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EKCO PICK-ME-UP P149 PORTABLE

CIRCUIT.—Signal frequency amplification is carried out by an H.F. pentode, V1, the gain of which is controlled by the filament current, the bias being fixed and derived from a common bias potentiometer.

The input to this valve takes the form of the medium- and long-wave frame windings, controlled by a two-position switch. An alternative connection can be made through a fixed condenser to an outside aerial.

Further control of the gain of the first valve for local and distant working is effected by varying the screen voltage, the local distance switch shorting out part of the screen-decouple resistance.

Radio-frequency amplification is carried out by tuned-anode coupling with capacity-controlled reaction. The reaction condenser is mechanically ganged with the filament-control resistance, which, of course, is a well-known system.

The detector valve is an ordinary reactive triode with simple resistance coupling to the next valve, V3, a triode L.F. amplifier. This is fitted with a series grid stopper. The anode load of V3 is a resistance which feeds a small L.F. transformer through a coupling condenser.

Grid bias for both V3 and V4 is obtained from a potentiometer consisting of a resistance net work in the common H.T. return, the bias for V3 being decoupled through a resistance and condenser.

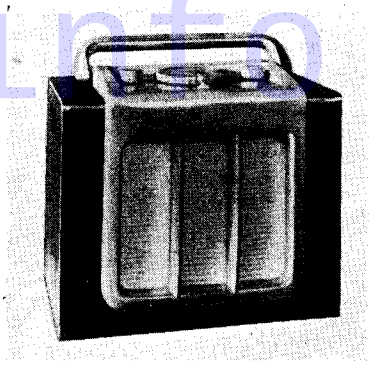
For the output use is made of a small pentode, V4, which is connected to the speaker transformer with the usual anode shunt condenser. The H.T. supply is obtained from an H.T. battery with a shunt condenser. Disconnection of the filament circuit forms the means of switching off the set.

Chassis Removal.—After removing the batteries and valves, release the two control knobs. These are fixed by grub screws. The dial is removed by releasing the central boss, removing the celluloid plate and printed metal scale. This discloses the two grub screws which hold the dial boss on the condenser shaft.

Next unsolder the two speaker leads. These are coloured red and blue, and are connected to the red and blue leads which go to the phone terminals. Taking the tags in order from the top, the connections are as follows :—No. 1, bare earth wire; No. 2, blank; No. 3, red; No. 4, blue; and No. 5, lead to cut-out switch (also blue).

The frame connections must now be unsoldered. Remove the blue lead from the M.W. frame at the right of the set and white and green leads from the long-wave frame.

Great care must be taken with a short bare lead from the external aerial socket. This will be found projecting from the sleeving on the grid lead of V1.



The "Pick-me-Up" battery portable, model P149, by E. K. Cole, Ltd., is a compact four-valve "straight" receiver with frame aerials.

Finally remove the snap switch from the control panel by releasing the locking ring and then remove the four retaining bolts. The chassis can now be withdrawn by tilting it from the output end.

Special Notes.—There should be very little difficulty in locating any of the components as they are quite easy to find once the chassis has been removed. It must be remembered that C4 and C18 are twisted wire condensers to be found on two of the leads going to the wave-change switch.

In carrying out any valve readings notice

VALVE READINGS

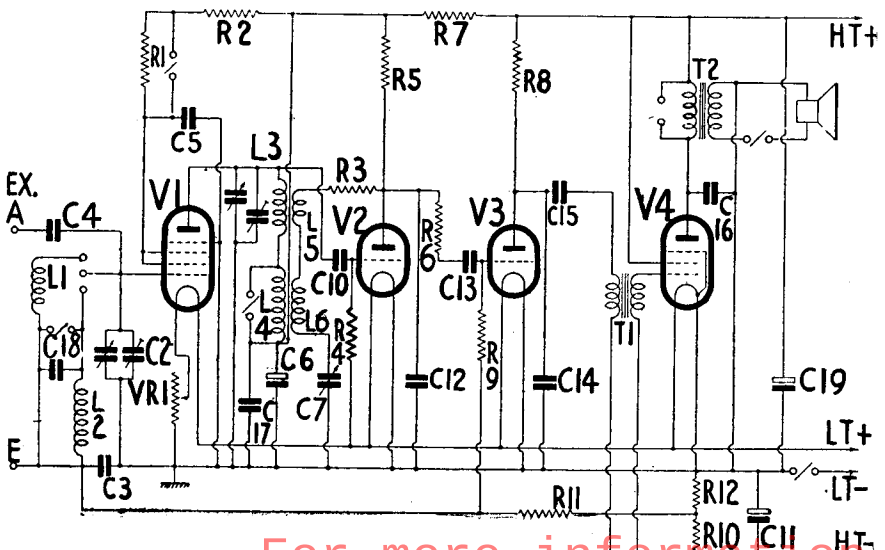
V.	Type.	Electrode.	Volts.	Ma.
	All Mullard.			
1	VP2B ..	Anode ..	75	.8
		Screen ..	55	.2
2	PM2HL ..	Anode ..	70	.5
3	PM2HL ..	Anode ..	65	.5
4	PM22A ..	Anode ..	85	4.2
		Screen ..	90	1

