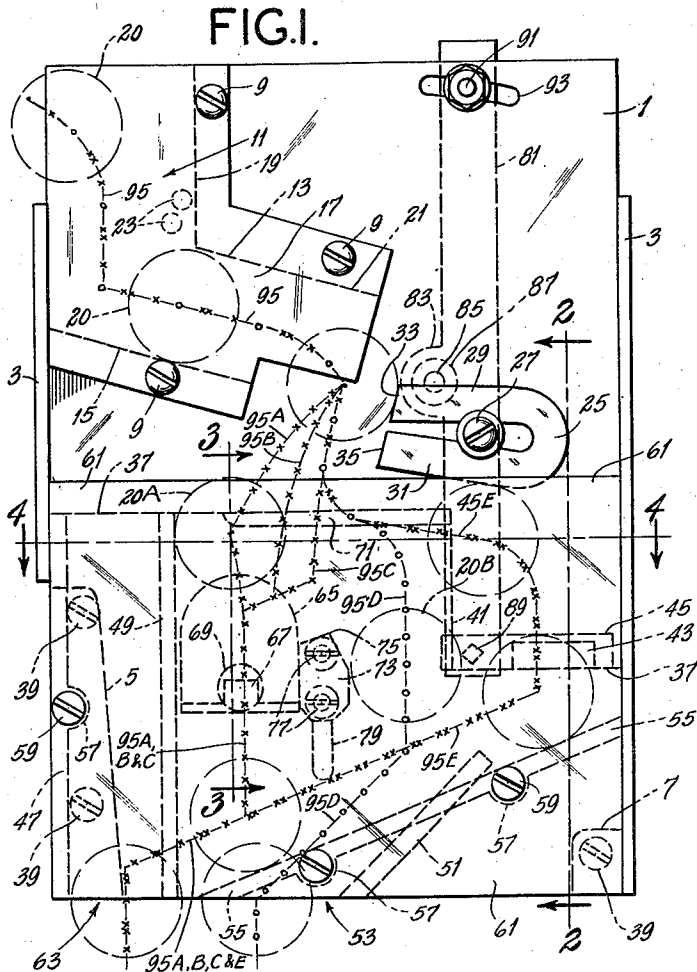


2,186,863

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LEGEND FOR FIG. 1.

- X—X—X—X—X—Y—X—X—X— DIAMAGNETIC COINS
—O—O—O—O—O—O—O—O— SLIGHTLY PARAMAGNETIC COINS
—XX—XX—XX—XX—XX—XX—XX—XX— MORE PARAMAGNETIC COINS

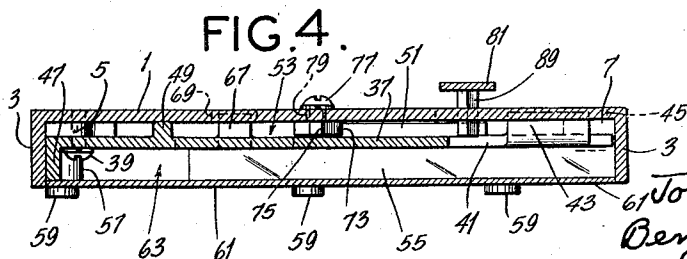


FIG.2.

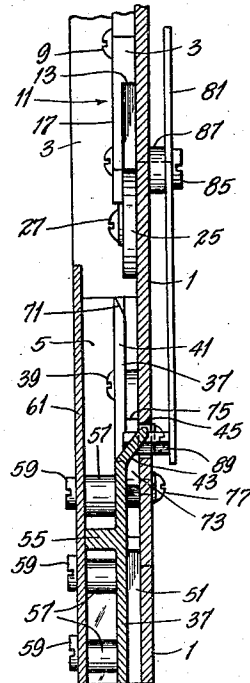
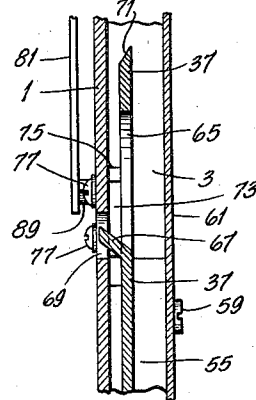


FIG.3.



