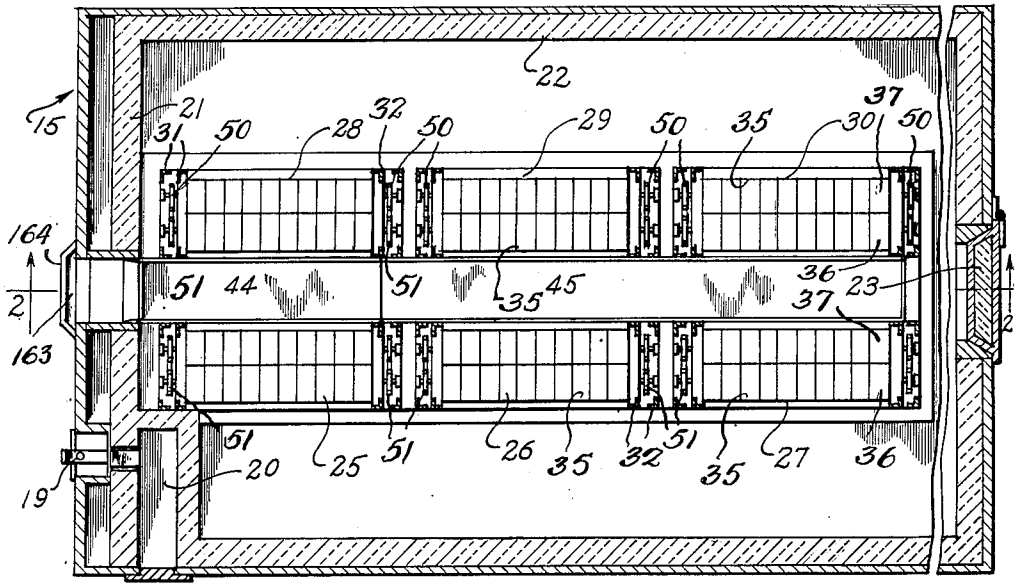
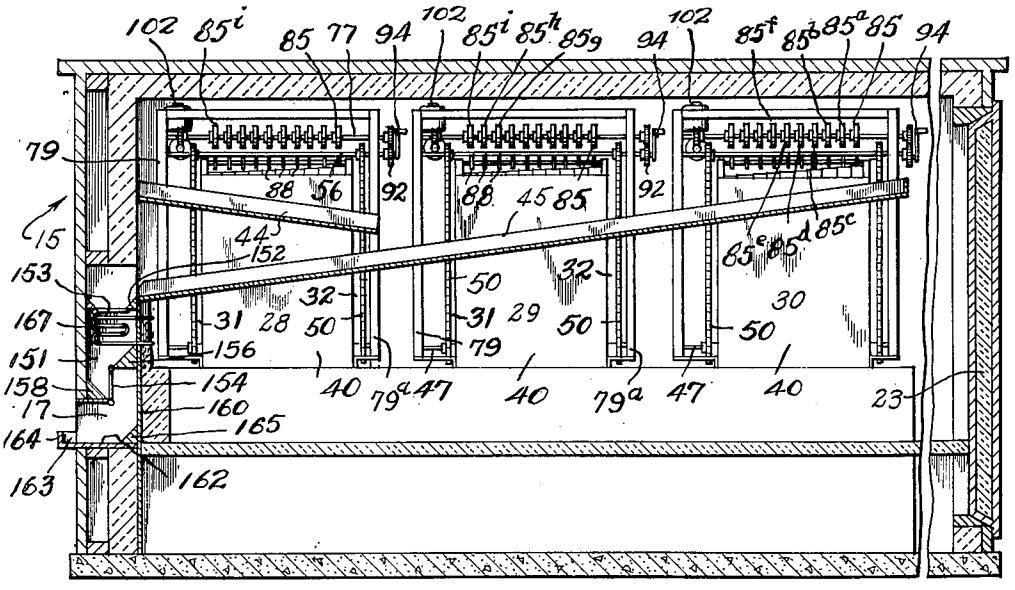
Dec. 16, 1952 H. W. SADLER 2,621,994

