

LOW frequency transformer troubles are by no means uncommon, but complaints are not frequently made, the resulting unsatisfactory rendition being attributed to wireless. However, a correspondent from Cromwell, suspecting trouble, writes thus:—

MY first transformer is a Ferranti 4, which does not seem to perform according to Cocker. When the machine is at maximum sensitivity this transformer will squeal when the casing is touched. I have noticed at times that the output volume of the set will increase when I hold this transformer with my hand. On odd occasions it will squeal when I put my hand near it. The other transformer, a Ferranti 3, does not do any of these tricks.

I find volume increased by tying the radio valve hard down in the socket. Cleaning the pins did not have this effect, so they could not be responsible.

I have an output filter, and despite the makers' assurance to the contrary, it does decrease the volume somewhat. The most annoying part, however, is that the filter sings—it acts like a 'phone and can be heard anywhere in the room quite distinctly.

Before I put on the filter, and even yet to a lesser extent, I was annoyed by a short explosive crackle in the speaker and 'phones. It was an intermittent cracking sound, and I could not track it down unless the first Ferranti was doing it. I can guarantee everything else in the set was O.K. Batteries, connections, and valves as good as gold.—Diogenes (Cromwell).

It would seem that the transformer is at fault. Following these notes is a lengthy article dealing with the locating of L.F. troubles, and Diogenes would be well advised to apply the test. However, a few other suggestions may be of value. The case of the offending transformer should be earthed; this may eliminate the difficulty if the test does not reveal a broken winding, which the crackling in the speaker would seem to indicate. Crackling has been dealt with in the Beginner Corner in our issue of September 28, but in this case we suspect the transformer.

It would also seem that a new socket for the R.F. valve would improve reception. It seems to be somewhat defective. Output filters do reduce volume, and singing is hard to stop, but the correspondent should try removing the filter further from his set.

DESPITE the recent great improvements in transformer design the commonest trouble with this instrument is still the "burn-out." This term—which, by the way, is a misleading one—is generally used to indicate a break in one of the windings.

If the break is in the primary winding, the anode supply to the valve in whose circuit it lies is automatically cut off, thus placing this and the succeeding valves hors de combat. If the break is in the secondary winding the results are almost equally disastrous.

#### Testing the Primary.

When the primary winding is fractured the usual result is not merely an interruption of the transfer of signal impulses to the following valve, but there is often a puzzling fluctuation in the fault as well, combined with weakness and distortion. Even without the transformer being touched in any way there is an irregular contact at

the point of fracture which gives rise to scratching and scraping noises, so that a broken primary often means that snatches of distorted music or speech come through much weaker than the usual signals, and puzzling by virtue of their inconstancy.

If the transformer can easily be moved from the set the continuity of its winding can be tested by means of the phones and dry-cell method. All that is necessary is a small battery to give the tell-tale double click when the phones leads are connected across it.

Then, if one end of the phones cord is connected to one side of the battery, the remaining side of this to the terminal of the winding under test, and the remaining transformer terminal is connected to the other phone tag, a loud click will be heard in the telephones if the winding is O.K. If, however, the winding is broken the click will either be quite a soft one, or else no click at all will be heard. The primary is the likeliest winding to "burn out," but if this appears to be O.K. the secondary winding should be tested in the same manner.

#### Under Working Conditions.

IF the L.F. transformer cannot easily be removed from the set for test, it can be tested for breakdown under working conditions by means of a pair of telephones. If the two or more wires which go to the primary are removed and a pair of telephones are connected across this point in the circuit, the output of the receiver to the transformer can be checked. Good results in the phones indicate that the primary terminals when connected will be getting their correct input. If now one side of the phones is connected to one of the primary terminals and then the remaining side of the telephones goes to the wire which previously went to this terminal, the telephones will be in series with the primary. (The remaining side of the primary should be connected to its ordinary lead, thus restoring the set to its original form except for the fact that the telephones are now linked in as well.) Weak or negative results will, of course, indicate that there is no connection through the primary. The shorting of the two primary terminals by a piece of wire and the consequent phone signals will prove without a doubt that a fault lies between these points. If, however, under this test the primary winding appears to be O.K. and the phone results are still good when connected in series with the primary, the phones should be taken out of circuit and placed across the transformer secondary terminals instead. Failure to get results here will be a clear indication that the fault lies in the transformer itself.

Not only can the continuity of the primary and of the secondary winding be tested by means of the phones and dry cell, but this method can be employed also to make sure that there is no fault in the insulation between the windings. For this test, disconnect all wires from both primary and secondary. Then join one side of the battery to one of the primary terminals, one side of the phones to one of the secondary terminals and then listen in when the circuit is completed by attaching the other side of the battery

to the other side of the telephone. If the insulation is as good as it should be, the fact that there is no current flowing in the circuit will be indicated by the absence of a click. But if a loud double click is heard on touching the battery and telephone terminals together it will prove that the insulation between these windings has broken down.

#### Investigating Insulation.

ON some transformers it is the practice to provide an extra terminal by means of which the metal case of the instrument may be connected to earth. As both the primary and the secondary windings should be insulated from the earthed case of the transformer, the phones and dry-cell method affords us an opportunity of testing whether this insulation is correct. In

this instance the test is carried out by connecting the battery to the earth terminal on the transformer, the remaining side of the battery to the telephones, and the remaining side of the telephones to the winding under test. When this final connection is being made no sound should be heard in the phones, but a loud click will indicate that the winding in question is not properly insulated from the frame of the instrument.

DO not lay a panel down on a bench which has not been brushed or freed from bits of metal, or otherwise you may scratch and mar its appearance before it is put in the cabinet.

UNDER no circumstances must the small holes in accumulator vent plugs become stopped up, as by allowing the escape of gases when the accumulator is being charged they play an important part in its maintenance.

## WHY do Batteries Last Longer when Charged by— Gruars Battery House BECAUSE

Each Battery is carefully watched throughout the charges and tested thoroughly in three different ways before being passed for delivery by our Service Vans.

You get a Full Charge.

The Life of your Battery is increased.

Our Battery Service Eclipses all Others.

We Collect, and Deliver, City and Suburbs; including Hutt, Petone, Ngaio, Johnsonville, Seatoun, Wadestown, Vogeltown, Brooklyn.

Just Ring---

**20-937**

Branches also at: AUCKLAND, WANGANUI