ROTARY SWITCH

AUTOMATIC ELECTRIC COMPANY 25 POINT HEAVY-DUTY TYPE

(USED IN SECONDARY LINE SWITCH ALLOTTER CIRCUITS)

REQUIREMENTS AND ADJUSTING PROCEDURES

1. GENERAL

1.01 This section covers the AECo heavy-duty-type 25-point rotary switch used in secondary line switch allotter circuits.

1.02 This section is reissued to revise the requirements covering lubrication and driving pawl movement. It is also reissued to revise the list of tools, gauges, materials, and test apparatus and to revise the procedures covering the cleaning of the magnet core gap and the position of overthrow stop. Detailed reasons for reissue are shown at the end of the section.

1.03 Reference shall be made to Section 020-010-711 covering General Requirements and Definitions for additional information necessary for the proper application of the requirements listed herein.

1.04 Steady and Uniform Operation: A switch operates steadily and uniformly when it operates regularly for not less than 5 revolutions. A slight hesitation, or momentary change of speed at or about the time the rotor brushes engage the feeder brushes, is not objectionable if it recurs regularly. A distinctive click indicating the failure of the pawl to latch up over a tooth shall not be present. It is satisfactory to rotate the selector for 5 revolutions and to judge its operation by the next 5 consecutive revolutions.

1.05 Unless otherwise specified, all requirements must be met with the parts in the position which they assume after the switch is operated electrically.

1.06 All rotor brush requirements shall be met on both ends of the rotor brush assembly.

1.07 When checking or adjusting a switch, the requirements and notes covered by the circuit requirement table shall be disregarded.

1.08 Operate means that the driving arm shall open the interrupter contacts and the driving pawl shall move the rotor assembly one bank terminal when the operate current is applied to the magnet and interrupted.

1.09 Nonoperate means that the driving arm shall not move sufficiently to open the interrupter contacts or allow the driving pawl to drop in on the next ratchet tooth when the nonoperate current is applied to the magnet.

1.10 One dip of KS-8370 oil, KS-2832 lubricant, or KS-8496 No. 3 lubricating compound for the purpose of this section, is the amount of lubricant retained on the KS-14164 No. 4 Artist's show card brush after being dipped into the lubricant to a depth of approximately 3/8 inch and scraped once against the side of the container as the brush is removed.

1.11 A column of KS-7471 grease for the purpose of this section is a cylindrical-shaped quantity of grease discharged from the nozzle of the No. 353C grease gun of the length specified in the requirements.

2. REQUIREMENTS

2.01 Cleaning

(a) The interrupter contacts shall be cleaned, when necessary, in accordance with the section covering cleaning of relay contacts and parts.

(b) If the rotor bearings were last lubricated with KS-8496 No. 3 lubricating compound and are to be relubricated with KS-7471 grease or KS-8370 oil, the rotor bearings shall be cleaned in accordance with approved procedures before applying the new lubricant.

(c) Treatment of Banks and Rotors: Treatment of bank terminals and rotors shall be done in accordance with approved procedures.

2.02 Lubrication

(a) In offices where room temperature never goes below 50F or in offices where room temperature goes below 50F, the rotor bearings, armature bearings, driving pawl bearings, ratchet wheel teeth, and overthrow stop shall be adequately lubricated. If lubrication is necessary, the following amounts of lubricant shall be applied, as shown in Table A.

TABLE A

Offices Where Room Temperature Never Goes Below 50F			Offices Where Room Temperature Goes Below 50F		
Part	Lubricant and Amount	Recommended Lubrication Interval (See Note 1)	Part	Lubricant and Amount (See 1.10)	Recommended Lubrication Interval (See Note 1)
Rotor Bearings - Fig. 1(A) - (Hollow rotor shaft type)	KS-7471 grease as required (See note 2)	2 years	Rotor Bearings - (Fig. 1(A) - (Hollow rotor shaft type)	6 dips of KS-8370 oil (3 at each side of rotor)	6 months
Rotor Bearings - (Solid rotor shaft type)	6 dips of KS-8496 No. 3 lubricating compound (3 at each side of rotor) (See 1.10)	2 years	Rotor Bearings - (Solid rotor shaft type)	6 dips of KS-8370 oil (3 at each side of rotor)	6 months
Ratchet Wheel Teeth - Fig. 1(B)	A 3/4- to 1-in. column of KS-7471 grease (see 1.11) distributed evenly over the ratchet wheel teeth (See note 3)	2 years	Ratchet Wheel Teeth - Fig. 1(B)	3 dips of KS-8370 oil applied while selector is operating	6 months
Overthrow Stop - Fig. 1(C)	Approximately 1/8-in. column of KS-7471 grease (see 1.11) applied to surface of overthrow stop adjacent to the driving pawl (See note 4)	2 years	Overthrow Stop - Fig. 1(C)	1 dip of KS-8370 oil applied between driving pawl and overthrow stop	6 months
Driving Pawl Bearings - Fig. 1(D)	2 dips of KS-2832 lubricant (1 at each side of the driving arm)	1 year	Driving Pawl Bearings - Fig. 1(D)	2 dips of KS-8370 oil (1 at each side of the driving arm)	6 months
Armature Bearings - Fig. 1(E)	4 dips of KS-2832 lubricant (1 at each side of each bearing)	1 year	Armature Bearings - Fig. 1(E)	4 dips of KS-8370 oil (1 at each side of each bearing)	6 months

Notes

1. These intervals may be extended if periodic inspections have indicated that local conditions are such as to insure that the requirement will be met during the extended interval.
2. If the No. 353C grease gun is available, the lubricant shall be added until grease is barely forced out at one or both sides of the rotor. If the grease gun is not available, the bearings shall be lubricated as covered for solid shafts.
3. If the No. 353C grease gun is not available, the teeth shall be lubricated with a lump of grease the size of the head of the retaining pawl mounting screw distributed evenly over the teeth.
4. If the No. 353C grease gun is not available, the overthrow stop shall be lubricated with a lump of grease one quarter the size of the lump specified in note 3.

