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COIN AND SLUG DETECTOR

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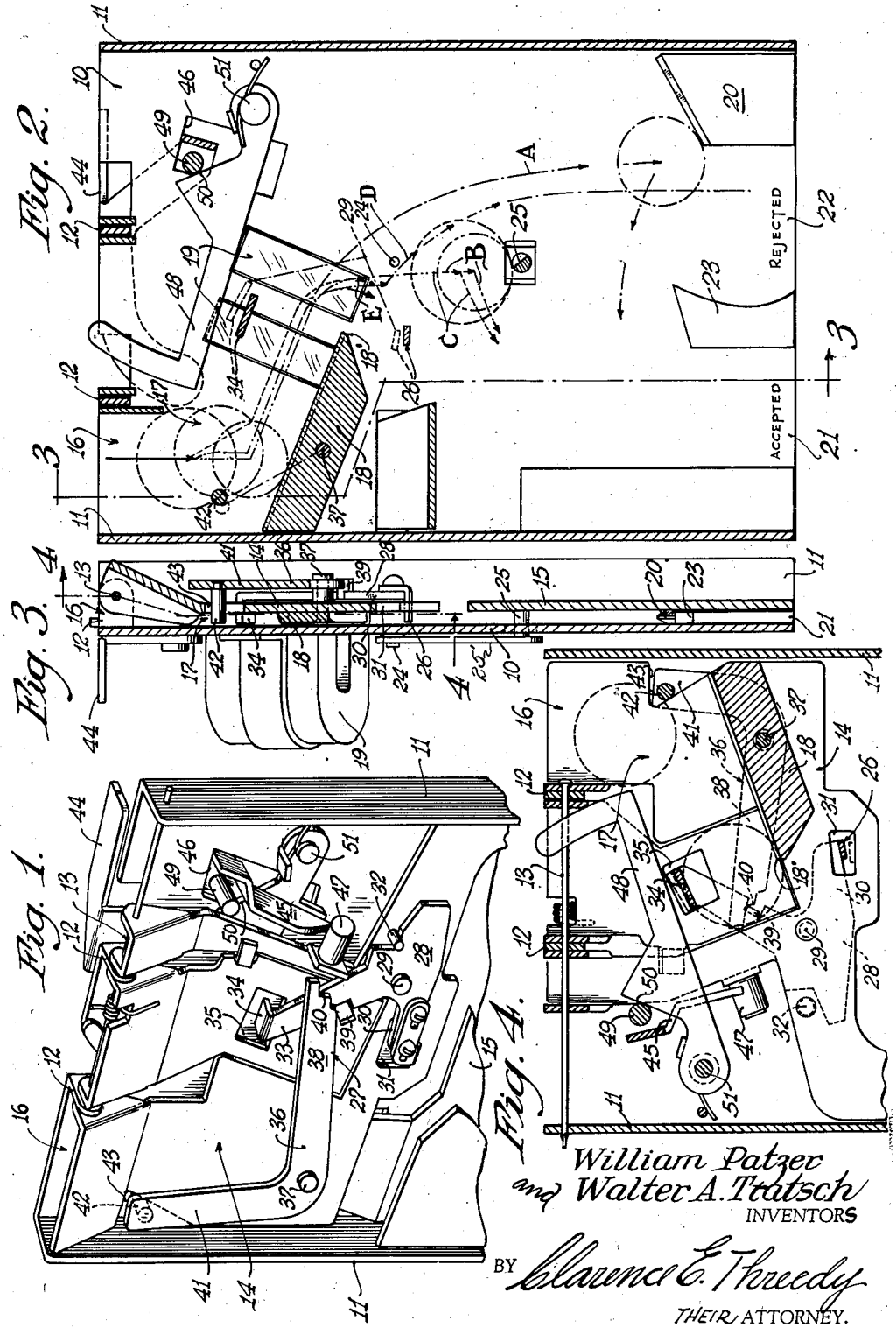


Fig. 2.

Fig. 3.

Fig. 1.

Fig. 4.

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COIN AND SLUG DETECTOR

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6 Claims. (Cl. 194—100)

This invention relates to coin testing devices and has for its principal object the provision of a gravity type chute which is adapted to test a plurality of denominations of coins, slugs and tokens to segregate the spurious from the valid, that is, particularly five, ten and twenty-five cent coins.

