Nov. 2, 1954 S. L. CHILDERS ET AL 2,693,300

VENDING MACHINE

Filed Jan. 19, 1951 2 Sheets-Sheet 1

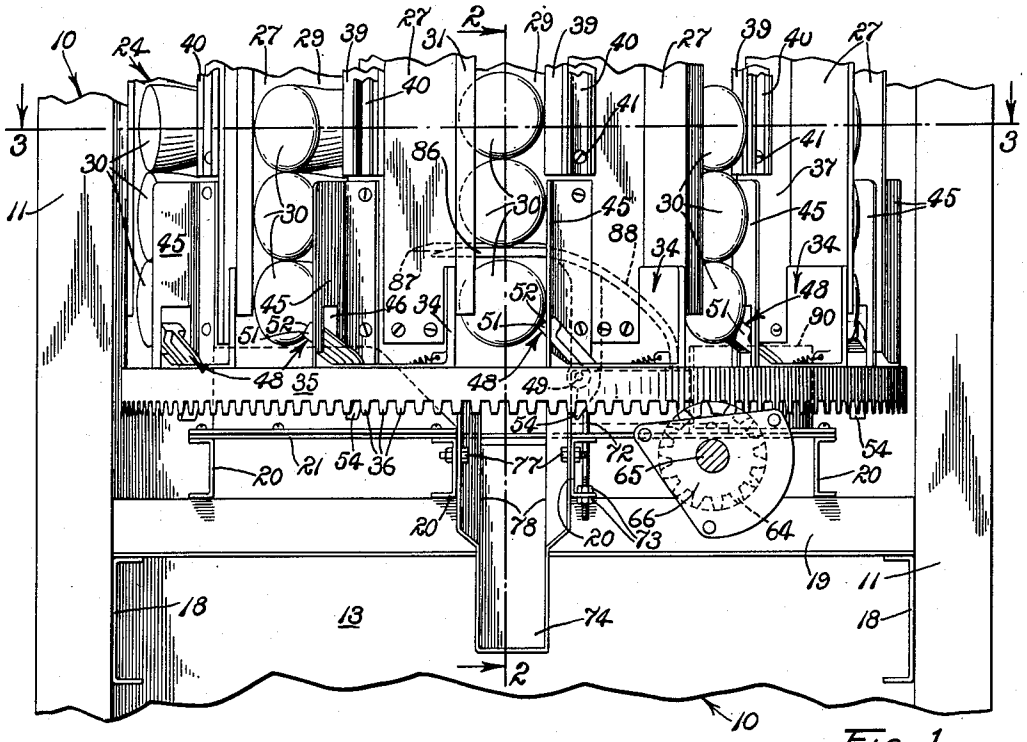


FIG. 1.

