

**STRICTLY CONFIDENTIAL**

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**SERVICE DOCUMENTATION**

for receiver

**153 A**

FOR A.C. MAINS FEEDING.

**WAVERANGES**

Short wave 1: 13.7—45 m ( 21.9 — 6.67 Mc)

Short wave 2: 45 —160 m ( 6.67— 1.87 Mc)

Medium wave: 160 —560 m (1875 —535 Kc).

**CONTROL KNOBS**

From right to left:

1. Tuning.
2. Waveband switch.

3. Volume control with mains switch.
4. Tone control.

**DIMENSIONS.**

Width: 53.5 cm )  
 Height: 31 cm ) knobs included.  
 Depth: 24 cm )

**WEIGHT:** 11 kg, tubes included.**TRIMMING THE RECEIVER.**

Retrimming is necessary:

- a. When a coil or condenser in the I.F., H.F. or oscillator part has been renewed.
  - b. When the receiver is not sufficient sensitive or selective. It is not necessary to take the receiver out of its cabinet; all trimmers become accessible after removal of the rear panel and the base plate. The positions of the trimmers are indicated in figs. 4 and 5. As regards the necessary trimming tools vide the list of parts and tools.
- On all wavebands the oscillator frequency is higher than the tuning frequency of the H.F. circuits.

The I.F. is 432 kc.

The I.F. bandwidth 1 : 10 is  $11\frac{3}{4}$  kc.The bandwidth at 1000 kc 1 : 10 is  $10\frac{3}{4}$  kc.**A. I.F. CIRCUITS.**

1. Earth the set and switch to medium wave band. Turn the variable condenser to minimum position.
2. Connect the output indicator via a trimming transformer to the extension loudspeaker sockets.
3. Apply a modulated signal of 452 kc via a condenser of 32000 pF to the first grid of L2.
4. Detune the third circuit by connecting a condenser of 80 pF in parallel with S25.
5. Tune S26-S27 to maximum output, then remove detuning condenser from S25.
6. Detune the second circuit by connecting a condenser of 80 pF in parallel with S24.
7. Tune S25 to maximum output.
8. Remove the detuning condenser from S24 and detune the first circuit by connecting a condenser of 80 pF in parallel with S23.
9. Tune S24 to maximum output.
10. Remove the detuning condenser and detune the second circuit by connecting a condenser of 80 pF in parallel with S24.
11. Tune S23 to maximum output. Remove detuning condenser and seal the cores.

**B. H.F. AND OSCILLATOR CIRCUITS.****I. SHORT WAVE 1 (13.7—45 m).**

1. Earth the set and switch to short wave band 1.
2. Connect the output indicator to the set to be trimmed.
3. Apply to the aerial socket, via the short wave dummy aerial, a modulated signal of 20.5 Mc.
4. Accurately tune the receiver to this frequency by means of the variable condenser (first maximum starting from minimum capacity).

5. Tune C15, C8 to maximum output. Seal trimmers C8, C15.
- NOTE. C24 is tuned to a fixed capacity and may not be altered.

**II. SHORT WAVE 2 (45—160 m).**

1. Fit the 15° gauge. Switch the set to short wave band 2.
2. Apply a modulated signal of 6.1 Mc via the short wave dummy aerial to the aerial socket.
3. Accurately tune the set to this frequency with the aid of C25, C16 and C9.
4. Seal the trimmers.

**III. MEDIUM WAVES (160—560 m).**

1. Fit the 15° gauge. Switch the set to medium waves.
2. Apply a modulated signal of 1740 kc to the aerial socket via the normal dummy aerial.
3. Accurately tune the set to this frequency with the aid of C26, C17 and C10.
4. Connect an auxiliary receiver to the anode of L2 via a condenser of 25 pF, and the output indicator to the auxiliary receiver. Short-circuit C5.
5. Apply to the aerial socket of the set to be trimmed via the normal dummy aerial, a modulated signal of 600 kc.
6. Accurately tune the set to this frequency with the tuning knob.
7. Take away the auxiliary receiver; connect the output indicator to the set to be trimmed. Remove the short-circuit of C5.
- DO NOT TURN THE VARIABLE CONDENSER.
8. Tune C30 to maximum output.
9. Turn the variable condenser against the 15° gauge.
10. Apply to the aerial socket of the set to be trimmed, via the normal dummy aerial, a signal of 1740 kc.
11. Tune C26, C17 and C10 to maximum output. Seal C10, C17, C26 and C30.

**C. ADJUSTING THE DIAL.**

1. Switch the receiver to the medium wave band. Connect the output indicator.
2. Apply to the aerial socket, via a normal dummy aerial, a modulated signal of 857 kc. (350 m).
3. Accurately tune the receiver to this frequency.
4. Slightly loosen the screw on the pointer for attaching the string and move the pointer until it points exactly to 350 m.
5. Tighten the screw.

