

Brunswick 39CGM P.B. Radiogram

Four valve, plus rectifier, two waveband mechanical push-button and manually tuned radiogram for 200-250 volt, 50-60 cycle AC supplies, price 15 gns.

CIRCUIT OUTLINE

A COMMON shunt-fed coupling coil forms the input to the two tuned circuits of the first valve, a triode hexode mixer. The input circuit also includes a permeability-tuned filter adjusted to the intermediate frequency. The oscillator section is normal, calling for no special comment.

A trimmer-tuned transformer couples the first valve to V2, an HF pentode, AVC being used. A further similar transformer connects V2 to the diode section of V3, a double diode triode.

Here one diode is used for demodulation and the other for AVC, which obtains a delay from the cathode resistor of this valve. The voltages from the signal diode are taken through a simple HF filter to the grid of the valve.

A conventional resistance-capacity network couples the triode section to the grid of V4, an output pentode. Tone is controlled on the anode of this valve.

The power supply is obtained from V5, a full-wave rectifier, and the speaker field is used for smoothing in conjunction with the usual electrolytic condensers.

CONSTRUCTIONAL FEATURES

TO carry out any investigation or repair work in the region of the last three valves, the main condenser block should be removed by releasing the two fixing bolts. The leads are sufficiently long to enable it to be swung clear of the chassis.

Should a wire be removed, the following colour code must be observed on re-connecting: Bias for V4, yellow; negative, black; HT line, red; unsmoothed HT, blue.

Components are easily identified with the exception, perhaps, of R3, which will be found inside a length of sleeving. It should be observed that the extension speaker sockets, although not shown on the maker's circuit, are on the high impedance side.

Wavechange Switches.

The switching is very simple, being carried out on a single small wafer. This carries three wiper. The first one controls the aerial circuits, the second the oscillator section, and the last one is used for shorting the unused oscillator coil.

Chassis Removal.

Unscrew the four control knobs from the front of the cabinet and pull off the six push-button knobs. Then remove the two chassis-retaining bolts. This enables the chassis to be partly withdrawn, if the radiogram switch is unscrewed.

If it desired to remove the chassis completely, unscrew the aerial and earth plate and the pick-up lead anchor strip and the leads to the motor. The latter are accessible by raising the motor board.

In addition, the leads to the speaker must be unscrewed. There are four tags on the strip, and reading from top to bottom the colours are: blue, black, red. The bottom tag is blank.

Alignment

IF Circuits (465 kc.).

Connect the generator to the grid of V1 and an output meter to the set.

Inject a signal of 465 kc. and adjust T1, T2, T3 and T4 for maximum output, keeping the input always below the AVC value.

Medium Waves (200 to 550 metres).

Connect the generator to the aerial and earth terminals through a dummy aerial.

Tune set and generator to 200 metres (1,500 kc.) and adjust T5 and T6 for maximum.

Tune set and generator to 500 metres (600 kc.) and adjust P1.

Check the trimming at 200 metres and re-check the padding at 500 metres. A slight pointer adjustment may be necessary.

Long Waves (900-2,200 metres).

First adjust any desired push-button to Midland Regional on the MW waveband.



This is done by unscrewing the button, tuning in the station manually and pushing the button forward as far as it will go. The button is then locked by screwing it up.

Next, switch to the LW and inject a signal of 1,293 metres (232 kc.) that is the frequency of Luxembourg, and adjust T7.

Tune set and generator to 2,000 metres (150 kc.) and adjust P2.

Repeat the series of operations until both ends of the scale fall into line.

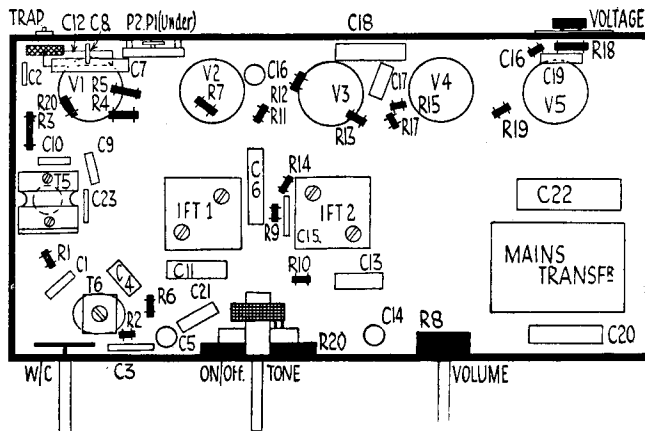
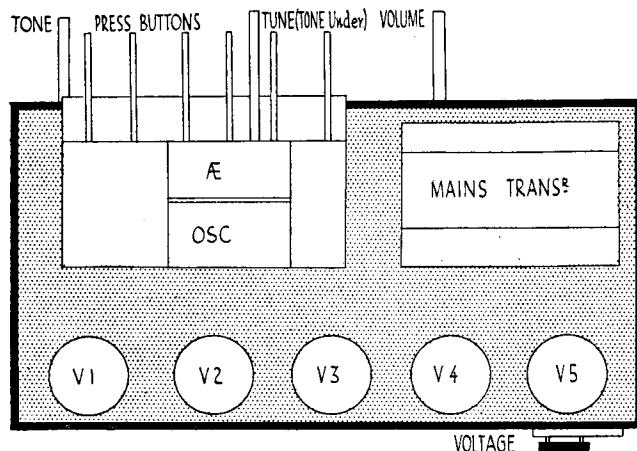
Push-Buttons

Automatic tuning is provided in this model by mechanical means, the push-buttons rotate the gang condenser to pre-set positions.

