

**Oct. 13, 1953**

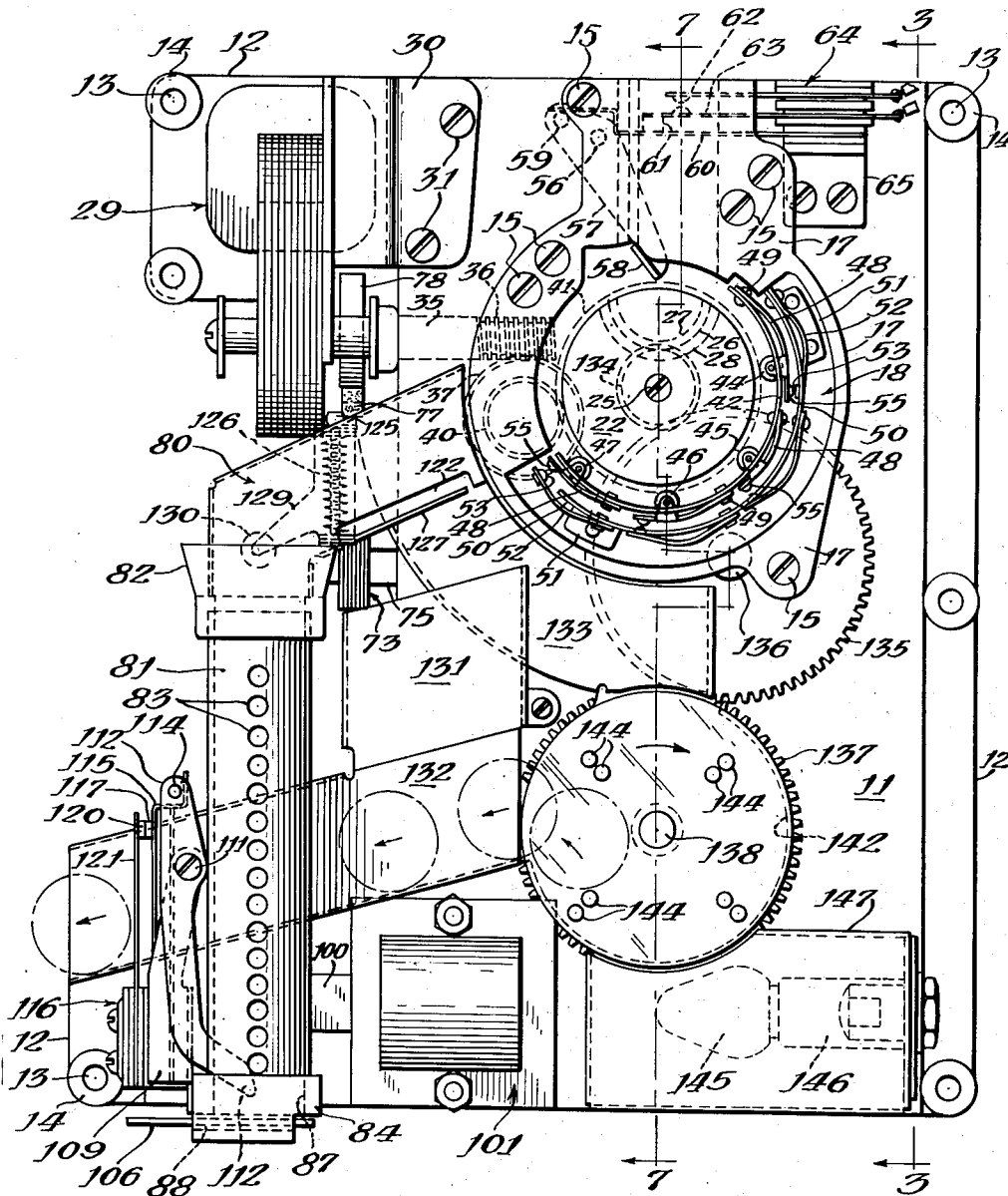
**L. F. HEHN**  
**COIN CHANGER**

**2,655,243**

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*Fig. 1.*



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Fig. 2.

