PHILIPS
SERVICE MANUAL

BATTERY RECEIVER

3 VALVES

Type 822 B

GENERAL REMARKS.

This receiver is a straight three-valve instrument for use with batteries. An eliminator can be used if desired.

Four control knobs are provided. The top centre is for tuning, the bottom centre comprises both the on/off switch and wave band switch. In the left-hand position the receiver is switched off; in the middle position the medium-wave band is obtained, and in the right-hand position it is adjusted for the long-wave band. The left-hand knob controls the volume, and the right-hand knob controls the sensitivity and selectivity.

Description of Circuits.

The control grid of the valve V1 (VP2) is connected to the centre aerial socket via the series condenser C1—which has R1 in parallel—to the H.F. transformer, the primary and secondary of which are coupled by the condenser C2. The secondary winding of the H.F. transformer is tuned by C12 and its associated trimmer. This tuned circuit is connected to V1 via the condenser C3. Control over the volume is effected by the potentiometer P1, which is connected at its ends to the grid bias voltage via the primary winding of the aerial H.F. transformer to the negative end and the positive side via R3. The slider of the potentiometer is taken to the control grid of the valve V1 via the resistance R2.

The anode of the first valve is coupled by the coil to the valve V2 (SP2), and this coil is tuned by the condenser C13 and its associated trimmer. This tuned circuit is connected to the control grid of V2 via the condenser C4 and grid leak R4. Selectivity and sensitivity is controlled by the circuit comprising the inductance and variable condenser C14 in the anode circuit of the detector V2. From the anode of the latter valve a resistance capacity circuit is connected forming the L.F. coupling to the output valve V3 (PM22A). The anode of this valve is connected to a permanent magnet moving coil loudspeaker via the output transformer T1.

A filter circuit is incorporated immediately after the anode of V2 comprising the air core coil CK1 together with the condensers C6, C8. The decoupling condensers C2, C5, C7 and C11 are connected in one box. Note that the switch not only short-circuits or places into circuit the long-wave sections of the coils, but also breaks the anode filament and grid bias batteries in the "off" position.

C 1 — E1

Trimming the tuned circuits.

The apparatus required for this adjustment is as follows :

1. A Service Oscillator similar to Philips Type 4028C.
2. An output indicator.
3. A small insulated screwdriver.

The method of balancing is as follows :
It will not be necessary to remove the chassis from the cabinet, as the trimmers are situated on top of the variable condensers.

1. Connect the Service Oscillator to aerial socket No. A2 via artificial aerial.
2. Connect output meter across loudspeaker.
3. Switch to medium-wave band.
4. Apply a signal of 250 metres.
5. Trim with the trimmers C12 and C13 until the output meter shows a maximum deflection.
6. Retrim with sensitivity control at best position. If signals are too strong reduce the strength of the oscillator.
7. Seal trimmers with sealing wax.
8. If the calibration is inaccurate readjust pointer for satisfactory calibration and re-check on 250 metres.
9. This trimming adjustment will hold good for the long-wave band.

How to trace Faults.

1. The following data is as completed as possible, but as there may be compound faults it cannot be complete.
2. Always carry out test measurements so as to find the fault.

The method of procedure should be as follows :

I. Check all anode and grid battery voltages together with the voltage across the filament sockets of the valve-holders with the switch placed at "ON."

II. Equip the receiver with a known good set of valves (or a set of valves from a receiver that functions satisfactorily) and, if necessary, try another loudspeaker.

III. **If V3 has abnormal current and voltages.**

A.
1. Switch open-circuited.
2. Primary T1 open-circuited.
3. C10, C11 short-circuited.
4. Screened anode lead V1, V2 earthing to screening.
5. Filament switch open-circuited or high resistance.
6. GB—4.5 V. open-circuited.
7. R7, R8 open-circuited.
8. C9 short-circuited.
9. Bad contact in valve holder.

B. **If V3 has normal voltages and currents.**

1. Primary T1 short-circuited.
2. C11, C10, C9 open-circuited.
3. R8 or R7 short-circuited.
4. Bad contact in valve holder.
5. Fault in loudspeaker or loudspeaker transformer.

C. **If V2 has abnormal voltages and currents.**

1. R6 open-circuited.
2. CK1 open-circuited.
3. Anode lead shorting to earthed screening.
4. C8 short-circuited.
5. R5 open-circuited.
6. C7 short-circuited.
7. Bad contact in valve holder.
8. R4 open-circuited.
9. C4 short-circuited.
10. C14 short-circuited.

