Jan. 1, 1957 F. HEBEL 2,776,035

MACHINE FOR DISPENSING REFRIGERATED ARTICLES

Filed June 22, 1951 3 Sheets-Sheet 1

Fig. 1

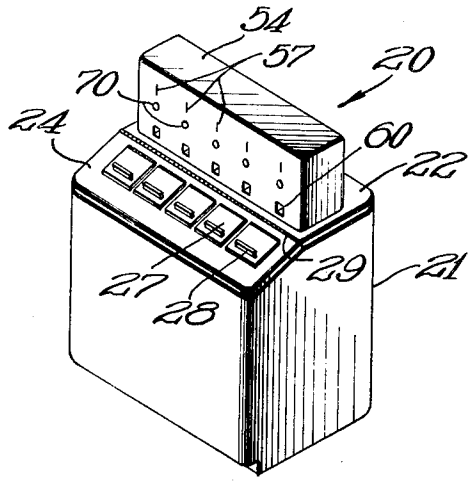
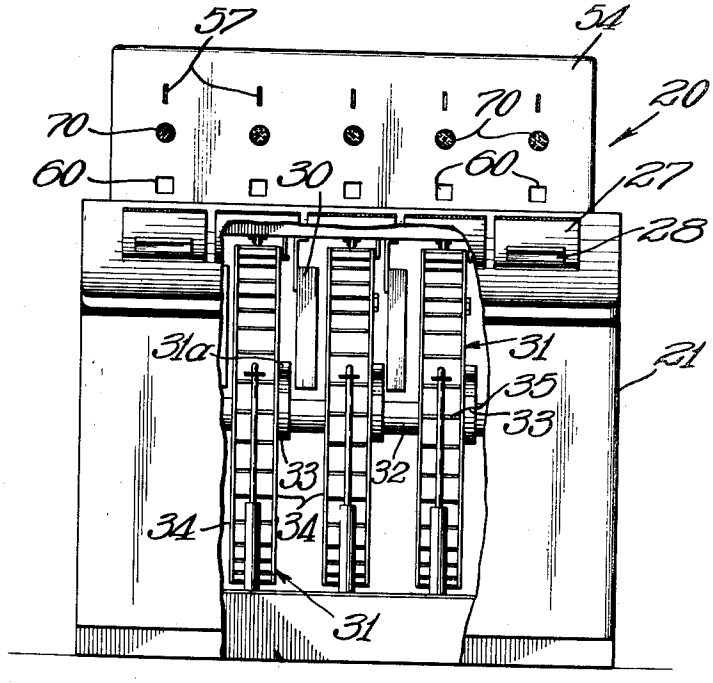


