

Aug. 6, 1929.

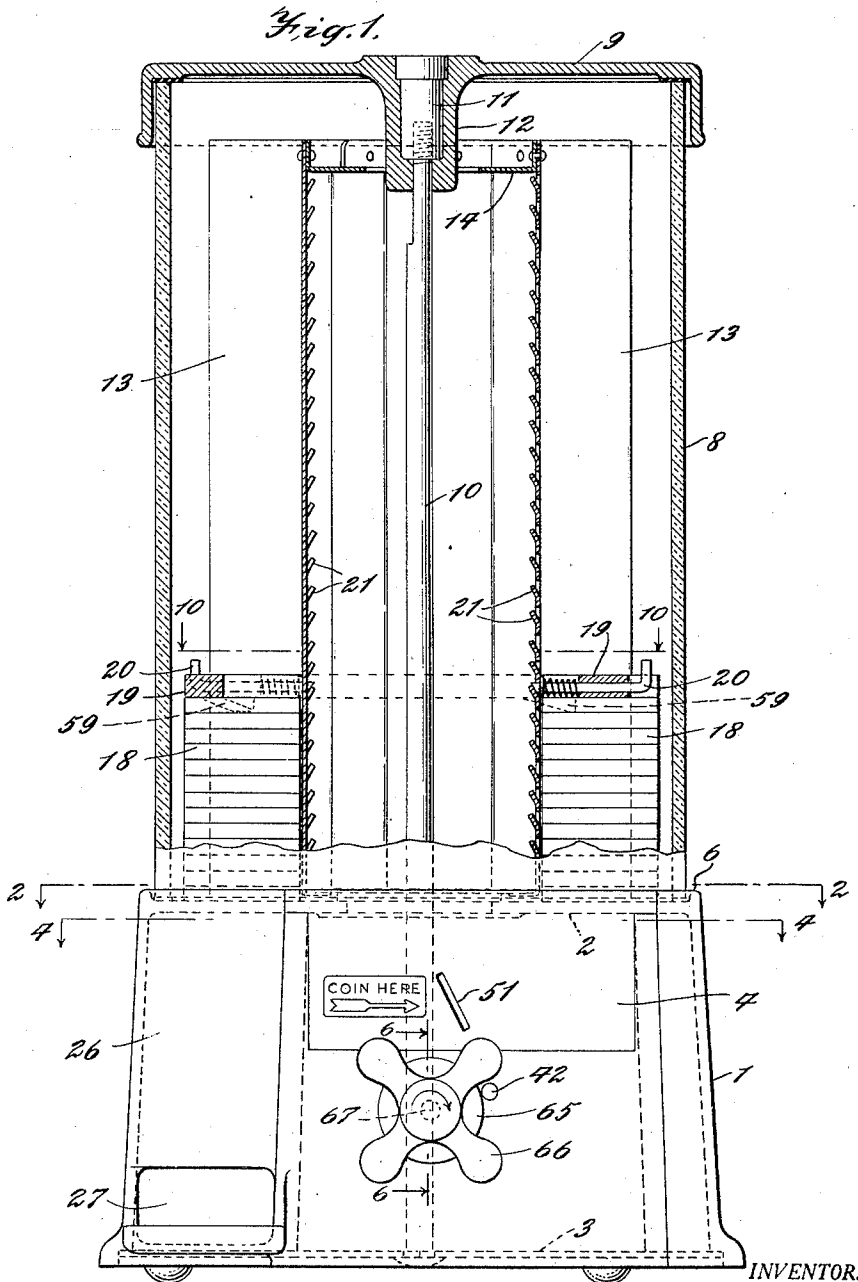
L. H. MORIN

1,723,948

VENDING MACHINE

Filed June 25, 1925

4 Sheets-Sheet 1



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Aug. 6, 1929.

