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AMPRO 16-mm: STYLIST PROJECTOR

"UNIVERSAL" MODEL

for 200-250 volts - AC or DC supply.

OPERATING INSTRUCTIONS

The following instructions should be read in conjunction with the attached descriptive diagram.

OPERATING WITH SPECIAL RESISTANCE UNIT on DC or AC supplies.

Firstly examine the RESISTANCE unit and make quite sure that all three voltage tapings for Lamp, Motor and Amplifier respectively are correctly set for the correct MAINS voltage.

After setting up the Projector in the normal manner, connect the usual projector power cable with 3-pin moulded plug (1) to the 3-pin socket (2) on the Resistance Unit which supplies current to the projector lamp and also provides the earth connection. The 4-pin socket (3) on the Resistance output cable is then connected to the 4-pin fixed plug (4) on the front base of the Projector to feed the Motor and Amplifier independently.

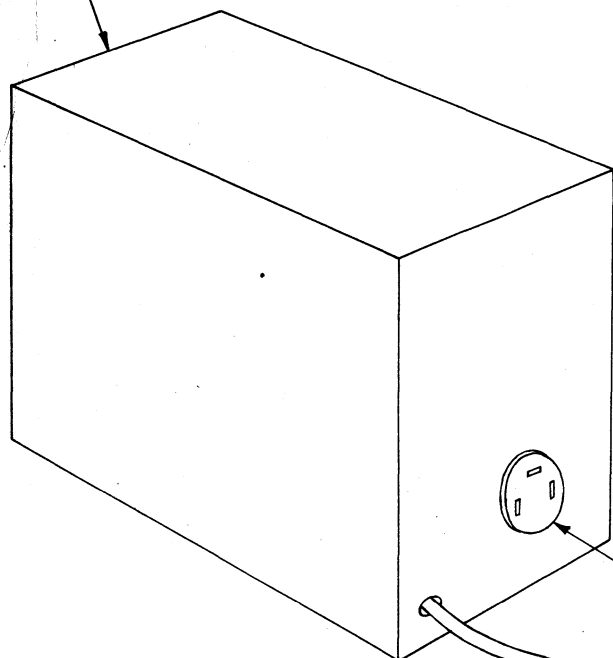
When these simple connections are completed the "UNIVERSAL" STYLIST Projector is then ready to operate on either DC, or AC, mains supply, 200-250 volts.

CORRECT POLARITY - If after making all connections and when the Projector is running no sound results (ie. the excitor lamp does not light), change the position of the red and black leads of the Resistance input cable to the mains supply to obtain correct polarity of current. This condition would only apply in the case of DC supply.

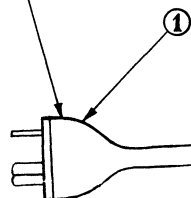
OPERATING WITH MAINS TRANSFORMER ON 200-250 volts AC SUPPLY.

The "UNIVERSAL" STYLIST projector can be also operated through a mains TRANSFORMER unit when used on AC supply only (200-250V), in which case the usual Projector power cable with 3-pin moulded plug is connected direct to the Transformer and in addition the 4-pin socket (5) attached to a short cable must be connected to the 4-pin fixed plug (4) mounted on the front base of the Projector. Care must be taken to see that all connections are made before connecting to the mains supply and before switching-on the Projector. CAUTION - never operate the Projector on AC supply without connecting the 4-pin socket (5) to the 4-pin fixed plug (4).

SPECIALLY DESIGNED "RESISTANCE UNIT" FOR OPERATING ON BOTH D.C. AND A.C., 200/250 VOLTS SUPPLY [PART 35057]



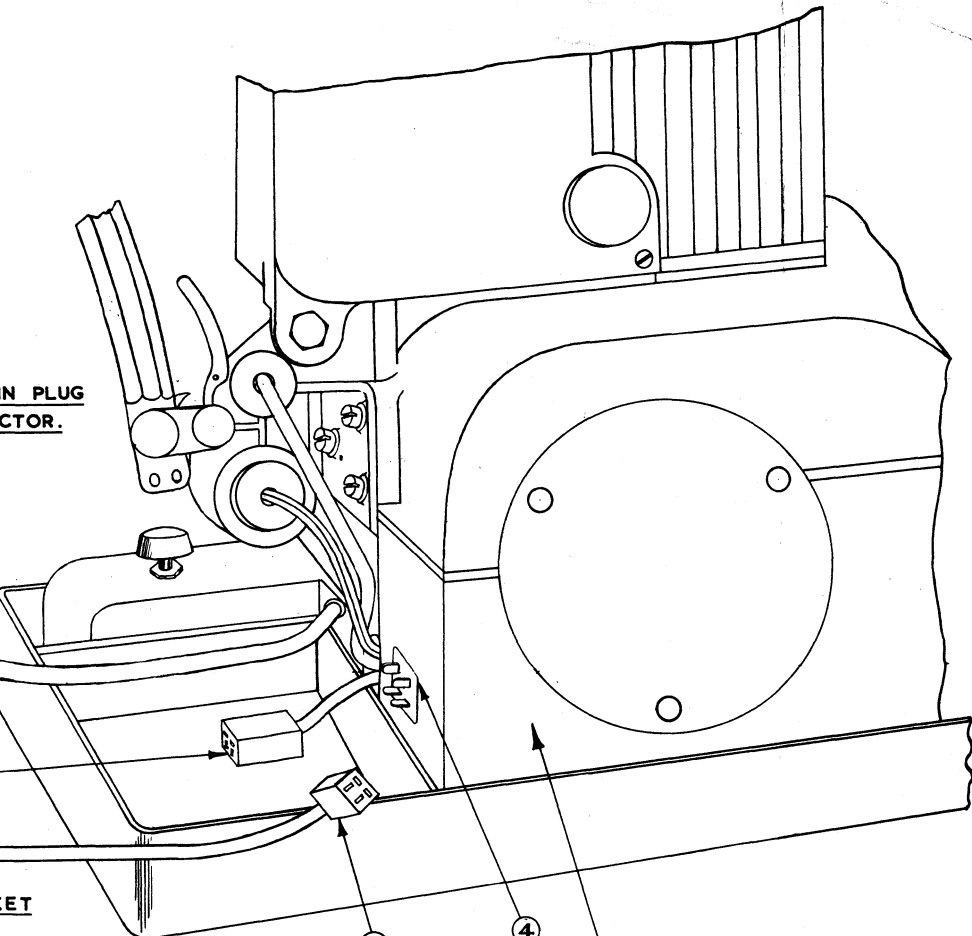
STANDARD LINE CABLE & 3 PIN PLUG SUPPLIED WITH STYLIST PROJECTOR. [FEEDING PROJECTION LAMP]



RESISTANCE OUTPUT CABLE & 4 PIN SOCKET SUPPLIED WITH RESISTANCE UNIT. [FEEDING PROJECTOR MOTOR & AMPLIFIER SEPARATELY]



MODIFIED STYLIST PROJECTOR "UNIVERSAL" MODEL [CODE: SPUSM]



CONNECTIONS

FOR OPERATING WITH RESISTANCE UNIT ON BOTH D.C. & A.C. SUPPLY, 200/250 VOLTS.

PLUG No. 1. CONNECTS SOCKET No. 2.

SOCKET No. 3. CONNECTS TO PLUG No. 4.

SOCKET No. 5. LEFT UNCONNECTED

WARNING - BEFORE MAKING CONNECTION TO THE PROJECTOR, MAKE QUITE CERTAIN THAT THE RESISTANCE UNIT IS CORRECTLY SET FOR THE CORRECT VOLTAGE TAPPINGS. [FOR LAMP, MOTOR & AMPLIFIER SUPPLY]

NOTE - WHEN OPERATING ON 105/125 VOLTS, A.C. OR D.C., THE RESISTANCE UNIT IS NOT USED, AND SOCKET No. 5. IS CONNECTED TO PLUG No. 4.

MODIFIED STYLIST PROJECTOR "UNIVERSAL" MODEL

FOR BOTH D.C. & A.C. SUPPLY 200/250 VOLTS

SIMPLEX - AMPRO LTD. - LONDON

AMPRO 16-mm: STYLIST PROJECTOR

"UNIVERSAL" MODEL

for operating on 200-250 volts.

AC. or DC. supply.

GENERAL DESCRIPTION.

The UNIVERSAL STYLIST Projector (Code: SPUSM) differs from the Standard Stylist Model only in regard to modifications to enable the UNIVERSAL Stylist model to be used on 200/250 volts either DC or AC supply in conjunction with a specially designed RESISTANCE UNIT (Part: 35057) but at the same time retaining the normal facilities of the Standard model, i.e:- operation from 105/125 volts direct or from 200/250 volts AC supply by means of the usual Mains Transformer.

The UNIVERSAL model is identical in general appearance excepting that a 4-pin fixed plug is fitted to the front of the projector base with a short cable and 4-pin socket connected internally to the projector power wiring. This arrangement enables the motor and amplifier circuits to be supplied individually from appropriate resistors in the mains Resistance Unit.

RESISTANCE UNIT - (Part 35057):- consists of three separate tapped resistors, one each for Lamp, Motor and Amplifier, and the tappings are brought out to panels on the side of the Resistance Unit for adjusting to the correct mains supply voltage. The Resistance Unit is furnished with a 3-pin socket to which is connected the 3-pin moulded plug and cable from the projector and is used for the Lamp supply and earth connection. The 4-pin socket and cable permanently attached to the Resistance Unit connects to the 4-pin plug fixed to the front of the projector base to feed current to the Motor and Amplifier. In addition a mains input cable is permanently attached for connecting to the mains voltage supply as follows:- Red - Positive or line. Black - Negative or Neutral. Green - Earth.

For particulars of Prices - see current Projector Price List.

AMPRO 16-mm: STYLIST PROJECTOR

"UNIVERSAL" MODEL

for 200-250 volts - AC.or DC.supply.

OPERATING INSTRUCTIONS

The following instructions should be read  
in conjunction with the attached descriptive  
diagram.

OPERATING WITH SPECIAL RESISTANCE UNIT on DC or AC.supplies.

Firstly examine the RESISTANCE unit and make quite sure that all three voltage tappings for Lamp. Motor and Amplifier respectively are correctly set for the correct MAINS voltage.

After setting up the Projector in the normal manner, connect the usual projector power cable with 3-pin moulded plug (1) to the 3-pin socket (2) on the Resistance Unit which supplies current to the projector lamp and also provides the earth connection. The 4-pin socket (3) on the Resistance output cable is then connected to the 4-pin fixed plug (4) on the front base of the Projector to feed the Motor and Amplifier independently.

When these simple connections are completed the "UNIVERSAL" STYLIST Projector is then ready to operate on either DC. or AC. mains supply, 200-250 volts.

CORRECT POLARITY - If after making all connections and when the Projector is running no sound results (ie. the excitor lamp does not light), change the position of the red and black leads of the Resistance input cable to the mains supply to obtain correct polarity of current. This condition would only apply in the case of DC.supply.

OPERATING WITH MAINS TRANSFORMER ON 200-250 volts AC.SUPPLY.

The "UNIVERSAL" STYLIST projector can be also operated through a mains TRANSFORMER unit when used on AC.supply only (200-250V), in which case the usual Projector power cable with 3-pin moulded plug is connected direct to the Transformer and in addition the 4-pin socket (5) attached to a short cable must be connected to the 4-pin fixed plug (4) mounted on the front base of the Projector. Care must be taken to see that all connections are made before connecting to the mains supply and before switching-on the Projector. CAUTION - never operate the Projector on AC. supply without connecting the 4-pin socket (5) to the 4-pin fixed plug (4).

SPECIALLY DESIGNED "RESISTANCE UNIT" FOR  
OPERATING ON BOTH D.C. AND A.C., 200/250  
VOLTS SUPPLY [PART 35057]

STANDARD LINE CABLE & 3 PIN PLUG  
SUPPLIED WITH STYLIST PROJECTOR.  
[FEEDING PROJECTION LAMP]

RESISTANCE OUTPUT CABLE & 4 PIN SOCKET  
SUPPLIED WITH RESISTANCE UNIT.  
[FEEDING PROJECTOR MOTOR & AMPLIFIER SEPARATELY]

MODIFIED STYLIST PROJECTOR  
"UNIVERSAL" MODEL  
[CODE: SPUSM]

### CONNECTIONS

FOR OPERATING WITH RESISTANCE UNIT ON BOTH D.C. & A.C. SUPPLY, 200/250 VOLTS.

PLUG No.1. CONNECTS SOCKET No. 2.

SOCKET No.3. CONNECTS TO PLUG No.4.

SOCKET No.5. LEFT UNCONNECTED

WARNING - BEFORE MAKING CONNECTION TO THE PROJECTOR, MAKE QUITE CERTAIN  
THAT THE RESISTANCE UNIT IS CORRECTLY SET FOR THE CORRECT  
VOLTAGE TAPPINGS. [FOR LAMP, MOTOR & AMPLIFIER SUPPLY]

NOTE - WHEN OPERATING ON 105/125 VOLTS, A.C. OR D.C., THE RESISTANCE  
UNIT IS NOT USED, AND SOCKET No. 5. IS CONNECTED TO PLUG No. 4.

MODIFIED STYLIST PROJECTOR  
"UNIVERSAL" MODEL

FOR BOTH D.C. & A.C. SUPPLY

200/250 VOLTS

SIMPLEX - AMPRO LTD. - LONDON

STYLIST PROJECTOR

NUMERICAL INDEX & PRICE LIST

1st MAY 1951

SIMPLEX - AMPRO LIMITED

167 - 169, WARDOUR STREET, LONDON, W.1. ENGLAND.

STYLIST PROJECTOR.Part B - Numerical Index & Price List.

(All prices subject to change without notice).

Part No.	Page	Price			Part No.	Page	Price			
		£.	s.	d.			£.	s.	d.	
632	12		6	0	yd.	30093	4	1	0	doz.
1443	2			6	ea.	30094	6	1	0	doz.
1675A	1			3	doz.	30095	5	1	0	doz.
1677A	1			3	doz.	30097	6		3	ea.
1679A	1		3	0	ea.	30098	6	2	0	doz.
1690A	1		2	0	doz.		6	2	0	doz.
	1		2	0	doz.	30099	4	2	0	doz.
	1		2	0	doz.		6	2	0	doz.
1691A	1		2	0	doz.	30101	5		6	ea.
2484	1			3	doz.	30103	5	1	0	ea.
2487B	1			6	doz.	30106	4	1	6	ea.
	2			6	doz.		5	1	6	ea.
2492B	9			6	doz.	30107	5		3	ea.
2625L	9		1	3	doz.	30111	5		6	ea.
	9		1	3	doz.		5		6	ea.
2625P	1		2	6	doz.	30112	4	1	0	doz.
2626G	1			4	ea.	30114	4	1	0	doz.
2629G	3		2	0	doz.	30119	4		6	ea.
2650L	9		1	0	doz.		5		6	ea.
2651L	9		1	3	doz.		5		6	ea.
2652L	3		1	0	doz.	30130	4	1	0	doz.
2653K	9		1	0	doz.		4	1	0	doz.
2661K	1		1	0	doz.	30131	6	1	0	doz.
	1		1	0	doz.		6	1	0	doz.
2662K	1		2	0	doz.		6	1	0	doz.
	1		2	0	doz.		6	1	0	doz.
2663K	12		1	0	doz.	30132	5		6	ea.
2664K	12		1	0	doz.	30133	6	1	0	doz.
	13		1	0	doz.		6	1	0	doz.
2665K	12		1	0	doz.		6	1	0	doz.
2666K	3		2	0	doz.		6	1	0	doz.
	3		2	0	doz.		6	1	0	doz.
2687K	9		2	0	doz.		6	1	0	doz.
2689K	10			6	ea.	30134	6	2	0	doz.
2690E	12		1	0	doz.		6	2	0	doz.
30051	4		2	0	ea.		6	2	0	doz.
30058	5		2	6	ea.		6	2	0	doz.
30077	4		2	6	ea.		6	2	0	doz.
	5		2	6	ea.	30135	6	2	0	doz.
30079	4		4	9	ea.		6	2	0	doz.
30080	4		4	0	ea.		6	2	0	doz.
30083	6		1	6	ea.	30139	4	5	0	ea.
30092	4			4	ea.	30144	6		6	doz.
30093	4		1	0	doz.	30145	4		9	ea.



1st May, 1951.

Part B - Numerical Index & Price List. (Cont'd.)

(All prices subject to change without notice).

Part No.	Page	Price				Part No.	Page	Price			
		£.	s.	d.				£.	s.	d.	
30147	5			9	doz.	30712	6	5	0	0	ea.
30161	6	1	1	0	ea.	30718	6	2	15	0	ea.
30171	1			6	ea.	30721	6	1	5	0	ea.
30175	5		2	0	ea.	30730	6	1	10	0	ea.
30176	5		1	3	ea.	30731	6	1	12	6	ea.
30178	5			3	ea.	30740	6		3	6	ea.
30194	6			3	ea.	30741	7		7	6	ea.
	6			3	ea.	30745	4		9	0	ea.
30200	7		1	0	doz.	31030	6			6	ea.
30213	4			6	ea.	31031	6			3	ea.
30261	6		6	6	ea.	31032	6			3	ea.
30262	4		2	6	ea.	31272	9			3	ea.
	5		2	6	ea.	31273	9		1	0	doz.
30263	5		2	6	ea.	31402	4		4	0	ea.
	5		2	6	ea.	31403	5		4	0	ea.
30296	7		3	6	ea.	31404	4		16	0	ea.
30301	4			6	ea.	31410	5			6	ea.
30321	6			6	ea.	31412	5			6	ea.
30322	4		1	3	ea.	31416	5		2	6	ea.
30323	4		1	3	ea.	31424	5		18	0	ea.
30358	9		2	6	ea.	31425	5		3	6	ea.
30393	5			6	doz.	31426	5			6	ea.
30455	6		2	6	ea.	31427	5			6	ea.
	6		2	6	ea.	31434	5		4	6	ea.
30456	6		4	0	ea.	31435	5			3	ea.
30460	6		1	6	ea.	31436	5		5	6	ea.
30501B	4		15	0	ea.	31438	5			9	ea.
30530	7		7	0	ea.	31441	5		2	6	ea.
30531	7		5	0	ea.	31443	5			6	ea.
30532	7		3	6	ea.	31444	5		1	0	ea.
30540	4		8	3	ea.	31445	5			4	ea.
30542	4		1	6	ea.	31447	5			9	ea.
	4		1	6	ea.	31448	4			3	ea.
	10		1	6	ea.		5			3	ea.
30543	4		8	6	ea.	31455	7		2	0	ea.
30550	4		10	0	ea.	31530	6	1	6	0	ea.
30551	4	1	10	0	ea.	31861	5		7	0	ea.
30571	5	1	0	0	ea.	31862	5		7	6	ea.
30581	7		7	6	ea.	31865	5	3	5	0	ea.
30584	6		17	0	ea.	31866	5	1	10	0	ea.
30585	6	1	4	6	ea.	31867	5	3	0	0	ea.
30594	5		9	6	ea.	31871	5	2	0	0	ea.
30597	4		9	6	ea.	31873	7		3	6	ea.
30599	4		15	0	ea.	31875	4	2	10	0	ea.
30701	6		11	0	ea.	31876	5	2	10	0	ea.
30702	6	2	12	6	ea.	31880	5		1	3	ea.
30703	6		18	0	ea.	31883	5		10	0	ea.
30711	6	2	5	0	ea.	31885	5		10	0	ea.

1st May, 1951.

## Part B - Numerical Index &amp; Price List. (Cont'd.)

(All prices subject to change without notice).

Part No.	Page	Price				Part No.	Page	Price			
		£.	s.	d.				£.	s.	d.	
31889	4	9	10	0	ea.	34342	10	2	0	doz.	
31893	7	12	0	0	ea.		11	2	0	doz.	
31900	3	45	0	0	ea.	34343	10		6	doz.	
31922	9	2	0	0	ea.	34346	10	1	3	ea.	
32003	4		17	6	ea.	34348	11	1	6	ea.	
32006	1	8	15	0	ea.	34349	10	1	0	ea.	
32010	10	6	6	0	ea.	34351	11		4	ea.	
32101	4	1	2	6	ea.	34352	11		3	ea.	
32102	4	1	10	0	ea.	34353	10		3	ea.	
32103	4	1	5	0	ea.	34354	10		6	ea.	
32107	4		1	0	ea.	34356	11	15	0	ea.	
33226	12			6	doz.	34357	10	1	4	0	ea.
33280	2		1	0	doz.	34361	10		9	0	ea.
	12		1	0	doz.	34365	10			3	ea.
	13		1	0	doz.	34366	10		1	0	ea.
33377	1	3	5	0	ea.	34370	10		1	6	ea.
33391	12		6	0	ea.	34372	10	15	0	ea.	
34026	8			6	ea.	34373	10	7	6	ea.	
	8			6	ea.	34385	10			6	ea.
34041	3		17	6	ea.	34386	10			3	ea.
34053	10			3	ea.	34391	10	1	0	doz.	
34058	8		1	6	ea.	34392	10	1	0	doz.	
34074	8		17	6	ea.	34393	10	2	0	ea.	
34077	8		1	6	ea.	34394	10			6	ea.
34078	8		1	0	doz.	34395	10			3	doz.
34079	8		1	0	doz.	34396	10			9	ea.
	8		1	0	doz.	34398	11	6	0	ea.	
34080	8		1	6	ea.	34417	10	1	0	ea.	
	8		1	6	ea.	34418	10			9	ea.
34081	8			9	ea.	34457	1			3	ea.
34088	8		1	6	ea.	34477	2	1	0	doz.	
34104	8		1	0	doz.		10	1	0	doz.	
34107	10		2	0	doz.	34480	2			6	ea.
34113	10		1	6	doz.	34522	2			3	ea.
34117	2		3	9	ea.	34529	2			6	ea.
	2		3	9	ea.	34533B	2	4	0	ea.	
34118	2		2	6	ea.	34565	2	3	6	ea.	
	2		2	6	ea.	34567	1			6	ea.
34119	2			5	ea.		12			6	ea.
	2			5	ea.		13			6	ea.
34120	2			6	doz.	34573	2			3	ea.
	2			6	ea.	34579	1			3	ea.
34150B	1		3	6	ea.	34633	10	1	6	doz.	
34159	1		2	6	ea.		11	1	6	doz.	
34160	1		1	6	ea.	34696	10	1	0	doz.	
34182	1		2	6	ea.	34755	3			3	ea.
34314B	10		12	6	ea.	34794	10	10	6	ea.	
34341	10		2	0	doz.	35205	2	3	0	ea.	

