

THE RECORD CHANGER

The record changer type AG 1000 is incorporated. For repairs and adjustments to this record changer see the service documentation appertaining hereto.

THE TAPE RECORDER

At the top of the lefthand compartment is a socket plate for the tape recorder type AG 8101.

LIST OF ILLUSTRATIONS

- Fig. 1: R.F. and oscillator circuits for each position of the waverange switch.
- Fig. 2: Trimming points on the dial.
- Fig. 3: Cable drive for pointer and variable capacitor.
- Fig. 4: Simplified diagram for tone control and bass switch SK6.
- Fig. 5: Push-pull output stage.
- Fig. 6: Switch wafers.
- Fig. 7: Mains transformer.
- Fig. 8: Circuit diagram.
- Fig. 9: Wiring diagram (under).
- Fig. 10: Wiring diagram (above).
- Fig. 11: Wiring diagram for cabinet.

CIRCUIT DESCRIPTION

A. R.F. Part

Fig. 1 shows for every position of the waverange switch a simplified diagram of the R.F. part.

Bandspread in the ranges S.W.2a, S.W.2b and S.W.2c is obtained by connecting condensers in series and in parallel with the variable condenser.

The vernier control is obtained by varying the inductance of the coil S28 for the ranges S.W.2a, S.W.2b and S.W.2c and of the coil S35 for the range S.W.2d.

B. The A.F. Part

The A.F. amplifier comprises 3 stages:

1. The pre-amplifier, B4, with tone control circuit.
2. The phase inverter valve, B5.
3. The push-pull output stage.

The A.F. signal obtained after detection is applied via R31-R32, C53, R39 and C54 to gB4. The volume controls R31-R32 and R54-R55 are mounted on one spindle in connection with the physiological tone correction.

1. TONE CONTROL

a. Bass switch (SK6, fig. 4)

Connected between the anode and the grid of B4 is an inverse feedback circuit some elements of which can be switched in and out of circuit.

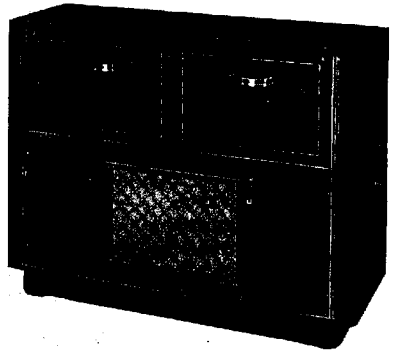
The working is as follows:

The impedance of the parallel connection R45-C59 is greater for low frequencies than for high ones, as a result of which the inverse feedback for the bass notes is reduced.

# PHILIPS

## SERVICE NOTES

for the radiogram

**FX737A**

R15047

1953

For A.C. mains supply

### GENERAL

#### WAVERANGES

1. M.W.	: 185	- 580	m	( 1622	- 517	kc/s
2. S.W.3	: 60	- 187	m	5	- 1.604	Mc/s
3. S.W.2a	: 32.25	- 60	m	9.3	- 5	Mc/s
4. S.W.2c	: 23.07	- 32.96	m	13.0	- 9.1	Mc/s
5. S.W.2b	: 17.00	- 25.87	m	17.6	- 11.6	Mc/s
6. S.W.2a	: 10.98	- 17.00	m	27.3	- 17.6	Mc/s

I.F.: 452 kc/s

#### CONTROLS

From left to right:

- Knob : volume control + mains switch  
Lever: radio-P.U. switch
- Knob : tone control  
Lever: bass switch
- Knob : vernier tuning
- Knob : waverange switch
- Knob : main tuning

#### MAINS VOLTAGE

90, 110, 125, 180,  
200, 220 V  
(50 c/s).

#### CONSUMPTION

75 W approx.

#### LOUDSPEAKER

Type : 9760-05;  
Z = 5 Ω  
(repairable).

#### VALVES

B1 : EF41    B7 : EL84  
B2 : ECH81    B8 : E280  
B3 : EBF80    B9 : E280  
B4 : EBC41    B10: EM34  
B5 : ECC40  
B6 : EL84

#### DIMENSIONS

Length: 110 cm  
Depth : 44 cm  
Height: 80.5 cm

#### WEIGHT

68.0 kg.

#### BANDWIDTH

The I.F. bandwidth (1:10) measured from g1 of B2 is approx. 11 kc/s. The "over-all" bandwidth (1:10) measured from the aerial socket is about 9.5 kc/s at 1622 kc/s and 9 kc/s at 1000 kc/s.

#### DIAL LAMPS

L1 : 8045D-00;  
L2 : 8045D-00.

#### ILLUMINATION LAMPS

L3 : 8073D-00  
L4 : 8045D-00

93 979 52.1.05

The resistor R46, which can be connected in parallel to R45, reduces the influence of the filter R45-C59. In the grid circuit of B4 there is also C54, a small capacitor which attenuates the bass notes reaching gB4. This capacitor can be short-circuited with the bass switch.

Summary of the 3 positions of SK6:

1. Minimum bass notes : C54 in series with C53-R39  
R46 parallel to R45-C59
2. Normal : C54 short-circuited  
R46 parallel to R45-C59
3. Maximum bass notes : C54 short-circuited  
R46 switched out of circuit

b. Whistle filter (9000 c/s) (fig. 4)

The 9000 c/s whistle filter consists of the series circuit ; S55-S48. Moreover a signal coming from S51 is applied to C55. At the resonance frequency a maximum voltage is produced across S48 which is applied to gB5 via R58 as inverse feedback voltage. The purpose of C64 is to prevent another rise of the frequency characteristic above 9000 c/s. The whistle filter is only switched on in the "radio" position of SK7.

c. Treble control (fig. 4)

The treble response is adjusted with R49-R50.

In the position "maximum treble" (slider of R49-R50 at the top of R49) the treble response is boosted because of the fact that C61 is connected in parallel to R47-R51.

In the position "minimum treble" (slider of R49-R50 to the earth side of R50) R47-R49-C60-R48 and R51-C61 form two low-pass filters as a result of which the treble response is attenuated.

d. Pick-up correction

In the position "gramophone" of SK7, R38 in the inverse feedback circuit of B4 is replaced by the network R29-R30-C50. The impedance of this network is lower for the treble notes than for the bass so that the inverse feedback for the treble notes is reduced.

2. PHASE INVERTOR CIRCUIT (fig. 5)

The A.F. signal which appears across R54-R55 is fed via R56 to gB5. B5 operates as a normal A.F. amplifier. B5' which receives part of this amplified signal, is fed back via R67 in such a way that the signal voltage across R71 is equal but opposite in phase to the signal voltage across R69.

