

July 23, 1929.

L. H. MORIN

1,722,230

VENDING MACHINE

Filed Dec. 30, 1925

2 Sheets-Sheet 1

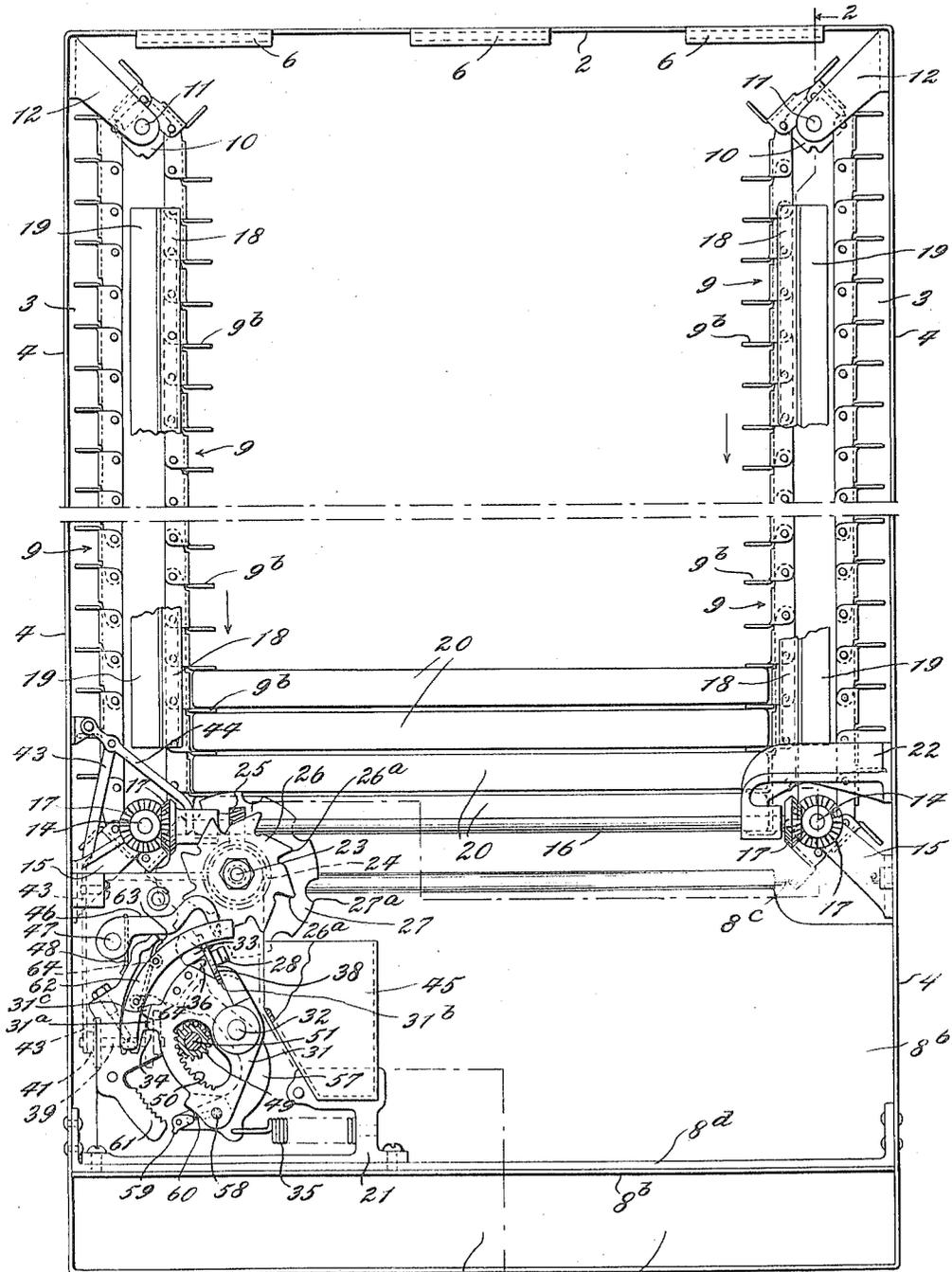


Fig. 1.

