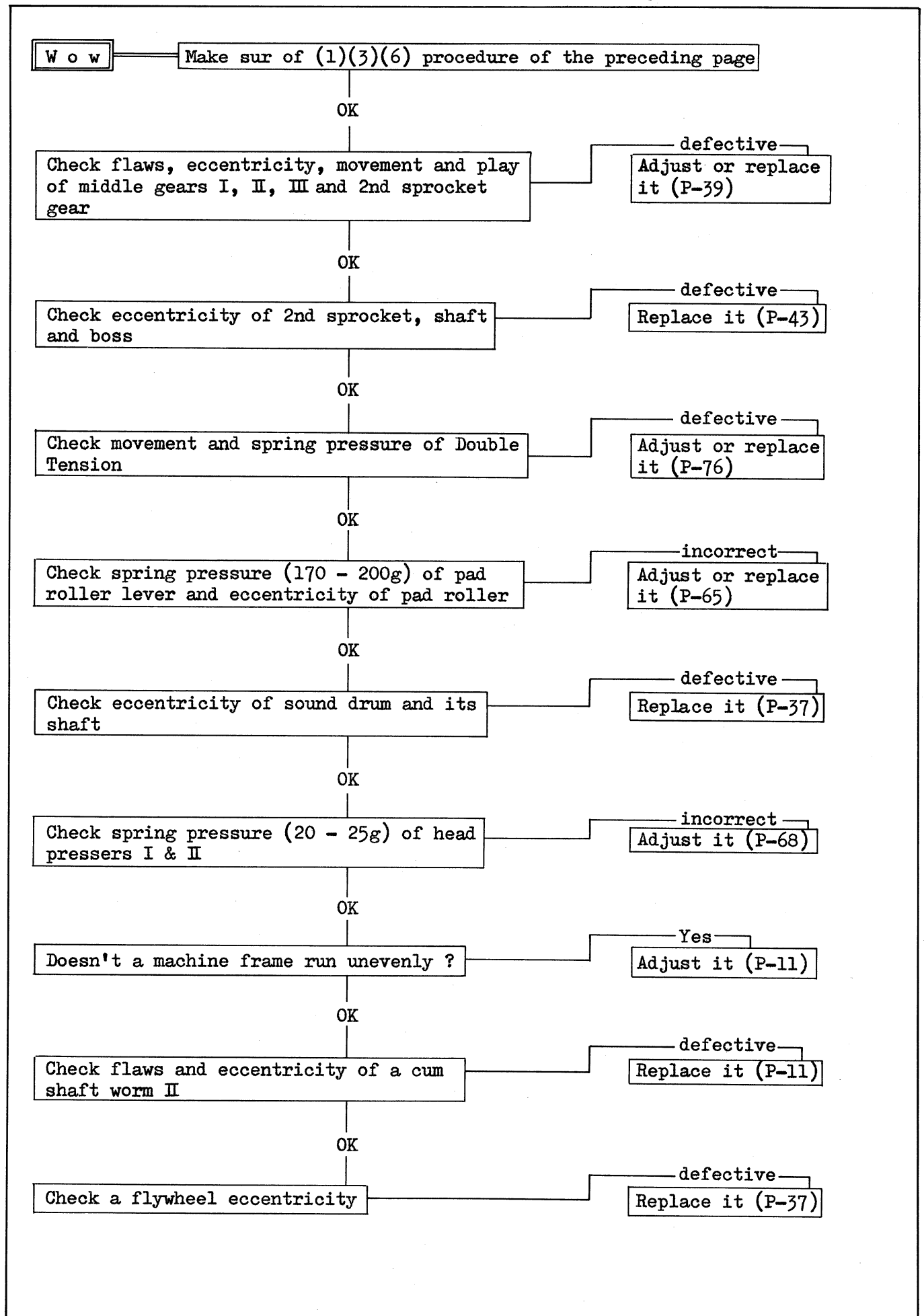
JIS Max. weighted 0.3%

CCIR Max. weighted 0.55%

IV-8. The Head Base Plate Assembly



IV-8. The Head Base Plate Assembly



IV-9. Disassembly of The Switch Mechanism

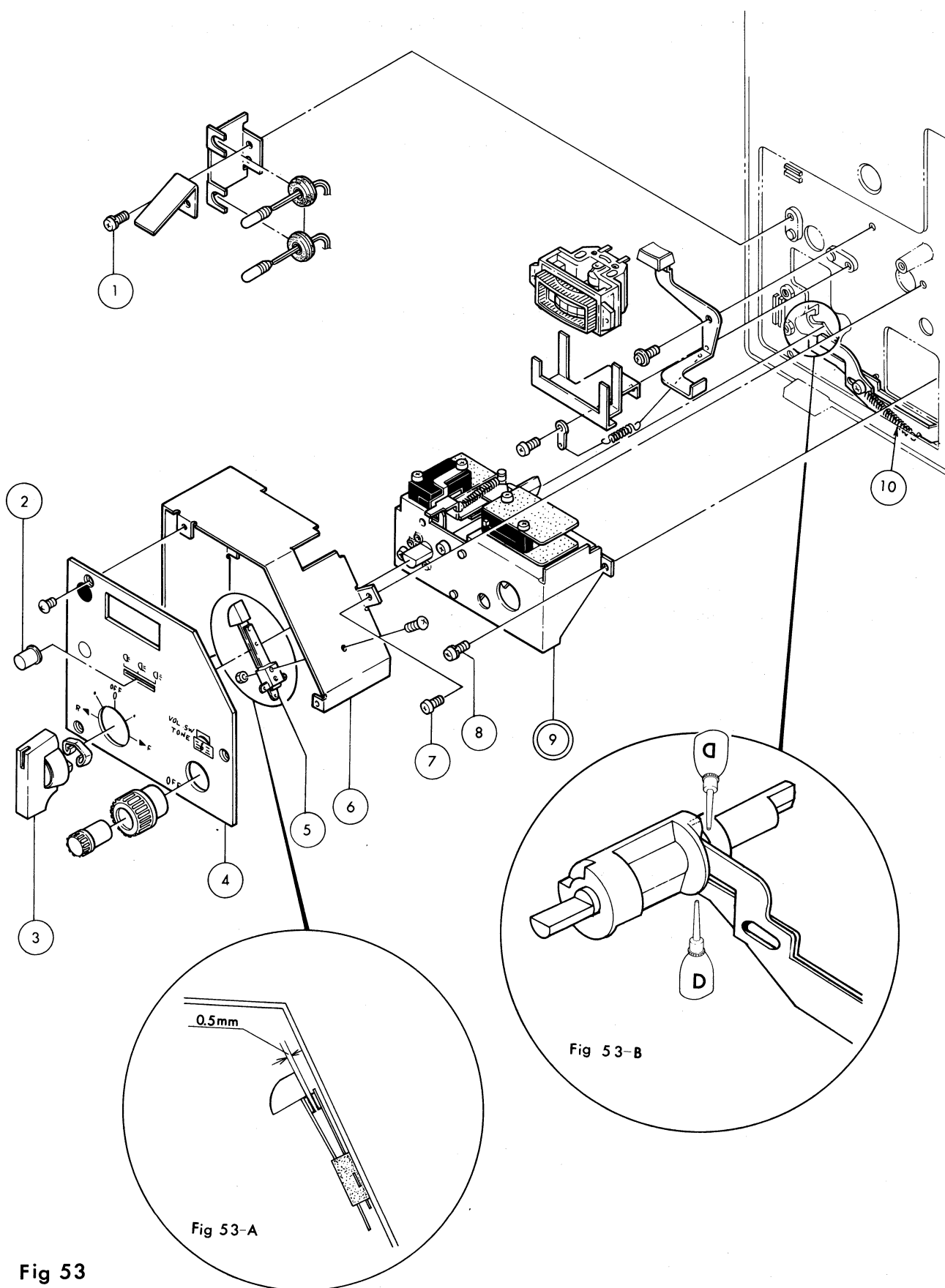


Fig 53

IV. Disassembly & Reassembly Notes

9. The Switch Mechanism

A. Disassembly Refer to Fig.53.

1. Remove the amplifier (P-45)
2. Pull out the (2) and (3). Remove the (4).
3. Unsolder the wires connected to the (5). Unscrew the (1)(7) and remove the (6).
4. Remove the (8)x3 and pull out the ((9)).

B. Reassembly Notes

- Contact space of (5) is too wide; Auto-thread is not released.
 - Contact space of (5) is too narrow; Auto-thread is not set.
 - Insufficient spring pressure of (11);
Picture unsteady (upward-downward) in reverse projection in that
pad roller keeps touch with sound drum in spite of the fact that
the motor knob turned to OFF and R.
- Insufficient adjustment of Fig.53-B; Heavy movement of the (3)

1. Paying attention to the Fig.53-B, push the ((9)) in the projector and tighten it by (3)x3.
2. Attach othe parts in the reverse way of Disassembly procedure.
Note : Adjust the contact space of (5) as shown in Fig.53-A.

IV-9. Disassembly of The Switch Mechanism

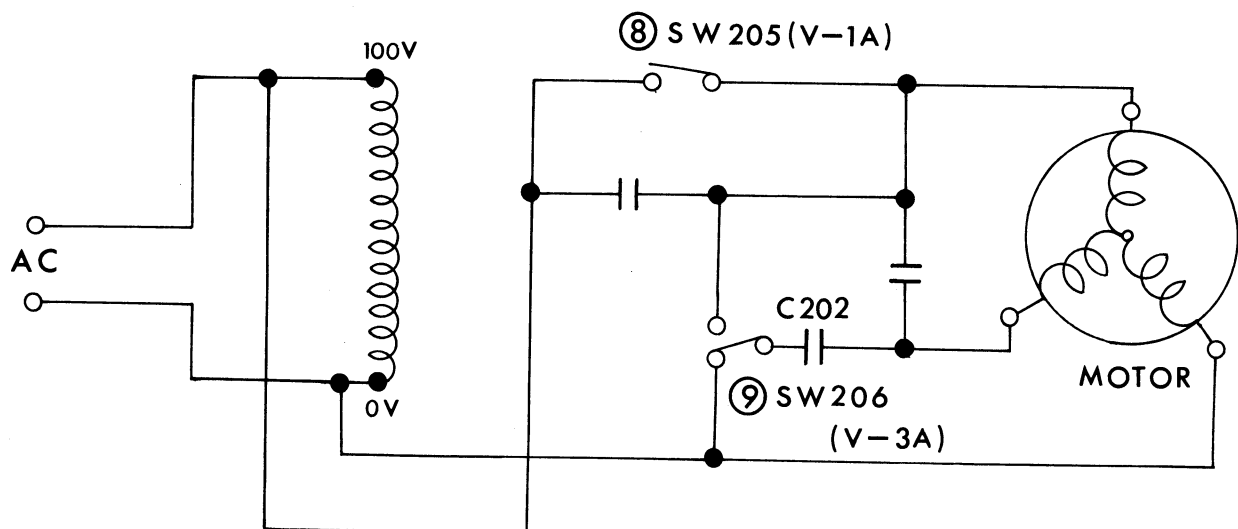
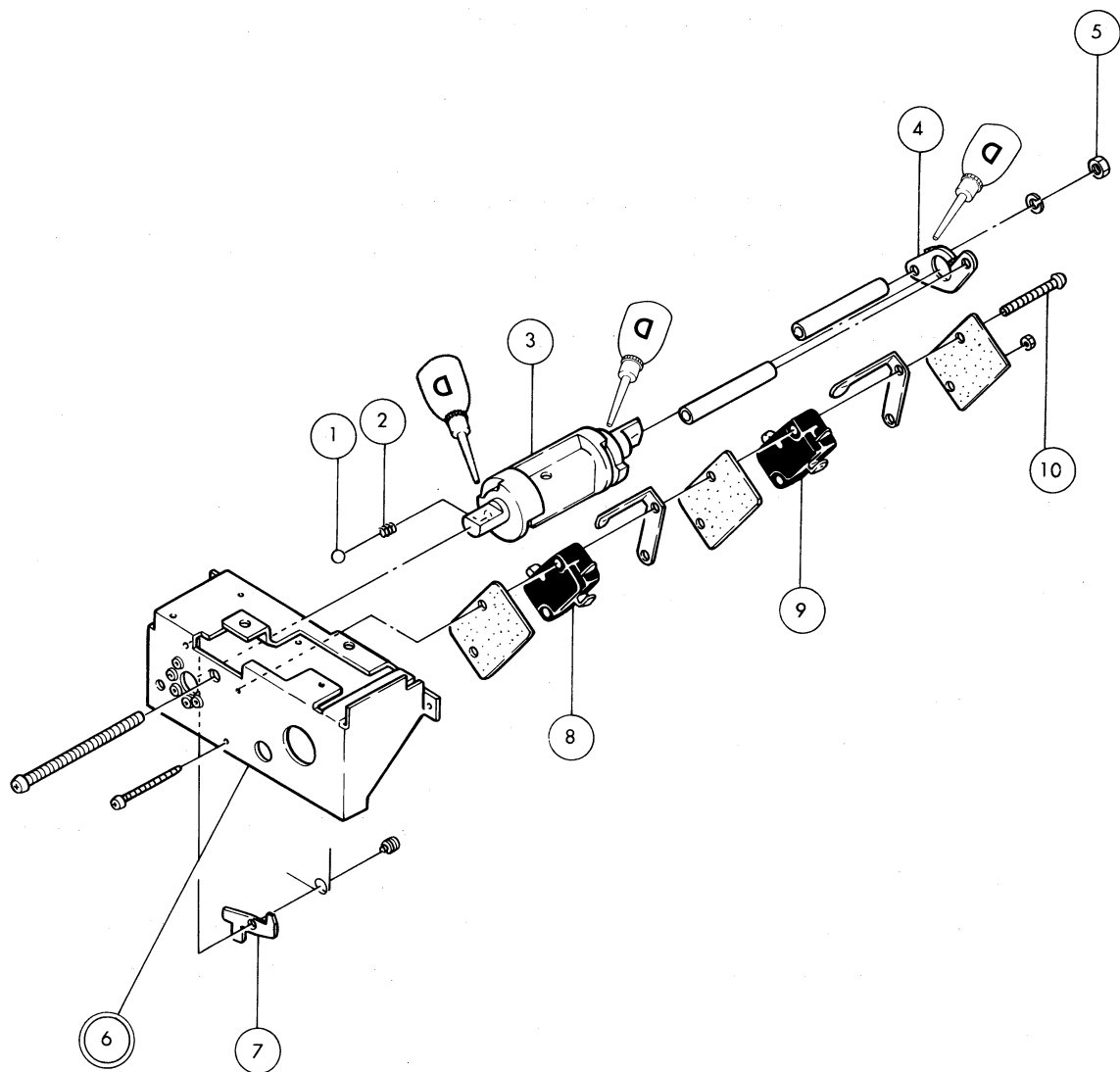


Fig 54

IV. Disassembly & Reassembly Notes

9. The Switch Mechanism (cont'd)

A. Disassembly Refer to Fig.54.

1. Pull out the ((6)).
2. For disassembly of the rest, refer to the Fig.54.

B. Reassembly Notes

- Wrong function of (8); Motor does not rotate or stop.
- Wrong function of (9); Unable to switch forward/reverse running
- Wrong function of (7); Lamp does not light.
- Insufficient pressure of (2); Click of motor knob does not work.
- Defective (3); Still projection is not possible.

1. Attach the parts, referring to Fig.53, 54.

Note : a) Make sure of function of (8) and (9).

b) Apply a touch of "Aluminum Grease" to the contact surfaces of (3) and (2)(4)(7).

c) Make sure when (3) is turned clockwise, (8) is pushed down and when (3) is turned counterclockwise, both of (8) & (9) are pushed down.

If not, adjust the positions of (8)(9) by (10)x2.