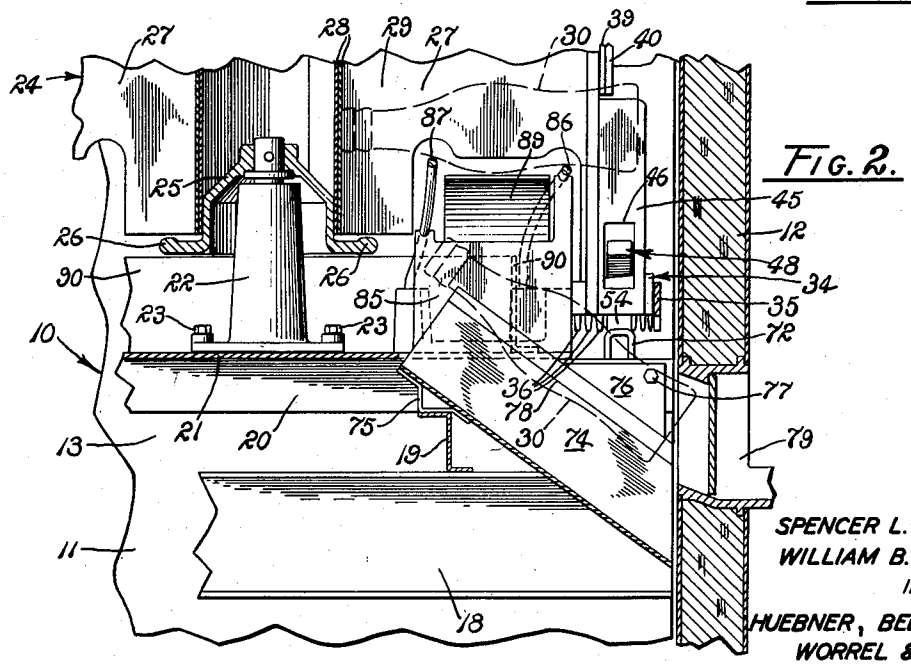


FIG. 2.

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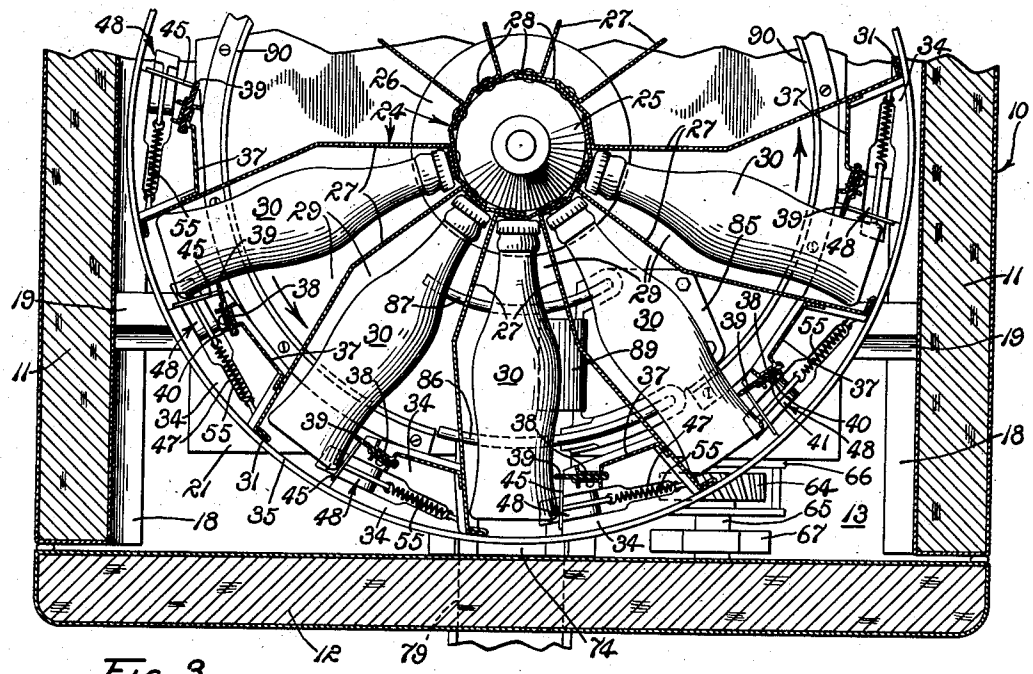


FIG. 3.