As the set is trimmed so that Midland Regional and Luxembourg are obtained on one button (see alignment notes), one button must be reserved for these stations. London Regional and Droitwich are then also obtained on one button.

By unscrewing any of the knobs the control mechanism is released. A button is set up by manually tuning in the desired station, depressing the button firmly and retightening.

The adjustment should be checked in case it has been disturbed in tightening the button.



The chassis is very orderly and compact. The valves (see surface diagram on left) are in a row, V1 to V5. On right is the

under-chassis layout

10 MINUTE FAULT-FINDER

BRUNSWICK 39CGM

Power Test.—This test checks the main HT circuit and reveals any major faults.

Unsmoothed voltage, 330 volts; HT line, 250 volts. Resistance L13, 970 ohms.

Total feed = $330 - 250 \div 970 = 82$ ma.

Output Stage, V4.

Inject 2 volts AF V4 grid. If defective, check :—

Voltagess : Anode, 236; screen, 250; cathode, 10.5.

Resistances : Anode-HT, 350; grid-chassis, 250,000 ohms.

AF Stage, V3.

Inject 0.5 volt V3 grid. If defective, check :—

Voltagess : Anode, 82; cathode, 1.9.

Resistances : Anode-HT, 125,000; grid-chassis, 500,000 ohms.

Demodulation.

Inject 465 kc. modulated signal V2 anode. If defective, check :—

Resistances : Diode-chassis, 300,600; L11, 5.7; L10, 8.3 ohms.

IF Stage, V2.

Inject modulated 465 kc., signal V2 grid. If defective, check :—

Voltagess : Anode, 250; screen, 85; cathode, 1.9.

Resistances : Screen-HT, 35,000 ohms; grid-chassis, 1 megohm.

Mixer, V1.

Inject 465 kc. modulated signal V1 grid. If defective, check :—

Voltagess : Anode, 250; screen, 85; cathode, 2.2.

Resistances : L8, 7.4; L9, 7.4 ohms.

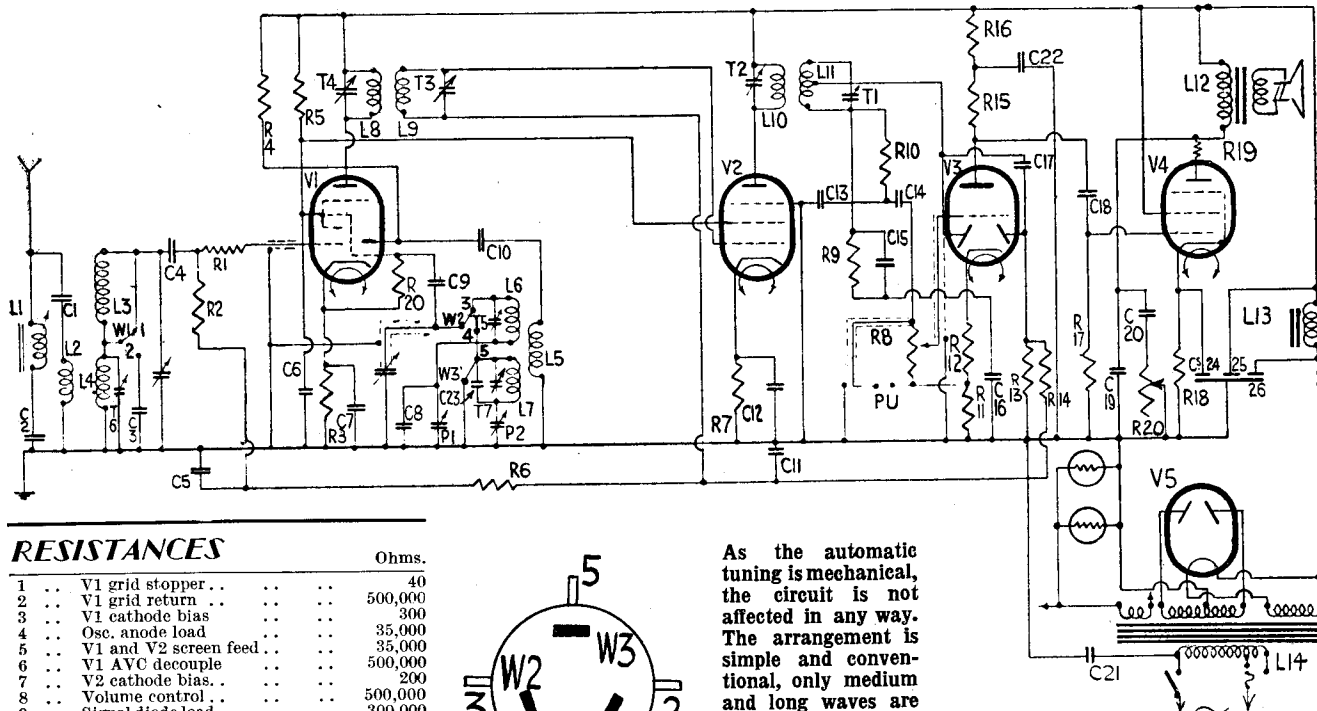
Oscillator Section, V1.

