April 14, 1942. D. D. BRODIE ET AL 2,279,936

VENDING MACHINE

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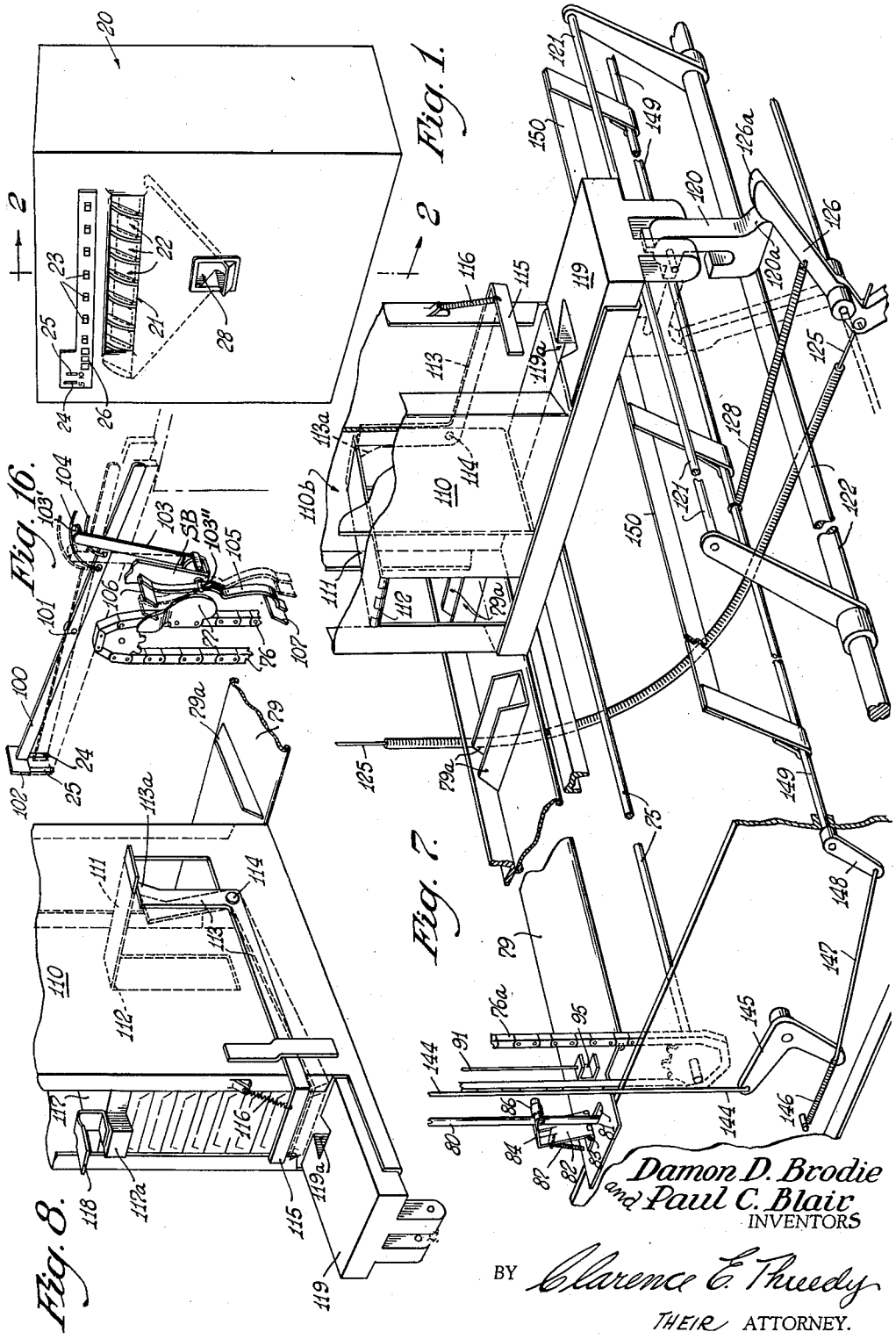


Fig. 1.

Fig. 1a.

Fig. 7.

Fig. 8.

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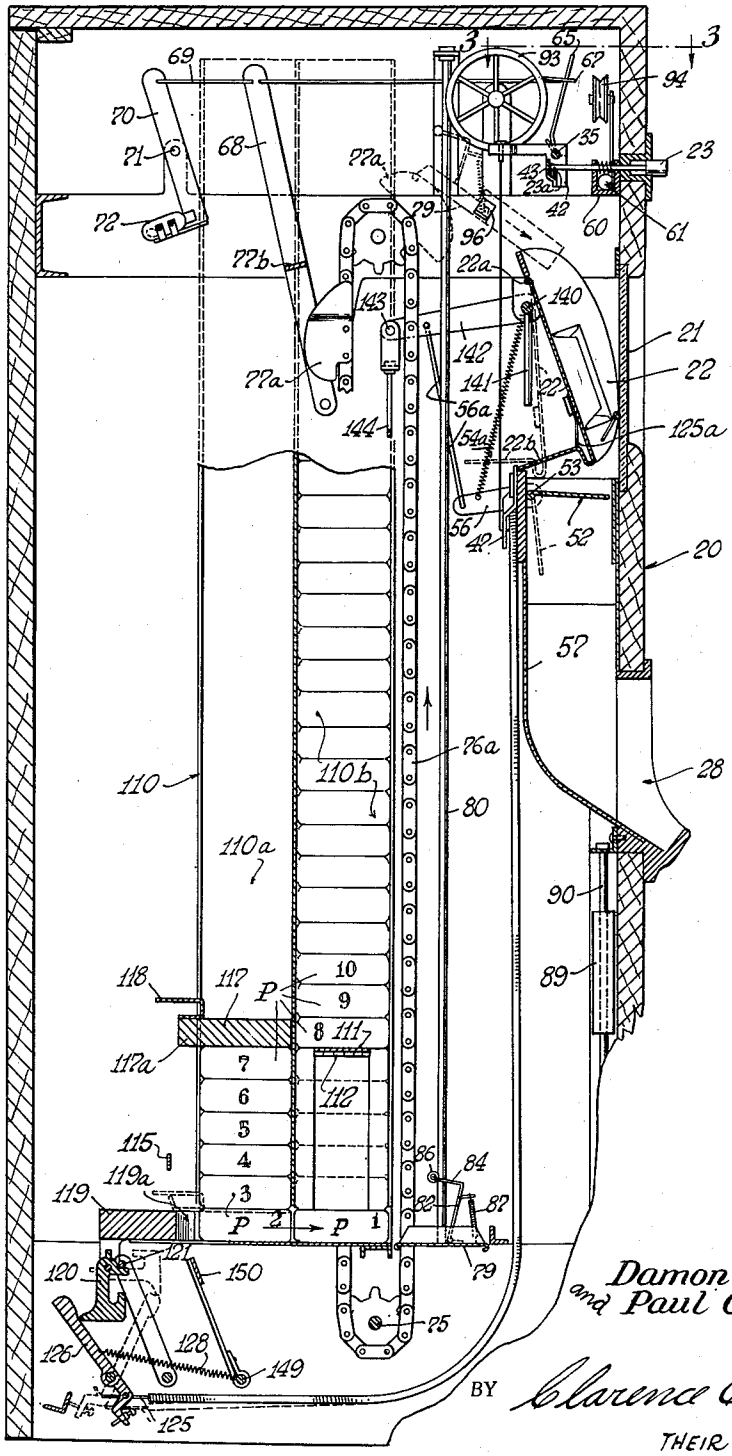
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Fig. 2.



