McMICHAEL 380 THREE-BAND FIVE

CIRCUIT.—The aerial input is *via* a series aerial condenser, two wave-traps and transformer coils to the signal grid of V1, a triode hexode. On the medium band extra primary to secondary coupling is afforded by C2. In the oscillator section separate regeneration modifying resistances are included for each waveband. An oscillator anode load resistance and coupling condenser are incorporated, and the reaction windings are tuned.

An I.F. transformer, tuned to 460 kc., provides the coupling to V2, an H.F. pentode operating as the I.F. amplifier.

A coupling condenser, C9, from the anode of V2, feeds the A.V.C. diode of V3, a double diode valve. The potentials obtained from the load resistances are fed back to the grids of V1 and V2 for automatic volume control.

A second I.F. transformer effects the coupling between V2 and the demodulating diode of V3. Connection to the demodulating diode load is made *via* an H.F. filter circuit. The rectified impulse is fed by an L.F. coupling condenser and manual volume control to the grid of the pentode output valve V4.

Control of the treble response is obtained from a fixed condenser and variable resistance connected between the anode of the output valve and chassis, and a pentode compensator condenser C17 supplements the tone control circuit. A choke condenser filter is connected across the primary of the speaker transformer.

Mains equipment consists of a mains transformer, a full-wave rectifying valve V5, electrolytic smoothing condensers and a smoothing choke (the speaker field).

Radio Chassis Inspection.—Remove the back of the cabinet (secured by wood screws) and the two larger bolts from the wood control panel.

It will then be possible to tilt the control panel with chassis attached so that the top of the chassis is completely accessible. It will be noted that the panel and chassis swing on two supporting brackets.

Output Chassis Removal.—Uncleat the cable from the side of the cabinet and

Three separate tuning scales, wave-change and volume indicators and two-speed tuning are distinctive details of the McMichael 380.

RESISTANCES

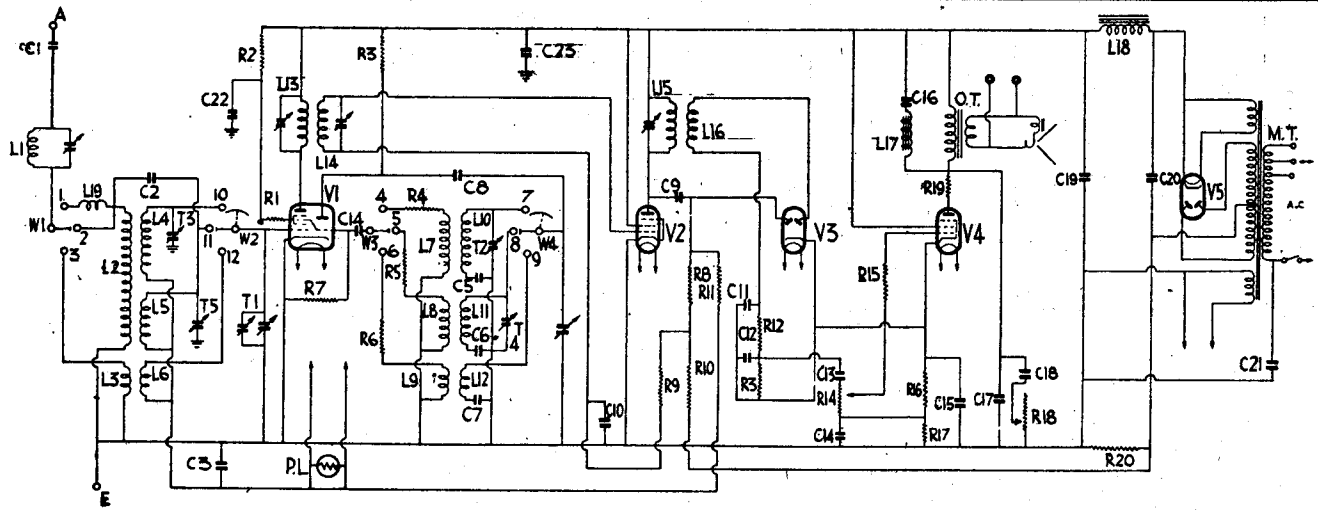
R.	Purpose.	Ohms.
1	V1 screen stabiliser	40
2	V1 screen decoupling	40,000
3	Osc. anode load	40,000
4	L.W. regeneration modifier	5,000
5	M.W. regeneration modifier	2,500
6	S.W. regeneration modifier	50
7	Osc. grid leak	50,000
8	A.V.C. diode load (part)	500,000
9	V2 A.V.C. decoupling	500,000
10	A.V.C. diode load (part)	500,000
11	V1 A.V.C. decoupling	500,000
12	H.F. stopper	50,000
13	Demodulating diode load	250,000
14	Volume control	500,000
15	V4 grid stopper	100,000
16	V4 cathode bias (part)	150
17	V4 cathode bias (part)	350
18	Tone control	100,000
19	V4 anode stabiliser	50
20	A.V.C. delay voltage	40

