THE BELL TELEPHONE CO. OF CANADA
ENGINEERING DEPARTMENT

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Specifications 3858

No. 50 COIN COLLECTOR MAINTENANCE

Contents **Page**

SCOPE 4
GAUGES AND TOOLS 4
REPAIR PARTS 4
DESCRIPTION OF COIN COLLECTOR 6
OPERATION 11
STANDARD ADJUSTMENTS 13
CLEARING TROUBLES 29
TESTS 34
REFERENCE SPECIFICATIONS 35

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TABLE OF CONTENTS

	SECTION	PAGE
SCOPE	1	4
GAUGES AND TOOLS	2	4
REPAIR PARTS	3	4
DESCRIPTION OF COIN COLLECTOR	4	6
OPERATION	5	11
STANDARD ADJUSTMENTS		
General Rules	6	13
Adjusting Coin Relay	7	14
Adjusting Armature for Side Play	8	15
Adjusting Armature Restoring Arms	9	15
Adjusting Operating Arm	10	16
Adjusting Ground Contact Springs	11	20
Adjusting and Replacing Coin Trigger	12	24
Adjusting Coin Trigger Lever	13	26
Adjusting Coin Trap	14	27
Replacing Coin Trap	15	28
Adding Chute Clip	16	29
Housing Contact Springs	17	29
Equalizing Spring	18	29
Switchhook	19	29
Coin Signal Gongs	20	29
CLEARING TROUBLES:		
General	21	29
No Ground	22	30
1000 Ohm Ground	23	30
Can't Collect or Return	24	31
Coins Left on Trap	25	31
Can't Call	26	31
Relay Chatters	27	31
Coins Collected When They Should Be Returned and Returned When They Should Be Collected	28	31

Two Coins to Call	29	32
Cord Interference	30	32
Switchhook	31	32
Coin Signals	32	32
Side Tone Reduction	33	32
Trouble Cleared	34	33
Trouble Not Cleared	35	34
TESTS:		
Open Ground Circuit	36	34
Reversed Lines	37	35
Test of Coin Relay	38	35
Coin Signals	39	35
REFERENCE SPECIFICATIONS	40	35

No. 50 COIN COLLECTOR MAINTENANCE

SCOPE

1. Scope. These Specifications cover the maintenance of No. 50 Coin Collectors at substations.

GAUGES AND TOOLS

2. In addition to the gauges and tools carried for other work, the following are required for adjusting No. 50 Coin Collectors at substations.

No. 37 Gauge—For gauging separation between ground spring contacts.

No. 44 Gauge—For gauging stroke of operating arm and adjustment of coin trigger.

No. 7 Sash Tool—Brush for cleaning coin chute.

No. 63 Tool—For setting up armature pivot screw locknut.

No. 138 Tool—For adjusting stops and arms.

No. 139 Tool—For leveling coins in coin receptacle.

No. 143 Tool—For adjusting coin trigger lever spring and ground contact springs.

No. 265 Tool—For cleaning contacts.

No. 281 Tool—For flattening ends of pivot pins.

REPAIR PARTS

3. The repair parts required for maintaining No. 50 Coin Collectors at substations are given below in alphabetical order. The parts which should be carried by the repairman and those which he should obtain from the storeroom, when required, will be covered by supplemental instructions.

Apparatus Blank: **No. 50-C**

Coin Collector:

CLIP FOR COIN CHUTE
COIN CHUTE ASSEMBLY FOR No. 50-E COIN COLLECTORS
COIN CHUTE MOUNTING SCREWS.

COIN CHUTE ASSEMBLY SCREWS 5/8"
COIN CHUTE NUTS
COIN TRAP (new type)
COIN TRIGGER HAVING STOP SPRING
COIN RELAY
COIN RELAY MOUNTING SCREWS
CORD BUSHING
EMERY PAPER No. 00
EQUALIZING SPRING
GONG NUT
GONG NUT WASHER
HOUSING CONTACT SPRINGS FOR No. 50-E COIN COLLECTORS
INSTRUCTION CARD
INSTRUCTION CARD FRAME
INSTRUCTION CARD GLASS
INSTRUCTION CARD FRAME SCREWS
GROUND SPRING ASSEMBLY
GROUND SPRING ASSEMBLY MOUNTING SCREWS
PIN FOR COIN TRAP AND COIN TRIGGER PIVOT
SWITCHHOOK SPRING ASSEMBLY
SWITCHHOOK AND STUD
SWITCHHOOK PIN
SWITCHHOOK SET SCREW
UPPER HOUSING FOR No. 50-E COIN COLLECTOR

REPAIR PARTS

Cords	**DIAL CORD**	**No. 13-A**
	RECEIVER CORD	**No. 92**
	RECEIVER CORD—WATERPROOF	**No. 542**
	TRANSMITTER CORD—8 inch	**No. 547**

Dials:

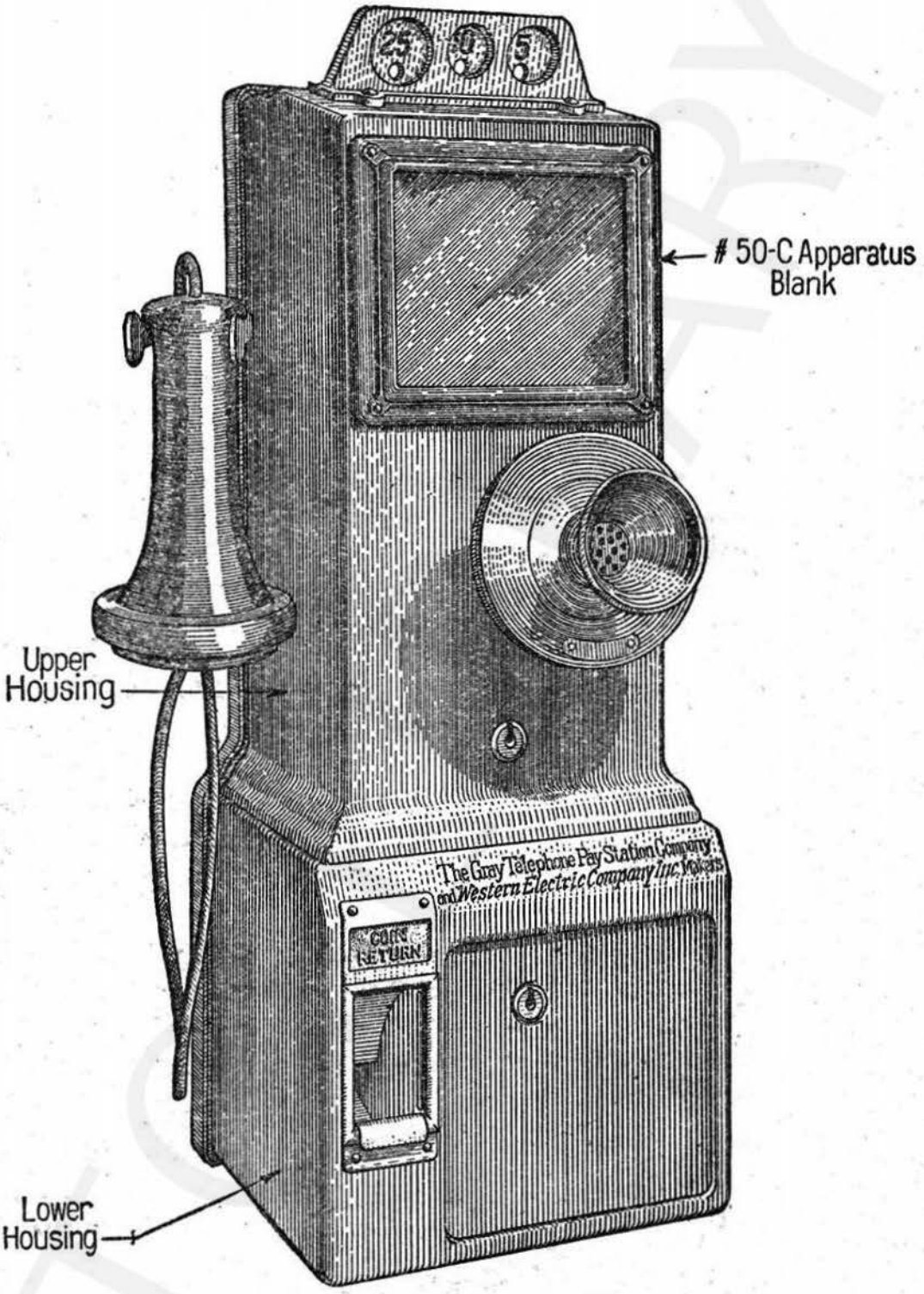
For dials and repair parts see Specifications No. 4159—Maintenance of Northern Electric Co. dials

NUMBER PLATE (out of service shield)	**No. 126-A**
TEMPORARILY OUT OF ORDER CARD	**Form E-158**
Receiver:	**No. 144**
Transmitter—(black finish)	**No. 323**
Transmitter Bracket	**No. 3-E**
Transmitter Bracket Screws	

DESCRIPTION OF COIN COLLECTOR

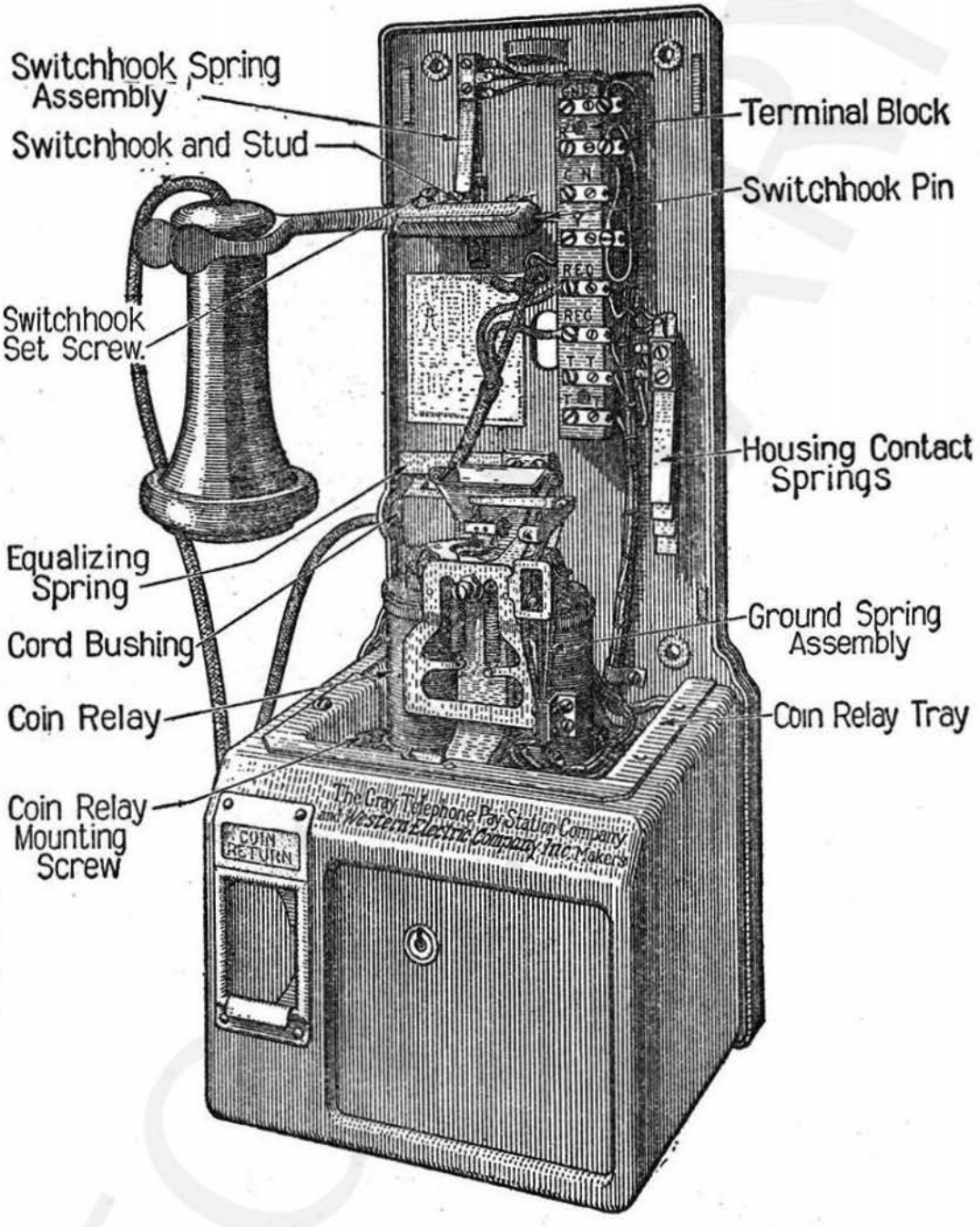
4. The illustrations shown in these specifications are of the No. 50-E coin collector. This collector can be used with either manual or machine switching equipment. The manual equipment may be converted (as covered in separate specifications No. 4160 for Machine Switching Substations) for use with machine switching equipment.