Fig. 2



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MACHINE FOR DISPENSING REFRIGERATED ARTICLES

Filed June 22, 1951 3 Sheets-Sheet 2

Fig. 3

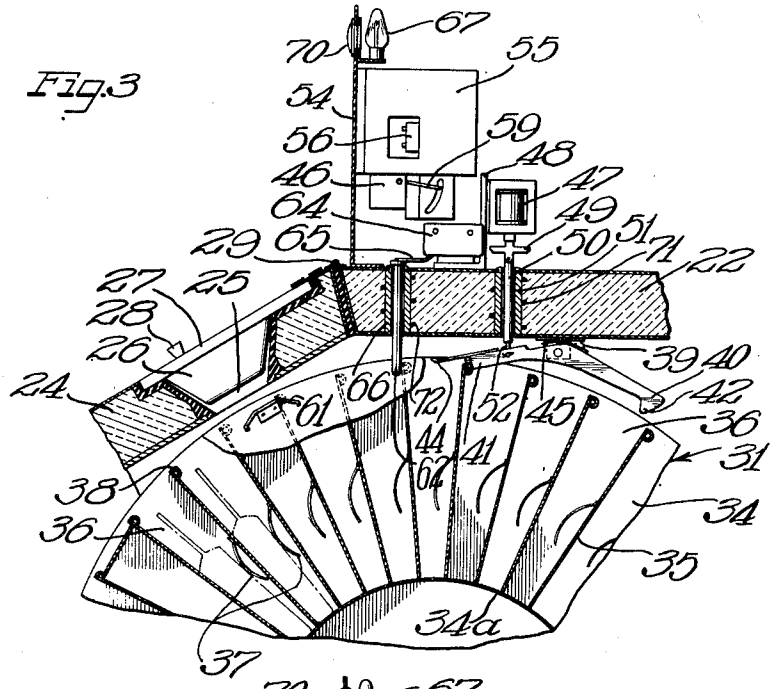
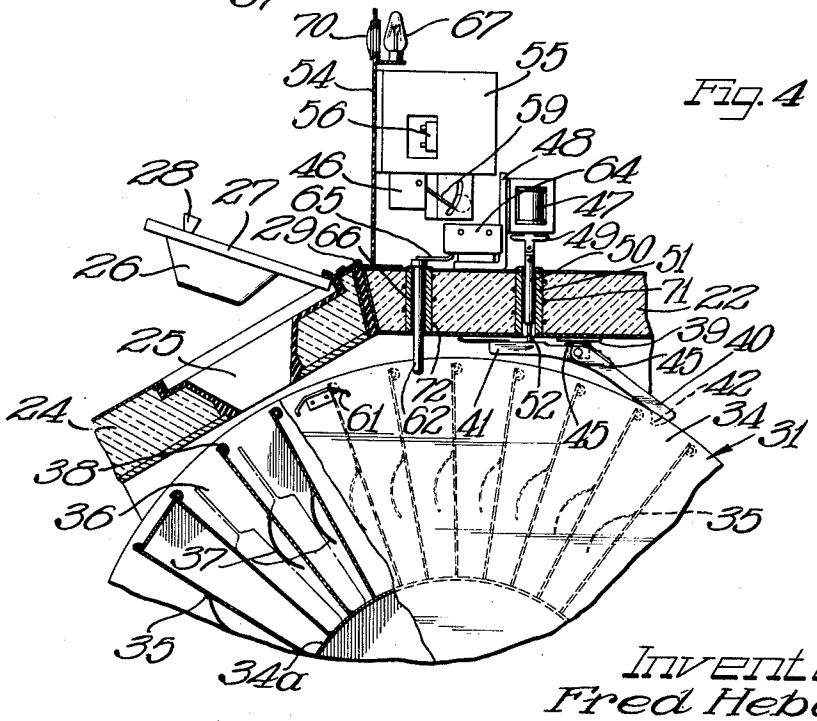


