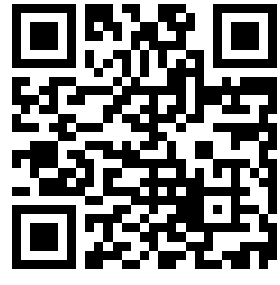

TM 11-1408

R DEPARTMENT TECHNICAL MANUAL

PREVENTIVE MAINTENANCE

RADIO EQUIPMENTS

RC-182-A AND RC-282-A

R DEPARTMENT 27 JULY 1944

TM 11-1408

WAR DEPARTMENT TECHNICAL MANUAL

PREVENTIVE MAINTENANCE

RADIO EQUIPMENTS RC-182-A AND RC-282-A

RESTRICTED. ***DISSEMINATION OF RESTRICTED MATTER.*** **—The information contained in restricted documents and the essential characteristics of restricted material may be given to any person known to be in the service of the United States and to persons of undoubted loyalty and discretion who are cooperating in Government work, but will not be communicated to the public or to the press except by authorized military public relations agencies. (See also par. 23b, AR 380-5, 15 Mar 1944.)**

WAR DEPARTMENT

27 JULY 1944

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TM 11-1408

PREVENTIVE MAINTENANCE

RADIO EQUIPMENTS RC-182-A AND RC-282-A

WAR DEPARTMENT *27 JULY 1944*

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WAR DEPARTMENT,

WASHINGTON 25, D. C., 27 JULY 1944.

TM 11-1408, Radio Equipments RC-182-A and RC-282-A, is published for the information and guidance of all concerned.

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BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,
Chief of Staff.

OFFICIAL:

J. A. ULIO,
Major General,
The Adjutant General.

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

CONTENTS

WARNING

HIGH VOLTAGE

is used in the operation of this equipment.

DEATH ON CONTACT

may result if personnel fail to observe safety precautions.

Be sure that high-voltage plate circuits 115-volt a-c input connections are dead before performing preventive maintenance on this equipment.

High-voltage capacitors in power supplies must be discharged manually before performing preventive maintenance operations. Observe the SAFETY PRECAUTIONS given in the individual items in chapter 4.

EXTREMELY DANGEROUS POTENTIALS

EXIST IN THE FOLLOWING UNITS:

Control Unit BC–1268–A
Indicator I–221–A
Receiver and Transmitter BC–1267–A
Power Supply RA–105–A

FIRST AID TREATMENT FOR ELECTRIC SHOCK

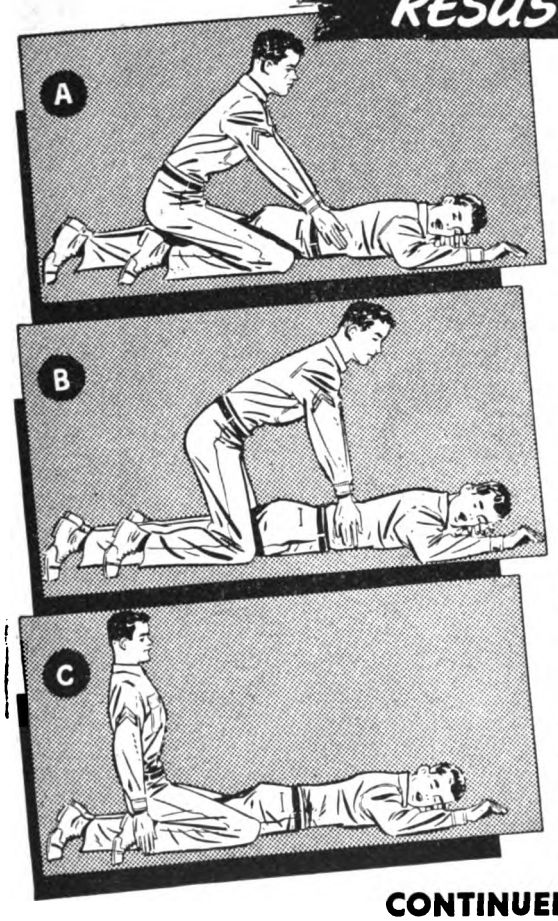
I. FREE THE VICTIM FROM THE CIRCUIT IMMEDIATELY.

Shut off the current. If this is not immediately possible, use a dry nonconductor (rubber gloves, rope, board) to move either the victim or the wire. Avoid contact with the victim. If necessary to cut a live wire, use an axe with a dry wooden handle. Beware of the resulting flash.

II. ATTEND INSTANTLY TO THE VICTIM'S BREATHING.

Begin resuscitation at once on the spot. Do not stop to loosen the victim's clothing. Every moment counts. Keep the patient warm. Wrap him in any covering available. Send for a doctor. Remove false teeth or other obstructions from the victim's mouth.

RESUSCITATION



POSITION

1. Lay the victim on his belly, one arm extended directly overhead, the other arm bent at the elbow, the face turned outward and resting on hand or forearm, so that the nose and mouth are free for breathing (fig. A).

2. Straddle the patient's thighs, or one leg, with your knees placed far enough from his hip bones to allow you to assume the position shown in figure A.

3. Place your hands, with thumbs and fingers in a natural position, so that your palms are on the small of his back, and your little fingers just touch his lowest ribs (fig. A).

FIRST MOVEMENT

4. With arms held straight, swing forward slowly, so that the weight of your body is gradually brought to bear upon the victim. Your shoulders should be directly over the heels of your hands at the end of the forward swing (fig. B). Do not bend your elbows. The first movement should take about 2 seconds.

SECOND MOVEMENT

5. Now immediately swing backward, to remove the pressure completely (fig. C).

6. After 2 seconds, swing forward again. Repeat this pressure-and-release cycle 12 to 15 times a minute. A complete cycle should require 4 or 5 seconds.

CONTINUED TREATMENT

7. Continue treatment until breathing is restored or until there is no hope of the victim's recovery. Do not give up easily. Remember that at times the process must be kept up for hours

8. During artificial respiration, have someone loosen the victim's clothing. Wrap the victim warmly; apply hot bricks, stones, etc. Do not give the victim liquids until he is fully conscious. If the victim must be moved, keep up treatment while he is being moved.

9. At the first sign of breathing, withhold artificial respiration. If natural breathing does not continue, immediately resume artificial respiration.

10. If operators must be changed, the relief operator kneels behind the person giving artificial respiration. The relief takes the operator's place as the original operator releases the pressure.

11. Do not allow the revived patient to sit or stand. Keep him quiet. Give hot coffee or tea, or other internal stimulants.

HOLD RESUSCITATION DRILLS REGULARLY

DESTRUCTION NOTICE

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

WHEN—When ordered by your commander.

HOW— 1. Smash—Use sledges, axes, handaxes, pickaxes, hammers, crowbars, heavy tools.

2. Cut—Use axes, handaxes, machetes.

3. Burn—Use gasoline, kerosene, oil, flame throwers, incendiary grenades.

4. Explosives—Use firearms, grenades, TNT.

5. Disposal—Bury in slit trenches, fox holes, other holes. Throw into streams. Scatter.

USE ANYTHING IMMEDIATELY AVAILABLE FOR DESTRUCTION OF THIS EQUIPMENT

WHAT—1. Smash—All tubes, taking special care to completely destroy the two type 2C26 tubes in the transmitter oscillator. All coil forms, transformers, selsyn motors, and all chassis.

2. Cut—All cables and coil windings.

3. Burn—All parts of the equipment that cannot be completely demolished by other means.

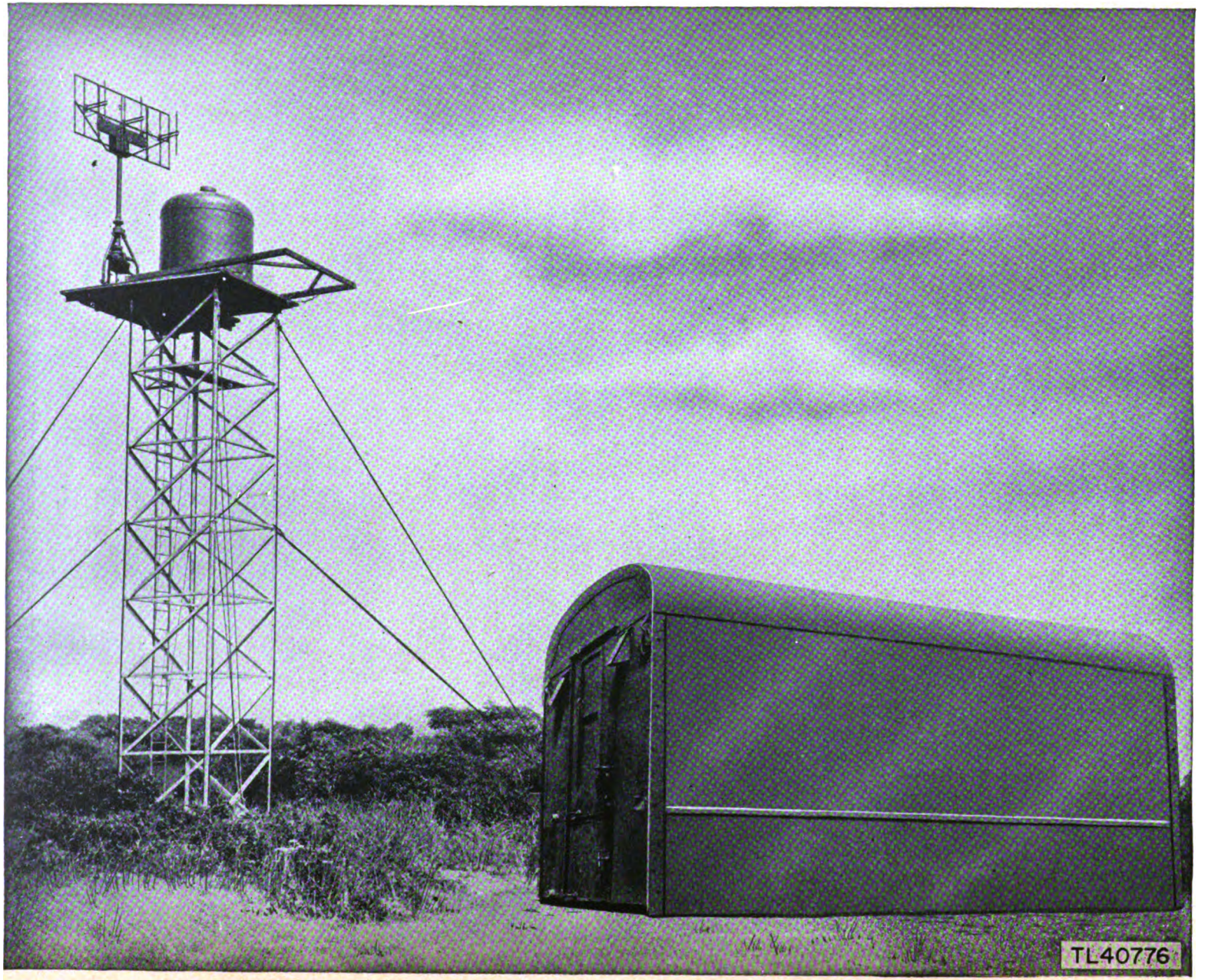
4. Bend—The dipoles and inductor bar in the transmitter-oscillator circuit.

5. Bury or scatter—Name plates, smashed tubes, and all other parts of the equipment.

DESTROY EVERYTHING

REFERENCE NOTICE

TM 11–1408, Preventive Maintenance Manual, is one of three technical manuals on Radio Equipments RC–182–A and RC–282–A. It is used in conjunction with TM 11–1308, Technical Operation Manual and TM 11–1508, Service Manual. This manual, TM 11–1408, is written to provide radar personnel with complete and practical instructions on how to carry on preventive maintenance on Radio Equipments RC–182–A and RC–282–A. It is intended that this manual will standardize and regulate certain maintenance routines which are necessary for the better operation and longer life of this radio equipment.



Radio Equipment RC–282–A set up for operation with Radio Set SCR–682–A.

CHAPTER 1

INTRODUCTION

Section I. GENERAL DESCRIPTION OF PREVENTIVE MAINTENANCE

1. General.

This manual describes the preventive maintenance procedures that are to be applied to Radio Equipments RC–182–A and RC–282–A.

2. Meaning of Preventive Maintenance.

Preventive maintenance may be defined as a systematic series of operations performed periodically on equipment in order to prevent break-downs. To appreciate the meaning of the term preventive maintenance it is necessary to distinguish between preventive maintenance, and trouble shooting and repair. The primary function of preventive maintenance is to prevent break-downs and the consequent necessity of repair. In sharp contrast, the primary function of trouble shooting and repair is to locate and correct existing defects. Trouble shooting and repair procedures are discussed in TM 11–1508 Service Manual. This manual, TM 11–1408, is concerned only with preventive maintenance. It is designed to maintain top efficiency in performance, to minimize interruptions in service, and to eliminate major break-downs.

3. Reasons for Preventive Maintenance.

a. PURPOSE. Preventive maintenance procedures are designed to—

(1) Protect the equipment from the detrimental effects of dirt, dust, moisture, water, and the ravages of weather.

(2) Keep the equipment in such condition as to insure uninterrupted operation for the longest period of time possible.

(3) Maintain the equipment so that it will always operate at maximum possible efficiency.

(4) Prolong the useful life of the equipment.

b. IMPORTANCE. The importance of preventive maintenance cannot be overemphasized. The entire system of aircraft identification presupposes that each Identification Friend or Foe (IFF) set will be on the air when it is needed and that it will operate at peak efficiency. It is vitally important that the personnel of radar stations properly maintain their sets.

4. Significance of Preventive Maintenance.

a. Preventive maintenance acquires its proper significance when it is examined from the point of view of equipment utility. Equipment must be kept running efficiently if it is to serve its purpose. Equipment will rapidly become useless if it is not maintained.

b. Preventive maintenance prolongs the useful life of the radio equipment and contributes to the success of the entire identification service. However, by its very nature, preventive maintenance requires the whole-hearted interest of the personnel assigned to it. They should have a keen appreciation of why the work is required. They should never think of their routine tasks as necessary evils.

c. Every soldier, who performs preventive maintenance on his pistol, rifle, or carbine, understands the importance of such work. He knows preventive maintenance may spell the difference between life and death, not only to himself but also to his comrades. He knows that the periodic disassembly, cleaning, and reassembly are done to keep the piece in working order and to minimize the chances of its jamming when the consequences are great.

d. The same reasoning applies to the maintenance of Radio Equipments RC–182–A and RC–282–A. The association between danger to personnel and failure of the apparatus may not be as obvious as in the case of the soldier and his gun, but the final result is the same. The enemy does not state his objective. It may be the demolition of the station, the bombardment of an area covered by the station, or the destruction of an important installation far behind the lines. Success or failure of the enemy's mission

may depend upon the efficient functioning of Radio Equipments RC–182–A and RC–282–A. Inoperative equipment endangers personnel and supplies and weakens the defenses of vital zones. The radio equipment can serve its purpose only if it is ready at all times to provide continuous and accurate information concerning the identity of approaching aircraft.

5. Preventive Maintenance Program.

The program of preventive maintenance as applied to Radio Equipments RC–182–A and RC–282–A has the following basic features:

a. The complete equipment is divided into units or groups of components and miscellaneous accessories.

b. Each unit is subdivided into a number of items. Each item consists of specific tasks to be performed.

c. The individual items are listed in the maintenance schedule shown in chapter 5. The scheduling is on a daily, weekly, biweekly, monthly, and quarterly basis. Groups of items are assigned to specified days of the week.

6. Precautions During Preventive Maintenance Operations.

Special safety precautions must be observed before and during the application of preventive maintenance procedures. These are discussed under two major headings.

a. Safety of personnel.

b. Damage to equipment.

7. Safety of Personnel.

a. General. Every effort must be made to avoid injury to personnel and equipment during the preventive maintenance work. Familiarity with equipment is apt to breed carelessness. Pay strict attention to every safety measure.

b. High Voltages. High voltages are dangerous. Death by electrocution awaits the operator or repairman who takes chances with high-voltage circuits. Careful operators or repairmen make certain that every precaution is taken.

c. Safety Precautions. Before performing any maintenance work inside a component, be sure to read the safety precautions in the preparatory steps item for that component. The preparatory steps item is the first item for each group of components.

8. Damage to Equipment.

a. Parts such as tube envelopes and resistor bodies located in the high power components remain very hot for several minutes after the power supply switches have been turned off. Some units have a temperature so high that painful burns will result if the units are touched. A burn may cause involuntary movements of the arm or the body which can damage the surrounding equipment, especially the tubes. Extreme care should be taken if work is started immediately after the power switches have been turned off.

b. Careful handling of equipment should become a regular habit. Care should be taken to avoid unnecessary strain on wires, cables, connections, and couplings.

c. Tools must be firmly grasped and special care must be taken to prevent the dropping of pliers, screw drivers, and similar repair tools on breakable parts. A heavy tool dropped on a tube may break the glass envelope or shift the position of the internal elements.

Section II. FUNDAMENTAL OPERATIONS OF PREVENTIVE MAINTENANCE

9. Basic Preventive Maintenance Operations.

The actual work performed during the application of the preventive maintenance schedule items is divided into six types of operation. Throughout this manual the lettering system for the six operations will be as follows:

F—Feel
I —Inspect
T—Tighten
C—Clean
A—Adjust
L—Lubricate

The first two operations determine the need for the other four. The selection of operations is based on a general knowledge of field requirements. For example, the dust encountered on dirt roads during cross-country travel filters into the equipment no matter how much care is taken to prevent it. Rapid changes in climatic conditions such as heavy rain followed by blistering heat; excessive dampness, snow, and ice all tend to cause deterioration of exposed surfaces and parts. Without continuous inspection and the continuous performance of necessary tightening, cleaning, and lubrication, the equipment

will soon become operationally erratic, undependable, and subject to break-down when it is most needed. Each of the basic operations listed above will be described in two ways. The description given in this chapter states the general nature of the operation and the manner in which it is generally undertaken. The second description given in chapter 3 states specifically how the operation is used in relation to particular parts and components.

10. Meaning of Feel Operation.

The feel operation is used most often to check rotating machinery such as blower motors, drive motors, etc., and to determine if electrical connections, resistors, bushings, etc., are overheated. Feeling is used to determine the need for lubrication or other similar conditions requiring correction. Become familiar with the normal operating temperatures of motors. Make allowances for local air temperatures.

Note: It is important that the feel operation be performed as soon as possible after the shut-down, and always before any other maintenance is done.

11. Meaning of Inspect Operation.

a. Inspection is probably the most important operation in the preventive maintenance program. Careful observation is required. A careless observer will overlook the obscure evidences of defects and abnormalities. Slight abnormalities may not interfere with the equipment performance, but these are the deviations from normal that should be discovered early. Valuable time and effort can be saved if defects are corrected before they lead to major break-downs. Operating personnel must make every effort to become thoroughly familiar with the indications of normal functioning. In this way they will be able to recognize the signs of malfunctioning.

b. Inspection consists of carefully observing all parts of the equipment, noticing their color, placement, and state of cleanliness. Inspect for the following conditions:

(1) Overheating, as indicated by discoloration, blistering, or bulging of the parts or surfaces of the container; leakage of insulating compounds; and oxidation of metal contact surfaces.

(2) Placement, by observing that all leads and cabling are in their original positions.

(3) Cleanliness, by carefully examining all recesses in the units for accumulation of dust, especially between connecting terminals. Parts, connections, and joints should be free of dust, corrosion, and other foreign matter. In tropical and high humidity locations, look for fungus growth and mildew.

(4) Tightness, by testing any connection or mounting which appears to be loose. This may be done by gently pulling on the wire or feeling the lug or terminal screw.

12. Meaning of Tighten Operation.

a. While in transit all units are subject to vibration. Other movements of equipment caused by concussion, falling shells, or by vibration from moving machinery, may result in loose connections which are likely to impair the operation of the set. All loose parts, especially if they are large, are definite hazards to the associated equipment. If loose parts shift or fall out of place, nearby parts may be crushed.

b. The importance of firm mountings and connections cannot be overemphasized. Screws, bolts, and nuts should not be tightened indiscriminately, but only when they are definitely known to be loose. Fittings tightened beyond the pressure for which they are designed may become damaged or broken. When tightening, always be certain to use the correct tool of the proper size.

13. Meaning of Clean Operation.

When the schedule calls for a cleaning operation it does not mean that every item which bears the identifying letter (C) must be cleaned each time it is inspected. Clean the parts only when inspection shows that it is necessary. Periodic cleanings are necessary more frequently on exposed parts than on those parts which are contained within cabinets. Inspection may reveal that some parts require more frequent cleaning than the schedule calls for. If so, the work must be done in accordance with the specific cleaning instructions given in chapter 3.

14. Meaning of Adjust Operation.

Minor adjustment will be made only when inspection indicates that it is required in order to maintain normal operating conditions.

15. Meaning of Lubricate Operation.

The word lubricate as used in this manual refers primarily to the application of a grease or oil to the bearings of motors or other rotating parts. It also means the application of a light oil to door hinges or other sliding surfaces. The small selsyn motors of the equipment are usually prelubricated at the factory and require no further lubrication.

CHAPTER 2

TOOLS

16. General.

The following tools are supplied with Radio Equipments RC-182-A and RC-282-A. The number in the circle following the tool description corresponds with the number on figure 1.

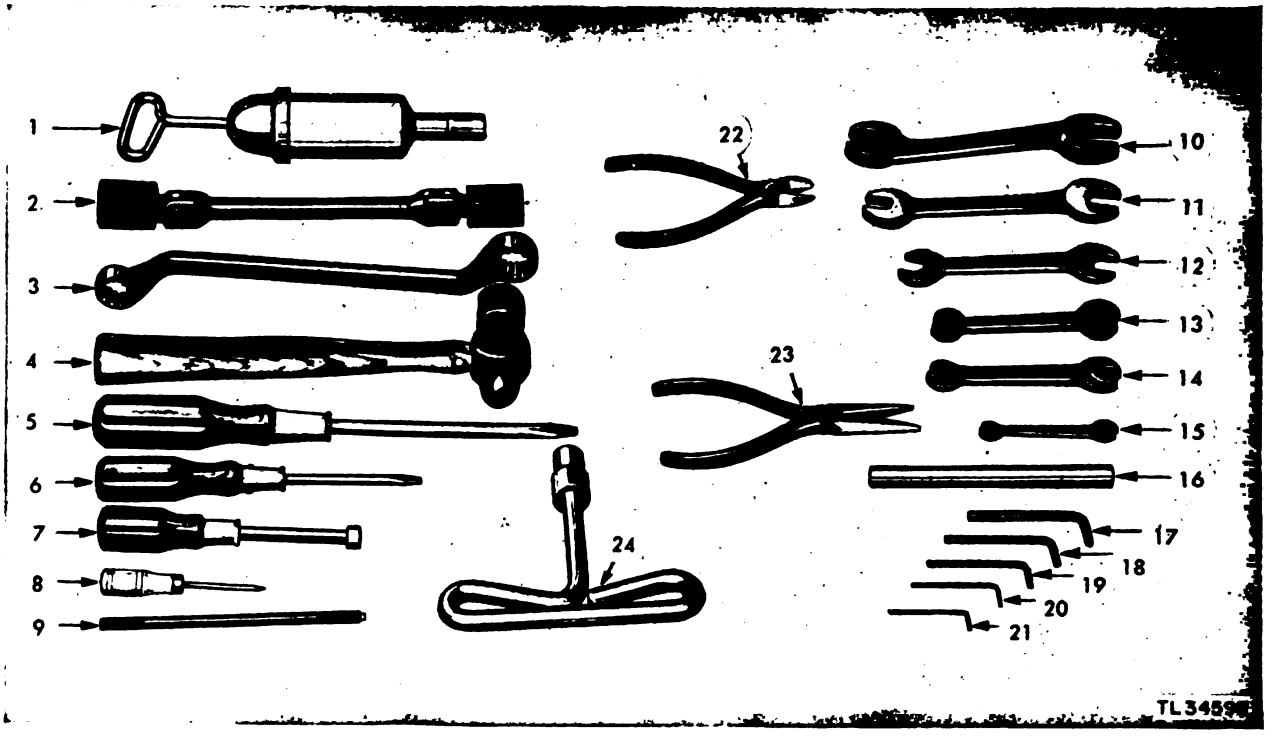


Figure 1. Tool equipment.

Quantity	Description
1	Bag, tool
1	Grease, can
1	Seal-tite, can
1	Gun, grease (1)
2	Wrenches, flexible, socket (2)
2	Wrenches, box (3)
1	Hammer (4)
1	Screw driver, 6" (5)
1	Screw driver, 2½" (6)
1	Wrench, spintite (7)
1	Screw driver, midget (8)
1	Screw driver, insulated (9)
1	Wrench, 25/32" and 7/8" (10)
1	Wrench, 5/8" and 11/16" (11)

Quantity	Description
1	Wrench, 9/16" and 3/4" (12)
1	Wrench, 7/16" and 1/2" (13)
1	Wrench, 5/16" and 3/8" (14)
1	Wrench, 3/16" and 1/4" (15)
2	Pins, drift (16)
1	Wrench, Allen, 3/8" (17)
1	Wrench, Allen, 5/16" (18)
1	Wrench, Allen, 1/4" (19)
1	Wrench, Allen, No. 8 (20)
1	Wrench, Allen, No. 6 (21)
1	Pliers, diagonal, cutting, 6" (22)
1	Pliers, long-nose, 6" (23)
1	Wrench, socket (24)

Note: Additional tools, if required, may be obtained from the tool equipment supplied with the radar set.

17. Construction of Special Cleaning Tools.

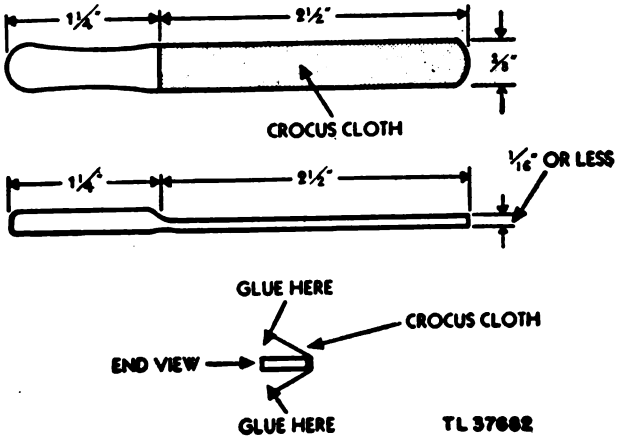


Figure 2. Crocus-cloth stick.

a. Crocus-Cloth Stick. The cleaning of the contacts used in the lobe switch and the relay may require an abrasive such as crocus cloth. This crocus cloth may be cemented to a suitable piece of wood in order to reach the contacts without bending and fraying the cleaning tool. Directions for making the necessary cleaning sticks follow:

(1) Cut a piece of wood to the size and shape as shown on figure 2.

(2) Cement the flat area and cover with a piece of crocus cloth.

(3) Place in a vise or other clamping device until the cement hardens.

(4) Cut off overlapping piece of crocus cloth.

b. Canvas Cleaning Cloth. Use the procedure as described above. Use a piece of light canvas instead of crocus cloth.

c. Jack Cleaning Tool. Use the procedure as described above. Instead of a flat piece of wood, use a piece of wood about 4 inches long and about ¼ inch in diameter. When using this tool, be careful to avoid bending the jack contact too far to the side. Use the crocus cloth only if conditions require an abrasive; otherwise use the canvas stick. Plugs should fit snugly into the jack openings. Do not wear away the sleeve contact by unnecessary abrasive cleanings.

18. Use and Care of Tools.

The importance of a well-kept tool kit is well known to good mechanics. Missing or broken tools cause delays and results in time off the air. The proper care of tools is just as much a responsibility as the proper care of the radio equipment itself. The following information on the use and care of tools is furnished for guidance.

a. Flat Crocus-Cloth Stick. Used for cleaning the relay contacts as well as the lobe switch contacts.

b. Long Jack Cleaning Stick. Used for cleaning jack contacts and sleeves by inserting into the jack openings. Use little pressure and as infrequently as possible. Excessive wear in the jack opening will cause loose fit of the plug and result in erratic set operation.

c. Allen Wrenches. Used to tighten or remove setscrews with the special Allen head. Various sizes are supplied to accommodate all screws in the equipment. These wrenches are numbered on figure 1 and described in the tool list. Keep them in the container provided. After use, wipe them with an oily rag.

d. Pliers. (1) Diagonal pliers are used to cut copper wire up to size 14. They are not designed to cut steel wire. Keep the joint oiled. Store the tool in the tool box when through with a job.

