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E. G. WEILER

2,016,127

VENDING APPARATUS

Filed March 29, 1930

4 Sheets-Sheet 1

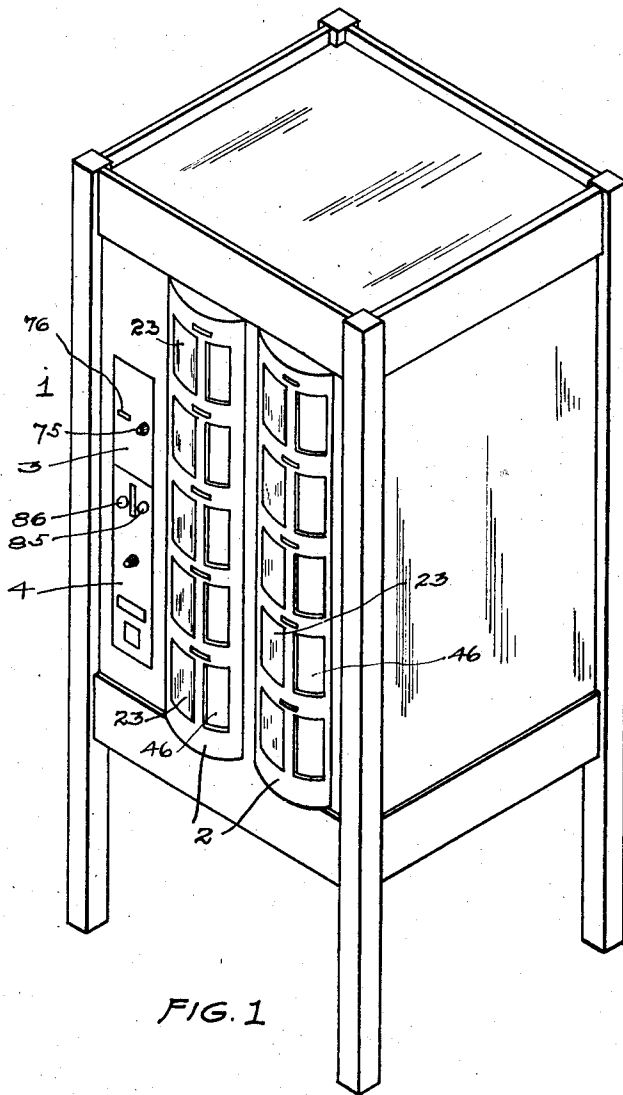


FIG. 1

INVENTOR.  
*Edward G. Weiler,*  
BY  
*Jay, Oberlin & Jay,*  
ATTORNEYS.

