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2,951,635

RELAY FOR COIN COLLECTOR

Filed Dec. 18, 1957

3 Sheets-Sheet 1

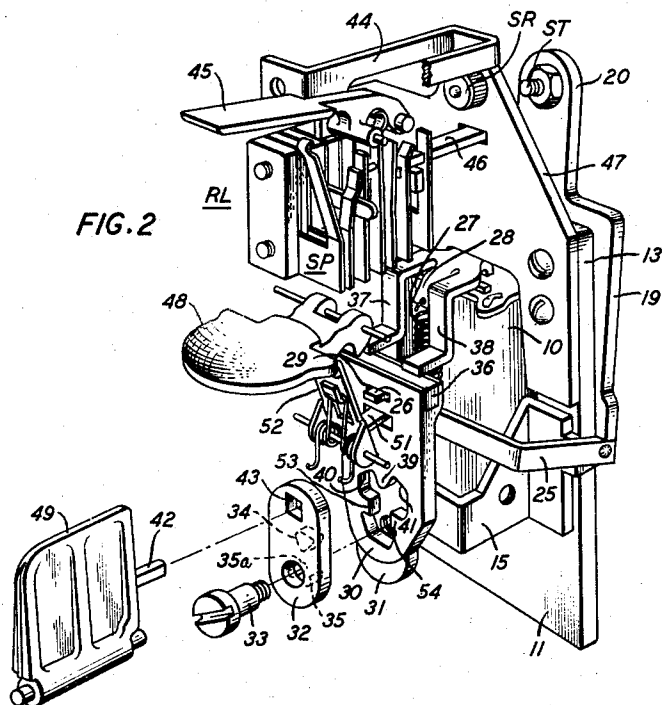


FIG. 3A

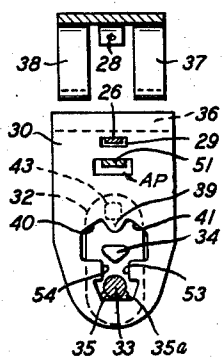


FIG. 3B

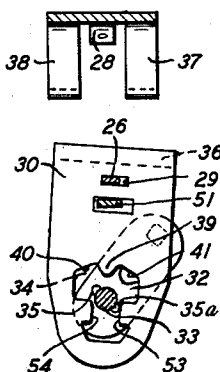
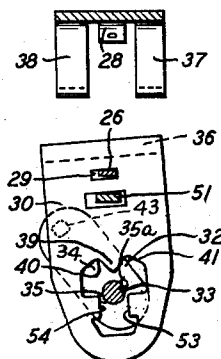


FIG. 3C



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FIG. 4

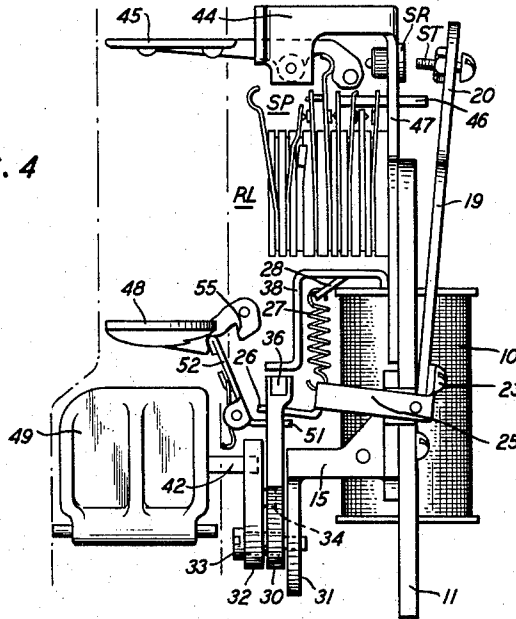
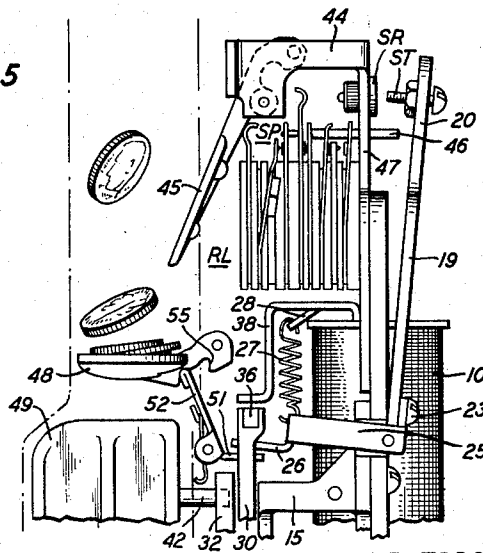


