

Aug. 25, 1964

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3,146,043

ROTATABLE ARTICLE SUPPORT STRUCTURE FOR VENDING MACHINES

Filed Jan. 8, 1962

2 Sheets-Sheet 1

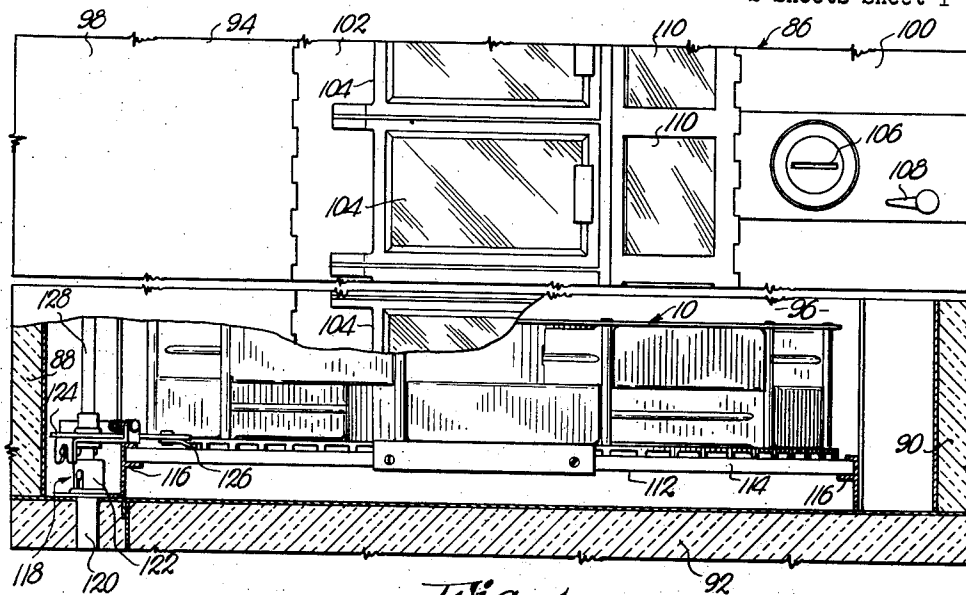


Fig. 1.

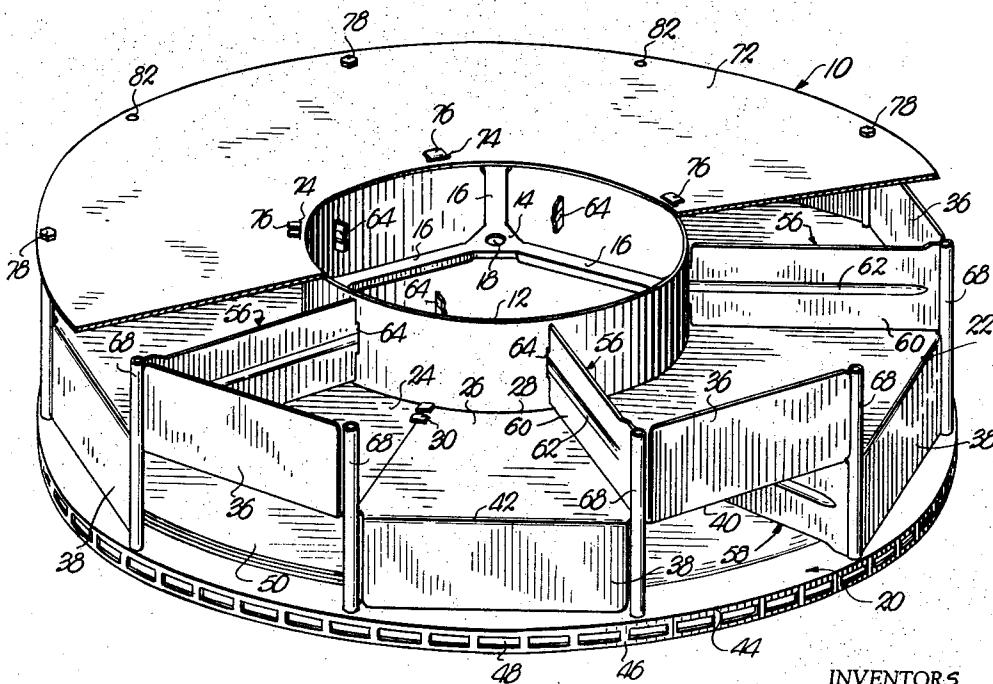


Fig. 2.