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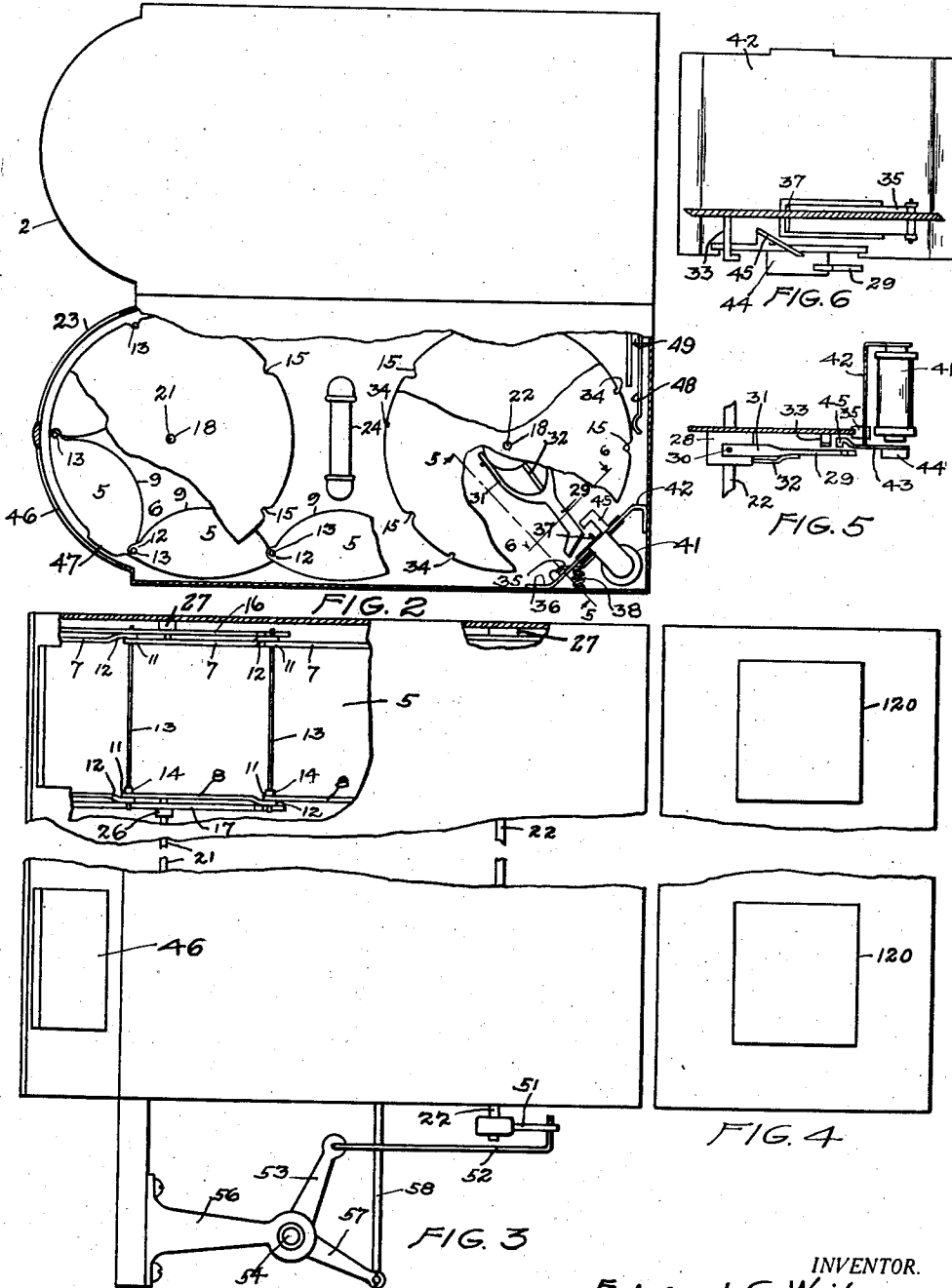
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4 Sheets-Sheet 2



INVENTOR.  
Edward G. Weiler

BY

