Imported American Receivers

RECEIVERS imported by the Government from the USA are of many makes and types. It is not possible to publish data for all models but, after analysis of the shipments, we have prepared service sheets dealing with the models and types of circuit present in the largest numbers. The Emerson reviews are the first of these and more will follow.

EMERSON 30L Etc.

Continued from opposite page

Voltage Analysis. — Readings taken with a 1,000 ohms-per-volt meter. Voltages shown are from the point indicated to the chassis side of the on-off switch with the volume control at full volume and no signal. The mains voltage (after the line cord) for these readings is 117.5 volts AC. Measurements on DC will be lower than those shown.

Valve.	Plate.	Screen.	Cathode	Heater.*
125A7	88	88	0	12
12SK7	88	88	0	12
12SQ7	30	l —	· 0	12
50L6	82	88	5.6	50
35 Z 5		l —	120	35

Voltage across dial light-4.5 volts. Voltage across speaker field—32 volts. Resistance of speaker field—450 ohms. *Measured across heater pins.

GANGING

IF Circuits.-Rotate the variable condenser to minimum capacity. Feed 455 kc to the grid of the 12SA7 through a .01 mfd condenser and adjust the four IF trimmers for maximum response.

The grid of the 12SA7 may be reached by clipping the ganging oscillator lead to the fixed section of the aerial tuning condenser.

RF Circuits.—Set the dial pointer at 160. Feed 1,600 kc from the ganging oscillator into a loop of wire about 12 in. in diameter.

Hold this radiating loop about 12 in. away from and parallel with the aerial coil. Advance the input to the loop until a satisfactory deflection is obtained on the output meter.

Adjust first the oscillator trimmer for maximum response, and then the aerial trimmer. The oscillator condenser is the front section of the variable condenser.

EMERSON 414, 415, 419, 439, 441

Single waveband, 540-1,630 kc (555-184 metre), six-valve superhet for operation on 105-125 volt AC or DC mains. A line cord is supplied with the set to allow it to work on 230 volt AC or DC mains. This line cord must not be cut.

lations, however, if it is desired to improve connected to the chassis. reception of weak stations, an additional outdoor aerial should be used. For this the circuit diagram, Fig. 1, and the purpose, a lead has been brought out of differences in the design of models 439 the rear near the mains lead.

The self-contained aerial is slightly

employ the same valve combination as this Emerson 414 series, and have similar circuit arrangements:-Admiral .. 4202—B6: 4203—B6: 4204-B6. Fada .. 215: 252 (some models only). .. L604 : L613 ; L621 : L600 (all with 12B7 as HF and IF valves). Motorola .. 61 x 17. RCA $.. 15x: 16 \times 2: 16 \times 3:$ 16 x 11: 16 x 13 : 26 x 1 (12SG7 as HF valve): 26 x 3: 26 x 4.

THE following American receivers

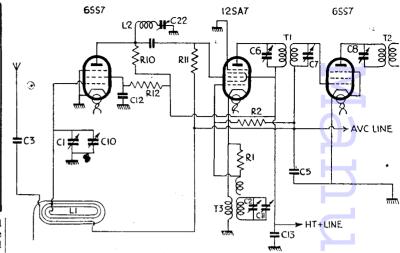
directional and the set should be rotated through 90 degrees, leaving it at the position where the station being received A LL models have self-contained aerials is at maximum volume. These receivers and do not require additional aerial do not require an earth connection and, connections. For permanent home instal- in particular, no earthed wire must be

Stromberg .. 500H.

Models 414, 415 and 419 are shown in and 441 are shown in Fig. 2.

The aerial coil, L1, is tuned with the

787 12SA7 7B7 12SQ7*****



variable condenser, C1 (C10). The coupling between the HF valve and the pentagrid is untuned, but there is a 455 kc L1 wave trap, L2, C22, in this circuit. The $\begin{bmatrix} L^2 \\ T \end{bmatrix}$ oscillator coil is connected between the cathode and oscillator grid of the pentagrid, and is tuned by C2 (C11).