The adjustments are the same for all of these collectors.

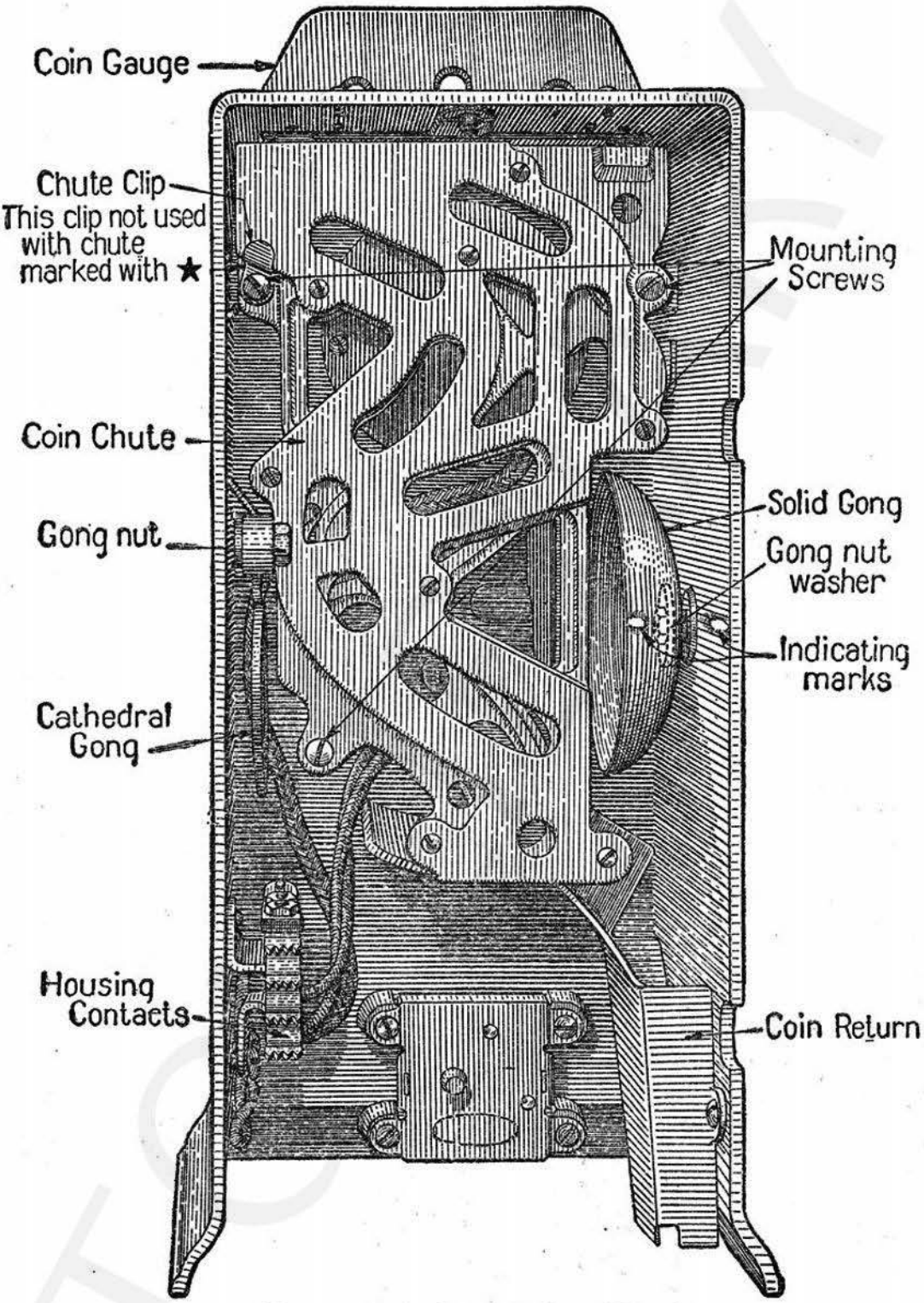


Coin collector arranged for use with manual equipment. When used with machine switching equipment apparatus blank is removed and dial and dial cord added.

Description of Coin Collector

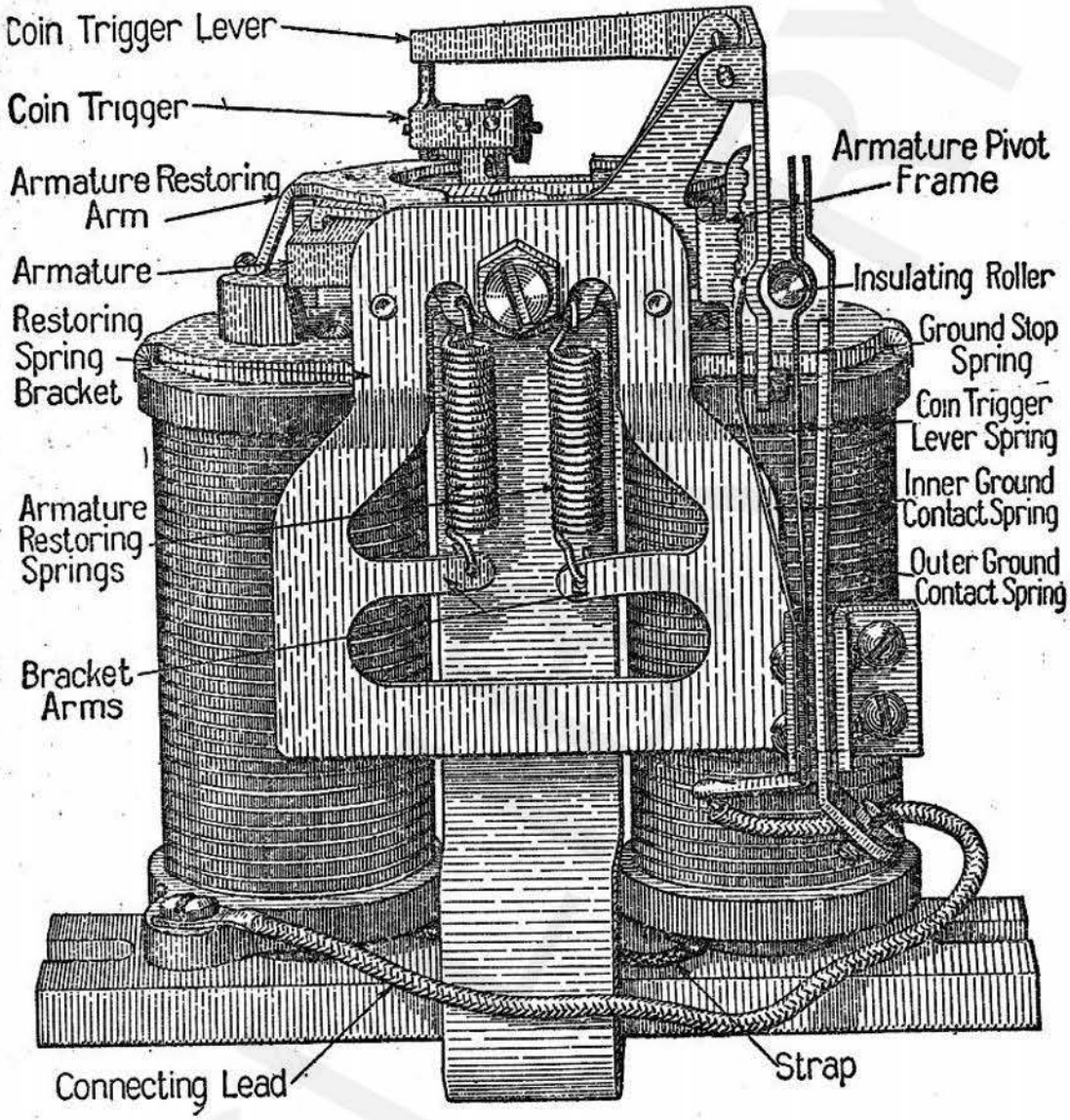


Coin collector with upper housing removed. The coin relay is fastened to the coin relay tray. The coin receptacle is contained within the lower housing.



Upper Housing—Rear View.

Description of Coin Collector



Coin relay in normal position.
Armature pivot frame cut away to show ground contact springs complete.

OPERATION

5. The operation of the coin collector is described below as an aid in making repairs to the collector.

The coin chute carries the coin from the coin gauge past the signal gongs to the coin hopper. A nickel strikes the solid gong once and a dime the solid gong twice. A quarter strikes the cathedral gong once. Slugs or coins not of proper size fall out of the coin chute, before reaching the signal gongs, into the coin return.

A coin trips the coin trigger and comes to rest on the coin trap where it is held until the coin relay is operated. The tripping of the coin trigger permits the coin trigger lever to fall. The coin trigger lever spring then pushes the coin trigger lever against the inner ground contact spring causing this spring to make contact with the outer ground contact spring. This contact closes the circuit from the tip side of the line through the coin relay to ground and is maintained until the armature of the coin relay has been operated and nearly restored.

When a deposited coin is to be collected in the case of manual equipment, the operator depresses a "collect" key. This key sends 110 volt positive battery to the tip side of the line and operates the coin relay so that the relay armature is drawn toward the right hand pole piece. (See Note). The coin vane (see Section 15) pivoted directly beneath the coin trap, is in consequence deflected by the pressure of the operating arm on the vane pin and the weight of the coin causes the trap to fall and the coin to drop into the coin receptacle. With machine switching equipment the collection is made automatically when the calling party hangs up after a completed local connection, or by means of cord circuit keys or other means on calls involving an operator.

Operation

When a coin is to be returned, in the case of manual equipment, the operator depresses a "return" key which sends 110 volt negative battery to the tip side of the line and operates the coin relay so that the armature is drawn toward the left hand pole piece. (See Note) In consequence the coin drops into the coin return. With machine switching equipment coins are returned automatically to the calling party when he hangs up if the connection was completed to a free number, or if for any other reason the coin is to be returned.

Note: In districts where negative battery is used for collecting and positive battery for returning the coins the above operations of collecting and returning will be reversed.

When the collect or return voltage is removed from the line, the coin relay armature restores to its normal position, the coin trap is returned to its normal position by the trap counterweight and the circuit is opened at the ground spring contacts.

The exit from the hopper into the coin return compartment is normally closed by the coin shield, (see Section 10). This shield is pivoted at the top and swings outward when it is struck by a coin passing from the hopper into the coin return.