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2 Sheets-Sheet 2

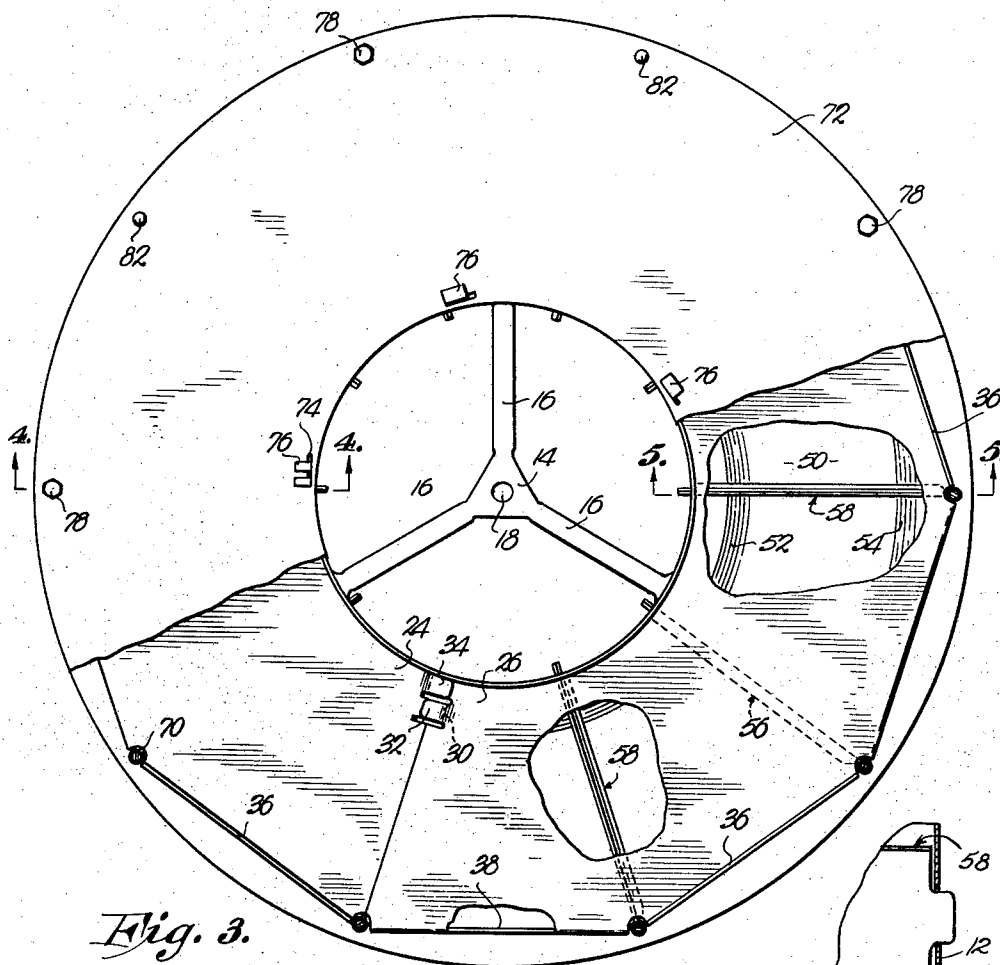


Fig. 3.

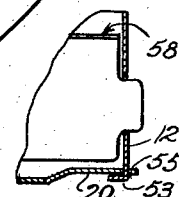


Fig. 6.

