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MONEY CHANGING MACHINE

3,220,530

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3 Sheets-Sheet 2

FIG. 2

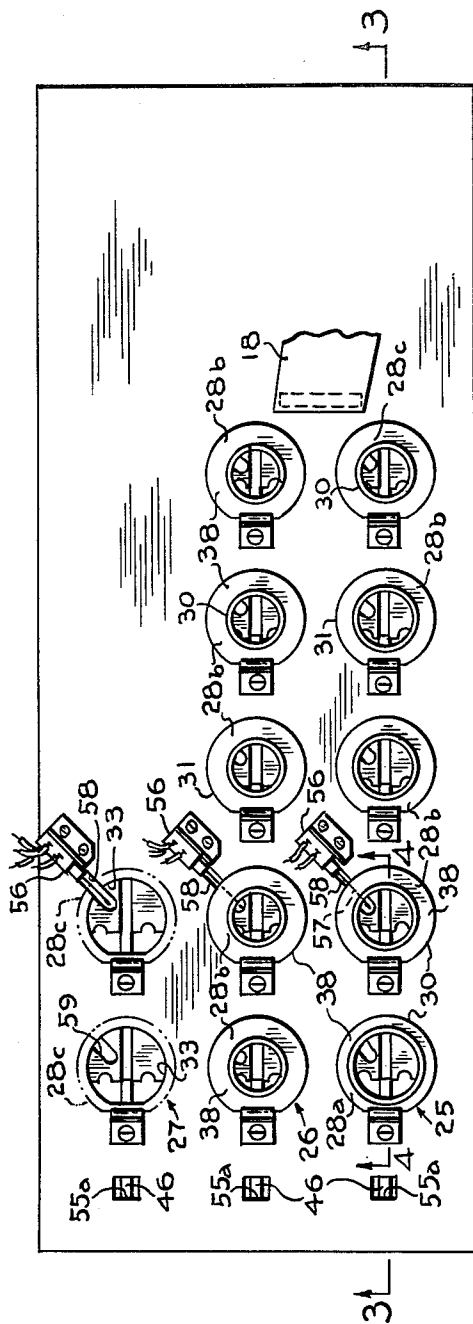
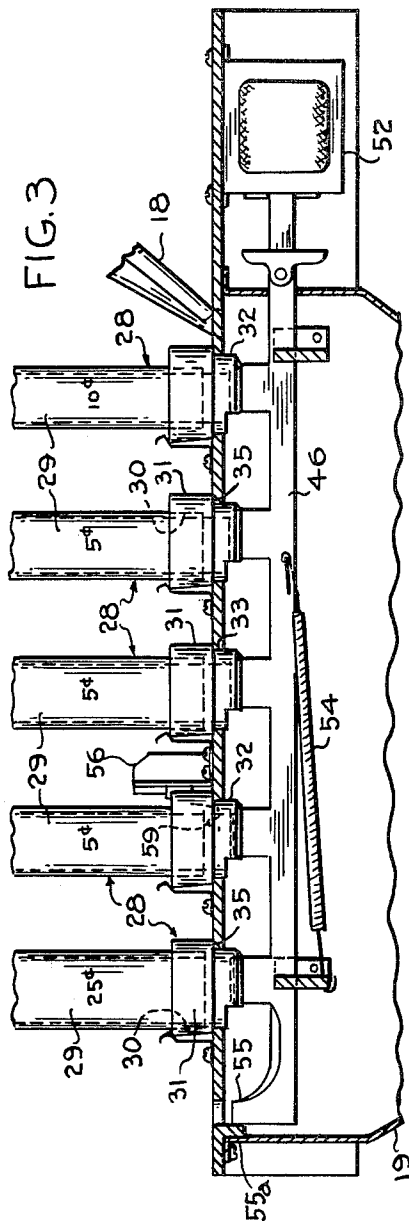


FIG. 3



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MONEY CHANGING MACHINE
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This invention relates to a money changing machine, and particularly relates to electrically operable machines in which an unrejected piece of money is exchanged for a number of coins of equivalent value.

