

Nov. 9, 1965

W. A. ESCHENBURG ETAL

3,216,613

ICE DISPENSING MACHINE

Original Filed Jan. 30, 1961

5 Sheets-Sheet 1

Fig. 1

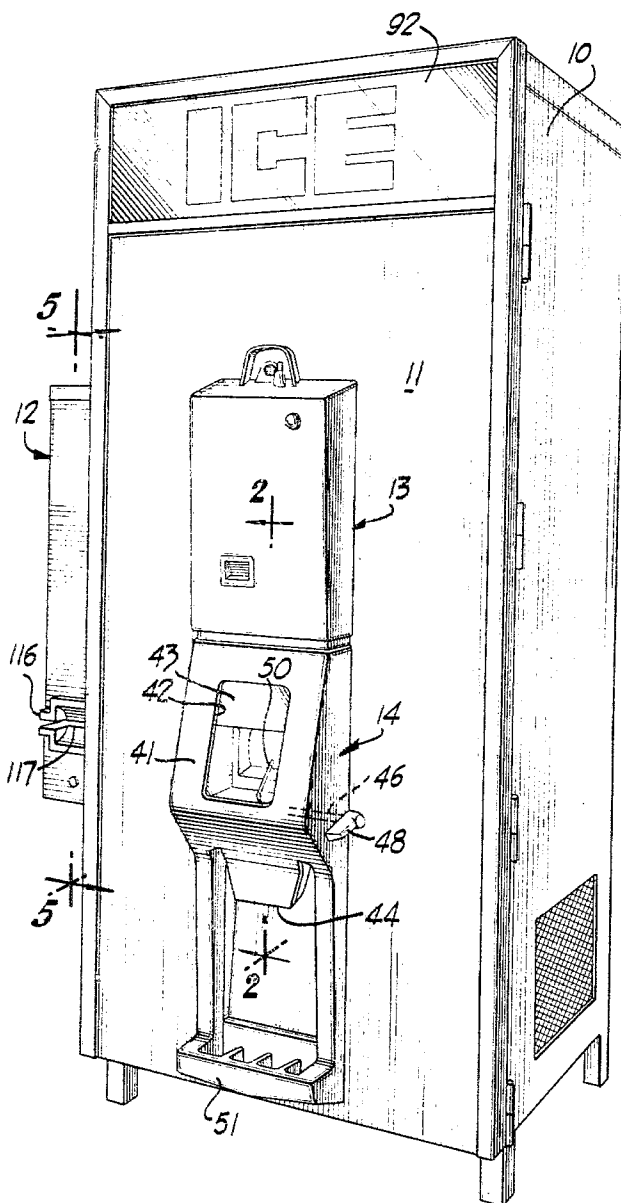


Fig. 7

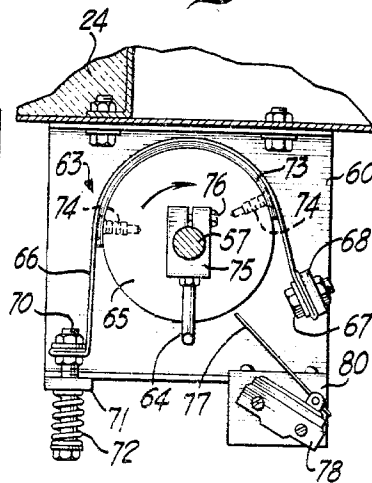
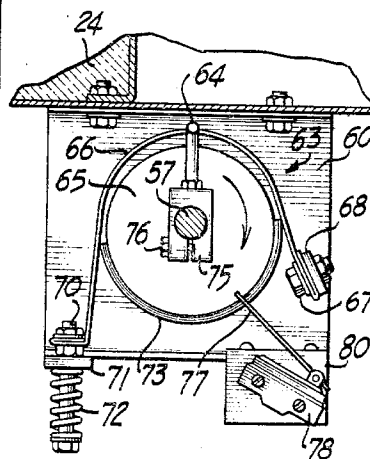


Fig. 8



INVENTORS
WILLIAM A. ESCHENBURG AND
BY WILLIAM S. TAYLOR

Hunt, Lockwood, Greenwalt & Dawsey
ATTORNEYS

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W. A. ESCHENBURG ETAL

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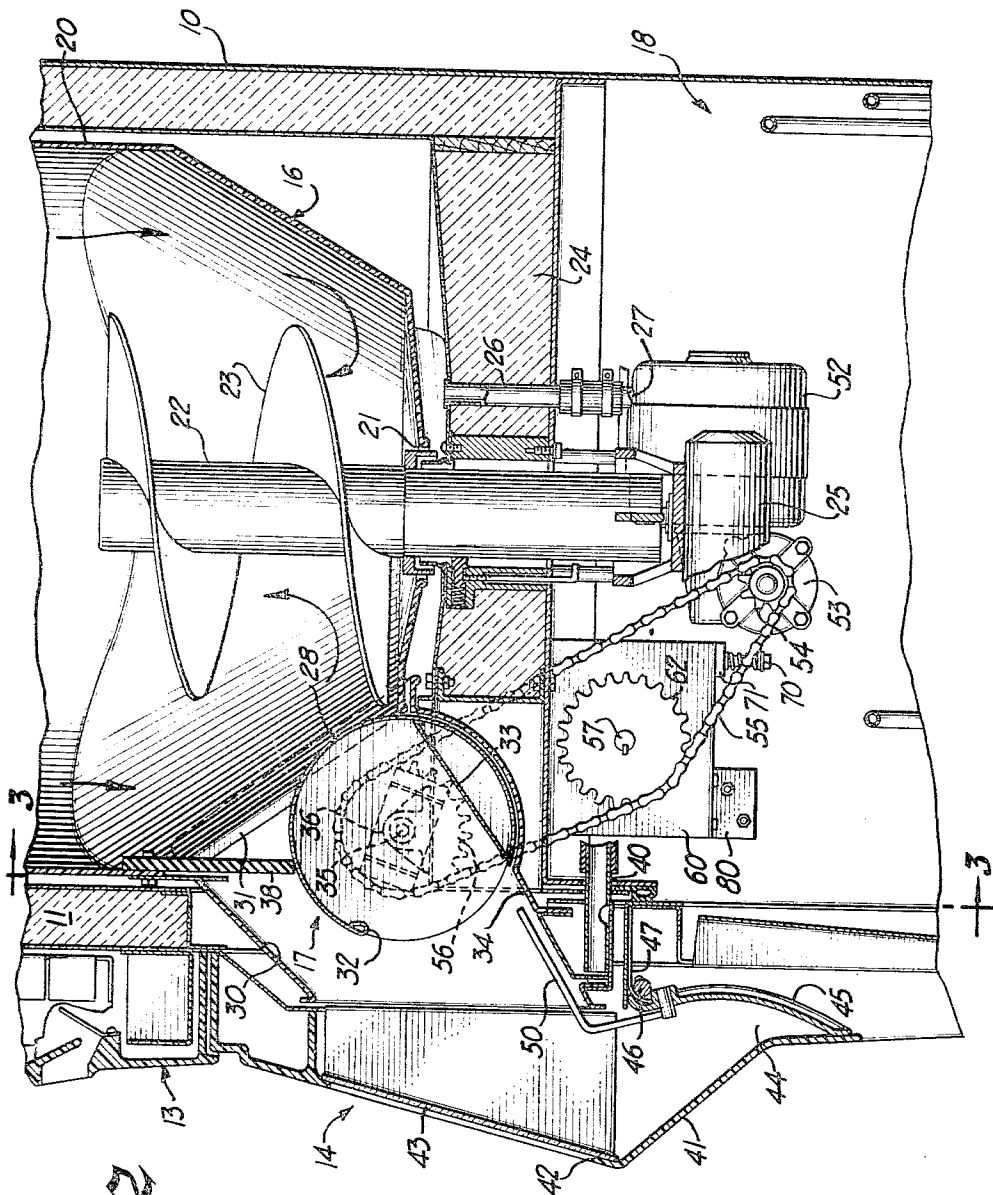


