March 4, 1941. W. A. TRATSCH ET AL 2,233,654

COIN CHUTE

Filed Sept. 20, 1937

Fig. 1.

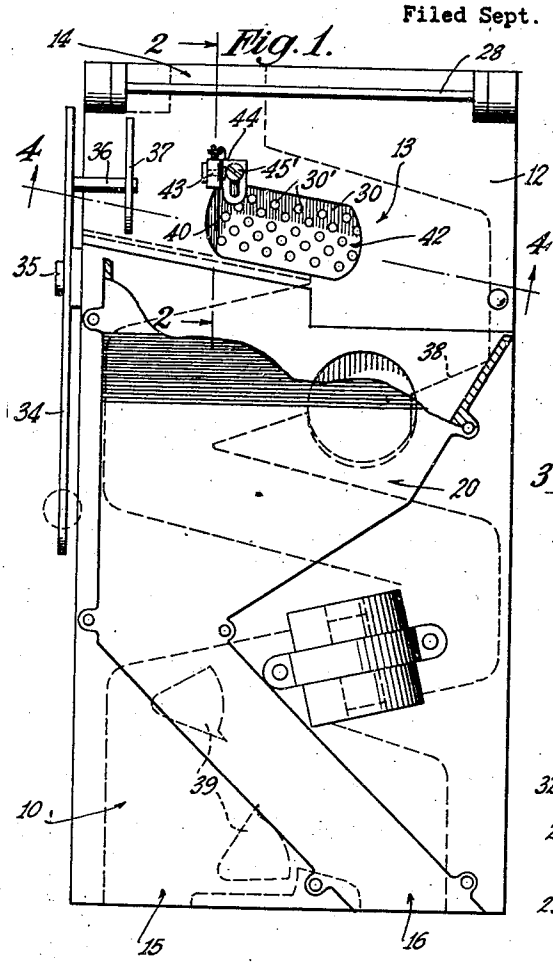


Fig. 3.

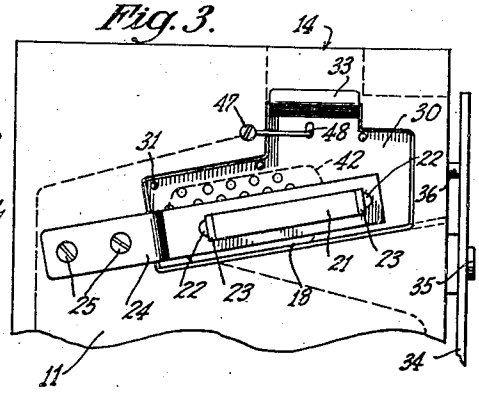


Fig. 2.

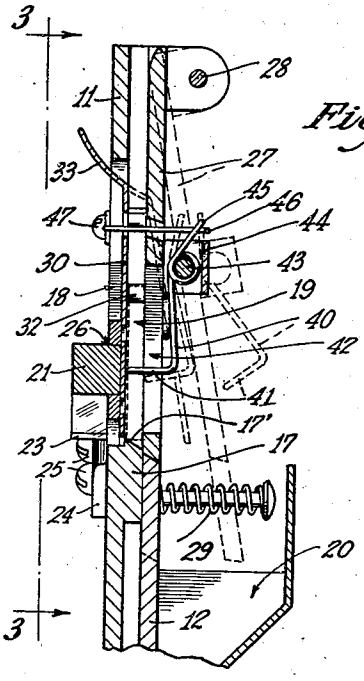
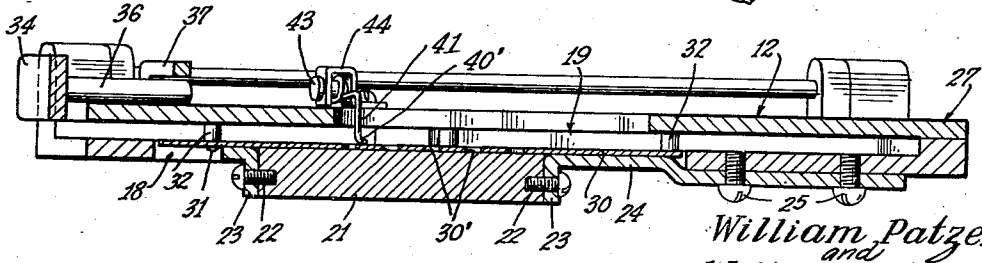


Fig. 4.



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COIN CHUTE

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19 Claims. (Cl. 194—101)

This invention pertains to coin chutes and the like and has among its particular objects the provision of a novel testing and scavenging means constituting improvements on the type of device shown in our Patent No. 2,158,909, issued May 16, 1939.

