BRUNSWICK "EVERY HOME" RADIOGRAM

CIRCUIT.—Aerial coupling is via a small fixed condenser, C20, to the tuning coils L4 and L5, for medium and long wave bands, which are automatically controlled in the press-button unit. A trap between the aerial and earth consists of L3 and trimmer T1.

The input circuits work into a triode hexode frequency changer, V1, the anode circuits of which contain the first I.F. transformer. This feeds a variable mu. pentode I.F. amplifier, V2, which is coupled to the demodulator, V3, through a special I.F. transformer with a tightly coupled, untuned secondary.

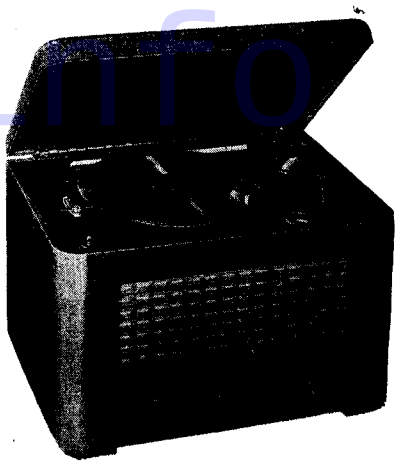
The demodulator is a double diode triode with conventional circuits, although a small negative bias is applied to the de modulation diode. The volume control is in the grid circuit of the triode section and the A.V.C. diode obtains a delay from the bias of the triode.

The triode section is resistance coupled in the normal manner to a beam power output valve, V4, with variable tone control consisting of a variable resistance and fixed condenser across the anode circuit.

Mains equipment consists of a full-wave rectifier, V5, electrolytic condensers and a smoothing choke (the field coil). A mains suppressor condenser is included.

Chassis Removal.—The bottom of the cabinet has an inspection cover for adjusting the trimmers on the press-button unit.

(Continued in col. 3, opposite page.)



The Brunswick 39E.H. "Every Home" model is an A.C. table radiogram with press-button tuning only. A choice of six medium and long wave stations is provided.

RESISTANCES

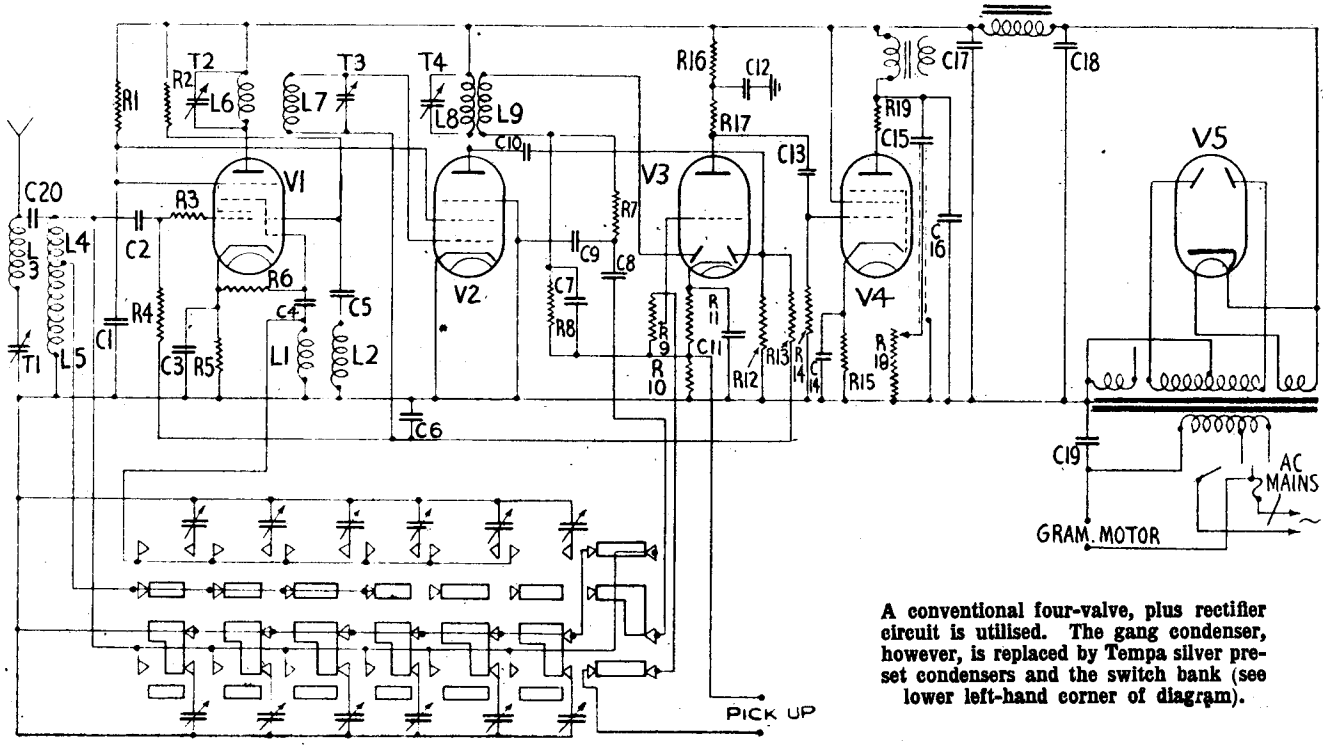
R.	Purpose.	Ohms.
1	V1 and V2 screen	35,000
2	V1 osc. anode feed	50,000
3	V1 series grid	40
4	V1 grid return	.5 meg.
5	V1 cathode	300
6	V1 osc. grid leak	47,000
7	H.F. filter	20,000
8	H.F. filter	300,000
9	Volume control	.5 meg.
10	V3 bias potr. (part)	5,000
11	V3 bias potr. (part)	3,000
12	A.V.C. diode load	.5 meg.
13	A.V.C. decoupling	.5 meg.
14	V4 grid leak	.5 meg.
15	V4 cathode bias	250
16	V3 anode decoupling	25,000
17	V3 anode load	100,000
18	Tone control	50,000
19	V4 anode stabiliser	100