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UNITED STATES PATENT OFFICE

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COIN SELECTOR

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Application February 16, 1939, Serial No. 256,660

1 Claim. (Cl. 194—101)

This invention relates to selecting devices, and with regard to certain more specific features, to devices for selecting acceptable coins from non-acceptable coins, slugs, etc.

Among the several objects of the invention may be noted the provision of selecting devices of the class described which are particularly designed and constructed for the differential selection and segregation of coins of various degrees of paramagnetic characteristics, such as to segregate effectively the five-cent pieces of the United States of America and the Dominion of Canada; the provision of selecting devices of the class described which are likewise effective to select coins of one selected degree of paramagnetism from coins not only of other degrees of paramagnetism but also from diamagnetic coins; the provision of coin selecting devices of the class described which are adapted to deliver all non-acceptable coins, slugs, etc., from a single outlet displaced from another single outlet for acceptable coins; and the provision of coin selecting devices of the class described which are simple and economical in construction and reliable in operation. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly comprises the elements and combinations of elements, features of construction, and arrangements of parts which will be exemplified in the structures hereinafter described, and the scope of the application of which will be indicated in the following claim.

In the accompanying drawing, in which is illustrated one of various possible embodiments of the invention,

Fig. 1 is a side elevation of a coin selecting device embodying the present invention; and Figures 2, 3, and 4 are cross sections taken respectively on lines 2—2, 3—3, and 4—4 of Fig. 1.

Similar reference characters indicate corresponding parts throughout the several views of the drawing.

In certain instances it is desired to separate coins of one degree of paramagnetism from all other coins (or slugs) both paramagnetic and diamagnetic. The problem of separation of coins of one degree of paramagnetism from coins of another degree of paramagnetism is considerably more difficult than that of separating paramagnetic coins generally from diamagnetic coins, because a simple test by magnetic attraction is not sufficiently sensitive. For instance, the five-cent (so-called "nickel") coins of the United States of America and of Canada are both paramag-

netic, and consequently are quite difficult to separate. The United States coin, however, has a lesser degree of paramagnetism than has the Canadian coin, so that a selection can be made on this basis, assuming sufficient sensitivity of the selecting device. The present invention affords such a device.

Referring now more particularly to Fig. 1, numeral 1 indicates a rectangular base plate, made of a preferably diamagnetic metal such as aluminum or zinc. Integral with and upstanding from the opposite vertical edges of plate 1 are flanges 3. Along the lower left-hand vertical edge of the plate 1, extending to the lower left-hand corner thereof, is a projection or mounting platform 5, and a corresponding projection or mounting platform 7 is provided at the lower right-hand corner of the plate 1.

On the upper left-hand corner of the plate 1 is mounted, as by screws 9, a coin receiving chute indicated generally by numeral 11. In commercial selecting devices this chute 11 may and preferably does embody various means for testing presented coins for various size, shape, and surface characteristics, but in the interest of simplicity such means are omitted from the present showing. Broadly, the chute 11 comprises a top wall 13, a bottom wall or runway 15, and a cover 17. The top wall 13 has a vertical portion 19 and a sloping portion 21; the bottom wall 15 is sloping and preferably parallel to the sloping portion 21. The walls 13 and 15 provide sufficient space between the plate 1 and the cover 17 to permit a coin freely to slide therebetween.

A coin 20 inserted into the chute 11 at the upper left-hand corner of plate 1 consequently first falls approximately vertically downwardly until it hits runway 15, and then rolls or slides down runway 15 towards the right. In order to make sure each coin 20 travels the full length of the runway 15, a pair of projections 23 are provided (on either the plate 1 or the cover 17) which direct inserted coins to the left, against flange 3.

Runway 15 is relatively shorter than upper wall 13, so that coins are free to fall from the end thereof in a manner hereinafter to be described.

