

A. D. GROVER.
VENDING MACHINE.

APPLICATION FILED MAR. 19, 1913. RENEWED FEB. 15, 1916.

1,198,437.

Patented Sept. 19, 1916.

2 SHEETS—SHEET 1.

Fig. 1.

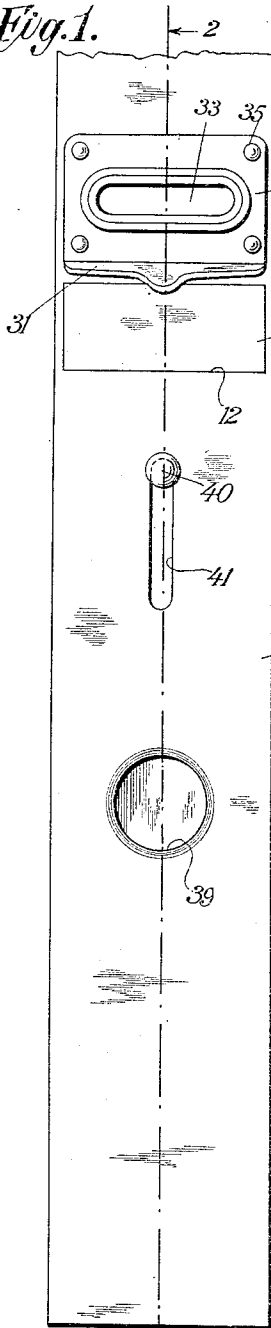


Fig. 2.

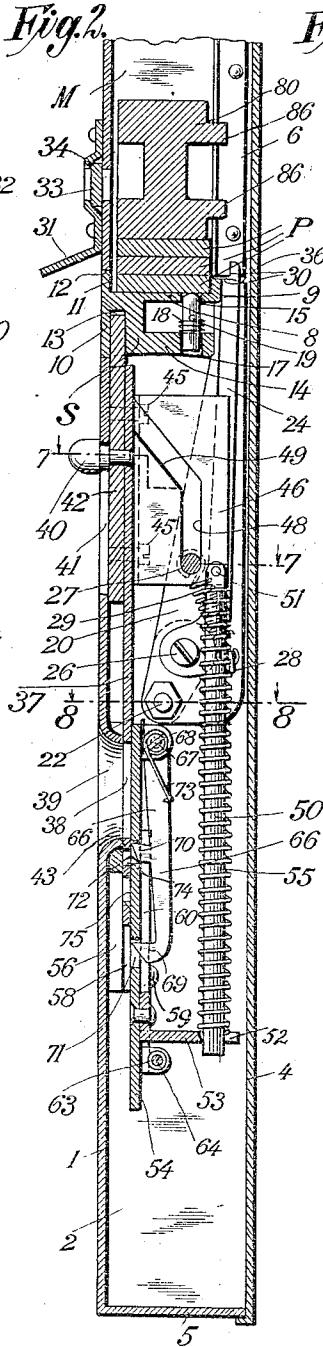
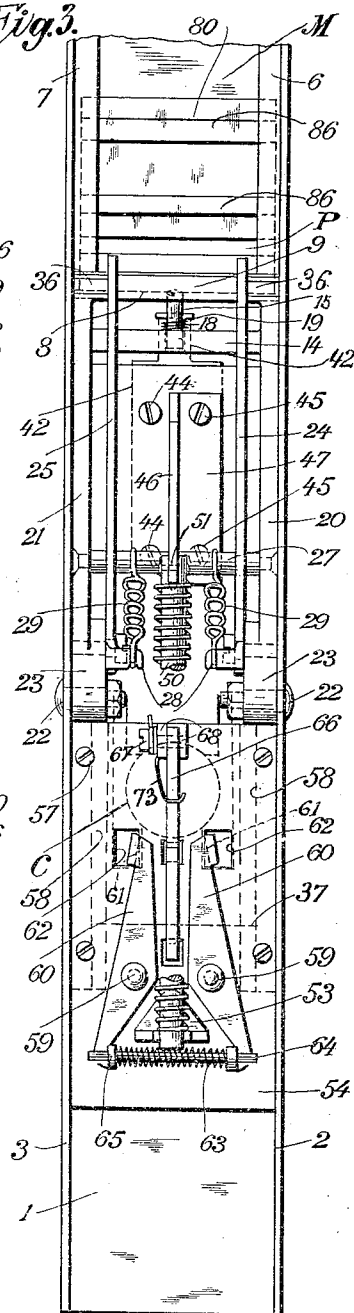


Fig. 3.



