July 28, 1953 C. GABRIELSEN 2,646,806

CHANGE DEVICE FOR ELECTRICAL COIN REGISTERS

Filed June 3, 1950 4 Sheets-Sheet 1

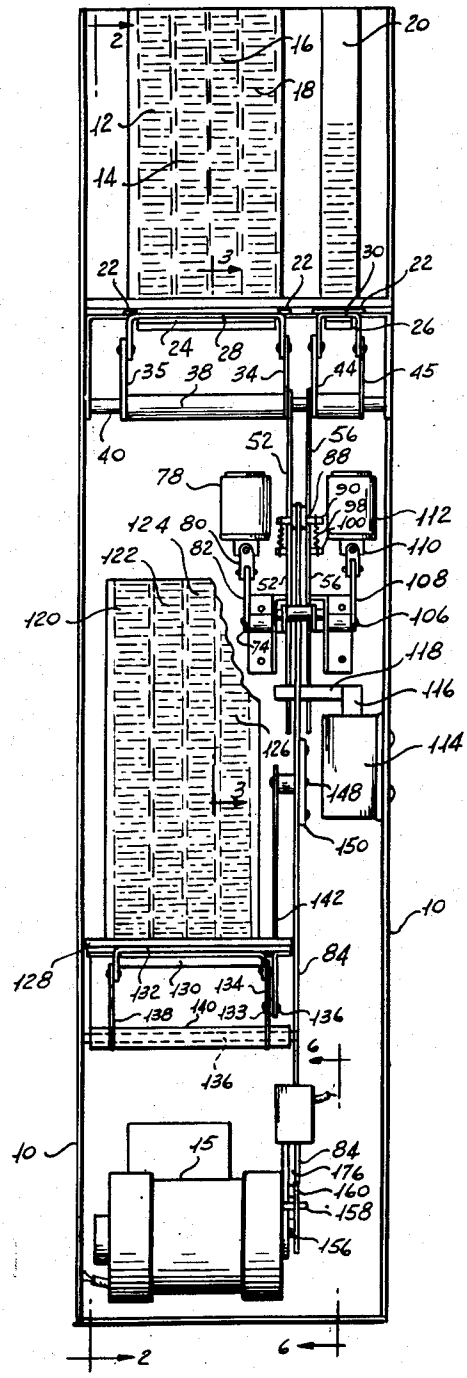


Fig 1

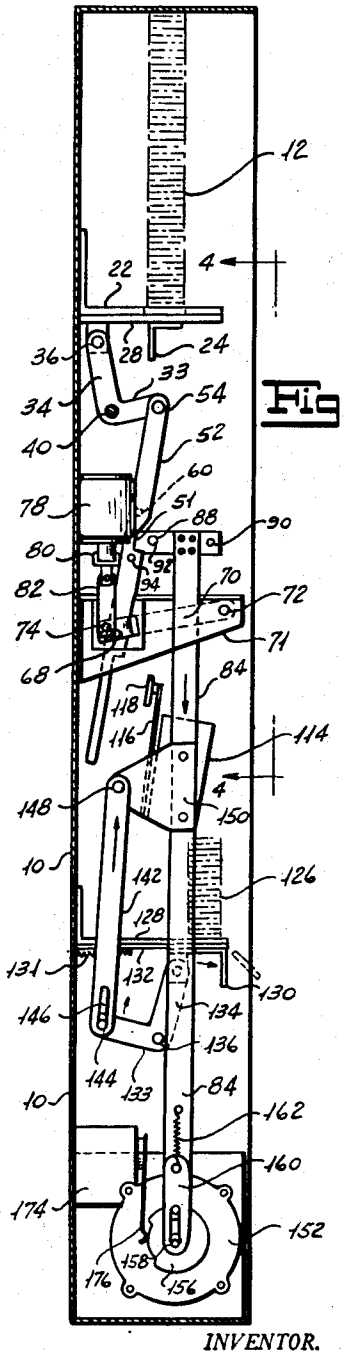


Fig 2

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CHANGE DEVICE FOR ELECTRICAL COIN REGISTERS

Filed June 3, 1950 4 Sheets-Sheet 2

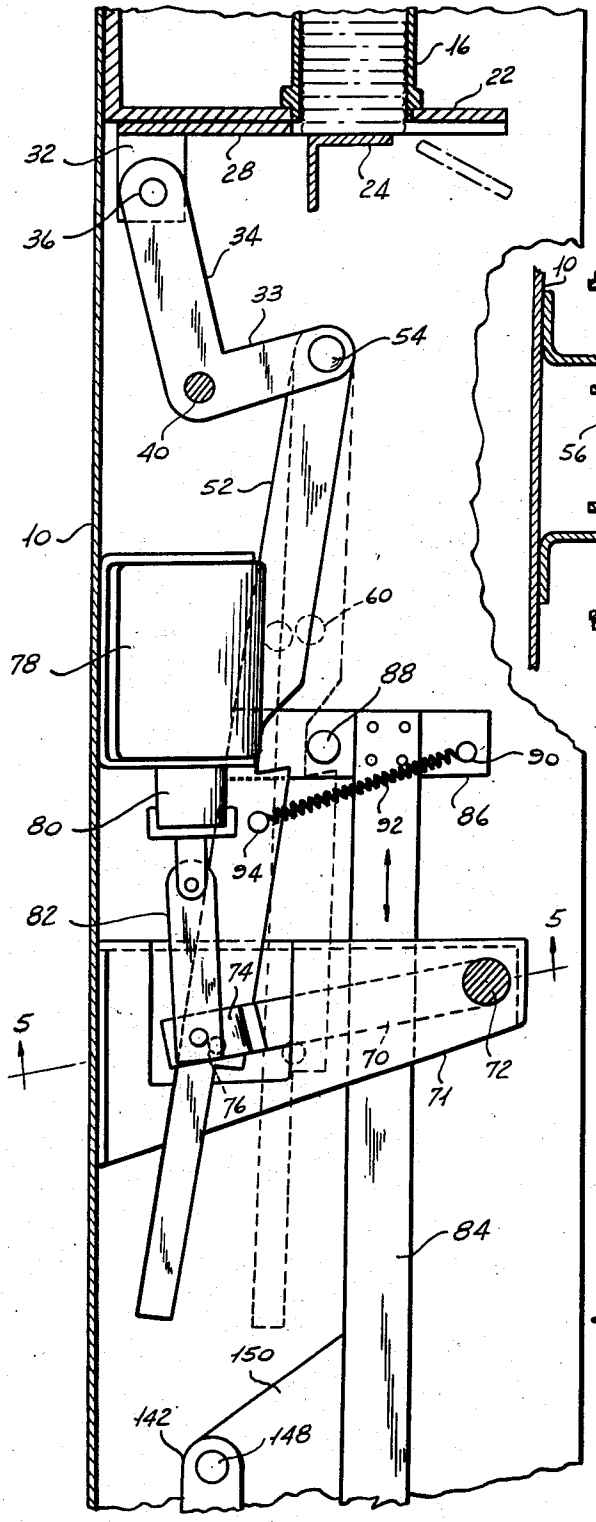


Fig 5

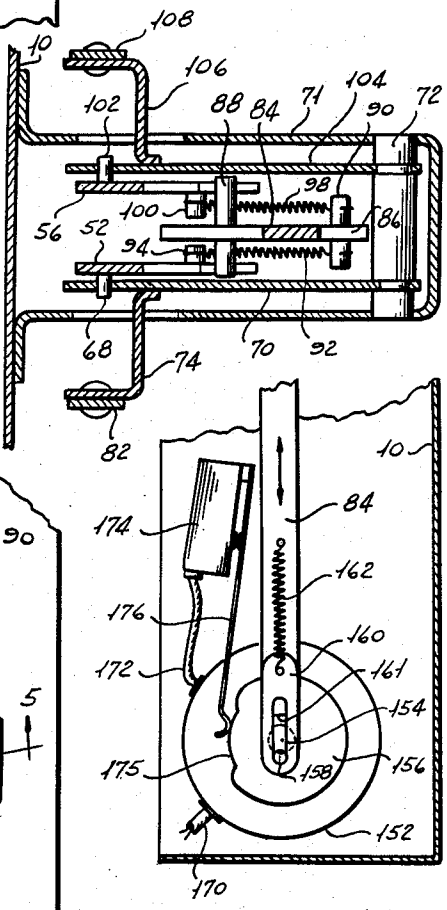


Fig 6

Fig 3

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CHANGE DEVICE FOR ELECTRICAL COIN REGISTERS

Filed June 3, 1950 4 Sheets-Sheet 3

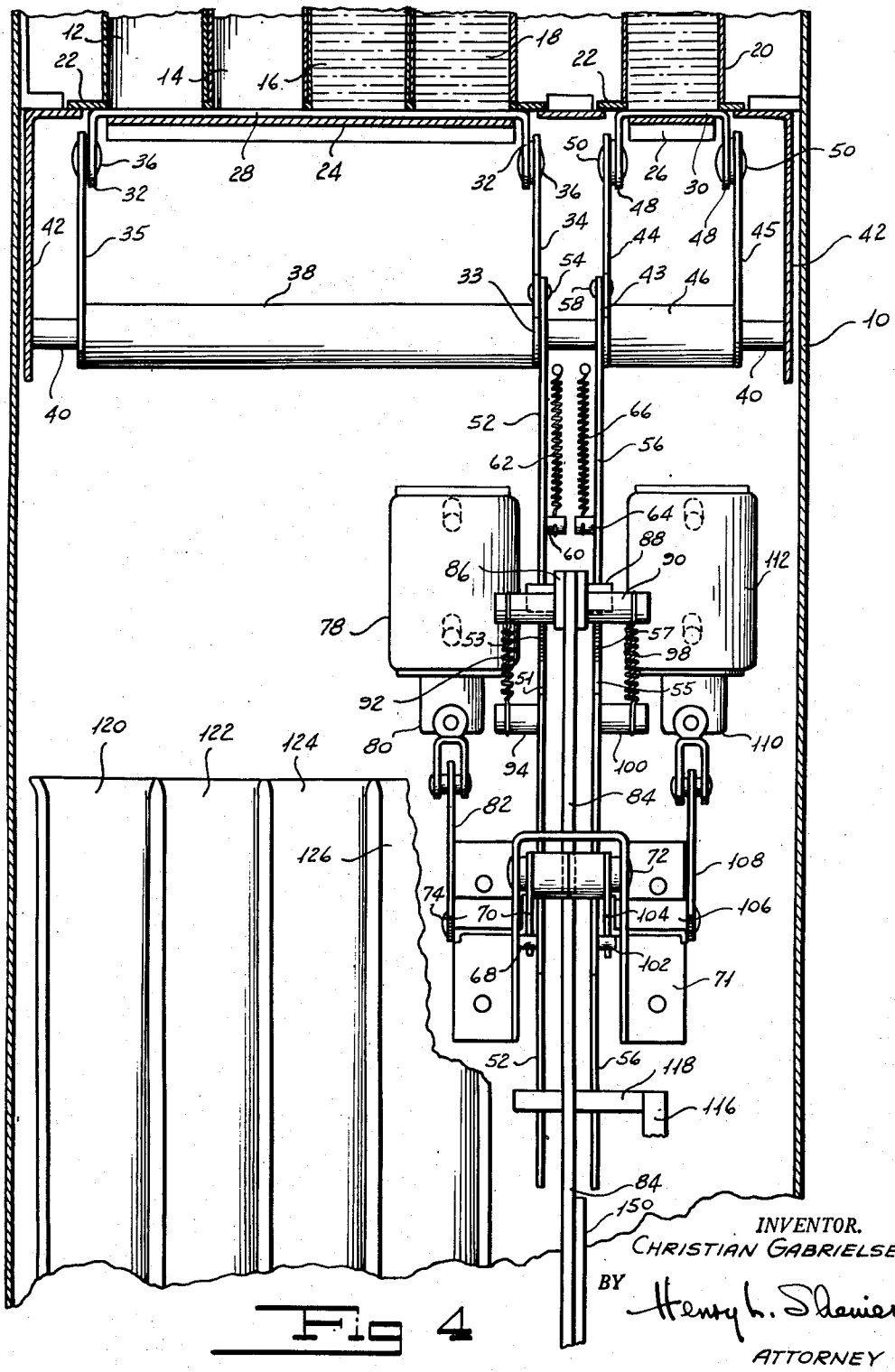


Fig 4

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CHANGE DEVICE FOR ELECTRICAL COIN REGISTERS

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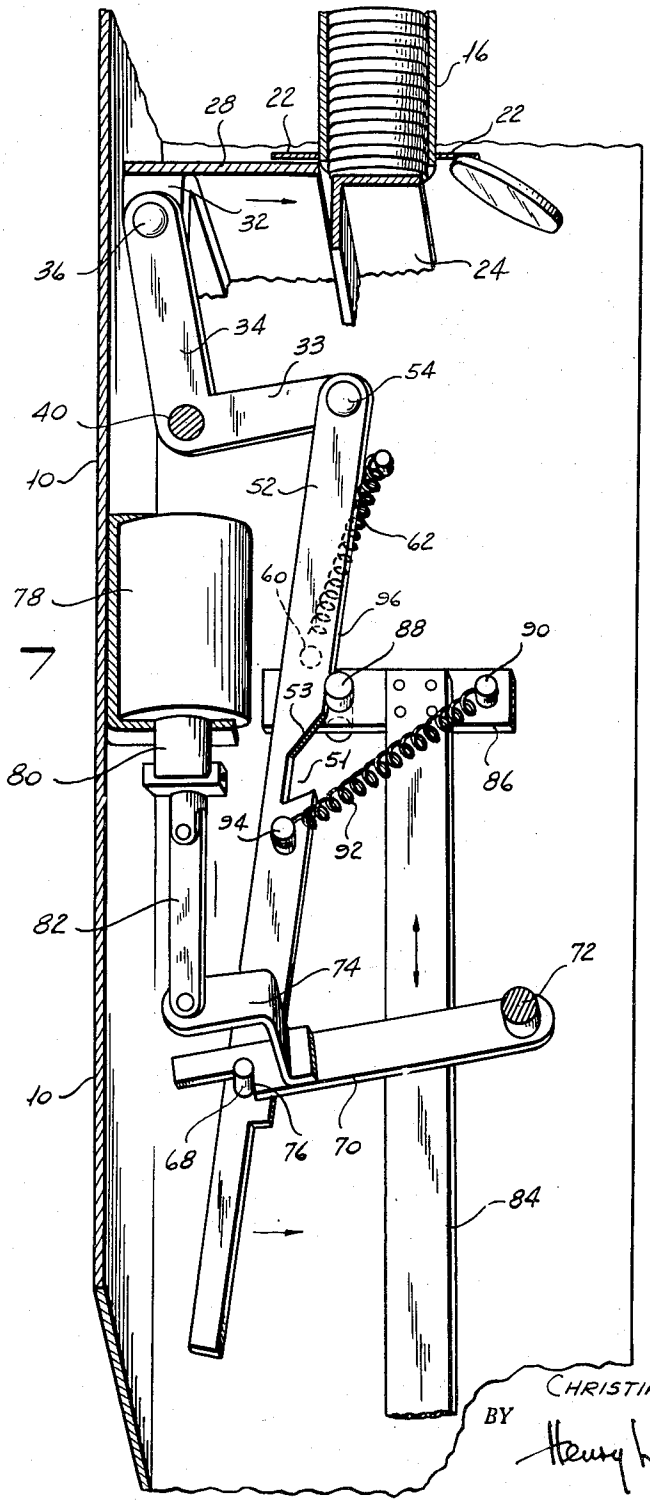


Fig 7

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UNITED STATES PATENT OFFICE

2,646,806

CHANGE DEVICE FOR ELECTRICAL COIN REGISTERS

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Application June 3, 1950, Serial No. 166,044

