Jan. 9, 1962 C. L. CASEY ET AL 3,016,165

ARTICLE VENDING MACHINE

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Fig. 1

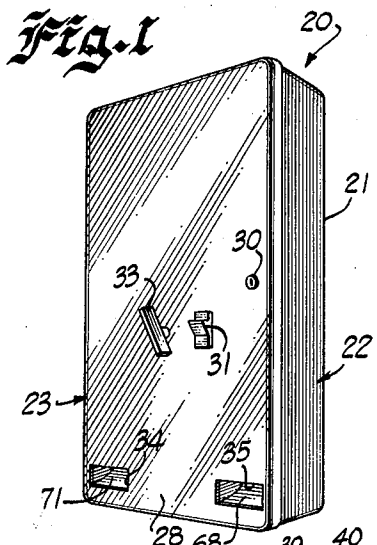


Fig. 3

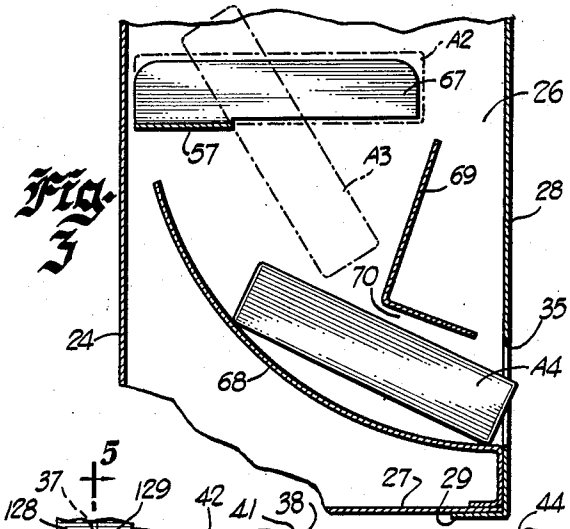
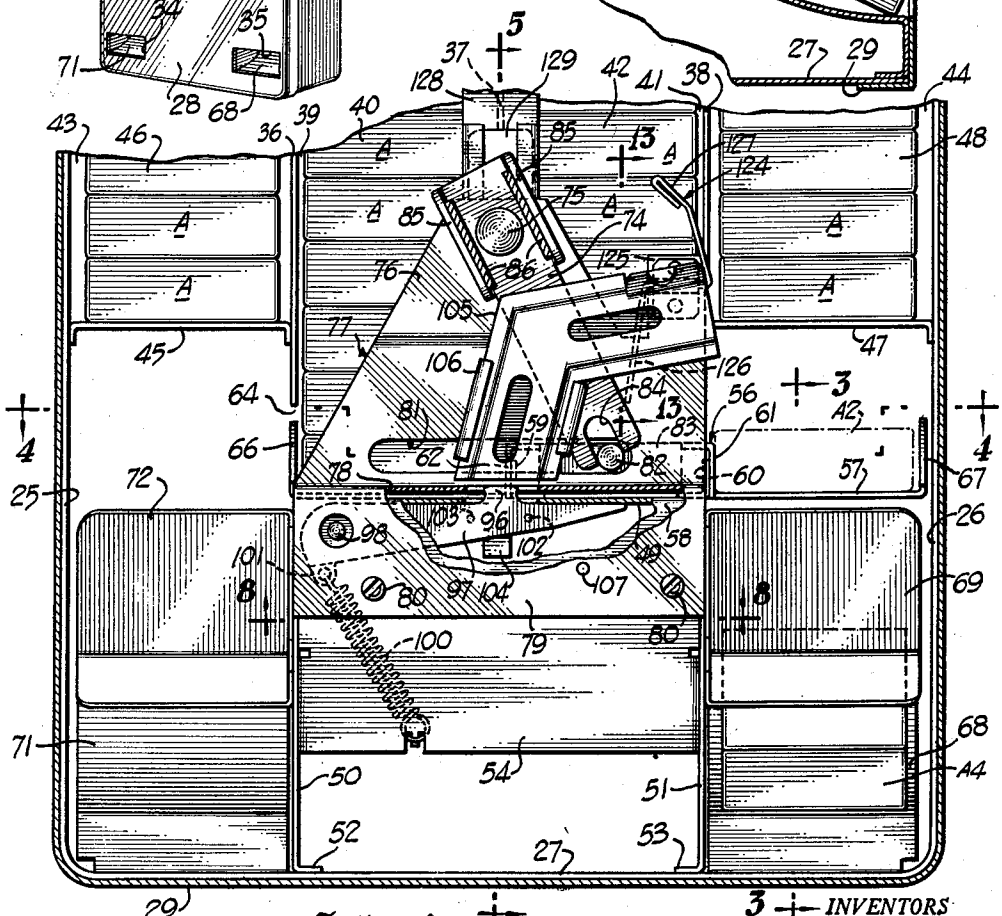


