SLUG REJECTORS
NATIONAL REJECTORS

INTRODUCTION
SLUG REJECTORS

Slug rejectors manufactured by National Rejectors, Inc. are classified generally into two groups. They are the "200 series" and the "600 series" rejectors.

The 200 series comprises rejectors which handle 5¢, 10¢ and 25¢ coin denominations in one rejector mechanism (See Figure 9-1).

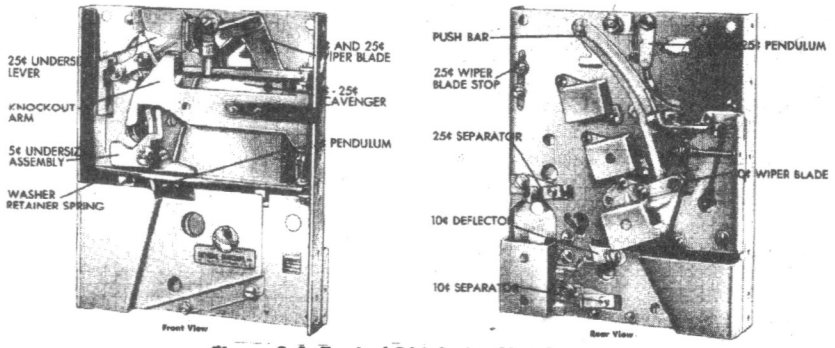

Figure 9-1, Typical 200 Series Slug Rejector

The 600 series includes two sub-groups. They are the single coin rejectors, which handle 5¢ coins (Figure 9-2) and the dual coin rejectors (Figure 9-3), which handle combinations of two coins as per example: 5¢-10¢.

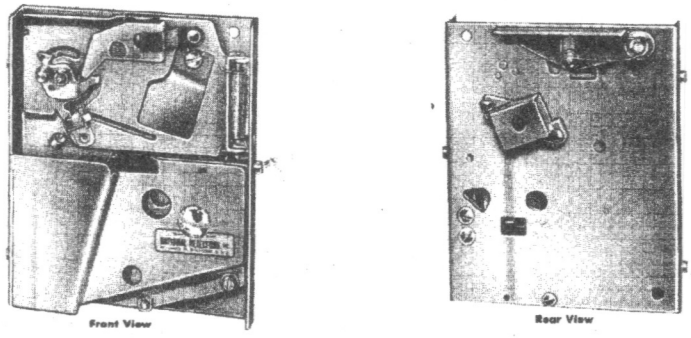

Figure 9-2, Typical 600 Series Single Slug Rejector

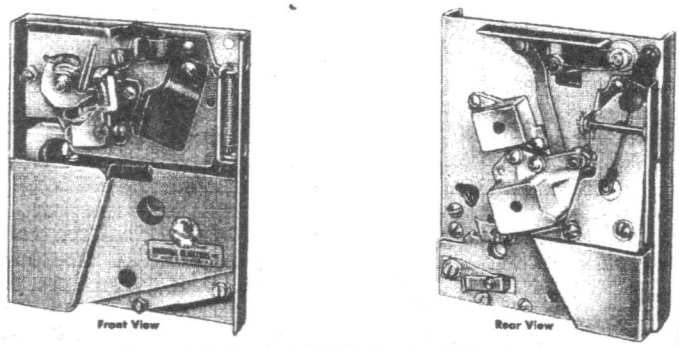

Figure 9-3, Typical 600 Series Dual Slug Rejector

OPERATION

SLUG REJECTORS

BASIC PRINCIPLES

Each coin, as it passes through the slug rejector mechanism, is first checked for proper diameter and thickness. Coins are rejected if badly nicked, warped, or perforated. A magnetic field of permanent magnets provides a means of rejecting coins which do not contain the proper metal alloy. The coins roll down inclined rails past these magnets, and their magnetic fields generate eddy currents in the coins which tend to retard their travel. The type of metal or alloy in a coin determines the speed with which the coin leaves the inclined rail. If the coin travels too fast or too slow, it will not follow the prescribed path leading to the "accept" outlet in the rejector. Instead, the false coin will strike certain deflectors or barriers in such a manner as to be deflected to the "reject" outlet.

The weight of the coin, its hardness, and its elasticity may also be factors in determining whether it will follow the specific path necessary to be accepted, or whether it will fall short of, or beyond this path, and be rejected.

Most rejected coins and slugs are immediately channeled to the "reject" outlets. However, a slug which is perforated or of improper size will be trapped in the rejector, as will slugs held by the magnets. To remove such slugs from the rejector, a wiper blade is provided. On respective units, the wiper blade sweeps the 5¢ and 25¢ coin paths and magnets, while the 10¢ wiper operated by a push bar sweeps the dime path and magnet. Simultaneously the scavengers are sprung open, releasing the trapped slugs which then drop through the "reject" outlet.

