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(SCR-583)

15-7.3

PRELIMINARY INSTRUCTIONS  
FOR  
RADIO SET, TYPE ✓ SCR-583  
PHILCO CORP.

ORDER # W-1077-SC-1111

5 January 1942

*0261  
Jenkins  
Widell  
Friedman*

**OBSOLETE**  
Authority: *Equipment Obsolete*  
Date: .....

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PRELIMINARY INSTRUCTIONS

FOR

RADIO SET, TYPE SCR-583

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HIGH VOLTAGES WHICH ARE DANGEROUS TO LIFE ARE PRESENT IN THIS EQUIPMENT UNDER OPERATING CONDITIONS. THE OPERATOR MUST EXERCISE CAUTION WHILE MAKING ADJUSTMENTS INSIDE THE EQUIPMENT WITH THE POWER ON. DO NOT PERMIT ANY PORTION OF THE BODY TO COME INTO CONTACT WITH JACKS LOCATED AT THE BACK OF THE CABINET WHILE MOTOR GENERATOR OR AUXILIARY POWER SOURCE IS IN OPERATION.

THE ATTENTION OF THE OPERATOR IS DIRECTED TO THE FACT THAT SEVERE BURNS OR OTHER INJURIES MAY RESULT SHOULD ANY PORTION OF THE BODY ACCIDENTALLY COME INTO CONTACT WITH THE ANTENNA OR OTHER PORTIONS OF THE EQUIPMENT CARRYING RADIO-FREQUENCY POTENTIALS.

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## I DESCRIPTION

### 1. GENERAL

The Radio Set, Type SCR-583, is intended primarily to provide a means of two-way radio communication between cavalry units, between units of horse artillery, and between cavalry and horse artillery units. However, its power capabilities and general design are such as to make it adaptable, with slight modifications, to vehicular use. The set provides for two-way communication by voice or by continuous wave, CW, telegraphy over a frequency band between 2200KC and 4600 KC.

The Radio Set, Type SCR-583, comprises a chest containing the radio transmitter and receiver, an accessory chest, and a roll containing the antenna mast sections, and set mounting legs. These three components mount on a Phillips Cavalry Pack Saddle. See Figure 1. Two quick release fasteners securely hold each chest to the pack saddle. By means of these fasteners the chests may be quickly attached to or detached from the saddle. When transported by means other than a pack animal these fasteners are clamped to metal straps provided on the chests. When packed for transportation by one pack animal, the antenna and leg roll is fastened to the radio transmitter and receiver chest and both are carried on the near side of the animal. The weight of the equipment is sufficiently well balanced to require no further compensation or pack transportation.

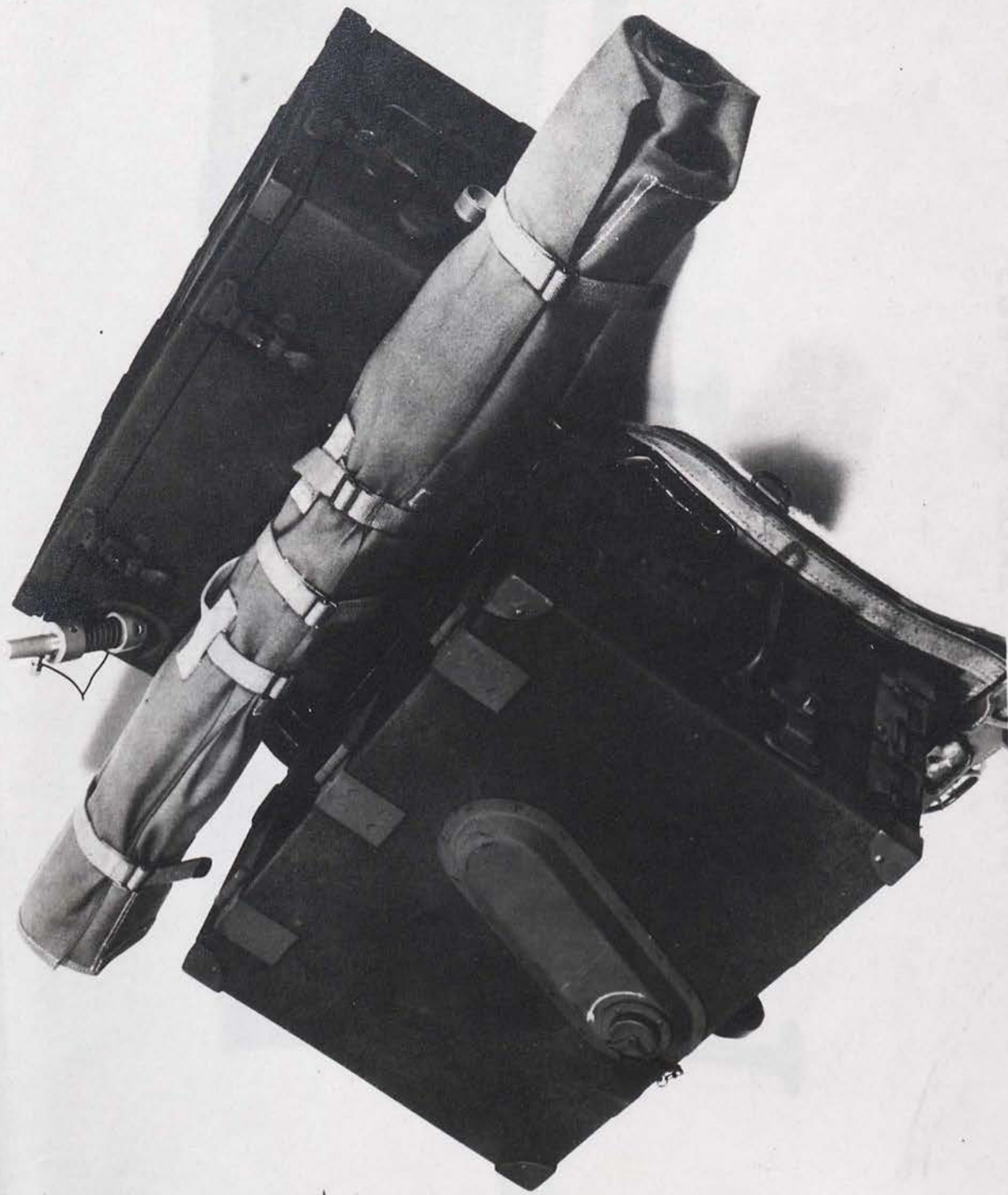
The Radio Set, Type SCR-583, may be operated while packed on the animal, or it may be operated on the ground, and the station can be set up or dismantled with great rapidity. See Figure 2.

Standby reception is also possible, whereby continuous phone or CW telegraph reception is obtained while the set is packed on the moving animal.

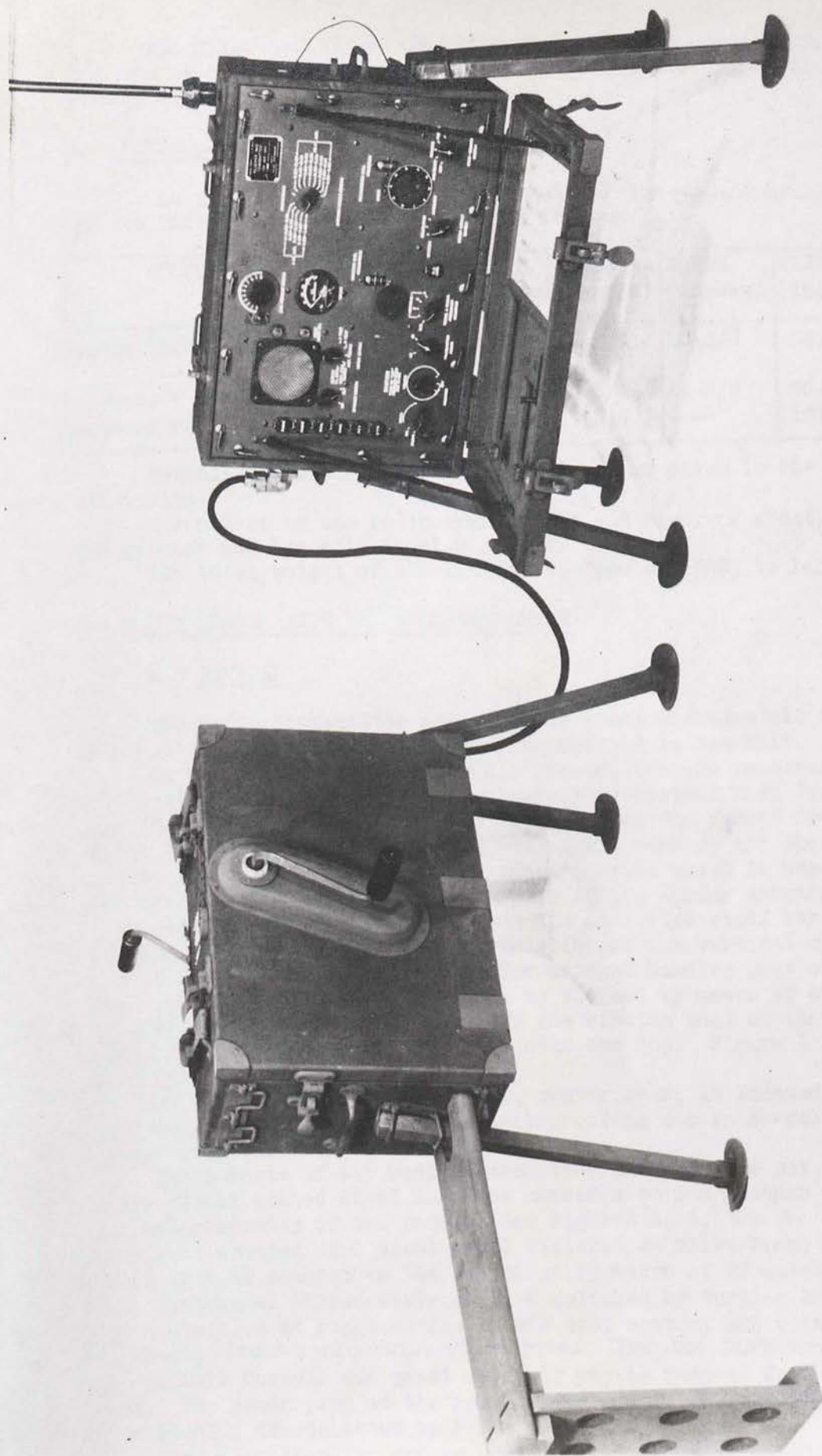
The chest containing the radio transmitter and receiver, and the accessory chest are of similar dimensions. They measure, exclusive of fittings, 19-7/8 inches long, by 15-7/8 inches wide, by 8-1/8 inches deep. They are both made of high density plywood, and are canvas covered for waterproofing. The Radio Set, Type SCR-583, is so waterproofed as to permit operation in a driving rain, either on pack or on the ground. Further, when the lids of both chests are properly latched, and with the crank and cable socket cover caps in place on the accessory chest, and the cable plug cover caps in place on the radio transmitter and receiver chest, the waterproofing is such that the chests may be totally immersed in water for short periods of time.

The Radio Set, Type SCR-583 is designed to be accurately set to any channel in the frequency band between 2200 KC and 4600 KC through the use of a continuously variable master oscillator in conjunction with a calibration crystal controlled oscillator. There are also, four crystal positions in which both the transmitter master oscillator, and the receiver oscillator are crystal controlled. The eight crystals, four in the transmitter and four in the receiver, are so paired that the receiver can be controlled on the same four frequencies on which the transmitter is controlled. It is also possible to set up the station to transmit and receive in any net, within its frequency limits, and without the necessity of referring to special calibrations.

The receiver of Radio Set, Type SCR-583 is a superheterodyne receiver having one radio frequency stage and one intermediate frequency stage. The intermediate frequency is 455 KC.



RADIO SET, TYPE SCR-583  
MOUNTED ON PACK  
FIG. 1



RADIO SET, TYPE SCR-583  
GROUND OPERATION  
FIG. 2



The Radio Set, Type SCR-583 carries its own power supply, but may be operated from an auxiliary power supply which will nearly double its normal power output.

## 2. PHYSICAL DIMENSIONS AND WEIGHTS

The physical dimensions and weights of the three components of the Radio Set, Type SCR-583 are as follows:

COMPONENT	LENGTH (inches)	WIDTH (inches)	DEPTH (inches)	WEIGHT (inches)
Radio Trans. and Receiver Chest	22-3/8	16-1/4	10-3/8	56.5
Accessory Chest	22-3/8	15-3/4	11-3/8	70.0
Antenna and Leg Roll	40	6 (dia.)	---	15.3

Overall dimensions including fittings are given in the above tabulation.

The weight of the radio transmitter and receiver chest, and the antenna and leg roll is 71.8 pounds.

The total weight of the Radio Set, Type SCR-583, is 141.8 pounds.

## 3. RADIO TRANSMITTER AND RECEIVER CHEST

### a. GENERAL

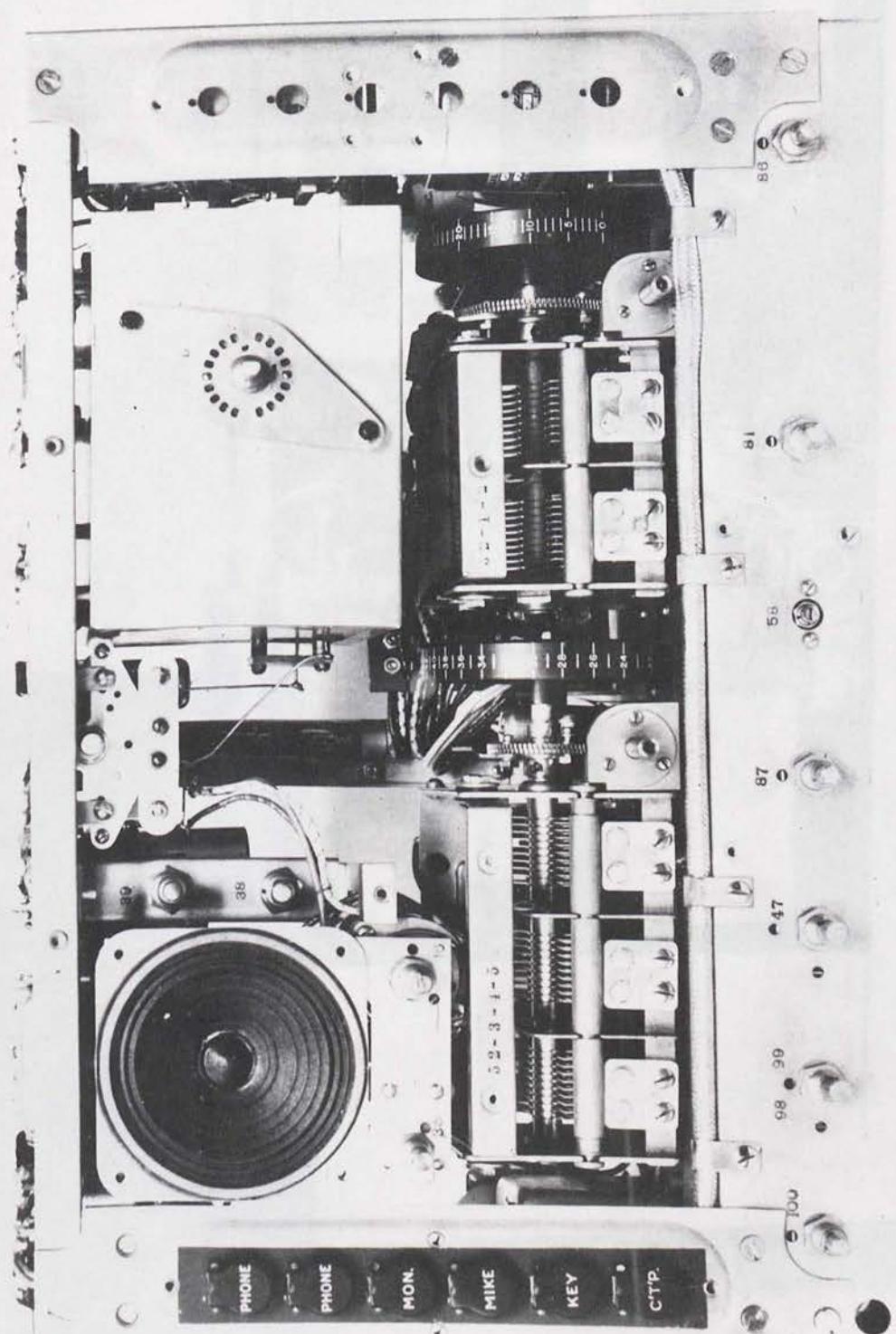
The radio transmitter and receiver chest includes all of the transmitting and receiving components combined in one unit.

On the right rear of the radio transmitter and receiver chest are located two "D" rings which support the Vertical Mast Base, Type IN-106-A. The Vertical Mast Base is used for ground operation of the set. On the right top and toward the rear of the chest is located the socket for the Spring Antenna Mount which is used for pack operation of the set. The purpose of the Spring Antenna Mount is to allow the antenna to bend from its otherwise rigid vertical position when passing under an obstruction of low vertical clearance, such as the limb of a tree, etc. The antenna binding post on the chest which connects either antenna to the set by means of an insulated wire, normally attached to the binding post on the spring antenna mount, is located on the right side near the top. Figure 1 shows the Spring Antenna Mount.

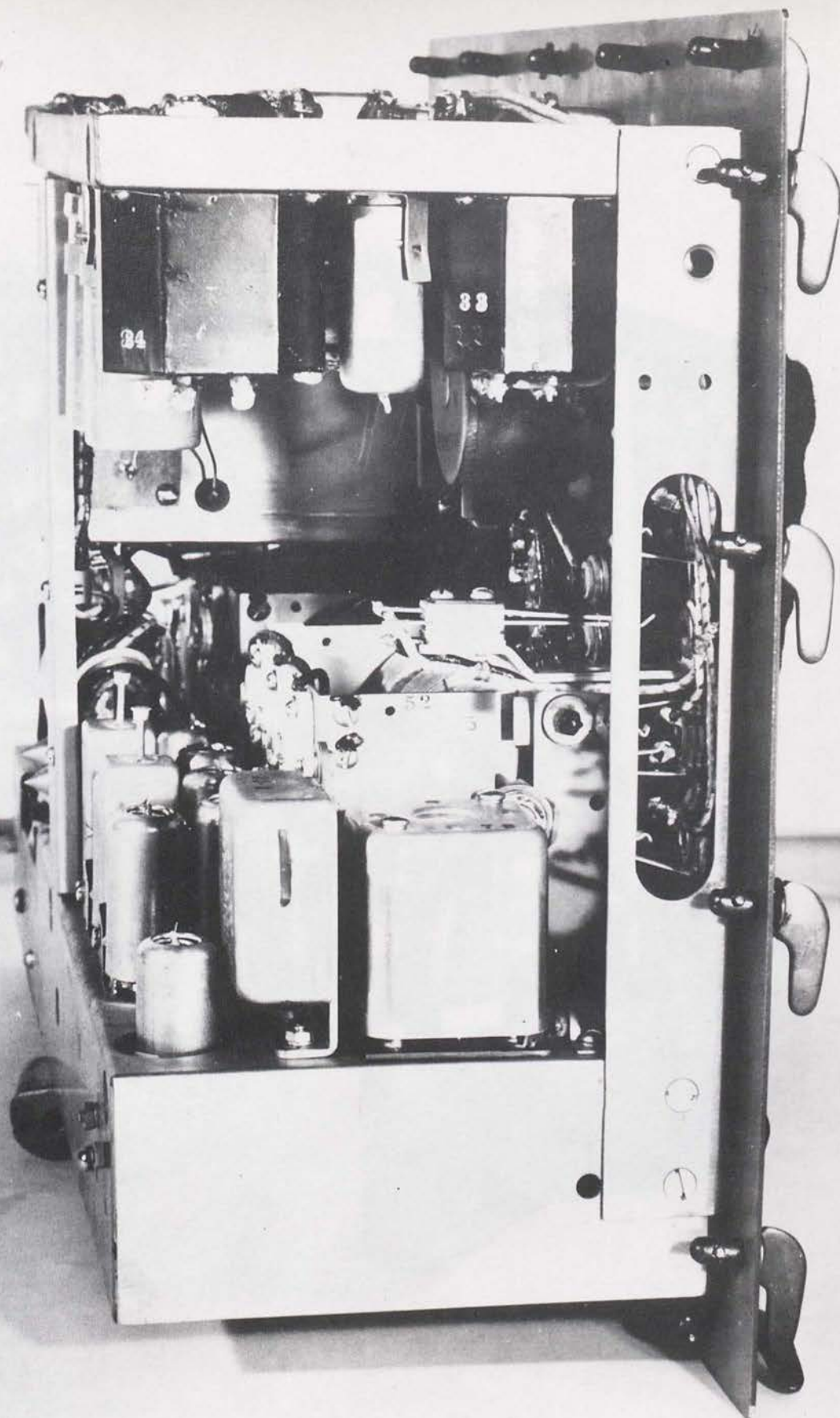
On the left side of the chest, center rear, is located the power supply plug receptacle. A waterproofing cap is normally screwed over the receptacle when not in use.