IV-9. Disassembly of The Switch Mechanism

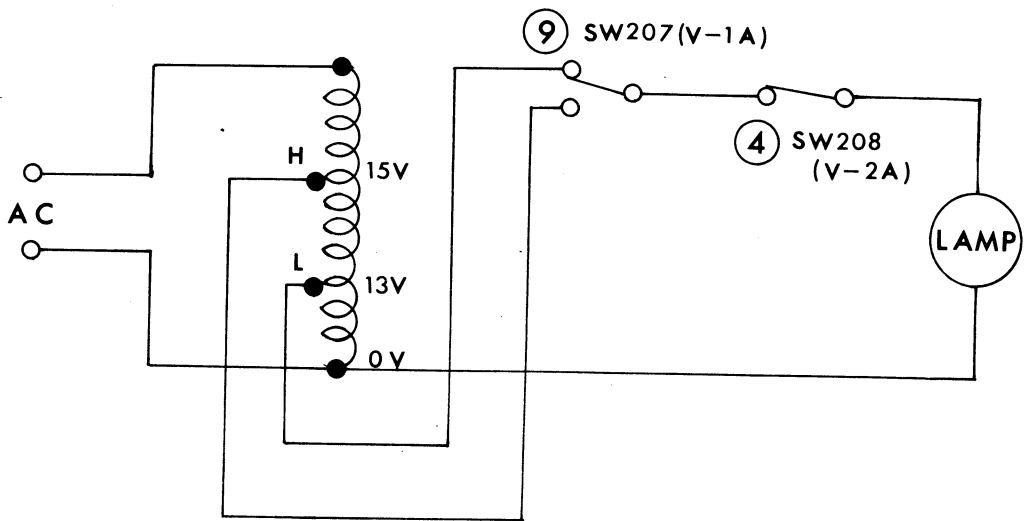
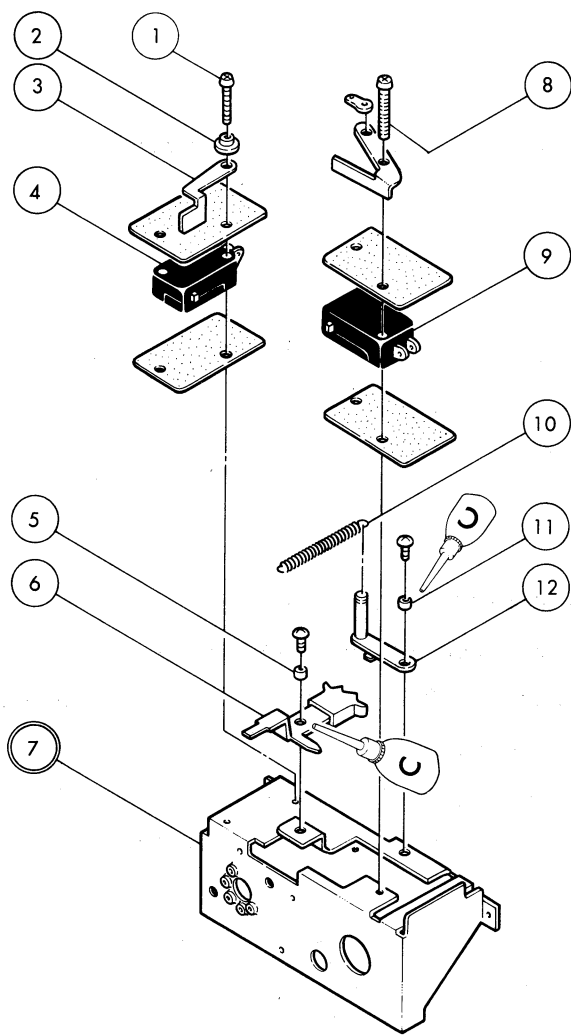


Fig 55

IV. Disassembly & Reassembly Notes

9. The Switch Mechanism (cont'd)

A. Disassembly Refer to Fig.55.

1. Pull out the ((7)). Refer to the disassembly steps on page 81.
2. For disassembly of the rest, refer to Fig.55.

B. Reassembly Notes

- Wrong function of (3)(4)(9); Proj. lamp does not light or not turn off.
- Wrong function of (9); Unable to switch H-L lighting
- Wrong function of (6); Click of lamp knob does not work.

1. Referring to Fig.55, reassemble the parts in the reverse way of Disassembly procedure.

Note : a) Check the function of (4)(9) with a tester.

- b) Apply a touch of "Alvania Grease" to the contact surface of (5) and (6) in order that (6) moves smoothly.
- c) Make sure that (3) works well.
- d) Make sure that when (6) is turned to right side (H-position), the microswitch (9) is pushed and when (6) is turned to the center (OFF-position) or left side (L-position), (9) returns. If not, adjust the position of (9) by (8)x2.
- e) When the (6) is on OFF position, the microswitch (4) should be pushed and when the (6) is on L & H position, (4) should returns.

IV - 9. Disassembly of The Power Transformer

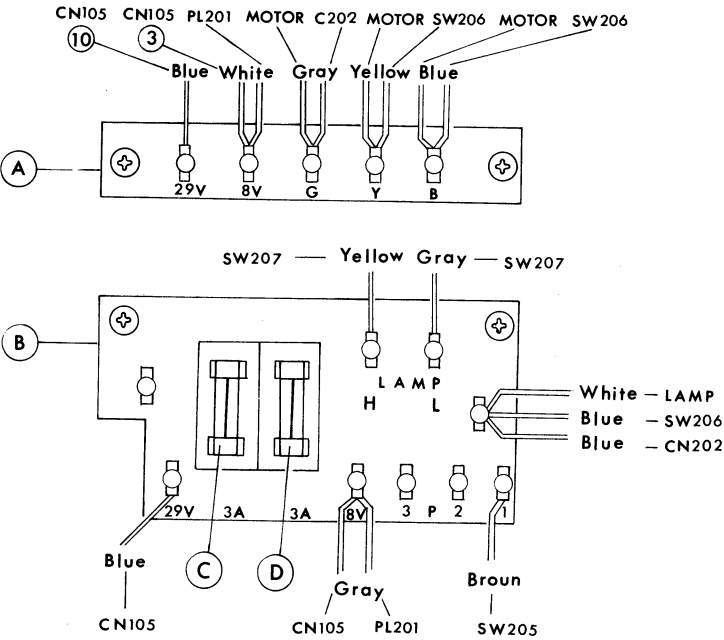
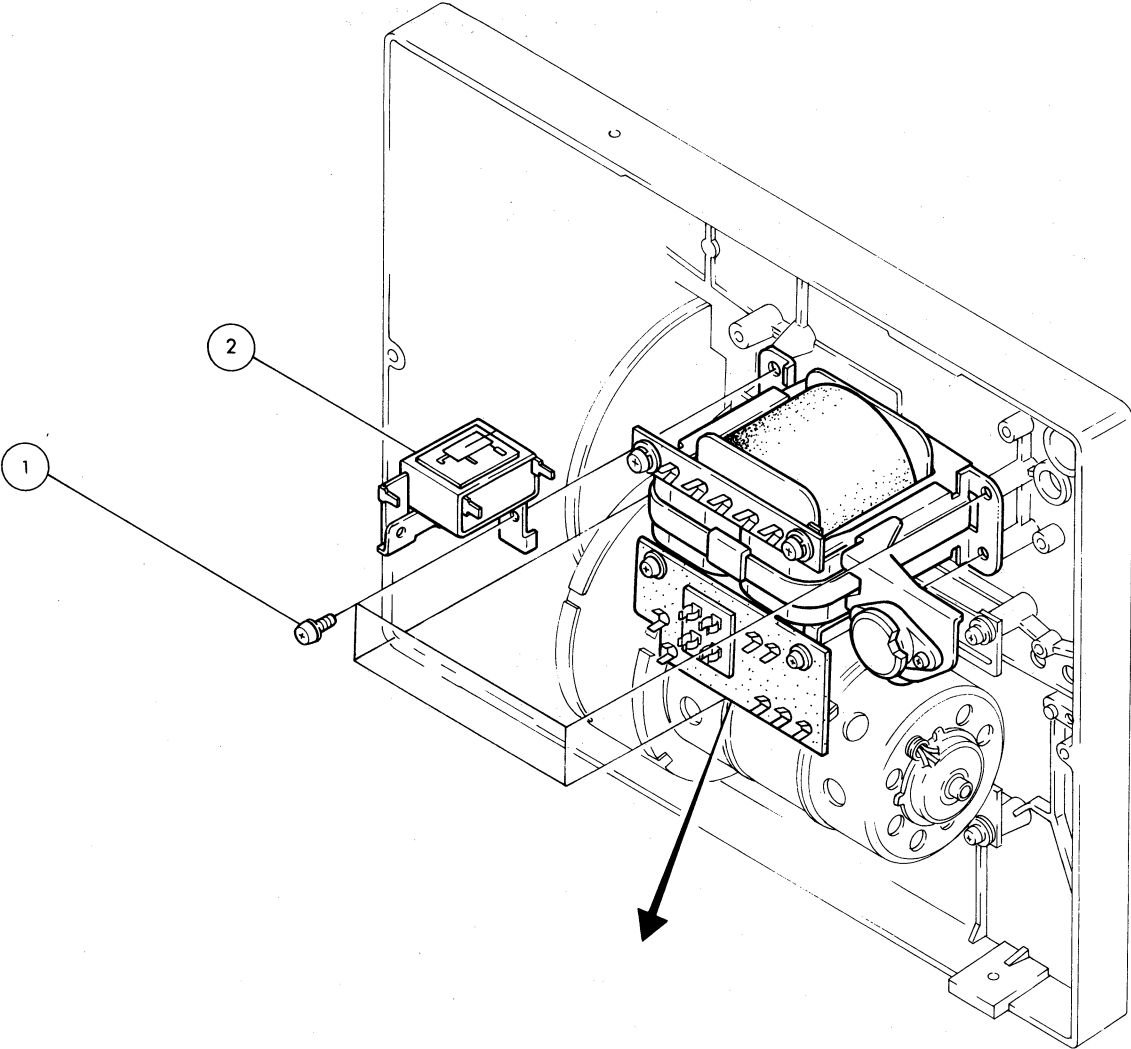


Fig 56

IV. Disassembly & Reassembly Notes

10. The Power Transformer

A. Disassembly Refer to Fig.56.

1. Unsolder the wires being connected to (A) & (B).
2. Remove (1)x4 and the transformer.

B. Reassembly Notes

- Breaking of (C); Amplifier does not work.
- Breaking of (D); Exciter lamp does not light.
 - Auto-thread is not released.
 - Pilot lamps P201 & P202 do not light.
 - Monitor circuit does not work.
 - Light Emission Diodes LED201 & LED202 do not light.
- Defective (2); Motor does not run rapidly in 50Hz area.

1. Attach the transformer in the reverse way of Disassembly procedure.

Note : Solder the wires, referring to the connecting diagrams on pages 92 and 93.

IV-11. Disassembly of The Motor Section

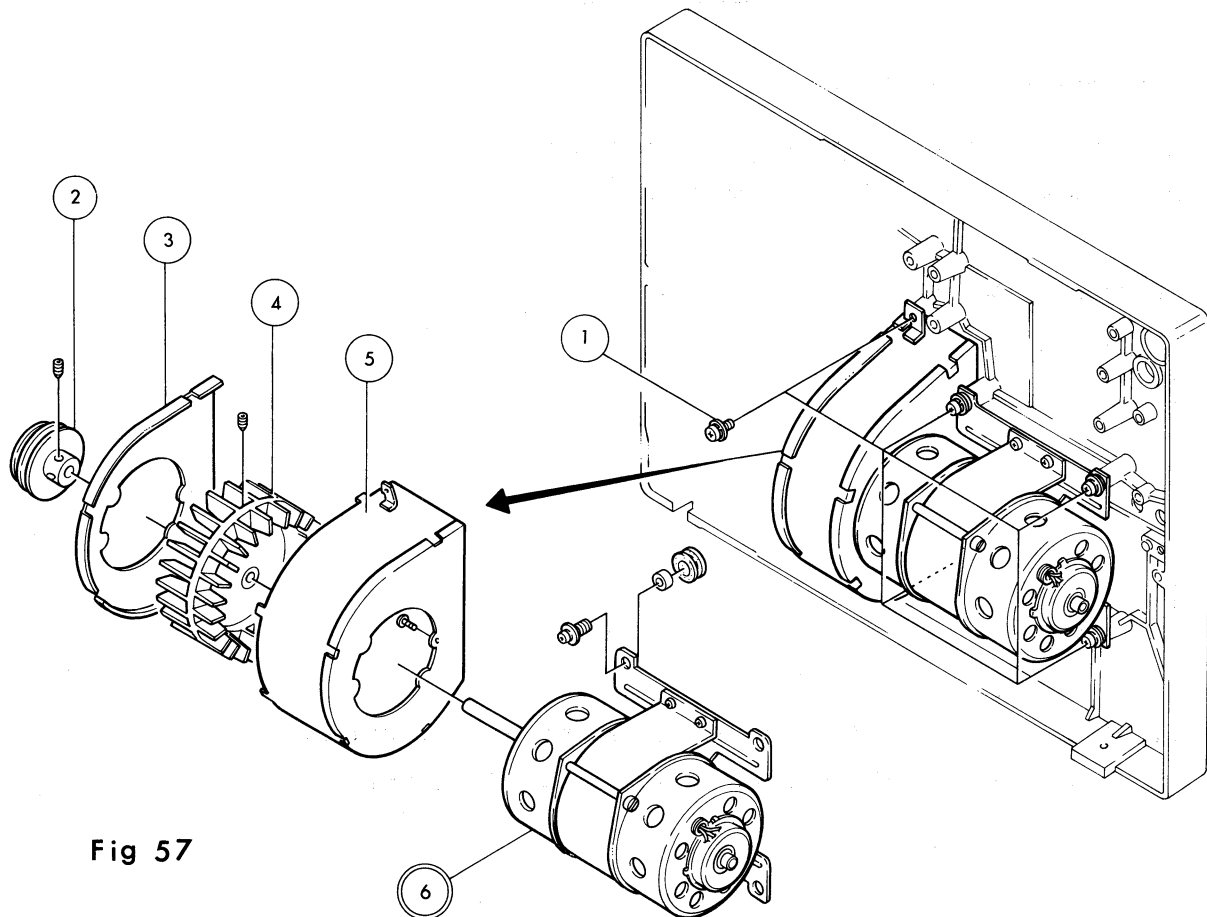


Fig 57

A. Disassembly

1. Remove the amplifier (P-45).
2. Remove the power transformer (P-87).
3. Unscrew (1)x5 in Fig.57 and remove ((6)).
4. For disassembly of the rest, refer to Fig.57.

B. Reassembly Notes

- Defective (4); Motor roars.
- Wrong position of (4) — beating noise of (3)(5); Noise
- Wrong position of (2) — Drive belt III comes off.
— Drive belt III vibrates; Flutter

1. Attach the parts in the reverse way of Disassembly procedure.
Note : a) Make sure that (4) does not touch with (3) & (5).
b) After attaching ((6)) and hanging the drive belt III, adjust the position of (2) to see that the center of (2) aligns to that of the clutch rollers 18, 24 fps.

IV-11. The Motor Section

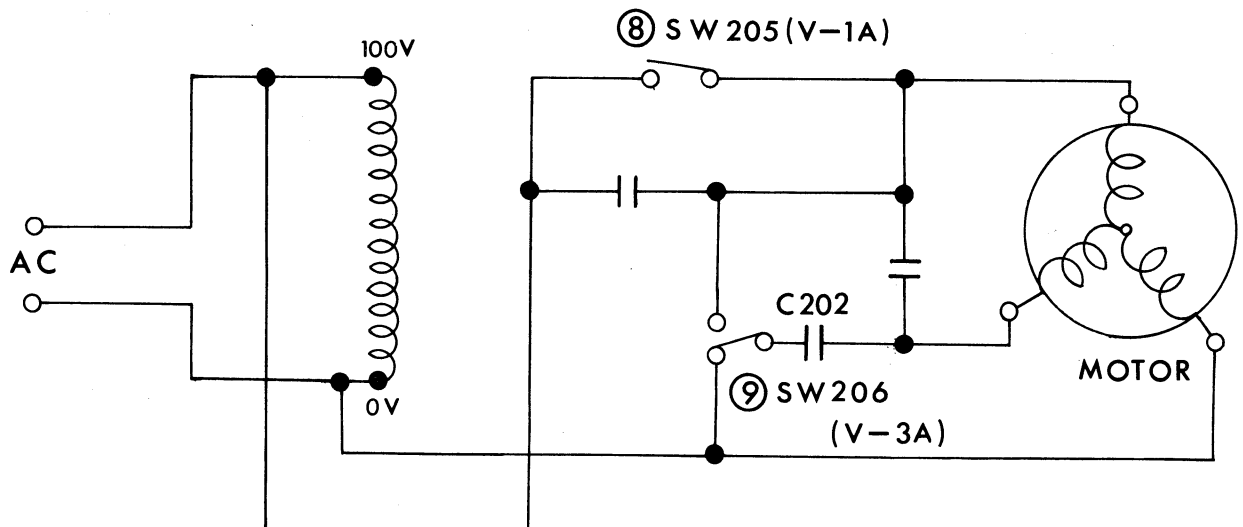
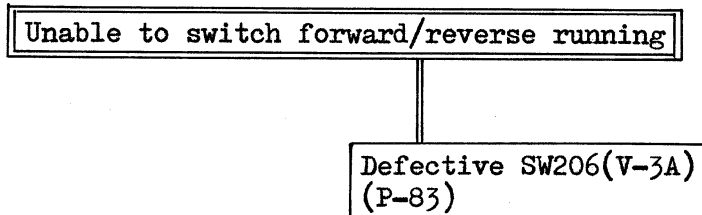
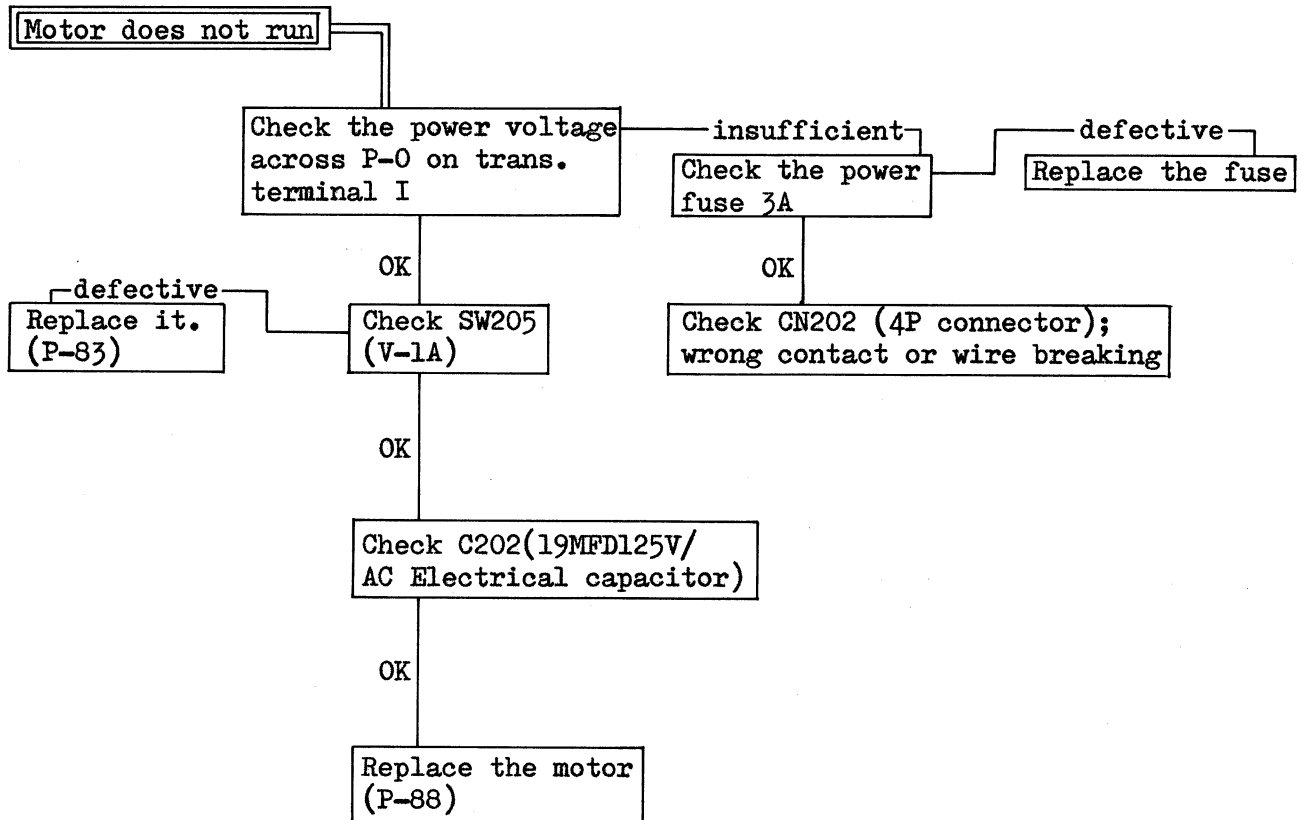


