March 23, 1943. J. C. REAR 2,314,632

REFRIGERATED DISPENSER

Filed Dec. 10, 1940 6 Sheets-Sheet 1

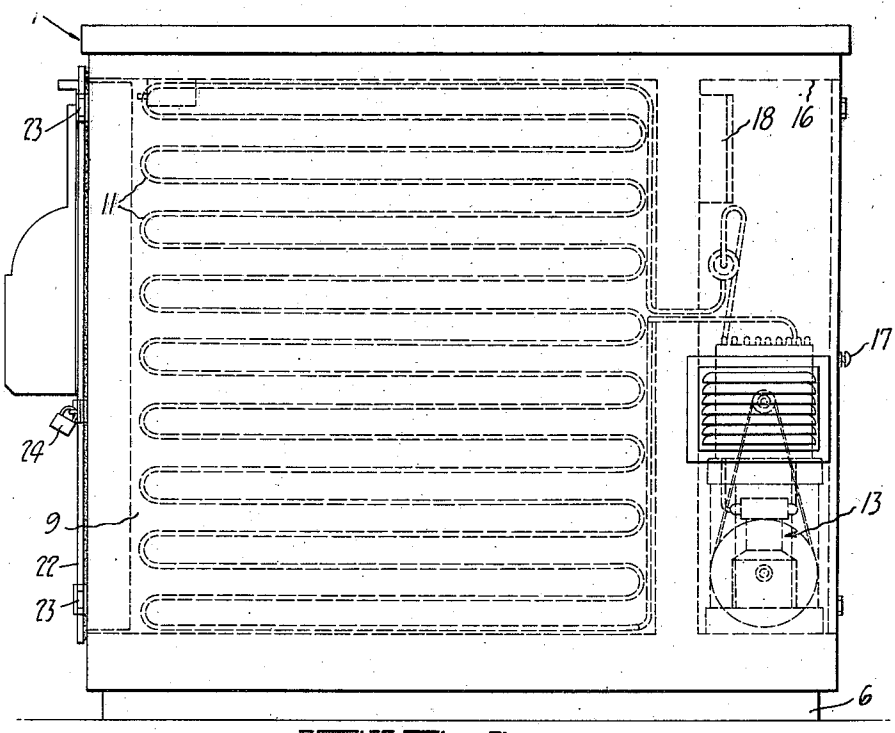

FIG. 1.

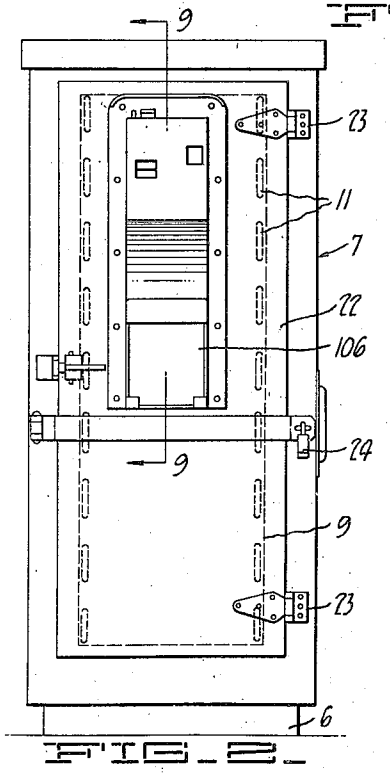

FIG. 2.

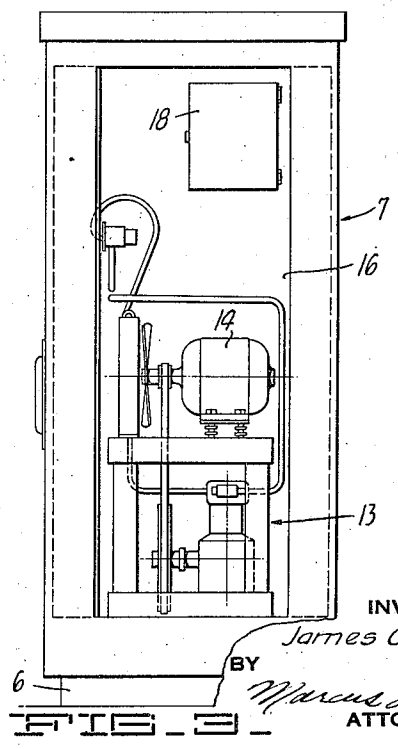

FIG. 3.