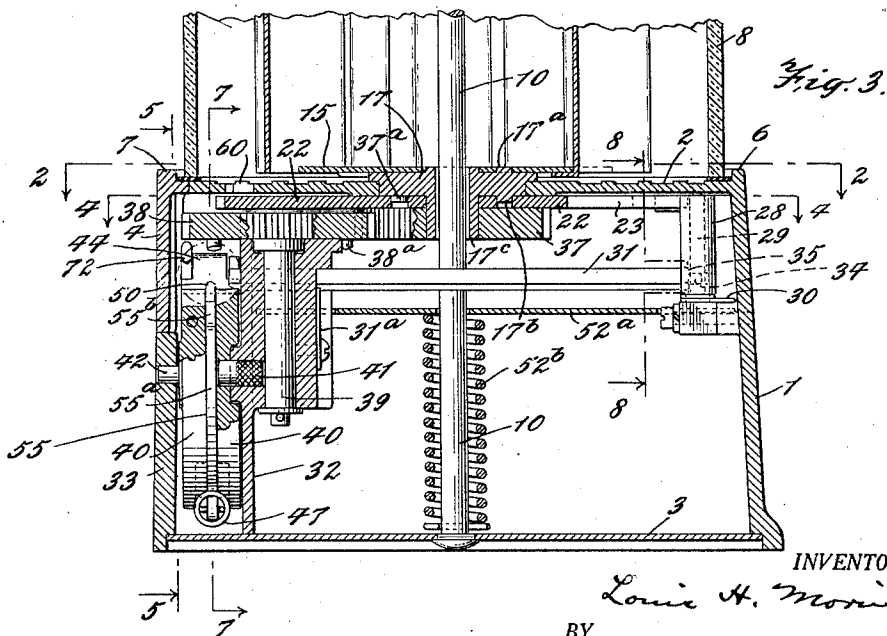
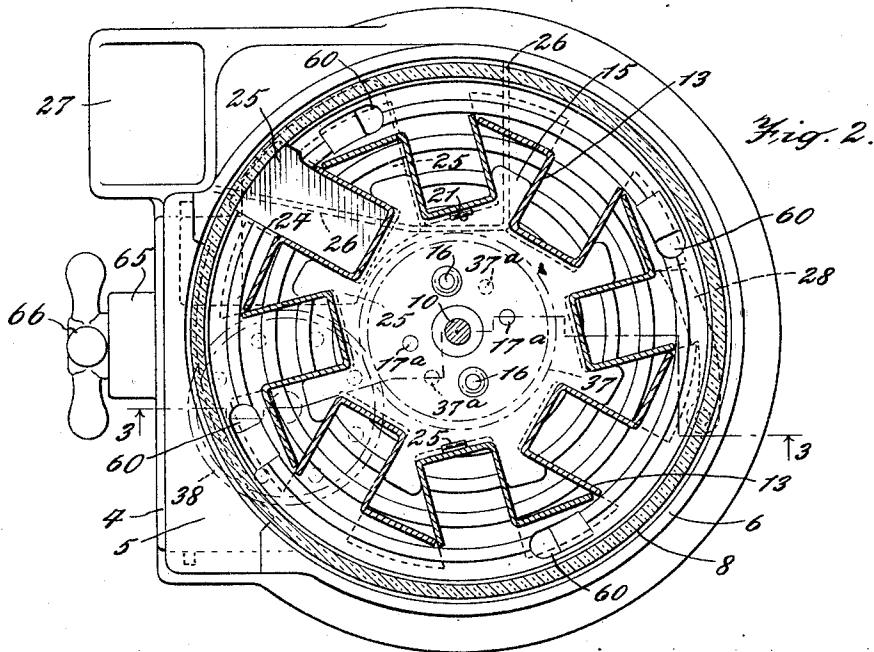
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VENDING MACHINE