D. **If V2 has normal voltages and currents.**

1. C6, C7, C8, C11 open-circuited.
2. Earthing of screen disconnected.
3. C14 open-circuited or condenser pigtail broken.
4. S7, S8 open-circuited.

E. **V1 has abnormal voltages and currents.**

1. S5, S6 open-circuited.
2. C4 short-circuited.
3. C13 or trimmer short-circuited.
4. Anode lead shorting to earthed screening.
5. Earthed screening shorting to H.T. end of trimmer or variable condenser.
6. R2, P1 short-circuited or open-circuited.
7. G.B.—9 open-circuited.
8. S1, S2 open-circuited.
9. C5, C2 short-circuited.
10. Bad contact in valve holder.
11. Defect in wave change switch.

F. **V1 has normal voltages and currents.**

1. C3 open-circuited.
2. S3, S4 open-circuited.
3. Fault in wave change switch.
4. C12 or trimmer short-circuited.
5. Aerial socket disconnected.
6. S1, S2 short-circuited.

REMOVING AND CHANGING OF PARTS.

Removing the chassis :
The method of removing the chassis should be done in the following way :

1. Release the back and remove the valves.
2. Remove the four knobs on the front of the cabinet by taking out the grub screws.
3. Remove the four screws and washers, etc., on the underside of the cabinet.
4. Disconnect the loudspeaker leads.

Important points to be noted when repairing.

1. Do not make any alteration to the wiring or screening plates.
2. Always replace earth connections to their original points.
3. Replace all spring washers, etc., in their original places.
4. All moving parts may be greased with a little vaseline.

Condenser Drive and Variable Condenser.

These parts should be removed together. After unsoldering the leads remove the securing screws when the complete assembly can be removed.
Refer to notes on trimming after the condenser assembly has been replaced.

LIST OF SPARE PARTS, ETC.

When ordering any of these items, please state :

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

Fig.	Item.	Description of Parts.	Code No.
		Variable condenser assembly	822.001
		Re-action condenser assembly	822.002
		Main spindle for re-action condenser	822.043
		Pigtail for re-action condenser	822.044
		Tags for re-action condenser	822.045
		Aerial coil assembly	822.009
		Inter-valve coil assembly	822.010
		Filter coil C.K.1	822.011
		Drive assembly	822.020
		Switch and screen assembly	822.021
		Spindle for switch	822.040
		Index assembly for switch	822.041
		Bank assembly for switch	822.042
		Valve holder, 7-pin	822.022
		Valve holder, 5-pin	822.023
		Aerial and earth socket panel	822.024
		Anode cap and mantle lead	822.025
		Anode cap and braided lead	822.026
		Station scale	822.027
		Four-way tag panel	822.028
		Pilot lampholder	822.029
		H.T. battery lead	822.030
		L.T. accumulator lead	832.031
		Screen lead	822.032
		Rubber insulating bush	822.033
		Wander plug, H.T. red (plus)	822.034
		Wander plug, H.T. black (minus)	822.035
		Wander plug, No. 1, grid minus, yellow	822.036
		Wander plug, No. 2, grid minus, blue	822.037
		Wander plug, aerial	822.038
		Wander plug, earth	822.039
		LOUDSPEAKER.	
		Loudspeaker, complete	822.046
		Bag for speaker	822.047
		Output transformer	822.048
		Wood screws for baffle	822.204
		Silk piece	822.049
		SMALL PARTS.	
		Cleat	822.101
		Distance-piece ($\frac{3}{32}$"), $\frac{3}{4}$" × $\frac{3}{4}$"	822.102
		Distance-piece ($\frac{3}{32}$"), $\frac{1}{2}$" × $\frac{3}{8}$"	822.103
		Grommet (large)	822.104
		Grommet (small)	822.105
		6 BA Tag, tinned	822.106
		Accumulator tags	822.107

LIST OF SPARE PARTS, ETC.—continued.