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REFRIGERATED DISPENSER

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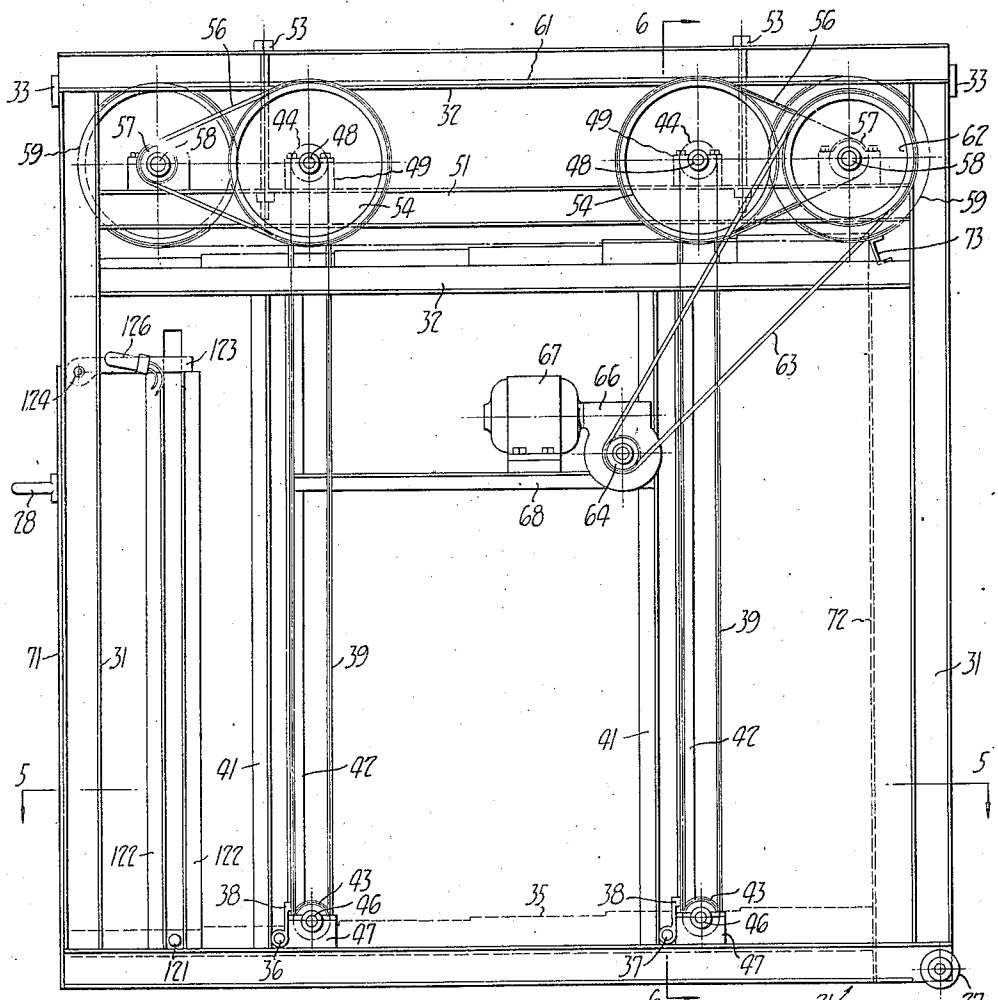

FIG. 4

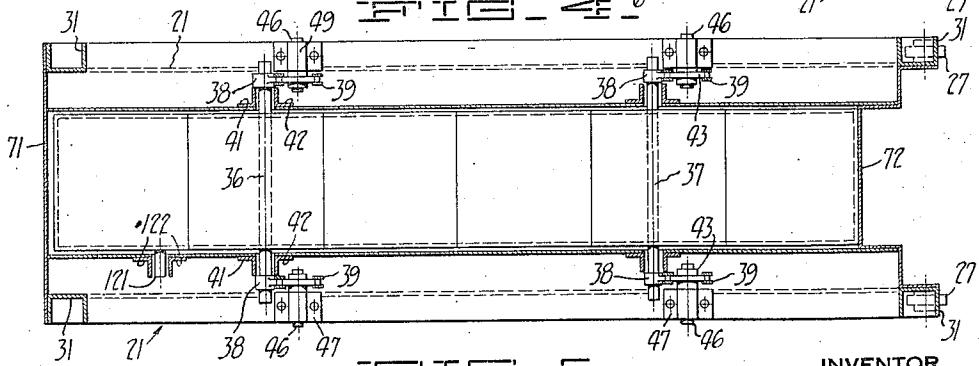

FIG. 5

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REFRIGERATED DISPENSER

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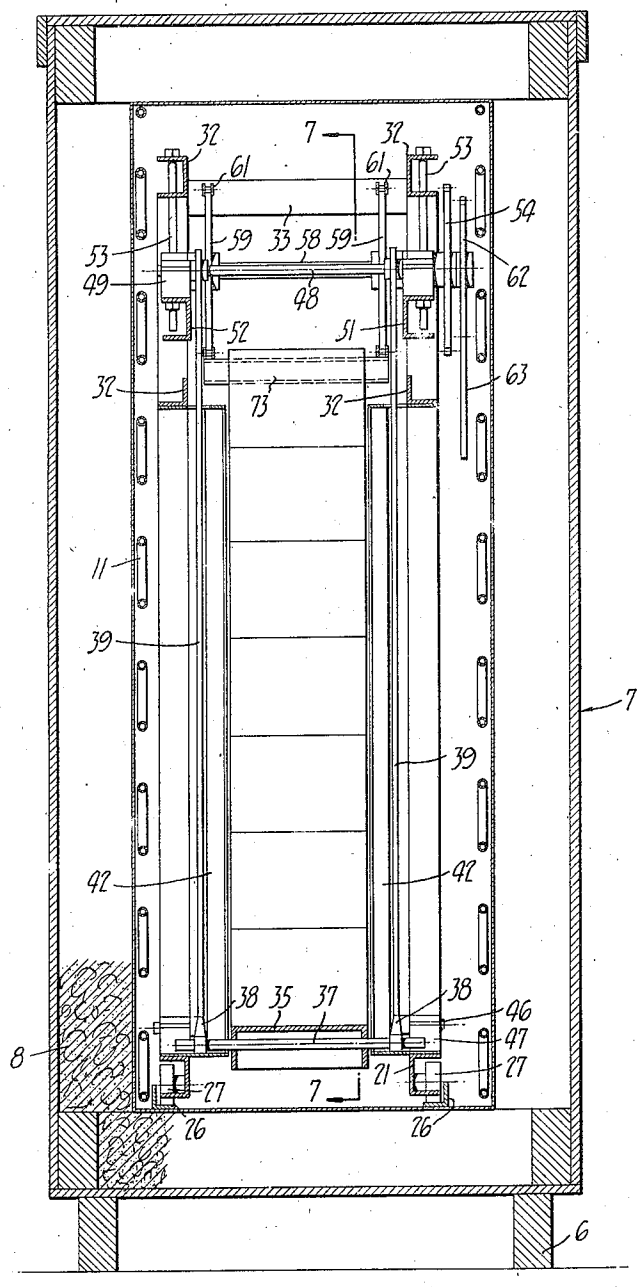

FIG. 6.