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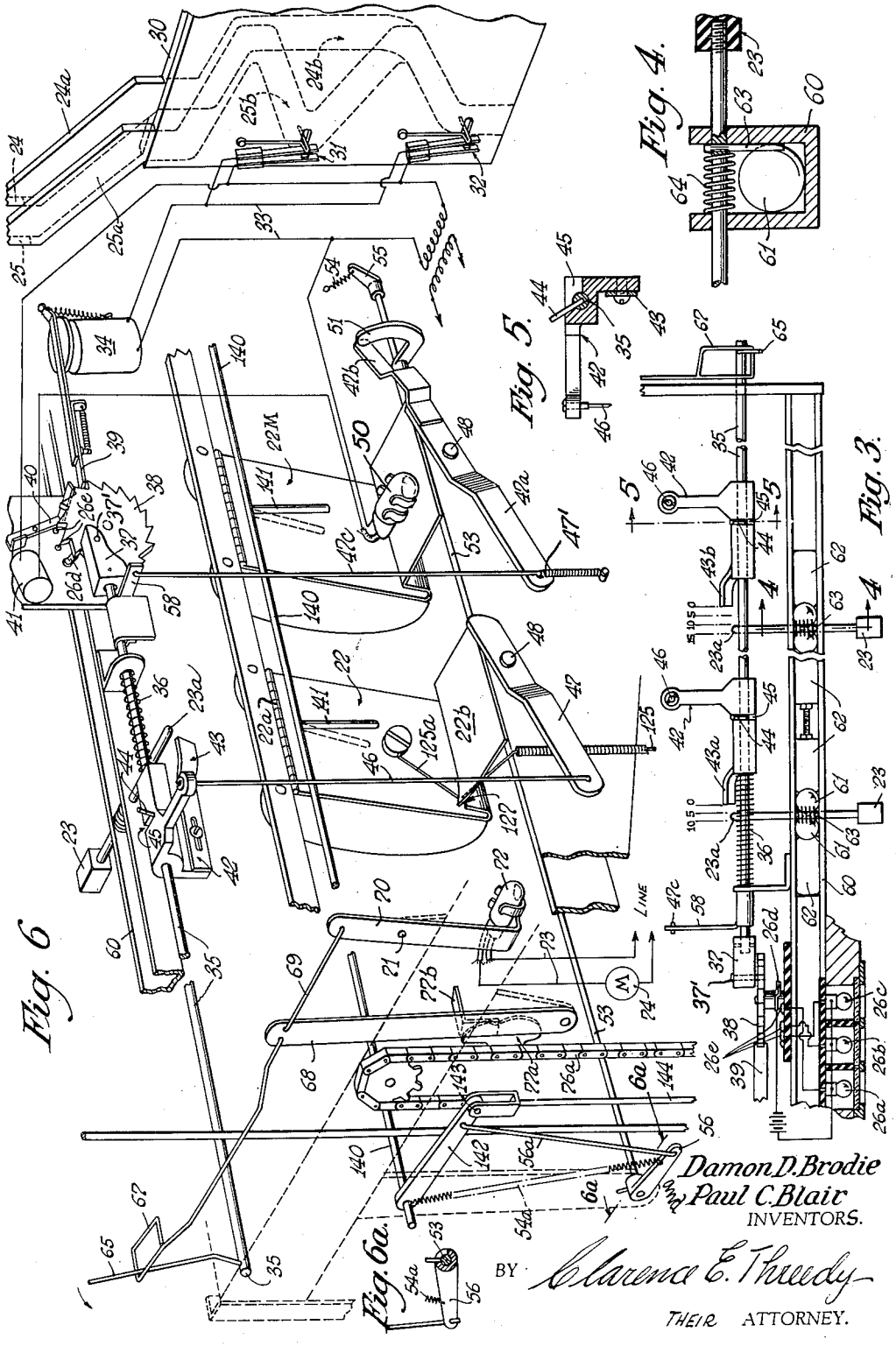


Fig. 6

Fig. 4.

Fig. 5.

Fig. 3.

Fig. 6a.

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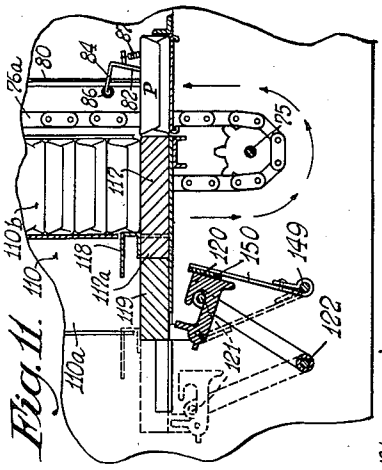


Fig. 11.

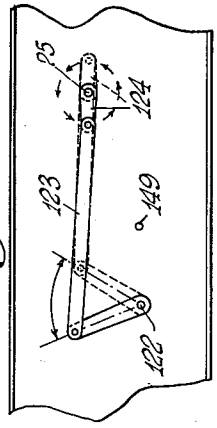


Fig. 10

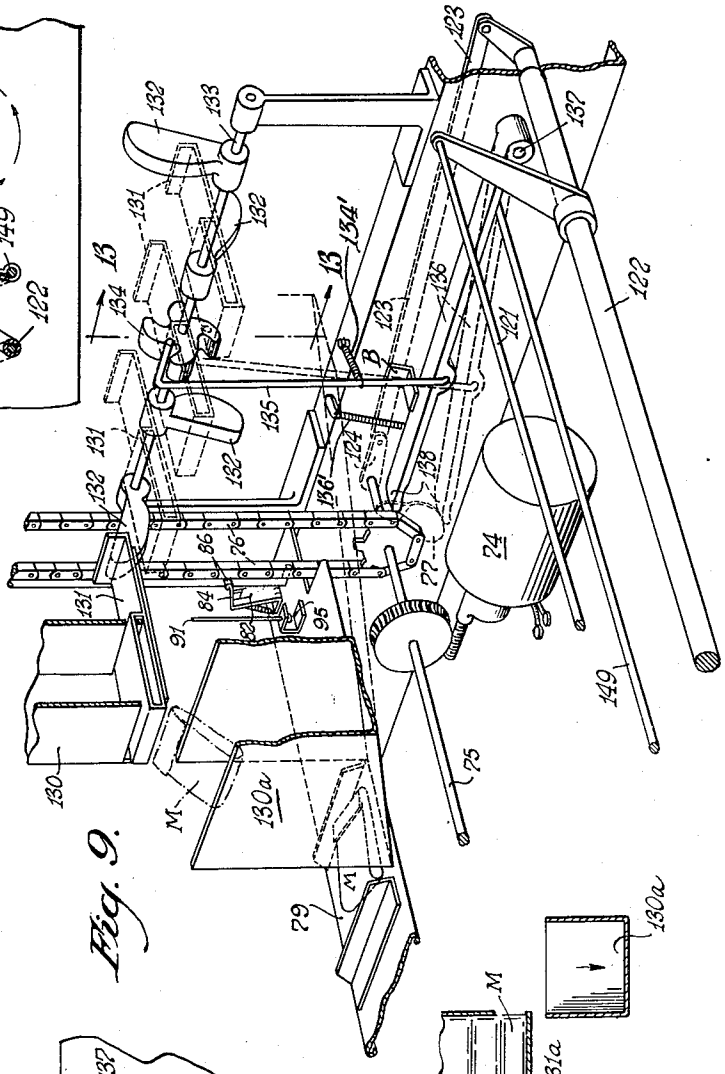


Fig. 9.

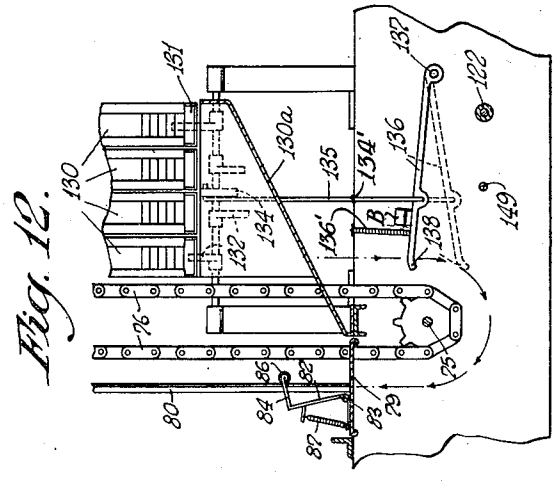


Fig. 12.

