

Nov. 2, 1937.

P. E. MILLS

2,097,497

COIN CHUTE FOR COIN COLLECTORS

Filed June 16, 1936

3 Sheets-Sheet 1

FIG. 2

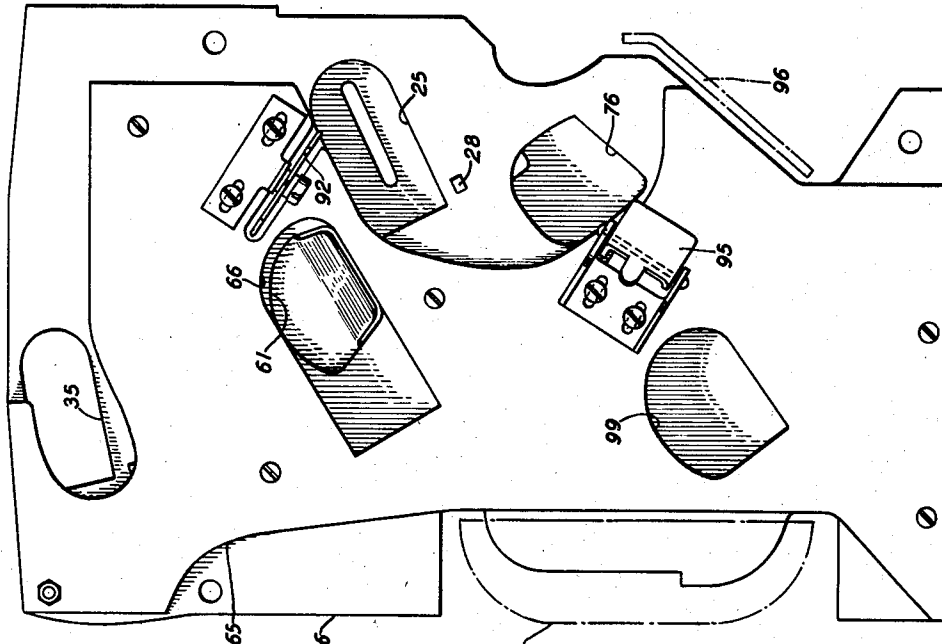
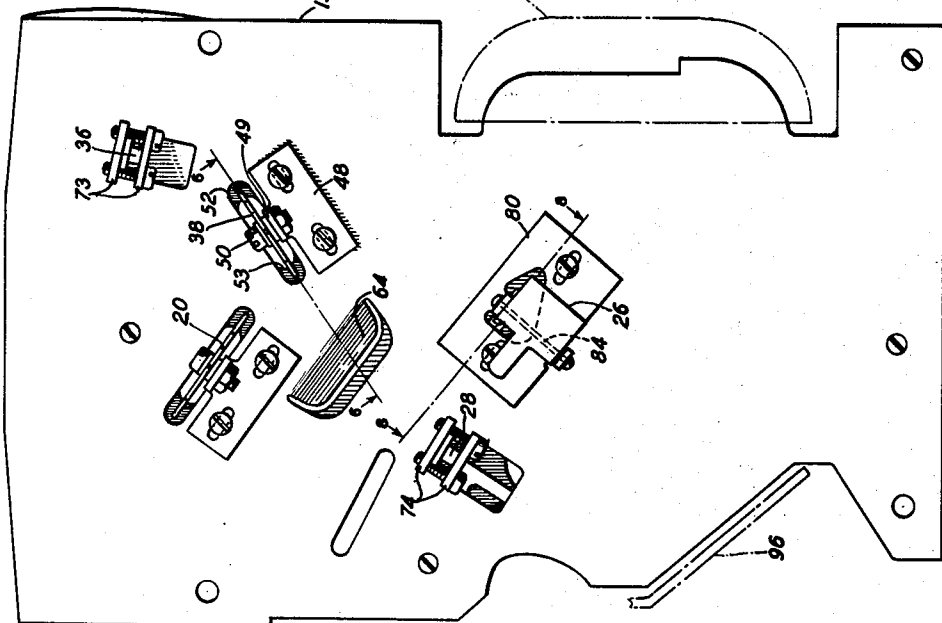