4 Claims. (Cl. 133—4)

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My invention relates to a change device for electrical coin registers and more particularly to an improved change device of flexible design capable, without change in structure, of accommodating a large variety of price changes.

In automatic merchandising machines adapted to vend cigarets, beverages, candy and the like, coin registers are employed for accepting the coins which go to make up the price of the merchandise. In times past these coin registers were adapted to receive coins of various denominations aggregating the price of the merchandise to be delivered in multiples of five cents. Due to the varying tax on cigarets, for example, and price changes brought about in other merchandise by varying conditions, it is important that price changes be accommodated for in a simple and convenient manner. The coin registers of the prior art which were adapted to give change were expensive to manufacture, complicated in structure, difficult to maintain and inflexible in design.

In copending application Serial No. 166,045 filed June 30, 1950, in which John F. Morrison and I are co-inventors, there is shown an electrical coin register adapted to selectively energize one of a pair of solenoids upon the deposit of coins of a predetermined aggregate value and to energize a mechandising cycle operating motor. In that application, too, a third solenoid is always operated each time the merchandising cycle motor is energized in response to the deposit of proper coins. The instant change device is adapted to be used with the electrical coin register shown in that application, though it is to be understood my change device may be used with any coin register adapted to complete a circuit energizing an electrical motor for actuating the vending mechanism and selectively energizing one of a pair of solenoids.

One object of my invention is to provide a change device which is simple in construction, inexpensive to manufacture and flexible in design.

Another object of my invention is to provide a change device adapted to give change from one cent to twenty-four cents in nickels and pennies to accommodate a wide range of prices with a wide variety of coins.

Another object of my invention is to provide a change device in which no structural changes need be made in making the adjustments for variations in prices of merchandise.

Another object of my invention is to provide a change device which is automatically operated

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from power used to deliver the merchandise in response to signals generated by the deposit of coins requiring the giving of change for the price of the merchandise for which my change device is set.

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

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

Figure 1 is a front elevation of a change device containing one embodiment of my invention.

Figure 2 is a side elevation of the change device shown in Figure 1.

Figure 3 is a sectional view drawn on an enlarged scale taken along the line 3—3 of Figure 1.

Figure 4 is an elevation drawn on an enlarged scale viewed along the line 4—4 of Figure 2.

Figure 5 is a sectional view taken along the line 5—5 of Figure 3.

