Nov. 9, 1965 W. A. ESCHENBURG ETAL 3,216,213

ICE MAKING AND DISPENSING MACHINE

Original Filed Jan. 30, 1961 5 Sheets-Sheet 1

Fig. 1

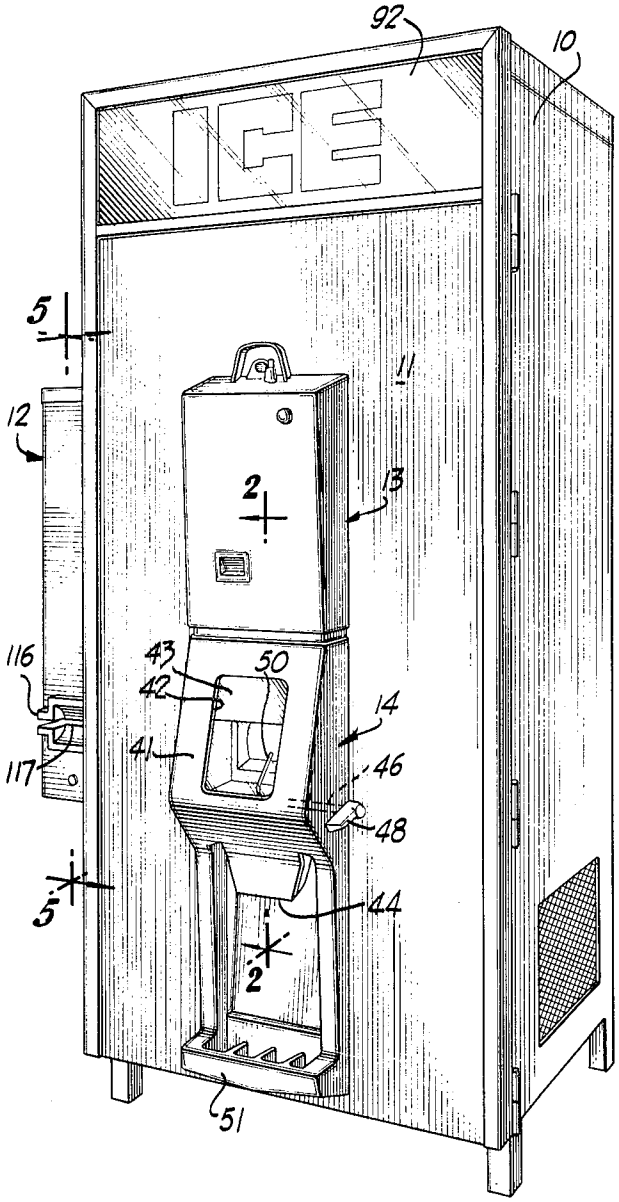


Fig. 7

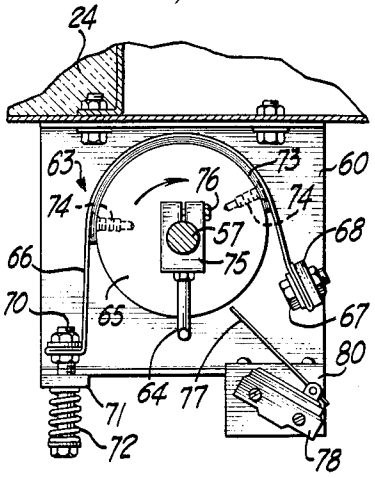
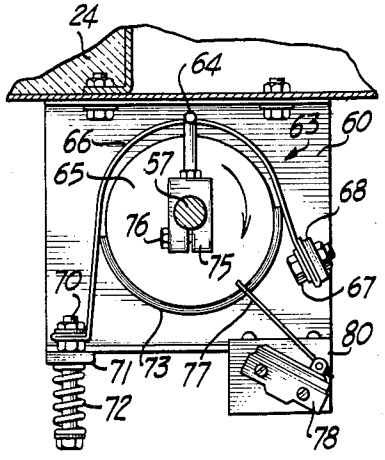


