June 2, 1964 H. BRAUNSBERG 3,135,567

VENDING MACHINES

Filed April 10, 1963 4 Sheets-Sheet 1

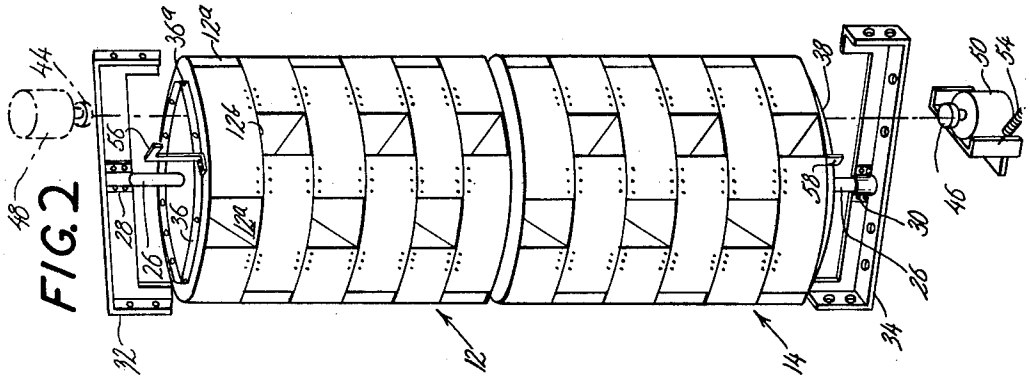


FIG. 2

