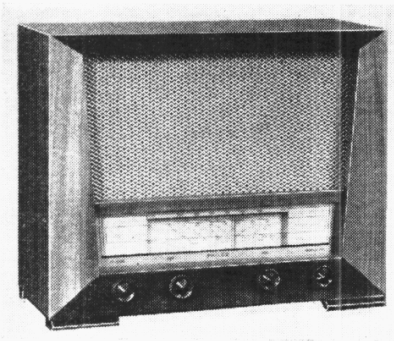
"TRADER" SERVICE SHEET
1063

PHILCO B2852

Covering also B2853 and B2854ARG



The appearance of the Philco B2852 table superhet. A photograph of the other table model of the series, the B2853, appears overleaf.

THE sample receiver from which the information was prepared was a Philco B2852, but three models using the same basic design are covered altogether. The B2852 is a 4-valve (plus rectifier) 3-band table superhet designed to operate from A.C. mains only of 200-250 V, 40-100 c/s, using a double-wound mains transformer. The waveband ranges are 16.67-51m, 187.5-590m and 855.2-140m.

The other two models are B2853 and B2854. B2853 employs an identical chassis in a different table cabinet using a smaller speaker. B2854 is a console autoradiogram fitted with a 3-speed record changer, employing a chassis that is basically like that in the B2852 but has a modified A.F. amplifier. The differences are explained under "Associated Models" overleaf and in the section diagram on the right of our main circuit diagram below.

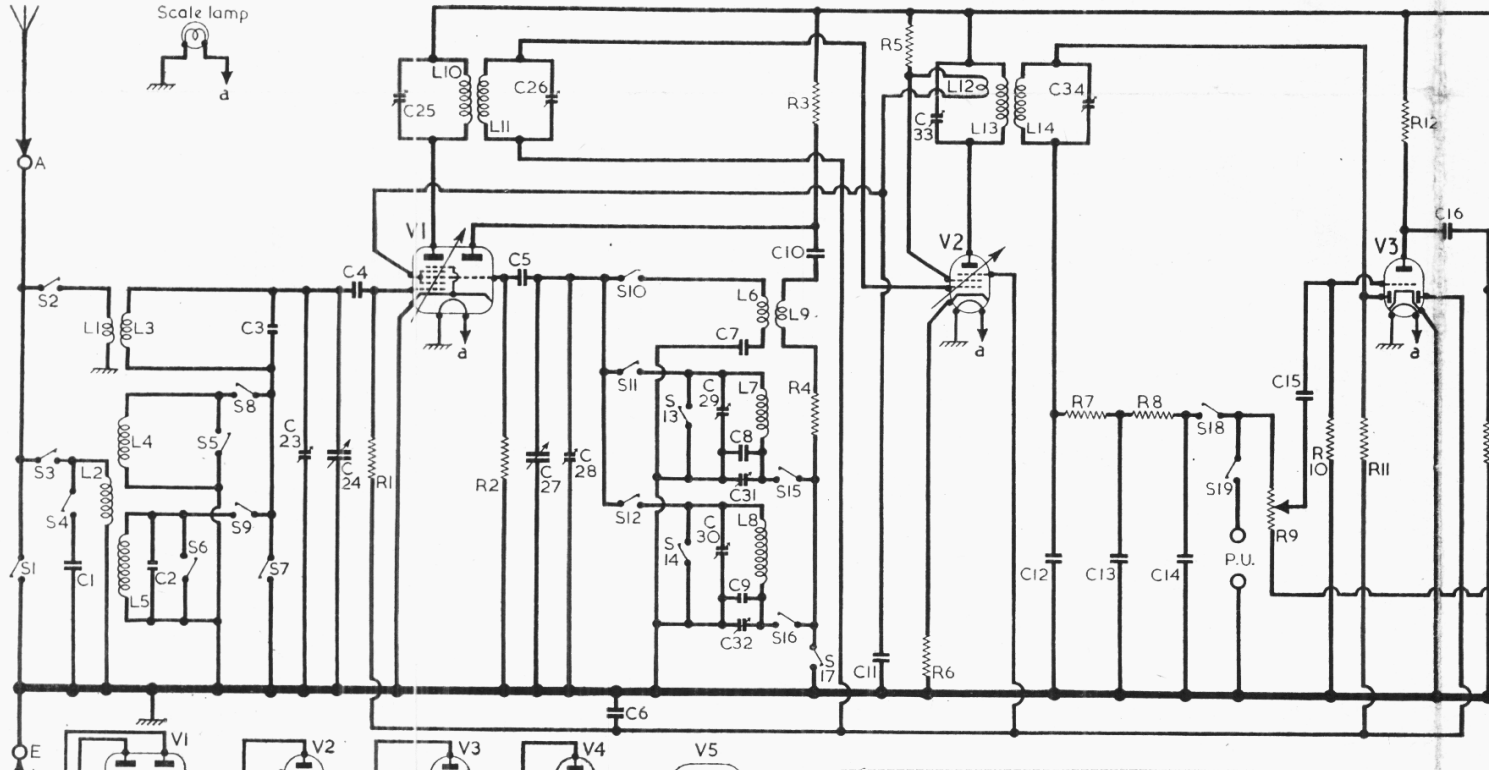
Release dates and original prices: B2852, November 1950, £19 0s 7d; B2853, September 1951, £18 7s 8d; B2854, December 1950, £62 10s 2d. Purchase Tax extra.

