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AN 08-10-94

HANDBOOK OF
MAINTENANCE INSTRUCTIONS
for
RADIO SET
SCR-578-A or SCR-578-B

This handbook replaces Preliminary Instructions for Radio Set SCR-578-A and Instruction Book for Operation and Maintenance of Radio Set SCR-578-A (Technical Order No. 08-10-94), dated 27 November 1942.



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19 August 1943

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UNSATISFACTORY REPORT

FOR U. S. ARMY AIR FORCE PERSONNEL:

In the event of malfunctioning, unsatisfactory design, or unsatisfactory installation of any of the component units of this equipment, or if the material contained in this book is considered inadequate or erroneous, an Unsatisfactory Report, AAF Form No. 54, or a report in similar form, shall be submitted in accordance with the provisions of Army Air Force Regulation No. 15-54, listing:

1. Station and organization.
2. Nameplate data (type number or complete nomenclature if nameplate is not attached to the equipment).
3. Date and nature of failure.
4. Airplane model and serial number.
5. Remedy used or proposed to prevent recurrence.
6. Handbook errors or inadequacies, if applicable.

FOR U. S. NAVY PERSONNEL:

Report of failure of any part of this equipment during its guaranteed life shall be made on Form N. Aer. 4112, "Report of Unsatisfactory or Defective Material," or a report in similar form, and forwarded in accordance with the latest instructions of the Bureau of Aeronautics. In addition to other distribution required, one copy shall be furnished to the inspector of Naval Material (location to be specified) and the Bureau of Ships. Such reports of failure shall include:

1. Reporting activity.
2. Nameplate data.
3. Date placed in service.
4. Part which failed.
5. Nature and cause of failure.
6. Replacement needed (yes—no).
7. Remedy used or proposed to prevent recurrence.

FOR BRITISH PERSONNEL:

Form 1022 procedure shall be used when reporting failure of radio equipment.

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SAFETY NOTICE

Do not operate the radio set or raise the antenna during severe electrical storms. Observe this rule to prevent death or serious injury.

Hydrogen gas is explosive around flames, coals, or sparks. Therefore, observe these precautions when using the generator:

1. Throw the hydrogen generator can away after inflating the balloon. The residue in the can is caustic and will cause burns if it comes in contact with the body or clothing. If parts are burned, wash them immediately with water.
2. Do not touch the hydrogen generator while it is in use, since it generates large amounts of heat.

FIRST AID

PERSONNEL ENGAGED IN THE INSTALLATION, OPERATION AND MAINTENANCE OF THIS EQUIPMENT OR SIMILAR EQUIPMENT ARE URGED TO BECOME FAMILIAR WITH THE FOLLOWING RULES, BOTH IN THEORY AND IN THE PRACTICAL APPLICATION THEREOF. IT IS THE DUTY OF EVERY RADIOMAN TO BE PREPARED TO GIVE ADEQUATE FIRST AID AND THEREBY PREVENT AVOIDABLE LOSS OF LIFE. YOUR OWN LIFE MAY DEPEND ON THIS.

Do These Three Things First in Any Emergency Requiring First Aid

1. Send for a doctor or carry the victim to a doctor.
2. Keep victim warm and quiet and flat on his back.
3. If breathing has stopped, apply artificial respiration. Stop all serious bleeding.

When, from any cause whatever, breathing has stopped, apply artificial respiration immediately and continue **WITHOUT STOPPING** until normal

breathing returns, or a doctor pronounces the victim dead. **SPEED IN BEGINNING ARTIFICIAL RESPIRATION IS ESSENTIAL.**

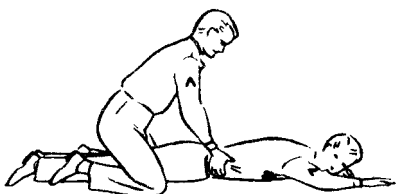
The Prone Pressure Method of Artificial Respiration

If Due to Electric Shock

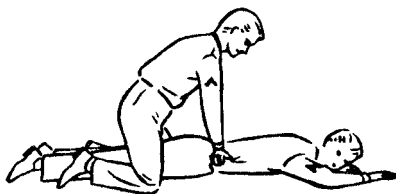
1. **PROTECT YOURSELF** with **DRY** insulating material.
2. **BREAK THE CIRCUIT** by opening the power switch or pulling the victim free of the live conductor. **DON'T TOUCH THE VICTIM WITH YOUR BARE HANDS UNTIL THE CIRCUIT IS BROKEN.**
3. **SPREAD DRY BLANKET ON THE GROUND**, and roll victim to center of blanket with his arms extended over his head, so that he lies **FACE DOWN** on blanket.
4. **BEND ONE OF THE VICTIM'S ARMS** at the

elbow and rest victim's cheek on the back of his hand.

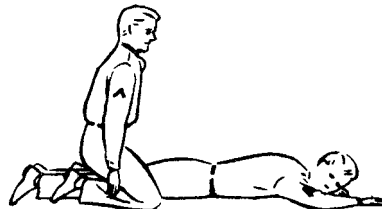
5. **REMOVE FALSE TEETH**, gum, candy, tobacco, food, etc., from victim's mouth.
6. **LOOSEN ALL TIGHT CLOTHING**, as belts or collars.
7. **COVER VICTIM LOOSELY** by wrapping the ends of the blanket around him.
8. **STRADDLE VICTIM** across thighs.
9. **PLACE THE PALMS OF YOUR HANDS ON VICTIM'S BACK** so that the little fingers of each hand just touch the victim's lowest ribs.



- (1) Straddle victim across thighs. Place the palms of your hands on the victim's back so that the little fingers of each hand just touch the victim's lowest ribs.



- (2) Keep your arms stiff and straight and swing your body forward, allowing your weight to bear down on victim. **DO NOT PUSH OR USE FORCE.**



- (3) Swing back at once to relieve pressure, and then continue the rhythmic application of alternate pressure and release.

Blanket is not shown in above drawings for the sake of clarity.

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10. **KEEP YOUR ARMS STIFF AND STRAIGHT** and swing your body forward, allowing your weight to bear down on the victim.
11. **DO NOT PUSH OR USE FORCE.**
12. **SWING BACK AT ONCE TO RELIEVE PRESSURE.**
13. **REPEAT** Number 10.
14. **REPEAT** Number 12.
15. **CONTINUE** as above, maintaining a steady rhythm until victim regains consciousness or is pronounced dead by a doctor.
16. **CONTINUE ARTIFICIAL RESPIRATION** even after victim begins to breathe, and until he becomes conscious.
17. **IF BREATHING STOPS AGAIN**, continue artificial respiration at once.
18. **DO NOT GIVE UP HOPE** of reviving the victim. Four hours or more of continuous application of artificial respiration may be required before consciousness returns.
19. **NEVER TRY TO FORCE LIQUIDS** down an unconscious person's throat. He will drown.
20. **ALWAYS WAIT UNTIL CONSCIOUSNESS RETURNS** before administering liquid stimulants.
21. **RECOMMENDED STIMULANTS ARE:** Hot, black coffee. Strong, hot tea. Aromatic spirits of ammonia, one teaspoonful to a glass of water.
22. **GIVE ONLY ONE STIMULANT**, which should be sipped slowly.
23. **ALCOHOLIC DRINKS** are not recommended, unless absolutely nothing else is available.
24. **WHEN VICTIM HAS RETURNED TO CONSCIOUSNESS**, allow him to lie quietly where he is for at least one hour, taking care that he is well covered and free from worry.
25. **IF POSSIBLE, CARRY, OR HAVE HIM CARRIED TO A DOCTOR.**

WOUNDS

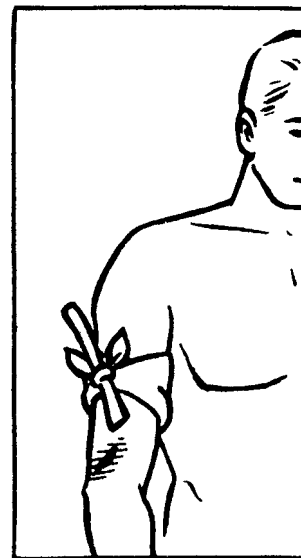
Neglected wounds can have serious consequences. Any break in the skin is a wound. Paint small cuts and scratches immediately with **TINCTURE OF IODINE**. Deep cuts and wounds should be **KEPT CLEAN** but **DO NOT** use Tincture of Iodine on them. Washing **AROUND** and **AWAY FROM** the wound with ordinary soap and water, if no other antiseptic is available, is recommended. Other antiseptics for use on deep wounds are: Violet gentian, Potassium permanganate, Tincture of Merthiolate, or ordinary baking soda and water. Cover the wound with a sterile gauze dressing and hold in place with adhesive tape or a strip of gauze.

In cases of serious bleeding, when an artery has been cut, firm pressure is necessary to stop the flow of blood. Arterial bleeding is **BRIGHT RED** and comes from the wound in **SPURTS**, with each beat of the heart. Bleeding from a vein is **DARK RED** and flows steadily. Pressure is not often needed for venous bleeding.

Pressure is applied **ABOVE** the wound, or between the **WOUND AND THE HEART**, to stop **ARTERIAL BLEEDING**. Pressure is applied **BELOW** the wound, or **AWAY FROM THE HEART** to stop **VENOUS BLEEDING**.

Pressure is best applied and maintained by means of a **TOURNIQUET**.

A **TOURNIQUET** is a strip of cloth, bandage, or other material, tied **ABOVE** the wound. Tie a simple,



Tourniquet in position
ABOVE wound.

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double knot in the cloth and place a strong stick or other rigid member in the loop thus made, then tighten the knot by pulling the ends of the cloth.

With the rigid member thus held firmly in place, twist it, until the bleeding stops.

DO NOT maintain such pressure longer than 15 minutes at a time.

IF BLEEDING CONTINUES after loosening tourniquet, allow the blood to flow for about 30 to 60 seconds and then re-apply pressure. Continue until bleeding stops.

AFTER BLEEDING HAS STOPPED, the wound should be carefully covered with a sterile dressing. DO NOT TOUCH WOUND OR DRESSING WITH DIRTY HANDS!

Keep the victim LYING FLAT ON HIS BACK, AND WELL COVERED. DO NOT LET HIM SEE HIS WOUND. Divert his thoughts from himself.

Obtain the services of a DOCTOR AS SOON AS POSSIBLE.

BURNS

Burns, whether caused by contact with high voltage electrical equipment, fire, or friction, require immediate attention.

1. Apply AT ONCE any one of the following:

- a. Tannic acid jelly.
- b. Butesin picrate.
- c. Paste made with baking soda and water.
- d. Very strong, cool tea.

2. Applications should be LIBERAL and the burned area covered with STERILE GAUZE.

3. If clothing sticks to the burned areas, DO NOT ATTEMPT TO REMOVE IT. Treat burn as above.

4. Keep the victim WELL COVERED and LYING FLAT ON HIS BACK. Soothe and reassure him.

5. Obtain the services of a DOCTOR AS SOON AS POSSIBLE.



Always obtain the services of a doctor as quickly as possible.

DESTRUCTION OF ABANDONED MATERIEL IN THE COMBAT ZONE

In case it should become necessary to prevent the capture of this equipment and when ordered to do so, DESTROY IT SO THAT NO PART OF IT CAN BE SALVAGED, RECOGNIZED OR USED BY THE ENEMY. BURN ALL PAPERS AND BOOKS.

Means:-

1. Explosives, when provided.
2. Hammers, axes, sledges or whatever heavy object is readily available.
3. Burning by means of incendiaries such as gasoline, oil, paper or wood.
4. Grenades and shots from available arms.
5. Where possible, and when time permits, bury all debris or dispose of it in streams or other bodies of water.

Procedure:-

1. Obliterate all identifying marks. Destroy nameplates and circuit labels.
2. Demolish all panels, castings, switch- and instrument-boards.
3. Destroy all controls, switches, relays, connections and meters.
4. Rip out all wiring in electrical equipment. Smash gas, oil and water cooling systems in gas-engine generators, etc.
5. Smash every electrical or mechanical part, whether rotating, moving or fixed.
6. Break up all operating instruments such as keys, phones, microphones, etc.
7. Destroy all classes of carrying cases, straps, containers, etc.

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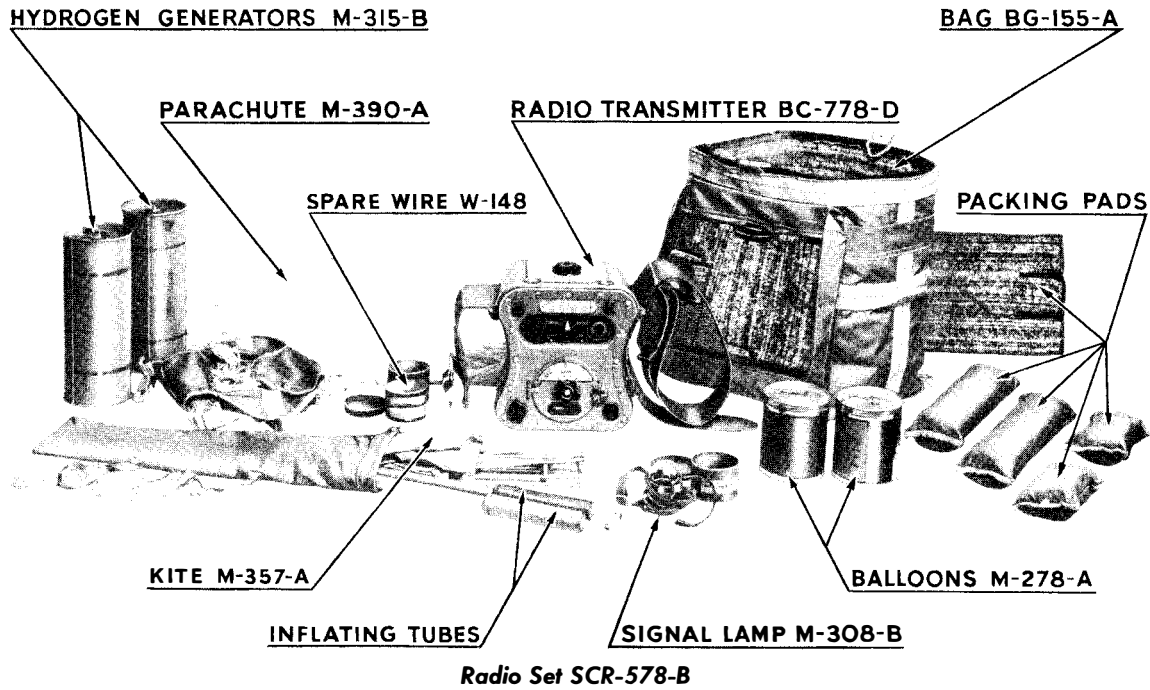
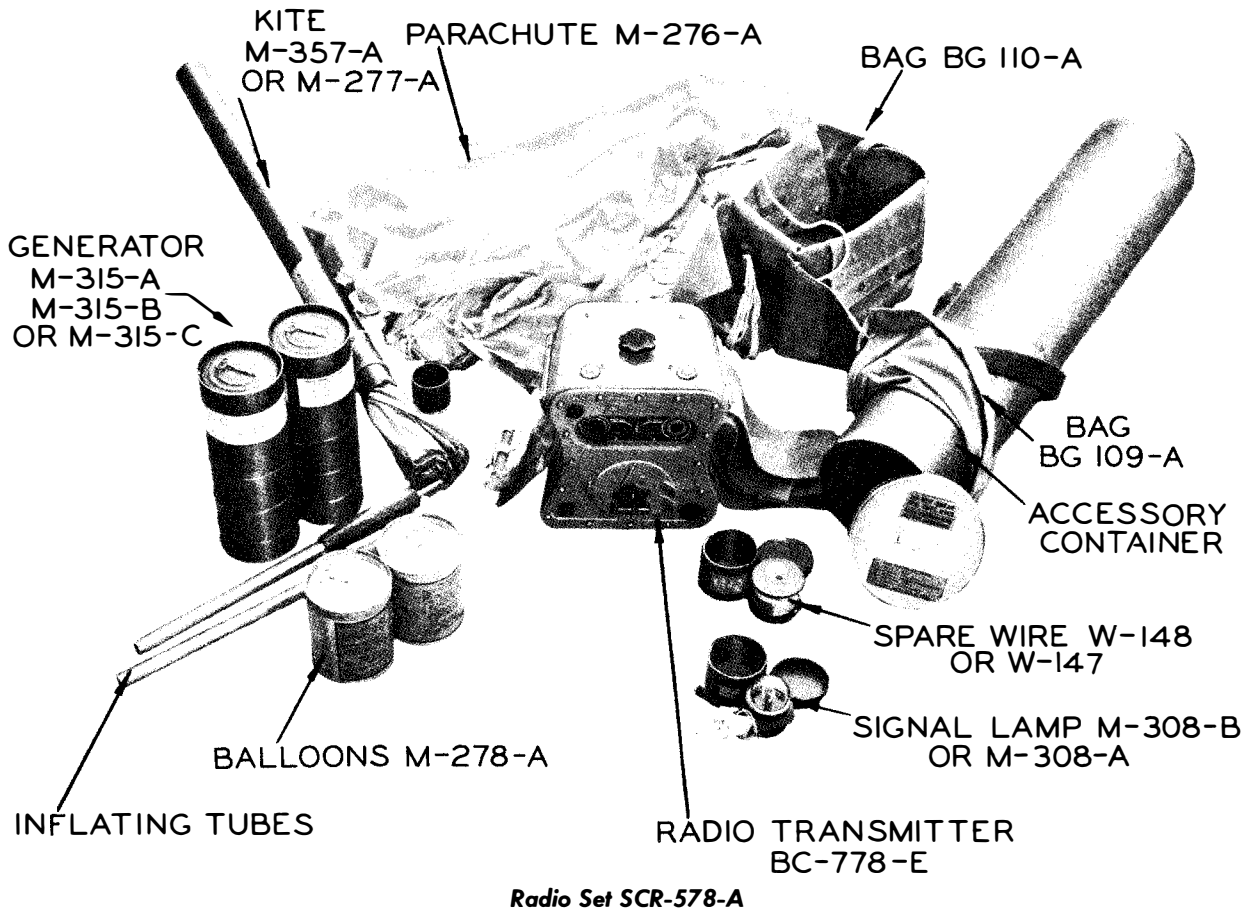


Figure 1—Radio Set SCR-578-A or SCR-578-B, Component Parts

**HANDBOOK OF
MAINTENANCE INSTRUCTIONS**
for
RADIO SET
SCR-578-A or SCR-578-B

**SECTION I
DESCRIPTION**

1. GENERAL.

a. Radio Set SCR-578-A or SCR-578-B, (see fig. 1), is a simple rugged emergency transmitting system designed for operation from a rubber life raft. No receiving equipment is incorporated. The set provides automatic code transmission of predetermined signals so that any operator, no matter how untrained, can send distress signals which, when received by rescue parties, will permit bearings to be taken. The set operates on the international distress frequency of 500 kc with a 1000-cycle tone modulation.

b. Radio Set SCR-578-A or SCR-578-B may be used as a hand-powered signal light with manual keying to transmit instructions, or as a constant signal light. (Radio Transmitters BC-778-A and BC-778-B have automatic keying instead of constant signal light.) If the signal light is employed, no radio transmission takes place.

c. All electrical power for operating either the radio transmitter or the signal light is furnished by the hand-powered generator in the transmitter case.

2. TUBE COMPLEMENT AND TABLE OF COMPONENT PARTS.

a. Two tubes are used in Radio Transmitter BC-778-A and Radio Transmitter BC-778-B, type 12SC7, as an audio oscillator and amplifier, and type 12A6 as an r-f oscillator.

b. The following table contains a complete list of all components found in Radio Set SCR-578-A or SCR-578-B with the overall dimensions and weight of each.

TABLE 1—COMPONENT PARTS

<i>Quantity</i>	<i>Name of Unit</i>	<i>Overall Dimensions</i>	<i>Weight (in lbs.)</i>
1	Antenna Wire W-147 or W-148, spare	2½" x 3" dia.	0.55
1	Bag BG-109-A (accessory) (in SCR-578-A only)	39½" x 7" dia.	2.95
1	Bag BG-110-A (in SCR-578-A only)	12½" x 10½" x 9"	1.5
1	Bag BG-155-A (in SCR-578-B only)	20¼" x 17" x 14½"	7.0
2	Balloon M - 278 - A (in container)	5⅞" x 4¼" dia.	1.2 each
1	Hand Crank GC-18-A		0.45
*2	Generator M - 315 - A or Generator M-315-B (Hydrogen)	11⅞" x 4¼" dia.	2.75 each
*2	Generator M-315-C (Hydrogen)	11⅞" x 4¼" dia.	4.75 each
2	Inflating Tube (Part of hydrogen generator)	19" x 1¼" dia.	0.5
1	Handbook of Instructions	8⅜" x 10⅞"	0.5
1	Kite M-277-A (in SCR-578-A only)	36½" x 3⅞" dia.	1.45
1	or Kite M-357-A	18" x 4"	1.5
1	Parachute M-276-A (in SCR-578-A only)		1.0
1	Parachute M-390-A (in SCR-578-B only)		2.81
**1	Radio Transmitter BC-778-E	13" x 10" x 9"	15.8
***1	Signal Lamp M-308-A (in container)	3⅞" x 3" dia.	0.3
***1	Signal Lamp M-308-B (in container)	2⅞" x 3" dia.	0.2

Total Weight—34 lbs. (for SCR-578-A with 2 cans of Generator M-315-A or M-315-B)

- 38 lbs. (for SCR-578-B with 2 cans of Generator M-315-A or M-315-B)
- 38 lbs. (for SCR-578-A with 2 cans of Generator M-315-C)
- 42 lbs. (for SCR-578-B with 2 cans of Generator M-315-C)

* A maximum of two hydrogen generators may be supplied with a given radio set. In some cases due to shortage of supplies only one generator is furnished.

** Radio Set SCR-578-A or SCR-578-B may contain any one of the following:

- Radio Transmitter BC-778-A, BC-778-B, BC-778-C, BC-778-D, BC-778-E, or BC-778-F.

*** Only one signal lamp is supplied with a given radio set.

3. DESCRIPTION OF COMPONENTS.

a. RADIO TRANSMITTER — The transmitter is self-contained in a cast shell and is air tight and water-proof. (See fig. 2.) The shell is molded to the contour of the operator's legs, between which it is held for operation. The operating controls, antenna TUNE, RADIO-LIGHT selector switch, and the manual KEY

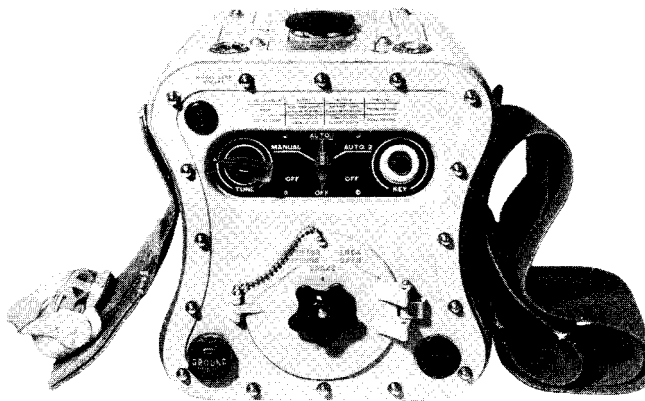


Figure 2—Radio Transmitter BC-778-E, Front View

are grouped in the elongated oval depression on the front panel. Reel RL-48, holding 300 feet of Antenna Wire W-147 or W-148 (see fig. 14) is in a compartment also mounted on the front panel. A strap is provided for securing the transmitter between the legs of the operator (see figs. 13 and 20). Various models of the radio transmitter differ only in details of electrical or mechanical design. The differences are summarized as follows:

(1) Radio Transmitter BC-778-A is the original transmitter supplied with Radio Set SCR-578-A.

(2) Radio Transmitter BC-778-B is an electrically modified version of Radio Transmitter BC-778-A. It uses a transformer-coupled audio oscillator instead of the resistance-coupled oscillator used in Radio Trans-

mitter BC-778-A. A neutralizing winding has been added to the r-f oscillator plate coil, and the plate is shunt-fed.

(3) Radio Transmitter BC-778-C is a modified version of Radio Transmitter BC-778-B and differs only in that no automatic keying of the signal lamp is provided. In "AUTO 1-LIGHT" and "AUTO 2-LIGHT" selector switch positions, the signal lamp is continuously illuminated.

(4) Radio Transmitter BC-778-D is a mechanically improved model of Radio Transmitter BC-778-C. The improvements are a new type of lock-open antenna-reel door, a new type of antenna-reel brake, improved instruction name plates, and longer-life gears in the main-power and governor gear trains.

(5) Radio Transmitter BC-778-E is the same as Radio Transmitter BC-778-D with the exception of a new type of antenna lead-in fastening.

(6) Radio Transmitter BC-778-F is a modified version of Radio Transmitter BC-778-C. The modifi-

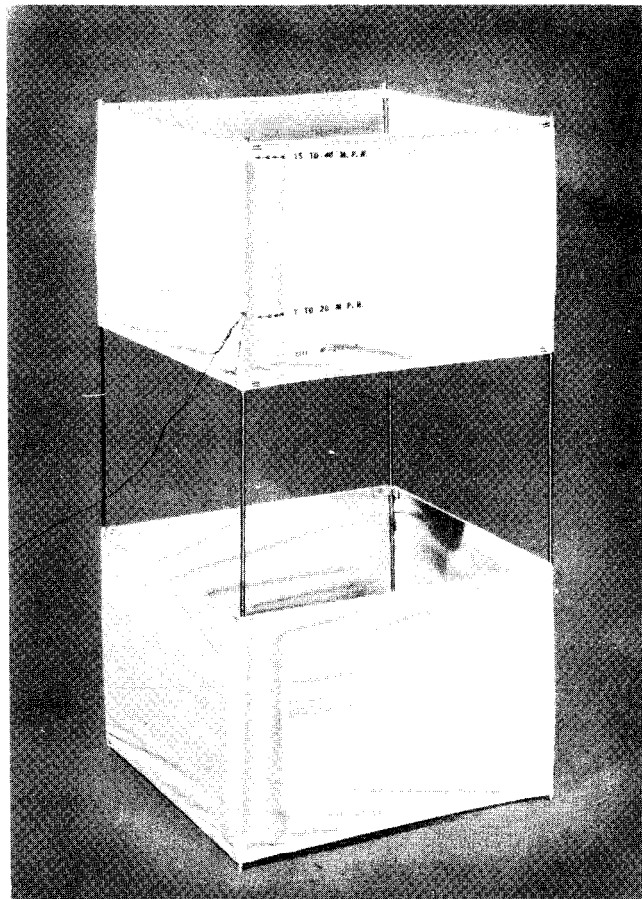


Figure 3—Kite M-277-A, Assembled and with Antenna Attached

cation consists of the replacement of the main-power and governor gear trains with longer-life gears. The name-plate type number is then changed to "BC-778-F." Radio Transmitters BC-778-A and BC-778-B may also be similarly modified. All such sets retain the original name plate, but are marked, "THIS EQUIPMENT HAS BEEN MODIFIED TO CONFORM WITH A BC-778-F."

b. KITE M-357-A or M-277-A (see figs. 3 and 4)—Either kite is used to send aloft the antenna.

