

Feb. 10, 1942.

I. M. MILLER

2,272,750

REFRIGERATED APPLE VENDING MACHINE

Filed July 20, 1940

2 Sheets-Sheet 1

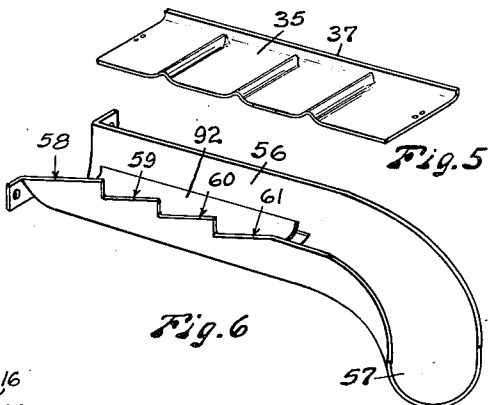
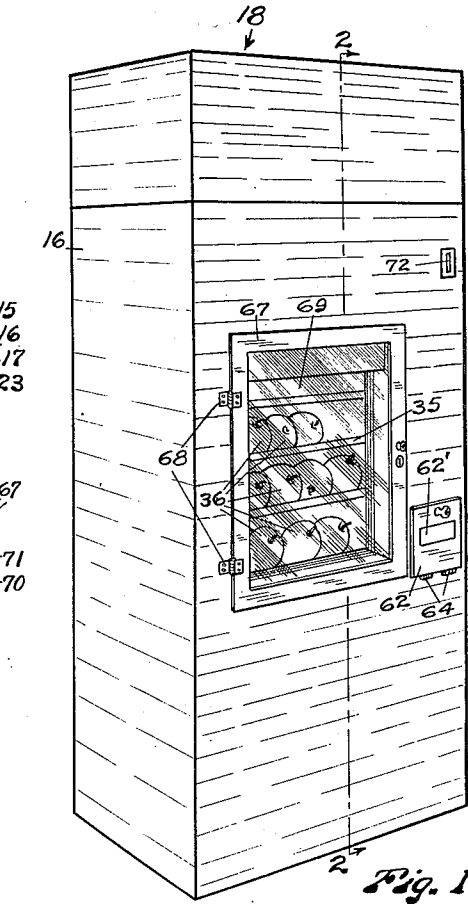
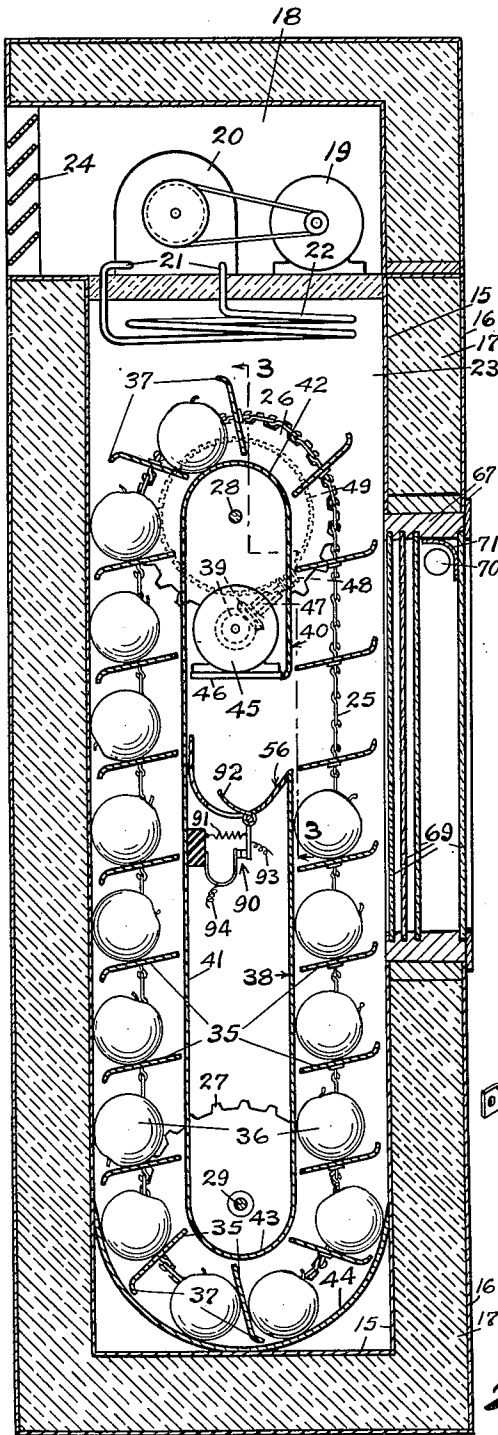