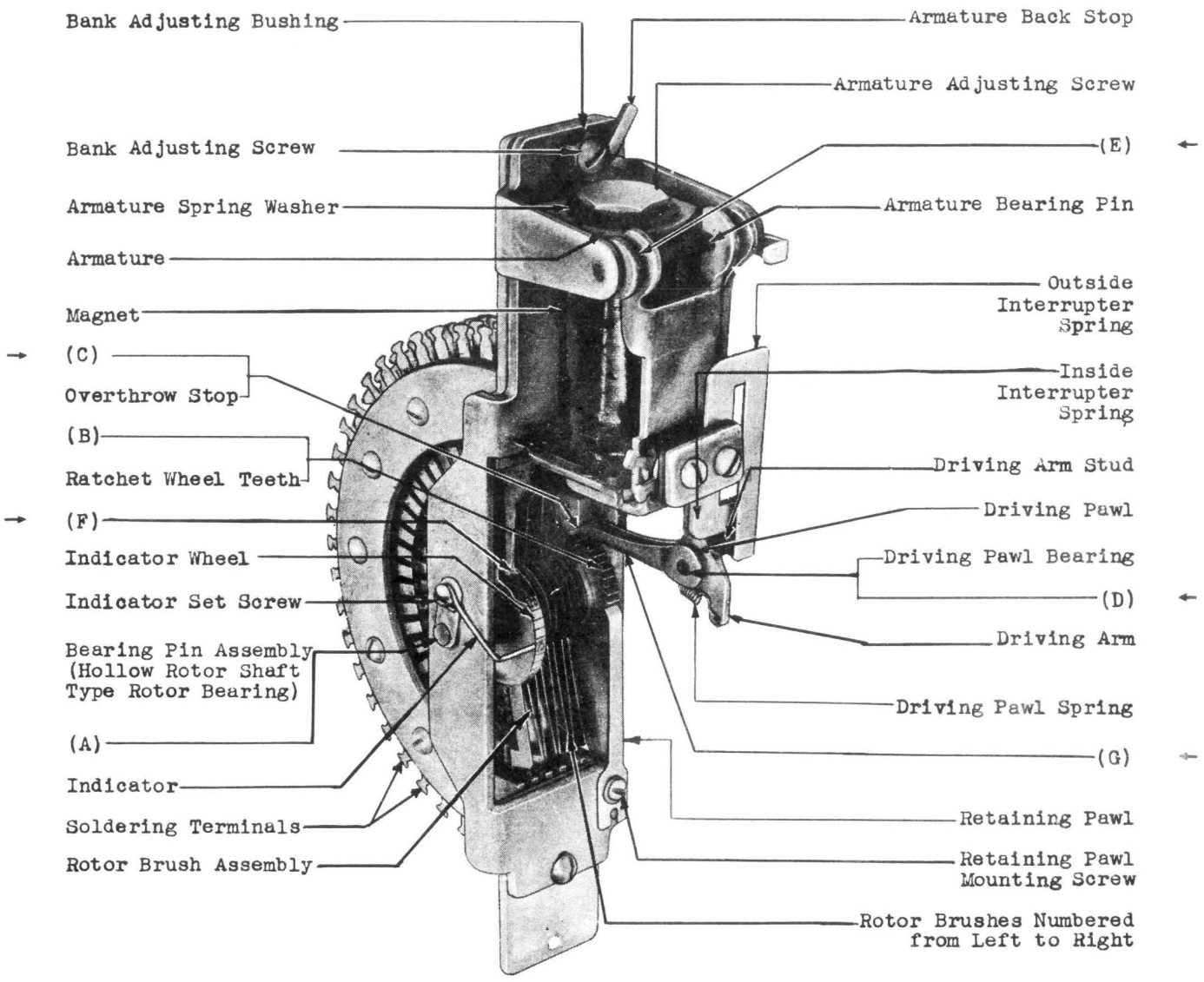

Fig. 1 - Heavy-duty 25-point Rotary Switch

2.03 Record of Lubrication: During the period of installation, a record shall be kept by date of the lubrication of the switch and this record shall be turned over to the telephone company with the equipment. If no lubrication has been done it shall be so stated.

2.04 Tightness of Driving Arm Stud: Fig. 2(A) - The driving arm stud shall fit tightly on the driving arm.

Gauge by feel.

2.05 Tightness of Armature Adjusting Screw: Fig. 2(B) - The armature adjusting screw shall be held securely in position.

Gauge by feel.

2.06 Rotor Assembly Movement: The rotor assembly shall turn freely on its bearings.

Gauge by feel.