Normally, the armature is held in a horizontal position by two spiral restoring springs. These springs restore the armature when the operating voltage has been removed from the line. The motion of the armature is limited by the ends of the operating arm. The operating arm also carries the insulating roller, which by pressing against the coin trigger lever when the coin relay is operated, restores the coin trigger to its normal position and keeps the ground springs in contact.

The coin relay and associated mechanism form a unit which is mounted upon the coin relay tray and may be removed by taking out the coin relay assembly mounting screws.

STANDARD ADJUSTMENTS

6. The following general rules shall be observed:

(a) Coin collectors have standard adjustments when received from the Western Electric Company through Company's storerooms. It should not, in general, be necessary to check the adjustments at installations of such coin collectors.

(b) On removals, where coin collectors are reused without going through the storeroom, check all adjustments and if necessary adjust.

(c) If trouble is experienced with collector at new installations check adjustments and if necessary adjust.

The separation between the armature and pole pieces, the tension on the armature restoring springs and the position of the bracket arms are adjusted by the manufacturer so that the coin relay should operate satisfactorily under the maximum and minimum voltage conditions met with in service. It is not practicable to make these adjustments on a coin collector in service, as the proper operation of the relay under the high and low voltage limits cannot readily be determined. **Therefore, the tension of the armature restoring springs, the position of the bracket arms, and the separation between the armature and pole pieces should never be changed on a coin collector in service.** If the coin relay cannot be made to operate properly without adjusting these parts, a new coin relay should be substituted.

(d) Make adjustments so that they will be correct when all nuts and screws are set up tight.

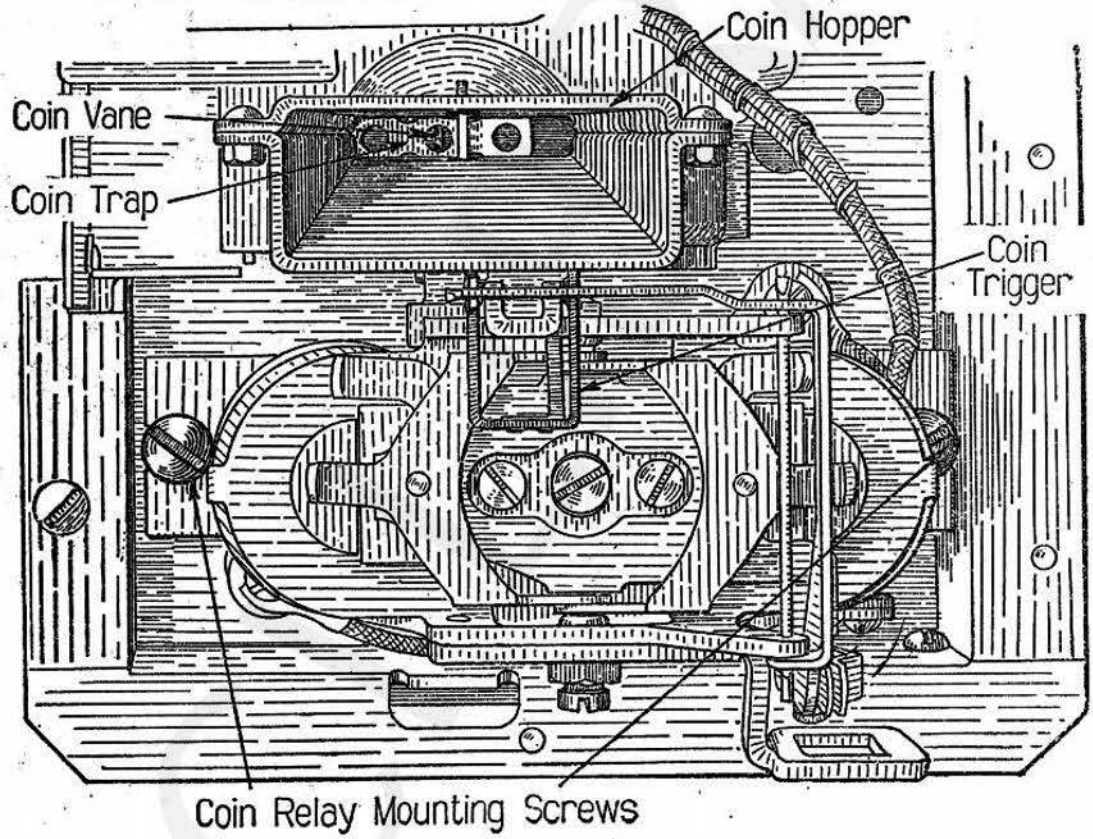
(e) If collector does not operate properly when adjusted according to these specifications (and cannot be made to operate properly by replacing parts as permitted by these specifications) replace collector.

(f) The adjustments included in Sections 7 to 20 should be made when required by (a), (b) and (c) above and to clear the troubles given in Sections 21 to 35.

Standard Adjustments

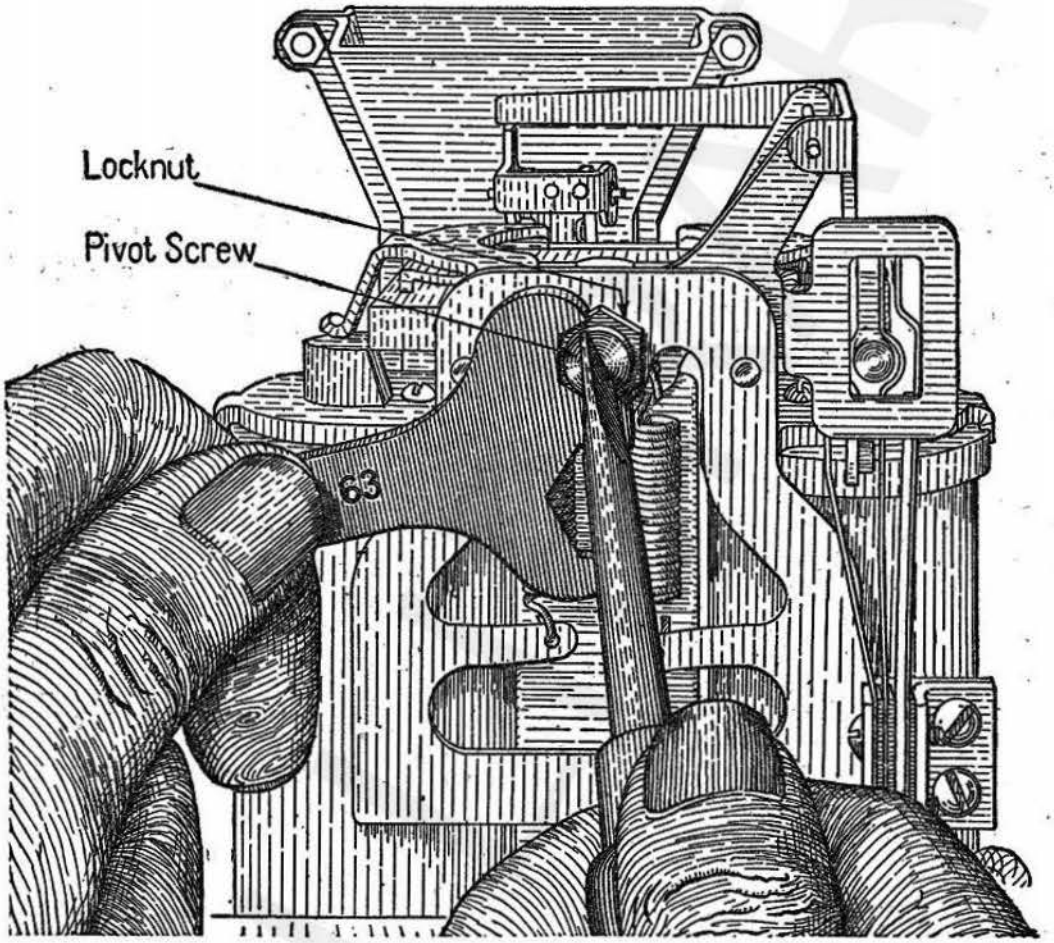
7. Adjusting coin relay. If the upper edge of the coin vane cannot be sighted through the hopper, directly beneath the center of the middle hole in the coin trap, the coin relay is not centered. To adjust:

1. Loosen coin relay mounting screws.
2. Center coin relay by shifting to right or left as required.
3. Hold coin relay in this position and tighten coin relay mounting screws.
4. If after centering coin relay the coin trigger does not project through the center of the slot, bend the trigger until the proper position is obtained. See Section 12.



8. Adjusting armature for side play.

1. Loosen locknut.
2. Adjust pivot screw so that armature will work freely without unnecessary sideplay.
3. Hold pivot screw in position while tightening locknut.

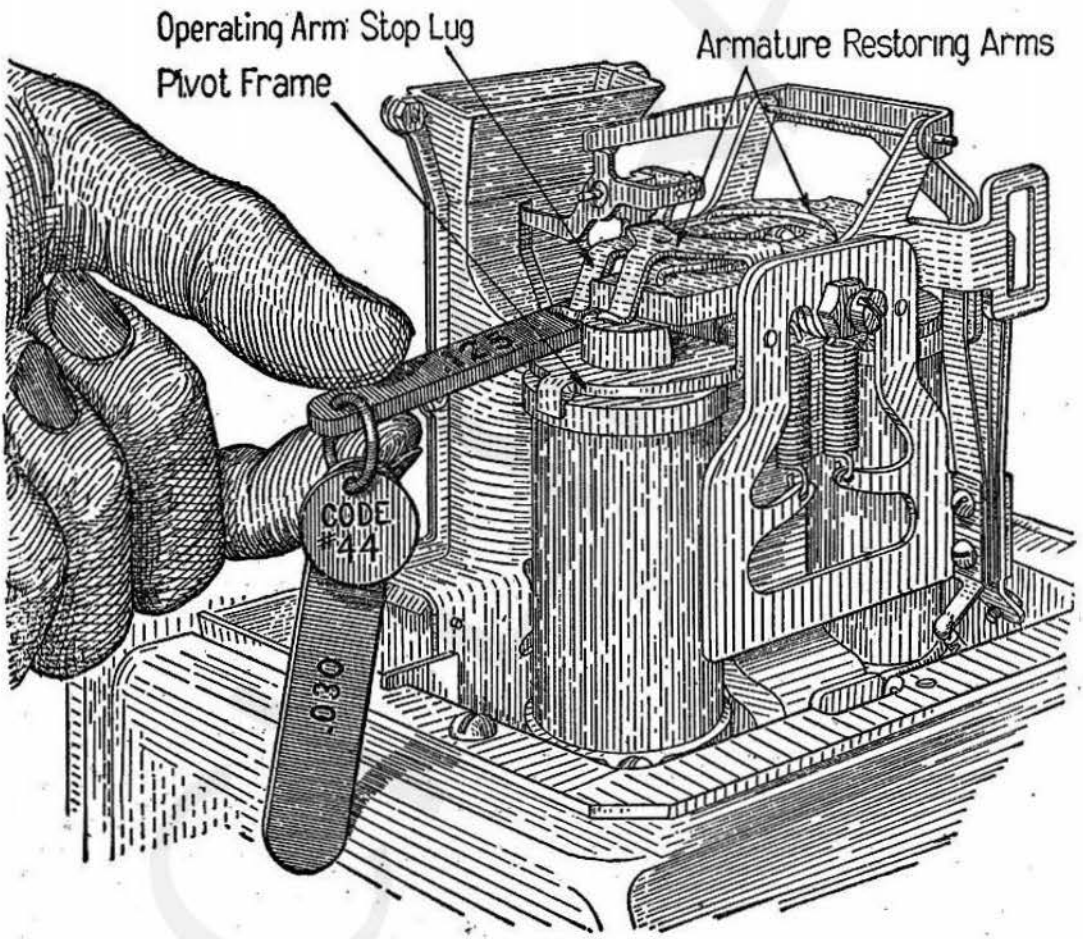


9. Adjusting armature restoring arms. When the armature is in a horizontal position the ends of the restoring arms should rest on their respective pole pieces. The armature restoring arms should also rest on top of the operating arm so that the operating arm cannot be moved without lifting one or the other of the restoring arms off its pole piece. When the armature restoring arms are properly adjusted the armature should come to rest in a horizontal position.

