

# PHILIPS SERVICE

313 A

12,5-45 m  
45-165 m  
165-560 m

9636 Z - 5 Ω

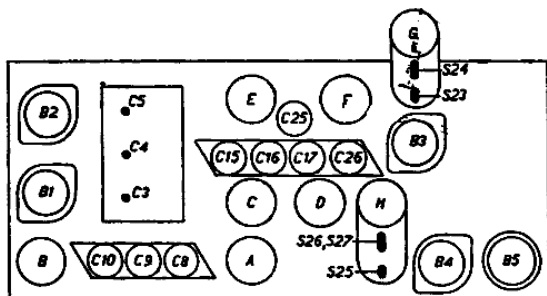
110 V, 125 V, 145 V,  
200 V, 220 V, 245 V.

452 kc/s

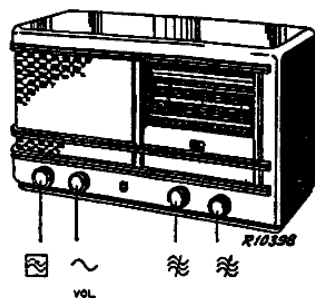
50 W

165-560 m	12,5-45 m	165-560 m
C2, C4, C5 min.	max.	max.
max.	20,5 Mc/s - Y	C2, C4, C5 + 15°
C33	C2, C4, C5 20,5 Mc/s	1740 kc/s - Y
452 kc/s-33000 pF-g1B2	C3, C15 max.	C26, C17, C10 max.
S25-S27 pF		25 pF-aB2
S25, S27 max.		C5
S25		600 kc/s - Y
S24-S27 pF	45-165 m	C2, C4, C5 600 kc/s
S25 max.	max.	C5
S24	C2, C4, C5 + 15°	C30 max.
S22-S27 pF	6,1 Mc/s - Y	
S24 max.	C25, C16, C9 max.	
S22		165-560 m V
S24-S27 pF		857 kc/s - Y
S23 max.		C2, C4, C5 857 kc/s
S24		350 m
C33		

15° - 057992 44.0



R10929



VOL

R1	1800 Ω	48 467 10/1K5	C1	45 μF	49 032 01.0
R2	0,22 MΩ	48 425 10/820K	C2	45 μF	49 032 01.0
R3	39 Ω	48 425 10/39E	C3	11-450 pF	49 032 01.0
R4	10000 Ω	48 427 10/10K	C4	11-450 pF	49 000 09.0
R5	0,15 MΩ	48 425 10/150K	C5	10000 pF	48 750 10/10K
R6	3,3 MΩ	48 427 10/33K	C6	10000 pF	48 406 20/40E
R7	150 Ω	48 425 10/150E	C7	63 pF	49 005 05.2
R8	0,1 MΩ/2	48 427 10/100K	C8	20 pF	49 005 05.2
R9	220 Ω	48 425 10/220E	C9	20 pF	49 005 05.2
R10	33000 Ω	48 425 10/33K	C10	20 pF	49 005 05.2
R11	2 x 10000 Ω	48 426 10/10K	C11	100 pF	48 406 20/100E
R12	5,6 MΩ	48 427 10/56K	C12	10000 pF	48 751 20/10K
R13	47000 Ω	48 425 10/47K	C13	20 pF	49 005 05.2
R14	47000 Ω	48 425 10/47K	C14	20 pF	49 005 05.2
R15	22000 Ω	48 425 10/22K	C15	20 pF	49 005 05.2
R16	60000 Ω	48 425 10/60K	C16	20 pF	49 005 05.2
R17	0,22 MΩ	49 500 09.0	C17	20 pF	49 005 05.2
R17a	70000 Ω		C18	10000 pF	48 750 10/10K
R18	1000 Ω	48 425 10/1K	C19	0,1 μF	48 751 20/100K
R19	1 MΩ	48 426 10/1M	C20	100 pF	48 406 10/100E
R20	180 Ω	48 425 10/180E	C21	150 pF	48 406 10/150E
R21	1,5 MΩ	48 426 10/15K	C22	220 pF	48 406 10/220E
R22	33000 Ω	48 425 10/33K	C23	20 pF	49 005 05.2
R23	100 Ω	48 426 10/100E	C24	20 pF	49 005 05.2
R24	50000 Ω	49 472 22.0	C25	20 pF	49 005 05.2
R25	5,6 MΩ	48 427 10/56K	C26	3750 pF	48 429 02/5K75
R26	15000 Ω	48 425 10/15K	C27	1600 pF	48 429 02/1K6
R27	2700 Ω	48 425 10/27K	C28	400 pF	48 406 10/400E
R28	47000 Ω	48 426 10/47K	C29	125 pF	28 212 07.2
R29	39000 Ω	48 425 10/39K	C30	100 pF	—
			C31	100 pF	—
			C32	100 pF	—
			C33	47000 pF	48 750 20/47K
			C34	10000 pF	48 750 20/10K
			C35	10000 pF	48 751 20/10K
			C36	100 pF	48 406 10/100E
			C37	100 pF	—
			C38	113 pF	—
			C39	100 pF	48 406 10/100E
			C40	47000 pF	48 750 20/47K
			C41	10000 pF	48 750 20/10K
			C42	25 pF	49 020 00.0
			C43	47000 pF	48 751 20/47K
			C44	4700 pF	48 750 20/47K
			C45	22000 pF	48 756 20/22K
			C46	0,22 μF	48 751 20/220E
			C47	1000 pF	48 751 20/1K
			C48	2 x 2,2 pF	49 055 61.0