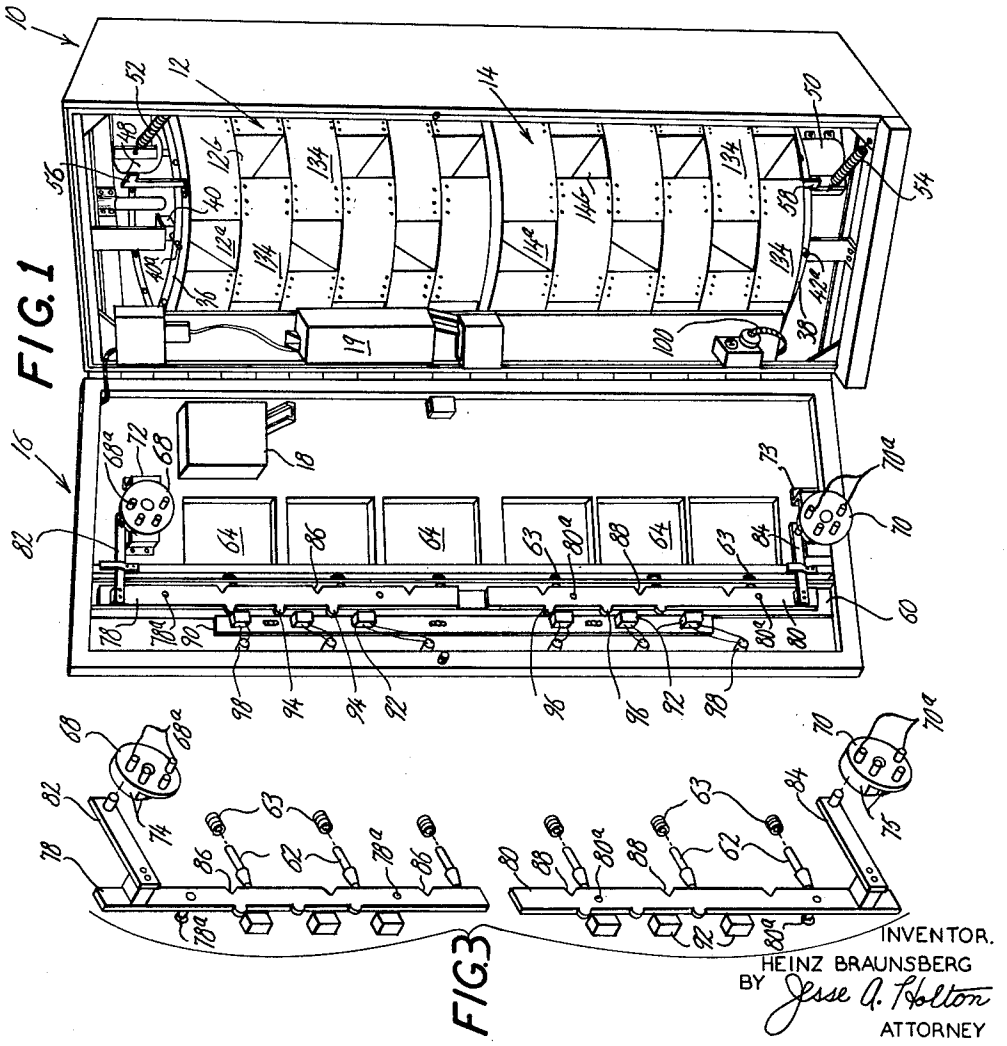


FIG. 1

FIG. 3

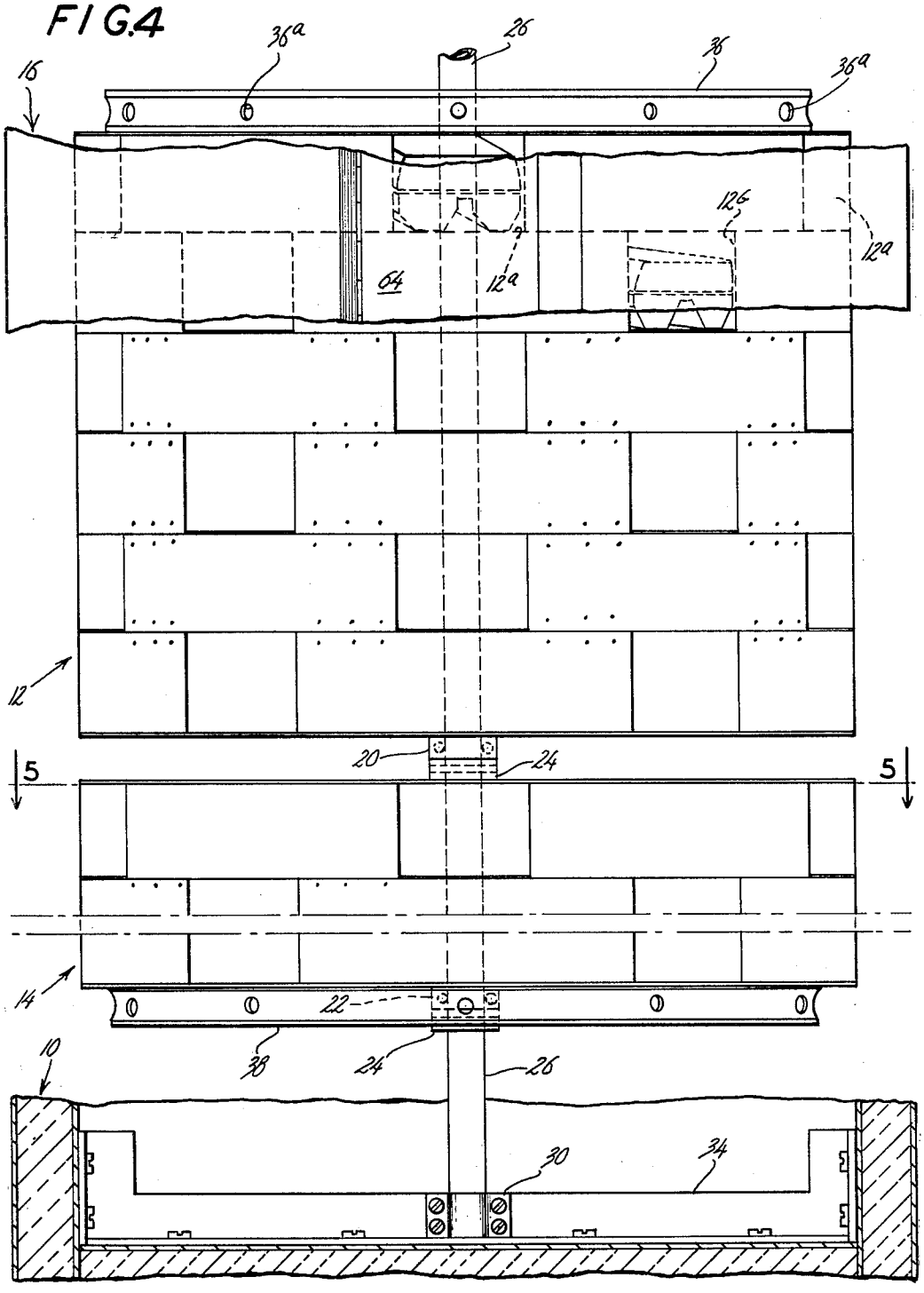
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ATTORNEY

