## THE SCR–95, SCR–125, AND SCR–125–A WAVE METERS.

**Equipment.**

1 SCR–95 wave meter.
1 SCR–125 wave meter.
1 SCR–125–A wave meter.
1 SCR–61 wave meter.

### GENERAL CONSTRUCTION OF THE SCR–95 WAVE METER.

**Information.**

The SCR–95 is a small portable wave meter covering a range from 500 to 1,100 meters. (See Fig. 44.) Unlike the SCR–61 in which the condenser is continuously variable and the inductance fixed, the SCR–95 wave meter has the inductance continuously vari-

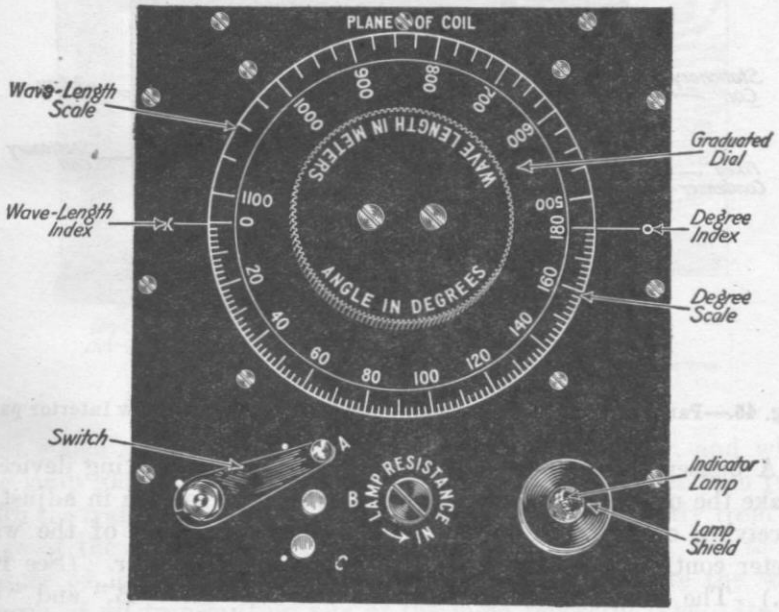


Fig. 44.—Top panel of SCR–95 wave meter.

able and the condenser fixed. The variable inductance consists of two windings connected in series, one within the other. (See Fig. 45.) The inner winding can be rotated through 180°, that is through one-half of a complete turn. When the inner winding is in such a position that the reading on the scale is 500 meters, the inductance

is at lowest value. Similarly when the inner winding is rotated 180° to the position at which the scale reading is 1,100 meters, the inductance is at its highest value. The inductance value varies with different positions of the movable winding due to the magnetic effect between the fields produced by the two windings. This magnetic effect is increased or decreased according to the position of the inner winding with respect to the position of the outer winding. It will thus be seen that the inductance is continuously variable between the highest and lowest value, depending upon the position of the inner winding. A variable inductance of this form is called a *variometer*.

