Nov. 7, 1950 R. M. FOUSHEE 2,528,690

PARAMAGNETIC COIN SEPARATOR

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Fig. 1.

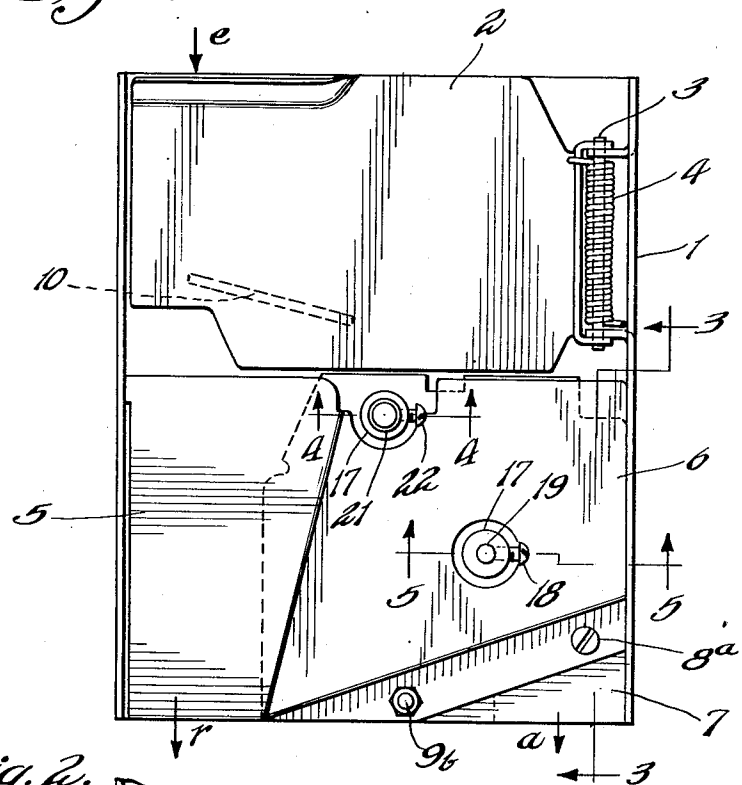
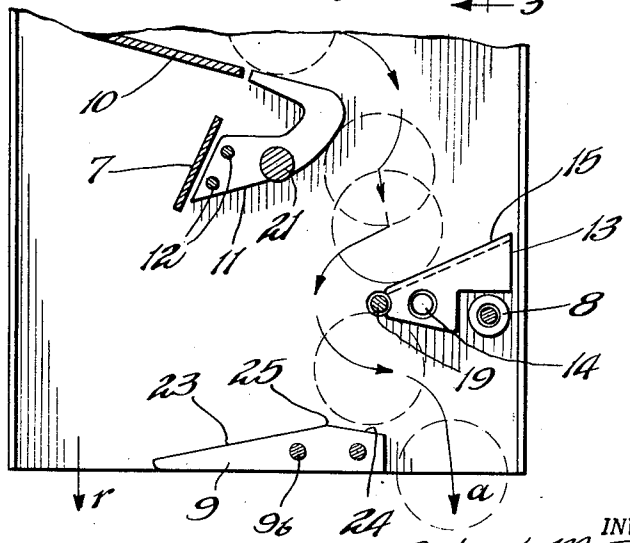


Fig. 2.



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Fig. 6.

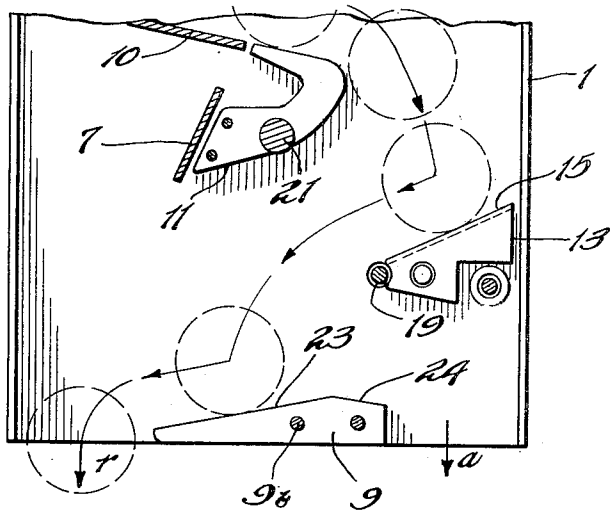


Fig. 3.