In the past, change-making machines have been provided wherein coins were dispensed from stacks thereof by relatively moving parallel plates, to slide the bottom coins from the stacks and drop them through matched holes in the plates. Frequently, however, the holes did not match properly and the coins could not drop through, whereby the users of the machines were short-changed. The known prior art machines were also objectionable because they were difficult to replenish with change coins, and also because the machines were sometimes operable even if one or more of several stacks in a series thereof became depleted.

One object of the present invention is to provide an improved coin-changing machine of the character described which is fool-proof to dispense an exact given value of coins for a piece of money of like value.

Another object of the invention is to provide a coin changing machine of the character described having improved means for replenishing the supply of change-making stacks of coins in a few minutes, and without necessarily counting the coins in situ.

Another object of the invention is to provide a change maker of the character described including at least one series of stacks of coins of various denominations, wherein the stacks are interchangeable with each other, as for varying the number of coins, or the value thereof, to be dispensed from a series of stacks for a given piece of money accepted by the machine.

Still another object of the invention is to provide a change maker of the character described including improved means to prevent the same from accepting money to be changed if the machine is incapable of dispensing the requisite number of coins in return.

Another object of the invention is to provide a change maker of the character described in which vibration of the machine due to external means cannot cause bottom coins of the stacks to be displaced or accidentally dispensed.

Other objects of the invention will be manifest from the following brief description and the accompanying drawings.

Of the accompanying drawings:

FIGURE 1 is a front elevation, partly broken away and in section, of a change maker embodying the features of the invention.

FIGURE 2 is a horizontal cross-section taken substantially on the line 2—2 of FIGURE 1, but with the housing therefor omitted, and two of the coin cartridges for one series therefor removed from the cartridge support to show openings for the cartridges.

FIGURE 3 is a vertical cross-section taken substantially on the line 3—3 of FIGURE 2.

FIGURE 4 is an enlarged, fragmentary cross-section taken substantially on the line 4—4 of FIGURE 2, and illustrating the normal inoperative condition of the machine, with coin stacks within removable coin cartridges thereof.

FIGURE 5 is a view corresponding to FIGURE 4, but illustrating a coin-ejector bar at the end of the rearward stroke thereof, and about to move forwardly to the

FIGURE 4 position, and thereby to eject coins from the bottoms of coin stacks in said cartridges.

FIGURE 6 is a fragmentary cross-section taken substantially on the line 6—6 of FIGURE 5, and illustrating bottom end of a coin cartridge in an operative, coin-dispensing condition.

FIGURE 7 is a schematic wiring diagram of a portion of the operating circuitry of the machine.

Referring particularly to FIGURES 1 to 4 of the drawings, there is illustrated a money changing machine 10, including within a suitable housing 11 an electrically operable money-receiving and selecting unit 12 of known type adapted to receive or reject money of various denominations, including coins and/or bills. Unit 12 is adapted, by acceptance of half-dollars, quarters, or dimes, for example, to close an electrical circuitry (see FIGURE 7), to a change-dispensing unit 13, also contained within the housing 11. Money accepted by the selecting unit 12 drops into a receptacle 14 after closing one or other of coin-evaluating switches 15, 16 and 17 connected in the circuitry of FIGURE 7, for purposes to be described later in connection with the dispensing unit 13. Money rejected by unit 12, on the other hand, drops through a chute 18 to hopper 19 beneath dispensing unit 13, and thence into a change-retrieving receptacle 20. Money is manually retrieved from this receptacle through a handhole 21 in casing 11.