The chassis of the radio transmitter and receiver set consists of two nickel plated steel subbases attached to one another as a unit independently of the panel. See Figures 3, 4, and 5. The chassis is mounted on a steel panel finished in olive drab, and the entire unit is mounted in the set chest by means of 18 quick-lock panel fasteners. These fasteners are unlocked by turning the wing from a position at right angles to the top, bottom, and sides of the chest, counter-clockwise 90 degrees. When the fasteners are unlocked, the complete chassis and panel assembly may be removed from the chest. The power plug at the rear, and the antenna connection are automatically disconnected by removing the chassis.

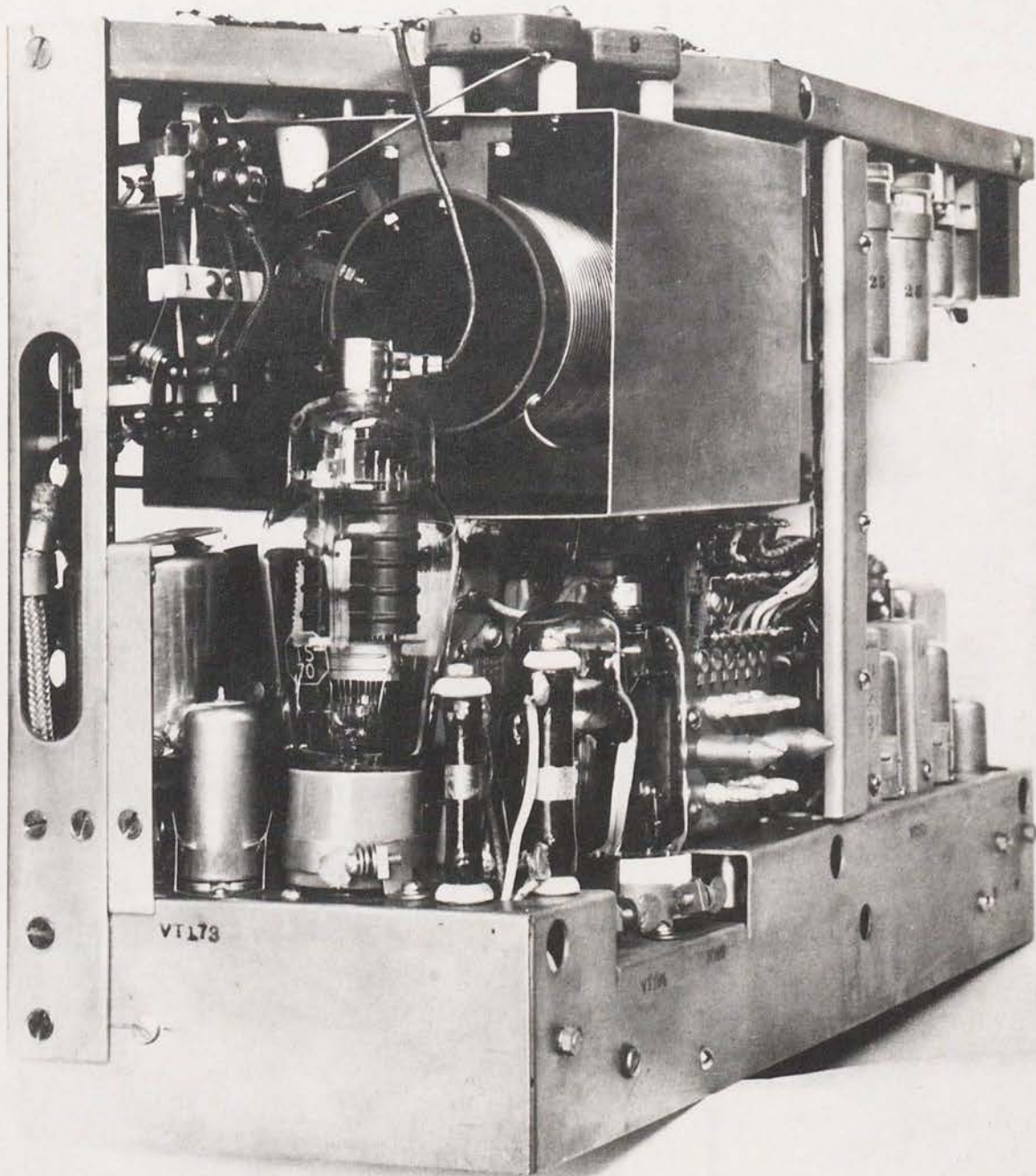
When installed for ground operation, the radio transmitter and receiver chest is supported on four demountable legs which fit into "D" rings attached to the chest. The front cover drops forward



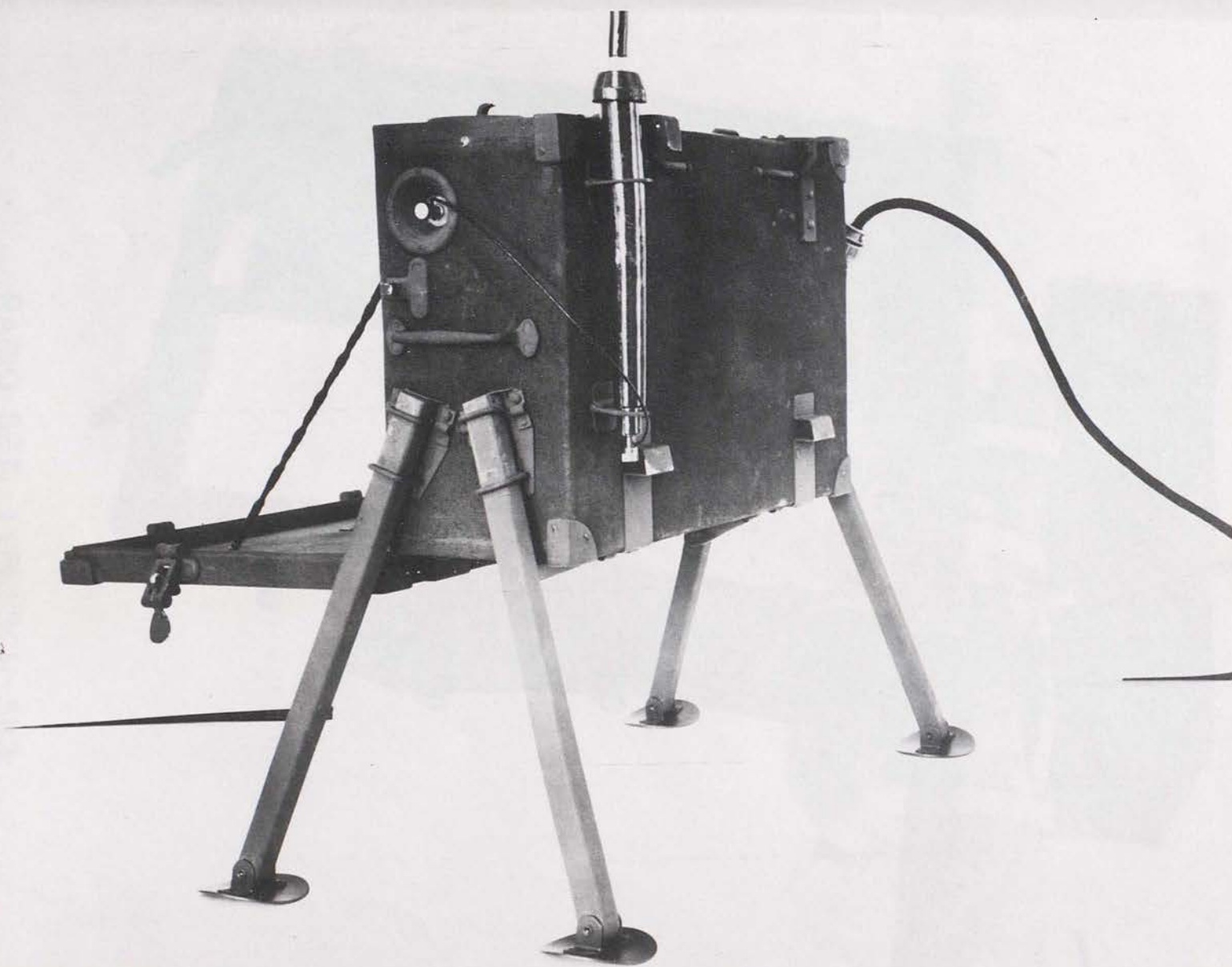
RADIO SET, TYPE SCR-583  
FRONT VIEW OF SET CHASSIS - PANEL REMOVED  
FIG. 3



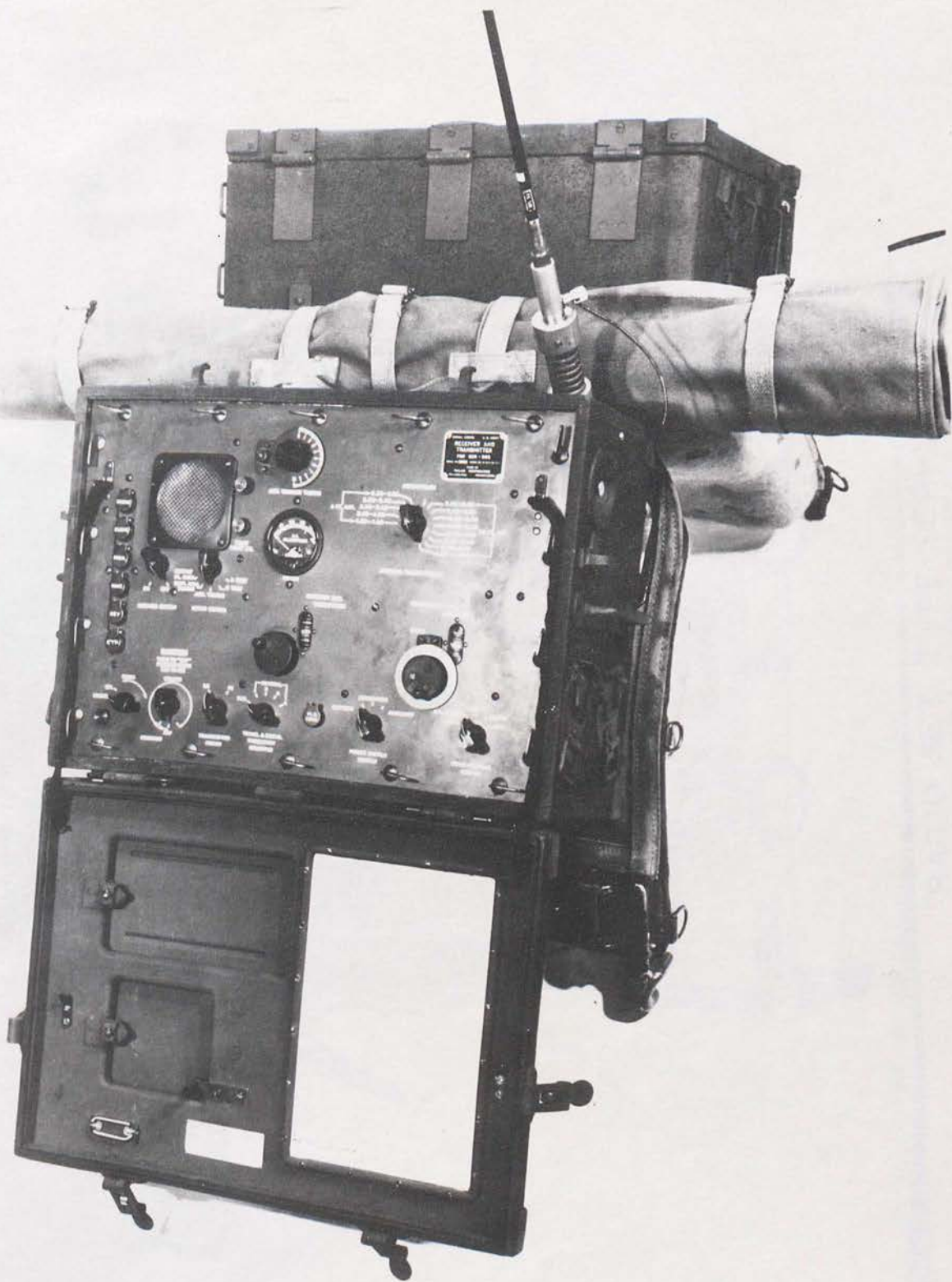
RADIO SET, TYPE SCR-583  
LEFT SIDE VIEW OF SET CHASSIS  
FIG. 4



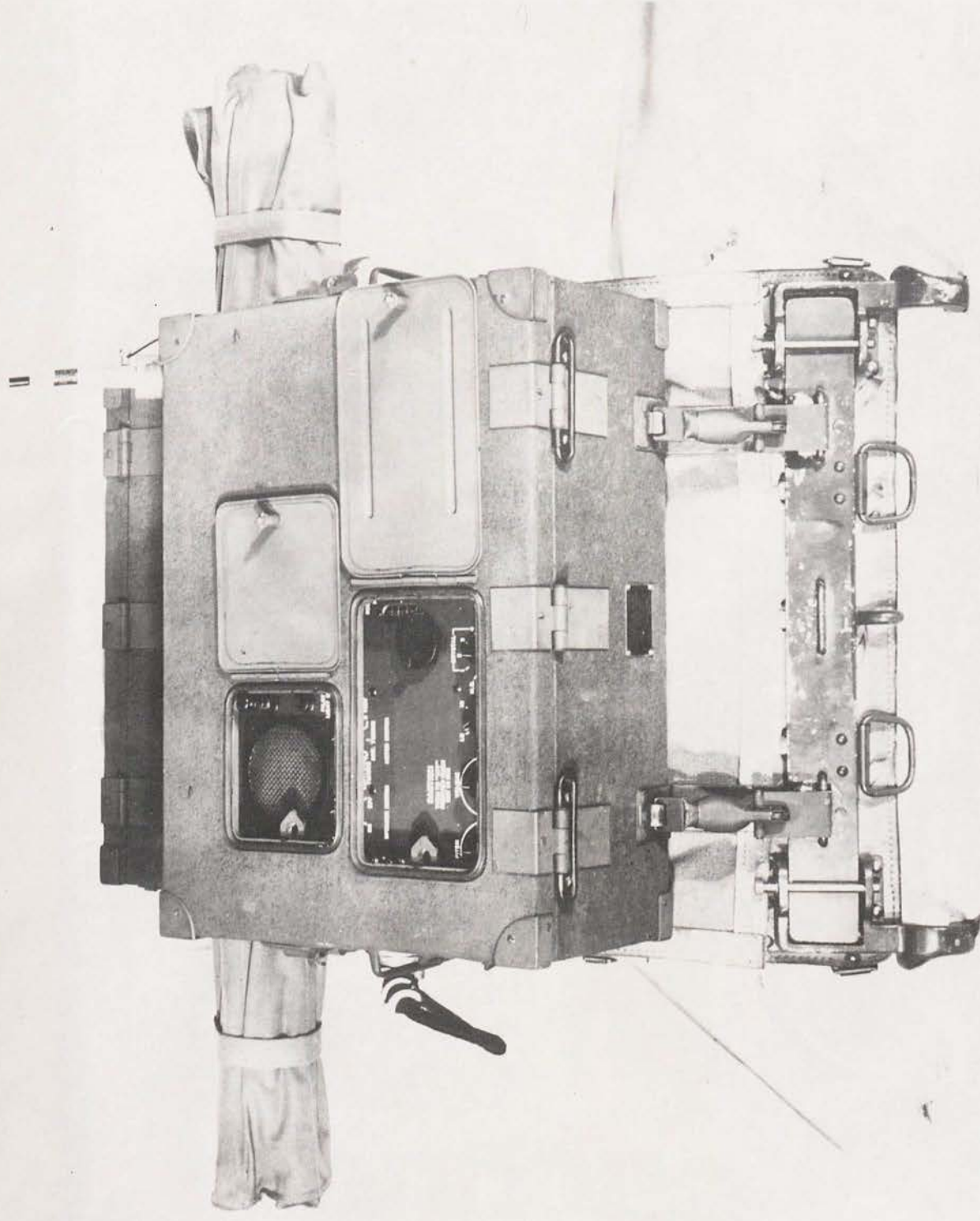
RADIO SET, TYPE SCR-583  
RIGHT SIDE VIEW OF SET CHASSIS  
FIG. 5



RADIO SET, TYPE SCR-583  
RADIO TRANSMITTER AND RECEIVER CHEST - GROUND OPERATION  
FIG. 6



RADIO SET, TYPE SCR-583  
PACK OPERATION  
FIG. 7



RADIO SET, TYPE SCR-583  
ON PACK FOR STANDBY OPERATION  
FIG. 8





and is supported in a horizontal position by means of chain fasteners. See Figure 6.

For pack operation the chest remains on the pack saddle and the cover support chains may be unhooked thus allowing the cover to be fully opened. See Figure 7.

Two auxiliary doors in the chest cover permit access to the receiver controls and the speaker when the chest is closed during stand-by operation. See Figure 8.

None of the control units, with the exception of the meter, are mounted directly on the panel itself, but rather are attached to the chassis assembly. All of the control devices appear on the face of the panel. See Figure 9. Two Bristo wrenches, #6 and #8, are mounted on the inside of the lid of the radio transmitter and receiver chest, and are for removing the control knobs.

#### b. CONTROLS

Looking from top to bottom in Figure 9, and proceeding from left to right the control devices are as follows:

(1) Two PHONE headset jacks. These phone jacks are connected in series with an 0.5 mf condenser to a tap on the receiver output transformer which matches either a Type P-20 head set, or the receiver of a Type TS-13 hand set.

(2) MON. (Monitor) jack. This jack is connected in series with the output indicator METER. When transmitting PHONE the quality of the emitted signal may be checked by plugging a Type P-20 head set into this jack, and listening as the operator speaks. The operator can thus adjust the level of his voice to obtain the maximum output with minimum distortion.

(3) MIKE (Microphone) Jack. This jack upon plugging in the Type PL-68 plug, connects the microphone of the Type TS-13 hand set into the transmitter circuit.

(4) KEY Jack. This jack, upon plugging in the Type PL-55 plug, connects the telegraph key into the key relay circuit.

(5) C'T'P (Counterpoise) Jack. This jack, upon plugging in the Type PL-55 plug, connects the counterpoise into the low-potential side of the antenna circuit.

(6) Beat Frequency Oscillator Padder. The beat frequency oscillator padder is not labeled on the panel but is located to the left of the PHONE-CW switch. By removing the plug the beat frequency oscillator padder is accessible so that with the PHONE-CW switch in the CW position the beat frequency oscillator may be tuned to the intermediate frequency.