Fig. 2



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Fig. 4

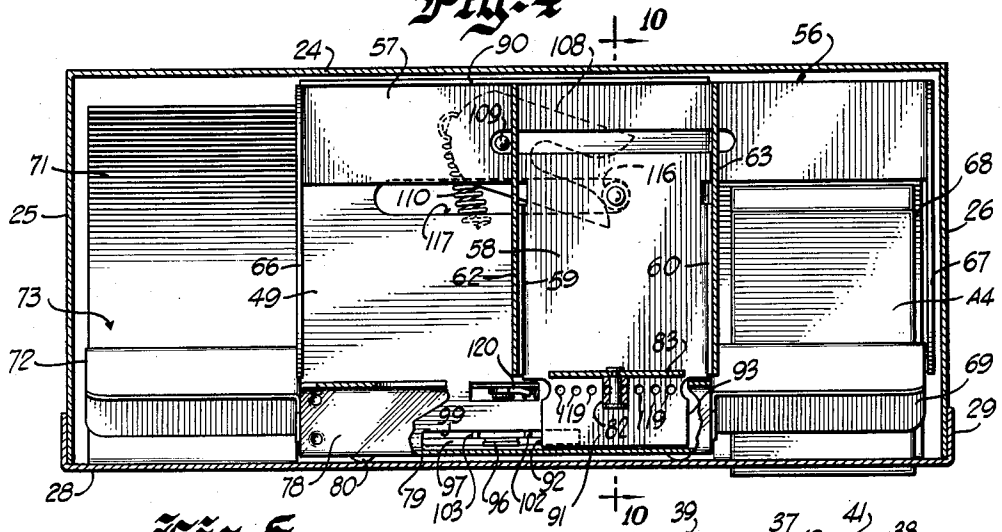
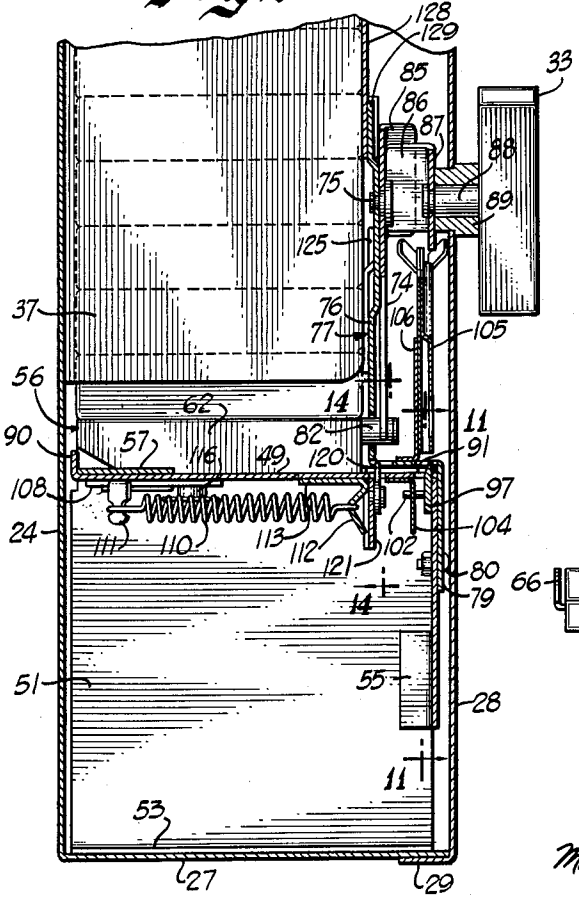