CONDENSERS

C.	Purpose.	Mfds.
1	V1 and V2 screen decoupling	.1
2	V1 grid isolating	.0001
3	V1 cathode decoupling	.1
4	V1 osc. grid	.0001
5	V1 osc. anode	.002
6	A.V.C. decoupling	.1
7	H.F. bypass	.0001
8	V3 grid coupling	.02
9	H.F. filter	.0001
10	A.V.C. coupling	.0001
11	V3 cathode bias	.25
12	V3 anode decoupling	4
13	V4 grid coupling	.01
14	V4 cathode bias	50
15	Tone control	.05
16	V4 anode shunt	.0006
17	H.T. smoothing	8
18	H.T. smoothing	8
19	Mains filter	.0006
20	Aerial coupling	.000012

WINDINGS (D.C. RESISTANCES)

L.	Ohms	Range	Where measured.
1	4.2	—	X and Y.
2	6	—	X and Y.
3	72	—	D and A.
4	3.3	M.W	B and C.
5	16.7	L.W.	B and chassis.
6	63	—	Anode V1 and H.T. +.
7	64	—	Grid V2 and C6.
8	60	—	Anode V2 and H.T. +.
9	60	—	V3 diode R7.
O.T. prim.	279	—	Across speaker transformer.



A conventional four-valve, plus rectifier circuit is utilised. The gang condenser, however, is replaced by Tempa silver preset condensers and the switch bank (see lower left-hand corner of diagram).

How to Adjust the Push-Buttons

PRESS-BUTTON control of two long-wave, four medium-wave stations, gramophone and mains is provided in the model 39EH. For station tuning the pre-set condenser system is employed.

The normal gang condenser is replaced —there is no manual tuning—by pre-set trimmer condensers, which are switched across the aerial and oscillator coils. When a button is pressed, the same switch also selects the required medium- or long-wave input coil. Special coil design obviates the need to switch the oscillator section.

Tempa silver trimmer condensers of extreme stability are employed to prevent oscillator and I.F. drift. To allow for any slight shift a special second I.F. transformer is employed.

To readjust the tuning of a station, or to select a new station, the bottom of the cabinet must first be removed. This discloses two rows of trimmers. The orange-coloured ones tune the oscillator circuit and the others the aerial circuit.

To accurately tune a station that is already audible, first adjust the oscillator trimmer and then the aerial trimmer for maximum.

To select a new station, connect an oscillator to the aerial and earth and an output meter to the extension sockets. Inject the frequency of the required station and adjust the trimmers.

