the first valve socket, and tune to the local station again, preferably using the outside aerial for this purpose. The outside aerial can be attached to the centre tap on the frame aerial, and the earth connection to the lower terminal of the three on the frame.

Having tuned-in the local at its loudest strength, adjust the neutralising condenser until the signals become inaudible, or grow very faint. The set is now balanced, and the neutralising condenser can be screwed down firm.

Disconnect batteries and slide into the cabinet. Tag all the battery leads with their correct connections, so that connecting will be done inside the cabinet without being able to refer to the terminals above.

Join the two A batteries in series, remembering that the terminal is the one in the middle.

Join the two 45-volt batteries in series and adjust the detector voltage to the best value.

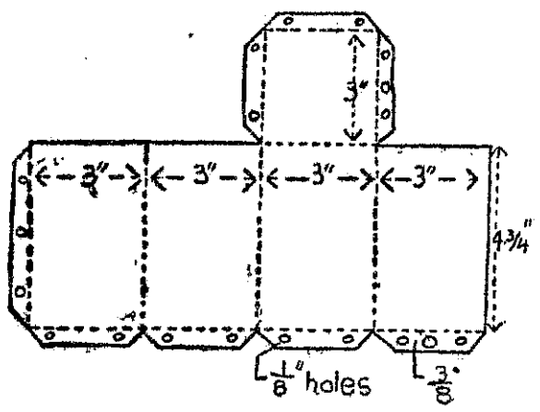
A Few Hints.

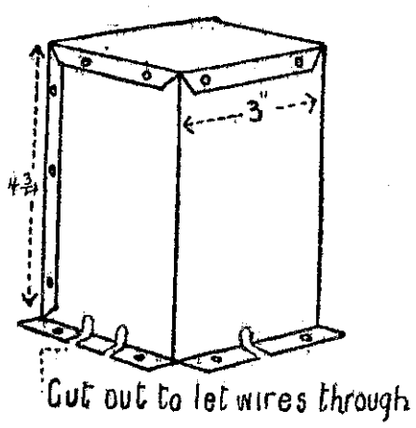
The receiver is now complete, and one or two hints may be useful for the user of this set.

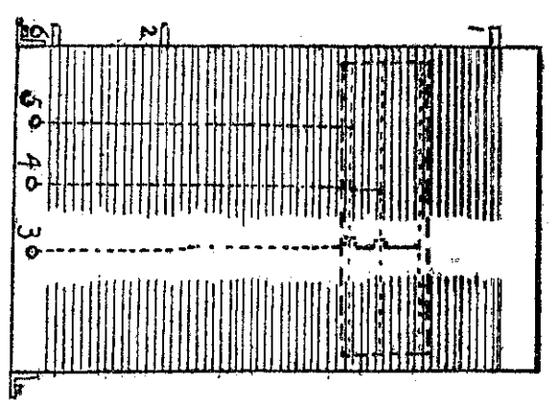
Always turn off the rheostat when not being used. This automatically cuts off all the batteries.

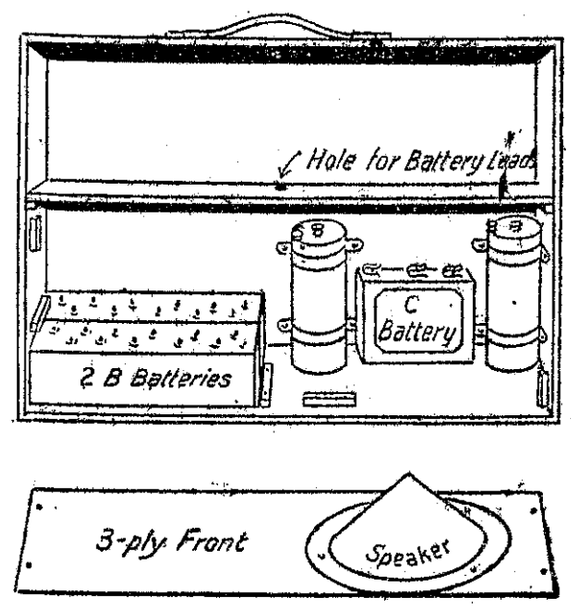
If a long outside aerial is used in conjunction with the frame, it may be necessary to use a .00025 fixed condenser in series with the outside aerial, and should be connected between the outside aerial and the centre terminal of the frame.

Handle the set with reasonable care, always remembering it is a wireless set and not just an attache case containing books.









Disposition of Batteries, &c.

Panels for the Experimenter.

FOR purely experimental work, ebonite or even bakelite panels can be dispensed with very easily. First of all, procure a supply of 3-ply wood. This material is not expensive, and when any prolonged amount of experimental work is carried out, it is a good thing to have a stock of this wood handy. Make the necessary panel for the experimental set or apparatus out of this wood. Whilst doing so, procure also one or two old gramophone records and half a pint of naphtha or methylated spirits.