Fig. 8



INVENTORS
WILLIAM A. ESCHENBURG AND
WILLIAM S. TAYLOR
BY

Dreist, Lockwood, Greenawalt & Dewey
ATTORNEYS

ICE MAKING AND DISPENSING MACHINE

Original Filed Jan. 30, 1961 5 Sheets-Sheet 2

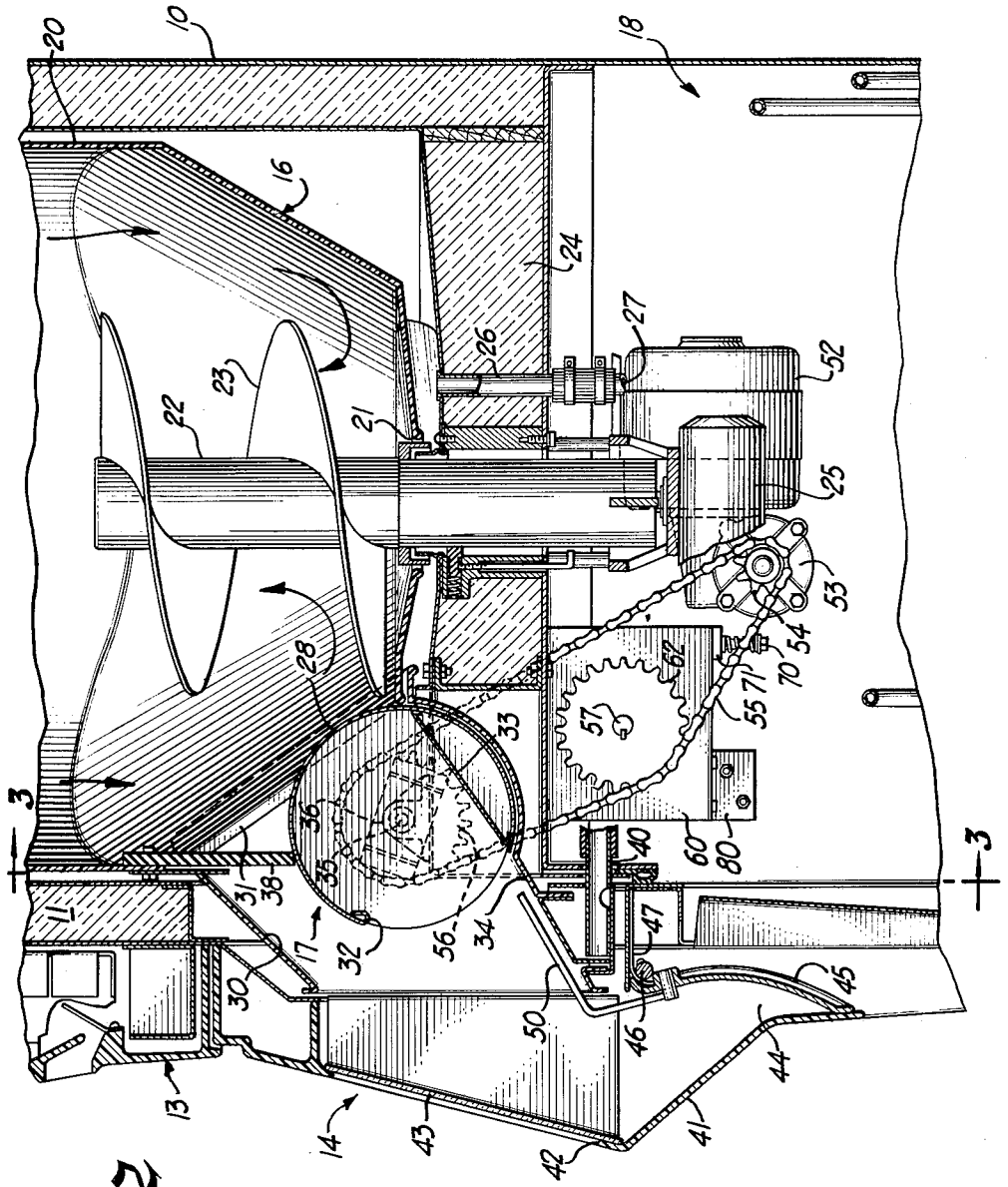


FIG. 2

INVENTORS
WILLIAM A. ESCHENBURG AND
WILLIAM S. TAYLOR
BY
Greist, Lockwood, Greenawalt & Dewey
ATTORNEYS