(2) Long-nose pliers are used to hold and bend fine wire, grip small parts, and for light work. Keep oiled and clean. Do not use the long-nose pliers for tightening nuts.

e. Grease Gun. The grease gun must be used carefully in order to prevent an excessive amount of grease from entering the part attached to the fitting being serviced. Study the operation of the gun by noting the quantity of grease leaving the nozzle as the handle is pushed in. Always hold the gun directly over the fitting to avoid loss of grease. The gun is filled by removing the handle end and with a flat stick or equivalent, push grease into the opening. Keep the gun exterior free of grease to avoid slipping of the hands during the greasing operation.

f. Spintite Wrench. The spintite wrench is used for hexagonal screws or nuts. It is handy for getting into the hard-to-get-at places. Use the exact size for the job and avoid rounding the corners of the hex head of the nut or screw.

g. Screwdriver. In the selection of a screw driver, make sure the tip is the same width as the head of the screw, and that it fits snugly in the slot. The handle should be large enough to give adequate leverage. Do not use the screw driver as a chisel or a crowbar. Keep the shaft clean and wipe with an oily rag occasionally.

h. Soldering Iron. Knowledge about the proper use of soldering irons will, if applied, result in good soldering. The following hints are suggested:

(1) Keep the tip clean. Use a file and dress the tip, being careful not to elongate the copper more than is necessary.

(2) Tin the tip. To tin, place rosin-core solder on the tip and hold it there until it flows readily. Tin all sides and wipe with a clean rag.

(3) Clean the joint carefully. Use sandpaper to remove all corrosion.

(4) Make the joint mechanically tight (wrap wire around lug).

(5) Hold the clean soldering iron tip against the joint. Hold it there until the applied solder runs freely.

(6) Use enough solder to fill the joint completely, and continue to apply the heat to sweat the solder. Allow the joint to cool without movement.

(7) Wipe off any excess flux or burned material.

(8) Do not depend upon the solder to hold the joint mechanically secure. Wrap the wire around the lug, the solder will do the rest.

(9) Always use a clean iron on a clean joint.

(10) Do not waste solder; a little solder will do the job if the joint is clean and bright.

(11) When through soldering, disconnect the iron. An unused connected soldering iron will oxidize and scale, thus requiring frequent cleaning.

(12) Remove the tip from the holder and tap off the scale. Use sandpaper to clean the shank. Remove the sand grains before inserting tip back into the holder.

CHAPTER 3

MAINTENANCE TECHNIQUES

19. General.

This chapter contains general information for performing preventive maintenance on the various electrical parts of Radio Equipments RC–182–A and RC–282–A. Refer to this information when doing maintenance work. For example, in item 3 (par. 41) the maintenance man is directed to inspect the contacts of the relay. Instructions for performing maintenance on the relay are found in par. 34.

20. Tubes and Sockets.

Preventive maintenance work on vacuum tubes is confined to inspection and cleaning. Work on tube sockets and mountings involves inspection, tightening, and cleaning.

Caution: Avoid touching the tubes immediately after shut-down; they are usually hot. Severe burns may result from hand contact with the tube envelope.

a. INSPECT (I). (1) Inspect tube envelopes for dirt accumulation and for possible break-away from the bases. Examine the tube caps for dirt, corrosion, and for possible break-away from the cement which attaches them to the glass envelopes. When tubes with loose plate caps or envelopes are found, they should be replaced. Do not attempt to repair.

(2) The spring clips which make contact with the grid caps must be examined for corrosion and loss of tension. Check the conditions of the wires soldered to these spring clips. The wires should be free of frayed insulation and broken strands. Special care should be taken in removing a loose spring clip attached to a grid cap which has broken away from its glass envelope. Never turn the clip while it is on a loose cap. Be particularly careful when signs of corrosion exist, as the clip may adhere to the cap.

(3) Firmness of the tubes in their sockets can be determined by pressing the tubes down in the sockets. Gently move the tube from side to side and note the resistance to movement. Firmly mounted tubes should resist sidewise as well as upward movements.

(4) Inspect the tube sockets at the time the tubes are examined. If the socket is faulty, notify the person in charge. If the tube pins do not make good physical contact with the socket spring sleeves, bend the sleeves a very small distance towards the tube pin. (Rarely, if ever, does a socket require this treatment; if it does, use the long-nose pliers and make the adjustment with extreme care.)

(5) Check the tightness of the bushing screws on the high-voltage tube sockets. If tightening is required, use extreme caution. The bushings are easily broken if excessive pressure is applied to the nuts on the sockets.

b. CLEAN (C). (1) The tubes should be cleaned only if necessary and not because the schedule calls for it on that particular day. The transmitter tubes especially should be free from dirt. Dirt together with moisture will form a path for the high voltage present in the circuit. Do not change any adjustments or move adjacent parts when cleaning inside the transmitter compartment. Keep the cleaning rag tightly bunched in the immediate vicinity of the cleaning operation. Watch for any possible entanglement with protruding parts such as the tube caps. If the removal of dirt is difficult, sprinkle water on the cleaning cloth. In extreme cases, use carbon tetrachloride.

(2) An abrasive such as crocus cloth may be used for cleaning the tube caps. Wrap the cloth around the cap and, with a gentle rotating movement, remove the corrosion and dirt. A follow-up with a clean cloth is necessary. The tube caps are cemented to the glass, and extreme care must be used when handling.

(3) Corrosion may be removed from the socket contacts by passing an elongated piece of crocus cloth through the socket contacts. At this time it may be desirable to examine the tube pins for corrosion and poor solder connections. Check the soldered connections to the lugs on the socket contacts for cold

soldered joints and rosin connections. A gentle tug on the connecting wire will usually disclose an existing defect.

c. ADJUST (A). Always remove the tube from the socket when adjustments are made to the spring clip or to the socket fingers. Place the tips of the long-nose pliers at a point near the end of attachment. Bend toward the position to be occupied by the tube pin or cap. Use a minimum of pressure, bend slightly, stop and examine, and bend again if necessary.

d. REMOVAL OF TUBES FROM SOCKETS. (1) The small glass tubes such as those used in the receiver are covered with a metal shield which is removed by simply turning counterclockwise until it is free of the base. Remove the spring inside. A shield key is provided for removing the shield. Figure 25 shows the key inserted into the top of the tube shield.

(2) A tube puller may be used to facilitate the removal of the hot metal tubes from their sockets when and if conditions prevent the usual 15-minute cooling-off period.

Note: Never use excessive force when removing a stubborn tube. Investigate the reason and apply the remedy as required. Avoid jarring a *warm* tube unnecessarily.

ening of the mounting nuts and assemblies. Oil-filled capacitors are subject to oil seepage. Their bushing-protected terminals must be kept free from dirt accumulation.

Caution: Capacitors retain dangerous charges for some time. Before touching the capacitor terminals, be sure they have been shorted with an insulated screw driver.

a. FEEL (F). Immediately after shut-down, discharge and feel the sides of the high-voltage filter capacitors. These should be reasonably cool. If abnormally warm, there are probably losses due to excessive internal leakage. (Operational difficulties will usually point to this defect.) Capacitors in this condition are subject to failure at any time. Notify the person in charge.

b. INSPECT (I). (1) The terminals of the capacitor must be inspected for corrosion and loose connections. The mounting assemblies of the capacitors should be carefully inspected for loose mounting screws, studs, or brackets. Check the leads and lugs to the capacitor terminals for poor insulation and defective soldering. Frayed insulation should be cov-

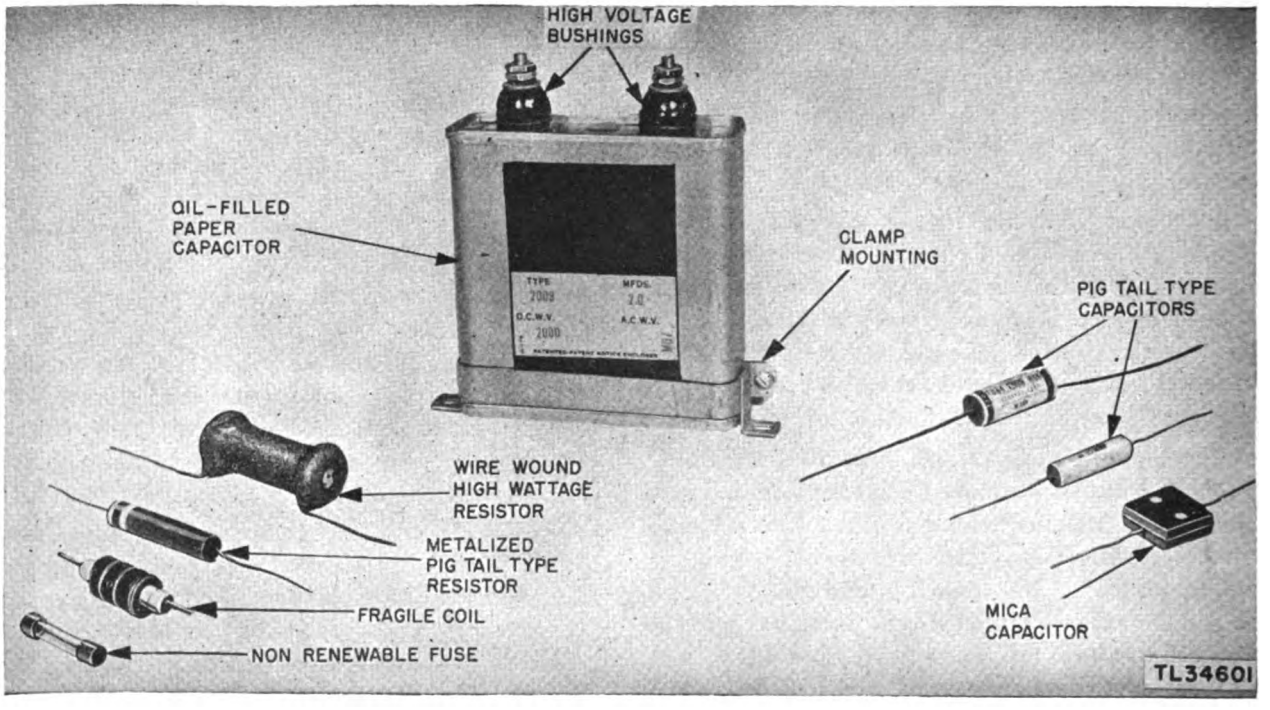


Figure 3. Resistors, capacitors, and fuse.

21. Capacitors.

Figure 3 shows some of the capacitor types used. Except for the oil-filled high-voltage type, maintenance is confined to cleaning and an occasional tightened with a strip of friction tape ⅜ inch wide as a temporary measure.

(2) The case of each oil-filled capacitor should be thoroughly inspected for leaks. If a capacitor leaks

oil, it should be removed and replaced. However, if a replacement is not available, locate the leak and resolder the open seam. If the seam is resoldered before a large amount of oil has leaked out, the capacitor may be used with good results. *No attempt to add oil should be made.*

c. TIGHTEN (T). Tighten all loose terminals. Particular care should be taken when tightening terminal nuts. If the bolts turn and terminal nuts are not sufficiently tight, grip the end of the terminal bolt with a pair of pliers while tightening the nut with the proper size wrench; otherwise, the seal or internal connections may be damaged. Tightening support insulators or bushings should be done with care. Do not apply too much pressure.

d. CLEAN (C). The cases of the capacitors, the insulating bushings, and the connections should be cleaned if dirty, rusted, or corroded. The capacitor cases can be cleaned with a dry cloth. If the deposit of dirt is hard to remove, use a solvent such as carbon tetrachloride or other dry-cleaning solvent. The bushings should be wiped carefully with a dry cloth after they are cleaned with a solvent. Corroded connections should be sanded with #0000 sandpaper and properly tightened. Clean insulated terminal strips.

22. Resistors.

Various types of resistors are used in the radio equipment (fig. 3). The more common type is the metalized resistor molded in plastic. These are widely used in low-voltage circuits where heat dissipation is not great. Another type is the vitreous enameled resistor with a hard ceramic coating baked on the resistance element. The connections to the various resistors are made in several ways, the most common of which is by the use of pigtails, in which the conducting lead enters the body of the resistor.

a. INSPECT (I). Examine the coating of the vitreous resistor for cracks and chipping. Look for blistering and discoloration (which usually indicate overheating) on the bodies of all types of resistors. Look for arc pits. Inspect leads, brackets, and all connections for corrosion, dirt, dust, and looseness. Look for broken strands in the connecting wire. Check for firmness of mountings. Do not unnecessarily move resistors with pigtail connections. Breaking of the pigtail connection may occur at the point where it enters the body of the resistor. Inspect the connections of the pigtail resistors for proper soldering on the terminal-strip lugs.

b. CLEAN (C). (1) All dirty or corroded connections of resistors should be cleaned with a brush dipped in carbon tetrachloride. Vitreous resistors must be kept clean to avoid flash-over or leakage between the terminals. They should be wiped with a dry cloth. If dirt is hard to remove, use carbon tetrachloride on the cloth.

(2) Discolored resistors cannot be cleaned. Slight discoloration of the resistor body at the center is normal. Excessive discoloration, however, is indicative of overloading at some time prior to the inspection, and is probably due to some circuit trouble which requires analysis. Such analysis is detailed in the Service Manual TM 11–1508.

(3) Resistors with pigtail connections should be cleaned with a small brush.

23. Fuses

a. GENERAL. (1) Fuses are small strips of metal with a low melting point. They are inserted in series with an electrical circuit to open the circuit when the amount of current in the circuit exceeds a safe value. Such fuses protect equipment against electrical overload and damage. The type of fuse used in Radio Equipments RC–182–A and RC–282–A is nonrenewable. When *blown* it must be replaced. When a fuse blows, an effort should be made to discover the reason for the failure and to make corrections, if possible, before a new fuse is installed. A black spot on the glass of a burned-out fuse may be noticed.

(2) Nonrenewable or one-time fuses (fig. 3) are

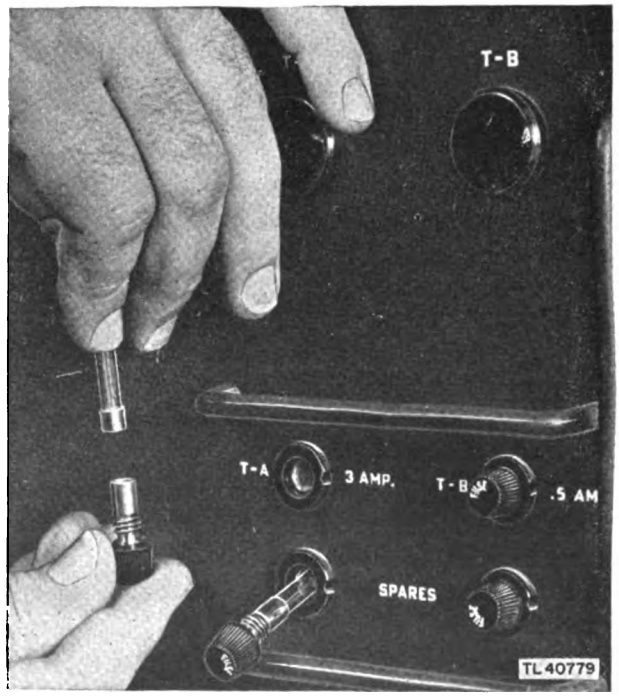


Figure 4. Replacing fuse.

to be discarded when blown and replaced with good fuses. The holder and fuse can be unscrewed from its socket. To remove a fuse, unscrew the fuse holder until it turns freely, and then pull it out with the fingers. The fuse holder fits over one terminal of the fuse and is held there by friction. The plug and fuse are separated by pulling them apart (fig. 4). Care must be taken to see that the contact surfaces of the fuse and socket are kept clean and tight.

b. INSPECT (I). Examine the fuse caps for charring and corrosion. Examine the fuse clips for proper tension, dirt, and loose connections.

c. TIGHTEN (T). After inspection and insertion into the panel receptacle, tighten fuse holders by screwing clockwise. Avoid excessive pressure.

d. CLEAN (C). All fuse ends are to be cleaned with #0000 sandpaper. Finish by wiping with a clean cloth.

24. Bushings and Insulators.

a. GENERAL (1) Insulator bushings are used in high-voltage circuits (fig. 33①). They are constructed of ceramic material with highly glazed surfaces. Since this type of insulator is no better than its surface, deposits of foreign substances upon the surface will materially reduce its insulation value. Therefore it is important that bushings be inspected frequently.

(2) Insulating bushings are used for different purposes, for example: as supports for high-voltage tube sockets, as supports for high-voltage leads, and as supports for the voltage terminals of transformers and capacitors.

b. INSPECT (I). Each bushing should be clean and without cracks or chips. It is possible for a highly glazed insulator to develop fine hairline surface cracks in which moisture and dust accumulate and eventually form a leakage path for the high voltage. The bushing surface must be inspected for such cracks. Replace a defective bushing. Bushings are held in position with a hexagonal nut on the end of a threaded conductor which passes through the center. Brush the finger over the glazed surface to check for dust.

c. TIGHTEN (T). All loose bushings must be tightened. The procedure used is simple, but one precaution must be observed. Avoid forcing the nuts or screws. Damage will result if too much pressure is exerted.

d. CLEAN (C). Insulated bushings are easily cleaned. If periodic cleanings are made, the use of a dry, clean cloth will usually suffice. If the dirt is stubborn, use a cleaning agent. (Never use an abrasive on the smooth glazed bushing surface.) Always follow up a cleaning job by wiping with a clean cloth to remove the white residue. This white deposit may cause trouble by holding moisture and dust.

Note: Replace all bushings which have rough surfaces.

25. Transformers and Chokes.

Feeling, cleaning, and tightening are the three operations required for the transformers and chokes. See figure 5 for representative types of transformers and chokes.

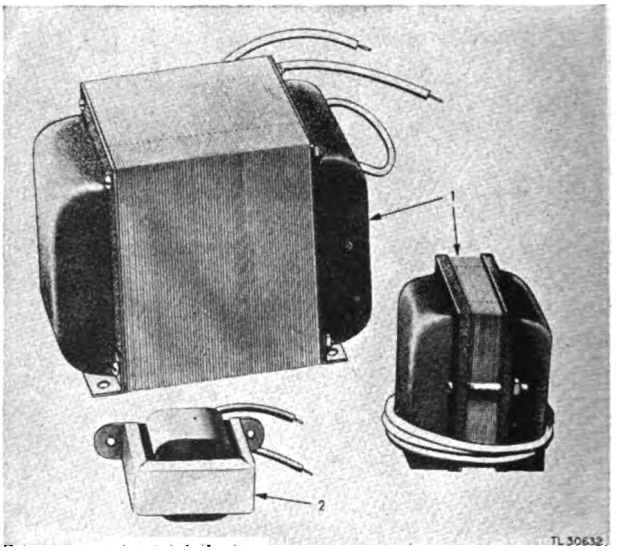


Figure 5. Transformers① and choke②.

a. INSPECT (I). All transformers and chokes should be checked for general cleanliness. Examine for tightness of connections, connecting lugs or terminals, mounting brackets, and rivets. Dust, dirt, or moisture present between the terminals of high-voltage transformers or chokes may cause flash-over and subsequent failure.

(2) Wax-impregnated transformers should be inspected for signs of overheating indicated by the presence of insulating compound (wax) on the outside of the seams of the cases. Such evidence is usually an indication of trouble, and a system analysis must be made. See TM 11–1508 for additional information.

b. CLEAN (C). The cases of the transformers and chokes should be cleaned with a dry cloth. In some instances it may be necessary to use carbon tetrachloride to remove stubborn foreign matter. Corroded contacts or connections may be sandpapered and wiped clean. Corrosion at ground contacts must be

removed and the connections resoldered. The transformers and chokes are inclosed, but the connections are external. Inspecting and cleaning the connections on these transformers and chokes need not be frequent.

c. TIGHTEN (T). All loose mounting screws and connections are to be tightened. If it is necessary to remove several wires from their terminals, note and tag their positions before they are unsoldered so that they can be restored to their original places.

26. Potentiometers.

a. INSPECT (I). The electrical operation of the potentiometers is best checked while operating the set. To check for mechanical operation, rotate the shafts and note how smoothly they turn. Listen for any scraping and grating noises. Noisy potentiometers should be investigated and replaced if found to be damaged. See TM 11-1508 for the disassembling procedure. All metallic parts should be inspected for dust, dirt, and corrosion. The range control mechanism, which controls the rotation of the range control potentiometer, is dependent for its proper action upon the lubrication of the gears and shafts in the assembly. Lubrication of this assembly is covered in item 2.

b. TIGHTEN (T). All loose assembly or mounting screws should be tightened. Tighten the control knob in place with an Allen wrench. A typical example of the use of the Allen wrench for tightening setscrews is shown in figure 27.

27. Terminal Strips.

The terminal strip is used for distribution and connection junctions in an electrical circuit. It usually consists of a flat strip of insulation with numerous lugs mounted on it (fig. 6).

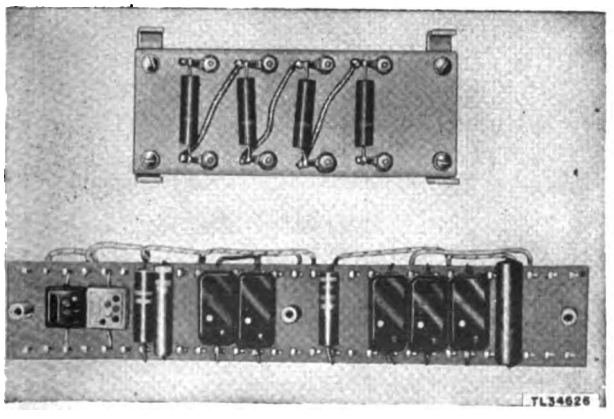


Figure 6. Terminal strips.

a. INSPECT (I). The terminal strips must be checked for cracks, breaks, dirt, and loose connections. Carefully examine the connections for mechanical defects, dirt, or corrosion. Look for poorly soldered connections.

b. TIGHTEN (T). All loose screws, lugs, and mounting bolts must be tightened. When tightening screws, select the proper screw driver and exert moderate pressure. Do not remove loose connections for cleaning unless they are dirty or corroded.

c. CLEAN (C). The terminal strips must be cleaned with a dry brush. In extreme cases use carbon tetrachloride. Following such an operation, the board must be thoroughly wiped with a cloth and then brushed to remove the lint.

28. Cables, Plugs, and Connectors.

Figure 7 shows various types of plugs, cables, and connectors as used in the equipment. A single broken wire or loose connection in a connector may cause the entire set to go off the air. Too much stress cannot be placed upon the importance of making sure the wire ends are securely fastened to the terminals. Excessive heating of the pins when soldering connections is a common fault. Permitting the melted flux to flow onto the pins or allowing the melted solder to run onto the insulated part of the connector usually results in an open or short circuit at a later date. Mishandling of cables, such as turning or inserting the connector by grasping the cable insulation, must be avoided. Ground connections must be clean and tight at all times. An open ground connection may cause the death of someone who unfortunately completes the electrical circuit. Remember that cables and connectors are the life lines of the set and must be handled with care. Do not place open connectors on the ground.

a. INSPECT (I). The cables and cords should be closely examined for cracked or deteriorated insulation, frayed or cut insulation at the connecting and supporting points (broken lacing cords), and for any improper placement which puts the cables under strain. Inspect the cable to see that it is properly supported and that there are no sharp bends.

Caution: During cold weather (5° above zero or less) all connectors and cables must be handled carefully.

b. TIGHTEN (T). All loose cable clamps, coupling rings, and cable connections must be tightened.

c. CLEAN (C). All dirty or corroded connections and pins must be cleaned. The easiest way to remove

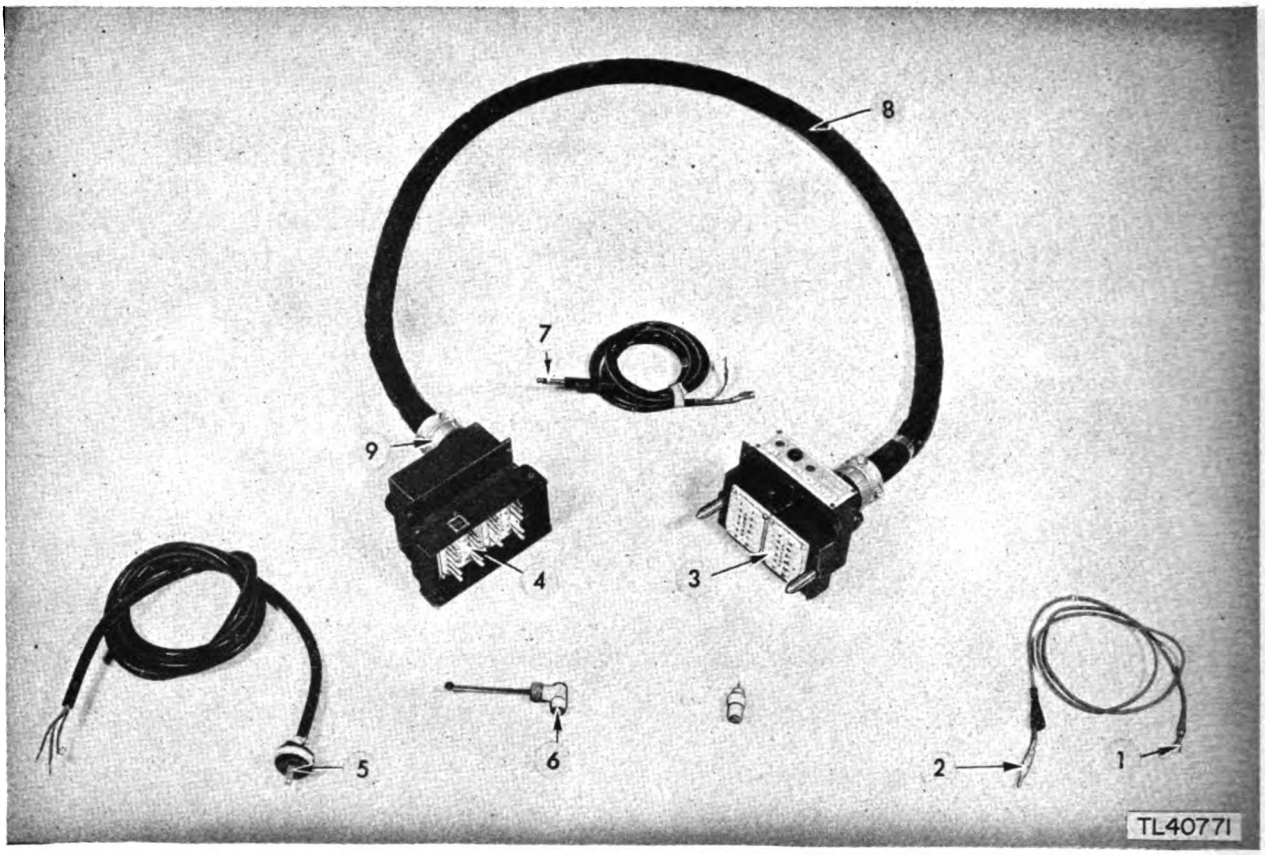


Figure 7. Plugs, cables, connectors, and cords.

dirt from connector pins is to remove connector from its receptacle and clean it with a brush dipped in carbon tetrachloride. Corroded connections and pins should be cleaned with #0000 sandpaper or crocus cloth. No attempt should be made to remove individual prongs from cable plugs.

29. Pilot Lights.

Pilot lights are used to indicate the application of power to a circuit and to illuminate panels on the front of the set. Two types of lamps are used; the 6–8–volt, (T–44) and the 117–volt (S–6) types. The 117–volt type is screwed into its socket, and the 6–8–volt type is bayoneted into its receptacle. To remove the 117–volt lamp, press the two flat strips located above and below the lamp base and draw out the assembly. Unscrew the lamp and replace. The 6–8–volt lamp is inserted into the socket and turned clockwise as it is pushed in. Some of the 6–8–volt lamps are made accessible by removing the jewel over the lamp. The replacement of a covered panel light is shown in figure 8.

a. INSPECT (I). The pilot-light assemblies should be examined for broken or cracked pilot-light shields,

Figure 8. Replacing pilot lamp.

loose bulbs, bulbs with loose bases, loose mounting screws, and loose, dirty, or corroded connections.

b. TIGHTEN (T). Tighten loose mounting screws and resolder loose connections. If the connections are dirty or corroded they should be cleaned before soldering. Loose bulbs should be screwed hand tight

into their sockets. Bulbs with a bayonet base should not be twisted hard enough to break the glass bulb from the base. Broken or burned-out pilot-light bulbs must be replaced as soon as possible. If removal is difficult, a small piece of friction tape folded over the top of the bulb and pressed against the two sides may be used to gain additional leverage. After the tape is attached, the bulb can be turned and removed from the socket. A new bulb can usually be replaced using the fingers, but if difficulty is again experienced, repeat the above procedure.

c. CLEAN (C). The pilot-light shields, the base assembly, and the glass of the bulb, where accessible, should be cleaned with a dry cloth. Clean the interior of the base of accumulated dust or dirt. Films of foreign material on the connections or the socket contacts may be removed with a piece of cloth or a small brush dipped in carbon tetrachloride. Because of the low voltage at which the 6–8–volt pilot lamps operate, all contacts must be clean.

