

July 24, 1951

L. W. SPRINGSTEEN

2,561,828

VENDING MACHINE

Filed Feb. 20, 1950

3 Sheets-Sheet 1

Fig. 1.

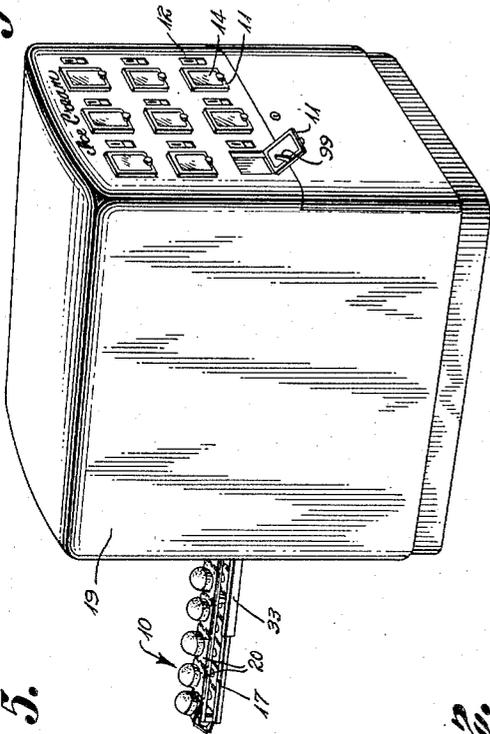


Fig. 5.

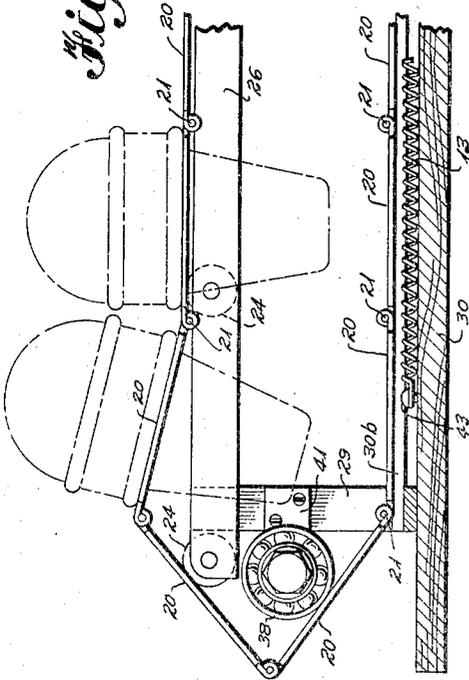
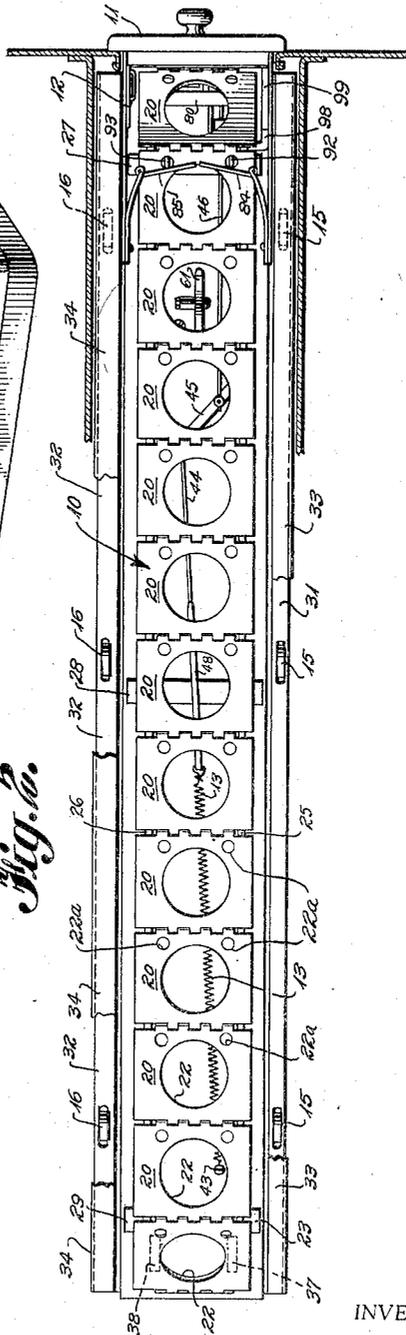


Fig. 2.



