

CLUTCHES — HELICAL SPRING TYPE WITH RELEASE SPRINGS REQUIREMENTS AND ADJUSTING PROCEDURES

1. GENERAL

1.01 This section covers panel helical spring-type clutches (Nos. 1A, 1B, 2A, 3A, and 3B and 4, 5, 6, and 7 types) when the updrives are equipped with release springs, and associated racks.

1.02 This section is reissued to revise the requirement for pawl clearance and to revise the procedures covering updrive electrical requirements. Detailed reasons for reissue will be found 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 Asterisk: Requirements are marked with an asterisk () when to check for them would necessitate dismantling or dismounting of apparatus, or would affect the adjustment involved or other adjustments. No check need be made for these requirements unless the apparatus or part is made accessible for other reasons or its performance indicates such a check is advisable.

1.05 Fully Operate: A clutch is said to fully operate if, when current is connected to a winding, the associated armature assumes a position so that:

(a) Updrive: The helical spring is extended and the armature is touching the front stop.

(b) Downdrive: The helical spring is extended and one or both of the nonfreezing discs on the armature farthest from the fulcrum are touching the associated magnet core.

(c) Trip Magnet: The nonfreezing disc on the armature farthest from the fulcrum touches its associated magnet core.

1.06 Operate: A clutch is said to operate if, when current is connected to a winding, the associated armature assumes a position so that:

(a) Updrive: The armature moves until it touches, or is less than 0.005 inch away from the front stop and a gap exists between the tip of the screw gap adjusting screw and the roller arm.

(b) Downdrive: The armature moves until the nonfreezing discs touch or are less than 0.005 inch away from the core of the front magnet, a gap exists between the tip of the screw gap adjusting screw and the roller arm, and the pawl is removed from the rack.

1.07 Nonoperate: A clutch is said to nonoperate if, when current is connected to a winding, the associated armature assumes a position so that:

(a) Updrive: The armature is 0.005 inch or more away from the frontstop. The brush rod may or may not travel and a gap may or may not exist between the tip of the screw gap adjusting screw and the roller arm.

(b) Downdrive: The armature is 0.005 inch or more away from the core. The brush rod may or may not travel and a gap may or may not exist between the tip of the screw gap adjusting screw and the roller arm.

1.08 Remove Pawl: A clutch is said to remove the pawl if, when current is connected to its associated downdrive winding, the rack travels downward and the pawl tooth clears the rack in all positions. The downdrive armature may or may not touch the magnet core and a gap may or may not exist between the screw gap adjusting screw and the roller arm.

1.09 Trial: A trial for the purpose of this section consists of the application of a specified current for approximately 1/2 second.

1.10 Gauge Divisions: Each division of the screw gap gauge corresponds to approximately 0.001-inch movement of the roller arm with respect to the updrive or downdrive armature and each division of the armature location gauge corresponds to approximately 0.001-inch movement of the armature with respect to the front stop.

1.11 Sender-selector-type Line Finders: If, in checking or readjusting clutches on sender-selector-type line finders, it is necessary to raise and keep the brush rod off normal, consult the circuit drawing for information as to the necessary relays which must be blocked to prevent circuit reactions and to prevent the downdrive armature from operating.

1.12 After checking or readjusting a clutch where it was necessary to disturb the wiring to the clutch, make a check of the terminal block wiring for loose connections or broken wires and correct as necessary.

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1.13 All requirements shall be met with the cork rolls revolving and with the brush rod free to travel when the clutch is operated.

1.14 Carrying Case for Small Clutch Gauges and Tools: The KS-8349 carrying case should be used to protect the screw gap and armature location gauges and may also be used for other small tools and gauges used on clutches.

1.15 Gear Case and Bearing Box Stops: If gear case and bearing box stops are to be installed on the frame and the associated clutches are to be readjusted, the stops should be installed before readjusting the clutches.

1.16 The method of installing the release spring on the updrive of a clutch already in service is covered in 3.009 of this section.

1.17 Terminal Designations: The terminal designations of 1-, 2-, and 3-type clutches are shown in Figs. 1, 2, and 3, respectively. On 4-, 5-, 6-, and 7-type clutches, the terminal designations appear on the terminal block.

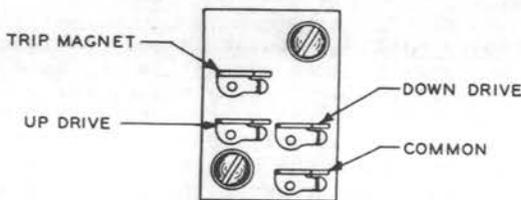


Fig. 1 - 1-type Clutch

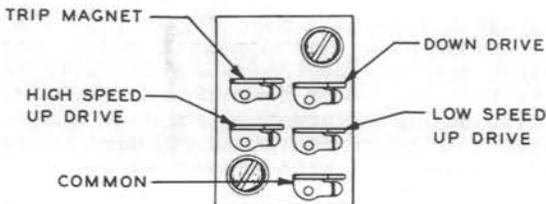


Fig. 2 - 2-type Clutch

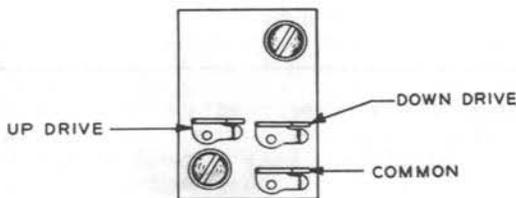


Fig. 3 - 3-type Clutch

1.18 Requirements for rack tongue tension and position, rack coupling pin engagement, clearance between trip armature extension and rack, and clearance between trip armature extension and multiple brush frame are covered in the section covering the particular type of elevator apparatus involved.

1.19 Make-busy Information: Before making any of the inspections or readjustments covered in this section, make the circuit busy in the approved manner.

2. REQUIREMENTS

REQUIREMENTS FOR RACKS

2.01 Bow of Rack: Fig. 4(A) - With the rack held vertically, any bow in the entire length of the rack shall not exceed

- For line finder racks - 1/4 inch
- For all other racks - 5/16 inch

Gauge by eye.

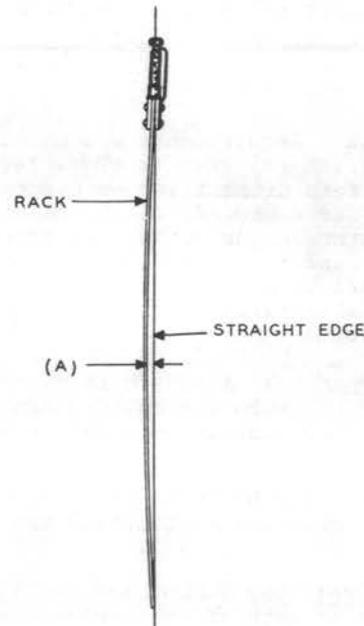


Fig. 4 - Bow of Rack

2.02 Cutting of Rack: - Fig. 5(A) - There shall be no tendency for the rack to cut on the earlier type rack guide. Smooth, bright edges on the rack due to normal wear shall not be considered as an indication of cutting.

Gauge by eye.

2.03 Slipping of Rack: There shall be no perceptible slip between the rack and cork roll when the updrive magnet of the clutch is fully operated and with the normal number of brushes tripped.

Gauge by eye.

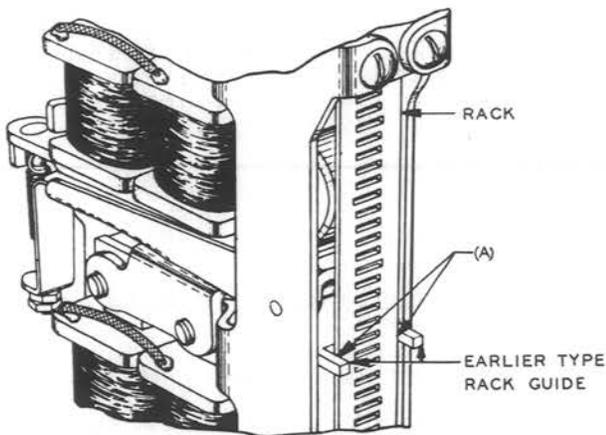


Fig. 5 - Relation of Rack and Earlier Type Rack Guide

GENERAL CLUTCH REQUIREMENTS

2.04 Clutch Location

- (a) There shall be a clearance between adjacent clutches.

Gauge by eye.

- (b) Fig. 6(A)

Test: The clearance between the clutch top locating plate and the top of the frame on the side nearest the plate shall be

Max 0.010 inch

Gauge by eye.

Readjust: The clutch shall fit snugly in a vertical direction against the top locating plate. If the top of one side of the clutch frame rests against the plate, this requirement is met.

Gauge by eye.

- *(c) The vertical alignment of the clutch shall be such that, with the rack uncoupled from the brush rod as covered in 3.005, the mean of the sideways swing of the rack top, when it is at the upper limit of its travel, shall not be more than 1/16 inch away from the center line of the brush rod.

Gauge by eye.

The thickness of the rack is approximately 1/16 inch.

2.05 Clutch Retaining Spring Tension:

Fig. 6(B) - The clutch retaining spring shall have sufficient tension to hold at least one of the clutch mounting ears firmly against the front of the slot in the clutch locating plate.

Gauge by eye and by feel.

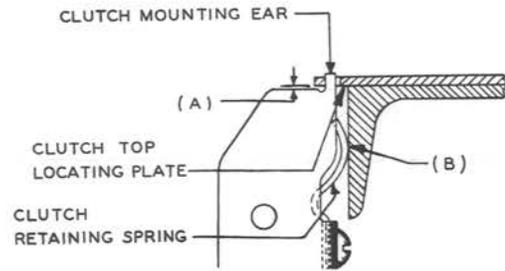


Fig. 6 - Clutch Location

REQUIREMENTS FOR TRIP MAGNET

- 2.06 Clearance Between Bent Portion of Trip Armature and Magnet Core: Fig. 7(A) - The clearance between the bent portion of the trip armature and the magnet core with the armature in the operated position shall be

Min 0.028 inch

Max 0.052 inch

Operate the armature manually and use the No. 81 gauge.