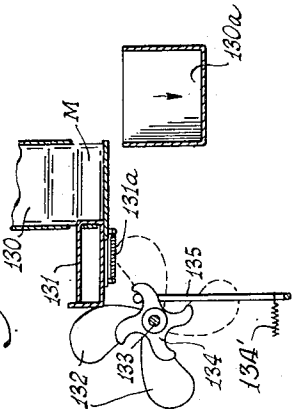


Fig. 13.

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Fig. 14.

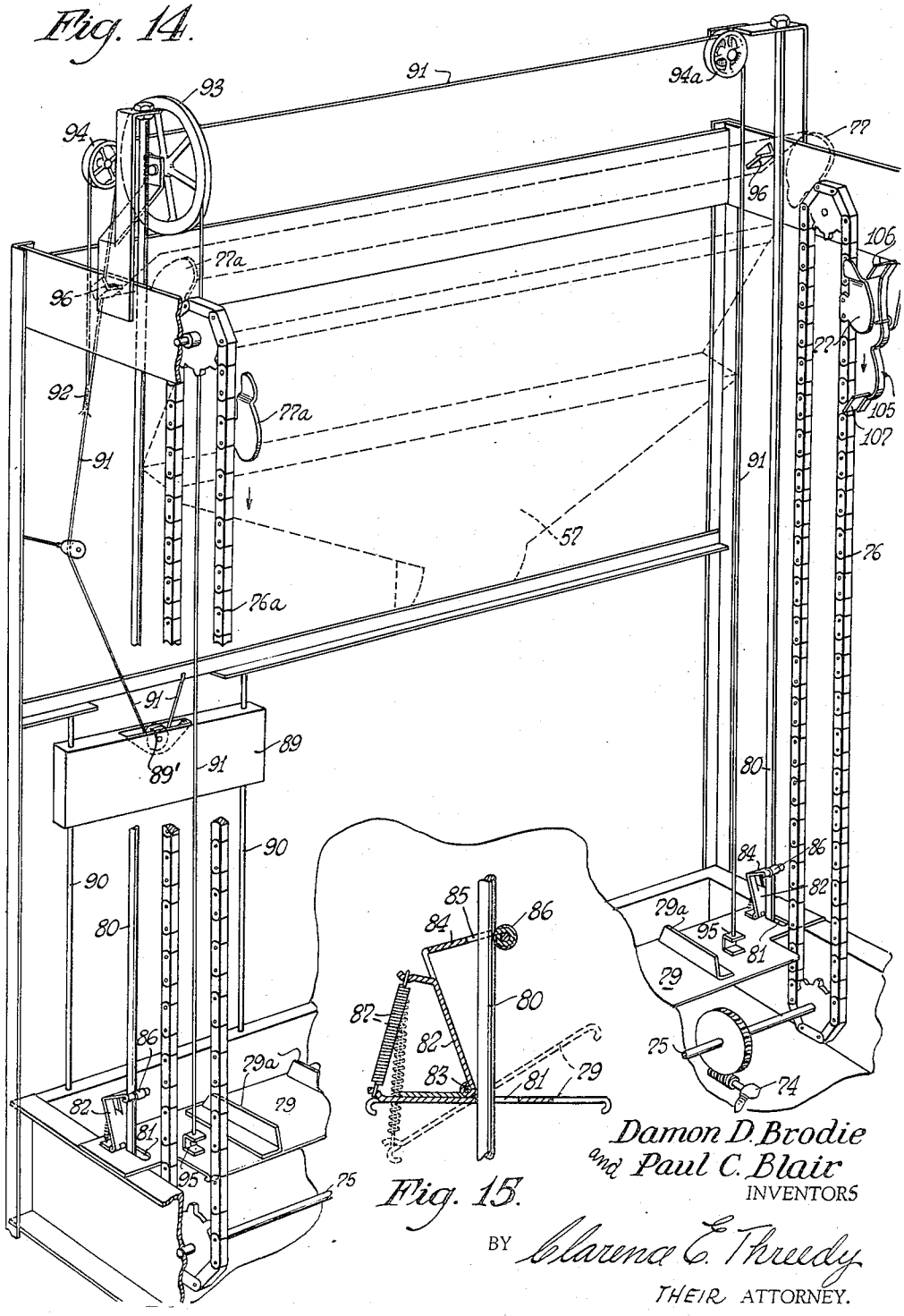


Fig. 15.

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UNITED STATES PATENT OFFICE

2,279,936

VENDING MACHINE

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Application December 28, 1939, Serial No. 311,240

14 Claims. (Cl. 312—63)

This invention relates to vending and dispensing machines and has as a principal object the provision of a console type machine for vending cigarettes and other packaged items.

Another object is the provision of a console type machine having a large storage capacity and means for displaying the actual package or item which will be delivered to the patron upon deposit of a proper number of coins and operation of selective control means.

A further object is the provision of a vending machine having a plurality of display compartments each provided with a trap retaining a packaged item or the like in view of the patron, a coin control unit common to all traps and push button means associated with each trap, certain groups of push buttons, corresponding to items having a certain price, being rendered operable when the adequate number or amount of coins is deposited, only one button, however, being operable at a time.

Yet another object is the provision of storage compartments for each display compartment and a common elevator and mechanism for automatically ejecting an article from the storage compartment or trap when an article has been vended from the latter, whereby the emptied compartment or trap is refilled.

Yet another object is the provision of a plurality of storage compartments for each display compartment or trap and means for successively ejecting articles from one storage compartment until it is emptied and then ejecting articles from the next compartment of the group.

A further object is the provision of selective coin control means including a push button for each display compartment, latch releasing means for each push button, and an interconnecting selector common to all push buttons for rendering certain of the same operable depending upon the number of coins deposited in the coin control.

Yet another object is the provision of means for visibly indicating to the patron the number of coins deposited.

A still further object is the provision of means for blocking the deposit of additional coins during vending operation of the machine.

Other objects, advantages and novel aspects of the invention reside in certain details of construction as well as the cooperative relationship of the component parts of the illustrative embodiment described hereinafter in view of the annexed drawings, in which:

Fig. 1 is a perspective view of the machine;

Fig. 2 is an enlarged vertical section along line 2—2 of Fig. 1;

Fig. 3 is a fragmentary horizontal section along line 3—3 of Fig. 2 above the selector means;

Fig. 4 is an enlarged sectional detail through one of the selector buttons along line 4—4 of Fig. 3;

Fig. 5 is a sectional detail through one of the latch operating levers taken along line 5—5 of Fig. 3;

Fig. 6 is a fragmentary rear perspective of the display compartments or traps and selector mechanism at the upper side of the machine;

Fig. 6A is a sectional detail through one of the reset crank arms taken along line 6A—6A of Fig. 6;

Fig. 7 is a rear fragmentary perspective of one of the refill ejector units, the view being complementary to Fig. 6;

Fig. 8 is a fragmentary rear perspective of one of the storage compartments and the storage compartment transfer mechanism;

Fig. 9 is a fragmentary rear perspective at the lower end of the machine, showing the match pack ejector means and main driving motor, the figure being complementary to the right-hand end of Fig. 7;

Fig. 10 is an elevational fragment at the right end of the machine showing the clutch bail operating drive from the main drive shaft;

Fig. 11 is a vertical sectional fragment through the refill ejector mechanism;

Fig. 12 is a vertical section looking outward toward an end of the machine and the match pack storage compartments, the view being supplemental to Fig. 9;

Fig. 13 is a sectional detail through the match pack ejector ratchet along line 13—13 of Fig. 9;

Fig. 14 is a rear perspective of the refill elevating mechanism;

Fig. 15 is a vertical sectional fragment of the rockable mounting for the elevator plate;

Fig. 16 is a perspective fragment of the coin blocking mechanism.