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4 Sheets-Sheet 2



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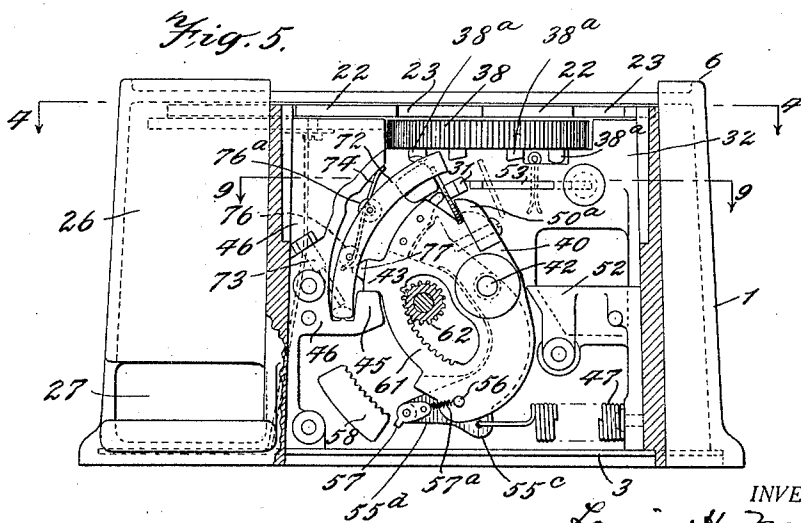
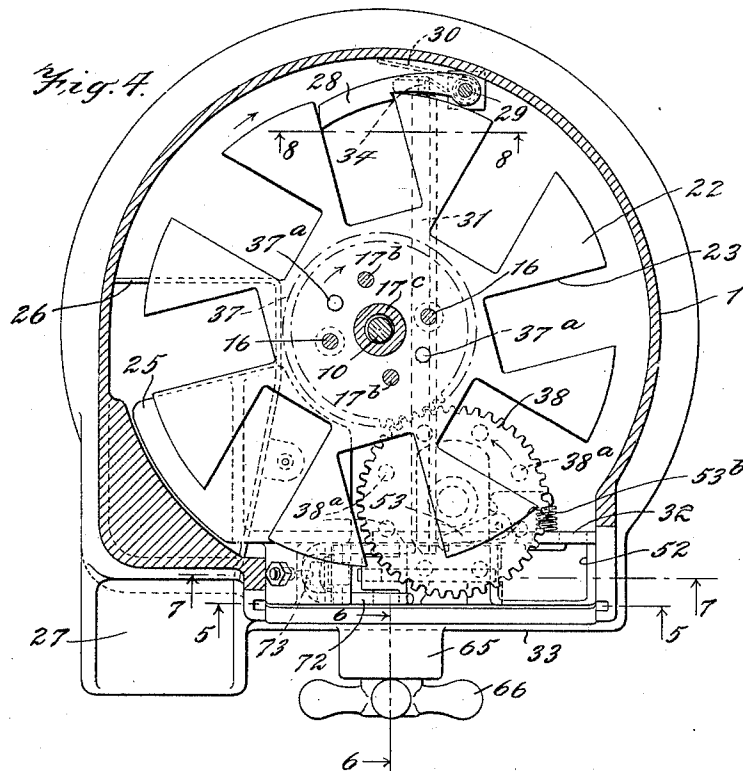
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1,723,948