(7) PHONE-CW switch and Audio beat frequency Oscillator PITCH Control for RECEIVER. When the switch is in the position marked PHONE the set will operate for voice reception. When in the position marked CW, the beat frequency oscillator is in operation and tuned to the center of the I-F channel for telegraph reception. By rotating the control further clockwise, an adjustment of pitch can be obtained. This is necessary when the receiver is crystal controlled.

(8) Speaker The speaker is not marked on the panel.

(9) SPEAKER SWITCH The speaker switch is connected in series with the voice coil of the speaker so that it may be turned off if desired when using head phones.

(10) On-OFF switch and VOLUME control for the RECEIVER. The switch is integral with the volume control, and controls the

filament and plate voltages of all the battery operated tubes, which includes all the tubes in the receiver, and the master oscillator, modulator, and the 200KC calibrating crystal oscillator in the transmitter. When receiving PHONE, the volume control varies the audio gain, while the receiver sensitivity is controlled by the automatic volume control. When receiving CW, the A. V. C. is disconnected, and the volume control varies the gain of the R-F, converter, and I-F tubes.

(11) Safety Switch. This switch is not marked on the panel but is located to the right of the speaker above the PILOT LIGHT SW. This switch is of the press-off type and is connected in series with the A-battery supply. It operates thru a mechanical link to automatically open the A-battery circuit when the radio transmitter and receiver chest lid is closed, and the speaker auxiliary door is closed. The purpose of this switch is to guard against battery exhaustion thru an oversight in not turning off the set before closing up the chest.

(12) PILOT LIGHT SW. (switch). This switch is located directly below the safety switch and is of the press-on type. It is connected in series with the RECEIVER DIAL and TRANSMITTER DIAL pilot lamps.

(13) METER SWITCH. This switch has five positions-- OUTPUT PL. CUR., BUFF. XTAL TUNING, ANT. TUNING, B TEST, and A TEST. The switch is normally held in the ANT. (antenna) TUNING position by spring return. In this position the METER is connected to a diode which rectifies a portion of the R-F output to the antenna so that the output can be maximized as indicated in (21). In the OUTPUT PL. (plate) CUR. (current) position the METER is connected across a shunt carrying the plate current of the transmitter output tube and reads directly in milliamperes. In the BUFF. (buffer) XTAL (crystal) TUNING position the METER is connected across a shunt which is in series with the grid leak of the transmitter output tube, and is used for maximizing the grid current of this tube as described in (18). In the B TEST position the condition of the 90 volt section of the receiver battery is checked. If the METER indication is below the indicated line on the METER the battery should be replaced. In the A TEST position the condition of the  $1\frac{1}{2}$  volt section of the receiver battery is checked. If the reading is below the same indicated line the battery should be replaced. The indicated line is the single line drawn below the scale at approximately 175 on the scale.

(14) TRANSMITTER POWER Switch. This switch in the HI position allows the maximum power output to be obtained from the transmitter. In the LO position, the screen voltage of the output tube is reduced such that the power output of the transmitter is reduced by approximately 3:1. The purpose of this power output reduction is to reduce the torque necessary to operate the hand generator when an extended period of set operation is required.

(15) ANT. VERNIER TUNING Control. This dial is used in conjunction with the ANTENNA TUNING SWITCH. See (21).

(16) METER. The METER is a 500 microampere meter with two multipliers self-contained. One multiplier is 1.68 volts full scale and the other 100 volts. On the ANT. TUNING position of the METER SWITCH, the 100 volt range of the METER is used with shunt resistors, and constitutes the diode load of the output indicator diode. In the B TEST position the 100 volt range is used, and in the A TEST position the 1.68 volt range is used. On the BUFF. XTAL TUNING position the 1.68 volt range is used and the METER is connected across a 177 ohm shunt in series with the transmitter

output tube grid leak. The sensitivity is 10 milliamperes full scale. In the transmitter a 1.68 volt multiplier is used and a 6.73 ohm shunt which is in series with the transmitter output tube. The sensitivity is 250 milliamperes full scale.

(17) RECEIVER DIAL is in hundreds of KC and is operated by

(18) TRANS. & RECVR. is in the M. O. (master oscillator) frequency is controlled by the RECVR. master oscillator frequency is determined. Four CRYSTAL control positions are being 2700 KC, 3010 KC, 3825 KC, receiver crystals, the frequency of the receiver, high frequency crystals are of the plug-in type. By plugging in others the crystal and receiver may be changed.

It is necessary to tune the RECEIVER to the frequency of the signal since only the receiver is tuned. In the case of the transmitter tuning is done by turning the METER SWITCH and rotating the TRANSMITTER TUNING dial. The signal is obtained on the METER.

(19) M. O. CORR. is connected to the master oscillator circuit. It is labeled M. O. CORR. This is described in Paragraph 7b (2).

(20) POWER SUPPLY is a position switch for operating the power supplies--BATTERY, GENERATOR, etc.

(21) ANTENNA has been adjusted to the frequency of the particular position of the ANTENNA TUNING SWITCH. The indicated range of which is shown. Care should be taken to see that the ANTENNA TUNING SWITCH with the correct position is used. One group of positions is for the transmitter and the other group applies to the receiver.

The TRANSMITTER TUNING dial is in the LO position. The press-button key or the key as the case may be. The ANTENNA TUNING dial is rotated until the signal is obtained on the METER.

(22) TRANS. TUNING dial reading HUNDREDS of divisions. The dial is calibrated in kHz and crank. SEE (18). The accuracy is somewhat greater accuracy is obtained by approaching the dial from the left side, as this was the case in the receiver.

(23) SENDING positions - NET, CAL, etc. In the SEND position the receiver is connected to the antenna. The transmitter is not used. That the master oscillator frequency is determined by tuning the receiver. It is decided to operate the transmitter.

In the CALIBRATE position the receiver is in operation but disconnected from the antenna. The master oscillator and the 200 KC calibrating crystal controlled oscillator are in operation. The transmitter master oscillator calibration may be checked at any frequency which is a multiple of 200 KC, using the receiver as a detector.

In the RECEIVE position the receiver is in operation and connected to the antenna. All other battery operated tubes, including the 200 KC calibrating crystal controlled oscillator are turned off to conserve the battery by the operation of this switch.

In the PHONE position the filaments of all the receiver tubes, the master oscillator tube, the modulator tube, the diode gate, and output indicator diode are lighted. The screen voltage of these tubes, where applicable, is controlled by the keying relay, which in turn is operated by the press-to-talk switch on the Type TS-13 hand set. When this press-to-talk switch is released reception is possible. When the press-to-talk switch is pressed the transmitter is operating but the receiver is rendered inoperative.

In the CW position the filaments of all the receiver tubes and those of the master oscillator tube are lighted from the battery, and when the telegraph key is open, reception is possible. The buffer tube, output tube, output indicator diode, and diode gate are lighted from the hand generator. When the telegraph key is pressed the transmitter is operating. Break in operation is accomplished by this means.

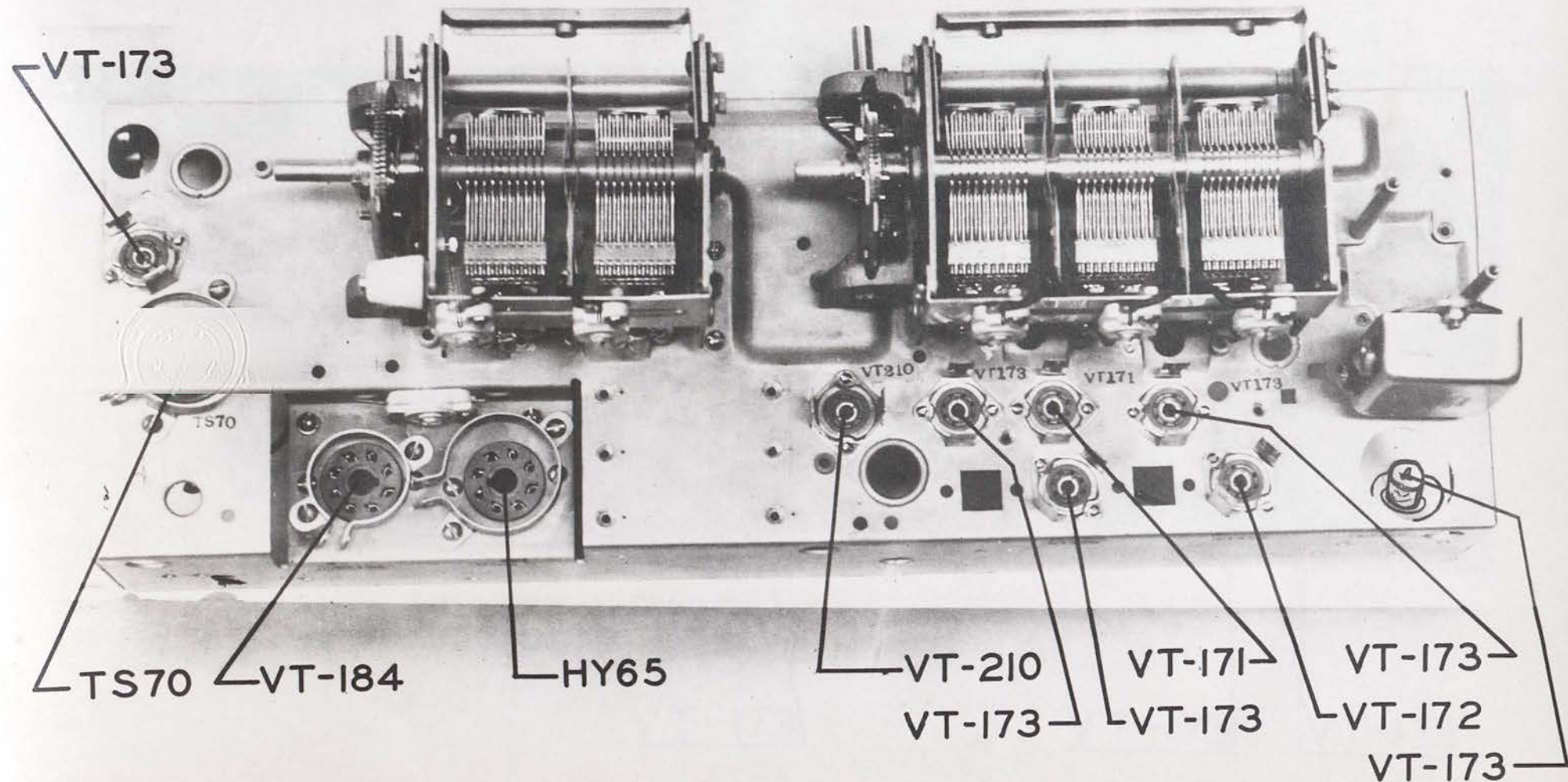
c. VACUUM TUBES

The Radio Set, Type SCR-583 uses a total of fifteen vacuum tubes. They are as follows:

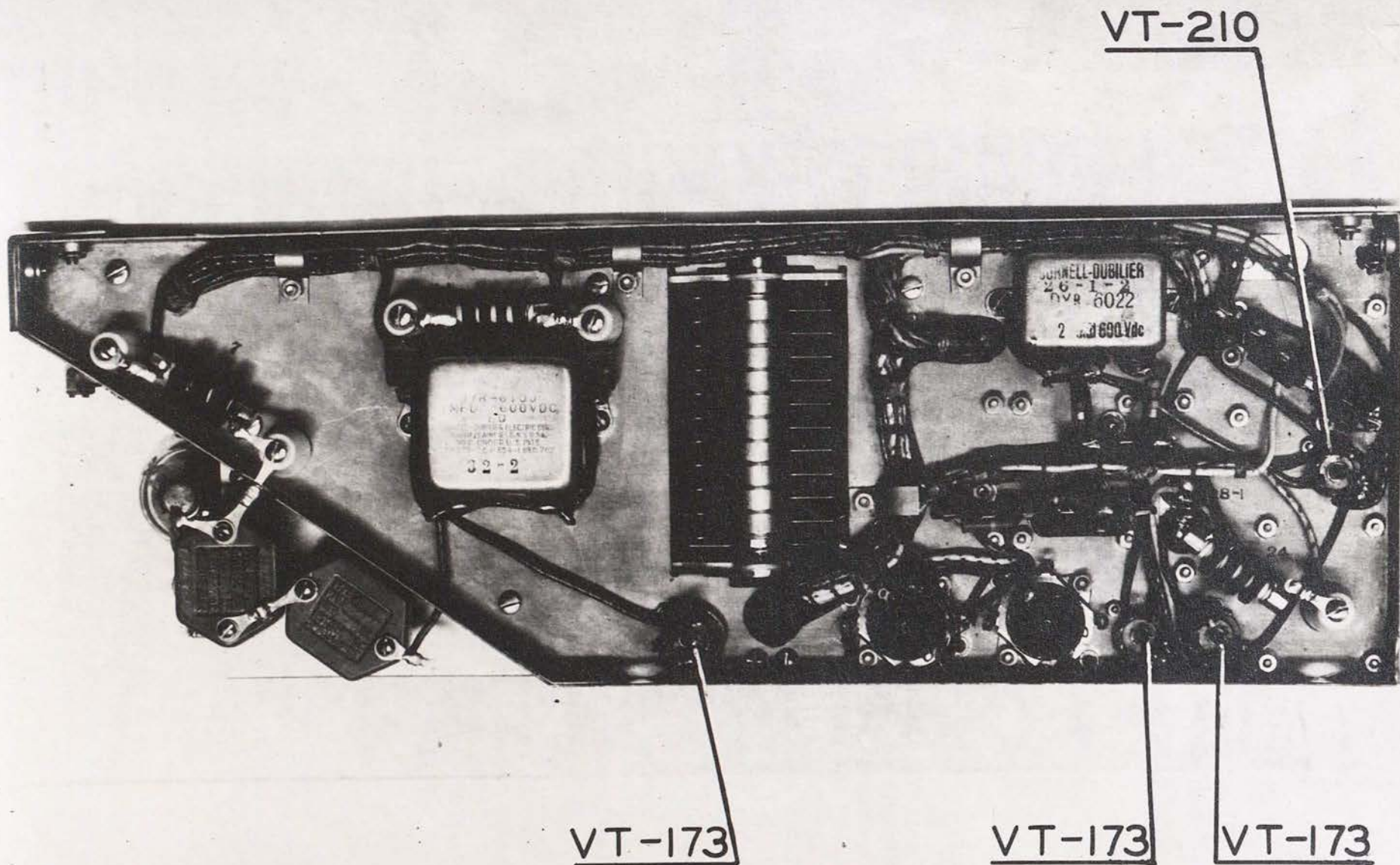
	TYPE	FUNCTION	LOCATION
Transmitter	TS-70	Output	Lower Subbase
	HY-65	Buffer	Lower "
	VT-210	Master Oscillator	Lower "
	VT-173	Modulator	Upper "
	VT-173	Diode Gate	Upper "
	VT-173	Output Indicator	Upper "
	VT-173	200 KC Calibration Crystal Controlled Oscillator	Lower "
Receiver	VT-173	Radio Frequency Amplifier	Lower Subbase
	VT-171	First Detector	Lower "
	VT-173	Oscillator	Lower "
	VT-173	Intermediate Frequency Amplifier	Lower "
	VT-172	Second Detector and Audio Amplifier	Lower "
	VT-210	Output	Upper "
	VT-173	Beat Frequency Oscillator	Lower "
	VT-184	Voltage Regulator	Lower "

0.9  
0.8

See Figures 10 and 11 for vacuum tube locations in the chassis.



RADIO SET, TYPE SCR-583  
 TOP VIEW, LOWER SUB BASE  
 FIG. 10



RADIO SET, TYPE SCR-583  
WIRING SIDE, UPPER SUB BASE  
FIG. II

25-263  
264

#### 4. ACCESSORY CHEST

##### a. LIST OF ACCESSORIES

The accessory chest carries the following accessories:  
One-Type P-20 Head Set fitted with a Type PL-55 plug.  
One-Type TS-13 Hand Set fitted with a Type PL-55 plug in the receiver circuit, and a Type PL-68 plug in the microphone circuit.  
One-Remote Key, cable, and leg clamp assembly fitted with a Type PL-55 plug.  
One-Case of Spare Vacuum tubes (complete set)  
One-Seat and Support for use in operating hand generator.  
One-Generator Filter Unit  
One-Type BA-40 Battery  
Two-Cranks for Hand Generator  
One-Power Cable assembly  
One-Counterpoise Assembly  
One-Type GN-45 Hand Generator (modified)

Figures 12 and 13 show the above listed accessories. Caps on either side of the chest are removeable for operation of the generator, which is mounted permanently in the accessory chest. The accessory chest can be set up on three legs and the seat fastened to the dual "D" ring fasteners at the bottom left of the chest. See Figure 14.

The accessory chest can be set up for ground operation without the three legs in which case the seat is fastened to the dual "D" ring fasteners at the top left of the chest. See Figure 15.

##### b. GENERATOR FILTER UNIT.

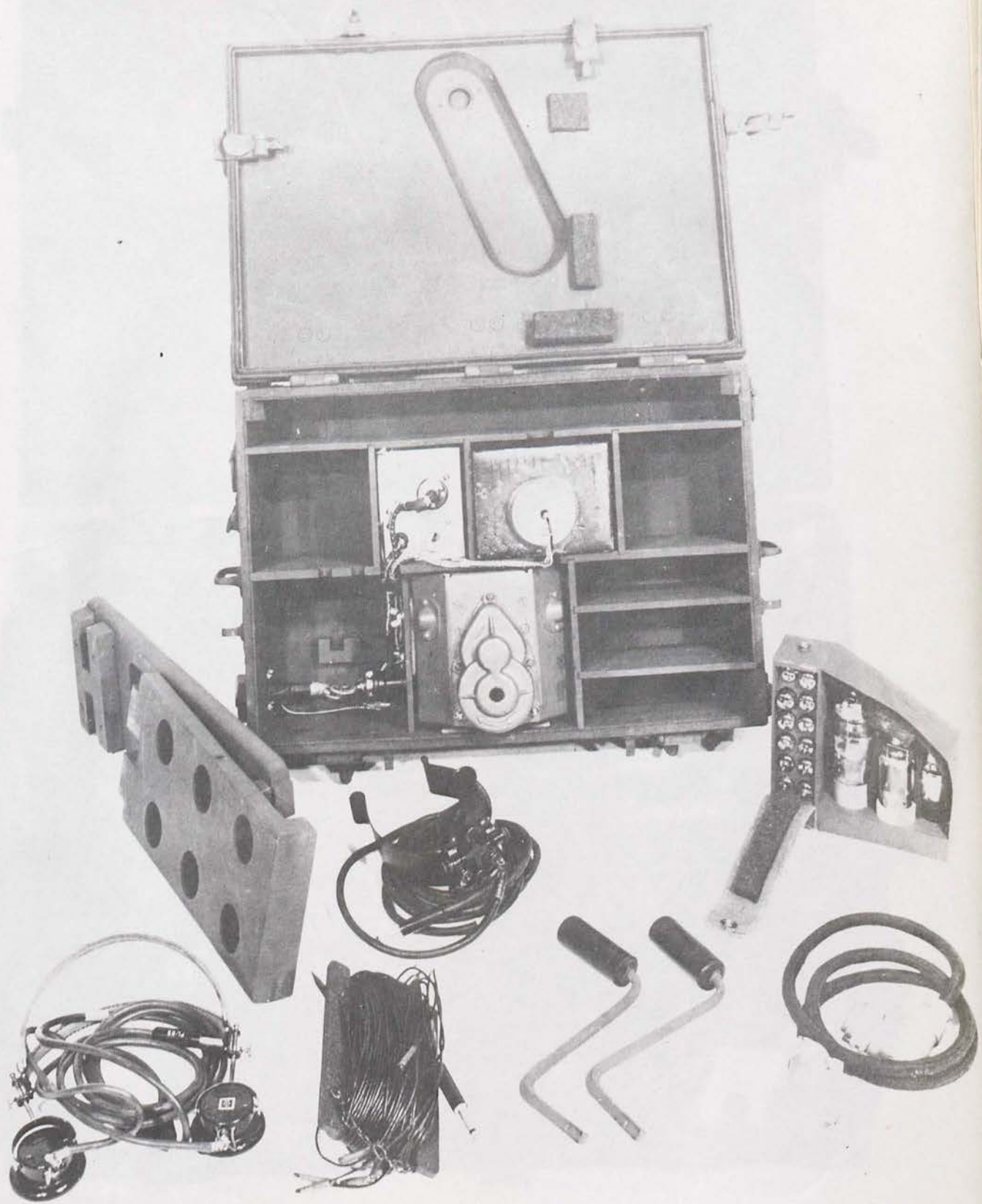
Provisions are made for emergency operation of the battery operated tubes in the Radio Set, SCR-583, from the hand generator. To accomplish this, the POWER SUPPLY SWITCH on the radio transmitter and receiver-set panel is turned to the GENERATOR position. This operation throws into the circuit a filter which filters the output of the hand generator and also reduces the plate and filament voltages to the correct values to operate the battery operated tubes. This filter is permanently mounted in the accessory chest, and is connected to the hand generator and power cable connector by suitable cable ended with a plug. This plug is plugged into a receptacle on the filter unit.