Fig. 2

INVENTORS
WILLIAM A. ESCHENBURG AND
WILLIAM S. TAYLOR
BY

Greist, Lockwood, Greenwalt & Dawsey
ATTORNEYS

Nov. 9, 1965

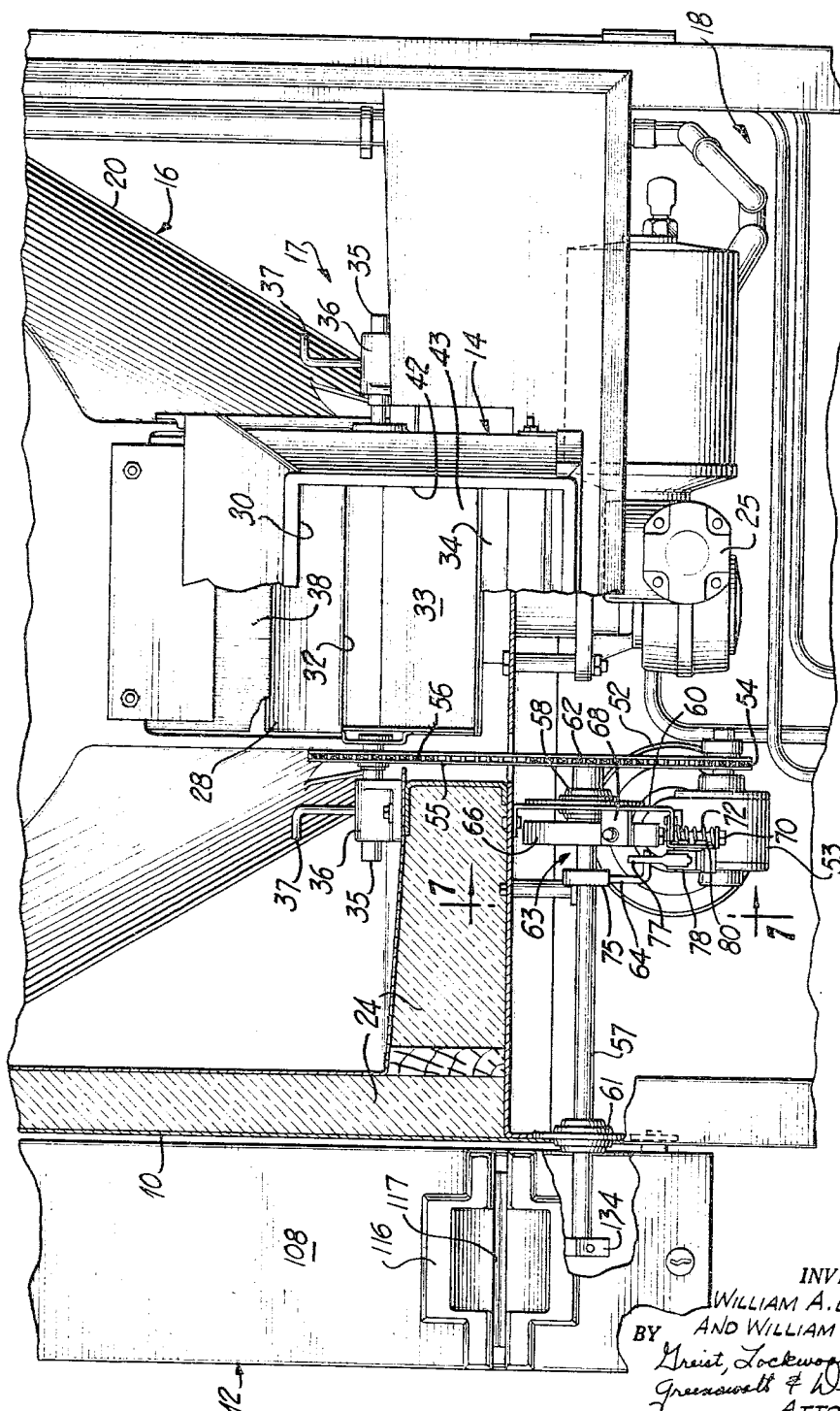
W. A. ESCHENBURG ETAL

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ICE DISPENSING MACHINE

Original Filed Jan. 30, 1961

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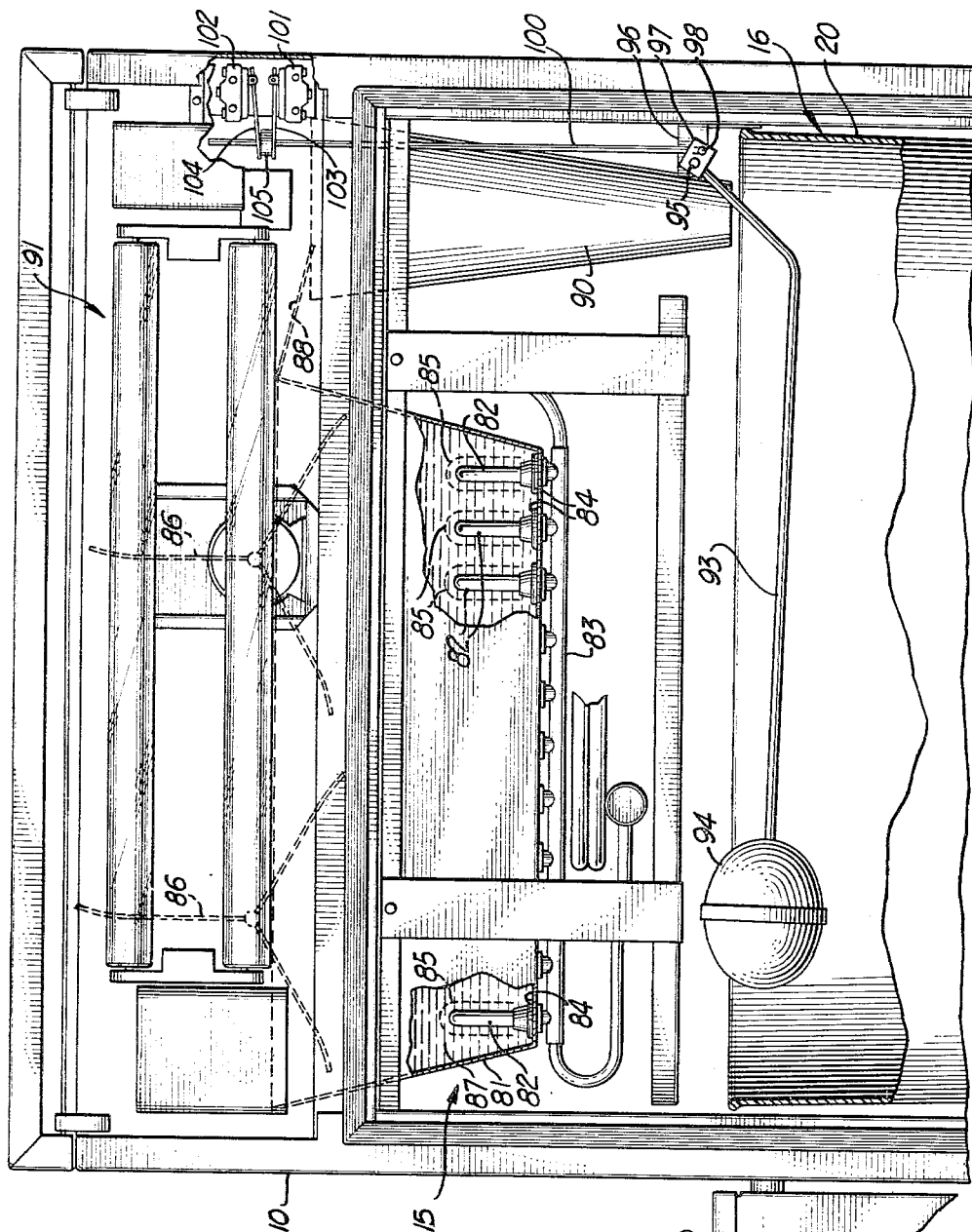


