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PHILIPS SERVICE DOCUMENTATION

for receiver type

463 A

For use on alternating current mains

GENERAL

This super-heterodyne receiver is equipped with:
7 tubes circuits,
Bandpass-filter pre-selection,
Filter for interference at the intermediate frequency,
Automatic volume control (A.V.C.),
Continuously variable tone control,
Permanent magnet m.c.loudspeaker,
Terminals for extension speaker having low impedance speech coil,
Terminals for pick-up,
Visuable tuning with cathode-ray indicator,
Tapping plate with automatic voltage indication on back plate,
for voltages 105-255 Volts A.C. and safety contact.

Wave ranges 13.5 - 40 m
 40 -125 m
 199 -570 m

Dimensions: Height 350 mm
 width 520 mm
 depth 200 mm

DESCRIPTION OF THE CIRCUIT

I.F. filter circuit: S5, C19; acts as short circuit across
 aerial and earth for I.F. signals.

R.F.pre-selection: : (199 - 570 m)
 Aerial coil S10 inductively coupled to
 1st bandfilter coil (S11), trimmer C9,
 tuning condenser C3. C48 capacitive
 aerial coupling.
 2nd bandfilter coil S13, trimmer C53, tuning
 condenser C4.
 Bandfilter coupling S34, S35, C21, R2.

40 - 125 m.

Aerial coil S8 inductively coupled to S9, trimmer C10, tuning condenser C4.

13.5 - 40 m.

Aerial coil S6, inductively coupled to S7, tuning condenser C4, capacitive aerial coupling C49.

Frequency changer

L1; R35 prevents parasitic oscillation; R8 is the grid leak R7 prevents unwanted oscillations.

Oscillator circuit 193 - 570 m

S18 inductively coupled to S19, trimmer C13, padding cond. C25, C14, tuning cond. C5.

40 - 125 m.

S16 inductively coupled to S17, trimmer C12, padding C24, tuning cond. C5.

13.5 - 40 m.

S14 inductively coupled to S15, tuning cond. C5, trimmer C11.

I.F. section (475' kc/s)

1st bandfilter: S20, S21, S22, S30, C15, C30, C16, C31. I.F. pentode L2.
2nd bandfilter: S23, S24, S25, S26, C17, C34, C18, C35.

Detector circuit

1st diode L3, S26, S24, R18, R19 (volume control, also on pick-up), cathode, C37.

A.V.C.

The d.c. voltage developed across R18, R19 by detection of the I.F. voltage, is applied through R16, R17, R15, R12 to the control grids of L1 and L2.

A.F. section

A.F. valve L3.

Volume control, also on gram. pickup: R19; tone control, also on pickup: R28, R29, C45.

Coupling condenser: C36.

Grid leak: R20, R37, R31.

Grid bias: R4, (R3, C38).

Coupling between L3 and L4: R23, R25, C43.

Resistance to prevent parasitic oscillation: R24.

Speaker transformer: S27, S28.

Output valve L4.

Tone compensation for treble and bass: R30, C50; C41, R22.

Tuning cross

L7. Part of the d.c.voltage across R19 is applied to the control grid of L7. In this way the tuning cross varies. Correct tuning is obtained at the greatest width

Supply

Mains transformer: S1, S2, S3, S4.

Ripple condenser: C52.

Rectifier valve: L5.

Smoothing filter: C1, C2, R4, R5.

Anode decoupling L1; R11, C27.

Screen grid decoupling L1, R9, C28.

Screen grid decoupling L2: R14, R13, C33.

Grid bias L1: R6, C26.

" " L2: R4.

" " L3: R4, R37, R20, R31.

" " L4: R4.

TRIMMING INSTRUCTIONS

The tuned circuits are provided with trimming condensers so that the sensitivity and selectivity may be adjusted to maximum values.

If the receiver is completely out of balance, the sequence of the following trimming instructions must be carefully adhered to.

Note: The bottom plate with the three chassis must be removed from the cabinet. See sheet G1.

Auxiliary apparatus.

1. Oscillator type GM 2880F with artificial aerial.
2. Output indicator, e.g. Universal Test-board type 4256 or 7629.
3. 15° gauge .
4. Insulated trimming screwdriver.
5. Insulated trimming key, 6 mm.
6. 32.000 μuF condenser, and 0.1 μF condenser.
7. Trimming transformer .
8. Aperiodic amplifier AM 2404.

Wire trimmer.

Some of the trimmers in this receiver are of a different type to the usual, being constructed of a tube of insulating material with a sprayed layer of metal on the inside and covered on the outside with a winding of copper wire. The capacity is adjusted by removing turns of wire. In trimming, turns are removed until the output indicator which has reached maximum value, drops back slightly. A couple of turns are then replaced and the surplus wire clipped off. The winding is held in place with wax.

Trimming.

