June 26, 1951 J. E. STEWART 2,558,394

VENDING MACHINE

Filed March 26, 1947 4 Sheets-Sheet 1

Fig. 1.

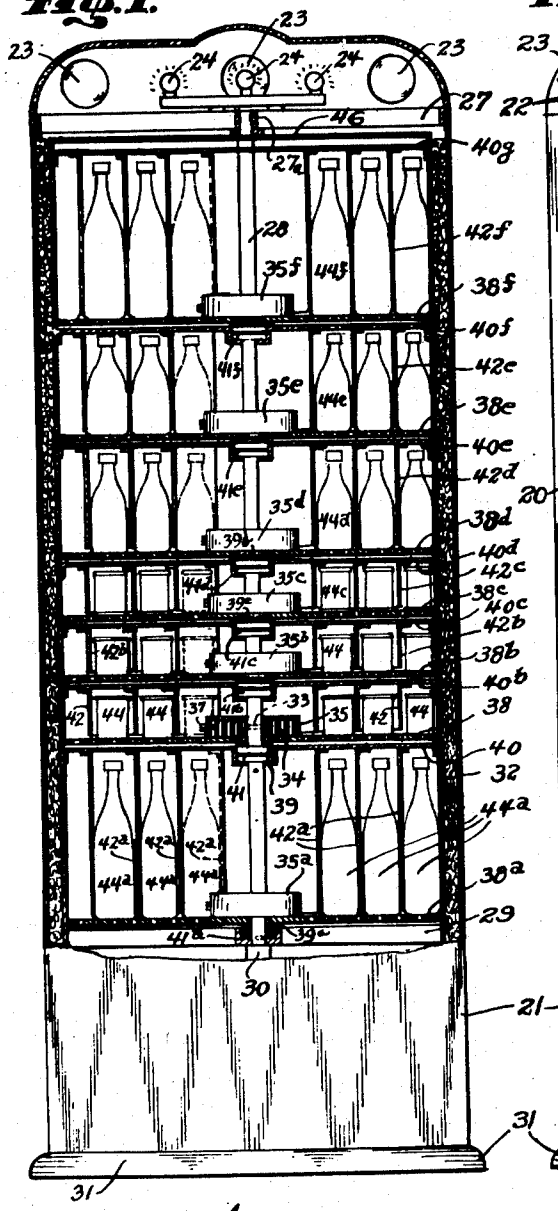


Fig. 2.

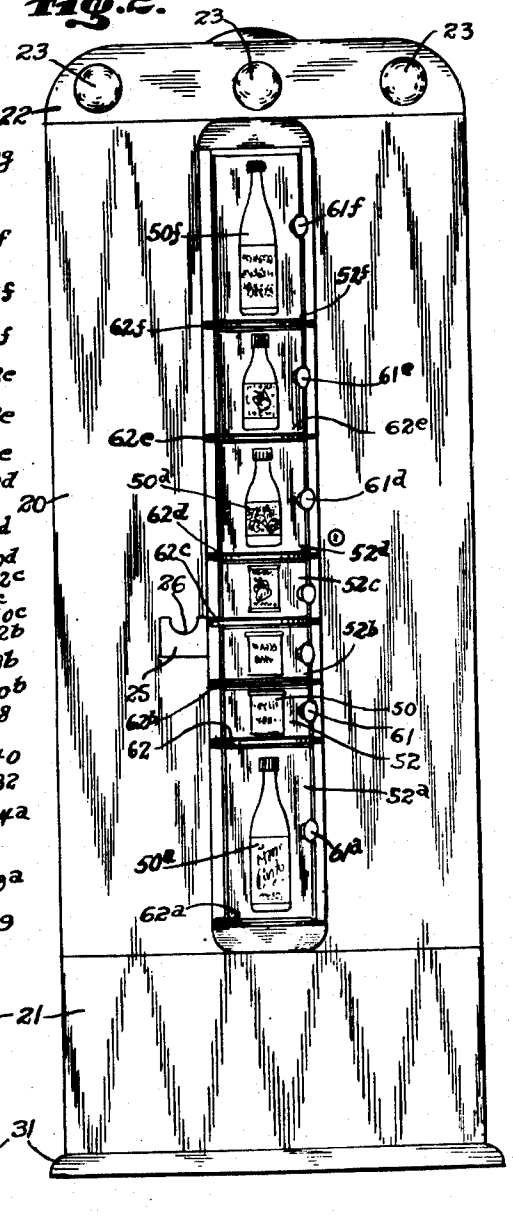
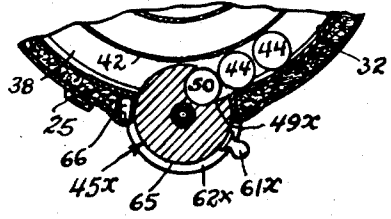


Fig. 16.



