New Points For Listeners and Dealers-- *By "Meter"*

The aim of this section is to give listeners information of new and interesting devices and sets on the local market. It is free of advertising intent or influence and to the best of our ability will convey only absolutely reliable statements. Names, prices and sources of supply are mentioned for the benefit of readers and to save individual inquiry.

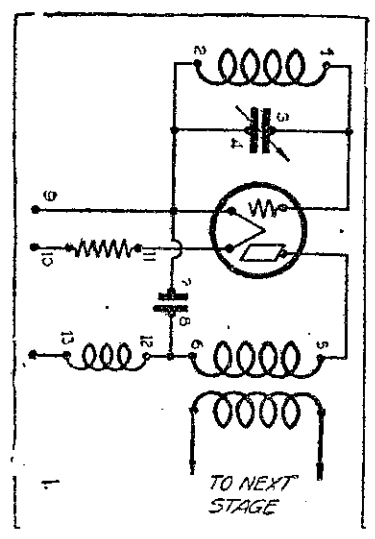
THE popularity of the short-wave bands is increasing day by day, and inquiries are to hand everywhere for information on short-wave receivers suitable for the reception of international broadcasting. Many excellent receivers are described from time to time; receivers which give excellent results if only the reader will stick to the specifications outlined. Many people will construct a receiver with perfectly suitable inductances with loose coupling to the aerial and then spoil the whole thing by the introduction of mechanically and electrically unsuitable condensers for tuning and oscillation control. One great fault is the placing of too great a capacity of tuning condenser across the grid coil, even amounting to a capacity as high as .0005 mfd. The absolute maximum capacity permissible across the grid coil of any short-wave receiver is .0001 mrd. This is essential, as a very small change of tuning capacity produces an enormous frequency change on the high frequencies. If too large a condenser is used the resultant tuning will be either critical to a degree or entirely uncontrollable. Some may object to the use of small variable condensers on the ground that the tuning range covered would be inadequate, but this is easily overcome by the provision of separate coil units for each wave band, of which there are several excellent makes on the market. It is often thought that a large variable condenser used in conjunction with a small vernier is satisfactory if the tuning condenser is adjusted to minimum capacity. This is not the case, as the minimum capacity of the combination will be in the neighbourhood of .00001 mfd. It is of great value to use condensers having metal end plates, provided they are connected to the rotor plates and thence to earth; this forms an excellent protection against body capacity effects. There must be absolutely no backlash or end play in the condenser bearings, otherwise the circuit cannot be adjusted accurately, and it will be found when tuning in a station, the relaxation of the fingers on the tuning knob will move the rotor plates and the station will be lost. It is also of great importance to use straight line frequency condensers. By so doing, the signals are spread evenly around the dial, and the tuning is consequently not crowded. The next best type of condenser is the "square law." Condensers for use in short-wave work should always be used with a smooth, running high reduction vernier dial control.

PROFESSIONAL TROUBLE SHOOTING.

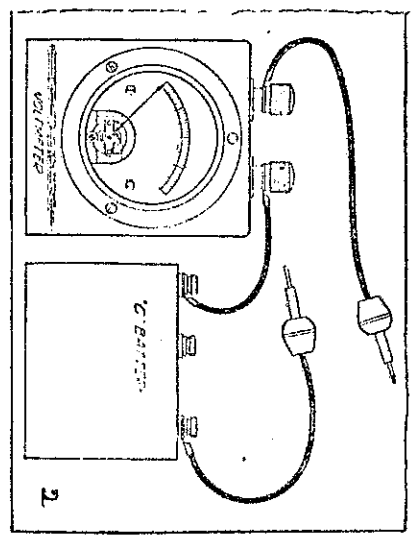
ONE of the first things that any professional set builder must learn to do is to pursue a definite routine for shooting trouble on a receiver (says the Chicago "Call Book Magazine"). In the following paragraphs, some idea will be given as to a standardised method of checking almost any receiver.

