

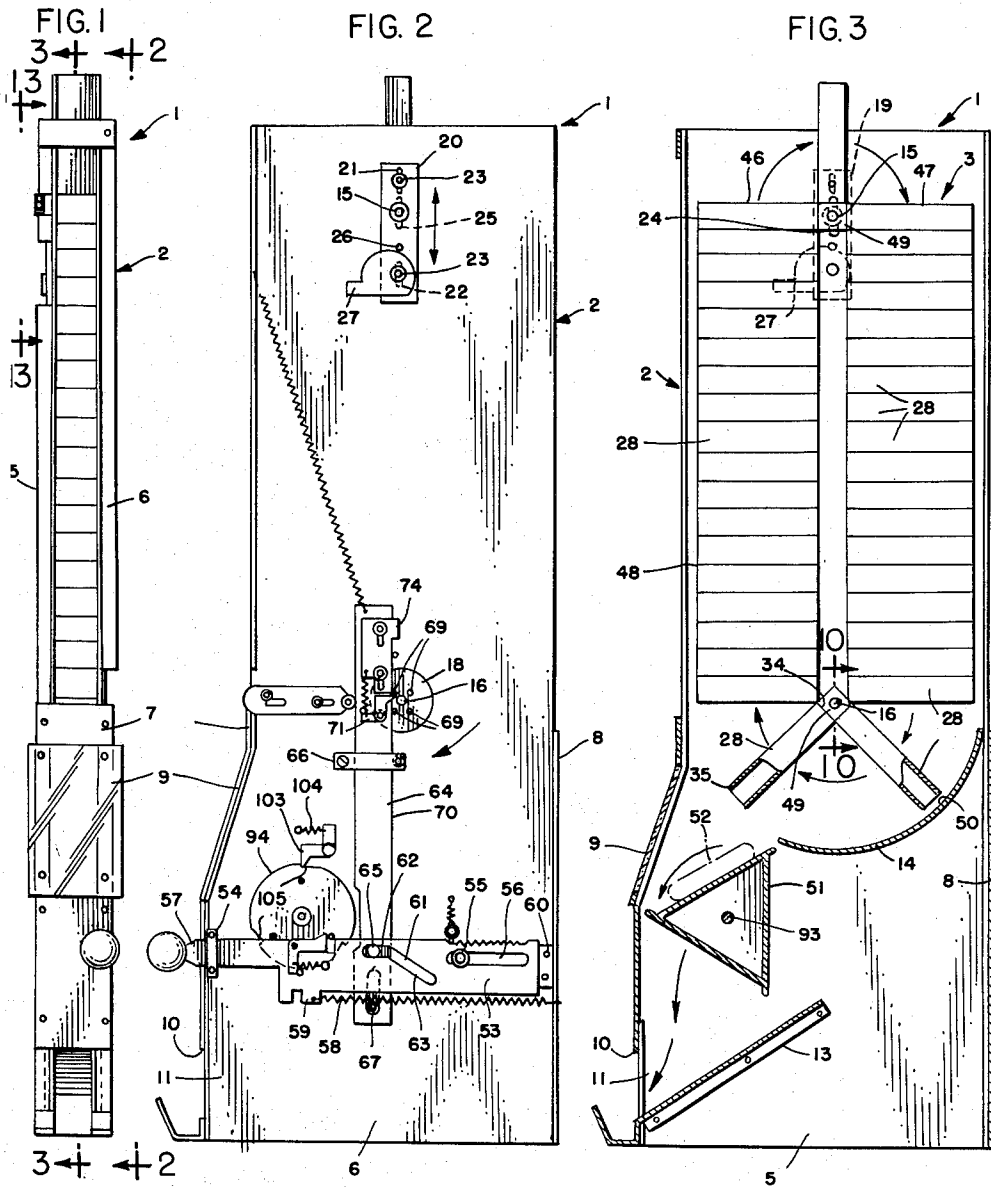
Dec. 17, 1963

C. WEBER
VENDING DEVICES

3,114,473

Filed March 31, 1961

3 Sheets-Sheet 1



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FIG. 4

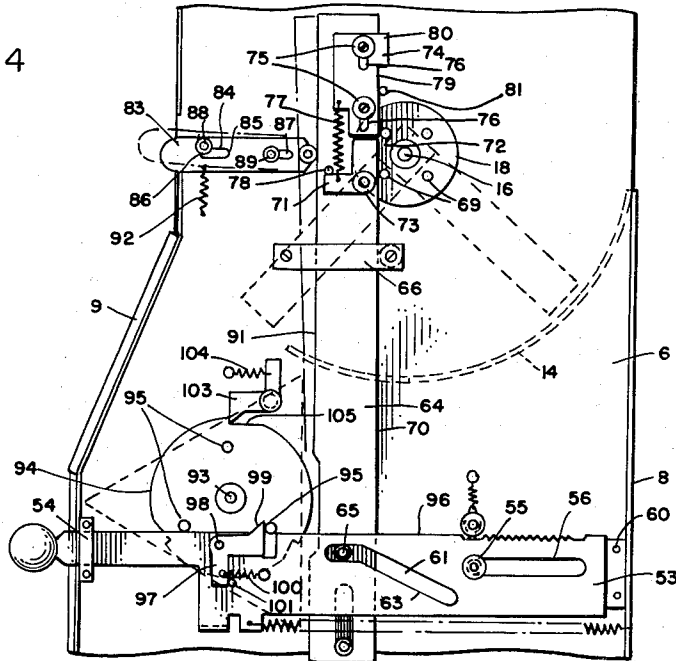
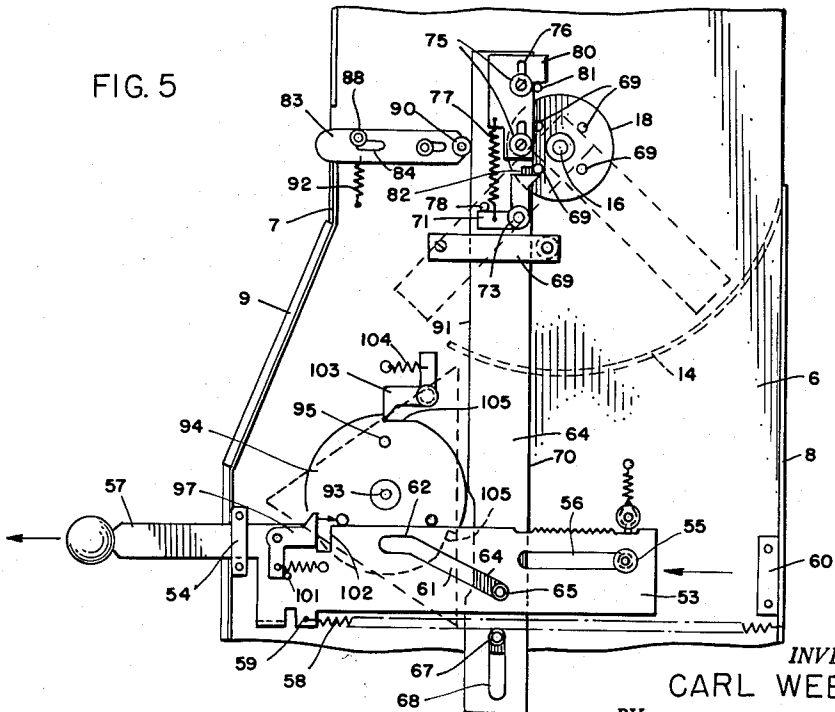