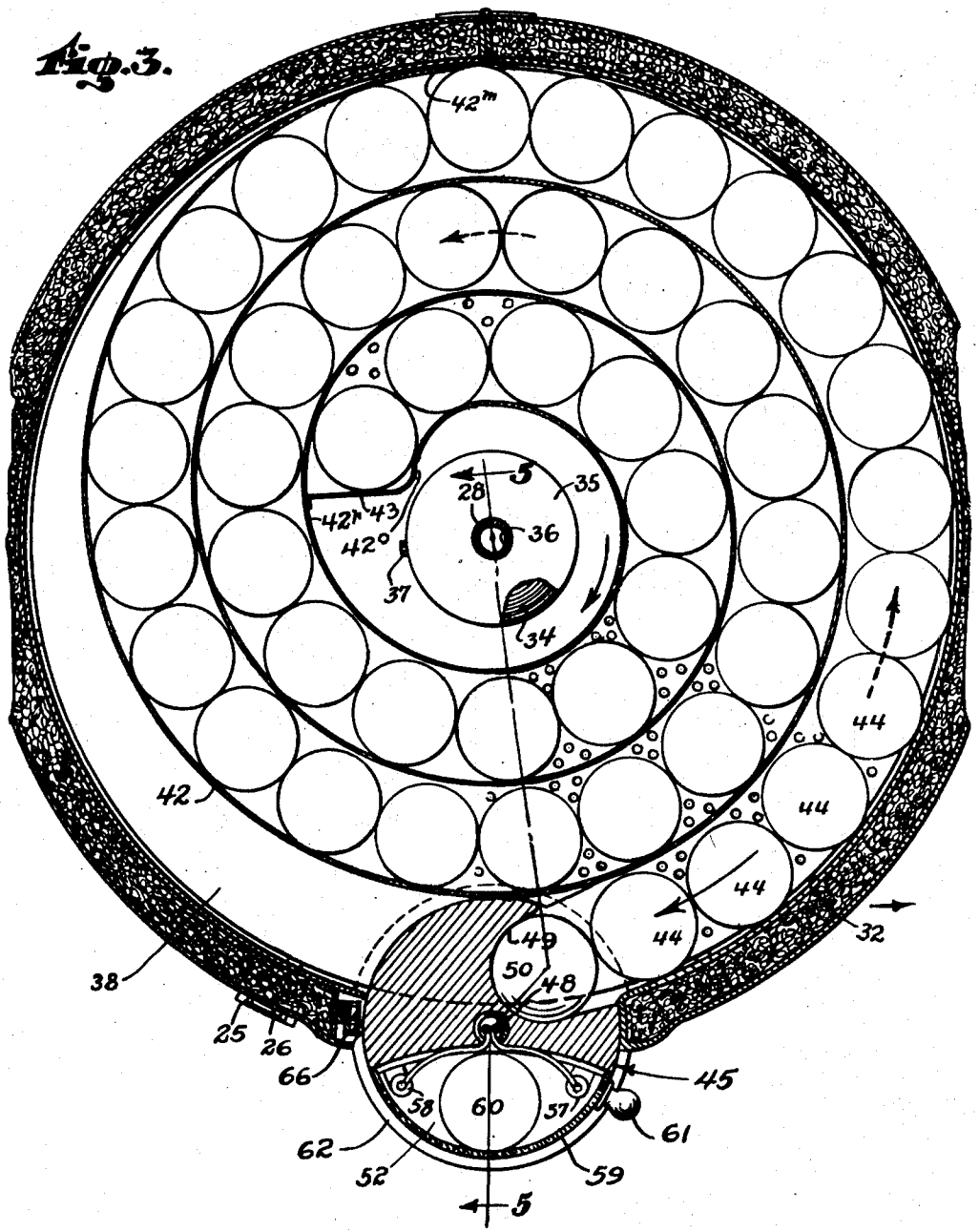
INVENTOR
JAMES E. STEWART
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ATTORNEY.

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VENDING MACHINE

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Fig. 3.



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VENDING MACHINE

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Fig. 4.