Fay, Oberlin & Fay  
ATTORNEYS.

Oct. 1, 1935.

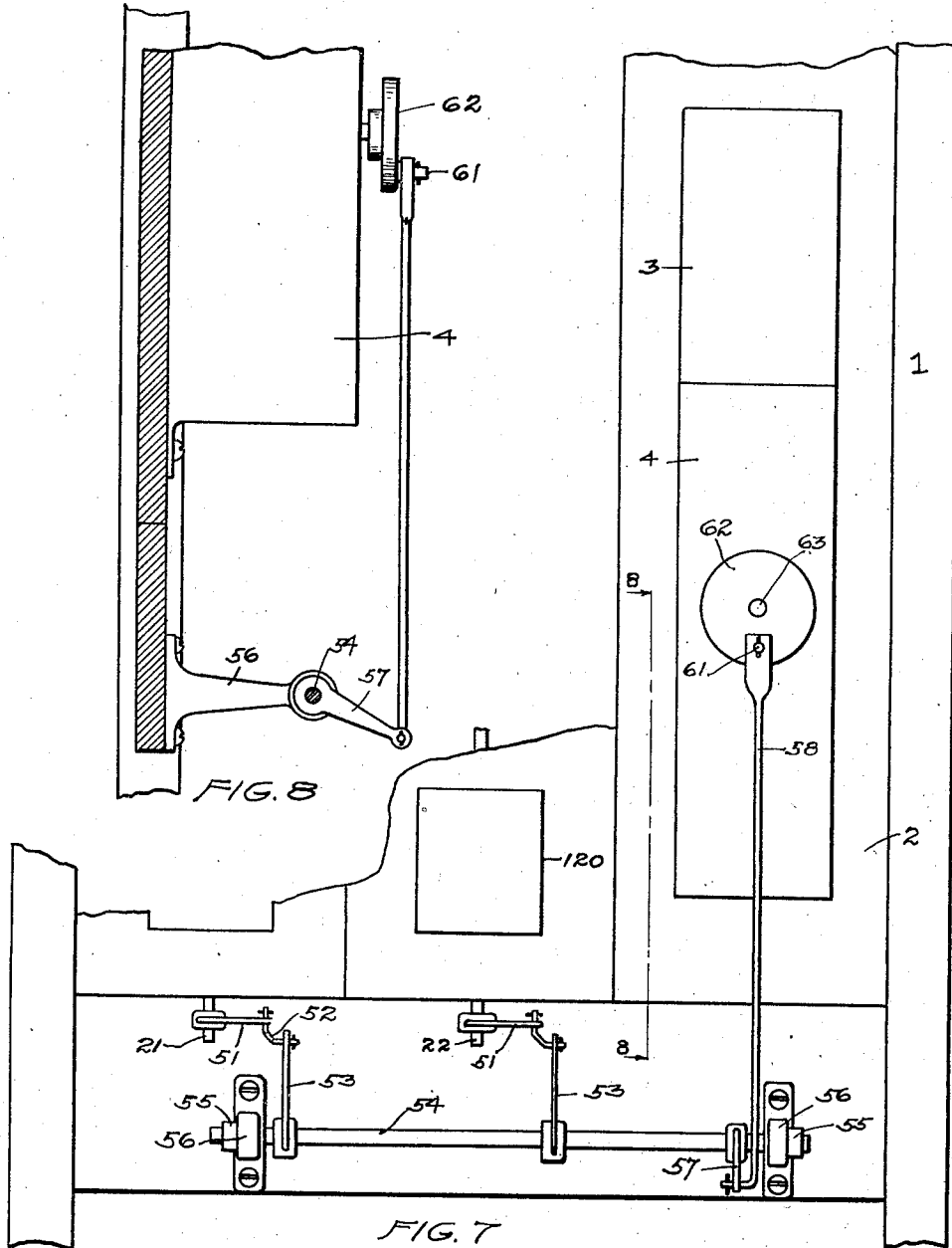
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INVENTOR.  
*Edward G. Weiler,*  
BY  
*Fay, Oberlin & Fay,*  
ATTORNEYS.