3. PUSH PULL OUTPUT STAGE

B6 derives its excitation voltage from B5, and B7 from B5'. These voltages are opposite in phase.

TRIMMING THE RECEIVER

A. The I.F. Part

1. Set the waverange switch to M.W.
2. Turn the variable capacitor to minimum.
3. Set the volume control to maximum.

4. Set the P.U. radio switch to radio.
5. Unscrew the iron cores of the I.F. coils.
6. Connect a voltmeter via a trimming transformer to the extension loudspeaker sockets.
7. Apply to g1 of B2 a modulated signal of 452 kc/s via a capacitor of 33000 pF.
8. Trim the I.F. circuits in the following order:
  - 4th I.F. circuit S46-S47-C41 (coil U).
  - 3rd I.F. circuit S44-S45-C40 (coil U).
  - 1st I.F. circuit S40-S41-C38 (coil T).
  - 2nd I.F. circuit S42-S43-C39 (coil T).
  - 3rd I.F. circuit S44-S45-C40 (coil U).

After the last circuit has been trimmed the cores of the I.F. coils must be left as they are.

9. Seal the cores.

Note

The iron cores of the I.F. bandfilters have been sealed with "Vaseline Compound" (see list of parts and tools). This compound can easily be removed in the cold state with the aid of a screwdriver. Heating of the core damages the core holder and makes trimming impossible.

B. R.F. and oscillator circuits

Trimming is done with the aid of trimming points on the dial (see fig. 2).

There is no need to take the chassis out of the cabinet. Before starting to trim, turn the variable capacitor to minimum and set the pointer on the extreme left trimming point of the dial (point 1).

For all waveranges the following applies:

1. Set the volume control to maximum.
2. Turn the tone control to the "quality" position.
3. Connect a voltmeter via a trimming transformer to the extension loudspeaker socket.

Trim as indicated in the following table strictly observing the order given:

1	Waverange switch in position	M.W.	S.W.3	S.W.2b	S.W.2a	S.W.2c	S.W.2d
2	Pointer on trimming point...	3	3	3 <sup>x</sup>	3 <sup>x</sup>	3 <sup>x</sup>	3 <sup>x</sup>
3	Apply modulated signal of... to aerial socket via a normal dummy aerial	547 kc/s	1.72 Mc/s	11.6 Mc/s	17.8 Mc/s	9.1 Mc/s	5.18 Mc/s
4	Trim for maximum output voltage .....	S39 S27 S18	S37 S24 S16	S30 S21 S10	S29 S20 S8	S31 S22 S12	S34 S23 S14
5	Pointer on trimming point... by means of tuning knob	1	1	1 <sup>x</sup>	-	-	-
6	Apply modulated signal of... via a normal dummy aerial	1630 kc/s	5.1 Mc/s	18 Mc/s	-	-	-
7	Trim for maximum output voltage .....	C37 C21 C7	C35 C20 C6	C32 C18 C8	-	-	-
8	Repeat the points .....	2-7	2-7	2-7	-	-	-
9	Seal the trimmers and cores	S39 S27 S18 C37 C21 C7	S37 S24 S16 C35 C20 C6	S30 S21 S10 C32 C18 C8	S29 S20 S8	S31 S22 S12	S34 S23 S14

<sup>x</sup> Place vernier tuning in the middle of its range.

### REPAIRS AND REPLACEMENTS

#### A. REMOVING THE CHASSIS FROM THE CABINET.

1. Remove the back panel from the radio compartment.
2. Remove the 2 screws at both sides of the chassis and the 3 wood screws above the chassis.
3. Push the chassis so far backwards that the terminal boards under the chassis are accessible from the front.
4. Disengage the connections between the chassis and the terminal boards.
5. Chassis + front panel can now be taken out of the cabinet.

#### B. REMOVING THE FRONT PANEL.

1. Remove the chassis.
2. Remove the knobs.

3. Unscrew the 4 screws holding the front panel (2 wood screws and 2 screws underneath the chassis plate).
4. The front panel can now be removed.

C. REPLACING THE DIAL

1. Remove the chassis.
2. Remove the front panel.
3. Disengage the 4 dial fixing brackets.
4. The dial can now be removed.

D. RENEWING THE DRIVING CABLES

The path and lengths of the cables are indicated in fig. 3. When renewing the cables for the variable condenser, begin at the small drum. The variable capacitor is placed in the maximum position.

E. REPAIR OF THE VERNIER CONTROL

For the repair of this part unscrew the bracket from the chassis after which it will be easy to remove both the driving spindle and the cores. Always keep the rubber driving rollers and core rods free of grease. After repair the cores must be moved to and fro once or twice against their stop points, after which they automatically find their right position.

F. MAINS TRANSFORMER

If the original mains transformer of this apparatus becomes defective, it must be replaced by the standard transformer mentioned in the electrical parts list.

If the set, equipped with the standard transformer, has to be operated on 180 V mains, the mains connections must be made to points 1A and 5 on this transformer.

For connections see fig. 7.

CURRENTS AND VOLTAGES

Valves			Va	Vg2(+4)	Vk	Ia	Ig2(+4)
B1	EF41	Pentode	184	90	2	5.0	1.45
B2	ECH81	Hexode	235	139	1.6	2.7	4.2
		Triode	127	-	1.6	4.3	-
B3	EBF80	Pentode	235	66	-	5.0	1.7
B4	EBC41	Triode	85	-	1.0	0.5	-
B5	ECC40	Triode	78	-	2.2	0.9	-
		Triode	78	-	2.2	0.9	-
B6	EL84	Pentode	265	235	7.2	38	4.3
B7	EL84	Pentode	270	235	7.2	32	4.1
B10	EM34	Tuning indicator	235	d1=50	-	-	d1=0.18
				d2=25			d2=0.21
			Volts	Volts	Volts	mA	mA

VC1 = 280 Volts

VC2 = 275 Volts

VC4 = 235 Volts

Iprim. 370 mA (220 V; 50 c/s)

These measurements have been taken with the Universal Measuring Instrument GM 4257 with the receiver connected to 220 V a.c. no signal on the aerial socket. Radio-P.U. switch to radio, and bass switch on "N".

