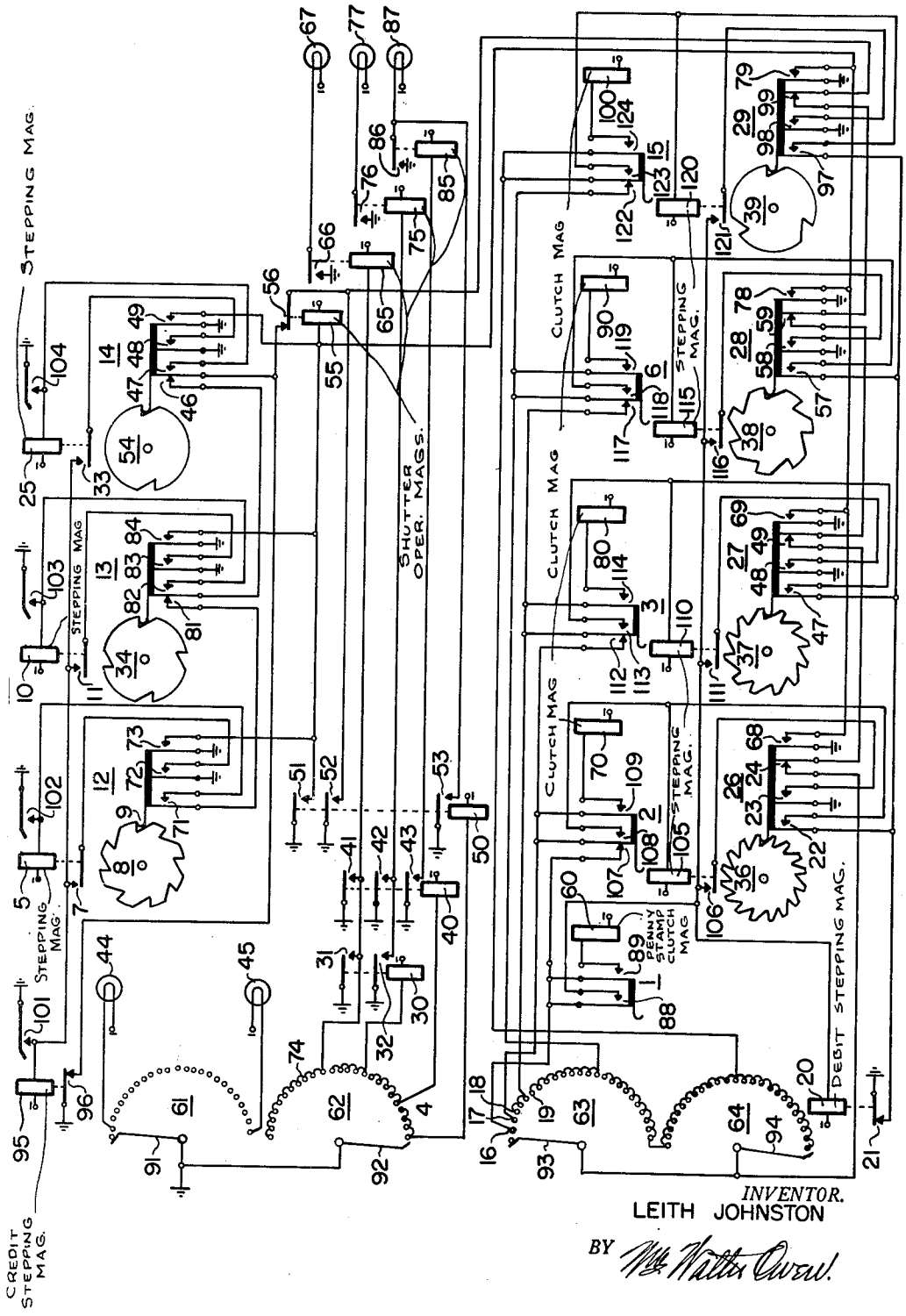
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CONTROL CIRCUIT FOR VENDING MACHINES

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CONTROL CIRCUIT FOR VENDING MACHINES

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1 Claim. (Cl. 194—9)