FIG. 1



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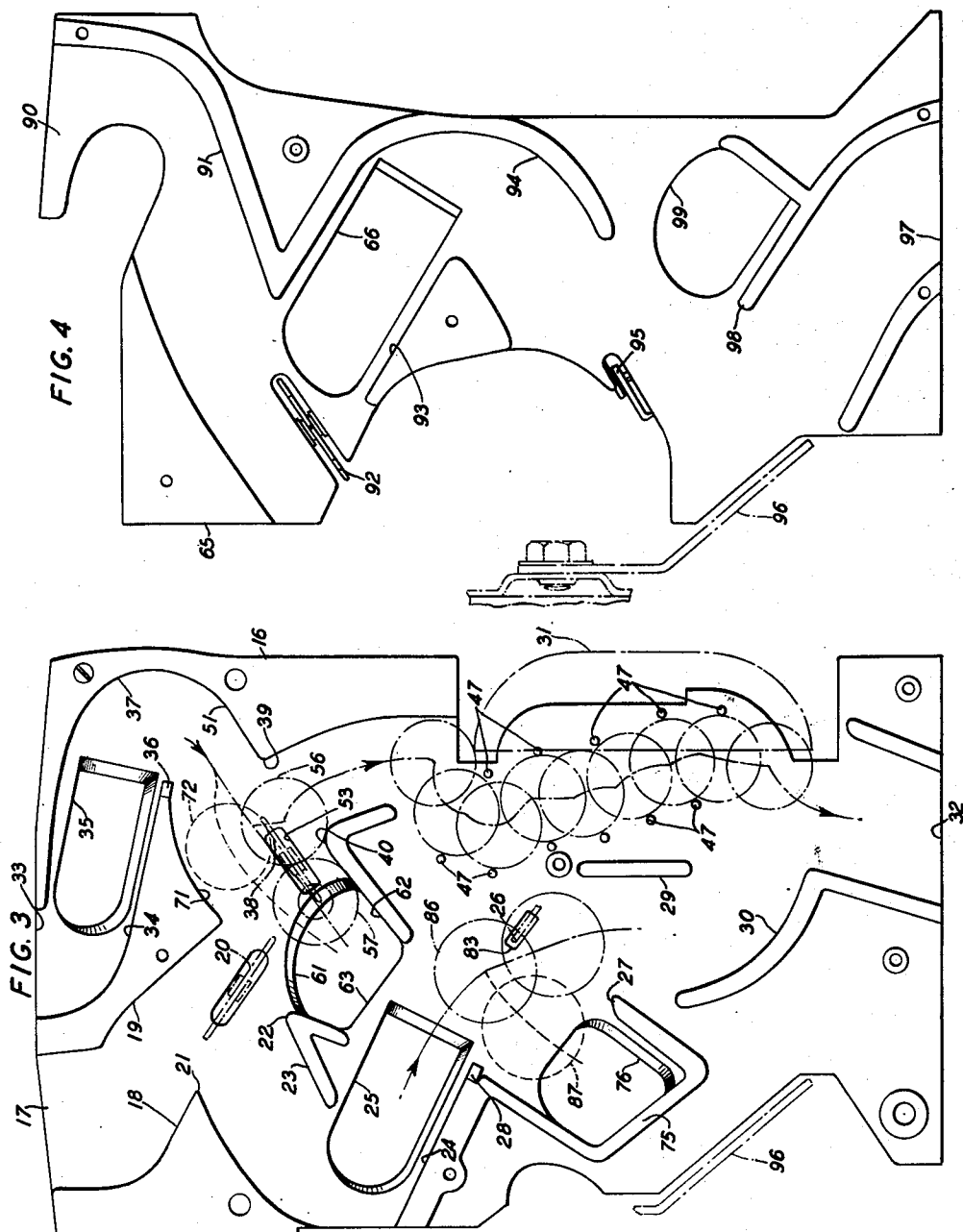
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FIG. 5