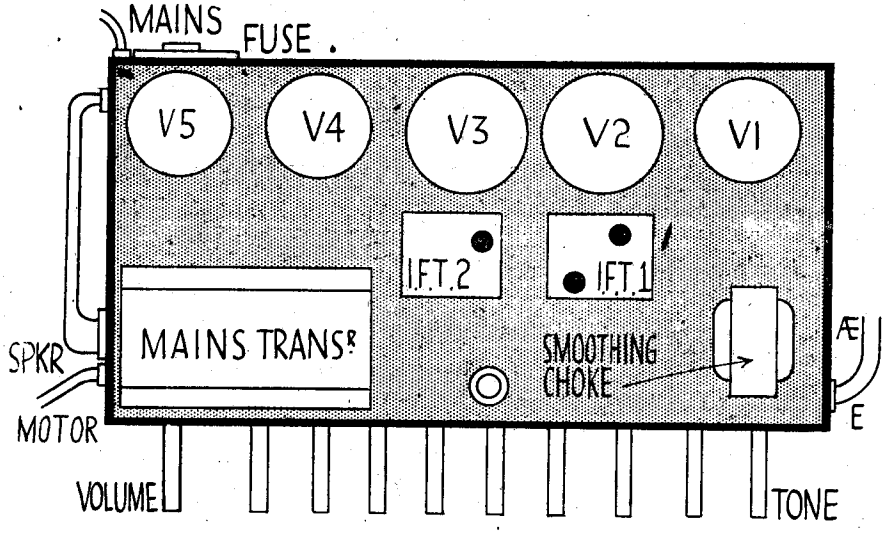
Final adjustments of the trimmers should be made on actual reception of the station required.

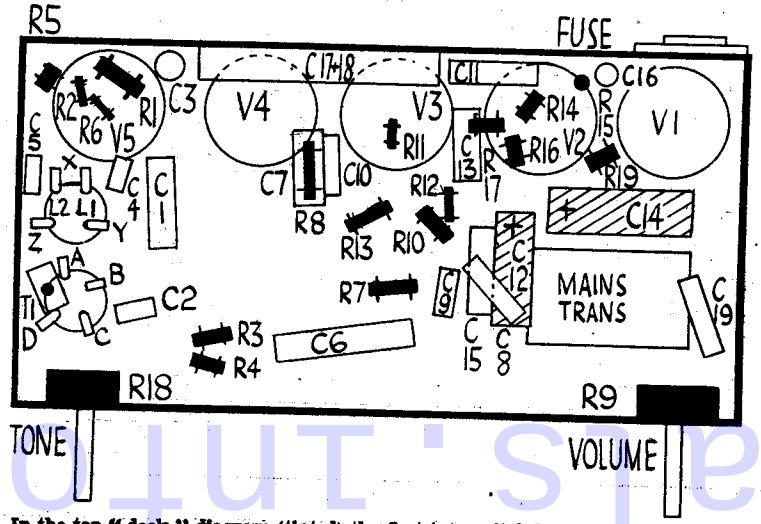
Refer also to Alignment Notes.

VALVE READINGS

On 200v. A.C. mains.

V.	Type.	Electrode.	Volts.
1	6P8G ..	Osc. anode ..	75
		Screen ..	105
		Anode ..	220
2	6U7G. . ..	Anode ..	220
		Screen ..	105
3	6R7G. . ..	Anode ..	80
4	6V6G. . ..	Anode ..	205
		Screen ..	220
5	5Z4G ..	Cathode ..	—





In the top "deck" diagram (tinted) the first two switch bars operate the mains and gramophone switches. The underside of the chassis is shown (below) with trimmer unit removed. Coil tags are lettered for windings tests.

Brunswick 139-E.H. on Test

MODEL 39/EH. "Every Home" Radiogram.—For A.C. operation, 200-250 volts, 50-60 cycles. Price, 11½ gns.

DESCRIPTION.—Four-valve, plus rectifier, table radiogram, with push-button control and without manual tuning. Walnut cabinet measures 16½ by 12¾ by 11¾ in.

FEATURES.—Selection of gramophone, two long wave and four medium wave stations and on-off control by push-buttons. Controls for volume and tone. High fidelity light armature pick-up, induction motor. Twelve-inch records can be played with lid shut.

LOADING.—Radio alone, 44 watts; with motor, 60 watts.

Radio Performance

The push-buttons are accurately set and all the stations are received at ample volume with a reasonable aerial.

Acoustic Output

Sufficient volume for an ordinary room. Pleasing characteristic with a reasonable amount of top response and a not too vigorous tone control. Balance is pleasing and both speech and orchestral reproduction are nicely balanced.