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4 Sheets-Sheet 4

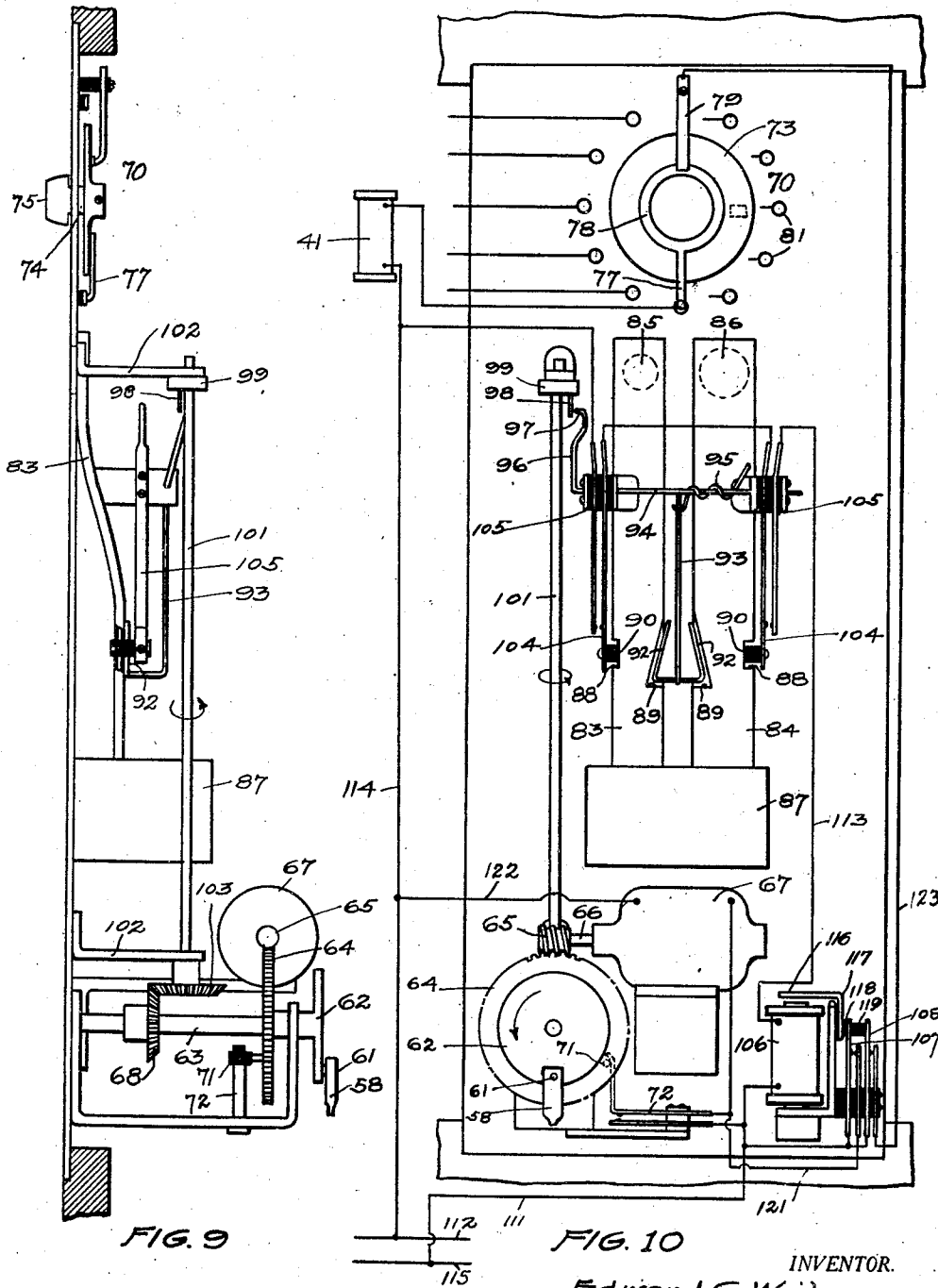


FIG. 9

FIG. 10

INVENTOR.

Edward G. Weiler.

BY

Fay, Oberlin & Fay  
ATTORNEYS.

# UNITED STATES PATENT OFFICE

2,016,127

## VENDING APPARATUS

Edward G. Weiler, Columbus, Ohio

Application March 29, 1930, Serial No. 439,935

6 Claims. (Cl. 312—35)

This invention, as indicated, relates to a vending apparatus. More particularly it comprises an improved type of storage, display and delivery apparatus for vending various articles of merchandise of respectively different sizes and shapes and is adapted for operation by a coin-controlled unit, and by an article selector unit which may be of the type herein shown, or of other type of construction, such, for example, as is set forth in my co-pending patent application, Serial No. 329,514, filed December 31, 1928, which matured into U. S. Patent No. 2,008,735, on July 23, 1935.

The principal object of the present invention is to provide standardized units adapted to be assembled in cooperative relation with as little duplication of operative elements, as possible, as an apparatus for vending articles, which units may be combined selectively to accommodate articles of various size and shape, and also be adapted to handle fragile merchandise.

The units may be so constructed that they may be assembled in groups containing storage and delivery compartments for selected sizes and shapes of articles and arranged for operation by means of one or more coin controlled units, and article selector units. Some of the operating elements are common to the entire apparatus, other elements are designed to serve one vertical group of units, and other elements are restricted to the individual units.

The apparatus is also adaptable to vending articles requiring refrigeration through the provision of cooling coils suitably placed adjacent to the storage and delivery compartments.

The apparatus thus may be sectional in form and may be built up of selected units to accommodate any desired line or lines of merchandise with a minimum of expense for control apparatus and service requirements and permitting at all times easy replacement, substitution or repair.

The annexed drawings and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings:—

Fig. 1 is a perspective view of one form of the apparatus and its enclosing cabinet; Fig. 2 is a top plan view, partly in section, showing two groups of storage and delivery units; Fig. 3 is a side elevation, partly in section, of the device shown in Fig. 2; Fig. 4 is a rear elevation of the device shown in Fig. 3; Fig. 5 is a sectional view of the delivery magnet mechanism taken along

the line 5—5 shown in Fig. 2, looking in the direction of the arrows; Fig. 6 is an enlarged sectional view of the delivery magnet mechanism taken along the line 6—6 shown in Fig. 2, looking in the direction of the arrows; Fig. 7 is a rear view showing a portion of the machine with one of the rear panels removed; Fig. 8 is a sectional view taken along the line 8—8 shown in Fig. 7; Fig. 9 is a vertical sectional view of the selector and coin control units; and Fig. 10 is a rear elevation of the apparatus shown in Fig. 9, together with the electric circuits to the operative elements.

The coin control and selector units and the electrical connections of the same, as stated, may be of the type shown in my co-pending application Serial No. 329,514, (now U. S. Patent No. 2,008,735) but it is to be understood that still other forms of coin-controlled mechanism may be used instead, and that where very heavy or bulky articles are to be vended, auxiliary relays may be used in the circuit to control the motor and the delivery magnet.