8 + 2 8a

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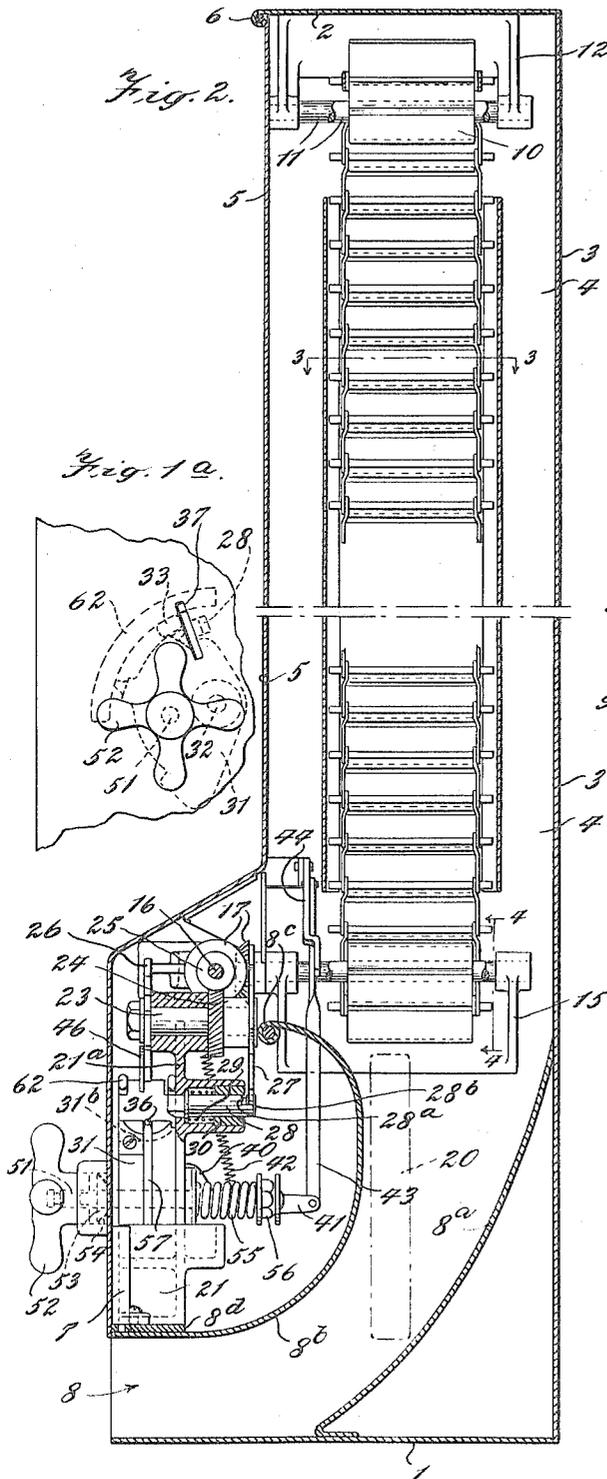


Fig. 2.

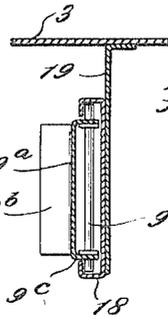


Fig. 3.

Fig. 4.

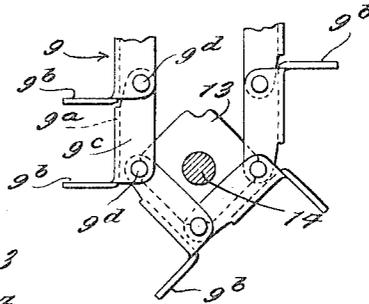
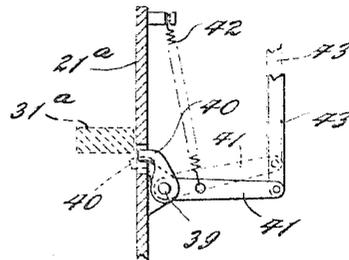


Fig. 5.



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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 December 30, 1925. Serial No. 78,265.

In coin-controlled vending machines, commonly heretofore articles or packages, particularly when of flat or rectangular shape, have been stacked in a magazine to rest one upon another in the form of a vertical column, the lower articles or packages in the column being subjected to the weight of those above; and in effecting the delivery of a purchase one or more of the articles or packages have been pushed out horizontally from the bottom of the stack or column while subjected to the friction due to the weight of the remaining articles or packages resting thereon. This method of vending is satisfactory for articles or packages which are sufficiently rigid, firm and strong. However, vending in this manner is not suitable for frail or soft packages, such as packages of soft fabric in paper wrappers, by reason of the fact that when such packages are stacked one upon another, the lower packages will be compressed and compacted by the weight of those above, and soft fluffy fabric will have its natural looseness and fluffiness destroyed so that its utility will be impaired; also not only delivery would be difficult if not impossible, but the packages would be crushed and crumpled and also would be likely to have their wrappers torn and contents damaged. The machine of the present invention is particularly useful in the vending of soft, frail packages although it is also adapted to vend packages and articles which are rigid and strong. The vending machine illustrated in the drawings as an embodiment of the invention has particular utility in the vending of packages of sanitary napkins and similar articles which when compressed or compacted lose their intended properties, such as that of absorption. The machine shown provides for individually supporting each package so that it is free from the weight of those above it.

This invention relates more particularly to the purchase-delivering mechanism, which in the construction shown in the drawings is adapted to be operated by a moving coin. In carrying out the invention the mechanism employed for thus moving the coin is substantially the same as that disclosed and claimed

in my copending application, Serial No. 39,442, filed June 25, 1925.