Gramophone Performance

The pick-up fitted is sensitive and gives ample reserve power with an average record. General characteristic is similar to that of the radio side and the pick-up is free from marked resonances.

(*Continued from opposite page.*)

To remove chassis, release all wood screws holding the motor board, release two chassis screws from the bottom of the cabinet, remove volume and tone knobs.

The aerial-earth wires are next disconnected from the sockets at the back of the cabinet and the extension speaker leads must be similarly disconnected, either from the sockets or the chassis.

The motor board and chassis can then be withdrawn through the top of the cabinet.

The speaker assembly as a whole can be removed by unscrewing the sub-baffle; or the wires from the speaker can be unsoldered from the plate on the side of the chassis. The chassis is most easily isolated from the motor board assembly by unsoldering the pick-up leads and the power leads to the motor and switch.

To service the interior of the receiver the press-button unit must be removed. This is released by two bolts and two nuts. Before it can be removed, however, seven leads must be unsoldered from the main chassis assembly, and leads going to the mains switch, which is operated by the press-button mechanism, must also be unsoldered.

It is advisable to make a rough sketch of the position of the leads, as they have no colour code.

Special Notes.—In the model examined the oscillator anode load and oscillator

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Ekco Push-button PB 179

(*Continued from page* 29.)

these an insulation-headed member is screwed.

The visual tuning indicator is a Mullard type TV4. Across the holder is connected the anode feed resistance R12.

Sockets at the rear of the chassis marked L.A. and S.A. are for connecting a long aerial or a short aerial, the L.A. socket bringing a series aerial condenser into circuit.

The single dial illuminating light is of the M.E.S. type and rated at 6.2 volts .3 amp.

C30 is enclosed in the push-button assembly screening can; R7, C21 and C22 in the oscillator coils can; C25 and C26 in I.F.T.1. and R9, C32, C33, C34 and C35 in I.F.T.2. A 140 mmfd. condenser may sometimes be found connected between the anode of V1 and chassis.

WINDINGS (D.C. Resistances)

Manual-tuning button depressed.

L.	Ohms.	Range.	Where measured.
1	14.3	—	Across tags.
3	8.5	—	Across C16.
5	25.8	L.W.	Aerial gang and C23.
6	2.8	M.W.	Aerial gang and C23.
7	24.4	L.W.	Top grid V1 and C23.
8	3	M.W.	Top grid V1 and C23.
9	.1	S.W.	Top grid V1 and C23.
10	.4	—	C52 and C53.
11	4	—	Anode V1 and R4.
12	7.6	—	Top grid V2 and C39.
13	4.4	—	Anode V2 and H.T. line.
14	—	—	Inaccessible.
15	.1	S.W.	C29 and C31.
16	.6	S.W.	R6 and C24.
17	—	—	Inaccessible.
18	—	—	Inaccessible.
19	—	—	Inaccessible.
20	—	—	Inaccessible.
21	1.6	A button depressed.	Osc. anode V1 and C24.
22	8.5	—	Across C30.
23	6	—	Across wires.
24	4.9	—	Across wires.
25	4	—	Across wires.
26	3.3	—	Across wires.
27	2.3	—	Across wires.
28	2	—	Across wires.
29	980	—	Yellow and red leads condenser block.
O.T. primary	330	—	Anode V3 and H.T. line.
M.T. primary (200v.)	28	—	Mains plug pins.
Total H.T. sec.	480	—	Anode pins V4.

Circuit Alignment Notes

I.F. Circuits.—Connect an output meter across the L.S. sockets or primary of the output transformer. Switch receiver to M.W. band, turn gang and volume to maximum, and tone to high.

Connect a service oscillator between the top cap of V1 (*via* a .02 mfd. condenser) and chassis, leaving the ordinary connection still made.

The main intermediate frequency is 480 kc., but receivers within a radius of 40 miles from the Washford Cross, Droitwhich, Westerglen and Burghead stations should be aligned at 465 kc. to avoid whistles.

Tune service oscillator to appropriate frequency and with a non-metallic tool adjust I.F.T.2 secondary (upper core), I.F.T.2 primary (lower core), I.F.T.1 secondary (upper core) and then I.F.T.1 primary (lower core) for maximum response. Reduce the input from the service oscillator as the circuits come into line. Then re-seal cores with wax.