In the schematic diagram shown with this article may be seen a typical vacuum tube circuit containing a tuned grid section, a plate circuit employing either an r. f. transformer or an intermediate transformer (or, in some cases, an audio transformer), with a suitable r. f. choke coil, bypass condenser, and the necessary filament resistor. In Figure 2 is shown a simple sketch of a voltmetre, a C battery, and two testing handles. My means of the voltmetre and C battery, it is possible for the set builder to check any of the apparatus involved in the schematic circuit, Figure 1. For example, if it is desired to check the continuity of the inductance in the grid circuit of this receiver, or any receiver, the two testing handles are placed one on terminal 1 and one on terminal 2. If the voltmetre registers, it is an indication of the fact that the wire in the inductance is continuous, and, therefore, not open. This form of testing is a standard test for continuity, and may also be supplied to the inductance in the plate circuit of the tube marked 5 and 6. It may be likewise used in the r. f. choke coil by placing the test handles across Nos. 12 and 13. For continuity, of resistance, the same thing may be done across Nos. 11 and 11. This test may be applied to any circuit, regardless of how complicated or how simple, as long as the general procedure outlined above is carried out, and each and every inductance choke, resistance, or transformer. For example, if the test is to be made in the plate circuit of a detector, the test is made in the same manner, as if the audio transformer primary were in the position shown at 5 and 6 in the diagram, Figure 1. The test for the secondary of the audio transformer would be the equivalent of the inductance shown at 1 and 2.

When testing condensers, the method is the same, although the indications on the metre are the opposite. For example, when testing an inductance, a continuous circuit is made evident by the reading on the voltmetre, which shows that the coil is O.K. On the contrary, when testing condensers, no reading should appear on the metre, and if one does appear it proves either of two things: that in testing the con-



denser the operator has neglected to remove either a resistance or an inductance, which may have spanned the condenser, or the condenser is actually shorted. To make this clear, if the operator wants to test the variable condenser shown in the grid circuit of the tube in Figure 1, and places the test handles across the rotor and stator, and 4, the metre will give a reading because of the fact that the circuit is closed through the inductance 1 and 2. Therefore, in order to obtain a true idea as to whether the condenser is shorted or not, it is necessary to remove either the inductance connection No. 2, or that marked No. 1. When this is done, and the test handles are applied to points 3 and 4, no reading should show on the metre. If one does show, it is an indication that the plates of the variable condenser are touching, or that some metallic substance has



lodged itself between the rotor and stator, and consequently short circuited these two sections. To see whether the short circuit is a temporary one, turn the rotor back and forth, and observe the metre. If the metre reading remains throughout the turning of the rotor back and forth, it can safely be assumed that the rotor plates scrape against the stator throughout the full travel of the rotor. If the metre reads when the rotor is unmeshed, that is, furthest removed from the stator, this indicates that a short circuit exists some place other than between the rotor plates and the stator. This might be caused by a wrong connection on the condenser, such as a piece of wiring joining the rotor and stator binding posts together, and perhaps not being observed by the builder. This test of a variable condenser is the same, regardless of where the test is applied. For example, the diagram in Figure 1 may be considered the grid circuit of an r. f. amplifier. This same test can also be tried on the detector stage, or an oscillator in a superheterodyne. When making any of the tests referred to, it would be wise to remove A, B, and C power from the receiver.

For testing a bypass condenser, it is only necessary that the test handles be placed at the points marked 7 and 8 in Figure 1. If a reading occurs, the condenser is shorted, unless it should happen that the builder has left the B battery in the circuit, in which event there would be return back to terminal 9, which would give a fictitious reading, since the reading would be that of the circuit existing between points 13 and 9, rather than between points 7 and 8. It is, therefore, wise not to have any battery connected or eliminators when this testing is done, since these would give a wrong reading.

SHIELD THE NEW VALVE.