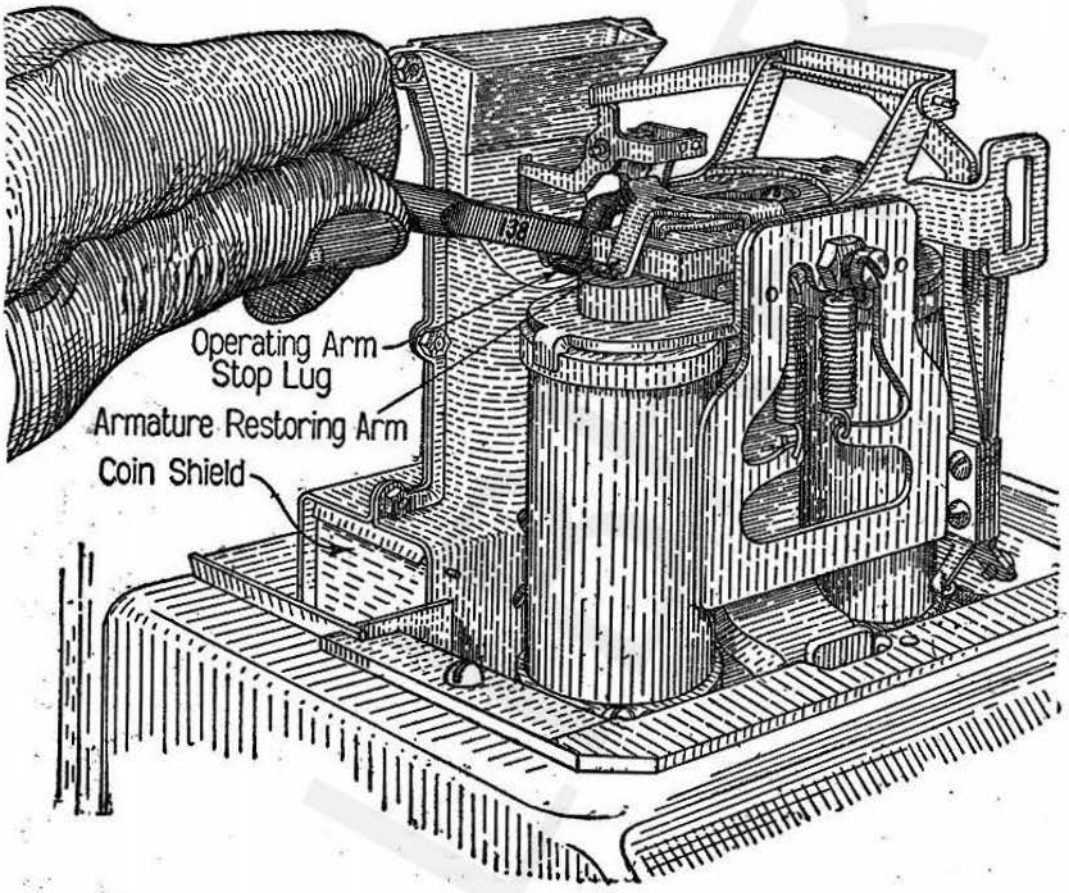
In adjusting the armature restoring arms bend arms by using the #138 tool as shown in Section 10.

10. Adjusting operating arm. Arm should swing freely between the coin hopper and relay coils (see Section 15.) The slot in the lower end of the arm should be free from burrs and the coin vane pin (which the arm engages) should be smooth and clean.

With armature in normal position the .125 leaf of #44 gauge should just fit between pivot frame and operating arm stop lug on each side of armature.



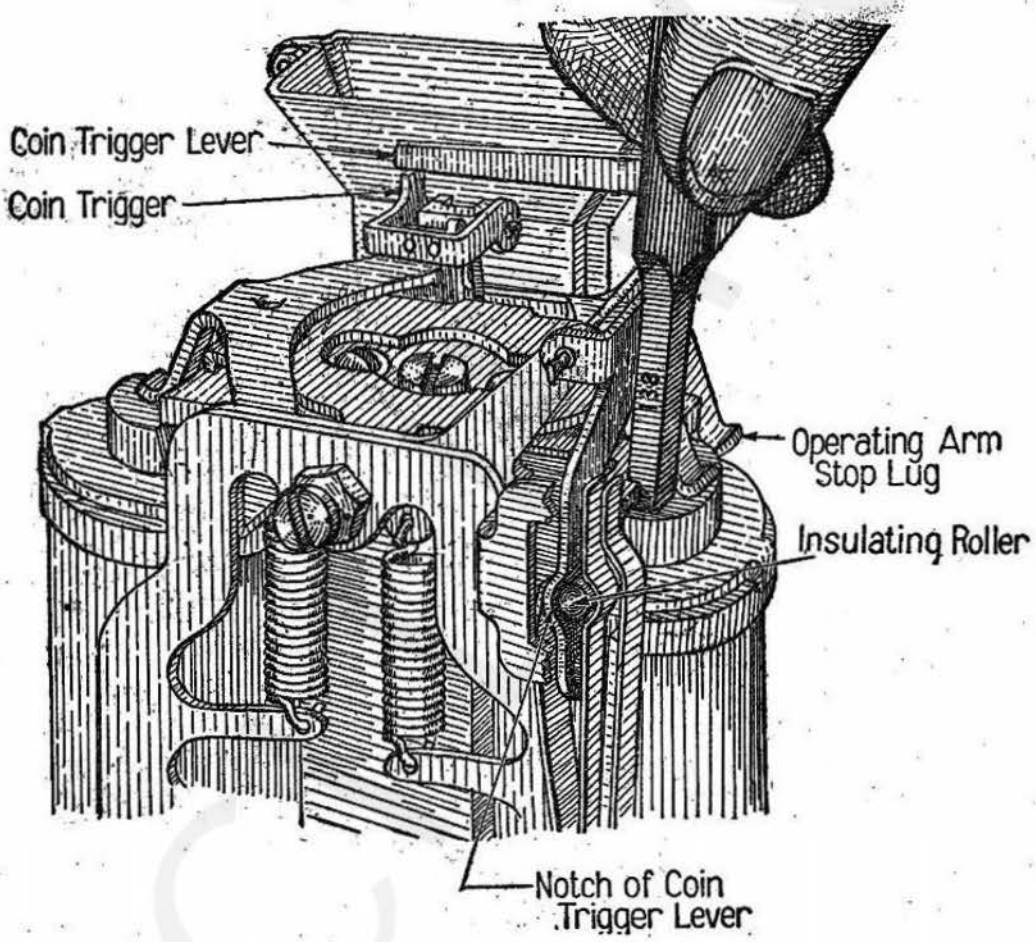
If operating arm stop lugs do not show proper clearance, adjust, using the #138 tool.



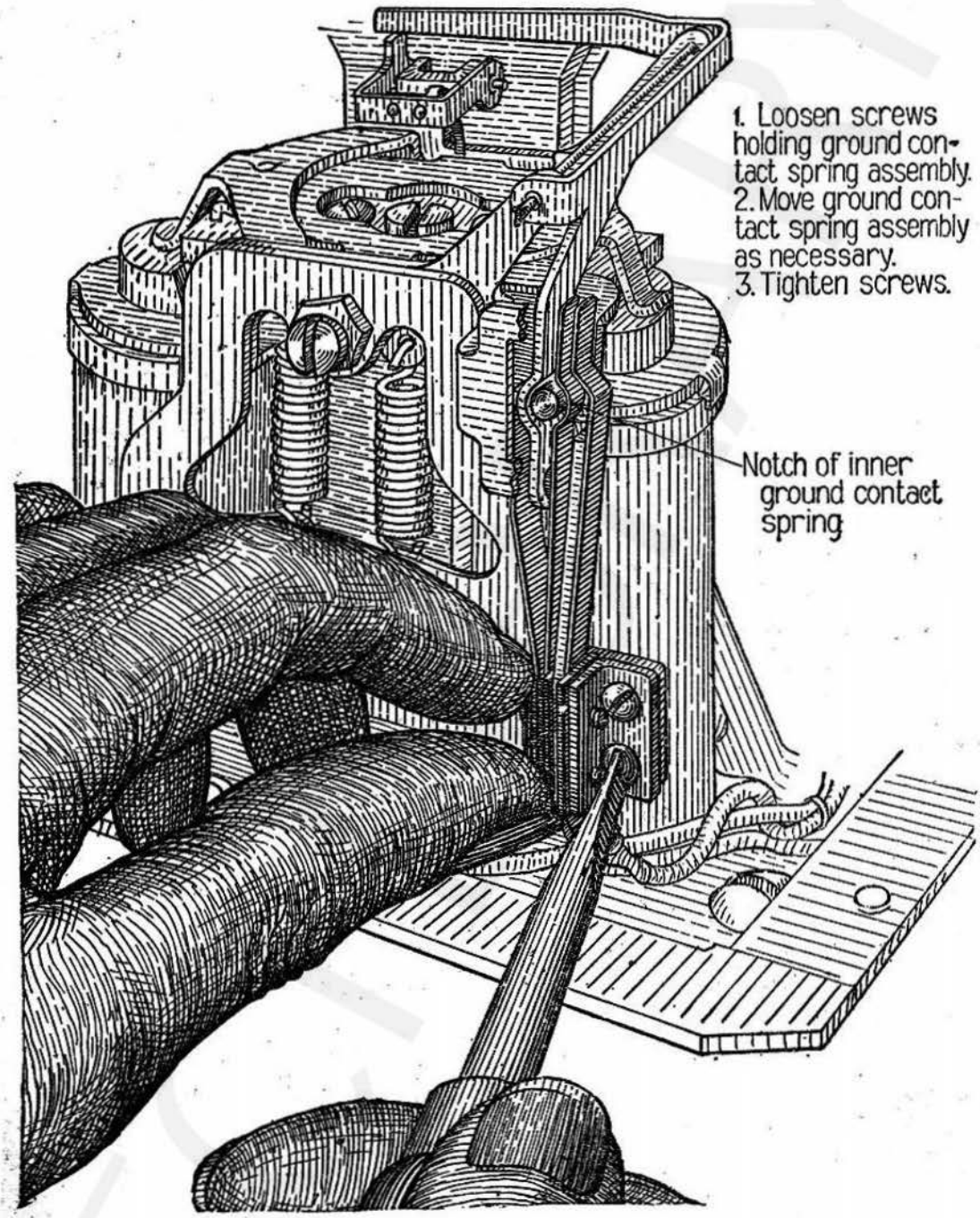
Standard Adjustments

The insulating roller on the operating arm should cause an equal rise of coin trigger lever over top of coin trigger when the armature is operated to its full amount of travel in either direction, pressure being applied at operating arm stop lugs. If adjustment is required:

(a) Raise or lower roller in notch of coin trigger lever by bending roller arm forward or back as required, maintaining the roller in a horizontal position.