(1) Kite M-277-A is the original kite supplied with Radio Set SCR-578-A. It is a collapsible box kite measuring 17 x 17 x 36 inches assembled. Complete instructions for its assembly and use are given on the cylindrical container in which the kite is packed. This kite will fly in wind velocities of from 7 to 40 mph. The cloth on the kite has been treated, making it moisture-repellent, and a section filled with kapok gives buoyancy. Continued soaking, however, will eventually cause it to become saturated.

(2) Kite M-357-A is identical with Kite M-277-A, except that the 36-inch longerons have been divided in the middle and equipped with sleeve fittings; this permits the complete kite to be stowed in a space approximately 2 x 4 x 19 inches. Complete instructions for the use of Kite M-357-A are given on the container in which it is packed.

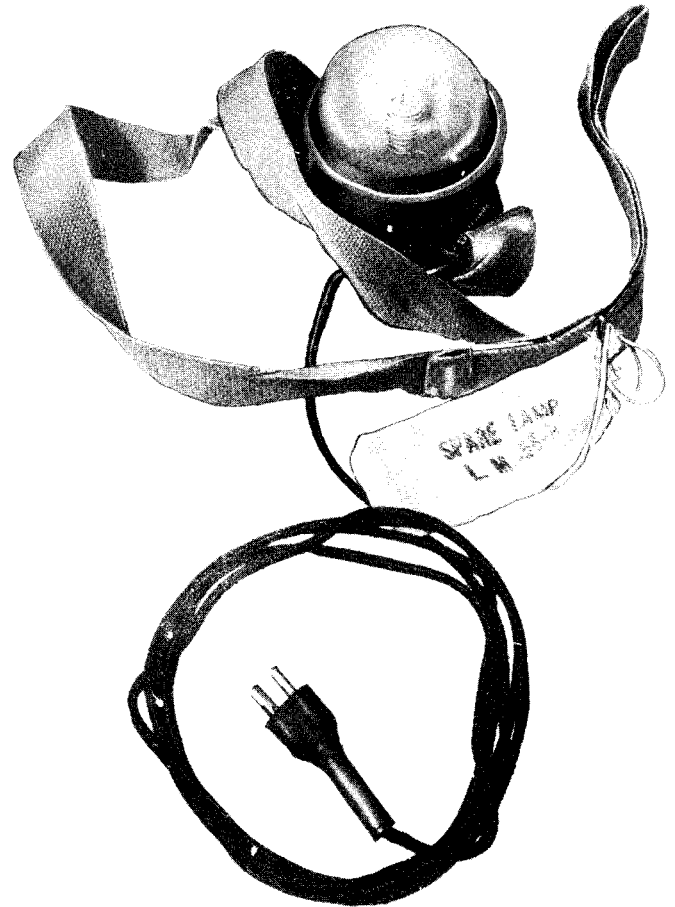


Figure 5—Signal Lamp M-308-B



Figure 4—Signal Lamp M-308-A with Hand Crank GC-18-A

c. SIGNAL LAMPS.

(1) Signal Lamp M-308-A is the original signal lamp supplied with Radio Set SCR-578-A. (See fig. 4.) A strap fastens it around the operator's head with the light on his forehead. This signal lamp is directional.

(2) Signal Lamp M-308-B is a modification of Signal Lamp M-308-A. (See fig. 5.) The modification consists of a dome type of lens, making the lamp non-directional. This lamp **MUST** be placed on top of the head with the strap under the operator's chin.

d. HYDROGEN GENERATORS.— A hydrogen generator (see fig. 6) is used to inflate the balloon. Upon coming in contact with water, hydrogen is generated by a chemical solid within the container. The hydrogen is supplied to the balloon by means of an inflating tube (see fig. 7).

(1) Generator M-315-A is the original type and has been supplied with all sets to date (July 1943). Its operating time is about 40 minutes, and it is quite

sensitive as regards depth of immersion. It is filled with one pound of lithium hydride.

(2) Generator M-315-B is also filled with one pound of lithium hydride, but the generator itself is improved. As a result, the operating time is only one half as long, and the depth of immersion is not so critical.



Figure 6—Generator M-315-B or M-315-C (Hydrogen) with Inflating Tube

(3) Generator M-315-C is filled with three pounds of calcium hydride. There is no appreciable difference between it and Generator M-315-B as far as use and performance are concerned.

e. BALLOON M-278-A.—This balloon is for raising the antenna when lack of wind does not permit use of the kite. Inflated, its diameter will be approximately 4 feet (see fig. 7).

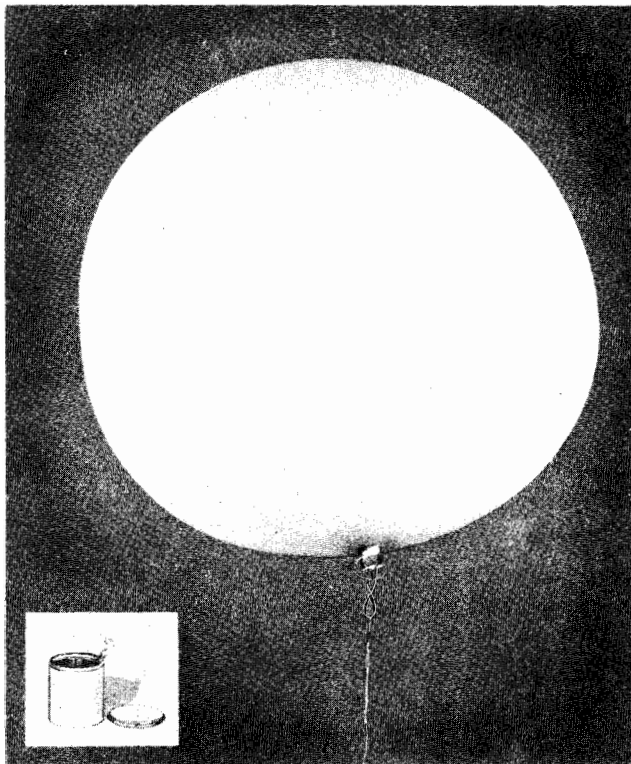


Figure 7—Balloon M-278-A, Inflated with Antenna Attached

f. BAGS BG-109-A, BG-110-A, and BG-155-A.—The first two together contain Radio Set SCR-578-A. They are strapped securely together (see fig. 1).

(1) Bag BG-109-A (see fig. 8) contains the following accessories:

Quantity	Article
1	Kite M-357-A or M-277-A
2	Balloon M-278-A
2	Generator M-315-A, M-315-B or M-315-C with inflating tube
1	Signal Lamp M-308-A or M-308-B
1	Extra roll of Antenna Wire W-148 or W-147
1	Instruction Book

(2) Bag BG-110-A (see fig. 9) contains the radio transmitter with Hand Crank GC-18-A (see fig. 13) affixed. Permanently attached to this bag is Parachute M-276-A with static cord and snap fastener. Included in the bag is a second copy of this handbook of instructions.

(3) Bag BG-155-A contains all of Radio Set SCR-578-B. Attached to this bag is Parachute M-390-A with static cord and snap fastener (see fig. 12).

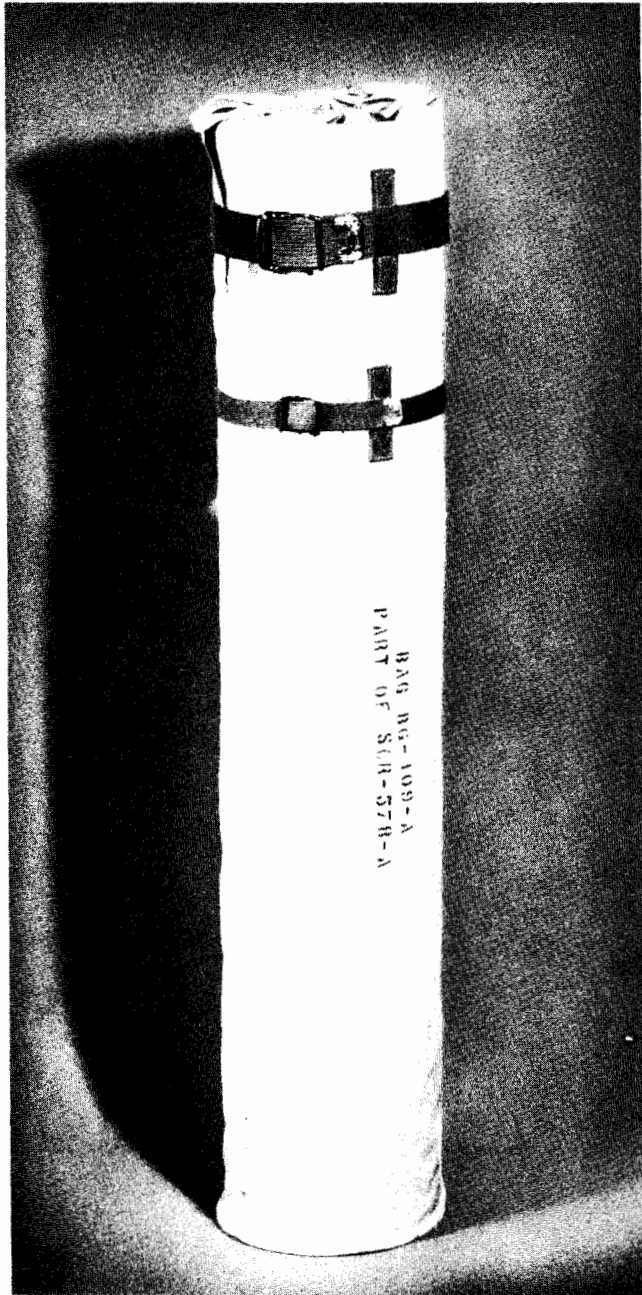


Figure 8—Bag BG-109-A (Accessory), Packed



Figure 9—Bag BG-110-A with Parachute M-276-A, Packed with Static Line in Place

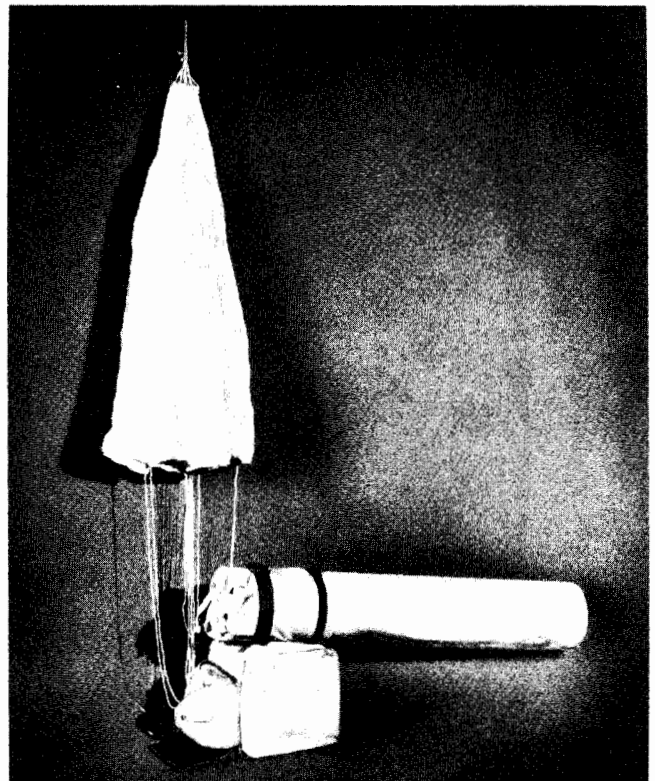
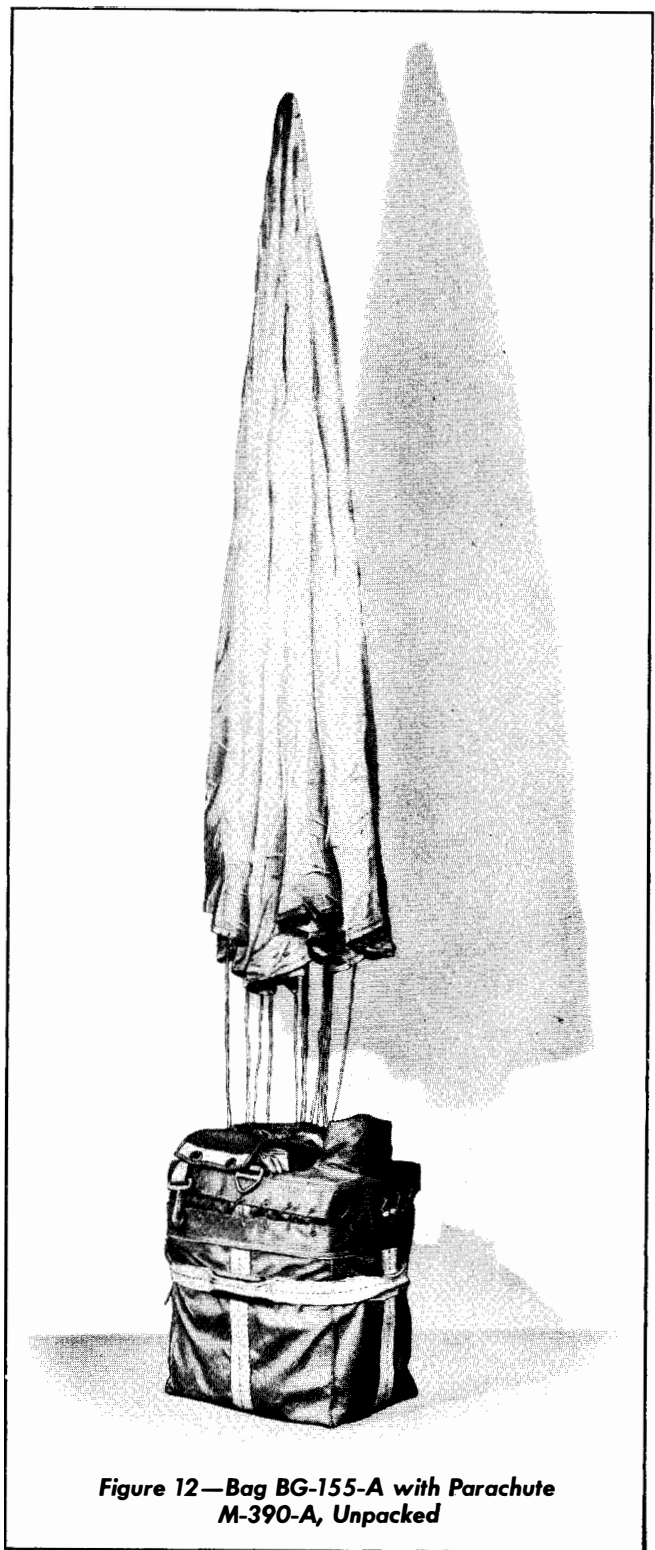


Figure 10—Bags BG-109-A and BG-110-A and Parachute M-276-A, Unpacked



*Figure 11—Bag BG-155-A with Parachute M-390-A,
Packed with Static Line in Place*



*Figure 12—Bag BG-155-A with Parachute
M-390-A, Unpacked*

SECTION II INSTALLATION AND ADJUSTMENT

1. INSTALLATION IN AN AIRPLANE.

Locate the radio set in an aircraft to facilitate fast removal in the event of an emergency landing. The two bags containing all the equipment for the radio set must be securely strapped together.

2. REMOVAL FROM THE AIRPLANE.

a. If the airplane is *ditched* (crash-landed on water), throw the radio set out of the airplane at the same time that the life raft is removed. Do not worry about it's getting wet. It will float and remain near until picked up. Make sure, however, that it is recovered before paddling away.

b. Only when the airplane is abandoned by parachute shall the radio transmitter be dropped from the air. Drop it at the same time the life rafts are dropped and complete the abandonment as quickly as possible so that the crew and equipment will land as closely together as possible.

c. If the radio set is to be dropped from an airplane (not in distress) to aid survivors who have been sighted, slow the airplane to its slowest flying speed and drop the equipment from an altitude of from 300 to 500 feet. If the speed is too great, damage or loss of the equipment may result and if the altitude at the time of release is too great, the radio set may drift too far while descending.

d. Using the parachute provided, drop the equipment on land or water. There is a great risk of damage to the equipment when dropped upon land. Therefore, wherever it is possible, drop the equipment upon a body of water.

e. In dropping the equipment by parachute, observe the following steps:

(1) Fasten the loose end of the static line to the metal structure of the airplane.

WARNING

Do not attach the static line to any part of your body when throwing out the radio equipment.

(2) Be sure that the static line, which is 12 feet long, is in the clear and does not foul.

(3) Throw out the radio equipment. The parachute will be opened by the static line.

(4) Complete operating instructions are contained in one of the bags which contain the equipment. Complete instructions for the use of the transmitter are also located on the transmitter.

3. ASSEMBLY OF THE EQUIPMENT.

CAUTION

Do not raise antenna or leave it up during lightning. To do this may result in severe injury to personnel.

a. Remove the radio transmitter from its bag.

b. Antenna Reel RL-48 is accessible from the transmitter front panel by removing the cotter key and opening the antenna-reel compartment door. If you have either Radio Transmitter BC-778-D or Radio Transmitter BC-778-E, keep the door open by sliding the cotter key into the holes provided at the door hinge in these two models (see fig. 14). Take enough slack wire from the reel to attach to the kite or the balloon. Adjust brake tension on the reel and maintain a slight tension by rotating the BRAKE knob clockwise.

NOTICE

See that the antenna wire does not kink while unreeling as a strong tug by the kite might cause the wire to break.

c. Unscrew the cap marked GROUND and remove the ground-wire reel. On water, play out the wire into the water, using the cap as a weight to keep it submerged. Proper operation of the transmitter on land depends upon an adequate ground and will be obtained only on very wet soil, and then only when the ground wire and cap have been buried as deeply as possible into the earth. If a body of water is available, operate the equipment, if possible, some distance offshore.

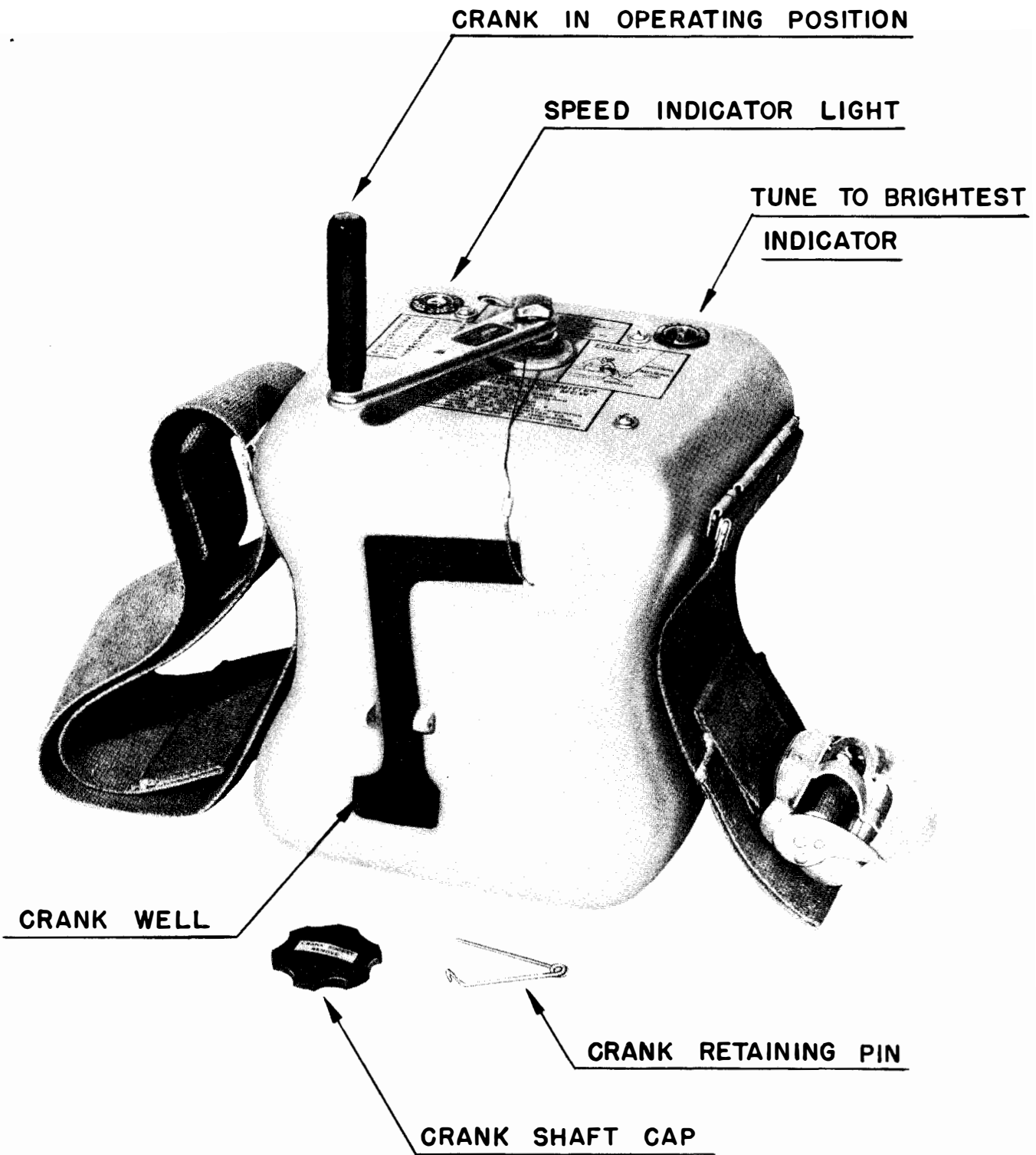


Figure 13—Radio Transmitter BC-778-E, Rear Oblique View

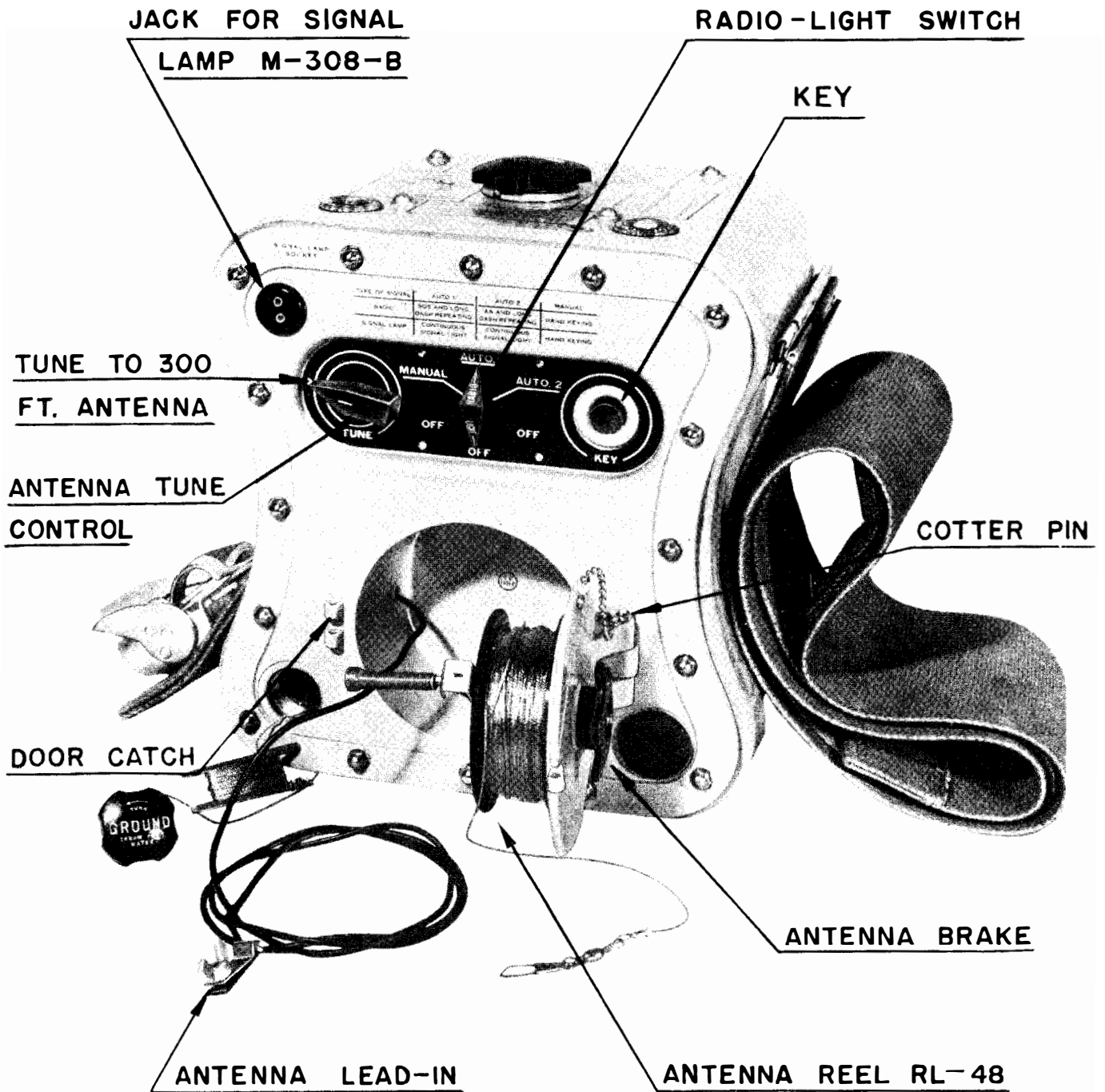


Figure 14—Radio Transmitter BC-778-E, Front Oblique View

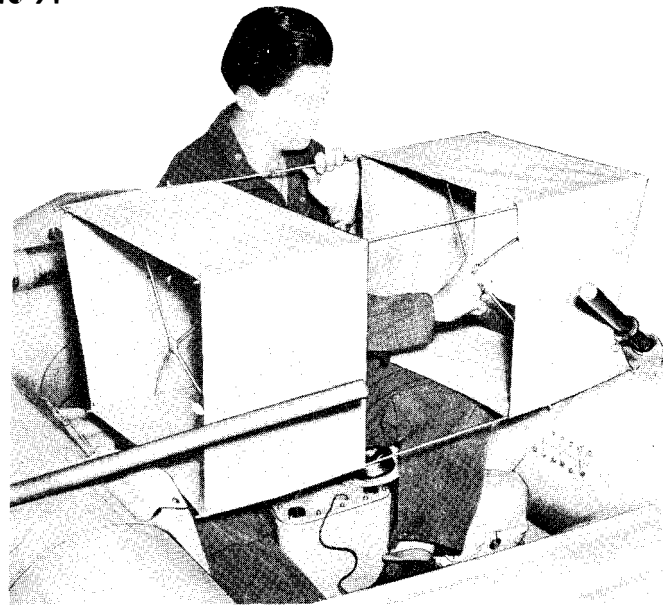
NOTE

It is absolutely essential to maintain an adequate ground when transmitting.