CIRCUIT DESCRIPTION

Aerial input via coupling coils **L1** (S.W.) or **L2** (M.W. and L.W.) to single tuned circuits **L3, C24** (S.W.), **L4, C24** (M.W.) and **L5, C24** (L.W.) which precede triode heptode valve **(V1, Brimar 7S7)** operating as frequency changer with internal coupling. **C1** shifts the resonance of the L.W. input circuit outside the band.

Oscillator grid coils **L6** (S.W.), **L7** (M.W.) and **L8** (L.W.) are tuned by **C27.** Parallel trimming by **C28** (S.W.) **C28, C29** (M.W.) and **C28, C30** (L.W.); series tracking by **C7** (S.W.), **C8, C31** (M.W.) and **C9 C32** (L.W.). Reaction coupling from anode via **L9** on S.W. and across the common impedance of the trackers on M.W. and L.W. Oscillator stabilization by **R4.**

Second valve **(V2, Brimar 7B7)** is a variable-mu R.F. pentode, operating as



Circuit diagram of the Philco B2852 A.C. mains superhet, which covers also the B2853 model. **L12** is a negative feed-back coupling winding, which ensures stability in the intermediate frequency amplifying circuit. There is also a two-channel negative feed-back circuit in the A.F. amplifier.

intermediate frequency amplifier with tuned transformer couplings **C25, L10, L11, C26** and **C33, L13, L14, C34.** Negative feed-back via **L12** between **V2** anode and screen circuits neutralizes the positive feed-back caused by the valve's internal capacitance.

Intermediate frequency 465 kc/s.

Diode signal detector is part of double diode triode valve **(V3, Brimar 7C6).** Audio frequency component in rectified output is developed across volume control **R9,** which operates as diode load, and is passed via **C15** to grid of triode section. I.F. filtering by **C12, R7, C13, R8** and **C14.**

D.C. potential developed across I.F. stoppers and diode load is tapped off from the signal diode anode and fed back as bias via **R11** to **V1** and **V2,** giving automatic gain control. The second diode of **V3** is connected to the A.G.C. line and prevents it from going positive. Provision is made for the connection of a gramophone pick-up across **R9** via **S19** which closes in the gram position of the waveband switch. **S1** closes and **S18** opens in this position to prevent radio break-through. In the gram model tone correction is provided by **R20, C35, R21, C36.**

Resistance-capacitance coupling by **R12, C16** and **R13** between **V3** triode and beam tetrode output valve **(V4, Brimar**

(Continued Col. 1 overleaf)