It should be borne in mind that the I.F. transformers are of the driftless type, and they should not need re-aligning under normal circumstances.

Signal Circuits.—To obtain access to the oscillator trimmers and iron cores, it is necessary to remove the scale by gently levering on the four press-studs (one at each corner), and breaking the scale away at the point where it is glued. This should be effected by slipping a knife down the back of the scale and carefully prising so as not to injure the scale.

A calibrated scale for re-aligning can be obtained from the manufacturers, and this should be cut to shape, glued to a piece of cardboard and the black circles on the scale punched out to allow the trimming tool to pass through. It is most important that the holes are accurately made to the sizes and positions given, and that the large centre hole be concentric to the drive spindle. Otherwise calibration will be incorrect when the normal scale is replaced.

Connect the service oscillator to the aerial and earth sockets via a dummy aerial. Progressively reduce the input as the circuits come into line so as to obtain reliable peaks free from A.V.C. action.

The wavelength pointer should be horizontal to the right, with the gang at maximum capacity.

I.F. Filter.—With service oscillator still tuned to the intermediate frequency, unscrew core of L1 and then screw in to obtain *minimum* response in output meter. Ignoring the small dip in the central position as in general practice the correct position will be found when the core is distinctly off centre.

Short Waves.—Tune set and oscillator to 17.6 metres (17 mcs.) and adjust T1 and then T2 for maximum response.

Check calibration at 50 metres (6 mcs.).

Medium Waves.—Tune set and oscillator to 200 metres (1,500 kcs.) and adjust T3 for maximum.

Tune set and oscillator to 250 metres (1,200 kcs.) and adjust T4 then T5 for maximum.

Tune set and oscillator to 500 metres (600 kcs.) and adjust P1 (core) for maximum, simultaneously rocking the gang.

Repeat above operations.

Long Waves.—Tune set and oscillator to 1,300 metres (230 kcs.) and adjust T6, T7 and then T8 for maximum.

Tune set and oscillator to 1,700 metres (176.5 kcs.) and adjust P2 (core) for maximum, simultaneously rocking the gang.

Repeat both operations.

Kolster-Brandes 730

(*Continued from page* 33.)

Trim T5 and T2 to give maximum output.

Reset generator and receiver to 600 kcs. (500 metres), and adjust the medium wave padding condenser, T8 (nut).

This completes the medium wave adjustments, but it is advisable to check the 1,400 kcs. trimmer settings after any adjustments made at 600 kcs.

Long Waves.—Switch the receiver to the long-wave range and set the pointer to 300 kcs. (1,000 metres). Adjust the signal generator to the same frequency and trim T6 and T3 for maximum output.

Reset the signal generator and receiver to 175 kcs. (1,714 metres), where another "dot" will be seen on the L.W. scale, and pad with T7 (screw).

Repeat the long wave adjustments until the calibration is correct over the complete range.

Short Waves.—Switch the receiver to the S.W. range and set the pointer to 17 mcs. (17.6 metres), where a "dot" will be seen. Adjust the generator to inject this frequency and trim with T4 for maximum signal.

It will be found that the signal can be tuned in at two positions as T4 is adjusted. It is important to use the higher frequency setting. This is obtained with the trimmer screw set towards its minimum capacity.

Finally, trim T1 for maximum output. While adjusting this trimmer the tuning control should be rocked a minute fraction. No padding is necessary on this range.

Brunswick 39E.H.

(*Continued from page* 35.)

grid leak had values slightly higher than those shown in the circuit.

To allow for slight drift the response of the second intermediate transformer is flattened by using a tightly coupled untuned secondary winding.

The switch button unit is of a non-standard type and the various buttons make provision for changing the input coils from medium to long. There is no switching of the oscillator coil.

Although the set has high inherent stability, it is definitely not stable with the screens removed from the valves. This point must be borne in mind in making any tests or adjustments.

Alignment Notes

I.F. Circuits.—Connect output meter to the extension speaker sockets and inject the I.F. of 120 kcs. between the grid of V2 and chassis. Adjust T4 for maximum response, but at the same time continuously reduce the input from the oscillator so that no A.V.C. action takes place.

Repeat the operation with the input applied between the grid of V1 and chassis, adjusting T3 and T2 in the normal manner.

The I.F. trap can be adjusted by injecting the intermediate frequency between chassis and, via an extremely small capacity, to the aerial. Adjust T1 until the output is at *minimum*.