

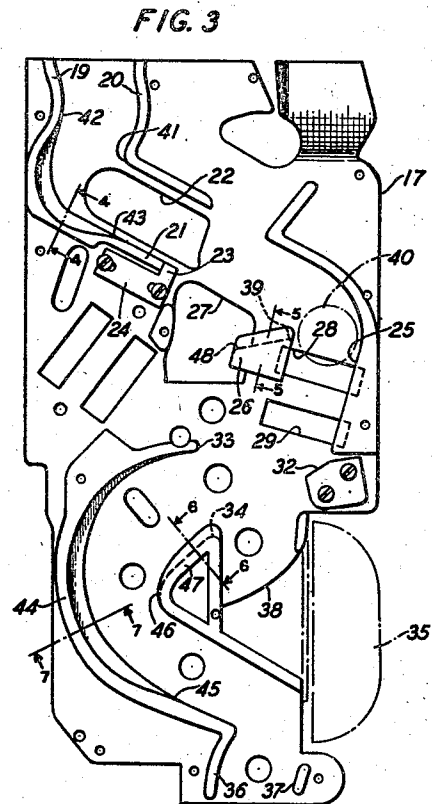
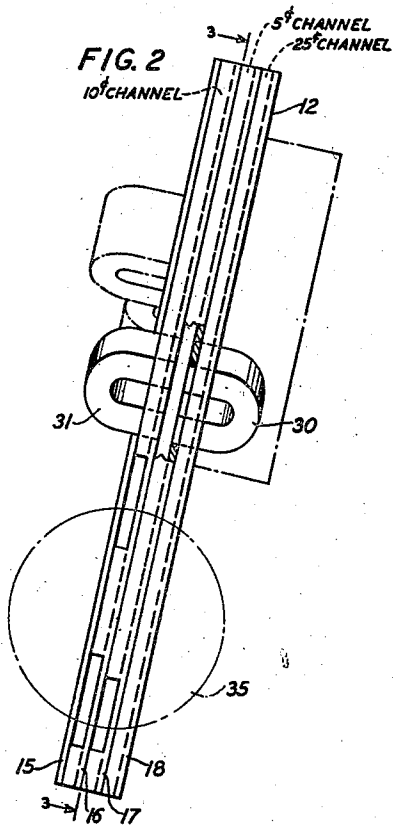
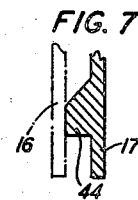
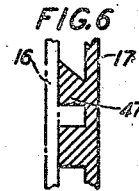
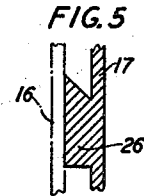
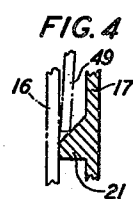
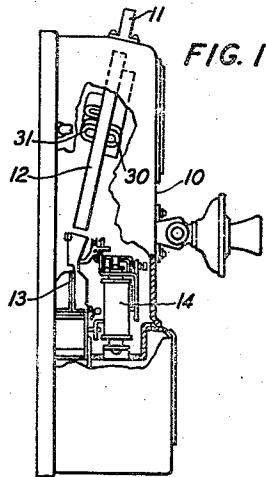
Feb. 4, 1941.

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2,230,352

COIN CHUTE

Filed March 31, 1939



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2,230,352

COIN CHUTE

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Application March 31, 1939, Serial No. 265,275

3 Claims. (Cl. 194—101)

This invention relates to coin chutes particularly for telephone coin collectors. The primary object of the invention is the provision of improved means for controlling the speed and trajectory of coins traversing the chute. A further object is to insure the refunding of a genuine coin when the passageway becomes blocked due to the deposit of a non-standard coin.