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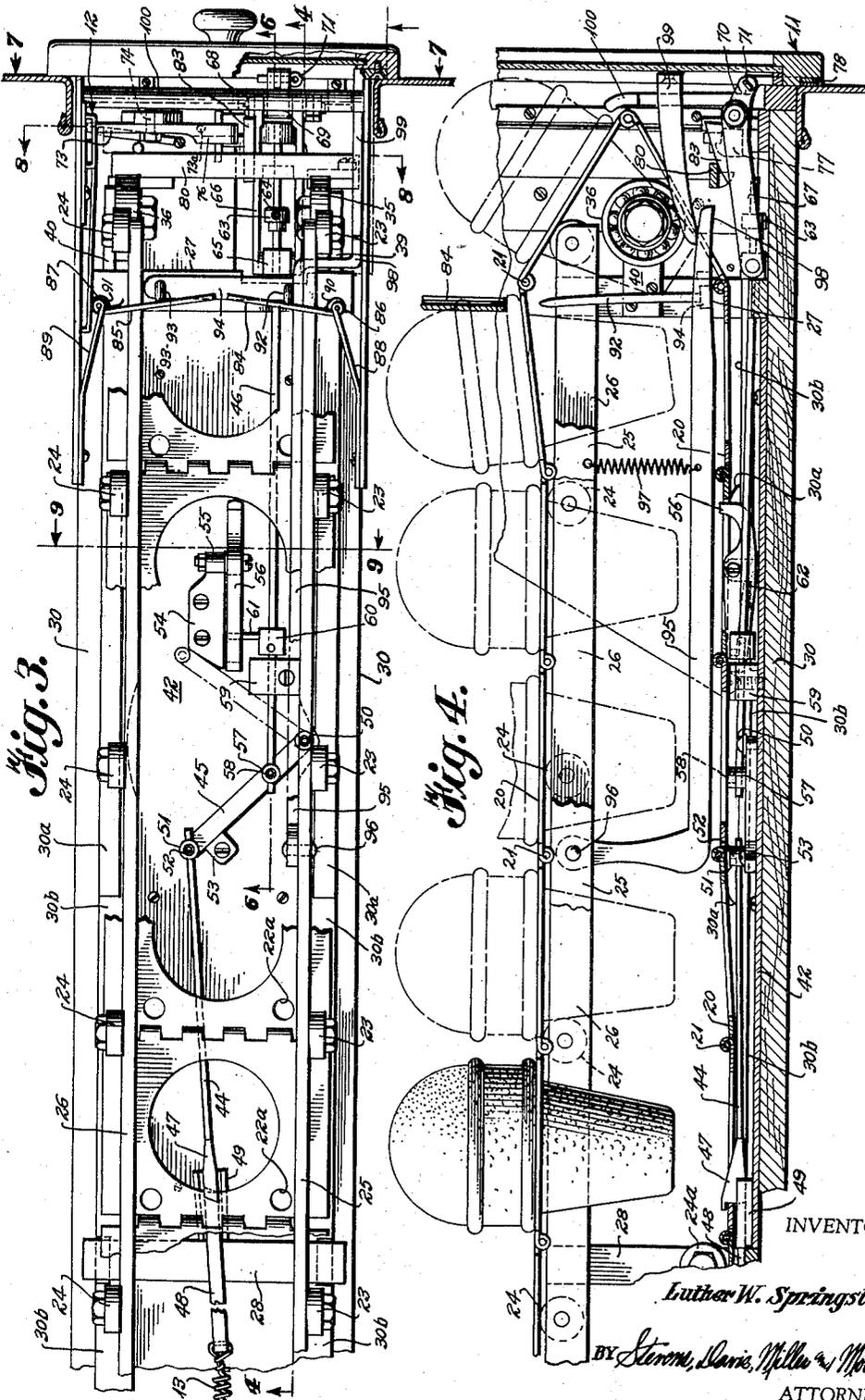
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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

