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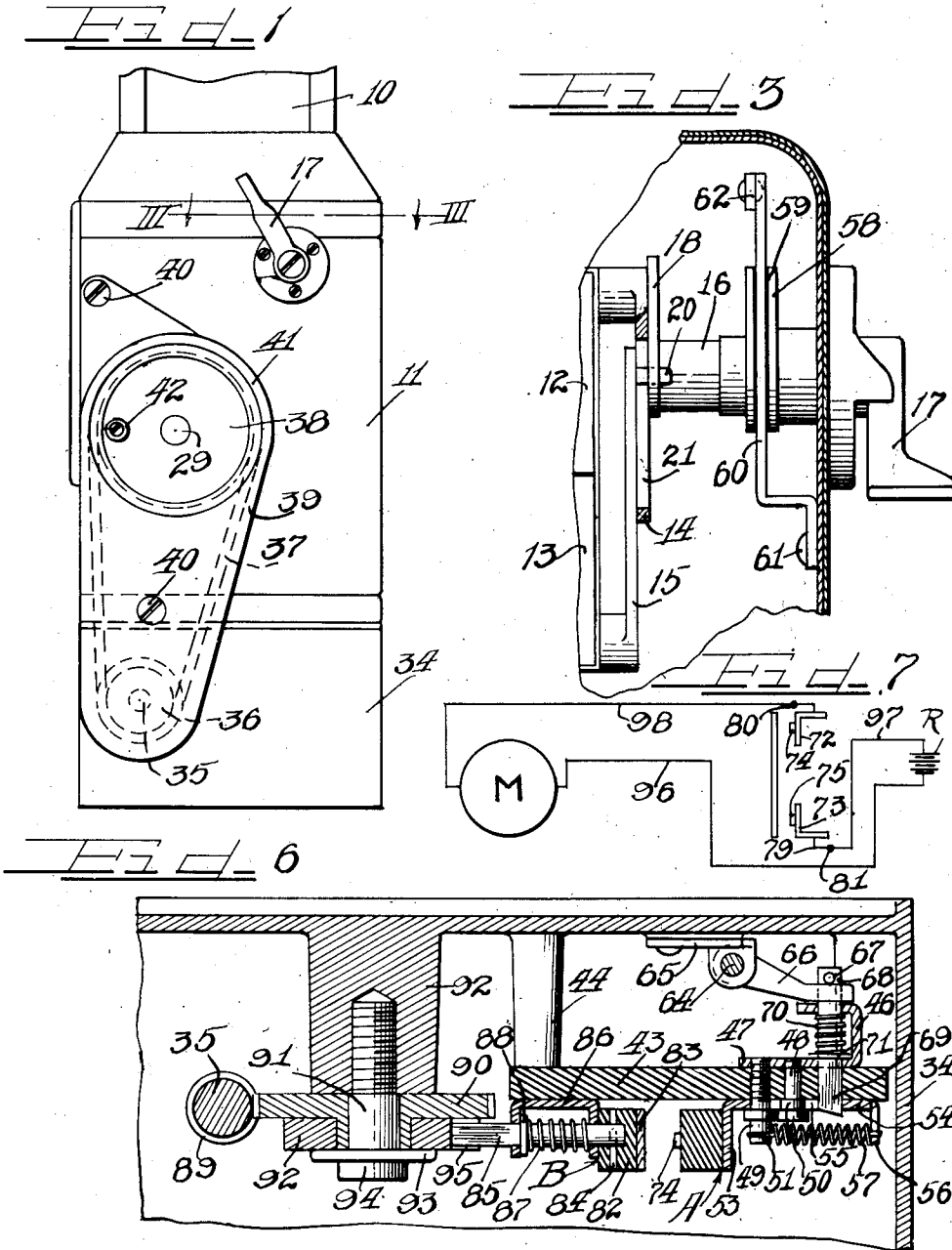
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2,118,914