5¢ COIN PATH

GENUINE NICKEL — 200 SERIES

When dropped into the coin insert, the nickel follows the path as shown in Figure 9-4, passing through the 25¢ undersize lever, to engage the 5¢ undersize lever. If the coin is of the correct diameter, the undersize lever will turn slightly on its pivot and withdraw the 5¢ undersize wire from the path of the coin, permitting it to drop onto the 5¢ rail. The genuine nickel, having an unusually high electrical resistance, will roll down the 5¢ rail between the 5¢ magnets at a high rate of speed, striking the 5¢ anvil, from which it will rebound with enough force to clear the 5¢ separator shoulder rivet. In this way the nickel-size coins are tested for hardness and elasticity as well as for metal content.

An oversize nickel coin, in passing down the 5¢ rail, will be trapped between the rail and the magnet plate rest rivet. Operating the wiper blade will reject the coin. This rest rivet also serves as a spacer for the 5¢-25¢ scavenger bracket, regulating the clearance to prevent over-thick coins from passing down the rail.

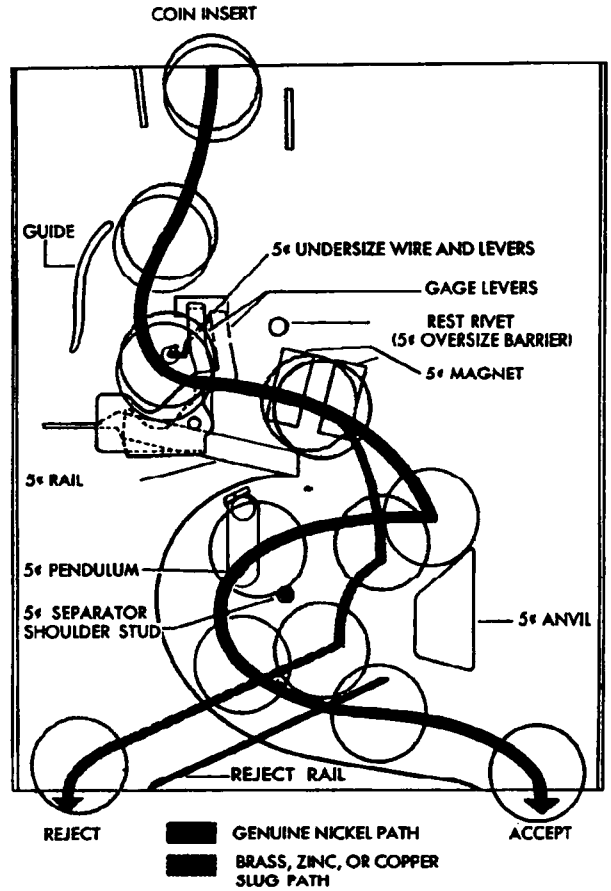

Figure 9-4, Nickel Coin Path — 200 Series

GENUINE NICKEL — 600 SERIES

When dropped into the coin insert, the nickel follows the coin path indicated in Figure 9-5, page 9-3, and drops into the arms of the 5¢ undersize cradle. If coin is definitely undersize in diameter, it will fall through the cradle arms to the reject outlet. An oversize coin will rotate with the cradle, but will be stopped against the oversize diameter pin on the 5¢ scavenger. Depressing the operating lever will reject the coin. If the coin or slug is not rejected at this point, it will rotate in the cradle and engage the 5¢ undersize lever. If the coin is of the correct diameter, the undersize lever will turn slightly on its pivot and withdraw the 5¢ undersize wire from the path of the coin,

permitting it to drop onto the 5¢ rail. The genuine nickel, having an unusually high electrical resistance, will roll down the 5¢ rail between the 5¢ magnets at a high rate of speed, striking the 5¢ anvil, from which it will rebound with enough force to clear the 5¢ separator shoulder rivet. In this way the nickel-size coins are tested for hardness and elasticity as well as for metal content.

UNDERSIZE COIN — 200 AND 600 SERIES

An undersize coin, or slug, in passing to the 5¢ rail, will allow the 5¢ undersize lever to return before the nickel has passed the 5¢ undersize wire. As the lever returns, it causes the wire to protrude into the nickel path to block the undersize nickel. To correctly visualize this action, open the scavenger, hold back the knockout arm, and slowly move a nickel down the path and around the undersize lever. Note how the lever pivots and first withdraws, then projects the 5¢ undersize wire into the coin path. The coin-blocking action can be checked with a Mexican nickel or other small coin (See Figures 9-4, page 9-2, and 9-5).