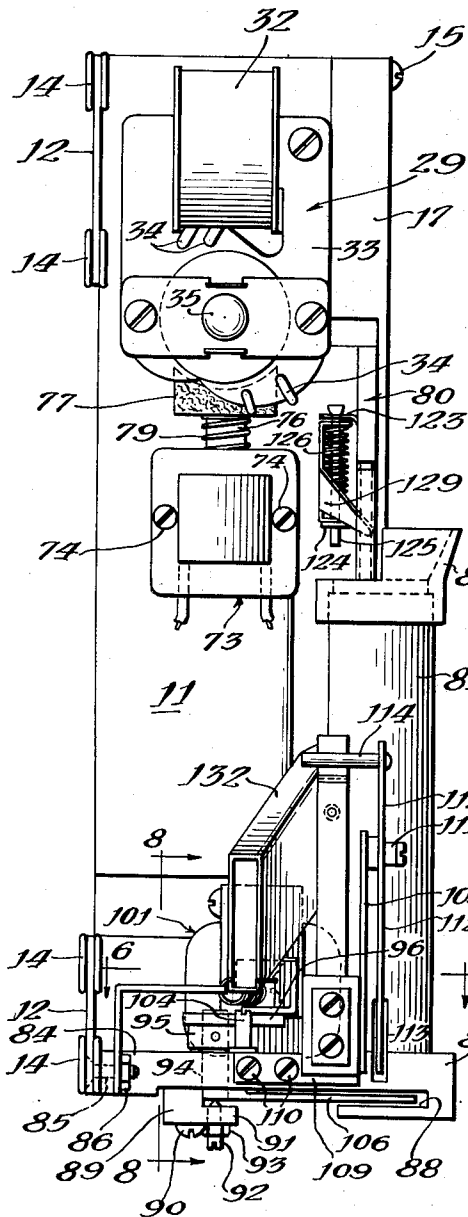
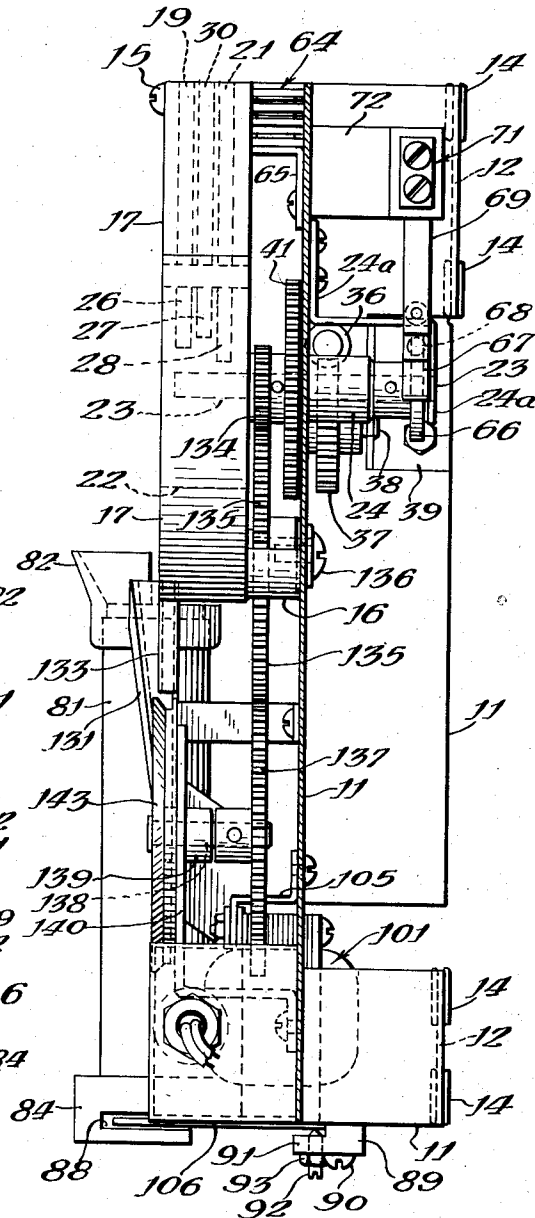


Fig. 3.



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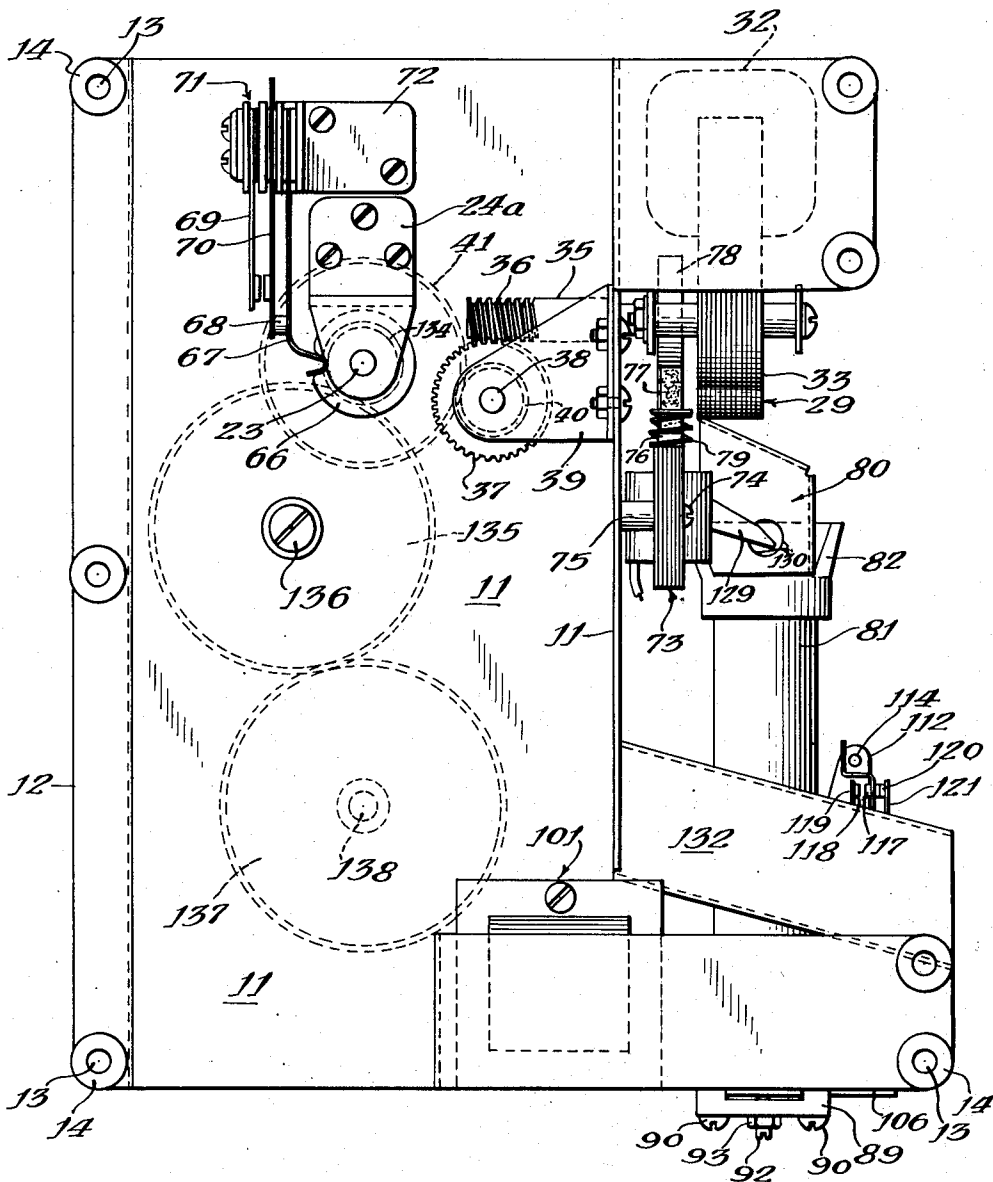
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*Fig. 4.*