Fig. 2

Fig. 1

Fig. 5

Fig. 6

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2 Sheets-Sheet 2

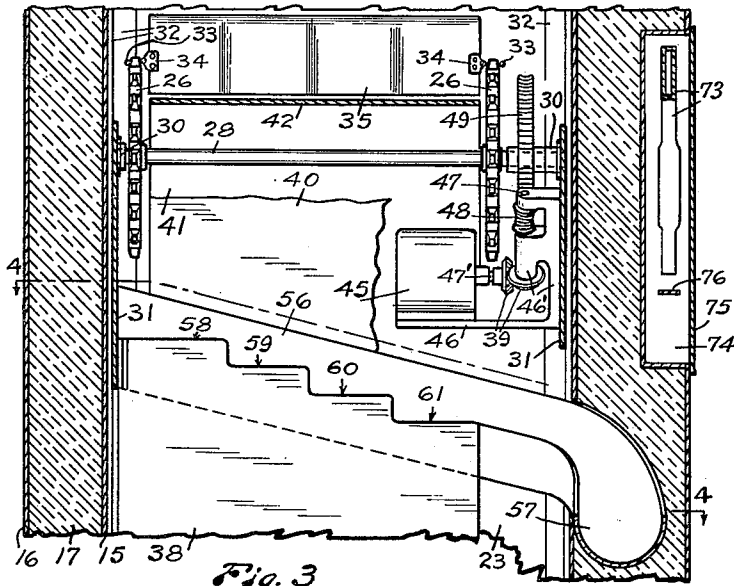


Fig. 3

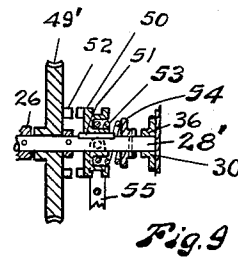


Fig. 9

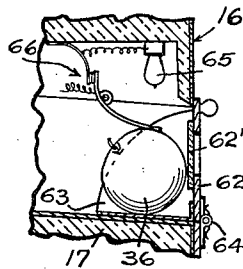


Fig. 7

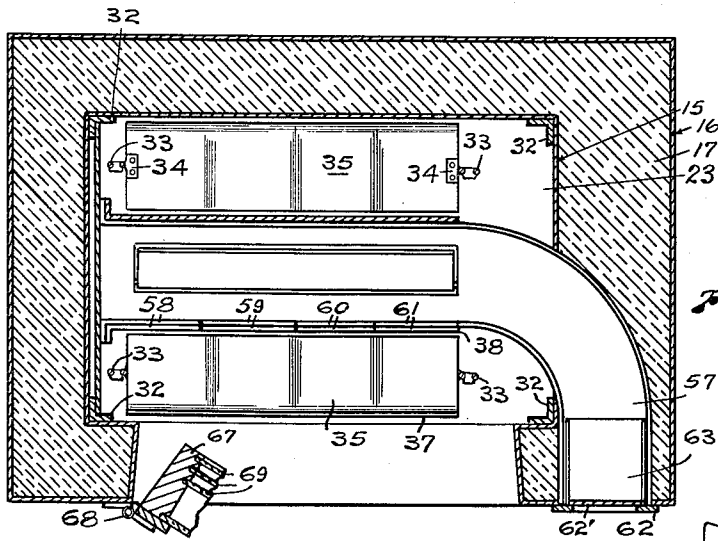


Fig. 4

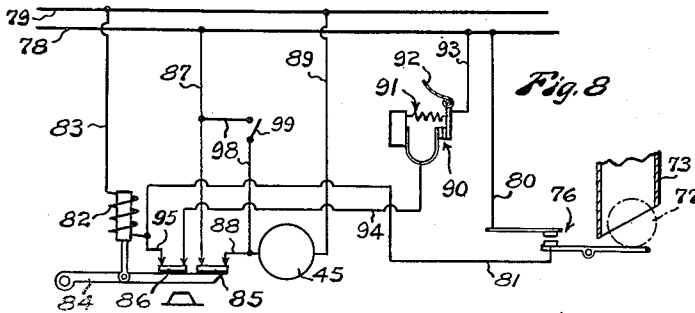


Fig. 8

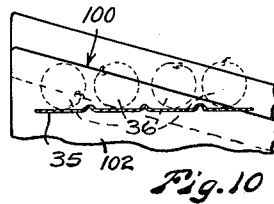


Fig. 10

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REFRIGERATED APPLE VENDING MACHINE