It is an object of the invention to provide a coin chute having magnetic testing means adapted to stop perforate tokens and coin elements and certain types of elements perforated with the fraudulent intent of causing them to pass the eddy-current type of testing device.

It is another object to provide a coin chute having a section normally in register with the main chute passage and movable laterally out of register therewith relative to a stationary magnetic means for the purpose of clearing an arrested coin element, whether magnetically attractable or not, out of the passage.

A further object is the provision of a coin chute having testing means in the form of a stationary bar magnet positioned at one side of the passage, a non-mangetic shield forming a side wall section of the passage, positioned close to the magnetic means and attached to a gate spaced in parallel relation therefrom and pivoted on the chute to form the opposite side wall, and mechanism for moving the gate to withdraw the same and the opposite plate from the passage to permit an arrested coin element to gravitate out of the latter.

Yet another object is the provision of magnetic testing means including a stationary magnet, a movable gate opposite the magnet, and a testing finger of magnetically attractable material pivoted on the gate and normally disposed across the passage by attraction to the stationary magnet, and means for opening the gate and simultaneously causing withdrawal of the finger.

Still another object is the provision of a coin chute providing a chute passage with a stationary magnet nearby and a perforated plate of diamagnetic material close against the magnet and forming a closure for one side of the passage and attached to a gate closing the opposite side of the passage and movable with the same to eject an arrested coin element from the passage.

Other novel aspects of construction and operation of the invention will appear as the following detailed description proceeds in view of the drawing in which:

Fig. 1 is a side elevation of the chute looking at the gate side thereof;

Fig. 2 is an enlarged fragmentary vertical section through the gate and testing means, as seen along lines 2—2 of Fig. 1;

Fig. 3 is a fragmentary elevation of the opposite side of the chute seen in Fig. 1, looking in the direction of lines 3—3 of Fig. 2; while

Fig. 4 is a horizontal section through the chute and testing means taken along lines 4—4 of Fig. 1.

In the prior art various arrangements of permanent magnets have been made wherein the magnet is positioned at one side along the coin passage for the purpose of arresting a paramagnetic element completely or of retarding or accelerating diamagnetic elements for testing purposes. The present invention is concerned with a magnetic testing device operable on both paramagnetic and diamagnetic coins. Moreover, the improved testing device is adapted to have a positive effect on diamagnetic coin elements that have been apertured in various manners to destroy the eddy current effects which would otherwise be set up in said elements save for the fraudulent deformation of the same.

A preferred construction for accomplishing the several objects of the invention includes a chute body 10 (Fig. 1) comprising a pair of spaced plate members 11 and 12 (Fig. 2) providing a chute passage 13 having an upper entrance end 14 and a plurality of selective discharge openings 15 and 16 at its lower end (Fig. 1). These plate members 11 and 12 are preferably castings recessed to provide a tortuous passage 13, the bottom ledge 17 of one upper section of which passes between two open and opposite side wall sections 18 and 19, such that were no closure means provided for these side sections, a coin element would tend to pass out of the chute in the direction of the opening 19 by virtue of the inclination 17' of the ledge formation 17 in this region, such coin elements lodging in a discharge chute 20 formed integrally with the body below the opening 19.

On the plate 11 (Fig. 3) there is mounted an elongated or bar magnet 21 attached by means of screws 22 in its axial ends to ears 23 struck up from an offset bracket 24 attached by screw means 25 to the plate, the bracket 24 having an elongated slot 26 between the ears 23 and into which the bar magnet fits so that its under surface is substantially flush with the inwardly offset portion of the bracket. The bracket 24 is inclined so that the long axis of the bar magnet is substantially parallel with the axis of the chute.

The opposite side openings 18 and 19 are pro-

vided with closure means which in effect constitute a laterally movable passage section having as its bottom portion the stationary inclined ledge 17'. This laterally movable passage section includes a gate member 27 pivoted as at 28 on the side 12 of the chute so as to move toward and away from the opening 19. At its lower end, the gate 27 is provided with a normal return spring 29 adapted to position the gate flush in the opening 19 to close the latter. The gate may be operated by gravity if desired.

Completing the so-called laterally movable passage section, is a non-magnetic plate member 30 (Figs. 2 and 3) shaped conformably with the opening 18 and attached to the gate 27 by means of screws 31 and spacing collars 32, the latter being disposed above the line of movement of coins. The upper end of the plate 30 is offset to provide a deflecting or guiding extension 33 which moves into the chute passage at a point substantially below the coin entrance 14 for the purpose of guiding the descent of coins deposited while the gate is open down in between the gate and plate 30 and out of the chute through the opening at the bottom edge of these latter members.

