TM 11-2208

WAR DEPARTMENT TECHNICAL MANUAL

TEST SET
TS-2/TG

WAR DEPARTMENT • 19 APRIL 1944

WAR DEPARTMENT,
WASHINGTON 25, D. C., 19 APRIL 1944.

TENTATIVE TECHNICAL MANUAL
for
TEST SET TS–2/TG
Teletype Instruction Manual No. 43

Bulletin 183, Issue 1.
Bulletin 1120, Issue 1.
Drawing W.D. 2265.
Specification S–5288, Issue 1.
Specification S–5456, Issue 1.

Signal Corps stock numbers are obtained by placing 4T before Teletype part numbers.

Tentative TM 11–2208, Test Set TS–2/TG, published by the Teletype Corporation, is furnished for the information and guidance of all concerned.

[A. G. 300.7 (18 Apr 44).]

BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,
Chief of Staff.

OFFICIAL:

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

DISTRIBUTION:

Armies (5); SvC (5); Depts (5); Def C (2); Base C (5); T of Opn (5); D (2);* PC & S (2) (Cont) (1) (Oversea); PE (2); C of Tech Sv (2); Arm & Sv Boards (2); Gen & Sp Sv Schs (10); ROTC (5); Sig C Deps (2); Gen O/S SOS Deps (Sig Sec) (2); Sig C Labs (2); Sig C Rep Shs (2).

* IBn 1, 11 (2); IC 11 (2).

IBn 1: T/O & E 1–457T;

IBn 11: T/O & E 11–15, 11–95;

IC 11: T/O & E 11–18, 11–97, 11–107, 11–127, 11–237, 11–287, 11–587, 11–592, 11–597.

TELETYPE INSTRUCTION MANUAL NO. 43
Issue 3
September, 1944

U. S. ARMY SIGNAL CORPS
TEST SET TS–2/TG

Contents

WAR DEPARTMENT TECHNICAL MANUAL

TM 11-2208

TEST SET

TS-2/TG

WAR DEPARTMENT • 19 APRIL 1944

United States Government Printing Office
Washington: 1944

For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

BULLETIN NO. 183. ISSUE 1—MARCH, 1944

DESCRIPTION AND ADJUSTMENTS
PORTABLE SIGNAL DISTORTION TEST SET

CODE DISC OPERATED SET, FOR TRANSMITTING A TEST MESSAGE OR REPETITIONS OF R, Y, OR SPACE, EITHER UNDISTORTED OR WITH A PREDETERMINED DEGREE OF DISTORTION

CONSISTS OF:

TELETYPE ED57GG SIGNAL DISTORTION TEST UNIT EQUIPPED WITH 110 V. A.C. 50–60 CYCLE GOVERNED MOTOR GEARED FOR 368.1 AND 404 O.P.M.

TELETYPE 107009 CHEST

CONTENTS

DESCRIPTION

ADJUSTMENTS

CUT ALONG THIS LINE BEFORE CEMENTING TO CHEST COVER

TEST SET TS–2/TG

OPERATING INSTRUCTIONS

1—CONNECT MOTOR POWER CORD TO 115 V. 50–60 CYCLE A.C. AND TURN ON MOTOR SWITCH.

2—TO CHECK MOTOR SPEED OPEN DOOR ON PANEL, TURN ON TARGET LAMP AND SIGHT ON TARGET WITH TUNING FORK. AN 87.6 V.P.S. FORK SHOULD BE USED FOR 368.1 O.P.M. AND A 96.19 V.P.S. FORK FOR 404 O.P.M. IF NECESSARY TO CHANGE SPEED, TURN OFF MOTOR, REMOVE CHEST COVER AND ADJUST GOVERNOR AS REQUIRED.

3—CONNECT BLACK SHELL PLUG OF SIGNAL CORD TO CIRCUIT IN WHICH SIGNALS ARE TO BE UTILIZED.

4—THE TEST SET IS EQUIPPED WITH A 60 MILLIAMPERE LOCAL TEST CIRCUIT. WHEN REQUIRED, CONNECT THIS CIRCUIT AS FOLLOWS:

A. CONNECT LOCAL TEST CIRCUIT POWER CORD TO 115 V. D.C.

B. CONNECT RED SHELL PLUG (RECEIVING) FROM UNIT UNDER TEST TO ONE OF LOCAL TEST JACKS.

C. CONNECT BLACK SHELL PLUG (SENDING) OF TEST SET TO OTHER LOCAL TEST JACK.

5—SET CHARACTER SELECTING SWITCH ON RIGHT SIDE OF PANEL TO POSITION OF CHARACTER DESIRED. A STOP POSITION IS PROVIDED FOR APPLYING A STEADY MARKING SIGNAL AND SENDING POSITIONS TO TRANSMIT A TEST MESSAGE, REPEATED "SPACE," REPEATED "R" OR REPEATED "Y" SIGNALS.

6—SET DISTORTION SWITCH ON LEFT SIDE OF PANEL TO SEND TYPE OF DISTORTION REQUIRED. POSITIONS ARE PROVIDED FOR SELECTING ZERO DISTORTION, MARKING OR SPACING BIAS AND MARKING OR SPACING END DISTORTION. THE COMMUTATOR DISTRIBUTOR IS USUALLY SET TO SELECT 35% BIAS OR END DISTORTION; HOWEVER, IT MAY BE READJUSTED TO SEND ANY VALUE FROM 0 TO 50%. THE AMOUNT OF DISTORTION IS INDICATED BY POINTER AT SIDE OF DISTRIBUTOR FACE PLATE.

7—USE TOGGLE SWITCH ON RIGHT SIDE OF TEST SET BASE CASTING TO REMOVE RADIO INTERFERENCE FILTER FROM TRANSMITTING CIRCUIT WHEN OUTPUT SIGNALS ARE BEING CHECKED WITH A TEST SET EQUIPPED WITH NEON LAMP INDICATOR.

8—CONNECT BINDING POST ON PANEL TO GROUND AND SET POSITION OF FILTER SWITCH TO REDUCE RADIO INTERFERENCE CAUSED BY SET.

9—REMOVE CHEST COVER OCCASIONALLY TO CHECK CONDITION OF DISTRIBUTOR BRUSHES AND DISTRIBUTOR FACE PLATE. COMMUTATOR SEGMENTS AND SPACE BETWEEN THEM SHOULD BE KEPT CLEAN AND BRUSHES PROPERLY ADJUSTED. WHEN BRUSHES ARE READJUSTED OR REPLACED, SET MUST BE RECALIBRATED.

10—DETAILED INSTRUCTIONS COVERING OPERATION, ADJUSTMENT, CALIBRATION, AND MAINTENANCE OF SET ARE INCLUDED IN INSTRUCTION MANUAL.

PRINTED IN U.S.A.

DESCRIPTION

GENERAL

The Portable Signal Distortion Test Set, herein described, is a motor driven unit arranged to transmit normal or distorted signals for testing Teletype circuits and checking the efficiency of start-stop selectors on Teletype apparatus.

The type of distortion set up may be marking or spacing bias, or marking or spacing end distortion.

The test set is arranged to transmit continuously any one of four test signals; R, Y, SPACE, or a test message. Since it may be desired to use the test set with Creed apparatus, the test message is a 68 character line. The test set is equipped with a governed motor so that the normal speed of 368.1 O.P.M. may be changed to 404 O.P.M.

The test set (Figure 1) consists essentially of an A.C. governed motor, a code disc transmitter, a distributor mechanism, and a panel equipped with control switches and local test jacks, all mounted on a base casting. The base is equipped with a power fuse, radio suppression filters, an output signal cord, a local test battery cord, and a power cord.

115 volts A.C. (50 or 60 cycle) is required for operating the motor, and 115 volts D.C., for the operation of the local line circuits.

DISTRIBUTOR TEST SIGNAL TRANSMISSION

(A) Code Disc Transmitter (Figure 2)

The transmitter, which sets up combinations for transmitting the test message, consists principally of five code disc cams, contact levers, contact tongues, and contacts. The code disc cams actuate the contact levers which in turn position the contact tongues against their proper contacts.

The code disc cam assembly is driven through a series of gears from the distributor shaft and is thus synchronized with the distributor brush arm.

A friction assembly located at the end of the code disc cam assembly shaft (Figure 1), applies a drag on the shaft and prevents backlash.

(B) R, Y, and Space Selections (Figure 1)

The repeated R, Y, and SPACE signals are obtained by electrically disconnecting the transmitting contacts and establishing, by means of the character control switch, the proper electrical circuit required for the transmission of the desired signal.

DISTRIBUTOR (Figure 1)

The distributor completes electrical connections between the transmitting contacts or the character control switch, and the signal line in the correct sequence and at the required speed. This is accomplished by brushes which are drawn across the commutator segments by the distributor brush arm attached to the distributor shaft. The brush arm mounts two sets of brushes: one pair of brushes makes contact with the inner solid collector ring and the segments of the stationary ring; the other pair of brushes makes contact with the other solid collector ring and the segments of the outer movable ring. The latter brushes and rings only are used to transmit undistorted signals. Both sets of brushes and rings are used to transmit distorted signals by connecting electrically the corresponding segments of the movable ring and the stationary ring, either in series or in parallel.

The outer segmented ring of the distributor is movable and is usually set to cause a 35% bias or end distortion of the transmitted signals; however, it may be adjusted to send any distortion from 0 to 50%. The amount of distortion is indicated on a scale at the side of the distributor disc.

CONTROL SWITCHES (Figure 1)

The distortion switch, motor switch (on and off), and character selecting switch are mounted on a panel above the motor.

The distortion switch is used to select the type of distortion required and may be set at any of the following positions:

(1) BIAS M (Bias Marking), which advances the beginning of each marking impulse with respect to the character cycle. The segments of the commutator rings are connected in parallel.

(2) BIAS S (Bias-Spacing), which delays the beginning of each marking impulse. The segments of the commutator rings are connected in series.

(3) ZERO (no distortion), normal signal transmission.

(4) EDM (End Distortion-Marking), which delays the end of each marking impulse. One stop segment and the selecting segments are connected in parallel.

(5) EDS (End Distortion-Spacing), which advances the end of each marking impulse. The corresponding segments of both segmented rings are connected in series, and the two stop segments are connected in parallel.

The character selecting switch is used to select the type of repeated signals to be transmitted, and may be set in any of the following positions:

(1) STOP, which short-circuits the signal line cord.

(2) TEST MSG. (Test Message), which sends the following 68 character sentence repeatedly:

THE QUICK BROWN FOX JUMPED OVER A LAZY DOG'S BACK 1234567890 TESTING

followed by carriage return and line feed combination.

(3) RPT SP (Repeat Space), which sends repeated SPACE signals.

(4) R, which sends repeated R signals.

(5) Y, which sends repeated Y signals.

RADIO FILTER CUTOUT SWITCH

A toggle switch is provided in the left wall of the base casting to disconnect the radio filter from the signal line when checking the operation of the test set with a Teletype Signal Distortion Test Set with stroboscope (see Calibration Adjustment on page 6).

ADJUSTMENTS

GENERAL

The following adjustments are arranged in a sequence that would be followed if a complete readjustment of the test set were undertaken. This fact should be kept in mind when a single adjustment is to be made because a change in one adjustment may affect other adjustments. If one adjustment is changed, related adjustments should be checked.

The spring tension values given in this bulletin were derived from measurements made with Teletype spring scales. The scales are calibrated for use in a vertical "pull" position. When used in any other position, the reading is an indicated value. Therefore in order to obtain the specified scale readings, the spring scales which are included in the Teletype parts bulletin tool list should be used. Springs which do not meet the requirements specified and for which no adjusting procedure is given, should be replaced with new springs. Ordering information may be obtained from the Teletype parts bulletin.

Before proceeding to adjust, remove the chest cover. Then remove the test set from the base of the chest and remove the base plate.

MAIN SHAFT POSITION ADJUSTMENT (Figure 3)

The center of the main shaft bakelite gear should line up with the center of the motor shaft and pinion gear as gauged by eye. To adjust, position the main shaft by means of its upper and lower bearing cap mounting screws. Tighten the cap mounting screws.

MOTOR POSITION ADJUSTMENT

There should be a minimum amount of backlash between the motor pinion and the main shaft bakelite gear throughout a complete revolution of the main shaft (Figure 3). To adjust, loosen the motor mounting screws and position the motor. Tighten the screws.

MOTOR ARMATURE THRUST SPRING COMPRESSION (Figure 4)

Apply the push end of a twelve pound scale horizontally against the governor outer contact disc and push toward the pinion end of the motor. It should require at least seven pounds to start to overcome the compression of the armature spring.

REMOVE THE BRUSH SPRING PLATE AND GOVERNOR COVER

REMOVE THE SPEED ADJUSTING SPRING

NOTE.—Before making any adjustments, see "General," on this page.

GOVERNOR SHELL ADJUSTMENTS (Figure 5)

(1) The governor contact points should meet squarely and there should be at least .010" clearance between the governor spring bracket and the rim of the governor shell. To adjust, remove the governor from its shaft and position the governor spring bracket by means of its mounting screws.

NOTE.—If necessary, reposition the "fixed contact" bracket to facilitate squaring up the contacts.

(2) There should be a gap of .015" to .040" between the governor contacts. To adjust, bend the governor contact spring.

REPLACE THE SPEED ADJUSTMENT SPRING

GOVERNOR SPEED ADJUSTING WHEEL FRICTION WASHER ADJUSTMENT (Figure 5)

Turn the governor speed adjusting wheel to a point where the tension on the governor contacts is from 13 to 14 ozs. as measured by hooking a 32 oz. scale over the spring arm next to the contact and pulling parallel to the speed adjusting spring. Then insert a bank pin radially in the leather rim of the speed adjusting wheel. Hook a 32 oz. scale over the pin and pull at a tangent to the periphery of the adjusting wheel. It should require 16 to 20 ozs. to start the wheel moving. To adjust the friction, remove the friction washer and bend the large projections.

GOVERNOR INNER AND OUTER DISC CONTACT SPRING ADJUSTMENT (Figure 6)

The inner and outer disc contact springs should conform to the following requirements:

(1) The distance from the inside surface of the governor cover to the highest point on the contact springs should be 25/32" to 27/32".

(2) Place a D (138–26) socket wrench over the nut located in the center of the governor cover that is used to hold the contact springs in place. With a 6" scale measure the radial distance from the vertical surface of the wrench to the point where the scale touches the curved surface of the inner disc contact spring. This distance should be 17/32" to 19/32".

(3) In a similar manner measure the distance from the wrench to the point of contact on the outer disc contact spring. This distance should be 7/16" to 1/2".

To make the adjustments for the foregoing requirements, bend the inner and outer disc contact springs.

NOTE.—Before making any adjustments, see "General," page 2.

REPLACE THE GOVERNOR COVER, TARGET, AND BRUSH SPRING PLATE

GOVERNOR BRUSH SPRING PLATE BRACKET ADJUSTMENT (Figure 4)

The governor brush spring plate bracket should be positioned to meet the following requirements:

(1) A line through the center of the outer disc should also pass through the centers of both contact brushes.

(2) The surface of the brush spring plate bracket, on which the brush spring plate is mounted, should be in alignment with the outer surface of that part of the governor cover on which the target is mounted.

(3) The brush spring plate bracket should be parallel to the surface of the governor cover.

To make the adjustments for the foregoing requirements, loosen the brush spring plate bracket mounting screws and position the bracket. Tighten the screws.

GOVERNOR BRUSH SPRING PRESSURE ADJUSTMENT (Figure 4)

(A) Inner Disc Brush Spring

Hook an 8 oz. scale over the inner spring just in front of the carbon contact brush. Pulling horizontally away from the motor, it should require 4 1/2 to 5 1/2 ozs. to start the brush moving away from the disc.

(B) Outer Disc Brush Spring

Apply the push end of an 8 oz. scale against the outer brush spring just in front of the carbon contact brush. Pushing horizontally toward the motor, it should require 4 1/2 to 5 1/2 ozs. to start the brush moving away from the disc.