VENDING MACHINE

Filed Dec. 19, 1949 5 Sheets-Sheet 1

Fig. 1





INVENTOR

Harold W. Sadler

Fig. 2

BY Christian R. Nielsen

ATTORNEY

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VENDING MACHINE

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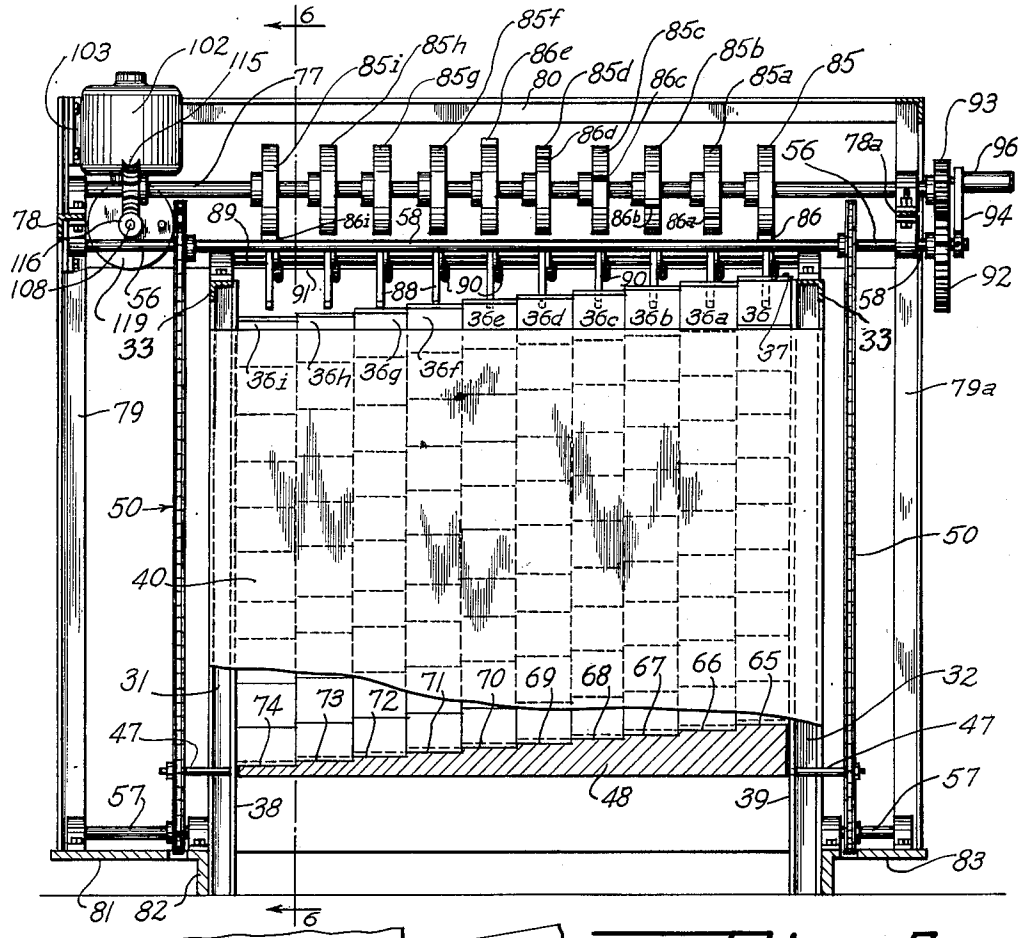


Fig. 3

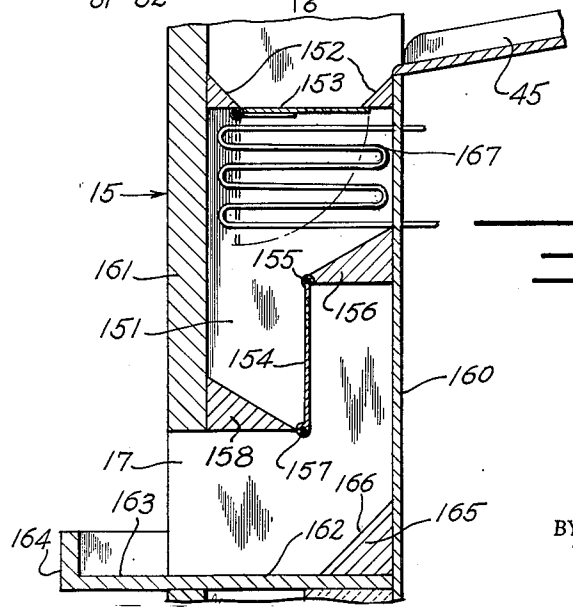


Fig. 4

INVENTOR
Harold W. Sadler
BY Christian R. Nielsen
ATTORNEY

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VENDING MACHINE

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Fig. 5

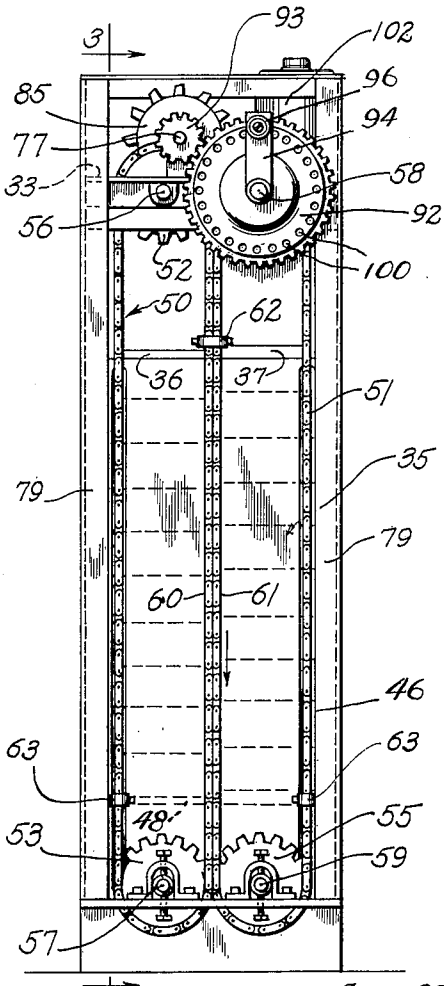
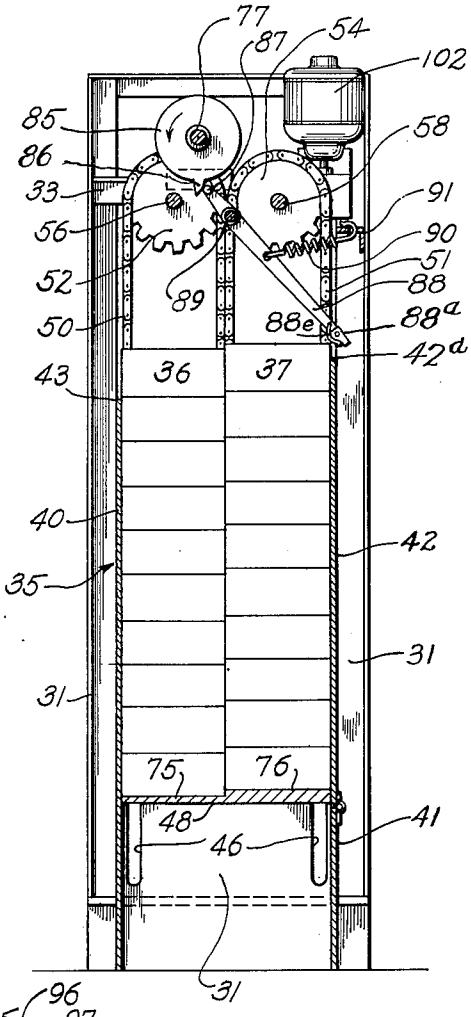