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Application July 20, 1940, Serial No. 346,576

6 Claims. (Cl. 312-89)

This invention relates to refrigerated apple vending machines and an object of this invention is to provide an apple vending machine which has refrigeration means embodied therein whereby the apples to be vended are always maintained at the proper temperature to keep them in perfect condition.

After apples are picked they are usually placed in cold storage to prevent deterioration. Before these apples can reach the consumer they must be taken out of cold storage and often are subject to considerable deterioration before they are eaten or used. Under present methods of distribution it is substantially impossible to make these apples available to the ultimate consumer without keeping them at atmospheric temperatures for a substantial period of time thus allowing them to become warm and subjecting them to deterioration. The use of my refrigerated vending machine makes it possible to transfer the apples from cold storage to the vending machine without allowing them to warm up and to keep them at the proper cold storage temperature in the vending machine until the ultimate consumer is ready to use them.

Another object of this invention is to provide an apple vending machine having an upright endless carriage means for supporting and carrying apples and for delivering said apples one at a time as desired.

Another object is to provide an apple vending machine of this nature in which a plurality of apples may be supported on each tray of an apple carriage and delivered from said trays one at a time into an inclined delivery chute by imparting successive advance movements to said apple carriage.

Another object is to provide an apple vending machine that is motor operated.

Another object is to provide a motor operated apple vending machine in which the starting of the motor is controlled by the insertion of a proper coin and the stopping of the motor is controlled by the delivery of an apple.

Another object is to provide a refrigerated apple vending machine having an apple delivery chute that is normally closed by closure means capable of being opened by a customer, said closure means normally preventing admission of heat to the machine through the apple delivery chute and to further provide means operated by the delivery of an apple to the chute closure means to notify the customer to open the chute closure means and remove the apple.

Other objects of the invention will be appar-

rent from the following description taken in connection with the accompanying drawings.

While this invention is herein referred to as a refrigerated apple vending machine it will be understood that the same may be used for vending other fruits of like shape which can be kept in better condition by refrigeration.

Fig. 1 is a perspective view of a refrigerated apple vending machine constructed in accordance with this invention.

Fig. 2 is a vertical sectional view of the same taken substantially on broken line 2-2 of Fig. 1.

Fig. 3 is a sectional view with parts in elevation taken substantially on broken line 3-3 of Fig. 2.

Fig. 4 is a view in cross section taken substantially on broken line 4-4 of Fig. 3, parts being shown in plan.

Fig. 5 is a detached perspective of one of the apple carrying trays.

Fig. 6 is a detached perspective view of an apple delivery chute.

Fig. 7 is a fragmentary sectional view of an apple take out device.

Fig. 8 is a wiring diagram showing electrical control means embodied in the invention.

Fig. 9 is a fragmentary sectional view of a releasable clutch that may be used to connect the apple carrying means to a motor actuated shaft.

Fig. 10 is a somewhat diagrammatic front elevation, with parts in section, illustrating a modified form of apple delivery chute.

Like reference numerals designate like parts throughout the several views.

This refrigerated apple vending machine comprises a housing preferably formed of spaced apart inner and outer shells 15 and 16 having a packing of temperature insulating material 17 therebetween. A compartment 18 for the reception of cooling means is preferably provided at the upper end portion of the housing. This compartment 18 may be separately constructed and removable or it may be integral with the lower portion of the housing. I have shown electrically actuated refrigerating apparatus, including a motor 19 and compressor 20, in the compartment 18. It will be obvious that "dry ice" or other refrigeration means may be used in said compartment 18. Suitable pipes 21 connect the compressor 20 with a cooling device, such as a coil 22, which is positioned in the upper portion of the compartment 23 in which the apples are kept.