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VENDING MACHINES

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FIG.4

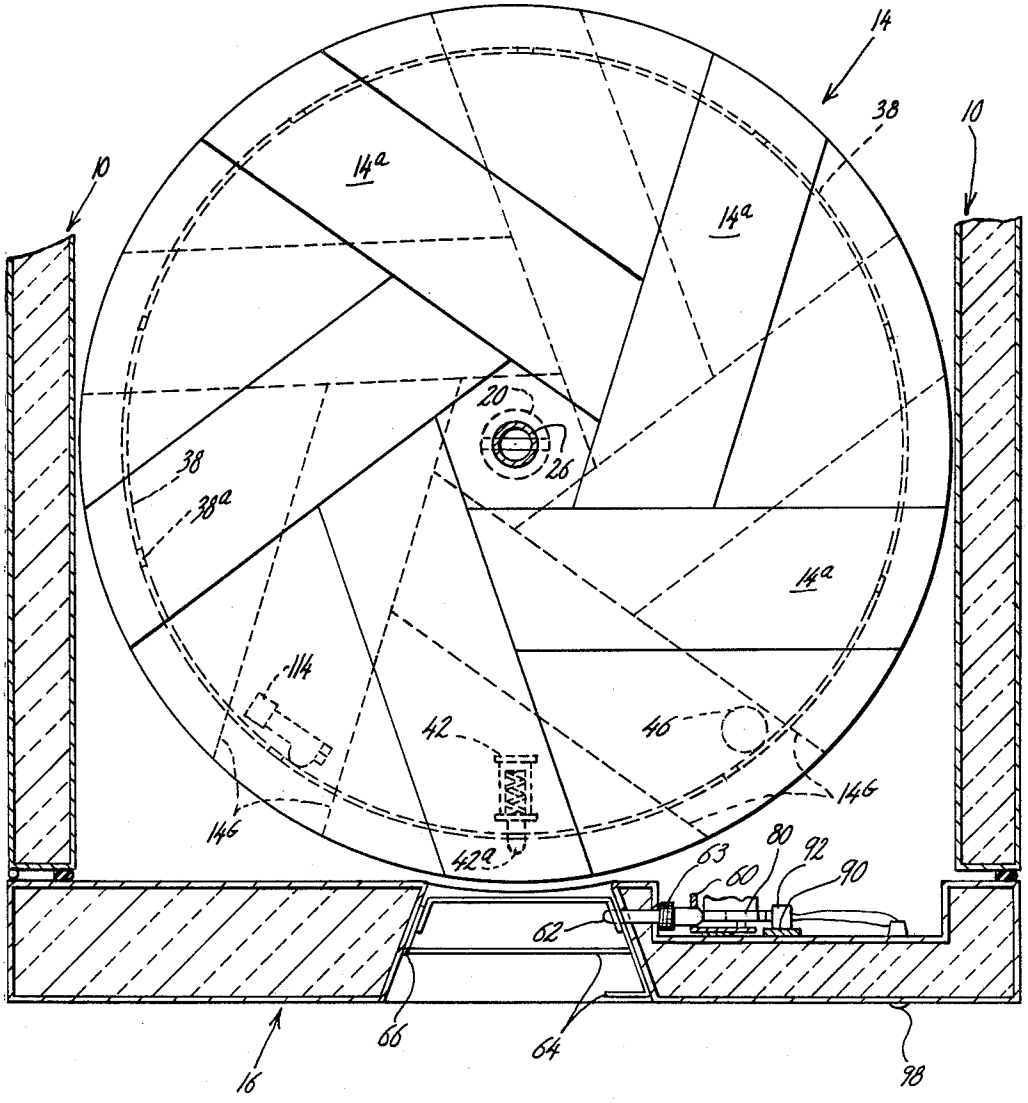


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FIG. 5



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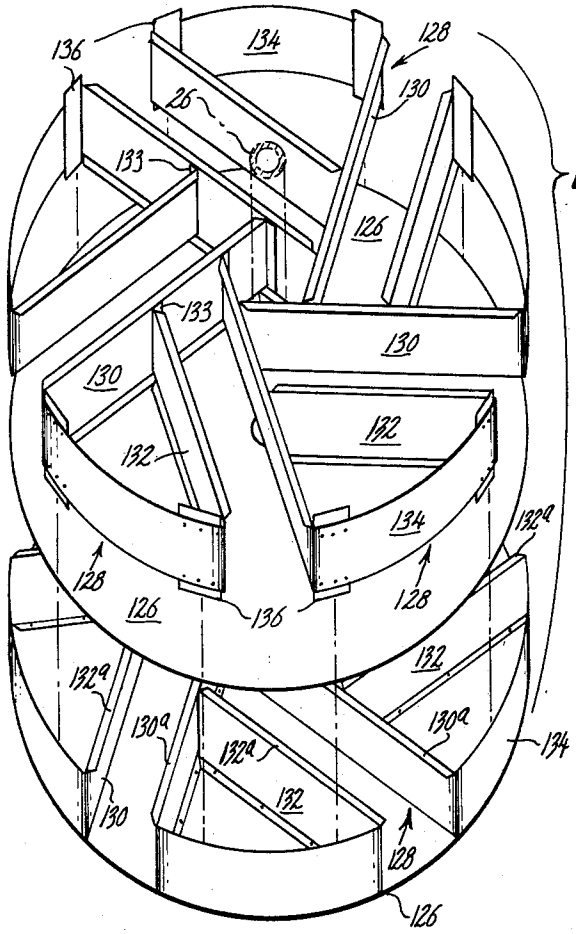