FIG. 5



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3 Sheets-Sheet 3

FIG. 1

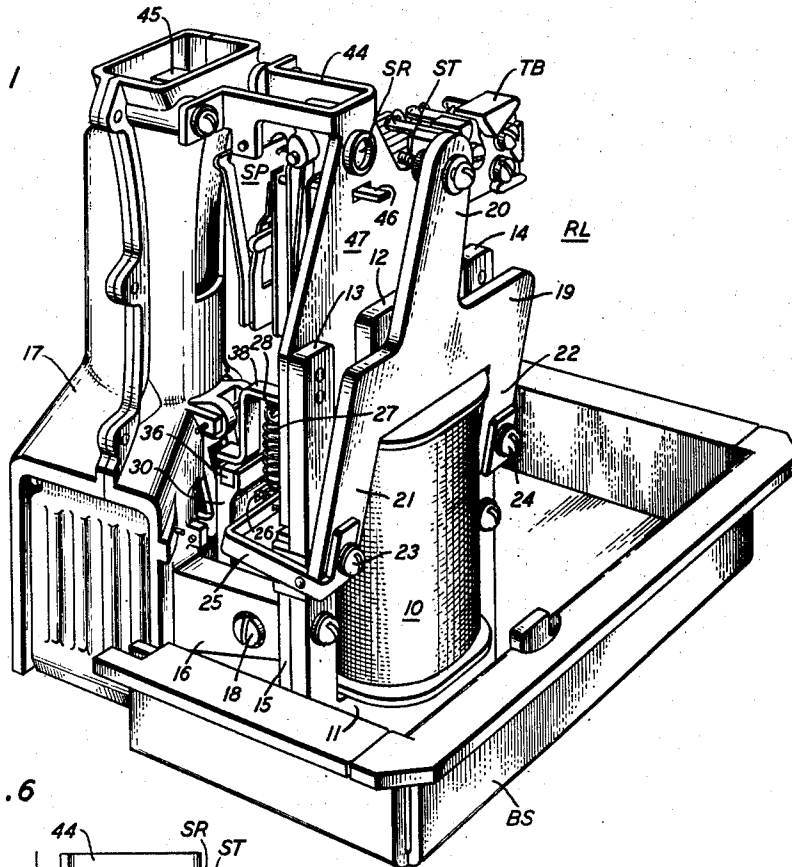
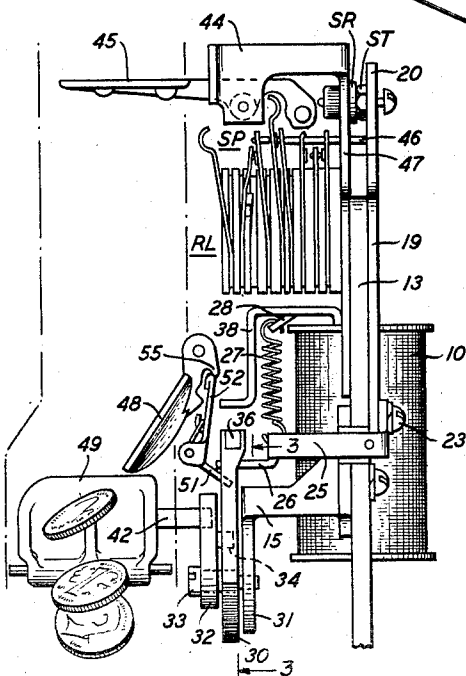


FIG. 6



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RELAY FOR COIN COLLECTOR

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3 Claims. (Cl. 232-57.5)

This invention relates to coin collectors for use at telephone pay stations and more particularly to an electromagnetic coin handling and switching mechanism therefor.