The IF transformers are peaker Continued on page vi

ners are peaked at	113 .	• [Oscillator con.			
	i ——						
n page vi	RI.	20 000 ohm	200 000 ohn	1-watt carbon			
	R2 .		15 meg	i-watt carbon.			
	R3 .		140 ohm	1-watt wire			
Fig. 2: Top of the	110 .	7.0 0	11001111	wound.			
	R4 .	3 meg	3 meg	1-watt carbon.			
page is the HF	R5 .		.5 meg	Vol. control.			
part of the circuit	R6 .		15 meg	1-watt carbon.			
of models 439 and				1 -watt carbon.			
441. Rest of the	R8 .			-watt carbon.			
circuit is like that	R9 .	. 50,000 ohm	50,000 ohm	1-watt carbon			
	D 10	10 000 -1	10 000 -1-	(part of T2).			
for the 414.	R10 . R11 .			i -watt carbon.			
	R12.			1-watt carbon.			
	K14.	Titleg	33,000 0111	T-watt Caroon.			
	C1, C	2		Two-gang con-			
Fig. 1: The circuit	, ,			denser.			
of models 414,	C3,	.002 mfd	.002 mfd	600-y tubular.			
415 and 419. The	_C16						
	C4 .		.0002 mfd	600-v tubular.			
set has an RF	C5,	.05 mfd	.05 mfd	200-v tubular.			
stage in front of	Ć13			T-1			
the frequency	C6, C1			Trimmers, part of IF trans.			
changer.	Co	1		of it traits.			
emanger.	C9			Trimmer and			
				fixed conden-			
				ser, part of T2.			
	C10,	1		Trimmers, part			
ļ	CII			of gang.			
i	C12	.00022 mfd	.05 mfd	Mica (.00022			
		1		mfd), 400-v			
i	C14	.05 mfd	.05 mfd	tubular (.05). 400-v tubular.			
1	C15.	.00011 mfd	.00022 mfd	Mica.			
	Č19	.ooorr ma	.00022 11110	wiica.			
ĺ	C17	.02 mfd	.02 mfd	400-v tubular.			
J	C18	.03 mfd	.02 mfd	400-v tubular.			
i	C20,	20+20 mfd	20 + 20 mfd	Dual, 150-v			
ļ	C21	.		electrolytic.			
ı	C22	′ (Trimmer, part			
	C2.2		0.464	of wave trap			
	C23	ı . !	0.4 mfd	200-v tubular			
RADIO MARKETING SERVICE ENGINEER-V							

414, 415, 419

DESCRIPTION

Loop aerial.

First IF trans-

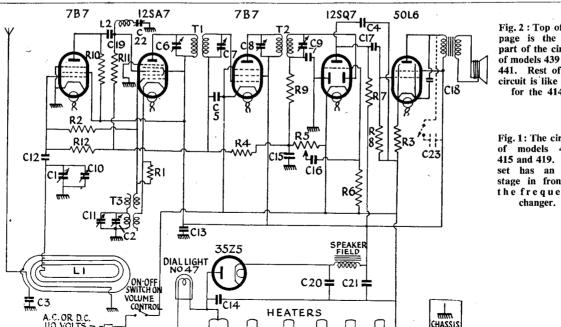
transformer.

Oscillator coil.

Wave trap.

former.

Second



RADIO MARKETING SERVICE ENGINEER-v

455 kc. AVC voltage is applied to the for maximum response. HF, pentagrid and IF valves.

beam power output valve. C18 is for obtained. tone correction and in models 439 and 441 there is an additional tone control 140. Feed 1,400 kc from the ganging

The heater circuit has all the valves in about 12 in. away from and parallel with series, the dial light being taken from a the aerial coil. tapping on the rectifier heater. The set will work with the dial light out, but it is satisfactory deflection is obtained on the advisable to replace as soon as possible if output meter. Adjust first the oscillator it should burn out. If one of the valves trimmer for maximum response and then is removed or burns out the dial light will the aerial trimmer. not glow.