ELECTRICAL CONTROL SYSTEM FOR FARE BOXES

Filed April 1, 1937

3 Sheets-Sheet 1



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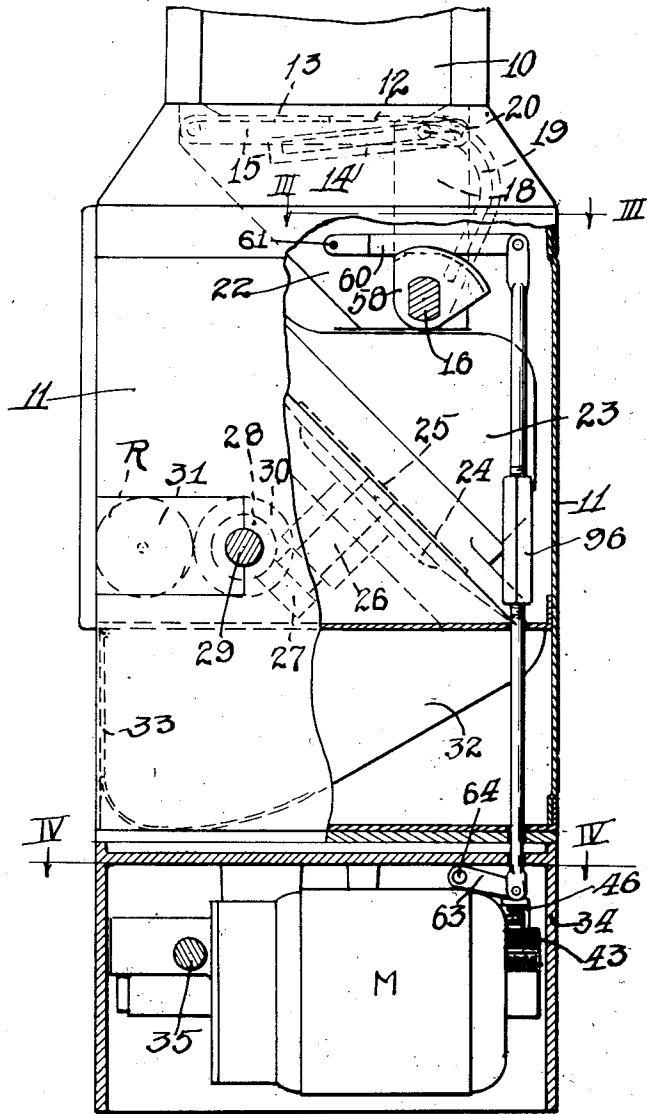
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3 Sheets-Sheet 2

Fig. 2.



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ELECTRICAL CONTROL SYSTEM FOR FARE BOXES

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5 Claims. (Cl. 235—45)

This invention relates to power driven fare box and register structure and may be considered as an improvement over the fare box and register structure disclosed in application of John W. Baur, Henry Van Zuilen, and Clarence F. Rogier, Serial No. 60,368, filed January 23, 1936.

In the structure of this copending application, the motor circuit controlling switch is actuated directly by the dumping lever and the circuit includes parts of the structure framework.

An important object of this invention is to isolate the switch mechanism from the dumping lever and to locate it preferably in the base of the fare box structure and to insulate all switch contacts and circuits from the fare box framework, and to control the setting of the switch through a mechanical connection extending to the dumping lever so that, when the dumping lever is swung for dumping of deposited coins or tokens, the switch mechanism will be operated for closure of the motor circuit and operation of the coin sorting and register mechanism by the motor.

Another important object of the invention is to provide switch structure which is normally latched in circuit opening position and which is unlatched by the operation of the dumping lever for closure of the circuit, together with means controlled by the operation of the motor for relatching and reopening the switch after a predetermined interval of operation of the motor.

The various features of our invention are incorporated in the structure disclosed on the drawings, in which drawings:

Figure 1 is a side elevation of the fare box and register;

Figure 2 is an enlarged side elevation partly in section;

Figure 3 is an enlarged section on plane III—III of Figures 1 and 2;

Figure 4 is an enlarged section on plane IV—IV of Figure 2;

Figure 5 is a bottom view;

Figure 6 is an enlarged section on plane VI—VI of Figures 4 and 5; and

Figure 7 is the circuit diagram.

To disclose the operation and advantages of the invention it is shown applied to a type of fare box such as is disclosed in Johnson Patent 1,344,898 dated June 29, 1920. As the construction and operation of the dumping mechanism and the coin sorting and counting mechanism will not be changed by the application of our invention, it will be unnecessary to show in full detail all of these various mechanisms and therefore in Figures 1 and 2, only sufficient structure is shown for making the application and operation of this invention clear.

The fare box shown comprises the inspection

compartment 10 which receives deposited coins or tokens from a coin drop (not shown), the evaluating and register mechanism being within the housing part 11.