- N.B. 1. Before commencing trimming, melt off the wax on the trimmers concerned by means of a hot soldering iron. After trimming re-melt the wax and allow to harden.
2. The volume control must be varied by means of the service oscillator only.
 3. Use only the valves belonging to the receiver. If the octode becomes defective during trimming, the R.F. and oscillator circuits must be re-trimmed to the new octode.
 4. Before trimming, wire trimmers must be replaced by new ones.
 5. Connect the output indicator to the extension speaker sockets via trimming transformer.
 6. The receiver must be properly earthed

I.F. circuits.

1. Connect condenser of 0.1 μF across the first grid of L1 and its cathode, switch over to medium wave band.
2. Apply a signal of 475 kc/s to the fourth grid of L1 through a condenser of 32.000 μuF , connect the output meter to the sockets of the second loudspeaker.

3. Adjust C18, C17, C16 and C15 in the sequence given for maximum output (see Fig.2).

I.F. interference filter:

1. Switch the set to medium wave band and turn the tuning condenser to its maximum capacity.
2. Apply a modulated signal of 475 kc/s to the aerial socket
3. Adjust the core of S5 until minimum output is obtained. (The adjustment screw of S5, not shown in fig.2, is accessible just above the aerial socket).

H.F. and oscillator circuits: (13.5-40 m)

1. Apply a signal of 20.5 Mc/s through a resistance of 400 Ohms (artificial aerial: red point).
2. Fit the 15° gauge (fig.3) and turn the tuning condenser towards its minimum capacity until it stops.
3. Connect the aperiodic amplifier GM 2404 to the anode of L1 through a condenser of 25 μ F.
4. Adjust C10 for maximum output.
5. Remove the GM 2404, the condenser of 0.1 μ F across the second grid and cathode of L1 and adjust C11 for maximum output.
6. Adjust C10 once again. (Without using the GM 2404).

40-125 m.

1. Connect the GM 2404 to the anode of L1.
2. Shunt the condenser of 0.1 μ F across the second grid and the cathode of L1.
3. Apply a signal of 7.5 Mc/s through a resistance of 400 Ohms (artificial aerial: red point).
4. Tune the set to the signal and remove the GM 2404 and the condenser of 0.1 μ F.
5. Adjust C12 for maximum output.

199-570 m:

1. Apply a signal of 1540 Kc/s to the aerial socket through a standard artificial aerial and connect a resistance of approx. 5000 Ohms across S11.
2. Tune the set to the signal and adjust C9 for maximum output.
3. Apply a signal of 550 Kc/s to the aerial socket.
4. Connect the GM 2404 to the anode of L1 and shunt the condenser of 0.1 μ F across the first grid and the cathode of L1.
5. Tune the set to the 555 kc/s signal and remove the components mentioned under point 4.
6. Adjust C14 for maximum output.
7. Connect again the components mentioned under point 4 and tune the set to 1540 kc/s.
8. Remove again the components mentioned under point 7.
9. Adjust C13 for maximum output.
10. Repeat proceedings mentioned under the points 3 to 10.

CURRENTS AND VOLTAGES

S1

	L1	L2	L3	L4	L5	L7	
Va	230	230	65	250	270	35	V =
-Vg	2.8	2.3	2.3	5	-	0.7	V =
Vg2 (screen)	87	87	-	230	-	239	V =
Vg3-5	87	-	-	-	-		V =
Ia	1.8	6.8	0.56	37	-	0.09	mA
Ig2 (screen)	2	2.6	-	47	-	0.27	mA
Ig3-5	4.2	-	-	-	.		mA

Voltage on C1 : 270 Volts.

Voltage on C2 : 255 Volts.

These voltages have been measured by means of a voltmeter basing a resistance of 2000 ohms/V. Using a voltmeter with a lower resistance will give lower readings.

Furthermore the values given are an average of several measurements; so that a deviation in the actual measurement need not necessarily indicate of a fault.