WITNESSES
Geoffrey
H. Hurdle

INVENTOR
Albert D. Grover
BY
A. Alexander Thomas
ATTORNEY

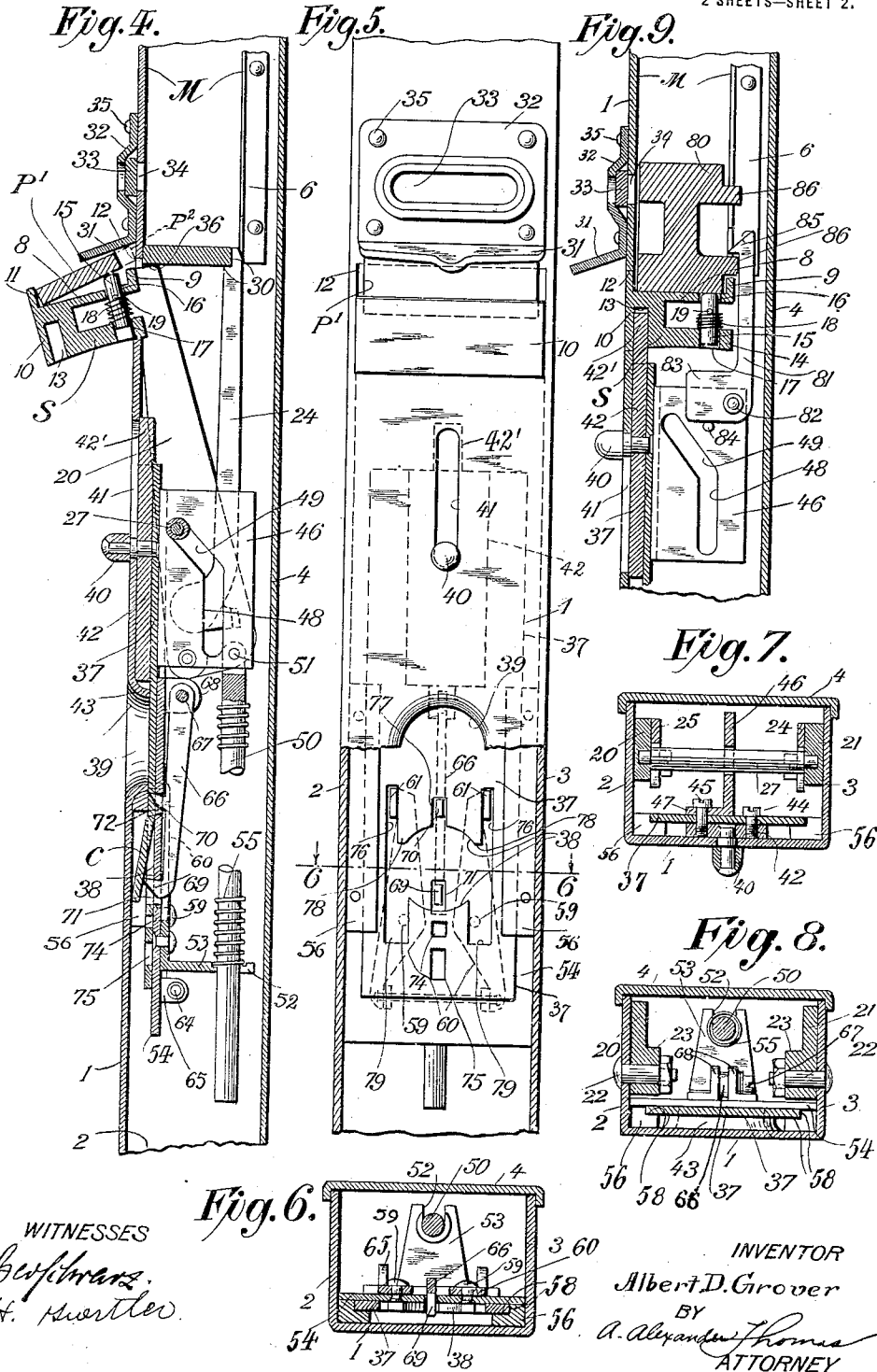
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2 SHEETS—SHEET 2.



WITNESSES
G. Schiratz.
H. H. H. H.

INVENTOR

Albert D. Grover

BY

A. Alexander Thomas
ATTORNEY

UNITED STATES PATENT OFFICE.

ALBERT D. GROVER, OF MALDEN, MASSACHUSETTS, ASSIGNOR TO AUTOSALES GUM AND CHOCOLATE COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

VENDING-MACHINE.

1,198,437.

Specification of Letters Patent. Patented Sept. 19, 1916.

Application filed March 19, 1913, Serial No. 755,411. Renewed February 15, 1916. Serial No. 78,536.

To all whom it may concern:

Be it known that I, ALBERT D. GROVER, a citizen of the United States, and a resident of Malden, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Vending-Machines, of which the following is a specification.

My invention relates to vending machines and is characterized by several features of novelty which result in a machine of great compactness and small dimensions, so that the machine is particularly adapted for use in locations where space is very limited.

The machine of my invention is designed to take up as little room as possible, and can be readily attached to the wall or posts between the windows in street cars or railway cars where it will not project sufficiently from its support to be considered an obstruction.

One feature of novelty which characterizes my invention is a positive delivery-mechanism which normally forms the bottom of the magazine within the casing, but which upon operation of the machine is adapted to be projected out of the machine, carrying with it the lowermost package or article. As soon as the latter is removed from the delivery-mechanism by the purchaser, the mechanism automatically returns to normal position within the machine. In the specific embodiment of my invention as shown by way of illustration in the accompanying drawings, this delivery-mechanism is in the form of a shelf carried by a pair of pivoted arms adapted to be moved into operated or rejecting position by a slidable member which is operable from the outside of the machine by hand. Where, as in the present instance, the machine is designed to be coin-controlled, this slidable actuating member is normally locked against operation and is released only upon the deposition of a proper coin.

I also provide means for supporting the column of articles within the magazine when the delivery-mechanism is in projected position. As the delivery-mechanism returns to normal position, this temporary supporting means is automatically moved into inoperative position.

Another feature of my invention consists

in means for automatically locking the machine against operation when the magazine is empty. In the preferred embodiment of my invention, this locking means includes a connection by which the hand-operated member operating the delivery-shelf is positively locked to the weight which rests on top of the goods in the magazine. This connection is not established until the magazine is entirely empty.