Fig. 4

INVENTORS
BY WILLIAM A. ESCHENBURG
AND WILLIAM S. TAYLOR

Greist, Lockwood, Greenawald & Dewey
ATTORNEYS

Nov. 9, 1965

W. A. ESCHENBURG ETAL

3,216,613

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Original Filed Jan. 30, 1961

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Fig. 5

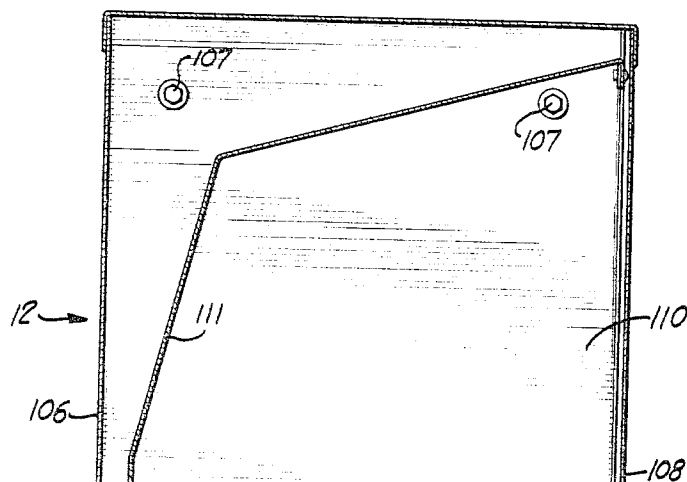
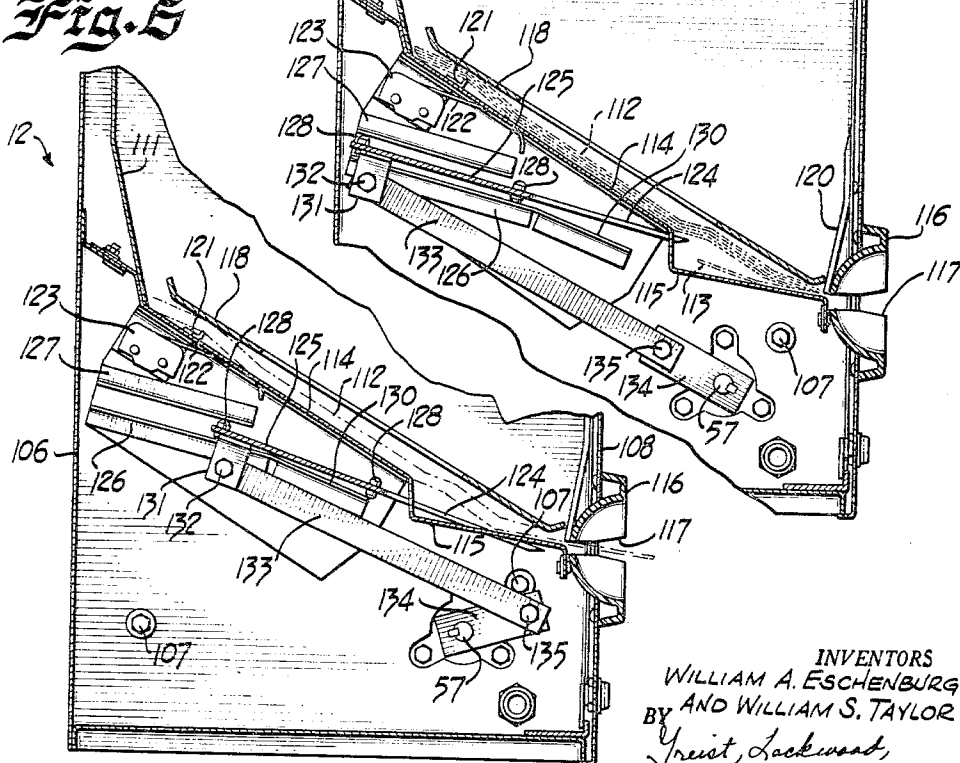