Nov. 9, 1965 W. A. ESCHENBURG ETAL 3,216,213

ICE MAKING AND DISPENSING MACHINE

Original Filed Jan. 30, 1961 5 Sheets-Sheet 3

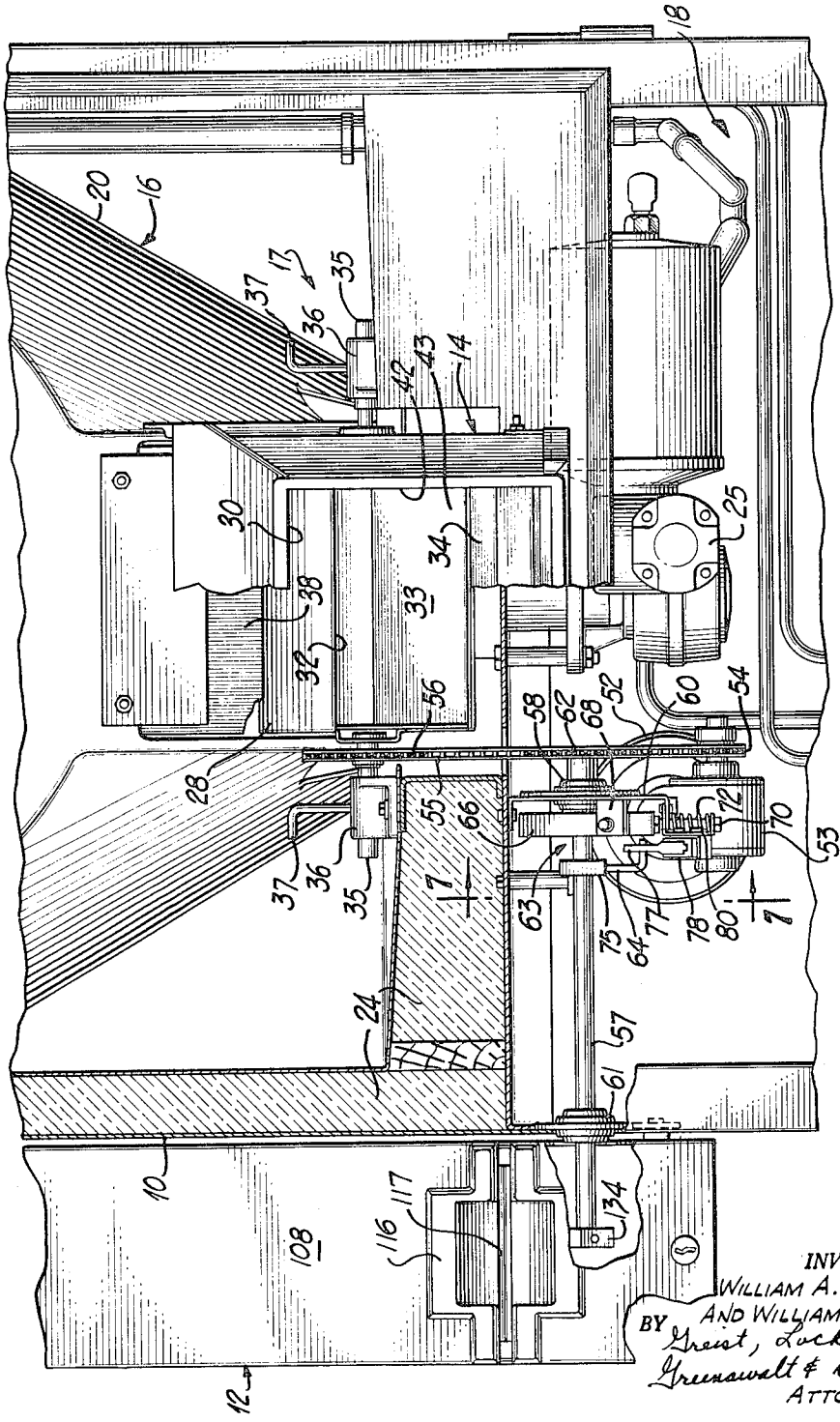


FIG. 3

INVENTORS
WILLIAM A. ESCHENBURG
AND WILLIAM S. TAYLOR
BY Greist, Lockwood
Greenawalt & Dewey
ATTORNEYS