Fig. 6



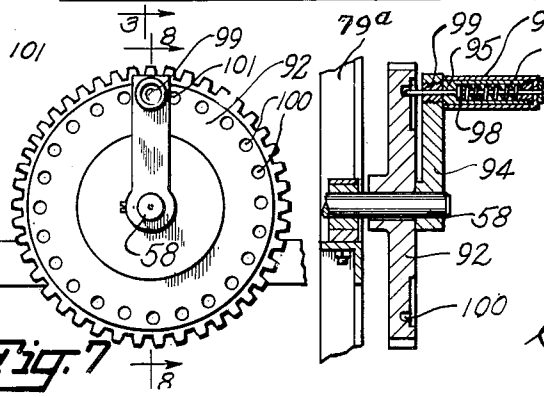


Fig. 7

Fig. 8

INVENTOR.

Harold W. Sadler

Christian L. Nielsen

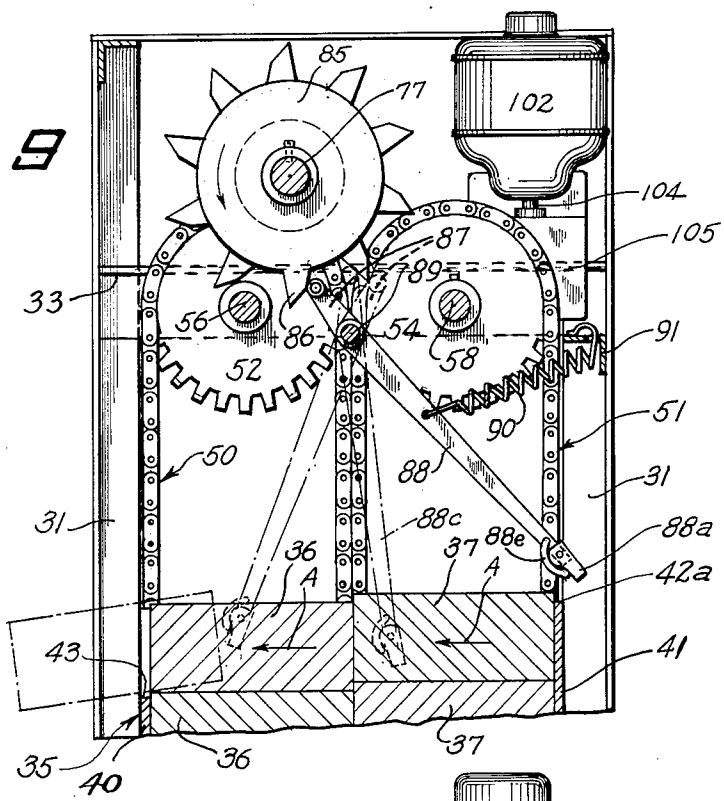
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VENDING MACHINE