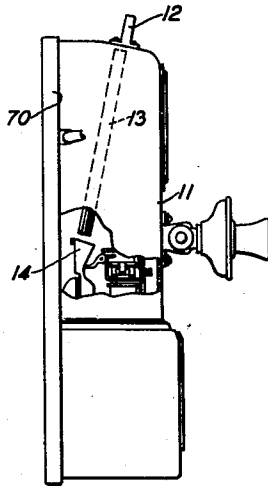


FIG. 6

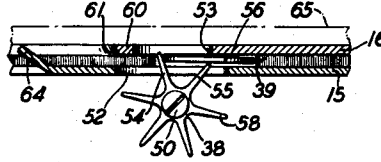


FIG. 7

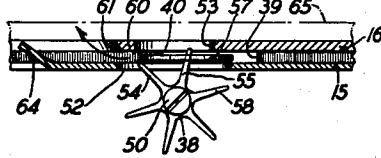


FIG. 8

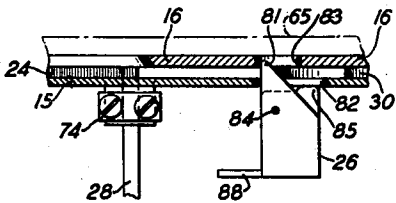


FIG. 9

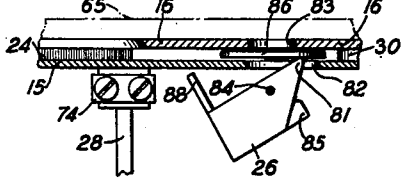


FIG. 10

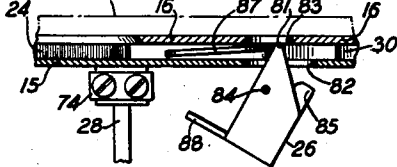
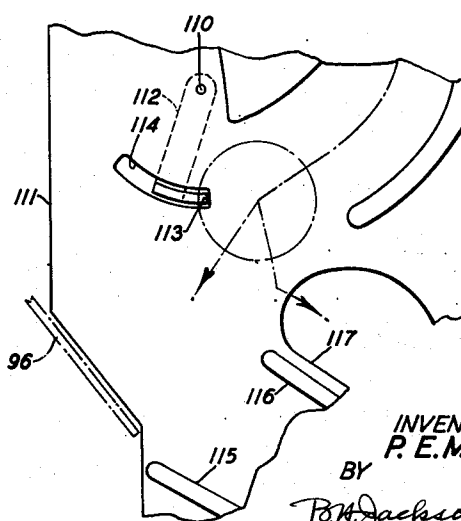


FIG. 11



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COIN CHUTE FOR COIN COLLECTORS

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Application June 16, 1936, Serial No. 85,448

6 Claims. (Cl. 194-97)

This invention relates to coin chutes, particularly to those intended for use in coin operated apparatus such as telephone coin collectors.

An object of the invention is to prevent the use of non-standard coins or slugs for fraudulently obtaining goods or services from coin controlled devices. A further object is to slow up the speed of coin travel in a coin chute in order to provide the proper time interval between successive operations by the same coin.

In order to prevent the acceptance of washers or other apertured slugs even when they are of the same diameter and thickness as a legitimate coin this invention provides a rotatable toothed wheel mounted to cause the teeth to project laterally into the coin channel and be struck by each deposited coin or slug. The angular spacing of the teeth is such that when struck by a washer the wheel freely rotates to permit the passage of the washer past the wheel into a coin reject chute but when the wheel is contacted by a genuine coin the rotation of the wheel is temporarily blocked by the absence of a center hole for receiving one of the teeth of the wheel and the blocked wheel thereupon allows the coin to drop into an opening in the bottom of the runway beneath the wheel, which opening leads the genuine coin into a further coin channel for performing any control functions desired, such as sounding a signaling device.

