United States Patent [19]

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[11] **3,737,070**

[45] **June 5, 1973**

[54] INCLINED SHELF VENDING MACHINE

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[73] Assignee: **The Vendo Company,** Kansas City, Mo.

[22] Filed: **May 20, 1971**

[21] Appl. No.: **145,234**

[52] **U.S. Cl.** **221/6,** 221/115, 221/129

[51] **Int. Cl.**.....**G07f 11/28**

[58] **Field of Search**.....221/6, 14, 112, 124, 221/125, 129, 130, 115, 251, 258, 262, 236, 273

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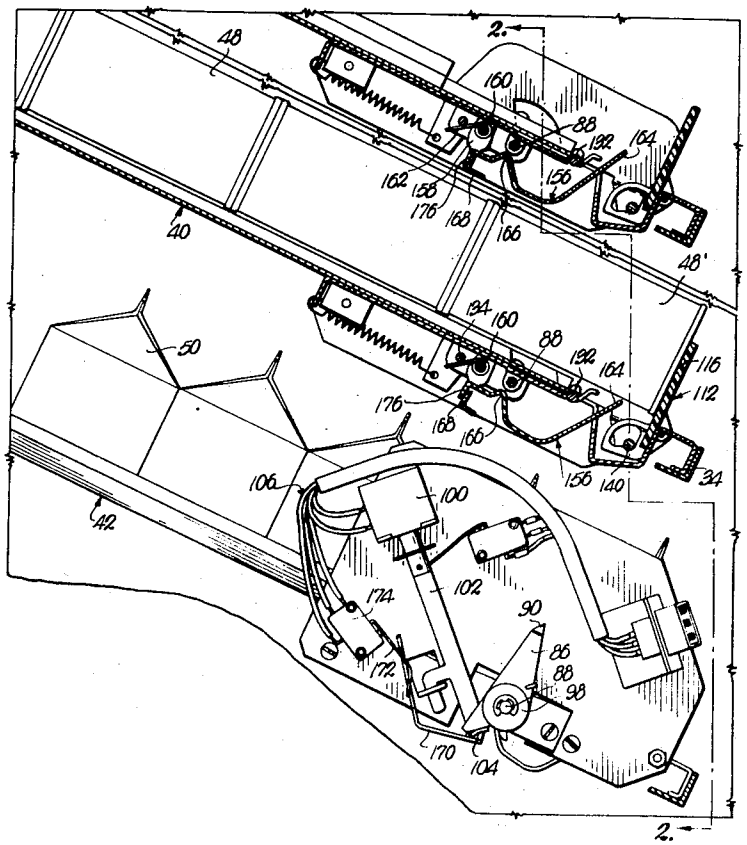
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[57] **ABSTRACT**

A slant-shelf type article dispensing or vending machine having a plurality of selectable shelves and adapted to dispense articles successively from various sections of any selected shelf is provided with improved structure for retaining and releasing articles from the sections of the shelves and for disabling particular shelves when a sold-out condition is sensed relative to any section of such shelf. The article retaining and releasing structure is normally locked against movement to release an article by external forces applied directly to an article-blocking member such as may occur during attempted pilferage, and means are provided for positively shifting the blocking member to an article-releasing position when authorized dispensing of an article is desired. The sold-out structure includes means for sensing the presence of an article in position to be dispensed for each section of each of the shelves and means for successively enabling only those sensing means associated with the particular section of each of the shelves from which an article is next to be dispensed.

5 Claims, 12 Drawing Figures



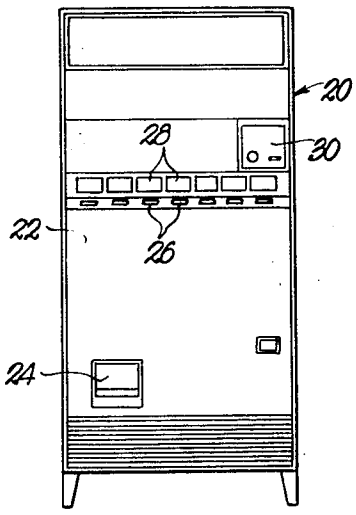


Fig. 1.

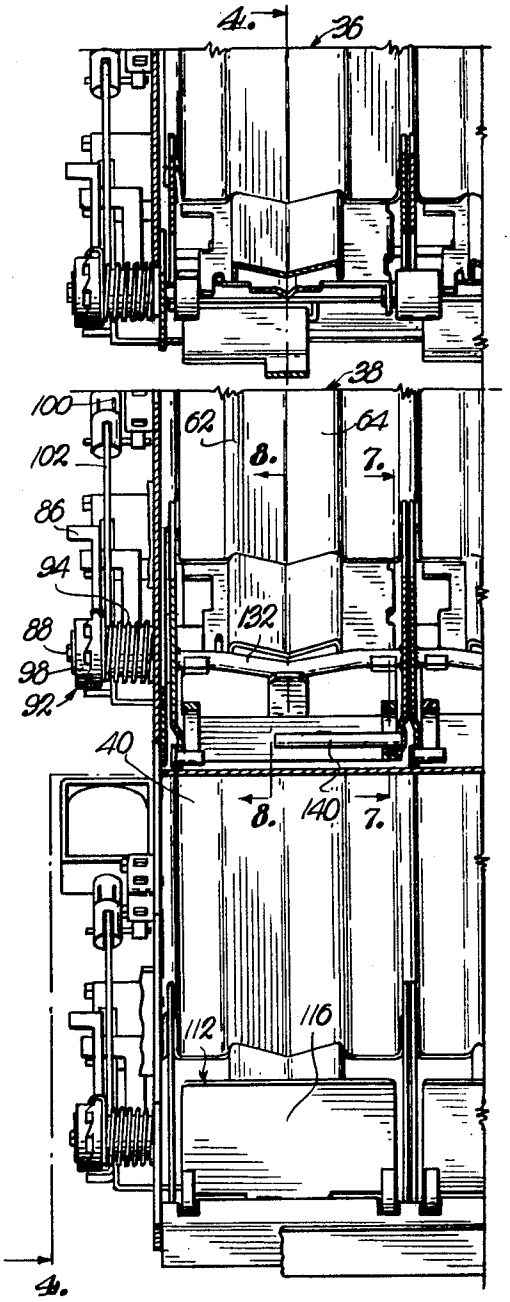


Fig. 2.

