COIN COLLECTORS

PREPAY — MAINTENANCE

TWO-COIL COIN RELAY

1.00 INTRODUCTION

This section covers specific items of maintenance required for prepay coin collectors arranged for 10-cent operation. These items cover the two-coil coin relay and the coin hopper (see Fig. 1 and 2), and are in addition to appropriate items covered in the C Section entitled Coin Collectors, Maintenance, General.

2.00 GENERAL

Caution 1: Remove receiver or handset from switchhook before removing or reassembling upper housing from or to backplate of coin collector equipped for 10-cent operation. This reduces possibility of damage to gate operating arm.

Caution 2: Do not reassemble upper housing on prepay coin collectors without a P-349486, P-16A336, or KS-7994 shield over relay. Shield protects relay from being damaged by upper housing.

3.00 TOOLS, GAUGES, AND MATERIAL

The following tool and gauges are needed in addition to tools, gauges, and material required for general maintenance.

146A Gauge—Bias margin test

147A Gauge—Trap and vane release test and ground contact spring force test

KS-14995—Coin collector tool for trap and vane release test

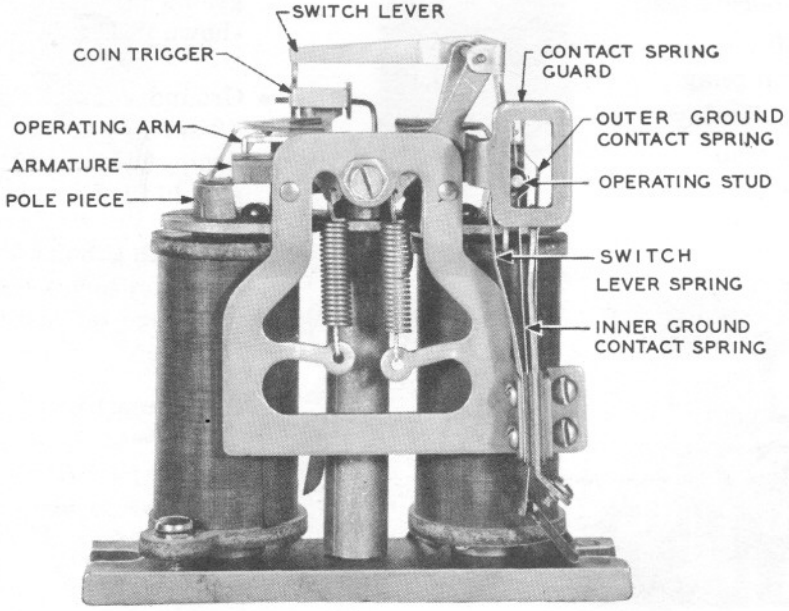

Fig. 1 — P-145749 Coin Relay

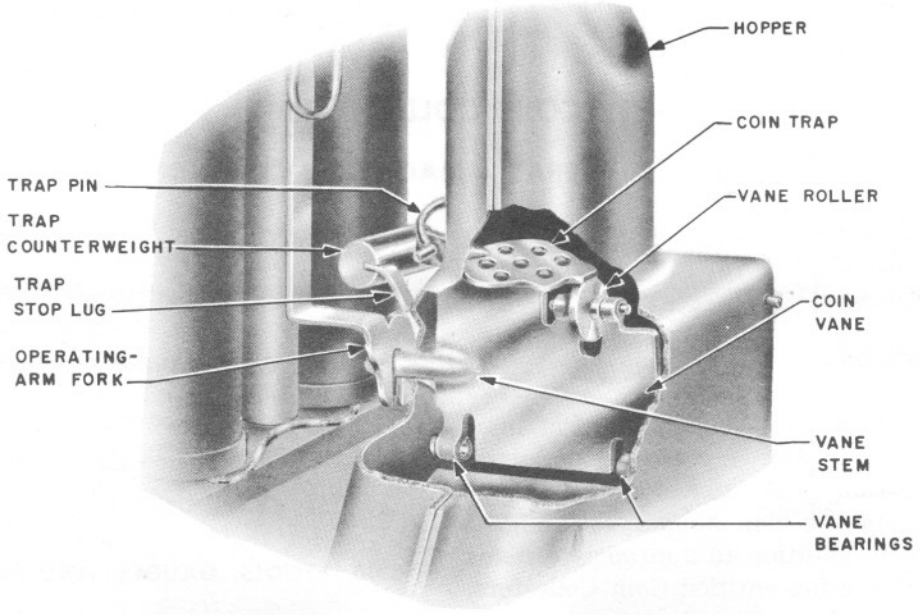

Fig. 2 — Hopper and Rear of Coin Relay

4.00 COIN RELAY AND COIN HOPPER TESTS AND PROCEDURES

4.01 No modification or adjustment of coin relay or hopper other than those specified herein shall be made. Tests and procedures are:

Ground contact springs	4.02, 4.03
Dial shorting contact springs	4.04
Trap and vane release test	4.06