1

My invention relates to a control circuit for vending machines. While one embodiment of this circuit is shown which registers coins in the denominations of 1 cent, 5 cents, 10 cents, and 25 cents and issues stamps in denominations of 1 cent, 2 cents, 3 cents, 6 cents, and 15 cents, it is obvious that this circuit with slight modifications could be used with other types of vending machines, and for registering other amounts. It is assumed that the vending machine herein described has individual coin chutes and rejectors and that these chutes have magnetically controlled shutters which prevent the insertion of coins when necessary. It is further assumed that the machine has magnetically controlled clutches which issue one stamp at a time of the denominations referred to.

An essential part of this circuit is a rotary switch, with a bank of four levels of 25 points arranged to provide two levels of 50 points, capable of being stepped both forward and backward. Credits and debits are registered on this switch which is stepped in one direction by a credit magnet and in the opposite direction by a debit magnet. These magnets are operated by pulses from cam switches associated with the coin chutes and with the dispensing control push keys. The type of switch used here is a rotary switch without wipers having a ratchet of a certain number of teeth and a cam associated with this ratchet having a certain number of lobes to provide a number of normal positions.

The circuit provides for the transmission of as many pulses through the credit magnet as there are cents in the coin deposited. It is designed to prevent the simultaneous operation of the stepping switches, to prevent the insertion of additional coins until the one inserted has been fully registered, and to prevent more coins being deposited than will add up to 49 cents. It further prevents the functioning of the push keys for issuing stamps when the credit part of the switch is busy and also prevents the insertion of any coins when the debit part of the switch is active as it would be when a stamp is being issued.

The single figure of the drawings is the schematic drawing of an electrical circuit which controls the operation of a postage stamp vending machine. At the left is a four-level two way uniselector switch with wipers 91, 92, 93, and 94 arranged to touch contacts on a bank of four levels 61, 62, 63 and 64. The switch is shown in normal position. The wipers are stepped

2

clockwise by credit magnet 95 and counterclockwise by debit magnet 20.

The credit control circuit is shown in the upper half of the drawing. Coin contacts 101, 102, 103, and 104 are associated with penny, nickel, dime and quarter coin chutes, respectively, and are closed when the proper coin is inserted in the chute. When a penny is inserted, a circuit is closed from ground through contact 101, through the coil of the credit magnet 95 to negative battery so that each time one cent is deposited the magnet operates once and steps wipers 91, 92, 93 and 94 of the selector switch in a credit direction. When a nickel is deposited a circuit is closed from ground through contact 102 and the coil of stepping magnet 5 of cam switch 12 to negative battery. Cam switches 12, 13, 14, 26, 27, 28 and 29 are stepping switches with pawls on their armatures turning ratchets. Each switch has a cam mounted on the same shaft as the ratchet. Magnet 5, on deenergization, steps 8-lobe cam 8 of cam switch 12 off-normal so that insulated armature 9 makes contacts 71, 72, and 73, the cam springs of the cam switch. A circuit is thus closed from ground through break contact 96 of the credit magnet, break contacts 46 and 81 of cam switches 14 and 13, make contact 71 of switch 12, and through the coil of stepping magnet 5 to negative battery and magnet 5 operating makes contact 7 and thereby closes a circuit from ground through contacts 72 and 7 through the coil of credit magnet 95 to negative battery. This steps the rotary switch clockwise and also opens contact 96 of the circuit to stepping magnet 5. Magnet 5 releases, thereby stepping switch 12 and breaking contact 7 which opens the circuit to the credit magnet. When credit magnet 95 is deenergized, contact 96 makes, magnet 5 is energized and another pulse is transmitted to the credit magnet. This cycle is repeated until armature 9 reaches a normal position on cam 8 and breaks contacts 71 and 72. Cam 8 has 8 lobes and is stepped by a pawl which engages a ratchet having 48 teeth. No pulse is transmitted on the first step because contact 7 breaks before contacts 71 and 72 make on deenergization of magnet 5. Therefore, in order to send five pulses to the credit magnet there are 6 teeth on the ratchet for each lobe on the cam.