Fig. 6



INVENTORS
WILLIAM A. ESCHENBURG
AND WILLIAM S. TAYLOR
BY *Greist, Lockwood,*

Greenawald & Newby ATTORNEYS

3,216,613

ICE DISPENSING MACHINE

William A. Eschenburg and William S. Taylor, Beloit, Wis., assignors, by mesne assignments, to J. B. Post Company, Wilkes-Barre, Pa., a partnership of Pennsylvania

Original application Jan. 30, 1961, Ser. No. 85,654, now Patent No. 3,119,518, dated Jan. 28, 1964. Divided and this application Sept. 9, 1963, Ser. No. 320,593
6 Claims. (Cl. 221-240)

The present invention relates to new and improved vending apparatus and product container dispensing means forming a part thereof, the apparatus in the embodiment to be described being especially adapted for use in the forming, storing and vending of ice particles. More specifically, the present invention is directed to improvements in the ice making and vending machine of our application Serial No. 693,928, filed November 1, 1957, now Patent No. 2,969,650, of which this is a continuation-in-part as well as a division of application Serial No. 85,654, filed January 30, 1961, and now Patent No. 3,119,518.

Different forms of unitized product storing and dispensing machines have been developed for substantially wide-spread commercial use. Examples of the simpler types of such machines which are most commonly known include candy vending and other solid article vending machines. Vending machines of a more complicated nature are those designed for handling liquid products, such as soft drinks, wherein the drinks are actually mixed automatically within the machine and are dispensed therefrom upon operation of the same. Because of the automatic operational characteristics of such machines, wide-spread use of the same is common and considerable quantities of the products can be sold without any substantial expense from the standpoint of labor accompanying such sales. With this advantage along with other well known advantages, the demand for automatic vending machines for use with many different types of products is great. However, limitations in the use of coin operated or otherwise automatically operated vending machines exist where the product involved is difficult to store or handle for vending purposes, the electro-mechanical operating mechanisms of the machines are of a complex nature requiring frequent and expensive maintenance, and vended product container dispensing means are subject to uncontrolled use to an extent that container supply is exhausted well prior to predetermined intervals of planned vending machine servicing.

The foregoing limitations are especially applicable to apparatus proposed for the vending of particles of ice, in cube form or the like, suitable for immediate use without further size reduction. Ice cubes are used for a variety of purposes in substantial quantities and due to their tendency to become fused together during storage, it is difficult to store a quantity of the same without coherence or fusing occurring unless, of course, each individual cube is maintained separately out of contact with adjacent cubes. Separation of ice cubes for storage purposes is impractical and our above identified copending application discloses a special storage arrangement whereby a substantial mass of accumulated ice particles may be indefinitely stored for the purpose of meeting periodical peak demand in vending and without undesirable coherence or fusing between particles occurring.

In the vending of ice particles it is necessary that containers be supplied for use by the purchaser. Without an adequate supply of containers available, the vending machine would be subjected to periods of inoperation thus materially limiting its commercial value. The provision of an uncontrolled supply of containers is considered im-

practical as the containers are often wasted or used for other purposes. An ice making and vending machine of the type disclosed in our earlier application is fully automatic in that the machine is capable of continuously producing an adequate supply of ice particles for vending purposes and storing an adequate accumulated mass of the ice particles for the accommodation of periodical peak demands in vending. Thus, with a machine of this type, it is essential that automatically controlled container dispensing means are provided in order to make full utilization of the fully automatic characteristics of the basic machine.

It is an object of the present invention to provide a new and improved combination vending machine for multiple product mass vending, and container dispensing means for dispensing product mass containers concurrently and automatically with product mass vending.

Another object is to provide a new and improved drive means for use in a combination vending machine and container dispensing device, the drive means being adapted to provide concurrent operation of multiple product mass vending means and product mass container dispensing means in an uncomplicated manner and with minimum maintenance requirements.

Still a further object is to provide a new and improved bag dispenser for use with a vending machine, the dispenser being adapted to store a plurality of product containers therein and including means for automatically dispensing separate containers in an efficient successive manner.

Still a further object is to provide a new and improved ice making and vending machine which provides for controlled ice particle formation, substantial capacity ice particle storage without coherence and fusion occurring and efficient ice particle vending as controlled by means preventing ice particle mass formation during the vending operation.

Other objects not specifically set forth will become apparent from the following detailed description of the present invention made in conjunction with the accompanying drawings wherein:

FIG. 1 is a perspective of the ice making and vending machine of the present invention including as a part thereof the container dispensing means;

FIG. 2 is an enlarged fragmentary section of a portion of the machine of FIG. 1 taken generally along line 2-2 therein, this view illustrating the drive means constituting a part of the present invention and a part of the ice particle storage means as well as the ice particle vending means of the machine;

FIG. 3 is a fragmentary section of the elements of FIG. 2 taken generally along line 3-3 therein;

FIG. 4 is an enlarged fragmentary and partly sectioned view of the ice making portion of the machine of FIG. 1 as well as the top portion of the ice storage means of the machine, the illustration of FIG. 4 being viewed from the front face of the machine of FIG. 1 with the top cabinet door portion thereof removed;

FIG. 5 is an enlarged fragmentary section of the product container dispensing means forming a part of the invention, this view being taken generally along line 5-5 in FIG. 1;

FIG. 6 is a fragmentary section of the lower portion of the product container dispensing means of FIG. 5 illustrating operation thereof;

FIG. 7 is an enlarged fragmentary section of a portion of the drive means taken generally along line 7-7 in FIG. 3; and

FIG. 8 is a view similar to FIG. 7 illustrating operational aspects of the portion of the drive means shown therein.

The ice making and vending apparatus of FIG. 1 gen-

erally comprises an insulated cabinet-type housing 10 closed along the front face thereof by a hingedly mounted door 11. Suitably mounted on one side surface of the cabinet 10 is a container dispensing means in the form of a bag dispenser 12 which forms a part of the present invention. The door 11 carries a known type of coin operated vending control mechanism 13 which does not form a part of the present invention, and a chute-type product delivery housing 14 which is suitably aligned with a product delivery opening formed in the door 11. The cabinet 10 as covered in our aforementioned application generally includes therein an ice particle forming portion, an ice particle storage portion, an ice particle vending portion and a suitable refrigeration system operating mechanism. The ice particle forming portion 15 is located in the top of cabinet 10 and is generally illustrated in FIG. 4. The ice particle storage portion 16 is positioned below the ice particle forming portion 15 in the cabinet 10 and is generally illustrated in FIGS. 2-4. The ice particle vending portion 17 is located to one side of the bottom portion of the ice particle storage portion 16 and is illustrated in FIGS. 2 and 3. The operating components of the refrigeration system are mounted in the cabinet 10 below the ice particle storage means 16 in an area generally designated by the numeral 18 as illustrated in FIGS. 2 and 3.