Bias margin test	4.08
Cleaning two-coil relay	4.12
Mounting two-coil relay	4.13
To replace coin trap	4.14–4.16
To replace coin shield	4.17

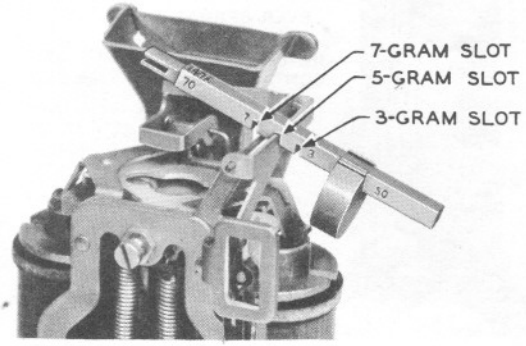

Fig. 3 — Gauge for Ground Spring Contact Force

Ground Contact Springs, P-145749 and D-96590 Relays

4.02 Ground contact spring force for the P-145749 (2-spring) relay and D-96590 (3-spring) relay shall be checked as follows:

- Ground contact spring force for P-145749 (2-spring) relays shall be minimum 5 grams measured with the 147A gauge, as shown in Fig. 3.

- Ground contact spring force for D-96590 (3-spring) relays shall be minimum 3 grams measured with 147A gauge 3-gram slot, in the manner shown in Fig. 3.

  1. With ground lead connected to coin collector, place required gram slot of 147A gauge on horizontal portion of switch lever.

  2. Connect hand test set across line terminals of coin collectors and trip coin trigger. Dial tone shall be heard in dial areas, or operator shall answer in manual areas. If not, proceed as follows:

     a. If contacts are open, force is less than minimum required. Replace relay.

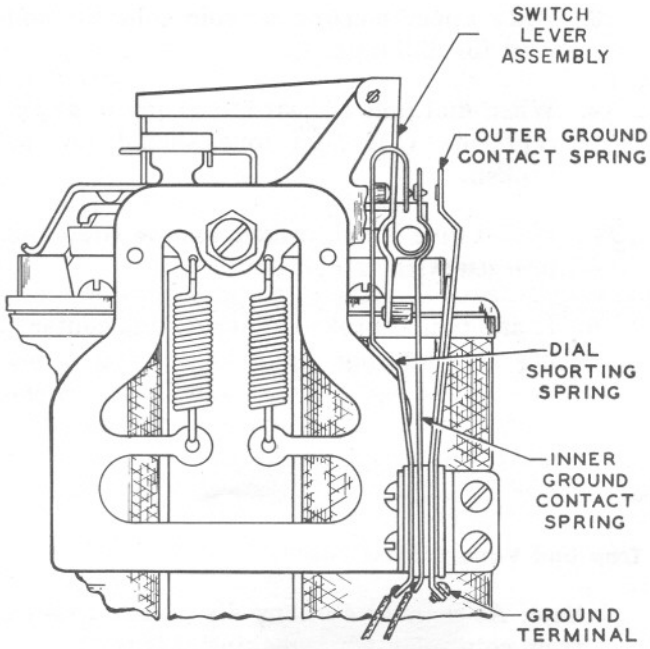

Fig. 4 — D-96590 Dial Shorting Relay, 3-Spring (Guard Cut Away)

b. If contacts touch but test open, burnish contacts with 265C tool.

c. If dial tone is not heard after burnishing contacts, short-circuit ground contact springs.

d. If dial tone is heard when contact springs are shorted, replace relay.

e. If dial tone is not heard when contact springs are shorted, test for open relay coil or trouble in station ground or line circuit.