As is clearly shown in Fig. 1 of the drawings, the apparatus comprises a cabinet 1 having groups of storage and delivery units 2 arranged vertically in one or more rows and having a selector unit 3 and a coin-control unit 4, adjacent one side for controlling the operation of the mechanism. The details of the selector unit and coin-control unit will be presently described after the article storage and delivery mechanism are first set forth.

Each vertical group of storage and delivery units may have the individual members thereof formed of identically shaped operating parts, although the sizes thereof may be varied to accommodate different sizes of articles.

In the present invention the apparatus includes dispensing units, each having a number of article storage and delivery compartments 5 associated in the form of an endless conveyor or chain 6. These compartments are preferably formed of sheet metal, or the like, with elliptical top and bottom members 7, 8, and a curved back wall 9. The compartments are open at the outer sides and the elliptical top and bottom members are formed with projecting end portions 11, 12. Connecting pins 13 are provided to be engaged through suitable apertures formed through the projecting end portions of such sheet metal compartments. The pins are formed adjacent their lower ends with collars 14 which seat upon the respective bottom compartment walls, and position the pin so as to project above and below the overlapping portions of the sheet metal sections

in order that they may engage notches 15 in the supporting wheels or spools of the conveyor system. These wheels are preferably circular metal discs 16, 17, united in spaced relation by a cylindrical hub member 18 freely supported upon front and rearward shafts 21, 22, respectively extending vertically through the apparatus so that the wheels of the several superposed compartments are all pivotally mounted on a single supporting member.

The articles to be vended are placed within the compartments of the conveyor and are advanced step-by-step about the supporting wheels so that a purchaser may, through the coin and selector mechanism, cause any article appearing behind a display window 23 at the front of the cabinet to be delivered to him by suitably operating the control mechanism and depositing the necessary coins.

Each compartment may have a refrigerating coil 24 running through the same so that the articles to be dispensed may comprise other than the usual staples and package goods, and may include bottled beverages or packages of ice cream or any other articles which it is desired to supply in cooled or frozen condition. The margins of the discs of the respective wheels are provided with notches 15 within which the ends of the pins interlocking the compartments engage and provide the means for supporting and moving the entire chain of compartments with their contents.

The forward vertical shaft 21 upon which the forward conveyor wheels are mounted is an idling shaft or pivot rod and supports the wheels by means of suitable collars 26 secured in spaced relation on said shaft and engaging the lower side of each bottom disc, respectively, adjacent its hub member. Bearings or supports 27 for said shaft are provided in the top and bottom walls of the cabinet. The rearward shaft 22 is the operating shaft and is adapted to be connected selectively with any one of the chains of compartments in its vertical series. It is adapted to be oscillated by means of a mechanism presently to be described. The rearward shaft extends freely through the supporting wheels, and also carries collars 28 secured in spaced relation on said shaft engaged therewith beneath said respective wheels. Each collar 28 has secured thereto an operating arm 29 which is substantially of Y-shape, with arms 31 thereof engaging on either side of the collar 28 and being pivoted thereto by means of pivot pins 30. A supporting arm 32 fixed to the collar beneath said operating arm serves to maintain the same in a substantially horizontal position and in a plane slightly below the lugs 33 formed on the under side of each lower disc of the rearward compartment supporting wheel at spaced points adequate to shift such wheels and move the conveyor system the distance of one compartment length. The margins of the lower rearward discs are provided at suitable intervals with notches 34 which are shown as being intermediate the notches which receive the pins of the compartment chain. A locking arm 35 is pivotally mounted on a support 36 at the side of the wheel and having an angular lug 37 at its forward end is adapted to engage successively into the notches 34 of the disc as it is moved in the course of the operation of the apparatus. A spring 38 serves to hold the locking arm in engaging position until the releasing mechanism is suitably operated.

The releasing and compartment chain actuating device will now be described. It comprises an electro-magnet 41 suitably supported by a frame member 42 attached to the walls of the cabinet. Beneath the electro-magnet an armature 43 is provided, said armature having a weight 44 to prevent chattering when alternating current is used, and also to automatically restore the armature to normal position, and said armature carrying at its forward end a downwardly inclined guide member 45. This guide member is adapted to be rocked downwardly when the opposite end of the armature is attracted upwardly. The sloping upper surface of the guide member 45 of the armature is thus lowered into the path of the delivery arm which, when carried through its outward range of motion by the oscillation of the shaft 22, rides over the inclined top face of said guide member and is raised through contact with its sloping surface so that it engages against the locking lug 37 and disengages it from the notch 34 in the disc. As the arm moves further it comes into contact with one of the lugs 33 on the under side of the bottom disc and moves said disc the distance of one compartment.