FIG. 6

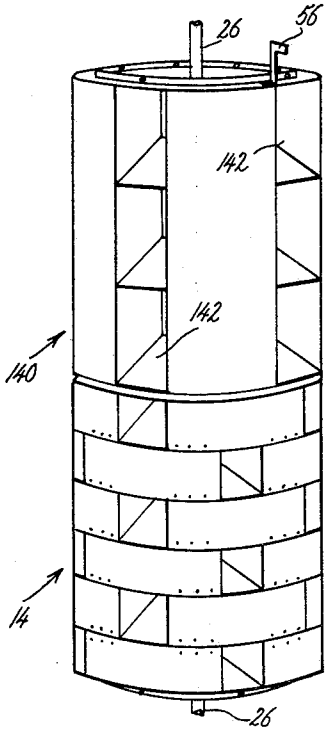


FIG. 8

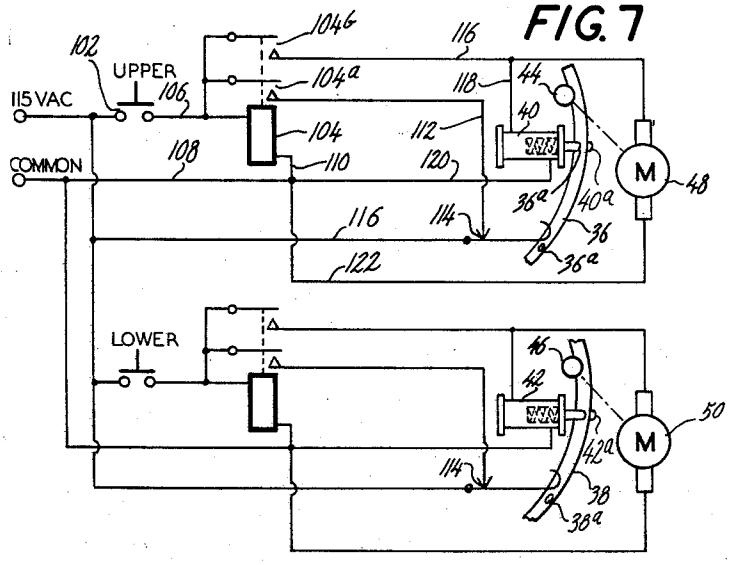


FIG. 7

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3,135,567

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3,135,567

VENDING MACHINES

Heinz Braunsberg, 856 Burlington Ave., Bristol, Conn.

Filed Apr. 10, 1963, Ser. No. 272,095
9 Claims. (Cl. 312—97.1)

This invention relates to improvements in vending machines and more particularly to improvements in coin controlled machines of the bulk vending type. The machine of the present invention preferably incorporates the fundamental apparatus disclosed in my co-pending application Serial No. 106,049, filed April 27, 1961, entitled vending machines. This application constitutes a continuation-in-part of that application.

The apparatus disclosed in the above-identified application comprises a multi-layer drum. Five commodity containing compartments constitute a single layer. A simple drive and indexing means progressively advances the commodity containing drum by means of coin insertion control whereby the drum is stepped five separate times or 360° of rotation in order to deplete a particular layer of merchandise. As a result of the sixth coin insertion, a programming cam and slide cooperative therewith are actuated, whereupon the initial compartment of the next lower layer of merchandise is made available to the purchaser. Indexing and programming continue in this fashion until all layers and compartments thereof are exhausted of merchandise whereupon a signal shall automatically so indicate.

There are presently in use numerous vending machines, most of which are particularly designed for dispensing articles that are relatively small and uniform in size, frequently relying on uniformity of commodity to effect machine operation. In contrast, the machine of this invention is arranged to dispense relatively large commodities, such commodities having no influence whatever on machine operation. Furthermore, the principles of this invention are applicable when vending articles of different sizes and shapes and remain so even though those articles may be vended at different prices.

Moreover, the instant invention provides various structural innovations and improvements for machines of the aforementioned type, whereby manufacturing cost is substantially reduced by minimization and simplification of parts as well as the adaption of a novel geometric compartment formation. By such technique, a machine of the type disclosed herein holds a greater supply of saleable articles, requires less frequent refilling, makes possible the storage of articles having comparatively great length, yet is relatively compact and more economical to produce than known bulk vending machines now in use.

This type of machine finds particularly wide use in large apartment dwellings or Development Housing Projects where such machines are centrally located for the convenience of the tenants along with temporary rental apparatus such as clothes washers and dryers that further accompany small unit vending apparatus. Therefore, the machine of this invention has particular utility in that it is capable of dispensing relatively large commodities such as a gallon, half gallons or quarts of milk per compartment, a dozen eggs, a loaf of multiple loaves of bread, so-called six-packs of soft drinks, merely to cite a few examples. It follows therefore, that in such locations compactness of such a vending unit is not only a desirable feature but a necessary prerequisite.