In its normal position the diamagnetic plate 30 (which may be constructed of a non-ferrous metal such as copper or any electro-conductive material which is not magnetically attractable), is provided with a plurality of equally spaced apertures 30' disposed along the line of movement of a descending coin over an area equal in width to, or greater than, the diameter of the largest coin element which may be deposited in the chute, and it will be observed in Fig. 2 that in its normal position (corresponding to the lowered position of the gate) the diamagnetic plate 30 is flush against the inner face of the magnet 21, the lines of force from which are concentrated to varying degrees between its polar ends through the plate 30 and the openings 30' therein.

This peculiar arrangement of the apertured plate 30 and the magnet 21 provides a testing device which is effective to stop paramagnetic coin elements and hold the same against the plate 30 until such time as the gate 27 is opened by means such as the lever 34 (Fig. 1) pivoted on the chute as at 35 and having a lateral pin 36 engaged in a lug 37 on the gate for moving the latter outwardly, whereupon such attracted or arrested coin element being removed largely from the influence of magnet 21, will gravitate out the open bottom of the passage section constituted by the plate 30 and the gate and into the reject cup 20.

As viewed in Fig. 1, and particularly described in the heretofore mentioned patent, this coin chute is of a type provided with selecting mechanism including a rebound anvil 38 and rebound deflectors 39 against which a coin of predetermined physical characteristics is adapted to strike as it descends in the chute to rebound for movement into one of the terminal openings 15 or 16. It is thus necessary that such a coin move through the upper portions of the passage at a predetermined rate, and it is possible to use coin elements made of ferrous or paramagnetic alloys, and which will otherwise have the necessary characteristics such as weight, hardness and over-all size, to rebound in the proper manner so that nothing but a magnetic testing means will stop such coins, such stoppage being effected by the magnet 21 in the manner heretofore explained. Moreover, it is possible to employ fraudulent coin elements of diamagnetic or non-magnetic qualities but which would otherwise rebound in the proper manner. A further function of the magnetic means 21, therefore, is to slow up the movement of such non-magnetic coin elements by inducing in the same reaction or eddy currents resulting from the passage of the element through the magnetic field set up by the bar magnet 21. This slowing up of the coin element is adequate to prevent proper rebound from the anvils so that the element will be properly rejected.

It is possible by variously deforming and slotting the diamagnetic or non-ferrous coin elements to prevent setting up retarding or reactionary effects in the element as it passes through the field. This is particularly true of metallic coin elements having radially extensive slots cut from the periphery or slots cut inwardly in the manner of a chord across an arc of the periphery. Such slotted, apertured, and similarly prepared coin elements are effectively influenced by the magnet 21 and plate 30; the reason, while not being fully understood at the present time, appearing to reside in the fact that the apertured or slotted slug as it cuts through the field of the magnet, although it does not generate eddy currents within itself sufficient to effectively alter its rate of travel, nevertheless sets up reaction effects or currents in the plate 30 which effects may be augmented by the provision of large numbers of small closely disposed openings 30', so that an appreciable amount of energy is necessarily given up by the slug as it moves through the field and the interposed diamagnetic plate member, because the reaction of the field is dissipated in part in the interposed plate.

Cooperable with the foregoing novel magnetic testing device is an additional testing device in the form of a selector finger 40 preferably constructed from magnetically attractable wire or rod and having a lateral nose projection 41 extending into the chute passage through a sidewise drop-out opening 42 in the gate member 27. The finger 40 is pivotally mounted as at 43 on a bracket 44 adjustably attached by screw means 45 on the gate 27 above the drop-out opening 42 thereof in such manner as to position the nose 41 substantially near one of the polar ends of the magnet 21, the finger being attracted by the magnet and pivoted so as to normally dispose the nose in blocking position across the chute passage and against the opposite wall plate 30. It will be observed in Fig. 4 that the nose 40 is offset as at 41 in the direction of descent of a coin so that it will be easily swung aside by the coin as it passes down the chute, the magnetic attraction between the finger and the bar magnet being calculated to provide positive positioning of the nose in blocking disposition across the passage, while at the same time permitting the easy deflection of the finger by a proper coin normally passing down the chute.

At its upper end the blocking finger 40 has an extension 45 which is disposed in the looped end portion 46 of a wire finger fixedly mounted by screw means 47 on the plate 11 and extends through an elongated slot 48 in the diamagnetic plate 30, so that when the gate 27 is moved to the right (Fig. 2), the end portion 45 of the finger 40 bears against the stationary loop 46, and the finger is pivoted into the dotted line position there seen, so that any apertured slugs or tokens which are hooked or caught on the nose 41 will be automatically discharged into the chute 20.