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REFRIGERATED DISPENSER

Filed Dec. 10, 1940 6 Sheets-Sheet 4

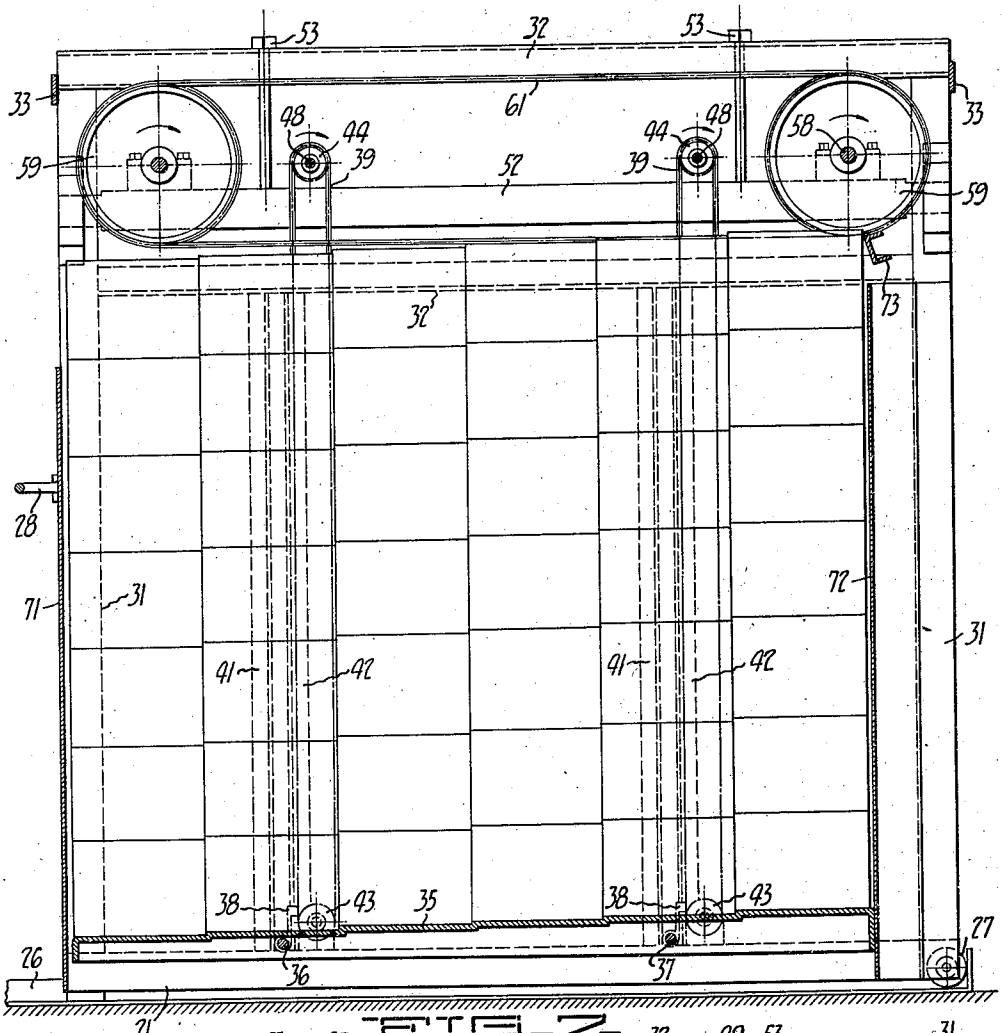

FIG. 7

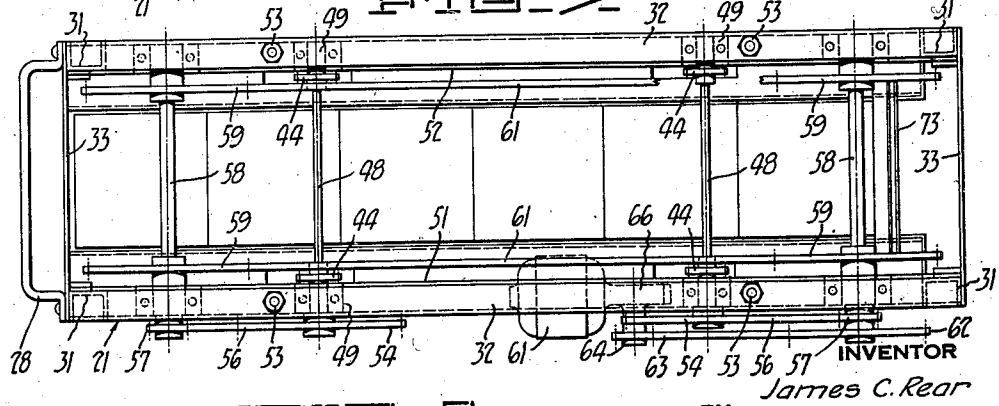

FIG. 8

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March 23, 1943. J. C. REAR 2,314,632

