OPERATING INSTRUCTIONS FOR RADIO SET SCR-583

Developed By
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I. INTRODUCTION

The following paragraphs and accompanying diagrams and photographs are intended to give a complete, concise description of Radio Equipment, SCR-583, which has been developed for the United States Army Signal Corps by the Farnsworth Television & Radio Corporation. The purpose of these instructions is to enable military personnel, who will conduct acceptance and field tests of the equipment, to readily understand its design and construction details and to operate the equipment with maximum facility.

II. GENERAL DESCRIPTION

The SCR-583 radio set is intended for both C.W. and phone communication in the frequency band extending from 2.2 to 4.6 mc. Provision has been made for continuous tuning of the set over this range of frequencies. Additionally, four crystal frequencies have been provided as follows: 2700 Kc., 3010 Kc., 3825 Kc., and 3995 Kc. The substitution of crystals ground to frequencies different from those just enumerated would provide for crystal operation at other frequencies.

Within the frequency range just specified the set may be operated on high power, medium power or low power, on either phone or C.W. Details of nominal power output under the several modes of operation are contained in the section of these instructions pertaining to the transmitter.

In order to perform the function just outlined, the SCR-583 radio set has been designed to include the following items; (1) transmitter with Type T-17 microphone and Type J-45 telegraph key; (2) receiver with built-in loud speaker, with Type BA-40 battery and with two sets of Type P-16 head phones; (3) hand generator, Type GN-45; (4) antenna consisting of standard Signal Corps sections MS-49 to MS-56 inclusive. Included in the antenna installation are a counterpoise, guy lines and guy stakes of our design; (5) an equipment box; (6) an accessory box; (7) a bag for holding the antenna when it is disassembled.

The equipment and accessory boxes are substantially identical in construction, as may be seen from Figure 1 which illustrates the SCR-583 radio set assembled for operation in the field. These boxes are constructed of Haskelite with metal trim and fittings. Their construction is similar to that of a foot locker trunk, but is somewhat more rugged. They measure approximately $8\frac{1}{2}$" x 14" x 23" not including the exterior metal fittings. Each box is provided with a lid which comprises one of the large sides of the box. The lid is hinged with a sturdy piano-type hinge and may be opened to an angle of approximately 135 degrees. Supporting stays at each end of the lid hold it open at the maximum position. When the box is closed it is held securely in this position by two metal clasps. A rubber gasket is provided around the inner edge of the lid. This gasket effectively seals the box against the entrance of moisture when the lid is closed. Details of construction can best be visualized by observing Figure 1. In particular, attention is called to the hooks and the spring hasp on the accessory box. These fixtures are provided so that the box may be readily mounted on a Phillip's Pack Saddle. Identical hardware is provided on the rear of the equipment box for the same purpose.

The equipment box houses the transmitter, the receiver and its battery, one set of head phones, the microphone, the telegraph key, and two stakes and guy lines. The box, equipped as described above and also equipped with an antenna mount, to be described later, weighs 65 pounds and 14 ounces.

Figure 2 shows the interior of the box with all of its equipment in place. The transmitter is located in the left hand portion of the box. Immediately to the right of it is the receiver. Below the receiver is a lid enclosing the battery compartment. To the left of the battery compartment is a space for the accessories listed above. The four compartments just enumerated are separated by plywood partitions which are held in proper place by metal angles. Metal angles fastened to the side of the box and to the tops of these partitions provide the necessary mounting space for the transmitter and the receiver. The transmitter and the receiver are described in detail in later sections of the report.

The interior of the accessory box is shown in Figure 3. The hand generator is securely mounted in the lower left hand corner of the box. Immediately to the right of the hand generator is a compartment housing the generator filter. The counterpoise is also stored in this compartment. Spare tubes are located in the compartment at the lower right hand corner. Immediately above this compartment is a storage space for a second set of head phones which are provided with this equipment. The compartment which extends along the entire upper portion of the box contains the supporting legs for both boxes, the crank handles for the hand generator, the power cable, and two stakes and guy lines for supporting the antenna. Equipment stored in this compartment is held securely in place by means of a heavy leather strap. The weight of the accessory box with all equipment in place is 66 pounds, 2 ounces. Thus a favorable weight balance between the equipment box and the accessory box has been realized.

The hand generator supplied with this equipment is a standard Signal Corps generator, Type GN-45. The several metal attachments which form sockets for the supporting legs usually supplied with this generator have been removed because they serve no useful purpose when the hand generator is mounted permanently in the accessory box. The tapped holes already existing in the hand generator case have been used to mount it in the accessory box. It was necessary to lengthen the shafts of the cranks supplied with this generator one inch, so that they could be used when the generator is mounted in the box. The location of the generator in the box and the design of the seat-leg were so chosen that the generator is located at substantially the same position with reference to the seat and to the ground in this case as in the standard form of mounting.

The output of the hand generator is fed through a combination A.F. and R.F. filter to a socket located in the right hand end of the equipment box. The socket is identical to that mounted in the hand generator frame. The connection between the hand generator and the socket mounted in the box is made through heavy four-conductor rubber-insulated and rubber-sheathed cable. A schematic diagram of the filter is shown in Figure 10.

The antenna supplied with this equipment is standard Signal Corps antenna, comprising sections MS-49 to MS-56. When the equipment is used while it is mounted on a pack animal, sections MS-49 and MS-50 are used to form a vertical antenna approximately six feet long. The antenna mount is located on the equipment box in the manner shown in Figure 4. The socket has been so designed that the antenna may be held in a vertical position when the box is mounted on the pack saddle, as well as when it is mounted on its legs. When the equipment is set up on the ground for normal operation, either the short antenna described above or the long antenna comprising all the sections may be used. The long antenna is approximately 25 feet long. When it is used, the lower end of section MS-56 fits over the cylindrical portion of the antenna mount projecting above the hexagonal nut. The cylindrical surface is openly visible below the knurled end of section MS-50 in Figure 4.

When the long antenna is used, it will be necessary to guy it. For this purpose four lengths of guy line and four stakes have been provided. Each of the guy lines is permanently attached to its stake. The guy lines are secured to the antenna simply by forming a slip noose in the free end of the line, sliding it over the lower end of section MS-51 pulling the slip noose tight just above the joint of this section. The antenna may then be completely assembled, erected, mounted on the antenna mount and guyed.

A bag of heavy canvas duck, suitably water-proofed, has been provided for the antenna sections. Two pockets are provided in this bag, each holding four sections of the antenna. The bag is mounted on the top of the pack saddle between the equipment box and the accessory box. The mounting means for the antenna bag are two 5/32" hex head cap screws each two inches long. These screws are inserted in two holes already existing in the pack saddle and held securely in place by a nut and lock washer. The antenna bag is provided with brass eyelets which fit over the extended ends of these screws. Two large wing nuts permanently secured to the bag are used to fasten it securely to the saddle.

The antenna and the antenna bag together weigh approximately six pounds. Thus, the total weight of the SCR-583 radio set with all of its accessories, is approximately 138 pounds. The weight unbalance is well within the limit of one pound specified as a maximum for a satisfactory load balance on the Phillip's Pack Saddle.

III. TRANSMITTER

The SCR-583 Transmitter is an extremely compact and highly versatile device designed for portable field use in communicating over relatively large distances, either by the use of telegraph signals or by means of speech. It is mounted in a separate compartment of one of the two boxes used to contain the complete SCR-583 equipment.

1. Description:

(a) Mechanical: The SCR-583 Transmitter is constructed as a single unit (exclusive of power supply), using a front panel and an attached chassis base. Construction is such as to be rigid and yet relatively light in weight. Front panel dimensions are 13 inches in width by 10 inches in height. The chassis extends 6-1/16 inches behind the front panel. Chassis construction is such as to provide a maximum of accessibility consistent with the requisitecompactness of the unit. Complete operational controls, indicating meters, calibration chart, and various connecting devices are provided on the front panel, as shown in the accompanying photographs. The transmitter unit is fastened in the compartment by means of 16 machine screws disposed around the edges of the front panel. The total weight of the complete transmitter unit, exclusive of accessories such as microphone and key, is 16 pounds, 9 ounces.

(b) Electrical: As shown by the accompanying Schematic Wiring Diagram, Drawing Number 102792, the SCR-583 Transmitter is a master oscillator-power amplifier combination with a buffer amplifier stage inserted. Provision is also made for operation on any one of four preselected crystal controlled frequencies within the operating range of 2200 to 4600 kilocycles per second. Selection of the mode of operation is made by Switch S-102, which has six positions, as follows: "M.O.", "Crystal 1-2-3-4", and "Cal." in "M.O." operation, the master oscillator stage, V-105, which is a Type 3Q4 Tube, is used to drive the buffer amplifier stage, V-105, which is a Type 3A4 Tube. The necessary tuning of these stages is accomplished by a ganged tuning condenser driven by a single calibrated precision dial. The output of V-105 is used to drive the power amplifier stage, V-102 or V-101 and V-102, which are Raytheon Type RK-75 Tubes. The plate tuning of the power amplifier is accomplished from the front panel by means of C-132. The power amplifier output is then coupled through the variable tuning coil L-104, also tunable from the front panel, to the antenna. Power amplifier plate current and antenna current are measured by the two meters on the front panel. Operation as described above, is of course contingent upon the closing of K-101 by means of the key or the "push to talk" switch on the microphone.

In "crystal" operation, the master oscillator, V-104, is inoperative, the buffer amplifier, V-105, being used to drive the power amplifier. In this mode of operation, V-105 is used as a crystal oscillator. Tuning is accomplished by the same front panel precision dial and by reference to Meter M-102A. Other operation is as described above with master oscillator control of frequency.

The "Cal." position of S-102 is provided for use in standardizing the frequency calibration to compensate for long-time drift, and for use in "netting". In this mode of operation only the master oscillator and buffer amplifier stages are operable; and the frequency is set, as explained later, by reference to the receiver. Keying relay K-101 must be closed, either by the key or by the "push to talk" switch, during calibration; after which operation is transferred to "M.O." on the same frequency.

In any of the above modes of operation, the output may be either keyed to form telegraph characters or modulated by speech. About half of maximum c.w. power output is obtainable during phone operation. The type of signal radiated (phone or c.w.) is determined by switch S-103. In "C.W." operation, the suppressor grids of the power amplifier are connected to the minus filament terminal, and operation of the entire unit is controlled by the telegraph key. In "Phone" operation, the suppressor grid of the power amplifier is biased negatively by the voltage drop across R-126; and the modulator stage, V-103, which is a Type 3Q4 Tube, is energized. The power amplifier output is thus modulated in accordance with the audio frequency output voltage of the microphone. Operation of the entire unit is now controlled by the "push to talk" switch on the microphone. Three additional modes of operation, defined by obtainable power putput (in c.w. operation) are possible. The selection of one of these is made by Switches S-101 and S-104. High power operation requires the use of an auxiliary power supply of 650 volts at 250 milliamperes plus 6 volts at 3 amperes. The use of the longest possible antenna (8 sections, or 25 feet) is contemplated in this case; although 6 or 7 antenna sections can be used with some sacrifice in radiation efficiency. In this case, Switch S-101 should be on "Hi" and Switch S-104 should be on "25 Ft.". The maximum power output on c.w. is nominally 40 watts. Medium power operation requires about 79 watts total output from the standard hand generator. The use of a 6-section antenna (19 feet) is contemplated in this case; although, if circumstances permit, 7 or 8 sections can be used to gain appreciably in radiation efficiency. Switch S-101 should be on "Med.", and Switch S-104 should remain on "25 Ft." Maximum c.w. power output in this case is nominally 18 watts. Low power operation requires about 41 watts total output from the standard hand generator, which may be turned with only one crank in this case, thus permitting operation of the equipment on the pack animal. The use of a 2-section antenna (6 feet) only, is intended, in low power operation. Switch S-101 should be on "Lo" and Switch S-104 should be "6 Ft." Maximum c.w. power output is nominally 6.5 watts.

In no case is operation intended for longer than 5 minutes on high power, 10 minutes on medium power or 20 minutes on low power. This requirement results from the sealing of the equipment box against weather. Operation for these specified times should be followed by an "off" period of 15 minutes or more. The same ratio of "on" to "off" times should hold during any operation, i.e., 1 minute "on" and 3 minutes "off" for high power.

2. Operation:

The antenna to be used should first be determined; and the Antenna Selector Switch, S-104, in the upper right corner of the front panel should be set accordingly. It should be set on "6 Ft.", for the

2-section (6-foot) antenna, and on "25 Ft." for 6-, 7-, or 8-section antennas (19, 22, or 25 feet). Variable Capacitor, C-133, located on the inner face of the top center portion of the panel, should be adjusted to approximately equalize the capacitances of the 2-section and 6-section antennas. This adjust is made at the factory and should not have to be repeated. The "6 Ft." position of the Antenna Selector is to be used only with the 2-section antenna and only under low power conditions of operation.

The power source to be used should next be considered. If the auxiliary power supply previously mentioned is to be used, the Power Switch, S-101, in the lower, right corner of the front panel, should be set on "Hi". Additionally, either the "Lo" or "Med." positions of the switch may be used, if this is desired for some reason, with the auxiliary power supply provided that the plate supply voltage does not rise above 700 volts. If the hand generator, dismounted and operated by both cranks, is to be used as the power supply, the Power Switch should be turned to "Med.". Additionally, the "Lo" position may be used, in this case to conserve input power, if the lower output power can be tolerated. If the hand generator, in position on the pack animal and operated by only one crank, is to supply power, the Switch should be set on "Lo".

The Phone-c.w. Switch, in the lower center of the front panel, should now be set on "Phone" or "C.W.", depending on the method of communication desired; and the microphone or key should be plugged into the proper jack. The power plug should now be inserted and locked, and the counterpoise or ground should be connected to the "Ground" post. If operation is to be with master oscillator control of frequency, the "M.O.-Crystal-Cal" Switch, in the lower left corner of the front panel, should be rotated to "M.O."; and the "M.O." tuning dial should be set to the desired operating frequency, as shown by the calibration chart. (The dial settings on this chart are those obtained by rotating the dial in the direction of increasing numbers). Power should now be applied to the unit; the key or "push to talk" switch should be closed; and the "P.A. Tuning" dial should be adjusted for minimum "P.A. Plate Cur.", as indicated by the right hand meter. If this is not a good minimum (if any antenna current is indicated by the left hand meter), the "Antenna Tuning" crank should be rotated several turns, to detune the antenna; and the "P.A. Tuning" should be readjusted. The "Antenna Tuning" should now be adjusted for maximum antenna current, as indicated by the left hand meter. The push button switch to the left of this meter must be pushed in to read antenna current. If the antenna current is very low, as for example if one of the long antennas is used on low power operation, the "Antenna Tuning" can be better adjusted by tuning for maximum loading of the power amplifier stage (maximum "P.A. Plate Cur."). This method of tuning, however, requires that the minimum plate current previously mentioned be a good minimum, as previously explained. In making these various tuning adjustments, it will be found helpful to remember that all dial readings increase with increasing frequency.

If it is desired to check the dial calibration prior to operation, the following procedure should precede that described above. Set the "M.O. Tuning" dial to the harmonic of 200 kilocycles (i.e., 2200, 2400, 2600, 2800 kc., etc.) nearest to the desired operating frequency. Rotate the "M.O.-Crystal-Cal" Switch to the "Cal" position;

place the receiver in operation in its "Cal." mode, and rotate its tuning dial to the calibration frequency; apply power to the transmitter; close the key or the "push to talk" switch; and adjust the "O. Trimmer" knob, in the lower center of the transmitter front panel, for zero beat, by reference to the audio frequency output tone of the receiver. The receiver may now be turned off, if desired. The "M.O.-Crystal-Cal." Switch, on the transmitter, should now be returned to the "M.O." position, and the procedure described in the preceding paragraph should be followed.

If it is desired to operate the unit in a "net", a procedure similar to calibration must be performed; unless the subject unit is to be the master station of the "net", in which case this procedure is omitted. In this case, however, calibration is probably desirable. The "netting" procedure follows. Place the receiver in operation and locate the master station, using "C.W." or "Phone" operation of the receiver as necessary. Switch the receiver to "Phone" operation; rotate the "M.O.-Crystal-Cal." Switch, on the transmitter, to the "Cal." position; apply power to the transmitter; close the key or the "push to talk" switch; and operate the "M.O. Tuning" dial on the transmitter until zero beat is obtained, as before. The receiver may now be turned off, if desired. Transmitter operation should now be returned to "M.O." and the procedure described in the second preceding paragraph should be followed.