A further object of my invention consists in the provision of means whereby the delivery-mechanism cannot be manipulated to deliver more than one piece of goods for each coin inserted. This means for preventing fraudulent operation of the machine includes a slidable operating member and a pivoted locking member which are so constructed and arranged that the slidable member, which controls the operation of the delivery-mechanism, must make a full return movement before it can be again operated to project the delivery-mechanism. As the slidable operating member returns to normal position, the delivery-mechanism retreats into the machine, and both reach normal position at about the same time. An attempt to "work" the machine by allowing the delivery-mechanism to return only part way to normal position, and then trying to move the operating member into full operated position, is resisted by the automatic locking of the operating member against forward movement. In other words, after each operation of the machine, the operating member and delivery-mechanism must return to full normal position before the next package can be delivered—which can only be done by the insertion of another coin.

The above and other objects and advantages of my invention will become apparent from a detailed description of the drawings which show a machine embodying the various features of my invention in a form now best known to me.

In these drawings Figure 1, is a front view of the machine, a portion of the outer casing being broken away. Fig. 2, is a longitudinal section on line 2—2 of Fig. 1, the parts being shown in normal position. Fig. 3, is a rear view of the inside of the machine. Fig. 4, is a view similar to Fig. 2, showing the parts in operated position. Fig. 5, is a

front view of Fig. 4, a portion of the front wall being broken away to expose certain parts within the casing. Fig. 6, is a transverse cross-sectional view on line 6—6 of Fig. 5. Fig. 7, is a transverse cross-sectional view taken substantially on the broken line 7—7 of Fig. 2. Fig. 8, is a transverse cross-sectional view on line 8—8 of Fig. 2; and Fig. 9, is a longitudinal view in cross-section of a portion of the machine, showing the means for positively locking the machine against operation when the magazine is empty.

The various parts of the different operating mechanisms of my machine are inclosed and supported within a narrow casing formed preferably of sheet metal and having a front wall 1, side walls 2 and 3, a back wall, 4 a bottom 5, and a top which is not shown in the drawings. The front, sides, top and bottom of the casing may conveniently be formed of one piece to which the back wall or plate is secured in any suitable manner.

The magazine for containing the vendible packages may be provided within the casing in any convenient way. In the drawing I have shown a pair of angle bars 6 and 7 secured to the sides 2 and 3 near the rear edge thereof. The space between these angle bars and the front wall of the casing constitutes the magazine M in which the vendible packages P are contained. The height of the magazine will of course depend upon the desired capacity of the machine. The bottom of the magazine is formed by the delivery-mechanism which may be said to be in the form of a shelf or tray indicated as a whole by S. The specific construction of the delivery-shelf may assume different forms. In the particular embodiment shown in the drawings, the shelf S comprises mainly a top plate 8, from which projects upwardly at the rear a retaining flange or shoulder 9, and a front wall 10, which projects partly above the top 8 to form an upstanding flange or shoulder 11. As best seen from Fig. 2, the lowermost package P rests on the top 8 of the shelf S between the flanges 9 and 11. The rear flange 9 terminates slightly below the top of the lowermost package, so that only one package at a time will be carried forwardly by the shelf. When the delivery-shelf is in normal position, as shown in Figs. 2 and 9, the front plate 10 is in alinement with the front wall 1 of the casing and rests within the rectangular opening 12 formed in the front wall 1. In other words, when the delivery-shelf S is in normal position, the front plate 10 thereof forms part of the front wall 1 of the casing. Preferably, the delivery-shelf is also formed with a slot 13 and a rearward extension 14. As will hereinafter be explained, the slot 13 is adapted to re-

ceive a locking bolt or lug for positively locking the shelf when in normal position against outward movement. The extension 14 is spaced from the top 8 and coöperates with the same to support a pin 15. The top 8 and lower extension 14 are provided with alined openings 16 and 17, respectively, for receiving the upper and lower ends of the pin 15. A coiled spring 18 surrounding the pin 15 normally tends to project the pin upwardly. The upward movement of the pin 15 is limited by any suitable means, such as a cross piece 19 carried by the pin, and adapted to bear against the under side of the top 8 when the pin is in projected position. As will be presently explained, the purpose of the spring-projected pin 15 is to throw the rear end of the ejected package slightly upwardly, so as to prevent return movement of the delivery-shelf until the ejected package is removed therefrom.

The delivery-shelf S is fixed to the upper end of the arms 20 and 21. As a convenience in manufacture, the shelf S and its supporting arms may be cast in a single piece. The arms 20 and 21 are at their lower ends pivoted on studs 22 carried by the sides of the casing. These studs pass through openings in the bearing portions 23 of the arms 20 and 21. Upon these arms are pivotally mounted the arms 24 and 25 by means of studs 26. The arms 20 and 21 are connected together by a cross-rod 27. The arms 24 and 25 are at their lower ends provided each with an inwardly extending lug 28 to which is secured one end of a contractile spring 29. The upper ends of the springs 29 are connected with the cross-rod 27. In this way a yieldable connection is established between the arms 20 and 21, and the arms 24 and 25. This connection may of course be carried out in other ways than the one just described. As the points of connection between the springs 29 and the arms 24 and 25 are to the rear of the pivot points 26, the tendency of these springs is to force the upper ends of the arms forwardly, as shown in Fig. 2. The forward movement of the arms 24 and 25 is limited by the rear flange 9 of the delivery-shelf S, against which the upper ends of these arms abut. It will be seen from Figs. 2 and 4 that the upper ends of the arms 24 and 25 are each formed with a rectangular notch or recess 30. The bottom of this recess is substantially flush with the top of the flange 9.

