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AUTOMATIC DISTRIBUTOR

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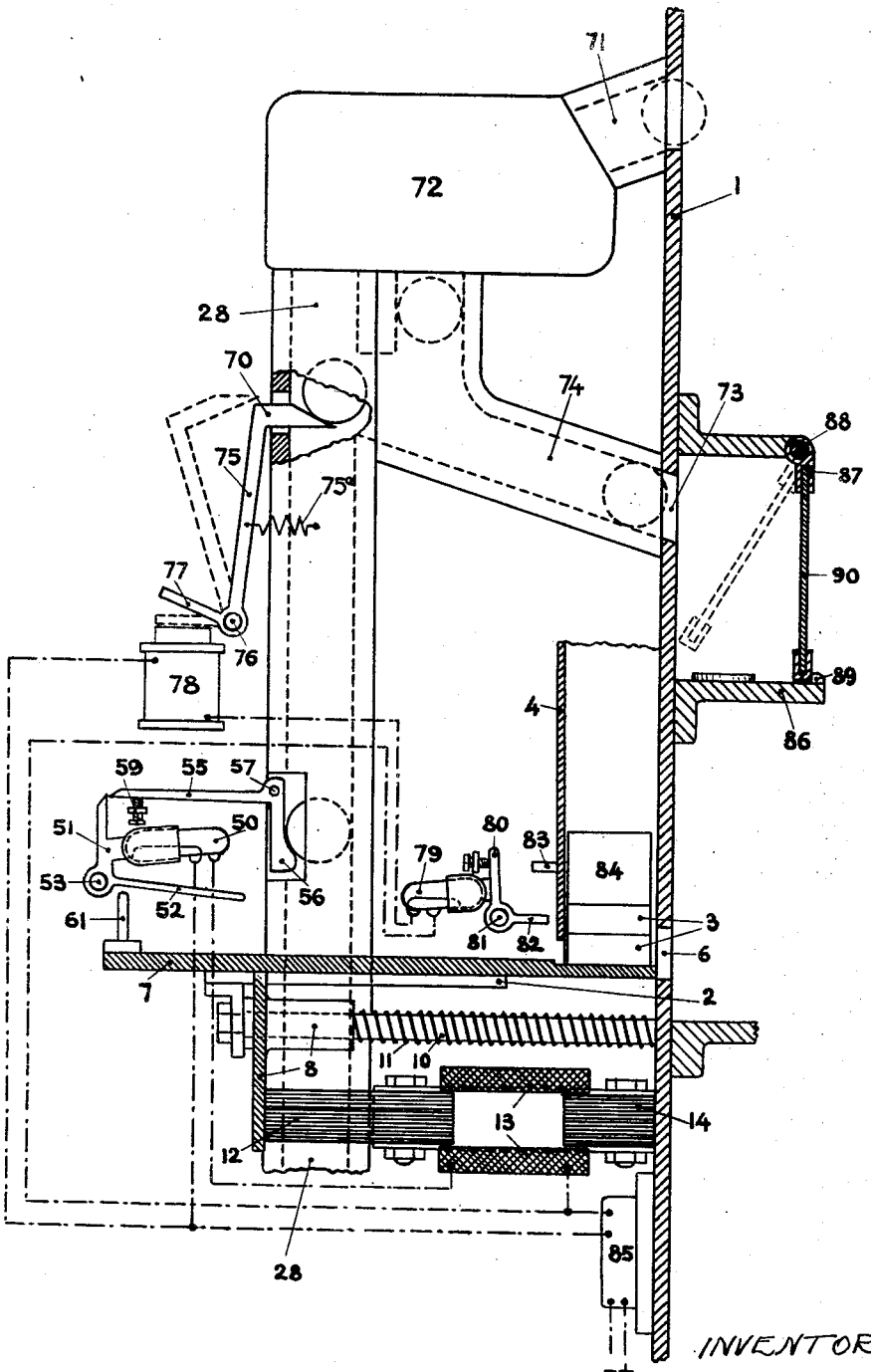

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AUTOMATIC DISTRIBUTOR

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4 Claims. (Cl. 194—10)

This invention relates to vending machines of the type in which the article ejecting or delivery device is electrically operated, and has generally in view to provide means whereby the machine cannot be made to operate except by the insertion of a proper coin or check into the same, and whereby a proper coin or check inserted into the machine is returned under certain conditions as, for example, when the article magazine becomes empty, or when the electrically operated article delivery means fails to function properly due either to failure of the current or to jamming of the ejector or to other causes.