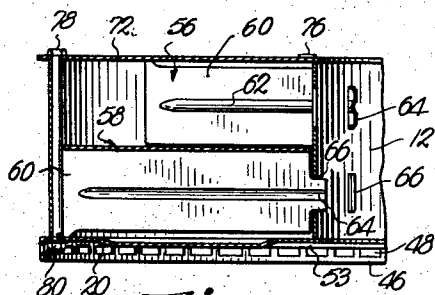


Fig. 4.

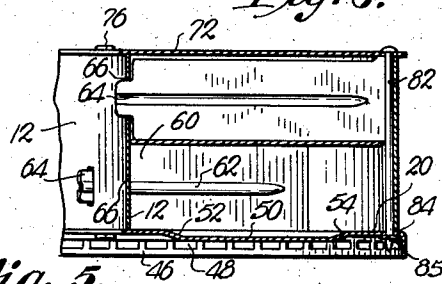


Fig. 5.

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ROTATABLE ARTICLE SUPPORT STRUCTURE FOR VENDING MACHINES

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Filed Jan. 8, 1962, Ser. No. 164,888

10 Claims. (Cl. 312—97.1)

This invention relates to coin actuated vending machines for dispensing articles of various kinds and, more particularly, to a machine of the aforesaid character for dispensing products packaged in elongated receptacles and adapted to be supported within the vending machine on a rotatable product supporting tray.

It has recently been determined that complete meals may be prepared and placed in elongated trays for subsequent placement in coin-actuated vending machines so that a consumer may purchase such meal directly from the machine, thus materially reducing the number of employees required to prepare and serve meals in a restaurant or cafeteria facility.

Heretofore, it has been the practice in utilizing machines of this type to place the articles within the machines on rotatable product supporting devices, whereby the rotation of the devices causes the articles to be moved into successive alignment with access apertures in the machine to permit removal of the articles therefrom. The use of rotatable support units for the products has been found to greatly simplify the structure for vending the units, the procedure for loading the machines has been made much quicker and easier, and this construction is ideally suited for vending of a large variety of both hot and cold products from the same machine. However, in order to provide the maximum number of compartments at each level of the rotatable support units, it has been found expedient to make the individual compartments of generally triangular configuration with the outwardly facing access openings of each compartment being the widest portion of each product receiving area. It can be readily recognized that these pie-shaped compartments for receiving the products to be vended, materially limit the size and configuration of the product packages which may be positioned within a corresponding compartment. For example, in the vending of a substantially complete meal in one package, for most efficient placement of the food in the package, and to render the various foods accessible to the purchaser in a conventional manner when he is eating the food, it is normally desirable to package the food in a generally rectangular package of substantial size. The triangular-shaped compartments of the rotatable support units referred to above, will not readily receive rectangular packages particularly when the same must remain substantially horizontal to preclude intermixing of the foods in the package or leakage of liquids therefrom.

The present invention provides a rotatable device for supporting a relatively large number of receptacles of greater longitudinal dimensions than heretofore was capable of being accommodated in conventional product dispensing machines. When utilized with such machines, the present invention permits the placement of complete meals in elongated receptacles in package form for subsequent vending thereof from the machine by a consumer.

It is, therefore, the primary object of the present invention to provide a rotatable, article-supporting device for use in a conventional coin-actuated vending machine for supporting articles contained in elongated packages, whereby the device is especially adapted for supporting packages containing complete meals as well as other types

of products that may most advantageously be vended in the form of an elongated package.

Another object of the present invention is the provision of a rotatable product supporting device of the aforesaid character which may be utilized with an existing machine with little or no modification thereto, whereby the device may be incorporated in the machine at a relatively low cost in comparison with the increased number and type of articles that may be dispensed thereby and devices of this character may be interchanged to accommodate the machine for packages of varying dimensions.

A further object of the present invention is the provision of an article support device of the aforesaid character, wherein the elements forming the device include partition members and blocking panels which may be formed by stamping or the like, whereby the parts comprising the device may be quickly and easily formed at a low cost and assembled together in a minimum of time, thus reducing the over-all cost of manufacturing a device of this type.