An object of the invention is to provide a vending machine particularly adapted for vending soft or frail packages without damage thereto. Another object is to provide a vending machine having a novel purchase-delivering mechanism which is adapted to cooperate with the coin-moving means disclosed in my said copending application. Other objects are to produce a vending machine which is inexpensive to manufacture, effective in operation, strong, durable and dependable. Other more particular objects and advantages will hereinafter appear.

The invention includes features of construction and combinations of parts, as set forth in the appended claims and as will appear from the following description of the embodiment of the invention illustrated in the accompanying drawings in which:

Fig. 1 is a front elevation of the machine with the casing door omitted and with the middle part of the magazine broken out;

Fig. 1^a is a fragmentary front elevation to show the relation of the coin carrier to the coin slot in the casing;

Fig. 2 is a vertical section substantially on the zig-zag line 2—2 of Fig. 1;

Fig. 3 is a partial horizontal section on the line 3—3 of Fig. 2;

Fig. 4 is an enlarged partial vertical section on the line 4—4 of Fig. 2; and

Fig. 5 is a view of parts of the mechanism which are partially concealed in Fig. 2.

The machine has an upright casing which is of rectangular shape as viewed from the front in Fig. 1 and which as viewed from the side in Fig. 2 is of substantially similar shape excepting in its lower portion it is offset forwardly. This casing may be made of suitable sheet metal and comprises a bottom closure 1, a top closure 2, rear wall 3, similar side walls 4 and a front wall 5 which forms a door hinged at its upper end to the top wall 2 at 6 and provided at its lower end with a suitable lock 7. By opening the door 5, access may be had to the entire interior of the casing. A curved delivery chute

8 is provided in the rear and lower part of the casing between its side walls 4. This chute has a rear wall 8^a which extends downwardly and is curved forwardly and at its lower end joins the bottom 1 near the middle of the latter so that the forward portion of the bottom 1 forms a floor part for the chute. This chute has a front wall 8^b of convex shape at the inside of the chute and which at its upper end is held in place by a cross rod 8^c whence it extends on a curve rearward, downward and forward and terminates in a horizontal portion adjacent the lower end of the door 5 and beneath a cross bar 8^d to which it may be secured. It is to be noted that the upper end of the chute 8 is flaring at the top while its other portions are of reduced cross section; this construction being for a purpose which will hereinafter appear. The upper part of the casing may be generally designated as a magazine portion while the lower part at the front of and above the delivery chute 8 houses the coin-controlled mechanism for operating the purchase-delivering mechanism which is adapted to drop the articles to be vended in the upper end of the chute 8; and the novel purchase-delivering mechanism will now be described.

A pair of conveyor or carrier chains 9, forming movable parts of the magazine, are arranged vertically within the casing 1 to have their inner parallel load-carrying runs facing each other and having their return runs adjacent the side walls 4 of the casing. These carrier chains are shown as made up of links each of which is formed of a single piece of sheet metal, each link comprising a flat cross bar 9^a, a package-supporting lug 9^b turned laterally outward at right angles from an edge of the cross bar, the ends of the cross bar being turned over rearwardly at right angles to form end portions 9^c, these end portions of each link being pivoted to the end portions of adjacent links by means of pivot pins 9^d, each pivot pin extending between and through both end portions of adjacent links and projecting therefrom at its ends as shown in Figs. 2 and 3. It will be evident, particularly from Figs. 1 and 4, that this carrier chain 9 is flexible only in one direction and that it will not bend to any appreciable extent in the opposite direction but will be rigid, since the cross bar 9^a, at a point adjacent the lug or shelf 9^b, will then abut against the arms formed by the ends 9^c.

The means for supporting and guiding the carrier chains 9 at the top of their runs adjacent the top casing wall 2 comprise a pair of similar small sprocket wheels 10, each of which is fixed upon a shaft 11 journaled at its ends in a bifurcated bracket 12 secured to the upper part of the adjacent side wall 4 of the casing. At the bottom of its runs each carrier chain passes around a small sprocket wheel 13 fixed on a shaft 14 jour-

naled in a bifurcated bracket 15 secured to the adjacent side wall 4 of the casing. All of the four sprocket wheels are alike and of small diameter so that the carrier chains may economize space in the casing, and also for another reason which will presently appear. Each of these sprocket wheels is shown as of square rectangular shape, provided in each of its corners with a notch in which the pivot pins 9^d of the links engage, the flat projecting parts between these corner notches forming sprocket teeth. It will be noted that the four sprocket teeth engaged successively and individually with the successive links in the carrier chain, each sprocket tooth engaging with a single link, with the inner side or back of the flat cross bar 9^a extending in parallel relation with the flat end of the sprocket tooth as the chain 9 passes down around the square sprocket wheel 13.