Another object of this invention resides in the provision of means for ejecting or deflecting spurious coin elements away from the acceptance opening.

A still further object of the invention resides in the provision of an adjustable deflector ledge which is adapted under normal conditions to extend into the path of large size coins for the purpose of deflecting spurious coins of a smaller diameter toward the reject opening and is further arranged with mechanism which is adapted to detect coins of a larger size passing through said chute so as to move said adjustable ledge to permit passage of valid pieces of such larger size along a normal path toward an acceptance opening and deflect certain spurious pieces from said acceptance passage.

Other objects will appear hereinafter.

The invention consists in the novel combination and arrangement of parts to be hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawing showing the preferred form of construction, and in which:

Fig. 1 is a fragmentary perspective view of the upper portion of the coin chute showing the adjustable ledge operating means associated therewith;

Fig. 2 is a vertical sectional view through the coin chute and illustrating the trajectories of the pieces as they pass therethrough;

Fig. 3 is a vertical sectional view as seen from line 3—3 in Fig. 2; and

Fig. 4 is a vertical sectional view showing the inner face of the gate means of Fig. 1 substantially as seen along line 4—4 of Fig. 3.

The embodiment of the improved chute includes a main plate 10 having opposite vertical edge portions struck at right angles thereto to provide side flanges 11 and having mounting pintle means 12 in the form of ears struck from the back plate to provide a pivotal support 13 for a front wall in the form of a gate means 14, there being further provided a stationary plate 15 in alignment with said gate 14 beneath the latter for guiding the coins in their gravitation through the chute.

The arrangement is such as to provide an entrance opening 16 into which coins and the like are adapted to be inserted for gravitation into a coin passage 17, to be guided along an inclined runway 18 carried by the gate 14, through a magnetic field provided by the magnetic flux lines of a cobalt magnet 19 carried by the plate 10. The coins or tokens passing through the magnetic field provided as aforesaid are affected in their movement along the ledge to leave the end portion 18' of the ledge in different trajectories. The ordinary U. S. five cent piece or "nickel" follows a trajectory indicated at A, for rebound from an anvil 20 at the right-hand of the lower edge of the chute as seen in Fig. 2, into an acceptance opening 21. A reject opening 22 is provided adjacent the rebound anvil 20 and is divided from the acceptance opening by a partition 23, it being apparent that such coins as fail to strike the anvil with sufficient force to rebound over the partition 23, will pass into the reject opening and be returned by means (not shown) to the person who has deposited the same.

There is provided in the passage of the coin chute between the ledge 18' of the runway 18 and the lower edge of the chute, a deflector pin 25 carried by an arm 25' in turn pendently supported as at 24 to the back face of the plate 10. The deflector pin 25 is adapted to be engaged by coins of the denomination of the U. S. ten cent piece or "dime" and the U. S. twenty-five cent piece or "quarter." By reason of the characteristics of dimes and quarters, coins of this type are affected by the magnetic field of the magnet 19 in such a manner to follow a trajectory substantially straight down from the ledge 18' of the runway 18 to engage the deflector 25, with their centers of gravity slightly to the left of the deflector 25 as seen in Fig. 2, so that the dime will follow trajectory B and the quarter the trajectory C and be directed into the acceptance opening 21.

Coins or tokens of a spurious character which are affected slightly less than the dimes and quarters by the flux lines of the magnetic means 19, will drop with sufficient speed with their centers of gravity to the right of the deflector 25 (as seen in Fig. 2) for gravitation into the rejection opening 22.

In the use of coin chutes of the character herein described, it has been found that spurious pieces, particularly having the magnetic qualities of copper and/or aluminum, have been slowed up considerably more than the legitimate dime or quarter at the ledge 18' by reason of the

magnetic forces across the passage thereabove.

By reason of such retarded movement of these copper or aluminum slugs, the latter, when leaving the ledge 18', rotate about the same and do not begin to fall therefrom until the center of gravity of such pieces has passed a plane extending substantially horizontally from the ledge 18'. It is therefore obvious that such spurious pieces would ordinarily be deflected to the left of the testing deflector 25 and thereby pass into the acceptance opening 21.