VENDING MACHINE

Filed June 25, 1925

4 Sheets-Sheet 3



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VENDING MACHINE

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4 Sheets-Sheet 4

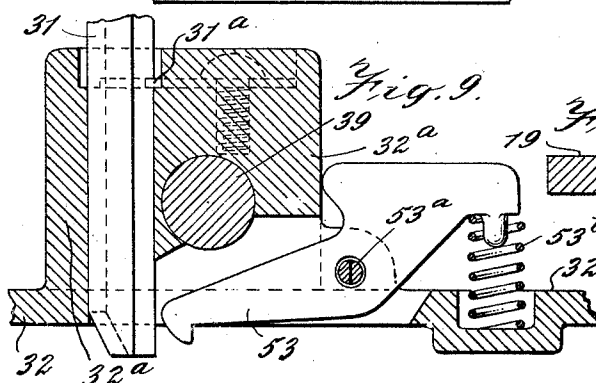
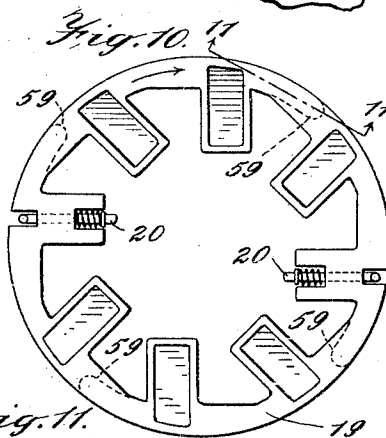
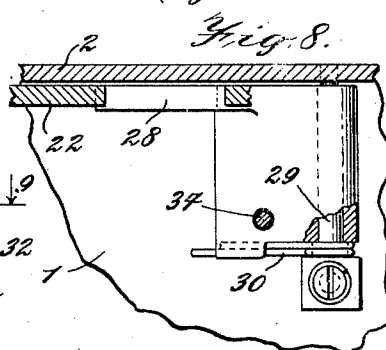
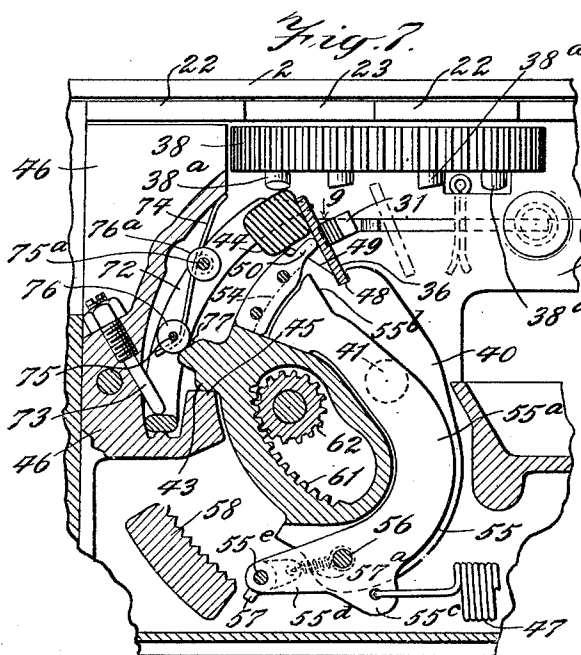
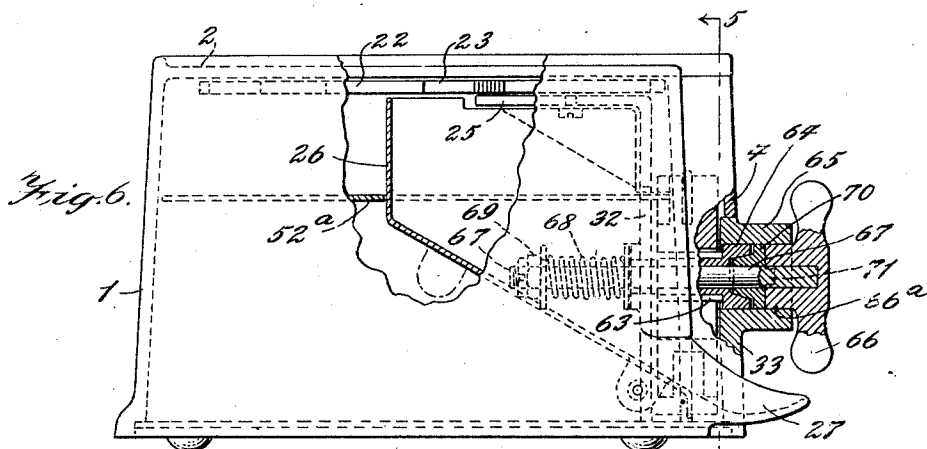


Fig. 11.

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1,723,948

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 June 25, 1925. Serial No. 39,442.

My invention relates to coin-controlled vending machines and has for its general objects, inexpensiveness of manufacture, simplicity of construction, effectiveness in operation, the prevention of tampering with the machine, assurance of operation when the proper coin is inserted, the reduction to a negligible minimum of the possibility of otherwise operating the machine, such as by the insertion of slugs of various kinds, the continuous operative condition of the machine, assurance against breakage and more particular objects and advantages which will hereinafter appear.

My invention includes features of construction and combinations of parts as will appear from the following description.

I shall now describe the embodiment of my invention illustrated in the accompanying drawings and shall thereafter point out my invention in claims.

Fig. 1 is a front elevation, partly in section, of a coin-controlled vending machine embodying my invention.

Fig. 2 is a horizontal section on the line 2—2 of Figs. 1 and 3, turned ninety degrees in a clockwise direction from the position shown in Fig. 1.

Fig. 3 is a substantially central vertical section of the lower part of the machine, on the zig-zag line 3—3 of Fig. 2.

Fig. 4 is a horizontal section on the line 4—4 of Figs. 1, 3 and 5, but turned ninety degrees in a counter clockwise direction from the position shown in Fig. 3.

Fig. 5 is a vertical section on the line 5—5 of Figs. 3, 4 and 6.