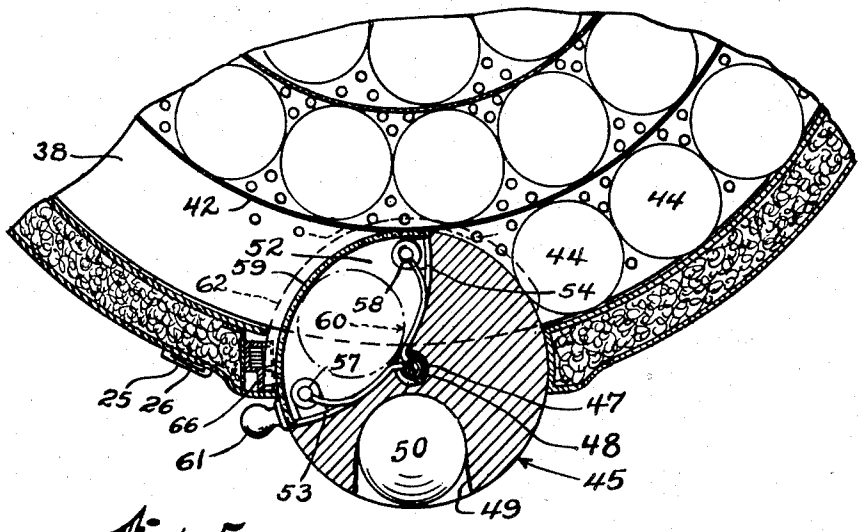
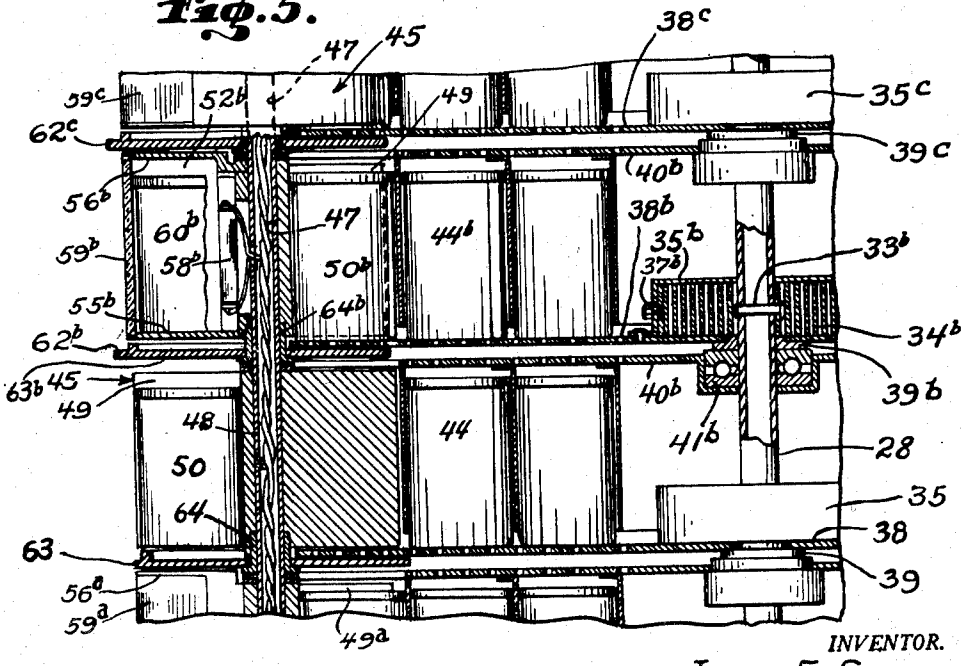


Fig. 5.



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VENDING MACHINE

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Fig. 6.

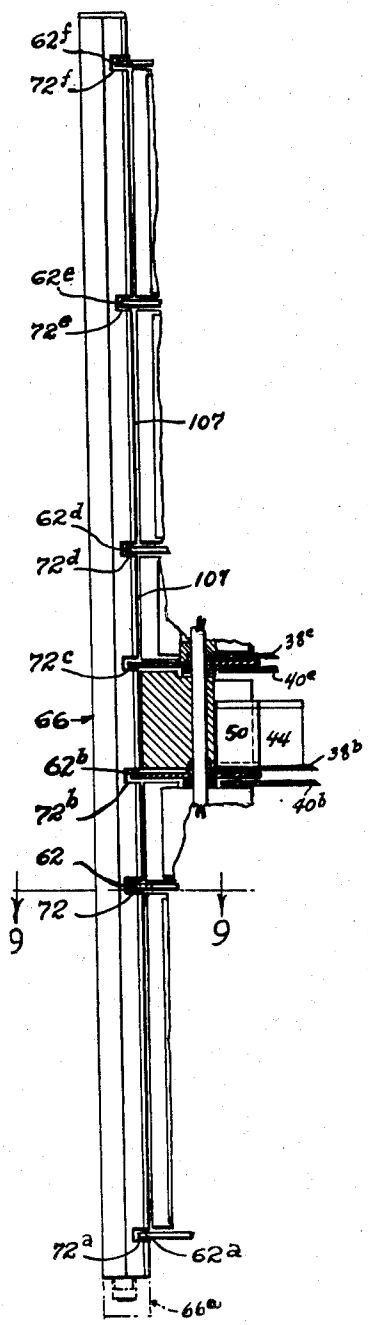


Fig. 7.