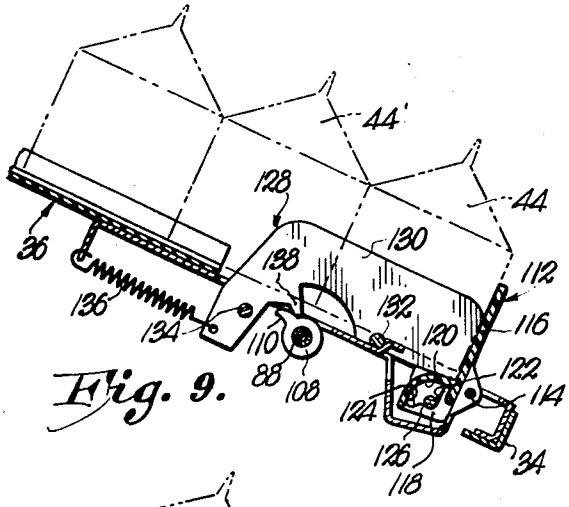


Fig. 9.

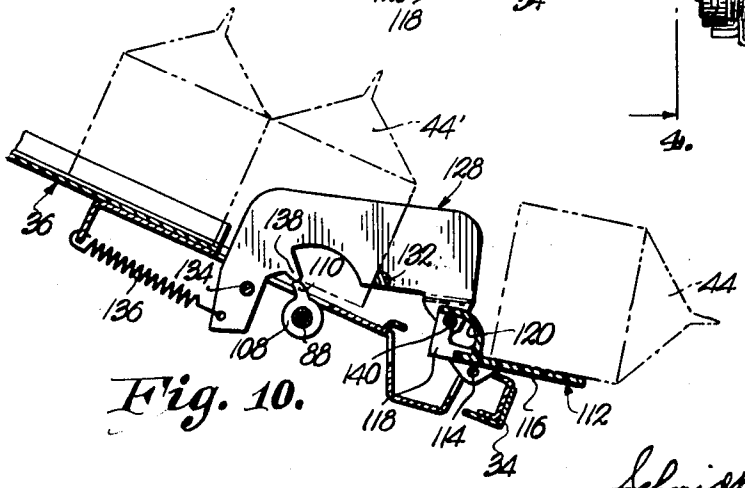


Fig. 10.

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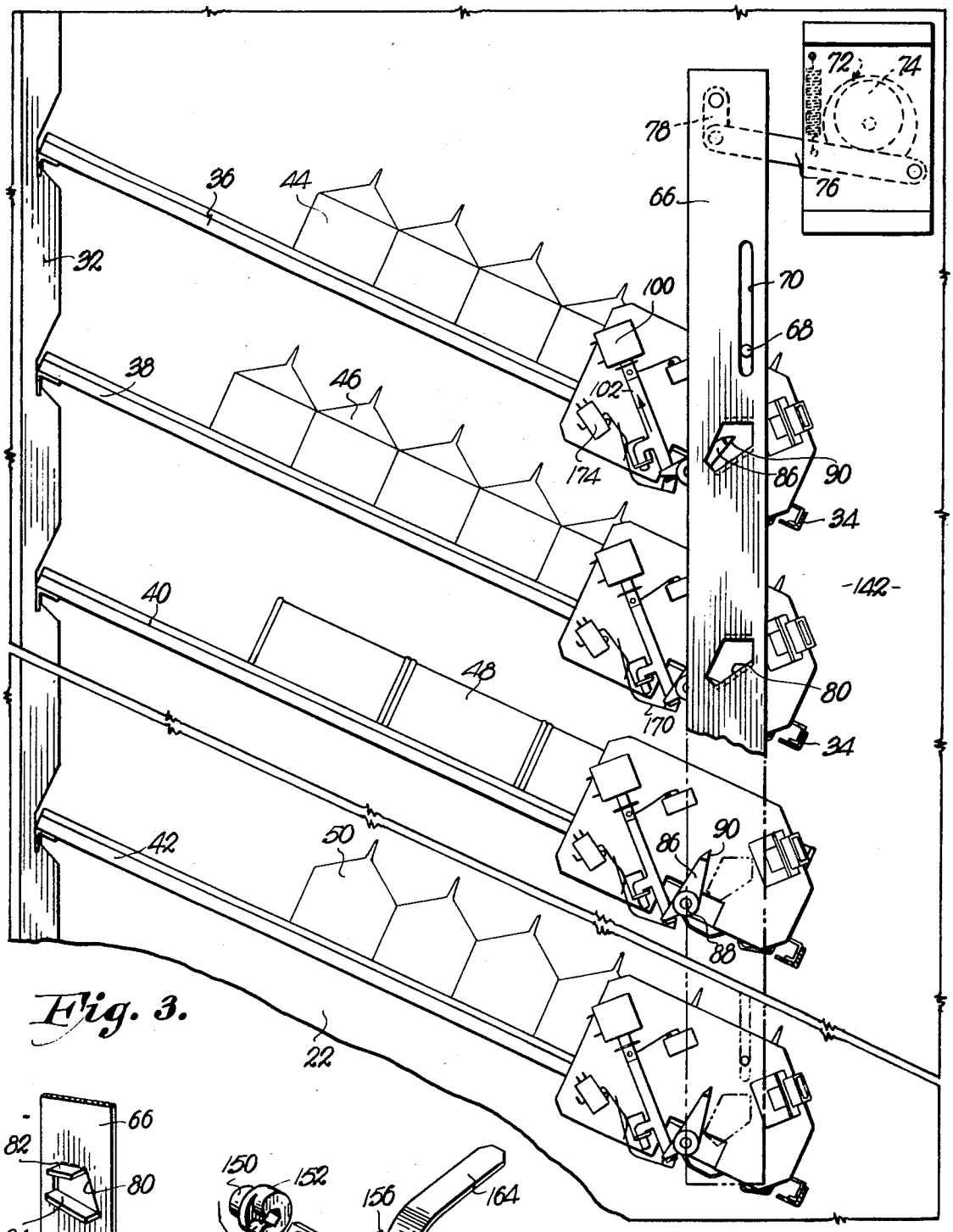


Fig. 3.

Fig. 11.