30. Air Filters.

An air filter is placed on the rear of the bottom panel of the cabinet to remove dust from the air drawn into the cabinet. The filter mounted on the panel is shown in figure 9. The filters are constructed of spun glass impregnated with oil to improve the filtering action.

a. INSPECT (I). The filter must be inspected for dirt accumulation. Note whether the filter is mounted correctly on the panel. Improperly assembled filter elements or warped frames will allow unfiltered air to leak around the edges and thus permit dust to enter the cabinet.

b. TIGHTEN (T). The mounting brackets should be tightened, and the filter must be adjusted to fit properly.

c. CLEAN (C). To clean the air filter, proceed as follows:

(1) Remove the filter pad from the back of the bottom panel (fig. 9).

(2) Hold the filter element in both hands with the dirty side facing down (fig. 10).

(3) Tap and shake the filter element.

(4) Hold up to the light and look through. If light can be seen, the element can still be used. If no light is seen, replace with a new filter element.

(5) Always replace the filter element with the arrow pointing towards the interior of the set.

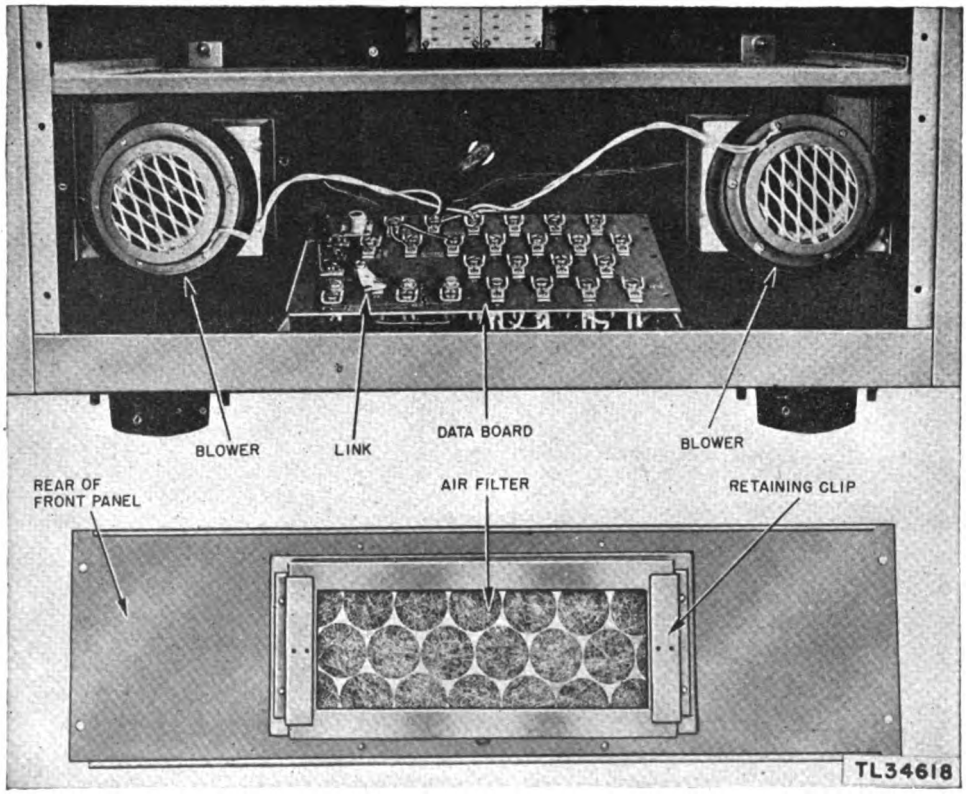


Figure 9. Blower motors and filter pad (bottom of Rack FM–80).

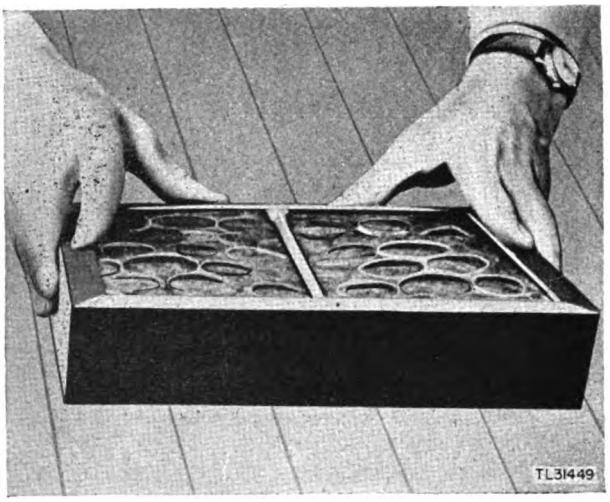


Figure 10. Cleaning air-filter pad.

31. Cabinet.

The case which houses the various components of Radio Equipments RC–182–A and 282–A is constructed of sheet steel painted olive drab. Figure 34 shows the front and rear view.

a. INSPECT (I). Inspect the outside and inside of the case thoroughly. Clean the inside when a chassis is pulled out for maintenance. Check the panel screws and retaining screws for stripped threads. Examine the pilot lamp covers for cracks and breaks. Inspect the panels for loose knobs, switches, and jacks. Tighten setscrews with the Allen wrench provided.

b. CLEAN (C). Each cabinet, outside and in, should be wiped with a clean, dry cloth. Sandpaper all rusty spots, wipe clean, and paint with a matching color. Wipe the pilot-light jewels with a clean cloth.

32. Meters.

A meter is a delicate instrument and must be handled carefully. A damaged meter cannot be repaired in the field and should be returned to the depot for adjustment.

a. INSPECT (I). The leads and the connections to the meter should be inspected. Look for loose, dirty, and corroded connections and for a cracked or broken case or cover glass. The accuracy of a meter will be seriously affected if the case or glass is broken and dirt and water filter through.

b. TIGHTEN (T). All terminal connections should be tightened. If loose mounting screws are found, they too should be tightened. Loose external meter wires should be inspected for dirt or corrosion before they are tightened.

c. CLEAN (C). Meter cases are usually made of hard, highly polished bakelite, and can be cleaned with a dry cloth. If cleaning is difficult, the cloth should be dampened with carbon tetrachloride. Dirty connections may be cleaned with a small stiff brush dipped in carbon tetrachloride, or with a small piece of cloth dipped in the solvent.

d. ADJUST (A). Normally, the meter pointer will indicate zero when the equipment is turned off. Before deciding that a meter needs readjusting, tap the meter case lightly with the fingertip. This will help the needle to overcome the slight friction which sometimes exists at the bearings and prevents an otherwise normal meter from coming to rest at zero *Zero shift* is caused by the gradual yielding of the hairspring. The pointer may gradually return to zero position. For this reason, it is advisable to check the zero setting of the meter only after the set has been off the air for several minutes. If adjustment is needed, insert the tip of the screw driver in the slotted screw head located below the meter glass (fig. 11) and slowly turn the adjusting screw until the pointer is at zero. View the meter face and pointer *full on* and not from either side.

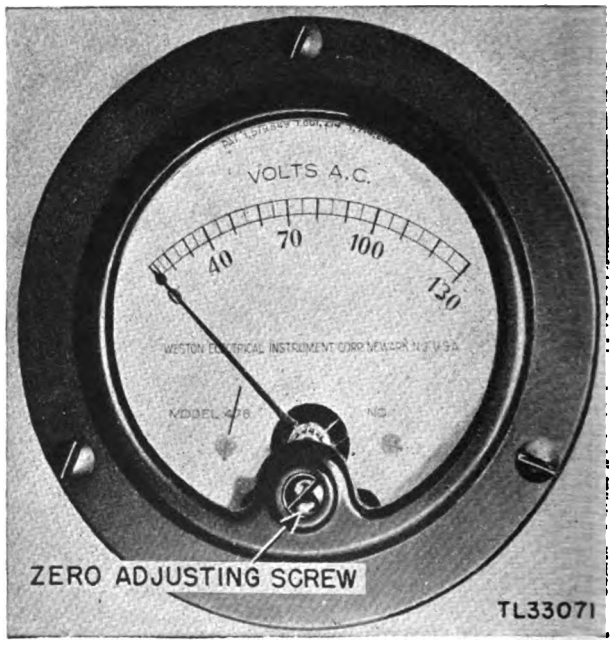


Figure 11. Meter zero-adjustment screw.

33. Jacks.

Jacks require very little attention and only at infrequent intervals. Occasionally, it will be necessary to tighten the mounting nut, clean the contacts, or increase the spring contact tension. Dirt is removed with a brush and carbon tetrachloride; corrosion is removed with the jack cleaning tool (par. 17*c*). Spring

tension is increased, when necessary, by bending the spring near its point of attachment with a pair of long-nose pliers. It is recommended that the action of the jack be tried after each adjustment. Avoid bending excessively. Keep all soldered connections intact.

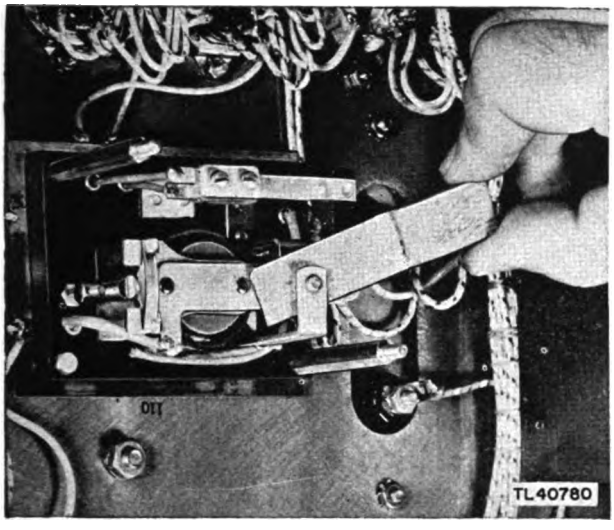


Figure 12. Cleaning the relay contacts.

34. Relays.

The relay used in Radio Equipments RC–182–A and RC–282–A requires little attention. It is adjusted at the factory and should not require any further adjustment. If the contacts require cleaning, use the crocus-cloth stick (fig. 2) and apply as shown in figure 12. Follow up with the canvas stick. Inspect the winding for evidence of overheating. Inspect the leads, brackets, and all connections for corrosion, dirt, dust, and looseness. Do not attempt to change the relay contact spacing.

35. Switches.

Many types of switches, such as toggle switches, circuit breakers, interlock switches, and gang switches are used. Some of these require preventive maintenance. The lobe switch in particular requires periodic attention. Figure 13 shows the contacts ① which should be cleaned at least once every 2 weeks. To clean a pitted contact, simply rub the crocus-cloth stick over the contact. Follow up with the canvas stick. The contacts may be cleaned (if not pitted badly) without removing them from the switch assembly. After cleaning, the contacts should be spaced about 0.011 inch apart. To adjust the contact gaps, rotate the cam until the spacing of the contacts is at a maximum. Loosen screws ② with a small screw driver and adjust the spacing by turning the contact adjusting screw ③ in or out until the inserted feeler gauge shows (snug fit) 0.011 inch. Repeat the process on the other contacts. When the job is finished, replace the cover on the housing and be sure it is watertight. A gang switch is shown in figure 14.

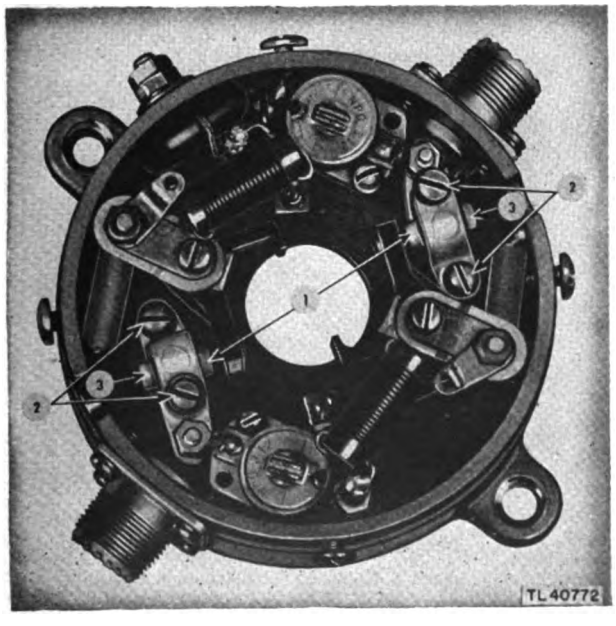


Figure 13. Lobe switch contacts.

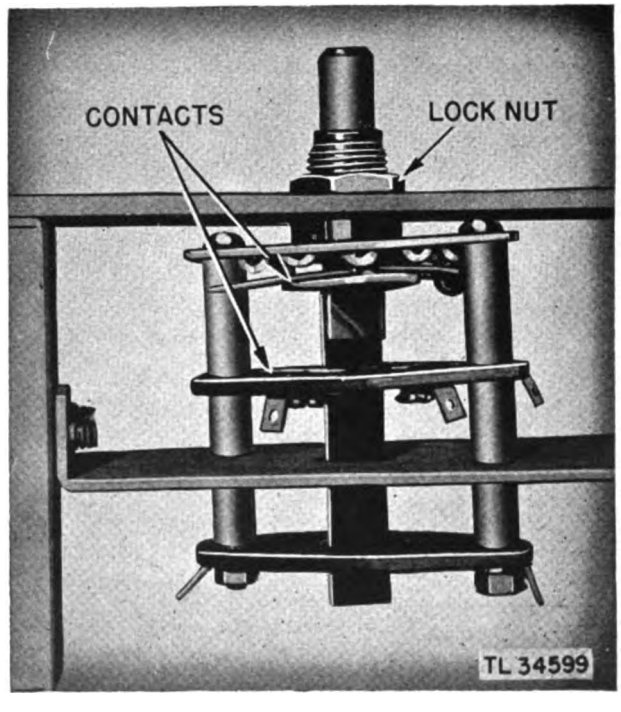


Figure 14. Gang switch.

a. INSPECT (I). (1) Check the mechanical action of each switch. The action of the switch is checked by operating the control knob or toggle and noting both the freedom of movement and the amount of spring tension. Check for a positive snap sound on the gang, toggle, and circuit-breaker switches.

(2) Inspect the gang switches for clean contacts. The inspection is visual. Do not attempt to pry the leaves of the contacts apart. The contacts are silver plated and do not corrode easily. The rotary contact should make a good connection with the stationary contact. As the former slides into the latter, a spreading of the stationary contact leaves should take place.

b. TIGHTEN (T). Tighten loose mountings and connections. Increase the tension of springs only if absolutely necessary.

c. CLEAN (C). The exterior surfaces of switches should be cleaned with a stiff brush moistened with carbon tetrachloride. Polish with a piece of clean cloth. Corroded connections should be cleaned with #0000 sandpaper.

d. LUBRICATE (L). If binding is noted, apply a a drop of lubricating oil on the shaft where it enters the bushing. Do not allow oil to run into the electrical contacts. Lubrication of switches is not recommended unless serious binding is felt.

36. Motors.

Four motors are used in Radio Equipments RC–182–A and RC–282–A. The two blower motors (fig. 9) require periodic lubrication. The lobe-switching and the antenna drive motor (fig. 46) are lubricated at the factory and once yearly are to be taken to the depot for a complete disassembly and cleaning. No commutators are used in the motors. The sealed antenna drive motor must not be tampered with. Do not force an excessive amount of grease into the worm gear unit at the end of the antenna drive motor assembly. Unless the plug is removed to allow the overflow to escape, the internal pressure will force the grease into the antenna drive motor windings. The lubrication chart in paragraph 55 may be referred to for additional information.

a. FEEL (F). The condition of a motor may sometimes be determined by feeling the housing for excessive temperature. If the normal running temperature is known, and due allowance is made for the surrounding air temperature, a check may be made by holding the palm of the hand on the housing of the motor.

b. INSPECT (I). Inspect the mounting bolts and nuts of all the motors for looseness and corrosion. Look for oil or grease on the top of the blower motors. Because of the inaccessibility of the blower motors, oil is frequently spilled over the top of the motor housing. Use a clean rag for wiping the dirt and oil from the bottom of the rack. Check the wiring and insulation for oil soak. The lobe-switching motor compartment (fig. 48) should be checked for moisture. Rain will enter the lobe-switching compartment if the cover and seals are not fastened tightly. Keep compartment door tightly closed. Check for grease along the motor shaft. Grease should not be allowed to get on the lobe-switch contacts.

CHAPTER 4

MAINTENANCE ITEMS

Section I. GENERAL INFORMATION

37. General.

a. PROCEDURE FOR MAINTENANCE. The components contained in Rack FM–80 will be maintained in the following manner:

(1) Remove component to be maintained from rack shelf.

(2) Place on a suitable surface.

(3) Procure similar component from the spare chest.

(4) Place spare component in the rack and tighten all captive screws; then make ready for operation.

(5) Using instructions as given in this manual, prepare to work on removed component.

(6) After the unit is properly serviced according to F, I, T, C, A, L operations, place in the spare chest space provided.

(7) When the schedule calls for maintaining the same component again, remove that component from the rack and repeat the process.

b. BREAK-DOWN. Radio Equipments RC–182–A and RC–282–A are divided into units as follows:

Unit	Items
Control Unit BC–1268–A	2
Indicator I–221–A	3
Receiver and Transmitter BC–1267–A	4
Power Supply RA–105–A	5
Rack FM–80	6
Test Equipment	8–9
Cables and Connectors	11
Antenna Assembly	13–14

38. Items.

Two different types of items will be found in this chapter: preparatory steps items, and maintenance items.

Note: The preparatory steps item will be included in every section.

a. PREPARATORY STEPS ITEM. This is the first item in each section. It pertains to the entire unit and is arranged in steps in the following sequence:

(1) *Tools and materials needed.* This subparagraph consists of a complete list of tools necessary for *all* the maintenance work on the particular unit. The work to be performed for each item will require the use of only some of these tools.

(2) *Safety precautions.* Personnel safety precautions to be observed while working on this unit are detailed in this subparagraph.

(3) *Equipment cautions.* This subparagraph contains the cautions that must be observed to protect the equipment.

b. MAINTENANCE ITEM. This is the item which tells what to do. The information is contained under the following subparagraphs:

(1) *Location.* This subparagraph is a reference to the illustration showing the location of the component.

(2) *Safety and equipment precautions.* This subparagraph deals with the specific personnel and equipment precautions necessary for work on each specific item.

(3) *Removal procedure.* The preliminary steps to be taken before starting work on a given component or chassis are given here. These steps pertain to the work concerned with the removal of each particular component.

(4) *Maintenance procedure.* This subparagraph covers the actual maintenance work on the removable component or chassis to which the item pertains. The number of subparagraphs which deal with each of the various sections of the removed component will vary in each item.

(5) *References.* References to other technical manuals may be inserted by the maintenance personnel in the spaces provided under this heading.

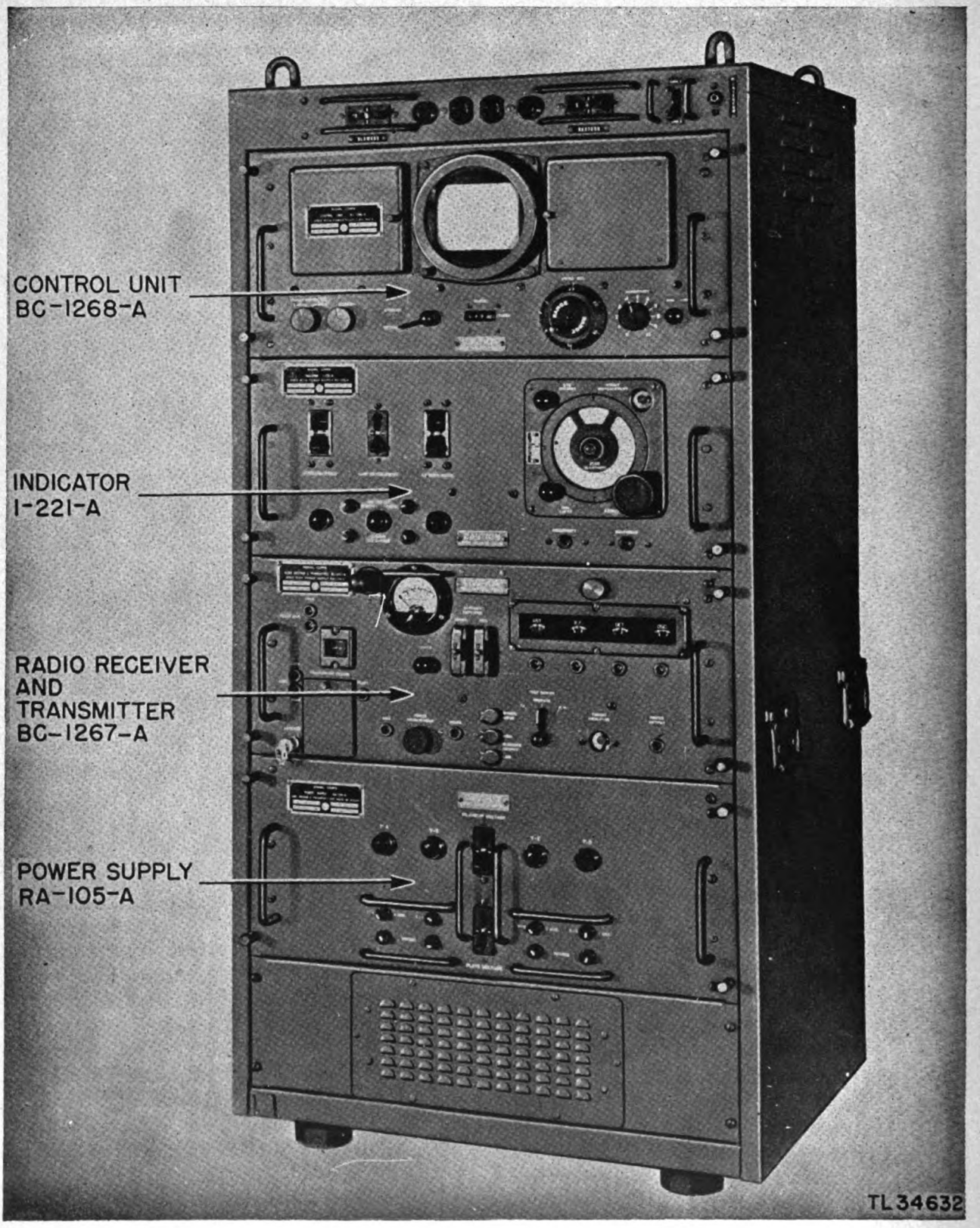


Figure 15. Rack FM-80—components.

Section II. RACK FM–80 COMPONENTS

39. Item 1—Preparatory Steps.

a. Tools and Materials Needed.

(1) Brush, cleaning.

(2) Brush, paint.

(3) Cleaning agent (carbon tetrachloride, naphtha, or alcohol).

(4) Cloth, clean.

(5) Grease, GL.

(6) Oil, AXS–777.

(7) Pliers, long-nose and side cutters.

(8) Screw driver.

(9) Wrenches, Allen, setscrew size.

b. Safety Precautions. (1) *Remove all power from the set* before attempting maintenance. Throw both circuit breakers on the front of the power supply panel to the OFF position (fig. 31④).

(2) Avoid striking the cathode-ray tube in the control unit as it will shatter and throw glass in all directions.

(3) Short circuit all terminals located on top of bushings (fig. 29).

c. Equipment Cautions. (1) Handle all tools carefully while working inside the chassis. Use proper size tool for the job.

(2) Place the chassis on a clean, stable surface. Do not place it on the ground.

40. Item 2—Control Unit BC–1268–A.

a. Location (fig. 15).

b. Removal Procedure. Loosen the four knurled, captive screws on both sides of the control unit panel and pull the unit forward and out.

c. Maintenance Procedure.

ITC. FRONT OF CHASSIS (fig. 16).

(1) Check oscilloscope glass cover ④ for cleanliness.

(2) Check knob setscrews ① for tightness on the shafts.

(3) Inspect jacks ② for corrosion and tight mounting nuts.

(4) Check tightness of handles ③.

(5) Clean entire front panel of control unit.

ITC. TOP OF CHASSIS (fig. 17).

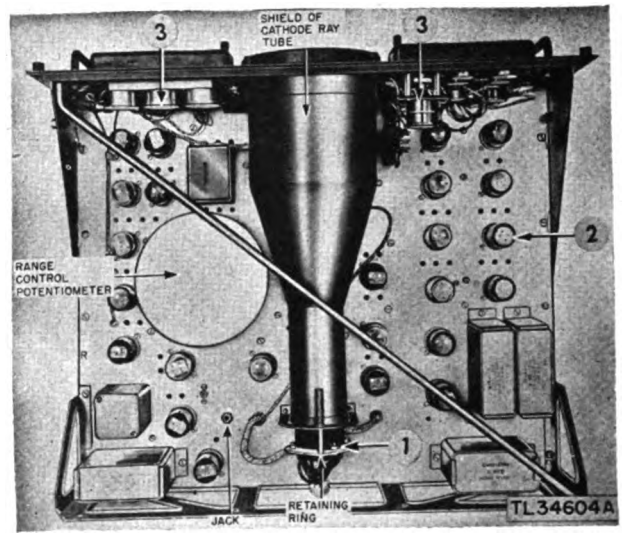


Figure 17. Control Unit BC–1268–A——top view.

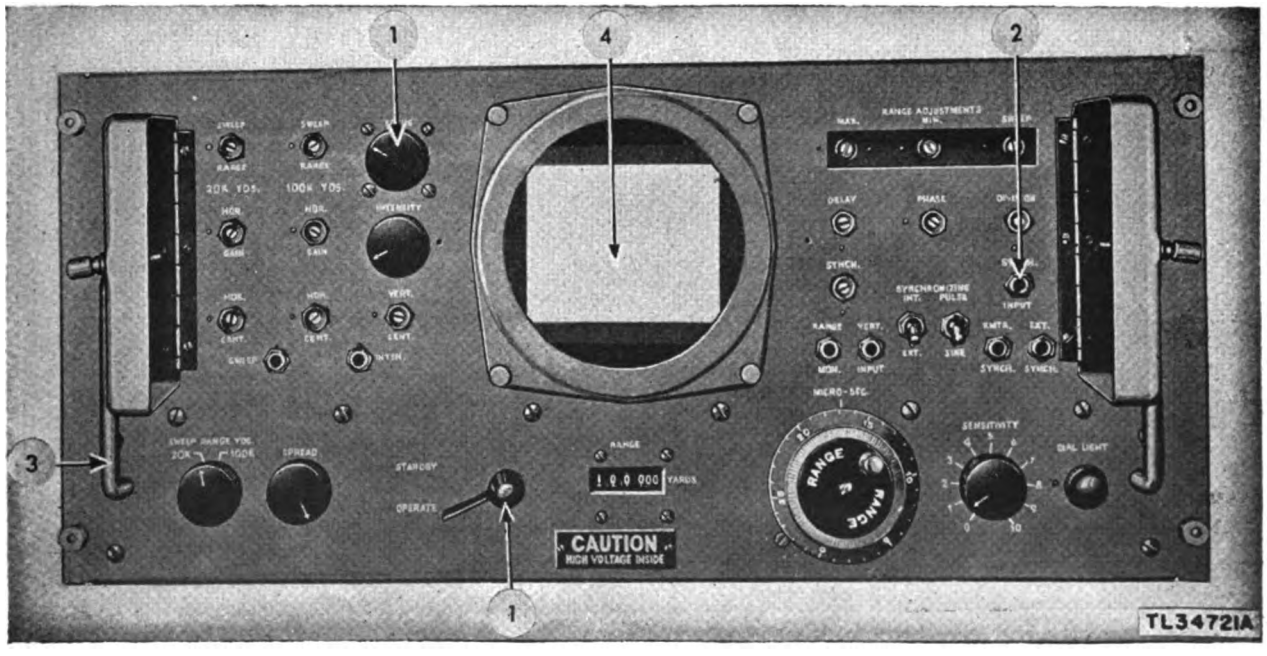


Figure 16. Control Unit BC–1268–A—front view.

(1) Inspect entire chassis top for cleanliness. Do not use water to clean hot tube envelopes. Clean CRT (cathode-ray tube) shield.

(2) Inspect jacks for cleanliness and tight mounting nuts.

(3) Check socket wiring of the cathode-ray tube ① for deterioration of the insulation and loose connections.

(4) Check tubes ② for proper insertion and cleanliness.

(5) Check the spring on the retaining ring of the cathode-ray tube for sufficient tension.

(6) Check the connections on the potentiometers ③ for good soldering and corrosion.

ITCL. BOTTOM OF CHASSIS (fig. 18).

(1) Clean the entire bottom of the chassis, using a brush and clean cloth. Clean the bushings ① with a cleaning agent.

(2) Inspect the capacitors ⑧ for wax leakage and tight connections on the terminals.

(3) Check the air capacitors ⑦ for dirt between the plates and for corrosion.

(4) Check the terminal strip ② for loose connections, poor soldering, and overheated resistors ③.

(5) Inspect all wiring and connections ④ for good soldering, and frayed insulation.