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Part B - Numerical Index & Price List. (Cont'd.)

(All prices subject to change without notice).

Part No.	Page	Price			Part No.	Page	Price					
		£.	s.	d.			£.	s.	d.			
35306	3			9	ea.	37075/15	9	2	0	doz.		
	3			9	ea.	37075/30	9		3	ea.		
35333	1			9	ea.	37076	9		9	ea.		
	2			9	ea.	37077	2	16	0	0	ea.	
35347	1			3	ea.	37078	9		2	0	ea.	
	3			3	ea.	37079	9			9	ea.	
35348	9			6	ea.	37101	1	2	5	0	ea.	
35349	1			9	ea.	37102	1		2	6	ea.	
35370	8		2	0	doz.	37104	1		12	6	ea.	
	9		2	0	doz.	37105	1		5	0	ea.	
35371	13		2	0	doz.	37106	1		4	0	ea.	
35372	12			3	ea.	37109	1			9	ea.	
	12			3	ea.	37110	1		3	0	ea.	
	13			3	ea.	37111	2			3	ea.	
	13			3	ea.	37112	1		3	6	ea.	
35373	8		1	0	doz.	37113	3		2	6	ea.	
	12		1	0	doz.		4		2	6	ea.	
	12		1	0	doz.	37115	1			*		
	13		1	0	doz.	37116	1		2	0	ea.	
37008	12		1	6	ea.		7		2	0	ea.	
37014	2	1	5	0	ea.	37117	1	2	0	0	ea.	
37020	10		1	0	doz.	37120	2	25	0	0	ea.	
	11		1	0	doz.	37121	2	3	10	0	ea.	
37026	10		1	6	ea.	37122	2	3	5	0	ea.	
37029	2		15	0	ea.	37123	1	33	0	0	ea.	
37032	3		4	0	ea.	37126	12		8	0	ea.	
37034	3	1	2	6	ea.	37127	12	2	0	0	ea.	
37035		1	15	0	ea.	37129	12		16	0	ea.	
37036	9			3	ea.	37130	12	1	4	0	ea.	
37037	9			2	0	ea.	37132	12	1	15	0	ea.
	9			2	0	ea.	37135	13		1	6	ea.
37038	9			9	ea.	37136	13		6	0	ea.	
	9			9	ea.	37137	13			3	ea.	
37039	9			4	ea.	37138	3		4	6	ea.	
37040	9			2	6	ea.		13		4	6	ea.
37043	9			6	0	ea.	37139	13		10	0	ea.
37046	9	1	5	0	ea.	37140	13		10	0	ea.	
37047	9			3	ea.	37141	13		7	6	ea.	
37057	9	3	5	0	ea.	37143	13		12	6	ea.	
37064	9			3	6	ea.	37144	13		7	6	ea.
37066	9	6	12	0	ea.	37145	13	1	0	0	ea.	
37069	9	12	0	0	ea.	37146	13		4	0	ea.	
37070	9			1	6	ea.	37147	12	1	7	6	ea.
37071	9			9	ea.	37150	12		3	0	ea.	
37072	9			2	0	ea.	37152	13		6	ea.	
37073	9			6	ea.	37153	13		6	ea.		
37074	9			2	0	doz.	37154	13		6	ea.	
37075/5	9			2	0	doz.	37155	13		6	ea.	

## Part B - Numerical Index &amp; Price List. (Cont'd.)

(All prices subject to change without notice).

Part No.	Page	Price			Part No.	Page	Price					
		£.	s.	d.			£.	s.	d.			
37156	13			6	ea.	37234	1			6	ea.	
37177	13			6	ea.	37235	1	1		6	ea.	
37178	13			6	ea.	37236	1	1		6	ea.	
37179	13			6	ea.	37237	3	1	0		ea.	
37160	13			6	ea.	37238	3	1		6	ea.	
37161	13			9	ea.	37239	3	1	3		ea.	
37162	13		1	3	ea.	37240	3	1		6	ea.	
37163	13			6	ea.	37241	2			6	ea.	
37164	13			6	ea.	37242	2	4	0		ea.	
37165	13			6	ea.	37243	2			3	ea.	
37166	12		3	0	ea.	37244	3			6	doz.	
37167	12		2	0	ea.	37245	3		1	0	ea.	
37168	12		5	0	ea.	37246	2		1	0	doz.	
37169	12		2	6	ea.		2		1	0	doz.	
37170	12		1	9	ea.		2		1	0	doz.	
37171	12		6	0	ea.	37247	3			6	ea.	
37172	12		3	6	ea.	37248	3		6	0	ea.	
37173	12		3	0	ea.	37249	2		7	6	ea.	
37174	12			6	ea.	37250	3			6	ea.	
37183	12		1	3	ea.	37251	3		12	0	ea.	
37184	12		1	6	ea.	37252	3		4	0	ea.	
37185	12		1	6	ea.	37254	3	13	0	0	ea.	
37186	12		1	6	ea.	37255	2	4	10	0	ea.	
37187	12		2	0	ea.	37256	2		15	0	ea.	
37188	12		2	0	ea.	37257	3		1	1	0	ea.
37189	13		2	6	ea.	37258	2		1	10	0	ea.
37198	11	4	7	0	ea.	37259	3		12	0	ea.	
37199	10		15	0	ea.	37262	3		2	6	ea.	
37200	10	2	8	0	ea.	37263	3		2	6	ea.	
37201	10		7	6	ea.	37264	1			6	ea.	
37202	10		12	0	ea.	37274	2	1	10	0	ea.	
37203	10	2	10	0	ea.	37275	2		15	0	ea.	
37204	10		12	0	ea.	37276	2	1	2	6	ea.	
37205	10	1	10	0	ea.	37277	2		6	0	ea.	
37206	10			6	ea.	37282	1	2	0	0	ea.	
37212	10		3	0	ea.	37283	1		6	0	ea.	
37212	10		3	0	ea.	37284	8		1	6	ea.	
37219	1		6	0	ea.	37285	2		1	9	ea.	
37220	8	1	5	0	ea.	37286	2			6	ea.	
37221	8		1	6	ea.	37288	12		2	6	ea.	
37222	8	1	5	0	ea.	37290	13			6	ea.	
37223	8			9	ea.	37291	13			6	ea.	
37225	8	1	10	0	ea.	37293	3			4	ea.	
37226	8	1	7	6	ea.	37294	12			Ж		
37227	8			9	ea.	37295	12			Ж		
37228	8		1	6	ea.	37296	12			Ж		
37231	1		3	6	ea.	37301	13	7	0		ea.	
37233	1	11	5	0	ea.	37304	2			6	ea.	

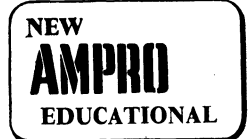
1st May, 1951.

Part B - Numerical Index & Price List. (Cont'd.)

(All prices subject to change without notice).

Part No.	Page	Price			Part No.	Page	Price		
		£.	s.	d.			£.	s.	d.
37305	2			3	ea.				
37309	1		2	0	doz.				
37319	3		10	0	ea.				
37320	9			9	ea.				
37350	3	7	10	0	ea.				
37351	3	5	10	0	ea.				
37352	12		18	0	ea.				
37353	2		6	0	ea.				
37354	2		12	6	ea.				
37378	3		6	0	ea.				
* See separate price list.									

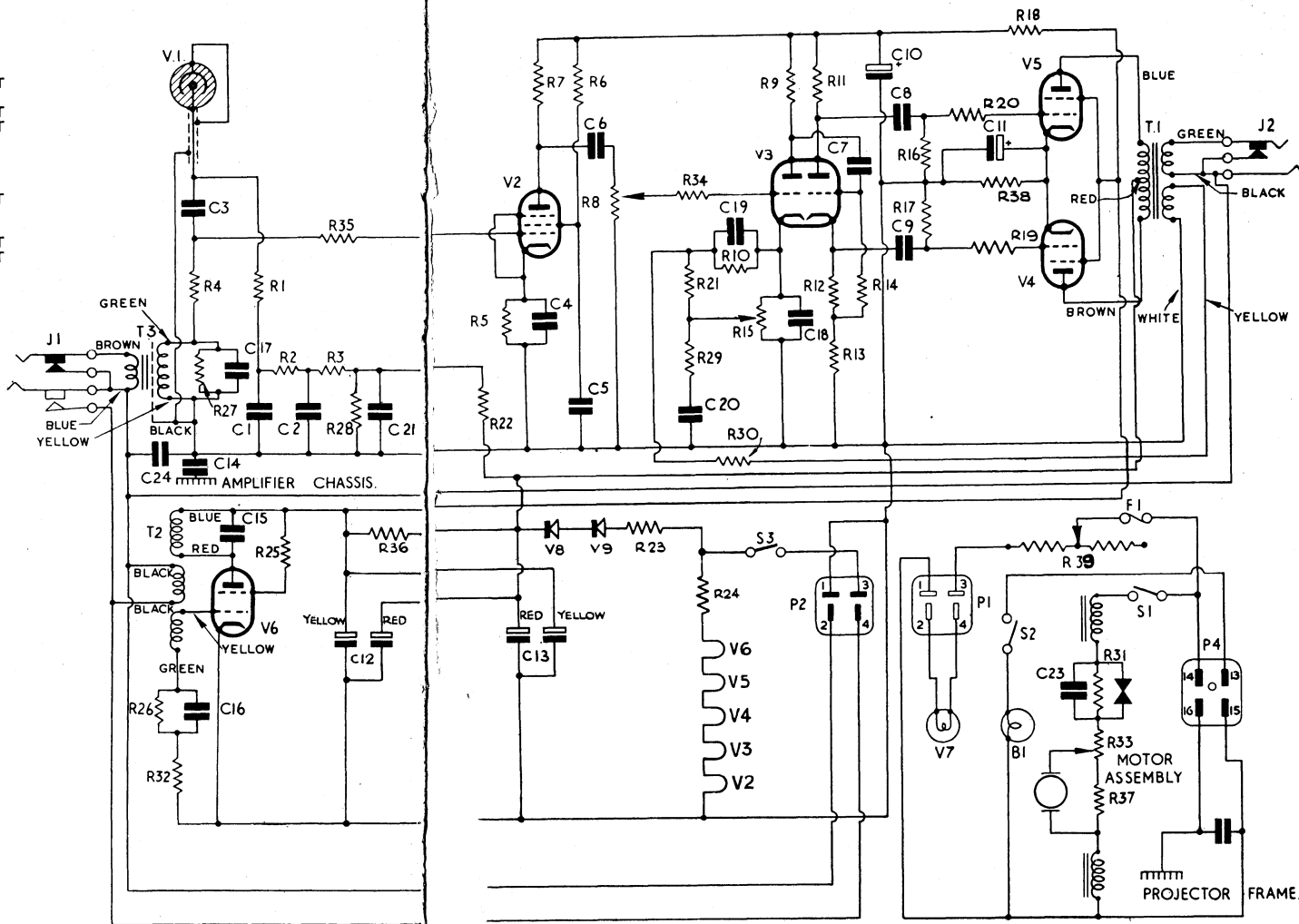
**NEW EDUCATIONAL  
PROJECTOR**



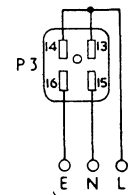
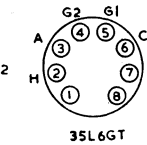
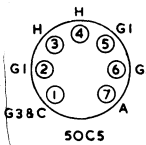
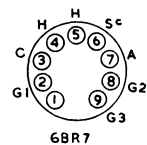
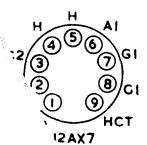
**FAULT FINDING** *Contd.*

SYMPTOM	PROBABLE CAUSE	REMEDY
8 Amplifier fuse burns out.	Excessive line voltage.  Damaged valves. Amplifier requires servicing.	Check main supply voltage and adjust tapping. Replace valves. Contact service agent.
9 Ringing noise from speaker.	Faulty photocell or exciter lamp.	Replace cell or lamp.
10 Regular thumping noise from speaker.	Dirt on edge of sound drum.	Clean drum.
11 Film noisy in gate.	Stretched or shrunken film. Mechanism requires adjusting.	Check film. Contact service agent.
12 Picture unsteady.	Stretched or shrunken film. Dirt in film gate. Mechanism requires adjustment.	Check film. Clean gate. Contact service agent.
13 Picture out of focus.	Dirty lens. Warped film.	Clean lens. Check film.
14 Colour bands on screen.	Damaged lamp. Lamp not centered.	Replace lamp. Adjust lamp adjusting screw (12, Fig. 4).

Reference	Description	Part No.
C1, C2, C21.	Capacitor, Paper, 0.25 mfd. 150V.	37172/T
C3, C6.	" " Ceramic, 0.001 mfd. 350V.	37167
C4, C5.	" " Paper, 0.02 mfd. 350V.	37288/T
C7, C8, C9.	" " Paper, 0.01 mfd. 350V.	37169/T
C10.	" " Electrolytic, 8 mfd. 350V.	37622
C11.	" " Electrolytic, 30 mfd. 15V.	37168
C12, C13.	" " Electrolytic, 16 + 16 mfd. 450V.	37650
C14.	" " Paper, 0.25 mfd. 350V.	37146/T
C15.	" " Ceramic, 0.0001 mfd. 500V.	37183
C16, C17.	" " Ceramic, 0.0005 mfd. 350V.	37170
C18, C19.	" " Paper, 0.05 mfd. 250V.	37166/T
C20.	" " Paper, 0.1 mfd. 250V.	37173/T
C22.	" " Paper, 0.05 mfd. 500V.	37252
C23.	" " Paper, 0.5 mfd. 250V.	37248
C24.	" " Mica, 0.005 mfd. 350V.	33312
R1, R4.	Resistor, Carbon, 1/2W., 5.6 M 10%	37152
R2, R3, R22.	" " Carbon, 1/2W., 2.2 M 10%	37153
R5.	" " Carbon, 1/2W., 3.9 K 10%	37290
R6.	" " Carbon, 1/2W., 1.5 M 10%	37291
R7, R9, R14, R34, R35.	" " Carbon, 1/2W., 270 K 10%	37155
R8.	Control, Volume, 1 Meg., S.P.S.T. Switch.	37143
R10, R11, R13.	Resistor, Carbon, 1/2W., 100 K 10%	37157
R12.	" " Carbon, 1/2W., 2.2 K 10%	37158
R15.	Control, Tone, 5 K.	37144
R16, R17.	Resistor, Carbon, 1/2W., 470 K 10%	37159
R18.	" " Carbon, 1/2W., 22 K 10%	37164
R19, R20.	" " Carbon, 1/2W., 27 K 10%	37604
R21.	" " Carbon, 1/2W., 2.7 K 10%	37163
R23.	" " Wirewound, 25W., 10 Ω 15%	37139
R24.	" " Wirewound, 25W., 500 Ω 5%	38247
R25.	" " Carbon, 1W., 2.7 K 5%	37189
R26, R32.	" " Carbon, 1W., 1.5 K 5%	37162
R27.	" " Carbon, 1/2W., 560 K 10%	37154
R28.	" " Carbon, 1/2W., 1 M 10%	37615
R29.	" " Carbon, 1/2W., 270 Ω 10%	37160
R30.	" " Carbon, 1/2W., 33 K 10%	37601
R31.	" " Wirewound, 250 Ω 10%	37334
R33.	Rheostat, Wirewound, 320 Ω	37333
R36.	Resistor, Wirewound, 25W., 1350 Ω 5%	38245
R37.	" " Wirewound, 20W., 600 Ω 10%	37335
R38.	" " Wirewound, 1W., 150 Ω 10%	37337
R39.	" " Wirewound, 25W., 34 + 38 Ω 5%	38248
B1.	Projection Lamp.	38020
F1.	Fuse, 1 Amp.	35333
J1.	Input Jack (Gram-Mic).	37126
J2.	Output Jack (Loudspeaker).	33391
S1, S2.	Switch Unit.	37276
S3.	" (Part of R8).	—
T1.	Output Transformer.	37343
T2.	Oscillator Coil.	37093
T3.	Input Transformer.	37127
V1.	Photo-Electric Cell.	33377
V2.	Valve, 6BR7.	37124
V3.	" " 12AX7.	37125
V4, V5.	" " 35L6GT.	37388
V6.	" " 50C5.	37007
V7.	Exciter Lamp, 4V., 1/2 Amp.	37115
V8, V9.	Disc Rectifier, Type RM3.	37141
P1.	Female Connector.	37277
P2.	Male Connector.	37138
P3.	Male Connector.	38240
P4.	Female Connector.	38238



**SCHEMATIC DIAGRAM**



VALVE BASE CONNECTIONS.

200/250V

# SIMPLEX-AMPRO LTD

MOTION PICTURE EQUIPMENT

Chronos Works, North Circular Road, London, NW2

Telephone Gladstone 6444    Telegrams Smithindus London Telex    Telex 22671

26th July 1963

Dear Sirs,

## Simplex-Ampro 16 mm. Projectors

We are writing to advise that we have decided to discontinue selling the Simplex-Ampro 16 mm. Projector which up to now has been made for us by Kelvin & Hughes Ltd. and later by S. Smith & Sons (England) Ltd. under licence from Graflex Inc. of America.

We are conscious of our responsibility in connection with the supply of genuine spare parts and the maintenance of service facilities for the thousands of Simplex-Ampro Projectors which we have sold over the past fifteen years.

We would advise that arrangements have been made whereby Mr. S. W. Rainbow, who for some years has been our General Sales Manager, will fulfil these functions on his own account. S. Smith & Sons (England) Ltd. will by arrangement continue to manufacture spare parts for Ampro projectors, from the production tools, and these parts will be sold by Mr. Rainbow.

In future, therefore, any enquiry respecting Simplex-Ampro Projectors, spares or service should be addressed to:-

Mr. S. W. Rainbow,  
Mayfield,  
Old Malden Lane,  
Worcester Park,  
Surrey.

Tele: DEFwent 4442

Money now due to us should be paid to us at Chronos Works, North Circular Road, London, N.W.2. within our normal terms of trade. No further such sales will be invoiced by us.

*Don't let me know when you  
send Ampro spares*

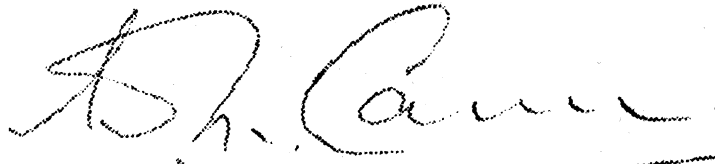
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*R*



We take this opportunity of thanking you for your past support and, whilst we regret that our action inevitably terminates our business relationship with your goodselves, we hope that any connection you may have with any other part of Smiths' activities will remain unimpaired.

Yours very truly,  
for **SIMPLEX-AMPRO LIMITED**

A handwritten signature in cursive script, appearing to read 'W. M. Cann', written over a horizontal line.

**W. M. CANN**  
Director.



# MAINTENANCE MANUAL

FOR

AMPRO  
*Stylist*

16MM SOUND  
PROJECTOR

**SIMPLEX-AMPRO LTD**

167-169 WARDOUR STREET, LONDON, W.1 ENGLAND

*Manufactured in Gt. Britain under U.K. patents of Ampro Corp. U.S.A. by*

**KELVIN & HUGHES LTD**

LONDON GLASGOW BASINGSTOKE

## INTRODUCTION

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

2. Section I of this manual gives a standard method of inspection for the projector and recommends that certain parts should be cleaned during this inspection. Service engineers will find it advisable to carry out an inspection of any machine received for repair whether or not details of the fault to be rectified have been given. This inspection will reveal the general condition of the Projector the absence of any components, the need for any repairs other than those specified by the customer (and of which the customer can be notified before commencing work), and finally the presence or absence of spare parts and accessory equipment. A certain amount of cleaning has been included since many of the irregularities in performance may be due simply to dirt or foreign matter lodged at critical points. After repair, a final inspection in accordance with Section I (omitting of course, the cleaning operations) will ensure that the machine is in first class condition.

3. Section II is a Fault Finding Table, and is intended as a guide to the isolation of specific faults. Reference to the appropriate part of Section III will then indicate the lines on which the repair should be carried out. Section III may also be used as a guide to the complete overhaul of any or all of the units of the projector.