CONDENSERS

C.	Purpose.	Mfds.
1	Series aerial	.0003
2	M.W. top aerial coupling	.000007
3	V1 A.V.C. decoupling	.25
4	Osc. grid	.0001
5	L.W. osc. fixed padder	.000174
6	M.W. osc. fixed padder	.0004777
7	S.W. osc. fixed padder	.0035
8	Osc. anode coupling	.0001
9	A.V.C. diode coupling	.0001
10	V2 A.V.C. decoupling	.1
11	H.F. bypass	.0001
12	H.F. bypass	.0001
13	L.F. coupling	.005
14	Control return shunt	.0003
15	V4 cathode bias shunt	25
16	Tone filter	.005
17	Pentode compensator	.002
18	Tone control	.03
19	H.T. smoothing	8
20	H.T. smoothing	8
21	Mains suppressor	.001
22	V1 screen decoupling	.1
23	H.T. line bypass	.01

WINDINGS (D.C. Resistances)

L.	Ohms.	Range.	Where measured.
1	6.7	Any	Tags.
2	16	Any	Tag L19 and chassis.
3	.1	S.W.	Tag L1 and chassis.
4	24.2	L.W.	Top grid V1 and C3.
5	2.2	M.W.	Top grid V1 and C3.
6	Below .1	S.W.	Top grid V1 and C3.
7	5.1	Any	R4 and chassis.
8	3.6	Any	R5 and chassis.
9	5.4	Any	R6 and chassis.
10	.1	L.W.	C8 and C5.
11	2.5	M.W.	C8 and C6.
12	9	S.W.	C8 and C7.
13	13	Any	Anode V1 and H.T. line.
14	13	Any	Top grid V2 and C10.
15	3	Any	Anode V2 and H.T. line.
16	—	—	Inaccessible.
17	99	Any	Tags.
18	1,200	Any	C19 and C20.
19	41	Any	Tags.
O.T. primary	670	Any	C18 and H.T. line.
M.T. primary (200v.)	28	Any	Mains plug pins.
Total H.T. sec.	428	Any	V5 anode pins.



An orthodox four-valve plus rectifier circuit is employed in the 380. The frequency changer forms the first valve and is a triode-hexode type with modifying resistances in the oscillator circuit on each of the three wavebands.

from the rear of the output chassis. Unsolder the two leads to the tone control resistance on the side of the cabinet and the blue and green leads to the extension speaker panel. Then remove the four chassis-securing nuts.

The output chassis may then be withdrawn from the chassis free to the extent of sundry leads, but there is sufficient play to allow service work to be carried out.

Special Notes.—In some receivers a 200-kc. filter is included. If fitted, this is included in the can holding the I.F. filter coil, L1, with associated trimmer. The I.F. filter is located in a can secured to the side of the cabinet near the aerial and earth panel. C3 is connected to the aerial socket.

A pair of sockets on an insulating panel secured to the side of the cabinet near the back are for connecting a 2- to 4-ohms extension speaker.

The mains voltage adjustment takes the form of an insulating panel on the output chassis deck in which are three screwed sockets inscribed with voltage values. An insulated member is adapted, to be screwed into the appropriate socket.

The tone control resistance R18 and the tone condenser C18 are mounted on the side of the cabinet.

The pilot lamp is rated at 6.2 volts .3 amp. and is of the M.E.S. base type.

R12, R13, C11 and C12 are contained in the can housing the second I.F. transformer and C2 inside the aerial coil can.

(*Continued on page* 10.)