V A L V E S

L1	L2	L3	L4	L5	L6	L7
EK2	EF5	EBF1	EL3	AZ1	8045-07	EM1

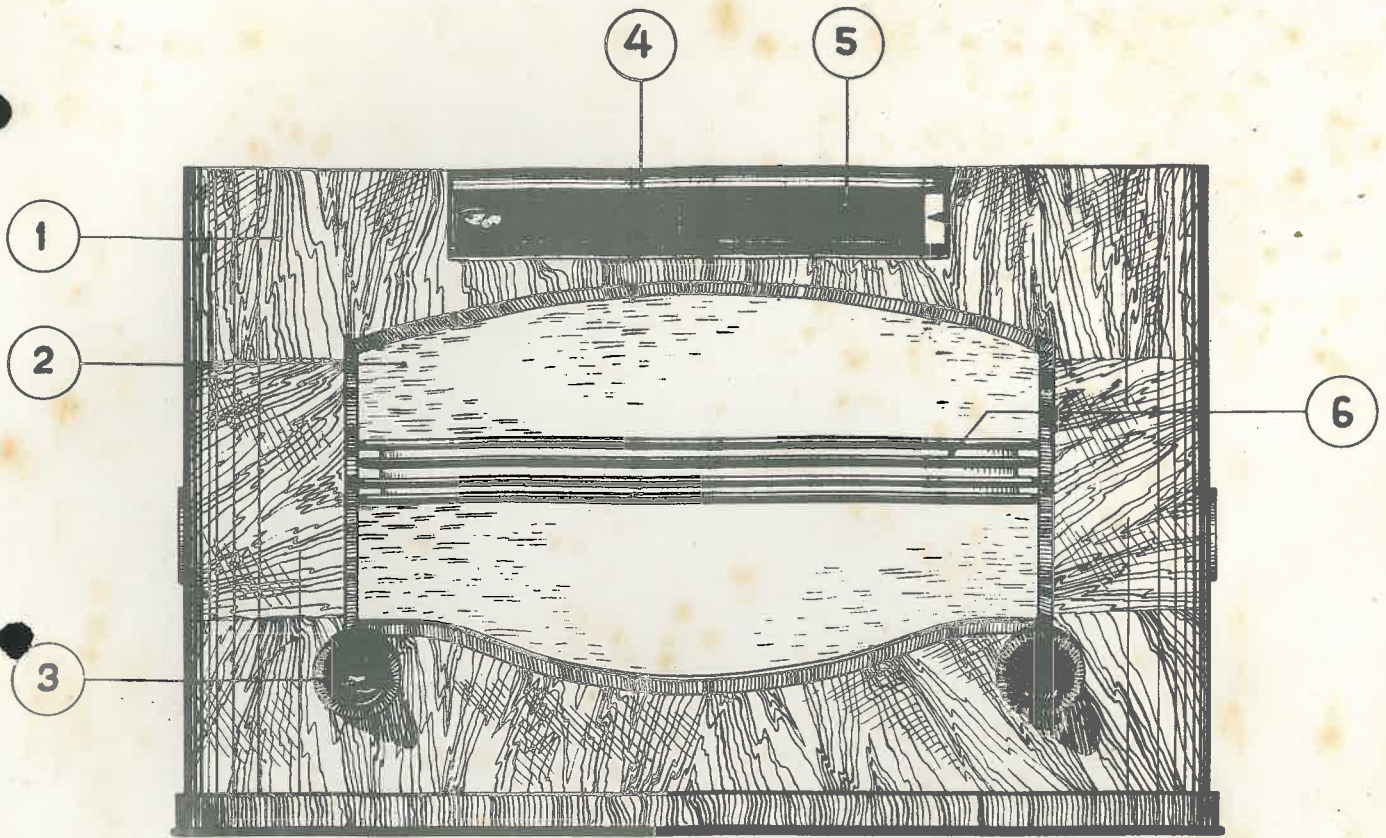
CONDENSERS.

Nr.	Capacity	Codenumber	Price
C1	32 μ F	28.182.400	
C2	32 μ F	28.182.400	
C3	11-490 μ F)		
C4	11-490 μ F)		
C5	11-490 μ F))	28.212.190	
C9	30 μ F	28.212.060	
C10	30 μ F	28.212.060	
C11	2,5-30 μ F	See "coils"	
C12	2,5-30 μ F	See "coils"	
C13	30 μ F	28.212.060	
C14	180 μ F	28.212.080	
C15	30 μ F	28.212.060	
C16	30 μ F	28.212.060	
C17	30 μ F	28.212.060	
C18	30 μ F	28.212.060	
C19	147 μ F	28.195.380	
C20	5750 μ F	28.195.690	
C21	40000 μ F	28.201.140	
C23	100 μ F	28.206.270	
C24	2080 μ F	28.195.240	
C25	400 μ F	28.190.190	
C26	50000 μ F	28.201.150	
C27	8 μ F	28.180.090	
C28	0.1 μ F	28.199.090	
C30	100 μ F	28.193.180	
C31	80 μ F	28.192.990	
C32	25000 μ F	28.201.120	
C33	50000 μ F	28.199.060	
C34	100 μ F	28.193.180	
C35	110 μ F	28.195.920	
C36	20000 μ F	28.201.110	
C37	100 μ F	28.206.270	
C38	0.1 μ F	28.201.180	
C39	0.1 μ F	28.199.090	
C41	3200 μ F	28.198.940	
C42	100 μ F	28.206.270	
C43	20000 μ F	28.199.020	
C45	50000 μ F	28.201.640	
C46	2000 μ F	28.201.480	
C48	12.5 μ F	28.206.350	
C49	2 μ F	28.205.880	
C50	800 μ F	28.190.220	
C51	0.1 μ F	28.201.180	
C52	20000 μ F	28.201.650	
C61	0.1 μ F	28.201.180	

