

ONE OF THE MOST REMARKABLE MEN IN RADIO

This is W. Francis Goodreau, Contributing Editor of "RADIO IN THE HOME." Mr. Goodreau has been bedridden for years. He does all of his studying, experimenting and set building flat on his back, and in spite of his physical handicap has worked himself up among the ranks of America's most popular and successful radio writers.

Building Radio Sets that Work

By W. FRANCIS GOODREAU

in testing tubes. If the test proves the tubes are defective, discard them and purchase new ones.

NOTE: Any fan who uses three tubes or more in his set ought to have a testing outfit of his own. He can easily build one at a cost of not more than \$5. Complete instructions were given in my "Radio Kindergarten," on Page 6 of the June issue of this magazine. No expensive measuring instruments are necessary and no technical knowledge is required beyond the simple directions given there.

H. M. N.

Whenever you purchase new parts to use in a new receiver test each one. No matter how good they are supposed to be, and no matter who makes them, test them just the same. Once in a while even the best makes of parts will prove defective.

This does not mean that these parts are no good, but simply that a defective one has slipped by the inspectors at the factory, or the instrument has become defective through handling in shipment. No matter what caused the trouble, if you find that the part is defective, return it to your dealer at once. *Never attempt to fix these yourself unless you are willing to stand the*

WITH the publication of one of the many articles on how to construct a radio receiving set, the writer usually receives quite a few letters like this:

"Dear Sir: I have built your receiver as described in your article, using the parts named by you, and hooking it up wire for wire and it doesn't work. Will you tell me what is the trouble?"

Yes; just like that.

Well, there are many things to cause trouble, even if you have used the best parts and have hooked it up wire for wire. Because a set is hooked up properly doesn't mean it is always going to work. Nor does the fact that it doesn't work mean that the circuit is at fault.

I think you will take it for granted that any circuit described in a reliable magazine will work, that it has worked for some one and with proper care will work for any one else who will build it.

I am going to try to outline for you in this article as many of the causes of failure to operate as I can, hoping that in doing so, I may help you to get in good working order a set that does not function.

First—and most important is the matter of *defective tubes*. This I think causes more trouble than anything else. The set constructed of the finest parts, and with the best of workmanship, cannot work as it should with defective tubes.

This does not mean that the tube must have a burnt-out filament in order to be defective. Many tubes light up O. K., but either no signals are received, or at the most very weak signals are received. If you have looked everywhere for the trouble and cannot find it, take your tubes to your dealer and ask him to test them for you. If he has no testing outfit, go to a dealer who has, and buy all your new tubes from this dealer and insist on having them tested.

Some time ago most dealers were without testing outfits, but with the great competition among radio stores at present, you will find that a good many dealers are not overlooking any chances to secure customers, even if it does mean free service

loss should you make the instrument worse. You cannot in all fairness expect a dealer to replace an instrument you have tinkered with, even if it was defective when you purchased it.

A few suggestions as to methods of testing parts will be useful right here. To test any kind of coil that has a continuous winding—that is one having no taps on it, such as honeycomb coils, etc.—get your phones and a dry cell. Connect one terminal of the dry cell to one end of the coil to be tested, connect the other cell terminal to one of your phone tips, then touch the other phone tip to the other end of the coil.

You should hear a "click" in the phones. Should no "click" be heard, it means that there is a break in the wire somewhere in the coil. This test can be used for any kind of coil, variometers, etc. included.

To test a tapped coil, proceed as before, but in this case touch each one of the taps with the phone tip. You should hear a "click" as each one is touched. If you do not hear it, it may mean that there is a break in the wire, or should it fail only at one or more taps it means that there is not a good connection to those taps.

Variable and fixed condensers are next on the list. If you can avoid doing so, never use anything but a good low loss condenser. It doesn't pay. You cannot expect good DX with a condenser that is absorbing most of the energy before it ever reaches your tube. Remember, you hear signals only when they are strong enough to operate your detector. It matters not how many stations reach your set; it's the ones that operate your detector you hear.

Troubles usually found in variable condensers are: first—short circuit. This is easily found because you can hear the plates scraping as you turn the dial. Second—loose connections. Third—no connection on rotor or stator.

Some types of condenser have friction connections on the rotor and sometimes these do not touch the shaft. Look for trouble here right away if you are using this type and seem unable to locate the trouble in your set. Fixed condensers are

subject to short circuits also. Try the same test on these you did on the coils. If you get a "click" this time then it means that the condenser is shorted. Discard it if you are unable to locate the short circuit. Watch out for loose connections here also.

Grid leaks also cause trouble. If you are using one of the variable leaks, and find that it has no effect on the operation of the set, you may take it for granted that it is defective. If you find that when you turn it it does affect the set, causing it to tick, sometimes fast, sometimes slow, then you may know that it is working O. K. Don't forget to adjust it so that there are no ticks heard.