Nov. 9, 1965 W. A. ESCHENBURG ETAL 3,216,213

ICE MAKING AND DISPENSING MACHINE

Original Filed Jan. 30, 1961 5 Sheets-Sheet 4

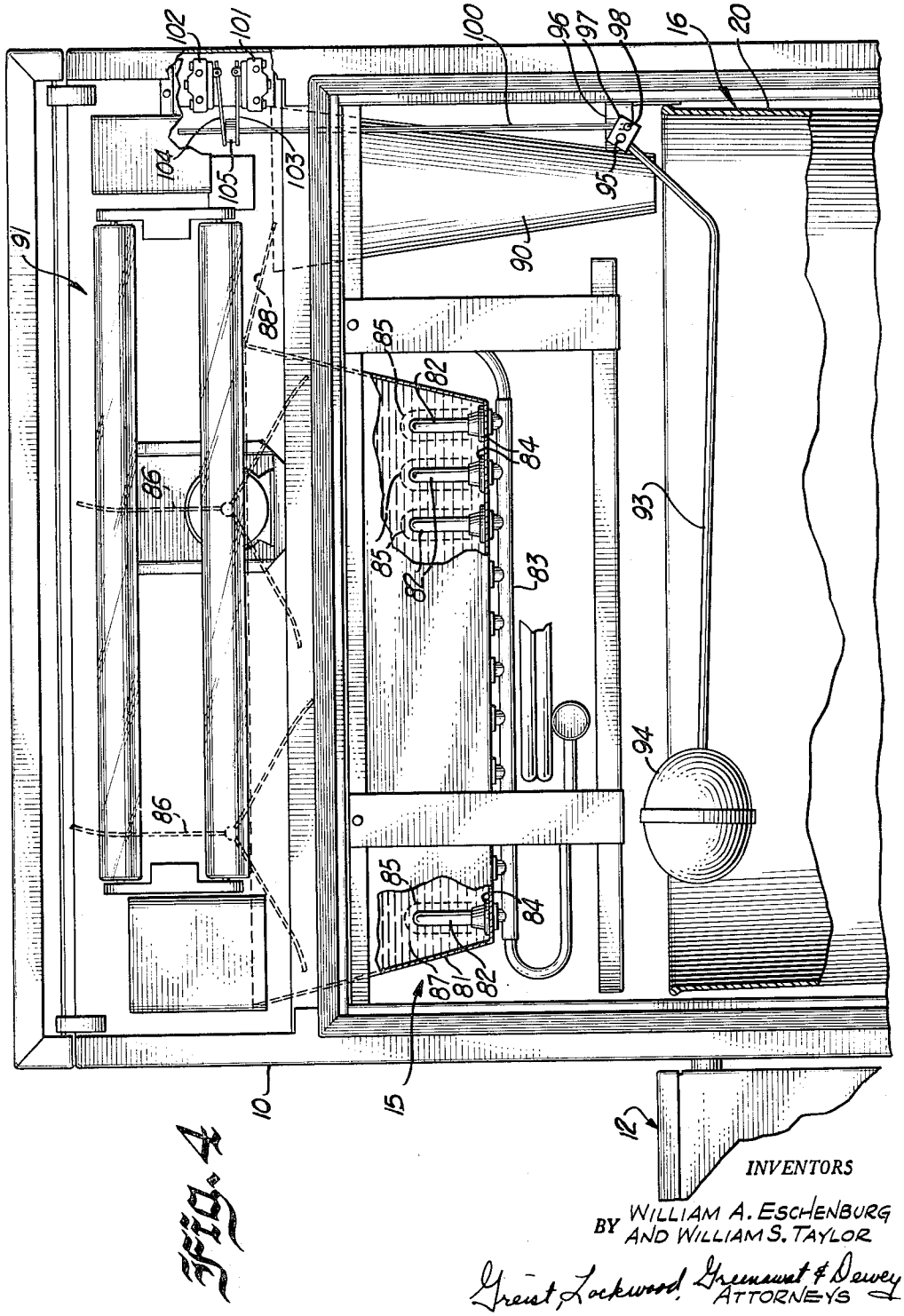


FIG. 4

INVENTORS

BY WILLIAM A. ESCHENBURG AND WILLIAM S. TAYLOR