A further object of the present invention is the provision of a device as described formed of a central, cylindrical, rotatable member having a pair of vertically spaced, article supporting elements thereon in surrounding relationship thereto, and partition means radiating outwardly from the member to divide the elements into a number of circumferentially and vertically spaced article receiving compartments, each having a partially blocked, outermost end to thereby permit removal of an article only through the unblocked portion thereof, with the unblocked portions of the open ends of the compartments being in staggered relationship whereby a maximum number of elongated articles may be stored in vend position within the rotatable support device.

Another object of the present invention is the provision of novel panel means carried by one of the supporting elements and located in disposition extending alternately upwardly and downwardly from the peripheral edges of the element, whereby the panel means serve as the blocking means for the upper and lower compartments to permit the removal of the articles only from the unblocked portions when the latter are in register with the aperture in the machine.

Other objects of this invention will become apparent as the following specification progresses, reference being had to the accompanying drawings, wherein:

FIGURE 1 is a fragmentary, front elevational view of a machine for vending articles and illustrating the utilization therewith of an article receiving device which forms the subject of the present invention, parts being broken away and in section to illustrate details of construction;

FIG. 2 is a perspective view of the article receiving device which forms the subject of the present invention and illustrating article receiving compartments therein having staggered access openings for removal of the articles from the compartments, parts being in section to illustrate details of construction;

FIG. 3 is a plan view of the device illustrated in FIG. 2, parts being broken away to further illustrate constructional details;

FIG. 4 is a cross-sectional view taken along line 4—4 of FIG. 3;

FIG. 5 is a cross-sectional view taken along line 5—5 of FIG. 3; and

FIG. 6 is a fragmentary, cross-sectional view similar to FIG. 4 but on a larger scale to more clearly illustrate the details of the components making up the present structure.

The present invention provides structure for use within a machine for vending articles, and more particularly, in a machine for vending articles of food, such as complete meals, placed in trays or receptacles having a longi-

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tudinal dimension considerably greater than that of article containing receptacles heretofore utilized in machines of this nature. The present invention provides a device having a number of upper and lower article receiving compartments, each compartment having an open end which is partially blocked to provide an access opening for removal of packaged articles from the compartments while adapting the compartments to receive packages of elongated configuration.

The device includes a central cylindrical, normally upright, rotatable member. A pair of vertically spaced, annular supports surround the member, and partition means radiate outwardly from the latter to divide the supports into upper and lower article receiving compartments. The supports are comprised of a pair of semicylindrical elements having spaced, upwardly and downwardly extending panels thereon at the peripheries thereof which provide blocking means for the compartments and which are disposed in staggered relationship about the peripheries of the elements. The unblocked portions of the compartments provide access openings for insertion and removal of elongated articles to be vended. Rotation of the member places at least one of the unblocked portions of the compartments in register with an aperture in the machine so that removal of one of the articles in the compartments may be accomplished when the machine is actuated by the insertion of proper coins in the appropriate coin receiving control means for the machine. By virtue of the staggered relationship of the access openings, the articles contained in proximal, vertically aligned compartments are vended in successive relationship.

The device which forms the subject of this invention is illustrated in FIGS. 2 and 3 and is comprised of structure 10 which includes a central, cylindrical, normally upright member which is adapted to be mounted within a vending machine for rotation about the longitudinal axis of member 12. To this end, member 12 is provided with a bearing 14 on the axis thereof, and a number of spokes 16 securing bearing 14 to the normally uppermost end of member 12. Likewise, a similar bearing is provided at the normally lowermost end of member 12 so that a shaft forming a part of the vending machine but not shown in the drawings, may pass through a central aperture 18 in each of the bearings 14, permitting member 12 to rotate about the shaft in either direction. Reference is made to application Serial No. 42,408 entitled "Universal Vending Machine" for a detailed showing and explanation of a tray unit adapted to rotatably receive structure 10 in supporting relationship thereto.