Fig. 5



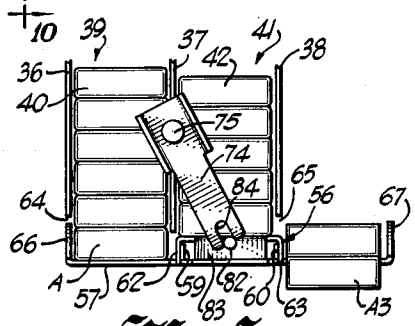


Fig. 6

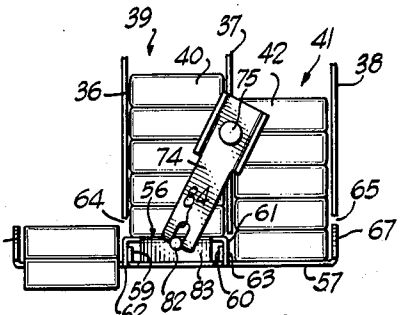


Fig. 7

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ARTICLE VENDING MACHINE

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Fig. 8

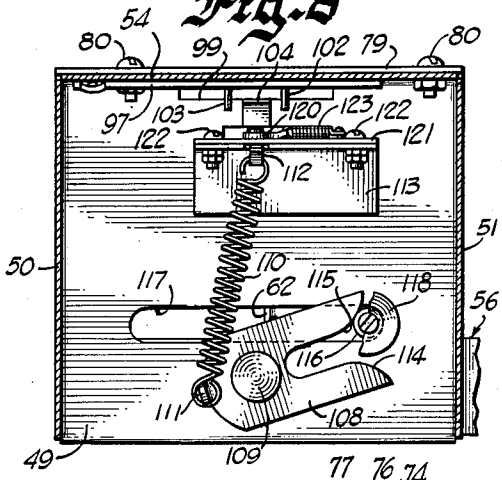
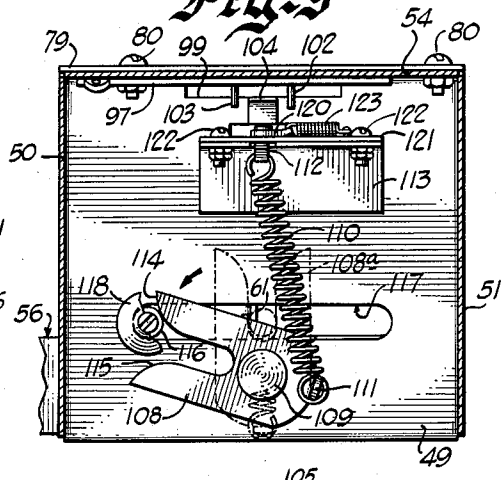


Fig. 9



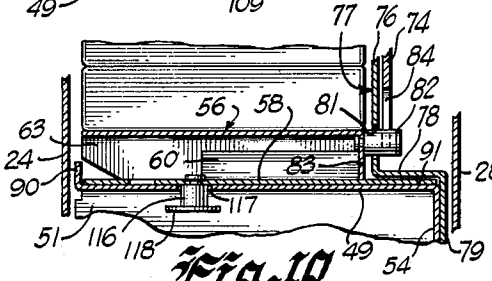


Fig. 10

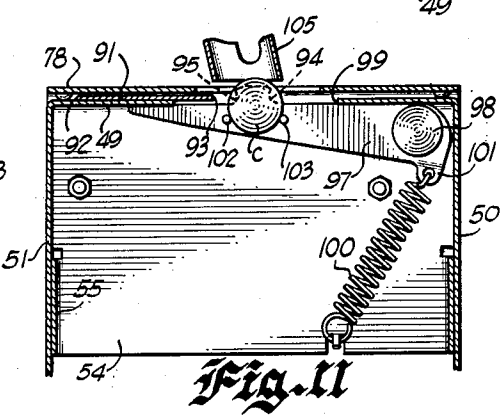
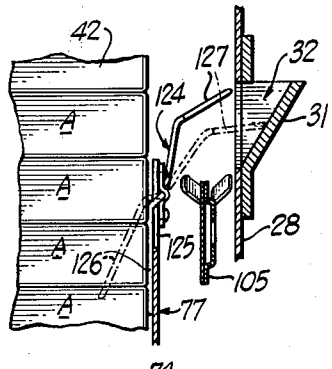


Fig. 11

Fig. 13



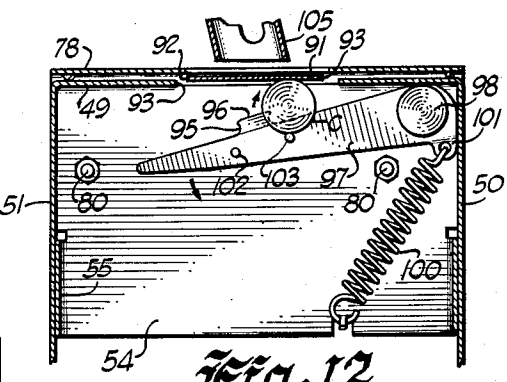


Fig. 12

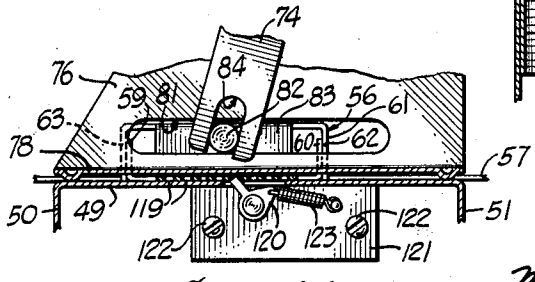


Fig. 14

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3,016,165

ARTICLE VENDING MACHINE

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Filed Sept. 26, 1958, Ser. No. 763,674
1 Claim. (Cl. 221—116)

This invention relates in general to vending machines, and more particularly to a machine for dispensing cartoned goods, and still more particularly to a coin operated vending machine which dispenses an article on tender of a coin by the purchaser to a coin slot of the machine and appropriate manipulation of an operating handle.

