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TECHNICAL MANUAL
No. 11-308



WAR DEPARTMENT
Washington, 13 January, 1944

REMOTE CONTROL UNIT RM-29-(*)

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¹This manual supersedes TM 11-308-A, 16 Jan. '43, and TM 11-308-B, 12 Nov. '42.

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DESTRUCTION NOTICE

WHY —To prevent the enemy from using or salvaging this equipment for his benefit.

WHEN—When ordered by your commander.

HOW —1. Smash—Use sledges, axes, handaxes, pickaxes, hammers, crowbars, heavy tools, etc.
2. Cut—Use axes, handaxes, machetes, etc.
3. Burn—Use gasoline, kerosene, oil, flame-throwers, incendiary grenades, etc.
4. Explosives—Use firearms, grenades, TNT, etc.
5. Disposal—Bury in slit trenches, fox holes, other holes. Throw in streams. Scatter.

USE ANYTHING IMMEDIATELY AVAILABLE FOR DESTRUCTION OF THIS EQUIPMENT

WHAT—1. Smash—Capacitors, switches, transformers, ringer hand generator, jacks, plugs, and front panel.
2. Cut—All cords and wiring.
3. Bend and/or break—Generator, ringer, jacks, and plugs.
4. Burn—All charts, diagrams, manuals, and wiring.
5. Bury or scatter—Any or all of the above pieces after breaking or burning.

DESTROY EVERYTHING

SECTION I. DESCRIPTION

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1. General

Remote Control Units RM-29-A and RM-29-B are complete and self-contained units used for the remote control voice operation of certain types of radio sets (par. 3). Such additional equipment as auxiliary switches, externally connected batteries, or ground rods, is not required for operation. Remote Control Unit RM-29-A is furnished with Carrying Case CS-76-(*), and RM-29-B with Carrying Case CS-76-(*). Two copies of TM 11-308 accompany each unit.

There are no differences in the operation, dimensions, or electrical wiring of these units, but there are differences in the patterns for the placement of parts within the cabinets. (See Figs. 3, 4, 5, and 6.) Space is provided inside Remote Control Unit RM-29-()² for one Battery BA-27, but to avoid deterioration, this battery is not inserted until the unit is ready for use.*

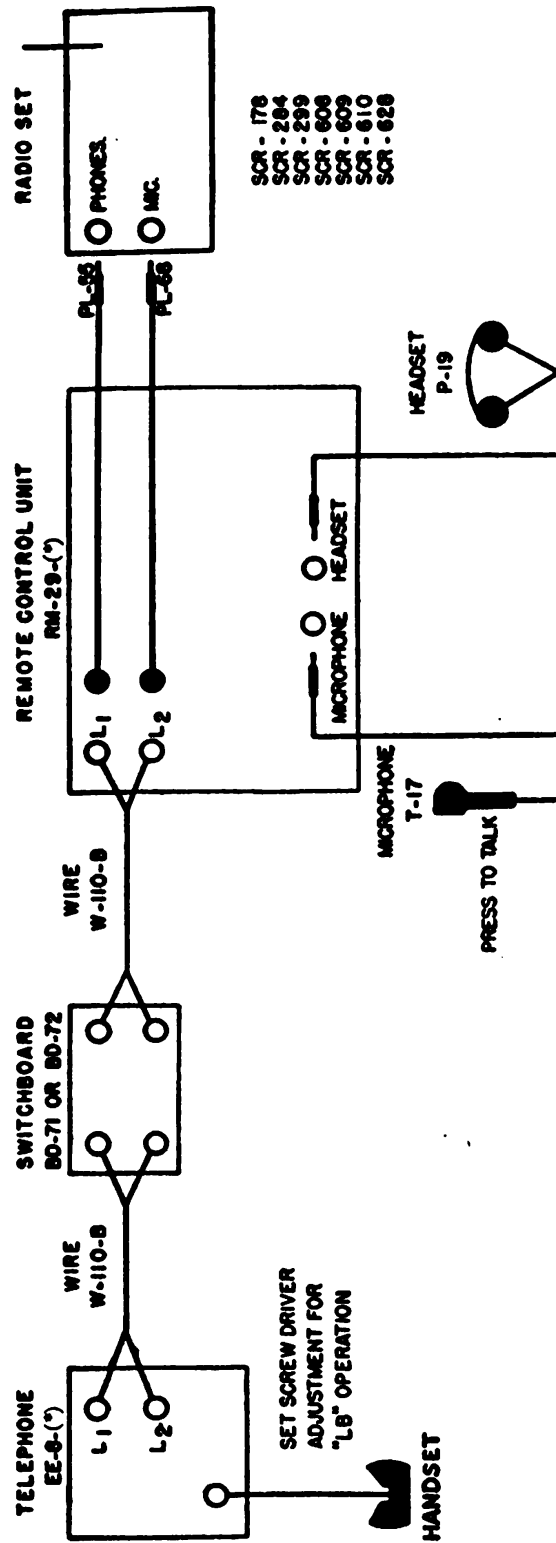
2. Equipment Used with Remote Control Unit RM-29-(*)

For remote control of a radio set, the following items of equipment are used in conjunction with Remote Control Unit RM-29-(*):

- 1 Battery BA-27 (to be installed inside Remote Control Unit RM-29-(*)).
 - 1 Headset P-19.
 - 1 Microphone T-17.
 - 1 Switchboard BD-71 or BD-72
- or
- 1 Telephone EE-8-(*).

Sufficient two-conductor wire, such as Wire W-110-B, to connect the switchboard or telephone to Remote Control Unit RM-29-(*).

²Throughout this manual, the symbol (*) will be used in place of the suffix letters in equipment titles to designate all models of a series.



- SCR - 178
- SCR - 284
- SCR - 298
- SCR - 608
- SCR - 609
- SCR - 610
- SCR - 628

**FIGURE 2. REMOTE CONTROL UNIT RM-29-(*)
CORDING DIAGRAM**

3. Use

Remote Control Unit RM-29-(* provides remote control voice operation of Radio Sets SCR-178, SCR-284-(*), SCR-299-(*), SCR-608-(*), SCR-609-(*), SCR-610-(*), and SCR-628-(*), and other models of similar design. The unit operates in conjunction with Telephone EE-8-(* over a two-wire telephone line. Although control may be exercised only at the remote control unit, the terminus for signals transmitted and received may be either Remote Control Unit RM-29-(* or Telephone EE-8-(*). Microphone T-17 and Headset P-19 when plugged into Remote Control Unit RM-29-(* are used for transmission and reception of signals via the radio set, for monitoring signals between the telephone and the radio set, and for direct telephonic communication with Telephone EE-8-(*). The operational positions are selected by Switch SW-185 (Figs. 1 and 12) on the front panel of the remote control unit. The positions on the switch are marked RADIO, THROUGH, and TELEPHONE.