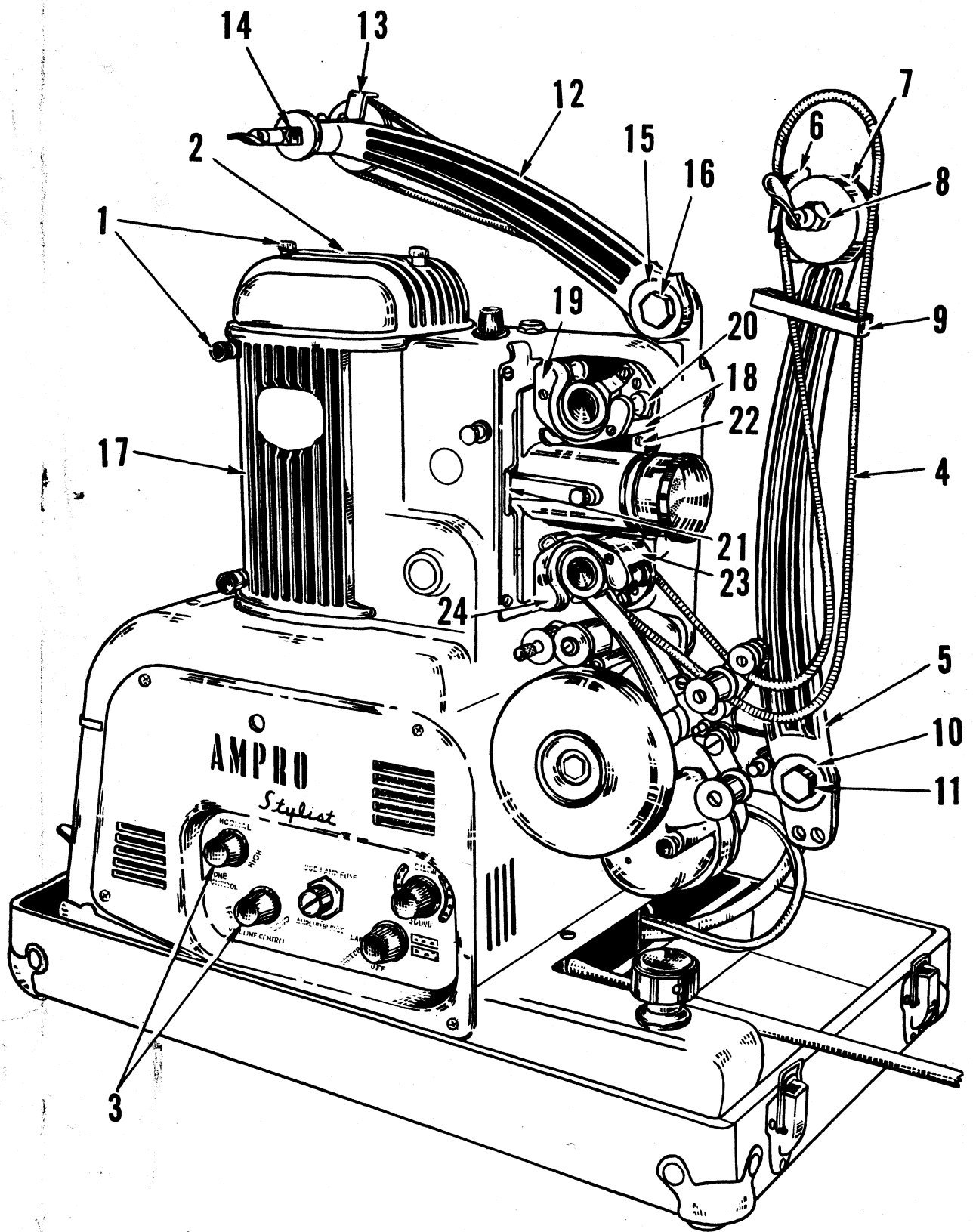


Fig. 1

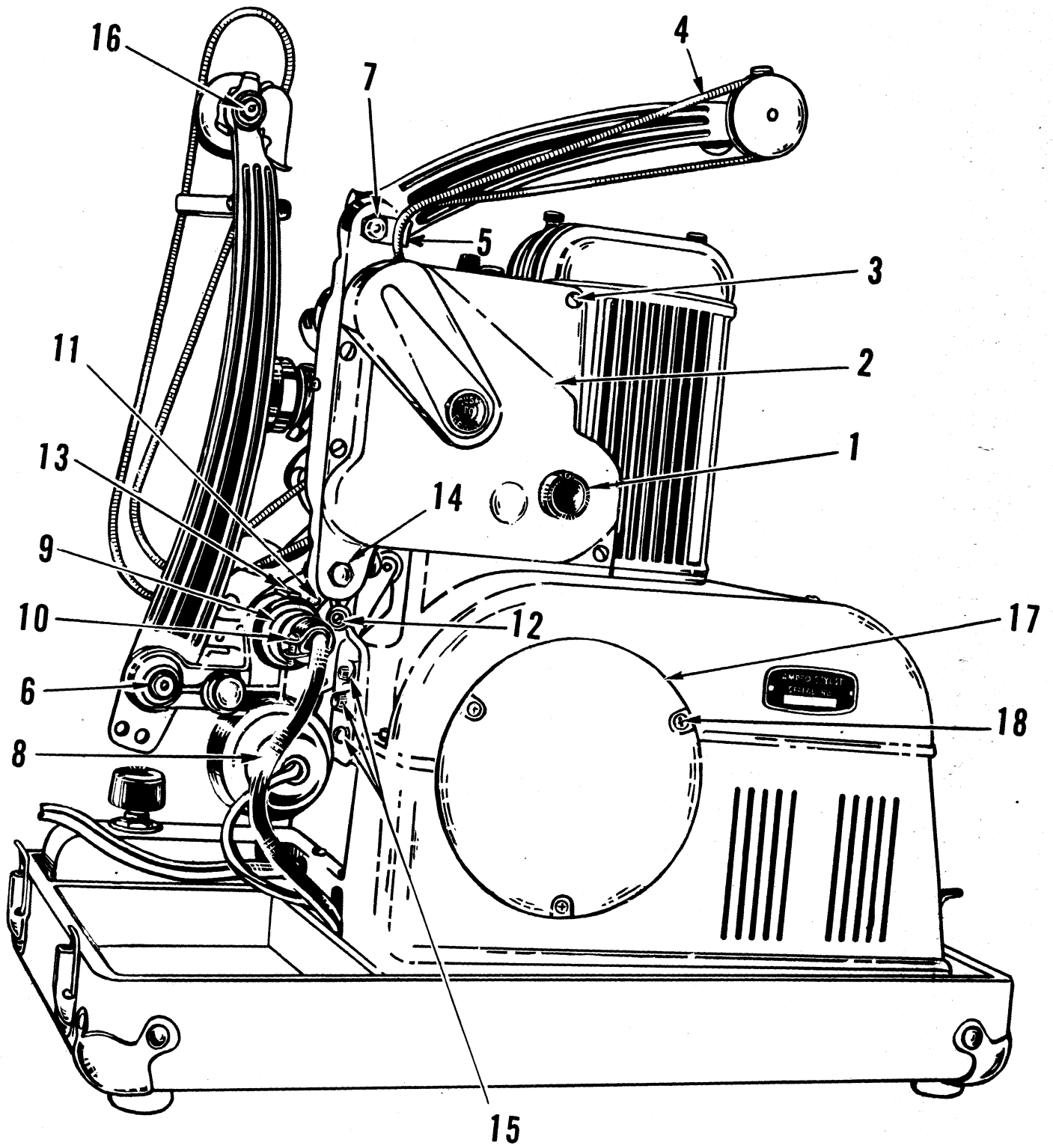


Fig. 2

## SECTION 1

### GENERAL INSPECTION AND CLEANING

It is assumed that the projector has just been received for repair and overhaul. Before proceeding with any work the machine should be inspected and cleaned in accordance with the following schedule. Should a major fault prevent any particular section from being checked, the inspection of that section should be carried out in detail after repair.

#### 1. General Condition

##### (a) Mains Transformer (if with projector)

- (1) Condition of cable, plugs and voltage adjuster.
- (2) Continuity of earth circuit.
- (3) Insulation check.
- (4) Correct relation between input and output volts.

##### (b) Case

- (1) All fittings present and in good condition.
- (2) Loudspeaker secure. Use blower to remove dust.
- (3) Damage to case. Wipe over fabric (wax if desired).
- (4) Condition of loudspeaker cable and plugs.

##### (c) Projector

- (1) All covers fitted.
- (2) All cover screws present.
- (3) Completeness of Spares Kit.
- (4) All knobs in position, secure.
- (5) Projector steady in bottom half of the case and tilt functioning correctly.
- (6) General External Cleanliness - wipe over with soft cloth and brush out lamphouse fins.

#### 2. Film Path

##### (a) Remove pressure shoe assembly and clean with carbon tetrachloride (C.T.C.). Check for:-

- (1) Distortion or roughness.
- (2) Operation of Springs.

##### (b) Clean aperture plate with C.T.C. using cleaning brush or piece of pointed wood to clear away any heavy deposit, particularly from the notches for the side tension spring. Check that:-

- (1) Edges of framing plate do not protrude through aperture plate.
- (2) Side tension spring is parallel with, or bent slightly towards film path.

(c) Replace pressure shoe and check that:-

- (1) Lens holder moves smoothly when gate lever is operated.
- (2) Pressure shoe goes properly home even when gate is closed slowly.
- (3) Follower roller assemblies lift and fall properly when gate is opened and closed.

(d) Remove sprocket shoe covers (19 and 24 Fig. 1). Pull off eight guide rollers and wash rollers and pins with C.T.C. Re-oil pins. Clean follower roller assemblies (unless very dirty these need not be removed from sprocket shoe). Run the projector slowly and brush the sprocket teeth and body keeping the brush at right angles to the axis of the sprocket to prevent it from being drawn between the sprocket and the shoe. Check that:-

- (1) All rollers revolve freely.
- (2) Rollers are free from flats or burrs.
- (3) Corresponding parts of rollers and sprockets are in alignment.

(e) Clean upper and lower film guides (13 and 15 Fig. 7) with C.T.C. Remove the film guide rollers (4 and 22 Fig. 7) and the pressure and film rollers (17 and 28 Fig. 7) and wipe over with C.T.C. Clean shafts and re-oil. Check that:-

- (1) The rubber sleeve of the pressure roller is free from flats.
- (2) All rollers revolve freely.
- (3) Corresponding parts of the rollers and film guides are in alignment.

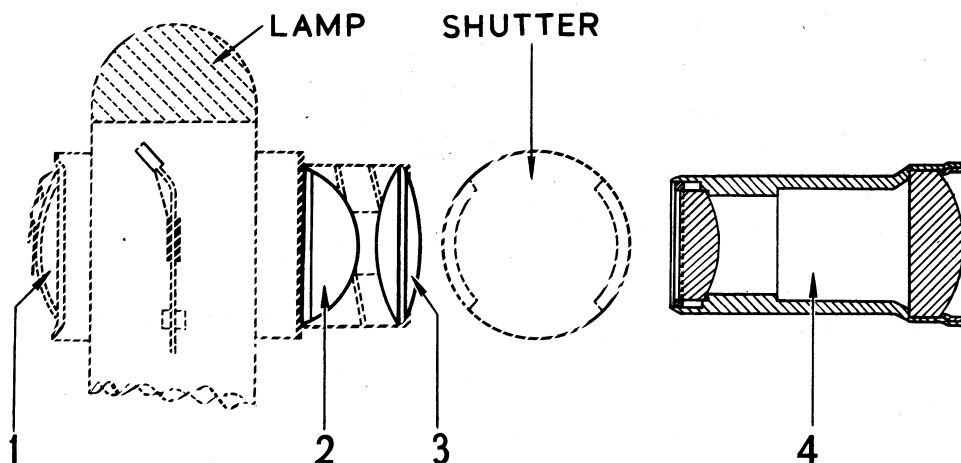


Fig. 3

(f) Clean the exposed lens surfaces of the sound optical unit, using a piece of lens tissue wrapped round a thin piece of wood.

(g) Clean the edge of the sound drum and check that:-

- (1) The flywheel revolves very freely. (When spun sharply with the fingers it should run for at least 30 secs.)
- (2) The end shake on the sound drum shaft is not greater than .003".
- (3) The side shake on the sound drum shaft is nil.
- (4) The sound drum is free from eccentricity or distortion.

### 3. Mechanism

- (a) Take off the inching knob (1 Fig. 2) and the four screws (3 Fig. 2) which hold the rear cover (2 Fig. 2) in place and remove rear cover. Brush out dirt from gears and inside of compartment and remove any surplus oil which may have accumulated. Wipe the gears with a cloth saturated with Amproil.
- (b) Remove the front cover (17 Fig. 1) and clean the condenser lenses and reflector with lens tissue. Remove dust and dirt from heat shield. Check that:-
  - (1) Lenses and reflector are free from cracks and blemishes.
  - (2) Condenser lenses are correctly positioned (see Fig. 3).
  - (3) Heat shields are not bent or damaged.
  - (4) Projector lamp in good condition and firm in socket.
  - (5) Interrupter shutter is damaged and does not foul casting or shuttle shield.
  - (6) Adjusting screws for interrupter shutter are tight.
- (c) With the front cover still removed, oil the mechanism at the oil well and at the vertical camshaft bearing. Turn the inching knob in the direction in which it normally runs and check that:-
  - (1) The mechanism revolves freely and the drive belt drives the motor.
  - (2) The drive belt is in good condition
- (d) Leave front cover off. With projector power cable disconnected, switch on amplifier at volume control and turn control switch to "lamp". Check insulation between line and earth at power plug, then switch off all switches and check between line and neutral. In each case the insulation should be better than 5 megohms. Connect to power supply and switch on motor. Check that:-
  - (1) Drive belt runs true and is aligned on pulleys.
  - (2) Mechanism runs at correct sound speed (24 frames/sec.).
  - (3) Speed control reduces speed to at least 16 frames in the fully anti-clockwise position of the speed control.
- (e) Replace front cover and check for mechanical noise as follows:-
  - (1) Shuttle noise.
  - (2) Shuttle striking shuttle cover.
  - (3) Gear whine.
  - (4) Motor noise. (Worn bearings).



- (5) Fan vibration. (Fan damaged or off balance).
- (6) Squeaky reel arm belts (apply smear of vaseline).

#### 4. Background

- (a) Connect loudspeaker, set tone control to "Normal" and volume control about 1/5 back from full volume. Check the following:-

- (1) Fit of speaker plug to projector.
- (2) Fit of cable plug to loudspeaker.
- (3) Hum.
- (4) Crackle, (when projector is still).
- (5) Crackle, (when motor is running).
- (6) Microphony from exciter lamp.
- (7) " " P.E.C.
- (8) " " 8 D.5.
- (9) " " 12AX7.

- (b) If crackle is heard when motor is running, check for excessive sparking at:-

- (1) Governor contacts, (clean contacts with magneto file).
- (2) Governor slip rings, (clean slip rings and check brushes).
- (3) Commutator.

#### 5. Reel Arms

- (a) Set feed and takeup reel arms to operating position, oil spindles and check that:-

- (1) Friction washers on studs will hold the arms in any position.
- (2) Takeup reel arm stop pin operates correctly.
- (3) Belt tension is correct.
- (4) Belt joins are secure.
- (5) Rewind belt not rubbing on mechanism rear cover.
- (6) Belt shifter operates correctly.
- (7) T.U. belt not rubbing on retainer.
- (8) T.U. belt guide rollers are free.

- (b) Place 1600 ft. reels on feed and T.U. spindle and check:-

- (1) Alignment of reels with mechanism sprockets.
- (2) Action of reel lock fingers.
- (3) Clearance between reels and belts.
- (4) Clearance between reel and belt retainer.

#### 6. Projection Check

- (a) Clean and examine projection lens. Switch on projector, without film and check:-

- (1) Focussing and clamping action of projection lens.
- (2) Cleanliness of framing plate.
- (3) Shape of framing plate image on screen.
- (4) Operation of framing plate.
- (5) Freedom from colour bars.
- (6) Uniformity of illumination.
- (7) Intensity of illumination.

(b) Thread general purpose test film in projector. The possession of a good test film is essential if the sound and picture performance is to be accurately assessed. At the moment, a standard test film is not generally available, however, a good quality print, known to be free from obvious defects, can be used quite successfully. Such a film could contain dialogue, piano music, orchestral music and some titling. If possible, sections of both variable area and variable density recording should be introduced. Run the film in the projector and check the following:-

- (1) Smooth passage of film through projector.
- (2) All film rollers rotating properly.
- (3) Vertical steadiness of picture.
- (4) Horizontal steadiness of picture.
- (5) Trailer ghost (particularly noticeable on titles).
- (6) Film Slap.
- (7) Film picking.
- (8) Loop synchronising action of pressure roller.
- (9) Smooth flow of film on film guides.

(c) Using the test film, check the sound performance as follows:-

- (1) Volume control action smooth.
- (2) Volume adequate.
- (3) Tone control action smooth and effective.
- (4) Speaker free from buzz or rattle at high volume.
- (5) Distortion.
- (6) Flutter or wow.
- (7) Jack in microphone socket should cut off picture sound.
- (8) Microphone input functioning.

7. Take-up and Rewind

(a) Use a 1600 ft. of film with 200 ft. on feed reel and 1400 ft. on takeup reel and check:-

- (1) Smooth takeup.
- (2) Action of film tension equalizer roller.
- (3) Film Tension.
- (4) T.U. belt clears belt guard.

(b) Rewind the 1600 ft. of film used in the previous test and check:-

- (1) Clutch maintains engagement at slow rewind speeds.
- (2) Rewind belt not touching.
- (3) Rewind operates evenly.
- (4) Clutch disengages at end of rewind.

SECTION IIFAULT FINDING TABLEA. Film Handling Troubles

<u>Trouble</u>	<u>Probable Cause</u>	<u>Section III Reference</u>
1. Takeup reel does not revolve.	Belt shifter does not shift belt to T.U. pulley. Damaged T.U. belt. T.U. belt catches on bent belt guard or shifter. Loose setscrew on T.U. sprocket pulley. Takeup pulley loose on takeup spindle. Bent takeup spindle.	Paragraph 2
2. Takeup reel won't takeup a full 1600 ft. reel.	Worn or stretched takeup belt. Worn takeup sprocket pulley. Worn takeup spindle pulley.	- 7(b) (3) 2
3. Takeup reel pulls film through takeup sprocket (400 ft. reel).	Reel arm in wrong position. Takeup belt has been cut too short in attempted repair. Use of wrong takeup belt.	- - -
4. Takeup reel jerks.	Worn takeup belt. Bent belt guard rubs on takeup reel. Worn takeup sprocket pulley. Worn takeup spindle pulley.	- - 7(b) (3) 2
5. Rewind won't operate.	Worn rewind belt. Rewind clutch broken or jammed. Bent feed spindle. Bent or loose belt guards. Rewind belt not crossed.	- 7(b) (5) 1 - -

<u>Trouble</u>	<u>Probable Cause</u>	<u>Section III Reference</u>
6. Upper loop not maintained.	Bent feed spindle. Rewind clutch engaged or jammed. Feed sprocket loose on shaft.	1 7(b) (5) -
7. Lower loop not maintained.	Pressure shoe not seating properly. Worn intermittent. Intermittent improperly timed. Excessive gate pressure applied to "green" film.	7(c) (8) 7(c) (10) 7(c) (6) 7(c) (10)
8. Film scratch.	Worn part or dirty film tracks. Locate source with small loop of film threaded as follows: (1) Feed sprocket; (2) Takeup sprocket; (3) Film gate; (4) Takeup sprocket and sound head.	-
9. Film slitting.	Upper guideway completely worn out.	3(b) (1)
10. Film tearing.	Wrong takeup belt.	-
11. Excessive film slap.	Worn intermittent.	7(c) (10)
12. Clicking noise (film picking).	Damaged sprocket teeth.	7(b) (3)

B Picture Troubles (Test Film must be in good condition)

<u>Trouble</u>	<u>Probable Cause</u>	<u>Section III Reference</u>
1. Picture jump (w/green film).	Excessive gate pressure.	7(c) (10)
2. Picture jump (w/used film).	Insufficient gate pressure. Worn aperture plate or pressure shoe. Worn intermittent.	7(c) (10) 7(c) (2) 7(c) (10)
3. Sidesway (weave)	Worn or bent side tension spring.	7(c) (2)

<u>Trouble</u>	<u>Probable Cause</u>	<u>Section III Reference</u>
4. In and out of focus (R.H. side only)	Worn or bent side tension spring.	7(c) (2)
5. In and out of focus (Random)	Loose projection lens element.	-
	Sticking pressure shoe.	7(c) (10)
6. Poor focus and halo.	Worn aperture plate or pressure shoe.	7(c) (10)
	Dirty projection lens.	-
7. Streaks outside of picture area.	Faulty or damaged projection lens - return for repair or replace.	-
	Optical black scraped off back of pressure shoe or associated parts.	-
8. Streaks near edges of picture.	Shutter out of line laterally.	7(b) (4)
9. Vertical bands of colour in picture.	Old lamp.	-
	Condensing lenses or reflector improperly installed.	-
	Lamp not centred with optical system.	-
10. Streaks above or below ends of vertical lines in picture (Trailer Ghost).	Shutter out of time.	7(c) (6)
11. Faint supplementary images of horizontal lines in picture (Double image).	Intermittent requires adjustment.	7(c) (10)
12. Nicks in edge of projected image.	Damaged framer plate.	7(c) (2)

C. Sound and Amplifier Troubles

<u>Trouble</u>	<u>Probable Cause</u>	<u>Section III Reference</u>
1. No sound, valves do not light.	Blown fuse. Amplifier supply plug disconnected. Defective switch. Loose connection.	
2. No sound, some valves only lit.	Faulty valve heater R.23, R.24 or R.36 open circuit.	
3. No sound, valves light, exciter lamp does not light. No hiss from speaker.	Reversed polarity on D.C.	
4. No sound, valves light (except 8D5). Exciter lamp does not light, no hiss from speaker.	No. H.T. (Choke or Rectifiers faulty).	
5. No sound, valves light, exciter lamp does not light, hiss from speaker.	Burned out exciter lamp. Faulty 50C5 (V6). Faulty oscillator coil.	
6. No sound, exciter lamp light, no hiss from speaker.	Broken speaker cable. Faulty speaker. Faulty output transformer.	
7. Low volume and excessive hum.	Damaged 50C5 (V4, V5). Faulty filter condenser.	
8. Low volume.	Faulty valve. Low line voltage. Exciter lamp out of position or faulty - (see Item 5). Faulty condenser (C-1, 2 or 21).	
9. Low volume, weak high frequency.	Sound optical system, dirty or out of adjustment.	
10. Normal volume, excessive hum.	Heater to cathode leakage, 50C5 or 12AX7. Faulty or improperly connected line filter condenser (C24).	

<u>Trouble</u>	<u>Probable Cause</u>	<u>Section III Reference</u>
11. Hash or crackle at sound speed only.	Sticking governor brush. Dirty governor contacts. C-14 or C-24 open circuited.	6(c) (7) 6(c) (7) -
12. Hash or crackle at silent or sound speed.	Sticking motor brush. Dirty or worn commutator. Faulty armature.	6(c) (5) 6(c) (1)
13. Microphony.	Faulty exciter lamp. Faulty photocell. Loose contact in P.E.C. Holder. Faulty 8D5 or 12AX7.	
14. Shock from microphone.	C-14 or C-24 connected to wrong side of line. Amplifier is damp.	
15. Slight 'tingle' or shock from projector.	Earth circuit incomplete or not in use. This is due to condenser discharge and is not dangerous.	
16. Heavy shock from projector.	Earth circuit incomplete and short circuit present between line and frame.	
17. Pitch of sound correct - no 'top'.	Sound optical system. Dirty or out of focus.	
18. Pitch of sound correct - no 'bass'.	Faulty coupling condenser.	
19. Pitch too high.	Motor running fast.	6(c) (9)
20. Pitch too low.	Motor running slow. Faulty belt. Governor not operating. Low line voltage.	6(c) (9)  6(c) (7)

<u>Trouble</u>	<u>Probable Cause</u>	<u>Section III Reference</u>
21. Pitch changes suddenly.	Dirty or sticking governor contact.	6(c)
	Splinter of metal lodged between governor slip rings.	-
	Sticking motor brush.	6(c)
22. Pitch changes slowly (wow).	Worn film guides.	3(c) (1)
	Guideways out of alignment.	3(d)
	Worn or damaged sound drum.	3(c) (2)
	Slipping drive belt.	
23. Pitch changes rapidly (flutter).	Damaged T.U. sprocket.	7(b) (3)
	Dirty or worn sound drum bearings.	3(c) (2)
	Wear or flats on pressure roller surface.	3(c) (4)
	Dirty (sticky) or worn bearings on pressure roller or film roller.	3(c) (4)
	Broken or worn pressure roller spring.	-
Faulty T.U. belt.	-	
24. 24 cycle buzz accompanies film sound.	Lower guideway out of adjustment.	3(d)
	Edge guide of lower guideway badly worn.	
25. Scratching and popping noise accompanies film sound.	Lower guideway out of adjustment.	3(d)
	Broken or weak film edge spring.	



