May 4, 1954 C. GABRIELSEN ET AL 2,677,450

ELECTRICAL COIN REGISTER

Filed June 3, 1950

4 Sheets-Sheet 1

Fig 1

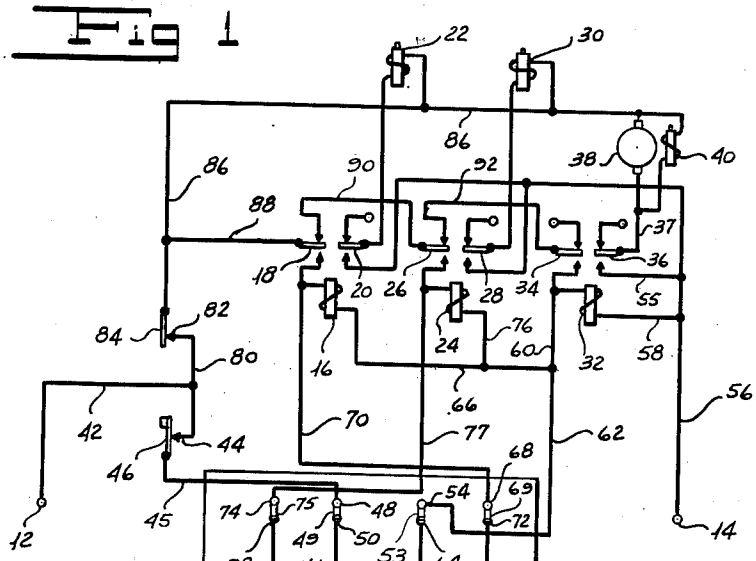


Fig 2

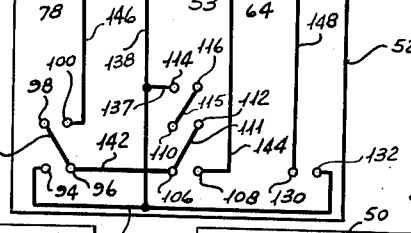
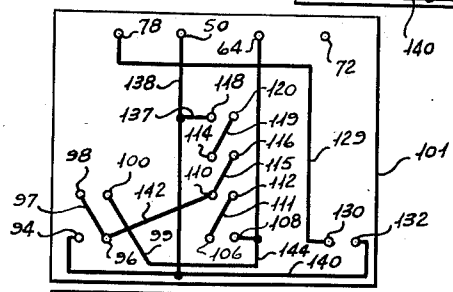
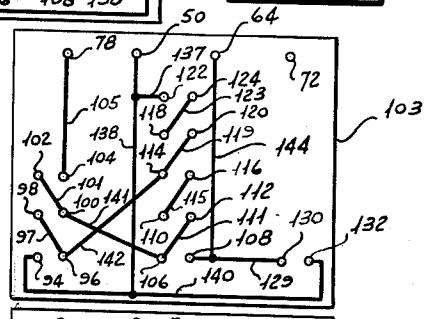


Fig 3





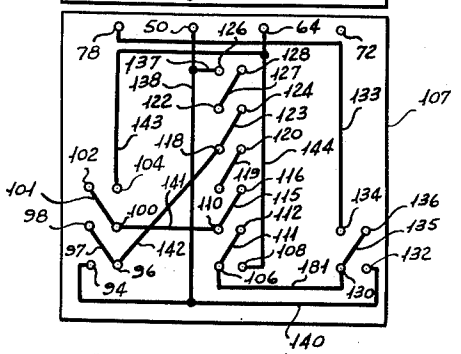


Fig 4

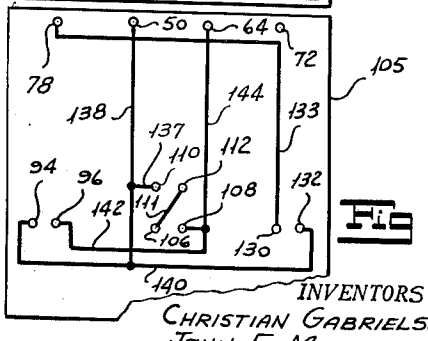


Fig 5

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May 4, 1954 C. GABRIELSEN ET AL 2,677,450