Numeral 25 indicates a horseshoe magnet that is mounted flat on the plate 1 by a screw 27, with its legs 29 and 31 substantially horizontal and its open end to the left. The ends of legs 29 and 31, designated respectively by numerals 33 and 35, are in a common plane which is substantially at right angles to both the surface of

plate 1 and the runway 15. By loosening screw 27 the position of the magnet 25 on the plate 1 may easily be adjusted.

Numeral 37 indicates a substantially rectangular plate that is mounted on the projections or platforms 5 and 7 by screws 39, to cover substantially the entire lower half of plate 1. Plate 37 has a rectangular notch 41 provided in its upper right-hand corner, but in mid-position along the horizontal edge of notch 41 is a rearwardly-extending sloping projection 43 that enters into a rectangular hole 45 in the base plate 1.

At its left-hand edge plate 37 has an upstanding flange 47 that nests with and extends upwardly to about the same level as the left-hand flange 3 of base plate 1.

On its under side the plate 37 carries an integral rib 49 that is vertical and spaced from the left-hand edge of plate 37 a distance about equal to one coin diameter. Rib 49 extends across the space between plates 1 and 37. This space, determined by the heights of projections 5 and 7, is sufficient freely to permit a coin to slide therein. The plate 37 also carries on its under side a sloping rib 51 that terminates on the lower edge of plate 37 and extends upwardly and to the right, as viewed in Fig. 1, to a position somewhat less than the diameter of a coin and a little to the right of the left-hand edge of hole 45 in base plate 1. Rib 51 also extends across the space between plates 1 and 37, and its lower end, together with the lower end of rib 49, defines an outlet 53 for accepted coins.

On its upper surface and extending across its lower right-hand corner plate 37 carries a long sloping rib 55, which is of substantially the same thickness as flange 47. Rib 55 extends from a point on the right-hand edge of plate 37 somewhat less than a coin diameter below the horizontal edge of notch 41, to the lower edge of plate 37 at a point just to the right, as viewed in Fig. 1, of the lower end of rib 49. Rib 55 and flange 47 have enlargements 57 to receive screws 59 for holding a rectangular cover plate 61 to the device. The cover plate 61 extends over the entire lower half of the apparatus, its upper edge being somewhat higher than the upper edge of plate 37. The plates 37 and 61 and the lower edges of flange 47 and rib 55 define an outlet 63 for non-accepted coins. Flange 47 and rib 55 space plate 61 from plate 37 a distance equal to five or six coin thicknesses.

Numeral 65 indicates a hole of generally rectangular shape (with its top arched) that is provided in plate 37 just to the right of rib 49, as viewed in Fig. 1. The hole 65 is wide enough laterally to freely pass a coin, and is higher than it is wide. Its lower edge is positioned at a level somewhat below the lower side of hole 45 in plate 1. On the lower edge of hole 65 is formed a sloping projection 67 which extends upwardly and rearwardly across the space between plates 1 and 37 and enters a hole 69 provided for it in plate 1.

The upper edge of plate 37, from a point somewhat to the right of rib 49 to the notch 41, is bevelled so as to slope downwardly and toward plate 1, as indicated by numeral 71.

Numeral 73 indicates a separator block having a coin-separating point 75 presented upwardly. Block 73 is adjustably mounted on plate 1 by screws 77 extending through a slot 79 in plate 1. Block 73 extends across the space between plates 1 and 37, and is positioned just to

the right of hole 65 in plate 37, viewed as in Fig. 1.

Numeral 81 indicates a bar that has a side-wardly projecting ear 83 midway between its ends. Bar 81 pivots on a screw 85 passing through ear 83 and mounted in a boss 87 on the reverse face of base plate 1. At its lower end bar 81 carries a projection 89 which extends into hole 45 and across the space between plates 1 and 37. The projection 89 is preferably of square cross-section, so as to present a sharp upper coin-separating edge 83. Bar 81 is locked in its adjusted position by a suitable bolt 91 passing through an arcuate slot 93 in the upper end of plate 1.