Fig. 4



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MACHINE FOR DISPENSING REFRIGERATED ARTICLES

Filed June 22, 1951 3 Sheets-Sheet 3

Fig. 5

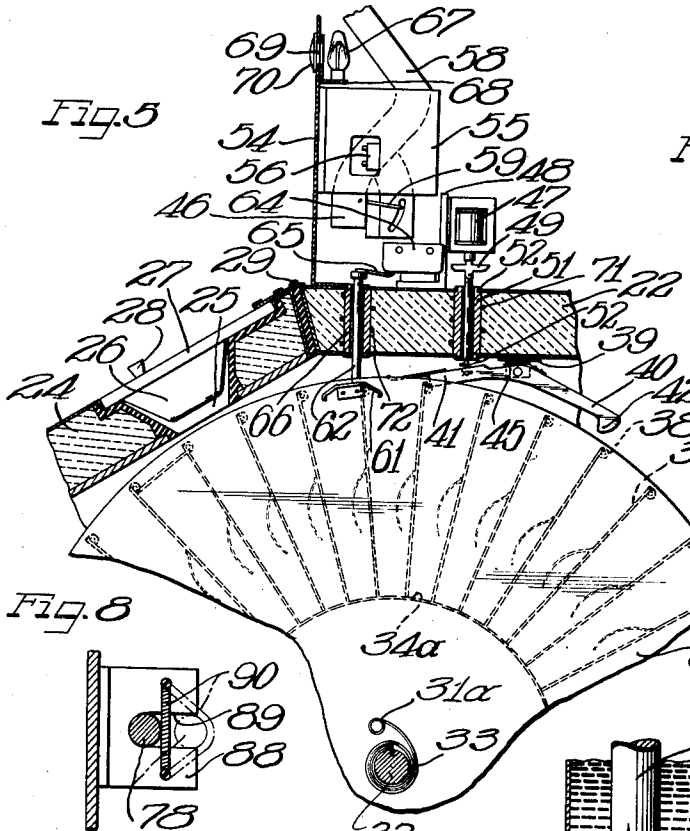


Fig. 7

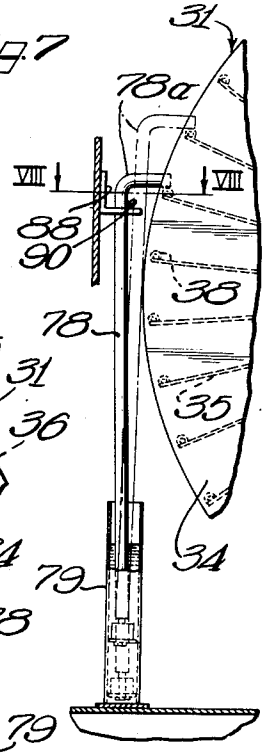


Fig. 8

Fig. 6

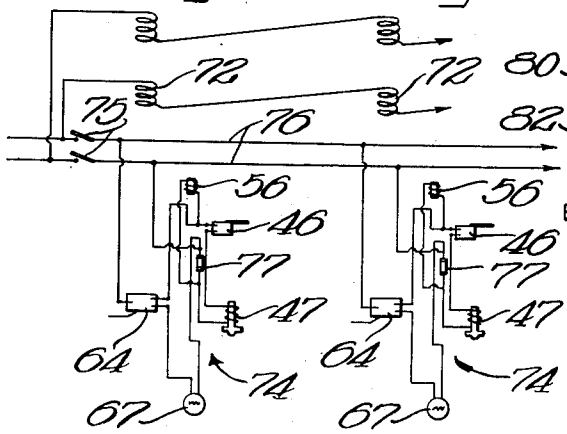


Fig. 9

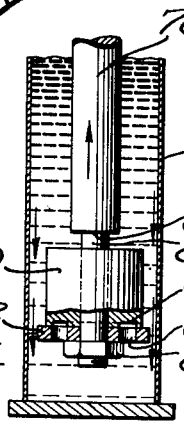
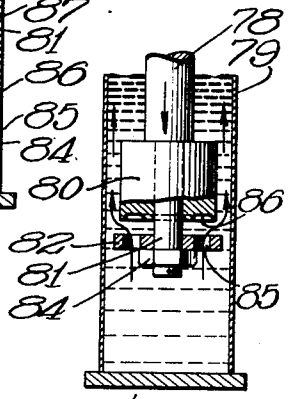


Fig. 10



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United States Patent Office 2,776,035 Patented Jan. 1, 1957

2,776,035

MACHINE FOR DISPENSING REFRIGERATED ARTICLES

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Application June 22, 1951, Serial No. 233,005

9 Claims. (Cl. 194—10)

This invention relates to a coin-operated vending machine for dispensing refrigerated articles. More specifically, the invention relates to improvements in a vending machine in which refrigerated articles are retained in an indexed dispensing wheel which is actuated through a coin deposit mechanism by electrical means and includes cam-operated electrical means for rejecting coins and lighting an empty light when the wheel is empty.

According to the general features of the present invention, an insulated cabinet contains a plurality of vertically disposed dispensing wheels for containing refrigerated articles such as ice cream bar confections. The interior of the cabinet is cooled by commercial refrigeration mechanism. Each of the wheels is provided with an escapement indexing lever actuated by a solenoid which is energized by a coin-operated switch. A door is provided in the cabinet for removing an ice cream bar after the deposit of a coin. An empty cam on each of the wheels actuates a double-throw switch to deenergize a lock-out relay for rejecting inserted coins when the associated wheel is empty. The double-throw switch also operates an empty light, when actuated by the cam, to indicate that the particular wheel is empty. Heating means are provided for preventing the accumulation of ice on the escapement actuating means and the double-throw switch actuating means. Improved dash pot damping means are incorporated for preventing too rapid a movement of each of the dispensing wheels.

It is, therefore, an object of the present invention to provide an improved vending machine including a plurality of dispensing wheels for dispensing refrigerated articles.

Another object of the invention is to provide improved electrically-operated indexing mechanism for a dispensing wheel in a vending machine.

A further object of the invention is to provide improved means in a vending machine for rejecting coins when the machine is empty and for lighting an empty light to indicate to the customer that the machine is empty.

Still another object of the present invention is to provide heating means for preventing the freezing or ice-locking of dispensing wheel actuated mechanism and empty reject mechanism in a vending machine.

A still further object of the present invention is to provide improved dash pot damping means for regulating the speed of operation of a dispensing wheel in a vending machine.

Yet another object of the invention is to provide improved indexing and empty reject means in a machine for dispensing refrigerated articles.

An additional object of the present invention is to provide improved movement and indexing characteristics for a dispensing wheel in a vending machine.