Referring particularly to FIGS. 2 and 3, the ice particle storage means 16 comprises a storage bin 20 formed with a bottom section which is frusto-conical in shape. The bottom section, by way of example only, may conform to a 60° true angle cone. The upper edge of the cone-shaped bottom section has integrally joined therewith a rectangular section the lower margin of which conforms to a true line of intersection of a rectangle with a cone. The particular shape of the storage bin 20 is covered in our aforementioned application and it is believed sufficient for the purposes of the present invention to merely describe the storage bin 20 as being adapted to receive therein an accumulation of ice particles which, by reason of the shape of the lower section of the bin, tend to accumulate toward the center bottom surface area of the bin.

The bottom surface of the bin 20 is provided with a centrally located aperture 21 through which projects an upstanding auger 22 provided with a continuous helical blade portion 23. The auger 22 is suitably journaled through an insulated partition 24 forming a part of the cabinet 10 and isolating the upper portion of the cabinet wherein ice particles are made, stored and vended from the lower portion 18 of the cabinet wherein the refrigeration system operating apparatus is mounted. An electric motor 25 is suitably mounted in the lower portion 18 of the cabinet 10 and is drivingly connected to the auger 22 through cooperating means of any suitable type which are not shown. The motor 25 operates continuously during use of the ice making and vending machine thus providing a continuous drive for the auger 22 which rotates in the storage bin 20.

As a result of continuous auger rotation in the storage bin 20, an accumulated mass of ice particles contained therein is subjected to a constant boiling-type agitation or motion to prevent coherence and fusing between the ice particles during their retention in the storage bin. This unique method of storing ice particles is fully covered in our aforementioned application and generally consists of continuously and slowly moving a centrally located mass of ice particles in an upwardly direction from the bottom of the bin 20 and radially outwardly from the upper center portion of the bin 20 in all directions relative to the auger 22. The ice particles deposited on the top surface portion of the accumulated mass then slowly move downwardly in response to the gravitational effect and eventually, by reason of the shape of the lower section of the storage bin 20, return into contact with the blade 23 of the auger 22. Thus continuous circulation of the ice particles accumulated in

the storage bin 20 occurs with the circulatory motion of the particles being maintained at a sufficiently slow rate to prevent breakage thereof, but at a sufficiently fast rate to prevent fusing coherence therebetween. Any water collecting in the storage bin 20 flows therefrom through the bottom opening 21 onto the top surface of the insulated partition 24. This top surface is shaped for drainage of water into a drain pipe or tube 26 which is suitably connected to a flexible hose 27 or the like which provides for water removal from the machine.

The ice particle vending means 17 generally comprises a rotatable drum 28 which is mounted in a chute-like vending member 30 which extends through a delivery opening in the cabinet door 11 and into communication with the delivery chute device 14 mounted on the door 11. As best shown in FIG. 2, the drum 28 is mounted adjacent an opening 31 in the bottom section of the storage bin 20. The drum itself is provided with an ice particle receiving and discharge opening 32 which rotates toward and away from the bin opening 31. The drum further includes internally thereof a false bottom 33 providing a flat ice particle supporting surface which becomes aligned with the bottom ice particle delivery surface 34 of the chute 30 in the vending position of the drum as illustrated in FIG. 2.

Referring particularly to FIG. 3, the drum 28 is formed with opposite end projecting pins 35 suitably received in bearings 36 which are mounted on the cabinet partition 24. Releasable locking members 37 function to suitably confine the pins 35 in the bearing 36 but are readily removable to permit complete disassembly of drum 28 from the machine for cleaning and maintenance purposes.

Referring particularly to FIG. 2, vending operation of the machine as actuated by the coin operated mechanism 13 results in rotation of the drum 28 with eventual alignment of the drum opening 32 with the storage bin opening 31. At this point of rotation of the drum 28 a predetermined quantity of ice particles is delivered by gravity from the bin 20 into the drum and continued rotation of the drum results in the discharging of this predetermined quantity onto the bottom surface 34 of the chute member 30. A resilient scrapper-type blade member 38 is suitably mounted in the cabinet 10 and projects downwardly into the chute member 30 and into rubbing engagement with the outer surface of the drum 28. This member prevents the movement of ice particles from the bin 20 around the outer surface of the drum 28 and into the delivery chute 30. Any water flowing from the drum 28 onto the surface 34 of the delivery chute 30 is collected in a drain member 40 and delivered by suitable hose-type means to a collection pan or external drain not shown.

The vended mass of ice particles delivered onto the surface 34 moves along the same into the delivery chute assembly 14. This assembly comprises a housing portion 41 having an aperture 42 formed therein which is closed off by a transparent plate 43 through which ice particle vending may be observed. The central bottom portion of the housing 41 as shown in FIGS. 1 and 2 is inclined inwardly and defines internally thereof a nozzle-type ice particle discharge area 44 which is closed off by a movable closure plate-like member 45.

The closure member 45 is in the form of a bowed or arcuate plate which is suitably attached to a transverse operating rod 46 journaled in the housing 41. As shown in FIG. 2, a leaf spring 47 fixed to the door 11 of the cabinet has an end portion which functions with the closure member 45 to spring urge the same into nozzle closing position. FIG. 1 illustrates an operating handle 48 which is suitably connected to the rod 46 and which upon downward movement pivots the closure plate 45 away from the bottom of the housing 41 to open the nozzle area and permit the ice particles collected therein to be discharged downwardly.

The closure plate 45 as shown in FIG. 2 carries a generally L-shaped, relatively rigid finger member 50 which

extends upwardly and over the ice particle receiving surface 34 of the chute member 30. Closure plate opening operation results in the finger 50 moving upwardly and away from the ice particle receiving surface 34 and thus through the mass of ice particles deposited thereon to separate any cohered ice particles and provide for complete separation of the mass from the surface 34. In this manner delivery of all of the ice particles vended by the drum 28 is assured and the cooperating delivery chute elements will not become clogged by cohered or fused masses of ice particles.