Ground Contact Springs, P-10C117 Relay

4.03 Ground contact spring force for the P-10C117 (4-spring) relay shall be checked as follows:

1. Ground contacts shall have perceptible follow. Observe by raising switch lever slowly by hand from its tripped position.

2. Connect hand test set across line terminals of coin collector and trip coin trigger. Dial tone shall be heard in dial areas, or operator shall answer in manual areas. If not, proceed as follows:

   a. If contacts have perceptible follow but test open, burnish contacts with 265C tool.

   b. After burnishing contacts, if dial tone is not heard, short-circuit ground contact springs.

   c. If dial tone is heard when contact springs are shorted, replace relay.

   d. If dial tone is not heard when contact springs are shorted, test for open relay coil or trouble in station ground or line circuit.

Dial Shorting Contact Springs

4.04 With coin trigger and operating arm in normal unoperated positions, dial shorting contact springs shall have perceptible follow. With coin trigger tripped they shall be open; judge visually. (See Fig. 4 and 5.)

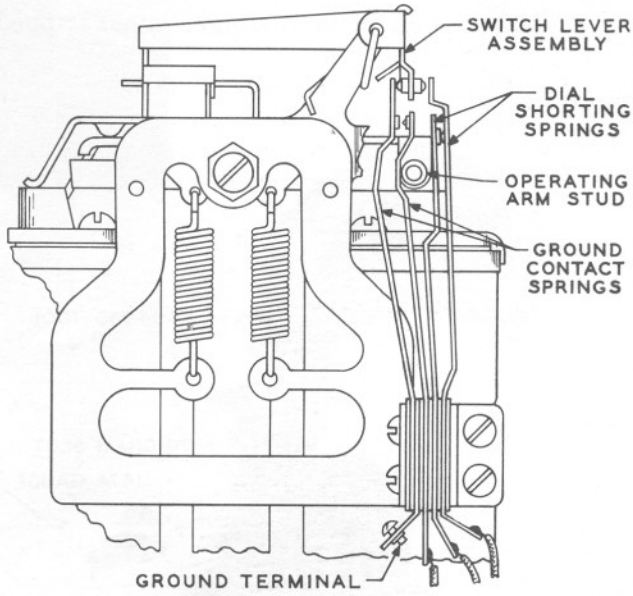

Fig. 5 — P-10C117 Dial Shorting Relay, 4-Spring (Guard Cut Away)

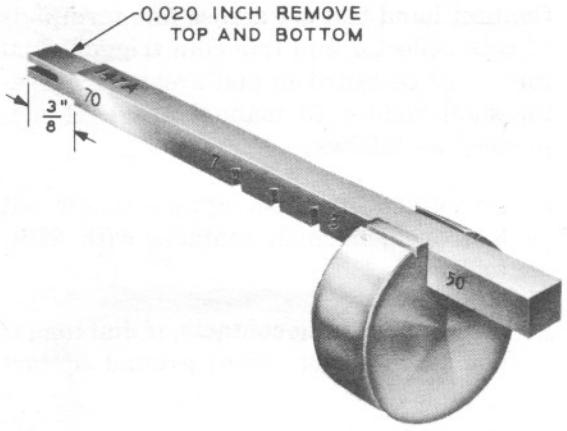

Fig. 6—147A Gauge

4.05 Dial shorting contacts shall shunt dial pulsing contacts when coin trigger is in normal position. With ground lead connected, check as follows:

1. Provide ground on line by strapping around ground contact springs:
   - On D-96590 (3-spring) relays, strap ground terminal to **left** coil terminal.
   - On P-10C117 (4-spring) relays, strap ground terminal to **right** coil terminal.
2. Make sure that coin trigger is **not** tripped.

