

April 7, 1942.

F. A. HOYT

2,278,930

COIN CHUTE

Filed Nov. 26, 1940

3 Sheets-Sheet 1

FIG. 1

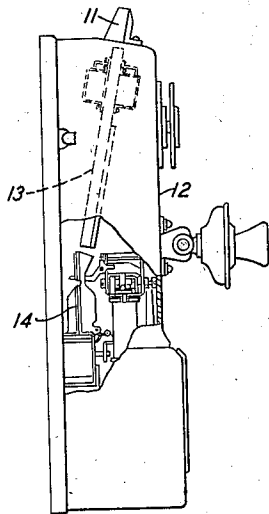


FIG. 2

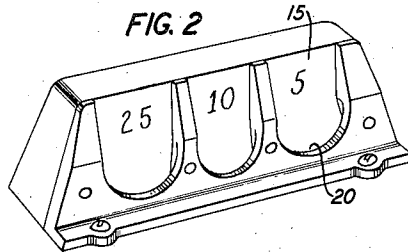


FIG. 3

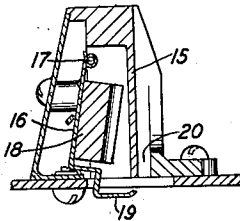


FIG. 4

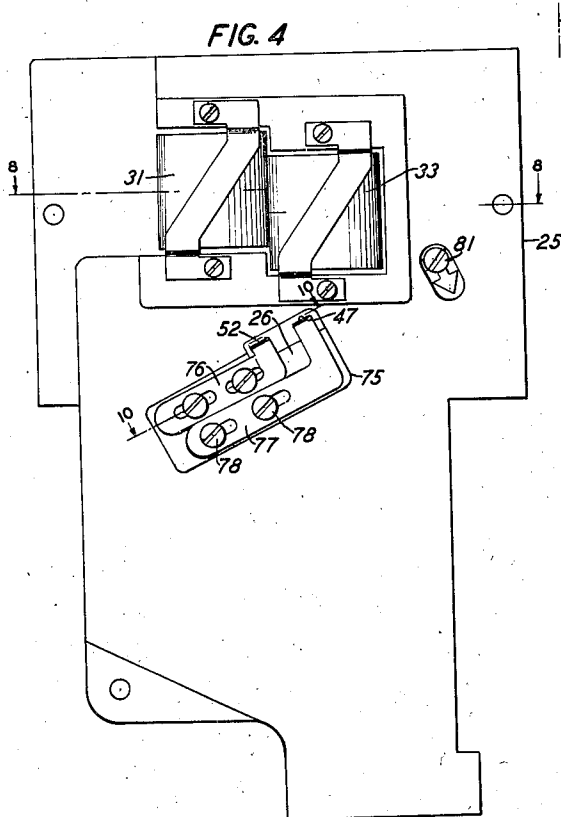
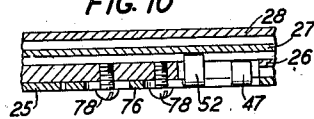