In its geneal aspects, the improved vending or dispensing machine includes a console type cabinet 20, shown in Fig. 1, in the front wall of which is disposed a display window 21 behind which are a plurality of individual display compartments or traps 22 in each of which a package of cigarettes or like merchandise reposes in plain view of the prospective customer. Above the display window are a series of selector buttons 23, to the left of which are the entrances 24 and 25 to a coin chute, the entrance 24 being adapted to

receive five-cent pieces, and the entrance 25 being adapted to receive ten-cent pieces. Adjoining the coin entrances are a plurality of signal lamps or windows 26 which light up to indicate the number and value of coins deposited. The cigarettes or other packaged items are intended to be sold at different prices, for example, five, ten or fifteen cents per package, so that the patron deposits one five-cent piece, or two five-cent pieces, or one ten-cent piece, or one five-cent piece and one ten-cent piece, depending upon whether he wants a five, ten or fifteen cent item. The amount deposited will be indicated by the lighted lamps or windows 26, described more particularly hereinafter, and the patron then pushes one of the buttons 23 corresponding to the item he desires and for which he has deposited an adequate sum. Upon pushing the appropriate button 23, the corresponding trap bearing the article which he desires, will be released to gravitate the article into a discharge chute leading to a delivery opening 28 beneath the window.

An important feature of the invention resides in the fact that there may be several brands or items selling at the same price and all of the control buttons 23 corresponding to items selling at that price will be rendered operable, although only one button may in fact be actuated.

As soon as the patron presses one of the buttons 23, mechanism is set into operation to refill the emptied compartment or trap, and during this time a special blocking device is also operated to block the coin entrances 24 and 25 during a short interval of time, approximately twenty seconds, required for refilling the trap.

Selective coin control and trap release mechanism

Referring to Fig. 6, the coin deposit opening 24 leads into a chute 24a which discharges into a coin testing device 30, while the ten-cent coin entrance 25 leads into a chute 25a likewise discharging into the testing device 30 in which the ten-cent piece follows a passage 25b leading past two coin switches 31 and 32, both of which are operated by the coin. The five-cent coin, however, follows a different passage 24b which guides the coin only past the lower switch 32. Both switches 31 and 32 are connected in a circuit 33 with a selector operating magnet 34, and it will therefore be apparent that for each five-cent piece deposited, switch 32 will be closed once and magnet 34 will therefore be impulsed once, while each ten-cent piece deposited, engaging both switches, will impulse the magnet 34 twice.

The selecting mechanism includes a selector bar 35 mounted to shift axially toward the magnet 34 in the region behind the several push buttons 23, a spring 36 urging the bar into a normal position toward the left away from the magnet. One end of the bar is attached, by a suitable joint 37, to a ratchet disc 38 arranged to be moved step by step by an armature 39 actuated by magnet 34. As seen in Figs. 3 and 6 a pin 37' is eccentrically arranged on disc 38 and pivotally connects the latter to the arm 37 such that upon each step of the disc 38 (clockwise, Fig. 6) the pin will be moved a substantial distance to the right, the ratchet being effective therefore to move the rod from its normal position a number of steps corresponding to the number of times the magnet 34 is impulsed, depending upon the number and value of coins deposited. A stopping and release pawl 40 prevents retrograde movement of the ratchet, but may be withdrawn by operation of the magnet 41 to permit restoration of the rod and ratchet to normal position when one of the traps 22 is released in a manner to be described.

Rockably mounted on the selector shaft or bar 35 adjacent each of the selecting buttons 23 is a latch operating lever 42 provided with an offset cam arm 43 adapted to be engaged by the inner end 23a of the corresponding push button shank provided the lever 42 is shifted from its normal position into alignment with said end of the button. The cam arm 43 being eccentrically mounted with respect to the bar 35 will swing or rock clockwise, (Fig. 2) when the inner end 23a of the push button is pressed against it and thereby cause the lever 42 to swing in a like manner.

Rocking movement of the latch operating members 42 is limited in one direction by means of a stop pin 44 fixed on the rod 35 and fitted into a slot 45 in the lever 42 (Fig. 5). Each lever 42 is connected by a rod 46 to a compartment or trip latch 47 pivoted as at 48 behind one of the compartment traps 22, the latter being hinged as at 22a and each having an offset wing portion 22b engaging the end of the latch so as to be held by the latter in a position toward the window 21 (see Fig. 2). In the preferred construction only the back portions of each compartment or trap are movable on hinge 22a, the vertical side wings or partitions being stationary, and while the traps would fall of their own weight, especially when urged by the added weight of the cigarette package, auxiliary means are provided to expedite the dropping of the trap, all of which will appear hereinafter.

Match pack delivery and delivery chute blocking

In the present machine, arrangement is made to deliver a packet of matches with each package of cigarettes, and to this end there has been shown in Fig. 6 a special compartment or trap 22M identical, in most respects, with the other traps 22, except that on the offset wing portion thereof it carries a mercury switch 50 and is provided with a special form of latch 47a having an offset 47b at its free end for engagement with an operating finger 51 for a fraud-preventive blocking plate or gate 52 (Fig. 2) fixed to a cross shaft 53 which is urged by springs 54—54a, connected to lever arms 55 and 56 and having thereon opposite ends fixed to the main frame, into normally lowered position and moved into raised position to block access through the package delivery chute 57 (Fig. 2) during the time any trap is sprung in a manner later to be described.

The offset 47b of the match-pack latch releasing lever engages the end of the finger 51, while the traps are all set, that is, in article supporting position, so that the fraud-preventive blocking gate 52 is open preparatory to the discharge of a package.

The match-pack releasing latch is connected by a rod 47c to a lever arm 58 fixed on the selector bar 35 so that each time the latter is rocked responsive to selective release of any trap, the latch lever 47a is likewise tripped to free the match pack trap 22M for delivery of a packet of matches. Immediately upon a tripping of the trap 22M as aforesaid the mercury switch 50 carried thereby will be tilted therewith into circuit closing condition thereby energizing the reset magnet 41 to attract the pawl 40 out of latching engagement with the ratchet 38 freeing the latter for retrograde movement back to normal position by action of the spring 36 on the rod 35.

Referring to Fig. 3, where the selector bar **35** is shown in its normal position with the cam arms **43** of the several latch operating levers **42** displaced from operative engagement with respect to the end portions **23***a* of the several operating buttons, it will be apparent that each step of the ratchet **38** will dispose the cam arms **43** closer to their respective operating buttons.

Selector bar operation and coin signalling

In Fig. 3, the left-hand cam arm **43** designated **43***a* is spaced only two steps from the end of its operating button, whereas the cam arm **43** designated **43***b* is spaced three steps away. If one ten-cent piece or two five-cent pieces are deposited in the coin control, ratchet **38** will step twice and bring the cam lever **43***a* opposite the end of the corresponding push button, which may then be depressed to rock the rod and release the corresponding trap as heretofore described.

There may be several cam levers spaced similarly to the lever **43***a* and in order to prevent the possibility of operating more than one push button effectively, there is provided a special blocking mechanism including a channel member **60** (Figs. 2 and 6 also) through which the shanks of each of the buttons **23** pass, blocking balls **61** being arranged on opposite sides of each shank with adjustable spacing blocks **62** disposed between the nearest balls of each adjoining pair of button shanks, and each shank having a pin **63** (Fig. 4) fixed thereon in a position to pass between the corresponding pair of balls against the tension of a spring **64** when the button is depressed, it being apparent that the movement of any pin **63** in between the corresponding pair of balls will displace the same and the adjoining blocking member **62** so as to prevent similar movement of any other pin **63**, thus making it possible to depress only one of the buttons **23** at a time, notwithstanding the fact that several of the same may be in condition otherwise for selective operation.