This requirement is met if there is some sideplay of the rotor assembly in its bearings.

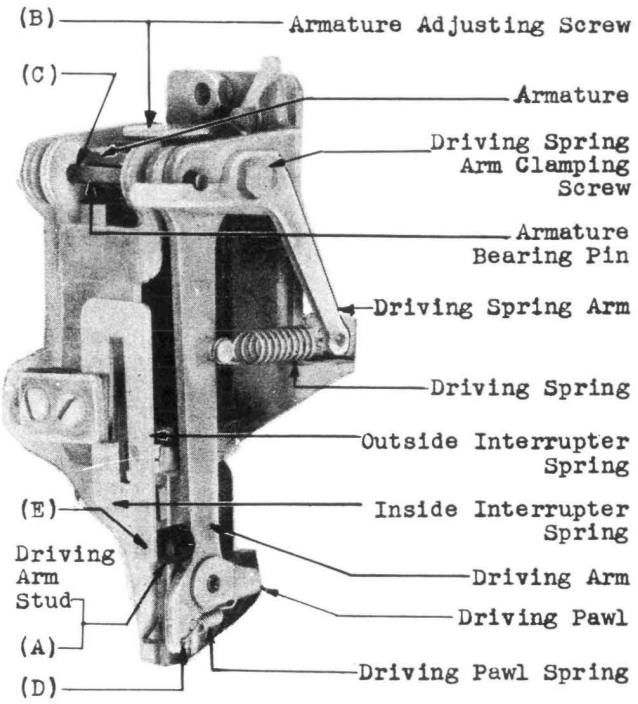

Fig. 2 - Driving Mechanism

2.07 Feeder Brush Closure: Fig. 1(F) - The springs of each pair of feeder brushes shall rest against each other from their bases to a point approximately 1/4-inch from their ends with the feeder brushes engaging the rotor brushes.

Gauge by eye.

2.08 Rotor Brush Alignment: The tips of the rotor brush springs shall be aligned so that they will enter onto the base of the feeder brushes without excessive movement to one side or the other.

Gauge by eye.

Excessive movement is defined as a movement greater than the width of the feeder brush springs.

To check the rotor brush alignment, set the switch to a position where one end of the rotor assembly is about to pass onto the feeder brushes. Note visually that the junction between each pair of rotor brush springs lines up with the center line of the associated feeder brush within the specified limits.

2.09 Rotor Brush Follow: Fig. 3(A) - Each spring of a pair of brushes shall have a follow of

Min 1/16 inch
Max 3/32 inch

measured at the brush tips when the pressure of the opposing spring is removed.

Gauge by eye.

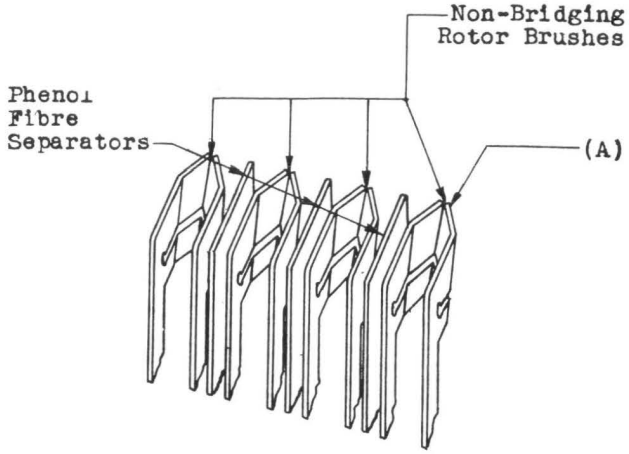

Fig. 3 - Nonbridging Rotor Brushes

2.10 Rotor Brush Location: Fig. 4(A) - With the brushes on Nos. 1 and 25 bank terminals, the tips of the brushes shall rest 1/4 to 1/2 the width of the bank terminals ahead of the leading edges of the bank terminals.

Gauge by eye.

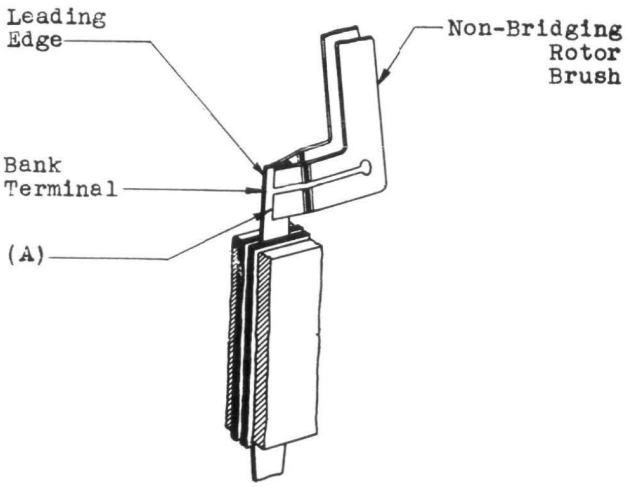

Fig. 4 - Position of Nonbridging Rotor Brush on Bank Terminal

2.11 Armature Backstop and Overthrow Stop Position ←

(a) The driving pawl, in its normal position, shall not bind on the overthrow stop.

Gauge by feel.

(b) It shall be possible to impart a perceptible rotary motion to the rotor brush assembly with the driving pawl in its normal position.