The lower sprocket wheels 13 are geared together for rotation at the same rate in opposite directions by means of a transverse shaft 16 and similar bevel gears 17 so that thereby the inner parallel load-carrying runs of the carrier chains will travel in the same direction at the same rate of speed. These load-carrying runs are shown as guided between the upper and lower sprockets by means of flanged guide strips 18 which engage the backs of the chains and which are turned over forwardly and inwardly at their ends to engage the projecting ends of the pivot pins 9^d, each of these guide strips being secured to a supporting strip 19 which is secured to the back wall 3 of the casing. The carrier chains 9 are arranged so that the lugs 9^b thereof on their inner load-carrying runs project horizontally towards each other in alignment. This particular machine is adapted to vend packages 20 of flat rectangular shape, i. e. packages of sanitary napkins, which are received between the load-carrying runs of the carrier chains 9 and are supported thereby. The lugs 9^b extend between the end portions of the packages and divide the stock of packages to be vended into individual purchases. In the machine shown in the drawings each package is individually supported by a lug 9^b at each end thereof as shown in Fig. 1, the packages 20 being sufficiently strong to be supported in this way. Means, now to be described, are provided for imparting purchase-delivering steps of travelling movement to the carrier chains 9 for thereby dropping and delivering the lowermost package 20 while the remainder of the stock of packages is moved downward to a corresponding extent.

A supporting frame 21 is located in the lower forwardly enlarged part of the casing, above and forwardly from the delivery chute 8, at the left side of the casing as viewed from the front and is secured to the cross bar 8^d and to the adjacent side wall 4 of the

casing. The transverse shaft 16, at its left end, is journaled in the upper part of this frame and at its right end is journaled in a bearing bracket 22 secured to the adjacent side wall 4 of the casing. A short horizontal counter-shaft 23 is journaled in the upper part of the frame 21 below the transverse shaft 16 and has fixed thereon a spiral gear 24 which engages a spiral pinion 25 fixed upon the transverse shaft 16, the number of teeth in the gears 24 and 25 being relatively such that one rotation of the drive shaft 23 will impart two rotations to the transverse shaft 16. A coin-operated member in the form of a peripherally toothed drive wheel 26 is fixed upon the forward end of the drive shaft 23 and is provided with eight teeth 26^a which form a circumferential series of equidistantly spaced abutments some one of which at the lower edge of the wheel is normally in the path of the upper edge portion of a moving coin in position to be engaged thereby and moved a step equal to the distance between the teeth as the coin is moved from left to right as viewed in Fig. 1. It will now be evident that the one-eighth step of rotation thus imparted to the drive wheel 26 will impart, through the speed-multiplying gearing connections above described, a one-fourth rotation in opposite directions to the pair of lower sprocket wheels 13 and thereby the package-carrying runs of the carrier chain 9 will be caused to travel downwardly a step equal to the distance between their package-carrying lugs 9^b and the lowermost package 20 supported by these lugs will thus be dropped into the upper end of the delivery chute 8 while the remainder of the stock of packages 20 will be moved downwardly to a corresponding extent. The weight of the stock of packages 20 of course assists in the delivery movement of the carrier chains 9, and this makes the operation of the machine easy.

A locking device adapted to be released by the moving coin preparatory to the delivery movement of the carrier chains 9 is provided for normally positively locking these chains against delivery movement. In the construction shown this locking device positively locks the drive wheel 26 and its shaft 23 against rotative movement in either direction and therefore, through the above described gearing connections, positively locks the carrier chains 9 against travelling movement in either direction. A locking disc 27 is fixed upon the inner end of the drive shaft 23 and is provided on its periphery with eight equidistantly spaced semi-circular notches 27^a. A normally effective automatically engaging coin-operated locking pawl in the form of a short horizontal push rod 28 is provided upon its upper side near its inner end, with a notch 28^a for the reception of the periphery of the locking disc 27 when the latter is rotated, the end portion 28^b of the rod beyond the notch 28^a normally engaging in a notch 27^a of the disc 27 to lock the latter against rotative movement in either direction. This pawl-forming push rod 28 is pressed forward to its engaging position by a coiled compression spring 29 which acts between a forward shoulder on the rod and a plug 30 screwed into the end of a boss on the rear side of a vertical transverse wall 21^a which forms a part of the frame 21. The pawl rod 28 is guided in the plug 30 and at its forward end projects through and is guided in the wall 21^a against the inner side of which the shoulder of the pawl rod abuts to limit the forward movement of this rod, the forward end portion of this rod being squared, as shown, to prevent rotative shifting of the rod. The forward end portion of the pawl rod 28 which projects beyond the wall 21^a is provided, as shown, with an inclined cam surface which is in the path of the rear edge portion of the moving coin so that the coin as it is moved from left to right (Fig. 1) between the front casing wall formed by the door 5 and the frame wall 21^a will push back the pawl rod 28 and disengage its pawl end 28^b from a notch 27^a in the locking disc 27, thus bringing the notch 28^a in the pawl rod in alignment with the disc 27, so that the latter is free to be rotated, thereby to permit rotative movement of the drive wheel 26 and corresponding travelling movement of the carrier chains 9. The pawl rod 28 is so located that while the moving coin is still in engagement with its outer end to hold it in the unlocking position, the coin will come into engagement with a tooth 26^a of the drive wheel 26 and start the latter to rotate together with the locking disc 27. A further slight travel of the coin will carry it beyond the end of the pawl rod 28, whereupon the pawl spring 29 will move the rod outward so that the inner pawl end 28^b of the pawl will ride upon the rear face of the locking disc 27 between adjacent notches 27^a in readiness to snap into the next notch for thereby again locking the disc 27 together with the drive wheel 26 and also locking the carrier chains 9.