##### c. TYPE BA-40 BATTERY.

The Type BA-40 Battery is made up of dry cells and supplies the  $1\frac{1}{2}$  volt and 90 volt d-c for the Radio Set, Type SCR-583. It is mounted in the accessory chest so as to be readily replaceable, and is connected to the power cable connector by suitable cable ended with a plug. This plug is plugged into a receptacle on the battery unit.

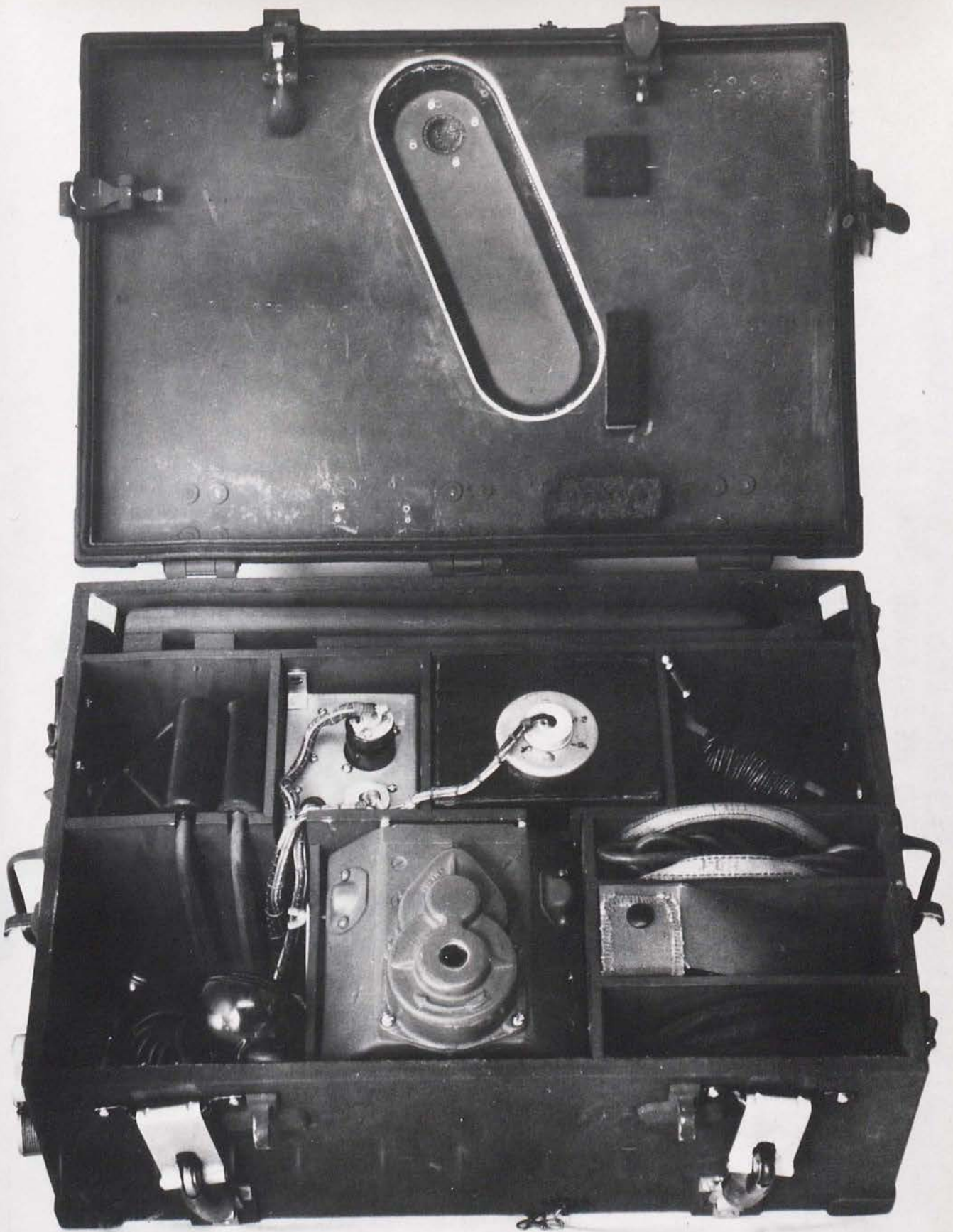
##### d. POWER CABLE ASSEMBLY

The power cable assembly comprises a four foot length of 11 conductor shielded cable terminated at the accessory chest end with a Type AN-3108-22-20P plug. At the radio transmitter and receiver chest end the power cable is terminated with a Type AN-3108-22-20S receptacle. These plugs are polarized so that they can be connected only in the correct manner. The power cable, connecting the radio transmitter and receiver chest and the accessory chest, carries both battery and hand generator circuits. (12)

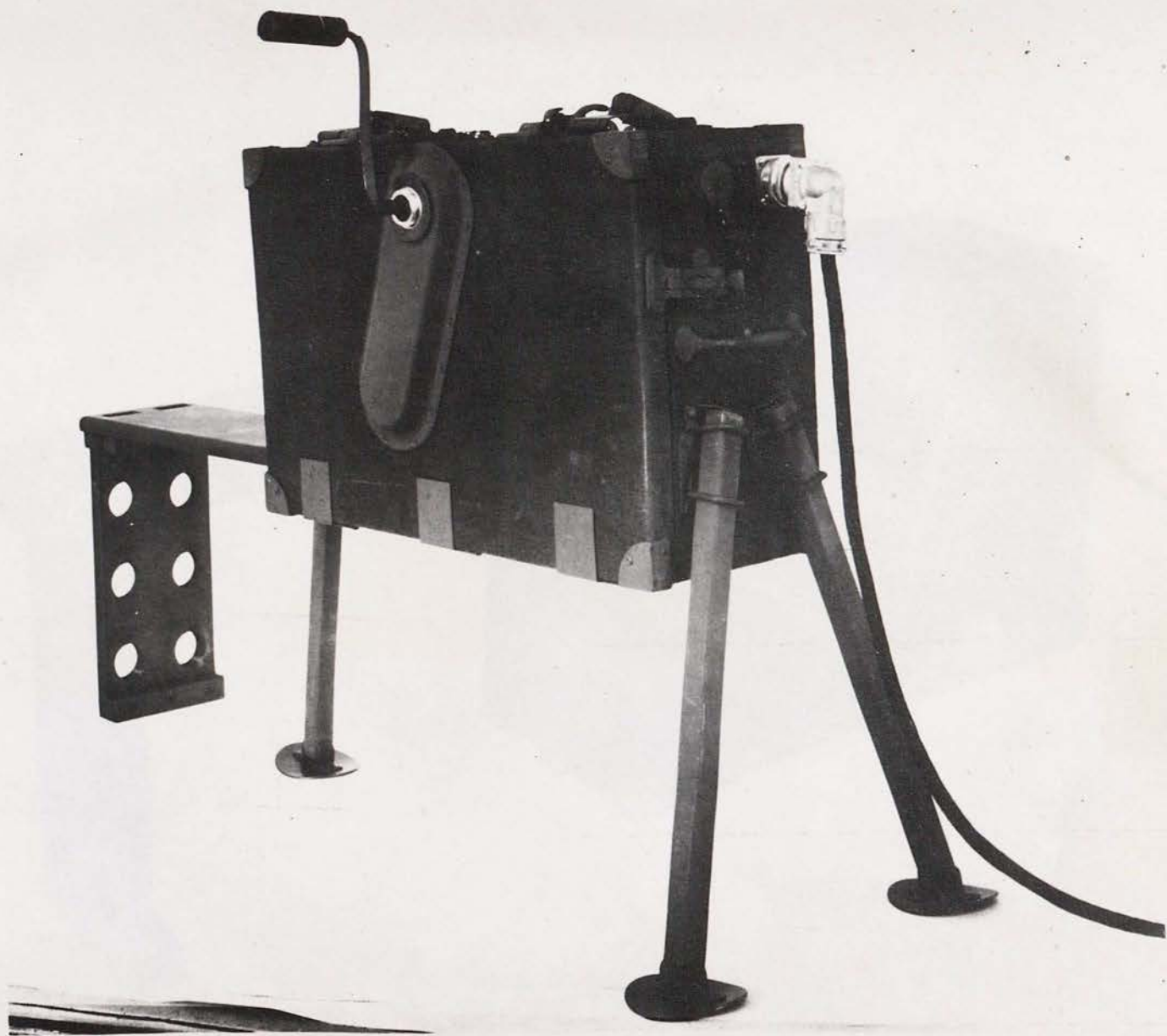


ACCESSORY CHEST SHOWING ACCESSORIES  
FIG. 12

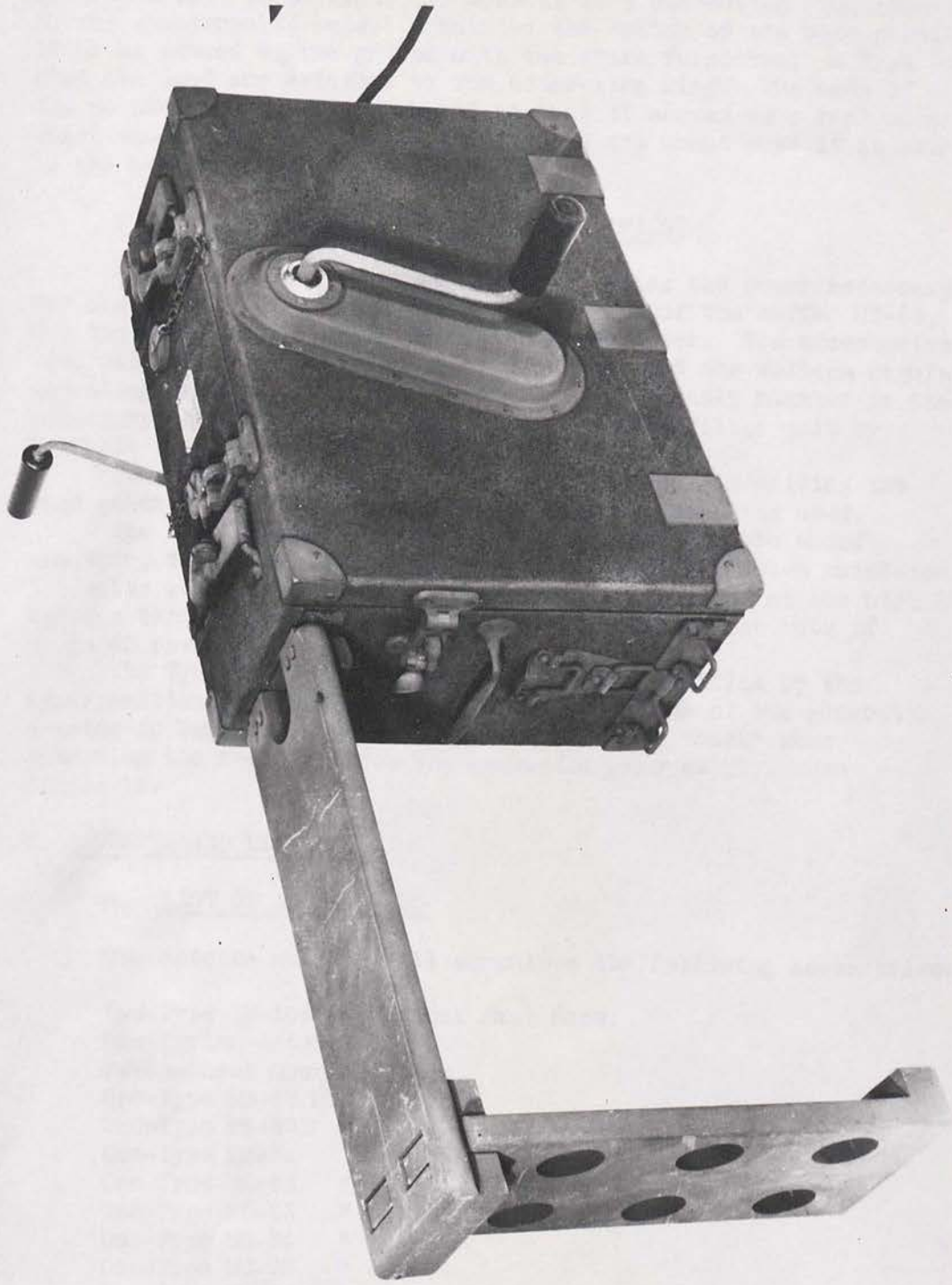




RADIO SET, TYPE SCR-583  
ACCESSORY CHEST  
FIG. 13



RADIO SET, TYPE SCR-583  
ACCESSORY CHEST ON LEGS-GROUND OPERATION  
FIG. 14



ACCESSORY CHEST SET UP WITHOUT  
LEGS FOR GROUND OPERATION  
FIG. 15

e. COUNTERPOISE ASSEMBLY

The counterpoise consists of eight wires, each 25 feet long which are spread radially on the ground from the radio transmitter and receiver. These wires all connect to a connecting ring mounted on the counterpoise base. A hole in the center of the base permits it to be staked to the ground with the stake furnished. A Type PL-55 plug and lead are attached to the connecting ring. The ends of the counterpoise base are shaped so that it serves as a reel upon which the counterpoise leads and lead-in are wound when it is stored in the accessory chest.

f. HAND GENERATOR, TYPE GN-45 (MODIFIED)

The hand generator, Type GN-45, produces the power necessary for the plate, screen, and filament circuits of the buffer HY-65, and the power amplifier TS-70 of the transmitter. The accessories used with the hand generator are two cranks and one voltage regulator adjusting gauge. The hand generator is permanently mounted in the accessory chest and connected to the generator filter unit by suitable cable ended with plugs.

For ground operation, two cranks are used for driving the hand generator. For pack operation, only one crank is used.

The hand generator is self excited, has a double wound armature, and is provided with a voltage regulator which maintains 6.0 volts at the low voltage terminal, and 500 volts at the high voltage terminal when the generator is cranked at the rate of 55 to 65 revolutions per minute.

The Type GN-45 Hand Generator has been modified by the incorporation of additional R-F filtering inside of the generator housing in both the A and B circuits to reduce "hash" when operating the receiver from the generator power supply. See Figure 19.

5. ANTENNA AND LEG ROLL

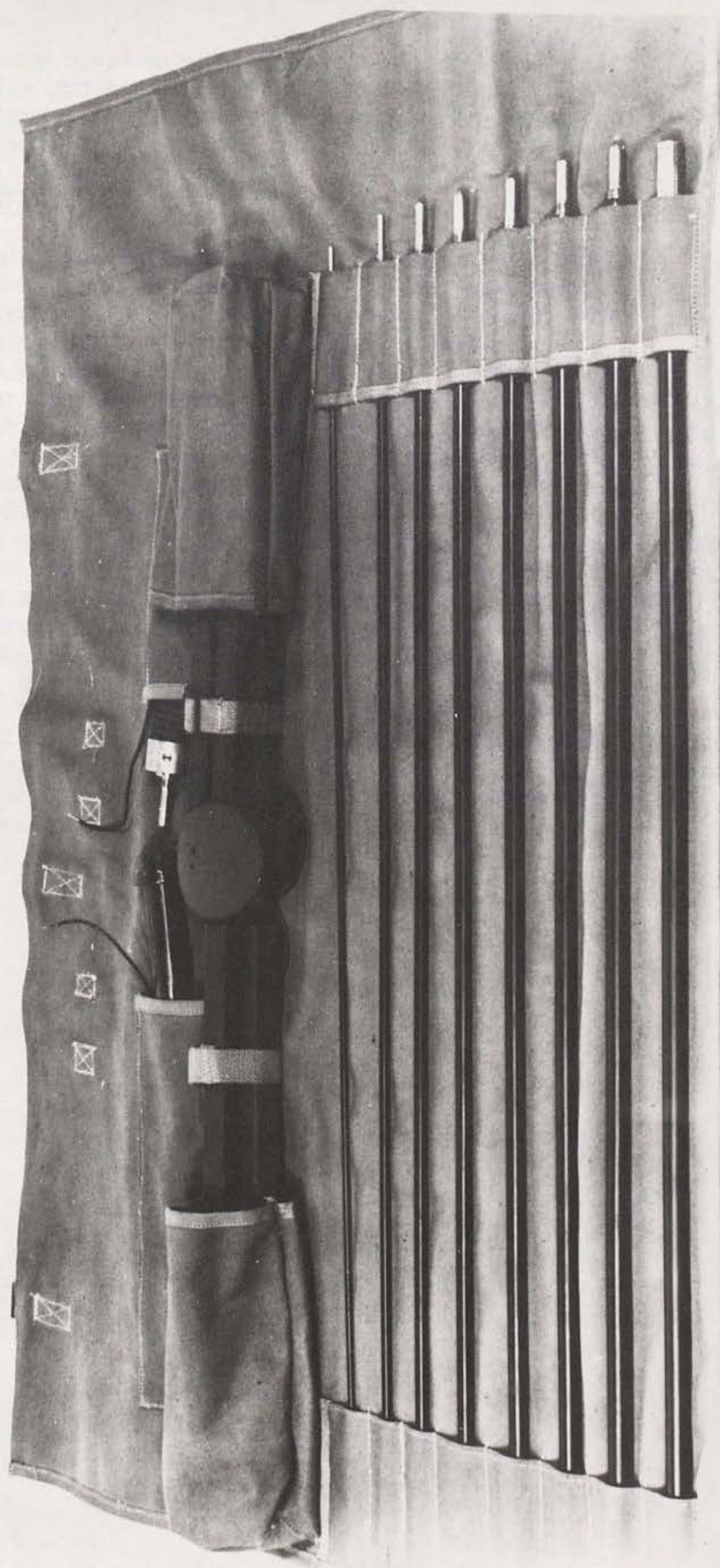
a. LIST OF ACCESSORIES

The antenna and leg roll comprises the following accessories:

One-Type IN-106-A Vertical Mast Base.  
One-Spring Antenna Mount  
Seven-Chest Mounting Legs  
One-Type MS-49 Mast Section  
One-Type MS-50 " "  
One-Type MS-51 " "  
One-Type MS-52 " "  
One-Type MS-53 " "  
One-Type MS-54 " "  
One-Type MS-55 " "  
One-Type MS-56 " "

Figure 16 shows the above listed accessories.

