Jan. 1, 1929.

1,697,510

L. H. MORIN

VENDING MACHINE

Filed May 14, 1927

4 Sheets-Sheet 1

Fig. 1.

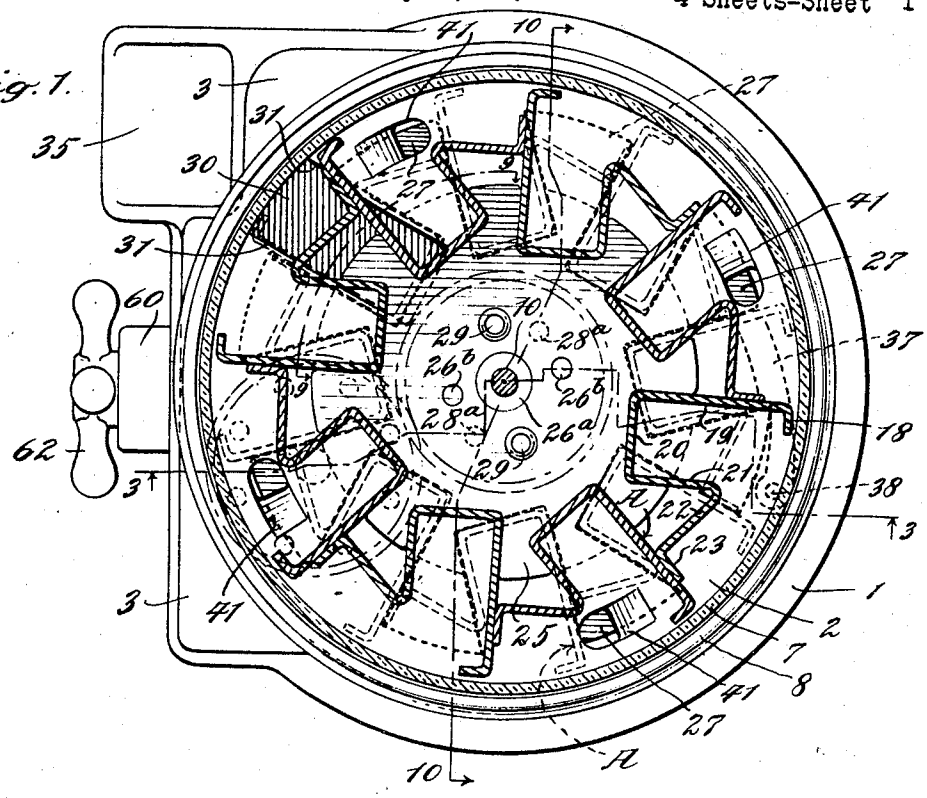
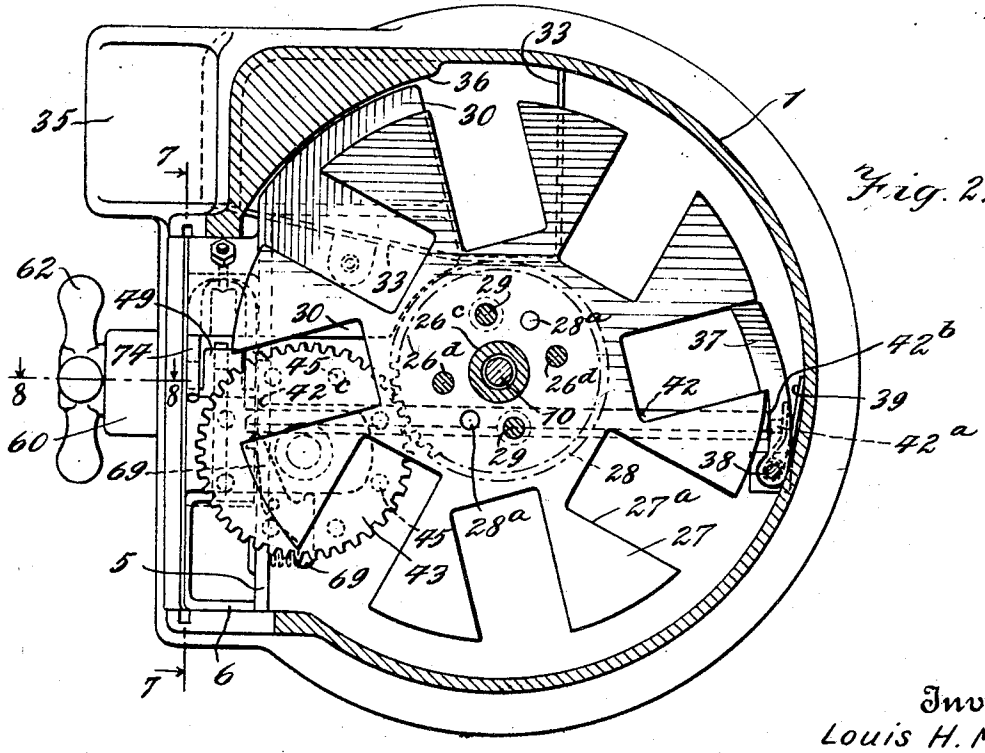


Fig. 2.



Inventor
Louis H. Morin

By his Attorney
Victor J. Evans

Jan. 1, 1929.

1,697,510

L. H. MORIN

VENDING MACHINE

Filed May 14, 1927

4 Sheets-Sheet 2

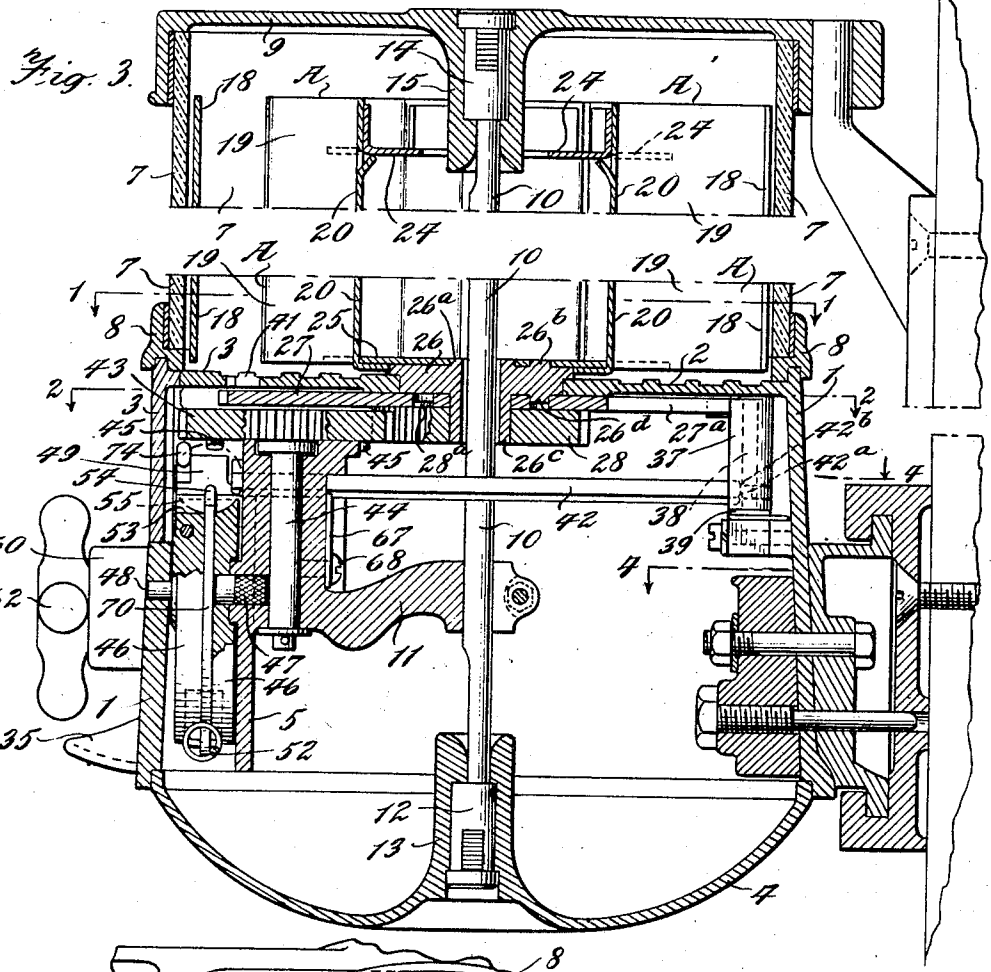


Fig. 3.