FIG. 5



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FIG. 6

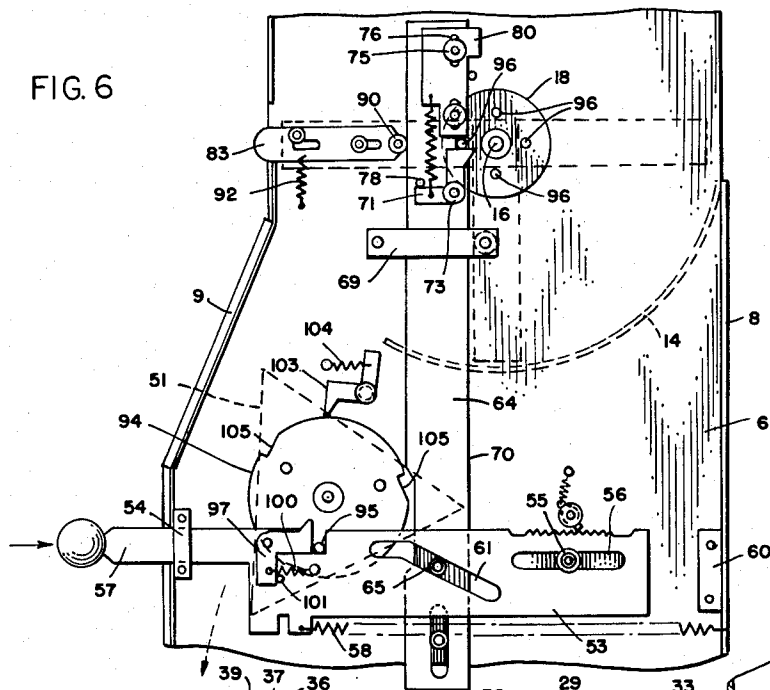


FIG. 7

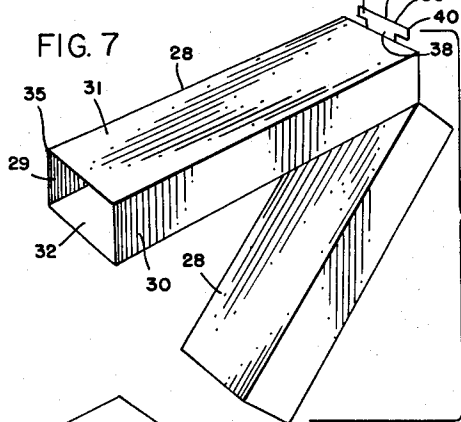
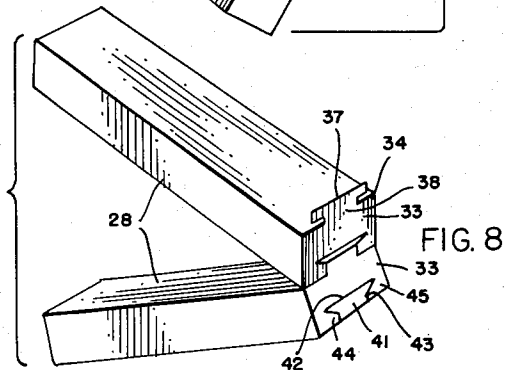


FIG. 9

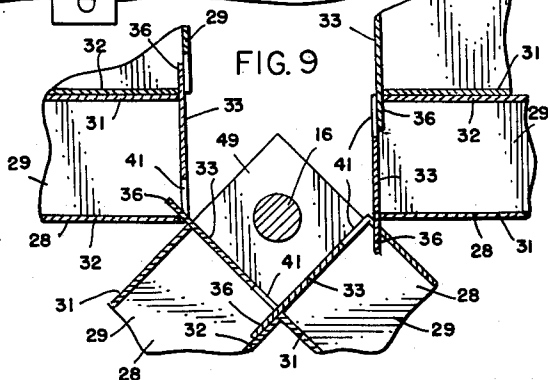
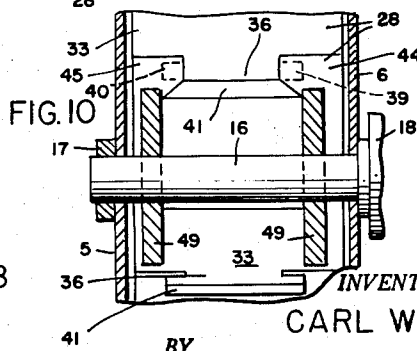


FIG. 10



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3,114,473

VENDING DEVICES

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13 Claims. (Cl. 221—82)

This invention relates to vending machines and more specifically to vending machines which are particularly well adapted for vending or dispensing packaged articles of merchandise such as, for example, candy bars, cigarettes, and the like.

It is a primary object of the present invention to afford a novel vending machine for vending or dispensing articles of merchandise on a first-in first-out basis in a novel and expeditious manner.

Another object of the present invention is to afford a novel vending machine of the aforementioned type which may be quickly and easily loaded from either in front or in back of the machine.

In vending machines heretofore known in the art for vending articles of merchandise such as, for example, candy bars, and the like, it has been common practice to use a special display article which was never vend-
ed from the machine. Such practice has several disadvantages such as, for example, constituting a waste of merchandise; constituting a waste of space in the machine; requiring frequent changes of the display article to insure that it does not acquire an unattractive appearance, and the like. It is an important object of the present invention to overcome such disadvantages.

Another object of the present invention is to afford a novel vending machine wherein the article displayed is the specific article dispensed in the next cycle of operation of the machine.

Another object is to provide a novel vending machine embodying shelves for storing the articles to be dispensed, wherein the shelves are constituted and arranged in a novel and expeditious manner.

Yet another object is to provide a novel vending machine embodying shelves of the aforementioned type which are supported in a novel and expeditious manner in both storing position and dispensing position.

A further object is to afford a vending machine of the aforementioned type wherein the shelves are moved between storing position and dispensing position in a novel and expeditious manner.

Another object of the present invention is to afford a novel vending machine of the type embodying shelves for storing articles to be dispensed, and from which the articles are dispensed one at a time, wherein the shelves are directly connected to each other in a novel and expeditious manner.

Yet another object of the present invention is to afford a novel vending machine of the aforementioned type wherein the shelves are directly engaged by the supporting mechanism therefor in a novel and expeditious manner.

Another object is to provide a novel vending machine of the aforementioned type wherein the shelves are directly engaged by the drive mechanism in a novel and expeditious manner for movement thereby.

Another object of the present invention is to afford a novel vending machine of the aforementioned type embodying novel drive mechanism.

Another object is to provide a novel vending machine of the aforementioned type embodying novel slide mechanism for driving rotatable parts in the machine.

Another object is to provide a novel vending machine of the aforementioned type which is practical and effi-

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cient in operation and may be readily and economically produced commercially.

Other and further objects of the present invention will be apparent from the following description and claims, and are illustrated in the accompanying drawings which, by way of illustration, show a preferred embodiment of the present invention and the principles thereof and what I now consider to be the best mode in which I have contemplated applying these principles. Other embodiments of the invention embodying the same or equivalent principles may be used and structural changes may be made as desired by those skilled in the art without departing from the present invention or the purview of the appended claims.