Gauge by eye and feel.

2.12 Clearance Between Driving Pawl and No. 1 Rotor Brush (Brush Nearest Ratchet Wheel): There shall be a clearance of

Min 1/64 inch

between the No. 1 rotor brush and the driving pawl and the overthrow stop with the rotor brush assembly in the position it assumes after being operated electrically and with the sideplay of the armature taken up to the left as viewed from the front.

Gauge by eye.

The thickness of the rotor brush is 0.010 inch.

To check this requirement, operate the switch electrically to the position in which the No. 1 rotor brush is adjacent to the driving pawl or the overthrow stop. Grasp the driving arm and apply a pressure to the left sufficient to take up the sideplay of the armature. Then check whether there is at least the specified minimum clearance between the No. 1 rotor brush and the driving pawl.

2.13 Armature Movement: Fig. 2(C) - The armature shall not bind on its bearings.

Gauge by eye and feel.

This requirement is met if the armature has perceptible sideplay.

2.14 Retaining Pawl Position: There shall be a perceptible clearance between the retaining pawl and the radial face of the ratchet tooth.

Gauge by eye.

2.15 Retaining Pawl Tension: Fig. 5(A) - The tension of the retaining pawl measured at the curve near the tip of the pawl shall be

Min 50 grams
Max 125 grams

Use the No. 79C gauge.

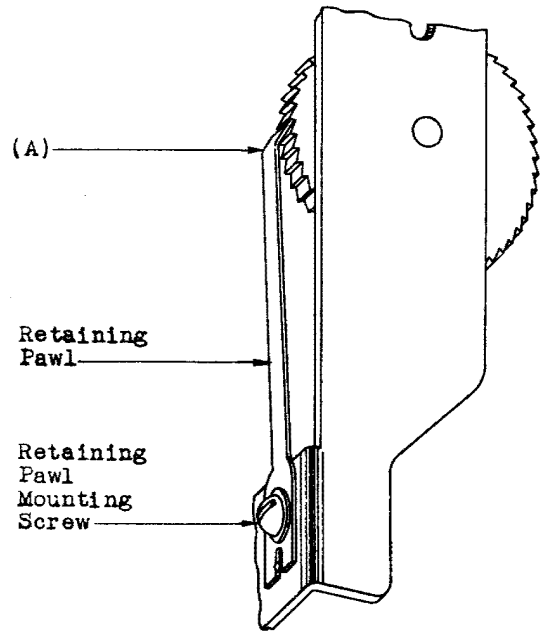

Fig. 5 - Position of Retaining Pawl Spring

2.16 Driving Pawl Movement: The driving pawl shall not bind on its bearing or on the switch frame.

Gauge by eye.

This requirement is met if, with the driving pawl spring unhooked from the driving arm (see Fig. 2D) and the armature operated by hand, the driving pawl falls by its own weight so that it rests against the ratchet wheel. ← ←

2.17 Driving Pawl Spring Tension and Position

(a) Fig. 1(G) - With the armature electrically operated, the driving pawl spring shall hold the driving pawl against the ratchet wheel teeth with a tension of

Test - Min 20 grams
Readjust - Min 25 grams

Use the No. 68C gauge.

To check this requirement, place the gauge against the concave surface of the driving arm in line with the front of the switch frame and push upward on the gauge.

(b) The edges of the driving pawl, along its length, shall be parallel to the sides of the ratchet wheel; and the tip of the pawl shall be parallel to the outer edge of the ratchet wheel teeth.

Gauge by eye.

2.18 Armature Airgap

(a) With a 0.003-inch gauge inserted between the armature adjusting screw and the core, the pawl shall drop onto the next ratchet wheel tooth when the magnet is electrically energized.

Use the KS-6909 gauge.

(b) With a 0.005-inch gauge inserted between the armature adjusting screw and the core, the pawl shall not drop onto the next ratchet wheel tooth when the magnet is electrically energized.

Use the KS-6909 gauge.

Note: In checking requirements (a) and (b), do not eliminate the overthrow or whip of the driving arm.

2.19 Contact Alignment: Fig. 6(A) - The contacts shall not be out of alignment more than one third of their base diameter.

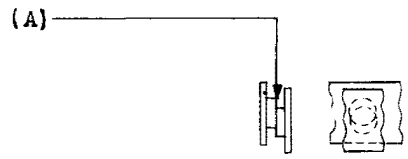

Fig. 6 - Contact Alignment

2.20 Driving Spring Tension: The driving spring shall be tensioned so that the magnet will meet the following electrical requirements.

	Operate MA	Nonoperate MA
Test	270	230
Readjust	255	240

2.21 Outside Interrupter Spring Tension: Fig. 2(E) - The tension of the outside interrupter spring measured at the point where the driving arm stud strikes the outside interrupter spring shall be

Min 250 grams
Max 400 grams

Use the No. 79B gauge.

2.22 Interrupter Spring Gauging

(a) With a 0.006-inch gauge inserted between the armature adjusting screw and the core, the contacts shall not break when the magnet is electrically energized.

Use the KS-6909 gauge.

(b) With a 0.004-inch gauge inserted between the armature adjusting screw and the core, the contacts shall break when the magnet is electrically energized.

Use the KS-6909 gauge.