If operation is to be with crystal control of the radiated frequency, the "M.O.-Crystal-Cal." Switch should be rotated to the desired crystal position; and the push button switch (S-105) to the left of the left hand panel meter should be pulled out. Power should now be applied to the transmitter; the key or the "push to talk" switch should be closed; and the "M.O. Tuning" dial should be rotated, in whichever direction is necessary until a pronounced dip is observed in the buffer plate current, as indicated by the left hand panel meter. This direction depends upon the various crystal frequencies, and can be learned only by experience. This dip in current will have the characteristic sharp slope with the tuning dial below the minimum current reading and broad slope with the dial above the minimum point. The value of the minimum current should be determined as accurately as possible; and the "M.O. Tuning" dial should be rotated beyond this point, in the direction of increasing numbers, by an amount sufficient to raise the indicated buffer plate current by approximately one division of the meter scale (.05 ampere). This is necessary for satisfactory crystal starting under keying conditions. The push-button switch to the left of the meter, should now be pushed in; and the "P.A. Tuning" and "Antenna Tuning" should be adjusted in the same manner as previously described for master oscillator operation.

The transmitter is now ready for operation, under control of the key or "push to talk" switch, whichever is in use.

3. Maintenance:

Removal of the SCR-583 Transmitter Unit from the case is accomplished by removing the 16 machine screws disposed around the edges of the front panel, sliding the unit forward a few inches, and opening the pin connector ("A" of Figure 6), which will be found

attached to a cable at the right end of the transmitter. This cable extends through the separating compartment wall to the receiver, and the connector must be opened when either the transmitter or the receiver is removed. The connector itself lies within the receiver compartment, but enough slack wiring is provided so that it can be pulled through the clearance hole in the separating wall when the transmitter is to be removed.

Every three months, or more often if dust conditions are severe, the following maintenance work should be performed: (1) Remove cover from "M.O. Tuning" mechanism. Dust carefully all over inside of cover and mechanism with a small, stiff-bristled brush, paying particular attention to the teeth of the worm and worm gear. Oil lightly with thin oil (such as 3-in-1) both worm shaft bearings and the bearing surface between the base plate and the worm mounting plate. Oil may be dispersed over this bearing surface by moving the worm mounting plate ("A" of Figure 5), back and forth by pressing against the action of the hold down spring with the finger. Do not disturb the adjustment of the worm mounting plate hold down screw, ("B" of Figure 5), unless the worm mounting plate surface bearing is found to bind when moved against the hold down spring, as described above. In this case, the hold down screw may be turned very slightly to the left until the bearing is free. This screw should never be turned to the right. A light coating of vaseline or similar light grease should be applied to the teeth of the worm and worm gear. Also, oil lightly both condenser shaft bearings and the bearing of the idler gear. The cover should now be replaced, being careful not to pull up the screws too tightly, as binding of the worm shaft will be caused if the cover is sufficiently distorted. (2) The "Antenna Tuning" crank and cover should be removed; dust should be cleaned off, as above; and all bearings should be lightly oiled. Before replacing the cover, the main shaft should be turned slowly, and the register of the gear actuating pin ("C" of Figure 5), and the gear teeth should be checked.

If the actuating pin should descend forcibly upon the top of the gear tooth, the mechanism will be damaged. No attention need be given to which gear tooth is engaged, as this can be simply corrected by lifting the contact shaft on the rotating coil assembly and moving the contact wheel one or more coil turns in the necessary direction. The counter dial should read zero when the contact wheel is against the bottom stop on the coil. No misalignment of the counter mechanism can normally occur once the cover has been installed. (3) All dust should be blown off the entire unit with an air hose. (4) Any dust remaining on condenser bearings or shaft bearings of the variable coil drive mechanism should be removed with a small brush, as described above; and all such bearings should be oiled lightly. (5) All dust should be brushed out of the teeth of the bevel gears ("A" of Figure 8), of the variable coil drive mechanism, and a light coating of vaseline or equivalent should be applied to the gear teeth. (6) All dust should be brushed out of the teeth of the worm and worm gear ("B" of Figure 8), used to drive the "O. Trimmer" condenser, and a light coating of vaseline or equivalent should be applied to the gear teeth. (7) The rotating coil and contact shaft ("B" of Figure 6), should be wiped off

with a cloth moistened with a cleaning fluid such as naptha or carbon tetrachloride. (8) The contact wheel ("C" of Figure 6), should be cleaned with the same fluid, but using a small stiff brush rather than a cloth. Particular attention should be given to the removal of all dirt collected in the groove of the contact wheel. No lubricant of any sort should be used on the contact wheel or shaft. (9) The top contact of the rotating coil assembly should be thoroughly cleaned, using a cloth and brush and cleaning fluid, as above. This top contact may easily be disassembled, if this is necessary, for better cleaning. (10) If binding is apparent at the bottom contact (which is hidden from view under the skirt of the coil form) of the rotating coil, two or three drops of light oil may be applied to the contact surface by tilting the unit back on the right rear corner and allowing the oil to run down the contact arm ("D" of Figure 6). This arm is visible at the bottom of the coil and is connected by a flexible lead to the contact shaft. After two or three minutes time (to allow most of the oil to reach the contact surface), any excess oil should be wiped off. This lubrication should not be done unless it is necessary.

Accessibility of some of the components is necessarily rather poor because of the compact construction. The left hand end panel of the chassis can be removed, if necessary, for servicing; and all the coil shields are removable. The rear panel of the chassis can be loosened and partially folded back. The manner of removal in each case is apparent upon inspection. The ganged condensers used to tune the master oscillator and the buffer, with the precision driving mechanism, are mounted on a separate rigid sub-base. This whole assembly is removable as a unit by disconnecting five wires and removing seven screws. The screws to be removed are first, the three holding the cover. Then the four screws ("D" of Figure 5), holding the tuning condenser assembly to the main chassis should be removed. These screws are disposed around the edges of the tuning condenser sub-base, one on the lower edge near the right end, two along the left edge, and one on the top edge near the center. In removing this last screw, care must be taken not to mistakenly turn the hold down screw ("B" of Figure 5), of the worm mounting plate. The entire tuning condenser unit may now be carefully withdrawn through the front panel of the transmitter. Before attempting to withdraw the unit, however, be sure that the condensers are rotated to the fully meshed position. By the methods just described, every component is made available for servicing, as necessity may demand.

Included in these instructions is a tabulation of various electrode voltages, for the convenient reference of the service man. In referring to these values, it should be borne in mind that they are average values, and may vary as much as 10% from one unit to another. All voltages were measured with the transmitter unload (i.e., nothing connected to the antenna terminal), since it is assumed that the necessary dummy load is not a part of the usual service equipment. All voltage values were measured with a multi-range voltmeter having a resistance of 20,000 ohms per volt. The points in the circuit at which the various values were measured are indicated in the second row of the table (refer to Drawing Number 102792).

IV. RECEIVER

The Receiver of the SCR-583 radio set has been developed specifically for use with the transmitter described in the preceding section of these instructions. Accordingly, it has been made as compact and light-weight as possible, consistent with good performance.

1. Description:

(a) Mechanical: The Receiver is constructed as a single unit (exclusive of power supply) with a front panel and an attached chassis base. In this manner rigidity and relatively light weight are achieved. The front panel measures 8-27/32 inches in width by 8-1/32" in height. The chassis extends six inches behind the front panel. The disposition of parts on the chassis is such as to provide a maximum accessibility consistent with the requisite compactness of the unit. All operational controls, the loud speaker, the phone jacks, and the tuning dial are located on the front panel as shown in Figure 11. The receiver slides into its compartment on two slides which fit over the edges of the chassis base and is held in place by means of six knurled-head captive machine screws, disposed along the vertical edges of the front panel. Figure 12 is a photograph of the receiver chassis looking down on the top of the chassis. Figure 13 is a corresponding view of the under surface of the chassis. These two figures, together with the parts layout diagram drawing No. RL-26373, illustrates the disposition of the various components on the receiver chassis.

The weight of the receiver, exclusive of head phones and battery, is 8 pounds, 12 ounces. The battery weighs 7 pounds, 6 ounces.

(b) Electrical: The accompanying schematic wiring diagram, drawing No. RL-36273, illustrates the circuit arrangement of the receiver. It is a superheterodyne receiver with one stage of tuned radio frequency amplification preceding the converter. Since the frequency range covered by this receiver extends from 2.2 to 4.6 mc, it has not been necessary to incorporate band switching in the receiver. The converter is followed by a single stage of intermediate frequency amplification feeding a diode detector. The intermediate frequency is 455 Kc. The diode detector and a triode first audio amplifier are included in a dual-purpose tube. A beam power tube is used as the audio output, operating a dynamic speaker of the permanent magnetic type; or alternatively, one or two sets of P-1 headphones. A beat-frequency oscillator is included for the reception of CW signals.

In addition to the conventional circuit arrangement described in the preceding paragraph, the receiver incorporates two additional features. The local oscillator section of the converter can be switched to any one of four crystals whose frequencies are 455 Kc. above those corresponding crystals in the transmitter. Thus, the transmitter and receiver can readily be tuned to exactly the same frequency at any one of four pre-selected frequencies.

The calibrating oscillator is also included in the receiver. It is a 200 Kc. crystal controlled oscillator with an untuned plate circuit which provides numerous harmonics as well as the fundamental crystal frequency. By use of this oscillator, it is possible to check the calibration of either the receiver or the transmitter at all harmonic frequencies of the crystal oscillator included in the 2.2 to 4.6 mc. band.

The receiver has been designed to operate from a BA-40 dry battery pack and auxiliary vibrator (6 or 12 volts) pack; or in an emergency, from the GN-45 hand generator.

2. Installation:

The receiver is installed in the SCR-583 equipment box by sliding it along the guides provided in the receiver compartment. Before the receiver can be slid completely into the compartment, it is necessary to connect the male 4-prong plug, attached to the end of flexible leads, into a fixed socket located on the right-hand wall of the receiver compartment near the bottom of the compartment. Another 4-prong male connector, having shorter prongs, also attached to the end of a flexible lead connected to the transmitter chassis. There is an opening in the partition separating the transmitter and receiver compartments to permit passage of this connection between compartments. After the latter connection has been made, the connecting plug and socket should be pushed through the opening into the transmitter compartment and the receiver should be slid almost completely in. The above mentioned plug and socket must now be manipulated, either by the use of suitable tools or with the fingers, back into the receiver compartment (this is necessary to keep the D.C. power leads away from the high potential antenna leads in the transmitter compartment). The receiver may now be slid fully into position and securely fastened by means of the knurled captive screws. The link connecting the antenna binding post on the receiver front panel to a similar post on the transmitter panel must then be connected. This link is held captive under the head of the binding post on the receiver panel. The set is now ready for operation.

3. Operation:

If the receiver is to be operated from its battery pack, the power selector switch located in the lower portion of the front panel (see Figure 11) should be rotated to the "BAT." position. The volume control, which incorporates an "on-off" switch, should be rotated clockwise to place the receiver in operation and to adjust the volume to the proper level. If the loud speaker is to be used, the speaker switch should be thrown to the "On" position. This switch is located near the right-hand edge of the receiver panel below the phone jacks. If headphones are to be used, the phone plugs may be inserted in the jacks. These jacks remain in the circuit at all times.

If the receiver is to be used on one of the crystal frequencies, the "MO - CRYSTALS" switch is rotated to the desired crystal control channel, and the tuning knob is rotated until the tuning dial indicates the frequency corresponding to the crystal frequency. For operation on frequencies other than crystal frequencies, the "MO-CRYSTALS" switch should be rotated to the MO position which allows continuous tuning of the 2.2 to 4.6 mc. band. The "PHONE - C.W. - CAL. - C.W. CAL"

switch should be rotated to the "PHONE" position for reception of voice modulated signals, or modulated telegraph signals. For the reception of C.W. signals, the switch should be thrown to the "C.W." position which places the BF oscillator in circuit. The pitch of the C.W. signal may then be varied by rotating the "C.W. PITCH" control. After the signal has been properly tuned in, the volume should be set as low as is consistent with good reception to avoid possible overload and attendant distortion.

The tuning dial of the receiver may be calibrated by placing the set in operation as outlined above and then throwing the "PHONE - C.W. - CAL. - C.W. CAL" switch to the C.W. CAL position. This places both the BF oscillator and the crystal oscillator in operation. Set the "C.W. PITCH" control so that the pointer is vertical. Then rotate the tuning knob to obtain zero beat with a harmonic of the 200 Kc. crystal oscillator. Calibration of the entire tuning dial may be checked in this manner every 200 Kc. between 2.2 and 4.6 mc.

In order to calibrate the transmitter, the receiver should be set on the "CAL" position which places the 200 Kc. crystal oscillator in operation, but renders the BF oscillator inoperative. The transmitter may then be calibrated as described in the section covering transmitter operation.

When the receiver is to be operated from an auxiliary power supply consisting of a vibrator unit, which is in turn powered from a storage battery, the dust cover over the socket marked "AUX. PWR." should be unscrewed and the lead from the vibrator supply plugged in. For this mode of operation, turn the power selector switch to the "VIB" position.

In an emergency, the receiver may be operated from the hand generator supplied with the set. For this mode of operation, switch the power selector switch to the position labeled "HD. GEN." The operation of the receiver under this condition is the same as that outlined above.

As has been mentioned previously, a link is normally connected from the antenna binding post of the receiver to a similar terminal on the transmitter panel. The antenna circuit is completed through a keying relay in the transmitter which short-circuits the input of the receiver when the transmitter key is closed. If the use of antennas, other than that included with the equipment is desired, the link should be disconnected and the auxiliary antenna connected to the receiver binding post.

4. Installation of Battery:

To install the BA-40 battery, open the door to the lower right corner of the equipment case. This door gives access to the battery compartment. Remove wedge from compartment, open battery clamp, latch must be outside of battery space. Grasp ends of web strap and pull toward front to stops. Slide battery into case "TOP" side up. When battery is against back of cabinet, use left hand to insert wedge between lower left end of battery and shelf while aligning plug bracket with right

hand. When wedge is in place, close clamp and snap latch in place.

To Remove Battery: Open latch and clamp, pull chain to remove wedge. Use wedge to pry battery away from plug. When battery is clear of guide bracket pull on ends of web strap to raise battery to point where it may be lifted out with the hands.

5. Service Information:

The receiver may be serviced in accordance with standard practice for servicing communication receivers. The tube lay-out, alignment instructions, and parts lay-out are contained in the attached photographs, circuit diagram, and parts lay-out diagram.

X-113
V-103
X-103

C-124

T-101

J-101
X-116

C-115

C-122

R-115

R-111
R-112
R-113
R-114

R-110

R-116

L-105

R-106 R-107

R-109

C-123

PH. CAL.

S-103

X-107
X-101
X-102
X-102
X-108
X-103
Y-104
X-106

C-114

X_{40} CAL.
X_{30}
X_{20}
X_{10}
MO

S-102

C-117

R-133 R-134 R-135 R-117 R-118 R-119

R-127

S-105

M-102A

C-101

L-102

C-130 C-129 C-128

X-114
V-104
X-104

X-115
V-105
X-105

C-116

R-101

C-105

R-132

C-107

C-127

L-101

R-120

R-121

R-122

R-123

R-124

C-109

R-125

R-108

C-125

C-120

C-131

C-129

C-112

L-106

C-134

K-101

R-139

R-140

J-102

TOLERANCE UNLESS SPECIFIED
FRACTIONAL DIMENSIONS ± 1/64
DECIMAL DIMENSIONS ± .005

102792

CHANGES

	DATE	CH. NO.	INITIAL ENG.
A			
B			
C			
D			
E			
F			
G			
H			
J			
K			

C-124
R-110
R-116
4
5
L-105
R-123
X-111
V-101
X-101
C-114
R-104
3
2
4
1
5
C-109
C-118
X-112
V-102
X-102
4
2
3
1
5
C-110
R-102
R-128
R-129
R-105
R-103
C-111
R-126
M-102A
+
−
R-130
C-119
C-132
C-106
L-103
L-102
C-113
R-131
M-101
C-129
C-128
R-132
C-107
C-127
M-102B
C-126
L
M
H
S-101
V-106
X-118
L-104
1
2
4
3
C-102
R-138
J-103
S
L
S-104
C-133
R-139
R-140
J-104
110

FARNSWORTH TELEVISION & RADIO CORPORATION

TITLE: SCHEMATIC WIRING DIAGRAM SCR-583 TRANSMITTER (4086)

MAT'L:

FINISH:

DATE 10-10-42 | SCALE: | REQ'D

DR. Stewart | TR. | NO. 102792

CK. P.O.R. | APP. 7.2.2.

