

DROPS
4, 19, 35 AND 56 TYPES
REQUIREMENTS AND ADJUSTING PROCEDURES

1. GENERAL

1.01 This section covers the 4, 19, 35 and 56 type drops.

1.02 This section is reissued to incorporate material from the addendum in its proper location.

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 Requirements are marked with an asterisk (*) when to check for them would necessitate the dismantling or dismantling 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 that such a check is advisable.

1.05 Operate means that when the operate current is applied the armature shall move towards the core until the tripping latch releases the shutter, which shall cause the night bell spring to make reliable contact with the contact wire.

1.06 Non-operate means that when the non-operate current is applied to the line winding, the armature shall not move toward its core sufficiently to cause the trip latch to release the shutter.

1.07 Release means that when the operate current is reduced to the release value (or open circuit) the armature shall return to its unoperated position so that the tripping latch can hold the shutter when it is restored.

2. REQUIREMENTS

2.01 Cleaning

(a) The armature frame, armature and tripping latch assembly, residual screw, pivot screws, shutter hinge plate, hinge pin, and shutter shall be cleaned when necessary with petroleum spirits in accordance with the procedures herein.

(b) The core shall be cleaned when necessary with KS-7187 or KS-7188 Bell seal bond paper in accordance with the procedures herein.

2.02 Mounting: The drop shall be fastened securely to the mounting plate. Gauge by feel.

2.03 Armature Movement:

(a) The armature shall move freely on its bearings.

(b) The side play in the armature measured in line with the axis of the pivots shall be
Max. .005"
Gauge by eye and feel.

*2.04 Tripping Latch Position - Figs. 1 (A) and 2 (A):

(a) There shall be no obstruction interfering with the free movement of the tripping latch. Gauge by eye or feel.