LIST OF PARTS AND TOOLS

When ordering always quote:

1. Codenumber
2. Description
3. Typenumber of the set.

	Description	Code number
	<u>1. General</u>	
	Tension spring for record changer (2x)	89 312 44.3
	Compression spring under record changer (4x)	49 933 87.0
	Plate (4x)	49 935 66.0
	Lid support	A3 403 08.0
	Lampholder behind the lens	A3 359 16.1
	Lens (colour DB)	P5 310 02/04
	Dial (Mediterranean)	A3 741 38.0
	Dial (Oversea)	A3 741 36.0
	Escutcheon for EM34	A3 685 02.0
	<u>2. Knobs</u>	
	Knob (colour UC; 4x)	A3 738 30.0
	Lever (colour UC; 2x)	P4 075 62.0
	Spring in knob (4x)	28 753 01.2
	Knob vernier control (colour UC)	23 609 73.0
	<u>3. Chassis</u>	
	Socket plate (3x)	A3 382 13.0
	Valve holder (5x)	B1 505 22.0
	Valve holder ECH81	B1 506 59.0
	Valve holder EM34	B1 505 26.1
	Spring for fixing single coilcan	A3 652 75.1
	Indication disc waverange switch	A3 404 08.0
	Indication disc vernier control	A3 406 87.0
	Indication disc tone control	A3 394 12.0
	Rubber grommet (under chassis; 2x)	A3 327 14.0
	Voltage adapter	A3 228 81.1
	Lampholder (3x)	A3 359 16.1
	Tension spring (pointer drive)	A3 646 14.0
	<u>4. Variable capacitor assembly</u>	
	Variable capacitor	see capacitors
	Spring in drum	A3 646 26.0
	<u>5. Tools</u>	
	Service oscillator	GM 2882 or GM 2883 or GM 2884
	Universal Measuring Instrument	GM 4256 or GM 4257
	Vaseline Compound	X 009 47.0
	NJ/MZ	



S1	-	}	A3 141 39.3	S48	100	Ω	A1 000 68.2
S2	-		}	S49	300	Ω	}
S3	-			S50	300	Ω	
S7	1.5 Ω	}	A3 125 79.0	S51	< 1	Ω	
S8	< 1 Ω		S52	4	Ω		
S9	1.5 Ω	}	A3 125 26.0	C1	50	μF	}
S10	< 1 Ω		C2	50	μF	48 317 59/50 + 50	
S11	1.6 Ω	}	A3 125 28.0	C3	2200	PF	A9 999 06/2K2
S12	< 1 Ω		C4	50	μF	48 312 09/50	
S13	1.6 Ω	}	A3 125 28.0	C5	100	PF	A9 999 04/100E
S14	< 1 Ω		C6	39	PF	A9 999 04/39E	
S15	13 Ω	}	A3 125 33.0	C7	30	PF	28 212 36.4
S16	1.7 Ω		C8	30	PF	28 212 36.4	
S17	40 Ω	}	A3 125 35.0	C9	11-498	PF	A9 999 07/20E- 100E
S18	3.5 Ω		C10	11-498	PF	}	
S19	26 Ω		A3 110 66.0	C11	11-498		PF
S20	< 1 Ω		A3 125 38.0	C12	150	PF	A9 999 04/150E
S21	< 1 Ω		A3 125 39.0	C13	150	PF	A9 999 04/150E
S22	< 1 Ω		A3 125 41.0	C14	150	PF	A9 999 04/150E
S23	< 1 Ω		A3 125 41.0	C15	15000	PF	A9 999 06/15K
S24	1.7 Ω	}	A3 125 46.0	C16	0.1	μF	A9 999 06/100K
S25					C17	150	PF
S26	45 Ω	}	A3 125 35.0	C18	60	PF	A9 999 07/20E- 100E
S27	3 Ω				C19	100	PF
S28	< 1 Ω		A3 111 65.0		39	PF	A9 999 05/39E
S29	< 1 Ω		A3 113 10.1	C20	30	PF	28 212 36.4
S30	< 1 Ω		A3 125 42.0	C21	30	PF	28 212 36.4
S31	< 1 Ω		A3 125 44.0	C22	0.22	μF	A9 999 06/220K
S32	< 1 Ω	}	A3 125 60.0	C23	150	PF	A9 999 04/150E
S33	< 1 Ω				C24	150	PF
S34	< 1 Ω			C25	15000	PF	A9 999 06/15K
S35	< 1 Ω		A3 111 65.0	C26	220	PF	A9 999 04/220E
S36	< 1 Ω	}	A3 125 68.0	C27	470	PF	A9 999 05/470E
S37	4 Ω					30	PF
S38	< 1 Ω	}	A3 125 72.0	C28	180	PF	A9 999 05/180E
S39	< 1 Ω				C29	100	PF
S40	2.5 Ω	}	A3 121 94.2	C30	100	PF	A9 999 04/100E
S41	5.0 Ω				C31	100	PF
S42	2 Ω	}	A3 121 94.2	C32	60	PF	A9 999 07/20E- 100E
S43	3 Ω				C33	150	PF
C38	115	}		C34	1500	PF	A9 999 05/1K5
C39	115					75	PF
S44	2.5 Ω	}	A3 121 94.2	C35	30	PF	28 212 36.4
S45	5.0 Ω				C36	470	PF
S46	2 Ω	}			15	PF	A9 999 05/15E
S47	3 Ω				C37	30	PF
C40	115	}					
C41	115						