With the foregoing general object in view, the invention consists in the novel combination of features as will be hereinafter more fully described, illustrated in the accompanying drawing and defined in the appended claims.

In the drawing:

The figure is a vertical section through a portion of a vending machine equipped with coin return mechanism in accordance with one practical embodiment of the invention.

Referring to the drawing in detail, 1 designates the front wall of a vending machine, 4 designates an open-bottom magazine disposed within the machine to contain the stacked articles 3 to be dispensed, 6 designates an opening in the wall 1 adjacent to the open bottom of the magazine through which the articles 3 are to be dispensed, and 7 designates an article ejecting element in the form of a horizontally disposed projectable and retractable pusher plate having a normally retracted position in which its outer end portion underlies the open bottom of the magazine 4 and supports the stack of articles 3, said pusher plate having a shoulder which is disposed inwardly of the lowermost article 3 when said plate is retracted so that upon projection of said plate the lowermost article is pushed from the stack through the opening 6.

The pusher plate 7 is supported for projection and retraction upon a suitable support designated as 2 and is provided with a depending portion 8 carrying a solenoid core 12 which extends forwardly into a solenoid winding 13 carried by a laminated frame 14 mounted upon the wall 1 or upon any other suitable support.

Underlying the pusher plate 7, parallel thereto, is a rod 10 which extends loosely through a suitable guide formation on the depending portion 8 of said plate and which, between said guide formation and the front wall 1 of the machine, is surrounded by a coil spring 11. A suitable stop such as an abutment on the rod 10 determines the limit of retractive or inward movement of the plate 7 and the spring 11 tends constantly to retract or move said plate inwardly until it is halted by said stop. On the other hand, when the solenoid 12, 13, 14 is energized it operates to effect projection of the plate 7 and consequent compression of the spring 11. Therefore, whenever the solenoid is energized with consequent projection of the plate and then is de-energized, the spring 11 immediately operates to return the plate to its normal retracted position as shown.

At 71 is designated a coin inlet or deposit portion of a coin chute which opens through the wall 1 and which has connected with its inner end a coin selector of any known or suitable type designated generally as 72. In a known manner this selector operates to reject any improper coin or check inserted into the chute 71, causing the improper coin or check either to be deflected into a suitable collection vessel or to enter a discharge or coin return chute, designated as 74, which leads through the wall 1 as at 73 into a box-like casing 86 at the outer side of the wall 1. In this connection and in order to prevent any unscrupulous person from obstructing the coin return chute for the purpose of collecting periodically any coins which may accumulate therein, the casing 86 is provided at its front with a door 87 which is hinged at its top, as at 88, to the top of the casing so that it tends constantly to assume a closed vertical position against a stop 89 which prevents its outward swinging movement beyond said position. It is not possible by inward swinging movement of this door 87 to obtain access to the coin return chute for the purpose of obstructing the same. However, simply by swinging the door 87 inwardly, access may be had to the casing 86 for the purpose of removing any coin which may fall into the same from the coin return chute. If desired, the door 87 may be provided with a transparent window 90.

Extending downwardly from the selector 72 is the coin chute proper, designated as 28, with which is connected the inner end of the coin return chute 74, and where the chute 74 is connected with the chute 28 there is movable into and from the latter chute, through an opening in one of the walls thereof, a coin deflector member 70.

The selector 72 does not affect the passage of a proper coin or check from the chute portion 71 to the chute proper 28, and when the deflector member 70 is withdrawn from the chute 28 a coin is free to fall through said chute. When, however, the deflector member is moved into the

chute 28 into the path of a descending coin, the coin is deflected into the coin return chute 14.