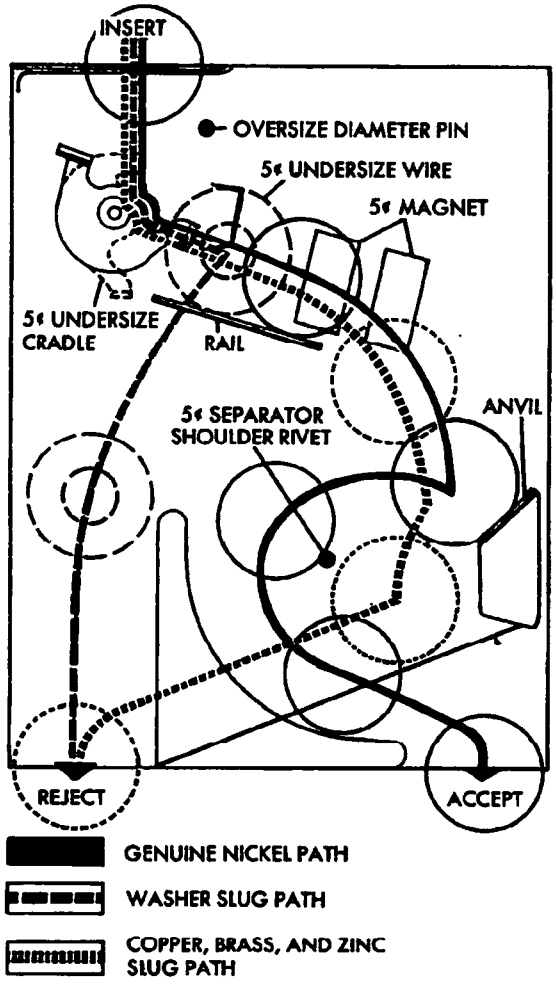

Figure 9-5, Nickel Coin Path — 600 Series

The 5¢ undersize wire will also cause nickel-size washers to hang up at this point. The knockout will reject them.

5¢ BRASS, COPPER, OR ZINC SLUGS

Nickel-size slugs of brass, copper, or zinc follow the paths indicated in Figures 9-4, page 9-2, and 9-5. These slugs have electrical resistances lower than that of the alloy of which nickels are made. As a result, these slugs are slowed down in the magnetic field, causing them to strike the anvil too low, or miss it entirely, and thus be rejected.

10¢ COIN PATH

GENUINE DIME — 200 SERIES

The dime, when dropped into the coin insert, follows the path shown in Figure 9-6, passing through the 25¢ undersize lever and to the left of the 5¢ undersize wire. At the bottom edge of the main scavenger, the dime is deflected through an opening in the main plate and deposited on the 10¢ runway, mounted at the bottom edge of the 10¢ scavenger. The dime rolls down the 10¢ runway,

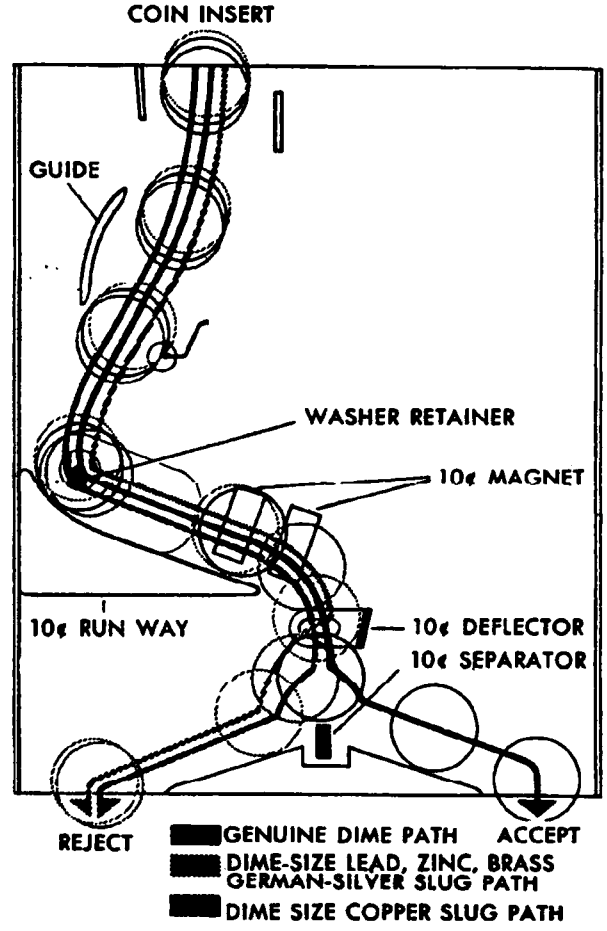

Figure 9-6, Dime Coin Path — 200 Series

passing through the magnetic field. The speed of the dime, as it leaves the runway, is retarded enough by the eddy currents, set up by this field, to prevent it from striking the 10¢ deflector, but it still follows a wide enough arc to drop onto the 10¢ separator with its center of gravity to the right. The dime is deflected into the "accept" channel.

A perforated slug, or washer, will be caught by the washer retainer pin at the top of the 10¢ runway. This pin also serves to deflect undersize 10¢ slugs through a hole in the main plate and into the "reject" channel. This hole is slightly smaller than the diameter of a dime.