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 whether the desired connection is obtained. The usual collector contains a multiple coin chute for receiving coins of various denominations, such as nickels, dimes and quarters, 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 particularly concerned with the type of coin channel where the velocity of coin travel along the channel is a determining factor as to whether or not the coin will be accepted or rejected. For example, as shown in the coin chute disclosed in the P. E. Mills U. S. Patent 2,049,170, issued July 28, 1936, a deposited coin or slug after dropping substantially vertically is directed along a longitudinally inclined section containing a magnet for retarding the speed of magnetic slugs. Beyond the longitudinally inclined section is a gap of such dimension that a standard coin will successfully jump the gap for acceptance while a magnetic slug will be retarded sufficiently by the magnet that it will be unable to leap the gap and will be rejected. In order that the proper discrimination may be made between genuine coins and magnetic slugs it is important that all coins or slugs enter this longitudinally inclined section with substantially the same velocity since it has been found that the desired discrimination may be endangered by the coins or slugs rebounding in a variable or erratic manner at the bottom of the vertical section immediately preceding the section including the specified magnet. In accordance with this invention it is proposed to provide at the bottom of the vertical section a coin receiving ledge having a V-shaped groove into which the forward edge of the falling coin will enter. This V-shaped groove substantially prevents rebound of coins entering the groove and insures that all coins and slugs will

enter the field of the magnet with substantially the same velocity. Such a V-shaped groove in the coin supporting wall may be of advantage in other parts of the chute where coin velocity and trajectory control are an important consideration, as is the case where an eddy-current magnet is employed to distinguish between coins and slugs in accordance with their electrical conductivity.

Another feature of the invention is concerned with that type of chute wherein the coin channel first employs a weak magnet for rejecting magnetic slugs and then employs a powerful magnet for discriminating against slugs of improper electrical conductivity. In such a chute there is an occasional possibility that a slightly magnetic coin may successfully pass the weak magnet but will be held in the chute by the strong magnet in such a manner as to prevent either the refund or acceptance of the next deposited coin. This invention provides means for overcoming this difficulty as will be described later.

Referring to the drawing,

Fig. 1 is a view of a telephone coin collector; Fig. 2 is a side view of a coin chute assembly;

Fig. 3 is a rear view of the channel plate for five cent coins forming a part of the multiple chute of Fig. 2; and

Figs. 4, 5, 6 and 7 are sectional views of the chute taken along the various lines designated in Fig. 3.

The type of telephone coin collector disclosed in Fig. 1 is quite similar to that described in the above-mentioned Forsberg patent and its general construction and operation will be described only briefly. Mounted upon the upper housing 10 is a coin gauge 11 for receiving nickels, dimes and quarters and for directing the deposited coins into a laterally inclined multiple coin chute 12. The coins while traversing the coin chute strike suitable sound signals and then are discharged into a coin hopper 13 where they are temporarily held for subsequent collection or refund under the control of the coin relay 14.

The multiple coin chute 12 may, in general, be of the type disclosed in the copending application of P. E. Mills, Serial No. 265,125, filed March 31, 1939, and may comprise a tortuous coin channel for dimes between cover plate 15 and plate 16, a tortuous coin channel for nickels between plates 16 and 17, and a tortuous coin channel for quarters between plates 17 and 18. The present invention is shown in Fig. 3 as em-

bodied in the nickel coin channel but it will be obvious that it may also be employed in channels for coins of other denominations.

The nickel coin channel is formed by ledges projecting from the rear surface of plate 17 with these ledges lying against the smooth front surface of adjacent plate 16. A five cent coin deposited in guage 11 drops substantially vertically between retaining walls 19 and 20 and then rolls down a longitudinally inclined bottom wall 21 past an elongated opening 22 for rejecting under-diameter coins or slugs. Mounted as a continuation of bottom wall 21 is one pole 23 of a bar magnet 24. The speed developed by a genuine coin in traversing this longitudinally inclined section is such that the coin will leap the gap to the right of pole 23 and proceed down the vertical channel between wall 25 and block 26. However, if a slug of magnetic material is deposited the velocity of such a slug in passing over pole 23 will be retarded to such an extent that the slug will fail to leap this gap and will fall out of the runway through opening 27.