Material List for SCR-583 Transmitter (4086)

Part No.	Description	Manufacturer	Mfr.'s Type No.
C-101	.0000025 mfd., 500 v. Mica Condenser	Aerovox	1468
C-102	.01 " 600 v. " "	"	1445
C-105	.01 " 1250 v. " "	"	1446
C-106	(Same as C-105)		
C-107	" " "		
C-108	" " "		
C-109	" " "		
C-110			
C-111	(Same as C-102)		
C-112	" " "		
C-113	.001 mfd., 500 v. Mica Condenser	Aerovox	1468
C-114	(Same as C-113)		
C-115	" " "		
C-116	" " "		
C-117	" " "		
C-118			
C-119	.000025 mfd., 500 v. Ceramic Condenser	Centralab	813N
C-120	.00003 " , 500 v. " "	"	813N
C-122	.5 " , 600 v. Paper Condenser	Solar	XDRMW6-.5
C-123	.5 " , 600 v. " "	"	"
C-124	.05 " , 600 v. " "	"	XDRMW6-.05
C-125	(Same as C-120)		
C-126	.000004 mfd., 500 v. Mica Condenser	Aerovox	1468
C-127	5-25 mmfd., Var. Air Condenser	Centralab	Sample: Code #7462
C-128	(Same as C-127)		
C-129	25-25 mmfd., Var. Air Condenser	Cardwell	ER-25-AD
C-130	325 mmfd., " " "	Bud	MC-910
C-131	(Same as C-130)		
C-132	" " "		
C-133	50 mmfd., Var. Air Condenser	Bud	MC-1853
C-134	.1 mfd., 400 v. Paper Condenser	Solar	Sealdtite
R-101	25,000 ohm, ½ w., Ins. Carbon Res.; ±10%	Allen-Bradley	EB
R-102	10,000 ohm, " " " " " {−0% +10%	" "	EB
R-103	(Same as R-102)		
R-104	680 ohm, ½ w., " " " ±10%	" "	EB
R-105	(Same as R-104)		
R-106	15 ohm, ½ w. " " " ±10%	" "	EB
R-107	100 ohm, ½ w. " " " ±10%	" "	EB
R-108	68 ohm, ½ w. " " " {+ 0% −10%	" "	EB
R-109	47 ohm, 1 w. " " " ± 5%	" "	GB
R-110	27000 ohm, 1 w. " " " ±10%	" "	GB
R-111	470000 ohm, 1 w. " " " ±10%	" "	GB
R-112	(Same as R-111)		
R-113	" " "		
R-114	" " "		
R-115	680000 ohm, 1 w. " " " ±10%	" "	GB
R-116	150000 ohm, ½ w. " " " ±10%	" "	EB
R-117	560000 ohm, 1 w. " " " ±10%	" "	GB
R-118	(Same as R-117)		
R-119	" " "		

Material List for SCR-583 Transmitter (4086)

Part No.	Description		Manufacturer	Mfr.'s Type No.
R-120	220000 ohm, ½ w., Ins. Carbon Res.;	±10%	Allen-Bradley	EB
R-121	33 ohm, 1 w. " " "	{+10% -0%	" "	GB
R-122	150 ohm, ½ w. " " "	{-10% +0%	" "	EB
R-123	20000 ohm, 1 w. " " "	±10%	" "	GB
R-124	(Same as R-123)			
R-125	1.8 megohm, ½ w. " " "	±10%	" "	EB
R-126	150 ohm, 10 w., Wire-wound Res.;	±10%	Ohmite	Brown Devil
R-127	20000 ohm, 10 w., " " "	±10%	"	" "
R-128	(Same as R-127)			
R-129	" " "			
R-130	10000 ohm, 10 w. " " "	±10%	"	" "
R-131	25000 ohm, 10 w. " " "	±10%	"	" "
R-132	1.4 ohm; Meter Shunt Res.		Farnsworth	Special
R-133	(Same as R-117)			
R-134	" " "			
R-135	" " "			
R-138	150 ohm, ½ w. Ins. Carbon Res.;	±10%	Allen-Bradley	EB
R-139	13800 ohm, 15 w. Wire-wound Res.;	±10%	Sprague	Koolohm, 15VD
R-140	5000 ohm, 5 w. " " "	±10%	"	" 5K

V-101	Tube	Raytheon	RK-75
V-102	"	"	"
V-103	"	R.C.A.	3Q4
V-104	"	"	"
V-105	"	"	3A4
V-106	Pilot Lamp	Tungsol	46
X-101	Tube Socket	Amphenol	MIP5T
X-102	" "	"	"
X-103	" "	"	64-7P
X-104	" "	"	"
X-105	" "	"	"
X-106	Crystal Socket	Cinch	9800
X-107	" "	"	"
X-108	Antenna Term. Ins.; ½" D.,1" L.,6-32 Tap	Isolantite	397
X-109	Cable Clamp	Amphenol	AN-3057-6
X-110	Ground Terminal	Eby	63
X-111	Tube Clamp	Westinghouse	Dwg. No. 7605035 G-6
X-112	(Same as X-111)		
X-113	Tube Clamp & Shield	Cinch	Exp.-7087
X-114	(Same as X-113)		
X-115	" " "		
X-116	Dust Cover (Mike Jack)	See I.P.T. 1611	
X-117	" " (Key Jack)	" " "	
X-118	Pilot Lamp Socket	Mallory	330
X-119	Receiver Antenna Terminal	Eby	31

Material List for SCR-583 Transmitter (4086)

Part No.	Description	Manufacturer	Mfr.'s. Type No.
Y-101	Crystal; 2700 Kc.	Bliley	FT-243
Y-102	" ; 3010 Kc.	"	"
Y-103	" ; 3825 Kc.	"	"
Y-104	" ; 3995 Kc.	"	"
S-101	Switch; 3-sec.,3-pole,3-pos.,Isol. Ins.	Centralab	Type H
S-102	" ; 5- " ,5- " ,6- " ,2 Front Sec. Bakelite Ins.,3 Rear Sec. Isol. Ins., 1 Rear Sec. Shorting Type.	"	Special
S-103	" ; 1-sec.,4-pole,2-pos.,Bakelite Ins.	"	Type M
S-104	" ; 1- " ,1- " ,2- " , Isol. Ins.	"	Trans. Type
S-105	" ; D.P.D.T., Push-Button	Mallory	2006-L
J-101	Jack,2-Circ.,Norm.Open, Insulated	Mallory	SCA-2B
J-102	" ,1- " , " " "	"	SC-1
J-103	Power Receptacle	Amphenol	AN-3102-14S-2P
J-104	Receiver Power Receptacle	Alden	204F
P-101	Power Plug	Amphenol	AN-3108-14S-2S
K-101	Relay; 3-pole,2-pos.,2000-V.Ceramic Insulation, 6-V. Coil (13 ohm)	Allied Control Co., Inc.	HRX
L-101	Coil;23½ T. #18 Bare Wire @ 12 T./In.; Load Tap @ 5 T.; Fil. Tap @ 16 T.;16 T. #24 SSE Interwound At Bottom. Form 1-3/4" Dia. x 3½" Long.	Farnsworth	102836
L-102	Coil;25 T. #18 Bare Wire @ 12 T./In.; Neut. Tap @ 2 T.;Load Tap @ 12 T. Form 1-3/4" Dia. x 3½" Long.	Farnsworth	102835
L-103	Coil;20½ T. #14 Bare Wire @ 11 T./In.; No Taps. 5-3/4 T. Link, As Continuation of Main Coil. Link Taps @ 1 T., 2 T., & 3 T. From Top End of Link. Form 2"Dia. x 4" Long.	Farnsworth	102833
L-104	Antenna Tuning Coil	Farnsworth	102870
L-105	A.F. Choke	Stancor	A-8528
L-106	R.F. " ; 250 microhenry Std. Peaking Coil, Stripped to DC Res.= 3 ohms. See P.O. 46111.	Meissner	See Desc.
M-101	Milliameter; 0-150, DC	Simpson	125
M-102A	Ammeter; 0-2, R.F. (6 ma.)	"	135
M-102B	Thermocouple For M-102A	"	
T-101	Transformer, 50 ohms To Grid	Thordarson	Similar To T-6A4S, But To S.C. Spec.

TRANSMITTER OPERATING TERMINAL VOLTAGES

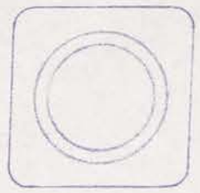
QUANTITY	E_F SUPPLY	E_P SUPPLY	OSC.			BUFF.					P. A. V-101				P. A.			P. A. V-102			MOD.					
			E_F	E_G*	E_P	E_F	E_F	E_G*	E_S	E_P	E_F	E_{SG}	E_G*	E_{SUP}	E_P C106	E_C C111	I_{PA}	E_{SG}	E_F	E_G*	E_{MIKE} R106	E_F	E_G	E_B	E_P	E_B C123
TERMINALS	1-2 CABLE INPUT	3-4 CABLE INPUT	C112 -G	3-G	6-G	7-G	5-G	4-G	3-G	C107 -G	5-G	2-G	3-G	4-G	-G	-G		2-G	5-G	3-G	-G	5-7	5-G	4-G	6-G	-G
3.4 MC., CW, HI POWER	6.15	650	2.95	-20.7	107	2.80	1.40	-16.2	115	164	5.65	174	-30.0	0	630	-14.0	22	180	5.65	-30.0	5.65	0	5.65	0	0	0
3.4 MC., CW, MED. POWER	66.15	500	2.90	-14.0	83	2.80	1.40	-11.4	95	134	5.65	99	-21.5	0	495	-8.3	12	106	5.65	-21.8	5.65	0	5.65	0	0	0
3.4 MC., CW, LO POWER	6.20	500	3.00	-14.0	83	2.85	1.40	-11.8	95	135	0	233	-5.5	0	495	-5.8	9	88	5.85	-22.0	5.56	0	5.65	0	0	0
3.4 MC., PHONE, HI POWER	6.20	650	2.95	-20.2	107	2.80	1.40	-16.6	117	167	5.65	175	-30.7	-14.6	635	-14.6	17	182	5.65	-31.0	0.65	1.30	4.35	76	90	192
3.4 MC., PHONE, MED. POWER	6.15	500	2.85	-14.0	84	2.75	1.40	-12.0	96	135	5.65	97	-21.2	-8.5	495	-8.6	10	105	5.65	-21.6	0.65	1.30	4.35	71	83	161
3.4 MC., PHONE, LO POWER	6.20	500	3.00	-14.0	84	2.85	1.40	-12.0	95	135	0	227	-6.0	-6.1	495	-6.3	7	81	5.85	-22.0	0.75	1.35	4.50	72	85	163
3.010 MC., CW, HI POWER	6.20	650	2.80	-2.8	0	2.80	1.40	-59	135	191	5.65	166	-34.8	0	640	-13.2	21	173	5.65	-35.2	5.65	0	5.65	0	0	0
3.010 MC., CW, MED. POWER	6.15	500	2.80	-2.0	0	2.80	1.40	-46	112	155	5.65	94	-25.3	0	495	-7.6	13	101	5.65	-25.7	5.65	0	5.65	0	0	0
3.010 MC., CW, LO POWER	6.20	500	2.85	-2.1	0	2.85	1.40	-53	112	156	0	229	-4.9	0	495	-5.2	10	83	5.85	-25.7	5.65	0	5.65	0	0	0
3.010 MC., PHONE, HI POWER	6.20	650	2.75	-2.9	0	2.80	1.40	-68	137	194	5.65	171	-35.3	-13.9	640	-13.9	18	180	5.65	-36.0	0.65	1.30	4.35	76	90	194
3.010 MC., PHONE, MED. POWER	6.20	500	2.75	-1.8	0	2.75	1.40	-48	112	155	5.65	90	-25.3	-8.1	495	-8.3	10	99	5,65	-25.8	0.65	1.30	4.35	71	83	161
3.010 MC., PHONE, LO POWER	6.20	500	2.85	-1.9	0	2.85	1.40	-54	112	158	0	223	-5.4	-5.6	495	-5.7	8	72	5.85	-25.5	0.70	1.35	4.50	72	84	162

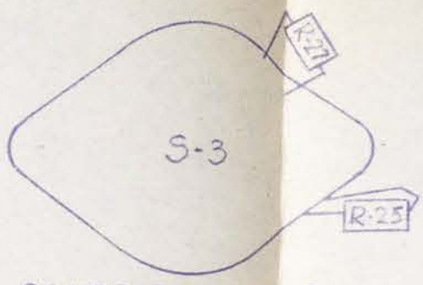
M.O. CONT

XTAL CONT

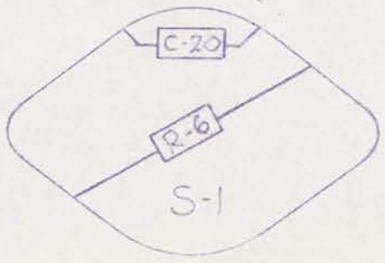
* MEASURED THROUGH R. F. CHOKE

ALL VOLTAGES MEASURED WITH 20,000 OHM PER VOLT METER.

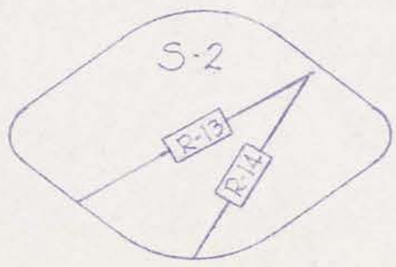




POWER SELECTOR SW.

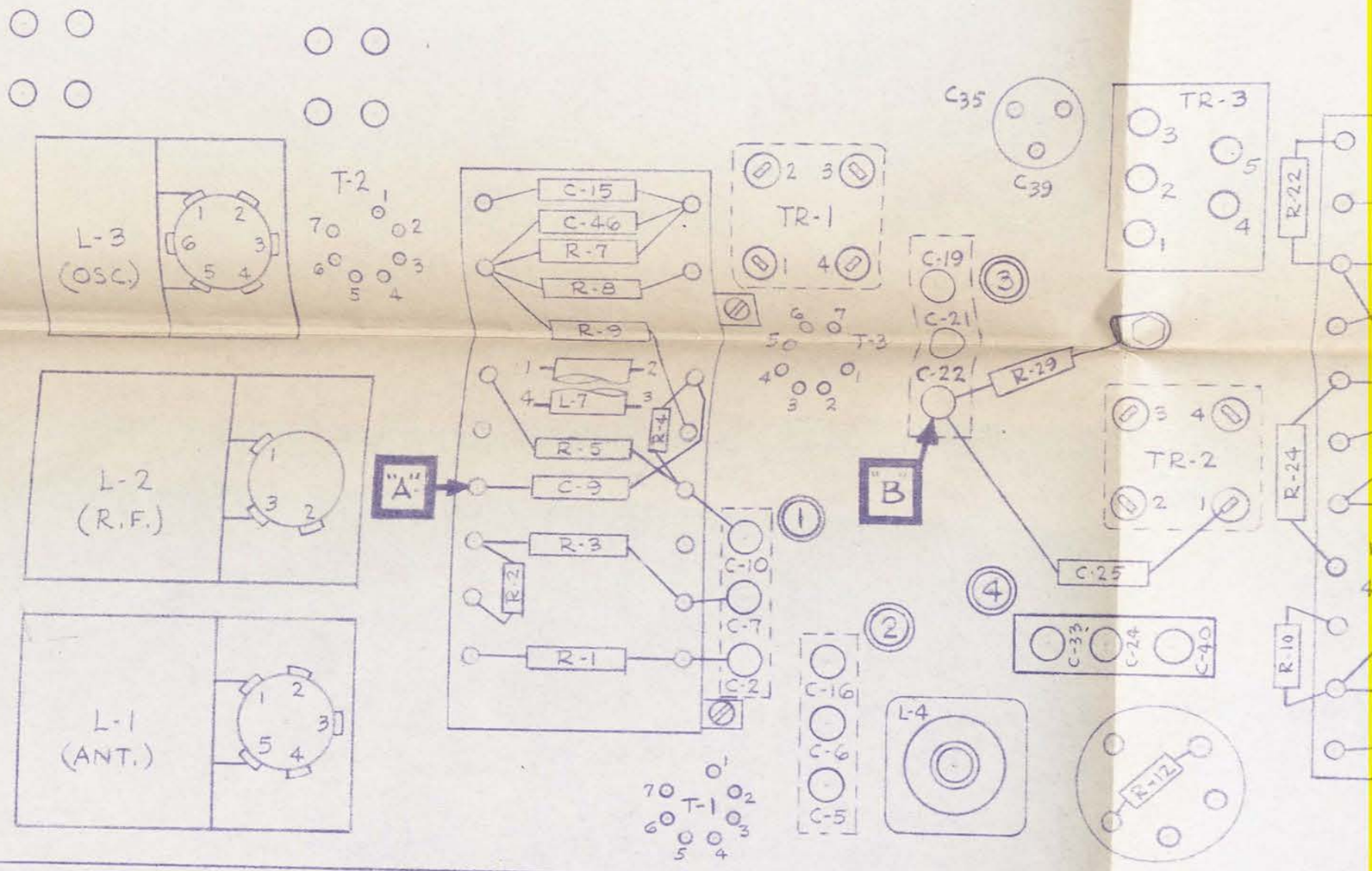


M.O. CRYSTAL SW.