PROBABLE RANGE OF RADIO SET

<i>Location</i>	<i>Distance in Miles</i>
At sea	250 to 500
In boat (center of inland lake)...	50 to 150
At edge of lake or large stream (ground lead in water)*.....	30 to 50
On land (ground lead buried in moist earth)*	5 to 10

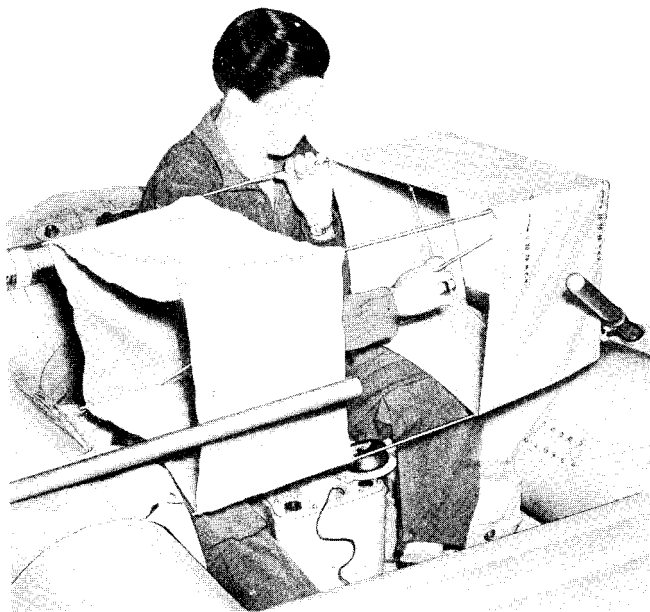
* The TUNE TO BRIGHTEST indicator may not function under these conditions. Use all the antenna wire and tune to the mark on the dial.



**Figure 16—Kite M-277-A or M-357-A,
Second Expansion Operation**

d. Set the transmitter in the bottom of the boat or life raft (if on water) ready to be secured to the operator later by means of straps provided at the sides of the unit.

e. Kite M-357-A or Kite M-227-A is individually packed in a long cylindrical package in accessory Bag BG-109-A of the radio set. Remove the kite and lay it crosswise on the lap. Holding the kite securely with



**Figure 15—Kite M-277-A or M-357-A, First
Expansion Operation**

ciently extended, they will lock into position. Repeat procedure for opening opposite end of kite. Stop pushing on the spiders just as soon as you feel them jump. The process may be thought of as similar to that of opening an umbrella (see figs. 15 and 16).

f. If you have Kite M-357-A (part of Radio Set SCR-578-B) which is divided in two, assemble by fitting the ends of the four longerons on one half into their respective sockets on the other half (see fig. 17) before proceeding with the instructions above. Be sure that the halves are pressed tightly together so that the locking mechanism holds them firmly in position. After assembling the kite, estimate the wind velocity. There are two eyelets on the kite, one at a corner marked "15 to 40 mph" and another further in near a marking "7 to 20 mph." Affix the antenna-wire swivel clasp into whichever of these two eyelets more nearly corresponds to the estimated wind velocity (see fig. 18). If in doubt, use the eyelet indicated for low-wind velocity. Exercising due caution, attempt to rise sufficiently in the boat to get the kite in the air without its falling into the water. The kite will be found a ready flyer in winds as low as 7 miles per hour. Always maintain a steady tension at the BRAKE to prevent the kite from dropping. On occasions it will be found more practicable to play out the wire by hand. For most efficient operation, play out ALL of the 300 ft. of antenna wire on the reel. Any reduction in length means a lowered efficiency of the transmitter. Make sure the antenna is not less

one hand, reach the other hand in through its center. Push outward on the hinged spider to make the four upright longerons spread. When these have been suffi-



Figure 17—Kite M-357-A, Assembly Operation

than 175 ft. long while transmitting. Next, attach the antenna-securing cord to the life raft and **AFFIX THE ANTENNA LEAD-IN FROM THE TRANSMITTER ONTO THE ANTENNA** (see fig. 20). Never permit the antenna to drag in the water while

transmitting. Try to keep the antenna wire as nearly vertical as possible. To dismantle the kite, push in on the spiders, allowing it to collapse.

g. Use Balloon M-278-A only if the wind velocity does not permit using the kite. Complete all the above instructions, except those pertaining to Kite M-277-A or M-357-A, before starting this operation. Remove one of the sealed balloon cans from Bag BG-109-A, or BG-155-A. Open the can and remove the balloon **WITH CARE**. Handle the balloon very carefully and exercise extreme caution to prevent abrasions or punctures in the process of inflation. If the balloon is stiff from cold, do not try to bend any part of it. It must be thawed before use. This can be done in either one of two ways:

(1) Hold the balloon in water and unfold it gently as the outer layers thaw. This will require from one to two minutes.

(2) Put the balloon under your arm between inner and outer clothing. After the outer layers have thawed, unfold them carefully and put the balloon back under your arm. Repeat the process until all parts of the balloon are flexible. This will require from 15 to 30 minutes.

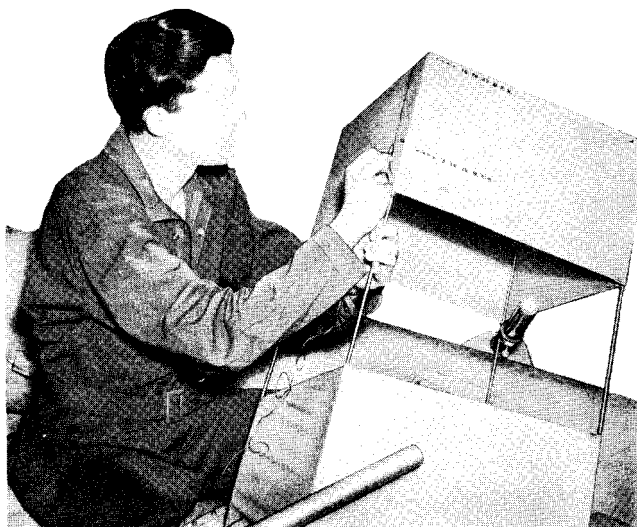


Figure 18—Kite 277-A or M-357-A,
Attaching Wire

CAUTION

In case only one hydrogen generator is supplied make absolutely certain that the balloon is perfect before attempting to inflate.

The generator will fill only one balloon.

After the balloon is removed, attach the antenna to the loops provided at the balloon valve.

b. Remove one of the two hydrogen generators and one of the inflation tubes from Bag BG-109-A or BG-155-A.

CAUTION

Hydrogen gas is explosive even when in the balloon. Do not smoke or permit sparks in its vicinity. Be careful when removing seals from the generator and the balloon cans that application of the winding key does not break the tongue-tip starter, as access to the equipment might then be difficult. The residue from the hydrogen generator is caustic; immediately wash off with water any caustic coming in contact with eyes, skin or clothing.

Generators M-315-A, M-315-B, and M-315-C vary considerably in use and required operating time, and it is recommended that instructions for preparation and use be taken from the particular generator supplied. In general, however, it will be necessary to remove the top and the bottom of the generator and then screw an inflation tube into its top. Next, WET and insert the blunt needle on the end of the inflation tube into the balloon's valve hole. **BE SURE THE BALLOON IS PUSHED DOWN AGAINST THE HILT OR SHOULDER ON THE INFLATION TUBE.** The balloon must be kept against this shoulder while being inflated. Otherwise, the *valve inside* of its neck may not be kept open, thus preventing gas from entering. The next step is to immerse the generator into the water. Immerse Generator M-315-A only to the long red immersion line, hold there for about 10 minutes, and then very slowly lower further into the water. If the vibration of the generator becomes considerable, it is being lowered too fast. Immerse Generators M-315-B and M-315-C at once so that the top of the generator is level with the surface of the water, and leave there throughout the operation.

NOTE

THE MINIMUM AMOUNT OF WATER NEEDED TO GENERATE THE GAS TO COMPLETELY FILL THE BALLOON IS APPROXIMATELY FIFTY GALLONS.

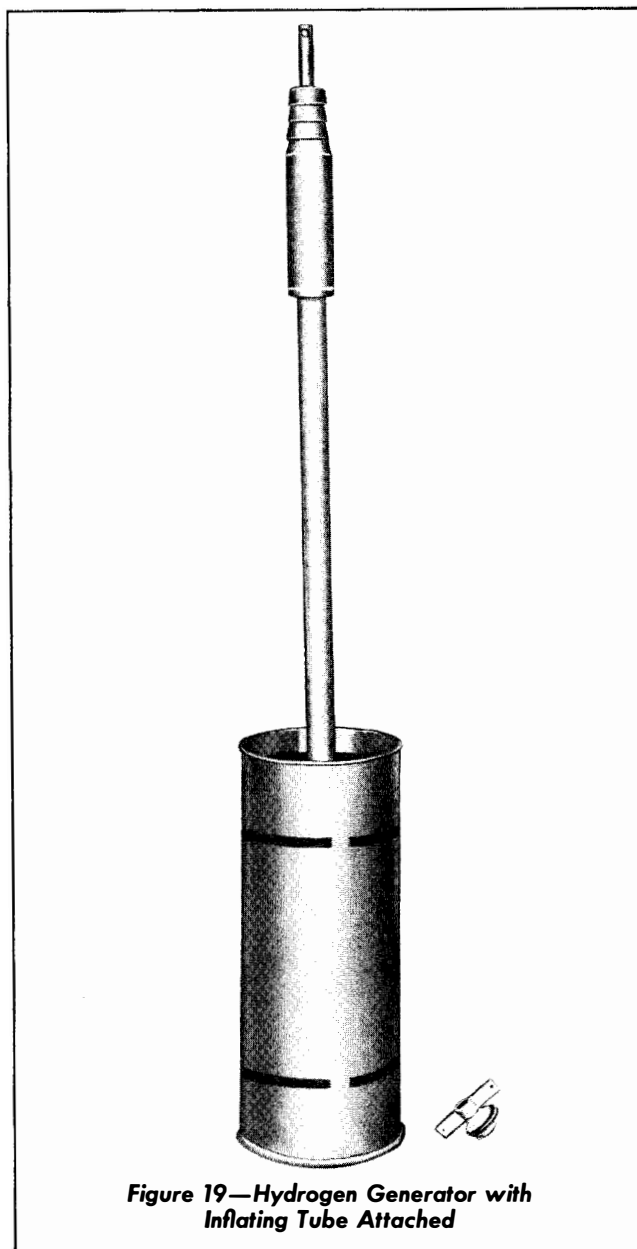


Figure 19—Hydrogen Generator with Inflation Tube Attached

In the process of obtaining hydrogen gas, heat will be generated; therefore, hold the insulated portion of the inflation tube. Occasionally, jiggle the generator up and down to flush out expended ingredients. Do not raise the bottom of the generator out of the water, as this will allow hydrogen to escape. If any liquid should enter the balloon during the inflation, allow it to remain until the hydrogen generator is finished. Depending upon the type furnished, generators will require from 15 minutes to nearly 1 hour to be inflated. Inflate the balloon until the hydrogen generator is exhausted. When fully inflated, the balloon will have a diameter of approximately 4 ft. Drain

any liquid remaining in the bottom of the balloon after inflation by holding the balloon with its neck pointing downward. The liquid will then drain from the balloon through the inflation tube. If it does not flow out, raise the generator out of the water or, as a last resort, unscrew the inflating tube from the generator. As soon as the liquid disappears, quickly remove the inflation tube from the balloon and tightly insert the rubber stopper into the neck of the balloon to give a positive gas seal. Prevent the escape of hydrogen if possible. Unscrew the inflation tube and retain it as a spare. Discard the generator can to avoid possible damage to clothes, equipment, or personnel from the chemicals left.

i. With the antenna affixed to the balloon, release the BRAKE, allowing the balloon to pull out ALL the wire on the reel. Attach the antenna-securing cord to the life raft and affix the antenna lead-in from the transmitter onto the antenna (see fig. 20). If a wind rises while using the balloon, it may be desirable to employ the kite. In general, the change from balloon to kite should be made when the wind rises above 20 mph. The balloon can be made captive to the raft by using part of the extra roll of antenna wire. The captive balloon should always be high enough to avoid striking objects that might cause it to burst, or to interfere with the antenna.

j. If the original antenna wire should become lost, an extra roll of Antenna Wire W-148 or W-147 is supplied in the accessory bag (see fig. 1). The wire on this spare roll is wound on backwards so that it may be reeled directly onto Reel RL-48.

k. Remove the cap located at the top center of the transmitter, making the crank socket available (see fig. 13). In the well on the back of the transmitter is Hand Crank GC-18-A. It is affixed to the case by a leash and is made available by the removal of the locking pin. The leash is long enough to enable the crank to reach the socket and must not be broken. Insert the crank into its socket and tighten the thumb screw. Save the cap as it should be replaced if crank is removed.

4. FASTENING OF THE BELT.

Operating the transmitter requires a comparatively high turning torque. To assure stability so that this may be accomplished, a belt assembly is affixed to the case of the transmitter (see figs. 14 and 20). The operator will assume a sitting position and strap the unit between the legs just above the knees, with the front panel facing away from him. Pass the strap over the left leg. Next, bring it underneath both legs, and buckle it above the right leg. The equipment is now ready for use.

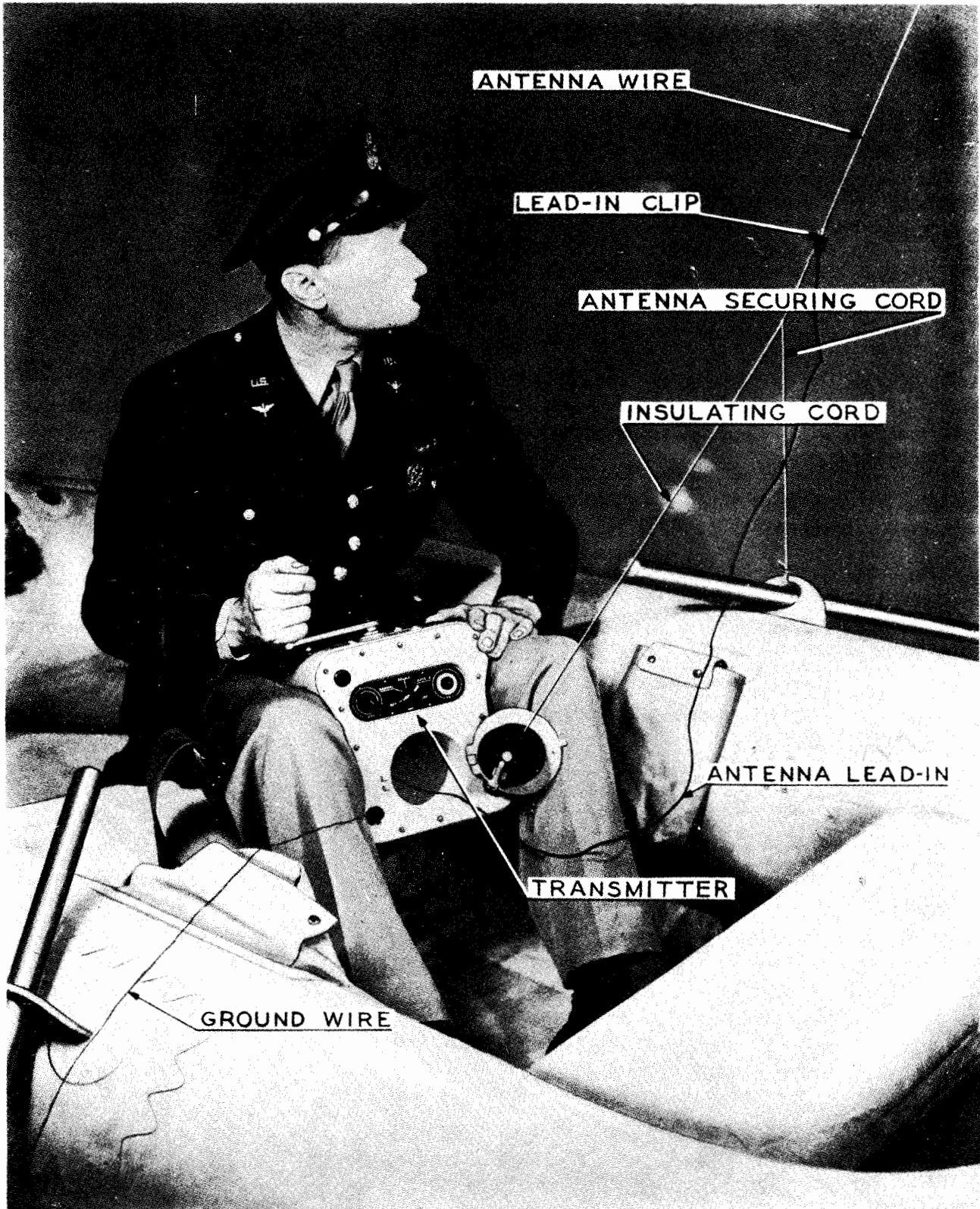


Figure 20—Radio Transmitter BC-778-E in Operating Position

SECTION III OPERATION

International law provides for ships' radio operators to maintain a watch on the distress frequency of 500 KC, during 3 minutes after the quarter hour and three-quarter hour: that is, from 15 to 18 minutes and from 45 to 48 minutes after the hour. Probability of interception, therefore, will be greatly increased if transmission is conducted during these intervals. Continue transmission sufficiently thereafter to allow rescue parties to take bearings.

1. RADIO TRANSMISSION.

a. Set the selector switch marked RADIO and LIGHT so that the RADIO half of the pointer is at the AUTO 1 or the AUTO 2 position (see fig. 2).

b. Rotate the crank in a clockwise direction at approximately 80 r.p.m. When sufficient speed has been attained, the ballast lamp (marked SPEED INDICATOR KEEP LIGHTED; see fig. 13) located on the top of the unit will light. Faster crank speeds are ineffective, as the transmitter contains automatic voltage-regulating and governing devices.

c. Continue cranking, allowing at least 20 seconds for the filaments of the vacuum tubes to warm. Next, tune the antenna to resonate with the transmitter. Accomplish this by adjusting the TUNE control so that maximum brilliance of the TUNE TO BRIGHTEST indicator (see fig. 13) is obtained. If the entire antenna is out (300 ft.) the TUNE knob will be at about the "9 o'clock" position. This approximate position is marked on the panel. If a shorter antenna is used, correct tuning will still be indicated at the point of maximum brilliance, but with the knob at a different position on the panel. In bright sunlight it may be necessary to shade the TUNE TO BRIGHTEST indicator so that the point of maximum brilliance may be observed. The indicator will flash off and on with the keying of the transmitter, indicating that radiation is occurring.

d. In the AUTO 1 position the transmitter will automatically alternate between SOS for 20 seconds and a continuous dash for 20 seconds.

e. In the AUTO 2 position the transmitter will automatically alternate between AA for 20 seconds and a continuous dash for 20 seconds.

NOTE

THE RADIO TRANSMITTER CAN BE CHANGED TO TRANSMIT OTHER CHARACTERS ON THE AUTO 1 AND AUTO 2 POSITIONS. SEE SECTION V, PARAGRAPH 4, FOR THE NECESSARY INFORMATION TO EFFECT THIS CHANGE.

f. In the MANUAL position, the operator, by manipulating the push button marked KEY (see fig. 14), may send his own telegraphic transmissions. This button KEY is manipulated most conveniently with one of the first two fingers of the left hand, arm rather than finger motion being desirable. Should a second person be available, one might crank and the other telegraph.

g. By interchanging hands every few minutes, the effort of cranking will be eased. To give rescue parties an opportunity to take bearings, operate the transmitter at least every half hour.

2. OPERATION OF SIGNAL LAMP M-308-A OR M-308-B.

Signal Lamp M-308-A or M-308-B may be used for visual signaling at night if an aircraft is heard. This does not necessitate an antenna. Merely remove the transmitter from its bag and insert the crank in its socket as instructed previously. Next, obtain the signal lamp from the accessory bag. Plug the cord attached to the signal lamp into the socket at the upper left corner of the control panel on the transmitter (see fig. 14). Strap the transmitter between the legs, set the RADIO-LIGHT selector-switch knob so that the end marked LIGHT points either to AUTO 1, AUTO 2, or MANUAL. In either of the AUTO positions, con-

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Paragraph 2

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tinuous light will be had (except in Radio Transmitters BC-778-A and BC-778-B, where automatic keying of the lamp is provided). Crank the transmitter at a speed where maximum brilliancy of the signal light is obtained. To telegraph with the signal light, place the selector switch so that the LIGHT end is at MANUAL; then turning the crank, manipulate the push-button KEY. **NO RADIO TRANSMISSION OCCURS WHEN THE SIGNAL LIGHT IS USED.** If Signal Lamp M-308-B is supplied (see fig. 6), strap it on top of the head with the straps under the chin;

this lamp is nondirectional, and its light may be seen from any direction. If the lamp does not light or if it burns out during use, unscrew the lens of the signal lamp, replace the bulb with the spare bulb supplied in the cloth bag attached to the signal lamp, and then replace the lens. If Signal Lamp M-308-A is supplied (see fig. 5), fasten its strap around the forehead and treat it as a directional lamp; if an aircraft is heard and its direction cannot be ascertained, shine the light down on the water or rotate it as a beacon. No spare bulb is provided with Signal Lamp M-308-A.

SECTION IV MECHANICAL AND ELECTRICAL CHARACTERISTICS

1. POWER SUPPLY AND KEYING DEVICE OF RADIO TRANSMITTERS BC-778-B, BC-778-C, BC-778-D, BC-778-E AND BC-778-F.

a. The crank fits into a socket in the main driving gear within the main gear-train assembly. This main driving gear actuates an assembly of two gears, which in turn drives a fourth gear. This gear train provides the step-up ratio necessary to drive generator G-101. (See figs. 21, 22 and 23.)

b. At the end of the main driving gear shaft opposite the crank socket is a second socket which fits into a projection on the clutch shaft of the governor gear-train assembly. The clutch drives the first gear by friction, and this in turn actuates (1) a gear train which provides a step-up ratio for the governor and (2) a gear which provides a step-down ratio for code wheel E-101A, E-101B and E-101C. A gear train driven by the shaft of the code wheel in turn provides a further step-down ratio for cam E-103.

c. Generator G-101 contains two windings. One winding furnishes the high-voltage potential for the transmitter; the second winding supplies the power for the filaments of the tubes, for the signal lamp when used, for ballast lamps I-102-1 and I-102-2, and for voltage-limiting relay K-101. Resistor R-101-2, in series with the coil of relay K-101, limits the current in this circuit so that the relay will not be energized unless the voltage across the circuit exceeds the predetermined proper level. If excessive voltage is generated by rotating the crank at too high a speed, the relay contact arm will be energized and will insert ballast lamps in series with the field coil or will ground it intermittently if the pull upon the relay is great enough; in either case the ballast lamps are lighted. One of these ballast lamps is placed beneath the window to be used as a speed-indicator light. As soon as the field coil is grounded, the turns in the generator armature windings cut fewer lines of force; hence the output voltage is lowered. When the low-voltage winding output drops sufficiently to release the relay contact arm, the field coil is again energized. The relay will vibrate rapidly when it is operating properly. This oscillation of the relay contact arm

will continue to hold the voltage down unless the crank speed is reduced below the predetermined level.

d. The governor which consists of a split friction cylinder mounted inside an adjustable compression ring acts only to maintain a constant rotational speed of the coding mechanism when the driving crank handle is turned too rapidly. If the handle is turned too rapidly, the split friction cylinder will expand due to centrifugal force and rub against the inner face of the compression ring, the resulting increase in friction causing the clutch to slip. Thus the code wheel and cam are slowed down to their rated speed.

e. The automatic keying mechanism has code wheel E-101A, E-101B, and E-101C consisting of three ledges which contain code characters as raised surfaces. As these discs are rotated, they actuate a set of contacts K-102A, K-102B, and K-102C which key the transmitter. The mechanism also contains cam switch E-103 which operates switches S-104A and S-104B, completing a cycle each forty seconds. The purpose of this cam is to change the characters of the transmitted signal every twenty seconds. The KEY (S-102) is a push button used to key the transmitter manually. The character of transmission is selected by the six-position switch S-103. A choice of AUTO 1, AUTO 2, and MANUAL is available for radio transmissions. The AUTOMATIC positions for the signal light provide only continuous light (except in Radio Transmitter BC-778-A or BC-778-B, which provide automatic keying of the light); the MANUAL position allows signal-light keying. Signal-light jack J-102, located on the front panel (see fig. 14), provides for plugging in the signal-light assembly.

f. Plug P-101 and jack J-101 compose the coupling for the cable which connects the transmitter to the generator power supply and keying device. Capacitor C-109 is an 8-microfarad electrolytic filter connected across the high-voltage windings of the generator.

2. AUDIO CIRCUITS OF RADIO TRANSMITTERS BC-778-B, BC-778-C, BC-778-D, BC-778-E, and BC-778-F.

The analysis of the circuit begins with the audio oscillator. V-101 (see figs. 37 and 38) is a 12SC7 dual

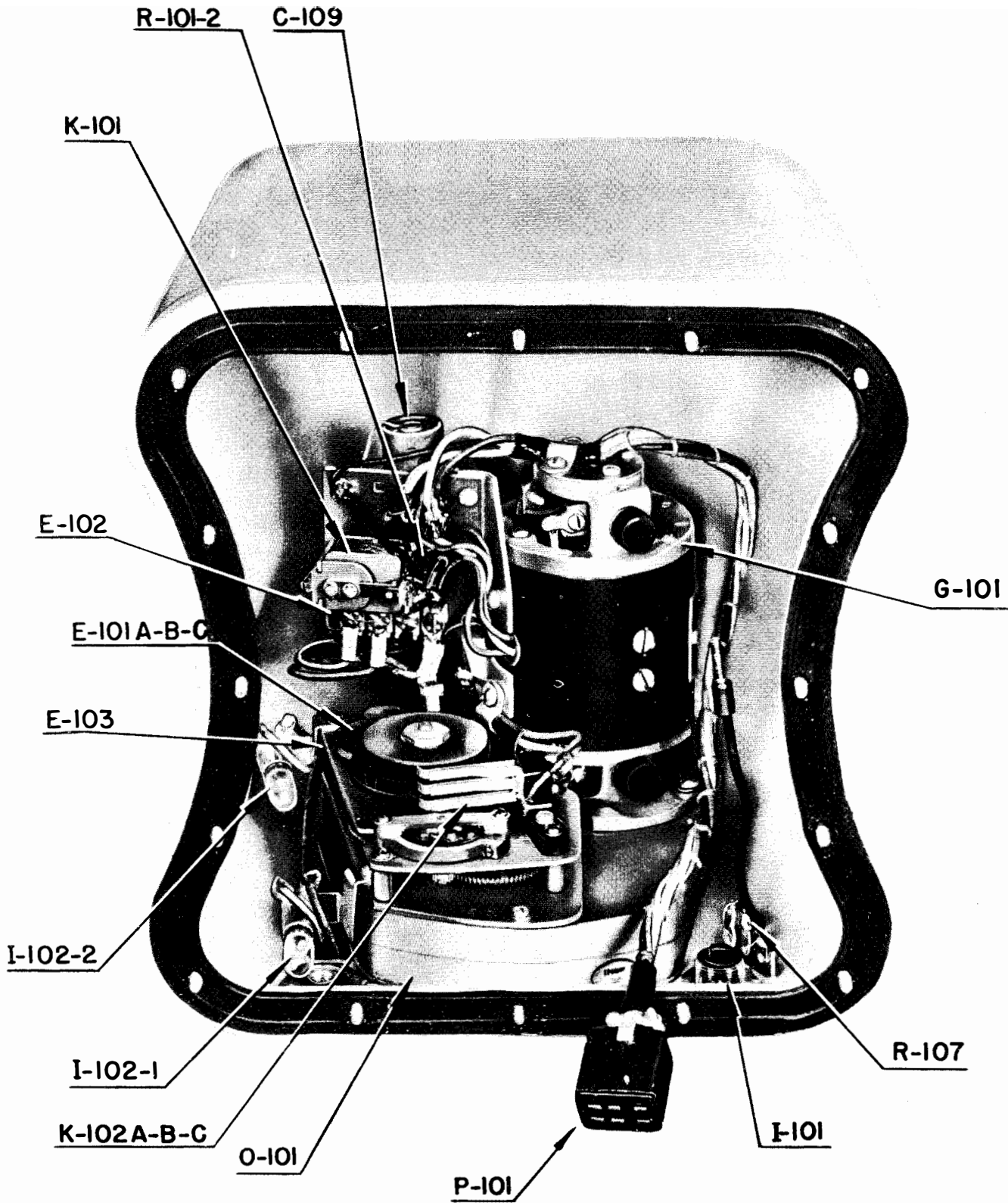


Figure 21—Radio Transmitter BC-778-B, BC-778-C, BC-778-D or BC-778-E, Parts Layout of the Cabinet

triode and serves as an audio oscillator and a one-stage audio amplifier. The oscillator is tuned to approximately one thousand cycles. Regeneration is accomplished through a common cathode resistor R-101-1 in conjunction with transformer T-101. Feed-back from plate P1 of V-101 is introduced into the primary circuit of transformer T-101 through blocking capacitor C-102-2. The feed-back voltage induced in the secondary of transformer T-101 is impressed on grid G1 of V-101. The secondary winding also provides a return to ground for grid G1 of V-101. Capacitor C-102-1, in conjunction with other circuit components, tunes transformer T-101 to approximately one thousand cycles. Resistor R-102-2 is the plate load for plate P1. Resistor R-103 is the plate load for plate P2. The audio coupling between P1 and G2 is provided by capacitor C-102-3. Capacitor C-102-3 also serves to block the direct current of plate P1 from grid G2. Resistor R-102-1 provides a path for the charge of grid G2 to return to ground. Feed-back, to produce stability, is introduced by capacitor C-101. Resistor R-101-1 in the common cathode circuit gives bias voltage for both sections of the tube.