Coin operated vending machines for dispensing cartoned goods as heretofore known have been complicated in structure, expensive to manufacture, of low capacity, and susceptible to being tampered with and looted. Moreover, vending machines in the past have been subject to being rendered inoperative by jamming of merchandise within the machine.

The vending machine of the present invention overcomes the above difficulties and enables quick and efficient vending of cartoned goods, while eliminating the common problem of the non-operative machine due to jamming of merchandise, and is completely foolproof against tampering. In addition, the machine of the present invention is capable of having a large capacity, and is extremely simple in construction and may be economically manufactured.

The vending machine that comprises this invention includes a housing or cabinet having a pair of spaced openings through which articles may be dispensed. A magazine is arranged in the cabinet and adapted to support a double stack of cartoned articles in side-by-side relationship. Openings are provided in the magazine through which articles may be ejected to dispensing chutes which connect with the openings in the cabinet. An ejector is provided for ejecting the lowermost article of one of these stacks to a position where it may be gravity fed to the dispensing opening in the cabinet. Subsequently, the lowermost article from the other stack is dispensed from the cabinet on the next stroke of the operating handle. The dispensed articles are delivered to the operator of the machine upon tender of the proper coin to the coin slot of the machine and manipulaton of a handle affixed to the outside of the cabinet. The coin assumes a direct part in the operation of the machine in defining a camming surface that serves to release a lock mechanism normally maintaining the ejector in one position. Means in the form of guard bars are provided on the ejector for closing the magazine opening opposite to the opening through which an article is ejected. Moreover, means is provided on the ejector for movement therewith which closes the opening through which an article is ejected after that article has been ejected therethrough. In addition, mechanism is provided which prevents movement of the ejector in a direction which would jam the merchandise in the machine after it has initiated a stroke to dispense an article from the magazine, as well as mechanism for assisting in movement of the ejector after it has been advanced through part of the ejecting stroke.

It is therefore an object of this invention to provide a vending machine that is simple in construction in that it has a relatively small number of parts, and may be economically manufactured.

Another object of this invention resides in the provision of a vending machine for dispensing cartoned goods one at a time that is foolproof against jamming of merchandise that would render it inoperative.

Still another object of this invention is in the provision

of a vending machine that is foolproof against tampering.

A further object of this invention is to provide a vending machine having a large capacity for cartoned articles, wherein the magazine holds a double stack of articles and alternately dispenses the lowermost article from one of the stacks.

A still further object of this invention resides in the provision of a vending machine including a magazine having openings through which articles may be ejected from a double stack arrangement, wherein means is provided on the ejector for closing the opening opposite to the opening through which an article is being ejected.

Another object of this invention is to provide a vending machine having a magazine adapted to support a double stack of articles in side-by-side relationship, and an ejector for ejecting the lowermost article of each stack alternately through an adjacent opening in the magazine, wherein means is provided on the magazine to close the opening opposite to the opening through which an article is being ejected and to close the opening through which an article is ejected after the ejection operation.

Still another object of this invention is in the provision of a vending machine including a magazine adapted to support a double stack of articles in side-by-side relationship and having a pair of openings through which articles may be alternately ejected, wherein means is provided to assist in the operation of the ejector and to prevent return of the ejector after an ejection stroke has been initiated.

Other objects, features, and advantages of the invention will be apparent from the following detailed disclosure, taken in conjunction with the accompanying sheets of drawings, wherein like reference numerals refer to like parts, in which:

FIG. 1 is a perspective view of the vending machine according to the invention;

FIG. 2 is an enlarged front view of the vending machine internal operating components with the cover broken away;

FIG. 3 is a transverse sectional view, taken substantially along line 3—3 of FIG. 2, illustrating the dispensing chute between the cabinet opening and the ejector dispensing position;

FIG. 4 is a transverse sectional view, taken substantially along line 4—4 of FIG. 2;

FIG. 5 is a sectional view, taken substantially along line 5—5 of FIG. 2;

FIG. 6 is a schematic view illustrating the ejector in one position;

FIG. 7 is a schematic view similar to FIG. 6 but illustrating the ejector in another position;

FIG. 8 is a bottom plan view of certain of the detailed mechanism, taken along line 8—8 of FIG. 2, and with certain parts eliminated for purposes of clarity;

FIG. 9 is a view similar to FIG. 8 but showing the parts in another position;

FIG. 10 is a sectional view, taken substantially along line 10—10 of FIG. 4 and looking in the direction of the arrow;

FIG. 11 is a vertical sectional view, taken substantially along line 11—11 of FIG. 5;

FIG. 12 is a view similar to FIG. 11 with the coin lever in down position;

FIG. 13 is a vertical sectional view and with some parts fragmentary, taken along line 13—13 of FIG. 2 and illustrating the mechanism for closing the coin slot when the magazine is empty; and

FIG. 14 is a vertical sectional view, taken substantially along line 14—14 of FIG. 5 and looking in the direction of the arrow.