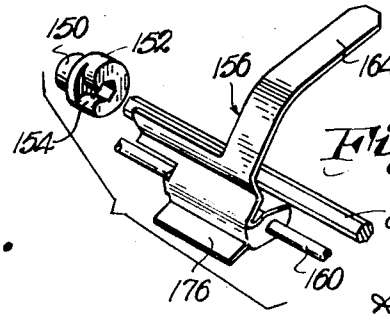


Fig. 12.

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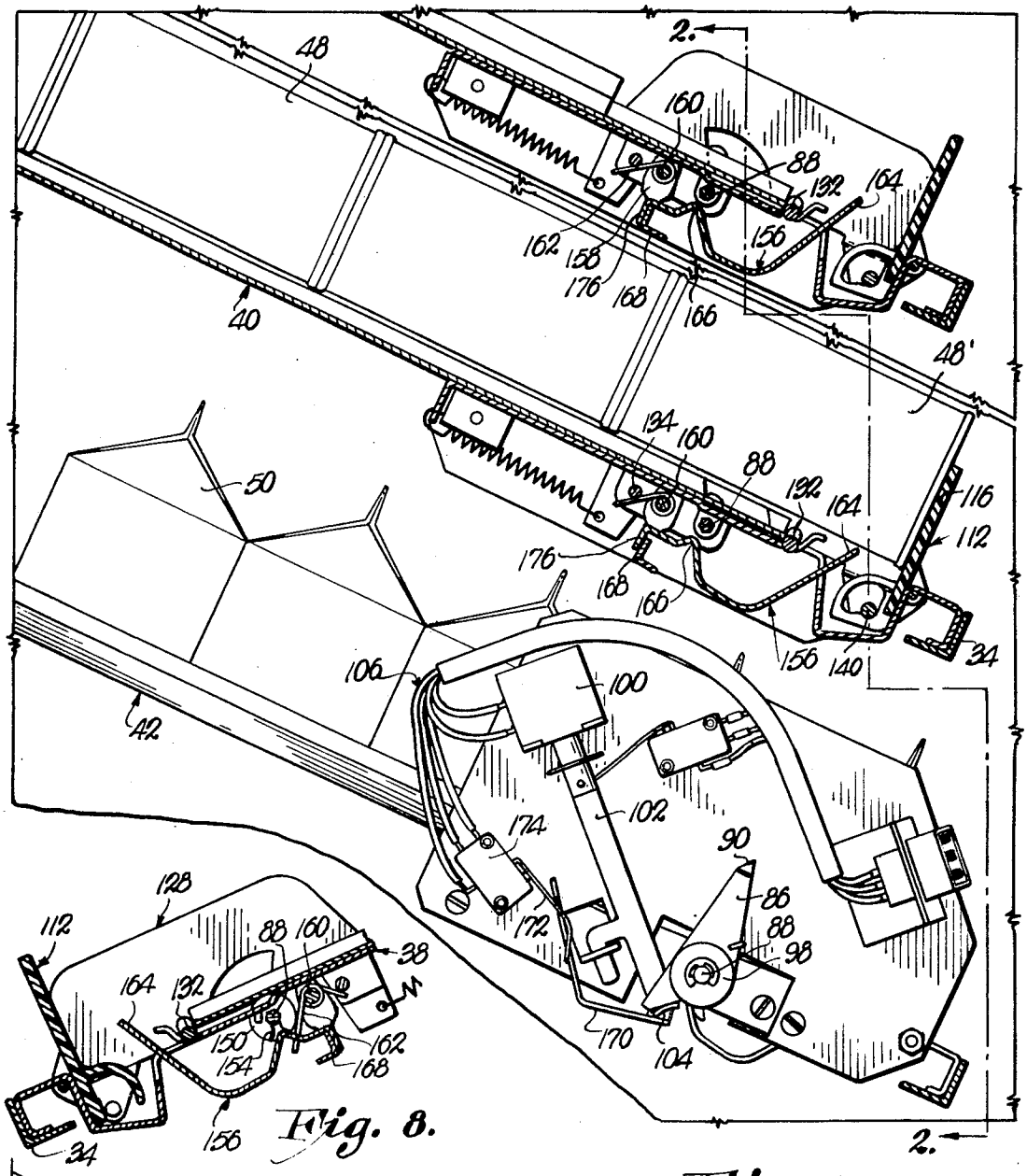


Fig. 4.

Fig. 8.

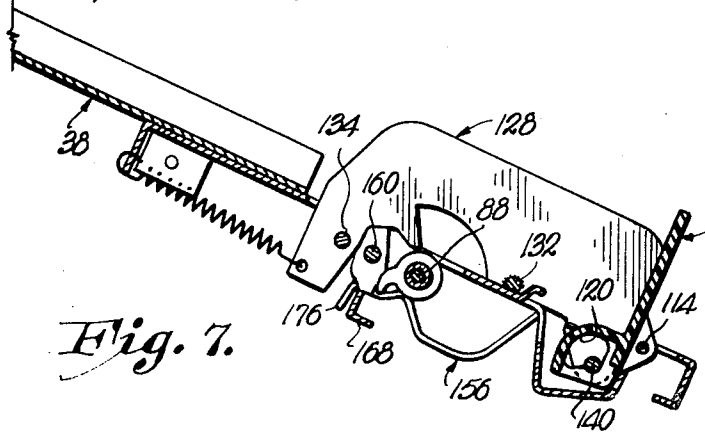


Fig. 7.