- 2.07 Clearance Between Nonfreezing Disc on Trip Armature and Core Nearer Fulcrum:

Fig. 7(B) - With the trip armature fully operated electrically, the clearance between the nonfreezing disc on the trip armature and the core nearer the fulcrum shall be

Min - Shall not touch

Max 0.010 inch

Use the KS-6909 gauge.

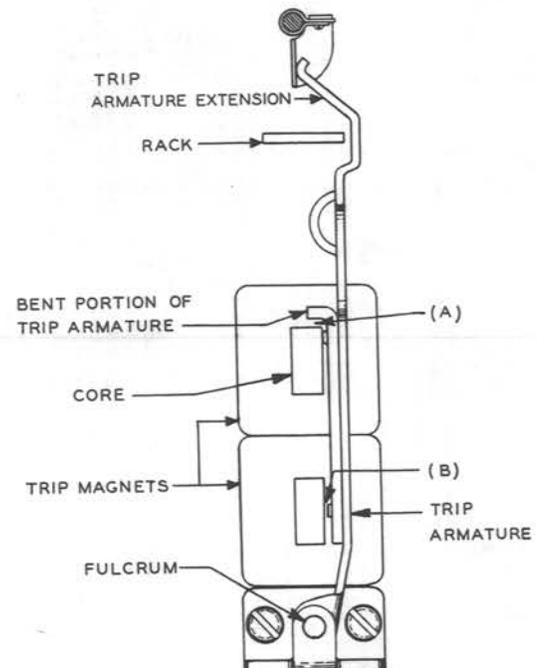


Fig. 7 - Trip Magnets and Associated Parts

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To check the minimum clearance, insert the 0.0015-inch blade of the KS-6909 gauge between the disc and the core and electrically operate the trip armature. Attempt to withdraw the gauge. The minimum limit is met if this gauge does not bind.

2.08 Trip Magnet Electrical Requirement: The trip armature shall fully operate and rotate the trip rod on

Max 0.200 ampere

Where two trip magnets are wired in parallel, the trip armature shall fully operate on

Max 0.400 ampere

REQUIREMENTS FOR HIGH AND LOW SPEED UPDRIVES

2.09 Unoperated Core Gap: Fig. 8(A) - With the armature resting against the backstop, the gap between the top of the non-freezing disc on the armature farthest from the fulcrum and the core of the corresponding coil shall be

Min 0.110 inch
Max 0.120 inch

Use the No. 84B gauge.

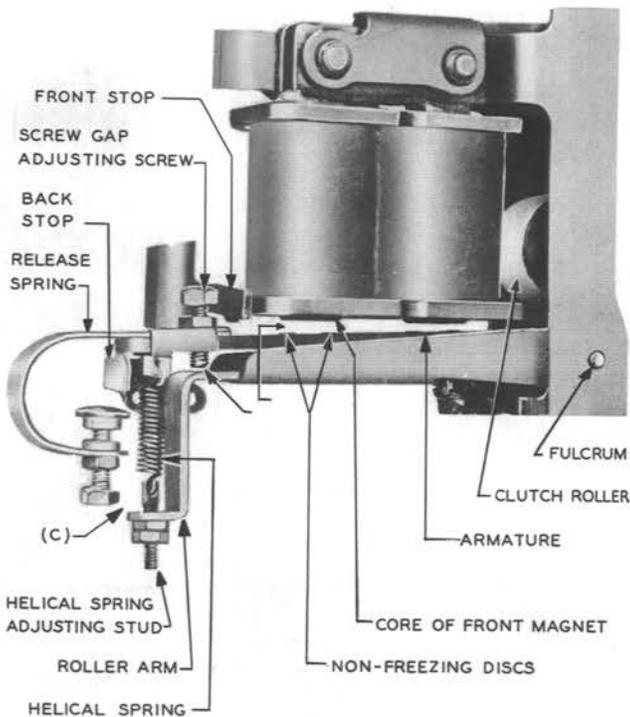


Fig. 8 - Updrive Armature in Normal Position

2.10 Operated Core Gap: Fig. 9(A) - With the armature fully operated, the gap between the armature and core of the magnet further from the fulcrum measured at a point between the two nonfreezing discs on the armature shall be

Min 0.016 inch
Max 0.024 inch

Use the No. 82B gauge.

2.11 Gap Between Screw Gap Adjusting Screw and Roller Arm - Fig. 9(B)

Test - Release Spring Attached: With the clutch updrive fully operated, when the screw gap adjusting screw is closest to the roller arm, the gap between the tip of the screw and the roller arm shall be

Min 8 divisions
Max 34 divisions

Use the No. 163B screw gap gauge.

Readjust - Release Spring Detached: With the clutch updrive fully operated when the adjusting screw is closest to the roller arm, the gap between the tip of the screw and the roller arm shall be

Min 18 divisions
Max 22 divisions

(1) The clutch shall operate each of six consecutive trials (see 1.09) on 0.275 ampere.

(2) The clutch shall nonoperate at least once in six trials on 0.245 ampere.

Use the No. 163B screw gap gauge and No. 162B armature location gauge.

Check this requirement at a time when no other brush rods on the same side of the frame are being driven upward. That is, if another clutch updrive operates as the requirement is being checked, repeat the portion of the check made during the time the other clutch was operated.

2.12 Helical Spring Tension: Fig. 8(B) - With the armature resting against the backstop, the gap, if any, between the tip of the screw gap adjusting screw and the roller arm shall not exceed 0.015 inch with the following tension applied to the roller arm just behind the helical spring adjusting stud.

	Translator and Line Finder Clutches	All Other Clutches
<u>Test</u>	- 1500 grams	1400 grams
<u>Readjust</u>	- 1600 grams	1450 grams

Use the Nos. 92E and 93B gauges.

2.13 Position of Release Spring

(a) Fig. 9(C) - With the clutch fully operated and with the release spring in position, the notched ends of the spring and clamping plate shall clear the frontstop by

Min 1/64 inch

Gauge by eye.

(b) Fig. 9(D) - With the play of the helical spring adjusting stud taken up in the direction toward the release spring, the periphery of the bronze cap shall clear the helical spring by

Min 1/64 inch

Gauge by eye.

The thickness of the release spring is approximately 1/32 inch.

(c) Fig. 9(E) - The bronze cap shall project beyond the inner edge of the backstop by

Min 3/64 inch

Gauge by eye.

The thickness of the backstop is approximately 1/16 inch.

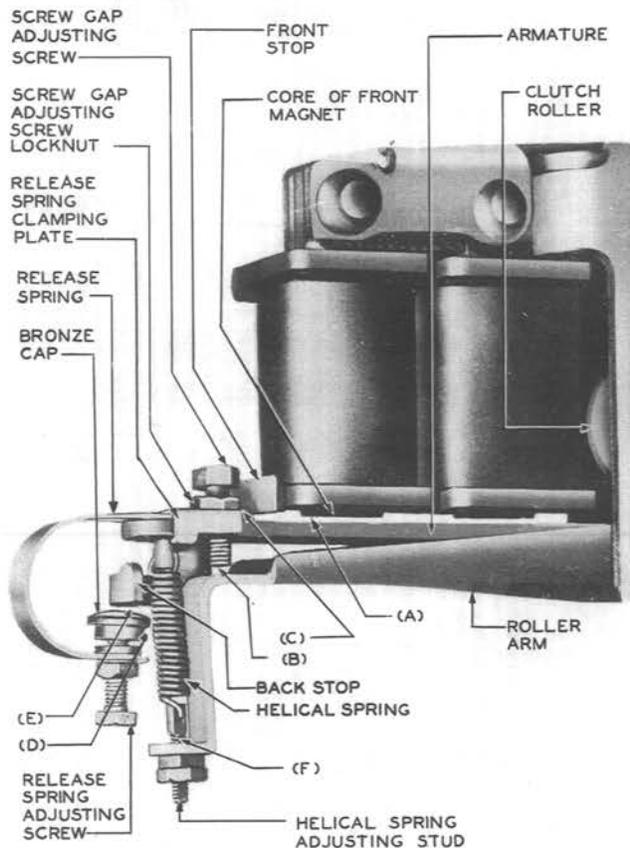


Fig. 9 - Updrive Armature Fully Operated

(d) Fig. 8(C) - There shall be a clearance between the hexagon head of the release spring adjusting screw and all portions of the roller arm.

Gauge by eye.

(e) With the front end of the armature pressed lightly to the left so as to take up the play in the armature bearings, the release spring clamping plate shall not touch the cable support.

Gauge by eye.

2.14 Updrive Electrical Requirements - Release Spring Attached

(a) Test Operate (Turnover Only): The clutch updrive shall operate each of six consecutive trials (see 1.09) on

Max 0.330 ampere

Use the No. 162B armature location gauge.

(b) Test Operate (After Turnover): When the clutch is energized on

Max 0.330 ampere

the armature shall move sufficiently to open a gap between the tip of the adjusting screw and the roller arm of

Min 5 divisions

This requirement shall apply during the entire upward travel of the brush rod.

Use the No. 163B screw gap gauge.

(c) Readjust Operate: The clutch updrive shall operate each of six consecutive trials on

Max 0.320 ampere

Use the No. 162B armature location gauge.

(d) Nonoperate: The clutch updrive shall nonoperate at least once in six trials on

	Turnover Only	After Turnover
<u>Test</u>	- Min 0.290 Amp	Min 0.240 Amp
<u>Readjust</u>	- Max 0.300 Amp	Min 0.300 Amp

Use the No. 162B armature location gauge.

Check (a), (b), (c), and (d) at a time when no other brush rods on the same side of the frame are being driven upward; that is, if another clutch updrive operates as a trial is being applied, repeat that trial.