To obtain the correct brush spring pressure, remove and bend the brush springs. When the springs are replaced and the spring pressure obtained, see that the contact brushes lie flat against their respective discs and that the outer edges of the brushes are either flush with or not more than 3/64" inside the outer edges of the discs.

NOTE.—If necessary, level off the brushes by passing a piece of No. 0000 sandpaper between the brush and the disc.

REMOVE THE INTERMEDIATE SHAFT GEAR GUARD

INTERMEDIATE SHAFT END PLAY ADJUSTMENT (Figure 7)

The intermediate shaft should have some end play, not more than .003". To adjust, unscrew the intermediate shaft collar set screws and position the collar. Tighten the set screws.

NOTE.—Before making any adjustments, see "General," page 2.

INTERMEDIATE SHAFT BAKELITE GEAR ADJUSTMENT (Figure 7)

The center of the intermediate shaft bakelite gear should be in line with the center of the main shaft pinion gear as gauged by eye, and the play between the gears should be a minimum without bind throughout a complete revolution of the bakelite gear.

To meet the foregoing requirements, proceed as follows:

(1) Loosen the intermediate shaft gear clamping screw and position the gear. Tighten the screw.

(2) Loosen the four mounting screws that fasten the code disc unit sub-base to the distributor base and position the assembly by means of its mounting screws. Tighten the mounting screws. Recheck adjustment (1).

CODE DISC SHAFT END PLAY ADJUSTMENT (Figure 7)

The code disc shaft should have some end play, not more than .006". To adjust, position the code disc assembly on its shaft by means of its mounting screw.

CODE DISC SHAFT GEAR ADJUSTMENT (Figure 7)

The code disc shaft gear should line up with the driving gear on the intermediate shaft as gauged by eye, and the play between the gears should be a minimum without bind throughout a complete revolution of the code disc shaft gear. To adjust, position the code disc bracket by means of its mounting screws.

CONTACT BRACKET ASSEMBLY ADJUSTMENTS (Figure 8)

NOTE.—To check these adjustments it will be necessary to remake them.

(A) Contact Lever Bracket Position Adjustment

Loosen the contact screw set screws and back off the upper and lower contact screws all the way. With the

No. 1 and No. 5 contact levers resting on a high part of their respective code discs, there should be .020" to .030" clearance between the No. 1 and No. 5 upper contacts and their respective contact tongues. To adjust, position the contact lever bracket by means of its mounting screws.

(B) Contact Tongues Adjustment

With all the contact levers on the low part of their respective code discs, contact tongues No. 2, No. 3 and No. 4 should line up with contact tongues No. 1 and No. 5 with a variation not to exceed .030". Adjust by bending the contact tongues.

NOTE.—Before making any adjustments, see "General," page 2.

(C) Contact Screws Adjustment

With the No. 1 contact lever on the high part of its code disc, turn in the No. 1 upper contact screw so that it just makes contact with the No. 1 contact tongue, and then advance it 2½ additional turns and tighten its set screw. Adjust the No. 1 lower contact screw so that there is a gap of .006" to .010" between the tongue and the lower contact. Tighten the set screw. Adjust Nos. 2, 3, 4, and 5 upper and lower contact screws in the same manner.

CONTACT LEVERS SPRING TENSION ADJUSTMENT (Figure 8)

With the No. 1 contact lever resting on the low part of its code disc, hook an 8 oz. scale under the horizontal portion of the contact lever (the scale rod just clearing the contact tongue pivotal mounting) and pull vertically upward. It should require from 3 to 3¾ ozs. to separate the contacts. To adjust the No. 1 contact lever spring tension, position the spring anchor by means of its clamping screws. Use a test lamp to determine when the contacts break. Adjust Nos. 2, 3, 4, and 5 contact lever springs in the same manner.

DISTRIBUTOR BRUSH ADJUSTMENT (Figure 9)

NOTE.—If either of the brushes that ride on the two segmented rings is readjusted or replaced, the calibration adjustment on page 6 should be remade.

Rotate the motor manually until the brush arm is parallel to the inscribed line on the commutator disc. Under this condition the trailing edge of the inner segment brush should make contact with its associated ring at a point in line (within .020") with the inscribed line on the stationary disc. All brushes should be centrally located with respect to their associated commutator rings. To adjust, loosen the brush spring clamping screws and position the brushes. Tighten the clamping screws.

DISTRIBUTOR BRUSH SPRING TENSION ADJUSTMENT (Figure 9)

Caution.—Brush springs that are kinked or have sharp bends should not be used.

Hook an 8 oz. scale under the end of each distributor brush spring and pull upward at right-angles to the end of the brush spring. It should require 2½ to 3½ ozs. to lift the brush from its commutator ring. To adjust, loosen the brush holder clamp screw so that the brush holder is friction tight and rotate the brush holder clockwise until the brushes rest against the segments with a pressure of 2½ to 3½ ozs. Tighten the brush holder clamping screw.

NOTE.—If it is found necessary to readjust the brush holder to obtain the proper spring tension, the brushes should be resurfaced in accordance with the following instructions.

Place a piece of No. 0000 sandpaper (approximately 1" wide) face up on the distributor disc so that the brush will pass over the 1" width and draw the brushes across it two or three times or until the bottoms of the brushes are parallel to the surface of the segments. Recheck the spring tension and readjust if it does not meet the requirements.

NOTE.—Before making any adjustments, see "General," page 2.

CODE DISC POSITION ADJUSTMENT

Each lower (marking) contact should close before the distributor brush is within two segment lengths of the associated distributor segment and should remain closed until the brush has passed beyond the associated segment by two segment lengths. Use the inner stationary segmented ring when determining the adjustment. (See Figures 8 and 9 for location of parts.) To adjust, proceed as follows:

Rotate the motor in its normal direction slowly by hand until the intermediate shaft bakelite gear clamping screw is accessible. Continue to rotate it slowly until the No. 3 marking (lower) contact just closes. Loosen the clamping screw and with the code disc held stationary, again rotate the motor until the brush riding on the inner segmented ring is within three segments plus or minus ½ a segment length of the front end of the No. 3 segment. (½ segment length refers to the length of ½ of any segment length except the stop segment.) Tighten the clamping screw on the intermediate shaft bakelite gear. Recheck the requirement for all contacts. Check the Code Disc Shaft End Play Adjustment on page 3.

CODE DISC FRICTION ASSEMBLY TORQUE ADJUSTMENT

With the motor running at least ten minutes hook a 32 oz. scale in the bottom of the slotted end of the fric-

tion drag lever (next to the stop post) and pull up vertically. It should require 20 to 32 ozs. to start the arm moving away from the stop post. To adjust, loosen the lock nut on the end of the code disc shaft and regulate the tension by means of the capstan nut. Tighten the lock nut. (See Figure 7 for location of parts.)

REPLACE THE INTERMEDIATE SHAFT GEAR GUARD

DISTORTION SWITCH ADJUSTMENTS (Figure 10)

NOTE.—Before making the following adjustments the switch knob and shaft detent cam should be positioned to meet the following requirements:

(1) The switch knob set screw should engage the flat side on the shaft, and there should be some clearance, not more than .025" between the knob and the dial.

(2) The shaft detent cam set screw should engage the flat side on the small diameter end of the shaft, and the vertical position of the cam should be such that the detent lever roller rides centrally on the cam.

Adjust by means of the set screws.

DETENT ADJUSTMENT (Figure 10)

With the detent roller in the center indent of the detent cam, the switch knob indicator should point to the center of the ZERO mark on the dial. To adjust, position the detent lever by means of its eccentric mounting screw.

NOTE.—Before making any adjustments, see "General," page 2.

SWITCH CONTACT CAM ADJUSTMENT (Figure 10)

The set screws of the switch contact cam should be at right-angles to the switch knob pointer and the heads of the set screws should be toward the left side of the unit when the switch knob is in the ZERO position. To adjust, position the cam by means of its set screws.

SWITCH DETENT LEVER SPRING TENSION (Figure 10)

With the detent lever roller in an indent on the cam, hook a 32 oz. scale over the roller and pull horizontally and at right-angles to the lever. It should require 22 to 30 ozs. to start the roller moving away from the cam.

SWITCH CONTACT ASSEMBLY ADJUSTMENT (Figures 10 and 11)

With the switch knob in the ZERO position, the contact pile-ups (numbered 1 to 8, from top to bottom) should be as follows:

#1—All Open
#2—All Open
#3—Open
#4—Back closed, front open
#5—Back closed, front open
#6—Back closed, front open
#7—Back closed, front open
#8—Open

(1) With the switch knob at the ZERO position, the eight cam follower springs should bear against the cam. Holding the long contact springs (swingers) out of the way, hook an 8 oz. scale over the end of each cam follower spring at the cam and pull at right-angles to the spring. It should require some tension, not more than 1 oz. to start each spring moving away from the cam.

(2) Turn the knob to the EDM (End Distortion-Marking) position. The cam follower spring of the pile-ups #3 to #8 inclusive should assume the same position (within .010") as in the ZERO position. If necessary, refine the Switch Contact Cam Adjustment on page 10. Turn the knob to the BIAS S (Bias Spacing) position and check the cam follower springs of contacts #1 and #2 for the same requirements.

(3) With the switch knob in the ZERO position, the long contact springs (swingers) should bear against the cam follower spring or the next inner long contact spring (swinger). The short contact springs and the outer long contact springs (swingers) should be held out of the way while measuring the pressure of the inner long contact springs. The short contact springs should be held out of the way while measuring the pressure of the outer long contact springs (swingers) of pile-ups #5 and #6. Hook an 8 oz. scale over the end of the long contact springs (swingers) and pull at right-angles to the springs. It should require 1½ to 3 ozs. to start the springs moving. Adjust by bending the springs.

NOTE.—Before making any adjustments, see "General," page 2.

NOTE.—For the following requirements, (4) and (5), refer also to the contact list on this page.

(4) Turn the switch knob to the EDS (End Distortion-Spacing) position. The contacts which were closed (when the switch knob was in the ZERO position) should now have a gap of .015" to .025". Adjust by bending the short contact springs.

(5) Turn the switch knob to the ZERO position. The contacts which are now open should have a contact gap of .015" to .025". Adjust by bending the short contact springs.

(6) With the switch knob in the ZERO position, the swinger spring studs of pile-ups #4 to #7 inclusive may not normally rest against the preceding swinger or cam follower springs. This is permissible if the requirements of (2) and (3) are met.

MOTOR SPEED ADJUSTMENT

The speed of the governed motor is checked by viewing the ten spot target on the motor governor through

the vibrating shutters of a speed indicator (tuning fork). In checking the speed of 368.1 O.P.M., an 87.6 V.P.S. fork should be used; and for the speed of 404 O.P.M., a 96.19 V.P.S. fork. The target is visible through a door on the switch mounting panel.

With the motor running and the target lamp turned on, tap the speed indicator lightly to make it vibrate and hold it so that the shutters are close to the eye. If the motor is running at the correct speed, the target will appear stationary. If the motor speed is too fast, the target will appear to be moving in the direction of rotation; and if too slow, in the opposite direction.

NOTE.—There is a possibility of setting the speed incorrectly, due to getting a speed multiple; i.e., the speed could be half or two-thirds the desired speed, or some other multiple, even though the spots appear to be stationary when viewed through the speed indicator shutters. This should be kept in mind if trouble is experienced in the operation of the unit.

To adjust the speed, stop the motor, and turn the governor adjusting wheel in one direction or the other. Check the speed after each adjustment until the correct speed is obtained. Replace the chest cover.

CALIBRATION ADJUSTMENT

(1) Connect the local test circuit plug to 115 volts D.C.

(2) Insert the signal line plug into one of the local test jacks.

(3) Plug an ammeter that will register approximately .060 amperes into the other local test jack. (Any device that will indicate when the circuit opens and closes, such as a Teletype unit with receiving magnets and armature, may be used.)

NOTE.—Before making any adjustments, see "General," page 2.

(4) Turn the character selecting switch to the Y position.

(5) Loosen the adjustable distributor disc clamping screws and rotate the disc clockwise until the pointer is off the calibration scale.

(6) Place the distortion switch in the EDM (End Distortion-Marking) position and rotate the motor shaft slowly in the normal direction until the brush arm approaches the beginning of the No. 5 segment of the stationary disc. Continue slowly to rotate the motor shaft until the ammeter just registers current. Allow the brush arm to remain in this position and turn the distortion switch to the BIAS S (Bias-Spacing) position. The ammeter should now register no current. Now rotate the adjustable distributor disc ring slowly counterclockwise until the ammeter again just registers current. Clamp the adjustable disc ring in this position by means of the three ring clamping screws. Then adjust the position of the indicator by means of its mounting screws, to register 0 on the calibration scale. Tighten the indicator mounting screws.

After the disc and indicator have been adjusted according to the foregoing instructions, the disc is usually set for 35% bias or end distortion; however, it may be adjusted for any value from 0 to 50%.

A Teletype Signal Distortion Test Set with stroboscope may be used to check various operations of the test set. However, an accurate check of the calibration adjustment cannot be made due to variation in speed caused by the governed motor of the test set. These speed variations will cause a wavering of the impulse as viewed on the stroboscope, making it very difficult to measure accurately the impulse length.

NOTE.—The radio filter cut-out switch should be placed in the OUT position during the time that the test set is being checked by a Teletype Signal Distortion Test Set with stroboscope, to prevent signal distortion in the form of a "tailing" effect as viewed on the stroboscope.

LUBRICATION

The oil and grease specified in the supplement furnished with this bulletin should be used to lubricate the test set.

Unless otherwise specified, one or two drops of oil at each of the places indicated will be sufficient. Use oil for lubrication at all places listed below except where the use of grease is specified.

Friction Assembly Felt Washers—Saturate.

Main Shaft—At bearings.

Code Disc Shaft—At bearings.

Contact Lever—At bearing (one drop of oil).

Contact Spring Arms—At bearings (one drop of oil).

NOTE.—Before making any adjustments, see "General," page 2.

Intermediate Shaft—At bearings.

Detent Cam.

Detent Lever.

Detent Roller.

Oil both loops of all helical springs.

All Gears—Apply a thin coat of grease.

Code Discs—Apply a thin coat of grease.

Contact Cams—Apply a thin coat of grease.

Motor—Grease through ball oilers with grease gun.