C38	voir bobines		R25	2.2 MΩ	A9 999 00/2M2
C39	see coils		R26	0.68MΩ	A9 999 00/680K
C40	véanse bobinas		R28	47000 Ω	A9 999 00/47K
C41			R29	82000 Ω	A9 999 00/82K
C42	47000 pF	A9 999 06/47K	R30	0.68MΩ	A9 999 00/680K
C44	47000 pF	A9 999 06/47K	R31	0.65MΩ	} 49 501 07.0
C45	12 pF	A9 999 04/12E	R32	0.2 MΩ	
C46	1500 pF	48 206 50/1K5	R33	180 kΩ	A9 999 00/180K
C47	0.1 μF	A9 999 06/100K	R34	1 MΩ	A9 999 00/1M
C48	47 pF	A9 999 04/47E	R35	1 MΩ	A9 999 00/1M
C49	47000 pF	A9 999 06/47K	R38	0.47MΩ	A9 999 00/470K
C50	680 pF	A9 999 04/680E	R39	1 MΩ	A9 999 00/1M
C52	8200 pF	A9 999 06/8K2	R40	1 MΩ	A9 999 00/1M
C53	3900 pF	A9 999 06/3K9	R41	1800 Ω	A9 999 00/1K8
C54	470 pF	A9 999 04/470E	R42	0.22MΩ	A9 999 00/220K
C55	18000 pF	A9 999 06/18K	R43	1 MΩ	A9 999 00/1M
C56	10000 pF	A9 999 06/10K	R44	1 MΩ	A9 999 00/1M
C57	50 μF	AC 5540/50	R45	6.8 MΩ	A9 999 00/6M8
C58	22 pF	A9 999 04/22E	R46	0.56MΩ	A9 999 00/560K
C59	270 pF	A9 999 04/270E	R47	0.22MΩ	A9 999 00/220K
C60	680 pF	A9 999 04/680E	R48	0.15MΩ	A9 999 00/150K
C61	680 pF	A9 999 04/680E	R49	0.65MΩ	} 49 475 20.0
C62	150 pF	A9 999 04/150E	R50	2 MΩ	
C63	6800 pF	A9 999 06/6K8	R51	0.22MΩ	A9 999 00/220K
C64	5.6 pF	A9 999 04/5E6	R52	0.56MΩ	A9 999 00/560K
C65	10 μF	48 313 09/10	R53	68000 Ω	A9 999 00/68K
C66	50 μF	AC 5540/50	R54	0.65MΩ	} 49 501 11.0
C67	33000 pF	A9 999 06/33K	R55	0.2 MΩ	
C68	33000 pF	A9 999 06/33K	R56	0.1 MΩ	A9 999 00/100K
C69	1000 pF	A9 999 06/V1K	R57	390 Ω	A9 999 00/390E
C70	1000 pF	A9 999 06/V1K	R58	2.2 MΩ	A9 999 00/2M2
C71	22000 pF	A9 999 06/V22K	R59	0.15MΩ	A9 999 00/150K
C73	1500 pF	48 206 50/1K5	R60	0.15MΩ	A9 999 00/150K
R1	1200 Ω	49 379 79.0	R61	10000 Ω	A9 999 00/10K
R2	27 Ω	A9 999 00/27E	R62	56 Ω	A9 999 00/56E
R3	1000 Ω	A9 999 00/1K	R63	2200 Ω	A9 999 00/2K2
R4	1 MΩ	A9 999 00/1M	R64	2200 Ω	A9 999 00/2K2
R5	330 Ω	A9 999 00/330E	R65	3900 Ω	A9 999 00/3K9
R6	0.1 MΩ	A9 999 00/100K	R66	1 MΩ	A9 999 00/1M
R7	10000 Ω	A9 999 00/10K	R67	1 MΩ	A9 999 00/1M
R8	1000 Ω	A9 999 00/1K	R68	1000 Ω	A9 999 00/1K
R9	12000 Ω	A9 999 00/12K	R69	0.68MΩ	A9 999 00/680K
R11	par. 2x 47000 Ω	A9 999 00/47K	R70	100 Ω	A9 999 00/100E
R12	180 Ω	A9 999 00/180E	R71	0.68MΩ	A9 999 00/680K
R13	1 MΩ	A9 999 00/1M	R72	1000 Ω	A9 999 00/1K
R14	47000 Ω	A9 999 00/47K			
R15	27000 Ω	A9 999 00/27K			
R16	560 Ω	A9 999 00/560E			
R17	1 MΩ	A9 999 00/1M			
R18	2.2 MΩ	A9 999 00/2M2			
R19	1.8 MΩ	A9 999 00/1M8			
R22	1.2 MΩ	A9 999 00/1M2			
R23	0.1 MΩ	A9 999 00/100K			
R24	47000 Ω	A9 999 00/47K			