The operation of my new delivery-mechanism as far as it has been described is as follows: When the arms 20 and 21 are rocked forwardly (by mechanism to be presently described), the shelf S is projected forwardly out of the machine, carrying with it the lowermost package. The upstanding flange 9 at the rear of the shelf makes the delivery of the lowermost package positive

and unailing. Besides, only one package can be carried along by the shelf at each operation of the machine, because the upper edge of the opening 12 does not extend to the top of the second package from the bottom. The projected position of the shelf is shown in Fig. 4. As soon as the ejected package on the shelf has passed out of the magazine, the pin 15 projects the rear end of the package upwardly against the retaining plate 31 which is suitably secured to the front wall of the casing. In the particular construction shown, the plate 31 is part of the frame 32 which holds the window 33 over the display opening 34 in the front wall of the casing. The purpose of the window 33 is to permit a view of the contents of the magazine. The frame 32 is secured to the front wall of the casing by screws or rivets 35. The front flange 11 on the delivery-shelf prevents the ejected package from being thrown off the shelf when the latter is projected forwardly. In Figs. 4 and 5, the ejected package is indicated at P¹. It will be clear from Fig. 4 that the delivery-shelf and the connected parts cannot return to normal position unless the ejected package P¹ be withdrawn, because the rear end of the package projects beyond the top of the opening 12, and thereby forms a positive stop against the return of the parts to normal position. It is desirable that the operated parts do not return to normal position as soon as released by the hand of the operator, because in that case, if the operator would let go of the operating knob or handle on the outside of the machine before he removed the ejected package, the latter would be carried back into the machine by the delivery-shelf on its return movement. In this way the patron would lose the package which he purchased. This contingency is entirely obviated by causing the ejected package itself to form a positive stop against the return movement of the parts. In the broad aspect of that feature of my invention, the means for throwing the ejected package into locking position, may be carried out in other ways than that specifically shown and described. If the retaining plate 31 were dispensed with the package would be thrown off the shelf by the pin 15. While this would prevent the shelf from accidentally carrying the package back into the machine, it is desirable to have the package retained on the shelf by some such means as the plate 31.

During the initial movement of the arms 20 and 21, the arms 24 and 25 move with the other arms as one member, until the recesses 30 engage the rear edge of the second package from the bottom. This prevents further movement of the arms 24 and 25 without interfering with the continued forward movement of the arms 20 and 21 and the delivery shelf. As the shelf leaves

the magazine with the lowermost package, the shoulders 36 at the upper ends of the arms 20 and 21 pass into engagement with what is then the lowermost package in the magazine. When the arms 20 and 21 have reached their operated position, the supporting shoulders 36 engage the lowermost package at the forward edge, while the arms 24 and 25 have remained in engagement with the rear edge of the lowermost package. In this way the arms 20 and 21 and 24 and 25, form a positive supporting means for the packages in the magazine when the delivery-shelf is in projected position. When the delivery-shelf returns to normal position, the entire column of packages simply drops on to the shelf, with the lowermost package resting between the flanges 9 and 11. The arms 24 and 25 remain in supporting position until they encounter the flange 9 of the returning shelf, whereupon they are forced back into normal or inoperative position, as shown in Fig. 2.

I will now describe the mechanism for operating the delivery-shelf S. The plate 37 is supported within the casing so as to slide vertically. This plate or slide is provided with a coin-slot 38 for receiving the deposited coin and carrying the same into operative position to release the slide for operation, as hereinafter explained in detail. For the sake of distinction, the slide 37 will be referred to as the coin-slide. When the coin-slide is in normal position, as shown in Fig. 2, the coin-slot 38 registers with the coin-opening 39 formed in the front wall 1 of the casing. The coin-slide is adapted to be operated from the outside by a knob or finger piece 40 secured to the coin-slide and adapted to extend to the outside of the casing through the vertical slot 41 in the front wall thereof. A spacing piece 42 is secured to the coin-slide 37 so as to hold the same properly spaced from the front wall in vertical alinement with the inner end of the annular flange or shoulder 43 surrounding the coin-opening 39. The spacing piece 42 also serves to close the slot 41 against insertion of any instrument in an attempt to manipulate the machine without the deposition of a coin. In the drawings I have shown screws 44 and 45 for securing the spacing piece 42 and coin-slide 37 together. To the back of the coin-slide 37 is fixed a rearwardly extending plate 46. By providing the plate 46 with a flange 47, the screws 45 also serve to secure the plate 46 to the coin-slide by passing through this flange, as shown in Figs. 3 and 7. The plate 46 is provided with a slot consisting of a straight lower portion 48 and an angular upper portion 49. The cross-rod 27 of the arms 20 and 21 is arranged to pass through the angular slot in the plate 46. When the parts are in normal or unoperated position, the rod 27

rests at the bottom of the angular slot, as shown in Fig. 2. When the operator presses down on the knob 40 (assuming the coin-slide to be free for operation), the arms 20 and 21 and consequently the delivery-shelf S, remain stationary until the rod 27 enters the forwardly extending portion 49 of the slot in the plate 46. The continued downward movement of the plate 46 rocks the arms 20 and 21 forwardly, thereby projecting the delivery-shelf S out of the casing, until the parts have reached their final position, as shown in Fig. 4. In this position of the parts, the rod 27 is at the upper end of the angular slot of the plate 46. Suitable means is provided for automatically returning the coin-slide to normal position when the operator has removed the package from the projected shelf. In the drawings, I have shown a rod 50 pivoted at its upper end to the plate 46 at 51, and passing at this lower end through the slot or opening 52 in a bracket 53 rigidly mounted on the fixed plate 54. A compression spring 55 surrounds the rod 50 between the bracket 53 and the plate 46, and normally tends to project the plate 46 and the connected parts upwardly into the position shown in Fig. 2. It is plain that any suitable means may be provided for returning the plate 46 to normal position after each operation of the machine.