Referring now to the drawings and particularly to FIG. 1, the article vending machine, according to the present invention, is generally designated by the numeral

20 and includes an enclosure or cabinet 21. The cabinet includes rear section 22 and a front or cover section 23 which constitutes a rectangular box-shaped cabinet. The rear section includes back panel 24, side panels 25 and 26, FIG. 4, a bottom panel 27, and a top panel parallel spaced from the bottom panel but not specifically illustrated.

The rear section 22 is closed by the cover section 23 which includes a front panel 28 and a peripheral flange 29 that completely telescopes over the entire peripheral edge at the open side of the rear section 22. A key operated lock 30, FIG. 1, is provided to lock the cover section 23 on the rear section 22. The vending machine 20 may be mounted on a wall by means of screws or other fasteners arranged to secure the back panel 24 against a wall, or it may be mounted on a stand if desired.

The front panel 28 of the cover section 23 is provided with a coin slot plate 31, FIGS. 1 and 13, having a coin slot 32 for receiving a coin deposited by the operator, a handle 33 to be manipulated by the operator in operation of the machine, and a pair of spaced openings 34 and 35 through which articles may be dispensed upon operation of the machine. The openings are arranged at the lower corners of the front panel 28 as seen in FIG. 1.

A magazine is provided within the cabinet 21 which is capable of receiving a double stack of articles in side-by-side relationship, and this magazine includes vertically spaced partitions or walls 36, 37 and 38, FIG. 2, each of which is secured to the rear panel 24 and projects toward the front panel 28. Between the partitions 36 and 37, the magazine chamber 39 is defined for receiving a stack of articles 40, while the partitions 37 and 39 define therebetween a magazine chamber 41 for receiving a second stack of articles 42. The individual articles may be designated by the letter A. The forward edges of the partitions 36, 37 and 38 terminate in spaced relationship from the cover panel 28 to provide room for operating mechanism. In addition to the magazine chambers, storage chambers 43 and 44, FIG. 2, are defined between the side panel 25 and the partition 36, and the partition 38 and the side panel 26. A supporting plate 45 extends between the partition 36 and the side panel 25 and is secured thereto for supporting a stack of articles 46 in the storage chamber 43. Similarly, a horizontally extending supporting plate 47 extends between the partition 38 on the side panel 26 for supporting a stack of articles 48 in the storage chamber 44. Thus, the vending machine of the present invention includes storage capacity which increases the usefulness and desirability of the machine.

The lowermost article in at least one of the stacks is always supported by the bottom 49 of the magazine chambers 39 and 41. This bottom is spaced inwardly from the bottom panel 27 of the cabinet and supported by means of a pair of parallel spaced legs 50 and 51 that have inwardly directed flanges 52 and 53, respectively, FIG. 2, resting on the bottom panel 27 of the cabinet. A forwardly arranged vertical mounting plate 54 extends downwardly from the forward edge of the magazine bottom 49 and is provided with a pair of flanges 55 bent at right angle thereto which may be secured to the inner surfaces of the opposed legs 50 and 51.

The articles from the stacks 40 and 42 are removed one at a time from the magazine chambers 39 and 41 by means of an ejector, generally designated by the numeral 56, wherein the ejector is arranged to alternately eject the lowermost article from each of the stacks. The ejector includes an elongated, rectangularly-shaped base plate 57, FIG. 4, capable of spanning the magazine chambers 39 and 41 and the area between one of the partitions 36 and 38 and the outer side panel of the cabinet. Projecting forwardly of the base plate 57 is a rectangular section 58 having upwardly directed flanges 59 and 60 which extend parallel to each other. The base plate 57 is sized to be arranged at the rear portion of the underlying magazine bottom 49.

An inverted U-shaped member 61 having downwardly bent flanges 62 and 63 is secured to the section 58 of the ejector whereby the flanges 62 and 63 are telescopically received on the flanges 59 and 60 and secured thereto as most clearly seen in FIGS. 2, 6 and 7. The upper surface of the U-shaped member 61 serves to support the lowermost article in one of the stacks, while the flanges 62 and 63 define pushers for ejecting articles from the stacks. For example, the flange 63 will eject articles from the stack 42 upon reciprocation of the ejector 56 toward the right as viewed in FIGS. 6 and 7, while the flange 62 will eject the lowermost article from the stack 40 when the ejector is reciprocated to the left. Thus, reciprocation of the ejector effects ejecting alternately the lowermost article from each of the stacks.