NJ/MZ

# FX737A

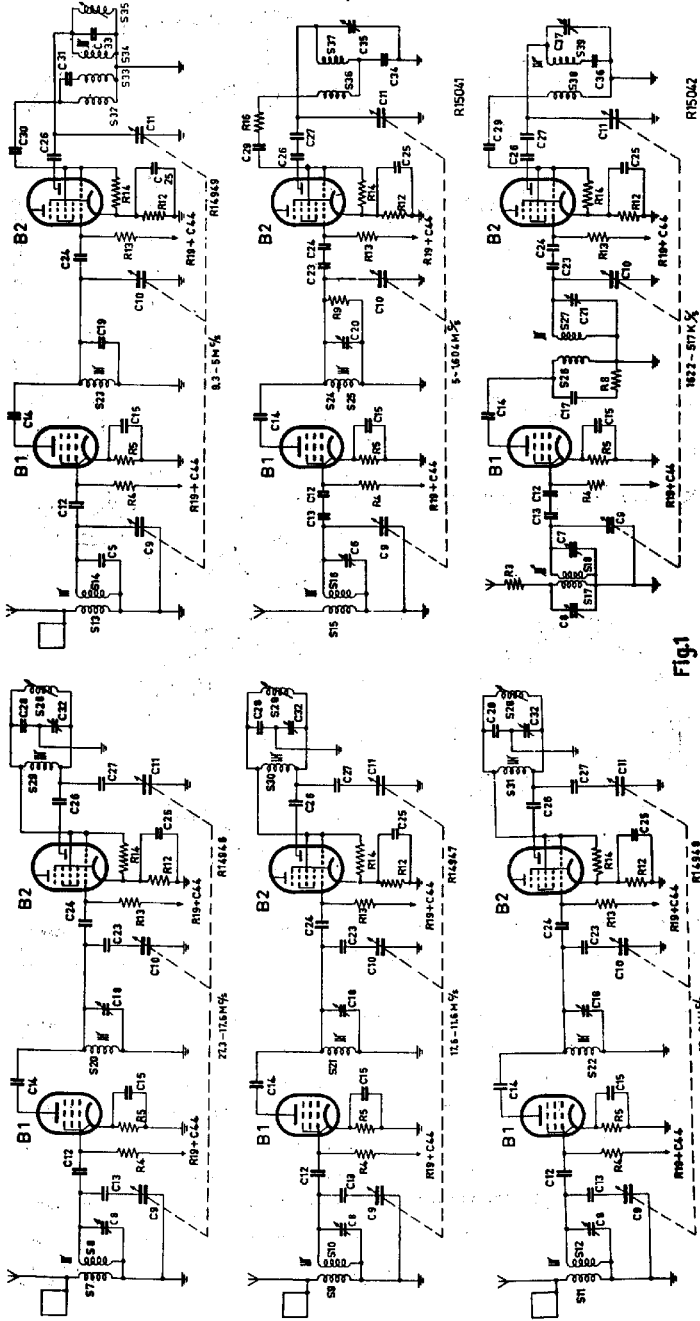


Fig.1

FX737A

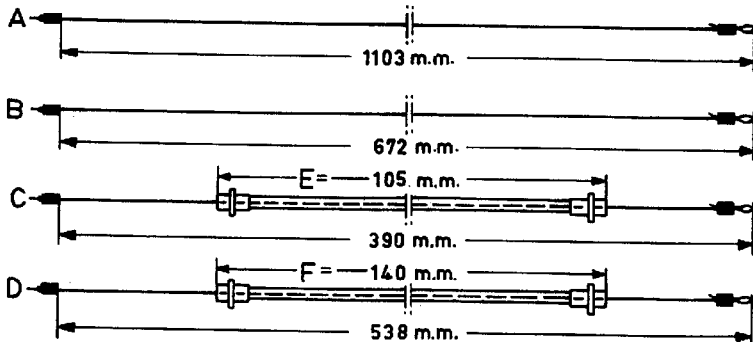
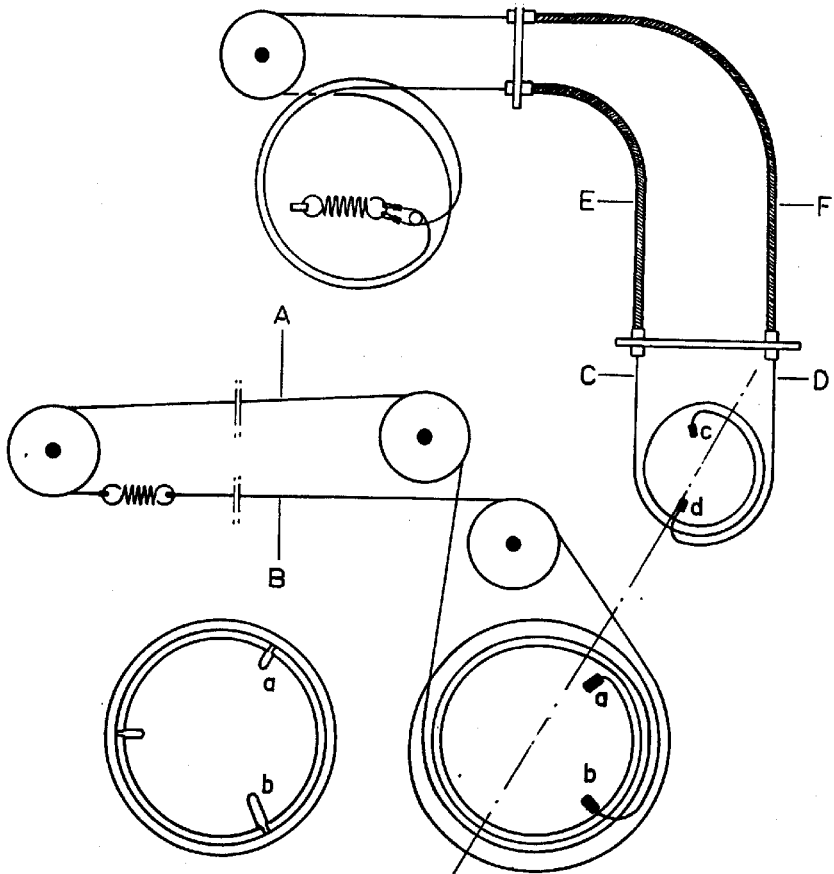


Fig.3

R15033

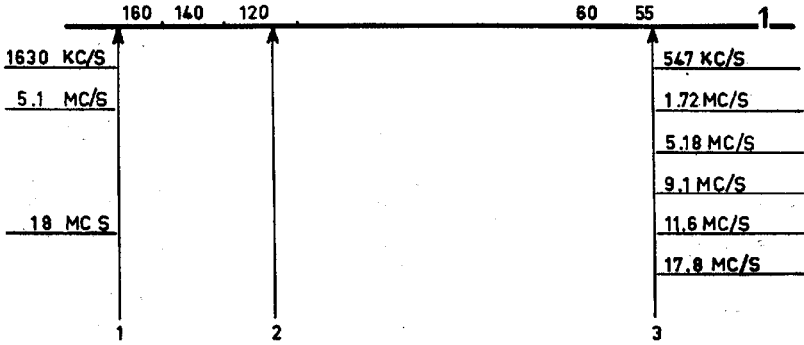
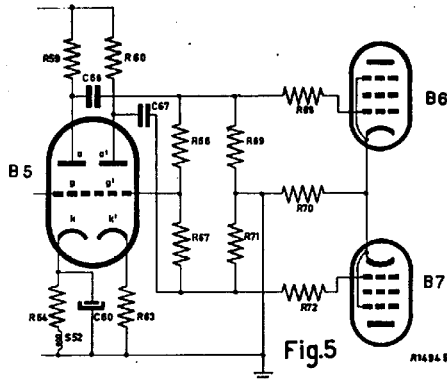
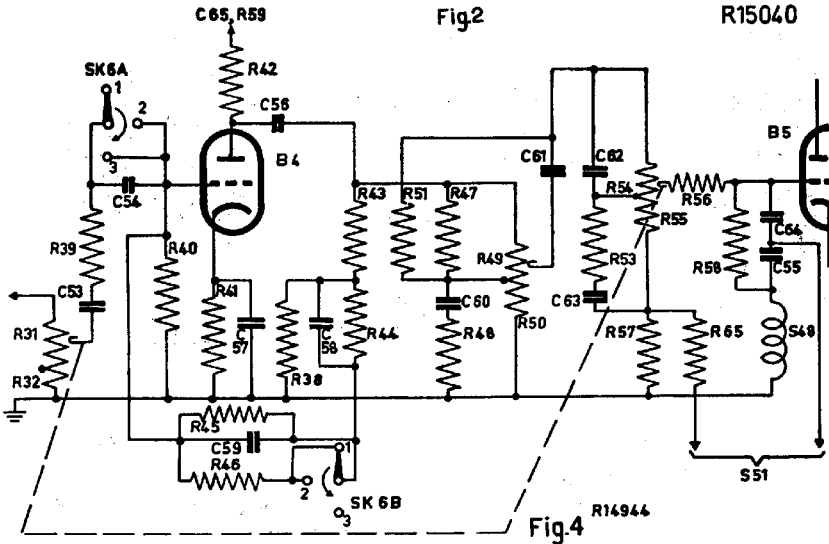


Fig2

R15040



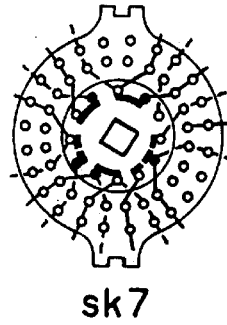
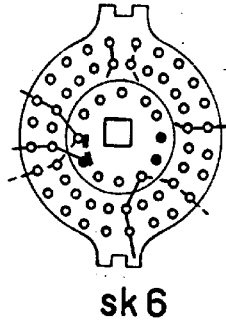
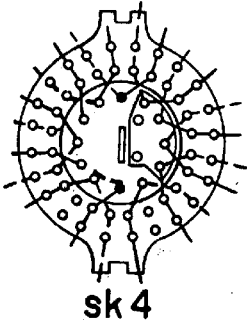
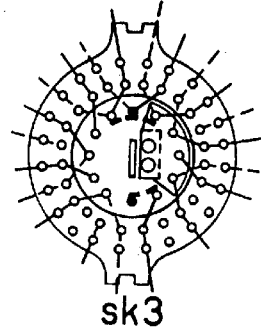
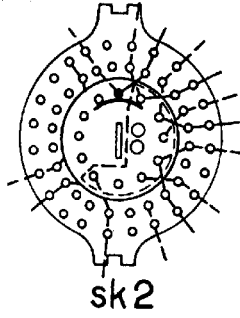
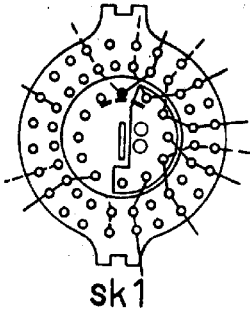