Fig. 6 is a side elevation of the base part of the machine partly broken away in vertical section and partly in vertical section on the line 6—6 of Figs. 1 and 4.

Fig. 7 is an enlarged partial vertical section on the line 7—7 of Figs. 3 and 4.

Fig. 8 is a partial vertical section substantially on the line 8—8 of Figs. 3 and 4.

Fig. 9 is a further enlarged partial horizontal section on the line 9—9 of Figs. 5 and 7.

Fig. 10 is a reduced plan view of the lower ring as viewed from the horizontal line 10—10 in Fig. 1.

Fig. 11 is a much enlarged vertical section on the inclined line 11—11 of Fig. 10, as viewed from below.

The coin-controlled vending machine il-

lustrated in the accompanying drawings as an embodiment of my invention has some features which are common to some machines of this type as heretofore constructed and which will now be described, in order that my present invention may be better understood. A prior vending machine of this general type is shown in the patent to Mortensen, No. 1,517,377 of December 2, 1924, in which some of the features of the delivery mechanism are similar to corresponding features in the disclosed embodiment of the present invention, but in which the coin-controlled mechanism is substantially different.

A case-forming base for the machine comprises an enclosing side wall 1, a flat top wall 2, shown as formed in one piece with the side wall 1, a bottom closure 3 and a removable front slide 4 guided at its edges in grooves formed in forwardly projecting portions of the side wall 1, as shown in the drawings, and provided with an inner top flange 5 which is in alignment with and forms a continuation of the top wall or base cover 2 as shown most clearly in Fig. 2. The side wall 1 is extended above the periphery of the top closure 2 to form a circumferential bead 6, and the top flange 5 of the front slide 4 is thickened, as shown at 7 in Fig. 3, to form a continuation of the bead 6.

The top closure 2 of the base forms the floor or bottom of a package-containing magazine which includes a glass cylinder 8 which at its lower end rests upon a gasket as shown on the top of the periphery of the magazine bottom 2 and just within the shoulders formed by the beads 6 and 7, so that the cylinder 8 rests upon the flange 5 of the slide 4 to prevent the removal of this slide, as shown in Figs. 2 and 3. A top cover or closure 9 for the magazine cylinder 8 rests upon a gasket upon the upper end of the latter as shown in Fig. 1. A central shaft 10 ties together the base bottom 3 and the top closure 9, and the latter is removably held upon the upper end of the shaft 10 by means of a suitable lock 11, the top cover 9 being provided with an internal boss 12 for the reception of the lock 11 as shown in Fig. 1.

An inner rotative upright magazine member comprises a circumferential series of vertical equidistantly spaced peripherally

open package-containing channels 13, shown as eight in number (Fig. 2) and which may be formed by suitably bent strips of sheet metal as shown in the drawings. The upper ends of the channels 13 are carried by a cupped disc 14, loosely surrounding the boss 12. The lower ends of the channels 13 are carried by a peripherally notched lower disc 15 which is shown as secured by means of a pair of bolts 16 to a flanged disc 17 which rotatively fits into an opening in the magazine bottom 2 and which loosely surrounds the shaft 10 (Fig. 3). Packages 18 to be purchased and delivered from the machine by means of purchase-delivering mechanism presently to be described, are contained in the magazine channels 13 in which they may move downward by reason of their own weight, assisted by the weight of a follower ring 19 (Figs. 1 and 10) having large internal lugs which project into the channels 13. Any free upward movement of the follower ring 19 is prevented by means of a pair of releasable spring-pressed pawls 20, the inner ends of which engage rack teeth 21 formed in the inner walls of two opposite channels 13, as clearly shown in Fig. 1.

The purchase-delivering mechanism employed in the carrying out of my invention will now be described. A rotative purchase-delivering member is shown as a plate 22 located immediately beneath the magazine bottom 2 and this plate is connected to the above described rotative magazine member, including the package-containing channels 13, by means of the bolts 16, for coaxial rotative movement of said magazine member and purchase-delivering plate 22. The lower disc 15 of the magazine, the flanged disc 17 and the delivery plate 22 are all further rotatively connected together by means of a pair of lugs 17^a on the upper side of the disc 17 entering holes in the disc 15 and a pair of lugs 17^b on the lower side of the disc 17 entering holes in the delivery plate 22. Also the flanged disc 17 is shown as provided with a slight upper boss over which the magazine plate 15 fits and with a longer lower boss 17^c which passes through and extends below the delivery plate 22. The delivery plate 22 is provided with a circumferential series of equidistantly spaced package-delivering openings 23 corresponding in number and in vertical alignment with the channels 13, these openings being formed by peripheral notches in the plate 22 as shown in the drawings so that the delivery plate 22 forms a star wheel.