RESISTANCES

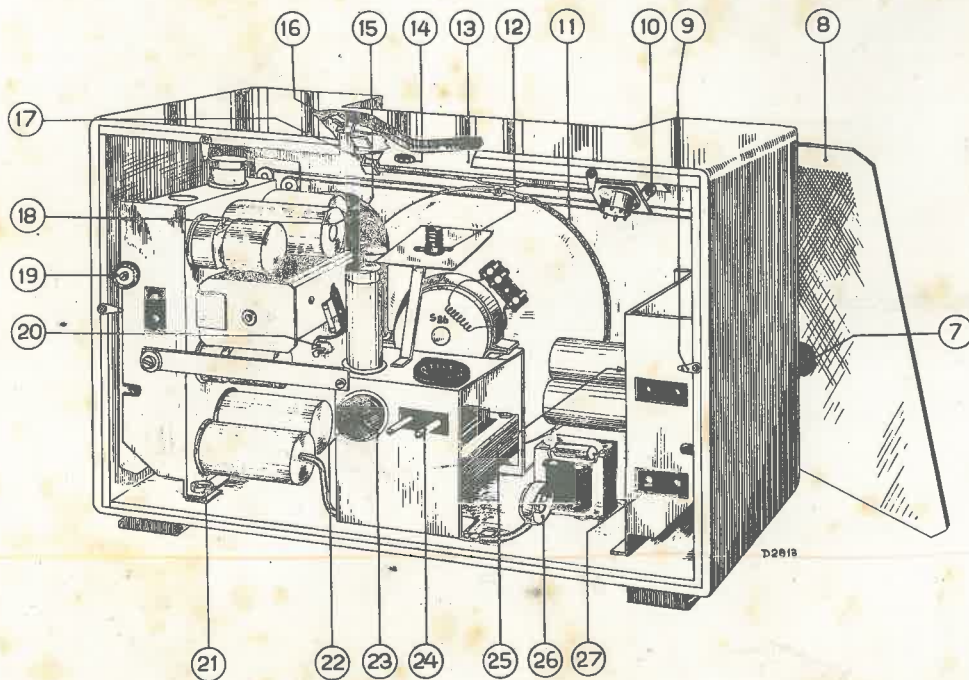
Nr.	Resistance	Codenummer	Price
R1	0.8 M. ohm	28.773.990	
R2	2 M. ohm	28.771.230	
R3	0.32 M. ohm	28.773.950	
R4	125 ohm	28.770.810	
R5	800 ohm	28.802.620	
R6	400 ohm	28.773.660	
R7	20 ohm	28.773.530	
R8	50000 ohm	28.773.870	
R9	0.2 M. ohm	28.773.930	
R11	20000 ohm	28.770.380	
R12	5 M. ohm	28.771.270	
R13	80000 ohm	28.773.890	
R14	64000 ohm	28.771.080	
R15	0.8 M. ohm	28.773.990	
R16	0.8 M. ohm	28.773.990	
R17	5 M. ohm	28.771.270	
R18	50000 ohm	28.773.870	
R19	0.5 M. ohm	28.814.640	
R20	2 M. ohm	28.771.230	
R22	80000 ohm	28.773.890	
R23	0.16 M. ohm	28.773.920	
R24	1000 ohm	28.773.700	
R25	0.4 M. ohm	28.773.960	
R28	100 ohm	28.773.600	
R29	50000 ohm	28.812.601	
R30	0.2 M. ohm	28.773.930	
R31	2 M. ohm	28.771.230	
R35	20 ohm	28.773.530	
R36	0.8 M. ohm	28.773.990	
R37	0.8 M. ohm	28.773.990	
R46	2 M. ohm	28.771.230	
R47	1 M. ohm	28.770.550	
R48	0.3 M. ohm	28.773.990	
R49	0.8 M. ohm	28.773.990	