If replacements are made or the wiring section of the variable condenser. disturbed in the HF section, the receiver should be carefully realigned.

In operating the receiver on DC, it may be necessary to reverse the line plug for correct polarity.

The colour coding of the IF transformer leads is as follows :-

Anode-blue. Grid-green. Grid return-black. HT+-red.

GANGING

IF Circuits.-Rotate the variable con denser to the minimum capacity position Feed 455 kc to the grid of the 12SA7

EMERSON 414 continued from valve (pin No. 8) through a .01 mfd. condenser and adjust the four IF trimmers

Wave Trap.—Feed 455 kc to the external The double-diode-triode is resistance- aerial lead and adjust the wave trap capacity coupled by R7, C17, R8, to the condenser until minimum response is

HF Circuits.-Set the dial pointer at with C23, and its accompanying switch. oscillator into a loop of wire about 12 in. All the cathodes are returned to chassis. in diameter. Hold this radiating loop

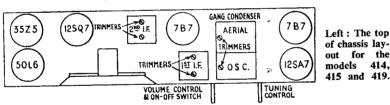
Advance the input to the loop until a

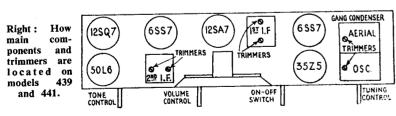
The oscillator condenser is the front

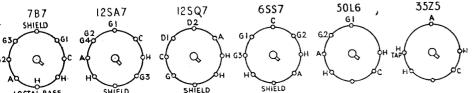
VALVES AND VOLTAGES

ı	Models 414, 415, 419	Models 439, 441
	1 7B7 HF amplifier	6SS7
	2 12SA7 Pentagrid modu	lator-
		oscillator 12SA7
	3 7B7 . IF amplifier	6SS7
	4 12SO7 Detector, AF	amplifier
	4 1250, 2000000, 111	and AVC 12SQ7
	5 50L6 Beam power ou	tput 50L6
	6 3575 Half-wave recti	fier 35Z5
	NR A few receivers of	model 439 will be
	found to use 0.3 amp heater	valves instead of the
	0.15 amp heater types shown	above. The valve
	combination is then as foll	OWS : 68G7 68A7
	combination is their as for	The simulation of
	6SK7, 6SQ7, 25L6, 25Z6.	The circuit arrange.
	ment is substantially the san	ne.

Continued in next column







From the Engineer's Case Book Section returned to the proper position. After reganging, the set then functioned in

parts of the dial after a condenser in the HT - before fitting a new rectifier valve. HF or LF section has been replaced.

This may be due to one of two causes. Either the original condenser was of the may be between 20,000 and 100,000 ohms. non-inductive type and the replacement but any resistance of less than 10,000 ohms is one of the type in which the layers are should cause a short circuit in a condenser wound in a roll; or the outer layer of to be suspected. the condenser may accidentally have been connected to a point at high HF or LF potential and may be causing reaction.

In the former case there is no alternative but to fit a non-inductive type; but in the second, all that is necessary is to turn the condenser round so that the outer layer of foil is at the low HF potential end of the circuit (usually HT+, or chassis).

As condensers are not always marked, the experiment has to be tried to find out which side is actually the outer.

Rectifier Burn-outs

AFTER a rectifying valve has been burnt out, the trial of a new one may well result in that also being destroyed.

Continued from previous column

Readings taken with a 1,000 ohms-pervolt meter. Voltages shown are from point indicated to chassis side of on-off switch with volume control at full volume and no signal. The mains voltage (after the line cord) for these readings is 117 volts AC. Measurements on DC will be lower than those shown.