In the drawings:

FIG. 1 is a front elevational view of a vending device embodying the principles of the present invention;

FIG. 2 is a side elevational view looking in the direction of the arrows 2—2 in FIG. 1;

FIG. 3 is a longitudinal sectional view taken substantially along the line 3—3 in FIG. 1;

FIG. 4 is an enlarged detail elevational view of a portion of the vending device shown in FIG. 2;

FIGS. 5 and 6 are views similar to FIG. 4 but showing certain parts in different operative position;

FIG. 7 is an enlarged perspective view of two of the shelves embodied in the device shown in FIG. 1;

FIG. 8 is a perspective view of the two shelves shown in FIG. 7, but looking in a different direction;

FIG. 9 is an enlarged detail sectional view of a portion of the vending device shown in FIG. 3; and

FIG. 10 is a detail sectional view taken substantially along the line 10—10 in FIG. 3.

A vending device 1, embodying the principles of the present invention, is shown in the drawings to illustrate the preferred embodiment of the present invention.

The vending device 1 embodies, in general, a housing 2 in which, and on which, storage and vending mechanism 3 and driving mechanism 4 are operatively mounted, FIGS. 1, 2, and 3, as will be discussed in greater detail presently. The vending device 1, while it constitutes a complete vending device, is of the type which is particularly well adapted for mounting in an outer housing, not shown, in side-by-side, parallel relation to other similar vending devices, as will be appreciated by those skilled in the art.

The housing 1 includes two parallel spaced side walls 5 and 6, a front wall 7 extending between the lower end portions of the side walls 5 and 6, and a rear wall 8, likewise extending between the lower end portions of the side walls 5 and 6, FIGS. 1, 2, and 3. The side walls 5 and 6 and the rear wall 8 may be made of any suitable material, such as, for example, sheet steel. The front wall 7 may also be made of any suitable material, such as, for example, sheet steel and has an opening in the upper end portion thereof which is covered by a suitable transparent material such as, for example, glass or a suitable transparent plastic material to afford a window 9, FIGS. 1 and 3. The front wall 7 terminates at its lower end 10 in upwardly spaced relation to the lower end portion of the housing 2 to thereby afford a discharge opening 11 in the lower end portion of the front of the housing 2. A discharge chute 13 extends between and is secured to the side walls 5 and 6 and projects upwardly and inwardly from the lower end portion of the discharge opening 11 at an acute angle to the horizontal for a purpose which will be discussed in greater detail presently.

An arcuate-shaped partition wall 14 extends between and is secured to the side walls 5 and 6 and slopes downwardly and forwardly from the rear wall 8 to a point spaced vertically above the chute 13, FIG. 3, to afford an arcuate-shaped guideway for articles moving with the

storage and vending mechanism 3 from stored position to vending position as will be discussed in greater detail presently.

Two elongated shafts 15 and 16 extend between, and are carried by the side walls 5 and 6 in vertically spaced parallel relation to each other, FIGS. 2 and 3. The lower shaft 16 is journaled in the side walls 5 and 6 and is retained therein against the longitudinal displacement thereof by a collar 17 (FIG. 10) secured to the end portion thereof projecting outwardly from the side wall 5, and a drive wheel 18 secured to the end portion thereof projecting outwardly from the side wall 6, FIGS. 2 and 10. The upper shaft 15 is journaled in two plates 19 and 20 slidably mounted on the outer faces of the side walls 5 and 6, respectively, FIGS. 2 and 3. The plates 19 and 20 each have an upper vertically extending slot 21 and a lower vertically extending slot 22 formed therein in alignment with each other. The plates 19 and 20 are secured to the side walls 5 and 6, respectively, for vertical sliding movement by suitable fastening means such as pins 23 extending through the slots 21 and 22 into the side walls 5 and 6, respectively.

The openings 24 and 25 in the side walls 5 and 6, respectively, through which the shaft 15 extends are vertically extending elongated openings, FIGS. 2 and 3, and the plates 19 and 20 are disposed on the side walls 5 and 6 in such position that the openings 21 and 22 in the plates 19 and 20 are disposed above and below the openings 24 and 25 in vertical alignment therewith, respectively. Each of the plates 19 and 20 has an outwardly projecting pin 26 disposed between the respective lowermost slot 22 and the shaft 15, and two cam members 27 are eccentrically mounted on the respective pins 23 in underlying relation to the adjacent pins 26 in position whereby rotation of the cam members 27 on the pins 23 is effective to slide the plates 19 and 20 upwardly or permit them to slide downwardly, to thereby vertically adjust the position of the shaft 15 in the slots 24 and 25.

The storage and vending mechanism 3 comprises a plurality of shelves connected to each other serially in an endless chain. The shelves are all identical, and each is in the form of an elongated hollow or tubular container which is open at one end. The shelves may be made of any suitable material such as, for example, sheet aluminum, steel, tin, or the like. The shelves 28 are substantially rectangular in transverse cross section, and each includes two narrow side walls 29 and 30 disposed in parallel spaced relation to each other, two wider side walls 31 and 32 disposed in parallel spaced relation to each other and extending between the side walls 29 and 30, and an end wall 33 disposed perpendicularly to the side walls 29—32 and substantially closing the one end 34 of the housing 28, FIGS. 7, 8, and 9. The other end 35 of each of the shelves 28 is open as may be seen in FIGS. 3 and 7.

Each of the shelves 28 also includes a substantially T-shaped tongue 36 formed as an integral part of the respective end wall 33, and disposed in uniplanar relation to the remainder of the latter. The tongues 36 project outwardly beyond side walls 31 of the respective shelves 28 in substantially perpendicular relation to the longitudinal center line of the respective shelves, and include an enlarged cross bar 37 at the free ends thereof, the cross bars 37 being connected to the remainder of the respective end walls 33 by narrower necks 38. The opposite ends 39 and 40 of the cross bars 37 are disposed in alignment with each other and extend outwardly beyond the respective necks 38, FIGS. 7 and 8.

Each of the shelves 28 also includes a substantially T-shaped opening 41 in its end wall 33. The openings 41 are disposed on the opposite sides of the end walls 33 from the tongues 36, and each includes a cross bar portion 42 which is substantially complementary to, but is slightly longer and wider than the cross bar 37, and a throat portion 43 which is substantially complementary to

but is somewhat wider and longer than the neck 38. The openings 41 are disposed in the end walls 33 in such position that the cross bars 42 are disposed between the side walls 31 and 32, in inwardly spaced relation thereto, with the throat portion 43 extending from the cross bar portion 42 into the junction between the end walls 33 and the side walls 32, FIGS. 8 and 9.