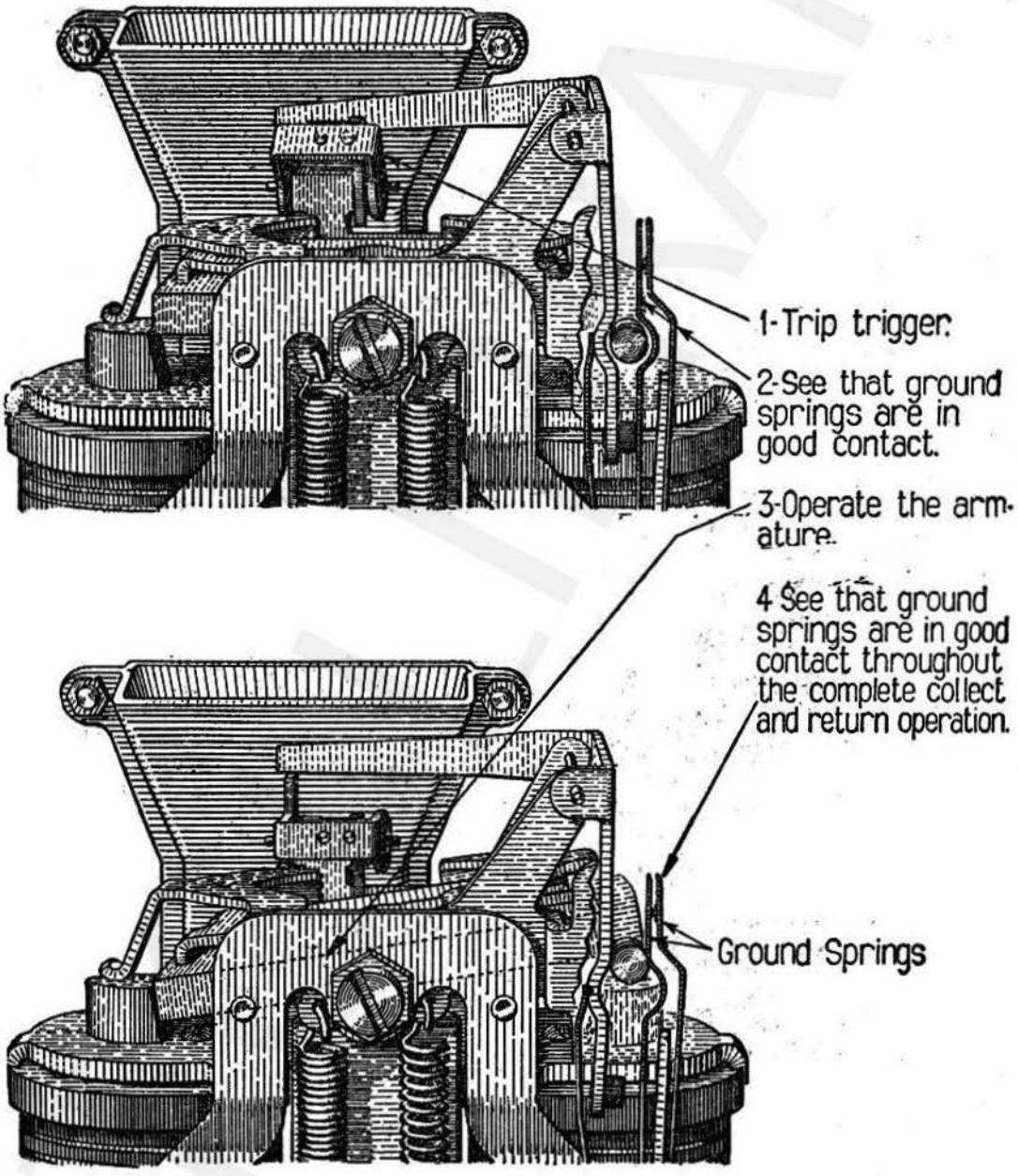
(b) Center roller in notch of inner ground contact spring by:



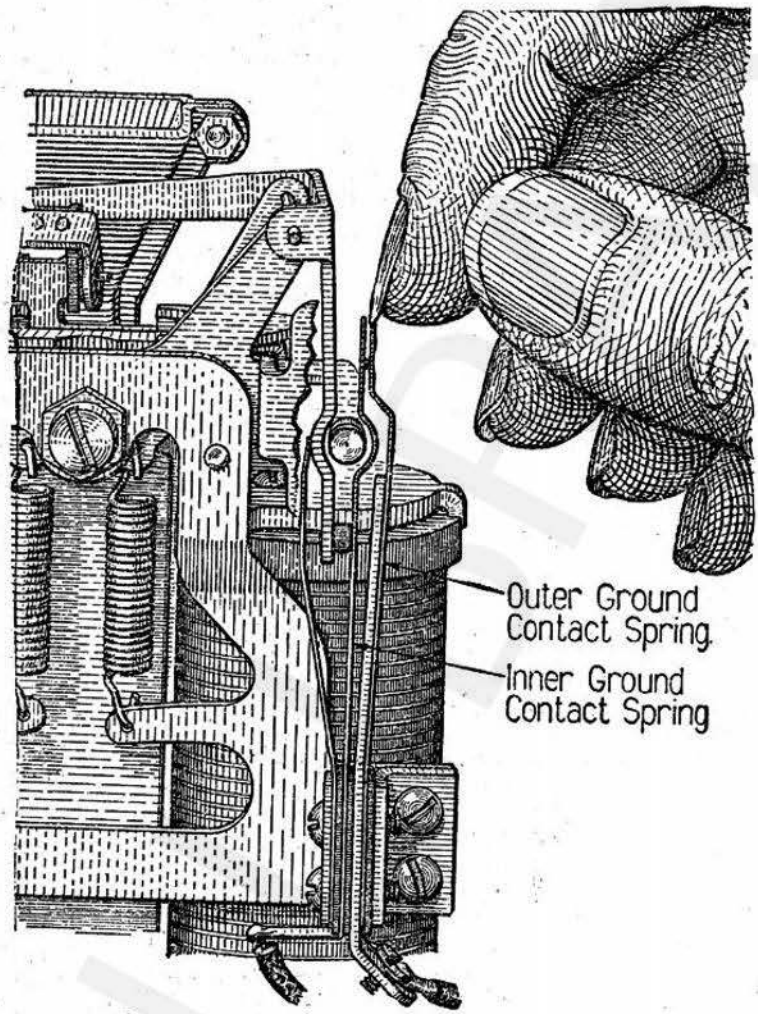
After roller is centered check ground contact spring adjustment. See Section 11.

11. Adjusting ground contact springs. With coin trigger and armature in normal position the separation between contacts should be approximately equal to the thickness of the .024 leaf of the #37 gauge.

To determine whether adjustment of ground springs is required:

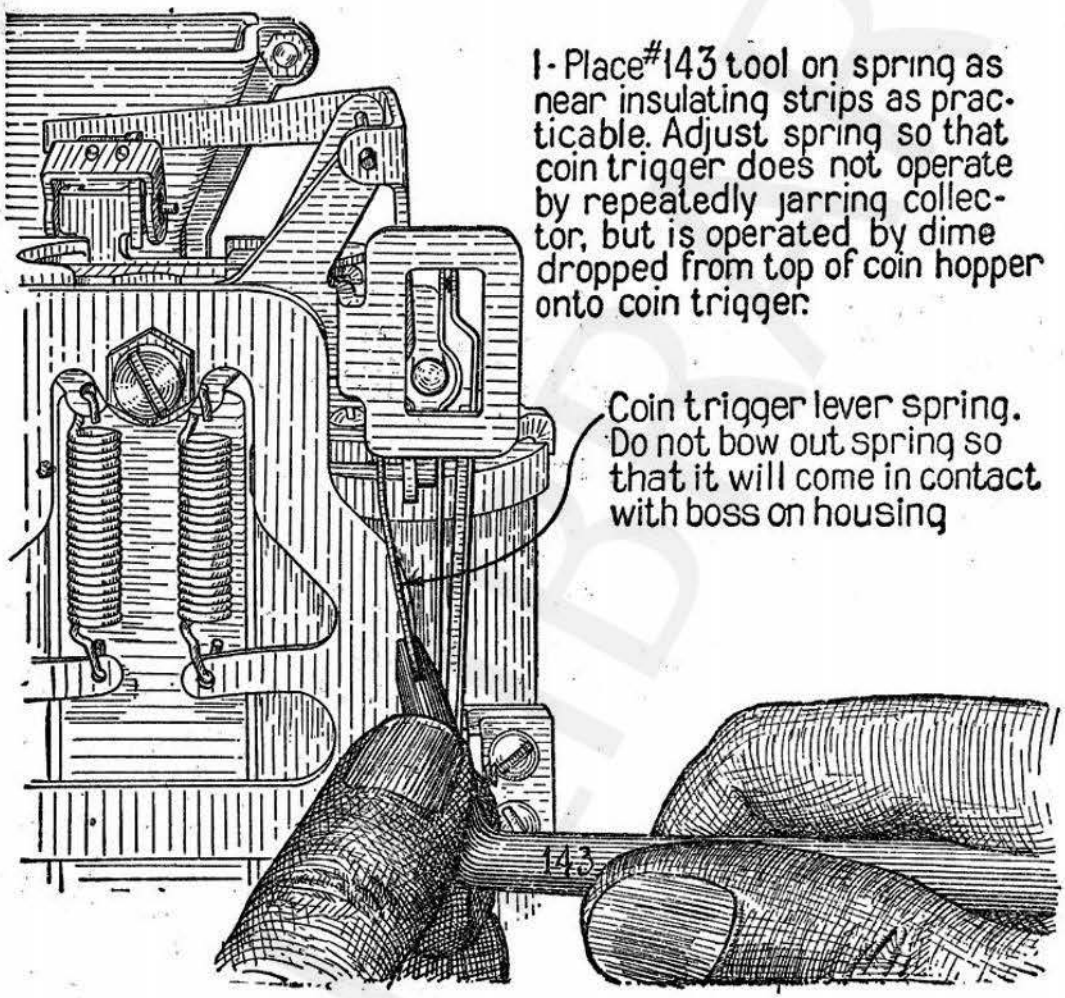


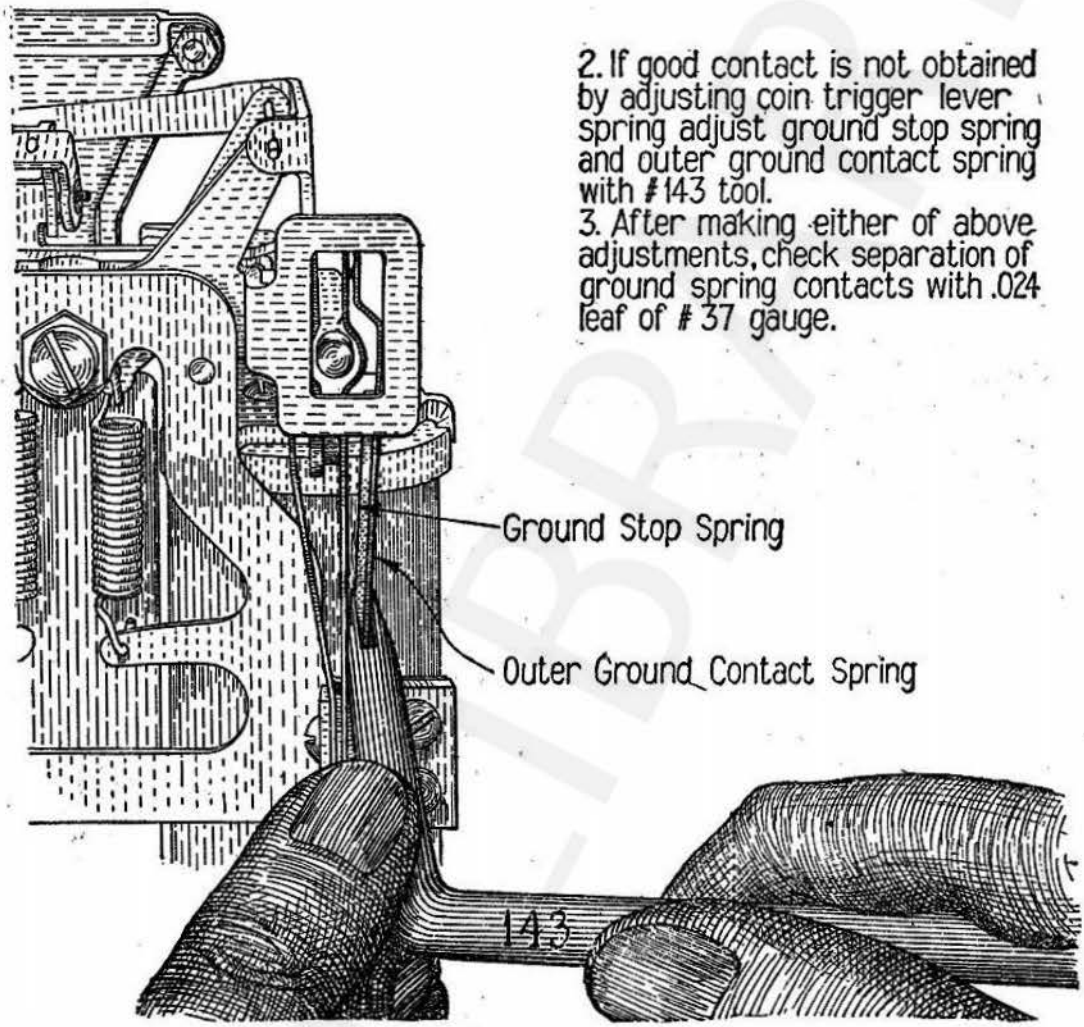
If ground contact springs are adjusted properly to ensure good contact the inner spring should follow the outer spring slightly when outer spring is pulled to the right.



Standard Adjustments

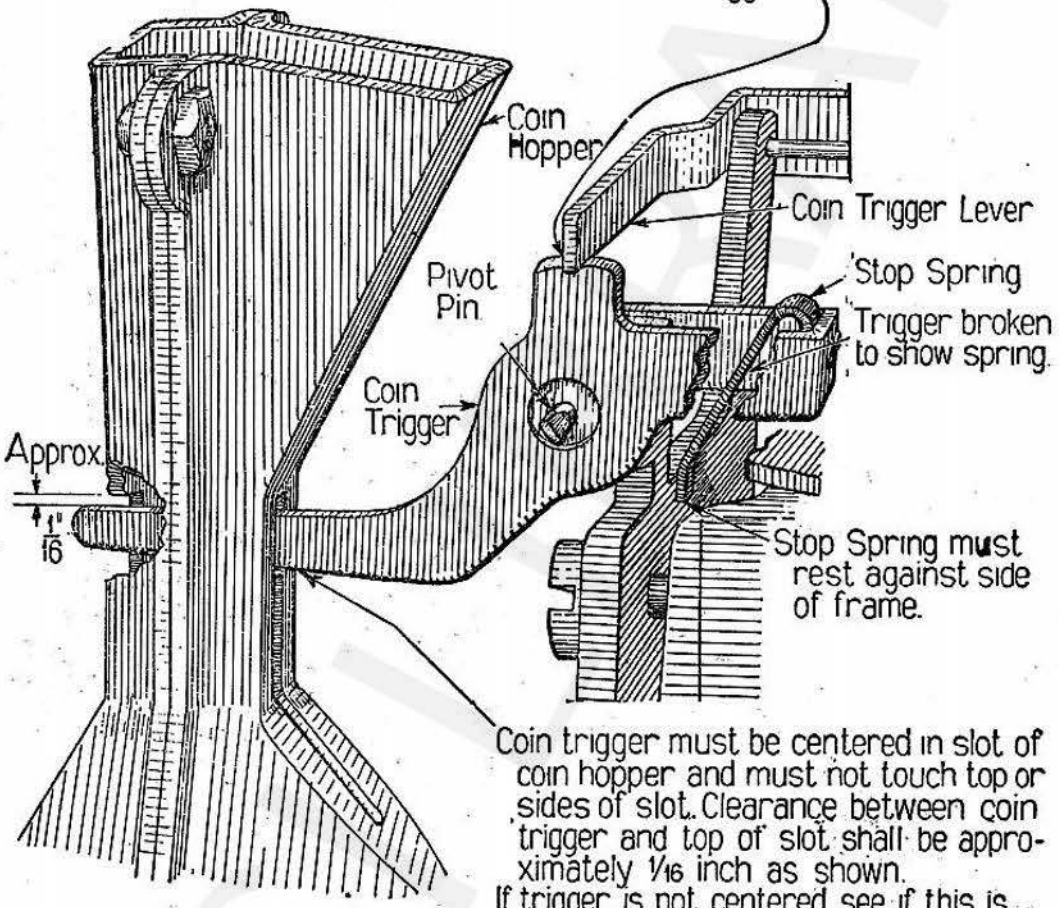
To adjust ground contact springs to obtain good contact increase tension on coin trigger lever spring.





2. If good contact is not obtained by adjusting coin trigger lever spring adjust ground stop spring and outer ground contact spring with #143 tool.
3. After making either of above adjustments, check separation of ground spring contacts with .024 leaf of #37 gauge.

12. Adjusting and replacing coin trigger. All collectors should be equipped with coin trigger having stop spring.

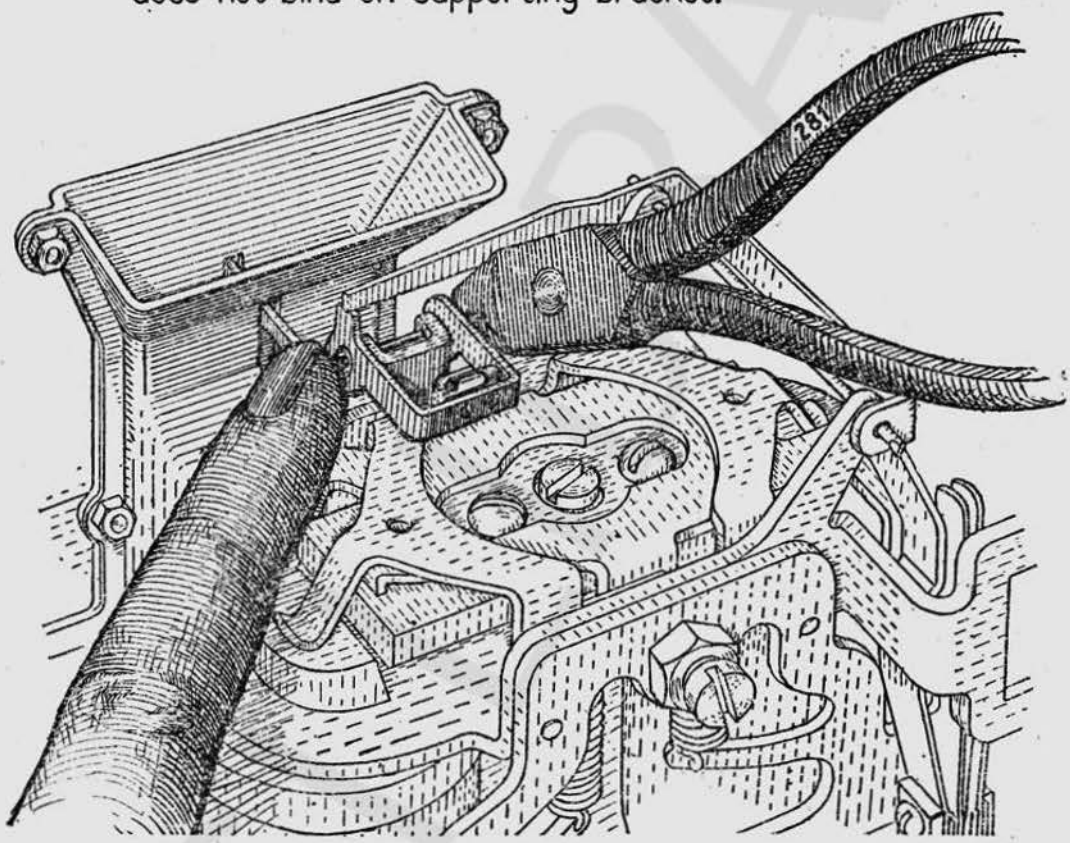


Coin trigger must be centered in slot of coin hopper and must not touch top or sides of slot. Clearance between coin trigger and top of slot shall be approximately 1/16 inch as shown.

If trigger is not centered see if this is due to coin relay not being centered. If so, center relay in accordance with section 7. If relay is centered and trigger is touching sides of slot center trigger by bending with long nose pliers.

If collector is found with old style trigger without stop spring replace with coin trigger having stop spring. To replace trigger.

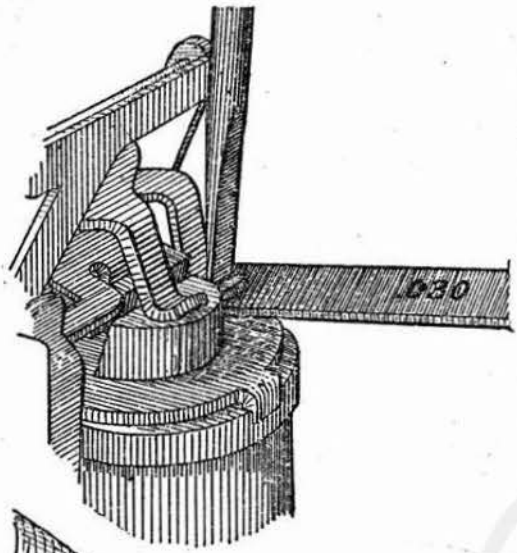
1. Cut off end of pivot pin with diagonal pliers and remove pin.
2. Flatten one end of pin. Place new trigger and hold pin in position as shown while flattening other end of pin.
3. See that trigger has proper sideplay and does not bind on supporting bracket.



The installation and adjustment of coin trigger must be made with care to ensure proper operation.

Check all adjustments after the coin trigger has been replaced.

