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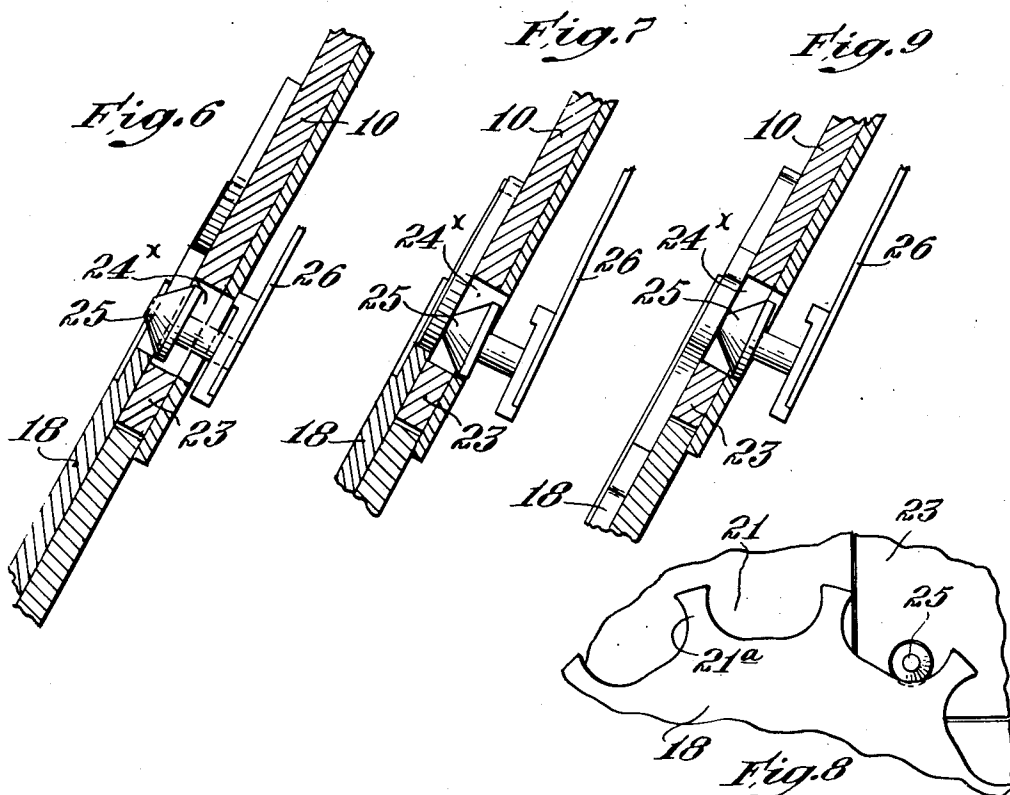
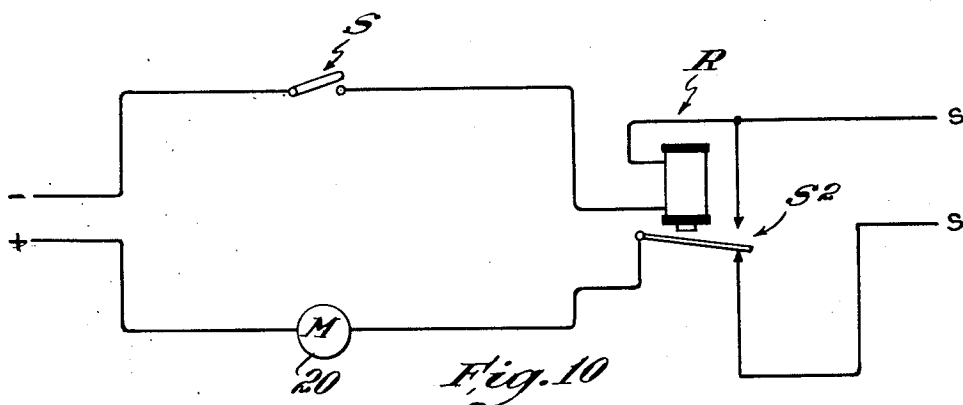
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AUTOMATIC STARTING MECHANISM FOR FARE REGISTERING APPARATUS

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2 Sheets-Sheet 2



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AUTOMATIC STARTING MECHANISM FOR FARE REGISTERING APPARATUS

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This invention pertains to multiple fare coin collecting apparatus of the kind wherein an electric motor actuates certain parts, and relates more particularly to automatic means for starting the motor in response to the introduction of a coin.

Heretofore the means for starting the motor automatically in response to the introduction of a coin in such apparatus has usually been of complicated, delicate and expensive type, for instance, parts responsive to the interception of a light beam by a passing coin. However, such prior devices, when exposed to the constant vibration, frequent shocks, dirt and careless handling to which coin collecting apparatus, installed on a public vehicle, is subjected, have not proven reliable.