As best shown in Figures 2 and 3, the dumping plates 12 and 13 at the bottom of the inspection compartment have arms 14 and 15 extending toward each other from the dumping plate hinge shafts. Below these arms extends the dumping shaft 16 terminating at its outer end in the dumping lever 17, the shaft at its inner end carrying a wing 18 having a cam slot 19 therein receiving a pin 20 extending from the dumping plate arm 15 through a longitudinal slot 21 in the dumping plate arm 14, so that when the dumping lever is swung downwardly (counter-clockwise, Figures 1 and 2) the dumping plates will be swung down for dumping of deposited coins or tokens into the chute 22.

The coins drop from the chute 22 into the hopper 23 which spans the stationary frame 24 on which the sorting disc 25 is rotatable. The sorting disc is connected to a shaft 26 terminating in a worm wheel 27 which meshes with a worm 28 on the drive shaft 29, this shaft also carrying a gear 30 meshing with a gear 31 which forms part of the turning train for the register mechanism R. Upon turning of the shaft 29, the deposited coins or tokens are sorted by engagement with the sorting disc and the register mechanism is set for the corresponding cash value or token entry and the registers are operated all in a manner as fully disclosed in Patent No. 1,344,898 referred to. After sorting and entry of the coins and tokens they are received in the cup 32 from which they may be readily withdrawn by inward swing of the door 33.

The driving motor M is located within the base structure 34, the motor shaft being suitably geared to a cross shaft 35 one end of which extends through a side wall of the base and supports a pulley 36 which is connected by a belt 37 with the pulley wheel 38 secured to the outer end of the drive shaft 29. A sheet metal guard frame 39 is detachably secured by screws 40 to the side of the fare box structure and has the opening 41 through which the pulley 38 is exposed, this pulley being provided with a handle 42 for manual operation of the drive shaft 29 should the motor become disabled. In such event the guard frame 39 may be removed so that the belt may be slipped off the pulleys in order that the pulley 38 may be easily manually rotated.

Describing now the circuit controlling switch mechanism, a plate 43 of insulating material is suspended from the top wall of the base 34 by lugs 44 depending from the top wall, the plate being detachably secured as by means of screws 45 to the lugs. On top of the plate 43 is mounted a U-shaped bracket 46. The base leg 47 of the

bracket is elongated, the outer end thereof receiving screws 48 and 49 extending through the plate from the under side thereof, collars 50 and 51 respectively below the heads of the screws abutting the under side of the plate 43.

One of the switch members A comprises a rectangular block 52 of insulating material secured to the depending leg of an L-shaped frame 53 whose base 54 engages the under side of the plate 43 and has a longitudinally extending slot 55 for receiving the collars 50 and 51 on the screws 48 and 49, the heads of the screws holding the frame against the under side of the plate 43 for longitudinal shift thereon under guidance of the screw collars in the slot 55. The frame 53 has a tail or extension 56 for anchoring one end of a tension spring 57 whose other end is anchored to the head of the screw 49, this spring tending to shift the switch member A forwardly.

Referring particularly to Figures 1, 2, and 3, the dumping lever shaft 16 carries a segment 58 having a peripheral channel 59 whose bottom forms a cam surface for engaging a lever 60 fulcrumed to the side wall of the fare box by a pivot member 61. The outer end of the cam engaging lever is connected to the upper end of a vertical rod 62 which extends downwardly into the base 34 and is there connected to a crank arm 63 extending from a shaft 64 journaled in bearing brackets 65 secured to the under side of the top of the base 34. The shaft 64 carries a trip arm 66 whose end engages under a pin 67 projecting from a latch bar 68. This latch bar extends through passageways in the base 47 and outer leg of the U-bracket 46 and through a passageway 69 in the switch base 43 for projection into the slot 55 in the base 54 of the supporting frame 53 for the switch block 52. A spring 70 encircling the latch bar between the upper leg of the bracket 46 and a collar 71 on the bar tends to shift the bar downwardly. When the switch member A is in its forward position, the solid end of the base 54 of the frame 53 will be below the passage 69 through the switch base 43 so that when the latch bar has been raised and released its lower end 69 will be withheld from the slot 55. However, when the switch member A is shifted rearwardly the slot 55 will be exposed to the passage 69 and the latch bar end will enter the slot 55 in front of the rear edge thereof and the switch member A will be held in its rear position against the pull of the spring 57. The passage 69 through the switch base 43 is preferably squared and the lower end of the latch bar correspondingly shaped so that this latch bar will be held against rotation in order to keep the pin 67 properly located for engagement by the trip lever 66.