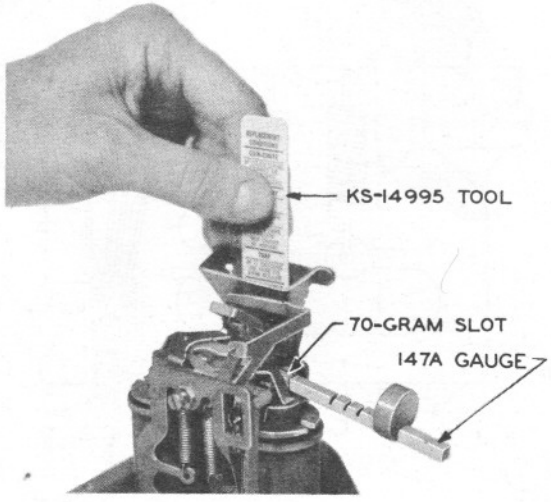

Fig. 7—Trap and Vane Release Test

3. Place upper housing on coin collector and wait for dial tone.
4. When dial tone is heard, dial any digit except one (1). Dial tone should not be broken.
5. If dial tone is not broken, **remove strap** and proceed with remaining tests.
6. If dial tone is broken, dial shorting contacts are not shunting dial. Clean contacts and recheck follow of dial shorting springs. Check wiring and transfer spring contacts for continuity.

Trap and Vane Release Test

Note: At manual stations disconnect ground from coin relay while making this test.

4.06 With the armature and trap fully operated manually, permit trap to restore slowly by using a KS-14995 coin collector tool inserted through hopper throat. Trap, vane, and relay shall restore fully to their nonoperated positions against a torque of 70 gram-inches applied to relay operating arm with a 147A gauge (see Fig. 6 and 7). Test should be made three times for each direction of operation as follows:

1. Remove shield from relay.
2. Apply slot 70 of 147A gauge to right rear horizontal portion of relay operating arm. Make sure that enclosed end of slot is against edge of operating arm and that weight on gauge is positioned up, as shown in Fig. 7.
3. Press down on 147A gauge to fully operate relay and vane to limit of their travel.
4. Insert KS-14995 coin collector tool into throat of hopper. Let tool down as far as it will go without forcing and hold in place, as shown in Fig. 7.
5. Release pressure on 147A gauge.
6. Slowly withdraw KS-14995 tool. Take at least 5 seconds.

7. Observe that vane and relay return to their unoperated positions.

8. Make test three times with gauge on right (collect) side and three times on left (refund) side.

4.07 If the mechanism fails, remove relay and proceed as follows:

1. If hopper is equipped with a brass coin vane, coin collector shall be replaced.

2. Check vane for binding on its bearings:

   a. Hold vane almost vertical but slightly to the right.

   b. Vane shall drop to fully-operated refund position (right) when released.

   c. Hold vane almost vertical but slightly to left.

   d. Vane shall drop to fully-operated collect position (left) when released. If vane binds on its bearings, the coin collector shall be replaced.

3. Check vane for binding on hopper:

   a. Holding vane stem as far forward as possible with fingers, move vane over its full travel in each direction three times, feeling that it does not scrape on front of hopper.

   b. Push vane to rear of hopper and move vane over its full travel in each direction, feeling that it does not scrape on back of hopper. Do not push hard enough to distort hopper.

   c. If vane binds on hopper, coin collector shall be replaced.

4. Check trap for catching on vane or on vane roller as follows:

   a. Hold vane in fully-operated collect position (to the left) using left hand.

   b. With the right hand, lift trap counterweight to its fully-operated position.

   c. Move vane slowly until it engages trap.

   d. Continue moving vane toward vertical position while gently restraining trap. Vane shall move smoothly to vertical position.

   e. Repeat test on refund side (to the right), reversing use of hands. If trap catches on vane or vane roller, replace trap as covered in 4.14 through 4.16, and repeat test. If replacement trap still catches, coin collector shall be replaced.

5. Check clearance between trap and vane roller.

   a. With trap in unoperated position, place a finger lightly on counterweight.

   b. Move vane to vertical position. Vane shall not rub on trap. If vane rubs, adjust trap stop lug so that trap will just clear vane.

   c. With vane in vertical position, lift trap counterweight. Trap shall not move more than a few degrees before touching vane roller. Adjust by bending stop lug.