GENUINE DIME — 600 SERIES

The dime, when dropped into the coin insert, follows the indicated coin path, shown in Figure 9-7. It drops straight down, is deflected through an opening in the main plate, and is deposited on the 10¢ runway mounted at the bottom edge of the 10¢ scavenger. The dime rolls down the 10¢ runway, and passes through the magnetic field. The speed of the dime, as it leaves the runway, is retarded enough by the eddy currents in the field to prevent it from striking the 10¢ deflector, but it still follows a wide enough arc to drop onto the 10¢ separator with its center of gravity to the right. The dime is deflected into the "accept" channel.

A perforated slug, or washer, will be caught by the washer retainer pin at the top of the 10¢ runway. This pin also serves to deflect undersize 10¢ slugs through a hole in the main plate and into the "reject" channel. This hole is slightly smaller than the diameter of a dime.

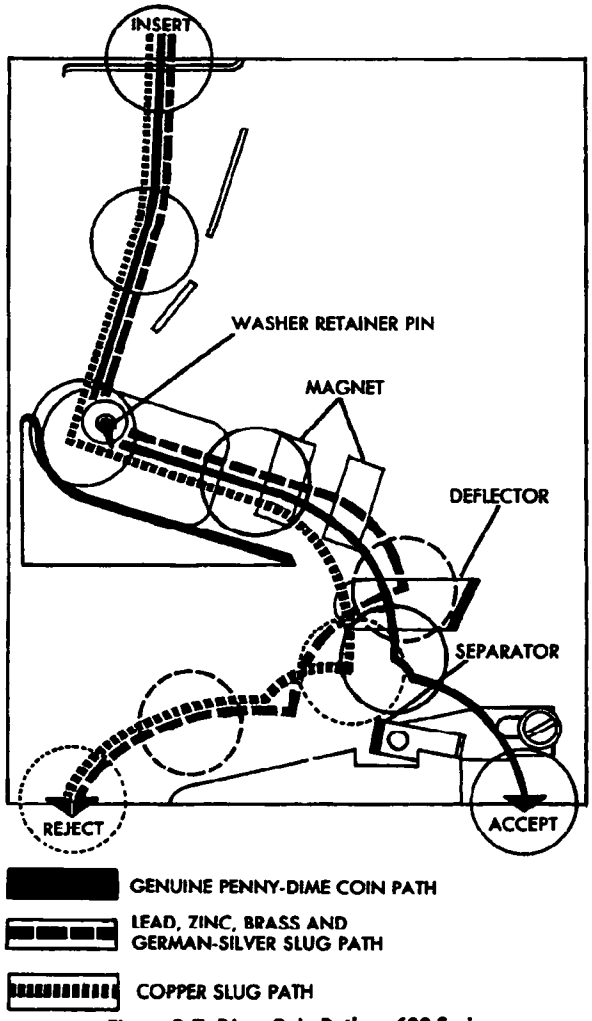

Figure 9-7, Dime Coin Path — 600 Series

DIME SIZE COPPER SLUG — 200 AND 600 SERIES

A dime-size copper slug, if of proper size, will follow a path as shown in Figure 9-6, page 9-3. This is the same path as the dime path until it reaches the magnet. Here the slug is retarded more than the genuine dime, because of the higher electrical conductivity of copper. As a result, the copper slug drops from the 10¢ runway onto the 10¢ separator, with the slug's center of gravity to the left, and is deflected into the "reject" channel.

DIME SIZE LEAD, ZINC, BRASS OR GERMAN-SILVER SLUGS — 200 AND 600 SERIES

This type of dime-size slug follows a path, as shown in Figures 9-6, page 9-3, and 9-7, which traces the dime path until it reaches the magnet. Here the false coin, having a higher electrical resistance, will leave the 10¢ runway at a higher rate of speed than a genuine dime. It strikes the 10¢ deflector, rebounds to the left side of the 10¢ separator, and drops into the "reject" channel.

25¢ COIN PATH

GENUINE QUARTER — 200 SERIES

Follow the path of a genuine quarter, shown in Figure 9-8, page 9-5. The coin drops through the insert into the arms of the 25¢ undersize lever which turns under the weight of the coin and deposits it upon the inclined 25¢ rail. As the coin rolls down the rail past the magnet, its speed is checked by generated eddy currents, and it leaves the rail in an arc that will permit it to miss the 5¢-25¢ wiper blade (which serves as 25¢ brass deflector) and land with its center of gravity to the right of the 25¢ separator and thus be accepted.

QUARTER SIZE COPPER SLUG — 200 AND 600 SERIES

A copper slug follows the path shown in Figure 9-8, page 9-5, which is the same path the quarter follows until it reaches the magnet. Since copper is a very good conductor of electricity, eddy currents of considerable strength are included and the slug is slowed down so that it drops almost straight down at the end of the rail. It strikes the 25¢ separator, with the slug's center of gravity to the left, and bounces to the "reject" side.