Miscellaneous Troubles

<u>Trouble</u>	<u>Probable Cause</u>	<u>Section III Reference</u>
1. Excessive vibration.	Bent Motor shaft. Loose part caught in fan. Damaged governor.	6(c) (1)  6(c) (7)
2. Squeaking noise.	Reel arm belts (grease lightly with vaseline.) Sprocket rubbing on follower roller. T.U. belt guide pulley sticking.	7(b) (3)
3. Rattling noise.	Loose shutter. Loose shuttle. Bent heat shield. Front condensing lens reversed.	7(c) (10)  Fig. 3.
4. Whining noise.	Loose fan.	
5. Drive belt comes off.	Worn belt. Worn pulleys. Mechanism binding. Fibre washers omitted from motor mounting.	
6. Short projection lamp life.	Line voltage exceeds lamp voltage. Operating below 16 f.p.s. Loose fan. Obstruction in air ducts.	

### SECTION III

### SERVICE PROCEDURE

In this section the complete disassembly of the projector is described, together with recommended methods of cleaning, repair and adjustment. Although the removal of each unit from the projector and subsequent complete dismantling is indicated, this will seldom be necessary; for example, practically every type of repair to the mechanism unit may be done without removing the unit from the projector.

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

- (a) Removal - Take off the cap nut (7 Fig. 2) and guard (5 Fig. 2). Disconnect the rewind belt (4 Fig. 2) and unscrew the reel arm stud (16). Remove the arm (12), washer, stud and friction washer (15).
- (b) Disassembly - Remove the two screws which hold the belt guard (13) in place. Take out the brakeshoe cap, the spring and the brake shoe. Drive out the tapered pin which attaches the re-wind pulley to the spindle (14), and remove the spindle and washers. If it is necessary to remove the bushings, push them out with an arbor press or support one end of the boss on a block bored to the O.D. of the bushing and drive out the bushings with a bearing extractor punch. To remove the reel lock finger from the spindle, use a 1/16" pin punch to drive out the pin.

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

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

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

- (a) Removal - Disconnect takeup belt (4). Take off the cap nut (6 Fig. 2)

and unscrew reel arm stud (11). Remove arm (5), washer, stud (11), and friction washer (10).

- (b) Disassembly - Take out two screws and lockwashers which hold the takeup belt retainer (9). Unscrew the brake shoe cap (7) and take out the spindle, brake spring and brake shoe. Hold the spindle (8). By the square section with a parallel jaw wrench and remove the cap nut (16 Fig. 2). Remove the face washer and the spacing washers and pull out the spindle assembly. Remove the takeup loose pulley and the belt shifter assembly (6). See para. 1-b, of this section for removal of reel lock finger. If it is necessary to remove the bushing, press it out with an arbor press or support the arm on a block bored to the Outside Diameter of the bushing, and drive out the bushing with a bearing extractor punch.
- (c) Repair and Re-assembly - If the spindle is bent, or the takeup pulley is loose on the spindle, replace the spindle assembly. If the brake shoe is worn or sticking, the film will not be re-wound with the proper tension and the shoe should be replaced. When installing the spindle, use spacing washers as required between the end of the bushing and the face washer to reduce the play to .005"-.007". If the spindle wobbles in the bushing during normal operation, replace the bushing. Press the new bushing in with an arbor press and drill the hole for the brake shoe after the bushing has been installed. When installing the reel arm assembly be sure that the friction washer (10) is placed on the stud (11) with the convex side of the washer toward the head of the stud. Tighten the stud enough so that the arm will remain in any position in which it is placed, but do not tighten the stud more than is necessary.

#### Sound Head Assembly (See Fig. 2)

- (a) Removal - Remove takeup reel arm assembly as per Para. 2 - a of this section. Remove the three screws which hold the exciter lamp socket assembly (do not lose the three socket spacers). Loosen the clamp (10) and slide back the P.E.C. socket insulator (9). Unscrew the larger ring nut on the P.E.C. socket and remove the socket and photocell. Take out the three fillister head screws (15) which attach the sound head to the base. Take out the sound head mounting stud (14) and lift off the sound head. When removing the stud, be careful to secure any shim washers fitted between the soundhead and the mechanism. It is important that these or washers of equal thickness should be fitted when the sound head is replaced.
- (b) Disassembly (See Fig. 7)
- (1) Upper Guideway - Take out the two screws (14) and remove the guideway assembly (13).
  - (2) Flywheel and Sound Drum Assembly - Loosen the flywheel retaining screw (12) one turn only. Hold the flywheel (8) and tap the

head of screw with a light hammer in order to free the flywheel from the tapered sound drum shaft (11), then remove the retaining screw and the flywheel.

Unscrew the two screws (30) which retain the sound drum bracket and remove the bracket. Press the sound drum and shaft out of the bearings and remove bearings from the bracket. Drum and bearings should always be pressed out and never hammered.

- (3) Lower Guideway Assembly - Remove the guideway adjusting screw (12 Fig. 2) and washer. Loosen the locking screw (11 Fig. 2.) and pull the guideway assembly (15) and aligning stud off the sound head. Remove the guideway aligning spring and separate the guideway from the aligning stud.
- (4) Pressure Roller Arm Assembly and Film Roller Assembly - Unscrew the pressure roller knob (18) and remove the pressure roller assembly (17) and spacing washers. Should it be necessary to remove the pressure roller arm sub-assembly (16), remove the pressure roller catch retaining screw (27) and the pressure roller catch (26). Take out the pressure roller arm pivot (20).  
NOTE: Support the arm while removing the pivot or the thrust from the pressure roller arm spring (19) may push the pivot out of line and damage the threads. As the pivot is removed the pivot washer will drop out. Lift out the pressure roller arm assembly (16) and separate the pressure roller arm spring (19) from the arm.

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

- (5) Film Guide Rollers - Remove the film tension equalizer pivot (25) and lift off the film tension equalizer assembly (21) and spring (24). Take out the film guide roller retaining screw (23) and remove the film guide roller (22) and spacing washer. Take out the guide roller stud (6) and remove the guide roller (4) and takeup belt guide roller. Take out the two takeup belt guide roller studs (7) and remove the takeup belt guide rollers (5).
- (6) Sound Optical System (1) - Break the seal on the sound optical system retaining screw (2) and loosen the screw. Insert the end of a small screwdriver in the slot in the sound optical system clamp and expand the clamp. Slide the optical system out of the sound head. Do not attempt to disassemble the optical system. If the inner surfaces of the lenses are dirty, or the system is damaged, return it to the manufacturer. Unless the equipment for re-focussing the sound optical system detailed in part (d) is available, it is not advisable to disturb the setting.

- (7) P.E.C. Shield - Loosen the two set-screws (13 Fig. 2) and slide the P.E.C. shield out of the sound head sub-assembly. Except for replacement if damaged, it should normally be unnecessary to remove this part.

(c) Repair and Re-assembly (See Fig. 7)

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

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

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

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

Wash the sound drum bearings (10) in a mixture of 1/2 carbon tetrachloride and 1/2 Amproil, then immerse them in Amproil and drain them on a blotter for 10 minutes (open side down). If cleaning will not remove the rough spots in the bearings, replace them. Use spacing washers (9) between the outside bearing and the flywheel to reduce the endplay to not more than .003".

- (3) Lower Guideway Assembly (15) - Check supporting ribs as per sub-para. (1), also check for wear in the fixed edge guide and make sure that the side tension spring is not worn or sticking. The side tension spring may be replaced separately if it alone is badly worn, otherwise the complete guideway should be renewed. Place the aligning spring over the aligning stud and install the guideway on the sound head. Install the adjusting screw (12 Fig. 2.) and washer.

- (4) Pressure Roller Arm Assembly and Film Roller Assembly - Check rollers for flat spots and replace if any flats are present. Clean the pressure roller spindle, and apply two drops of Amproil to the bearings in the pressure roller (17), then install roller, washer and knob (18). If the pressure roller arm assembly has been removed, install the pressure roller arm spring (19) on the hub of the arm assembly making sure that the end of the spring is engaged in the hole in the arm. Apply a drop of oil to the pivot (20), insert the pivot in the arm and replace the pivot washer. Place the end of the spring under the pressure roller catch stud and press the arm assembly upward and forward until the pivot screw is in line with the tapped hole. The pressure roller assembly

should pivot smoothly and should be free from shake when the pivot screw has been tightened. Install the pressure roller catch (26) and retaining screw (27).

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

- (5) **Film Guide Rollers** - Inspect the rollers for flat spots worn in the body of the roller and cuts in the flanges. If either type of wear is found, replace the roller. Clean all studs and lubricate them with Amproil before assembly.
  - (6) **Sound Optical System** - Clean external surfaces of the lenses with a piece of lens tissue, dampened with lens cleaner or alcohol. Hold the unit in front of a bright light and look through it from the end adjacent to the exciter lamp. A narrow, sharply defined and evenly illuminated beam of light should be seen. If the beam is hazy, unevenly illuminated, or appears unserviceable in any way, return the unit to the manufacturer for repair.
  - (7) **P.E.C. Shield** - Check for cracks or chips. Examine the conducting coating in the bore. The coating should be continuous all over the inside surfaces and should not be loose or "flaky". When replacing, the hole in the side of the shield must be accurately lined up with the axis of the sound optical system.
- (d) (1) **Adjustment (See Fig. 4)**

**Equipment** - It must be emphasised that repair and adjustment to the soundhead should, except in emergency, only be carried out if the proper tools and test gear are available. The following equipment is required for setting up the sound optical system:-

- (a) **Adjusting Harness (Part No. 34758)**
- (b) **Buzz Track Test Film (to British Standard Specification 1488/1948 or Society of Motion Picture Engineers' Test Film)**
- (c) **Sound Focussing Test Film, 5,000 cps. (to B.S.S. 1488/1948, or S.M.P.E.)**
- (d) **Phillips Screwdriver**
- (e) **Output Meter**

For the mechanical repairs and test, the tools required are normally to be found in a workshop capable of carrying out precision work, but the general policy should be repair by replacement of worn or damaged parts. Repair of the optical unit is a factory job and should never be attempted in the field.

- (2) Lateral Alignment - The film is guided on to the sound drum by the lower film guide and the latter may be moved bodily by means of an adjusting screw thus providing lateral positioning of the film. Adjustment should only be necessary under the following conditions:-
  - (a) When the sound optical unit has been changed.
  - (b) When the lower film guide has been damaged or dis-assembled.
  - (c) When the adjusting screw has been tampered with or accidentally rotated.
- (3) To carry out the adjustment, thread a loop (about 3 ft.) of the Buzz Track Test Film in the projector in the normal way. Slacken the locking screw and run the projector. The test film has a completely blank sound track to one side of which is recorded a 1,000 -cycle note and to the other a 300-cycle note. When the film is in the correct position, nothing should be heard in the loudspeaker, but, if it is displaced laterally, one or other of these tones will be heard. Rotate the adjusting screw until no note or an equal and very slight proportion of both notes is heard and tighten the locking screw.
- (4) Focussing - The sound optical unit projects a very small image of the exciter lamp filament on the sound track of the film. If this image is not focussed correctly on the emulsion surface and at right angles to the length of the sound track, the sound quality will suffer in proportion to the error. The sound optical unit is set at the factory and the head of the locking screw (2 Fig. 7) is sealed, adjustment should only be necessary under the following conditions.
  - (a) When the sound optical unit has been moved or replaced.
  - (b) When the sound drum has been changed.
- (5) To focus the sound system using a loop of 5,000-cycle test film and the adjusting harness (see Fig. 4) proceed as follows:-
  - (a) Remove the exciter lamp cover and, using the two cover screws, secure the main body of the harness (6) into position on the soundhead (1).

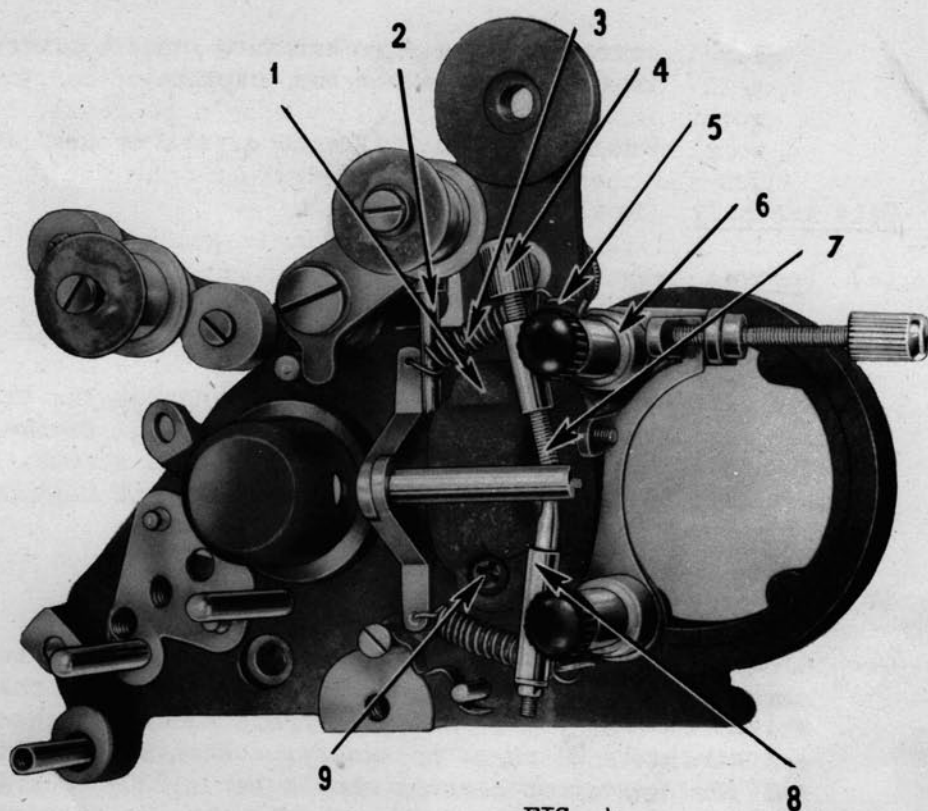


FIG. 4.

- (b) Place the yoke of the harness round upper straight portion of the optical unit barrel leaving a gap between the bottom of the yoke and the soundhead casting, at the same time slipping the lug attached to the yoke between the plunger (8) and the screw (7) of the horizontal (azimuth) adjustment (4). Close the ring and holding it in the position indicated, tighten the locking screw (2) until the optical barrel is firmly gripped.
- (c) Loop the outer spring (3) on to the hook (5) and screw up the vertical (focus) adjustment until the pin just touches the base of the optical unit. Slacken the Phillips head screw until the optical unit is free to move. Do not slacken excessively or it will be difficult to hold the setting when tightening after adjustment.
- (d) Thread a loop (about 3ft.) of the focussing test film in the projector in the normal way and run the projector. With the loudspeaker connected, make rough adjustment of focus and azimuth until the 5,000 or 7,000 c.p.s. note is heard.
- (e) Replace speaker by output meter, and re-adjust focus and azimuth alternately until maximum output is obtained.
- (f) Lock optical unit in position by slowly tightening Phillips



screw ensuring, by observing output meter, that the setting is not disturbed in the process.

(g) Remove harness and replace exciter lamp cover.

4. Tilt Assembly (See Fig. 8)

(a) Removal

Lay the projector on its back so that the bottom of the case overhangs the edge of the bench. Take off the three nuts, lock-washers, and washers and remove the case bottom. Unscrew the tilt knob (25) until the tilt screw (26) clears the tilt nut (2). Remove the locknuts from the tilt pivot screws (32) and remove the screws, sleeves and spring washers. Lift out the tilt frame. Take off tilt knob (25) and detach tilt screw bushing (3).

(b) Repair and Re-assembly

Clean tilt screw and check that it runs smoothly in tilt nut. Slight damage to the threads can be removed by careful chasing with a 5/16" Whitworth tap or die. The tilt frame should be checked for distortion and straightened where necessary. When reassembling, the tilt screw and the two pivot sleeves should be lightly lubricated with mineral jelly and a little of this should also be applied to the tip of the tilt spring at the point which bears on the inside of the casting. When fitting the tilt pivot screw, be sure that they are firm enough to lock the spacers in position before tightening the locknuts.

5. Amplifier Assembly (See Fig. 2)

(a) Removal

Take off bottom case and tilt as indicated in Para. 4 (a). Slide back P.E.C. Insulator, unscrew the ringnut on the P.E.C. holder and slide out holder and P.E. Cell from the sound head. Remove P.E. Cell from holder for safety. Take off Volume and Tone Control Knobs and remove the four screws retaining the control panel. Take out the four screws which hold the amplifier to the projector base. Partially remove the amplifier, then disconnect the power connector (16 Fig. 8) and complete the removal of the amplifier.

(b) Servicing (See Fig. 11)

It is beyond the scope of this manual to describe in detail the servicing of a multi-stage amplifier. The components of the amplifier are readily accessible, therefore, disassembly and reassembly instructions are not necessary. Lead dressing is not critical.

The circuit diagram of the amplifier and table of electronic components is provided in Fig. 11, and a list of valve voltages is given on opposite page.

It is not possible to list all the possible faults which may occur, but the fault finding table in Section II may be of some assistance in isolating a fault.

For general fault finding, the following procedure and equipment is recommended.

- (1) Check valve/voltages in accordance with table below (D.C. voltmeter 10,000 ohms/volts. A.C. voltmeter 1,000 ohms/volts. or better.)
- (2) Connect an audio frequency oscillator, terminated with its correct output impedance, through a 0.5 mfd. capacitor and a 10 megohm resistor in series to pin. 1 of the photocell socket. The capacitor and 10 megohm resistor and the connecting cable should all be shielded and the shielding connected to pin 2. of the photocell socket. The Signal should be traced through the amplifier from stage to stage using a Cathode Ray Oscilloscope or Vacuum Tube Millivoltmeter. A capacitor should always be used in the probe lead from either of these instruments to isolate any D.C. components, while the other lead should be connected to the Negative H.T. line, ( a convenient point is the screening can of either electrolytic condenser).

**WARNING:** Ensure that the neutral connection of the mains supply is taken to the negative H. T. line before switching on. It is also essential that any earth connections to the Audio Oscillator, Oscilloscope or Vacuum Millivoltmeter be removed since the nominal "earth" of the system is in fact the neutral side of the mains.

TABLE OF VALVE VOLTAGES

Test line Voltage 115 volts 50 or 60 c.p.s.

Pin	8D5 (V2)		12AX7 (V3)		50C5			
						(V4)	(V5)	(V6)
1	-	0	A2	+71 $\times$	G3 & C	+7.0	+7.0	6.3
2	G1	0	G2	+ 5 $\times$	G1	0	0	-7
3	C	+0.8	C2	+20 $\times$	H	0	60 A.C.	12.5 A.C.
4	H	0	H	0	H	50 A.C.	111 A.C.	62.5 A.C.
5	H	+6.2 D.C.	H	12.5 A.C.	G1	0	0	-7
6	-	0	A1	+50 $\times$	G2	+118	+118	+88
7	A	+40 $\times$	G1	0	A	+115	+115	+118
8	G2	+20 $\times$	C1	+0.6	-	-	-	-
9	G3	+0.8	H.C.T.	N.C.	-	-	-	-

All voltages are D.C. unless otherwise indicated. All voltages are measured from negative H.T. Line with a 10,000 ohms/volt meter on D.C. and 1,000 ohms/volt or better on A.C.

Voltages marked \* are taken on the 100 volt range of the meter. If measured on a different range or with a meter of less sensitivity, the readings for these pins may differ widely from the figures quoted.

## 6. Motor Assembly (See Fig. 8)

### (a) Removal

Take off bottom of case, tilt amplifier etc., as in paras. 4 (a) and 5 (a). Disconnect following leads:-

- (1) Three leads (red, blue and orange) from the control rheostat (10).
- (2) One lead (black or brown) from motor switch (13).
- (3) One lead (black or brown) from terminal strip.
- (4) Two leads (orange) from power resistor (29).
- (5) Three leads (two red, one green) from governor condenser (31).

It is best to mark terminals and leads when disconnecting to avoid any doubt when reassembling.

Take out the three screws which hold the fan housing cover in place and remove the fan.

There are three Phillips head screws holding the motor in place. Slacken each of these a few turns, then lift the motor slightly, and unscrew the screws until the motor is free. In this way the fibre washers under the motor will retain the screw, grommets, spacers, etc. captive to the motor.

### (b) Disassembly (See Fig. 9)

If the motor is to be stripped for complete overhaul, the sleeving and resistor leads should be removed, but for brush changing and other simple repairs it is only necessary to ease back the sleeving for about 3 inches. Remove motor pulley, spring, and disc and take off the governor and governor brushes. The two tie bolt nuts (12) and lock-washers (19) should be taken off when the governor end cover can be eased off the shaft. Care should be taken to ease the motor leads through the grommet as the cover is removed. Before proceeding any further, mark the alignment of the end covers, field and brush holder assembly, and note the brush connections, otherwise the motor may accidentally be reversed on reassembly. Disconnect the leads to the

commutator brush boxes and remove the springs and brushes through the outer end of the brush box. Withdraw the motor leads from the grommet in the end casting and remove the governor brush holder (20) which is directly connected to the field winding. The end casting is now free. Remove remaining governor brush holder (20) and take out the two self tapping screws (14) which retain the bearing (16) and oil pad (17). Remove the nuts (12) and washer which hold the brush holder assembly (24) in place and lift off the latter. Slip out the armature assembly (7), taking care to collect all the spacing washers (4 & 5). These washers should be retained for the appropriate end of the armature on reassembly.

