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F. X. BEE

COIN DETECTOR FOR VENDING MACHINES

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FIG. I.

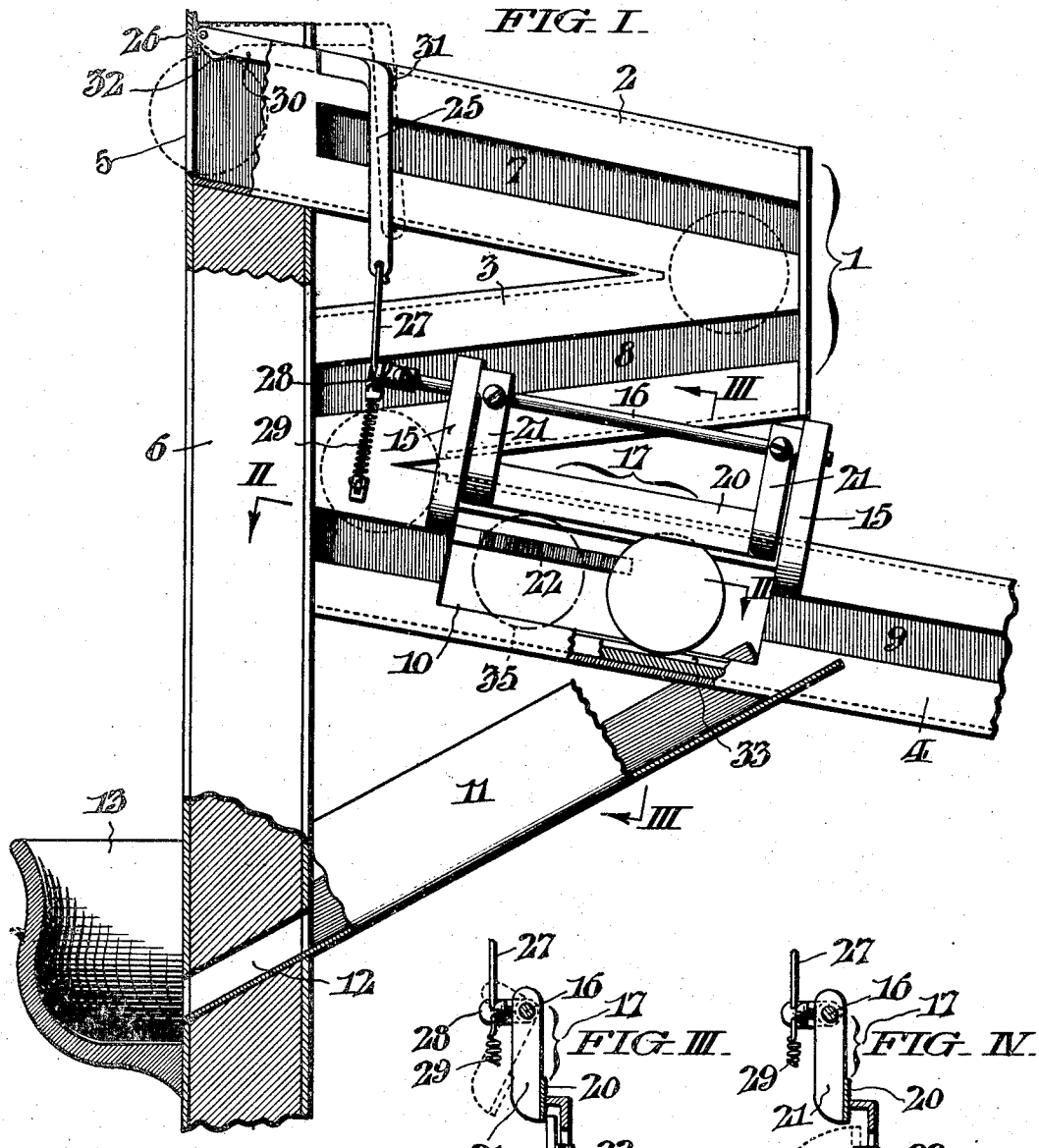
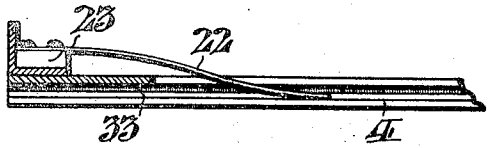


FIG. III.

FIG. IV.

FIG. II.



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UNITED STATES PATENT OFFICE.

FRANCIS X. BEE, OF PHILADELPHIA, PENNSYLVANIA.

COIN DETECTOR FOR VENDING MACHINES.

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To all whom it may concern:

Be it known that I, FRANCIS X. BEE, a citizen of the United States, residing in Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Coin Detectors for Vending Machines, whereof the following is a specification, reference being had to the accompanying drawings.