Fig 54

IV-12. Disassembly of Light Section

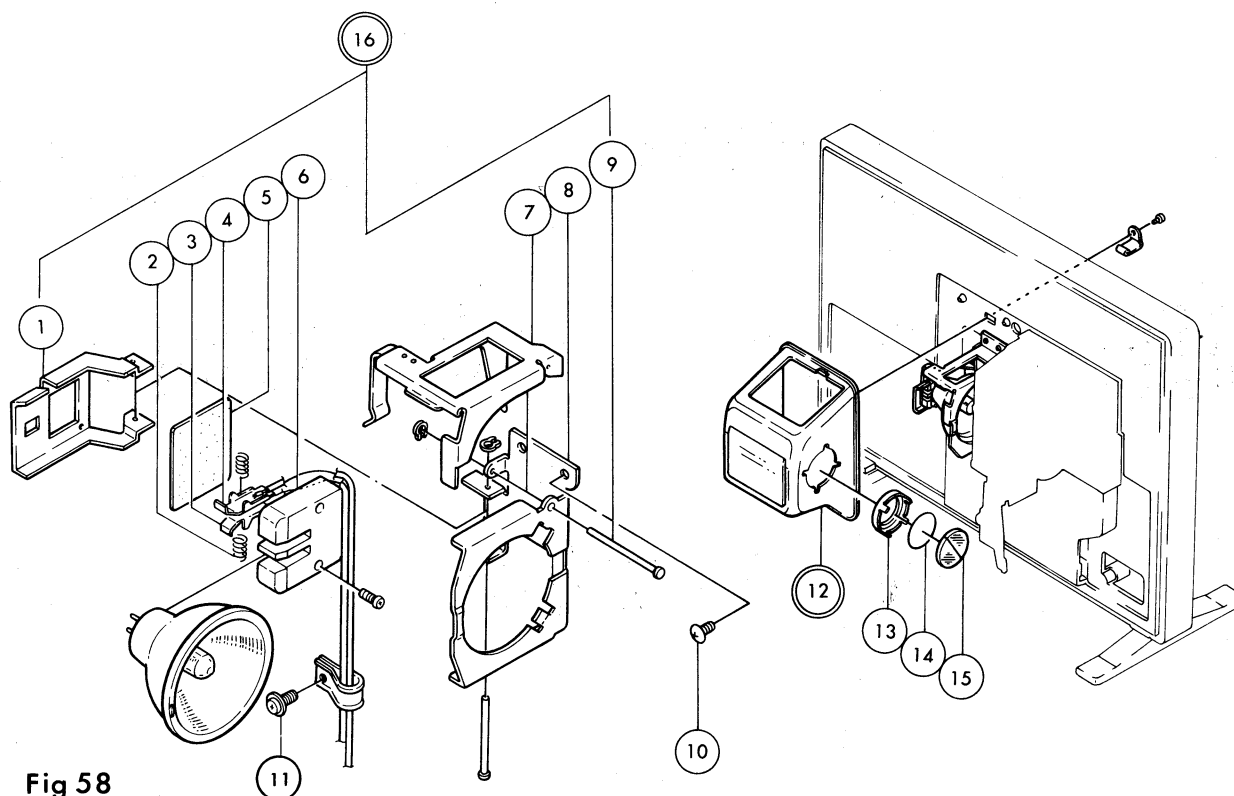


Fig 58

Lamp cover assembly ((12))

- ☐ Broken (15); Film is damaged by heat. Picture is dark.
- ☐ Loose (13); Vibration noise

Disassemble and reassemble the parts, referring to Fig.58.

Lamp socket assembly ((16))

- ☐ Defective (2)(3)(4); Lamp lighting is unsteady.
- ☐ Defective (7)(8); Lamp replacement work is difficult.
- ☐ Wrong position of ((16)); Uneven illuminance

1. Disassemble and reassemble the parts, referring to Fig.58.
2. Adjust the position of ((16)) by (10)x2 to obtain the brightest picture without unevenness.

Measure illuminance — condition; Picture width is 50cm/Rated voltage is applied.

F/1.1 — More than 1100Lx at the center and more than 55% at 4 corners.
 F/1.3 — More than 800Lx at the center and more than 55% at 4 corners.

IV-12. Light Section

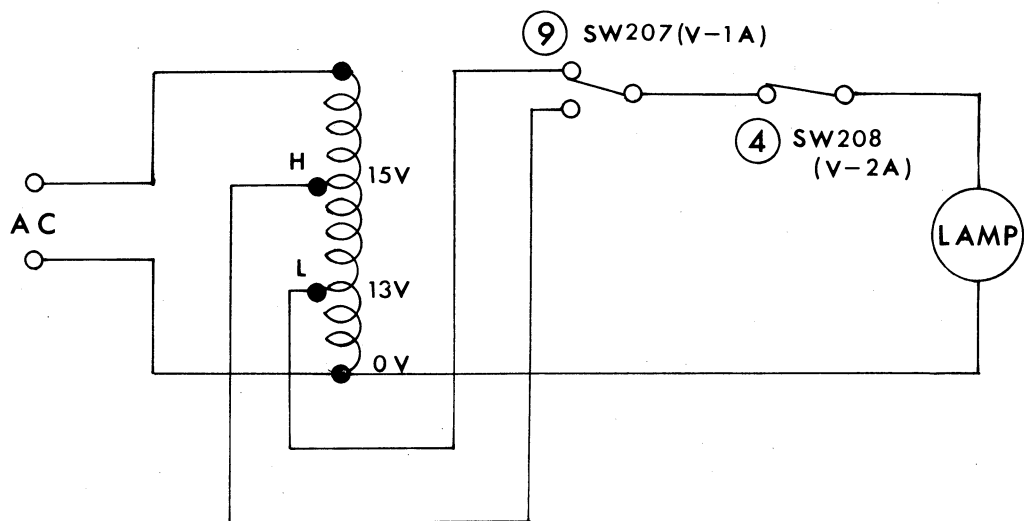
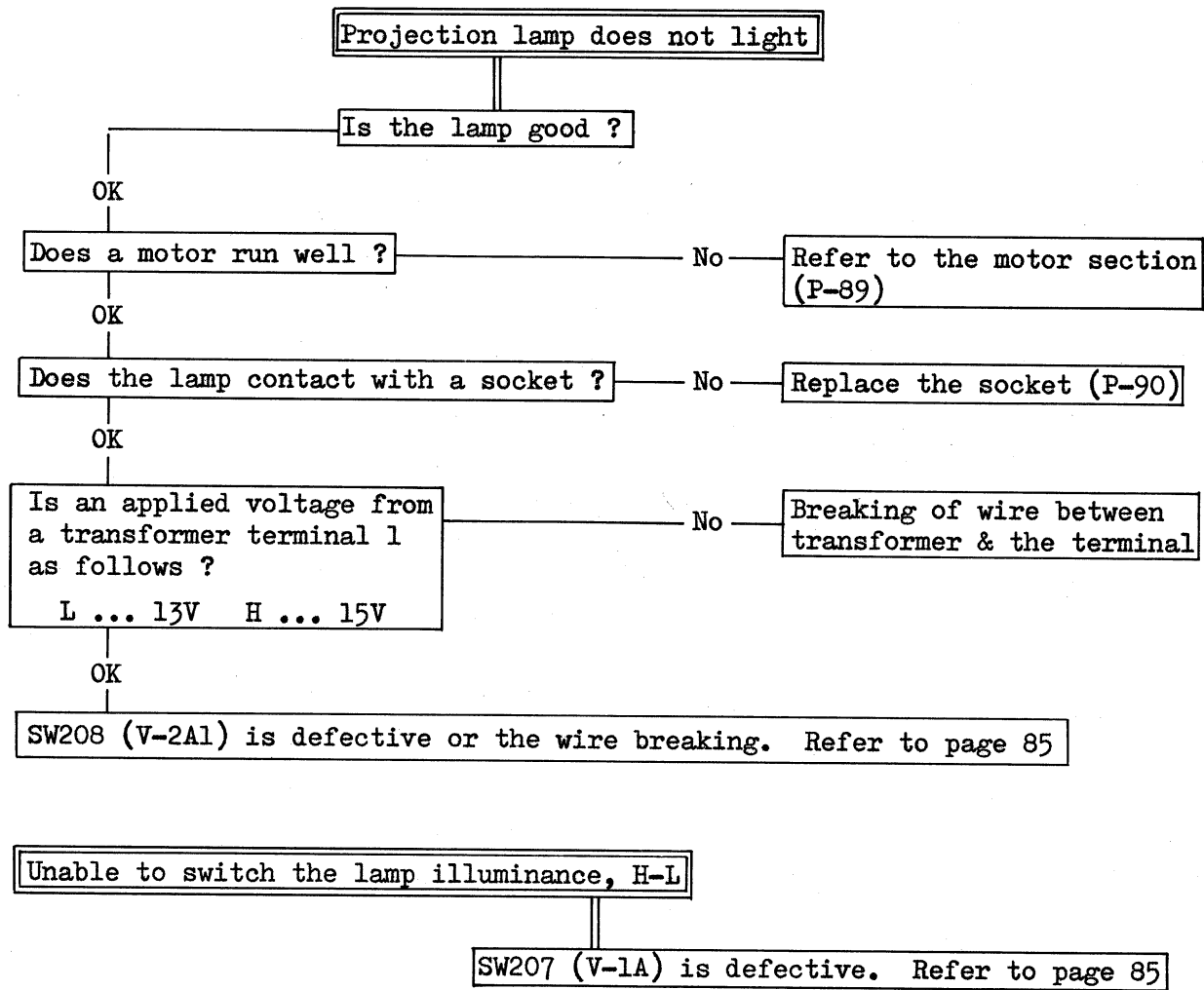
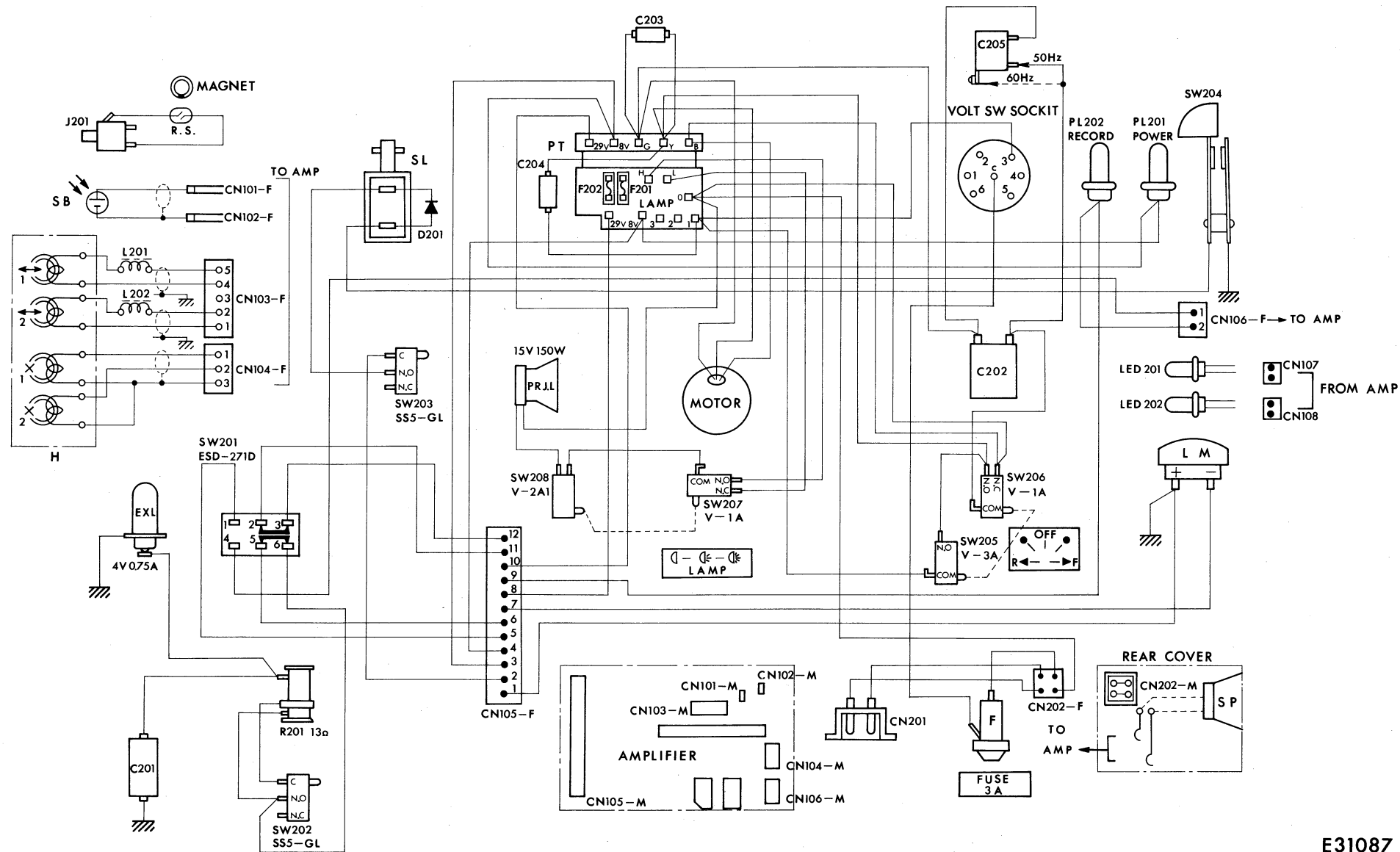
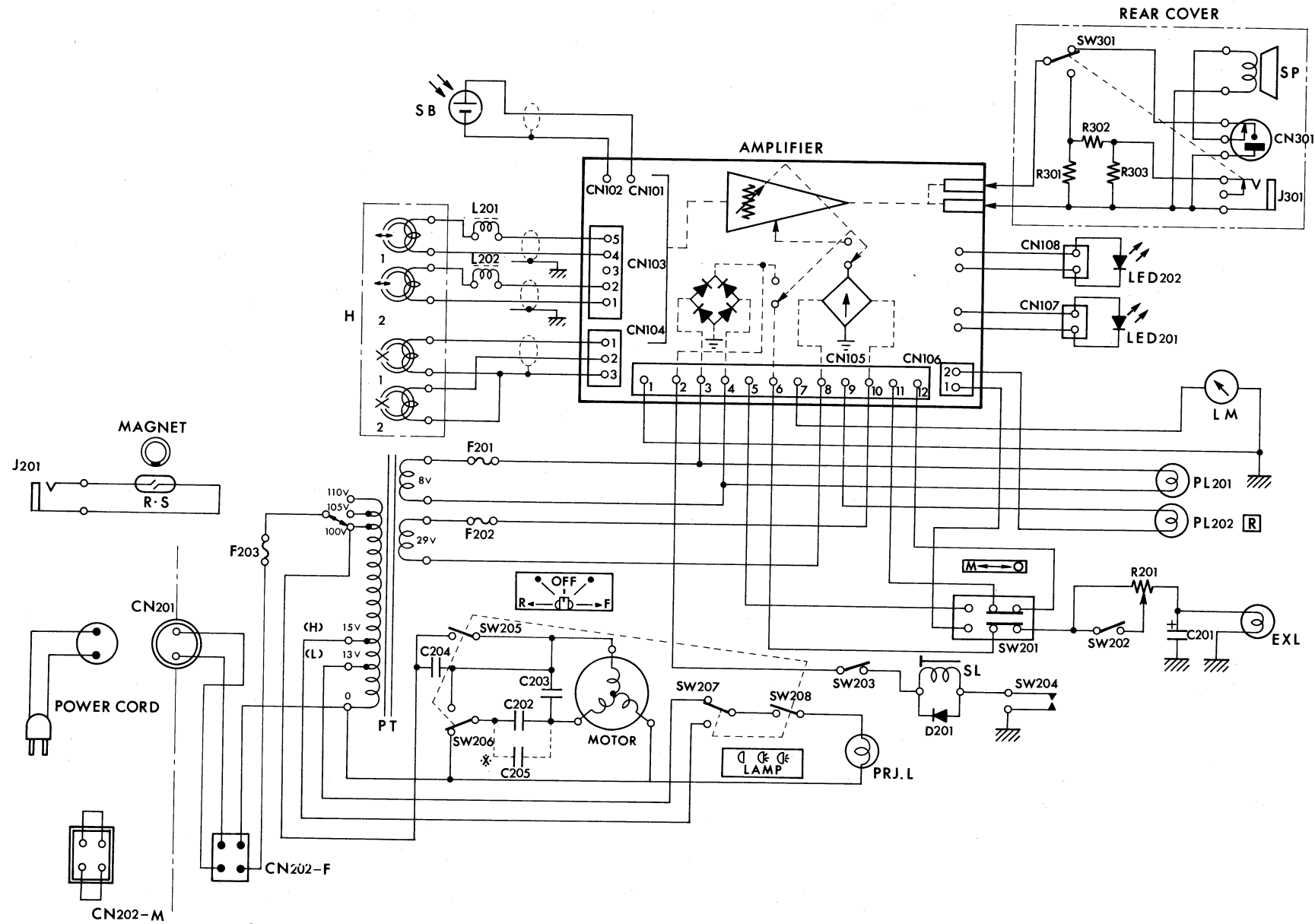