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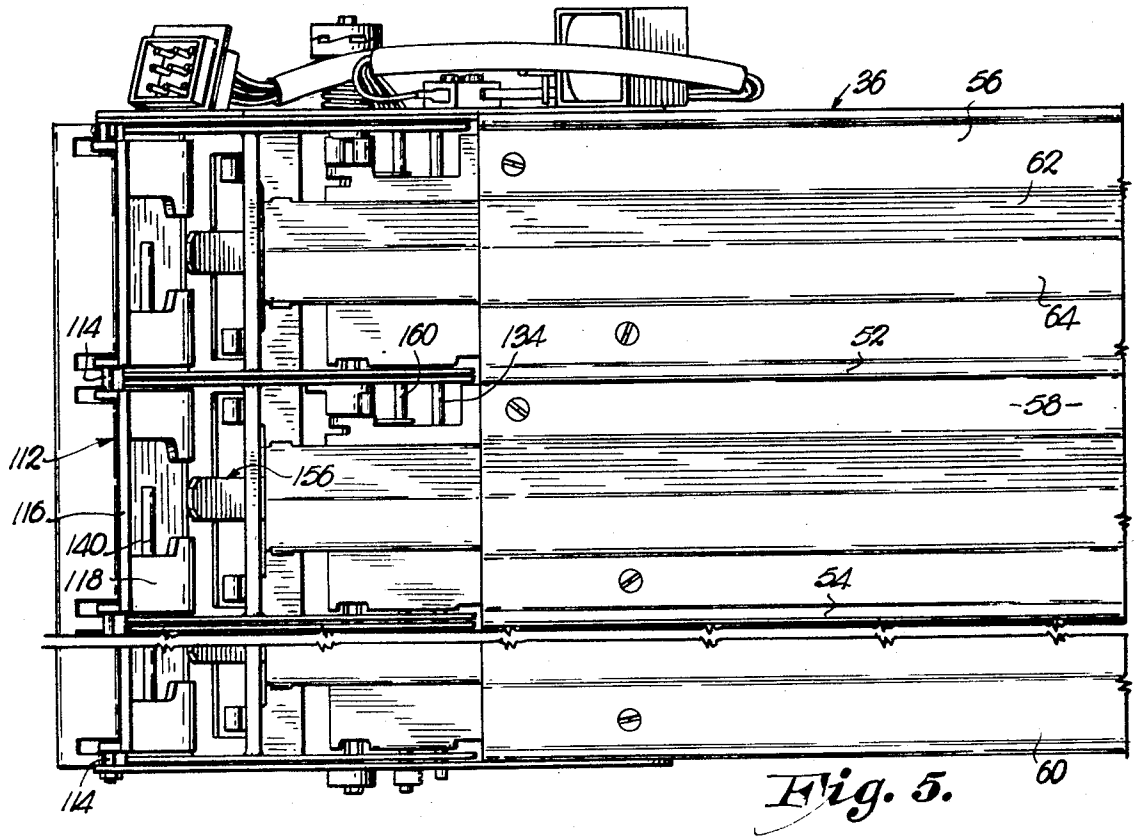


Fig. 5.

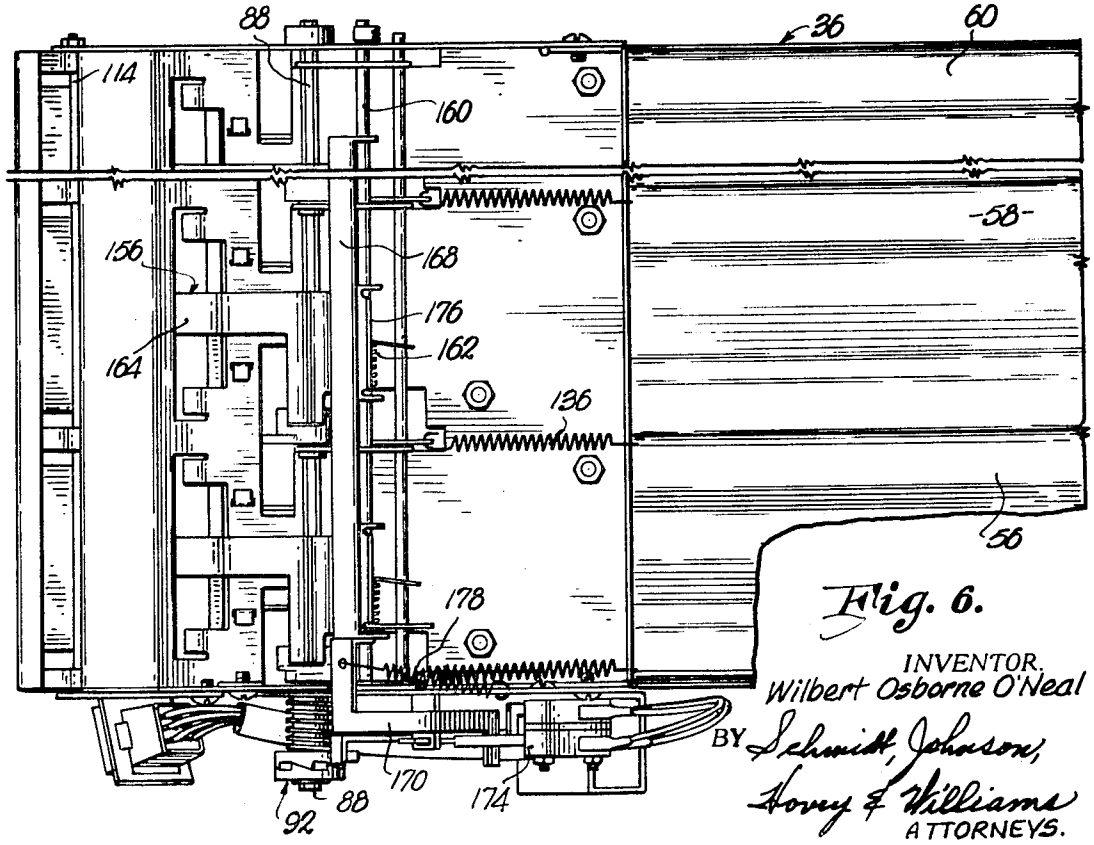


Fig. 6.

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INCLINED SHELF VENDING MACHINE

This invention relates to article dispensing or vending machines of the slant-shelf type and, more particularly, to improvements in the article retaining and releasing structure and the sold-out condition responsive control structure of such machines. An illustrative machine of the subject general class is disclosed in the copending application Ser. No. 884,811, now U.S. Pat. No. 3,627,172, of LeRoy D. Gore, Kermit W. Dyer, and Charles A. Moss, filed Dec. 15, 1969, and assigned to the same assignee as this application.