2.15 Position of Helical Spring Adjusting Stud (Turnover Only): Fig. 9(F) - After all adjustments have been made, there shall be at least one thread showing above the roller arm to provide for further tensioning of the spring.

Gauge by eye.

REQUIREMENTS FOR DOWNDRIVES

2.16 Unoperated Core Gap: Fig. 10(A) - With the armature in its normal position, the gap between the top of the nonfreezing disc on the armature farthest from the fulcrum and the core of the corresponding coil shall be

Min 0.080 inch
Max 0.100 inch

Use the No. 83B gauge.

2.17 Clearance Between Frontstop and Armature: Fig. 11(A) - With the armature fully operated there shall be a clearance between the armature and armature frontstop. This requirement applies to 1-, 2-, 3-, 4-, and 6-type clutches only, since there are no frontstops on 5- and 7-type clutches.

2.18 Gap Between Screw Gap Adjusting Screw and Roller Arm: Fig. 11(B) - With the clutch downdrive fully operated, when the screw gap adjusting screw is closest to the roller arm, the gap between the tip of the screw and the roller arm, shall be

Test - Min 8 divisions
- Max 34 divisions
Readjust - Min 19 divisions
- Max 25 divisions

Use the No. 163B screw gap gauge.

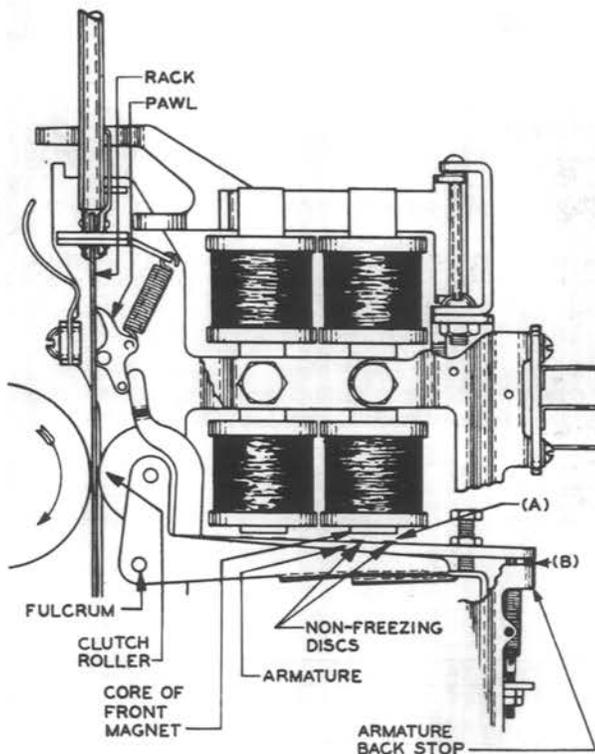


Fig. 10 - Downdrive Armature in Normal Position (Earlier Type Pawl)

2.19 Downdrive Electrical Requirements

(a) Operate: The clutch downdrive shall operate each of six consecutive trials (see 1.09) on

Nos. 1A, 2A, 4A, and 5A Clutches	Nos. 1B, 3A, 3B, 4B, 6A, 6B, 7A, and 7B Clutches
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Test - Max 0.215 Amp Max 0.245 Amp
Readjust - Max 0.170 Amp Max 0.210 Amp

Use the No. 162B armature location gauge.

(b) Nonoperate: The clutch downdrive shall nonoperate at least once in six trials on

Nos. 1A, 2A, 4A, and 5A Clutches	Nos. 1B, 3A, 3B, 4B, 6A, 6B, 7A, and 7B Clutches
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Test - Min 0.115 Amp Min 0.150 Amp
Readjust - Min 0.140 Amp Min 0.180 Amp

Use the No. 162B armature location gauge.

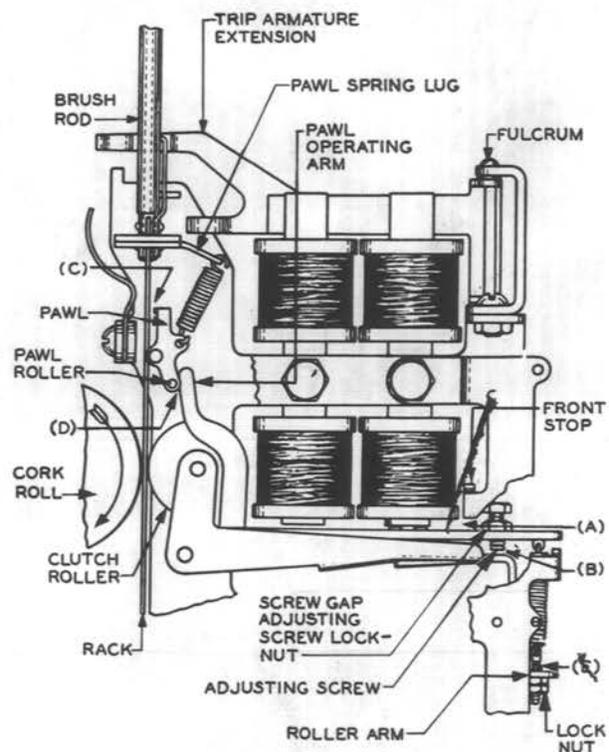


Fig. 11 - Downdrive Armature in Fully Operated Position (Later Type Pawl)

(c) Remove Pawl (Test Only): The clutch downdrive shall remove the pawl each of six consecutive trials on

Nos. 1A, 2A, 4A, and 5A <u>Clutches</u>	Nos. 1B, 3A, 3B, 4B, 6A, 6B, 7A, and 7B <u>Clutches</u>
Max 0.190 Amp	Max 0.225 Amp

Check (a), (b), and (c) at a time when no other brush rods on the same side of the frame are being driven downward; that is, if another clutch downdrive operates as a trial is being applied, repeat that trial.

2.20 Pawl Clearance: Fig. 11(C) - With the clutch roller pressed against the rack and the rack pressed against the cork roll with just sufficient pressure to drive the rack down without slipping, the pawl shall not touch the rack in any vertical position the rack may assume.

Gauge by feel.

2.21 Pawl Engagement: Fig. 10(B) - The pawl shall engage the rack sufficiently to prevent the rack from slipping or dropping for any position the rack may assume when a 0.020-inch thickness gauge is placed between the backstop and armature.

Use the No. 80B gauge.

*2.22 Pressure of Pawl Roller Against Pawl Operating Arm: Fig. 11(D) - The pressure of the pawl roller against the operating arm shall be

Min 55 grams
Max 100 grams

Use the No. 79C gauge.

2.23 Position of Helical Spring Adjusting Stud (Turnover Only): Fig. 11(E) - After all adjustments have been made, there shall be at least one thread showing above the roller arm to provide for further tensioning of the spring.

Gauge by eye.

3. ADJUSTING PROCEDURES

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

Code or Spec No.	Description
<u>Tools</u>	
273	Adjuster
310B (two required)	9/32-inch Hex. Open Double-end Offset Wrench
325B	Adjuster
335	Frontstop Lug Adjuster
379A	Adjuster

Code or Spec No.	Description
467A	9/32-inch Hex. Open Double-end Flat Wrench (See 3.002)
589A	Adjuster
KS-6367	7/16- and 5/8-inch Hex. Open Double-end Flat Wrench ←
KS-8097	5/8- and 7/16-inch 12-point Off-set Box Wrench
KS-8349	Carrying Case
KS-14164	No. 4 Artist's Show Card Brush ←
KS-14250,L1	Flashlight ←
	(or the replaced flashlight equipped with KS-7742 bottom cap)
R-1051	6-inch Pillar File
R-1313	Fish Line ←
R-2593	7/8- and 1-1/16-inch Hex. Open Double-end Flat Wrench ←
-	6-1/2-inch P-long-nose Pliers
-	3-inch Cabinet Screwdriver
-	4-inch Regular Screwdriver
-	Double Grip Screwdriver
-	FT10 Oil Stone, Behr Manning Co. ← (or equivalent)
-	7/16- and 1/2-inch 12-point Box Offset Wrench (J.H. Williams & Co. No. 8725 Superrench) ←

Gauges

74D	Thickness Gauge Nest
79C	0-200 Gram Push-Pull Tension Gauge
80B	0.010-, 0.020-, 0.030-inch and 0.015-, 0.035-inch Thickness Gauge
81	0.028- and 0.052-inch Thickness Gauge
82B	0.016- and 0.024-inch Double-end Thickness Gauge
83B	0.080- and 0.100-inch Double-end Thickness Gauge
84B	0.110- and 0.120-inch Double-end Thickness Gauge
92E	0.015-inch Thickness Gauge
93B	Gram Weights
162B	Armature Location Gauge ←
	(or replaced 162A)
163B	Screw Gap Gauge ←
	(or replaced 163A)
KS-6909	Thickness Gauge Nest

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Code or Spec No.	Description
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Test Apparatus

35 Type	Test Set
→1W13B (two required)	Cord (One Equipped With a KS-6278 Connecting Clip in One End)
2W17A (three required)	Cord (One Equipped With Two KS-6278 Connecting Clips) (One Equipped With a KS-6278 Connecting Clip in the No. 360C Tool End) (One Equipped With a KS-6278 Connecting Clip in the No. 360B Tool End)
	Dry Cells as required

Materials

KS-2423	Cloth
KS-7860	Petroleum Spirits
KS-8496	Lubricating Compound No. 3
P-173711	Magnet Clamping Clearance Screw [See 3.010(5)]
-	Spring Clothespin

3.002 No. 467A Wrench: In these procedures, the No. 310B wrench is specified for use on the clutch adjusting screws and adjusting nuts. In case the opening of the No. 310B wrench is too small to fit the screws or nuts, use the No. 467A wrench instead of the No. 310B wrench.