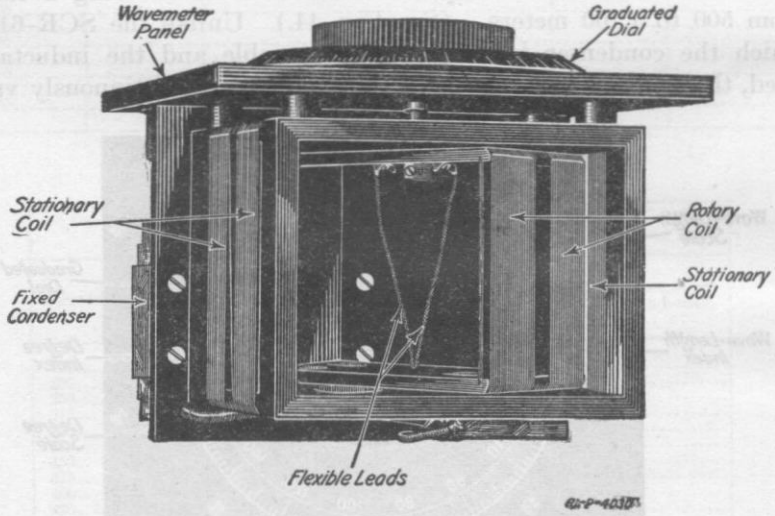


**Fig. 45.—Panel of SCR–95 wave meter removed from box to show interior parts.**

A buzzer is provided in the wave meter as an exciting device to make the meter act as a low-power transmitter for use in adjusting receiving circuits. A switch mounted on the panel of the wave meter controls the starting and stopping of the buzzer. (See Fig. 44.) The three switch contacts are marked "A," "B," and "C," respectively. In the illustration the switch arm is shown resting on contact A. In this position of the switch arm no current flows through the buzzer circuit. To start the buzzer, the switch is placed on contact B.

The wave meter is also provided with a small low-voltage lamp which is lighted by the same dry cell used to operate the buzzer. To light the lamp the switch arm on the wave meter panel must be placed on contact C. The amount of current flowing through the

lamp is controlled by a special type of rheostat, which is in turn controlled by an adjustment knob on the wave meter panel, marked "lamp resistance."

A small specially-wound inductance, known as a "choke coil," is inserted in the lamp circuit to prevent the high frequency currents from passing through the battery circuit.

To find the wave length of a transmitting set, the switch on the panel is turned to contact C, and the resistance is adjusted so that the filament of the lamp just begins to get red hot. The wave meter is then coupled closely with the transmitting set. The indicating

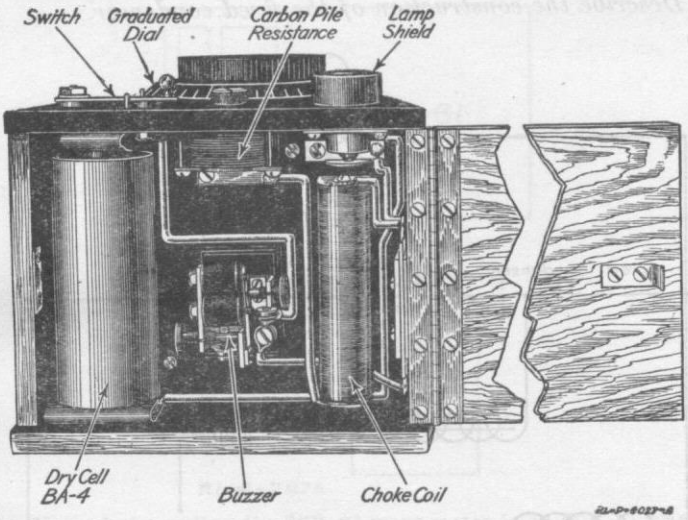


**Fig. 46.—SCR–95 wave meter with side door open.**

dial which varies the inductance is now turned slowly, and when the lamp glows brightly it indicates that the wave meter is in tune with the transmitting set. The wave length is read directly from the edge of the variometer dial. The SCR–95 wave meter, due to the nature of its indicating device, can be used to measure the wave length of all transmitting sets of the more powerful type. Its use in this connection will be taken up later.

**Directions.**

**1.** Examine the meter, noting all the markings on the panel. Open the door at the side and notice how the battery is inserted and the buzzer adjusted. (See Fig. 46.) Note the construction of the choke coil, the carbon pile resistance, and the small fixed condenser.