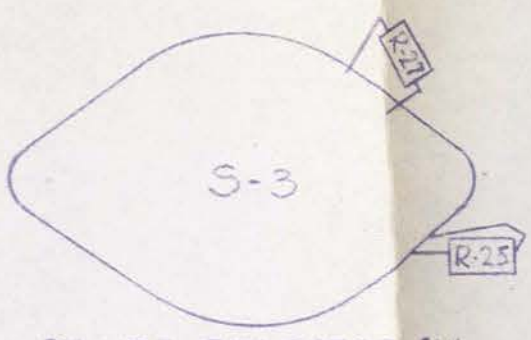


RECEPTION SW.

ON-OFF
& VOL. CO

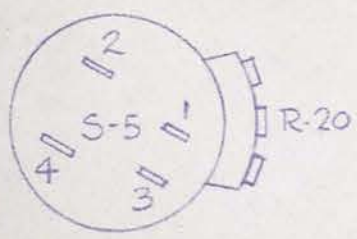


REVISIONS

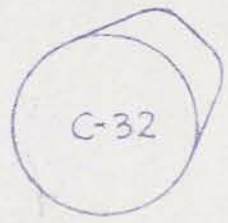


POWER SELECTOR SW.

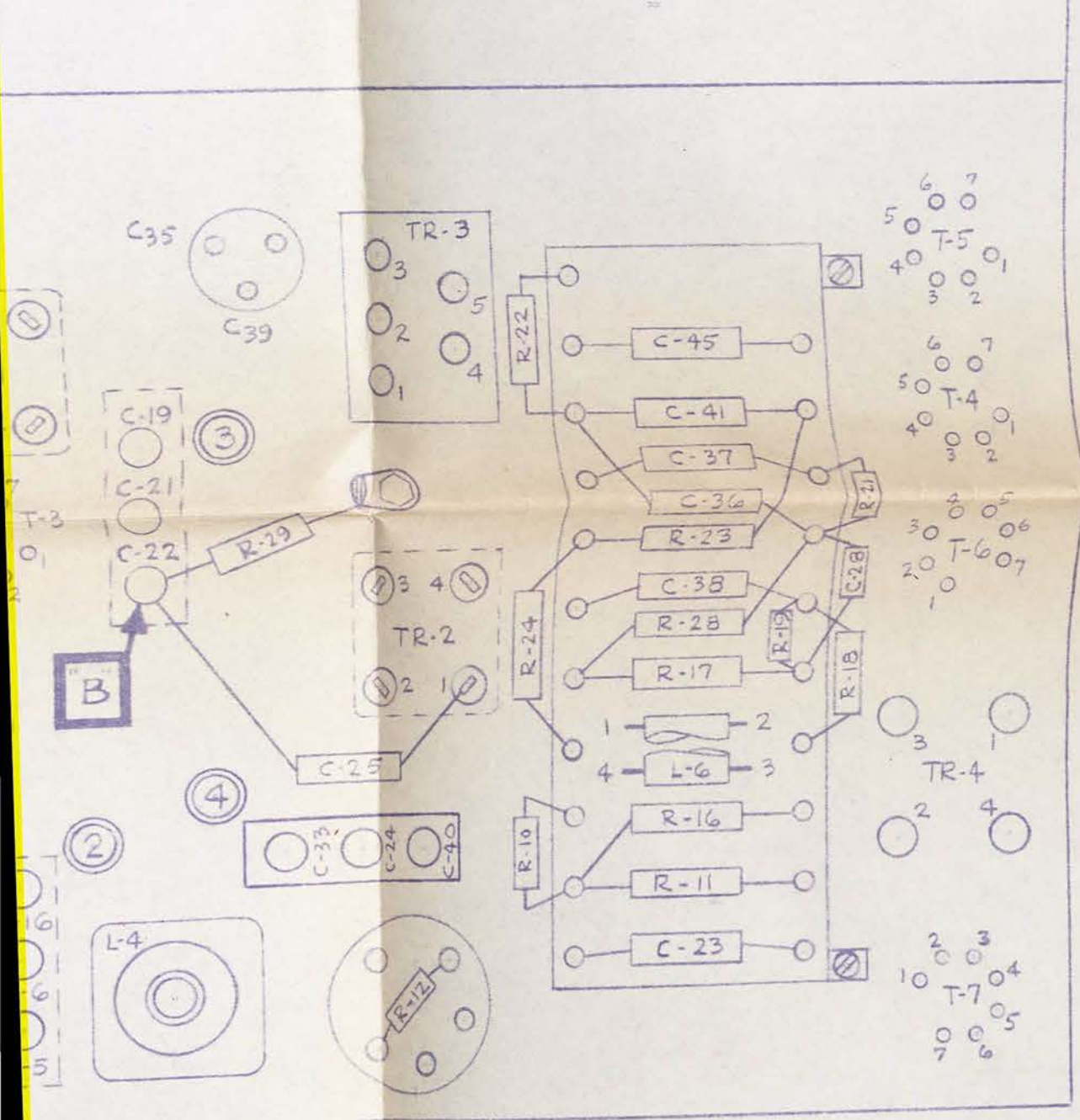
C-42



ON-OFF SW. & VOL. CONT.



C.W. PITCH CONT.



VOLTAGE MEASUREMENTS TAKEN FROM POINT (B) TO VARIOUS TUBE PINS. MEASUREMENTS TAKEN WITH 1000 OHM / VOLT VOLTMETER. BATTERY VOLTAGE 90 VOLTS "B", 1.5 VOLTS "A".

TUBE VOLTAGE CHART.

PIN → TUBE ↓	1	2	3	4	5	6	7
T-1	0	82	46	0	0	0	1.35
T-2	0	82	47	0	0	0	1.35
T-3	0	82	46	0	0	0	1.5
T-4	0	0	0	NOTE(a) 15	NOTE(a) 15	0	1.5
T-5	1.5	83	0	84	0	83	1.5
T-6	0	43	43	0	0	0	1.35
T-7	0	49	45	0	0	0	1.35

NOTE (b)

NOTE (a) - VOLTMETER ON 250-V SCALE
" (b) - RECEPTION SW. IN C.W. CAL. POSITION.

ALIGNMENT PROCEDURE

SEE TOP VIEW OF CHASSIS FOR LOCATION OF TRIMMERS.

I.F. :- CONNECT GENERATOR GROUND TO CHASSIS. WITH .05 MFD. CAPACITOR IN SERIES WITH HIGH SIDE OF GEN. APPLY 455 KC SIGNAL, WITH 400 ~ MOD., TO POINT "A". ADJUST 2ND I.F. TRANSFORMER C-43 & C-44 FOR MAX. OUTPUT. IN ADJUSTING 1ST I.F. TRANS. TURN C-48 AS FAR OUT OF LINE AS POSSIBLE (MIN. OUTPUT), ADJUST C-49 FOR MAX. OUTPUT. THEN ADJUST C-48 FOR MAX. OUTPUT. DO NOT READJUST C-49.

B.F.O. :- WITH GEN. CONNECTED AS ABOVE APPLY 455KC SIGNAL UNMODULATED, SET C.W. PITCH CONTROL KNOB VERTICAL, SET RECEPTION SWITCH TO C.W. AND ADJUST C-29 FOR ZERO BEAT.

R.F. :- CONNECT GEN. GROUND TO CHASSIS. WITH 65 MMf IN SERIES WITH HIGH SIDE OF GEN. APPLY 400 ~ MODULATED SIGNAL TO ANT. POST. SET GEN. AT 4625 KC AND SET DIAL TO MAX. FREQ. END, ADJUST OSC. TRIMMER C-14 FOR MAX. OUTPUT. TURN SET DIAL AND GEN. TO 4300 KC AND ALIGN C-1 & C-8 FOR MAX. OUTPUT.

OCT 26 1942

CONFIDENTIAL

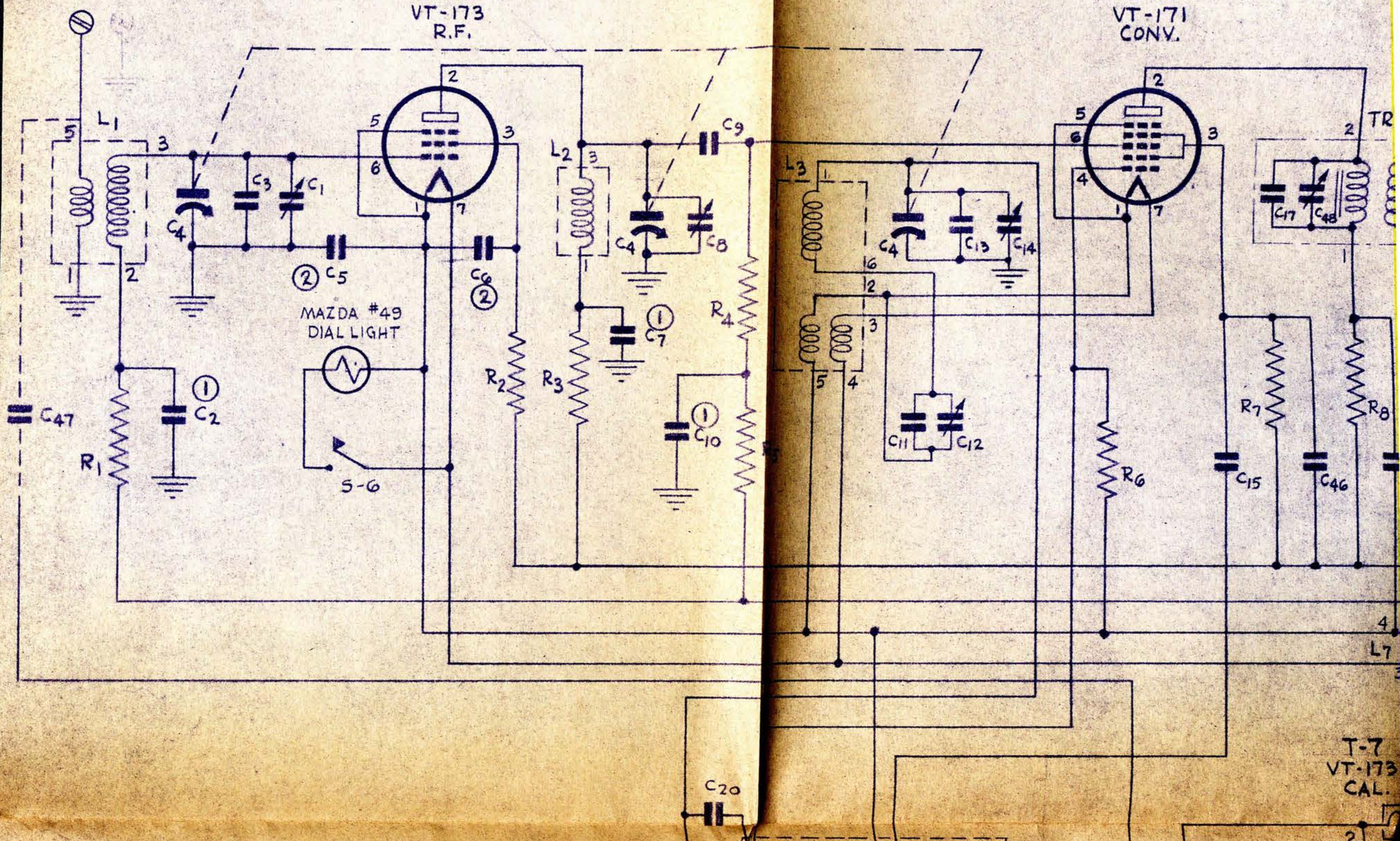
K RL-36373

SAMPLE MUST BE APPD. BY ENG. DEPT.

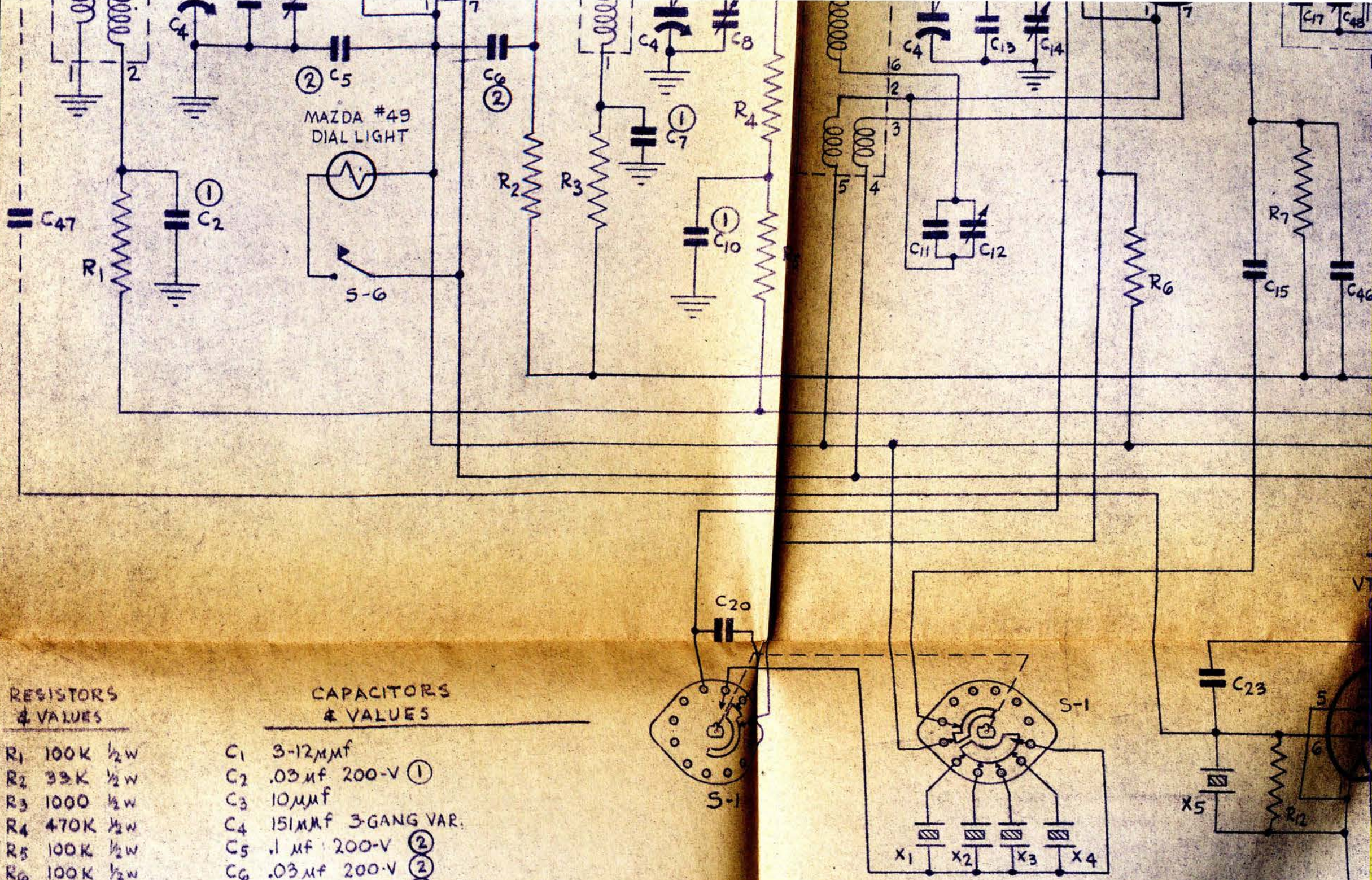
TOLERANCE—DECIMALS ± FRACTIONS ±

ENGINEERING DEPARTMENT FARNSWORTH TELEVISION & RADIO CORPORATION, MARION, INDIANA

ITEM	PART No. 1	DESCRIPTION
ASSEMBLY PART No.	PARTS LAYOUT DIAGRAM	
	DRN. E. Ross 10-24-42	MAT'L.
	MECH CHK.	FIN
	ELEC. CHK.	SUPERSEDES
	APPD.	SUPERSEDED BY