Referring particularly to FIG. 1, the housing 41 of the delivery chute assembly 14 mounted on the door 11 has a portion thereof extending downwardly to form a container supporting rack-like member 51. A suitable container such as a bag or the like may be supported on the rack 51 and the top open end of the bag may be received about the nozzle-like area of the delivery chute assembly. Thus upon vending operation of the ice machine, a measured mass of ice particles is delivered into the delivery chute assembly 15 and may be readily observed by the purchaser through the transparent plate 43. Simultaneously with vending a bag-type container is automatically dispensed from the bag dispensing device 12 as will be described. The vended mass of ice particles is retained in the delivery chute assembly 14 while the purchaser opens the dispensed bag and places the same in covering relation about the bottom nozzle delivery portion of the assembly 41. The handle 48 is then pressed downwardly and the nozzle area 44 of the chute assembly 14 is opened and the ice particles drop into the bag supported on the rack 51.

The unique drive mechanism constituting a part of the present invention is best illustrated in FIGS. 2 and 3. This mechanism includes an electric motor 52 suitably mounted in the bottom area 18 of the cabinet 10 and connected to a gear box 53 to power a sprocket 54 attached thereto. The sprocket 54 is engaged with a drive chain 55 which in turn is engaged with a driven sprocket 56 suitably mounted on a pin 35 of the drum 28. The insertion of a coin in the coin operated mechanism 13 results in energization of the motor 52 through means of an electrical circuit not shown but which is of well known type. The chain 55 drives the drum 28 and the ice particle mass vending operation previously described results.

In providing for concurrent container dispensing during product vending, and further to provide for predetermined operational cycle termination, a special power take-off mechanism forms a part of the drive arrangement. This mechanism includes a rotatable shaft 57 which is supported near opposite ends thereof in a bearing assembly 58 suitably carried by a bracket 60 attached to the insulated partition 24, and a bearing assembly 61 mounted in the side wall of the cabinet 10 immediately adjacent the bag dispensing device 12. The innermost end of the shaft 57 as viewed in FIGS. 2 and 3 carries thereon an idler sprocket 62 which is engaged with the chain 55 and is driven thereby resulting in rotation of the shaft 57. Between the bearing assemblies 58 and 61, the shaft 57 has operatively associated therewith a brake assembly generally designated by the numeral 63 and a switch operating finger 64. FIGS. 7 and 8 illustrate these elements and the functioning thereof in detail.

The brake assembly 63 comprises a brake drum 65 fixedly mounted on the shaft 57 with its center offset from the center of rotation of the shaft 57. Thus the brake drum 65 is eccentrically mounted on the shaft 57 for controlled engagement and disengagement with a metallic brake band-type element 66. This element is mounted at one end thereof by a fixed bolt assembly 67 which is suitably attached through a flange 68 to the bracket 60. The other end of the band-like element 66 is attached to a spring mounted bolt assembly 70 which extends through a flange like member 71 carried by the bracket 60. A coil

spring 72 forming a part of the bolt assembly 70 provides for resilient movement of the band element 66 in response to brake drum pressure thereagainst.

Rotation of the shaft 57 to the position shown in FIG. 7 results in tight engagement of a friction brake pad or lining 73 with the inner surface of the band element 66. The lining 73 is suitably secured to the outer periphery of the brake drum 65 by screws 74 or the like. The lining 73 covers only a prescribed portion of the outer periphery of the brake drum 65, this portion being that which is located relative to the true center of the brake drum 65 to place the true center between the lining and the shaft 57. When the lining 73 is engaged with the band 66 as shown in FIG. 7, the bolt assembly 70 is pulled upwardly as illustrated resulting in compression of the coil spring 72. Thus tight frictional engagement occurs between the band 66 and the lining 73 to an extent that rotation of the shaft 57 is stopped. As shown in FIG. 8, rotation of the shaft 57 to an extent that the lining 73 is moved out of contact with the band 66 results in expansion of the coil spring 72 and a drawing downwardly of the band 66. With the lining 73 out of contact with the band 66, the shaft 57 is free to rotate through a prescribed arc.

De-energization of the motor 52 is controlled by the switch operating finger 64 carried on the shaft 57. As best shown in FIGS. 7 and 8, the finger 64 is fixedly carried by split yoke member 75 which is fixed to the shaft 57 by a fastening element 76. The finger 64 is generally L-shaped and the outer end thereof rotates about the center of the shaft 57 concentrically therewith. The positioning of the outer end of the finger 64 is arranged for contact with a switch operating arm 77 forming a part of a motor control switch 78 suitably mounted on a bracket member 80 which is attached to the bracket 60. The finger 64 projects generally away from the lining 73 carried on the drum 65 to provide for contact thereby with the switch arm 77 just prior to full frictional engagement of the lining 73 with the band 66. Thus in the direction of rotation of the shaft 57 as indicated by the arrow in FIG. 7, the outer end of the finger 64 will engage the switch arm 77 and operate the switch 78 just prior to complete engagement of the lining 73 with the band 66 in the position shown in FIG. 7.

Operation of the switch 78 in the manner described results in de-energization of the drive assembly and de-energization of the motor 52 to complete the ice particle vending and bag dispensing cycle. The brake assembly 63 is provided to prevent overdrive or overrun of the vending drum 28 upon completion of the vending cycle of operation. It will be appreciated that mere de-energization of the motor 52 itself will not result in complete and immediate stopping of the various elements of the drive arrangement. Accordingly, the drum assembly 63 provides a positive stop control arrangement and the various elements are related to provide for consistently accurate stopping of the vending drum 28 in the position shown in FIG. 2. The electrical circuit including the switch 78 and coin operated switch (not shown) in the coin operated mechanism 13 is of a known type capable of being energized by coin operation involving a resetting of the switch 78 for subsequent de-energization of the circuit by contact of the finger 64 with the switch arm 77. Use of the rotating shaft 57 in operating the bag dispensing mechanism 12 will be subsequently described.

FIG. 4 illustrates the ice forming portion 15 of the machine and in conjunction therewith illustrates a storage bin full and empty control mechanism forming a part of the present invention. The ice forming mechanism 15 illustrated is of known type and is fully disclosed in U.S. Patent No. 2,696,717. For this reason, only certain of the basic structural features will be described for the purpose of understanding the operation of the machine. The mechanism 15 includes an open top tank 81 having mounted on the bottom wall thereof a plurality of vertically

upwardly directed freezing tubes or fingers 82 which, as disclosed in the aforementioned patent, are hollow tubes having received therein centrally disposed refrigerant conduits which feed refrigerant from a distributor line 83 into the fingers 82 in a continuous manner with the refrigerant being continuously withdrawn therefrom by suitable conduit means. Rubber grommets 84 insulate each finger 82 relative to the bottom wall of the tank 81 and the tank is substantially filled with fresh water for ice particle forming purposes.