The telephone pay station to which our present invention is applicable is disclosed generally in Patent 1,043,219 to O. F. Forsberg to which reference is made for a more complete description of the apparatus.

In the operation of telephone coin collectors, a coin or token is deposited by the customer. The coin in its passage operates certain mechanisms which cause the operation of a switch which completes a circuit to the central office to operate a signal thereat to indicate that communication is desired.

As disclosed in the Forsberg patent, heretofore referred to, the mechanism includes an electromagnet which may be operated in one direction to collect the deposited coin and in the other direction to return the coin to the refund compartment. The operating circuit for this electromagnet includes the switch contacts which are closed when the coin is deposited.

In the coin collectors in use today, while performing in a highly satisfactory manner, fine adjustment of the clearance and the tensions of various springs and levers is required.

The present invention has as its principal object the simplification of the operating mechanism used in coin collectors of the prepay type and to insure their reliability and contemplates the use of a single electromagnet having associated therewith an armature operatively connected to a selector card and a cam member operated thereby. The selector card is slidably and pivotally mounted and is constructed of insulating material, preferably nylon.

Imbedded in the upper edge of the selector card and extending substantially the full width thereof, is a permanent magnet. This permanent magnet is in spaced relation with respect to a pair of pole pieces which extend from the core of the electromagnet. The selector card will thus tilt either to the right or to the left depending upon the direction of the current flow through the electromagnet, and at the same time will move downwardly under the influence of an operating bar and lug connected to the armature. This combined action causes the cam member, operatively connected to the selector card, and also to a coin diverting vane, to operate the vane either to collect or refund the coin depending upon the direction of the current flow through the electromagnet which is under the control of the operator at the central office.

The invention will be more clearly understood from the following detailed description when read with reference to the accompanying drawings in which:

Fig. 1 is a view in perspective illustrating the general form of the improved coin collector mechanism of our invention;

Fig. 2 is an exploded view in perspective of the coin relay and its associated parts;

Fig. 3A is a fragmentary view, looking from the rear,

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taken on line 3-3 of Fig. 6 illustrating the selector card and its associated cam in their normal positions;

Fig. 3B is a view similar to Fig. 3A, but illustrates the selector card and the cam in the positions they assume when operated to collect;

Fig. 3C is a view similar to Fig. 3B, but illustrates the selector card and cam in the refund position;

Fig. 4 is a fragmentary side elevational view of the mechanism with its operating components in normal position;

Fig. 5 is a view similar to Fig. 4 but shows the upper hinged shelf member or gate operated by the passage of coins, with the coins resting on the lower gate and the contact springs, which control the circuit to the central office, closed; and

Fig. 6 is a view similar to Fig. 5 but illustrates the upper gate restored to its normal position and the lower gate operated with the coins being directed to their proper channel by the vane which is controlled by the selector card through the cam.

In a preferred embodiment of our invention as shown in the various figures and with particular reference to Fig. 1, we have provided an electromagnetic device comprising a single electromagnetic coil 10 which is supported on an E-shaped core 11 with the coil positioned over the center leg 12 between the outer legs 13 and 14.

A yoke member 15 as shown in Fig. 2 is secured to the rear side of the core 11 and serves to support the assembly by being secured to the arms 16 which extend from the coin chute casting 17, by means of screws 18.

A substantially flat U-shaped armature 19, having an extending ear portion 20 on the top thereof and a suitable stop pin ST and a cooperating spring member SR, is hingedly mounted on the outer surface of the legs 13 and 14 of the core 11 midway with respect to the top and bottom edges thereof. Secured to the bottom portions 21 and 22 of the armature 19 adjacent the hinges, by means of the screws 23 and 24, is the yoke member 25. Extending rearwardly from the yoke 25 is an integral ear or lug 26, the purpose of which will be explained later on in the specification.