Fig.6

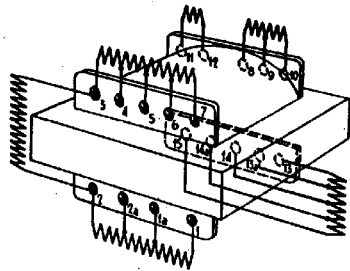
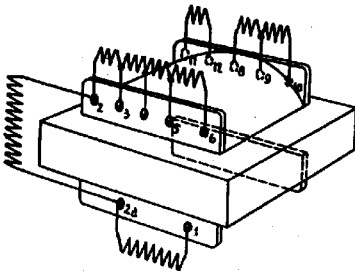


Fig.7

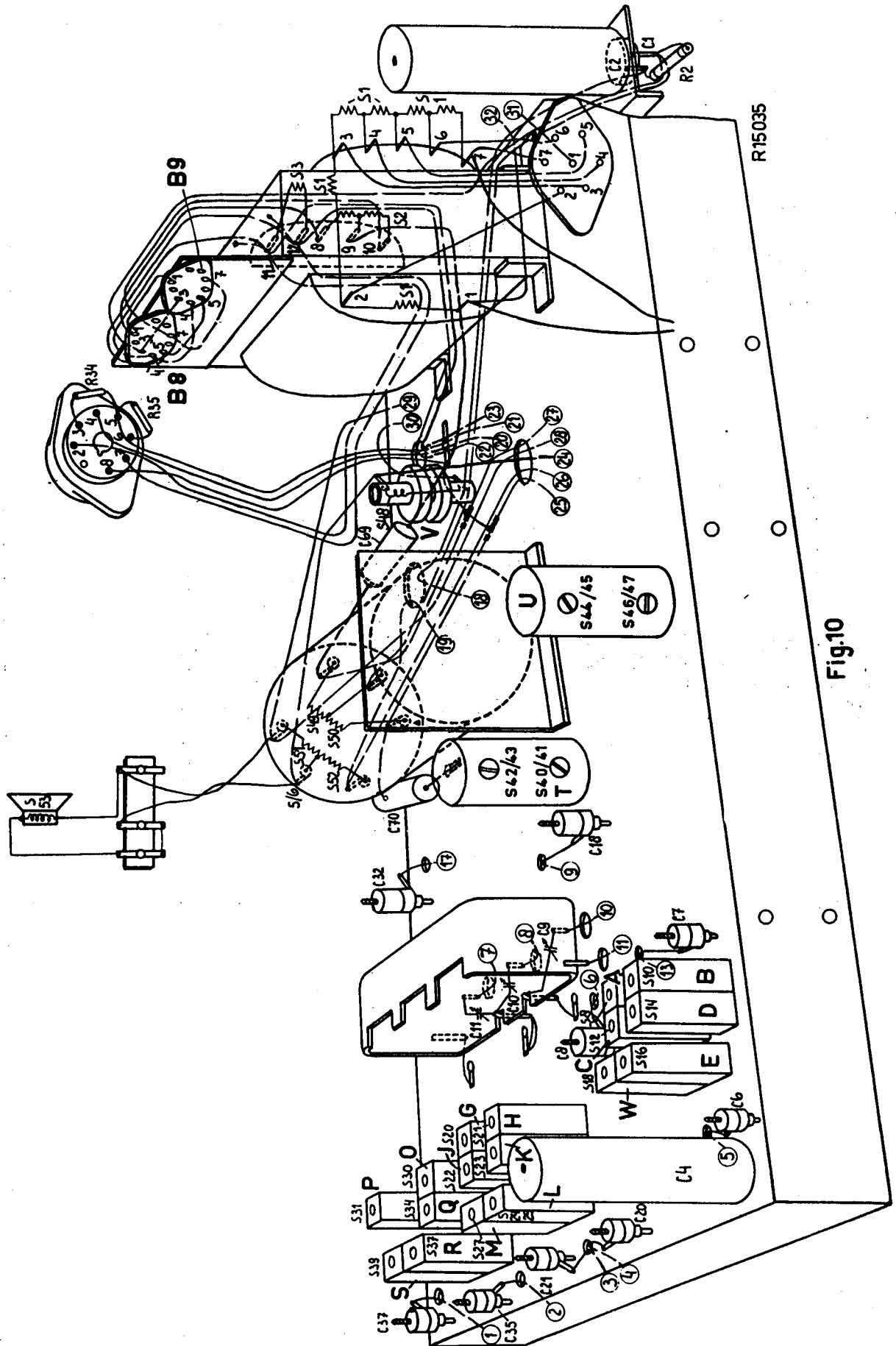
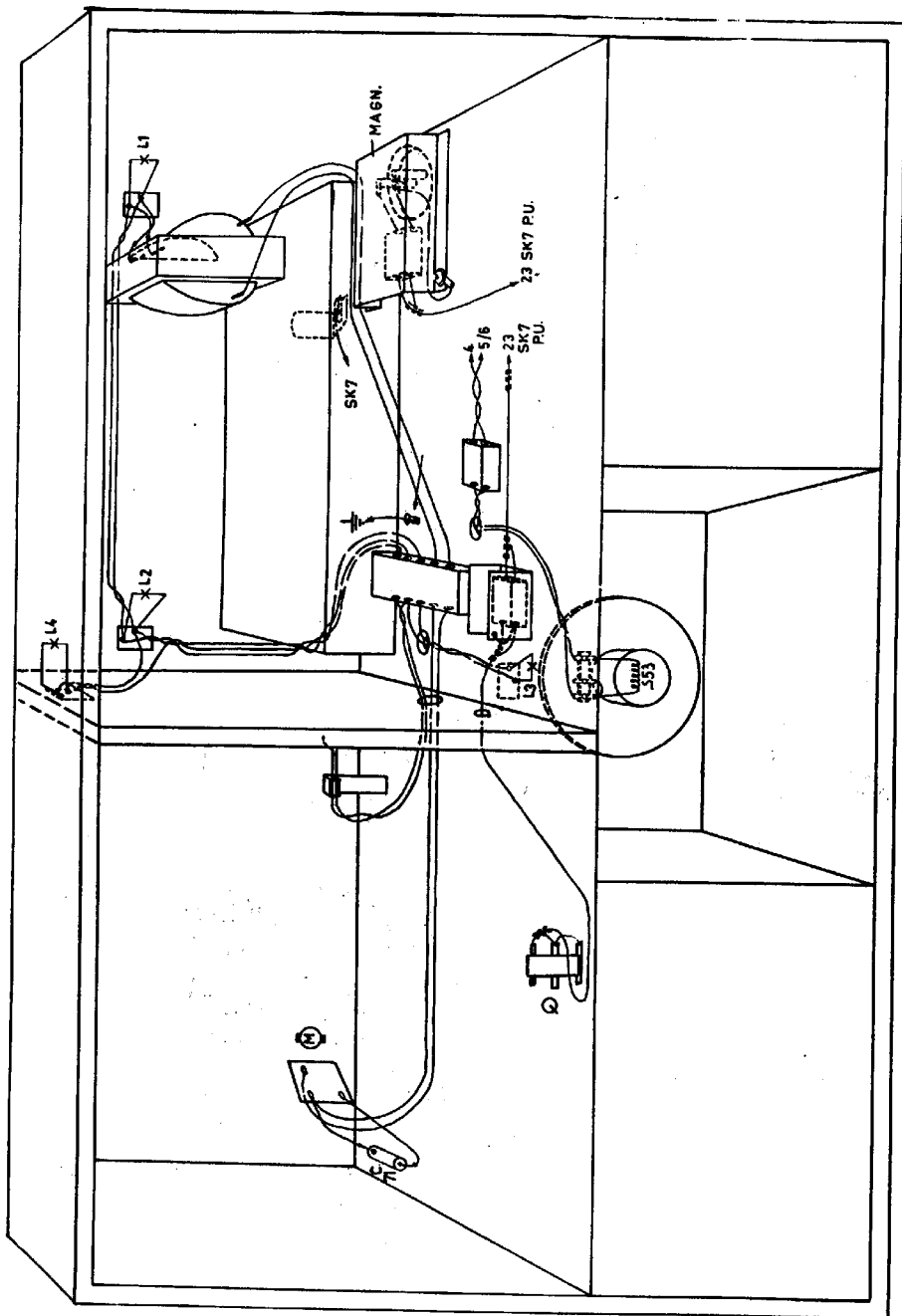