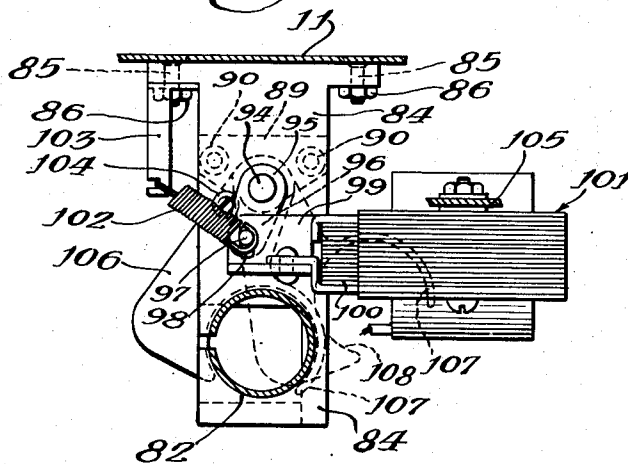
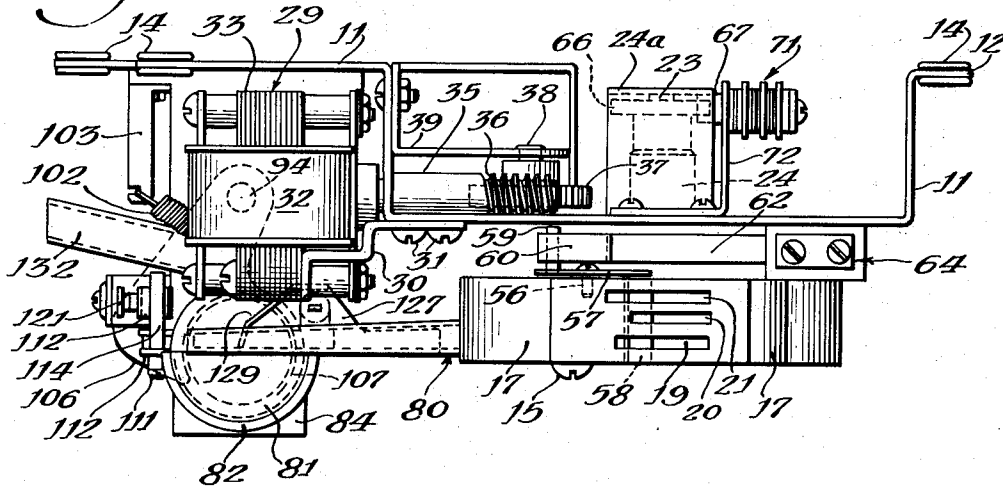
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*Fig. 7.*