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Fig. 9



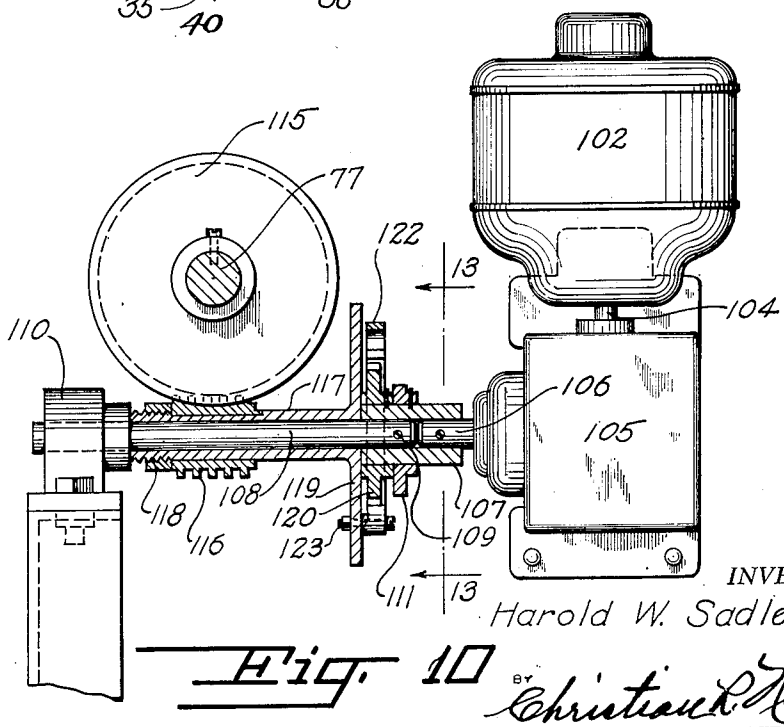


Fig. 10

INVENTOR.
Harold W. Sadler
BY Christian R. Nielsen
ATTORNEY

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VENDING MACHINE

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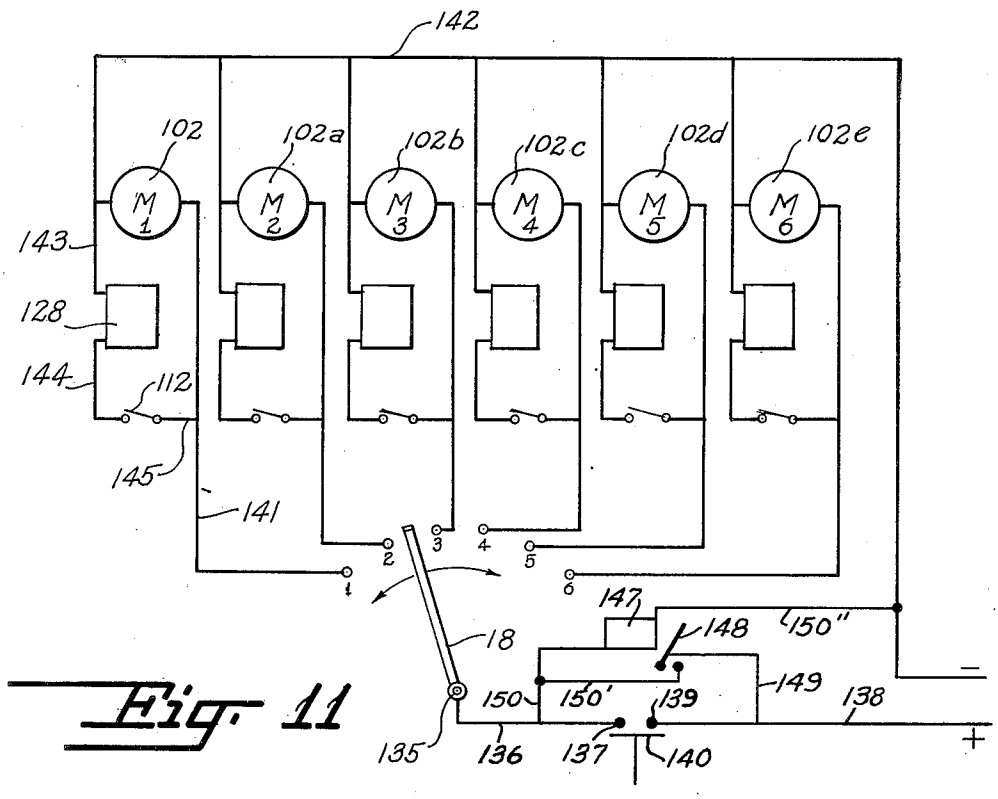


Fig. 11

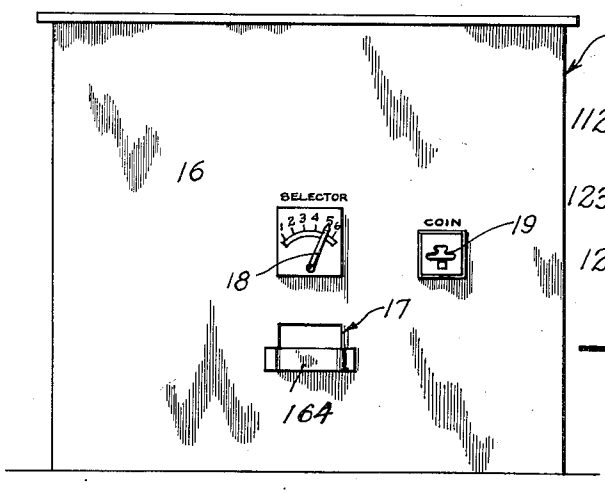


Fig. 12

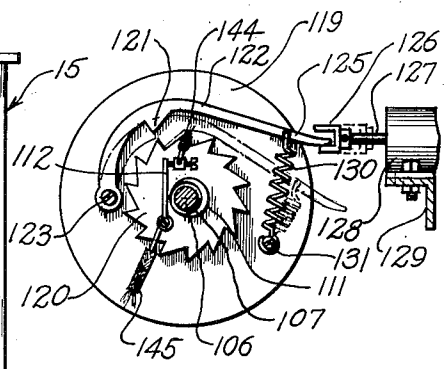


Fig. 13

INVENTOR.

Harold W. Sadler

BY Christian D. Kiehen

ATTORNEY

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2,621,994

UNITED STATES PATENT OFFICE

2,621,994

VENDING MACHINE

Harold W. Sadler, Hyattsville, Md.