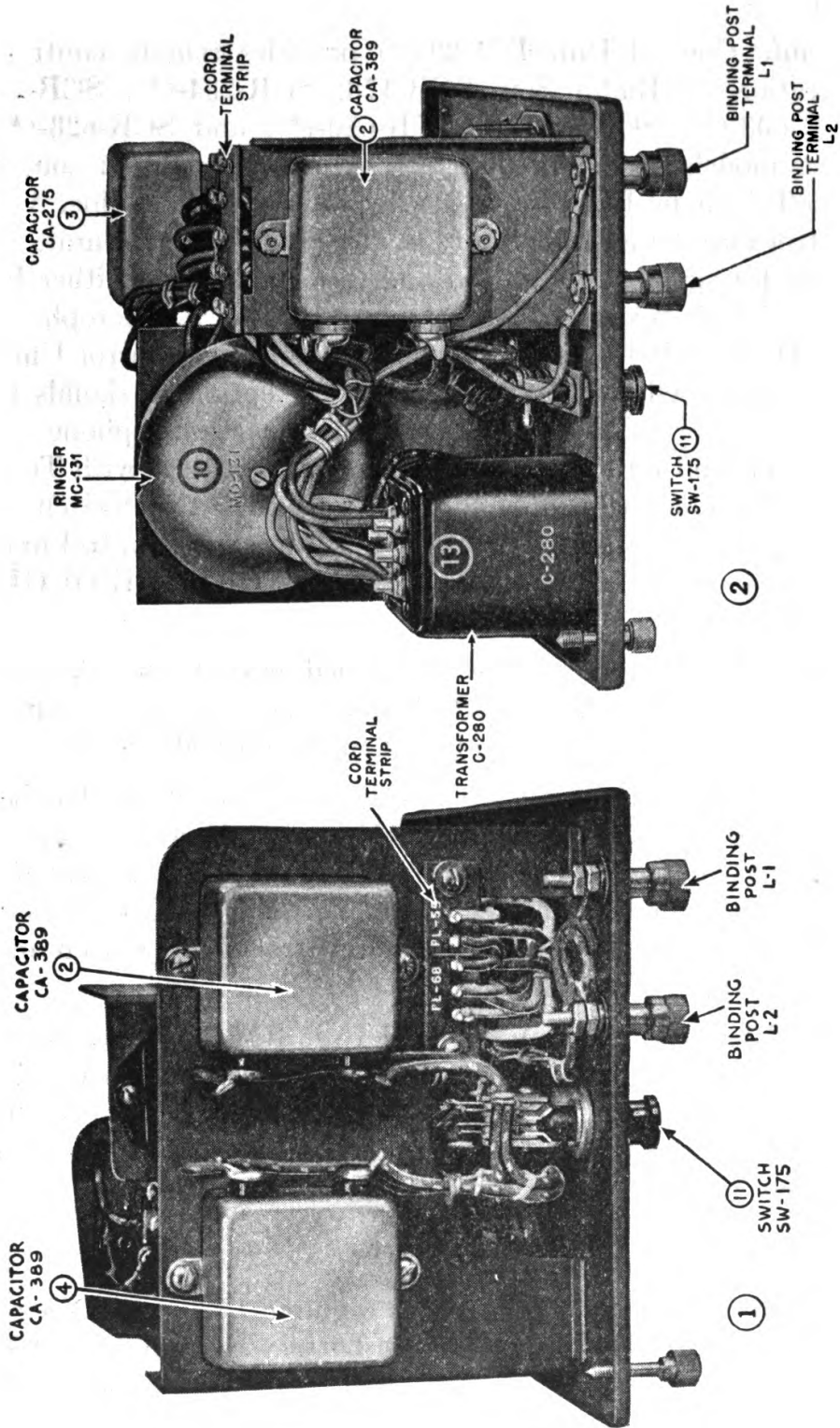
- a. **RADIO.**—The radio set is controlled entirely by the operator stationed at the remote control unit. The operator transmits and receives signals using the radio set in the normal manner.
- b. **THROUGH.**—The radio set is still controlled entirely by the operator at Remote Control Unit RM-29-(*). However, he can not transmit, but can only monitor the signals passing over the line, both from the radio receiver to any Telephone EE-8-(* connected to the telephone line of the remote control unit, or from any telephone to the radio transmitter.
- c. **TELEPHONE.**—Remote Control Unit RM-29-(* functions as a telephone, and the operator can communicate with any Telephone EE-8-(* connected to the telephone line. However, neither the operator at the telephone nor the operator at the remote control unit can transmit to the radio.

4. Power Requirements

One Battery BA-27 (4½ volts) is required to operate Microphone T-17. The current drain from the battery is from 50 to 95 milliamperes, depending on the position in which the microphone is held.

5. Appearance

- a. **Panel.**—Remote Control Unit RM-29-(* is housed in an olive-drab metal box. On the front panel are located RADIO-THROUGH-TELEPHONE Switch SW-185, Crank GC-9, ANTI-HOWL Switch SW-175, MICROPHONE and HEADSET Jacks JK-33-A and



**FIGURE 3. ① REMOTE CONTROL UNIT RM-29-B,
LEFT SIDE VIEW WITH HOUSING REMOVED**
**② REMOTE CONTROL UNIT RM-29-A,
LEFT SIDE VIEW WITH HOUSING REMOVED**

JK-34-A respectively, and cordage and Plugs PL-55 and PL-68 for connection to the radio set. Line binding post terminals L_1 and L_2 , providing line connections from the switchboard or telephone, are also located on the front panel.

- b. *Case.*—Case CS-76-(*), is an olive-drab duck bag with leather reinforcements on the bottom and corners. It has a carrying strap and three compartments, one for Remote Control Unit RM-29-(*), and the other two for a chart, technical manuals and tools.

6. Weights and Dimensions

<i>Article</i>	<i>Weight</i>	<i>Approx. Dimensions</i>
Remote Control Unit RM-29-(*) (complete with Battery BA-27)	13½ lbs.	9 ⁵ / ₁₆ " x 6 ⁵ / ₁₆ " x 5 ³ / ₁₆ "
Case CS-76-(*).	2 lbs.	10 ¹ / ₂ " x 9 ¹ / ₄ " x 7"

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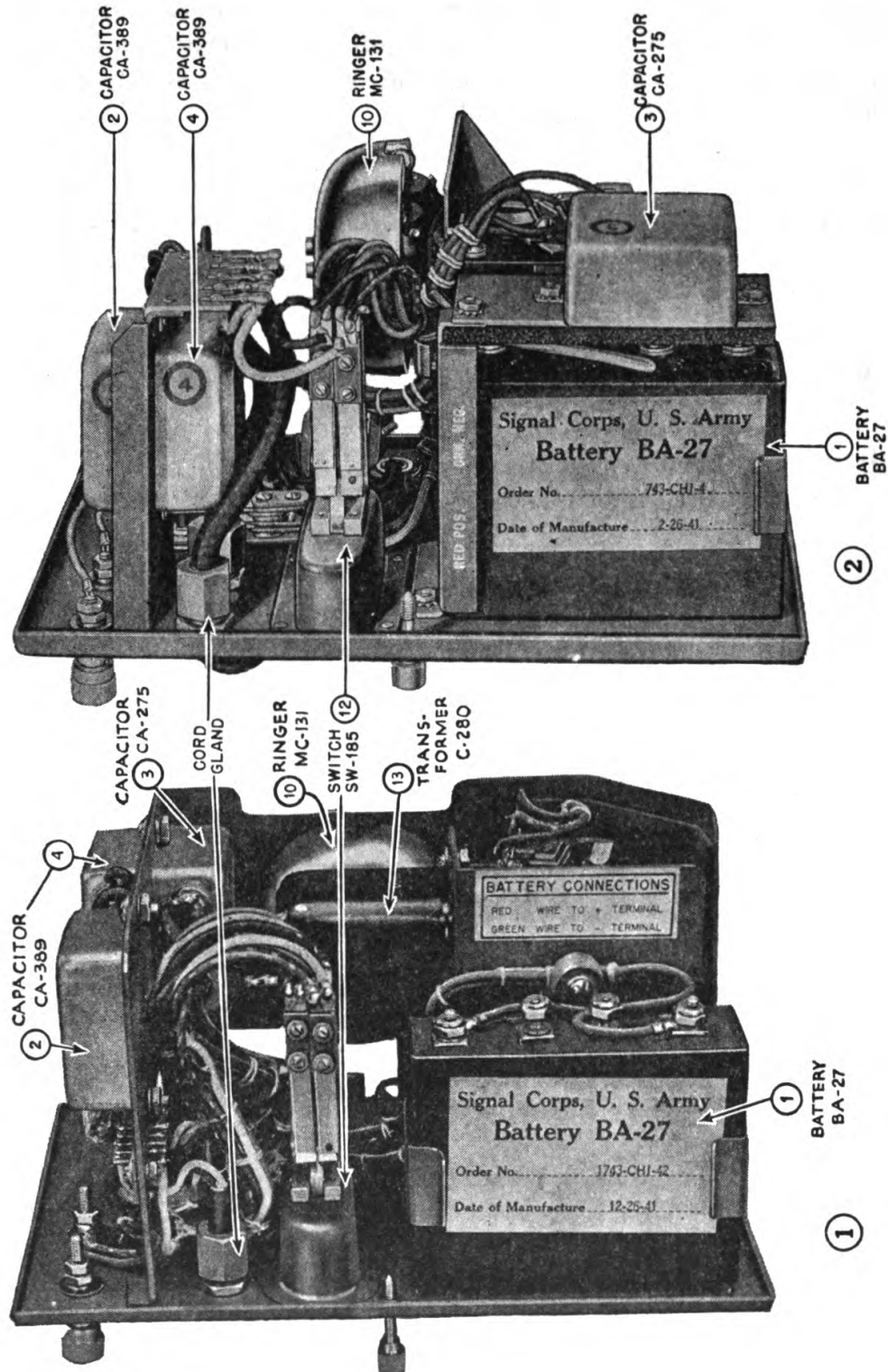


FIGURE 4. ① REMOTE CONTROL UNIT RM-29-B, TOP VIEW WITH HOUSING REMOVED
② REMOTE CONTROL UNIT RM-29-A, TOP VIEW WITH HOUSING REMOVED