3.003 Method of Connecting 35-type Test Set to Clutch Updrive and Downdrives

Updrives - Battery Connected to Common Terminal of Clutch

(1) Set all keys on the test set normal and slide all the rheostat sliders to the right. Insert the No. 310 plug of the 2W17A cord, which is equipped with two KS-6278 connecting clips, into the TEST T & R jack of the test set. Connect the black (ring) conductor to the updrive terminal of the clutch and connect the white (tip) conductor to ground.

(2) Insert the No. 310 plug of the 2W17A cord, which is equipped with a KS-6278 connecting clip in the No. 360C tool end, into the TEST EXT KEY 4W jack of the test set and connect the white (tip) conductor of this cord to the downdrive terminal of the clutch. Operate the three knife switches designated "4" so as to engage the jaws designated "0" and operate the BATT & GRD CO key. Move the sliders of the No. 4 rheostat to the extreme left. By this arrangement, telegraph keys Nos. 1, 2, and 3 can be used to apply current flow values to the updrive while key No. 4 is used to operate the downdrive in restoring the brush rod to normal.

(3) To obtain a given current flow value, such as the operate current, manually hold the updrive armature in its unoperated position. Operate the circuit closing lever associated with telegraph key No. 1 and move the sliders of the No. 1 rheostat until the desired current flow value is obtained. To obtain a second current flow value such as the nonoperate current, release telegraph key No. 1, operate key No. 2, and move the sliders of the No. 2 rheostat. To obtain a third current such as is required to fully operate the clutch updrive in requirement 2.11 operate the three knife switches designated "3" so as to engage the jaws designated "0" and move the sliders of the No. 3 rheostat to the extreme left. If the office voltage is near the minimum allowable, it may be necessary to connect one or more dry cells in series with the test set and the clutch updrive magnet in order to obtain some of the current flow values specified. When readjusting to the electrical values, check the current flow values frequently so as to insure that the temperature rise of the magnet caused by current flowing through it will not affect the resulting adjustment.

Updrives - Ground Connected to Common Terminal of Clutch

(4) Connect the test set to the clutch updrive as covered in (1), connecting battery instead of ground to the white (tip) conductor of the cord plugged into the test set TEST T & R jack. Operate the REV key. Obtain the desired current flow values as in (3). It will be necessary to operate the downdrive manually in order to restore the brush rod.

Downdrives

(5) In checking downdrives, the connections are the same as described in (1) to (4), inclusive, except that the connections to the updrive and downdrive terminals are interchanged.

3.004 Checking Requirements With Brush Rod in Motion: To avoid damaging the cork rolls in checking requirements 2.11 and 2.14, where the check is made with the brush rod in motion, take care not to keep the clutch energized after the brush rod reaches its limit of travel.

3.005 Method of Removing Rack: Raise the brush rod a few terminals. Uncouple the brush rod from the rack by inserting the blade of the 3-inch cabinet screwdriver between the rack tongue and brush rod as shown in Fig. 12 and turning the screwdriver just enough to disengage the tongue from the brush rod.

Caution: Insert the blade of the screwdriver just below the horizontal portion of the lip of the rack tongue so as to affect the tension of the rack tongue as little as possible.

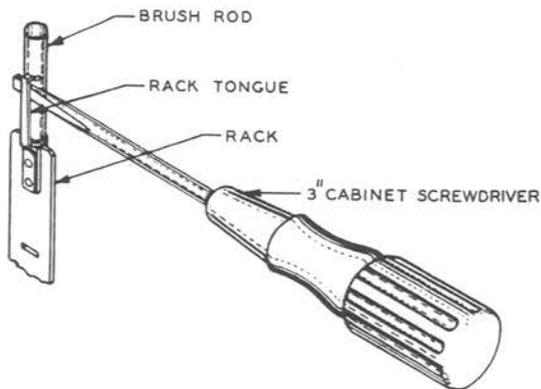


Fig. 12 - Method of Uncoupling Rack From Brush Rod

Lift the brush rod away from the rack with the other hand. The rod now has no means of support, so it will be necessary to hold it in place with a spring clothespin just above a bearing plate as shown in Fig. 13. Lift the rack out from behind the clutch.

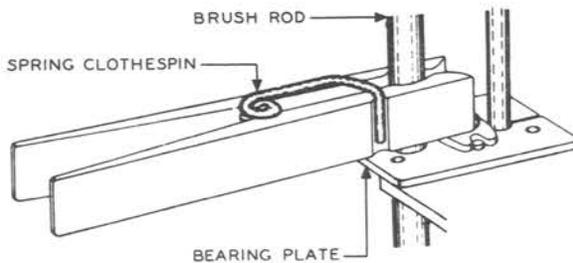


Fig. 13 - Placing Spring Clothespin on Brush Rod

3.006 Method of Removing Clutch: Remove the fuse which supplies current to the clutch. Uncouple the rack from the brush rod as outlined in 3.005. Loosen the clutch mounting screw with the double-grip screwdriver. Where the clutch mounting screw will not budge, apply the KS-6367 or R-2593 wrench ← to the square shank of the double-grip screwdriver thereby obtaining greater leverage. Lower the clutch until the two projections at the top just clear the holes in the clutch top locating plate, taking care not to disturb the trip rod rotating lever. Pull the top of the clutch away from the frame until it is clear of the locating plate and then lift it up to disengage the mounting screw at the bottom of the clutch. Take care when removing and handling the clutch while making adjustments not to break the wires connected to the soldering lugs.

3.007 Method of Remounting Clutch: Remount the clutch on the frame making sure that the clutch is satisfactorily located as outlined in requirement 2.04 and that the clutch retaining spring tension is satisfactory as outlined in requirement 2.05. Remount the fuse that was removed. Check that the commutator and multiple brushes are located correctly as covered in 3.008.

3.008 Rechecking Other Requirements After Clutch is Shifted or Removed From Frame
If, for any reason, it is necessary to shift the position of the clutch or to remove the clutch from the frame, make sure that the commutator brush and multiple brushes are located in accordance with the requirements specified in the section covering the particular type of apparatus involved. This is important because the vertical location of the entire brush rod assembly may have been affected by shifting the clutch.

3.009 Procedure for Installing Release Springs on Clutch Updrives

- (1) Experience has shown that the work of equipping the clutch updrives on one side of a frame with release springs and adjusting them as covered in this section will be facilitated by beginning with the clutch at the left-hand side of the frame and working on each clutch, in turn, from left to right.
- (2) Experience has also shown that to obtain satisfactory engagement of the bronze cap of the release spring and the armature backstop, it is necessary that the front surface of the backstop be in approximate alignment with the front edge of the armature. If the backstop of the clutch on which the release spring is to be mounted is not so located, position the backstop as required with the No. 589A adjuster.
- (3) With the R-1051 pillar file, remove any rough or burred edges from the lower surface of the armature backstop at the point where the bronze cap of the release spring adjusting screw will engage the backstop. Also, with the pillar file, slightly round the front lower corner of the backstop (see Fig. 15), because the bronze cap of the release spring adjusting screw is likely to contact the backstop on the corner. These filing operations will reduce wear on these parts and result in a longer-lived adjustment. No further filing of the armature backstop will be necessary on subsequent re-adjustments. On new or shop-repaired clutches these filing operations may have been performed at the time of manufacture or repair.
- (4) After adjusting for requirements 2.11 and 2.12, carefully loosen the screw gap adjusting screw locknut, using the No. 310B wrench to hold the screw from turning and another No. 310B wrench to loosen and turn the nut. Turn the nut up sufficiently to

permit placing the release spring and re-release spring clamping plate beneath the nut, taking care not to turn the adjusting screw. Place the release spring clamping plate over the wider portion of the release spring so that the open end of the slot is toward the clutch. Mount the spring and plate beneath the locknut and position the spring and plate in accordance with requirement 2.13 and preferably so the end of the slot in the spring rests against the adjusting screw. Push the release spring clamping plate tight against the adjusting screw where this can be done without interference from the cable support and frontstop and securely tighten the locknut.

3.010 Lowering Rear Magnet and Raising Front Magnet of Updrives

Lowering Rear Magnet

(1) Remove the rack and support the brush rod with the spring clothespin as outlined in 3.005. Remove the clutch from the frame as outlined in 3.006. It is not necessary to remove the wires, but the clutch should be supported in such a way as to prevent the wires from being broken or the insulation from being damaged.

(2) With the armature operated manually, check that there is a minimum clearance of 0.006 inch between the top surface of the nonfreezing disc nearest the fulcrum and the associated magnet core using the No. 74D gauge or if the clutch is not equipped with nonfreezing discs at this point, check to see that a clearance of 0.010 inch exists between the armature and the magnet core nearer the fulcrum using the 0.010-inch blade of the No. 74D gauge.

(3) If this clearance is appreciably greater than 0.006 inch or 0.010 inch, depending on the clutch, loosen the rear magnet clamping screw with the KS-8097 wrench as shown in Fig. 14 and lower the rear magnet. On some earlier clutches it will be necessary to use the Williams & Co. Superrench to loosen the magnet clamping screw. In making this adjustment, reduce the clearance as much as possible (without going below the specified value) so as to get the maximum pull from the rear magnet. This adjustment may be facilitated by placing the 0.008-inch or 0.012-inch blade of the No. 74D gauge between the armature and the core of the rear magnet and lowering the magnet until the gauge is tight. Make sure that the face of the rear magnet core is parallel to the surface of the armature. Securely retighten the magnet clamping screw, applying enough force to insure that the magnet will not be jarred out of position during service. Then recheck the clearance between the core and armature to be sure that it is not less than the specified value with the armature manually operated.