Thus the compartment originally in back of the display window will be moved to a position back of the opening 46 through which the article may be obtained by the customer. In the meantime the electric contact will be broken, as will be hereinafter more particularly described, and the armature will rise and the operating arm will be dropped to a horizontal position. The locking arm then enters the next adjacent notch on the lower rear disc when it is brought into registry, thus locking the chain of compartments and placing the article in the succeeding compartment back of the display window.

The chain of compartments carries on one of the compartments a projecting lug 47 which is adapted to contact with a spring 48 carrying a contact 49 forming part of the control circuit, so that when the last article in the chain of compartments has been dispensed, the circuit will be broken, and the further deposit of coins will result in the operation of a refunding mechanism, which mechanism may be of the type set forth in my co-pending application (now U. S. Patent No. 2,008,735).

The operative mechanism as associated with the selector and coin control apparatus is best shown in Figs. 7, 8, 9 and 10 of the drawings. As heretofore stated, the rearward shafts 22 extend respectively through the rearward supporting wheels of each vertical row of conveyor chains of each vertical series. At their lower ends they are provided with operating arms 51 connected by links 52 with delivery arms 53 on the universal operating shaft 54 extending horizontally across the rear portion of the cabinet and journaled in bearings 55 formed in supporting arms 56 secured to the frame work of the cabinet. The operating shaft carries an operating arm 57 adjacent one end which is engaged by the lower end of the release rod 58. The release rod at its upper end, is mounted on a pivot pin 61 on the drive disc 62, which is carried on the worm wheel shaft 63. The worm wheel 64 of said shaft is adapted to be driven by a worm 65 on the shaft 66 of an electric motor 67. A beveled gear 68 is also mounted on the worm wheel shaft and through mechanism hereinafter to be described operates the coin-releasing mechanism.

The worm wheel carries a control pin 71 for a maintaining switch 72 of the electric circuit which will be hereinafter described in connection with the circuit connections.

As is shown more particularly in Figs. 9 and 10, the apparatus is provided with a selector mechanism 70 comprising a disc 73 mounted on the shaft 74, of the selector knob 75 which projects from the front of the cabinet. Adjacent the knob an indicating window 76 is provided through which the designation by number or otherwise of the various article compartments may be seen as the disc is turned. The disc carries a contact finger 77 to which one end of the selector circuit is connected by means of a contact ring 78 and a brush 79 connected with the conductor element of the circuit. The contact finger is adapted to be moved over a plurality of stationary contacts 81, each connected with one of the electromagnets 41 positioned respectively adjacent the rearward wheels of the respective conveyor chains.

Beneath the selector mechanism 3 the coin control mechanism 4 is positioned. This mechanism comprises coin chutes 83, 84, shown as two in number and for two different coin sizes. However, it is not intended to limit the mechanism to any specified number or sizes of coins and a mechanism may be used for this apparatus corresponding to that set forth in my co-pending application (now U. S. Patent No. 2,008,735) heretofore referred to, wherein one or more coins forming different price combinations may be employed and also refunded in the event of a mistake by the applicant or the exhaustion of any indicated line of merchandise.

The coin chutes are provided with suitable coin slots 85, 86, or openings on the front panel of the apparatus and terminate in a coin box 87 within the apparatus. At an intermediate point each coin channel is cut away on opposite side edges to provide an opening 88 on each outer edge for an insulated switch-actuating lug 90 and an opening 89 on the adjacent inner edges for the plates of the coin arrester and release mechanism, which comprises inclined plate members 92 supported on an arm 93 attached to a rocking bar 94 and normally held by a spring 95 in a position to force the arrester plates inwardly against the front walls of the coin chutes. The rocking bar carries an extension arm 96 at one end having a projection 97 in a position to be acted on by a pin 98 carried on the under side of a rotating disc 99 mounted on a shaft 101 suitably supported on brackets 102 adjacent said extension arm and having a beveled gear 103 at its lower end engaged with beveled gear 68 on the worm wheel shaft 63 heretofore described.

As stated, the switch-actuating lug normally projects into the coin channel, said lugs being carried on movable switch arms 104 of a pair of switches 105 connected in series with a relay 106 shown at the bottom of Fig. 10, and when said switches are closed, the relay will be energized to close two switches 107, 108, one in the circuit of the electric motor 67 and another in the circuit of the selector contacts 79, 81 to the selector electromagnets 41 adjacent the respective conveyor chains carrying the articles which it is desired to have delivered from the apparatus.