ELECTRICAL COIN REGISTER

Filed June 3, 1950

4 Sheets-Sheet 2

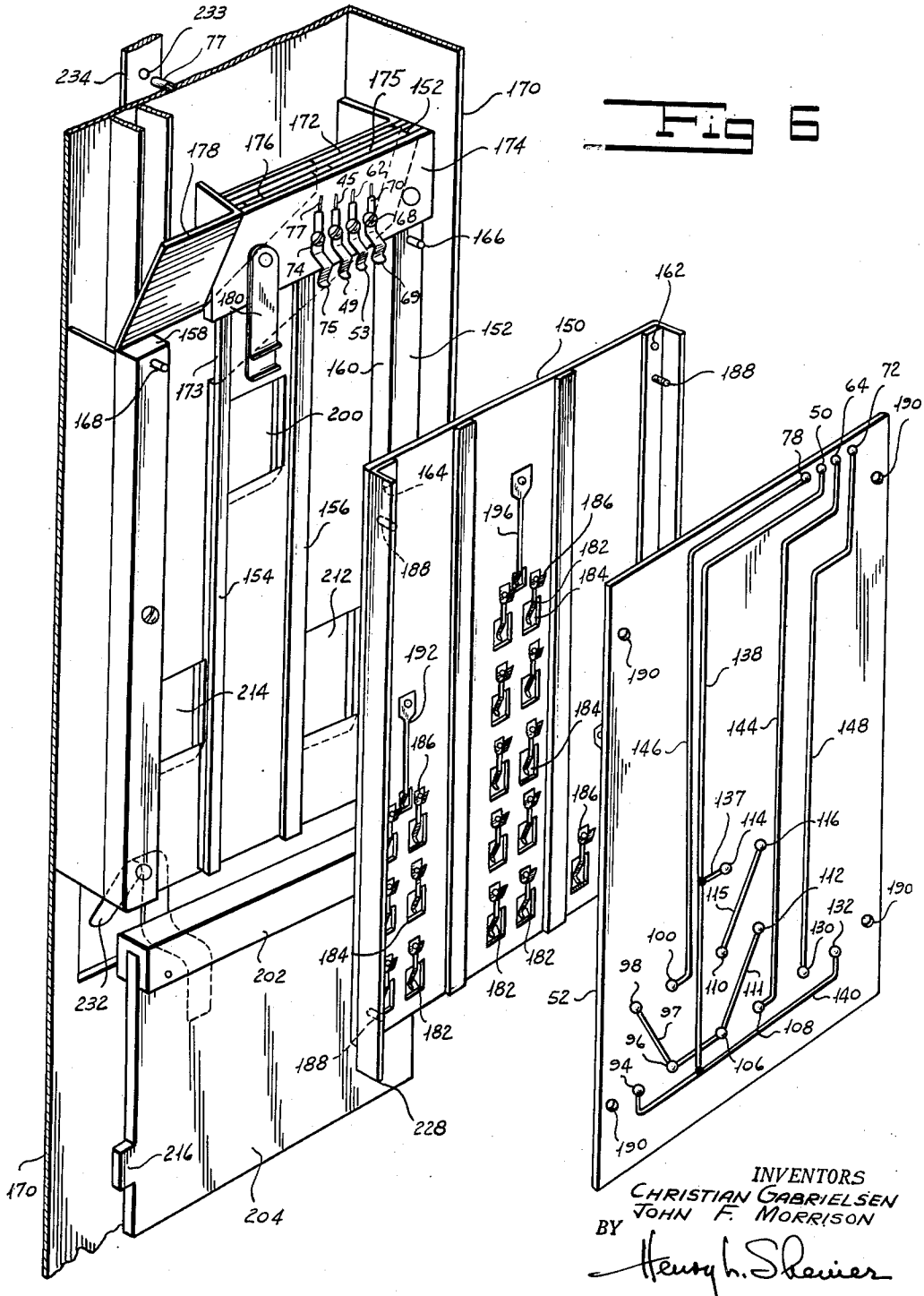


Fig 6

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ELECTRICAL COIN REGISTER

Filed June 3, 1950 4 Sheets-Sheet 3

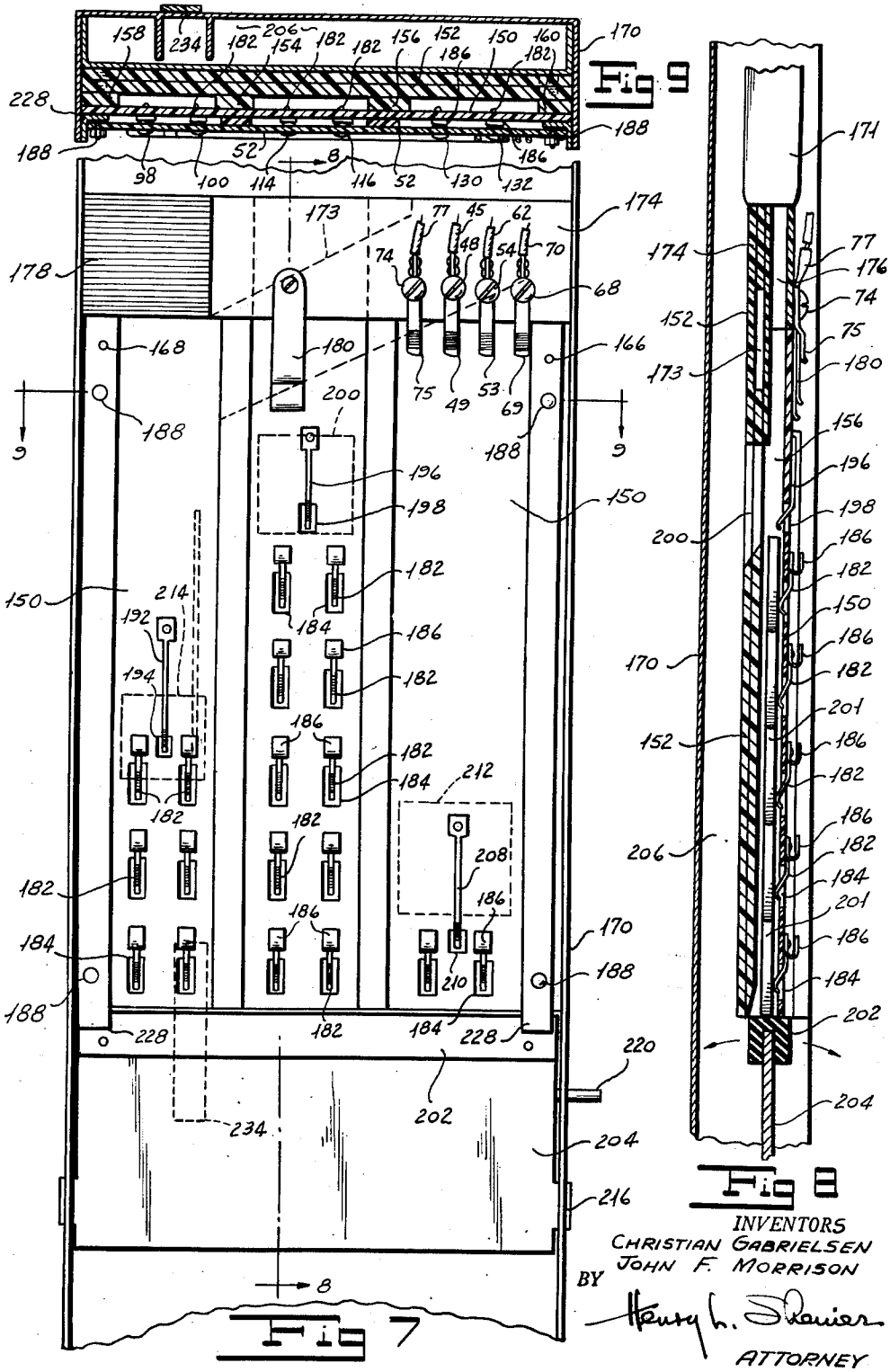


Fig 7

Fig 8

Fig 9

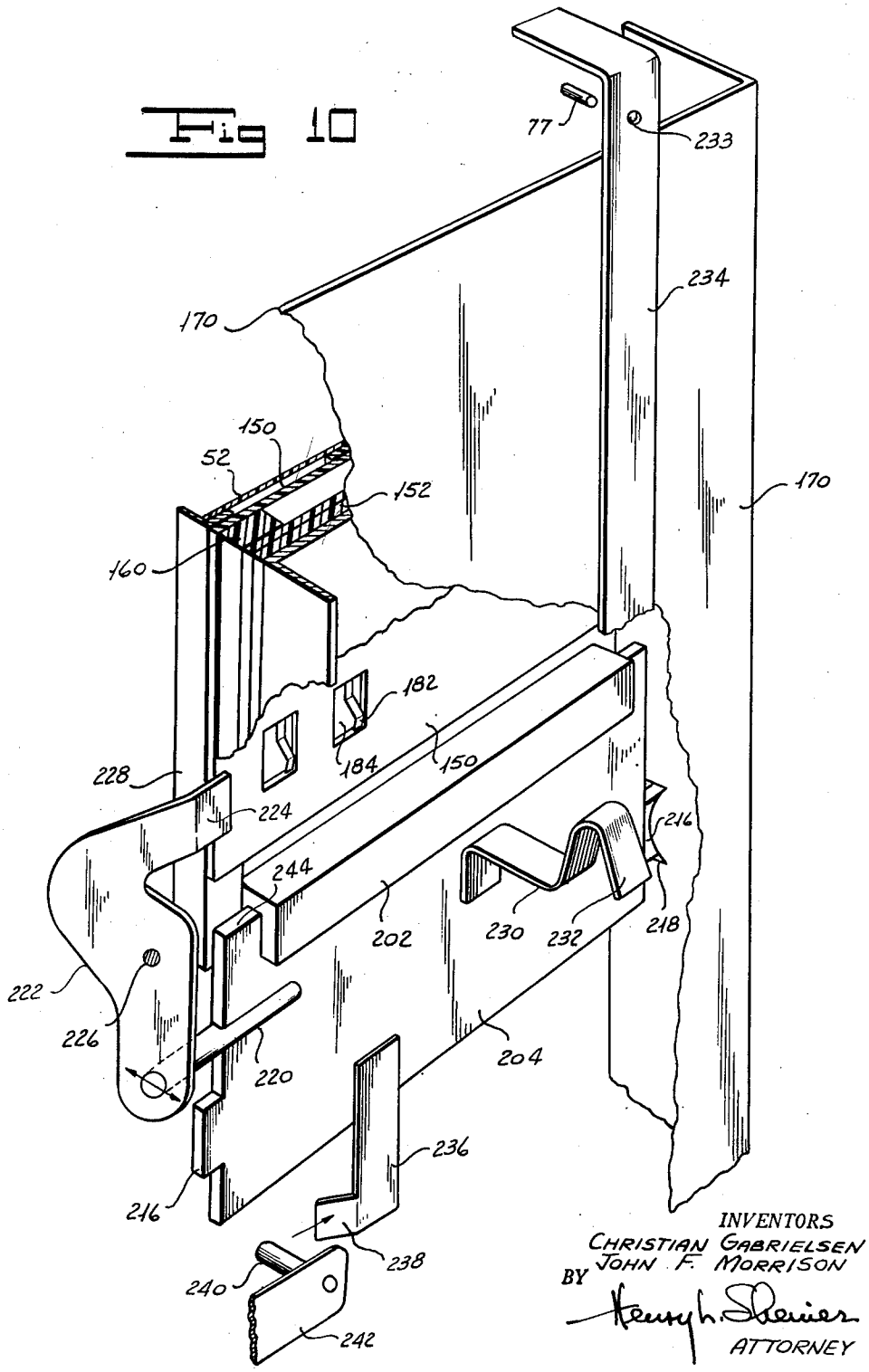
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ELECTRICAL COIN REGISTER

Filed June 3, 1950 4 Sheets-Sheet 4

Fig 10



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2,677,450

UNITED STATES PATENT OFFICE

2,677,450

ELECTRICAL COIN REGISTER

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Application June 3, 1950, Serial No. 166,045

10 Claims. (Cl. 194—7)

1

Our invention relates to electrical coin registers and more particularly to an improved electrical coin register which is simple in construction, sure in operation, flexible in design and inexpensive to build.

Electrical coin registers of the prior art have been complicated and expensive devices and inflexible in design. Normally a large number of relays have been employed or a complicated mechanical or electrical totalizer has been used adapted to count coins being deposited. The complicated construction affords much room for the development of troubles with the result that difficulties are frequently encountered in operation. Then, too, the initial cost of construction has been high and the devices have been inflexible, being adapted to take a certain combination of coins. In the registers of the prior art, furthermore, the register was adapted to be responsive only to the exact combination of coins.

One object of our invention is to provide an electrical coin register which is simple in construction, sure in operation and inexpensive to manufacture.

Another object of our invention is to provide a coin register which is very flexible and can be readily adapted to vend merchandise at a plurality of different prices. Another object of our invention is to provide a flexible coin register which will automatically initiate the delivery of the merchandise and operate a change device to give the correct change in event coins of larger denomination than that required are employed.

Another object of our invention is to provide an electrical coin register which will operate with any combination of coins and will initiate the delivery to a purchaser of the merchandise and the correct change for the coins deposited representing the difference between the price of the merchandise and the coins deposited.

Another object of our invention is to provide an electrical coin register in which the coin register is scavenged, whenever the merchandise is delivered, in order to preclude jams.

Another object of our invention is to provide an electrical coin register in which the money is not accepted until the merchadise delivery cycle has started.