Dimes and quarters similarly operate cam switches 13 and 14, respectively. Cam 34 in switch 13 has 4 lobes and is associated with a 44-tooth ratchet which operates magnet 95 ten times for each operation of contact 103 while

cam 54 of switch 14 has 2 lobes and is associated with a 52-tooth ratchet which operates magnet 95 twenty-five times for each operation of contact 104.

Each contact on bank 61, except the first, is connected through an individual lamp to negative battery. The wipers of the switch are grounded so that wiper 91 moving in a clockwise direction lights one of 24 lamps at each step, the first and last of which are numbered 44 and 45 in the drawing. These 24 lamps indicate to the depositor the credit he has established in the machine up to 24 cents.

The first 11 contacts of bank 62 are strapped. As wiper 91 leaves bank 61, wiper 92 touches the first contact of bank 62 and closes a circuit from ground through wiper 92 and strap 74 through shutter magnet 65 to negative battery. Magnet 65 closes contact 66 lighting lamp 67 which indicates a credit of 25 to 35 cents. The twelfth through sixteenth contacts of bank 62 are also strapped and whenever wiper 92 touches one of these contacts magnet 30 is energized and closes contact 32 which closes a circuit from ground through contact 32 and magnet 75 to negative battery. Magnet 75 closes contact 76 and lights lamp 77 which indicates a credit of 36 to 40 cents. Similarly, the seventeenth through twenty-first contacts on bank 62 are strapped and the wiper, touching one, energizes magnet 40 which closes contact 43 energizing magnet 85 which closes contact 86 and lights lamp 87 which indicates a credit of 41 to 49 cents. The last four contacts on the bank are connected to magnet 50 which operates make contact 53 when energized, thereby lighting lamp 87.

The machine is designed to accept a maximum deposit of 49 cents. This limitation is effected by a number of magnetic coin slot shutters. The shutter of the quarter slot is closed by magnet 65 when a credit of 25 cents or more is established. Magnet 65 draws current either through contacts 1 to 11 of bank 62, through contact 31 when magnet 30 is energized, or through contacts 41 when magnet 40 is energized. The dime slot shutter is operated by magnet 75 which draws current through contacts 32 or 42 when magnets 30 or 40 are energized. Nickel slot shutter magnet 85 draws current through contact 43 when magnet 40 is energized. Magnet 55 is a common magnet which operates all shutters. When 46 cents or more has been deposited, current flows from ground through wiper 92, strap 4 and the coil of magnet 50 to negative battery. Magnet 50 closes contact 51 which closes a circuit to magnet 55. Magnet 55 also may draw current from stepping switches 12, 13 and 14 through contacts 73, 84, or 49 when one of the switches is in an off-normal position. This prevents other coins from being deposited and interrupting the crediting of the first coin deposited.

The lower half of the drawing shows the debit control circuit. Wipers 93 and 94 of the 4-level rotary switch correspond to wipers 91 and 92, respectively, and touch contacts in banks 63 and 64 corresponding to those in banks 61 and 62 touched by wipers 91 and 92.

Push keys 1, 2, 3, 6, and 15 are interlocked mechanically to prevent more than one from being depressed at the same time. Switches 26, 27, 28, and 29 are cam switches similar to switches 12, 13, and 14 of the credit control circuit shown at the top of the drawing. Switch 26 has a 16-lobe cam 36 and a 48-tooth ratchet, 27 has a 12-lobe cam 37 and a 48-tooth ratchet, 28 has a 7-lobe cam 38 and a 49-tooth ratchet, and 29 has a 3-lobe cam 39 and a 48-tooth ratchet.