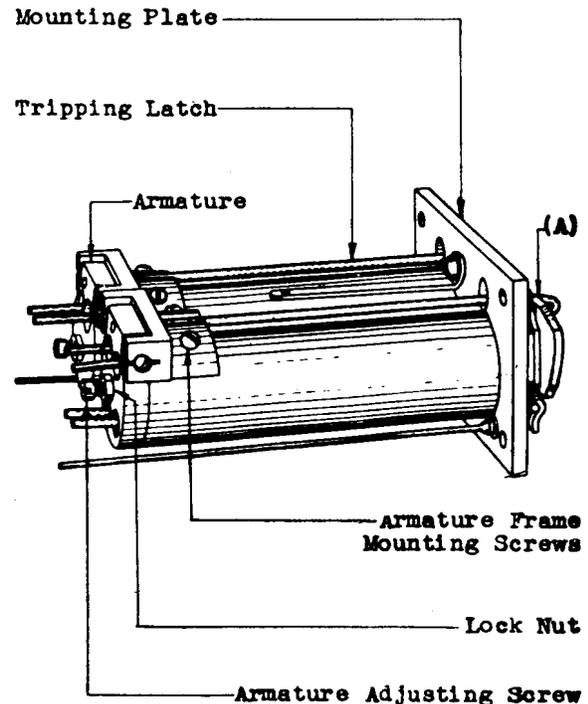


Fig. 1 - Parts of 56 Type Drop

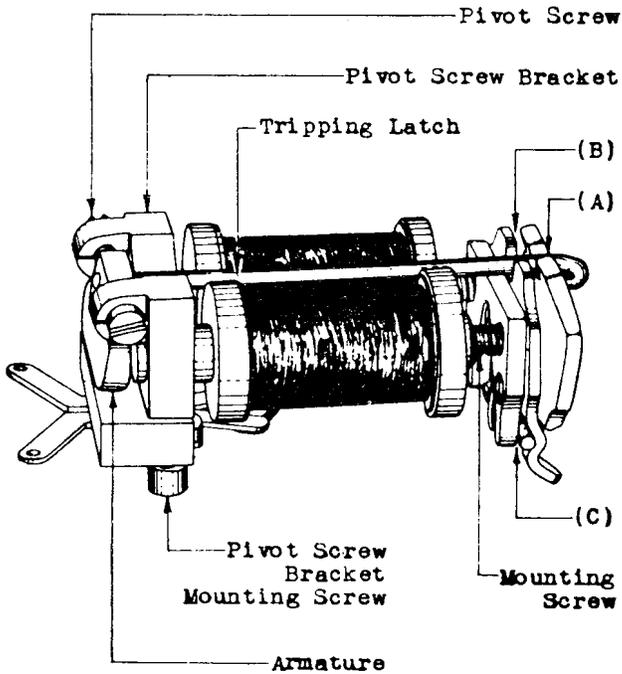


Fig. 2 - Parts of 4 Type Drop

(b) The latch shall not touch the sides of the slot in the shutter and mounting plate with the side play of the armature and shutter taken up in opposite directions. Gauge by eye.

*2.05 Lock Nut Tightness (All except 4 type drops): The lock nut on the armature adjusting screw shall be sufficiently tight to hold the screw in its adjusted position.

2.06 Shutter Movement - Figs. 2 (C) and 3 (A): The shutter shall move freely on its hinge pin. Gauge by feel.

2.07 Night Bell Spring Clearance - Fig. 3 (B): There shall be a clearance between the night bell spring and the contact wire, when the shutter is held by the tripping latch, of Min. .005" Gauge by eye.

2.08 Shutter Clearance - Figs. 2 (B) and 3 (C):

(a) There shall be a clearance between the closest point on the top edge of the shutter and the shutter hinge plate, when the shutter is held by the tripping latch, of Min. .015" Use the No. 42 gauge.

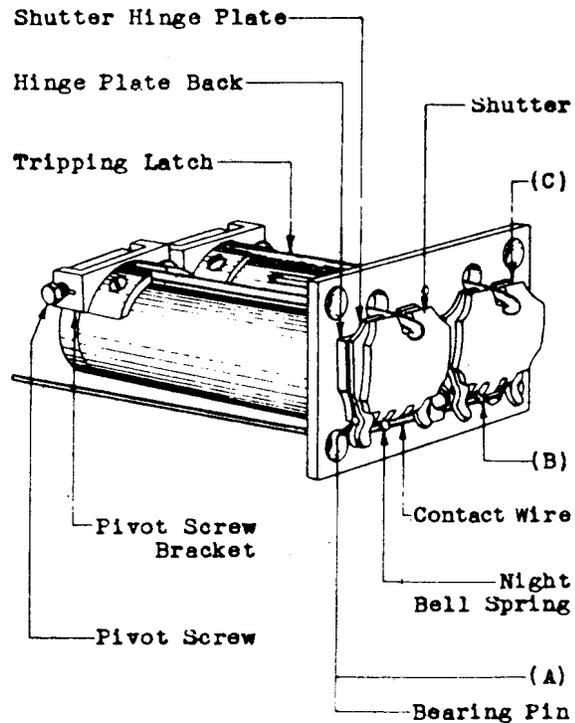


Fig. 3 - Shutter Movement, Night Bell Spring Clearance and Shutter Clearance Requirements on 35 Type Drops

(b) Drops Equipped with Night Bell Spring Mounting Screws which Protrude Beyond the Front of the Shutter Hinge Plate Only: There shall be a clearance between the closest point of the top edge of the shutter and the shutter hinge plate when the shutter is held up against the night bell spring mounting screw, of Min. .005" Gauge by eye or feel.

*2.09 Tightness of Pivot Screws: The pivot screws shall be sufficiently tight in their bracket to hold any adjusted position. Gauge by feel.

2.10 Electrical Requirements: The drop shall meet the electrical requirements specified on the circuit requirement table.