Figure 6 is a fragmentary elevation drawn on an enlarged scale taken along the line 6—6 of Figure 1.

Figure 7 is a sectional perspective view similar to Figure 3 more clearly showing the relationship of parts.

In general, my invention contemplates an actuating member adapted to be reciprocated by an electric motor each time the motor operates. A pair of bell cranks are pivoted adjacent the operating member and adapted to be selectively coupled to the actuating member in response to the action of respective solenoids whenever change is called for. A third bell crank is pivoted adjacent the operating member and linked to it so that it will operate every time the actuating member operates. One of the first pair of bell cranks is adapted to operate a coin ejector to eject a nickel. The other of the bell cranks is adapted to operate a coin ejector associated with a bank of four coin tubes so that it will eject one, two, three or four nickels, depending on whether or not nickels are in the coin tubes of the bank. The third bell crank is adapted to actuate a coin ejector associated with a bank of four coin tubes adapted to hold pennies and will always eject none or one, two, three or four pennies, depending on whether or not pennies are positioned in the coin tubes.

While it is to be understood that any suitable number of coin tubes may be used in the bank, I will describe my invention with reference to a

coin register adapted to be operated by any combination of coins to vend merchandise from five cents to thirty cents with variations accomplished by the use of the penny coin tubes. When I speak of a ten cent vending, for example, when four pennies are placed in the penny coin tubes the vending will be for six cents, when three pennies are placed in the penny coin tubes seven cents' merchandise will be accommodated, if two penny coin tubes are loaded the value of the merchandise will be eight cents, and if one penny coin tube is loaded the merchandise being sold will have a value of nine cents. For the even ten cent purchase no pennies will be loaded in the penny coin tubes. An analagous price differential will be created for the thirty cent vending of merchandise valued between twenty-six cents and thirty cents. In the case of a twenty-five cent coin deposit, merchandise varying in value between twenty-one cents and twenty-five cents can be sold by means of varying the number of penny coin tubes loaded with pennies. For a twenty cent register acceptance, merchandise selling between sixteen cents and twenty cents can be sold. For a fifteen cent coin register adjustment, merchandise selling between eleven cents and fifteen cents can be sold, and for a five cent adjustment, merchandise selling between one cent and five cents can be sold.

Considering the nickel coin tubes, when my change device is associated with a register set to vend at five cents, only the single nickel coin tube will be loaded. No change will be given for a nickel. If a dime is deposited for a nickel purchase, the nickel change solenoid will be actuated and one nickel in change will be returned. All four of the bank of nickel coin tubes are loaded so that when a quarter is deposited and the bank solenoid is actuated, four nickels in change will be returned along with the merchandise.

When the coin register is set to operate at ten cents, no change will be given for a dime. The bank of nickel coin tubes will have only three of the coin tubes loaded so that if a quarter is deposited, three nickels in change will be given in response to the actuation of the bank solenoid.

When the coin register is set to operate at fifteen cents, two of the tubes of the bank of nickel coin tubes are loaded. When two dimes are deposited the single nickel solenoid is actuated to give one nickel in change, and when a quarter is deposited, two nickels in change will be given in response to the actuation of the bank solenoid.

When the coin register is set to operate at twenty cents, the bank of nickel coin tubes can be emptied, since these will not be employed. In response to the deposit of a quarter, a nickel in change will be given.

When the coin register is set to operate at thirty cents, four of the coin tubes of the nickel bank will be filled, so that upon the deposit of two quarters, four nickels in change will be returned in response to the actuation of the bank solenoid.

More particularly referring now to the drawings, my change device is housed in a casing 10, which supports four nickel coin tubes 12, 14, 16 and 18 in a bank and a single nickel coin tube 20. These are mounted adjacent the upper portion of the casing 10 and supported on a common shelf 22. Directly under the bank of nickel coin tubes I mount a bracket 24 adapted to support the nickels in the tubes 12, 14, 16 and 18. Directly under the coin tube 20 I mount a bracket 26 adapted to support the nickels in this tube.