RESISTORS & VALUES		CAPACITORS & VALUES			
R_1	100K ½W	C_1	3-12μμf		
R_2	33K ½W	C_2	.03μf 200-V (1)		
R_3	1000 ½W	C_3	10μμf		
R_4	470K ½W	C_4	151μμf 3-GANG VAR.		
R_5	100K ½W	C_5	.1 μf 200-V (2)		
R_6	100K ½W	C_6	.03μf 200-V (2)		
R_7	15K ½W	C_7	.03μf 200-V (1)		
R_8	1000 ½W	C_8	3-12μμf		
R_9	33K ½W	C_9	100μμf	C_{30}	500μμf N-750
R_{10}	1000 ½W	C_{10}	.03μf 200-V (1)	C_{31}	200μμf
R_{11}	22K ½W	C_{11}	1350μμf N-750	C_{32}	20-150μμf N-400 (C.W. PITCH)
R_{12}	1MEG ½W	C_{12}	20-150μμf N-400	C_{33}	.1 μf 200-V (4)
R_{13}	33Ω ½W	C_{13}	10μμf N-750	C_{34}	350μμf
R_{14}	33Ω ½W	C_{14}	4-30μμf N-500	C_{35}	25μf - 25-V }
R_{15}	100K ½W	C_{15}	2200μμf 400-V	C_{36}	200μμf } CCCW
R_{16}	22K ½W	C_{16}	.03 μf 200-V (2)	C_{37}	2200μμf 400V } DRY ELECT.
R_{17}	470K ½W	C_{17}	90μμf	C_{38}	2200μμf 400V }
R_{18}	2.2 MEG. ½W	C_{18}	100μμf	C_{39}	10μf - 200-V }
R_{19}	47 K ½W	C_{19}	.03μf 200-V (3)	C_{40}	.03μf 200-V (4)
R_{20}	2.2 MEG. V.C.	C_{20}	50μμf N-750	C_{41}	3200μμf 400V



RESISTORS & VALUES

R_1	100K	½w
R_2	33K	½w
R_3	1000	½w
R_4	470K	½w
R_5	100K	½w
R_6	100K	½w
R_7	15K	½w
R_8	1000	½w
R_9	33K	½w
R_{10}	1000	½w
R_{11}	22K	½w
R_{12}	1MEG	½w
R_{13}	33Ω	½w
R_{14}	33Ω	½w
R_{15}	100K	½w
R_{16}	22K	½w
R_{17}	470K	½w
R_{18}	2.2 MEG.	½w
R_{19}	47K	½w
R_{20}	2.2 MEG.	V.C.
R_{21}	6.8 MEG.	½w
R_{22}	470K	½w
R_{23}	2.2 MEG.	½w
R_{24}	47K	½w
R_{25}	330Ω	½w
R_{26}	11.5Ω	5w
R_{27}	330Ω	½w
R_{28}	1000	½w
R_{29}	220K	½w

CAPACITORS & VALUES

C_1	3-12μμf	
C_2	.03μf	200-V (1)
C_3	10μμf	
C_4	151μμf	3-GANG VAR.
C_5	.1 μf	200-V (2)
C_6	.03μf	200-V (2)
C_7	.03μf	200-V (1)
C_8	3-12μμf	
C_9	100μμf	
C_{10}	.03μf	200-V (1)
C_{11}	1350μμf	N-750
C_{12}	20-150μμf	N-400
C_{13}	10μμf	N-750
C_{14}	4-30μμf	N-500
C_{15}	2200μμf	400-V
C_{16}	.03 μf	200-V (2)
C_{17}	90μμf	
C_{18}	100μμf	
C_{19}	.03 μf	200-V (3)
C_{20}	50μμf	N-750
C_{21}	.03 μf	200-V (3)
C_{22}	.1 μf	200-V (3)
C_{23}	10μμf	
C_{24}	.03μf	200-V (4)
C_{25}	.05μf	200-V
C_{26}	90μμf	
C_{27}	100μμf	
C_{28}	200μμf	
C_{29}	7-45μμf	N-500
C_{30}	500μμf	N-750
C_{31}	200μμf	
C_{32}	20-150μμf	N-400 (C.W. PITCH)
C_{33}	.1 μf	200-V (4)
C_{34}	350μμf	
C_{35}	25μf - 25-V	CCCW DRY ELECT.
C_{36}	200μμf	CCCW DRY ELECT.
C_{37}	2200μμf	400V CCCW DRY ELECT.
C_{38}	2200μμf	400V CCCW DRY ELECT.
C_{39}	10μf - 200-V	CCCW DRY ELECT.
C_{40}	.03μf	200-V (4)
C_{41}	2200μμf	400V
C_{42}	.05μf	300-V
C_{43}	4-30μμf	N-500
C_{44}	4-30μμf	N-500
C_{45}	.008μf	400-V
C_{46}	100μμf	
C_{48}	4-30μμf	N-500
C_{49}	4-30μμf	N-500
C_{47} – C_{50}	LEAD CAPACITY	

N-500 = NEGATIVE TEMP. COEFFICIENT OF .0005μμf/μμf/C°
N-750 = " " " " .00075μμf/μμf/C°
N-400 " " " " .0004μμf/μμf/C°
NUMBERS IN CIRCLES FOLLOWING CAPACITOR VALUES DENOTE CAPACITORS ASSEMBLED IN COMMON CASE

S-1, S-2, & S-3 SHOWN IN EXTREME C.C.W. POSITION.
S-1 = M.O. CRYSTAL SW.
S-2 = RECEPTION SW.
S-3 = POWER SELECTOR SW.
S-4 = SPEAKER SW.
S-5 = ON-OFF SW. (ON VOL. CONT.)
S-6 = PILOT LIGHT SW.

JK-1, JK-2 } TYPE J-33A

T-2
VT-171
CONV.

T-3
VT-173
I.F. AMP.

T-4
VT-172
DET., A.V.C., AUDIO

T-5
VT-264
OUTPUT

T-7
VT-173
CAL.

T-6
VT-173
B.F.O.

TR-1

TR-2

TR-4

C17 C48 C49 C18 C19 C21 C25 C26 C43 C44 C27 C41 C15 C46 C16 C28 C38 C37 C50 C36 C40 C23 C24 C22 C31 C29 C30 C34 C32 C33 C35 C39

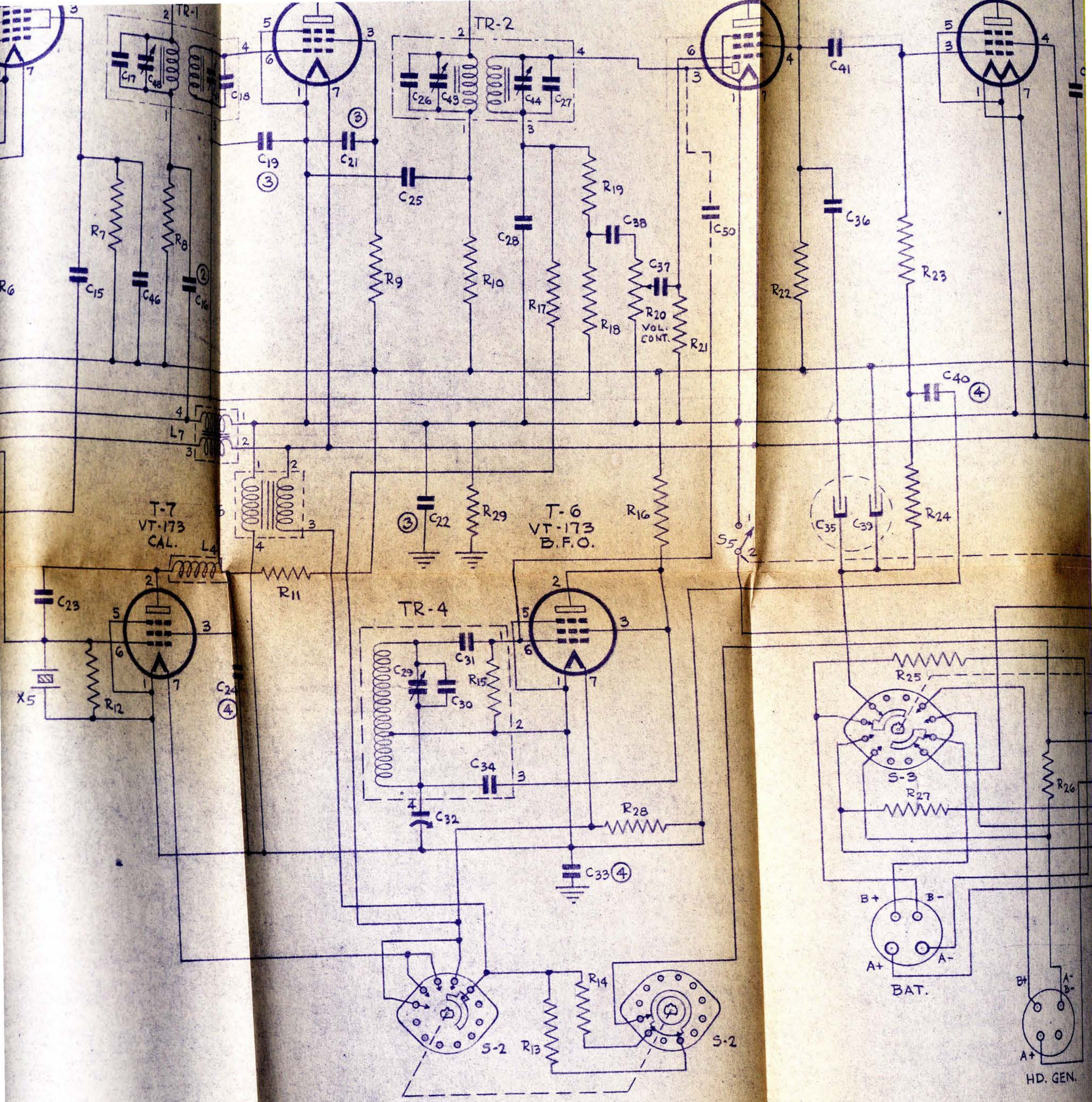
R7 R8 R9 R10 R17 R19 R18 R20 VOL. CONT. R21 R22 R23 R24 R6 R11 R12 R29 R16 R14 R15 R25 R27 R28

L7 L6 L4

S5 S-3

X5

B+ B- A+ A-



ALL PLUGS VIEWED FROM F

(CONT.)

C38 C37 R20 VOL. CONT. R21 C50 C36 R22 R23 C40 JK. #2 R16 C35 C39 R24 S5 R25 S-3 R26 S-3 R27 S-2 B+ B- A+ A- BAT. B+ A- B- A+ HD. GEN. B- B+ A- A+ VIB.

ALL PLUGS VIEWED FROM PRONG SIDE.

RRL-36273

SAMPLE MUST BE APPD. BY ENG. DEPT. TOLERANCE—DECIMALS ± FRACTIO

ENGINEERING DEPARTMENT FARNSWORTH TELEVISION & RADIO CORPORATION, MARION, INDIANA

CONFIDENTIAL

OCT 2[illegible] 1942

OCT 28 1942

ITEM	PART No.	DESCRIPTION
ASSEMBLY PART No.	SCHEMATIC	
	DRN. E. Ross 10-24-42	MAT'L.
	MECH. CHK.	FIN.
FIRST MADE FOR	ELEC. CHK.	SUPERSEDES
	APPD.	SUPERSEDED BY
	FIRST MADE FOR 4086	RRL-3627B
	DIST.	

ENG. 5 500 8-41 PPC

4
72
DET C., AUDIO

T-5
VT-264
OUTPUT

TR-3

S4

C41

C45

C42

C36

R22

R23

JK. #1

JK. #2

R19

C38

C37

R20
VOL. CONT.

R18

R21

C40

4

C35

C39

R24

S5

R16

R25

S-3

R27

R26

S-3

R28

3

B+ B- A+ A-

BAT.

B+ A- B-

A+

HD. GEN.

B- B+ A- A+

VIB.

S-2

RL-36273

TOLERANCE—DECIMALS ± FRACTIONS ±

SAMPLE MUST BE APPD. BY ENG. DEPT.