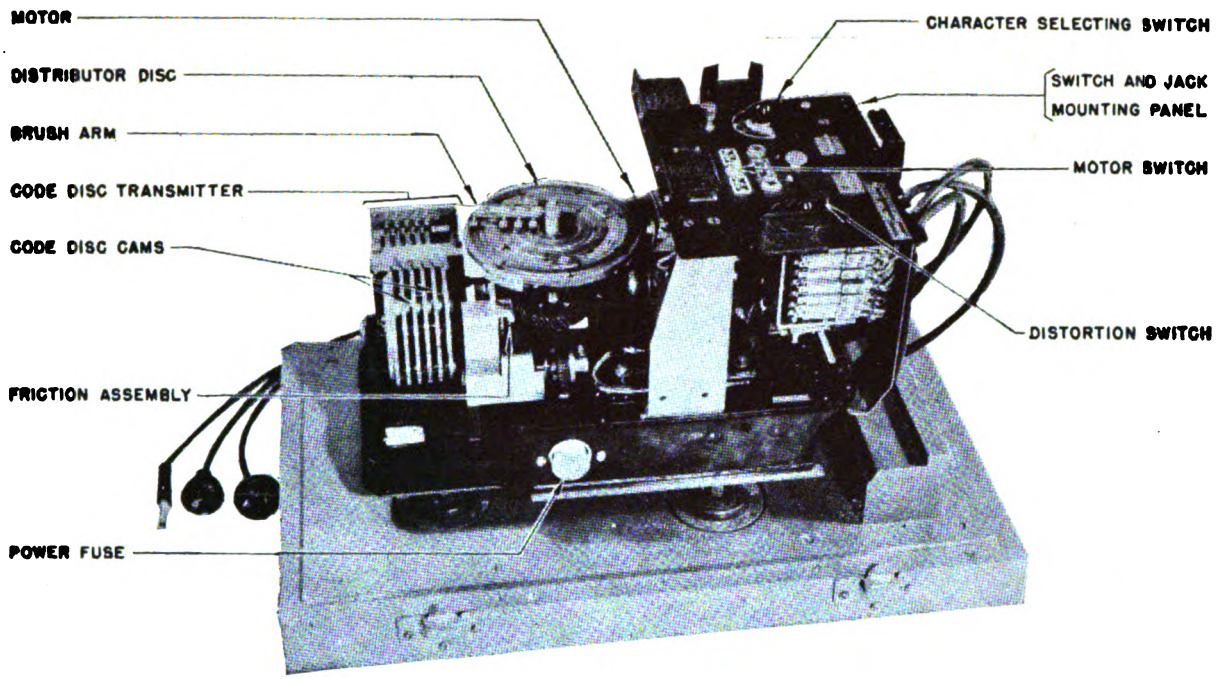


Figure 1

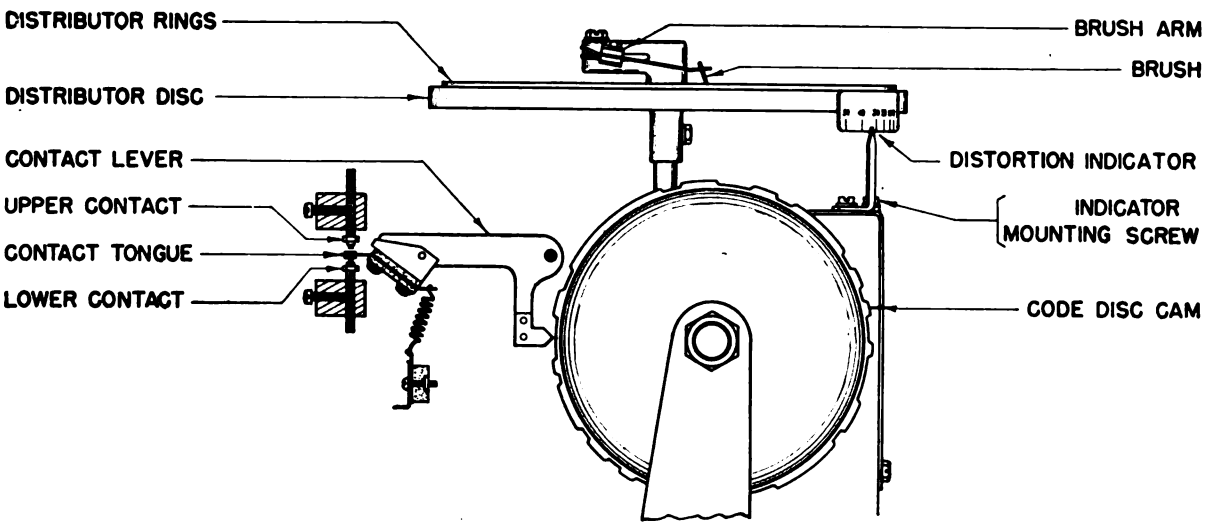


Figure 2

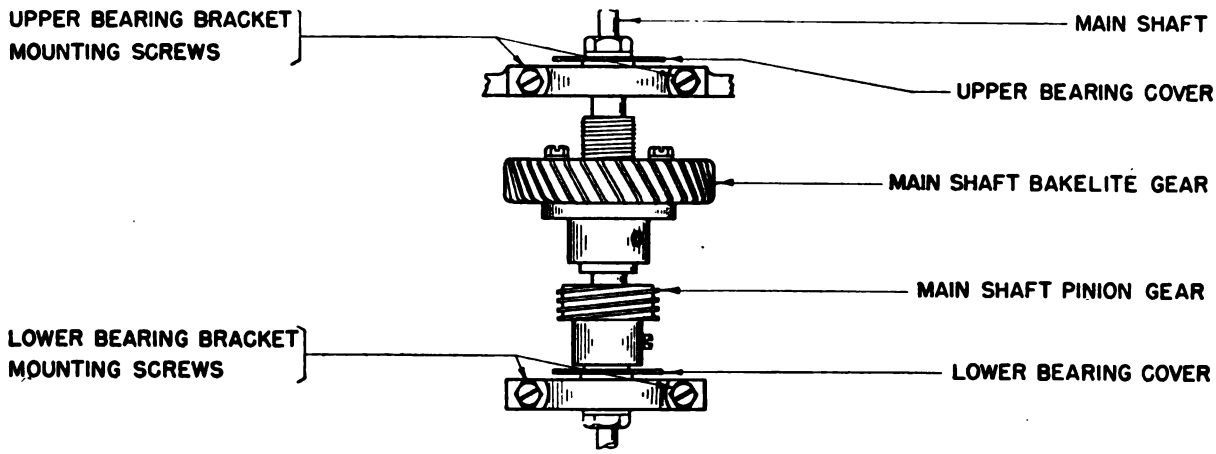


Figure 3

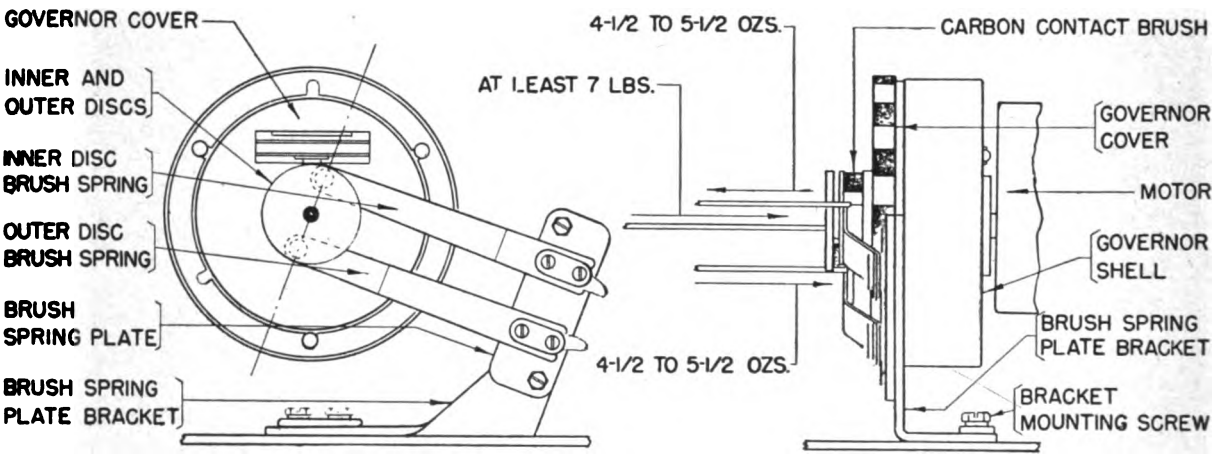


Figure 4

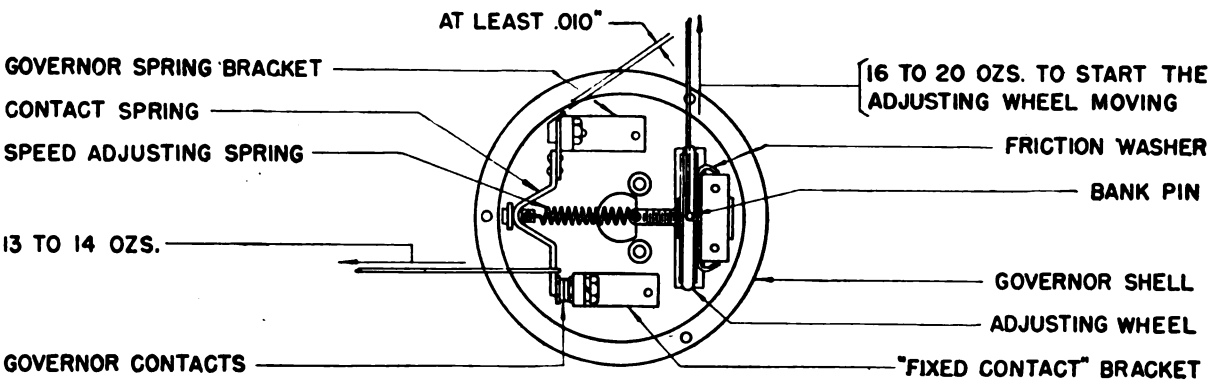


Figure 5

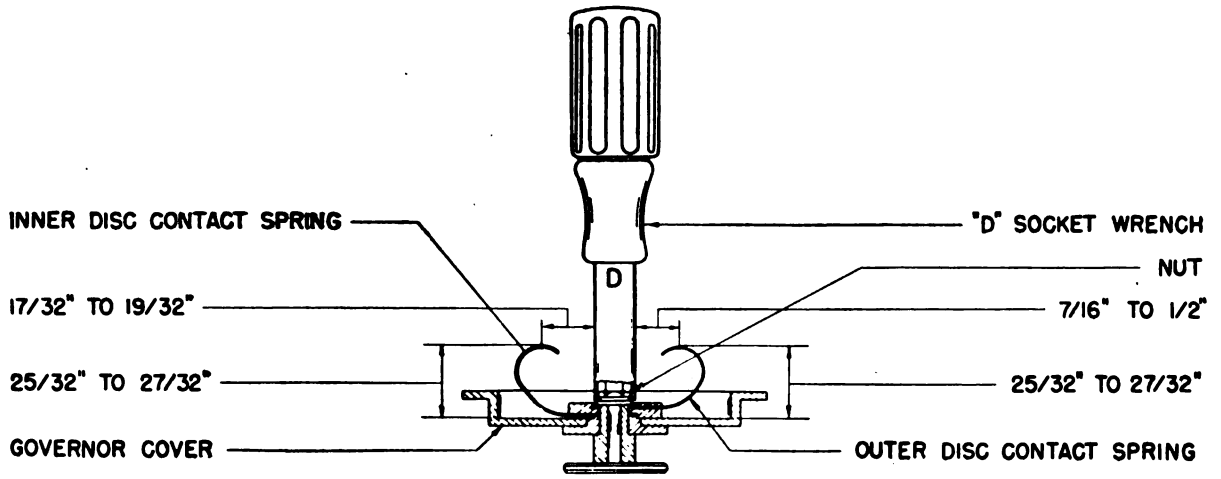


Figure 6

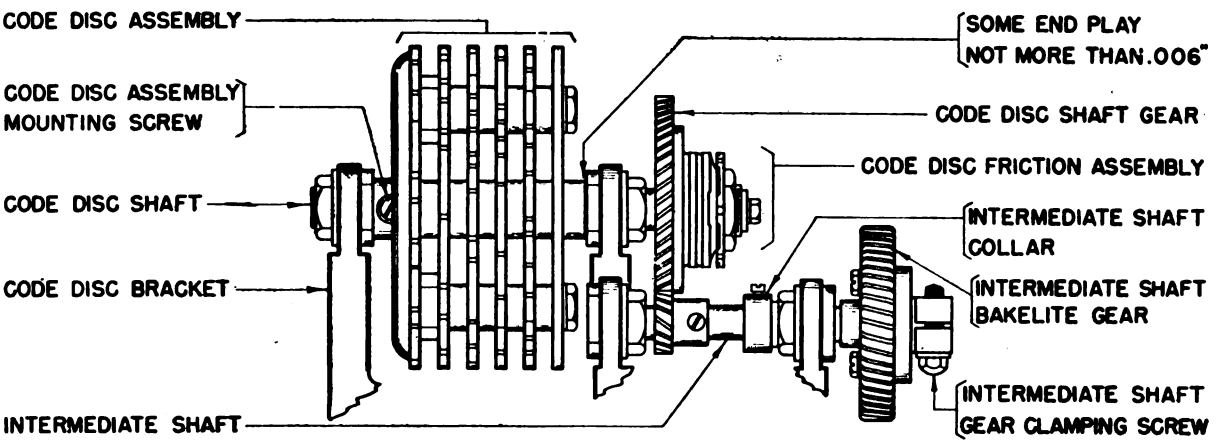


Figure 7

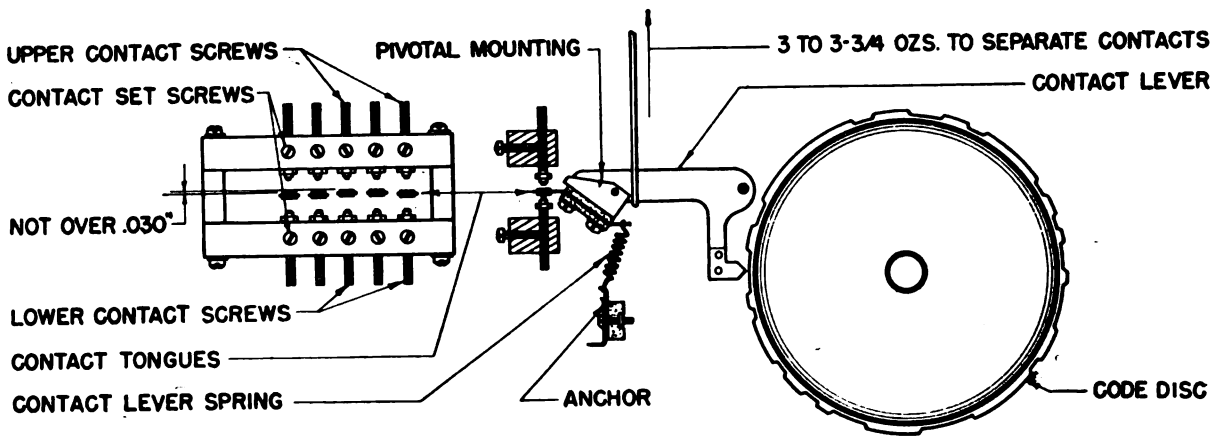


Figure 8

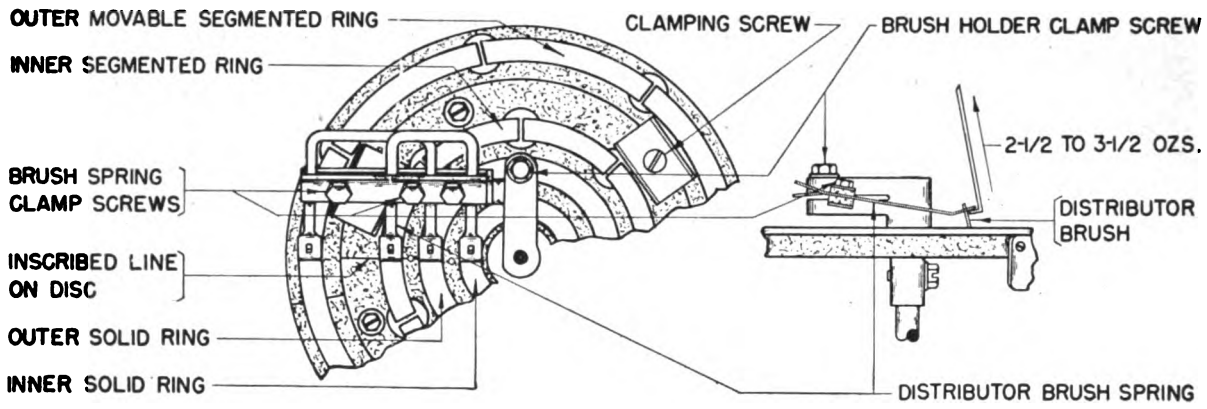


Figure 9

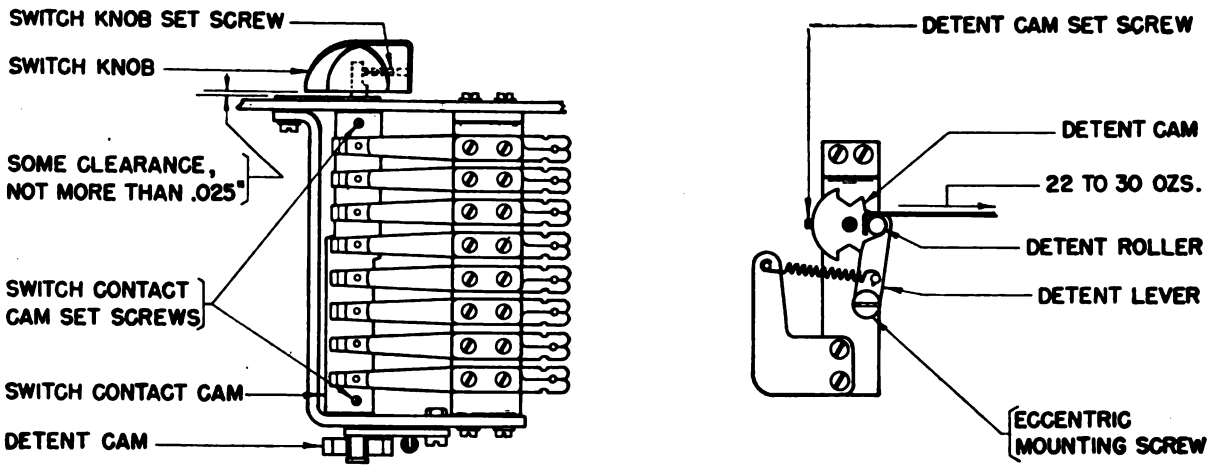
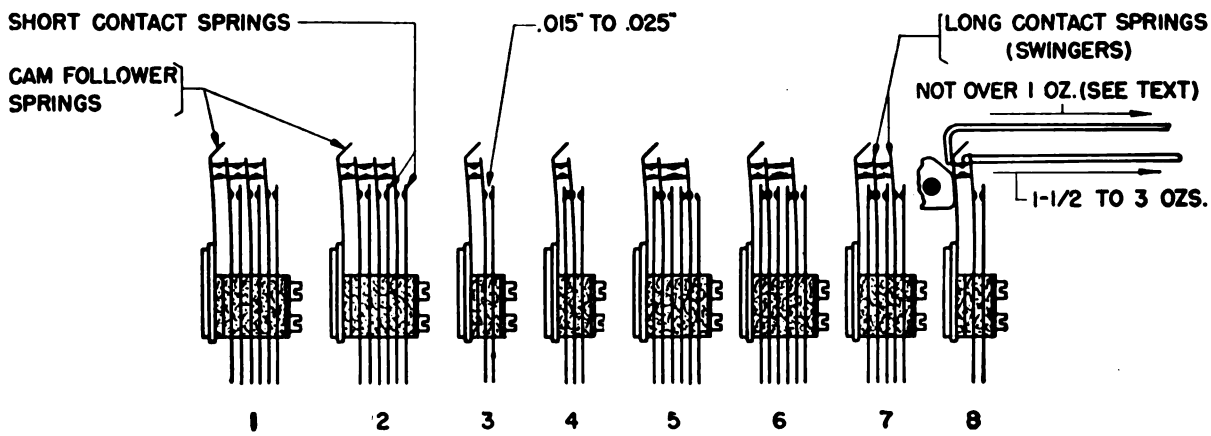


Figure 10



POSITION OF CONTACT SPRINGS WITH THE SWITCH KNOB IN ZERO POSITION