The operation of the apparatus has already been indicated in part, but will now be outlined in consecutive order. The operator of the apparatus examines the articles on display through the display windows 23 at the front of the cabinet, noting the number of the window of the article

he desires to purchase and then turns the selector knob 75 until the desired number appears at the indicator window 76. He then deposits a coin of the indicated denomination in each of the slots 85, 86, of the coin chute. The coins move down the coin chutes until they engage the inclined plates 92 of the coin arrester and release mechanism which causes them to engage respectively the insulated lugs 90 of the series switches 105 and hold such switches closed until the coins are released as will be hereinafter explained. In this manner a circuit will be closed through the conductor 111 attached to one branch 115 of the main line from the power source, through the windings of the relay 106 the conductor 113 and series switches 105 and through the return line 114 to the other branch 112 of the main line.

The relay 106 when thus energized will attract the armature 116 and the depending arm 117 thereof will coast with the insulated lugs 118, 119 to move the flexible switch arms of the switches 107, 108, respectively into contact with their companion switch elements.

The closing of the switch 107 will energize the motor 67 through the conductor 121 and the return line 122. The starting of the motor will move the control pin 71 away from the flexible arm of the maintaining switch 72 and will permit the latter to close. The current through the motor will then be maintained through said switch until the motor has moved the driving disc 62 through one complete revolution and reopened the maintaining switch by again bringing the control pin 71 against the switch arm.

The driving disc through the release rod 58 and the associated shafts and links of the article delivery mechanism heretofore described moves all of the operating arms 29 through one complete oscillation. All of the arms move idly adjacent the respective compartment chains excepting the arm adjacent the compartment carrying the selected article, and this arm is moved to an elevated operative position as has been heretofore explained and serves to move the selected compartment chain, one compartment length.

The closing of the switch 108 by the relay 106 closes the circuit through the conductor 123, brush 79, ring 78, contact finger 77, and through the selected contact terminal 81 through the winding of one of the electro-magnets 41 and return line 114. The selected electro-magnet 41 attracts its armature 43 which brings the sloping guide member 45 into the path of oscillation of the adjacent operating arm 29 and moves the compartment chain thus selected in the manner heretofore described.

Before the electro-magnet circuit is broken, the inclined guide member 45 under the selected magnet 41 will have been lowered and will raise the operating arm associated with the selected conveyor chain into contact with the locking arm 35 of such chain to release the same and then will drop the operating arm onto a supporting flange of one of the depending lugs 33 on the selected conveyor chain disc. When the relay is de-energized the inclined guide member rises out of the path of return movement of the operating arm which immediately after leaving a position in contact with a supporting flange on the depending lug falls to a horizontal position and thereafter clears the succeeding depending lugs on the conveyor chain disc and will not again contact therewith unless the particular electro-

magnet of such conveyor chain is energized in due course of operation of the apparatus.

At each action of the device the selected conveyor chain will move one compartment length and when the chain has completed its circuit and all the compartments are empty, the lug 47 on one of the compartment discs will contact with the switch arm 48 mounted at the side of the frame work in the path of such lug and will open the circuit to prevent operation of that conveyor chain by means of mechanism corresponding in detail to that set forth in my co-pending application (now U. S. Patent No. 2,008,735) heretofore mentioned.

The series switches 105 will be maintained in contact until the coins are released into the coin box 97. The release of the coins is brought about by the withdrawal rearwardly of the coin arrester and release mechanism. This is accomplished by the rotation of the shaft 101 through the bevel gears 90 and 103 and the bringing of the pin 98 on the disc 99 into contact with the projection 97 on the arm 96 of the rocking bar 94, whereby the rocking bar 94 is oscillated. The lower end of the supporting arm 93 carrying the inclined plate members 92 is moved rearwardly and the plates are thus withdrawn from the coin chutes and permit the coins to fall by gravity into the coin box.

The filling of the compartments of the conveyor chain may take place through the dispensing window 46 or through a door 120 at the rear of the apparatus. The locking lug 35 of any conveyor chain may be withdrawn and held retracted while the filling operation is taking place or suitable means may be supplied for simultaneously withdrawing all the locking lugs at one time so that the compartment chains may be freely rotated and any vacant compartments filled without separate unlocking.