Application December 19, 1949, Serial No. 133,786

2 Claims. (Cl. 312—69)

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This invention relates to vending machines and more particularly those adapted for use in dispensing refrigerated articles such as packaged ice cream and sherbets or frozen food products.

An object of the invention is the provision of a vending machine having a simple and efficient positive means for ejecting packages from the machine, said means including a lever which is rocked a predetermined degree when a coin is deposited for causing a package of refrigerated goods to eject an alined package, the ejecting package being dispensed by the lever when a second coin is deposited, the lever being maintained in engagement with the ejecting package during the two dispensing operations.

Another object of the invention is the provision of a vending machine for dispensing packaged frozen confections or packaged frozen foods in which a plurality of levers are arranged along an axle and each is adapted to be rocked through two stages for ejecting successively a pair of aligned packages from the tops of a pair of vertical columns of the packages, a lever being alined with each pair of the columns, the pairs of columns being supported at progressively decreasing levels with means for raising all of the columns by increments each time a package is being ejected, means being employed for causing the series of levers to be rocked successively as the pairs of alined packages are raised and brought into registration with the free ends of the associated levers.

A further object of the invention is the provision of a dispensing machine for packaged frozen comestibles in which a lever is rocked through two stages for ejecting the uppermost pair of packages from each pair of vertical columns of the packages, the lever shifting one package in a column against a similarly positioned package in the other column for ejecting the second mentioned package when a coin is deposited, the lever ejecting the first mentioned package when a second coin is deposited, the columns being raised by increments during each ejection, the lever being rocked through a predetermined angle by a cam on a shaft, the angular degree of rotation of the shaft and cam being controlled by an electrical means in such a maner that only one package will be ejected for each coin deposited so that after one package has been dispensed, the shaft will be stopped and the cam will retain the lever against movement until the shaft is caused to be rotated in an authorized manner.

This invention is best understood from a consideration of the following detailed description considered in conjunction with the accompanying

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drawings forming a part of this specification, nevertheless, it is to be borne in mind that the invention is not confined to the disclosure, but is susceptible of such changes and modifications as shall define no material departure from the salient features of the invention as expressed in the appended claims.

In the drawings:

Figure 1 is a longitudinal horizontal section of my dispensing machine.

Figure 2 is a longitudinal vertical section taken along the line 2—2 of Figure 1.

Figure 3 is an enlarged longitudinal vertical section of a single unit for dispensing one kind of confection or food, taken on the line 3—3 of Figure 5.

Figure 4 is a greatly enlarged fragmentary vertical section showing the particular construction of the discharge passage for the ejected packages.

Figure 5 is an enlarged rear end view in elevation of the unit shown in Figure 4 disclosing the means for elevating a series of pairs of columns of packaged goods.

Figure 6 is an enlarged transverse vertical section of the unit illustrated in Figure 3, taken on the line 6—6 showing the stepped arrangement of the supporting base of an elevator.

Figure 7 is an enlarged fragmentary front view in elevation of a manual means for moving the elevator independently of the ejecting mechanism.

Figure 8 is a vertical section taken along the line 8—8 of Figure 7.

Figure 9 is a greatly enlarged fragmentary transverse vertical section showing the mechanism for ejecting the packaged goods.

Figure 10 is an enlarged vertical section showing the mechanism for connecting the motor with the ejecting mechanism.

Figure 11 shows more or less diagrammatically a plurality of circuits for the various ejecting means of the associated units.

Figure 12 is a front view of the housing for the dispensing units and the various elements for initiating operation of a particular unit, and

Figure 13 is a transverse vertical section taken along the line 13—13 of Figure 10.

Referring more particularly to Figures 1, 2 and 12, the numeral 15 designates a building forming the housing for a plurality of dispensing units and provided with a front wall 16. A discharge passage 17 for dispensed packages is located below a selector arm 18 which acts as a switch. A coin slot 19 forms the outer entrance for a coin which falls finally into a draw 20. The

building may be constructed of any suitable material but the interior thereof must be well insulated as shown at 21 and 22. A refrigerating machine (not shown) is employed for maintaining the interior of the building at the proper temperature. A door 23 is sealed hermetically within the rear passage forming an entrance for admitting a workman for repairs and for replenishing the various dispensing units 25 to 30 inclusive with packaged frozen goods. Figures 1 and 2 illustrate a building of sufficient size to house a great number of dispensing units. This building is placed on a lot where it is possible for customers to drive in and obtain the frozen confection or food without entering the building. On the other hand, the dispensing units may be placed in refrigerators in stores.

Each dispensing unit as illustrated more particularly in Figures 3, 5, 6, 9 and 10 includes a metal supporting frame formed of vertical angle irons 31, 32 and suitable horizontal connecting and reinforcing angle irons 33. The four vertical angle irons 31 and 32 brace and support a narrow tank 35, rectangular in cross section which houses two rows or columns of packaged frozen confections or foods, the columns or rows running lengthwise of the tank. This arrangement provides pairs of packages 36 and 37 extending transversely of the tank and in longitudinal alinement as shown in Figure 9.