Signal means for apprising the patron of the number of coins deposited includes the provision of a plurality of signal lamps, generally indicated at **26**, and individually designated **26***a*, **26***b* and **26***c* in Fig. 3, the lighting of the first of which indicates the deposit of a single five-cent coin, the second of which indicates the deposit of two five-cent coins or one ten-cent coin, and the third of which indicates the deposit of three five-cent coins or one five-cent coin and one ten-cent coin. These lamps are illuminated by a switch arm **26***d* stepped with the ratchet disc **38** to engage individual contacts **26***e* each connected with one of the signal lamps to illuminate the latter serially, corresponding to the number of steps made by the ratchet. Thus, if one ten-cent piece is deposited, both switches **31** and **32** will be closed in sequence, energizing the ratchet stepping magnet **34** twice and causing the ratchet **38** to take two steps from normal position, thus bringing the contact arm **26***d* onto the second contact **26***e* to illuminate bulb **26***b*.

Refilling and resetting mechanism

Assuming that one of the compartments **22**, as well as the match pack compartment **22M**, has been tripped, mechanism is automatically started to reset the trap and transfer or deliver a fresh package thereto.

Operation of this mechanism is initiated by the rocking movement of the selector bar **35** in releasing the trap, which movement causes a finger **65** (Fig. 6) to engage one end of a loop **67** on a rod attached to a switch operating lever **68** which is in turn linked by a rod **69** with a switch carrying lever **70** pivoted as at **71** on the main frame and normally disposing a mercury switch **72** in open circuit condition.

Switch **72** is connected in a circuit **73** with the main driving motor **74** (Fig. 9) which, through a suitable worm drive, turns the main drive shaft **75**, driving a pair of sprocket chains **76** and **76***a* (Figs. 6 and 9 together; also Fig. 14) in a clockwise direction, starting a pair of cams **77** and **77***a* from their normal positions at the top flight of the chains for movement down beneath an elevator plate **79** upon which there will be resting a new package, as well as a packet of matches, as the result of the operation of certain ejecting mechanism in the intervals between the time the cams start down and engage the underside of the elevator plate. The plate **79** is arranged such that when the cams **77** and **77***a* start their upward flight these cams will lift the plate **79** until the cams ride over the upper sprocket over which their respective chains are trained.

The elevator plate **79** is arranged so as to be common to all storage compartments and display compartments or traps and therefore extends substantially across the width of the machine as illustrated particularly in Fig. 14. This plate is normally disposed in the lowered position seen in the latter figure and is guided in its movement upon vertical rods **80** at opposite ends thereof and each passing through a laterally elongated slot **81** in the plate. The elevator plate is mounted for rocking movement to discharge the articles carried thereby into the traps **22** adjacent the elevator plate **79**, this mounting being accomplished, as shown in Fig. 15, by the provision of an attaching bracket **82** hinged to the plate as at **83** and having an upper offset **84** provided with an elongated slot **85** through which the guide post **80** extends for engagement with a roller **86**. A spring **87** pivots the hinged bracket member **82** to the limit of its movement toward the plate **79** in an arrangement which maintains the latter in an approximately horizontal condition to support the items carried thereby. The plate **79** when raised by cams **77** and **77***a*, aforesaid, to the top sprocket will engage a bracket **96**, fixed upon the main frame adjacent each end of the plate **79**, to tilt the plate **79** and discharge the articles carried thereby into the respective trap **22** as seen in Fig. 2.

Spacing angles **79***a* are disposed across the elevator plate in alignment with corresponding compartments or traps and corresponding storage compartments.

The elevator plate **79** is counterweighted by means of a counterweight **89** working on rods **90** and connected by a pulley cord **91** having one end anchored to the main frame and its opposite end trained through a pulley **89'** carried by the counterweight **89**, and branched as at **92** to pass over pulleys, **93**, **94**, **94***a* (Fig. 14) for connection as at **95** to opposite ends of the elevator plate, the object of the counterweight being to permit the elevator plate **79**, which is slightly heavier than the counterweight **89**, to drop easily into the normal position shown in Fig. 14 preparatory to reception of replenishing items from the storage compartments. By the same token the counterweight **89** relieves the load on the driving

motor 74 when the plate 78 is lifted by means of the cams 77 and 77a on drive chains 76 and 76a.

It being assumed that a fresh package of cigarettes or the like and a packet of matches have been deposited on the elevator plate in its lowered condition at the time the sprocket chains 76 begin their movement as aforesaid, the cams 77 and 77a will ultimately be carried around against the underside of the plate 78 and raise the latter to dotted line position shown in Fig. 2, at which time the plate will bear against tripping brackets 96 (Fig. 14 also), causing the plate to rock into the position shown in dotted lines in Fig. 15, which dislodges the items carried thereon for movement into their respective traps, for example, the package trap 22, and the match pack trap 22M of Fig. 6, the cams 77 and 77a riding from beneath the elevator plate toward their normal full line position shown in Figs. 2 and 14 wherein the chain is automatically stopped by means shortly to be described. As soon as the cams pass from beneath the elevator plate, the latter drops to normally lowered position shown in Fig. 14.

Stoppage of the motor and elevator driving sprockets is accomplished by the left-hand cam 77a which (as shown in Fig. 6), after passing the topmost point in its flight, bears against an offset 77b carried on the side of the resetting lever 68 pivoting the latter back to normal position which through link 69 pivots the switch carrying lever 70 to normal position, opening switch 72 and breaking circuit to the driving motor 74; there being a slight movement of the chain and cam 77a after the circuit to the motor 74 is shut off to allow the cam 77a to pass beyond the offset 77b so that the lever 68 may again be conditioned for operation.

Coin blocking

In order to prevent the deposit of coins while the refilling operation is in progress, although a very short interval of approximately twenty seconds is all that is involved, there is provided the arrangement of Fig. 16 which includes a blocking lever 100, pivoted as at 101, to dispose a blocking plate 102 in blocking position before the coin entrances 24 and 25 interiorly of the machine. Such movement is effected by a lever 103 having a roller 103' at its free end bearing against and riding in a trackway provided by arcuate offset arms 104 on the blocking lever, the lever 103 being mounted on a shaft 103'' which is supported for pivotal movement on a stationary bracket SB rocked by a peculiarly shaped cam bar 105 fixed to shaft 103'' and having upper and lower contact faces 106 and 107 respectively. In this figure (16), the cam 77 is shown in its normal position of rest just below the top of its flight, and when the driving motor is first started, cam 77 rides against the lower contact face 107 and through the rocking movement of parts 103, 104 and 105 effects a tilting of the blocking lever 100 to dispose the blocking plate 102 over the coin entrances 24 and 25 as shown in dotted lines, Fig. 16. When the cam 77 returns to its normal position, passing over the top of its flight, it engages the contact face 106, rocking the aforesaid levers in the opposite direction and restoring the blocking lever 100 from dotted line position to the normal full line position shown.

Article storage and ejecting means

As shown in Fig. 7, an article storage compartment 110 is situated behind each of the traps 22 in the machine and in consequence behind each of the spaces defined by the spacing brackets 79a on the elevator plate. As shown in Fig. 2, each storage compartment consists of at least two chambers 110a and 110b, one behind the other in alignment with the traps, it being intended that both compartments be loaded with packages of merchandise P.

The arrangement is such that the ejectors will empty the rearward compartment of each group first, this being accomplished by the provision of a sustaining platform 111 (Figs. 2, 7 and 8) beneath each forward chamber or compartment of each group of storage compartments, this platform being in the nature of a plate which is hinged as at 112 at one side of the compartment and which is sustained in normally raised position by a tripping lever 113 pivoted as at 114 and having an offset free end 115 which is urged by a spring 116 to project the nose 113a beneath the outer end of the platform 111 to sustain the latter in raised condition supporting the lowermost package in the forward compartment at a level several packages high above the lowermost level of either compartment so that the articles may be ejected or fed from the rearmost compartment beneath the sustained articles in the foremost compartment until there are no longer any articles in the rearmost compartment, whereupon the sustaining lever 113 is tripped automatically. An ejector 119 moves the bottom article from the rear stack in beneath the raised stack in front, and the succeeding package from the rear compartment will finally eject the preceding package from the front compartment. Thus, any number of compartments may be arranged in this manner.