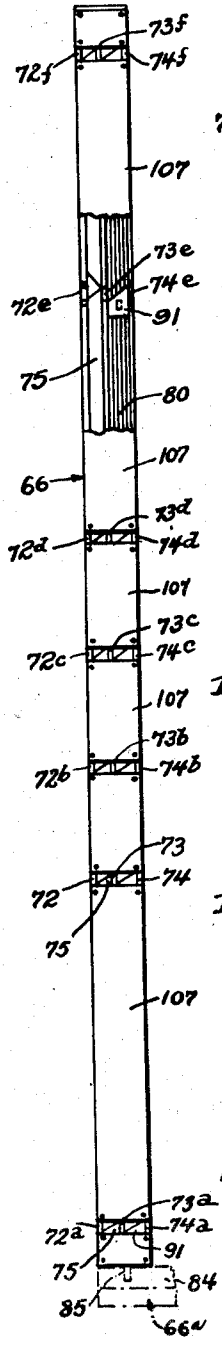


Fig. 8.

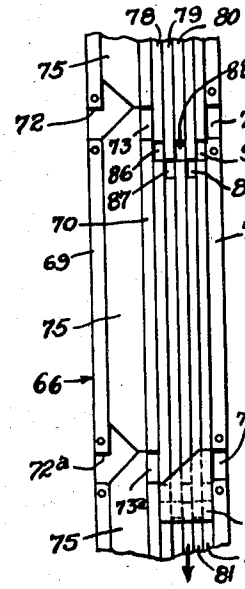


Fig. 10.

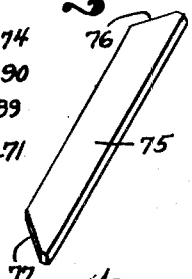


Fig. 11.

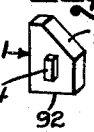


Fig. 12.

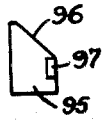


Fig. 9.

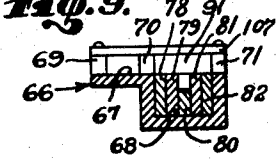


Fig. 15

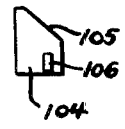


Fig. 17.

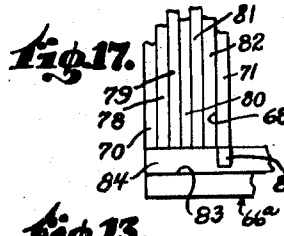


Fig. 14.

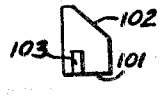
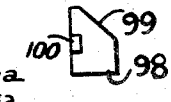


Fig. 13.



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Patented June 26, 1951

2,558,394

UNITED STATES PATENT OFFICE

2,558,394

VENDING MACHINE

James E. Stewart, Rye, N. Y., assignor, by mesne assignments, to Cleveland-Detroit Corporation, a corporation of Delaware

Original application June 16, 1943, Serial No. 490,995, now Patent No. 2,423,265, dated July 1, 1947. Divided and this application March 26, 1947, Serial No. 737,370

3 Claims. (Cl. 312—46)

1

This invention relates to improvements in vending machines and is a division of United States application Serial No. 490,995, filed June 16, 1943, now Patent No. 2,423,265, dated July 1, 1947.

In said patent, the claims are directed to the arrangement of the article supporting shelves, the guide means for the articles, and a fixed central vertical shaft supporting the shelves, and spring means for urging the shelves rotatively.

In the present application, the claims are all limited to structural features of the article delivery rotor and associated structure in a cabinet of the character hereafter described.

An object of the invention is the provision of a vending machine having a refrigerator cabinet and a plurality of rotary shelves therein, means associated with each shelf for urging it in a predetermined direction, stationary means associated with each shelf for guiding the bottles or wares thereon toward a delivery point, and coin-controlled means for each shelf for effecting the delivery one at a time therefrom.

Another object of the invention is the provision of individual delivery means for each shelf, coin mechanism adapted to render some of said delivery means operable when it receives coins of one value, and adapted to render others of said delivery means operable when it receives coins of a different value, and means common to all said delivery means and actuated by an operating delivery means for locking all the others against movement.

Another object of the invention is the provision, in a refrigerating machine for drinks, of delivery means for effecting the delivery of drinks therefrom with a minimum loss of refrigeration.

Yet another object of the invention is the provision, in a vending machine for drinks, of delivery mechanism for delivering drinks therefrom, said mechanism being adapted to illuminatedly display the kind of drink delivered thereby.

Other objects and advantages of the invention will be apparent to those skilled in the art upon a study of the following specification and the accompanying drawings.