REFRIGERATED DISPENSER

Filed Dec. 10, 1940 6 Sheets-Sheet 5

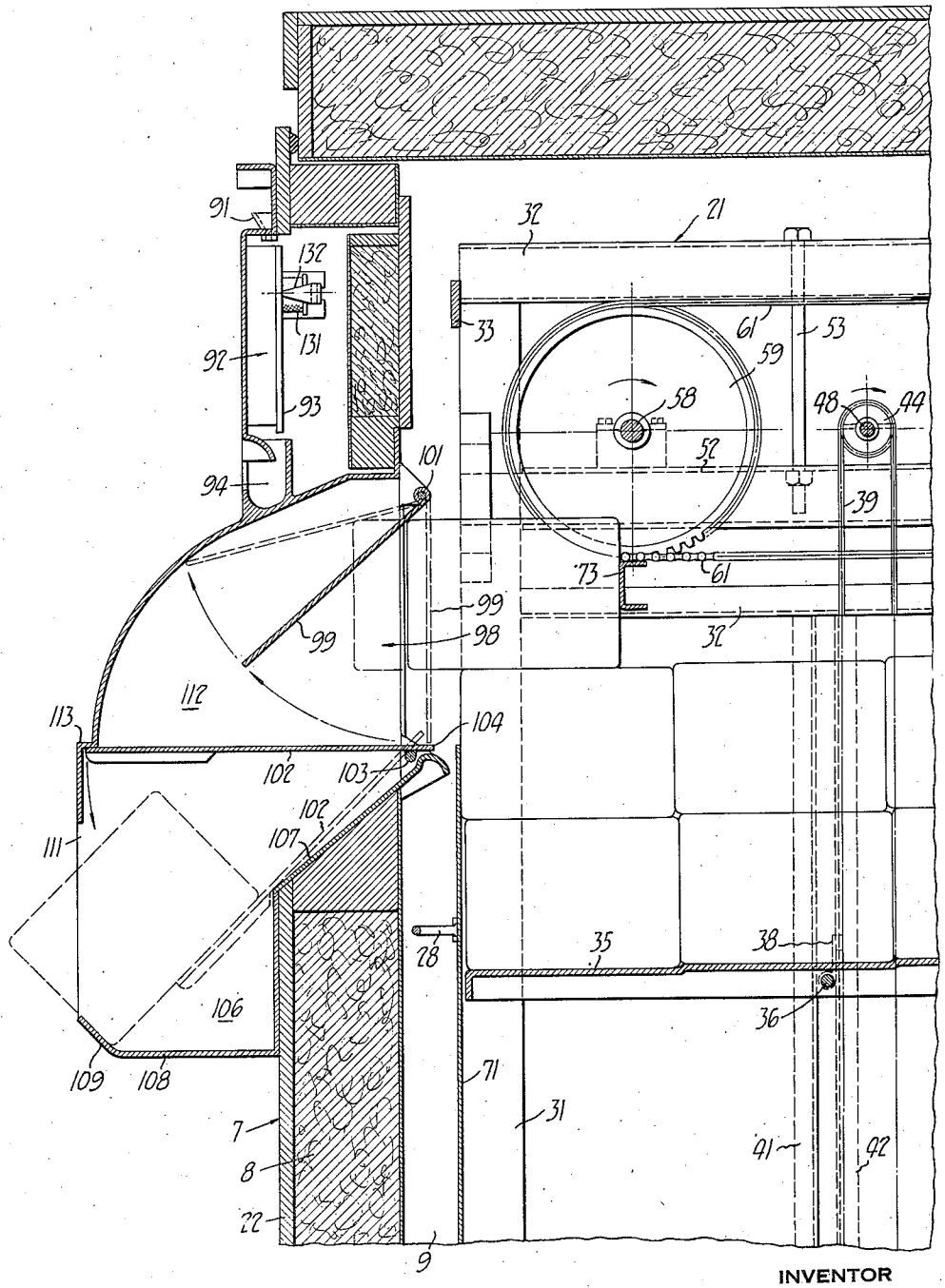

FIG. 9.

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REFRIGERATED DISPENSER

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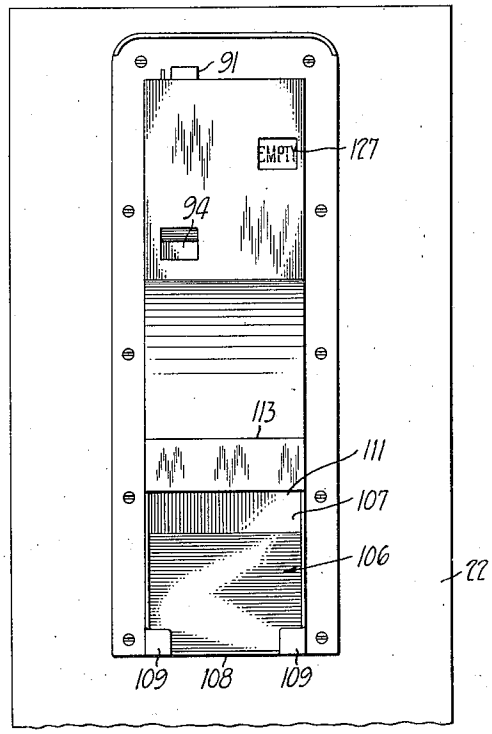

FIG. 10.

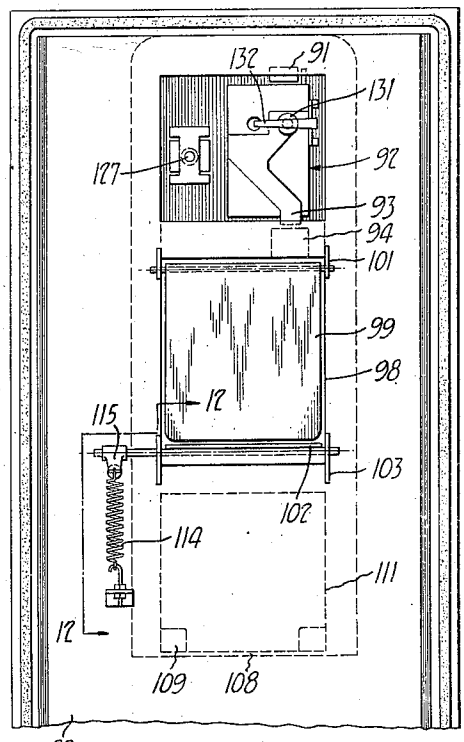

FIG. 11.