It will now be evident that the delivery plate 22 and the above described magazine member including the channels 13 are adapted to rotate together from any one purchase-delivering position of the plate 22 to the next succeeding delivery position and that concomitantly the said magazine mem-

ber will be rotated to correspondingly successive positions for supplying packages to the delivery plate 22. For enabling the packages 18 to be thus supplied to the delivery plate 22, the magazine bottom 2 is provided with an exit opening 24 (Fig. 2) through which the packages 18 may be dropped into the corresponding aligned slot 23 in the plate 22, a segmental lower floor plate 25 (Figs. 2, 4 and 6) being provided immediately below the delivery plate 22 upon which a package carried by the delivery plate may be moved along to the purchase-delivering position for delivering a single purchase. In the particular machine illustrated in the drawings such purchase will be a single one of the packages 18.

For thus delivering a single package 18 it is to be noted that the stationary bottom plate or main floor plate 2 of the magazine is of substantially the same thickness as any one of the packages 18, and that the delivery plate 22 is also of the same thickness, so that when a package 18 is supplied to the delivery plate 22, this package will be substantially flush with the upper surface of this plate while the next following package will be retained in the package supplying opening 24 in the magazine bottom 2 substantially flush with both sides thereof. When the plate 22 reaches its delivery position, the package carried thereby will drop into a chute 26, and will slide down the inclined bottom of this chute into an external reception cup 27, shown as formed on the base 1. The above described rotative magazine member having the package-containing channels 13, the delivery plate 22, below and connected thereto to rotate therewith, and the above described means for supplying packages from the magazine to the delivery plate 22 do not per se form a part of my present invention, but these parts, however, particularly the notched plate 22, do form elements in combination in the complete coin-controlled mechanism according to my invention, as will hereinafter appear.

In accordance with my invention and as a feature of the coin-controlled mechanism thereof, a releasable locking device, adapted to be released by a moving coin, is provided and is normally effective to stop and positively lock the delivery plate 22 together with the above described rotative magazine member against rotative movement in either direction away from any delivery position of the plate 22. In the machine illustrated in the drawings, such locking device is shown as comprising a double acting locking pawl 28 pivoted within the base 1 on a vertical pivot 29 and normally pressed to its engaging position by a spring 30, being adapted to engage in the outer end of one of the empty package-delivering notches 23 of the delivery plate 22, thereby, as clearly

shown in Fig. 4, positively locking the delivery plate 22 against rotative movement in either direction. Thus the rotatable delivery plate 22 forms also a coin-controlled locking plate and thereby becomes a part of the coin-controlled mechanism, as will hereinafter more clearly appear.

For disengaging or releasing the locking pawl 28, a coin-operated trip rod 31, which is a push rod, shown as rectangular in cross-section, is provided extending substantially diametrically across the upper part of the casing 1, being guided at its forward end in a vertical partition wall 32, which extends across the forward part of the casing 1 in spaced parallel relation to the slide 4 and bearing a substantially similar relation to a front lower flat wall portion 33 of the casing 1, and this partition wall 32 may be cast in one piece with the casing 1, or it may be a separate casting firmly secured in place therein. At its rear end the slidable pawl-releasing push rod 31 has a reduced portion 34 which loosely engages in a hole in the locking pawl 28, the reduced portion 34 forming a shoulder 35 whereby rearward movement of the push rod 31 will disengage the pawl 28 from the delivery plate 22.