The principal object of the present invention is to provide motor starting means for apparatus of the above type which is simple, inexpensive and wholly reliable. Other and further objects and advantages of the invention will be pointed out in the following and more detailed description and by reference to the accompanying drawings wherein

Fig. 1 is a fragmentary, diagrammatic front view of so much of a fare collecting apparatus of the motor-driven type as is necessary to illustrate the application of the present invention;

Fig. 2 is a fragmentary section, to larger scale than Fig. 1, on the line 2—2 of the latter figure;

Fig. 3 is a fragmentary rear elevation illustrating the coin-actuated circuit closing lever and associated switch;

Fig. 4 is a diagrammatic view showing details of a switch of a desirable type;

Fig. 5 is a section on the line 5—5 of Fig. 4;

Fig. 6 is a fragmentary section, to larger scale than Fig. 2, showing the coin-detecting button in its normal position in readiness to be contacted by a coin;

Fig. 7 is a view similar to Fig. 6, but showing a coin contacting the detector button and holding the latter depressed;

Fig. 8 is a fragmentary front view showing a portion of a coin-transferring rotor and the location of the coin-detecting button with relation to the coin-receiving pocket of the rotor;

Fig. 9 is a fragmentary section, similar to Fig. 7, showing the rotor overriding the detector button; and

Fig. 10 is a wiring diagram illustrating the connections between the circuit-closing lever and the motor which drives the apparatus.

Referring to the drawings the numeral 10 (Fig. 2) designates a downwardly inclined coin support along which coins slide after having been deposited in a suitable coin-receiving hopper (not shown). A transparent plate 11 parallel to the support 10, but spaced therefrom cooperates with the plate 10 to define a shallow chamber 12 wherein the coins are visible from the front of the apparatus, the chamber being of insufficient depth to permit coins sliding down the support 10 to tip over. A guide rail 13 (Fig. 1) extending transversely of the chamber 12 receives the coins as they enter the chamber 12

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and causes them to roll as they move to the left, as viewed in Fig. 1, thus tending to separate coins which enter the chamber 12 at the same time. The coins which are delivered from the lower end of the rail 13 come into contact with a curved rail 14 and are thereby caused to reverse their direction of rotation and travel down a second inclined rail 15. As they drop from the lower end of the rail 15 they drop down through a narrow slot between a gauging bar B and the supporting plate 10 and enter the lower part 16 of the chamber 12 and contact a guide surface 17 which directs them into a pocket of a rotor 18 which overlies the lower portion of the support 10 and which is in substantial contact with the forward surface of the support 10. This rotor is of a thickness approximating that of the largest coin which is to be registered by the machine and is carried by a shaft 19 which is turned intermittently by appropriate gearing (not shown) driven by the electric motor 20 (Fig. 10) which actuates the mechanism of the coin-collecting apparatus. The rotor 18 is provided with peripheral pockets 21 of such dimensions as to accommodate coins of any of the denominations which may be deposited and which are separated by radial arms 21^a and comes to rest between successive periods of rotation with one of the pockets 21 so disposed as to receive a coin from the chamber 16. At the next partial rotation of the rotor a coin which has been received in the pocket 21 is transferred to a gauging position where the coin C (as shown in Fig. 1) is contacted by a gauging finger 22 which, through appropriate means (not shown) determines the denomination of the coin.

The coin support 10 comprises a movable portion or door 23 of such dimensions that it extends from the chamber 12 down into the lower chamber 16, underlying a part of the gauging bar B. This door is suspended on hangers 24 (Fig. 3) pivoted at 24^a near their upper ends (Fig. 2) and the door is normally held closed, with its forward face flush with the coin-supporting surface of the stationary part of plate 10. However, it may be swung rearwardly, by means not shown, to allow a coin, lodged between the bar B and the door, to drop out.

At a point immediately behind that one of the pockets 21^a which, at any given instant, is at the coin-receiving position, the door 23 has a window 24^x (Figs. 7 and 9) which is of a diameter somewhat less than that of the smallest coin which is to be registered by the apparatus. Since the window is immediately behind the pocket of the rotor which receives a coin, any coin entering the pocket will necessarily extend across or partly across the window 24. Within this window 24 there is arranged a feeler or detector button 25 designed to be engaged by a coin as the latter enters the receiving pocket of the rotor. This button is mounted on the lower end of a switch-actuating arm 26 (Figs. 2, 3, 6, 7 and 9) which is pivotally supported near its upper end on a horizontal shaft 26^a (Fig. 2) carried by a bracket 27 secured to the rear side of the door 23. An arm 28 fixed to the upper end of the arm 25 is arranged to diverge from the rear surface of the door 23 and at its upper end carries a weight 29 which, by reason of the angular position of the arm 28, tends constantly to swing the arm 26 in a counterclockwise direction (as seen in Fig. 2) thus to project the detector button 25 forwardly through the window 24 so that its forward portion lies in the path of a coin sliding into the pocket of the rotor.