FIG. 10



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FIG. 6

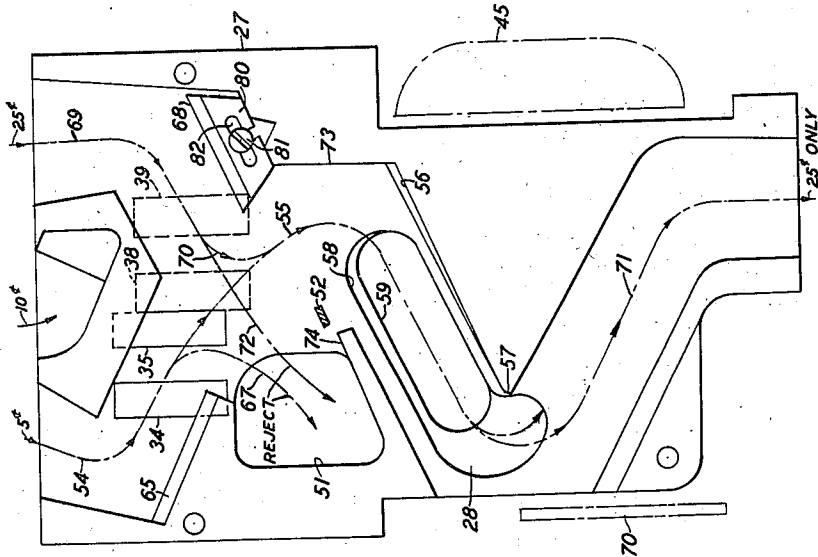
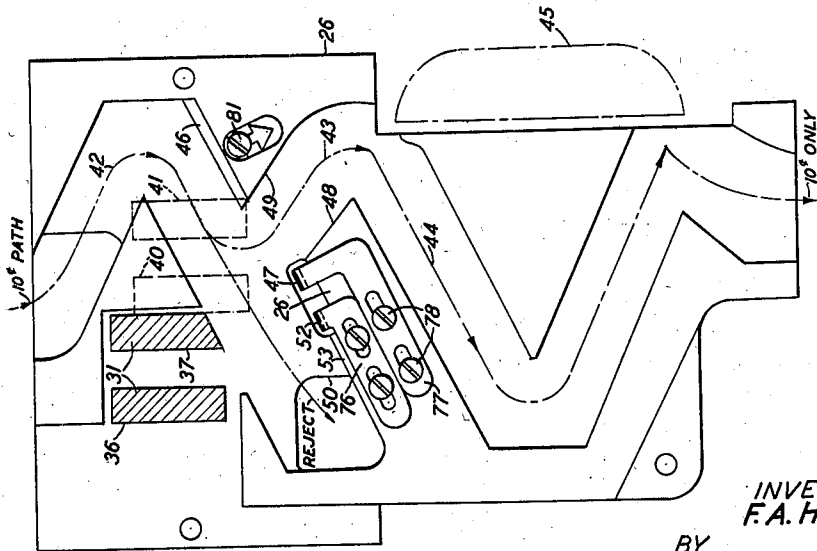


FIG. 5



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2,278,930

COIN CHUTE

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Application November 26, 1940, Serial No. 367,199

7 Claims. (Cl. 194—101)

This invention relates to coin chutes particularly for telephone coin collectors and has for an object the provision of means for ejecting from the chute non-standard checks or slugs.

In telephone coin collectors as exemplified by the disclosure in the O. F. Forsberg U. S. Patent 1,043,219, issued November 5, 1912, it is customary for the subscriber to tentatively deposit a coin when a telephone connection is desired, which coin is subsequently collected or refunded depending upon conditions occurring after deposit. The usual collector contains a multiple coin chute for receiving coins of various denominations and for guiding the coins first to a suitable sound signal and then to a coin hopper where they are temporarily held for subsequent collection or refund.

This invention is primarily concerned with the rejection from the chute of slugs whose electrical resistance is substantially different from that of a standard coin. In the specific embodiment disclosed in the attached drawings the invention is illustrated as applied to the rejection from the nickel runway of slugs of lower electrical resistance than a standard nickel, and to the rejection from the twenty-five cent runway of slugs of higher electrical resistance than a standard quarter. In order to obtain this result the chute assembly contains a chamber into which nickels and quarters are laterally projected in opposite directions after traversing the field of a separate eddy-current magnet for controlling their speed of projection in accordance with their electrical resistance. The bottom portion of this chamber contains two coin outlets, one leading to a reject channel and the other leading to an acceptance channel, with the first outlet adjacent the point where the nickel enters the chamber and with the second outlet adjacent the point where the quarter enters the chamber. The speed of projection of a standard nickel is preferably such that the coin leaps over the first outlet and into the second outlet while the speed of a quarter is retarded sufficiently by its eddy-current magnet to divert the quarter into the second outlet. With such an adjustment of the strength of the two eddy-current magnets relative to the two outlets it will be apparent that a nickel slug of substantially lower electrical resistance than a standard nickel will be retarded sufficiently more than the standard coin to cause the slug to be diverted into the first outlet while a twenty-five-cent slug of higher electrical resistance than a standard quarter will have sufficiently greater speed than the standard coin to leap over the second outlet and into the first outlet.