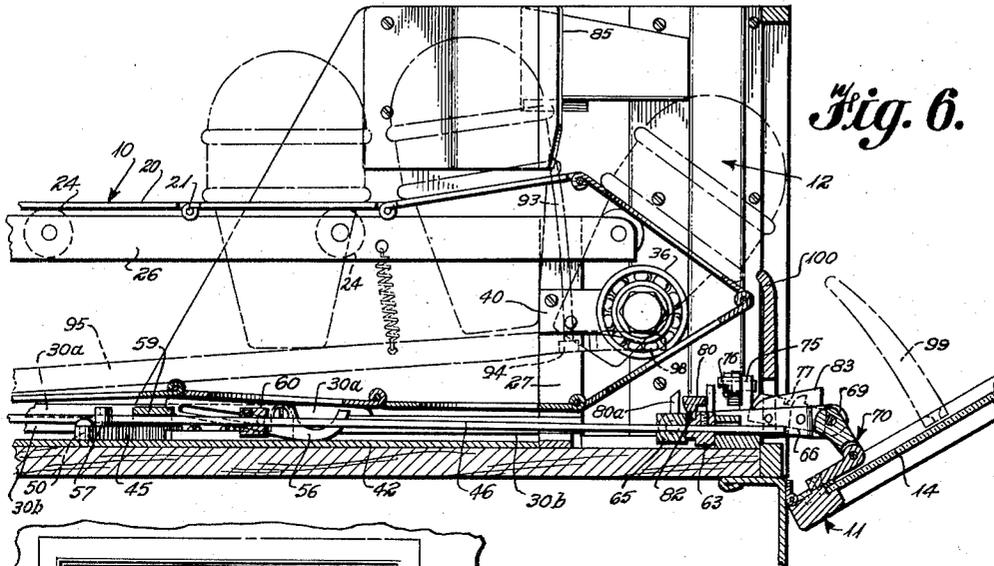


Fig. 6.

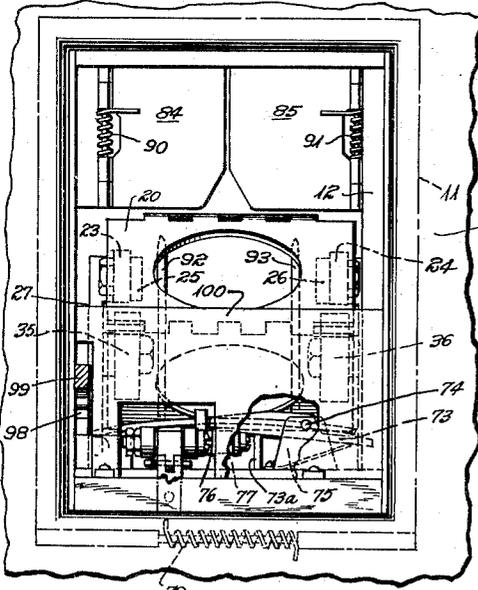


Fig. 7.

Fig. 8.

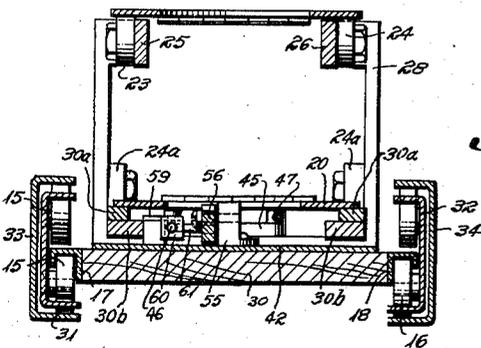
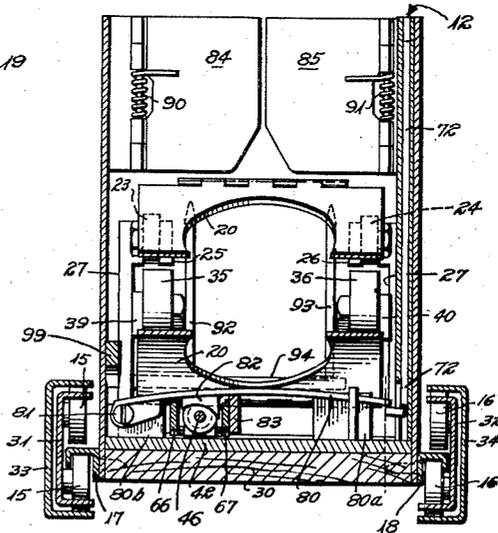


Fig. 9.

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# UNITED STATES PATENT OFFICE

2,561,828

## VENDING MACHINE

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Application February 20, 1950, Serial No. 145,260

5 Claims. (Cl. 312-97)

1

This invention relates to vending machines and more particularly to a machine having particular utility in the vending of unwrapped frozen food products such as ice cream cones.