(6) Check the switch ⑤ connections for proper soldering, and test the shaft for freedom of action. After the test return the switch knob to its original position.

(7) Check the backs of the potentiometers ⑥ for corrosion and good soldering on the lugs. Do

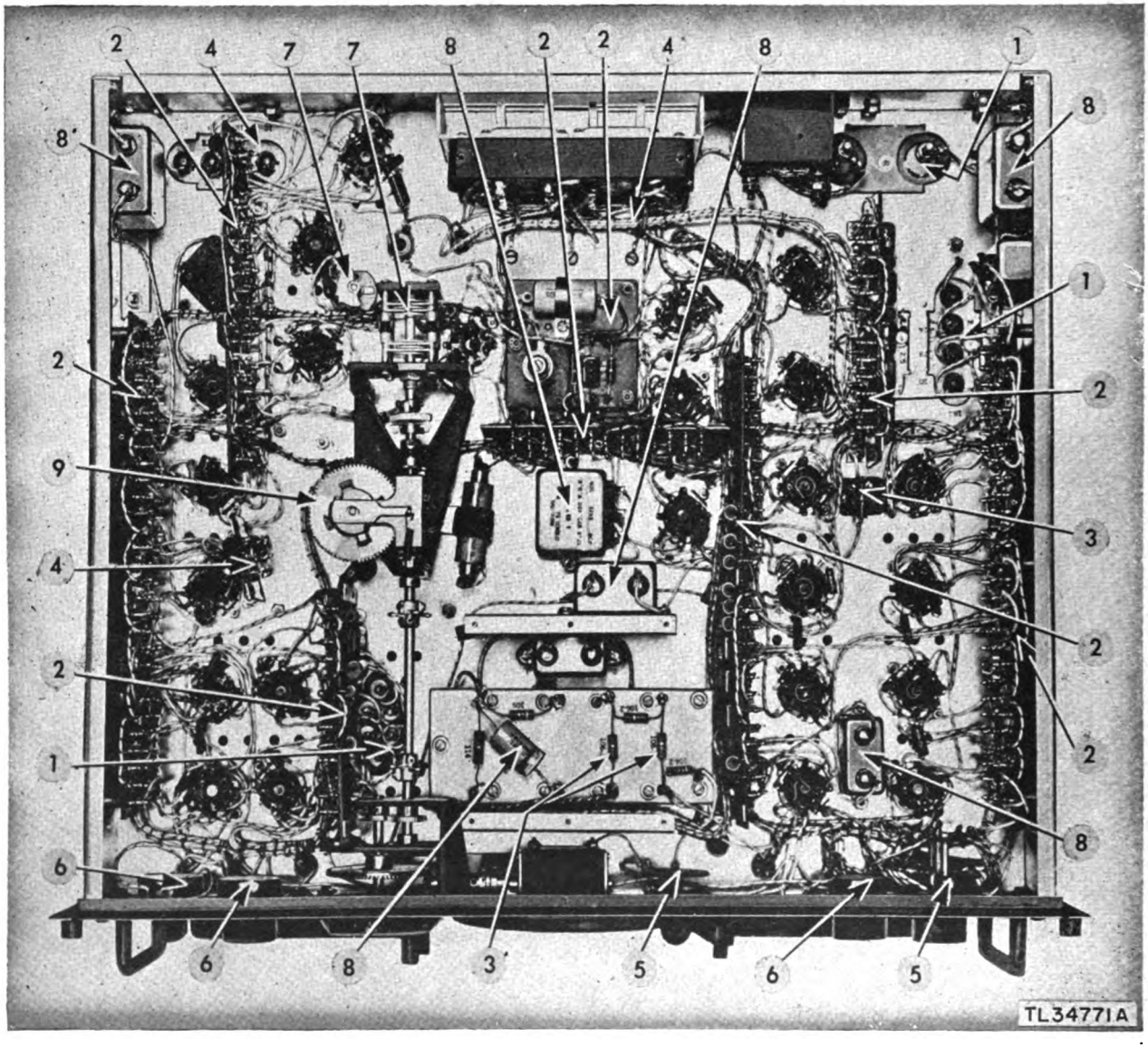


Figure 18. Control Unit BC-1268-A—bottom view.

not rotate the potentiometer shafts for checking purposes. This action will throw the circuits out of adjustment.

(8) Check the range control assembly ⑨ for lubrication. To lubricate the gears, proceed as follows:

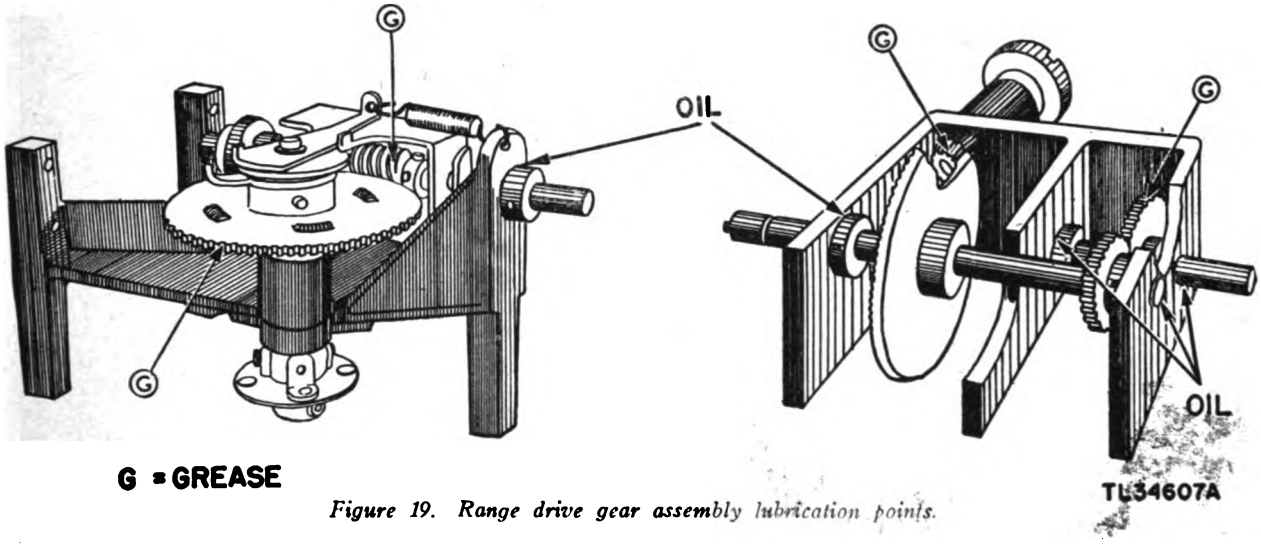


Figure 19. Range drive gear assembly lubrication points.

(*a*) Apply light grease (supplied with the set) to the gears, using a stick or the fingers. Apply sparingly and avoid dropping the lubricant on any adjacent parts. Figure 19 shows the points to be lubricated with grease (G), and the points to be oiled (OIL).

(*b*) After lubricating the points indicated on figure 19, be sure to remove all oil and grease from the adjacent areas. Clean hands before proceeding with further maintenance work.

d. REFERENCES.

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Paragraph	(	)	(	)	(	)	(	)
TM 11–	(	)	(	)	(	)	(	)

41. Item 3—Indicator I–221–A.

a. LOCATION (fig. 15).

b. REMOVAL PROCEDURE. Loosen the four captive screws on front panel of the indicator and pull out the chassis. Place upon a suitable surface. This will require two men.

c. MAINTENANCE PROCEDURE.

ITC. FRONT OF THE CHASSIS (fig. 20).

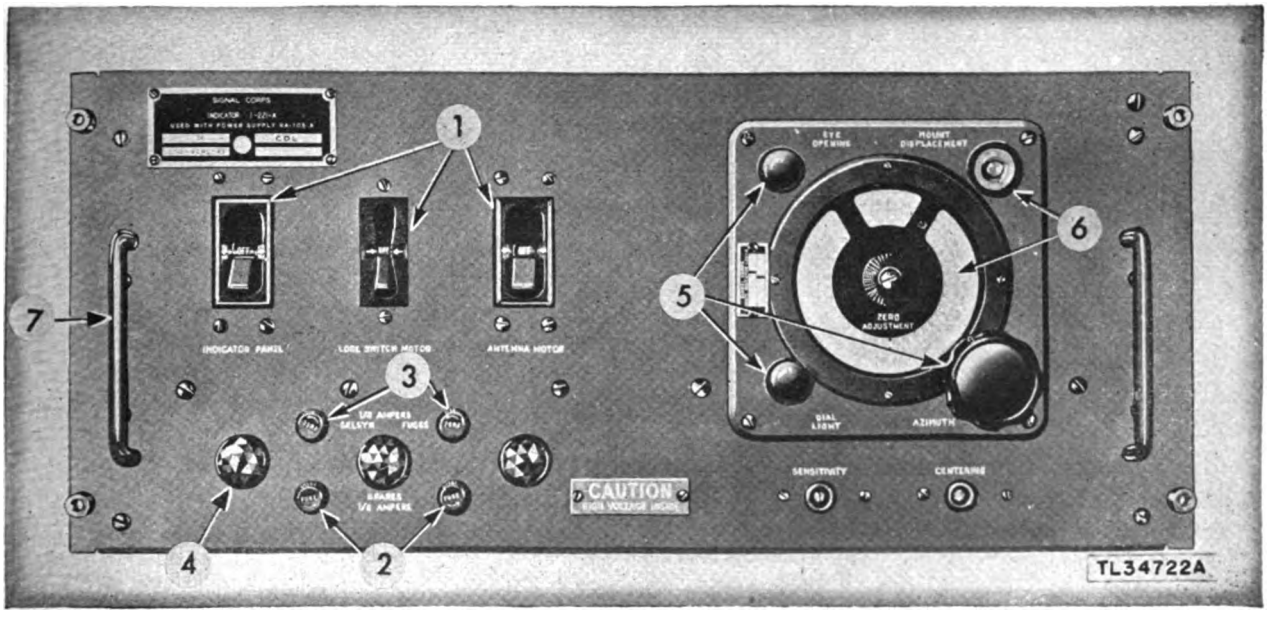

Figure 20. Indicator I-221-A—front view.

(1) Clean the following:

(*a*) Entire panel.

(*b*) Pilot jewels ④.

(*c*) Dial and eye tube ⑥.

(2) Check knobs ⑤ for tight setscrews.

(3) Check handles ⑦ for tightness of mounting screws.

(4) Throw switches ① to check for positive action and snap.

(5) Check contents of the spare fuse holders ② for the proper size fuses.

(6) Check fuses ③ and their fuse holders for corrosion and proper insertion. Figure 4 shows the method used for checking fuses and fuse holders.

ITC. TOP OF CHASSIS (fig. 21).

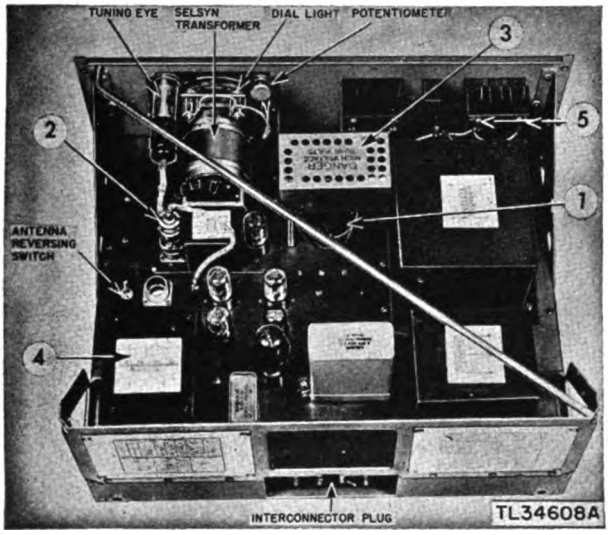

Figure 21. Indicator I–221–A—top view.

(1) Clean entire top of the chassis, paying particular attention to the inter-connector plug and the bushing ③ on the high-voltage transformer, but do not use an abrasive to clean the bushing.

(2) Clean backs of the potentiometers, but do not turn the control knobs located on the front panel.

(3) Check the antenna reversing switch for positive action. Tighten the mounting nut if necessary. Return the toggle arm to its original position.

(4) Check connections on the selsyn transformer for tightness and good soldering.

(5) Check connector and plug ② and its cable for corrosion and dirt.

(6) Check wiring and switch connections ⑤ for corrosion and soldering faults.

(7) Cement the schematic ④ to the chassis if loose, using varnish or mucilage.

(8) Inspect socket and connections to the tuning eye. Do not remove the latter from its bracket unless it requires replacement.

ITC. BOTTOM OF CHASSIS (fig. 22).

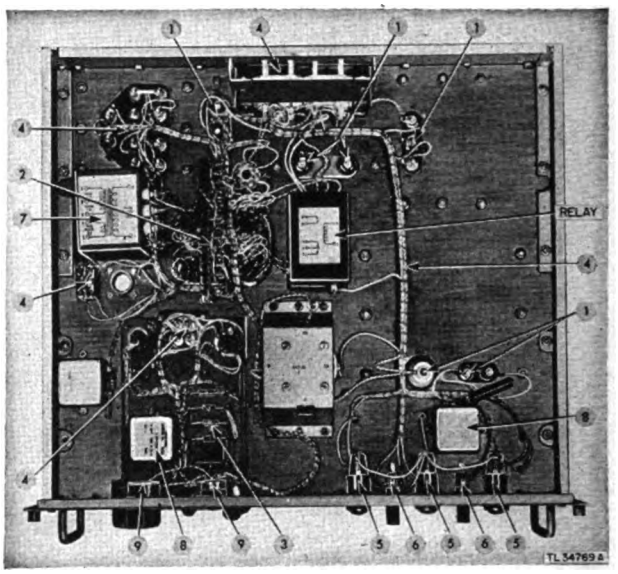

Figure 22. Indicator I–221–A—bottom view.

(1) Check terminal strips ② for loose connections, poor soldering, and shorts between the mounted parts.

(2) Inspect carbon resistors ③ for signs of overheating.

(3) Check wiring connections ④ and wiring for frayed insulation.

(4) Check capacitors ⑧ for wax leakage.

(5) Cement the diagram ⑦ to the case, if loose.

(6) Check the connections on the fuse holders ⑥ for rosin joints (poor soldered connections) and tightness of mounting.

(7) Inspect the pilot assemblies ⑤ for dirt and corrosion.

(8) Check the potentiometers ⑨ for dirt and corrosion. Do not rotate the shafts.

(9) Check the relay contacts for pitting and corrosion. Figure 12 shows how the relay contacts are cleaned by using the crocus-cloth stick. Do not use the abrasive unless pitting is observed. Use the canvas stick (par. 17) to remove the dirt. See paragraph 34 for more details.

d. REFERENCES.

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42. Item 4—Receiver and Transmitter BC–1267–A.

a. Location (fig. 15).

b. Safety and Equipment Precautions (fig. 29). (1) Short-circuit the terminals found on all bushings ① before attempting maintenance.

(2) Do not change adjustments on r-f oscillator when cleaning inside r-f oscillator compartments.

(3) Be careful when cleaning the eye tube ③. Handle gently.

(4) Do not change adjustments in r-f tuner unit.

(5) Avoid damage to modulator tube by keeping the cover on during cleaning operation. The metal-to-glass seal is easily broken.

c. Maintenance Procedure.

ITC. FRONT OF THE CHASSIS (fig. 23).

(1) Check knobs for tight setscrews. This includes pilot-light control, test switch, and power measurement knobs.

(2) Inspect calibration chart for dirt and legibility.

(3) Check antenna receptacle for dirt and corrosion.

(4) Check meter ① for zero position of its pointer. It is always best to wait at least 15 minutes after shut-down before attempting adjustment. Figure 11 shows the location of the adjustment screw.

(5) Clean tuning indicator ④ front and the dial glass ③.

(6) Check pilot-light receptacle ② for firm mounting.

(7) Check mounting of handles ⑤ for firmness.

ITCL. TOP OF CHASSIS (fig. 24).

(1) Check tubes for cleanliness. Remove tube shields ① from the tubes with the shield key (fig. 25).

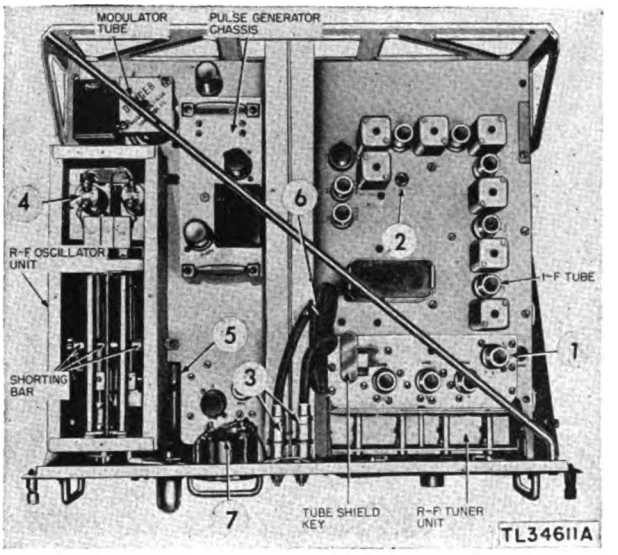

Figure 24. Receiver and Transmitter BC–1267–A—top view.

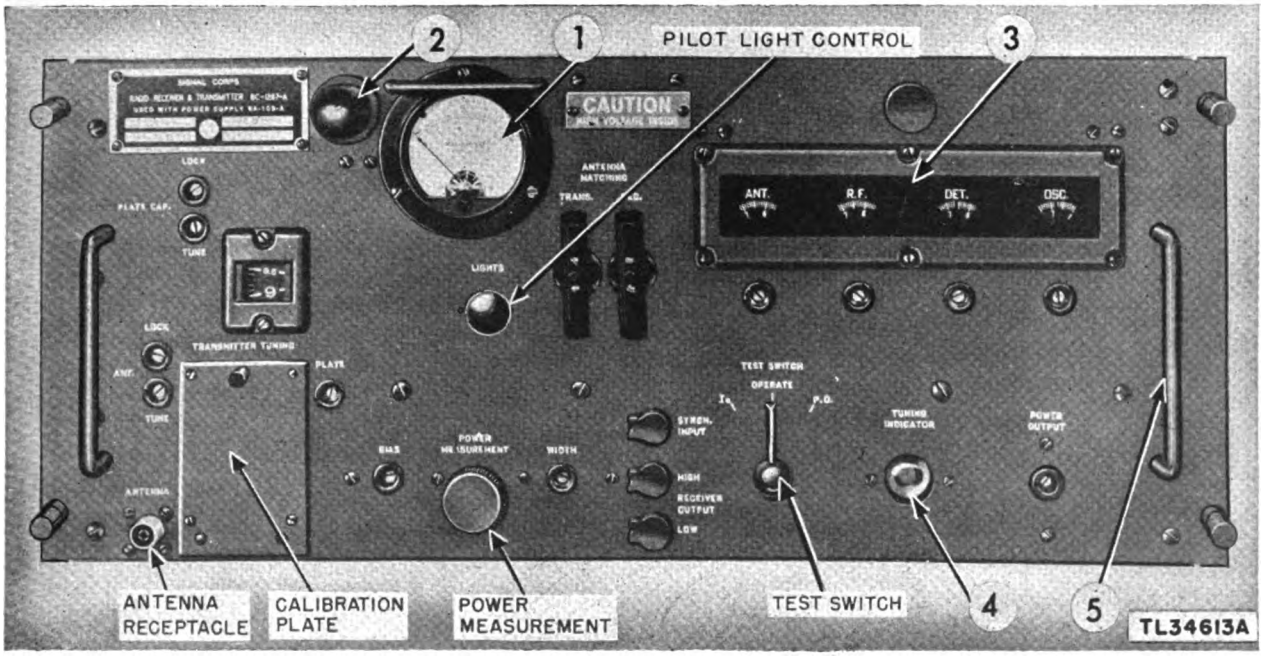

Figure 23. Receiver and Transmitter BC–1267–A—front view.

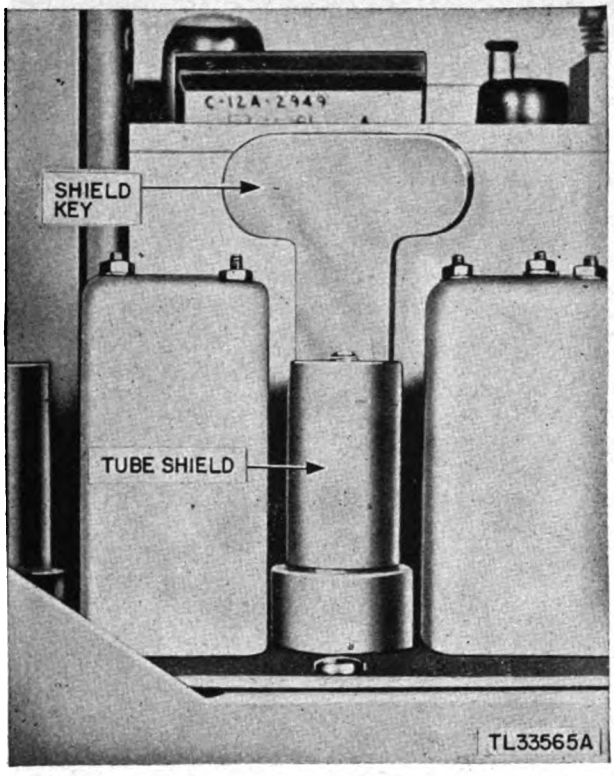

Figure 25. Removing tube shield with shield key.

(2) Check tube clips on the modulator tube and those on the transmitter tubes ④ for good tight connections. If corrosion exists, remove the clips carefully and clean with crocus cloth and a cleaning agent. Be very careful because the seal on the tube breaks easily.

(3) Check jacks ② for corrosion and tightness of mounting.

(4) Inspect meter terminals ⑦ for tightness. Do not force the nuts; handle soldering lugs carefully, as extreme twisting will break the capacitor pigtails. See paragraph 32 for additional information about meters.

(5) Check cable insulation ⑥ for cracks and other signs of deterioration. Handle carefully in cold weather.

(6) Inspect the connectors ③ for corrosion and tightness.

(7) Check the transmitter-tuning gears for lubrication. If the gears are dry, proceed as follows:

(*a*) Using the finger, apply a small quantity of grease to the teeth of the worm gear ⑤. Figure 26 shows where to apply the lubricants.

(*b*) Remove all excess oil and grease from gears, bearings, and their adjacent areas. Clean hands before proceeding with the next job.

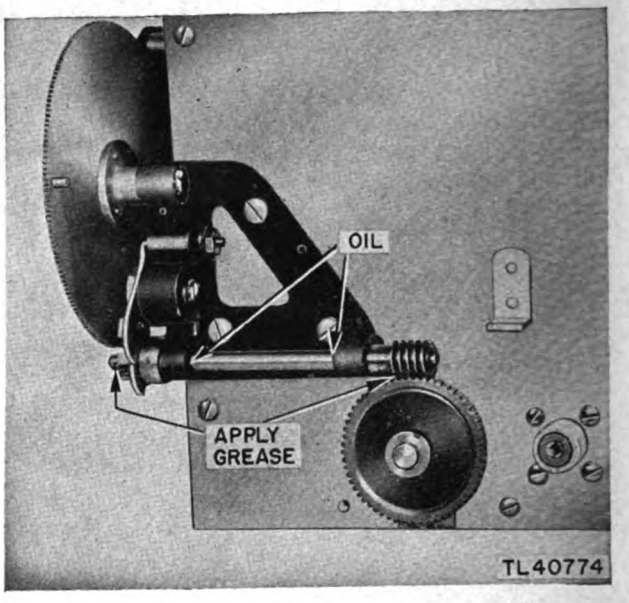

Figure 26. Transmitter-tuning gear assembly.

(8) Check the r-f end of the receiver for loose setscrews (fig. 27).

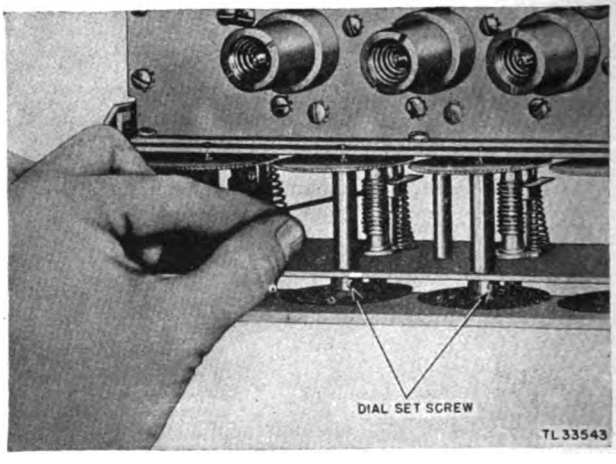

Figure 27. Tightening tuning assembly setscrews.

(9) Clean the entire top of the chassis with a clean cloth.

ITC. R-F OSCILLATOR UNIT (fig. 28).

(1) Check the following for corrosion and dirt:

(*a*) Tube caps and clips ①.

(*b*) Oscillator lines ②.

(*c*) Shorting bar ③.

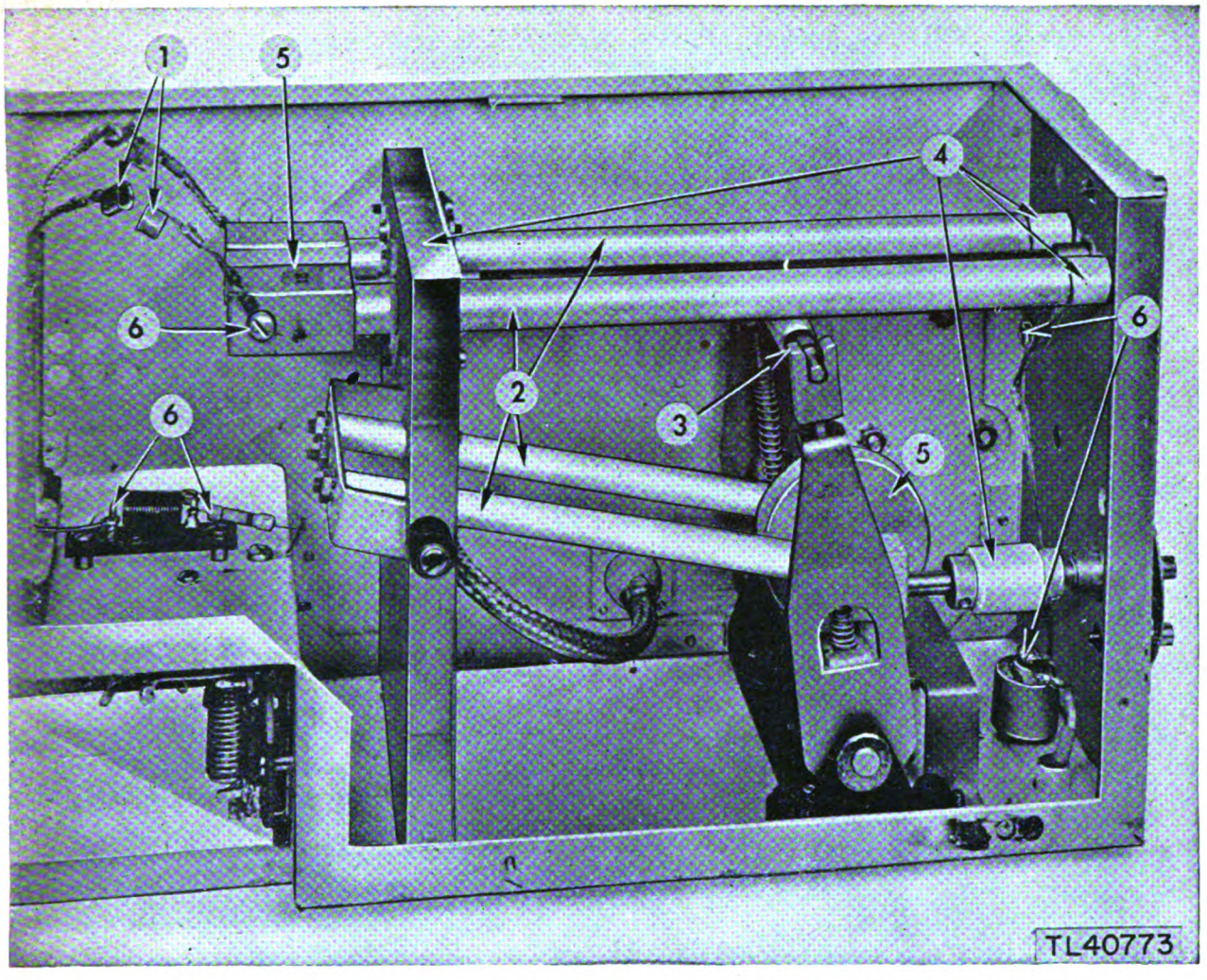

Figure 28. R-f oscillator compartment in Receiver and Transmitter BC-1267-A.

(*d*) Variable capacitors ⑤.