	B1	B2	B3	B4	B5	
	EF 4	ECH 3	ENF 2	EL 3	AZ 1	
Va	150	aT 130 aH 235	220	260		V
Vg2(4)	160	70	90	225		V
Vh	0,3	1,2	—	6		V
Ia	7,2	aT 5,2 aH 2,4	3,6	32		mA
Ig2(4)	0,3	3,4	1,2	3,1		mA

Vc1 - 270 V  
Vc2 - 220 V

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# PHILIPS

## SERVICE DOCUMENTATION

for receiver

# 313 A

FOR A.C. MAINS FEEDING.

### WAVERANGES

Short wave 1 : 13.5 — 45 m ( 22.2 — 6.67 mc)  
Short wave 2 : 45 — 165 m ( 6.67 — 1.8 mc)  
Medium wave : 165 — 560 m (1800 — 535.6 Kc).

### CONTROL KNOBS

From right to left:

1. Tuning.
2. Waveband switch.

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

### DIMENSIONS.

Width: 50 cm }  
Height: 29 cm } knobs included.  
Depth: 22.5 cm }

WEIGHT: 10.75 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 sensitive or selective enough. 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 452 kc.

The I.F. bandwidth 1 : 10 is 11.5 kc.

The bandwidth at 1000 kc 1 : 10 is 10 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. Short-circuit C33.
3. Apply a modulated signal of 452 kc via a condenser of 32000  $\mu\text{F}$  to the first grid of L2.
4. Detune the third circuit by connecting a condenser of 80  $\mu\text{F}$  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  $\mu\text{F}$  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  $\mu\text{F}$  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  $\mu\text{F}$  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 (13.5—45 m).

1. Earth the set and switch to short wave 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 C8, C15 to maximum output. Seal trimmers C8, C15.  
NOTE. C24 is tuned to a fixed capacity and may not be altered.

##### II. SHORT WAVE 2 (45-165 m).

1. Fit the 15° gauge (lowest capacity). Switch the set to short wave 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 (165-560 m).

1. Fit the 15° gauge (lowest capacity). 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 GM 2404 to the anode of L2, and the output indicator to the GM 2404. Short-circuit the oscillator (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 GM 2404, 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 (lowest capacity).
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 oscillator.
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.