Tripping of the sustaining lever is accomplished by the provision of a weighted follower 117 placed on the topmost package in the rear compartment and provided with a tripping wing 118 adapted to engage the offset 115 on the tripping lever when the last package in the rear compartment is ejected, thereby rocking the lever to withdraw the nose 113a and permit the platform 111 to fall, disposing the lowermost package of the group in the forward compartment at a level for engagement by the follower 117 interlocked (Fig. 11) with the reciprocable ejector 119 by a wedge projection 117a dovetailed into slot 119a so that ejector 119 and follower 117 move as a unit.

Ejector operating mechanism

As shown in Fig. 7 particularly, each of the reciprocable ejectors 119 is provided with a clutch hook 120 pivoted thereon to be rocked from a normally pendent and ineffective position such as shown in Fig. 7, into a raiscd position as shown in Fig. 11, for engagement with a common clutch bail rod 121 rocked on a cross shaft 122 by a driving linkage 123 (Figs. 9 and 10), 124, with the main drive shaft 75. The normal position of the bail is shown in Figs. 7 and 9, and when the motor 74 is energized by operation of the selector bar as aforesaid, the clutch bail 121 begins to move forward for engagement with any of the clutch hooks 120 which may be in raised position, whereby to pull the corresponding ejector 119 into engagement with the lowermost package of whichever stack is being used, such package being pushed in between the corresponding partition brackets 79a on the elevator plate.

Selective actuation of the clutch hooks 120 is

effected by means of a Bowden wire 125 operatively connected to a clutch operating finger or lever 126 associated with each ejector. Reading Figs. 6 and 7 together, the upper end 125a of each Bowden wire is passed through a notch 127 (Fig. 6) at the juncture of the wing 22b and the trap plate 22 for attachment to the back of the latter. As shown in Figs. 2 and 7, a spring 128 is attached to each clutch operating finger to urge the latter against the corresponding clutch hook for movement of the latter into operative position and at the same time to give a corresponding pull upon the Bowden wire 125. The particular trap 22 to which the Bowden wire is attached being latched by the lever 47 as heretofore described and by the same token the corresponding clutch finger 126 is latched against movement by its spring 128. As soon as any of the latches 47 is released by operation of a selected button 23 and its lever 42 to pull upward on rod 46, the corresponding merchandise compartment or trap 22 is quickly pulled into article releasing position by action of the Bowden wire responsive to the effort of the spring 128 associated with the corresponding clutch operating finger 126, the latter quickly moving the corresponding clutch hook into operative position for engagement by bail 121 which then pulls the corresponding ejector block 119 forward in ejecting action. All of the foregoing operations take place in a brief interval a considerable time before the cams 77 arrive beneath the elevator plate, so that the fresh package and match pack will be deposited on the elevator with allowance of a good time margin before the elevator begins its upward movement.

The ejectors are automatically released at the end of their ejecting stroke by the provision of a cam nose 126a at the end of each finger and a corresponding cam portion 120a on each clutch hook, the arrangement being such that the fingers will slip out of operative engagement with their respective clutch hooks at the end of their forward stroke with the ejector, the ejector being retracted to its normal position by action of the bail 121 in moving back to the normal position of Fig. 7 from the advanced position of Fig. 11.

Match pack storage and ejection

The match packs are stored in a series of four vertical compartments 130 extending laterally at one end of the machine as shown in Fig. 12 and in part in Fig. 9. Each of these chutes is provided with a reciprocable ejector 131 and mechanism is arranged to operate these ejectors in sequence, this mechanism including the provision of four cams 132, each offset 90 degrees with respect to the other on a shaft 133, each cam being positioned opposite the end of one of the ejecting slides 131. Thus, as shaft 133 is rotated, cams 132 successively move their corresponding ejector slides 131 in ejecting operation, each slide having a spring 131a (Fig. 13) arranged to restore the same when the cam passes out of engagement therewith.

Means for rotating the shaft 133 a quarter of a revolution upon each refill operation of the elevator includes the provision of a star gear or ratchet 134 (Fig. 13 particularly) fixed on shaft 133 and connected by a link 135 to a lever 136 pivoted as at 137 and having a free end portion 138 disposed to be engaged by the cam 77 as the same passes down from normally raised position to engage the underside of the elevator. The lever 136 is urged to its normal position against a stop bracket "B" (Fig. 9) by a coil spring 136' having one end fixed to lever 136 near the portion 138 thereof and an opposite end anchored to the main frame; the link 135 being constantly urged toward the ratchet 134 by spring means 134'.

Thus, the match pack ejectors 131 will each in succession be reciprocated once for every revolution of shaft 133, one of the ejectors being operated for every complete cycle of movement of the elevating cams 77—77a to effect dislodgment of a packet of matches M (Fig. 9) from one of the compartments 130 into a common match delivery chute 130a (Fig. 12 also) which is inclined to discharge onto the elevator plate 79.

Trap resetting

Resetting of the traps as well as the fraud-preventive chute blocking gates 52 is effected by a reset bar 140 (Figs. 2 and 6) journaled to extend across the machine behind the several traps and provided with a plurality of pins 141, each disposed to bear against the back of one of the traps when the shaft is rocked (counter-clockwise Fig. 2; clockwise Fig. 6) to pivot the traps back into set position, the several latching members 47, by the greater weight on the lever side plus the weight of the rod 46 attached thereto, automatically snapping into latching position while the latch 47a is urged by a spring 47' to cause its latching end to snap into position to latch the trap 22M.

Rocking of the resetting shaft 140 is accomplished by a lever 142 fixed thereon and connected as at 143 with a rod 144 which extends to the bottom of the machine (conveniently located by placing Fig. 7 below Fig. 6), which rod is in turn connected to one arm of a bell crank 145. A spring 146 is attached to the opposite end of the bell crank to urge the latter and the connected resetting shaft into a normal position as shown in Fig. 6. This latter arm of the bell crank is connected by a rod 147 to a lever 148 rigid on a common resetting bail shaft 149, the latter carrying a resetting bail 150 disposed in a normal rearward position as shown in Figs. 2 and 6 and extending across the machine before the several clutch hooks on the individual ejectors in such manner as to be engaged and rocked by any clutch hook in operative position in the manner illustrated in solid and dotted lines in Fig. 11, the arrangement being such that as the ejectors move forward in ejecting operation, the resetting bail is rocked thereby into the full line position shown in Fig. 11, which in turn rocks the lever 148, the bell crank 145, and, in consequence, the resetting shaft 140, causing pins 141 to push any released trap back into latched position and at the same time cause the Bowden wire 125 attached to such trap to be pulled upwardly against the action of the spring 126 associated therewith.

At the same time the fraud-preventive chute block plate 52 is rocked by shaft 53 from full line to dotted line position as shown in Fig. 2, this being accomplished through a connecting link 56a connected at one end to the lever arm 142 on the trap resetting shaft, and at its opposite end to the lever arm 56 on shaft 53.

Summary of operation

Referring to Fig. 6, it will be assumed that one five-cent piece and one ten-cent piece are de-

posited respectively in chutes 24a and 25a. The five-cent piece will engage and actuate switch 32 once, causing magnet 34 to be energized once; the ten-cent coin will engage and operate both switches 31 and 32, causing magnet 34 to be energized twice, making a total of three operations of this magnet, armature 39 of which will therefore step the ratchet 38 three times, thus shifting the selector rod 35 three steps toward the right. Switch arm 26d will be stepped to the third contact 26e (Fig. 3 also) to light lamp 26c, designating deposit of coins in the amount of fifteen cents.