In accordance with another aspect of the invention the acceptance of underweight slugs is prevented by providing a pivoted member having an arm which projects across the coin channel for contacting each deposited coin or slug. The bottom wall of the channel immediately preceding and below the pivoted arm has a gap so arranged that the momentum of a genuine coin is sufficient to permit the coin to leap the gap and continue on down the coin passage in spite of the loss incurred in knocking the pivoted arm out of the coin channel. A lightweight slug, however, in striking the pivoted arm will lose so much momentum that it will be unable to leap the gap in the bottom of the runway and hence is rejected through this opening.

Another aspect of the invention is concerned with the problem of obtaining the proper time interval between two successive control operations of the same coin traversing a coin channel while still utilizing a relatively short length of coin channel between the two control points. This feature of the invention is of particular importance in telephone coin collector coin chutes where it is desired to have a coin strike both the upper and lower portions of a gong. It is necessary to insure that there is a substantial time interval between the two successive strikings of the gong in order that the central office may properly interpret the double signal. In accordance with

this invention the coin channel which guides the coin from the upper edge to the lower edge of the gong is defined by two rows of spaced pins or posts connecting the two plates forming the front and rear walls of the chute. The arrangement of the pins is such as to cause the coin under the action of gravity to bounce back and forth in a zigzag fashion from one row to the other and, therefore, introduce a considerable delay in the time of coin travel as compared with a smooth coin channel of the same length.

These and other aspects and objects of the invention will be better understood by reference to the following detailed description taken in connection with the accompanying drawings in which:

Fig. 1 is a rear view of the coin chute assembly of this invention;

Fig. 2 is a front view of the coin chute assembly;

Fig. 3 is a rear view of the center plate of the coin chute;

Fig. 4 is a rear view of the front plate of the coin chute;

Fig. 5 illustrates the general manner of mounting a coin chute in a telephone coin collector;

Figs. 6 and 7 are sectional views of the washer rejector taken along the line 6-6 of Fig. 1;

Figs. 8, 9 and 10 are sectional views of the underweight slug rejector taken along the line 8-8 of Fig. 1; and

Fig. 11 illustrates an alternative type of swinging weight for securing the rejection of lightweight coins or slugs.

The coin collector coin chute illustrated in the attached drawings is, in general, of the conventional type in that it comprises front, center and rear plates suitably fastened together with a quarter runway between the front and center plates, and nickel and dime runways between the rear and center plates conforming in general construction to the type of coin chute disclosed in the O. F. Forsberg United States Patent 1,043,219, issued November 5, 1912. The manner in which the coin chute is mounted in a laterally inclined position within a telephone coin collector 11 is shown in Fig. 5. The coin gauge 12 on top of the collector 11 has separate openings for receiving nickels, dimes and quarters and individual runways for these coins are provided in the coin chute 13 in order that the coins may be tested in certain particulars before dropping into a coin hopper 14.

Fig. 1 shows the rear view of the coin chute assembly and Fig. 2 shows the front view. The rear cover plate 15 of Fig. 1 has been removed in Fig. 3 to show the nickel and dime runways formed in the rear side of the center plate 16. Referring more particularly to Fig. 3 the coin entrance for nickels is at the point 17 whereupon the genuine coin follows a longitudinally in-

clined passage between walls 18 and 19 until the coin strikes an arm of a washer rejector 20 which prevents the coin from continuing further in the same direction and causes the coin to drop through an opening in the bottom wall between the points 21 and 22 whereupon it is guided in the reverse direction by bottom wall 23. After reaching the lower end of bottom wall 23 the coin drops onto the bottom wall 24 and passes alongside the under-diameter reject opening 25 of the usual type. The coin after rolling off the lower end of wall 24 strikes a pivoted arm 26 which normally projects into the runway for deflecting lightweight coins into a discharge opening located between projection 27 and the pole 28 of a magnet forming the termination of wall 24. However, a genuine coin has sufficient momentum to knock arm 26 outside the runway and continue to the right of projection 27 down a passage between walls 29 and 30 to strike the lower edge of gong 31 and then down through outlet opening 32 into the coin hopper 14 of Fig. 5.