Each of the shelves 28 may be connected to another one of the shelves 28 by disposing the two shelves substantially perpendicular to each other, with the tongue 36 on one shelf aligned with the cross bar portion 42 of the opening 41 in the other shelf, and then inserting the tongue 36 on the one shelf through the cross bar portion 42 of the opening 41 in the other shelf. The one shelf 28 may then be moved away from the other shelf in a direction to move the tongue 36 on the one shelf into juxtaposition with the inner face of the side wall 32 on the aforementioned other shelf. In this position of the one shelf 28, the end portions 39 and 40 of the cross bar 37 on the one tongue are disposed behind the portions 44 and 45 of the end wall 33 on the other shelf 28 which define the lateral boundaries of the throat 43 of the opening 41 in the aforementioned other shelf. The neck 38 on the one tongue 36 is of sufficient length that the shelves 28 which are thus connected together may be pivoted around the connection between the tongue 36 and the opening 41 between the aforementioned perpendicular relationship to each other and the parallel, juxtaposed position of the shelves 28 in the two stacks 46 and 47 of shelves 28 shown in FIG. 3. The throat 43 of the openings 41 extend inwardly from the side wall 32 of their respective shelves 28 a sufficient distance that when adjacent shelves 28 are disposed in the aforementioned parallel, juxtaposed position, the end portions 39 and 40 of the tongue 37 on the one shelf 28 are disposed inwardly of, and in parallel juxtaposition to the inner face of the portions 44 and 45 of the end wall 33 through which it is inserted.

With this construction, the shelves 28 may be directly connected together serially in an endless chain, such as the chain of shelves 48 shown in FIG. 3, wherein the closed ends 34 of the shelves 28 are pivotally connected directly to each other and project inwardly toward the center of the chain 48, and the open ends 35 of the shelves 28 project outwardly away from the center of the chain 48. As will be discussed in greater detail presently, such a chain of shelves may be supported in stationary position to store articles, such as candy bars, and the like, and may be caused to rotate to thereby sequentially discharge the articles from stored position on the respective shelves.

The chain 48 of shelves 28 in the novel vending device 1 is disposed around the shafts 15 and 16, FIG. 3. Each of the shafts 15 and 16 has two square sprocket members 49 mounted thereon in parallel spaced relation to each other. The shelves 28 are of such width that they fit between the side walls 5 and 6 of the housing 2 with a relatively snug but freely movable fit therebetween, and the sprocket members 49 are secured to the shafts 15 and 16 in sufficiently inwardly spaced relation to the side walls 5 and 6 that they are always disposed inwardly of the outer lateral edges of the shelves 28, FIG. 10.

The chain 48 of shelves 28 is trained over the sprocket members 49, and the sprocket members 49 are slightly narrower in width than the distance between the side walls 31 and 32 of any one of the shelves 28. In the vending device 1, the rods 15 and 16 are spaced from each other at such a distance that the chain 48 of shelves 28 is trained over the sprocket members 49 on the rods 15 and 16 with a relatively snug, but free running fit. Thus, it will be seen that by rotating either one of the shafts 15 or 16 such as, for example, the shaft 16, the chain 48 of shelves 28 may be driven by the sprocket members 49 on that shaft to thereby cause the chain 48 to rotate around the shafts 15 and 16 in direct engagement with the sprocket members 49 thereon. For ex-

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ample, by rotating the shaft 16 in a clockwise direction, the chain 48 of shelves 28 is rotated by the sprocket members 49 in a clockwise direction, as viewed in FIG. 3, around the rods 15 and 16, the shelves 28 in the stack 46, during this movement, swinging sequentially upwardly over the rod 15 down unto the stack 47, and the shelves 28 in the stack 47 swinging sequentially down around the rod 16 upwardly into the lowermost position in the stack 46.

During the initial portion of the swinging movement of the shelves 28 from the stack 47 to the stack 46, the open ends 35 thereof swing downwardly along the guideway 14 in closely spaced relation thereto, to thereby prevent articles such as, for example, the article 50, FIG. 3, from dropping out of the thus downwardly swinging shelves 28 until the shelf has cleared the inner end of the guideway 14. During this movement of the shelves 28, as the open ends 35 thereof clear the inner ends of the guideway 14, the articles carried in the shelves 28 are free to fall downwardly therefrom. A platform 51 is disposed in the housing 2 below the guideway 14 in position to supportingly receive the articles thus dropped from the shelves 28 as they move into discharge position past the guideway 14, the platform 51 supporting the thus dropped articles in the position of the article 52 shown in FIG. 3. When the article to be dispensed is disposed in the position of the article 52 shown in FIG. 3, it is supported by platform 51 in such position that it is readily visible from outside of the vending device 1 through the window 9. As will be discussed in greater detail presently, the article thus visible on the platform 51 is the article which is dispensed from the vending device 1 during the next cycle of operation.

As the shelves 28 pass downwardly around the shaft 16, the inner ends 34 thereof are disposed in juxtaposition to respective sides of the sprocket members 49 on the shaft 16. The sprocket members 49 on the shaft 16 are so disposed relative to the chain 48 of shelves 28 that they engage the lowermost shelves 28 in the stacks 46 and 47 in such position that they are effective to prevent the shelves 28 in the stacks 46 and 47 from pivoting downwardly to any substantial extent and, therefore, the shelves 28 in the two stacks are disposed in substantially horizontally extending position. As the shaft 16 rotates in a clockwise direction, as viewed in FIG. 3, during the operation of the vending device 1, side faces of the sprocket members 49 thereon move into parallel juxtaposition to the end wall 33 of the lowermost shelf 28 in the stack 47, and that shelf 28 then moves with the sprocket members 49 around the shaft 16 into position in the bottom of the stack 46, the end walls 33 of the shelves 28 thus moving around the shaft 16 remaining in juxtaposition to the respective side faces of the sprocket 49 during this movement, as may be seen in FIG. 3.

Thus, it will be seen that the shelves 28 in the novel vending device 1 are directly operatively engaged by the driving mechanism, and the vending device 1 does not require auxiliary sprocket chains, or the like, commonly used in vending devices heretofore known in the art wherein shelves are moved in an endless chain.

The vending device 1 shown in the drawings is a manually operated vending device and the drive mechanism 4 thereof includes manually operated mechanism for rotating the shaft 16 to thereby cause the chain 48 of shelves 28 to rotate around the shafts 15 and 16.

The drive mechanism 4 includes an elongated manually operated slide 53 which is slidably secured to the outer face of the side wall 6 of the housing 2 in horizontally extending position by a bracket member 54 secured over the front end portion thereof, and a pin 55 extending through an elongated, longitudinally extending slot 56 in the slide 53 and secured to the side wall 6, FIG. 2. The front end portion 57 of the slide 53 extends outwardly from the housing 2 to thereby afford a handle by which

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the slide 53 may be manipulated. A tension coil spring 58 has one end portion connected to a downwardly extending ear 59 on the slide 53 and the other end portion connected to the rear wall 8 of the housing 2 to thereby yieldingly urge the slide 53 rearwardly along the side wall 6 toward abutting engagement with a stop 60 mounted on the inner face of the rear wall 8.

The slide 53 has a cam slot 61 formed in the longitudinal central portion thereof, FIGS. 2, 4, 5, and 6, the cam slot 61 having a substantially straight, horizontally extending front end portion 62 and a rear end portion 63 which projects downwardly and rearwardly from the front end portion 62 at an acute angle to the horizontal. Another elongated slide 64 is disposed in substantially vertically extending position between the slide 53 and the side wall 6, FIG. 2. The slide 64 has a pin 65 on the lower end portion thereof, which projects downwardly through the cam slot 61. When the slide 53 is disposed in normal, at-rest position, as shown in FIG. 2, the pin 65 is disposed in the front end portion 62 of the cam slot 61. When the slide 53 is moved forwardly from the normal at-rest position shown in FIG. 2 to the fully actuated, forward position shown in FIG. 5, the pin 62 rides along the cam slot 61 into the lower end portion of the end portion 63 thereof to thereby cam the slide 64 downwardly from the normal at-rest position shown in FIG. 2 to the fully actuated position shown in FIG. 5.