COMPONENTS AND VALUES

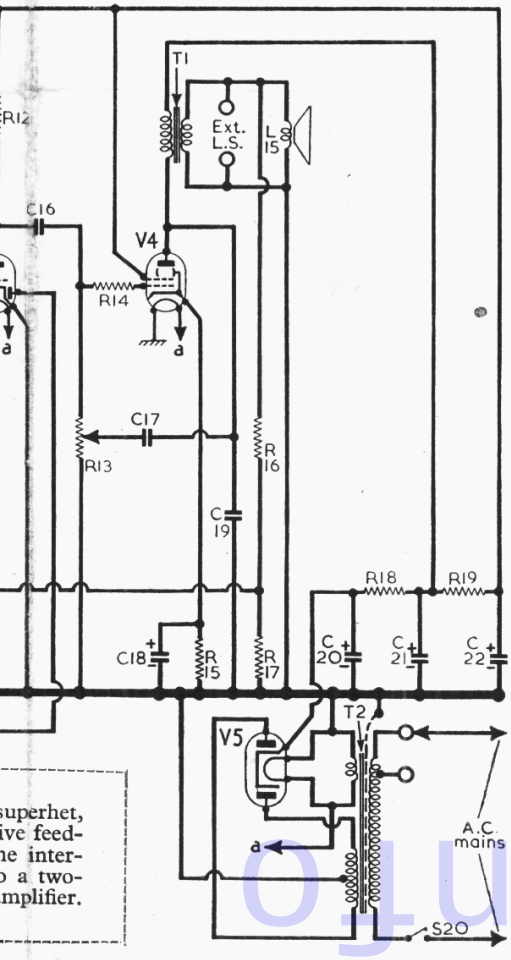
	RESISTORS	Values	Locations
R1	V1 C.G.	1MΩ	G4
R2	V1 osc. C.G. ...	68kΩ	G4
R3	Osc. anode feed ...	33kΩ	G4
R4	Osc. stabilizer ...	180Ω	H4
R5	S.G. H.T. feed ...	47kΩ	F4
R6	V2 G.B.	180Ω	G4
R7	I.F. stoppers ...	47kΩ	C2
R8		68kΩ	F4
R9	Volume control ...	500kΩ	F3
R10	V3 C.G.	10MΩ	F3
R11	A.G.C. decoupling	2·2MΩ	F4
R12	V3 anode load ...	470kΩ	F3
R13	Tone control ...	500kΩ	E3
R14	V4 C.G. stopper ...	10kΩ	E3
R15	V4 G.B.	270Ω	E4
R16	Negative feed-back	220Ω	F4
R17		33Ω	F3
R18	H.T. smoothing ...	470Ω	G3
R19		1·5kΩ	G3
R20§	P.U. tone correctors	2·2MΩ	—
R21§		2·2MΩ	—
R22§	V4 C.G.	470kΩ	—
R23§	Negative feed-back	1·5kΩ	—
R24§		220Ω	—

§ Gram models only.

If the component numbers given in the accompanying tables are used when ordering replacement parts, dealers are advised to mention the fact on the order, as these numbers may differ from those used in the manufacturers' diagram.

	CAPACITORS	Values	Locations
C1	Aerial shunt ...	0·001μF	H4
C2	L.W. aerial trim ...	20pF	H3
C3	S.W. aerial trim	20pF	H3
C4	V1 C.G.	100pF	G4
C5	V1 osc. C.G. ...	100pF	G4
C6	A.G.C. decoupling	0·05μF	F4
C7	S.W. osc. tracker...	3,790pF	H4
C8	M.W. osc. tracker	430pF	H4
C9	L.W. osc. tracker	80pF	H4
C10	Osc. anode coup.	220pF	G4
C11	S.G. decoupling ...	0·05μF	G4
C12	I.F. by passes	100pF	C2
C13		100pF	C2
C14		220pF	E3
C15	A.F. coupling ...	0·005μF	F3
C16		0·01μF	F3
C17	Part tone control	220pF	E3
C18*	V4 cath. by pass	10μF	B1
C19	Tone corrector ...	0·01μF	E3
C20*	H.T. smoothing ...	40μF	B1
C21*		20μF	B1
C22*		10μF	B1
C23†	S.W. aerial trim.	—	A2
C24†	Aerial tuning ...	—	A2
C25‡	1st I.F. trans. tuning	—	B2
C26‡		—	B2
C27†	Oscillator tuning	—	A1
C28‡	S.W. osc. trim. ...	—	A1
C29‡	M.W. osc. trim. ...	—	H4
C30‡	L.W. osc. trim. ...	—	H4
C31‡	M.W. osc. tracker	—	H4
C32‡	L.W. osc. tracker	—	H4
C33‡	2nd I.F. trans. tuning	—	C2
C34‡		—	C2
C35§	P.U. tone correctors ...	0·001μF	—
C36§		0·001μF	—
C37§	Part tone control	0·01μF	—
C38§	Neg. feed back ...	0·25μF	—

* Electrolytic. † Variable. ‡ Pre-set.
§ Gram models only.