SET builders who propose using the new screen grid valve should pay strict attention to its shielding if the best results are desired. Careful shielding is the secret of success in using the screen grid valve. While inter-electrode capacity is practically eliminated in this valve, interstage coupling is not. Each radio frequency stage must be enclosed in completely interlocing heavy shields. Aluminium shields should be at least .08in. thick; copper not less than .05in. thick. The use of copper facilitates soldering of joints. Best results are secured by putting "cans" on the valves and by enclosing the lead which connects the plate from one valve to the coil of the next in a small grounded metal covering. Radio frequency chokes and by-pass condensers are necessary in the plate circuits to prevent coupling through the battery or eliminator circuits. For a three-stage amplifier it is also advisable to include chokes in the screen grid leads of each stage. The use of heavy shielding, solid construction and cushion sockets minimise microphonic noises.

BATTERY SETS STILL UNECLIPSED.

THERE are slight symptoms of panic among New Zealand radio traders over the advent of the new A.C. valve radio sets, in fear, as may be expected, that the demand for battery sets now in stock will completely disappear.

The San Francisco "Radio" remarks: "To-day every buyer seems to want an A.C. set, not because it gives any better selectivity, sensitivity, or tone quality, but because the average user is too lazy or too ignorant to take care of a storage battery. Most of the manufacturers, jobbers, and dealers are agreed that it is here to stay, and are diligently trying to perfect its minor defects.

"Undoubtedly new and improved types of A.C. tubes will be developed for various special purposes, just as have D.C. tubes. A shielded grid tube for A.C. filament operation is in the offing as a more efficient r.f. amplifier than the present A.C. tube used for that purpose. A new heater type, designed for longer life than those first marketed will also soon be available.

"The filaments of all the present power tubes used as audio amplifiers may be heated with raw A.C. with but slight hum. This can be eliminated by push-pull connection. But, contrary to general accepted opinion, such push-pull connection does not also double the lower output. In fact, carefully conducted tests have proved that push-pull connection of two tubes gives but 1.1 times the power output of a single tube with the same plate and grid voltage.

"The availability of A.C. tubes has also created a demand for means of converting D.C. sets for A.C. operation. This may readily be done at slight expense and trouble so that old sets can thus be brought up-to-date if desired. But the wise man, in our estimation, is he who takes advantage of the present low prices of D.C. sets and accessories. A battery-powered set gives just as good results to-day as the latest A.C. model.'

HEAT SPOILS FIXED CONDENSERS.

"WHEN in doubt, solder." That happens to be good radio advice for every point of the construction of a radio set with the exception of the connections to fixed condensers. The connections to fixed condensers should be made by fastening a soldering lug to each end by means of a small machine screw and nut. Fixed condensers are usually assembled under pressure, with some substance like beeswax used to make the article moisture proof. If you use a hot soldering iron on the metal ends, the beeswax with which the condenser is impregnated will run out and the capacity of the condenser will be changed considerably.

Many manufacturers of fixed condensers have changed the design of their product to include soldering lugs on the terminals. Some condensers still being sold at the present time may not be equipped with soldering lugs, and you may feel inclined to solder directly to the metal end. Use soldering lugs instead or you may ruin your condenser.

SHIELDED grid valves require radio-frequency transformers having a high primary impedance in order to give the high amplification of which they are capable. This means that the transformer primary should have about the same inductance as the secondary. Less selectivity but equally good amplification is obtained with impedance coupling, using a single coil common to both the plate circuit of one valve and the grid circuit of the next.

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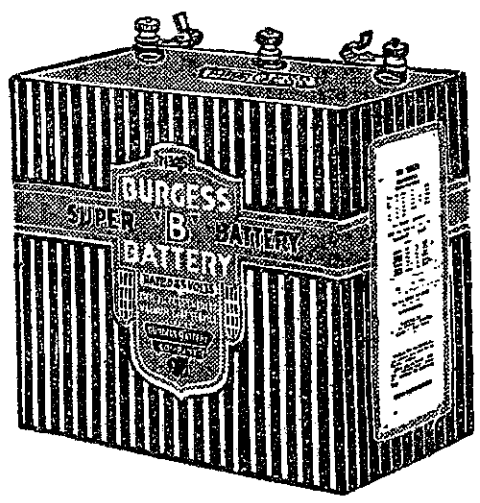

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