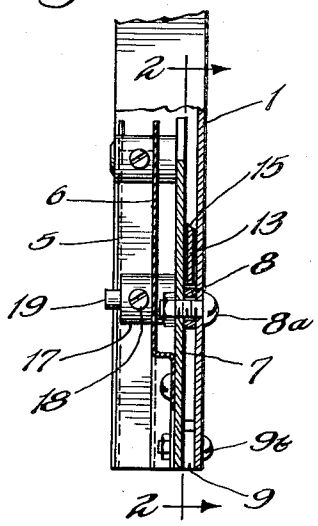


Fig. 7.

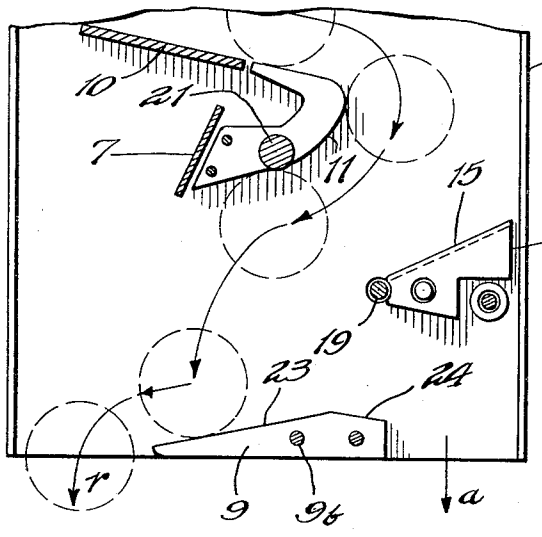


Fig. 4.

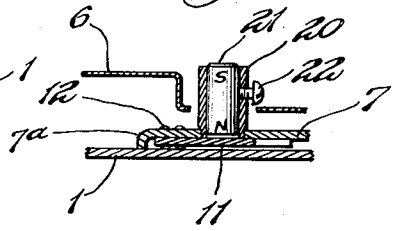
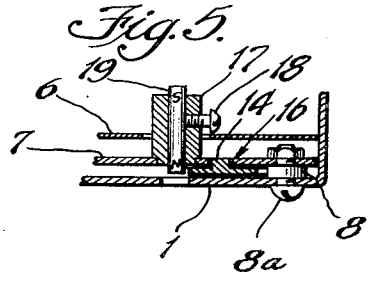


Fig. 5.



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PARAMAGNETIC COIN SEPARATOR

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Application April 26, 1947, Serial No. 744,217

3 Claims. (Cl. 194—101)

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This invention in general relates to coin selecting apparatus and more particularly to a device for sensitively separating coins having different magnetic properties. In previous devices of this general character it has been common practice to separate coins having paramagnetic properties from coins having diamagnetic properties but solution of the problem of separating coins having slightly different magnetic properties has long been desired such as separating a Canadian 5¢ piece from a United States 5¢ piece both of which are paramagnetic.

This invention is directed to a structure for separating coins having paramagnetic properties similar to the Canadian 5¢ piece from other coins having paramagnetic and diamagnetic properties and constitutes the principal object of the invention.

A further object of the invention is the provision of an adjustable magnetic path for testing coins propelled by gravity having different magnetic properties and releasing them in corresponding different predetermined trajectories.

Another object of the invention is a provision of a structure combining a magnetic testing means for projecting coins in paths corresponding to the magnetic properties of the coins and a second impacting means for arresting the movement of coins prior to engagement with a second magnetic testing means for guiding acceptable coins in a particular path.