Figure 11

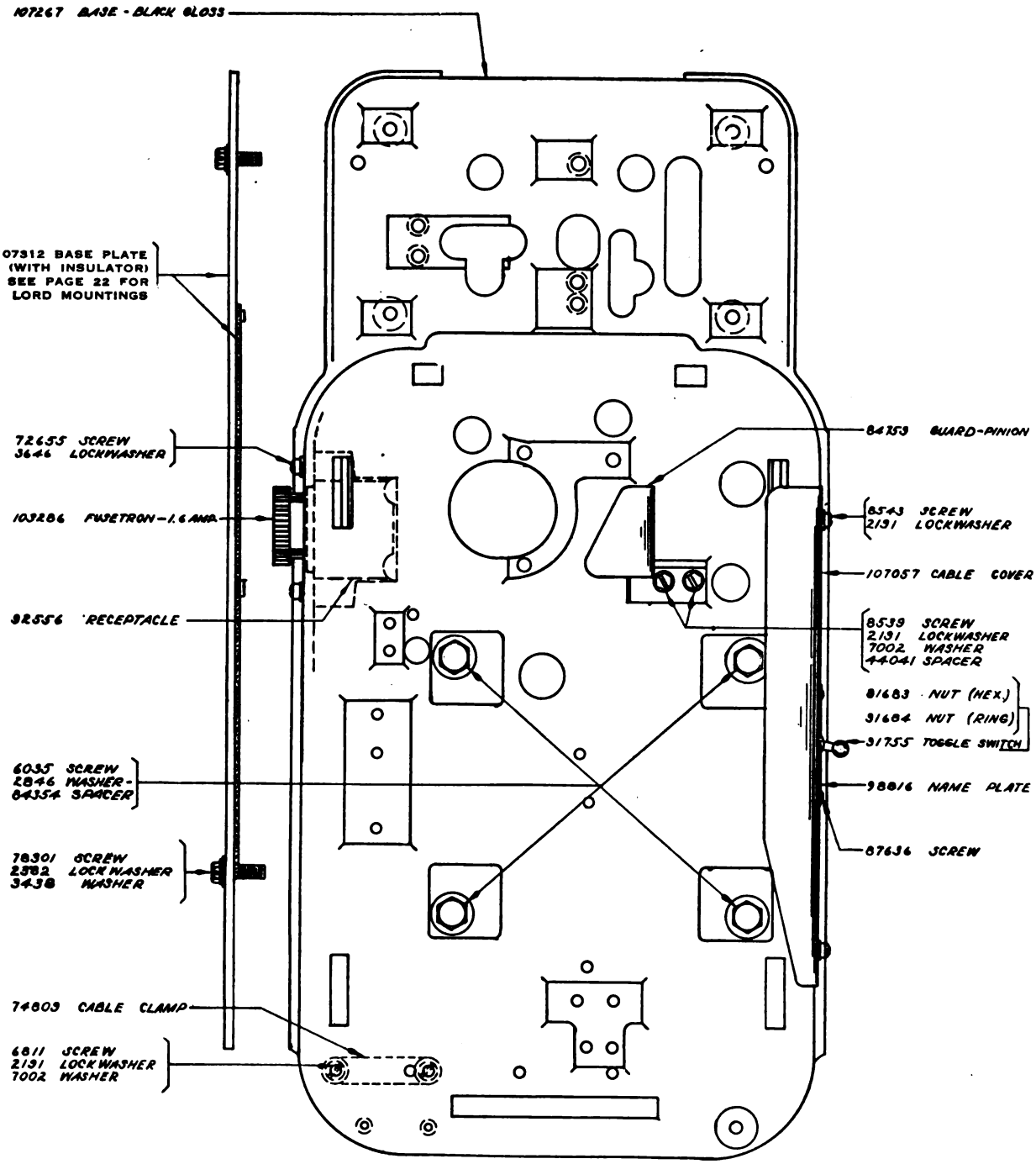
PARTS

PORTABLE SIGNAL DISTORTION TEST SET
(CODE DISC OPERATED)

SIGNAL CORPS TEST SET TS–2/TG

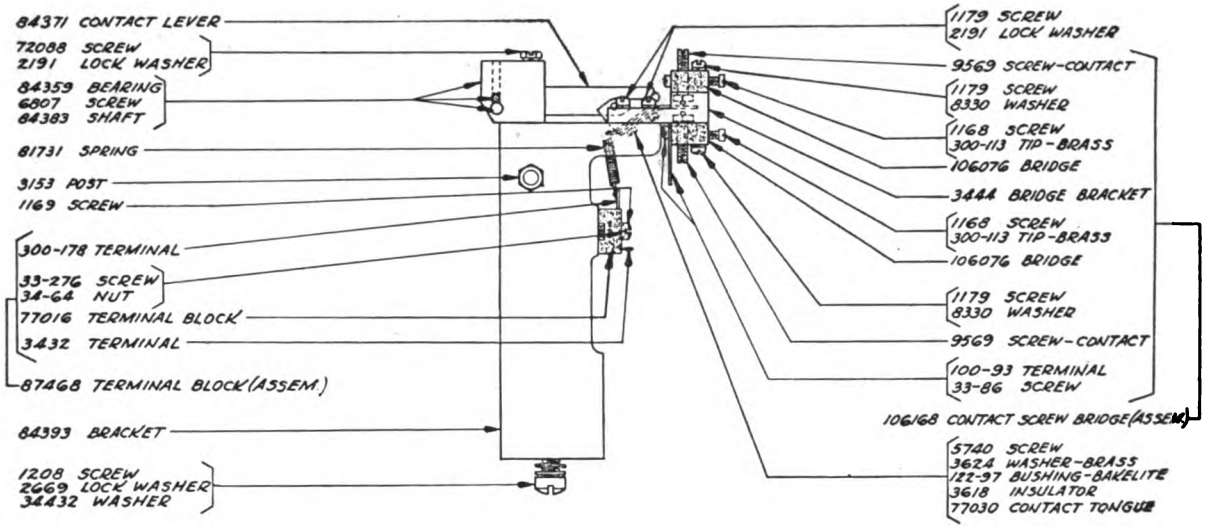
TELETYPE
ED57GG SIGNAL DISTORTION TEST UNIT
WITH 107009 CHEST

ALPHABETICAL INDEX

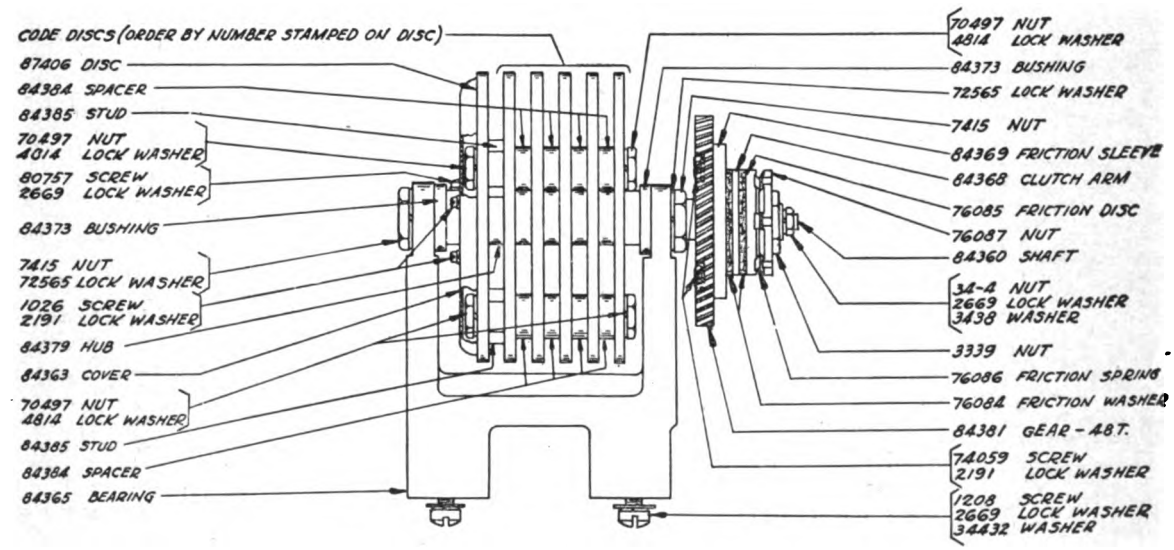


BASE

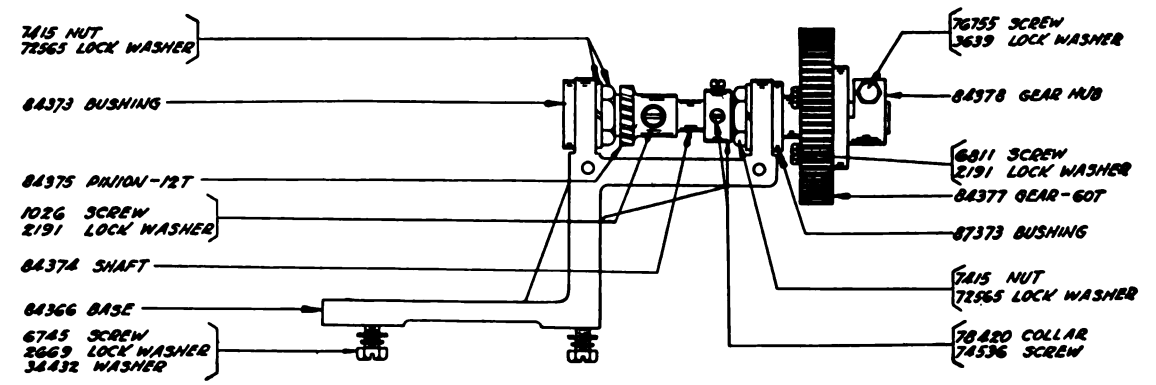
107088 LINE CABLE
107089 MOTOR CABLE
107090 TEST CIRCUIT CABLE
(W.D.-2265)



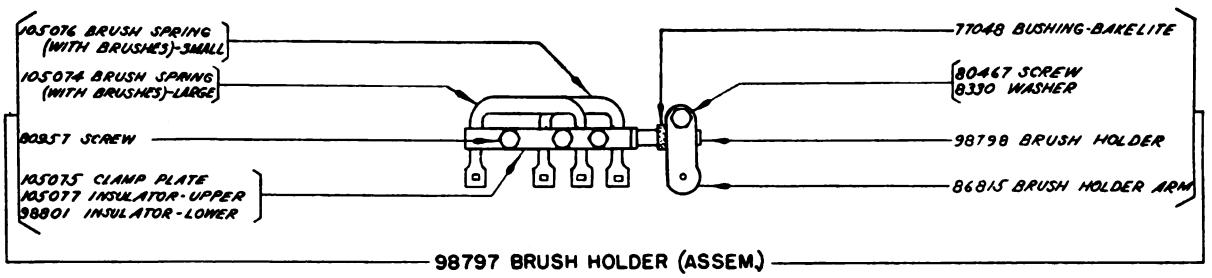
CONTACT LEVER BRACKET (ASSEM.)

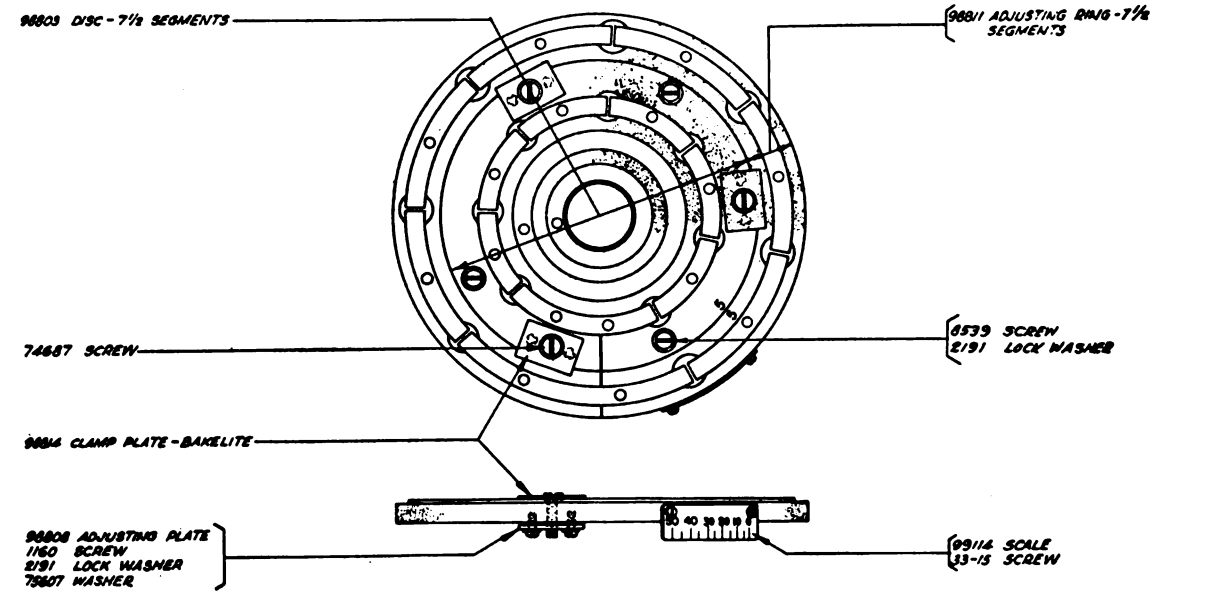


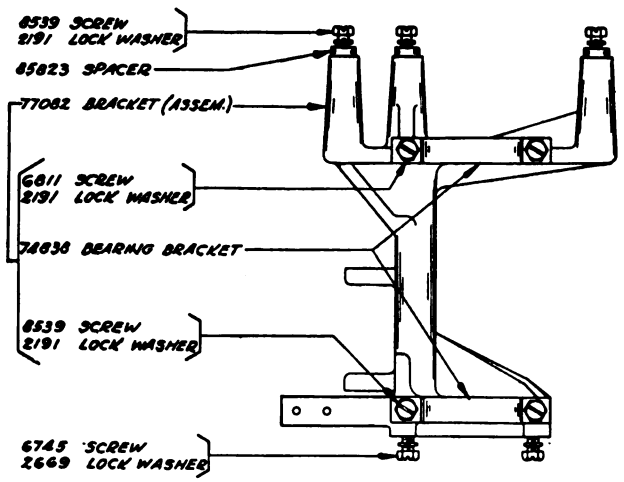
CODE DISC BEARING (ASSEM.)