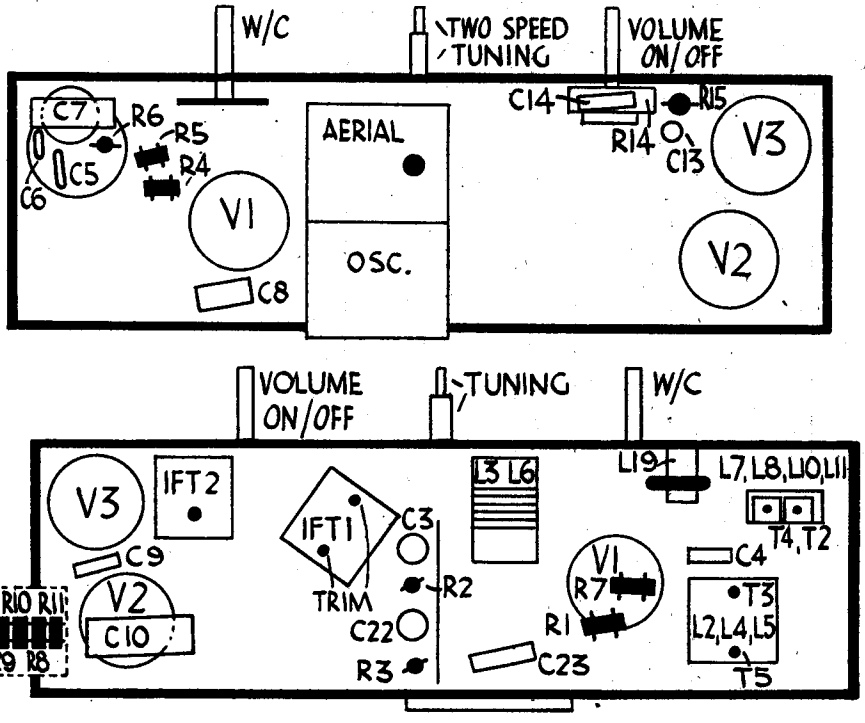
VALVE READINGS

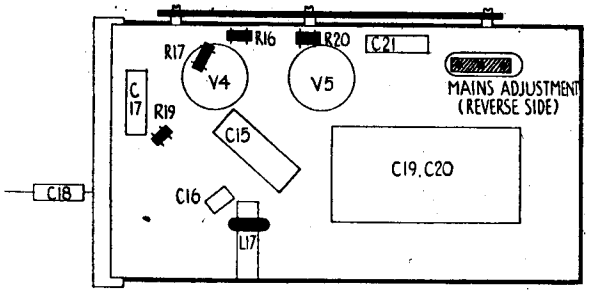
No signal. Volume maximum. M.W. min. cap. 200 volt A.C. mains.

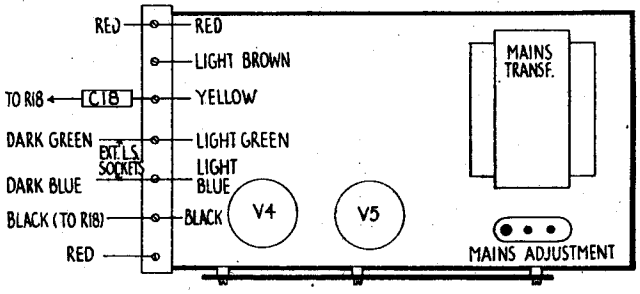
V.	Type.	Electrode.	Volts.	Ma.
	All Mazda.			
1	AC/TH1 ..	Anode ..	235	2
		Screen ..	70	4.1
		Osc. anode	60	4.5
2	AC/VP2 ..	Anode ..	235	12
		Screen ..	235	3
3	V914	Diodes only.	—	—
4	AC/2/Pen ..	Anode ..	212	30
		Screen ..	235	7
5	UU4	Heater ..	310	—

QUICK TESTS

Quick tests are available on the leads to the output chassis terminal strip at the speaker end.
Red lead, 235 volts, smoothed H.T.
Light brown lead, 310 volts, unsmoothed H.T.
Yellow lead, 212 volts, smoothed H.T.







There are separate "radio" and output chassis in the 380 and the former can be swung on a pivot for easy accessibility. The layout diagrams for the radio chassis are the larger ones given above.

McMichael 380 on Test

MODEL 380.—For A.C. mains, 200-260 volts, 40-100 cycles. Price, 9½ gns.

DESCRIPTION.—Four valve, plus rectifier, three-band table model.