Prior article dispensing machines of the slant-shelf type have characteristically presented special problems in the provision of article retaining and releasing structure of the desired simplicity, reliability and resistance to pilferage attempts. Such problem has been increased by the circumstance that the articles to be dispensed normally advance to a position from which they may be released under the influence of gravity acting upon their own weight or, perhaps, some relatively weak internal biasing force to aid the effect of gravity in causing the articles to slide toward the lower discharge end of the article-supporting, slant-shelf assembly. In dealing with such problem, heretofore conventional machines have normally employed some sort of stop, which is often fixed, at the bottom of the inclined shelf, together with some mechanism for lifting or tipping the lowermost article over the stop for discharge from the shelf when desired. Such mechanisms have often proved unreliable under field conditions, as well as relatively susceptible to pilferage. Also, conventional article retaining and releasing mechanisms heretofore employed in this class of machine have been ill-adapted to handle articles of differing sizes and configurations without adjustment or even replacement of certain portions of the mechanism associated with each section of each shelf, depending upon the size and configuration of the articles to be handled.

In this class of machine, it has been conventional to provide structure for sensing the presence or absence of an article in position to be vended at each of the several sections of each shelf, which structure cooperates with the article retaining and releasing structure, as well as the article-selecting structure normally provided, in an effort to warn users of a sold-out condition that would prevent dispensing of an article from any particular shelf before that shelf has been selected. The sold-out structures heretofore employed for such purpose, however, have been subject to one of two disadvantages. Some of such structures provide warning of a sold-out condition only if there is no article in position to be dispensed from any of the several sections of a given shelf, which may result in abortive dispensing cycles in a pure dispensing machine or in cheating a customer in a vending machine equipped with coinage-responsive means for enabling the machine to perform a dispensing operation. Other sold-out mechanisms for such machines have provided for a sold-out warning for any given shelf upon sensing the absence of an article in position to be dispensed from any of the several sections of that shelf, which results in disabling such shelf at least prematurely and while there are other sections of such shelf from which articles could continue to be dispensed in the normal order of successive dispensing from the sections of that shelf before coming to a section of such shelf actually suffering from a fault condition.

Accordingly, it is the primary object of this invention to provide article-dispensing machines of the slant-shelf type incorporating improved structures for overcoming the abovementioned and other problems and disadvantages experienced with heretofore conventional constructions of such machines.

It is another important object of this invention to provide improved slant-shelf dispensing machines in which the article-blocking member forming a part of the article retaining and releasing mechanism is pivotally mounted adjacent the lower end of each article-receiving section of the shelves, and in which such member is shiftable during a dispensing operation from a normal article-blocking position to an article-releasing position permitting the lowermost article in the section to move across the shifted member under the influence of gravity for discharge to an article-access station.

It is another important object of the invention to provide such machines which include means for positively locking the shiftable article-blocking member in its normal article-retaining position until internal operating structure of the machine has been actuated, in order to frustrate pilferage attempts involving external forces being applied to the shiftable member in an effort to swing the latter to its article-releasing position other than by normal operation of the machine.

It is another important object of the invention to provide such a machine in which the operating structure for the shiftable blocking member includes an element serving the dual function of urging the lowermost article on to the member as it is shifted and simultaneously presenting a stop engageable with the next higher article for retaining all except the lowermost article on the shelf during an operation for dispensing such lowermost article.

It is another important object of the invention to provide such a machine in which each article-receiving section of every shelf is provided with independently operable feeler means for sensing the presence or absence of an article at the lowermost position of such section, together with means normally disabling the feelers associated with all sections of the shelves except the particular single section of each shelf from which an article is next to be dispensed during the normal order of dispensing articles successively from the various sections of each shelf.

It is another important object of the invention to provide such a machine in which the means for controlling enablement and disenablement of the sold-out condition sensing feelers is operably associated with, driven by the same forces as, and automatically synchronized with the means provided for controlling the dispensing of articles successively from the various sections of each shelf.

Still other important objects and advantages of the invention will hereinafter be made clear or become apparent to those skilled in the art from the disclosure of an illustrative, preferred embodiment of the invention.

In the drawings:

FIG. 1 is a front elevational view of the exterior of a typical slant-shelf type article dispensing or vending machine;

FIG. 2 is a fragmentary, front elevational view, internally of the machine, of a portion of several of the inclined article-supporting shelves and the drive and con-

trol structure associated therewith, taken on irregular line 2—2 of FIG. 4;

FIG. 3 is a fragmentary, side elevational view, interiorly of the machine, of several of the article-supporting shelves and their associated control and actuating structures;

FIG. 4 is a fragmentary view, partially in side elevation and partially in cross section, taken on irregular line 4—4 of FIG. 2;

FIG. 5 is a fragmentary, top plan view of a portion of one of the shelves;

FIG. 6 is a fragmentary, bottom plan view of a portion of one of the shelves;

FIG. 7 is an enlarged, fragmentary, cross-sectional view taken on line 7—7 of FIG. 2, showing the sold-out sensing mechanism in a disabled condition;

FIG. 8 is an enlarged, fragmentary, cross-sectional view taken on line 8—8 of FIG. 2, showing sold-out condition sensing mechanism in an enabled condition;

FIG. 9 is an enlarged, fragmentary cross-sectional view of the article retaining and releasing structure showing the shiftable retaining and releasing member in its article-blocking position and the operating means associated therewith in its standby condition;

FIG. 10 is a view similar to FIG. 9 except showing the article-releasing member and its associated operating means in an actuated condition for discharging an article;

FIG. 11 is an enlarged, fragmentary perspective view of a portion of the common drive bar assembly shown in FIG. 3, viewing the same from the opposite side thereof; and

FIG. 12 is an enlarged, fragmentary, exploded perspective view showing the feeler and cam parts of one of the sold-out sensing mechanisms.

Referring now initially to FIG. 1 of the drawings, an improved slant-shelf type vending machine illustrative of a preferred embodiment of the invention is generally designated **20**, having a cabinet **22** provided with an article-access opening **24**, a plurality of article selection buttons **26**, each having a sold-out condition indicator built therein, a plurality of selection identification windows **28**, and, if desired, a coin-receiving mechanism **30**.

Referring next particularly to FIG. 3, the cabinet **22** is internally provided with rear bracket means **32** and forward bracket means **34** for removably supporting a plurality of article-supporting shelves as at **36, 38, 40** and **42** at a forward incline sufficient for gravitational sliding movement of articles as at **44, 46, 48** and **50** toward the lowermost ends of the corresponding shelves. It will be understood that there is an article selection and sold-out indicating means **26** and a selection identification window **28** provided for and operably associated with each of the shelves **36, 38, 40** and **42**, and it will also be noted that the articles **44, 46, 48** and **50** respectively received and supported upon the various shelves **36, 38, 40** and **42** may be of differing sizes and shapes, as well as having contents of differing nature or flavor.

