BELMONT 550

Three-valve, plus rectifier, tuned radio-frequency midget receiver on American lines. Two wavebands, and suitable for A.C./D.C. mains. Service agents: Price & Co. (Manchester), Ltd., 78, Tib Street, Manchester, 4, and Shannons & Bishop, Ltd., 182, Wardour Street, London, W.1.

Circuit.—The aerial is connected through a small capacity to the primary of a simple dual-wave coil. Extra coupling is given by a small top capacity.

The aerial is also connected to the bottom of the volume control, R10. As the slider of the control moves downward (in diagram) the resistance in the cathode of V1 increases and, with it, the bias, thus reducing the gain. At the same time, the part of R10 shunted across L1 is reduced and a smaller signal is applied to the secondaries.

V1 is a pentode employed as a radio-frequency amplifier. R11 provides a minimum bias to prevent excessive gain and instability. The signal is passed on by an anode winding coupled to the grid circuit of V2.

This H.F. coupling transformer closely corresponds to the aerial transformer. V2 is an R.F. pentode used as an anode bend detector.

R5, the anode load, of high value, develops the signal and passes it on to V3, via C6. C8 is an H.F. by-pass.

The output pentode V3, has the usual auto bias cathode components and an output transformer with a fixed tone shunt.

H.T is smoothed by the speaker field and two electrolytics. The rectifier, although a full-wave type, is used with strapped anodes and cathodes in the usual half-wave "universal" arrangement. R1 is a current limiter.

The heaters are run in series, the voltage being suitably reduced by a K52H barretter, and R2, a 400-ohm line cord. When the receiver is used on voltages above 220 a further 100 ohm cord should be used.

GANGING

Medium Waves.—Switch knob to left (M.W.), set gang at minimum capacity, and set pointer parallel with lower datum line on scale.

Set the medium wave "tickler" (this is a reaction device situated on the gang condenser and not shown in the circuit) at minimum capacity.

Dial to 214 m. (1,400 kc.) and inject a modulated signal of this frequency to the aerial and earth. With volume control at maximum, adjust the aerial and R.F. trimmers on the gang (T1 and T2) for maximum, reducing the input to prevent oscillation.

Adjust the "tickler" for the desired amount of reaction over the whole waveband without being excessive at the lower end.

Inject 600 kc., tune to 500 m., and check alignment.

Long Waves.—Adjust long wave "tickler" (under chassis) to produce sufficient reaction over the band.

CONDENSERS

C		*Mfds.*	*C*		*Mfds.*
1	..	10	7	..	.01
2	..	8	8	..	.00025
3	..	5	9	..	.1
4	..	5	10	..	.1
5	..	.1	11	..	.1
6	..	.01	12	..	.00012

WINDINGS

L		*Ohms.*	*L*		*Ohms.*
1	..	21.5	4	..	32
2	..	3.8	5	..	3.8
3	..	13.6	6	..	13.6
			Field		1,500