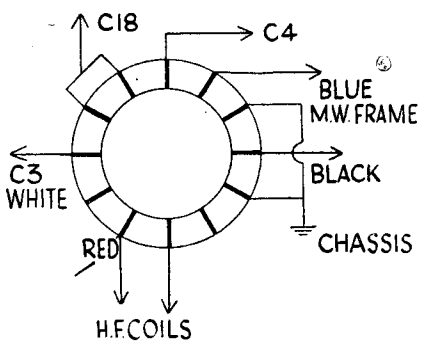
RESISTANCES

R.	Purpose.	Ohms.
1	V1 screen decouple, local working.	3 meg.
2	V1 screen decouple	100,000
3	Reaction stabiliser	200
4	V2 grid leak	8 meg.
5	V2 anode load	30,000
6	V3 grid stopper	150,000
7	V1 and V2 anode decouple ..	10,000
8	V3 anode load	50,000
9	V3 grid leak	1 meg.
10	Bias pot. (part)	200
11	Bias decoupling	1 meg.
12	Bias pot. (part)	100

CONDENSERS

C.	Purpose.	Mfds.
3	V1 A.V.C. decouple	.1
4	Aerial series	Twisted wires.
5	V1 screen decouple	.1
6	V1 and V2 anode decouple. .	2
10	V2 grid	.0001
11	Bias shunt	20
12	V2 anode bypass	.0002
13	V3 grid	.01
14	V3 anode shunt	.002
15	Transformer primary coupling.	.1
16	Pentode compensating ..	.002
17	V1 and V2 anode H.F. decouple.	.1
18	L.W. aerial coil shunt ..	Twisted wires.
19	H.T. shunt	8





Screen-grid, reactive detector and two L.F. valves form the P149 circuit. Switching is simple and all details of the single bank are given by the above diagram and in the text on the opposite page. The local-distant switch is across R1.

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Making the Most of the Ten-Minute Fault-Finders

New-style reviews are given from page 34 onwards. These notes explain ideas behind the 10-Minute Fault-Finders.

IN every mains set there is an H.T. supply and a smoothing choke through which the total H.T. current passes. In nine cases out of ten the connections to the choke (and the output valve anode) are accessibly situated on the output transformer on the speaker. If we measure the voltage on each side of the choke and also its resistance we immediately know more about the set than could be determined after many minutes of general voltage and resistance testing.

To start with, these voltages are important as a precaution. If they are extremely high or low, the rectifier and, perhaps, other components are in danger of damage, and the engineer will at least know that the receiver should be switched off.

But the Power Test is much more than a safety measure. By subtracting one voltage from the other and dividing the answer by the resistance of the choke we learn the total feed current of the set. This can be found as quickly as this takes to read. For example, if the measured voltages are 280 and 220 and the field resistance 1,500 ohms, the current is $60 \div 1.5 = 40$ ma.

The value of current through the choke and the two voltages tell us more than may generally be realised. For example, suppose the current was 30 ma. below standard. Reference to the Valve Readings Table might show that the output valve normally drew 30 ma. Evidently an open H.T. or cathode circuit to the output valve would be indicated.

The two voltages alone tell a surprisingly full story.

For example, if the unsmoothed volts (measured on the rectifier side of the choke) are a little low and the smoothed volts very low, we have a heavy feed current. This immediately points to excessive consumption in the set, and we think of leaking condensers and open grid circuits. If both voltages are low, we suspect the rectifier or mains transformer.

On the other hand, if both smoothed and unsmoothed volts are both very high and nearly equal, obviously no anode current of any magnitude is passing.

Output Stage.

The first dynamic test is on the output stage, and is made by applying approximately two volts A.C. to the grid circuit of the output valve.

If a proper output is obtained from the speaker there is no need to worry any more about anything connected with that part of the circuit. If not, voltage and resistance tests are made.

A test prod only is required, and there is no insertion of adaptors or unsoldering of leads.

Demodulation.

By injecting a strong modulated I.F. signal on the signal diode (connect oscillator between diode and chassis) we have an immediate check-up on the diode load and filter circuit to the grid of the triode.

I.F. Amplification.

By injecting on the primary of the second I.F. transformer (oscillator connected between anode and chassis) we test the secondary and at the same time roughly trim it. By then injecting on the grid we simultaneously check the primary trimming and the I.F. valve.