In the drawings:

Figure 1 is an elevation, partly in section, of one embodiment of my new and improved drink vending machine for several drinks at different prices;

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Figure 2 is an elevation of the machine shown in Figure 1;

Figure 3 is a transverse cross-sectional view of the machine showing the arrangement of the bottles or containers on a shelf and the means for urging said containers towards the delivery mechanism, one container having been engaged by the delivery mechanism and ready to be delivered;

Figure 4 is a fragmentary view similar to Figure 3 in which the delivery mechanism has been operated and the delivered container may be picked up by the customer;

Figure 5 is a sectional elevation of the delivery mechanism showing one rotor as just having received the end container from its associated shelf, and showing the rotor of the tier below it in the position with its article cavity and the article therein outside the cabinet;

Figure 6 is a side elevation of price bar mechanism for controlling the operability of the several delivery mechanisms;

Figure 7 is a face view of the machine shown in Figure 6;

Figure 8 is an enlarged view of the mechanism shown in Figures 6 and 7;

Figure 9 is a cross-sectional view of the mechanism of Figures 6, 7, and 8 as seen along the line 9—9 of Figure 6;

Figure 10 is a perspective view of one of my lockout bars;

Figure 11 is a perspective view of one of my price bar cams;

Figures 12, 13, 14, and 15 show price bar cams of different values, the engaging lug being in different positions on each cam;

Figure 16 is a fragmentary view of a modified form of delivery door; and

Figure 17 is a fragmentary view of the lower end of the price bar mechanism with the cover removed and showing a positionable member moved by a coin mechanism in accordance with the value of money received by the coin mechanism.

Referring first to Figures 1 and 2, the mechanism is enclosed in a tubular casing 20, the lower portion 21 of which may be used for storage, and which may also contain the coin box (not shown)

for accepted coins after they leave the coin mechanism. The upper portion 22 of the casing may be domed and may be provided with bull's-eyes 23, behind which lamps 24 may be positioned for decorative effects.

A plate 25 on the wall of the cabinet has a slot 26 therein for receiving coins, and this slot communicates, through suitable conduits, with coin mechanism (not shown) adapted to receive single or plural coins and control a positionable member in accordance with the value of the coin or coins deposited, as will hereinafter be described.

Within the cabinet 20, near the upper end thereof is secured a spider ring 27, the hub 27*a* of which forms a rigid support for the upper end of a shaft 28. A second spider ring 29 secured within the lower portion of the inner cabinet wall 32 has a hub which engages and steadies the lower portion of the shaft 28, and an extension 30 of this shaft may extend through the lower portion (or compartment) 21 to the base 31 of the machine.

The shaft 28 (although shown as round in cross-section) may be of any desired cross-section, and the shaft carries a headed stud 33, similar to the headed stud 33*b* shown in Fig. 5, the head of which is engaged by the apertured inner end of a spiral spring 34 which is housed in an inverted drum-like member 35, having a hole 36 therein forming a bearing on the shaft 28. The outer end of the spiral spring may be secured to the wall of the drum-like member 35 by means of a bolt 37. The shaft 28 is stationary and may be rigidly secured in the cabinet 20 in any suitable manner. For example, one way of rigidly securing the shaft in the cabinet is the provision of a bushing in the floor of the cabinet and securing the lower end of the shaft in said bushing by a key or pin. The upper end of the shaft 28 is fixed to the spider 27, and between the top and bottom of the cabinet the shaft is fixed to the spider 29.

At flat disc 38, which is preferably perforate, is secured to the spring drum 35 and is supported on a suitable bushing 39 which has a hole therein engaging the shaft 28 and supported by a thrust bearing like 41 to be presently described. The disc 38 forms a rotary shelf for supporting articles to be vended and is of a diameter clearing the inner surface of the inner wall 32.

Beneath the disc 38 is a disc-like member 40 having a flanged rim which is secured to the inner wall 32 in any suitable manner, for example by riveting, spot welding, etc. The mid-portion of the member is cupped downwardly, as shown, to accommodate a thrust bearing 41 supporting the bushing 39 and the flat disc or turntable 38. The thrust bearing 41*b*, which is exactly like the thrust bearing 41, is shown enlarged in Figure 5 and consists of a lower disc having an annular race formed on the upper surface thereof. This disc has a hole formed therein to clear the shaft 28, and its outer diameter is such that it forms a press fit with the depression formed in the flanged disc member 40*b*. The thrust bearing has an upper disc-like portion with a downwardly facing annular race. The outer perimeter of this disc clears the depression formed in the disc-like member 40*b* and the center hole may also clear the shaft 28. Between the two members of the thrust bearing is a row of balls which are engaged by the races above referred to. The weight of the rotary shelf 38*b* is impressed upon the upper member of the thrust bearing via the bushing 39*b*.

Beneath and spaced apart from the turntable 38 is a turntable 38*a* provided with a like spiral spring housed in a drum 35*a*. A thrust bearing 41*a* for the turntable 38*a* is supported by a cup-like cavity formed in the spider ring 29.

Above and spaced apart from the turntable 38 are several other turntables designated as 38*b*, 38*c*, 38*d*, 38*e* and 38*f*, supported respectively on thrust bearings 41*b*, 41*c*, 41*d*, 41*e* and 41*f*, supported in downwardly cupped mid-portions of flanged disc-like members 40*b*, 40*c*, 40*d*, 40*e* and 40*f*, like the member 40. These turntables, like the turntable 38, are provided respectively with spring drums 35*b*, 35*c*, 35*d*, 35*e* and 35*f*.