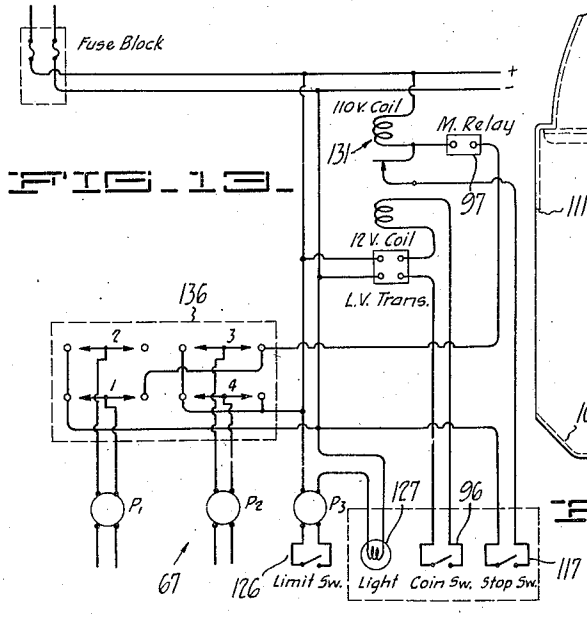

FIG. 13.

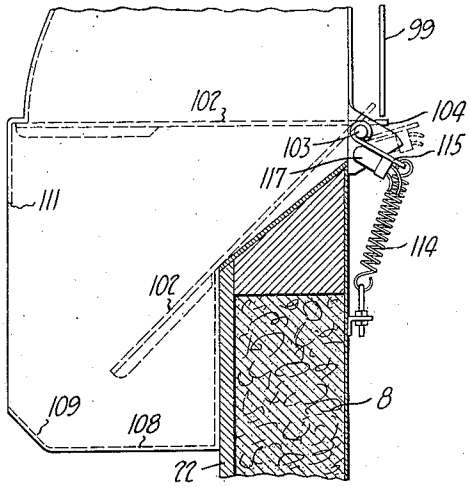

FIG. 12.

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Patented Mar. 23, 1943 2,314,632

UNITED STATES PATENT OFFICE

2,314,632

REFRIGERATED DISPENSER

James C. Rear, Berkeley, Calif., assignor to The Union Ice Company, San Francisco, Calif., a corporation of California

Application December 10, 1940, Serial No. 369,373

8 Claims. (Cl. 312—36)

My invention relates to means which are automatically effective upon energization by a user to dispense one unit of a commodity which is kept under special conditions such as refrigeration.

The principal field for my invention is in the storage and dispensing of packaged material such as commodities which are maintained at subatmospheric temperatures, for example, frozen foods, ice cream or ice, particularly ice in the form of ice cubes. These materials are preferably packed in containers which are liquid tight and which are of a standard size for dispensing. The invention contemplates depositing a plurality of such packages in a depot and releasing for a coin a single one of such packages for each actuation of the machine.

An object of my invention is to provide a refrigerated dispenser which is simple in construction and economical to manufacture, making it feasible to provide a structure of this nature at low cost.

Another object of my invention is to provide a refrigerated dispenser which can readily be serviced.

Another object of my invention is to provide a refrigerated dispenser which is mechanically substantially trouble free.

Another object of my invention is to provide a refrigerated dispenser which is not subject to tampering by an unauthorized person.

Another object of my invention is to provide a refrigerated dispenser which automatically maintains itself in condition for dispensing until empty, whereupon it ceases to function.

The foregoing and other objects of the invention are attained in the embodiment illustrated in the drawings, in which

Fig. 1 is a side elevation of a refrigerated dispenser constructed in accordance with my invention.

Fig. 2 is a front elevation of my dispenser.

Fig. 3 is a rear elevation of my dispenser, the rear door being removed.

Fig. 4 is a side elevation of the removable package containing unit or magazine of my dispenser.

Fig. 5 is a cross section the plane of which is indicated by the line 5—5 of Fig. 4.

Fig. 6 is a cross section the plane of which is indicated by the line 6—6 of Fig. 4.

Fig. 7 is a cross section the plane of which is indicated by the line 7—7 of Fig. 6.

Fig. 8 is a plan of the structure shown in Fig. 7.

Fig. 9 is a central longitudinal cross section on a vertical plane of a portion of the structure showing the package release mechanism located in the front door of the machine.

Fig. 10 is a fragmentary front elevation showing the appearance of the machine when it is empty.

Fig. 11 is an interior view of the package releasing mechanism with the cover of the coin mechanism compartment removed.

Fig. 12 is a cross section the plane of which is indicated by the line 12—12 in Fig. 11.

Fig. 13 is a schematic wiring diagram of the electrical components of my refrigerated dispenser.

In its preferred form my dispenser comprises a generally insulated cabinet within which is located a mechanism for elevating a plurality of packages and projecting a single package at a time through a discharge opening leading from the interior of the container to the exterior thereof, each operation of the structure being subject to energization by the introduction of a coin and being normally completed by the passage of the package through the discharge structure, the possibility of further operation finally being precluded when the machine is empty.