Structure 10 also includes a lower article supporting element 20 secured to member 12 adjacent the lowermost end thereof in surrounding relationship thereto and an upper article receiving element 22 secured to member 12 intermediate the ends thereof and in vertically spaced relationship to element 20. Element 22 is formed from a pair of generally semicircular sections 24 and 26 which are provided with arcuate, innermost edges 28 for engaging the outer surface of member 12 as is illustrated in FIG. 2. Sections 24 and 26 are provided with tab means 30 thereon on the end edges thereof for mating with the tab means on the adjacent section to thereby interconnect sections 24 and 26 and secure the same to member 12. As shown in FIG. 3, section 26 is provided with a tab 32, which overlaps a similar tab of section 24, and section 24 is provided with a tab 34 overlying a similar tab on section 26.

Each section 24 and 26 is provided with a number of upper panels 36 and a number of lower panels 38 thereon at the peripheries thereof, as is illustrated in FIG. 2. Panels 36 and 38 are integral with corresponding sections 24 and 26 and placed in required disposition by folding of sections 24 and 26 along lines 40 and 42 respectively. Panels 36 and 38 are generally rectangular, and are disposed in substantially vertical planes above and below the planes of sections 24 and 26.

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Element 20 is provided with a circular periphery 44 and is of slightly greater diameter than element 22. A slotted flange 46 integral with and depending from periphery 44 of element 20 is provided with a plurality of of equally-spaced, elongated slots 48 therein. The upper surface of element 20 is provided with an annular depression 50 defined by opposed, annular frusto conical sections 52 and 54, illustrated in FIG. 3. Depression 50 is provided in element 20 to add rigidity thereto.

As best illustrated in FIG. 6, member 12 rests on the proximal upper surface of element 20 and the latter is connected to member 12 by downwardly-extending tabs 53 received within corresponding aligned openings 55 in element 20 inwardly of section 52 thereof. When sections 24 and 26 are positioned on member 12 as illustrated in FIG. 2, the lowermost edges of lower panels 38 engage the upper surface of element 20 and thereby assist in supporting sections 24 and 26 in vertically spaced relationship relative to depression 50 of element 20.

A number of upper partitions 56 radiate outwardly from member 12 and a like number of lower partitions 58 radiate outwardly from member 12 below partitions 56. The partitions 56 and 58 are identical in configuration and include a substantially rectangular component 60 having a longitudinally extending rib 62 thereon formed in any suitable manner, such as by stamping or the like, to add rigidity thereto. A tab 64 is formed integrally with one side edge of each of the partitions 56 and 58, and is received within a corresponding elongated slot 66 in member 12, as illustrated in FIGS. 4 and 5. At the opposite side edge of component 60, a tubular rod 68 is formed by rolling of the material of component 60 upon itself although it is clear from FIGS. 2 and 5 that the rod 68 is substantially twice the length of the side edge of component 60 corresponding thereto. To form the upper partitions 56, the components are disposed in the manner illustrated in FIG. 2, with the tabs 64 thereof in the corresponding slots 66 adjacent the upper end of member 12. Components 60 therefore, radiate from member 12, and rods 68 extend downwardly and engage the upper surface of element 20.

To form lower partitions 58, components 60 are positioned with the lowermost longitudinal edges thereof in spanning relationship to depression 50, and the tabs 64 thereof disposed within slots adjacent the lower end of member 12. Rods 68, therefore, extend upwardly above the planes of sections 24 and 26 and terminate adjacent the plane formed by the upper edges of upper panels 36. Rods 68 are disposed adjacent the side edges of panels 36 and 38, and to accommodate rods 68, arcuate recesses 70 are provided in sections 24 and 26 adjacent the peripheries thereof and between adjacent upper and lower panels 36 and 38. When components 60 are in the proper locations, the rods 68 are disposed within the recesses 70 as illustrated in FIG. 3.