VALVE READINGS

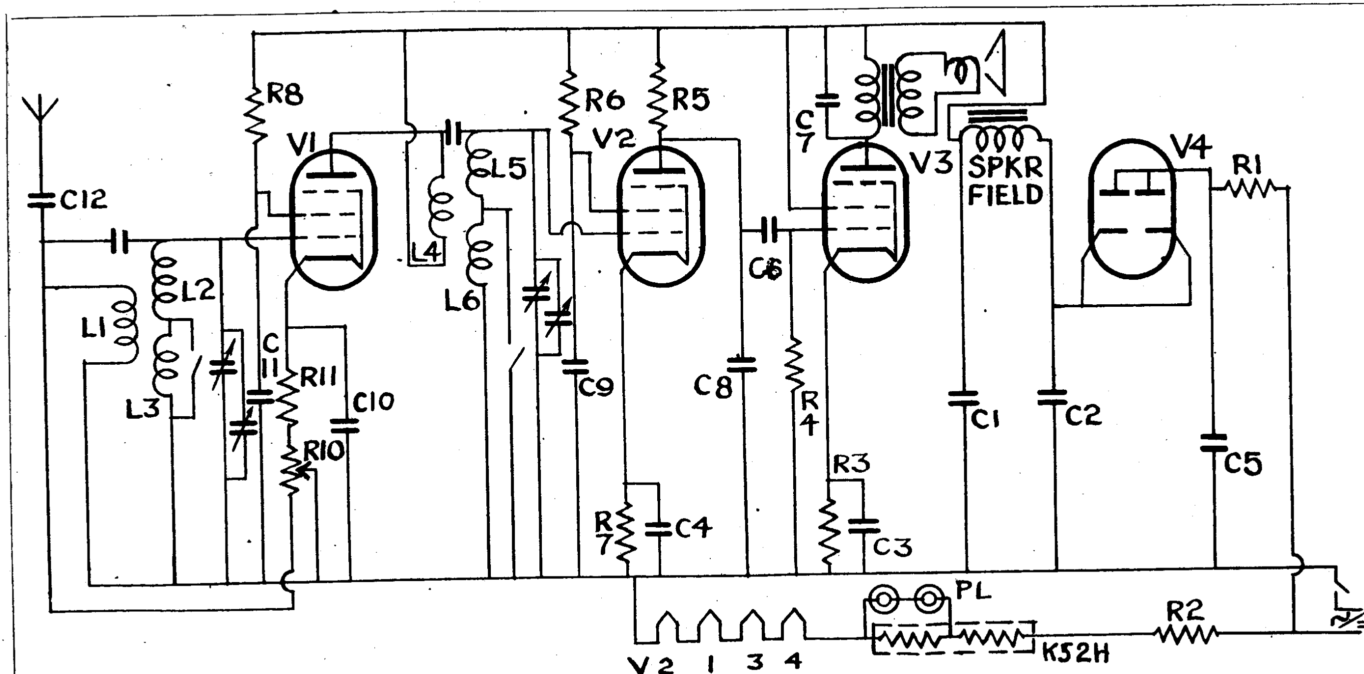
V	*Type*	*Electrode*	*Volts.*
1	6U7G	Anode	140
		Screen	100
		Cathode	3.25
2	6J7G	Anode*	—
		Screen	—
3	25A6G	Anode	135
		Screen	140
4	25Z6G	Cathode	150
—	K52H	Barretter	—

Pilot lamps.

*High feed resistances prevent accurate measurement.

RESISTANCES

R		*Ohms.*	*R*		*Ohms.*
1	..	50	6	..	2 meg.
2	..	400	7	..	25,000
3	..	500	8	..	25,000
4	..	.5 meg.	9		500
5	..	.5 meg.	10		50,000



The circuit of the Belmont 550, a midget T.R.F. receiver. Two bands are covered and the detector (V2) is an RF pentode used as an anode-bend rectifier.

Condenser and Circ[uit] Duties

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resolve OE into OER in phase with OI and EER at right-angles.

The power used in the circuit will be OI times OER. By geometry, we know that OER is equal to the cosine of the phase angle times OE.

The power, therefore, is the measured voltage OE times the measured current OI times the cosine of the phase angle. The latter is clearly the "power factor" of the circuit. It can be described as the ratio of the power in watts to the product of voltage and current.

This explains why A.C. devices are often rated in volt-amps and not watts. To find the actual watts, volt-amps must be multiplied by the power factor, *i.e.*, the cosine of the phase difference.

The quantity EER in Fig. 8 could be called the wattless component of the voltage. Similarly, if vectors of the current in a circuit are drawn, the wattless current can be ascertained.

We have strayed quite a distance from our primary object, but we are now in a much better position to understand the performance of condensers in a receiver. Condensers are employed for :—

(*a*) Tuning ;
(*b*) Coupling ;
(*c*) Decoupling ;
(*e*) Current smoothing.

Tuning is a subject which introduces many new factors that cannot be considered at present. We would refer readers in this connection to an article in the August, 1941, SERVICE ENGINEER.

When used as a coupling, the job of a condenser is to pass an A.C. signal while acting as a barrier to D.C. The most familiar situation is between the anode of one valve and the grid of the next.

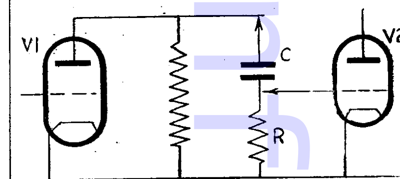

Fig. 9:—The valve and its anode load are in parallel. The signal voltage across them is applied to a coupling condenser and series grid resistance.

H.T. is at zero potential as far as signals are concerned, and so the valve and its anode load resistance are really

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external aerial is required for local stations, but provision is made for one by a washer clip condenser on the plate

V2 is a straightforward I.F. amplifier. V3 is a combined double-diode triode with a very simple demodulation and

GANGING

I.F. Circuits.—Inject 465 kc. to V1 signal grid and adjust the four I.F.

V	*Type*	*Electrode*	*Volts.*
1	12SA7	Anode	90