2.23 Position of Indicator: Fig. 7(A) - The indicator shall point to the number or line on the indicator wheel corresponding to the bank contacts on which the rotor brushes are resting.

Gauge by eye.

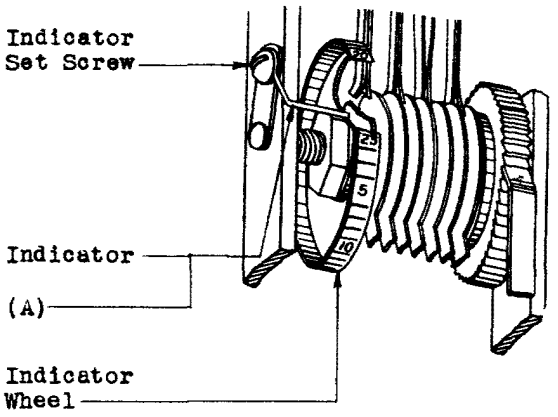

Fig. 7 - Position of Indicator

2.24 Self-interruptions: The switch, when required to operate under self-interruptions, shall step steadily and uniformly on the normal office voltage.

2.25 Speed: After the switch has been operated electrically under self-interruptions for approximately 5 revolutions, the speed for the next 5 revolutions shall be

Min 40
Max 50 } terminals per second

Use the KS-3008 stop watch.

Caution: The magnet coil should be checked by feel to determine that it is not excessively warm to the touch before the speed test is applied.

3. ADJUSTING PROCEDURES

3.001 List of Tools, Gauges, Materials, and Test Apparatus

Code or Spec No.	Description
Tools	
303	Spring Adjuster
332 (2 reqd)	Spring Adjuster

Code or Spec No.	Description
Tools	
*353C	Grease Gun (must be equipped with No. 571A curved nozzle) ←
359	Magnet Core and Armature Cleaning Tool
363	Spring Adjuster
417A	1/4-inch and 3/8-inch Open Double-end Flat Wrench
418A	5/16-inch and 7/32-inch Open Double-end Flat Wrench
R-1760	Frame and Armature Adjuster
KS-2631	4-1/2-inch Screwdriver
KS-6367	7/16-inch and 5/8-inch Open Double-end Flat Wrench ↰
KS-14164 (or the replaced R-1575)	No. 4 Artist's Show Card Brush ↲
-	4-oz Riveting Hammer
-	6-1/2-inch P-long-nose Pliers
-	1/16-inch Pin Punch
-	3-inch Cabinet Screwdriver
-	4-inch Regular Screwdriver
Gauges	
68C	70-0-70-Gram Gauge
79B	0-1000 Gram Push-Pull Tension Gauge
79C	0-200 Gram Push-Pull Tension Gauge
KS-3008	Stop Watch (or second indicating watch) ← ←
KS-6909	Thickness Gauge Nest
Materials	
KS-2423 or KS-14666 (or the replaced D-98063)	Cloth ↰ ↲
KS-2832	Lubricant
KS-7471	Grease
KS-7860	Petroleum Spirits

*Part of the No. 1003A tool kit ←

Code or Spec No.	Description
Materials (Contd)	
KS-8370	Oil ←
KS-8496	No. 3 Lubricating Compound ←
-	Toothpicks, Hardwood, Flat at One End and Pointed at Other
Test Apparatus	
35 Type	Test Set ←

3.01 Cleaning (Rq 2.01)

(1) Interrupter Contacts: Clean the interrupter contacts in accordance with approved procedures.

(2) Treatment of Banks and Rotors: If necessary, clean and treat the rotor and bank terminals in accordance with approved procedures. ↰ ↲

(3) Ratchet Wheel Teeth and Armature Bearings: If upon inspection there is found to be an accumulation of gummy oil or other foreign matter on the ratchet wheel teeth or armature bearings, attempt to remove it with a clean toothpick. If the switch cannot be cleaned in this manner, dip the flat end of a clean toothpick in KS-7860 petroleum spirits and apply it very sparingly to the dirty part of the switch to soften this foreign material so that it may be removed with the other end of the toothpick. Allow all wearing parts of the switch, such as ratchet wheel or armature bearings, to dry after being cleaned and then lubricate. Under no circumstances should the petroleum spirits be used on the bank terminals or brushes.

(4) Magnet Core Gap: Insert the No. 359 cleaning tool between the armature adjusting screw and the core and apply sufficient pressure to the bottom of the armature to force it downward against the cleaning tool. Then forcibly withdraw the cleaning tool. Repeat this operation several times, using first one flat surface of the tool and then the other, so as to remove dust and loose galvanizing scales that may have accumulated between the armature adjusting screw and the core. ↰

Note: If a new No. 359 cleaning tool is to be used, check whether the tool is covered with a protective film of oil. If this condition exists, remove the film with KS-7860 petroleum spirits applied on a KS-14666 cloth. ↲

3.02 Lubrication (Rq 2.02)

Rotor Bearings

(1) On switches equipped with solid shafts and on those equipped with hollow

shafts in cases where the No. 353C grease gun is not available, lubricate the shafts as covered in (2). If the No. 353C grease gun is available, lubricate the hollow shafts as covered in (3).