Partitions 56 and first and second sections 24 and 26 define a number of circumferentially spaced, upper compartments for receiving articles to be vended. The articles are supported on the upper surfaces of sections 24 and 26 and are separated from the articles in adjacent compartments by the partitions 56. Similarly, the partitions 58 and element 20, define a number of circumferentially spaced, lower compartments which are partially offset from the upper compartments by virtue of the positions of the upper and lower partitions 56 and 58. For instance, each lower partition 58 is disposed in a vertical plane substantially midway between the vertical planes formed by the upper partitions 56. Therefore, each upper compartment partially overlies a pair of adjacent compartments therebelow. Likewise, an upper panel 36 overlies an unblocked portion of a compartment therebelow, and a lower panel 38 underlies an unblocked portion of a compartment thereabove. The unblocked portions of the compartments therefore, provide access openings for the removal, as well as the insertion of articles from and

into the compartments, which openings are in staggered relationship about the periphery of device 10.

An annular cover 72 is secured to member 12 and to lower element 20, to add rigidity to device 10, as well as to cover the upper compartments. Cover 72 is provided with a number of circumferentially spaced slots 74 for receiving tabs 76 which extend upwardly from member 12. A number of elongated bolts 78 pass through circumferentially spaced openings in cover 72 and through alternate rods 68, terminating adjacent the under surface of element 20. A nut 80 is threadably secured to the lowermost end of each bolt 78 beneath element 20 to interconnect cover 72 with the latter. A number of elongated elements 82 pass through openings between adjacent openings in cover 72 containing bolts 78 and pass downwardly through the remaining rods 68, terminating below element 20. A C-clip 84 is received within an annular recess 85 in the lower end of each of the elements 82 for retaining the latter in position to thereby assure that rods 68, associated therewith, remain in upright positions.

In operation, device 10 is utilized in a machine broadly denoted by the numeral 86 and partially illustrated in FIG. 1. Machine 86 is provided with side walls 88 and 90, a lower wall 92 interconnecting walls 88 and 90, and a door 94 swingably mounted on one of the walls 88 or 90 for removably closing a space 96 for receiving a plurality of devices 10. Door 94 is provided with a pair of swingably mounted sections 98 and 100 on opposed sides of a central section 102 having a number of vertically aligned doors 104, permitting access to the interior of machine 86, it being clear that a door 104 is associated with each device 10 to be utilized within machine 86.

Section 98 covers the control mechanism for actuating machine 86 and thereby permits ready access to the mechanism at all times. Section 100 covers the coin control apparatus and is provided with a coin-receiving slot 106 thereon as well as a coin-return lever 108. Section 100 also permits access to a region within which may be mounted a number of cards having indicia thereon defining the type of article carried by a particular device 10 adjacent thereto. A number of vertically spaced, transparent plates 110 may be provided in corresponding openings in central section 102 to permit indirect lighting of the cards mounted in the region within machine 86 behind plates 110.

Each device 10 is preferably, although not necessarily, mounted on a plate 112 having a flange 114 around the periphery thereof, and since one device 10 is provided for each of the access doors 104, it can be recognized that the plates 112 having corresponding devices 10 thereon, are located within the machine in vertically spaced, superimposed relationship. Opposed, horizontally aligned, inwardly directed channel members 116 provided within the interior of the vending machine cabinet, serve as means for removably receiving corresponding plates 112 to maintain the devices in correct alignment with the product openings in door 98.

Mechanism broadly designated 118 in FIG. 1, is provided at the lower end of the cabinet and at the left-hand side thereof, for effecting rotation of corresponding devices 10 to bring another product into alignment with a corresponding door 104 after the latter has been opened by a customer to remove a packaged product from the machine. The shaft 120 is adapted to be coupled to a suitable unit for rotating the latter in one direction, such as an electric motor having cam actuated means associated therewith for causing the shaft 120 to be rotated through one revolution each time the motor is energized. Shaft 120 is operably coupled to a vertical shaft 128 extending substantially the full height of the interior of the vending machine cabinet and connected to shaft 120 through the coupler 122. Selectively operable coupling means 124 is mounted on the shaft 128 for each of the devices 10 and is provided with hook means 126 thereon adapted to en-

gage corresponding devices 10 within the openings 48 in corresponding flanges 46.