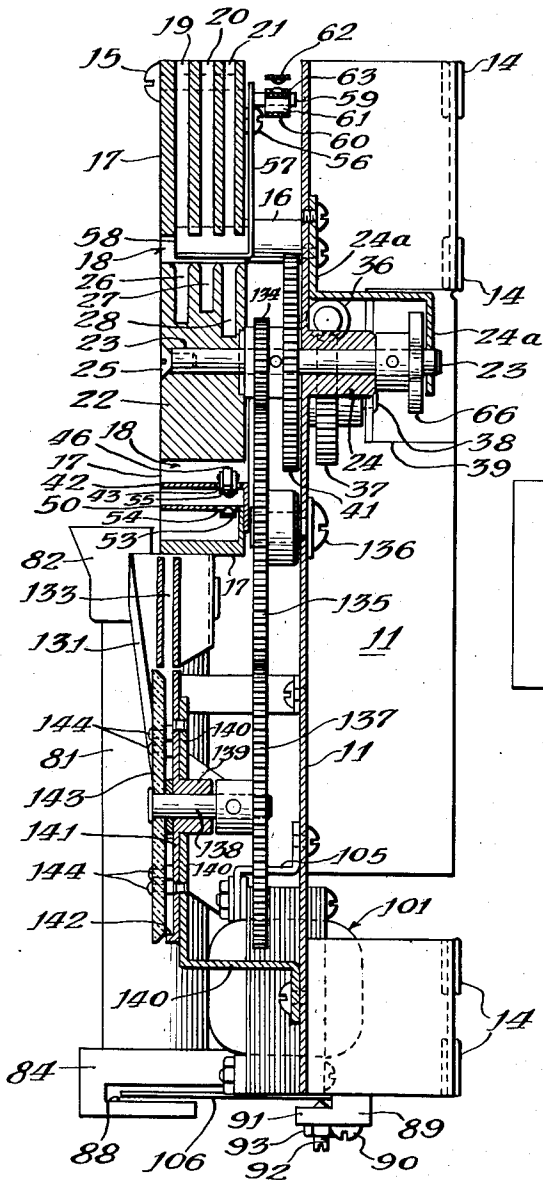
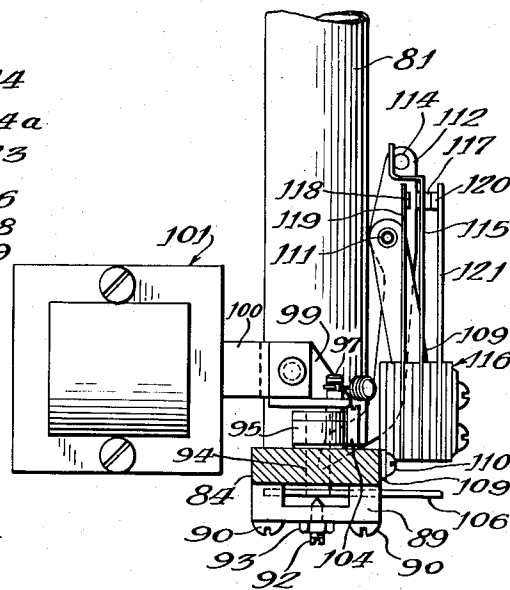


*Fig. 8.*



## UNITED STATES PATENT OFFICE

2,655,243

## COIN CHANGER

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Application November 1, 1947, Serial No. 783,590

4 Claims. (Cl. 194—10)

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This invention relates to automatic coin changers of a type adapted for use with coin-operated vending machines and the like which are constructed so as to receive coins of more than one denomination and which require deliveries of proper amounts of change in return for certain of such coins. A vending machine of this type, for example, may be one arranged to vend a five-cent item of merchandise upon the insertion of either a nickel, dime or quarter, the correct value in change being returned to the purchaser with the delivery of merchandise when a dime or quarter has been received by the machine.

Coin changers of earlier construction suitable for use with merchandise vending machines of the character described have, in all instances of which I am aware, utilized in one way or another the inertia of falling coins to actuate levers or switches to mechanically or electrically motivate a mechanism for causing the controlled discharge of a number of coins as change. It will readily be understood that particularly when the actuation of such levers and switches is dependent upon the inertia of light weight coins such as United States dimes, said levers or switches must be highly sensitive. To provide the required sensitivity coin changers of prior construction have had incorporated therein delicate electrical switches or mechanical parts which, in addition to requiring frequent adjustment, have a much shorter service life than the vending machines with which they are associated. To overcome these difficulties I have devised the present coin changer, an important object of which is to provide a mechanical and dependable means for positively moving a coin to actuate one or more strong and durable electric switches and to thereby cause the quick delivery of a proper number of small coins as change.

Another object of my invention is to provide in a device of this type means for automatically replenishing and controlling a supply of small coins as change for coins of larger denominations.

A further object of my invention is to provide an adjustable means having a minimum of frictional drag for causing the discharge of said small coins individually as change from a change supply container.

A still further object of my invention is to provide in such a coin changer means for displaying coins for which change has been delivered.

Other objects and advantages of the invention will be apparent from the following description

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taken in connection with the accompanying drawings, in which:

Fig. 1 is a front elevational view of a coin changer embodying my invention;

Fig. 2 is a side view of the same, viewed from the left of Fig. 1;

Fig. 3 is a sectional view of the device taken on line 3—3 of Fig. 1;

Fig. 4 is a back view of said changer;

Fig. 5 is a top view of the same;

Fig. 6 is a fragmentary sectional view taken on line 6—6 in Fig. 2 to more fully illustrate the mechanism for delivering small coins as change;

Fig. 7 is a sectional view taken substantially on line 7—7 in Fig. 1; and

Fig. 8 is a fragmentary sectional view taken on line 8—8 in Fig. 2 to show in further detail the small coin delivery mechanism.