During the step of travelling movement of the carrier chains 9 imparted thereto by the one-eighth rotation of the drive wheel 26, the lowermost package 20 will be released by the lugs 9^b which support it and will be delivered through the chute 8 while the next package 20 above the one delivered will be brought into position to be delivered at the next purchase-delivering operation. It is to be noted that the lowermost package 20 to be delivered is relieved of the weight of the remaining packages above it, each of which, in the construction shown, is supported individually so that it does not rest upon the next package below. In the delivery of the lowermost package 20 it is simply released at its ends by the

downward movement and withdrawal of the lugs 9^b as the conveyor chains 9 move a one-fourth step around the lower sprockets 13 by which they are driven. The limited length or extent of projection of the carrier lugs 9^b together with the small diameter of the sprocket wheels 13, by reason of which they make a quarter turn at each purchase-delivering step of movement of the carrier chains 9, as above described, causes the pair of lugs 9^b which support the lowermost package 20, to swing around the sprockets sufficiently to effect a complete withdrawal of these lugs at a single step of movement, thereby to set free and deliver the lowermost package, while the next package above the one delivered is still fully supported by the next following pair of lugs 9^b, which projects horizontally.

In carrying out the invention, the means provided for moving the coin to deliver a purchase as above described, comprise a manually operable rocking coin carrier 31, located between the frame wall 21^a and the front casing wall 5 and pivoted on the frame 21 at 32. The rocking movement of the coin carrier is limited by the engagement of a lug 31^a thereon with stop lugs 33 and 34 provided on the frame 21 and the coin carrier is returned to and normally held at its retracted position shown in the drawings by a coiled retractile spring 35. In its upper portion the coin carrier 31 is provided with a coin-holding slot or notch 31^b and back of this notch is an inclined shoulder from the upper part of which projects a coin-pushing finger 36. The coin holding slot 31^b is curved upwardly at the back to prevent the insertion of angular slugs, and the forward wall of this slot at the front of the coin carrier projects upward to form a coin guide which is shown as a separate piece secured in place by a screw. A coin slot 37 is provided in the front casing wall or door 5 in alignment with the coin-holding slot 31^b in the coin carrier, as shown in Fig. 1^a. When the coin carrier 31 is rocked in clockwise direction as viewed in Fig. 1 thereby to move the coin 38 to cause the delivery of a purchased package 20, as above described, the coin carrier will move across and obstruct the coin slot 37 so that thereby a coin cannot be inserted into the machine until the coin carrier has been retracted to its normal position by its spring 35.

In carrying out the invention, automatically acting means are provided to prevent the loss of coins in the machine when the stock of packages 20 needs replenishing. In the particular machine illustrated in the drawings the coin carrier 31 is then held in position to obstruct the coin slot 37 against the insertion of a coin, although in accordance with the present invention other means could be employed. A horizontal transverse rock shaft 39 pivoted in lugs projecting from the rear of the frame wall 21^a carries at its

end adjacent the coin carrier an upwardly extending pawl or locking hook 40, the outwardly turned upper end of which may be projected through a hole in the wall 21^a into the path of the coin carrier lug 31^a in the return movement of the coin carrier, as shown most clearly in Fig. 5. The other or left hand end of the rock shaft 39, as viewed in Fig. 1, has fixed thereon a rearwardly extending operating lever 41 having connected thereto a retractile spring 42 (Figs. 2 and 5) which normally tends to move the locking pawl 40 to its engaging position. A link 43 has its lower end pivoted to the lever arm 41 and its upper end is pivoted to a feeler lever 44 at an intermediate point thereon. The feeler lever is pivoted at one end to a lug on the adjacent side wall 4 of the casing and extends, as viewed in Fig. 1, to the right and downward and has a downwardly turned free end forming a feeler tip which is normally urged towards the right and against the adjacent end of the lowermost package 20, by the spring 42.

The direction in which the feeler tip of the lever 44 tends to move is transverse to the direction of traveling movement of the stock of articles or packages to be vended. The feeler end of the lever 44 will thus be engaged successively by the packages 20 as the latter are moved downward in effecting the delivery of purchases so that as long as any packages remain, the locking pawl 40 will be held in retracted position. When the last package 20 has been delivered the feeler 44 will then be free to move inward and upward and will be lifted by the spring 42, which at the same time moves the hooked end of the locking pawl 40 into the path of the lug 31^a on the coin carrier as the coin carrier is returned to its normal position by its spring 35. The locking end of the pawl 40 is positioned at a point where it will arrest the return movement of the coin carrier while the latter still obstructs the coin slot 37 so that a coin cannot be inserted. This feature by which the coin carrier 31 is locked in a position to close the coin slot 37 against the insertion of a coin when the magazine of the delivery mechanism requires replenishing is substantially similar to that claimed in my copending application Serial No. 205,285, filed July 13, 1927, as a division of the application which became Patent No. 1,652,540, December 13, 1927.