Although not illustrated in the drawings since the same forms no part whatsoever of this invention, it is to be understood that the control unit of the machine includes means for permitting only one of the doors 104 to be opened at a time and then only after coins of predetermined value have been inserted in the machine and corresponding to a value which has been set up in the machine for a corresponding product level.

In the preferred operation of the vending machine, the customer may open one of the doors 104 to permit removal of a product therebehind, whereupon closing of such door actuates the motor connected to shaft 120 to rotate shaft 128 in a manner to cause coupling means 124 corresponding to the door which has been opened, to shift the respective device 10 through an arc to bring the next product into alignment with the door 104. As previously indicated, the means for effecting connection of only one of the coupling means 124 to the device 10 from which a product has been removed, has no bearing on the present invention and therefore is not detailed.

For purposes of providing a more complete understanding of the utility of each of the devices 10, it is assumed that the customer desires to remove a product from the lowermost device 10 as shown in FIG. 1, and normally blocked by the lower door 104. The customer grasps the operating handle of door 104 and pulls the same outwardly thereby actuating test mechanism to determine if proper coins have been inserted in the machine and corresponding to the value which has been set up in the machine for the lower product level. Assuming that proper coin deposit has been made, the customer continues to pull the lower door 104 outwardly thereby rendering one of the adjacent upper or lower compartments accessible. As is apparent in FIG. 1, the product in the upper compartment is accessible to the customer whereas the panel 38 in blocking relationship to the lower compartment therebelow prevents the customer from removing more than one product from the device 10.

Closing of the lower door 104 activates the motor coupled to shaft 120 and causes the coupling means 124 associated with the device 10 to be operably joined to flange 46 of device 10 to shift the latter through an arc to bring the access opening of the next adjacent lower compartment into alignment with the lower product door 104. Therefore, if the next customer also selects the product in the lower device 10, reopening of the door 104 as previously described permits the customer to have access to the product in the lower compartment below the compartment from which the product was previously dispensed.

The structure described above permits vending of elongated packaged products from a rotatable drum with a maximum number of articles being vendable from a minimum amount of space and without modification of the machine being required other than replacement of the support device for the products.

Device 10 provides means for carrying elongated receptacles containing articles to be vended, such as food or the like, while occupying no more space than normally utilized by article supporting means of conventional character. It can, therefore, be seen that device 10 of the instant invention can replace these conventional supporting devices with little or no modification to machine 86, the only requirement being that the plate 112 of device 10 be capable of being carried by members 116. In the position illustrated in FIG. 1, device 10 is disposed so that a single unblocked portion of one of the upper or lower compartments is aligned with door 104. When device 10 is rotated through a predetermined arc, the next adjacent unblocked portion is moved into register with door 104. By properly controlling the rotation of device 10, compartments of any size may be provided for device 10 to accommodate articles of greater or lesser dimensions to suit the demands placed on machine 86.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In a coin-actuated machine adapted to contain a number of articles to be vended and having an access aperture therein through which an article is permitted to pass for removal from the machine, the improvement of which comprises article receiving tray means adapted to be disposed within the machine adjacent said aperture for moving individual articles into register with said aperture upon actuation of said machine, said tray means including:

(a) a supporting member adapted to be mounted within the machine for rotation about a vertical axis through a predetermined arc each time said machine is actuated;

(b) a pair of vertically spaced, superimposed, article-supporting elements mounted on said member in surrounding relationship thereto;

(c) a plurality of circumferentially spaced, radially extending partitions on said elements and secured to the outer surface of the member for dividing the area above said elements into a number of upper and lower article-receiving compartments respectively; and

(d) panel means on at least one of the elements adjacent the peripheral edge thereof and cooperable with said dividing means for defining peripheral access openings for the compartments with each access open of an upper compartment offset circumferentially of the elements relative to the access openings of the next adjacent lower compartment, the proximal side edges of adjacent upper panels defining the upper access openings and the proximal side edges of adjacent lower panels defining the lower access openings whereby access may be alternately provided to upper and lower compartments by rotation of said member through successive predetermined arcs to bring successive access openings into alignment with said aperture.