In the vending machine art certain basic problems are always present and these problems are mitigated or aggravated to some extent by the nature of the articles to be sold. Thus, in the selling of cigarettes or other such wrapped articles, the problems encountered in designing a satisfactory vending machine are mitigated to a considerable extent due to the fact that wide latitude of storage temperature conditions is possible, the articles themselves are not sensitive to position and are rugged enough to coact with machine parts. Furthermore, cigarettes, being wrapped, greatly reduce the effort which is required to maintain sanitary conditions.

On the other hand, in the vending of an unwrapped frozen food such as an ice cream cone, it is absolutely essential that the machine be accessible for easy and convenient cleansing, be reliable in operation under low-temperature conditions, be capable of operation wholly independently of the articles to be sold and also be capable of protecting those articles against mechanical damage before sale.

It is with the solution of the latter type of problem that the present invention is primarily concerned and it is therefore an object of this invention to provide a vending machine in which a large number of ice cream cones or the like can be stored under ideal conditions of refrigeration and mechanical support until dispensed to the customer.

It is a further object of this invention to provide dispensing or vending units which may be combined in groups within a single refrigerating cabinet in such manner that the units may be individually removed from the cabinet for cleaning or maintenance.

According to the present invention it is proposed to provide a storage conveyor so arranged that it may be actuated by operation of a transparent door under the control of a coin lock so that the sales advantage of visual access to the contents of the machine is achieved.

Other objects and advantages of this invention will be apparent upon consideration of the following detailed description of a preferred embodiment thereof in conjunction with the annexed drawings wherein:

Figure 1 is a perspective view of a typical commercial installation of a group of dispensing machines of the type of the present invention;

2

Figure 2 is a top plan view of a single dispensing machine according to the present invention;

Figure 3 is a fragmentary top plan view to an enlarged scale of the dispensing end of the machine of Figure 1, some parts being broken away for convenience of illustration;

Figure 4 is a view partially in section along the line 4-4 of Figure 3 and partially in side elevation;

Figure 5 is a view partially in section and partially in side elevation of the filling end of the machine of Figure 3;

Figure 6 is a view partially in side elevation and partially in section along the line 6-6 of Figure 3 of the dispensing end of the machine, the dispensing door being shown in open position;

Figure 7 is an end view of the machine taken from the dispensing end along the line 7-7 of Figure 3;

Figure 8 is a view in section taken on the line 8-8 of Figure 3; and,

Figure 9 is a view in section taken on the line 9-9 of Figure 3.

Before discussing the drawings in detail, a broad summary of the general mode of operation is helpful to an understanding of the various structural features embodied in the machine. Basically, each dispensing unit comprises a conveyor 10 adapted to support articles to be dispensed and to advance said articles intermittently toward an access door 11 in response to each operation of that door. The opening of the door is coin controlled and the particular coin controlling apparatus shown at 12 forms no part of this invention but is merely exemplary of one type of coin control apparatus which may be used.

The actual advance of the conveyor 10 is effected upon the closing of the door 11 by the release of energy which is stored in a spring 13 incident to the opening of the door. The door 11 is provided with a sight window 14 and visual access to an article to be dispensed is therefore possible.

So that the conveyor can be conveniently filled with articles to be dispensed, the whole machine is mounted on groups of paired rollers 15 and 16, see Figures 2, 8 and 9, coacting with tracks 17 and 18. By this expedient the entire machine can be withdrawn from the cabinet in which it is located so that the conveyor can be conveniently cleaned or refilled.

Now referring more specifically to the drawings and in particular to Figure 1 thereof, a refrigerating cabinet 19 is shown as provided with nine of the machines or units of the present in-

vention. It is visualized that a group of machines arranged in a single refrigerating cabinet will be particularly desirable in dispensing ice cream cones of different flavors. Furthermore, by grouping the machines they are more convenient and economical to refrigerate.

Through back doors in the cabinet 19, one associated with each unit, individual access to each conveyor 10 is possible, the particular conveyor to be refilled or serviced being withdrawn by use of the roller-track arrangement previously mentioned.

Since all of the machines with which the cabinet is equipped may be alike, reference can now be made to a particular machine and an understanding of its details of construction will afford an understanding of all of the machines or units with which the cabinet 19 is provided.

The conveyor 10 of the machine of Figure 2 is comprised of a large number of individual sheet metal plates 20 each provided with marginal integral ferrules interdigitating to define space for pins 21 which connect the plates together in articulated fashion. Each metal plate is provided with a central aperture at 22 for the accommodation of the article to be dispensed and through which the conveyor advancing mechanism operates, as well as a pair of small apertures 22a through which a lock operates.