SECTION II. INSTALLATION AND OPERATION

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7. Initial Procedure

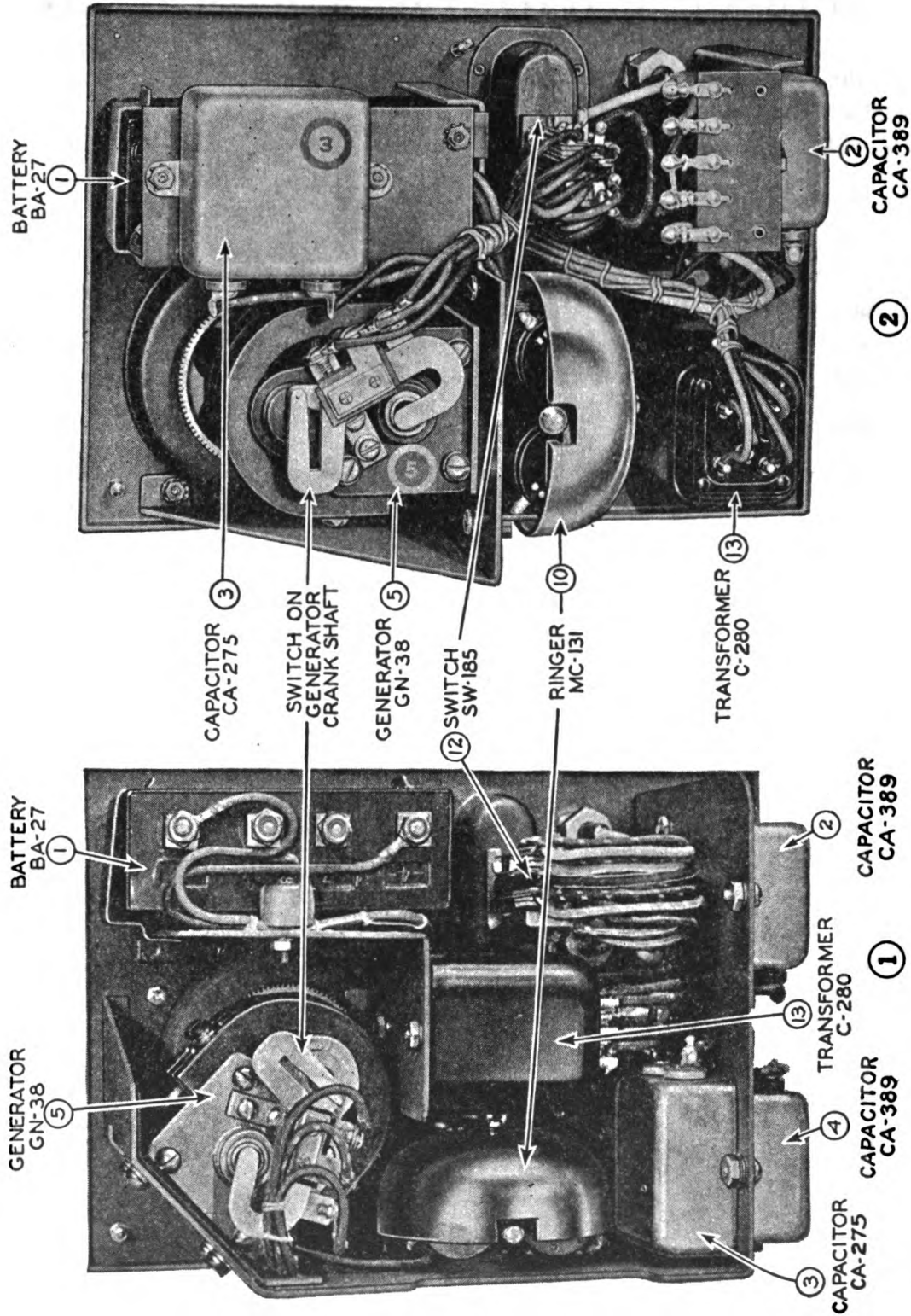
Unpack Remote Control Unit RM-29-(*), being careful not to throw away the two technical manuals which are packed in the same carton. Inspect the unit for any damage which may have occurred during shipment. Clean Plugs PL-55 and PL-68 with a soft cloth if they have become corroded or badly tarnished.

8. Installation

- a. *Battery*.—Unscrew the three knurled head-locking screws on the front panel and withdraw the unit from its housing. Install one Battery BA-27 in the space provided for it on the chassis. Connect the positive (red) lead of the cable to the binding post on Battery BA-27 marked +, and the negative (green) lead of the cable to the battery binding post marked —4½. Be sure that the battery is securely held in place by the two spring clips, and be certain that the nuts on the battery are securely tightened. Remove the battery from the unit whenever it is to be stored or not used for 48 hours.
- b. *Switchboard or Telephone*.—Replace Remote Control Unit RM-29-(*), in its housing and tighten the panel locking screws. Connect the two wires of the line from the switchboard to binding posts L₁ and L₂ on the panel. Remote Control Unit RM-29-(*), may be used without a switchboard. When thus used, connect line wires to L₁ and L₂ of the remote control unit and to L₁ and L₂ of Telephone EE-8-(*).
- c. *Microphone*.—Insert Plug PL-68 of Microphone T-17 and Plug PL-55 of Headset P-19 into the correct jacks marked MICROPHONE and HEADSET on the front panel of the unit. Insert the plugs coming from the panel holes marked RECEIVER and MICROPHONE into the correct jacks of the radio set. These connections are shown in Figure 2.

9. Operation

- a. *RADIO*.—When the radio set is to be operated only by Remote Control Unit RM-29-(*), (Fig. 7):
 - (1) Set Switch SW-185 to RADIO position.
 - (2) To transmit, press the Microphone T-17 “press-to-talk” switch and talk into the microphone.



**FIGURE 5. ① REMOTE CONTROL UNIT RM-29-B,
REAR VIEW WITH HOUSING REMOVED**
**② REMOTE CONTROL UNIT RM-29-A,
REAR VIEW WITH HOUSING REMOVED**

- (3) To receive, the radio receiver is turned on and the signals are heard in the headset. While receiving, don't press the microphone "press-to-talk" switch.
 - (4) When a call is made from any telephone on the line while Switch SW-185 is at RADIO, the ringer in Remote Control Unit RM-29-(*) will operate. To answer, throw Switch SW-185 to TELEPHONE, and press the microphone switch.
- b. **THROUGH.**—When the radio set is to be operated from a Telephone EE-8-(*) (Fig. 8):
- (1) Set Switch SW-185 to THROUGH.
 - (2) Monitor all signals passing through the line, both from the radio receiver to the line, and from the line to the radio transmitter. With Switch SW-185 at THROUGH, the operator at Remote Control Unit RM-29-(*) can hear all signals, but cannot transmit.
 - (3) Press the ANTI-HOWL PRESS Switch SW-175 to permit transmission to go through from Telephone EE-8-(*) to the radio set. When transmission ceases from Telephone EE-8-(*), release the ANTI-HOWL PRESS Switch SW-175, to permit signals to go through from the radio set to the telephone.
 - (4) If a call is made from any telephone on the line while Switch SW-185 is at THROUGH, the ringer in Remote Control Unit RM-29-(*) will operate. To answer, throw Switch SW-185 to TELEPHONE, and press the microphone switch.
- c. **TELEPHONE.**—When operating Remote Control Unit RM-29-(*) as a telephone (Fig. 9):
- (1) Set Switch SW-185 to TELEPHONE.
 - (2) Transmission coming from Telephone EE-8-(*) will be heard in the headset. When listening, do not press the microphone "press-to-talk" switch.
 - (3) To talk, press the microphone "press-to-talk" switch and speak into Microphone T-17.
 - (4) The ringer in the remote control unit will operate if a call is made from any telephone on the line. Press the microphone "press-to-talk" switch and answer into Microphone T-17.
 - (5) To call another telephone, lift handle of Generator Crank GC-9, and rotate to the right.

