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F. HEDLEY ET AL
HOLDING CIRCUIT MEANS

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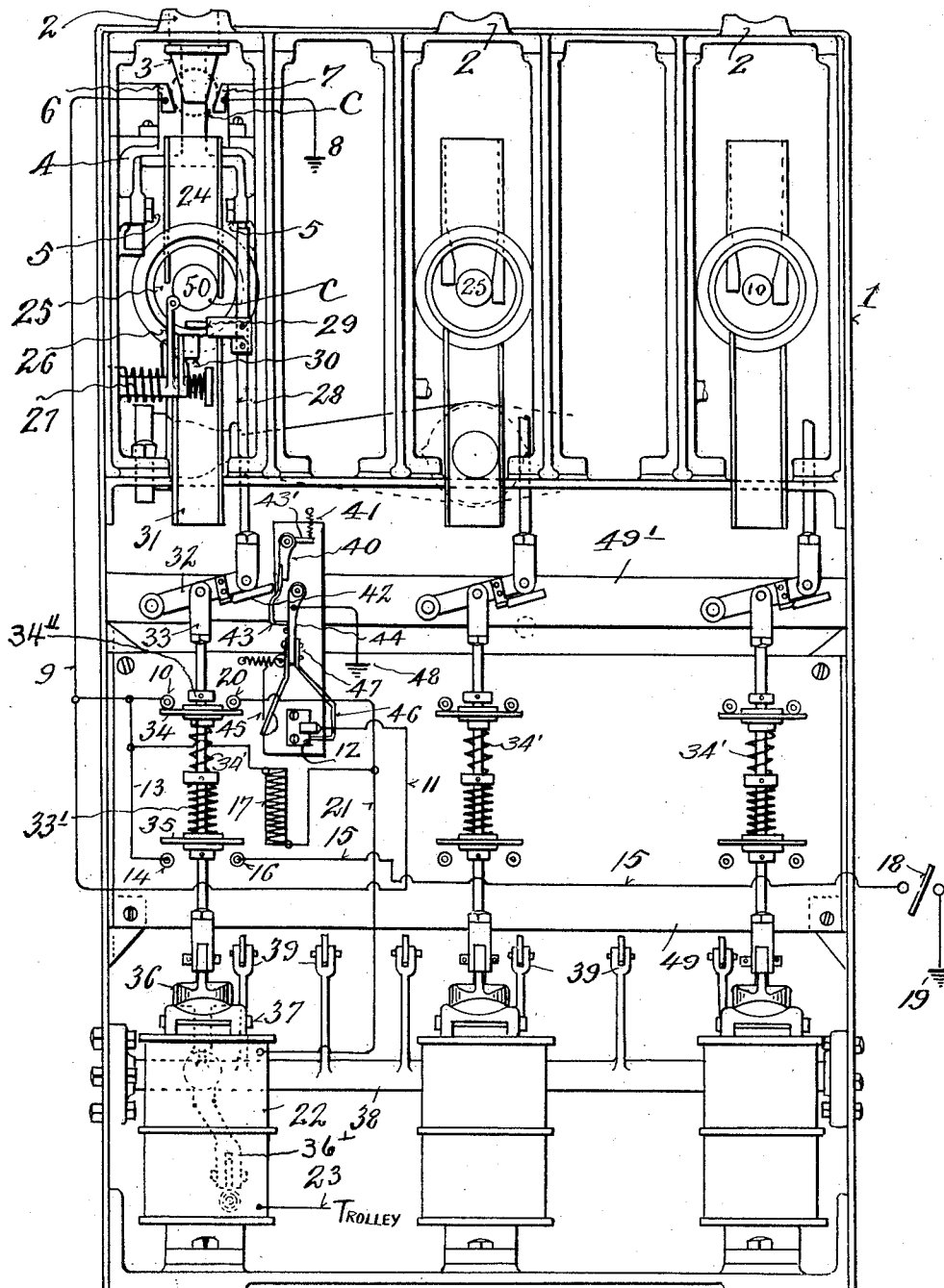


Fig. 1.