In addition, bulk vending machines are attaining ever increasing popularity in outdoor usage as a welcome public convenience when conventional store purchases cannot be made during the off hours and holidays. In this instance, it is not only highly desirable to provide a relatively portable machine that utilizes its storage area to the most favorable advantage but also to provide apparatus that is highly reliable in operation and requires very little technical know-how for purposes of servicing.

Accordingly, it is the main object of this invention to provide a bulk vending machine that utilizes the maximum of its interior area for commodity storage and yet is of simple construction, economical to manufacture and easily serviced.

Another object is to provide such a machine wherein the vendible articles are disposed in compartments arranged in novel geometric array to so accommodate the maximum complement of merchandise per cubic foot of area.

In keeping with the above objects, it is a further object to provide a vending machine of the rotatable drum type wherein multiple selection of vendible commodities is available at different prices.

A still further object is to provide such a machine that can house and readily dispense articles of appreciable length yet retain compactness.

A still further object is to develop a commodity carrying drum in a simple and economical manner from individual and identical compartment-forming members fixed on a multiple of identical discs and to arrange each compartment location so that it projects substantially tangentially to a theoretic circumference at the center of the discs.

Another important object of this invention is to provide a vending machine having at least an upper and lower compartment available from a single dispensing door which is unlocked in response to initial coin insertion into the machine and where only one compartment is accessible during any one unlocking operation, the commodities in all other compartments being fully protected against removal.

It is yet a further object to arrange the disposition of commodities in order to permit maximum utilization of available storage space and wherein the programming and indexing mechanism in no manner encroaches on the storage area.

Other objects will be in part obvious and in part particularly pointed out hereinafter.

In the drawings, wherein is shown one of the various possible embodiments of the invention:

FIG. 1 is an overall perspective view of the machine embodying the invention wherein the main door is shown unlocked, open and the dispensing doors therein in locked condition. The view further illustrates the start position of the dispensing drums prior to their loading and the programming mechanism in start position;

FIG. 2 is a detail perspective view of the commodity supporting drums of the invention;

FIG. 3 is a partially exploded perspective view illustrating certain elements of the programming apparatus;

FIG. 4 is a front elevation, partially broken away, of the drums shown in FIG. 2 and includes a portion of the main door and drum housing;

FIG. 5 is a diagrammatic plan view taken substantially along lines 5—5 of FIG. 4 and particularly illustrates the novel disposition of one dispensing door level of the lower drum;

FIG. 6 is a partially exploded view of the compartments of FIG. 5 depicting the novel manner in which assembly is pursued;

FIG. 7 is a diagrammatic showing of the pertinent electro-mechanical indexing controls for the drums of the invention;

And FIG. 8 is a view similar to FIG. 2 but showing the upper drum in modified form to receive a differently shaped commodity unit.

Before describing the specific of the present invention it might prove helpful to generally review the basic operation and co-operating elements of the machine.

Referring now to the drawings and particularly to

FIGURE 1, the machine incorporating the invention consists mainly of a housing **10** which may or may not be insulated, depending on the type of commodity stored therein. commodity carrying drums indicated at **12** and **14** are adapted to be individually rotated a specific angular distance within said housing in order to present the commodities to a delivery station in sequential order. The main door of the machine is generally indicated at **16** and, when closed, normally seals off accessibility to the drums **12** and **14**. Door **16** supports the main programming apparatus, to be described, whereby each article stored within each of the drums is made individually accessible upon introduction of a coin or combination of coins deposited in the coin box **18** mounted at the inner portion of the door. The coin box **18** and the mechanism directly cooperative therewith, generally indicated at **19**, may be of a commercially available type and forms no direct portion of this invention.

Dispensing drums **12** and **14** are supported for rotatable movement on bearing members **20** and **22**, respectively, and members **20**, **22** are mounted on collars **24** fixed on a center post **26**. (See particularly FIG. 4.) Center post **26** is secured by brackets **28** and **30** to upper and lower supports **32** and **34** (FIG. 2) fixed at the roof and base of the housing **10**. Drum **12** has fixed at the top thereof a ring **36** and drum **14** has fixed at the bottom thereof an identical ring **38**. The rotary movement of drum **12** and drum **14** is controlled by energization and deenergization of solenoid **40** or **42**, respectively (FIG. 7). Drive wheels **44** and **46** are the fractional driving forces for the respective drums **12** and **14** when the individual motors **48** and **50** are energized by a coin or combination thereof being introduced into the coin box **18**. The solenoids **40** and **42** may be connected as shown in FIG. 7 and are enabled and disabled in a manner to be pointed out hereinafter.

The motor assemblies are pivotally supported at the roof and base within the cabinet **10** and each drive wheel **40** and **42** is arranged to frictionally engage the inner portion of its respective ring **36** and **38** under the urge of their respective springs **52** and **54**. The energization of either motor **48** or **50** turns its respective wheel **44** or **46** which rotates its respective drum **12** or **14** to a new dispensing position.