SIGNAL CORPS

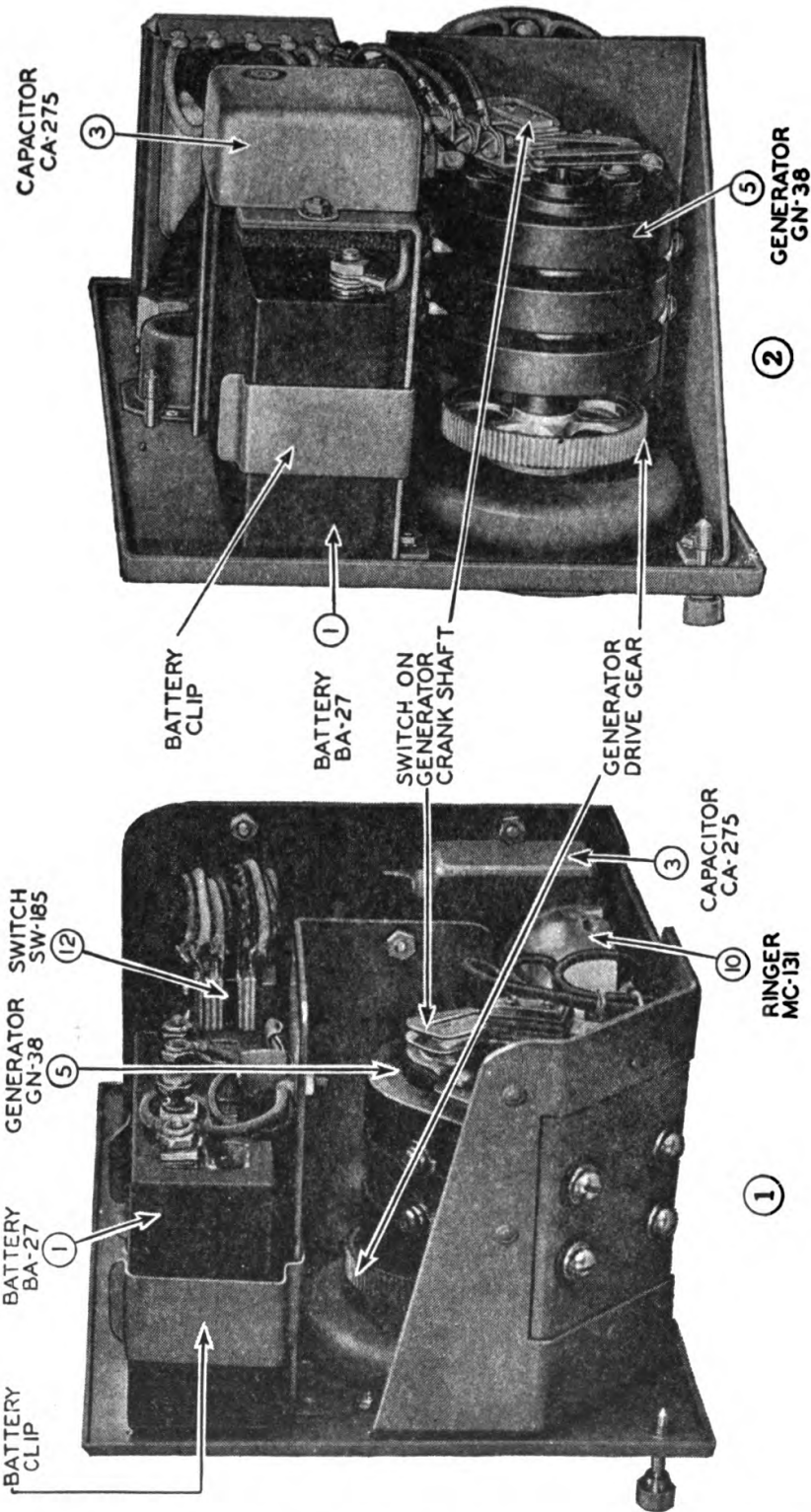


FIGURE 6. ① REMOTE CONTROL UNIT RM-29-B, RIGHT SIDE VIEW WITH HOUSING REMOVED
② REMOTE CONTROL UNIT RM-29-A, RIGHT SIDE VIEW WITH HOUSING REMOVED

SECTION III. DETAILED FUNCTIONING OF PARTS

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TELEPHONE Position	12
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Ringer MC-131	14
Transformer C-280	15
Switch SW-175	16
Switch SW-185	17

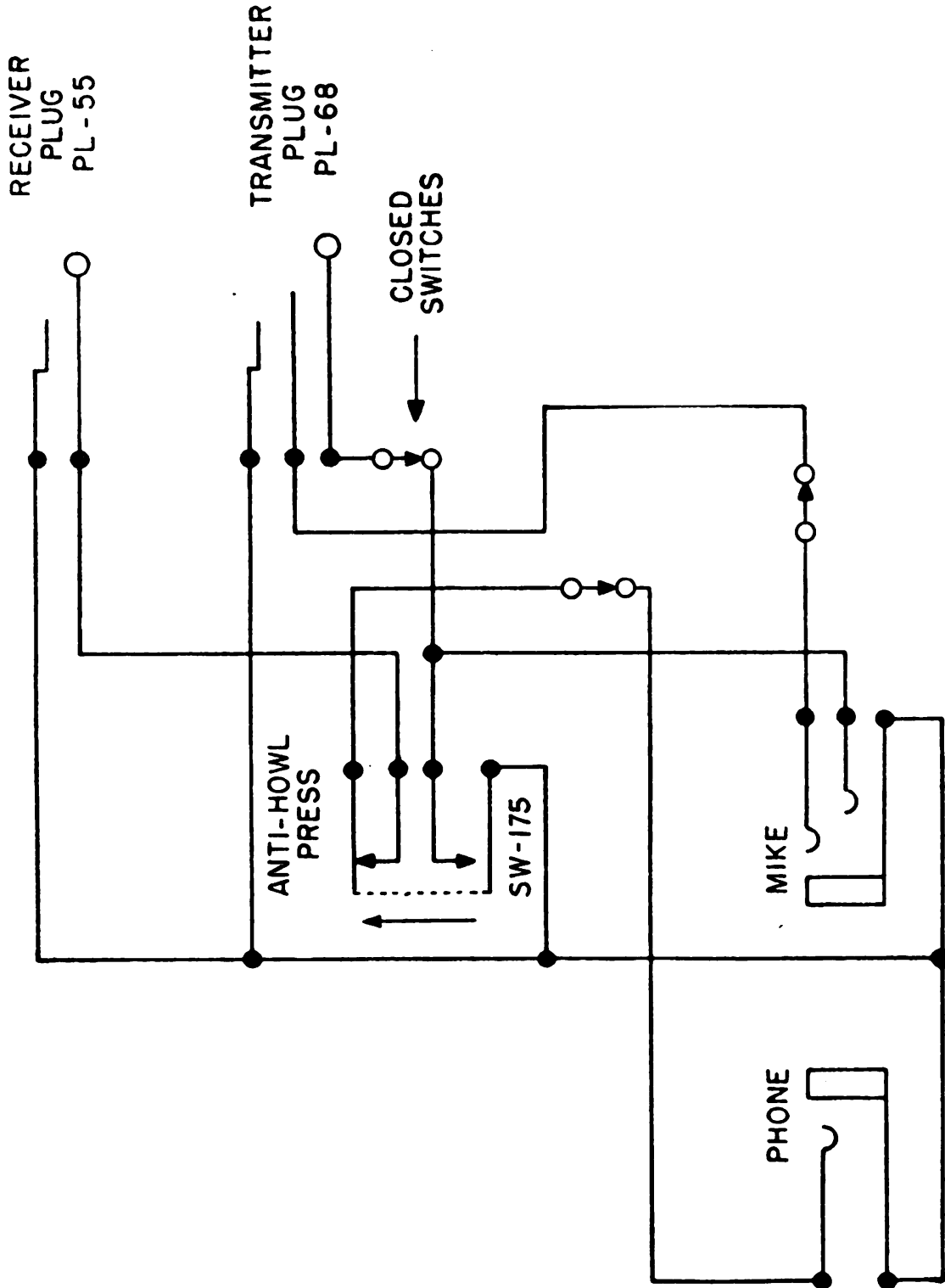
10. Radio Position

Figure 7 is a functional diagram of Remote Control Unit RM-29-(*) switched to RADIO, and its connections to the headset, microphone, and the radio set. Transformer C-280 is disconnected from the microphone and the headset. Ringer MC-131 is connected across the telephone line through a 1 μ f capacitor and the generator switch, and can be rung by any telephone on the line. Generator GN-38-(*) can be used to call any telephone on the line. With the microphone switch not in the operating position, the headset is connected to the output of the audio amplifier in the radio set, which operates as a receiver, since the relay in the radio set which selects the functions of sending and receiving is not actuated. Microphone T-17 is inoperative. When the microphone switch is pressed, it is connected to the audio input transformer and the 4½-volt battery in the radio set. The radio set then functions as a transmitter, since the relay in the radio set is actuated through the microphone switch. The headset remains connected to the output of the audio amplifier in the radio receiver.