3. ADJUSTING PROCEDURES

3.001 List of Tools, Gauges, Test Apparatus and Materials

<u>Code No.</u>	<u>Description</u>
<u>Tools</u>	
74	5/32" and 7/32" Hex. Open Double-End Flat Wrench

<u>Code No.</u>	<u>Description</u>
206	30° Offset Screwdriver
207	60° Offset Screwdriver
220	3/16" Hex. Single-End Socket Wrench
-	6-1/2" P-Long Nose Pliers
-	KS-7782 Parallel Jaw Pliers or KS-6015 6" Duck-bill Pliers
-	3" Cabinet Screwdriver
-	6" Cabinet Screwdriver
-	R1005 Jeweler's Screwdriver
-	KS-6854 3-1/2" Screwdriver
-	6" Tweezers

Gauges

42 .015" Thickness Gauge

Test Apparatus

35 Type Current Flow Test Set

Materials

- KS-7860 Petroleum Spirits

- KS-7187 Bell Seal Bond Paper, Substance No. 20, 1/2" x 1-1/2"

- KS-7188 Bell Seal Bond Paper, Substance No. 20, 1/4" x 2-1/2"

- KS-2423 Cloth
or
D-98063 Cloth

- Hardwood Toothpicks, Flat at one end and pointed at the other

- P-82232 Mounting Screw (See 3.003)

3.002 Examine local conditions to determine whether it is necessary to unsolder wires or remove the drop from the mounting plate. Where the drop is removed without removing the wires take care not to break the wires.

3.003 In cases where considerable trouble has been experienced with the shutter sticking on the shutter hinge plate remove the shutter and shutter hinge plate as described in 3.01 (3). Remove the night bell

spring mounting screw with the KS-6854 screwdriver and mount a P-82232 mounting screw in position. Remount the shutter hinge plate and shutter and adjust the clearance between the shutter and the shutter hinge plate as covered in 3.08.

3.01 Cleaning (Rq.2.01)

(1) General: To clean the individual parts of a drop proceed as outlined in (2), (3), (4), (5), (6) or (7). If the action of the drop is such that it appears that a general cleaning of all the parts is necessary dismantle the drop as covered in (8) and (9) inclusive and clean the parts thoroughly with a clean piece of D-98063 cloth saturated with petroleum spirits. The parts should then be dried well with a clean cloth. Re-assemble the parts as covered in (10). If after cleaning the shutter it continues to stick consider changing the night bell spring mounting screw as covered in 3.003.

(2) Tripping Latch and Top Notches of Shutter and Shutter Hinge Plate: To clean only the tripping latch and top notches of the shutter and shutter hinge plate apply a clean piece of D-98063 cloth saturated with petroleum spirits and then wipe dry with a clean cloth. This can be done without dismounting these parts.

(3) Entire Shutter End of Drop: If only the shutter end of the drop needs cleaning proceed as follows: Remove the shutter hinge plate mounting screws with the 3" cabinet screwdriver. Remove the shutter, shutter hinge plate and hinge pin, clean the parts with a clean piece of D-98063 cloth saturated with petroleum spirits and dry them thoroughly with a clean cloth. In the case of brass shutters confine the petroleum spirits to the bearing surfaces and latch slots and prevent the use of an excess of the petroleum spirits on the face of the shutter or shutter hinge plate to avoid removal of the lacquer. Mount the shutter hinge plate on the hinge plate back and tighten the mounting screws securely.

(4) Armature Bearings and Pivot Screw: To clean only the armature bearings and pivot screws apply a small amount of petroleum spirits to the bearings and pivot screw by means of a clean toothpick. Take care to prevent the petroleum spirits from coming in contact with the parts of the drop other than the armature bearings, and from adjacent apparatus.