3. R-F CIRCUITS OF RADIO TRANSMITTERS BC-778-B, BC-778-C, BC-778-D, BC-778-E AND BC-778-F.

a. Capacitor C-103-1 couples the signal from the audio circuit to the grid of the r-f oscillator and keeps the plate voltage of plate P2 from reaching the grid of V-102 (12A6). Resistor R-104 provides a path for charges on the grid of V-102 to return to ground. Resistor R-105-1 damps the r-f oscillations in the grid circuit of V-102, preventing them from feeding back into the plate circuit of the audio tube. Capacitor C-104 is employed to couple the r-f oscillator circuit to the grid of V-102.

b. An electron-coupled r-f oscillator is used. A tetrode V-102 (12A6), employing its screen grid as the anode in the oscillator circuit, does not have its plate in the oscillator circuit. The plate functions instead as an amplifier electronically coupled to the oscillator section of the tube.

c. Resonance of the r-f oscillator is obtained through the values of inductor L-101 and capacitors C-105, C-106-1, and C-106-2. The r-f oscillator coil returns to ground through neutralizing coil L-102B, which is inductively coupled to plate-tank inductor L-102A.

Choke L-103-1 serves as an r-f impedance to place the cathode above ground with respect to the r-f component. Capacitor C-103-2 serves to keep the screen of V-102 at ground potential with respect to the radio frequency. The high-voltage supply for the screen of V-102 is reduced through resistor R-106. The output plate is shunt-fed through choke L-103-2. High voltage in the plate circuit is blocked from the plate tank and antenna by capacitor C-103-3.

d. Inductor L-102A is the plate-tank load which, in conjunction with capacitors C-107, C-108, and the capacity of the antenna, tunes the transmitter to resonance. Capacitor C-107 is variable having a rotation of 360 degrees, during 180 degrees of which, switch S-101 closes, causing capacitor C-107 to be paralleled by C-108.

4. RADIO SET SCR-578-A, POWER SUPPLY, AUDIO, AND R-F CIRCUITS.

The first model, Radio Transmitter BC-578-A, differs in several respects from Radio Transmitter BC-578-E. (See figs. 24 and 25.) These differences are:

a. Filtering is provided in the transmitter itself rather than in the power supply. (See fig. 36.) Capacitor 14, 8-microfarad electrolytic, and capacitor 13-2, r-f by-pass, are used.

b. Radio Transmitter BC-778-A has no audio transformer and relies upon the cathode resistor alone for regeneration.

c. Condenser 7 (see fig. 23) tunes the circuit to about 1000 cycles with the help of other circuit constants.

d. Condenser 9-2 is provided in the circuit of grid G1 of V2 to by-pass stray r-f oscillations; this condenser has been eliminated in later models.

e. Inductor 17 is similarly provided to keep radio frequency from V1, but has been replaced by a resistor in later models.

f. Condenser 11-2 provides an r-f ground for the oscillator coil; in later models the ground has been instead provided through a coil for purposes of neutralization.

g. In the first model the plate is series-fed, rather than parallel-fed (as in later models), and a tap is provided on the tank coil to match the plate impedance.

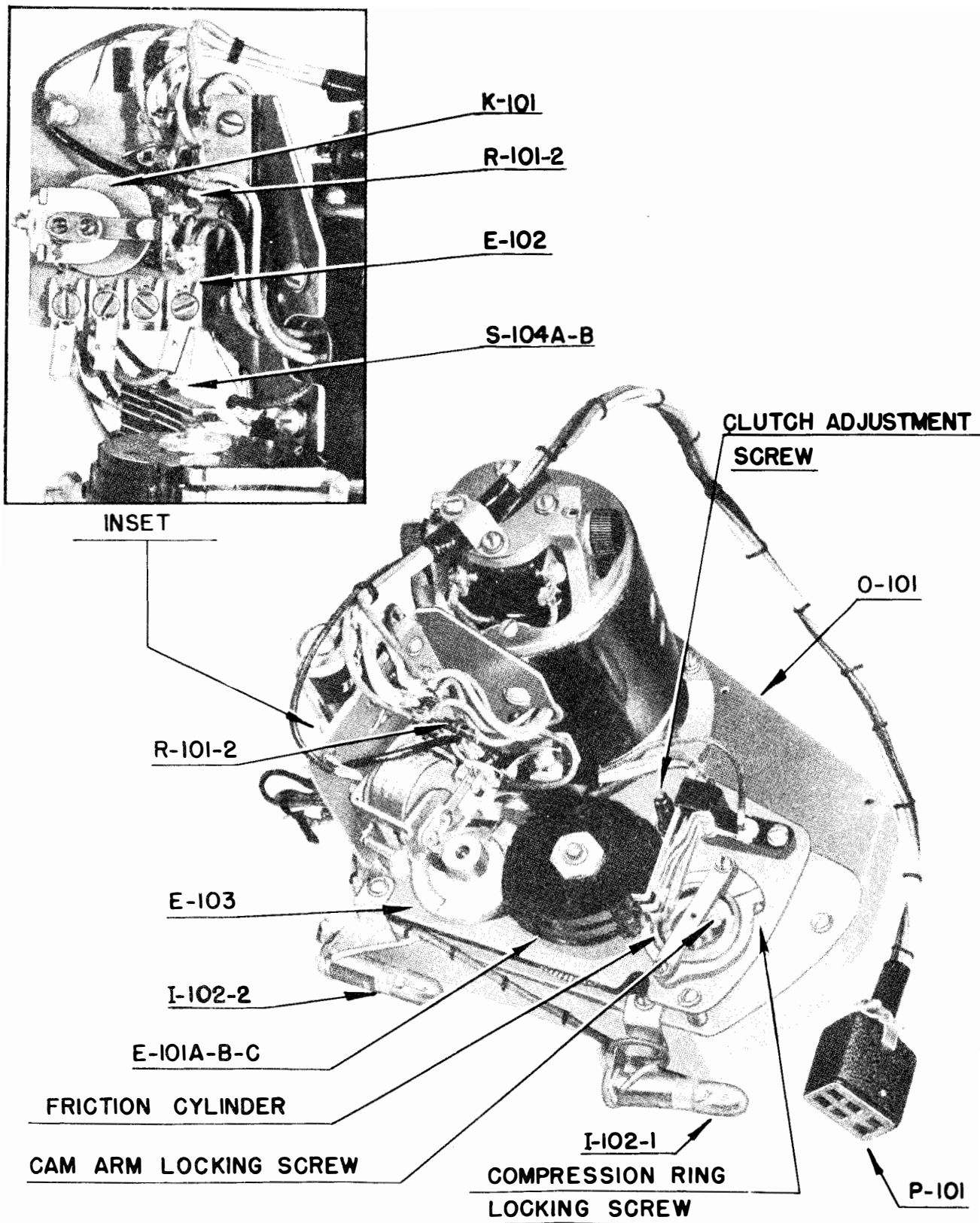


Figure 22—Gear Train and Keying Mechanism

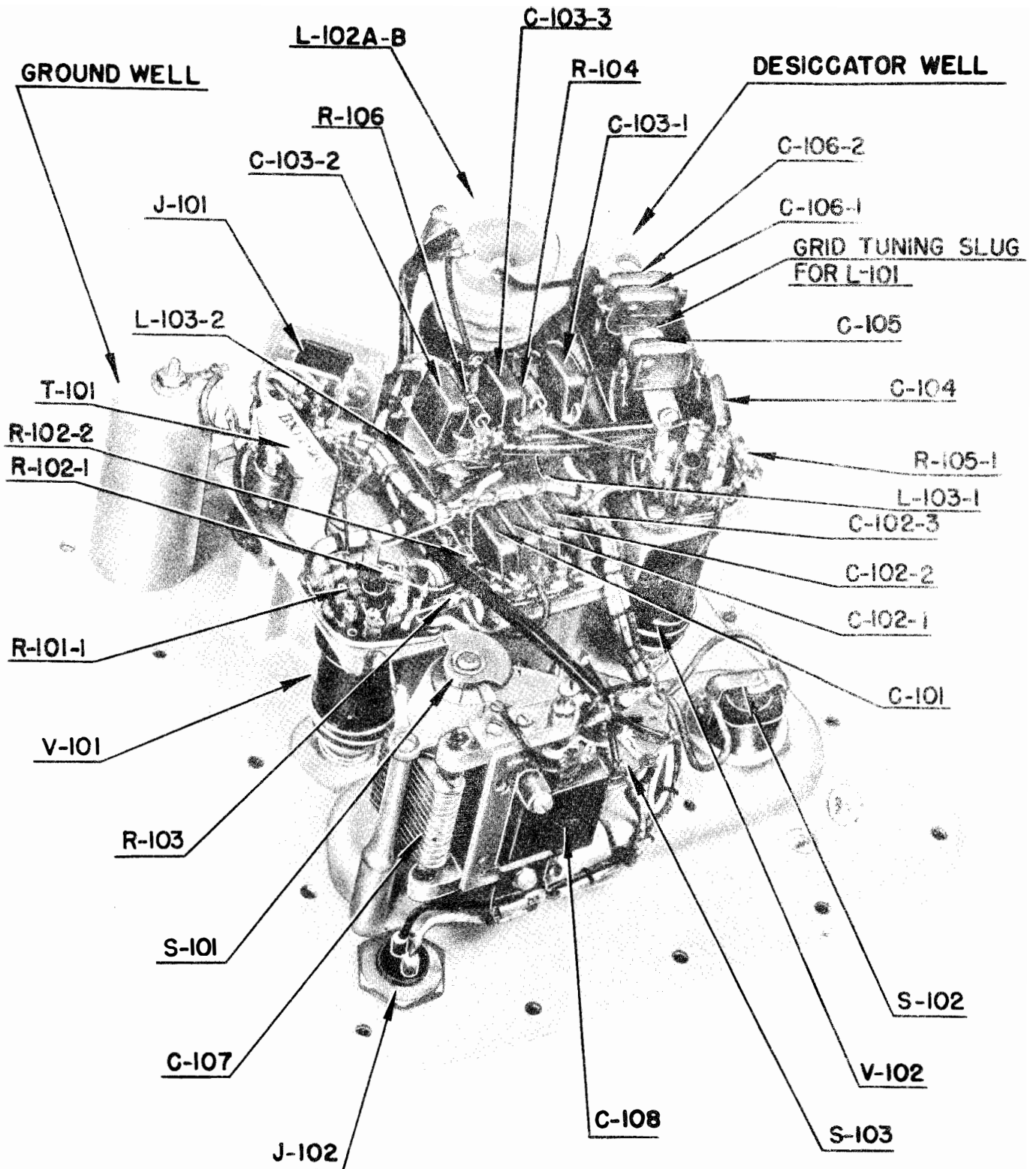


Figure 23—Radio Transmitter BC-778-B, BC-778-C, BC-778-D or BC-778-E, Parts Layout of Cover

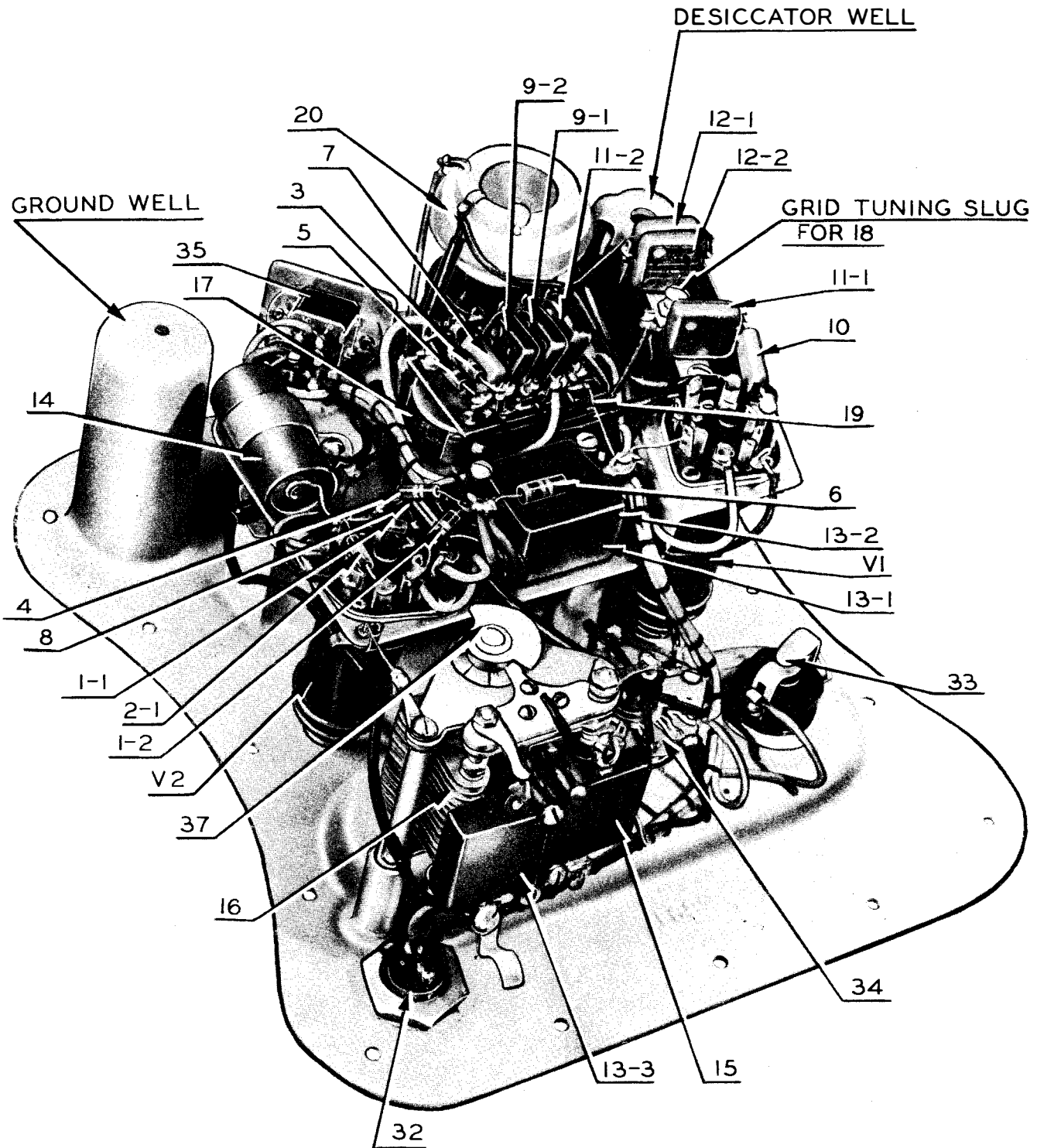


Figure 24—Radio Transmitter BC-778-A, Parts Layout of Cover

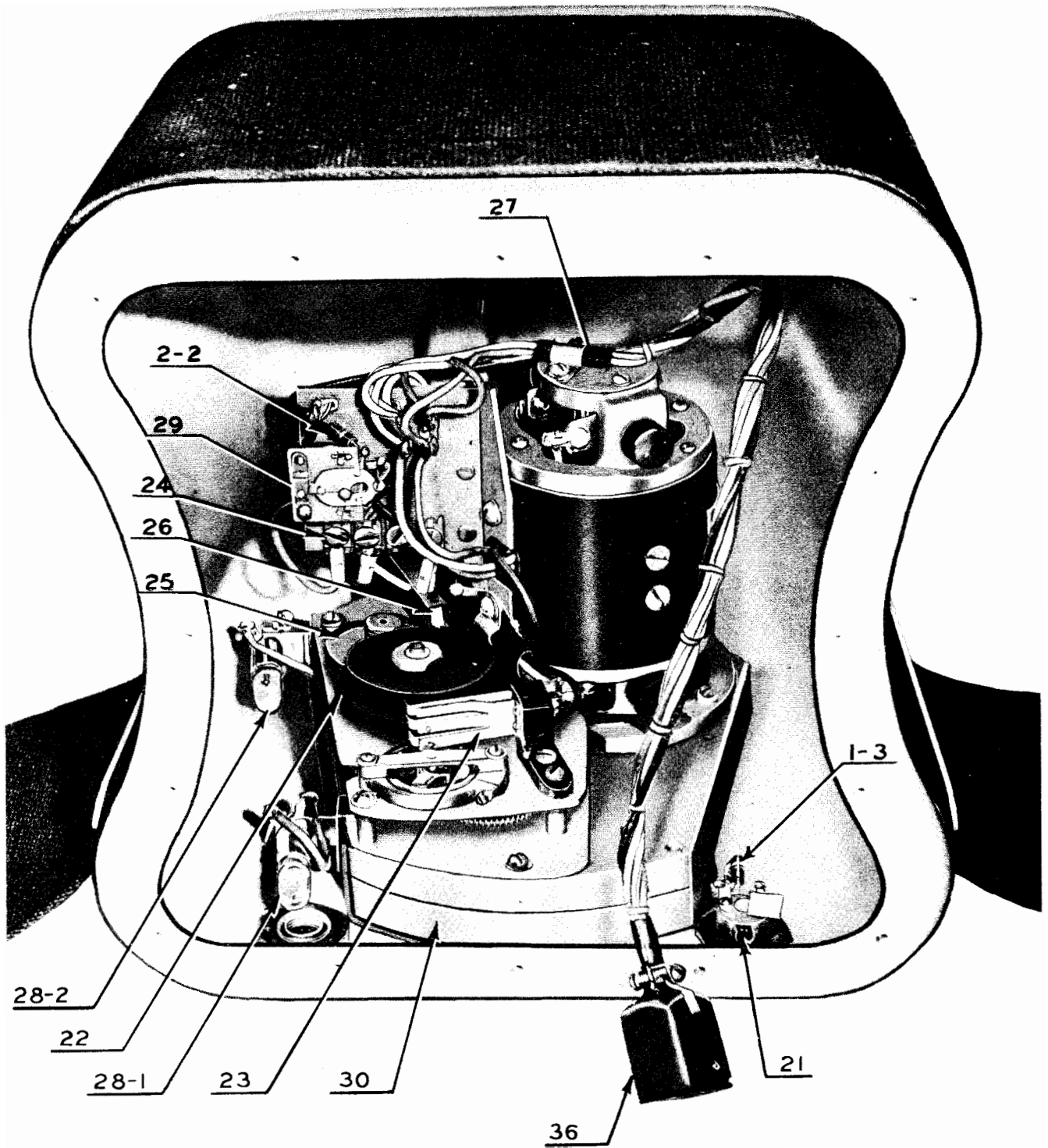


Figure 25—Radio Transmitter BC-778-A, Parts Layout of Cabinet

SECTION V MAINTENANCE

1. INSPECTION OF RADIO SET SCR-578-A OR SCR-578-B.

Give a monthly inspection, as set forth in the following sub-paragraphs, when in storage. When installed in an airplane, give the following inspection at the time of the regular 100 hour inspection.

a. Remove the radio transmitter from Bag BG-110-A or BG-155-A. Insert the crank. Connect Antenna A-98* between the antenna and ground connectors on the transmitter. Set the selector knob on the radio set in either AUTO 1 or AUTO 2 position. Turn the crank at approximately 80 r.p.m. and adjust the TUNING control to produce maximum brightness in the TUNE TO BRIGHTEST indicator. Check the automatic keying in both AUTO 1 and AUTO 2 position. The TUNE TO BRIGHTEST indicator shows that the transmitter is generating and delivering r-f power to the dummy antenna. At 80 r.p.m. the TUNE TO BRIGHTEST indicator should light and flash on and off with the keying. The full cycle will occupy 40 seconds which will include a 20-second dash and 20 seconds of automatic keying. Check the keying in the MANUAL position.

If no dummy antenna is available and the necessary parts cannot be secured, make the preceding tests without any load connected. The indications will not be so reliable but it will be possible to determine whether the set is working. Use a radio receiving set, if available, to monitor the output of the transmitter. No antenna need be connected, simply tune the receiver to 500 kc, turn the crank and listen on the receiver for the transmitted signal. These are emergency methods of checking and are to be used only when regular tests cannot be carried out. If the necessary equipment is available, use the following method when tuning the transmitter. Connect an r-f ammeter Ammeter IS-70, or the ammeter of Test Equipment IE-26 or Ammeter IS-27 or a similar 0-500

* Antenna A-98 is not a part of Radio Set SCR-578-A, but is included in the squadron communications kit as test equipment. If it is not available, a dummy antenna consisting of a 31-ohm 5-watt resistor and a 700-mmfd condenser may be substituted.

ma or higher range r-f milliammeter in series with Antenna A-98 and the antenna and ground terminals of the radio transmitter. Crank the transmitter long enough to allow the tubes to warm up. Depress the MANUAL KEY; the meter should read at least 250 ma.

NOTE

Do not disassemble the transmitter unless it fails to operate satisfactorily.

b. Plug in the signal lamp and rotate the selector knob until it is set at LIGHT at one of the three positions: AUTO 1, AUTO 2, or MANUAL. Check the signal light on all three positions. Rotate the crank at approximately 80 r.p.m.

c. Make a visual check of all other units in the accessory bag for possible mechanical damage. Do not open the sealed cans containing the balloon and the hydrogen generator. In repacking, carefully follow the sketch in figures 30 or 31 to avoid trouble.

d. Only *authorized* personnel shall unpack and check Parachute M-278-A or M-390-A. Do this at least once every 60 days.

e. Adequate lubrication is provided on all parts for the normal life of the equipment. Additional lubrication may be detrimental to its operation. The brushes of the generator should not require replacing.

f. If the radio transmitter is subject to continuous humid conditions, replace the desiccant monthly or whenever it changes color. This desiccant is silica gel and is normally blue. On absorbing moisture, it will turn pinkish white. A replacement may be obtained from authorized repair depots. Throw away the old silica gel in the sack, dry the sack and refill with fresh desiccant, *MAKING CERTAIN THAT THE SCREW-CAP COVERING OF THE SILICA-GEL CHAMBER IS SECURELY REPLACED. IF THE FRONT PANEL OF THE TRANSMITTER IS REMOVED, IT WILL BE NECESSARY TO RENEW THE DESICCANT.*

NOTE

In case it is impossible to replace the desiccator unit due to a shortage of supplies,

reactivate the dessicant as follows: Open the cloth bag containing the silica gel and remove the gel, placing it in a suitable flat pan. Heat the silica gel to a temperature of 350° F. (177° C.) until it assumes a deep blue color. During this heating it is advisable to stir the particles occasionally so that all are evenly heated. *Do not exceed a temperature of 400 degrees, or the activity of the silica gel may be permanently impaired.* Dry out the cloth bag thoroughly by heating, being careful not to burn the cloth. Refill the bag and replace in the equipment.

2. ELECTRICAL REPAIRS.

Attempt repairs only if adequate facilities and parts are at hand. Make sure only competent authorized personnel handle these repairs.

a. The grid-coil assembly is pre-tuned and sealed at the factory, and attempts to replace components of this assembly may make it impossible to tune the transmitter to 500 kc. Therefore, if any component of the grid-coil assembly composed of L-101, C-105, C-106-1, and C-106-2 (see fig. 38) is found to be defective, replace the entire assembly as a unit.

b. To remove tubes for testing or replacement, first remove the springs holding them in their sockets. Slide the small end of the spring out of its groove, then push the large end off the top of the tube, and finally slide the spring away to one side. Then take the tube out in the usual manner. Be sure to replace the spring after putting the tube back. It is advisable to check power output as described in section V, paragraph 1*a* after changing tubes.

c. To test or replace ballast lamps I-102-1 and I-102-2 (fig. 38), remove the lamps from their sockets and check continuity.

d. To replace or test the TUNE TO BRIGHTEST neon lamp (I-101), unsolder the leads connected to the lamp.

e. The generator is mounted in the transmitter cabinet attached to the gear-train case. This generator has two windings, one for low voltage, the other for high voltage. Except in Radio Transmitter BC-778-A, the two windings are connected in series to supply 328 volts of plate voltage. When the equipment is in normal radio-transmitting operation, the low-voltage winding supplies 28 volts at 160 ma and the high voltage winding supplies about 330 volts at 26 ma.

f. The tube-socket voltages between the pin and ground, key down, MANUAL position, with the crank being rotated at 80 r.p.m., are shown for Radio Transmitter BC-778-A in Section VI, Table IV.

g. Tube socket voltage and others for all models, except Radio Transmitter BC-778-A, are shown in figure 26. Readings refer to chassis ground and are taken with a 20,000-ohms-per-volt meter except when VTVM (vacuum tube voltmeter) is indicated next to the reading. All readings are approximate. The position of the wafer switch is RADIO AUTO 1 (as shown in the figure). Be sure to take readings during the 20-second dash. The type of load is the standard dummy antenna as described in *a* above. A power supply which furnishes the required voltages may be used; if such a power supply is not available, use the crank on the unit and turn at the speed required to light the indicator lamp.

b. Approximate voltages above chassis ground in the power supply for all models, except Radio Transmitter BC-778-A, are shown in figure 28. These readings were taken with a 20,000-ohms-per-volt meter and with the crank turned at the speed indicated above.

i. Approximate values of resistance for all models, except Radio Transmitter BC-778-A, are shown in figure 27 for the cover and in figure 29 for the power supply. These readings are all in ohms. In figure 27 the points between which the readings are to be taken are indicated by arrows. In figure 29 all readings are above the ground point indicated on the diagram.