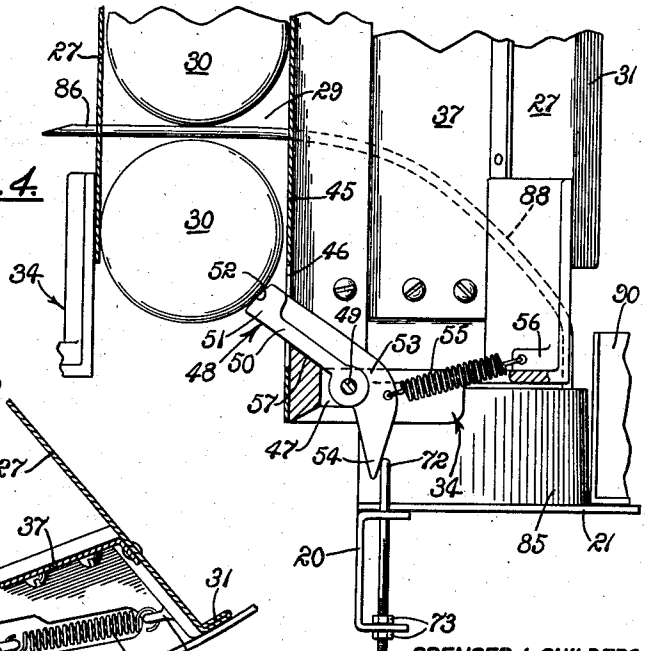
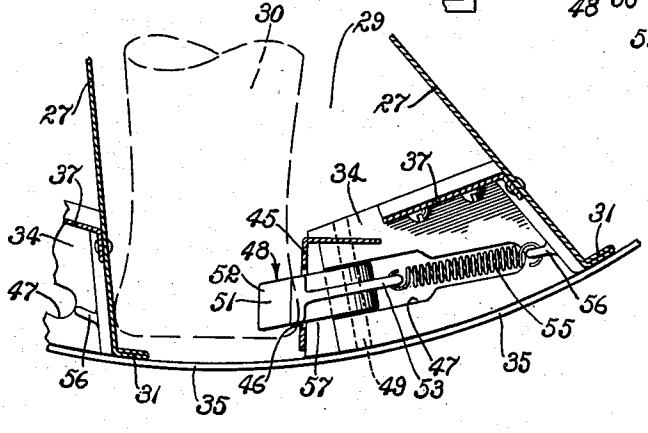


FIG. 4.

FIG. 5.



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2,693,300

Patented Nov. 2, 1954

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VENDING MACHINE

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Application January 19, 1951, Serial No. 206,776

2 Claims. (Cl. 221—113)

The present invention relates to vending machines and more particularly to an improved merchandise retaining mechanism for such machines requiring a minimum of power for actuation to release merchandise during vending operations.

Vending machines, for bottled beverages and the like, to which reference is made herein, are generally operated by customer manipulation or electrically in response to customer triggering. Such devices are almost universally responsive to the insertion of a coin of suitable size in a receiver provided for the purpose and driven through a vending cycle electrically or by customer lever operation. In each instance, it is desirable to minimize the power requirements of the vending operation.

It is also the general practice to carry bottled beverages and other vendable merchandise in a rotatable magazine from which the merchandise is ejected in response to the stepped progression of the magazine past a given vending position usually defined by a selection finger and a delivery chute. It is essential to successful operation of such vending machines that the merchandise be dependably retained in the magazine until the vending position is reached and at that point released with a minimum of effort. Bottled beverages and other vendable merchandise are generally carried in the magazines in stacked relation and the lowermost vended from the stack. This imposes the weight of the entire stack on the unit of merchandise to be next vended from the stack and aggravates the problems of dependable retention and convenient release at the precise point of vending.

In many such machines the problems of retention and release are met by horizontal ejection of the lowermost unit of merchandise from each stack. Although operable, such structures possess undesirably high power requirements and necessitate undesirably large cabinets for such machines because of the horizontal movement. The minimizing of cabinet size in vending machines of a given capacity has long been recognized as an important goal particularly where the vending machines are to be utilized in such limited areas as theatre lobbies, hallways, waiting rooms, lounges and the like.

An object of the present invention is to provide an improved merchandise retaining mechanism for vending machines.

Another object is to provide a merchandise retaining mechanism for vending machines making possible the substantial reduction of cabinet size in vending machines of a given capacity and of the power requirements for the performance of vending operations.

Another object is to provide a merchandise retaining mechanism for vending machines making possible the dependable retention and convenient release of the lowermost unit of merchandise of a stack of such merchandise downwardly with no appreciable lateral or horizontal movement.