The particular form of ice particle or body 85 formed on each finger 82 is illustrated in broken lines in FIG. 4. The ice particle is generally of a size readily usable in individual glasses for beverage cooling purposes and is provided with a relatively flat bottom surface having a central opening extending upwardly short of the top rounded end thereof. Thus each ice particle takes the general shape of its associated finger 82 during formation of the same.

Suitably mounted above the tank 81 are a pair of paddle members 86 which rotate in a counter-clockwise direction as viewed in FIG. 4 to continuously agitate the body of water 87 contained in the tank 81. One of the functions of the paddle members 86 is to provide for continuous agitation of the water thus permitting the formation of substantially clear ice particles on the tubes 82. The cycle of ice particle formation is controlled by suitable means (not shown) forming a part of the refrigeration system which permit circulation of hot refrigerant through the tubes 32 following completed ice particle formation thereon to automatically detach each ice particle from its respective tube and permit the same to float upwardly towards the surface of the water 87 in the tank. Upward floating of the ice particles results in contact thereof with the paddle members 86 and these members move the ice particles toward the right-hand side of the tank 81 as viewed in FIG. 4. The right-hand paddle member 86 as viewed lifts the ice particles over the adjacent edge of the tank 81 and these particles slide along a supporting surface 88 into a downwardly directed delivery chute 90 which deposits the ice particles in the storage bin 20. The top portion of the cabinet 10 may also include a lighting fixture generally designated by the numeral 91 for illumination of a translucent advertising panel 92 shown in FIG. 1.

When the ice machine is subjected to at least fairly frequent vending operations, continuous operation of the ice forming assembly 15 is necessary to replenish the supply accumulating in the storage bin 20. However, during periods of extended inoperation, the storage bin 20 will be filled and the ice forming assembly 15 must be deactivated. In order to provide an automatic control for the level of ice particles accumulated in the storage bin 20, a float-like member 93 is mounted in the upper end of the bin. This member includes a bulb-like end portion 94 which maintains contact with the top surface of accumulated ice particles in the bin. The arm portion of the member 93 is pivotally attached through a pin 95 to a bracket element 96 carried by the cabinet 10. The arm portion has fixedly attached thereto a plate-like link 97 which also pivots about the pin 95 and in spaced relation to the pin 95 has attached thereto a second pin 98. This pin is attached to a rocker-type arm 100 which extends upwardly in the cabinet 10 to one side of a pair of fixedly positioned, juxtaposed switches 101 and 102. These switches include operating switch arms 103 and 104 respectively. The upper end of the rocker-type arm 100 carries a fixed block-like element 105 thereon which moves with the arm in contact with the switch arms 103 and 104. Thus pivoting of the float-like member 93 results in vertical reciprocal movement of the rocker-type arm 100 and alternate operation of the switches 101 and 102 through the switch arms 103 and 104.

The switch 101 is connected to a suitable electrical circuit which provides for on and off operation of the ice particle forming assembly 15. The switch 102 is con-

nected to the electrical circuit controlling vending operation. As illustrative of operation of the full and empty control, the float-like member 93 in the position illustrated in FIG. 4 indicates a filled bin 20. The switch arm operating block 105 is positioned to provide for opening of the switch 101 and closing of the switch 102. The switch 101 by reason of being open prevents operation of the ice particle forming assembly 15 and thus interrupts further delivery of ice particles into the bin 20. The switch 102 being in the machine vending cycle and being closed as illustrated in FIG. 4 permits vending operation of the machine. In the event that excessive vending occurs to the point that the accumulated supply of ice particles in the bin is completely exhausted and continuous operation of the ice particle forming assembly 15 is insufficient to provide a supply of ice particles adequate to meet the vending requirements, the float-like member will be pivoted downwardly and the rocker-type arm 100 will be moved upwardly to an extent that the switch 101 is closed and the switch 102 is open. Thus the vending circuit will be interrupted and vending cannot take place. Meanwhile, the ice particle forming assembly will be operating and when sufficient ice particle accumulation occurs in bin 20, the rocker-type arm 100 will be positioned to result in the closing of the switch 102 to permit vending operation while also maintaining the circuit including the switch 101 closed for continued ice particle forming operation.

FIGS. 5 and 6 illustrate in detail the bag dispensing mechanism 12 of the present invention. This mechanism includes a housing 106 suitably attached by fasteners 107 to the cabinet 10 of the ice machine. The front face of the housing is formed with a removable plate 108 by means of which access is gained into the housing into the container or bag storage area 110 which is defined by an inner housing 111. The inner housing includes an upwardly inclined top wall portion, a concave rear wall portion and a downwardly inclined bottom wall portion. The shape of the housing 111 is such that a substantial supply of folded paper bags 112 illustrated in broken lines may be stacked therein. The bags 112 are formed in the conventional manner having an open end portion and a closed bottom end portion which is folded upon itself to provide a bottom flap-like portion 113. The bags are stacked with the bottom flap portion 113 facing down for a purpose to be described.

The bottom downwardly inclined portion of the inner housing 111 defines a bag supporting surface 114 which includes a downwardly offset portion 115 in which the bottom ends of the bags 112 are received. The offset portion 115 is aligned with a dispensing face member 116 which is formed with a bag delivery slot 117. A weight in the form of a relatively flat plate 118 is placed on top of the stack of bags 112 received in the inner housing 111 to force the same downwardly against the bottom supporting surface 114. A plate guide member 120 is suitably mounted within the housing 111 and the outer edge of the weight plate 118 rides against the guide plate 120 to hold the plate in proper position. The free edge of the guide member 120 is spaced from the offset portion 115 sufficiently to permit a single bag to be pushed by the dispensing mechanism between the elements into the dispensing slot 117. A bag lift element 121 is carried on the supporting surface 114 near the upper end thereof and functions to raise the upper ends of the bags 112 to permit dropping of an end of a single bag during dispensing thereof onto a counter spring 122 attached to a counter mechanism 123 for bag inventory purposes. The blade-like counter spring 122 also serves to cut off the machine when the bag inventory is depleted. As is evident in FIGS. 5 and 6, the counter spring 122 remains depressed as long as bags 112 are in the housing. After the last bag has been dispensed, however, the weight 118 is held in spaced relation to the bag support surface 114 by means of the lift element 121, thus allowing the spring 122 to rise to actuate the switch mechanism 123.

The offset portion 115 of the supporting surface 114 is suitably slotted to receive therethrough a bag engaging means in the form of a projecting finger 124. The finger 124 is designed to engage the bottom end of a bag 112 between the rearwardly folded portion 113 thereof and the main portion of the bag and in doing so to permit pushing of the bottom bag out from under the bag stack and into the dispensing slot 117. The bottom end of the bag will then project out of the main housing 106 and a purchaser may readily grasp the same and completely remove the bag from the mechanism 12 for ice particle filling thereof in the manner previously described.