Preferably a removable grating 24 is provided

in the rear wall of the compartment 18 for ventilation and to afford access to the interior thereof.

Preferably all exterior and interior walls are coated with baked enamel or are of material that is ornamental and resistant to corrosion.

The mechanism within the compartment 23 for supporting and vending the apples includes a movably supported upright endless apple carriage or conveyor. This apple carriage comprises two spaced apart endless link belts 25 movable on upper sprocket wheels 26 and lower sprocket wheels 27. The upper and lower sprocket wheels 26 and 27 are mounted on upper and lower transverse shafts 28 and 29 respectively.

The shafts 28 and 29 are journaled in bearings 30 that preferably are supported by transverse frame plates 31 secured to upright angle bars 32, one of which is provided in each corner of the lower compartment 23. This makes it possible to construct the housing and the apple carrying mechanism separately and then lower the apple carrying mechanism into such housing before the upper housing part that carries the refrigerator mechanism is applied.

The link belts 25 are provided at predetermined intervals with special links 33 having brackets 34 to which are secured apple supporting trays 35. The trays 35 are supported at an angle to the horizontal, as shown in Fig. 2, when the link belts are vertical so that objects of generally round or oval shape, such as apples 36, when carried on the trays will tend to roll off. The angle of the trays carried by the upright portions of the link belts at the front of the machine gives the trays a rearward pitch so that the apples will tend to roll toward the rear of the machine.

Preferably the trays 35 are formed of sheet metal and are bent or shaped as best shown in Fig. 5, to provide a plurality of concavo-convex portions with ribs therebetween. The concave sides of the concavo-convex portions are uppermost when the trays are at the front of the machine and the apples rest in said concavo-convex portions. Also the outer edges of the trays are preferably bent to provide flanges 37 which extend upwardly when the trays are positioned at the front of the vending machine. Obviously the trays may be made plane and flat and partitions provided thereon instead of bending the trays to the concavo-convex shape, as shown and described. Also I find that it is possible to use plane flat trays without any transverse ribs or partition means although they are not as desirable because they do not keep the apples evenly spaced apart and are more liable to allow apples to become displaced endwise on the trays in the event the trays are not horizontal from end to end, or in the event persons shake or jar the machine.

The trays 35 are positioned so that their outer flanged edges 37 are in close proximity to the upright front and rear walls 15 of the housing. The inner edges of these trays are in close proximity to an upright baffle wall 38 when the trays are below an apple discharging position.

An upright wall 40 is also preferably provided above the location where the apples are discharged and in close proximity to the path of travel of the inner edges of the trays 35. Also an upright inner rear wall 41 may be provided in close proximity to the path of travel of the inner edge of the rear flight of trays. This inner rear wall 41 is preferably connected with the baffle

wall 38 and the upper front wall 40 respectively by upper and lower arcuate wall portions 42 and 43 respectively. Part or all of the walls 40, 41, 42 and 43 may be dispensed with, as hereinafter pointed out. An arcuate bottom wall 44 is provided in close proximity to the path followed by the outermost edges of the trays in passing around the lower sprocket wheels 27.

Preferably the apple carriage or conveyor is motor driven. The driving means herein disclosed comprises an electric motor 45 supported by bracket means 46 and having a shaft 47' connected by bevel gears 39 with another shaft 47. The shaft 47 is provided with a worm 48 that operatively engages with a worm wheel 49 on the upper sprocket shaft 28. A suitable bearing for shaft 47' is formed on bracket 46 and numbered 46'. The control circuit for the motor 45 is shown in Fig. 8 and hereinafter described.

The worm drive between the motor 45 and shaft 28 provides a relatively great speed reduction making possible slow movement and accurately timed stopping of the apple carriage and permitting the use of a small and inexpensive motor of standard construction. Also this worm transmission, when not operating, is self locking as respects the shaft 28 and will hold the apple carriage in any position in which it is stopped irrespective of the unbalance of the load of apples thereon. This obviates the necessity of providing any additional brake or carriage holding means. In this connection it is to be noted that the load of apples or the like on the apple carriage will usually be out of balance and that sometimes all of the apples on the apple carriage will be on the set of trays at the front of the machine.