To overcome the foregoing objectionable acceptance of spurious pieces made of copper and/or aluminum, there is provided an automatically adjustable deflector ledge 26 now to be described.

The deflector ledge 26 is operatively associated with an automatically operated lever mechanism 27 which comprises a lever 28 pivotally mounted on gate 14 of the chute as at 29. The deflector ledge 26 is carried by and formed as a part of a horizontal portion 30 of the lever 28 and extends through an opening 31 in the wall 14 of the chute and is disposed at a point adjacent the ledge 18' of the runway 18 substantially beneath the same. The deflector ledge 26 is normally disposed in the position shown in full lines in Figs. 1 and 2 by reason of the lever 28, when in normal position, engaging the stop pin 32 fixedly mounted on the gate 14 of the chute. The lever 28 is provided with an arm 33 which extends obliquely from the pivotal mounting 29 and which arm 33 is provided with a lateral extension 34 adapted to extend through an opening 35 formed in the gate 14.

The lateral extension 34 extends into the passage provided above the runway 18 and is adapted to be engaged under certain circumstances by coins gravitating down the runway 18 as they pass through the flux lines provided by the magnet 19. The automatically operated lever mechanism 27 further includes a second lever 36 pivotally mounted as at 37 on the gate means 14 of the chute and this lever 36 has a laterally extending arm 38 which normally rests upon a lug 39 struck out from the arm 33 of the lever 28 to be disposed beneath the arm 38 of the lever 36.

By reason of the multiplicity of coins, that is, the different denominations, which the chute is adapted to receive and test, the valid twenty-five cent piece or quarter requires an unobstructed passage along the trajectory C toward the testing deflector 25. However, if a fixed ledge were employed, the deflector ledge 26 would be disposed in a position to be engaged by the periphery of oncoming valid twenty-five cent pieces as such pieces move along the trajectory C and such coins would be obstructed from movement toward the testing deflector 25 and be cast out through the reject opening 22. The ledge 26 is therefore made movable so as to assume a detecting position (Figs. 1 and 2) when coins of five and ten cent size are deposited in the entrance 16; whereas the ledge 26 will be withdrawn from such detecting position (into the dotted line position, Fig. 2) when coins of the dimension of a twenty-five cent piece are deposited in the entrance 16.

When a coin, check or token of the diameter of a twenty-five cent piece is deposited in the entrance 16, it gravitates along the runway 18 and in cam-like action engages the lateral extension 34 of the arm 33 to raise the same into dotted line position as seen in Fig. 2, whereupon the lug 39 of the lever 28 will pass from beneath the arm 38 on lever 36 and engage in a notch 40 provided at the end of the arm 38 for latching engagement with the lever 28 as shown in dotted lines in Fig. 4, whereupon the deflector ledge 26 will rotate with the lever 28 into the position shown in dotted lines in Fig. 2, out of the path of a valid twenty-five cent piece following the normal trajectory C for deflection into the acceptance opening by the testing deflector 25.

Should the coin deposited have a diameter of a twenty-five cent piece but the metallic characteristic different therefrom, such as copper or aluminum, so as to be affected to a greater extent by the eddy currents due to the magnet 19, the center of gravity of such spurious pieces would scribe a radius substantially indicated at E, causing the periphery of such pieces to engage the ledge 26 in its raised position and be deflected therefrom to the right-hand side of the testing deflector 25 for gravitation into the reject opening 22 along the trajectory D.

The lever 36 is provided with a vertically extending arm 41 which carries at its upper end a trip pin 42 extending laterally through an opening 43 formed in the gate means 14. The trip pin 42 extends into the passage 17 beneath the entrance 16 of the chute. Upon each deposit of a coin into the entrance 16 of the chute, such coin, regardless of size or denomination, will strike the trip pin 42, and the force of such striking action by the coin will cause the lever 36 to be pivoted counterclockwise as seen in Fig. 1 (clockwise, Fig. 4), to raise the notched end portion 40 of the lever 36 out of latching engagement with the lug 39 of the lever 28 to permit the latter to rotate, by gravity, anti-clockwise Fig. 1, by reason of the greater portion of its weight being to the left of the pivot mounting 29. Upon such rotative movement the lever 28 will assume a position against the stop pin 32 which for the purpose of clarity will be considered its normal position. It is therefore apparent that upon the entrance of a coin into the chute for gravitation down the runway 18, the automatically operable lever mechanism is reset into a normal position, and should the last coin deposited be of a diameter smaller than a twenty-five cent piece, the deflector ledge 26 will remain at its normal position as seen in Fig. 2. Should the last coin deposited be of a diameter of a valid five cent piece or nickel, but of a metallic quality which is affected to a greater extent by the flux lines of the magnet 19, such piece, instead of following the trajectory A, would scribe a radius about the ledge 18', engage the deflector ledge 26 which is normally extended substantially to the right of a vertical line struck down from the ledge 18', to be deflected to the right of the testing deflector 25 for passage into the rejection opening 22.

