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COIN MACHINE SLUG EJECTOR

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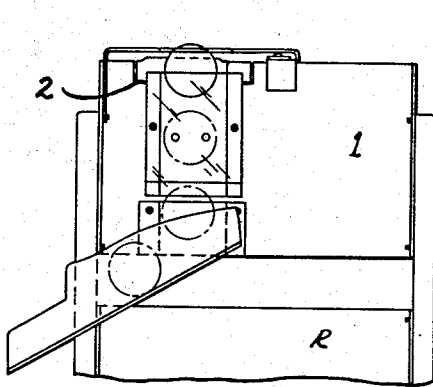


FIG. 1

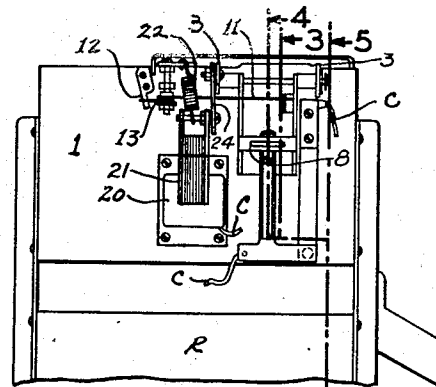


FIG. 2

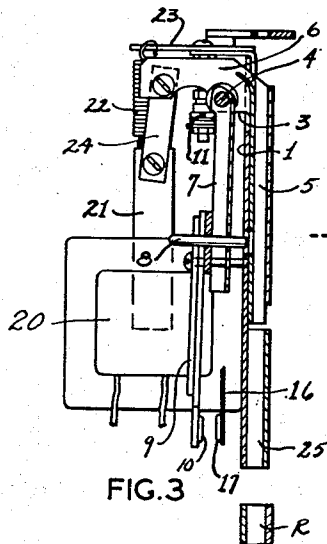


FIG. 3

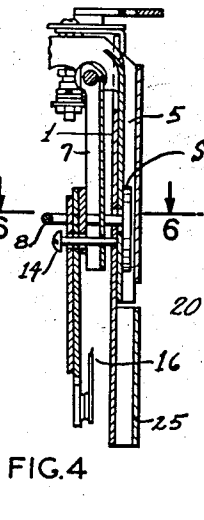


FIG. 4

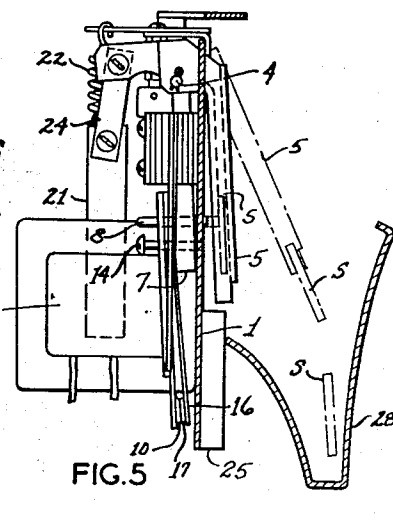


FIG. 5

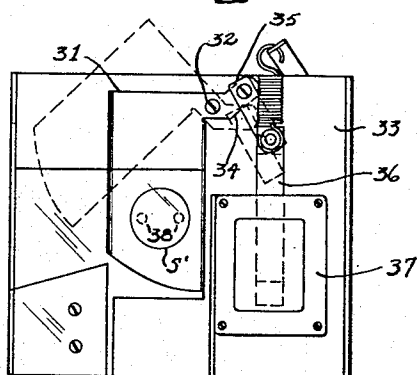


FIG. 7

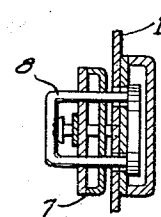


FIG. 6

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COIN MACHINE SLUG EJECTOR

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This invention relates to coin testing devices and is particularly applicable to the separation and rejection of paramagnetic slugs from genuine coins and slugs composed of non-magnetic metals and alloys. Its principal objective is to improve the efficiency and convenience of presently existing apparatus for separating genuine and spurious coins, by preventing paramagnetic items from reaching and entering the magnetic fields of a conventional selector-rejector device of the type which utilizes permanent magnets for testing coins and slugs.