Another object of our invention is to provide an electrical coin register in which, in the event merchandise is not delivered, a coin return mechanism may be operated to recover the coins deposited and in which the coin register is scavenged each time the coin return mechanism is operated.

Other and further objects of our invention will appear from the following description.

2

In the accompanying drawings which form part of the instant specification and in which like reference numerals are used to indicate like parts in the various views:

Figure 1 is a diagrammatic view of an electrical circuit employed in our electrical coin register with a panel adapted to vend merchandise for fifteen cents positioned in the circuit.

Figure 2 is a diagrammatic view showing the panel adapted to vend merchandise for twenty cents, which may be inserted in the circuit shown in Figure 1 in place of the 15¢-panel.

Figure 3 is a panel similar to that shown in Figure 2 showing the circuit for vending merchandise for twenty-five cents adapted to be substituted for the 15¢-panel in Figure 1.

Figure 4 is a panel similar to that shown in Figures 2 and 3 adapted to vend merchandise for thirty cents.

Figure 5 is a panel similar to that shown in Figures 2, 3 and 4 adapted to be placed in the circuit in Figure 1 for vending merchandise for ten cents.

Figure 6 is a perspective exploded view showing our electrical coin register illustrated diagrammatically in Figure 1.

Figure 7 is a front elevation of our electrical coin register with the panel removed.

Figure 8 is a sectional view taken on the line 8—8 of Figure 7.

Figure 9 is a sectional view taken on the line 9—9 of Figure 7.

Figure 10 is a perspective view showing the money shelf and the scavenging arrangement.

In general our invention contemplates the provision of a coin guide containing a plurality of guideways adapted to receive coins. The coin guide is made of insulating material and may be a transparent plastic of any suitable type. A plurality of conducting brushes project into the guideways adapted to contact coins positioned therein to complete circuits. The coins are adapted to rest on a money shelf which supports the coins in the guideways in contact with the brushes. The brushes are interconnected in predetermined circuit relationship by means of an insulating panel having registering contact points with predetermined brushes and with predetermined circuit connecting conductors. The arrangement is such that a plurality of panels may be interchangeably used, one for each of a plurality of different corresponding merchandise prices. The coin guide is made of two parts normally held together by a spring or other resilient means. Means are provided for separating the two parts of the coin guide to permit coins to fall

freely whenever the money shelf is operated either to accept coins or in response to the coin return operator. The arrangement is such that the vending cycle is started and correct change is returned automatically whenever a predetermined number of coins of proper denomination is placed in the register.