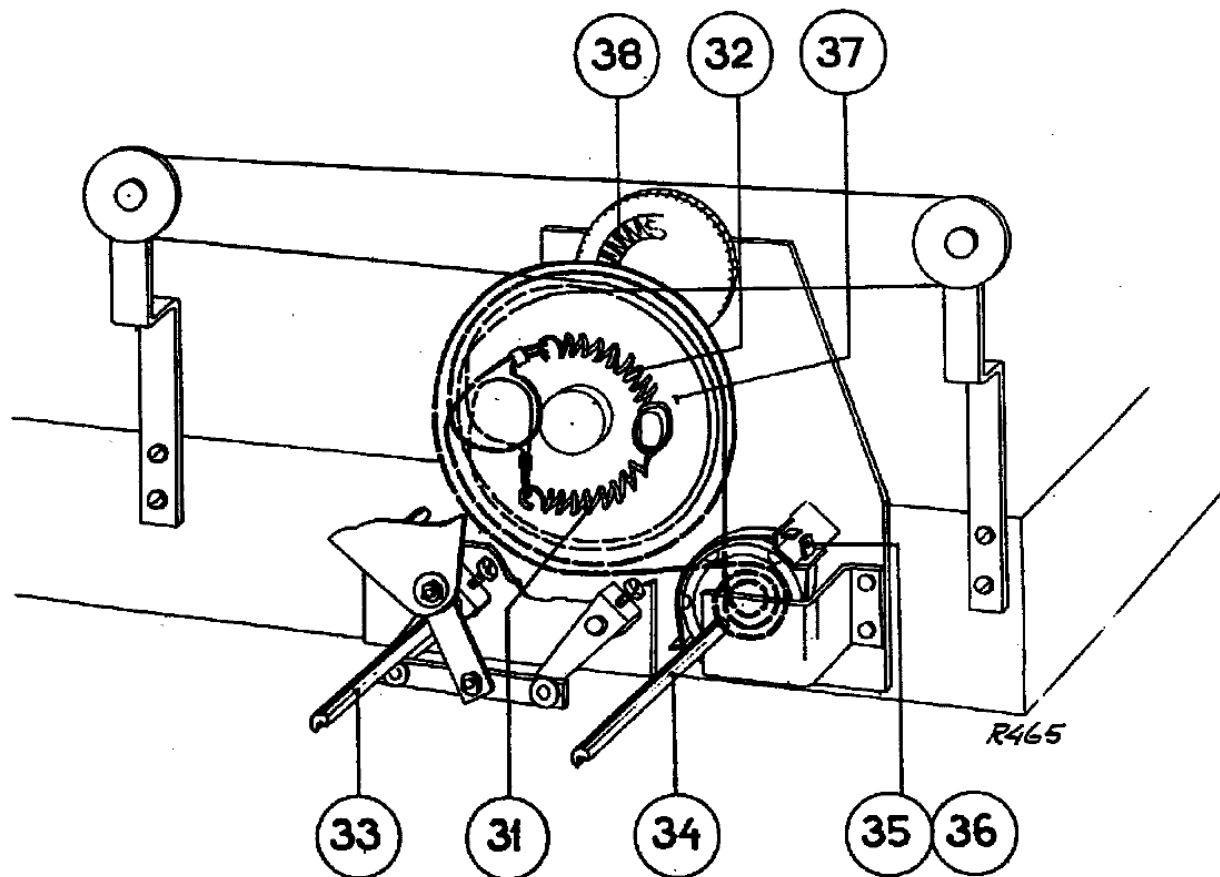
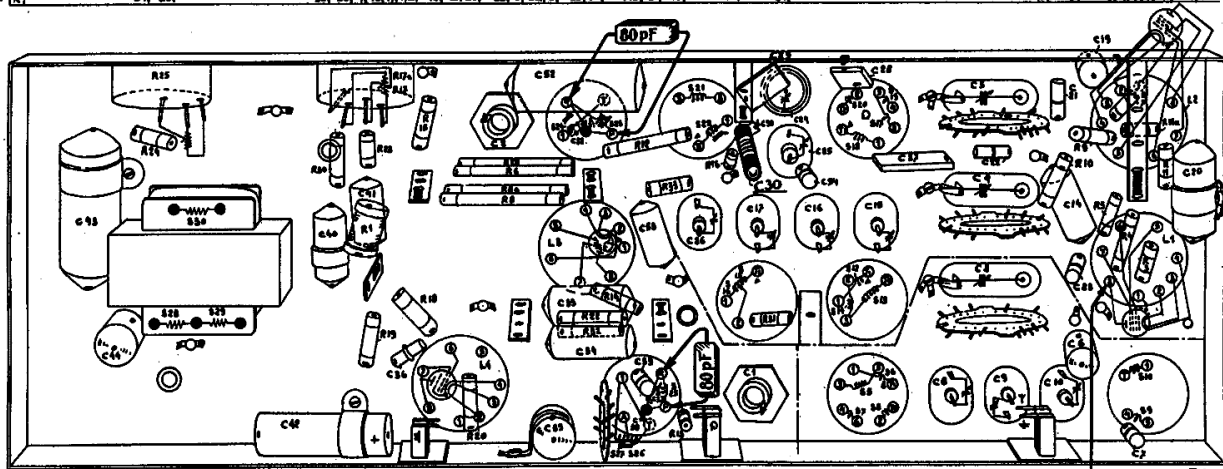