The upper run of the conveyor is supported by groups of spaced rollers 23 and 24, mounted on supporting rails 25 and 26 for free rotation. The rails 25 and 26 are held in position by three U-shaped brackets 27, 28 and 29, see Figures 5 and 9. The bases of the U-shaped brackets are fastened to a base plate 30 to which unit supporting channels 17 and 18 are also attached. The channels 17 and 18 ride between the paired rollers 15 and 16 which in turn are supported by elongated brackets 31 and 32, see Figures 8 and 9. The brackets 31 and 32 have apertures therein through which the paired rollers 15 and 16 pass to bear against the inner shanks of U section tracks 33 and 34, respectively. The tracks 33 and 34 are suitably supported in the cabinet 19 by any convenient means, not shown. It will be recognized that the specific wheel and track arrangement involving parts 15 to 18, inclusive, and 31 to 34, inclusive, is well known in the file cabinet art.

Having now described the general mounting of the machine in the supporting cabinet, further details of the conveyor 10 and the mounting means therefor may be considered. At opposite ends of the conveyor 10 and on each side of it there are mounted ball bearing guiding rollers 35, 36, and 38. The rollers 35 and 36, at the dispensing end of the machine, are supported on brackets 39 and 40, respectively, which are, in turn, mounted on the vertical shanks of the U bracket 27, see Figures 4 and 8. The guiding rollers 38 are similarly supported from brackets 41, only one of which shows in the drawings, see Figure 5. The brackets 41 are attached to and extend from the vertical shanks of the U bracket 29. The lower run of the conveyor is not associated with guiding rollers except for the rollers 24a which are attached near the base of the bracket 28 on opposite sides of the conveyor, see Figure 9.

The lower run of the conveyor 10 is spaced from the floor 30 by a pair of stationary guide bars 30a which can best be seen in Figure 9. The guide bars 30a rest on longitudinally extending spacer bars 30b which interconnect the brackets 27, 28 and 29.

On the floor plate 30 of the machine there is mounted a metal supporting plate 42 which extends for nearly the full width of the floor plate 30 lengthwise of the machine between the U brackets 27 and 28, see Figure 4. Most of the mechanism for advancing and holding the conveyor is mounted on this plate 42. Basically, this mechanism comprises the operating tension spring 13, which is anchored at one end by a pin 43 to the floor 30, an operating link 44, a lever 45 and an operating rod 46.

The operating link 44 includes a dog 47 which is arranged to engage the portion of a plate 20 which defines the central aperture at 22. The dog is connected through an integral flat metal tape 48 to the unanchored end of the spring 13. A small guiding channel 49 fastened to the plate 42 serves to guide the dog 47 in its movements to be hereinafter more fully described.

It can now be seen that the spring 13, under tension, biases the dog 47 to the left of Figures 3 and 4 and will cause movement of the lower run of the conveyor 10 in that direction unless it is otherwise prevented. It is also apparent that pulling the lever 46 to the right of Figures 3 and 4 will not cause the dog 47 to displace the lower run of the conveyor, since movement on the part of link 44 to the right of the position of Figures 3 and 4 merely advances the dog 47 from the position shown in Figure 3 to a similar position in respect to the next plate 20 to the right on the lower run of the conveyor.

Movement of the link 44 to the right of the Figure 3 position is, as stated above, accomplished through movement of rod 46 and lever 45. Lever 45 is mounted for pivotal movement at one of its ends by a pin 50. At the other end a pivoted boss 51 receives the end of the rod 44 which is held by a set screw 52. A stop 53 is bolted to the bottom plate 42 and this stop serves to limit the movement of the lever 45 in a counterclockwise direction as it is viewed in Figure 3. Movement in a clockwise direction is limited by a stop 54 which is also fastened to the bottom plate 42 and which provides a bearing 55 for the pivot shaft of a cam 56 which is thus mounted for movement about a horizontal axis.

Between the pivoted boss 51 and the pivot point 50, the lever 45 is provided with a pivotally-mounted boss 57 which receives one end of the rod 46 which is held in position by a set screw 58. A small guiding bracket 59 acts to guide the left-hand end of the rod 46 as it is viewed in Figure 3.