(*e*) The soldered connections to the lugs and other parts ⑥.

(2) Clean ceramic insulators ④. Use care when reaching inside r-f compartment. Do not change capacitor adjustment ⑤.

ITC. BOTTOM OF CHASSIS (fig. 29).

(1) Clean the following:

(*a*) All bushings ①. Use a cleaning agent; avoid abrasives.

(*b*) The Lapp connector ⑫. Use the crocus cloth on the pins, but do not use it on the ceramic insulation. See figure 30 for a close-up of the Lapp plug or interconnector. Use a cleaning agent and a clean cloth. Remove the white film left by the cleaning agent.

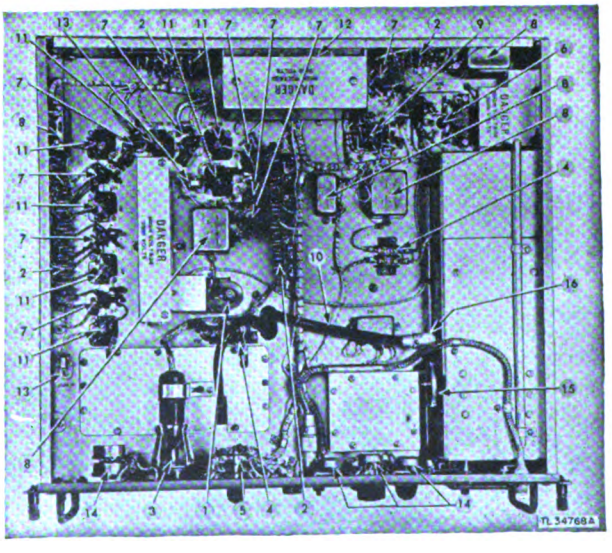

Figure 29. Receiver and Transmitter BC-1267-A—bottom view.

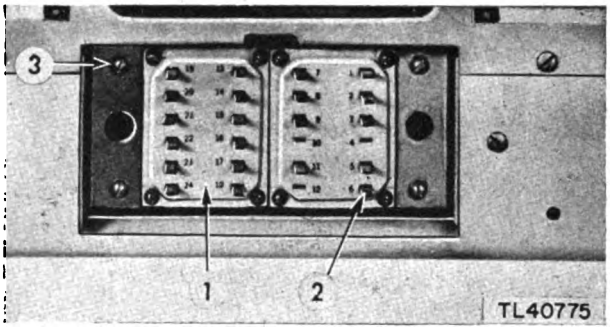

Figure 30. Interconnector plug—close-up.

(2) Clean the pins with a brush dipped in the same cleaning agent. If the corrosion is severe, use crocus cloth or #0000 sandpaper. Wipe away the sand grains left after cleaning. Always tighten or check the tightness of the mounting screws ③. Clean the following:

(*a*) The modulator tube socket ⑥. Use a cleaning agent.

(*b*) All capacitors ⑧ because wax frequently leaks out at the terminals and must be cleaned.

(*c*) All sockets ⑦ in receiver and other circuits.

(*d*) Entire chassis bottom.

(3) Check all wiring ⑨ for breaks, frayed insulation, and broken lacing cord.

(4) Inspect the cable insulation ⑩ for signs of deterioration and cracks. Handle carefully in cold weather.

(5) Check the gang switch ⑤ for positive action and well soldered connections.

(6) Inspect the soldering lugs, capacitor connections, and resistor pigtail connections on all the terminal strips ②.

(7) Check the eye-tube mounting ③ and socket connections for corrosion. Be careful when handling the eye tube. It is very fragile.

(8) Check the jacks ⑬ for corrosion and loose mounting nuts.

d. References.

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43. Item 5—Power Supply RA–105–A.

a. Location (fig. 15).

b. Safety and Equipment Precautions. (1) Two men are required to remove the 120-pound chassis from the rack.

(2) Short circuit all capacitors before attempting maintenance. The terminals on the bushings ① of the high-voltage capacitors must be shorted with an insulated-handled screw driver. Because of the varnish which covers all moistureproofed terminals, it will be necessary to dig into the film in order to make contact with the terminals. Do not scrape more than is necessary to make the contact. Revarnish the spot after the capacitor is shorted.

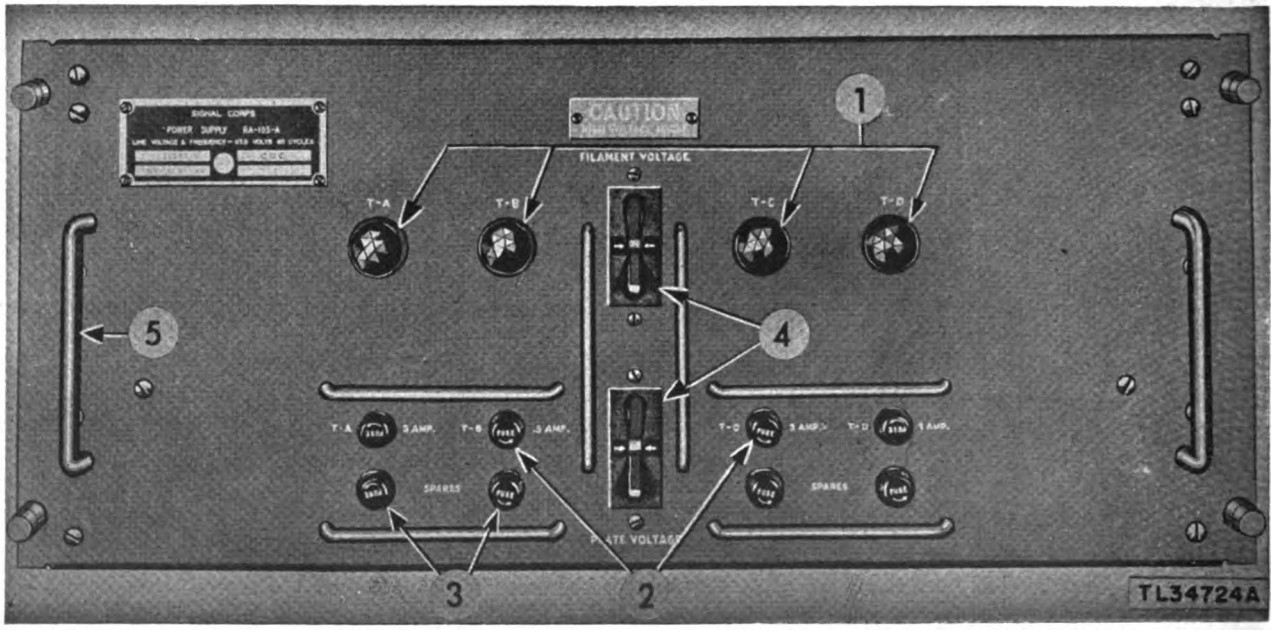

Figure 31. Power Supply RA–105–A—front view.

(3) Do not twist the plate clip on the high-voltage rectifier tubes. The metal-to-glass seal is easily broken.

(4) Be sure the set is dead before starting work. Throw both switches on the front panel of the power supply to the OFF position (fig. 31).

c. REMOVAL PROCEDURE. Loosen the four knurled, captive screws on both sides of the power-supply panel and pull out the chassis. Place the unit on a suitable surface.

d. MAINTENANCE PROCEDURE.

ITC. FRONT OF THE CHASSIS (fig. 31).

(1) Check the operating fuses② for corrosion, and the spare fuse holders③ for contents.

(2) Clean the pilot jewels① with a soft clean cloth.

(3) Check the handles⑤ for tightness.

(4) Clean the entire front panel.

Note: The two switches④, circuit breakers, marked FILAMENT VOLTAGE and PLATE VOLTAGE are not to be thrown for checking purposes unless the main a-c line is known to be open. Consult TM 11-1308 supplied with the radar set for the location of the main switch supplying the IFF equipment with current.

FITC. TOP OF THE CHASSIS (fig. 32).

(1) Feel the chokes and transformers for excessive heat.

(2) Check the pilot lamps. If the lamps were lighted satisfactorily before shut-down, pass on to next stop.

(3) Check the tube caps for corrosion and the clips② for tension.

(4) Inspect the terminal nuts③ and all bushings① for dirt, looseness, and corrosion.

(5) Check the high-voltage tubes and the other tubes④ for cleanliness and proper insertion.

(6) Check the wiring on the rear of the circuit breakers.

(7) Clean the entire top of the chassis with a clean cloth. If the dirt is stubborn, use a cleaning agent. Avoid the use of water.

ITC. BOTTOM OF THE CHASSIS (fig. 33).

(1) Check the ground contacts⑪ for good soldering.

(2) Look for corrosion on the following:

(a) The high-voltage sockets⑩.

(b) The interlock switch⑧, and the Lapp interconnector⑨.

(c) All terminal nuts and lugs⑥. Also check for tightness.

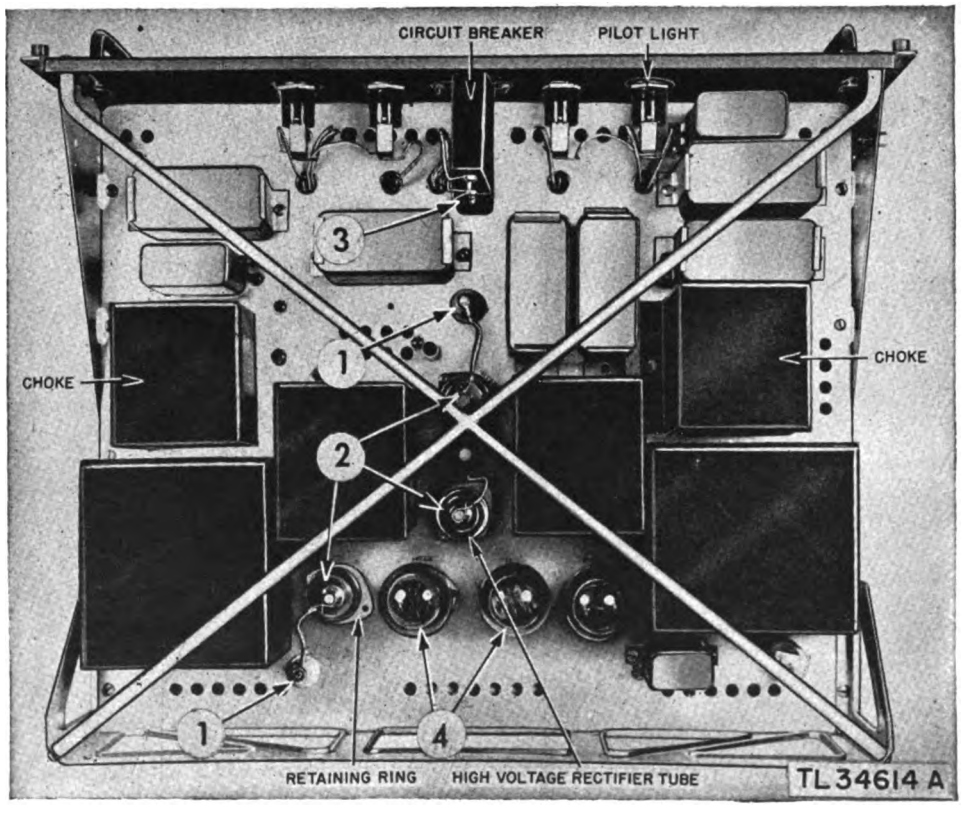

Figure 32. Power Supply RA-105-A—top view.

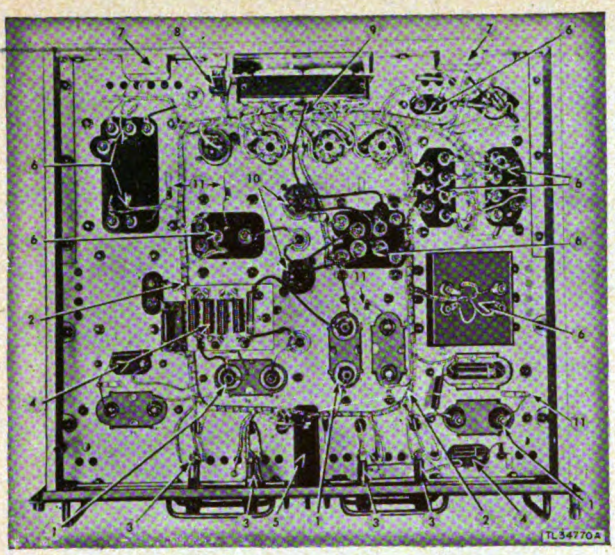

Figure 33. Power Supply RA-105-A—bottom view.

(3) Check the capacitors⑦ for wax leakage. This leakage is not necessarily an indication of a defective capacitor or circuit fault; it is usually the result of an extremely high operating temperature. If the set has been performing satisfactorily before the shutdown, the capacitors with wax leakage may be judged to be in good condition. Simply clean the capacitors with a cloth.

(4) Check the lugs on the fuse holders③ for looseness and poor soldering.

(5) Check the wiring and cables② for proper lacing and frayed insulation.

(6) Check the bushings① for dirt. Clean with a soft cloth, using a cleaning agent such as carbon tetrachloride. Wipe off the white residue.

Caution: Never use an abrasive to clean the bushings. To be effective, the surface must be smooth and glazed .

(7) Check the carbon resistors④ for signs of overheating.

(8) Clean the entire bottom of the chassis.

e. REFERENCES.

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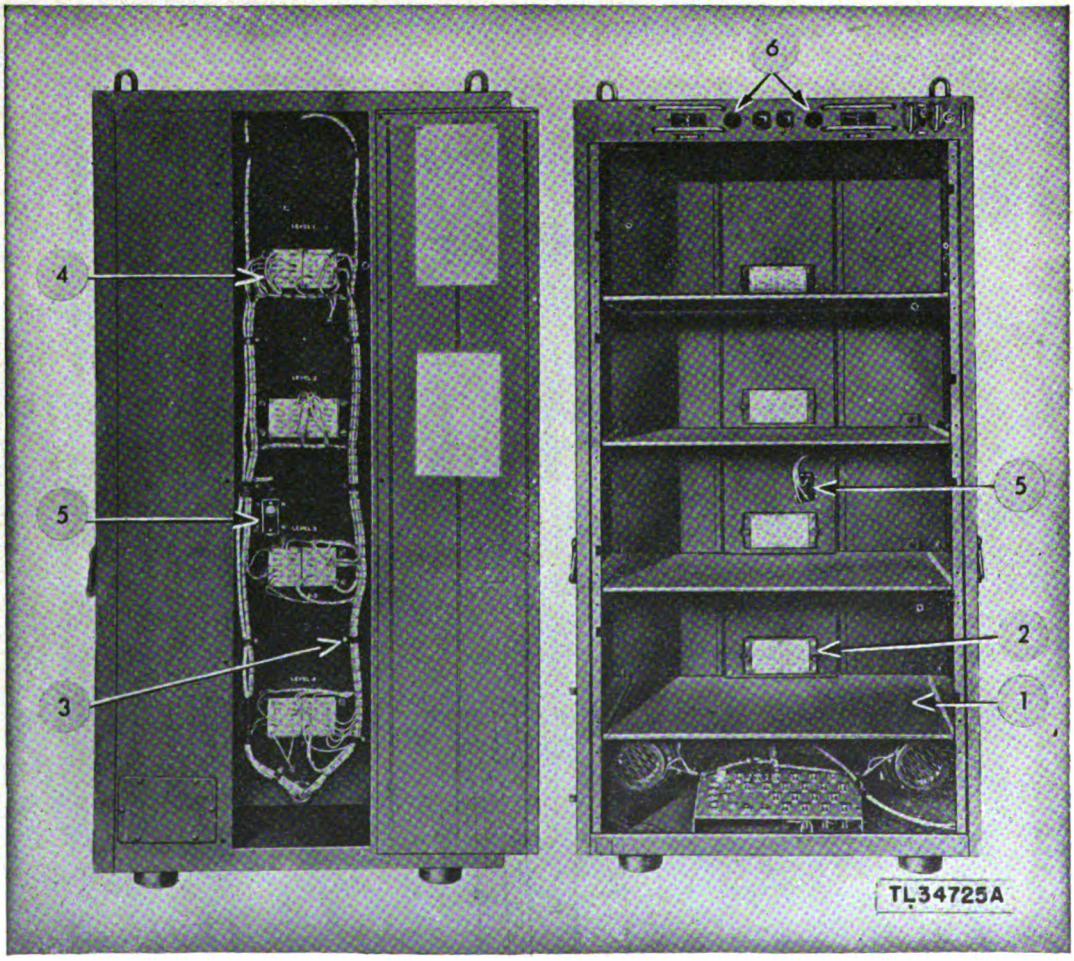

Figure 34. Rack FM-80—rear and front, open.

44. Item 6—Rack FM–80.

a. Maintenance Procedure.

ITC. OUTSIDE OF RACK (fig. 34).

(1) Clean the outside of the rack with a clean cloth. Repaint spots which have scaled or have been scratched.

(2) Check the wiring cable clamps③ and soldered connections④ on the interconnectors②. Look for poor soldering and frayed insulation.

(3) Inspect the interlock switch⑤ for corrosion and a good spring action of the two inside contacts.

ITC. INSIDE OF RACK.

(1) Clean the shelves with a clean cloth. Remove any any deposits of pitch, tar, or wax with a cleaning agent.

Note: Ordinarily the entire interior of the rack is not accessible for maintenance at one time. Therefore, whenever a component is removed for maintenance, clean the shelf and interior walls with a clean cloth.

(2) Clean the interconnectors② with a soft, clean cloth.

(3) Keep the ventilation holes at the side of the shelves free of obstructions.

ITCL. BOTTOM OF THE RACK (fig. 9).

(1) Check the air filter pad for dirt (par. 30).

(2) Check the connections on the data board for corrosion and poor soldering.

Caution: The main a-c line from the radar set must be dead before work is attempted on the data board. Consult the TM 11-1308 manual for the location of the a-c line switch on the radar set. Throw this switch to the OFF position.

(3) Lubricate the blower motors. Using a flexible-spout oil can, put about eight drops of OE 10 oil into each of the oil wells located on the top front and rear of each motor. Avoid excessive oiling (par. 55).

Note: The motors may be removed from their mounting for oiling if no flexible spout is available on the oil can. See Service Manual TM 11-1508 for the blower motor disassembly instructions.

b. References.

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TM 11–	(	)	(	)	(	)	(	)

Section III. TEST EQUIPMENT

45. Item 7—Preparatory Steps.

a. Tools and Materials Needed.

(1) Brush.
(2) Cleaning agent.
(3) Cloth, dry.
(4) Grease, lubricating special, AXS–637.
(5) Oil, special, AXS–777 or OE 10.
(6) Pliers, long-nose.
(7) Crocus-cloth stick.
(8) Screw driver.
(9) Wrench, Allen.

b. Equipment Cautions. (1) Test equipment must be handled gently. Rough handling will throw the delicate tuning mechanism out of adjustment and alignment.

(2) Do not open the coil turret in the signal generator without the permission of the person in charge.

(3) Avoid handling the crystals (fig. 36④).

(4) Always push in the antenna of the signal generator before carrying the unit and also before removing the chassis from the housing.

46. Item 8—Signal Generator I–222–A.

a. Maintenance Procedure.

ITC. FRONT (fig. 35).

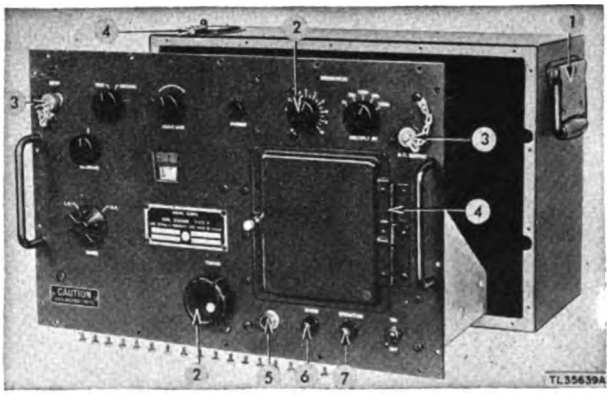

Figure 35. Signal Generator I–222–A—front view.

(1) Check the tightness of the setscrews② in the knobs.

(2) Inspect the operating fuse⑦ for corrosion and dirt.

(3) Check the spare fuse holder⑥ for contents.

(4) Clean the pilot jewel⑤, the calibration chart located under the hinged door, and the entire front panel.

(5) Tighten the jack covers⑧.

ITC. TOP CHASSIS (fig. 36).

(c) The coil② and connections.

(3) Check the tube shield⑤ for tightness and dirt.

(4) Clean the envelopes⑥ of the tubes with a clean cloth.

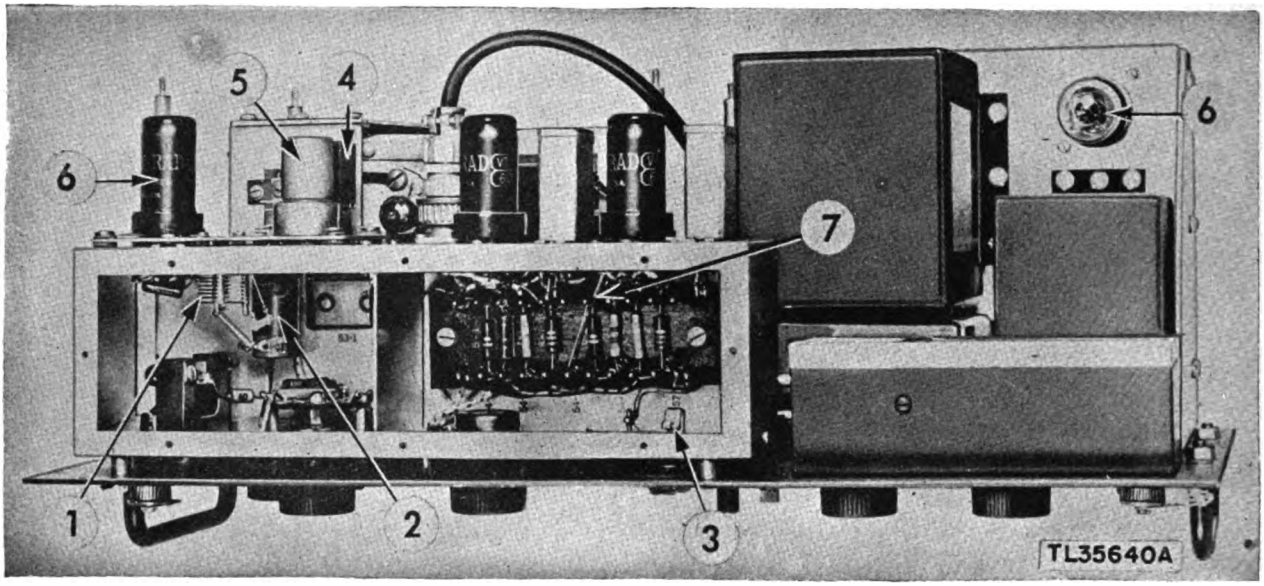

Figure 36. Signal Generator I-222-A—top view.

(1) Check the plates of the air capacitors① for dirt and corrosion.

(2) Using a brush, clean the dust from the following:

(a) The crystals④.

(b) The terminal strip⑦, and the mounted capacitors and resistors.

ITCL. BOTTOM OF CHASSIS. (fig. 37).

(1) Keep the terminals tight, and the cable clamps from biting into the wires.

(2) Check the following for corrosion and cleanliness:

(a) Air capacitors②.

(b) Tube sockets⑥.

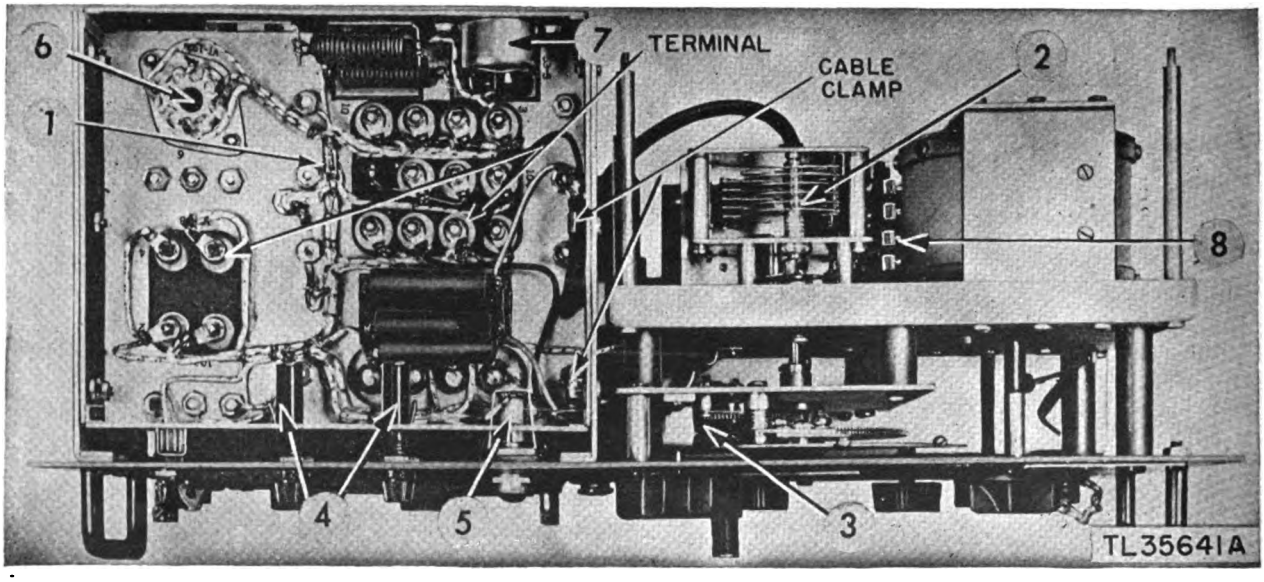

Figure 37. Signal Generator I-222-A—bottom view.

(c) A-c input receptacle⑦.

(d) Coil turret contacts. (Avoid the excessive use of an abrasive for cleaning these contacts. Use a cleaning agent on the cleaning brush unless the contacts are pitted).

(3) Check the wiring① for loose cable lacing and frayed insulation.

(4) Inspect the lugs④ on the fuse holders for poor soldering.

(5) Lubricate the tuning mechanism as follows (fig. 38).

(a) Apply grease to the points marked (G) (fig. 38).

(b) Rotate the gears as the lubricant is applied. Avoid dropping grease on the adjacent parts.

(c) Wipe off the excess grease with a clean cloth.

b. REFERENCES.

Page	(	)	(	)	(	)	( )
Paragraph	(	)	(	)	(	)	( )
TM 11–	(	)	(	)	(	)	( )

47. Item 9—Range Calibrator I–223–A.

a. MAINTENANCE PROCEDURE.

ITC. FRONT (fig. 39).

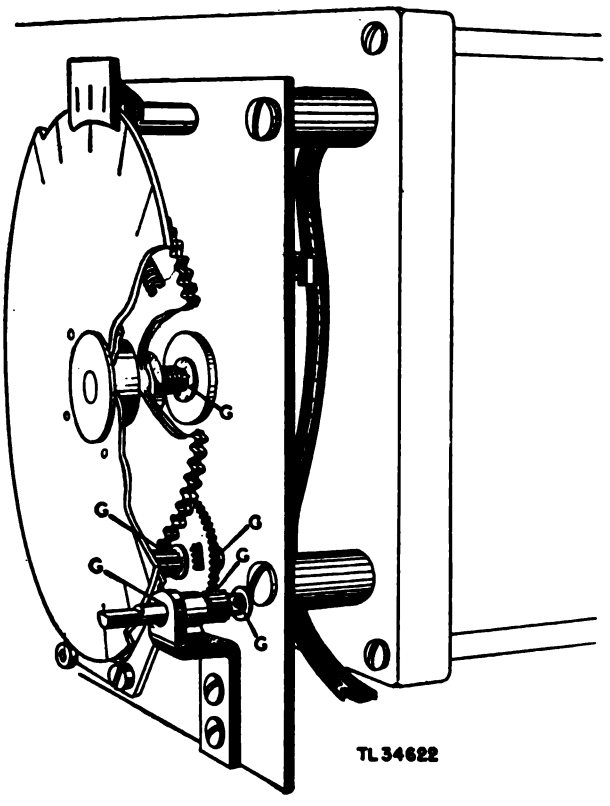

Figure 38. Signal Generator I–222–A, dial mechanism lubrication points.