6. Check operating arm fork and vane stem for roughness, and clean and lubricate as covered in 4.12. Also check operating stud. If stud is rough or roller type, replace relay.

7. Remount coin relay as covered in 4.13, and repeat trap and vane release test. If mechanism fails, replace relay.

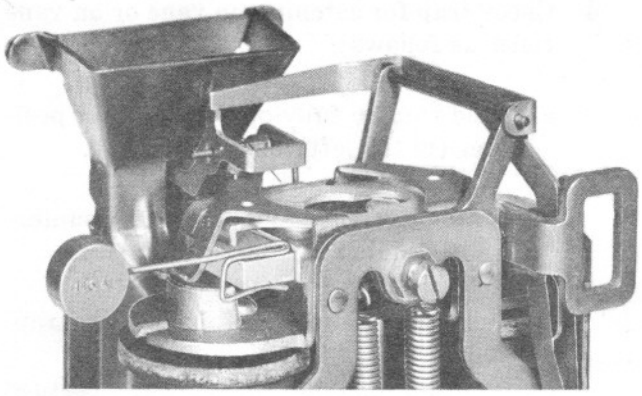

Fig. 8 — Bias Margin Test

Bias Margin Test

4.08 Relay shall operate against torque of a 146A gauge attached to armature in both collect and refund directions. The appropriate central office coin battery shall be applied. Test as follows:

1. To test in collect direction, place a 146A gauge on left side of armature (see Fig. 8).
2. Connect hand test set across line terminals.
3. Trip coin trigger (see 4.10).

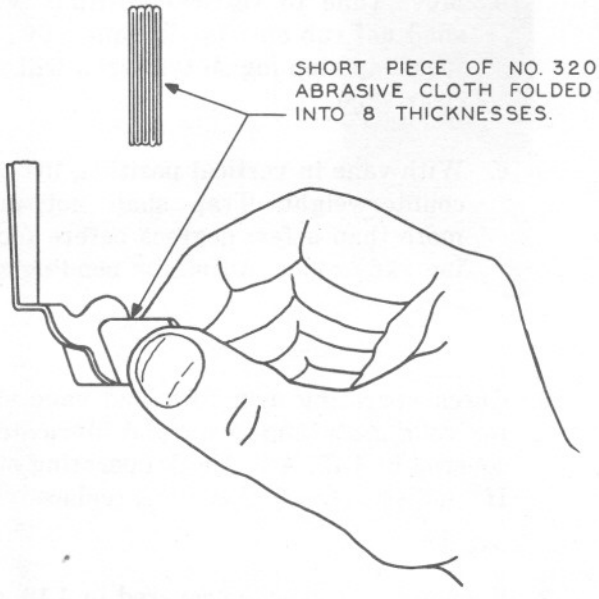

Fig. 9 — Polishing of Fork Slot

4. Obtain collect current by any available local arrangement. Relay shall operate to collect (lifting gauge). Trigger shall restore. Make test three times (see 4.11).
5. To test in refund direction, place 146A gauge on right side of armature.
6. Trip coin trigger.
7. Obtain refund current. Relay shall operate to refund (lifting gauge). Trigger shall restore. Make test three times.

4.09 If relay fails to operate in the correct direction or if trigger fails to restore, check for and remove magnetic particles or replace relay.

Note: Make sure that line and ground are satisfactory and that coin battery is being applied.

4.10 When coin trigger is tripped, ground contact springs shall be made and shall remain closed without break while armature is moved from its normal to its fully-operated position. It is immaterial at what point on return stroke contacts open.

4.11 If severe arcing or relay chatter is observed during electrical operation to collect or to refund, indicating that contacts open momentarily, replace relay.

Cleaning Two-coil Relay

4.12 If relay has been removed for any reason proceed as follows:

1. Clean and lubricate fork and vane stem.
   - Surfaces of fork slot shall be smooth. If bearing surfaces of fork are so rough that they cannot readily be made smooth, replace relay; otherwise smooth rough spots using No. 320 or finer abrasive cloth folded as shown in Fig. 9.
   - Clean with a KS-2423 cleaning cloth moistened with KS-7860 petroleum spirits.