Fig.10



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Fig.11

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PHILIPS NEDERLAND N.V.  
Technische Dienst



S:																				U:	35, 28, T:																			
C:	52, 64, 55, 62, 63, 57, 65, 53	50, 61, 54, 58, 68	59, 60, 56, 67	66, 49, 3, 47, 44	48, 45, 25, 42, 22, 46	26, 24, 27	13, 29, 17, 23	28, 30, 14	12, 5, 31, 19, 13, 33, 15	4	73, 36, 34	16																												
R:	33, 28	52, 58	53, 38, 31, 32, 54, 55, 59, 57, 65	29, 30, 51, 68, 44, 56, 43, 69, 50, 49, 59, 66, 47, 60, 46, 45, 61, 70, 63, 62, 42, 72, 71, 40, 64, 48, 41, 62, 25, 118, 11, 26, 24, 1, 23, 32, 10, 18, 72, 22, 14, 15	13, 4	16	8	5	9, 6, 4	7																														

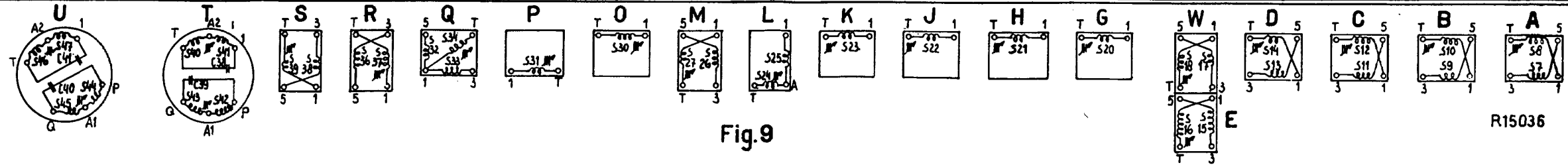
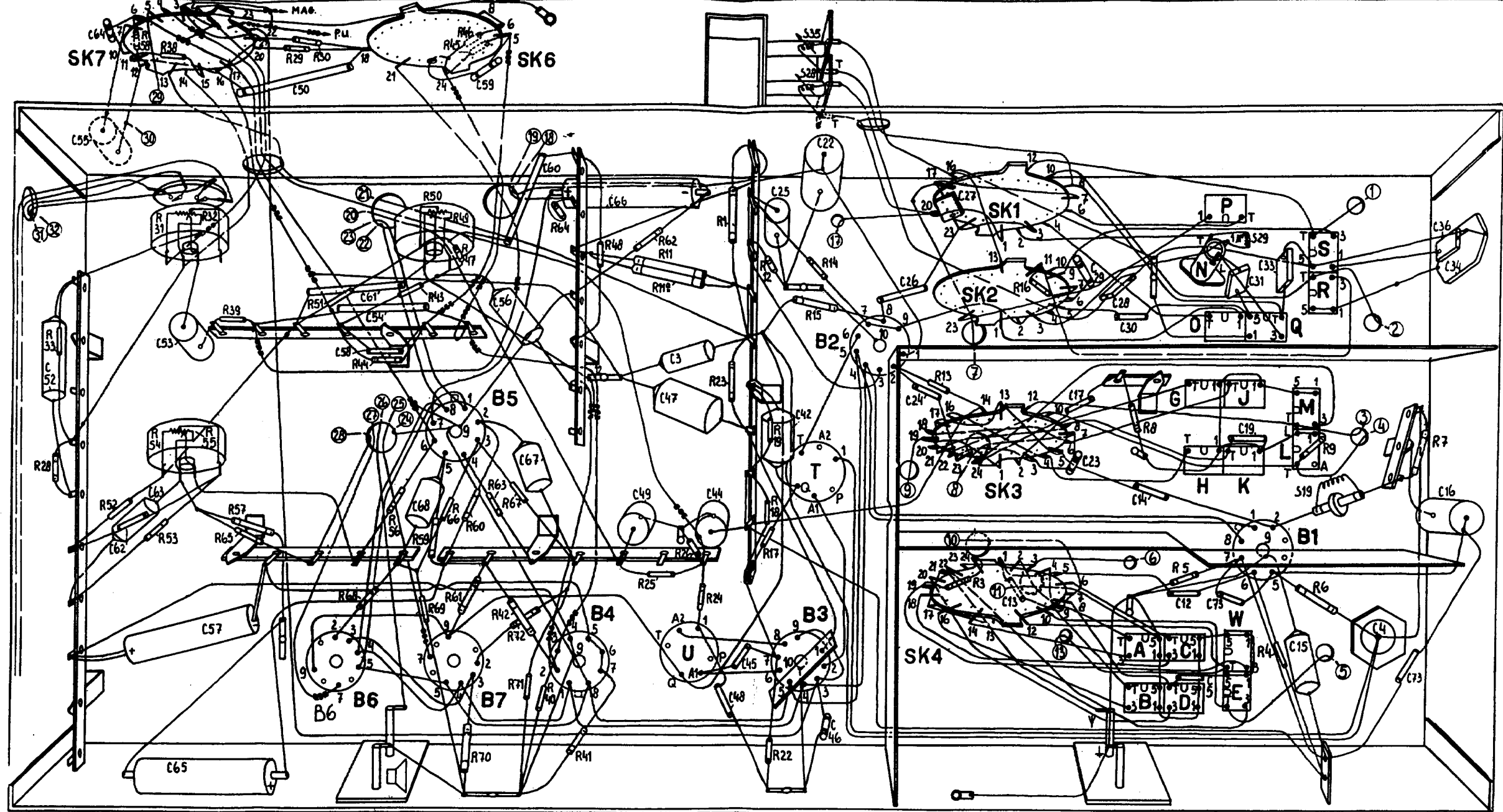