(5) Armature Adjusting Screw (All except 4 type drops): To clean only the armature adjusting screw proceed as follows: Insert the KS-6854 screwdriver

through the No. 220 socket wrench and loosen the nut by turning it in a counter clockwise direction with the wrench while holding the armature adjusting screw with the screwdriver. Remove the armature adjusting screw from the armature, clean it with a clean piece of D-98063 cloth saturated with petroleum spirits and then dry it thoroughly with a clean cloth. Remount the armature adjusting screw in the armature and tighten the lock nut securely.

(6) Core: To clean the core insert a piece of KS-7187 or KS-7188 Ball Seal Bond Paper between the armature and core from the bottom. Hold the armature against the paper and then withdraw the paper.

(7) Latch Slot In Pivot Screw Bracket (All Except 4 Type Drops) Dismantle the drop as covered in (8) and (9) and flush out with petroleum spirits applied at the end of a clean toothpick. Dry with a clean D-98063 cloth, pushing the cloth through the hole in the pivot screw bracket with a toothpick.

(8) Dismantling Parts: Unsolder the wires from the drop. Remove the shutter hinge plate mounting screws with the 3" cabinet screwdriver and remove the shutter, shutter hinge plate, and hinge pin. On all except the 4 type drop remove the hinge plate back mounting screws with the 6" cabinet screwdriver and remove the hinge plate back. Remove the drop mounting screws with the 6" cabinet screwdriver and withdraw the drop from the rear of the mounting plate.

(9) On drops equipped with slotted head pivot screws turn the pivot screw in a counter-clockwise direction with the KS-6854 or the R-1005 jeweler's screwdriver sufficiently to permit the armature to be removed from the pivot screws. On drops equipped with hexagon head pivot screws apply the No. 74 wrench to one of the pivot screws and turn the screw in a counter-clockwise direction to a point where the armature can be removed from the pivot screws. Remove the armature frame mounting screws on 19, 35 and 56 type drops with the KS-6854 screwdriver and remove the armature frame from the shell. On 4 type drops remove the pivot screw bracket mounting screws and remove the coils and pivot screw bracket.

(10) Reassembly of Parts: Mount the armature frame or pivot screw bracket with the KS-6854 screwdriver. Mount the armature and latch assembly in the armature frame and tighten the pivot screw to a point where the armature is

held in its proper position, with adequate end play. Remount the drop on the mounting plate and remount the hinge plate back, shutter hinge plate, shutter and hinge pin. Check to see that the drop meets its various requirements and re-adjust as necessary.

3.02 Mounting (Rq.2.02)

(1) If the drop is loose on the mounting plate, remove the shutter hinge plate mounting screws with the 3" cabinet screwdriver and remove the shutter, shutter hinge plate and bearing pin. Tighten the drop mounting screws with the 6" cabinet screwdriver as necessary. On 19, 35 and 56 type drops it will be necessary to remove the hinge plate back to gain access to one of the drop mounting screws. Use the 6" cabinet screwdriver for this purpose. Reassemble all parts, tightening the screws securely.

3.03 Armature Movement (Rq.2.03)

(1) If the armature fails to operate freely move it from side to side in line with the axis of the pivot screws and observe whether or not the side play is within the specified limits. If it is not within the specified limits, re-adjust the side-play as covered in (3) or (4) to (6) inclusive.

(2) If the sideplay is within the specified limits and the drop fails to operate satisfactorily, clean the armature bearings in accordance with 3.01(4).

(3) Drops Equipped with Hex. Head Pivot Screws: If the amount of side-play is too small, apply the No. 74 wrench to one of the pivot screws and turn the screw counter-clockwise, 1/4 of a revolution. This should give a sufficient amount of side-play. To decrease the side-play, turn the pivot screw in a clockwise direction.

(4) Drops Equipped with Slotted Head Pivot Screws: On 4 type drops use the Nos. 206 and 207 offset screwdrivers to turn one or both of the pivot screws where mounting conditions permit. However, it will in most cases be necessary to remove the drop from the mounting plate as described in (5) in order to gain access to the pivot screws.