The invention relates to coin detectors such as are useful in connection with automatic vending machines, and its primary purpose is to provide a detecting device which is infallible in sorting both spurious, and other coins of incorrect denominations from those for which the vending machine is designed.

The invention is in part directed to a novel gravity coin conductor of such form that the momentum of the guided coins is so controlled as to facilitate ready sorting, and also to prevent forced operation of the actuating mechanism of the vending machine by momentum initially induced at the time of the insertion of the coins.

The invention further comprehends novel means whereby slugs of comparatively soft metals are temporarily arrested in the coin conductor, and also means whereby such slugs are ejected from the conductor upon the insertion of the next coin.

In the drawings, Fig. I, is a view partly in elevation and partly in section of a coin detecting device conveniently illustrating my invention.

Fig. II, is a detailed sectional view of the same indicated by the arrows II—II in Fig. I, longitudinally through the coin conductor at the region of its ejection opening.

Fig. III, is a cross section through the coin conductor as viewed in the direction of the arrows III—III in Fig. I, showing the manner of passage of the proper coin for which the device is designed;

Fig. IV, is a view similar to Fig. III showing the manner in which coins of diminutive size are automatically ejected from the coin conductor.

The organization herein illustrated, comprises a gravity coin conductor comprehensively indicated at 1, preferably zigzagged in form and consisting of a succession of oppositely inclined segments 2, 3 and 4. This conductor leads from a coin slot 5, in the front panel 6, and is functional in guiding the coin to the actuating mechanism (not shown) of the vending machine proper. The conductor is of such cross sectional configuration as to conveniently accommodate the proper coin for which the machine is adapted and to permit passage with absolute freedom under the influence of gravity. Except for the longitudinal side openings, 7, 8, the segments 2 and 3, are closed channels, and this is also true, for the most part, of the segment 4, which is likewise formed with a side opening 9. At one point, however, the latter segment is interrupted as at 10, so that spurious coins or those of smaller dimensions than the predetermined standard may be ejected from the conductor and discharged into a chute 11, which leads through an opening 12, in the front panel and terminates in a receiving cup 13, upon the exterior.

Attached to the side of the conductor segment 4, are bearing brackets 15—15, within which is journaled a rock shaft 16. Fixed to said shaft between its bearing brackets is a swinging member 17, in the form of a flat strip 20, suspended by means of arms 21—21. As will be seen by reference to Fig. III, the strip 20 is disposed longitudinally with respect to the coin conductor, and normally serves to preserve the continuity of the segment 4, at the region of its opening 10; but when swung to the dotted position in the same figure, it permits spurious coins arrested (in a manner to be explained later herein) to be ejected into the discharge chute 11. The strip 20, is formed as a permanent magnet so as to be capable of temporarily detaining slugs of iron or steel within the conductor, and its inner side is serrated or otherwise roughened as shown to afford an abrasive surface adapted to assist in arresting slugs of comparatively softer metals such as lead, zinc, etc. In accomplishing this latter office, the strip 20, is assisted by a comparatively light spring finger 22, which is arranged in opposition and projects into the opening 10, of the segment 4, from the far side of the structure as viewed in Fig. I. From Fig. II, it will be noted that this spring finger extends outwardly from a fixed anchorage 23, and that its free end is also notched or serrated for a reason already explained. Said finger is further functional in deflect-

ing arrested coins laterally from the coin conductor and into the discharge chute 11; for this reason it is disposed somewhat above the center of the opening 10, in the segment 4, so as to engage the sides of such coins well toward their tops. The element 17, is actuated by a lever 25, fulcrumed at 26, to the upper segment 2, and connected by means of a link 27, with a crank arm 28, on the left hand end of the rock shaft 16, a coil spring 29, serving to maintain the interconnected parts in the normal positions illustrated. The portion 30, of the actuating lever 25, when in its normal position, is coincident in slope with the segment 2, and serves as a closure for the top of the coin channel at this point, while the depending portion of the lever extends laterally to the exterior of the segment through a clearance cut 31. At a point directly adjacent its fulcrum, this lever is formed with a rounded cam projection 32, adapted to be engaged by the coin inserted through the receiving slot 5, to effect movement of the lever as shown by the dotted lines in Fig. I.

Referring once more to Figs. I and III, it will be noted that the bottom of the coin channel in the conductor segment is formed with a V groove 33, so that coins of different thicknesses may roll in different planes thereby affording an additional means for effecting selective sorting.