As best shown in FIGS. 5 and 6, each of the article-supporting shelves **36** etc. is provided with raised divider means as at **52** and **54** separating the shelf into a plurality of side-by side article-receiving sections **56, 58** and **60**, each of which is preferably provided with raised contour portions as at **62** and **64** for reducing friction between the shelf **36**, etc., and lines of articles **44** etc. slidably received and supported in a line upon each of the sections **56** etc.

Referring now back to FIG. 3, the machine **20** is provided with an upright actuating bar assembly **66** reciprocably mounted within the housing or cabinet **22** by any suitable means such as pins **68** and slots **70.** Provision is made for reciprocating the bar assembly **66** downwardly upon actuation of any of the selection buttons **26** to initiate a dispensing cycle by means of a motor **72** coupled with the bar **66** in any suitable fashion, as by an eccentric cam **74** driven by the motor **72,** a follower arm **76** engageable with the cam **74,** and a link **78** coupling the arm **76** with the bar **66.** The bar **66** is provided with a series of cutouts **80,** one for each of the shelves **36,** etc., presenting upper and lower laterally extending tabs **82** and **84,** as best shown in FIG. **11.**

Referring particularly to FIGS. **2, 3** and **4,** it will be seen that each of the shelves **36,** etc., is provided with an actuating crank **86** pivotally mounted on a shaft **88** and provided with a laterally extending stud **90.** Each of the cranks **86** is coupled with the corresponding shaft **88** by means of a ratchet mechanism **92** including a spring **94** biasing a toothed part **96** of the crank **86** toward a toothed wheel **98** rigidly carried on the shaft **88.** Each shelf **36,** etc., is also provided with a solenoid **100** adapted to be operated by a corresponding one of the selection buttons **26** and provided with an operating arm **102** having an end flange **104** adapted to engage and swing the corresponding crank **86** from its normal position through a limited arc to a position moving the stud **90** into the space between the corresponding tabs **82** and **84** of the bar **66** for engagement thereby when the bar **66** is moved. Those skilled in the art will appreciate that the solenoid **100** is conventionally coupled with the selection buttons **26** by electrical circuit means generally indicated at **106,** so that, upon actuation of a selection button **26,** and after proper coin deposit in the mechanism **30** in a vending machine, the solenoid **100** for the particular shelf **36,** etc., whose product has been selected, will be energized to swing the stud **90** of the corresponding crank **86** in a position for engagement by the upper tab **82** of bar **66** when the latter is reciprocated downwardly by action of the cam **74** on motor **72,** which is also energized by the initiation of a dispensing cycle pursuant to actuation of a selection button **26.** Downward movement of the bar **66** will rotate the crank **86** of the selected shelf **36,** etc., to ratchet and rotate the corresponding shaft **88** through a predetermined angular arc. The ratchet mechanism **92** is arranged so that each actuation of a crank **86** will rotate its shaft **88** through an angle substantially equal to 360° divided by the number of sections **56,** etc., provided in each of the shelves **36** etc.

Each shaft **88** has mounted thereon for rotation therewith a separate cam **108** for each section **56,** etc., of the corresponding shelf. Each cam **108** is provided with a raised contour portion **110** for controlling the article retaining and releasing structure hereinafter to be described, it being understood that the raised contour portions **110** of the various cams **108** on a given shaft **88** are angularly offset from each other by an angle substantially equal to the incremental rotation of the shaft **88** during each ratcheting thereof by the associated crank **86,** and the offsetting of such contours **110** is preferably done between each successively adjacent cam **108** on each shaft **88** to provide for successive

dispensing of articles from the successively adjacent sections **56**, etc., of any given shelf **36**, etc., the angular offset being such as to automatically return to the section **56** at one side of a shelf **36**, etc., for the next dispensing operation after an article has been dispensed from the section of the same shelf disposed at the opposite side of the latter. Thus, the offset cams **108** control the sequence of vending through the article retaining and releasing structure to be described in manner permitting successive discharge of the lowermost article from each of the sections **56**, etc., of a given shelf in turn, then returning to dispense the previously next lowest article of each of such sections of that shelf in turn until all articles from all sections of a given shelf have been dispensed responsive to repeated selections of that shelf for operation.

Referring now particularly to FIGS. **9** and **10**, a separate gate structure **112** is provided for each section **56**, etc., of each shelf **36** etc. and is pivotally mounted as at **114** on the article-supporting shelf means adjacent the lower end of a corresponding section thereof. Each gate structure **112** includes a normally upstanding blocking member portion **116** extending upwardly and forwardly from the pivotal axis **114** and the corresponding shelf into a normal article-blocking position where it is disposed for engagement by a lowermost article **44** of the line of articles slidably supported upon the corresponding section **56**, etc., of the particular shelf **36**, etc., for retaining such articles **44** against further gravitational movement downwardly of and off the lower end of such section. The article-retaining and releasing member **112** also includes a control portion **118** extending below the level of the pivotal axis **114** and provided with an internal cam surface **120** having a normally rearwardly facing face **122**, a rearwardly disposed face portion **124**, and a raised contour portion **126** therebetween.

An operating assembly **128** is provided for each of the article-retaining and releasing mechanisms **112** and includes a pair of spaced sidewalls **130** interconnected by a lifting and stop element **132** and pivotally mounted on the corresponding shelf **36** as at **134**. Each operating assembly **128** is normally yieldably held in the standby position illustrated in FIG. **9** by a spring **136**. Each operating assembly **128** is provided with a downwardly extending cam follower finger **138** adapted to cooperate with the corresponding cam **108** and be engaged by the raised contour portion **110** of the latter.