Thus the improvements constituting the present invention provide a novel form of magnetic

testing means including an elongated bar magnet disposed close to the path of movement of the coin and a non-ferrous or non-magnetic but electro-conductive plate member interposed between the magnet and moving coin, and adapted to affect the descending movement of coin elements slotted and apertured so as to escape retarding influence of the usual magnetic testing means, and in addition a magnetic testing finger normally attracted in blocking position across the coin passage by the magnet and operable to catch certain types of apertured slugs, yet easily deflected by proper coins moving down the passage, together with gate means for effecting ejecting operation of the entire testing unit. It will be evident that various changes in form and location may be made in the arrangement particularly described herein for purposes of illustration, all without departing from the spirit of the invention, and it is therefore to be understood that the appended claims are intended to include within their call all such changes, modifications and rearrangements.

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

1. In a coin chute providing a coin passage, defined between opposite wall members, testing means including a stationary magnet positioned at one side of the passage on one of said wall members, and an electro-conductive but non-magnetic plate member comprising a part separate from the material of the body of said chute and said wall members and interposed between the magnet and a coin moving in said passage so as to form a wall portion of the passage in the region opposite said magnet.

2. In a coin chute providing a coin passage, testing means including an elongated permanent magnet mounted on a particular wall portion of said chute at one side of said passage in close proximity to coins moving in the latter, and an electro-conductive plate of a non-magnetic material forming a side of said passage opposite said magnet and interposed between the field of the same and a coin moving down the chute passage, said plate being a part separate from the material of which the chute and said particular wall portion are constructed so as to localize electro-magnetic effects from the field of said magnet in said plate.

3. In a coin chute having a coin passage, testing means in the form of a thin copper plate arranged to provide a movable wall section for a part of the passage and past which coin elements may move in close proximity to the plate, and a permanent magnet placed close to the outer surface of said plate in such manner that the field of said magnet will extend through the plate and into said section of the passage, whereby coin elements having cut-away portions and passing through said field will vary the same and be affected by virtue of the reactive effect of said varied field on said plate, and means for moving said plate outwardly crosswise of said passage away from said magnet whereby to effect release of magnetically attracted coin elements and to drive released coin elements out of said passage.

4. Testing means for coin chutes and adapted to affect the movement of metallic coin elements having radial and diagonal slots extending into their peripheries, said means including a thin metal plate of non-magnetic quality arranged in said chute at a point between the ends of the chute passage as a part separate from the body material thereof so that coin elements will move past the same in close proximity thereto, and a permanent magnet placed close to said plate so that its field of force will pass through the plate into the chute and be cut by a coin element moving therein, the normal movement of the aforesaid slotted element being altered by reaction effects in said field and plate and resulting from the passage of such elements through said field.

5. A coin chute comprising a chute body providing a descending coin passage having opposite open side wall portions between its ends, a gate member pivoted on said body and normally closing one of said open portions and a non-magnetic electro-conductive plate member mounted in parallel spaced relation on said gate and adapted to close the opposite opening and provide between said gate and plate a movable passage section for a coin moving down the passage, yieldable means normally positioning said gate to close said openings, means for moving said gate into open position, and a permanent magnet mounted on said body in close proximity to said plate to extend the influence of its field through said plate into said movable passage section.

6. The device of claim 5 further characterized by the provision of a magnetically attractable finger pivoted on said gate and having a nose portion adapted to project into said passage and be attracted by said magnet in blocking position across the passage, said nose portion being angled for deflection by a coin moving down said passage, and stationary means engageable with said finger when said gate is open to pivot the latter in a direction out of blocking position.

7. The device of claim 5 in which said plate member has an offset extension near its upper end movable into deflecting position across said passage when said gate is open.

8. A coin chute comprising a body providing a descending coin passage having an entrance and exit end, means providing a movable passage section normally in register with said coin passage and movable laterally out of register therewith and having an open bottom portion through which coin elements may drop when moved out of register, one wall of said movable section being formed by a substantially thin electro-conductive plate member of non-magnetic material, a permanent magnet mounted on said body and positioned to fit in closely parallel relation to said plate member when said section is in register, said section being moved away from said magnet to effect release of attracted elements when the section is moved out of register, together with means for moving said passage section into and out of register.

9. The device of claim 8 further characterized by the provision of a magnetic finger pivoted on the side of said section opposite said plate member and having a nose portion projected into the passage portion thereof by magnetic attraction, said nose portion being formed to be deflected out of blocking position by a coin moving down said section, and stationary means on said body and operable to pivot said finger and nose portion thereof in a direction out of said passage when said section is moved out of register.