463A



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Fig. 7



D2813

Fig. 8

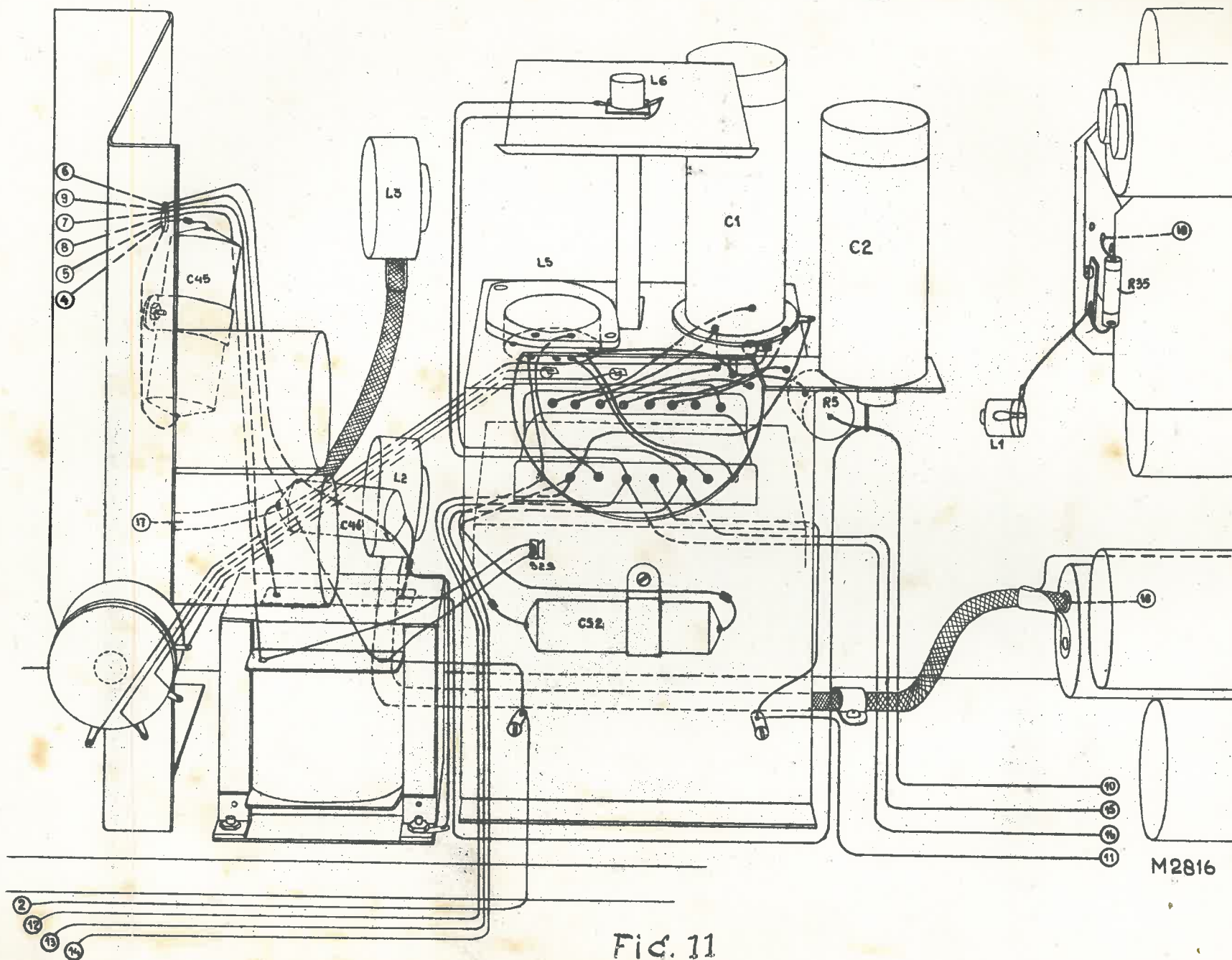
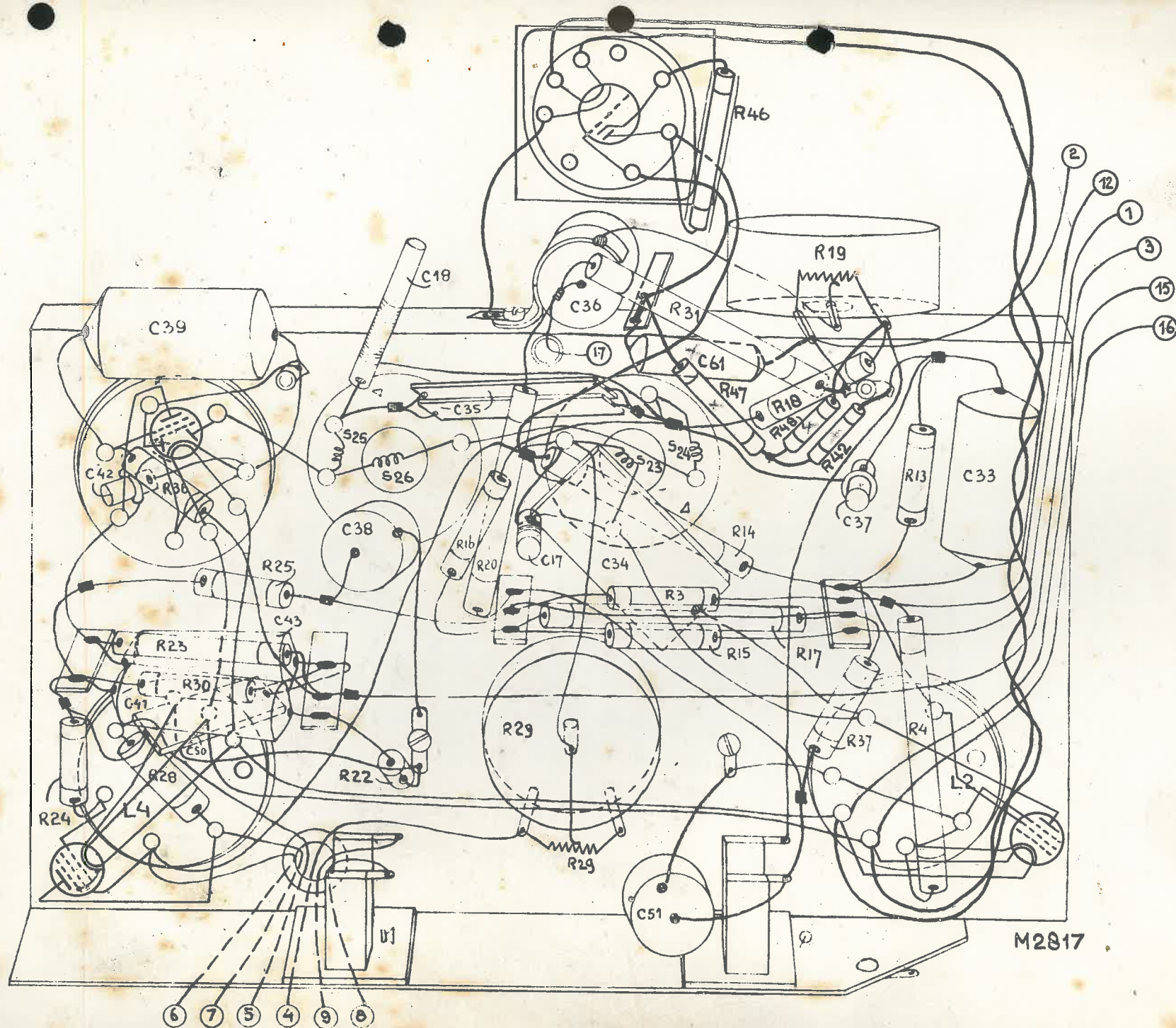