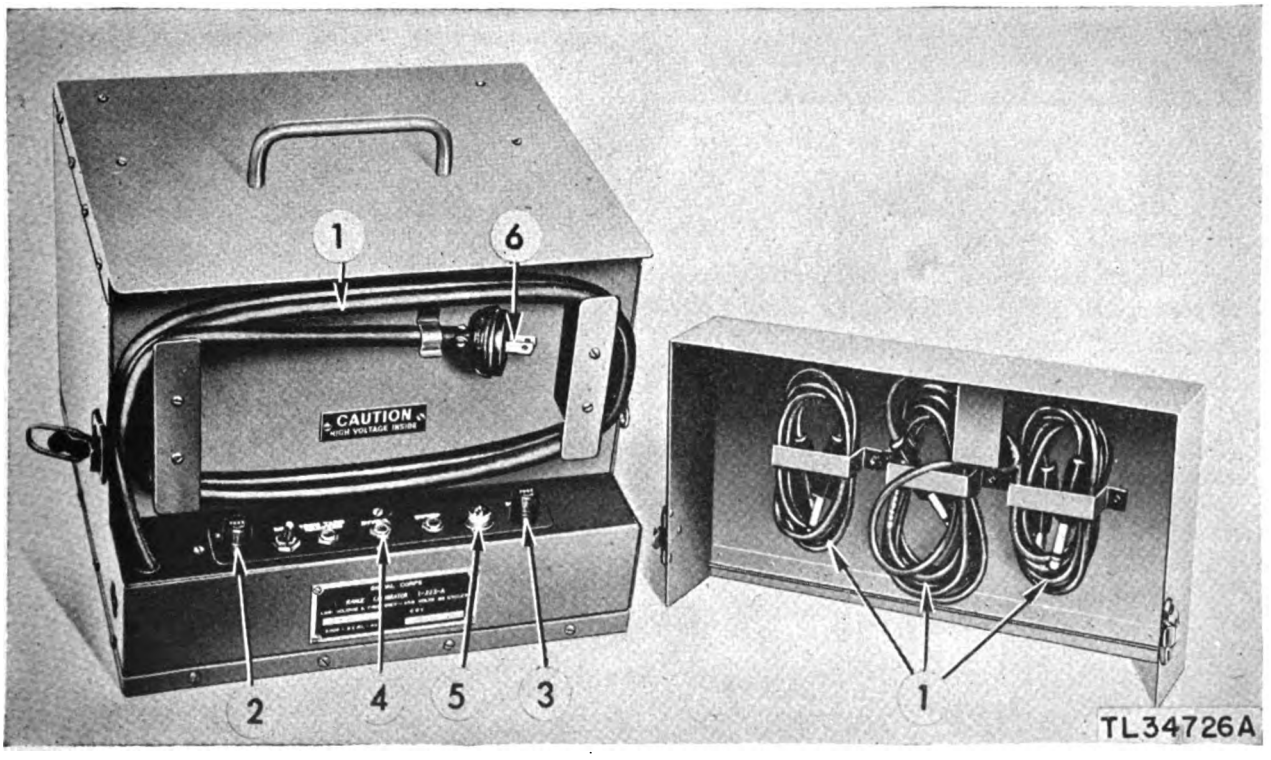

Figure 39. Range Calibrator I–223–A—front view.

(1) Check the condition of the cords and plugs which are coiled on the inside of the front cover①.

(2) Check the fuse② for corrosion and tight fit in the holder.

(3) Check the fuse holder③ for a spare fuse.

(4) Inspect the jacks④ for corrosion and firm mounting nuts.

(5) Check for loose connections and corrosion on the a-c plug⑥.

(6) Clean the entire front panel and the cover with a clean cloth.

ITC. TOP OF CHASSIS (fig. 40).

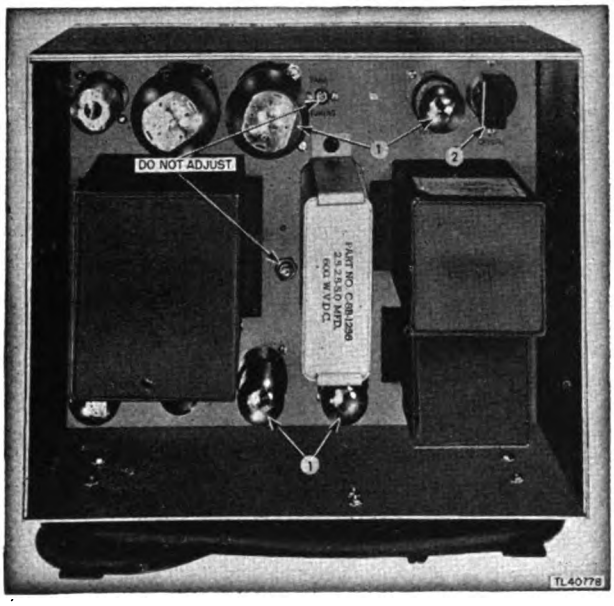

Figure 40. Range Calibrator I-223-A—top view.

(1) Check all the tubes①. for cleanliness and proper insertion in their sockets.

(2) Check the crystal② for proper insertion in its socket and for corrosion on its pins. Do not handle the crystal unless it is necessary.

(3) Clean the entire top of the chassis with a clean cloth.

Note: Do not tamper with the two screw adjustments indicated on figure 40.

ITC. BOTTOM OF CHASSIS (fig. 41).

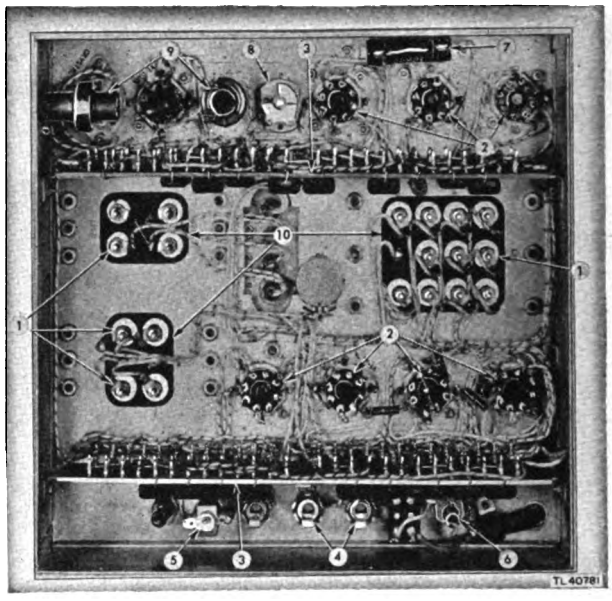

Figure 41. Range Calibrator I-223-A—bottom view.

(1) Check the following for corrosion and tightness:

(a) The terminal nuts①, all sockets② and their lugs, the jacks④, the pilot assembly⑤, the fuse holder⑥, and the soldering lugs thereon.

(b) The air capacitor plates⑧. Do not move the position of the plates when cleaning.

(2) Check the coils⑨ for chipped wax and loose mounting.

(3) Inspect the terminal strip③ for broken pigtails on the capacitors and carbon resistors. Look for rosin joints on the lugs.

(4) Check the resistor⑦ for signs of overheating. See paragraph 22 for additional information on resistors.

b. REFERENCES.

Page	( )	( )	( )	( )
Paragraph	( )	( )	( )	( )
TM 11–	( )	( )	( )	( )

Section IV. CABLES, CONNECTORS, AND OPERATOR'S CHAIR

48. Item 10—Preparatory Steps.

a. TOOLS AND MATERIALS NEEDED.

(1) Brush.

(2) Cleaning agent.

(3) Cloth, cleaning

(4) Cloth, crocus.

(5) Pliers, long-nose.

(6) Screw driver.

(7) Tape, friction or splicing.

b. EQUIPMENT CAUTIONS. (1) Do not grasp the

cable insulation when removing connectors from their receptacles.

(2) Be sure the connector is properly guided into the receptacle before exerting additional force for the insertion.

(3) Avoid placing connectors on the ground.

(4) Avoid sloppy soldering on the connector pins. The distance between the pins is not great enough to allow the use of a large soldering iron carelessly handled.

49. Item 11—Cables, Connectors, and Operator's Chair.

a. MAINTENANCE PROCEDURE.

I. INSPECT (fig. 7).

(1) Look for corrosion on the following:

(a) Spade terminals①.

(b) Alligator clip②.

(c) Lapp connector pins④.

(d) Blades on the a-c plug⑤.

(e) Pins on the selector connector⑥.

(f) Shaft on the phone plug⑦.

(2) Check tightness of the cable collar clamp⑨.

(3) Inspect insulation③ on the Lapp connector for dirt and cracks.

(4) Check insulation⑧ of cables for cracks, deterioration, and fraying. Handle carefully in cold weather.

(5) Lubricate the operator's chair with OE 10 oil. Wipe off any excess oil with a clean cloth.

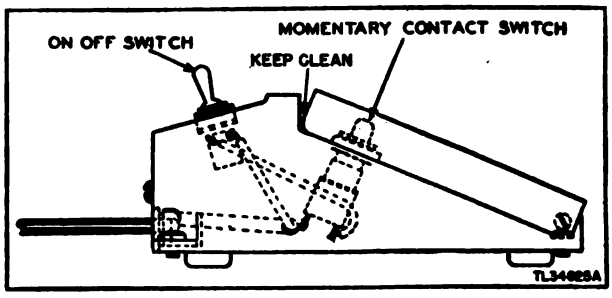

Figure 42. Foot switch.

(6) Clean the foot switch (fig. 42) with a brush. It is important that the dirt does not cake under the foot pedal. Check the ON-OFF switch for positive action and snap.

b. REMARKS. While the assembly of cables is not strictly a maintenance operation, sometimes it becomes necessary to reconnect cables to their respective plugs or connectors. The operation requires care and a knowledge of the circuits fed by the wires contained in the cables. If however, the wire is definitely known to belong to a certain pin from which it has been separated, then proceed to solder or reconnect it. Figure 43 shows various assembly views of the different plugs and connectors used in the set.

c. REFERENCES.

Page	( )	( )	( )	( )
Paragraph	( )	( )	( )	( )
TM 11–	( )	( )	( )	( )

Section V. ANTENNA ASSEMBLY

50. Item 12—Preparatory Steps.

a. TOOLS AND MATERIALS NEEDED.

(1) Brush.

(2) Cleaning agent.

(3) Cloth; dry, clean.

(4) Cloth, oily.

(5) Grease, lubricating special, AXS–637.

(6) Gun, grease.

(7) Ladder.

(8) Oilcan.

(9) Oil, OE 10 or AXS–777.

(10) Pliers.

(11) Sandpaper #0000, and crocus-cloth stick.

(12) Screw driver.

(13) Wrench.

b. SAFETY AND EQUIPMENT PRECAUTIONS. (1) Use the ladder only when conditions prohibit the lowering of the antenna.

(2) Be careful when standing on the ladder.

(3) Handle tools and grease gun carefully. Remember those people working below.

(4) Avoid excessive lubrication when using the grease gun. Three or four pumps on the grease gun handle is usually sufficient.

(5) Avoid sandpapering the metallic external parts of the antenna assembly, because the plating is for protection and must be preserved.

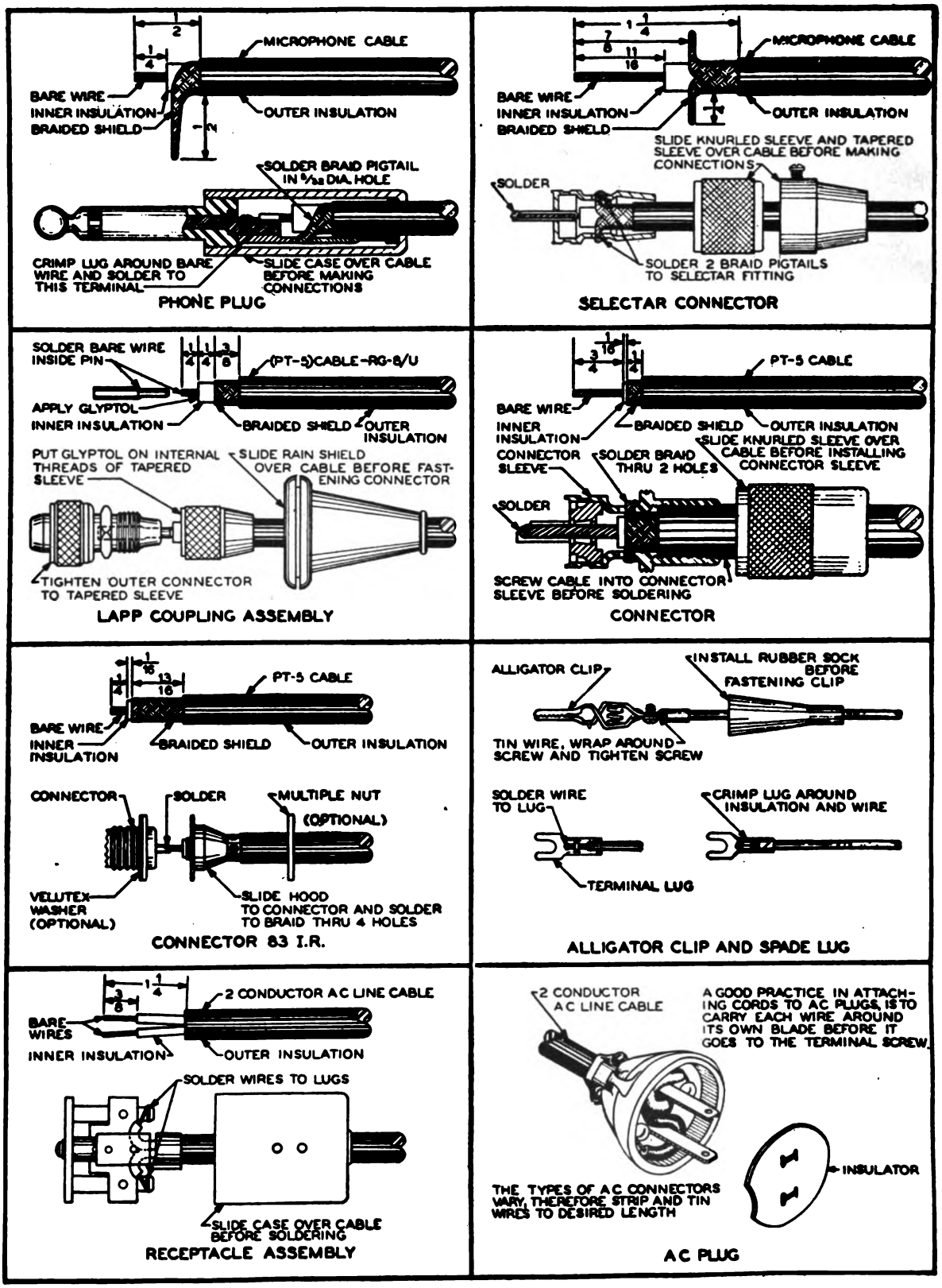

Figure 43. Assembly views of plugs and connectors.

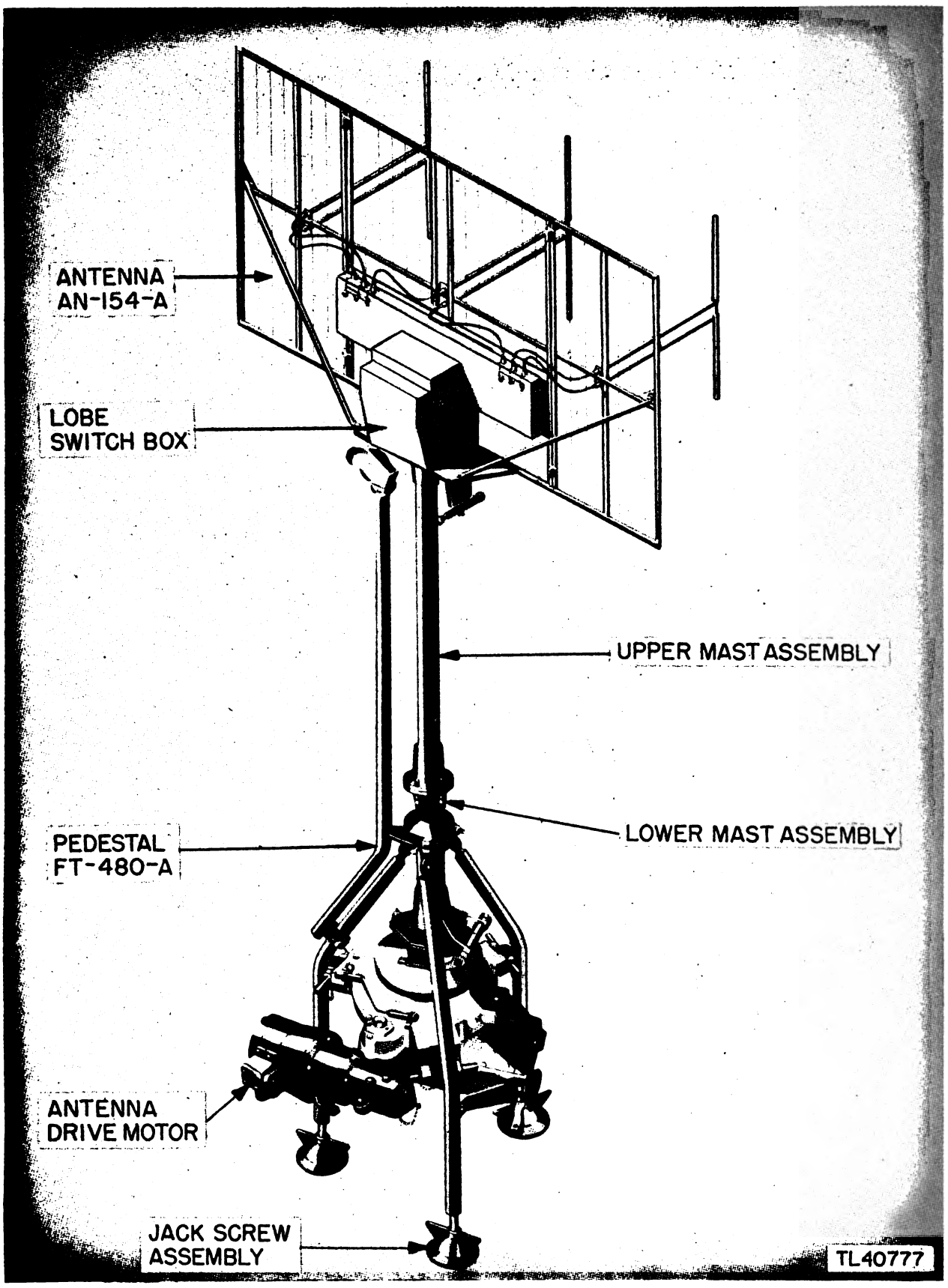

Figure 44. Antenna AN-154-A and Pedestal FA-480-A.

51. Item 13—Pedestal FT-480-A.

a. Location (fig. 44).

b. Maintenance Procedure.

FITCL. COMPLETE UNIT (figs. 45 and 46).

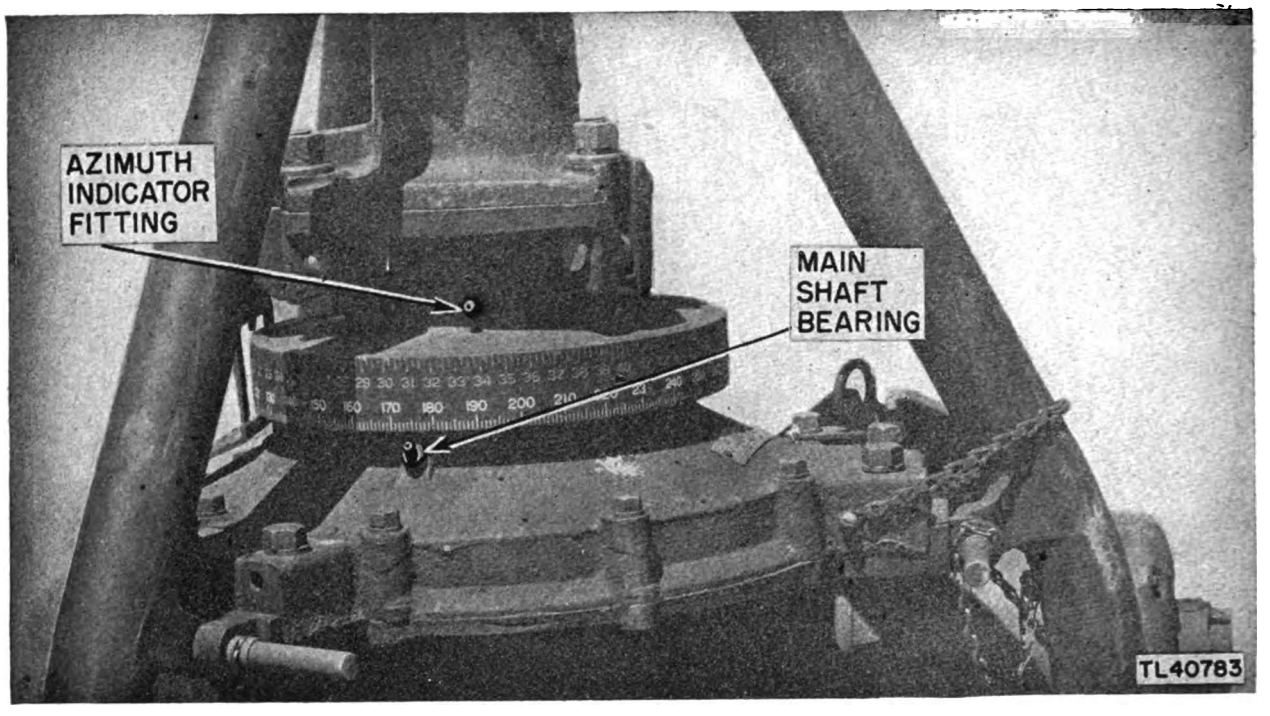

Figure 45. Pedestal FT-480-A, lubrication points.

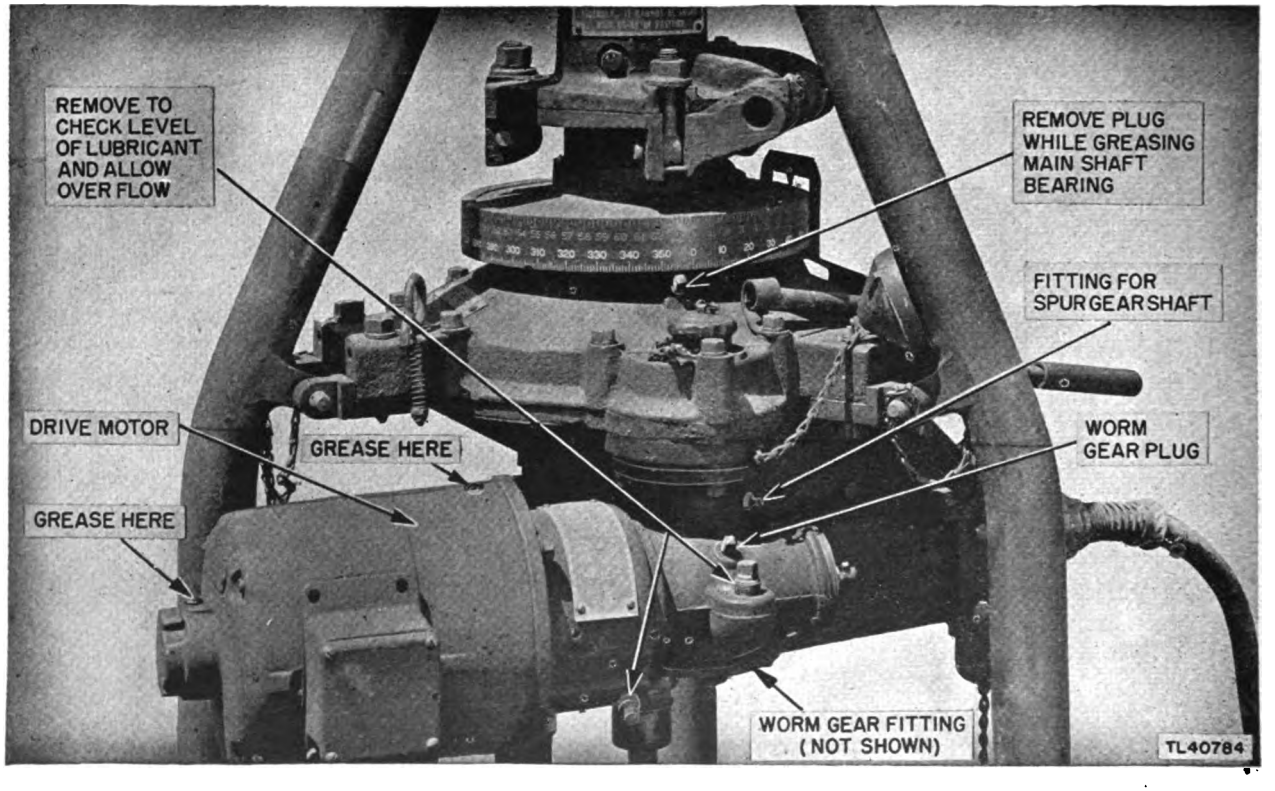

Figure 46. Pedestal FT-480-A, lubrication points.

(1) Feel the drive motor for excessive temperature. Make allowance for the air temperature.

(2) Check the entire frame assembly for chipped paint, chipped plating, and rust. Paint the unplated spots.

(3) Check the jack screw assembly (fig. 44) for secure mounting and corrosion on the screw threads.

(4) Clean the azimuth indicator ring.

(5) Lubricate the pedestal as follows (par. 55):

(a) Fit the grease gun to the fitting so that the grease flows into the fitting directly and not to the sides.

(b) Pump the handle with one hand while using the other hand to hold and guide the gun.

(c) Apply the lubricant to the fittings shown on figures 45 and 46.

Note: The grease fitting located under the worm gear housing is not shown on figure 46. The grease fitting on the upper mast bearing is not shown. It is located under the flared plate at the mast junction.

(6) A few drops of OE 10 oil on the screw threads of the jack assembly will make for easier operation.

c. References.

Page	(	)	(	)	(	)	( )
Paragraph	(	)	(	)	(	)	( )
TM 11–	(	)	(	)	(	)	( )

52. Item 14—Antenna AN–154–A.

a. Location (fig. 44).

b. Preparatory Steps. If the antenna must be lowered to permit maintenance, see TM 11-1308 for instructions for the raising and lowering of the antenna.

c. Maintenance Procedure.

ITCAL. ENTIRE ASSEMBLY (fig. 47).

(1) Check the reflectors for broken welds.

(2) Inspect the dipoles for alignment and broken welds. (See also fig. 48.)

(3) Check the entire frame for corrosion, alignment, and rigidity.

(4) Inspect the connectors for moisture and corrosion. Check the cables for cracked insulation.

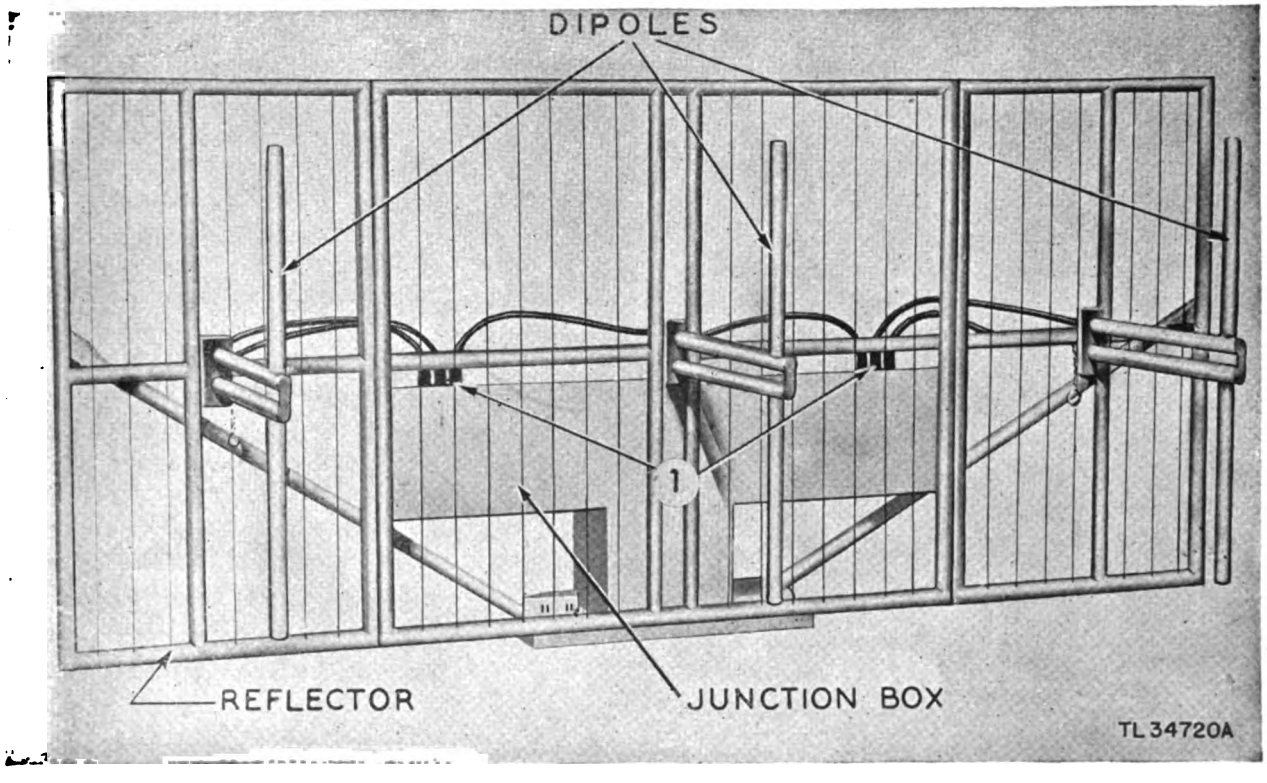

Figure 47. Antenna AN 154–A.

