

HAND GENERATOR, TYPE GN-29-A.

1. *Purpose.*—The hand generator type GN-29-A (to replace the type GN-29) is designed for use with the SCR-127 set. The necessary filament and plate voltage for the transmitter is supplied by this generator. The cording diagram (Fig. 112) shows the method of connecting the type GN-29-A generator.

2. *Improvements.*—The GN-29-A generator differs from the type GN-29 in that the voltage regulator of the former is mounted in the set box instead of on the side of the generator, also the new voltage regulator, type MC-62, is an improvement over the old type. The location of the voltage regulator was changed due to the fact that when it was mounted on the generator it was subjected to vibrations which tended to disturb the contact adjustments, consequently causing an

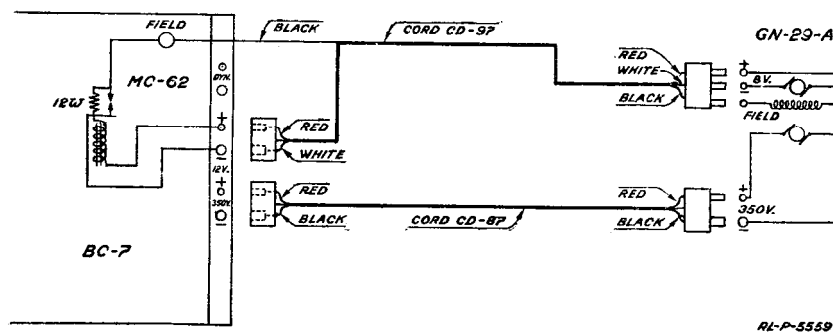


Fig. 112.—Cording diagram showing connections between the type GN-29-A hand generator and the set box of the SCR-127 set.

improper regulation of the voltage. Mounted in the set box the regulator is free from disturbances and therefore gives more satisfactory operation.

3. *Details and Operation of Regulator.*—a. All regulators are carefully adjusted by the manufacturer so as to maintain the generator low voltage between 8 and 9 volts. The adjustments are securely locked. The operator is cautioned against tampering with the regulator, as no readjustment is necessary. If it is found impossible to maintain the generator voltage between the limits of 8 and 9 volts, a *readjustment should be made by a radio electrician at the direction of an officer.*

b. After a set has been operated for a long period of time the regulator may need attention due to the sticking of the contacts. This trouble is made evident by the sudden brightening of the VT-2 tube filaments or by sudden increase of antenna current. Excessive

sparkling will also be caused at the same time at the telegraph sending key contacts. The transmit-receive switch should be opened momentarily, which will probably correct the trouble. If the trouble still persists and the generator fails to develop the proper voltage it is probable that the regulator contacts have become roughened. If this is the case, the contacts should be lightly smoothed with a very fine file or very fine emery paper. *The work should be done by a radio electrician at the direction of an officer.*

c. The operation of the regulator is as follows: The electromagnet winding is connected across the generator low-voltage brushes. A resistance of 12 ohms is connected across the contacts of the regulator, so that when the contacts are closed the resistance is short-circuited. The contacts are connected in series with the generator field. When the generator is turned at slow speed the voltage developed is insufficient to cause the electromagnet to pull the armature separating the contacts. When the generator speed is above a certain minimum value (about 35 revolutions per minute of the handles) the voltage developed pulls the armature closer, thus opening the contacts. This places the resistance in series with the shunt field and reduces the generated voltage sufficiently so that the electromagnet allows the armature to move back again, thus closing the contacts. This process occurs at a sufficient rate to maintain the voltage at a value practically unchanged by an increasing generator speed. The regulator, therefore, operates to maintain the generator voltage at a fixed value for all generator speeds above a certain minimum value.

4. *Voltage adjustment.*—a. The curved spring adjusts the air gap between armature and core. Decreasing the air gap will cause a lower voltage to exert the same pull on the armature as previously obtained with a higher voltage.

b. When the contact screw barely touches the armature contact, a slight pull will open the circuit. When the screw is turned in further, the pressure at the contacts is greater, consequently making greater the magnetic pull necessary to open the circuit.

c. The transmit-receiver switch of the radio set must be open during the adjustment of the regulator in order to prevent damage which may be caused by excessive filament and plate voltage. A direct-current voltmeter, having a range of not less than 0–10 volts, should be connected to the 12-volt binding posts on the radio set.

d. The adjustment screw which bears on the small curved spring should be turned in until the air gap between the armature and the core is about $1/16''$; the contact screw should then be turned in (with

the generator running at high speed) until the contact adjustment giving the highest voltage is found. It is desired that the maximum voltage thus tested be $9\frac{1}{2}$ volts.

(1) If the voltage is *greater* than $9\frac{1}{2}$ volts, it is necessary to turn in the screw bearing on the curved spring, about one turn, decreasing the air gap slightly. Another test should be made to see if the maximum voltage obtainable is, $9\frac{1}{2}$ volts. If the maximum voltage is still above $9\frac{1}{2}$ volts, it is necessary to turn in still further, the screw bearing on the adjusting spring.

(2) If the voltage is *less* than $9\frac{1}{2}$ volts, it is necessary to turn out the screw bearing on the curved spring, about one turn, increasing the air gap slightly. Again a test should be made to see if the maximum voltage obtainable is $9\frac{1}{2}$ volts. If the maximum voltage is still below $9\frac{1}{2}$ volts, it is necessary to turn out, still further, the screw bearing on the adjusting spring.

e. The maximum voltage adjustment having been obtained at $9\frac{1}{2}$ volts, the contact screw should be turned outward until the voltage has decreased to $8\frac{1}{2}$ volts.

f. This process insures proper spring tension. A certain minimum tension is necessary in order to prevent sticking at the contacts. The screw adjustments should be secured by means of the lock nuts provided.