The substantially vertical coin channel defined by retaining wall 25 includes eddy-current magnets for separating out slugs of the improper electrical conductivity. Plate 17 has two parallel slots 28, 29 for receiving the two ends of a U-shaped magnet 30 while the other plates 15 and 16 are adapted to hold another U-shaped magnet 31 with its poles opposite the poles of magnet 30 and with its pole faces flush with that face of plate 16 adjacent the nickel runway. A coin or slug after falling through the field of eddy-current magnets 30, 31 strikes an inclined anvil 32 and rebounds therefrom in a path depending upon the resilience of the coin and the retarding effect produced by magnets 30, 31. A genuine five cent coin will rebound from anvil 32 in such a path that it will enter the coin channel between shoulders 33 and 34, will strike the lower edge of bell 35 and will fall between retaining walls 36, 37 into the coin hopper 13. A slug of standard resilience but of higher electrical resistance than standard will fall through the field of magnets 30, 31 more rapidly than a standard coin and will rebound from anvil 32 in a path which will cause the slug to strike shoulder 33 from which it will be deflected back through the gap between shoulder 34 and anvil 32 and will be discharged through opening 38. A slug of standard resilience but of lower electrical resistance than standard will be retarded by magnets 30, 31 to a greater extent than a standard coin and such a slug in its restricted rebound from anvil 32 will be unable to leap the gap 32-34 but will drop directly into opening 38. A slug of standard electrical conductivity but of the improper resilience will also be discharged through opening 38 either because it strikes shoulder 33 and is deflected back into opening 38 or because it will fall directly into said opening.

All non-standard slugs rejected through openings 22, 27, and 38 drop into a refund chute which, as in the type of coin collector disclosed in the Forsberg patent, leads to an opening in the front of the housing where such rejected slugs may be recovered by the depositor.

One difficulty that may be encountered in the operation of a chute of the character just described is the possibility that a slug which is only slightly magnetic may not be retarded sufficiently by the relatively weak magnet 24 but will successfully leap gap 23-26 only to be held in the

coin channel between the powerful eddy-current magnets 30, 31. In such an instance the legitimate coin channel becomes blocked and the collector can no longer be used. Until the chute is cleared of this obstruction it is, of course, advisable from the subscriber's standpoint that any subsequently deposited coin be refunded and not held in the blocked passageway.

In accordance with one feature of this invention the upper legs of the eddy-current magnets 30, 31 are placed only a short distance below the dividing point 39 on block 26 so that any slightly magnetic slug held by the eddy-current magnets will project for a considerable distance above dividing point 39 and such a slug held by the eddy-current magnets is shown by the dotted line 40. With the slug 40 held in the position shown it is obvious that a subsequently deposited coin after striking slug 40 will be deflected back into opening 27 and be returned to the depositor in the usual manner. In order to prevent any coin or slug from coming to rest on block 26 without passing out opening 27 or entering the eddy-current channel it is preferable that the upper coin supporting surface of block 26 be longitudinally inclined with point 48 lying substantially below point 39.

At several points in the nickel runway above described it is important that every deposited coin should have the same velocity rather than a velocity depending upon the manner in which the coin is deposited or the erratic manner in which it may rebound after striking one or more of the guiding walls. Thus a coin falling between walls 19 and 20 might rebound in such a path as to strike shoulder 41 and start down bottom wall 21 with a much slower speed than that of a coin which rebounded in some other manner with the result that occasionally a genuine coin might be slowed up sufficiently to be rejected through opening 27. This invention provides means for insuring that all coins will reach pole 23 with substantially the same velocity. This result is secured by providing a V-shaped groove at the junction of walls 19, 21 with this groove extending between the points 42 and 43. A sectional view of such a groove or slot is shown in Fig. 4. It has been found that any coin falling down the vertical channel 19, 20 with its forward edge entering this V-shaped slot will lose substantially all tendency to rebound out of the slot and will smoothly start rolling down the inclined wall 21. This V-shaped slot, therefore, insures that all genuine coins will pass over magnet 23 with substantially the same velocity, thereby enabling the chute to be designed for a sharp discrimination between a coin speed that will result in acceptance and a coin speed that will result in rejection. It is preferable that the groove be so designed that a nickel will not enter the groove beyond a point about half way down the sloping wall of the groove as shown by the position of nickel 49 in Fig. 4.