(2) Loosen the bearing pin assembly mounting screw with the 3-inch cabinet screwdriver and remove the bearing pin. In some cases it may be necessary to remove the switch from the frame in order to remove the bearing pin. Apply the lubricant evenly over the surface of the pin and reassemble the parts. Wipe off any excess lubricant with a cloth.

(3) Mount the No. 571A curved nozzle on the No. 353C grease gun. Insert the tip of the nozzle into the grease hole in the end of the rotor shaft and apply the grease as required. Take care not to apply more grease than necessary to barely force grease out at one side of the rotor. In some cases the grease may start out at both sides of the rotor at the same time.

Ratchet Wheel Teeth

(4) If necessary, clean the ratchet wheel teeth as outlined in 3.01(3) before lubricating them.

(5) No. 353C Grease Gun Available: Distribute the grease over the ratchet wheel teeth, using the No. 353C grease gun, stepping the selector about 1/4 revolution between applications. At each point of application, apply approximately 1/4 of a discharge to the teeth, continuing in this manner until the specified quantity of grease has been distributed. This will insure that the grease is evenly distributed over the ratchet wheel teeth.

(6) No. 353C Grease Gun Not Available: Using a toothpick, obtain a quantity of the grease approximately the size of the head of the retaining pawl mounting screw and apply the grease to the surfaces of the ratchet wheel teeth just below the retaining pawl while the switch is rotating. If cleaning in accordance with 3.01(3) is unnecessary, less grease may be sufficient. Exercise care in applying the grease as an excessive amount in one spot on the ratchet wheel is liable to splash onto the brushes or bank terminals.

(7) Surface of Overthrow Stop: With the switch operated manually or electrically, apply the specified quantity of grease to the surface of the overthrow stop adjacent to the driving pawl using the No. 353C grease gun. If the grease gun is not available, lubricate the parts with a toothpick covered with the quantity of grease specified. To do this, insert the grease-covered end of the toothpick between the driving pawl and the overthrow stop and spread the grease over the stop.

(8) Driving Pawl Bearings: Apply the specified quantity of lubricant to each side of the driving arm. After the lubricant has been applied, operate the driving pawl up and down several times to distribute it more evenly over the bearings.

(9) Armature Bearings: Apply the specified quantity of lubricant to each side of each bearing. After the lubricant has been applied, rotate the switch several revolutions under self-interruptions or step by step, in order to distribute it more evenly over the bearings.

3.03 Record of Lubrication (Rq 2.03) No procedure.

3.04 Tightness of Driving Arm Stud (Rq 2.04)

(1) If the driving arm stud is loose on the armature, replace the stud as covered in Section 030-766-801.

3.05 Tightness of Armature Adjusting Screw (Rq 2.05)

(1) If the armature adjusting screw is not held securely in place, remove the bank adjusting bushing and bank adjusting screw with the No. 418A wrench and 4-inch regular screwdriver. Then remove the armature adjusting screw with the KS-6367 wrench and remove the armature spring washer.

(2) Increase the bow in the armature spring washer by bending it with the P-long-nose pliers. Then reassemble it, making sure that the washer bows outward toward the armature adjusting screw.

3.06 Rotor Assembly Movement (Rq 2.06)

(1) If the rotor assembly binds in its bearings, it is probably due to a deposit of dirt and gummy oil in the bearings.

(2) Remove the indicator setscrew with the 3-inch cabinet screwdriver and remove the bearing pin. Clean the bearings with KS-7860 petroleum spirits applied with the flat end of a clean toothpick. After allowing the bearings to dry, lubricate them in accordance with requirement 2.02. After lubricating, remount the bearing pin and insert and tighten the indicator setscrew securely in place.

3.07 Feeder Brush Closure (Rq 2.07)

(1) If the springs of each pair of feeder brushes do not engage each other as specified, adjust them by applying the No. 363 spring adjuster as near as possible to the base as shown in Fig. 8 and slide it downward while giving it a slight twist.