In one commercial form of my refrigerated dispenser there is provided a suitable base 6 which preferably is not fastened down so that the machine is readily portable. On the base there is provided a cabinet 7 including the usual walls and cover preferably inclusive of a thermal insulating material 8 since the main compartment 9 of the structure is maintained at a fixed temperature different than atmospheric temperature. In order to maintain such interior temperature suitable refrigeration means is provided and includes heat transfer coils 11 suitably arranged within the main compartment 9 preferably along the side walls thereof. The heat exchange coils are part of a standard refrigeration circuit also part of which is a refrigeration mechanism, generally designated 13, driven by and responsive to the operation of an electric motor 14. This refrigeration structure is conveniently located in a refrigeration compartment 16 at the rear of the cabinet 7 and accessible to authorized persons through a normally locked rear door 17. When opened, the door 17 affords access to substantially all of the refrigeration regulating and driving structure as well as to the principal electrical controls and switches (shown diagrammatically in Fig. 13) which are installed within a separate interior housing 18. The refrigeration mechanism 13 is effective automatically to maintain the desired temperature condition within the main compartment 9.

Normally located within the main compartment 9 is a frame or magazine 21 for the packages of commodity to be dispensed. Preferably except for minor electrical connections which are readily disrupted if necessary, the magazine or frame 21 is a separate structure from the re-

mainder of the cabinet 7 so that e frame and its contents can if so desired, be ...talled or removed through the front door 22 of the cabinet. The front door is mounted on hinges 23 and is provided with a lock 24 so that only authorized persons can have access to the interior of the cabinet. The frame 21 is preferably constructed of a plurality of structural shapes such as angles and channels and generally rests on a pair of guide angles 26 affixed to the interior floor of the main compartment 9. Running on the angles 26 are rollers 27 at the rear of the frame 21 so that while the frame when in position is frictionally retained by the forward ends of the channels 21 resting upon the angles 26 and hence is quite stable, yet when an operator lifts the front of the frame 21 by means of a handle 28 a large part of the weight is borne on the rollers 27 and the magazine or frame is readily wheeled into or out of the cabinet.

Included in the framework 21 is a plurality of uprights 31 joined by cross beams 32 and braced by tie plates 33 to provide a generally rectangular enclosure within which is disposed an elevator platform 35. This platform is preferably comprised of a metallic sheet and is intended to receive a plurality of packages of the commodities to be dispensed. In order to reduce the interference between successive packages and to facilitate their ejection from the machine, the elevator platform 35 is not planar but throughout its length is progressively staggered or elevated at intervals corresponding to the length of each of the packages so that in effect a series of terraces is provided ascending from the front of the machine toward the back thereof so that packages being forced forwardly from the rear of the machine will gradually descend and will project over and ride over any upstanding projections of a minor character on packages ahead of and below them.

The elevator platform 35 at appropriate points in its down turned side flanges is pierced by a pair of through rods 36 and 37, each of which at its opposite ends is provided with a hook strap 38 engaging an appropriate link in an adjacent one of several chains 39 arranged symmetrically on opposite sides of and spaced apart in the length of the general frame 21. Thus, as the chains are advanced the elevator platform 33 is lifted and as the chains are retracted the elevator platform is lowered. To guide the elevator platform and to relieve the chains of any duty except that of support vertically, the rods 36 and 37 are confined to vertical translation by associated pairs of angles 41 and 42 which extend from the base channels of the frame 21 to the lowermost cross members 32. By this arrangement the elevator platform 33 is guided and appropriately confined for its rising and falling movement.

In order suitably to effectuate the operation of the elevator platform the chains 39 are all similarly trained around pairs of sprockets 43 and 44, the lower ones of which are mounted on stub shafts 46 secured in suitable bearing brackets 47 in the lower portions of the frame 21 whereas the upper ones are mounted on cross shafts 48 journaled in suitable bearings 49 supported on the associated one of a pair of floating beams 51 and 52 sustained from the uppermost cross beams 32 by adjustable tension bolts 53. By suitably manipulating the adjusting bolts 53 the floating beams 51 and 52 are raised or lowered in order to regulate or establish the tension of the chains 39.

In order that the chains 39 may be appropriately driven the shafts 48 are provided with large diameter sprockets 54. The sprockets 54 are connected by chains 56 to small sprockets 57 on end shafts 58 journaled on the floating beams 51 and 52. Also fastened on the end shafts 58 are pairs of sprockets 59 joined by chains 61 so that all of the various connected instrumentalities are driven in unison.

In order to drive these various motion trains one of the end shafts 58 is also provided with a sprocket 62 connected by a chain 63 to a sprocket 64 driven by a gear reduction (not shown). This is located in a housing 66 mounted on the frame of an electric motor 67 supported on a cross strap 68 spanning the distance between adjacent ones of the guides 41 and 42. The motor 67 is the primary source of motion of all of the driven members. When the machine is fully loaded there are arranged on the elevator platform 35, for example, seven tiers of six packages each. These are arranged substantially as shown in Figure 7, since the terraced or stepped nature of the elevator platform persists throughout the entire load.

In accordance with my invention one package at a time is projected from the load compartment by lateral or horizontal translation of the top tier of packages from the rearmost part of the structure toward the front. The entire load is confined on the elevator platform 35 by a front plate 71 and a rear plate 72 so that even due to friction between the packages, only the top tier can be translated, the top of the front plate 71 being cut away just sufficiently for that purpose. In order to propel the packages towards discharge position the two chains 61 are spanned by a pusher 73 in the form of a channel which is affixed to appropriate links in the two chains and extends transversely of the structure. The pusher follows an orbit with the chains 61 so that adjacent the rear part of the machine the pusher 73 rounds the rearmost sprockets 59 and engages the rear package in the top tier adjacent the upper corner thereof. As the pusher 73 advances due to the movement of the chains 61 it presses the entire top tier toward the left in Figure 7 or toward the front of the machine. The packages in the upper tier slide over the packages in the next lowermost tier and are discharged from the load compartment over the forward wall 71 in succession. Because of the sliding movement of the tiers of packages it is preferable to make each package of paraffined or waxy material, although because of the terraced disposition thereof, such lubrication is not always needed.