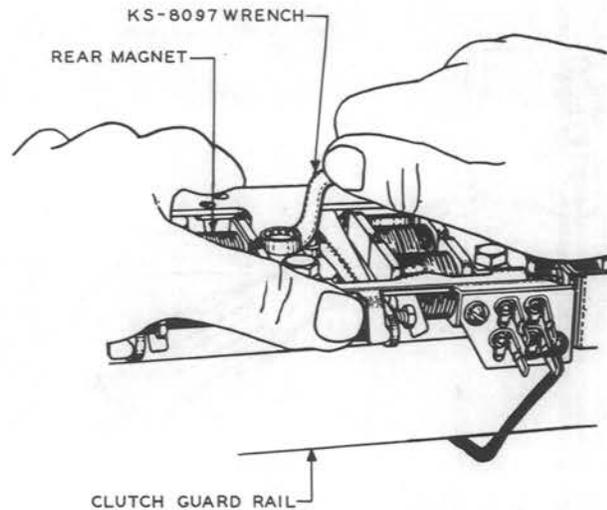


Fig. 14 - Method of Loosening Rear Magnet Mounting Screw

Raising Front Magnet

(4) If it is not possible to lower the rear magnet sufficiently to obtain the proper clearance between the nonfreezing discs or core of the rear magnet and the armature, as outlined in (3), proceed as follows. Raise the frontstop with the No. 273 adjuster if the clutch is of the 1, 2, or 3 type or with the No. 335 adjuster as shown in Fig. 18 if the clutch is of the 4, 5, 6, or 7 type, sufficiently to allow the armature to come up against the front magnet core. Loosen the front magnet clamping screw with the KS-8097 or Williams wrench. Raise the front magnet until the clearance between the armature and the core of the rear magnet is satisfactory. Adjust the frontstop so that this clearance can be maintained and raise or lower the front magnet until the requirements covering operated core gap are met. Make sure that the face of the core of the front magnet is parallel to the surface of the armature. Securely retighten the magnet clamping screw, applying enough force to insure that the magnet will not be jarred out of position during service. Recheck requirement 2.09.

Installing Clearance Screw in Place of Rear Magnet Clamping Screw

(5) In some cases, it may not be possible to lower the rear magnet and raise the front magnet sufficiently to meet the updrive requirements. This is more likely to occur on line finder and translator clutches because of the higher helical spring tension requirement. Where this occurs if, with the armature operated, the clearance between the core of the rear magnet and the armature still exceeds 0.006 inch or 0.010 inch as indicated in (2), remove the rear magnet clamping screw

with the KS-8097 wrench. Substitute a P-173711 clearance screw and lower the rear magnet until the clearance between the armature and the core of the magnet is satisfactory.

Note: The P-173711 clearance screw may be recognized by the undercut. ← ←

(6) Remount the clutch as outlined in 3.007.

3.011 Lubricating Armature Backstop: When the requirements are met, using the KS-14164 brush, coat the lower portion of the armature backstop at the point where the bronze cap of the release spring adjusting screw contacts the backstop with the KS-8496 lubricating compound. No subsequent lubrication of this part is necessary due to service or when the clutch is readjusted.

PROCEDURES FOR RACKS

3.01 Bow of Rack (Rq 2.01)

- (1) Remove the rack as covered in 3.005. Hold the rack vertically and place a straight edge, such as another rack, against the front or rear surface of the rack.
- (2) If the rack is bowed to such an extent that it requires straightening, straighten it by bending it as a whole and not in sections, and thereby prevent putting a kink in it. If it cannot be straightened in this manner the rack may be straightened in sections, exercising extreme care not to produce kinks in it.

3.02 Cutting of Rack (Rq 2.02)

- (1) Whenever the edge of a rack is worn so as to present a flat surface, it is an indication that the rack is being cut on the rack guides. Smooth, bright edges on the rack due to normal wear should not be considered as an indication of cutting.
- (2) This condition is usually caused by improper alignment of the clutch with respect to its associated brush rod. Check for alignment and adjust for it, if necessary, as covered in 3.04.

3.03 Slipping of Rack (Rq 2.03)

- (1) If the rack slips it may be due to a binding brush rod in which case refer to the section covering the particular type of elevator apparatus involved.
- (2) If the rack is bowed, straighten it as covered in 3.01.
- (3) If the rack still slips and an inspection shows that it is not due to incorrect clutch adjustment, it is probably due to oil or grease on the rack or the surface

of the cork roll. In this case, clean the rack and cork roll as covered in the section on friction roll drives.

- (4) If the rack only is to be cleaned, remove the rack as covered in 3.005. Then clean it with a KS-2423 cloth moistened with KS-7860 petroleum spirits. Remount the rack and check it for slipping.

GENERAL CLUTCH PROCEDURES

3.04 Clutch Location (Rq 2.04)

- (1) Before checking the vertical alignment, uncouple the rack from the brush rod as covered in 3.005 and raise the brush rod to a point near the upper limit of its travel. Hold the brush rod in this position by means of the spring clothespin as shown in Fig. 13, preferably between banks Nos. 2 and 3.
- (2) If any part of the requirement is not met, loosen the clutch mounting screw as outlined in 3.006 and shift the clutch as required. If the proper clearance between clutches cannot be obtained by shifting one clutch, it may be due to failure of one or both of the adjacent clutches meeting this requirement. In this case, loosen the clutch mounting screws of these clutches and shift them until the requirement is met on all the clutches. With the clutches properly located, securely tighten the clutch mounting screws that were loosened.
- (3) Check requirement 2.05 and the location of the commutator brush and multiple brushes (see 3.008).

3.05 Clutch Retaining Spring Tension (Rq 2.05)

- (1) Remove the rack as outlined in 3.005 and the clutch as outlined in 3.006.
- (2) Make sure that the two retaining spring mounting screws are tight. If necessary, adjust the retaining spring tension by prying the spring away from the frame with the 4-inch regular screwdriver.
- (3) Remount the clutch on the frame, making sure that requirement 2.04 is met. Reassemble the rack and make sure that the commutator brush and multiple brushes are correctly located (see 3.008).

PROCEDURES FOR TRIP MAGNET

- 3.06 Clearance Between Bent Portion of Trip Armature and Magnet Core (Rq 2.06)
- 3.07 Clearance Between Nonfreezing Disc on Trip Armature and Core Nearer Fulcrum (Rq 2.07)

- (1) To readjust it may be necessary to remove the clutch from the frame as covered in 3.006.

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(2) In some cases, it may be possible to meet both of these requirements by applying the No. 325B adjuster to the trip armature between the core of the magnet nearer the fulcrum and the fulcrum and adjusting the trip armature. If both requirements cannot be met by adjusting the trip armature in this manner, proceed as follows.

(3) Loosen the two trip armature bracket mounting screws with the 4-inch regular screwdriver using the No. 310B wrench, if necessary, to hold the nuts. Position the trip armature bracket as required and securely retighten the screws.

(4) If the clutch was removed, remount it as covered in 3.007.

3.08 Trip Magnet Electrical Requirements (Rq 2.08)

(1) If the requirement is not met, this may be caused by a binding trip rod or by faulty trip armature extension or rotating lever adjustment. Refer to the section covering the particular type of elevator apparatus involved for the method of correcting these conditions.

PROCEDURES FOR HIGH AND LOW SPEED UPDRIVES

3.09 Unoperated Core Gap (Rq 2.09)

(1) Adjust the armature backstop by bending it up or down as required using the No. 273 adjuster as shown in Fig. 15. In making this adjustment, take care not to mar the lower surface of the backstop at the point where the bronze cap of the release spring adjusting screw will engage it when the release spring is installed.

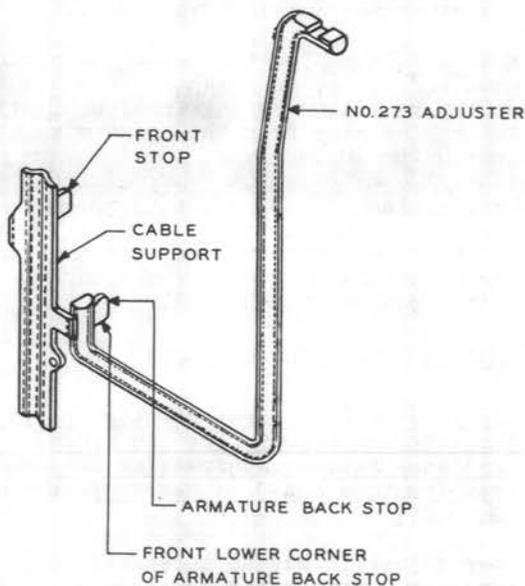


Fig. 15 - Adjusting Armature Backstop

- 3.10 Operated Core Gap (Rq 2.10)
- 3.11 Gap Between Screw Gap Adjusting Screw and Roller Arm (Rq 2.11)
- 3.12 Helical Spring Tension (Rq 2.12)
- 3.13 Position of Release Spring (Rq 2.13)
- 3.14 Updrive Electrical Requirements - Release Spring Attached (Rq 2.14)

(1) General: Connect the 35-type test set to the clutch as covered in 3.003.

Operated Core Gap

(2) To check the operated core gap, fully operate the updrive. If necessary manually raise the armature to bring it to the fully operated position. Should the helical spring tension be so great that the armature will not stay in this position, reduce this tension just enough to bring about the above condition by loosening the helical spring stud adjusting nut and locknut with two No. 310B wrenches as shown in Fig. 16.

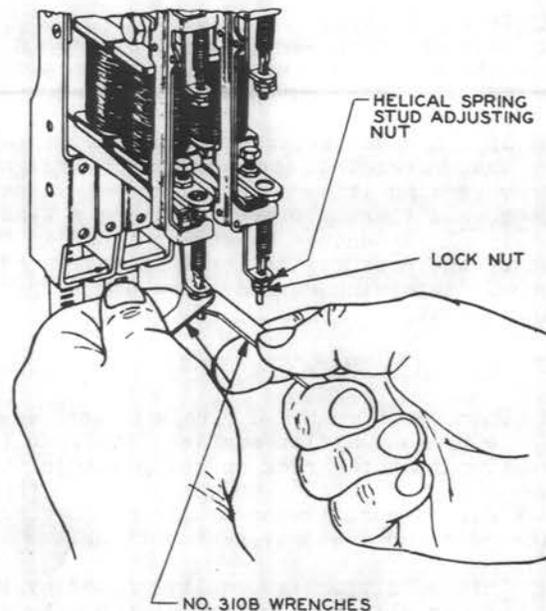


Fig. 16 - Adjusting for Helical Spring Tension

(3) With the armature in the fully operated position, check the operated core gap with the No. 82B gauge as shown in Fig. 17. Observe that the 0.016-inch end of the gauge is free and the 0.024-inch end of the gauge is tight in the gap.