The deflector member 10 is illustrated in the present instance as comprising a lateral extension at the upper end of a substantially vertically disposed lever arm 15 which is pivoted at its lower end, as at 16, to a suitable support and which includes at its lower end a lateral extension 17 constituting the armature of an electro-magnet 18. A light spring 15a tends constantly to swing the lever arm 15 to a position in which the deflector member 10 is disposed within the chute 28 to deflect coins through the coin return chute 14, but normally the electro-magnet 18 is energized and holds said lever arm in the position shown by dotted lines in the drawing, thereby maintaining the deflector member 10 withdrawn from the chute 28. If desired, the spring 15a may be eliminated by forming and arranging the lever arm 15 so that it tends constantly to swing under the influence of gravity to project the deflector member 10 into the chute 28.

The electro-magnet 18 forms part of an electric circuit including a tiltable mercury switch 19. This switch 29 is mounted on a substantially vertically extending arm 80 of a bell crank lever 82 which is pivoted to a suitable support adjacent to the lower end of the article magazine 4 and which includes a substantially horizontally disposed arm extending into the path of downward movement of a finger or projection 83 on a weight 84 which is disposed upon the top of the stack of articles 3 contained in the magazine 4. The finger 83 may project for example through a slot in a wall of the magazine 4. In any event, the substantially horizontally disposed arm of the bell-crank lever 82 is so arranged that it is engaged and swung downwardly by the finger 83 on the weight 84 when the last article 3 has been ejected from the magazine 4. Normally the switch 19 swings by gravity to a position in which it closes the circuit of the electro-magnet 18, thereby maintaining the coin deflector member 10 normally withdrawn from the chute 28. When, however, said switch 19 is tilted by the cooperation of the finger 83 with the second mentioned arm of the bell-crank lever 82, the circuit is interrupted and the deflector member 10, being no longer restrained by the electro-magnet 18, is moved by the spring 15a or by gravity into the chute 28 to deflect coins through the return chute 14. Thus it is apparent that when the magazine 4 does not contain articles to be dispensed, or if for any reason the current fails, a coin deposited in the chute 11 will be returned through the chute 14.

The invention additionally includes means whereby coins will be returned if the article ejecting means becomes jammed for any reason. Above the pusher plate 7 is pivoted, as at 53, a bell-crank lever including a substantially vertically disposed arm 51 and a substantially horizontally disposed, forwardly extending arm 52. On a forward extension of the arm 51 is mounted a mercury switch 50 forming part of a circuit including the solenoid winding 13 and supplied with current from the same source as the electro-magnet 18. Under the influence of gravity the bell-crank lever tends constantly to swing forwardly and downwardly or, in other words, clockwise as illustrated in the drawing. When so swung the contacts of the mercury switch are bridged by the mercury and the solenoid circuit is closed. Normally, however, the bell-crank lever is held by a coin releasable trigger in a position in which the mercury switch maintains the solenoid circuit open.

The coin releasable trigger referred to is in the form of a bell-crank lever pivoted as at 57 to any suitable support and includes a substantially horizontally disposed rearwardly extending arm 55 and a substantially vertically disposed downwardly extending arm 56. Under the influence of gravity this bell-crank lever or trigger tends constantly to swing in a counter-clockwise direction as viewed in the drawing to its normal position as determined by contact of the arm 55 with an adjustable stop 59. In this position of said trigger the free end of the arm 55 is disposed in the path of swinging movement of the arm 51 of the bell-crank which carries the mercury switch 50. The arm 51 normally is disposed inwardly of the trigger arm 55 and as a consequence the mercury switch 50 normally is restrained by said trigger arm against downward swinging movement. When the mercury switch 50 is so restrained it maintains the solenoid circuit open.

