Diagnosis of Radio



EFORE commencing the subject of this week's "Diagnosis," the writer wishes to try at least to clear away a diffiand condensers, and says be volts.

can now trace the path of the current through his set until it reaches the audio transformer, where he is "stumped." The audio transformer is merely a form of audio choke, and consequent-Iv cannot pass the a.f. current-but how does it energise the secondary if it cannot pass it?

The phenomenon is more or less explained by the notes on the transformer appearing this week. The audio frequency current is absorbed in the primary of the transformer (really an audio choke). Instead of being dissipated, the a.f. current excites similar vibrations in the secondary of the transformer and a transfer of energy takes place. The primary will not pass the audio frequency, but absorbs it rather than blocking it.

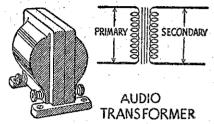
Transformers

A TRANSFORMER is a device for transforming energy from one cir-cuit to another without directly coupling them.

That means that if we have two coils with one circuit and one connected with the other, and arranged so that they can in nowise touch and apply alternatpicked up in the other. Now that sounds wonderful, but it is the basis of all radio; but current must be alternating before a transformer can be five. of any use, thus we cannot put a transa circuit containing a.c. current. We are in will take, for instance, the a.c. mains. formers. If we put a transformer between the

By the Technical Editor

culty that is facing one cor- volt main, and we had one turn connect tector. So that we find iron-core transrespondent. He has read the to it, and another turn nearby, we formers used in all a.c. work except previous articles on chokes would get from that second turn 230 where there is h.f. current. As we is get double that, or 460. Of course least two windings on a transformer other points enter into transformer one connected with the first circuit from construction, so that really we could which the energy is to be transferred not actually do this, but the principle and the other one connected to the sec holds.



We shall come back to that point when we know a little more about the transformer.

But we need not use the electric mains for transformers. We can use them in a wireless set. You will remember that current that comes from a wireless station is alternating, and if it is alternating, transformers can be used in the circuit associated with that current. These can be more simple than of wire close together, one connected the transformer connected with our mains, and if we wind a coil of, say, 10 turns on one former and put it near 50 on another former and connect the ing current to one, the impulse will be smaller to one circuit and the larger to another, we would find that that trans former not only transfers the energy but actually magnifies the signal by

If two coils are arranged in this manformer between our batteries and the ner, they are spoken of as r.f. transformset and expect the current to be trans- ers. If you look back to a recent week's ferred. A rather remarkable thing "Radio Record" you will see a three happens when we put a transformer in and two-coll tuner illustrated. These We are in reality radio frequency trans-

If we put iron in the core the mazmains and our set, that transformer netic coupling is strengthened, but we will alter the voltage, and the voltage cannot use iron where very high pul-will be determined by the number of salting current is used. Therefore ironturns on the coil. If we have a 230- cored transformers must follow the de-

where there is h.f. current. As we te-If we had two turns we would marked before, there are always at least two windings on a transformer. and the other one connected to the sec ond circuit to which the energy is to be transferred.

We speak of the first coil as the primary coil and the second as the secondary. If we wish to step up the value of the current we use a step-up transformer, in which the number of secondary turns is greater than the number of primary turns.

If we wish to step it down we use a step-down transformer, with a secondary smaller than the primary.

Here are some examples: We put a transformer in between the mains and our radio set. There are usually several secondaries. One is used to de-

POWER TRANSFORMER

liver the high voltage to the rectifier. This in many cases is higher than the a.c. mains voltage so that that part of the transformer is a step up. we will probably want several lower voltage windings for, say, the filaments and these then are made smaller than the primary, the exact number depending upon the transformer.

Do not think, however, that because higher voltage can be taken out we can get more power than we put in. Far from it. If we take out the current at a high pressure or voltage we must be prepared to take out less of it or fewer amperes. We cannot take out any more than we put in.

An auto transformer is one which has one winding and the primary circuit is connected to part of the main winding. We see auto transformers in the Browning Drake for example, and sometimes a crystal set, where there is only one coil and the aerial is tapped in at a certain point. Here are some facts about the transformers in your radio set.

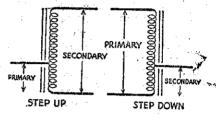
1. Keep the ratio low; 3-1 is ample where you have two audio transformers. If you use a high ratio transformer and then follow it by another stage you will get not only distortion but frequently hum and audio oscilla-

2. Keep the cores, that is, the metal parts, at right angles to one another. When cores are parallel or approaching parallel, hum will very frequently If you are not wise to it, it will be very hard to track out.

3. If you have two transformers, one better than the other, it is usually advisable in a valve set to put the best transformer first, but in a crystal set, strangely enough, it should be put last.

4. If troubled with motor-boating and audio oscillation, try reversing the connections to one of the transformer primaries.

5. With regard to small transform. ers with special steel cores, remember that although the cores can be made



An Auto Transformer.

of very highly magnetised steel, this has no effect upon the wires and they are just as prone to burn out if the small gauge wire is used as any other transformer. Do not try to pass more current through the primary of your transformer than it is designed to take.

6. A broken-down transformer can

always be picked out by a strange crackling noise that can be heard in the speaker.

7. The usual connections for an audio transformer are the primary to the plate of the valve and the "B" bat-tery positive, the secondary to grid and

the grid bias.

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