When a purchase is made and the lowermost package 20 thus released to be delivered through the chute 8, such package will start to drop straight downward in flatwise level position at the beginning of its descent, but almost immediately its forward edge portion will strike against the rounded shoulder formed by the curved forward wall 8^b of the delivery chute, with the result that as the rear edge portion of the package continues to descend, the package will be tipped gradually

and the rear edge of the package will be guided in its downward movement by the rear curved wall 8^a of the chute so that the package will descend by an edgewise movement through the narrower portions of the chute, as shown in broken lines in Fig. 2, and will be delivered in the lower horizontal part of the chute at the front of the machine in a reversed position as compared with its position when it entered the flared end of the chute at the top thereof. It is to be noted that the curved shape of the delivery chute 8 together with its reduced cross section will prevent any one from inserting a hand to extract, or otherwise extracting, an unpaid-for package.

When the coin carrier 31, having reached its forward limit of movement, thereby to deliver a purchase as above described, is set free for return movement, the coin 38 carried thereby will be free to drop into a coin box 45. However, should the coin fail to become disengaged from the coin carrier, its upper edge portion at the rear thereof, as the coin carrier moves backward, will be engaged by a coin disengaging or kick off pawl 46 which is pivoted at 47 on the frame 21 and pressed downwardly towards its coin engaging position by a spring 48, the spring-pressed movement of the pawl being limited by a part of the frame 21. As the coin moves to the right in the operation of the machine, it will pass the end of the pawl 46 by reason of an inclined surface provided thereon and as the coin carrier is retracted the pawl will dislodge the coin therefrom and it will drop into the coin box.

The coin carrier may be rocked against the tension of its restoring spring 35 by means of a pinion 49 engaging an internally toothed arcuate rack 50 formed on the coin carrier. The pinion 49 is loosely mounted on a handle shaft 51 upon the outer end of which is fixed a handle knob 52. The handle knob imparts rotation to the pinion 49 through a friction clutch comprising a cone member 53 rotative with the handle knob and a cup member 54 connected to the pinion 49, the clutch elements 53 and 54 being held in driving relation by a coiled compression spring 55 which is held under tension upon the inner end portion of the handle shaft 51 by means of a nut 56. This yieldable clutch connection is a safeguard against breakage.

It will be noted of the illustrated embodiment of the invention, as thus far described, that the coin-operated toothed drive wheel 26 constitutes an operating member which imparts the definite steps of traveling movement to the carrier chains 9 which are required for effecting a single delivery at each operation of the machine, that the coin-operated pawl 28 together with the locking disc 27 positively determines and limits the extent of each step

of delivery movement of the carrier chains 9 to the making of a single delivery, and that the coin carrier 31, when carrying a coin and operated by means of the handle knob 52, forms an operating device for the locking pawl 28 and for the drive wheel 26, and thus for the carrier chains 9, for imparting such definitely fixed steps of delivery movement thereto. It will thus be seen that the chain-operating drive wheel 26, the chain-locking pawl 28 and the prime operating member or coin carrier 31 directly cooperate with the carrier chains 9 in effecting their desired operation in making deliveries, thereby forming incorporated parts of the delivery mechanism, as well as of the coin-controlled mechanism, in the carrying out of the present invention, as will hereinafter more clearly appear. Obviously the locking of the carrier chains 9 might take place at a different point, for example, at the adjacent sprocket shaft 14, and likewise the coin-controlled driving connection from the coin carrier 31 might be different than that shown. The remaining features of the complete coin-controlled operating mechanism illustrated in the drawings and which forms the subject of my first above noted copending application for patent, Serial No. 39,442 do not have such a direct co-operating relation in the present invention, but form features of the completely operative vending machine in which the invention claimed herein is carried out.