Fixed at top of drum **12** and extending upwardly therefrom is tab **56** and fixed to the underside of drum **14** and projecting downwardly therefrom is a tab **58**, the function of each to be explained hereinafter.

Fixed to the inner portion of main door **16** by welding or the like is a length of angle iron **60** which together with the main door **16** support a series of spring-urged door latches **62** each of which normally holds a delivery door **64**, in locked position, as shown in FIG. 5, against the urge of its compression spring **63**. Each delivery door **64** is hingedly mounted on the main door, as indicated at **66**. In the preferred embodiment each door **64** is so positioned as to register with two levels of compartments, which, as will be seen, is an important feature of this invention. The doors are spring urged to the closed position as shown in FIG. 5 by standard torsion springs (not shown) mounted within the hinges. It will be particularly noted that the exit area of the delivery doors are angled or beveled to facilitate direct line commodity removal from the compartments.

The main door **16** also supports as upper program cam **68** and a lower program cam **70**. Each cam is mounted for free rotation on its individual support **72**, **73**. Cams **68** and **70** are idential and may be of aluminum casting. Cam **68** is provided with a multiple of studs **68***a* and cam **70** with a multiple of studs **70***a*. In addition, cam **68** has a multiple of levels **74** and cam **70** a multiple of levels **75**, as indicated in FIG. 3. The purpose of cams, studs and levels thereof to be later described.

Mounted at the inner portion of main door **16** are a pair of program bars **78** and **80**. Bar **78** which controls the upper group of delivery doors **64** has secured to the upper part thereof an arm **82** which is adapted to rest on the highest level **74** of upper cam **68** when bar **78** is in its fully elevated position, indicating that drum **12** is fully stocked and is at "start" or "home" position. Program bar **80** has secured to the lower portion thereof an arm **84** which rests on the highest level **75** of cam **70** when the lower drum is at its "home" position.

Bars **78** and **80** each may be guided by studs **78***a* and **80***a*, respectively, fixed therein where are guidingly arranged in slots formed in angle iron **60**. Each bar **78** and **80** is also provided with differentially spaced indentations **86** and **88**, respectively. When either bar **78** or **80** is lowered, an indentation **86** or **88** is aligned with a door latch **62** whereupon a delivery door **64** is liberated through the action of spring **63**. For example, unlatching of the top door **64** renders one compartment **12***a* or **12***b* of the upper two shelves of drum **12** available and, therefore, the commodity stored therein accessible after drum **12** has been rotated off "home" position by the expedient of inserting a coin or group thereof into coin box **18**.

Also mounted at the inner portion of the main door **16** is a plate **90** (FIG. 1) which fixedly mounts a group of spaced switches **92**. The switches are so positioned as to cooperate with a group of protrusions **94** formed in upper program bar **78** and a group of protrusions **96** formed in lower program bar **80**. Protrusions **94** and **96** sequentially actuate the switches **92** at each program step of bar **78** or bar **80**, as will be further explained below. A series of lamps **98**, mounted at the level of each delivery door **64**, are electrically and individually controlled by each of the switches **92**, during each program step of program bar **78** or **80**. A main cable **100** is connected to a source of current and supplies power to all components of the machine during operation.

With the drums of the machine in "home" position and referring particularly to the schematic diagram of FIG. 7, insertion of a coin or combination thereof representing a predetermined value into the coin box **18** of FIG. 1 will cause momentary closure of upper switch **102**. Such closure supplies current to a relay **104** via conductor **106**. A circuit to relay **104** is completed through conductor **108** and connecting line **110** to the common side of the circuit. Upon energization of relay **104**, points **104***a* and **104***b* thereof close. Points **104***a* provides a holding circuit for relay **104** by way of conductor **112**, a switch **114** which is fixed within main housing **10** and a conductor **116** which is connected to the current supply. Switch **102** may now open and relinquish control over relay **104** during the immediate dispensing operation.

Closure of points **104***b* provides current for solenoid **40** and motor **48** via the current input, through conductor **116**, switch **114**, conductor **112**, closed points **104***a* and **104***b*, a conductor **116**, connecting line **118** to solenoid **40**, and from conductor **116** to the motor **48**. A circuit is completed to solenoid **40** via conductor **108** and a connecting line **120**. The circuit to motor **48** is completed via conductor **108** and connecting line **122**.

Energization of solenoid **40** and motor **48** causes the solenoid armature **40***a* to be withdrawn from an opening **36***a* in upper ring **36** against the urge of the solenoid spring while simultaneously the motor **48** rotates its drive wheel **44** clockwise, as viewed in FIG. 7.