Take off the brush holder spacers (11), remove the tie-bolts (1) and press out the field assembly. Collect the field spacers (10) from inside the case, and the sleeves (9) from the holes in the field assembly. The bearing (16) and oil pad (21) can be taken out by removing the two screws, nuts and lockwashers which retain them.

(c) Repair and Reassembly

(1) Check the armature as follows:-

- (i) The armature should be concentric within .001" (.002" clock reading). If necessary, turn with very sharp tool at high speed (not less than 1,000 r.p.m.). Undercut to a depth of .010" - .015" making sure that all mica is removed to the full width of slot.
  - (ii) The shaft should be straight within .001" per inch.
  - (iii) The commutator surface should be smooth and should be evenly covered with a black patina where the brushes have been running. Any segment which is very much darker than all the others, (the slots will have a burned appearance also), indicates an open-circuit coil while a very light coloured or unmarked segment suggests a short-circuited coil. If the commutator surface appears good, it should not be touched other than wiping it with a soft dry rag, but if the surface is rough, it may be lightly cleaned with very fine glass-paper. ON NO ACCOUNT SHOULD EMERY PAPER BE USED. If any oil or grease has got onto the commutator clean with carbon-tetrachloride (C.T.C.)
  - (iv) The resistance of the armature should be 17 - 19 ohms measured between diametrically opposite segments and to 3.5 ohms between adjacent segments.
- (2) The field assembly should be examined for overheating, the insulation will be brittle or charred. The resistance of each field winding should be 4 - 4.5 ohms. As the coils are impregnated in position the field assembly must be replaced complete when necessary.

- (3) The bearing bushes should be replaced if appreciable side-shake is present and the oil pads washed with C.T.C. and re-soaked in fine machine oil. After soaking, the pads should be tightly squeezed to remove all surplus oil before fitting. Clean the end covers, motor brush holder, and governor brush holders with C.T.C. to remove dirt and oil.
- (4) Place the tie-bolts in position in the rear end cover, fit the field spacers, and slip the field assembly into position. Insert the spacer tubes in field and put the brush holder spacers in position. Next, install the armature with spacing washers, fit the brush holder assembly and tighten down with lockwashers and nuts. Check that the outer edge of the commutator is in line with the outer face of the brush boxes; if not, re-adjust spacing washers.
- (5) Re-connect the appropriate field lead to governor brush holder and fit both brush holders in front cover. When inserting the brushes, lay the pigtail along the side of the brush towards the commutator and let the pigtail lead the brush into the brush box. To attach the leads to the brush box, take a 1/4" dia. rod of almost any material and make a diametrical slot about 1/16" wide and 1/4" deep. Insert the spring in the brush box and push home with the slotted end of the rod. Align the slot with the two holes in the brush box and thread the lead through. The rod may then be withdrawn and the lead soldered to the box. The brush pigtail can now be soldered in place, taking care to leave as much free length as possible, and using the minimum of heat and solder, so that the solder does not "run" up the pigtail and unduly stiffen it. Check that the brushes slide freely in their holder.
- (6) Replace motor leads in grommet and put on the front cover. Care should be taken to tuck all wires close to the walls of the cover. If the wires are correctly stowed, a pull on any of the leads should not bring it near the commutator. When the cover is in position the end shake of the motor should be not less than .005" and not more than .015" and the spacing washers should be adjusted if necessary. Secure the cover with its lockwashers and nuts, tighten down firmly and evenly and tap both end covers to allow the self-centering bearings to take up their correct position. The shaft should now revolve freely and without "knocking".
- (7) Check the governor brushes and renew if necessary. If the brushes show signs of wear on the sides check the truth of the governor slip rings (maximum run-out .005"). Clean the governor contact with a magneto file. The slip ring surfaces should be cleaned with C.T.C. and may be lightly cleaned with fine glass-paper. NEVER USE EMERY PAPER. The governor should be fitted with a gap 1/32" between the face of the slip rings and the governor brush holder. When replacing both the governor and the motor

pulley make sure that the grub screws are square on the flats of the shaft otherwise they will loosen when the projector is running.

- (8) When installing the motor in the projector, make sure that the fibre washers have a good grip on the mounting screws. The motor can then be located just above the mounting bosses and the three screws engaged, a few turns each, before tightening home. Note that the packing washers under the rubber bushes on the double lug of the motor are of different thickness to compensate for the taper of the lug.
- (9) The speed of the governor can be adjusted by means of the setscrew (28 Fig. 8). This should always be done in the projector and can be checked at the framing knob (1,440 r.p.m.) or at either film sprocket (180 r.p.m.). To adjust, remove the button (33) and turn the disc (21) until one of the two holes is opposite the set screw. Tightening the screw (clockwise) will increase speed and vice-versa.

## 7. Mechanism

### (a) Removal

Slacken the three cover screw (1 Fig. 1) and lift off the front cover assembly (17 Fig. 1). Similarly slacken the two cover screws which hold the lamp house cover (2 Fig. 1) in place and remove the cover. Take out the projection lamp. Run the drive belt off over the front edge of the drive pulley assembly (2 Fig. 6), loosen the setscrew in the pulley hub and remove the pulley. Take out the two screws (4 Fig. 6) and remove the shuttle shield (3 Fig. 6). Take out the two screws (6 Fig. 6) and remove the vertical camshaft bearing assembly (5 Fig. 6). Take out the shuttle oil pad (11 Fig. 6) and remove the two hex nuts and lockwashers located in the shuttle compartment. Loosen but do not remove completely the two screws which hold the rear heat shields in position and lift out heat shields complete with screws and spacers. Take out the  $\frac{3}{16}$ " Whitworth screw in the rear corner of the lamphouse.

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

Remove the takeup belt and take out the sound head mounting stud (14 Fig. 2). Lift the mechanism off the base.

### (b) Disassembly

- (1) Projection Optics ( See Fig. 3 ) - Push the condensing lens spacing spring toward the reflector and remove the front condensing lens (3), then remove the spring. Take out the rear condensing lens (2). Push the reflector (1) toward the retaining spring and

lift the reflector out of the holder. Do not remove the condensing lens holder from the front cover unless it is damaged; it is pre-aligned and will require re-alignment if removed.

- (2) Sprocket Shoe Assemblies and Lens Holder Assem. - Take out the binder head screws which hold the film strippers to the sprocket shoes and remove the strippers. Take out the two fillister head screws located between the stripper retaining screws and the sprocket shoe guide rollers. Take out the four screws located between the lens holder and the sprocket shoes and remove the lensholder gibs, the lens holder, the gate lever, and the gate lever shoe. Push back on the feed sprocket shoe follower and remove the feed sprocket shoe assembly. Push back on the takeup sprocket shoe follower and remove the takeup sprocket shoe assembly.

Remove the two screws which hold each of the sprocket shoe covers (19 and 24 Fig. 1) in place and remove the covers. Remove the sprocket shoe guide rollers and follower roller assemblies. Remove the pressure shoe assembly from the lens holder, then take out the two screws which hold the pressure shoe adjusting plate to the mounting plate and separate the parts. Remove the two pressure shoe retaining screws and take off the pressure shoe sub-assembly and the upper and lower springs. Remove the binder head screws which hold the pressure shoe retaining springs to the lensholder and remove the springs. Take out the screw and washer which hold the lens tension spring assembly in place and remove the spring assembly.

- (3) Sprocket Assemblies & Associated Parts - Take out the setscrew in the feed sprocket assembly (17 Fig. 6) and remove the sprocket. Remove the setscrew from the film sprocket collar and take off the collar and spacing washers.

Remove the takeup sprocket screw, neoprene washer and takeup sprocket assembly (16 Fig. 6). Remove the setscrew from the takeup sprocket pulley and remove the pulley and spacing washers.

- (4) Shuttle Assembly and Interrupter Shutter Assembly (See Fig. 6) - Remove the front cover, drive pulley, shuttle shield and vertical camshaft bearing as per para. 7(a). Remove the shutter retaining nut (14) and the shutter assembly (12). Remove the interrupter shutter shaft washer and spacing washers.

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

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

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

- (5) Rewind Clutch Assembly and Large Intermediate Gear Assembly (See Fig. 10) - Remove the rear cover as per para. 7 (a) and lift the rewind belt off the rewind clutch.

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

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

- (6) Sprocket Gear Assemblies and Small Intermediate Gear Assemblies (See Fig. 10) - Pull out the feed sprocket gear assembly (17) and takeup sprocket gear assembly (16). Remove the screw (20) and washer (19) from the end of the small intermediate sprocket gear assembly (18) and remove the gear and spacing washer.

- (7) Camshafts and Shutter Gear (See Fig. 10) - Rotate the gear train until the timing marks on the Camshaft gears and shutter gear are aligned - the large end of the tapered pins (13 & 15) which hold the camshaft gears (12 & 14) will now be as shown. Rotate the vertical camshaft gear (14)<sup>1</sup>/<sub>2</sub> turn and drive out tapered pin (15). Push the camshaft out of bearing and remove the gear. Pull out the shutter gear assembly (11). Support the hub of the lateral camshaft gear assembly on a "V" block and drive out the tapered pin (15). Remove the gear and the shaft.

- (8) Aperture Plate Assembly and Framing Plate Assembly (See Fig. 6) - Take out the five screws which hold the aperture plate to the mechanism sub-assembly and remove the aperture plate assembly. Remove the split pin from the end of the framing knob shaft and unscrew the framing knob shaft. Lift out the framing plate.

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

(c) Repair and Reassembly

- (1) Projection Optics - Clean the condensing lenses and reflector and install them as indicated in Fig. 3. Be sure that the rear condensing lens is properly seated in the holder and is not tipped up on the retaining detent.

Clean all surfaces of the projection lens elements with lens tissue or lens cleaning cloth dampened with lens cleaner.



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

Check the aperture plate for wear of the film supporting rails adjacent to the claw slot. If the rails are worn down to within .005" of the relief, replace the plate assembly. Check the side tension spring for grooves at the film line. If the spring is grooved, replace it. Make sure that the edge of the side tension spring is either at a right angle to the film plane or inclined toward the optical axis at the outer edges. If the side tension springs are inclined outward, the picture may go in and out of focus. Install the aperture plate. Use calendar film or a loop of title film to align the aperture (by centering the projected image) before tightening the retaining screws.

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

Remove the oil well cap (21 Fig. 10) and oil well strainer, then squirt oil through each tube and make sure that it flows out through each bearing and also onto the large and small intermediate gear studs. If oil does not flow into the bearings, check for plugged tubes. Either replace the oil well pad or clean the old one with carbon tetrachloride. Hold the oil well (22 Fig. 10) with a wrench while tightening the cap in order to avoid damaging the oil tubes.

- (4) Sprocket Gear Assemblies and Small Intermediate Sprocket Gear Assembly - Clean the shutter gear assembly with a bristle brush and check for damaged teeth or excessive shaft wear. Replace any damaged assembly. Place a spacer washer over the feed sprocket gear shaft, oil the shaft and insert the shaft in the bearing. Install another washer and the film sprocket collar. Push the gear and collar together to remove end play and tighten the set

screw on the flat on the shaft.

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

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

- (5) Shutter Gear Assembly and Shutter - Clean the shutter gear assembly with a bristle brush and check for damaged teeth or excessive shaft wear. Replace a worn or damaged part. Oil the shaft and insert it into the bushing. Install the shutter shaft washer and enough spacing washers to reduce the endplay to .003" - .005". Install the shutter assembly and retaining nut.
- (6) Camshafts - Wash the camshafts and cams in grease solvent and immediately coat with a film of oil. Clean the cam gears with a bristle brush and check for damaged teeth. Examine the shafts for wear, and the cams for wear, and flats, paying particular attention to the sharp corners of the vertical cam.

Place a .010" spacing washer on the vertical camshaft and insert the shaft in the bearing. Measure the distance from the face of the cam to the face of the mechanism (finished surface upon which front cover bears). Use spacing washers as required to make the distance from the cam to the face of the mechanism  $.533" \pm .002"$ . Place a .010" spacing washer on the opposite end of the shaft. Turn the cam so that the oil feather is horizontal and pointing to the rear of the projector and install the gear with the larger hole for the taper pin as indicated by (15) in Fig. 10. Slip the tapered pin in place and check for endplay. Use spacing washers as required to reduce the endplay to .001" - .003". When the correct combination of washers has been selected, remove the gear and the washers and place them together for future installation. Place a .010" spacing washer on the lateral camshaft, oil the shaft and insert in the bearing. Install the lateral cam spacer and the lateral cam assembly. Measure the distance from the face of the lateral cam to the face of the mechanism. Use spacing washers as required to locate the cam within .001" of the same distance as the vertical cam is located from the face of the mechanism. Rotate the lateral cam so that the dowel pin is horizontally in line with the camshaft on the side towards the vertical cam, then install the lateral cam gear with the large hole for the tapered pin as indicated by 13 in Fig. 10. Insert the tapered pin and check for endplay in the shaft. Add spacing washers as required, in order to reduce the endplay to .001" -

.003". When the correct combination of washers has been selected, support the gear hub on a "V" block and drive home the pin.

Position the vertical camshaft so that about  $1/16$ " of shaft extends through the bushing and the cam faces the lateral cam. Turn the shutter gear so that the centre of a blade is approximately over the centre of the aperture. Rotate the cam shafts to their setting positions indicated in the preceding paragraphs, i.e. feather and dowel horizontal with their respective shaft centres and towards one another. Install the pre-selected combination of spacing washers on the vertical camshaft. Slip the vertical camshaft gear into position making sure that the timing marks on the gear match the timing marks on the shutter gear and lateral cam gear. Push the vertical camshaft through the bore in the vertical cam gear and insert the tapered pin. Drive the pin home.

Check the timing of the projector. If it has been properly assembled, the cams and shutter can be aligned as shown in Fig. 5.

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

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

Check the position of the end of the release spring (5 Fig. 10) with respect to the groove in the clutch dog. The spring should be approximately  $\frac{1}{8}$ " ahead of the bottom of the groove. If the rewind clutch releases during

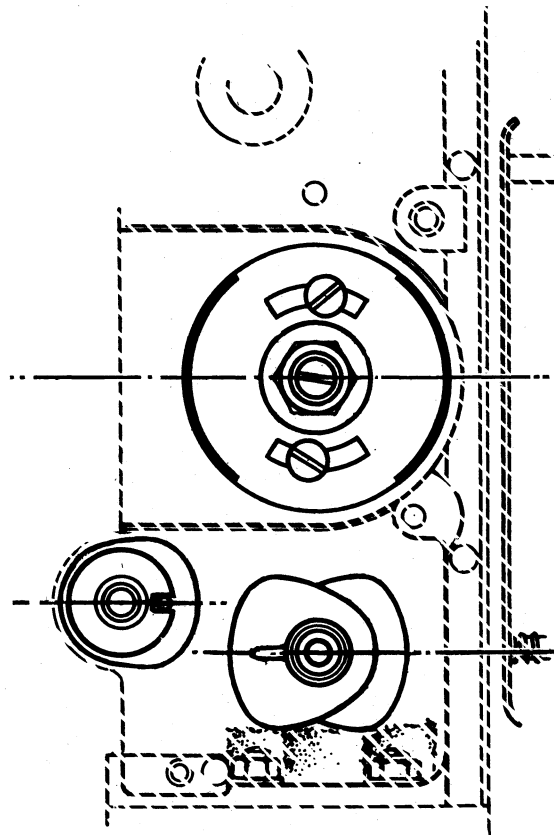


Fig. 5

the rewinding process, decrease the distance between the release spring and the clutch dog by loosening the spring retaining screw (6 Fig. 10) and retarding the spring. If the rewind clutch does not release at the end of the rewinding process, increase the distance between the spring and the clutch dog.

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

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

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

Clean and inspect the pressure shoe parts - if the pressure shoe rails are worn down at any point to within .010" of the relief, replace the pressure shoe sub-assembly. Replace weak or broken springs. Assemble the pressure shoe assembly with the weaker spring on the upper stud. Apply a light film of grease to the ways on the lens holder. Place the gate lever shoe in the slot in the lens holder. Mesh the stud on the gate lever in the hole in the shoe. Place the lens holder on the mechanism with the lower way in the channel formed by the lower gib and the takeup sprocket shoe. Mesh the rear stud on the gate lever in the hole in the gate lever eccentric pivot and press the lens holder assembly against the mechanism.

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

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

Install the feed sprocket and line up the flanges with the flanges on the guide roller, then tighten the setscrews on the flat on the shaft. Install the film stripper and make sure that it does not rub on the sprocket. Install a spacing washer on the takeup sprocket shaft. Temporarily install the takeup sprocket, grommet, and retaining screw, and check the sprocket alignment with the guide rollers. Add spacing washers as required, then tighten the

takeup sprocket screw. Check to be sure that the sprocket grommet is functioning, then install the film stripper.

- (10) Shuttle Assembly - Clean the shuttle, shuttle pivot and pivot bushing with carbon tetrachloride. Inspect the shuttle gibs for wear. If they are not worn more than .005" they can be honed flat. Inspect the claw teeth for wear. If they are not cut more than .010" - .012" they can be honed. Replace shuttle assembly if worn beyond limits indicated. Install shuttle pivot in shuttle gibs and check the fit between the pivot and the gibs. This should be a "push fit". If the pivot fits too tightly, stone the surface of the pivot to obtain proper fit. If the pivot is too loose, support the gib of the shuttle on a small anvil and peen the other gib lightly to close the gibs. Install the shuttle with pivot and bush on the lateral camshaft with the claw pointing toward the rear of the lamphouse. Turn the mechanism and check for play between the lateral gibs and the lateral cams. If any play is found, remove the shuttle and support the shorter of the lateral cam gibs with a small anvil and peen the longer of the lateral cam gibs in order to close the gibs enough to correct the play. After completing this operation it is advisable to check the lateral gibs with an inside caliper to make sure that the gibs are parallel. If the gibs are not parallel, stone the surface of the gibs, using a medium India stone. After the lateral gibs have been adjusted install the shuttle in the regular position and turn the mechanism. Check for play between the vertical gibs and the vertical camshaft. If play exists, remove the shuttle, support one gib on a small anvil and peen the other gib lightly to decrease the space between the gibs. After this operation is completed, it is advisable to check the alignment of the gibs, using an inside caliper for this purpose.

After the vertical gibs have been fitted, install the lateral camshaft washer and retaining nut. Check the shuttle for endplay on the lateral camshaft. If end play exists, stone the shuttle bush to remove end play. If the mechanism is tight after the lateral cam retaining nut is tightened, then stone the face of the shuttle pivot to reduce binding. Install the vertical cam shoulder washer and vertical cam retaining nut. Check the shuttle for end play at this point, and if end play is found, stone the shoulder of the vertical cam washer. If the mechanism binds when the vertical cam washer is installed and the vertical cam nut is tightened, then renew the vertical cam washer. Install the vertical camshaft outboard bearing assembly, and after tightening the screws which hold it in place, tap the bearing assembly lightly to allow the self-aligning bearing to take up the correct position.

Run the mechanism and check for excessive noise. If excessive noise is encountered, apply pressure to the rear lateral gib. If

the noise disappears, the shuttle is not properly fitted to the lateral cam. Press downward on the shuttle, if the noise disappears, the shuttle is not properly fitted to the vertical cam. When the shuttle is adjusted properly, the mechanism should be quiet and should also be free enough so that the shutter control knob will continue to rotate for 40-50 degrees after it has been given a quick snap.

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

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

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

- (a) Film Slap - hone the bottom surface of the centre tooth of the claw.
- (b) Strike - check for spots on the edges of the claw (except bottom of centre and lower teeth) where claw has contacted film. Hone claw at any contact points except as noted.
- (c) Double Image - hone the bottom surface of the top tooth of the claw.
- (d) Trailer Ghost - loosen the two screws that hold the interrupter shutter in position and advance or retard shutter as required.
- (e) Picture Jump - Check and adjust gate pressure first threading and starting the projector. Loosen the fillister head screw (2 Fig. 10). Rotate the gate lever eccentric pivot (1 Fig. 10) while holding down the gate lever (3 Fig. 10). Move the lensmount forward as far as it will go, then rotate the eccentric to move the lensmount toward the aperture. Set the eccentric to apply the minimum amount of gate pressure required to obtain a steady picture. When the pressure is adjusted properly, it should be possible to grasp the film by the edges at a point  $\frac{1}{2}$ " -  $\frac{3}{4}$ " above the aperture and push it downward through the aperture without any tendency of the film to buckle. If the gate pressure is correct, hone the bottom surface of the lower tooth of the claw.

8. Control Panel Assembly (See Fig. 8)

(a) Removal

Take off the tone and volume control knobs and remove the four screws which hold the control panel to the projector. Slide the control panel downward, tilt out at the top and lift away from the projector. It is seldom necessary to disconnect the wiring as components can be removed and replaced without disconnecting more than two or three leads.

(b) Repair and Reassembly

Check the operation of motor and lamp switches and adjust the actuating pins where necessary. Clean the contact edge of the rheostat with carbon tetrachloride. When replacing the control panel, avoid over-tightening the four retaining screws.

9. Speaker Assembly

(a) Removal

Unsolder the leads to the speaker receptacle. Remove the four nuts, lockwashers and washers which hold the speaker in place. Lift out the speaker and the grille.

(b) Repair

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

#### SECTION 4. GENERAL SPARES LIST

This Section lists all the component parts of the Stylist Projector which are procurable as individual spares. It is arranged in two parts:-

Part A lists component descriptions and numbers in order of disassembly. The General Spares List at the beginning covers the complete projector, except that the major units are only shown as complete items, and their component parts are shown, again in order of disassembly, in the separate lists for each of these main units. Throughout Part I sub-assembly parts are 'stepped' in from the edge of the column and appear directly after the assembly of which they form part. Fixing parts are listed following the part which they secure with only sub-assembly components intervening. For example, on page 2 the "case Assembly - Carrying" is shown followed by "handle", "leg" and "leg" all stepped in as they are parts of the Carrying Case Assembly. Immediately following are the "washers", "nuts" and "lockwashers" and they are the parts which secure the Carrying Case Assembly to the projector.