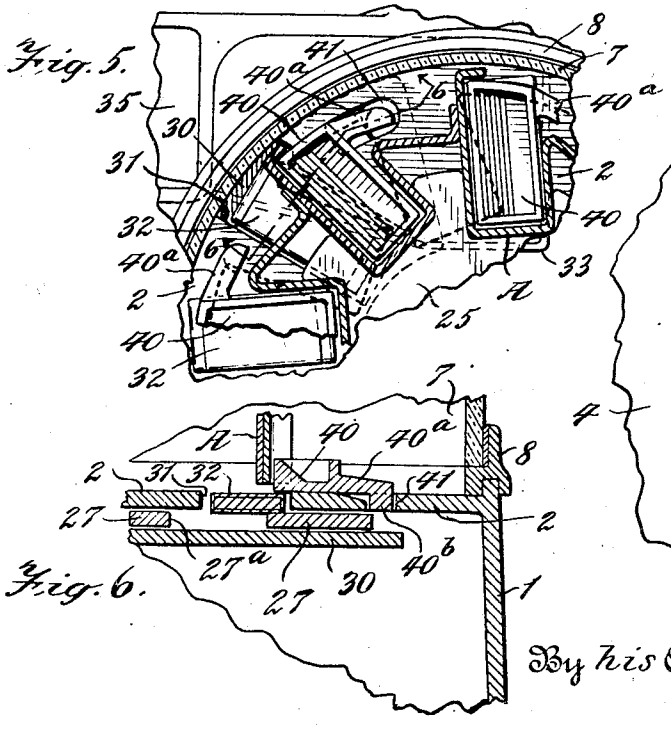


Fig. 5.

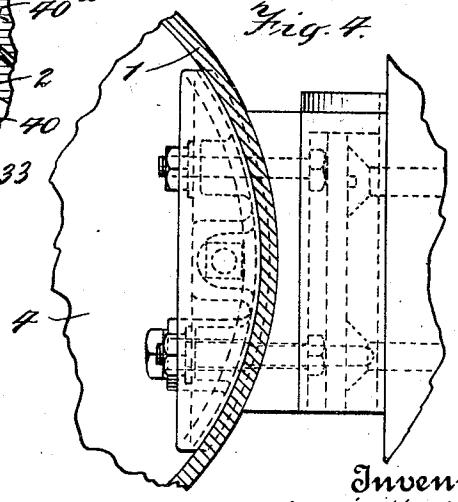


Fig. 4.

Fig. 6.

Inventor
Louis H. Morin

By his Attorney
Victor J. Evans

Jan. 1, 1929.

1,697,510

L. H. MORIN

VENDING MACHINE

Filed May 14, 1927 4 Sheets-Sheet 3

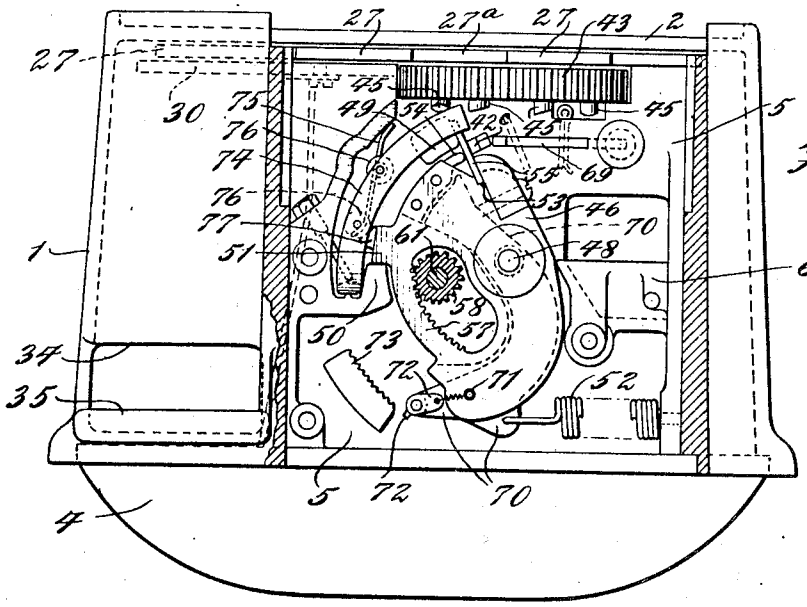


Fig. 7.

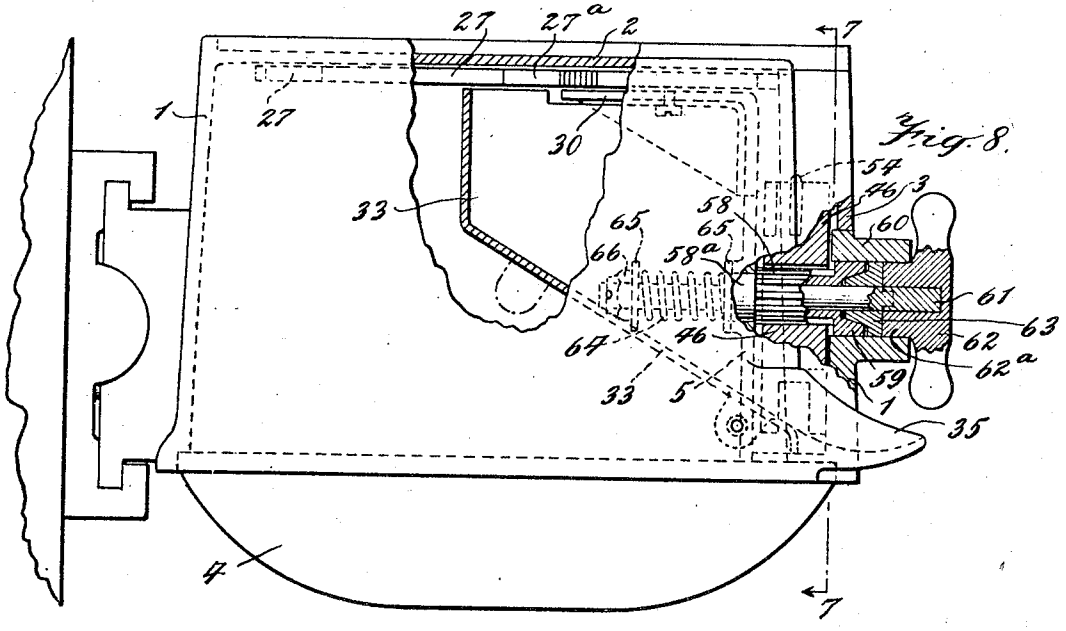


Fig. 8.