Other objects, features and advantages of the present invention will be apparent from the following detailed description of a preferred embodiment taken in conjunction with the accompanying drawings, in which:

On the drawings:

Figure 1 is a perspective view of a vending machine according to the present invention;

Figure 2 is a front elevational view of the vending machine with a portion of the cabinet broken away to show the dispensing wheels therein;

Figure 3 is a fragmentary sectional view with parts in elevation showing the wheel-operating and coin-receiving means and the access door;

Figure 4 is a fragmentary sectional view similar to Figure 3 but with the wheel operating mechanism in operation in the vending cycle and the access door in the open position;

Figure 5 is a fragmentary sectional view similar to Figure 3 but showing the approximate alternative coin paths, the spring biasing mechanism for the wheels, and with the wheel empty and the double-throw switch actuated by the empty cam;

Figure 6 is a fragmentary circuit diagram of the vending machine;

Figure 7 is a fragmentary sectional view with parts in elevation of the dash pot damping mechanism and showing the actuated position of the damper rod in phantom outline;

Figure 8 is an enlarged fragmentary sectional view with parts in elevation taken substantially along line VIII—VIII of Figure 7;

Figure 9 is an enlarged fragmentary sectional view with parts in elevation of a portion of the dash pot showing the damper rod being actuated to damp the motion of the dispensing wheel; and

Figure 10 is an enlarged fragmentary sectional view similar to Figure 9 but showing the end of the damper rod moving toward static position after being released from the dispensing wheel.

As shown on the drawings:

As shown in Figures 1 and 2, a refrigerated article dispensing machine 20 has an insulated open top casing or cabinet 21 with the open top closed by an insulated top closure member 22 and an insulated slanted cover member 24. A plurality of apertures 25 (Figures 3, 4 and 5) are provided through the cover 24 and are located in a substantially transverse line across the cover. Each of the apertures 25 has convergent walls for receiving a wedge portion 26 of an access door 27 in approximately conforming relationship in order to normally close each of the apertures. The door 27 is hinged at its upper edge portion to the cover 24 and has a handle 28 for grasping to pivot the door 27 to open position (Figure 4) in order to extract a refrigerated article, such as an ice cream bar, through the open aperture 25.

For loading the vending machine 20, the cover 24 is pivotally attached at its upper edge portion 29 to the closure member 22. Thus, the entire cover 24 may be pivoted in a clockwise direction, as seen in Figures 3, 4 and 5, to provide a large opening to permit easy loading.

It will be understood that any satisfactory type of resilient sealing strip may be provided between the various removable or pivotal portions of the cabinet in order to prevent the ingress of heat thereinto.

Refrigeration means are provided for cooling the interior of the cabinet 21 and may comprise any satisfactory type of commercial mechanism such as a compressor and motor (not shown), together with cooling elements such as evaporators 30 (Figure 2).

In order to provide means for containing the refrigerated articles to be dispensed through the apertures 25 and for putting one article at a time within the easy reach of a customer, a plurality of article carrying or dispensing wheels 31 are rotatably attached in axially spaced relation on a horizontal shaft 32 which is retained within the

cabinet 21. It is apparent that any number of wheels may be utilized, depending on the size of the cabinet 21, and herein five such dispensing wheels are provided.

Biasing means are provided for inducing rotation of each of the wheels 31 in a clockwise direction, as seen in Figures 3, 4 and 5. Herein such means comprise a spring 33 wound about the shaft 32 with one end portion affixed to the shaft and with the other end portion affixed to a peg 31*a* which is fastened to the wheel 31.

Each of the wheels 31 is provided with a pair of circular side disks or plates 34. The plates 34 are held in fixed axially spaced relation by a circular ring-like strip 34*a* of smaller diameter than the disks 34. A plurality of radially extending separator strips 35 are provided between the disks 34 and extend from the ring 34*a* to substantially the periphery of each of the disks. A plurality of compartments 36 are provided between adjacent separators 35 and the side discs 34. These compartments are of a convenient size for receiving refrigerated articles, such as ice cream bars, shown in phantom outline in Figures 3 and 4. Each of the compartments 36 is provided with a spring clip 37 for retaining the ice cream bars in place within the compartments. For reinforcing the outer edges of the separators 35, curled portions 38 are provided.

For indexing each of the wheels 31 to allow movement for the peripheral length of one compartment 36 with each actuation of the wheel, indexing or escapement mechanism is provided. Herein such mechanism comprises an escapement arm or lever 40 pivotally mounted on a bracket 39 which is fixedly attached to the lower surface of the closure member 22. The lever 40 has an abutment portion 41 with its end normally abutting the curled adge 38 of one of the separators 35 to hold the wheels 31 against clockwise rotation. The opposite end of the escapement lever 38 is provided with an engagement tooth 42 to engage the curled portion 38 of one of the separators 35 after the lever 38 has been rotated clockwise from the normal position of Figure 3 to allow the wheel 31 to move for part of the length of one of the compartments 36.