Rheostats also cause trouble at times. Always be sure that you are using the proper resistance rheostat for the tube you have. If you find that the tube lights up bright as soon as you turn the rheostat on a trifle and you are unable to reduce the light without turning it completely out, you are using a rheostat the resistance of which is too low for the tube.

If you were using a 6-ohm rheostat, with a battery of $4\frac{1}{2}$ volts on a UV199 or C299 you would have just that trouble. The remedy would be to use the proper rheostat. This can be found by referring to the circular which came with the tube. These are put there for your information and not to help in packing the tube.

Should you find when turning on the rheostat, the tube lights and then, as you turn it more, it goes out, and then as you continue to turn it the tube lights up again, it means that the sliding arm is not making proper contact with the wire of the rheostat. Troubles with the carbon-type rheostat should be called to the attention of the maker.

Sockets: Here is usually where we find a lot of trouble. Mostly poor connection from socket to tube, or else loose contacts on the socket. Before using a new socket make sure the contacts are clean and bright. Sandpaper them if you have to, but get them clean. Also make sure the contacts are tight. If you don't they are very apt to work looser when you are working on them, and on most of them the only way you can really tighten the contacts is by removing the sockets from the set, and if you have already soldered several wires to the socket, it's quite a lot of work to do over. Play safe; tighten them before you put them on the set.

Audio-frequency transformers give trouble, too. The most common ones are loose or broken connections. Sometimes there is a break in either one of the windings. Test the primary and secondary coils with the phones and battery as you did the coils in the tuning unit. If everything is O. K. then try reversing the leads on the primary. If that doesn't help, try revers-

ing the leads on the secondary. I would like to say right here that in the first place you should have purchased transformers on which the connections were plainly marked. You will save yourself a lot of trouble by doing so.

Jacks are next on the list. Here is where a great deal of trouble occurs at times. Never purchase anything but the best jacks. Make sure they have good insulation and good contacts. Look for trouble in double circuit jacks caused by failure of all the springs to make good contact. If you get

one on the top and one on the bottom of the next jack. Keep them all alike.

Also do not forget that when you connect a wire from the "B" battery to either the top or bottom of the double-circuit jack, the blade next to this must be connected to the post marked B plus on the next audio transformer. Also when you connect a wire to the top or bottom connector of this same jack leading from the plate circuit of the tube, do not forget that the blade next to this is connected to the post marked P on the audio transformer.

Phones: Use the best phones you can afford. It is not wise to purchase cheap phones. If you are using jacks and plugs on your set, make sure that the positive terminal of your phones—the one with red woven in the cord—is connected so that when placed in the jack this positive terminal will make contact with the jack blade which is connected to the "B" battery. This is important.

Batteries "A" and "B": Always be sure your batteries are in good condition by testing them quite often. Keep your storage "A" fully charged. Replace your dry cells if your signals are getting weak. Do not use run-down "B" batteries. Weak signals will result from using weak batteries.

Antenna: Whenever it is possible, use a good outdoor antenna. Use good insulators on each end. Use stranded wire, preferably with each strand enameled and thus all insulated from each other. If possible have antenna and lead-in in one piece, or at least make sure the lead-in is well soldered to the antenna.

Ground: Make your ground wire as short as possible. Use heavy wire for your ground wire and fasten to a water pipe with a ground clamp. Do not merely wrap the wire around the pipe. Scrape the pipe clean, fasten the ground clamp to the pipe, and solder the wire to the clamp.

Lightning Arrester: Purchase a good arrester. Look out for trouble here. If you are getting weak signals, look for a short circuit from antenna to ground through the arrester. Hook

up your set without it, and if signals come in O. K., then connect arrester; and if signals are weak there is a short circuit.

Wiring: Here is where a great many fans fall down. They cannot—or will not—do a good wiring job. This does not mean that you must use buss bar and make nice square corners; oh, no, indeed. The shortest distance between two points is a straight line. Square corners in your wire make a pretty looking set, but your wires are much longer than they would be had you used other wire. You may use square wiring on your set and have it look well without any sacrifice of efficiency, provided you plan your set so the wires will run as direct as possible. When build-

(Continued on Page 32)



The Radio Set Goes With Her

Portable sets have now reached the stage of development where they are really portable—airial, batteries, loud speaker and all. Here is one of the models which are becoming increasingly popular as all-around sets, equally well adapted for home, travel, vacation—everywhere. The set in this particular picture is a Telmaco Acme Type P-1

good signals from the detector, but nothing from the audio amplifier, and have been unable to locate trouble, take a look at the jacks and I think you will find it there.

It is a good idea when building a set with jacks that you have all the positive wires coming direct from the "B" battery to either the top or bottom connectors of the jacks. Do not put one on the top con-



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Graham could make himself just as popular.