The entrance for a dime is at the point 33 and the deposited dime rolls along bottom wall 34 past a suitable under-diameter reject opening 35. The lower end of wall 34 comprises a pole 36 of a straight bar magnet for deflecting magnetic coins. The direction of travel of the dime is reversed by curved wall 37 and the dime then encounters an arm of a washer rejector 38 which stops the dime from continuing on in the same direction, and allows the coin to drop through an opening in the bottom wall of the runway between the points 39 and 40 whereupon the coin strikes the upper edge of the bell 31. After striking the bell the dime continues down a channel between two rows of pins 47. Adjacent pins in each row are spaced apart a distance substantially less than the coin diameter to prevent a coin from leaving the channel. The two rows of pins are spaced relatively close together to prevent a coin from dropping freely down the channel between the rows and the pins in the two rows are staggered. Since the channel defined by pins positioned in this staggered manner is tortuous it follows that the coin bounces back and forth in a zigzag course between the pins until it strikes the lower edge of the bell and drops out through the exit opening 32 into the coin hopper 14 of Fig. 5. This irregular course of the dime considerably increases the time for the dime to travel from the upper edge to the lower edge of bell 31 and, therefore, insures that the two successive strikings of the bell will be correctly heard by the remote operator. These pins 47 may be of any suitable metal or may comprise metallic pins surrounded by bushings of rubber or other resilient material to further delay the passage of the coin through the channel.

A divisional application Serial No. 104,973, filed October 10, 1936, has been filed to protect the dime runway construction above described.

The washer rejector 20 for the nickel runway and the washer rejector 38 for the dime runway are similar in construction except for certain differences which will be explained later, due to the difference in the diameters of nickel and dime coins. The rejector 38 for the dime runway will be explained in connection with the rear view of Fig. 1 and the sectional views of Figs. 6 and 7. Adjustably mounted on the rear cover 15 of the chute is a plate 48 having an upturned edge 49 carrying a small bolt 50 which acts as a pivoting support for the freely rotatable star wheel 38.

The axis of wheel 38 is inclined to the horizontal and is substantially perpendicular to the plane of the straight portion 51 of bottom wall 37. The rear cover 15 of the chute has an elongated narrow slot 52 and there is a juxtaposed slot 53 in the center section 16 to permit the arms of the star wheel during rotation to extend transversely across the dime runway and slightly beyond since the tip of each arm enters slot 53 for a short distance as seen in Figs. 6 and 7.

Assume that a genuine dime 56 is deposited and that arm 54 is extending across the dime runway. The forward edge of the dime 56 will strike arm 54 and wheel 38 will rotate counter-clockwise until the adjacent arm 55 strikes the side of the coin at the approximate center of the coin whereupon the wheel is stopped and the wheel blocks further forward movement of the coin but allows the coin to drop freely through an opening between points 39 and 40 and continue on down the legitimate coin channel.

The action of the rejector 38 is quite different for a washer of the same diameter as the dime as shown by Fig. 7. Assume that a washer 57 is deposited and that arm 54 is extending across the dime runway. The forward edge of the washer will strike arm 54 and wheel 38 will rotate counter-clockwise. The angular separation between arms 54 and 55 is such that arm 55 as the washer moves forwardly will enter the center hole of the washer allowing the continued forward movement of the washer since the next arm 58 when it enters the runway will merely follow the rear edge of the washer. After passing the toothed wheel 38 and portion 60 35 of the center section 16 the washer will tend to roll along bottom wall 62 but center section 16 above wall 62 has a large opening 61, and the channel between section 16 and cover 15 at the far end 63 of opening 61 is blocked by a deflecting tab 64 formed from cover 15 and projecting through opening 61 adjacent edge 63 but not projecting far enough to enter the quarter channel between the center section 16 and the front section 65 (see Fig. 2). It follows, therefore, that the washer 57 after passing star wheel 38 will strike the deflector 64 and due to the lateral inclination of the coin chute will be deflected out through opening 61 and through opening 66 in the quarter runway and, therefore, be rejected without striking the signal gong 31. It may be noted that deflecting tab 64 prevents the discharged washer 57 from entering the five-cent runway.