Thus, it will be seen that when the escapement lever 40 is rotated in a clockwise direction, the abutment portion 41 is released from the end of the engaged separator 35, and the tooth 42 will engage the end of another separator to prevent movement of the wheel 31 at a point short of the peripheral length of one compartment 36. When the lever 40 is rotated in a counterclockwise direction back to normal position, the tooth 42 is released and the abutment portion 41 contacts the next adjacent separator 35. When the abutment portion 41 is in normal position, one of the compartments 36 is in radially opposed relation to the access aperture 25 of the respective wheel 31. Hence, a customer may raise the door 27 and extract an ice cream bar from the compartment 36 through the aperture 25.

Guide means are provided for preventing the abutment portion 41 of the lever 40 from moving too far downwardly during counter-clockwise movement of the lever. Herein such means comprise a guide strip 44 fixedly attached to the abutment portion 41 and extending longitudinally from the end thereof. The free end portion of the guide 44 is bent upwardly to prevent inadvertent catching with a curled end portion of one of the separators 35.

For providing a firm pivoting contact between the escapement lever 40 and the bracket 39 and for assisting a return to normal position after actuation of the lever, respective leaf springs 45 are fixedly attached to each of the levers near the pivot points and slidably and resiliently engage the opposed portions of the attachment brackets.

According to the present invention, coil-energized electrically-actuated means are provided for each of the wheels 31 to move the lever 40 through one cycle of operation in response to the deposit of a coin. In the present instance such means comprise a coin-operated switch 46 electrically connected to a solenoid 47 which is in turn, mechanically linked to the abutment portion of the lever 40 intermediate the free end and the pivot point. The solenoid 47 is fixedly attached to a bracket 48 attached to the top surface of the closure member 22 for holding the center of the solenoid 47 directly above the point of attachment to the lever 40. In order to link the solenoid 47 to the lever 40, a magnetically-actuated plunger 49 is pivotally connected to a link rod 50 which is inserted in loosely slidable relation through a sleeve 51 fixedly attached in a vertical aperture in the closure member 22. A hook 52 is attached to the lower end of the link rod 50 and pivotally attached to the lever 40.

A housing 54 is attached to the closure member 22 for enclosing the actuating mechanisms of each of the wheels 31. A coin-operated coin deposit and reject device 55 is fixedly attached to the inside front face of the housing 54 adjacent each of the lever actuating mechanisms and contains the coin-operated switch 46. Each of the coin deposit devices 55 contains a lock-out relay 56 for controlling a reject pin (not shown). The lock-out relay 56 is normally actuated, and in the actuated position prevents the reject pin from rejecting inserted coins.

In order to allow insertion of coins for actuating the coin-operated switches 46, a coin slot 57 is provided through the housing 54 above each of the respective coin devices 55. A coin chute 58 (Figure 5) connects each of the slots 57 with the respective coin device 55.

The alternative paths of the coins through the coin device 55 are shown in dotted lines in Figure 5, the left fork representing the path of a rejected coin when the lock-out relay is deenergized and the right forking showing the normal path of a coin through the device.

Referring to Figure 4, the vending machine is shown during an operative cycle with a coin shown in dotted outline pressing down a coin lever 59 to actuate the coin-operated switch 46. As seen in this figure, actuation of the coin switch 46 energizes the solenoid 47 to urge the abutment portion of the lever 40 upwardly by means of the plunger 49, the link 50 and the hook 52. The coin drops from the position shown in Figure 4 into a coin-receiving box (not shown), and hence the solenoid 47 is deenergized and allows the escapement lever 40 to return to the position shown in Figures 3 and 5.

When the lock-out relay 56 is deenergized, rejected coins are diverted through the reject path into coin-return receptacles 60 attached to the front face of the housing 54 and communicating with respective apertures therethrough.

Means are provided, in combination with the lock-out relay 56, for returning inserted coins when the respective wheel 31 is empty. According to the present invention such means comprise an empty cam 61 fixedly attached to each of the wheels 31 on the outside thereof near the outer periphery and include a cam follower plunger 62 for actuating a reject control or double-throw switch 64. The double throw switch 64 is fixedly attached to the mounting bracket 48 and has an actuating arm 65 with an end portion disposed over the top end of the cam follower plunger 62 which is inserted in loosely slidable relationship within a sleeve 66. The lower end portion of the plunger 62 is within the cabinet 21 in position to ride up on the empty cam 61 when the last compartment of the respective wheel 31 is opposite the respective access aperture 25, as seen in Figure 5. With the double-throw switch actuating arm 65 in the position shown in Figure 5, the lock-out relay is deenergized, and therefore any coins inserted in the respective slots 57 will be rejected into the return receptacle 60.

