DE WALD 414

Three-valve, plus rectifier, TRF two waveband AC/DC American midget receiver. Mains voltage range depends on type of line cord fitted. Each instrument is labelled with this information.

Circuit.—No provision for an outside aerial or earth is made. For an aerial, a reel of brown wire is provided at the rear of the chassis and this is intended to be stretched round the floor of the room. An outdoor extension may be joined to the wire for additional range, if required. The chassis is "live" and a direct earth must not be connected.

The aerial input is taken through C1 to the aperiodic coupling coil L1. A shunt path for the aerial input is via R1, the volume control, to chassis. R1 is also the cathode bias resistance for the HF pentode V1, so that the aerial circuit is shunted and the valve desensitised to a degree depending upon the amount of resistance in circuit between chassis and aerial.

L1 is coupled to L2, the MW grid coil, and L3 the LW coil, the latter having its own trimmer T4.

V1 is coupled to V2, a triode demodulator, by an HF transformer with aperiodic primary L4. L5 and L6 are the MW and LW grid coils and leaky-grid rectification is by R2 and C3.

Resistance capacity coupling transfers the LF signal from V2 to V3, R3 and C5 being the components concerned. C4 is the anode to chassis HF by-pass for V2.

R4 is the grid resistance for V3, the output pentode, which is biased by R5 and transformer coupled to the PM speaker. C6 is the pentode tone corrector. R6 is the voltage dropping resistance for the screens and anodes of all valves except V3, whose anode is taken to the maximum HT supply of the half-wave rectifier V4. R6 also acts as a smoothing component in conjunction with the large capacity coupling condensers C7, C8.

The mains input circuit is of conventional type, all valve heaters being in series with the mains dropping resistance incorporated in the line cord R8, R9. The valve heaters take .15A so that for the values of the resistances in the line cord of the particular model reviewed, the instrument may be worked from a 230v mains supply. The total volts dropped by R7, R8 and R9 is 114v and the total valve heater voltage is 120.2 (V1, V2, 12.6v each; V3, 50v; V4, 45v.)

HT is taken from R9 after a voltage drop of 72.7 which on 230v mains leaves approximately 157v for the HT line.

The pilot lamp is fed from a 7.5v tap on the rectifier heater. C9 is the mains filter condenser and S1 is the on-off switch which is ganged with the volume control R1.

GANGING

MW Band.—Switch set to MW and volume control to maximum. Inject a signal of about 200m, keeping the input low and adjust T1 and T2 in that order for maximum output.

LW Band.—Switch receiver to LW and inject a signal of about 1,000m. Adjust T3 and T4 for maximum output.

RESISTANCES

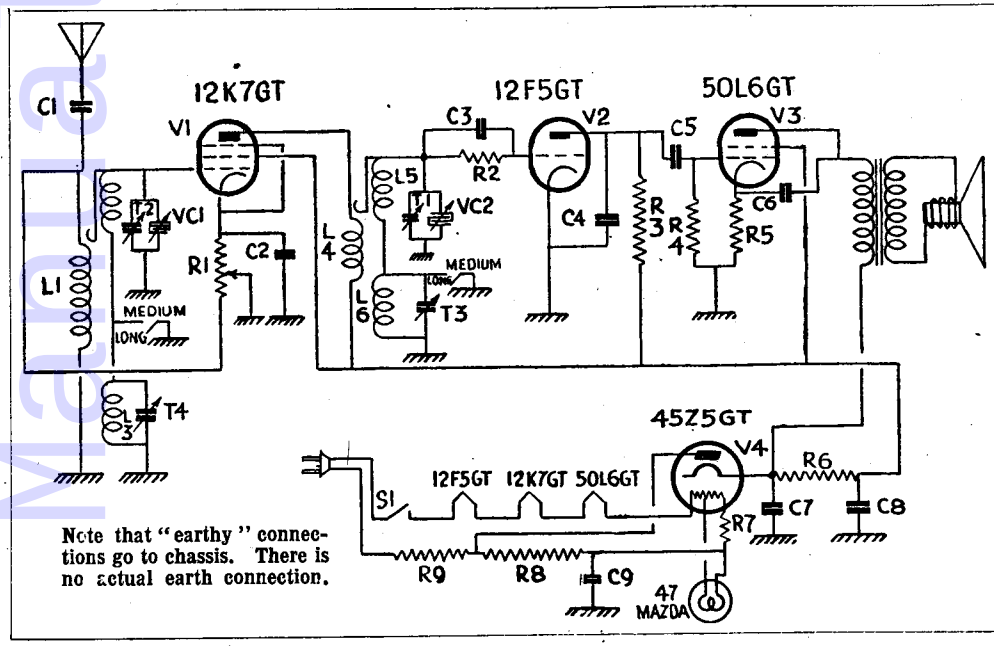
R			Ohms	R			Ohms
1	..	..	25 meg.	6	..	..	2,000
2	..	..	5 meg.	7	..	..	75
3	..	..	1 meg.	8	..	..	200
4	..	..	1 meg.	9	..	..	485
5	..	..	150				

