MURPHY
A24

Four-valve, plus rectifier, two wave-band superhet for operation from 200–250v., 50 cycle A.C. supplies. Marketed in 1934 by Murphy Radio, Ltd., Welwyn Garden City, Hertfordshire.

Circuit.—A band-pass input filter covering medium and long waves, and including an image rejector circuit, LO, couples the aerial to V1, the frequency-changer.

The triode oscillator section is tuned anode with the feed-back windings in the cathode, and not grid, circuit. R5 and C11 bias and decouple the valve; R4 and C12 are the grid leak and condenser, and R3 is an oscillation smoother.

Cathode injection, it will be appreciated, modulates the electron stream through the pentode section, and produces the required mixing of oscillator and signal frequencies.

Trimmer-tuned I.F. transformers link up V2, the I.F. amplifier, and V3, the double-diode triode. R10, 11 and 12 form the signal diode load, and L.F. is tapped off to V3 grid via C22.

A pick-up connection is made via C20 and R13 by means of a jack which breaks the cathode path of V2, thus preventing break-through of radio on records.

The A.V.C. is an amplified system in which the rectified carrier voltage is applied to the grid of the triode (via R9) to regulate the anode current of the valve. To prevent overloading, the signal voltage applied to the grid via C22 must be only about a third of this bias voltage. This is why R10 is 1 meg., while R11 and R12 are only .5 meg. and 99,000 ohms.

Additional smoothing components, R14, R15, C24, C25 are necessary. When there is no signal, the full anode current of V3 through R14, R15, produces a voltage which offsets the drop across L13 and R22 in the negative H.T. line, and makes V3 cathode positive. As the carrier biases V3 and reduces the anode current, the drop across R14 and R15 is reduced until on a strong signal, the cathode is 12 volts *negative* to chassis.

The anode circuit of V3 includes a sharp cut-off heterodyne whistle filter. R17 is the anode load and R19, the grid leak of V4, the output pentode, is also the volume control.

C33 and R21 form a variable tone control across V4.

H.T. is drawn from a full-wave rectifier. L13 (the speaker field), in the negative lead, is the larger smoothing choke but there is also a resonant filter L14–C35 in the positive side.

GANGING

I.F. Circuits.—Switch to M.W. and short L9 or L11. Inject modulated 117 kc. via dummy aerial to signal grid of V1. Adjust four trimmers for maximum on output meter.

Use low signal to prevent A.V.C. working or short circuit R 16.

M.W. Band.—Tune to 220 m. Inject 220 m. to aerial and earth via dummy aerial. Adjust T1, T2 and T3 for maximum. Repeat adjustment until no further improvement results.

Padding is fixed.

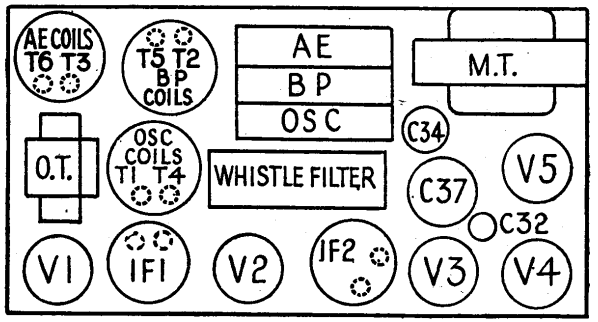
L.W. Band.—Tune to 1,100 m. Inject 1,100 m. and adjust T4, T5 and T6 for maximum.

Padding is fixed.

Image Suppressor.—Inject 333 m. Tune for maximum at about 450 m. Adjust the erinoid screw on band-pass secondary coil for *minimum*.

RESISTANCES

R		Ohms	R		Ohms
1	..	.25	12	..	99,000
2	..	20,000	13	..	99,000
3	..	3,200	14	..	30,000
4	..	50,000	15	..	33,000
5	..	700	16	..	.25 meg.
6	..	100,000	17	..	30,000
7	..	7,500	18	..	7,000
8	..	.25 meg.	19	..	50,000
9	..	2 meg.	20	..	150
10	..	1 meg.	21	..	50,000
11	..	.5 meg.	22	..	55



Top-of-chassis layout of the Murphy A24. The trimmers are accessible from below. Switch elements are in S1-S5 order from front to rear.