The slide 64 is held freely slidable on the outer face of the side wall 6 of the housing 2 by a bracket 66 disposed over the upper end portion thereof and secured to the side wall 6, and a pin 67 extending through a longitudinally extending slot 68 in the lower end portion of the slide 64 and secured to the side wall 6.

The shaft 16 projects outwardly from the side wall 6 of the housing 2 rearwardly of the upper end portion of the slide 64, and the drive wheel 18, which is secured to the shaft 16 for rotation therewith, is disposed between the slide 64 and the outer face of the side wall 6. The drive wheel 18 has four pins 69 projecting outwardly from the outer face thereof, the pins 69 being equally spaced from each other around the periphery of a circle having the longitudinal center line of the drive shaft 16 as the center thereof. The pins 69 are spaced from the shaft 16 at such a distance that when the slide 64 is disposed in the normal, at-rest position shown in FIGS. 2 and 4, the front peripheral surfaces of the two forwardmost pins 69 are disposed in the same vertical plane as the rear face 70 of the slide 64.

A pawl 71, having a latching ear 72, is pivotally mounted by a pin 73 on the outer face of the slide 64. A slide plate 74 is slidably mounted for vertical reciprocation on the outer face of the slide 64 by two pins 75 which extend through respective, elongated, vertically aligned slots 76 in the plate 74, FIGS. 2 and 4. A tension coil spring 77 is connected between the plate 74 and the pawl 71 in position to urge the slide 74 downwardly and the pawl 71 to rotate in a clockwise direction, as viewed in FIG. 4. A pin 78 is mounted on the slide 64 and projects outwardly from the outer face thereof in position to engage the pawl 71 in such position as to prevent the pawl 71 from rotating in a clockwise direction beyond the position wherein the latching ear 72 projects outwardly from the rear edge 70 of the slide 64 in the position shown in FIG. 5. The slide 74 is of such length, and the slots 76 are so disposed therein, that when the slide plate 74 is disposed in lowermost position, as shown in FIGS. 2 and 4, it is disposed in upwardly spaced relation to the top of the pawl 71, but the space between the plate 74 and the pawl 71 is less than the thickness of the pins 69, for a purpose which will be discussed in greater detail presently.

The lower end portion of the plate 74 is so disposed on the slide 64 that the rear edge 79 thereof is disposed in the same vertical plane as the rear edge 70 of the slide 64. However, the upper end portion of the plate 74 has

an ear 80 projecting rearwardly therefrom into outwardly projecting relation to the slide 64. A pin 81 projects from the outer face of the side wall 6 of the housing 2 between the ear 80 and the drive wheel 13 in position to engage the lower edge of the ear 80 at approximately the two-thirds point in the downward movement of the slide 64 during a reciprocation thereof, for a purpose which will be discussed in greater detail presently.

The pawl 71 is so disposed on the slide 64 that when the slide 64 is disposed in normal at-rest position, as shown in FIG. 4, the latching ear 72 is disposed in underlying relation to the upper one of the two forwardmost pins 69 on the drive wheel 13, as shown in FIG. 4. At this same time, the lower one of the two forwardmost pins 69 on the drive wheel 13 is engaged with the rear edge 70 of the slide 64, as shown in FIG. 4. It will be remembered that in this position of the slide 64 the plate 74 is disposed in lowermost position wherein the space between the pawl 71 and the lower end of the plate 74 is less than the thickness of the pins 69, so that the aforementioned upper one of the forwardmost two pins 69 is disposed in abutting engagement with rear edge 79 of the lower end portion of the plate 74. Thus, it will be seen that in this position of the slide 64 the drive shaft 16 and, therefore, the chain 48 of shelves 28 is effectively held by the slide 64, the pawl 71, and the plate 74 against the rotation in either a clockwise or counterclockwise direction.

During downward movement of the slide 64 from the position shown in FIG. 4 toward the fully actuated position shown in FIG. 5, as caused by full forward movement of the slide 53 from its normal at-rest position shown in FIG. 4 to its fully actuated position shown in FIG. 5, the pawl 71 moves downwardly past the lower one of the forwardmost pins 69 into the underlying relation thereto shown in FIG. 5, this lower pin 69 camming the pawl 71 in a counterclockwise direction against the urging of the spring 77 to thereby permit the latching ear 72 of the pawl 71 to move into the aforementioned underlying relation thereto. During the same downward movement of the slide 64, the ear 80 on the plate 74 engages the pin 81 to thereby stop further downward movement of the plate 74 and cause the plate 74 and the pawl 71 to be separated against the urging of the spring 77, as shown in FIG. 5. This separating of the plate 74 and the pawl 71 is effective to uncover a notch or recess 82 formed in the rear edge 70 of the slide 64 immediately above the ear 72 on the pawl 71, as shown in FIG. 5. The notch 82 is slightly wider than the thickness of the pins 69 and is so disposed on the slide 64 that during return or upward movement of the slide 64, the pin then engaged by ear 72 on the pawl 71 may move into the notch 82, as shown in FIG. 6. During continued upward movement of the slide 64 the last-mentioned pin 69 rides out of the notch 82, and the ear 80 on the plate 74 by this time having moved out of engagement with the pin 81, the plate 74 is thereby permitted to be snapped downwardly by the spring 77 into normal at-rest position as shown in FIG. 4. As this occurs, the next succeeding pin 69 below the pin 69 engaged by the ear 72 moves into engagement with the rear edge 70 of the slide 64 to thereby again latch the drive shaft 16 and, therefore, the chain 48 of shelves 28 against rotation in either a clockwise or counterclockwise direction as viewed in FIG. 3.

A stop member 83 in the form of an elongated slide is mounted on the outer face of the side wall 6 in substantially horizontally extending position forwardly of the upper end portion of the slide 64, FIGS. 2, 4, 5, and 6. The stop member 83 includes a substantially L-shaped slot 84 having one leg 85 extending longitudinally therein, and another leg 86 projecting upwardly from the front end of the leg 85. Another slot 87 is formed in the rear end portion of the stop member 83 in longitudinal alignment with the leg 85 of the slot 84, and two pins 88 and 89 extend through the slots 84 and 87, respectively, and secure the stop member 83 to the outer face of the side

wall 6. A roller 90 is rotatably mounted on the rear end of the stop member 83, and when the stop member 83 is disposed in normal latching position, as shown in solid lines in FIG. 4, the roller 90 is disposed in engagement with the front edge 91 of the slide 64 to thereby hold the slide 64 rearwardly against the two forwardmost pins 69 of the drive wheel 13 in position to rotate the drive wheel 13 upon reciprocation of the slide 64 as hereinbefore discussed.