Fig. 6

[illegible]

*Fig. 4*

R463

GM2404

**313A**

## LIST OF PARTS AND TOOLS

When ordering parts always state:

1. Code number
2. Description
3. Type number of receiver.

Fig.	Pos.	Description	Code number	Price
7	1	Cabinet (colour 041) .....	23 660 95.2	
7	2	Station name dial .....	A1 894 52.1	
7	3	Knob (colour 041) .....	23 611 30.0	
7	4	Decorative strip .....	A1 345 05.5	
		Trade mark .....	28 713 27.1	
7	6	Loudspeaker cloth .....	06 601 29.0	
		Rear panel .....	A1 715 32.1	
7	11	Waveband indicator .....	A1 314 60.0	
8	12	Pointer .....	A1 436 43.0	
8	13	Spiral spring for shaft of pointer runner .....	A1 973 18.0	
8	14	Screw for shaft of pointer runner .....	A1 854 25.1	
8	15	Valve holder for L2 .....	28 839 81.0	
8	16	Valve holder for L1, L3, L4 .....	25 161 92.0	
8	17	Rubber duct for variable condenser .....	28 725 52.0	
8	18	Radio-gramophone switch .....	A1 133 07.2	
8	19	Valve holder for L5 .....	28 226 10.0	
8	20	Mains voltage connecting plate .....	28 875 39.0	
8	21	Fixing screw for loudspeaker .....	07 472 03.0	
6	31	Drawspring for pointer string .....	28 740 59.0	
6	32	Drawspring for driving string .....	28 740 51.0	
6	33	Shaft for the driving mechanism of the waveband switch .....	A1 436 23.0	
6	34	Vernier unit .....	A1 322 02.0	
6	35	Plate spring for pos. 34 .....	28 751 81.1	
6	36	Fibre strip for pos. 34 .....	28 681 11.1	
6	37	Drum for driving strings .....	23 687 13.1	
6	38	Pressure spring for driving cogwheels .....	28 730 85.0	
4		Switch element No. 1 .....	49 543 08.1	
4		Switch element No. 2 .....	49 543 30.1	
4		Switch element No. 3 .....	49 543 44.0	
<b>LOUDSPEAKER: TYPE 9636</b>				
		Protective cap .....	28 256 17.0	
		Flanged ring .....	25 871 81.0	
		Paper ring .....	28 451 54.0	
<b>TOOLS</b>				
		Aperiodic amplifier .....	GM 2404	
		Service oscillator .....	GM 2880F	
		Universal measuring apparatus .....	GM 4256	
		Universal and Tube measuring apparatus .....	GM 7629	
		15° gauge .....	09 992 44.0	
		Centring gauge for loudspeaker .....	09 991 53.0	
		Insulated trimming screwdriver .....	M 646 38.2	
		Insulated trimming plug-in key 6 mm .....	23 695 66.0	