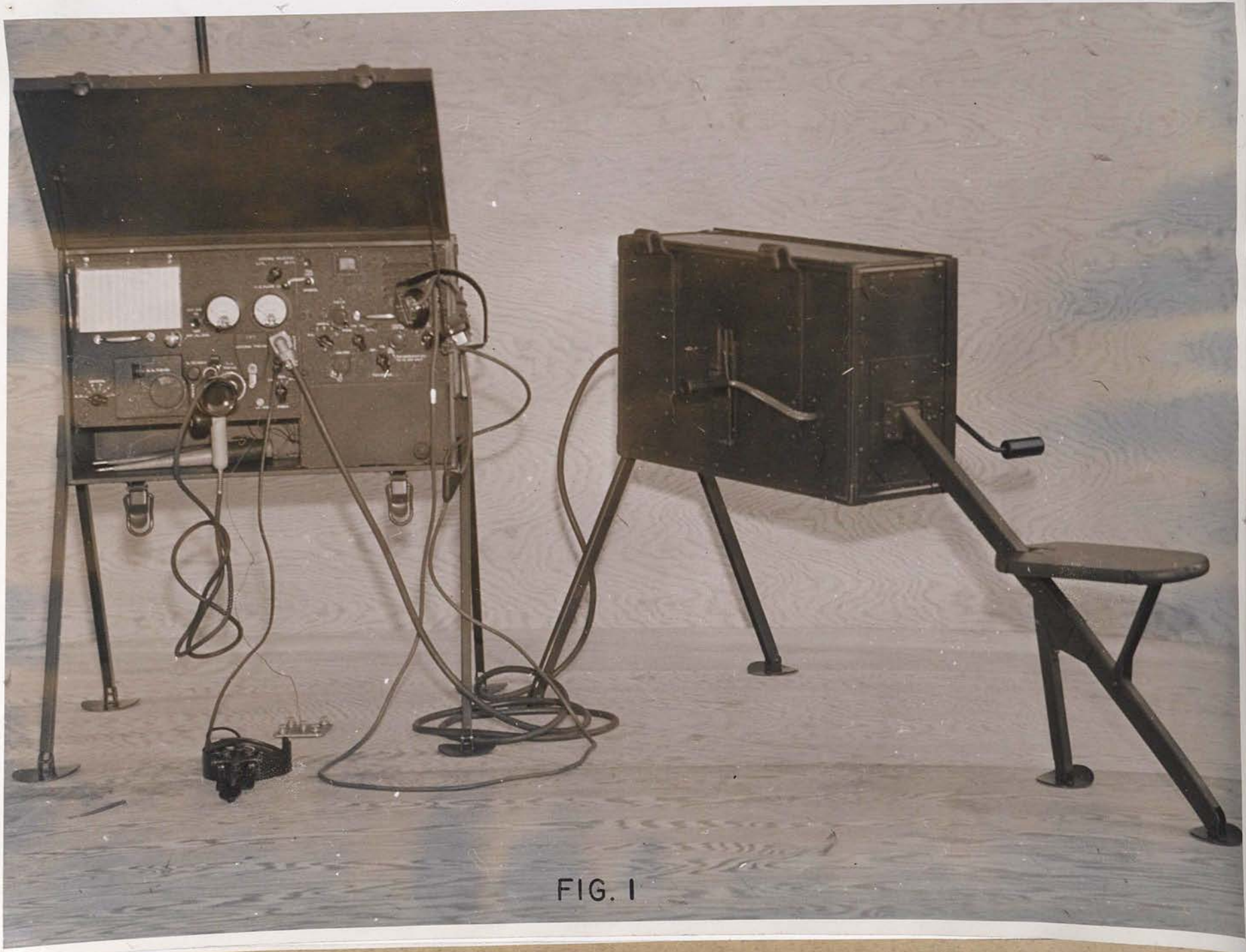


FIG. 1

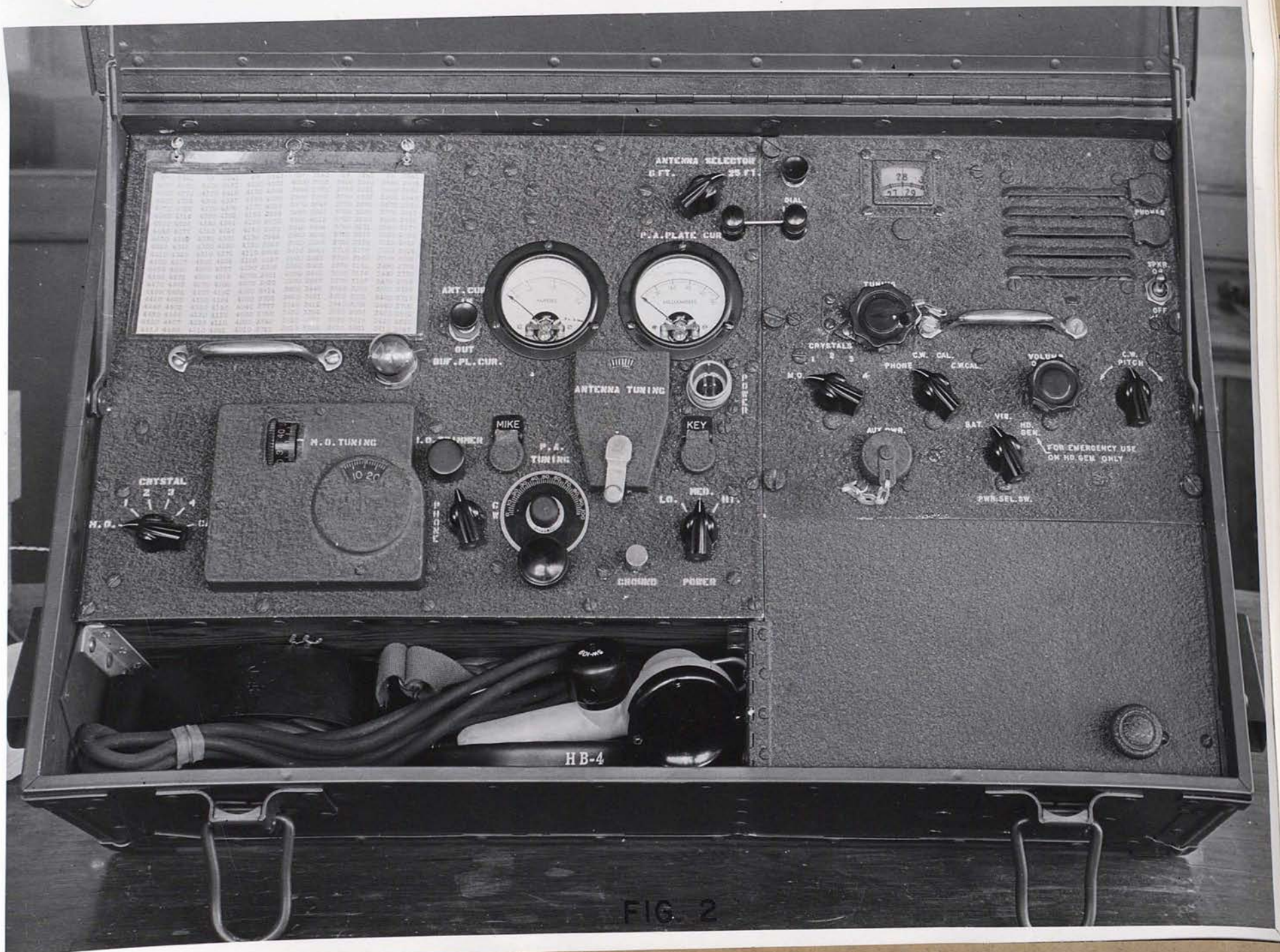

ANTENNA SELECTOR
8 FT.
35 FT.
DIAL
P.A. PLATE CUR
ANT. CUR
OUT
BUF. PL. CUR.
ANTENNA TUNING
M.O. TUNING
MIKE
KEY
P.A. TUNING
CRYSTAL
M.O.
PHONE
C.W.
CAL.
CMCAL
VOLUME
C.W. PITCH
BAT.
VIB.
HD. GEN.
AUX PWR.
PWR. SEL. SW.
FOR EMERGENCY USE ON HD. GEN. ONLY
LO.
MED.
HI.
GROUND
POWER
PHONES
SPKR.
OFF
HB-4

FIG. 2

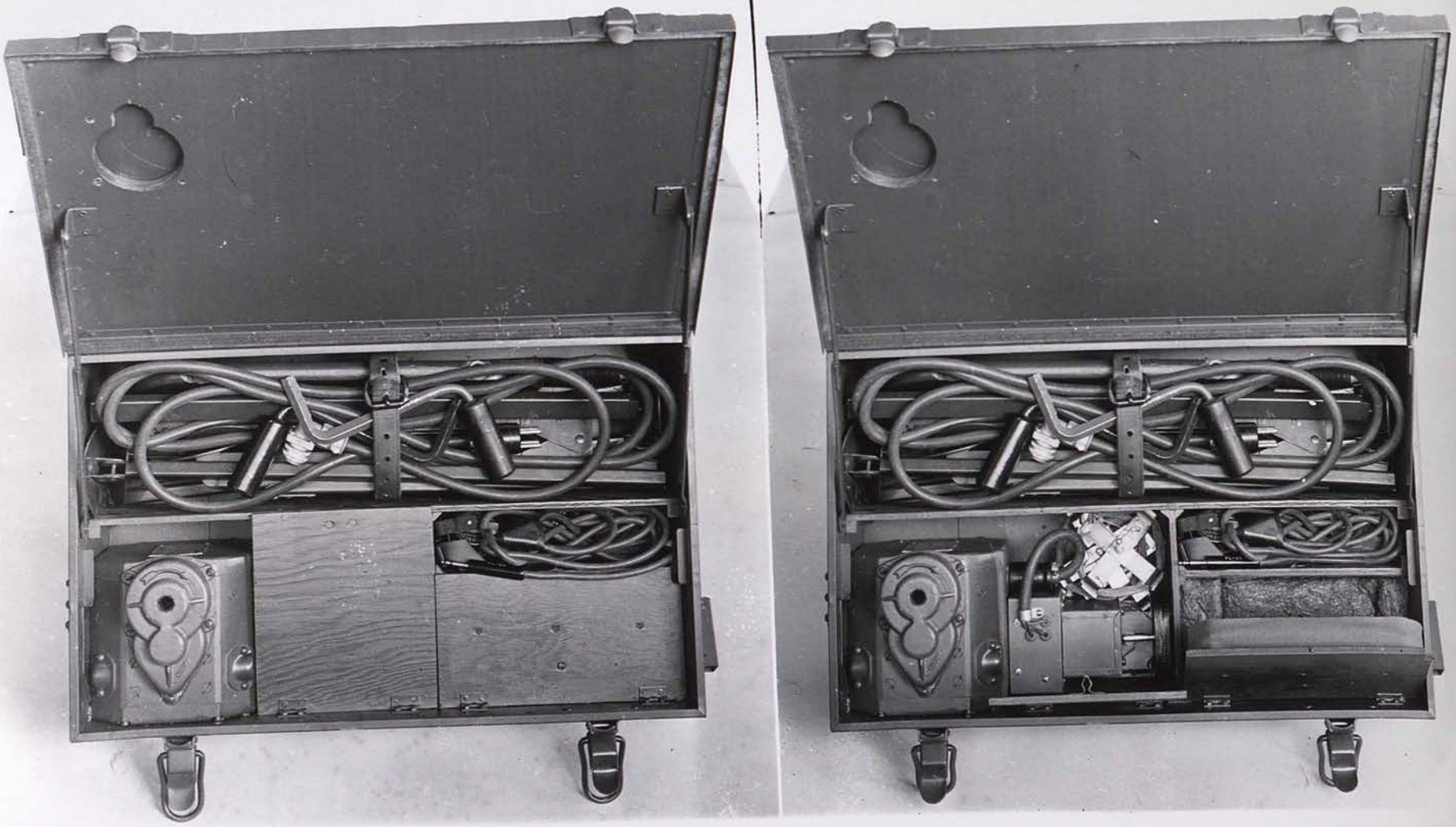


FIG. 3

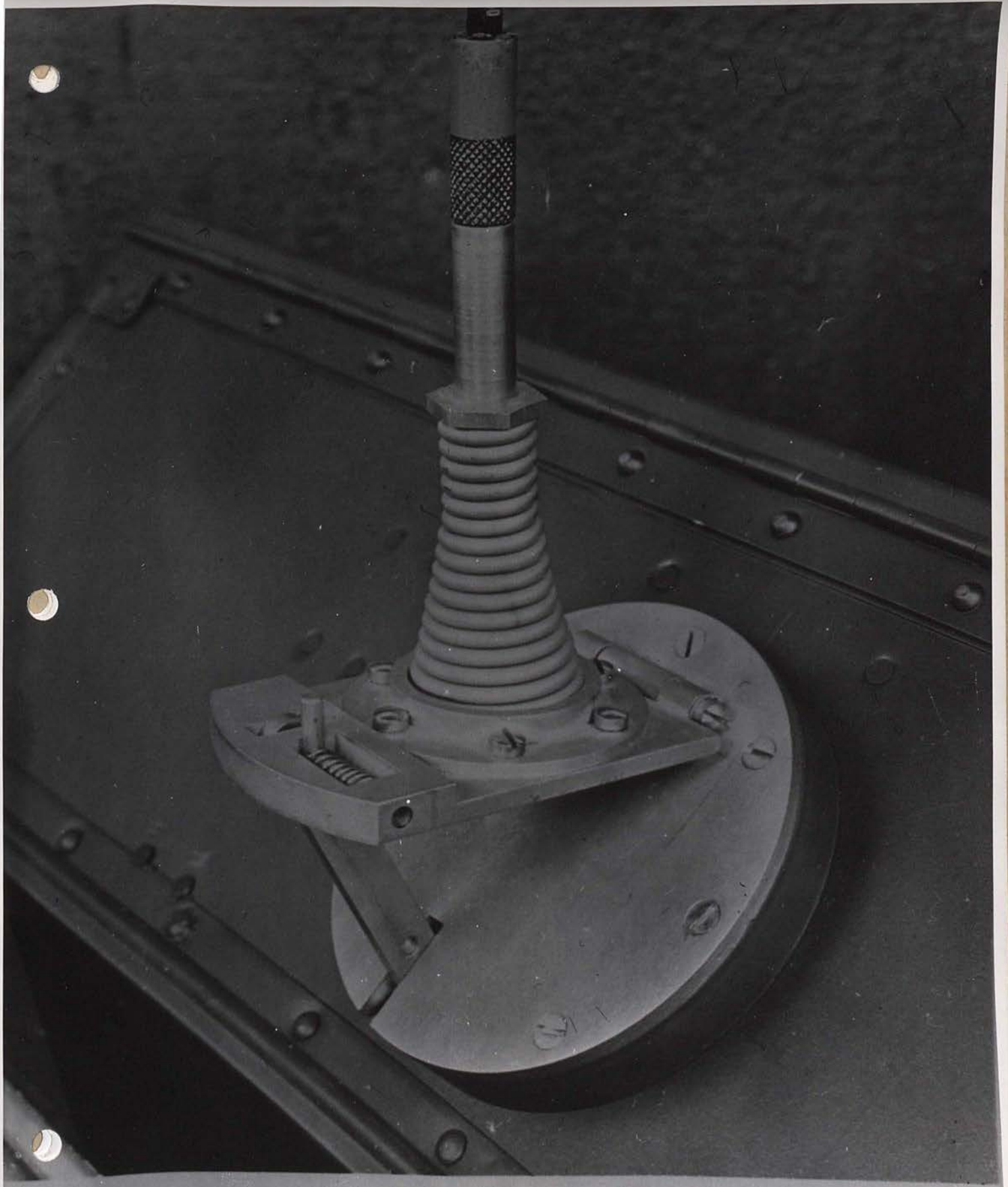


FIG. 4

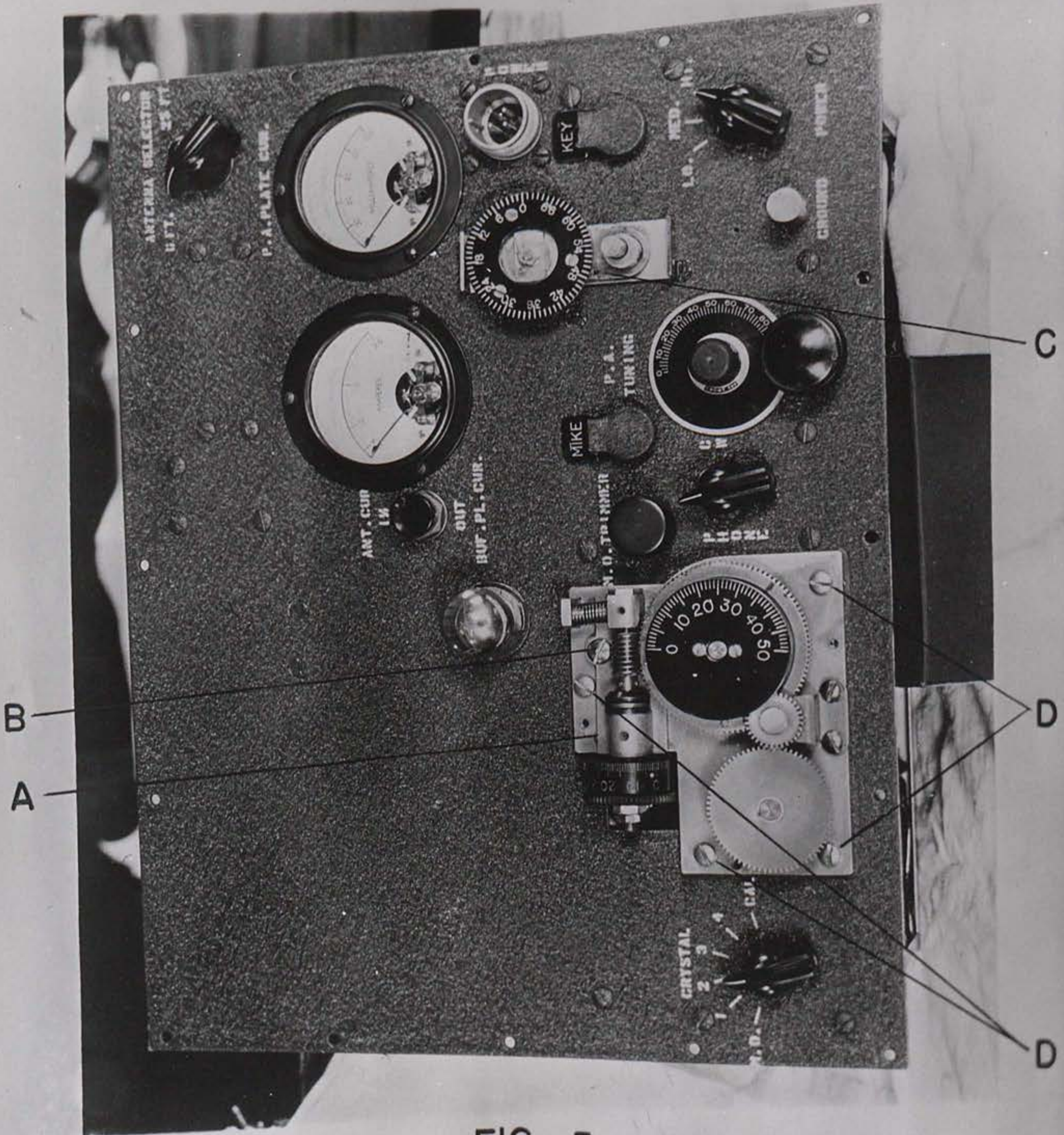

ANTENNA SELECTOR
P.A. PLATE CUR.
KEY
MIKE
P.A. TUNING
ANT. CUR
BUF. PL. CUR.
M.O. TRIMMER
PHONE
GROUND
POWER
CRYSTAL
A
B
C
D
D