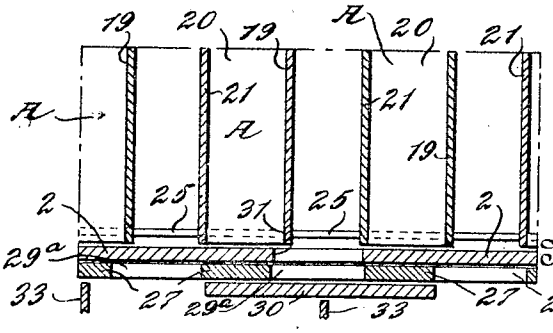


Fig. 9.

Inventor
Louis H. Morin

By his Attorney
Victor J. Evans

Jan. 1, 1929.

1,697,510

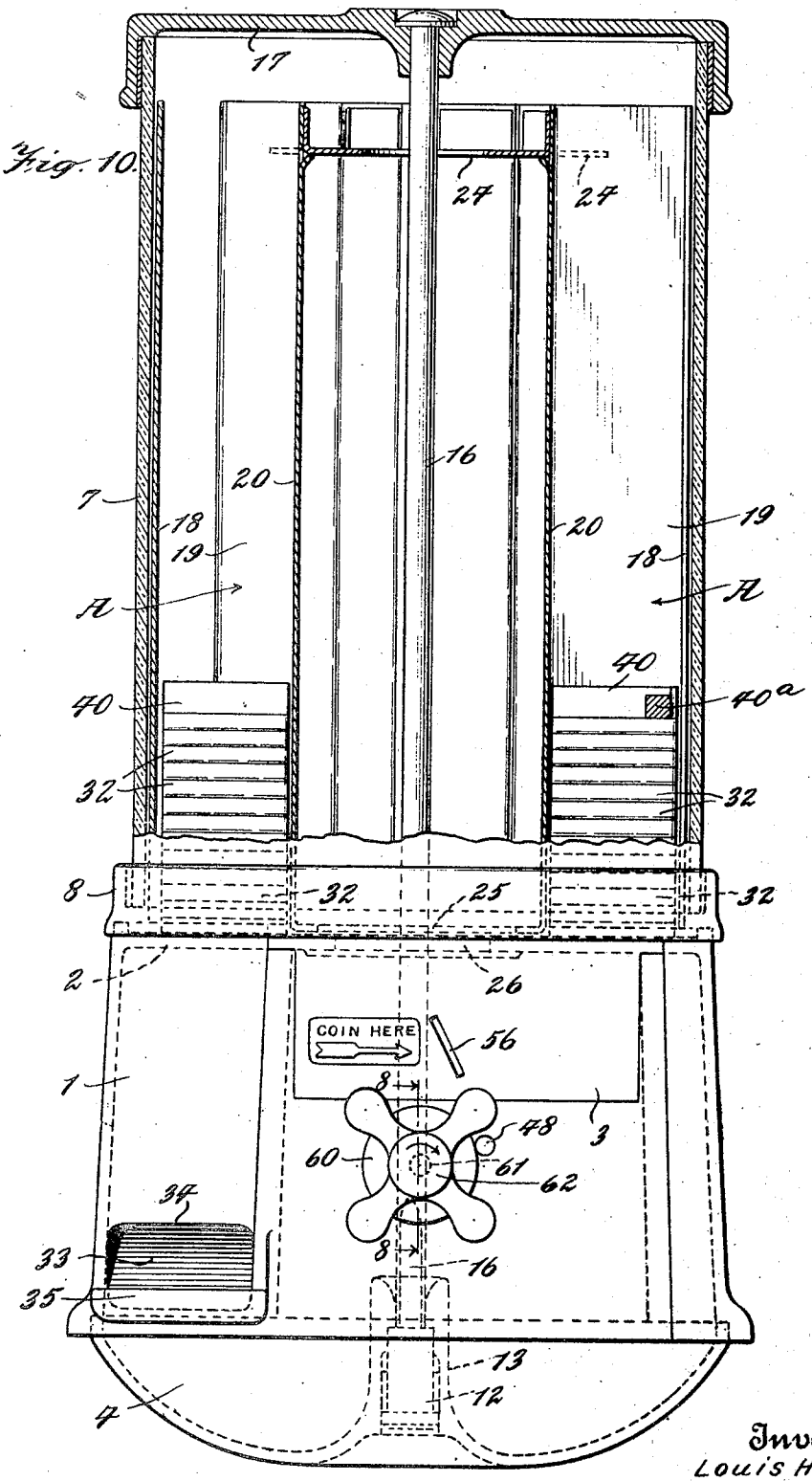
L. H. MORIN

VENDING MACHINE

Filed May 14, 1927

4 Sheets-Sheet 4

Fig. 10.



Inventor
Louis H. Morin

By his Attorney
Victor J. Evans

Patented Jan. 1, 1929. 1,697,510

UNITED STATES PATENT OFFICE.

LOUIS H. MORIN, OF NEW YORK, N. Y., ASSIGNOR TO DOEHLER DIE-CASTING CO., A CORPORATION OF NEW YORK.

VENDING MACHINE.

Application filed May 14, 1927. Serial No. 191,533.

This invention relates more particularly to vending machines of a general type such as is disclosed in my prior copending application for patent, Serial No. 39,442, filed June 25, 1925, and also such as disclosed in a machine of similar type, but of somewhat different construction, in the patent to Mortensen, No. 1,517,377 of December 2, 1924. In vending machines of the type referred to, stacks of small packages to be vended, such as of chewing gum, are contained in vertical peripheral channels of a magazine member which is rotatable on a vertical axis and which slides the stacks of packages around upon the smooth surface of a magazine bottom plate. This plate is provided with an aperture into which packages may drop from the channels and from which they may thence drop into peripheral delivery openings in a delivery plate which is immediately below the bottom plate and is connected to the magazine member to be rotatable therewith. In these machines, the package-containing channels of the magazine member and the package-delivering openings in the delivery plate are in vertical alignment with each other and when the machine is at rest one of these channels together with the corresponding opening in the delivery plate is in alignment with the aperture in the intervening bottom plate. At this time this stack of packages is supported by a lower plate immediately below the delivery plate and which also supports the packages in the openings of the delivery plate while they are moved thereby to a delivery position, the delivery plate and magazine member being given successive steps of movement from one position of rest to the next for delivering a purchase, such as a single package, at each operation of the machine, and being locked at this position of rest. In the machine of my above noted earlier application this lower supporting plate is stationary and the delivery plate moves a package beyond the forward edge thereof to permit it to drop for delivery, while in the Mortensen machine the corresponding lower plate is moved forward with the delivery plate and is then retracted to permit the dropping of a package from the delivery plate. However, in both of these prior machines, when they are in a condition of rest, the next package to be delivered, which is contained in an opening of the delivery plate, is subjected to the entire weight of the stack of packages above it, and when the machine is operated, the delivery plate is compelled to initiate the delivery movement of this lowermost package under this condition of pressure to which the package may have been subjected for some time, and the consequent frictional resistance between this package and the next package immediately above it in the stack and which at this time is contained in the aperture of the bottom plate with an entire stack of packages in the magazine directly above it.

From experience gained from extensive commercial use of my prior machine referred to, it has been found that after a machine has been standing idle for some little time this friction between the packages is increased, so that when the lowermost package is pushed out under these conditions, such frictional resistance sometimes will mar or tear its paper wrapper. An object of this invention is to assure that the packages shall at all times be delivered to the customer in a perfect condition. Other more particular objects and advantages of the invention will hereinafter appear.