## REPAIRS AND RENEWAL OF PARTS.

For various kinds of repairs it is not necessary to take the receiver out of the cabinet as often removal of the rear panel and the base plate suffices.

## TAKING THE CHASSIS OUT OF THE CABINET.

1. Remove the rear panel.
2. Remove the knobs.
3. Unscrew the connection of the chassis with the bottom-screening.
4. Unsolder the connections to the loudspeaker.
5. Take off the tuning cross.
6. Slightly loosen the screw on the pointer for fixing the string, so that the string is released.
7. Unscrew the chassis from the bottom.
8. Slide the chassis out of the cabinet.  
After having returned the chassis into the cabinet, the pointer must be correctly adjusted (vide sheet 1 "Adjusting the dial").

## RENEWING THE DIAL.

1. Unscrew the 4 screws A (fig. 8).  
The ornamental window can now be removed together with the scale, that can now be renewed easily.

## RENEWING THE POINTER.

1. Slightly loosen the screw on the pointer for fixing the string, so that the string is released.
2. Undo the lower guide shaft for the pointer by loosening the two nuts near the end of this shaft.
3. Loosen the pointer from the pointer runner and screw on a new one.

NOTE. The new pointer must be covered at the extremities with silk yarn: the length of the covered part is  $\pm 8$  mm.

## ADJUSTMENT OF THE LINE OF LIGHT.

If the line of light is not clearly defined, this can be corrected by adjusting the distance of the guide shafts till the scale by means of the nuts at the end of the shafts.

## MICROFONIC EFFECT.

To avoid microphony, the variable condenser with the driving mechanism is fixed resiliently to the chassis by means of rubber ducts. This combination must therefore always be set up freely.

The following faults may lead to microphony:

1. Rubber ducts worn out.
2. Connections at the variable condenser too stiff or too taut.
3. The fixing strip 18 (fig. 6) is clamped to tight between the bracket on the variable condenser and the bracket on the chassis. This is to be remedied by unscrewing and fixing again the bracket on the variable condenser.

## DRIVING CABLES.

The way the driving cables have to run is indicated in fig. 6. Length of the string for driving the pointer 970 mm. Length of the cord for driving the variable condenser 660 mm. The length of the driving strings is measured from fixing point to fixing point. To allow for the loops, the strings must be cut slightly longer.

## LIST OF PARTS AND TOOLS.

When ordering parts, please always mention:

1. Codenumber;
2. Description;
3. Typenumber of the receiver.

Fig.	Pos.	Description	Codenumber	Price
		Cabinet (colour 038) . . . . .	23 661	35.0
		Ornamental window (colour 038) . . . . .	23 690	47.1
		Statiomedial . . . . .	A1 896	38.0
		Statiomedial for British India . . . . .	A1 896	39.0
		Statiomedial for South-Africa . . . . .	A1 896	40.0
		Statiomedial for the Mediterranean . . . . .	A1 896	41.0
		Knob for wavebandswitch (colour 038) . . . . .	23 613	02.0
		Knobs, other than the foregoing (colour 038) . . . . .	23 612	29.0
		Wooden panel . . . . .	A1 375	02.0
		Loudspeakercloth . . . . .	06 601	42.0
		Rear panel . . . . .	A1 356	98.0
8	10	Glass pointer . . . . .	57 027	76.0
8	11	Screw for fixing the shafts for guiding the pointer . . . . .	A1 854	62.0
8	12	Flat spring under the two higher screws of pos. 11 . . . . .	A1 978	92.1
8	13	Spiral spring under the two lower screws of pos. 11 . . . . .	A1 973	18.0
6	37	Driving drum . . . . .	23 687	13.1
6	32	Spring for the pointerstring . . . . .	28 740	59.0
6	31	Spring for the driving cord . . . . .	28 740	51.0
6	34	Vernier unit . . . . .	A1 322	06.0
6	35	Flat spring for pos. 34 . . . . .	28 751	81.1
6	36	Fibre strip for pos. 34 . . . . .	28 681	11.1
6	39	Cogwheel . . . . .	A1 346	10.0
6	38	Spring for pos. 39 . . . . .	28 730	85.0
6	33	Shaft for wavebandswitch . . . . .	A1 436	68.0
		Switch element no. 1 . . . . .	49 543	08.1
		Switch element no. 2 . . . . .	49 543	30.1
		Switch element no. 3 . . . . .	49 543	44.0
		Mains voltage connecting plate . . . . .	28 875	39.0
		Valveholder for L2 (colour 344) . . . . .	28 839	81.0
		Gramophone switch . . . . .	A1 133	35.0
		Rubber grommet under the variable condenser . . . . .	28 725	52.0
LOUDSPEAKER.				
		Service clamping ring . . . . .	25 871	81.0
		Paper ring . . . . .	28 451	54.0
		Cone with coil . . . . .	28 220	51.1
TOOLS.				
		Service oscillator . . . . .	GM 2880F	
		Universal Measuring Apparatus . . . . .	GM 4256	
		Universal and Valve Measuring Apparatus . . . . .	GM 7629	
		15°-gauge . . . . .	09 992	44.0
		Centring-gauge for loudspeaker . . . . .	09 991	53.0
		Insulated trimming screw driver . . . . .	M646	38.2
		Insulated trimming key 6 mm . . . . .	23 685	66.0