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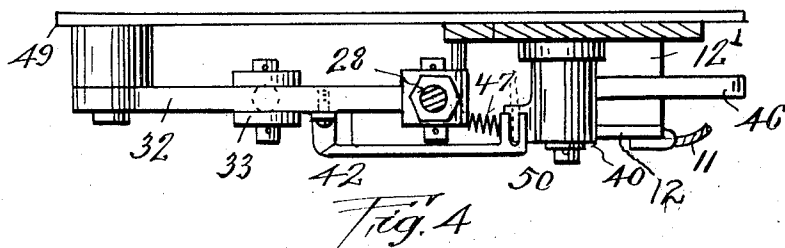
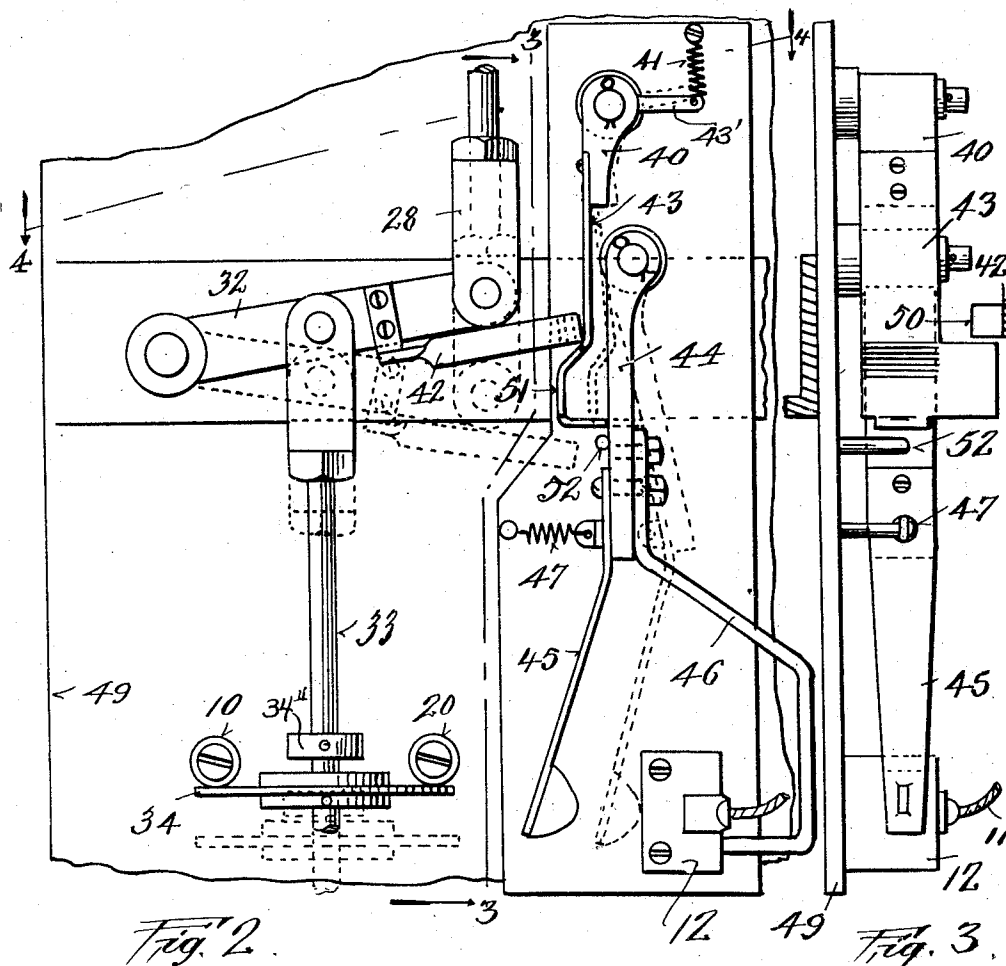