In accordance with the invention and since the elevator platform 35 is driven from the same source as is the pusher 73, I preferably make the size of the sprockets which drive the shafts 48 and 58 such that the elevator platform 35 rises vertically through a distance substantially equal to the height of one package while the pusher 73 makes a complete circuit, or such that the elevator platform 35 rises through a distance equal approximately to half the height of one package while the pusher 73 completes an active pushing cycle from the righthand or rearmost sprocket 59 to the lefthand or foremost sprocket 59 and rises the remaining half of the package height while the pusher 73 returns on its idle stroke from the forward sprocket to the rearward one. Thus, the pusher 73 advances the topmost tier of packages

as the elevator 35 rises so that there is some sliding movement of the pusher 73 vertically with respect to the package against which it abuts at the rearmost end of the row as the pusher advances, and the extent of this relative vertical sliding movement is about half the height of the package. The relationship between the elevator platform 35 and the pusher 73 is of a continuous relative movement rather than intermittent motion, but in order that one package may be dispensed at a time, I provide means for energizing and deenergizing or enabling and disabling the motor 67 for just sufficient length of time to drive the pusher 73 forwardly through a horizontal distance equal to the length of one package so that but one package during that time is pushed off of the tier.

Since the original operation of the machine is preferably responsive to coin control, I preferably mount adjacent the top of the front door 22 a coin slot 91 which leads to a standard coin receiving mechanism 92 effective to retain acceptable coins, but which has a coin return 93 for rejecting unacceptable coins and depositing them in a pocket 94 where the user can recover them. An acceptable coin received by the standard coin mechanism 92 is effective to close momentarily a coin switch 96 (Figure 13), which by means of a relay 97, closes a circuit to the motor 67. Then, the motor begins its operation to advance the pusher 73 and lift the elevator platform 35. This action displaces the foremost package from the top tier on the elevator platform and projects it through a discharge opening, generally designated 98, provided in the insulated door 22.

I provide means for readily releasing the dispensed package from the machine, yet for preventing unauthorized access to the interior of the machine, and also for maintaining a measure of insulation between the interior of the machine and the atmosphere. Such insulation preferably takes the form of an air trap or dead air chamber between the interior of the cabinet and the exterior. Mounted on the inside of the door at the entrance to the discharge opening 98 is a flap 99 provided with a hinged mounting 101 and normally depending by gravity vertically across the opening to the discharge chamber. Also extending across the discharge opening 98, but normally in a horizontal position, is a flap 102 provided with a hinged mounting 103 adjacent the interior of the door 22 and having an extension 104 normally underlying the lower end of the flap 99. Under the flap 102 in its normal position there is a receiving compartment 106 partially defined by an inclined plate 107 and also defined by a lower receptacle wall 108 terminating in an upwardly inclined retaining lip 109 at the lower margin of a release opening 111. Between the flaps 99 and 102 in the normal position which they occupy for most of the time, there is a chamber 112 which contains a body of quiescent or trapped air acting substantially as an insulator between the interior compartment 9 and the outside air, thereby reducing materially thermal losses through the discharge aperture 98. Since the opening 111 is relatively large, a person might attempt to reach through it and attempt to depress the plate 102 into its dotted line position (Figure 9), then to swing the flap 99 upwardly, thereby gaining access to the merchandise within the compartment 9. But this unauthorized access is prevented, since the extension 104 underlies the normally depending flap 99. Despite great force applied to the lower surface of the flap 102, it cannot be revolved from outside of the machine and hence unauthorized access through this opening cannot be had. But when the motor 67 operates and the foremost package in the top tier is advanced against the flap 99, it is swung from its lower dotted line position into its full line position as shown in Figure 9. Such movement of the flap 99 swings it out of the normal path of the extension 104 so that the package being discharged not only can pass through the initial portion of the discharge aperture 98 into the insulating chamber 112, but the weight of the package on the flap 102 overbalances that flap and it swings into the dotted line position of Figure 9. This releases the package to slide downwardly against the retaining lip 109 so that the user can then extract it from the machine through the opening 111. When the package has been removed from the position against it, the flap 102 is returned to its original position against a stop ledge 113 by a spring 114 engaged with an arm 115 projecting from the flap 102 and likewise suitably attached to the inside of the door 22. Also, the flap 99 returns to its vertically depending position by gravity as soon as the flap 102 has been restored so that the interlocking arrangement is reestablished as soon as the dispensed package is removed by the user. Preferably the size of the aperture 111 is so close to that of the package that until the package is withdrawn from the machine, no access can be had to the interior thereof and since the flap 102 is restored to position just prior to the final withdrawal of the package from the machine, it is not possible to gain access to the machine at this time.

In accord with my invention I interrupt the operation of the motor 67 as soon as one package has been dispensed and leave it in a condition to be reenergized or reenabled as soon as a subsequent coin is deposited. For this purpose, on the extension 115 which is responsive to movement of the flap 102, in turn responsive to the dispensing of a package, I mount a mercury switch 117 which is effective when tipped by the discharge of the package to interrupt the operation of the motor relay 97 so that the motor is disabled and the machine stops. As soon as the package is withdrawn, however, the machine is in condition to cycle again to discharge one additional package for each coin introduced.