To prevent loss of coins in the machine, means are provided to prevent backward movement of the coin carrier when it carries a coin while permitting free return movement of the coin carrier from any point of its forward movement when it carries no coin. A feeler lever 57 in a slot in the forward edge of the coin carrier is pivoted to the lower part of the coin carrier at 58 and the restoring spring 35 for the coin carrier is connected to the feeler lever 57 below its pivot and normally tends to hold the upper end or feeler tip of this lever to the rear of the coin-receiving slot 31^b in the coin carrier as shown in Fig. 1. The feeler lever 57 has at its lower end a rearwardly extending arm which pivotally carries a reversible pawl 59 which is urged toward its intermediate position by a small retractile spring 60. When the coin carrier rocks in either direction the reversible pawl 59 wipes over a ratchet 61 shown as provided on the frame 21 and escapes from the end of the ratchet at each complete movement of the coin carrier in either direction. When the coin carrier carries no coin, the pull of its spring 35 will reverse the pawl 59 on the ratchet 61 and will return the coin carrier from an intermediate position to its fully retracted position, the upper end or feeler tip of the lever 57 then passing across the empty coin-holding slot 31^b in the coin carrier to

permit the reversal of the pawl 59. When there is a coin in the slot of the coin carrier, as shown in Fig. 1, the tip of the feeler lever 57 will abut against the coin and will prevent the reversal of the pawl 59 so that the coin carrier cannot then be returned to its retracted position until it has completed its forward coin-carrying movement.

A horseshoe magnet 62 for lifting magnetizable slugs out of the slot 31^b in the coin carrier is rocked on its lower middle portion and lifted at its upper end against the tension of a spring 63 by means of a cam lug 31^c which projects from the coin carrier lug 31^a and which successively engages small rollers 64 carried by the magnet. This magnet feature is claimed in my Patent No. 1,657,836 of January 31, 1928, the application for which was a division of my above noted application, Serial No. 39,442. The coin-pushing finger 36 on the coin carrier engages substantially the center of the coin to move the latter for operating the machine to deliver a purchase, but it will pass through the hole in a washer thereby to discard the latter without operating the purchase-delivering mechanism; and also this finger will bend and mutilate a weak slug, such as of thin metal or paper, and discard the latter without operating the purchase-delivering mechanism. The kick-off pawl 46 is effective to remove a washer from the finger 36, thus preventing the possibility of the washer jamming against an adjacent tooth 26^a of the drive wheel 26.

As illustrated in the drawings a single package 20 is delivered at a time to constitute a purchase for each coin inserted, however, it is obvious that with thinner packages two or more packages could be placed between the conveyor lugs 9^b to be delivered at the same time. It is likewise obvious that by increasing the ratio of multiplication of the gearing connections between the drive wheel 26 and the carrier chains 9, two or more of the packages 20 could be delivered at the same time to constitute a single purchase.

However, it is to be particularly noted, in any case, that the packages in the lower part of the vertical series are not subjected to the weight of those in the upper part; either the single package 20, or the few number of thinner packages that may be inserted between adjacent pairs of lugs 9^b, being supported by these lugs so as not to rest upon the next package below, whereby the soft contents of the compressible packages will retain their original loose, soft condition, so as to be salable and satisfactorily usable.

Obviously, particularly when the magazine is fully loaded, the stock of packages has considerable weight also, when moved downward in effecting a delivery, accumulates considerable momentum. In order to deliver an aliquot part of the stock, such as a single package 20, at each operation of the machine,

it is necessary that the carrier chains 9 shall have a step by step movement with each step of equal length and positively determined. The coin carrier 31 acting upon the toothed drive wheel 26 transmits such steps of delivery movement to the carrier chains 9, and the equal length of these steps is positively determined by the locking pawl 28 acting upon the locking disc 27, the pawl 28 also positively preventing free downward movement of the packages 20, by reason of their weight, when the machine is idle. The coin carrier 31, drive wheel 26, locking disc 27 and pawl rod 28 therefore form operating parts of the kind required in the delivery mechanism in the machine shown. Thus it will be evident that these parts form elements both in the coin-controlled mechanism per se and in the delivery mechanism per se, in the illustrated embodiment of the present invention.

Referring to Fig. 1 and also to Fig. 4, more particularly to the depending run of the carrier chain 9 at the left side of Fig. 4, it will be noted of the chain and sprocket arrangement shown and the manner in which it is operated, that the lowermost package 20 (Fig. 1), which is supported at its ends between the two carrier chains 9 on the lowermost horizontal lugs 9^b, will be moved straight downward, with these lugs 9^b still in their package-supporting horizontal position, during the first half or one-eighth part of the complete one-fourth delivery turn, while the complete delivery of this package will be effected during the last half or remaining one-eighth turn of these sprockets, by which the lowermost package-supporting lugs 9^b will be rocked and moved from their horizontal package-supporting position to their lowermost inclined position shown in Figs. 1 and 4, in which these lugs have been, during this latter one-eighth turn, completely withdrawn beyond the opposite ends of the package, with ample clearance for this package to drop for delivery.

Were the arrangement such that these lugs 9^b would drop the package during the first half or first one-eighth turn of the sprockets 13, the delivery of this package would take place at a substantially half-way position of movement of all of the movable parts of the mechanism. Upon the delivery of the package, the customer, particularly if the handle knob 52 were being turned slowly, would release the handle knob with the coin carrier 31 then locked against return movement by the pawl 59, in a position closing the coin slot 37. The next customer, not being able to insert a coin, would most likely conclude that the machine was closed or out of order. Even in a dispensing device without coin control, it is obvious that this manner of operation would also be objectionable, since it would be necessary to complete the previous partial operation before the next suc-

ceeding operation could be inaugurated. It may be well to note that the construction shown could be undesirably timed so as to operate in this objectionable manner. For example, it would only be necessary to retine or mistime the connecting gears 17 a one-eighth turn relatively to each other, so that then the normal position of rest of the sprocket wheels 13 would be a one-eighth turn away from that shown in Figs. 1 and 4.

