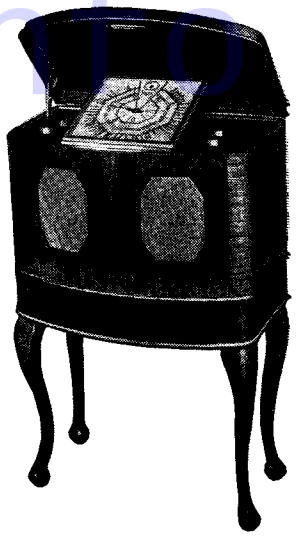
McMICHAEL ALL-WAVE TWIN-SPEAKER 137



Both tuning scale and cabinet are very distinctive in the McMichael 137.

CIRCUIT.—The aerial input passes *via* a series aerial condenser to a set of band-pass coils and thence to the grid of V1, a triode-hexode frequency changer. On short waves the aerial is inductively coupled to the grid of V1, and the A.V.C. of the receiver is rendered inoperative.

The output of V1 passes through an iron-cored I.F. transformer to V2, an H.F. pentode acting as an I.F. amplifier.

The signal then passes through another I.F. transformer (air core) to the demodulating diode of V3, a double-diode-triode; the other diode provides a D.C. potential which is fed back to the preceding stages.

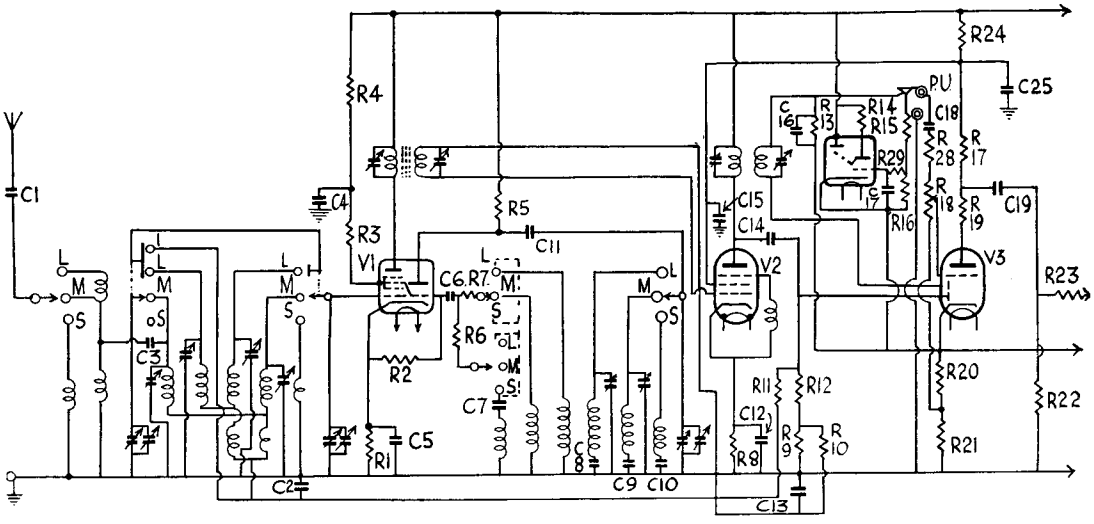
A TV4 tuning indicator is fed from a potentiometer which is connected in parallel with the diode load and gives a visual indication when a station is tuned in. A volume control is connected in the grid circuit of the triode section of V3.

V3 is resistance-capacity coupled to the output valve, V4, a beam power output pentode incorporating a variable tone control in the anode circuit. The signal then passes to the loud-speakers.

Mains equipment consists of a mains transformer, full-wave rectifying valve, electrolytic condensers and smoothing choke (speaker field).

Special Notes.—The resistance strips are drawn in such a manner as to show the various resistances and condensers. R25 is to be found on the speaker transformer. There is a holder with pilot light on the lid (front of the cabinet) that indicates when the set is on with the lid closed. The pilot light is rated at 6.2 volt .3 amp. It is mounted in a screw-type holder in an enclosed tube that is easily removable from the lid by unscrewing the terminal-headed screws to the extent of a few turns and pulling away from the

Band-pass input to the frequency changer, iron-core I.F. transformer, cathode-ray tuning indicator and double-diode triode resistance coupled to an output pentode are features of the 137