The bag dispensing operating mechanism includes the finger 124 described above which constitutes a part of a sliding plate-like member 125 which is slidably mounted between a lower guide plate 126 and an upper guide plate 127. The plate 125 has fixedly secured therethrough transversely extending guide pins 128 which control the positioning of the plate between the guide means 126 and 127. The lower outermost end of the guide plate 126 is provided with a downwardly inclined plate support portion 130 on which the outermost pin 128 will slide during fully extended movement of the plate 125 and finger 124 during the dispensing operation.

The plate 125 is provided with a depending flange 131 to which is pivotally attached by means of a fastener 132 a rocker-type arm 133. The opposite end of the arm 133 is pivotally attached to a rocker lever 134 by a fastener 135. The lever 134 is fixedly attached to the rotating shaft 57 previously described and as best illustrated in FIG. 3.

Rotation of the shaft 57 occurs during vending operation of the ice machine as described above. During rotational operation of this shaft the lever 134 rotates therewith and the rocker-type arm 133 functions to reciprocate the plate 125 and finger 124 towards the right and back to the left as viewed in FIGS. 5 and 6. During this operation the end of the finger 124 engages the free folded bottom portion 113 of a bag 112 and ejects the same through the slot 117 of the bag dispensing member 116. One complete rotation of the shaft 57 returns the plate 125 and finger 124 to its original position from which it can again operate during the next vending cycle to eject another bag. Operation of the brake assembly 63 in the manner previously described also functions to prevent overrun or overdrive of the operating elements of the bag dispensing assembly 12 and thus provides for positively controlled uniform bag dispensing with each vending cycle.

Obviously certain modifications and variations of the invention as hereinbefore set forth may be made without departing from the spirit and scope thereof, and therefore only such limitations should be imposed as are indicated in the appended claims.

We claim:

1. A bag dispenser for use with a vending machine, said dispenser comprising a housing provided with a bag supporting surface therein, bag engaging means projectable through and beyond said surface to engage a bag lying against said surface and slide the same along said surface toward a face of said housing, a dispensing slot in said face of said housing and aligned with said surface and dispensing slot adapted to receive a bag therethrough during movement thereof by said bag engaging means, and operating means connected with said bag engaging means to move the same in a non-linear path for successive bag engagement and dispensing movement thereby to eject a portion of said bag through said dispensing slot in the face of said housing.

2. A bag dispenser for use with a vending machine, said dispenser comprising a housing provided with a bag supporting surface therein, said bag supporting means having an offset portion to receive the folded bottom portion of a bag, bag engaging means projectable through and beyond said surface to engage said bag lying against said surface and slide the same along said surface toward a face

of said housing, a dispensing slot in said face of said housing aligned with said surface and adapted to receive a bag therethrough during movement thereof by said bag engaging means, and operating means connected with said bag engaging means to reciprocate the same for successive bag engagement and dispensing movement, said operating means comprising a rocker-arm assembly operated by a rotating shaft with the free end of the rocker-arm thereof connected to said bag engaging means.

3. A bag dispenser for use with a vending machine, said dispenser comprising a housing provided with a bag supporting surface therein, bag engaging means projectable through and beyond said surface to engage a bag lying against said surface and slide the same along said surface toward a face of said housing, a dispensing slot in said face of said housing aligned with said surface and adapted to receive a bag therethrough during movement thereof by said bag engaging means, means engageable with one of the bags in said dispenser for maintaining control of the bag inventory, and operating means connected with said bag engaging means to move the same in a predetermined path for successive bag engagement and dispensing movement.

4. A bag dispenser for use with a vending machine, said dispenser comprising a housing provided with a bag supporting surface therein, bag engaging means projecting through said surface to engage a bag lying against said surface and slide the same along said surface towards a face of said housing, a dispensing slot in said face of said housing adapted to receive the bag therethrough during movement thereof by said bag engaging means, said bag engaging means being in the form of a plate-like member provided with a projecting bag engaging finger means, said plate-like member being slidably supported between upper and lower guide means mounted in said housing below said surface, said lower guide means having a downwardly inclined late support portion to guide said finger towards the face of said housing, and operating means connected with said bag engaging means to reciprocate the same in a non-linear path for successive bag engagement and dispensing movement thereby to eject a portion of said bag through said dispensing slot in the face of said housing.

5. A bag dispenser for use with a vending machine, said dispenser comprising a housing provided with a bag supporting surface therein, said bag supporting surface having an offset portion to receive the folded bottom portion of a bag, bag engaging means projecting through said surface to engage said bag lying against said surface and slide the same along said surface towards a face of said housing, a dispensing slot in the face of said housing adapted to receive a bag therethrough during movement thereof by said engaging means, said bag engaging means being in the form of a plate-like member provided with a projecting bag engaging finger means, said plate-like member being slidably supported for movement in a non-linear path between guide means mounted in said housing below said surface, said guide means including a downwardly inclined plate support portion to co-operate with a guiding surface on the end of a plate-like member closest to said bag engaging finger means, and operating means connected with the bag engaging means to reciprocate the same for successive bag engagement and dispensing movement, said operating means comprising a rocker arm assembly operated by rotating said shaft with the free end of the rocker arm thereof connected to said bag engaging means.

6. A bag dispenser for use with a vending machine, said dispenser comprising a housing provided with a bag supporting surface therein, bag engaging means projectable through and beyond said surface to engage a bag lying against said surface and slide the same along said surface towards the face of said housing, a dispensing slot in the face of said housing adapted to receive a bag therethrough during movement thereof by said bag engaging means, said bag supporting surface being formed with a down-

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wardly offset portion for reception of a bottom end portion of said bag, said offset portion being slotted to receive and permit withdrawal of said bag engaging means as it moves in a non-linear path, and operating means connected with said bag engaging means to move the same for successive bag engagement and dispensing movement thereby to eject a portion of said bag through said dispensing slot in the face of said housing.

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10 LOUIS J. DEMBO, *Primary Examiner.*

HADD S. LANE, EVERETT W. KIRBY, *Examiners.*

**UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION**

Patent No. 3,216,613

November 9, 1965

William A. Eschenburg et al.

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 5, line 21, for "15" read -- 14 --; column 6, lines 13 and 16, for "bank", each occurrence, read -- band --; column 9, lines 60 and 61, for "and dispensing slot" read -- , said dispensing slot --; column 10, line 37, for "late" read -- plate --.

Signed and sealed this 19th day of July 1966.

(SEAL)

Attest:

ERNEST W. SWIDER

Attesting Officer

EDWARD J. BRENNE

Commissioner of Patent