It is to be noted that where the deflector ledge 26 under all conditions is disposed in a position to permit a twenty-five cent piece to fall along the trajectory C, such position would be ineffective to cast out spurious pieces of a metallic quality affected by the magnet 19 to a greater extent than valid coins and that by reason of the automatically operable lever mechanism with which the ledge 26 is associated, the ledge 26 assumes a position to meet the requirement of a means for casting off spurious pieces in accordance with the particular denomination passing through the testing means as determined by the diametrical dimensions of coins deposited.

In the particular illustration disclosed, there is associated with the coin chute a gate means 14 which normally provides a front wall for the

chute. This gate means is pivotally mounted at 13 and operable by lever mechanism 44 having a cam portion 45 thereof extending through an opening 46 formed in the plate 10 to cooperate with a roller means 47 carried by the gate 14 to swing the gate on its pivot counterclockwise as seen in Fig. 3, when the lever 44 is depressed.

Such operation of the gate means comprises a scavenger whereby the passage 17 is cleared of any foreign matter which may be deposited in the same, the construction of such scavenging means being so arranged as to effect simultaneous operation of a sweep arm 48 operable by engagement of a roller 49 carried by the lever 44 and engaging cam 50 formed on the sweep 48 to rotate the sweep 48 at its pivot mounting 51 on the plate 10 upon each depression of the lever 44.

The construction and arrangement of parts just described constitute improvements particularly described and claimed in our Patent No. 2,249,225.

Operation

Having thus described the structural characteristics of our new device, a brief description of operation is related to facilitate a better understanding of the invention.

Assuming the parts to be in normal position as shown by Figs. 1 to 3 inclusive and that a coin of the twenty-five cent size is deposited in the coin entrance opening 16; the deposited coin upon descent will strike the trip pin 42 to pivot the lever 41 counterclockwise, Fig. 1, and raise the latch lever 38 out of engagement with the lug 39 on the lever 28. Thus, the lever 28 will be permited to rotate into normal position against the stop 32. However, the deposited coin being of a size that is to be tested by the deflector pin 25 and because of its movement toward such testing pin 25 would, by reason of the coin's broad diametrical dimension, engage the normally projecting detector ledge 26, such ledge 26 must be withdrawn to permit an unobstructed descent of the quarter toward the deflector pin 25.

The withdrawal of the ledge 26 is accomplished by reason of the quarter descending down the runway 18 and being engaged by the lateral extension 34 on the lever 28, whereupon the lever will be pivoted into dotted line (Fig. 2) position. By reason of the foregoing pivotal movement of the lever 28, the lug 39 thereof will be disposed into latched engagement with the notch 40 at the free end of the latch lever 38, thus latching the lever 28 and the detecting ledge 26 thereof in the position shown in Fig. 4. With the ledge 26 latched in withdrawn position, the descending quarter will be free to drop along the trajectory C without being obstructed and to engage the deflector pin 25 for deflection toward the acceptance opening 21.

Should a coin having the dimensions of a quarter be of a different metallic character than such twenty-five cent piece it may do one of two things. First, if it is of a metal that has a greater magnetically attractable character than a valid quarter, it will follow a trajectory substantially along the line E, engage the detector ledge 26, and be cast in the direction to the right of the deflector pin 25 for descent into the reject opening 22; or

If it is less magnetically attractable than a quarter it will descend in a direction to the right of the deflector pin 25 (Fig. 2) and thence out through the reject opening 22.