As best shown in FIGURES 2 to 4, the change-dispensing unit 13 may include an elongated channel-shaped support 24 affixed with housing 11, for removably and interchangeably supporting series 25, 26 and 27 of coin-holding cartridges 28, 28 upright thereon. To this end, each cartridge may include an elongated tube 29 of, rigid, transparent plastic having one end thereof firmly affixed in a socket 30 in a base 31 of metal or other rigid material. Each base has a reduced cylindrical portion 32 for tight reception within circular openings 33, 33 in a web or plate 34 of the support 24, said reduced portion defining an annular seat or shoulder 35 which seats against the upper side of the plate. For positively and non-rotatable locating the cartridges with respect to support 24, each base has a flat face 36 on the forward side of reduced portion 32, complementally to engage a straight edge 37 in any one of the openings 33. The larger upper portion 38 of the cartridge bases may be provided with flat, undercut faces 39 for yielding cam engagement with latch-type leaf springs 40 extending upwardly from plate 34, and which have offset portions 41 for latching engagement with the upper edges of the bases 38. That is, the springs 40 yieldingly retain the cartridges upright on the plate 34. While the tubes 29 may have various internal diameters, as for retaining quarters, nickels and dimes, the bases 38 are otherwise identical to be interchangeably received in any one of the openings 33 in plate 34.

As best shown in FIGURES 4 to 6 each cartridge base 38 may have an integral web portion on the underside thereof, providing an upwardly presented platform 43 for supporting a stack CS of coins within the tube. Platform 43 has a straight edge portion 44 defining with forwardly adjacent portions of the base, opening means 45 which normally downwardly exposes a segment of the bottommost coin in the stack, but also providing for passage of the coin forwardly from the platform to fall therefrom by gravity. For thus ejecting coins from the stacks of each series thereof as controlled by electrical means to be described later, an ejector bar 46 is reciprocally mounted beneath each said series of cartridges, and normally presents transversely spaced projections 47 vertically through transverse slots 48 in the respective platforms 43. The projections 47 each have a top edge 49

normally supporting a stack of coins slightly above the platform to be out of horizontal alignment with the forward opening means 45 in the base. The top edges 43 and forward vertical edges 50 of the projections 47 define a cornering edge portion 51, 51 so positioned that with each reciprocation of the respective bar 46 the several coin stacks will be momentarily released toward full gravitational support therein on the respective cartridge platforms 43, as shown in FIGURE 5, and then with the return stroke of the bar these edge portions 51 will re-engage the rear edges of the bottommost coins to dis-
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pend the same forwardly through the opening means 45, and at the same time again to support the remainder of the stacks on the top edges 49. The dispensed coins drop to the open receptacle 20, through chute 19. Referring particularly to FIGURES 3 and 7 the bars 46 for the respective cartridge series 25, 26 and 27 are adapted to be selectively reciprocated as described, by a coin C deposited in the selector unit 12. Half dollars, quarters, and dimes if accepted by the selector unit, will close contacts of switches 15, 16 or 17, respectively. Acceptance of a half dollar to close switch 15 for ex-
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ample, will momentarily actuate an electromagnet 52 connected to the rearward end of the bar 46 for cartridge series 25, to move said bar for a predetermined rearward stroke against the resilient action of a tension spring 54, from the inoperative position of the bar shown in FIGURE 4 to the operative position shown in FIGURES 5 and 6, in which the coin stacks have dropped to align the bottom coins horizontally with respect to the openings 45. The switch 15 closes immediately and allows spring 54 to urge bar 46 forwardly toward stop engagement of a forward end portion 55 thereof with a stop lug 55a on the plate 24 (see FIGURE 3), the return stroke of the bar being effective to dispense a coin through the opening 45 of each cartridge, as described above (see FIGURE 4).

In each transverse series of cartridges a switch 56 may be mounted on plate 24 adjacent one given cartridge of the series, as shown in FIGURES 2 and 3. Each switch 56 has a pivoted, spring-pressed arm 57 which extends through suitable openings 58 and 59 in plate 24 and platform 24, respectively, toward yielding depression of the arm by the bottom coin of the respective given stack thereof. Such yielding depression of arm 57 closes contacts to money selector unit 12 to close a known type of electrical coin-acceptance means therein. Assuming that all coin stacks of a series thereof contain the same number of coins, the switch arm 57 is released to open the respective switch 56 when said given cartridge of the series is empty. Opening switch 56 sets unit 12 to reject the piece of money being changed and by-passes it to the coin return container 20 (see FIGURE 1).