The roll is made of #4 hard texture olive drab cotton duck and is provided with pockets for the eight mast sections. A pocket is provided for the Type IN-106-A Vertical Mast Base, and a pocket for the Spring antenna Mount. Two pockets are provided for the seven legs, one for four and the other for three. Three of these legs



ANTENNA AND LEG ROLL OPEN  
FIG. 16

Mount the accessory chest and four mount the radio transmitter and receiver chest for ground operation. This roll fastens to the top of the radio transmitter and receiver chest by the straps and strap fasteners provided.

b. ANTENNA

The complete antenna is composed of eight mast sections, Types MS-49, MS-50, MS-51, MS-52, MS-53, MS-54, MS-55, and MS-56. Each mast section is approximately 3 feet 2 inches in length, thus, giving a complete antenna length of approximately 25 feet.

When the antenna is to be installed for ground operation, the Type IN-106-A Vertical Mast Base is first placed in the two "D" rings at the right rear of the radio transmitter and receiver chest. The Type MS-56 Mast Section is then inserted into the socket thus provided. The other mast sections are then screwed together, end to end, to make up the complete antenna assembly.

For pack operation the Spring Antenna Mount is screwed into the socket at the right rear top of the radio transmitter and receiver chest. The Type MS-51 Mast Section is screwed in. The Type MS-50 Mast Section is screwed onto the end of the type MS-51 Mast Section to make up the complete antenna assembly for pack operation. When mounted on the pack the antenna will be vertical.

The high tension insulated wire fastened to either the Type IN-106-A Vertical Mast Base or the Spring Antenna Mount binding posts should, in either case, be attached to the antenna binding post located at the forward part of the right side of the radio transmitter and receiver chest near the top. See Figure 6.

## II INSTALLATION

### 6. UNPACKING AND INITIAL INSPECTION

a. The radio transmitter and receiver chest, accessory chest, and antenna and leg roll are each packed in a cardboard carton and the three cartons are securely packed in a wooden case.

To unpack the Radio Set, Type SCR-583, the lid of the wooden case marked TOP is removed. The two cardboard cartons, so exposed, may be opened, the cardboard packing removed, and the chests carefully lifted out. Remove the two cardboard boxes and miscellaneous packing from the wooden case and carefully lift out the remaining 4 $\frac{1}{2}$ " x 6" x 41" cardboard carton. Open this carton and remove the antenna and leg roll.

b. Open the radio transmitter and receiver chest, and turn the wings of the 18 quick-lock panel fasteners counter-clockwise 90 degrees. Carefully remove the complete chassis and panel assembly from the chest.

The Radio Set, Type SCR-583 is shipped with all vacuum tubes in place. Check the tubes for their proper sockets and make sure that they are pressed down fully in their sockets. Check the grid clips for proper contact at the vacuum tube. Inspect the radio transmitter and receiver chassis for mechanical defects. Carefully replace the chassis in the chest, properly engaging the power plug at the back, and tighten up the 18 quick-lock panel fasteners.

c. Open the accessory chest and check the accessories with Figure 12, or the list in Paragraph 4a. The case of spare vacuum tubes may be checked with the list in Paragraph 3c. Inspect the accessories for mechanical defects.

d. Open the antenna and leg roll and check its contents with Figure 16, or the list in Paragraph 5a.

e. Set up the Radio Set, Type SCR-583, as instructed in Paragraph 7 and check for proper functioning.

### 7. INSTALLING THE RADIO SET, TYPE SCR-583, FOR GROUND OPERATION

Instructions for the installation of the set are contained in sub-paragraphs referring to its various parts, but these various installations may be carried out simultaneously.

#### a. RADIO TRANSMITTER AND RECEIVER

Refer to Figures 2, 6, 14, and 15.

In choosing locations for installing the various components of the set, consideration must be given to the location and arrangement of all other parts. Remove four legs from the canvas roll and attach them to the "D" ring fasteners at the bottom on either side of the chest. Lower the front cover of the chest to a horizontal position. If transmission and reception are both to be used, remove the TS-13 Hand Set from the accessory chest and insert the PL-55 plug into one of the jacks marked PHONE and the PL-68 plug into the jack marked MIKE. Remove the remote key from the accessory chest and insert its cord plug into the jack marked KEY. Place the clamp of the remote key around the thigh just above the knee so that it is convenient to operate the key while in a kneeling position. If just reception is desired, probably it will be desirable to utilize the P-20 Head Set instead of the TS-13 Hand Set and, of course, the key will not be required.

Note calibration chart and operating instructions contained on inside cover.

b. GENERATOR, TYPE GN-45 (MODIFIED).

The generator is placed in operation leaving it in place in the accessory chest. After removing all desired accessories, including the two cranks, seat and seat support, and chest interconnecting cable from the chest, close its cover and set it so that the crank covers are toward the top of the chest. Remove the covers and insert the cranks through the case openings into the generator crank sockets. Operating the generator with the chest on legs is recommended for this and provides the proper relations to enable a man to operate the generator with a minimum of fatigue. The chest is supported on three legs. These are carried in the antenna and leg roll. Insert the legs in the "D" ring supports, two legs supporting one side of the chest and one leg the other side. The seat mounts into a dual "D" ring support at the bottom of the side supported by the single leg. Before mounting the seat, insert the seat support into the rear of the seat. If a more rapid installation is desired the legs may be dispensed with. In this case the seat attaches to the dual "D" ring support at the top of the chest, or the same side as the lower dual "D" ring support. The power cable connector on the side of the chest opposite the seat is a female connector. The male connector on the power cable connects to it by means of the screw coupling ring on the assembly. The connector at the other end of the cable fastens into the connector on the radio transmitter and receiver chest.

c. ANTENNA AND COUNTERPOISE SYSTEM.

Remove the Vertical Mast Base, Type LN-106-A and the mast sections from the antenna and leg roll. Remove the counterpoise from the accessory chest. Assemble all of the mast sections. Note that Type MS-56 mast section must be used as the lower section in order to fit the Vertical Mast Base. The various sections have been numbered consecutively according to the order in which they should be assembled. Insert the Vertical Mast Base LN-106-A into the two "D" rings provided at the right rear of the transmitter-receiver chest. Raise the antenna to a vertical position and insert the lower end of the Type MS-56 Mast Section into the socket in the Type LN-106-A Vertical Mast Base, making a tight fit. Connect the wire lead, normally packed connected to the binding post on the Type LN-106-A Vertical Mast Section, to the antenna binding post at the forward top of the right side of the radio transmitter and receiver chest. Unwind the counterpoise so as to form an eight wire assembly extending radially from beneath the radio transmitter and receiver chest. The counterpoise base is held in place by driving the stake provided through the hole in the center of the base. Insert the Type PL-55 plug on the end of the connector lead into the jack on the transmitter-receiver panel marked C'T'P (counterpoise).

In case the set has been packed or operated while packed the above procedure must be modified. Remove the antenna and spring antenna mount from the pack operation antenna mounting by unscrewing and pulling it out of the socket. Care should be taken that this movement does not end in an abrupt jerk of the antenna in which event the pack animal might become fractious. Remove the key plug and if the head set or hand set have been used remove their plugs. Close the cover of the chest. Release the two quick-release devices by which the chest is held in position on the saddle. Remove the chest



from the pack by raising it up so that the two pack irons are clear of their saddle clamps. The chest is now located where desired and the ground installation completed. The accessory chest is removed from the saddle in the same manner as the radio transmitter and receiver chest. If the crank is in place for pack operation it should be removed before the chest is released from the saddle.

## 8. INSTALLING THE RADIO SET, TYPE SCR-563, FOR PACK OPERATION

### a. RADIO TRANSMITTER AND RECEIVER

Refer to Figures 7 and 17.

By pack operation is meant both transmission and reception with the pack animal halted and with the set on the pack saddle. Open the cover of the transmitter-receiver chest and unhook the support chain so it may hang in a vertical position. Open the accessory chest and remove the remote key and key clamp and the Type TS-13 Hand Set. Insert the hand set plug and key plug into their respective jacks on the set panel. Place the clamp and the remote key around the thigh as noted for ground operation.

### b. GENERATOR, TYPE GN-45 (MODIFIED)

Remove the power cable and one crank from the accessory chest. Remove the waterproofing cap from the metal bushing on the under side of the chest. The power cable should be connected to the receptacles provided on the two chests. It will be noted that this causes the cable to be dressed diagonally across the top of the pack in such a manner that there is not excess slack hanging free. Insert the crank through the opening into the exposed generator crank socket. The generator may now be cranked.

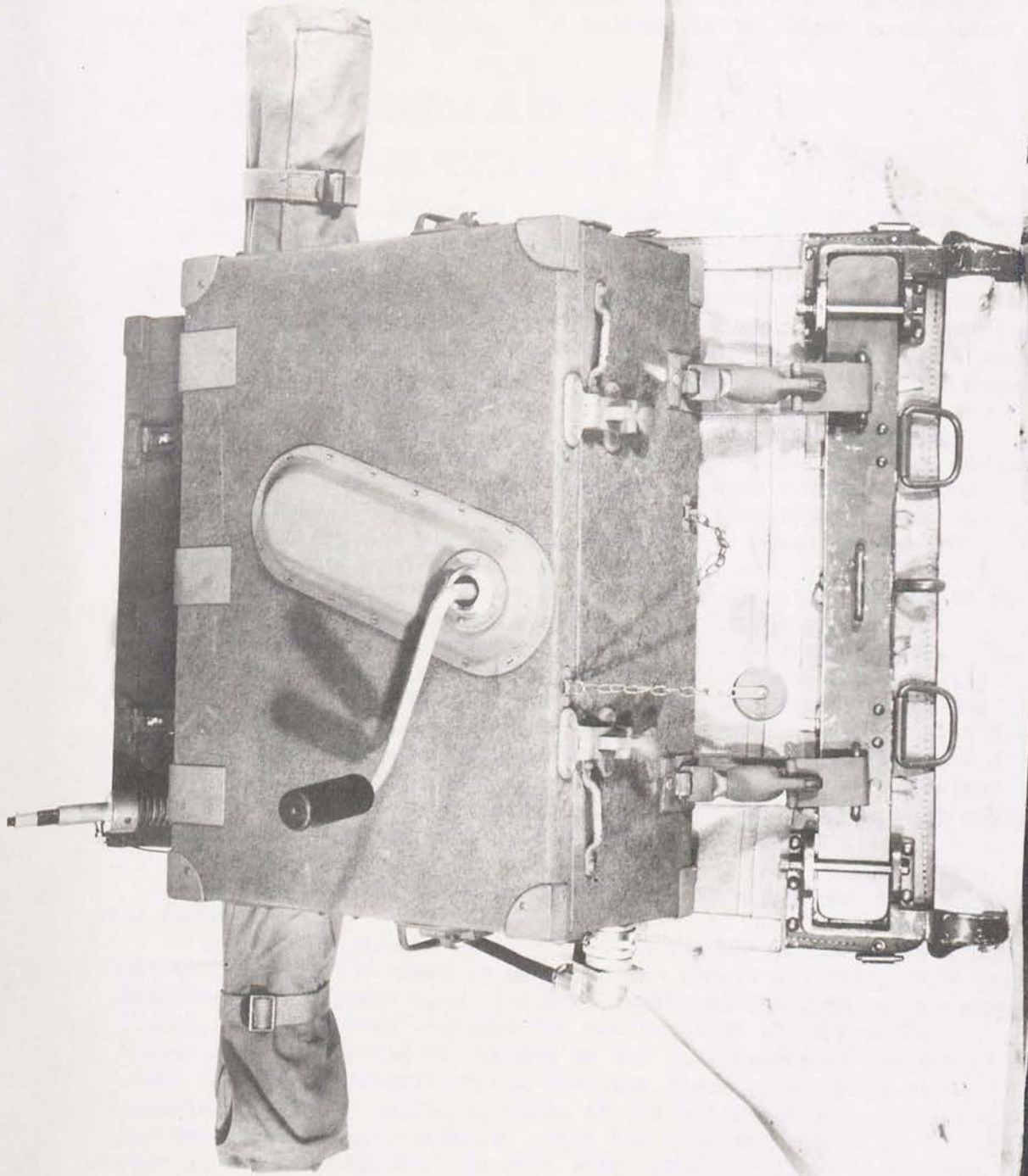
### c. ANTENNA SYSTEM

Remove the antenna and leg roll from the radio transmitter and receiver chest. From the roll remove the spring antenna mount and the Types 50 and 51 mast sections. Insert and screw into place the spring antenna mount. The receptacle for this is at the right rear of the top of the radio transmitter and receiver chest. Attach the insulated lead-in wire, normally packed connected to the binding post on this base, to the antenna binding post on the radio transmitter and receiver chest. Fasten the Types MS-50 and MS-51 mast sections together and insert the base of Type MS-50 mast section into the socket in the spring antenna mount, and screw tightly into place. The antenna will now be in a vertical position at the rear of the pack. The counterpoise is not normally used in the case of pack operation. If ground operation has preceded stationary pack set operation, the antenna must be dismounted and the Type 1N-106-A Vertical Mast Base removed. The spring antenna mount with the Types MS-50 and MS-51 mast sections is used as described above.

## 9. INSTALLATION OF RADIO SET, TYPE SC-583, FOR STAND-BY OPERATION

### a. RADIO TRANSMITTER AND RECEIVER

Refer to Figure 8. By stand-by reception is meant operation of the set as a receiver while the pack animal is moving. Open the speaker auxiliary door and also the auxiliary control door. This



RADIO SET, TYPE SCR-583  
PACK OPERATION - ACCESSORY CHEST SIDE  
FIG. 17

latter exposes all necessary controls. During reception while the pack animal is moving, the main cover is closed and access to the receiver tuning controls is had through the auxiliary control door as outlined above. Be sure before closing the main door that the SEND-RECEIVE SWITCH is set on the RECEIVE position and the POWER SUPPLY SWITCH is set on the BATTERY position. Be sure the power cable is attached as outlined in Paragraph 8b. The antenna installation is as noted in Paragraph 8c.

## 10. REMOVING FROM SERVICE IN THE FIELD

### a. TO CLOSE THE GROUND STATION

Turn the OFF switch to the OFF position. Disconnect the power cable and coil it carefully. Remove the seat and legs and two cranks from the accessory chest. Remove the counterpoise plug and all head set and hand set plugs. Disconnect the antenna lead from the antenna binding post on the radio transmitter and receiver chest leaving the lead attached to the binding post on the Type 1N-106-A vertical mast base. Close and fasten the cover of the radio transmitter and receiver chest. Grasp the lower section of the antenna just above the mast insulator and remove the Vertical Mast Base and antenna fastened together. Lower the antenna. Disassemble the various sections and the Vertical Mast Base from the lower section. Next remove the four supporting legs. Remove the stake from the counterpoise base and coil the counterpoise wires and lead-in on it. Pack the generator, two cranks, counterpoise, head set, key, hand set, seat, and seat support in the accessory chest. If stand-by operation is not to be used, also carefully disconnect, coil and pack the power cable. Figure 13 shows the accessories packed in the accessory chest. The generator, generator filter, battery and spare tubes are normally left in place in the chest. Close the chest and fasten the cover securely. Be sure that the power cable receptacle waterproofing cover is in place on both accessory and radio transmitter and receiver chests. Be sure both auxiliary doors on the radio transmitter and receiver chest are closed and securely fastened. Pack the antenna mast sections, Vertical Mast Base and legs in the antenna and leg roll.

In case the set is to be transported by a pack animal proceed as follows:-

Fasten the antenna and leg roll on the top of the radio transmitter and receiver chest by means of the straps and strap fasteners provided. To prevent excessive unbalancing of the load on the pack animal, both the radio transmitter and receiver chest and the accessory chest should be mounted on the pack saddle at the same time. Place the radio transmitter and receiver chest on the near side securing it to the saddle by means of the two metal pack irons and the two quick-release catches. Pack the accessory chest on the off side in the same manner. In case pack operation is to follow the closing of the ground station, proceed as indicated in Paragraph 8 for the installation of the set for pack operation. In this case, of course, the complete antenna, head set or hand set, key, one generator crank, and power cable are not packed.

### b. TO CLOSE STATION AFTER PACK OPERATION

Turn the OFF switch to the OFF position. Disconnect the power cable and coil it carefully. Remove the crank from the generator socket. Remove

the head set and hand set plugs and key plug. Disconnect the antenna lead from the antenna binding post of the radio transmitter and receiver chest, leaving the lead attached to the binding post on the spring antenna mount. Remove the two antenna sections from the spring antenna mount first and then remove the spring antenna mount from its mounting socket. Take care not to abruptly jerk the mast sections or spring antenna mount in removing. The spring antenna mount and power cable may be left in place to facilitate prompt opening of the pack station in case such action is contemplated in the near future. Close and fasten the cover of the radio transmitter and receiver chest. Pack the generator crank, head set or hand set in the proper place in the accessory chest. Pack the power cable in the accessory chest, if not left connected in place. Close the accessory chest cover and screw the waterproofing cups on the power cable receptacles on both chests. Screw the waterproofing cover on the generator crank socket opening on the accessory chest. Remove the antenna and leg roll from the top of the radio transmitter and receiver chest and pack the mast sections therein along with the spring antenna mount if it is not left in place on the chest. Replace the roll to its proper location. In case stand-by operation is to follow pack operation this procedure must be modified. The antenna should be left erected. The head set or hand set, key, and crank should be packed in the accessory chest. The main transmitter-receiver chest cover is closed and the auxiliary covers opened. Be sure the SEND-RECEIVE switch is on the RECEIVE position and the POWER SUPPLY switch is on the BATTERY position before closing the main cover.

c. TO CLOSE THE STATION AFTER STAND-BY RECEPTION

Halt the pack animal and turn the OFF switch to its OFF position. Disconnect the antenna lead-in from the antenna binding post on the radio transmitter-and receiver chest, leaving the lead attached to the binding post on the spring antenna mount. Close and fasten both auxiliary doors. Dismantle the antenna as indicated in (b) above. The vertical mast base and power cable may or may not be removed depending on whether pack operation is contemplated in the near future. Pack the vertical mast base, if removed, in the antenna and leg roll along with the mast sections as described under (b) above. Pack the power cable, if removed, in the accessory case. Be sure the waterseal caps are in place over the power cable receptacles on both chests. In case the set is to be transported by vehicle following its operation on the pack saddle, the two carrying chests should be removed from the pack saddle by unfastening the quick-release devices and lifting each chest off the saddle. In order to prevent excessive unbalancing of the load, these two chests should be removed at the same time. The quick-release fasteners should be swung up and hooked into the two clamps provided on the radio transmitter and receiver chest. The spring antenna mount should always be packed in the antenna and leg roll when the set is transported by vehicle.

11. TRANSPORTATION IN THE FIELD

This set is specially designed for transportation on one pack animal. Each carrying chest is provided with two metal straps, irons and two quick-release fasteners for securing them to the cavalry type Phillips pack saddle.

18. PREPARATION FOR STORAGE

Pack all units in accordance with instructions in paragraph 10 except that the dry battery Type BA-40 should be removed and placed in separate storage. Check all parts carefully for serviceability and repair or replace all unserviceable parts. Store the equipment in a dry place, free from dust.

### III OPERATION

#### 15. OPERATION OF THE GROUND SET

##### a. GENERAL

When the equipment is to be used, the OFF switch must be turned on by advancing the volume control clockwise. The receiver is in operation on all five positions of the SEND-RECEIVE SWITCH. In the case of the PHONE or CW positions, the receiver is in operation whenever the press-to-talk microphone switch, or the key, respectively are released. However, when reception only is desired, the SEND-RECEIVE SWITCH should be turned to the RECEIVE position to conserve battery drain. Always turn the volume control counter-clockwise to OFF position when the equipment is not in use. Otherwise, there will be a continuous drain on the batteries.

##### b. TRANSMITTER

The transmitter should be tuned up with the TRANSMITTER POWER switch in the LO position. Adjustments (1) to (3) must be made before the press-to-talk switch, or key is closed. Normally the battery operated tubes receive power from the battery. In this case the POWER SUPPLY SWITCH is in the BATTERY position.