## COILS.

	Value	Codenumber	Price		Value	Codenumber	Price
S1	—			S21	2 Ohm	A1 035 66.1	
S2	200 Ohm			S22	5.5 Ohm		
S3	^ 1 Ohm	A1 055 44.3		S23	7 Ohm	A1 035 67.1	
S4	^ 1 Ohm						
S5	^ 3 Ohm			S24	7 Ohm		
S6	^ 1 Ohm	A1 035 61.1		C31	100 pF	A1 103 29.0	
S7	^ 7 Ohm						
S8	0.8 Ohm			C32	106 pF		
S9	20 Ohm	A1 035 64.0		S25	10 Ohm	A1 035 68.2	
S10	4 Ohm						
S12	^ 1 Ohm			S26			
S13	^ 1 Ohm	A1 035 62.2		S27	6 Ohm		
S14	^ 1 Ohm						
S15	^ 3 Ohm	A1 035 65.1		C37	106 pF	A1 103 29.0	
S16	^ 1 Ohm						
S17	^ 1 Ohm			C38	113 pF		
S18	^ 1 Ohm	A1 035 63.5		S28	600 Ohm	A1 035 68.2	
S19	^ 1 Ohm						
S20	^ 1 Ohm			S29	< 1 Ohm		
				S30	230 Ohm		
				S31	230 Ohm		
				S32	4 Ohm	28 220	51.1
				S35	700 Ohm	A1 000	32.0

RESISTANCES.

	Value	Codenummer	Price
R1	1800 Ohm	49 356	30.0
R2	0.82 M. Ohm	49 375	59.0
R3	39 Ohm	49 375	07.0
R4	10000 Ohm	49 377	36.0
R5	0.15 M. Ohm	49 375	50.0
R6	3.3 Ohm	49 377	66.0
R7	150 Ohm	49 375	14.0
R8	0.1 M. Ohm/2 =	49 377	48.0
	50,000 Ohm		
R9	220 Ohm	49 375	16.0
R10	33000 Ohm	49 375	42.0
R11	2 x 10,000 Ohm =	49 376	36.0
	20,000 Ohm		
R12	5.6 M. Ohm	49 377	69.0
R13	47000 Ohm	49 375	44.0
R14	47000 Ohm	49 375	44.0
R15	22000 Ohm	49 375	40.0
R16	68000 Ohm	49 375	46.0
R17	0.65 M. Ohm	49 500	19.0
R17a	0.2 M. Ohm		
R18	1000 Ohm	49 375	24.0
R19	1 M. Ohm	49 376	60.0
R20	180 Ohm	49 376	15.0
R21	47000 Ohm	49 375	44.0
R22	1.5 M. Ohm	49 376	62.0
R23	82000 Ohm	49 375	47.0
R24	1800 Ohm	49 375	27.0
R25	0.35 M. Ohm	49 470	31.0
R28	5.6 M. Ohm	49 377	69.0
R29	12000 Ohm	49 375	37.0
R30	12000 Ohm	49 375	37.0
R31	2700 Ohm	49 375	29.0
R32	47000 Ohm	49 375	44.0
R33	39000 Ohm	49 375	43.0
R40	2.2 M. Ohm	49 377	64.0
R41	2.2 M. Ohm	49 377	64.0
R42	1 M. Ohm	49 376	60.0
R43	1.5 M. Ohm	49 376	62.0
R44	0.82 M. Ohm	49 375	59.0

CONDENSERS.

	Value	Codenummer	Price
C1	48 µF	49 025	22.0
C2	48 µF	49 025	22.0
C3	11—490 pF		
C4	11—490 pF	49 000	09.0
C5	11—490 pF		
C6	10000 pF	49 127	14.0
C7	68 pF	49 055	48.0
C8	20 pF	49 005	03.0
C9	20 pF	49 005	03.0
C10	20 pF	49 005	03.0
C11	100 pF	49 055	49.0
C14	10000 pF	49 128	57.0
C15	20 pF	49 005	03.0
C16	20 pF	49 005	03.0
C17	20 pF	49 005	03.0
C19	10000 pF	49 127	14.0
C20	0.1 µF	49 128	63.0
C21	100 pF	49 055	28.0
C22	150 pF	49 055	30.0
C23	220 pF	49 055	32.0
C24		49 005	13.0
C25	20 pF	49 005	05.0
C26	20 pF	49 005	03.0
C27	5750 pF	28 195	69.0
C28	1600 pF	49 080	34.0
C29	400 pF	49 057	00.0
C30	125 pF	28 212	07.0
C31	100 pF		
C32	106 pF		Vide "Coils"
C33	47000 pF	49 127	61.0
C34	10000 pF	49 127	57.0
C35	10000 pF	49 128	57.0
C36	100 pF	49 055	28.0
C37	106 pF		Vide "Coils"
C38	113 pF		
C39	100 pF	49 055	28.0
C40	27000 pF	49 127	19.0
C41	3300 pF	49 128	08.0
C42	25 µF	49 020	00.0
C43	330 pF	49 055	05.0
C44	4700 pF	49 126	54.0
C47	1000 pF	49 126	53.0
C51	22000 pF	49 129	90.0
C52	0.22 µF	49 128	65.0
C54	2 x 2.2 pF par.	49 055	61.0
C58	47000 pF	49 127	61.0
C59	47000 pF	49 127	61.0