More particularly, referring now to Figure 1, an electrical potential is impressed across binding posts 12 and 14. It is understood that this potential may be either direct or alternating. For purposes of clarity in describing the circuits we will assume that a direct current potential is applied and that binding post 12 is a positive terminal so that the current will flow from this binding post through the various circuits to the negative terminal 14. If desired, the negative terminal 14 may be ground. The relay winding 16 is adapted, when energized, to attract armature 18, the holding armature, and the armature 20. The function of the holding armature is to complete a circuit to maintain winding 16 energized after coins have been accepted and before merchandise has been delivered. Armature 20 is adapted to complete a circuit through a solenoid 22 adapted to operate a change giving device to dispense a single dime by way of change. The relay winding 24, when energized, is adapted to attract holding armature 26 and an armature 28. The function of the holding armature 26 is to maintain the winding 24 energized after coins have been accepted and removed from the register and before merchandise has been delivered by the vending machine with which the coin register is associated. Armature 28 when attracted will complete a circuit through the solenoid winding 30 adapted to actuate a nickel change device. As will be pointed out more fully hereinafter, whenever a 30¢-circuit panel is in place this change device must deliver four nickels, and whenever a 10¢-circuit panel is in place this change device must deliver three nickels. In the case of the 15¢, 20¢- and 25¢-panels, the nickel change maker will deliver one nickel whenever operated in response to solenoid 30. A relay winding 32 is adapted, when energized, to attract holding armature 34 whose function it is to maintain the winding energized after the removal of coins from the coin register until merchandise is delivered. The energization of solenoid 32 will also attract armature 36 adapted to complete the circuit through a motor 38, which motor operates the vending cycle. The armature 36 will also complete the circuit through a solenoid 40 which operates the penny change maker. By the simple expedient of placing no pennies in the penny change maker and by the use of proper panels, merchandise may be vended for prices of thirty cents, twenty-five cents, twenty cents, fifteen cents and ten cents by any combination of coins. For example, a thirty cent purchase may be completed by six nickels, by three dimes, by two dimes and two nickels, by one dime and four nickels, or by a nickel and a quarter or by two quarters. In the case of two quarters, four nickels' change is given. In all other cases obviously no change will be returned. For a twenty-five cent purchase the circuit can be operated by five nickels, by three dimes, by two dimes and one nickel, by three nickels and one dime, or by a quarter. In the case of three dimes, a nickel's change will be returned. For a twenty cent purchase our register can be operated by a quarter, by two dimes, by one dime and two nickels or by four nickels, change being

given in the case of the deposit of a quarter. For a fifteen cent purchase our coin register may be operated by a quarter, by two dimes, by three nickels or by a dime and a nickel. In the case of two dimes, a nickel's change is made, and in the case of a quarter a dime's change is returned. For a ten cent purchase with the 10¢-panel in place, our coin register can be operated by a quarter, by two nickels or by a dime. In the case of a quarter three nickels' change is given. By the use of from one to four pennies in the penny change maker adjustment, the 30¢-panel, by giving four cents' change will operate to vend at twenty-six cents, by giving three cents' change will operate for a twenty-seven cent purchase, by giving two pennies' change will operate for a twenty-eight cent purchase, and by giving one penny's change will operate for a twenty-nine cent purchase. Similarly, the 25¢-panel, by giving four pennies' change will vend for twenty-one cents, by giving three pennies' change will vend for twenty-two cents, by giving two pennies' change will vend for twenty-three cents and by giving one penny's change will vend for twenty-four cents. It will be clear that similar increments may be had for the 20¢-panel, the 15¢-panel and the 10¢-panel so that by making the proper adjustments in the change maker, merchandise varying in price from thirty cents to six cents may be sold.

In Figure 1, the 15¢-panel is shown in place. The positive potential from binding post 12 is led by conductor 42 to a contact point 44 adapted to be closed by a push button operated switch arm 46. Whenever the push button arm 46 is operated, the binding post 48 is connected to the positive potential. A brush 49 is adapted to connect the binding post 48 to a terminal contact 50 on the panel 52 which is made of insulating material and carries the contact posts and the conductors for the circuit. If desired, the push button 46 may be omitted and the positive potential led directly to binding post 48, in which case assuming proper coins are placed in the register, operation will begin. The holding circuits will maintain the correct solenoids energized after the push button 46 is released.

The negative potential is connected to terminal post 54 by way of conductor 56, conductor 58, winding 32, conductor 60 and conductor 62. A brush 53 connects terminal 54 to binding post 64 on the panel 52. Terminal post 68 is connected to the negative terminal 14 by means of conductor 66, the relay winding 16 and conductor 70. It will be observed that whenever the circuit is completed from binding post 68 to binding post 12, the current will flow through relay winding 16 and relay winding 32 in series. The binding post 68 is connected to post 72 on the panel 52 by means of brush 69. The post 74 is connected to the negative terminal 14 by way of conductor 66, conductor 76, the relay winding 24 and conductor 77. It will be observed that whenever the circuit is completed between post 74 and the positive terminal 12, current will flow through windings 24 and 32 in series. The binding post 78 on the panel 52 is connected by brush 75 to the terminal post 74. The positive potential is also led through conductor 80 to a contact point 82 through a normally closed switch arm 84 to conductor 86 and through a conductor 88 connected to armature 18. When relay winding 16 is de-energized, armature 18 will energize armature 26 through conductor 90. When both windings 16 and 24 are de-energized, armature 34 will be

connected to the positive potential through conductor 92. The arrangement is such that whenever relay 16 is energized, the circuit to armatures 26 and 34 is broken so that only one change maker can operate at a time.

The contact points 94 and 96 are adapted to be connected to the brushes for the bottommost dime when the panel 52 is in place. The contact points 98 and 100 are adapted to be connected to the brushes for the second dime. The contact points 106 and 108 are adapted to be connected to the brushes for the bottommost nickel. Contact points 110 and 112 are adapted to be connected to the brushes for the second nickel, and contact points 114 and 116 are adapted to be connected to the brushes for the third nickel. Contact points 130 and 132 are adapted to be connected to the brushes for the quarter. Figure 2 shows the 20¢-panel 101 which has the same contact points as shown on panel 52 with the addition of contact points 118 and 120 for the fourth nickel. The interconnection between the brushes, however, by way of contact points is different, as will be pointed out hereinafter. Similarly, the panel 103 for the 25¢ vending has a pair of additional dime contact points 102 and 104, and an additional pair of nickel contact points 122 and 124. The contact points are wired differently, as will be pointed out hereinafter in describing the 25¢-panel. The 10¢-panel 105 shown in Figure 5 has only one pair of dime contact points, two pairs of nickel contact points and a pair of quarter contact points. The 30¢-panel 107 has an additional pair of nickel contact points 126 and 128 and an additional pair of quarter contact points 134 and 136.