10. In a device of the class described including means providing a coin passage in a substantially vertical plane, said passage having an opening in the side wall portion thereof between its ends, testing means comprising: a perforate non-magnetic plate arranged to close said opening and constitute a wall portion of said passage

past which coin elements move in traversing the latter, and a permanent magnet mounted close to the side of said plate exterior of said passage and arranged to provide a magnetic field of force extending into said passage in the region of said plate.

11. In a device of the class described including means providing a coin passage having a wall portion formed of a non-magnetic substance, testing means including: magnetic means arranged exteriorly of said passage near said wall portion, and a feeler pivoted for movement into and out of said passage toward said magnetic means and including a magnetically attractable portion so as to be normally attracted by the latter into said passage to engage coin elements traversing the latter for the purpose of engaging and testing coins for surface irregularities.

12. In a coin chute of the class described including a laterally opening gate which forms one side wall for a portion of a coin passage, the combination of testing means comprising a non-magnetic metallic plate mounted on said gate in substantially parallel spaced relation thereto so as to form a side wall portion for said passage opposite said gate, that portion of the passage between the gate and plate having no bottom, a stationary magnet mounted with a pole close to said plate on a side thereof remote from said gate so as to propagate a magnetic field through said plate and into said passage opposite the gate, whereby certain coin elements passing through said field will cause electromagnetic reaction effects operable to influence the movement of said elements for further testing by additional testing means for selectively influencing the movement of coin elements depending upon the manner in which said elements move after leaving said first-mentioned testing means.

13. The combination of claim 12 in which said plate is provided with a plurality of perforations with intervening imperforate portions to concentrate said electromagnetic effects in certain areas of said plate.

14. The combination of claim 12 in which said magnet is of elongated form with polar extremities at its opposite ends, and is mounted closely parallel to said plate with its length extending in the direction of movement of coin elements toward said second-mentioned testing means.

15. The combination of claim 12 in which there is provided a magnetically attractable coin feeler pivotally mounted on said gate so as to be attracted into coin-engaging position across said passage toward said plate by said first-mentioned magnet when the gate is closed, coin elements arrested by said feeler or first-mentioned magnet passing from said chute between said gate and plate when the gate is opened.

16. The combination of claim 12 in which there is provided a magnetically attractable coin feeler pivotally mounted on said gate so as to be attracted into coin-engaging position across said passage toward said plate by said first-mentioned magnet when the gate is closed, coin elements arrested by said feeler or first-mentioned magnet passing from said chute between said gate and plate when the gate is opened, and means for automatically pivoting said feeler in a direction away from said plate when said gate is moved toward open position to expedite release of coin elements arrested thereby.

17. The combination of claim 12 in which said plate is provided with a deflecting member arranged to move with the plate, when the gate is opened, into position relative to said passage at a point in advance of said gate therein to guide coin elements down between said plate and gate for movement out of the chute while the gate is open.

18. In a coin chute of the type including a descending coin passage, testing means comprising the provision at one side of said passage close to the path of a coin moving theredown of a non-magnetic electro-conductive plate having the major portion of its area spaced from electrical contact with said chute, and means for propagating a magnetic field through said plate in a direction across said passage to be cut by coins moving theredown past the plate for the purpose of effecting electrical reactions in certain legitimate coins through the agency of said plate in said field to affect the movement thereof in a predetermined manner down said passage.

19. A coin chute including a body providing a descending coin passage having entrance and exit openings at its ends and opposite sidewise openings between said ends, a gate member pivoted on said body and yieldably disposed in normal position to close one of said sidewise openings, an electro-conductive plate member of non-magnetic material mounted on said gate in parallel spaced relation thereto to move jointly with the gate and adapted to substantially close said opposite sidewise opening when the gate is closed to define cooperably with said gate a section of said passage, an elongated permanent magnet mounted to extend in close parallel proximity to said plate member when the same is in normal position corresponding to closed condition of the gate, a finger for arresting coins having perforations and analogous surface irregularities therein and pivoted on said gate with a magnetically attractable nose portion attracted by said magnet toward said plate yieldingly across said passage, said nose portion being arranged and constructed to be deflected by a coin moving down said passage and to engage in depressions or openings in certain unacceptable coin elements to arrest the same, means for opening said gate to substantially withdraw the same and said plate member from said passage whereby coin elements arrested by said magnet or finger may be discharged from the passage through the space between the plate and gate, and means engaging said finger responsive to opening movement of the gate to pivot the finger in a direction to move the nose portion thereof away from said plate.

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