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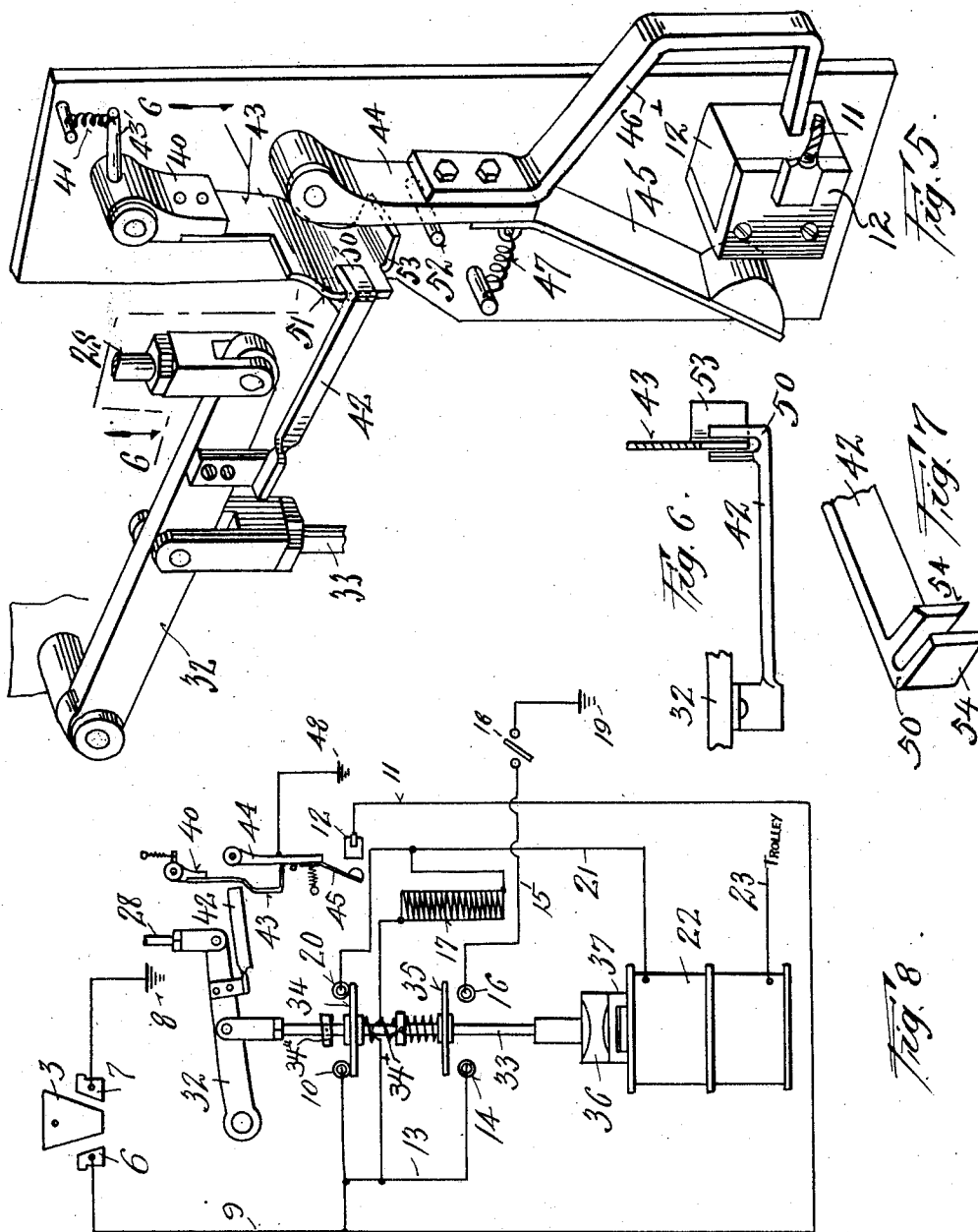
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