Such an arrangement diverts standard quarters and nickels into the same channel wherein they must be separated to enable a deposited quarter to strike a different sound signal from a

deposited nickel. One of the walls of this acceptance channel preferably contains an elongated opening so related to the channel that a deposited nickel will fall therethrough into a nickel channel leading to the nickel signaling device while a deposited quarter being of greater diameter will continue on past this opening to engage the quarter signaling device.

Referring to the drawings,

Fig. 1 discloses a telephone coin collector embodying the coin chute of this invention;

Fig. 2 is a front view of a multiple coin gauge adapted to be mounted on top of the collector housing of Fig. 1;

Fig. 3 is a sectional view of the coin gauge of Fig. 2;

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

Fig. 5 is a front view of the dime channel plate with the cover plate removed;

Fig. 6 is a front view of the combined nickel and quarter channel plate;

Fig. 7 is a front view of the lower portion of the nickel channel plate;

Fig. 8 is a sectional view of the chute assembly taken along the line 8—8 of Fig. 4;

Fig. 9 is an edge-on view of the chute assembly taken in the direction indicated by the arrows 9—9 of Fig. 4;

Fig. 10 represents a sectional view of the chute assembly taken along the plane indicated by the line 10—10 of Fig. 4; and

Fig. 11 is a sectional view of the quarter and nickel channels taken along the line 11—11 of Fig. 7.

For illustrative purposes the telephone coin collector shown in Fig. 1 may be assumed to be of substantially the same general type of prepay telephone coin collector as shown in the O. F. Forsberg U. S. Patent 1,043,219 in which a legitimate coin such as a nickel, dime or quarter after deposit in a coin gauge 11 mounted on top of the upper housing 12 is selectively directed into the proper channel of a laterally inclined coin chute assembly 13 for actuating a sound signal before reaching a coin hopper 14 where the deposited coin is held in suspense for subsequent collection or refund depending upon conditions occurring after deposit.

The present invention is primarily concerned with the rejection of non-standard slugs from the coin chute where their rejection is secured by means of eddy-current magnets which are used to discriminate against slugs having an electrical resistance substantially different from that of a standard coin. The eddy-current magnets used for this purpose are generally of such strength as to hold in the chute any slug of magnetic material which enters the fields of these magnets so that it is desirable to provide means for preventing magnetic slugs from reaching the coin chan-

nel sections adjacent the eddy-current magnets.

In order to conserve space within the upper housing 12 it is preferable to make the magnetic slug rejector a part of the multiple coin gauge 11 mounted on top of the housing 12. One form of the magnetic slug rejector may take is disclosed in my copending application Serial No. 363,237, filed October 29, 1940, and is also shown in Figs. 2 and 3 of the present drawings. A sectional view of the coin gauge 11 is shown in Fig. 3 where the sectional view may be assumed to be taken at the center of either the nickel, dime or quarter openings in the coin gauge shown in the front view of the gauge of Fig. 2. For illustrative purposes it may be assumed that Fig. 3 is a sectional view along the center of the nickel opening in the coin gauge 11. Behind the rear wall 15 of the nickel coin slot is a chamber containing a pivoted member 16 mounted for rotation about a pin 17 and carrying a U-shaped permanent magnet 18. When a magnetic slug is deposited in the coin slot the mutual attraction between the slug and the magnet will attract the magnet 18 towards the slug until the magnet is stopped in its forward movement by wall 15 and this advance of the magnet causes a lateral arm 19 on member 16 to move forward from its normal position of Fig. 3 to an advanced position blocking the bottom opening of the coin runway 20 so that arm 19 acts as a barrier to the entrance of the magnetic slug into the coin chute 13, and hence the magnetic slug will have to be manually removed from the coin gauge before a legitimate coin may be deposited. It further may be assumed that gauge 11 has a similar pivoted magnet of the above description for each of the nickel, dime and quarter coin slots so as to provide a barrier against the entrance into the housing of any slug containing magnetic material.