The bracket 24 is spaced from the bottom of the coin tubes of the nickel bank by a distance slightly in excess of the thickness of a nickel. Similarly, the support 26 is mounted below the bottom of the coin tube 20 by a distance slightly in excess of the thickness of a nickel. Positioned adjacent this space of the bank and adapted to move into it to eject nickels is an ejector plate 28. Positioned between the nickel tube 20 and the support 26 I mount a nickel ejector member 30. Both the ejector 28 and the ejector 30 are adapted to be reciprocated in a horizontal plane by a pair of bell cranks. The ejector plate 28 is provided with a pair of depending flanges 32 which are secured, respectively, to a bell crank 34 and an arm 35 by means of pivot pins 36. A tube 38 interconnects the bell crank 34 and the arm 35 so that these will move in unison. The tube is mounted for rotation about a shaft 40 carried by the housing 10 in any suitable manner as, for example, by brackets 42. The bell crank 44 is secured to the arm 45 by means of the sleeve 46 mounted upon the shaft 40. The ejector 30 is provided with a pair of depending lugs 48 which are secured to the bell crank 44 and the arm 45 by means of pins 50. The end of arm 33 of bell crank 34 is pivotally secured to a link 52 by means of a pin 54. Similarly, a link 56 is secured to the arm 43 of the bell crank 44 by means of a pin 58. A pin 60 is carried by the link 52. One end of a spring 62 is secured to the pin 60. The other end of the spring 62 is secured to the housing 10 so that the link 52 is normally urged upwardly to rotate the bell crank 34 about the shaft 40 in a counterclockwise direction, as viewed in Figures 2, 3 and 7, in order to maintain the ejector 28 to the left in these views. Similarly, a pin 64 is carried by the link 56. The lower end of a spring 66 is secured to the pin 64, the other end of this spring being secured to the housing 10 in order to urge the link upwardly to rotate the bell crank 44 in a manner similar to the rotation of the bell crank 34 holding the ejector 30 clear of the coin tube 20.

The link 52 also carries a pin 68 adjacent its lower end. A lever 70 is pivoted around a shaft 72 carried by the support 71 and carries a bracket 74 secured thereto. The lever 70 is provided with a notch having a surface 76 against which the pin 68 is normally adapted to rest. A solenoid 78 is carried by the casing 10 and provided with an armature 80 adapted to move upwardly when energized. A link 82 connects the armature 80 and the bracket 74 so that when the solenoid is energized the stop lever 70 will move upwardly, lifting the notch and the stop surface 76 clear of the pin 68, allowing the link 52 to rotate in a counterclockwise direction, as viewed in Figures 2, 3 and 7. Actuating member 84 is mounted for vertical reciprocation in the housing 10, as will be described more fully hereinafter. The actuating member 84 carries at its upper end a cross bar 86 carrying a pair of pins 88 and 90. A spring 92 interconnects the pin 90 and a pin 94 carried by the link 52, maintaining the surface 96 of the link 52 against the pin 88. Similarly, a spring 98 extends between the pin 90 and a pin 100 carried by the link 56, maintaining the link 56 against the other side of the pin 88. The link 56 carries a pin 102 similar to pin 68 and this is lodged in a slot formed in a stop link 104 pivoted about shaft 72 in a manner similar to link 70. The stop link 104 normally maintains the link 56 in a position similar to that shown in Figure 7 for the link 52. A bracket 106 similar to bracket 74 is carried

by the stop link 104 and this is connected by link 108 to the armature 110 of a second solenoid 112 carried by the housing 10. The link 52 is formed with a re-entrant portion 51 having an inclined surface 53, as can readily be seen by reference to Figures 2, 3 and 7. Similarly, link 56 is provided with a re-entrant portion 55 having an inclined surface 57. When the actuating member 84 moves downwardly, the stop members 70 and 104 will maintain both links 52 and 56 in the positions shown in Figure 7 and there will be no working connection between the actuating member 84 and these links. If, however, a solenoid, say solenoid 78, is actuated before actuating member 84 moves downwardly, the stop member 70 will be rotated in a clockwise direction, lifting it clear of the pin 68. Normally, the spring 92 will continue to urge the surface 96 against the pin 88. When the actuating member 84 moves downwardly, however, the member 52 will rotate in a counterclockwise direction under the influence of the spring 92 as the inclined surface 53 permits this rotation as the member 84 moves downwardly. Finally, the pin 88 will become lodged in the re-entrant portion 51, being held in this position by the spring 92. When the member 84 continues to move downwardly, the bell crank 34 will be rotated in a clockwise direction, causing the ejector 28 to move to the right, as viewed in Figure 7, sweeping nickels out of those coin tubes in which nickels are positioned. The ejected nickels will fall downwardly to a return coin chute to the customer.