When the stop member 83 is disposed in the aforementioned normal position thereof, the pin 88 is disposed in the vertically extending leg 85 of the slot 84 to thereby hold the stop member 83 against longitudinal displacement. A tension coil spring 92 has one end secured to the front end portion of the stop member 83 and another end secured to the side wall 6 below the stop member 83 in position to yieldingly urge the slide 83 to move downwardly and thereby normally hold the pin 88 in the leg 85 of the slot 84. When it is desired to freely rotate the chain 48 of the shelves 28 around the shaft 15 and 16, such as, for example, when an operator is loading the shelves 28 with merchandise, the operator may move the stop member 83 forwardly out of aforementioned normal retaining position relative to the slide 64 by vertical pivoting the forward end portion of the stop member 83 upwardly against the urging of the spring 92 and then pulling the stop member 83 forwardly into position wherein the pin 88 is disposed in the rear end of the leg 85 of the slot 84, as shown in broken lines in FIG. 4. The leg 85 and the slot 87 are of sufficient length that this forward movement of the stop member 83 moves the roller 90 away from the slide 64 a sufficient distance that the slide 64 may be pivoted around the pin 67 in a counterclockwise direction into the position shown in broken lines in FIG. 4, wherein the slide 64 is disposed forwardly of the pins 69 a sufficient distance to permit free rotation of the drive wheel 13, the bracket 66 being of sufficient length to permit this pivotal movement of the slide 64. With the drive wheel 13 and, therefore, the chain 48 of shelves 28 thus free for rotation by the operator it will be seen that the operator may readily rotate the chain 48 of shelves 28 around the shafts 15 and 16 during the replenishing of any empty shelves 28. The merchandise to be inserted into the shelves 28 may be inserted by the operator either through the front of the housing into the stack 46 or through the rear of the housing 2 to the housing 47, and after the empty shelves have thus been replenished the operator may manually rotate the chain 48 of shelves 28 back to position wherein the shelf 28 which was disposed in position to discharge the next article onto the platform 51 when the restocking operation began is again disposed in that position. The operator may then move the stop member 83 back into its latching position, as shown in solid lines in FIG. 4, and the vending device 1 is again fully loaded and operable for vending operations.

As may be seen in FIG. 3, the platform 51 is triangular in transverse cross section. It comprises a closed elongated housing which is rotatably mounted between the side walls 5 and 6 by a rod 93 which extends along the longitudinal center line of the platform 51 and is journaled in the side walls 5 and 6. The ends of the platform 51 are secured to the shaft 93 extending there-through by suitable means such as, for example, welding, so that the platform 51 is rotatable with the shaft 93. The platform 51 is preferably of such length as to fit between the side walls 5 and 6 with a relatively snug but freely rotatable fit, and a drive wheel 94 is mounted on and secured to the end portion of the shaft 93 which projects outwardly from the side wall 6, FIGS. 4, 5 and 6.

The drive wheel 94 has three pins 95 projecting outwardly from the outer face thereof. The pins 95 are equally spaced around the periphery of a circle which has the longitudinal center line of the shaft 93 as its center, and are so disposed on the drive wheel 94 that

when the slide 53 is disposed in normal at-rest position, two of the pins 95 are disposed in abutting relation to the horizontal plane of the upper edge 96 of the slide 53 and the third pin 95 is disposed vertically above the shaft 93, as shown in FIG. 4.

The slide 53 has a pawl 97 pivotally mounted by a pin 98 to the outer face thereof. The pawl 97 has an ear 99 thereon, and is so disposed on the slide 53 that when the slide 53 is disposed in normal at-rest position the pawl 97 is disposed between the two aforementioned lower pins 95 with the ear 99 disposed immediately forward of the rearwardmost one of these two pins 95. A tension coil spring 100 has one end portion connected to the pawl 97 and another end portion connected to the slide 53 in position to urge the pawl 97 to rotate in a counterclockwise direction as viewed in FIG. 4, around the pin 98, and a stop pin 101 is disposed on the slide 53 in position to limit such counterclockwise rotation of the pawl 97 to the position wherein the ear 99 is disposed in the upwardly projecting relation to the slide 53 shown in FIG. 4.

The forward stroke of the slide 53 is of such length that when the slide 53 moves from the normal at-rest position in FIG. 4 to the fully actuated position shown in FIG. 5, the pawl 97 moves forwardly of the front one of the two pins resting on top of the slide 53, as shown in FIG. 5, the pawl 97 being cammed in a clockwise direction by the last-mentioned pin 95 to thereby permit the pawl 97 to move past the last-mentioned pin 95. The slide 53 has a slot 102 in the upper edge portion disposed immediately rearwardly of the ear 99 of the pawl 97, when the pawl 97 is disposed in the aforementioned normal position. The slot 102 is of slightly greater width than the thickness of the pins 95. During return movement of the slide 53 from the fully actuated position shown in FIG. 5 to the normal at-rest position shown in FIG. 4, the ear 99 on the pawl 97 engages the forwardmost one of the two pins 95 and thereby causes the drive wheel 94 to rotate in a counterclockwise direction as viewed in FIGS. 4 and 5. During this rotation, the pin 95 engaged by the ear 99 moves downwardly into the slot 102 and then upwardly out of the slot 102 into the aforementioned overlying abutting relation to the horizontal plane of the upper edge 96 of the slide 53. Thus, this rearward movement of the slide 53 is effective to rotate the drive wheel 94 through one-third of a revolution, to thereby bring the next succeeding pin 95 into engagement with the upper surface 96 of the slide 53 forwardly of the pawl 97. A pawl 103, mounted on side wall 6, is urged by a spring 104 into engagement with the periphery of the wheel 94, and engages in respective notches 105 in the periphery of the wheel 94 when the latter is disposed in normal at-rest position.

The aforementioned rotation of the drive wheel 94 through a one-third of a revolution is effective to likewise rotate the shaft 93 and, therefore, the platform 51 through one-third of a revolution. This rotation of the platform 51 is effective to drop the article previously briefly disposed on the upper surface thereof, such as, for example, the article 52 shown in FIG. 3 downwardly onto the chute 13 so that it may slide downwardly therealong and be discharged outwardly through the opening 11 in the front of the vending machine 1.

The pawl 97 is so disposed on the slide 53, and the pins 95 are so disposed on the wheel 94, that the platform 51 is rotated into position wherein the upwardly disposed surface thereof in normal at-rest position, as shown in FIGS. 3 and 4, is rotated into vertically extending position wherein it is effective to drop the article disposed thereon, such as the aforementioned article 52, well in advance of the time that the next succeeding shelf 23 in the chain 43 moves into discharge position past the guideway 14, as is shown in FIG. 6. When the platform 51 has been rotated into the position wherein

the aforementioned previously uppermost side thereof has been moved into vertically extending discharge position, the next succeeding side has already moved outwardly past the forward end of the guideway 14, as shown in FIG. 6, and during continued rotation of the drive wheel 94 by the slide 53 and the chain 48 of shelves 28 by the slide 64 this next succeeding side of the platform 51 moves into position to receive the next article to be discharged from the shelf 28 moving along the guideway 14 toward the bottom of the stack 46, so that when this next succeeding shelf clears the forward end of the guideway 14 the platform 51 is disposed in position to supportingly receive the article discharged from the last-mentioned shelf.