- Apply graphite from lead of a grade 2B or softer lead pencil to bearing surfaces of fork slot. Rub lead on these surfaces so as to deposit as continuous a coating as practicable.

2. Remove magnetic particles from adjacent surfaces of armature, pole pieces, and top of magnet with rubber tape or equivalent.

- Place a piece of rubber tape about 1 inch long on top of pole piece on left side of relay with at least 1/4 inch extending into air gap under armature. Press down on armature until it squeezes rubber tape. Discard tape with embedded magnetic particles.

- Repeat operation on right side with a new piece of rubber tape.

- Use tape folded over orange stick to remove particles from top of magnet.

Mounting Two-coil Relay

4.13 When mounting relay, it shall be centered so that with operating arm in its normal vertical position fork slot engages vane stem and holds coin vane in a vertical position. Full thickness of coin vane shall be visible in the center hole of coin trap, as shown in Fig. 10. If relay cannot be centered, replace relay. If replacing relay cannot be centered, replace coin collector.

- Coin trigger shall not touch upper end of slot in hopper or bind on sides of slot at any point of travel.

- Relay shall be placed as close as possible to hopper but with at least 1/16-inch clearance between fork and hopper, between vane stem and relay, and between trap counterweight and relay.

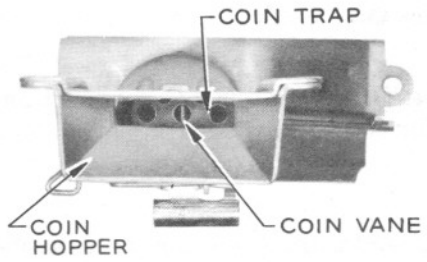

Fig. 10 — Position of Vane When Relay is Centered

To Replace Coin Trap

4.14 Relay must be removed to replace coin trap.

4.15 Coin traps in later style hoppers may be replaced through front of hopper without removing coin shield.

4.16 To replace coin trap in *earlier* style hoppers:

1. Remove coin return shield, if present, by inserting blade of a cabinet screw driver in loop of pin. Twist screw driver sufficiently to release end of pin from hole in hopper and slowly pull shield and pin out together.

2. Move vane to the right.

3. Fasten a piece of string or wire to trap counterweight.

4. Remove trap pin by lifting right end of loop and sliding pin to the left.

5. Push trap into hopper and allow it to drop into coin return.

6. Fasten string or wire to new trap and pull trap up to slot in front of hopper.

7. Position new trap with lugs uppermost and assemble trap pin.

8. Recheck clearance between trap and vane roller.

To Replace Coin Shield

Note: Coin shield is not required on coin collector equipped with pull bucket return chute.

4.17 If coins are stuck due to damaged or distorted coin shield, or if a bent shield pin causes shield to stick, shield pin and shield shall be removed if not required; if required, replace as follows:

1. Place pin through tubular bearing at top of shield so that curved-in portion on bottom of shield is toward hopper when loop of pin is to the front. (See Fig. 11.)

2. Hold loop of pin with long-nose pliers or fingers and place coin shield pin in hole in rear of hopper.

3. Hold shield in place with fingers and secure end of loop in front hole of hopper with aid of long-nose pliers.

4. Adjust loop in such a manner that pin does not come out when play is taken up in either direction.

5. Check operation of shield.

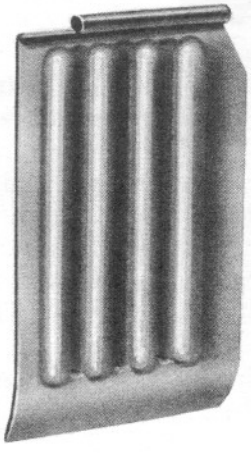

Fig. 11 — Coin Shield

5.00 COIN RELAY SHIELD

5.01 The coin relay shall be protected by a shield. Shield P-349486, molded of polystyrene, replaces the KS-7994 fiber shield. It is held in place with a P-11E122 shield clip. Snap shield clip in place between locknut and head of coin relay pivot screw while exerting slight pressure on shield near pivot screw hole. Shield clip is not used on fiber shield.

5.02 On coin collectors equipped with a D-95365 contact device, use P-16A336 shield which differs from P-349486 in that lower-left corner is cut away so as not to interfere with contact device.