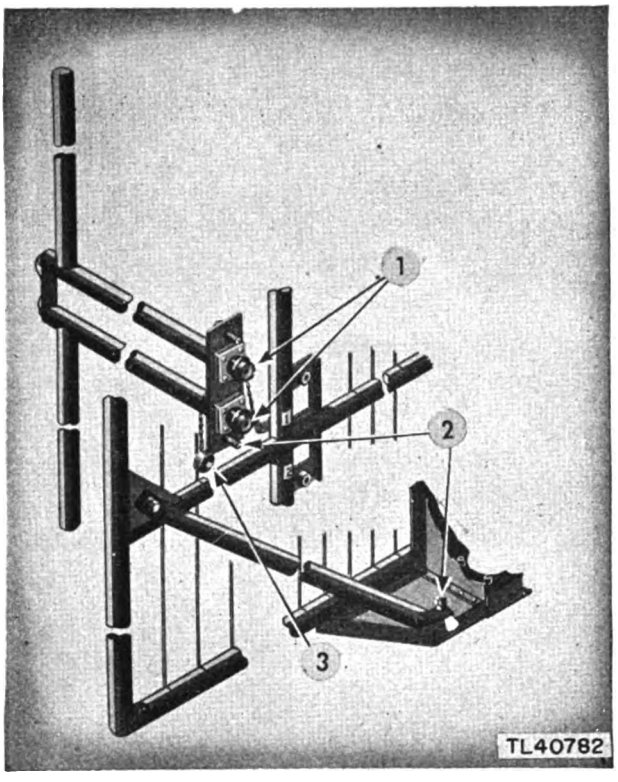

Figure 48. Antenna AN-154-A—close-up.

Avoid excessive handling and bending, especially in cold weather (fig. 48).

(5) Check the lobe switching compartment door for a watertight gasket. Make sure the door closes satisfactorily against the weather.

(6) Tighten all the mounting bolts②.

(7) Clean the inside of the lobe switching compartment with a clean cloth.

(8) Lubricate the cam, adjust and clean the lobe switching contacts (par. 35).

(9) Remove the lobe switching motor at least once a year for lubrication. The bearings are grease packed. It will be necessary to disassemble the motor and lobe switch; this is done at the depot (par. 55).

c. REFERENCES.

Page	(	)	(	)	(	)	(	)
Paragraph	(	)	(	)	(	)	(	)
TM 11-	(	)	(	)	(	)	(	)

CHAPTER 5

WORKING SCHEDULES

Section I. LUBRICATION CHART

53. Use of Chart.

The lubrication chart contains tabulated information on the frequency, quantity, and type of lubrication and the points where it must be applied to the various parts of Radio Equipments RC–182–A and RC–282–A. This information is based on recommendations furnished by the manufacturers of the equipment. Certain specific lubricating instructions have been given in the text of chapter 4, but such instructions cover only those parts where *regularly timed* lubrication is not of primary importance. Such parts as door hinges, switch blades, and tension springs, for example, do not require regular lubrication after a certain number of hours or days of operation. The lubrication chart therefore applies only to rotating machinery or moving equipment which must be lubricated regularly. Frequency and type of lubrication depend on the average surrounding temperature, cleanliness of surrounding air, and the lubricants available. For this reason, the lubrication chart is only a guide which is based on prevailing conditions in temperate zones. In tropical climates heavier types of lubricant must be used, and lubrication must be applied more frequently. The opposite is true of cold and subzero climates. Unusually dusty or dirty air will also make it necessary to lubricate more frequently. It is almost impossible to give lubricating instructions complete enough to take into account every possible location of radar stations. The person in charge must therefore determine whether some modifications to the chart may be necessary for a particular station.

54. Explanation of Chart.

The lubrication chart consists of five columns as follows:

a. COLUMN 1. ITEM NO. This column, entitled *Item No.,* is provided for ready identification of items requiring regular lubrication. Thus a means of cross-reference is furnished from chapter 4 to the chart; that is, where the paragraph in chapter 4 contains a reference to the chart, brief instructions for lubrication of this item may be located on the chart by means of the item number.

b. COLUMN 2. HOURLY INTERVAL. The second column, entitled *Hourly interval,* gives the number of operating hours between lubrication periods as recommended by the manufacturer. Operating hours must not be confused with regular hours. By *operating hours* or *hourly interval* is meant the length of time the equipment has been under actual operation as recorded by the hour-meter or running-time meter. The recommended practice is to tag each section or part which must be lubricated regularly and mark on the tag the date when lubrication is done and the hour-meter reading or running-time meter reading. In this manner a constant lubrication record is maintained *at the equipment,* and dangerous oversights are avoided.

c. COLUMN 3. LOCATION. The third column of the lubrication chart identifies by name and figure number the part that must be lubricated. The actual points where lubrication is applied are shown in the illustrations for the respective items in chapter 4. Instructions for lubrication have been inserted in chapter 4.

d. COLUMNS 4 AND 5. QUANTITY AND TYPE OF LUBRICANT. The last two columns of the lubrication chart indicate approximately what quantity of lubricant is used during each operation and also the type of lubricant recommended. This information must be considered more as a guide than as a fast rule. In general, the quantity of lubricant to be used is determined by the person doing the lubricating job, and it may take two or three trials before the right amount is determined. The recommended types of lubricants are based on manufacturers' specifications,

modified to the extent that certain types may not be available at the radar station. If the types of lubricant suggested are not available, the person in charge will determine the most suitable substitutes, but *under no circumstances will lubrication be skipped or disregarded.*

55. Lubrication Chart.

1	2	3	4	5
Item No.	Hourly interval	Location	Quantity of lubricant	Type of lubricant
		Antenna Pedestal FT-480-A		
13	As required	Azimuth indicator (fig. 45)	As needed	GL*
13	Every 1,000 hrs.	Main shaft bearing, lower (fig. 45)	Until overflow appears	GL*
13	Every 1,000 hrs.	Main shaft bearing, upper (fig. 44)	Until overflow appears	GL*
13	Every 1,000 hrs.	Worm gear (fig. 46)	As needed	GL*
13	Every 1,000 hrs.	Spur gear and shaft (fig. 46)	As needed	GL*
13	Every 1,000 hrs.	Drive motor (fig. 46)	As needed	GL*
		Antenna AN-154-A		
14	Yearly	Lobe switching motor (fig. 48)	Pack bearings	GL*
		Rack FM-80		
6	Every 150 hrs.	Blower motors (fig. 9)	8 drops from oilcan	OE No. 10

*Special lubricating grease AXS-637.

Section II. PREVENTIVE MAINTENANCE SCHEDULES AND CHECK LISTS

56. Maintenance Schedule.

This section of the manual describes the maintenance schedule which tells *when* and *what* maintenance work is to be done. The information supplied by the schedule is as follows:

a. The item on which work is to be done.

b. The day of the week the job is to be done.

c. The number of times the work is to be done each month.

d. Code letters (F, I, T, C, A, L) which specify the particular maintenance operations to be performed. F = Feel; I = Inspect; T = Tighten; C = Clean; A = Adjust; L = Lubricate.

57. How to Use Schedule.

a. Item numbers on the schedule correspond to the item numbers in chapter 4 of this manual. Maintenance men may refer to the specific item for instructions when doing the job called for. The complete maintenance schedule for a year's work is given on the seven schedule sheets.

b. Each schedule sheet consists of eight vertical columns. The first column in the schedule gives the item number. The second column gives the code letter (F, I, T, C, A, L) of the maintenance operation to be performed; the third, the item title. Columns 4, 5, 6, 7, and 8 indicate how often certain maintenance operations are performed on a given item. For example, blank spaces across all five columns indicate that maintenance work specified in the item is to be performed once a week. Shaded spaces indicate that maintenance on that item is not performed during the week shaded (see example below).

1	2	3	4	5	6	7	8
Item No.	Operations	Items	Maintenance to be done				
			First Mon.	Second Mon.	Third Mon.	Fourth Mon.	Fifth Mon.
		Control Unit					
2	ITC	Front panel of control unit					
2	ITC	Top of control unit					
2	ITC	Bottom of control unit					
		Signal Generator					
7		Preparatory steps		XXX	XXX	XXX	XXX
8	ITC	Front panel of signal generator		XXX	XXX	XXX	XXX
8	ITC	Top of signal generator		XXX	XXX	XXX	XXX
8	ITC	Rear of signal generator		XXX	XXX	XXX	XXX

Note: Operating conditions, as shown by the Equipment Performance Log or other records, might indicate that certain maintenance operations should be performed more often than specified in the schedule. More frequent scheduling of items is left to the discretion of the person in charge.

58. Summary Schedule.

In addition to the seven regular schedules, a summary schedule sheet is provided. This summary sheet shows at a glance the maintenance operations that are to be performed. It also indicates how often each item is to be done. Maintenance items are divided into daily, weekly, semimonthly, and monthly groups, and are to be performed at the intervals indicated by this summary sheet. For example, item 6 is performed daily; item 2 is performed weekly, etc.

59. Suggested Check Lists.

Illustrated below are several sample check lists which may be used by personnel at the radar set to keep a record of maintenance work completed. In making up lists of this type, the form indicated should be used. List all daily items in numerical sequence on the daily check sheet, all weekly items on the weekly sheet, etc. The person performing the weekly maintenance places his initials in the space provided, after he has completed the scheduled work. If maintenance is not completed when it is scheduled, appropriate remarks should be entered on the reverse side of the check sheet.

SUGGESTED CHECK LISTS

WEEKLY CHECK LIST FOR 1 MONTH

Item No.	Operation	Description of item	Echelon	1st wk.	2d wk.	3d wk.	4th wk.	5th wk.
2	ITCL	Control unit	2nd					
3	ITCL	Indicator	2nd					
4	ITCL	Receiver-transmitter	2nd					
		etc.						

BIWEEKLY CHECK LIST FOR 2 MONTHS

Item No.	Operation	Description of item	Echelon	1st wk.	2d wk.	3d wk.	4th wk.
13	FITCL	Pedestal FT-480-A	2nd				
14	ITCA	Antenna AN-154-A	2nd				
		etc.					

MONTHLY CHECK LIST FOR 6 MONTHS

Item No.	Operation	Description of item	Echelon	1st mo.	2d mo.	3d mo.	4th mo.	5th mo.	6th mo.
8	ITCL	Signal generator	2nd						
9	ITC	Range calibrator	2nd						
11	ITCL	Cables, connectors, and operator's chair	2nd						
		etc.							

SUMMARY SCHEDULE SHEET

1	2	3	4
Item No.	Operations	Description of item	Echelon
		Daily items	
1		Preparatory steps	1st
2	ITC	Front panel of control unit	1st
3	ITC	Front panel of indicator	1st
4	ITC	Front panel of receiver-transmitter	1st
5	ITC	Front panel of power supply	1st
6	ITC	Rack FM–80, outside	1st
		Weekly items	
2	ITCL	Control unit	2d
3	ITC	Indicator	2d
4	ITCL	Receiver-transmitter	2d
5	FITC	Power supply	2d
6	L	Rack FM–80	2d
		Biweekly items	
12		Preparatory steps	2d
13	FITCL	Pedestal FT–480–A	2d
14	ITCAL	Antenna AN–154–A	2d
		Monthly items	
7		Preparatory steps	2d
8	ITC	Signal Generator I–222–A	2d
9	ITC	Range Calibrator I–223–A	2d
10		Preparatory steps	2d
11	ITC	Cables, connectors, and operator's chair	2d

SCHEDULE FOR MONDAY

1	2	3	4	5	6	7	8
ITEM NO.	OPER-ATIONS	ITEMS	MAINTENANCE TO BE DONE				
			FIRST MON.	SECOND MON.	THIRD MON.	FOURTH MON.	FIFTH MON.
1		Preparatory Steps					
3	ITC	Front panel of indicator					
4	ITC	Front panel of receiver-transmitter					
5	ITC	Front panel of power supply					
6	ITC	Rack FM-80					
6	L*	Rack FM-80					
		CONTROL UNIT					
2	ITC	Front panel of control unit					
2	ITC	Top of control unit					
2	ITC	Bottom of control unit					
2	L	Bottom of control unit					
		SIGNAL GENERATOR					
7		Preparatory steps		X X X	X X X	X X X	X X X
8	ITC	Front panel of signal generator		X X X	X X X	X X X	X X X
8	ITC	Top of signal generator		X X X	X X X	X X X	X X X
8	ITC	Rear of signal generator		X X X	X X X	X X X	X X X

*See Lubrication Chart (par. 55).
X indicates no operation necessary.

F=Feel; I=Inspect; T=Tighten; C=Clean; A=Adjust; L=Lubricate.

SCHEDULE FOR TUESDAY

1	2	3	4	5	6	7	8
ITEM NO.	OPER-ATIONS	ITEMS	MAINTENANCE TO BE DONE				
			FIRST TUES.	SECOND TUES.	THIRD TUES.	FOURTH TUES.	FIFTH TUES.
1		Preparatory steps					
2	ITC	Front panel of control unit					
4	ITC	Front panel of receiver-transmitter					
5	ITC	Front panel of power supply					
6	ITC	Rack FM-80					
		INDICATOR					
3	ITC	Front panel of indicator					
3	ITC	Top of indicator					
3	ITC	Bottom of indicator					
		RANGE CALIBRATOR					
7		Preparatory steps		X X X	X X X	X X X	X X X
9	ITC	Front panel of range calibrator		X X X	X X X	X X X	X X X
9	ITC	Top of range calibrator		X X X	X X X	X X X	X X X
9	ITC	Bottom of range calibrator		X X X	X X X	X X X	X X X

F=Feel; I=Inspect; T=Tighten; C=Clean; A=Adjust; L=Lubricate.
X indicates no operation necessary.

SCHEDULE FOR WEDNESDAY

1	2	3	4	5	6	7	8
ITEM NO.	OPER-ATIONS	ITEMS	MAINTENANCE TO BE DONE				
			FIRST WED.	SECOND WED.	THIRD WED.	FOURTH WED.	FIFTH WED.
1		Preparatory steps					
2	ITC	Front panel of control unit					
3	ITC	Front panel of indicator					
5	ITC	Front panel of power supply					
6	ITC	Rack FM-80					
		RECEIVER - TRANSMITTER					
4	ITC	Front panel of receiver-transmitter					
4	ITC	Top of receiver-transmitter					
4	ITC	Bottom of receiver-transmitter					
4	L	Bottom of receiver-transmitter					

F=Feel; I=Inspect; T=Tighten; C=Clean; A=Adjust; L=Lubricate.

SCHEDULE FOR THURSDAY

1	2	3	4	5	6	7	8
ITEM NO.	OPER-ATIONS	ITEMS	MAINTENANCE TO BE DONE				
			FIRST THUR	SECOND THUR	THIRD THUR.	FOURTH THUR.	FIFTH THUR.
1		Preparatory steps					
2	ITC	Front panel of control unit					
3	ITC	Front panel of indicator					
4	ITC	Front panel of receiver-transmitter					
6	ITC	Rack FM-80					
		POWER SUPPLY					
5	ITC	Front panel of power supply					
5	FITC	Top of power supply					
5	ITC	Bottom of power supply					

F=Feel; I=Inspect; T=Tighten; C=Clean; A=Adjust; L=Lubricate.

SCHEDULE FOR FRIDAY

1	2	3	4	5	6	7	8
ITEM NO.	OPER-ATIONS	ITEMS	MAINTENANCE TO BE DONE				
			FIRST FRI.	SECOND FRI.	THIRD FRI.	FOURTH FRI.	FIFTH FRI.
1		Preparatory steps					
2	ITC	Front panel of control unit					
3	ITC	Front panel of indicator					
4	ITC	Front panel of receiver-transmitter					
5	ITC	Front panel of power supply					
6	ITC	Rack FM-80					
10		Preparatory steps		X X X	X X X	X X X	X X X
11	ITC	Cable, connectors, and operator's chair		X X X	X X X	X X X	X X X

F=Feel; I=Inspect; T=Tighten; C=Clean; A=Adjust; L=Lubricate.
X indicates no operation necessary.

SCHEDULE FOR SATURDAY

1	2	3	4	5	6	7	8
ITEM NO.	OPER-ATIONS	ITEMS	MAINTENANCE TO BE DONE				
			FIRST SAT.	SECOND SAT.	THIRD SAT.	FOURTH SAT.	FIFTH SAT.
1		Preparatory steps					
2	ITC	Front panel of control unit					
3	ITC	Front panel of indicator					
4	ITC	Front panel of receiver-transmitter					
5	ITC	Front panel of power supply					
6	ITC	Rack FM-80					
12		Preparatory steps		X X X		X X X	X X X
13	FITC	Pedestal FT–480–A		X X X		X X X	X X X
13	L*	Pedestal FT–480–A		X X X	X X X	X X X	X X X

*See Lubrication Chart (par. 55).
X indicates no operation necessary.

F=Feel; I=Inspect; T=Tighten; C=Clean; A=Adjust; L=Lubricate.

SCHEDULE FOR SUNDAY

1	2	3	4	5	6	7	8
ITEM NO.	OPER-ATIONS	ITEMS	MAINTENANCE TO BE DONE				
			FIRST SUN.	SECOND SUN.	THIRD SUN.	FOURTH SUN.	FIFTH SUN.
1		Preparatory steps					
2	ITC	Front panel of control unit					
3	ITC	Front panel of indicator					
4	ITC	Front panel of receiver-transmitter					
5	ITC	Front panel of power supply					
6	ITC	Rack FM–80					
12		Preparatory steps		X X X		X X X	X X X
14	ITCA	Antenna AN–154–A		X X X		X X X	X X X
14	L*	Antenna AN–154–A	X X X	X X X	X X X	X X X	X X X

*See Lubrication Chart (par. 55).
X indicates no operation necessary.

F=Feel; I=Inspect; T=Tighten; C=Clean; A=Adjust; L=Lubricate.

APPENDIX

1. Moistureproofing and Fungiproofing.

a. GENERAL. Communication failures commonly occur when Signal Corps equipment is operated in tropical areas where temperature and relative humidity are extremely high. The following problems are typical:

(1) Resistors and capacitors fail.

(2) Electrolytic action takes place in coils, chokes, transformer windings, etc., causing eventual breakdown.

(3) Hook-up wire and cable insulation break down. Fungus growth accelerates deterioration.

(4) Moisture forms electrical leakage paths on terminal boards and insulating strips causing flashovers and crosstalk.

(5) Moisture provides leakage paths between battery terminals.

b. TREATMENT. A moistureproofing and fungiproofing treatment has been devised which, if properly applied, provides a reasonable degree of protection against fungus growth, insects, corrosion, salt spray, and moisture. The treatment involves the use of a moisture-resistant and fungi-resistant varnish applied by means of a spray gun. A brief description of the method of application follows:

(1) All repairs and adjustments necessary for the proper operation of the equipment are made.

(2) Equipment to be processed is thoroughly cleaned of all dirt, dust, rust, fungus, oil, grease, etc.

(3) Equipment is partially disassembled and cer-

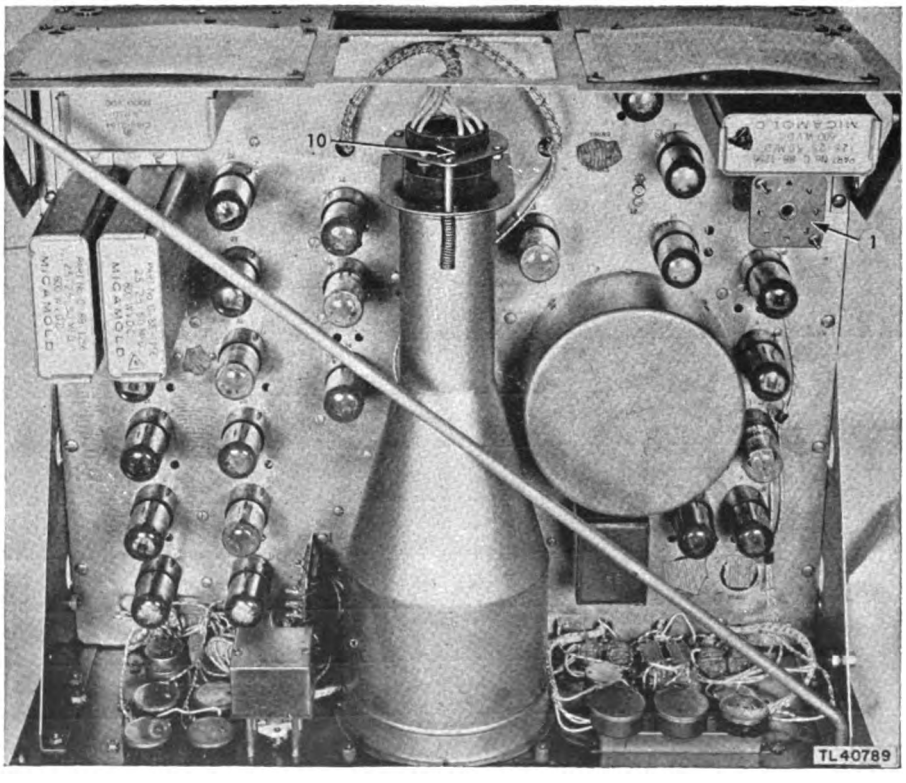

Figure 49. Control Unit BC-1268-A—top view showing masked parts.

tain points, such as relay contacts, open switches, air capacitors, sockets, bearings, etc., are covered with masking tape.

(4) Equipment is thoroughly dried by heat to expel moisture which the circuit elements have absorbed.

(5) All circuit elements and all parts of the equipment are sprayed or painted with three coats of moistureproofing and fungiproofing varnish.

(6) The equipment is given a final operational check; radio sets receiving a 24- to 36-hour aging period, when time permits, before alignment.

c. STEP-BY-STEP INSTRUCTIONS FOR CONTROL UNIT BC–1268–A. (1) *Disassembly.*

(a) Loosen the four knurled captive screws on the front panel and pull the chassis out of the rack.

(b) Remove the two nuts from the top of the metal can (fig. 49①), which covers timing coil 146, and remove the can.

(c) Remove the three screws from the mountings (fig. 50②) of each terminal strip under the sides of the chassis.

(d) Remove Tubes VT–231–3 and VT–231–4.

(2) *Masking* (figs. 49 and 50).

(a) With masking tape, mask switches 142 and 143③, the ceramic bushings④ on capacitor 23, all jacks, and the sockets⑤ of Tubes VT–231–3 and VT–231–4.

(b) With paper and masking tape, mask trimmer capacitor 12⑥, and the range mechanism⑦ (shafts, gears, etc.), capacitor 19 (air, gang)⑧, and the shaft and coupling of potentiometer 132⑨.

(3) *Drying.* Dry for 6 hours at 140° F.

(4) *Varnishing. (a)* Apply three coats of moistureproofing and fungiproofing varnish.

(b) On the top of the chassis, spray the wiring, circuit elements, soldered terminals, and insulating materials behind the front panel. Spray the wiring for the cathode-ray tube and the socket⑩, and coil 146①. Brush-coat the wiring on the top right side of the chassis, but keep the coating material off the vacuum-tube glass envelopes as much as possible.

(c) On the right side of the chassis, spray the voltage reference chart.

(d) On the under side of the chassis, spray all unmasked, visible surfaces and objects, and both sides of the dismounted terminal strips⑪.

(5) *Reassembly.* Reassemble and test operation.

(6) *Marking.* Mark MFP and date of treatment. Example: MFP–2/28/44.

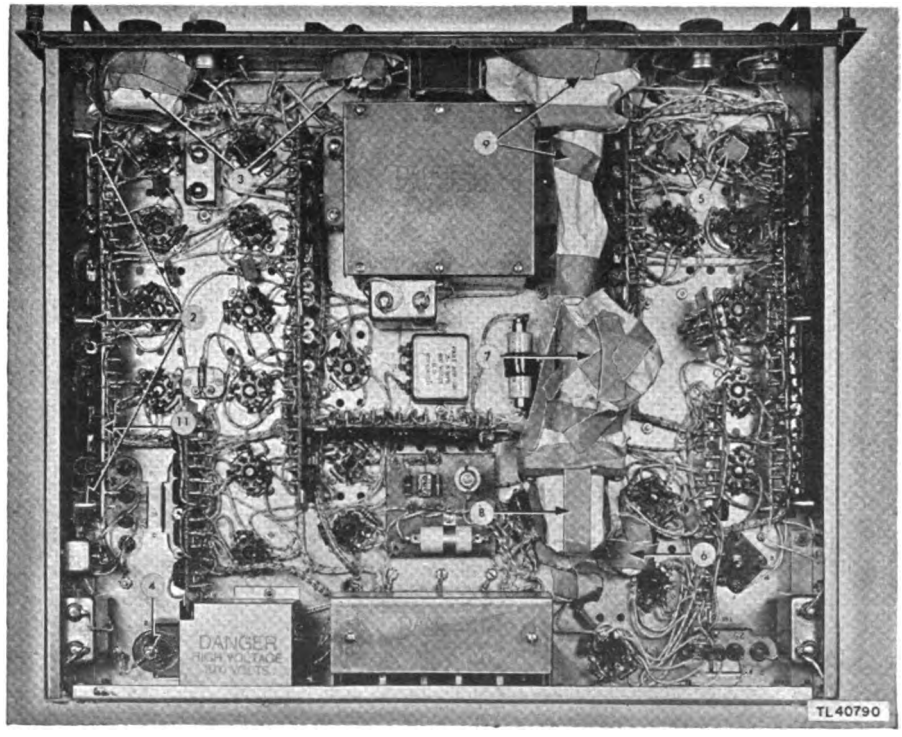

Figure 50. Unit BC–1268–A—bottom view showing masked parts.

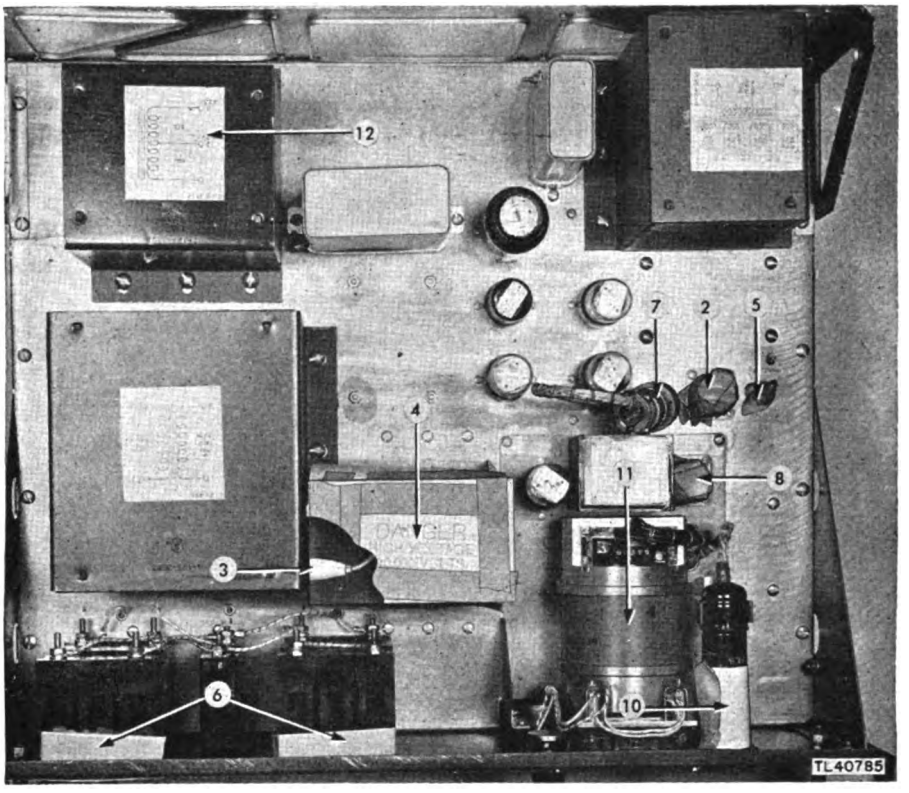

Figure 51. Indicator I–221–A—top view showing masked parts.

d. STEP-BY-STEP INSTRUCTIONS FOR INDICATOR I–221–A. (1) *Disassembly.* Loosen the four knurled captive screws on the front panel and pull the chassis out of the rack.

(2) *Masking* (figs. 51 and 52).

(a) With masking tape, mask the azimuth gear mechanism①, the connector bushing② adjacent to the antenna-reversing switch, the ceramic bushing③ on terminal 3 of transformer 102, the holes④ in the shield on top of the high-voltage rectifier tube, the toggle arm⑤ of the antenna-reversing switch, the slits⑥ in the top front edges of circuit breakers 116 and 118, and plug⑦ and receptacle 112⑧.