It will be understood that as the shaft **88** associated with a given shelf **36**, etc., is incrementally rotated for successive dispensing operations from the various sections of such shelf, the raised contour **110** of the cam **108** for each section will engage the follower portion **138** of the corresponding operating mechanism **128** to swing and raise the latter about the pivotal axis **134** from the standby position illustrated in FIG. **9** to the operated position shown in FIG. **10**. Affixed to at least one of the sidewalls **130** of each operating mechanism **128** is a lateral pin element **140** which extends into the internal cam surface **120** of the corresponding article-retaining and releasing gate mechanism **112**. When the operating mechanism **128** is in its normal standby position as illustrated in FIG. **9**, the pin **140** is disposed below the plane through the respective parallel pivotal axes **114** and **134** of the gate **112** and the operating mechanism **128**, and is normally directly engaged with the rearward face **122** of the internal cam surface **120** to positively hold the gate **112** against rotation in a clockwise direction as shown in FIG. **9**. As long as the operating assembly **128** remains in its standby position, the raised contour portion **126** of cam surface **120** is disposed behind the pin **140** to further prevent the gate **112** from being shifted from its article-blocking position by the application of external forces to the blocking member **116** during a pilferage attempt. As the operating assembly **128** is shifted to its operated position illustrated in FIG. **10** by the associated cam **108**, however, the pin element **140** moves up the face **122** and around to the rearward face **124** of cam surface **120** thereby positively raising the control portion **118** of the gate **112** to swing the blocking member **116** about the pivotal axis **114** to an article-releasing position extending forwardly and downwardly from the lower end of the corresponding section of the shelf.

As will be clear from FIG. **9**, as the operating assembly **128** commences to raise during operation thereof, the lifting and stop element **132** will engage the lower surface of the lowermost article **44** to tilt and urge the latter on to the upper surface of the shifted member **116** from which it will be discharged for travel by gravity along a chute space **142** (see:FIG. **3**) leading to the product access opening **24** in the cabinet **22**. As best shown in FIG. **10**, the lifting and stop element **132** also moves during operation of the assembly **128** into a raised position for engaging the front side of the next article **44'** to prevent further downward movement of the latter and articles thereabove toward the lower end of the shelf section until a further incremental rotation of the shaft **88** during a successive dispensing operation from the same shelf has shifted the cam portion **110** from engagement with the follower portion **138**, whereupon the operating assembly **128** will be returned to its normal standby position by action of the spring **136**. It will be noted that, as the operating assembly **128** returns to its normal standby position, the pin element **140** thereon rides across the contour **126** of cam surface **120** and returns into engagement with the cam face **122** to again positively lock the gate mechanism **112** in its article-blocking position until the next operation of the assembly **128** by its associated cam **108**.

Referring next particularly to FIGS. **4**, **7**, **8** and **12** wherein the improved sold-out mechanism of the invention is most clearly illustrated, it should first be noted that the shaft **88** for each of the shelves **36**, etc., is provided with a plurality of sold-out indication control cams **150** mounted thereon and rotatable therewith, there being a cam **150** for each of the sections **56**, etc., of each shelf. Each cam **150** has a major annular surface **152** and a minor concave contour **154**. The various cams **150** on the shaft **88** for a given shelf **36**, etc., are angularly offset thereon in manner similar to the above described offsetting of the operating cams **108**, except that the control cams **150** are so arranged that the concave contours **154** thereof will come into operative position as illustrated in FIG. **8** for that section **56**, etc., from which the next article dispensing operation on that shelf is to be performed and will be in such operative position prior to commencement of a dispensing operation from that section, rather than moving into its operative position during the cycle of dispensing from that section as is done with the raised contours **110** of the operating cams **108**. An article feeling finger **156** is provided for each section **56**, etc., of every shelf **36**, etc., and includes ears **158** pivotally mounting the

finger 156 on a shaft 160. Spring means 162 normally urges each finger 156 toward the enabled sensing position shown in FIG. 8 in which an extremity 164 of the finger extends upwardly above the level that would be occupied by a lowermost article in position to be dispensed from the corresponding section of the shelf. As indicated in connection with the middle shelf depicted in FIG. 4, a lowermost article 48' is in position engaging the blocking member 116 and ready to be dispensed, and such article 48' so engages the extremity 164 of the associated finger 156 as to swing the latter about the pivot shaft 160 to a position indicating the presence of the article 48' in a ready position. Each finger 156 is provided with an upturned follower portion 166 disposed to ride upon the surface of the corresponding cam 150.

While the follower portion 166 of any feeler finger 156 is riding upon the surface 152 of the corresponding cam 150, such feeler 156 will be held in the disabled position illustrated in FIG. 7, whether or not there is an article in the lowermost position ready to be dispensed from the corresponding section. During the dispensing operation from a preceding section, however, the cam 150 associated with the next section of the same shelf is rotated to a position aligning the concave contour 154 of such cam 150 with the raised follower portion 166 of the corresponding feeler 156, as shown in FIG. 8. This permits the finger extension 164 of such feeler 156 either to move to the raised position illustrated in FIG. 8 and in connection with the top shelf shown in FIG. 4, or to be held in its lower position by an article ready for dispensing as shown in connection with the middle shelf of FIG. 4. Thus, the cams 150 serve to automatically enable and disable the feelers 156, with only that feeler 156 associated with the section 56, etc., from which an article is next to be dispensed being enabled at any given time on each of the shelves 36 etc.

In order to accomplish a sold-out fault detection and indication when the absence of a properly positioned article is detected by an enabled feeler 156, each shelf 36 etc. is provided with an elongated member 168 common to the sections of a given shelf 36, etc., and also pivoted on the shaft 160 associated therewith (see: FIG. 6). The member 168 is provided at one end thereof with an arm 170 engageable with the operating lever 172 of a sold-out switch 174 common to all sections of that shelf and coupled by electrical circuit means as generally indicated at 106 with the sold-out indicating light associated with the selection buttons 26 for that shelf. The member 168 for each shelf 36, etc., is yieldably urged by a spring 178 (FIG. 6) toward a tab portion 176 provided on each of the feelers 156 associated with that shelf; thus, the members 168 are urged to rotate about the axes of shafts 160 in a clockwise direction as shown in FIGS. 4 and 7 and in a counterclockwise direction as shown in FIG. 8. FIG. 7 illustrates the relationship of the parts in connection with one of the sections 56, etc., which is not the next section of its shelf from which an article is next to be dispensed and presuming that there is no article in position ready for dispensing from the next section of that shelf from which a dispensing operation should occur. In FIG. 7, although there is no article at the lowermost portion of the section therein illustrated, it will be understood that the cam 150 of such section is holding the associated feeler 156 against swinging its finger 164 into the lowermost article position on the shelf. Such feeler 156 is, therefore, in its disabled condition in which no article sensing thereby occurs. Presuming that there is no article in the lowermost portion on the section of the shelf from which a dispensing operation is next to occur, however, the enabled feeler 156 of the last mentioned section will have swung to the position illustrated in FIG. 8 and in connection with the topmost shelf depicted in FIG. 4 and, as it did so, its tab 176 will have engaged and rotated the member 168 about the axis of shaft 160. Such rotation of the member 168 will operate the sold-out switch 174 through the arm 170 associated with the member 168, but the member 168 will have also moved to a position out of contact with the tab portion 176 of the disabled feelers 156 associated with that shelf, as illustrated in FIG. 7.