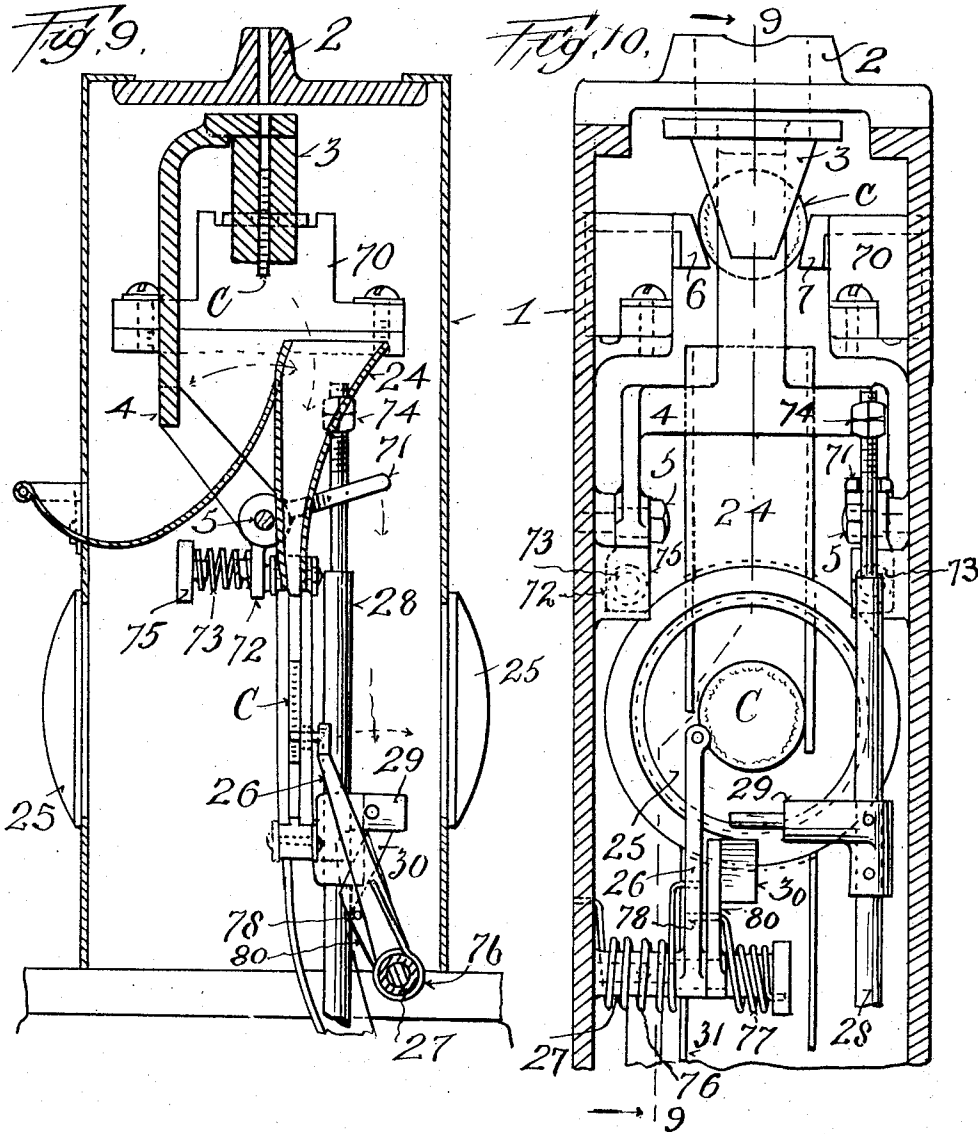
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4 Sheets-Sheet 4