In the present size machine some 42 packages are so dispensed and I provide means for shutting down the machine when the last package has been discharged. For that reason on the elevator platform 35 I provide a projection 121 extending between guides 122 upstanding from the framework. Since the elevator platform 35 rises uniformly throughout the operation of the machine, it rises $1/42$ of its total travel for each package dispensed and I consequently arrange matters so that the projection 121 is effective through the final 42d part of the total rise of the elevator platform to disable the mechanism. Consequently, in the path of the projection 121 I provide an arm 123 fastened by a pivot 124 to the framework and carrying a mercury switch 126, included in the circuit of the motor 67, so that when the elevator completes its final rising movement, the switch 126 is opened and the motor 67 is stopped and cannot be started from outside the machine.

In order that the empty condition may be apparent to a prospective user I provide an indicating light 127 for illuminating a legend such

as the word "Empty" appearing in the front door near the coin slot so that this legend is illuminated at all times while the machine is not in operating condition. Simultaneously, I energize an electromagnet 131 effective to project an arm 132 into the coin mechanism 92 so that all coins afterward introduced through the slot 91 are immediately returned to the cup 94. This condition persists until an attendant reloads the machine. The reloading can either be accomplished by removing the empty magazine frame 21 and replacing it with a filled one, or by reversing the motor 67 and as the parts go through their reverse operation, individually loading the packages on to the elevator platform 35. When the front door is opened ready access is had to the opening at the upper edge of the wall 71 and as the pusher 73 retreats cyclically the elevator platform 33 correspondingly lowers so that ultimately the machine is replaced in condition shown in Figure 7, fully charged, and upon reversal of the motor connections, is ready for the type of operation heretofore described. The motor is preferably provided with a reversing switch 136 diagrammatically illustrated in Figure 13. When the machine is restored to filled or partially filled condition, the descent of the elevator platform 35 releases the projection 121 from the arm 123 of the mercury switch 126, which recloses by gravity so that the motor 67 can be run forwardly, the light 127 is extinguished, the electromagnet 131 is deenergized, the coin mechanism is again in condition for operation and the dispensing operations can proceed.

By providing a refrigerated dispenser in accordance with my invention, there is afforded a structure which is cheap and easy to manufacture, one which is quite reliable in commercial operation, one in which service and repair can readily be accomplished in a very short space of time either by changing the effective units of the machine or by recharging them, one in which refrigeration is feasible because of good insulation without substantial loss through the dispensing aperture and one in which a plurality of packages of material can readily be dispensed without requiring great accuracy in the packages themselves or requiring a package of a special character.

I claim:

1. A refrigerated dispenser comprising an insulated cabinet having a discharge opening, a flap overlying said opening, a door closing said opening, means within said cabinet for projecting a package from within said cabinet through said opening to push said flap aside and to actuate said door, means for energizing said projecting means, means controlled by said door for deenergizing said projecting means and means for preventing actuation of said door until said flap is pushed aside.

2. A refrigerated dispenser comprising an insulated cabinet having a discharge opening, means for closing said opening, a flap overlying said opening to hold said closing means in closed position, means for projecting a package from within said cabinet through said opening for moving said flap out of holding position and to actuate said closing means, means controlled from outside said cabinet for energizing said projecting means, and means responsive to the actuation of said closing means for deenergizing said projecting means.

3. A refrigerated dispenser comprising a cabinet having a discharge opening, an elevator platform mounted within said cabinet for rising movement toward said opening through a predetermined distance, a projecting means within said cabinet arranged to advance toward said opening, and means for simultaneously lifting said elevator platform through said predetermined distance and advancing said projecting means a plurality of times.

4. A refrigerated dispenser comprising a cabinet having a discharge opening, an elevator platform mounted within said cabinet for rising movement through a predetermined distance toward said opening, a projecting means within said cabinet arranged to advance through a predetermined distance toward said opening, and means for operating said projecting means to advance a plurality of times through said latter predetermined distance as said elevator platform lifts once through said first named predetermined distance.

5. A refrigerated dispenser comprising a cabinet having a discharge opening, an elevator platform mounted within said cabinet for rising movement toward said opening and adapted to support a plurality of horizontal tiers of similar packages, a projecting means mounted within said cabinet for advancing movement to push a tier of said packages through said aperture, and means for operating said elevator platform and said projecting means in synchronism whereby said projecting means pushes each tier of said packages through said aperture as said elevator platform lifts the height of each one of said plurality of tiers of said packages.

6. A refrigerated dispenser comprising a cabinet, an elevator platform mounted within said cabinet, means for lifting said platform through a multiple number of distance units, a projecting means mounted within said cabinet to advance through a distance equal to the length of said elevator platform, and means for operating said projecting means to advance through said distance each time said elevator platform is lifted through one of said distance units.

7. A refrigerated dispenser comprising an insulated cabinet having a discharge opening, a hinged flap depending from said cabinet across said opening, a horizontal flap hinged on said cabinet and extending across said opening, means preventing movement of said horizontal flap until said depending flap is moved, means within said cabinet for projecting a package through said opening first to displace said depending flap and then to displace said horizontal flap, and means responsive to displacement of said horizontal flap for disabling said projecting means.

8. A refrigerated dispenser comprising an insulated cabinet having a discharge opening, a horizontal flap hinged on said cabinet across said opening and adapted to swing into open position, a projection on said flap adapted to move in a predetermined path as said flap swings into open position, a depending flap hinged on said cabinet across said opening at a distance from said horizontal flap and disposed normally to lie in the path of said projection, means for projecting a package from within said cabinet through said chamber to displace said depending flap out of the path of said projection and then to displace said horizontal flap, and means responsive to displacement of said horizontal flap for disabling said projecting means.

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