After any amount of money up to 49 cents has been deposited and the credit established stamps may be issued by depressing the push keys for each stamp desired. Bank levels 63 and 64 are wired so that push keys for stamps of a value greater than the amount of the credit stored do not function electrically to issue stamps. If 1 cent credit has been established and the 1 cent push key is depressed, a circuit is made from ground through contact 96 of credit magnet 95 through break contact 56 of common shutter magnet 55, break contacts 99, 59, 49, and 24 of switches 29, 28, 27 and 26, through wiper 93, contact 16 on bank 63, contact 88 of push key 1 and through debit magnet 20 to negative battery. The current divides at the push key, part of it flowing through contact 89 to clutch magnet 60 which dispenses a 1 cent stamp. Release of the key releases debit magnet 20 causing the switch to step back one step to the zero position and deenergizes the clutch mechanism so that it again becomes operative. No current is available to the other push keys until more than 1 cent has been deposited. If two cents have been deposited wiper 93 will touch contact 17 which is connected to push key 2. The operator may then elect to take a two cent stamp or two one cent stamps. Key 1 may draw current through break contact 107 of key 2. If key 2 is depressed, a circuit is closed from ground through contacts 96, 56, 99, 59, 49, 24, 17 and 103, and through stepping magnet 105 of switch 26 to negative battery. Current also flows through contact 109 to clutch magnet 70 which dispenses a two cent stamp. When key 2 is released magnet 105 is deenergized and steps cam 36 off-normal making contacts 22, 23, and 68. Current flows from ground through break contact 21 of debit magnet 20, contact 22 and magnet 105 to negative battery. Magnet 105 closes contact 106 and current flows from ground through contacts 23 and 106 and debit magnet 20 to negative battery. This pulse steps the wipers of the uniselector back one step and opens contact 21 interrupting the circuit to stepping magnet 105. 105 releases, stepping switch 26 another step and opening the circuit to magnet 20 which releases and makes contact 21. Switch 26 continues to step in this manner until it reaches a normal position causing a second operation of magnet 20 and a second step of wipers 93 and 94. The switches of higher denomination operate in the same manner when an adequate credit has been established.

Contacts 68, 69, 78, or 79 close a circuit which operates magnet 55 when one of the debit stepping switches is in an off-normal position. This closes all coin slots to prevent simultaneous debiting and crediting. When 46 cents or more has been deposited the common shutter is also operated by magnet 50 by a previously defined circuit. When magnet 50 is operated, contact 52 closes making a shunt around the common shutter so that although contact 56 is open, current is available to wipers 93 and 94. The circuit may be arranged so that the push keys close only a circuit to the clutch magnets, and contacts associated with the operation of the machine to issue the stamp close a circuit to the magnet of the associated stepping switch to put it in an off-normal position. This is a more positive circuit but requires more wiring and contacts.

As well as vending merchandise, this machine could be used to render services by substituting

for the dispensing means an automatic timing device and a movie projector, sightseeing binoculars, rotating shoe shine brush, telephone pay-station, radio or record player, or other coin operated device.

While there has been described what is at present considered to be the preferred embodiment of the invention, it will be understood that various modifications may be made therein, and it is intended to cover in the appended claims all such modifications as fall within the true spirit and scope of the invention.

What I claim is:

In a vending machine having coin operated devices and dispensing means for dispensing merchandise or services, a step-by-step counting switch, a credit magnet and a debit magnet for operating said counting switch in opposite directions to indicate the difference between the value of the coins deposited and the value of the merchandise or services dispensed, a cam, an operating magnet for rotating said cam, a series of contacts controlled by said cam, means for closing a circuit for said operating magnet to move said cam off-normal to operate said contacts, means whereby said last mentioned means is controlled by the deposit of a particular coin, a circuit including said credit magnet controlled by one of said cam contacts, another circuit including said operating magnet controlled by another of said cam contacts, a contact on each of said magnets, each of said contacts included in the circuit of the other of said magnets, means

including said magnet contacts whereby said credit magnet and said operating magnet are energized alternately in said circuits to operate said counting switch and said cam an equal number of steps until said cam reaches a predetermined point, said cam contacts opened when said cam reaches said point to open the circuits controlled to thereby stop the rotation of said switch and said cam, a similar cam controlled by said dispensing means for operating said debit magnet a predetermined number of steps to step said counting switch a number of steps in the opposite direction dependent upon the value of the merchandise or service dispensed to thereby cause said switch to indicate the difference between the value of the coin deposited and the value of the merchandise or services so dispensed.

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