According to this invention the rotatable magazine member bears such a relation to the other parts of the machine which are concerned in the operation that this magazine member supplies a package to the aperture in the magazine bottom plate while one of the package-containing channels is moving over this aperture, and the magazine member is brought to a stop and locked at a position in which all of the stacks of packages carried thereby are supported upon the smooth bottom plate of the magazine, so that all packages which are dropped from the open lower ends of the channels in this magazine member into such aperture are then free from the weight of any stack of packages contained in the magazine during all periods of idleness of the machine between its successive operations. The in-

vention also more particularly includes various features of construction and combinations of parts as will hereinafter be evident from the description thereof.

In carrying out the invention, while the features of improvement relate per se more particularly to the delivery of the packages, it is to be noted that some of the features of the coin controlled mechanism per se cooperate with and enter into direct combination with the vending features, and thus virtually or in effect necessarily form parts of the vending mechanism in order thereby to render the machine operable for carrying out the invention. In the combination, the coin controlled mechanism constitutes the means for operating and controlling the vending mechanism in the manner required in accordance with the invention. For example, the positively controlled step by step movement of the magazine member is effected by means of manually operable coin controlled parts. The present invention is shown in the illustrated embodiment thereof as carried out by utilizing the coin controlled mechanism which is disclosed and claimed per se in my above noted prior application for patent, but it is to be understood that various changes in construction, both as to the coin controlled mechanism and as to the vending mechanism operated and controlled thereby, may be made without departing from the spirit and scope of the invention as defined in the appended claims.

One embodiment of the invention is illustrated in the accompanying drawings, in which:

Fig. 1 is a horizontal section of a complete vending machine embodying the invention, taken on the line 1—1 of Fig. 3, showing the parts at rest in the idle condition of the machine and also further showing, in broken short dash lines, an intermediate position of movement of the rotatable package carrying magazine member during the operation of the machine;

Fig. 2 is a horizontal section on the line 2—2 of Fig. 3 and shows, among other things, a plan view of the rotatable delivery plate as locked at its delivery position of rest;

Fig. 3 is a somewhat irregular but substantially central vertical section from front to rear of the complete vending machine, this section in the lower part of the machine being taken substantially on the zig-zag line 3—3 of Fig. 1, the middle part of the magazine being broken out as indicated by the broken parallel lines;

Fig. 4 is a partial horizontal section substantially on the line 4—4 of Fig. 3;

Fig. 5 is a partial horizontal section similar to Fig. 1 but showing the position in which the rotatable magazine member is locked when one of its package-containing channels becomes empty;

Fig. 6 is a partial vertical section on the irregular zig-zag line 6—6 of Fig. 5;

Fig. 7 is a vertical section on the line 7—7 of Figs. 2 and 8;

Fig. 8 is a left side elevation of the base part of the machine, partly in vertical section on line 8—8 of Figs. 2 and 10, and also partly broken away in vertical section;

Fig. 9 is a partial vertical section developed in a plane indicated by the arcuate line 9—9 of Fig. 1, and

Fig. 10 is a front view of the complete machine with the lower base part thereof in elevation and the upper or magazine part thereof in substantially central vertical section on the somewhat irregular line 10—10 of Fig. 1, the slight modification of construction shown in the magazine cover having no relation to the present invention.

Excepting as to features of the operating mechanism involving the present invention and also excepting as to some changes in the casing construction which are unrelated to this invention, the vending machine shown in the accompanying drawings and in which this invention is embodied is in other respects of substantially the same general construction as that disclosed in my hereinbefore mentioned prior copending application for patent. It may be noted that some of the features of this different casing construction shown in the drawings form a part of the subject matter of my copending application for patent, Serial No. 168,300, filed February 15, 1927.

In the illustrated embodiment of the present invention, a strong lower casing base part, which may be a suitable casting and which tapers slightly upwardly and is for the most part circular, has an enclosing side wall 1 which is closed at its upper end by a top plate 2 which also forms a magazine bottom plate and which may be cast in one piece with the side wall 1, as shown. At the front of the machine the side wall 1 is shown as having a forwardly projecting flat portion above which there is provided an upwardly removable front slide 3 which is guided in the main wall part 1 and is provided at its top with an inner flange which is horizontally aligned with the plate 2. A removable money pan 4 closes the lower end of the wall 1, fitting at its edge or rim into the lower end of this wall and abutting against a shoulder formed thereon. A frame 5 forms a forwardly located vertical partition within the wall 1 and supports parts of the coin controlled mechanism. This frame is provided with a coin chute 6 for directing the coins into the money pan 4.

The magazine casing part has a vertical cylindrical side wall 7 which may be of glass, as indicated. The lower edge of this

cylinder is protected by a flanged metal ring 8 secured thereto by an adhesive and grooved to fit over a bead which projects above the periphery of the magazine bottom plate 2 and extends along the top of the removable slide 3 which is thus held in place. The upper end of the cylinder 7 is closed by a flanged metal cover plate 9 which is secured to the cylinder by an adhesive.

The upper magazine casing part may be lifted off as a whole for replenishing the magazine with packages to be vended. As shown in Fig. 3, this upper casing part and the casing base part may be held and locked together and the money pan 4 may be held and locked in place by means of a central tie rod or locking shaft 10 which is anchored and fixed in place in the casing base part by means of a clamp provided on the end of a bracket arm 11 projecting from the frame 5. The lower end of this rod 10 is detachably engaged by a money pan lock 12 seated in an upstanding boss 13 on the bottom of the money pan, and the upper end of this rod is similarly engaged by a magazine lock 14 seated in a depending boss 15 on the cover 9. In Fig. 10 the corresponding tie rod and locking shaft 16 is shown as headed above the magazine cover plate 17, this rod being removable along with the magazine casing part, the money pan lock 12 serving also as a magazine lock, and the bracket arm 11 shown in Fig. 3 may be omitted. Excepting as to this slight modification shown in the casing construction, the entire vending machine shown in Fig. 10 is to be considered as being of the same construction as is shown in the preceding figures of the drawings. In Figs. 3, 4 and 8 the vending machine is shown as supported from the rear thereof by means of wall brackets, which, so far as the present invention is concerned, may be of any suitable construction.

The cylindrical upper casing part or magazine chamber has therein a package-supplying magazine member which is rotatable on a vertical axis and comprises a circumferential series of vertical equidistantly spaced package-containing channels A, shown as eight in number. In the construction shown, each of the channels A is a sheet metal column and comprises a narrow outer or peripheral wall 18 in the form of a laterally inturned flange, a wide radial rear wall 19, a shorter inner wall 20 and a forward wall 21 from the outer limit of which there extends forwardly a connecting web 22, which at its edge is provided with an outwardly turned flange 23 which is firmly secured, for example, by spot welding, to the back of the radial rear wall 19 of the next adjacent column or channel in the series. At their upper ends the channels A are further secured together and held rigid by means of a peripherally notched and flanged plate 24 firmly secured thereto. The lower ends of these channels are similarly rigidly secured together and firmly held by means of a peripherally notched plate 25 beneath which the ends of the inner walls 20 of the channels A are flanged and firmly secured thereto. It will now be seen that the rotatable magazine member provided with the package-containing channels A is rigid, strong and light. The lower open ends of the channels A terminate adjacent to but out of contact with the smooth upper surface of the magazine bottom plate 2, which may be circularly grooved to provide smooth circular ridges or tracks, as shown in Fig. 3, but omitted from Fig. 1, for clarity.

This package-supplying magazine member is supported and rotatably mounted by means of a hub disc 26 which is journaled in a rather large central aperture in the magazine floor plate 2 and has a peripheral flange overlying this plate, while its lower face is substantially flush with the lower surface of this plate 2. The locking rod 10 passes freely through a central aperture in this journal disc. On its upper side this disc is provided with a short boss 26^a over which the lower plate 25 of the magazine member snugly fits, and with a pair of diametrally disposed lugs 26^b which snugly enter holes in this plate, so that the entire magazine member having the channels A is rotatably coupled to the disc 26. On its lower side this disc 26 is centrally provided with a long depending boss 26^c and with a pair of diametrally disposed drive lugs 26^d, shown as in vertical alignment with its upper lugs 26^b.