Should the next deposit be that of a nickel or a dime, either one would, as did the quarter, strike the trip pin 42 to pivot the lever 36 anticlockwise and release the latch notch 40 from engagement with the lug 39 on the lever 28 to permit the latter to return by its own weight into normal position abutting the stop pin 32.

Coins of a size of a nickel will if of a proper metallic character follow the trajectory A for engagement with the anvil 20 and rebound over the partition 23 into the acceptance chute 21. Dimes will, by reason of the effect of the magnetic flux set up by the magnet 19, drop along trajectory B for deflection by the pin 25 toward the acceptance opening 21. It will be noted that even though dimes and nickels descend down the runway 18, neither of them is of a diameter sufficient to cam the lateral extension 34 out of its normal position and that even though the detector ledge 26 is in extended condition (full lines, Fig. 2), neither a nickel or a dime, when following its predetermined trajectory A or B respectively, will in any way be obstructed by such extending ledge 26.

On the other hand, should invalid coins of a size of less diameter than that of a quarter and of a greater magnetically attractable character than that of a valid ten cent piece be deposited, such coins will, by reason of the magnetic flux lines of the magnet 19, cling to the edge portion 18' of the runway 18 and descend along a trajectory substantially along line E. The detector ledge 26 being in normal extended condition will then engage the periphery of such descending invalid coins to obstruct their gravitation to the left of the deflector pin 25 and to cause such invalid coins to be deflected to the right of the deflector pin 25 for descent into and through the reject opening 22.

It is therefore seen that the movable detector ledge 26 functions both when coins of a size of a quarter are being tested as well as when coins of a lesser size are tested, the adjustment of the ledge 26 being effected by the coin being tested as determined by the diameter of the coins.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I therefore do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

Having thus described our invention, what we claim as new and desire to protect by Letters Patent is:

1. A coin chute having an entrance opening in its upper region and acceptance and reject openings provided in its lower region, a descending runway beneath said acceptance opening, magnetic means arranged with its field of force cutting across said runway at the terminus of the latter and adapted to affect coins of a paramagnetic characteristic of valid U. S. dimes and quarters passing from said runway to follow a predetermined trajectory toward testing means disposed in a region between the terminus of said runway and said reject opening and adapted to deflect coins following said predetermined trajectory into said acceptance opening, the combination of automatically operable lever means, variable deflector ledge means operatively associated with the lever means for movement therewith, said lever means adapted to be affected by all coins entering said entrance opening to cause the deflector ledge means to assume a normal posi-

tion to obstruct coins of a size of said valid U. S. quarters from passing along said predetermined trajectory, said lever means further being engageable by coins of a diameter of said valid U. S. quarters passing along said runway whereby said deflector ledge means will be withdrawn from obstructing position with respect to coins following the aforesaid predetermined trajectory.

2. A coin chute having an entrance opening in its upper region and acceptance and reject openings provided in its lower region, a descending runway beneath said acceptance opening, magnetic means arranged with its field of force cutting across said runway at the terminus of the latter and adapted to affect valid U. S. dimes and quarters passing from said runway to follow a predetermined trajectory toward testing means disposed in a region between the terminus of said runway and said reject opening for deflection into said acceptance opening, the combination of automatically adjustable lever means comprising a deflector ledge normally disposed in the path of movement of valid U. S. quarters following said predetermined trajectory, a testing lever pivotally mounted on said coin chute to movably support said deflector ledge in the position aforesaid and having a portion thereof extending into the coin passage above said runway and adapted to be engaged by coins of a diameter of valid U. S. quarters, said automatically adjustable lever means further including a latching lever adapted to releasably hold said testing lever when said testing lever is engaged by a coin of said diameter to withdraw said deflector ledge out of the path of movement of coins along said predetermined trajectory, and means on said latching lever extending into said entrance opening and adapted to be engaged by coins passing therethrough whereby to release the testing lever.

3. In combination, a coin chute comprising a casing defining a coin passage having an entrance opening and an acceptance and a reject opening, a runway, means for maintaining a magnetic field across said runway to influence the valid U. S. dime and quarter denomination to follow a predetermined trajectory, testing means below said runway adapted to receive coins following said predetermined trajectory with their center of gravity disposed on that side of the testing means in the direction of said acceptance opening, said magnetic field influencing spurious coins having greater paramagnetic qualities than said valid U. S. dimes and quarters to descend short of said predetermined trajectory, deflector means adjacent the lower end of said runway normally disposed in the path of coins of the size of a quarter following the aforesaid trajectory to deflect said spurious coins of the size less than that of a quarter in the direction of said testing means with their center of gravity disposed on that side of the testing means in the direction of said reject opening, means automatically operable by coins passing down said runway and operatively connected with said deflector means and adapted to be affected by said coins of the size of a quarter to withdraw said deflector means from said normal position in the path of coins following the aforesaid trajectory.