In the embodiment of the invention thus illustrated a base plate 11 is provided as a mount for the various parts of the device to be hereinafter described. Said base plate may have mounting flanges 12 formed thereon in which mounting holes 13 having rubber grommets 14 therein may be provided to receive mounting bolts (not shown). Attached to the face of the base plate by means of bolts 15 and spacers 16 is a block 17 of hard dielectric fibrous material being externally shaped in a generally circular form. A circular cavity shown generally at 18 in Fig. 1 is provided in the central portion of the block. In the upper portion of said block are formed three vertically disposed parallel coin chutes 19, 20 and 21. (See Figs. 3, 5 and 7.) Chutes 19, for example, may be of a proper size to receive U. S. nickels, chute 20 to receive U. S. dimes, and chute 21 to receive U. S. quarters. Each of said chutes extends downwardly from the top of the block to the upper inner surface of the cavity 18 (Figs. 1, 3 and 7).

Within the cavity a circular member 22 is mounted upon a rotatable shaft 23 which extends through said member and rides in a hub 24 formed on the rear side of the base plate 11 and in a bracket 24a attached to the backside of said plate. Said member is also of a hard dielectric fibrous material and may be secured to the shaft by means of a screw 25 threaded into the end of said shaft. Semicircular receptacles 26, 27 and 28 are formed side by side in the periphery of member 22. When said member is in its normal inactive position, as illustrated in Figs. 1, 3 and 7, receptacle 26 is positioned directly below chute 19 and arranged to receive a coin when the same is passed through said chute. Similarly, receptacle

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27 will receive coins from chute 20 and receptacle 28 will receive coins from chute 21.

An electric motor shown generally at 29 is mounted to the base plate 11 by means of a bracket 30 and screws 31. Said motor may be of a well known two pole induction type having the usual field winding 32, laminated stator 33, flux dampening rings 34, and a rotor shaft 35 (Fig. 4). On the extremity of said shaft is a worm gear 36 which drives a circular gear 37 fixedly mounted upon a shaft 38 which rotates in a bracket 39 attached to the base plate 11 (Figs. 1, 3, 4 and 5) and extends through the forward side of said plate. On the front side of the plate a gear 40 mounted upon the shaft 38 drives a gear 41 of larger size fixedly mounted upon the shaft 23 to rotate the member 22 in a clockwise direction as viewed in Fig. 1.

Within the cavity 18 a semi-circular strip 42 of brass or other electrically conductive material is fixedly mounted circumjacent the member 22 and extends along a portion of the circumference of the latter (Figs. 1 and 7). Holes 43 are provided in the strip 42 and rollers 44, 45, 46 and 47 are rotatably mounted upon springs 48 which are attached to the outer surface of said strip, as for example, by rivets 49. Said springs are arranged so that the rollers retractably protrude through the holes 43 (Figs. 1 and 7). The roller 44 is of a width and positioned so as to intersect the planes of the receptacles 27 and 28. The rollers 45, 46 and 47 are so positioned as to intersect only the plane of receptacle 28.

Outside the outer circumference of the strip 42 another strip 40 of substantially equal length and similar material is fixedly mounted as by brackets 51 within the cavity 18. Attached to the outer surface of said strip 50 are springs 52, the extremities of which are provided with contact buttons 53 which are arranged to protrude inwardly through holes 54 (Fig. 7) in the strip 50 opposite buttons 55 provided on the free ends of springs 48. It will be understood that when any one of the rollers 44, 45, 46 and 47 are moved outwardly, contact will be made between the corresponding buttons 53 and 55. (See Fig. 1.)

Attached to the rear side of the upper portion of the block 17, as by a pivot screw 56, is a pivot arm 57 which has on its lower end a finger 58 which extends into the cavity 18 across the lower openings of the chutes 19, 20 and 21 and above the receptacles 26, 27 and 28 when the latter are in their normal inactive positions. (See Figs. 1 and 7.) When a coin is dropped through any one of said chutes said coin will move the finger 58 to the left (as viewed in Fig. 1) to cause the arm 57 to pivot on the screw 56 and raise a pin 59 which is fixed horizontally to the upper end of said arm. The pin 59 in turn raises a spring leaf 60 to move a pad 61 thereon upwardly and thus close contacts 62 and 63 of a switch shown generally at 64 which may be mounted to the base plate 11 as by a bracket 65. The arm 57 will be held in its pivoted position, and consequently the switch 64 will be closed, until a coin held by any one of the receptacles 26, 27 and 28 has been moved in a clockwise direction by the rotation of the member 22.

A cam 66 is fixedly mounted upon the shaft 23 to the rear of the hub 24 and is arranged to move a spring leaf 67 immediately after said shaft and the member 22 have started to rotate. The leaf 67 has a pad 68 thereon which closes contacts 69 and 70 of a switch shown generally at 71 and

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mounted upon the rear side of base plate 11 as by a bracket 72.