The apparatus as thus described operates in the following manner:

All coins presented to the chute 11 at the upper left-hand corner of plate 1 first drop vertically and then slide downwardly to the right along runway 15. In Fig. 1, the line of movement of the centers of such coins is shown at numeral 95, and the fact that all coins move alike in chute 11 is indicated by the interruption of line 95 with small single crosses (indicating diamagnetic coins), small circles (indicating relatively less paramagnetic coins) and small double crosses (indicating relatively more paramagnetic coins).

All coins so moving acquire substantially the same velocity and inertia, so that when they pass off the end of runway 15 they are projected across the intervening space to bounce against the end face 33 of leg 29 of horseshoe magnet 25.

If the particular coin is diamagnetic, such as coin 20A, Fig. 1, the face 33 of leg 29 of magnet 25 acts simply as an anvil, and such coin bounces away from said face 33 to the left, its center following line 95A, 95B, or 95C. The distance to the left through which the particular coin will bounce depends upon its resilience, but lines 95A and 95C represent maximum and minimum resiliences ordinarily encountered. In any event, a diamagnetic coin bounces enough so that in subsequently falling its center of gravity is to the left of the separating point 75 of block 73; hence all diamagnetic coins drop to the left of block 73, encounter sloping projection 67 and are thereby guided through hole 65, drop to rib 55, and roll downwardly to the left therealong until they are discharged through non-acceptable coin outlet 63.

Coins of paramagnetic character instead of bouncing off surface 33 cling thereto instantaneously, and then, under gravity, roll downwardly over surface 35 of leg 31 and turn rearwardly, as if to follow the outer surface of said leg as along line 95E. However, because of the well-known weakening of the magnetic effect of a horseshoe magnet as the end face thereof is left, weakly paramagnetic coins almost at once pass from a magnetic field of sufficient strength to hold them adhered to the magnet, and consequently they drop off said magnet, following line 95D and assuming the position 20B. Such coins are the acceptable coins of the present embodiment of the invention, and they fall vertically down with their centers of gravity between edge 75 of block 73 and the edge of projection 89, to lodge against rib 51, to roll or slide therealong to be ejected through acceptable coin outlet 53.

In the third place coins of a more strongly paramagnetic character adhere longer to the lower edge of leg 31 of the magnet 25, and roll there-

along until their centers of gravity are to the right of the said separating edge of projection 89. Then such coins fall off magnet (see line 95D) 25, are deflected by projection 43 into the space between plates 37 and 61, drop to rib 55, and roll outwardly therealong to be ejected through the same outlet 63 as the diamagnetic coins.

The separation, therefore, it will be seen, is conditioned upon the relative susceptibility of the coin material to magnetism, and overly paramagnetic coins are not accepted but rejected, and discharged through the same outlet as diamagnetic coins.

It will be understood that the word "coin" is used herein to stand for not only legal coinage but illegal slugs and tokens.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As many changes could be made in the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

We claim:

In a coin selecting device, means providing

a sloping chute down which coins are adapted to roll, said coins being disposed in a substantially vertical plane, and a magnet with a pole face disposed at a substantially horizontal distance greater than the diameter of a coin from the lower end of said chute and with its plane substantially vertical, said pole face being thereby presented as an anvil against which coins projected from said chute will abut, said magnet having an edge of decreasing magnetic flux intensity receding from said pole face in a direction away from said chute and disposed in a substantially horizontal plane, whereby diamagnetic coins bounce from said pole face, while paramagnetic coins adhere to said pole face and then, under the influence of gravity, clingingly run down said edge a distance proportional to their paramagnetic character, finally to drop downward therefrom, separating means for segregating dropping coins of relatively greater paramagnetic character from coins of relatively lesser paramagnetic character, in accordance with the points at which said coins drop off the said magnet edge, and further separating means for segregating bounced coins of diamagnetic character from coins of paramagnetic character.

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