The plate 54 is rigidly secured to a pair of blocks 56 by means of screws 57 or otherwise. The blocks 56 are fixed to the casing in any suitable manner, and are provided with recesses 58 for receiving the side edges of the coin-slide 37 and thereby acting as a guide for the same. The plate 54 carries a pair of studs 59 on which are pivoted the levers 60. The upper ends of these levers are turned forwardly to provide lugs 61 which extend through slots 62 in the plate 54 into the plane of movement of the coin-slide 37. The lugs 61 are held pressed against the inner sides of the slots 62 by suitable spring means, such as the expansion spring 63 coiled on the rod 64 between ears or lugs 65 provided at the lower ends of the levers 60. A pawl 66 is pivoted at the upper end of the plate 54 by pin or stud 64 held in lugs 68. The pawl 66 is provided with a lower tooth 69 and an intermediate tooth 70. These teeth are adapted to pass into the plane of operation of the coin-slide 37 through the openings 71 and 72, respectively, formed in the plate 54. A spring 73 fixed at one end to the plate 54 and bearing at its other end on the pawl 66, is adapted to press the pawl forwardly (to the left as viewed in Figs. 2 and 4). The coin-slide 37 is provided with openings 74 and 75 arranged centrally below the coin-slot 38 in vertical alinement with the pawl 66.

When the parts are in normal position, as

shown in Fig. 2, the tooth 70 of the pawl 66 bears against the coin-slide at a point between the coin-slot 38 and the opening 74. As the coin-slide begins to move down, the beveled edge of the tooth 70 rides over the lower edge of the coin-slot (assuming no coin has been deposited), thereby allowing the pawl to swing forwardly under the influence of the spring 73. Before the lower edge of the coin-slide 37 can pass the tooth 69, the latter is swung forwardly into the path of the descending coin-slide, and arrests further downward movement of the coin-slide. The tooth 69 therefore serves to lock the coin-slide against downward movement when the slide is operated without the deposition of a coin. The slight free movement of the slide from its normal position until the lower edge encounters the tooth 69 is of course insufficient to have any effect on the delivery-mechanism. Let us now assume that a proper coin has been deposited in the coin-slot 38. As the coin slide is pushed down, the edge of the coin (indicated in dotted lines at C in Fig 3), encounters the lugs 61 of the levers 60 and wedges them apart into vertical alinement with the slots 76 formed in the coin-slide 37 above the coin-slot and on either side thereof. At the same time, as the coin-slide descends, the deposited coin holds the pawl 66 rearwardly in its normal or inoperative position, in which position the teeth 69 and 70 do not project into the path of movement of the coin-slide 37, as shown in Fig. 2, and therefore do not interfere with its continued downward movement. The coin-slide is thus free to descend until it has reached the limit of its downward movement, as shown in Fig. 4. As previously explained in detail, the complete downward movement of the coin-slide results in the delivery-shelf S being projected out of the casing, with the lowermost package exposed for ready removal by the patron. When the coin-slide is in lowermost or operated position, the deposited coin is automatically ejected from the coin-slot 38 by the lower tooth 69 of the pawl 66. Fig. 4 shows very clearly how the coin C is thus ejected by the tooth 69. The ejected coin drops by gravity to the bottom of the casing. If desired, a separate coin receptacle may be provided for receiving the ejected coin.

I will now explain the function of the double toothed pawl 66 during the return movement of the coin-slide 37. Referring to Fig. 4, it will be clear that as the coin-slide begins to return, the lower tooth 69 is cammed rearwardly by the lower edge of the coin-slot 38, the underside of the tooth 69 being for this reason beveled. When the opening 74 in the ascending coin-slide comes into alinement with the tooth 69, the latter snaps into the opening and locks the slide

against downward movement, without interfering with the further upward movement thereof. As the slide continues to move upwardly, the opening 75 will then come into alinement with the tooth 69, whereupon the latter is thrown into that opening to lock the slide once more against downward movement. As the slide continues to rise, the tooth 69 is cammed out of the opening 75, thus allowing the slide to reach its normal position, as shown in Fig. 2. By thus progressively locking the slide against downward movement as it returns to normal position, it is impossible to bring a second package into exposed position without the deposition of a coin. The delivery-shelf S does not reach normal position until after the lower edge of the coin-slide has passed the lower tooth 69. And, as previously explained, the tooth 69 positively locks the coin-slide against operation from normal position unless a coin is deposited in the coin-slot. When the slide is in lowermost position, the tooth 70 of the pawl 66 is accommodated in the slot 77 formed above the coin-slot 38 in alinement with the pawl 66, as best shown in Fig. 5.

The deposited coin must be of proper thickness in order to hold the lower tooth 69 on the pawl 66 out of the path of the descending coin-slide. Referring to Fig. 2, it will be clear that unless the coin has substantially the thickness of the coin-slide 37, the intermediate tooth 70 will move forwardly when the coin comes opposite, with the result that the lower tooth 69 is thrust into the path of the descending slide and locks the same against full downward movement. As the tooth 69 works on a radius approximately twice the length of the working radius of the intermediate tooth 70, the arc of travel of the tooth 69 is twice that of the tooth 70, so that only a slight inward movement of the tooth 70 is necessary to cause the lower tooth 69 to project into the path of the coin-slide 37. Besides testing the deposited coin as to thickness, the tooth 70 also acts as washer tester. When the washer is carried downwardly by the coin-slide 37, the movement of the slide is arrested as soon as the hole in the washer comes opposite the tooth 70, which at once snaps into the opening and thereby locks the slide. The beveled lower edge of the tooth 70 permits the slide to move back into normal position so that the washer may be removed.

