

Farm Receivers are Easy to Service

There is a good prospect of financial profit as well as valuable experience in working on battery sets in a rural area

By RICHARD LAURENCE

THE beginner in servicing should concentrate on the simpler radios. This gives him needed familiarity with basic circuits, and at the same time allows him to turn out enough work so that he will not become too discouraged over the financial prospects of his new profession.

The 1½-volt farm radio is ideal for the purpose; because there is no built-in power pack, it is probably the most easily repaired set in general use today. The convenience and economy of its 1½-volt A—90-volt B-battery pack have made it so popular that it has replaced nearly all other types of receiving equipment in places where electric mains power is not obtainable.

This type of radio is found chiefly in small towns and rural communities, but there are many millions of them in use. From the beginning of my service career I have found them more profitable than the average electric radio powered from an a.c. or d.c. line.

For one thing, there is the battery; most owners will use a battery every six months, and the serviceman is the logical person to sell it to him. Always keep two or three popular brands on hand and let no customer get out of the shop without trying to sell him one. If he doesn't need it, he is reminded that you have them for sale. Follow-up cards about five months after each sale are helpful, too. The profit on these batteries is two dollars. If you can build up a list of one hundred and fifty customers who will take at least one a year, you have made \$300 with no pain whatsoever.

Then there are tubes. The low filament drain of the 1½-volt tube makes it inherently fragile, and the replacement rate is high. The owner of one of these sets usually lives a good distance from town. The radio is his main source of entertainment, so he wants it in top-notch condition. If you can show him by actual test that some of his tubes are weak, he will generally have these replaced as well as the ones that are inoperable.

A word of caution here. Never, never try to fool the farmer! He gets his money the hard way and expects value received. If he comes in with a loose grid cap—don't sock him with a two-dollar minimum charge. Just keep your services on a straight merchandise and earned-labor basis. Be sure that every set that goes out has been tried thoroughly and is functioning at its best. This policy will pay rich dividends.

Battery-set defects run along the same general lines as those of other radios. However, a few basic defects occur with great frequency; the ability to recognize these at once will greatly speed up your work and add to your profits.

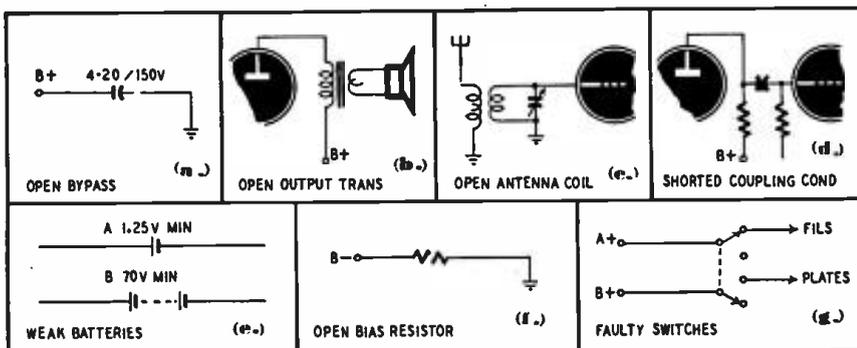
One of the most frequent troubles is opening up of the electrolytic condenser which bypasses audio current from B-plus to ground. This is shown at (a) in the drawing below. The low-frequency oscillation that is set up makes a noise that is more like a hen clucking than anything else I can think of. After the first couple of experiences you will recognize it every time. A supply of 8- μ f, 150-volt electrolytics

should be kept on hand for this job. Of course, polarity should always be observed when installing the new condenser.

The output transformer is the next big troublemaker. It has been my experience that the replacement rate on these is about twice as high as on non-battery radios. When you find a set that makes no noise whatsoever when connected to a good battery, test the output audio tube. If it is o.k., insert your ohmmeter probes in plate and screen grid prongs of the tube socket (with power turned off). A reading on the meter but no click in the PM speaker means the transformer secondary or the voice coil (see b) is defective; no reading and no click means the transformer primary is open. You will find that this is usually the trouble. If the present transformer is riveted to the speaker, you can solder the new one on the chassis. The only precaution necessary is to use a transformer with the correct primary impedance and current-carrying rating for the output tube. Consult a tube manual.

A fault common in farm sets is a burned-out antenna transformer (c). The isolated location of farm buildings makes them more liable to lightning damage, and after every electrical storm you can count on getting a couple of radios with the primary of the antenna transformer burned out. The coil is usually charred and broken so that visual inspection will locate the trouble. You can connect the antenna directly to the grid of the converter tube to make the set play. I have found the Meissner 14-026 universal adjustable coil an excellent replacement in most cases. Install it according to directions, and realign the set if a signal generator is available. In the case of radios which have one or more short-wave bands and a tapped coil, an exact duplicate from the manufacturer of the set will be necessary.

I have found that shorted paper condensers occur much less frequently in battery radios than in transformer-operated a.c. sets. The usual trouble is a shorted coupling condenser between the audio amplifier tubes (d) though a bypass will blow occasionally. Replace



The imperfect drawings indicate troubles which can frequently be found in farm receivers.

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with one of a higher voltage rating.

One frequent trouble is that the oscillator will stop. The radio will pop and crackle like a live set, but will not play. I always test the oscillator section of the converter tube first, and replace it if emission is weak. Of course, low A-battery voltage will give the same effect. If you replace the tube and the set will not play at home because of a weak battery, just explain to the customer that the trouble is a combination of two faults—and sell him a new battery. Always try to keep these sets a few days and try them several times to make sure that they keep oscillating. In a very few stubborn cases a new oscillator coil is necessary, but the new tube will nearly always do the trick by itself.

You will find many cases where the owner will bring in his radio, but not the battery, and the set will play perfectly in the shop. If you cannot find anything wrong after a thorough trial, there is nothing to do but suggest that he bring his battery in to be tested. In fact, it is a good idea to encourage customers to bring their batteries along. Test them with the set plugged in and turned on, so as to load the battery. If the A-voltage is under 1.25 or the B-voltage under 70 (e), you should recommend replacement of the battery as it will fail soon.

The output tube is biased by connecting the B-minus battery lead to the chassis through a resistor, so that the voltage drop through the resistor creates a negative bias for the control grid. When making voltage tests on a dead set, try first with the negative prod directly on the chassis. If there is no reading, move the prod directly to the B-minus lead. A normal voltage reading in this position indicates the resistor is burned out (f). The bad resistor can often be detected visually by its discolored appearance.

A final word of warning—don't trust the switches too far. They are of the double-pole, single-throw type (g), and break both A and B circuits. Sometimes one side of the switch gives way and does not break the circuit when turned off. The switch will click normally, but, of course, the set will not operate, as the other circuit is broken. This will ruin a new battery very quickly. I always throw the switch several times and make voltage tests to see if both circuits are broken before I O.K. the switch.

Many farm homes are being connected to power by the Rural Electrification Administration, and you can interest some of these people in converting their battery sets to electric operation. A good converter, such as the GTC Model A Perma-Power, is excellent for this purpose. The set will give the same quality performance it did on battery operation, and will use only 5 watts of power. You will realize a quick return on the job and will save a good servicing account that might be lost for a while if the customer had bought a new receiver.



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