Referring again to Figure 1 in which the 15¢-panel 52 is shown in place, let us assume that a purchaser deposits one nickel. The circuit across contact points 106 and 108 is completed but this is insufficient to complete any operational circuit. If at this time a dime is dropped into the register to complete the circuit across contact points 94 and 96, assuming that the push button 46 is pressed, current will flow through conductor 45 to contact point 48 and its registering contact point 50, thence through conductor 138 to conductor 140, across the dime, through conductor 142, across the first nickel to conductor 144, thence thence to contact point 64, across brush 53 to contact point 54, through conductor 62, through winding 32, through conductor 58 to the other side of the line by way of binding post 14, thus energizing the winding 32. The energization of winding 32 will attract armature 34 so that current will flow through conductor 88, through the conductors 90 and 92, through the winding 32 to the other side of the line, maintaining the relay winding energized. At the same time armature 36 will be attracted, permitting current to flow through the motor 38 from conductor 86, through the motor, through conductor 37, through the armature 36, through conductor 55, through conductor 56 to the other side of the line 14, energizing the motor and operating the vending cycle. As soon as the vending cycle is completed, the switch 84 is interrupted by a cam actuated by the motor 38 to interrupt the circuit through the motor and also through the holding circuit of the winding 32, stopping the operation. The circuit between conductors 138 and 144 can also be completed by means of three nickels. It will be observed that when the third nickel is deposited, the hot wire 138 is connected to conductor 144 by means of the conductor 137 and by means of the three nickels and the inter-nickel contact conductors 115 and 111. If two dimes are deposited in the register with the 15¢-panel shown in Figure 1, a circuit is completed through the two dimes and the inter-dime connector 97, from conductor 138 to conductor 146 which is connected to contact point 78 and its registering post 74. From thence current will flow through conductor 77, through the relay winding 24 and the relay winding 32, thus giving a nickel in change and operating the vending motor. It is understood that in each case the interruption of the circuit by switch 84 de-energizes the holding circuit and interrupts the operation of the motor and these cannot be re-established except by the redeposit of proper coins into the register. When a quarter is deposited in the register the hot wire 140 becomes connected by the quarter and the brushes, as will be described more fully hereinafter, to the conductor 148, which is connected to the contact point 72 and its registering post 68. Current will then flow through conductor 70, energizing the relay winding 16 and the relay winding 32, thus operating the dime change maker and the vending motor.

Referring now to Figure 6, in which the panel 52 is shown in perspective, adjacent the brush holding panel 150, this panel is made of insulating material and is adapted, together with a member 152, to form the coin guide housing, it being understood, of course, that the member 152 is likewise made of nonconducting material. Ribs 154 and 156 divide the surface of the member 152 into three areas. The left-hand edge of member 152 is formed with a flange 158 and the right-hand edge of member 152 is formed with a flange 160. The distance between flanges 158 and rib 154 is such that it will permit the ready passage of a dime. The distance between ribs 154 and 156 is such that it will permit the ready passage of a nickel, and the distance between rib 156 and flange 160 is such that it will permit the ready passage of a quarter. The panel 150 is formed with a pair of openings 162 and 164. These are adapted to register respectively with pin 166 and pin 168 carried by the member 152. The member 152 is supported by the register housing 170 in any suitable manner. When coins are dropped into a vending machine with which our electrical register is associated they are separated and tested by a slug ejector 171, shown in Figure 8, as is well known to the art. Quarters will be directed to the opening 175, shown in Figure 6, formed in the upper portion 174 of the member 152 for passage to the quarter guideway. Dimes will be directed to the opening 172 formed in the upper portion 174 of the member 152 and will pass through the inclined guideway 173 to the dime guideway. Nickels will pass through the opening 176 to the nickel guideway and all rejected coins will pass through the baffle 178 and return to the purchaser. A spring 180 is adapted to bias the brush panel 150 so that its surface will rest against the ribs 154 and 156 when the panel is hung on the pins 166 and 168 by means of the openings 162 and 164. The brush panel carries a plurality of brushes 182. Each brush is mounted adjacent a respective opening 184 through which the lower ends of the brushes are adapted to pass so that the brushes will extend into the coin guideways adapted to contact coins positioned therein. Each of the brushes carries a spring contact member 186 which is positioned to reg-

ister with contact points mounted on the panel 52 and upon panels 101, 103, 105 and 107. There are three pairs of brushes positioned adjacent the dime guideway. If the 30¢-panel is to be used there will be six pairs of brushes positioned adjacent the nickel guideway and two pairs of brushes positioned adjacent the quarter guideway. If price changes not exceeding twenty-five cents are desired, only five pairs of nickel brushes will be used and only one pair of quarter brushes will be used. In Figure 6 this type of brush panel is shown. The brush springs 186 are positioned to register with the respective contact points 94, 96, 98, 100, and the like, positioned adjacent the dime guideway on the wiring panels. Similarly, the springs 184 associated with the nickel brushes are positioned to register with the contact points 106, 108, 110, 112, 114, 116, and so forth, positioned on the wiring panels adjacent the nickel guideway, and the springs 186 associated with the quarter brushes are positioned to register with the contact points 130 and 132 positioned on the wiring panels adjacent the quarter guideway. The brush panel carries four threaded studs 188 adapted to register with and pass through four openings 190 formed on the contact and wiring panels such as 52. Nuts are adapted to be threaded on the studs 188 to hold the circuit panels upon the brush panel. The wiring for each circuit panel terminates in the four contact points 78, 50, 64 and 72 which are positioned in exactly the same place on each wiring panel. The brushes 75, 49, 53 and 69 are carried by the member 174 of the coin guide housing such that when the assembly is complete the control circuit for the vending motor and the change makers will be connected to the particular contact panel assembled, thus determining the value of the coins it is necessary to deposit into the coin register to initiate the operation of the vending mechanism with which the register is associated.

Referring now to Figure 7, it will be observed that there is a wiper 192 in the dime guideway between the uppermost brushes 182. The lower end of the wiper 192 passes through an opening 194 in the brush panel into the dime guideway. Similarly, there is a wiper 196 positioned above the uppermost pair of nickel brushes 182. The lower end of this wiper extends through an opening 198 into the nickel guideway. The coin guideway housing 152 is formed with an opening 200 in the nickel chute adjacent the lower end of the wiper 196.