The tank is open at its top and bottom and contains two end walls 38 and 39 (Figure 3) and two side walls 40—41 (Figures 6 and 9). The side wall 41 has an opening for supplying the packages 36 and 37 to the tank, said opening being closed by a door 42. The side wall 40 terminates at its upper end at 43 (Figure 6) to provide a discharge passage for the packages when they are ejected from the tank onto an inclined conveyor 44 or 45 (Figure 2). It will be understood that a conveyor 44 will be employed in each unit, but for clarity in the drawing, only one conveyor has been shown. Each opposite end wall 38 and 39 is provided with a pair of parallel vertical slots 46 to receive guide rods 47 projecting from the opposite ends of a support or platform 48 which carries the packages 36 and 37.

A pair of endless chains 50 and 51 are located at each end of the tank 31 and exteriorly of the end walls 38 and 39. The chains 50 are trained on sprockets 52 and 53 while the chains 51 are trained on sprockets 54 and 55. The pairs of sprockets 52 and 53 are secured to the respective shafts 56 and 57, while the sprockets 54 and 55 are secured to the respective shafts 58 and 59. The shafts 57 and 59 are mounted in adjustable bearings at the opposite end walls of the tank 35. The inner contacting sections 60 and 61 of the respective chains 50 and 51 are connected together as shown at 62. The guide rods 47 (Figures 3, 5 and 6) which extend through the slots 46 in the opposite end walls of the tank 35 have connections at 63 with the other sections of the chains so that the support 48 may be raised with a load of packages when the chains are moved.

The base or platform 48 (Figure 3) has stepped portions 65, 66—73, 74 extending lengthwise thereof for progressively elevating the stacks of packages between the opposite ends of the tank 35 for a purpose which will be presently explained. As illustrated in Figure 6, the platform is stepped transversely in two sections 75 and 76. This stepped arrangement places the packages 37 at a slightly higher elevation than the packages 36 so that the packages 37 will always clear the upper surfaces of the packages 36 when the packages 37 are shifted to the left in Figure 9 to eject a package 36 and thence a package 37.

A cam shaft 77 is mounted in bearings carried by horizontal angle irons 78 and 78*a* connecting together the upper ends of the respective pairs of vertical angle irons 79 and 79*a*. Angle irons 80 connect the tops of the angle irons 78 and 79*a* (Figure 3). The lower ends of the angle irons 79 are secured rigidly to a platform 81 having a flange 82 welded to the angle irons 31. The lower ends of the angle irons 79*a* are rigid with a platform 83 welded to the irons 32. The platforms 81 and 83 carry the bearings for the respective shafts 57 and 59 supporting the respective sprockets 53 and 55 (Figures 3 and 5) at the front and rear end walls of each unit. The angle irons 78, 78*a*, 79, 79*a* and 80 form an auxiliary frame which embraces the top and end walls of each unit. This frame includes a sufficient number of reinforcing angle iron bars to provide a sturdy support.

A series of disks designated by the numerals 85, 85*a* to 85*i* inclusive are secured in equally spaced relation on the shaft 77 with each disk being aligned with a vertical plane passing through and associated pair of the packages such as 36 and 37 (Figure 6). The disks each have a cam thereon and the cams 86 to 86*i* are so arranged that when the shaft 77 is revolved, the cams in succession will be brought into registration with the upper free ends 87 of levers 88 alined with the associated disks. The levers are rockably mounted on a rod 89 intermediate the ends of said levers. A coil spring 90 is connected between the lower portion of each lever and an angle iron 91 secured to a pair of the vertical angle irons 79 and 79*a*. The rod 89 has its ends fixed in the upper ends of a pair of angle irons 33. Each lever has a package engaging member 88*a* at the lower end. Said member as shown in Figure 9 is pivoted on the lower end of the lever so that said member may tilt forwardly when the lever 88 is returned to an inoperative position. A spring 88*e* may be employed for retaining the member in an operative position.

A gear 92 (Figures 3, 5, 7 and 8) is loose on the rear end of the shaft 58 and meshes with a pinion gear 93 fixed to the cam shaft 77. A crank 94 is fixed to the outer end of the shaft 58 adjacent the gear 92. A hollow post 95 has its inner end secured to the outer face of the crank and slidably receives a cylinder 96. A compression spring 97 is mounted in the post and has one end bearing on a ring 98 fixed to a reciprocating rod 99 while the opposite end of the spring bears against the closed end of the post. The inner end of the rod 99 is received normally in any one of a series of pockets 100 circumferentially arranged in the outer face of the gear 92. The outer end of said rod is held in place on the outer closed end 101 of the cylinder 96. As long as the inner end of the rod 99 is in a pocket 100 of the gear 92, the gear 93 will be revolved when the crank is turned for a purpose to be described presently. When the rod or pin 99 is withdrawn, the crank may rotate the shaft 58 without rotating the gear 93 or shaft 77.

A motor 102 has the usual housing bracket 103 which is bolted to the upper end of one of the angle irons 79 (Figures 3, 5, 6, 9 and 10). This

motor drives a shaft 104 which in turn operates a transmission in a casing 105 secured in any approved manner to one of the elements of the auxiliary frame of a unit. The transmission revolves a shaft 106 received by a hallow shaft 107 and pinned thereto (Figure 10). A second shaft 108 aligning the 105 has one end received by the hollow shaft 107. A pin 109 connects the shafts 107 and 108 together. The other end of shaft 108 is mounted in a bearing 110 carried by the auxiliary frame of a unit. A cam 111 is secured to the hollow shaft 107 and is adapted to open a micro-switch 112 (Figure 13) for a purpose which will be explained hereinafter.