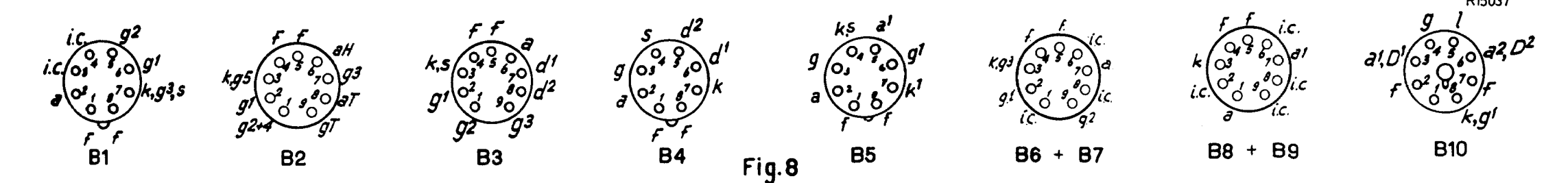
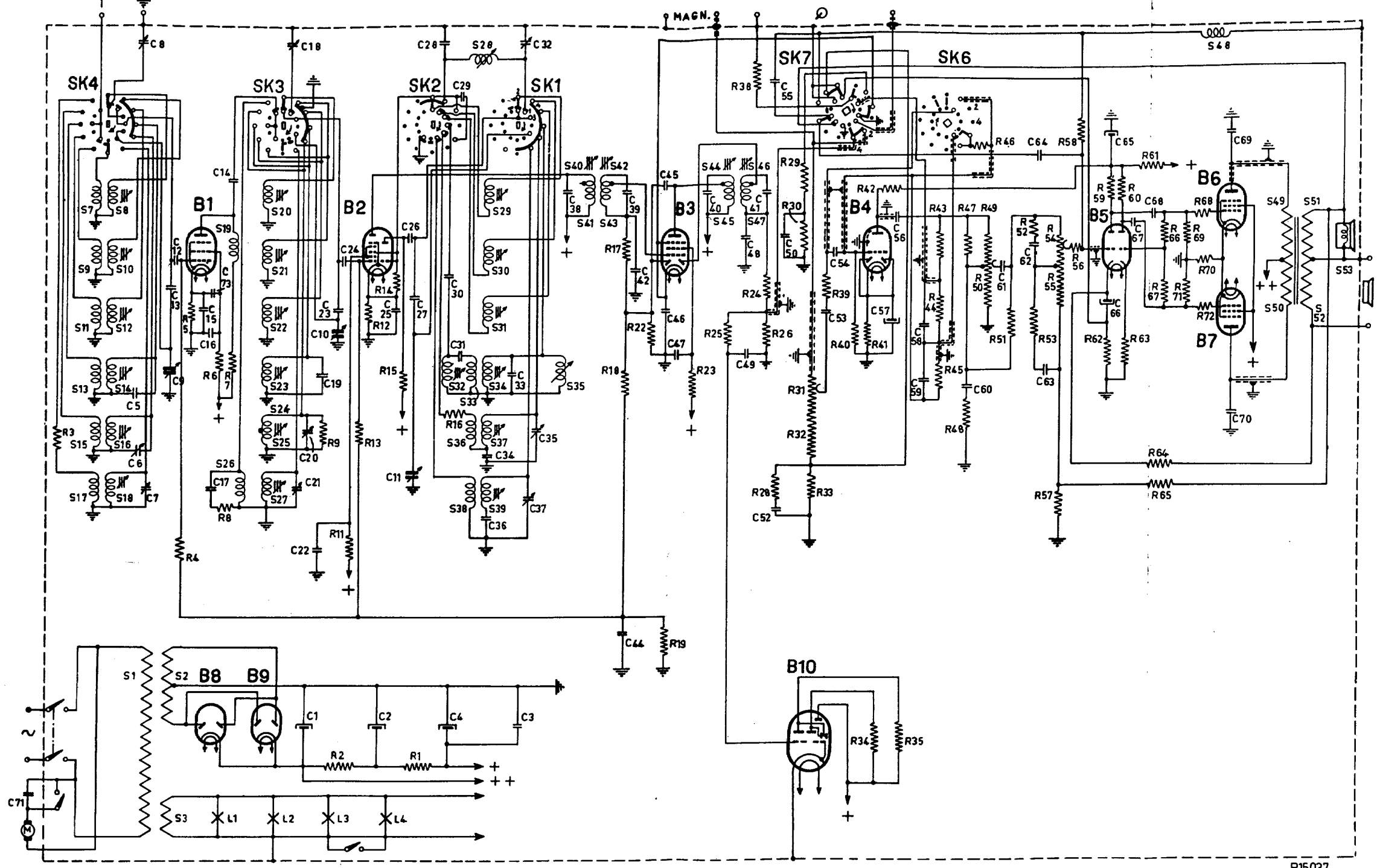
Fig.9

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V

S.	7 9 11 13 15 0 10 12 14 16 118	17	2 3 19 26 20 21 22 23 24 25 27	32 33 36 38 28 29 30 31 34 37 38 35 40 41 42 43	44 45 46 47	48	49 50 51 52 53
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