Since the only latch releasing lever 43 shown in Fig. 6 is a "ten-cent" lever, attention is directed to the lever 43b in Fig. 3 which requires the deposit of fifteen cents if it is to be rendered operative. The shifting of rod 35 three steps brings the cam arm 43b into alignment opposite the end 23a of the corresponding releasing plunger or button 23, which the patron now depresses, causing the entire latch releasing lever assembly 42b—43b to rock in a counter-clockwise direction (Fig. 6). Since the trap which corresponds to the releasing lever 42b of Fig. 3 is not seen in Fig. 6, it will now be assumed that the trap 22 is being operated as a result of the rocking of the latch releasing lever and shift bar 35, as just explained in view of Fig. 3, such operation resulting in the elevating of the rod 46 and rocking the latch lever 47 out of engagement with the wing 22b so that trap 22 may fall back both by action of gravity and as a result of the pull of Bowden wire 125 thereon.

As the selector shaft 35 is thus rocked, the main motor switch 72 is closed through the linkage 65—67—68—69, starting motor 74. Rocking of the selector shaft 35 also trips the match pack latch 47a through the linkage 47c—58, and movement of the match pack trap 22M into released position closes switch 50, which energizes the ratchet releasing or resetting magnet 41, thereby permitting the selector shaft 35 and ratchet 38 to restore to normal position. Release of traps 22 and 22M effects the discharge of a fifteen-cent package of cigarettes and a packet of matches into the common discharge chute 57. Release of the match pack latching lever 47a also withdraws the offset end portion 47b thereof from restraining engagement with the finger 51, thereby permitting the fraud-preventive gate shaft 53 to be rocked by action of springs 54 and 54a so that the blocking gate 52 moves from normal dotted line position shown in Fig. 2, into closed or blocking full line position.

Meanwhile, the operation of motor 74 rotating the main counter or driving shaft 75, drives sprocket chains 76—76a, causing the elevator operating cams 77—77a to descend from normally raised position. The initial downward movement of the right-hand cam 77 (Figs. 14 and 16) trips the coin blocking cam 105 to cause coin blocking element 102 to block coin entrances 24 and 25.

As cam 77 continues downward, it transiently engages the lever portion 138, rocking the match pack ejector shaft 133 a quarter of a turn through the star gear means 134—135, causing the package of matches M to be delivered onto the normally lowered elevator plate 79 (Fig. 9).

In the interval of descent of the elevator cams, the ejector operating clutch bail 121 is being rocked forward through the linkage 123—124 (Fig. 9) with the main countershaft and the previous tripping of the trap 22 has freed the corresponding Bowden wire 125 for movement with its clutchhook operating finger 126 (Fig. 7) by spring 128 to rock the corresponding clutch hook 120 into position to be caught by bail 121 in the manner illustrated in dotted lines at the bottom of Fig. 2. The forward movement of the clutch bail thus carries with it the corresponding ejector block 119 which effects dislodgment of the package of cigarettes numbered "1" at the bottom of Fig. 2 onto the waiting elevator 79.

By the time the package has been ejected onto the elevator from the storage compartment as aforesaid, cams 77—77a will have moved around against the underside of the elevator plate and started the latter on its upward movement to be tripped or rocked by the stops 96 (upper part of Figs. 2 and 14) and the action of the cams in turning from under the plate at the top of their flight thus releasing the package of cigarettes and the package of matches for movement into appropriate traps which by this time have been reset.

Resetting of the traps will have been effected by the time the elevator reaches the tripping position as a result of engagement of the operated clutch hook (Fig. 11) with the resetting bail 150 which, through the linkage (Fig. 7) 144—145—147—148 will depress the lever 142 (Fig. 6), causing pins 141 to be rocked against any released traps for restoration to latched position, and also, through linkage 56—56a connected with lever 142, causing the gate shaft 53 to rock the fraud-preventive gate 52 into open position.

As the cams 77—77a pass over the top of their flight, cam 77 again trips the coin blocking lever 105 and associated mechanism to withdraw the coin blocking lever 102, while cam 77a trips the switch resetting lever means 68—69—70, again opening the main switch 72 and stopping the driving motor. The machine is now in condition for the next operation.

The various advantages and objects of the invention may be accomplished by modifications of the particular embodiment specifically described herein, and it is intended that the appended claims shall include all equivalent arrangements fairly coming within their call.

Having thus described our invention, what we claim as new and desire to protect by Letters Patent is:

1. In a vending machine, in combination, a plurality of article display traps, selectively operable means for releasing a certain preselected one of said traps at the option of the vendee to empty said trap, and refill means comprising article storing means for each of said display traps, and an ejector at the lower end of each of the storing means at a point below said display traps, and elevator means, said ejector and elevator coacting and being operably controlled by said selectively operable means for automatically ejecting an article from the lower end of the storing means corresponding to the trap released on to said elevating means, mechanism operable by said ejector when the latter is moved into ejecting condition aforesaid for restoring released traps to article retaining condition, and means effecting a tilting action of said elevator means when the latter reaches its higher level whereby to discharge said articles disposed on the elevator into said trap emptied by operation of said selectively operable releasing means.

2. In a vending machine, in combination, a plurality of merchandise display traps and means releasably latching each of the same in mer-

chandise supporting position, means for selectively, releasing any trap to effect discharge therefrom of the merchandise supported thereby, and means for restoring merchandise to a released trap, said means comprising a storage compartment arranged behind each trap, each compartment having a lower discharge end at a level below said traps, an elevator common to all traps and storage compartments and arranged for movement from a normally lowered position opposite the discharge ends of the several compartments to a raised position above the several traps, ejecting means for effecting transfer of articles from the several storage compartments onto said elevator in normal position, means for moving said elevator into raised position above said traps, means for automatically tripping said elevator in raised position to effect discharge of merchandise carried thereby into emptied traps, driving mechanism for actuating said elevator moving means and said ejecting means in timed relationship to effect ejection of an article from a storage compartment onto the elevator in normally lowered position and return said elevator from raised to lowered position, and control means for said driving means actuated cooperably with said selectively operable trap releasing means.

3. In a vending machine, a plurality of article supporting traps and means for releasably latching each trap in article supporting position, an operating plunger associated with each trap and selector means common to all plungers and comprising a member shiftable from a normal position and carrying a plurality of operating members each associated with one of said releasable latching means and each normally disposed out of operative engagement with a corresponding plunger when said shiftable member is in normal position, said shiftable member being movable various amounts away from normal position to dispose certain operating members in operative relationship with their respective plungers, and means for selectively shifting said shiftable member.

4. In a vending machine, in combination, a plurality of traps arranged to support articles on display, and latch means associated with each trap and releasably maintaining the same in article supporting position, an operating plunger associated with each trap, means for selectively linking said operating plunger with the corresponding latch means to release a desired one of said traps, a storage compartment arranged behind each trap, merchandise being ejectable from each compartment at a level below that of the traps, ejecting means associated with each compartment, means common to all traps and compartments for elevating discharged articles from the compartments into position for gravitation into corresponding traps, means for automatically tripping said elevating means in elevated position to effect gravitation of merchandise therefrom for the purpose aforesaid, driving mechanism adapted to drive said elevating means for moving the latter into a raised position, said driving means being controlled by said selective linking means for actuation automatically following operation of the latter means in releasing a trap, connecting means operable to selectively connect any ejecting means with said driving mechanism, said connecting means being operatively controlled by the several traps to effect driving connection between the connecting means and the ejecting means of the storage compartment corresponding to any released trap, said driving mechanism being arranged to effect movement of said elevating means subsequent to the operation of any ejecting means, and means for automatically stopping said driving mechanism following each transferring operation of said elevating means.