The partitions 36 and 38 terminate upwardly from the magazine bottom 49 a distance slightly greater than the thickness of a single article A and define opposed magazine openings 64 and 65 through which articles are ejected from the magazine. In order to prevent tampering and removal of articles without operating the ejection mechanism, tamper guards 66 and 67 are mounted on the ejector and movable therewith to respectively close the magazine openings 64 and 65 during reciprocation of the ejector. Each tamper guard is in the form of an upstanding plate having a height slightly less than the magazine openings and a length substantially equal to the opening, and is integrally attached to the base plate 57 as seen in FIG. 4. Thus, during the stroke of the ejector 56 to the right as viewed in FIG. 6, the lowermost article A of the stack 42 will be ejected by the pushing section 63 to dispensing position through the opening 65, while the tamper guard 66 closes the opening 64 of the magazine chamber 39. Similarly, when the ejector 56 is stroked toward the left in FIG. 7, the pushing section 62 of the ejector will eject the lowermost article A from the stack 40 through the opening 64 of the magazine chamber 39, while the tamper guard 67 will close the opening 65 of the magazine chamber 41. On the other hand, the pushing sections 62 and 63 respectively close the openings 64 and 65 through which an article has been ejected after the ejection operation. The middle partition 37 terminates above the magazine bottom by a distance slightly greater than the height of the inverted U-shaped member 61, thereby permitting passage of the inverted U-shaped member between the magazine chambers 39 and 41, but preventing the transfer of articles between the two chambers. Accordingly, it is seen that it is impossible to remove an article from either of the chambers without stroking the ejector 56.

The ejector 56, in one of the eject positions, as seen in FIGS. 3 and 6, initially moves the lowermost article from the magazine chamber 41 to the position A, FIG. 3, where the forward end of the article, being unsupported, will fall down to the position as seen by the article A3. When the article reaches the full eject position as seen in FIG. 6, only the back end of the article will be supported by the base plate 57 of the ejector, thereby permitting the article to pivot on the forward edge of the base plate and topple down onto an arcuately-shaped guide plate 68 which coacts with a reverse L-shaped plate 69 to define a chute 70 leading to the cabinet opening 35 in the front panel 28. The articles then will be gravity fed downwardly to the point shown by the article A4, FIG. 3, whereby the operator can reach through the opening and grasp the article and remove it from the machine. The chute guide 68 and the plate 69 may be secured to the leg 51 of the inside framework. Similarly, when the ejector ejects an article from the magazine chamber 39, it will drop and be guided to the opening 34 by means of a guide plate 71 and a reverse L-shaped plate 72 defining a chute 73. Similarly, the plates 71 and 72 may be secured to the leg 50 of the inside framework.

The ejector 56 is stroked or reciprocated by means of an actuating lever 74 pivotally mounted on a pin 75 se-

cured to an upstanding portion **76** of a mounting plate **77**, FIG. 2. The mounting plate **77** includes a forwardly bent, generally horizontal section **78** extending from the lower end of the upstanding section **76**, FIG. 10, and in spaced relationship from the magazine bottom **49**. A second upstanding portion **79** extends downwardly from the forward edge of the horizontal portions **78** and lies against the mounting plate **54**. Fasteners **80**, FIG. 2, secure the portion **79** to the mounting plate **54** and thus the entire mounting plate **77** to the framework within the cabinet. A horizontally extending slot **81** is formed in the upstanding section **76** of the mounting plate **77** to receive a roller **82** extending from a vertical panel **83** bent downwardly at the forward end of the inverted U-shaped member **61** of the ejector. The free end of the actuating lever **74** is provided with an open-ended slot **84** which slidably receives the roller **82** on the ejector, whereby swinging or oscillating movement of the actuating lever **74** reciprocates the ejector **56** between its opposite ejecting positions.

The upper end of the actuating lever **74** is provided with a pair of forwardly extending fingers **85** which receive between their opposite inner faces a pair of fingers **86** connected to a plate **87**, FIGS. 2 and 5. The plate **87** is secured on the end of a shaft **88** journaled in a bearing **89** mounted on the front panel **28** of the cover. The shaft **88** is also connected to the handle **33**, whereby oscillation of the handle **33** will effect oscillation of the actuating lever **74** through the driving fingers **85** and **86**.