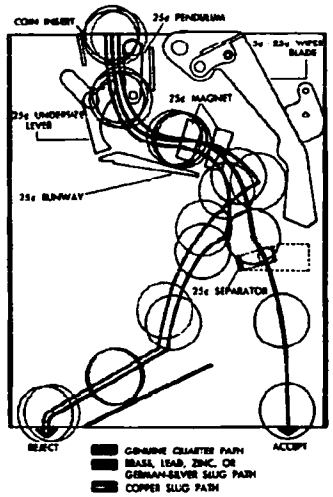

Figure 9-8, Quarter Coin Path — 200 Series

QUARTER SIZE BRASS, LEAD, ZINC OR GERMAN-SILVER SLUGS — 200 SERIES

This type of slug, or coin, is a poorer conductor of electricity than a quarter, so it is retarded less and goes through the magnetic field at a greater speed. The coin follows the path shown in Figure 9-8 and leaves the inclined rail in a wide arc causing it to strike the wiper blade and rebound, dropping to the left of the 25¢ separator to be rejected. It would be possible for a rebounding slug of this type to pass over the 5¢ separator shoulder rivet (Figure 9-4, page 9-2) and become jammed in the nickel acceptance channel. However, the 5¢ pendulum blocks these slugs and they are rejected by operating the wiper linkage.

SERVICE AND MAINTENANCE

SLUG REJECTORS

PERIODIC MAINTENANCE

Maintenance on the rejector, other than occasional adjustments, is slight. It can be enumerated as follows:

Keep the rejector level and vertical so as not to upset the normal travel of coins and slugs.

Periodically clean the 5¢ anvil through the access hole, using a cloth over a screwdriver blade. The anvil edge must be free of any foreign matter which might cushion the "bounce" of the nickel.

Keep the magnets clean of all metal particles which tend to cling to them. Access to the face of the 10¢ magnet can be gained by bending the soft end of a small triangular file to a "hockey club" angle, with which to sweep across the face of the magnet. The metallic particles which cling to the file can be readily brushed away.

A suggested method of cleaning is to immerse in extremely hot water. Brush with soft brush to remove particles. (Heavy abrasives are injurious to this equipment.)

ADJUSTMENTS

NICKEL PATH — 200 AND 600 SERIES

Before adjustments are made, be certain the rejector is level, the 5¢ magnets are free of metal particles, and the 5¢ anvil is both clean and rigid.

Nickel Undersize Wire. Adjustment of the 5¢ undersize wire, to correct for error in sizing the diameter of nickel slugs, is made by bending the upper prong of the wire inward or outward (Figure 9-5 or 9-6, page 9-3). If wire is accepting Mexican nickels, or other small size coins, bend upper end of wire to the right while holding the doubled end in. The wire is of high-grade spring steel and resists a permanent bend, so considerable distortion may be necessary to permanently change its shape.

If good nickels are being blocked, bend the upper end of the undersize wire to the left. Support the doubled end of the wire by placing a small screwdriver blade beneath it to effect this bend.

If the upper bend of the wire is habitually jumping over the inner lever, bend it down slightly.

The undersize wire must move freely in the slot of the lever bracket if it is to work efficiently. If it binds slightly, because the wire does not fit the slot properly, it may easily be reshaped to fit without removing either the bracket or the wire. Simply grasp the double end of the wire with a pair of long-nose pliers, bend it toward the top of the rejector and then back into place. Then check to see that it has reshaped itself and moves freely in the slot.

DIME PATH — 200 AND 600 SERIES

Before adjustments are made, be certain the rejector is level and clean, and the magnet is free of metal particles.

10¢ Runway. The 10¢ runway, attached to the 10¢ scavenger, is held firmly against the main plate by the pressure of the 5¢-25¢ scavenger (reverse side) acting through the leverage of a 10¢ scavenger adjusting screw (Figure 9-1, page 9-1). The pressure of the 5¢-25¢ scavenger on the 10¢ scavenger is opposed by the 10¢ scavenger spring.

The 10¢ scavenger adjusting screw must be so positioned that it holds the 10¢ runway firmly against the main plate, yet does not raise the 5¢-25¢ scavenger foot from the main plate. Make this adjustment (with guard removed) with a finger, while turning in the adjusting screw. Just as the clearance "click" disappears, and before the 5¢-25¢ scavenger is raised, stop and lock the position of the adjustable screw. The 10¢ runway is now properly seated.

NOTE

This adjustment is not necessary on the 260 models as the positive opener scavenger is pre-set at the factory.

The position of the 10¢ runway on the 10¢ scavenger is also adjustable, by means of slotted screw holes. The 10¢ runway must be positioned, for proper clearance with the washer retainer pin and opening in main plate, so as to allow this pin to force undersize coins through the opening and out into the "reject" channel.

Oversize coins are gauged between the tip of the 10¢ rail and the 10¢ wiper blade. Therefore, this adjustment applies to both undersize and oversize rejection. This is a precise, sizing adjustment set at the factory with a special, gauging fixture and, under normal conditions, should not require resetting.

10¢ Deflector. When lead, zinc, brass, or German-silver slugs are accepted through the dime path, the 10¢ deflector is positioned too far from the 10¢ runway and should be moved inward. Make slight adjustments until proper acceptance and rejection results. Genuine dimes should not strike the 10¢ deflector.