Secured to the lower surface of the flanged disc-like member 40*b* is a spiral strip 42 extending vertically downward and having a portion at right angles thereto spot welded or attached in any other suitable manner to the member 40*b*. The downwardly extending portion of the spiral strip 42 amply clears the upper surface of the turntable 38.

Referring to Figure 3, the outer end 42*m* of the spiral strip 42 is substantially tangent to the inner wall 32 (opposite the delivery opening to be presently described). The inner end 42*o* at a point adjacent to the spring drum 35 terminates in an almost right angled portion 43 which is secured to the convolution of the spiral designated by the numeral 42*r*.

It was pointed out above that the member 40*b* is welded or otherwise stationarily secured to the inner wall 32, therefore the spiral 42 is also stationary.

Assuming the shelf 38 to be empty and it is desired to reload it, the serviceman opens a hinged section of the wall 32, exposing a portion of the shelf outside the outer convolution of the spiral, and places a plurality of mechandise containers 44 thereon. He then rotates the shelf 38 in a direction shown by the dotted arrows; this moves the containers 44 around the spiral and at the same time winds the spring 34. As soon as the first plurality of containers are moved in by so rotating the shelf, exposing a second portion of the shelf, the serviceman can place additional containers thereon. The serviceman continues to move the shelf in the direction of the dotted arrows, placing additional containers thereon until the first or end container, which he placed on the shelf, comes to rest against the right angled portion (or inner end) 43 of the spiral and a continuous series of containers extends therefrom, about the convolutions of the spiral, to the delivery exit 45. The act of turning the shelf in the direction of the dotted arrows not only distributed the containers around in the spiral as just described, but also effected the winding of the spring 34.

With the shelf 38 full and with the spring 34 fully wound, the latter constantly urges the shelf in the direction of the solid arrows and insures the successive delivery of each and every one of the containers on the shelf 38 to the delivery exit 45.

A similar spiral 42*a* secured to the bottom of the member 40 cooperates with containers 44*a* on the shelf 38*a*. The height of the spiral is of course greater, as the space between the shelf 38 and the shelf 38*a* is greater, and as pointed out above, the spiral extends downwardly from its support and amply clears the shelf below.

Likewise, spirals 42*b*, 42*c*, 42*d*, 42*e*, and 42*f*, respectively, secured to and extending downwardly from stationary members 40*c*, 40*d*, 40*e*, 40*f* and

40*g*, amply clear and cooperate with merchandise containers on the rotary shelves 38*b*, 38*c*, 38*d*, 38*e*, and 38*f*, respectively, and the latter may be loaded with merchandise in the same manner as described above in connection with the shelf 38.

As each shelf is loaded, its spring is automatically wound up and will act in the same manner to effect the delivery of the merchandise containers to the respective delivery exits.

The inner wall 32 of the cabinet may be provided with a closure top 46, which may be secured thereto in any suitable manner.

The delivery mechanism, generally referred to by the numeral 45, consists of a generally round section, Figures 4 and 5, with a central vertical hole 47 therein which is journaled on a hollow shaft 48. A generally U-shaped cavity 49 is formed in this round section without top or bottom walls. The end container 50, due to the urge of the rotary shelf 38 and the action of the spiral 42, enters the cavity 49 and continues to rest on the shelf 38 until the delivery mechanism is operated, as will presently be described.

A second cavity 52 is formed in the delivery mechanism, the sides 53 and 54 of which are angular, with respect to each other, greater than 90°, and this cavity may be termed a "display niche." It also has a bottom wall, and a top wall which are identical with the bottom wall 55*b* and the top wall 56*b* of the cross-sectioned delivery mechanism just above the mechanism 45.

Within the display niche are lamps 57 and 58, which are preferably tubular in form, for illuminatedly displaying the sample container 60. A curved panel 59 of glass or transparent plastic is removably secured to the delivery exit body, in any suitable manner, for enclosing the sample container 60 and the lamps 57 and 58. A knob 61 is secured thereto for rotating the delivering mechanism body, as will presently be described.

Beneath the bottom wall of the delivery mechanism 45 is a circular platen 63, which may have formed integral therewith an arcuate cam 62 of a predetermined length. This cam cooperates with release bar cams in a manner to be presently described.

A bushing 64 forms a working fit on the shaft 48 and has a polygonal shank which fits aligned matching polygonal holes formed in the platen 63 and in the lower end of the hole 47, with the result that when the delivery mechanism is rotated to deliver an end container (50, for example) to the customer, by moving the knob 61 around to the position shown in Figure 4, the container, which at the beginning of the operation was positioned in the cavity 49 and resting on shelf 38, is by this movement, slid off the shelf 38 and onto the platen 63 (while still positioned in the cavity 49). When the knob 61 reaches the position shown in Figure 4, the container 50 is in front and may be picked up by the customer.