Fig 55



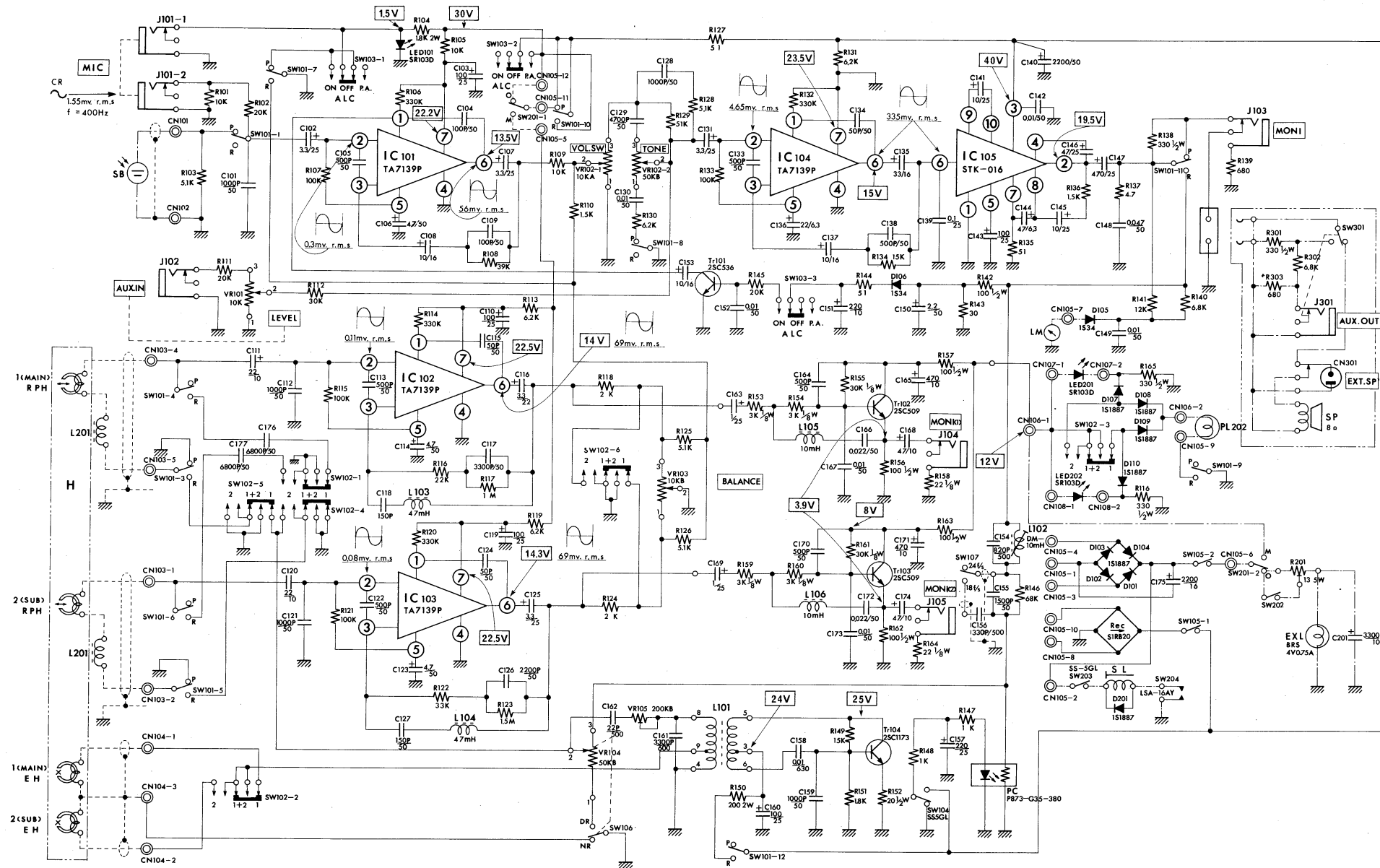
E31087

Connecting diagram for machine for ST-1200HD



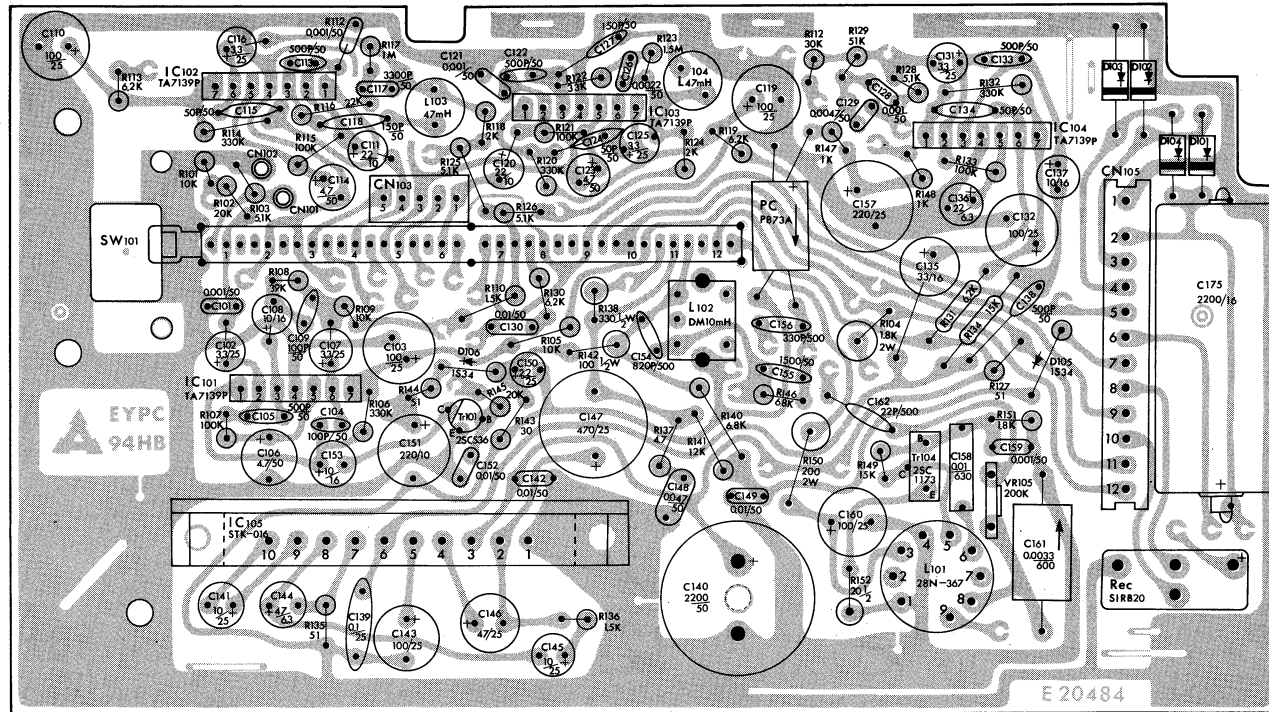
Schematic diagram for machine for ST-1200HD

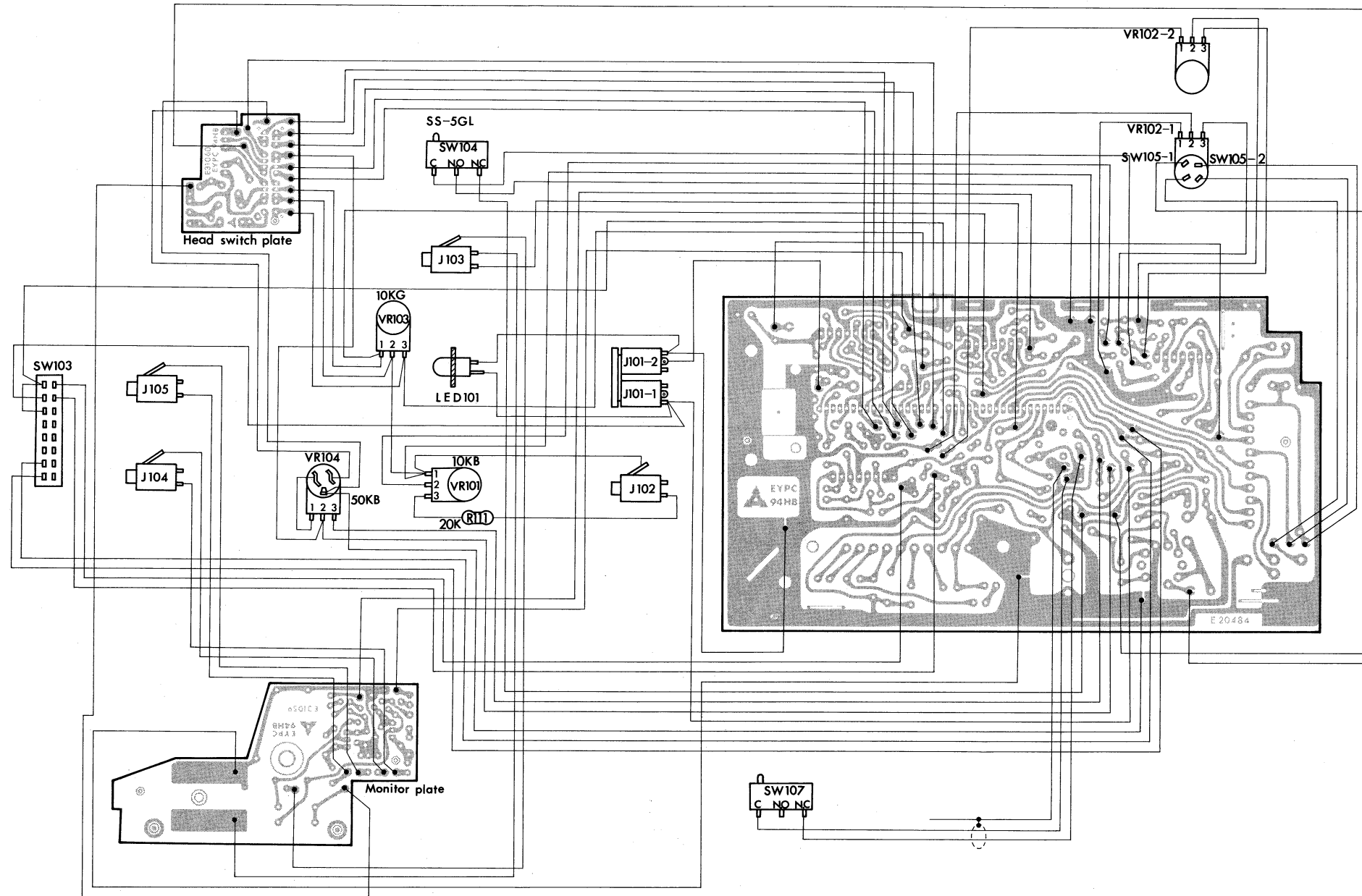
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E20485

Schematic diagram for amplifier for ST-1200HD



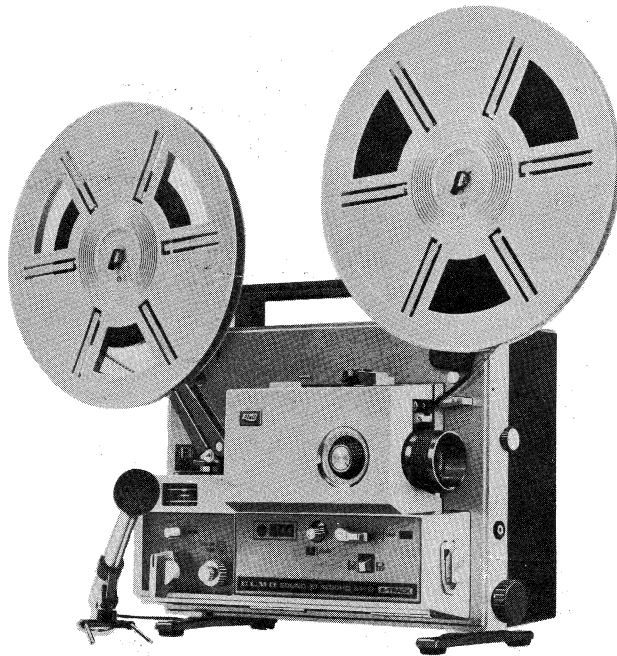


Connecting diagram for amplifier for ST-1200HD

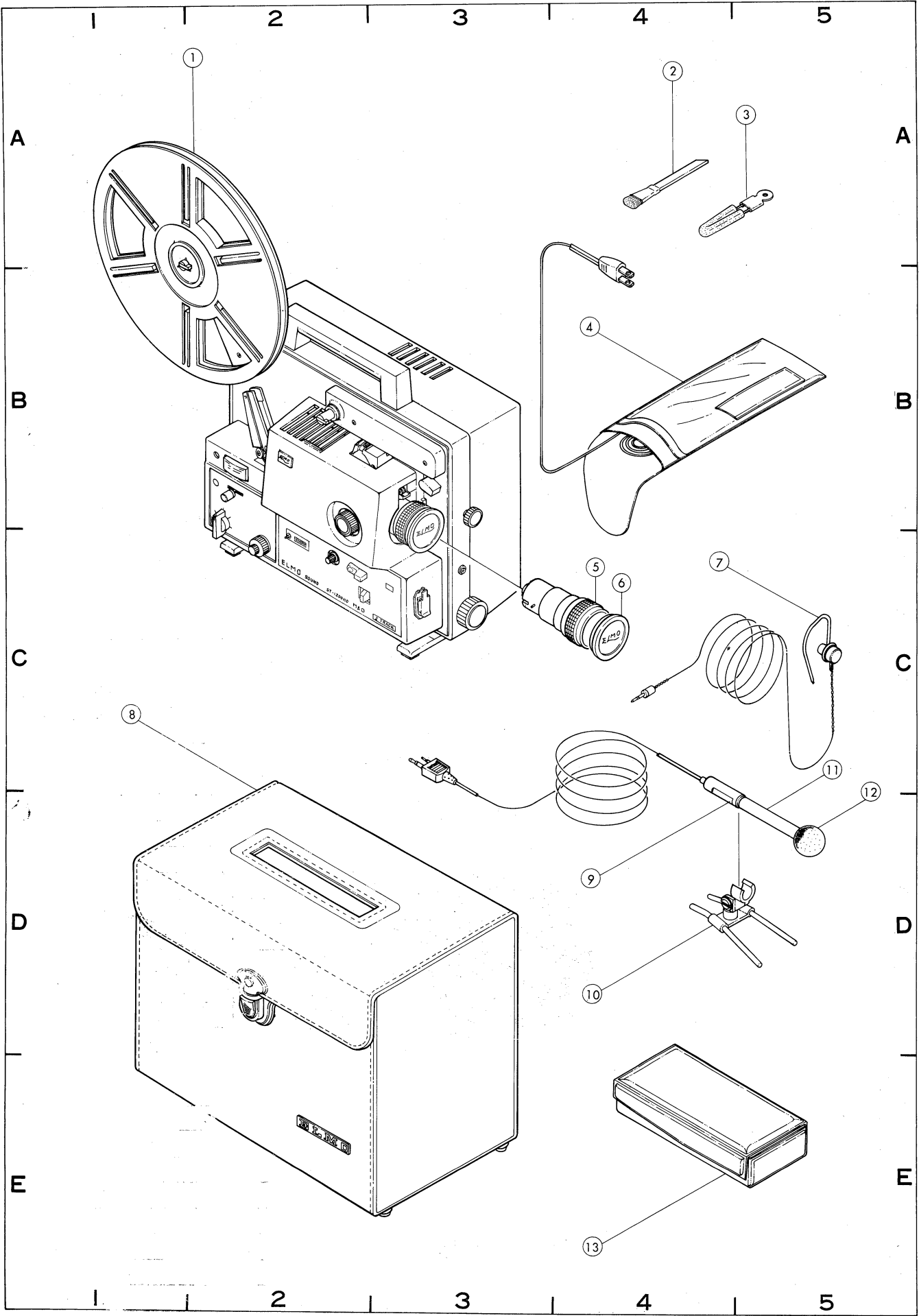
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PARTS LIST

ST-1200HD



ELMO CO., LTD.