Another object is to provide an improved releasable retaining mechanism for bottled beverages arranged in stacked relation in a movable magazine.

Another object is to provide a trigger finger adapted to support stacked horizontal bottles of beverages and the like in a rotatable magazine that is tripped in response to rotation of the magazine to release a lowermost bottle of a stack with no appreciable upward nor horizontal movement of such bottle for release.

Another object is to provide in combination with such a trigger finger a selection finger of improved form adapted to translate gravitational descent of bottled beverages and the like incident to trigger finger release into motivation of the magazine facilitating vending operations.

Other objects are to provide improved elements and arrangements thereof in a device of the character and for the purposes set forth.

Still further objects and advantages will become apparent in the subsequent description in the specification.

Referring to the drawing:

Fig. 1 is a fragmentary front elevation of a vending machine mechanism constructed in accordance with the principles of the instant invention as viewed with the front of a cabinet therefor removed.

Fig. 2 is a vertical section through the mechanism as taken along line 2—2 in Fig. 1.

Fig. 3 is a fragmentary horizontal section through the vending machine as taken along line 3—3 in Fig. 1 but showing the front of the machine in closed position.

Fig. 4 is an enlarged vertical section through the magazine showing the trigger finger in elevation.

Fig. 5 is a fragmentary horizontal section through the magazine of the mechanism illustrating trigger finger operation.

Referring in detail to the drawing:

The present invention is employed in conjunction with a vending machine enclosed in a cabinet 10 having a plurality of insulated walls 11. The cabinet has an open forward portion which is normally closed by means of an insulated door 12 extending in sealed relation across the open front of the cabinet. The cabinet 10 and door 12 provide a sealed insulated compartment 13 for the enclosure of vending apparatus hereinafter described. The compartment is refrigerated by any suitable means, not shown, so as to cool bottled beverages therein to a potable temperature.

A supporting structure is provided for mounting vending apparatus in the compartment 13 by securing a pair of channels 18 longitudinally in a horizontally extending position against opposite side walls of the cabinet. Although only one is shown, a pair of Z supports 19 are secured on and extend between the channels 18 in spaced parallel relation. A plurality of cross channel members 20 are located in supported relation transversely of the pair of Z supports and secured thereto in parallel relation. The upper surfaces of the cross channels 20 are in a common horizontal plane upon which is secured a sheet metal support plate 21.

A cast metal bearing 22 is bolted, as at 23, in an axially upright position substantially centrally of the supporting plate 21 and the compartment 13. A magazine, indicated generally by the reference numeral 24, of substantially cylindrical shape, is supported axially vertically on the bearing 22 for rotation. Although the lower end only of the magazine is shown in the drawings, the upper end thereof is constructed and assembled somewhat similarly to its bottom end. The magazine is provided with an axially central hub 25 of metal or the like which is rotatably mounted on the upper end of the bearing 22. The hub is formed with a radially extending flange 26. A plurality of sheet metal division plates 27 are provided, each having an inner lip 28 bent at substantially right angles thereto. The lips are secured to the periphery of the hub 25 in overlapping relation with the plates extending substantially radially outwardly therefrom. The spaces between the radiating division plates 27 provide a plurality of elongated vertically extending pockets 29 for the reception of a quantity of articles therein in vertically stacked relation to be vended therefrom. The articles to be vended are typified by bottles 30 of beverages.

The outer edges of the division plates 27 are formed into outer lips 30 extending substantially at right angles to the general plane of their respective plates. The lips are engaged by the bottom ends of the bottles and the bottles thus maintained in confined stacked relation to the pockets 29.

The magazine is provided with a plurality of cast brackets 34 equal in number to the number of pockets in the magazine. One bracket is attached to the lower

end of each division plate 27 and the outer edge surfaces of the combined brackets define a cylindrical peripheral surface at the lower end of the magazine. A gear ring 35 is secured to the outer surfaces of the brackets and maintains the brackets and division plates in desired spaced relation. Gear teeth 36 are formed in the lower edge of the gear ring 35 so that the magazine may be driven in a manner hereinafter more fully described.

