THE SCR–74–A TRANSMITTING SET.
(SET BOX BC–18–A.)

Equipment.

1 set box, BC–18–A only.
1 wave meter, type SCR–61.
1 head set, type P–11.
1 storage battery, 10 volts, type BB–3; or 3 batteries, type BB–14.

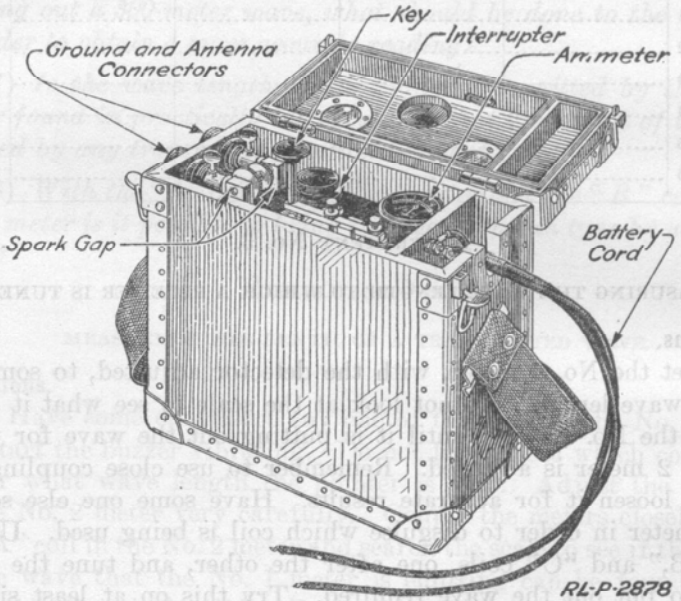

Fig. 30.—Set box, BC–18–A, with lid open.

GENERAL CONSTRUCTION OF THE SCR–74–A SET.

Information.

The SCR–74–A is an *induction coil* transmitting set of low power. (See Fig. 30.) The power supply is obtained from a 10-volt storage battery, which is connected to the primary of the induction coil through an ammeter and a key.

The induction coil is composed of two separate coils which are designated the *primary* and the *secondary*. These two coils are wound around a soft iron core. The primary winding, or coil, is formed of large wire wound directly on the core. The secondary winding is built outside the primary, in such a way that it incloses both the core and primary, and is constructed of small wire with

many more turns than the primary. After the winding has been completed the two coils and the core are dipped in wax, paraffin, or some other good insulator. One end of the primary winding is connected to one of the battery terminals through an interrupter, similar to the one on an ordinary buzzer, and a telegraph key. The other end of the primary winding is connected to the other side of the battery. (See Fig. 30.) The ammeter connected in the primary circuit is used to indicate when the coil is working properly. The ends of the secondary winding are connected to the sparking surfaces or *electrodes* of the *spark gap*.

The function of the induction coil is to change the low voltage *direct current* from the storage battery in the primary coil to a high voltage *alternating current* in the secondary. It suffices to say here that an alternating current is an electric current which flows first in one direction and then reverses and flows in the opposite direction. This reversal of the direction in which the current flows occurs with great frequency—many times per second.

Briefly the change in current from direct to alternating is effected as follows: The *interrupter* alternately breaks and makes the electrical circuit of the primary, thereby causing a *pulsating current* to flow whenever the current is stopped and started with the opening and closing of the circuit. The *magnetic fields* created by this pulsating current cut the secondary coil winding and induce in it an alternating current. There are more turns of wire on the secondary than on the primary. Consequently the induced voltage is much higher than that supplied to the primary since the voltage induced in the secondary depends upon how many more turns there are in the secondary than in the primary. As an example, if there are ten times as many turns on the secondary as there are on the primary, the voltage of the secondary will be about ten times as great as that supplied to the primary. Some idea can be had of the secondary voltage of this coil from the fact that 20,000 volts will cause a spark to jump a gap of 1 inch.

Questions.

(1) *What does each of the following mean? Interrupter, spark gap, electrode, function, magnetic field.*

(2) *What is the difference between a direct current and an alternating current?*

Directions.