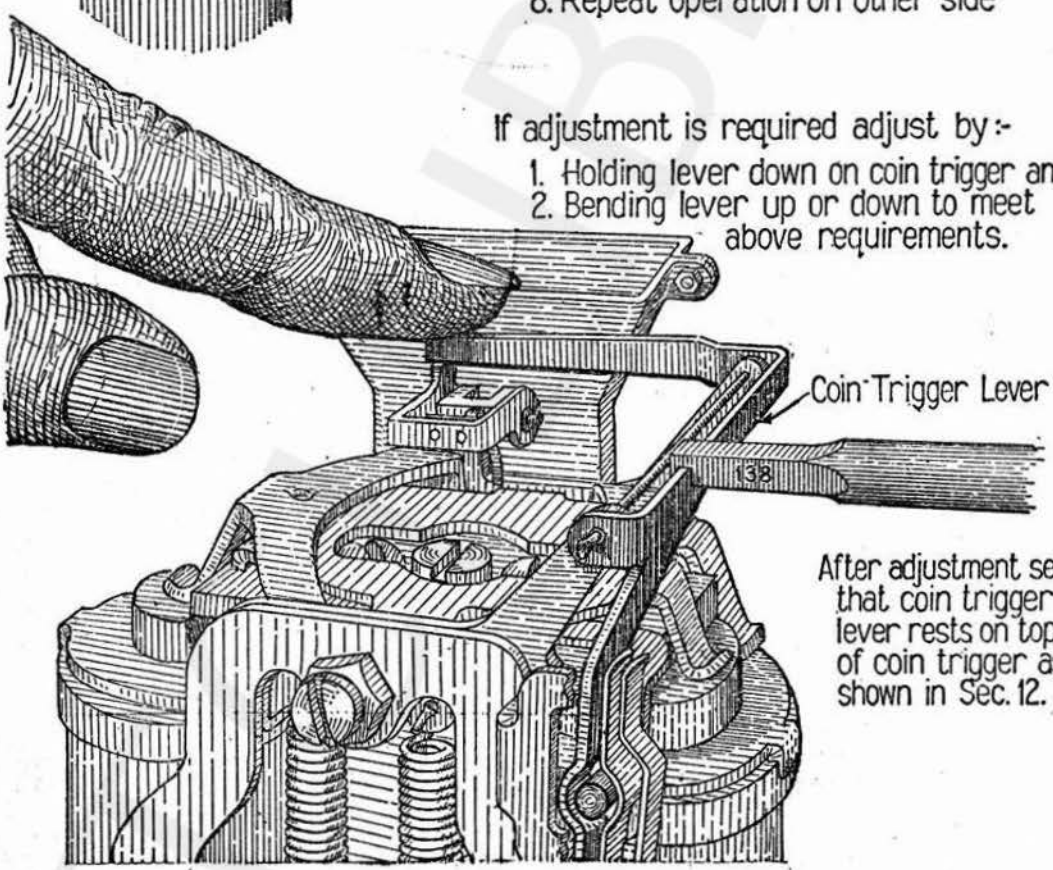
13. Adjusting coin trigger lever. To determine whether adjustment is required proceed as follows:



1. See that roller is adjusted in notch of coin trigger lever See section 10.
2. Trip coin trigger
3. Give full downward travel to the operating arm stop lug on one side. Coin trigger should restore to normal.
4. Repeat operation on other side.
5. Trip coin trigger.
6. Insert .030 leaf of #44 gauge under operating arm stop lug on one side.
7. Press operating arm stop lug down with screw driver to gauge as shown Coin trigger should not restore.
8. Repeat operation on other side

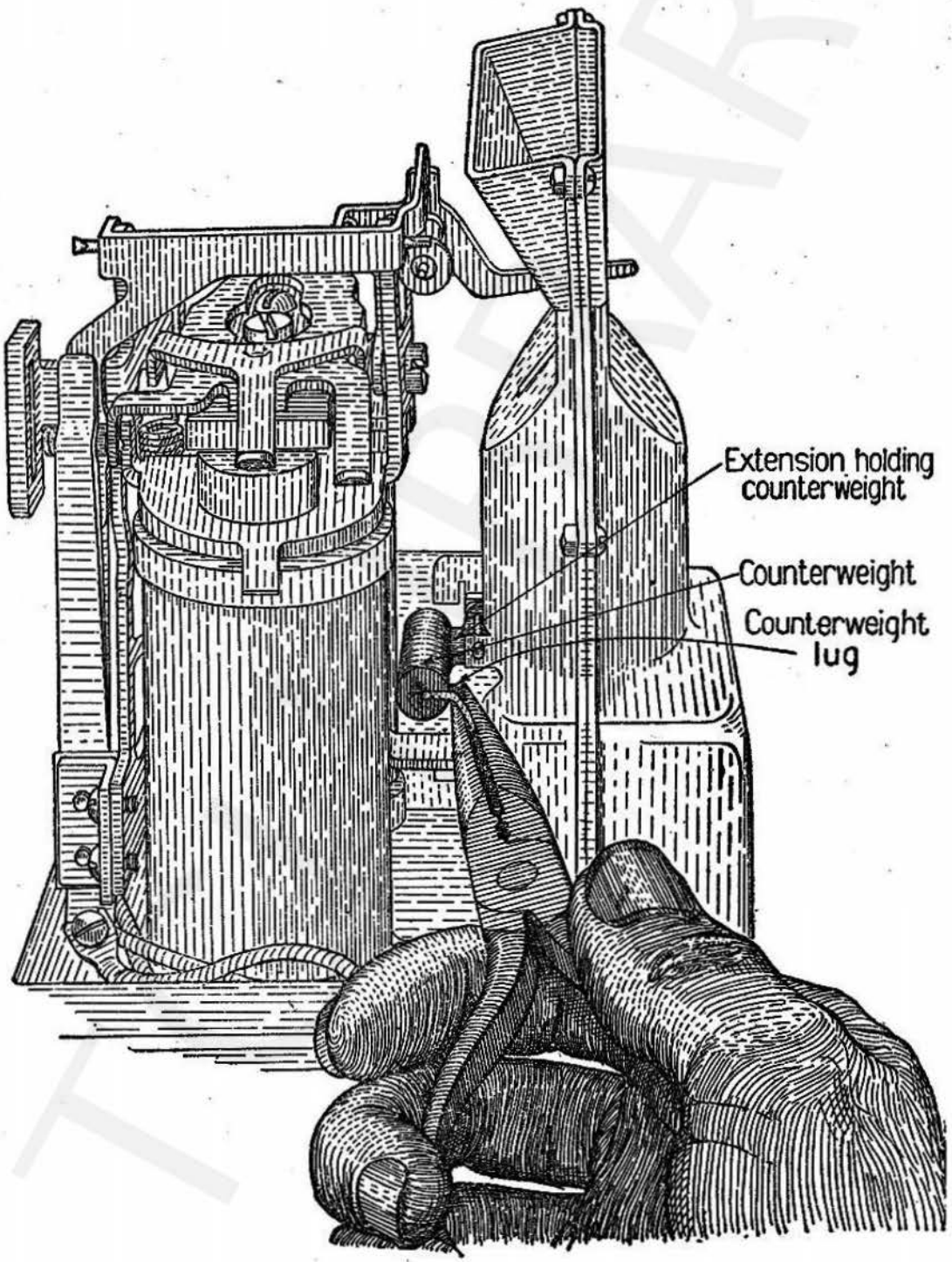
If adjustment is required adjust by:-

1. Holding lever down on coin trigger and
2. Bending lever up or down to meet above requirements.



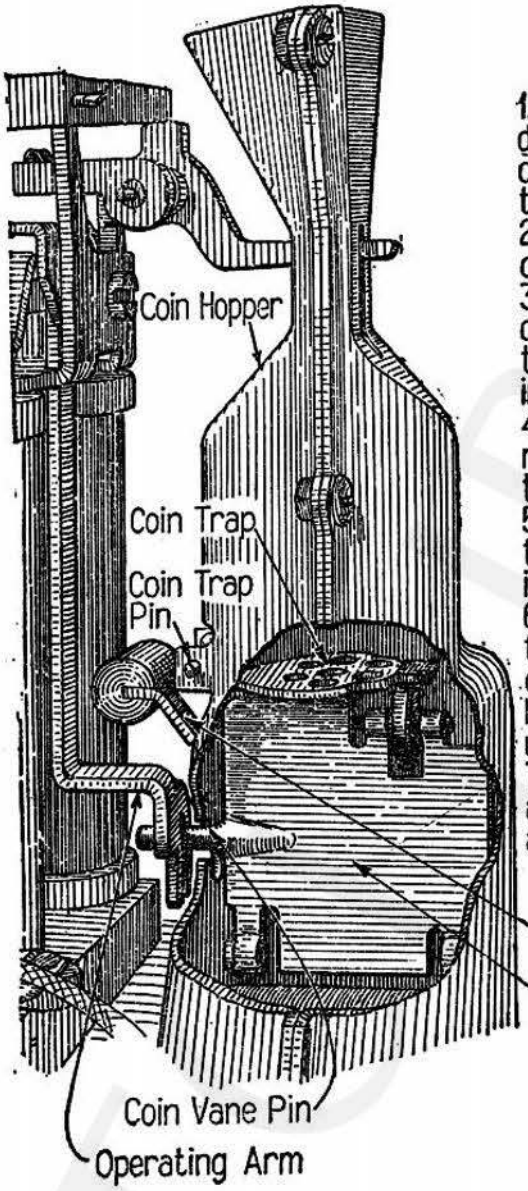
After adjustment see that coin trigger lever rests on top of coin trigger as shown in Sec. 12.

14. Adjusting coin trap. If coin trap is not in a horizontal position (as may be determined by position of extension holding counterweight) adjust by bending counterweight lug.



15. Replacing coin trap. Should trouble be experienced due to coin trap sticking against coin vane replace coin trap with new type coin trap.

To replace trap proceed as follows:



1. Remove coin relay mounting screws, disconnect and remove relay from coin collector. Take care not to injure coin trigger.
2. Move coin vane to right, by pushing on the coin vane pin.
3. Cut off end of coin trap pin with diagonal pliers and remove pin. Push trap in hopper and allow it to drop into coin return.
4. Tie a small string to one of the coin relay mounting screws and drop from trap opening in hopper to coin return.
5. Remove string from screw and tie it to lug of new coin trap. Draw trap into position holding coin shield open.
6. Flatten one end of pin with #281 tool. Fasten trap with pin and flatten other end of pin. Adjust position of trap by bending counterweight lug as required by Section 14.
7. Replace and reconnect relay and adjust relay and coin trigger in accordance with Section 7 and 12.

16. Adding coin chute clip. To prevent spreading of coin chute at point just below nickel slot (resulting in stuck coins) add chute clip on all collectors on which it has not been installed and which are not equipped with chutes marked with star. See Section 4.

17. The housing contact springs should be clean and adjusted to follow the contact terminals about ¼ inch when the housing is removed.

18. The equalizing spring should be adjusted to follow the housing about ¼ inch when the housing is removed.

19. The switchhook should move freely. If switchhook binds due to pin being bent or rusted, replace pin. If switchhook squeaks, trouble may be eliminated by tightening set screw or by removing and cleaning pin.

20. Coin signal gongs must be tight to ensure good signals to the operator. Signals will be deadened if receiver cord or dial cords come in contact with gongs. See that cords are properly tied and are clear of gongs. (See Substation Apparatus Installation and Machine Switching Substations.)

The indicating mark on solid gong should line up with mark on edge of housing. (See Section 4.) If marks do not line up, loosen gong nut and reset the gong so that they do.

CLEARING TROUBLES

21. General. The troubles most likely to occur in #50 Coin Collectors are given in Sections 22 to 35. The methods of clearing these troubles are given in Sections 7 to 20. Any troubles encountered which are not covered by these specifications should be reported through the proper channels.

Troubles in receivers, transmitters, cords, dials and subscribers' sets associated with the collectors should be taken care of the same as other common battery sets.

When clearing troubles make sure that collectors are fastened securely, and in case reinstallation is required report through the proper channels.

Tests for operation of coin relay and coin signals, given in Sections 38 and 39, should always be made when collectors are visited to clear trouble within coin collector.

Take care in removing and replacing housing not to damage the mechanism of collector.

22. No Ground. May be due to:

(a) Dirty contacts on ground springs. Clean contacts with #265 tool.

(b) Not sufficient tension on coin trigger lever spring to close contacts.

(c) Tension too great on coin trigger lever spring to permit coin trigger to operate.

(d) Inside and outside ground contact springs not making contact when coin trigger is operated.

To clear (b), (c) and (d) inspect and adjust according to Section 11.

(e) Open at ground clamp or in ground wire.

(f) Open relay coils, strap or connecting leads.

To test for (a), (b), (c), (d), (e) and (f), see Section 36.

23. 1000 ohm ground caused by inside and outside ground contact springs in permanent contact. May be due to:

(a) Ground springs out of adjustment—See Section 11.

(b) Full coin receptacle. To clear this trouble temporarily, use #139 tool (through hole in right side of coin relay tray) to distribute coins evenly in receptacle. Report that a collection should be made. If trouble cannot be cleared in this way see that Out of Order card is installed.