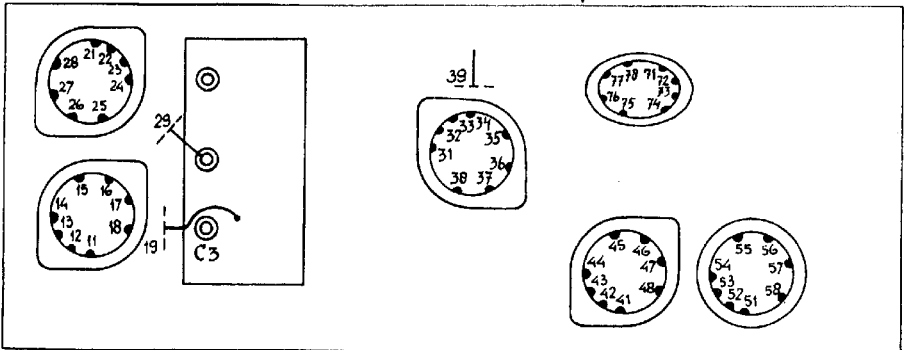
TUBES.

L1	L2	L3	L4	L5	L6	L7
EF8	ECH3 B	EBF2	EL3	AZ1	8091D-00	EM4

CURRENTS AND TENSIONS.

	Va	Va tr.	Vg2	Vkath.	Ia	Ia tr.	Ig2
L1	150		170	0.3	7.6		0.2
L2	220	115	80	1.2	1.4	4.6	2.2
L3	225		85	0	4.6		1.5
L4	255		225	6.2	32		3.1
L7	20		225	0	0.2 and 0.1		0.6

Vc1 = 275 V, Vc2 = 225 V.  
 Primary consumption = 50 Watt.



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RESISTANCE:

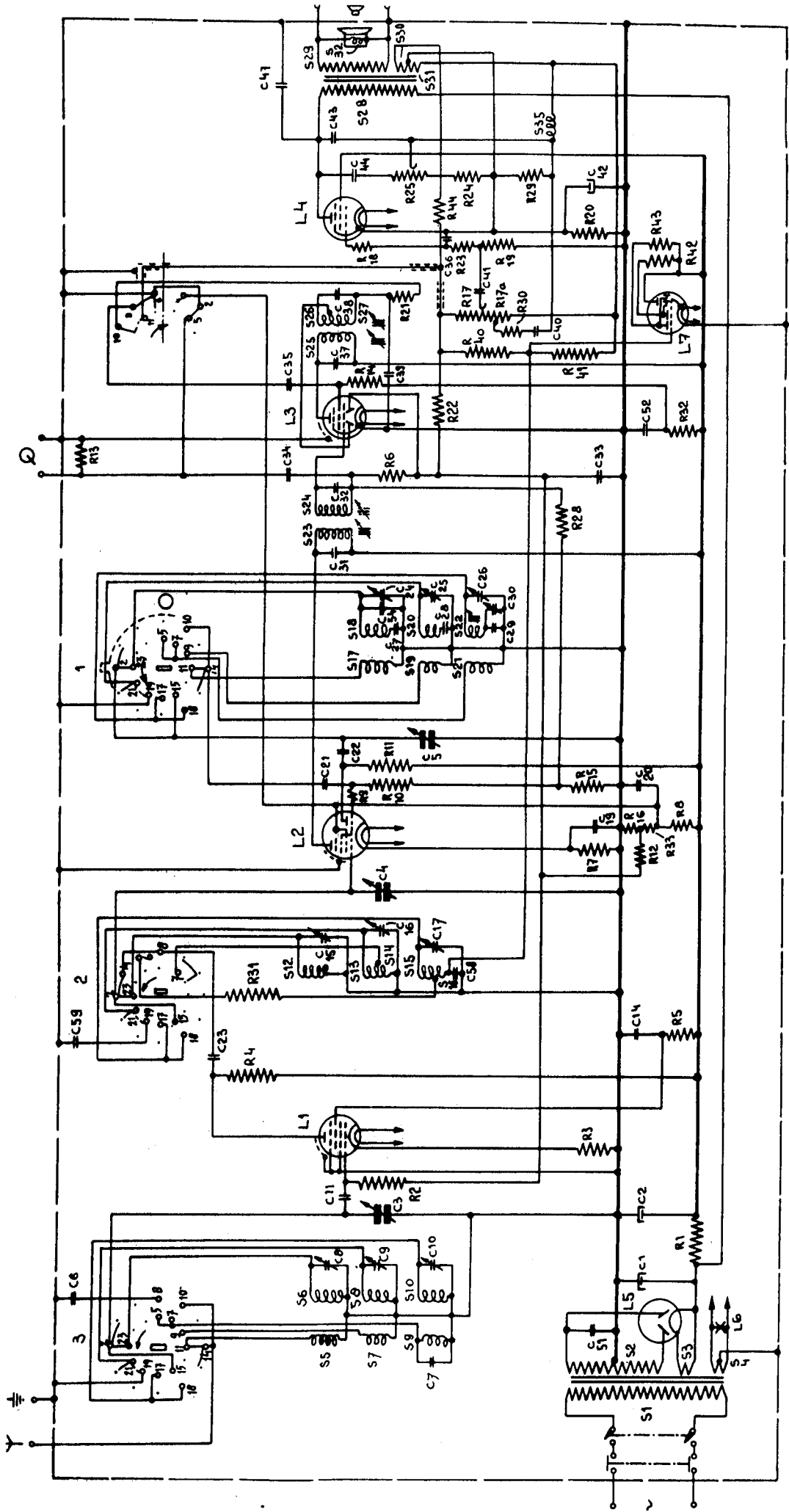
12	11	12/ /13	14	15	16	21	22/ /23	27	29	29	31	32/ /33	34	42/ /43	52/ /53	72/ /73
	10	10	400	10	10	10	10	Gram 10	KG1 10	KG2 40	10	10	10	10	10	10
12	74	Y	Y	Y	C3	C3	C3	C3								
	10	KG1 120	KG2 210	MG for 350	MG loc 350	KG1 10	KG2 40	MG for 150	MG loc 150							
11	24	28	38	44	47	48	55	58	77							
	215	450	450	240	450	385	170	165	450							
10	18	25	26	27												
	320	240	140	185												
9	17	19	29	29	35	36	37	39	46	P	75	76	78			
	360	80	MG for 120	MG loc 120	120	250	400	65	130	Gram 150	100	120	140			

CAPACITY:

12																
11	27	35														
	255	150														
10																
9																

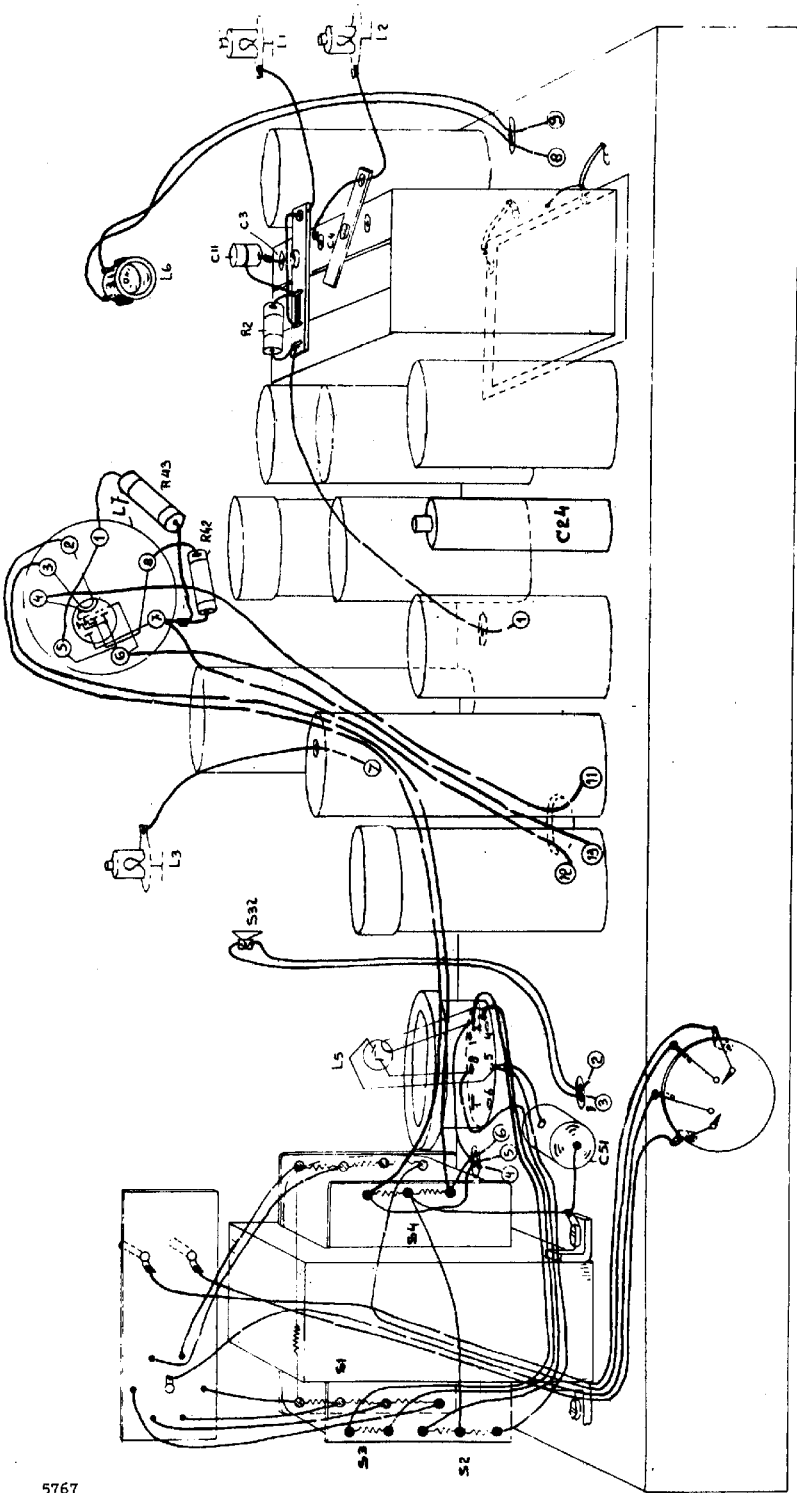
NUMBERING OF THE CONTACTS. The first number indicates the number of the tube, the second number corresponds with the number indicated in fig. 3 and 4.