(1) If transmission is desired under crystal control of the master oscillator, then set the FREQUENCY SELECTOR on one of the four crystal frequency selector points. Skip procedure outlined in (2) and proceed under (3).

(2) If crystal control is not employed, set the FREQUENCY SELECTOR switch on M. O. position. If the equipment has not been used for several days or has received rough usage, the calibration should be checked. Otherwise, proceed under (3).

To calibrate, first set the SEND-RECEIVE SWITCH to the CALIBRATE position. Refer to the CALIBRATION CHART and note the stars opposite certain frequencies. These indicate crystal check points. Select the crystal check point nearest the frequency of transmission and set the TRANSMITTER DIAL and dial drum at this check point. By tuning the receiver through a frequency, as indicated on its dial, which corresponds to the crystal check point, a beat note should be heard. If the dial calibration at zero beat does not correspond to the calibration on the chart, bring the two into agreement by adjusting the M. O. CORR. Lift the adjustment cover marked M. O. CORR. and with a screw driver adjust the corrector for correct calibration (i. e. obtain zero beat with the dial calibration set to the point indicated on the chart). The transmitter is now calibrated. The steps from here on under TRANSMITTER require hand generator operation.

(3) Turn the SEND-RECEIVE SWITCH to either PHONE or CW, whichever corresponds to the type of transmission desired. Set the TRANSMITTER DIAL and dial drum to the reading indicated on the CALIBRATION CHART corresponding to the desired frequency of transmission. This chart is located on the inside of the radio transmitter and receiver chest cover. This procedure, in the case of crystal operation of the transmitter can be somewhat simplified. Hold the METER SWITCH at the XTAL TUNING position and turn the TRANSMITTER DIAL until a reading is noted

on the METER. Tune for maximum deflection of the METER. The TRANSMITTER DIAL is now correctly set. On releasing, the METER SWITCH will return to its normal position indicating ANT. TUNING.

(4) Set the ANTENNA TUNING SWITCH to the tap falling within the desired frequency range for the 6 ft. or 25 ft. antenna as the case may be. This gives a rough setting of the antenna tuning.

(5) Now the press-to-talk switch, or the key should be held closed. Adjust the ANT. VARIABLE TUNING control for maximum output on the METER. The transmitter is now in adjustment for transmission on the selected frequency. The TRANSMITTER POWER switch may now be advanced to the HI position if desired. In the interests of the hand generator operator it is desirable to conduct all transmissions where possible on the LO position.

(6) Although the ANTENNA TUNING SWITCH is calibrated for only the 6 foot and 25 foot antennas, it can be used with other antennas near in length to the above. For example - note the blank calibration line, just above the 2.20 - 2.40 calibration on the 25 foot antenna. If the 2.20 - 2.40 calibration were moved up to this line and all of the successive calibrations moved with it, thus leaving a blank line at the bottom, these calibrations would be approximately correct for a 15 foot antenna. Experience will indicate how other antennas can be adapted. Of course, in some cases extremes of the tuning range may not be covered, particularly on lengths greater than 25 feet. When using antennas of lengths other than those calibrated, the METER SWITCH should be turned to the OUTPUT PL. CUR. position after all adjustments have been made. In no case should the meter read over 110 divisions. If the reading is over this, it indicates either a length of antenna is being used that is beyond the ability of the transmitter to match, or some adjustment is incorrectly made.

(7) When the transmitter is set up for PHONE operation, the transmitter output may be monitored by inserting the head set plug in the jack marked MON. (monitor). This gives a means of checking the quality of the transmitted voice. The operator can thus adjust the level of his voice to obtain the maximum output with minimum distortion.

### c. RECEIVER

(1) For reception only, using battery power, turn the SEND-RECEIVE SWITCH to RECEIVE position and the POWER SUPPLY SWITCH to the BATTERY position.

(2) For variable tuning, set the FREQUENCY SELECTOR switch to the M. G. position.

(3) The receiver oscillator may be crystal controlled by setting the FREQUENCY SELECTOR switch on one of the four crystal frequency selector points. Note that the RECEIVER DIAL must be tuned to the frequency to be received as only the oscillator frequency is preselected by the crystal switch.

(4) For CW reception, the PHONE-CW switch must be turned to the CW position. The CW position is a zero beat position under conditions of crystal control, or at the point of peak tuning when variable tuning is used. The pitch of the

beat note can be varied in either case by advancing the control beyond the CW detent over the portion of arc noted PITCH.

#### d. NETTING

This is a specialized procedure to permit the rapid and accurate setting up of the transmitter and receiver into a net with a minimum of reference to any calibrations. Proceed as follows:

- (1) Set the SEND-RECEIVE SWITCH on the RECEIVE position.
- (2) Set the PHONE-CW switch to the CW position.
- (3) Set the FREQUENCY SELECTOR switch to the M.O.

position and tune in the net signal to which the set is to be adjusted. Adjust the beat note to zero beat by tuning the RECEIVER DIAL. Note the frequency setting of the RECEIVER DIAL. Using the CALIBRATION CHART set the TRANSMITTER DIAL and dial drum to approximately the frequency indicated on the RECEIVER DIAL.

(4) Set the SEND-RECEIVE switch to the NET position. By varying the setting of the TRANSMITTER DIAL and dial drum a short distance either side of the above approximate setting, a beat note should be heard. Tune to zero beat. Now proceed to complete the tuning of the transmitter as outlined under TRANSMITTER, steps (4) to (7).

#### e. EMERGENCY OPERATION OF BATTERY SUPPLIED TUBES

If the battery appears to be dead, this can be checked by turning the METER SWITCH in turn to the A TEST and B TEST positions. If the needle in either case reads below the calibration line extending toward the center of the meter and located just past the 175 division line, the battery Type BA-40 should be replaced. If a spare is not available, the station can still be operated by turning the POWER SUPPLY SWITCH to the GENERATOR position. This switches a filter into the generator output circuit and provides the correct voltage for the battery operated tubes. Under this type of operation, of course, the hand generator must be cranked for all conditions of use. It is generally desirable to locate the hand generator as far as possible from the antenna to minimize possibilities of interference pick-up from the hand generator.

### 14. OPERATION OF THE PACK SET

#### a. TO TRANSMIT

Proceed as outlined for ground operation. Note that a single crank should be used, and operation on HI (high) power should not be attempted. The two section antenna in conjunction with the spring antenna mount is used. In setting up the transmitter under Paragraph 8c note that the 6 ft. antenna calibration on the ANT. TUNING SWITCH is used. Transmission is now accomplished by means of the remote key, with the operator resting on one knee on the ground.

#### b. TO RECEIVE

Proceed as outlined for ground operation. In most cases



it will be found convenient to use the speaker rather than the head set for reception.

15. OPERATION FOR STAND-BY RECEPTION

Transmission is not contemplated when the pack animal is in motion.

To receive:

- a. Be sure SEND-RECEIVE switch is turned to RECEIVE.
- b. Close the main cover. Open the speaker cover. The small control cover may be either left open or closed as desired. It must be opened, of course, to make adjustments of the receiver.
- c. The pack animal may now be started, the operator following on the near side. Tuning may now be accomplished by adjustment of the receiver controls through the auxiliary adjustment door.

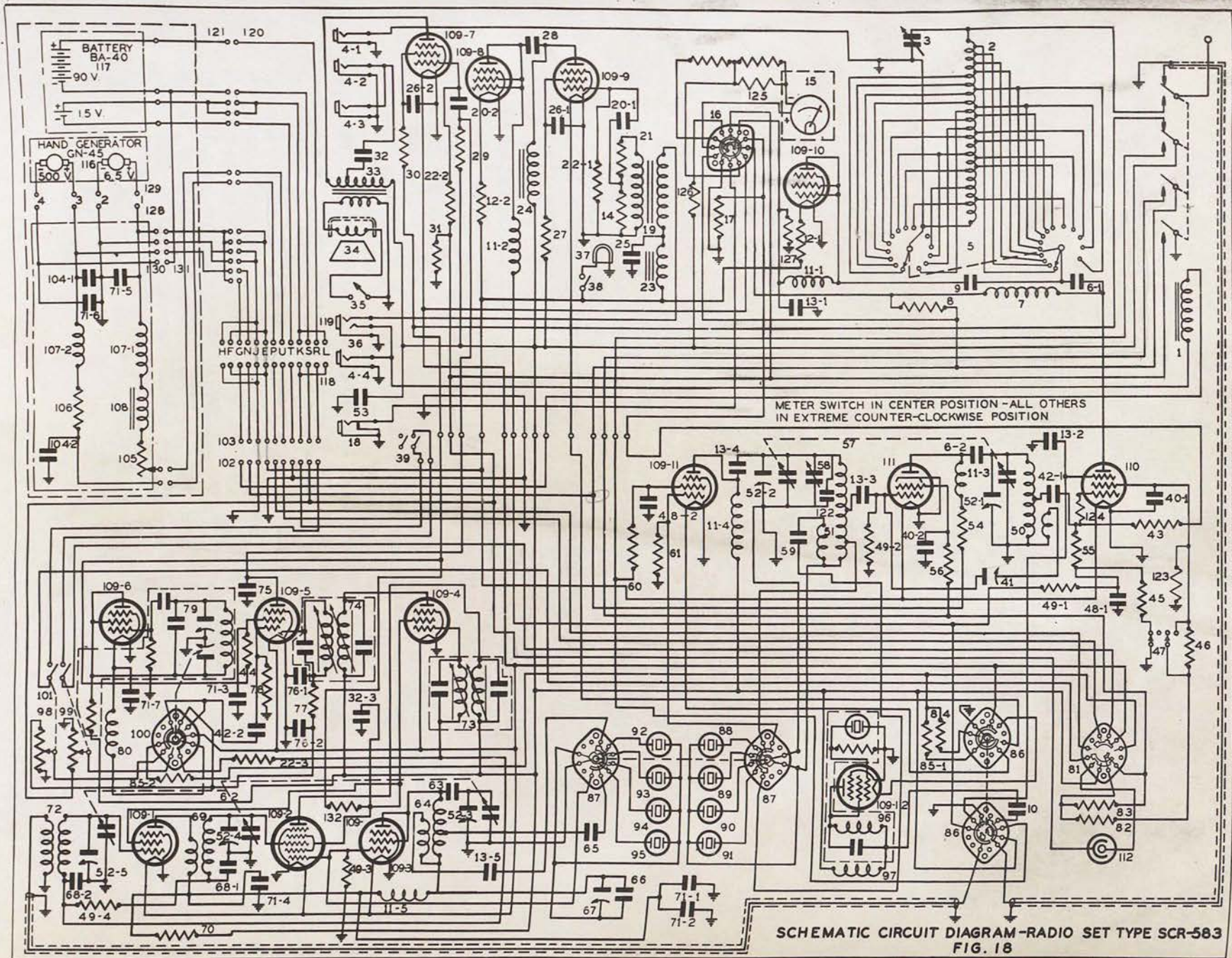
#### IV FUNCTION OF PARTS

##### 16. FUNCTION OF THE RADIO TRANSMITTER AND RECEIVER

###### a. AS A TRANSMITTER

Figure 18 shows the complete schematic circuit diagram of both the transmitter and receiver. The transmitter is of the master oscillator - buffer - power amplifier type. The master oscillator is a type VT-210 pentode employing a tuned plate modified Hartley circuit. The plate is shunt fed, and coupled to the oscillator coil by means of the coupling condenser 13-4. The plate, screen, and filament receive their potential from the Type BA-40 battery, which is mounted in the accessory chest. This provides a stable source of power and, as will be brought out later, eliminates the necessity for operating the hand generator while calibrating. The tube is self biased by the use of the grid leak resistor 61 and the grid coupling capacitor 59. The oscillator inductor 51 is wound on an isolantite form, and all critical connections, such as plate and grid connections, are made using bus-wire. These factors all contribute to oscillator stability. Stability is further secured by taking the buffer stage grid coupling capacitor 13-3 from a tap on the oscillator inductor 51 rather than directly from the plate end of the oscillator coil.

As the oscillator inductor controls the frequency range it also controls the frequency calibration, and its calibration in turn may be checked by means of the 200 KC calibration crystal controlled oscillator. The 200 KC calibration crystal controlled oscillator when put into operation by turning the SEND-RECEIVE SWITCH to the CALIBRATE position, oscillates at the frequency of its control crystal which is 200 KC. The circuit is designed to be rich in harmonics which appear in the operating frequency band between 200 KC and 4600 KC as multiples of 200 KC. These harmonics are called crystal check points and are indicated on the calibration chart by stars. When picking a frequency that is to be checked, the operator refers to the nearest crystal check point and sets the TRANSMITTER DIAL to it. He then tunes the receiver, which is also in operation on this SEND-RECEIVE SWITCH position (CALIBRATE), to approximately the crystal check point frequency. At the correct frequency the operator will hear a beat note which is the correct harmonic of the 200 KC calibration oscillator beating with the fundamental of the master oscillator. Of course if the master oscillator is in exact calibration there actually will be no audible beat note as the two oscillators will be at zero beat. The presence of this condition can be checked by tuning the M.O. CORR. The M.O. CORR. is a small variable capacitor, carrying the symbol designation 58 in Figure 18, which connected



to the buffer tap of the oscillator inductor 51, essentially places a still smaller equivalent capacity in parallel with the oscillator tuning capacitor 57. It is obvious that the adjustment of the M. O. CORR. capacitor 58 changes the master oscillator frequency, and thus, by adjusting it the fundamental frequency of the master oscillator, can be brought to zero beat with the proper harmonic of the 200 KC calibration crystal controlled oscillator. This proper harmonic is selected as noted above by tuning the receiver to the master oscillator frequency. Thus the master oscillator can at any time be accurately checked against the nearest harmonic of the 200 KC calibration oscillator.

The buffer tube, HY-65, is a pentode. It is used because of its extremely low grid to plate capacity which limits the effect of the plate circuit on the grid, and thus in turn on the master oscillator. The buffer receives its operating potentials from the hand generator with the exception of the grid bias. The grid bias is developed by the rectified signal current flowing in the grid resistor 49-2. The plate is shunt fed and coupled to the buffer output inductor 50 by the capacitor 6-2. The buffer is tuned by a section of the same gang that tunes the master oscillator (capacitor 57). The inductance of the buffer output inductor 50 is adjusted so that the buffer and master oscillator circuits track at all frequencies over the tuning range. To further reduce the loading effect of the buffer stage upon the master oscillator, the buffer is neutralized. Energy in the proper phase is picked up by the neutralizing winding on the buffer output inductor 50 and fed back thru the neutralizing capacitor 41 to the buffer grid. By correct adjustment of the neutralizing capacitor 41, the major portion of the effect of the buffer tube's grid to plate capacity is thus nullified. The buffer output inductor 50 is coupled to the grid of the output pentode TS-70 by the grid coupling capacitor 42-1.

The output tube TS-70 also receives all of its potentials from the hand generator with the exception of the control and suppressor grids. The control grid receives its bias in the same manner as the buffer tube HY-65 i.e. from the grid current flowing in the grid resistor 43 as a result of rectifying the input signal. On CW operation the suppressor grid is at ground potential. On PHONE operation, however, a negative bias of proper amount is placed on the suppressor grid. This is obtained from the negative potential developed across the grid resistor 43. An audio voltage is introduced from the suppressor grid to ground. This voltage is the amplified output of the microphone. Its positive peaks will make the effective potential on the suppressor grid less negative, and its negative peaks will of course make the suppressor grid more negative. This in turn varies the electron flow in the output tube TS-70, and thus modulation is accomplished. If the potential of the suppressor grid is driven positive by this action the tube may block and remain positive even after the

driving source is removed. To prevent this occurring, a diode is placed in the circuit in such a manner that when the suppressor of the output tube TS-70 is driven positive, the anode of the diode connected VT-173 is made positive. The resulting flow of diode current which establishes a connection to ground removes the positive charge from the suppressor grid of the output tube TS-70. The suppressor grid thus again becomes negative and the diode is inoperative until the next positive charge is established. This diode has been called the diode gate in the list of vacuum tubes in Paragraph 3C. The plate of the output tube TS-70 is coupled by the capacitor 6-1 to a tap on the antenna tuning inductor 2. This tap is varied for various frequencies by means of the ANTENNA TUNING SWITCH. At the same time the inductance between the antenna and ground is varied by changing the tapped connection to ground. A variable capacitor 3 from antenna to ground controls points between taps. Thus by setting the ANTENNA TUNING SWITCH to the proper frequency band and setting the variable capacitor 3 for maximum output as indicated by the METER, the correct impedance relations are set up for getting maximum power into the antenna at the frequency of the master oscillator. The transmitter output is indicated by rectifying a small portion of the R-F potential developed across the antenna tuning inductor 2 by means of a VT-173 tube connected as a diode. This diode is called the output indicator diode. The METER reads the rectified diode current.

The TRANSMITTER POWER SWITCH when in the LO position reduces the screen potential on the output tube TS-70. In the case of PHONE operation, the bias on its suppressor grid is also reduced.

Keying is accomplished by opening the screen grids of the master oscillator tube VT-210, the buffer tube HY-65, and the output tube TS-70 when the key is up. When the key is down the screen grids of the receiver tubes are opened. In addition, the antenna connections are switched from the transmitter with the key down to the receiver with the key up by operation of the keying relay, which carries the symbol designation 1 in Figure 18.

In the case of PHONE operation the press-to-talk switch operates the keying relay.

#### b. AS A RECEIVER

The receiver is a conventional superheterodyne employing an antenna stage with a high impedance primary, carrying the symbol designation 72 in Figure 18, an R-F amplifier stage using a VT-173 tube and working into the R-F transformer 69, a converter using a VT-171 tube, and a tuned heterodyne oscillator using a VT-173 tube connected as a triode. These three stages are tuned by means of a

three gang variable capacitor bearing the symbol designation 62 in Figure 18. The heterodyne oscillator is tracked to the antenna and R-F stages by means of the series tracking capacitor 65 when crystal controlled and capacitor 66 in parallel with trimmer 67 when self controlled. The plate of the converter tube VT-171 feeds a double permeability tuned I-F transformer which bears the symbol designation 73 in Figure 18.

The I-F amplifier uses a VT-173 tube to feed a double permeability tuned transformer 74 which in turn feeds the diode section of a VT-172 tube, which acts as the second detector. The rectified diode current flowing thru the volume control 98 is used as a source of A.V.C. voltage. At the same time the audio frequency voltage, produced by the detector action of the diode section of the VT-172 tube, is impressed across the volume control 98, of which the variable center arm is connected to the control grid of the pentode section of the VT-172 tube thru the grid coupling capacitor 42-2. The pentode section of the VT-172 tube acts as the first audio frequency amplifier stage. The plate of the VT-172 tube is capacity-resistance coupled to the control grid of the VT-210 output tube by means of the capacitor 20-2 and resistors 29 and 22-2. The plate of the VT-210 output tube is connected to the output transformer 33 which supplies either speaker or headphones.

For CW operation the A.V.C. voltage is disconnected from the R-F, converter, and I-F tubes grids and a source of manually controlled bias voltage substituted. In addition a beat frequency oscillator, which uses a VT-173 tube, is put into operation. The B. F. O. can be set at either zero beat with the I-F signal frequency, when the PHONE - CW SWITCH is set at CW, or at some discreet audio frequency difference from the signal frequency up to approximately 5 KC by the rotation of the PHONE - CW switch over the PITCH scale.