When a paramagnetic item is received in a conventional testing device, it is held by the attraction of the permanent magnet adjacent to the channel in which the item is traveling, thus blocking that channel until the item is removed by manual operation of a "scavenger" mechanism. Obviously, this recourse to manual operation of an otherwise largely automatic device causes confusion and delay, and results in lowered commercial efficiency.

The objects of the present invention are to reject the inserted item, if paramagnetic, before it reaches the conventional testing mechanism and thereby avoid the blocking referred to, and to effect a quick and automatic ejection of the item from the device.

This device may be incorporated as an integral part of the otherwise conventional coin testing unit, or it may be added to a coin-inlet chute at any point ahead of the conventional tester, the intention being to initially route all coins and slugs through this device.

The above-mentioned objects and other detail objects as may be apparent to those skilled in the art are attained by the structure illustrated in the accompanying drawings, in which:

Figure 1 is a front view of the paramagnetic slug ejector.

Figure 2 is a rear view of the ejector.

Figure 3 is a vertical transverse section on the line 3—3 of Figure 2.

Figure 4 is a section taken on the section line 4—4 of Figure 2 but showing the parts moved from the position shown in Figure 3 to a position assumed as a paramagnetic slug is received.

Figure 5 is a section taken on the section line 5—5 of Figure 2 but showing the parts moved to a further position assumed promptly following their movement to the position shown in Figure 4. Figure 5 shows in dot-dash lines an extreme position assumed by the coin chute.

Figure 6 is a detail horizontal section taken on the line 6—6 of Figure 4.

Figure 7 is a view corresponding generally to Figure 1 but illustrating another form of the invention.

The device includes an upright frame member or a base plate 1, there being a notch 2 extending downwardly from the upper edge of the plate. Brackets 3 at the ends of notch 2 mount a pivot pin 4. A shallow rectangular initial chute 5 normally parallels one side of

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plate 1 and is pivotally suspended from pin 4 by ears 6 which extend through notch 2.

Suspended from pin 4 at the other side of plate 1 and substantially abreast of chute 5 is a carrier 7. Mounted on carrier 7 is a horseshoe magnet 8, Figure 6, the legs of which normally extend through apertures in plate 1 and are aligned to pass through apertures in the left hand side of chute 5. Also mounted on carrier 7 and depending therefrom is an insulated switch blade 9, the lower end of which carries a contact 10. A wire torsion spring 11, anchored at 12 and 13, passes through flanges on carrier 7 below pin 4 and effects a light thrust on the carrier away from plate 1, such movement being limited by the head of an adjustable screw 14, the other end of which extends through an aperture in carrier 7 and is threaded into plate 1. An insulated spring switch blade 16 has its upper end fixed on plate 1. Its lower end carries a contact 17 opposed to contact 10 on blade 9.

Spring blades 9, 16 control a circuit C leading to a solenoid 20 mounted on plate 1 and having an armature 21 suspended by a spring 22 from a bracket 23 on plate 1. A link 24 is pivoted near its opposite ends to the upper end of armature 21 and to the inner end of one of the ears 6 on chute 5.

Mounted on plate 1 is a fixed main chute 25 with which chute 5 is normally in alignment so that valid coins and all slugs except paramagnetic slugs supplied to chute 5 will be delivered to chute 25 from which they will be fed to the conventional rejector indicated generally at R which will reject slugs other than paramagnetic slugs. Where slugs are mentioned below, reference is made to paramagnetic slugs. It will be understood that except for magnet 8 and the solenoid elements, all of the major parts illustrated are of brass or other non-magnetic material.

Operation: When a slug S (formed of iron, steel or other magnetic alloy, including "steel" pennies) is dropped into chute 5 and enters the magnetic field extending between the magnet poles and through chute 5, the slug and the magnet attract each other and since plate 1 is stationary and holds chute 5 against movement to the left, the magnet is moved to the right from the position shown in Figure 3 to the position shown in Figure 4, swinging carrier 7 and switch blade 9 on pin 4 and bringing contact 10 into engagement with contact 17 which energizes the solenoid circuit and draws armature 21 from the position shown in Figures 2 and 3 to the position shown in Figure 5. This movement of the armature and link 24 swings chute 5 to the right away from plate 1, the magnet and switch blades also moving to the right until carrier 7 strikes plate 1 and chute 5 is in the full line position shown in Figure 5. Swinging movement of switch blades 9 and 16 is positively arrested by the contact of carrier 7 with plate 1, but the momentum of chute 5 and the slug, created by the movement of the magnet and chute up to this point and by the additional action furnished by the solenoid, is sufficient to kick the chute, and the slug, farther to the right to the position shown in broken lines in Figure 5 where the slug is outside of the field of magnet 8 and is released and falls into a reject trough 28 before the chute can reverse the direction of its movement and swing by gravity back to its normal position.