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HOLDING-CIRCUIT MEANS

Application filed March 28, 1927. Serial No. 178,911.

This invention relates broadly to means for maintaining auxiliary electric circuits.

One of the objects of this invention is to provide an improved form of auxiliary circuit holding means to maintain the circuit to electrical devices for a predetermined period after its main circuit has been interrupted.

A further object of this invention is the provision of means for maintaining auxiliary circuits as used in connection with devices such as change making machines or passage-way turnstile devices and in fact any apparatus operated by means of electrical devices whose circuits are interrupted at one point but which are intended to be energized for a predetermined period after the said interruption, such combinations of devices as disclosed in our co-pending applications, Serial No. 656,416, filed August 8, 1923, and Serial No. 690,121 filed February 2nd, 1924.

A further object of this invention is to provide a relatively simple, auxiliary circuit maintaining device which is simple to construct and which is positive in action and efficient in operation.

This invention is also capable of many other objects as will appear from the following description.

This invention resides substantially in the construction, combination and relative location of parts as will be clearly understood from the following description.

Referring to the drawings in which the same reference numerals will be used throughout the several views to indicate the same or similar parts,—

Figure 1 is an interior view of a change making device showing the operation of my invention thereto;

Fig. 2 is a front elevational view somewhat enlarged with some parts broken away of the switch means for closing the auxiliary circuit;

Fig. 3 is a cross sectional view taken on the line 3—3 of Fig. 2 looking in the direction of the arrows;

Fig. 4 is a cross sectional view taken on the line 4—4 of Fig. 2 looking in the direction of the arrows;

Fig. 5 is a perspective view of the switch for the auxiliary circuit with some parts broken away;

Fig. 6 is a cross sectional view taken on the line 6—6 of Fig. 5, looking in the direction of the arrows;

Fig. 7 is an enlarged perspective view of one of the elements of this switch;

Fig. 8 is a diagrammatic circuit view of the method of connecting the various elements into operative relation;

Fig. 9 is a cross-sectional view taken on the line 9—9 of Figure 10;

Fig. 10 is an enlarged interior view similar to Figure 1 showing the coin mechanism.

We wish to distinctly point out at this stage that while we have shown the device of our invention associated with a change making machine, we do not desire to limit its application thereto since the invention is of general application and may be applied to any form of device which utilizes electrically operated devices whose operation must be maintained for a pre-determined or indefinite period after its main circuit has been broken. For this reason we have not completely disclosed all the operative parts of a change making machine since it is only necessary for purposes of this disclosure to show those parts which cooperate with our invention to produce the results thereof.

Our invention is concerned with a switch device which has the purpose of closing a holding circuit through an electrical means such as a solenoid. The general operation is that after the electrical means is energized by the closing of its main circuit and the main circuit is opened by the operation of the device to which it is applied, an auxiliary circuit is closed through the electrical means and maintained for a predetermined period notwithstanding the fact that the main circuit has been interrupted by the operation of the device.

Fig. 1 is a rear view of a change making machine showing only those parts which cooperate with the device of our invention. A casing is shown at 1 having a series of coin receiving slot forming members 2. The mechanism associated with the slot at the extreme

left of Fig. 2 is shown complete but most of this equipment has been omitted from the rest of the drawing since it is mere duplication. A coin receiving member 3 is disposed
 5 directly under the member 2 and consists of two parallel portions between which the coin slides down into contact with the contacts 6 and 7 on the insulating supports 70. The member 3 is mounted on a U-shaped member 4 which is pivotally mounted to the sides
 10 of the casing at 5. Contact 7 is grounded at 8 and contact 6 is connected by means of wire 9 to a contact 10. Wire 9 is also connected to wire 11 which terminates on a contact 12,
 15 on insulating blocks 12'. A wire 13 connects contact 10 with contact 14 and wire 15 connects contact 16 with a manually operated switch 18 which has its other contact grounded at 19. All this equipment is mounted on
 20 the members 49 and 49' supported within the casing 1. Adjacent contact 10 is a contact 20 which is connected by the wire 21 to one terminal of a magnet or solenoid 22 which has its other terminal connected to the trolley
 25 or power source by means of wire 23. The other terminal of the power source is grounded. A resistance 17 of the proper value is connected directly across the wires 13 and 21 and serves to limit the current through
 30 coil 22 when the current is completed at 45 and 12 or at 18 so that it will not overheat.