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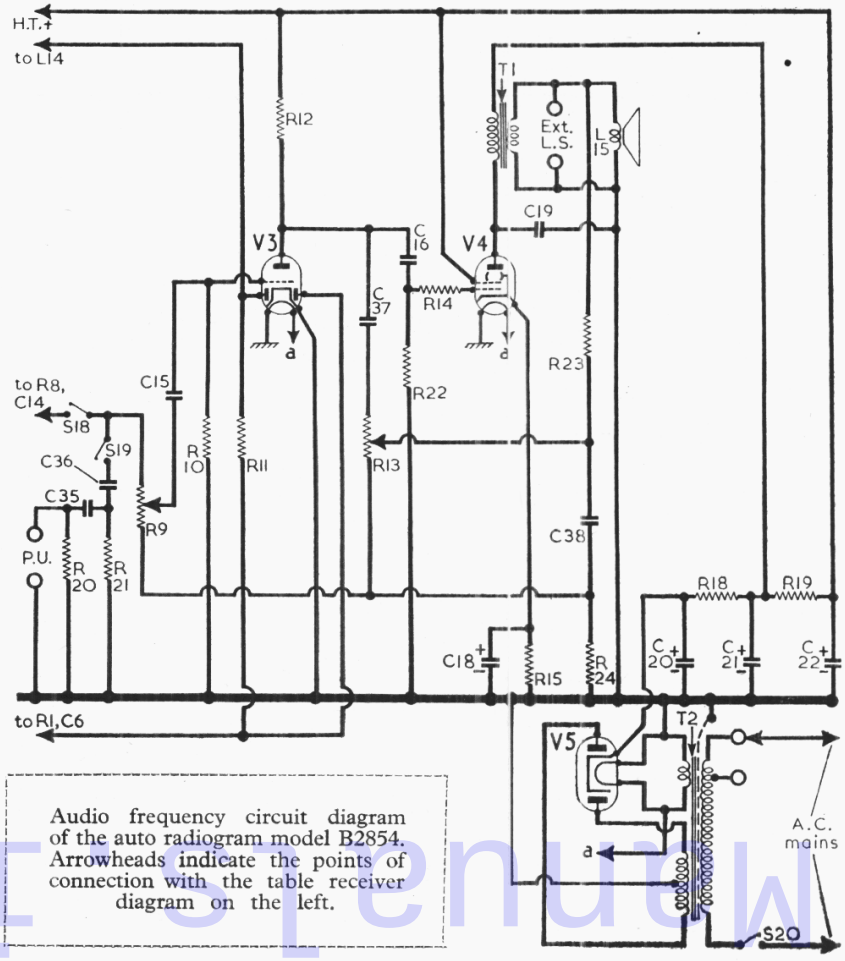


Audio frequency circuit diagram of the auto radiogram model B2854. Arrowheads indicate the points of connection with the table receiver diagram on the left.

OTHER COMPONENTS			Approx. Values (ohms)	Locations
L1	Aerial coupling coils		2·3	G3
L2			29·0	B2
L3			—	G3
L4	Aerial tuning coils		3·2	B2
L5			38·0	B2
L6	Oscillator tuning coils		—	H4
L7			3·6	H4
L8			16·0	H4
L9	Osc. reaction coil		1·0	H4
L10	1st I.F. trans.	Pri.	34·0	B2
L11		Sec.	34·0	B2
L12	2nd I.F. trans.	Neut.	—	C2
L13		Pri.	25·0	C2
L14		Sec.	25·0	C2
L15	Speech coil		2·5	—
T1	O.P. trans.	Pri.	600·0	C1
		Sec.	—	
T2	Mains trans.	Pri., total	33·0	
		H.T. sec., total	410·0	D2
		Htr. sec.	—	
S1-S19	Waveband switches		—	H3
S20	Mains sw., g'd R13		—	E3

Circuit Description—*continued*

6V6GT). Variable tone control by negative feed-back between **V4** anode and grid circuits via **C17** and **R13.** Fixed tone correction by **C19** in **V4** anode circuit, and by the feed back of a proportion of the speech coil voltage, that developed across **R17,** to **V3** grid circuit. In the gram model the speech coil feed-back network is modified and the variable tone control is fed from it. Provision is made for the connection of a low impedance external speaker across **T1** secondary.