The ejector **56** is slidably guided along the magazine bottom **49**, wherein the rear edge of the base plate **57** is prevented from moving rearwardly in the cabinet and along the magazine bottom **49** by means of an upturned guide plate **90**, FIGS. 4, 5 and 10, and the ejector is prevented from moving any substantial distance forwardly of the magazine bottom by means of an extension **91** integral with the rectangular section **58** of the ejector, FIG. 4 and FIG. 5. The extension **91** is slidably guided between the forward edge of the magazine bottom **49** and the horizontal section **78** of the mounting plate **77** thereby holding the front end of the ejector down against the magazine bottom. The forward edge of the extensions **91** cannot move forwardly any further than the upstanding portions **79** of the mounting plate **77**. In addition, the roller **82** prevents upward movement of the ejector by being received in the slot **81** of the mounting plate **77**. And with removal of the cover **23**, the fingers **86** carried thereby separate from the fingers **85** of the actuating lever **74** to permit removal of the cover from the cabinet and access thereinto.

The extension **91** also coacts with the coin mechanism to lock the ejector **56** in either of the ejecting positions, wherein opposing edges **92** and **93** of the extension may respectively engage the edges **94** and **95** of a stop **96** on a pivotally mounted lever **97**. The coin lever **97** is pivotally mounted on a pin **98** at the back side of the mounting plate **54**, FIGS. 11 and 12. A longitudinally extending slot **99** is provided in the magazine bottom **49**, FIG. 4, to receive the stop **96** so that it extends above the plane of the magazine bottom **49** and normally in the path of the ejector extension **91**.

A spring **100** is fastened at one end to the mounting plate **54** and at the other end to an arm **101** of the lever **97**, FIGS. 11 and 12, to normally bias the lever into the position shown in FIG. 11 where the upper edges of the lever abut against the under side of the magazine bottom **49**. And in this position, the stop **96** extends above the plane of the magazine bottom **49** and in the path of the ejector extension **91** so that it prevents stroking or reciprocation of the ejector.

A coin pocket is defined in the coin mechanism by pins **102** and **103** projecting laterally from the coin lever **97**, the lever **97** itself, and a plate **104** depending from the under side of the magazine bottom **49**, FIG. 5, whereby a coin may be received as seen in FIG. 11.

The coin C, when received in the coin pocket of the coin mechanism as seen in FIG. 11, serves to take the place of the stop **96** and the stop edge **95** while serving as a cam member during stroking of the ejector, whereby the edge **93** of the ejector extension **91** engages the rounded edge of the coin C and transmits a force through the coin which forces the coin mechanism lever **97** downwardly, FIG. 12. The coin C as seen in FIG. 12 is rolled over the pin **103** on the lever **97** and ultimately permitted to drop downwardly into a coin box or the like. Once the coin C is free from the pin **103** on the lever, the spring **100** brings the coin lever **97** back to its normal position for locking the ejector in its ejected position. Similarly, when the next coin is received in the coin pocket, the other opposing edge **92** of the ejector extension **91** engages the coin and rolls it over the pin **102** on the coin lever **97**. In each case, the coin serves to take the place of the stop **97** and the edges **94** and **95** and act as a direct link to swing the stop out of the path of the ejector extension **91**.

A coin chute **105** serves to receive the coin from the coin slot **32** on the outside of the cabinet and feed the coin to the coin pocket of the coin mechanism. The coin chute is supported by means of a bracket **106** upstanding from the horizontal section **78** of the mounting plate **77**, FIG. 5.

In some instances, where it may be desired to employ free use of the machine, where the operator can operate the machine without tendering of a coin, a pin may be inserted in an aperture **107** which extends through the panel **79** of the mounting plate **77** and the mounting plate **54** after pulling down of the lever **97**, whereby the lever **97** will be locked by the pin in its down position thereby keeping the stop **96** of the lever continually out of the path of the ejector extension **91**. This permits free operation.

Referring now to FIGS. 4, 8 and 9, mechanism is provided for aiding in the stroking or reciprocation of the ejector to provide positive movement of the ejector to its extreme ejecting positions, wherein a bifurcated lever **108** is pivotally mounted on a pin **109** at the under side of the magazine bottom **49** and at a midpoint between the legs **50** and **51**. A spring **110** is connected at one end to a lug **111** extending downwardly from the end of the lever **108** opposite its bifurcated end, and at its other end to a lug **112** extending down from an angle plate **113** which is secured to the under surface of the magazine bottom **49**. The bifurcated end of the lever **108** includes curvate camming surfaces **114** and **115** which alternately engage a roller **116** which extends downwardly from the rectangular section **58**, FIG. 10, of the ejector **56** and through a longitudinally extending slot **117**. A disk-shaped plate **118** is secured to the free end of the roller **116** and is of a size greater than the width of the slot **117** in order to maintain the rear end of the ejector in its down position against the magazine bottom and prevent raising of the rear end of the ejector beyond the limits of the plate **118** as it abuts against the under side of the magazine bottom **49**.