The coin chute assembly, a rear view of which is shown in Fig. 4 and an end view of which is shown in Fig. 9, comprises a cover plate 25, a dime channel plate 26, a combined nickel and quarter channel plate 27 and a nickel channel plate 28. The dime channel plate 26 is shown in Fig. 5 with the cover plate removed; the nickel and quarter channel plate 27 is shown in Fig. 6 with plates 25 and 26 removed; and the nickel channel plate 28 is shown in Fig. 7 with plates 25 and 26 removed, while still retaining a portion of plate 27.

Near the upper portion of the chute assembly are four eddy-current magnets, magnets 30 and 31 being for the nickel runway and magnets 32 and 33 being for the dime and quarter runways. The magnet 30 is suitably mounted on plate 27 at a point above the upper end of the nickel plate 28 with the magnet passing into apertures 34, 35 to enable the pole faces of the magnet to lie flush with the front face of plate 27. The other nickel eddy-current magnet 31 is suitably mounted on cover plate 25 and the magnet passes into apertures 36, 37 in the dime plate 26 to have its pole faces flush with the rear face of plate 26 as viewed in Fig. 8. The dime and quarter eddy-current magnet 32 is suitably mounted on plate 27 with its pole faces resting against the rear face of plate 27 as shown in Fig. 8. In Fig. 6 it may be assumed that the dotted rectangles 38, 39 represent the two ends of magnet 32. The other dime and quarter eddy-current magnet 33 is suitably mounted on the cover plate 25 with the pole faces of the magnet flush with the outer face of cover plate 25 as shown in Fig. 8. The

relative positions of the two eddy-current magnets for the dime and quarter runways are, therefore, indicated by the rectangles 38, 39 of Fig. 6 or rectangles 40, 41 of Fig. 5, while the relative positions of the eddy-current magnets for the nickel runway are indicated by the apertures 34, 35 of Fig. 6.

The complete dime runway is shown in Fig. 5 where a deposited dime after leaving the coin gauge 11 drops into a coin channel between cover plate 25 and the dime plate 26 to follow a path indicated generally by arrows 42, 43 and 44 to strike the upper and lower edges of bell 45 before dropping into the coin hopper 14. A deposited dime in rolling down the longitudinally inclined ledge 46 passes between the eddy-current magnets 32, 33 near the lower end of this ledge; and the strength of magnets 32, 33 is preferably such as to slow up the speed of the deposited dime so that its projected velocity upon leaving the lower end of ledge 46 is insufficient to enable the coin to leap over the dividing point 47 so that the dime drops downwardly between dividing point 47 and ledge 46 to follow the legitimate coin channel defined by guide rails 48, 49 whereby the standard dime follows the path indicated by arrows 43, 44. On the other hand, a deposited ten-cent slug of substantially higher electrical resistance than a standard dime will not be appreciably slowed up when passing through the fields of magnets 32, 33 but will be projected with sufficient velocity to leap over dividing point 47 and be directed out of the chute assembly by falling through opening 50 in plate 26 and opening 51 in plate 27. In the rejection of such a slug the lower edge of the slug rides on tabs 47 and 52, and ledge 53 to reach the reject opening 50.