In order to bias the armature 19 and hold it in its unoperated position away from the core leg 12, a spring 27 is provided, one end of which is secured to the yoke 25 and the other to an extending ear 28, which forms part of the core 11.

Associated with the armature 19 and adapted for movement therewith, is the ear 26 on the yoke member 25 heretofore referred to. The free end of the ear 26 is positioned in an enlarged aperture 29 in the selector card 30 as shown in the various figures and with particular reference to Figs. 3A, 3B and 3C, and is thus operatively connected thereto as shown in more detail in Fig. 2.

As shown in the various figures and with particular reference to Fig. 3A, the selector card 30 which is preferably constructed from an insulating material such as nylon, is slidably and pivotally mounted adjacent the downwardly extending ear portion 31 of the yoke 15, and has operatively associated therewith a cam member 32. The cam 32 is pivotally mounted on the stud 33, parallel with and in spaced relation with respect to the card 30 and is adapted to tilt either to the right or the left as shown in Figs. 3B and 3C by virtue of the protuberance 34 and the teeth 35-35a.

In order to cause the functioning of the selector card 30 and its associated cam 32 as heretofore described when the relay RL is energized, there is imbedded in the top edge of the card 30, a permanent magnet 36 which cooperates with the pole pieces 37 and 38, to establish a secondary magnetic circuit therethrough and through the magnet 36, to tilt the card slightly to the right or left depending upon the direction of the current flow. Pole

pieces 37 and 38 are of the same polarity with respect to one another but reverse their polarity with change in direction of current flow through the electromagnet. The direction of current flow through the electromagnet is under the control of the central office operator either to collect or refund a coin or coins.

As shown in Figs. 3B and 3C, the tilting of the card 30 to the right or left causes the card to assume a position with respect to the cam 32 and with respect to the protuberance 34 and the teeth 35—35a on said cam so that the downward travel of the card 30 under the influence of the ear 26 on the yoke 25, as shown, will cause one or the other of the teeth 35—35a to be struck by the corresponding one of the teeth 54 or 53 on card 30 respectively. The rotation of cam 32 due to the engagement of these teeth causes the protuberance 34 to engage and slide over the hump 39 in the apertured portion of the card 30 and come to rest either against the portion 40 or 41 thereof. Depending upon the direction in which the card 30 is tilted (for example in Fig. 3B, looking from the rear the card 30 is tilted to the right and in Fig. 3C also looking from the rear, to the left) the cam 32 will assume the positions shown and carry with it an arm 42 positioned in the aperture 43 as shown in Fig. 2.

Mechanically associated with the mechanism heretofore described and secured thereto to form a compact unit is a coin chute casting 17. Pivotaly mounted on the bracket member 44 and extending into the coin chute 17 at its upper end, as shown in Figs. 2, 4, 5, and 6, is a gate member 45. This gate is so biased that the weight of a coin will cause it to tilt and to remain tilted until it is restored to normal by the operation of the armature 19, which upon being actuated, causes the ear 20 thereon to strike the slidable member 46, associated with the contact springs SP, which extends through the plate 47 of nonmagnetic material, secured to the core 11 and which controls the circuitry of the mechanism for collecting or refunding coins, completing a call or transmitting signals to the central office operator.

When a coin is deposited and passes into the coin chute 17, it strikes the gate 45 as shown in Fig. 5, tilts it and permits the contact springs SP to operate to signal the central office operator. The coin thus deposited will originate the call to the central office and subsequent coins deposited will then come to rest on the gate 48 as shown and will remain there until they are finally disposed of, i.e., collected or refunded as shown in Fig. 6. The ear 26 on the member 25 exerts downward pressure against the card 30. Card 30 is delayed for exerting pressure on ear 51 on the bell crank latch member 52 until the top of the aperture AP in the card 30 engages the ear 51. Latch member 52 then rotates under downward pressure of card 30 on ear 51 and strikes cam 55 on gate 48 to produce rapid movement of gate 48 to the open position.

When the coins are released from the gate 48, as shown in Fig. 6, the path they will take is determined by the vane 49 which is pivotaly mounted in the coin chute 17 and diverts the coins either to the coin box for collection or to the refund receptacle.

