

- >>> War or trouble about.
 >>> Peace.
 → Road to be followed.
 □ → Letter hidden three paces from here in the direction of arrow.
 X This path not to be followed.
 ⊙ "I have gone home."

WIRELESS TELEGRAPHY

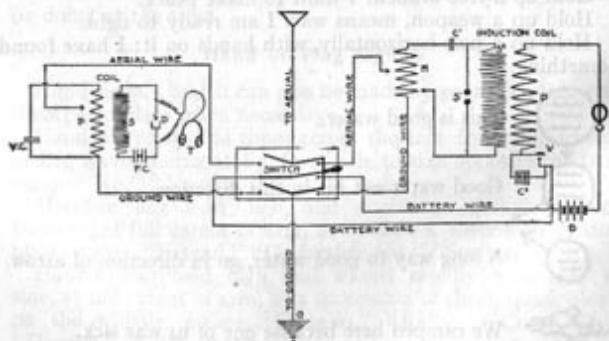
The Boy Scout Wireless Club

Y. M. C. A., Newark, N. J.

The following directions are given for an up-to-date wireless apparatus for stationary use in the home or at the meeting place of each patrol.

We will consider the receiving apparatus first:

The first thing to do is to build an aerial. First find out how long your location will allow you to build it, and how high. It ought to be at least 50 to 60 feet high and about 70 to 100 feet long. The main point in building an aerial is to have it



Tracks, Trailing and Signaling

well insulated from the ground, and all connections in wire perfectly solid. It is advisable to solder every connection and to make your aerial strong as it has a great deal to do with the working qualities of the station.

After this is completed, the inside work on instruments should begin.

1. A pair of watch-case receivers having a resistance of 1000 ohms each, manufactured by a reliable firm.
2. A loose coupler tuning coil of about 800 meters.
3. One of Mordock's metal detectors or one of similar design.
4. A variable condenser of about 5-10 plates.
5. A fixed condenser so arranged that its capacity can be changed if desired.

With these instruments the receiving set is complete, so we next take up the sending apparatus.

1. A two-inch induction coil.
2. A heavy spark gap (zinc preferable).
3. One wireless key with heavy contacts.
4. A plate condenser which can be easily made by any scout. Good glass is the main point.
5. A triple pole, double throw aerial switch. (Can be made by scouts.)

Now you have everything necessary to go ahead and assemble your station. The next thing is to connect them up.

Above is a diagram which will make a good station for a scout. This station, if the aero is of the proper height, is capable of sending messages from 8 to 10 miles.

The Receiving Set

Perhaps the most fundamentally important part of a wireless telegraph station is the aerial. Its construction varies with each station, but a few general suggestions may be of use.

The builder should aim to get as high and as long an aerial as possible, height being the more important factor. In a stationary set the aerial may be fastened to a tree or pole or high building while in a field set a tree or an easily portable pole must be used.

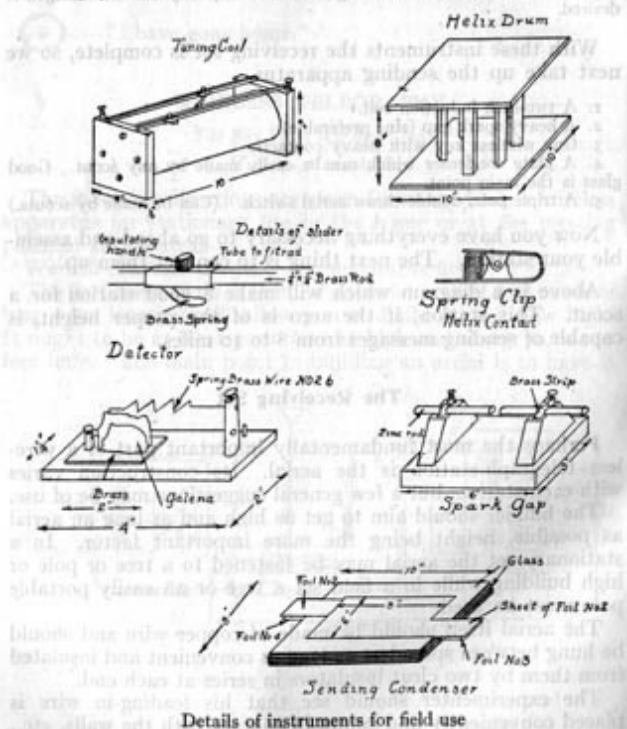
The aerial itself should be made of copper wire and should be hung between spreaders as long as convenient and insulated from them by two cleat insulators in series at each end.

The experimenter should see that his leading-in wire is placed conveniently and comes in contact with the walls, etc.,

as little as possible. All points of contact must be well insulated with glass, porcelain, or hard rubber.