(4) Be sure that the gauge is not applied on top of the nonfreezing disc. To insure this, place the gauge on top of the nearest nonfreezing disc, and then energize the magnet and push the gauge away until it snaps off the disc and the armature is felt or seen to move. Also work the gauge back and forth between the discs which will act as stops for the gauge.

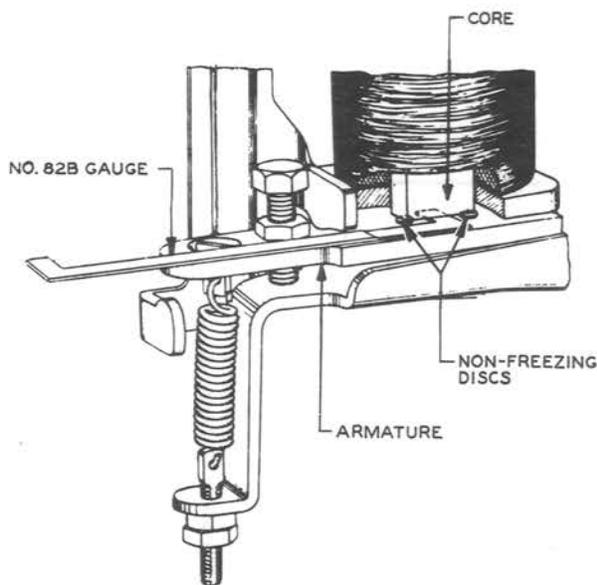


Fig. 17 - Checking Operated Core Gap

- (5) De-energize the magnet.
- (6) Adjust the frontstop up or down as required using the No. 273 or 335 adjuster as required. Use the notch in the shorter arm of the No. 273 adjuster for making this adjustment on 1-, 2-, and 3-type clutches in the same manner as adjusting the backstop as shown in Fig. 15, and the No. 335 adjuster for making the adjustment on 4-, 5-, 6-, and 7-type clutches as shown in Fig. 18.

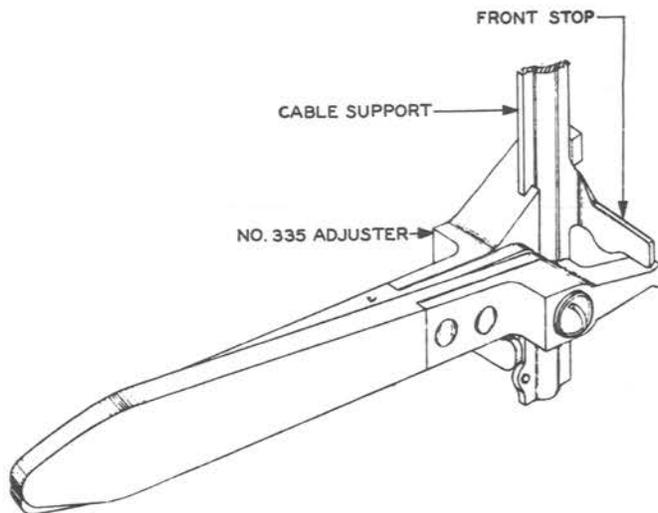


Fig. 18 - Adjusting Frontstop

Checking Test Requirement for Gap Between Adjusting Screw and Roller Arm - Release Spring Attached

(7) With the 35-type test set connected to the clutch as covered in 3.003, fully operate the clutch and visually make sure that the clutch has some screw gap. A screw gap is essential to get an indication of the point at which the adjusting screw is closest to the roller arm. Operate the downdrive magnet to restore the clutch to normal.

(8) Insert the No. 310 plug of the 2W17A cord, which is equipped with a KS-6278 connecting clip in the No. 360B tool end, into the SIGNAL BAT & GRD jack of the test set. Make sure that a 48-volt lamp is in the lamp socket and connect the black (ring) conductor of the cord to the common terminal of the clutch, or some other source of 48 volts. Operate the knife switch designated "L" to the 500 & LAMP position.

(9) Mount the No. 163B screw gap gauge on the roller arm as shown in Fig. 19. To do this, back off the mounting bracket clamping screw as far as possible. Hold the contact end of the contact arm down against the gauge frame. This will permit the gauge to be mounted on the roller arm without damaging the contact arm. Insert the jaws of the bracket over the vertical portion of the roller arm with the contact arm above the armature. Raise the gauge on the roller arm until it rests against the undersurface of the roller arm. Tighten the clamping screw finger-tight to hold the gauge in position. Connect the white (tip) conductor of the cord in the SIGNAL BAT & GRD jack of the test set to the pin terminal of the gauge.

(10) To gauge the screw gap, fully operate the clutch. As the brush rod travels upward, carefully adjust the calibrated adjusting screw of the gauge until the test set lamp barely flickers or is practically extinguished. Release the clutch when the brush rod approaches the upper limit of travel and restore the brush rod. When the calibrated adjusting screw is correctly set, with the clutch fully operated, the lamp will be lighted only momentarily at the instant the adjusting screw and roller arm assume their closest positions and if the screw is turned part of a division in a counterclockwise direction the lamp will be completely extinguished. The setting of the screw should be based upon the lamp indications obtained from two or three upward trips of the brush rod. With the armature in the normal position, the lamp should be lighted.

Note: If another clutch updrive on the same side of the frame operates while the calibrated adjusting screw of the gauge is being adjusted, the lamp indication may change. Therefore, set the screw when no other brush rods on the same side of the frame are being driven upward.

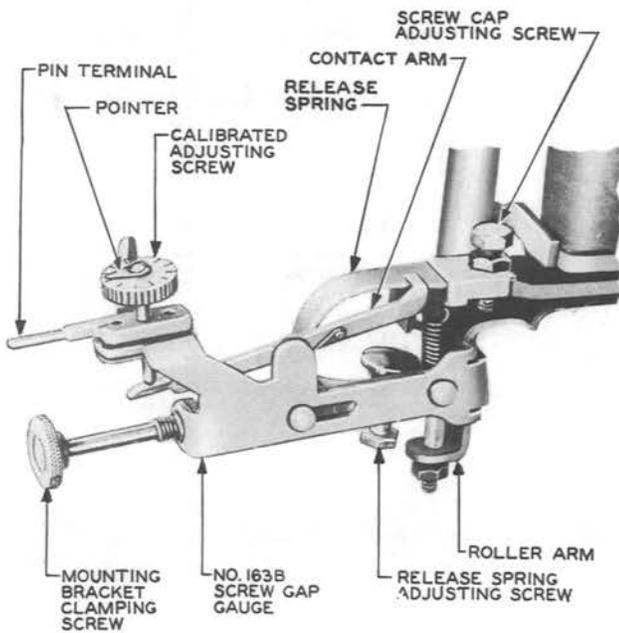


Fig. 19 - Checking Gap Between Screw Gap Adjusting Screw and Roller Arm

- (11) With the armature resting against the backstop, turn the pointer on the calibrated adjusting screw with the fingers so it lines up with the scribed line on the gauge, taking care not to turn the calibrated screw. Then turn the calibrated adjusting screw in a counterclockwise direction and carefully note the number of divisions the screw is turned before the point is reached where the lamp is again barely lighted. (In determining this point, turn the calibrated adjusting screw until the lamp is extinguished, after which turn the screw back to the point where the lamp is barely lighted.) The pointer will aid in counting the number of divisions passed when this point is reached. Each full turn of the screw (12 divisions) corresponds to approximately 0.012 inch.

Readjusting for Gap Between Screw Gap Adjusting Screw and Roller Arm

(12) If the clutch was previously equipped with a release spring, loosen the screw gap adjusting screw locknut with a No. 310B wrench. Remove the release spring and temporarily retighten the adjusting screw locknut.

(13) Proceed as outlined in (7) to (10) inclusive. Turn the calibrated adjusting screw of the screw gap gauge in a counterclockwise direction as covered in (11) except that the screw should be turned 20 divisions (corresponding to the average adjustment specified). The magnitude of the existing gap should be noted as the screw is being turned the 20 divisions by observing when or whether the lamp is extinguished

as the screw is being set. If the lamp is not extinguished after turning the screw 20 divisions, it is an indication that the screw gap is near or exceeds the maximum permitted gap.

(14) To adjust the gap between the screw gap adjusting screw and roller arm, loosen the screw gap adjusting screw locknut with one No. 310B wrench, using another No. 310B wrench to hold the screw gap adjusting screw. Turn the adjusting screw in the required direction until the setting is such that the lamp is barely lighted. If the gap is too small turn the adjusting screw in a counterclockwise direction and if it is too large turn it in a clockwise direction. Retighten the adjusting screw locknut and make sure that the clutch operates and non-operates on the specified currents when checked with the armature location gauge as covered in (15) to (17) inclusive. If not, loosen the screw gap adjusting nut locknut with one No. 310B wrench, using another No. 310B wrench to hold the adjusting nut. Position the screw gap adjusting nut as required and retighten the adjusting nut locknut. Recheck that the gap between the screw gap adjusting screw and the roller arm is still within the specified limits as covered in (7) and (11) and if not, refine the adjustments as required.