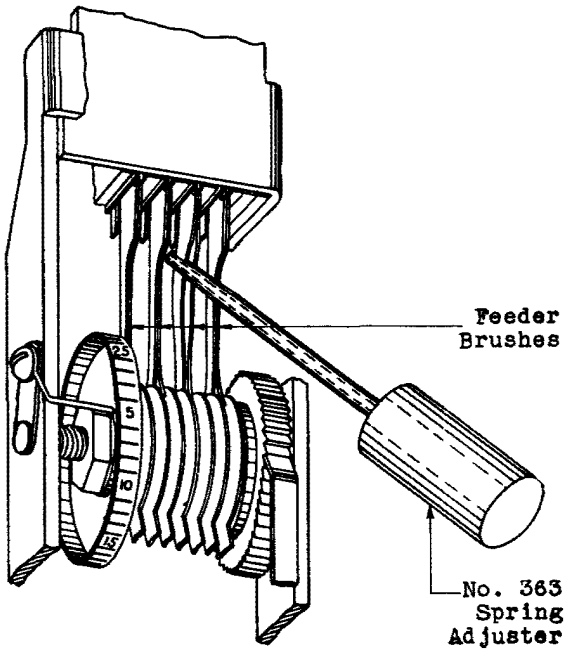

Fig. 8 - Method of Adjusting for Feeder Brush Closure

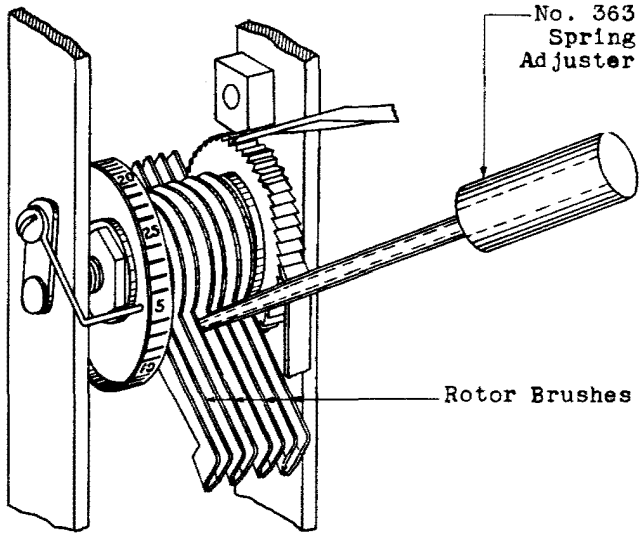

Fig. 9 - Method of Adjusting for Brush Alignment

3.08 Rotor Brush Alignment (Rq 2.08)

(1) To realign the rotor brushes, locate the rotor assembly so that the side-play at each side on the rotor assembly is approximately equal. Block the assembly in this position by means of toothpicks, and adjust one set of brushes with the No. 363 spring adjuster applied at the base of the brush, close to the shaft of the rotor brush assembly as shown in Fig. 9. Remove the toothpicks, rotate the rotor assembly one half a revolution, and repeat as outlined above.

3.09 Rotor Brush Follow (Rq 2.09)

(1) If the follow of a rotor brush is not satisfactory, apply the No. 363 spring adjuster at the base of the brush close to the shaft of the rotor assembly, as shown in Fig. 9, and adjust the rotor brush as required.

3.10 Rotor Brush Location (Rq 2.10)
3.11 Armature Backstop and Overthrow Stop Position (Rq 2.11)

(1) If the tips of the brushes do not rest properly on the No. 1 bank terminal, correct as follows. Loosen the bank adjusting screw with the 4-inch regular screwdriver; turn the bank adjusting bushing in a clockwise or counterclockwise direction as required with the No. 418A wrench; and then securely tighten the bank adjusting screw.

(2) If the tips of the brushes do not rest properly on No. 25 bank terminal, correct as follows. Loosen the overthrow stop setscrew with the No. 418A wrench. Then loosen the armature backstop setscrew with the 3-inch cabinet screwdriver. Move the armature backstop as required until the brushes are properly positioned and then securely tighten the armature backstop setscrew. Check that the brushes rest properly on the No. 1 terminal.

(3) After the brushes are properly adjusted on Nos. 1 and 25 bank terminals tighten the overthrow stop setscrew noting that there is perceptible forward movement of the rotor assembly which indicates a perceptible gap between the driving pawl and the overthrow stop.

(4) If there is not a perceptible forward movement of the rotor assembly, loosen the overthrow stop setscrew with the No. 418A wrench and move the stop upward and tighten the stop securely. Note that the brushes still line up properly with the bank terminals.

3.12 Clearance Between Driving Pawl and No. 1 Rotor Brush (Brush Nearest Ratchet Wheel) (Rq 2.12)

(1) If the No. 1 rotor brush meets requirement 2.08 (rotor brush alignment),

failure to meet the requirement covering the clearance between this brush and the driving pawl is probably due to a bent driving arm. Adjust the driving arm with the R-1760 adjuster applied to the driving arm directly beneath the pawl bearing. After adjusting the driving arm, make sure that the end of the pawl strikes the overthrow stop squarely.

3.13 Armature Movement (Rq 2.13)

(1) If the armature fails to operate satisfactorily it may be due to bind between the armature and its bearings. This bind may be due to an accumulation of gummy oil or other foreign matter. Clean the bearings as outlined in 3.01(3).

(2) If the armature still fails to operate satisfactorily, it may be due to bind of the armature arms against the bearing arms. To correct this condition, insert the blade of the 3-inch cabinet screwdriver between the armature arm and the bearing arm at fault and twist the screwdriver slightly so as to relieve the bind. Take care in doing this not to bend the bearing pin.

(3) If the bind persists, the trouble may be due to a bent bearing pin. To correct, remove the driving spring from the driving arm with the P-long-nose pliers. Scribe a pencil line on the lower surface of the driving spring arm and the adjacent surface of the bearing arm so as to facilitate the reassembly of the parts. Loosen the driving spring arm clamping screw with the No. 417A wrench and remove the driving spring arm from the slot in the bearing pin. Drive out the bearing pin with the 4-ounce hammer and the pin punch. In some cases it may be necessary to remove the switch from the frame in order to remove the bearing pin. Insert a new bearing pin through the bearing arms, armature arms, and spring assembly mounting bracket arms with the slot in the bearing pin down and on the same side of the switch as the driving spring arm. Place the driving spring arm in the slot, align the scribed lines, and tighten the mounting screw securely. Remount the driving spring and check for requirement 2.20.

3.14 Retaining Pawl Position (Rq 2.14)

(1) To position the retaining pawl, loosen the retaining pawl mounting screw with the 3-inch cabinet screwdriver and move the pawl up or down as required. Tighten the screw securely.