S:	12,3,4,5,7,9, 6, 8, 10,	12, 13, 14, 15, 16,	17, 18, 21, 18, 20, 22,	23, 24	25, 26, 27,	35, 28, 29, 30, 31, 32,
C:	7, 51, 6, 1, 8, 9, 10, 3, 2, 11,	14, 58, 15, 16, 17, 4,	19, 20, 21, 22, 5,	9, 27, 28, 29, 34, 24, 25, 26,	31, 32, 33, 34, 52,	55, 89, 37, 40, 38, 41, 36,
R:	1, 2, 3,	4, 5, 31,	12, 7, 33, 16, 8, 9, 10, 15, 11,	28,	6, 13,	22, 32, 14, 40, 41, 30, 17, 21, 18, 23, 14, 24, 20, 44, 25, 24, 23,



R 990

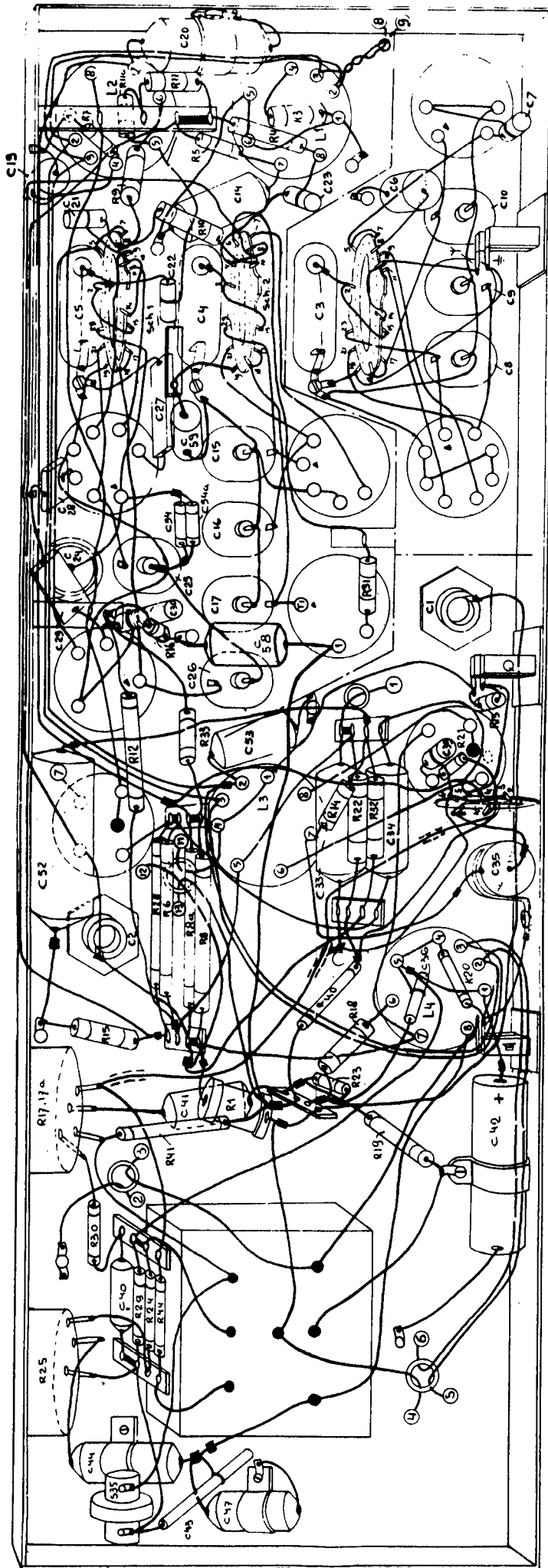
Fig 1



S:	3, 2, 1	4	32
C:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	24	11
R:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	43, 44	8