Greist, Lockwood, Greenawat & Dewey ATTORNEYS

Nov. 9, 1965 W. A. ESCHENBURG ETAL 3,216,213

ICE MAKING AND DISPENSING MACHINE

Original Filed Jan. 30, 1961 5 Sheets-Sheet 5

Fig. 5

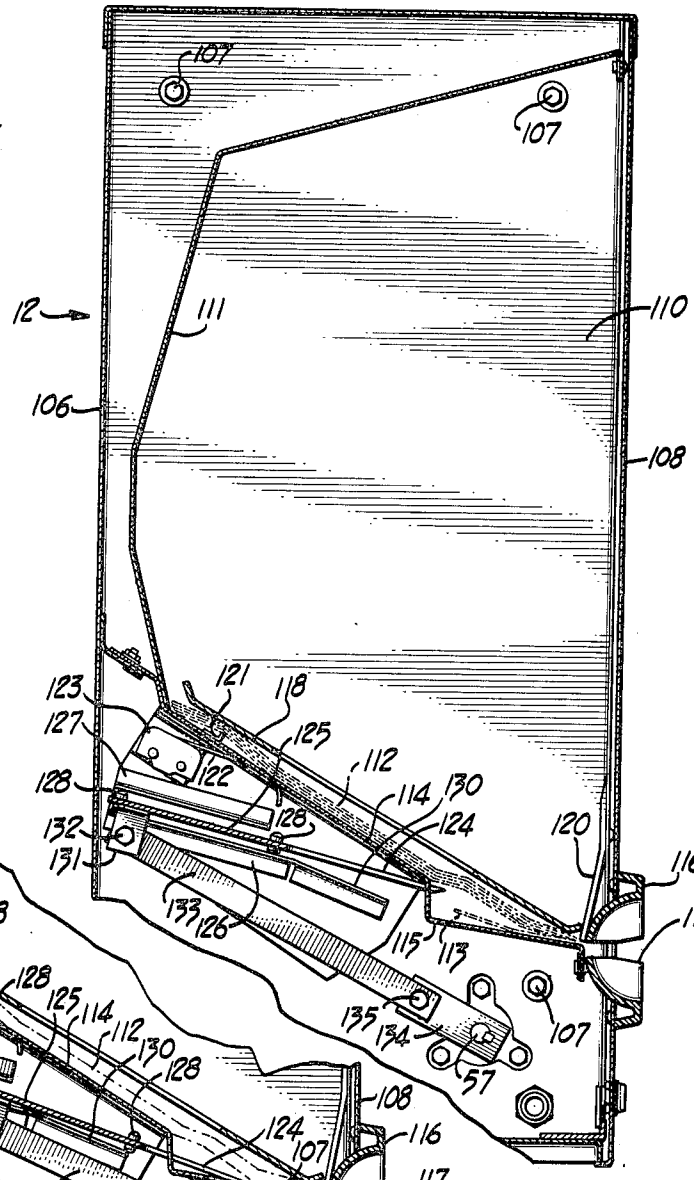
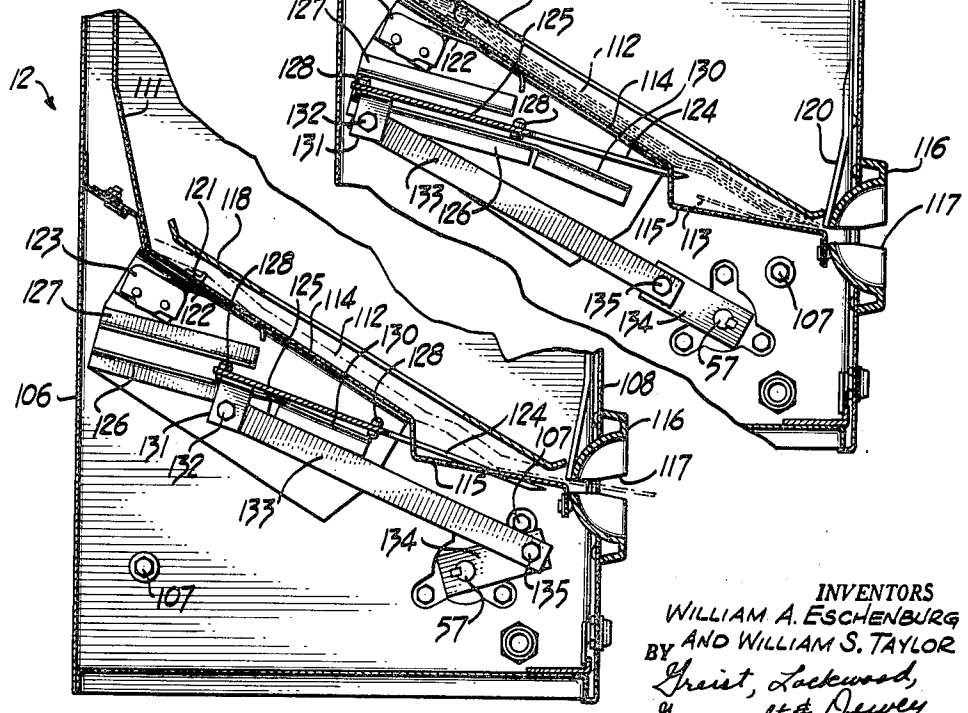