The combined nickel and quarter channel plate 27 is disclosed in Fig. 6. A deposited nickel after passing through coin gauge 11 drops between plates 26, 27 to follow a coin channel indicated by arrows 54, 55, after which the bottom edge of the coin rolls down the longitudinally inclined coin track 56 of plate 27. Plate 27 above track 56 has an elongated opening 58 which serves to divert a nickel into a separate nickel runway lying between plate 28 of Fig. 7 and the rear face of plate 27 of Fig. 6. As the bottom edge of a nickel rolls down track 56 the upper edge of the nickel drops through opening 58 and is supported by plate 28 as shown by nickel 60 in Fig. 11. When the bottom edge of the nickel reaches the lower end 57, the nickel passes completely into the nickel channel between plates 27, 28 to follow the path indicated by arrow 61, Fig. 7, to strike the lower edge of bell 45 after which the coin drops into hopper 14. It will be understood, however, that a standard quarter, being of larger diameter than a nickel, will not enter opening 58. It will also be noted that plate 28 has the usual underdiameter reject opening 59 for rejecting from the chute assembly any slug of smaller diameter than a nickel.

It will be noted that in the upper portion of the nickel runway a deposited nickel rolls down along a longitudinally inclined ledge 65 to pass between the poles of eddy-current magnets 30, 31 and to be projected from the lower end of ledge 65 with sufficient speed to pass to the right of the dividing point 52 as indicated by arrow 55 to follow the legitimate coin channel previously described. On the other hand, a nickel slug having a substantially lower electrical resistance than a standard nickel in traversing the field of

eddy-current magnets 30, 31 will be retarded to a greater extent than a standard coin and hence will be unable to leap over the dividing point 52 but will be deflected to the left to follow a path indicated by arrow 67 of Fig. 6 whereby such a slug is rejected through said wall opening 51.

A deposited quarter after dropping through the coin gauge 11 will enter a coin channel between plates 26 and 27 and will roll down a longitudinally inclined ledge 68 for projection through the fields of the eddy-current magnets 32, 33. Since a silver coin has a relatively high electrical conductivity it follows that the deposited quarter will be substantially retarded upon entering the fields of the eddy-current magnets 32, 33 and the fields of these magnets are preferably of such strength that the quarter will have insufficient speed of trajectory to leap over dividing point 52 but instead will follow the path indicated generally by arrows 69, 70 and 55. A standard quarter, being of a greater diameter than a nickel, will not be diverted through the nickel opening 58 but will continue past opening 58 to strike the quarter gong signal 70 and then follow the path indicated by arrow 71 for discharge into the coin hopper 14.

On the other hand, if a quarter slug of substantially higher electrical resistance than a legitimate quarter is deposited in the quarter runway, such a slug will not be retarded to any substantial extent by eddy-current magnets 32, 33 but will be projected from ledge 68 with sufficient lateral velocity to leap over dividing point 52 for rejection through opening 51 as indicated by arrow 72 of Fig. 6.

As a summary of the foregoing description of Figs. 6 and 7, a genuine nickel will be projected from ledge 65 with sufficient velocity to pass into the acceptance channel lying between dividing point 52 and ledge 73 while a standard quarter upon leaving ledge 68 will be retarded sufficiently to cause the coin to be diverted into the same acceptance channel between dividing point 52 and ledge 73; a nickel slug of lower electrical resistance than a standard nickel will be diverted into the reject channel lying between dividing point 52 and the lower end of ledge 65 where ledge 74 prevents the rejected slug from entering the section of the acceptance channel containing opening 58; and a quarter slug of higher electrical resistance than a standard quarter will leap across the acceptance channel into said reject channel and out through opening 51.