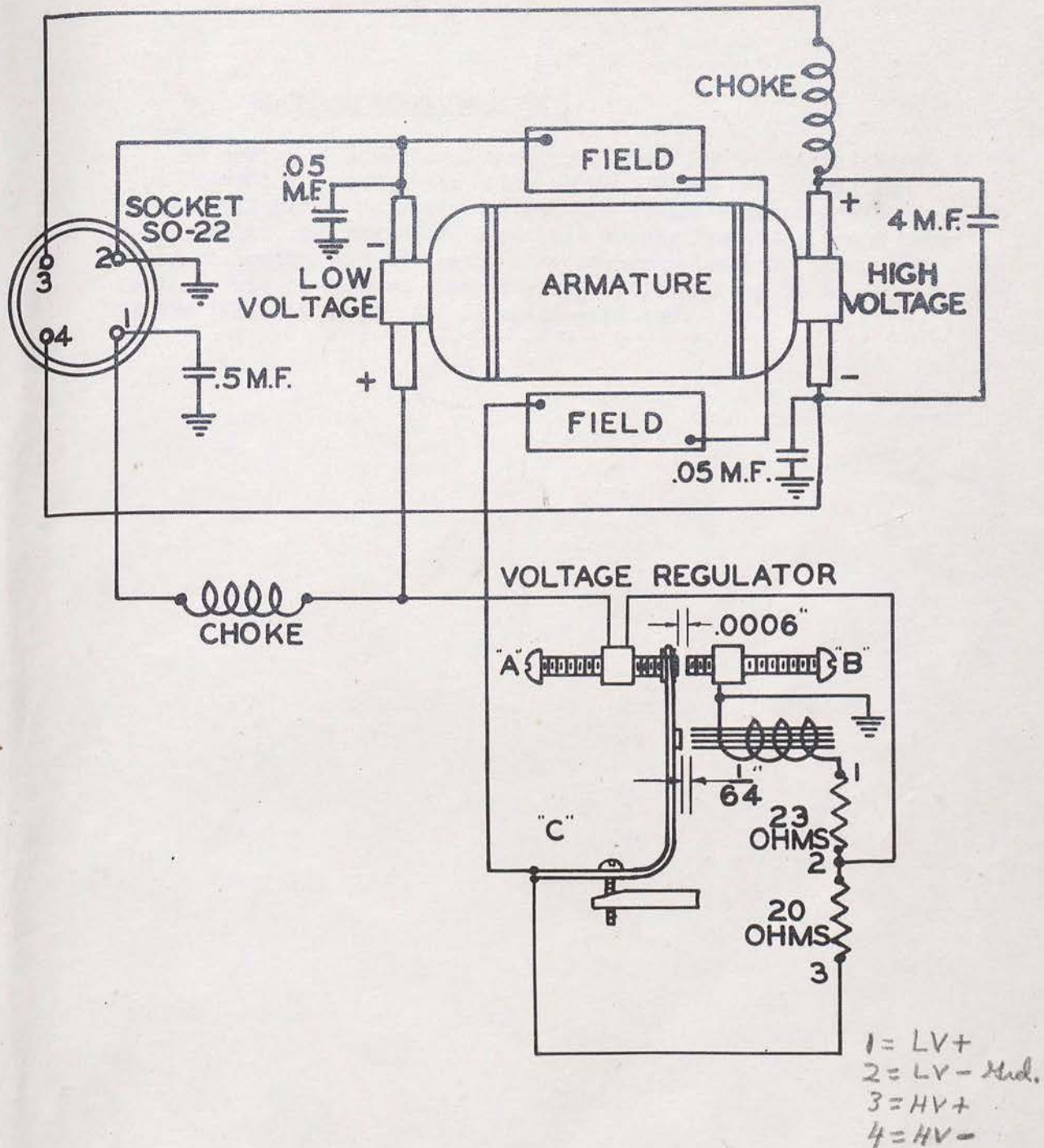
All of the receiver tubes including the B. F. O. normally receive all of their power from the Type BA-40 battery. As has been noted in previous sections, however, all battery operated tubes in both the transmitter and receiver may receive their power from the hand generator, by proper switching. As the potential at the hand generator is dropped from 500 volts to 90 volts for this operation by means of a series resistor, this source of power supply has very poor voltage regulation. This means, for example, that turning on and off the receiver tubes, the master oscillator tube, etc., will cause serious changes in voltage. To eliminate this effect a VT-184 tube is connected across the 90 volt supply circuit. This tube has the property of variable resistance with applied voltage such that it maintains a constant load on the power supply system and consequently maintains a constant supply voltage.

## 17. FUNCTION OF THE POWER SUPPLY

### a. HAND GENERATOR GN-45 (MODIFIED)

The schematic circuit diagram of the generator is shown in Figure 19. There are two armature windings on the rotor, the low voltage winding producing 6 volts D-C, the high voltage winding producing 500 volts D-C. The field winding is connected across the low voltage winding and provides excitation for both the high and low voltage windings. An R-F air-core choke coil is connected in the positive lead of the low voltage terminal and the high voltage terminals are shunted by a capacitor; the choke coil operates to keep R-F out of the generator windings and the capacitor is employed to reduce the commutator ripple in the plate supply for the transmitter. In addition, another R-F air-core choke coil is connected in series with the positive lead of the high voltage terminal, a capacitor with one side connected to ground is connected to the positive low voltage terminal at the socket Type 50-22, a capacitor with one side connected to ground is connected to the negative low voltage lead from the generator commutator, and a capacitor with one side connected to ground is connected to the negative high voltage lead from the generator commutator. The function of these four additional components is to reduce "hash" when operating the receiver from the generator.

The voltage regulator is adjusted to supply 6 volts and 500 volts at the generator terminals under full load for speeds between 55 and 65 revolutions per minute. It is essential that the operating speed be maintained within these limits to insure a steady and direct-current filament and plate supply. Below 55 revolutions per minute there appears to be a heavy load on the generator but on turning slightly faster this load becomes greatly reduced. This is due to the action of the voltage regulator. A 20 ohm resistor is provided for the purpose of decreasing the field current. The coil of the regulator is connected in series with the 23 ohm resistor directly across the low voltage winding of the generator. The armature contact operated by the coil may be in one of three positions, against A, between A and B, or against B. When the contact is against A, the 20 ohm resistor is shunted and the field winding is connected directly to the low voltage of the generator. Increase of current thru the regulator coil due to an increase of voltage in the low voltage winding pulls the contact into a position between A and B. In this position the short across the 20 ohm resistor is removed and the 20 ohms are in series with the field winding and the low voltage winding. If the contact is drawn all the way over to B, the field winding is shunted by being grounded at both ends and the 20 ohm resistor is left across the low voltage winding. The change from one to another of the three possible positions of the contact occurs rapidly, thus giving excellent voltage regulation.



SCHEMATIC CIRCUIT DIAGRAM  
 GENERATOR, TYPE GN-45  
 (MODIFIED)

FIG. 19



b. AUXILIARY POWER EQUIPMENT

No auxiliary power equipment is included with the Radio Sst, Type SCR-583. However, the POWER SUPPLY SWITCH has a position marked AUXILIARY. In this position the VT-184 regulator tube is in the circuit. The keying relay 6 volt supply lead, and the 6 volt filament supply lead are brought to separate leads in the power cable. This is done so that dropping resistors may be incorporated in the filament supply for 12 volt operation.

## VI MAINTENANCE

### 18. GENERAL

Always make a thorough test and inspection of the radio transmitter and receiver before taking it into the field. Remove the chassis from the chest as described in Paragraph 5b. Clean all dirt, dust, and foreign matter out of the chassis. It is best to use a bellows to clean out the dust, although a small, clean paint brush used carefully will be satisfactory. Check all connections to see that none are loose. Do not jerk any wires or connections. Carefully resolder any loose connections. See that all leads to the vacuum tube grid clips are securely soldered, and that all screws, nuts, bolts, and knobs are firm. In tightening any loose screws or nuts be careful not to damage the panel or strip the screw threads. Adjust the METER to read zero by means of the zero adjustment screw on the front at the bottom of the meter. Check the contact prongs of each socket to see that they are clean and bright, and that they make good contact with the tube prongs. Inspect all switch contacts to see that their arms are making good connections. Inspect all jacks on the radio transmitter and receiver panel and see that the plugs attached to the head set, hand set, key, and counterpoise assemblies are bright and clean. See that they fit into the proper jacks securely, making good contact. Inspect the power supply receptacle at the back of the radio transmitter and receiver chest, and the plug on the back of the chassis which fits into it. Make sure good contacts are made when the chassis is mounted in the chest. Inspect the spring contact in the antenna circuit located in the chest at the upper right hand front corner. A contact on the keying relay contacts this spring when the chassis is mounted in the chest. Make sure these contacts are clean and that the spring presses sufficiently hard at the contact when the chassis is mounted in the chest. Adjustment of the keying relay is made at the factory and should rarely need readjustment. If trouble should develop in the relay, the relay should be removed from the chassis and sent to a Signal Corps depot for repair. Carefully replace the chassis in the chest and tighten up the 18 quick-lock panel fasteners.

Check the Type BA-40 Battery in the accessory chest and replace it if necessary.

Always test the hand generator Type GN-45 (modified) before taking it into the field. When the generator is adjusted for 6 volts on the low voltage side, the voltage across the high voltage terminals will be approximately 500 volts. These adjustments are made by the manufacturer or at the depot before issuing the generator. The name plate on the generator should indicate the voltage rating for the set with which the generator is used. Check the generator voltages to see that they check with the set requirements. The low voltage output may be measured by connecting a voltmeter across terminals 1 and 2 of the socket Type SO-22. The high voltage may be measured across terminals 3 and 4 of this socket. If the generator voltages are incorrect, it is necessary to adjust the voltage regulators. See the label on the inside of the name plate cover of the generator housing for regulation adjustments. Removal of this cover also gives access to the voltage regulator. Readjustment of the voltage regulator should not be attempted unless absolutely necessary. The generator is rugged and built to require a minimum of care but should not on that account be subjected to hard usage. The shafts run in ball

bearings, these latter do not require lubrication but the balls and races must be kept greased to prevent rusting. Every 6 months the bearings should be greased with vaseline or light motor grease; excessive gear greasing will cause generator trouble as surely as will failure to grease the bearings. To grease the bearings remove the five screws holding the projection plate on the right of the generator housing; this plate may then be removed and three ball bearings will be found. On the left hand side of the generator are two diamond shaped plates each held to the housing by two screws; removing these plates gives access to the other bearings of the generator, one to each plate. Periodic inspection should be made of the generator brushes and any that are worn out should be replaced. If brushes are to be replaced, be sure to place the low voltage brushes (carbon) and the high voltage brushes (copper and carbon) in the proper brush holders.

Inspect the cabling in the accessory chest, and the power cable assembly which connects the radio transmitter and receiver chest to the accessory chest, to see that the insulation is in good condition and that all contacts and prongs have bright surfaces.

Inspect all mast sections for corrosion and cracks. A poor connection between sections may cause crackling noises in the receiver and changes in antenna radiation when transmitting. Handle the mast sections carefully so as not to damage the surfaces or to bend the sections in any way. See that there is no foreign matter in the hollow end of each section and that both the male and female coupling surfaces are bright. See that the various mast sections make a firm fit when connected to a section having an adjacent type number. See that the lower part of Mast Section, Type 14J-56 will make a firm fit into the socket of the Vertical Mast Base, Type 1N-106-A, and that the lower part of Mast Section, Type 1S-51 will make firm fit into the socket of the Spring antenna Mount. See that the binding posts of the Type 1N-106-A Vertical Mast Base and of the Spring Antenna Mount are in servicable condition and that the short wire leads are securely attached to these binding posts. Check the antenna binding post on the side of the radio transmitter and receiver chest. Check the counterpoise assembly and see that the eight wires are properly soldered to the ring. See that the wires are in good condition. When the counterpoise is to be packed the counterpoise wires should be carefully coiled on the carrying reel in order to prevent damage to them when the reel is packed in the chest.

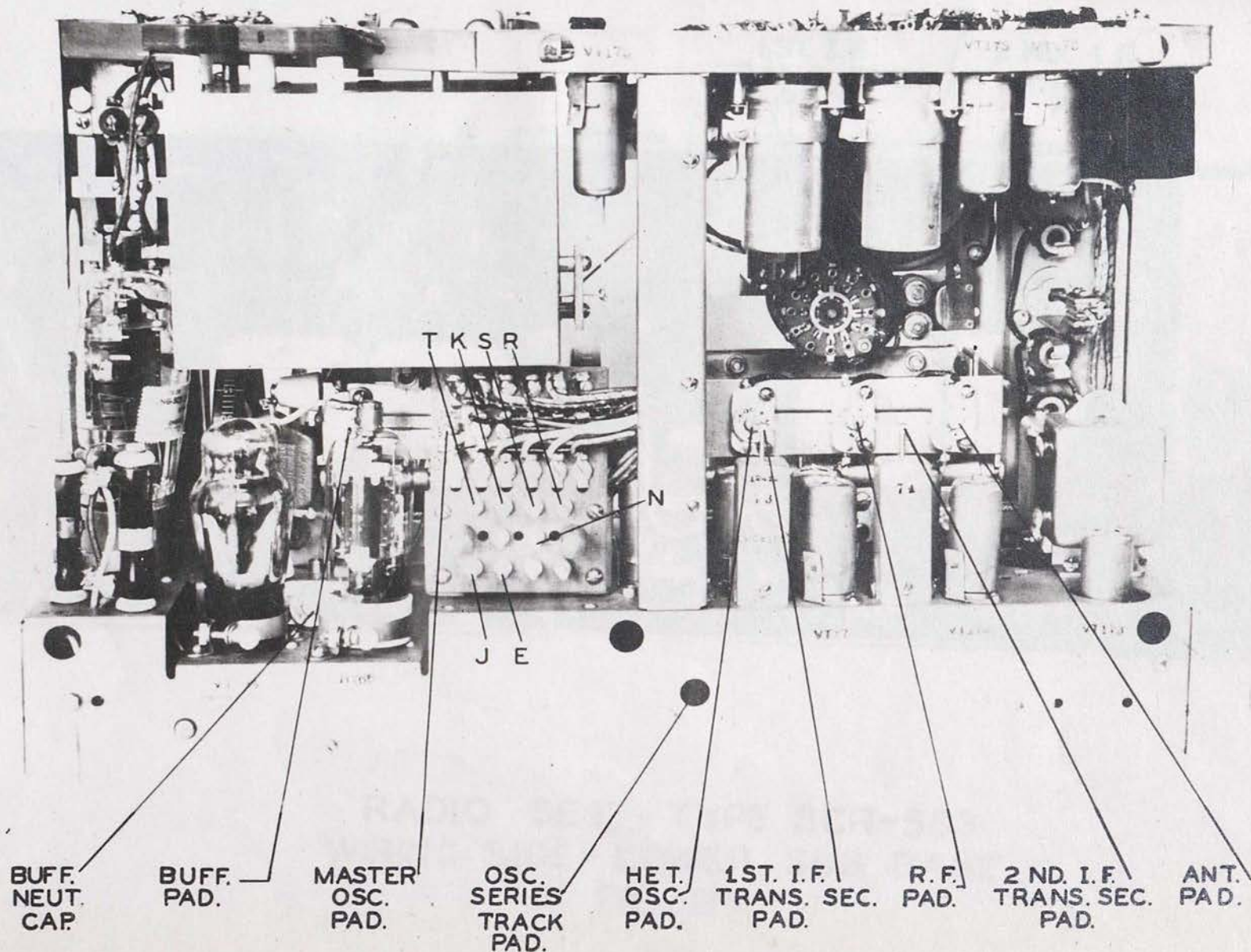
Inspect the antenna and leg roll to see that the equipment carried therein will be securely bound when packed. Inspect the straps and releases by attaching them to the carrying chests and testing their supporting and quick-release functions. See that the metal carrying hooks on the two chests are in good condition.

## 19. ALIGNMENT PROCEDURE

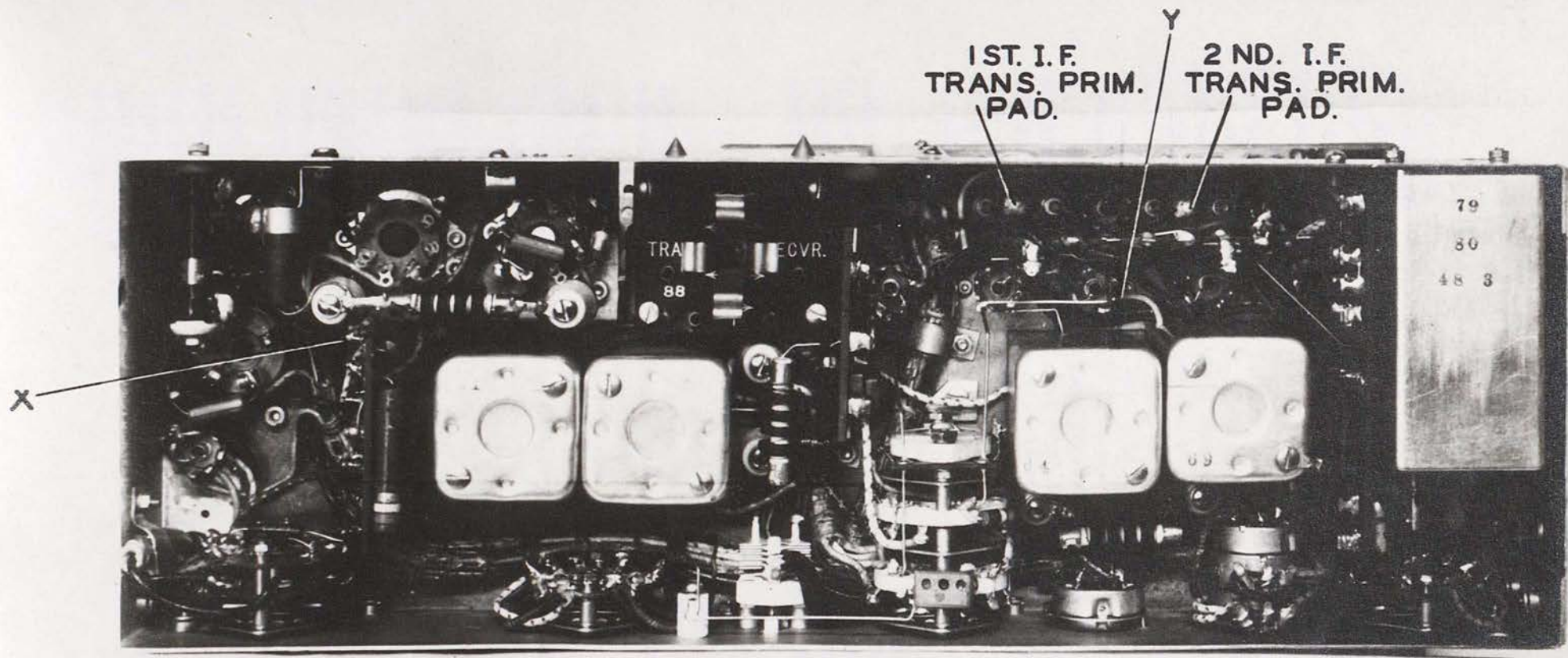
### a. TRANSMITTER

Alignment of the Radio Set, Type SCR-583 should be made at a Signal Corps base where equipment necessary for proper alignment of both the transmitter and receiver are available. Proceed as follows:

1. The radio transmitter and receiver chassis is removed from the chest. Refer to Figures 20 and 21 for locations of the various padding adjustments, and test connection terminals.



RADIO SET, TYPE SCR-583  
 REAR VIEW - SET CHASSIS



RADIO SET, TYPE SCR-583  
WIRING SIDE - LOWER SUB BASE  
FIG. 21

Apply filament and plate voltage to the battery operated tubes, -1.5 volts to terminal T, +1.5 volts to terminal K, -90 volts to terminal S, and +90 volts to terminal R. Apply -6 volts to terminal J, and +5 volts to terminal E. Turn the SEND-RECEIVE SWITCH to CW position, plug telegraph key in the KEY jack, and press the key. Turn the TRANSMITTER DIAL to extreme clockwise position. Adjust the master oscillator padding to a frequency of 4700 KC, using a heterodyne type of frequency meter.