As illustrated in Fig. 3 of the drawing, a sheet metal web 37 is secured edgewardly to one face of each of the division plates 27 and extends in a clockwise direction therefrom, as viewed. Each web 37 terminates at its edge in a clockwise direction from the separator plates in a terminal channel 38 extending vertically of the magazine. A rubber or other resilient retainer strip 39 is received by each terminal channel 38 and extends edgewardly therefrom in a clockwise direction with an attaching plate 40 secured over the outer face of each of the retainer strips as by a plurality of screws 41 passed therethrough. The retainer strips are provided so that bottles may be inserted endwardly into each of the pockets 29 past the outer lips 31 thereof and be dependably retained in the pockets by the resilient urging of the bottles by the strips over behind their respective cooperative lips 31. This structure comprises the subject matter of a co-pending patent application and is not described in greater detail at this point.

As will soon become apparent, the magazine is driven in stepped progression in a counter-clockwise direction, as viewed in Fig. 3. A sheet metal guide plate 45 is attached to the leading end of each bracket 34 and extends upwardly therefrom a distance substantially equal to the diameters of two bottles to be contained in the magazine. Each guide plate 45 is slotted vertically at 46 from its respective bracket 34 upwardly a short distance. Each bracket is also slotted horizontally at 47 tangentially of a circle inwardly concentric of the outer cylindrical surface of each cast mounting.

A trigger finger 48 is pivotally mounted on a pivot pin 49 in the slot 47 of each cast mounting 34. Each trigger finger 48 is formed with an arm 50 extending substantially radially from its pivot pin through the slot 46 in its respective guide plate 45. Each arm extends angularly upwardly from its pivot and terminates in a head 51 at the lower end of each magazine pocket 29. The head of each trigger finger is formed with a surface 52 which is concentric with the axis of its respective pivot pin 49 and may be of cylindrical, frusto-conical, or other desired surface of revolution complementary to the bottles 30. To engage bottles of the form shown in the drawings, fragmentary frusto-conical portions are excellently suited to the purpose. Each trigger finger is cast or otherwise formed with a central longitudinal web 53 which extends downwardly therefrom in the form of a tail or extension 54. A helical tension spring 55 interconnects a portion of each web 53 and an ear 56 on each bracket 34 in a position to rotate its respective trigger finger in a counter-clockwise direction viewed radially inwardly of the magazine. An angular stop 57 is formed on each bracket 34 under the arm 50 of its respective trigger finger 48 so that the counter-clockwise pivotal movement of each trigger finger is limited to an extent that the head 51 of each trigger finger extends into its respective pocket a maximum sufficient to engage and support the lower-most bottle in each pocket. As shown in Fig. 4, limiting of the counter-clockwise rotation of the trigger fingers to positions diametrically related to the lower-most bottles of their respective stacks achieves dependable support inasmuch as the triggers are pivotally mounted a distance appreciably below the bottles.

The magazine 24 is adapted to rotate in a counter-clockwise direction, as viewed in Fig. 3, and this is accomplished by providing a helical spur gear 64 which is in constant mesh with the gear teeth 36 on the gear ring 35. The spur gear 64 is mounted on a shaft 65 which is journaled on a horizontal axis in a pair of spaced gear mounting plates 66 supported on the plate 21. The spur gear 64 and the magazine are manually rotatable by providing a releasable coupling 67 which is operably rotatable by lever means, not shown, accessible from exteriorly of the door 12.

The lower-most bottle of each stack of bottles in the magazine pockets 29 is released as its pocket moves to a vending position. A trip rod 72 is secured to one of the cross channels 20 and extends upwardly therefrom in the path of the plurality of tails 54 of the trigger fingers 48. The trip rod extends through its cross channel and is maintained in a proper vertical position by means of a pair of nuts 73 threaded onto the trip rod against opposite sides of a portion of the cross channel.