Mounted below the contacts 6 and 7 and coin member 3 and to one side thereof is a coin chute 24 which terminates near the center of a window 25 in the front of the casing. An arm 26 pivotally mounted at 27 projects
 25 so as to be in the path of the coin C, when it passes down chute 24 to hold it there as is clearly shown in the drawing. A spring 76 encircles the mounting 27 and has one end engaging in a hole in arm 26. Mounted to
 40 slide vertically in the casing is a rod 28 which has a member mounted thereon with a projection 29 adapted to contact with the projection or cam surface 30 forming part of the arm 80 pivotally supported on a spindle as
 45 shown. A spring 77 has one end 78 extending through the arm 80 and projecting in back of arm 26. The upper end of rod 28 passes through the forked member 71 which
 50 is secured to the member 4. A nut 74 attached to the upper end of rod 28 engages the forked member 71 when it moves downwardly. The member 4 is also provided with a depending
 55 projection 72 on each arm between which and fixed stops 75, compression springs 73 are supported. Mounted directly under chute 24 is a chute 31 which delivers into a suitable coin receiving receptacle. Pivotaly mounted
 60 on the support 49' is a short lever 32 which is pivotally connected to a vertically slidable plunger 33 and which is also pivotally connected to the vertically slidable rod 28. Slidably mounted on the plunger 33 and insulated
 65 therefrom, is a contact member 34 adapted to

bridge the contacts 10 and 20 as well as the similar disk or member 35 adapted to bridge the contacts 14 and 16. The plunger 33 is pivotally connected to the member 36 which
 70 is pivotally mounted at 37 so that when the magnet 22 is energized, the member 36 will swing about its pivot 37 to pull the plunger 33 downwardly against the action of spring pressed arm 36'. Extending transversely
 75 across the casing is a shaft 38 which is adapted to be rocked by the movement of the member 36 so as to actuate the levers 39 which operate the change ejecting mechanism. This feature forms no part of this invention but is included
 80 to completely describe all that is shown in the drawings. Springs 33' and 34' serve to hold the contact members 35 and 34' respectively during a portion of the movement of rod 33.

A pivotally mounted lever 40 is adapted to be maintained by means of the spring 41
 85 secured to arm 43' in the position shown in Figures 1, 2 and 5. A short arm 42 is rigidly secured to the arm 32 and is provided with a right angle bifurcated portion 50 as will be described later. Secured to the arm 40 is a projecting member
 90 43 which normally contacts with the pivoted arm 44. The arm 44 is grounded at 48. The projecting contact member 45 is secured to the arm 44 and a spring 47 maintains the arm and its contact member in the position
 95 shown in Figs. 1, 2 and 5. Spring 47 is slightly stronger than spring 41 so that the arm 44 is maintained in its normal position as shown, while the member 40 is maintained in contact therewith. A projecting arm 46
 100 is mounted on the side of the arm 44 opposite to that to which the member 45 is secured and contacts against insulating block 12' to act as a stop, limiting the movement of arm 44 to
 105 its normal position. If desired, an additional stop 52, see Fig. 5 is provided to limit the movement of the arm 44. It will be noted that member 43 is provided with the right angle projection 53 which contacts with the
 110 member 44 and has also the projecting member 51 which is suitably curved to provide a cam surface. It will be noted particularly from Figs. 6 and 7 that the edges of the bifurcated member 50 are tapered at 54 so as
 115 to permit the forked member to pass down over the cam surface 51. The arm 42 can be made if desired with but a single right angled projection.

The operation of the device is as follows:
 120 When a coin C is dropped in the slot 2, it falls into the coin member 3 and is held there between the contacts 6 and 7. This closes the main circuit of the electric device 22 as follows: from 8, through contact 7, coin C,
 125 contact 6, wire 9, contact 10, member 34, contact 20, wire 21, magnet 22 and thence to the other side of the power source by the wire 23. This energizes the magnet 22, pulling the plunger 33 downwardly against the ac- 130