1. Open the set box by undoing the latches and throw back the lid. (See Fig. 30.) Unscrew the two thumbscrews and remove

the two round bakelite nuts which hold the antenna and ground insulators in the box. Observe how these insulated connectors make contact with opposite sides of the spark gap. At the opposite end of the box remove the screws connecting the battery leads to the

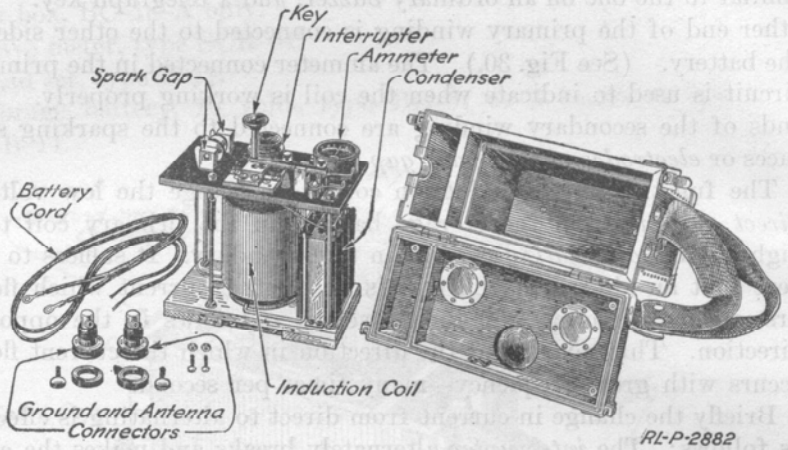

Fig. 31.—Set box, BC–18–A, disassembled to show various parts.

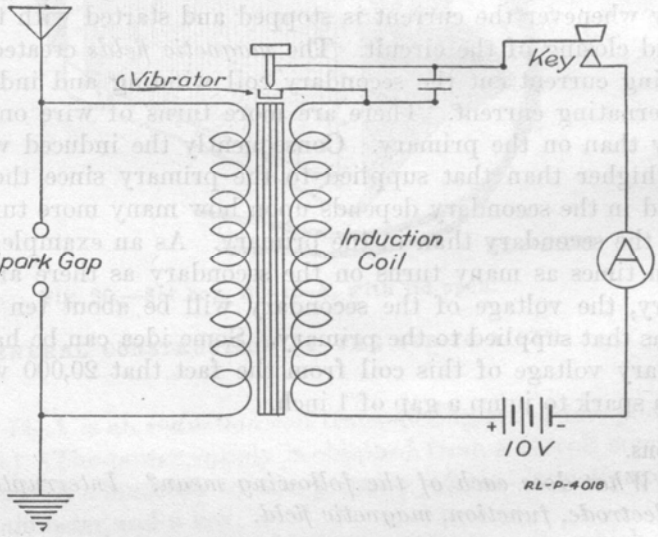

Fig. 32.—Schematic wiring diagram of SCR–74–A transmitter.

box. Turn the box over, holding the parts in place so they will not fall out, and remove the two screws in the bottom of the box. The panel and attached parts should now come out easily. (See Fig. 31.) Check the wiring with the diagram in the lid of the set box or with the diagram shown in Fig. 32. Compare the size of

the wire coming out near the center of the coil with that on the outside. Note which winding is connected in the primary circuit and which is connected to the spark gap. Examine the interrupter and note how it is constructed and how it operates. Note how the key is connected, constructed, and adjusted, and how the condenser is connected in the primary circuit.

Questions.

(3) *What is the meaning of each of the following? Bakelite, ground, insulators, antenna, ground lead.*

(4) *How is the key operated when the box is closed?*

(5) *Is the ammeter in the primary or secondary circuit?*

(6) *For what purpose is the fixed condenser used?*

(7) *What is the purpose of the interrupter?*

(8) *How is contact made between the spark gap and the antenna and ground leads?*

(9) *How is the spark gap adjusted?*

(10) *How is the interrupter adjusted? Does the lock nut on the interrupter contact screw up or down to lock the contact screw in position?*

(11) *Can the spark gap be seen when the lid is closed?*

(12) *Why are there thumbscrews on the antenna and ground lead in terminals?*

(13) *For what is the little compartment on the right of the box used?*

(14) *How is the distance between the contacts of the key adjusted?*

(15) *Does it make any difference which battery lead is connected to the positive pole of the battery?*

(16) *Which coil is wound with the larger wire, the primary or the secondary?*

(17) *Why are the windings of the induction coil dipped in wax or paraffin?*

(18) *Which two screws hold the apparatus in the set box?*

(19) *What is the voltage of the storage battery used with this set?*

(20) *What would be the effect of connecting a 20-volt battery in the primary instead of the 10-volt battery?*

Directions.