3. MECHANICAL REPAIRS.

If any trouble arises with the generator, gear-train assembly, or governor gear-train assembly, obtain a complete unit to replace the defective one if possible. However, if such a replacement unit is not obtainable and if proper shop facilities and experienced personnel are available, follow the procedure outlined below.

a. If the generator brushes must be replaced, fit them to the commutator.

b. Lubricate the generator bearings only at the time they are replaced. To replace bearings it is necessary to remove the generator from the case. Remove the four screws and the spanner nut which hold the gear-train assembly and generator to the case. Next, remove the three screws at the base of the generator. The generator can then be removed from the gear train. Take off the gear and the four brushes on the armature shaft, noting polarity and position of each

brush. Removal of the two slotted head bolts in the end of the generator permits removal of the end bracket, giving access to the armature which may then be removed. Bearing pullers will be required to remove the bearings. Remove and discard the old bearings, then press new bearings into place. Check the lubricant before replacing the armature. It is recommended that only Andok C, manufactured by New Departure, be used as a lubricant on these bearings.

CAUTION

Be sure the transmitter generator is rotated a few times once every month to keep grease from freezing or packing in the bearings.

c. The governor and code-wheel adjustments are locked at the factory. Do not disturb without definite proof that they are out of adjustment. If corrections must be made, have highly accurate equipment for adjusting speeds of rotation. The governor is designed to operate at 1320 r.p.m. at any crank speed from 80 to 100 r.p.m. and must be adjusted to $\pm 3\%$ of this speed for proper operation. At this speed the code wheel revolves at 12 r.p.m., and the cam switch at $1\frac{1}{2}$ r.p.m. When the crank is turned at a speed greater than necessary, the clutch governor will cause the clutch to slip and thus maintain the timing mechanism at constant normal speed.

d. If adjustment of the timing mechanism is ABSOLUTELY necessary, first try to correct by use of the fine adjustment. Loosen the compression-ring locking screw and rotate the friction cylinder; the conical inner surface causes the braking action to increase when the cylinder is rotated clockwise (lower speed) and causes the braking action to decrease when rotated counter-clockwise (higher speed). Rotate the friction cylinder by using a scribe or other sharp-pointed object in the holes provided in the cylinder (see fig. 22). Following this adjustment tighten the compression ring locking screw.

WARNING

Only where the above procedure is not effective, make the following adjustment.

e. Loosen the cam-arm locking screw on the rotating assembly (see fig. 22) and move the cam arm to right or left, thus changing the spring tension. Turn clockwise for lower speed and counterclockwise for higher speed. Tighten the cam arm locking screw.

f. Synchronize the code wheel with the cam switch so that the cam switch completes its change-over in the one-second interval during which the code-wheel contacts are traversing the 72-degree space on the code wheel (see fig. 22). Make this adjustment as follows:

(1) Loosen the code-wheel lock-nut so that the code wheel turns freely on its shaft.

(2) Turn the crank until the cam-switch contacts are exactly in the center of their vertical travel (all cam-switch contacts open).

(3) Turn the code wheel until its contact operating fingers rest exactly in the center of the 72-degree space.

(4) Lock the code wheel in this position by tightening the lock-nut.

4. SELECTION OF OTHER SIGNAL SEQUENCES.

The signal sequence of AUTO 1 and AUTO 2 positions are set at the factory and are indicated on the transmitter. If it becomes necessary to change the sequence, first remove the front panel from the transmitter case.

a. A table of signal sequences for Radio Transmitter BC-778-A will be found in TABLE II of Section VI. The practical wiring diagram, figure 33, illustrates the mechanism and terminal strip used.

b. A table of signal sequences for Radio Transmitter BC-778-B, BC-778-C, BC-778-D, BC-778-E and BC-778-F will be found in TABLE III, Section VI. Practical wiring diagram, figure 35, illustrates the mechanism and terminal strip used.

SECTION VI
SUPPLEMENTARY DATA

TABLE II—SIGNAL SEQUENCES FOR AUTOMATIC POSITIONS OF RADIO TRANSMITTER BC-778-A

AUTO 1 POSITION

<i>Link Together Terminals Whose Numbers Are</i>		<i>Signal Transmitted A Repeating Cycle of</i>	
		<i>20 Seconds of</i>	<i>Followed by 20 Seconds of</i>
1 and 5	4 and 6	SOS	DASH (Solid)
2 and 5	4 and 6	AA	DASH (Solid)
1 and 5	2 and 6	SOS	AA
1 and 5	1 and 6	SOS	SOS
2 and 5	2 and 6	AA	AA
4 and 5	4 and 6	DASH (Solid)	DASH (Solid)
1 and 5	3 and 6	SOS	AUTOMATIC ALARM
2 and 5	3 and 6	AA	AUTOMATIC ALARM
4 and 5	3 and 6	DASH (Solid)	AUTOMATIC ALARM
3 and 5	3 and 6	AUTOMATIC ALARM	AUTOMATIC ALARM

AUTO 2 POSITION

<i>Link Together Terminals Whose Numbers Are</i>		<i>Signal Transmitted A Repeating Cycle of</i>	
		<i>20 Seconds of</i>	<i>Followed by 20 Seconds of</i>
1 and 7	4 and 8	SOS	DASH (Solid)
2 and 7	4 and 8	AA	DASH (Solid)
1 and 7	2 and 8	SOS	AA
1 and 7	1 and 8	SOS	SOS
2 and 7	2 and 8	AA	AA
4 and 7	4 and 8	DASH (Solid)	DASH (Solid)
1 and 7	3 and 8	SOS	AUTOMATIC ALARM
2 and 7	3 and 8	AA	AUTOMATIC ALARM
4 and 7	3 and 8	DASH (Solid)	AUTOMATIC ALARM
3 and 7	3 and 8	AUTOMATIC ALARM	AUTOMATIC ALARM

TABLE III—SIGNAL SEQUENCES FOR AUTOMATIC POSITIONS OF RADIO TRANSMITTER BC-778-B,
BC-778-C, BC-778-D, BC-778-E OR BC-778-F

AUTO 1 POSITION

<i>Link Together Terminals Whose Numbers Are</i>		<i>Signal Transmitted A Repeating Cycle of</i>	
		<i>20 Seconds of</i>	<i>Followed by 20 Seconds of</i>
1 and 6	4 and 5	SOS	DASH (Solid)
2 and 6	4 and 5	AA	DASH (Solid)
1 and 5	2 and 6	SOS	AA
1 and 5	1 and 6	SOS	SOS
2 and 5	2 and 6	AA	AA
4 and 5	4 and 6	DASH (Solid)	DASH (Solid)
1 and 5	3 and 6	SOS	AUTOMATIC ALARM
2 and 5	3 and 6	AA	AUTOMATIC ALARM
4 and 5	3 and 6	DASH (Solid)	AUTOMATIC ALARM
3 and 5	3 and 6	AUTOMATIC ALARM	AUTOMATIC ALARM

AUTO 2 POSITION

<i>Link Together Terminals Whose Numbers Are</i>		<i>Signal Transmitted A Repeating Cycle of</i>	
		<i>20 Seconds of</i>	<i>Followed by 20 Seconds of</i>
1 and 8	4 and 7	SOS	DASH (Solid)
2 and 8	4 and 7	AA	DASH (Solid)
1 and 7	2 and 8	SOS	AA
1 and 7	1 and 8	SOS	SOS
2 and 7	2 and 8	AA	AA
4 and 7	4 and 8	DASH (Solid)	DASH (Solid)
1 and 7	3 and 8	SOS	AUTOMATIC ALARM
2 and 7	3 and 8	AA	AUTOMATIC ALARM
4 and 7	3 and 8	DASH (Solid)	AUTOMATIC ALARM
3 and 7	3 and 8	AUTOMATIC ALARM	AUTOMATIC ALARM

TABLE IV—TUBE SOCKET VOLTAGES FOR RADIO TRANSMITTER BC-778-A

NOTE

All readings were taken with a 20000 ohm-per-volt meter, and the radio transmitter was working into a phantom antenna consisting of a 31-ohm resistor in series with a 700-micromicrofarad condenser.

<i>Pin Number</i>	<i>Tube VI (12SC7)</i>		<i>Tube V2 (12A6)</i>	
	<i>Voltage</i>	<i>Voltmeter Scale</i>	<i>Voltage</i>	<i>Voltmeter Scale</i>
1	GR	0	GR	0
2	120	250	GR	0
3	—5	10	*300	1000
4	—15	50	200	250
5	250	250	*—85	250
6	1.3	2.5	NC	NC
7	14	50	15	50
8	28	50	.75	2.5

* It is necessary to take these readings through an r-f choke connected directly to the tube pin or the radio transmitter will go out of oscillation, and a true reading will not be obtained.

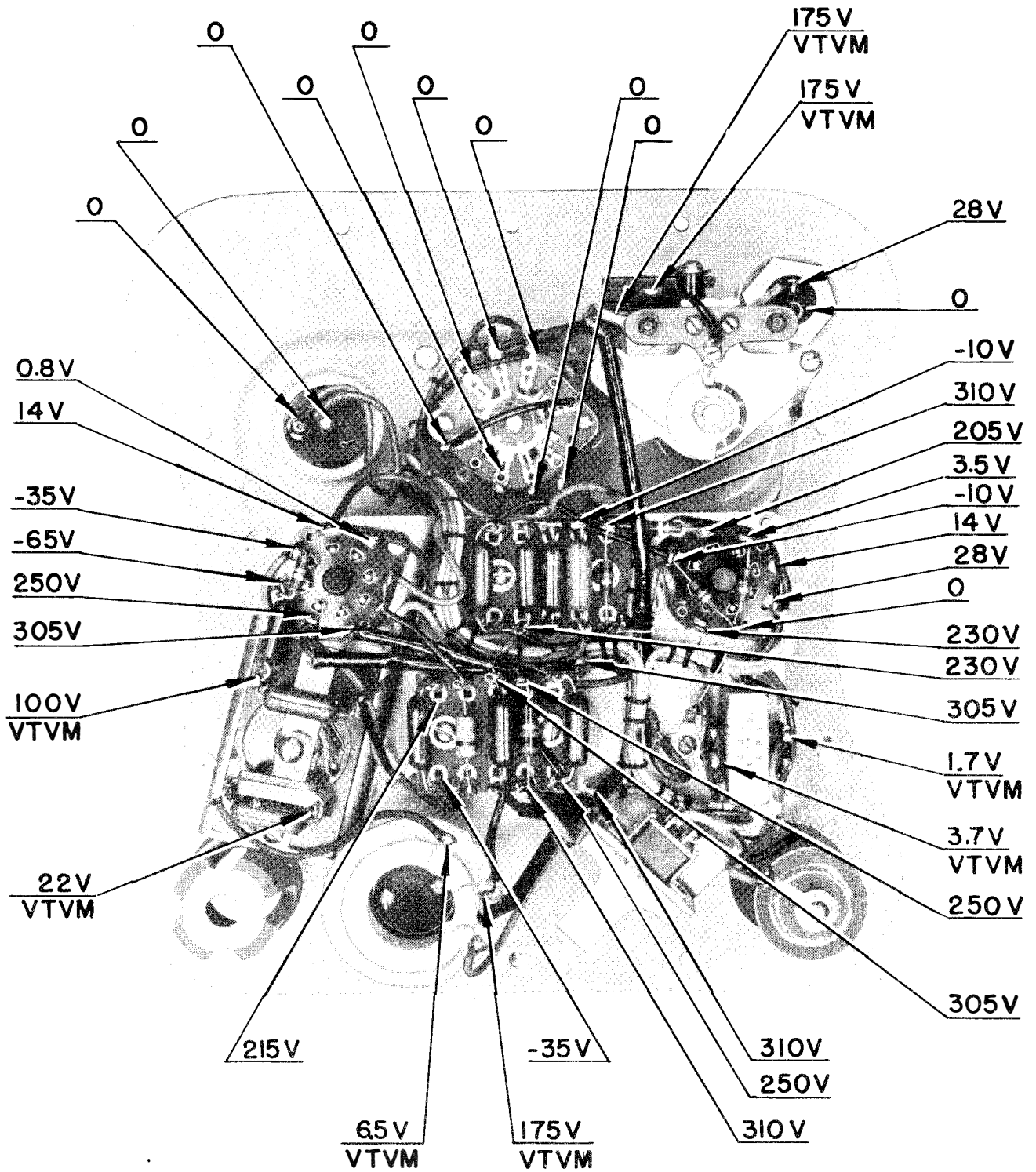


Figure 26—Radio Transmitter BC-778-C, BC-778-D or BC-778-E, Point Voltages of Cover

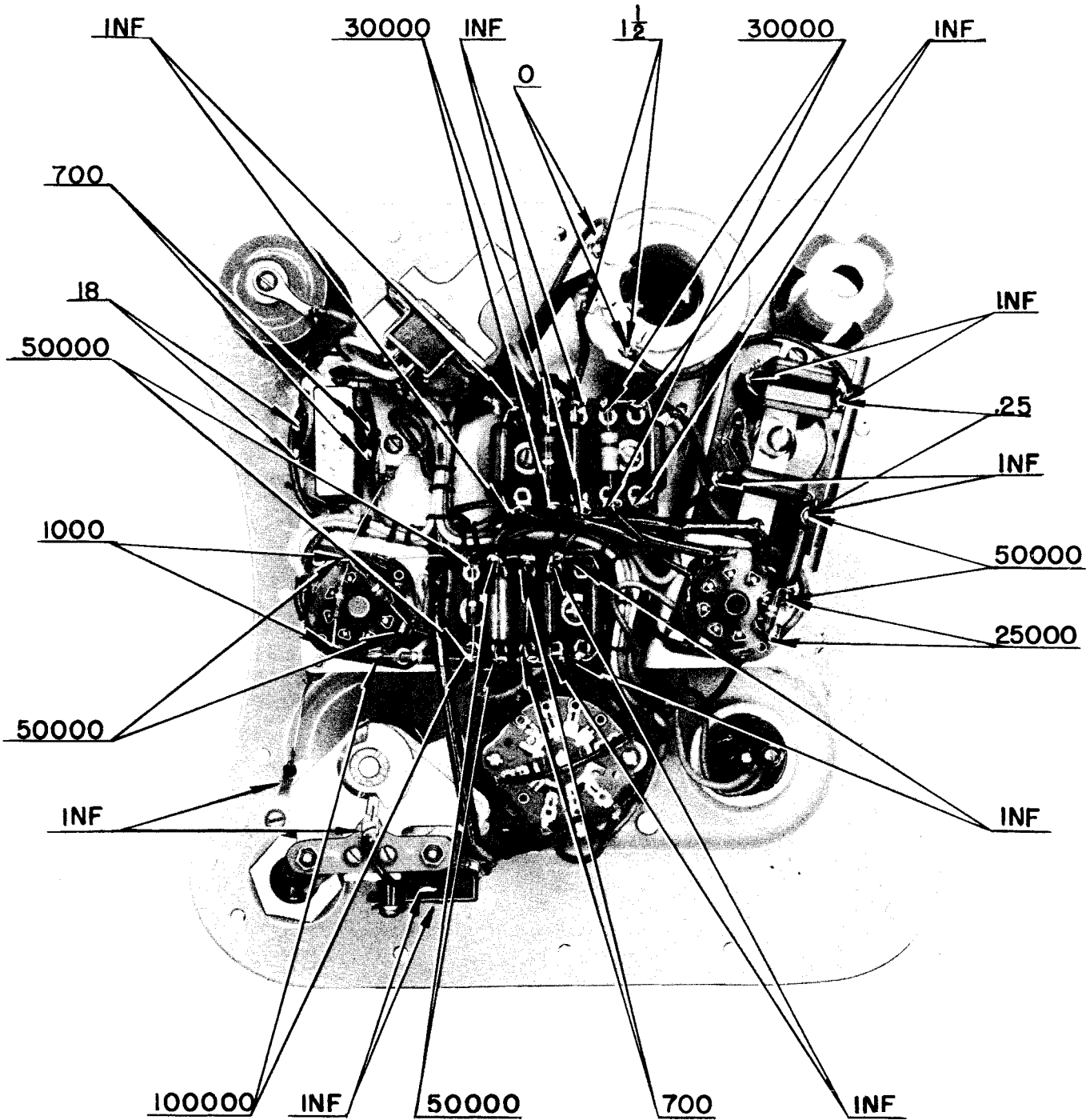


Figure 27—Radio Transmitter BC-778-C, BC-778-D or BC-778-E, Point Resistances of Cover

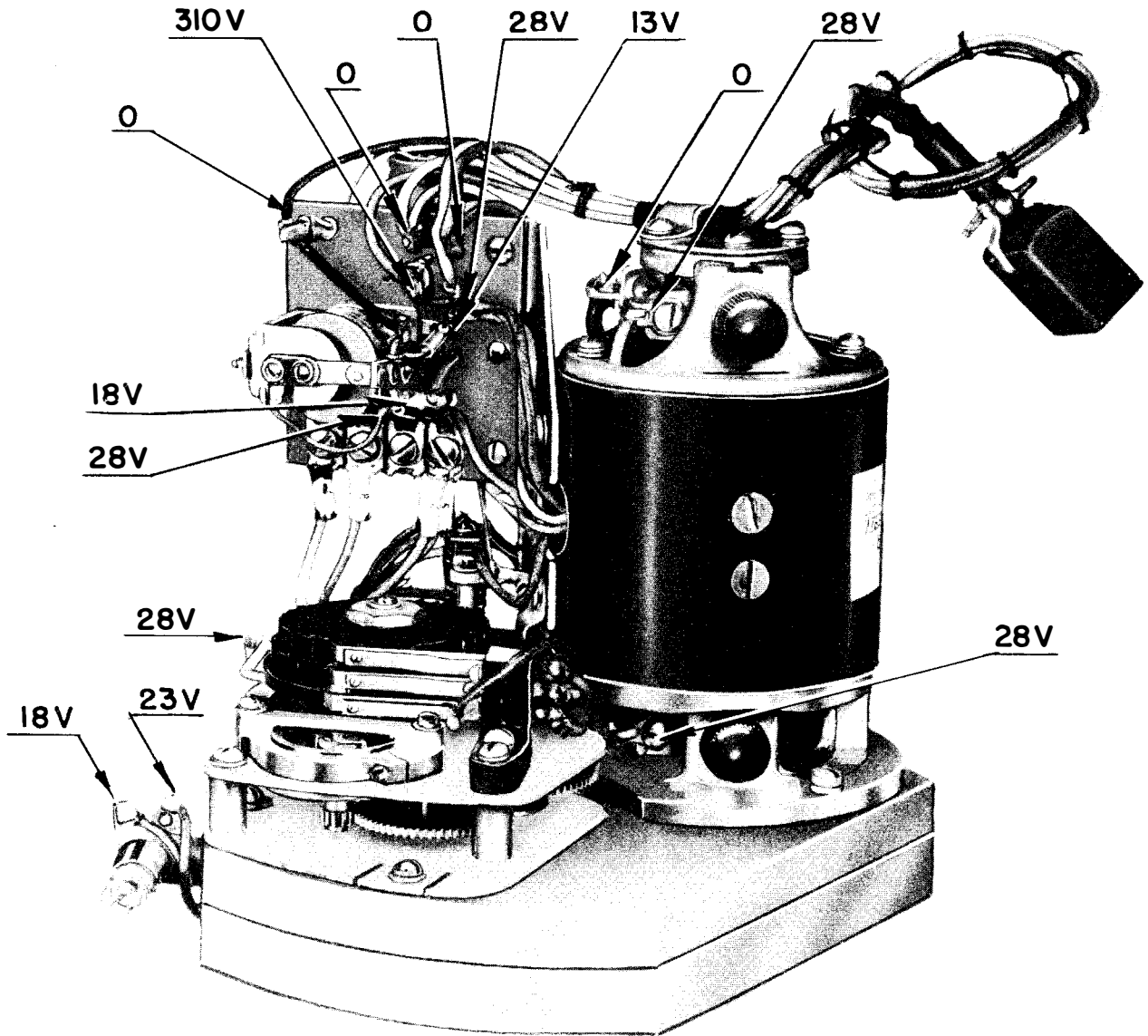


Figure 28—Radio Transmitter BC-778-C, BC-778-D or BC-778-E, Point Voltages of Power Supply

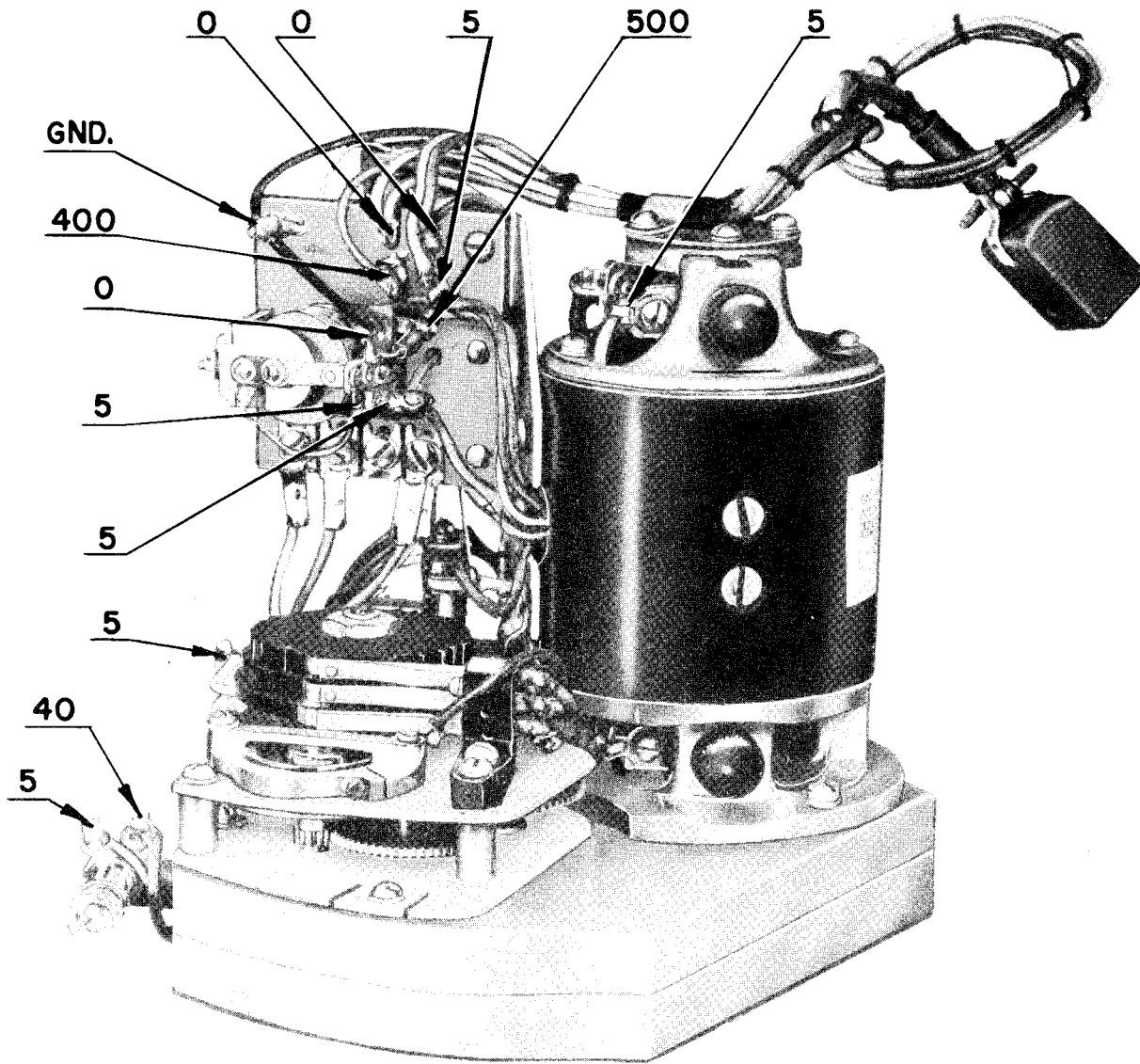


Figure 29—Radio Transmitter BC-778-C, BC-778-D or BC-778-E, Point Resistances of Power Supply

SECTION VII
TABLE OF REPLACEABLE PARTS

NOTE

Each Service using this list has established certain depots and service groups for the storage and issue of spare parts to its organizations requiring them. The regulations of each Service should be studied to determine the method and source for requisitioning spare parts. The information in this list, as to manufacturer's or contractor's name, type, model or drawing number, is not to be interpreted as authorization to field agencies to attempt to purchase identical or comparable spare parts direct from the manufacturer or a wholesale or retail store except under emergency conditions as covered by existing regulations of the Service concerned.