Fig. 6



INVENTORS
WILLIAM A. ESCHENBURG
AND WILLIAM S. TAYLOR
BY Greist, Lockwood, Greenawalt & Dewey
ATTORNEYS

United States Patent Office 3,216,213 Patented Nov. 9, 1965

3,216,213

ICE MAKING AND 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. 320,594

5 Claims. (Cl. 62—137)

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. 85,654, filed Jan. 30, 1961, now Patent No. 3,119,518, issued January 28, 1964, of which this is a division and which was a continuation-in-part of application No. 693,928, filed November 1, 1957, now Patent No. 2,969,650, issued January 31, 1961.

Different forms of unitized product storing and dispensing machines have been developed for substantially widespread 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 opreational characteristics of such machines, widespread 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 electromechanical 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 containers is considered impractical 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 conatiner 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 prvoide 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 opera-

tional aspects of the portion of the drive means shown therein.

The ice making and vending apparatus of FIG. 1 generally 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 **14** 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 continuosuly 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 permits 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 view 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 connected 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** suitable 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 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 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 decribed 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.

For ease and clarity in claiming, the product dispensed will be referred to as ice cubes, however, it is to be understood that the invention is not limited thereto but includes ice chips, particles and the like. 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. An ice making and vending machine including an insulated cabinet having an ice delivery opening in a face thereof, ice cube forming means in said cabinet adapted to continuously supply ice cubes for storage and vending purposes, ice cube storage means in said cabinet defining an area of substantial dimensions in which ice cubes are accumulated for vending purposes, ice cube delivery means forming a part of said ice cube forming means and associated with said storage means to feed ice cubes thereinto, ice cube vending means associated with said storage means and said delivery opening to deliver ice cubes from said machine for vending purposes, a storage means full and empty control including a pivotal float-like member mounted in said storage means over the top surface area of ice cubes accumulated therein and carrying rocker-arm type control means adapted for reciprocal movement in said cabinet in response to pivoting of said float-like member, switch means including a pair of juxtaposed switch arms adapted to be electrically connected with said ice cube forming means to control operation thereof and of said vending means, said rocker-arm type control means being provided with means fixed thereon and operative between the switch arms of said switch means for on and off operation of said ice cube forming and vending means depending on the level of ice cubes accumulated in said storage means, and ice cube moving means in said storage means to impart continuous motion to the ice cubes therein to prevent coherence and fusing therebetween during storage.

2. On ice making and vending machine including an insulated cabinet having an ice delivery opening in a face thereof, ice cube forming means in said cabinet adapted to continuously supply ice cubes for storage and vending purposes, ice cube storage means in said cabinet defining an area of substantial dimensions in which ice cubes are accumulated for vending purposes, ice cube delivery means forming a part of said ice cube forming means and associated with said storage means to feed ice cubes thereinto, ice cube moving means in said storage means to impart continuous motion to the ice cubes therein to prevent coherence and fusing therebetween during storage, and ice cube vending means associated with said storage means and said delivery opening to deliver ice cubes from said machine for vending purposes, said delivery opening being in the form of a downwardly directed chute closed at the bottom thereof by a pivotally mounted closure means spring urged into chute closing position, and relatively rigid finger means carried by said closure means and overlying the surface area of said chute on which ice cubes are deposited by said vending means, said finger means being movable with said closure means relative to said surface area during opening of said chute to break up any ice cube formation formed in said chute.

3. An ice making and vending machine including an insulated cabinet having an ice delivery opening in a face thereof, ice cube forming means in said cabinet at the top thereof adapted to continuously supply ice cubes for storage and vending purposes, ice cube storage means in said cabinet centrally thereof defining an area of substantial dimensions in which ice cubes are accumulated for vending purposes, ice cube delivery means forming a part of said ice cube forming means and adapted to feed ice cubes into said storage means, ice cube moving means in the form of a centrally positioned and vertically directed auger in said storage means to impart continuous motion to the ice cubes therein to prevent coherence and fusion therebetween during storage, and ice cube vending means including a rotatable drum having an opening therein and being associated with said storage means and said delivery opening to deliver ice cube from said machine for vending purposes, said delivery opening being in the form of a downwardly directed chute closed at the bottom thereof by pivotally mounted closure means spring urged into chute closing position, and relatively rigid finger means carried by said closure means and overlying the surface area of said chute on which ice cubes are deposited by said drum, said finger means being movable with said closure means relative to said surface area during opening of said chute to break up any ice cube formation formed in said chute.