When the trigger is in its normal position a lower end portion of its arm 56 extends through an opening in a wall of the chute 28 into the latter so that when a coin descends through said chute it engages the lower end portion of the arm 56 and swings said arm outwardly, thereby elevating the arm 55 and releasing the mercury switch for downward tilting movement. When this occurs, the solenoid circuit is closed by the switch 50 and the solenoid operates to effect projection of the pusher plate 7 thereby to eject the lowermost article 3 of the stack from the magazine 4. On the pusher plate 7 is a pin 61 which underlies the arm 52 and which, upon outward movement or projection of the pusher plate, engages said arm 52 and elevates the same, thereby returning the mercury switch 50 to its normal or starting position and interrupting the solenoid circuit. This occurs just as the outward movement of the pusher plate is completed. Thereupon the spring 11 operates to return the pusher plate to its normal retracted position. When the arm 52 is swung upwardly by the pin 61 during projection of the pusher plate, the arm 51 is moved behind the trigger arm 55 and the latter gravitates to its normal position in front of the arm 51, thereby restoring the mechanism to its original condition in readiness to repeat the operation just recounted upon the falling of another coin through the chute 28.

The circuits of the solenoid winding 13 and the electro-magnet 18 are supplied with current from a common source under the control of a thermal switch 85. This switch is of any known or suitable construction to permit a constant flow of a small current through the electro-magnet 18 to maintain the same normally energized and, moreover, is of such construction as to permit a large flow of current (sufficient to operate the solenoid) for a short period of time. It operates in known manner, however, to cut off the supply of current if for any reason the solenoid circuit is maintained closed over a period of time only slightly in excess of the period of time required for projection of the pusher plate 7 under normal conditions. For example, thermal switches suitable for the purposes of the present switch are disclosed in U. S. Patents Nos. 823,295; 1,640,701; 1,897,118; 1,920,030 and 1,924,647. If, therefore, following coin actuation of the trigger to release the mercury switch

50 and subsequent tilting and closing of said switch with consequent closing of the solenoid circuit, the pusher plate 7 should for any reason become jammed so that it cannot move forwardly to elevate the mercury switch 50 and effect opening of the solenoid circuit, the thermal switch 85 then operates to cut off the supply of current to both the solenoid 13 and the electro-magnet 78. When this occurs, the coin deflector member is moved into the coin chute 28 and deflects any deposited coins into the coin return chute 74.

Without further description it is thought that the features and advantages of the invention will be readily apparent to those skilled in the art, and it will of course be understood that changes in the form, proportion and minor details of construction may be resorted to, without departing from the spirit of the invention and scope of the appended claims.

We claim:—

1. In a vending machine, a main coin chute, electrically operated article ejecting means, means for operation by a coin passing through the main coin chute to control ejecting operation of said article ejecting means, a coin return chute leading from the main coin chute between said last named means and the inlet end of the main coin chute, a coin deflector member also disposed between said last named means and the inlet end of the main coin chute and tending constantly to move into the main coin chute to deflect coins through said coin return chute, and normally energized electrical means operated from the same source as said article ejecting means maintaining said coin deflector normally withdrawn from the coin chute, whereby, in the event of failure of the current supply for actuating the article ejecting means, the coin deflector moves into the coin chute to deflect coins through the coin return chute before the coins can reach the means for controlling the ejection of articles from the machine.

2. In a vending machine, a main coin chute, electrically operated article ejecting means, means for operation by a coin passing through the main coin chute to control ejecting operation of said article ejecting means, a coin return chute leading from the main coin chute between said last named means and the inlet end of the main coin chute, a coin deflector member also disposed between said last named means and the inlet end of the main chute and tending constantly to move to a position to deflect coins from the main coin chute through said coin return chute, and normally energized electrical means operated from the same source as the article ejecting means maintaining the coin deflector member normally in a position in which it does not deflect coins through said coin return chute, whereby in the event of failure of the current supply for actuating the article ejecting means, the coin deflector moves to its first mentioned position before the coins can reach the means for controlling the ejection of articles from the machine.

3. The combination as set forth in claim 1 including a thermally operable switch controlling the supply of current to the article ejecting means and the coin deflector restraining means operable to cut off the supply of current to said means if for any reason the circuit through the article ejecting means remains closed in excess of a predetermined period of time.

4. The combination as set forth in claim 2 including a thermally operable switch controlling the supply of current to the article ejecting means and the coin deflector restraining means operable to cut off the supply of current to said means if for any reason the circuit through the article ejecting means remains closed in excess of a predetermined period of time.

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