10¢ Separator. Copper slugs passing down the dime path should drop on the "reject" side of the 10¢ separator. If copper slugs are being accepted, move the 10¢ separator away from the "reject" side far enough to reject copper slugs, but not so far as to reject good dimes. Check operation thoroughly after adjustments are made.

QUARTER PATH — 200 SERIES

25¢ Undersize Lever. The first point of possible adjustment in the 25¢ coin path is the 25¢ undersize lever (Figure 9-8, page 9-5). This lever measures quarter-size coins for correct diameter. Adjustment will very seldom be necessary and should be avoided if at all possible. Oversize coins will be blocked by the 25¢ pendulum which prevents such coins from leaving the undersize lever.

Undersize quarters and slugs will either drop through between the sizing arms and be rejected, or will fit tight and stick in the lever. If the arms are too close together, undersize coins will not stick but will be laid onto the rail, along with good quarters, and may be accepted. If this occurs, special cradles can be ordered to reject a specific type coin. A genuine quarter, when placed between the tips of the two measuring arms, should extend far enough so its edge is even with the edge of the lever arm. Take care not to distort the 25¢ undersize lever or it may bind on the plate when reinstalled. Also see that the clearance between the arms and the main plate is not increased, allowing quarters to by-pass the undersize lever and drop through to the "reject" outlet.

5¢-25¢ Wiper Blade. The 5¢-25¢ wiper blade (Figure 9-8, page 9-5) serves also as the deflector for quarter-size brass slugs. Its position is controlled by the 5¢-25¢ wiper blade stop.

If quarter-size brass, lead, zinc, or German silver slugs are accepted, the wiper blade stop is probably set too far to the outside. Loosen the two adjusting screws, move the stop down slightly, and then tighten the screws. If the stop is moved too far down, good quarters will strike the wiper blade. Move up the wiper blade stop very slightly, and check quarter travel until proper acceptance and rejection results.

25¢ Separator. A combination adjustment of the wiper blade stop and the 25¢ separator position may be necessary to properly select the good quarters.

If good quarters are being rejected with the bad, the 25¢ separator may be too far to the outside. Loosen the separator attaching screw and slide the 25¢ separator inward. Make slight adjustments until proper acceptance and rejection of coins and slugs result.

If quarter-size copper slugs are being accepted, move the 25¢ separator slightly outward.

5¢-25¢ Scavenger. The 5¢-25¢ scavenger (Figure 9-1, page 9-1) must seat flush against the main plate to properly size quarters and other coins for thickness. In case the scavenger foot (located beneath the 25¢ undersize lever weight) is not contacting the main plate, the scavenger must be sprung slightly. Lift up the scavenger and insert a pencil beneath the scavenger lower bar near the hinge, then press down firmly but not excessively on the coin insert guide at the top corner. Repeat this procedure until the scavenger foot firmly seats against the main plate.

PARTS REPLACEMENT

The replacement of most parts on the slug rejector is relatively simple and obvious, and is consequently omitted here. Such parts as the wiper blade stop, deflectors, separators, etc., require only the removal of a screw or two to replace the part. However, the positioning and adjustment of these parts, when installed, is highly critical for the proper operation of the rejector.

Be sure that the proper washers are reinstalled when replacing parts, and that no attaching screws project through the main plate into any coin track to obstruct or hinder coin travel. In replacing any part or assembly on the rejector, be certain to make a careful adjustment of the part as directed in the preceding paragraphs.

5¢ —25¢ SCAVENGER

Remove the hair cotter pins from the hinge rod. Using a pin punch, tap the hinge rod up. Then draw it from the hinge with a long-nose pliers. Remove the 5¢-25¢ scavenger spring and scavenger assembly, consisting of the knockout arm, 5¢-25¢ scavenger, and the 5¢-25¢ scavenger bracket (See Figure 9-1, page 9-1).

To install the scavenger assembly, insert the hinge rod through the scavenger assembly and the scavenger spring, with the hinge rod flush at the top. Position the scavenger assembly with the spring end projecting over the edge of the main plate. Press the scavenger assembly into place, forcing the spring into tension, then insert the hinge rod into the lower hinge bracket. Slip the upper hinge point into position, and push up the hinge rod. Install the hair cotter pins.

Check that the scavenger assembly is free from binding, has adequate spring tension, and rests squarely on the scavenger foot and the rest rivet. Check the wiper linkage action.

5¢ UNDERSIZE WIRE

If the 5¢ undersize wire becomes distorted from repeated attempts to adjust it, replace the wire. To remove the undersize wire, remove the two retainer screws, releasing the undersize lever assembly. Then lift off the 5¢ undersize wire, lever and bracket (Figures 9-4, page 9-2, and 9-5, page 9-3).

Place the new wire properly bedded into the slot in the 5¢ undersize bracket. The right angle wire end must project between the two undersize levers, with the doubled end of the wire protruding through the scavenger hole. Hold the assembly rigid, and position it on the scavenger. Tighten the retainer screws.