The rod 46 between its door-actuated end, which has not yet been described, and the end which is connected to the pivoted boss 57, is provided with a cam operator which consists of a block 60 adjustably mounted in fixed position on the rod 46 and carrying a pin 61 acting in an actuating slot 62 within the cam 56, see in particular Figures 3 and 4. It can now be seen that when the rod 46 is in the full line position of Figure 3, the right-hand end of the cam 56 coacts with the aperture-defining edges of one of the conveyor plates 20 to lock the lower run of the conveyor against movement to the left as viewed in Figure 3. On the other hand, when the lever 45 is in the broken line position of Figure 3 which is caused by movement of the rod 46 to the right of the Figure 3 position by opening the door 11, the pin 61 acting in the groove 62 raises the left-hand end of the cam 56 as it is viewed in Figure 4 and depresses the right-hand or locking end so that the lower run of the conveyor is conditioned for movement from right to left as viewed in Figure 3. When

the rod 46 moves to the left of Figure 3 under the action of spring 13, the pin 64 riding in the groove 62 of the cam 56 moves the right-hand end of the cam 56 to locking position at the end of the stroke of the dog 47 so that each stroke of the dog 47 accurately positions the conveyor by preventing overtravel. In this regard attention is directed to the coaction of the right-hand end of the cam 56 with the aperture-defining edge of the plates 20. See and compare Figures 4 and 6.

The rod 46 is actuated by opening and shutting the door and to this end it is provided with a sleeve 63 which is locked in position by a set screw 64. This sleeve 63 receives thrust from a block 65 which is mounted to slide on the rod 46 and is freely pivoted between a pair of arms 66 and 67 at one end thereof. The pair of arms 66 and 67 are pivotally connected at the other end thereof by a pin 68. The pin 68 connects the arms to an ear 69 which is integral with an L-shaped bracket 70, one end of which is permanently fastened to the inner bottom frame of the door 11. The L-shaped bracket at the right angle bend thereof is made of interdigitating parts which are held together by a pin 71 in the nature of a cotter pin which can be easily extracted to free the entire assembly from the door when the mechanism is to be withdrawn from the back end of the cabinet for refilling or servicing.

It can now be seen that when the door is opened the L-shaped bracket 70 acting through the integral ear 69 pulls the pin 68 which, through the arms 66 and 67, pulls the block 65 which bears against the sleeve 63 and causes the rod 46 to move to the right of the Figure 3 position. When the door is closed, the block 65 moves away from the sleeve 63 and permits the spring 13 to advance the conveyor a distance equal to the length of one of its component plates 20. The remainder of the undescribed mechanism relates to the mechanism for locking the door and that mechanism will now be described.

When a coin is applied to the check control apparatus 12, see Figure 8, a rod 72 is caused to project vertically downwardly from the bottom of the check control assembly. This rod, in projecting, engages one end of a lever 73 which is pivoted at 74 between its ends to the standards 75. The end of the lever 73 remote from the rod 72 is provided with paired teeth 76 which coact with dogs 77 which are mounted on the arm 66. A pin 73a serves to limit the downstroke of the end of the lever 73 which is provided with the teeth 76. When the right-hand end of the lever 73 is pushed down, as it is viewed in Figure 7, the left-hand end disengages the teeth 76 from the dogs 77 whereby the door 11 is released to be opened. In this regard note that the door 11 is provided with hinges 78 at the bottom edge and with a spring 79 for normally biasing the door 11 to a closed position.

Also incident to the opening of the door 11 is the actuation of a lock acting on the sleeve 63. This lock is comprised of a lever 80 pivoted at 81, see Figure 8, and locking element 82 projecting from the lower edge of the lever. The lever 80 operates in front of guiding blades 80a and 80b which project upwardly from the bottom plate 42. The supporting structure which supports the dogs 77 from the frame 66 also includes a cam 83 which acts on the underside of the lever 80 to raise the same as the door is

closed and to lower the same as the door is opened. Thus, as the door is opened, the sleeve 63 engages the beveled underface of the locking element 82 and raises the lever 80 to a height sufficient to permit the sleeve 63 to pass underneath the locking element 82. Immediately after the sleeve 63 passes under the locking element 82, the latter falls to a locked position in respect to the sleeve which it keeps until the cam 83 acts thereon almost at the completion of the closing of the door. Due to the delayed action of the cam 83, the door is just about entirely closed before the conveyor is actuated so that the next of the articles to be dispensed is not brought into position where it could be removed until the dogs 77 have already engaged with the teeth 76 to prevent the door from being opened again without first inserting another coin.