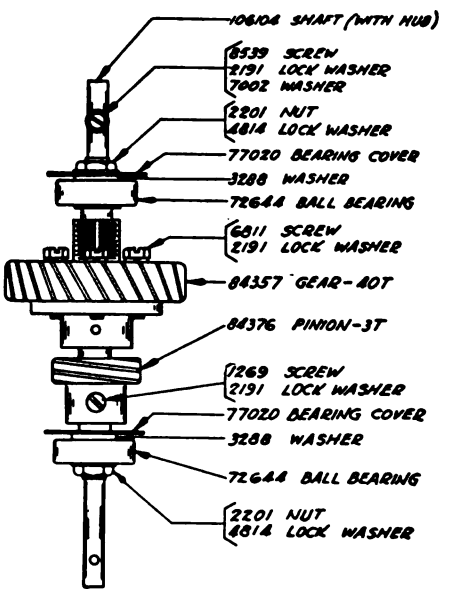


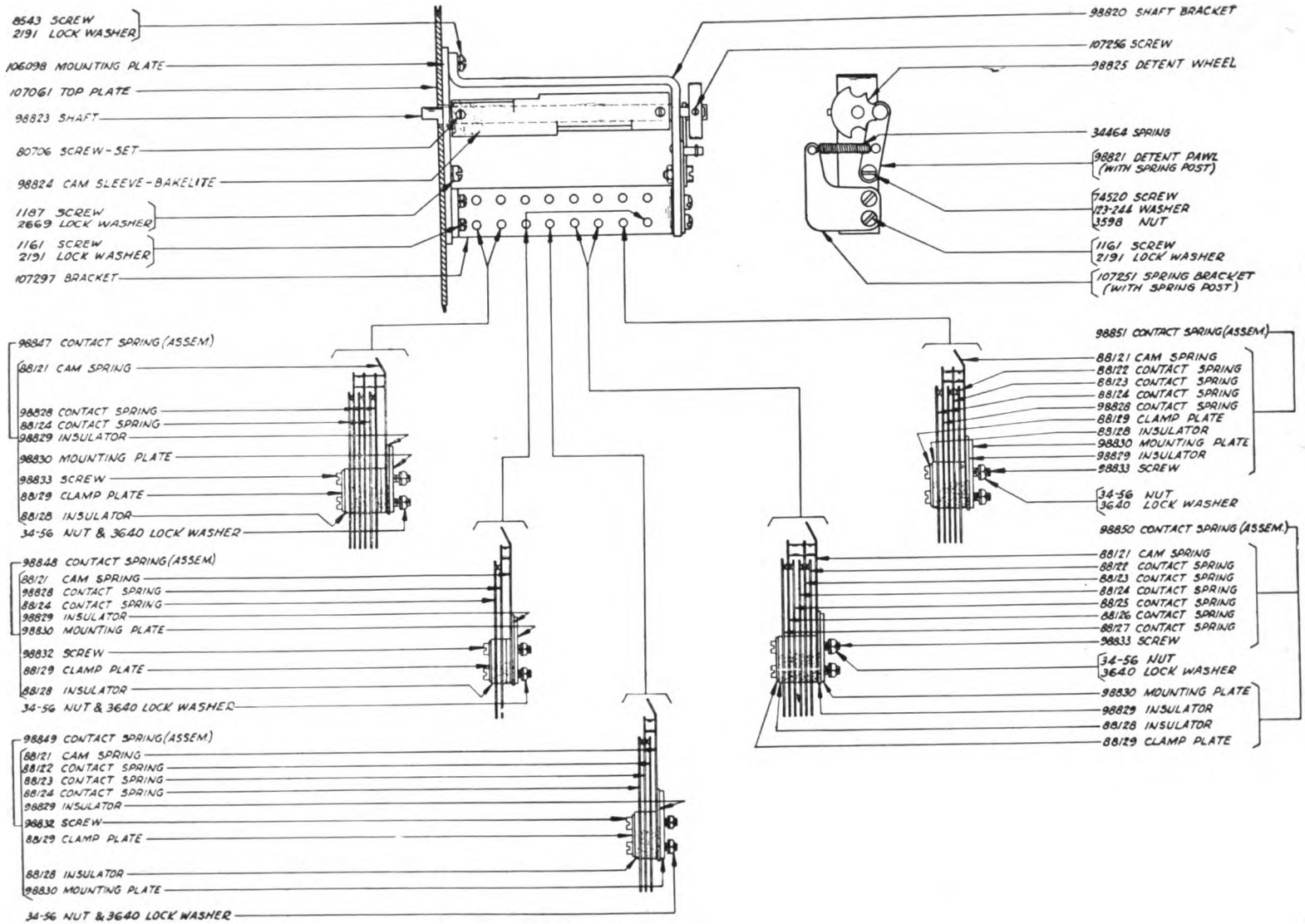
INTERMEDIATE SHAFT (ASSEM.)



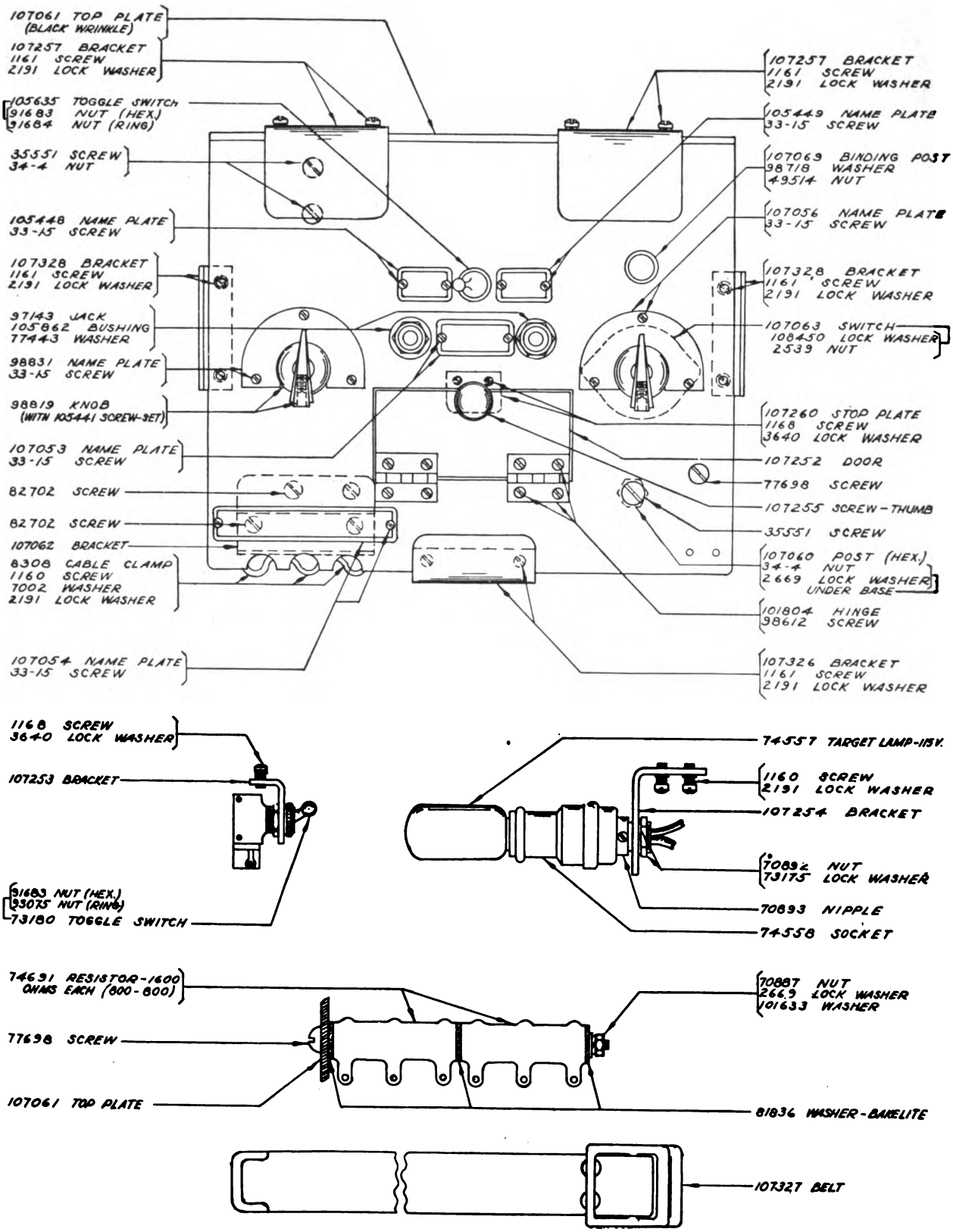


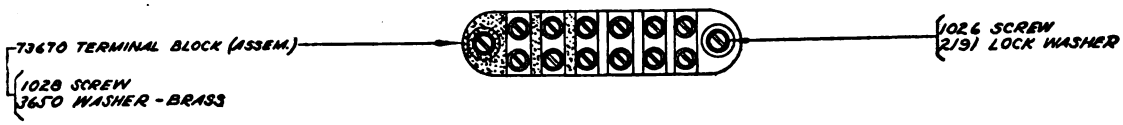


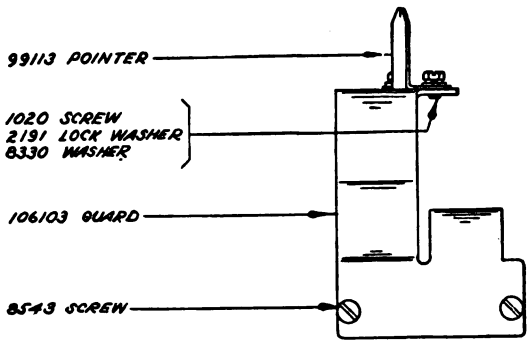




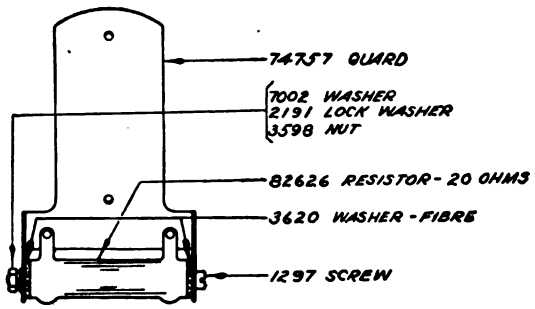
DISTORTION SWITCH (ASSEM.)



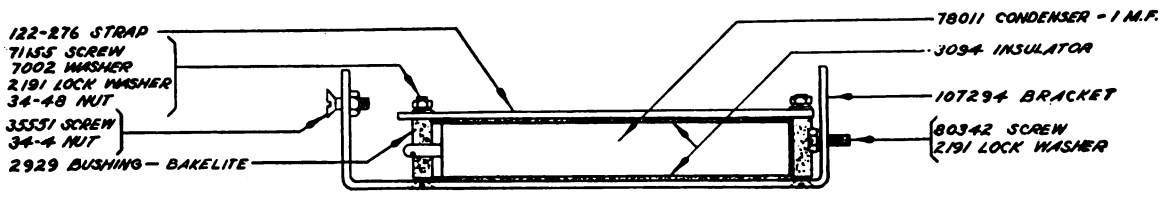




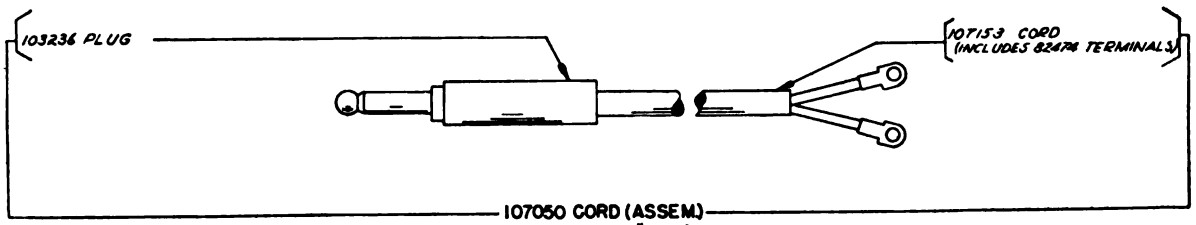
GUARD & POINTER

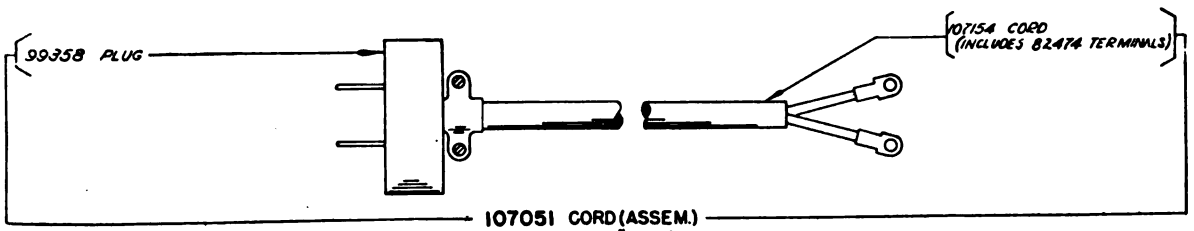


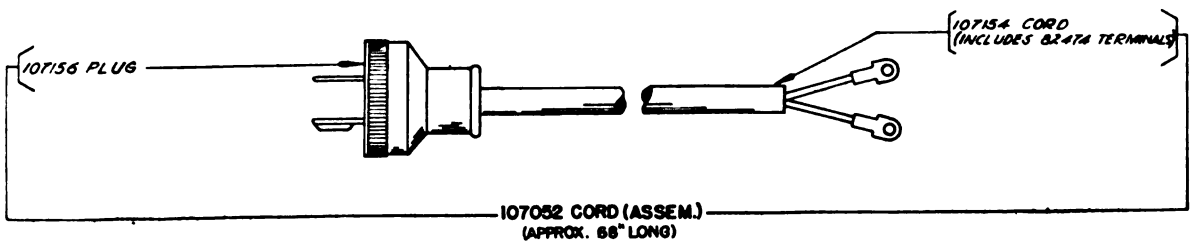
RESISTOR & BRACKET

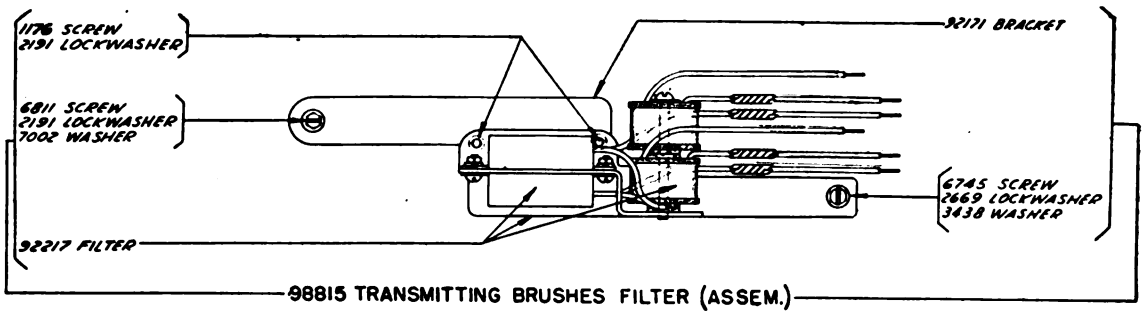


CONDENSER (ASSEM.)