Fig.	Item.	Description of Parts.	Code No.
		SCREWS AND NUTS.	
		6 BA × $\frac{1}{4}$" rd. hd. screws, D.N.P.	822.200
		6 BA × $\frac{3}{8}$" rd. hd. screws, D.N.P.	822.201
		6 BA × $\frac{9}{16}$" rd. hd. screws, D.N.P.	822.202
		4 BA × $\frac{3}{8}$" rd. hd. screws, D.N.P.	822.203
		6 BA std. full nuts	822.210
		4 BA std. full nuts	822.211
		4 BA std. hex. lock nuts	822.212
		6 BA shakeproof washers (int. teeth)	822.213
		4 BA shakeproof washers (int. teeth)	822.214
		Washers, P.11238 (for wave change switch)	822.215
		Rivets, oval hd. semi tub., No. 12 × $\frac{3}{64}$"	822.218
		Rivets, oval hd. semi tub., No. 12 × $\frac{11}{64}$"	822.219
		Rivets, oval hd. semi tub., No. 12 × $\frac{1}{8}$"	822.220
		CABINET.	
		Silk piece	822.052
		Cabinet complete	822.050
		Back	822.051
		Valve indicator label	822.053
		Milled thumb screws	822.108
		Inserts for thumb screws	822.109
		Clips for back	822.110
		Glass for escutcheon	822.055
		Spring for securing glass	822.111
		No. 4 × $\frac{3}{4}$" rd. hd. steel wood screws	822.205
		Washer for same	822.206
		Knob for wave change switch	822.056
		Knob tuning	822.057
		Escutcheon	822.054
		No. 4 × $\frac{1}{2}$" rd. hd. steel wood screws, F.B.	822.207
		4 BA × $\frac{3}{16}$" steel grub screws	822.208
		Felt protectors	822.112
		Felt protector pads	822.113
		2 BA × $\frac{5}{8}$" rd. hd. steel screws, cadmium plated	822.209
		Washers for chassis	822.216
		Washers 2 BA	822.217

CURRENTS AND VOLTAGES.

H.T. Battery = 135 V. L.T. Battery 2.0 V.

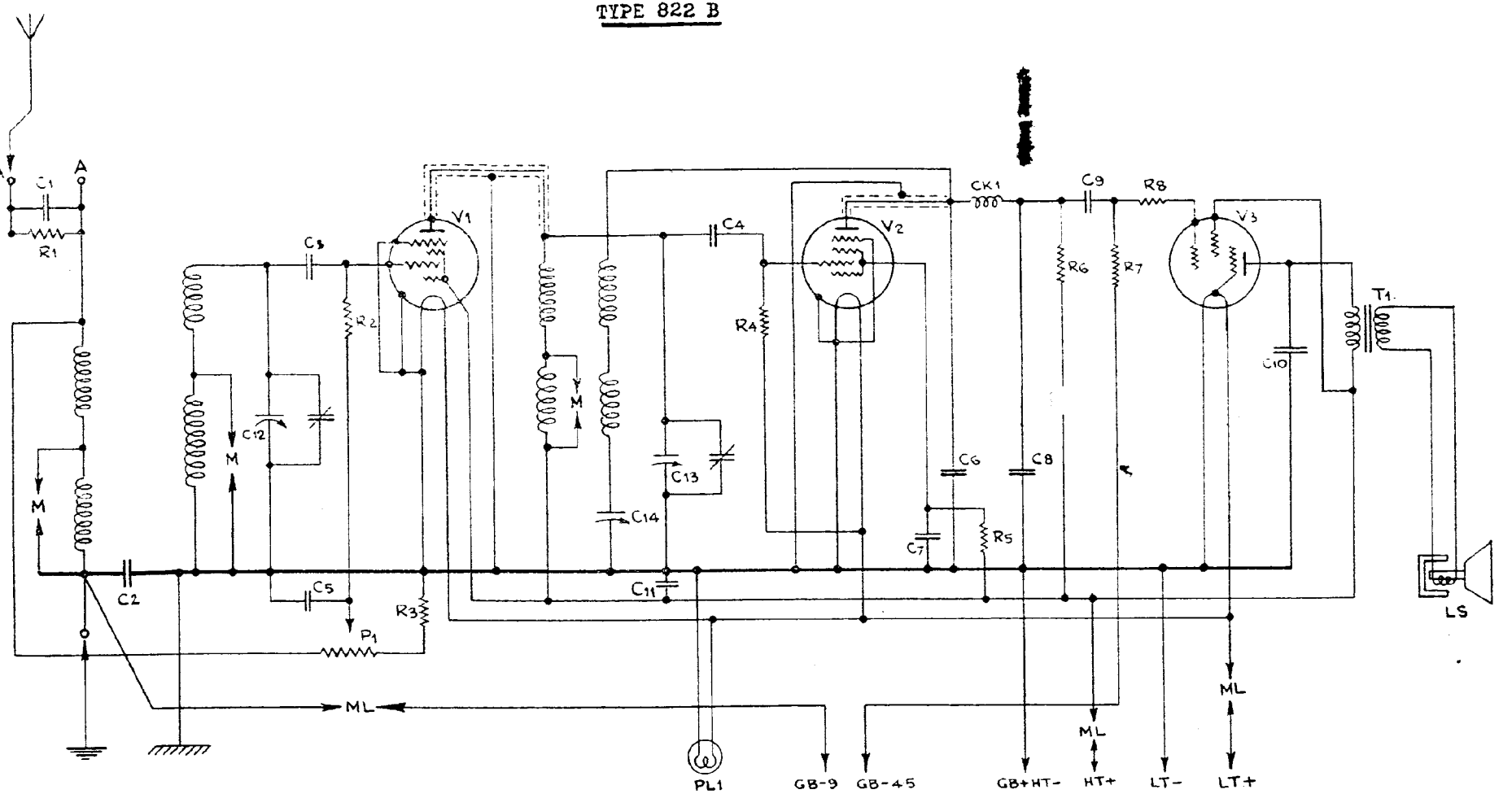
Approximate values.