Tune to local station and inject that frequency plus 465 kc. If defective, check :—

Voltage : Osc. anode, 100.

Resistances : Osc. anode-HT, 35,000; osc. grid-chassis, 50,000 ohms.

If still no signals, check coil resistances and switching of oscillator and pre-selector coils.



RESISTANCES

	Ohms.
1 .. V1 grid stopper	40
2 .. V1 grid return	500,000
3 .. V1 cathode bias	300
4 .. Osc. anode load	35,000
5 .. V1 and V2 screen feed ..	35,000
6 .. V1 AVC decouple	500,000
7 .. V2 cathode bias	200
8 .. Volume control	500,000
9 .. Signal diode load	300,000
10 .. HF filter	70,000
11 .. V3 cathode bias (part) ..	3,000
12 .. V3 cathode bias (part) ..	3,000
13 .. AVC diode load	250,000
14 .. V2 AVC decouple	500,000
15 .. V3 anode load	100,000
16 .. V3 anode decouple	25,000
17 .. V4 grid resistor	250,000
18 .. V4 Cathode bias	250
19 .. V4 anode stopper	100
20 .. Tone control	50,000

CONDENSERS

	Mfd.
1 .. Aerial coupling .. .. .	.0004
2 .. Trap tune .. .. .	.00006
3 .. LW input trimmer .. .. .	.00125
4 .. V1 grid isolating .. .. .	.0001
5 .. V1 AVC decouple .. .. .	.02
6 .. V1, V2 screen decouple ..	.1
7 .. V1 cathode shunt .. .. .	.1
8 .. MW fixed padder .. .. .	.0003
9 .. Osc. grid .. .. .	.0001
10 .. Osc. anode coupling .. .. .	.002
11 .. V2 AVC decouple .. .. .	.02
12 .. V2 cathode shunt .. .. .	.1
13 .. HF filter .. .. .	.0001
14 .. AF coupling .. .. .	.02
15 .. HF filter .. .. .	.0001
16 .. V3 cathode shunt .. .. .	.25
17 .. AF coupling .. .. .	.0001
18 .. AF coupling .. .. .	.01
19 .. V4 anode shunt .. .. .	.006
20 .. Tone control .. .. .	.05

Condensers (continued)

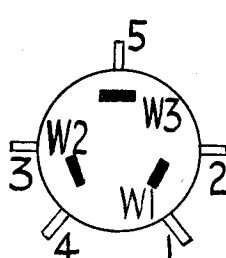
21 .. Mains filter .. .. .	.006
22 .. V3 anode decouple	4
23 .. LW osc. fixed padder ..	.00006
24 .. V4 cathode shunt	50
25 .. HT smoothing	8
26 .. HT smoothing	8

Windings (continued)

12 .. 250	On tags.
13 .. 970	On tags.
14 .. 26	Mains plug.

WINDINGS

L.	Ohms.	Range.	Where measured.
1 .. 8.5	—	—	On tags.
2 .. 14.5	—	—	C1 and chassis.
3 .. 17	LW ..	—	C4 and W1.
4 .. 3.5	—	—	C10 and chassis.
5 .. 2	—	—	C10 and chassis.
6 .. 2.1	MW ..	—	W2 and C8.
7 .. 4.3	LW ..	—	W2 and P2.
8 .. 7.4	—	—	V1 anode and HT positive.
9 .. 7.4	—	—	V2 grid and C11.
10 .. 8.3	—	—	V2 anode and HT positive.
11 .. 5.7	—	—	Signal diode and R10.



As the automatic tuning is mechanical, the circuit is not affected in any way. The arrangement is simple and conventional, only medium and long waves are covered; trimming is a little unusual. Left, the single switch bank.

VALVE READINGS

V.	Type.	Anode.	Screen.	Cathode.
1 .. 6P8 .. 250 .. 85 ..				2.2
2 .. 6R7 .. 100(osc.) ..				1.9
3 .. 6R7 .. 250 .. 85 ..				8
4 .. 6Y6 .. 82 .. 250 ..				10.5
5 .. 5Z4 .. 236 ..				330

Pilot Lamps, Osram MES, 6.3 volts, 300 ma.

Replacement Condensers.—Exact replacement electrolytics are available from A. H. Hunt, Ltd., makers of the original units. For C22, there is unit list number 3,949 at 2s., and for the C24, 25, 26 block, unit 3,569, 8s. 6d.