11. Through Position

Figure 8 is a functional diagram of the unit at the THROUGH position. The telephone line is connected to winding terminals 5 and 7 of Transformer C-280†; headset and receiver output is connected to terminals 3 and 4 and microphone and transmitter audio input is connected to terminals 1 and 2. Generator GN-38-(*) and Ringer MC-131 operate in normal manner. With the ANTI-HOWL Switch SW-175 *up*, the headset is connected to the output of the audio amplifier of the receiver, Microphone T-17 is inoperative, and signals from the receiver pass through Transformer

†NOTE: Refer to Fig. 10 for terminal numbers.



**FIGURE 7. REMOTE CONTROL UNIT RM-29-(*)
FUNCTIONAL DIAGRAM, RADIO POSITION**

C-280† to the telephone line. When the ANTI-HOWL switch is pressed, the relay in the radio set operates and the transmitter functions; Microphone T-17 remains inoperative, and signals from the telephone line pass through C-280 to the transmitter. These signals are also audible in the headset which remains connected to winding terminals 3 and 4 of Transformer C-280†. Pressing the ANTI-HOWL switch opens the circuit of winding terminals 3 and 4 of the transformer, which was connected to the audio amplifier in the radio set, thus preventing "howling" due to *feedback*.

12. Telephone Position

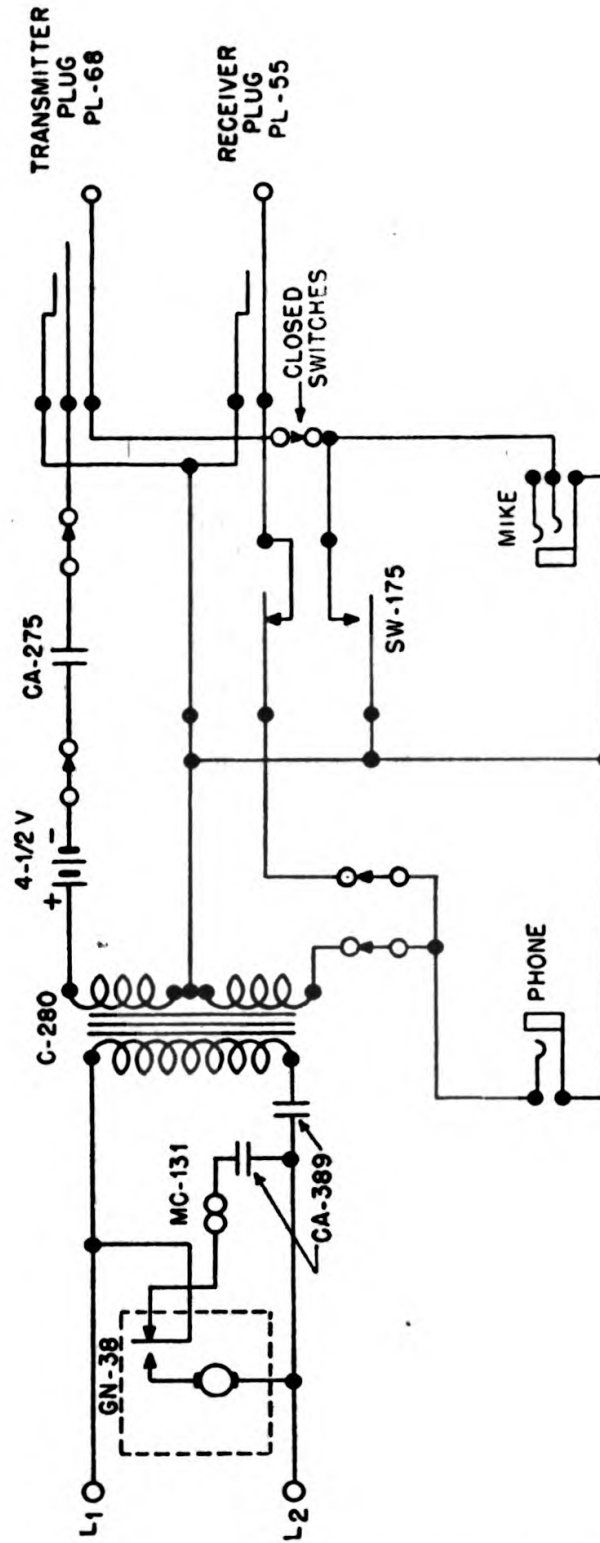
Figure 9 is a functional diagram of the unit at the TELEPHONE position. The telephone line is connected to winding terminals 5 and 7 of Transformer C-280†. The headset is connected to winding terminals 3 and 4, and when the microphone switch is pressed, it is connected to winding terminals 1 and 2† with Battery BA-27 in the circuit, and the radio operator and any telephone operator on the line may carry on a two-way conversation. However, with switch in TELEPHONE position, there is no electrical circuit to the radio set. Generator GN-38-(*) and Ringer MC-131 continue to operate in the normal manner.

13. Generator GN-38-(*)

a. Models.—Remote Control Unit RM-29-(*) may be equipped with either Generator GN-38, GN-38-A, or GN-38-B. The generator type number is shown on the generator frame just below the driven end of the armature or rotor. Generator GN-38 is housed in an aluminum alloy case. The design of Generators GN-38-A and GN-38-B is not the same as the design of Generator GN-38, due to a use of other metals. Generator GN-38 has three magnets arranged on two-pole faces about an armature, GN-38-A has a rotating magnet and stationary coils, and GN-38-B has two stationary magnets and two pole pieces arranged alternately about an armature. Generators GN-38-A and GN-38-B are designed to give a slightly greater voltage output, in order to overcome the magnetic field losses in the ferrous metal case for which they were designed.

b. Operation.—Generator GN-38-(*) is a permanent magnet type, a.c. generator driven by gears from Crank GC-9 on the front panel. A

†NOTE: Refer to Fig. 10 for terminal numbers.



**FIGURE 8. REMOTE CONTROL UNIT RM-29-(*)
FUNCTIONAL DIAGRAM, THROUGH POSITION**

spring holds back Crank GC-9 when it is not in use in a recessed space on the front panel. A V-shaped cam causes the crankshaft to move back about $\frac{1}{8}$ inch when Crank GC-9 is rotated. This cam operates a single-pole, double-throw switch which disconnects Ringer MC-131 from the line and connects Generator GN-38-(*). When Crank GC-9 is no longer rotated, the generator is again disconnected from the line and the ringer is connected. This switch prevents the generator from acting as a load on the line when not in use, and prevents operation of the local ringer when ringing another telephone. The armature of the generator has only two poles. The open circuit terminal voltage is about 90 volts, r.m.s. (root mean square), when the crank is rotated at 180 r.p.m. One terminal of the armature winding is brought out through the armature shaft to a spring terminal on the rear of the generator. The other armature terminal is grounded to the generator frame, which is insulated from the chassis (Figs. 5 and 6).

14. Ringer MC-131

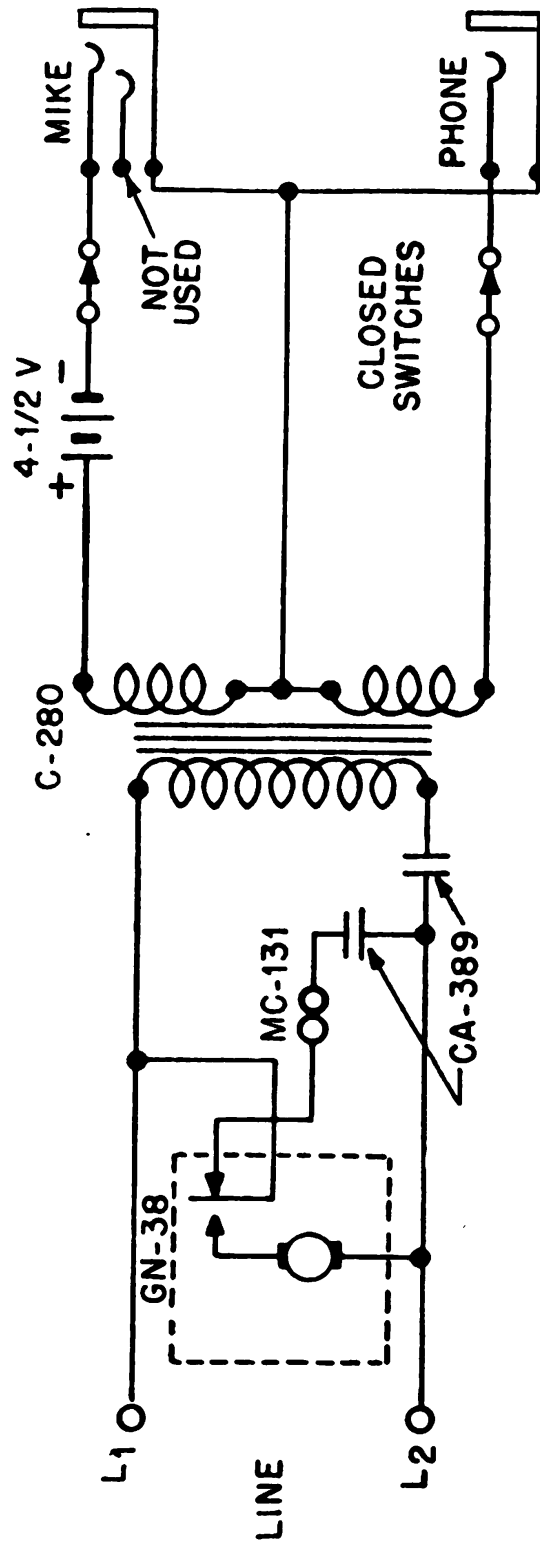
Ringer MC-131 is a polarized ringer. The series impedance at 1000 cycles of the ringer and blocking capacitor, Capacitor CA-389, is about 25,000 ohms.