The lugs 61 at the upper ends of the levers 60 test the deposited coin as to diameter. The coin must have a predetermined diameter in order to spread the levers 60 sufficiently to allow the lugs 61 to enter the slots 76 in the coin-slide. If the coin is of less than the prescribed diameter, the lugs 61 will engage the stop shoulders 78 and there-

by arrest further downward movement of the slide. When the coin-slide is in upper or normal position, the coin-engaging lugs rest against the inner sides of the recesses 79 formed in the coin-slide below the coin-slot 38 and upon either side thereof. It should be noted that the slots 62 in the plate 54 are substantially in alinement with the recesses 79, so that the lugs 61 rest normally in vertical alinement with the stop shoulders 78. Therefore, even if the pawl 66 were omitted, the coin-slide could not be fully operated without the deposition of a coin. The lugs 61 have their adjacent upper edges sharp, so that a deposited check of soft material is impaled upon these lugs. The tension of the spring 63, which presses the levers 60 together, is such as to require a check of hard material to wedge the levers 60 apart.

I make no claims herein broadly to the combination of the coin-slide and coin-engaging levers 60, because that feature is disclosed and claimed in my copending application, Serial No. 738,128, filed December 23, 1912.

The delivery shelf S is locked in normal position within the casing by engagement of the cross-rod 27 in the vertical portion 48 of the angular slot in the plate 46. I may, however, provide additional locking means in the form of a pawl or lug 42¹ extending upwardly from the spacing block 42 and adapted to enter the slot or recess 13 in the delivery-shelf. This is best shown in Figs. 2 and 9. The extension 42¹ also serves as an additional guiding means for the coin-slide 37 during the initial movement thereof.

It will be noted from Fig. 4 that when the delivery-mechanism and the connected actuating parts are in full operated position, the rear edge of the exposed package P¹ on the projected shelf is a slight distance from the front wall of the casing. As soon as the operator releases the knob 40, the spring 55 moves the operated parts slightly back to normal position, until the rear edge of the exposed package P¹ bears against the front wall of the casing, as indicated in dotted lines at P² in Fig. 4. As previously explained, this engagement between the exposed package and the front wall of the casing positively prevents the parts from returning to normal position until the package is withdrawn.

When the magazine is empty, the machine is automatically locked against further operation by the weight 80 which rests on top of the packages in the magazine. It will be clear from Fig. 2 that when the magazine is empty, the lower portion of the weight 80 rests on the delivery-shelf between the flanges 9 and 11, so that any attempt to cause operation of the shelf simply presses the flange 9 against the lower

rear edge of the weight. However, as this arrangement causes the upper edge of the angular portion 49 of the slot in the plate 46 to bear down on the cross-rod 27, which would ultimately cause wear in the edge of the slot, I prefer to provide a positive lock between the weight and the plate 46. This is shown in Fig. 9. Referring to this figure, it will be seen that a locking dog 81 is pivotally mounted on the plate 46 by means of a stud 82. The dog 81 has a weighted portion 83 which holds the dog in the vertical position shown. A pin 84 fixed on the plate 46 limits the forward movement of the dog. It will be seen that the beveled tooth 85 at the upper end of the dog does not project into the magazine, so as not to interfere with the descending of the packages. When the last package has been ejected and the delivery-shelf S has returned to normal position, the weight 80, which is provided with rearwardly extending lugs 86, drops into the position shown in Fig. 9 with the tooth 85 extending over the lower lug 86. In this way the dog 81 forms a positive lock between the stationary weight 80 and the plate 46. The upper edge of the tooth 85 is beveled so that the dog 81 readily yields to the rear as the weight 80 falls into final position. Only one lug 86 is necessary on the weight 80, but by providing two the weight may be inserted either way. The locking dog 81 has been purposely omitted from the other figures so as not to confuse the drawings.

While I have herein shown and described a specific construction embodying the various features of my invention, I will have it understood that I do not intend to be limited to such construction, as it is obvious that the different features of my invention may be mechanically carried out in other ways than herein set forth by way of illustration, without departing from the scope of the invention as defined in the appended claims.

Having thus described my invention what I claim as new and desire to secure by Letters Patent of the United States is:

1. In a vending machine having a magazine for containing the vendible articles, the combination of a movable shelf forming the bottom of said magazine for supporting the articles therein, means for projecting said shelf out of the machine, said shelf being arranged to carry the lowermost article into exposed position for ready removal, means for automatically locking said shelf in projected position until the exposed article is removed therefrom, and means for supporting the articles in the magazine while said shelf is in projected position.

2. In a dispensing or delivery machine, a casing having a vertical magazine for containing the articles to be delivered, a shelf-

member pivoted below said magazine and normally adapted to support the articles in the magazine, said shelf-member being tiltable downwardly to convey the lowermost article forwardly out of said magazine, means for normally holding said shelf-member in supporting position, and yieldable means controlled by said shelf-member and arranged to move automatically into supporting engagement with the rear edge of the lowermost article in said magazine when said shelf-member is in delivering position, said means being normally held in an inoperative position by said shelf-member.

3. In a vending machine having a magazine for containing the vendible articles, the combination of a movable shelf forming the bottom of said magazine for supporting the articles therein, means for projecting said shelf out of the machine, said shelf being arranged to carry the lowermost articles into exposed position for ready removal, means for automatically locking said shelf in projected position until the exposed article is removed therefrom, and means connected with said shelf for supporting the articles in the magazine while said shelf is in projected position.

4. In a vending machine having a magazine for containing the vendible articles, the combination of a movable shelf forming the bottom of said magazine for supporting the articles therein, means for projecting said shelf out of the machine, said shelf being arranged to carry the lowermost article into exposed position for ready removal, and means for supporting the articles in the magazine while said shelf is in projected position, said last mentioned means including a pair of spring-pressed arms which automatically move into supporting engagement with the rear edge of the lowermost article in the magazine as the shelf is projected forwardly.