Fig. 11

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S: 5, 6, 7, 8, 9, 10, 11, 13, 1, 2, 3, 4, 34, 35,	14, 15, 16, 17, 18, 19,	20, 21, 22, 30,	23, 24, 25,	26	27, 28, 29,
C: 19, 48, 49, 3, 20, 52, 3, 21, 10, 1, 4, 26, 2,	23, 5, 11, 12, 13, 14, 24, 25, 27, 28, 29, 30, 15,	31, 32, 16, 33, 17, 34, 61, 51, 35, 36, 37, 38, 18,	39, 42, 43, 50, 41,	45, 46,	
R: 1,	2, 3, 4, 35, 5, 6	7, 8,	9, 11	16, 17, 15, 12, 13, 14, 46, 47, 48, 49,	18, 19, 20, 31, 36, 37, 25, 23, 30, 22, 24, 28, 29,

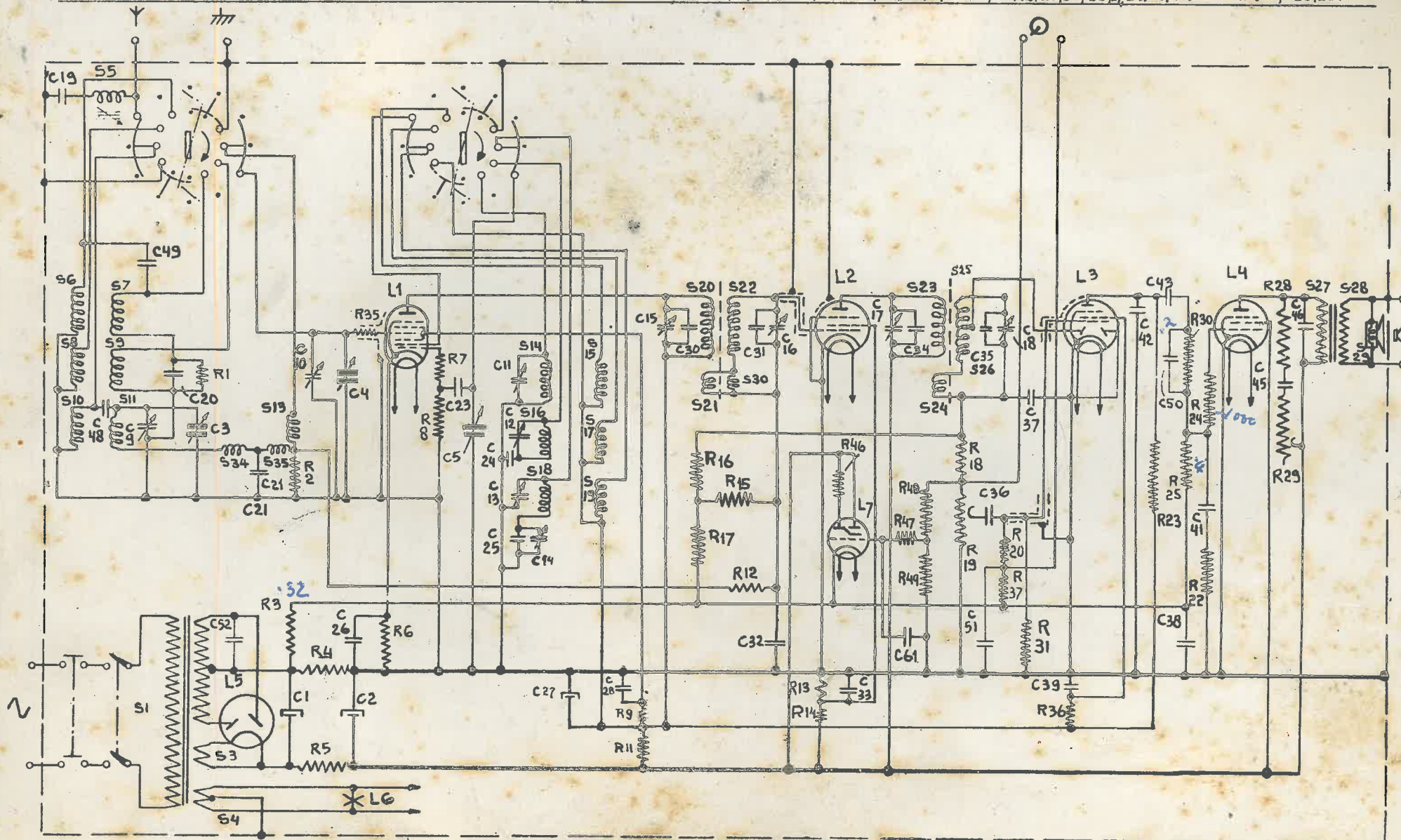
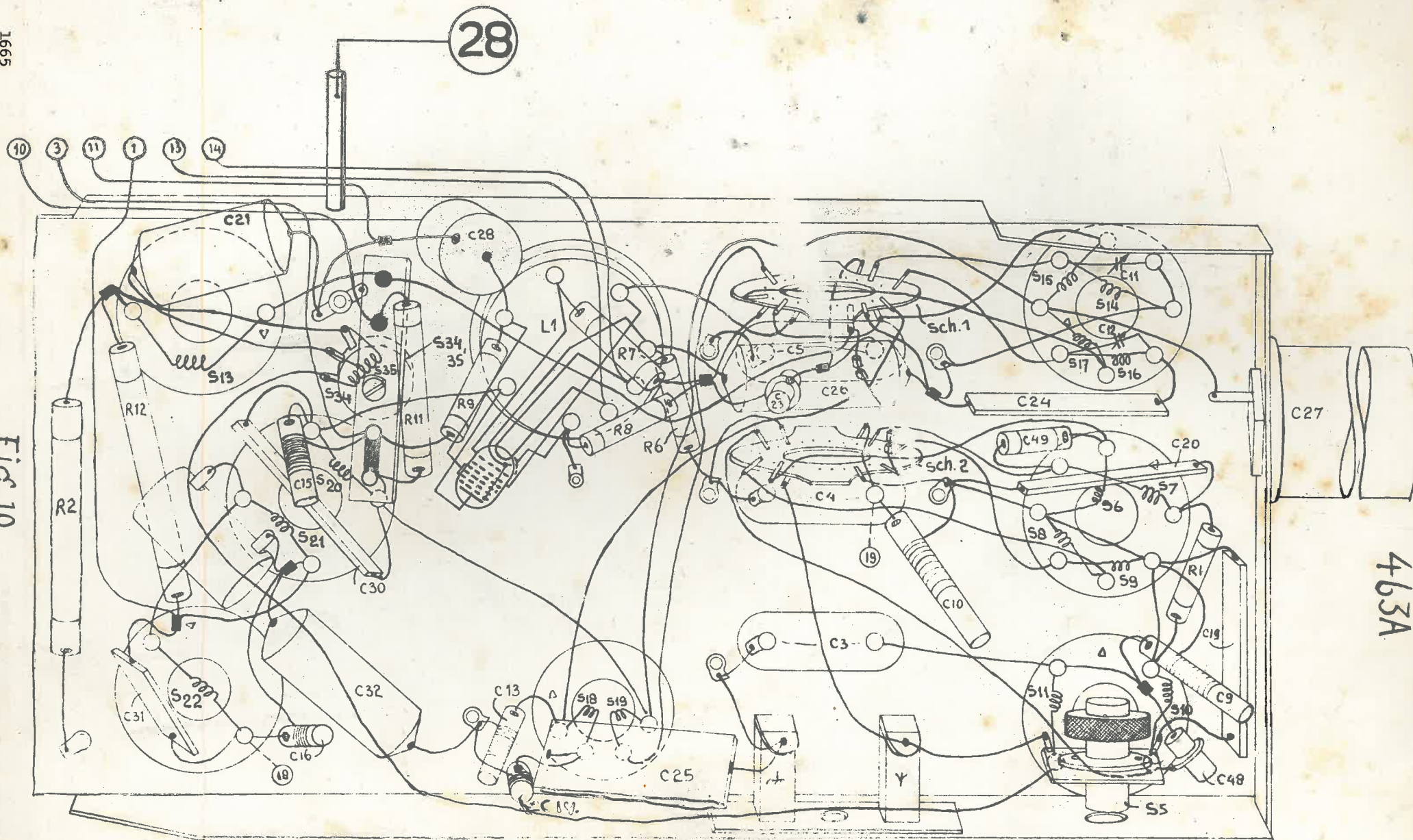