Here absence of signals may be due to the valve or to the grid, anode or cathode circuits.

Oscillator Circuits.

Here use is made of two generators or, more conveniently, the local station and one generator.

First, short the oscillator gang and tune by the dial to the local station. Inject on the oscillator grid a frequency equal to that of the desired station plus the I.F. If the signal is heard it means that the input circuits of the set are working and that the fault, therefore, is in the oscillator section.

Preselector Circuits.

Absence of signals during the oscillator substitution test must mean a fault in the input to the oscillator.

Ekco P149 (*Continued*)

must be taken of the presence of a very high screen resistance for V1 in the local position. With this resistance, which is three megohms, in circuit, the current is so small that it will not show on an ordinary milliameter, and it might be thought that the valve or circuit was defective.

Switching.—All the switching is accomplished on a single wafer, which performs three functions. First of all there are contacts for the filament supply. These form the main control switch of the set.

One pair of contacts is used to short-circuit the long-wave H.F. coil in the M.W. position. One wipe is used to select either the M.W. or L.W. frame aerial coil, but shorting contacts are also provided to short out the L.W. frame coil in the M.W. position. The drawing should make the whole arrangement perfectly clear.

Circuit Alignment

Set the local distance switch to the distant position and tune in a weak station between 220 and 300 metres.

Adjust the aerial trimmer condenser for maximum. This is located on the top of the gang nearest to the control shaft.

Then adjust the H.F. trimmer for maximum. This is located on the top of the second gang.

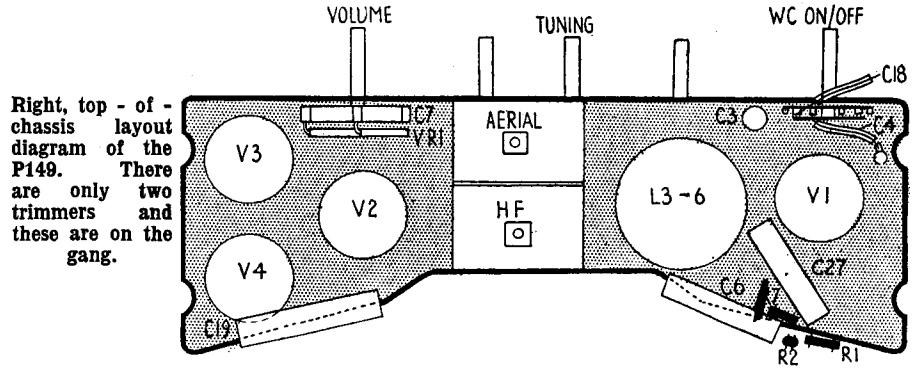
In carrying out the trimming adjustment care must be taken that the set does not rotate on the turntable, as otherwise the results will be inaccurate.

Reaction should be advanced, but not to the oscillation point.

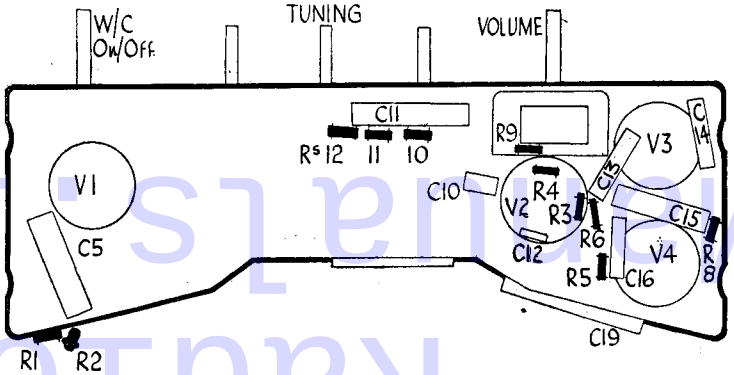
If desired the circuits can be aligned in the workshop by injecting a signal from a service oscillator by means of a loop of wire brought near the frame aerial.

WINDINGS (D.C. Resistances)

L.	Ohms.	Range.	Where measured.
1.. ..	1	M.W.	On tags.
2.. ..	24	L.W.	On tags.
T2 prim.	1,320	—	On 'phone sockets.
T1 prim.	590	—	V3 pin and +C15 and C11+R10.
T1 sec. ..	2,500	—	V4 grid and C11+R10.
5 + 6	5	—	V2 pin and reaction condenser.
3	5	M.W.	V1 anode and C6.
4 + 3	23	L.W.	V1 anode and C6.



Right, top-of-chassis layout diagram of the P149. There are only two trimmers and these are on the gang.



Underneath the chassis construction is very simple and straightforward (see layout diagram on left).

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