tion of spring pressed arm 36' and carrying with it the pivoted arm 32 and the vertically slidable rod 28. The movement of rod 28 first causes the pin on member 29 attached thereto to engage the cam 30 on arm 80 on the left side (see Fig. 9). The continued downward movement of the rod 28 effects a clockwise movement of the arm 80 (Fig. 9) together with arm 26, through the agency of the projecting end 78 of the spring 77. This releases coin C which moves down chute 24 into a receptacle. When the pin on member 29 moves downwardly far enough to pass out of contact with cam plate 30, springs 76 and 77 force both arms back to normal position (Fig. 9). By the time the arm 26 has returned the nut 74 on rod 28 has engaged the forked arm 71 and the continued downward movement of rod 28 swings members 4 and 3 on the pivots 5 against the spring 73. The movement of member 3 wipes the coin, off contacts 6 and 7 and permits it to drop down chute 24 where it is stopped by the pin of arm 26, in front of the inspection window 25. The removal of the coin C from contacts 6 and 7 breaks the main circuit to magnet 22. The movement of the plunger 33 downwardly also breaks the magnet circuit at contacts 10 and 20 after stop 34' has moved down into contact with disk 34. The movement of the plunger 33 also causes arm 42 to move down into contact with the cam surface 51. Its continued downward movement forces member 43 to the right, carrying with it the arm 44 and its contact member 45. This closes a circuit connected to the member 45 and contact 12. The extent of the cam surface 51 may be so regulated as to keep the contacts 45 and 12 together for any predetermined period. A circuit is then formed through the magnet 22 as follows: from ground 48, through arm 44, member 45, contact 12, wire 11, resistance 17, wire 21 and magnet 22 and thence to trolley through wire 23. It will be seen then that although the main circuit is broken at the contacts 6 and 7, an auxiliary circuit is made and maintained at the contacts 45 and 12 for a predetermined period so that the magnet 22 remains energized even though the coin C, has been ejected from the contacts 6 and 7. Should the attendant desire to inspect the coin C through the window 25 for a longer period than provided by the holding circuit, he may, by closing the switch 18, maintain the magnet 22 energized notwithstanding the fact that the auxiliary circuit will, in the meantime, be broken at contacts 45 and 12. This occurs as follows: the current travels from ground 19 through switch 18, wire 15, contact 16, member 35, contact 14, wire 13, resistance 17, wire 21, magnet 22 and thence to trolley through wire 23. Upon opening of the auxiliary circuit at contacts 45 and 12 or the circuit containing switch 18, the magnet 22 is

deenergized and the plunger 33 and rod 28 with all their connected parts return to their normal raised position by reason of spring pressed lever and number 4 is returned by springs 73 36'. Upon the deposit of another coin and the energization of magnet 22, and the descent of rod 28, the cam member 29 contacting with the other cam member 30 on its passage thereby, forces the stop 26 out of the path of the previously deposited coin C, to permit it to fall down chute 31 into any suitable container.

It will be apparent from the foregoing description that we have devised a new and novel combination of elements for carrying out the purposes of this invention as disclosed by us. We are well aware that many changes in the details of construction, relative arrangement of parts and sequence of operation will occur to those who are skilled in this art and we prefer therefore to be limited to the principles and scope of our invention as we define it in the appended claims rather than to the structure as disclosed and described by us for purposes of illustration.

What we seek to secure by United States Letters Patent is:

1. The combination with a raceway and a pair of fixed coin contacts arranged to support a coin above the raceway of a circuit including a magnet, said circuit being open at said contacts, means operated by said magnet for wiping a coin from said contacts and means operated by said first means for maintaining said magnet energized for a predetermined period after the coin has been wiped from said contacts.

2. The combination with a circuit open at a pair of coin contacts and including a magnet of means operated by said magnet to release a coin from said contacts, means for retaining the coin at a point of inspection, means for releasing the coin at the point of inspection before the next coin is released from said contacts and means operated by said magnet operated means for maintaining the magnet circuit for a predetermined period after the coin is released.

3. The combination with a circuit open at a pair of coin contacts and including a magnet of means operated by said magnet to release a coin from said contacts, means for retaining a coin at a point of inspection, means operated by said magnet operated means for maintaining said magnet energized a predetermined period after the coin is released and means operated by said magnet to release the coin at the point of inspection before the coin at the contact is released.

4. The combination with a circuit including a magnet and a pair of fixed coin contacts at which the circuit is closed when a coin is deposited between said contacts of means operated by said magnet for wiping a coin from said contacts and switch means also operated

by said means for maintaining said magnet energized a predetermined period after the coin is wiped from said contacts.