WINDINGS

L			Ohms	L			Ohms
1	..	..	36	4	..	..	55
2	..	..	4	5	..	..	4
3	..	..	25	6	..	..	30

CONDENSERS

C			Mfd
1	..	..	.001
2	..	..	.01
3	..	..	.005
4	..	..	.0001
5	..	..	.01
6	..	..	.02
7	..	..	16
8	..	..	16
9	..	..	.02



Note that "earthy" connections go to chassis. There is no actual earth connection.

A typical American TRF midget receiver, the 414 employs .15 amp valves. The voltage of each heater is shown by the type number.

MURPHY A36

Continued from opposite page

applying a paralysing voltage to the signal diode from V4 cathode circuit. To prevent distortion on strong well modulated signals due to this excessive bias, the latter is neutralised to a certain extent by the application of a voltage derived from R12 and R9 which comprise a diode load, the suppressor grid of V2 being the diode. Only strong signals across R12 and R9 will provide sufficient voltage to release the bias on V3. Local "noise" and weak stations are suppressed.

The suppressor circuit is controlled by switch S2, particularly the contacts S2d which control the action of the resistance R26 in the cathode circuit of V4.

With the switch closed, *i.e.*, with no noise suppression, there is a voltage of about 5 between V4 cathode and earth. This voltage is also the AVC delay and suppression voltage, which being very low allows a small LF signal to develop across the diode load.

The LF signal developed across the diode load is attenuated by R7 and R38 and passed to the reflex valve V5.

When S2d is opened the AVC delay voltage rises to about 15 providing a larger signal to the grid of V5. A second effect is to produce an anti-phase feedback into the grid circuit of the output valve due to R26, and this effectively reduces the gain of the output valve by the amount of the increase in LF signal applied to V5. Thus there is no large change in output but only the effect of the suppression voltage on the diode.

R20 and C19 are LF decoupling components which prevent attenuation of bass due to the anti-phase feedback. Other contacts on the noise suppression switch are S2a and S2b. The first pair of contacts allows an AVC voltage across R16 to be applied to V5 while the contacts S2b alter the standing bias on the tuning indicator triode to accommodate the change of voltage across R11.

SW Section.—On SW the aerial is switched to L22 and coupled by C30 to the grid of the SW pentode amplifier, V5, which is biased by R30, decoupled by C32 (LF) and C33 (HF). A small amount of AVC is applied via the filter network R39, R40, C26, C27 from the junction of R15, R16.

Tuned secondary HF transformer coupling is employed to couple V5 to the SW frequency-changer V6. The primary of the HF transformer is L23 and, as previously stated, is HT fed via R29 which is the LF coupling resistance for the reflex action of V5. C34 is the HF bypass of R29. R37 is the voltage dropper for the anode and screen of V5, the screen being decoupled by C31, the anode by C39.

The secondary of the HF transformer L24 is tuned and the signal passed direct to the control grid of the frequency changer V6.

The oscillator section of V6 comprises a tuned anode circuit L26, VC6 with grid coil coupling L25. Switch contacts S1b break the oscillator anode circuit on MW and LW. The IF output of V6 has a frequency of 1,000 kc (300m) and is fed by C28 as a broadcast signal to the aerial circuit of the MW and LW section of the receiver where it is again frequency-changed by V1 and passed through the circuits already described. C29 is a loading capacity for L1 to compensate for the aerial load.

The SW condenser gang moves in steps, each step being the mid-point of a SW band. Tuning over the band is effected by the broadcast condenser gang which thus alters the SW intermediate frequency. As the SW oscillator frequency remains constant, to produce a different IF, the input signal must be different and thus the band is covered.

GANGING

IF Circuits.—Switch to LW, tune to 2,000m and advance the volume control to maximum. Connect a service oscillator to the control grid of V2 and chassis via a dummy aerial. Inject a signal of 119 kc keeping signal below AVC voltage.

Adjust T1 and T2 for maximum reading on output meter; repeat for final adjustment.

Transfer signal input to the pentode control grid of V1 and chassis. Adjust T3 and T4 for maximum output and repeat.

MW Band.—Switch to MW and with the normal aerial and earth connected to the receiver, adjust the pointer to the wavelength of a broadcast transmission as near to 220m position as possible.

Adjust T5 for maximum signal strength as shown by the tuning indicator. Without touching the tuning control, replace the aerial and earth with the dummy aerial of the service oscillator. Tune the service oscillator to obtain maximum signal from the receiver ignoring the actual calibration.

Adjust T6 and T7 for maximum output, and repeat for final adjustment.

Continued on page iv