(15) Mount the No. 162B armature location gauge on the cable support of the clutch. To do this back off the clamping screw until there is about 1/2 inch between the undersurface of the head of the screw and the clamping bracket. With the calibrating adjusting screw uppermost, hold the gauge and insert it between the clutch being adjusted and the clutch to the left, tilting the clamping portion of the gauge slightly to the left and downward toward the magnets and engaging the guide pin in the angle formed by the armature backstop as shown in Fig. 20. Take special care that with the gauge in this position the finger of the gauge is under the frontstop and above the armature. If it is not in this position the finger may be damaged. Then rotate the gauge to the right to a vertical position and with the index finger of the left hand acting as a guide, hook the clamping hook around the cable support. Hold the gauge in this position with the index finger and tighten the clamping screw securely as shown in Fig. 21.

(16) Disconnect the cord from the screw gap gauge and transfer it to the pin terminal of the armature location gauge. Fully operate the clutch and carefully adjust the calibrated adjusting screw of the armature location gauge so that the lamp just lights or flickers. When the calibrated adjusting screw is correctly set, the lamp will be extinguished or will flicker when the clutch is operated. Turn the pointer on the calibrated adjusting screw with the fingers until

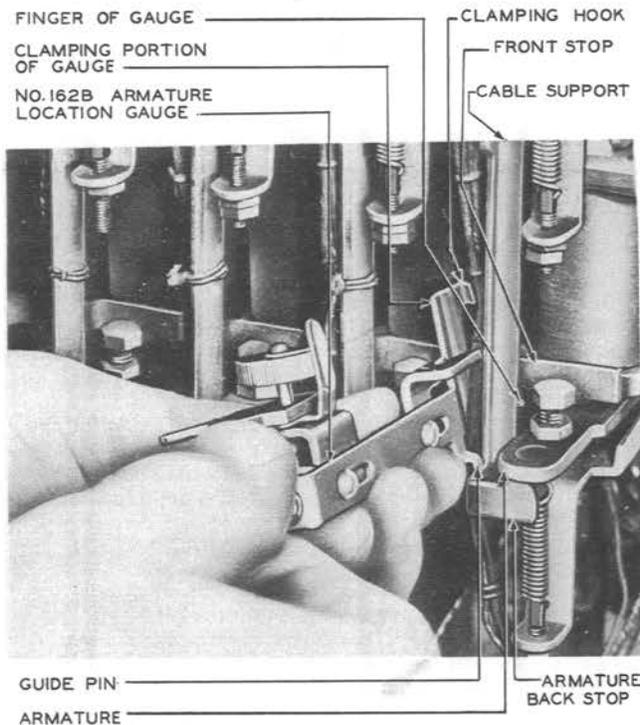


Fig. 20 - Method of Mounting No. 162B Armature Location Gauge

the pointer lines up with the scribed line on the gauge. Then turn the calibrated adjusting screw five divisions in a counter-clockwise direction. The resulting contact setting will be such that the contact will open as the armature moves closer than 0.005 inch from the frontstop to permit the operate and nonoperate conditions, as defined in 1.06 and 1.07, to be gauged. In checking for the operate and nonoperate conditions, obtain the required current flow values as covered in 3.003. Depress the proper key of the 35-type test set for approximately 1/2 second (time required for high speed updrive to travel over approximately 20 bank terminals on line finders and "A" link sender selectors or 30 bank terminals on other circuits) and then release the key long enough for the armature to restore to the backstop. These operations constitute one trial. On a 100-point bank and a high speed updrive it will be possible to complete three such trials during the upward travel of the brush rod (two trials on 40-point line finders and only one trial on 20-point line finders). The clutch operates if the lamp is extinguished, even momentarily, during the interval the current is applied; it nonoperates if the lamp remains lighted during that interval.

(17) If desired, a KS-14250, List 1 flashlight may be used to give an indication of the gap between the adjusting screw and

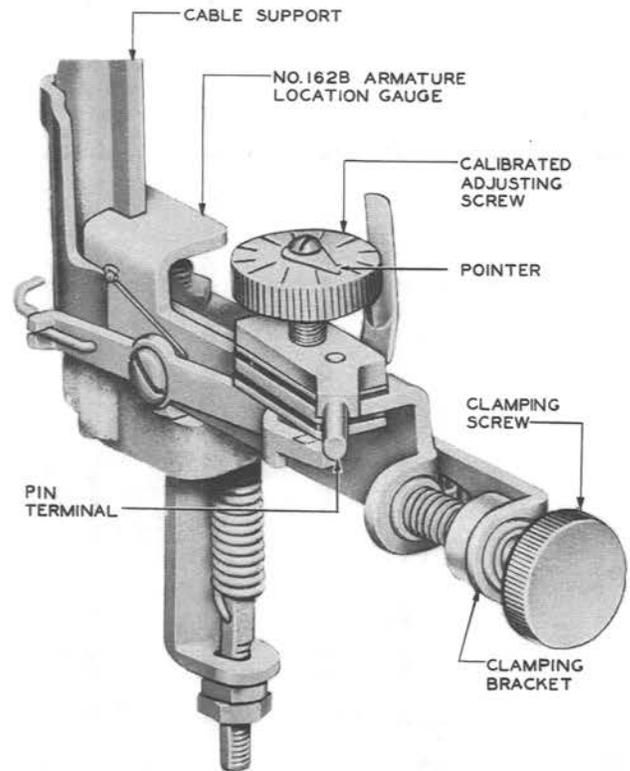


Fig. 21 - No. 162B Armature Location Gauge Mounted on Cable Support

roller arm in place of the lamp in the 35-type test set. This will eliminate shifting the lead of the cord in the SIGNAL BAT & GRD jack of the test set from one gauge to the other. To use the flashlight, connect one of the terminals of the flashlight to ground by means of a LW13B cord which is equipped with a single KS-6278 connecting clip. With another LW13B cord, connect the pin terminal of the screw gap gauge to the other terminal of the flashlight instead of to the cord in the SIGNAL BAT & GRD jack. Operate the flashlight switch.

Checking Helical Spring Tension

(18) If no depression is worn in the roller arm beneath the adjusting screw, check the helical spring tension as follows. Suspend the specified weights of the No. 93B gauge just behind the helical spring adjusting stud as shown in Fig. 22 and make sure that the No. 92E gauge binds when placed between the tip of the screw gap adjusting screw and the roller arm.

(19) If a depression is worn in the roller arm beneath the adjusting screw, the No. 92E gauge cannot be used to gauge the 0.015-inch clearance between the roller arm

and the adjusting screw. In this case, the No. 163B screw gap gauge may be used in place of the No. 92E gauge as outlined in (20).

(20) With the No. 163B screw gap gauge mounted on the clutch as covered in (9) and with the clutch armature normal, carefully adjust the calibrated adjusting screw of the gauge until the lamp is barely lighted. Then suspend the No. 93B gauge as outlined in (18). If the lamp is extinguished, turn the calibrated adjusting screw in a clockwise direction and carefully note the number of divisions the screw is turned before the lamp lights again. If less than 15 divisions are passed, the requirement is met.

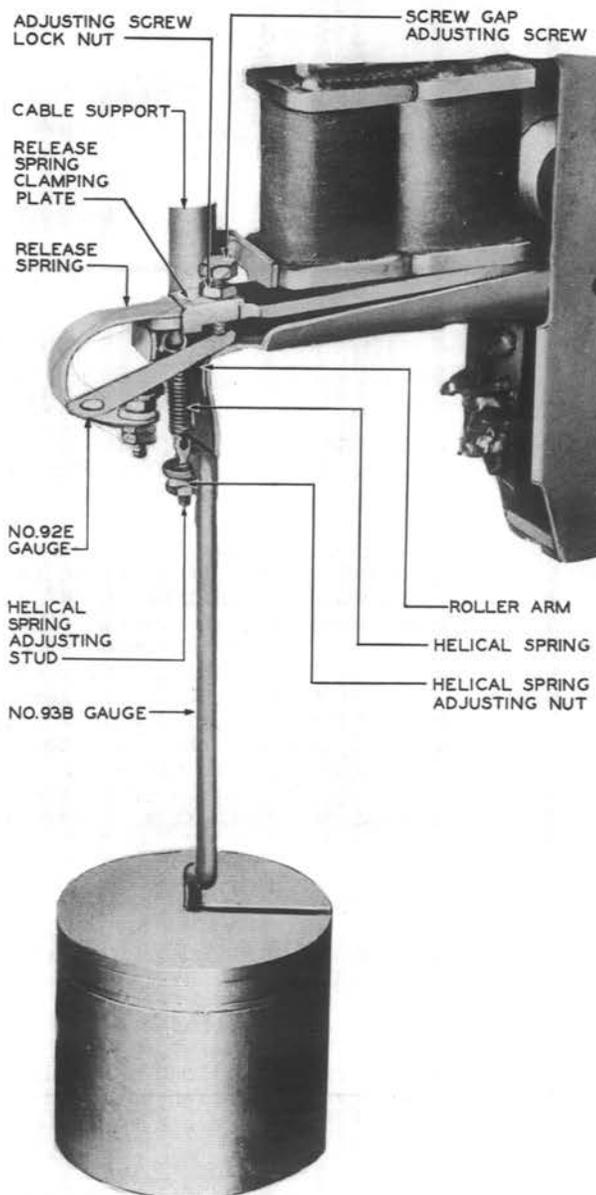


Fig. 22 - Checking Helical Spring Tension

Readjusting for Helical Spring Tension

(21) If the tension is less than the specified minimum, remove the No. 93B gauge and increase the tension as required by means of the helical spring adjusting nut and then recheck that the gap between the screw gap adjusting screw and roller arm is still met. If both requirements cannot be met with the same adjustment, recheck the operated core gap. If it is toward the maximum, adjust toward the minimum. If this does not correct the condition note whether the helical spring has a copper finish on it. If it has not, replace the spring with a spring with a copper finish as outlined in Section 026-115-801 and adjust the clutch as outlined in the preceding methods. If the clutch still cannot be adjusted, it will be necessary to lower the rear magnet or raise the front magnet as covered in 3.010 in order to increase the pull on the armature and then repeat the adjustments. Securely tighten the helical spring adjusting nut locknut.