A circular delivery plate 27, immediately beneath the magazine floor plate 2, snugly fits over the long lower boss 26^c up against the lower surface of the disc 26 and has therein holes which snugly receive the lower lugs 26^d of this disc 26. A spur gear 28 which forms a part of a driving device for imparting successive steps of step by step rotative movement to the package-supplying magazine member having the channels A and to the delivery plate 27 snugly fits over the lower end of the boss 26^d up against the lower surface of the delivery plate 27 to which it is rotatably coupled by a pair of diametrally disposed lugs 28^a on the upper side of this gear and which snugly fit in holes in the delivery plate (Figs. 1, 2 and 3). The magazine plate 25, journal disc 26, delivery plate 27 and operating gear 28 are all further coupled and firmly held together as a unit by means of a pair of diametrally disposed bolts 29 (Figs. 1 and 2). The driving device, which includes the spur gear 28, forms a part of the hereinafter further described operating means of the machine.

The delivery plate 27 is provided with

a circumferential series of equidistantly spaced package-delivering openings 27ª which are eight in number to correspond with the number of the package-supplying channels A. These openings are shown as formed by deep peripheral notches in the delivery plate, the rear edge walls of such notches being radial and the bottoms of these notches are at the same radial distance from the common axial center as are the inner walls 20 of the channels A. At the front and left side of the machine a substantially sector-shaped or segmental stationary floor plate 30 is fixed immediately beneath the delivery plate to support packages in the delivery openings 27ª and guide them to an advanced position in which they may drop from a substantially radial delivery edge of this floor plate 30, this edge being substantially in vertical alignment with the rear radial edge wall of one of the delivery openings 27ª when the delivery plate has completed a delivery movement and has been brought to rest, as is shown in Fig. 2.

Above the lower floor plate 30 the magazine bottom plate 2 has therein an aperture 31 (Figs. 1, 5, 6, and 9) which is of a suitable size and shape and so positioned as to form an exit opening for packages 32 contained in the channels A as the latter are successively moved around. As the packages drop into this opening 31 the stacks of packages in the channels A successively move downward. The packages successively received in this opening 31 are retained therein and subsequently drop therefrom into the delivery openings 27ª of the delivery plate 27, in the step by step movement of this plate together with that of the channels A.

When the delivery plate 27 slides the packages off the forward or delivery edge of the lower floor plate 30 they drop from the delivery openings 27ª into the upper end of a delivery chute 33 by which they are guided through an opening 34 in the lower part of the base wall 1 and into a reception cup 35 shown as cast on the wall 1 at the lower end of this chute. As the packages are moved over the lower floor plate 30 by the delivery plate 27 they are guided at their outer ends by an arcuate wall portion 36 in the base wall 1 (Fig. 2). In the machine shown, the delivery plate 27 and the magazine bottom plate 2 are each of substantially the same thickness as one of the packages 32 to be vended, so that thereby the purchase delivered at each operation of the machine will comprise a single package. The outer guide walls or flanges 18 of the channels A keep the outer ends of the packages 32 in even alignment and out of contact with the glass cylinder 7, against which otherwise they might sometimes scrape.

In carrying out the invention a normally automatically effective releasable locking device is provided for positively stopping and locking the rotatable magazine member having the channels A and likewise at the same time stopping and locking the delivery plate 27 after each step of movement, in which the magazine member supplies a package to the exit opening 31 and the delivery plate delivers a previously supplied package to the reception cup 35. In the illustrated embodiment of the invention, this locking device comprises a double acting locking pawl 37 pivoted within the base wall 1 on a vertical pivot pin 38 and normally urged to its engaging position by a spring 39, to engage in the outer end of one of the empty delivery notches 27ª of the delivery plate 27 at the rear of the machine, thereby normally positively locking both the delivery plate and the above described magazine member at their normal positions of rest against rotative movement in either direction, as shown in Figs. 1 and 2.

This delivery plate 27 thus becomes also a locking disc for the entire delivery mechanism of the machine. By reason of the large diameter of this plate and its strong connection to the loaded magazine member, the pawl 37 will be effective to stop and lock this member without danger of breakage of any part of the mechanism. This locking pawl, together with the means provided for operating it in such manner as to release it and thereafter to permit its automatic reengagement, forms a part of the hereinbefore mentioned and hereinafter further described means for operating the machine in effecting the successive delivery of the packages 32.

According to the present invention, the rotatable magazine member is brought to a stop and locked in a normal position of rest in which the package-receiving aperture 31 in the magazine floor plate 2 will be between two of the package-containing channels A, and thus these channels and this aperture will be out of vertical alignment. Accordingly, this magazine member will supply a package 32 to the aperture 31 during the rotative movement of the magazine member and while one of its channels A is passing over this aperture, and when the magazine member is brought to rest the packages in this channel A, as well as in all of the other channels, will rest upon and be supported upon the smooth surface of the magazine bottom 2.

Any package which has dropped into the aperture 31 will not be subjected to the weight of a stack of packages above it, and accordingly when this package drops into a delivery opening 27ª of the delivery plate 27 it may be freely and easily moved for effecting its delivery. The position of the

channels A of the moving magazine member at the time when one of these moving channels supplies a package 32 to the aperture 31 is indicated in Fig. 1 by means of the broken short dash lines there appearing, while the final position or position of rest of these channels is shown in section in full lines, and the corresponding final position or position of rest of the delivery plate 27 is shown in dotted lines, corresponding to the plan view of this plate, appearing in Fig. 2.

In the construction shown in the drawings for carrying out the invention, the lower plate 25 of the magazine member and the delivery plate 27 are rigidly so connected together as a unit, through the connecting means already described, that the package-containing channels A of the magazine member and the delivery openings 27ª of the delivery plate 27 are circumferentially out of vertical alignment, with the channels A shown as disposed substantially midway between the openings 27ª, that is, the channels A are circularly spaced substantially 22-1/2 degrees relatively to the openings 27ª. Also it will be noted of the construction shown that when the channels A and the delivery plate 27 come to their locked position of rest one of the delivery openings 27ª of the latter is positioned directly beneath and in vertical alignment with the package-receiving aperture or exit opening 31 in the magazine bottom plate 2, as will be clear from Figs. 1 and 2 and as is shown in Fig. 9.

This package now contained in the delivery opening 27ª was deposited in the aperture 31 during the time of the last previous operation of the machine and was at that time initially received upon the top of the delivery plate 27 between two of its openings and while the delivery plate was moving in unison with the channel A which was then passing over the aperture 31, the entire stack of packages in this channel then moving downward so that the lowermost of these packages was then left behind in the opening 31 as this channel traveled onward, and as the delivery plate 27 moved onward this package dropped from the aperture 31 into a delivery opening 27ª. At the next succeeding operation of the machine this package contained in the opening 27ª will be delivered by the delivery plate 27 while another package will be supplied to the delivery plate in the manner above described, and so on.

Thus it will be seen that, according to the invention, each package 32 which is to be thus delivered has previously been separated and segregated from the bottom of one of the stacks of packages and is thus left free in an isolated condition to be moved forward underneath the magazine bottom plate 2 and delivered to the customer in a neat and presentable condition without having had its paper wrapper scarred, torn, or otherwise damaged in this delivery operation. Also, by reason of all of the stacks of packages in the magazine being supported upon the smooth surface of the magazine floor plate 2, the rotatable magazine member may be more easily started in motion when an operation of the machine is initiated.