FIG. 5

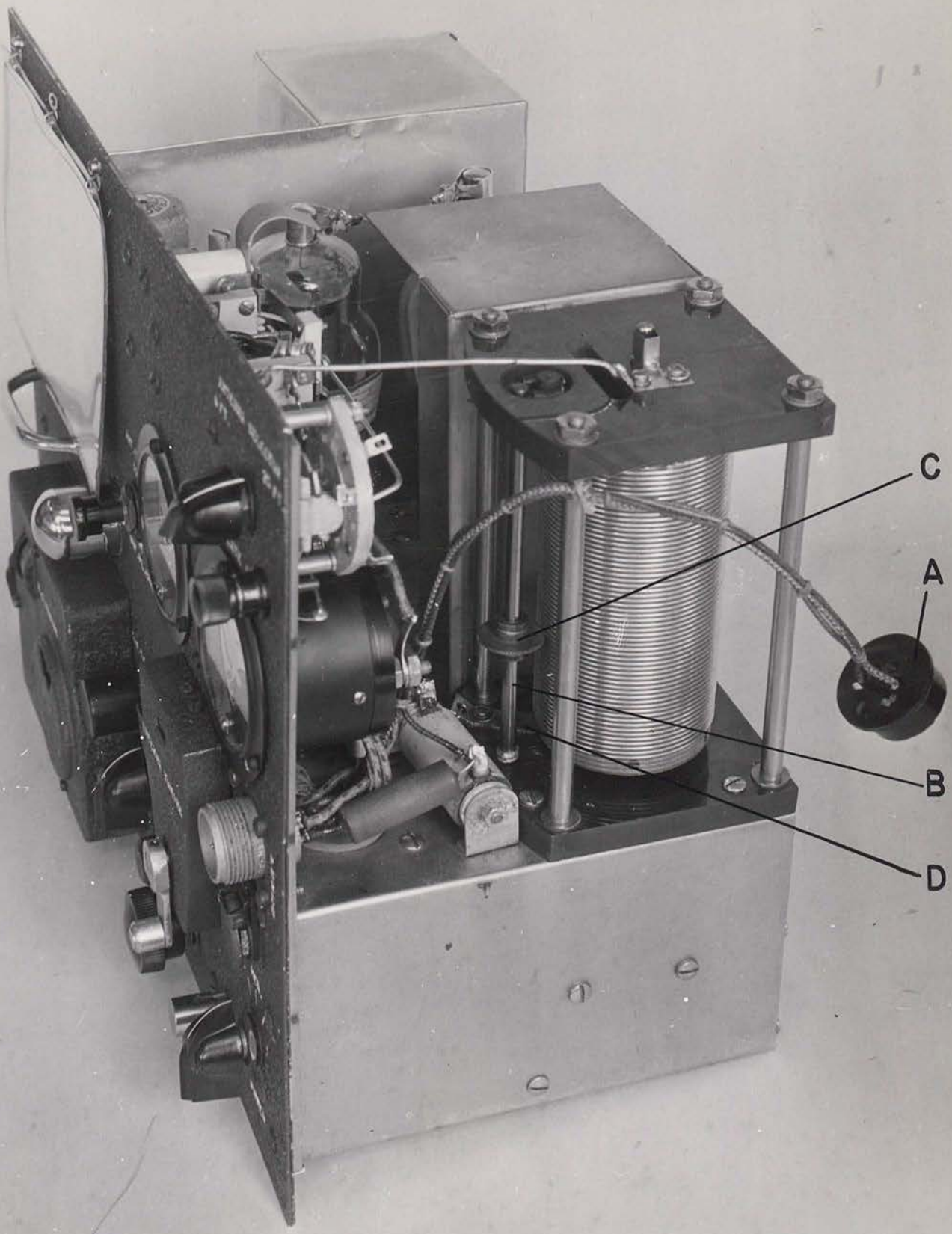


FIG. 6

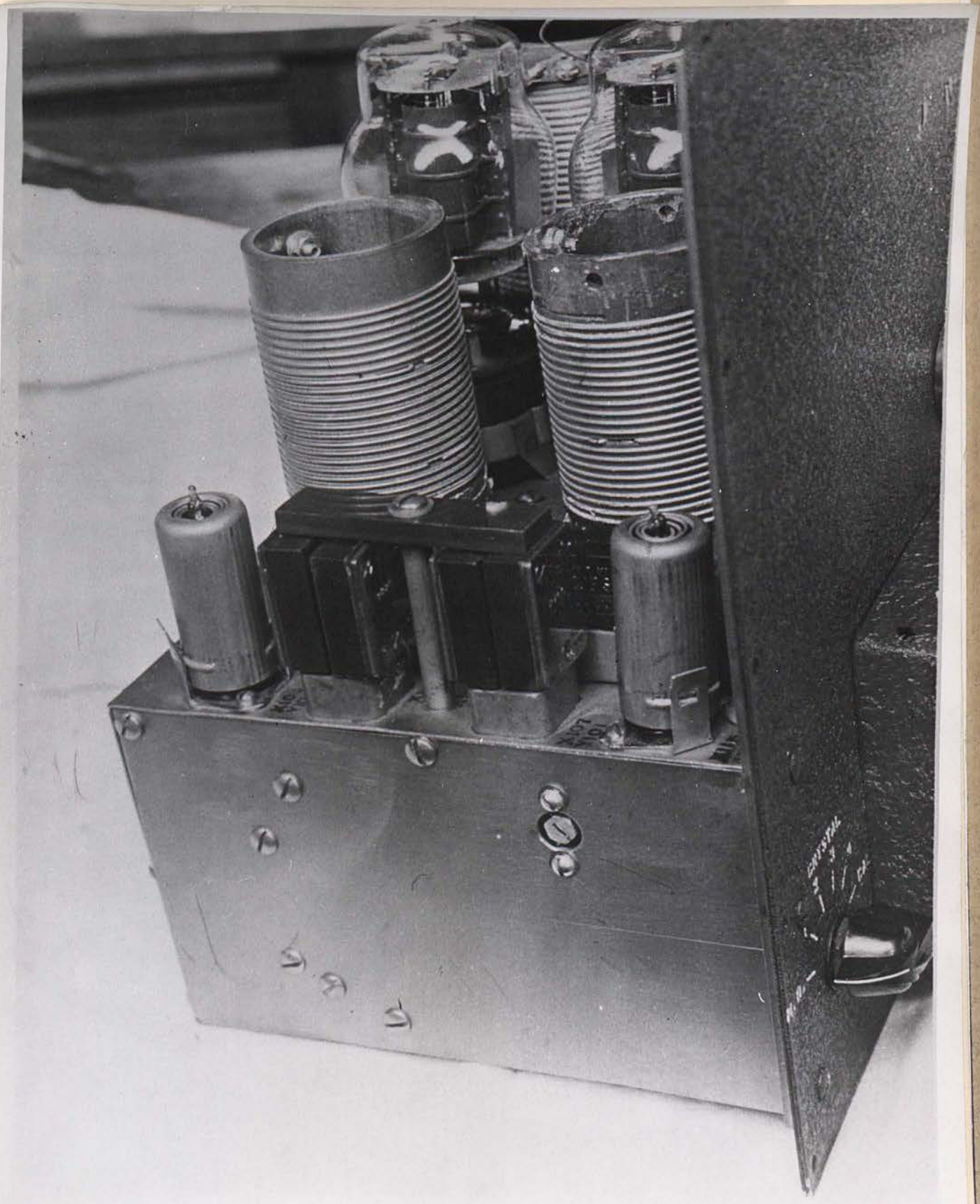


FIG. 7

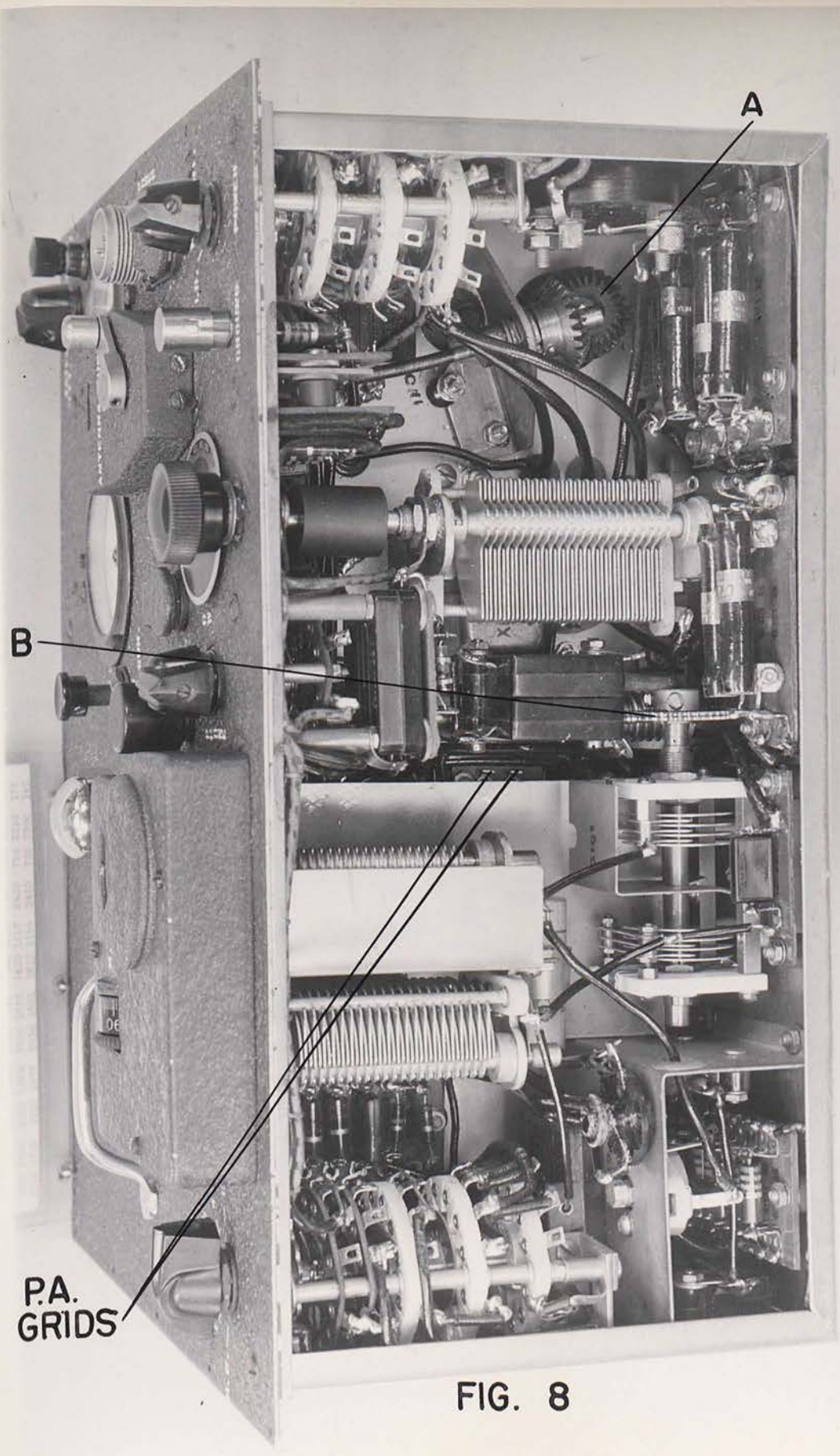


FIG. 8

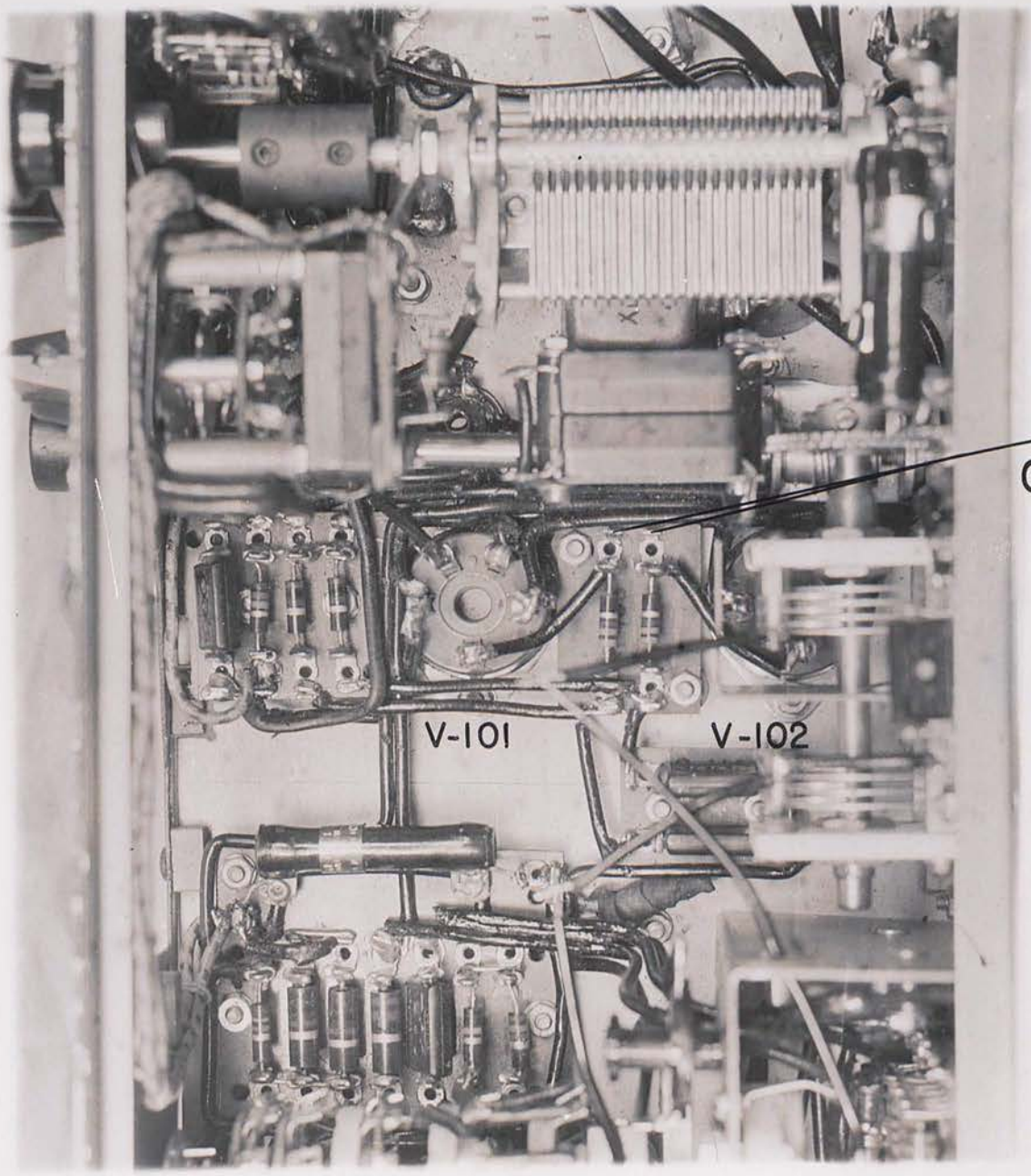


FIG. 9

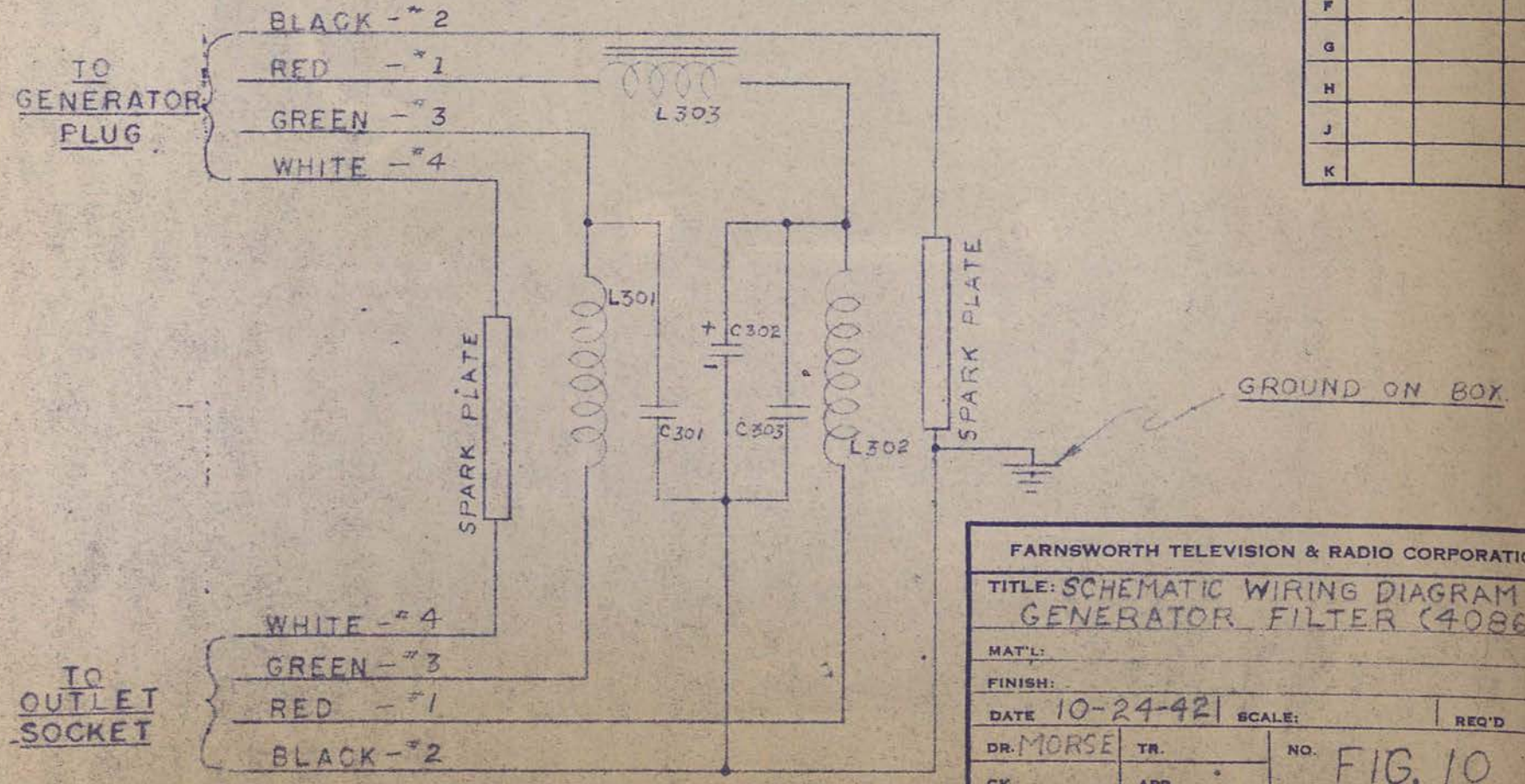
Part No.	Description	Manufacturer	Mfr.'s Part Number
C-301	.25 mfd.,600 v. Cond.	Aerovox	684
C-302	500 mfd., 15 v. Cond.	Mallory	FPS-037
C-303	.05 mfd.,600 v. Cond.	Cornell-Dubilier	Tiger
L-301	RF Choke; 176 T. #28E on Form ½"Dia.x4-11/64"L.	Farnsworth	102896-1
L-302	RF Choke; 58 T. #16E on Form ½"Dia.x4-11/64"L.	Farnsworth	102896-2
L-303	AF Choke; Special	Aroo Trans. Co.	As per our P. O. 94406

TOLERANCE UNLESS SPECIFIED
FRACTIONAL DIMENSIONS ± 1/64
DECIMAL DIMENSIONS ± .005

FIG. 10

CHANGES

	DATE	CH. NO.	INITIAL ENG.
A			
B			
C			
D			
E			
F			
G			
H			
J			
K			



FARNSWORTH TELEVISION & RADIO CORPORATION