MODEL: RADIO SET SCR-578-A

MAJOR UNIT: RADIO TRANSMITTER BC-778-B-C-D-E-F

<i>Reference Symbol</i>	<i>Army Stock Number Navy Type Number British Reference Number</i>	<i>Name of Part and Description</i>	<i>Function</i>	<i>Mfr. and Designation</i>	<i>Drawing or Specification No.</i>
C-101	3DA1.500-3	CAPACITOR: fixed; mica; 1500 micromicrofarads; $\pm 20\%$; 500 volts d-c working; bakelite case; case dimensions $\frac{3}{4}$ " long, $\frac{3}{4}$ " wide, $\frac{1}{4}$ " thickness; axial terminal leads.	Audio Oscillator grid coupling	Micamold W	Bendix BX-37-63
C-102	3DKA3-49	CAPACITOR: fixed; mica; 3000 micromicrofarads; $\pm 20\%$; 500 volts d-c working; XM262 low loss moulding bakelite case, $1\frac{1}{16}$ x $\frac{3}{4}$ x $\frac{3}{8}$ "; axial leads		Micamold W	Bendix BX-37-58
C-102-1		See C-102	Audio Oscillator tuning condenser		
C-102-2		See C-102	Audio Oscillator coupling condenser		
C-102-3		See C-102	Audio Oscillator coupling condenser		
C-103	3DKA1-108	CAPACITOR: fixed; mica; 1000 micromicrofarads; $\pm 20\%$; 500 volts d-c working; XM262 low loss molded bakelite case, $1\frac{1}{16}$ x $\frac{3}{4}$ x $\frac{3}{8}$ "; axial leads		Micamold W	Bendix BX-37-59
C-103-1		See C-103	Audio coupling		
C-103-2		See C-103	R-F screen by-pass		
C-103-3		See C-103	R-F plate coupling		
C-104	3D9500-69	CAPACITOR: fixed; mica; 500 micromicrofarads; $\pm 20\%$; 500 volts d-c working; moulded bakelite case; case dimensions $\frac{3}{4}$ " long, $\frac{1}{16}$ " wide, $\frac{3}{16}$ " thickness; axial terminal leads	R-F grid coupling	Micamold Type O	Bendix 1 BX-37-66
C-105		CAPACITOR: part of T-102; (not to be replaced independently)	R-F Oscillator tuning		

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Section VII

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SET SCR-578-A

MAJOR UNIT: RADIO TRANSMITTER BC-778-B-C-D-E-F

Reference Symbol	Army Stock Number Navy Type Number British Reference Number	Name of Part and Description	Function	Mfr. and Designation	Drawing or Specification No.
C-106		CAPACITOR: part of T-102; (not to be replaced independently)			
C-106-1		See C-106	R-F Oscillator tuning		
C-106-2		See C-106	R-F Oscillator tuning		
C-107	2CK6596-778A/A1.1	CAPACITOR: variable; air; 245 micromicrofarads max. to 20 micromicrofarad min.; $\pm 1\%$; 0.093 plate spacing; 13 stator plates; 14 rotor plates; $\frac{1}{4}$ " shaft $1\frac{1}{4}$ " long $\frac{3}{16}$ " slot in end for slip on spring center knob; brass plated plates and shaft; special rotor terminal switch on back so that rotor connection is made only over 180 degrees; brown bakelite insulation; mtg. bar on bottom with four No. 6-32 thread mtg. holes $\frac{3}{16}$ " x $1\frac{1}{16}$ " centers; dimensions 3" long x $2\frac{1}{2}$ " x $\frac{3}{4}$ " high with plates meshed, exclusive of shaft; $2\frac{1}{4}$ " high plates out of mesh	Antenna tuning	Mission-Bell special	Bendix 4670 modified to include BX-57-11 (Change order N2)
C-108	3DK9200-36.1	CAPACITOR: fixed; mica; 200 micromicrofarads; $\pm 10\%$; 2500 volts d-c working; bakelite case; salt water seal; case dimensions $1\frac{1}{4}$ " long, $1\frac{1}{8}$ " wide, $\frac{1}{4}$ " thickness; lug terminal leads	Antenna padding capacitor	Cornell-Dubilier 4S-53020	Bendix BX-37-97
C-109	3DB8-31	CAPACITOR: fixed; tubular dry electrolytic; 8 microfarads; 450 volts; dimensions $1\frac{3}{4}$ " long x $\frac{9}{16}$ " diameter; axial leads $1\frac{1}{2}$ " long	High voltage filter	Solar M-408	Bendix BX-38-8
E-101	2CK6596-778A/W4	WHEEL ASSEMBLY: code; moulded black bakelite includes brass bushing cadmium plated $\frac{7}{8}$ " long x $\frac{5}{16}$ " O.D. by $\frac{3}{16}$ " I.D. and $\frac{3}{16}$ " x $\frac{1}{8}$ " nut; keying wheel $\frac{1}{2}$ " thick over $\frac{3}{16}$ " wide flange with $\frac{3}{4}$ " hub containing bushing; 3 code tracks, edges notched to key SOS, AA and automatic dash, on face; dimensions 2" diameter x $\frac{3}{4}$ " thick	Automatic coding	Bendix 4775	Bendix 4775 (Change order F1)
E-101A		Part of E-101	SOS characters		
E-101B		Part of E-101	AA characters		
E-101C		Part of E-101	Automatic dash characters		

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TABLE OF REPLACEABLE PARTS

MODEL: RADIO SET SCR-578-A

MAJOR UNIT: RADIO TRANSMITTER BC-778-B-C-D-E-F

Reference Symbol	Army Stock Number Navy Type Number British Reference Number	Name of Part and Description	Function	Mfr. and Designation	Drawing or Specification No.
E-102		4 Terminal contact strip; part of K-102			
E-103		SWITCH CAM: zamac; attached to governor-gear train; 180° make and 180° break; dimensions 1½" diameter 5/32" hub; part of S-104	Code change over cam	Bendix	
G-101	3HK4495-1	POWER UNIT ASSEMBLY: including gear case and gear train with socket 1¼" diameter with 1½" square cut out hole for crank; a governor and gear train assembly; generator supplying 300 volts, 25 milliamperes, 28 volts, 160 milliamperes, completely assembled, overall dimensions 6⅞" long x 5½" wide x 6" deep. Includes 0-101	High and low voltage generator	Bendix	Bendix 4504 (Change order T1) and 15000
H-101	4B462A	CRANK ASSEMBLY: GC-18-A; consists of steel L-shaped frame with moulded plastic bakelite rotating hand grip, pawl spring, crank ratchet, ratchet pawl, and hub screw assembly; all metal parts cadmium plated; string attached to frame to anchor crank dimensions 6⅞" long x 1" to ¾" wide taper handle x 5/16" thick	Power supply crank	Pyrne Co. Special	Bendix 4506 (Change order K1)
I-101	2Z5889-2	LAMP: neon; two ¾" wire leads on one end; other end pointed; ¼" diameter x 1⅓" exclusive of leads	R-F indicator	G.E. NE-2	BX79-3
I-102	2ZK5935.4	LAMP: bayonet; 1 amp; 28 volts; 1⅓" long x 7/16" diameter		G.E.	Bendix BX19-4
I-102-1		See I-102	Indicator for speed of generator		
I-102-2		See I-102	In series with I-102-1		
J-101	2Z8639-7	RECEPTACLE: female; 6 contact; 3 rows of 2 contacts each; moulded bakelite insulation; black krinkle finish metal encased with 3/8" diameter wire opening at back end with adjustable aluminum wire clamp to hold cable; dimensions 1½" long x 1" wide x 3/8" thick	Power connection to transmitter	Jones Type S-306-CCT	Bendix BX-34-62
J-102	2ZK7512-18	RECEPTACLE: moulded bakelite; two plated brass inserts ¾" long x 3/16" diameter, 9/32" centers; dimensions, 7/8" diameter x ¾" long	Receptacle for signal light		Bendix 4632-H

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Section VII

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SET SCR-578-A

MAJOR UNIT: RADIO TRANSMITTER BC-778-B-C-D-E-F

<i>Reference Symbol</i>	<i>Army Stock Number Navy Type Number British Reference Number</i>	<i>Name of Part and Description</i>	<i>Function</i>	<i>Mfr. and Designation</i>	<i>Drawing or Specification No.</i>
K-101	2ZK7636-8	RELAY ASSEMBLY: consists of single pole double throw relay, contacts normally open; 1000 ohms coil for 28 volts, single hole mounting by 6-32 stud $\frac{1}{16}$ " long; relay fastened to mounting shelf and bracket; 4 screw type lugs on a bakelite strip at one end; 5 Cinch soldering lugs on other end; dimensions $1\frac{1}{2}$ " long x 1" wide x $1\frac{1}{4}$ " deep, exclusive of terminals; $\frac{3}{16}$ " wide $\frac{1}{16}$ " thick x $\frac{1}{4}$ " long locating pin; 8 microfarads, 450-volt tubular dry electrolytic condenser mounted on opposite side of mounting bracket from relay; overall dimensions of assembly $2\frac{1}{8}$ " deep x $3\frac{3}{8}$ " long x $2\frac{1}{4}$ " wide Includes C-109	Voltage regulation and high voltage filter	Bendix 4794 Relay only Leach type P3	Bendix 4794 (Change order P1)
K-102	2C6596-778A/K2	CONTACT ASSEMBLY: consists of 3 steel cadmium plated keying contact fingers and 3 contacts mounted on $1\frac{1}{16}$ " long x $\frac{1}{4}$ " x $\frac{3}{8}$ " moulded L-shaped bakelite form; contacts staggered in $\frac{1}{8}$ " deep steps, one for each finger; $2\frac{1}{8}$ " mounting holes, $\frac{5}{16}$ " center; one solder terminal for all three contacts and 3 solder terminals for fingers; dimensions $1\frac{7}{16}$ " x $1\frac{3}{4}$ " Includes E-102	Automatic keyer	Bendix	Bendix 4767 (Change order G)
K-102A		Part of K-102	SOS contacts		
K-102B		Part of K-102	AA contacts		
K-102C		Part of K-102	Automatic dash contacts		
L-101		Part of T-102 (not to be replaced independently)	R-F Oscillator grid inductance	Bendix	Bendix 4655 (Change order K1)

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TABLE OF REPLACEABLE PARTS

MODEL: RADIO SET SCR-578-A

MAJOR UNIT: RADIO TRANSMITTER BC-778-B-C-D-E-F

Reference Symbol	Army Stock Number Navy Type Number British Reference Number	Name of Part and Description	Function	Mfr. and Designation	Drawing or Specification No.
L-102	3CK1084C-1	COIL ASSEMBLY: plate; (includes neutralizing coil), plate coil 47 turns No. 80/41 SSE Litz wire; neutralizing coil 5 turns No. 20 D.C.C. wire; both coils wound clockwise and thoroughly coated with hallowax; 3 solder terminals moulded into top of form; plate coil connections center and left terminals; neutralizing coil outside terminals; moulded bakelite form 1 3/4" high x 1 3/8" diameter except ring at base 1 5/8" diameter; 2 6-32 mounting holes tapped in base 5/8" centers Includes L-102A and L-102B	Plate coil assembly	Bendix	Bendix 15150 (Change order D1)
L-102A		Part of L-102	R-F plate inductance		
L-102B		Part of L-102	R-F neutralizing inductance		
L-103	3CK336-27	CHOKER: r-f; 2.5 millihenry; 10%; No. 36 SSE wire; wound on 1/2" diameter x 1/2" long wood dowel; riveted to 1 1/8" O.D. spauldite base holding 2 tinned solder terminals	Choke	Teleradio Eng.	Bendix BXSP18-11
L-103-1		See L-103	Oscillator cathode choke		
L-103-2		See L-103	R-F plate choke		
O-101		GEAR TRAIN: part of G-101	Generator drive		
P-101	2Z7227-2	PLUG: male; 6 contacts; 3 rows of 2 contacts each 1/16" long; moulded bakelite insulation; mounting nickel plated bracket attached each side with two 3/64" mounting holes 1" centers; dimensions 1" long x 1 1/16" wide x 1 1/16" deep; terminals numbered 1 to 6	Power connection to transmitter	Jones type P-306-AB	Bendix BX-34-60
R-101	3Z6100-58	RESISTOR: fixed; carbon material; 1000 ohms; ± 10%; 1/2 watt; insulated; length 3/8"; diameter 9/64"; axial wire leads, 1 1/2" long		Allen-Bradley EB	Bendix BX-21-14-E
R-101-1		See R-101	Cathode bias resistor		
R-101-2		See R-101	In series with voltage regulator		

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Section VII

TABLE OF REPLACEABLE PARTS

MODEL: RADIO SET SCR-578-A

MAJOR UNIT: RADIO TRANSMITTER BC-778-B-C-D-E-F

Reference Symbol	Army Stock Number Navy Type Number British Reference Number	Name of Part and Description	Function	Mfr. and Designation	Drawing or Specification No.
R-102	3Z6650-52	RESISTOR: fixed; carbon material; 50000 ohms; $\pm 10\%$; $\frac{1}{2}$ watt; insulated; length $\frac{3}{8}$ "; diameter $\frac{3}{64}$ "; axial wire leads $1\frac{1}{2}$ " long		Allen-Bradley EB	Bendix BX-21-31-E
R-102-1		See R-102	Grid load resistor		
R-102-2		See R-102	Plate load resistor		
R-103	3Z6700-61	RESISTOR: fixed; carbon material; 100000 ohms; $\pm 10\%$; $\frac{1}{2}$ watt; insulated; length $\frac{3}{8}$ "; diameter $\frac{3}{64}$ "; axial wire leads; $1\frac{1}{2}$ " long	Plate load resistor	Allen-Bradley EB	Bendix BX-21-34-E
R-104	3Z6630-19	RESISTOR; fixed; carbon material; 30000 ohms; $\pm 10\%$; $\frac{1}{2}$ watt; insulated; length $\frac{3}{8}$ "; diameter $\frac{3}{64}$ "; axial wire leads	Grid leak	Allen-Bradley EB	Bendix BX-21-29-E
R-105		RESISTOR: fixed; carbon material; 25000 ohms; $\pm 10\%$; $\frac{1}{2}$ watt; insulated; length $\frac{3}{8}$ "; diameter $\frac{3}{64}$ "; axial wire leads $1\frac{1}{2}$ " long		Allen-Bradley EB	Bendix BX-21-28-E
R-105-1		See R-105	Grid leak		
R-105-2		See R-105	Grid limiting resistor		
R-106		RESISTOR: fixed; carbon material; 30000 ohms; $\pm 10\%$; 1 watt; insulated; length $\frac{9}{16}$ "; diameter $\frac{1}{32}$ "; axial wire leads	Screen load resistor	Allen-Bradley GB-1	Bendix BX-22-29-E
R-107	3Z6725-21	RESISTOR: fixed; carbon material; 250000 ohms; $\pm 10\%$; $\frac{1}{2}$ watt; insulated; length $\frac{3}{8}$ "; diameter $\frac{3}{64}$ "; axial wire leads, $1\frac{1}{2}$ " long	In series with r-f indicator	Allen-Bradley EB	Bendix BX-21-38-E

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TABLE OF REPLACEABLE PARTS

MODEL: RADIO SET SCR-578-A

MAJOR UNIT: RADIO TRANSMITTER BC-778-B-C-D-E-F

Reference Symbol	Army Stock Number Navy Type Number British Reference Number	Name of Part and Description	Function	Mfr. and Designation	Drawing or Specification No.
S-101		SWITCH: special rotor terminal switch; part of C-107			
S-102	3ZK3618	KEY ASSEMBLY: manual; consists of moulded bakelite housing $\frac{7}{8}$ " long x 1" diameter outside threaded for $\frac{1}{4}$ " to screw into front panel from the rear; with 2 solder pins at back; 1 tapered steel spring with guide end into one solder pin on base; one plunger fits into top of spring; one brass washer; hat type rubber gasket	Manual key	Bendix	Bendix 15250 (Change order C1) 4639 (Change order F) 15254 (Change order A) 15253 (Change order B)
S-103	2C6596-778A/S1	SWITCH: rotary; wafer type; continuous rotation; single section; 3 circuits or poles; 2 positions; bakelite insulation; dimensions $\frac{3}{8}$ " long; $1\frac{1}{16}$ " diameter; solder terminals located around wafer; shaft $1\frac{1}{4}$ " long x $\frac{1}{4}$ " diameter, $\frac{3}{8}$ " long slot for center spring knob $\frac{3}{32}$ " wide x $\frac{1}{2}$ " shoulder; mounting dimensions, spacer—two No. 6-32 screws; mounting centers $1\frac{1}{16}$ "; without position indicating plate; without attaching hardware	Selector	Oak	Bendix BXSP16-54
S-104	2C6596-778A/A2	SWITCH ASSEMBLY: cam; DPST; normally held open by springs; laminated bakelite insulation; bakelite base; 4 contacts; bakelite insulated pointer makes and breaks contacts over cam surface, closing two and opening two; 6 solder terminals at rear; $\frac{3}{8}$ " mounting centers No. 6-32 thread; dimensions 2" long x $\frac{3}{8}$ " thick x $1\frac{1}{8}$ " wide	Keyer change over	Bendix	Bendix 4770 (Change order H1)
S-104A		Part of S-104	Coding change over switch		
S-104B		Part of S-104	Automatic dash switch		
T-101	2ZK9590-4	TRANSFORMER: audio; unshielded; primary 340 turns No. 35 plain enameled wire wound inside; secondary 2140 turns No. 42 plain enameled wire wound outside; core lamination to be stacked so that primary has inductance of 78 millihenries $\pm 15\%$ at 0.825 volts rms; secondary inductance 3.2 millihenries $\pm 15\%$ at 5.2 volts rms; all measurements at 1000 cycles; 2 solder terminals each side at the top; two $\frac{3}{16}$ " mounting holes $1\frac{5}{8}$ " centers; dimensions $1\frac{1}{4}$ " long x $1\frac{1}{8}$ " high x $\frac{1}{8}$ " thick	Audio transformer	Peerless from BXSP 17-20	Bendix BXSP 17-20

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TABLE OF REPLACEABLE PARTS

MODEL: RADIO SET SCR-578-A

MAJOR UNIT: RADIO TRANSMITTER BC-778-B-C-D-E-F

Reference Symbol	Army Stock Number Navy Type Number British Reference Number	Name of Part and Description	Function	Mfr. and Designation	Drawing or Specification No.
T-102	3CK2604-500	COIL ASSEMBLY: grid; preset to 500 kc; includes coil wound on moulded bakelite form on base $2\frac{1}{8}$ " long x $1\frac{3}{8}$ " wide x $\frac{3}{16}$ " thick; inductance 46.5 microhenries; capacity 2180 micromicrofarads; has 3000 micromicrofarads; 600 volts, $\pm 5\%$, silver mica bakelite capacitor and two 4000 micromicrofarads $\pm 5\%$, 500 volts, silver mica bakelite capacitors attached Includes L-101, C-105, C-106-1 and C-106-2	Grid coil assembly	Bendix	Bendix 4655 (Change order K1)
V-101	2T268	TUBE: VT-268 (12SC7); octal; twin triode; 12.6-volt heater	Audio oscillator and amplifier		
V-102	2T134	TUBE: VT-134 (12A6); octal; tetrode. beam power; 12.6-volt heater	R-F oscillator		
X-101	2ZK8670.10	SOCKET: octal; wafer; two $\frac{1}{8}$ " diameter mounting holes $1\frac{3}{4}$ " centers; spring contacts; dimensions $1\frac{7}{16}$ " diameter x $1\frac{7}{8}$ " long	Socket for tubes	National fabricated type K-39	Bendix BX45-1
	2ZK2720	LEAD: r-f; No. 18 neoprene wire 5" long with brass tip cadmium plated $\frac{1}{2}$ " long with fibre cap	R-F indicator lead	Bendix	Bendix 15148 (Change order C1)
	2ZK2720-1	SOCKET: lead; r-f; brass socket receptacle; r-f indicator lead plug attached to 1" square bakelite board $\frac{1}{8}$ " thick, drilled with $\frac{1}{8}$ " hole		Bendix	Bendix 15145 (Change order D)
	2AK276-6	ANTENNA AND DOOR ASSEMBLY: consists of antenna wire (W-148) with hard wire swivel attached to one end, wound on reel 1" thick x $3\frac{1}{4}$ " diameter with collapsible handle attached; mounted on door die cast aluminum alloy $4\frac{3}{8}$ " diameter x $\frac{1}{8}$ " thick by a hex screw $\frac{1}{4}$ " diameter between flats threaded $\frac{1}{4}$ -28 N.F. by 2" long, including flat coin head $\frac{3}{4}$ " diameter x $\frac{1}{16}$ " thick; a fluted hand wheel $1\frac{1}{16}$ " radius x $1\frac{5}{32}$ " thick, held captive by the washer riveted to the outer end of the hex screw; chain $3\frac{5}{8}$ " long with $\frac{1}{8}$ " diameter x $1\frac{1}{2}$ " long pin attached to one end; phosphor bronze friction washer $\frac{3}{4}$ " diameter cupped to $\frac{1}{8}$ " deep; and one brass washer $\frac{7}{8}$ " outside diameter $\frac{1}{2}$ " inside diameter x $\frac{1}{16}$ " thick completely assembled	Door to antenna compartment and antenna	Bendix	Bendix 4685 (Change order N)

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MODEL: RADIO SET SCR-578-A

MAJOR UNIT: RADIO TRANSMITTER BC-778-B-C-D-E-F

Reference Symbol	Army Stock Number Navy Type Number British Reference Number	Name of Part and Description	Function	Mfr. and Designation	Drawing or Specification No.
	2C6596-778A/A3	LEAD-IN-ASSEMBLY: antenna; 4 ft. long No. 18 rubber covered wire; one end stripped and tinned for $\frac{1}{2}$ " ; special bushing over the wire, $6\frac{1}{4}$ " from the same end; special round bushing 1" long x $\frac{1}{4}$ " diameter with $\frac{3}{8}$ " diameter shoulder in center against which plain No. 10 round Neoprene washer $\frac{3}{8}$ " outside diameter fits; other end fitted with $\frac{3}{4}$ " long turbo tubing, has a flat brass cadmium-plated clip $\frac{1}{4}$ " long with wing nut for tightening, this clip attached after assembly	Antenna lead in	Bendix	Bendix 4789 (Change order S1)
	6LK3510-24.1	NUT: moulded zamac; $1\frac{5}{32}$ " O.D. across flats; $\frac{1}{8}$ " thick; tapped $\frac{5}{8}$ "-24 thread	Holds speed indicator window; holds R-F window	Zamac No. 5	4698
	3FK26100	WINDOW: lucite; 1" diameter x $\frac{3}{32}$ " flange; $\frac{5}{8}$ "-24 threads for $\frac{3}{16}$ "; $\frac{1}{32}$ " x 45° chamfer; start of thread end painted black; $\frac{3}{16}$ " slot to .270" diameter x $\frac{1}{16}$ " long cut through center of threaded portion for neon bulb to go in; TUNE TO BRIGHTEST engraved on back of flange	R-F indicator	Bay Mfg. Co.	4645 (Change order E1)
	2Z5958A	LAMP LM-58-A: signal; screw base; 24-28-volt; miniature; white bead; single contact; $1\frac{3}{16}$ " long x $\frac{3}{8}$ " diameter	For signal light	G. E. MA-2DA Type 1477 screw	Bendix BX-19-5
	2C6596-778A/K3	KNOB: bar; black tenite; one end tapered to provide pointer; shaft hole 0.255" diameter x $\frac{13}{32}$ "; spring insert for slot in center of shaft; $\frac{1}{4}$ " long white line on flat; dimensions $1\frac{1}{2}$ " long x $\frac{1}{16}$ " wide x $\frac{1}{2}$ " thick	Tuning knob	Bendix 4695	Bendix 4695 (Change order E1)
	2C6596-778A/K4	KNOB: bar; double pointed; black tenite; both ends tapered to provide a dual pointer; one end engraved on slope RADIO; other end engraved on slope LIGHT; spring insert for slot in center of shaft; shaft hole 0.255" x $\frac{13}{32}$ "; dimensions $1\frac{1}{16}$ " long x $\frac{1}{2}$ " wide x $\frac{1}{2}$ " high at center	Selector—light or radio	Bendix 4694	Bendix 4694 (Change order E1)
	6LK3919	PIN FASTENING: safety pin type; steel music wire, cadmium-plated; 0.0625" diameter x $1\frac{5}{16}$ " long with $\frac{3}{16}$ " diameter coil at one end and $\frac{5}{8}$ " right angle bent at other end with $\frac{1}{8}$ " hook to hold straight end	Crank retaining pin	Hollister Spring Co., from Bendix 4730	Bendix 4730 (Change order B1)

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TABLE OF REPLACEABLE PARTS

MODEL: RADIO SET SCR-578-A

MAJOR UNIT: RADIO TRANSMITTER BC-778-B-C-D-E-F

Reference Symbol	Army Stock Number Navy Type Number British Reference Number	Name of Part and Description	Function	Mfr. and Designation	Drawing or Specification No.
	2C6596-778A/C1	CAP: socket; moulded No. 2 tenite; 6 curved finger grips in edge; engraved TURN TO REMOVE through arrow pointing counter-clockwise; 2" diameter knob, with 1½" inside threads to fit crank case stud; ⅜" thick in center; tapered all around to ⅜" at edge	Crank socket	T Die Cast Corp. from Bendix 4547	Bendix 4547 (Change order D1)
	2C6596-778A/H1	HARDWARE GROUP: including all screws, nuts and washers used in the transmitter LIGHT ASSEMBLY M-308-B: signal; includes lamp, case, cord, plug and head strap, moulded bakelite case, plastic screw-in glass lens and polished reflector; dimensions 2⅜" outside diameter x 2⅞" length, fastened to ¾" flat web head strap, adjustable with buckle; strap non-elastic rusco, olive drab 42" long; 5 ft. long cord Packard 22 gauge conductors terminating in plug assembly; 2 split pins in rubber moulded plug	Signal lamp	Bendix special Bendix	 Bendix 15890
	1AK147 1A148	WIRE: antenna W-148; 300 ft. rolls; 16 strand cadmium copper alloy No. 12 wound on wooden spool 2" wide; has hardened wire swivel attached to antenna end; shipped in round box	Radiation antenna	Bendix	Bendix 15125
	2C6596-778A/A4	WIRE ASSEMBLY: cap, reel and wire; No. 12 cadmium copper alloy wire 8 feet long with solder lug on one end attached to cap; other end soldered to ground lug with ⅜" diameter hole; wound on metal "H" type reel 2¼" long x ¾" wide x ⅜" thick	Radiation ground	Bendix	Bendix 4711 (Change order G1)
	6G250-2	DESICCANT: silica gel; in air-tight jar	Dehydrating agent	Silica Co.	Bendix
	3FK26100-1	WINDOW: lucite; 1" diameter x ⅜" flange; ⅝"-24 threads for ½", ⅜" x 45° chamfer; SPEED INDICATOR KEEP LIGHTED engraved on back of flange	R-F indicator	Plastic Tool & Die from Bendix 4741	Bendix 4741 (Change order H1)
	2CK6596-778A/G4.1	GASKET: tuning and switch shaft; moulded hycar ⅜" outside diameter x ¼" inside diameter; cross section ⅜"	Tuning shaft water seal	Bendix 15714-5	Bendix 15714-5
	2CK6596-778A/G10.1	GASKET: crank cap; neoprene; no screw holes, dimensions 1⅜" O.D. x ½" I.D. x 0.050" thick	Crank cap water seal	Bendix 4765	Bendix 4765 (Change order D)

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TABLE OF REPLACEABLE PARTS

MODEL: RADIO SET SCR-578-A

MAJOR UNIT: RADIO TRANSMITTER BC-778-B-C-D-E-F

<i>Reference Symbol</i>	<i>Army Stock Number Navy Type Number British Reference Number</i>	<i>Name of Part and Description</i>	<i>Function</i>	<i>Mfr. and Designation</i>	<i>Drawing or Specification No.</i>
	2CK6596-778A/G7.1	GASKET: rim; neoprene; 16 holes 0.170" diameter punched to match holes in cover; dimensions outside overall 9 $\frac{3}{4}$ " x 9 $\frac{1}{8}$ " x $\frac{1}{64}$ " thick x $\frac{5}{8}$ " wide around rim; has $\frac{1}{8}$ " high triangular rise around inner edge	Water seal	Bendix 15892	Bendix 15892 (Change order B1)
	2C6596-778A/G11	GASKET: dessicator cap; moulded hycar; dimensions 1.005" O.D. x 0.757" I.D. circular cross section 0.103" diameter	Dessicator cap water seal; ground cap water seal	Bendix 15714-14	Bendix 15714-14
	2CK6596-778A/G8.1	GASKET: gear housing; vellumoid; dimensions overall 4 $\frac{5}{8}$ " x 5 $\frac{1}{2}$ "; $\frac{1}{32}$ " thick; 1 hole 1 $\frac{1}{4}$ " diameter; 4 holes 0.213 to match holes in gear housing	Gear housing water seal	Bendix 4739	Bendix 4739 (Change order C)
	2C6596-778A/G5	GASKET: indicator windows; neoprene; dimensions 1" O.D. x $\frac{5}{8}$ " I.D. x $\frac{1}{32}$ " thick; slot out on inside $\frac{1}{16}$ " x $\frac{1}{16}$ "	Speed indicator window water seal; R-F indicator window water seal	Bendix 4740	Bendix 4740 (Change order C1)
		*GASKET: key; vellumoid; dimensions $\frac{29}{32}$ " O.D. x $\frac{11}{16}$ " I.D. x 0.015" thick	Manual key water seal	Bendix 15255	Bendix 15255
	2C6596-778A/G3	GASKET: crank bushing; vellumoid; dimensions 1 $\frac{3}{32}$ " O.D. x 1 $\frac{1}{4}$ " I.D. x 0.032" thick		Bendix 4764	Bendix 4764 (Change order B)
	2C6596-778A/G6	GASKET: signal light receptacle; moulded hycar; dimensions .617" O.D. x 0.424 I.D. x 0.100" diameter	Signal light receptacle water seal	Bendix 15714-9	Bendix 15714-9