As soon as the delivery mechanism is returned to its normal position, which is the position shown in Figure 3, the succeeding container, due to rotative urge of the spring 34 on the shelf 38, as described above, passes into the cavity 49 and is ready to be delivered when the delivery mechanism is again turned to the left. Due to the presence of the fixed spiral 42, this action may continue until the last container on the shelf 38 is delivered.

The other delivery mechanisms 45 associated with the other shelves are substantially the same

(except for height) and they all operate in the same manner, therefore they are given the same numerals as the one described above with an additional letter corresponding to that of the shelf with which the delivery mechanism is associated. For example, the parts of the delivery mechanism associated with the shelf 38*a* have the letter "*a*" added to the numeral, etc.

A modified form of the delivery mechanism 45*x* is shown in Figure 16, wherein the rotative portion consists of a solid cylinder having a single open ended cavity 49*x* formed therein, and the illuminated display niche is eliminated. The wall portion 65 may, if desired, carry decorative effects. A knob 61*x* is provided for rotating the delivery mechanism, and an arcuate cam lip 62*x* is provided for determining whether or not said mechanism may be rotated, as will be hereinafter explained.

Referring now to Figures 6 to 12, inclusive, and 17, a stepped bar member 66 has a comparatively shallow channel 67, and a deeper channel 68 (Figure 9) formed therein. The channel 67 lies between longitudinal walls 69 and 70, and the longitudinal walls 70 and 71 define the channel 68. Lateral aligned slots 72, 73, and 74 (Figure 8) are formed respectively in the walls 69, 70, and 71. In Figures 6 and 7, a set of similar slots are shown at 72*a*, 73*a*, and 74*a*, below the slots 72, 73, and 74, a distance equal to the distance between the cam lip 62 and the cam lip 62*a* (Figure 2). Other sets of slots 72*b*, 73*b* and 74*b*; 72*c*, 73*c*, and 74*c*, etc., are provided to receive the cam lips 62*b*, 62*c*, etc.

The stepped bar member 66 is positioned vertically with the slots above referred to in position where the cam 62, 62*a*, 62*b*, 62*c*, etc., may enter them. This position may best be seen in Fig. 3.

Within the channel 67 is a plurality of bars 75 having beveled ends 76 and 77 (Figure 10). These bars are of lengths corresponding to the distances between the cam lips 62, 62*a*, 62*b*, 62*c*, etc., and are so proportioned that when any one cam lip is positioned between the adjacent ends of any two bars, the entire length of the channel is filled up and no other cam lip can enter between any of the other bars 75. The beveled ends facilitate the entrance of a cam lip between the adjacent ends of the two bars with which it cooperates (when no other cam lip is between any other bars).

Within the channel 68 are price bars 78, 79, 80, 81, and 82, the lower ends of which terminate adjacent to a cross-slot 83 (Figure 17) formed in the lateral extension 66*a* of the bar member 66 at the bottom of, and at a right angle to, the channel 68. A positionable bar member 84 is mounted in the slot 83 and has a slot 85 formed therein which is normally beneath the lower end of the wall 71. The positionable bar member 84 may be connected to a suitable coin mechanism (not shown) which positions the member 84 in accordance with the value of the money inserted. For example, if 5¢ is inserted, the coin mechanism would move the member to bring its slot 85 below the price bar 82; 10¢ would cause the slot to align with the price bar 81; 15¢ would align it with price bar 80; 20¢ would align it with price bar 79; and 25¢ would align it with the price bar 78.

The price bars 78 to 82, inclusive, are urged upwardly by spring means (not shown), and the lower ends thereof clear the positional member by a few thousandths of an inch permitting it to be moved freely by the coin mechanism. It is

obvious that if the positionable member **84** is moved to a point where the slot **85** is positioned below the price bar **82** (which is described above as the 5¢ bar), the price bar may be moved downwardly against the urge of the spring means referred to above, and its lower end will enter said slot. It is also obvious that none of the other price bars can be moved down because they would encounter solid portions of the positionable member.

The price bars all have slots formed therein, spaced to correspond to the distances between the cam lips **62**, **62***a*, **62***b*, **62***c*, etc. (Figure 2). It will be noted in Figure 8, that these slots are staggered to prevent interference, slots **86**, **88**, and **90**, in bars **78**, **80**, and **82** being aligned, and slots **87** and **89**, in bars **79** and **81** being out of alignment with slots **86**, **88**, and **90**, but in alignment with each other.

Referring now to Figure 11, a removable key **91** is shown. It consists of a rectangular block **92** having a beveled face **93** formed thereon, and integral with and extending rearwardly from the block is a rectangular tongue **94**. This tongue is positioned on the vertical center line of the block and is therefore adapted to be positioned in any slot **88** in the price bar **80** (described above as the 15¢ bar). If more than one shelf in the vending machine carried 15¢ merchandise, the same number of keys **91** may be placed in engagement with corresponding slots in the 15¢ price bar **80**. One is shown in Figure 8 positioned between the wall slots **73***a* and **74***a*.