H.T. current is supplied by I.H.C. full-wave rectifying valve **(V5, Brimar 6X5GT).** Smoothing by **R18, R19** and electrolytic capacitors **C20, C21** and **C22.** The heaters of all the valves, including **V5,** are supplied from a common winding on **T2.**

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating from 230 V A.C. mains. The receiver was tuned to the high wavelength end of M.W., with the volume control set to maximum, but there was no signal input.

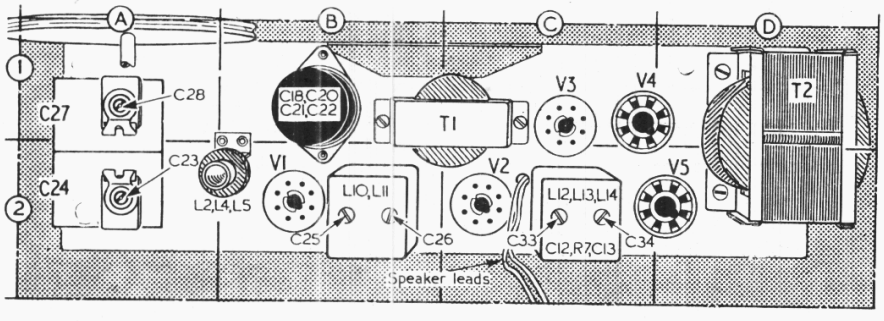
Valve	Anode V	Anode mA	Screen V	Screen mA	Cath. V
V1 7S7	270 Oscillator 140	1.6 2.8	60	3.5	—
V2 7B7	270	4.0	60	1.1	1·0
V3 7C6	100	0.3	—	—	—
V4 6V6GT	275	40·0	270	3.0	12·5
V5 6X5GT	250†	—	—	—	310·0

† A.C. reading, each anode.

Voltage readings were measured with an Avo Electronic TestMeter, and as this instrument has a very high internal resistance, allowance should be made for the extra current drawn by other types of meter. Chassis was the negative connection.

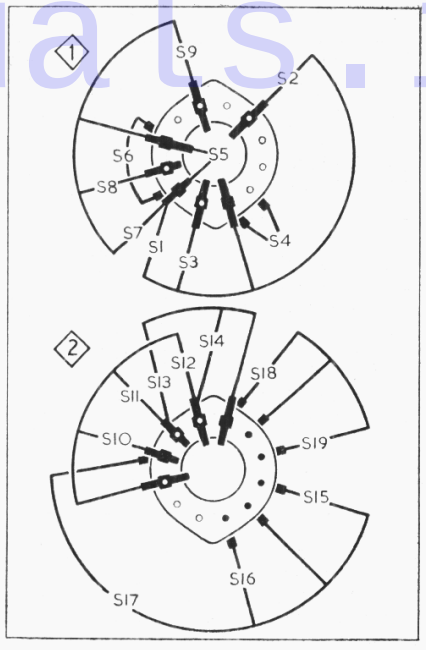
DISMANTLING

Removing Chassis.—Remove four control knobs (pull off);
unsolder aerial and earth leads from sockets on rear of cabinet;
unsolder leads from speech coil tags on speaker;
remove the self-tapping screws from rear edges of chassis and withdraw chassis.
When replacing, connect the blue speaker lead to the speech coil tag which is earthed to the speaker frame.



Plan view of the chassis, which is applicable to all three models covered.