(5) Remove the shutter hinge plate mounting screws with the 3" cabinet screw driver. Remove the shutter, shutter hinge plate and hinge pin. On 19, 35 and 56 type drops remove the hinge plate back mounting screws with the 6" cabinet screwdriver and remove the hinge plate back. Remove the drop mounting screws with the 6" cabinet screwdriver and withdraw the drop from the rear of the mounting plate, taking care not to break the wires.

(6) Then turn one of the pivot screws with the KS-6854 or R-1005 jeweler's screwdriver in a clockwise direction to decrease the play and in a counter-clockwise direction to increase the play. Observe at this time that the pivot screws are sufficiently tight in their brackets to hold their adjusted position, and if not, adjust the brackets as described in procedure 3.09 (1). Then reassemble the drop on the mounting plate.

3.04 Tripping Latch Position (Rq.2.04)

(1) If the latch touches the side of the mounting plate or the sides of the slot in the shutter or hinge plate, it may be due to the tripping latch not being centered in the slot in the pivot screw bracket, or to a bent tripping latch, or to excessive side-play of the shutter. To correct these conditions it may be necessary to remove the drop from the mounting plate as described in 3.03 (5).

(2) To center the tripping latch in the slot in the pivot screw bracket, move the armature to the right or left as required by changing the position of the pivot screws with the No. 74 wrench or the KS-6854 or R-1005 jeweler's screwdriver. Then check requirements 2.03 and 2.09.

(3) To adjust a bent tripping latch, apply the KS-7782 parallel jaw pliers or the KS-6015 duck-bill pliers to the tripping latch near the pivot screw bracket as shown in Fig. 4 or 5 and then give a slight twist to the right or left as required.

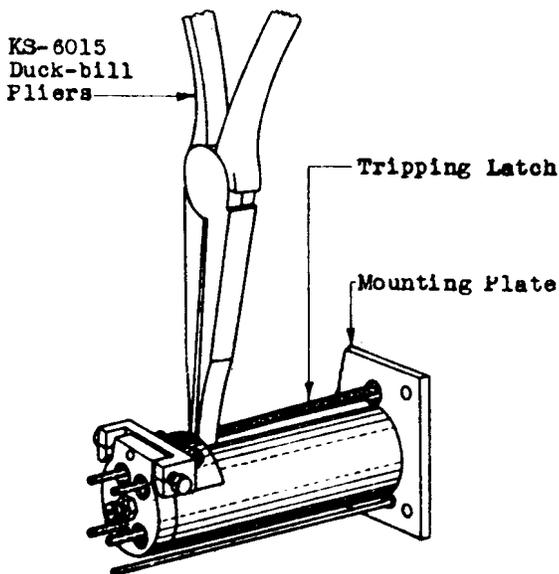


Fig. 4 - Method of Adjusting for the Tripping Latch Position on 19, 35 and 56 Type Drops

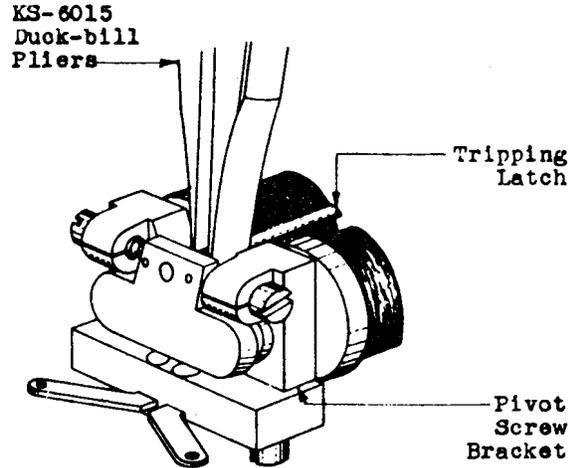


Fig. 5 - Method of Adjusting for Tripping Latch Position on 4 Type Drops

(4) If the side-play of the shutter is excessive adjust the hinge plate bearing tangs to the left or right as required with the P-long nose pliers as shown in Fig. 6. If the tangs are adjusted note that the shutter will still drop sufficiently to close the night bell contact reliably as indicated by the operation of the alarm circuit.