Test the operation of the new 5¢ undersize wire. Adjust the position and shape of a new wire only when absolutely necessary to effect proper rejection. Directions for "Adjustments" are found on page 9-5.

WIPER ASSEMBLY

Open the main scavenger for access to the 5¢-25¢ wiper blade (Figure 9-1, page 9-1). Unhook the push bar spring from the stud. Remove the hair cotter pins. Back off the hex nut and remove the shoulder screw; remove the 5¢-25¢ wiper blade and push bar. Remove the 10¢ wiper blade by releasing tension on 10¢ wiper spring, and remove the three screws holding the 10¢ magnet assembly. Remove the magnet and 10¢ wiper blade.

Install the 10¢ wiper blade, magnet, and 10¢ wiper spring. Install the 5¢-25¢ wiper blade with the shoulder screw, coin guide, washer, and hex nut. Position the push bar and secure it with the hair cotter pin and tension spring. If the push bar drags along the outer edge during operation, twist the spring 1/2 turn to provide a "lift" on that edge. Check wiper operation manually for free movement with minimum friction.

WASHER RETAINER SPRING

If the washer retainer spring (Figure 9-1, page 9-1) loses its tension or is distorted, causing it to work improperly, and if crimping the spring fails to remedy the condition, the 10¢ scavenger assembly containing the washer retainer pin and spring must be replaced. Be certain, however, that the failure is not caused by the 10¢ scavenger adjustment screw being set too loose, causing excessive clearance of 10¢ scavenger, 10¢ runway.

To replace the 10¢ scavenger assembly, slide the washer retainer spring guard upward to unclip it from the scavenger pivot rod. Remove the two hair cotter pins and slide out the pivot rod; remove the scavenger assembly.

Lift up the 10¢ scavenger spring, and position the new 10¢ scavenger assembly. Insert the pivot rod and hair cotter pins. Position the scavenger spring and clip on the guard. Adjust the position of the 10¢ runway with adjusting screw as directed in "Adjustments," page 9-5.

MAGNETS

The magnets are sufficiently strong and permanent to last the normal life of the rejector. If the magnets should eventually weaken to the point where the rejector operates inefficiently, it is likely that other parts of the rejector are worn to a degree making it advisable to replace the entire rejector.

MECHANICAL ACTUATORS

OPERATION

MECHANICAL ACTUATORS

BASIC PRINCIPLES

A mechanical actuator, being an entirely mechanical device, requires only cleanliness of the parts, lubrication and correct adjustment, to insure its best performance. Its principle is based upon supplying the necessary cam to move back the lock levers, parts No. 20 and No. 23. This obviously will allow the shaft, part No. 17, to rotate, thus actuating the vending mechanism inside the vendor. There are models which dispense change upon the insertion of a larger denomination coin than required (See Figure 9-10A, page 9-9).

In a straight 5¢ mechanism, only part No. 20, a lock lever, is necessarily cammed out by the insertion of a nickel to allow rotation. In a 10¢ changer mechanism, an alternative of the one just mentioned, a dime is required for the same purpose of camming back parts No. 23 and No. 20 while at the same time paying out change by way of the following procedure:

When a dime is allowed to drop into the cam on the shaft of part No. 17 and this shaft is rotated, it cams back the lock lever, part No. 23, and allows part No. 31 to rotate. This, in turn, engages a small pin at the right end of part No. 36 and begins its travel to the right. Continuation of this rotation will obviously force the long slide, part No. 36, to the extreme right and consequently actuate the change slide, part No. 55. This will, in turn, slide off one nickel from the bottom of the tube and direct it to the coin return cup at approximately the same time the merchandise is vended.

Each time the mechanism has actuated, part No. 29 is cammed to a downward position and with its linage to part No. 47, through the connecting wire, part No. 44, it is able to scavenge the rejector. This function is necessary for the purpose of removing foreign matter and bent coins from it.