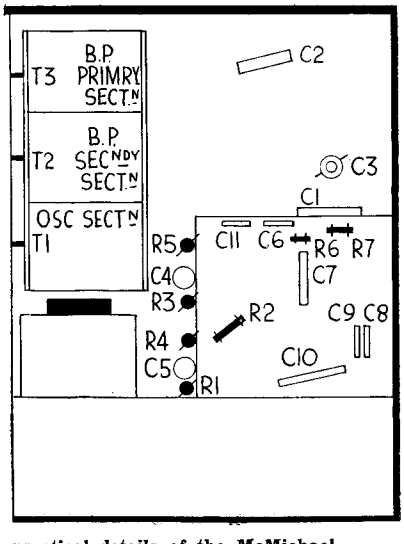


RESISTANCES

R.	Purpose.	Ohms.
1	V1 cathode bias	250
2	Oscillator grid leak	50,000
3	V1 screen feed	50
4	V1 screen decoupling	40,000
5	Osc. anode load	40,000
6	Regeneraton modifier ...	50
7	Regeneration modifier ...	2,000
8	V2 cathode bias	200
9	A.V.C. diode load (part) ...	5 meg.
10	V2 A.V.C. decoupling ...	500,000
11	V1 A.V.C. decoupling ...	1 meg.
12	A.V.C. diode load (part) ...	500,000
13	Demodulator diode load ...	250,000
14	Tuning indicator feed ...	2 meg.
15	Tuning indicator input potr....	3 meg.
16	Tuning indicator input potr....	5 meg.
17	V3 anode load (part) ...	4,000
18	Volume control	500,000
19	V3 anode load (part) ...	30,000
20	V3 and V4 cathode bias (part)	70
21	V3 and V4 cathode bias (part)	40
22	V4 grid leak	500,000
23	V4 grid stopper	100,000
24	V2 screen V3 anode decoupling	10,000
25	H.T. bleeder	40,000
26	V4 anode stabiliser	50
27	Tone control	10,000
28	H.F. filter	100,000
29	Tuning indicator grid decoupling	250,000

CONDENSERS

C.	Purpose.	Mfds.
1	Series aerial	.0002
2	V1 A.V.C. decoupling ...	.1
3	Aerial coupling	.00007
4	V1 screen decoupling	.1
5	V1 cathode shunt	.1
6	Oscillator grid	.0001
7	Osc. grid s.w. coupling ...	.0001
8	Long wave fixed padder ...	.000174
9	Medium wave fixed padder ...	.000534
10	Short wave fixed padder ...	.000354
11	Oscillator anode coupling ...	.0001
12	V2 cathode shunt	.0001
13	V2 A.V.C. decoupling... ...	.1
14	A.V.C. diode coupling ...	.0001
15	V2 screen decoupling	.1
16	R.F. by-pass	.0001
17	Tuning indicator grid shunt ...	.1
18	L.F. coupling	.005
19	L.F. coupling	.01
20	V3 and V4 cathode shunt ...	50
21	Pentode compensator ...	.002
22	Tone control	.05
23	H.T. smoothing	8
24	H.T. smoothing	8
25	V3 anode decoupling	4



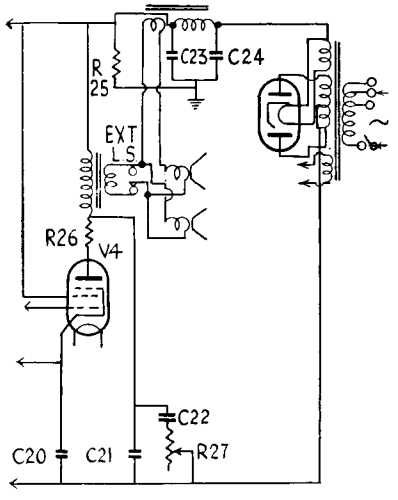
The three drawings to the right show the practical details of the McMichael 137 chassis. From left to right the views show: the front of the chassis, the rear and the underside.

supporting members. To remove the bulb from inside the tube, hold the two terminal heads and pull them apart, when the end containing the bulb assembly will come out. It will be observed from the circuit that the anode of V3 is fed from a potentiometer network.

A pair of sockets at the back of the receiver enable a pick-up to be used. An adjacent pair of sockets are for an external loud-speaker. This should be of the permanent-magnet moving-coil type with a low-resistance matching transformer (2 ohms). The built-in loud-speakers are operated by a three-point control allowing the set speakers, the external speaker, or both, to be used as desired.