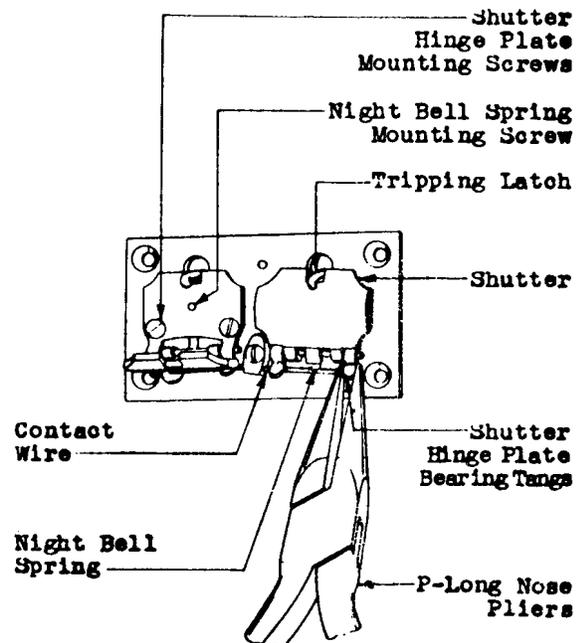


Fig. 6 - Method of Adjusting the Shutter Hinge Plate Bearing Tangs

3.05 Lock Nut Tightness (Rq.2.05)

(1) To tighten loose lock nuts, hold the adjusting screw with the KS-6854 screwdriver while turning the nut with the No. 220 wrench.

3.06 Shutter Movement (Rq.2.06)

(1) If the shutter does not move freely on its hinge pin, the trouble may be due to dirt, in which case the shutter hinge pin and shutter hinge plate should be cleaned as covered in 3.01 (3).

(2) Bind may also be due to a bent hinge pin or to lack of clearance between the shutter and the hinge plate bearing tangs. If the hinge pin is bent, replace it with a new one. If the bind is between the shutter and the shutter hinge plate bearing tangs adjust the tangs with the P-long nose pliers as shown in Fig. 6 away from the shutter and recheck requirement 2.03.

3.07 Spring Clearance (Rq.2.07)

(1) The clearance between the night bell spring and the contact wire with the drop held by the tripping latch may be changed ordinarily without removing the shutter, by adjusting the spring near the tip with the 6" tweezers as shown in Fig. 7. If the requirement cannot be met in this manner, remove the shutter hinge plate mounting screws with the 3" cabinet screwdriver. Then remove the hinge pin and shutter and adjust the spring with the KS-7782 parallel jaw pliers or the KS-6015 duck-bill pliers.

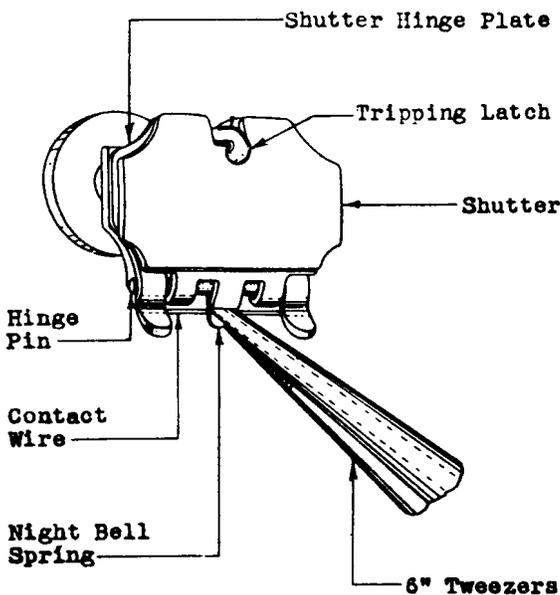


Fig. 7 - Method of Adjusting for Spring Clearance

3.08 Shutter Clearance (Rq.2.08)

(1) To change the clearance between the shutter hinge plate and shutter with the shutter held by the tripping latch, adjust the tip of the tripping latch upward or downward as required with the P-long nose pliers. Note that the latch can still engage the shutter.