5. In a vending machine including a plurality of merchandise supporting traps and releasable latch means associated with each trap to trip the latter for discharge of merchandise, latch releasing means comprising an operating plunger for each trap, a selector bar shiftable transversely of the several plungers, means yieldably shifting said bar to a normal position, a latch operating lever for each latch means and mounted on said bar adjacent the inner ends of each plunger, each latch operating lever having a portion for operative engagement with the corresponding plunger, the engaging portions of the several levers being normally out of operative relationship with their respective plungers when said bar is in normal position, said bar being shiftable different amounts from normal position to dispose various operating levers in operative relationship with respect to their plungers, mechanism for selectively shifting and holding said bar from normal position, and means operatively controlled by one of said traps for effecting release of said bar for restoration to normal position.

6. In a dispensing machine including a plurality of merchandise supporting traps and releasable latch means for selectively releasing any of said traps to effect discharge of merchandise therefrom, the combination with said traps of refill means including a storage compartment for each trap, merchandise transfer means common to said traps and compartments and movable from a normal position of alignment into a position to discharge merchandise onto a trap, an ejector associated with each compartment and operable to eject merchandise therefrom onto said transferring means when the latter is in normally aligned position, driving mechanism for driving said transferring means and ejectors, connecting means associated with each ejector and operable to connect a particular one of the latter with said driving mechanism, each connecting means being operatively associated with one of said traps and actuated by the latter in released condition to effect operation of the ejector of the storage compartment corresponding to the released trap, and means actuated by said driving mechanism for effecting transferring movement of said transfer means following operation of any ejector and for restoring said transfer means to said normal position.

7. In a dispensing machine, the combination with a plurality of releasable horizontally aligned merchandise dispensing traps, of refill mechanism comprising a vertical storage compartment aligned behind each trap and adapted to have merchandise ejected therefrom at a level below the traps, an ejector associated with each storage compartment, driving mechanism common to all ejectors, connecting means associated with each ejector and operable to connect the same with said driving means, mechanism operatively connecting each trap with the connecting means for the ejector of a corresponding storage compartment, and means operable in timed relation to the actuation of said ejectors for transferring ejected merchandise to the corresponding trap.

8. In a vending machine, the combination with a plurality of merchandise dispensing traps aligned horizontally in side by side relationship and means for selectively tripping said traps, of refill means comprising an upright storage compartment for each trap, means for ejecting merchandise from the bottom of each compartment, an elevator in the form of a horizontally extending member common to all traps and compartments and arranged to move from a normally lowered position opposite the bottoms of the several compartments into raised position above the several traps, said ejecting means each being operatively connected to a corresponding one of said traps operable to eject merchandise from a compartment to rest on said elevator member in a position of alignment with the corresponding trap, means for automatically tilting said elevator member at the top of its flight to discharge therefrom merchandise for movement onto the corresponding trap, and means operatively associated with said tripping means for driving said elevator member and any of said ejectors in timed relationship to effect ejection of merchandise onto the elevator and movement of the latter into raised and tripped position following tripping of any trap.

9. In a dispensing machine, in combination, a plurality of merchandise dispensing traps aligned in horizontal side by side relationship, an elevator mounted to extend behind the several traps for movement from a level below the traps to a level above the same, means for storing a supply of merchandise behind each trap in alignment therewith, said stored supply means having a lower level below the level of said traps and substantially opposite the lower level of movement of said elevator, ejecting mechanism operable to effect ejection selectively of merchandise from the supply corresponding to any trap onto said elevator in a position on the latter opposite the corresponding trap, and mechanism operated automatically following release of any trap for actuating said ejecting mechanism to effect ejection of merchandise from the corresponding storage supply means and thereafter to move said elevator to raised position, means cooperable with said ejecting mechanism upon ejecting operation thereof for restoring released traps to merchandise supporting position, means for tilting said elevator when the same reaches raised position to effect gravitating movement therefrom of said merchandise onto the restored trap, and means for restoring said elevator from raised position to normally lowered position to receive merchandise ejected from the storage supply means as aforesaid.

10. In a dispensing machine, merchandise elevating means in the form of an elongated member, means mounting said member for vertical movement and tilting movement about its long axis, means yieldably disposing said member in an approximately horizontal plane to support merchandise, and means for effecting raising and lowering movement of the elevator member and comprising cyclically traveling drive chains at opposite ends thereof and cam means mounted on each chain, means for driving said chains in a direction to move said cams beneath said elevator member to move the same from lowered to raised position, stop means opposite the raised position of said elevator member and against which the latter is moved and tilted by said cam means to effect discharge of merchandise therefrom, said cam means thereafter disengaging said elevator member and permitting the latter to gravitate to lowered position.

11. In a dispensing machine including merchandise dispensing means in horizontal alignment and correspondingly aligned vertical storage compartments arranged to have merchandise ejected therefrom at a level below that of said dispensing means, elevating means comprising: an elevator plate and guide means mounting the same for vertical movement from a normally lowered position at the level of ejection of merchandise from said compartments to receive said merchandise and elevate the same to a level above said dispensing means, mechanism for moving the elevator plate as aforesaid, means for moving said plate in raised position to discharge merchandise carried thereby into said dispensing means and counterweight means for said elevator plate of slightly lesser weight than the latter for assisting said mechanism for moving the plate and for retarding the descent of said elevator plate to its normally lowered position.

12. In a dispensing machine, article storage means including at least two storage compartments arranged one behind another and adapted to contain packaged articles in a stack, ejecting means movable in a direction across the bottoms of the compartments to effect dislodgment and ejection of the bottommost articles herein, and means for effecting ejection of articles from said compartments successively as the same are emptied, said means comprising a stack supporting trap in a forward one of said compartments, releasable latch means normally supporting said trap with the merchandise stack in said forward compartment raised at a predetermined level above the bottom thereof and said ejector means being operable to move articles from the rearward compartment beneath the raised stack in the forward compartment and out of the latter, and means following the downward movement of articles in said rearward compartment for tripping said latch means when the last article has been ejected from said rearward compartment to lower said raised stack in the forward compartment so that the bottommost articles therein will be in position for dislodgment and ejection by operation of ejecting means as aforesaid.

13. In a dispensing apparatus, the combination of front and rear compartments each adapted to contain a stack of articles, means releasably sustaining the stack in the front compartment at a level above the bottom of the stack in the rear compartment, means for ejecting the bottommost articles from the rear compartment to a position beneath the raised stack, a succeeding article ejected from the rear compartment ejecting a precedingly ejected article from its position beneath the raised stack and out of the front compartment, means following the downward movement of the topmost article of the rear stack for automatically releasing said sustaining means to lower the front stack when the last article has been ejected from the rear stack, and means automatically coupling said ejector and following means for joint operation to eject articles from the stack in the front compartment when said stack is lowered as aforesaid.

14. In a vending machine, in combination, a plurality of upright merchandise storage compartments, a merchandise displaying trap mounted before each compartment near the upper regions thereof and releasable from a normal displaying position to discharge merchandise therefrom, ejecting means for each compartment and

arranged for actuation to eject merchandise from the bottom regions thereof, means for transferring ejected merchandise to the corresponding displaying trap, and driving mechanism common to said transferring means and said ejecting means and including connecting mechanism for selectively connecting any of said ejecting means with said driving mechanism, said connecting mechanism including a common ejector actuating member operated by said driving mechanism, a hook element associated with each ejector and arranged to be moved from a normally ineffective position into an effective position for operative engagement with said ejector actuating member, an operating member operatively associated with each hook element and each of said display traps, means operatively associated with each of said operating members yieldably urging said operating members to move the corresponding hook elements into effective position, means operatively connecting each of said operating members with the corresponding display trap and actuated by the latter in normal merchandise displaying position to maintain the corresponding operating member in ineffective position, the corresponding hook element being moved into effective position by movement of the corresponding trap into released position, and means for selectively releasing said traps and starting said driving mechanism to effect a cycle of operation of said transferring and ejecting means to restore merchandise to the released trap from the corresponding storage compartment.

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