As has been heretofore stated, the various features shown in my co-pending application, since issued as U. S. Patent No. 2,008,735, may be combined with the features of construction herein disclosed. Thus the selection of different coin values as well as different articles by the selector may be arranged for, and the refunding of the coins under certain conditions may also be provided for as well as many other structural features set forth in said co-pending application, since issued as U. S. Patent No. 2,008,735.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:

1. A vending apparatus comprising a cabinet, a plurality of vertical rows of horizontally disposed article dispensing conveyor chains mounted within said cabinet, an operating element for each vertical row of chains, locking means for each conveyor chain, an article selector mechanism and driving mechanism within said cabinet, a drive disc adapted to make one complete revolution when actuated, means connecting said drive disc with all of the operating elements for said chains, and means associated with said article selector and driving mechanism for releasing one of said locking means and connecting an adjacent operating element with an adjacent chain to shift said chain toward a point of delivery.

2. A vending apparatus comprising a cabinet, a plurality of vertical rows of horizontally disposed article dispensing conveyor chains mounted within said cabinet, an operating element for each vertical row of chains, locking means for each conveyor chain, an article selector mechanism and driving mechanism within said cabinet, a drive disc adapted to make one complete revolution when actuated, a motor for operating said drive disc, means connecting said drive disc with all of the operating elements for said chains, and means associated with said article selector and driving mechanism for actuating said motor, releasing said locking means, and connecting said operating element with the selected chain to shift said chain toward a point of delivery.

3. A vending apparatus comprising a cabinet, a plurality of article dispensing conveyor chains mounted within said cabinet, an operating element for each row of chains, locking means for each conveyor chain, an article selector mechanism and driving mechanism within said cabinet, a drive disc adapted to make one complete revolution when actuated, a motor for operating said drive disc, means connecting said drive disc with all of the operating elements for said chain, and means associated with said article selector and driving mechanism for energizing said motor, releasing said locking means and connecting said operating element with a selected chain to shift said chain toward a point of delivery.

4. An apparatus of the character described having in combination a cabinet, a plurality of vertical rows of horizontally positioned article dispensing conveyor chains, supporting wheels for said chains at the front and back of said cabinet, an operating shaft extending through said rearward supporting wheels, arms pivotally mounted on said shaft disposed beneath each rearward wheel of said chains, means for supporting said arms in a horizontal position, an electro-magnet adjacent each rearward wheel, an armature associated with said magnet, an operating arm carried by said armature presenting an inclined member adapted to be drawn into the path of said horizontal arms, a locking member associated with each rearward supporting wheel, a lug depending from each rearward supporting wheel, said member and lug being in a position slightly above the normal horizontal path of oscillation of said operating arm and lying in the path of outward movement of such operating arm when said arm is displaced upwardly from its horizontal position by contact with the inclined member of said armature.

5. An apparatus of the character described, having in combination a cabinet, a plurality of vertical rows of horizontally positioned article dispensing conveyor chains, supporting wheels for said chains at the front and back of said cabinet, an operating shaft extending through said rearward supporting wheels, arms pivotally mounted on said shaft disposed beneath each rearward wheel of said chains, means for supporting said arms in a horizontal position, an electro-magnet adjacent each rearward wheel, an armature associated with said magnet, an operating arm carried by said armature presenting an inclined member adapted to be drawn into the path of said horizontal arms, a locking member associated with each rearward supporting wheel, a lug depending from each rearward supporting wheel, said member and lug being in a position slightly above the normal horizontal path of oscillation of said operating arm and lying in the path of move-



ment of such operating arm when said arm is displaced upwardly from its horizontal position by contact with the inclined member of said armature, a drive disc adapted to make one complete revolution when actuated, means connecting said drive disc with each rearward vertical shaft, means for actuating said drive disc to move all of said vertical shafts through one complete oscillation and to unlock one conveyor chain and thereafter to shift said chain one step toward the point of delivery by contact with the lug on the bottom of said rearward wheel.

6. A vending apparatus comprising movable means for supporting a variety of articles for delivery, a projecting member carried by said

movable means adjacent the position of each article, locking means for said movable means, a common delivery actuating mechanism adapted to be moved adjacent to said article supporting means through a cycle of motion, a pivoted member associated with said delivery actuating mechanism, a positioning member, and an electromagnet to move said positioning member into the path of movement of said pivoted member to deflect the same into releasing contact with said locking means and into engagement with the adjacent projecting member carried by the article supporting means and effect the movement of an article to a point accessible to the operator.

EDWARD G. WEILER. 15