Removing Chassis.—The back is held by sliding clips. The four control knobs are of the spring-fixing type. Close the lid and turn the cabinet on its side so as to place the chassis of the receiver nearest the bench. The four fixing bolts and washers observed on the base of the cabinet should then be removed. Extend the loud-speaker cable by removing it from the clips on the chassis. Now turn the set right way up again. Open up the lid of the cabinet and remove the two fixing screws on the lid securing the spring catch slider, when the lid can be opened to a greater extent. Take a grip on the top of the chassis and carefully manœuvre the chassis and top panel out of the cabinet. The various leads will be found long enough to enable the chassis to be placed on its side outside the cabinet and conveniently available for service requirements.

The twin loud-speakers are then perfectly accessible in the cabinet. If it be desired to remove them, take out the eight screwed-down sliding clips and the four screws securing the matching transformers to the cabinet base, when the speakers and transformers can be removed.



Circuit Alignment Notes

I.F. Circuits.—Connect a service oscillator between the top grid cap of V1, the frequency changer and chassis in the usual manner and an output meter across the primary of the loud-speaker transformer.

(*Continued on page* 33.)

QUICK TESTS

Quick tests are available on this receiver between the leads on the speaker transformer and the chassis.

Volts measured should be :—

Brown—375 unsmoothed H.T.

Red—220 smoothed H.T.

VALVE READINGS

No signal. Volume maximum. 200 volt A.C mains.

V.	Type.	Electrode.	Volts	M.a.
	(*All Mazda.*)			
1	AC/TH1 (7)	Anode ...	219	1.8
	Met.	Osc.anode...	65	3.8
		Screen ...	65	4
2	AC/VP2 (7)	Anode ...	218	82
	Met.	Screen ...	178	2
3	AC/HL/DD(7)	Anode ...	135	1
4	AC,2/PEN(7)	Anode ...	202	33
		Screen ...	219	8
5	UU4 (4)	Filament ...	375	—

McMichael 137 on Test

MODEL 137.—Standard model for A.C. mains working, 200 to 260 volts, 40-100 cycles. Price 17 gns. Floor type stand, 2 gns. extra.

DESCRIPTION.—Three waveband, twin speaker, table superhet using four valves plus rectifier.

FEATURES.—Large scale, under hinged lid. Controls for tuning, wave selection, tone and volume. External speaker and pick-up connections. Tuning indicator.

LOADING.—71 watts.

Sensitivity and Selectivity

SHORT WAVES (16.5-50.5 metres).—Selectivity and sensitivity up to standard, ease of control helped by two-speed tuning knob. No appreciable drift. Sensitivity well maintained.

MEDIUM WAVES (200-550 metres).—Excellent sensitivity. Selectivity up to standard, local stations spreading on adjacent channels only. Sensitivity well maintained.

LONG WAVES (700-2,100 metres).—Very similar performance to medium waves, side splash only on Deutchlandsender.