However, it is to be noted that if, with the sprocket wheels 13 thus retimed in this manner, the carrier chains 9 should be reversed in position on the sprockets, so that then their carrier lugs 9^b on the descending or delivery runs thereof would project from the upper ends of the links, instead of from the lower ends as shown, it should be obvious that the downward tilting delivery movement of these lugs will then be gradual throughout the complete quarter turn from the horizontal to a vertical position of these lugs which support the lowermost package, so that then this package would be delivered near to and substantially at the termination of the complete one-fourth turn of the sprockets 13. This last noted arrangement of the chains and sprockets shown, produces a satisfactory manner of operation and is disclosed in my co-pending application Serial No. 224,051, filed October 5, 1927, for coin controlled mechanism, in which a pair of similar carrier chains and sprockets are shown. It is obvious that this slight modification, effected merely by a different manner of assembly, could likewise be employed in carrying out the present invention.

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 expressed in the appended claims.

I claim:

1. In a dispensing device of the kind having a pair of similar endless traveling carrier chains provided with equally spaced projecting carrier lugs and with the chains supported and guided to have inner vertical parallel runs, these carrier chains being geared together for downward movement of their inner runs at the same rate so that packages carried between the chains on their lugs may be delivered at the bottom of their runs, the combination of a four-toothed sprocket wheel for each carrier chain at the lower end of its run, each link of the carrier chain carrying one of the said lugs and the links being of a length to cooperate successively one by one with the successive teeth of the sprocket wheel so that as the sprocket wheels are rotated the said lugs will be abruptly and quickly withdrawn from beneath the ends of the lowermost package for delivering the latter.

2. The invention defined in claim 1, in combination with a transverse shaft geared at its

opposite ends to the sprocket wheels for thereby gearing the carrier chains together in the manner above set forth.

3. The invention defined in claim 1, in combination with a transverse shaft geared at its opposite ends to the sprocket wheels for thereby gearing the carrier chains together in the manner above set forth, and a drive shaft geared to the transverse shaft at right angles thereto for thereby transmitting the delivery movement to the carrier chains through the said drive shaft and transverse shaft.

4. The invention defined in claim 1, in combination with a transverse shaft geared at its opposite ends to the sprocket wheels for thereby gearing the carrier chains together in the manner above set forth, and a drive shaft at right angles to the transverse shaft and geared thereto through a speed-multiplying gearing so that thereby a slower movement of the drive shaft will result in a quicker movement of the sprocket wheels for releasing and delivering the lowermost package.

5. The invention defined in claim 1, in which there is such a relation between the point of location of the said package-carrying lugs along the length of the respective links and the timing of the said sprocket wheels that the package will be delivered during the latter part and near the termination of a quarter turn delivery movement of the said sprocket wheels from a normal position of rest to the next normal position of rest.

6. In a dispensing device, in combination, a vertically arranged endless carrier chain each link of which is provided with an outwardly right-angularly projecting carrier lug, and a sprocket wheel at the lower end of the run of the carrier chain, the said sprocket wheel having four teeth and being of a diameter relatively to the length of the chain links such that the successive teeth of the sprocket wheel will cooperate successively one by one with the successive links of the carrier chain, and in which the teeth of the sprocket wheel are formed by notches in its respective corners and the chain is formed with journals or pivots to be received respectively in the said notches so that the corner notches of the sprocket wheel engage with the chain successively at the pivot points between its respective successive links.

7. The invention defined in claim 6, in which the links of the carrier chain have overlapping ends pivoted together by means of pivot pins having exposed portions to seat in the said notches of the sprocket wheel so that thereby the corner notches of the sprocket wheel engage the carrier chain at the pivotal points between its respective links.

8. In a dispensing device, in combination, a vertically arranged endless delivery chain comprising one-piece sheet metal links, each link comprising a flat front cross bar and a

package-supporting lug projecting outward
at right angles from one edge of the cross bar
and end portions of greater length along the
chain than the width of the cross bar project-
5 ing rearwardly at right angles from the ends
of the cross bar, the said end portions of the
adjacent links in the chain being overlapped,
pivot pins for the links of which each pivot
pin extends between and through both end
10 portions of adjacent links so as to be exposed
between the said end portions, and a square

four-toothed sprocket wheel at the lower end
of the run of the delivery chain and having
a notch in each of its corners for engage-
ment with one of the said pivot pins and 15
proportioned so that the said notches engage
successively respectively with the successive
pivot pins of the delivery chains.

In witness whereof, I hereunto subscribe
my signature.

LOUIS H. MORIN.