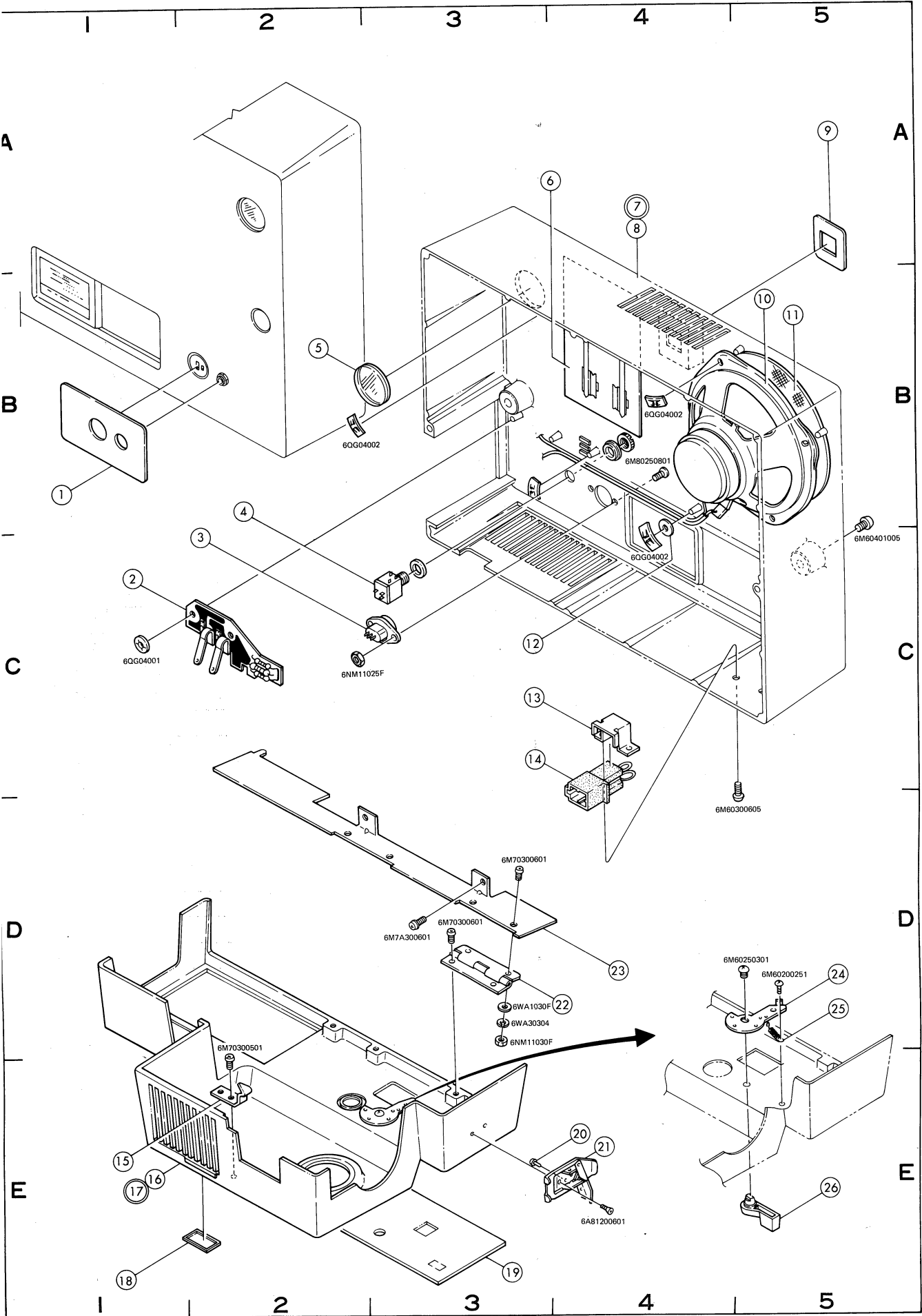


Illustration No.	Parts No.	Parts Name		Common Use Model	Illustration Position
1	4P53674	バネ調節カラー	Spring adjusting collar	ST-1200D ST-800	A-1 D-4
2	4P48867	バネ逆転スリップ	Reverse slip spring	ST-1200D ST-800	A-1
3	4P54074	巻取巻戻シバネ座金	Pulley washer	ST-1200D ST-800	A-1 D-4
4	P412139	中間ギヤ(2)逆転	Middle gear(2) reverse	ST-1200D ST-800	A-1
5	P412110	摩擦板	Friction plate	ST-1200D ST-800	A-1
6	P412109	中間ギヤ(1)逆転	Middle gear(1) reverse	ST-1200D ST-800	A-1
7	P412111	摩擦車プーリ	Friction wheel pulley	ST-1200D ST-800	A-1
8	4P8STD045	巻返シギヤ(1)組立品	Rewind gear(1) assy	ST-1200D	A-1
9	4P48782C	取付板組立巻返シギヤ	Rewind gear holder	ST-1200D	A-2
10	4P48733B	カラー摩擦板バネ押エ	Spring adjusting collar	ST-1200D	B-1
11	P411259	バネ逆転ギヤ	Reverse gear spring	ST-1200D	B-2
12	4P48766	中間ギヤ逆転(1)	Reverse middle gear 1	ST-1200D	B-2
13	4P48726	摩擦板	Friction plate 1	ST-1200D	B-2
14	P411264	中間ギヤ逆転(4)	Reverse middle gear 4	ST-1200D	B-2
15	4P48737	ボス逆転ギヤ	Reverse gear boss	ST-1200D	B-2
16	4P8STD046	巻返シギヤ(2)組立品	Rewind gear(2) assy	ST-1200D	B-2
17	P410505	ボスアーム(2)	Arm boss 2	ST-1200D	B-2
18	4P8STD037	基板前部アーム組立品	Front arm base plate	ST-1200D	A-2
19	4P8STD026	前部アーム組立品	Front arm assy	ST-1200D	A-2
20	4P48635	ギヤリール軸	Reel shaft gear	ST-1200D ST-800	A-3 A-5
21	4P49672	リール軸組立アーム	Reel shaft assy	ST-1200D	A-3 A-5
22	4P48637	ネジピンリール軸	Reel shaft pin	ST-1200D ST-800	A-3 A-5
23	4P31335002	前部アーム	Front arm	ST-1200D	A-4
24	4P48837	間座アームギヤ	Arm gear washer	ST-1200D ST-800	A-4 B-5
25	4P48838	軸アームギヤ	Arm gear shaft	ST-1200D ST-800	A-4 B-5
26	4P48646	ギヤアーム	Arm gear	ST-1200D ST-800	B-4 B-5
27	4P48817B	ギヤ前部アーム軸組立品	Front arm shaft gear	ST-1200D	B-4
28	4P45595	ピンスプロケット軸	Sprocket shaft pin	ST-1200D ST-800	B-4
29	4P48653	ピンアームストッパ	Arm stopper pin	ST-1200D ST-800	B-3 B-4
30	4P48649	ボスアーム	Arm boss	ST-1200D ST-800	B-4
31	4P8STN044	基板後部アーム組立品	Rear arm base plate	ST-1200D ST-800	B-4
32	4P8STD027	後部アーム組立品	Rear arm assy	ST-1200D	B-4
33	4P48650B	ギヤ後部アーム軸組立品	Rear arm shaft gear	ST-1200D ST-800	B-5
34	4P31336002	後部アーム	Rear arm	ST-1200D ST-800	B-5
35	4P48807	ツマミ巻返シ	Rewind knob	ST-1200D	B-5
36	4P48749	中間ギヤ逆転(3)	Reverse middle gear 3	ST-1200D ST-800	B-1 D-1
37	4P48734	軸中間ギヤ(2)	Middle gear shaft 2	ST-1200D	B-2
38	4P48814	押エ板正逆切換板	Changing plate presser	ST-1200D	C-1
39	4P48917	切換板ロック(2)	Changing plate lock 2	ST-1200D	C-1
40	4P48815	間座レバー逆転ヘッド部	Reverse lever washer	ST-1200D ST-800	C-2
41	4P48771	切換板ロック(1)	Changing plate lock 1	ST-1200D	C-2
42	4P48654	バネアームボタン	Arm button spring	ST-1200D	B-2 D-5
43	4P48618	ボタンアーム	Arm button	ST-1200D ST-800	B-3 D-5
44	4P48295	ロックバネボスアーム	Arm lock spring	ST-1200D ST-800	B-3 D-5
45	4P48739	レバー巻返シ	Rewind lever	ST-1200D	C-2
46	4P55126	バネリンクレバー	Link lever spring	ST-1200D 16-S	C-3
47	P411960	巻取ベルト(2)	Take-up belt 2	ST-1200D ST-800	C-3
48	P411963	プーリ(3)中間巻取	Take-up middle pulley 3	ST-1200D ST-800	C-4
49	4P48866	取付板組立巻取プーリギヤ	Take-up pulley holder	ST-1200D ST-800	C-4
50	P412079B	プーリ(4)中間巻取	Pulley(4) middle take-up	ST-1200D ST-800	C-5

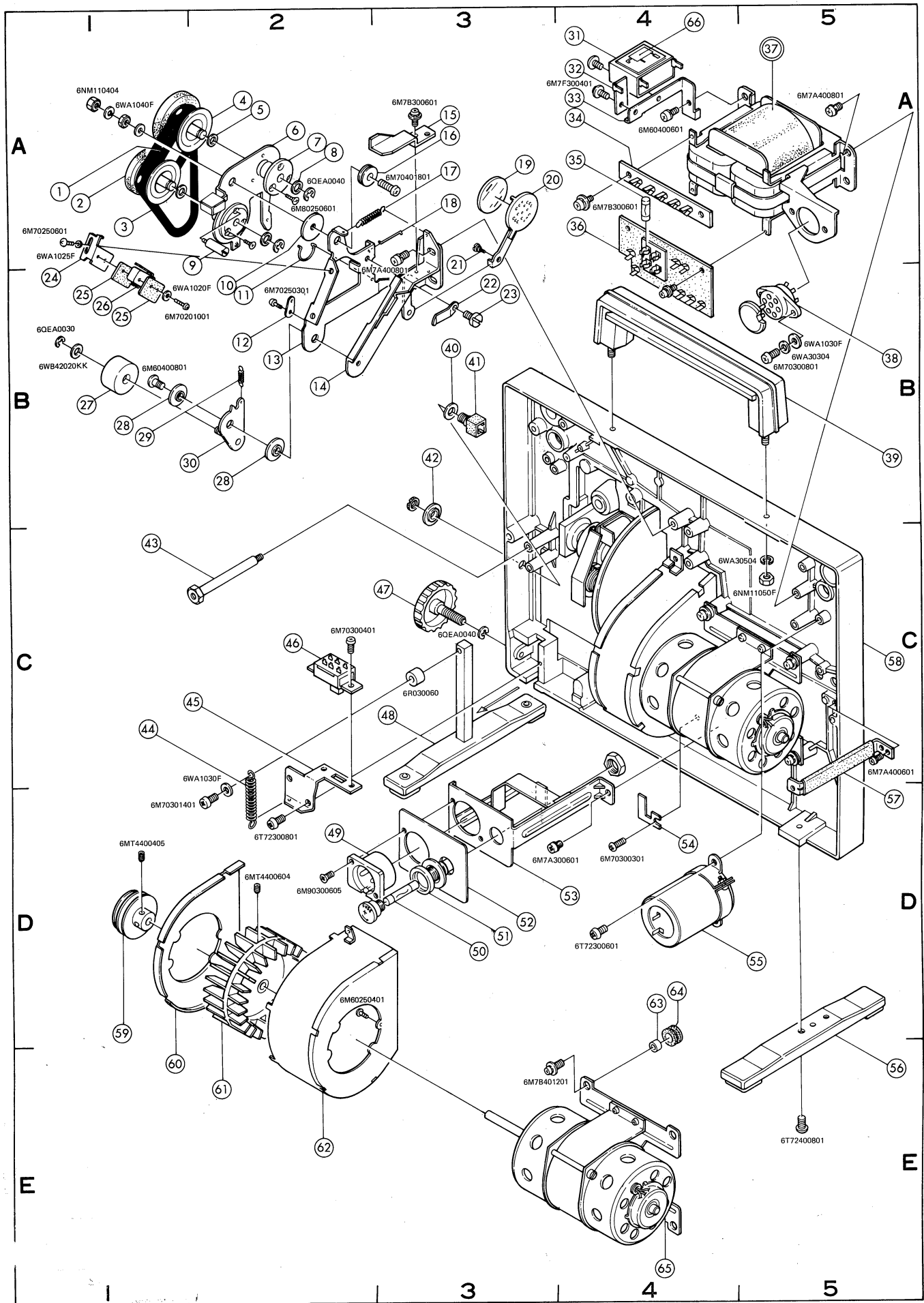


Illustration No.	Parts No.	Parts Name		Common Use Model	Illustration Position
1	P411996	ベルト(2)駆動	Drive belt 2	ST-1200D	A-1
2	P411971	組立18コマローラクラッチ	18 roller clutch assy	ST-1200D	A-1
3	P412323	ベルト(3)駆動	Drive belt 3	ST-1200D	A-1
4	P411970	組立24コマローラクラッチ	24 roller clutch assy	ST-1200D	A-2
5	4P55455	間座プーリ軸(2)	Pulley shaft washer 2	ST-1200D	A-2
6	4P31797	組立レバー(2)クラッチ	Lever(2) clutch assy	ST-1200D	A-2
7	P411933	メタルクラッチ	Metal clutch	ST-1200D	A-2
8	4P54978	間座プーリ軸	Pulley shaft washer	ST-1200D SP	A-2
9	P412624	ピン SW クラッチ	Pin switch clutch		A-2
10	P412625	座クラッチレバー(2)	Mount clutch lever 2		B-2
11	P411945	バネクラッチレバー	Spring clutch lever	ST-1200D	B-2
12	P411749	バネ掛板パッドローラ	Spring fix plate	ST-1200D ST-800	B-2
13	4P31791	レバー(1)クラッチ	Lever(1) clutch	ST-1200D	B-2
14	P411943	組立ホルダクラッチレバー	Holder clutch lever assy	ST-1200D	B-2
15	P411929	ステー(2)クラッチレバー	Stay(2) clutch lever	ST-1200D	A-3
16	P411932	間座ステー	Stay washer	ST-1200D	A-3
17	4P55356	バネスレディングガイド(2)	Thread guide spring	ST-1200D 16-A	A-3
18	P411944	ピンクラッチレバー(1)	Pin clutch lever 1	ST-1200D	A-3
19	4P45144	セフティシャッタ取付防熱ガラス	Heat proof glass	ST-1200D SP	A-3
20	4P48686	セフティシャッタ組立品	Safety shutter assy	ST-1200D	A-3
21	4P55250	ネジ(2)ループフォーマ	Loop former screw 2	ST-1200D ST-800	B-3
22	P411343	バネクラッチホルダ	Clutch holder spring	ST-1200D	B-3
23	P411344	ネジクラッチホルダ	Clutch holder screw	ST-1200D	B-3
24	P412632	取付板18・24コマスイッチ	Holder speed switch		B-1
25	P410047	絶縁紙ミニチュアスイッチ	Switch isolator	ST-1200D	B-1
26	5E1025	小型マイクロスイッチ SS-5GL	Micro switch SS-5GL	ST-1200D	B-1
27	P412782	組立プーリアイドラ	Pulley idler assy		B-1
28	P411938	座クラッチレバー	Mount clutch lever	ST-1200D	B-1 B-2
29	4P53018	バランシングスタビライザバネ(1)	Balance lever spring 1	ST-1200D ST-800	B-1
30	P412779	組立レバーアイドラ	Lever idler assy		B-1
31	5DK0460221	コンデンサ CME405K200AF	Polyest film 4MF/200WV	16-CL	A-4
32	4E42855	組立絶縁板タブ	Isolator terminal assy		A-4
33	4E42856	取付板4 μ F コンデンサ	Holder condenser		A-4
34	4E41989	端子板(2)組立品	Terminal plate 2	ST-1200D	A-4
35	5H1030007	ミゼットヒューズ 3A	Midget fuse 3A	ST-1200D ST-800	A-4
36	4E41988	端子板(1)組立品	Terminal plate 1	ST-1200D	A-4
37	4I00203	電源トランス	Transformer	ST-1200D SC-8T	A-5
38	5N40060	電圧切換ソケット	Volt sw socket	ST-1200D SP	B-5
39	P411406	吊手	Carrying handle	ST-1200D K-100	B-5
40	P410668	間座3.5mmジャック	3.5mm Jack washer	ST-1200D	B-3
41	5N50092	3.5mmジャック SJ-296	Jack 3.5mm SJ-296	ST-1200D ST-800	B-3
42	P410667	銘板シンクロナイザ	SYNC R-1 name plate	ST-1200D	B-3
43	4P47168	スタッド裏カバー取付	Rear cover fixing stud	ST 1200D GP	C-1
44	4P55217	バネアオリ	Tilting spring	ST-1200D SP	C-1
45	P411903	ホルダM-O スイッチ	Holder M-O switch	ST 1200D	C
46	5E5001	切換スイッチ ESD-271D	Slide switch ESD-271D	ST-1200D S-1000T	C-2
47	4P48760	ツマミアオリ	Tilting knob	ST 1200D	C-3
48	4P49626	アオリ足組立品	Tilting leg assy	ST 1200D SP	C-3
49	4E42630	電源コンセント	Power cord socket	ST 1200D K-100	D-2
50	5H1030004	ガラス管入ヒューズ 3A	Fuse 3A	ST 1200D ST-800	D-2