In use of the device cartridge series 25 may, as an example, include one stack of quarters, three stacks of nickels, and one stack of dimes, as shown in FIGURE 3, to provide change for fifty cents; cartridge series 26 may include five stacks of nickels, to change a quarter; and cartridge series 27 may have two stacks of nickels as change for a dime. An attendant, however, may rearrange the stacks as necessary to make change in various combinations of coins of the same or different denominations, utilizing all or some of the places for coin cartridges in each series. Each stack may be changed, or an empty cartridge may be exchanged for a full one in several seconds. Accordingly, the empty cartridges may be replenished at a central place of business remote from the machine, and risky, time-consuming counting of money or filling of cartridges with coins at the location of the machine is thereby avoided.

When a person desires change for fifty cents, for example, the fifty-cent piece is dropped into the money selector unit 12. If a full amount of change is available in cartridge series 25, and the money to be changed is otherwise accepted by the selector unit, switch 15 is closed by downward passage of the accepted piece of

money to container 14. Momentary closing of switch 15, actuates its electromagnet 52 to reciprocate bar 46 of said cartridge series 25, first to release and drop the coin stacks to full support thereof on the respective cartridge platforms 43, as shown in FIGURE 5, and then upon return forward movement of bar 46 by spring 54, to engage edge portions 51 with the rear edges of the bottommost coins of the five coin stacks and throw the same forwardly through the respective opening means 45, as shown in chain-dotted lines in FIGURE 4. The remainder of the stacks are thereby again supported on the edges 49, out of horizontal alignment with the openings 45, so that the new bottom coins may not be accidentally vibrated from the stacks. The dispensed coins, namely one quarter, three nickels and one dime now may be retrieved from the receptacle 20 and, if desired, the quarter and the dime may be successively inserted in unit 12 to close switches 16 and 17 and thereby to dispense five nickels from cartridge series 26 and two nickels from cartridge series 27, respectively.

As a modification of the invention the operative order of reciprocation of the bars 46 may be reversed, so that the coin removing projections 50 normally will be positioned relatively as shown in FIGURE 5. In this event the electromagnets 52 will be utilized to move projections 50 to the FIGURE 4 positions to remove the coins, and suitable spring means will be provided to return the bars to the FIGURE 5 positions.

It is further contemplated that the apparatus shown and described may be utilized for dispensing articles together with requisite change over and above the predetermined price of the article. That is, article-dispensing means of known type, not shown, may be activated by the electrical means shown in FIGURE 7 to dispense an article simultaneously with activation of one or more coin cartridges 29 to dispense a precise amount of change.

Other modifications of the invention may be resorted to without departing from the spirit thereof or the scope of the appended claims.

What is claimed is:

1. A money changing machine comprising the combination with a money receiving and selecting device and an electrical contact device in an electrical circuitry and operable by an unrejected piece of money of given value, electrically to close said circuit: of a change-dispensing unit including a horizontal plate having a series of transversely spaced openings vertically therethrough; a plurality of tubes for receiving vertical stacks of coins therein; base means on said tubes for affixing the respective tubes upright on said plate over said openings, said base means having portions complementally received through the respective openings and terminating in relatively fixed platforms below the plate and adapted for positive downward support of the vertical stacks of coins thereon within the tubes; said base means each having forwardly presented opening means permitting forward passage of the bottommost coin, horizontally from each said stack thereof, and each base means having passage means exposing the rear edge of the bottommost coin of the respective stack and extending forwardly through the platform; a bar reciprocably mounted adjacent the lower ends of the tubes of said series of openings and having series of transversely spaced, forwardly presented edge portions protruding above said platforms for entry within the respective said passage means; and means operable by electrically closing said circuitry transversely to reciprocate said bar, and thereby to engage said protruding edge portions with the rear edges of said bottommost coins to eject the same horizontally from the respective platforms and outwardly through said opening means.