VALVE READINGS

V	Type	Electrode	Volts	Ma.
1	AC/TP	Anode	195	3.5
		Screen	190	1.3
		Osc. Anode	40–70	1.5
2	AC/VP1	Anode	224	9
		Screen	225	3
3	AC/HL/DD	Anode:		
		No signal	130	2.4
		Strong signal	185	1.4
		Cathode:		
		No signal	30	—
		Strong signal	— 12	—
4	AC/2 Pen.	Anode	210	25
		Screen	225	6
5	U12	Across C34	240	—

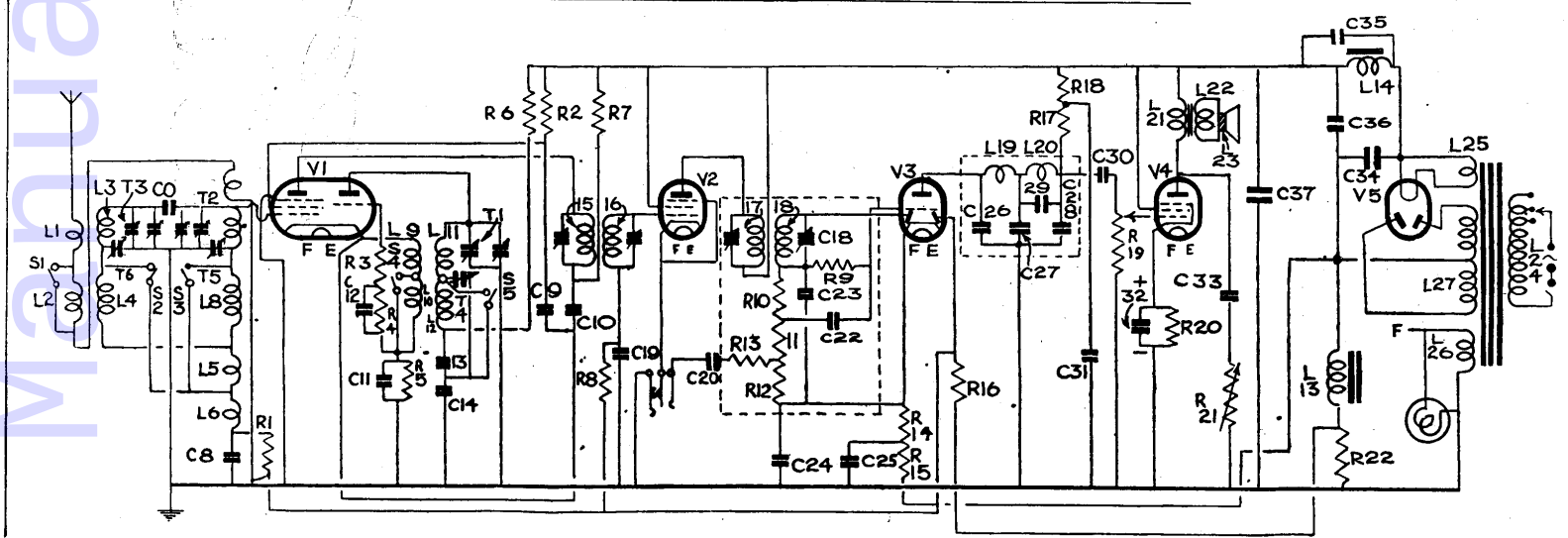
The triode-pentode frequency-changer uses cathode injection to the mixer section, the oscillator coupling coils being in the cathode line. Very full whistle filtering and H.T. smoothing and amplified A.V.C. are features.

WINDINGS

L		Ohms	L		Ohms
0	..	.25	14	..	315
1	..	1	15	..	40
2	..	7	16	..	40
3	..	5	17	..	40
4	..	12	18	..	40
5	..	2.75	19	..	450
6	..	.75	20	..	370
7	..	5	21	..	650
8	..	12	22	..	.25
9	..	1	23	..	2
10	..	2.5	24	..	29
11	..	4	25	..	.6
12	..	8.5	26	..	.6
13	..	2,400	27	..	255+255

CONDENSERS

C		Mfds.	C		Mfds.
Co	..	2 mmfds.	25	..	1
8	..	.1	26	..	.002
9	..	.001373	27	..	.003
10	..	.002	28	..	.001
11	..	.1	29	..	.001373
12	..	.0003	30	..	.1
13	..	.001373	31	..	3
14	..	.002	32	..	50
19	..	.1	33	..	.025
20	..	.05	34	..	4
22	..	.002	35	..	.13
23	..	.00005	36	..	1
24	..	1	37	..	8



Repair to Pick-up

WITH the lightweight pick-up used in the latest H.M.V. and Marconi radiograms it is sometimes found that after working for a short period bad distortion and weak volume is apparent. This is usually caused by the armature fouling the poles of the magnet in the P.U., and may be caused by mishandling (most people think it is necessary to push the needle home well, as there is no tightening screw similar to the older model).

By cleaning off the surrounding paint on the joint between the needle-holder and the metal part suspended by the rubbers, and resoldering very lightly a satisfactory repair may be made. It may be necessary to remove the magnet during this operation and also to re-centre the armature in the pole gap.