The shaft 77 is driven by a worm gear 115 which in turn is revolved by a worm 116 keyed to a hollow shaft 117 loose on the shaft 108. A nut 118 threaded onto one end of the last mentioned shaft retains the worm in place. A disk 119 connected to an end of the hollow shaft 117 abuts a ratchet wheel 120 (Figure 10) fixed to the shaft 107. A pawl 121 (Figure 13) mounted on a lever 122 pivoted at 123 on the disk 119 is adapted to engage a tooth of the ratchet wheel 120 for connecting the shaft 117 temporarily with the driven shaft 108. At this time the shaft 77 is revolved while the gear 93 fixed to said shaft revolves the intermeshing gear 92 and shaft 56 for driving the chains 50 and 51.

The free end 125 of the lever 122 is received by a clutching member 126 on the outer end of an armature 127 of a solenoid 128 mounted on an angle iron 129 of the auxiliary frame of each dispensing unit. A coil spring 130 has one end attached to the lever 122 which is curved around the ratchet wheel 120, the other end of the spring being connected to a pin 131 fixed to the disk 119. Said spring tends at all times to draw the lever 122 towards the ratchet wheel 120 so that the pawl 121 will engage the wheel when the free end of the lever is released by the clutch member 126 when a source of current energizes the solenoid 128 temporarily.

Referring more particularly to Figure 11, it will be seen that the selector arm 18 is the initiating switch element for all six dispensing units 25 to 30 inclusive (Figure 1). The pivoted end 135 of the arm is connected by a wire 136 with a contact 137. A wire 138 connects a contact 139 with the positive side of a source of electrical current. A bridging member 140 which is actuated temporarily when a coin is inserted in the slot 19 closes the circuit to the motor of a selected unit. Any one of the contacts, numbered from 1 to 6 inclusive, will be engaged by the free end of the arm 18 when a selected circuit is closed. Each contact will have associated therewith indicia defining the kind of product to be dispensed. Thus, in case of one kind of product, such as ice cream, the words, vanilla, chocolate, strawberry, etc. will be arranged above the numerals 1 to 6 inclusive for guiding the purchaser in making the proper selection. A wire 141 connects the contact 1 with the positive pole of the motor 102 while a wire 142 connects the negative pole of the motor with the negative side of the source of electrical current. The other contacts 2 to 6 inclusive are connected similarly to the respective motors 102^a to 102^e of the associated dispensing units. A wire 143 connects the negative wire 142 with the solenoid 128 while wires 144 and 145 complete the circuit to said solenoid in conjunction with the switch 112 actuated by the cam 111.

A time relay 147 closes a switch 148 for maintaining the circuit closed to the motor 102 for a sufficient length of time until the various functions of the units have been completed. The time relay is in a circuit which is shunted around the switch 140 by the wires 149, 150' and 150''.

In Figure 4, the discharge for the ejected packages is more specifically illustrated and includes a vertical chute 151 into which terminates the lower end of the inclined chute 45. The upper end of the vertical chute has package guiding members 152 at points where a spring-pressed trap door 153 closes normally the upper end of the chute 151 to prevent the loss of cold air from the housing 15 and the entrance of warm air to said housing. A second trap door 154 is hinged at 155 on the free end of a guiding block 156 and has its lower free edge 157 normally in engagement with the free edge of a tapered guiding block 158 for closing the lower end of the vertical chute 151. It will be noted that the block 156 is secured to one wall 160 of the chute while the block 158 is secured to the opposite wall 161 and below the block 156 with the free edges of said block being in the same vertical plane thereby providing a tortuous pathway for the ejected packages before said packages strike the bottom 162 of the chute and are projected forwardly on an outwardly extended shelf 163. A vertical flange 164 rising from the periphery of the shelf retains the package on said shelf. A guiding block 165 triangular in cross section, has an inclined face 166 which shifts the falling package onto the shelf 163. Said block is secured at inner portions of the bottom of the chute. Refrigerating coils 167 are mounted on opposite side walls of the chute 151 for maintaining said chute at a predetermined temperature.

The operation of the dispensing apparatus is as follows: With the various units supplied with the packaged frozen products as illustrated in Figures 1, 3, 6 and 9, a customer may obtain a package by placing a coin or coins of the proper denomination in the slot 19 of a standard coin controlling mechanism. The coin or coins causes the member 140 (Figure 11) to close the switch which includes the contacts 137 and 139. However, it must be borne in mind that the customer must rock the selector arm 18 for engagement with one of the contacts 1 to 6 inclusive which determines the kind or flavor of the product desired. The selector arm must be positioned before a coin is inserted. The circuit is then closed to the motor 102 if the selector arm is in engagement with the contact numbered 1. The closing of the circuit by the insertion of the coin or coins is only momentary but the relay 147 retains the circuit closed long enough for the functioning of the various mechanisms which are coordinated for causing the delivery of a package 36 to a customer. In the operation of the dispensing mechanism of the unit 25 (Figure 1) when the arm 18 engages the contact 1 on the front face of the building or housing 15, with the motor 102 operating, the shafts 106, 107 and 108 are revolved (Figures 10 and 13) and the cam 111 and the ratchet wheel 120 are rotated. At this time, the micro switch 112 is closed whence the solenoid will withdraw the clutching member 126 from the free end 125 of the lever 122 so that the spring 130 will pull the arm 122 inwardly and cause the pawl 121 to engage a tooth of the wheel 120 for connecting the disk 119 and hollow shaft 117 with the driven shaft 108 so that the shaft 117 and worm 116 will be revolved.