15. Transformer C-280

Transformer C-280 has three windings, a primary connected to the telephone line and two secondaries. One secondary (3-4) matches the impedance of the carbon button microphone to that of the telephone line; and the other (1-2) matches the audio output impedance of the radio set to that of the telephone line. (See Fig. 10.)

16. Switch SW-175

Switch SW-175 is a non-locking, push-button type switch consisting of four contact springs. When it is in the normal position (not operated), one pair of springs are closed, forming what is known as the "normally *closed* contact." At the same time, the other pair of springs remains open, forming the "normally *open* contact." The switch is adjusted so that during operation the normally closed contact opens before the normally open contact closes. This adjustment is necessary in order to open the feed-back circuit from the radio receiver to Transformer C-280 before the operating circuit for the start relay in the radio transmitter is closed, thus preventing "howling."



**FIGURE 9. REMOTE CONTROL UNIT RM-29-(*)
FUNCTIONAL DIAGRAM, TELEPHONE POSITION**

17. Switch SW-185

Switch SW-185 is a 3-way, locking key type switch, consisting of 12 contact springs arranged in 5 sections. Viewed from the rear of the panel, that is from the wiring side of the remote control unit, the assembly of the switch when in the center position marked THROUGH is, as follows:

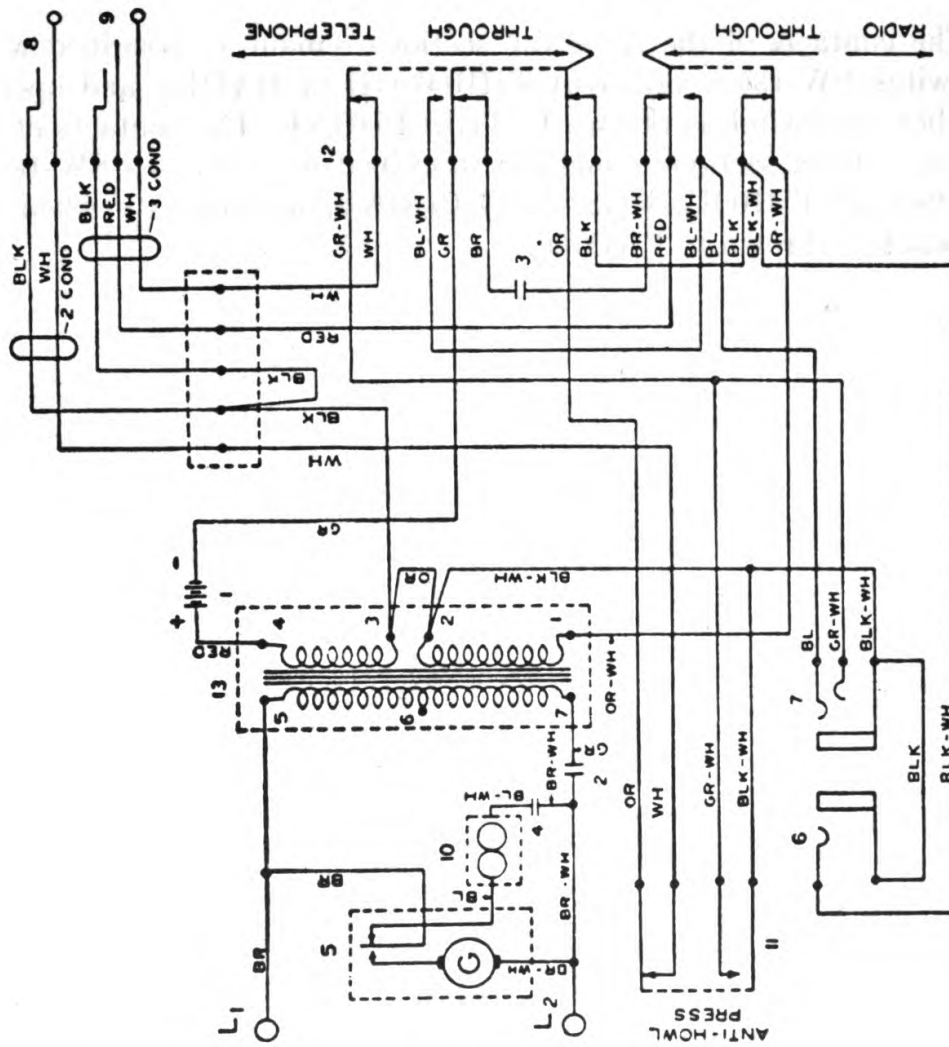
- (a) Top left-hand section—one normally closed contact.
- (b) Below this is another section—one normally closed contact.
- (c) Top right-hand section—one change-over contact.
- (d) Bottom left-hand side—one normally closed contact.
- (e) Bottom right-hand side—one change-over contact.

The contacts of the three top sections remain as described when Switch SW-185 is either at THROUGH or RADIO, and operate when the switch is thrown to TELEPHONE. The contacts of the two bottom sections remain as described when Switch SW-185 is either at THROUGH or TELEPHONE, and operate when the switch is thrown to RADIO.

APPARATUS LEGEND

PART	TYPE	DESCRIPTION
1	BA-27	BATTERY 4.5V
2	CA-389	CAPACITOR
3	CA-275	CAPACITOR
4	CA-389	CAPACITOR
5	GN-38	GENERATOR
6	JK-34A	JACK
7	JK-33A	JACK
8	PL-55	PLUG
9	PL-68	PLUG
10	MC-131	RINGER
11	SW-175	SWITCH
12	SW-185	SWITCH
13	C-280	TRANSFORMER

CAUTION - REMOVE BATTERIES
BEFORE STORING



**FIGURE 10. REMOTE CONTROL UNIT RM-29-(*)
SCHEMATIC DIAGRAM**

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18. Inspection

In case of trouble, do not attempt any replacements or repairs until an inspection of Remote Control Unit RM-29-(*) and its associated apparatus and connections has been made, and all visible troubles corrected. Inspect particularly the following points:

- a. *External Connections.*—Binding posts L₁ and L₂ should be securely tightened. Plug PL-55 attached to Headset P-19 and Plug PL-68 attached to Microphone T-17 should be pushed all the way in. Plugs PL-55 and PL-68 coming from Remote Control Unit RM-29-(*) should be clean and pushed all the way into their respective jacks on the radio set.
- b. *Switches and Plugs.*—Switches should operate freely. Inspect each switch to make sure that positive contact is made, and that contact is broken on one side before it is made on the other when the switches are operated. Unscrew the plug sleeves and check to see that the cord terminals are securely fastened under the heads of the binding screws.
- c. *Internal Connections.*—All connections are accessible. Inspect them for broken soldered joints and for short circuits where several soldered connections are close together.

19. Lubrication

All parts are lubricated as required by the manufacturer. They require no further lubrication during the life of the unit.

20. Removal of Parts

All parts are readily accessible for removal and replacement. Cord and plug sub-assemblies can be replaced by unsoldering the cords from the terminal panel in the remote control unit. Then the cord can be removed by loosening the cord gland locknut. Make replacement by reversing the foregoing procedure. When connecting any parts being replaced, use the color code of the Remote Control Unit RM-29-(*) wiring diagram as a guide (Fig. 11).