WAVEBAND SWITCH DIAGRAMS AND TABLE



Switch	L.W.	MW.	S.W.	Gram.
S1	—	—	—	C
S2	—	—	C	—
S3	C	C	—	—
S4	C	—	—	—
S5	—	—	C	—
S6	—	C	C	—
S7	—	—	C	—
S8	—	C	—	—
S9	C	—	—	—
S10	—	—	C	—
S11	—	C	—	—
S12	C	—	—	—
S13	—	—	C	—
S14	—	C	C	—
S15	—	C	—	—
S16	C	—	—	—
S17	—	—	C	—
S18	C	C	C	—
S19	—	—	—	C

Diagrams of the waveband switches (left) drawn as seen when viewed from the rear of an inverted chassis. On its right, above this caption, is the associated switch table.

Connect the brown earth lead to the **E** socket and the blue aerial lead to the **A** socket on the panel at the rear of the cabinet.

GENERAL NOTES

Switches.—**S1-S17** are the waveband switches and **S18, S19** are the radio/gram change-over switches, ganged in two rotary units beneath the chassis. These units are indicated in our underside drawing of the chassis, where they are identified by the numbers **1** and **2** in diamond surrounds.

The arrows there indicate the direction in which the units are viewed in the diagrams in col. 2 where they are shown in detail. The table beside them gives the switch positions for the four control settings, starting from the fully anti-clockwise position of the control. A dash indicates open, and **C** closed.

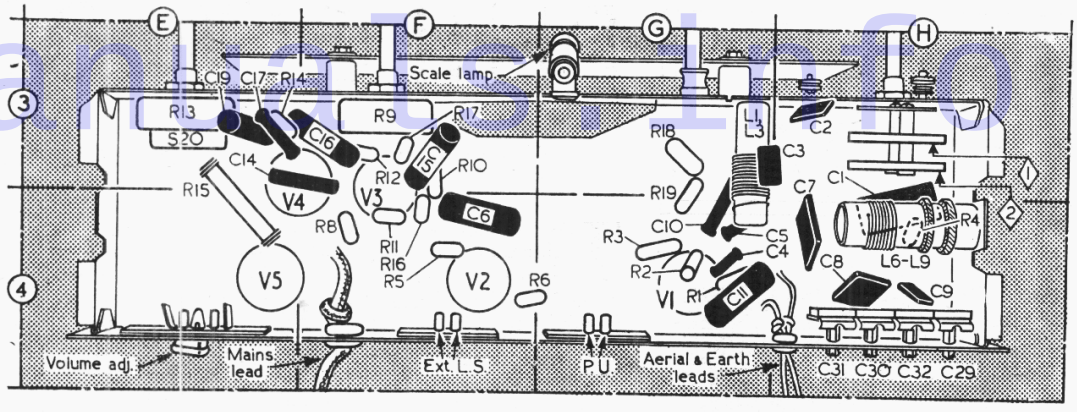
S20 is the Q.M.B. mains switch, ganged with the tone control **R13.**

Scale Lamp.—This has a clear round spherical bulb and an M.E.S. base, and it is rated at 6.5 V, 0.3 A.

External Speaker.—Two sockets are provided at the rear of the chassis for the connection of a low impedance (about 3 Ω) external speaker. A special non-reversible 2-pin plug is supplied with the receiver for this purpose, with one pin thicker than the other. The plug is of the same type as is used for connection to the all-dry L.T. battery units.

Gramophone Pick-up Connections.—On the table models the pick-up connections are effected by means of the same kind of plug and socket as is used for the external speaker.

Resistor R18.—In our chassis this was a wire-wound unit encased in cement, but in some chassis it may consist of two 820 Ω resistors connected in parallel. The total rating should be 1.5 W or more.



Underside view of the chassis. The waveband switch units are identified by the numbers **1** and **2** in diamond surrounds, with arrows to indicate the directions in which they are viewed into the diagrams in Col. 2, where they are seen in detail.

Associated Models

Model B2853.—The only electrical difference between this model and the B2852 is the provision on the mains transformer primary of an additional tapping for mains of 100-130 V. The cabinet is of a different design, however, and the speaker is a 6in type instead of 8in as in the B2852.