2. Put the set back in the box, and replace all the screws, nuts, and leads.

Information.

When the SCR–61 wave meter is used as a transmitter, the inductance coil acts as a radiator of the rapidly vibrating or high frequency currents. The distance over which the wave meter is effective is limited to a matter of only a few inches. If a wire, suspended above the ground between two supports, were connected at one end to one of the coil terminals on the wave meter, the transmitting range would be increased considerably. A large

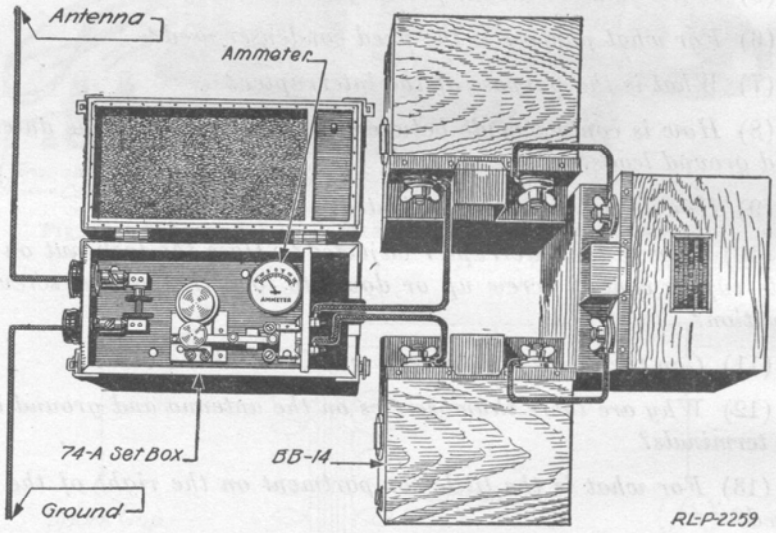

Fig. 33.—Cording diagram of SCR–74–A transmitter.

radiator or antenna of this type is necessary when using the SCR–74–A transmitter in order to reach the maximum distance range of the set.

EXPERIMENT No. 1.

MEASURING THE WAVE LENGTH RADIATED.

Directions.

3. Take the set box, battery, and wave meter over to the lead-in of the antenna indicated by the instructor. Connect the antenna lead, and ground or counterpoise lead to the set box. Set the spark gap to about one-eighth inch. Connect the battery leads to the battery. (See Fig. 33.) *Do not touch the spark gap or antenna, while*

there is current in the primary, as there is danger of receiving a severe shock.

4. Never close the key until both the antenna and counterpoise are connected to the set, and be sure that the length of the spark gap is not over one-eighth inch. If the gap is greater than this there is danger of breaking down the insulation in the secondary winding of the spark coil.

5. Close the key and adjust the interrupter until it is giving a clear steady pitched note and the ammeter registers about 5 to 7 amperes. Adjust the spark gap, being careful not to touch it while the current is on, until it has a good blue-white spark playing steadily between the sparking surfaces.

6. By means of the wave meter take a reading of the wave length being transmitted by the set. Begin by trying to obtain this reading close to the set and then move out toward the end of the antenna until the reading is fairly sharp. Record the results.

EXPERIMENT No 2.

7. Repeat the work performed in Experiment No. 1 on another antenna indicated by the instructor. Measure the wave length as in Experiment No. 1 and compare this wave length with the wave length measured on the antenna of Experiment No. 1.

Questions.

(21) *Why is it dangerous to touch the antenna when the key is down?*

(22) *On which antenna was the largest wave length reading obtained?*

(23) *Is the wave length on which this set transmits dependent on the antenna used?*

(24) *Is the signal readily tuned out?*

(25) *Could many of these sets work close together without interference?*

(26) *What is a high frequency current?*