2. Turn the TRANSMITTER DIAL counter-clockwise to a frequency of 4600 KC. Remove the IS-70 output tube from its socket and insert in its place a IS-70 tube with the screen pin removed. Apply +6 volts to terminal E, -500 volts to terminal S, and +500 volts to terminal N. While holding the BUFFER SWITCH in the BUFF. XTAL TUNING position, adjust the buffer padding for maximum METER reading. See 5 below for use of an external meter instead of the set METER.

3. Turn the frequency meter to zero beat with the master oscillator. Disconnect the +6 volts from terminal E, and adjust the buffer neutralizing capacitor to restore zero beat. Repeat this procedure until alternate application to, and removal of the +6 volts from terminal E causes no shift in the master oscillator frequency.

4. Replace the IS-70 output tube.

5. If desired, it is possible to use an external meter to indicate the buffer tuning. A D-C voltmeter, approximately 0-2 volts, should be connected, with the negative terminal to the low potential end of the IS-70 grid leak, test terminal X, and the positive terminal to the chassis. See Figure 21.

#### b. RECEIVER

1. The radio transmitter and receiver chassis is removed from the set. Refer to Figures 20 and 21 for locations of the various padding adjustments, and test connection terminals.

Apply filament and plate voltage to the battery operated tubes, -1.5 volts to terminal T, +1.5 volts to terminal K, -90 volts to terminal S, and +90 volts to terminal R. Align the intermediate frequency amplifier first, then proceed with the oscillator, radio-frequency, and antenna stage alignment.

(a) Intermediate Frequency Amplifier Alignment.- Apply a 455 KC signal from the signal generator to the grid of the VT-171 first detector tube which is the #6 prong of its socket and indicated in Figure 21 as test terminal Y. The coupling lead from the signal generator should have a .1mf capacitor in series. In padding the two I-F transformers the adjustments on the secondary sides are made from the top of the lower subbase chassis; the adjustments on the primary sides are made from the underneath of the lower subbase chassis.

Align the second I-F transformer for maximum output by adjustment of both of the primary and secondary side padders then proceed in like manner with the first I-F transformer. Repeat the procedure for greater accuracy. The I-F sensitivity, when lined up, should be of the order of 50 milli-watt output for 200 micro-volts, 500 cycles, 30% modulation input at the first detector grid. In adjusting the I-F transformer padders, it makes no difference which side is adjusted first. The output meter is connected into the PHONE jack on the set panel and

should have a resistance load of 4000 ohms. A General Radio Power Output Meter, Type 583-A, or similar instrument may be used.

Remove the signal generator lead from the test terminal Y when the I-F Amplifier has been aligned.

(b) Oscillator, Radio Frequency, and Antenna Stage Alignment.--Set the RECEIVER DIAL and signal generator to 4600 KC and apply the signal to the receiver thru an antenna dummy of 90 mmf series, and 5 mmf shunt capacity. Align the oscillator padder for maximum power output at this point; the output meter is still connected into the PHONE jack on the set panel. Set the RECEIVER DIAL and signal generator to 4400 KC and adjust the R-F and Antenna padders for maximum output. Tune the RECEIVER DIAL and signal generator to 2500 KC and adjust the oscillator series tracking padder for maximum output. Reset the RECEIVER DIAL and signal generator to 4600 KC and align the oscillator padder again, then set the RECEIVER DIAL and signal generator to 4400 KC and readjust the R-F and antenna padders. Repeat the above procedure for greater accuracy. The receiver sensitivity when lined up should be of the order of 10 milli-watts output for 2.5 microvolts, 400 cycles, 50% modulation input.

V TABLE OF REPLACEABLE PARTS

SYMBOL

- 1 Keying Relay
- 2 Antenna Tuning Inductor
- 3 Antenna Vernier Tuning Capacitor
- 4-1 Counterpoise Jack
- 4-2 Phone Jack
- 4-3 Phone Jack
- 4-4 Key Jack
- 5 Antenna Tuning Switch
- 6-1 Transmitter Output Plate Coupling Capacitor, Mica, .001 mf  $\pm 10\%$ , 2500 V.D.C.
- 6-2 Buffer Plate Coupling Capacitor, Mica, .001mf  $\pm 10\%$ , 2500 V.D.C.
- 7 Transmitter Output Plate Choke 2.5 MH, 250 MA. D. C.
- 8 250 MA. Meter Shunt 6.73 ohms  $\pm 1\%$ .
- 9 Output Indicator Diode Coupling Capacitor, Mica, 5mmf  $\pm 10\%$ , 2500 V.D.C.
- 10 200 KC Crystal Osc. Coupling Capacitor, Mica, 25 mmf  $\pm 10\%$
- 11-1 Output Indicator Diode Output Choke, 2.5 MH.
- 11-2 Diode Gate Choke, 2.5 MH.
- 11-3 Buffer Plate Choke, 2.5 MH.
- 11-4 Master Osc. Plate Choke, 2.5 MH.
- 11-5 Receiver Osc. Plate Choke, 2.5 MH.
- 12-1 Output Indicator Diode Filament Dropping Resistor, 112 ohms  $\pm 5\%$ ,  $\frac{1}{2}$ W.
- 12-2 Diode Gate Filament Dropping Resistor, 112 ohms  $\pm 5\%$ ,  $\frac{1}{2}$ W.
- 13-1 Output Indicator Diode Filter Capacitor, Mica, 250mmf  $\pm 10\%$ .
- 13-2 Trans. Output Suppress $\&$ Bypass Capacitor, Mica, 250mmf  $\pm 10\%$ .
- 13-3 Buffer Grid Coupling Capacitor, Mica, 250mmf  $\pm 10\%$
- 13-4 Master Osc. Plate Coupling Capacitor, Mica, 250 mmf  $\pm 10\%$ .



- 13-5 Receiver Osc. Grid Coupling Capacitor, Mica, 250 muf  $\pm 10\%$
- 14 Shunt Element, Modulation Voltage Divider, 53000 ohms  $\pm 10\%$   $\frac{1}{2}$ W.
- 15 Meter
- 16 Meter Switch
- 17 Meter Shunt, 177 ohms  $\pm 1\%$ , 10MA.
- 18 Modulation Monitor Jack
- 19 Microphone Transformer
- 20-1 Modulator Grid Coupling Capacitor, Mica, <sup>Mf</sup>.002  $\pm 10\%$ , 200 V.D.C.
- 20-2 Receiver Output Grid Coupling Capacitor, Mica, <sup>Mf</sup>.002  $\pm 10\%$ , 200 V.D.C.
- 21 Series Element, Modulation Voltage Divider, 330000 ohms  $\pm 10\%$   $\frac{1}{2}$ W.
- 22-1 Modulator Grid Leak, 1 Meg.  $\pm 10\%$   $\frac{1}{2}$ W.
- 22-2 Receiver Output Grid Leak, 1 Meg.  $\pm 10\%$   $\frac{1}{2}$ W.
- 22-3 A.V.C. Filter Resistor, 1 Meg.  $\pm 10\%$   $\frac{1}{2}$ W.
- 23 Microphone Filter Choke
- 24 Modulator Plate Choke
- 25 Microphone Filter Capacitor, Dry Electrolytic, 25 mf, 25 V.D.C.
- 26-1 Modulator Screen Bypass Capacitor, Paper, .25 mf  $\pm 10\%$ , 200 V.D.C.
- 26-2 Receiver Output Screen Bypass Capacitor, Paper, .25mf  $\pm 10\%$ , 200 V.D.C.
- 27 Modulator Screen Dropping Resistor, 75000 ohms  $\pm 10\%$   $\frac{1}{2}$ W.
- 28 Modulator Plate Coupling Capacitor, Paper, .1 mf  $\pm 10\%$ , 600 V.D.C.
- 29 A.F. Amplifier Plate Resistor, 400000 ohms  $\pm 10\%$   $\frac{1}{2}$ W.
- 30 Receiver Output Screen Dropping Resistor, 9000 ohms  $\pm 10\%$   $\frac{1}{2}$ W.
- 31 Receiver Bias Resistor, 500 ohms  $\pm 10\%$   $\frac{1}{2}$ W.
- 32 Receiver Output Plate Coupling Capacitor, Paper, .5 mf  $\pm 10\%$ , 200 V.D.C.
- 33 Receiver Output Transformer
- 34 Speaker
- 35 Speaker On-Off Switch

- 36 Microphone Jack
- 37 Pilot Light
- 38 Pilot Light Switch
- 39 Safety Switch
- 40-1 Trans. Output Screen Bypass Capacitor, Moulded Paper, .01 mf  $\pm 10\%$ , 800V.D.C.
- 40-2 Buffer Screen Bypass Capacitor, Moulded Paper, .01 mf  $\pm 10\%$ , 800 V.D.C.
- 41 Buffer Neutralizing Capacitor, Ceramic Trimmer, 1.5 mmf - 7mmf, NPO
- 42-1 Trans. Output Grid Coupling Capacitor, Mica, 600 mmf  $\pm 10\%$
- 42-2 1st A. F. Grid Coupling Capacitor, Mica, 600 mmf  $\pm 10\%$ .
- 43 Trans. Output Grid Leak, 10000 ohms  $\pm 10\%$ , 1W.
- 44 1st A. F. Screen Dropping Resistor, 3 Meg.  $\pm 10\%$ ,  $\frac{1}{2}$ W.
- 45 Shunt Element-Trans. Output Suppressor, 50000 ohms  $\pm 10\%$ ,  $\frac{1}{2}$ W.
- 46 Trans. Output Screen Dropping Resistor - Low Power Operation, 35 000ohms  $\pm 10\%$ , 10W.
- 47 Hi-Lo Power Switch
- 48-1 Trans. Output Suppressor Bias-Filter Capacitor, Moulded Paper, .01mf  $\pm 10\%$ , 200V.D.C.
- 48-2 Master Osc. Screen Bypass Capacitor, Moulded Paper, .01mf  $\pm 10\%$ , 200 V.D.C.
- 49-1 Trans. Output Suppressor Coupling Resistor, 100000 ohms  $\pm 10\%$ ,  $\frac{1}{2}$ W.
- 49-2 Buffer Grid Leak, 100000 ohms  $\pm 10\%$ ,  $\frac{1}{2}$ W.
- 49-3 Receiver Oscillator Grid Leak, 100000 ohms  $\pm 10\%$ ,  $\frac{1}{2}$ W.
- 49-4 1st Detector Grid Filter Resistor, 100000 ohms  $\pm 10\%$ ,  $\frac{1}{2}$ W.
- 50 Buffer Output Inductor.
- 51 Master Oscillator Inductor
- 52-1 Buffer Ceramic Trimmer, 4 mmf - 30 mmf, N500
- 52-2 Master Oscillator Ceramic Trimmer, 4 mmf - 30 mmf, N500
- 52-3 Receiver Oscillator Ceramic Trimmer, 4 mmf - 30 mmf, N 500
- 52-4 Receiver R-F Amp. Ceramic Trimmer, 4 mmf - 30 mmf, N500
- 52-5 Receiver Antenna Ceramic Trimmer, 4 mmf - 30 mmf, N500
- 53 Receiver B<sub>f</sub> Bypass Capacitor, Paper, 1 mf  $\pm 10\%$ , 200 V.D.C.

- 54 Buffer Plate Dropping Resistor, 27000 ohms  $\pm 10\%$ , 5W.
- 55 Trans. Output Suppressor Bias Filter Resistor, 35000 ohms  $\pm 10\%$ ,  $\frac{1}{2}$ W.
- 56 Buffer Screen Dropping Resistor, 250000 ohms  $\pm 10\%$ , 2W.
- 57 Master Osc. and Buffer Tuning Capacitor (2 section)
- 58 Master Osc. Corrector, Air Trimmer, 3 mmf - 29 mmf.
- 59 Master Osc. Grid Coupling Capacitor, Mica, 50 mmf  $\pm 10\%$
- 60 Master Osc. Screen Dropping Resistor, 15000 ohms  $\pm 10\%$ ,  $\frac{1}{2}$ W.
- 61 Master Osc. Grid Leak, 200000 ohms  $\pm 10\%$ ,  $\frac{1}{2}$ W.
- 62 Receiver Tuning Capacitor (3 Section)
- 63 Receiver Osc. Plate Coupling Capacitor, Silver Mica, 5000 mmf  $\pm 1\%$
- 64 Receiver Osc. Inductor
- 65 Receiver Osc. Series Track. Capacitor (XTAL), Silver Mica, 1560mmf  $\pm 1\%$ .
- 66 Receiver Osc. Series Track. Capacitor (Self Cont. ), Silver Mica, 1500mmf  $\pm 1\%$
- 67 Receiver Osc. Series Track. Ceramic Trimmer (Self Cont.), 10mmf-110mmf, N500.
- 68-1 A.V.C. Filter Capacitor, Grid of 1st Detector, Moulded Paper, .05mf  $\pm 10\%$ , 200V.D.C.
- 68-2 A.V.C. Filter Capacitor, Grid of R-F, Moulded Paper, .05mf  $\pm 10\%$ , 200 V.D.C.
- 69 Receiver R-F Transformer
- 70 Receiver R-F and Osc. B-Supply Filter Resistor. 4700 ohms  $\pm 10\%$ ,  $\frac{1}{2}$ W.
- 71-1 Receiver B-Supply Bypass Capacitor, Paper, .1mf  $\pm 10\%$ .
- 71-2 Receiver B-Supply Bypass Capacitor, Paper, .1mf  $\pm 10\%$
- 71-3 1st A.F. Screen Bypass Capacitor, Paper, .1 mf  $\pm 10\%$ .
- 71-4 Receiver R-F and Osc. B-Supply Filter Capacitor, Paper, .1 mf  $\pm 10\%$ .
- 71-5 B-volt Generator Bypass Capacitor, Paper, .1 mf  $\pm 10\%$
- 71-6 -500-volt Generator Bypass Capacitor, Paper, .1mf  $\pm 10\%$
- 71-7 B.F.O. Filament Bypass Capacitor, Paper, .1 mf  $\pm 10\%$ .
- 72 Receiver Antenna Transformer.
- 73 1 st I-F Transformer
- 74 2nd I-F Transformer

- 75 1st A.F. Plate Bypass Capacitor, mica, 150 mmf  $\pm 10\%$
- 76-1 Receiver Diode Filter Capacitor, Mica, 100 mmf  $\pm 10\%$
- 76-2 Receiver Diode Filter Capacitor, Mica, 100 mmf  $\pm 10\%$
- 77 Receiver Diode Filter Resistor, 25000 ohm  $\pm 10\%$ ,  $\frac{1}{2}W$ .
- 78 1st A. F. Grid Leak Resistor, 10 Meg.  $\pm 10\%$ ,  $\frac{1}{2}W$ . 1000 V.D.C.
- 79 B.F.O. Transformer Assembly Filter, Paper, 1.1 mH, 1000 V.D.C.
- 80 B. F. O. Filter Choke Output Dropping Resistor, 7 ohms, 10W.
- 81 Power Switch Input Dropping Resistor, 15000 ohms  $\pm 5\%$ , 25W.
- 82 Trans. Output Screen Dropping Resistor (Normal), 15000 ohms  $\pm 10\%$ , 15W.
- 83 Trans. Output Screen Dropping Resistor (Aux.), 7000 ohms  $\pm 10\%$ , 10W.
- 84 Filament Bleeder Resistor, 9.3 ohms  $\pm 5\%$ ,  $\frac{1}{2}W$ . 100V max.
- 85-1 Filament Bleeder Resistor, 28 ohms  $\pm 5\%$ ,  $\frac{1}{2}W$
- 85-2 B.F.O. Filament Bleeder Resistor, 28 ohms  $\pm 5\%$ ,  $\frac{1}{2}W$ .
- 86 Send-Receive-Switch Filter Oscillator
- 87 Trans. and Receiver Freq. Selector Filter
- 88 Trans. Crystal, 3995 KC. Band Pass Filter and 1st A. F. Amplifier
- 89 Trans. Crystal, 3825 KC.
- 90 Trans. Crystal, 3010 KC. Output
- 91 Trans. Crystal, 2700 KC. Output
- 92 Receiver Crystal, 3155 KC. Filter
- 93 Receiver Crystal, 3465 KC. Receiver Filter
- 94 Receiver Crystal, 4280 KC. Filter
- 95 Receiver Crystal, 4450 KC. Filter Oscillator
- 96 200 KC. Crystal, Choke, Capacitor, and Resistor Assembly.
- 97 Crystal Harmonic Choke, 15 micro-henry
- 98 Audio Gain Control, 500000 ohms
- 99 R-F Gain Control, 500000 ohms
- 100 B. F. O. Switch

- 101 Receiver On-Off Switch
- 102 Power Plug Assembly
- 103 Power Jack Assembly
- 104-1 500-volt Generator Filter Capacitor, Paper, .1mf, 1000 V.D.C.
- 104-2 Emergency Receiver B-Supply Filter, Paper, .1 mf, 1000 V.D.C.
- 105 Emergency Receiver Filament Dropping Resistor, 7 ohms, 10W.
- 106 Emergency Receiver B<sub>1</sub> Dropping Resistor, 15000 ohms  $\pm$  5%, 25W.
- 107-1 Emergency Receiver Filament Filter Choke, 9.3 micro-henries.
- 107-2 Emergency Receiver B<sub>1</sub> Filter Choke, 9.3 micro-henries.
- 108 Emergency Receiver Filament Filter Choke, .45H. iron core.—
- 109-1 Socket for VT-173 Receiver R-F Amplifier
- 109-2 Socket for VT-171 Receiver 1st Detector
- 109-3 Socket for VT-173 Receiver Oscillator
- 109-4 Socket for VT-173 Receiver I-F Amplifier
- 109-5 Socket for VT-172 Receiver 2nd Detector and 1st A. F. Amplifier
- 109-6 Socket for VT-173 B.F.O.
- 109-7 Socket for VT-210 Receiver output
- 109-8 Socket for VT-173 Diode Gate
- 109-9 Socket for VT-173 modulator
- 109-10 Socket for VT-173 Output Indicator Diode
- 109-11 Socket for VT-210 Master Oscillator
- 109-12 Socket for VT-173 200 KC Crystal Oscillator
- 110 Socket for TS-70 Trans. Output
- 111 Socket for HY-65 Buffer *6.3v 0.85 I 63 pin 7 con*
- 112 Socket for VT-184 Voltage Regulator
- 116 Hand Generator -Type GN-45 (modified)
- 117 Battery - Type BA-40
- 118 Power Connector Plug on Receiver Chest

- 119 Power Connector Receptacle on Power Cable
- 120 Power Connector Plug on Power Cable
- 121 Power Connector Receptacle on Accessory Chest
- 122 Master Oscillator Ceramic Compensator Capacitor,  $5\text{mmf} \pm .5\text{mmf}$ , NO30K
- 123 Trans. Output Screen Bleeder Resistor, 40 000 ohms  $\pm 10\%$ , 10W.
- 124 Trans. Output Grid Parasitic Suppression Resistor, 100 ohms  $\pm 10\%$ ,  $\frac{1}{2}\text{W}$ .
- 125 Meter Multiplier, 61000 ohms  $\pm 1\%$ ,  $\frac{1}{2}\text{W}$
- 126 Meter Multiplier, 150000 ohms  $\pm 1\%$ ,  $\frac{1}{2}\text{W}$ .
- 127 Output Indicator Diode Load Resistor, 4700 ohms  $\pm 10\%$ ,  $\frac{1}{2}\text{W}$ .
- 128 Generator Connector Plug
- 129 Generator Connector Receptacle (Accessory chest)
- 130 Generator Filter Connector Plug (Accessory chest)
- 131 Generator Filter Connector Receptacle (Accessory chest)
- 132 Receiver R-F, 1st Detector, and I-F Screen Dropping Resistor, 27000 ohms  $\pm 10\%$   
 $\frac{1}{2}\text{W}$ .