In the preferred form of the invention the upper edge of block 26 also has a V-shaped groove as shown in Fig. 5. The preferred position of block 26 is such that a genuine coin will strike an intermediate point on the upper edge of block 26 with sufficient forward momentum to roll over dividing point 39 into the vertical channel containing the eddy-current magnets. The V-shaped groove in block 26 minimizes the possibility of random coin rebound therefrom and insures that genuine coins will start down the ver-

tical channel 25, 26 from substantially the same point.

In view of the free path taken by a genuine coin after leaving anvil 32 it is obvious that genuine coins may enter chute section 33, 34 in a random manner resulting in a variable coin speed at the moment the coin strikes the bell 35 and consequently resulting in a sound signal of variable intensity. In accordance with this invention the possibility of variable coin speed at signal impact is substantially prevented by providing a V-shaped groove of gradually increasing and then decreasing depth in retaining wall 44 between point 33 and point 45 and by providing a V-shaped groove in the opposite side wall 47 between points 34 and 46. In the preferred embodiment the bottom of the V-shaped groove in ledge 44 is adjacent plate 16 as shown in Fig. 7 while the bottom of the V-shaped groove in ledge 47 is adjacent the coin supporting surface of plate 17 as shown in Fig. 6.

It is to be understood that if desired still other portions of the coin channel which support the periphery of a deposited coin may be grooved in a similar manner.

What is claimed is:

1. A coin chute comprising a coin runway section having opposed side walls and a bottom wall, said bottom wall having a longitudinally inclined portion terminating in a gap over which a genuine coin must leap for acceptance, means for diverting magnetic slugs into said gap, said chute beyond said gap comprising a steeply inclined runway section, a coin supporting ledge separating said gap from said steeply inclined section, a magnet in said steeply inclined section for retarding the speed of coins or slugs in accordance with their electrical conductivity, said ledge sloping upwardly from said gap towards said steeply inclined section, said magnet being located near the upper end of said steeply inclined section to

cause a magnetic slug held by said magnet to project a substantial distance above the adjacent edge of said ledge.

2. A coin chute comprising a coin runway section having opposed side walls and a bottom wall, said bottom wall having a longitudinally inclined portion terminating in a gap over which a genuine coin must leap for acceptance, means for diverting magnetic slugs into said gap, said chute beyond said gap comprising a steeply inclined runway section, a coin supporting ledge separating said gap from said steeply inclined section, a magnet in said steeply inclined section for retarding the speed of coins or slugs in accordance with their electrical conductivity, said ledge sloping upwardly from said gap towards said steeply inclined section, said ledge defining a V-shaped groove for receiving the lower edge of any coin leaping said gap to reduce the rebound of such coin from said ledge.

3. A coin chute comprising spaced side walls, a substantially vertical coin runway section between said side walls, an anvil having a longitudinally inclined coin receiving face for receiving coins and slugs from said vertical section, an acceptance channel for receiving coins rebounding from said anvil with a certain velocity, and a reject channel for receiving slugs rebounding from said anvil with a smaller velocity, said acceptance channel being defined by spaced rails lying between said side walls and separated a distance greater than the diameter of a standard coin, one of said rails adjacent the entrance to said acceptance channel defining a V-shaped slot for directing the edge of a coin towards one of said side walls, the other of said rails adjacent the entrance to said acceptance channel defining a V-shaped slot for directing the edge of a coin towards the other of said side walls.

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