4. An ice making and vending machine including an insulated cabinet having an ice delivery opening in a face thereof, ice cube forming means in said cabinet at the top thereof adapted to continuously supply ice cubes for storage and vending purposes, ice cube storage means in said cabinet centrally thereof defining an area of substantial dimensions in which ice cubes are accumulated for vending purposes, ice cube delivery means forming a part of said ice cube forming means and adapted to feed ice cubes into said storage means, ice cube vending means including a rotatable drum having an opening therein and being associated with said storage means and said delivery opening to deliver ice cubes from said machine for vending purposes, a storage means fullness control including a pivotal float-like member mounted in said storage means

over the top surface of ice cubes accumulated therein and carrying a rocker-arm type control means adapted for reciprocal movement in said cabinet in response to pivoting of said float-like member, switch means including a pair of juxtaposed arms adapted to be electrically connected with said ice cube forming means to control operation thereof and of said vending means, said rocker-arm type control means being provided with means fixed thereon and operative between the switch arms of said switch means for on and off operation of said ice cube forming and vending means depending on the level of ice cubes accumulated in said storage means, and ice cube moving means in the form of a centrally positioned and vertically directed auger in said storage means to impart continuous motion to the ice cubes therein to prevent coherence and fusion therebetween during storage.

5. An ice making and vending machine including an insulated cabinet having an ice delivery opening in a face thereof, ice cube forming means in said cabinet at the top thereof adapted to continuously supply ice cubes for storage and vending purposes, ice cube storage means in said cabinet centrally thereof defining an area of substantial dimensions in which ice cubes are accumulated for vending purposes, ice cube delivery means forming a part of said ice cube forming means and adapted to feed ice cubes into said storage means, ice cube vending means including a rotatable drum having an opening therein and being associated with said storage means and said delivery opening to deliver ice from said machine for vending purposes, a storage means fullness control including a pivotal float-like member mounted in said storage means over the top surface area of ice cubes accumulated therein and carrying a rocker-arm type control means adapted for reciprocal movement in said cabinet in response to pivoting of said float-like member, switch means including a pair of juxtaposed switch arms adapted to be electrically connected with said ice cube forming means to control operation thereof and of said vending means, said rocker-arm type control means being provided with means fixed thereon and operative between the switch arms of said switch means for on and off operation of said ice cube forming and vending means depending on the level of ice cubes accumulated in said storage means, and ice cube moving means in the form of a centrally positioned and vertically directed auger in said storage means to impart continuous motion to the ice cubes therein to prevent coherence and fusion therebetween during storage, said delivery opening being in the form of a downwardly directed chute closed at the bottom thereof by a pivotally mounted closure means spring urged into chute closing position, and relatively rigid finger means carried by said closure means and overlying the surface area of said chute on which ice cubes are deposited by said drum, said finger means being movable with said closure means relative to said surface area during opening of said chute to break up any ice cube mass formation in said chute.

References Cited by the Examiner

UNITED STATES PATENTS

2,383,229	8/45	Thompson	194—.04
2,961,842	11/60	Wright	62—137
2,986,897	6/61	Howard	62—344
3,059,450	10/62	Mueller et al.	62—3
3,067,591	12/62	Lingle	62—344
3,104,835	9/63	Weber.	

ROBERT A. O'LEARY, *Primary Examiner.*

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,216,213 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 1, line 33, for "opreational" read -- operational --; column 7, line 10, for "continuosuly" read -- continuously --; line 42, for "view" read -- viewed --; column 8, line 36, for "suitable" read -- suitably --; column 10, line 50, for "cube" read -- cubes --; column 11, line 1, after "surface" insert -- area --; line 5, after "juxtaposed" insert -- switch --; column 12, line 22, strike out "mass".

Signed and sealed this 19th day of July 1966.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

EDWARD J. BRENNER
Commissioner of Patents