5. In a vending machine provided with a magazine, the combination of a pair of pivoted arms, a shelf carried at the upper end of said arms and arranged to form the bottom of said magazine, means for rocking said arms to project said shelf out of the machine, said shelf being adapted to carry the lowermost articles into exposed position for ready removal, and means for automatically locking said shelf in projected position until the exposed article is removed therefrom.

6. In a vending machine, the combination of a casing provided with a magazine and having a delivery-opening in the front wall thereof, a movable shelf arranged to form the bottom of said magazine, the front wall of said shelf being adapted to close said opening when the shelf is in normal position, means for projecting said shelf out of the machine through said opening, said

shelf being adapted to carry the lowermost article into exposed position for ready removal, and means whereby said projecting means locks said shelf in position within the casing when said projecting means is in normal position.

7. In a vending machine, a casing having a magazine for containing the vendible articles, a movable shelf normally forming the bottom of said magazine for supporting the articles therein, a vertically slidable member mounted within said casing below said shelf for projecting the same out of the casing, said shelf being arranged to carry and retain the lowermost article in exposed position for ready removal, vertically reciprocable means projecting out of said casing to actuate said slidable member, and means for supporting the articles in the magazine while said shelf is in projected position.

8. In a vending machine, a casing provided with a magazine and having a delivery-opening in the front wall thereof, a shelf pivoted in said casing and arranged normally to form the bottom of said magazine, said shelf having a flat front wall adapted to close said opening when the shelf is in normal position and to form a continuance of the front wall of said casing, vertically slidable mechanism below said shelf for rocking the same out of the casing through said opening, said shelf being adapted to carry the lowermost article into exposed position for ready removal, and hand-operable means projecting through said casing for actuating said mechanism.

9. In a vending machine provided with a magazine, the combination of a pair of pivoted arms, a shelf carried at the upper end of said arms and arranged normally to form the bottom of said magazine, and a vertically slidable member below said shelf for rocking said arms to project said shelf out of the machine, said shelf being adapted to carry the lowermost article into exposed position for ready removal.

10. In a vending machine, a casing provided with a magazine, a pair of pivoted arms, a shelf carried on the upper end of said arms and arranged to form the bottom of said magazine, a vertically slidable member below said shelf, means carried by said arms for operatively engaging said slidable member, whereby the operation of said member projects said shelf out of the machine, said shelf being adapted to carry the lowermost article into exposed position for ready removal, and vertically reciprocable hand-operated means projecting horizontally through one of the vertical walls of said casing and connected with said slidable member for actuating the same.

11. In a vending machine having a magazine for containing the vendible articles, the combination of a movable shelf forming the

bottom of said magazine for supporting the articles therein, means for projecting said shelf out of the machine, said shelf being arranged to carry the lowermost article into exposed position for ready removal, means carried by said shelf for projecting the exposed article upwardly, and means for limiting said upward movement of the exposed article, whereby the latter is held in position to positively prevent return movement of the shelf until the exposed article is removed.

12. In a vending machine having a magazine for containing the vendible articles, the combination of a movable shelf forming the bottom of said magazine for supporting the articles therein, means for projecting said shelf out of the machine, said shelf being arranged to carry the lowermost articles into exposed position for ready removal, and means whereby the exposed article is held in a position to positively prevent return movement of the shelf until the exposed article is removed.

13. In a vending machine having a magazine for containing the vendible articles, the combination of a movable shelf forming the bottom of said magazine for supporting the articles therein, means for projecting said shelf out of the machine, said shelf being arranged to carry the lowermost article into exposed position for ready removal, a spring-pressed pin mounted on said shelf for projecting the exposed article upwardly, and a fixed plate extending forwardly from the front wall of the machine to limit said upward movement of the exposed article, whereby the latter is held in a position to positively prevent return movement of the shelf until the exposed article is removed.

14. In a vending machine provided with a magazine, the combination of a pair of pivoted arms, a delivery-shelf carried thereby and arranged to form the bottom of said magazine, means for rocking said arms forwardly to project said shelf out of the machine, said shelf being adapted to carry the lowermost article into exposed position for ready removal, and a pair of spring-pressed arms pivotally mounted on said first mentioned arms and adapted to form with said first mentioned arms a positive support for the articles in the magazine when the shelf is in projected position.

15. In a dispensing or delivery machine, a casing having a vertical magazine for containing the articles to be delivered, a shelf-member pivoted below said magazine and normally forming the bottom thereof to support the articles in the magazine, said shelf-member being tiltable downwardly to convey the lowermost article forwardly out of said magazine, means for normally holding said shelf-member in supporting posi-

tion, and yieldable means mounted on said shelf-member and arranged to move automatically into supporting engagement with the rear edge of the lowermost article in said magazine when said shelf-member is in delivering position, said means being normally held in an inoperative position by said shelf-member.

16. In a dispensing or delivery machine, a casing having a vertical magazine for containing the articles to be delivered, a shelf-member pivoted below said magazine and normally forming the bottom thereof to support the articles in the magazine, said shelf-member being tiltable downwardly to convey the lowermost article forwardly out of said magazine, means for normally holding said shelf-member in supporting position, and a pair of spring-pressed arms carried by said shelf-member and arranged to move automatically into supporting engagement with the rear edge of the lowermost article in said magazine when said shelf-member is in delivering position, said arms being normally held in an inoperative position by said shelf-member.

17. In a vending machine provided with a magazine, the combination of delivery-mechanism arranged to form the bottom of said magazine and adapted to retain thereon the lowermost article, means for projecting said mechanism and the article thereon out of the machine in exposed position, and means for automatically locking said delivery mechanism in projected position until the exposed article is removed therefrom.