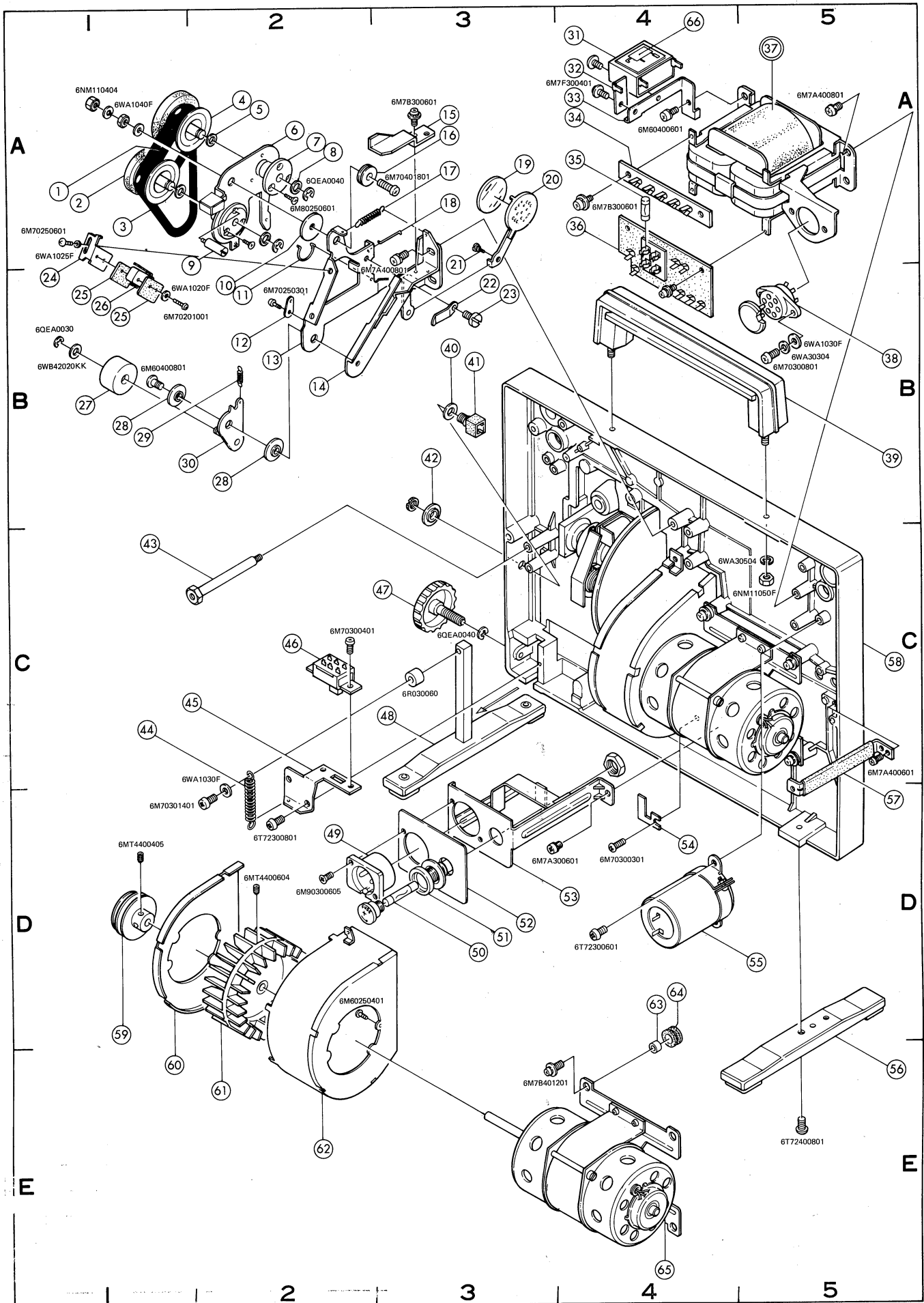


Illustration No.	Parts No.	Parts Name		Common Use Model	Illustration Position
1	5L41501511	映写ランプ 15V-150W	Lamp 15V-150W	ST-1200D SC-8T	B-1
2	6Z0047	コード押エ EJM	Cord supporter	ST-1200D ST-800	B-1
3	4E42789	ホルダソケット映写ランプ	Holder socket lamp		A-1
4	4E42788	絶縁板ソケット映写ランプ	Isolator socket lamp		A-1
5	4E42787	バネソケット映写ランプ	Spring socket lamp		A-1
6	4E42785001	組立端子(1)ソケット	Terminal(1) socket		A-1
7	4E42785002	組立端子(2)ソケット	Terminal(2) socket		A-1
8	4E42784	ソケット映写ランプ	Socket lamp		A-1
9	4E42906	組立(1)インジェクタ映写ランプ	Injector lamp(1) assy		A-2
10	4E42790	ホルダ映写ランプ	Holder lamp		A-2
11	4E42791	軸ソケット映写ランプ	Shaft socket lamp		A-2 B-2
12	4E31036	組立(3)ソケット映写ランプ	Socket lamp(3) assy		A-1
13	4P31829B	組立ランプカバー	Lamp cover assy	ST-1200D	A-3
14	4P31782B	カバーランプ	Cover lamp	ST-1200D	A-3
15	P410765	メクラ蓋シンクロ装置	Rubber cover	ST-1200D ST-800	A-4
16	4P48818	ストップランプカバー	Lamp cover stopper	ST-1200D	A-5
17	4P55643	特殊トラス小ネジ 3×8	Special SC truss M3×8	ST-1200D	C-1
18	4P49226	キャップ第1スプロケット	First sprocket cap	ST-1200D ST-800	C-1
19	4P46283	スプロケットスーパ	Super sprocket	ST-1200D ST-800	C-1
20	4P48642	ボス第1スプロケット	First sprocket boss	ST-1200D ST-800	C-1
21	4P48748	軸スプロケット(1)	Sprocket shaft 1	ST-1200D	C-1
22	4P49227	巻込ミ除(1)	Film guide plate	ST-1200D ST-800	C-2
23	6QA12001	丸S形止メ輪 呼び径12	stopper ring S-type D12	ST-1200D ST-800	C-2
24	4P49675	レバー(2)組立ループフォーマ	Loop former lever 2	ST-1200D ST-800	C-2
25	4P47244	ネジ(4)ループフォーマ	Loop former screw 4	ST-1200D ST-800	B-2
26	4P31349	ループフォーマ	Loop former	ST-1200D ST-800	B-2
27	4P47246	レバーループフォーマ(1)	Loop former(1) lever	ST-1200D ST-800	B-3
28	4N01878	銘板ランプ指示	Lamp type label	ST-1200D SC-8T	B-3
29	P411990	防熱ガラス取付枠	Heat proof glass holder	ST-1200D K-100	B-3
30	P411998	防熱ガラス押エ	Heat proof glass presser	ST-1200D K-100	B-4
31	P411997	導風板取付防熱ガラス	LC heat proof glass	ST-1200D K-100	B-4
32	4P48617	ネジローラシュー	Shoe roller screw	ST-1200D ST-800	D-1
33	P412443	ローラ(2)スプロケットシュー	Roller(2) sprocket shoe	ST-1200D ST-800	D-1
34	4P49676	取付板組立クリックバネ	Click spring	ST-1200D ST-800	C-2
35	4P8STD011	マシンフレーム組立品	Machine frame assy	ST-1200D	C-3
36	4P8STD082	マシンフレームメタル付	Machine frame	ST-1200D	C-3
37	4P49890	ピンスプロケット軸(1)	Sprocket shaft pin 1	ST-1200D ST-800	C-3
38	4P48747	ギヤ第1スプロケット	First sprocket gear	ST-1200D ST-800	C-3
39	4P55242	ネジローラ挿入口	Film slot roller screw	ST-1200D ST-800	D-1
40	4P49627	フィルム挿入ローラ	Film slot roller	ST-1200D ST-800	D-1
41	P410358	シュー組立第1スプロケット	First sprocket shoe assy	ST-1200D ST-800	D-1
42	4P55636	段付ネジ M-O 切換レバー(1)	Screw(1) loop former	ST-1200D ST-800	D-1
43	4P55294	座金スプロケットシュー座板	Sprocket shoe washer	ST-1200D ST-800	D-2
44	P412298	組立座板(1)スプロケットシュー	Spro. shoe mount(1) assy	ST-1200D ST-800	D-2
45	4P47243	バネ(2)シュー座板	Shoe mount spring 2	ST-1200D ST-800	D-2
46	4P55352	間座セフティシャッタ	Safety shutter washer	ST-1200D SC-8T	E-2
47	4P31913	ループセッタ	Loop setter		E-2
48	P412634	ホルダループセッタ	Holder loop setter		E-2
49	P412934	バネ(2)ループセッタ	Spring(2) loop setter		E-2
50	4P8ST030	アパーチュアプレート組立品	Aperture plate assy	ST-1200D ST-800	C-3

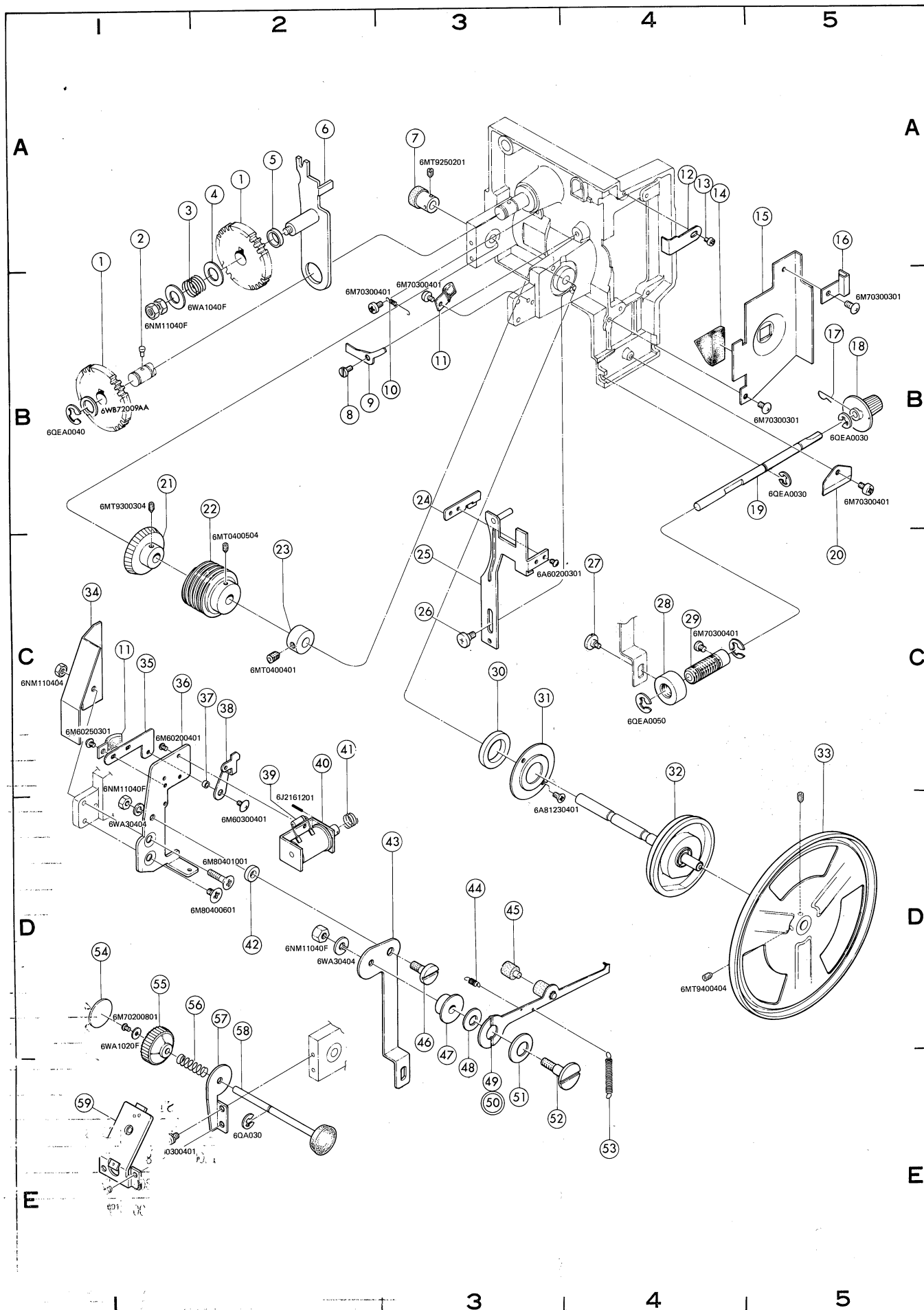
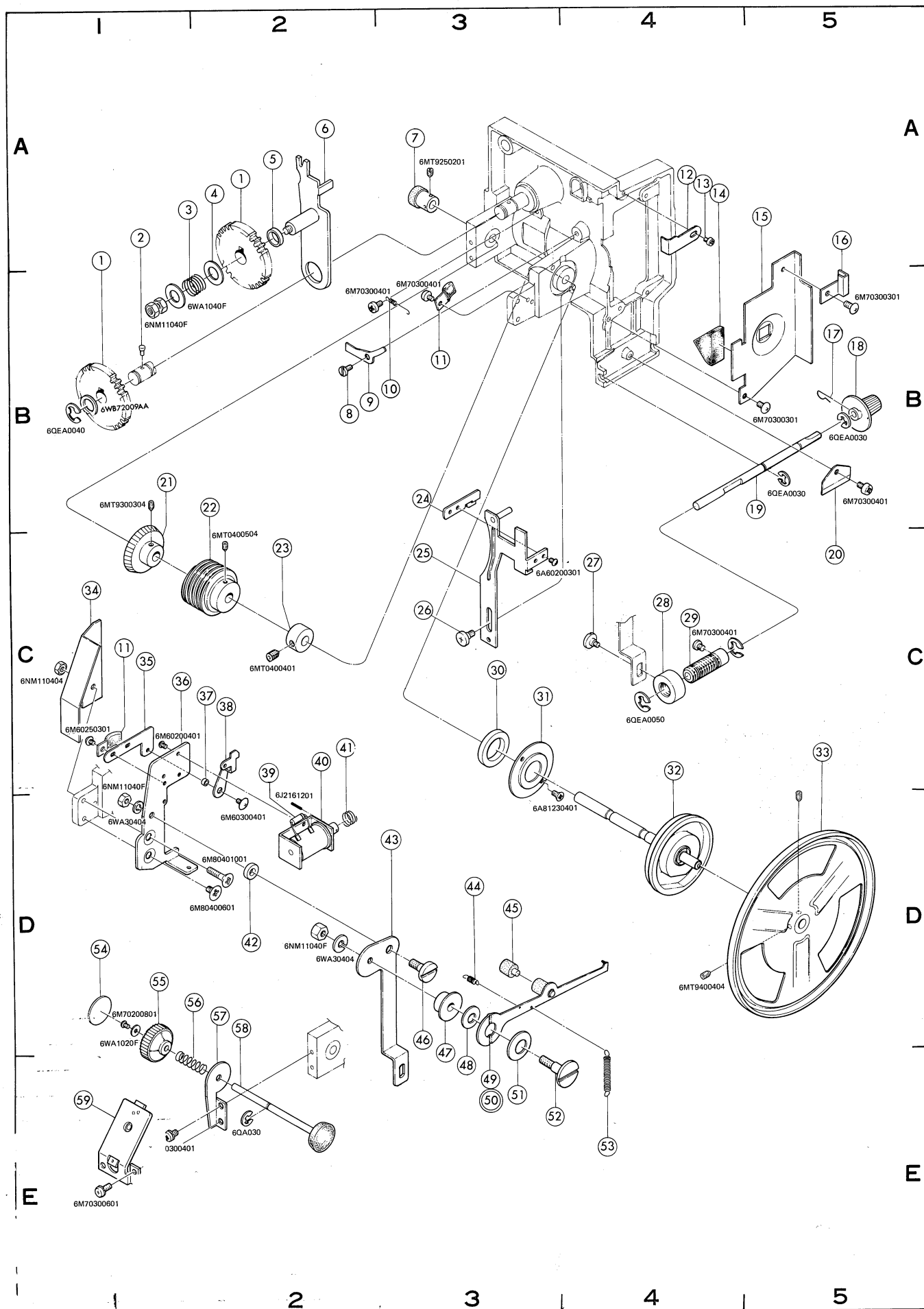