It is desirable to aid the downward gravitational movement of the packages 32 in the channels A, particularly when the stacks of packages become rather low with a corresponding reduction in their weight, thereby to assure that a package will be positioned in the bottom aperture 31 at each operation of the machine. For effectively accomplishing this result, according to the invention, an individual follower weight 40 is loosely contained in each of the respective channels A above its stack of packages. This follower weight is guided by the walls of the channel and is retained therein and held in position, so that it cannot come in contact with and scrape against the glass cylinder 7, by the outer narrow wall or flange 18 of the channel.

In carrying out the invention, these follower weights are also individually utilized for stopping and locking the rotatable magazine member against movement after the last package has dropped from any one of the channels A and before this empty channel can again pass over the package-receiving opening 31 in the magazine bottom plate 2. In the construction shown, each of the weights 40 is provided at its outer end with a somewhat inwardly inclined forwardly extending arm 40ª which, on the lower side of its forward end, is provided with a square shouldered lug 40ᵇ. The magazine bottom plate 2 is shown as provided with a plurality of four equidistantly spaced locking holes 41 to receive the lugs 40ᵇ, these holes having abrupt forward faces to be engaged by the lugs but the rear faces thereof are inclined at the top to assure the entrance of the lugs. These locking holes 41 are so located that the locking of the magazine member and delivery plate will not take place until after a package has been delivered by the delivery plate 27 and also another package supplied to the package-receiving opening 31 in the magazine bottom plate 2, as shown in Figs. 5 and 6.

In the machine shown, this locking takes place just before the rotatable magazine member and delivery plate 27 have reached their final normal position of rest, but after the delivery opening 27ª which is delivering a package has advanced far enough beyond the delivery edge of the lower floor plate 30 to permit the package to drop therefrom into the delivery chute 33, as is shown in Figs. 5 and 6. The reason for locking these

parts before they have completed their forward movement is in order to lock the entire mechanism of the machine, including a manually operable device for operating the machine, as will hereinafter appear.

Obviously any one of the locking holes 41, if only one such hole were provided, would be effective for accomplishing the above described locking operation, but by providing a plurality of these holes, additional assurance that the locking will take place is provided. As shown in the drawings, such locking will take place at the first of these holes reached after a channel A becomes empty, and such locked condition is shown in Figs. 5 and 6. By providing the individual follower weights 40, together with the outer guide walls 18 of the channels A, the tops of the stacks of packages 32 do not necessarily all need to be at the same level. The narrow outer walls 18 permit a clear view of the packages 32 through the glass cylinder 7 of the magazine chamber. Also the follower weights 40 are readily accessible to be lifted, through the open space provided between the channel walls 18 and 21.

The means for operating the locking pawl 37, which is included with such means in the operating mechanism of the machine, comprises, in the construction shown, a pawl-releasing push rod 42 which extends from front to rear almost centrally across the upper part of the base wall 1. This pawl-operating rod has a reduced rear end portion 42^a which loosely enters a hole in the lower part of the locking pawl 37, this reduced end portion forming a shoulder 42^b which upon rearward movement of the push rod 42 will cause it to disengage the locking pawl 37 from the combined locking disc and delivery plate 27 (Figs. 2 and 3). This operating rod 42 is rectangular in cross section and adjacent its forward end is guided for sliding movement in the frame 5. The forward end of this rod normally projects beyond the partition wall formed by this frame and is there provided, at the left side thereof as viewed in Fig. 7, with an inclined cam face 42^c by means of which this rod may be moved rearwardly for thereby disengaging the locking pawl 37. The manually operable device for effecting such release and the subsequent reengagement of the locking pawl 37 will be presently described.

The hereinbefore mentioned driving device for imparting successive steps of step by step movement to the unlocked magazine member including the channels A and to the unlocked delivery plate 27 further comprises a second spur gear 43 for driving the central gear 28 and which is located forwardly thereof and meshes therewith, in the construction shown these two gears being of the same diameter and having the same number of teeth for rotative movement at the same rate in opposite directions. The drive gear 43 is fixed upon the upper end of a vertical stud shaft 44 which is journaled in the frame 5. In the construction shown, the drive gear 43 forms the initial driving member of the driving device, and for serving this purpose this gear is provided with a circumferential series of eight equidistantly spaced abutment-forming teeth or studs 45 which project downwardly therefrom and by means of which this gear may be given successive steps of movement to the extent of a 1/8 rotation thereof. Such movements are imparted to the drive member or gear 43 by means of the manually operable device now to be described.

As a means for carrying out the invention in an operative construction, there is provided a normally ineffective manually operable device, to be made effective by means of a coin, for causing such device first to release the above described locking device and thereafter to operate the above described driving device for thereby imparting a step of movement to the unlocked magazine member and delivery plate from one of their locked positions to their next locked position in which the package-containing channels A of the magazine member are out of alignment with the package-receiving aperture 31 in the magazine bottom plate 2.

Such manually operable device comprises a rocking coin carrier 46 located in the space provided for it within the front of the casing base between the partition wall formed by the frame 5 and the casing base front wall formed by the flat portion of the wall 1 and by the slide 3. At its rear the coin carrier is journaled on a stud 47 fixed in the frame 5 and at its front is provided with a stud 48 in axial alignment with the rear stud 47 and journaled in the casing wall 1. The rocking movement of the coin carrier 46 is limited by upper and lower stop lugs 49 and 50 provided on the frame 5 to be engaged by a lug 51 which projects from the coin carrier at the left (Fig. 7). The coin carrier is returned to and normally held at its retracted position shown in the drawings by a coiled retractile spring 52 connected to the lower end thereof and anchored to the frame 5. At its upper end or top the coin carrier 46 is provided with a transverse coin-holding slot 53. Above and at the back or left of this slot the coin carrier is provided with a coin-moving finger 54, the rounded end of which will engage substantially the center of a coin 55, the lower edge of which is engaged in the coin-holding slot 53 (Figs. 3 and 7).

The coin 55 is thus held by the coin carrier in a slightly inclined position which is substantially radial to the pivotal axis of the coin carrier to be moved thereby in an

arcuate path from left to right, as viewed in Fig. 7. In the retracted position of the coin carrier a proper coin may be inserted to this position through a slightly inclined coin slot 56 provided in the front slide 3 of the casing base wall. With the coin 55 thus positioned in the coin carrier its rear edge will be just back of or at the left of the inclined cam face 42[c] of the pawl-operating rod 42 and the upper edge portion of the coin will be just at the front or right hand face of the upper stop lug 49 and in spaced relation to one of the abutment studs 45 of the drive member or gear 43, with this stud in the path of the coin as the latter is moved from left to right (Fig. 7) by the coin carrier, some one of these studs being always normally thus positioned.

The remaining parts of the manually operable device which are directly concerned in the carrying out of the present invention will now be described. The coin carrier 46 at its left hand margin and lower part is provided with an internally toothed arcuate or segmental rack 57. This rack is engaged by a pinion 58 having a rear reduced end 58[a] journaled in the frame 5 and provided at its forward end with a head 59 which is journaled in a tubular boss 60 formed on the front of the casing base wall 1. A handle shaft 61 passes loosely through the pinion 58 and has fixed upon its outer end a handle knob 62, the hub 62[a] of which is journaled in the boss 60. The hub 62[a] of the handle knob has coupled thereto to rotate therewith, the cone element 63 of a friction clutch. This cone clutch element has frictional driving engagement with a cup clutch element formed by the head 59 of the pinion 58. These clutch elements are maintained in frictional driving engagement by means of a coiled thrust spring 64 on a projecting portion of the handle shaft 61 inwardly from the frame 5. This spring acts between two washers 65. The spring 64 is kept under tension and the tension may be adjusted by means of a nut 66 on the inner end of the handle shaft 61. One of the washers 65 abuts against the inner reduced end 58[a] of the pinion 58, for enabling the spring 64 to keep the clutch elements in driving engagement, and this washer loosely overlaps the adjacent inner face of the frame 5, for maintaining all of the parts just described in place in the machine.