2. A machine as set forth in claim 1, wherein means is provided for interchangeably releasably mounting said tubes upright on said plate with respect to said openings.

3. A machine as set forth in claim 1, including a plurality of said series of openings and series of said

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cartridges therefor, and complemental portions on said base means for interchangeably mounting said cartridges in said openings.

4. A machine as set forth in claim 1, wherein securing releasable means is provided for interchangeably affixing said tubes upright on said plate, whereby said tubes are interchangeable with like tubes containing stacks of coins of the same or different denominations.

5. A money changing machine comprising the combination with a money receiving and selecting device and an electrical contact device in an electrical circuitry and operable by an unrejected piece of money of given value, electrically to close said circuit: of a change-dispensing unit including a horizontal plate having a series of transversely spaced openings vertically therethrough; a plurality of tubes for receiving vertical stacks of coins therein; base means on said tubes for affixing the tubes upright on said plate over said openings, said base means having portions complementally received through the openings and terminating in relatively fixed platforms below the plate and adapted for positive downward support of the vertical stacks of coins thereon within the tubes; said base means each having forwardly presented opening means permitting forward passage of the bottommost coin, horizontally from each said stack thereof, and each base means having passage means exposing rear edge of the bottommost coin of the respective stack and extending forwardly through the platform; a bar reciprocally mounted adjacent the lower ends of the tubes of each said series of openings and having series of transversely spaced, forwardly presented edge portions protruding above said platforms for entry within the respective said passage means; and means operable by electrically closing said circuitry to reciprocate said bar for a given said series of openings, and thereby to engage said protruding edge portions with the rear edges of said bottommost coins to eject the same horizontally from the respective platforms and outwardly through said opening means; said passageways being transverse slots vertically through said platforms and said edge portions being transversely reciprocable within said slots; said edge portions being cornering edges including upwardly presented edges normally supporting the stacks, whereby upon reciprocation of said bar said edge portions momentarily release the stacks toward gravitational support thereof on the respective platforms, and re-engagement of the edge portions with said rear edges of the bottommost coins forwardly to dispense the same and to support the remainders of the stack on said upwardly presented edges.

6. A money changing machine comprising the combination with a money receiving and selecting device and at least one electrical contact in an electrical circuitry and operable by an unrejected piece of money of given value, electrically to close said circuit; of a change-dis-

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pensing unit including a supporting member; a cartridge for receiving a stack of coins therein; means on said cartridge for removably affixing the same upright on said member, said cartridge having a relatively fixed platform at the lower end thereof adapted for positive downward support of a stack of coins vertically thereon within the cartridge; said cartridge having forwardly presented opening means permitting forward passage of the bottommost coin horizontally from said stack thereof, and said cartridge having passage means exposing the rear edge of the bottommost coin of the stack and extending forwardly through the platform; an element reciprocally mounted adjacent the lower end of the cartridge and having a forwardly presented edge portion protruding above said platform for horizontal reciprocation within said passage means; and means operable electrically closing said circuitry horizontally to reciprocate said element, and thereby momentarily to engage said protruding edge portion with the rear edge of said bottommost coin to eject the same horizontally from said platform and forwardly through said opening means; said passageway being a transverse slot vertically through said platform and said edge portion being transversely reciprocable within said slot, said edge portion being a cornering edge including an upwardly presented edge normally supporting said stack, whereby upon reciprocation of said element said edge portion momentarily releases the stack toward gravitational support thereof on said platform, and re-engagement of the edge portion with said rear edge of the bottommost coin forwardly to dispense the same and to support the remainder of the stack on said upwardly presented edge.

7. A machine as set forth in claim 1, including a plurality of said series of openings and series of said cartridges therefor, and complemental portions on said base means for interchangeably mounting said cartridges in said openings, and wherein means is provided for interchangeably releasably mounting said tubes upright on said plate with respect to said openings.

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