\* When renewing the station name dial always use a dial with the same code number as the one to be replaced.

For parts not mentioned on this list vide the "General list of parts".

## COILS

	Value	Codenummer	Price		Value	Codenummer	Price
Z1				S21	2 ohm		
S1	34 ohm			S22	6.5 ohm	A1 035 66.1	V
S2	200 ohm	A1 055 44.3		S23	8 ohm		
S3	< 1 Ohm			S24	8 ohm	A1 035 67.1	X
S4	< 1 Ohm			C31	100 μF		
S5	3.5 ohm			C32	106 μF		
S6	< 1 Ohm	A1 035 61.1	V	S25	10 ohm		
S7	7 ohm			S26	6 ohm		
S8	< 1 Ohm			S27	—	A1 035 68.2	V X
S9	29 ohm			C37	106 μF		
S10	4 ohm	A1 035 64.0		C38	113 μF		
S12	< 1 Ohm			S28	330 ohm		
S13	< 1 Ohm	A1 035 62.2		S29	12 ohm	A1 080 47.1	
S14	< 1 Ohm			S30	< 1 Ohm		
S15	3 ohm			S31	4 ohm	28 220 51.1	
S16	< 1 Ohm	A1 035 65.1					
S17	< 1 Ohm						
S18	< 1 Ohm						
S19	< 1 Ohm	A1 035 63.5	V				
S20	< 1 Ohm						

## RESISTANCES

	Value	Codenumbr	Price
R1	1800 Ohm	49 356 30.0	
R2	0,82 Mohm	49 375 59.0	
R3	39 Ohm	49 375 07.0	
R4	10000 Ohm	49 377 36.0	
R5	0,15 Mohm	49 375 50.0	
R6	3,3fOhm	49 377 66.0	
R7	150 Ohm	49 375 14.0	
R8	0,1 Mohm/2 =	49 377 48.0	
R9	50.000 Ohm	49 375 16.0	
R10	220 Ohm	49 375 42.0	
R11	33000 Ohm	49 376 36.0	
R12	2x10.000 Ohm =	49 377 69.0	
R13	20.000 Ohm	49 375 44.0	
R14	5,6 Mohm	49 375 44.0	
R15	47000 Ohm	49 375 40.0	
R16	22000 Ohm	49 375 46.0	
R17	68000 Ohm	49 500 09.0	
R17a	0,28 Mohm	49 375 24.0	
R18	70000 Ohm	49 376 60.0	
R19	1000 Ohm	49 376 15.0	
R20	1 Mohm	49 376 62.0	
R22	180 Ohm	49 375 42.0	
R23	1,5 Mohm	49 376 12.0	
R24	33000 Ohm	49 470 17.0	
R25	100 Ohm	49 377 69.0	
R28	50000 Ohm	49 375 37.0	
R30	5,6 Mohm	49 375 29.0	
R31	12000 Ohm	49 376 44.0	
R32	2700 Ohm	49 375 43.0	
R33	47000 Ohm		
	359000 Ohm		

## TUBES

L1	L2	L3	L4	L5
EF8	ECH3(10)	EBF2	EL3	AZ1

Dial lighting lamp: 8091 D-00.