Mr. Gimbel's shrewdness and good judgment of his public was soon proved. Mr. Graham went bravely ahead with his Uncle Wip stories and roll call, and it was not long before it became very evident that the entire following of kiddies had transferred their affections to him. His annual kiddies' day at Willow Grove Park now has more than repaid him for the unpleasantnesses of the first few weeks and he now has a tremendous following of his own.

And Ehrhart, meanwhile, has performed the miracle of creating Dream Daddy and becoming even more popular than he was before.

If Joel Chandler Harris could come back today and watch a million children of America listening in to radio bedtime stories, it would make his heart glad. He would probably have Uncle Remus tell Little Boy that "Brer Fox wouldn't get the radio child, no, suh, 'case he was a good chile listen' in."

And I wager that enterprising WSB, The Atlanta Journal, would have "Uncle Remus" broadcasting a bedtime story about "jes what Brer Rabbit did next."

Building Radio Sets That Work

(Continued From Page 22)

ing a set don't just slam the parts in anywhere they seem to fit. Plan the set so that it will look well, but most of all plan it so that the wires connecting each part will be as short as possible. If your set is to be permanent, solder all connections. If you are trying out a new hookup, scrape your connecting wires clean and tighten them as much as possible to the posts that they are connected to.

Well, I guess I've covered 'most everything that would cause trouble in your set. At least I've tried to.

And now, look at this article. It covers eight full-size typewritten pages and took quite a while to write.

But should I try to answer in full the letters I receive similar to the one I have outlined, I should have to repeat everything I have written here. Imagine twenty-five letters like that—and it is not uncommon to receive that number. How long will it take me to write them?

So please have a heart when you ask for help. Please do your part by checking these things mentioned here. Then if you are unable to make it work, write and explain in detail what your trouble is. Those who

write articles on how to build sets are *always* willing to help you, but it is almost impossible to locate your trouble by reading a letter like the one I have included in this article.

If this article has helped you in any way, won't you please write to me, in care of the editor and tell me just how it has helped you? I thank you.

Editorially Speaking

(Continued From Page 4)

circuits are already very thoroughly overstocked with all kinds of apparatus and is no longer necessary for them to buy anything new in order to try another circuit. All they have to do is to go to their closet or their attic and bring half a dozen variometers and half a dozen variable condensers or anything of that kind which is needed.

The hook-up fans are very much oversold. There is not a day goes by that I do not get letters from readers telling me of the various kinds of apparatus which they have on hand and asking me which particular type to use in a particular circuit.

Many of these fans are so thoroughly stocked that they could almost start a small radio retail store themselves.

You cannot attract the money of these people by advertising new parts unless these parts are on a radically different idea or contain features so entirely new that their interest is aroused sufficiently to test them.

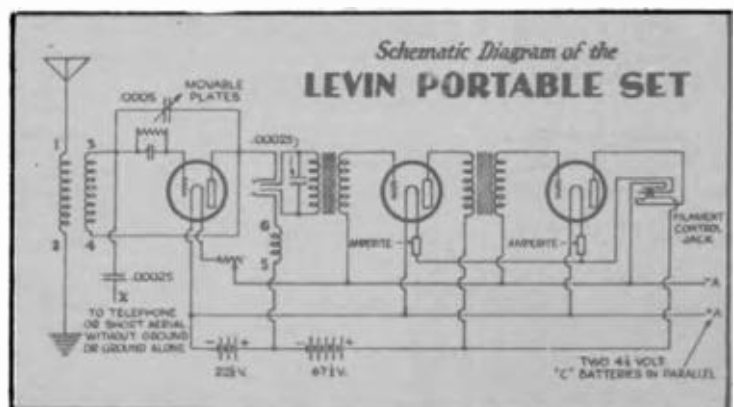
It seems to me that everybody is manufacturing variable condensers or loud speakers or variometers or variocouplers or some of the standard apparatus which has been on the market so long.

These people come out and, instead of offering anything radically new, simply make the same old claims for their apparatus that have been made for apparatus of similar type ever since it has been on the market.

Manufacturers will place advertisements of a new variable condenser in the magazines and will then suddenly withdraw them, claiming that the magazines have no "pulling power." That is where the manufacturer is wrong. The trouble is that his advertisement has no pulling power, because it is merely offering to add to an already overstocked market just another variable condenser making the same claims for itself, or just another loud speaker claiming to give "perfect reproduction," or just another coil claiming to

(Continued on Page 44)

Correction in Levin Circuit



Moe Levin calls our attention to the fact that the diagram of his portable set printed on page 29 of July issue contains one very vital error. It shows the left-hand connection of the second tube going down to the

plus B battery line. This is unfortunate. Of course the connection should have been made to the plus "A" battery line and should not go to "B" battery at all. The correct hookup is given above.