18. In a dispensing or delivery machine, a casing having a vertical magazine for containing the articles to be delivered, said magazine having a discharge opening at its lower forward end, a shelf-member extending across the lower open end of said magazine to form the bottom thereof and thereby support the stack of articles therein, said shelf-member being mounted to swing on an axis arranged transversely of said casing, means for operating said shelf-member from the outside of said casing to convey the lowermost article forwardly out of said magazine, means for normally holding said shelf-member in supporting position, and yieldable means controlled by said shelf-member and arranged to move automatically into supporting engagement with the lowermost article in the magazine when said shelf-member is in delivering position, said means being normally held in an inoperative position by said shelf-member.

19. In a vending machine provided with a magazine, the combination of delivery-mechanism arranged to form the bottom of said magazine and adapted to retain thereon the lowermost article, means for projecting said mechanism and the article thereon out of the machine in exposed position, and

means whereby the delivered article itself prevents return movement of said mechanism.

20. In a vending machine having a magazine, the combination of a pair of pivoted arms, delivery-mechanism carried thereby, and a second pair of arms arranged to form with first said mentioned arms a positive support for the articles in the magazine when said delivery-mechanism is in operated position.

21. In a vending machine having a magazine, the combination of a pair of pivoted arms, delivery-mechanism carried thereby, and a pair of spring-pressed arms pivotally mounted on said first mentioned arms and arranged to form with said first mentioned arms a positive support for the articles in the magazine when the delivery-mechanism is in operated position.

22. In a vending machine having a magazine for containing the vendible articles, a movable shelf normally forming the bottom of said magazine for supporting the articles therein, mechanism for projecting said shelf out of the machine to carry the lowermost article into exposed position for ready removal, and means whereby said mechanism automatically locks said shelf within the machine when said mechanism is in normal or unoperated position.

23. In a vending machine having a magazine for containing the vendible articles, a swinging shelf normally forming the bottom of said magazine for supporting the articles therein, mechanism for swinging said shelf out of the machine to carry the lowermost article into exposed position for ready removal, and cooperating means on said shelf and said mechanism for locking said shelf within the machine when said mechanism is in normal or unoperated position.

24. In a vending machine, a casing provided with a magazine and having a delivery opening in the front wall thereof, a movable shelf normally forming the bottom of said magazine for supporting the articles therein, said shelf having a flat front wall adapted to close said opening when the shelf is in normal position, said front wall forming a flange or shoulder projecting above the bottom of said shelf, a rear flange or shoulder on said shelf adapted to cooperate with said front shoulder to retain the lowermost article on the shelf when the latter is projected out of the casing, and vertically reciprocable hand-operated mechanism mounted within said casing below said shelf to project the same out of the casing.

25. In a vending machine having a magazine, the combination of mechanism for ejecting the articles from said magazine, means mounted independently of said mechanism for operating the same, a weight

adapted to rest loosely in said magazine on top of the articles, and means for automatically locking said operating means to said weight when the magazine is empty to prevent further operation of said mechanism.

26. In a vending machine having a magazine, the combination of mechanism for ejecting the articles from said magazine, means mounted independently of said mechanism for operating the same, a weight adapted to rest loosely in said magazine on top of the articles, and a locking member carried by said operating means and arranged to become automatically locked to said weight when the magazine is empty, whereby further operation of the ejecting mechanism is prevented.

27. In a vending machine having a magazine, the combination of mechanism for ejecting the articles from said magazine, a slidable member mounted independently of said mechanism for operating the same, a weight adapted to rest loosely in said magazine on top of the articles, and means connected with said slidable member for automatically locking the same to said weight when the machine is empty to prevent further operation of said mechanism.

28. In a vending machine having a magazine, the combination of mechanism for ejecting the articles from said magazine, a slide for operating said mechanism, a weight adapted to rest loosely in said magazine on top of the articles, a lug on said weight, and a toothed member mounted on said slide and arranged to automatically hook over said lug when the magazine is empty, whereby said slide becomes locked to said weight to prevent further operation of the ejecting mechanism.

29. In a vending machine, a flat and substantially rectangular casing having a magazine, a horizontally movable shelf normally forming the bottom of said magazine for supporting the articles therein, and a vertically movable slide arranged within said casing below said shelf and said magazine for projecting said shelf out of the casing,

said shelf being adapted to retain the ejected article in exposed position until removed.

30. In a vending machine having a magazine, the combination of a horizontally movable shelf for delivering the articles from said magazine, a vertically movable slide arranged below said delivery-shelf for operating the same, and means for automatically locking said slide in normal position when the magazine is empty.

31. In a vending machine having a magazine, the combination of delivery-mechanism, a movable member for operating the same, a weight adapted to rest loosely in said magazine on top of the articles, and means automatically locking said member in normal position to said weight when the magazine is empty.

32. In a vending machine having a magazine for the vendible articles, the combination of delivery-mechanism, a vertically movable slide for operating the same, and means for automatically locking said slide in uppermost position when the magazine is empty.

33. In a vending machine having a magazine for containing the vendible articles, the combination of delivery-mechanism, a vertically movable slide for operating the same, a weight adapted to rest loosely in said magazine on top of the articles, and a locking member carried by said slide for automatically engaging said weight when the magazine is empty to lock the slide in its normal position to said weight.

34. In a vending machine, the combination of delivery mechanism, means for operating the same to eject the vendible articles, and means whereby the ejected article itself forms a positive stop against the return movement of said mechanism.

In witness whereof, I hereunto subscribe my name this 7th day of March, 1913.

ALBERT D. GROVER.

Witnesses:

H. TUERTLER,
A. A. THOMAS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."