The circuit which energizes both solenoid 78 and solenoid 112 contains a series-connected switch 114 having a switch-operating arm 116 carrying a cross member 118. This cross member is disposed in the path of the lower ends of both links 52 and 56, as can readily be seen by reference to Figures 1 and 4. Whenever link 52 rotates in a counterclockwise direction due to the lodging of re-entrant portion 51 about the pin 88, its lower end will strike the cross member 118 and actuate the switch 114 through the arm 116 to interrupt the circuit through the solenoid 78, permitting the locking member 70 to fall downwardly. When the arm 84 moves upwardly, the pin 88 will cam the link 52 in a clockwise direction through the inclined surface 53, again bringing the parts to the locked position shown in Figure 7. This insures that on the next operation of the vending cycle no change will be given unless the solenoid 78 is again operated. In a similar manner the pin 88 will become lodged in the re-entrant portion 55 of the link 56 so as to connect the coin ejector 30 to the actuating member 84 whenever the solenoid 112 is actuated. The actuating of the solenoid will permit the link 56 to become engaged with the pin 88 and the rotation of the link 56 will interrupt the circuit through the solenoid 112 after it has operated through the cross member 118.

Referring now to Figure 1, I provide four penny tubes 120, 122, 124 and 126 supported by a shelf 128 carried by the casing 10. The pennies are supported by a shelf 130 spaced from the lower ends of the coin tubes by slightly more than the thickness of a penny. Ejector plate 132 is adapted to be reciprocated adjacent the penny coin tubes to eject pennies from those tubes in which pennies are positioned. The ejector plate 132 is secured to a bell crank 134 which is mounted on a shaft 136. The bell crank 134 is secured to an arm 138 by means of a sleeve 140 so that the arm 138 and the bell crank 134 will rotate together. The lower arm 133 of the bell crank 134 is pivotally connected to a link 142 by means of a pin 144 the connection being made through a slot 146 formed in the link 142 to provide lost motion. The ejector plate 132 is normally urged to the left, as viewed in Figure 2, by means of a spring. The upper end of link 142 is secured by pin 148 to a bracket 150 which is carried by the actuating member 84. Whenever the actuating member moves upwardly, the lower end of slot 146 will engage the pin 144 to rotate the bell crank 134 around shaft 136 in a clockwise direction as viewed in Figure 2, thus ejecting pennies from those coin tubes in which pennies are positioned. When the member 84 moves downwardly the spring will cause the ejector 132 to move to the left, as viewed in Figure 2, under the influence of spring 131. It will be seen that every time the actuating member 84 operates, the penny ejector 132 will be caused to reciprocate.

A motor 152 is carried by the casing 10 secured thereto in any suitable manner adjacent the bottom of the housing. The motor shaft 154 carries a cam 156, as can readily be seen by reference to Figure 6. The cam carries an eccentric pin 158 to which the lower end of the actuating member 84 is secured by means of a spring loaded link 160. The link 160 is adapted to reciprocate upon the lower end of the actuating member 84. It is urged upwardly by means of a spring 162 the upper end of which is secured to the actuating member 84 and the lower end of which is secured to the link 160. As the eccentric pin 158 moves downwardly, it will pull the actuating member downwardly through the link 160 and the spring 162, thus providing a cushion for the operation of the coin ejectors. When the pin 158 moves upwardly it will be in engagement with the lower surface 161 of the end of the actuating member 84 and thus push it upwardly. The circuit of motor 152 is adapted to be completed through conductors lodged in cable 170 and is also adapted to be completed through conductors lodged in cable 172. The circuit through cable 170 is initially closed by the coins in the coin register causing the motor to rotate and carrying the cam 156 around during this rotation. The motor is also adapted to be maintained in energized condition by a switch 174 controlling the conductors lodged in the cable 172. This switch is shown in the off position in Figure 6. When the arm 176 moves to the left, as viewed in Figure 6, the motor circuit will be closed. As soon as the lower end of the arm 176 rides upon the cam surface of the edge cam 156 it will close the switch 174 to energize the motor 152 through the conductors in the cable 172. This insures that after the motor once starts to rotate it will complete its cycle of rotation until the arm 176 moves into the re-entrant portion 175 of the cam 156, interrupting the circuit through the motor 152 by means of the switch 174 and stopping the action of the actuating member 84.

It is believed that the operation of my change device will be clear from the foregoing description. It is mounted within the cabinet of a vending machine in an appropriate position so that pennies and nickels which are ejected from the coin tubes will fall by gravity into a coin chute for return to the purchaser. The change from one price merchandise to another is very simple and easily accomplished by the loading of nickels or pennies in the appropriate coin tubes. When set for nickel vending, the four nickel coin tubes are loaded, it being understood that the

single nickel tube likewise is always loaded. The change device will then be in a position of giving four nickels' change upon the deposit of a quarter and one nickel's change upon the deposit of a dime. When set for ten cent vending, nickels are placed in three of the tubes of the bank of nickel coin tubes. No nickels need be put in the single nickel coin tube, though no harm will be done, since the solenoid 112 which controls this tube will never be actuated for the ten cent vending. For fifteen cent vending, upon the deposit of two dimes the solenoid 112 will be actuated to give one nickel. Two of the coin tubes of the nickel bank will be loaded so that upon the deposit of a quarter, two nickels will be returned. For twenty cent vending, the bank of nickel coin tubes may be left empty and only the single nickel coin tube need be loaded. For thirty cent vending, all four coin tubes of the nickel bank must be loaded in order to be able to give twenty cents' change upon deposit of two quarters. The single nickel coin tube will also be loaded in event of the deposit of a quarter and a dime, so that one nickel's change may be given from this bank.