An important feature of washer rejector 38 is that its arms such as arm 55 are long enough to extend fully across the dime runway and slightly beyond due to the narrow slot 53. If these arms did not project fully across the runway there would be danger that the chute would become blocked due to a thin slug getting jammed between a prong of the star wheel and the adjacent side wall. The distance between apex 40 and the axis of star wheel 38 should equal approximately the radius of a genuine coin. At the time a genuine coin is stopped by star wheel 38 the bottom edge of the coin is resting just to the right of apex 40 and with its forward movement stopped the coin then commences to drop between points 39 and 40. It is also preferable that a line drawn from the point 40 substantially at right angles to slope 51 or slope 62 should be in alignment with the axis of star wheel 38.

It will be noted that the lower end of bottom wall 34 in the first inclined portion of the dime

runway terminates in one pole of a straight bar magnet 36 to secure rejection of magnetic slugs that are not rejected by under-diameter reject opening 35. As shown in Fig. 1, the bar magnet 36 projects outwardly substantially perpendicular to the plane of plate 15 at least for a substantial distance although the remainder of the bar magnet may be bent in any suitable manner to avoid any apparatus on the adjacent coin collector base 70 of Fig. 5. The magnet may be held in any suitable manner as by a clamp 73 supported by upturned lugs formed from cover 15. The strength of magnet 36 should be such that a magnetic slug will pivot around the magnet against upper wall 71 and pass above the arms of star wheel 38 as shown by magnetic slug 72 and be ejected through opening 61 in the same manner as the washers.

The star wheel 20 in the nickel runway is of similar construction to the star wheel 38 of the dime runway except for a greater length for each of its six projecting arms to provide for the passage of a washer of the diameter of a nickel instead of a dime. It will be apparent that any deposited washer in the nickel chute will be passed by the star wheel 20, strike the retaining wall 62 and be rejected through opening 61 in the same manner as washers rejected from the dime runway. Washers rejected from the nickel runway will be prevented from returning to the nickel chute below opening 61 due to the deflecting tab 64 previously described.

The lower end of bottom wall 24 in the nickel runway terminates in a pole of a straight bar magnet 28 which for a substantial portion of its length projects away from the chute in a direction substantially perpendicular to cover 15 and is held by a suitable clamp 74 mounted on the cover 15. It will be apparent that magnetic slugs 40 will be diverted by magnet 28 and caused to fall between magnet 28 and projection 27, strike the retaining wall 75 and fall out of the chute through opening 76.

The nickel runway is also provided with means 45 for causing the rejection of lightweight slugs even though they are of the same diameter and thickness as a legitimate coin, as will be explained in connection with the sectional views shown in Figs. 8, 9 and 10. Mounted on the rear cover 15 of the chute is an adjustable mounting plate 80 which supports a pivoted lightweight slug rejecting member 26 having an arm 81 projecting through a narrow slot 82 in cover 15 across the runway and projecting slightly into a narrow slot 83 in the center section 16. As shown in Fig. 1 this swinging member 26 is pivoted for movement of its projecting arm 81 in a direction coinciding with the direction a legitimate coin takes in passing from bottom wall 24 across the gap 27, 28 and down between walls 29, 30; that is, the pivoting axis of member 26 is parallel to the surface of cover 15 and substantially at right angles to the path of coin travel at the point where the coin makes contact with finger 81. Most of the weight of member 26 is on the side of its pivoting axis 84 away from the coin chute, and member 26, due to gravity, normally takes the position shown in Fig. 8 with a projection 85 resting against the cover 15 below slot 82. This position maintains finger 81 directed straight across the runway, tending to block the passage of any coin which does not possess sufficient momentum to knock finger 81 clockwise out of the runway. Legitimate 75 nickel coins after leaving bottom wall 23 and re-

versing their direction along bottom wall 24 leave the end 28 of the bottom wall with a substantially constant velocity and the effective weight of member 26 is such that a legitimate coin such as coin 86 of Fig. 9 will have sufficient momentum to knock finger 81 out of the runway and continue on past finger 81 to the right of projection 27, Fig. 3, and on down between walls 29, 30. The maximum clockwise rotation of finger 81 is reached when lug 88 strikes cover 15.