5 The combination with a circuit including a magnet and a pair of coin contacts at which the circuit is closed when a coin is deposited between said contacts of means operated by said magnet for ejecting a coin from said contacts, switch means also operated by said magnet for maintaining said magnet energized a predetermined period after the coin is ejected, means for holding the coin at a point of inspection, means operated by the magnet for releasing the coin from the point of inspection before the next coin is ejected from said contacts and means for maintaining said magnet energized indefinitely and independent of said switch means for preventing the release of the coin at the point of inspection by another coin.

6. The combination with a circuit including a magnet and a pair of fixed contacts at which it is open of means operated by said magnet when the circuit is closed at said contacts by wiping the coin therefrom for opening the circuit at said contacts and means operated by said means for maintaining said magnet energized for a predetermined period after the circuit is opened at said contacts.

7. The combination with a circuit including an electromagnet and a pair of fixed contacts at which said circuit is open of means including a slidable rod independent of said contacts, operated by said magnet for ejecting a coin used to bridge said contacts, an auxiliary circuit for said magnet, and means actuated by said slidable rod for closing the auxiliary circuit to said magnet for a predetermined period after said coin is ejected.

8. The combination with a circuit including an electromagnet and a pair of contacts at which said circuit is open of means operated by said magnet for ejecting a coin used to bridge said contacts, means for retaining the coin at a point of inspection after ejection from said contacts, an auxiliary circuit for said magnet, means for maintaining the auxiliary circuit through said magnet for a predetermined time after said coin is ejected, and means operated by said magnet for releasing the coin at the inspection point before the next coin is ejected from said pair of contacts.

9. The combination with a circuit including an electromagnet and a pair of contacts at which said circuit is open of means operated by said magnet for ejecting a coin used to bridge said contacts, means for retaining the coin at a point of inspection after ejection from said contacts, an auxiliary circuit for said magnet, means for maintaining the auxiliary circuit through said magnet for a predetermined time after said coin is ejected, and independent means for maintaining said magnet energized an indefinite period and

also retaining the coin at said inspection point for the same period.

10. The combination with a circuit including a magnet and a pair of contacts at which said circuit is open of a plunger operated by said magnet, a rod operatively connected to said plunger and adapted to eject a coin from said contacts when the magnet is energized by the closure of said circuit at said contacts by the coin, means for retaining the coin at a point of inspection on its ejection from said contacts, means on said plunger for breaking said circuit when said magnet is energized, an auxiliary circuit for said magnet, and means operated by said plunger for closing the auxiliary circuit to said magnet for a predetermined period after said circuit is broken by the ejection of the coin and the movement of said plunger.

11. The combination with a circuit including a magnet and pair of contacts at which said circuit is open of a plunger operated by said magnet, a rod operatively connected to said plunger and adapted to eject a coin from said contacts when the magnet is energized by the closure of said circuit at said contacts by the coin, means for retaining the coin at a point of inspection on its ejection from said contacts, means on said plunger for breaking said circuit when said magnet is energized, an auxiliary circuit for said magnet, means for closing said auxiliary circuit and means including a cam for operating said means when said plunger is moved to close said auxiliary circuit for a predetermined period.

12. The combination with a circuit including a magnet and pair of contacts at which said circuit is open of a plunger operated by said magnet, a rod operatively connected to said plunger and adapted to eject a coin from said contacts when the magnet is energized by the closure of said circuit at said contacts by the coin, means for retaining the coin at a point of inspection on its ejection from said contacts, means on said plunger for breaking said circuit when said magnet is energized, an auxiliary circuit for said magnet, switch means for closing said circuit, means including a cam for operating said switch means when said plunger is moved to close said auxiliary circuit for a predetermined period and means operated by said rod for releasing said means for retaining the coin at the point of inspection before the next coin is ejected from said contacts.

In testimony whereof we have hereunto set our hands on this 24th day of March, A. D. 1927.

FRANK HEDLEY.
JAMES S. DOYLE.