TITLE: SCHEMATIC WIRING DIAGRAM OF GENERATOR FILTER (4086)

MAT'L:

FINISH:

DATE 10-24-42 | SCALE: | REQ'D

DR. MORSE | TR. | NO. FIG. 10

CK. | APP.

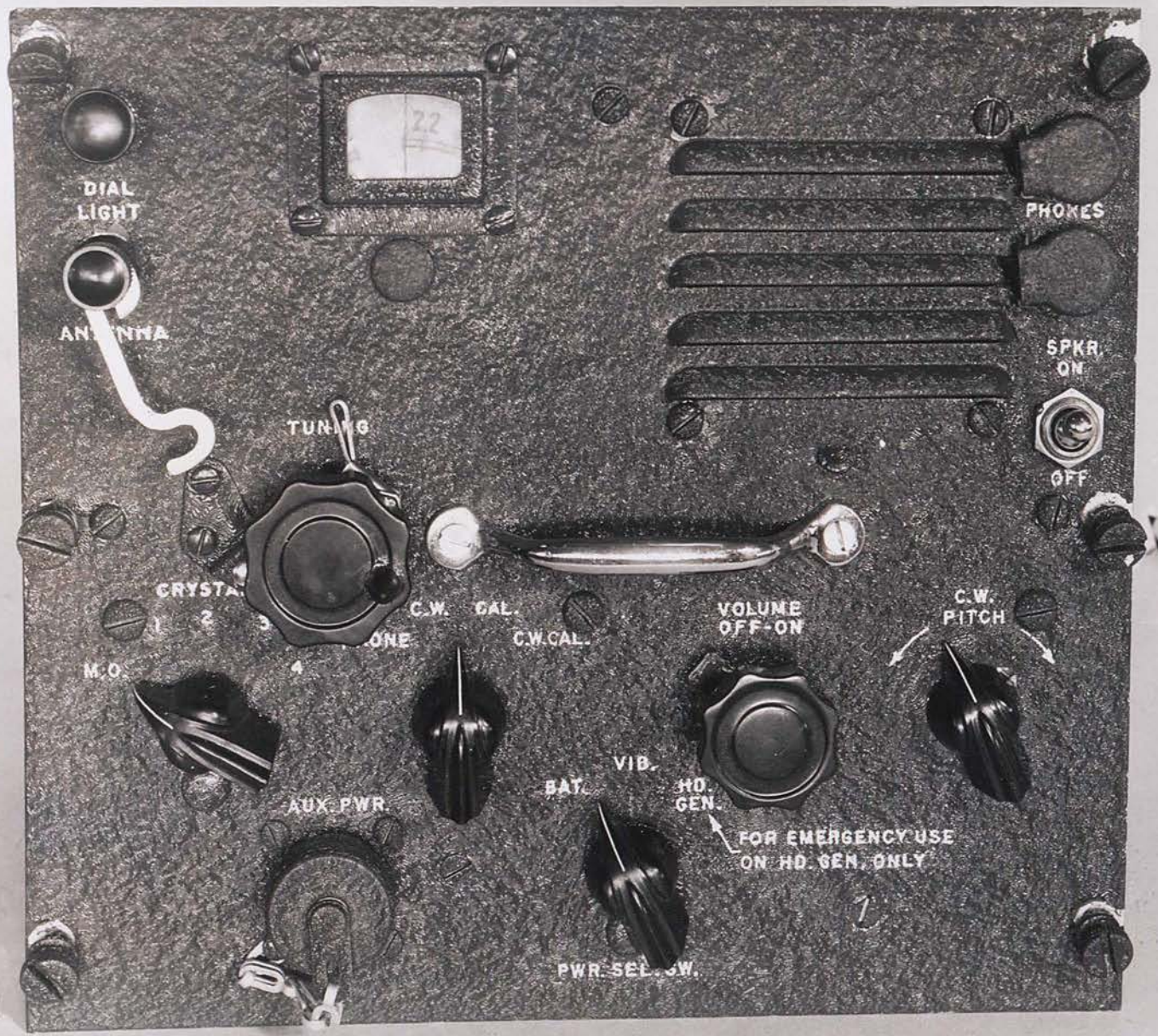

DIAL LIGHT
PHONES
SPKR. ON
OFF
TUNING
C.W. CAL.
C.W.CAL.
VOLUME OFF-ON
C.W. PITCH
M.O.
AUX. PWR.
VIB.
BAT.
HD. GEN.
FOR EMERGENCY USE ON HD. GEN. ONLY
PWR. SEL. SW.

FIG. II

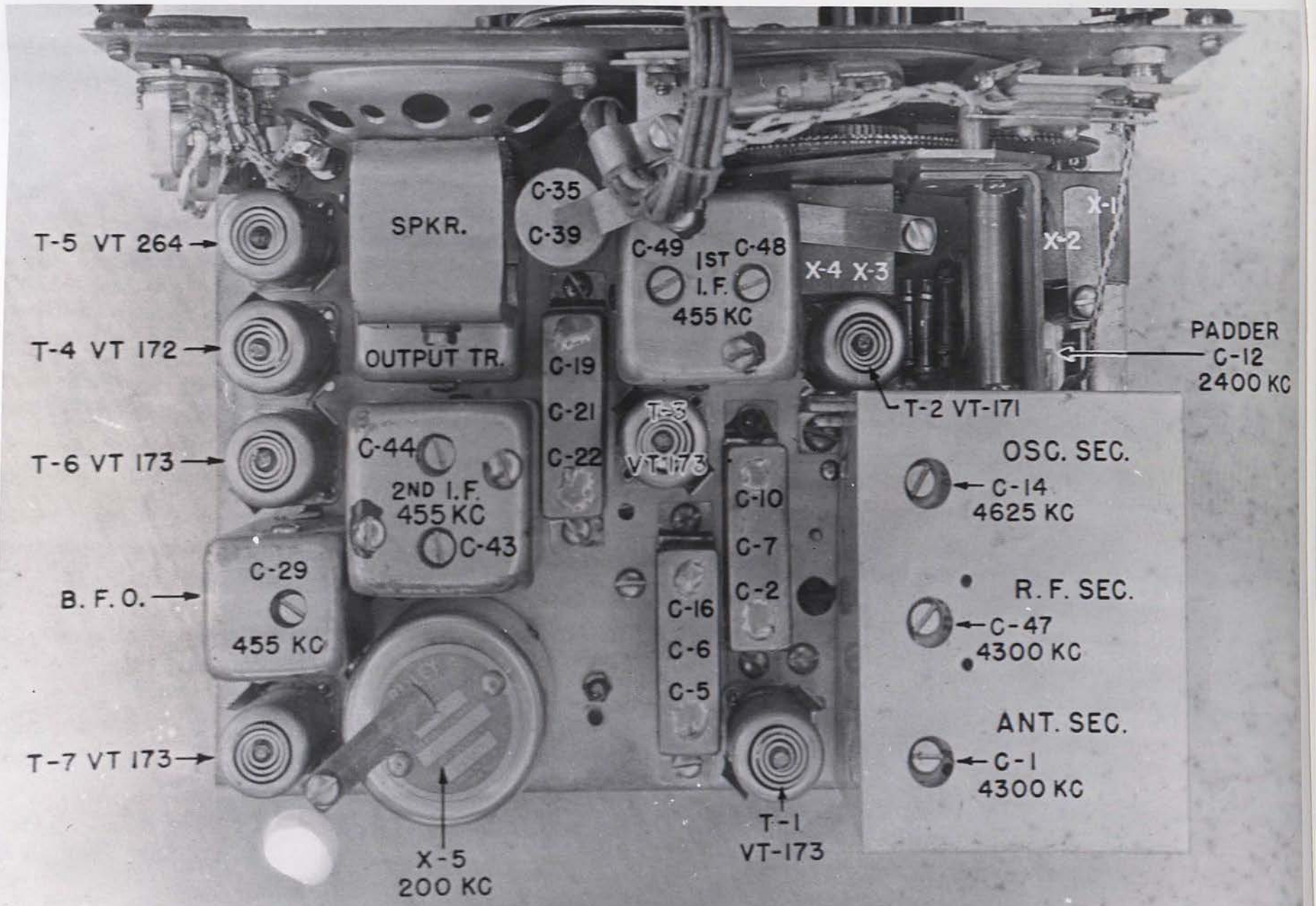

T-5 VT 264
T-4 VT 172
T-6 VT 173
B. F. O.
T-7 VT 173
SPKR.
OUTPUT TR.
C-35
C-39
C-49
1ST I.F. 455 KC
C-48
X-4 X-3
X-1
X-2
PADDER C-12 2400 KC
T-2 VT-171
C-19
C-21
C-22
T-3 VT-173
C-44
2ND I.F. 455 KC
C-43
C-29
455 KC
C-10
C-7
C-2
C-16
C-6
C-5
OSC. SEC.
C-14 4625 KC
R. F. SEC.
C-47 4300 KC
ANT. SEC.
C-1 4300 KC
X-5 200 KC
T-1 VT-173

FIG. 12

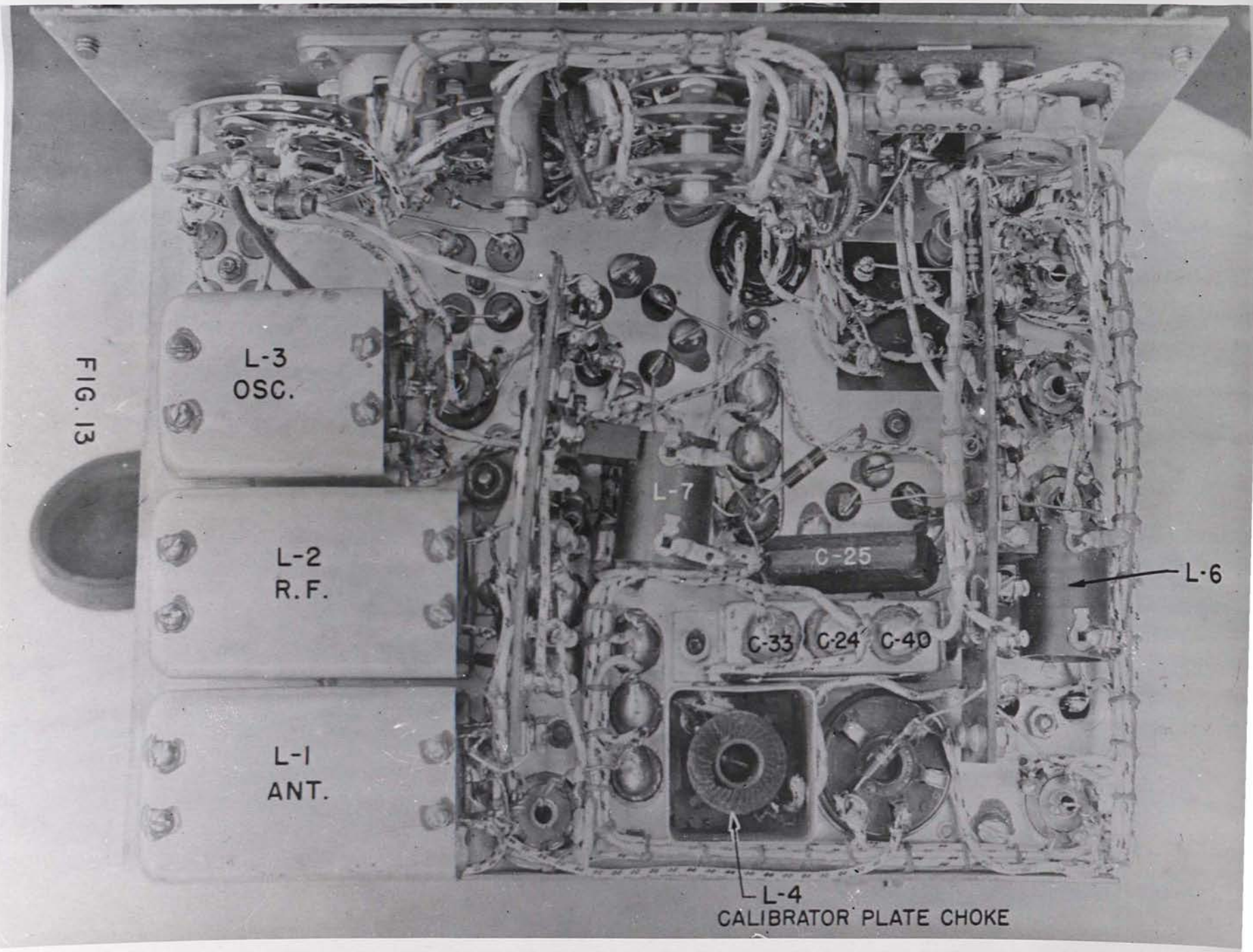

L-3
OSC.
L-2
R.F.
L-1
ANT.
L-7
C-25
L-6
C-33
C-24
C-40
L-4
CALIBRATOR PLATE CHOKE

FIG. 13