	V1 (VP2)	V2 (SP2)	V3 (PM22A)	
Va	135	45	135	Volts
Vg′	135	50	135	Volts
—Vg	—9	—	—4.5	Volts
i.a.	1.6	0.8	7.5	mA
i.s.	0.5	0.4	2.5	mA

Measured with voltmeter having 1,000 Ohms per volt.

Grid voltage measured across battery.

TYPE 822 B


A
C1
R1
C3
V1
R2
C12
M
M
M
C2
C5
R3
P1
C4
V2
R4
C13
C14
C11
CK1
C9
R8
V3
R6
R7
C6
C8
C7
R5
C10
T1
LS
ML
ML
ML
PL1
GB-9
GB-45
GB+HT-
HT+
LT-
LT+

RESISTANCES.

Designation.	Resistances.	Code No.
R1	10000 Ohm	822.017
R2	2 M. Ohm	822.012
R3	500 Ohm	822.016
R4	2 M. Ohm	822.012
R5	0.25 M. Ohm	822.014
R6	0.1 M. Ohm	822.015
R7	2 M. Ohm	822.012
R8	0.2 M. Ohm	822.013
P1	10000 Ohm	822.017

CONDENSERS.

Designation.	Condensers.	Code No.
C1	10 $\mu\mu$F	822.007
C2	0.1 μF	*
C3	100 $\mu\mu$F	822.006
C4	10 $\mu\mu$F	822.007
C5	0.1 μF	*
C6	100 $\mu\mu$F	822.006
C7	0.1 μF	*
C8	1000 $\mu\mu$F	822.003
C9	2000 $\mu\mu$F	822.004
C10	5000 $\mu\mu$F	822.005
C11	2 μF	*
C12	444 $\mu\mu$F	822.001
C13	444 $\mu\mu$F	
C14	350 $\mu\mu$F	822.002
	* Condenser Box	822.008

COILS.

Designation.	Resistance in Ohms.	Component Part.
S1	0.2	Aerial Coil.
S2	42.0	
S3	3.5	
S4	11.5	
S5	3.5	Anode Coil.
S6	11.5	
S7	1.5	
S8	6.5	
S9	800	Speaker Transformer.
S10	.8	Speech Coil.
S11	2.1	H. F. anode choke.
CK1	100.0	

The above are average figures.

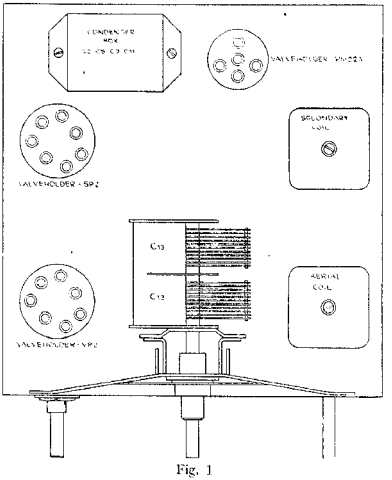

VALVEHOLDER - SP2
SOLENOID
C13
C12
AERIAL
COIL
VALVEHOLDER - VP2

Fig. 1

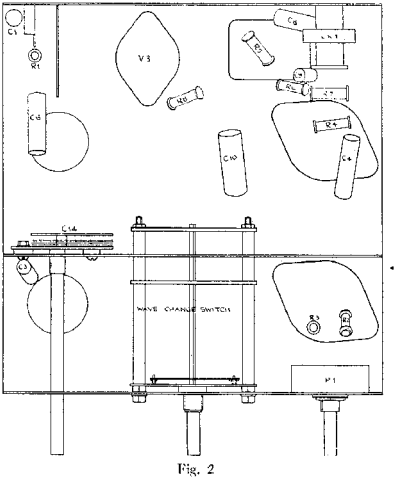

C1
V3
C8
C10
C4
C14
WAVE CHANGE SWITCH
S3
M1

Fig. 2