It will be understood, therefore, that the tab portion 176 of only that particular feeler 156 that is enabled at the moment may engage and move the member 168 to register a sold-out condition. The middle shelf shown in FIG. 4 illustrates the other common situation in which an enabled finger 156 is being held depressed by the presence of an article 48' in position ready to be dispensed from the corresponding section. In this situation, the tab portions 176 of all of the feelers 156 associated with the shelf will be in longitudinal alignment and the member 168 will be in its normal position urged thereagainst by the spring 178, it being noted that the tab portions 176 of all of the disabled feelers 156 of a given shelf are maintained in alignment by the action of the associated followers 166 upon the surfaces 152 of the associated cams 150, while tab portion 176 of the enabled feeler 156 will either be held in such alignment by the presence of a lowermost article in position to be dispensed or will swing out of such alignment to move and actuate the sold-out condition detecting member 168 as illustrated in FIG. 8 and in connection with the topmost shelf depicted in FIG. 4.

It should be apparent to those skilled in the art that the improvements contemplated and provided by the invention are well adapted to achieve the above-mentioned objects of the invention, as well as to provide simple, inherently reliable and economic structure for doing so. It should be further understood that minor changes of details of construction from those shown and described for illustrative purposes could be made by those skilled in the art in the light of the foregoing disclosure without departing from the true spirit of the invention. Accordingly, the invention should be deemed limited only by the fair scope of the claims that follow.

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

1. In an article dispensing machine:

article support means having a plurality of elongated, side-by-side, longitudinally inclined sections each adapted to receive a plurality of articles arranged in a line extending longitudinally of said section and to shiftably support said articles for movement toward and successive dispensing from the lower end of said section;

shiftable gate means adjacent the lower end of each of said sections movable between a blocking position for engaging and preventing further movement of the lowermost of said articles off the lower end of said section and an article-releasing position for dispensing said lowermost article from the lower end of said section;

shiftable operating means adjacent each of said gate means and movable between a normal standby position and an operated position;

locking and actuating means operably coupling each of said operating means with a corresponding one of said gate means for locking said gate means in its blocking position when the corresponding one of said operating means is in its standby position and for moving said gate means to its article-releasing position when the corresponding one of said operating means is moved to its operated position;

control means operably coupled with each of said operating means for moving each of said operating means to its operated position in a predetermined order of succession to normally dispense a lowermost article from the lower end of each of said sections in said successive order; and

article-sensing means adjacent the lower end of each of said sections respectively for sensing the presence or absence of a lowermost article in position to be dispensed, said control means including means for selectively enabling operation of only that one of said sensing means associated with the particular section whose operating means is next in said order to be operated and for disabling the remaining of said sensing means.

2. The invention of claim **1,** wherein there are a plurality of said support means one above the other and each provided with a plurality of said side-by-side sections, one each of said gate means, said operating means and said locking and actuating means for each of said sections, and one of said control means for each of said support means; there are means for selectively operating any of said support means to dispense an article therefrom, including a shiftable assembly common to said support means, means for shifting said assembly, and a plurality of coupling means for selectively coupling said control means of a selected support means with said assembly; there are means for sensing a fault condition involving the absence of a lowermost article in position to be dispensed in that section from which an article is next to be vended from each of said support means; and there are means responsive to each of said sensing means for disabling said coupling means for the corresponding support means whenever a fault condition is sensed.

3. The invention of claim **2,** wherein each of said support means is provided with individual visual display means coupled with said fault detecting means for that support means for warning users against selecting an article for dispensing from that particular support means only when no lowermost article is in position to be dispensed from the next to be operated section of that support means despite possible absence of a lowermost article in position to be dispensed from other sections of that support means.

4. In an article dispensing machine;

article support mans having a plurality of elongated, side-by-side, longitudinally inclined sections each adapted to receive a plurality of articles arranged in a line extending longitudinally of said section and to shiftably support said articles for movement toward and successive dispensing from the lower end of said section;

shiftable gate means adjacent the lower end of each of said sections movable between a blocking position for engaging and preventing further movement of the lowermost of said articles off the lower end of said section and an article-releasing position for dispensing said lowermost article from the lower end of said section;

shiftable operating means adjacent each of said gate means and movable between a normal standby position and an operated position;

locking and actuating means operably coupling each of said operating means with a corresponding one of said gate means for locking said gate means in its blocking position when the corresponding one of said operating means is in its standby position and for moving said gate means to its article-releasing position when the corresponding one of said operating means is moved to its operated position;

control means operably coupled with each of said operating means for moving each of said operating means to its operated position in a predetermined order of succession to normally dispense a lowermost article from the lower end of each of said sections in said successive order; and

article-sensing means adjacent the lower end of each of said sections respectively for sensing the presence or absence of a lowermost article in position to be dispensed, said control means including means for selectively enabling operation of only that one of said sensing means associated with the particular section whose operating means is next in said order to be operated and for disabling the remaining of said sensing means,

said article-sensing means each including a shiftable feeler adapted to engage and be held in a normal position by the presence of a lowermost article in position to be dispensed but to shift to a fault condition indicating position in the absence of a lowermost article thereat,

said control means including a rotatable shaft common to said sections and having a separate fault indication control cam for each section respectively engageable with said feeler for that section, each of said control cams having a first contour portion for enabling the corresponding feeler for shifting into its fault indicating position and a second contour portion for holding said feeler against said shifting and in its normal position whether or not a lowermost article is present in position to be dispensed, said first contour portions of said control cams being angularly offset from each other for successive enabling of each of said sensing means only when its associated operating means is next in said order to be operated.

5. The invention of claim **4,** wherein is provided fault detecting means common to said feelers and operably coupled therewith for detecting shifting movement of any of said feelers from its normal to its fault indicating position.

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