2. Remove the nine screws from the edge of the panel. Remove the panel and attached parts from the box.

3. Note the construction of the variometer and how connections are made to the moving coil.

4. Check the wiring with the wiring diagram shown in Fig. 47.

**Questions.**

(1) *Describe the construction of the carbon pile resistance.*

(2) *How does this wave meter differ electrically from the SCR–61?*

(3) *Describe the construction of the fixed condenser.*

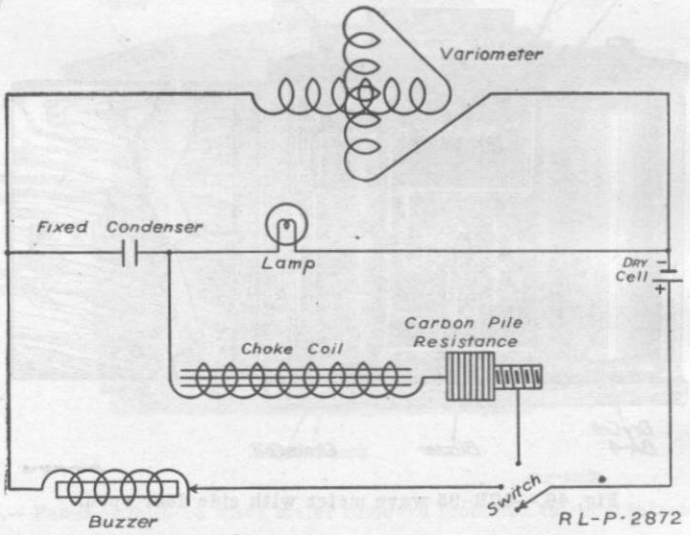


**Fig. 47.—Schematic diagram of connections in the SCR–95 wave meter.**

(4) *Can the battery be put in backwards, and would this damage it?*

(5) *Is there any current flowing from the battery when the small switch is on A? On B? On C? Where in each case? (Trace the circuit in detail.)*

(6) *Describe the construction of the variable inductance.*

**Directions.**

5. Replace the panel and parts in the box. Put the screws in place.

## EXPERIMENT No. 1.

### CHECKING THE SCR–95 WAVE METER WITH THE SCR–61 WAVE METER.

**Directions.**

6. Set up the SCR–61 with the " B " coil in place. Set the switch of the SCR–95 on B and adjust the buzzer. Set the dial at 500 meters. Couple the SCR–95 closely with the SCR–61. (See Fig. 48.) Adjust the SCR–61 until the signal comes in loud in the head set and loosen the coupling until the tuning of the SCR–61 wave meter is fairly sharp. The coupling should be as loose as possible

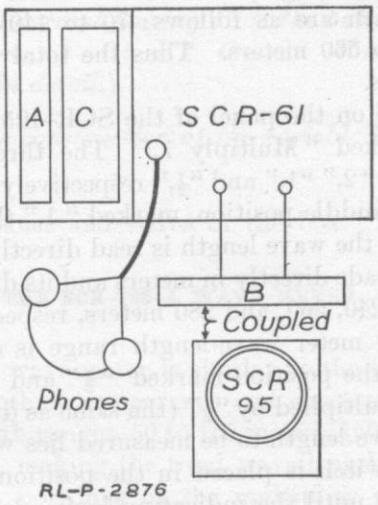


**Fig. 48.—Method of coupling the SCR–95 wave meter to an SCR–61 wave meter.**

to secure accurate results. Prepare a table similar to the one shown below. Take readings every 50 meters and record the results in the table.

TABLE.

| Reading SCR–95 wave meter. | Reading SCR–61 wave meter. |
|---|---|
| 500 | ..... |
| 550 | ..... |
| Etc. | ..... |

7. When the experiment is completed remove the battery from the SCR–95 wave meter.

**Questions.**

(7) *How do the readings of the SCR–95 wave meter compare with the readings of the SCR–61 wave meter?*

(8) *Can the SCR–95 wave meter be used to receive the buzzer signals from the SCR–61 wave meter? Explain your answer.*

## THE SCR–125 WAVE METER.

**Information.**

The SCR–125 wave meter is very similar to the SCR–95 wave meter both in appearance and construction. The main difference is in the wave-length ranges, the SCR–125 meter having three wave-length ranges which are as follows: 70 to 140 meters, 140 to 280 meters, and 280 to 560 meters. Thus the total range of the meter is 70 to 560 meters.