Fig. 9

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Fig. 10



S: 5, 6, 7, 8, 9, 10, 11, 13, 1, 2, 3, 4, 34, 35,	14, 15, 16, 17, 18, 19,	20, 21, 22, 30,	23, 24, 25,	26	27, 28, 29,
C: 19, 48, 49, 3, 20, 52, 3, 21, 10, 1, 4, 26, 2,	23, 5, 11, 12, 13, 14, 24, 25, 27, 28, 29, 30, 15,	31, 32, 16, 33, 17, 34, 61, 51, 35, 36, 37, 38, 18,	39, 42, 43, 50, 41,	45, 46,	
R: 1,	2, 3, 4, 35, 5, 6	7, 8,	9, 11	16, 17, 15, 12, 13, 14, 46, 47, 48, 49,	18, 19, 20, 31, 36, 37, 25, 23, 30, 22, 24, 28, 29,

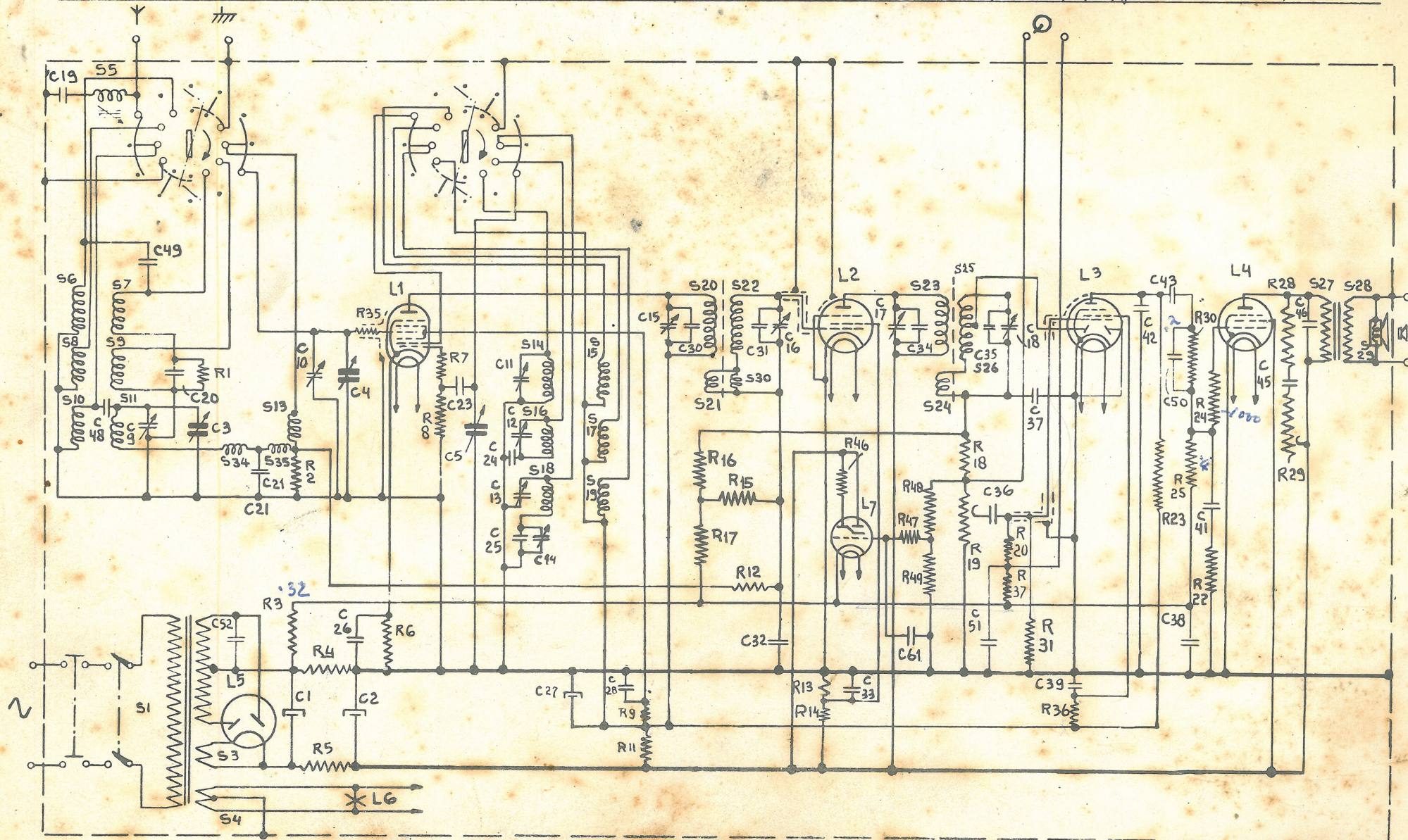


Fig. 9

M2815

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