FEATURES. — Three wavelength scales with separate pointers. Separate medium and long wave scales calibrated in station names only. The other scale calibrated for all wavebands in metres. Controls for two-speed tuning, wave selection, tone and combined volume and master switch. Wave selection and volume controls operate indicators on panel. Pilot light above calibrated scale. Sockets for extension L.S. Underside of chassis quickly accessible by removing back of cabinet and removal of two bolts enables the chassis to be swung on a pivot.

LOADING.—56 watts.

Sensitivity and Selectivity

SHORT WAVES (16-52 metres).—Very good gain and selectivity well maintained over the range with easy handling and no drift.

MEDIUM WAVES (200-550 metres).—Excellent gain and selectivity, with good background and small local station spread.

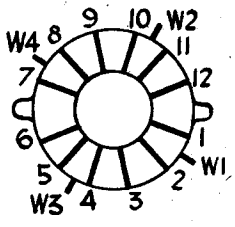
LONG WAVES (850-2,000 metres).—Good gain with all main stations easily received.

Acoustic Output

Ample volume for an ordinary room, with well balanced tone, crisp, clean speech and generally pleasing reproduction.

Replacement Condensers

EXACT replacement condensers are available from A. H. Hunt, Ltd., for C15, unit 2918, 1s. 9d., and for the block containing C19 and C20, unit 1573A, 6s. 6d.



(Right) The wave-change switch unit with the contacts and wipes numbered to correspond with the circuit diagram.

Kolster Brandes Model 750 Four-Band Eight

(*Continued from page* 9.)

to 1,000 metres (300 kc.) and adjust T4, T5 and then T6 for maximum.

Tune set and oscillator to 1,714 metres (175 kc.) and adjust P2 (the screw of double padding condenser) for maximum, simultaneously rocking the gang. 1,714 metres is marked by a dot on the L.W. scale.

Repeat both operations until no further improvement results.

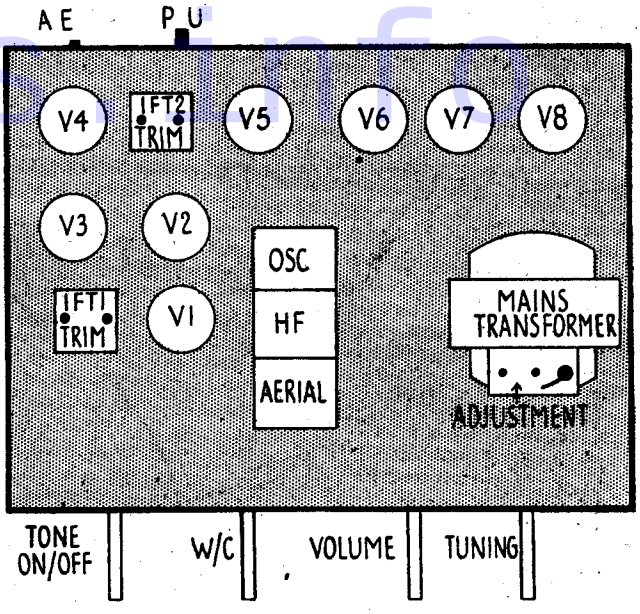
S.W.2 Band, 30-100 metres.—Tune set and oscillator to 33 metres (9 mc. approx.). This is marked by a dot on scale.

Screw T7 right up and then unscrew until the second peak from "tight" is heard. Then adjust T8 for maximum, at the same time slightly rocking the gang. Then trim T9 for maximum.

S.W.1 Band, 11.5-32 metres.—Tune set and oscillator to 15 metres (20 mc.). This is marked by a dot on scale.

Screw T10 right up and then unscrew until the second peak from "tight" is heard. Then adjust T11 for maximum at the same time slightly rocking the gang. Then trim T12 for maximum.

This "top deck" layout diagram for the K.B. 750 gives the valve positions and identifies other components. The diagram for the underside is given on the previous page adjoining the circuit diagram and component "tables"



WINDINGS (D.C. Resistances)