A lightweight slug traversing the nickel runway such as slug 87, Fig. 10, will not possess the necessary momentum to knock finger 81 out of the coin passage and will be sufficiently retarded that it will not be able to pass to the right of projection 27 but will strike to the left of tip 27 and be rejected through opening 76 in the same manner as magnetic slugs previously described. Such a rejection of a lightweight slug is shown in Fig. 10. It will be apparent that projection 27 due to retarding action of finger 81 serves to divide the standard weight coins from lightweight slugs.

It is preferable that the width of the gap between magnet 28 and the adjacent edge of finger 81 in its normal position should be somewhat greater than the diameter of a standard nickel, so that lightweight discs which do not move finger 81 appreciably will have sufficient space to fall through to reach reject opening 76. It is also advisable that the gap between tip 27 and the adjacent lower edge of finger 81 should be somewhat greater than the diameter of a standard nickel in order to prevent an occasional rejection of a standard nickel which may not be moving fast enough to pass finger 81 before finger 81 returns into the chute after impact with the coin. With the distance between tip 27 and finger 81 greater than the coin diameter such a coin will still have room to pass below finger 81 and be accepted.

A divisional application Serial No. 104,972, filed October 10, 1936, has been filed to protect the light-weight slug rejector as disclosed in Figs. 8 to 10, inclusive.

Fig. 2 shows the front face, and Fig. 4 the rear face of the plate 65 which when placed against the front face of middle section 16 forms a quarter runway. A deposited quarter after leaving the coin gauge 12 (Fig. 5) enters the runway at the point 90 and after passing along bottom wall 91 encounters a washer rejector 92 of the star wheel type as illustrated in Figs. 6 and 7 except that the prongs are longer to accommodate a washer of the diameter of a quarter. The washer rejector 92 will not permit a genuine quarter to pass through it and hence the quarter will drop onto the bottom wall 93, pass the under-diameter reject opening 66, pass along curved end wall 94 and strike a lightweight coin rejector 95 which will be knocked out of the runway by the quarter to permit the quarter to strike a spiral gong 96 and continue through the final runway portion 97 into the coin hopper 14 of Fig. 5.

It will be obvious that washer rejector 92 will freely rotate when struck by a washer of the same diameter as a quarter and will cause the washer to be rejected from the chute. Rejector 92 is so positioned that during rotation each arm projects more than completely across the quarter runway, the tip of each arm entering a shallow groove or slot in the center section, for example, as illustrated in Figs. 6 and 7 for the dime washer rejector.

The pivoted lightweight slug rejector 95 for the quarter runway is of a construction similar to that described for the nickel runway except that it is somewhat heavier so as to distinguish properly between the weight of a legitimate quarter and a slug which is substantially lighter in weight. A lightweight slug will be slowed up enough by the finger 95 to cause the slug to drop to the right of the upper end of dividing wall 98 and hence will be ejected through opening 99 without striking the signaling device 96. The finger 95 projects more than completely across the quarter runway and partially enters a groove or slot in center section 16, substantially in the manner previously described for the corresponding member in the nickel channel.

Fig. 11 discloses an alternative form of the swinging member of Figs. 8 to 10 for rejecting lightweight coins or slugs as applied to the quarter runway of Fig. 4. Pivoted on a substantially horizontal axis at the point 110 and external to the quarter runway section 111 (corresponding to section 65 of Fig. 4) is a swinging member 112 having a right-angle tab 113 which enters the quarter runway through a slot 114 and projects completely across the runway to occupy substantially the same position as the coin impact portion of the rejecting member 95 of Fig. 4. When arm 113 is struck by a legitimate coin it is knocked out of the way and the coin proceeds down the acceptance chute between walls 115 and 116 but it will be obvious that a lightweight coin will be retarded sufficiently to cause its rejection through the reject opening 117.