Referring now to Figure 8, it will be seen that there are five nickels 201 in place resting on the insulating top 202 of the money shelf 204 which supports the nickels in the guideway. If a sixth nickel were now deposited into the nickel coin chute, the wiper member 196 would tip the nickel backward through the opening 200 into the space 206 formed between the rear of the member 152 and the coin guide housing 170 permitting the extra coin to fall down this space to the coin return chute to be returned to the customer. It will be observed, also, that whenever the money shelf 204 rotates so that its upper portion moves to the right as viewed in Figure 9, all of the nickels would fall into this area to be returned to the customer. When the upper end of the money shelf, however, moves to the left, that is, when it rotates in a counterclockwise direction, the coins will be routed to the coin box of the machine.

There is a wiper 208 associated with the quarter guideway having its lower end extending into the guideway through an opening 210 and adapted to eject excess quarters through an opening 212. The opening 214 is associated with the dime wiper 192. Wipers 192, 196 and 208 are made of very light spring metal and are such that coins falling by them will remain in the coin chute. It is only when it is attempted to deposit an excess of coins in a coin chute that the wipers will eject them in order to preclude coins jamming in the coin chute.

As can be seen by reference to Figure 10, the coin shelf 204 is provided with a pair of lugs 216 positioned in slots 218 formed in the housing 170 so that the coin chute can pivot both in a clockwise and counterclockwise direction. A pin 220 is secured to the coin shelf 204 extending parallel to and above its axis of rotation. A lever 222 is pivoted around a shaft 226 carried by the housing 170. The upper end of the lever is formed with a flange 224 extending between the coin guide member 152 and the brush panel 150. The brush panel is carried by a frame 228, the lower end of which extends downwardly in the path of the upper end of the shelf 204, as is clearly shown in Figure 10. A bracket 230 is carried by the shelf secured thereto above the longitudinal axis of rotation of the shelf. The bracket is formed with an inclined surface 232 positioned in the path of a reciprocal member 234. This member acts as the coin return operating link and when it moves downwardly it will strike the inclined surface 232 and rotate the shelf 204 in a counterclockwise direction, as viewed in Figure 10, carrying the pin 220 to the left, as viewed in Figure 10. This will rotate the lever 222 in a clockwise direction so that the flange 224 will move away from the brush panel 150, having no effect thereon. The upper end of the shelf 204, however, will strike the frame 228 of the brush panel and carry it to the left as viewed in Figure 10, opening the coin guides and permitting coins to fall freely between the money shelf and the rear of the machine, that is, through the space 206 in Figure 8, and toward the observer in Figure 10.

The money shelf 204 is provided with a second bracket 236 carried by it below its axis of rotation. This bracket is provided with an inclined surface 238 adapted to be contacted by pin 240 carried by the reciprocating link 242. This link is adapted to be moved toward the right during the operation of the vending cycle to carry the pin 240 into contact with the inclined surface 238 in order to cam the money shelf to rotate in a clockwise direction, as viewed in Figure 10. This carries the lower end of the lever 222 to the right, moving the flange 224 of the lever 222 to the left, rotating the lever in a counterclockwise direction. The flange 224 contacts the lower end of the brush panel 150 moving it outwardly against the action of the spring 180, thus opening the coin chutes and permitting them to be scavenged in event there is a tendency of coins to stick therein due to excessive friction or due to a slightly bent coin or the like. When the money shelf rotates in a clockwise direction to a position clear of the coin chutes money will drop into the coin box. It will be seen that whether the coin return is operated or whether the money shelf is actuated to take the coins, in either event the coin chutes are opened or scavenged, guarding against the coin chutes becoming jammed, or relieving a jam if one should

occur, as for example might be the case with a badly worn dime which is exceptionally thin.

We have thus far described the operation of our coin register with a 15¢-panel in place. Referring now to Figure 2 in which the 20¢-panel 101 is shown, it will be observed that there are now four pairs of nickel contact points, the contact points 118 and 120 being added above contact points 114 and 116. Connector 119 connects contact point 120 with contact point 114. The conductor 137, instead of connecting conductor 138 to contact point 114, now connects this conductor to contact point 118. In addition, the conductor 142, which was formerly connected to the first nickel, is now connected to the second nickel and an additional conductor 99 connects the second dime to the conductor 144. When two dimes are placed in the coin chutes with panel 101 in place, the circuit across posts 59 and 64 is completed by way of conductor 97 and the two dime brushes which are connected to the dime contact points. When two nickels and one dime are inserted in the register fitted with panel 101 the circuit is completed by way of the first dime and by way of the two nickels in series, current flowing through the first dime then to the second nickel by way of conductor 142, through the connection 111, then through the first nickel to conductor 144, thence to post 64. In the case of four nickels, the circuit is completed through conductor 137, to the fourth nickel, thence through the connecting wires 119, 115 and 111, through the third, second and first nickels intermediate thereof and thence to conductor 144 to the post 64. If a quarter is placed in the register with the 20¢-panel 101 in position, the circuit is completed from post 59 through conductor 138, conductor 140, through the quarter and thence through conductor 129 to the post 78, which is connected by post 74 and conductor 77 to actuate the nickel change device and the vending cycle, as described above. It will be seen, therefore, that with the 20¢-panel in place the register will operate the vending cycle for two dimes, for four nickels or for two nickels and one dime, giving no change. In the case of a quarter the change maker is operated to give change of one nickel and to operate the vending cycle.

Referring now to Figure 3 in which the 25¢-panel is shown, it will be noted that a pair of of third dime contacts 102 and 104 have been added and that contact 102 is connected to contact 100 by means of a conductor 101. Another pair of nickel contact points 122 and 124 have been added and the contact point 124 of the fifth nickel is connected to the contact point 118 of the fourth nickel by a conductor 123. The circuit can be completed by means of five nickels since the connection 137 connecting hot wire 138 to the nickel contact points now makes contact with the uppermost nickel contact point 122. When the fifth nickel is in place current will flow through the nickels and the intermediate connecting conductors 123, 119, 115 and 111 to the conductor 144, thus completing the vending cycle circuit, in the manner described above. It will be observed that the conductor 142 now interconnects the third nickel contact point 114 with the first dime contact point 96 so that the circuit may be completed from the hot wire 138 through the conductor 140 to the first dime contact point 94, thence through the first dime to conductor 142, to the third nickel contact point 114, which, when three nickels have been deposited, will complete the circuit to conductor 144, thus permitting the register to operate the vending mechanism for one dime and three nickels and giving no change. It will be observed that in the 25¢-panel 103 we have added a conductor 141 which interconnects the second dime contact 100 with the first nickel contact point 106. If we deposit two dimes in the register fitted with the panel 103, current will flow from the hot wire post 59 to the conductor 140, to the first dime, through connecting conductor 97 to the second dime, through the second dime, thence through conductor 141 to the first nickel post 106. If a first nickel is also in the register, the circuit will be completed through conductor 144 to the post 64, thus operating the vending cycle and giving no change. When a quarter is deposited in the register fitted with the panel 103 current will flow from the hot wire 138 through the conductor 140, to the contact point 132, through the quarter, to the contact point 130 and thence through conductor 129, to the conductor 144 and thence to negative post 64, operating the vending cycle and giving no change. When three dimes are deposited in the register fitted with the panel 103, current will flow from the hot wire 138 through conductor 140, through the first dime, through conductor 97, through the second dime, through conductor 101, through the third dime and thence through conductor 105 to the post 78, this post being connected to post 74 which operates the nickel coin change mechanism and the vending cycle relays, as described above. It will be seen, therefore, that with the 25¢-panel 103 in place in the register the vending mechanism will operate and give a nickel in change.