In order to indicate to a customer when a wheel is empty of ice cream bars, each wheel 31 has an associated empty light 67 attached on a bracket 68 which is fixedly attached to the inner surface of the housing 54. An aperture 69 is provided through the housing 54 adjacent each of the lights 67 and a transparent cover 70 is disposed over each of the apertures 69. The empty light 67 is

electrically connected to the respective double-throw switch **64** so that when the actuating arm **65** is in the position shown in Figure 5 the empty light is operated. Therefore, the customer can see through the apertures **69** which of the wheels **31** is empty.

Ice prevention means are provided in order to prevent icing of the sleeves **51** and **66** and the associated plungers **50** and **62**, respectively. In the present instance such means comprise a heating coil **71** about the sleeve **51** and a heating coil **72** about the sleeve **66**.

Circuit completing means are included to complete the electrical circuit to all of the electrically-operated mechanisms within the vending machine **20**. Herein such means include a pair of push buttons (not shown) which are actuated upon closing of the cover **24** to complete the circuit.

In Figure 6 is shown a partial circuit diagram of the vending machine **20**. A wiring circuit diagram **74** for two of the vending wheels **31** and associated mechanisms is shown, the others being similar. The circuit-completing push buttons actuate a pair of master switches **75** which energize the main supply lines **76**. Each of the wheel circuits **74** is connected across the lines **76**. When one of the wheels **31** is not empty and a coin is inserted into the associated slot **57**, the coin switch **46** is momentarily actuated, energizing the solenoid **47** which is in series therewith. When the double-throw switch **64** is in unactuated position, the lock-out relay **56** is always energized. When the double-throw switch **64** is actuated by the empty cam **61**, the lockout relay **56** is deenergized and the empty light is energized. A fuse **77** is connected in series with each of the wheel circuits **74**.

Each of the heater coils **71** and **72** is connected in series across the main supply lines **76** independently of the switches **75**. Hence, the heater coils are not deenergized while the machine is being loaded, and therefore ice accumulation in the sleeves and about the plunger is prevented during this time.

In order to prevent too fast an operation of each of the wheels **31**, respective damping means are provided. In the present instance such means comprise a damping rod **78** having a lower end portion disposed in a dash pot **79**. The upper end portion of the damper rod **78** is bent perpendicular thereto to form a hook **78***a* which is normally disposed closely adjacent and above one of the curled ends **38** of one of the wheel separators **35**. The dash pot **79** comprises an elongated cylindrical upstanding reservoir which is sealed at its lower end and fixedly attached to the inside bottom surface of the cabinet **21**. A liquid having a relatively low freezing point, such as propylene glycol in solution in water, substantially fills the dash pot **79**.

In order to provide a substantial resistance to upward movement of the damper rod **78** but to allow the rod to return quickly to the normal static position, valving means are provided at the bottom end portion. In the present instance such means comprise a valve block **80** slidably disposed on a reduced diameter portion **81** of the damper rod **78** in conjunction with a valve plate **82** fixedly attached on the reduced diameter end portion below the valve block. The valve block **80** and the valve plate **82** are retained on the end portion of the damper rod by means of a nut **84** threadedly inserted on a threaded lower end of the reduced diameter portion **81**. A limited clearance is provided between the edge of the valve plate **82** and the inside surface of the dash pot **79**. A plurality of orifices **85** are provided through the valve plate **82** and are adapted to be closed by the valve block when it rests on the valve plate. An annular recess **86** is provided about the lower surface of the valve block **81** and lies directly above a plurality of orifices **85** in the valve plate. A substantial amount of axial movement of the valve block **80** is purposely allowed because of the length of the reduced diameter portion **81**. This movement in a downward direction is positively arrested by the valve plate **82** and in an upward direction by a shoulder **87** formed between the reduced portion **81** and the adjacent portion of the damper rod. A wetting agent may be used to prevent the valve block **80** from sticking onto the reduced diameter portion **81**.

Release means are provided near the upper end portion of the damper rod **78**. Herein such means comprise an angle bracket **88** fixedly attached to the inside surface of the cabinet **21** by one leg and having a horizontal inwardly extending leg with an open-ended slot **89** receiving the upper end portion of the damper rod **78** in slidable relationship. A light tension spring **90** is stretched across the slot **89** and resiliently retains the adjacent portion of the rod **78** therein.