The dividing points 47 and 52 will now be described in further detail. As shown in Fig. 4, the cover plate 25 has an enlarged aperture 75 to permit the mounting on the dime channel plate 26 of two metal strips 76, 77, each strip being held in an adjusted position by screws such as screw 78, which pass through elongated apertures in the strips. Strip 76 has a lug 52 (see Fig. 10) which projects laterally across the space between cover plate 25 and the dime channel plate 26 and across the space between the dime plate 26 and the nickel-quarter plate 27 to abut against the inner face of plate 27 to serve as shown on Fig. 6 as a dividing point between the reject channel leading to opening 51 and the acceptance channel including the coin track 56. Similarly, strip 77 has a lug 47 which projects laterally across the space between the cover plate 25 and the dime plate 26 to serve as a dividing point between the reject channel leading to opening 50 and the acceptance channel indicated by arrows 43, 44 on Fig. 5.

As shown on Fig. 6, the coin supporting ledge 68 constitutes a part of a separate member 80 mounted on plate 27 by a screw 81 which passes through a slot 82 in member 80.

In adjusting the device for maximum discrimination against dime slugs having a somewhat higher electrical resistance than a standard dime, lug 47 should be adjusted to such a position that a standard dime will just fail to pass over lug 47 into the reject channel leading to opening 50. In order to obtain maximum discrimination against slugs having a somewhat lower electrical resistance than a standard nickel, metal strips 76 should be adjusted to such a position that a standard nickel coin will just be able to pass over lug 52 into the acceptance channel 52-73; and with lug 52 in this optimum position for the acceptance of nickel coins the ledge 68 should be adjusted to such a position as to just prevent a standard quarter coin from being able to pass over lug 52 into the reject channel leading to opening 51.

In the preferred embodiment of the invention all parts of the chute assembly are of non-magnetic material with the exception of the four eddy-current magnets 30, 31, 32, 33.

It will be understood that this invention is capable of other embodiments commensurate with the scope of the appended claims.

What is claimed is:

1. A substantially vertically arranged coin chute assembly comprising a chamber having an upper portion and a lower portion, an upwardly extending partition for dividing said lower portion into a first coin passage and a second coin passage, a downwardly inclined coin channel terminating above said first coin passage and at one side of said chamber for laterally projecting a deposited coin of a first denomination into said upper portion, a second downwardly inclined coin channel terminating above said second coin passage and at the opposite side of said chamber for laterally projecting a deposited coin of a second denomination into said upper portion in a direction opposite to that in which a coin of said first denomination is projected and magnetic means associated with each of said coin channels for controlling the projected speed of a deposited coin or slug in accordance with its electrical conductivity.

2. A coin chute comprising a chamber, a first coin outlet and a second coin outlet spaced from each other in the bottom of said chamber, means for projecting a coin element of a given diameter into said chamber along a trajectory determined by its electrical resistance whereby a standard coin of said diameter will be directed into said second outlet and a slug of said diameter but of lower electrical resistance than said standard will be diverted into said first outlet, means for projecting a coin element of a different diameter into said chamber along a trajectory determined by its electrical resistance whereby a standard coin of said different diameter will be diverted into said second outlet while a slug of higher electrical resistance than said different diameter standard will be diverted into said first outlet, and a coin channel for receiving coins from said second outlet.

3. In a coin chute, a chamber, a partition for separating the lower portion of said chamber into two substantially parallel coin passages, a downwardly inclined coin channel terminating adjacent one of said passages and at one side of said chamber for projecting a coin of one diame-

ter across said chamber in one direction, a second downwardly inclined coin channel terminating adjacent the second of said passages and at the opposite side of said chamber from said first channel for projecting coins of a second diameter across said chamber in the opposite direction, magnetic means associated with said first coin channel for controlling the coin speed whereby a standard coin upon leaving said first channel will leap over said partition into said second coin passage, magnetic means associated with said second coin channel for controlling the coin speed whereby a standard coin of said second diameter will be diverted into said second coin passage, a third coin channel leading from said second coin passage, said third channel comprising spaced plates laterally inclined, the lower of said plates having an elongated opening for diverting out of said third channel standard coins of the smaller diameter while retaining in said third channel coins of the larger diameter, and a fourth coin channel for receiving coins discharged from said third channel through said opening.