Let us now consider the register with the 30¢-panel 107 assembled. It will be observed that in this panel a sixth pair of nickel contact points 126 and 128 have been added and that the hot wire 138 is now connected by means of conductor 137 to the sixth nickel contact 126. In addition, the first dime contact point 96 is connected by conductor 142 to the fourth nickel contact point 118, and the second dime contact point 100 is connected by conductor 141 to the second nickel contact point 110. In addition, the third dime contact point 104 is connected by conductor 143 to the return conductor 144. A second pair of quarter contacts 134 and 136 have been added with the contact point 136 being connected to the contact point 130 by the connecting conductor 135. The second quarter contact point 134 is connected by conductor 133 to the nickel change operating post 78. In this case it will be observed that the nickel change maker is designed to give four nickels in change instead of merely one nickel, as is well understood in the art. Since the panel 107 is a 30¢-panel, it is set to operate only with thirty cents. Considering now six nickels, it will be observed that the circuit between posts 59 and 64 will be completed by the sixth nickel by way of conductor 137, the sixth nickel, connector 127, the fifth nickel, connector 123, the fourth nickel, connector 119, the third nickel, connector 115, the second nickel, connector 111, the first nickel and thence through conductor 144 to the post 64, operating the vending cycle for six nickels. When three dimes are in position in the register fitted with the panel 107, the third dime is adapted to complete the circuit by way of conductor 140, the first dime, connector 97, the second dime, connector 101, the third dime, conductor 143 to post 64. When two dimes are employed the

circuit will be completed in the register fitted with panel 107 by the addition of two nickels, in which case the circuit is completed from conductor 138 to conductor 140, through the first dime, connector 97, through the second dime, through conductor 141, through the second nickel, through connector 111, through the first nickel and thence through conductor 144 to the post 64. The circuit is adapted to be completed by means of one dime and four nickels, in which case current will flow from the hot wire 138 through the conductor 140, through the first dime, through conductor 142, through the fourth nickel, through connector 119, through the third nickel, through connector 115, through the second nickel, through connector 111, through the first nickel and thence through conductor 144 to the post 64. The circuit is also adapted to be completed by a quarter and a nickel. In this case current will flow through the conductor 138, through conductor 140, through the first quarter, through conductor 131, through the first nickel and thence through conductor 144 to the post 64. In all the cases just mentioned the register will cause the vending cycle to operate, and no change will be given. When, however, two quarters are deposited in the register, the circuit will be completed from the hot wire 138 through the conductor 140, through the first quarter, through connecting conductor 135, through the second quarter, through the conductor 133 to the post 78 which will operate both the change making relay and the vending cycle relay. In this case the change making relay, that is, the nickel relay will dispense four nickels so that from the fifty cents deposited twenty cents in change is given and the merchandising cycle operated.

Referring now to the 10¢-panel 105, it will be seen that there are only two pairs of nickel contact points, a single pair of dime contact points and a single pair of quarter contact points. In this case the change maker is adjusted to dispense three nickels every time the nickel change maker is operated. With one dime the circuit is completed from the hot wire 138 through conductor 140, through the dime and thence through conductor 142, which in this case is connected directly to the conductor 144 so that the circuit between posts 59 and 64 is thus completed by a single dime. The circuit is also adapted to be completed by two nickels. In this case conductor 137 is connected to the contact point 110 of the second nickel so that upon the deposit thereof current will flow from conductor 136, through the conductor 137, through the second nickel, through the cross connection 111, through the first nickel, through the conductor 144 to the post 64. When a quarter is deposited, current will flow from the hot wire 138, through the conductor 140, across the quarter, through the conductor 133, which is now connected to the first quarter, contact point 130 and thence to post 78 so that the change maker and the vending cycle relays are both energized by the deposit of a quarter. Since the change maker is loaded to dispense three nickels, upon its operation both the merchandise and three nickels will be returned.

It will be understood, of course, that with the operation of the vending cycle, the change making solenoid 40, which may be any suitable type of prime mover, is also operated and this is designed to dispense pennies in groups of one, two, three or four depending on its adjustment. If the prices are multiples of five cents, then no pennies are loaded, as described above.

If, however, the price is from one to four cents less than the even multiple of five, from one to four pennies are loaded in the penny change maker, as described above.

It will be noted that the push button operated switch 46 described above can be used to initiate the vending cycle. The operation of this push button may be controlled by a number of selector buttons as is known in the art so that a particular vending column in a multicolumn vending machine may be mechanically or electrically coupled to the vending cycle, as is well known in the art, by the use of individual selector buttons. If desired, the push button switch 46 may be eliminated so that the register will function automatically upon the deposit of the right number of coins of proper denomination.

It will be seen that we have accomplished the objects of our invention. We have provided an extremely simple, reliable and flexible electrical coin register adapted to vend merchandise with any combination of coins with a wide variety of ranges, and the price of the merchandise being vended may be readily changed with convenience and facility. Unless the right number of coins is deposited, it is impossible to initiate the vending cycle, and change is automatically given in event the right combination of coins is not possessed by the user. If the vending cycle is not initiated coins will not be accepted. The relay 160 is also adapted to operate a locking mechanism comprising the locking pin 77, shown in Figure 6, adapted to fit in the opening 233 of the coin return operating link. The arrangement is such that as soon as the vending cycle starts, the coin return link cannot be operated. This precludes the danger of starting the vending cycle and then operating the coin return mechanism. If the vending cycle is not started the coin return may be operated. The coin chutes are scavenged automatically whenever the coins are accepted or whenever the coin return mechanism is operated. This ensures that the coin chutes will not become jammed. Furthermore, the scavenging arrangement enables us to use considerable spring pressure on the brushes 182. The constant falling of coins by the brushes keeps wiping the brushes, maintaining good electrical contacts through the coins. Since silver and nickel are good conductors, there is little danger that the circuits will not be completed by the coins. If a coin happens to be covered with insulating material or a layer of grease or grime, which is non-conducting, all that is necessary is to operate the coin return and redeposit the coins.