If desired provision may be made for disconnecting the worm wheel from its shaft so that the apple carriage may be freely moved by hand. This may be used to facilitate one method of loading the machine, as hereinafter described. One form of mechanism by which this may be accomplished is shown in Fig. 9. This mechanism comprises a jaw clutch member 50 slidable on a key 51 on the shaft 28' and adapted to engage with a clutch means 52 on a worm wheel 49'. A compression spring 53 between clutch member 50 and a fixed collar 54 on the shaft 28' normally holds the clutch in engaged position, but it may be disengaged by a clutch lever 55 of well known form. The worm wheel 49' and shaft 28' correspond in purpose and function to the worm wheel 47 and shaft 28 but have the necessary alterations to conform to the requirements of the clutch means. The worm wheel 49' is rotatable on shaft 28' when clutch 50 is disengaged and suitable means are provided for preventing longitudinal movement of said worm wheel 49' on shaft 28'. The lever 55 is accessible only from the inside of the machine and is only for the use of persons servicing the machine.

The preferred mechanism for controlling the dropping and delivery of the apples one at a time comprises a transverse apple delivery trough or chute 56 positioned between the two walls 38 and 41 just below the motor 45. This chute 56 is inclined downwardly from one side of the machine toward the other, as best shown in Fig. 3, and is provided with an apple discharge portion 57 that is curved forwardly to deliver apples at the front of the machine. The baffle wall at the front of the chute 56 is formed with a series of steps to provide a plurality of substantially horizontal edges 58, 59, 60 and 61 over which apples or the like may roll, one at a time, into the apple dis-

charge chute 56 as the apple carrying trays are moved upwardly past the top edge of the baffle wall 38 and past said chute 56. The steps 58, 59, 60 and 61 may be provided in both the baffle wall 38 and the chute 56 or they may be formed only in one of these parts as long as a smooth baffle surface is provided for holding the apples as the trays move upwardly and the steps are provided at the point of delivery.

Provision is made for imparting intermittent advance movements to the apple carrying trays to discharge one apple at each advance movement. I have provided for supporting four apples on each tray and have provided the wall at the front of the chute 56 with four discharge levels or steps 58, 59, 60 and 61. However, it will be understood that each tray may be made to carry a greater or less number of apples or the like and the number of discharge steps altered accordingly.

To conserve width, the apple delivery end 57 of the chute 56 is preferably positioned within the insulated side wall of the vending machine housing. To provide room for the forward end 57 of the apple discharge chute this wall of the housing may be made thicker than the other walls as shown.

To receive an apple and make it accessible to the purchaser and to close the forward end of the chute 56—57, I provide a door 62 that has a scoop shaped portion 63 into which the apple will roll. The door 62 is connected by spring hinges 64 with the front of the housing. The spring hinges 64 normally hold the door closed but allow it to be opened by a purchaser. Preferably the door 62 has an insert 62' therein made of light-conductive material, such as ground glass, and adapted to show a light when an apple has rolled into the scoop 63. Also preferably the light conductive portion 62' of this door has a notation marked thereon, such as "here is your apple" to attract the attention of the purchaser and cause him to open the door and remove an apple. This notation preferably can only be read when a lamp is lighted on the inside of the door. A lamp 65 is provided just inside the door 62 and a normally open switch 66 controlling a circuit to this lamp 65 is provided in or near the scoop 63 in such a position that it will be engaged and closed by an apple that is delivered to the scoop 63. This provides a signal controlled by the apple and visible only when there is an apple accessible at the point of delivery. The door 62 is normally held closed and prevents heat from entering the refrigerated machine.

By the use of this machine, I am able to vend apples or like fruit wrapped in "cellophane" as well as to vend the same fruit without any wrapping. Cellophane wrappers when drawn snugly around the apples will not interfere with the rolling of the apples and will provide better and more complete protection for the apples or like fruit. Advertising matter may be printed on the Cellophane to advertise the product and the district where it is produced.

An opening is provided in the front wall of the vending machine housing and a door 67 is connected with the housing by hinges 68 and adapted to close this opening. Preferably this door 67 has a plurality of spaced apart layers 69 of transparent material, such as glass, therein to provide for visibility and at the same time to provide enough dead air spaces to build up an efficient insulation against transfer of heat. Preferably an electric lamp 70 with a reflector 71 is provided

within this door to illuminate the interior of the vending machine.