Part B lists component part numbers only in numerical order and gives the page reference to Part A.



PART "A"

1. General Spares List - Stylist Projector

Fig. No.	Item No.	Part No.	Qty.	Description		
3	4	37101	1	Cable Assembly Speaker (40 ft. with Plugs)		
		37105	1	Plug, Speaker Cable (2 prong)		
		37106	1	Jack Plug		
				34150B	1	Reel - Film - 400 ft.
				2626G	1	Nut - Wing (Film Reel to case)
				37102	1	Instruction Book
				32006	1	Lens, Projection
				37104	1	Accessory Kit Assembly
				34182	1	Amproil (1 ox. bottle)
				34160	1	Aperture Brush
				35333	5	Fuse - 1 amp
				34159	1	Lamp Glove
				37282	1	Speaker 8"
				37231	1	Socket - Speaker Plug
				37234	3	Bumper - Rubber (for Case Legs)
				37233	1	Case Assembly - Carrying
				37283	1	Handle - Carrying Case
				2625P	2	Screws
				2661K	2	Washers
				37235	2	Leg - Carrying Case (Corner Type)
				1690A	8	Rivets (Leg to Case)
				37236	1	Leg - Carrying Case (Flat Type)
				1690A	4	Rivet (Leg to Case)
				1679A	3	Case Fastener (Complete with key)
				1677A	18	Rivet (Case Fastener to Case)
				37309	4	Rubber Bumper
				1691A	4	Rivets (Bumpers)
				2484	4	Washers
				37264	1	Clip (Speaker Cable Jack)
				1690A	1	Rivet (Clip Speaker Jack)
				2661K	3	Washer
				2662K	3	Nut - Hex. } - (Carrying Case to Projector)
		2487B	3	Lockwasher }		
8	1	37117	1	Tilt Assembly		
		37219	1	Spring Tilt Take-up		
		37109	2	Sleeve Pivot		
		34457	2	Washer Spring		
8	32	35349	2	Screws		
		2662K	2	Nuts		
11	V1	33377	1	Cell Photo-Electric		
11	V7	37115	1	Lamp Exciter, 4 volt, 0.75 Amp.		
		34567	3	Spacers		
		34579	3	Screw		
1	3	37116	4	Knob Control (Tone, Volume, Projector Switch and Motor Speed)		
8	4	37123	1	Amplifier Unit (See page 11- General Spares List)		
		35347	4	Screw (Amplifier Unit to Projector)		
1	4	37112	1	Belt Take-up		

1. General Spares List - Stylist Projector (Cont'd.)

Fig. No.	Item No.	Part No.	Qty.	Description
1	5	37121	1	Arm Assembly Take-up Reel (See Page 8)
1	11	34117	1	Stud - Reel Arm
2	6	34118	1	Nut - Reel Arm Stud
1	10	34119	1	Washer - Reel Arm Tension
		34120	1	Washer - Reel Arm Stud
2	4	34565	1	Belt - Rewind
1	12	37122	1	Arm Assembly Feed Reel (See Page 8)
2	5	37285	1	Support - Rewind Belt
1	16	34117	1	Stud - Reel Arm
2	7	34118	1	Nut - Reel Arm Stud
1	15	34119	1	Washer - Reel Arm Tension
		34120	1	Washer - Reel Arm Stud
		34120	1	Sound Head Assembly (See page 10)
2	14	37110	1	Stud - Sound Head Mounting
		37111	A. R	Washer - Shim
2	15	34573	3	Screws
		2487B	3	Lockwashers
		37286	A. R	Sound Head Mounting Pad
2	17	37242	1	Cover Fan Housing
2	18	37246	3	Screws (Fan Cover to Projector)
8	5	37014	1	Fan (with Grub Screw)
		1443	1	Grub Screw - Hexagon Socket
8	6	37256	1	Cover Assembly - Valve
8	7	37246	4	Screws (Valve Cover to Projector)
8	8	37255	1	Panel Assembly Control
8	10	37274	1	Rheostat (R-33)
11	F1	35333	1	Fuse - 1 amp
8	11	35205	1	Fuseholder
8	12	37276	1	Switch Unit
8	13	37353	1	Switch - Motor (S-1)
8	14	37354	1	Switch - Lamp (S-2)
		37275	1	Panel - Control
		37246	4	Screws (Control Panel to Projector)
8	15	37258	1	Cable Assembly Amplifier
8	16	37277	1	Socket - Female - 4 Terminal (P - 1)
8	17	34533B	1	Cover Exciter Lamp Socket
8	18	37029	1	Socket Assembly - Exciter Lamp
8	19	33280	3	Grommet Rubber
		34522	1	Spring - Exciter Lamp Socket
		34529	1	Washer - Bakelite Exciter Lamp Socket
		37249	1	Belt - Motor Drive *
8	22	37077	1	Motor Unit Assembly (See page 9)
		37243	3	Washer - Fibre
		37241	3	Sleeve - Motor Mounting
		34480	3	Bushing Rubber
		34477	3	Washer Plain
		37304	1	Washer Motor Mounts - Thick
		37305	1	Washer Motor Mounts - Thin

1. General Spares List - Stylist Projector (Cont'd.)

Fig. No.	Item No.	Part No.	Qty.	Description
		37244	3	Screws
11	B1	34116	1	Lamp projection 750 Watt 115 Volt
8	25	37113	1	Knob Control (Tilt)
8	26	37259	1	Screw Assembly Tilt
8	3	37240	1	Nut - Tilt Screw Bushing (Tilt Screw to Casting)
		31900	1	Mechanism Unit (See page 4)
		37237	4	Stud - Mechanism Mounting
		2629G	4	Nut - 2 BA Hex. (Mechanism to
		2652L	4	Washers Spring } Projector Base)
		37245	1	Screw }
		37034	1	Socket Assembly Projection Lamp
		34041	1	Socket Projection
		37032	1	Seat Assembly Projection Lamp
		35347	2	Screw, (Lamp Socket to Seat)
		37239	4	Screw - Lamp Socket Assembly Mounting) (Lamp Socket
		34755	4	Washers } to Projector
		37247	4	Springs } Base)
8	20	37238	1	Screw Lamp Adjusting
11	R31	37251	1	Resistor Assembly Governor (R-31)
		2666K	2	Speed Nuts) (Resistor Assembly to Projector Base)
		35306	2	Screws }
8	31	37248	1	Capacitor Governor (C-23)
8	30	37252	1	Capacitor Line Filter (C-24)
8	29	37319	1	Resistor Assembly - Motor (R-37)
		2666K	2	Speed Nuts
		35306	2	Screws
		37257	1	Cable - Power (9 ft. with 3-pin Moulded Plug)
		37250	1	Clamp - Cable (Power Cable to Projector)
8	27	37254	1	Base Sub-Assembly Projector (Comprising the two base castings fixed together and having the fan inlet ring and mounting strip Assembly fitted in position).
		37350	1	Base casting - upper section (Machined and painted).
		37351	1	Base casting - lower section (Machined, painted and with fan inlet ring, mounting strip and rivets).
		37262	1	Mounting strip and clip assembly
		37263	1	Ring - fan inlet
		37207	1	Stop Tilt
		1675A	5	Rivets (Tilt Stop to Casting)
8	33	37293	1	Button - plug (access hole for governor adjustment)
				The following parts are only required for the 200/250 volt Universal Model:-
		37138	1	Plug - Male - 4 terminal (Chassis Mounting)
		37378	1	Connector - Female - 4 terminal.

2. Mechanism Unit

Fig. No.	Item No.	Part No.	Qty.	Description
1	17	31889	1	Cover Assembly - Front
3	3	32101	1	Lens - Front Condensing
6	1	32107	1	Spring - Condensing Lens Spacing
3	2	32102	1	Lens - Rear Condensing
3	1	32103	1	Reflector
6	18	30051	1	Shield - Front Inner Heat
		30213	1	Spacer - Front Heat Shield
		30130	2	Washer ) (Heat Shields to
		30093	2	Screw, Self Tapping ) Front Cover)
		32003	1	Holder Assembly - Condensing Lens
		30092	2	Screws (Condensing Lens Holder to Front Cover)
6	19	30540	1	Shield Assembly - Front Heat
1	1	30542	3	Screws - Cover (Front Cover to Mechanism)
2	1	37113	1	Knob Control (Inching)
2	2	31404	1	Cover - Rear
2	3	30119	4	Screws (Rear Cover to Mechanism)
1	2	30501B	1	Cover - Lamphouse Top
1	1	30542	2	Screw - Cover (Lamphouse Cover to Mechanism)
6	2	30745	1	Pulley - Drive (with grub screw)
		30099	1	Grub Screw (Drive Pulley to Cam Shaft)
6	3	30079	1	Shield Shuttle
6	4	30114	2	Screw (Shuttle Shield to Mechanism)
6	5	30599	1	Bearing Assembly - Vertical Cam Shaft
6	6	30112	2	Screw (Vertical Cam Shaft Bearing to Mechanism)
		30550	1	Pivot Assembly - Shuttle
6	7	30551	1	Shuttle Assembly
6	8	30322	1	Nut - Vertical Cam ) (Shuttle to Vertical
6	9	30139	1	Washer - Vertical Cam ) Cam Shaft)
6	10	30323	1	Nut - Lateral Cam ) (Shuttle to Lateral
		30145	1	Washer - Lateral Cam ) Cam)
6	11	30301	1	Oil Pad - Shuttle
6	20	30080	1	Shield - Rear Inner Heat
6	21	30543	1	Shield Assembly - Rear Heat
		30130	2	Washer ) (Heat Shields to
		30093	2	Screw, Self-tapping ) Mechanism)
		30077	1	Stripper - Film (Feed Sprocket)
		30106	1	Screw (Film Stripper to Feed Sprocket Shoe)
1	18	31875	1	Shoe Assembly - Feed Sprocket
1	19	31402	1	Cover Feed Sprocket Shoe
		31448	2	Screw (Cover to Feed Sprocket Shoe)
		30597	1	Follower Assembly - Feed Sprocket
		30262	2	Roller Sprocket Follower

2. Mechanism Unit (Cont'd.)

Fig. No.	Item No.	Part No.	Qty.	Description
1	20	30176	1	Spring - Sprocket Follower
		30263	4	Roller - Sprocket Shoe
		31861	1	Shoe Sub-Assembly (Shoe Moulding with Pins)
		30111	1	Screw } - (Shoe Assembly to Mechanism)
30119	2			
1	21	31867	1	Shoe Assembly - Pressure
		31866	1	Shoe Sub/Assembly Pressure
		31426	1	Spring - Upper
		31427	1	Spring - Lower
		31444	2	Screw. } (Shoe Sub/Assembly to Adjusting Plate)
		31425	1	
		30101	2	Screw (Adjusting Plate to Mounting Plate)
		31424	1	Mounting Plate
6	22	31865	1	Holder Assembly - Projection Lens
		31412	2	Spring - Pressure Shoe
		30103	2	Screw (Pressure shoe spring to lens holder)
		31880	1	Lens tension spring assy.
6	23	31416	1	Screw - Lens Locking
10	1	31441	1	Pivot - Gate Lever Eccentric
10	3	31885	1	Lever Assembly - Gate
		31436	1	Shoe Gate Lever
10	2	31443	1	Screw (Lens Lever Pivot Locking)
1	22	31438	2	Gib-lens holder
		30077	1	Stripper Film (T.U. Sprocket)
		30106	1	Screw (Film Stripper to T.U. Sprocket)
1	23	31876	1	Shoe Assembly - T.U. Sprocket
1	24	31403	1	Cover - T.U. Sprocket Shoe
		31448	2	Screw (Cover to T.U. Sprocket Shoe)
		30594	1	Follower Assembly - T.U. Sprocket
		30262	2	Roller - Sprocket Shoe Follower
		30175	1	Spring - Sprocket Follower
		30263	4	Roller - Sprocket Shoe
		31862	1	Shoe Sub/Assy. - (Shoe Moulding with Pins)
		30111	1	Screw } - (Shoe Assembly to mechanism)
		30119	2	
6	15	30571	1	Plate Assembly Aperture
		30058	1	Spring - Film Edge
		30132	1	Washer } - (Film Edge Spring to Aperture Plate)
		30095	1	Screw }
		31447	5	Screws (Aperture Plate to Mechanism)
10	4	31883	1	Clutch Assembly Rewind
10	5	31410	1	Spring -
10	6	30393	1	Washer } - (Spring to Rewind Clutch)
		31445	1	
		30178	1	Ring - Rewind Clutch Snap (Rewind Clutch to Collar) -
10	7	31435	1	Spring - Rewind Clutch Release
10	10	31871	1	Gear Assembly - Large Intermediate Sprocket

2. Mechanism Unit (Cont'd.)

Fig. No.	Item No.	Part No.	Qty.	Description
10	24	30147	1	Washer Plain
10	8	31434	1	Collar - Large Intermed. Sprocket Gear
10	9	30107	1	Screw
6	12	30740	1	Shutter Assembly Interrupter
		30460	1	Shutter Interrupter
		30083	1	Disc - Interrupter Shutter
6	13	30094	1	Screw (Shutter to Disc)
10	11	30721	1	Shaft Assembly Interrupter Shutter
		30133	A.R	Washer
		30144	1	Washer
6	14	30321	1	Nut - Interrupter Shutter
10	12	30702	1	Shaft Assembly Lateral Cam
		30701	1	Lateral Cam Assembly
		30703	1	Lateral Cam Gear Sub. Assembly
		30161	1	Shaft - Lateral Cam
10	13	30194	1	Taper Pin (Lateral Cam Gear to Shaft)
		30131	2	Washer
		30133	A.R	Washer - Shim
		30134	A.R	Washer - Shim
		30135	A.R	Washer - Shim
10	14	30712	1	Shaft Assembly - Vertical Cam
		30711	1	Vertical Cam Shaft Sub. Assembly (Includes Cam)
		30718	1	Vertical Cam Gear Assembly
10	15	30194	1	Taper Pin (Vertical Cam Gear to Shaft)
		30131	1	Washer
		30133	A.R	Washer - Shim
		30134	A.R	Washer - Shim
		30135	A.R	Washer - Shim
6	16	30731	1	Sprocket - Film Take-up
		30455	1	Button - Film Sprocket
		31032	1	Washer - Neoprene
		31031	1	Washer - Plain
		31030	1	Screw
		30261	1	Pulley - T.U. Belt Drive
		30098	1	Screw (Pulley to Shaft)
10	16	31530	1	Gear Assembly - T.U. Sprocket
		30131	A.R	Washer Shim
		30133	A.R	Washer Shim
		30134	A.R	Washer Shim
6	17	30730	1	Sprocket - Film Feed
		30455	1	Button, Film Sprocket
		30099	1	Grub Screw (Film Feed Sprocket to Shaft)
		30456	1	Collar - Film Sprocket
		30098	1	Screw (Collar to Shaft)
10	17	30585	1	Gear Assembly - Feed Sprocket

2. Mechanism Unit (Cont'd.)

Fig. No.	Item No.	Part No.	Qty.	Description
		30131	A. R	Washer - Shim
		30133	A. R	Washer - Shim
		30134	A. R	Washer - Shim
10	18	30584	1	Gear Assembly - Small Intermediate Sprocket
10	19	30135	1	Washer Plain
10	20	30097	1	Screw
		30133	A. R	Washer - Shim
		30134	A. R	Washer - Shim
10	21	30296	1	Cap - Oil Well
10	22	30741	1	Oil Well Assembly
		30581	1	Framing Plate Assembly
		30171	1	Spring Framing Plate
6	24	31455	1	Shaft - Framing Control
10	23	37116	1	Knob (framing control)
		30200	1	Split Pin (Framing Control Shaft)
		31893	1	Mechanism Housing Assembly (Mechanism Casting complete with bushes and studs)
		30530	1	Bushing - Shutter Shaft
		30531	2	Bushing - Sprocket Shaft
		30532	3	Bushing - Cam Shafts
		31873	1	Bushing - Lateral Cam Shaft

3. Take-up Reel Arm

Fig. No.	Item No.	Part No.	Qty.	Description
1	9	37223	1	Retainer T.U. belt
		35370	2	Screw, Self-tapping (Belt retainer to Reel Arm)
		34080	1	Cap - Spindle Brake
		34081	1	Spring - Spindle Brake
		34026	1	Shoe Brake
1	6	34074	1	Shifter Assembly - Belt
1	7	37221	1	Pulley - T.U. Loose
1	8	37222	1	Spindle Assembly - T.U. Reel
		34078	1	Washer - Plain
2	16	34079	A.R	Washer - Plain } - (Spindle Assembly to Reel Arm)
		34077	1	Nut - Cap
		37220	1	Arm Sub-assembly T.U. Reel (Arm with Bushing fitted)
		34058	1	Bushing - T.U. Reel Arm

4. Feed Reel Arm

Fig. No.	Item No.	Part No.	Qty.	Description
1	13	37284	1	Guard - Feed Reel Belt
		35373	2	Screw - 6 BA (Belt Guard to Feed Reel Arm)
		34080	1	Cap - Spindle Brake
		37227	1	Spring - Feed Spindle Brake
		34026	1	Shoe - Brake
1	14	37226	1	Spindle Assembly - Feed Reel
		37228	1	Pulley - Rewind
		34104	1	Pin- Taper (Rewind Pulley to Spindle)
		34079	1	Washer - Plain
		37225	1	Arm Sub-Assembly Feed Reel (Arm with Bushing fitted)
		34088	2	Bushing - Feed Reel Arm



5. Motor Unit Assembly

Fig. No.	Item No.	Part No.	Qty.	Description
8	24	37064	1	Pulley Assembly - Motor (with 2 grub screws)
		37079	1	Spring - Motor Shaft
8	21	37078	1	Disc - Motor Shaft
8	23	37057	1	Governor Unit
8	28	31272	1	Grub Screw - (Speed Adjustment)
		31273	2	Grub Screw - (Governor to Motor Shaft)
		30358	2	Brush - Governor (with spring)
		37069	1	Motor Sub/Assembly (complete motor less Governor, pulley, disc and spring).
9	13	37035	1	End Cover Assembly (Governor End)
9	17	37036	1	Oil Pad
9	16	37037	1	Bearing Self-Aligning
9	15	37038	1	Retainer - Bearing
9	14	35370	2	Screws - Self-tapping (Retainer to End Cover)
9	8	37039	1	Grommet - Rubber
9	12	2625L	2	Locknut 4 BA
9	19	2651L	2	Washer, Single Coil Spring
9	20	37040	2	Brush Holder Assembly - Governor
9	18	2687K	2	Grub Screw (Governor Brush Holder to End Cover).
9	24	37043	1	Brush Holder Assembly - Motor
9	23	37072	2	Brush - Motor (without spring)
9	22	37073	2	Spring - Motor Brush
9	11	37071	2	Spacer - Brush Holder
9	4	37074	A.R	End-Play Washer - Steel
		(37075/5	A.R	End-Play Washer - .005" bakelite)
9	5	(37075/15	A.R	End-Play Washer - .015" "
		(37075/30	A.R	End-Play Washer - .030" "
				} Adjust location and end-play of armature.
9	7	37066	1	Armature Assembly
9	3	31922	1	Field Assembly
9	9	37076	2	Sleeve - Tie-bolt
9	10	37320	2	Pillar - Field Support
9	2	37046	1	End Cover Assembly - Rear
9	21	37047	1	Oil Pad
9	16	37037	1	Bearing - Self Aligning
9	15	37038	1	Retainer - Bearing
		(35348	2	Screw 6 BA
9	6	(2653K	2	Nut 6 BA
		(2492B	2	Lockwasher 6 BA
				} Retainer to Rear End Cover
9	1	37070	2	Tie-bolt - Motor
		2650L	2	Washer - 4BA small
9	12	2625L	2	Locknut - 4 BA
				} Brush Holder and Field to End Cover.

6. Sound Head

Fig. No.	Item No.	Part No.	Qty.	Description
		34314B	1	Cover - Exciter Lamp (Casting)
		30542	2	Screws - Cover (Exciter Lamp Cover to Sound Head)
7	1	32010	1	Sound Optical Unit
7	2	34366	1	Screw - Phillips Head (Sound Optical Unit to Sound Head)
7	3	37201	1	Shield Assembly - P.E.C.
2	13	34113	2	Screws - Headless Set (P.E.C. Shield to Sound Head)
		37199	1	Guide Assembly - Take-up
7	4	37212	1	Roller - Film Guide
7	6	34417	1	Stud - Film Guide Roller
7	5	37026	3	Roller - T.U. Belt Guide
7	7	34418	2	Stud - T.U. Belt Guide Roller
		34053	1	Nut - Hex. Cap (T.U. Guide Assy. to Soundhead)
7	8	37200	1	Flywheel Sound Drum
7	12	34385	1	Screw - Flywheel Retaining
		34391	A.R	Washer - Shim
7	9	34392	A.R	Washer - Shim
		34386	A.R	Washer - Shim
				(For adjustment of end-play on Sound Drum Shaft)
7	11	37203	1	Shaft Assembly - Sound Drum (Fitted with two ball bearings)
7	10	34794	2	Ball Bearings
7	29	37205	1	Bracket Assembly - Sound Drum
		34696	1	Screw 2 BA Cask Head
7	30	37206	1	Screw 2 BA Special Head
				(Sound Drum Bracket to Sound Head)
7	13	34361	1	Guideway Assembly - Upper Film
7	14	34107	2	Screw 4 BA Binder Head (U.F. Guideway to Soundhead)
7	15	37202	1	Guideway Assembly - Lower Film
		34394	1	Spring
		34395	1	Rivet (Spring to L.F. Guide)
		34393	1	Stud - Guideway Aligning
		34396	1	Screw (Stud to Lower Film Guide)
		34353	1	Spring - Guideway Aligning Stud
2	12	34365	1	Screw
		34343	1	Washer
				(Secure and adjust L.F. Guideway and stud to soundhead).
2	11	2689K	1	Screw Hex. Socket (L.F. Guide Adjustment Locking)
7	16	34357	1	Arm Assembly - Pressure Roller
7	17	34372	1	Roller - Pressure
7	18	34370	1	Knob - Pressure Roller
		37020	1	Washer - Plain
		34373	1	Arm Sub-Assembly - Pressure Roller (Arm only)
7	19	34354	1	Spring - Pressure Roller Arm
7	20	34346	1	Pivot - Pressure Roller Arm
		34477	1	Washer - Plain
7	26	34349	1	Catch - Pressure Roller Arm

6. Sound Head (Cont'd.)

Fig. No.	Item No.	Part No.	Qty.	Description
7	27	34341	1	Screw (Pressure Roller Arm Catch to Soundhead)
7	21	37204	1	Equalizer Assembly - Film Tension
7	22	37212	1	Roller Film Guide
		34342	1	Washer
7	23	34633	1	Screw } (Film Guide Roller to Equalizer Arm).
		34398	1	Arm Assembly - Film Tension Equalizer)
7	24	34351	1	Spring - Film Tension Equalizer
7	25	34348	1	Pivot - Film Tension Equalizer
7	28	34356	1	Roller - Film
		34342	1	Washer
		34633	1	Screw
		37020	1	Washer
		34352	1	Spring - Film Roller
		37198	1	Head - Sub/Assembly Sound (Soundhead casting fitted with all fixed studs and dowels and Reel Arm Lock Pin).

