Mainly About Construction

By "Megohm"

Testing Audio Transformers

MANY queries that are sent in dealing with sets that have gone "dead," or nearly so, point to breakdown in audio transformer windings as being the cause of the trouble. It is quite a simple matter to ascertain whether a transformer is in good order or not, though many listeners do not appear to know how it is done. Every owner of a receiver should either make a special testing piece or be able to put it together for use at any time.

The only requirements are a pair of headphones, one dry-cell of 1½ volts, which can be a "dud" that has done service on filaments or grid-bias, so long as it shows not much less than one volt. A couple of yards of flexible wire.

IF an old pair of 'phones can be set aside for the purpose, a small flashlight cell can be attached on top of the headband and put in series with the 'phones, ready for use at any time. Otherwise the cell can be kept ready with connecting wires and clips or terminals, to which a pair of 'phones can be quickly attached. This tester is useful not only for transformers, but for testing any other part of the circuit where lack of continuity is suspected.

In whatever form the tester is put together, it is simply the cell connected in series with the headphones with two loose, flexible leads that can be applied to any parts to be tested.

Testing a Transformer.

THE breakdown of a transformer is sometimes a puzzling occurrence, for although a break in the primary will probably cause a complete stoppage of signals, a break in the secondary may only cause weak signals or distortion. With a break in the secondary, no grid bias is applied to the grid of the valve, so that distortion and blocking are likely to occur.

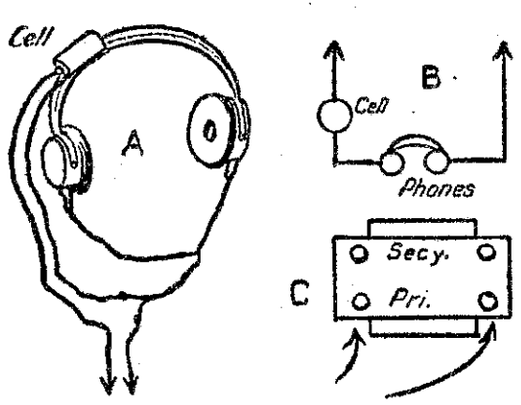
In the case of the first audio transformer, if the input to the grid of the valve is small, this distortion might not be noticed for some time. It is quite possible to receive weak signals from the local station with a break in either a transformer or resistance amplifier, and this should be a hint to apply the test to either.

SOMETIMES the break in a transformer is only partial, and in such a case reception will be varying in strength or intermittent, and noisy. Crackles like violent static will probably be heard.

At the same time it must be remembered that such crackling can be caused by defective joints in wiring, or by a dry B battery that has become "bone dry."

Connecting wires should be taken off transformers for the purposes of testing. First apply the two free ends of the tester (shown as arrowheads in the diagrams) to the two primary terminals of the transformer. A click should be heard in the 'phones that is not quite as loud as that heard when the two free ends are touched together. If this is so, the winding is intact. If the winding is broken, a very minute click will probably be heard, which is the broken winding receiving a charge from the battery just in the same way as a condenser can be charged. The secondary winding is tested in the same way. The click that indicates continuity may not be quite as loud as that from the primary, but it should be distinct. If extremely faint, the same indications apply as above.

Some listeners may be puzzled to know which are the primary and secondary connections of a transformer. The two primaries may be marked 1P,



0P; P and B positive, or P and HT. The two secondary terminals may be marked IS, OS; G, GB, or G and F.

ANOTHER test to show that the transformer is functioning correctly is to connect the 'phones alone across the secondary, place them on the head, then connect the dry cell across the primary, making and breaking contact. Good loud indications heard in the 'phones indicate that all is in order.

Suspected joints or connections in any part of the circuit are tested by applying the tester to each side of the joint—loud clicks indicate good contact. No clicks indicate that resoldering is required.

Fixed condensers are tested for breakdown in the same way, if of small capacity.

Moving-Coil Speakers.

THIS type of speaker has up to now been very little in evidence in New Zealand, owing to the fact that neither complete speakers or the necessary castings have been imported. To keep readers well posted in the matter, an article is being prepared for next week, giving a full description of the principle involved and general construction.

An A.C. Screen Grid.

A SCREEN grid valve for a.c. operation has now appeared in America. It differs little in appearance from the familiar 222, except that a cathode heater is included, and the outer screen is a square mesh of wire instead of a spiral coil. The ordinary four-prong UX base is used, the cathode being connected to the A positive terminal, thus obviating the necessity for a fifth prong.

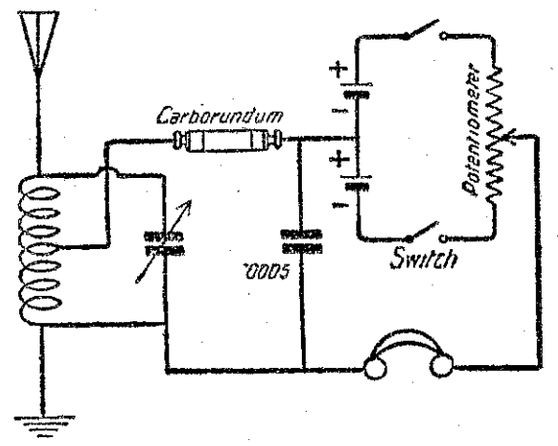
Battery Potential on Crystal

READERS often inquire as to the method of applying battery potential to the carborundum crystal. If the biassing voltage is carefully applied to the crystal and properly adjusted, results exceeding those of the ordinary perikon detector may be gained. (A perikon detector is usually zincite in combination with copper pyrites, hornite, or other crystal.) When a biassing voltage is applied there is a critical point where the strength of signals increases in greater proportion than the applied voltage. In all other crystal combinations the increase in signals is only in direct proportion to the applied voltage. Inthe case of both there are definite limits above which increase of applied voltage will produce no benefit.

THE usual method of applying voltage to a carborundum-steel combination, such as those obtainable in cartridge form, is shown in the diagram.

The ordinary tuning circuit is shown at the left, the crystal in this case being shown connected to a tap on the tuning coil, but may be connected to the aerial end if found an advantage. The circuit is tuned by a .0005 variable condenser with about 56 turns on the coil, or .00025 with about 78 turns, the wire being better spaced about half its own thickness. The diameter of coils is 3 inches. The foregoing particulars are given for those who wish to construct a complete receiver, but any existing crystal receiver may have the carborundum cartridge put in and the biassing arrangement added.

THE biassing is accomplished by means of a potentiometer of 400 ohms resistance. The arm is connected to one side of the 'phones, and the two other contacts to the negative and positive, respectively, of two small flashlight dry cells. A connection is taken from between the two cells to one end of the crystal and to a fixed



condenser of .0005 capacity, which functions as a by-pass. A switch should be provided for each battery as shown, and this may conveniently be a double-pole single throw, so that both are switched off together when not in use. It is immaterial which end of the detector is connected to the central point of the battery, as the potentiometer allows the application of a voltage of positive or negative from 0 to 1½ volts.

If one cell is omitted its position is bridged over with wire, and it is then