As will be more fully explained later, the switch member A is normally held in its rearward or latched position, and then when the dumping lever 17 is swung down and the cam sector 58 is swung, the cam arm 60 will be swung upwardly for raising of the connecting rod 62 and rotation of the shaft 64 for upward swing of the trip arm 66 and raising of the latch bar for release of the switch member A for forward shift thereof, the extent of such forward shift being limited by the engagement of the rear end of the slot 55 with the guide collar 50 on the screw 48.

At the end of the switch block 52 corner plates 72 and 73 are secured, these plates having contact points 74 and 75, respectively, secured thereto, the corner plates at the ends of the switch block having terminal posts 76 and 77 mounted

thereon from which circuit wires 78 and 79 extend to connector screws 80 and 81 extending through the switch base 43 for connection of the switch member A in the electrical circuit for the fare box structure.

The switch member B comprises a rectangular block 82 of insulating material which is faced by a contact plate 83 for engagement with the contact points 74 and 75 when the two switch members are brought together. The switch block 82 is secured as by a cross pin 84 to a cam contact bar 85 which is slidable in the legs of a U-frame 86 secured against the under side of the switch base 43. A spring 87 abuts the inner leg of the U-frame and a collar 88 on the bar and tends to shift this bar and the switch block forwardly, the passage in the forward leg of the U-frame being preferably square and the forward end of the bar being correspondingly shaped so as to prevent rotary movement of the bar and switch block. When the member B is thus held in its outer position and the switch member A is held in its rearward or latched position, the switch members are out of electrical engagement and are separated by a wide gap, as shown in Figures 5 and 6.

The motor driven shaft 35 terminates at its inner end in a worm 89 which meshes with a worm gear 90 journaled on a pin 91 seated in a lug 92 depending from the top of the base 34. Secured to rotate with the gear 90 is a cam disc 92, the disc being secured to the gear by the pressure of a washer 93 under the head 94 of the screw 91. The cam disc shown has three cam ridges 95 cooperable with the end of the cam bar 85, the cam disc rotating in the direction of the arrow indicated thereon and the end of the cam bar being preferably beveled off as shown in Figure 5. When the cam bar end is at the base of any of the cam ridges the switch block 82 will be in its foremost position as shown in Figures 5 and 6. When the switch member A is latched in its rearmost position as shown in Figures 5 and 6, it will be separated from the switch member B but after tripping of the switch member A its forward movement will be sufficient for engagement of its contact points 74 and 75 with the contact plate 83 on the switch member B for closure of the electrical controlling circuit for the motor.

The electrical circuit is shown in Figure 7, one terminal of the motor being connected by conductor 96 with one terminal of a source of current such as a battery R whose other terminal is connected by conductor 97 with the conductor screw 81 which is connected by the wire 79 with the corner plate 73 which carries the contact point 75. The other terminal of the motor is connected by conductor 98 with the connector screw 80 which is connected by the wire 78 with the corner plate 72 having the contact point 74.

Describing now the operation, the parts are normally in the positions indicated on the drawings. After a number of coins or tokens have been deposited in the fare box the dumping lever 17 is swung downwardly its full distance and immediately released. Upon such downward swing of the dumping lever the deposited coins or tokens are dumped into the sorting mechanism and the cam sector 58 is swung to raise the cam arm 60 and the connecting rod 62 for rotation of the shaft 64 and upward swing of the trip lever 66, the latch bar 68 being then raised for release of the switch member A which is then shifted forwardly by the spring 57 to engage the contact points 74 and 75 with the switch plate 83 on the switch member B, and the motor circuit is then