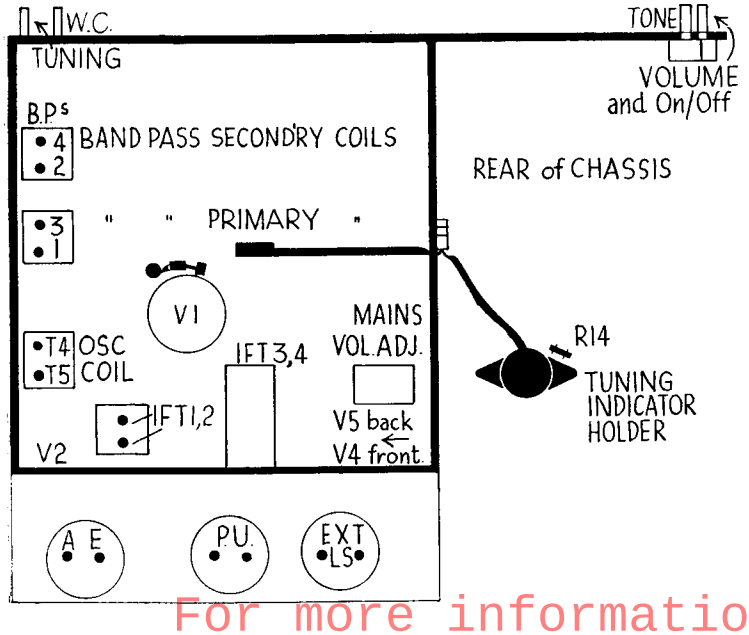
Acoustic Output

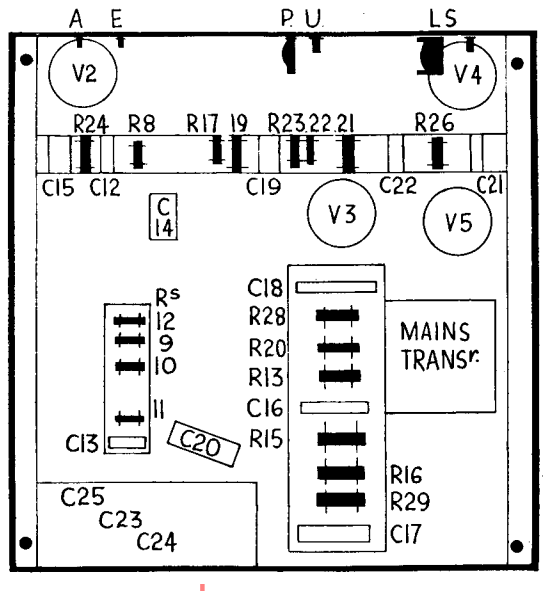
Ample volume for a large room, well helped by twin speakers. There is little colouration on speech, and orchestral production is very pleasing. Tone control not too vigorous in action.

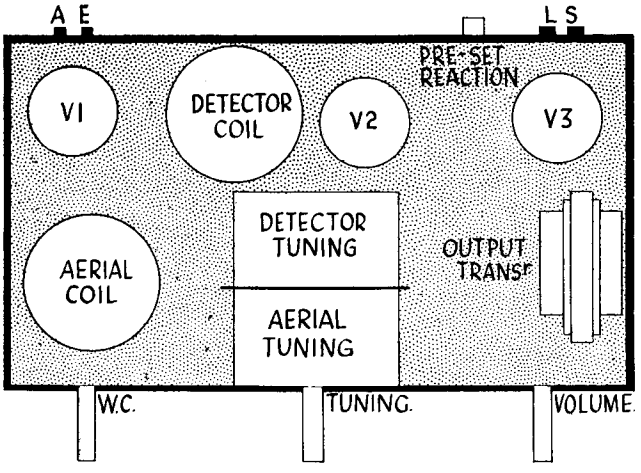
Replacement Condensers

TWO condenser replacements suitable for the McMichael 137 are available from A. H. Hunt, Ltd., of Garratt Lane, Wandsworth, London, S.W.18.

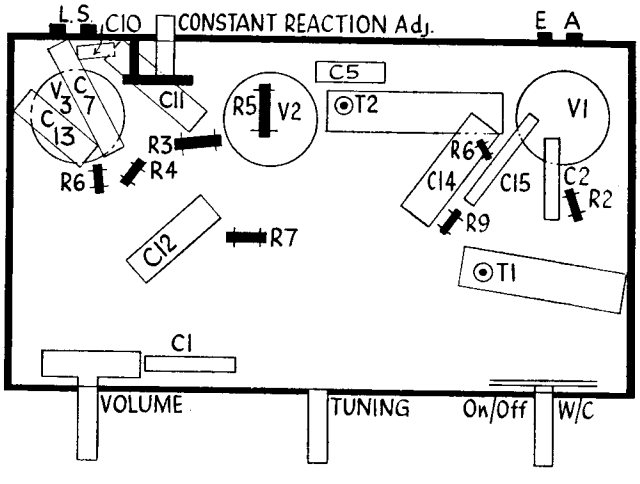
The first is a unit containing Cs 23, 24 and 25, list number 3,666, this retails at 8s. 6d. The other is the bias type, C20, which is list 2.915, price 1s. 9d.







The diagram on the left identifies the valves and other parts on the top of the G.E.C. Battery S.P. Three. The receiver is a simple service proposition.



Right is the under-chassis layout of the S.P.3. Note the pre-set reaction adjustment. There are only two tuned circuits and the trimmers for the medium-wave band are under the chassis.

G.E.C. S.P.3 on Test

MODEL Battery S.P. Three.—Standard model for battery operation, using a G.E.C. 120-volt, type BB720, battery and a Genalex No. BC145 2-volt 45-amp. accumulator. Price £6 15s.