4. In a coin separator, a casing providing a coin passage having an entrance opening, means providing an acceptance opening and a reject opening in said passage, a runway beneath said entrance opening along which coins are rollable, means for maintaining a magnetic field across the lower end of said runway for influencing valid U. S. ten and twenty-five cent pieces for descent from said runway along a predetermined trajectory toward said acceptance opening and for influencing spurious coins having a slightly greater magnetic attractability than said valid coins for a descent short of said predetermined trajectory, and deflector means adjacent the lower end of said runway adapted to deflect said spurious coins in the direction of said reject opening and normally disposed in the path of twenty-five cent pieces descending along said predetermined trajectory and adapted to move out of said aforementioned path when coins having the diameter of a twenty-five cent piece descend said runway, said deflector means including a lever pivotally mounted on said casing, a lateral extension on said lever and projecting into said coin passage above said runway and adapted to be engaged by coins of a diameter of a twenty-five cent piece to move said deflector means out of said aforementioned path to permit valid twenty-five cent pieces to follow said predetermined trajectory.

5. In a coin separator, a casing providing a coin passage having an entrance opening, means providing an acceptance opening and a reject opening in said passage, a runway beneath said entrance opening along which coins are rollable, means for maintaining a magnetic field across the lower end of said runway for influencing valid U. S. ten and twenty-five cent pieces for descent from said runway along a predetermined trajectory toward said acceptance opening and for influencing spurious coins having a slightly greater magnetic attractability than said valid coins for a descent short of said predetermined trajectory, and deflector means adjacent the lower end of said runway adapted to deflect said spurious coins in the direction of said reject opening and normally disposed in the path of twenty-five cent pieces descending along said predetermined trajectory and adapted to move out of said aforementioned path when coins having the diameter of a twenty-five cent piece descend said runway, said deflector means including a lever pivotally mounted on said casing, a lateral extension on said lever and projecting into said coin passage above said runway and adapted to be engaged by coins of a diameter of a twenty-five cent piece to move said deflector means out of said aforementioned path to permit valid twenty-five cent pieces to follow said predetermined trajectory, and latch means pivotally mounted on said casing and adapted to hold said deflector and lever out of normal position, and pin means on said latch means and extending into said coin passage in the region of said entrance opening and adapted to be engaged by coins deposited therein to release said latch means for return to normal position.

6. In a coin chute having means providing a descending runway, means for maintaining a constant magnetic field across the lower end portion of said runway, means defining adjacent acceptance and reject openings in the region below said end of the runway and spaced apart in the direction of movement of coins down said runway, a testing means for engagement by legitimate U. S. ten and twenty-five cent pieces in a manner to deflect the latter into said acceptance opening, said magnetic field effecting movement of coins having the metallic characteristics of said legitimate coins along a predetermined trajectory in the direction of said testing means and affecting spurious coins having a greater paramagnetic metallic characteristic than such legitimate

coins to cause said spurious coins to fall short of said predetermined trajectory, detector means arranged in said chute in the region thereof between the terminus of said runway and said testing means and normally disposed in the path of movement of legitimate twenty-five cent pieces along said predetermined trajectory and adapted to deflect spurious coins toward said reject opening and adapted to move into a position withdrawn from said path of movement when twenty-five cent pieces descend said runway, a lever supporting said detector means for movement as aforesaid, means pivotally mounting the lever upon said chute, a coin engaging projection on said lever and extending into said descending runway and adapted to be engaged by coins of a size of a legitimate twenty-five cent piece to move the lever and said detector means as aforesaid, latch means pivotally mounted upon said chute and engageable with said lever to latch the latter and said detector means in withdrawn position, and trip means on said latch means and extending into said descending runway and adapted to be engaged by deposited coins to pivot said latch means out of latched relation with said lever.

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