A solenoid shown generally at 73 may be mounted upon the base plate 11, by means of screws 74 and spacers 75 (Figs. 2 and 4), in a manner so that armature 76 of said solenoid may reciprocate vertically. On the upper end of the armature a fiber brake-shoe 77 may be arranged to be forced, by a compression spring 79, against a brake-drum 78 mounted upon the rotor shaft 35 of the electric motor 29. When the solenoid 73 is energized, the action of said solenoid will overcome the action of the spring and cause the brake-shoe to move downwardly away from said brake-drum.

Extending from the lower left side of the cavity 18, as viewed in Fig. 1, are diagonal coin passages (not shown) which pass through the side of block 17. One of these passages is in a plane with the receptacle 26 and communicates with a diagonally disposed closed coin chute shown generally at 80. The chute 80 leads downwardly to the top of a vertical coin tube 81 within which coins suitable for change may be stacked one upon another. Said tube may be provided with a flared funnel-like ring 82 at its upper end and may also be provided with observation ports 83 through which the level of coins in the tube may be observed. Said tube is supported at its base by a steel block 84 which is attached to the base plate 11 by means of bolts 85 and nuts 86. A coin passage 87, slightly larger in diameter than the diameter of the coins to be used as change, extends downwardly from the base of the tube 81 through the block 84.

Below this passage is a table 88 which may be formed as an integral part of the block 84 and upon which the lowermost of the coins contained by the tube 81 will rest (Fig. 2).

A bracket 89 is attached to the rear portion of the lower surface of the block 84 by means of screws 90 (Figs. 2 and 6). A horizontally projecting member 91 extends from said bracket and an adjustable bearing screw 92 is threaded vertically through said member and provided with a lock-nut 93. Supported upon the upper tapered end of the screw 92 is a vertical shaft 94 which passes through the block 84. On the upper end of said shaft is fixed a collar 95 from which a finger 96 extends horizontally. A vertically disposed pin 97 is fixed upon the extremity of said finger and is operatively engaged by a slot 98 in a bracket 99 which is fixed to an armature 100 of a solenoid shown generally at 101. (See Figs. 2, 6 and 8.) A coil spring 102 has one of its ends attached to the upper portion of the pin 97 and its other end to a bracket 103 which may be attached to the base plate 11 in any suitable manner. The spring tends to rotate the finger 96 and the shaft 94 in a clockwise direction (as viewed in Fig. 6) and a stop 104 fixed to the upper surface of the block 84 limits the rotation in said direction. Activation of the solenoid 101 causes the finger and the shaft 94 to rotate in the opposite direction. The solenoid may be attached to the base plate 11 as by means of a bracket 105 (Fig. 7).

On the lower end of the shaft 94 is fixed a coin discharge plate 106 upon one edge of which is formed a sickle-shaped finger 107 (Fig. 6) which, together with a forward edge 108 of the plate forms an open recess within which a coin of the size to be used for change will fit. In its normal position, as shown by the solid lines in Fig. 6, the plate 106 is disposed so that the lower-

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most coin, which rests upon the table 88, is positioned within the above described recess. When the solenoid 101 is energized, the consequent movement of the finger 96 and the shaft 94 pivots the plate 106 to its position shown in Fig. 6 by the broken lines and, in so moving, said plate ejects said lowermost coin from the stack of coins. The action of the spring 102 causes the plate 106 to return to its normal position immediately upon the de-energization of the solenoid. For a satisfactory discharging of both new and old coins, I have found that the thickness of the plate 106 should preferably be slightly less than the thickness of the oldest coins. By an adjustment of the bearing screw 92, the plate 106 may be raised slightly or lowered to a position in which the most satisfactory coin discharging results are obtained. It will readily be understood that the frictional drag experienced in operating the plate 106 will be at a minimum inasmuch as the plate is supported entirely by the small point of the bearing screw 92.

An L-shaped bracket 109 may be mounted by means of screws 110 to a side of the block 84 and a pivot pin 111 may be fixed upon the upper extremity of said bracket (Figs. 2 and 8). A finger 112 may be mounted upon said pin and have its lower end arranged to protrude through a slot 113 cut in the tube 81 and in the upper portion of the block 84 (Fig. 2). A pin 114 may be fixed to the upper end of said finger to move a center spring leaf 115 of a two-way contact switch 116. When a satisfactory number of coins for change are stacked within the tube 81, the finger 112 will be forced from the interior of said tube and a contact button 117 on the center leaf 115 will make contact with a similar button 118 on a second leaf 119 of said switch. However, when the supply of coins in said tube has been reduced to a predetermined minimum, as, for example, four, said finger will be allowed to enter the tube through the slot 113 to cause the buttons 117 and 118 to break contact and to cause said button 117 to make contact with a button 120 on a third leaf 121 as illustrated in the drawings. (See Fig. 8.) The switch 116, as operated by the movement of the finger 112, may be used for a variety of purposes, as, for example, the illumination of warning lights (not shown) to indicate the supply of coins for change which is present in the tube 81, or to operate a coin chute blocking device (not shown) to prevent the insertion of coins when the supply of change is at a minimum.