Models 414, 415 and 419.					
Valve.	Anode.	Screen.	Cathode.	Heater.*	
7B7	18	88	0	5.5	
12SA7	88	88	0	12.0	
7B7	88	85	0	5.5	
12SQ7	30	l —	0	12.0	
50L6	82	88	5.6	50.0	
35Z5		i <u> </u>	1 120	35.0	
Models 439 AND 441.					
6SS7	50	1 57	0	6.0	
12SA7	87	89	0	12.0	
6SS7	88	89	0	6.0	
12507	30	i —	0	12.0	
50L6	82	89	5.3	50.0	
35Z5	<u> </u>		115	35.0	
Voltages across pilot light, 4.5 volts.					
Voltage across speaker field, 32 volts.					

Voltage across speaker field, 32 volts Resistance of speaker field, 450 ohms. *Measured across heater pins.

Left: Pin

connections of

the valves used

in the Emer-

son 414 series.

ENGINEERS are sometimes puzzled to It is advisable to make a practice of find that a set is unstable at certain lecting the resistance between HT + and find that a set is unstable at certain testing the resistance between HT + and

> With sets in which potentiometer feed is used for screen grids, the resistance

> The most convenient method of applying the test is usually to insert a prod into one of the filament sockets of the rectifying valve holder with the other side of the ohmmeter connected to the chassis.

Continuous Buzzing

WELL-KNOWN make of AC receiver, which was otherwise working perfectly, showed peculiar noise symptoms. A continuous buzzing noise provided a constant background from one end of the dial to the other.

This was definitely not due to any outside source, as the set was tried in more than one location, and the noise still persisted.

Checks on valves or any of the usual components did not produce anything useful. The trouble was finally found to be in a faulty dial lamp, which was actually arcing inside the glass bulb whenever the set was switched on.

Substitution of a new dial lamp provided an immediate cure.

Coil that Slipped

A PHILCO 444 model (People's set) received in for repair the other day had a fault we do not remember previously experiencing. The set had been overheating badly. It was duly cleaned, the necessary new components to cure the overheating fitted, and the valves tested.

When switched on, the set remained silent, and on checking stage by stage it was found that the frequency changer (6A7) was not oscillating. Voltages and currents were correct, and the windings of the oscillator coil appeared to be in T8. order. A change of valve did no good.

On another careful check, it was thought that the windings of the oscillator coil were somewhat further apart than normal. and a careful inspection revealed that the overheating had melted the paraffin wax with which the coil is impregnated, and one section, a little loose on the former. had slid down until just far enough away from the other section to stop oscillation.

The coil was gently heated, and the be automatically retuned.

Sets Should be Sealed

COULD makers devise some simple arrangement whereby a receiver could be "sealed" by an engineer after repairing? This would deter unauthorised persons from meddling with the apparatus and protect both the owner and the repairer.

Too often after a set has been repaired a dabbler comes along and tries to improve on the work done. If damage is done, the original repairer is notified and left in ignorance of the meddling and may be out of pocket as a result.

Use for Old Valves

ALWAYS keep old AC-DC valves (including 1184 cluding USA valves of all types). They are very useful, if their heaters are OK, for testing in a universal set where a new valve is wanted. F.D.C.

BUSH BA 61 Continued from bage vii

Press the button allocated to the particular station, turn the oscillator screw (clockwise for increase in wavelength) above the button, so that the index mark coincides with the wavelength required. Then carefully rotate the screw for the loudest output.

Adjust the pre-selector trimmer below the button (clockwise for increase in wavelength) for loudest output. Finally, make a careful readjustment of each tuned circuit. The remainder of the tuned circuits associated with each button should be adjusted in the same manner outlined above.

Adjustment of the LW oscillator trimmer T5 (painted red) will affect tuning of the three press-button stations. Therefore, when this trimmer is used to adjust the manual LW circuit always retrim the automatic stations oscillator adjustments L15 to L17.

Adjustment of the MW manual aerial trimmer T4 may necessitate retrimming the MW press-button trimmers T7 and

Adjustment to the LW manual aerial T6 may necessitate retrimming the LW press button trimmer T9.

The replacing of the frequency-changer V1, may slightly alter the oscillator tuning. To compensate for this, press the button covering the 200-350 metre band (No. 3 button) and adjust the LW oscillator trimmer T5 until the station is correctly tuned; the remaining stations will then

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