The worm wheel 115 is revolved by the worm 116 thereby rotating shaft 77 (Figures 3, 5, 6, 9

and 10), gears 93 and 92 and shaft 58. The chains 50 and 51 are driven by the sprockets 54 fixed to the shaft 58 and the series of spaced disks 85 to 85[1] inclusive and the attached cams 86 are revolved. The staggered relationship of the various cams on the shaft 77 will cause the ejector levers 88 to force successively pairs of packages 36 and 37 from each column of packages in a unit. As shown more particularly in Figure 9, the cam 86 on the revolving disk 85 is engaging the upper free end of the lever 88. As the cam moves in the direction indicated by the arrow, applied to the disk, the lower free end 88*a* of the lever is moving inwardly and shifting the packages 37 and 36 in the direction of the arrows A until the package 36 has been ejected onto the chute 45 and the lever has reached a substantially vertical position. At this time, the vending mechanism stops and will not be set in motion until another coin or coins are inserted. It will be noted that the uppermost packages 36 and 37 must have cleared the upper edge 43 of the wall 40 of the tank or casing 35 in order to be dispensed.

The shaft 106, the wheel 120, disk 119, shaft 117 and cam 111 (Figures 1 and 13) complete one revolution each time a coin is inserted. Therefore, the cam 111, the clutching member 126 and the free end 125 of the lever 122 complete one cycle and are restored to their original positions shown in Figure 13. The worm wheel 115, shaft 77 and the associated operating elements, such as the various cams 86 and the sprockets 52, 54, 53 and 55 complete only a partial revolution.

A partial revolution of the shaft 77 stops the cam 86 at a point when the lever 88 reaches the dotted line position indicated by the numeral 88[c]. On the other hand, the chains 50, 51 and the associated sprockets raise the platform 48 carrying the packages only a fraction of an inch for each complete revolution of the ratchet wheel 120 (Figures 10 and 13). When the package 37 has been ejected, the upper end of the lever 88 will clear the cam 86 and the spring 90 will return said lever to an inoperative position. The spring pressed pivoted member 88[a] will drag over the top of the next package 37 on the return stroke but will engage rigidly the next package 37 when the shaft 77 has completed a full revolution. Upon the insertion of the third coin the package 37*a* Figure 3 will remove or eject the aligned package 36*a* by a second lever 88 rocked by a cam 85*a*. The cams in succession will be brought into registration with the successive levers for ejecting the packages 37*a* to 37*i* and the associated packages 36*a* and 36*i*.

The chute 45 may be equipped with rollers to facilitate the discharge of the ejected packages. The chute 44 will receive those packages which are nearer the front wall of the housing 15, thereby reducing the height of the fall of the packages at these points before said packages are discharged onto the chute 45.

The gear 92 is connected to the shaft 58 by the pin 99 engaging a pocket 100 in said gear. However, when a platform 48 of a unit has been completely elevated and emptied, said platform may be lowered by withdrawing the pin from the pocket by pulling on the sleeve 96 (Figure 8) which normally serves as a handle. The operator may turn the crank 94 thereby rotating reversely the shaft 58 and the sprockets 54 and 52. The platform will thus be lowered without disturbing the setting of the cams 86 to 86[1] or without reversing the motor 102 or any of the associated parts.

The description of the dispensing operation has been applied to one unit which ejects one kind of packaged goods. However, the different types of frozen foods or the differently flavored ice creams may be obtained by setting the selector arm 18 on the proper contact numbered from 1 to 6 inclusive.

I claim:

1. In a machine for dispensing packages, a casing, a platform movable vertically in the casing adapted to support a plurality of pairs of transversely alined stacks of the packages, a lever alined with each pair of packages in a pair of stacks, a shaft, a plurality of cams spirally arranged on the shaft and adapted to successively rock the levers to eject the packages progressively from the top of the stacks, an electric motor for causing rotation of the shaft, a clutching means adapted to connect the motor to the shaft for a cycle of operation, means controlling the clutching means and means driven from the shaft for causing the platform to be elevated progressively as the packages are ejected successively from the stacks until all of the packages have been ejected from the platform.

2. In a machine for dispensing packages, a casing, a platform movable vertically in the casing adapted to support a plurality of pairs of transversely alined stacks of the packages, a lever alined with each pair of packages in a pair of stacks, a shaft, a plurality of cams spirally arranged on the shaft and adapted to successively rock the levers to eject the packages progressively from the top of the stacks, an electric motor for causing rotation of the shaft, a clutching means adapted to connect the motor to the shaft for a cycle of operation, means controlling the clutching means, and means driven from the shaft for causing the platform to be elevated progressively as the packages are ejected successively from the stacks until all of the packages have been ejected from the platform, means included in the driven means between the motor and the platform for disconnecting the driven means from the platform and manual means for causing the platform to be returned to its lowermost position without disturbing the shaft and cams.

HAROLD W. SADLER.

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