Immediately upon the release of the slug from the magnetic field and its ejection from chute 5, spring 11 returns carrier 7 and switch blade 9 to the position shown in Figure 3, opening the circuit which energizes the solenoid. The device is now ready to receive the next coin or slug.

It will be understood that the operation just described

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is more rapid than possible operation of the human hand in depositing successive items in the coin chute.

The structure shown in Figure 7 includes the major features of the device previously described but the details differ. The ejector chute 31 is pivoted at 32 on a base plate 33 and has an ear 34 connected by a link 35 to an armature 36 moved by a solenoid 37 which will be energized by a circuit controlled by a switch similar to that previously described and closed by the passage of a slug S' through the magnetic field of a magnet 38 arranged and functioning as the magnet previously described.

When the solenoid is energized, the chute swings on pivot 32 parallel to base plate 33 and the slug is dragged across and finally beyond the poles of magnet 38, thus providing a sufficiently lengthy period for the switch blades to be held in contact to develop the desired momentum of the armature and chute.

The permanent magnets and solenoid armature elements are shown as illustrative devices for effecting the actions described but obviously electromagnets and other electrically driven devices may be substituted for these simple devices.

The details of the structure may be varied otherwise without departing from the spirit of the invention and the exclusive use of those modifications coming within the scope of the claims is contemplated.

What is claimed is:

1. In an ejector for paramagnetic slugs, a movable coin chute, a movable magnet closely adjacent to said chute and movable by a paramagnetic slug passing through said chute, and means actuated by the movement of the magnet to automatically move the chute bodily to a position spaced from the magnet and aligned with an eject receptacle.

2. In a paramagnetic slug ejector, a coin chute having a portion normally aligned with the remainder of the chute but movable out of such alignment to a position to eject a slug in said portion, a magnetic device movable by the attraction of a paramagnetic slug present in said movable portion, and means controlled by the device movement and directly connected to the chute for shifting the chute bodily away from said magnetic device to slug-ejecting position.

3. In an ejector for paramagnetic slugs, a movable coin chute, a movable magnet closely adjacent to said chute and attractable by a paramagnetic slug passing through said chute, a stop positively limiting the slug-induced movement of said magnet, an electric circuit having a switch closed by said magnet movement, a solenoid in said circuit, and a core actuated by said solenoid and operatively connected to said chute for shifting said chute away from said magnet to break the pull of a slug therein and to release the slug.

4. In a paramagnetic slug ejector, a coin chute having a portion normally aligned with the rest of the chute but shiftable out of such alignment to eject a slug in said portion, a magnet adjacent said chute portion and movable by the attraction of a paramagnetic slug in said chute portion, a stop limiting the slug-induced movement of said magnet, an electric circuit including a switch closed by such movement of the magnet, and a solenoid device directly connected to said chute portion and actuated by the closed circuit for shifting said chute portion away from said magnet and out of alignment with the remainder of the chute and away from the magnet to eject the slug.

5. In a paramagnetic slug ejector, a relatively thin and wide coin chute having a portion movable transversely of its width out of alignment with the remainder of the chute to a position to eject a slug in said portion; a magnet movable transversely of said width towards said chute portion by the presence of a paramagnetic slug in said portion, and means actuated by such move-

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ment of said magnet for shifting said chute portion transversely of its width out of its normal position to eject the slug and away from said magnet to render said means ineffective.

6. In a paramagnetic slug ejector, a relatively thin and wide coin chute having a portion movable parallel of its width out of alignment with the remainder of the chute to a position to eject a slug in said portion; a magnet movable parallel of said width towards said chute portion by the presence of a paramagnetic slug in said portion, and means actuated by such movement of said magnet for shifting said chute portion parallel of its width out of its normal position to eject the slug.