At the vending position of the vending machine is provided a sheet metal chute 74 onto which a bottle gravitates when released by tripping of its respective trigger finger 48. As illustrated in Fig. 2 of the drawings, the chute 74 is radially outwardly and downwardly angled so that when a bottle falls thereon it gravitates to a position of convenient customer access. The chute is attached at its inner end to the upper surface of one of the Z supports 19 by means of a bracket 75 secured to both the under side of the chute and the Z support. The outer end of the chute is provided with a pair of spaced wings 76 each of which is bolted at 77 to the forward ends of the two innermost cross channels 20. The chute 74 is wider in its upper portion than in its lower portion with shoulders 78 therebetween on which a bottle rests as it slides along the chute. The door 12 of the vending machine is provided with a vending opening 79 which is longitudinally aligned with the chute 74 so that a bottle deposited on the chute 74 slides longitudinally outwardly thereon into the vending opening in the door where the bottle is available to the customer.

Whenever the lower-most bottle is released from one of the magazine pockets 29 downwardly onto the chute 74, it is necessary elevationally to support the remainder of the bottles in that respective pocket. This is accomplished by providing a base member 85 which is bolted to the upper surface of the support plate 21 and has an inner separation or division finger 86 and an outer separator finger 87 anchored thereto. Each separator finger is provided with a portion 88 downwardly inclined in the direction of magazine rotation adjacent to its anchored end. The separator rods 86 and 87 extend concentrically of the magazine in a direction from their anchored portions opposite to the direction of magazine rotation and have horizontal portions extended over the chute 74. A sheet metal guide plate 89 is also attached to the base 85 and extends arcuately upwardly and opposite to the direction of magazine rotation therefrom to aid in guiding the lower-most bottle at the vending position downwardly into the chute therebelow.

As a precaution against the stack of bottles in any of the pockets 29 precipitating therefrom as a result of a structural failure of a trigger finger, a track or rail 90 of substantially cylindrical form is secured to the upper surface of the support plate 21 in concentric relation to the axis of the magazine slightly below the lower-most portion of the lowest bottle in each pocket so that under ordinary circumstances the bottles do not ride on the rails. In the event of the breaking of a trigger finger, its stack of bottles finds rollable support on the track and the vending machine continues to be operable although substantially increased power is required.

Operation

The operation and utility of the present invention are believed to be apparent from the foregoing description and are briefly summarized at this point. The vending machine is periodically serviced to replenish the bottles therein so that vertical columns of bottles are located in the magazine with one vertical row in each pocket thereof and with each row supported in the magazine by means of the flange 26 and a trigger finger 48 extending outwardly below the lower-most bottle of each stack. To operate the machine, the gear 64 is manually rotated to advance the pockets in a counter-clockwise direction, as viewed in Fig. 3, successively to a position over the chute. As each magazine pocket 29 approaches the vending position, the projecting terminal ends of the separator fingers 86 and 87 wedge between the lower-most bottle and the next bottle thereabove. This causes the bottle above the lower-most bottle and the superimposed bottles to be supported while the lower-most bottle is vended.

As each pocket 29 approaches its vending position over the chute 74, the cam 54 of its respective finger 48 engages the stationary trip rod 72 which detains the cam portion 54 of the trigger finger and pivots the head of the trigger finger upwardly. Upon sufficient movement upwardly, the head 51 releases the bottle previously engaged for gravitation downwardly onto the chute. With the separator fingers 86 and 87 temporarily supporting

the bottles above the vended bottle, no more than the lower-most bottle is vended with the remainder of the bottles retained in the pocket thereabove. When the magazine has been rotated sufficiently that the cam **54** of a trigger finger has moved past the trip rod **72**, the spring **55** urges the trigger finder back into effective position to support a successive bottle thereon gradually lowered by the separator fingers upon continued magazine rotation.