In operation of the damping means, when one of the wheels **31** is actuated, the upper hooked end of the respective damping rod **78** engages the adjacent curled end portion of the separator **35** and is urged upwardly as the wheel moves in a clockwise direction. During this upward movement of the damper rod the valve block **80** will remain seated on the valve plate **82**, thus forcing the fluid to pass through the relatively restricted path between the peripheral edge of the valve plate **82** and the sides of the dash pot **79**. The consequent fluid friction substantially slows the upward movement of the damper rod **78** and damps the movement of the respective wheel **31**.

As long as the wheel **31** continues to move upwardly, the friction between the hook **78***a* and the curled end of the separator **35** causes the hook to remain engaged thereon. However, as soon as the movement of the wheel **31** is arrested the vertical force between the separator and the hook becomes very small and the spring **90** urges the damper rod to the left as seen in Figure 7 to release the hook **78***a* from the edge of the separator **35** and allow the rod to move by gravity back to the position shown in the solid lines in position to damp the wheel during another cycle of operation.

Downward movement of the damper rod **78** by means of gravity is expedited as shown in Figure 10 because the valve block **80** moves upwardly against the shoulder **87** in response to the fluid pressure against its lower surface. Hence, the fluid can pass through the orifices **85** as well as past the periphery of the valve plate **82**. Consequently, the fluid friction is greatly reduced and the downward movement of the damper rod is substantially faster than the upward movement was.

From the foregoing description it will be understood that the present invention provides an improved vending machine for dispensing refrigerated articles including a solenoid-actuated indexing mechanism for a dispensing wheel energized in response to the action of an inserted coin in a coin switch, a cam and a double-throw switch controlling a coin return mechanism for rejecting coins when the respective wheel is empty, an empty indicating device also actuated by said cam and double-throw switch, means for keeping the actuating devices from ice, and an improved damper assembly to provide smooth operation of each of the dispensing wheels during an operative cycle.

It will be understood that modifications and variations may be effected without departing from the scope of the novel concepts of the present invention.

The present application is a continuation in part of my co-pending application Serial No. 732,998, filed March 7, 1947, and now abandoned.

I claim as my invention:

1. A vending machine for dispensing refrigerated articles in response to insertion of a coin comprising an insulated cabinet having an access opening therein, means for maintaining a low temperature in said cabinet, an article-retaining wheel rotatably disposed in said cabinet in position for dispensing articles from said wheel through said aperture, means biasing said wheel for rotation in one direction, indexing mechanism operatively associated with said wheel and including a slidable actuating

rod extending through a wall of said cabinet, a heating coil about said rod and operative to prevent ice formation thereon, a cam on said wheel, a slidable plunger extending through a wall of said cabinet, a heating coil about said plunger and operative to prevent ice formation thereon, a switch operated by said plunger, and a coin-reject mechanism and a light alternatively energized by said switch, whereby operation of said switch by said plunger and the cam lights said light and renders said reject mechanism operative to return coins inserted into said machine.

2. A vending machine for dispensing refrigerated articles comprising a cabinet having an access aperture therein, means for maintaining a low temperature in said cabinet, an article-retaining wheel rotatably disposed in said cabinet in position for removing articles from said wheel through said aperture, means for urging said wheel to rotate in one direction, solenoid-actuated indexing mechanism for controlling movement of said wheel and including an actuating rod slidably inserted through the wall of said cabinet, a heating coil about said rod and operative to prevent ice formation thereon, a cam on said wheel, coin-reject means associated with said wheel, said coin reject means including a plunger slidably inserted through a wall of said cabinet, said cam engaging said plunger to actuate said reject means to return coins inserted into said machine when said wheel is empty, a heating coil about said plunger and operative to prevent ice formation thereon, and a dash pot damper associated with said wheel for slowing and smoothing the indexed movement thereof.

3. In a machine for dispensing frozen foods or the like, a cabinet of generally rectangular cross section and having a sloping front removable cover and a generally horizontal rear cover closing the top of said cabinet, a shaft horizontally disposed in said cabinet, a wheel mounted for rotation in a vertical plane on said shaft, means including radially extending walls defining compartments in said wheel, said compartments opening at the periphery of the wheel, said sloping front cover having an opening therein aligned with said wheel for providing access to the compartments thereof, the inner wall of said sloping front cover extending generally tangent to said wheel at the opening, means for continuously urging said wheel to rotate in one direction on said shaft, means for consecutively aligning each compartment of said wheel with said opening comprising an escapement mechanism including a lever pivotally mounted beneath said rear cover, said lever being disposed to successively engage said radially extending walls, an actuating rod extending generally vertically through said rear cover and connected at its lower end to said lever for actuation thereof to index said wheel, and coin receiving means operable to actuate said rod.