*Eliminated after 10-8-42 by increasing the thickness of the rim of diaphragm-key 4639 (see S-102) by the thickness of the gasket

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SECTION VIII
DRAWINGS

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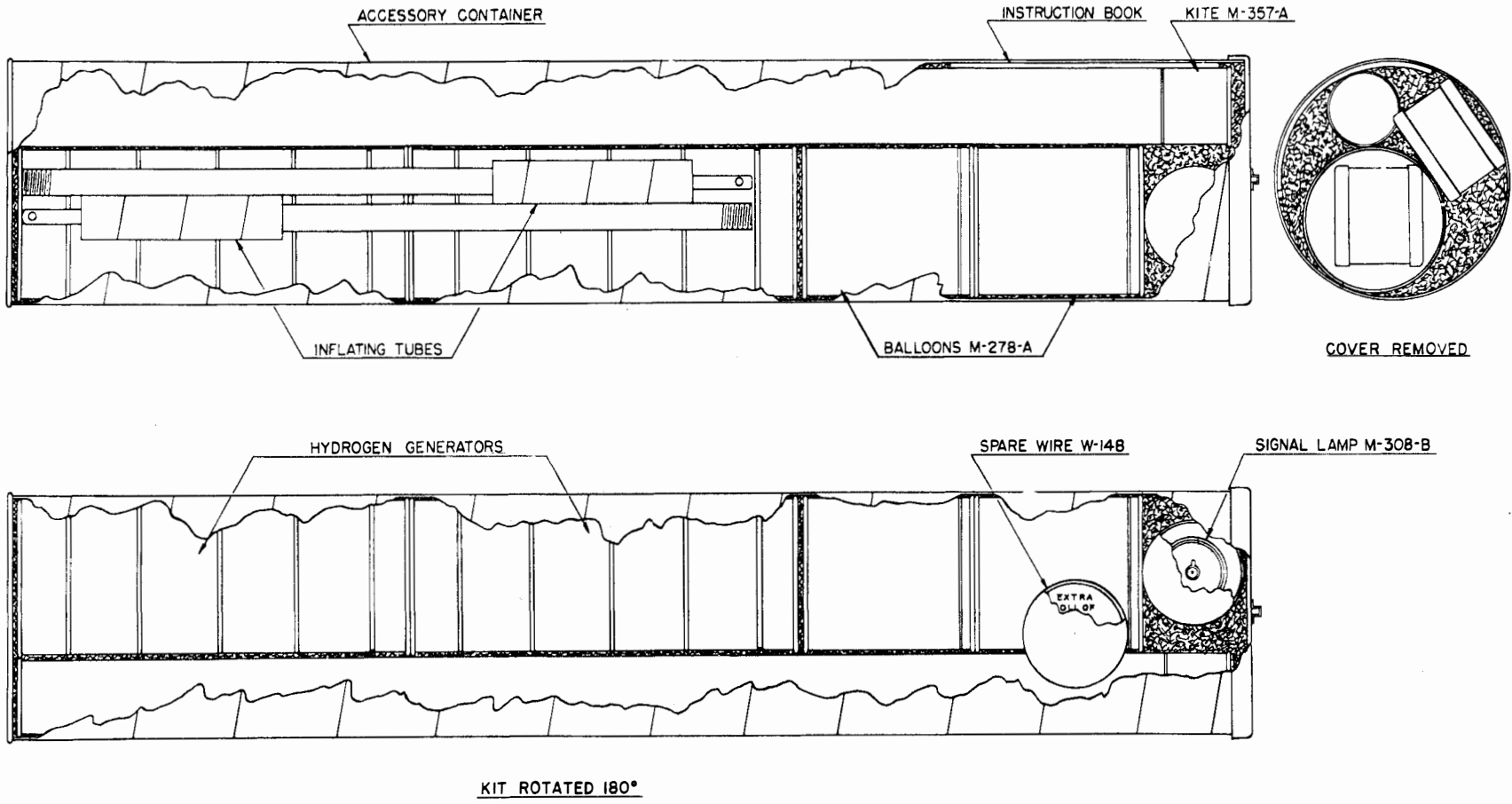
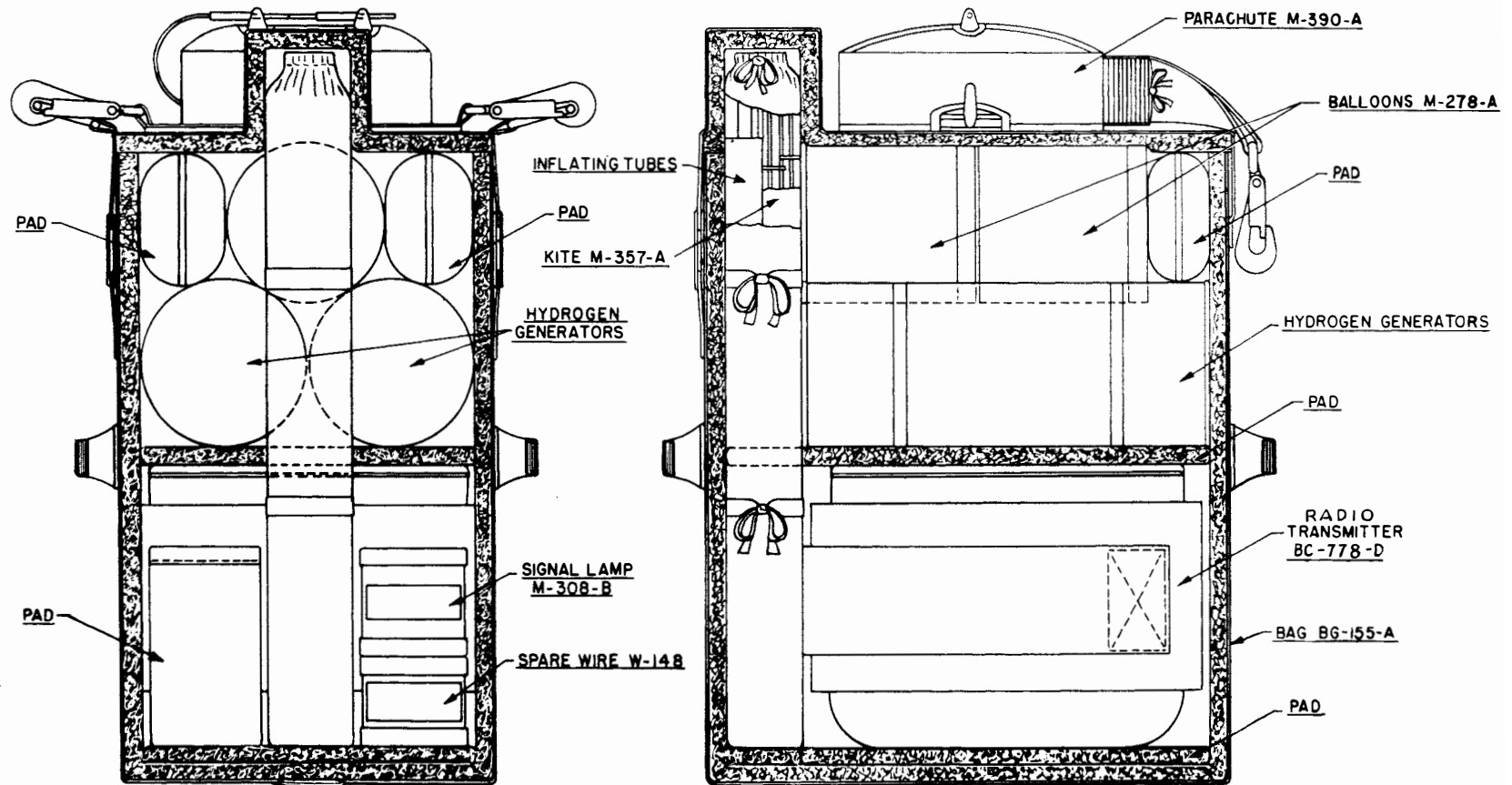


Figure 30—Bag BG-109-A, Packing Diagram

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Figure 31—Bag BG-155-A, Packing Diagram

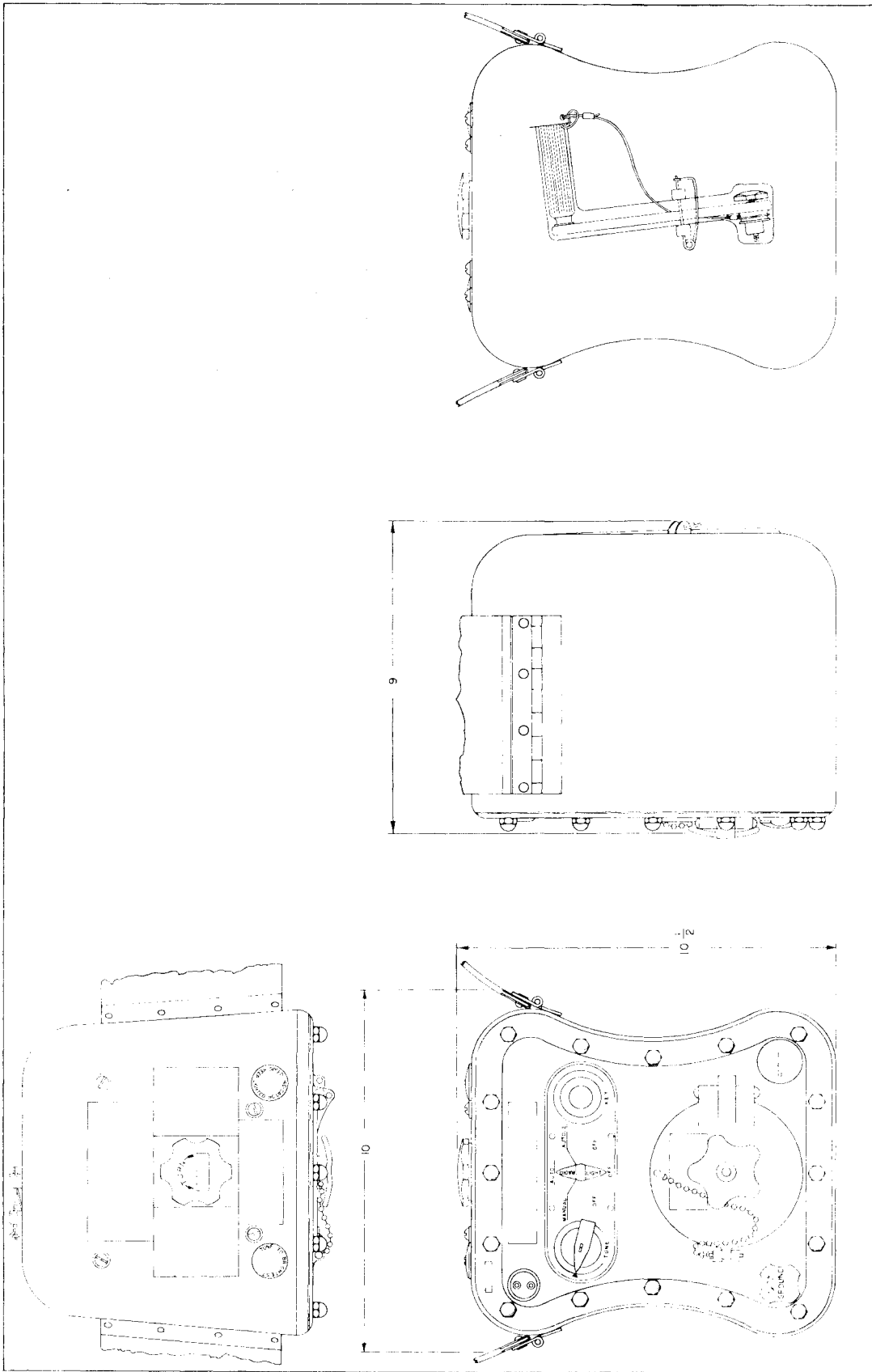


Figure 32—Radio Transmitter BC-778-E, Outline Dimensional Drawing

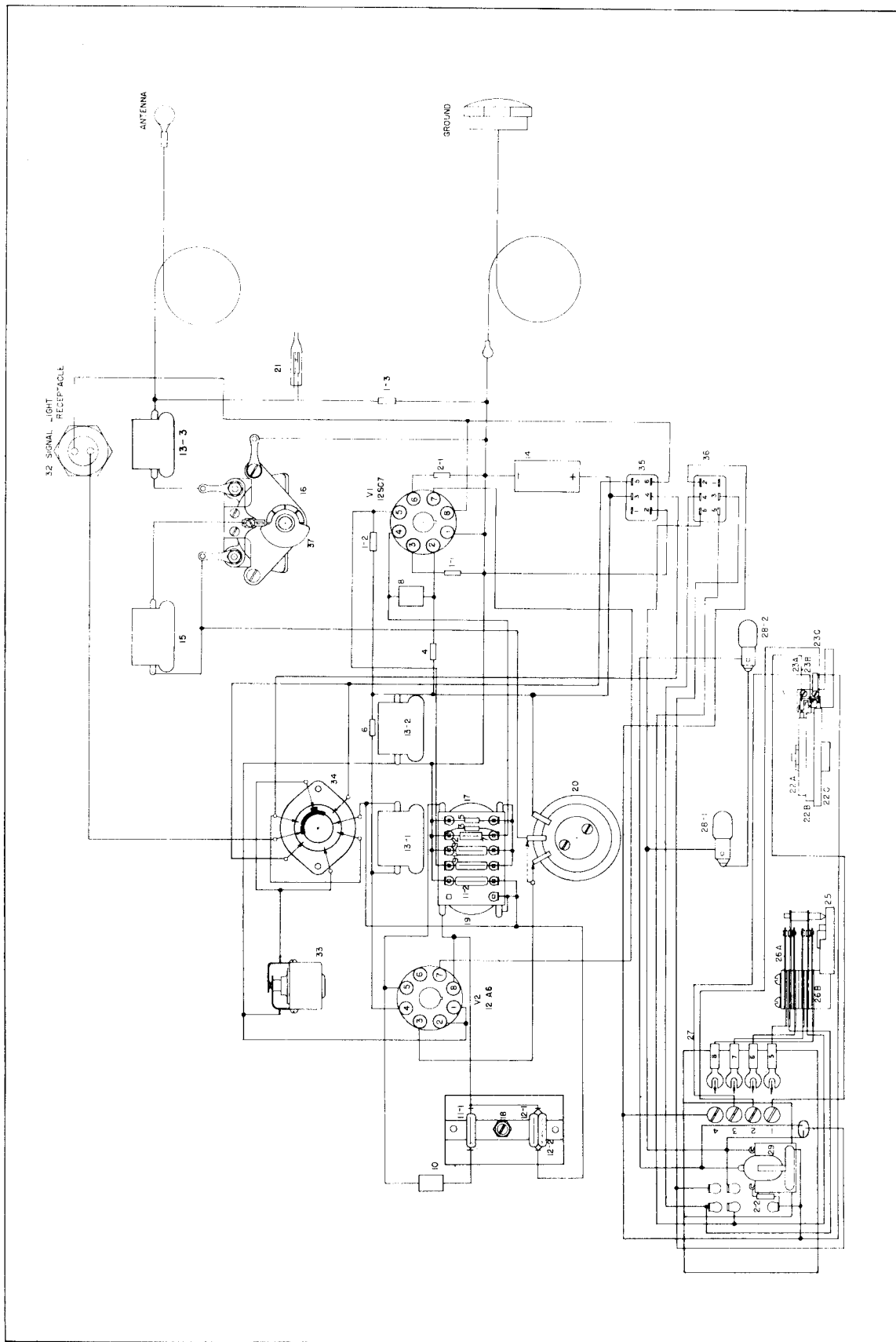


Figure 33—Radio Transmitter BC-778-A, Practical Wiring Diagram

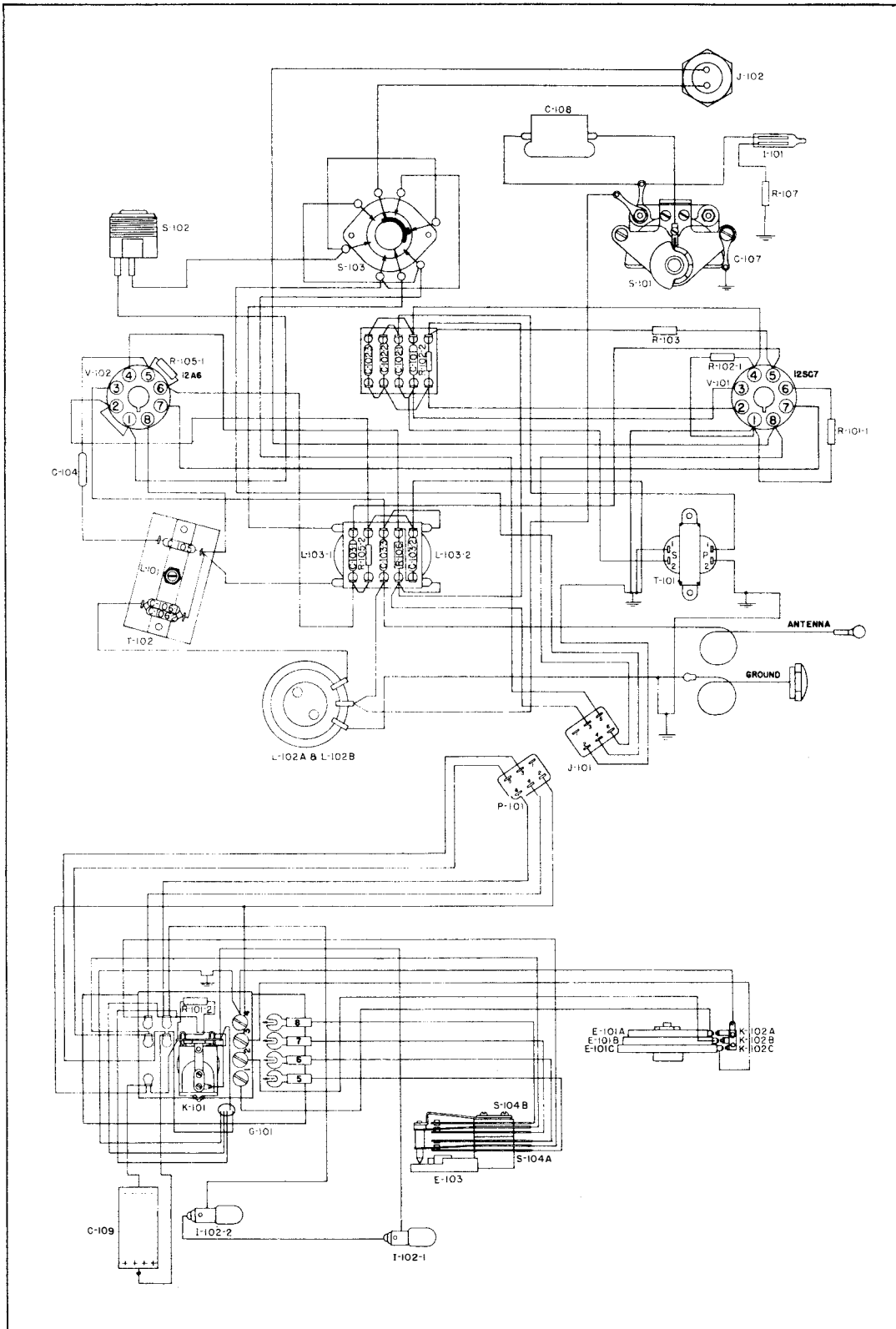


Figure 34—Radio Transmitter BC-778-B, Practical Wiring Diagram

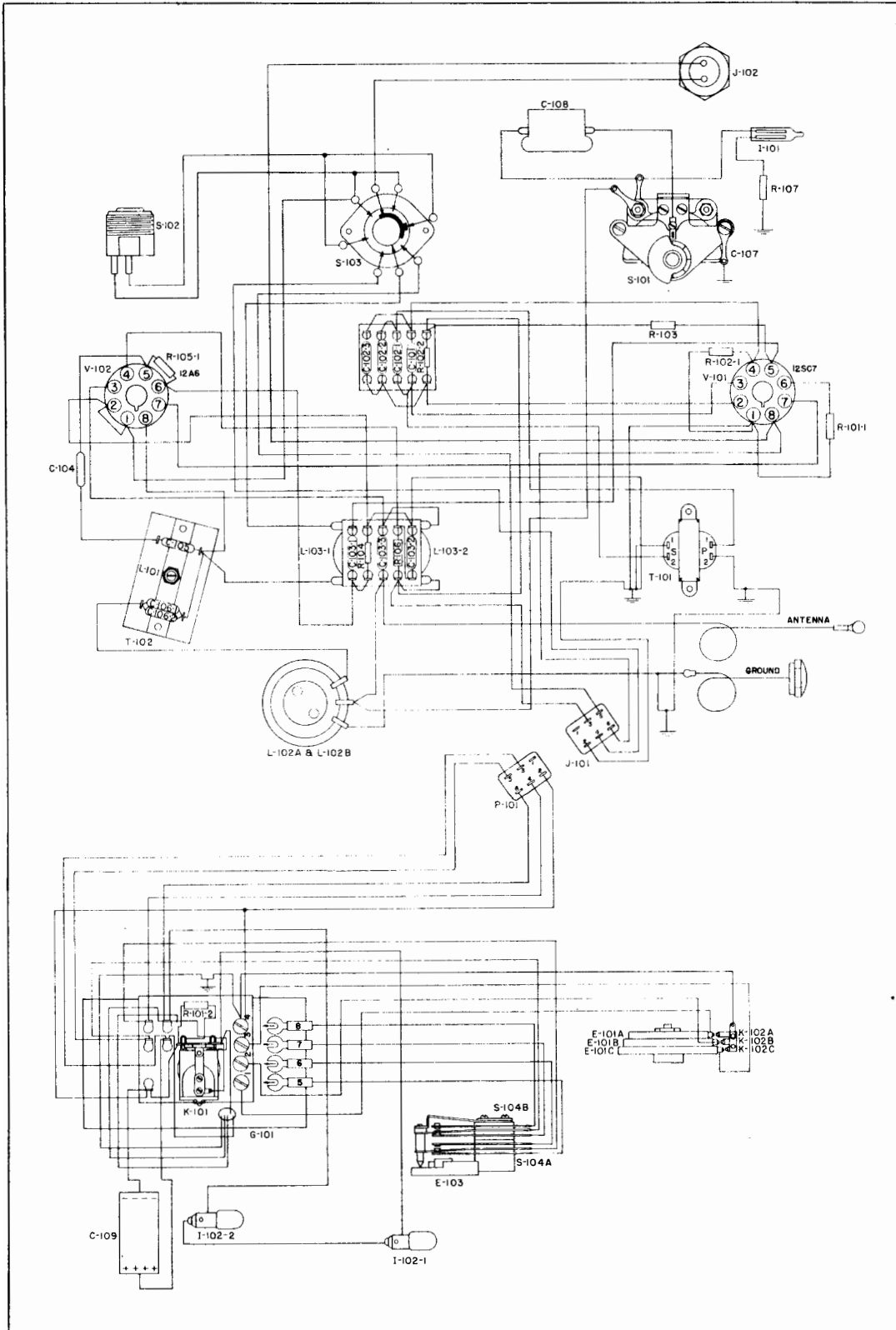
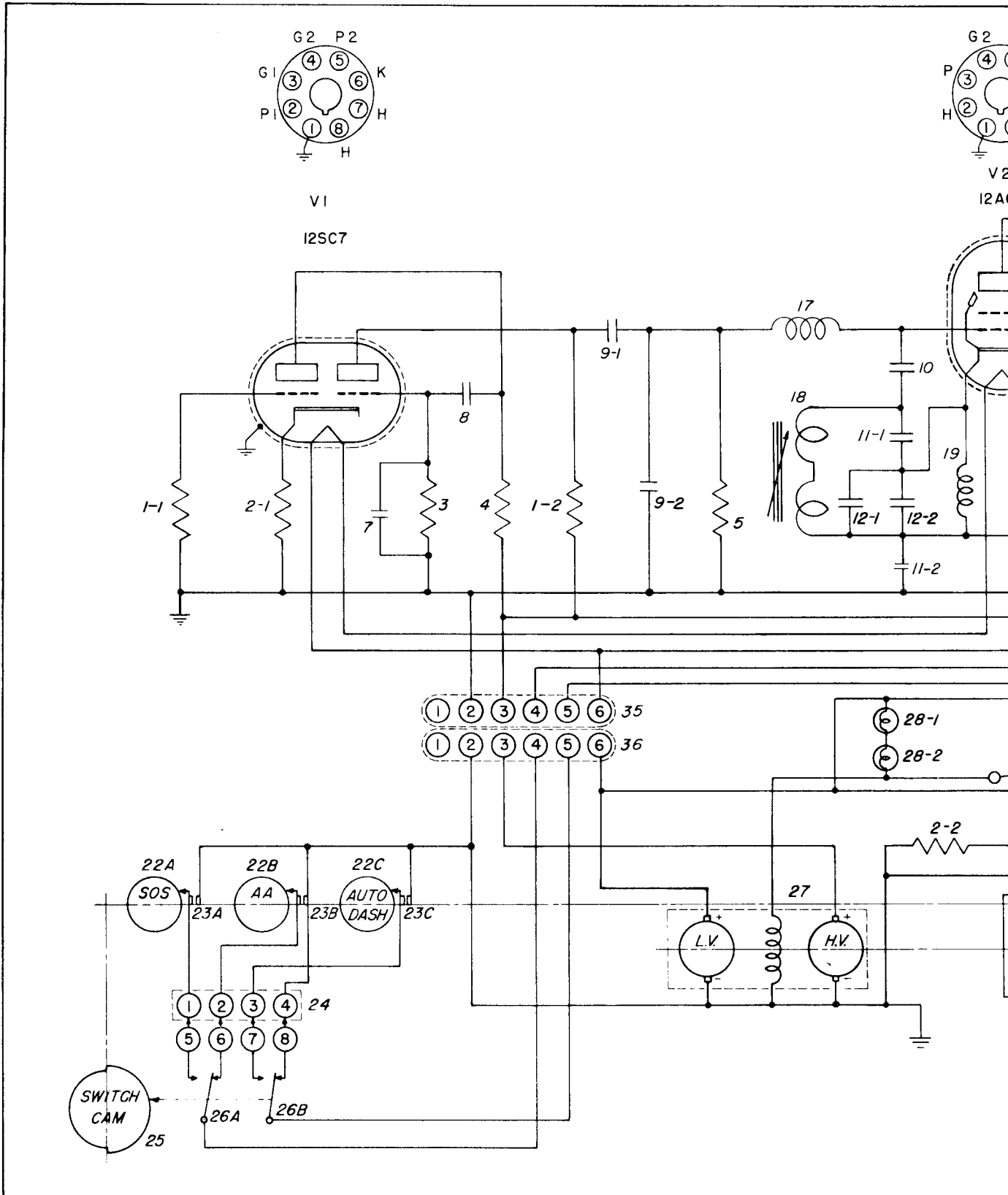