Thus, it will be seen that at the close of each cycle of operation of the vending machine 1, the article to be dispensed from the machine during the next cycle of operation thereof is disposed in display position on the platform 51, wherein it is readily visible from outside the machine 1 through the window 9. Also, the merchandise in the machine is well protected from tampering or vandalism from outside the machine through the discharge opening 11.

It will be appreciated by those skilled in the art that although I have shown the dispensing device 1 as embodying a manually operated driving mechanism 4, this is merely by way of illustration, and not by way of limitation, and other types of driving mechanism such as, for example, electrical drive mechanisms, and the like, may be embodied therein without departing from the purview of the present invention.

From the foregoing, it will be seen that the present invention affords a novel dispensing device wherein novel shelves are constituted and arranged therein in a novel and expeditious manner for storing and discharging articles therefrom.

Also, it will be seen that the novel vending device disclosed herein embodies novel shelves which are constituted and arranged in a novel and expeditious manner.

In addition, it will be seen that the vending device disclosed herein embodies novel storage and vending mechanism and novel drive mechanism therefor constituted and arranged in a novel and expeditious manner.

Also, it will be seen that the present invention affords a novel vending device which is practical and efficient in operation and may be readily and economically produced commercially.

Thus, while I have illustrated and described the preferred embodiment of my invention, it is to be understood that this is capable of variation and modification, and I therefore do not wish to be limited to the precise details set forth, but desire to avail myself of such changes and alterations as fall within the purview of the following claims.

I claim:

1. In a vending machine, a plurality of shelves, each of said shelves including an inner end having an outwardly projecting tongue formed as an integral part of said end and uniplanar therewith, and a substantially complementary opening formed in said end, said shelves being connected together seriatim in an endless chain with said tongue on each shelf engaging that portion of an adjacent shelf which defines said complementary opening therein, and drive means extending through said chain of shelves and operatively engaged therewith for rotating said chain of shelves therearound.

2. In a vending machine, a plurality of shelves, each of said shelves including an inner end having an outwardly projecting generally T-shaped tongue and a substantially complementary opening therein, said shelves being connected together seriatim in an endless chain with said tongue on each shelf engaging at least a portion of an adjacent shelf which defines said complementary opening therein, sprocket means directly operatively engaged with said chain of shelves in supporting relation thereto, and

means for rotating said sprocket means to thereby rotate said chain of shelves.

3. In a vending machine, a plurality of shelves, each of said shelves including an inner end having an outwardly projecting generally T-shaped tongue and a substantially complementary opening therein, said shelves being connected together seriatim in an endless chain with said tongue on each shelf engaged in said opening in a respective adjacent shelf, and multi-lateral sprocket means disposed within said chain in position to directly drivingly engage said inner ends of said shelves in parallel juxtaposition thereto whereby rotation of said sprocket means is effective to rotate said chain of shelves therearound, and means for rotating said sprocket means.

4. In a vending machine a plurality of shelves, each of said shelves having an opening therein and an outwardly projecting generally T-shaped tongue, said shelves being directly pivotally connected to each other in series to form an endless chain by said tongues on each of said shelves extending into openings in respective other ones of said shelves, two elongated rotatable shafts, each of said shafts having square sprocket means mounted thereon for rotation therewith, said shafts being disposed in spaced parallel relation to each other and extending through said chain of shelves in position to support the latter directly on said sprocket means in such position that shelves in said chain are disposed in two substantially vertically extending stacks on opposite sides of said shafts with shelves in said stacks disposed in substantially horizontally extending position, and means for rotating one of said shafts to thereby rotate said chain of shelves around said shafts.

5. In a vending machine a plurality of tubular-shaped shelves adapted to receive therein articles to be dispensed from said machine, each of said shelves having an open end and a closed end, said shelves being directly connected to each other seriatim in an endless chain with said closed ends projecting inwardly toward each other and said open ends projecting outwardly away from each other, means rotatably supporting said chain of shelves for rotation in a vertical plane, a stationary guideway disposed below said chain of shelves in closely underlying relation to the initial path of travel of said open ends under said chain of shelves during said rotation of said chain, said guideway terminating short of the completion of said path of travel of said open ends, a platform disposed below said guideway, said platform having a normal position wherein it is disposed in position to receive such an article from one of said shelves as soon as said one shelf has moved past said guideway in said movement of said one shelf along said path of travel, and means operatively connected to said chain of shelves and to said platform for simultaneously rotating said platform and said chain of shelves in timed relation to each other through paths of movement effective to first move said platform into position to dump said article therefrom, then move said platform into article-receiving position, and then move the next succeeding shelf in said chain past said guideway into position to drop the article in said last-mentioned shelf onto said platform.

6. In a vending machine a plurality of tubular shelves adapted to receive therein articles to be dispensed from said machine, each of said shelves having an open end and a closed end, said shelves being connected to each other in an endless chain with said closed ends pointing inwardly and said open ends pointing outwardly with respect to said chain, means rotatably supporting said chain of shelves in a vertical plane wherein two substantially parallel stacks of shelves extend vertically with said shelves in said stacks extending substantially horizontally, said chain of shelves being rotatable in said vertical plane through a path of movement wherein said shelves in one of said stacks swing over the top of said chain to the other of said stacks and said shelves in said other stack swing under said chain to said one stack, a stationary guideway

disposed under said chain in closely underlying relation to the initial portion of the path of movement of said open ends of said shelves moving from said other stack to said one stack to thereby retain said articles in said shelves during said initial movement, said guideway terminating in such relation to said one stack that when said open ends move past said guideway in said last-mentioned path of movement the respective shelves are disposed in downwardly extending discharge position effective to drop said articles therefrom, a platform disposed below said guideway, said platform having a normal position, wherein it is disposed in position to receive such an article from any of said shelves disposed in said discharge position, and an actuated position, wherein it is effective to drop said article therefrom, and means for rotating said chain of shelves and moving said platform between said normal and actuated positions in such timed relation to each other as to dispose said platform in said normal position when any one of said shelves moves into said discharge position and thereafter move said platform to said actuated position before the next succeeding shelf moves into said discharge position.

7. In a vending machine a plurality of tubular shelves adapted to receive therein articles to be dispensed from said machine, each of said shelves having an open end and a closed end, said shelves being connected to each other in an endless chain with said closed ends pointing inwardly and said open ends pointing outwardly with respect to said chain, means, including multi-lateral sprocket members disposed within said chain in position to directly supportingly engage said shelves, for rotatably supporting said chain in a vertical plane wherein two substantially parallel stacks of shelves extend vertically with said shelves in said stacks extending substantially horizontally in position to support therein such articles to be dispensed from said machine, said chain of shelves being rotatable in said vertical plane through a path of movement wherein said shelves in one of said stacks swing over the top of said chain to the other of said stacks and said shelves in said other stack swing under said chain to said one stack, a guideway disposed under said chain in closely underlying relation to the initial portion of the path of movement of said open ends of said shelves moving from said other stack to said one stack to thereby retain said articles in said shelves during said initial movement, said guideway terminating in such relation to said one stack that when said open ends move past said guideway in said last-mentioned path of movement the respective shelves are disposed in downwardly extending discharge position effective to drop said articles therefrom, a platform disposed below said guideway, said platform having a normal position, wherein it is disposed in position to receive such an article from any of said shelves disposed in said discharge position and to support said article in display position visible from outside said vending machine, and an actuated position, wherein it is effective to drop said article therefrom, and means for rotating said chain of shelves and moving said platform between said normal and actuated positions in such timed relation to each other as to dispose said platform in said normal position when any one of said shelves moves into said discharge position and thereafter move said platform to said actuated position before the next succeeding shelf moves into said discharge position.