If there is to be any change in price from even multiples of five cents, the appropriate number of penny coin tubes are loaded, depending upon the particular change, so that all of the penny coin tubes will be empty for even multiples of five cents, and from one to four coin tubes will be loaded with pennies, depending upon the variation from the even multiple of five representing the price of the merchandise to be vended. If my change device is to be used with a milk machine vending milk at thirteen cents a pint, the register is set for fifteen cent vending and two of the penny coin tubes are loaded. If a quarter is then deposited, two nickels and two pennies are returned in change. If two dimes are deposited, one nickel and two pennies are returned in change. If three nickels or a dime and a nickel are deposited, then only two pennies will be returned in change.

It will be seen that I have accomplished the objects of my invention. I have provided a change device which is simple in construction, inexpensive to manufacture and flexible in design and adapted to accommodate a wide variety of prices, giving change for a wide variety of combinations of coins. No structural changes need be made in making adjustments for variations in prices of merchandise since this can be accomplished by the simple expedient of selecting the coin tubes which are to be loaded with pennies and nickels. After my change device is operated to give change, the operator is automatically disconnected from the change dispenser. For the multiplicity of functions performed, my change device has comparatively few moving parts and the giving of the change is controlled by only two solenoids even though a wide variety of coins in change may be given.

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 my claims. It is further obvious that various changes may be made in details within the scope of my claims without departing from the spirit of my invention. It is therefore to be understood that my invention is not to be limited to the specific details shown and described.

Having thus described my invention, what I claim is:

1. A change device including in combination an electric motor, means for cyclically energizing the motor, an actuating member driven by the motor during each cycle of its operation, a coin tube for holding coins to be dispensed as change, a dispensing member for dispensing coins from the coin tube, means for operating the dispensing member, a coupling member having one end thereof connected to the dispensing member operating means, a spring biasing the coupling member into operative engagement with the actuating member, a latch normally holding the coupling member out of operative engagement with the actuating member against the action of the spring, electrical means for releasing the latch when energized whereby to couple the dispensing member to the actuating member through the coupling member to dispense coins during the initial part of the cyclic movement of the actuating member and coacting camming means carried by the coupling member and the actuating member for camming the coupling member to its latched position during the terminal part of the cyclic movement of the actuating member.

2. A change device as in claim 1 including a second coin tube for holding coins to be dispensed as change, a second dispensing member for dispensing coins from the second coin tube, means for operating the second dispensing member and coupling means constantly coupling said operating means for the second dispensing member to the actuating member.

3. A change device as in claim 1 including a normally closed switch, circuit means connecting said switch in series with said electrical means and means responsive to the operation of the coupling means for opening said switch to de-energize the latch-releasing electrical means.

4. A change device including in combination an electric motor, means for cyclically energizing the motor, an actuating member driven by the motor during each cycle of its operation, a first coin tube for holding coins to be dispensed as change, a first dispensing member for dispensing coins from the first coin tube, a second coin tube for holding coins to be dispensed as change, a second dispensing member for dispensing coins from the second coin tube, a means for operating the first dispensing member, means for operating the second dispensing member, a first coupling member having one end thereof connected to the first dispensing member operating means, a second coupling member having one end thereof connected to the second dispensing member operating means, a first spring biasing the first coupling member into operative engagement with the actuating member, a first latch normally holding the first coupling member out of operative engagement with the actuating member against the action of the first spring, a second spring biasing the second coupling member into operative engagement with the actuating member, a second latch normally holding the second coupling member out of operative engagement with the actuating member against the action of the second spring, a first electrical means for releasing the first latch when energized whereby to couple the first dispensing member to the actuating member through the coupling member to dispense coins during the initial part of the cyclic movement of the actuating member, coacting camming means carried by the first coupling member and the actuating

member for camming the first coupling member to its latched position during the terminal part of the cyclic movement of the actuating member, a second electrical means for releasing the second latch when energized whereby to couple the second dispensing member to the actuating member through the second coupling member to dispense coins from the second coin tube during the initial part of the cyclic movement of the actuating member and coacting camming means carried by the second coupling member and the actuating member for camming the second coupling member to its latched position during the terminal part of the cyclic movement of the actuating member.

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