(2) If the shutter does not properly clear the shutter hinge plate, on drops equipped with night bell spring mounting screws which protrude beyond the shutter hinge plate, replace the night bell spring mounting screw as covered in 3.003.

3.09 Tightness of Pivot Screws (Rq.2.09)

(1) If the pivot screws will not hold their adjusted position, remove the drop from the mounting as described in procedure 3.03 (5) and remove the pivot screws from the pivot screw bracket with the No. 74 wrench where the pivot screws have hexagon heads, or with the KS-6854 or R-1005 jeweler's screwdriver where the pivot screws have slotted heads. Then close up the slot in the bracket with the P-long nose pliers as shown in Fig. 8. Replace the screws and check requirement 2.03.

(2) If the pivot screws are too tight in their brackets, the slot in the bracket may be widened by forcing the blade of the KS-6854 screwdriver into it.

3.10 Electrical Requirements (Rq.2.10)

(1) If the armature fails to operate on the operate current, reduce the un-operated air-gap. It may be possible in some cases to obtain a satisfactory gap without removing the drop from its mounting by holding the tripping latch against the bottom of the slot while

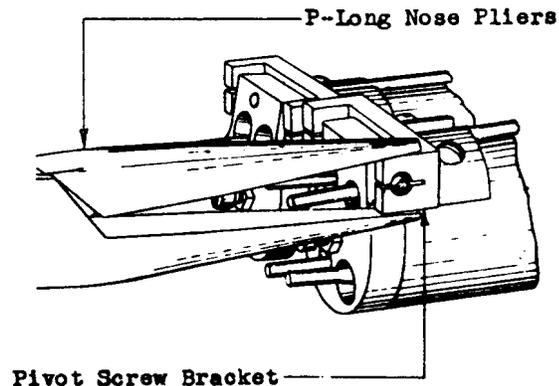


Fig. 8 - Method of Closing Up the Slot in the Pivot Screw Bracket

forcing the armature towards the core. If impossible to obtain a satisfactory adjustment in this way, remove the drop from its mounting as described in procedure 3.03 (5) to make this adjustment.

(2) If the armature moves all the way up to the core on the operate current but the tripping latch does not release the shutter, it may be due to insufficient armature movement or the latch being bent downward at the tip too much. First adjust the tip upward with the P-long nose pliers. On 19, 35 and 56 type drops it may be that the armature adjusting screw is turned in too far, thus limiting the movement of the armature. In this case, turn the adjusting screw in a counter-clockwise direction using the No. 220 wrench to loosen the lock nut and the KS-6854 screwdriver to turn the screw.

(3) To adjust a drop to meet the non-operate requirement increase the un-operated air-gap as follows. Bend the latch end of the tripping latch with the KS-7782 parallel jaw pliers or the KS-6015 duck-bill pliers so as to increase the air-gap. It may be necessary in certain cases to remove the drop from the mounting plate as covered in 3.03 (5). If the armature air-gap cannot be adjusted in this way without distorting the tripping latch loosen the armature frame mounting screws with the KS-6854 screwdriver and shift the armature frame toward the rear of the drop to increase the air-gap.

(4) If the armature on 19, 35 and 56 type drops fails to release, turn the armature adjusting screw in a clockwise direction with the KS-6854 screwdriver after loosening the lock nut with the No. 220 wrench, until the armature releases. Tighten the lock nut securely and recheck the operate requirement.