Close to the dial on the panel of the SCR–125 wave meter is a 3-point switch, marked "Multiply λ." The three positions of the switch are marked "2," "1," and "½," respectively. When the switch is adjusted to the middle position, marked "1," the 140 to 280 meter range is in use and the wave length is read directly on the dial. The wave-length dial reads directly in meters and its divisions are marked 140, 180, 200, 220, 240, 260, and 280 meters, respectively.

If the 70 to 140 meter wave-length range is desired, the switch must be placed in the position marked "½" and the reading on the wave-length dial multiplied by "½" (the same as dividing by 2). For example, if the wave length to be measured lies within the 70 to 140 meter range, the switch is placed in the position marked "½" and the dial is adjusted until the indicating lamp glows brightest. The wave-length reading on the dial may be, say 220 meters. Dividing this reading by 2, the correct wave-length reading is obtained—110 meters.

When the wave meter is being used to emit a wave within the 70–140 meter range, the desired wave length must be multiplied by 2 and the dial adjusted accordingly. For example, the desired wave length is 130 meters, which, multiplied by 2, is 260 meters. The wave-length dial is then adjusted so that the 260-meter mark is exactly opposite the "λ" mark on the panel.

If the wave length desired lies within the 280 to 560 meter range, the switch is placed in the position marked "2" and the reading on the wave-length dial must be multiplied by 2.

**Directions.**

8. Repeat directions 1, 2, 3, and 5, using the SCR–125 wave meter in place of the SCR–95 wave meter.

**Questions.**

(9) *Describe the construction of the carbon pile resistance.*

(10) *How does the SCR–125 wave meter differ from the SCR–95 wave meter?*

(11) *Locate the three small fixed condensers. Describe this construction and use.*

(12) *Can the battery be put in backwards and would this damage it?*

(13) *Is there any current flowing from the battery when the small switch is placed on A? On B? On C? Where in each case? (Trace the circuit in detail.)*

(14) *Describe the construction of the variable inductance.*

**Directions.**

9. Replace the panel and parts in the box. Put the screws in place.

## THE SCR–125–A WAVE METER.

**Information.**

The SCR–125–A wave meter is similar to the SCR–95 and SCR–125 wave meters both in appearance and construction. This meter has three wave-length ranges, 50 to 150 meters, 150 to 450 meters, and 450 to 1,350 meters, making the total wave-length range 50 to 1,350 meters. The three positions of the multiplier switch are marked "$\frac{1}{3}$," "1," and "3," respectively. If the wave length desired lies within the 150 to 450 meter range the multiplier switch is placed in the position marked "1" and the wave length is read directly on the dial. The wave-length dial reads directly in meters and is marked in divisions from 150 to 450 meters consecutively. When the 50 to 150 meter range is desired the multiplier switch is placed in the position marked "$\frac{1}{3}$." The wave length reading on the dial is then multiplied by "$\frac{1}{3}$" (the same as dividing by 3). Similarly, if the 450 to 1,350 meter range is desired the multiplier switch is placed in the position marked "3" and the wave length reading on the dial must be multiplied by 3.

**Directions.**

10. Repeat directions 1, 2, 3, and 5, using the SCR–125–A wave meter in place of the SCR–95 wave meter.

**Questions.**

(15) *Describe the construction of the carbon pile resistance.*

(16) *How does the SCR–125–A wave meter differ from the SCR–125 wave meter?*

(17) *Locate the three small fixed condensers. Describe their construction and use.*

(18) *What type of switch is used to control the current to the buzzer and indicator lamp?*

(19) *Is the battery entirely disconnected from the buzzer and lamp circuits when the switch is in the middle position? (Trace the wiring and see.)*

(20) *Describe the construction of the variable inductance.*

**Directions.**

11. Replace the panel and parts in the box. Put the screws in place.