2. In a coin-actuated machine as set forth in claim 1, wherein said member comprises a cylindrical, normally upright tube rotatable about the longitudinal axis thereof, said dividing means including a plurality of circumferentially spaced, radially extending partitions secured to the outer surface of said tube.

3. In a coin-actuated machine as set forth in claim 1, wherein said panels are secured to the upper element at the periphery of the latter, said lower panels being disposed to engage said lower element to support the upper element above said lower element.

4. In a coin-actuated machine as set forth in claim 1, wherein said member comprises a cylindrical, normally upright tube rotatable about the longitudinal axis thereof, said upper element comprising a pair of generally semi-circular sections having end edges and disposed about said tube with said end edges of one of the sections being releasably interconnected to the end edges of the other section to facilitate assembly and disassembly of said tray means.

5. In a coin-actuated machine as set forth in claim 4, wherein each of said sections is provided with outwardly projecting tabs thereon at said end edges thereof, said tabs of said sections being coupled together to mount said sections on said tube.

6. In a coin-actuated machine as set forth in claim 1, wherein said dividing means comprises a number of upper and lower partitions disposed radially of said axis, each of said upper partitions being in staggered relationship to an adjacent lower partition so that each upper compartment overlies substantially equal portions of a pair of adjacent lower compartments.

7. In a coin-actuated machine as set forth in claim 6, wherein said upper and lower partitions are provided with

tabs on the innermost edges thereof, said tabs being coupled with said member to secure the corresponding edges of the partitions to said member, and including an elongated support rod secured to the outermost edge of each of said upper partitions and depending therefrom for engaging said lower element to thereby support the corresponding outermost edge above said lower element.

8. In a coin-actuated machine as set forth in claim 7, wherein said rods are tubular, a cover plate is provided in overlying relationship to the upper edges of said upper partitions, and elongated fastening means connects said cover plate with said lower element and passes through said rods.

9. An article-receiving tray unit for a vending machine provided with an article access aperture therein, said tray unit including:

(a) structure adapted to be rotatably mounted within the machine adjacent said aperture therein and including means dividing the structure into at least two rows of peripherally facing, article-receiving, circumferentially positioned compartments, said dividing means being located to define respective compartments therebetween, each of a dimension measured circumferentially of the structure, substantially as many times greater than the width of said article access aperture as there are rows of compartments; and

(b) blocking means on the structure restricting access to each compartment to an opening substantially equivalent in width to the width of said article access aperture, the blocking means operably associated with one row of compartments being offset circumferentially of the structure relative to the blocking means operably associated with an adjacent row in disposition whereby controlled rotation of the structure through consecutive arcs, each substantially equivalent to the width of said article access aperture, provides access to only one compartment at a time and successively in a different row thereof.

10. An article-receiving tray unit for a vending machine provided with an article access aperture therein, said tray unit including:

(a) structure adapted to be rotatably mounted within the machine adjacent said aperture therein and including means defining two, superimposed, horizontally disposed rows of peripherally facing, article-receiving, circumferentially positioned compartments, said means being located to define respective compartments therebetween, each of a dimension measured circumferentially of the structure, substantially twice the horizontal width of said article access aperture and of a vertical dimension approximately one-half the vertical dimension of said article access aperture; and

(b) blocking means on the structure restricting access to each compartment to an opening substantially equivalent in width to the width of said article access aperture, the blocking means operably associated with one row of compartments being offset circumferentially of the structure relative to the blocking means operably associated with an adjacent row in disposition whereby controlled rotation of the structure through consecutive arcs, each substantially equivalent to the width of said article access aperture, provides access to only one compartment at a time and successively in a different row thereof.

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