It will, of course, be obvious that, if desired, a lightweight coin rejector similar to rejector 26 may be incorporated in the dime runway.

It will be noted that the washer rejectors 20, 38 and 92 and the coin weight testers 26 and 95 are supported by mounting plates which are adjustable to insure that they are properly located to give the desired selectivity while still preventing the rejection of genuine coins. While the star wheel washer rejector has been disclosed as having six prongs it is to be understood that a smaller or greater number of prongs will also be satisfactory, for example star wheels with four and five prongs have also been used; the greater the number of prongs the larger must be the diameter of the star wheel to insure that when one prong is being advanced by a washer the next prong will enter the center of the opening in the washer as the rotation of the wheel is continued.

What is claimed is:

1. A coin chute comprising a longitudinally inclined coin channel having top, bottom and side walls, said bottom wall having an aperture for discharging genuine coins and a rotatable toothed wheel mounted on one of said side walls and projecting transversely into said channel for causing legitimate coins to be diverted into said aperture while permitting a perforated slug to pass said aperture, the center of said wheel from the standpoint of the direction of coin travel being located substantially above the far end of said aperture.

2. A coin chute comprising a longitudinally inclined coin channel having top, bottom and side walls, said bottom wall having an aperture for discharging genuine coins and a pivoted sprocket

toothed wheel mounted for rotation with its teeth extending transversely into said channel and adapted to engage a perforated slug traversing said channel to prevent said slug from falling through said aperture while guiding a non-perforated coin into said aperture, the center of said wheel from the standpoint of the direction of coin travel being located substantially above the far end of said aperture.

3. A coin chute comprising a longitudinally inclined coin channel having top, bottom and side walls, said bottom wall having an aperture for discharging genuine coins, the effective width of said channel for coin travel being substantially constant in the region above said aperture to prevent any substantial lateral movement of either a genuine coin or a perforated slug traversing said channel, and a rotatable toothed wheel mounted on one of said side walls and projecting transversely into said channel for causing legitimate coins to be diverted through said aperture while freely permitting a perforated slug to pass said aperture, the center of said wheel from the standpoint of the direction of coin travel being located substantially above the far end of said aperture.

4. A coin chute comprising a longitudinally and laterally inclined coin channel having opposed side walls and a bottom wall, said bottom wall having an aperture for discharging genuine coins, the lower of said side walls having an elongated slot above said aperture and running substantially parallel to the path of coin travel, a rotatable star toothed wheel mounted on said lower side wall and projecting through said slot fully across said channel for causing legitimate coins to be diverted through said aperture while a perforated slug will be hooked by a tooth of said wheel and be prevented from entering aperture, the center of said wheel from the standpoint of the direction of coin travel being located substantially above the far end of said aperture.

5. A coin chute comprising a longitudinally and laterally inclined coin channel having opposed side walls and a bottom wall, said bottom wall having an aperture for discharging genuine coins, the lower of said side walls having an elongated slot above said aperture and running substantially parallel to the path of coin travel, a rotatable sprocket toothed wheel mounted on said lower side wall and projecting through said slot fully across said channel, the upper side wall opposite said wheel preventing a legitimate coin from being laterally deflected by said wheel whereby a legitimate coin blocks the rotation of said wheel and is caused to drop through said aperture, said wheel hooking a perforated slug and preventing said slug from dropping through said aperture, the center of said wheel from the standpoint of the direction of coin travel being located substantially above the far end of said aperture.

6. A coin chute in accordance with claim 5 in which the far end of said aperture is defined by a bottom wall portion which is substantially lower than if said wall portion were placed in a continuation of the plane of said bottom wall immediately preceding said aperture.