8. A vending machine for storing and dispensing articles comprising a housing, a plurality of tubular shelves, each of said shelves having an open end and a closed end, each of said shelves having a substantially T-shaped tongue projecting from said closed end and a substantially T-shaped opening through said closed end, said shelves being pivotally connected directly to each other in an endless chain with said tongue on each shelf pivotally connected in said opening in a respective other one of said shelves, two shafts extending through said chain and rotatably mounted in said housing, square sprocket mem-

bers mounted on said shafts and directly supportingly engaging said chain of shelves in position to support said chain in two substantially vertically extending passes wherein said shelves in said passes are disposed in substantially horizontally extending article-supporting position, means for rotating one of said shafts to thereby rotate said sprocket members thereon and thereby rotate said chain of shelves around said shafts to thereby sequentially swing said shelves from one of said passes through a downwardly extending position to the other of said shelves, a partition wall mounted in said housing in closely adjacent relation to the initial portion of the path of travel of said open ends of said shelves during movement of said shelves through said downwardly extending position to thereby retain said article in said shelves during said initial portion of said path of travel, said partition wall terminating in such spaced relation to said other pass that said shelves move out of alignment with said partition wall into discharge position during said last-mentioned path of travel while said shelves are disposed in said downwardly extending position to thereby permit said articles therein to drop therefrom, a multisided platform mounted in said housing below said discharge position of said shelves, said platform being rotatable in said housing from normal position, wherein one of said sides is disposed in position to receive said article from the one of said shelves disposed in said discharge position and to support said article in display position in said housing, through a dumping position effective to dump said article from said one side, back to normal position wherein the next succeeding one of said sides is disposed in said normal position, means in the bottom of said housing for discharging therefrom said articles so dumped from said platform, and means, including said first-mentioned means, operatively connected to said one shaft and said platform for so rotating said chain of shelves and said platform in such timed relation to each other that said platform is rotated from said normal position through said dumping position back to normal position while said chain is rotating a distance which moves one of said shelves out of said discharge position and moves the next succeeding shelf into said discharge position.

9. A vending machine as defined in claim 8 and in which said means for rotating said platform and said chain of shelves in timed relation to each other includes a drive wheel mounted on said one shaft, said drive wheel having a plurality of equally spaced pins extending therefrom, a slide reciprocally mounted adjacent to said wheel, a pawl disposed on said slide in position to sequentially drivingly engage said pins upon repeated reciprocation of said slide to thereby rotate said wheel, another slide reciprocable transversely to said reciprocation of said first-mentioned slide, said other slide being drivingly connected to said first-mentioned slide for reciprocating the latter during reciprocation of said other slide, another drive wheel drivingly connected to said platform, said other wheel having equally spaced pins projecting therefrom, and another pawl on said other slide in position to sequentially drivingly engage said other pins upon repeated reciprocation of said other slide to thereby rotate said other wheel.

10. In a vending machine of the type embodying a rotatably mounted shaft; a drive wheel drivingly connected to said shaft, said drive wheel having a plurality of equally spaced pins projecting therefrom, an elongated slide slidably mounted for reciprocation through a path of travel adjacent to said drive wheel from a normal position through an actuated position and back to said normal position, said slide being disposed closely adjacent to two of said pins when said slide is disposed in said normal position, a pawl pivotally mounted on said slide and normally projecting outwardly therefrom toward said pins, said pawl being disposed in underlying engagement with one of said two pins when said slide is disposed in said normal position, said pawl being disposed in underlying engagement

with the other of said two pins when said slide is disposed in said actuated position and being drivingly engaged with said other pin during movement of said slide from said actuated position to said normal position to thereby rotate said wheel during said last-mentioned movement, said slide having a slot disposed thereon in position for said other pin to move thereinto and thereout of during said movement of said slide from said actuated position to said normal position, a slide plate slidably mounted on said slide for movement longitudinally thereof, said slide plate being disposed in covering relation to said slot in position to prevent said pins from entering said slot when said slide is disposed in said normal position, means yieldingly urging said side plate toward said covering relation to said slot, abutment means disposed in position to engage said slide plate during said movement of said slide from said normal position to said actuated position to thereby hold said slide plate against the urging of said urging means and permit said slot to move out from under said slide plate during the remainder of said movement of said slide toward said actuated position to thereby uncover said slot for reception of said other pin in said actuated position, and means for so reciprocating said slide.

11. The combination defined in claim 10, and in which said slide is pivotally mounted for swinging movement toward and away from said wheel between said position adjacent to said pins and a released position wherein said slide is disposed away from said wheel a sufficient distance to permit free rotation of said wheel, and latching means normally disposed in position to hold said slide in said position adjacent to said pins, said latching means being movable into position wherein it is ineffective to hold said slide in said last-mentioned position to thereby free said slide for swinging movement to said released position.

12. In a vending machine of the type embodying two shafts to be simultaneously rotated in timed relation to each other; first and second drive wheels drivingly connected to respective ones of said shafts, each of said wheels having pins projecting outwardly therefrom, a first slide slidably mounted for reciprocation through a path of travel adjacent to said first wheel, a pawl pivotally mounted on said first slide in position to pass over said pins on said first wheel during movement of said first slide in one direction along said path of travel therefor and to drivingly engage said pins on said first wheel to thereby rotate said first wheel and said shaft connected thereto during movement of said first slide in the other direction along said path of travel therefor, said first slide having a slot therein adjacent to said pawl for receiving said pins on said first wheel during said reciprocations of said first slides, a second slide slidably mounted for reciprocation through a path of travel adjacent to said second wheel, another pawl pivotally mounted on said second slide in position to pass over said pins on said second wheel during movement of said second slide in one direction along said path of travel therefor and to drivingly engage said pins on said second wheel to thereby rotate said second slide in the other direction along said path of travel therefor, said second slide having a slot therein adjacent to said pawl for receiving said pins on said second wheel during said reciprocations of said second slide, said second slide having an elongated slot therein disposed at an acute angle to the path of travel of said first slide, and pin means carried by said first slide and extending through said last-mentioned slot in said second slide in operative engagement with said second slide to thereby reciprocate said first slide through said path of travel therefor upon reciprocation of said second slide through said path of travel of the latter.

13. In a vending machine a plurality of shelves, each of said shelves having an open frontal portion and a generally closed rear portion, said rear portion having a projecting tongue formed as an integral part of said rear por-

tion and uniplanar therewith, and an opening therein adapted to receive the tongue on an adjacent shelf, two rotatably mounted shafts disposed in parallel spaced relation to each other, each of said tongues being connectingly disposed in one of said openings in a respective other one of said shelves to thereby directly connect said shelves to each other in an endless chain around said shafts, sprocket means on at least one of said shafts directly engaged with said shelves within said chain in position to rotate said chain of shelves around said shafts upon rotation of said one shaft, and means for rotating said one shaft.

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