7. In an ejector for paramagnetic slugs, an upright frame member, a coin chute suspended from said frame member to swing away from the same, a magnet suspended from said frame member to swing towards and from the chute, said chute and magnet being normally spaced apart slightly, means positively limiting movement of the magnet towards said chute, a device activated by movement of said magnet towards said chute to move said chute away from said frame member and said magnet, the lines of force of said magnet passing through said chute when said magnet and chute are in their normal positions.

8. In an ejector for paramagnetic slugs, a normally upright coin chute, one of the sides of the chute being apertured, a horseshoe magnet movable transversely of the chute through the apertured side of the chute, with the ends of its legs disposed to project inwardly of the chute, an electric circuit having a switch blade movable by said magnet to close and open the circuit, a solenoid energized by said circuit when the circuit is closed, and including an armature operatively connected to said chute for moving the latter away from said magnet when the solenoid is energized.

9. In an ejector for paramagnetic slugs, a frame member, a magnet movably supported upon the frame member, a coin chute movably supported on said frame member, said magnet and chute being normally adjacent but slightly spaced apart and said magnet being movable towards said chute by the attraction between the magnet and a paramagnetic slug moving through the chute, elements limiting the movement of said magnet towards said chute, an electric circuit associated with said device, a switch in said circuit controlled by the position of said magnet, a device in said circuit for moving said chute member bodily away from said magnet to open the circuit, and spring means for returning the chute to normal position adjacent said magnet.

10. In an ejector for paramagnetic slugs, a coin chute shiftable bodily from a normal coin delivering position to an abnormal coin ejecting position, a magnet normally positioned adjacent to but slightly spaced from said chute and mounted and arranged for movement by a paramagnetic slug passing through said chute to an abnormal position closer to said chute, an electric circuit including a switch blade shiftable by said magnet movement to close the circuit, a solenoid in said circuit, a connection between said solenoid and said chute for positively shifting the chute away from the magnet to open said switch, spring means acting upon said magnet to return said magnet to its normal position, separate spring means yielding to the solenoid-induced momentum of said chute to permit said chute to shift further to slug-ejecting position after the switch is opened but subsequently returning said chute to its normal position.

11. In an ejector for paramagnetic slugs, an upright frame member, a coin chute having a pivotal mounting on said frame member to swing bodily away from one side thereof, a magnet having a pivotal mounting on said frame member to swing towards and from the opposite side thereof, said frame member being apertured to permit the approach of the magnet towards

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said chute, a switch blade movable with said magnet, a spring switch blade in the path of said first-mentioned blade, a stop positively limiting the movement of said magnet towards said chute, a circuit closed by contact between said switch blades, a solenoid in said circuit and including an armature, and a link connection between said armature and said chute for moving the latter on its pivot away from said frame member and magnet when the circuit is closed, and means returning the magnet, switch blades, and chute to initial position when the circuit is opened.

12. In an ejector for paramagnetic slugs, an upright support plate, a narrow, and relatively wide, coin chute having a pivotal mounting on said plate and arranged so that a wide side of the chute will slide along one side of said plate as the chute swings bodily on its mounting, a magnet having a pivotal mounting on said plate to swing towards and from the opposite side thereof, said plate being apertured to permit the approach of the magnet and chute towards each other, a switch blade movable with said magnet when the latter is attracted by a paramagnetic slug in the chute, a spring switch blade in the path of said first-mentioned blade, a circuit controlled by said switch blades, a solenoid in said circuit and including an armature, and a link connection between said armature and said chute for moving the latter on its pivot transversely of and past said magnet when the circuit is closed, there being means for returning the chute and the switch blades and magnet to their initial position when the circuit is opened.

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13. In an ejector for paramagnetic slugs, a movable coin chute, a magnet having an initial position adjacent to said chute, said chute and magnet having relative movement from their initial position towards each other by the attraction between the magnet and a slug in the chute, an electric circuit closed by said movement, a device energized by said circuit to shift said chute bodily to eject the slug, and elements operating automatically and rapidly upon such shifting of the chute to open the circuit and return the chute and magnet to their initial relative position.

14. In an ejector for paramagnetic slugs in a coin operated machine, a magnet movable from a normal position toward its field, an initial coin chute normally positioned in the effective field of said magnet and spaced from said magnet and held against shifting toward said magnet but shiftable away from said magnet and out of its effective field to an abnormal slug-delivery position, and means actuated by a paramagnetic slug when present in such chute to shift said chute into said abnormal position.

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