Our device is inexpensive to construct and there are few moving parts which are apt to become misadjusted.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of our claims. It is further obvious that various changes may be made in details within the scope of our claims without departing from the spirit of our invention. It is therefore to be understood that our invention is not to be limited to the specific details shown and described.

Having thus described our invention, what we claim is:

1. An electrical coin register including in combination an electrically energizable prime mover, a source of potential, a first relay having a winding, an armature and a pair of contacts, a plurality of coin chutes adapted to receive coins of different denominations, brushes positioned in said coin chutes adapted to be bridged by coins therein, means for supporting coins in said coin chutes, a change giving device, a second relay having a winding, a first initating circuit including the source of potential, predetermined brushes and said first relay winding in series, a second initiating circuit including said second relay winding, predetermined brushes and said first relay winding connected in series across said potential source, a holding circuit including said first relay winding, one of the relay contacts, the relay armature and a normally closed switch connected in series across said potential source, an operating circuit including the prime mover, the armature and the other of said relay contacts connected in series across the potential source, means responsive to a predetermined movement of the prime mover for opening said normally closed holding circuit switch, means responsive to the movement of the prime mover for moving said coin support to accept coins from the coin register and means responsive to the energization of said second relay for operating said change giving device.

2. An electrical coin register as in claim 1 including in combination a removable circuit panel adapted to connect groups of predetermined brushes in series and readily releasable means for securing said circuit panel in brush-connecting position.

3. An electrical coin register as in claim 1 in which said coin chutes are adapted to receive nickels, dimes and quarters, some of said brushes being positioned in pairs in the dime chute, some of said brushes being positioned in pairs in the nickel chute, and one pair of said brushes being positioned in the quarter chute, a removable circuit panel adapted to permit the energization of the first initiating circuit for ten cents, said removable circuit panel having circuit means connecting one pair of dime brushes in series with the first initiating circuit, circuit means connecting two pairs of nickel brushes in series with the first initiating circuit and the pair of quarter brushes in series with the second initiating circuit to give change aggregating fifteen cents in value.

4. An electrical coin register as in claim 1 in which said coin chutes are adapted to receive nickels, dimes and quarters, a plurality of said brushes being positioned in pairs in the dime chute, a plurality of said brushes being positioned in pairs in the nickel chute, and one pair of said brushes being positioned in the quarter chute, a removable circuit panel adapted to permit the energization of the first initiating circuit for fifteen cents, said circuit panel having conductors adapted to connect three pairs of nickel brushes in series with the first initiating circuit, circuit means to connect one pair of dime brushes and one pair of nickel brushes in series with the first initiating circuit, conductors adapted to connect two pairs of dime brushes in series with said second initiating circuit to give change of a nickel, a third initiating circuit having a third relay winding connected in series with said first relay winding across said potential source, a second change maker, means responsive to the actuation of said third relay for operating said second change maker, circuit means carried by said removable panel adapted to connect the pair of quarter brushes in series with said third initiating circuit whereby to return change aggregating ten cents to operate the device with which the coin register is associated in response to the deposit of a quarter.

5. An electrical coin register as in claim 1 in which said coin chutes are adapted to receive nickels, dimes and quarters, a plurality of said brushes being positioned in pairs in the dime chute, a plurality of said brushes being positioned in pairs in the nickel chute, and one pair of said brushes being positioned in the quarter chute, a removable circuit panel adapted to permit the energization of the first initiating circuit for twenty cents, said circuit panel having conductors for connecting four pairs of nickel brushes in series with said first initiating circuit, conductors for connecting two pairs of dime brushes in series with said first initiating circuit, conductors for connecting two pairs of nickel brushes and one pair of dime brushes in series with said first initiating circuit and the pair of quarter brushes in series with said second initiating circuit whereby, upon the deposit of a quarter, the device with which the coin register is associated will be operated and a nickel in change returned to the user.

6. An electrical coin register as in claim 1 in which said coin chutes are adapted to receive nickels, dimes and quarters, a plurality of said brushes being positioned in pairs in the dime chute, a plurality of said brushes being positioned in pairs in the nickel chute, and one pair of said brushes being positioned in the quarter chute, a removable circuit panel adapted to permit the energization of the first initiating circuit for twenty-five cents having conductors connecting five pairs of nickel brushes in series with said first initiating circuit, conductors connecting three pairs of nickel brushes and one pair of dime brushes in series with said first initiating circuit, conductors connecting two pairs of dime brushes and one pair of nickel brushes in series with said first initiating circuit, conductors connecting the pair of quarter brushes in series with said first initiating circuit and conductors connecting three pairs of dime brushes in series with said second initiating circuit.

7. An electrical coin register as in claim 1 in which said coin chutes are adapted to receive nickels, dimes and quarters, a plurality of said brushes being positioned in pairs in the dime chute, a plurality of said brushes being positioned in pairs in the nickel chute, and a plurality of said brushes being positioned in pairs in the quarter chute, a removable circuit panel adapted to permit the energization of the first initiating circuit for thirty cents including conductors connecting six pairs of nickel brushes in series with said first initiating circuit, conductors connecting three pairs of dime brushes in series with said first initiating circuit, conductors connecting four pairs of nickel brushes and one pair of dime brushes in series with said first initiating circuit, conductors connecting two pairs of dime brushes and two pairs of nickel brushes in series with said first initiating circuit, conductors connecting one pair of nickel brushes and one pair of quarter brushes in series with said first initiating circuit and conductors connecting two pairs of quarter brushes in series with said second initiating circuit.

8. In an electrical coin register a coin guide member, a brush panel, means for biasing the

coin guide member and the brush panel into engagement with each other to form a coin chute, brushes carried by the brush panel and extending into the coin chute, a coin shelf, means for pivotally mounting the coin shelf below the coin chute to support a coin thereon in the coin chute, means for pivoting the coin shelf to accept a coin in the coin chute and means responsive to the pivoting of the coin shelf to separate the coin guide member and the brush panel against the action of the biasing means.

9. An electrical coin register as in claim 8 in which said coin guide member and said brush panel form a plurality of coin chutes and said brushes carried by the brush panel extend into each of said coin chutes, circuit means for connecting the brushes to form an electrical circuit adapted to be completed across the brushes by coins in said coin chutes.

10. In an electrical coin register a coin guide member, a brush panel, means for biasing the coin guide member and the brush panel into engagement with each other to form a coin chute, a coin shelf, means for pivotally mounting the coin shelf adjacent the coin chute to support coins thereon in the coin chute, brushes carried by the brush panel and extending into the coin chute, means for pivoting the coin shelf in one direction to accept coins in the coin chute, means for pivoting the coin shelf in the opposite direction to return coins in the coin chute to a depositor and means responsive to the pivotal movement of the coin shelf in either direction to separate the coin guide member and the brush panel from each other against the action of said biasing means.

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