A slot 72 for the insertion of a coin, such as a five cent piece, is provided at the front of the machine. This slot communicates with a coin chute 73 through which the coin may pass downwardly. Preferably mechanism is provided in connection with the chute 73 for safeguarding the machine against being operated by improper coins and by slugs, checks, washers and the like. Such mechanism is readily obtainable on the market and one satisfactory form of the same is commercially known as the "A. B. T" coin mechanism. As this mechanism does not form any part of the present invention it is not herein shown in detail.

The coin operated mechanism is preferably located in a receptacle 74 having a door 75 affording access thereto for the purpose of removing accumulated coins and servicing the mechanism.

The dropping of a proper coin controls the movement of the apple carriage by means diagrammatically illustrated in Fig. 8. Said Fig. 8, shows a coin operated normally open switch 76 positioned adjacent the lower end portion of the coin chute 73 and adapted to be momentarily closed by any proper coin that drops through said chute. I have shown this switch 76 open and have indicated by dot and dash lines the position of a coin 77 just as it engages with this switch. The coin 77 preferably does not stop in the position shown in Fig. 8, but continues downwardly, first momentarily closing the switch 76 and then dropping clear of both the switch 76 and the chute 73. The momentary closing of switch 76 closes a circuit from an electric current source of supply wire 78 through conductor 80, switch 81, coil of solenoid 82, and through conductor 83 to another source of supply wire 79. The momentary closing of a circuit through coil 82 moves switch arm 84 upwardly and closes two switches 85 and 86. The closing of switch 85 closes a motor circuit and permits a flow of current from wire 78 along conductor 87, through switch 85, along conductor 88, through motor 45, and along conductor 89 to wire 79, a shunt circuit 98 having a manually operated switch 99 therein is connected around the switch 85 to start and stop the motor manually as herein-after explained. The closing of switch 86 closes a hold-in circuit for the coil 82. This hold-in circuit has a normally closed apple operated switch 90 interposed in it for the purpose of breaking the hold-in circuit and the motor circuit as soon as an apple has been dropped into the apple delivery chute 56. The apple operated switch 90 is normally held closed by a spring 91 and is adapted to be temporarily opened by engagement of an apple with a pivoted trip member 92, Fig. 2, in the chute 56 as soon as an apple drops into said chute. Preferably the trip member 92 is substantially as long as one of the trays 35 so that an apple dropping from any position on one of the trays 35 will engage with said trip bar and open switch 90 as soon as it drops and without having to first roll along the chute.

The hold-in circuit may be traced on Fig. 8, as follows: From source of supply wire 78, along conductor 93, through switch 90, when said switch is closed, along conductor 94, through switch 86, along conductor 95, through solenoid coil 82, and along conductor 83 to source of supply wire 79. The temporary opening of switch 90 breaks the hold-in circuit and allows the switch arm 84 to drop by gravity and open both of the

switches 85 and 86. It will require the closing of switch 76 by another coin to again start the motor so as to advance the conveyor and deliver another apple.

The switch 99 provides for advancing the apple carriage at desired intervals when the machine is being serviced or apples loaded thereinto.

Fig. 10 shows alternative delivery control means in which an inclined edge 100 at the upper extremity of a baffle plate 102 is provided to control the delivery of the apples in place of the stepped control means shown in Fig. 3. When the apples on the inclined trays reach predetermined positions they will roll over this inclined edge into an apple delivery chute.

One mode of operation which may be followed in loading this machine with apples or the like is to open the front door 67 and lay the apples on the trays that are opposite the wall 40, using the switch 99 to operate the motor 45 and advance the apple carriage by short intermittent movements after each tray is loaded so as to bring successive trays into loading position. When this is being done the manual switch 99 is used to control the motor. By proceeding in this way the apples will be carried over the upper arcuate wall 42 and supported by the backs of the trays in the compartment at the rear of the machine and then picked up on the concave top sides of the trays as they pass around the bottom of the machine. In this way all of the trays can be loaded and the first loaded tray can be brought to a stop in the proper position for delivery of the first apple upon the first advance movement imparted to the conveyor in response to the insertion of a coin.

Obviously the apple carriage may be partly loaded by following this same mode of operation. If the machine is only partly empty and more apples are to be loaded therein then the apples on the trays below the apple delivery chute 56 may be transferred to trays above and in this way will be brought back to their original position when the machine is fully loaded.