The lower end of the arm 26 carries a small permanent magnet 30 (Figs. 3 and 4) which is the actuating element for closing a switch S of the magnetically actuated type such, for example, as that shown in the patent to Hunicker 2,085,326 dated June 29, 1937. As illustrated in Figs. 4 and 5, this switch comprises a cylindrical glass tube 31 closed at its lower end to form a pocket or cup 32 which

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receives and retains a small body 33 of mercury. The upper end of the glass tube is closed and has lead-in wires sealed into the glass. One electrode 34 is a rigid wire which extends from its lead-in wire down into the mercury 33. The other electrode 35 is very flexible and terminates in a bent-down end 36 which is normally out of contact with the mercury 33 but which may be brought into contact with the mercury by a slight flexing of the part 35. The part 35 carries a piece 37 of magnetic metal, for example soft iron, acting as an armature, and which responds to movement of the magnet 30 located outside of the tube. The parts are so arranged that when the arm 26 swings in a clockwise direction (Fig. 2) the magnet 30, acting on the armature element 37, moves the part 36 into contact with the mercury 33, thus closing an electrical circuit.

As diagrammatically illustrated in Fig. 10, the circuit, which is closed by the closure of the switch S, includes a relay R of conventional type which, when the circuit is closed through switch S, acts to close a switch S² which is in circuit with the drive motor 20 of the apparatus. Thus when the lever arm 26 swings in a clockwise direction (Fig. 2) the motor 20 is energized and the entire apparatus performs one cycle of operation.

The feeler button 25 is of a generally conical or truncated conical shape, presenting a smooth beveled margin surface for engagement by a coin as the latter slides down into the rotor pocket. Thus, as illustrated in Figs. 6 and 7, a coin so moving down the surface of door 23 into the rotor pocket will engage the sloping surface of the button and depress the latter to the position shown in Fig. 7, thereby closing the motor circuit. While it is the edge of the coin which first engages the beveled margin of the button and cams the button rearwardly, the broad rear face of the coin rides up over the button and remains in contact with the front face of the button until the rotor has been started and has swept the coin from off the button. Thus regardless of the size of the coin, the button is depressed and held depressed for a substantial interval of time, it being noted that the rotor arm which impells the coin also rides over the button and continues to hold the latter depressed and the circuit through the relay closed until the trailing edge of the arm passes the button.

While one desirable embodiment of the invention has been illustrated by way of example it is to be understood that the invention is broadly inclusive of any and all modifications falling within the scope of the appended claims.

I claim:

1. In a multiple-coin fare-collecting apparatus of the kind which is capable of handling a fare comprising conventional imperforate coins of different diameters and wherein the mechanical parts are moved through a cycle of operations by a uni-directional electric motor, and having an inclined coin support against which coins lean and down which the coins slide by gravity action into a coin-feeding space, a rotary impeller having a plurality of circumferentially spaced, peripherally open coin-receiving pockets, and which is intermittently driven always in the same direction by motor actuated connections, the means for turning the impeller being so constructed and arranged that the impeller always stops with one of its pockets registering with the coin-receiving space, the latter being freely open at all times for the discharge of coins into a pocket of the impeller, the coin support

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comprising a door, a part of which normally constitutes the rear wall of said coin-feeding space and which normally closes an opening in the support, the door being arranged to swing rearwardly away from the impeller about a horizontal axis spaced above said opening, the door having therein a circular window of a diameter less than that of the smallest coin which may be deposited and across which the coins pass in moving from the feeding space into a pocket of the impeller, in combination, coin-actuated motor-starting means mounted on the rear of the door and which is made inoperative by opening the door, said motor-starting means comprising a lever pivotally supported by and arranged at the rear side of the door, said lever having one arm which is normally substantially parallel to and closely adjacent to the rear surface of the door and whose free end is adjacent to the window, the lever having a second arm and means associated therewith so as yieldingly to urge the first arm of the lever forwardly, a substantially conical feeler button having its base attached to the first-named arm of the lever and which is normally located within the window with its apex projecting forwardly into that pocket of the impeller which, at any time, is positioned to receive a coin from the feeding space, the parts being so constructed and arranged that the force exerted by the edge of a coin against the button, as the coin slides edgewise from the coin-feeding space into a pocket of the impeller, cams the button rearwardly out of the impeller pocket, that arm of the impeller which immediately follows the coin holding the button in rearward position for a short period of time after the coin has disengaged the button but releasing the button before the impeller has completed its advance movement, the rearward movement of the button moving the first-named arm of the lever away from the door, a switch actuator carried by the first-named arm of the lever, and an electrical switch mounted on the rear side of the door and having a circuit closing element which is moved by said actuator from normal position thereby to close a motor-starting circuit.

2. Fare-collecting apparatus according to claim 1 wherein the door is fixed to the lower ends of elongate hangers which are pivotally attached at their upper ends to the rear side of the support so that the entire door may be swung rearwardly out of the plane of the support, the space to the rear of the support being free of obstructions such as might interfere with such rearward swinging of the door.

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