An opening 122 is provided in the floor of the diagonally disposed coin chute 80 through which coins may fall before reaching the coin tube 81 (Fig. 1). Brackets 123 and 124 are provided on the rear side of said chute and a pin 125 is passed vertically through said brackets (Fig. 2). A U-shaped member 126 is pivotally mounted upon said pin, and extending from one side of said member is a floor section 127 which is normally held in a position to close the opening 122 by means of a coil spring 128 disposed about the pin 125. From the opposite side of the member 126 a finger 129 extends through a hole 130 formed in the rear wall of the chute 80 near its lower end directly above the coin tube 81. When the tube 81 has been filled with coins, the next coin to pass into the coin chute 80 will come to rest in an upright position on the uppermost one of the coins in the tube and in the lowermost portion of said chute 80. In this position said coin will, by its presence in the chute, expel the finger 129 from the hole 130 and will thus

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cause member 126 to pivot on the pin 125 and move the floor section 127 to an open position. Thereafter, until the supply of coins in the tube 81 has been reduced sufficiently to allow the coin to fall from the lower portion of the chute 80, all coins which enter said chute 80 will fall from the opening 122 into a hopper 131 and thence into a coin chute shown at 132 which may direct said coins to a cash box (not shown).

Also extending from the lower left-hand side of the cavity 18, as viewed in Fig. 1, are two additional diagonally disposed coin passages (not shown) which pass through the side of the block 117. One of said passages is in a plane with the coin receptacle 27 and the other is in a plane with the receptacle 28. Both of said passages communicate with an arc-shaped coin passage, shown generally in Figs. 1 and 3 at 133, which passage is adapted to carry coins to the lower end thereof.

A small spur gear 134 is fixed to the shaft 23, between member 22 and gear 41, and is arranged to drive a larger gear 135 which is rotatably mounted upon the front face of the plate 11 by means of a shaft bolt 136 (Figs. 3, 4 and 7). The gear 15, in turn, drives a gear 137 which is fixed upon a shaft 138 mounted in a hub 139. Said hub is supported upon the forward side of the base plate 11 by means of a bracket 140. Upon the forward side of said bracket is fixed a circular metallic disk 141 which has a flange 142 extending approximately 250 degrees about its circumference. Forward of said disk 141 and in close proximity of said flange another disk 143 of transparent material is fixed upon the shaft 138. Rivets 144 may be passed through said disk 143 and allowed to extend into the space between the disks 141 and 143 to divide said space into four sections. The lower end of coin chute 133 opens into said space and said space is in communication with an open upper end of the coin chute 132. From the above description it will be understood that the transparent disk 143 and the rivets 144 revolve with the shaft 138 and that the metallic disk 141 is stationary.

If desired, an electric light bulb 145 may be provided with a socket 146 of commercial construction within a casing 147 having a slot (not shown) located beneath the lowermost edge of the disk 143. Light emitted from the slot will illuminate the space between the disks 141 and 143.

In the operation of the coin changer above described when, for example, said changer is constructed to receive U. S. nickels, dimes and quarters, a nickel dropped into the chute 19 will fall therethrough into the coin receptacle 26 and, in so doing, will move the finger 58 and the arm 57 to close the contacts of the switch 64. Said switch completes circuits (not shown) to both the motor 29 and the brake solenoid 73, the latter of which withdraws the brake-shoe 77 from the brake-drum 78 as the rotor of said motor begins to turn to rotate member 22 and the coin contained within the receptacle 26. As said nickel is moved away from the finger 58, the contacts of the switch 64 will begin to open, but the cam 66 will theretofore have caused the contacts of the switch 71 to close to complete another circuit (not shown) to the motor and to the brake solenoid.

After the member 22 has been rotated approximately 45 degrees in a clockwise direction the presence of the strip 42 will retain the nickel in said receptacle until said nickel reaches the end

of the strip, whereupon it will enter the coin chute 80, normally roll downwardly therethrough, and drop into the coin tube 81. In the event that the tube 81 is already full of coins, the nickel will fall from the chute 80 through the opening 122 and be delivered, for example, to the cash box (not shown) through hopper 131 and the chute 132. After said nickel has rolled from said receptacle 26 into the chute 80, the member 22 will complete its rotation whereupon the cam 66 will cause the contacts of switch 71 to open thereby stopping the motor 29 and simultaneously de-energizing the solenoid, thus allowing the brake-shoe 77 to be applied to the brake-drum 78 to prevent member 22 from coasting past its proper inactive position.

The insertion of a dime or quarter into the machine will cause a similar action by the mechanism. The dime will drop through the coin chute 20 into the receptacle 27 and thereby move the finger 58 to energize the motor 29 and solenoid 73 and cause the member 22 to begin its rotation. A quarter dropped into the chute 21 will fall into the receptacle 28 and similarly cause said member 22 to start its rotation. The member 22, by its positive mechanically induced rotation, will carry the dime or the quarter in a circular path along the strip 42. The dime will come into contact and raise only the roller 45. The movement of said roller will cause the contact buttons 50 and 53 to meet and thus momentarily energize the solenoid 101 to operate the coin discharge plate 106 and cause the ejection of one nickel from the coin tube 81. The quarter, on the other hand, will sequentially come into contact with rollers 44, 45, 46 and 47, move each of them one by one, and cause the corresponding buttons 50 and 53 to meet one after the other. The sequential and momentary meeting of said buttons will actuate the solenoid 101 four times to cause the coin discharge plate to pay out four nickels as change for the quarter.