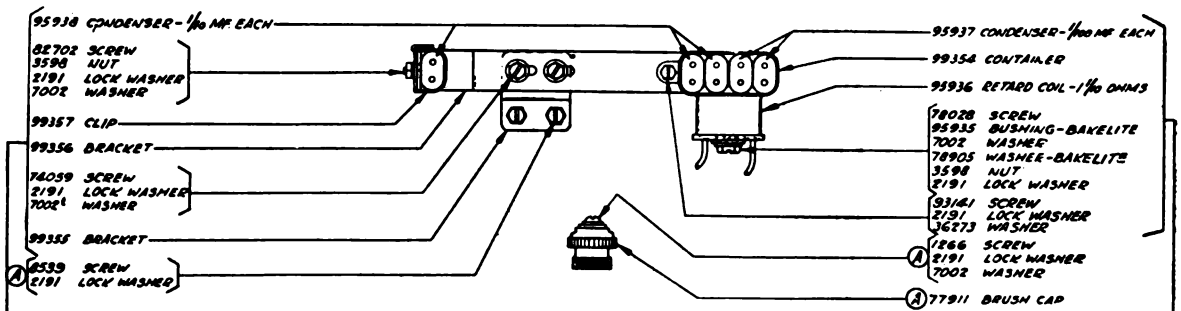




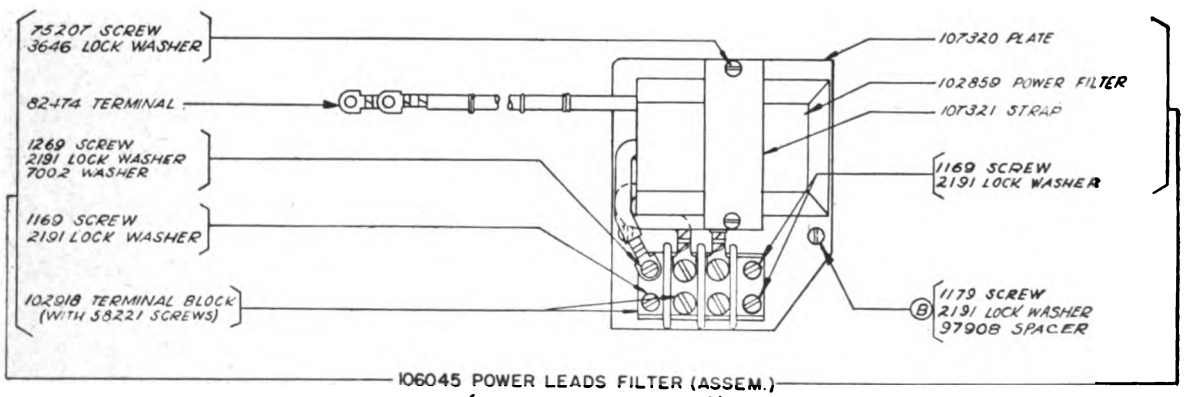




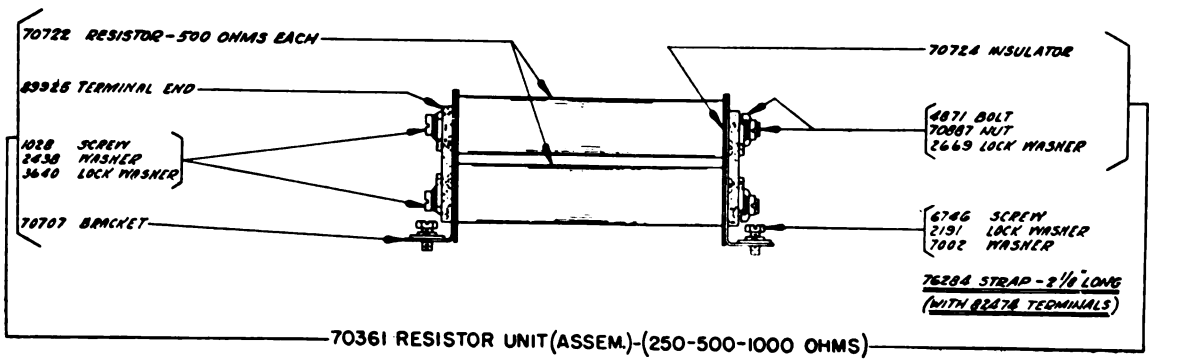
98815 TRANSMITTING BRUSHES FILTER (ASSEM.)



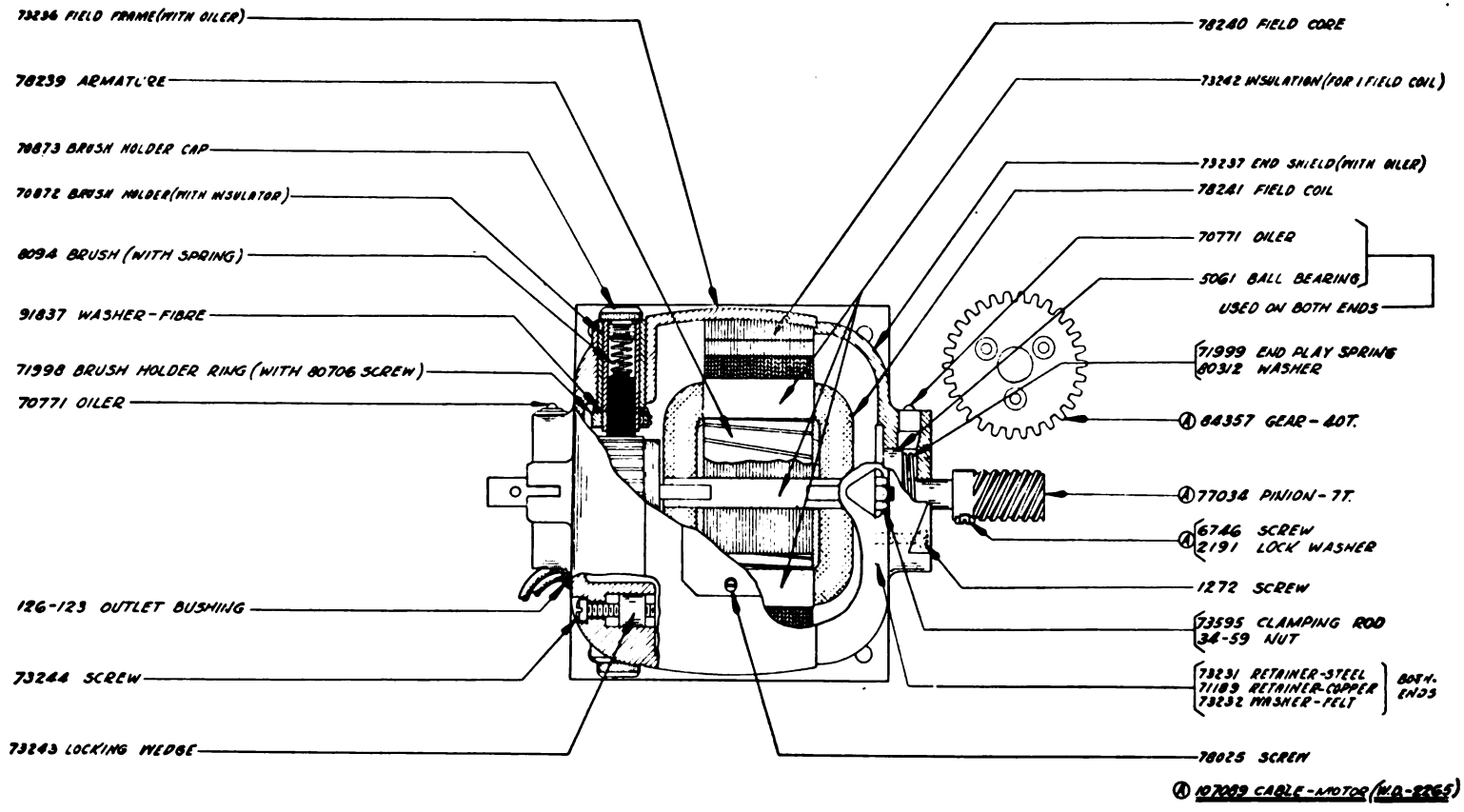
107094 MOTOR-GOVERNOR FILTER (ASSEM.)
(EXCLUDES PARTS MARKED (A))



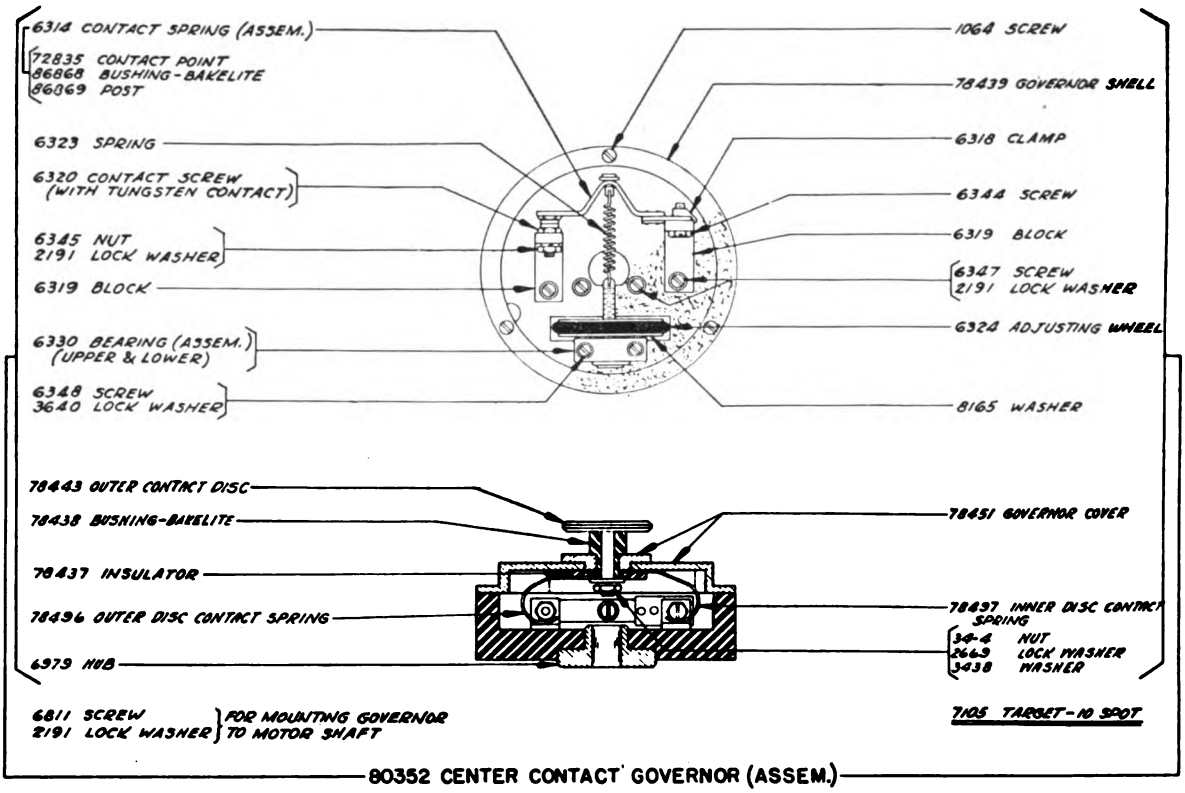
106045 POWER LEADS FILTER (ASSEM.)
(EXCLUDES PARTS MARKED (B))



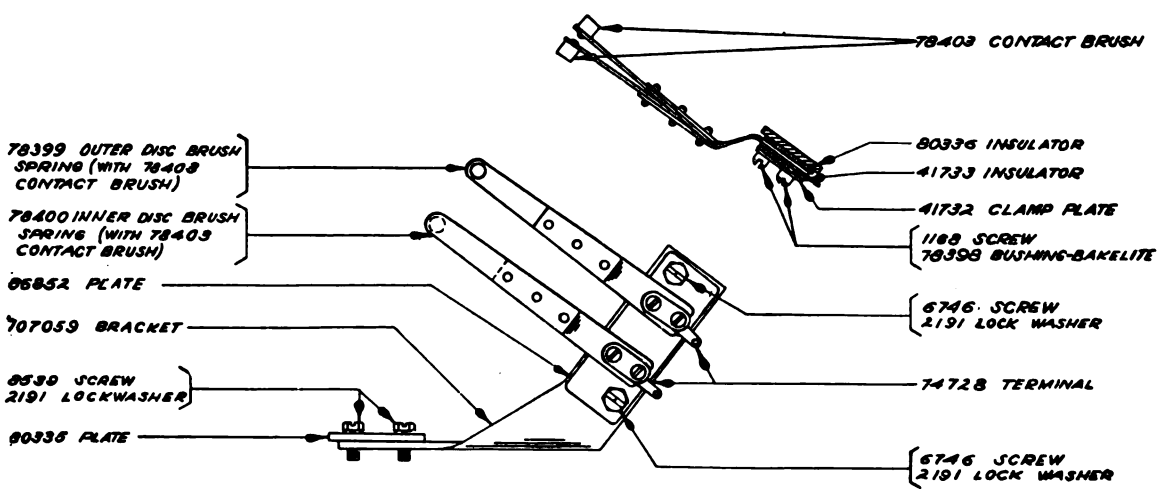
70361 RESISTOR UNIT (ASSEM.)-(250-500-1000 OHMS)



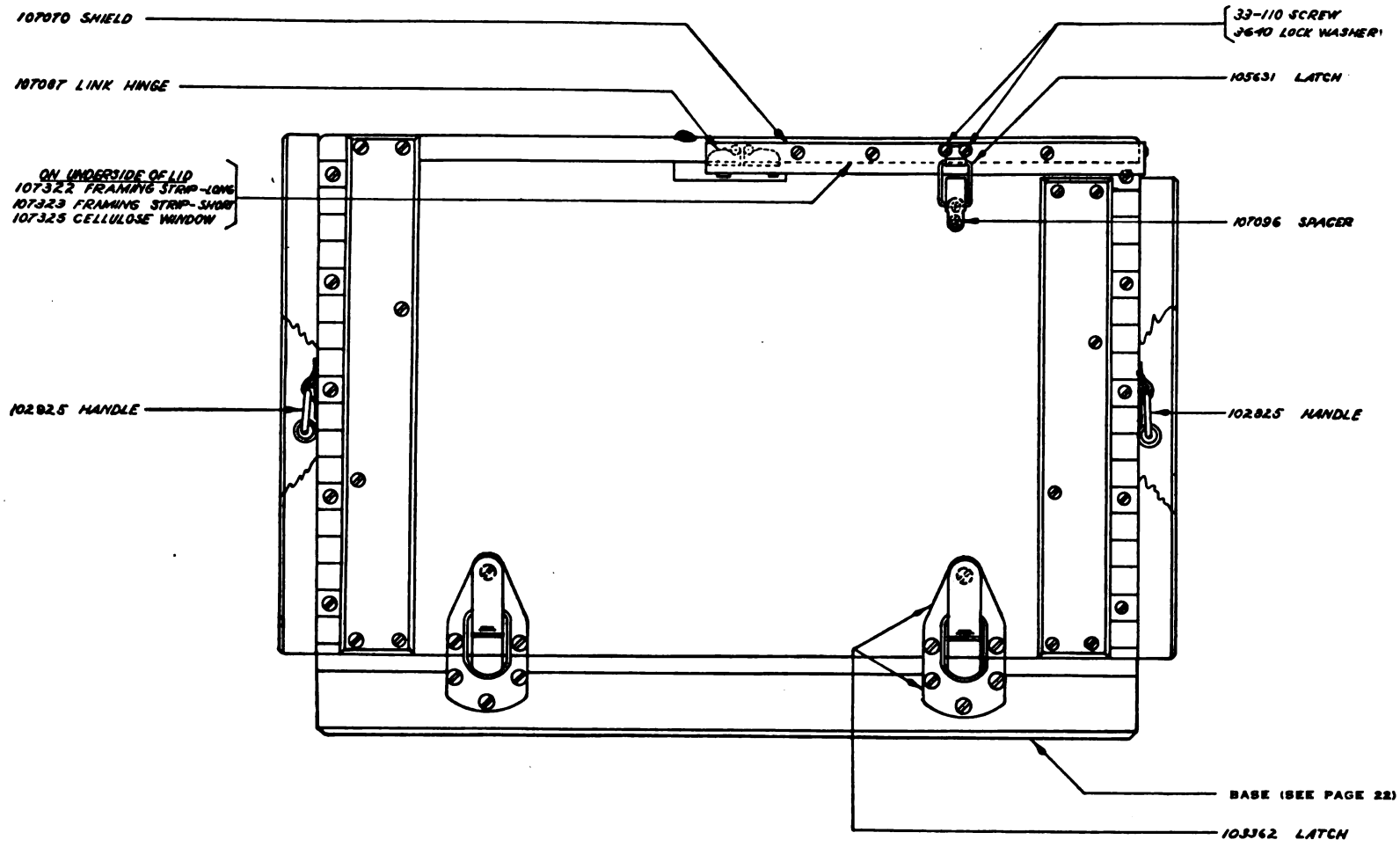
77953 GOVERNED MOTOR, 1/25 H.P., 110 V., 60 CYCLE, A.C. SERIES (G.E. MODEL 5BA65AA29)-EXCLUDES PARTS MARKED Ⓐ