In order that the customer opening the door 11 shall not be apprised of the number of items contained on the upper run of the conveyor, a gate is provided at the right end of the upper run of the conveyor between the item in a position to be dispensed and the next item therebehind on the upper run. The gate can best be understood by concurrent reference to Figures 3 and 6. It comprises a pair of doors 84 and 85 which are connected by hinges 86 and 87 to supporting brackets 88 and 89 that are supported from the side of the machine. These doors are lightly spring urged to closed position but can be easily opened in a forward direction as the article to be dispensed is drawn there-through incident to operation of the conveyor. In this regard see the springs 90 and 91 as they show in Figure 7.

It will be observed that when the cam 56 is in the Figure 6 position, which is the position which it assumes when the door 11 is opened, the conveyor is free to move. This freedom, if discovered by a customer, could result in the emptying of the entire machine by payment of a single coin. Consequently, a lock is provided comprised of pins 92 and 93 which extend upwardly from the supporting bracket 94 which is fastened to a lever 95 which is pivoted at 96 to rail 25. A spring 97, extending in tension between the rail 25 and another portion of the lever 95, normally biases the lever to the Figure 6 position, at which time the pins 92 and 93 project through the apertures 22a of a conveyor link 20 to hold the conveyor against movement. So that the conveyor may be released for movement when the door is shut, a projecting portion 98 of the lever 95 lies in position to be engaged by a projection 99 fastened to and extending from the door. See and compare Figures 4 and 6. A shield 100 extends across the lower face of the conveyor at the dispensing end to prevent tampering with the operating apparatus.

It will be understood that the projection 99 acts sufficiently in advance of the locking element 82 so that the pins 92 and 93 are already withdrawn from the conveyor before the locking element 82 releases the sleeve 63. An additional and secondary function of the pins 92 and 93 is to restrain the doors 84 and 85 against opening when the main door 11 is open. This feature can best be understood by reference to Figures 3 and 6 in which it will be observed that the pins 92 and 93 in their upper position project through the plates 20 in front of the doors 84 and 85.

Although this invention has been described with respect to but a single embodiment thereof,

7

it is intended that the disclosed embodiment shall be regarded as exemplary in nature and that modifications may be made within the spirit and scope of the invention.

I claim:

1. A vending machine comprising a cabinet, a conveyor in said cabinet, spaced article supporting means on said conveyor, a spring, means actuated by said spring to advance said conveyor in increments equal to the spacing between adjacent article supporting means, a door in said cabinet affording access to one only of said article supporting means and means responsive to the opening of the door to store energy in said spring and means responsive to the closing of said door to cause said spring to actuate said conveyor.

2. A vending machine comprising a cabinet, a conveyor in said cabinet, spaced article supporting means on said conveyor, a spring, means actuated by said spring to advance said conveyor in increments equal to the spacing between adjacent article supporting means, a door in said cabinet affording access to one only of said article supporting means, door controlled means for storing energy in said spring in response to opening of the door, for locking said spring against action in response to the attainment of full open position of said door and for releasing said spring to act upon the completion of the closing of said door.

3. A vending machine comprising a cabinet, a conveyor horizontally disposed in said cabinet, a door in said cabinet affording access to one end of said conveyor, said conveyor being comprised of articulated links each having an article supporting cavity therein, a dog device movable from a first position engaging the defining edge of a link of the lower run of the conveyor to a second position in engaging relationship to that link of the lower run of the conveyor next adjacent in

8

the direction of the door, a limiting device for preventing overtravel of the conveyor, said limiting device being movable from a first position restraining conveyor travel to a second conveyor releasing position, a spring normally biasing said devices to their respective first positions, means responsive to opening of the door for moving said devices to their respective first positions and door actuated means to hold said devices in their second positions until the door is substantially closed whereupon the spring restores the devices to their first position and advances the conveyor one link.

4. A vending machine as claimed in claim 1 further comprising means to lock the conveyor against movement, a second spring biasing said conveyor locking means toward locking position, and means responsive to the closure of the door to hold said locking means in unlocked position against the bias of said second spring.

5. A vending machine as claimed in claim 3 further comprising link engaging means to lock the conveyor against movement, a second spring biasing said locking means to link engaging position, and means responsive to closure of the door less complete than that required to restore the devices to their first position for holding said locking means out of link engaging position.

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