These and other objects in one embodiment of the invention are described and shown in the following description and drawings in which:

Fig. 1 is a front elevation of the separator;

Fig. 2 is a fragmentary front elevation same as Fig. 1 with covers removed;

Fig. 3 is a fragmentary cross sectional end view taken thru section line 3—3, Fig. 1;

Fig. 4 is a fragmentary cross sectional view taken thru section line 4—4, Fig. 1;

Fig. 5 is a fragmentary cross sectional view taken thru section line 5—5, Fig. 1;

Figs. 6 and 7 same as Fig. 2, showing different coin paths.

Fig. 1 shows the entire assembly constructed within a frame 1. A gate 2 hinged to the frame 1 by pin 3 is urged into close proximity to the inside surface of frame 1 by spring 4 and provides a coin entry shown by arrow e in which

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coins to be tested are deposited. A chute 5 secured to frame 1 provides a rejection passageway indicated by arrow r. A plate 6 secured to the frame 1 provides a cover for the internal elements to be hereinafter described.

Referring to Fig. 3 a guide plate 7 secured in spaced relation to the inside surface of frame 1 by spacers 8 and 9 retained by screws 8a and 9b provides a passageway therebetween for the movement of coins deposited therein.

Referring to Figs. 2, 3, and 5, a coin entrance runway 10 integrally mounted to gate 2 provides means for conducting a coin propelled by gravity to the upper edge of a magnet pole-piece 11 which is secured to plate 7 by rivets 12—12 as shown in sectional view, Fig. 4. A coin arrester 13 is loosely supported between the inner surface of frame 1 and plate 7 by spacer 8 and a projection 14 loosely engaging a hole 16 in plate 7. Arrester plate 13 is provided with an angled sloping edge 15 as shown.

Referring to Fig. 5 a non-magnetic bushing 17 is secured to plate 7 as shown and provided with an adjustable cylindrical permanent magnet 19 which is capable of adjustable positioning along the bore of bushing 17 by screw 18.

Referring to Fig. 4 a non-magnetic bushing 20 is secured in plate 7 and provided with a longitudinal adjustable permanent magnet 21 in its bore secured by screw 22. The inner end of the magnet 21 may be adjustably positioned with respect to one side of pole-piece 11 as shown. The spacer 9 shown in Fig. 2 is provided with two sloping edges 23 and 24, the junction of which serves as an abutment 25.

In order to insure the proper separation of magnetic coins, the magnet 21 is adjusted with relation to the pole-piece 11 to cause coins having certain magnetic properties to be deflected from the contour of its working edge at predetermined positions.

In operation and referring to Fig. 2 under the assumption that an acceptable paramagnetic coin is deposited on the runway 10, it will descend upon the upper edge of pole-piece 11 and begin descent upon its right hand radii whereupon because of the predetermined magnetic strength imparted by magnet 21, it will move in a trajectory as shown and impinge upon the lower sloping edge of coin arrester 13 where the kinetic energy pres-

ent in the coin will be substantially absorbed. The coin will then descend the runway 15 and contact the projecting end of magnet 19 whereupon the coin will roll around the periphery of the magnet and descend in a free trajectory to the edge 24 of spacer 9 and then into the acceptance passageway *a*.

Referring to Fig. 6 under the assumption that a diamagnetic coin is deposited on the runway 10 it will descend along the upper surface of the pole-piece 11 and because of the lack of magnetic attraction between the pole-piece and the coin it will descend in a free trajectory to the upper edge 15 of the coin arrester 13 and thereby lose substantially all of its kinetic energy. The coin will then descend along the sloping edge 15 passing over magnet 19 because of lack of magnetic attraction therebetween to descend in a free trajectory to the sloping edge 23 of spacer 9 and continue its descent into rejection passageway *r* as shown.

Referring to Fig. 7 and under the assumption that a coin having excessive paramagnetic properties is deposited on runway 10 it will descend along the upper surface of pole-piece 11 and continue to move about the lower arcuate edge of pole-piece 11 until it assumes a free trajectory directly to the sloping edge 23 of spacer 9 whereupon it will further descend to the rejection passageway *r*.

It is apparent from the preceding operation that the shape of the arcuate contour and the adjustment of magnet 21 with respect to the pole-piece provides a means for exceedingly sensitive separation of paramagnetic coins having different magnetic properties.