It will be observed that the surface **52** concentric to the pivotal mounting of the finger **48** is moved across the supported bottle **30** with a minimum of force. In the release of a bottle no displacement thereof from its normal position in the magazine ise required prior to its gravital descent directly from the bottom of the magazine into the chute **74**. Heretofore it has been considered necessary to slide a bottle endwardly or to lift it preliminary to discharge. Such preliminary physical displacement required increased driving power as compared to the release by the finger of the present invention.

Further, it will be observed by reference to Figs. 1 and 4 that immediately following the release of a bottle by the tripping action of a trigger finger **48**, the stack of superimposed bottles rested on the fingers **86** and **87** descend downwardly of the inclined portions **88** thereof. This gravitational descent of the bottles operating against the inclined portions thrust the magazine in the direction of its normal operating rotational movement. This serves to compensate for the small amount of power required to trip the finger and a vending operation is made possible with an absolute minimum of driving power applied to the shaft **65**.

Still further, the trigger finger of the present invention makes possible the vending of bottled beverages and the like directly downwardly from the magazines in which they are stored. Such downward movement from the magazine makes possible the construction of a smaller cabinet for housing a vending machine of a given capacity. Well known vending machines of the type requiring an endward movement of the bottles for delivery from the magazine require several inches additional thickness and thus are less conveniently located in restricted areas, such as theatre lobbies, hallways, waiting rooms, lounges and the like.

The trigger fingers are economical to construct, dependable in operation and fully effective in performing their intended functions.

Although we have herein shown and described our invention in what we have conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of our invention, which is not to be limited to the details disclosed herein, but is to be accorded the full scope of the claims so as to embrace any and all equivalent systems and apparatus.

Having described our invention, what we claim as new and desire to secure by Letters Patent is:

1. In a vending machine adapted to dispense articles of axially elongated substantially circular transverse form having a substantially cylindrical magazine mounted for rotation about a substantially erect axis and having a plurality of radial partitions defining elongated substantially erect pockets adapted to receive articles to be vended in substantially horizontal stacked relation therein axially radially of the magazine and having open lower end portions for the discharge of such articles, the magazine including means for supporting the radially inwardly disposed ends af the lowermost article in each stack; means for releasably supporting the radially outwardly disposed ends of the articles in the magazine comprising trigger fingers pivotally mounted on individual axes substantially radially of the magazine laterally adjacent to the lower ends of the erect pockets and spaced radially of the magazine from the article support means, each finger having an upwardly extended head pivotally movable to and from its respective pocket providing an arcuate article supporting surface concentric to its pivotal axis, and a stop mounted in the magazine adjacent to each of the fingers engageable with its respective finger to limit pivotal movement of its finger into its respective pocket to a position with the arcuate surface of its head engaged with the lowermost article in its pocket at a position on said arcuate surface aligned with the pivotal axis of the finger diametrically of said lowermost bottle.

2. In a vending machine adapted to dispense articles of axially elongated substantially circular transverse form having a substantially cylindrical magazine mounted for rotation about a substantially erect axis and having a plurality of radial partitions defining elongated substantially erect pockets adapted to receive articles to be vended in substantially horizontal stacked relation therein axially radially of the magazine and having open lower end portions for the discharge of such articles, the magazine including means for supporting the radially inwardly disposed ends of the lowermost article in each stack; means for releasably supporting the radially outwardly disposed ends of the articles in the magazine comprising trigger fingers pivotally mounted on individual axes substantially radially of the magazine laterally adjacent to the lower ends of the erect pockets and spaced radially of the magazine from the article support means, each finger having an upwardly extended head providing an arcuate article resting surface concentric to its pivotal axis, resilient means pivotally urging each of the fingers in a direction causing the heads thereof to enter their respective pockets to support the outer ends of the lowermost bottles in the pockets, stops limiting inward pivotal movement of the fingers to positions diametrically related to the lowermost articles in their respective pockets, and means for pivoting the fingers individually from their respective pockets for bottle releasing purposes.

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