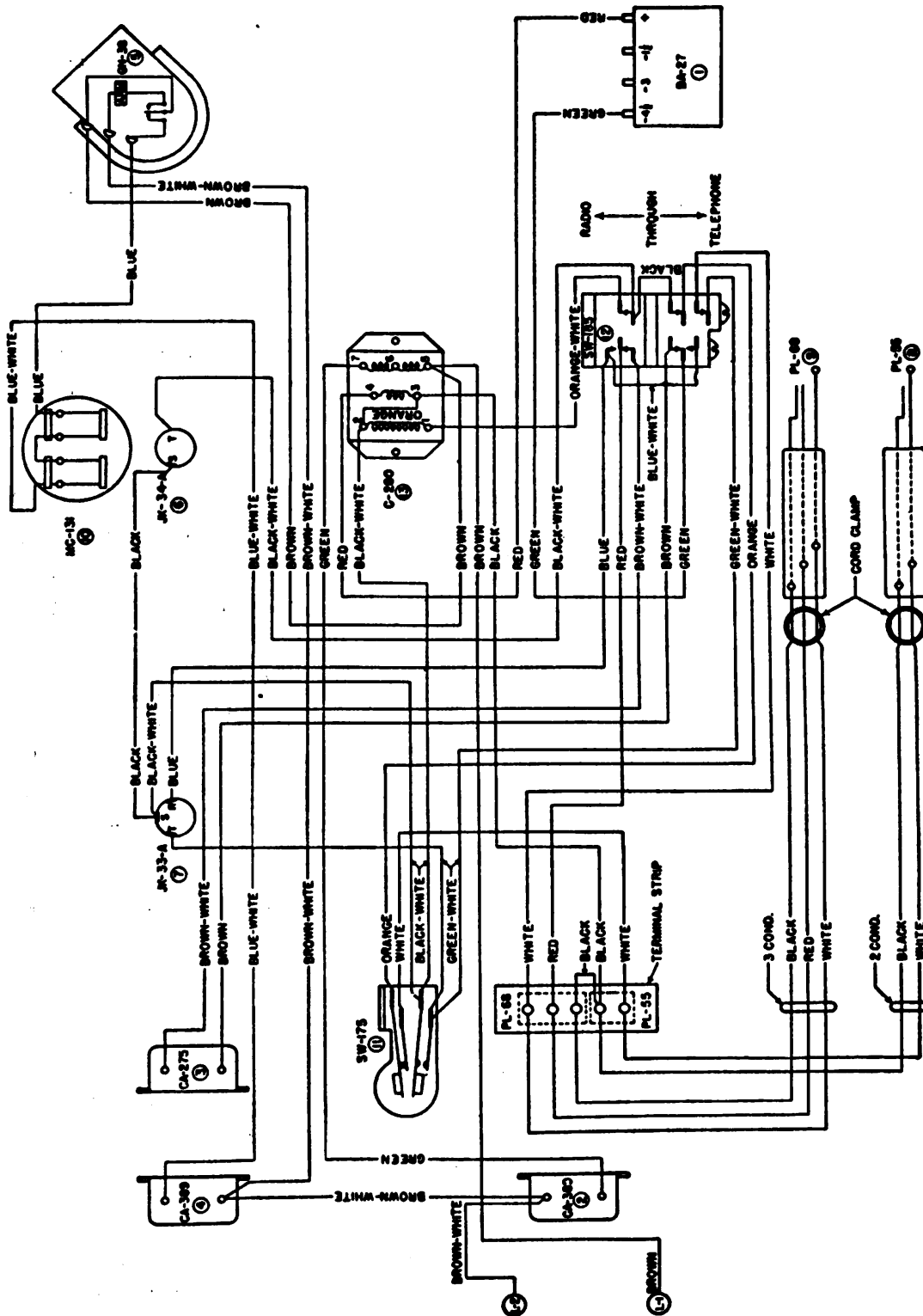


FIGURE 11. REMOTE CONTROL UNIT RM-29-(*)
WIRING DIAGRAM

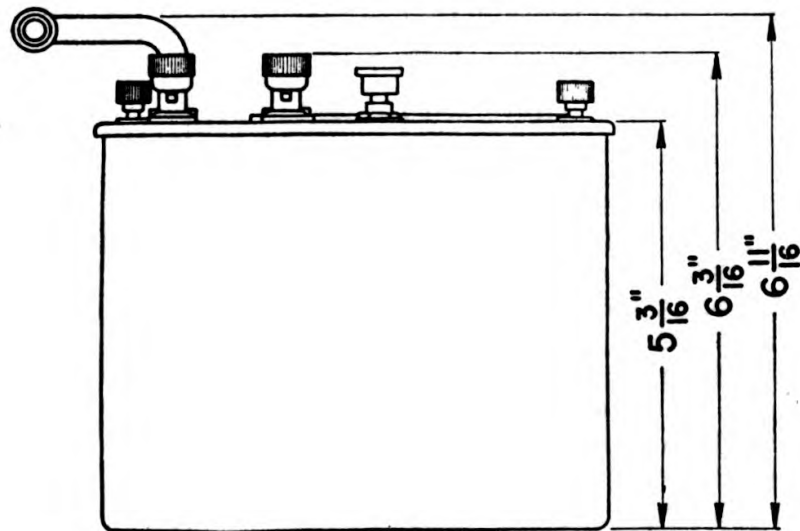
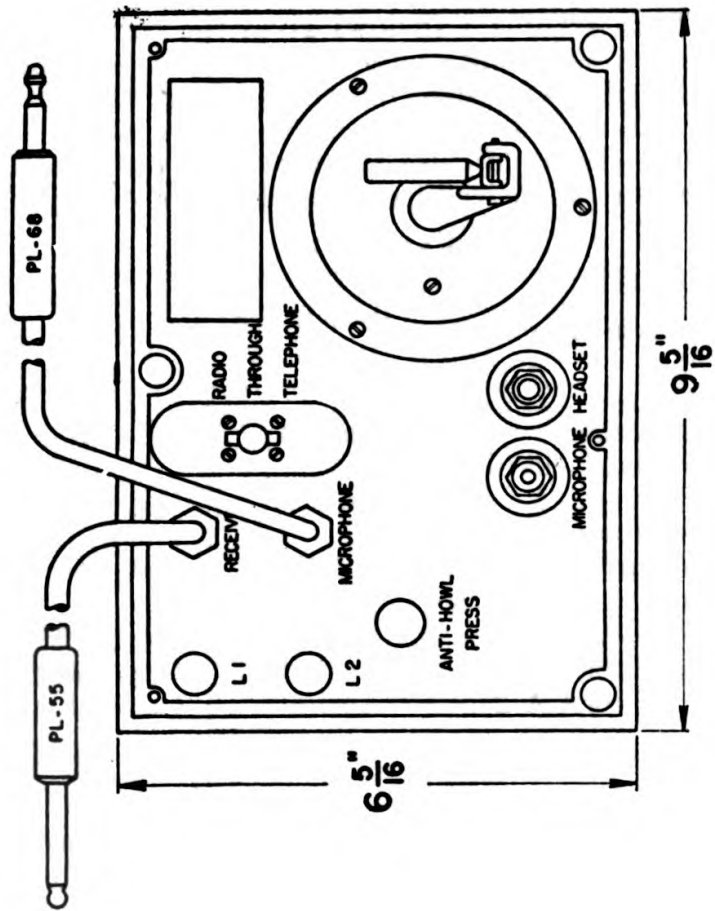
21. Continuity and Voltage Tests

a. *Continuity Tests.*—Table I (below) gives the correct values of resistance between the points indicated, under the following conditions: there should be no external connections; throw Switch SW-185 to RADIO, except where indicated. Any material deviation from the values given indicates trouble in the part tested. “Front” and “rear” mean “as viewed from panel side of chassis.”

TABLE I

Points of Measurement	Resistance in Ohms	Parts Tested
<i>All Points to Chassis:</i> (Test for short circuits)	Infinity	All parts
L ₁ to L ₂	Infinity	Capacitor CA-389
L ₂ to rear contact of switch on generator crankshaft.	525	Generator GN-38-(*)
L ₁ to rear terminal on lower Capacitor CA-389	1,300	Ringer MC-131
Across Capacitor CA-389	Infinity	Capacitor CA-389
Across Capacitor CA-275	Infinity	Capacitor CA-275
<i>Transformer C-280:</i>		} Transformer C-280
5 to 7	50	
3 to 4	18	
1 to 2	180	
4 to 5	Infinity	
<i>Switch SW-185 each section:</i>		} Switch SW-185
Central to lower contact (RADIO position)	0	
Central to upper contact (TELEPHONE position)	0	
<i>Plugs:</i>		} Plugs PL-55 and PL-68, cordage, and Jacks JK-33-A and JK-34-A
Plug PL-55, sleeve to Jack JK-33-A, sleeve, Jack JK-34-A, sleeve and Plug PL-68, sleeve	0	
Plug PL-55, tip to Jack JK-34-A, tip	0	
Plug PL-68, ring to Jack JK-33-A, ring	0	
Plug PL-68, tip to Jack JK-33-A, tip	0	

b. *Voltage Tests.*—Table II gives voltage measurements from Battery BA-27 and Generator GN-38 (*). See paragraph 22 d. for conditions of measurement for Battery BA-27. See paragraph 22 b. for conditions of measurement for Generator GN-38-(*).