The tuning coil is very simple in construction. A cardboard tube, about three inches in diameter, is mounted between two square heads. This tube is wound with No. 24 insulated copper wire and very well shellacked to avoid loosening of the wire.

Two pieces of one quarter inch square brass rod, to be fastened between the heads, are secured, and a slider, as shown in drawing, is made. The rods are fastened on the heads and the insulation in the path of the slides is then well scraped off. Binding posts are then fastened to rods and coil ends.



The detector, although the most important of the instruments, is perhaps the simplest. It is constructed of a hardwood base with a small brass plate fastened on by means of a binding post. On the other end of the base is fastened a double binding post which holds a brass spring, as in the drawing. On the end of this spring is fastened a copper point made by winding a few inches of No. 36 or 40 wire on it and allowing about three sixteenths of an inch to project. This completes the detector but, for use in this instrument, lead sulphide or Galena crystals must be secured.

The condenser is made of two pieces of tin-foil, four by ten, and three pieces of waxed paper a little larger than the foil. A piece of wire is twisted into the end of each piece of foil, and then one sheet of foil is laid on a sheet of paper. This is then covered by another sheet of paper upon which is laid the second sheet of foil. On top of this is laid the third sheet of paper and the whole is folded into a convenient bundle. The sheets of foil must be well insulated from each other and the wires must project from the condenser.

The ground connection is made by soldering a wire to a cold-water pipe. In the case of a portable set the ground may be made by driving a metal rod into the ground or sinking metal netting into a body of water.

The telephone receivers cannot well be made and must therefore be bought. The type of 'phones used will therefore depend entirely on the builder's purse.

The Sending Set

The same aerial and ground are used for sending as were used for receiving, and for the experimenter, it will be far cheaper to buy a spark coil for his sending set than to attempt to make one.

For a field set there will be very little need of a sending helix, as close tuning will be hardly possible; but for the stationary set this is very useful.

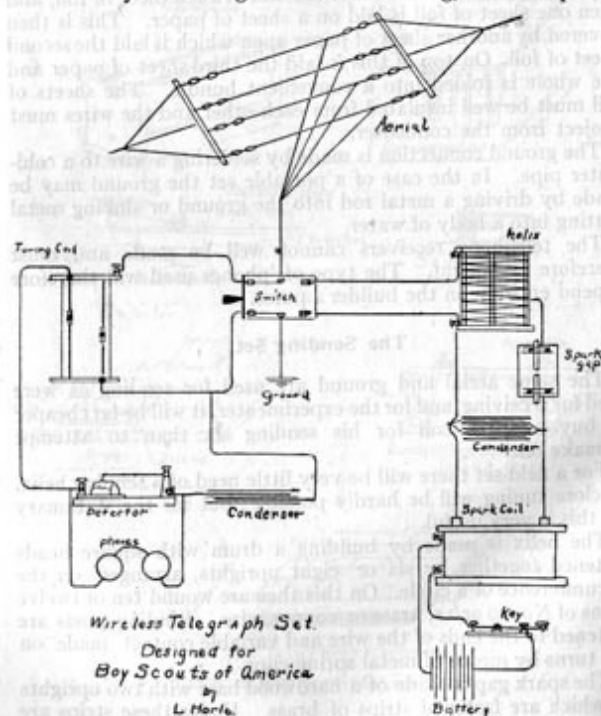
The helix is made by building a drum with square heads fastened together by six or eight uprights, arranged on the circumference of a circle. On this then are wound ten or twelve turns of No. 10 or 12, brass or copper wire. Binding posts are fastened to the ends of the wire and variable contact made on the turns by means of metal spring clips.

The spark gap is made of a hardwood base with two uprights to which are fastened strips of brass. Under these strips are

placed two pieces of battery zincs so as to make the gap between their ends variable. Binding posts are fastened to the strips for contact.

The sending condenser is the same as the receiving in construction, but different in material. The dielectric is glass while the conducting surfaces are tin-foil, arranged in a pile of alternate sheets of glass and foil. The foil is shaped as in drawing and alternate sheets have their lugs projecting on opposite sides, all lugs on same side being connected together. For a one-inch coil but a few of these plates are needed, but for higher power a greater number are necessary.

All that now remains is the setting up of the instruments. They are arranged as in the drawing, a double-point,



double-throw switch being used to switch from sending to receiving.

After having connected up the receiving instruments, the receiver is placed at the ear and the point of the detector placed on the various parts of the mineral until the signals are heard clearly. Then the tuning coil is adjusted until the signals are loudest.

The sending apparatus is set up, the key and batteries having been bought or made, and used to call some other station. The clip is put on various turns of the helix until the other station signals that the signals are loudest. The station is then ready for actual operation.

Notes