80352 CENTER CONTACT GOVERNOR (ASSEM.)

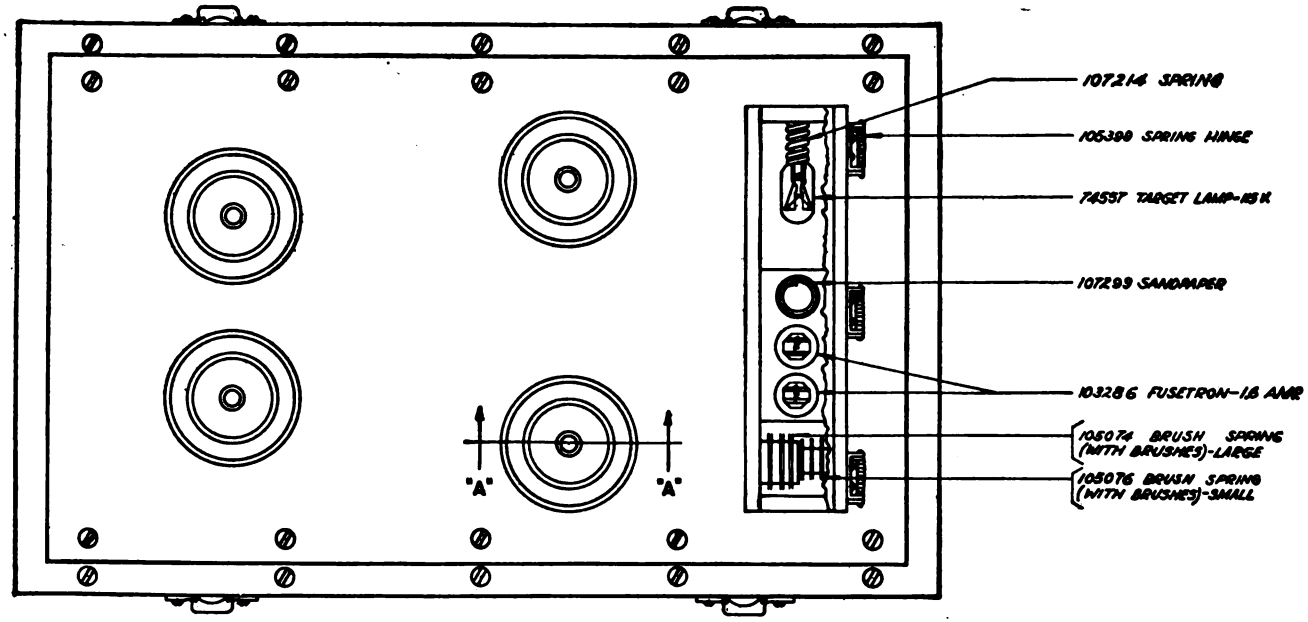


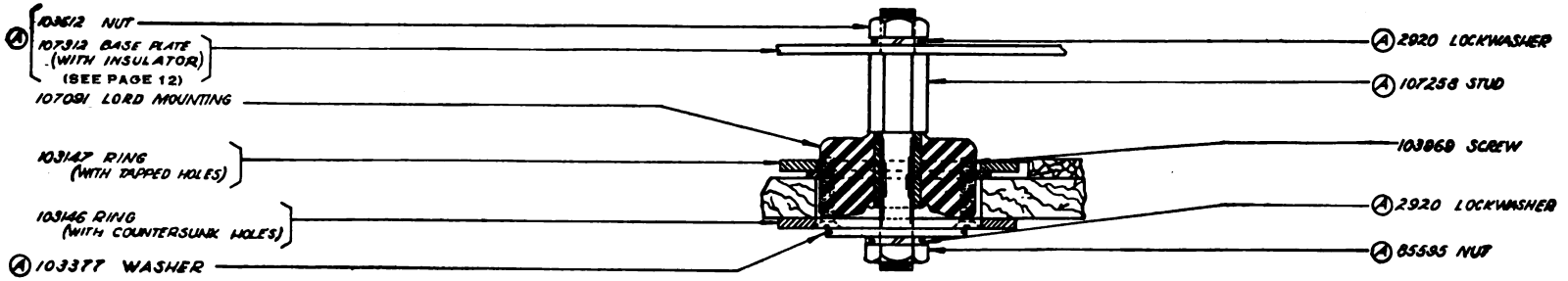
GOVERNOR BRUSH BRACKET (ASSEM.)



107009 CHEST (ASSEM.)

(SEE PAGE 22 FOR ILLUSTRATION OF BASE)





SECTION "A-A" (ENLARGED)

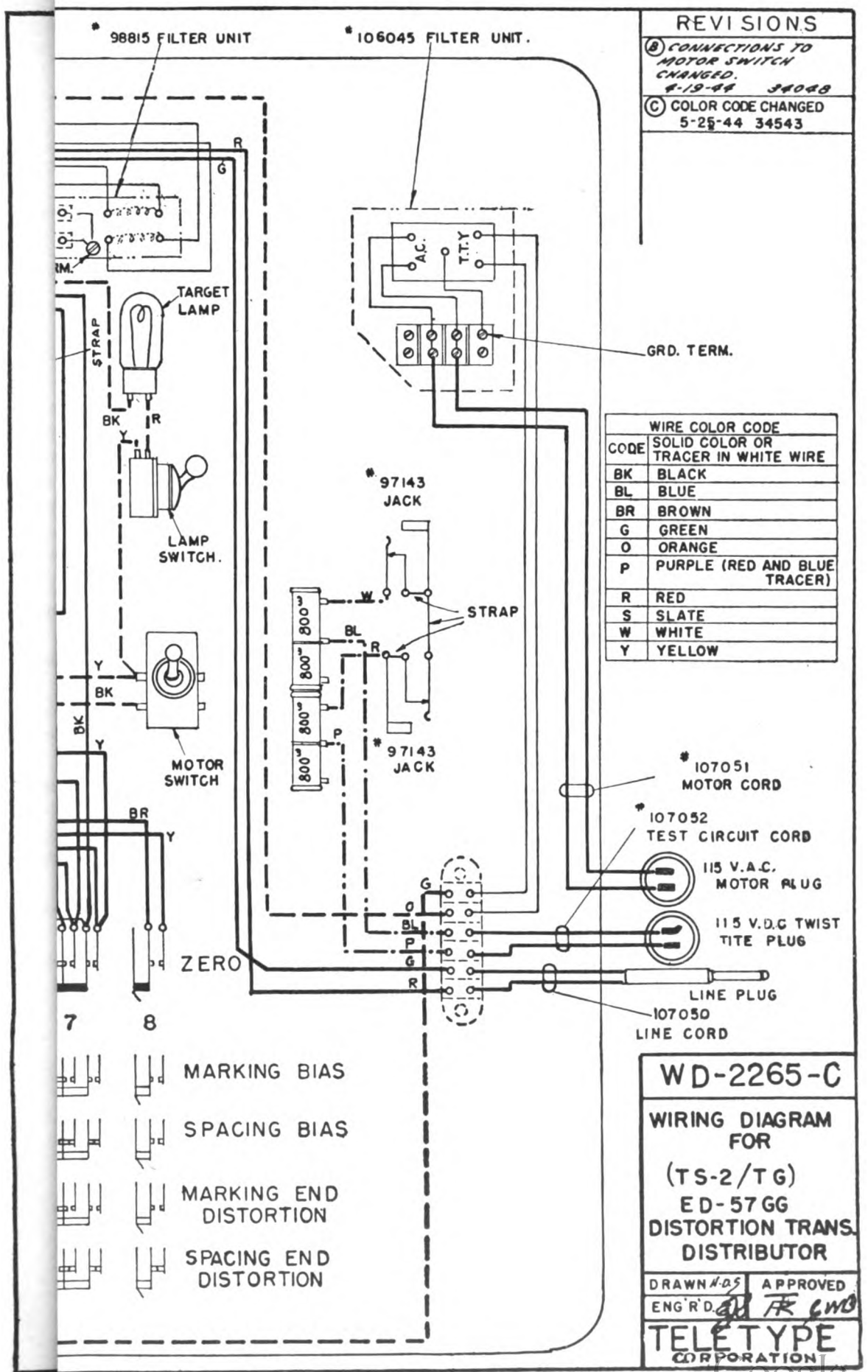
BASE– PART OF 107009 CHEST (ASSEM.) – SHOWN ON PAGE 21

(EXCLUDES PARTS MARKED Ⓐ)