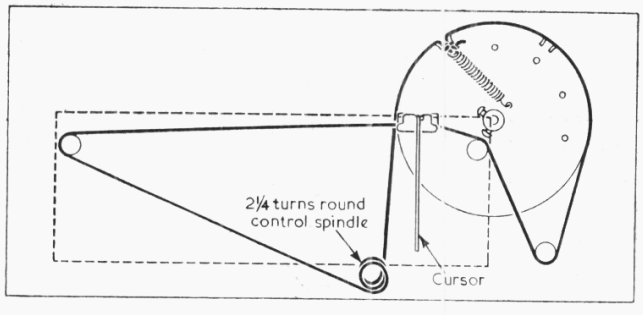
Model B2854 ARG.—This is a console model fitted with a 3-speed record changer and a felt-lined compartment for record storage. The chassis is of the same basic design as that in the B2852, but various differences occur in the audio-frequency sections, from the pick-up input connections onwards.

These differences are shown in the diagram section on the right of the main circuit diagram overleaf, where the complete circuit of the A.F. amplifier is shown as it is in the auto-radiogram.

DRIVE CORD REPLACEMENT

About four feet of nylon braided glass yarn is required for a new drive cord, which should be run as shown in the accompanying sketch, where the tuning drive system is drawn as seen when viewed from the front of the chassis, "through" the scale backing plate, with the gang at minimum capacitance. Four feet of cord leaves an ample margin for tying off.

In this position the cord can easily be wound 2¼ times round the control spindle while pulling against the gang stop. When passing the cord over the lower right-hand pulley position, two pulleys will be found, and the cord should run under the rear one to bring it in line with the groove in the drum. The cursor can be slipped on afterwards and it should then be adjusted as explained under "Circuit Alignment."



Sketch showing the tuning drive system, drawn as seen from the front of the chassis when the gang is at minimum capacitance. The position of the scale backing plate is indicated by a dotted outline.

CIRCUIT ALIGNMENT

All the trimmer adjustments are accessible with the chassis in its cabinet.

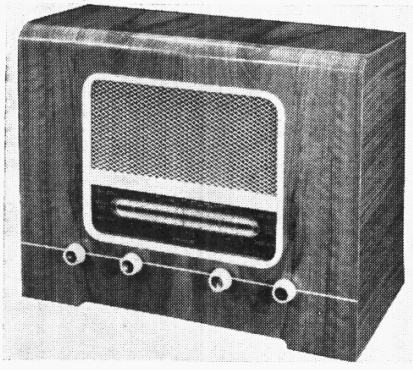
I.F. Stages.—Switch receiver to M.W., tune it to low wavelength end of band and connect signal generator output across **C24.** Feed in a 465 kc/s (645.16 m) signal and adjust **C34, C33, C26** and **C25** (location references C2, B2) for maximum output. Repeat these adjustments.

R.F. and Oscillator Stages.—As the tuning scale is fixed to the cabinet, the following alignment should be carried out with the chassis in its cabinet. Check that with the gang at maximum capacitance the cursor coincides with zero on the lower 0-100 calibration scale.

S.W.—Switch receiver to S.W., tune to 17 Mc/s, and transfer "live" signal generator lead, via a 400 Ω carbon resistor, to **A** socket. Feed in a 17 Mc/s (17.65 m) signal and adjust **C28** (A1) for maximum output. If two peaks are found, use that involving the lesser trimmer capacitance. Adjust **C23** (A2) for maximum output while rocking the gang for optimum results.

M.W.—Switch receiver to M.W., tune to 545.4 m and replace the 400 Ω carbon resistor with a 200 pF capacitor. Feed in a 545.4 m (550 kc/s) signal and adjust **C31** (H4) for maximum output while rocking gang for optimum results. Tune receiver to 200 m, feed in a 200 m (1,500 kc/s) signal and adjust **C29** (H4) for maximum output while rocking the gang for optimum results. Repeat these adjustments.

L.W.—Switch receiver to L.W. and with the same input conditions as for M.W. tune to 2,000 m. Feed in a 2,000 m (150 kc/s) signal and adjust **C32** (H4) for maximum output while rocking the gang for optimum results. Tune receiver to 882.2 m, feed in a 882.2 m (340 kc/s) signal and adjust **C30** (H4) for maximum output while rocking gang for optimum results.



The appearance of the Philco B2853 table superhet. It can be distinguished from the B2852 overleaf by the plastic escutcheon round the speaker aperture and scale.

Printed in England by Cornwall Press Ltd., Paris Garden, London, S.E.1.