The remaining parts of the coin controlled mechanism do not appear to be directly concerned in the present invention and do not form elements in the claimed combination, although such parts form features of substantial utility in the complete practically operable vending machine shown in which this invention is embodied, and it might be noted that similar parts are disclosed as forming features in the subject matter of my above noted first filed application Serial No. 39,442.

The entire above described manually operable device, from the coin carrier 46 to the handle knob 62, together with the intermediary parts, is normally ineffective to operate the pawl rod 42 or the drive member 43 and is made effective for doing so by means of a proper coin inserted through the coin slot 56. When the coin carrier carries no coin it may be rocked forwardly to its limit of movement, or to any intermediate point, by means of the handle knob 62 and will be returned to its normal position by its spring 52. While the above described friction clutch connection or coupling for the handle knob 62 exerts sufficient gripping action to operate the machine, it permits the handle knob to be rotated to any extent in either direction, and thereby safeguards all parts of the mechanism against breakage under all conditions.

When a coin is inserted through the coin slot 56, this coin then becomes virtually or in effect an operating part of the coin carrier 46. Should the customer now inadvertently rotate the handle knob 62 in a left hand or counterclockwise direction, there will be no result other than the rotation of this handle knob and no harm can result. When the handle knob 62 is rotated in a clockwise direction, the pinion 58 will impart rocking movement to the coin carrier 46 in the same direction at a reduced rate of movement, but with multiplied power, by reason of which the machine will be effectively operated.

Immediately at the beginning of this forward movement of the coin carrier 46, the rear edge of the coin 55 will engage the cam face 42[c] of the pawl rod 42 and will slide the latter rearwardly, which will operate to move the double acting locking pawl 37 out of the rearmost locking notch or delivery opening 27[a] in the locking disc or delivery plate 27. Immediately after this unlocking operation, the right hand face of the upper edge portion of the coin 55 is brought into driving engagement with the adjacent tooth or stud 45 of the drive member or gear 43 and initiates rotative movement of the latter, while the package-supplying channels A and the delivery plate 27 are still in the unlocked condition. Soon after rotative movement of the unlocked channels A and delivery plate 27 has begun, the coin 55 is carried beyond the end of the pawl rod 42, whereupon the pawl 37 will be pressed by its spring 39 against the smooth periphery of the delivery plate 27, which is then free to continue its movement in sliding engagement with the pawl. When the coin thus sets free the pawl-operating push rod 42, the latter will be immediately returned to its normal forward

position, independently of the pawl 37, by means of a leaf spring 67, which is secured at its lower end to the inner side of the frame 5 by means of a screw 68 and which at its upper end engages in a notch in the lower side of the pawl rod 42 (Fig. 3).

When the magazine channels A and the delivery plate 27 have completed a step of movement of the required extent the pawl 37 automatically snaps into another notch 27a and brings both the delivery plate 27 and the magazine channels A to a stop at their next normal locked position of rest. During this operation a package 32 will be delivered, as above described, by the delivery plate 27 and another package will be supplied to the package-receiving opening 31 by one of the channels A while it is moving thereover, this channel, together with the rest of the channels, subsequently being brought to rest and locked out of alignment with this opening 31 by the automatic engagement of the locking pawl 37 with the delivery plate 27.

In this operation it will be noted that the delivery plate 27 and the magazine channels A are thus brought to a stop at their proper normal position while they are still being driven forward by the then effective coin carrier 46, in the particular machine shown in the drawings the coin 55 itself forming the driving connection. Thus the coin carrier 46 will be brought to a stop before it has quite completed its forward limit of movement as determined by the upper stop lug 49 and the coin carrier lug 51. Thereby, a full forward movement of the delivery plate 27 and the magazine channels A is assured, while at the same time the automatically acting locking pawl 37 prevents the accumulated momentum of the loaded magazine channels A from carrying them, together with the delivery plate 27, beyond their normal proper position of rest.

For the sake of completeness of description, perhaps the remaining parts of the complete coin controlled mechanism shown in the drawings should be briefly noted. When the spring 52 retracts the coin carrier 46, the disengagement of the coin 55 therefrom is assured by means of a spring-pressed coin-disengaging pawl 69 (Figs. 2 and 7). It will be noted that the coin carrier spring 52 is connected thereto through the intermediary of a feeler lever 70 which is pivoted at 71 to the lower end of the coin carrier. The left end of this lever (Fig. 7) pivotally carries a double acting reversible spring-pressed pawl 72 to wipe in either direction over and escape from each end of a segmental ratchet 73 on the frame 5. The upper end of the lever 70 forms a feeler finger at the back or left of the coin-holding slot 53 in the coin carrier 46. When this coin-holding slot is empty, the pawl 72 may reverse on the ratchet 73 to permit the coin carrier spring 52 to retract the coin carrier 46 from any position, but a coin in this slot will lock the movement of the feeler lever 70 so that the pawl 72 cannot reverse on the ratchet 73 and accordingly the coin carrier 46 must be given a full forward movement when it carries a coin. It may be noted that when the rotatable magazine member is locked by one of the follower weights 40 in the channels A, as hereinbefore described, accordingly the coin carrier 46 will then be locked at a forward position by the pawl 72.

A curved horseshoe magnet 74 is mounted to rock on the frame 5 and has its spaced pole ends extending over the coin-holding slot 53 in the coin carrier 46 and is urged towards the coin carrier and normally pressed against the upper stop lug 49 by means of a spring 75. The magnet 74 carries a pair of small rollers 76, and a cam lug 77 on the coin carrier lug 51 successively engages these rollers to rock the magnet against the tension of its spring, which then causes the magnet arms to strike against the stop lug 49. This operation will lift a magnetizable slug out of the coin carrier slot 53 and discard it. Also the spring-pressed magnet arms receive between them the upper edge of the coin 55 (Fig. 7) and aid in positioning it and in maintaining it in position in the coin carrier slot 53, and free from the coin slot 56.

By way of summing up, it may be noted that the gist of the present invention resides in the combined cooperating features of construction by reason of which as soon as a package 32 has been deposited in the package-receiving opening 31 in the magazine bottom plate 2, there will then be no stack of packages resting upon it during the idle condition of the machine, nor to subject it to friction during a subsequent operation of the machine when this package is to be delivered, hence such package may then be delivered without damage thereto, or to any other package, as a result of such delivery. For accomplishing this desired result, manifestly, at all times, both during the operation of the machine and in its idle condition, there must be a proper cooperating relationship between the magazine channels A, the magazine bottom plate 2 in regard to the location of its aperture 31, the delivery plate 27, the lower floor plate 30 from which the packages are delivered, the above described locking device, the above described driving device and the above described manually operable device.

It will now be evident that, in carrying out the invention, parts of the coin controlled mechanism per se have a cooperating relation in direct combination with parts of the delivery or vending mechanism per se

and that particularly is this true of the manually operable device and specifically in regard to the coin carrier thereof, in order thereby to produce an operative embodiment of the invention.