Still referring to FIG. 7, the drive wheel **44**, by means of frictional engagement with ring **36** rotates drum **12** fixed thereto an angular amount of movement whereby upper tab **56** (FIG. 1) engages upper stud **68***a* on cam **68** and thereby rotates said cam allowing program bar **78** to drop to the next lower level of cam **68**. Wheel **44** continues to drive drum **12** until opening **36***a* in ring **36** reaches the spring-strap of switch **114** whereupon the contacts thereof are momentarily opened. At such time the circuit that existed to relay **104** and motor **48** via switch **114** and relay point **104***a* is opened causing points

104*a* and 104*b* to open. Switch 114 will again close, however, as the drum 12 travels by momentum, to condition the circuit for the next dispensing operation. Deenergization of solenoid 40 allows its spring to actuate armature 40*a* forward whereby said armature enters the approaching opening in ring 36 and arrests the drum 12, motor 48 now deenergized. The usual means are provided (but not disclosed) to indicate when the stored commodities are exhausted whereby the indexing and programming mechanisms are disabled and coins that are inadvertently inserted into the coin box are automatically returned.

The control circuit for the lower drum 14 operates in precisely the same manner as does the above described circuit for drum 12 with the exception that the lower switch closing may be responsive to a coin combination of different value.

However, with the rotation of cam 68 by tab 56 (see FIGS. 1, 2 and 3), upper program bar 78 drops by gravity a short distance as defined by the next level of cam 68. As a result of such movement, indentation 86 of bar 78 aligns with door latch 62 of the topmost delivery door 64. Compression spring 63 is now effective to remove latch 62 (rightwardly in FIG. 5) whereupon the door 64 may now be opened and the commodity in compartment 12*b* may be removed by the purchaser, the exit area adjacent door 64 being particularly beveled to facilitate unhindered removal.

Furthermore, the upper protrusion 94 of upper program bar 78 engages the operating strap of upper switch 92 and causes the lamp 98 associated therewith to light. Switch 92 is then held operated so long as any commodity remains in upper compartments 12*a* or 12*b* and upper lamp 98 indicates that upper delivery door is the dispensing exit. The upper door now remains unlatched after the commodity is removed but closed under the urge of its spring hinge. All other delivery doors 64 remain latched.

As can be appreciated by reference to the drawings only a single compartment is accessible for commodity removal while all other compartments are concealed. With particular reference to FIGS. 4, 5 and 6 it is readily apparent that while a single delivery door 64 accommodates two levels of compartments (12*a* and 12*b*) only the commodity of a single compartment and level is available per step of drum 12. A subsequent rotation of drum 12 is necessary before the adjacent compartment and alternate level is aligned with delivery door 64.

The novel manner in which such selection and isolation is achieved while still retaining the maximum available drum area for commodity storage space forms an important part of this invention, as pointed out in the objects. With particular reference to FIG. 6 wherein is illustrated a partially exploded view of the two lowest levels or shelves of drum 14 which is constructed in a simple and economical manner by use of a series of identical discs 126 and identical compartment-forming members 128. The discs are of predetermined, reasonably constant diameter and constitute the upper and lower enclosures for the compartments while each member 128 is identically formed in a jig to the configuration shown in FIG. 6, with one long leg 130 and a short leg 132 joined by a web 134, the free end of short leg 132 being spot welded to leg 130 as at 133. Legs 130 and 132 form the lateral enclosures for the compartments while web 134 the compartment isolator.

In fabricating, the lowest disc 126 has mounted thereon as by spot welding or the like five compartment-forming members 128. In mounting, each adjacent long leg 130 is disposed 72° apart and substantially tangential to an inscribed or imaginary circle of predetermined diameter at the center of disc 126 as can be seen in the diagrammatic showing of FIG. 5. Such setting may be accomplished by use of a simple template to facilitate fabrication and the free end of each adjacent leg 130 may be fixed, again by spot welding, to the tangentially disposed long leg 130 of its neighbor, as in FIG. 6.

Upper disc 126 of FIG. 6 is then placed on the lower array of compartment-forming members 128 and may be spot welded to the upper tabs 130*a* and 132*a* of long legs 130 and short legs 132, respectively. Upper disc 126 now forms the top cover or upper enclosure for the compartments established by the lower compartment-forming members 128 while the lower disc 126 serves as the lower enclosure therefor. Tabs 136 may be spot welded to the webs 134 of the upper compartment-forming members 128, as shown in FIG. 6. Tabs 136 may be arranged to fit between the outer periphery of upper disc 126 and the inner portion of lower webs 134 and then be spot welded thereto. Discs 126 are provided with a central hole therein to receive center post 26.

Thus two levels which may consist of ten compartments are formed for lower drum 14 with each compartment substantially 36 degrees, center to center, apart. Accordingly, subsequent layers are built up in the same fashion until the drum 14 shown in FIG. 2 is achieved. Ring 38 and tab 58 are fixed to the underside of the bottom disc 126 to complete the sub-assembly. Upper drum 12 is constructed in a like manner with ring 36 and tab 56 fixed to the upper disc thereof. Drums 12 and 14 are then mounted on center post 26, as previously described, and set within the housing 10 and conditioned for vending.