By using a reversible motor in place of the motor 45 and providing manually controlled switch and circuit means for reversing said motor in place of switch 99 and shunt circuit 98 it is possible to reverse the direction of movement of the apple carriage for loading. Apples can then be laid on the trays below the apple chute 56 and the conveyor backed up as it is loaded, the apples following around the curved bottom wall 44 until the apple carriage is loaded to any desired extent.

The use of clutch mechanism such as that shown in Fig. 9 makes it possible to disconnect the apple carriage from the worm means by which it is normally controlled and move the same by hand as it is being loaded.

The operation of this refrigerated apple vending machine has been fully explained in the preceding description and may be summarized as follows:

Care is taken to supply the machine with apples that are in perfect condition. These apples are kept in the same condition while in the machine because they are kept at the proper temperature by refrigeration and this also insures proper humidity. Some of these apples are visible at all times through the transparent door panels 69. When a proper coin is inserted in the slot 72 it will momentarily close the coin operated switch 76 and energize coil 82. This will close switches 85 and 86 and start the motor 45.

As soon as an apple drops on the member 92 the switch 90 will be opened, the coil 82 de-energized and the motor switch 85 opened to stop the motor. The apple so delivered will immediately roll to the delivery end of the chute 56—57 and light the lamp 65 thereby notifying the customer that he can open the door 62 and pick up such apple.

The use of the stepped discharge control, Fig. 3, or the alternative inclined edge discharge control, Fig. 10, makes it possible to use long apple receiving trays with several apples side by side on each tray and to deliver these apples one at a time by successively advancing the apple carriage.

The foregoing description and accompanying drawings clearly disclose a preferred embodiment of my invention but it will be understood that this disclosure is merely illustrative and that changes may be made in the invention within the scope and spirit of the following claims.

I claim:

1. In an apple vending machine, an apple storage compartment; an endless belt type apple carriage movably mounted in a substantially upright position in said apple storage compartment with the two upright portions of said apple carriage spaced apart; apple supporting trays on said apple carriage; and apple discharge means positioned between the two upright portions of said apple carriage to receive apples discharging from said trays, said trays being inclined toward the apple discharge means as they pass in front of said apple discharge means to deliver apples from the trays to the apple discharge means.

2. In an apple vending machine, an apple storage compartment; an endless belt type apple carriage movably mounted in a substantially upright position in said apple storage compartment with the two upright portions of said apple carriage spaced apart; apple supporting trays carried by said carriage and positioned at an incline relative to the horizontal when the carriage parts with which they are connected are in an upright position; baffle means positioned between the two upright portions of said carriage adapted to hold apples on said trays in a predetermined zone of movement; and an apple discharge chute positioned between the two upright portions of said carriage to receive apples released by said baffle means.

3. In an apple vending machine, an endless belt type apple carriage movably mounted in a substantially upright position, inclined trays carried by said apple carriage each adapted to receive a plurality of apples in side by side relation; a baffle wall positioned adjacent the upward path of movement of the trays to hold the apples on the trays; and stepped discharge control means at the upper edge of said baffle wall providing for successive discharge of apples on the trays as the trays are moved into alignment with successive steps of the discharge control means.

4. In an apple vending machine an apple delivery chute; a normally closed door forming a closure for said chute; an electric signal lamp in close proximity to said door; and an electric switch positioned adjacent said door and connected with said lamp and adapted to be operated by an apple to light said signal lamp when an apple rolls down said chute into a position adjacent said door.

5. In a machine for vending substantially round articles, a storage compartment; an end-

less belt type carriage movably mounted in said storage compartment in a substantially upright position with the two upright portions of said carriage spaced apart; trays carried by said carriage adapted to support substantially round articles to be vended; and an inclined discharge chute positioned between the two upright portions of said carriage to receive the substantially round articles as they discharge from said trays, said chute being inclined whereby the substantially round articles discharged thereinto will roll sidewise clear of said carriage.

5 6. In a vending machine, a storage compartment; a display window at the front of said storage compartment; a belt type carriage vertically movable in said storage compartment adjacent said window; trays carried by said carriage adapted to support substantially round articles to be vended; a discharge chute positioned adjacent the side of said carriage remote from said display window; and means controlling the delivery 10 of articles rearwardly off of said trays into said discharge chute.

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