Illustration No.	Parts No.	Parts Name		Common Use Model	Illustration Position
1	4P48750	ギヤ正逆切換	Changing gear	ST-1200D	A-1 A-2
2	4P45595	ピンスプロケット軸	Sprocket shaft pin	ST-1200D ST-800	A-1
3	4P49291	バネ正逆切換	Changing spring	ST-1200D	A-1
4	4P55254	間座前部リール	Front reel shaft washer	ST-1200D GP	A-2
5	4P48908	間座中間ギヤ(1)	Middle gear washer 1	ST-1200D	A-2
6	4P48794B	取付板組立正逆	Changing holder	ST-1200D	A-2
7	P410671	マグネット組立品	Magnet assy	ST-1200D	A-3
8	4P55250	ネジ(2)ループフォーマ	Loop former screw 2	ST-1200D ST-800	B-2
9	4P47247	レバー(6)ループフォーマ	Loop former lever 6	ST-1200D ST-800	B-2
10	4P55228	バネレバー(2)	Lever(2) spring	ST-1200D ST-800	B-3
11	4P49889	コード押エ組立品	Cord supporter	ST-1200D ST-800	B-3 C-1
12	P411266	押エレバー(1)	Pressing lever 1	ST-1200D ST-800	A-4
13	4P47391	ネジ押エレバー	Pressing lever(1) screw	ST-1200D SP	A-4
14	4P49252	油含ミ	Oil keeper	ST-1200D ST-800	A-4
15	4P48638	遮熱板	Heat shielding plate	ST-1200D ST-800	A-5
16	4P49743	飾り板マシン部	Machine decoration plate	ST-1200D ST-800	A-5
17	P411949	バネフレーミングツマミ	Spring framing knob	ST-1200D ST-800	B-5
18	P412042	ツマミフレーミング	Knob framing	ST-1200D	B-5
19	P411950	軸フレーミング	Shaft framing	ST-1200D ST-800	B-5
20	4P48641	押エ板フレーミング軸	Framing shaft plate	ST-1200D ST-800	C-5
21	4P48915	駒送りローラ(1)	Threading roller 1	ST-1200D ST-800	B-1
22	4P47329	ウォーム(2)カム軸	Cam shaft worm 2	ST-1200D ST-800	B-2
23	4P54751	ウォーム間座	Worm gear washer	ST-1200D ST-800	C-2
24	4P48709	レバー横押エ開閉	Release lever	ST-1200D ST-800	B-3
25	4P49679	レバー(1)組立ループフォーマ	Loop former lever assy	ST-1200D	C-3
26	4P55230	ネジ(1)ループフォーマ	Loop former screw 1	ST-1200D ST-800	C-3
27	4P55080	段付ネジオートセット	Auto set screw	ST-1200D ST-800	C-4
28	4P48769	ナットフレーミング	Framing nut	ST-1200D ST-800	C-4
29	4P48616	ネジフレーミング	Framing screw	ST-1200D ST-800	C-4
30	4P48629	油含ミカム軸	Cam oil keeper	ST-1200D ST-800	C-3
31	4P48630	蓋給油フェルト	Cam oil keeper lid	ST-1200D ST-800	C-3
32	4P48609	カム組立品	Cam assy	ST-1200D	C-4
33	4P43855	シャッター組立品	shutter assy	ST-1200D FP-A	C-5
34	4P49984	プロテクタ給送部	Machine protector	ST-1200D ST-8	C-1
35	4P48643	取付板ソレノイドレバー	Solenoid lever holder	ST-1200D	C-1
36	4P48644	座板フレーミングレバー	Framing lever holder	ST-1200D	C-1
37	4P55352	間座セフティシャッター	Safety shutter washer	ST-1200D 16-S	C-2
38	4P48707	レバーソレノイド	Solenoid lever	ST-1200D SC-8T	C-2
39	5S21S1887	ダイオード 1S1887	Si diode 1S1887	ST-1200D ST-800	C-2
40	4P48706	ソレノイド組立品	Solenoid assy	ST-1200D SC-8T	C-2
41	4P48811	バネソレノイド	Solenoid spring	ST-1200D SC-8T	C-2
42	4P51407	フレーミングレバー間座	Framing lever washer 1	ST-1200D ST-800	D-2
43	P411916	レバーフレーミング	Lever framing	ST-1200D	D-2
44	4P54733	送り爪バネ(2)	Claw spring 2	ST-1200D ST-800	D-2
45	4P45364	送り爪ピン組立品	Claw pin	ST-1200D ST-800	D-2
46	4P55239	ネジフレーミングレバー	Framing lever screw	ST-1200D ST-800	D-2
47	4P43683B	送り爪バネ座	Claw spring mount 1	ST-1200D ST-800	D-2
48	4P45962	送り爪バネ座(2)	Claw spring mount 2	ST-1200D ST-800	D-2
49	4P8ST031	送り爪ピン付	Claw	ST-1200D ST-800	E-3
50	4P8ST017	送り爪組立品	Claw assy	ST-1200D ST-800	E-3



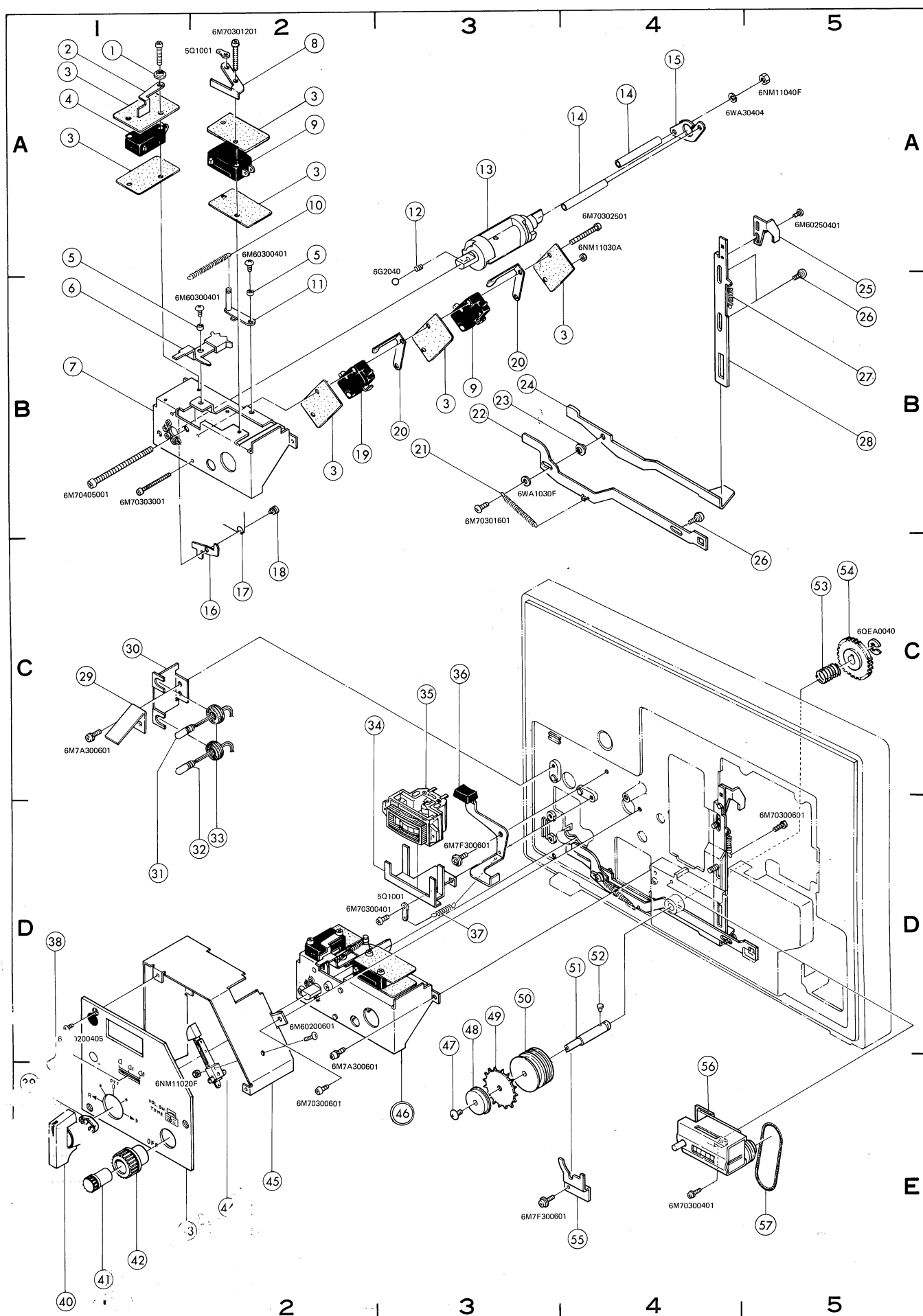


Illustration No.	Parts No.	Parts Name		Common Use Model	Illustration Position
1	4P49966	間座ランプスイッチ押エ	Lamp switch washer	ST-1200D SC-8T	A-1
2	4P48716	ランプスイッチ押エ	Lamp switch presser	ST-1200D SC-8T	A-1
3	P411247	スイッチ絶縁板(3)	Isolator switch 3	ST-1200D K-100	A-1 A-2 B-2・3
4	5E1002	マイクロスイッチ V-2A1	Micro switch V-2A1	ST-1200D SP	A-1
5	4P48815	間座レバー逆転ヘッド部	Reverse lever washer	ST-1200D ST-800	A-1 A-2
6	4P48790	レバーランプスイッチ(1)	Lamp switch lever 1	ST-1200D	B-1
7	4P31348	取付板スイッチ	Switch holder	ST-1200D	B-1
8	4P53175	接点押エ	Contact presser	ST-1200D 16-A	A-2
9	5E1008	マイクロスイッチ V-1A	Micro switch V-1A	ST-1200D SP	A-2 B-3
10	4P55331	バネ摺動金具	Slide metal spring	ST-1200D XP-350	A-2
11	4P49680	クリック板組立スイッチ	Click plate assy	ST-1200D	B-2
12	4C52273	フェーダクリックバネ	Fader click spring	ST-1200D K-100	A-3
13	4P31355B	カムスイッチ	Switch cam	ST-1200D SC-8T	A-3
14	4P48714	間座スイッチカム取付	Switch cam washer	ST-1200D SC-8T	A-4
15	4P48713B	取付板スイッチカム	Switch cam holder	ST-1200D	A-4
16	4P48742	レバーランプスイッチ(2)	Lamp switch lever 2	ST-1200D	C-2
17	4P49457	バネランプスイッチ	Lamp switch spring	ST-1200D	C-2
18	4P48743	軸スイッチレバー	Lamp switch shaft	ST-1200D	C-2
19	5E1003	マイクロスイッチ V-3A	Micro switch V-3A	ST-1200D 16-A	B-2
20	4P47087B	アクチュエータマイクロスイッチ	Micro switch actuator	ST-1200D ST-800	B-3
21	4P49290	バネレバー逆転ヘッド部	Reverse lever spring	ST-1200D	B-3
22	P411874	レバー組立逆転ヘッド部	Reverse lever assy	ST-1200D	B-3
23	4P48785	間座クラッチ	Clutch washer	ST-1200D	B-3
24	4P48751B	レバー(3)クラッチ	Clutch lever 3	ST-1200D	B-3
25	4P48685	押エ板セフティシャッタ	Safety shutter presser	ST-1200D	B-5
26	4P55636	段付ネジ M-O 切換レバー(1)	Screw(1) loop former	ST-1200D ST-800	B-5 C-5
27	4P55356	バネスレディングガイド(2)	Thread guide spring	ST-1200D 16-A	B-5
28	4P48684B	連桿(1)クラッチ	Clutch link 1	ST-1200D	B-5
29	4P49749	遮光板パイロットランプ	Light shielding plate	ST-1200D	C-1
30	4P48663	ホルダパイロットランプ	Pilot lamp holder	ST-1200D	C-1
31	4K00712	パイロットランプ録音表示用	Pilot lamp recording	ST-1200D	D-1
32	4K00705	パイロットランプ電源表示用	Pilot lamp power	ST-1200D	D-2
33	5G5028	ゴムブッシュ No687D	Gum bush	ST-1200D	D-2
34	4P48724	ホルダVU	VU meter holder	ST-1200D	C-2
35	5F7D008	レベルメータ H-310KA	Level meter		C-3
36	4P48798B	レバー(2)組立オート解除	Release lever(2) assy	ST-1200D	C-3
37	4P53018	バランスングスタビライザバネ(1)	Balance lever spring 1	ST-1200D ST-800	D-3
38	4P48857	ツマミ組立ランプスイッチ	Lamp switch knob	ST-1200D SC-8T	D-1
39	4P48784	バネツマミ	Knob spring	ST-1200D ST-800	E-1
40	4P31819	ツマミモータスイッチ	Motor switch knob	ST-1200D	E-1
41	4P48828	ツマミ組立ボリューム	Volume control knob	ST-1200D ST-800	E-1
42	4P48831	ツマミ組立トーンコントロール	Tone control knob	ST-1200D ST-800	E-1
43	4N02645	銘板スイッチパネル	Switch panel		E-1
44	5E9007	リーフスイッチ LSA-16AY	Release switch	ST-1200D	E-2
45	4P31356B	カバースイッチ機構	Switch cover	ST-1200D	E-2
46	4P8STD035	モータスイッチ機構組立品	Switch assy	ST-1200D	E-3
47	4P55643	特殊トラス小ネジ 3×8	Special SC truss M3×8	ST-1200D ST-800	D-3
48	4P48764	キャップ第2スプロケット	Second sprocket cap	T-800	D-3
49	4P31342	第2スプロケット	Second sprocket	S 800	D-3
50	P411914	ボス第2スプロケット	Second sprocket b	S	D-3

Illustration No.	Parts No.	Parts Name		Common Use Model	Illustration Position
1	4P49854	ローラ巻取ガイド	Take-up guide roller	ST-1200D	A-1
2	4P48775	軸巻取ガイドローラ(2)	Take-up roller shaft	ST-1200D	A-1
3	4P8ST036	巻取ガイド組立品	Take-up guide	ST-1200D	A-1
4	4P48778	ローラ(1)巻取ガイド	Take-up guide roller 1	ST-1200D ST-800	A-1
5	4P48779	軸巻取ガイド	Take-up guide shaft	ST-1200D	A-1
6	4P48804	押エ板オート解除スイッチ	Release switch presser	ST-1200D	A-2
7	4P49118	バネ巻取ロック	Take-up lock spring	ST-1200D	A-2
8	4N01857	巻取ガイド銘板	Take-up guide plate	ST-1200D	B-2
9	4P48701C	フィルムガイド(4)	Film guide 4	ST-1200D	B-2
10	P411220	バネ第2スプロケット押エ	Sprocket press(2) spring	ST-1200D	B-2
11	4E40781	エキサイタランプ KE-02	Exciter lamp KE-02	ST-1200D ST-800	A-3
12	4P53366C	エキサイタランプソケットスリーブピン	Exciter lamp sleeve pin	ST-1200D ST-800	A-3
13	4P8ST032	ホルダ(2)エキサイタランプ組立品	Exciter lamp holder 2	ST-1200D ST-800	B-3
14	4P48700	バネエキサイタランプ	Exciter lamp spring	ST-1200D ST-800	B-3
15	4P48697	ホルダ(1)エキサイタランプ	Exciter lamp holder 1	ST-1200D ST-800	B-3
16	4P48699	底板エキサイタランプソケットスリーブ	Exciter lamp mount	ST-1200D ST-800	B-3
17	4P49625	エキサイタランプソケット組立品	Exciter lamp socket assy	ST-1200D ST-800	B-2
18	4E42681	中継端子組立品	Connecting terminal assy	ST-1200D ST-800	A-4
19	5R2Z013081	巻線抵抗 13Ω-5W	Wire wound R. 13 ohm 5W	ST-1200D ST-800	A-4
20	4E50857	絶縁ワッシャ	Isolation washer	ST-1200D ST-800	A-5
21	5DA3380111	アルミ電解コンデンサ 3300μF10WV	Al elect 3300/10 axial-L	ST-1200D ST-800	B-4
22	5E1025	小型マイクロスイッチ SS-5GL	Micro switch SS-5GL	ST-1200D SP	A-5 B-4
23	4P48656	連桿オート	Auto link	ST-1200D	A-5
24	4P48815	間座レバー逆転ヘッド部	Reverse lever washer	ST-1200D ST-800	A-5
25	P412626	押エ板ヘッド	Press plate head		C-1
26	P412956	底板ヘッド	Mount head		C-1
27	4E31043	B型コンビネーションヘッド	Combinationhead B type		C-1
28	P412627	調節板ヘッド	Adjust plate head		C-1
29	P412620	ガイドヘッド前部	Guide head front		C-2
30	4P20608	ホルダヘッド	Holder head		C-2
31	P412630	廻り止メヘッド	Stopper head		C-2
32	P412631	ヘッド押エ(2)	Head presser 2		C-2
33	4P55733	バネヘッド押エ	Spring head presser		C-2
34	4P31921	ヘッド押エ(1)	Head presser 1		C-2
35	4P55734	バネスライダヘッド押エ	Spring slider presser		C-3
36	P412628	スライダヘッド押エ	Slider presser		B-3
37	P412621	間座ヘッド押エ	Washer head presser		C-3
38	4P55690	ピンヘッド押エ	Pin head presser		C-3
39	P412822	ガイドフィルムヘッド	Guide film head		C-2
40	P412635	取付板キャンセルコイル	Holder cancel coil		D-2
41	4E42092	基板キャンセルコイル取付	Cancel coil base plate	ST-1200D	D-2
42	5J20005	キャンセルコイル	Cancel coil	ST-1200D ST-800	D-2
43	4P48795	軸テンションローラ	Tension roller shaft	ST-1200D ST-800	D-1
44	4P55688	軸テンションレバー	Shaft tension lever	ST-1200D	D-1
45	4P48720B	レバー中間テンション	Tension middle lever	ST-1200D	D-1
46	4P48658	パッドローラ	Pad roller	ST-1200D ST-800	D-
47	4P55751	バネ中間テンション M-O	Spring mid. tension M-O	ST-1200D	D
48	P412435	ネジフィルムガイド	Screw film guide		
49	4P31894	フィルムガイド第2スプロケット	Film guide second sr		
50	4P55652	間座フィルムガイド	Washer film guide		