FIG. 8 illustrates one example modification whereby the upper and lower compartments may support different type and form of commodities. The upper drum 140 may constitute compartments 142 disposed in substantially tangential array about center post 26 in order to most efficiently utilize the available storage area. With such construction, drum 140 may accommodate six compartments stocked with milk or beverage six-packs per layer while the machine of Serial No. 106,049 referred to earlier herein may only accommodate five compartments per layer for the same size drum. The lower drum may be the same as drum 14 of FIG. 2 and accommodate, for example cartons containing each a dozen eggs.

In a manner of summarizing, and with particular reference to the diagrammatic showing of FIG. 5, the importance of the novel tangential setting of the compartments is emphasized. It can also now be appreciated that articles of relatively short depth and substantial length may be accommodated while maximum shelf area is utilized for storage. It is also now apparent that a single delivery door may accommodate at least two levels or shelves of compartments and that the programming and indexing mechanisms in no way encroach on the storage area of the machine.

Having described the invention by making detailed reference to preferred forms of the elements thereof it is obvious that various modifications may be made without departing from the spirit of the invention. It is therefore understood that this invention is not limited to the exact arrangement disclosed except as limited by the state of the art to which this invention pertains.

What is claimed is:

1. A bulk vending machine having a cabinet with a main door and at least one delivery door from which selectively exposed commodities may be removed from individual compartments, a drum within said cabinet composed of said compartments, means including a center post for effective step-by-step rotation of said drum; the improved combination comprising,

said drum having a plurality of shelves at said delivery door level to support a multiple of commodities,

compartment-forming means cooperative with said shelves to segregate said commodities and cause the disposition of each of said commodities on each of said shelves to lay substantially tangential to said center post,

and means including said compartments and shelves to conceal all compartments at said delivery door level except the compartment selectively exposed.

2. The combination defined in claim 1 and means including,

a latch under control of a slide and cam for liberating said delivery door to selectively expose said commodities for removal.

3. The combination defined in claim 2 and,

illuminating means effective under control of said slide and cam to indicate when said delivery door is liberated and extinguished when said delivery door is not.

4. The combination defined in claim 2 and,

indexing means controlling said step-by-step rotation of said drum to expose alternate shelves at said delivery door following each rotational step.

5. A bulk vending machine having a cabinet with a main door and a multiple of delivery doors at different vertical levels from which selectively exposed commodities may be removed from individual compartments; the improved combination comprising,

a multiple of drums within said cabinet,

means including a center post for effecting selective step-by-step rotation of said drums,

each of said drums having a plurality of shelves at each delivery door level to support a multiple of commodities,

compartment-forming means cooperative with said shelves to segregate said commodities and cause the disposition of each of said commodities on each of said shelves to lay substantially tangential to said center post,

and means including said compartments and shelves to conceal all compartments of said drums except the compartment selectively exposed.

6. The combination defined in claim 5 and means including,

a latch for each of said delivery doors and control means therefor to selectively expose said commodities for removal.

7. The combination defined in claim 6 and,

individually selective indexing means for each of said drums for controlling selectively their step-by-step rotation.

8. A bulk vending machine having a cabinet with a main door, a multiple of delivery doors and an exit area adjacent each delivery door, a step-by-step rotatable drum within said cabinet having a plurality of shelves composed of individual compartments, means to rotate said drum, a center post mounted in said cabinet, means on said center post for mounting said drum for rotation; the improved combination comprising,

a multiple of compartment-forming members each having a multiple of legs joined by a web,

disc units serving as upper and lower enclosures for said compartments,

each disc unit having substantially equal outer peripheries and a hole in the center to receive said center post,

said compartment-forming members fixed on said discs so that each of said webs is positioned in approximate concentricity with said outer periphery of each of said discs,

and said legs joined to form individual side and depth enclosures for said compartments.

9. A bulk vending machine having a cabinet with a main door, a multiple of delivery doors and an exit area adjacent each delivery door, a step-by-step rotatable drum within said cabinet having a plurality of shelves composed of individual compartments, means to rotate said drum, a center post mounted in said cabinet, means on said center post for mounting said drum for rotation; the improved combination comprising,

a multiple of substantially identically contoured compartment-forming members each having two legs joined by a web,

a multiple of disc units of substantially identical contour having outer peripheries substantially equal and serving as upper and lower enclosures for said compartments,

said compartment-forming members fixed on said discs so that each said web is positioned in approximate concentricity with said outer periphery of each of said discs,

and said legs joined to form individual side and depth enclosures for said compartments whereby said side enclosures lay substantially tangential to said center post and said depth enclosures terminate said compartments which extend inwardly beyond said center post.

No references cited.