Inasmuch as the buttons 50 and 53 are indirectly caused to contact each other by the positive mechanically induced rotation of the member 22, the energy available for moving said buttons is far greater than would be the case if such contact were caused by the inertia of a falling coin. The springs 48 and 52, upon which the buttons are supported in my coin changer, may therefore be of a heavy and rugged construction with a service life greatly in excess of the life of known electric switches or mechanical devices which have the sensitivity required for use in changers which depend for their action upon the inertia of falling coins. As hereinbefore stated, the strong and durable but yet inexpensive construction of my coin changer is one of the important objects of my invention.

When the aforesaid dime or quarter has been carried to the end of the strip 42, the coin will roll from its receptacle and enter the coin chute 133. The member 22 will complete its rotation and be stopped in a proper position in the manner described above. Said dime or quarter will roll down the chute 133 and drop into one of the four divided spaces between the transparent disk 143 and the stationary disk 141. The ratio of the gears 137, 135 and 134 may be such that the disk 143 will make one complete revolution in a clockwise direction for each four revolutions of member 22. Coins which fall into the space between said disks will be carried with the movement of the disk 143 and will be supported during said movement by the shaft 138, the rivets 144, and/or

the flange 142. The disk 143 may be visible to the customer or operator of the vending machine with which my coin changer may be associated, and the display of coins behind said disk will add to the attractiveness of said machine.

When any coin which has entered the space between the disks has been carried approximately 270 degrees in a clockwise direction, said coin will roll from said space and pass down the chute 132 to the cash box in a path indicated by the broken outline of coins in Fig. 1.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, but the appended claims should be construed as broadly as permissible in view of the prior art.

I claim:

1. A coin changer comprising: intermittently rotatable coin receptacles, each being adapted to receive a coin of a different denomination; power means for rotating said receptacles to carry said coins one at a time through circular paths; means actuated by the coin passing into said receptacle for energizing said last-mentioned means; electric switches disposed contiguously to each of said paths in number corresponding to the denomination of said coins carried there-through whereby said switches will be individually actuated upon being contacted by said coins; a change supply container; and a coin dispensing means associated with said container and operated by the actuation of said switches for ejecting change from the container each time any one of said switches is actuated.

2. A coin changer comprising: a rotatable coin receptacle for receiving a coin to be changed; an electric motor in operative relation with said receptacle for rotating the latter whereby said coin will be moved in a circular path; a switch closed by the initial presence of said coin in said receptacle for energizing said motor; a cam rotatably associated with said receptacle; a second switch actuated by said cam for de-energizing said motor when said receptacle has completed one revolution; a brake arranged to stop the rotation of said receptacle upon the de-energization of said motor; a solenoid in the motor circuit for controlling the application of said brake; a third switch disposed contiguously to said path whereby said coin in passing said latter switch will actuate the same; a supply container for change; and a coin dispensing means associated with said container and operated by the actuation of said third switch for ejecting change from the latter each time said third switch is actuated.

3. A combination dispenser control device and coin changer comprising: a movable coin carrier having a pocket therein for a coin of the value required for operation of the dispenser and a pocket for a coin of higher value; power means for actuating said carrier upon and as a result of insertion of a coin in any pocket thereof; an electric switch including a movable element in the path of the coin in said first-mentioned pocket and operable by pressure thereof against said element; means operable by actuation of said switch for operating the dispenser; a plurality of additional switches each including a movable element in the path of the coin in said second-mentioned pocket and operable by pressure thereof against said element, said dispenser-operating means being operable by actuation of one of said switches; a change container; and a change-ejecting mechanism operable by actuation of one

or more others of said additional switches for ejecting a coin or coins from said container equal in value to the excess value of the coin in said second-mentioned pocket over the value of the coin required for operation of said dispenser.

4. A combination dispenser control device and coin changer comprising: a movable coin carrier having a pocket therein for a coin of the value required for operation of the dispenser and a pocket for a coin of higher value; power means for actuating said carrier upon and as a result of insertion of a coin in any pocket thereof; an electric switch including a movable element in the path of the coin in said first-mentioned pocket and operable by pressure thereof against said element; means operable by actuation of said switch for operating the dispenser; a plurality of additional switches each including a movable element in the path of the coin in said second-mentioned pocket and operable by pressure thereof against said element, said dispenser-operating means being operable by actuation of one of said switches; each of said switches including a movable contact-carrying element a part of which lies in the path of the coin for actuating the same, a rugged spring arm on which said element is carried, a cooperating contact against which the contact on said movable element is pressed by pressure exerted by movement of said coin upon operative movement of said carrier, and a rugged spring arm on which said cooperating contact is carried; a change container; and a change-ejecting mechanism operable by actua-

tion of one or more others of said additional switches for ejecting a coin or coins from said container equal in value to the excess value of the coin in said second-mentioned pocket over the value of the coin required for operation of said dispenser.

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