Part numbers one to nine, inclusive, when as-

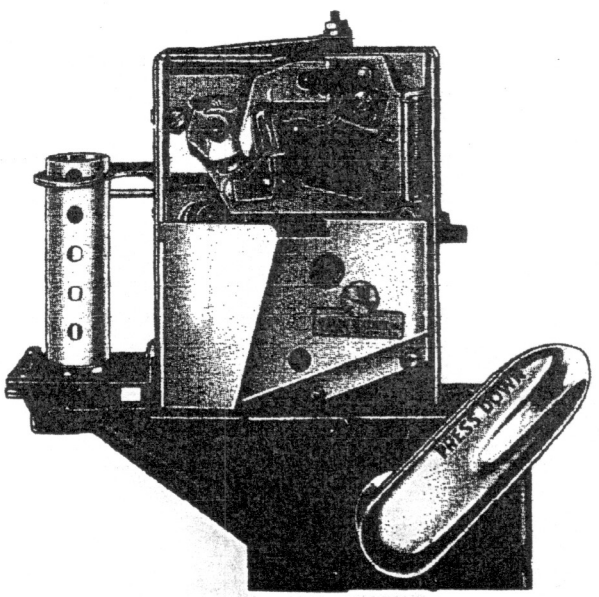

Figure 9-9, Series 3700 Actuator and Changer

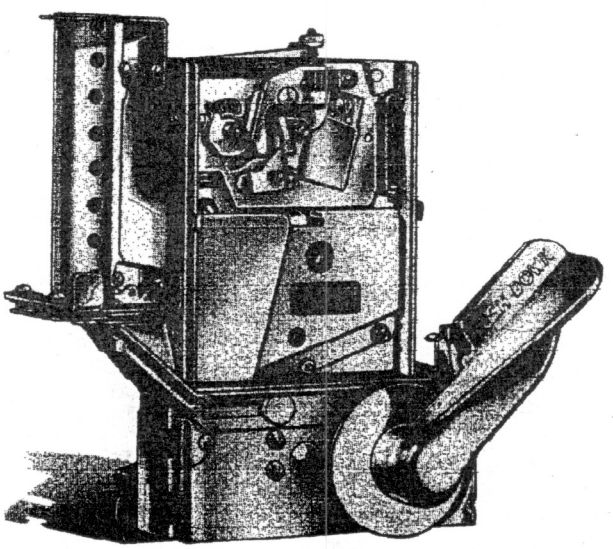

Figure 9-10, Series 3300 Actuator and Changer

sembled, form the handle and clutch assembly which is a protective measure against transmitting any unnecessary force into the mechanism. This clutch action is provided by allowing part No. 3 to back out of the slot of part No. 2, against the spring compression of part No. 5. When this happens, the handle will rotate around the cam freely and will have no further coupling with the actuator shaft until it is again returned to the normal position, lining up the pawl with the cam. Care must be taken to rotate the handle in a counterclockwise direction when breaking handle for the purpose of opening the door of the vendor, as it is designed to break easy in that direction.

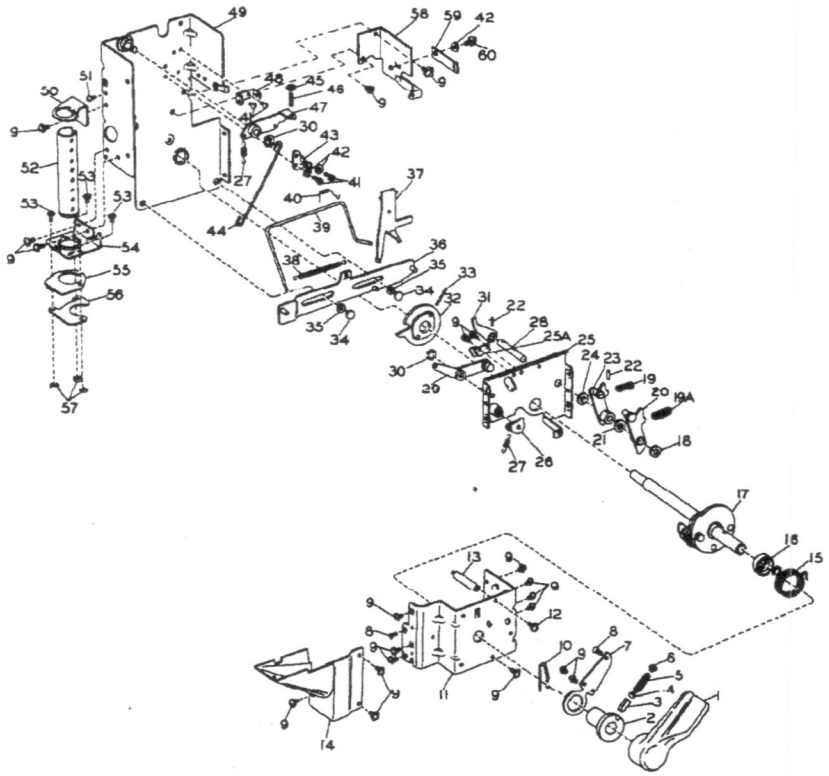

Figure 9-10A Series 3700 Actuator Changer, Exploded View

SERVICE AND MAINTENANCE

MECHANICAL ACTUATORS

ADJUSTMENTS

The only major adjustment is the screw nut assembly, part No. 46, in connection with the scavenger lever, part No. 47. It is adjusted as follows:

With part No. 29 in its farthest downward position through partial rotation of the shaft, the set screw should be so adjusted as to force the operating lever of the slug rejector far enough to allow maximum travel. When correctly adjusted, the operating lever should have a slight bit of play, although depressed completely down. After this adjustment is made, the lock nut, part No. 45, should be tightened down against part No. 47, while part No. 46 is held in position by a screwdriver.

LUBRICATION

Obviously, all moving parts require lubrication, and the prescribed lubricant is Lubriplate No. AA 30. Whenever the mechanism requires cleaning to the point of removing all lubrication, it must again be lubricated before placed back into operation.