3.15 Retaining Pawl Tension (Rq 2.15)

(1) To adjust the retaining pawl, apply the No. 303 spring adjuster to the pawl as near as possible to the pawl mounting screw and adjust as required.

3.16 Driving Pawl Movement (Rq 2.16)
3.17 Driving Pawl Spring Tension and Position (Rq 2.17)

(1) If the driving pawl binds on its bearings, clean the bearings with KS-7860 petroleum spirits applied with a clean toothpick and relubricate in accordance with 3.02(8). After relubricating, recheck the requirement.

(2) If the tension of the spring is unsatisfactory, replace the spring.

(3) If the driving pawl is not positioned correctly with respect to the ratchet wheel, apply the R-1760 adjuster to the driving arm beneath the pawl bearing and adjust the arm so that the requirement is met.

3.18 Armature Airgap (Rq 2.18)

(1) If the requirement is not met, turn the armature adjusting screw in a clockwise or counterclockwise direction as required with the KS-6367 wrench. After making this adjustment recheck requirements 2.10 and 2.11.

3.19 Contact Alignment (Rq 2.19)

(1) To realign the contacts, loosen the spring assembly mounting screws with the KS-2631 screwdriver. Shift the springs as required and tighten the mounting screws securely.

3.20 Driving Spring Tension (Rq 2.20)
3.21 Outside Interrupter Spring Tension (Rq 2.21)
3.22 Interrupter Spring Gauging (Rq 2.22)

(1) If the tension of the driving spring is not satisfactory, loosen the driving spring arm clamping screw with the No. 417A wrench and adjust the driving spring tension by shifting the driving spring arm in or out as required. Make sure that the front end of the arm rests in the slot in the armature bearing pin. Then securely tighten the screw.

(2) If the tension of the outside interrupter spring is not satisfactory, adjust as follows. Grasp the horizontal portion of the spring with a No. 332 spring adjuster and the vertical leg of the spring near the bottom of the spring with another No. 332 spring adjuster. Hold the first spring adjuster stationery and adjust the vertical leg of the spring as required. Adjusting the spring toward the inside interrupter spring will increase the tension and away from it will decrease the tension.

(3) If requirement 2.22 is not met, adjust the inside interrupter spring by grasping the horizontal portion of the spring with the No. 332 spring adjuster, twisting the adjuster to the left to decrease the gap and to the right to increase the gap.

3.23 Position of Indicator (Rq 2.23)

(1) If the indicator does not point to the proper number or line on the indicator wheel, loosen the indicator setscrew with the 3-inch cabinet screwdriver and move the indicator as required. Tighten the indicator setscrew securely when the indicator has been located in the proper position.

3.24 Self-interruptions (Rq 2.24)

(1) Check for self-interruptions by grounding the terminal of the inside interrupter spring and connecting battery to the winding of the magnet.

(2) If the switch does not operate steadily and uniformly under self-interruptions on the normal central office voltage, recheck and adjust, if necessary, to meet requirements 2.06, 2.10, 2.13 through 2.18, 2.20, 2.21, and 2.22. If the switch still does not operate satisfactorily, adjust the tension of the outside interrupter spring to near the minimum tension limit.

3.25 Speed (Rq 2.25)

(1) If a switch fails to meet the speed requirement, proceed as outlined below.

To Increase Speed

Decrease	Toward Value	Requirement
Pressure of retaining spring	50 grams	2.15
Armature airgap	0.003 inch	2.18
†Driving spring tension	-	2.20
Tension of outside interrupter spring	250 grams	2.21
Interrupter spring gauging value	0.004 inch	2.22
Follow of rotor brushes	1/16 inch	2.09

†This value to be limited by the nonoperate readjust current.

To Decrease Speed

Increase	Toward Value	Requirement
Pressure of retaining spring	125 grams	2.15
††Armature airgap	0.005 inch	2.18
Driving spring tension	-	2.20
Tension of outside interrupter spring	400 grams	2.21
Interrupter spring gauging value	0.006 inch	2.22
Follow of rotor brushes	3/32 inch	2.09

††This value to be limited by the operate readjust current.

Note: If the switch fails to stop on the calling line terminal, readjust the follow of the rotor brushes toward the maximum. If necessary, clean the bank as outlined in 3.01(2).

Caution: The magnet coil should be checked by feel to determine that it is not excessively warm to the touch before the speed test is applied.

REASONS FOR REISSUE

1. To revise definition of one dip of oil (1.10).
2. To revise the requirement covering cleaning (2.01).
3. To revise the requirements covering lubrication (2.02).
4. To revise Fig. 1.
5. To revise title of requirement 2.11.
6. To revise requirement covering driving pawl movement (2.16).
7. To reword requirement covering driving spring tension to specify milliamperes (2.20).
8. To revise the list of tools, gauges, materials, and test apparatus (3.001).
9. To add a procedure for cleaning of banks and rotors [3.01(2)].
10. To revise the procedures covering the cleaning of the magnet core gap [3.01(4)].

11. To delete reference to lubricating the driving pawl adjacent to switch frame [3.02(7)].

12. To revise the adjusting procedures to specify the use of a wrench instead of the P-long-nose pliers when tightening the armature adjusting screw (3.05 and 3.18).

13. To revise the adjusting procedure covering position of overthrow stop [3.10 and 3.11 (4)].