Figure 35—Radio Transmitter BC-778-C, BC-778-D, BC-778-E, Practical Wiring Diagram



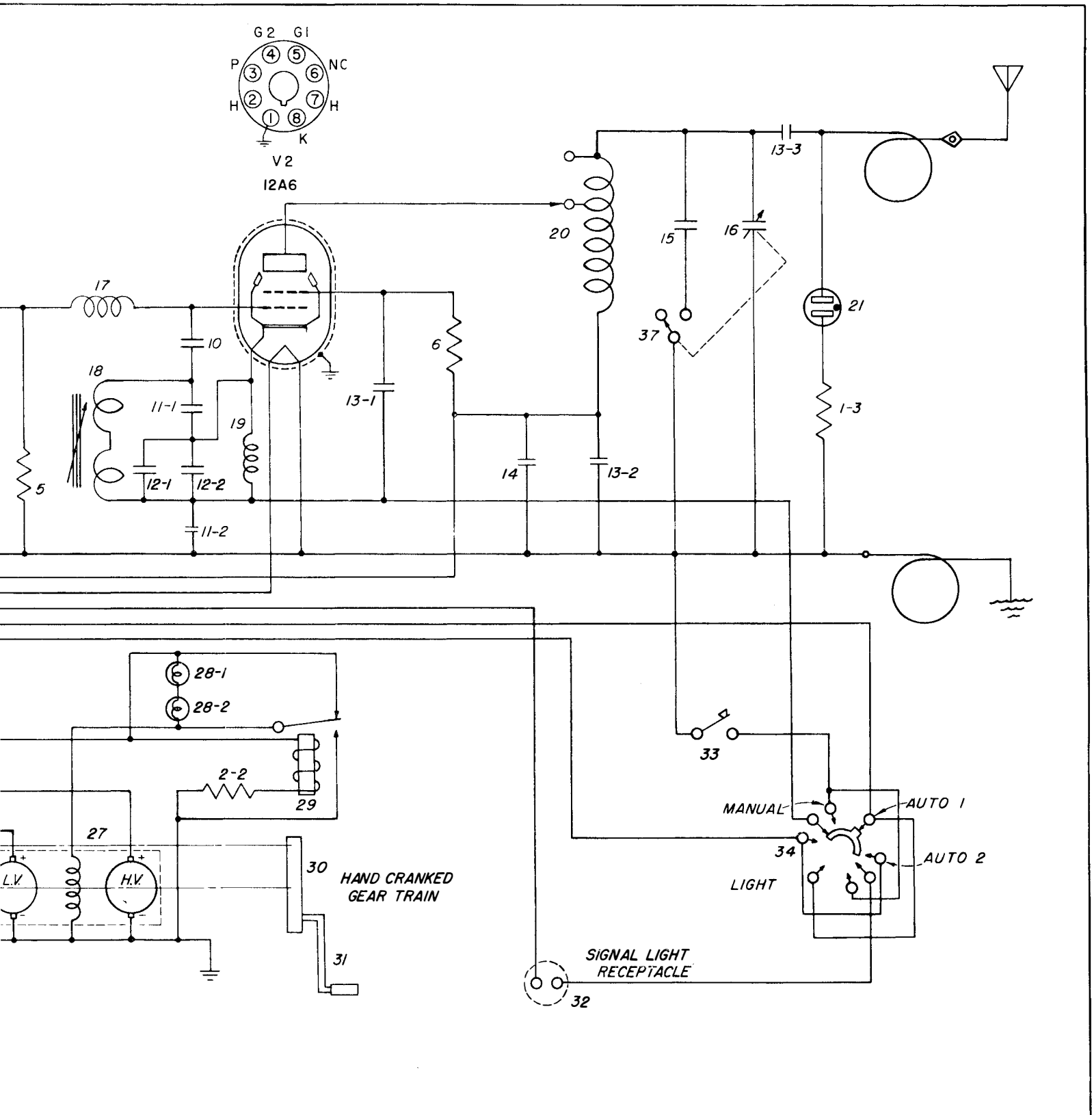
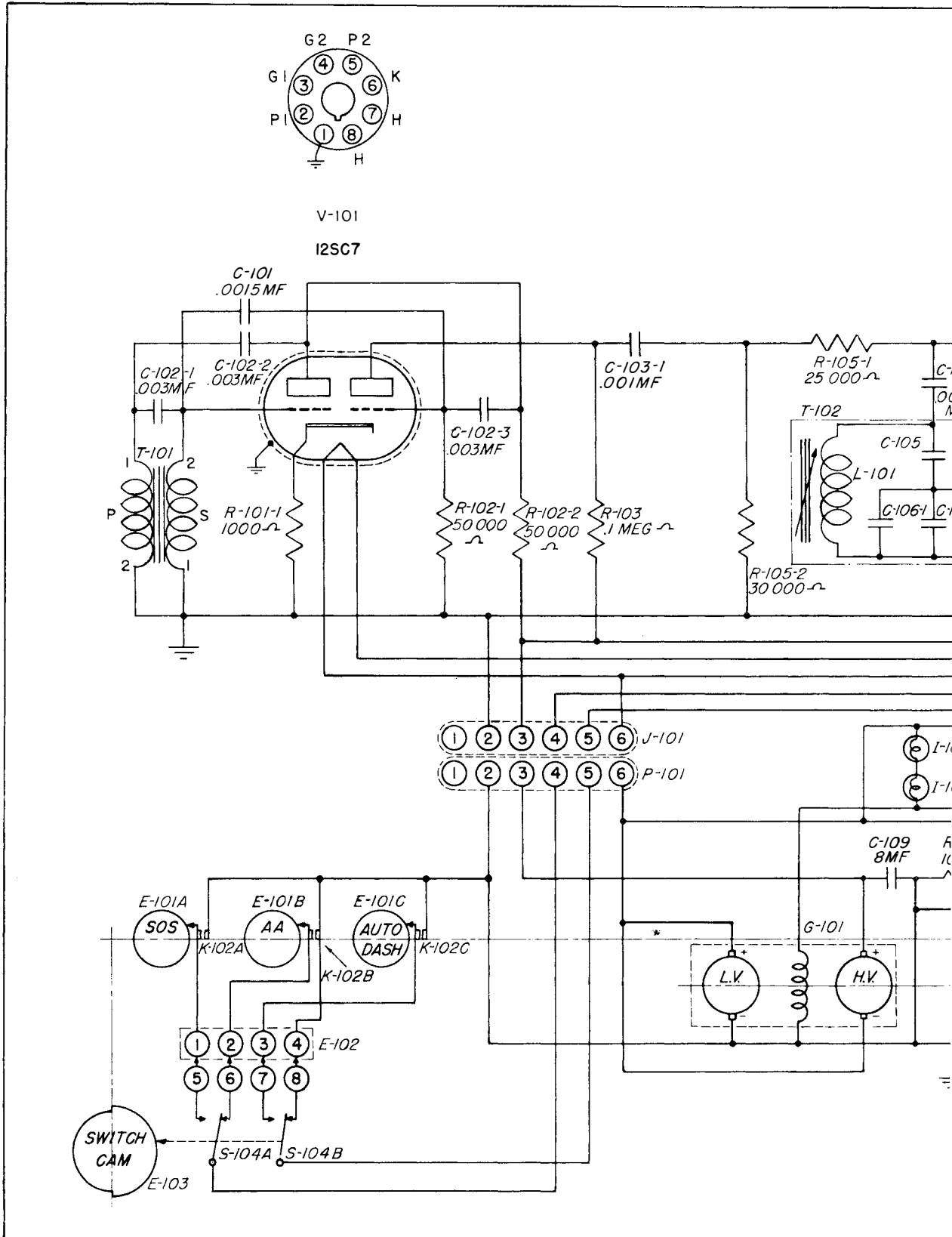


Figure 36—Radio Transmitter BC-778-A,
Schematic Diagram



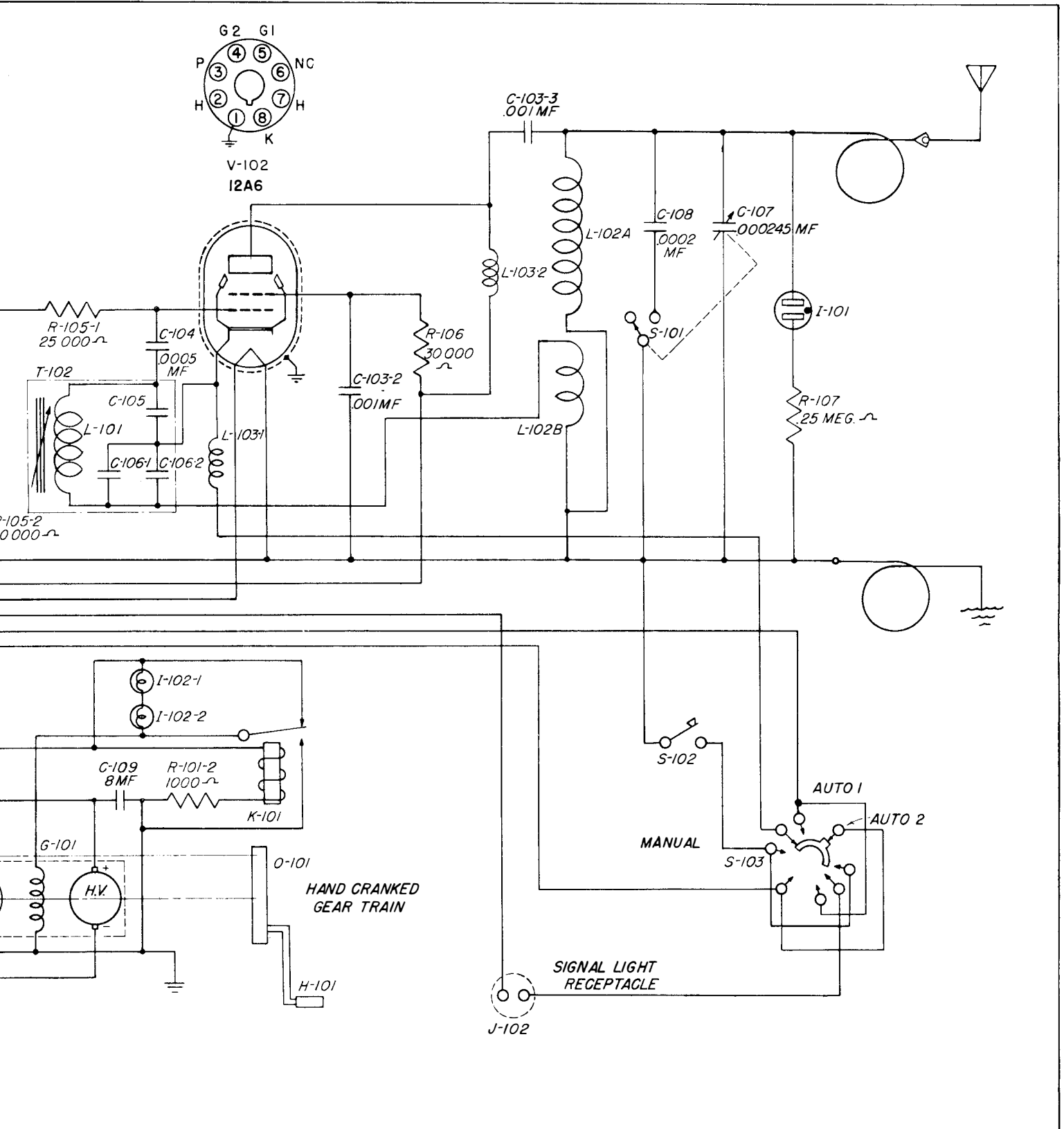
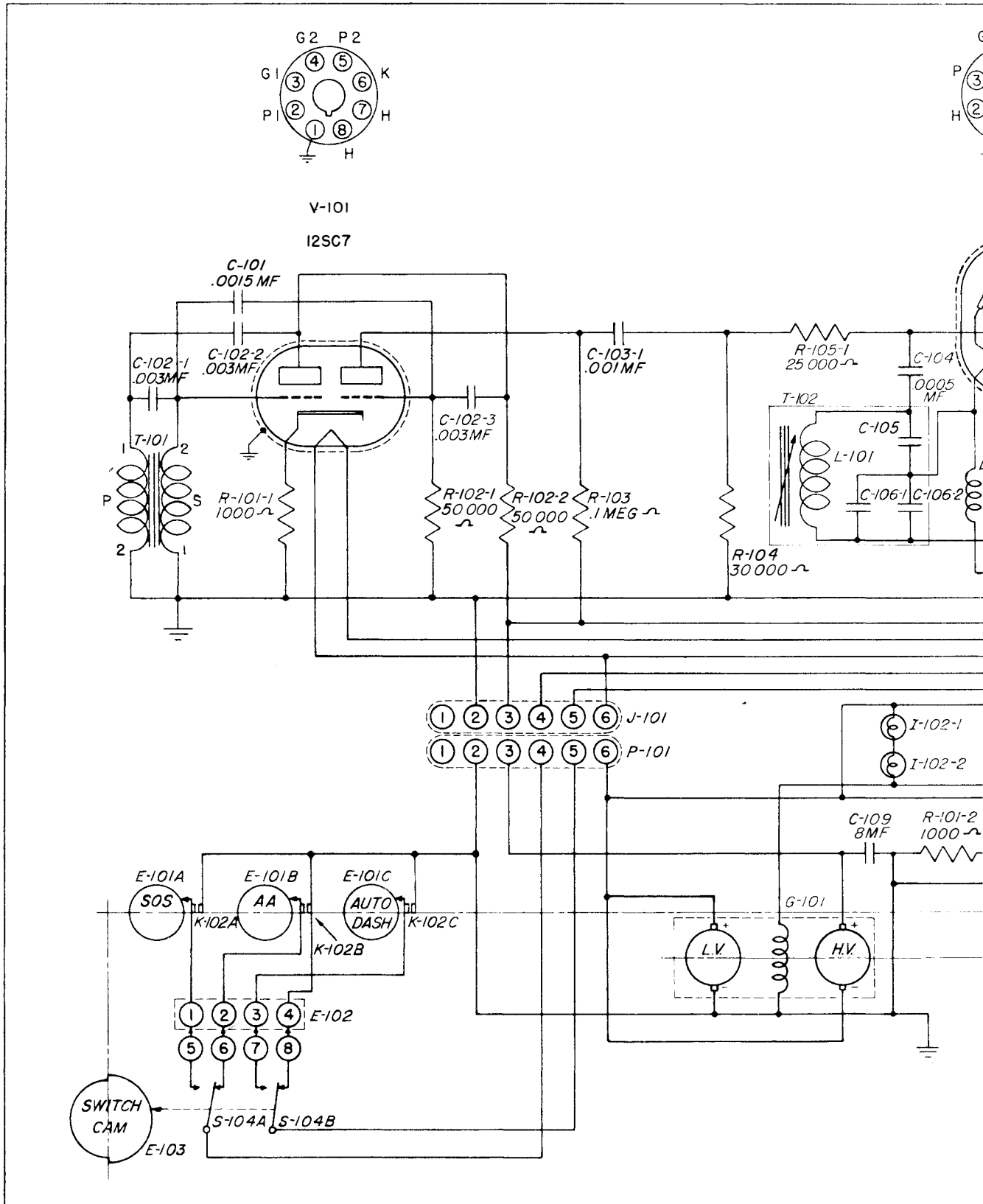


Figure 37—Radio Transmitter BC-778-B,
Schematic Diagram



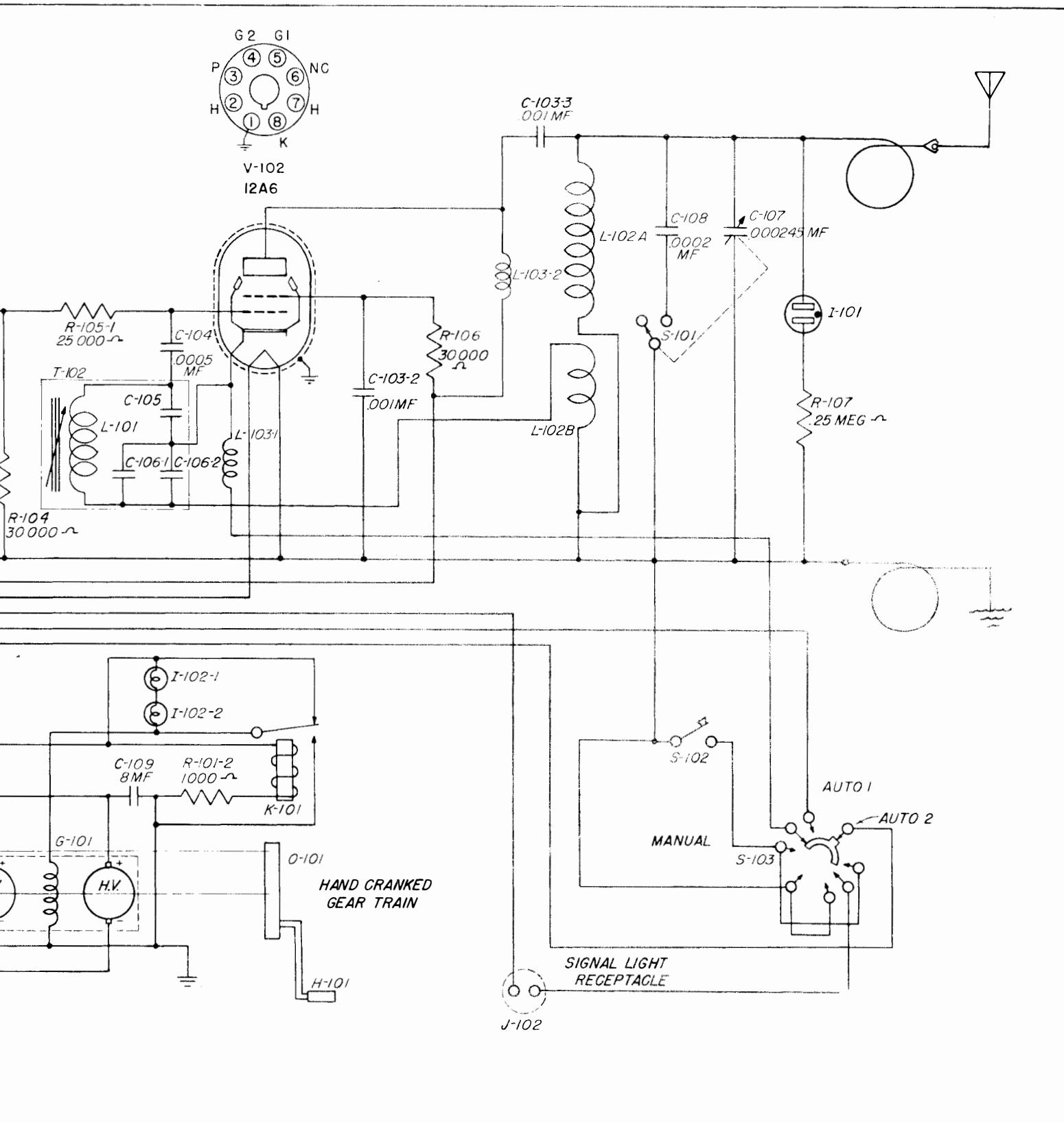


Figure 38—Radio Transmitter BC-778-C, BC-778-D or BC-778-E, Schematic Diagram

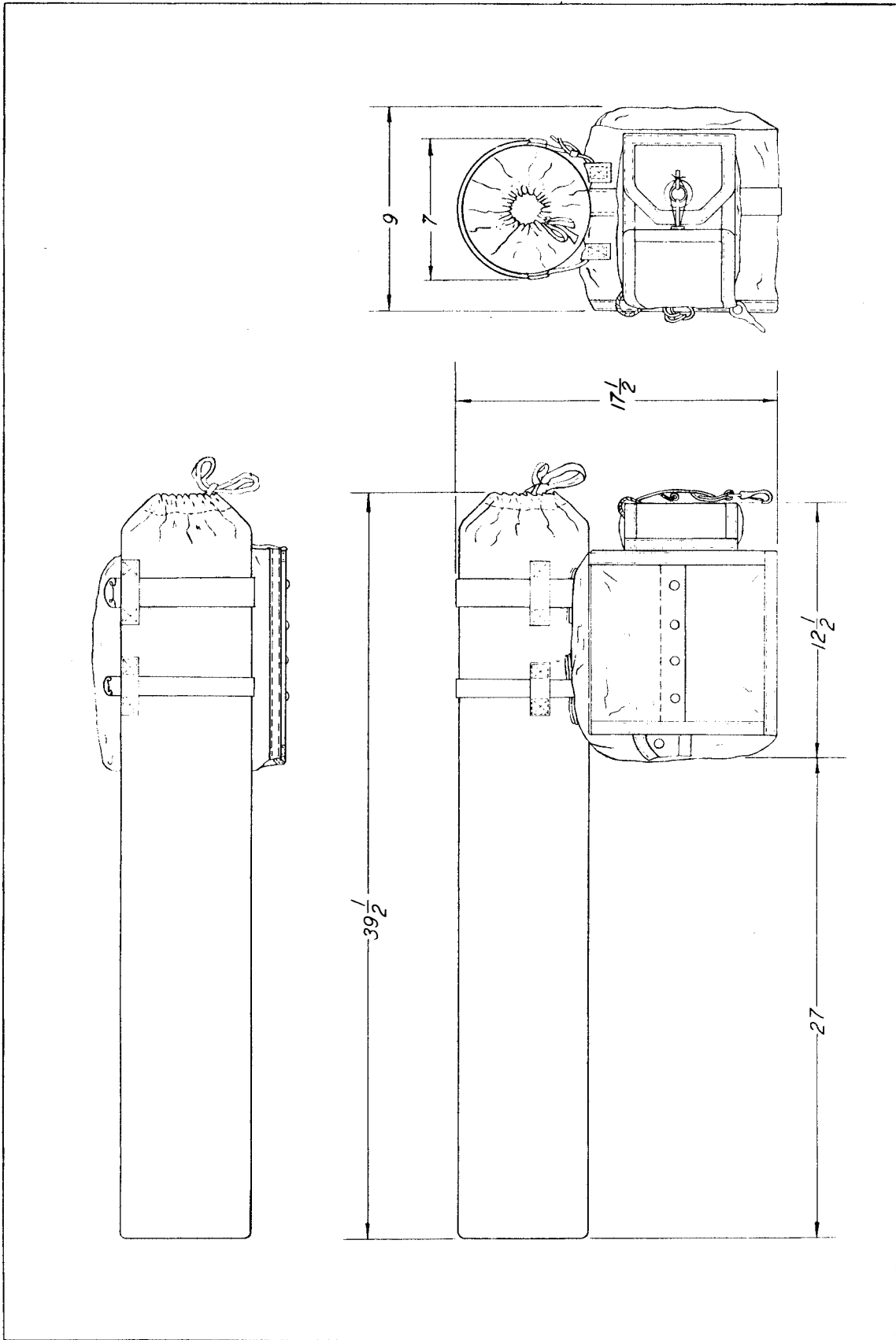


Figure 39—Radio Set SCR-578-A, Outline Dimensional Drawing

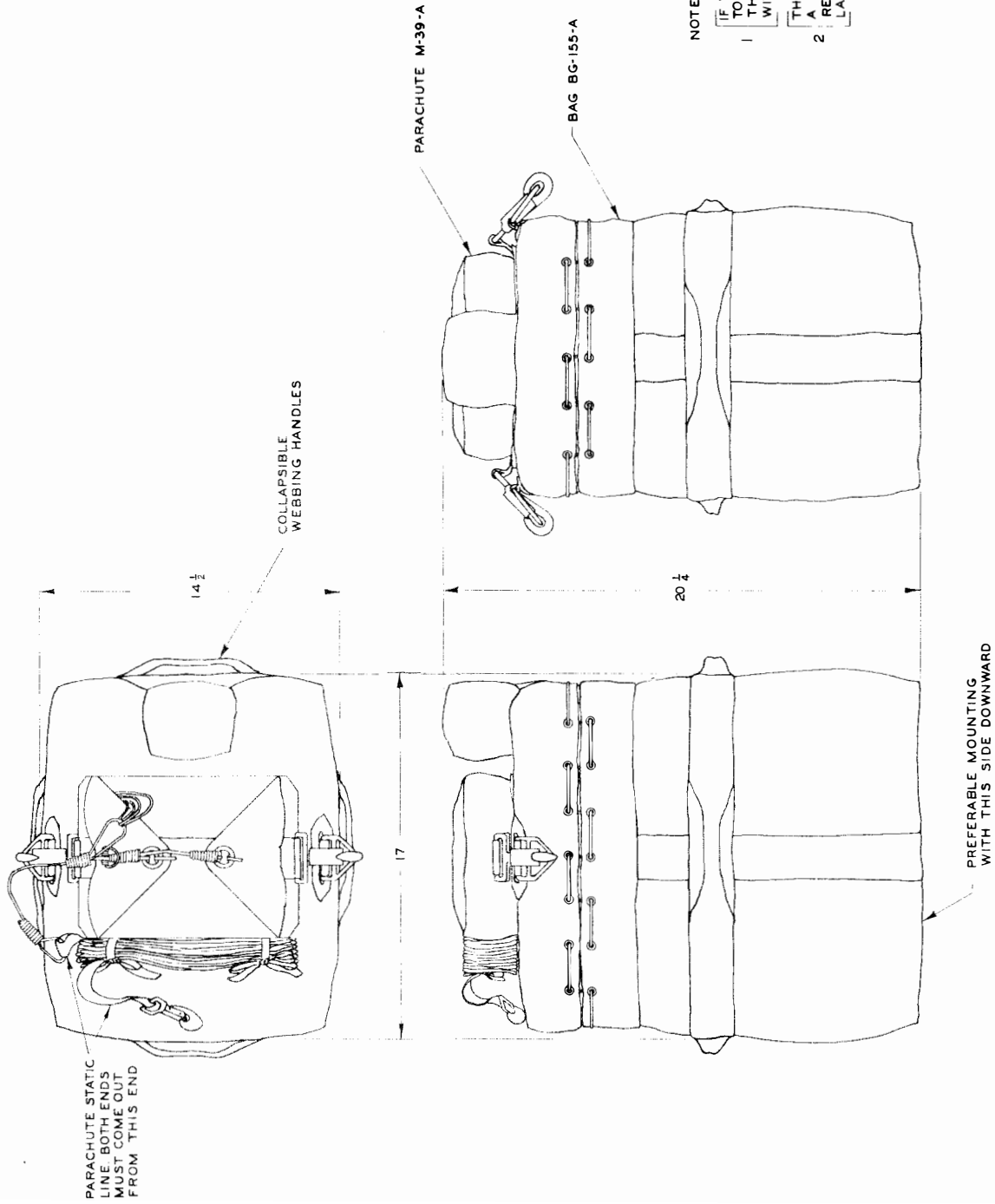


Figure 40—Radio Set SCR-578-B, Outline Dimensional Drawing