4. A coin actuated vending machine comprising a cold storage cabinet, an access door controlling an opening in the upper portion of the cabinet, a conveyor movably mounted in the cabinet to successively advance articles from the lower portion of the cabinet to said opening, means mounted in said cabinet for controlling the movement of said conveyor including an escapement mechanism, a plate-like cooling element depending from the top of said cabinet on either side of said conveyor, the upper edge of said cooling element being disposed below the level of said escapement mechanism to avoid the detrimental effect of freezing atmosphere on said mechanism.

5. In a machine for dispensing frozen foods or the like, a cabinet of generally rectangular cross section and having a sloping front removable cover and a generally horizontal rear cover closing the top of said cabinet, a shaft horizontally disposed in said cabinet, a plurality of wheels mounted for rotation in a vertical plane on said shaft and having compartments therein, said sloping front cover having a plurality of openings therein each aligned with one of said wheels for providing access to the compartments thereof, means for consecutively aligning each compartment of each wheel with the associate opening comprising an escapement mechanism mounted beneath said rear cover, and a plate-like cooling element depending from said rear cover between adjacent wheels at the upper part of the wheel but below the level of said escapement mechanism to avoid the detrimental effect of freezing atmosphere on said mechanism.

6. A machine for dispensing articles comprising a dispensing wheel mounted for successive arcuate dispensing movements and having a plurality of peripherally spaced abutments, means for moving said dispensing wheel to dispense successive articles therefrom, damping means, abutment-engaging means controlled by said damping means and mounted for engagement with said abutments and for arcuate movement along with the abutments successively engaged thereby against the action of said damping means, and means for laterally shifting said abutment-engaging means out of engagement with one abutment and into engagement with the next succeeding abutment at the end of each dispensing movement of the wheel.

7. A machine for dispensing articles comprising a dispensing wheel mounted for successive arcuate dispensing movements and having a plurality of peripherally spaced abutments, means for moving said dispensing wheel to dispense successive articles therefrom, damping means, abutment-engaging means controlled by said damping means and mounted to overlie successive ones of the abutments as the wheel is successively moved to dispense articles therefrom, said abutment-engaging means frictionally engaging successive ones of said abutments upon successive dispensing rotations of said wheel and said abutment-engaging means being mounted for arcuate movement with the abutment engaged thereby against the action of said damping means, and means continuously urging said abutment-engaging means out of frictional engagement with the abutment engaged thereby during the arcuate travel of the abutment-engaging means, said continuously acting means being operative to restore said abutment-engaging means to initial position upon decrease in the frictional force between the abutment-engaging means and the abutment at the end of each dispensing movement of the wheel.

8. A machine for dispensing articles comprising a dispensing wheel rotatably mounted for successive arcuate dispensing movements and having a plurality of peripherally spaced abutments, damping means for engaging said abutments successively during successive dispensing movements of the wheel, said damping means including a damper rod having a hooked portion for overlying successive abutments as the wheel is rotated, means mounting said damper rod for vertical and lateral movement, said hooked portion engaging successive abutments and moving vertically and laterally to follow the arcuate path of the successive abutments during movement of the wheel for slowing and smoothing the movement thereof, said hooked portion being retained in engagement with the abutments by friction, means for shifting said rod laterally to move the hooked portion out of engagement with the abutments at the end of successive dispensing movements of the wheel, said rod being then moved by gravity downwardly to its initial disposition with the hooked portion overlying the next succeeding abutment.

9. A machine for dispensing articles comprising a dispensing wheel rotatably mounted for successive dispensing movements and having a plurality of peripherally spaced abutments, damping means for retarding movement of the wheel during successive dispensing movements thereof, said damping means including a damper rod having a portion normally disposed in overlying relation to one of the abutments, means mounting said damper rod for vertical and lateral movement to follow the arcuate path of the abutment engaged thereby, said

damper rod portion being retained in engagement with the abutment by friction therewith during movement of the wheel, a bracket having a slot receiving said damper rod for vertical and lateral movement therein, and spring means extending across said slot to resist lateral movement of the rod with the successive abutments, and for shifting the rod laterally to disengage the rod from the successive abutments after each successive movement of the wheel, said spring acting to restore the rod to its initial lateral position and the rod being movable downwardly under the action of gravity to normal disposition with the damper rod portion disposed in overlying relation to the next succeeding abutment carried by the wheel.

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