The operation of the gate 48 and the vane 49 is controlled by the actuation of the relay RL and its associated parts, the vane tilting in one direction or the other depending upon the direction of the current flow through the electromagnet which causes the card 30 to tilt to the right or left and move downwardly and cause the cam 32 to move to the right or left and carry with it the arm 42 secured to the vane 49.

As shown in Fig. 1, a suitable terminal block TB is provided for establishing electrical connections to the contact springs SP and the coil 10 of the electromagnet.

While the preferred embodiment of our invention has been disclosed in the above described figures, it is to be understood that the invention may possess alternative

forms commensurate with the scope of the appended claims.

What is claimed is:

1. In a coin collector for telephone pay stations, an electromagnet, an armature therefor, a yoke member extending from said armature and having an apertured selector card operatively connected thereto, an apertured cam member in operative engagement therewith and having protuberances thereon extending into one of the apertures of said card, a pair of spaced apart pole pieces extending from the core of said electromagnet and having their end portions in spaced relation with respect to the upper edge of said card, a permanent magnet imbedded in said card adjacent said upper edge and adapted to be influenced by the direction of the current flowing through said electromagnet and the resulting polarity of said pole pieces to selectively tilt said card either to the right or to the left and move it downwardly under the influence of said yoke member thereby causing said cam to swing in a clockwise or counterclockwise direction, a coin chute for the reception of coins in juxtaposition with respect to said electromagnet, a coin deflecting gate pivotally mounted in said chute and having an arm thereon projecting through the side wall of said chute and having its free end located in the aperture in said cam to cause the rotation of said gate upon the operation of said selector card and said cam, to deflect the coins in said chute in one direction or the other depending upon the polarity of the pole pieces resulting from the direction of the current flow through the electromagnet.

2. In a coin collector for telephone pay stations, an electromagnet, an armature therefor, a spring-biased yoke member extending from said armature and having a slidable and rotatable apertured selector card operatively connected thereto, an apertured cam member in operative engagement therewith and having protuberances thereon extending into one of the apertures of said card, a pair of spaced apart pole pieces extending from the core of said electromagnet and having their end portions in spaced relation with respect to the upper edge of said card, a permanent magnet, imbedded in said card, adjacent the upper edge thereof and adapted to be influenced by the direction of the current flowing through said electromagnet and the resulting polarity of said pole pieces to selectively tilt said card either to the right or to the left and move it downwardly under the influence of said yoke, thereby causing said cam to swing either in a clockwise or counterclockwise direction, a coin chute for the reception of coins in juxtaposition with respect to said electromagnet, a coin deflecting gate pivotally mounted in said chute and having an arm thereon projecting through the side wall thereof and having its free end located in the aperture in said cam to cause the rotation of said gate upon the operation of said selector card and said cam to deflect the coins in said chute in one direction or the other depending upon the polarity of the pole pieces resulting from the direction of the current flow through the electromagnet when it is energized.

3. In a coin collector for telephone pay stations, a coin chute, a coin deflecting gate pivotally mounted in said chute and movable to either of two positions to deflect coins in said chute in one direction or another, and motive means for moving said gate to the selected one of said two positions, said motive means comprising an electromagnet, an armature operable by said electromagnet, a yoke member secured to and extending from said armature, transmission means including a selector card and a cam member, said selector card operatively connected to said yoke for transmitting motion of said armature to said gate through said cam, said selector card having a permanent magnet mounted thereon with one of its poles adjacent pole pieces spaced from said magnet and said selector card, said pole pieces being positioned so as to be energized by said electromagnet with a

polarity dependent upon the direction of flow of current through said electromagnet, said selector card being shiftable by the interaction of said magnet and said pole pieces to the right or to the left, dependent upon the polarity of the pole pieces and then downwardly in one of selector card positions, the motion of the armature and the card connected thereto and the cam member associated with said card causing said gate to move to one of

said positions and in the other of which selector card positions the motion of the armature causing said gate to move to the other of said gate positions.

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