It will be noted of the particular vending machine shown in the drawings for carrying out the invention, that the coin 55 itself, when moved by the coin carrier 46 of which it then forms an operating element, directly operates the locking device and the driving device in proper timed sequence. However, so far as the present invention is concerned, it is substantially immaterial in what particular way the coin 55, when moved by the manually operable device, may operate for rendering the manually operable device effective to operate the locking device and the driving device in their proper sequence of operation, as the coin 55 might otherwise render the normally ineffective manually operable device effective for operating the locking device and the driving device. For example, according to the invention, the coin 55 itself need not necessarily constitute the driving instrumentality, and the coin controlled driving connection under the control of the coin 55 could be different than that shown.

It may be further noted that while this invention has been commercially embodied in a coin controlled vending machine it may as well be embodied in a purely dispensing device or machine without coin control should occasion arise and without departure from the claimed invention.

In conclusion it may be stated that it is obvious that various modifications may be made in the construction shown in the drawings and above particularly described, within the principle and scope of the invention as defined in the appended claims.

I claim:

1. In a vending machine, the combination of a magazine member rotatable on a vertical axis and provided with circularly equidistantly spaced channels to contain packages to be vended, a stationary bottom plate provided with an aperture to receive packages supplied from the lower ends of the channels, a delivery device for the packages received in said aperture, a locking device for locking the magazine member with its channels out of alignment with said aperture, a driving device for rotating the magazine member and operating the delivery device, and a manually operable device to operate the locking device and the driving device.

2. The invention defined in claim 1, in which said delivery device includes a delivery plate connected to the magazine member to rotate therewith and provided with circularly equidistantly spaced delivery openings equal in number to said channels and disposed circularly out of vertical alignment therewith.

3. The invention defined in claim 1, in which each of the channels of the magazine member is provided at the periphery of the latter with an outer peripheral wall for guiding the packages in the channel and maintaining them in vertical alignment therein.

4. The invention defined in claim 1, in which each of the channels of the magazine member is provided at the periphery of the latter with an outer peripheral wall for guiding the packages in the channel and maintaining them in vertical alignment therein, and an individual follower weight above the packages in each of said channels and retained in place and guided therein by said outer wall.

5. The invention defined in claim 1, in which each of the channels of the magazine member is provided at the periphery of the latter with a laterally inturned flange for guiding the packages in the channel and maintaining them in vertical alignment therein, while leaving a peripherally open space for inspection and for convenience in filling the magazine.

6. The invention defined in claim 1, in which each of the channels of the magazine member is provided at the periphery of the latter with an outer peripheral wall for guiding the packages in the channel and maintaining them in vertical alignment therein, and an individual follower weight above the packages in each of said channels and retained in place and guided therein by said outer wall and each such weight being individually effective to lock the magazine member against rotative movement after the last package has dropped from the channel and before such empty channel can again pass over said aperture in the magazine bottom plate.

7. In a vending machine, the combination of a magazine member rotatably mounted on a vertical axis and provided with a circumferential series of vertical equidistantly spaced package-containing channels open at their lower ends, a stationary horizontal plate forming a magazine bottom immediately below the lower ends of said channels and upon which the packages therein rest and may slide around, said magazine bottom plate being of a thickness commensurate with the thickness of a purchase to be delivered and having therein an aperture to receive and retain a purchase supplied thereto from one of said channels passing thereover during the rotative movement of the magazine member, a delivery device immediately below said magazine bottom plate at the said aperture therein to support the stacks of packages in said channels as they pass over said aperture and to deliver a

purchase received therefrom, and means for operating said delivery device and for imparting successive unidirectional steps of package-supplying movement to the magazine member and at the termination of each such step bringing the latter to rest at a position with said aperture out of alignment with and between two of its package-containing channels and so that the magazine member supplies packages to said apertures during its rotative movements as the channels pass thereover, said means including a manually operable device to impart a step of rotative movement to the magazine member from one of its positions of rest to the next position of rest in which the package-containing channels thereof are out of alignment with said aperture in the magazine bottom plate, and a normally effective releasable locking device for stopping and locking the magazine member after each said step of its movement and releasable by the manually operable device preparatory to such step of movement of the magazine member.

8. A vending machine having, in combination, a casing base having a top plate, an upper magazine casing part for which said top plate forms a magazine bottom plate, a magazine member within the magazine casing part mounted to provide for successive unidirectional rotative movements on a vertical axis and provided with a circumferential series of vertical equidistantly spaced channels terminating at their lower ends adjacent to the magazine bottom plate for containing stacks of packages to move downward therein, said magazine bottom plate being of substantially the same thickness as the packages which constitute a single purchase to be delivered and said plate having therein a aperture shaped and positioned to receive from one of said channels and to contain such purchase as the magazine member is moved rotatably thereover, a delivery plate immediately beneath the magazine bottom plate and connected to the magazine member for rotatable movement therewith and provided with a circumferential series of equidistantly spaced package-receiving openings equal in number to said channels for successively receiving packages from said aperture when the delivery plate and magazine member have rotative movement imparted thereto, a lower floor plate immediately beneath said delivery plate in line with said aperture and having a delivery edge in advance thereof so as to retain packages in the openings of the delivery plate until the latter has substantially completed a delivery movement, and operating means for imparting successive unidirectional steps of delivery movement to the delivery plate and of package-supplying movement to the magazine member and at the termination of each such step bringing the latter to rest at a position in which said aperture is between two of its package-containing channels with the latter out of alignment with said aperture and so that the magazine member supplies packages to said aperture during its rotative movements as the channels pass thereover, whereby when the machine is idle the weight of the packages stacked in said channels will be borne entirely by the bottom plate of the magazine while a package which has been deposited in said aperture will be free from such weight of packages in the magazine, said operating means including a manually operable device to impart a step of rotative movement to the magazine member and the delivery plate, and a normally effective releasable locking device to stop and lock the delivery plate and magazine member at each said step of their movement and to be released by said manually operable device preparatory to such step of rotative movement.

9. The invention defined in claim 8, in which said magazine member and said delivery plate are connected together with the package-containing channels of the former disposed circumferentially between and out of vertical alignment with the package-delivering openings in the latter and have a normal position of rest in which one of said openings in the delivery plate is in alignment with said aperture in the magazine bottom plate.

10. The invention defined in claim 8, in which said lower floor plate has a stationary fixed position with its delivery edge permanently positioned to permit a purchase to drop from an opening in the delivery plate substantially at the conclusion of each step of its delivery movement, and a delivery chute positioned at the delivery edge of the lower floor plate for guiding delivered packages to an accessible point.

11. The invention defined in claim 8, in which said magazine member and said delivery plate are connected together with the package-containing channels of the former disposed circumferentially between and out of vertical alignment with the package-delivering openings in the latter and having a normal position of rest in which one of said openings in the delivery plate is in alignment with said aperture in the magazine bottom plate, and in which said lower floor plate has a stationary fixed position with its delivery edge permanently positioned to permit a purchase to drop from an opening in the delivery plate substantially at the conclusion of each step of its delivery movement, and in which said operating means also includes a driving device connected to the magazine member and delivery plate for imparting successive steps of rotative movement thereto and such driv-

ing device including a rotatable drive member provided with a circumferential series of equidistantly spaced abutments by means of which it may be given successive steps of movement by said manually operable device, and in which said manually operable device first releases the locking device and thereafter imparts a step of movement to the drive member for thereby rotating the unlocked delivery plate and the magazine member from one of their locked positions to the next locked position in which the package-containing channels of the magazine member are out of alignment with said aperture in the magazine bottom plate.

In witness whereof, I hereunto subscribe my signature.

LOUIS H. MORIN.