(22) When the screw gap and helical spring tension requirements are met, dismount the screw gap gauge. Do not dismount or disturb the setting of the armature location gauge at this time as it will be required in checking 2.14.

Position of Release Spring

(23) Install the release spring as covered in 3.009.

Checking After Turnover Test Operate Requirement - Release Spring Attached

(24) Mount the No. 163B screw gap gauge on the roller arm as covered in (9).

(25) With the armature normal, carefully adjust the calibrated adjusting screw of the gauge until the test set lamp just lights. Turn the pointer on the calibrated adjusting screw with the fingers so it lines up with the scribed line on the gauge, taking care not to turn the calibrated adjusting screw. Turn the calibrated adjusting screw of the gauge five divisions as covered in (11), except that the screw should be turned in a clockwise direction.

(26) Apply the specified current. Observe that the lamp is entirely extinguished during the time the brush rod is being driven upward.

Checking Nonoperate, Turnover Test Operate, and Readjust Operate Requirements - Release Spring Attached

(27) Determine whether the clutch is operating or nonoperating as covered in (16).

Readjusting for Updrive Electrical Requirements - Release Spring Attached

(28) Loosen the release spring adjusting screw locknut with a No. 310B wrench and position the release spring adjusting screw so that this requirement is met. Turning the screw toward the backstop will aid in meeting the nonoperate requirement and turning it in the opposite direction will aid in meeting the operate requirement. Securely tighten the release spring adjusting screw locknut. Remove the armature location gauge.

(29) As a final check, manually operate the armature, noting the point at which the bronze head of the release spring adjusting screw engages the armature backstop. Then make sure that the release spring deflects when the armature is raised to the fully operated position. The amount of deflection to be expected must be learned by experience, but if the adjustments before and after the release spring is mounted are properly made there will be an appreciable deflection of the spring.

Lubrication

(30) When the requirements are met, if the clutch was not previously equipped with a release spring, lubricate the lower portion of the armature backstop as covered in 3.011.

3.15 Position of Helical Spring Adjusting Stud (Updrive) (Rq 2.15)

No procedure.

PROCEDURES FOR DOWNDRIVES3.16 Unoperated Core Gap (Rq 2.16)

(1) Adjust the armature backstop by bending it up or down as required using the notch in the shorter arm of the No. 273 adjuster as shown in Fig. 15.

3.17 Clearance Between Frontstop and Armature (Rq 2.17)

(1) If the front armature stop does not entirely clear the armatures of the 1-, 2-, and 3-type clutches, adjust the frontstop with the No. 273 adjuster as shown in Fig. 15 until it clears the armature in its operated position. If this clearance between the front armature stop and the armature is not present on the 4- and 6-type clutches, make the adjustment with the No. 335 adjuster as shown in Fig. 18.

3.18 Gap Between Screw Gap Adjusting Screw and Roller Arm (Rq 2.18)3.19 Downdrive Electrical Requirements (Rq 2.19)

(1) Check and readjust for the gap between the screw gap adjusting screw and roller arm and the operate and nonoperate electrical requirements as described for updrives in 3.10 to 3.14. When checking the remove pawl electrical requirement, proceed as outlined in (2) and (3) making sure that requirement 2.20 is met. When checking the electrical requirements remove the No. 163B screw gap gauge.

Remove Pawl

(2) Raise the brush rod and apply the specified current the specified number of trials. The pawl should be removed and the rack should be driven downward without slipping when each trial is applied.

(3) If the pawl is not removed, make sure requirement 2.20 is met and if necessary readjust for that requirement as covered in 3.20 to 3.21. In some cases, failure to remove the pawl may be caused by a burr on the pawl. In this case remove the clutch from the frame as covered in 3.006 and smooth the surface of the pawl with the FT10 oil stone. Remount the clutch on the frame as covered in 3.007.

3.20 Pawl Clearance (Rq 2.20)3.21 Pawl Engagement (Rq 2.21)Checking Pawl Clearance

(1) To check the pawl clearance, raise the brush rod manually. Hold the rod to prevent it from dropping and manually raise the downdrive armature. Apply just sufficient pressure to the armature to restore the rack under power, taking care not to let the rod drop on the downstop collar while doing this. Make sure that the pawl does not snag or touch the rack as the brush rod restores to normal.

Checking Pawl Engagement

(2) To check the pawl engagement, place the No. 80B gauge between the armature and the backstop. Clamp the gauge in this position with the thumb and index finger, placing the index finger on the backstop and the thumb on the armature as shown in Fig. 23.

(3) By means of the test set operate the updrive magnet sufficiently to raise the rack several terminals and then allow the updrive to release. Continue this throughout the length of the rack checking that the elevator rod does not drop back as the clutch is released.

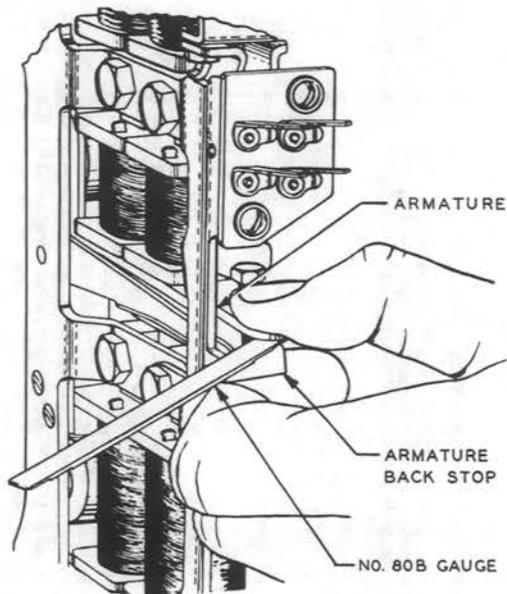


Fig. 23 - Holding Gauge in Position to Check Pawl Engagement

Readjusting for Pawl Clearance and Pawl Engagement

(4) Adjust the pawl operating arm in the desired direction very slightly with the No. 273 adjuster as shown in Fig. 24.

(5) In readjusting for these requirements, make an effort to keep the pawl as close as possible to the rack. To insure the best clutch operation and least pawl wear, make the pawl shoulders set against the face of the rack taking care, however, that the pawl clearance requirement is still met.

(6) If difficulty is experienced in adjusting the pawl to meet these requirements recheck requirement 2.16. If the unoperated core gap is near the minimum limit, readjust the gap as near the maximum limit as possible. By so doing the maximum pawl engagement can be obtained which, in turn, means a wider range for adjusting the pawl to meet both requirements.

3.22 Pressure of Pawl Roller Against Pawl Operating Arm (Rq 2.22)

(1) To check the pressure of the pawl roller against the pawl operating arm, remove the clutch from the frame as covered in 3.006.

(2) Loop a piece of R-1313 fish line over the roller and attach the No. 79C gauge to the fish line as shown in Fig. 25. Measure

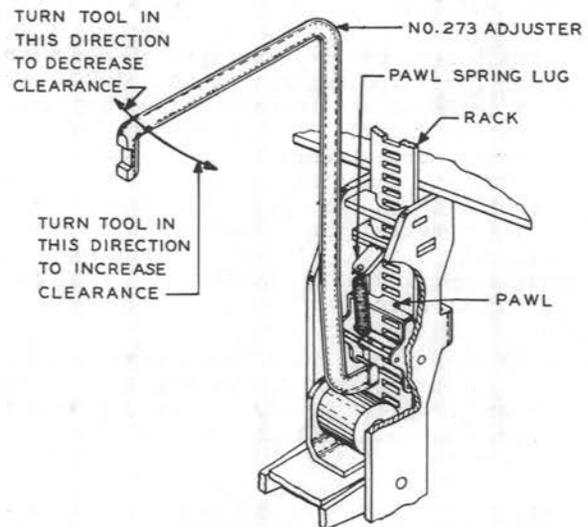


Fig. 24 - Adjusting Pawl Operating Lever

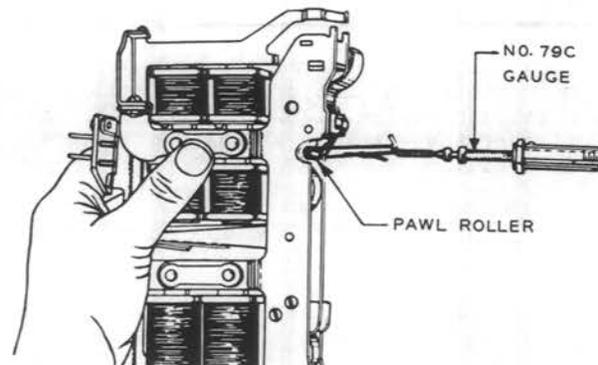


Fig. 25 - Measuring Tension of Pawl Roller Against Pawl Operating Arm

the tension required to barely pull the pawl roller away from the pawl operating arm.

(3) Adjust the pawl spring lug as required with the No. 379A adjuster. Then remount the clutch on the frame as covered in 3.007.

3.23 Position of Helical Spring Adjusting Stud (Rq 2.23)

L No procedure.

REASONS FOR REISSUE

1. To delete paragraph referring to another section covering clutches not equipped with release springs (previously covered as 1.02).

2. To revise the requirement for Pawl Clearance (2.20).
3. To revise the List of Tools, Gauges, and Test Apparatus wherever necessary (3.001).
4. To revise the procedure for loosening the rear magnet clamping screw on earlier type clutches (3.010).
5. To revise the procedure for Installing Clearance Screw in Place of Rear Magnet Clamping Screw (3.010).
6. To revise the procedure for Checking Test Requirement for Gap Between Adjusting Screw and Roller Arm Release Spring Attached (3.11).
7. To add procedure covering Position of Helical Spring Adjusting Stud (3.23).