7. Amplifier Unit

Fig. No.	Item No.	Part No.	Qty.	Description
11	V2	37294	1	Valve, 8D5 (6BR7)
11	V3	37295	1	Valve, 12AX7
11	V4/5/6	37296	3	Valves, 50C5
8	34	37129	1	Cover Assembly - Amplifier Bottom
		35372	4	Screws, Sheet Metal, No.6 x $\frac{1}{4}$ " (Cover to Chassis)
2	8	37130	1	Cable Assembly - P.E.C.
		37352	1	P.E.C. Socket Assembly
		632	1	Cable - Co-axial
2	9	37008	1	Insulator - P.E.C. Socket
		37174	1	Clamp (Insulator to Cable)
2	10	2665K	1	Cable Clamp
11	J1	37126	1	Input Jack (Gramophone-Microphone)
11	T4	37127	1	Transformer Input
		35373	2	Screws, 6 BA Binder Hd. x $\frac{3}{16}$ " ) (Input Transformer
		2663K	2	Speed Nuts - Flat Type ) to Chassis)
11	J2	33391	1	Output Jack (Speaker)
11	T1	37132	1	Transformer Output
		35373	2	Screws, 6 BA Binder Hd. x $\frac{3}{16}$ " ) (Output Transformer
		2664K	2	Speed Nuts "U" Type ) to Chassis)
11	T2	37147	1	Oscillator Coil
(The following parts are on the Valve Platform and Group Board Assembly).				
		37184	3	Valve Holder, B7G inverted (50C5)
		37187	3	Retainer Assembly - Valve (50C5)
		37186	1	Valve Holder, B9A inverted (12AX7)
		37188	1	Retainer Assembly - Valve (12AX7)
		37185	1	Valve Holder, B9A - Normal (8D5)
		33280	2	Grommets - Rubber )
		34567	2	Spacers ) (8D5 Valveholder to
		2690E	2	Screws, 6 BA x ) Valve Platform)
		33226	2	Stop Nuts )
		35372	2	Screws, Sheet Metal, No.6 x $\frac{1}{4}$ " (Group Board to Valve Platform)
11	C1/2/21	37172	3	Capacitor, Paper 0.25 mfd. 150 v.
11	C3/6	37167	2	Capacitor, Ceramic 0.001 mfd. 350 v.
11	C4/5	37288	2	Capacitor, Paper, 0.02 mfd. 150 v.
11	C7/8/9	37169	3	Capacitor, Paper, 0.01 mfd. 350 v.
11	C10	37171	1	Capacitor, Electrolytic, 8 mfd. 150 v.
11	C11	37168	1	Capacitor, Electrolytic, 30 mfd. 15 v.
11	C15	37183	1	Capacitor, Ceramic, 0.0001 mfd. 500 v.
11	C16/17	37170	2	Capacitor, Ceramic, 0.0005 mfd. 500 v.
11	C18/19	37166	2	Capacitor, Paper, 0.05 mfd. 250 v.
11	C20	37173	1	Capacitor, Paper, 0.1 mfd. 150 v.
11	C22	37150	1	Capacitor, Paper, 0.03 mfd. 350 v.

7. Amplifier Unit (Cont'd.)

Fig. No.	Item No.	Part No.	Qty.	Description
11	R1/4/28	37152	3	Resistor, Carbon, $\frac{1}{4}$ W. 5.6 m. 10%
11	R2/3	37153	2	Resistor, Carbon, $\frac{1}{4}$ W. 2.2 m. 10%
11	R5	37290	1	Resistor, Carbon, $\frac{1}{4}$ W. 3.9 K. 10%
11	R6	37291	1	Resistor, Carbon, $\frac{1}{4}$ W. 1.5 m. 10%
11	R7/9/14	37155	5	Resistor, Carbon, $\frac{1}{4}$ W. 270 K. 10%
	R34/R35			
11	R10/11/13	37157	3	Resistor, Carbon, $\frac{1}{4}$ W. 100 K. 10%
11	R12	37158	1	Resistor, Carbon, $\frac{1}{4}$ W. 2.2 K. 10%
11	R16/17	37159	2	Resistor, Carbon, $\frac{1}{4}$ W. 470 K. 10%
11	R18	37164	1	Resistor, Carbon, $\frac{1}{4}$ W. 22 K. 10%
11	R19,29	37160	2	Resistor, Carbon, $\frac{1}{4}$ W. 270 ohm. 10%
11	R20	37161	1	Resistor, W.W. $\frac{1}{2}$ W. 10 ohm. 10%
11	R21	37163	1	Resistor, Carbon, $\frac{1}{4}$ W. 2.7 K. 10%
11	R22	37165	1	Resistor, Carbon, $\frac{1}{4}$ W. 1.8 M. 10%
11	R25	37189	1	Resistor, Carbon, $\frac{1}{2}$ W. 2.7 K. 5%
11	R26/32	37162	2	Resistor, Carbon, $\frac{1}{2}$ W. 1.5 K. 5%
11	R27	37154	1	Resistor, Carbon, $\frac{1}{4}$ W. 560 K. 10%
11	R30	37156	1	Resistor, Carbon, $\frac{1}{4}$ W. 10 K. 10%
11	R36	37301	1	Resistor, W.E. 2 W. 68 ohm. 10%
		33280	3	Grommets - Rubber
		34567	3	Spacers
		35371	3	Screws, Sheet Metal, No.4 x $\frac{3}{8}$ "
11	V8/9	37141	2	Rectifiers, Dry Disc
		37135	1	Screw 4 BA Special (Rectifiers to Chassis)
11	C12/13	37136	2	Capacitor, Electrolytic 80 mfd.
		37137	2	Plate - Capacitor Mounting (Capacitors to Chassis)
11	R23	37139	1	Resistor Assembly - Power 10-ohms.
		35372	2	Screws, Sheet Metal, No.6 x $\frac{1}{4}$ " (Resistor to Chassis)
11	R24	37140	1	Resistor Assembly - Power 350 ohms.
		35372	2	Screws, Sheet Metal, No.6 x $\frac{1}{4}$ " (Resistor to Chassis)
11	P2	37138	1	Plug - Male - 4 terminal (Chassis mounting)
11	C14	37146	1	Capacitor, Paper, 0.25 mfd. 350 v.
11	R8	37143	1	Control Volume
11	R15	37144	1	Control Tone
11	T3	37145	1	Choke Filter
		35373	2	Screws, 6 BA Binder Hd. x 3/16"
		2664K	2	Speed Nuts - "U" Type
				(Valve Platform to Chassis)
				(Filter Choke to Chassis)

STYLIST PROJECTOR

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1679A	1	30098	6
1690A	1	"	6
"	1	30099	4
"	1	"	6
1691A	1	30101	5
2484	1	30103	5
2487B	1	30106	4
"	2	"	5
2492B	9	30107	6
2625L	9	30111	5
"	9	"	5
2625P	1	30112	4
2626G	1	30114	4
2629G	3	30119	4
2650L	9	"	5
2651L	9	"	5
2652L	3	30130	4
2653K	9	"	4
2661K	1	30131	6
"	1	"	6
2662K	1	"	6
"	1	"	7
2663K	12	30132	5
2664K	12	30133	6
"	13	"	6
2665K	12	"	6
2666K	3	"	6
"	3	"	7
2687K	9	"	7
2689K	10	30134	6
2690E	12	"	6
30051	4	"	6
30058	5	"	7
30077	4	"	7
"	5	30135	6
30079	4	"	6
30080	4	"	7
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30175	...	...	...	5	30730	...	...	...	6
30176	...	...	...	5	30731	...	...	...	6
30178	...	...	...	5	30740	...	...	...	6
30194	...	...	...	6	30741	...	...	...	7
"	...	...	...	6	30745	...	...	...	4
30200	...	...	...	7	31030	...	...	...	6
30213	...	...	...	4	31031	...	...	...	6
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30262	...	...	...	4	31272	...	...	...	9
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30296	...	...	...	7	31404	...	...	...	4
30301	...	...	...	4	31410	...	...	...	5
30321	...	...	...	6	31412	...	...	...	5
30322	...	...	...	4	31416	...	...	...	5
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30358	...	...	...	9	31425	...	...	...	5
30393	...	...	...	5	31426	...	...	...	5
30455	...	...	...	6	31427	...	...	...	5
"	...	...	...	6	31434	...	...	...	6
30456	...	...	...	6	31435	...	...	...	5
30460	...	...	...	6	31436	...	...	...	5
30501B	...	...	...	4	31438	...	...	...	5
30530	...	...	...	7	31441	...	...	...	5
30531	...	...	...	7	31443	...	...	...	5
30532	...	...	...	7	31444	...	...	...	5
30540	...	...	...	4	31445	...	...	...	5
30542	...	...	...	4	31447	...	...	...	5
"	...	...	...	4	31448	...	...	...	4
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30543	...	...	...	4	31455	...	...	...	7
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30571	...	...	...	5	31862	...	...	...	5
30581	...	...	...	7	31865	...	...	...	5
30584	...	...	...	7	31866	...	...	...	5
30585	...	...	...	6	31867	...	...	...	5
30594	...	...	...	5	31871	...	...	...	5
30597	...	...	...	4	31873	...	...	...	7
30599	...	...	...	4	31875	...	...	...	4
30701	...	...	...	6	31876	...	...	...	5
30702	...	...	...	6	31880	...	...	...	5
30703	...	...	...	6	31883	...	...	...	5
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32006	1	34348	11
32010	10	34349	10
32101	4	34351	11
32102	4	34352	11
32103	4	34353	10
32107	4	34354	10
33226	12	34356	11
33280	2	34357	10
"	12	34361	10
"	13	34365	10
33377	1	34366	10
33391	12	34370	10
34026	8	34372	10
"	8	34373	10
34041	3	34385	10
34053	10	34386	10
34058	8	34391	10
34074	8	34392	10
34077	8	34393	10
34078	8	34394	10
34079	8	34395	10
"	8	34396	10
34080	8	34398	11
"	8	34417	10
34081	8	34418	10
34088	8	34457	1
34104	8	34477	2
34107	10	"	10
34113	10	34480	2
34116	3	34522	2
34117	2	34529	2
"	2	34533B	2
34118	2	34565	2
"	2	34567	1
34119	2	"	12
"	2	"	13
34120	2	34573	2
"	2	34579	1
"	2	34633	11
34150B	1	"	11
34159	1	34696	10
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35347	1	37078	9
"	3	37079	9
35348	9	37101	1
35349	1	37102	1
35370	8	37104	1
"	9	37105	1
35371	13	37106	1
35372	12	37109	1
"	12	37110	2
"	13	37111	2
"	13	37112	1
35373	8	37113	3
"	12		4
"	12	37115	1
"	13	37116	1
37008	12		7
37014	2	37117	1
37020	10	37121	2
"	11	37122	2
37026	10	37123	1
37029	2	37126	12
37032	3	37127	12
37034	3	37129	12
37035	9	37130	12
37036	9	37132	12
37037	9	37135	13
"	9	37136	13
37038	9	37137	13
"	9	37138	3
37039	9	"	13
37040	9	37139	13
37043	9	37140	13
37046	9	37141	13
37047	9	37143	13
37057	9	37144	13
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37159	...	...	...	13	37237	...	...	...	3
37160	...	...	...	13	37238	...	...	...	3
37161	...	...	...	13	37239	...	...	...	3
37162	...	...	...	13	37240	...	...	...	3
37163	...	...	...	13	37241	...	...	...	2
37164	...	...	...	13	37242	...	...	...	2
37165	...	...	...	13	37243	...	...	...	2
37166	...	...	...	12	37244	...	...	...	3
37167	...	...	...	12	37245	...	...	...	3
37168	...	...	...	12	37246	...	...	...	2
37169	...	...	...	12		...	...	...	2
37170	...	...	...	12		...	...	...	2
37171	...	...	...	12	37247	...	...	...	3
37172	...	...	...	12	37248	...	...	...	3
37173	...	...	...	12	37249	...	...	...	2
37174	...	...	...	12	37250	...	...	...	3
37183	...	...	...	12	37251	...	...	...	3
37184	...	...	...	12	37252	...	...	...	3
37185	...	...	...	12	37254	...	...	...	3
37186	...	...	...	12	37255	...	...	...	2
37187	...	...	...	12	37256	...	...	...	2
37188	...	...	...	12	37257	...	...	...	3
37189	...	...	...	13	37258	...	...	...	2
37198	...	...	...	11	37259	...	...	...	3
37199	...	...	...	10	37262	...	...	...	3
37200	...	...	...	10	37263	...	...	...	3
37201	...	...	...	10	37264	...	...	...	1
37202	...	...	...	10	37274	...	...	...	2
37203	...	...	...	10	37275	...	...	...	2
37204	...	...	...	11	37276	...	...	...	2
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37207	...	...	...	3	37283	...	...	...	1
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37212	...	...	...	10	37285	...	...	...	2
37219	...	...	...	1	37286	...	...	...	2
37220	...	...	...	8	37288	...	...	...	12
37221	...	...	...	8	37290	...	...	...	13
37222	...	...	...	8	37291	...	...	...	13
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37225	...	...	...	8	37294	...	...	...	12
37226	...	...	...	8	37295	...	...	...	12
37227	...	...	...	8	37296	...	...	...	12
37228	...	...	...	8	37301	...	...	...	13
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37352	...	...	12		
37353	...	...	2		
37354	...	...	2		
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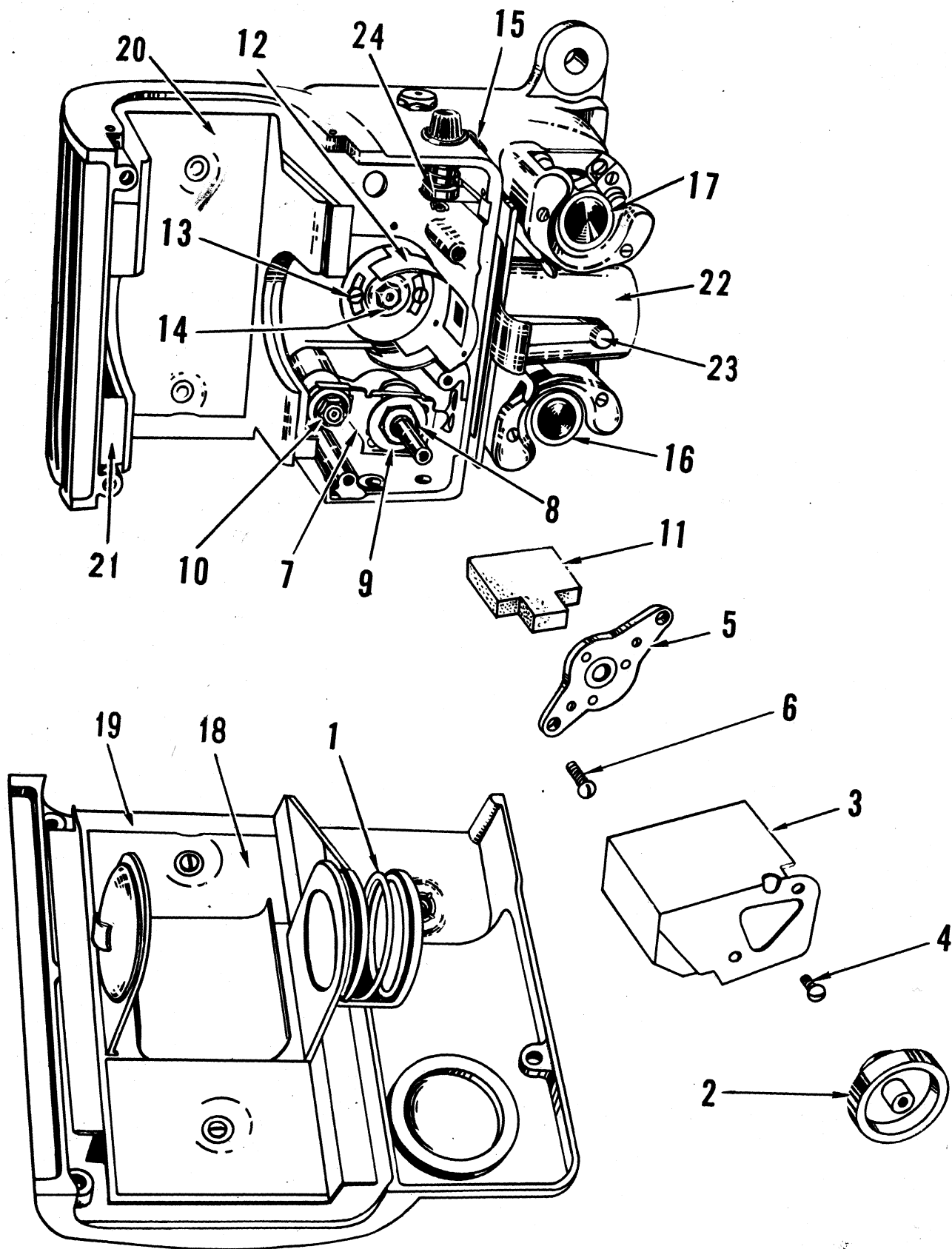
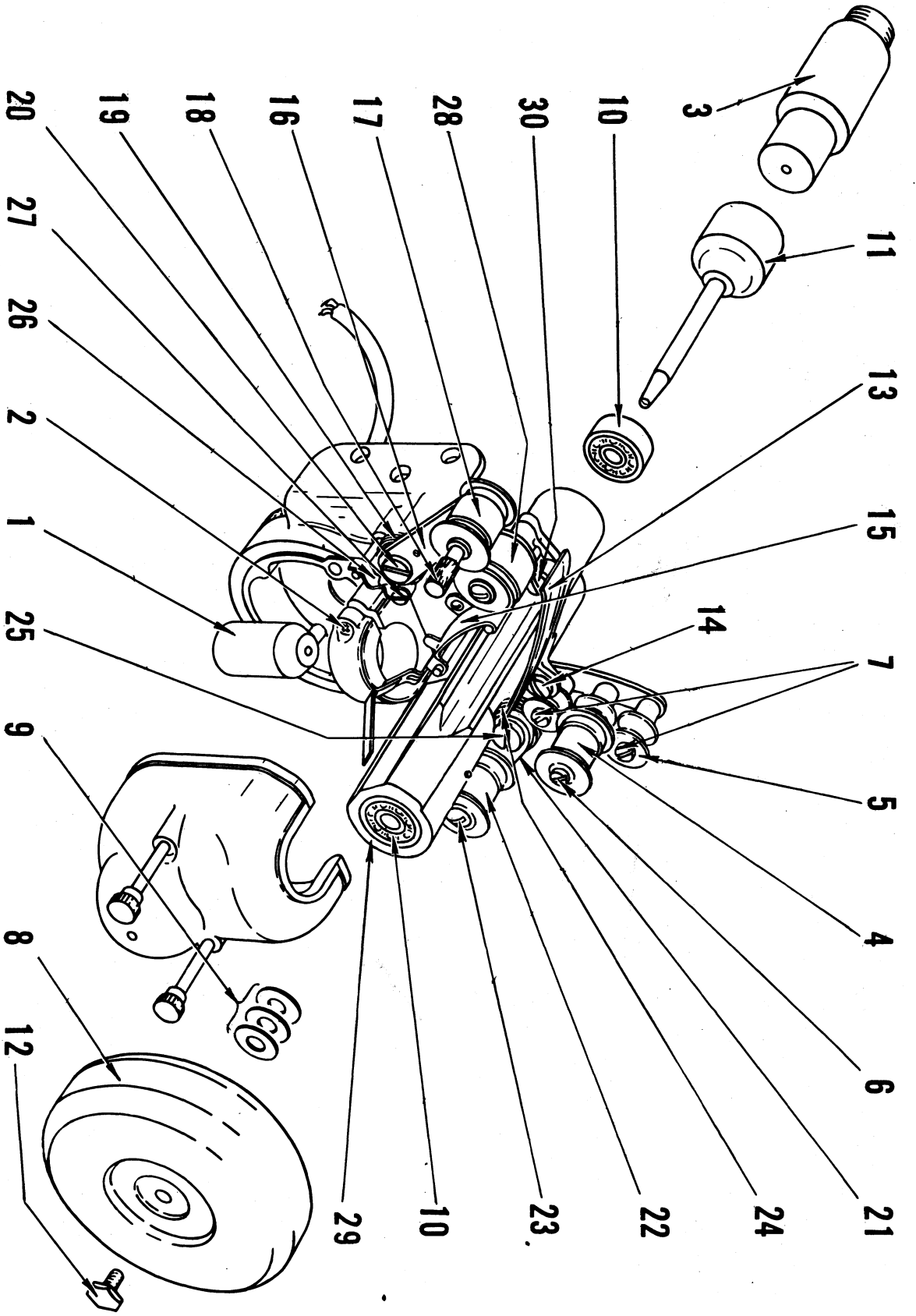
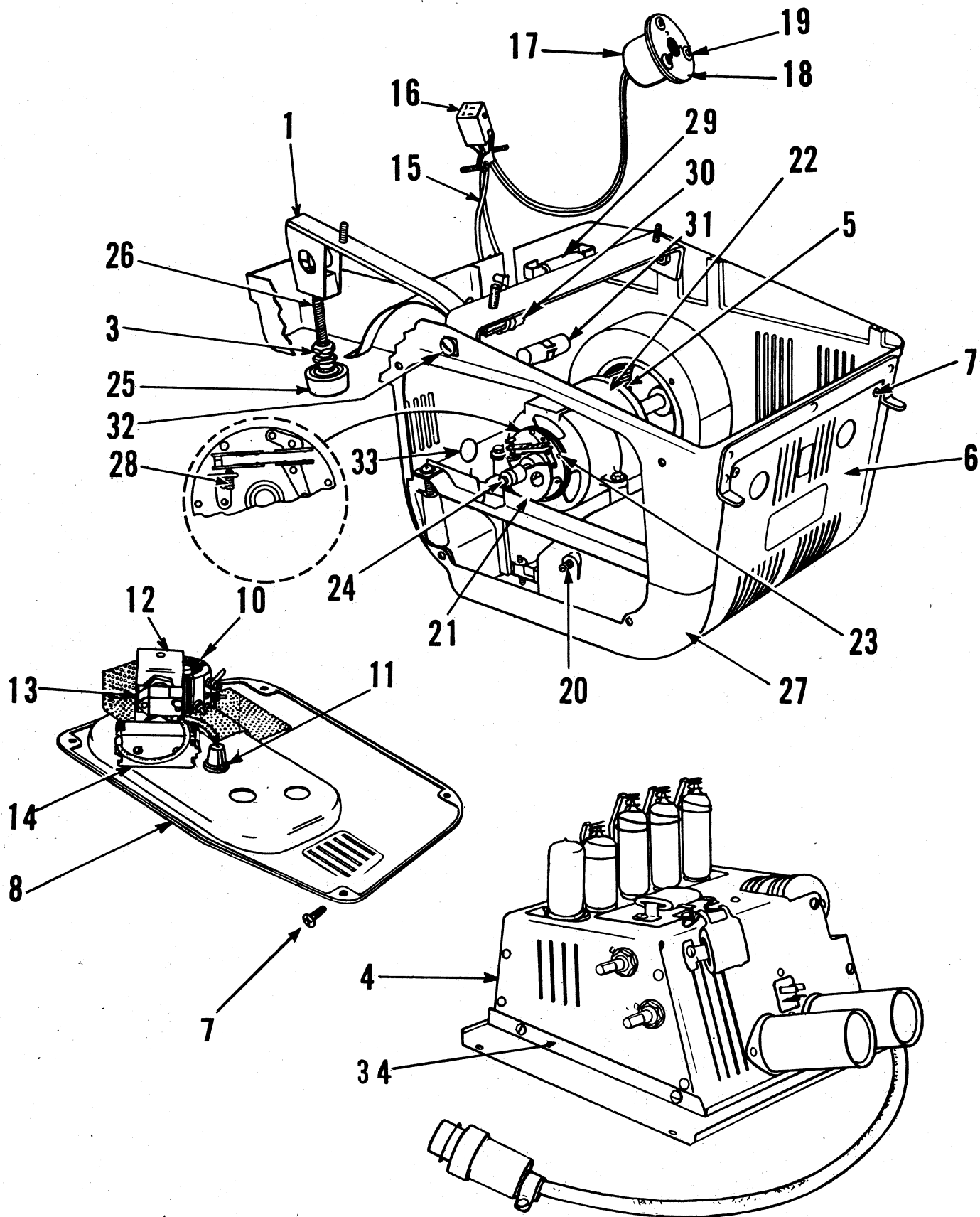