In Figures 6 and 7, the positionable member **84** is shown with its slot **85** below the price bar **80**, due to the fact that 15¢ was inserted in the machine. The cam lip **62***a* (on the bottom delivery mechanism, as the latter is turned) enters the slot **72***a* and first engages the beveled surfaces of the adjacent bars **75**, cams them apart and passes between them—thus locking out all of the other cam lips. As the delivery mechanism is rotated further, the cam lip **62***a* engages the beveled face **93** of the key **91**, and forces the price bar **80**, with which the key **91** is associated, downwardly and causes the lower end of the price bar **80** to enter the slot **85** in the positionable member **84**. The delivery mechanism is turned further until the cavity **49** containing the merchandise is accessible, and the customer may remove the same. It will also be noted that a key **91** is associated with the delivery mechanism carrying the cam lip **62***e*, therefore if the purchaser, after depositing 15¢, decided to choose that merchandise, he could obtain it by operating that delivery mechanism in the same manner.

In Figures 12, 13, 14, and 15 are shown other keys to be associated with other price bars Figure 12 shows key **95** having a beveled face **96**, and a rectangular boss **97**, positioned to engage notches **86** in the 25¢ price bar only. Figure 13 shows key **98** having a beveled face **99** and a rectangular boss **100**, positioned to engage only notches **90** in the 5¢ price bar **82**. Figure 14 shows key **101** in this group having a beveled face **102** and a rectangular boss **103**, adapted to engage only notches **89** in the 10¢ price bar **81**. Figure 15 shows key **104** having a beveled face **105** and a rectangular boss **106** adapted only to engage notches **87** in the 20¢ price bar **79**.

With the above described keys **91**, **95**, **98**, **101** and **104**, several priced shelves of merchandise may be carried in the machine and the price bars may be "keyed up" in accordance with the prices. The keys are positioned in the channel **68**, above the price bars as seen in Figure 9, and are retained therein by removable cover plates **107**, which also retain the bars **75** therein.

Although I have shown and described my new and improved vending machine as vending drinks in containers or bottles, it must be understood that the machine will vend liquids or any other kinds of commodities packaged in any desired manner, and I intend to use the machine for vending said commodities.

It will also be understood that many changes may be made in the arrangements shown and described without departing from the scope of the invention as set forth in the appended claims.

What is claimed is:

1. Article delivery means for an article vending machine having a cabinet provided with a side wall opening and also having coin controlled mechanism arranged within said cabinet, said article delivery means comprising a drum-like member for rotatable disposition in the side wall opening of said cabinet, with said member being partially inside and partially outside said cabinet, said drum-like member being provided with a cavity which when it is located within the cabinet is adapted to receive an article to be vended and which, upon rotary movement of said drum-like member in one direction, is adapted to bring such cavity, and hence the article therein, to the outside of the cabinet, and a plate-like element located below and movable with said drum-like member and providing a support for the article in the cavity of said drum-like member when such member is being rotated to bring said cavity from a position inside the cabinet to a position outside the cabinet, said plate-like element being provided with cam means for cooperation with the coin controlled mechanism of the machine for controlling the rotation of said drum-like member in the direction to bring its cavity from a position inside the cabinet to a position outside the cabinet.

2. Article delivery means for an article vending machine having a cabinet provided with a side wall opening and also having an article supporting shelf within said cabinet and adjacent said opening, said article delivery means comprising a drum-like member and a disc-like member, said drum-like member being provided with an article receiving cavity of generally U-shaped cross section extending inwardly from the side wall of such member and said cavity being open at its bottom, said disc-like member being below and spaced from said drum-like member and providing a support for an article in the cavity of said drum-like member, said drum-like member and said disc-like member being adapted to be rotatably mounted in the side wall opening of the cabinet, with such members partially inside and partially outside the cabinet, the space between said drum-like member and said disc-like member permitting the marginal portion of said shelf to be disposed between those parts of such members which are within the cabinet and to serve as a support for an article in the cavity of said drum-like member when such cavity is inside the cabinet, the article in such cavity moving from said marginal portion of the shelf onto said disc-like member as the drum-like member is rotated to bring its cavity from the inside of the cabinet to the outside of the cabinet.

3. Article delivery means for an article vending machine having a cabinet provided with a side wall opening, said article delivery means comprising a drum-like member having a hollow

shaft extending axially therethrough, said member being adapted to be rotatably mounted in the side wall opening of said cabinet, with substantially one-half of said member inside the cabinet and substantially one-half of said member outside the cabinet, said member being provided with two diametrically opposed cavities, one for the reception of an article to be vended, the other for the reception of an article to be displayed, the diametric disposition of said cavities enabling the display cavity to be located outside the cabinet when the other cavity is inside the cabinet for article-receiving purposes, electric illuminating means in said display cavity,

and current carrying wires for said illuminating means extending through the hollow shaft with which the drum-like member is provided.

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The following references are of record in the file of this patent:

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