## CURRENTS AND TENSIONS

	Va	Vg2(4)	Vk	Ia	Ig2/4
L1	150	160	0.3	7.2	0.3
L2	130	—	—	5.3	—
L3	225	70	1.2	2.4	3.4
L4	220	90	—	3.6	1.2
L5	260	225	6	32	3.1
Vc1	Volt	Volt	Volt	mA	mA

Vc1 = 270 Volt

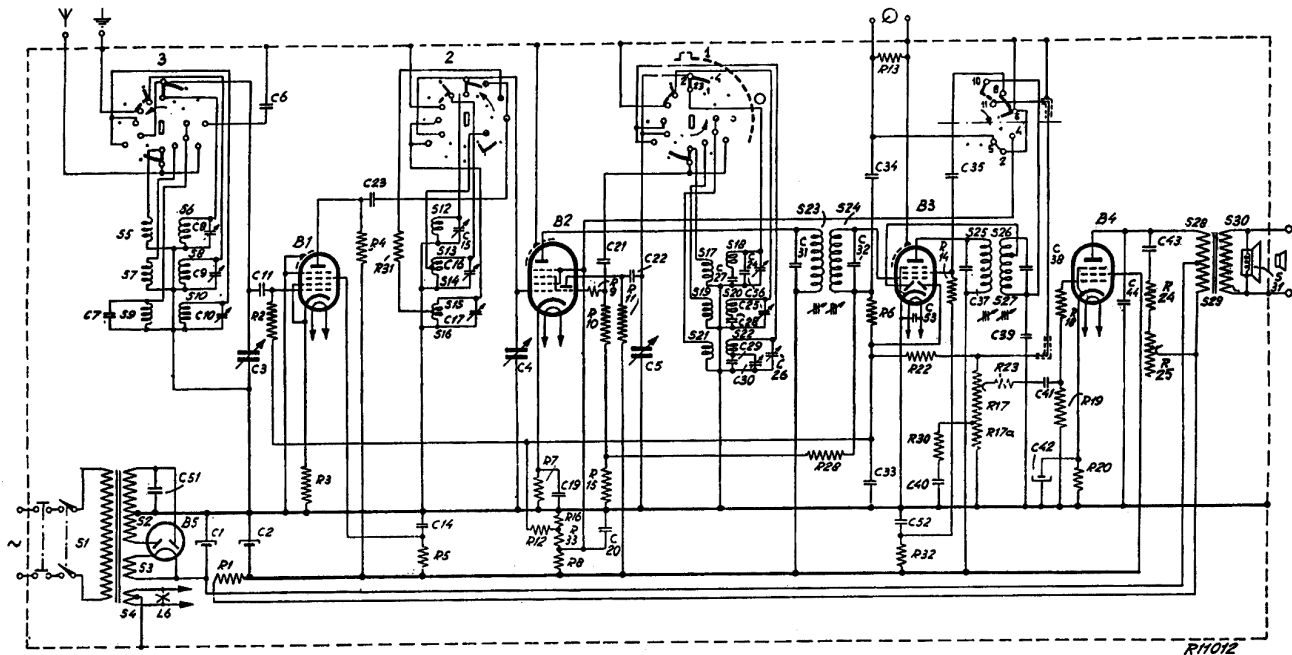
Vc2 = 220 Volt

Ia total = 62 mA

Primary consumption: 50 Watt.