4. A substantially vertically arranged coin chute assembly adapted to receive a coin of one denomination, a slug comparable in size to said first denomination but of lower electrical resistance, a coin of a second denomination and a slug comparable in size to said second denomination but of higher electrical resistance, said assembly comprising a chamber having an upper portion and a lower portion, a partition for dividing said lower portion into a first coin passage and a second coin passage, coin channel means terminating above said first passage for projecting said one denomination coin into the upper portion of said chamber with sufficient lateral velocity to pass over said partition into said second passage, magnetic means associated with said coin channel means for retarding the speed of said first-mentioned slug sufficiently to divert such slug into said first passage, a second coin channel means terminating above said second passage for projecting said second-mentioned slug with sufficient lateral velocity to pass over said partition into said first passage, and magnetic means associated with said second coin channel means for retarding the speed of a second denomination coin sufficiently to divert such coin into said second passage.

5. A substantially vertically arranged coin chute assembly comprising a chamber having an upper portion and a lower portion, a partition dividing said lower portion into a first coin passage and a second coin passage, both of said passages being downwardly directed whereby coins projecting into said upper portion will fall into one or the other of said passages, a longitudinally inclined coin channel leading into the upper portion of said chamber above said first passage and adapted to project a coin of a first denomination into said chamber with sufficient lateral velocity to pass over said partition into said second passage, magnetic means for retarding the speed of projection from said channel of a slug having a substantially lower electrical resistance than a coin of said first denomination to an extent sufficient to divert such a slug into said first passage, a second longitudinally inclined coin channel leading into the upper portion of said chamber above said second passage,

said second channel being adapted to receive coins of a second denomination and having such a configuration as to project into said first coin passage a slug having a higher electrical resistance than a standard coin of said second denomination, and magnetic means for retarding the speed of projection from said second channel of a standard coin of said second denomination to an extent sufficient to divert such standard coin into said second passage.

6. A coin channel comprising substantially parallel front and rear walls spaced from each other but laterally inclined from the horizontal, a chamber between said walls, a partition dividing the lower portion of said chamber into a first downwardly directed coin passage and a second downwardly directed coin passage whereby coins or slugs projected into said chamber will fall into one of said passages, a coin channel between said walls for receiving a deposited coin of one denomination, means forming a part of said channel for projecting a coin of said one denomination into the portion of said chamber above said first passage with sufficient lateral velocity to pass over said partition into said second passage, magnetic means acting on slugs of lower electrical resistance than a coin of said first denomination for retarding their speed of projection into said chamber whereby such slugs are diverted into said first passage, a second coin channel for a coin of a second denomination but adapted also to receive slugs of higher electrical resistance than said second denomination coin, means forming a part of said second channel for projecting said higher resistance slug into a portion of said chamber above said second passage and with sufficient lateral velocity to pass over said partition into said first passage, and magnetic means acting on deposited coins of said second denomination for retarding their speed of projection into said chamber whereby such coins are diverted into said second passage.

7. In a coin chute, a chamber, a first downwardly inclined coin channel for directing coins of one denomination into said chamber, a second downwardly inclined coin channel for directing coins of a second denomination into said chamber, a reject opening adjacent the termination of said first coin channel, an acceptance channel having a coin entrance adjacent the termination of said second coin channel, magnetic means adjacent the termination of said first channel creating a magnetic field of such strength as to permit a deposited coin of said first denomination to be projected into said chamber with sufficient velocity to pass over said reject opening and to enter said acceptance channel while diverting into said reject opening slugs of lower electrical resistance than a standard coin of said first denomination, and magnetic means adjacent the termination of said second channel of such strength as to divert into said acceptance channel a standard coin of said second denomination while permitting a slug in said second channel of higher electrical resistance than said second denomination coin to be projected with sufficient speed to pass over said acceptance channel and enter said reject opening.

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