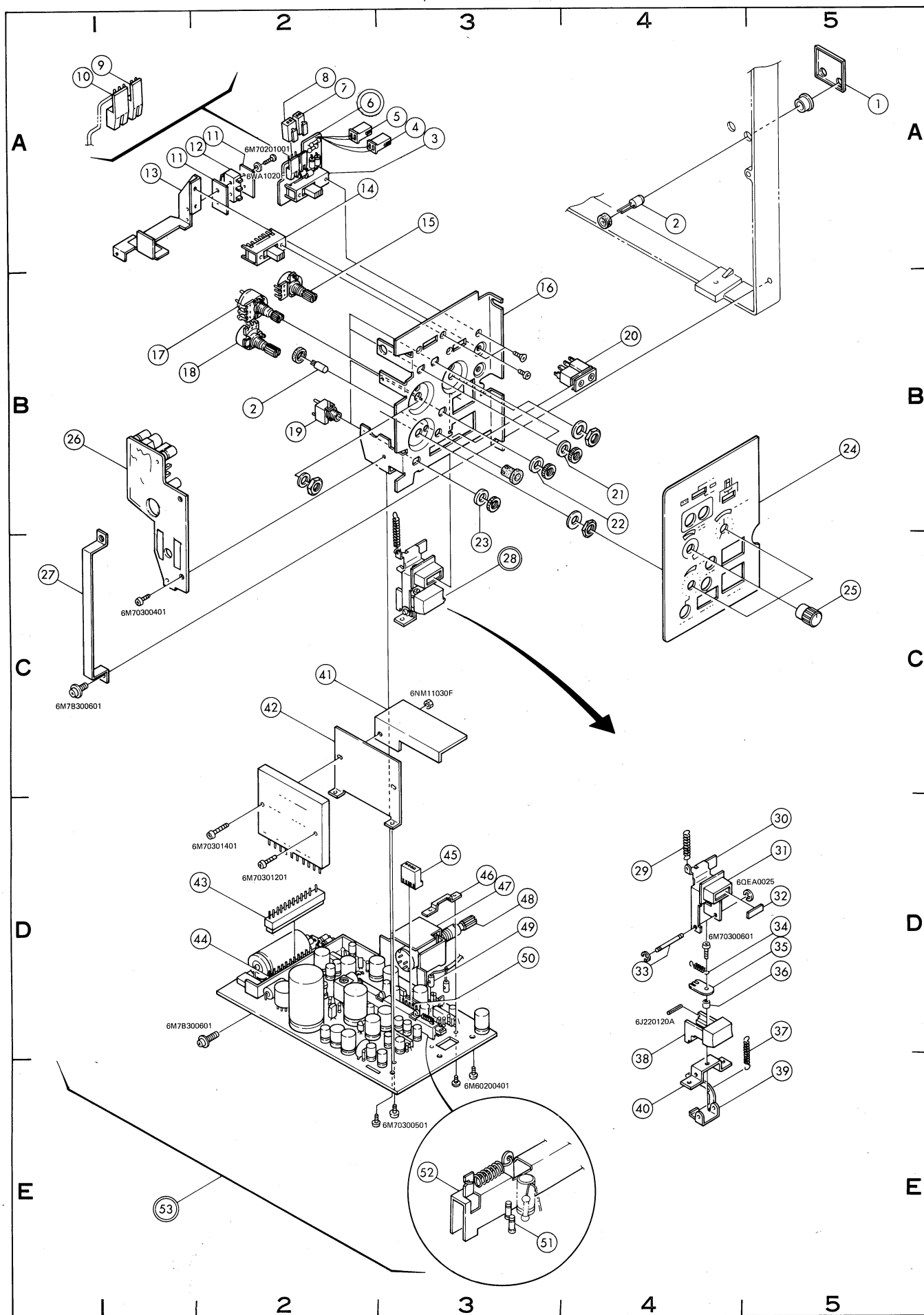


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1	4N02638	銘板トラック表示	Plate track indicator		A-5
2	5S2SR103D	発光ダイオード SR103D赤	LED SR103D	ST-1200D	A-4 B-2
3	5E5026	スライドスイッチ ESD-3014B	Slide switch		A-3
4	4K00804002	2P マイクロコネクタ(2)	2P micro connector 2		A-3
5	4K00804001	2P マイクロコネクタ(1)	2P micro connector 1		A-3
6	4E31091	組立ヘッド切換スイッチ基板	Head switch plate assy		A-2
7	5N202312	2P コネクタ(2) IL-2P-S3FP2	2P connector 2 IL-2S-S3L		A-2
8	5N203202	3P コネクタ(2) IL-3S-S3L	3P connector 2 IL-3S-S3L		A-2
9	5N202311	2P コネクタ(1) IL-2S-S3L	2P connector 1 IL-2P-S3FP2		A-1
10	5N203201	3P コネクタ(1) IL-3S-3P-S3FP2	3P connector 1 IL-3P-S3FP2		A-1
11	P410047	絶縁紙ミニチュアスイッチ	Switch isolator	ST-1200D SC-8T	A-1 A-2
12	5E1025	マイクロスイッチ SS-5GL	Micro switch SS-5GL	ST-1200D GP	A-2
13	4E42657	シールド板	Shield plate		A-1
14	5E5028	スライドスイッチ 32T-6S229	Slide switch		A-2
15	5R6Z0014G1	可変抵抗 10K G	VR 10K Gtype		A-3
16	4E20486	取付板増巾器	Holder amplifier		B-3
17	4R6Z0054B4	可変抵抗 50KB-S付 軸5mm	VR 50K Btype W/ S (D-5mm)		B-1
18	5R6Z0014B1	可変抵抗 10K B	VR 10K Btype	ST-1200D	B-2
19	5N50092	3.5mm 小型ジャック SJ-296	Jack 3.5mm SJ-296	ST-1200D ST-800	B-2
20	5N50082	2連ジャック SJ -G0303	Jack SJ-G0303	ST-1200D	B-4
21	6WB60014J5	塩ビワッシャ(緑)	Washer green		B-4
22	6WB60014J4	塩ビワッシャ(黄)	Washer yellow		B-4
23	4P48827	ワッシャ絶縁	Isolation washer	ST-1200D F16-1000A	C-3
24	4N02647	銘板増巾器	Plate amplifier		B-5
25	P411958	ツマミ AUX	Knob AUX	ST-1200D	C-5
26	4E31090	組立モニタ基板	Monitor plate assy		B-1
27	P412636	飾り板増巾器	Amplifier decorate plate		C-1
28	4P8STD024	取付台録音ツマミ組立品	Recording knob assy	ST-1200D	C-3
29	4P55113	バネパッドローラ	Pad roller spring	ST-1200D 16-A	D-4
30	4E42660	レバー(2)録音ロック	Lever(2) recording lock	ST-1200D	D-5
31	4E42623	ボタンレバー録音ロック	Button recording lock	ST-1200D ST-800	D-5
32	P411820	銘板録音解除ボタン	Plate recording lock	ST-1200D ST-800	D-5
33	4E42661	軸レバー録音ツマミ	Shaft recording lock	ST-1200D	D-4
34	4P48722	バネ録音レバー	Recording lever spring	ST-1200D	D-5
35	4P48662B	押エ録音ツマミ	Recording knob presser	ST-1200D	D-5
36	4P48721B	間座録音	Recording washer	ST-1200D	D-5
37	4E50858	バネレバー(1)録音ロック	Spring recording lock	ST-1200D	D-5
38	4P48627	ツマミ録音	Recording knob	ST-1200D	E-4
39	4E42659	レバー(1)録音ロック	Lever(1) recording lock	ST-1200D	E-5
40	4E42658B	取付台録音ツマミ	Holder recording knob	ST-1200D	E-4
41	4E41972	シールド板 IC	IC shield plate	ST-1200D	C-2
42	4P48800	放熱板 IC	IC radiation plate	ST-1200D	C-2
43	5N212032	12P コネクタ(2) 128-12-10-281S	12P connector 2	ST-1200D	D-2
44	5N212031	12P コネクタ(1) 128-12-10-281P	12P connector 1	ST-1200D	D-2
45	5N205092	5P コネクタ(2)	5P connector 2		D-3
46	P410162	ガイド録音ボタン	Recording knob guide	ST-1200D	D-3
47	4E42023	シールド板ボリューム	Volume shield plate	ST-1200D	D-3
48	5R4Z0054B2	2連可変抵抗 50KB 10KA	VR 50K Btype & 10K Atype	ST-1200D	D-3
49	5N2010202	アンプ端子(2)	Amplifier terminal 2	ST-1200D SR-1	D-3
50	5N205091	5P コネクタ(1)	5P connector 1		D-3

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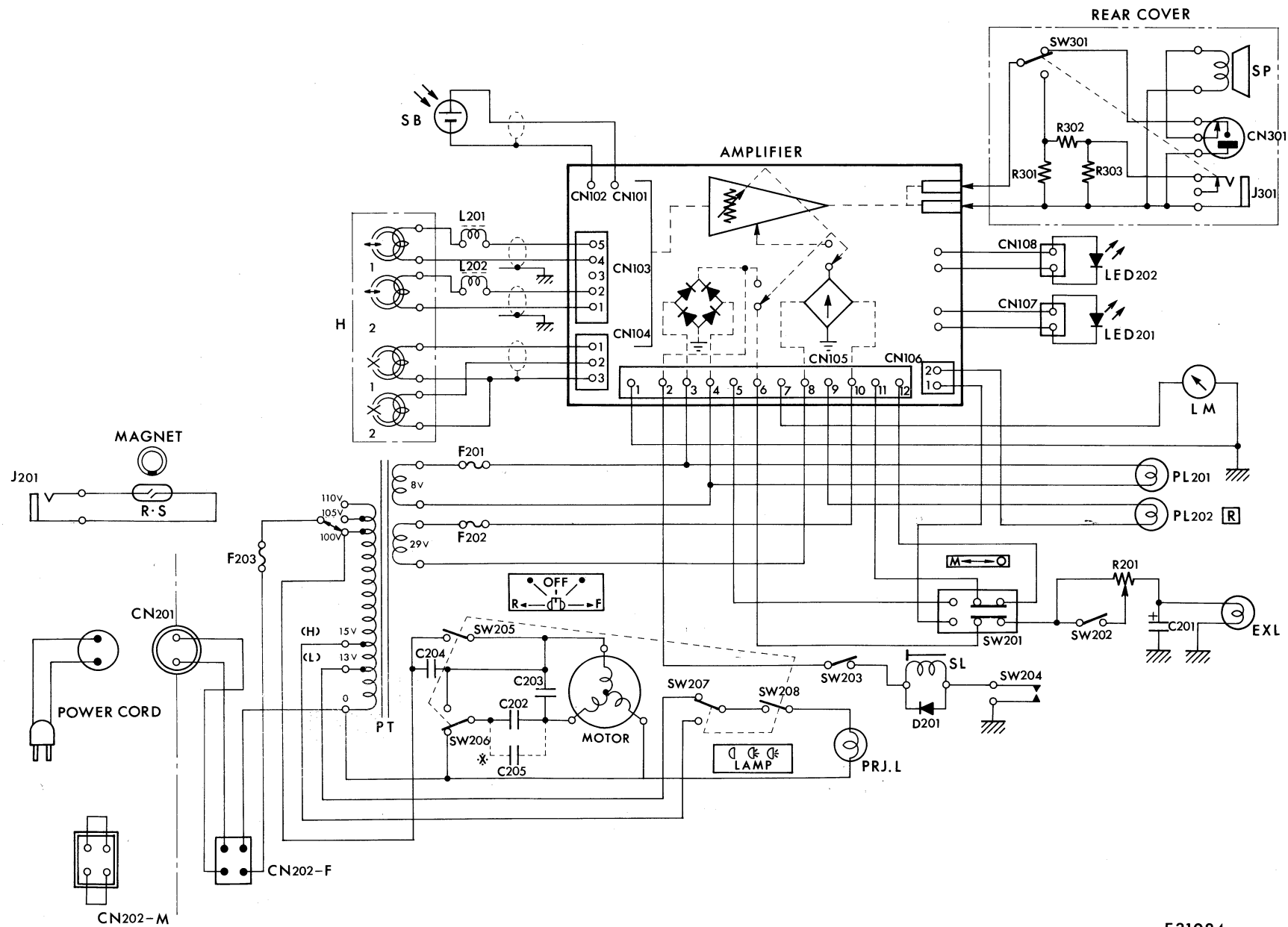
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Schematic diagram for machine for ST-1200HD

E31084

PARTS LIST

ST-1200HD

NOTICE

1. Please file away this parts list, page 14 into the parts list No. 148 for the ST-1200HD projector in your hand.

This list shows modification of the parts on page 8. The modification is made for improvement in sound quality furthermore.

ご 注 意

1. このパーツリストは、ST-1200HD の音質をより一層向上させるため、頁8の改定部品及追加部品が記載してあります。
頁14として御利用下さい。

ELMO CO., LTD.

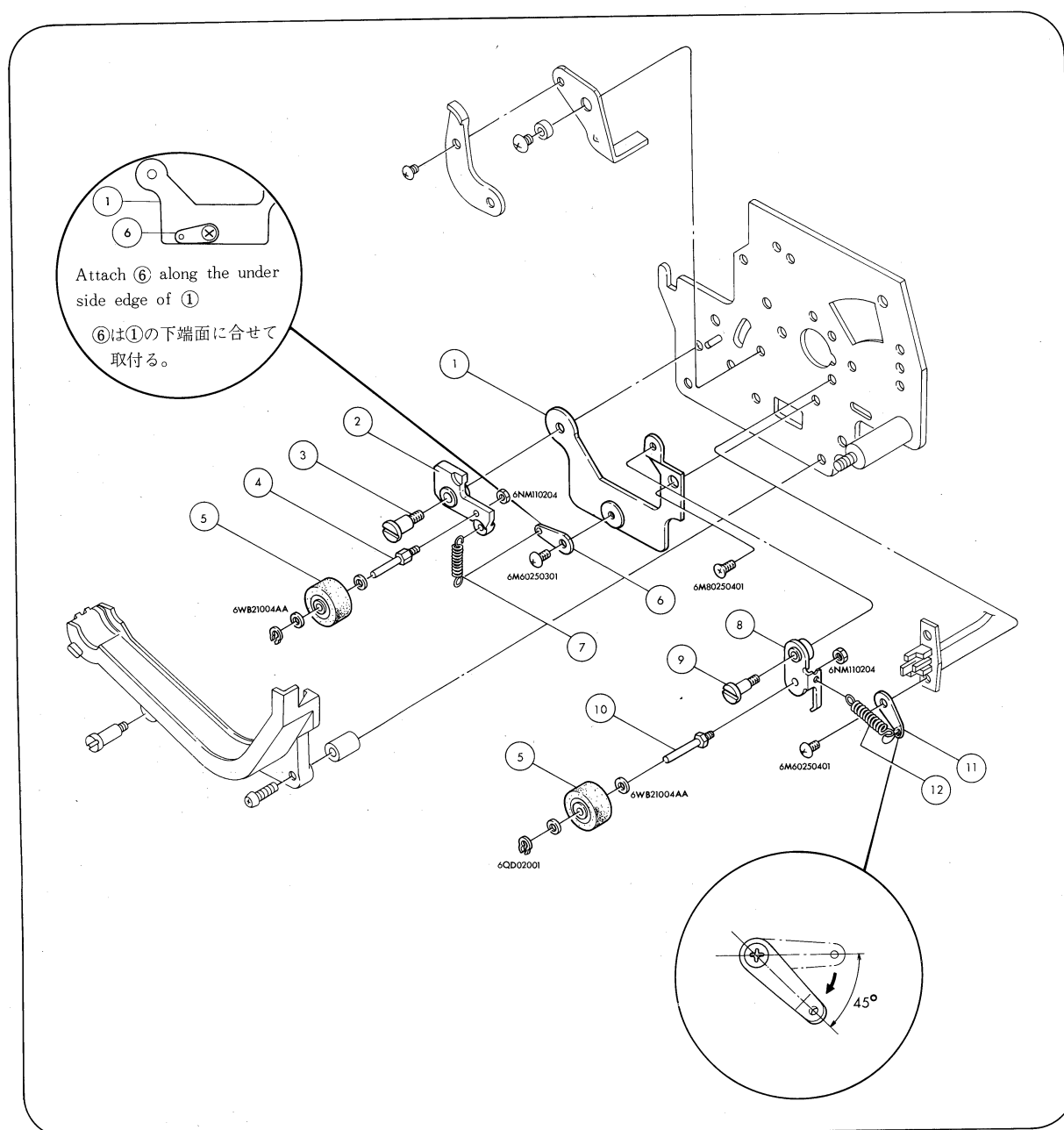


Illustration No.	Parts No.	Parts Name		Common Use Model
1	P413337	取付板テンション	Fix plate tension	
2	P413340	ホルダテンション(2)組立品	Holder tension(2) assy	
3	4P55832	軸(2)テンション(2)	Shaft(2) tension 2	
4	4P55831	軸(1)テンション(2)	Shaft(1) tension 1	
5	4P48658	パッドローラ組立品	Pad roller assy	ST-600. ST-800
6	P411749	バネ掛板パッドローラ	Spring fix plate	ST-1200D
7	4C55275	バネセフティーレバーD O.L部	Spring safety lever D	350SL
8	P413338	ホルダテンション(1)組立品	Holder tension(1) assy	
9	4P55829	軸(2)テンション(1)	Shaft(2) tension 1	
10	4P55828	軸(1)テンション(1)	Shaft(1) tension 1	
11	4P55663	バネレンズホルダ	Spring lens holder	ST-600. ST-800
12	4P53018	バランシングスタビライザ バネ(1)	Spring(1) balance lever	ST-1200D

ELECTRIC PARTS LIST

E 20485

No.	Parts No.	Parts Name	Schematic Diagram No.
1	5ATA7139P	IC TA7139P	IC ₁₀₁ IC ₁₀₂ IC ₁₀₃ IC ₁₀₄
2	5ASTK016	IC STK016	IC ₁₀₅
3	5S12SC536	Transistor 2SC536	Tr ₁₀₁
4	5S12SC509	Transistor 2SC509	Tr ₁₀₂ Tr ₁₀₃
5	5S12SC1173	Transistor 2SC1173	Tr ₁₀₄
6	5Z0015	Photo coupler P873-G35-380	PC
7	5S2SR103D	LED SR103D	LED ₁₀₁ LED ₂₀₁ LED ₂₀₂
8	5S21S1887	Si diode 1S1887	D _{101~104} D _{107~110} D ₂₀₁
9	5S21S34	Ge diode 1S34	D ₁₀₅ D ₁₀₆
10	5S2SIRB20	Si rectifier SIRB20	Rec
11	4K00708	OSC coil 28N-367	L ₁₀₁
12	5J20009	Trap coil DM10mH	L ₁₀₂
13	5J20011	Trap coil RX9P-473K	L ₁₀₃ L ₁₀₄
14	5J20013	Filter coil RC875-103K	L ₁₀₅ L ₁₀₆
15	5R6Z0014B1	VR 10K Btype	VR ₁₀₁
16	5R6Z0014G1	VR 10K Gtype	VR ₁₀₃
17	5R4Z0054B2	VR 50K Btype & 10K Atype	VR ₁₀₂₋₁ VR ₁₀₂₋₂
18	5R6Z0054B4	VR 50K Btype W/S (D-5mm)	VR ₁₀₄
19	5R8Z0025B3	Semi fix R 200K	VR ₁₀₅

ELMO CO., LTD.

Service Department

Nagoya Japan

MAY 1977