Break the records up into very small pieces, and allow them to soak for several hours in the naphtha or spirit, stirring them frequently. The records will almost completely dissolve the liquid, which should then be poured off into a bottle. Before assembling terminals, or components on the plywood panels, give the latter three good coats of the above mixture. The panel will then be found to provide a perfect degree of insulation, and its total cost will work out as the merest fraction of that of an ebonite panel of the same dimensions.

Judging Speakers

THE human ear is such a tricky piece of mechanism that one can be deceived into believing something that is actually not so. That is why it is so hard to judge loudspeakers. After hearing a loudspeaker in a friend's place or at the shop of a dealer, one may decide that it is not as good as his own when he turns on his radio receiver a little while later. Yet the speaker just heard may be the better. The reason for this queer decision is that the ear has become adapted to listening to distorted music, and when the faithful reproduction is heard, it sounds as though the speaker is at fault. The ear has become used to the omission of tones and overtones, and when they are introduced the effect is not always pleasing to the ear.

It is for this reason that it is almost impossible to compare two speakers unless they are heard working alternately on the same receiver, with some arrangement that will enable the speakers to be changed over rapidly.

IN a land where one has to pay nothing in the way of license fees, radio has become most popular with the farmer, says an American writer. In the State of Iowa, according to a recent official report, one farm in every three has a receiving set. The number rose from 10,556 to 76,032 in one year.

Useful Tips and Jottings

Battery Connections.

BATTERY connections can be made with almost any size wire, provided it is suitably insulated. The B Battery wires carry small amounts of current, but the voltage is as high, and in many cases higher, than the voltage in the electric light wires in your home. Rubber covered wire is desirable. The A battery wires carry relatively larger amounts of current at much lower voltage. This means that very small wire should not be used. The size should be at least No. 16. While thin insulation is theoretically sufficient because of the low voltage, rubber covered insulation is safe because an accidental short circuit in storage battery wiring may result in a fire. The special cables sold for connecting the batteries contain a group of wires each of the right size and with the proper insulation. The size of the wire used to connect the loudspeaker is of no importance.

A CORRESPONDENT wants advice on his receiver. With the aid of his circuit and layout diagram, it was quite easy to diagnose his trouble. The writer considered it of sufficient interest to mention in these columns, and it may help other amateurs, whose sets have similar symptoms.

1. B batteries run down abnormally fast, and when milliam meter connected in B—lead, a current of 3ma. was passing even when filaments cut off.

2. C battery also continually discharging through no apparent reason.

3. Very distorted music when C battery disconnected, and poor with C battery connected. The circuit under discussion was a Browning Drake, with three audio stages. Two impedance, and one resistance capacity coupling. To find the reason of the B current flowing when filaments turned off, assuming, of course, that no leakage through faulty insulation, the B circuit was followed. The only place that was likely to be faulty was either the large condenser across the B battery, or the coupling condenser in either the resistance or impedance coupling unit.

In view of the fact that the C battery ran down very quickly, it was assumed to be a faulty coupling condenser. This is the path the anode current was taking. Through the anode resistance or choke, through the faulty condenser, to the grid of the following valve, and so on ,through the grid leak, or impedance and C battery to B. As the C and B batteries are thus connected in series, both would run down, even when the receiver was not in use. This is a fault that is always likely to occur, and those owners of sets suffering from similiar complaints should not fail to test all their condensers with a pair of phones and a dry battery, by the method described this week in the "Beginner's' Corner." Substitution with new ones is the only remedy, and only good mica condensers of .006 to .01 mfd. capacity should be used. In the case of some commercial impedance units, the condenser is incorporated inside. To test this, temporarily disconnect the P, G, B, and F terminals on the unit, and test terminals P and C, as it is between these two that the coupling condenser is connected.

The Trickle Charger.

RE your trickle charger for A and B batteries in "Radio Record," November 23. Having built this charger to your specifications throughout I should just like to know one or two points about connecting up. (1) Can I charge A battery on its own and also B battery likewise? (2) The charger seems to be working OK, but on testing current on A minus and plus terminals I only get 2 volts ¼ amp., but on bridging B minus and plus I get 12 volts ¾ amp. I would like to know if it is all right to charge A battery on these rates, or is there some fault somewhere? The wiring is OK, the only thing my cell transformer is 8 volts instead of 10-12, as you mention. Would that make any difference, or could the charger be made to charge at, say, 2 to 3 amps if wanted. My battery is 4 volts 80 amp. hour, charging rate 3 amps.—B.L.O. (Auckland).

ANSWERS.

(1) Yes, a wet B battery can be charged as readily as an A accumulator, but charge one at a time.

(2) If the instructions had been followed and a 10-12 volt Bell transformer been employed the voltage would have been 4 volts as required. The charger is meant to charge at the rate of ½ ampere per hour.

FOR really strong and pure loudspeaker reproduction it is absolutely essential to use a large power or a super-power valve on the last stage.