closed and the motor then operates to turn the drive shaft 29 for sorting and registering of the received coins and tokens, and the worm gear 90 and the cam disc 92 are also rotated. As the disc rotates, the cam ridge engaged by the cam bar 85 gradually shifts the switch members B and A rearwardly, the circuit remaining closed. When the high point of the cam ridge reaches the cam bar, the two switch members will have been shifted rearwardly a sufficient distance for re-exposure of the slot 55 to the latch bar 68 and the latch bar shifts down into the notch to re-latch the switch member A, and then when the high spot of the cam ridge has passed the end of the cam bar 85 the spring 87 will quickly shift the cam bar and the switch block 82 back to normal position for a quick break of the circuit to thus eliminate sparking. As soon as the switch has been opened the motor stops and the cam bar will be at the low end of the next cam ridge ready for the next operation. Where the fare box is used on vehicles such as trolley cars and the trolley circuit is used for supplying current to the motor circuit, the quick or snap opening of the switch is a very desirable feature. It will be noted that all the switch contacts and the various circuit conductors are insulated from the fare box framework, thus reducing the liability to shock to a minimum. The location of the switch at the bottom of the fare box structure away from the dumping lever also assures safety. To increase the safety factor, the connector bar 62 could be in two parts threaded at their adjacent ends and connected by a turnbuckle 96 which could be of suitable insulating material and this turnbuckle, in addition to affording adjustability for the rod 62, would also insulate the upper end of the rod from any switch or circuit disturbances in the base of the fare box structure and from the person actuating the dumping lever so as to eliminate all possibility of shock.

We have shown a practical and efficient embodiment of the various features of our invention but we do not desire to be limited to the exact construction, arrangement and operation shown and described as changes and modifications may be made without departing from the scope of the invention.

We claim as follows:

1. An electrical control system for a fare box structure of the class described in which a lever controls the discharge of deposited tokens to the registering means, comprising an electrical circuit including a driving motor for said registering means and a switch, said switch comprising two movable switch members, means for normally holding said switch members apart including latch means for one of said members, means controlled by the operation of said lever for unlatching the latched member for relative movement of said switch members for closure of the circuit and operation of the motor, and means effective during operation of said motor for shifting the engaged switch members for relatching of the one member and for then releasing the other switch member for movement away from the latched member for opening of the circuit and stopping of the motor.

2. An electrical control system for a fare box of the class described in which a lever controls the discharge of deposited tokens to the registering mechanism, comprising an electrical circuit including a driving motor for said registering mechanism and a switch, said switch comprising a first switch member and a second switch member, means tending to shift said first switch mem-

ber toward said second switch member, latch means normally holding said first switch member away from said second switch member for opening of said circuit, means controlled upon operation of said lever for unlatching said first switch member for movement thereof for engagement with said second switch member for closure of said circuit and operation of said motor, means operable during operation of said motor for shifting both switch members until said first switch member has been relatched and for then releasing said second switch member, and means for shifting the released second switch member away from the latched member for opening of the circuit and stopping of the motor.

3. An electrical control system for a fare box structure of the class described in which a lever controls the discharge of deposited tokens to the registering means, comprising an electrical circuit including a driving motor for said registering means and a switch, said switch comprising switch members movable relatively and together, means tending to effect engagement of said switch members, latch means normally preventing such engagement, means controlled by the operation of said lever for releasing the latch means for engagement of said switch members to close said circuit for operation of the motor, and means controlled by the running of the motor for shifting the engaging switch members for reengagement of the latching means and for separation thereafter of said members to open said circuit to stop the motor.

4. An electrical control system for a fare box structure of the class described in which a lever controls the discharge of deposited tokens to said registering means, comprising an electrical circuit including a driving motor for said registering means and a switch, said motor and switch being located in the base of the fare box structure, means tending to close said switch, latch means normally preventing closure of the switch, a mechanical connection between said latch means and said lever adapted upon actuation of said lever to move the latch means for release of the switch for closure of said circuit and operation of the motor, and cam means driven by said motor for setting said switch back to latched condition and for opening the switch after a predetermined period of operation of the motor.

5. An electrical control system for a fare box of the class described in which a lever controls the discharge of deposited tokens to the registering mechanism, comprising an electrical circuit including a driving motor for the registering mechanism and a switch, said switch comprising a first switch member and a second switch member, spring means tending to bodily shift said first switch member towards said second switch member, latch means normally holding said first switch member away from said second switch member for opening of said circuit, means controlled upon operation of said lever for unlatching said first switch member for movement thereof and for engagement with said second switch member for closure of said circuit and operation of said motor, cam means operable by said motor for shifting both switch members until said first switch member has been relatched and for then releasing said second switch member, and spring means for shifting the released second switch member away from the latched member for opening of the circuit and stopping of the motor.

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