6.00 FINAL TESTS

Coin Chute Operation and Refund Test

6.01 To ensure that coin chute and coin return paths are clear and that station and coin relay are operating satisfactorily, make a final test as follows:

1. With upper housing locked in place and with receiver or handset **on switchhook,** deposit a nickel. Coin shall drop into coin return. Repeat test five times. Coin shall be returned each time.

2. With receiver or handset **off switchhook,** deposit a nickel. Nickel shall be held at holding latch. Lower switchhook slowly. Coin shall drop into coin return. Repeat test five times.

3. With receiver or handset **off switchhook,** deposit a nickel. Nickel shall be held at holding latch. Deposit second nickel. Second nickel shall release first nickel and permit both coins to pass through coin chute, strike gong, and trip trigger as they drop into hopper. Dial tone shall be heard at dial stations, or operator shall answer at manual stations. Deposit a third nickel. Third nickel shall pass through coin chute, strike gong, and reach trap in coin hopper.

4. At dial stations, when dial tone is heard, dial any digit except one (1) to break dial tone; then hang up receiver or handset. Coins shall drop into coin return on hang-up. At manual stations, when operator answers, request that coins be returned.

5. With receiver or handset **on switchhook,** deposit dime. Dime shall pass through coin chute, strike gong twice, and trip trigger. Dial tone or manual operator shall be heard after receiver or handset is removed from switchhook.

6. With receiver or handset **off switchhook,** deposit dime. Dime shall pass through coin chute, strike gong twice, and trip trigger bringing in dial tone or manual operator.

7. With receiver or handset **on switchhook,** deposit quarter. Quarter shall be stopped by the open gate. Remove receiver or handset from switchhook. Gate will be closed, and quarter will be released and strike gong. Dial tone or manual operator shall be heard.

8. With receiver or handset **off switchhook,** deposit quarter. Quarter shall pass through coin chute, strike gong, and trip trigger bringing in dial tone or manual operator.

9. If cutover clip is used for 5-cent operation, initial nickel deposited shall not be held at holding latch. All other tests shall be same as above (see Fig. 12).

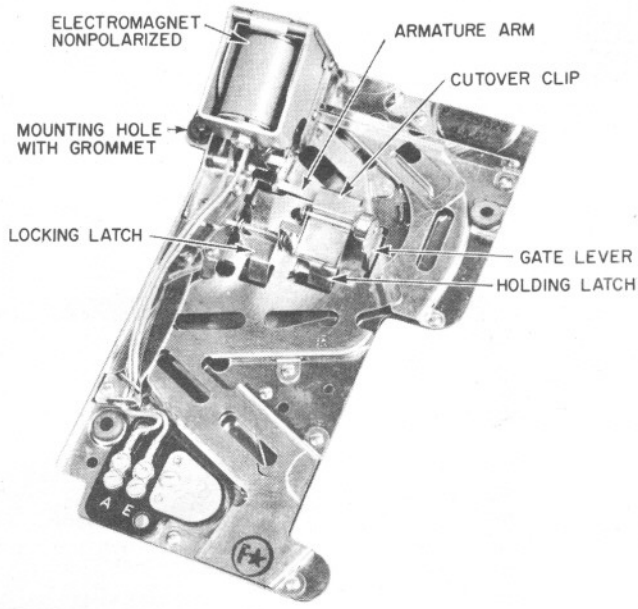

Fig. 12 — Prepay Steel Coin Chute (Equipped with Cutover Clip for 5-Cent Service)

Coin Signal Test

6.02 Notify operator that tests for coin signals are about to be made and that coins are to be returned after deposit. Deposit nickel, dime, and quarter. If operator does not identify signals correctly, inspect for trouble at station and correct as specified under coin chute alignment in the C Section entitled Coin Collectors, Maintenance, General.

Long Loop Coin Collectors

6.03 Coin collectors used on long loops shall meet all above maintenance requirements. In addition, operation and adjustment of the S36 relay housed in the subscriber set shall be checked as covered in the C Section entitled Subscriber Sets, Maintenance. If relay is defective and cannot be corrected, replace subscriber set.