The operation of the device is as follows: Upon the insertion of the coin of a proper denomination (five-cent piece in this instance) into the receiving slot 5, the same rolls under the influence of gravity through the successive segments of the coin conductor and passes on to the actuating mechanism of the vending machine, the adjustment of the various elements of the detecting mechanism being such that the momentum acquired by the coin during travel is sufficient to overcome their resistance, the opposed abrasive surfaces of the parts 20 and 22, being ineffective on account of the hardness of the coin composition. An unduly light disc, on the other hand, would not acquire sufficient momentum to pass the detecting mechanism, but would be arrested thereby and subsequently ejected. An iron disc, even though it be of the proper size and weight, will be arrested in the conductor segment 4, by the attraction of the magnet strip 20, of the element 17, and during the subsequent movement of the latter during the insertion of another coin, will be ejected laterally from the conductor, through the opening 10, and into the discharge chute 11. In the case of a lead slug, the frictional resistance of the opposed abrasive surfaces of the strip 20, and the spring finger, serves to detain the same in the conductor, and ejection is subsequently effected, as before, by the succeeding movement of the element 17. A smaller coin such as represented, in dot and dash lines at 35, in Fig. I, and in full lines in Fig. IV, on account of its not engaging in the conductor behind the overhanging ledge formed by the strip 20, simply drops laterally from the conductor segment under the thrust of the spring finger. Thin coins, although they be of the same diameter as those for which the machine is designed, also drop out, because by virtue of their thinness they run lower in the V groove in the bottom of the conductor segment 4, than the predetermined standard, and, as a consequence, their upper edges fail to engage behind the ledge afforded by strip 20, as in the previous instance. Thus it will be seen that the structure herein set forth provides for the discrimination and ejection of all types of spurious coins, and also those of diminutive size and thickness. By the peculiar configuration of the coin conductor, the movement of the coins is so controlled as to facilitate the ready sorting of the spurious from the proper coins, and so that operation of the vending machine cannot be effected through any initial momentum artifically determined, or induced by forced insertion of the coin, as is sometimes possible in machines where a straight conductor leads directly to the operating mechanism proper.

Having thus described my invention, I claim:

1. In a device of the character described, the combination of a coin conductor with a lateral ejection opening; abraded magnetic means controlled by momentum and hardness of the coins for arresting and retaining spurious ones at said opening; and resilient means for subsequently releasing and discharging coins so arrested.

2. In a device of the character described, the combination of a coin conductor with a lateral ejection opening, a V groove for the lower edge of the coin at said opening adapted to coact with the edge of the ejection opening to release coins which are too thin, means for ejecting coins which are too small sidewise through said opening and means for arresting and retaining other spurious coins of soft or magnetic metal, said joint means functioning when actuated by insertion of a subsequent coin in the device for releasing and discharging coins so arrested.

3. In a device of the character described, the combination of a substantially closed coin conductor interrupted at one point by an ejection opening; a member having an abrasive facing serving to preserve the continuity of the conductor at the region of its ejection opening; a resilient finger cooperative in opposition to said facing in detaining slugs of comparatively soft metal

in the conductor; said member and finger also functioning to subsequently release said slugs to permit them to fall from said conductor.

4. In a device of the character described, the combination of a substantially closed coin conductor interrupted at one point by an ejection opening; a magnet having an abrasive facing serving to preserve the continuity of the conductor at the region of its ejection opening and serving to arrest slugs of magnetic metals; a resilient finger co-operative in opposition to the abrasive facing of the magnet in detaining slugs of comparatively soft metal in the conductor; said magnet and finger also functioning to subsequently release the slugs to permit them to fall from the conductor.

5. In a device of the character described, the combination of a substantially closed coin conductor interrupted at one point by an ejection opening; a movable element normally serving to preserve the continuity of the conductor at the region of its ejection opening, said element having an abrasive facing; a resilient finger co-operative in opposition to the abrasive facing of said element in detaining slugs of comparatively soft metal in the conductor; and means for actuating said movable element to release such slugs to permit them to fall from the conductor.

6. In a device of the character described, the combination of a substantially closed coin conductor interrupted at one point by an ejection opening; a movable element normally serving to preserve the continuity of the conductor at the region of its ejection opening, said element having an abrasive facing; a resilient finger co-operative in opposition to the abrasive facing of said element in detaining slugs of comparatively soft metal in the conductor; and means controlled by newly inserted coins for actuating said movable element to release the detained slugs from the conductor.

7. In a device of the character described, a coin chute having a lateral discharge opening, a magnetic strip extending longitudinally of the coin chute forming part thereof and bridging the opening, a hinge support for said strip, means located at the mouth of the chute and operable by the insertion of a coin to swing the hinge supported magnetic strip and release any magnetic object arrested thereby, and a resilient finger engaged by the coin or other object to eject the same from the opening.

In testimony whereof, I have hereunto signed my name at Philadelphia, Pennsylvania, this 17th day of May, 1920.

FRANCIS X. BEE.

Witnesses:
JAMES H. BELL,
E. L. FULLERTON.