**FIGURE 12. REMOTE CONTROL UNIT RM-29-(*)
OUTLINE DIMENSIONS**

TABLE II

Battery BA-27 (across each cell)	1.5 volts d.c.
Generator GN-38-(*) (L ₁ to L ₂)	90 volts a.c. (Approx.)

22. Trouble Location and Remedy

- a. Table III shows possible troubles due to failure of components of Remote Control Unit RM-29-(*), separated under the positions of Switch SW-185 in which they may occur. Some of the same troubles may also occur due to external causes. Proceed as in paragraph 18 and check all associated apparatus for correct performance before attempting replacement or repair of components of the remote control unit. "Right" and "left" as used in Table III mean "as viewed from the rear of the chassis."
- b. In case of suspected trouble in Ringer MC-131, Generator GN-38-(*), or Transformer C-280 measure their winding resistances. Replace the component if you find the values differ materially from those given in Table I, paragraph 21. In addition to the winding resistance test, make a voltage test on Generator GN-38-(*). With the telephone line disconnected from terminals L₁ and L₂, connect an a-c voltmeter from L₁ to L₂. The voltage when Crank GC-9 is rotated at 180 r.p.m. should be approximately 90 volts.
- c. In case of suspected trouble in Capacitors CA-275 or CA-389, measure the resistance between the terminals given in Table I, paragraph 21. Replace the capacitor if it shows other than infinite resistance when measured with the highest resistance scale available on the ohmmeter.
- d. In case of suspected trouble in Battery BA-27, measure the terminal voltage when operating. This means, for Battery BA-27, that Switch SW-185 should be at TELEPHONE and the microphone "press-to-talk" switch pressed. Replace Battery BA-27 when the voltage *per cell* is reduced to 1 volt while operating, although the apparatus will work with a battery voltage lower than that given in Table II.
- e. In case of suspected trouble in any pair of switch contacts, measure the resistance across the contacts when closed. It should be zero. If any pair of switches has a resistance greater than zero, burnish the contacts with a burnishing tool although they appear to close properly. The contact springs may be bent slightly to insure closing if a pair of contacts fails to close.
- f. *It is important to speak loudly into the microphone of Telephone EE-8-(*), when line lengths of 1/2 to 2 miles are used.*

TABLE III
Troubles

Positions of Switch SW-185

Possible Causes

Positions of Switch SW-185	Troubles	Possible Causes
All Positions	Ringer MC-131 fails.	Defective Ringer MC-131. Switch on shaft of Generator GN-38-(*) fails to make contact when generator is not turning.
All Positions	Generator GN-38-(*) fails.	Defective Generator GN-38-(*). Switch on shaft of Generator GN-38-(*) fails to make contact when generator is turning.
All Positions	Ringer MC-131 operates when Generator GN-38-(*) is turning.	Switch on shaft of Generator GN-38-(*) closed on both sides when generator is turning.
All Positions	On common battery operation with switchboard, current flows continuously in line, operating signal on switchboard.	Defective Capacitor CA-389. Defective switch on shaft of Generator GN-38-(*) .
TELEPHONE Position (only)	Signals cannot be heard in the headset.	3rd section on left side of Switch SW-185 fails to make contact in THROUGH and TELEPHONE positions.
TELEPHONE Position (only)	Microphone T-17 fails.	1st section on right side of Switch SW-185 fails to make contact in TELEPHONE position. Defective Transformer C-280. Battery BA-27 weak, dead, or disconnected.
TELEPHONE Position (only)	Microphone and headset both fail.	Defective Transformer C-280.
THROUGH Position (only)	Signals from radio receiver can be heard in Headset P-19, but fail to go over line.	ANTI-HOWL PRESS Switch SW-175 fails to make contact in unoperated position. 3rd section on left side of Switch SW-185 fails to make contact in THROUGH and TELEPHONE positions.

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<p>THROUGH Position (only)</p>	<p>Signals from line can be heard in headset, but fail to go to radio transmitter.</p>	<p>1st and 2nd sections on right side of Switch SW-185 fail to make contact in THROUGH position, or Battery BA-27 dead or disconnected.</p>
<p>THROUGH Position (only)</p>	<p>Signals cannot be heard in headset and fail to go from telephone line to radio transmitter.</p>	<p>3rd section on left side and 1st and 2nd sections on right side of Switch SW-185 fail to make contact in THROUGH position, or Battery BA-27 dead or disconnected.</p>
<p>RADIO Position (only)</p>	<p>Microphone T-17 fails.</p>	<p>2nd section on right side of Switch SW-185 fails to make contact in RADIO position.</p>
<p>THROUGH and TELEPHONE Positions (only)</p>	<p>Signals cannot be heard in headset.</p>	<p>Defective Transformer C-280.</p>
<p>THROUGH and TELEPHONE Positions (only)</p>	<p>All signals from the line weak.</p>	<p>Defective Ringer MC-131. Defective switch on shaft of Generator GN-38-(*).</p>
<p>RADIO and THROUGH Positions (only)</p>	<p>Signals cannot be heard in headset.</p>	<p>2nd section on left side of Switch SW-185 fails to make contact in THROUGH and RADIO positions. ANTI-HOWL PRESS Switch SW-175 fails to make contact in unoperated position.</p>
<p>RADIO and THROUGH Positions (only)</p>	<p>Radio transmitter cannot be operated.</p>	<p>1st section on left side of Switch SW-185 fails to make contact in THROUGH and RADIO positions.</p>

SECTION V. SUPPLEMENTARY DATA

Paragraph

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23. Table of Replaceable Parts

Ref. No.	Signal Corps Stock No.	Name of Part	Description	Function
1	3A27	Battery BA-27	4.5 v	Microphone supply
2	3D389	Capacitor CA-389	1.0 μ f, 600 v	Line blocking
3	3D275	Capacitor CA-275	4.0 μ f, 50 v	Transmitter input blocking
4	3D389	Capacitor CA-389	1.0 μ f, 600 v	Ringer blocking
5	4B838-(*)	Generator GN-38-(*)	Permanent magnet, a-c	Signaling
5A	4B454	Crank GC-9	Generator crank	Operate generator
6	2Z5534A	Jack JK-34-A	2 conductor	Headset connection
7	2Z5533A	Jack JK-33-A	3 conductor	Microphone connection
8	2Z7155	Plug PL-55	2 conductor	Radio connection
9	2Z7168	Plug PL-68	3 conductor	Radio connection
10	4B3371	Ringer MC-131	Polarized	Signaling
11	3Z8175	Switch SW-175	2-section	ANTI-HOWL
12	3Z8185	Switch SW-185	5-section	RADIO-THROUGH-TELEPHONE
13	2Z9880	Transformer C-280	3-winding	Line impedance matching
.....	3E3162-42	Cord and plug assembly (Cord CO-144 and Plug PL-55)	2-conductor cord and plug	Radio connection
.....	3E3163-42	Cord and plug assembly (Cord CO-145 and Plug PL-68)	3-conductor cord and plug	Radio connection
.....	2C7629D/CL	Cord clamp assembly (RM-29-16-17-18)	Anchor clamp	Cord clamp
.....	2C7629D/SL	Panel mounting screw (RM-29-30)	Thumb screw	Panel mounting
.....	2C7629D/TL	Terminal Board (RM-29-42A)	5-terminal board	Junction terminal block

24. List of Manufacturers

<i>Name</i>	<i>Address</i>
Crosley Corporation	Cincinnati, Ohio
Galvin Manufacturing Corporation	Chicago, Ill.
International Telephone & Radio Manufacturing Corporation	East Newark, N. J.
Zenith Radio Corporation	Chicago, Ill.

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(A. G. 300.7 [16 Sept. 43].)

By order of the Secretary of War:

G. C. MARSHALL,

Chief of Staff.

Official:

J. A. ULIO,

Major General,

The Adjutant General.

Distribution:

R 6, 7, (2); IBn 3, 5, 6, 7 (2);

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(For explanation of symbols, see FM 21-6).