	L.	Ohms.	Range.	Where measured.
1	.. ..	.4	S.W.1	Aerial socket and chassis.
2	.. ..	Below .1	S.W.1	Top grid V1 and C1 +R1.
3	.. ..	.7	S.W.2	Aerial socket and chassis.
4	.. ..	.1	S.W.2	Top grid V1 and C1 +R1.
5	.. ..	4.9	M.W.	Aerial socket and chassis.
6	.. ..	2.6	M.W.	Top grid V1 and C1+R1.
7	.. ..	35.5	L.W.	Aerial socket and chassis.
8	.. ..	33.1	L.W.	Top grid V1 and C1 +R1.
9	.. ..	.4	S.W.1	Anode V1 and screen V7.
10	.. ..	Below .1	S.W.1	Top grid V2 and R3 +C4.
11	.. ..	.7	S.W.2	Anode V1 and screen V7.
12	.. ..	.1	S.W.2	Top grid V2 and R3 +C4.
13	.. ..	5.2	M.W.	Anode V1 and screen V7.
14	.. ..	2.7	M.W.	Top grid V2 and R3 +C4.
15	.. ..	36	L.W.	Anode V1 and screen V7.
16	.. ..	32	L.W.	Top grid V2 and R3 +C4.
17	.. ..	7.9	Any	Anode V2 and screen V7.
18	.. ..	7.7	Any	Top grid V3 and C10.
19	.. ..	.5	S.W.1	R8 and chassis.
20	.. ..	Below .1	S.W.1	C8 and chassis.
21	.. ..	.8	S.W.2	R8 and chassis.
22	.. ..	—	S.W.2	Inaccessible.
23	.. ..	2.1	M.W.	R8 and chassis.
24	.. ..	3.4	M.W.	C8 and P1.
25	.. ..	10.5	L.W.	R8 and chassis.
26	.. ..	15	L.W.	C8 and P2.
27	.. ..	7.6	Any	Anode V3 and screen V7.
28	.. ..	5.5	Any	Diodes V5.
O.T. primary		2450 +250	Any	Blue and red leads spkr. panel.
M.T. primary		10	Any	Mains plug pins.
Field	..	950	Any	Brown and red leads spkr. panel.
Total H.T. sec.		340	Any	Anodes V8.

Fixing Electrolytics

I HAVE found Chatterton's Compound one of the most useful things to have about the service shop.

I have found it particularly useful in the following connection: One is often called upon to replace a condenser pack in a crowded chassis with a replacement having either no fixing flaps or unsuitable ones.

In a case like this, the original pack is taken out and the rear section *complete with fixing flaps* carefully cut away and then fixed with Chatterton's Compound to the replacement pack. A soldering iron, run at about half normal temperature, will serve to run on the Compound. Any Compound remaining on the bit can be removed easily.

The result is a strong and rapid job.

Other uses for this substance suggest themselves almost daily, and one soon wonders how the service bench got along without it.—L. P. D., Malta.

* * *

A PHILIPS receiver came in the other day and was giving only about half normal volume. Even when I located the trouble in the output stage it took some time actually to place it.

Finally I found that the series resistance in the cap of the Pen. 4DD was apparently O.C., and replacing it cured the trouble.

This is one of those "simple" faults that are so baffling until one is aware of the possible cause, which, in this case, was not visible. In future I shall look for resistors in this position.—B. S. S., Southampton.

McMichael 380 Three-Band Five Alignment

(*Continued from page* 7.)

I.F. Circuits.—Connect a service oscillator between the top grid of V1 and chassis and an output meter across the primary of the speaker transformer Switch set to M.W. band and turn gang to maximum capacity. Turn volume control to maximum and tone to "high."

Tune the service oscillator to 460 kc., and adjust the trimmer of I.F.T.2, and then the trimmers of I.F.T.1 for maximum. Reduce the input from the service oscillator as the circuits come into line to render the A.V.C. inoperative.

Signal Circuits.—Connect the service oscillator to the aerial and earth sockets of the receiver *via* a dummy aerial or fixed condenser. Only feed sufficient input to obtain reliable peaks in the output meter and reduce the input as the circuits come into line.

Short Waves.—Inject a 20 metres (15 mcs.) signal, tune in on receiver and adjust T1 for maximum response.

The short wave padding is fixed.

Medium Waves.—Tune set and oscillator to 214 metres (1,400 kc.), and adjust T2 and then T3 for maximum.

The medium wave padding is fixed, but check the calibration, compensating slightly with T2 if very much out.

Long Waves.—Tune set and oscillator to 1,000 metres (300 kc.), and adjust T4 and then T5 for maximum.

The long wave padding is fixed, but check calibration, compensating if necessary.

I.F. Wavetrap.—Switch set to L.W. band, inject a fairly strong 460 kc. signal, tune in signal on receiver, and adjust T6 for *minimum* response.

T6 is the trimming condenser contained in the wavetrap can secured to the side of the cabinet near the aerial and earth panel.