The positioning of magnet 19 for proper attractive strength also contributes to the sensitivity of selection between coins having slightly different paramagnetic properties.

It is also to be noted that the arrester 13 does not serve the purpose of rebound anvil as is commonly employed in coin rejectors but on the contrary because of its loose mounting it is used to arrest the downward motion of the coin rather than to cause the coin to rebound by impact.

Having described my invention I claim:

1. A coin separator comprising a frame, means in said frame sequentially forming an entrance runway, a testing passageway and an acceptance passageway, a pole piece having an arcuate outer surface forming a descending continuation of said entrance runway, a permanent magnet positioned in said frame adjacent to said pole piece for magnetizing said pole piece, an impact absorber means loosely secured to said frame in said testing passageway, the upper edge of said means forming a sloping runway, said impact absorber being located below said permanent magnet, the space between said magnet and said impact absorber forming a gravitational drop portion of said testing passageway whereby both an acceptable paramagnetic coin, when leaving said permanent magnet descend in a free trajectory path into engagement with the lower sloping edge of said impact absorber and a diamagnetic coin when leaving said permanent magnet will descend in a free trajectory path into engagement with the upper sloping edge of said impact absorber a second permanent magnet having an arcuate outer surface positioned in said frame in proximity to the lower end of said upper sloping edge of said absorber means, whereby an acceptable paramagnetic coin descending on said entrance runway will roll around said outer surface of said pole piece a predetermined distance and descend in a free vertical trajectory to the upper edge of said absorber means and then roll along said upper edge and partially around said arcuate surface of said second magnet sufficiently far to fall into said acceptance passageway.

2. A coin separator comprising a frame, means in said frame sequentially forming an entrance runway, a testing passageway and an acceptance passageway, a pole piece having an arcuate outer surface forming a descending continuation of said entrance runway, a permanent magnet positioned in said frame adjacent to said pole piece for magnetizing said pole piece, an impact absorber means loosely secured to said frame in said testing passageway, the upper edge of said means forming a sloping runway, said impact absorber being located below said permanent magnet, the space between said magnet and said impact absorber forming a gravitational drop portion of said testing passageway whereby both an acceptable paramagnetic coin when leaving said permanent magnet descend in a free trajectory path into engagement with the lower sloping edge of said impact absorber and a diamagnetic coin when leaving said permanent magnet will descend in a free trajectory path into engagement with the upper sloping edge of said impact absorber, a second permanent magnet having an arcuate outer surface positioned in said frame in proximity to the lower end of said upper sloping edge of said absorber means, whereby an acceptable paramagnetic coin descending on said entrance runway will roll around said outer surface of said pole piece a predetermined distance and descend in a free vertical trajectory to the upper edge of said absorber means and then roll along said upper edge and partially around said arcuate surface of said second magnet sufficiently far to fall into said acceptance passageway, and a spacer located below said second permanent magnet and having oppositely sloping upper surfaces extending from an apex located between the opposite ends of said spacer.

3. A coin separator comprising a frame, means in said frame sequentially forming an entrance runway, a testing passageway and an acceptance passageway, a pole piece having an arcuate outer surface forming a descending continuation of said entrance runway, a permanent magnet positioned in said frame adjacent to said pole piece for magnetizing said pole piece, an impact absorber means loosely secured to said frame in said testing passageway, the upper edge of said means forming a sloping runway, said impact absorber being located below said permanent magnet, the space between said magnet and said impact absorber forming a gravitational drop portion of said testing passageway whereby both an acceptable paramagnetic coin, when leaving said permanent magnet descend in a free trajectory path into engagement with the lower sloping edge of said impact absorber and a diamagnetic coin when leaving said permanent magnet will descend in a free trajectory path into engagement with the upper sloping edge of said impact absorber, whereby an acceptable paramagnetic coin descending on said entrance runway will roll around said outer surface of said pole piece a predetermined distance and descend in a free vertical trajectory to the upper edge of said absorber means and then roll along said

upper edge sufficiently far to fall into said acceptance passageway.

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