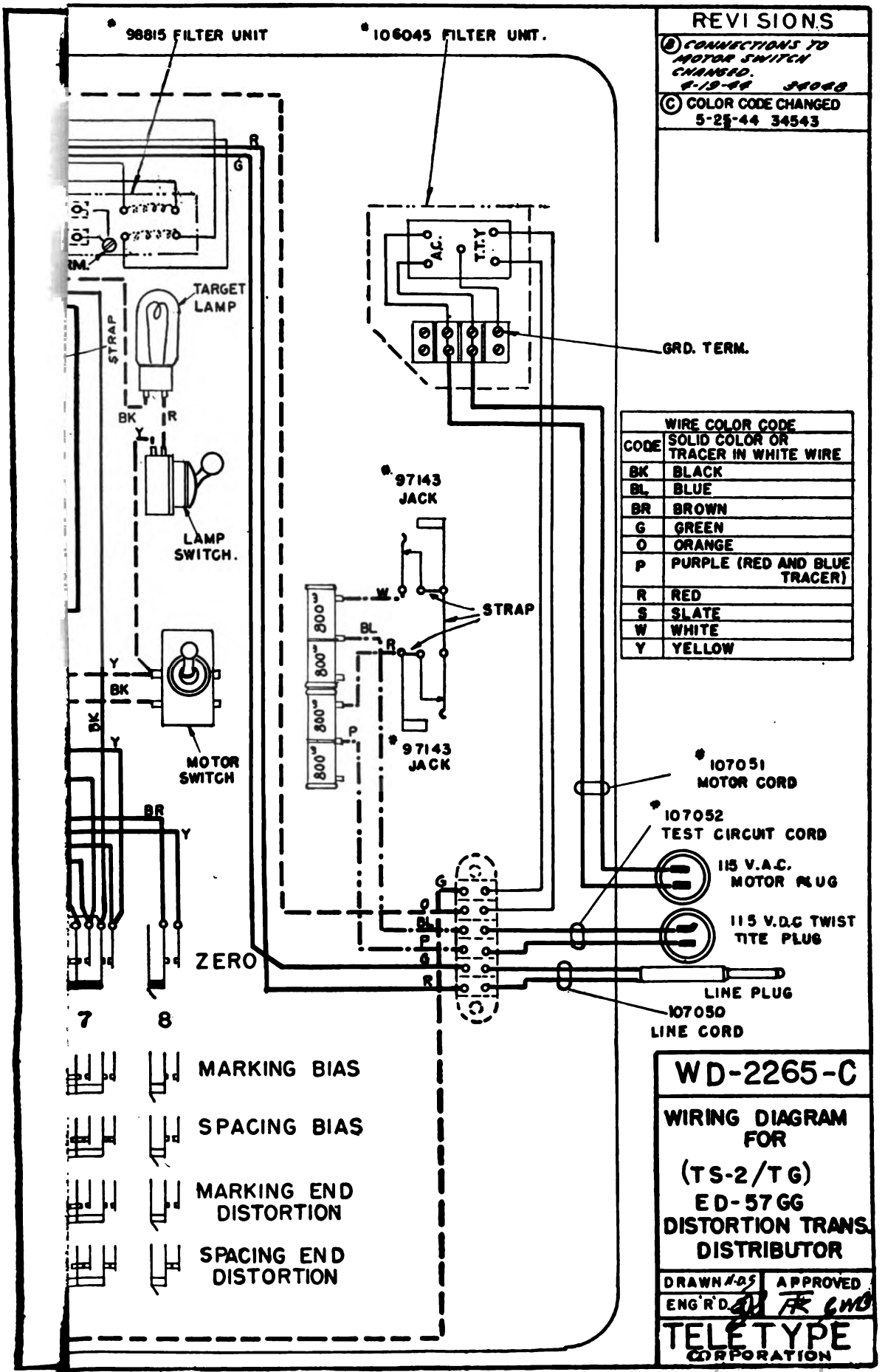
NUMERICAL INDEX

33–15 Screw (2–56x1/8), 14, 16
33–86 Screw (4–40x1/8), 13
33–110 Screw (4–40x3/16), 21
33–276 Screw (3–48x5/16), 13
34–4 Nut (10–32 Hex.), 13, 16, 20
34–48 Nut (6–32 Hex.), 17
34–56 Nut (4–40 Hex.), 15
34–59 Nut (10–30 Hex.), 19
34–64 Nut (3–48 Square), 13
100–93 Terminal, 13
122–97 Bushing—Bakelite, 13
122–276 Strap, 17
123–244 Washer, 15
126–123 Outlet Bushing, 19
300–113 Tip-brass, 13
300–178 Terminal, 13
1020 Screw (6–40x1/4), 17
1026 Screw (6–40x3/8), 13, 17
1028 Screw (4–40x1/4), 17, 18
1064 Screw (6–32x1/4), 20
1160 Screw (6–40x5/16), 14, 16
1161 Screw (6–40x1/4), 15, 16
1168 Screw (4–40x5/16), 13, 16, 20
1169 Screw (6–40x7/16), 13, 18
1176 Screw (6–40x3/16), 18
1179 Screw (6–40x5/8), 13, 18
1187 Screw (10–32x1/4), 15
1208 Screw (10–32x5/8), 13
1266 Screw (6–32x7/16), 18
1269 Screw (6–40x1/2), 14, 18
1272 Screw (6–40x11/16), 19
1297 Screw (6–40x27/16), 16
2191 Lockwasher, 12–20
2201 Nut (5/16–32 Hex.), 14
2382 Lockwasher, 12
2438 Washer, 18
2539 Nut (3/8–32 Hex.), 16
2669 Lockwasher, 13–16, 18, 20
2846 Washer, 12
2920 Lockwasher, 22
2929 Bushing—Bakelite, 17
3094 Insulator, 17
3153 Post, 13
3288 Washer, 14
3339 Nut (9/16–32 Hex.), 13
3432 Terminal, 13
3438 Washer, 12, 13, 18, 20
3444 Bridge Bracket, 13
3598 Nut (6–40 Hex.), 15, 17, 18
3618 Insulator, 13
3620 Washer—Fibre, 17
3624 Washer—Brass, 13
3639 Lockwasher, 13
3640 Lockwasher, 15, 16, 18, 20
3646 Lockwasher, 12, 18, 20
3650 Washer—Brass, 17
4814 Lockwasher, 13, 14
4871 Bolt (3/16–24x4), 18
5061 Ball Bearing, 19
5740 Screw (2–56x1/4), 13
6035 Screw (1/4–20x5/8), 12
6314 Contact Spring (Assem.), 20
6318 Clamp, 20
6319 Block, 20
6320 Screw (6–32 Contact), 20
6323 Spring, 20
6324 Adjusting Wheel, 20
6330 Bearing (Assem.), 20
6344 Screw (6–32x11/32), 20
6345 Nut (6–32 Hex.), 20
6347 Screw (6–32x3/8), 20
6348 Screw (4–36x3/4), 20
6745 Screw (10–32x1/2), 13, 14, 18
6746 Screw (6–40x5/16), 18, 19, 20
6807 Screw (6–40x3/16 Set), 13
6811 Screw (6–40x5/8), 12, 13, 14, 18, 20
6979 Hub, 20
7002 Washer, 12, 14, 16, 17, 18
7105 Target—10 spot, 20
7415 Nut (1/2–32 Hex.), 13
8094 Brush (with spring), 19
8165 Washer, 20
8308 Cable Clamp, 16
8330 Washer, 13, 14, 17
8539 Screw (6–40x1/2), 12, 14, 18, 20
8543 Screw (6–40x1/4), 13, 15, 17
9569 Screw (3–56 Contact), 13
34432 Washer, 13
34464 Spring, 15
35551 Screw (10–32x3/8), 16, 17
36273 Washer, 18
41732 Clamp Plate, 20
41733 Insulator, 20
44041 Spacer, 12
49514 Nut (8–32 Hex.), 16
58221 Screw (6–32x1/4), 18
70361 Resistor Unit (Assem.),—250–500–1000 ohms, 18
70497 Nut (5/16–32 Hex.), 13
70707 Bracket, 18
70722 Resistor—500 ohms, 18
70724 Insulator, 18
70771 Oiler, 19
70872 Brush holder (with insulator), 19
70873 Brush Holder Cap, 19
70887 Nut (3/16–24 Hex.), 16, 18
70892 Nut (1/8–27 Hex.), 16
70893 Nipple, 16
71155 Screw (6–32x1 1/4), 17
71189 Retainer—copper, 19
71998 Brush Holder Ring, 19
71999 End Play Spring, 19
72088 Screw (6–40x3/4), 13
72565 Lockwasher, 13
72644 Ball bearing, 14
72655 Screw (8–32x1/2), 12
72835 Contact point, 20
73175 Lockwasher, 16
73180 Toggle Switch (with 91683 nut—Hex. and 93075 nut—Ring), 16
73231 Retainer—steel, 19
73232 Washer—Felt, 19
73236 Field Frame (with oiler), 19
73237 End Shield (with oiler), 19
73242 Insulation (for 1 field coil), 19
73243 Locking Wedge, 19
73244 Screw (10–32x7/8), 19
73595 Clamping Rod, 19
73670 Terminal Block (Assem.), 17
74059 Screw (6–40x7/32), 13, 18
74520 Screw (6–40 Eccentric), 15
74536 Screw (6–40x5/32), 13
74557 Target Lamp—115 V, 16, 22
74558 Socket, 16
74687 Screw (6–40x5/8), 14
74691 Resistor—1600 ohms (800–800), 16
74728 Terminal, 20
74757 Guard, 17
74809 Cable Clamp, 12
74838 Bearing Bracket, 14
75207 Screw (8–32x15/8), 18
75607 Washer, 14
76084 Friction Washer, 13
76085 Friction Disc, 13
76086 Friction Spring, 13
76087 Nut (9/16–32 Special), 13
76284 Strap—2 1/8" long, 18
76755 Screw (10–32x13/16), 13
77016 Terminal Block, 13
77020 Bearing Cover, 14
77030 Contact Tongue, 13
77034 Pinion—7T, 19
77048 Bushing—Bakelite, 14
77082 Bracket (Assem.), 14
77443 Washer, 16
77698 Bolt (3/16–24x45/8), 16
77911 Brush, Cap, 18
77953 Governed Motor, 1/25 H.P. 110V., 60 cycle, A.C. Series (G.E. Model 5BA65AA29), 19
78011 Condenser—1 MF., 17
78025 Screw (4–48x3/16), 19
78028 Screw (6–40x15/16), 18
78239 Armature, 19
78240 Field Core, 19
78241 Field Coil, 19
78301 Screw (10–32x5/8), 12
78398 Bushing—Bakelite, 20
78399 Outer Disc Brush Spring (with 78403 contact brush), 20
78400 Inner Disc Brush Spring (with 78403 contact brush), 20
78403 Contact Brush, 20
78420 Collar, 13
78437 Insulator, 20
78438 Bushing—Bakelite, 20
78439 Governor Shell, 20
78443 Outer Contact Disc, 20
78451 Governor Clamp, 20
78496 Outer Disc Contact Spring, 20
78497 Inner Disc Contact Spring, 20
78905 Washer—Bakelite, 18
80312 Washer, 19
80335 Plate, 20
80336 Insulator, 20
80342 Screw (6–40x23/64), 17
80352 Center Contact Governor (Assem.), 20
80467 Screw (6–40x3/8), 14
80706 Screw (6–40x3/16), 15, 19
80757 Screw (10–32x1/2), 13
80957 Screw (4–40x1/4), 14
81731 Spring, 13
81836 Washer—Bakelite, 16
82474 Terminal, 17
82626 Resistor—20 ohms, 17
82702 Screw (6–40x9/32), 16, 18
84354 Spacer, 12
84357 Gear—40T, 14, 19
84359 Bearing, 13
84360 Shaft, 13
84363 Cover, 13
84365 Bearing, 13
84366 Base, 13
84368 Clutch Arm, 13
84369 Friction Sleeve, 13
84371 Contact Lever, 13
84373 Bushing, 13
84374 Shaft, 13
84375 Pinion—12T, 13
84376 Pinion—3T, 14
84377 Gear—60T, 13
84378 Gear Hub, 13
84379 Hub, 13
84381 Gear—48T, 13
84383 Shaft, 13
84384 Spacer, 13
84385 Stud, 13
84393 Bracket, 13
84759 Guard-Pinion, 12
85595 Nut (3/8–16 Hex.), 22

NUMERICAL INDEX



NUMERICAL INDEX



LUBRICATION SUPPLIES AND DIRECTIONS FOR USE

The following lubricants have been standardized for use on all types of Teletype apparatus:

88970 1 Qt. of KS–7470 Oil
88971 1 Gal. of KS–7470 Oil
88973 1 Lb. of KS–7471 Grease
88975 KS–8319 Grease Gun
97116 4–oz. Tube of KS–7471 Grease

The above grease is recommended instead of oil for lubricating motors equipped with ball bearings. The 88975 grease gun should be used for injecting grease into the bearings of Teletype ball bearing motors. The gun may be used also for applying grease to other parts of the apparatus and no other grease container need be carried. If this grease gun is not available, the oil listed in the foregoing should be substituted for lubricating ball bearing motors.

Instructions for Filling the Grease Gun

1. Unscrew the lubricant tube from the cap casting of the grease gun.

2. Insert fresh lubricant through the open end of the tube with the fingers. Apply gradually to eliminate air pockets.

3. Tamp the lubricant down solidly in the tube by pounding the closed end solidly against the palm of the hand. Continue to add lubricant until the tube is completely filled and the metal follower rests against the perforated tube cover.

4. Fill the cap casting with lubricant flush to the bottom side of the tube threads.

5. Screw the lubricant tube into the cap casting part way only. Then insert a pencil or rod through the perforated tube cover and exert pressure against the metal follower so as the expel any entrapped air past the tube threads. When lubricant begins to ooze through the threads, tighten the lubricant tube securely in the cap casting.

6. Operate the handle back and forth for several strokes or until lubricant is pumped from the nozzle. The gun is then ready for use. If the lubricant does not flow from the nozzle in a solid stream, it is an indication that all air has not been expelled from the lubricant tube. Invert the gun and pound the cap casting end against the palm of the hand to jar the lubricant into the pump cylinder.

Instructions for Lubricating Motor Ball Bearings

The motor bearings are packed with grease before the motor leaves the factory and under ordinary operating conditions need no additional lubrication for approximately two months. At the regular lubricating intervals one or two strokes of the plunger of the gun should apply sufficient grease to each bearing. To lubricate, press the nozzle of the gun against the ball oiler and force the grease into the hole by pushing on the plunger of the gun. Care should be taken that the bearings are not overloaded. Overloading will result in the grease oozing out of the end castings and being forced into the motor or being thrown on other parts of the mechanism. After lubricating, the motor should be run for a few minutes and then any excess grease that has been forced out of the ends of the castings should be wiped off. Each time that the gun is used for lubricating a motor bearing, the plunger should first be depressed slightly to make sure that grease will be delivered.

SUPPLEMENT
to
TECHNICAL MANUAL
TEST SET TS-2/TG
19 APRIL 1944

The following information, published on Order No. 25798-Phila-44, supplements TM 11-2208, 19 April 1944. This supplementary information consists of a maintenance parts list with Signal Corps stock numbers for Test Set TS-2/TG.

NOTE: UNSATISFACTORY PERFORMANCE OF THIS EQUIPMENT WILL BE REPORTED IMMEDIATELY ON WD, AGO FORM NO. 468. IF FORM IS NOT AVAILABLE, SEE TM 38-250.

MAINTENANCE PARTS LIST FOR TEST SET TS–2/TG

NOTE—*Order maintenance parts by stock number, name, and description.*

‡Ref symbol	Signal Corps stock No.	Name of part and description	Quan per unit	Mfrs part and code No.	†Station stock	†Region stock
.....	4ED57GG	TEST SET TS–2/TG: complete	1	.....	.....	*
.....	4T5061	BEARING: ball	2	.....	.....	*
.....	4T6314	SPRING ASSEMBLY: contact	1	.....	.....	*
.....	4T6320	SCREW: contact; with tungsten tip	1	.....	*	*
.....	4T6323	SPRING: retractile; spiral	1	.....	.....	*
.....	4T6330	BEARING ASSEMBLY	2	.....	.....	*
.....	4T7105	TARGET: 10-spot	1	.....	.....	*
.....	4T8094	BRUSH: commutator; with spring	2	.....	*	*
.....	4T9569	SCREW: contact	2	.....	*	*
.....	4T34464	SPRING: retractile; spiral	1	.....	.....	*
.....	4T70361	RESISTOR UNIT ASSEMBLY: 250-, 500-, 1,000-ohm	1	.....	.....	*
.....	4T70722	RESISTOR: 500-ohm	2	.....	.....	*
.....	4T70873	CAP: brush holder	2	.....	.....	*
.....	4T71999	SPRING: end play	1	.....	.....	*
.....	4T72644	BEARING: ball	2	.....	.....	*
.....	4T72835	POINT: contact	1	.....	*	*
.....	4T73180	SWITCH: toggle	1	.....	.....	*
.....	4T74557	LAMP: target; 115-v	1	.....	*	*
.....	4T74558	SOCKET: lamp; target	1	.....	.....	*
.....	4T74691	RESISTOR: 800-ohm	1	.....	.....	*
.....	4T76084	WASHER: friction	2	.....	.....	*
.....	4T76085	DISC: friction	1	.....	.....	*
.....	4T76086	SPRING: friction	1	.....	.....	*
.....	4T77034	PINION: 7-tooth	1	.....	.....	*
.....	4T77953	MOTOR: series-governed; 1/25-hp; GE model 5BA65AA29; (110-v a-c, 60-cycle)	1	.....	.....	*
.....	4T78011	CAPACITOR: 1-mf	1	.....	.....	*
.....	4T78399	SPRING: brush; outer disc with No. 78403 contact brush	1	.....	.....	*
.....	4T78400	SPRING: brush; inner disc with No. 78403 contact brush	1	.....	.....	*
.....	4T78443	DISC: outer contact	1	.....	.....	*
.....	4T78496	SPRING: contact; outer disc	1	.....	.....	*
.....	4T78497	SPRING: contact; inner disc	1	.....	.....	*
.....	4T80352	GOVERNOR ASSEMBLY: motor; center-contact	1	.....	.....	*
.....	4T82626	RESISTOR: 20-ohm	1	.....	.....	*
.....	4T84357	GEAR: 40-tooth	1	.....	.....	*
.....	4T84359	BEARING	1	.....	.....	*
.....	4T84368	ARM: clutch	1	.....	.....	*
.....	4T84369	SLEEVE: friction	1	.....	.....	*
.....	4T84371	LEVER: contact	1	.....	.....	*
.....	4T84375	PINION: 12-tooth	1	.....	.....	*
.....	4T84376	PINION: 3-tooth	1	.....	.....	*
.....	4T84377	GEAR: 60-tooth	1	.....	.....	*
.....	4T84381	GEAR: 48-tooth	1	.....	.....	*
.....	4T87406	DISC	1	.....	.....	*
.....	4T91755	SWITCH: toggle	1	.....	.....	*
.....	4T92556	RECEPTACLE: fusetron	1	.....	.....	*
.....	4T95936	COIL: retardation; filter assembly; 1-1/10-ohm	2	.....	.....	*

† Parts not stocked in station or region stock are carried in depot stock.
* Indicates stock available.
‡ Reference symbols appearing on illustrations are stock numbers less "4T."

MAINTENANCE PARTS LIST FOR TEST SET TS–2/TG (contd)

NOTE—*Order maintenance parts by stock number, name, and description.*

‡Ref symbol	Signal Corps stock No.	Name of part and description	Quan per unit	Mfrs part and code No.	†Station stock	†Region stock
.....	4T95937	CAPACITOR: filter assembly; 0.01-mf	2	.....	.....	*
.....	4T95938	CAPACITOR: filter assembly; 0.1-mf	3	.....	.....	*
.....	4T97143	JACK	2	.....	.....	*
.....	4T98797	BRUSH HOLDER ASSEMBLY	.....	.....	.....	.....
.....	4T98803	DISC: 7½-segment	6	.....	.....	*
.....	4T98815	FILTER ASSEMBLY: transmitting brush	1	.....	.....	*
.....	4T98819	KNOB: handle for No. 107063 switch	2	.....	.....	*
.....	4T98821	PAWL: detent with spring post	1	.....	.....	*
.....	4T98847	SPRING ASSEMBLY: contact	1	.....	.....	*
.....	4T98848	SPRING ASSEMBLY: contact	1	.....	.....	*
.....	4T98849	SPRING ASSEMBLY: contact	1	.....	.....	*
.....	4T98850	SPRING ASSEMBLY: contact	1	.....	.....	*
.....	4T98851	SPRING ASSEMBLY: contact	1	.....	.....	*
.....	4T99113	POINTER	2	.....	.....	*
.....	4T102859	FILTER: power-lead	1	.....	.....	*
.....	4T103286	FUSETRON: 1.6-amp	1	.....	*	*
.....	4T105074	SPRING: brush; with two brushes; large	1	.....	.....	*
.....	4T105076	SPRING: brush; with two brushes; small	1	.....	.....	*
.....	4T105635	SWITCH: toggle	1	.....	.....	*
.....	4T106876	DISC: code; No. 1	1	.....	.....	*
.....	4T106877	DISC: code; No. 2	1	.....	.....	*
.....	4T106878	DISC: code; No. 3	1	.....	.....	*
.....	4T106879	DISC: code; No. 4	1	.....	.....	*
.....	4T106880	DISC: code; No. 5	1	.....	.....	*
.....	4T107051	CORD ASSEMBLY: consists of plug 99358 and cord 107154 which is 68″ long, 2-conductor; with two 82474 terminals	1	.....	*	*
.....	4T107052	CORD ASSEMBLY: consists of plug 107156 and cord 107154 which is 68″ long; 2-conductor; with two 82474 terminals	1	.....	*	*
.....	4T107063	SWITCH	2	.....	.....	*
.....	4T107153	CORD: 70″; 2-conductor; with two 82474 terminals and one 103236 plug	1	.....	*	*

† Parts not stocked in station or region stock are carried in depot stock.
* Indicates stock available.
‡ Reference symbols appearing on illustrations are stock numbers less "4T."

☆ U. S. Government Printing Office: 1945—618700