DESCRIPTION. — Two-waveband, three pentode straight set with pre-set reaction. Brown cellulose table cabinet.

FEATURES.—Full-vision scale with wave indicator operated by selection switch. Controls for tuning and volume. Sockets for external speaker.

LOADING.—L.T., 0.43 amp.; H.T., 7.1 ma.

Sensitivity and Selectivity

MEDIUM WAVES (200-550 metres). —Very good gain, well maintained over the band. Pre-set reaction constant. Adequate selectivity for most areas. Local stations spread appreciably in "swamp" area.

LONG WAVES (800-2,000 metres).—Similar performance to medium waves. All main stations easily separated if volume control is not advanced too far. Reaction again very constant.

Acoustic Output

Excellent volume for very moderate H.T. loading. Ample for ordinary room. Well balanced tone and good upper and lower note radiation.

A replacement condenser for C14 is available from A. H. Hunt, Ltd., list number 2970; it retails at 1s. 10d.

FERRANTI 1137 SUPERHET

(*Continued from page 33.*)

by the lower capacity is the correct one. The gang should be rocked.

Medium Waves.—Tune the set and oscillator to 200 metres (1,500 kcs.) and adjust trimmer T2 whilst rocking the gang.

Tune the set and oscillator to 228 metres (1,316 kcs.). Adjust the medium wave aerial trimmer (on gang) for maximum response, simultaneously rocking the gang.

Now tune the set to 500 metres and apply a signal of 500 metres (600 kcs.). Adjust P1 for maximum response, simultaneously rocking the gang.

With the gang condenser at maximum apply a 450 kcs. signal to the set. Adjust the I.F. wavetrap (I.F.W.T.) for minimum.

It is now necessary to repeat the first three operations under this heading.

Long Waves.—Tune the set and oscillator to 1,128 metres (266 kcs.) and adjust T3 for maximum, simultaneously rocking the gang.

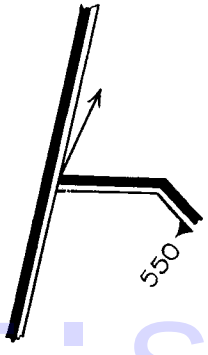
Tune the set and oscillator to 1,818 metres (165 kcs.) and adjust P2 for maximum response. Any alteration to T3 affects the setting of P2.

Now, with the set still switched to the long-wave band, apply a signal of 261 metres. Tune this in on the set (approximate reading 1,200 metres), and adjust I.R. (image rejector trimmer) for minimum output.

(*Continued from page 5.*)

Tune the oscillator to a frequency of 465 kcs. and adjust the I.F. trimmers IFT1, IFT2, IFT3 and IFT4 for maximum output in the output meter, reducing the input from the oscillator as the circuits come into line to prevent the A.V.C. working.

Signal Circuits.—Leave the output meter connected as before, but connect the



The tuning pointer of the McMichael 137 should be set as in this diagram with the condenser at maximum (see "Signal Circuits.")

leads of the oscillator between the aerial and earth terminals of the receiver.

Feed only sufficient input to obtain a reasonable signal. If too much input is fed the A.V.C. comes into operation and a false reading will be obtained.

Before calibrating the receiver, turn the gang condenser to maximum and set the pointer so that it takes up the position as shown in the diagram.

Short Waves.—This is the first range to be adjusted. Inject a signal of 18 mcs. (approximately 16.5 metres). There is a mark on the wave-length scale half-way between the 16.5 and 17 metre position, to which the pointer of the receiver is to be set while the calibration of the receiver on short waves is being carried out. Adjust the trimmers on the condenser gang T1, T2 and T3 in that order for maximum response on the output meter.

Long Waves.—Calibrate this range before the medium waves, as the adjustment of the long waves affects the M.W. calibration to a certain extent.

Inject a signal of 1,000 metres (300 kcs.) and turn the pointer of the set to the same wave length.

Adjust the long-wave oscillator trimmer T4 until the maximum response is obtained, then adjust BP1 and BP2 respectively for maximum sensitivity.

Medium Waves.—A mark is to be found on the wave-length scale approximately half-way between 210 and 220 metres, opposite the station Radio Lyons. Inject a signal of 1,400 kcs. and adjust the medium-wave oscillator trimmer T5 for maximum response. Then adjust BP2 and BP3 respectively for maximum sensitivity.