(b) With paper and masking tape, mask the high-voltage rectifier Tube VT–218 and its socket⑨ on the under side of the chassis, and the envelope of Tube VT–215⑩.

(3) *Drying.* Dry the unit for 6 hours at 140° F.

(4) *Varnishing. (a)* Apply three coats of moistureproofing and fungiproofing varnish:

(b) On the top of the chassis, spray the wiring, the cases of the circuit-breaker switches⑥, selsyn motor 115⑪, and transformer labels⑫, keeping the coating material off the vacuum tubes as much as possible.

(c) On the right side of the chassis, spray all visible unmasked surfaces and objects.

(d) On the right side of the chassis, spray the voltage reference chart.

(e) Brush-coat the wiring associated with the high-voltage rectifier Tube VT–218.

(5) *Assembly.* Reassemble and test operation.

(6) *Marking.* Mark MFP and date of treatment. Example: MFP–2/28/44.

e. STEP-BY-STEP INSTRUCTIONS FOR RADIO RECEIVER AND TRANSMITTER BC–1267–A. (1) *Disassembly* (figs. 53 and 54).

(a) Loosen the four knurled captive screws on the front of the panel and pull out the chassis.

(b) Remove the nuts from the top of the cans① covering transformer assemblies 106–112 inclusive, and remove these cans.

(c) Remove the leads② from meter 160, then take out the meter (be careful).

(d) Remove the thumbscrew③ holding Tube VT–215 socket-mounting bracket in place. Remove the six nuts and two screws holding the shield under the r-f section of the receiver, and then remove this shield.

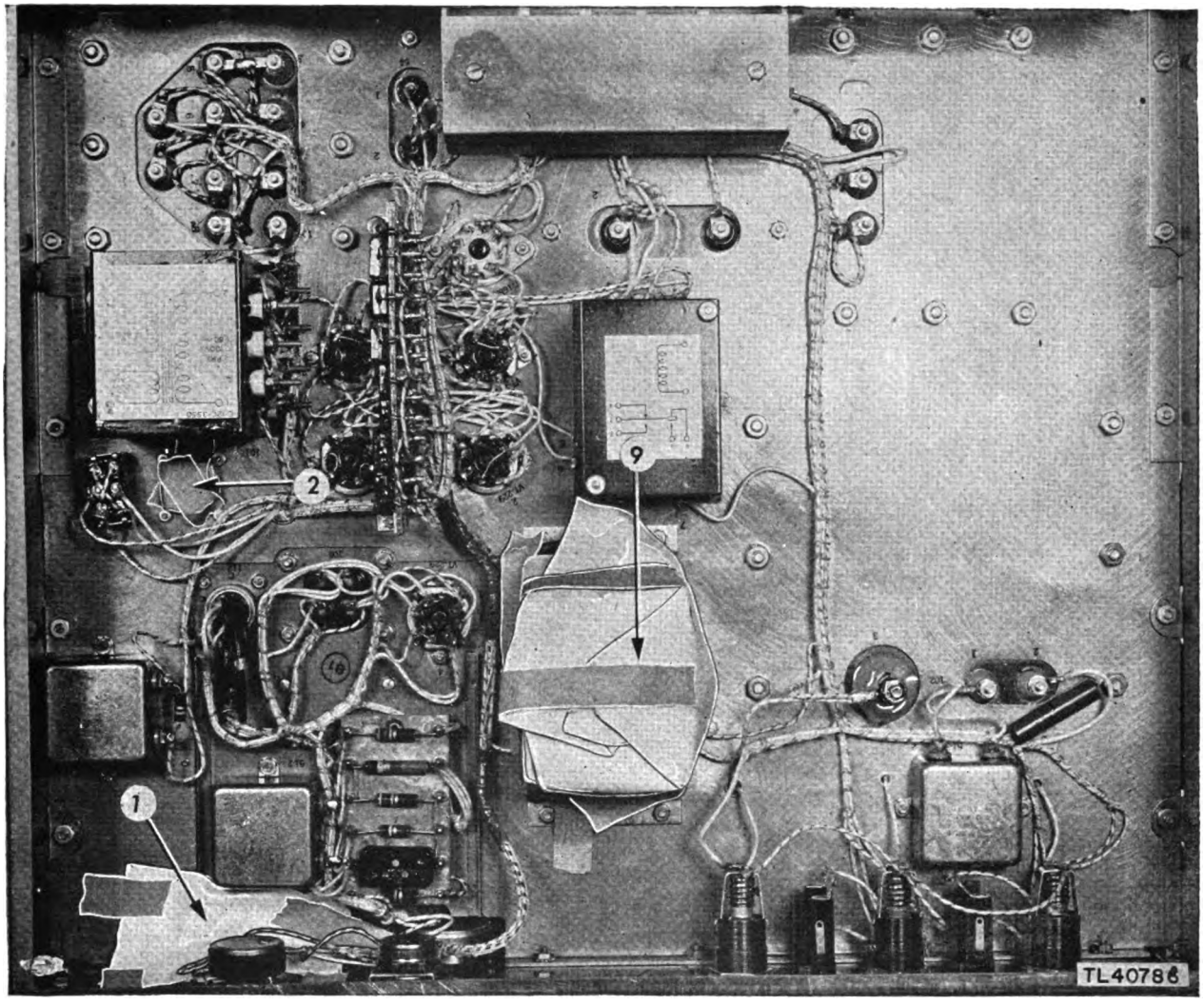

Figure 52. Indicator I-221-A—bottom view showing masked parts.

(e) Loosen the four thumbnuts on the cover of the r-f oscillator section and remove this cover.

(2) *Masking. (a)* With masking tape, mask the terminals② of the meter leads, all jacks⑤, and the holes④ in the ends of the coil forms of the movable core chokes in the r-f receiver section.

(b) With paper and masking tape, mask all gears⑥ and shafts of the under side of the chassis, the envelope⑦ of Tube VT-215, switch 140⑧, the under side of the socket of tube 3E29⑨, and the inside of the interconnector plugs⑩.

(3) *Drying.* Dry for 6 hours at 140° F.

(4) *Varnishing. (a)* Apply three coats of moistureproofing and fungiproofing varnish.

(b) Brush-coat all wire and cable insulation and soldered connections on the top of the chassis.

(c) Spray transformer assemblies 106-112① inclusive.

(d) Brush-coat the tuning shaft⑫, coil 113⑪ and supporting laminated strip, and resistor 62-1 in the transmitter section.

(e) Spray all unmasked visible surfaces and objects on the under side of the chassis and the under side of the r-f receiver chassis.

(f) Spray the voltage reference chart on the right side of the chassis.

(g) After removing the masking, touch up with a brush the wiring and terminals on the inside of the interconnector plugs, the wiring, circuit elements, and laminated material under the socket of the 3E29 tube.

(h) After remounting the meter 160, touch up the terminals with a brush.

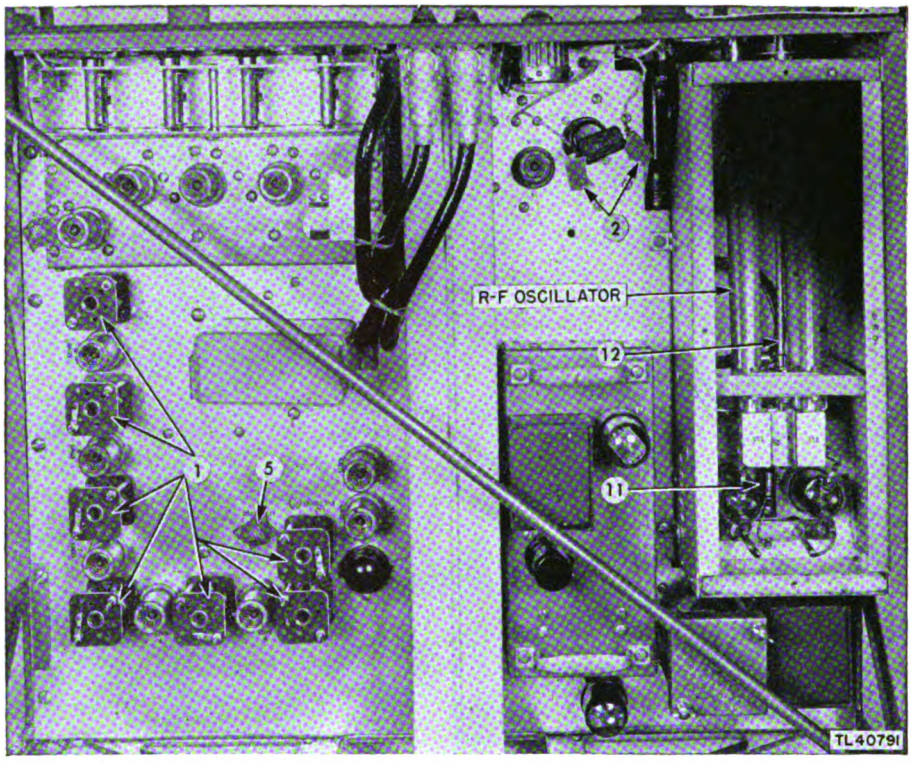

Figure 53. Receiver and Transmitter BC-1267-A—top view showing masked parts.

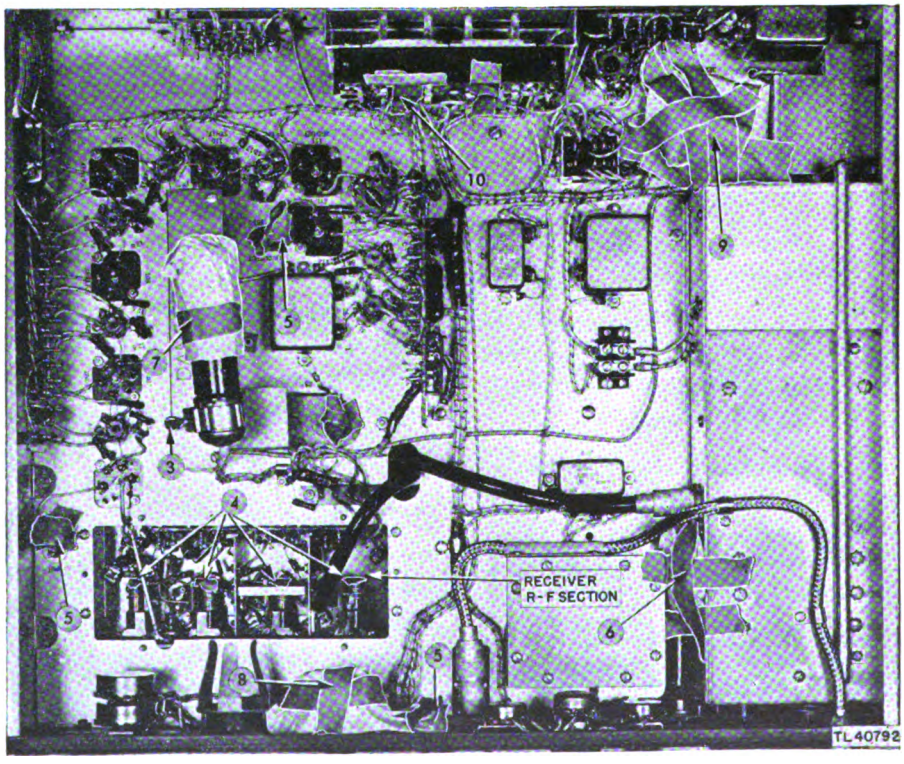

Figure 54. Receiver and Transmitter BC-1267-A—bottom view showing masked parts.

(i) Using a full brush, seal the following portions of the milliammeter:

1. The joint between the backplate and the meter shell.

2. All screw holes.

(b) Brush-coat the wiring④ to the plate connections on the three Tubes VT–119.

(c) Spray all other wiring on the top of the chassis and the case⑤ of the circuit-breaker switch.

(d) Spray the transformer and choke labels.

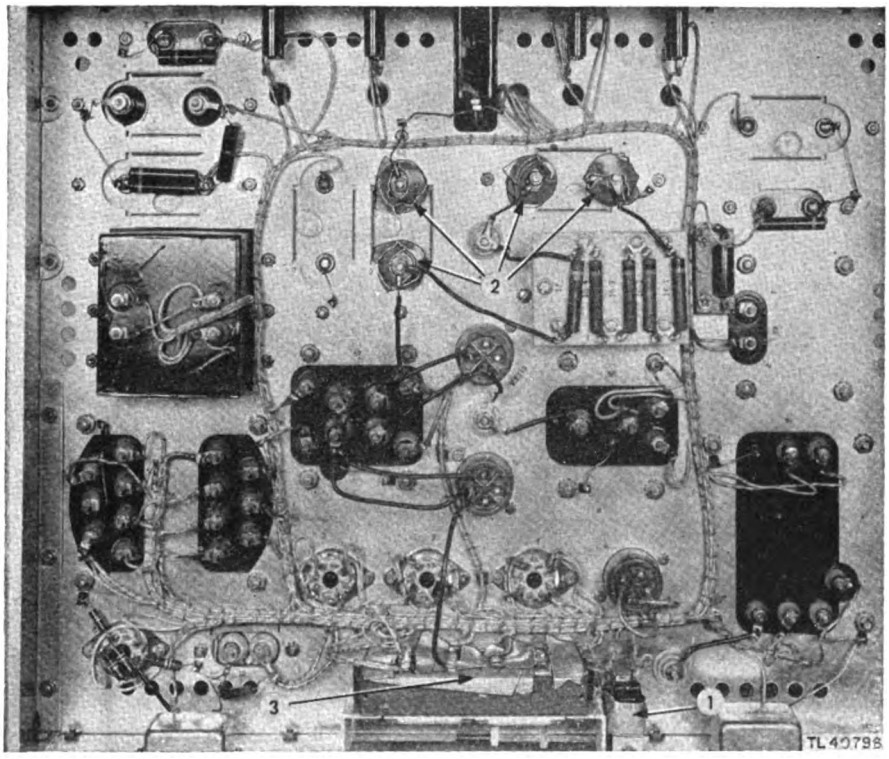

Figure 55. Power Supply RA–105–A—bottom view showing masked parts.

3. The joint between the meter glass and the case.

4. The zero-set adjusting screw.

(5) *Assembly.* Reassemble and test operation.

(6) *Marking.* Mark MFP and date of treatment. Example: MFP–2/28/44.

f. Step-by-step Instructions for Power Supply RA–105–A. (1) *Disassembly.* Loosen the four knurled captive screws on the front of the chassis and pull out the chassis.

(2) *Masking* (figs. 55 and 56). With masking tape, mask the moving parts① of the interlock switch, the ceramic bushings② of capacitors 6–1 and 6–2, and a 1-inch radius of the ceramic surface③ around pins 11 and 15 of the Lapp receptacles.

(3) *Drying.* Dry for 6 hours at 140° F.

(4) *Varnishing. (a)* Apply three coats of moistureproofing and fungiproofing varnish.

(c) Spray the voltage reference chart on the right side of the chassis.

(f) Spray all unmasked visible surfaces and objects on the under side of the chassis.

(5) *Assembly.* Reassemble and check operation.

(6) *Marking.* Mark MFP and date of treatment. Example: MFP–2/28/44.

g. Step-by-step Instructions for Rack FM–80. (1) *Disassembly.*

(a) Remove the four screws from the cover to the blower compartment and take off this cover.

(b) Remove chassis of Control Unit BC–1268–A, Indicator I–221–A, Radio Receiver and Transmitter BC–1267–A, and Power Supply RA–105–A from the rack.

(c) Disconnect all external connections.

(2) *Masking.* No masking is required.

(3) *Drying.* Dry for 6 hours at 140° F.

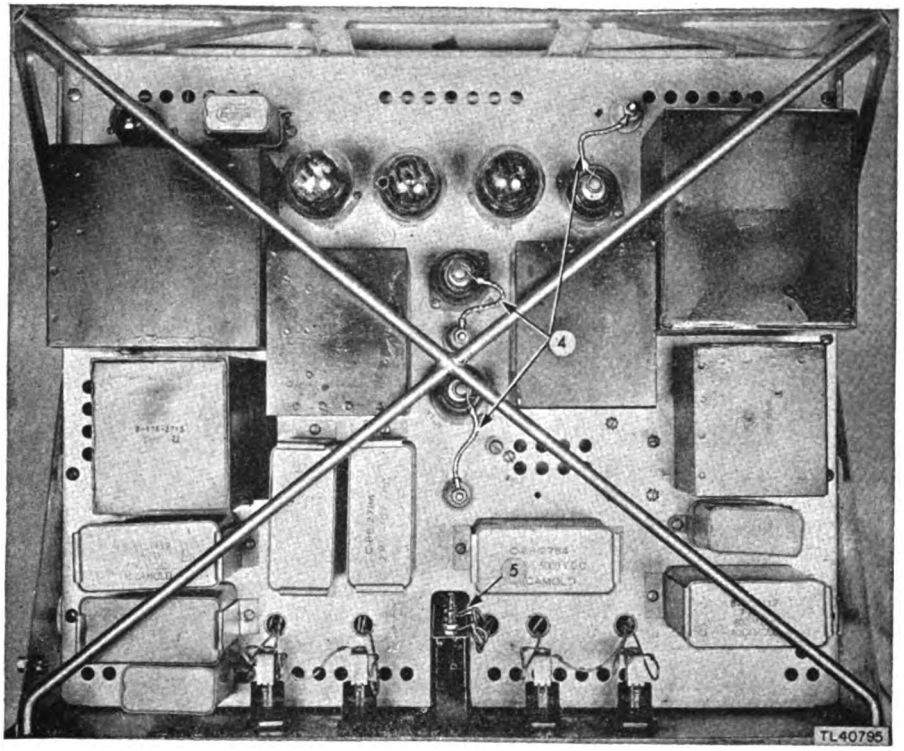

Figure 56. Power Supply RA–105–A—top view.

(4) *Varnishing. (a)* Apply three coats of moistureproofing and fungiproofing varnish.

(b) Brush or spray all visible wiring and bakelite materials. (Do not coat rubber-covered wiring or the interconnector plugs).

(5) *Assembly.* Reassemble and check operation.

(6) *Marking.* Mark MFP and date of treatment. Example: MFP–2/28/44.

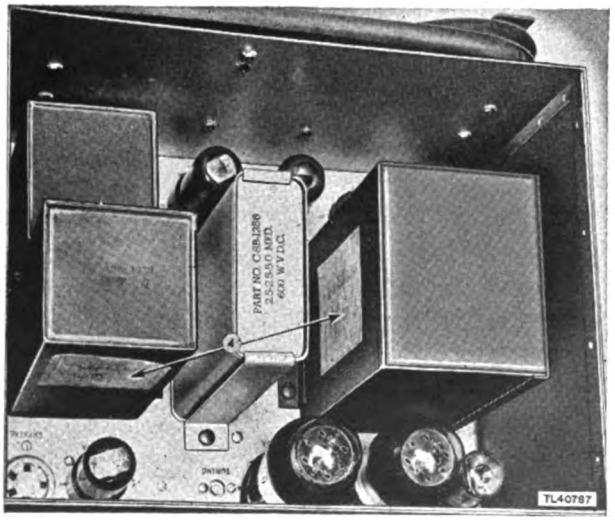

Figure 57. Range Calibrator I–223–A—top view ready for brush coat.

h. Step-by-step Instructions for Range Calibrator I–223–A. (1) *Disassembly. (a)* Remove the 24 screws from around the edge of the top and bottom covers.

(b) Remove the crystal holder. Replace it after drying.

(2) *Masking* (figs. 57 and 58). *(a)* With masking tape, mask jacks 114–1, 114–2, and 114–3①.

(b) With paper and masking tape, mask resistor 57②.

(c) Mask capacitor 2③. Do not bend or move plates.

(3) *Drying (a)* Dry the unit at 140° F for 6 hours.

(b) Do not heat the crystal.

(4) *Varnishing. (a)* Apply three coats of moistureproofing and fungiproofing varnish.

(b) Spray all visible unmasked surfaces and objects on the under side of the chassis.

(c) Spray the transformer and choke labels④ on the top side of the chassis.

(5) *Assembly.* Reassemble and test operation.

(6) *Marking.* Mark MFP and date of treatment. Example: MFP–2/28/44.

i. Step-by-step Instructions for Signal Generator I–222–A. (1) *Disassembly* (figs. 59 and 60).

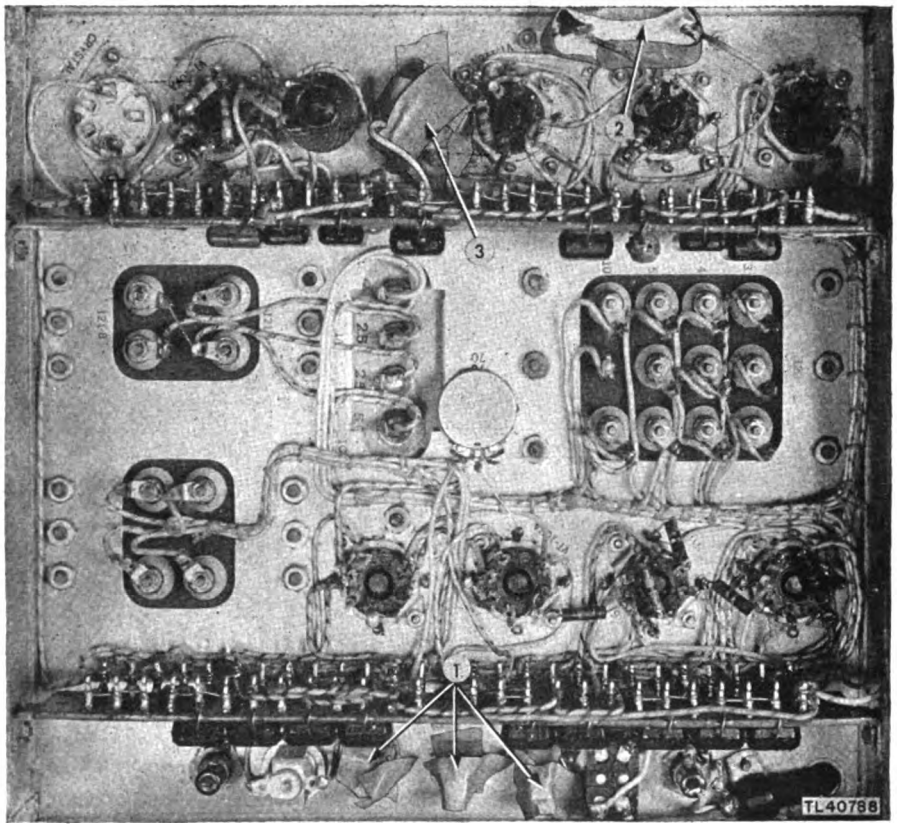

Figure 58. Range Calibrator I-223-A—bottom view showing masked parts.

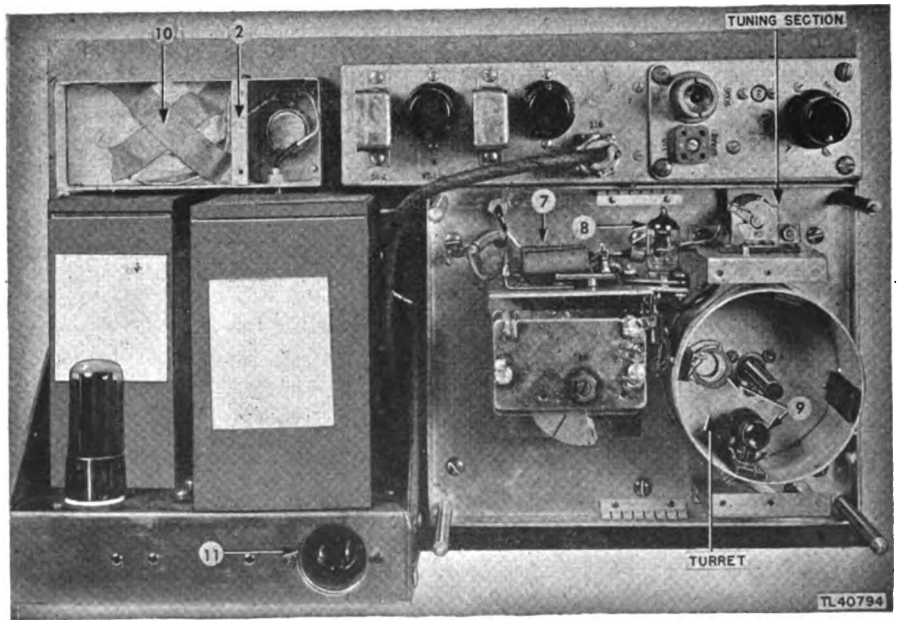

Figure 59. Signal Generator I-222-A—rear view showing masked parts.

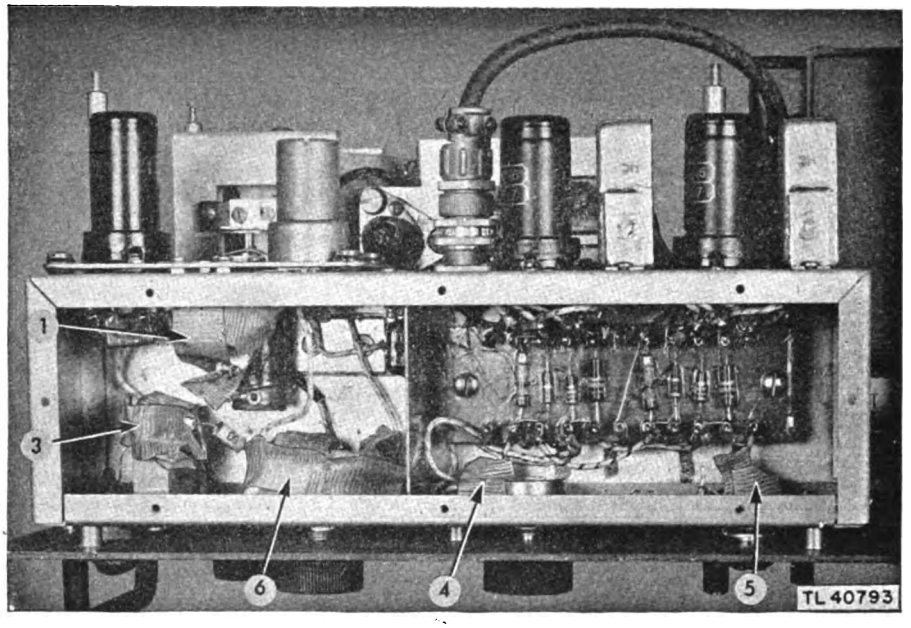

Figure 60. Signal Generator I-222-A—top view showing masked parts.

(a) Remove the phone plug, disconnect the r-f output cable, and take out the power receptacle⑪ from the rear of the unit.

(b) Remove the 18 screws from the front panel and pull the chassis out of the case.

(c) Take out the two screws and remove the cover from the shielded section② which houses switch 105–A–B⑩ etc.

(d) Remove the eight screws and the shield cover of the subchassis on the top left of the unit.

(e) Remove the four thumbnuts from the corners of the large shield covering the tuning section and remove this shield.

(f) Remove the crystal holder. Replace it after the drying operation.

(g) Disassemble the turret containing coils 100 and 101⑨ and remove one end cap.

(2) *Masking. (a)* On the subchassis on the top left of the unit, mask the variable air capacitor 61① and switch 106⑥ with paper and masking tape; then mask the contacts on part 109③, switch 106, the hole in the case of potentiometer 4④, and jack 107⑤ with masking tape.

(b) With masking tape, mask any portions of the antenna pick-up rod③ likely to be coated by spraying or brushing as described below.

(3) *Drying. (a)* Dry the unit at 140° F for 6 hours.

(b) Do not heat the crystals.

(4) *Varnishing. (a)* Apply three coats of moistureproofing and fungiproofing varnish.

(b) Spray all unmasked visible objects and surfaces inside the case of the subchassis on the top left of the unit. After removing masking, use brush to touch up capacitor 66, the insulation of switch 106, and the uncoated wiring.

(c) Brush-coat wiring, resistors, and switch insulation in the section② where switch 105–A–B is located.

(d) Spray all visible surfaces and objects on the the under side of the power subchassis.

(e) In the tuning section, spray coils 102–1⑦, 102–2⑦, and the wiring, circuit elements, and phenolic materials in the immediate vicinity of these coils. Brush-coat all other phenolic materials, wiring (except rubber-covered), small circuit elements under the socket of the 9002 Tube VT–202⑧, and the phenolic stand-off insulators.

(f) Spray coils 100 and 101⑨, capacitor 64, and the insulating material inside the turret which houses these articles. Brush-coat the insulation visible from the exterior of the turret, keeping the coating material off the contacts.

(5) *Assembly.* Reassemble and test operation.

(6) *Marking.* Mark MFP and date of treatment. Example: MFP–2/28/44.

j. REFERENCE. For a full description of the varnish-spray method of moistureproofing and fungiproofing refer to TB SIG 13.

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