Fig. 6

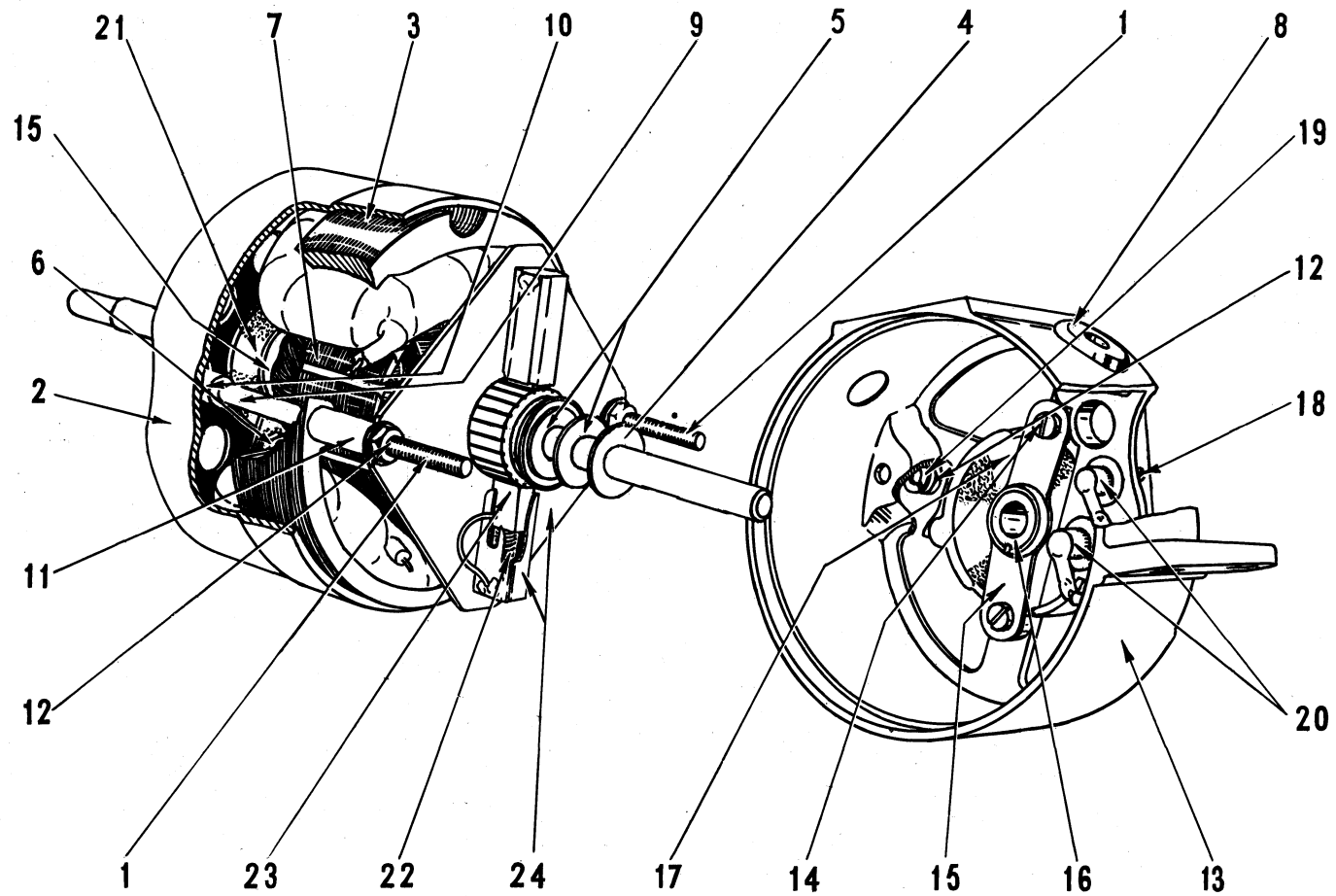


**SOUND HEAD**  
EXPLODED VIEW.



**BASE**  
EXPLODED VIEW

Fig. 8



**MOTOR**  
EXPLODED VIEW.

Fig. 9

Modification to Increase Audio sensitivity

~~R25 change 2.7K to 170Ω~~

~~R30 10K to 22K~~

Change Rectifier to BY100

+ 10 to 20Ω

Sound Focus should give

3VAC.T.

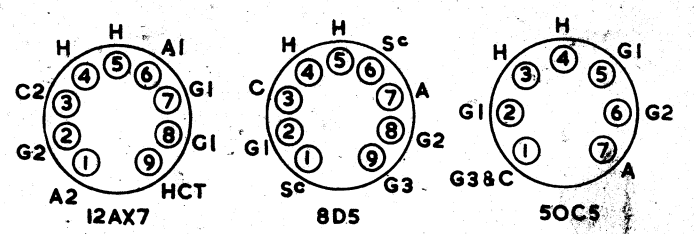
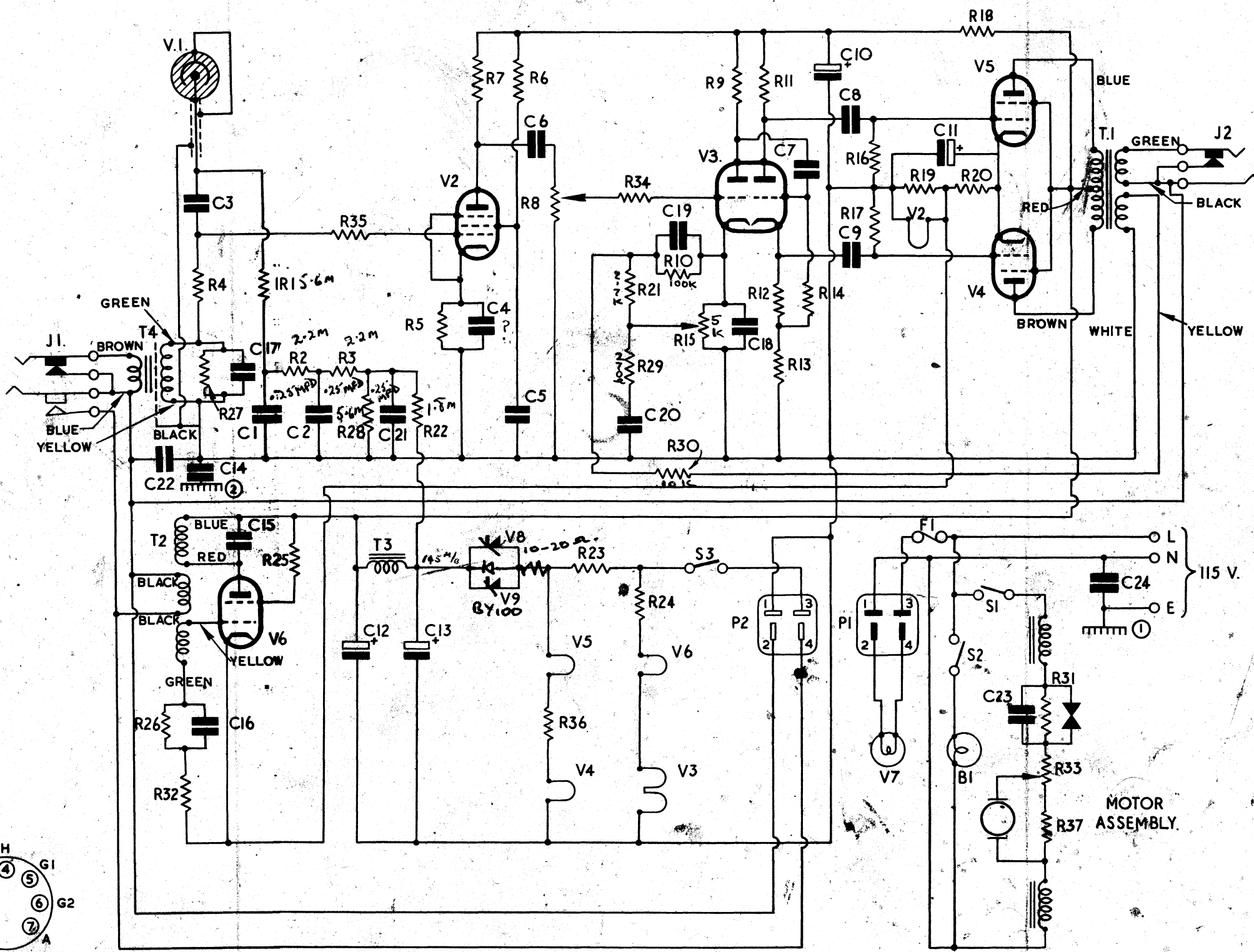
Vol. Max

Tone Max

O/P 3Ω Resistor.



Reference	Description	Part No.
C1, C2, C21	Capacitor, Paper, 0.25 mfd. 150 V.	37172
C3, C6	" Ceramic, 0.001 mfd. 350 V.	37167
C4, C5	" Paper, 0.02 mfd. 150 V.	37288
C7, C8, C9	" Paper, 0.01 mfd. 350 V.	37169
C10	" Electrolytic, 8 mfd. 150 V.	37171
C11	" Electrolytic, 30 mfd. 15 V.	37168
C12, C13	" Electrolytic, 80 mfd. 150 V.	37136
C14	" Paper, 0.25 mfd. 350 V.	37146
C15	" Ceramic, 0.0001 mfd. 500V.	37183
C16, C17	" Ceramic, 0.0005 mfd. 350V.	37170
C18, C19	" Paper, 0.05 mfd. 250 V.	37166
C20	" Paper, 0.1 mfd. 150 V.	37173
C22	" Paper, 0.03 mfd. 350 V.	37150
C23	" Paper, 0.5 mfd. 250V. A.C.	37248
C24	" Paper, 0.05 mfd. 500 V.	37252
R1, R4, R28	Resistor, Carbon, 1/2 W., 5.6 M 10%	37152
R2, R3	" Carbon, 1/2 W., 2.2 M 10%	37193
R5	" Carbon, 1/2 W., 3.9 K 10%	37290
R6	" Carbon, 1/2 W., 1.5 M 10%	37291
R7, R9, R14, R34, R35	" Carbon, 1/2 W., 270 K 10%	37155
R8	Control, Vol., 1 Megohm. SPST. Switch	37143
R10, R11, R13	Resistor, Carbon, 1/2 W., 100K 10%	37157
R12	" Carbon, 1/2 W., 2.2K 10%	37158
R15	Control, Tone, 5 K	37144
R16, R17	Resistor, Carbon, 1/2 W., 470 K 10%	37159
R18	" Carbon, 1/2 W., 22 K 10%	37164
R19, R29	" Carbon, 1/2 W., 270 ohm 10%	37160
R20	" Wirewound, 1/2 W., 10 ohm 10%	37161
R21	" Carbon, 1/2 W., 2.7 K 10%	37163
R22	" Carbon, 1/2 W., 1.8 M 10%	37165
R23	" Wirewound, 10 ohm 15%	37139
R24	" Wirewound, 350 ohm 5%	37140
R25	" Carbon, 1/2 W., 2.7 K 5%	37189
R26, R32	" Carbon, 1/2 W., 1.5 K 5%	37162
R27	" Carbon, 1/2 W., 560 K 10%	37154
R30	" Carbon, 1/2 W., 10 K 10%	37156
R31	" Wirewound, 60 ohm 10%	37251
R33	Rheostat, 60 ohm, Wirewound	37274
R36	Resistor, Wirewound, 2 W., 68 ohm 10%	37301
R37	" Wirewound, 90 ohm 20%	37319
B1	Projection Lamp, 750 W.	34116
F1	Fuse, 1 Amp.	35333
J1	Input Jack (Gramophone-Microphone)	37126
J2	Output Jack (Loudspeaker)	33391
S1, S2	Switch Unit	37276
S3	Switch—Part of R8	
T1	Output Transformer	37132
T2	Oscillator Coil	37147
T3	Choke	37145
T4	Input Transformer	37127
V1	Photo-Electric Cell	33377
V2	Valve 8D5	37294
V3	" 12AX7	37295
V4, V5, V6	" 50C5	37296
V7	Exciter Lamp, 4 volt, 1/2 Amp.	37115
V8, V9	Disc Rectifier, Type RM3	37141
P1	Female Connector	37277
P2	Male Connector	37138

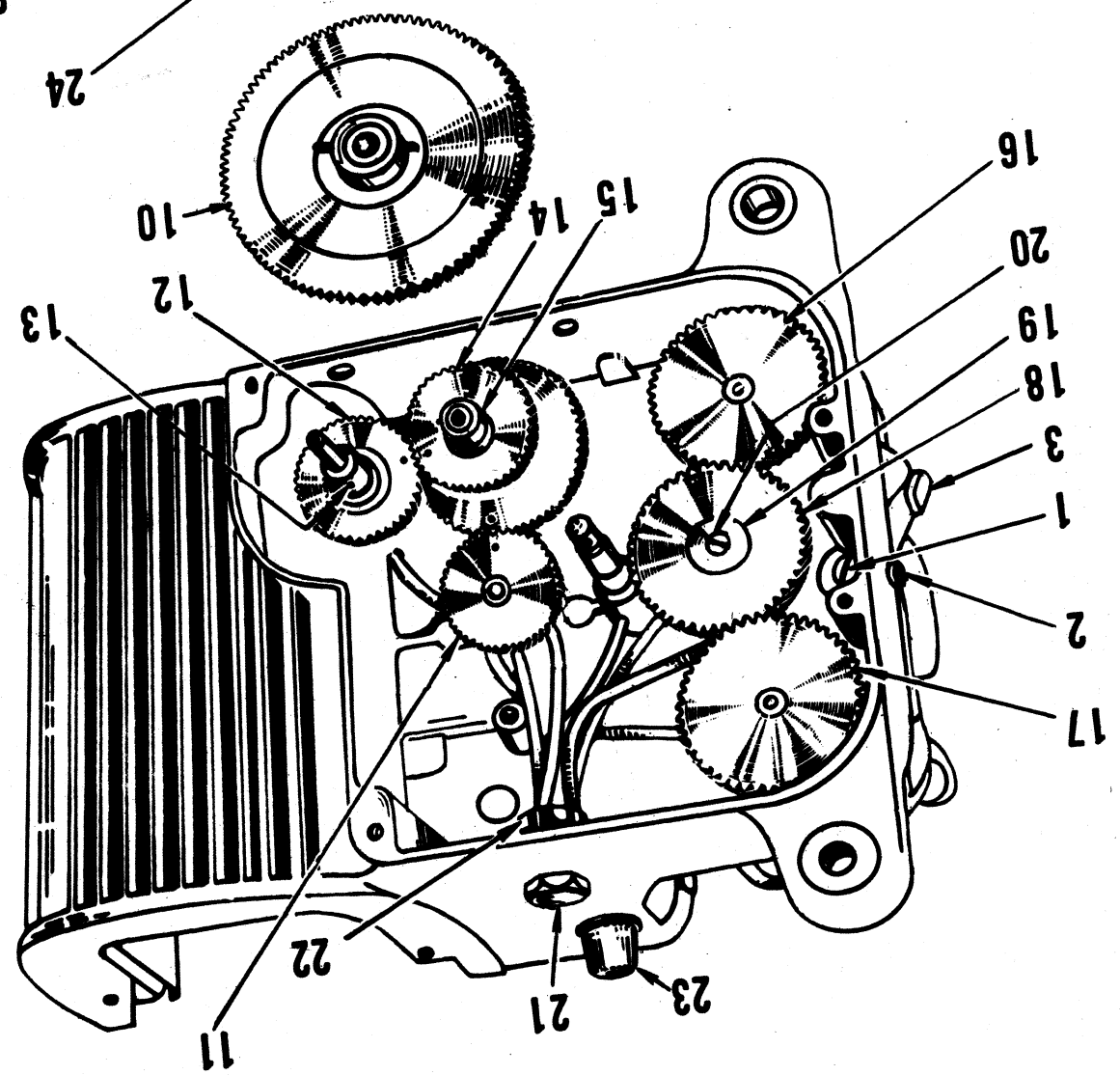
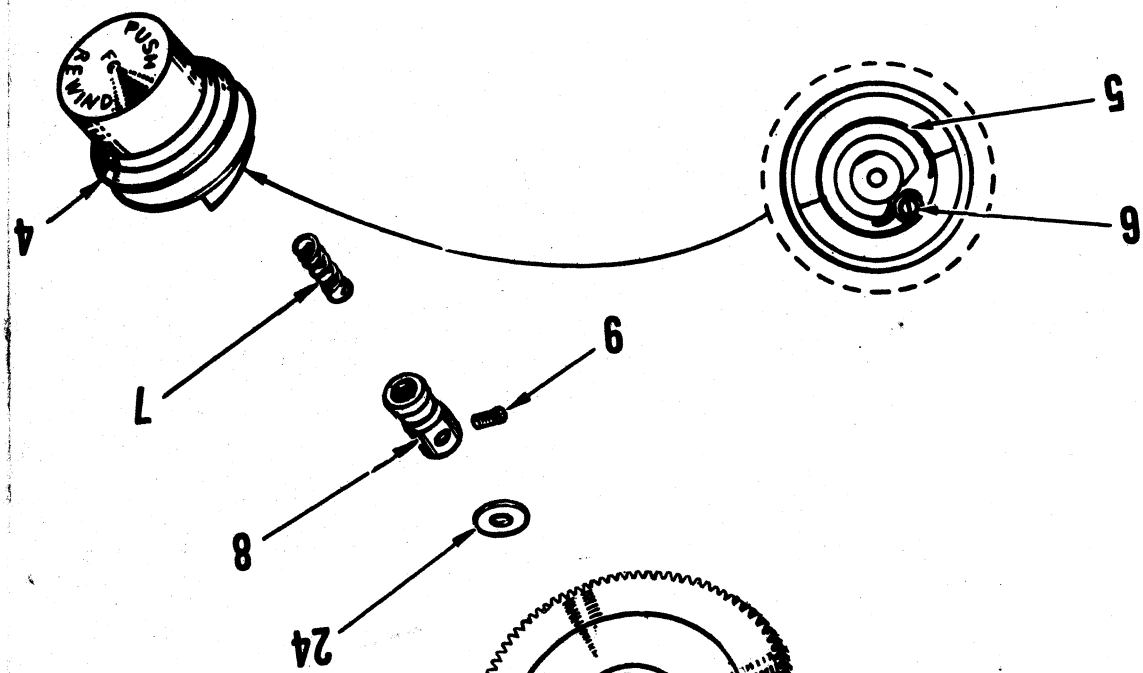


VALVE BASE CONNECTIONS.

① DENOTES PROJECTOR FRAME.

② DENOTES AMPLIFIER CHASSIS.

Fig. 11 SCHEMATIC DIAGRAM.





## **SERVICE**

AMPRO products are distributed throughout the world with suitable Service facilities. When ordering any spare parts or entering into any correspondence it is essential to quote both the projector model and serial number. The names and addresses of the nearest Ampro Dealer and Servicing Depot will be furnished on request.

*This apparatus has been designed and tested for use with electronic valves manufactured by members of the B.R.V.M.A. who mark their valves with the letters B.V.A. which is a guarantee of quality and efficiency. No responsibility can be accepted for the performance of the apparatus if electronic valves other than those marked B.V.A. are employed.*