(c) Coin trap stuck-caused by operating arm being out of adjustment or coin trap stuck on coin vane—See Sections 10, 14 and 15.

(d) Coin trigger in contact with side of hopper—See Sections 7 and 12.

(e) Armature stuck due to striking pole pieces when operated —See Section 6.

(f) Armature stuck due to lack of side play at pivots. See Section 8.

(g) Armature stuck due to burrs in slot of operating arm—Use #00 emery paper to remove burrs and see that coin vane pin is smooth and clean.

(h) Armature stuck due to filings or dirt—Remove any accumulation of filings or dirt from ends of armature or pole pieces with piece of clean cheesecloth.

(i) Ground contact springs short circuited. May be caused by particles of metal lodged between the springs or burned out bushings—Clean springs with cheesecloth. If the trouble is not readily cleared, replace the ground spring assembly with a new one.

24. Can't collect or return. May be due to:—

(a) Full coin receptacle—See Section 23.

(b) Too much tension on armature restoring spring—See Section 6.

(c) Armature or operating arm out of adjustment—See Sections 6 to 10 inclusive.

(d) Dirty protector blocks—Inspect and clean blocks in accordance with standard instructions.

(e) Reversed line—See Section 37.

(f) Coin trap dirty—Dirt and corrosion on the under side of the coin trap sometimes cause failure of operation. Clean or replace coin trap. See Section 15.

25. Coins left on trap. Caused by premature restoration of coin trigger due to coin trigger lever being out of adjustment. Adjust coin trigger lever according to Section 13.

26. Can't Call. May be due to:

(a) Coins or foreign material stuck in coin chute. In case coins or foreign material are lodged in coin chute, turn housing upside down and shake out if possible. If obstruction can not be removed in this way, remove chute from housing and take apart to remove obstruction.

If coin chute is in good condition brush out runways and replace in collector. If runways are covered with a sticky substance clean with alcohol or tetrachloride.

In case a good coin is lodged due to excessive wear at any point in chute (this is most likely to happen just below nickel slot) replace coin chute with new one.

Make sure that all screws and nuts are tight.

Note:—The coin chute is made of soft metal. Care must be taken not to injure chute by tools or rough handling.

(b) No ground—See Section 22.

(c) Open in wire between coin collector and subscribers' set or between subscribers' set and line—Check wiring and connections between line and coin collector. Repair wiring if required and tighten connections where necessary.

(d) Ground potential interfering with operation of line signal.

27. Relay Chatters. May be due to poor adjustment of ground springs. Adjust springs according to Section 11.

28. Coins collected when they should be returned or returned when they should be collected. Usually caused by a reversal of relay connecting leads.

29. Two coins to call. May be due to:—

(a) Too much tension on coin trigger lever spring to permit coin trigger to operate—See Section 11.

(b) Burrs or rough surface on top of coin trigger or on under side of coin trigger lever where it rests on top of coin trigger preventing proper operation—Remove burr or smooth the surface with #00 emery paper.

(c) Swinging open in ground circuit—Check wiring and ground clamp connections. Repair wiring if required, and tighten connections where necessary.

NOTE:—It may happen that while the telephone is in use, a second party is waiting to make a call and deposits coin before the operator has collected on the first call. When the operator collects, both coins are collected and the party has to deposit a second coin to get the operator.

30. Cord Interference. Long transmitter cords may cause coin trigger to operate. Be sure that 8 inch transmitter cord is used. Receiver cord may interfere with the coins in the chute and repairman should see that it is properly tied and clear of coin chute.

31. Switchhook binds or squeaks—See Section 19.

If switchhook binds due to its being bent at shoulder, place screwdriver back of switchhook (below switchhook stud to prevent breaking the stud) and push up on end of switchhook, bending it back to its normal position.

The switchhook stud may become broken or missing. Inspection should be made for this trouble and switchhook and stud replaced if stud is broken or missing.

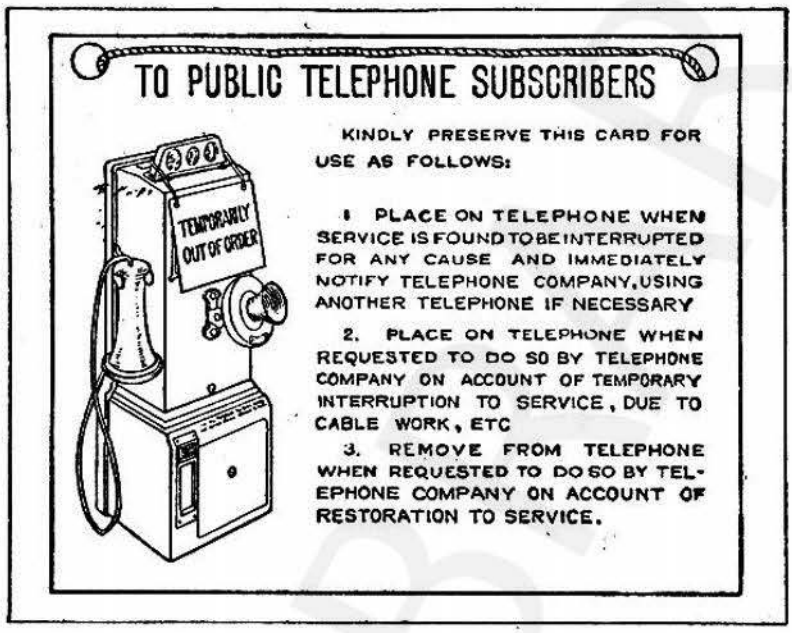
Dirty switchhook contacts should be cleaned with #265 tool.

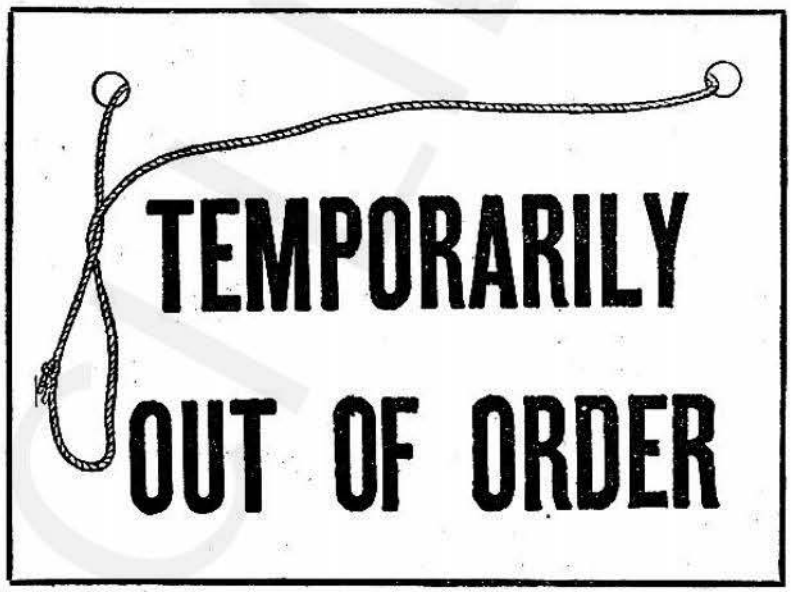
32. Coin signals must enable operator to distinguish signals properly. See Sections 20 and 39.

33. Side tone reduction. The transmitter (if the #323 is used) should be connected for side tone reduction when the loop resistance is less than 90 ohms. (Loop resistance to be determined according to Supplement A of Specifications covering Substation Apparatus Installation).

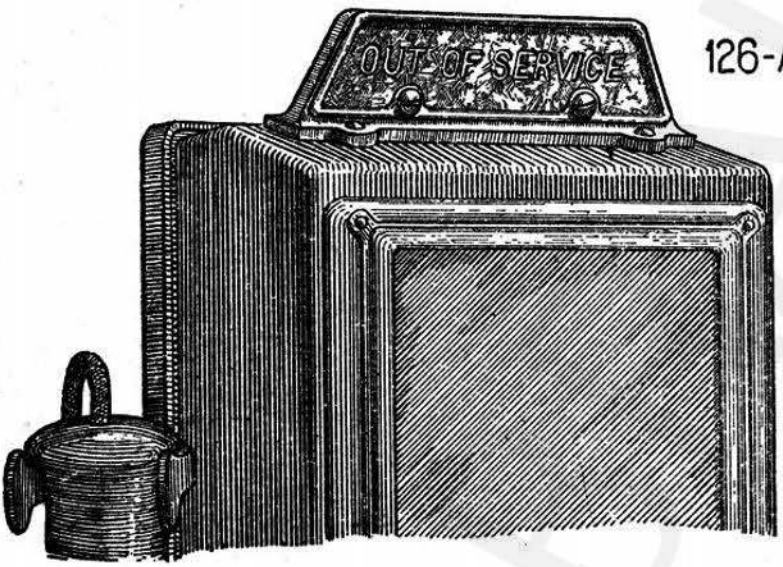
For side tone reduction take wire running from switchhook to (R or 2) terminal and connect it to (Y or L2) terminal. Take wire running from housing contact spring to (Y or L2) terminal and connect it to (R or 2) terminal.

34. Trouble cleared. The repairman should remove and return to public telephone subscriber the "Temporarily Out of Order" card.





35. Trouble not cleared. When trouble is of such nature that repairman can not clear it (as in case a new machine is required) he should immediately advise the Test Desk and place #126-A number plate or see that "Temporarily Out of Order" card is placed on collector.



126-A Number Plate

TESTS

36. Open Ground Circuit.

Manual Districts.

(a) To determine whether open is outside or inside of the collector, connect test set across the Gnd. and Y or L2 terminals on terminal block of collector. If click is heard the open is inside the collector. If no click is heard the open is outside the collector. If the circuit outside the collector is O.K. an open in the collector may be located as follows:

(b) Trip coin trigger and connect one clip of test set to the Y or L2 terminal. With other clip of the test set touch each of the following points of the circuit in the order named:

(c) In districts where positive side of the central office battery is grounded.

(1) Left relay terminal.
(2) Right relay terminal.
(3) Inside ground spring lug.
(4) Outside ground spring lug.
(5) Ground lug.

Machine Switching Districts.

To determine whether open is outside or inside of the collector connect test set across (R or 2) and (Y or L2) terminals on terminal block of collector. If click is heard the open is inside the collector. If no click is heard the open is outside the collector. If the circuit outside the collector is O. K. an open in the collector may be located as follows:

Open yellow wire from subscriber's set to (Y or L2) terminal of coin collector at terminal block, remove receiver from hook, short circuit the two middle housing contact springs and proceed as specified for manual districts starting at (b).

If the open is in the coils, replace coin relay otherwise repair where necessary.

37. Reversed Lines. Signal operator, place one clip of test set on ground, touch (R or 2) terminal with other clip and note that battery is on (R or 2) terminal.

Have the operator disconnect and note that the battery is connected to (Y or L2) in manual districts and (R or 2) in machine switching districts.

Reverse the lines if battery is not found as above.

38. Test of Coin Relay. After all necessary adjustments have been made, connect test set across (R or 2) and (Y or L2) terminals of collector. Trip coin trigger with finger and request operator, or test desk operator to depress "return" and "collect" keys successively, then remove clips of test set.

See that the relay armature operates positively in each direction.

39. Coin Signals. To determine that operator receives signals properly signal her by depositing small 5 cents coin, advise that you are about to test signals and that she should return coins deposited. Then deposit a nickel, dime and quarter and see if operator distinguishes signals properly.

REFERENCE SPECIFICATIONS

40. The repairman should have the following specifications and supplements thereto for use in connection with this work:

Substation Apparatus.	No. 3851
Substation Apparatus Installation.	No. 3852
No. 50 Coin Collector Installation.	No. 3857
Machine Switching Substations.	No. 4160

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