Fig 2

R 991



R 992

Fig 3



S:	35	30, 28, 31, 29	34	23, 27, 26, 25, 21, 22	15	20, 24, 27, 28, 29, 30, 31, 32, 33, 34	40, 9
C:	47, 43, 44	40	41	52, 38, 35, 34, 33, 34, 35, 37, 38, 39	2	5, 4, 3, 2, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	7, 20
R:	25	44, 43, 29, 30	17, 18, 19, 17, 17, 18, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	10, 9, 7, 5, 4, 3, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	10, 9, 7, 5, 4, 3, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	10, 9, 7, 5, 4, 3, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	10, 9, 7, 5, 4, 3, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100

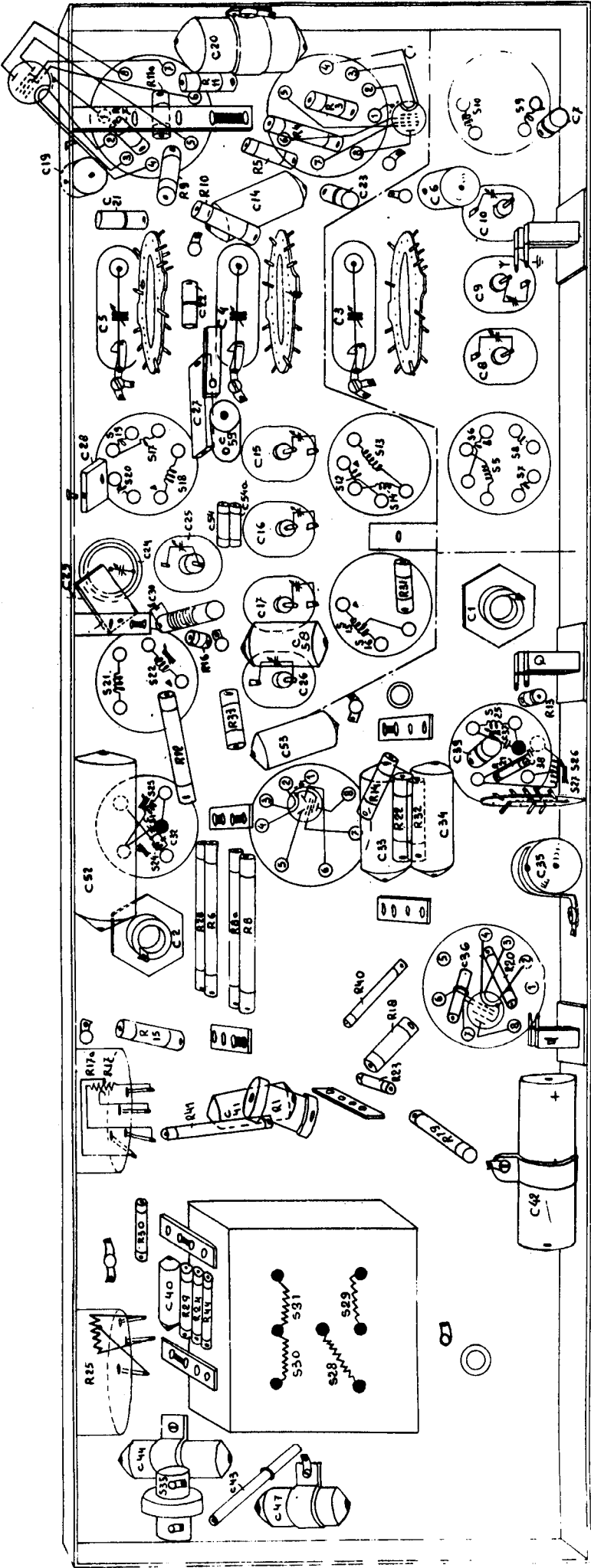


Fig 4

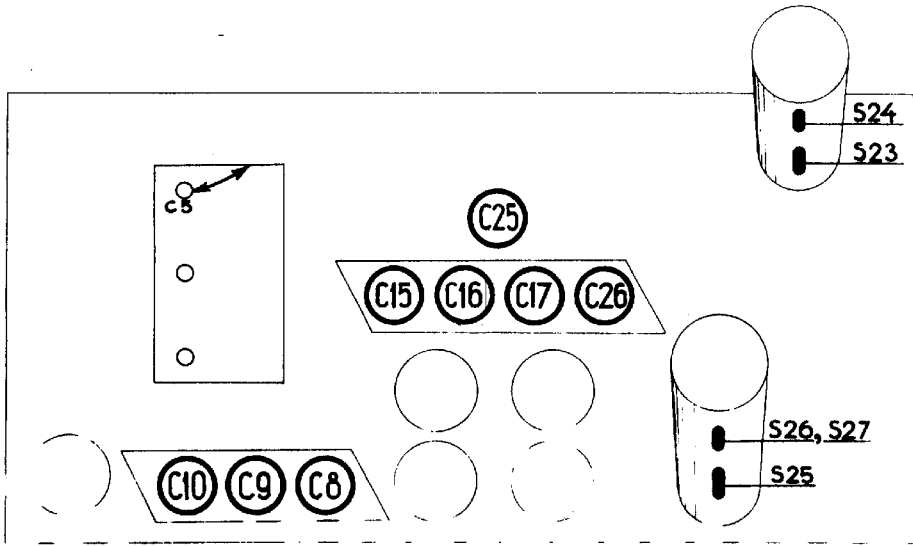


Fig 5

R96-7

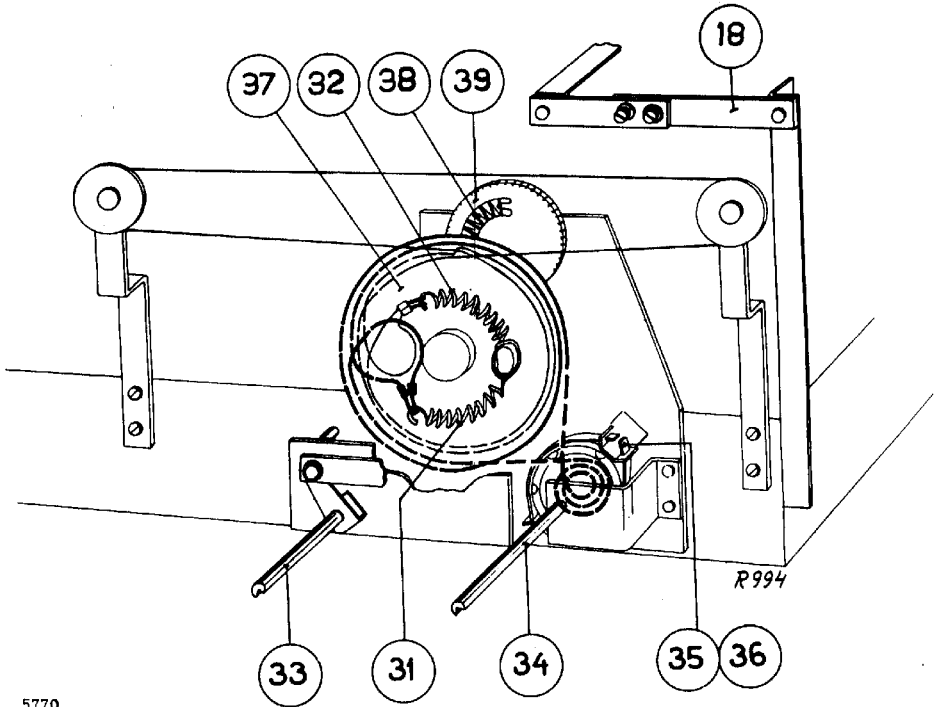
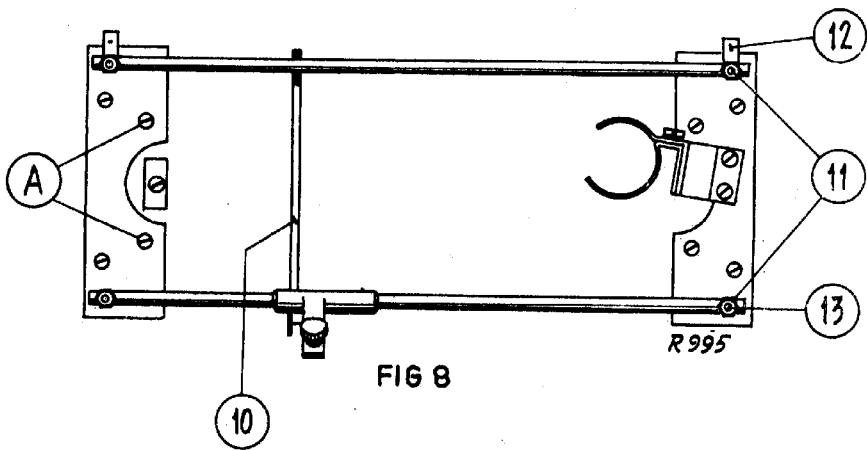


Fig 6



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