The roller **116** of the ejector is shown in one of its extreme positions in FIG. 8, and upon shifting of the ejector to its other extreme position, the roller **116** engages a cam surface **115** on the bifurcated lever **108** and drives it against the action of the spring **110** to the position shown in dotted lines in FIG. 9 and designated by the numeral **108A**, at which time the spring **110** acts directly against the lever **108** and the pin **109** in a position of the lever which may be defined as a position where the spring will not act to shift the bifurcated lever **108** to either position. As the roller **116** of the ejector further urges the bifurcated lever toward the left, as seen in FIG. 9, the spring **110** is then brought off center with the pin **109** and serves to aid in forcing the lever **108** to the position shown in full line in FIG. 9. Similarly, when the roller **116** of the ejector is shifted in the other direction,

the roller engages the cam surface **114** of the bifurcated lever **108** and shifts the lever to its other position, whereupon the lever aids in shifting the ejector after the spring has passed the dead center position. Hence, means is provided to assure positive ejecting position of the ejector should an operator not force the ejector to its complete ejection position.

In order to prevent return of the ejector to the position from which it is moving away during stroking of the ejector, a plurality of longitudinally spaced apertures **119** are provided in the extension **91** for coaction with the pawl **120** pivotally mounted on a plate **121** secured to the angle plate **113** at the under side of the magazine bottom **49** by fasteners **122**, FIGS. 4, 5, and 14. A spring **123** is fastened at one end to the pawl **120** and at the other end to the plate **121** for normally maintaining the pawl in a vertical position. The pawl extends upwardly into engagement with the extension plate **91** of the ejector and the apertures **119**, whereby movement of the ejector in either direction will force the pawl off center against the biasing of the spring **123**, whereby the bridges between the apertures **119** serve as spaced stops to engage the pawl and prevent return of the ejector until it has completely passed the row of apertures. Then, on the return stroke the pawl will be pivoted off center in the opposite direction and serve to prevent return of the ejector until it has again passed the extension **91** and the apertures **119** so that it can return to normal vertical position. Thus, a person putting a coin in the machine will not experience losing of the coin by starting the stroke of the ejector and not completing it before a lapse of time.

Inasmuch as the lowermost article is ejected from each of the stacks alternately, the stacks will be emptied at a similar rate. Once the magazine chamber **41** is empty with the depletion of the stack **42**, a gravity actuated wire member **124**, FIGS. 2 and 13, functions to block the coin slot **32** and refuse further coins. This wire member is pivotally mounted on an extension **125** of the mounting plate **77** and includes an article detecting leg **126** and a coin refusing leg **127**, wherein the ejection of the lowermost article A on the stack **42**, FIG. 13, permits the heavier end **127** of the wire member **124** to swing the member about its pivot so that the coin refusing leg **127** assumes a position shown in dotted lines wherein it blocks the coin slot **32**. Thus, when the machine is empty, it is not possible for a person to lose his coin without an article.

The articles A are retained in their proper stacked relationship within the magazine chambers after the machine has been filled by means of a removable article retaining bar **128**, FIGS. 2 and 5, which is removably received on an upstanding projection **129** of the mounting plate **77**. When filling the machine, the bar **128** may be removed to facilitate filling and subsequently replaced in order to maintain the articles A properly located in the magazine chambers.

In view of the foregoing, it is seen that the present invention provides a relatively simply constructed and easily operable vending machine which has a very large capacity and foolproof operation.

It will be understood that modifications and variations may be effected without departing from the scope of the novel concepts of the present invention, but it is understood that this application is to be limited only by the scope of the appended claim.

The invention is claimed as follows:

An article vending machine comprising, a cabinet having front, back side, top and bottom panels, a pair of spaced openings in said front panel through which articles are to be dispensed, a magazine in said cabinet adapted to support a double stack of articles in side-by-side relation, said magazine having opposite side walls and a bottom wall extending between said cabinet front and back panels, said magazine side walls terminating above said bottom wall and defining a pair of opposed openings adjacent said bottom wall thereof through which the articles may be ejected, guide means between said magazine and cabinet openings for guiding articles ejected from the magazine openings to the cabinet openings, ejector means for ejecting alternately the lowermost article of one stack through one of said magazine openings and the lowermost article of the other of said stacks through the other of said magazine openings, and means for assisting the stroke of the ejector means after it has partially ejected an article through a magazine opening, said means for assisting the stroke of the ejector means including a pin extending from said ejector means, a bifurcated lever engageable with said pin and pivotally mounted adjacent the ejector means and a spring connected to said lever and biasing same to a predetermined position.

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