## CONDENSERS

	Value	Codeno.	
C1	50 $\mu$ F	49 025 92.0	
C2	50 $\mu$ F	49 025 02.0	
C3	11-490 $\mu$ F	49 000 09.0	
C4	11-490 $\mu$ F	49 127 14.0	
C5	11-490 $\mu$ F	49 055 48.0	
C6	10000 $\mu$ F	49 005 63.0	
C7	68 $\mu$ F	49 005 03.0	
C8	20 $\mu$ F	49 055 49.0	
C9	20 $\mu$ F	49 128 57.0	
C10	20 $\mu$ F	49 005 03.0	
C11	100 $\mu$ F	49 005 03.0	
C14	10000 $\mu$ F	49 005 03.0	
C15	20 $\mu$ F	49 005 03.0	
C16	20 $\mu$ F	49 005 03.0	
C17	20 $\mu$ F	49 127 14.0	
C19	10000 $\mu$ F	49 128 63.0	
C20	0.1 $\mu$ F	49 055 28.0	
C21	100 $\mu$ F	49 055 30.0	
C22	150 $\mu$ F	49 055 32.0	
C23	220 $\mu$ F	49 005 13.0	
C24	20 $\mu$ F	49 005 05.0	
C25	20 $\mu$ F	49 005 03.0	
C26	20 $\mu$ F	28 195 69.0	
C27	5750 $\mu$ F	49 080 34.0	
C28	1600 $\mu$ F	49 080 92.0	
C29	400 $\mu$ F	28 212 08.1	
C30	200 $\mu$ F	49 127 61.0	
C31	100 $\mu$ F	49 127 57.0	
C32	106 $\mu$ F	49 128 57.0	
C33	47000 $\mu$ F	49 055 28.0	
C34	10000 $\mu$ F	49 127 61.0	
C35	10000 $\mu$ F	49 127 57.0	
C36	100 $\mu$ F	49 020 00.0	
C37	106 $\mu$ F	49 129 85.0	
C38	113 $\mu$ F	49 126 54.0	
C39	100 $\mu$ F	49 129 90.0	
C40	47000 $\mu$ F	49 128 65.0	
C41	10000 $\mu$ F	49 128 51.0	
C42	25 $\mu$ F	49 055 60.0	
C43	47000 $\mu$ F	49 055 61.0	
C44	4700 $\mu$ F		
C51	22000 $\mu$ F		
C52	0,22 $\mu$ F		
C53	1000 $\mu$ F		
C54	1,5 $\mu$ F	par.	
	2,2 $\mu$ F		



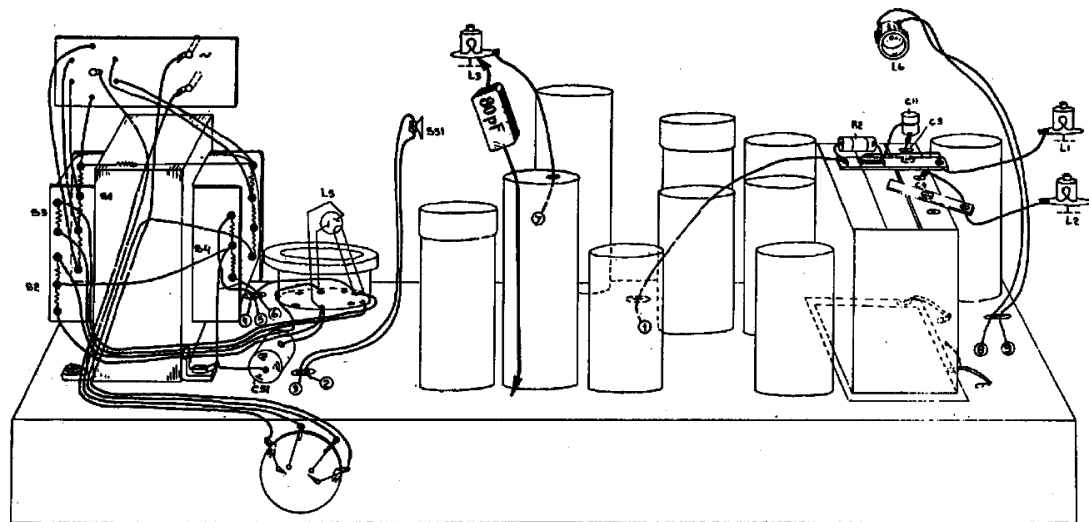


Fig. 2

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