The forward end of the push rod 31 normally projects through the partition 32 and is provided with an inclined cam surface as shown in the drawings, which is normally in the path of the rear edge portion of a coin 36 to be engaged thereby as the coin is removed from left to right, as shown in Figs. 5 and 7 of the drawings, whereby the coin 36 as it moves between the partition 32 and front slide 4 will push back the push rod 31 and thereby disengage the pawl 28, such disengagement of the pawl 28 being effected preparatory to a rotative purchase-delivering movement of the delivery plate 22 and a corresponding package-supplying movement of the rotative magazine member. A slight further forward movement of the coin 36 beyond the pawl-disengaging position thereof will carry the coin beyond the end of the pawl-releasing push rod 31, thereby permitting the pawl spring 30 again to become effective for urging the pawl 28 towards its locking position in readiness again to stop and positively lock the delivery plate 22 at the next succeeding delivery position.

Means are provided for limiting the forward movement of the push rod 31, such means being shown as a leaf spring 31^a which at its lower end is secured by means of a screw to a boss 32^a formed on the inner side of the partition wall 32, the upper end of the spring 31^a engaging in a notch in the lower side of the push rod 31, as shown in Figs. 3 and 9, this spring also being effective to return the push rod to its nor-

mal forward position. As soon as the coin 36 has passed the projecting cam end of the push rod 31 the latter will be thrust forward by its spring 31^a to its normal position independently of the locking pawl 28, thereby leaving the latter to be separately returned later to its locking position without the possibility of such return movement of the pawl being hampered by the push rod, the shoulder 35 on the push rod having moved away from the pawl 28 by reason of the reduced rear end 34 sliding forward in the hole in the pawl 28, as will be readily understood.

In carrying out by invention, mechanism as a coin-controlled feature thereof operated by the moving coin 36, and now to be described, is provided for imparting a step of rotative movement to the combined locking and delivery plate 22 and the package-supplying magazine member from any one of the delivery positions of the plate to the next succeeding positively locked delivery position thereof. A spur gear 37, which fits over the lower end of the lower boss 17^c of the flanged disc 17 coaxial with the delivery plate 22, is fixed to this plate, as well as to the flanged disc 17 and bottom disc 15 of the package-supplying magazine member by the bolts 16, and is further coupled to the delivery plate by means of a pair of lugs 37^a on the upper side of the gear 37 which enter holes in the delivery plate 22, as is shown in Figs. 2, 3, and 4.

A second spur gear 38 which is a coin-operated drive member, forward of the central spur gear 37, meshes therewith and is fixed on the upper end of a stub shaft 39 journaled in the boss 32^a on the partition wall 32, the gears 37 and 38 being of the same diameter and having the same number of teeth so as to have unitary rotative movement in opposite directions. The drive gear 38 is provided with a circumferential series of eight equidistantly spaced abutment-forming studs 38^a which project downwardly therefrom. Some one of these abutments or studs 38^a is normally in the path of the moving coin 36, in position to be engaged thereby while the coin is still in engagement with the end of the coin-operated lock-releasing push rod 31, as will be clear from Figs. 5, and 7, whereby the delivery plate 22 will be in unlocked condition to permit initial rotative movement to be imparted thereto, and when, by reason of the subsequent further advance of the coin 36, the push rod 31 is disengaged thereby, the locking pawl 28, being urged inward by its spring 30, will ride upon the periphery of the delivery plate 22 between two adjacent purchase-delivering slots or notches 23 therein, as will be readily understood, the disengaged push rod 31 being returned to its normal forward position by the spring 31^a. The traveling

coin 36 first unlocks the delivery plate 22 and then, by reason of its engagement with one of the studs 38^a, rotates the delivery plate from one of its delivery positions to the next succeeding locked delivery position, thereby assuring the delivery of a single purchase.

The means employed in accordance with my invention for moving the coin 36 as above described, for first releasing the locking device including the pawl 28, and then to operate the unlocked purchase-delivery mechanism to deliver a purchase, will now be described. Such means comprise a manually operable coin carrier 40 mounted for forward and backward movement and shown as pivoted for rocking movement upon the forward end of a stud 41 fixed in the partition wall 32, which at this point is shown (Fig. 3) as formed with a slight circular boss entering a corresponding recess in the rear face of the coin carrier, and the portion of the stud 41 fixed in the wall is shown as knurled. The coin carrier 40 is further pivotally supported by means of a stud 42 projecting from the front thereof in axial alignment with the rear stud 41 and journaled in the front casing wall 33.

The coin carrier 40 is in general arcuate or segmental in shape, as appears in Figs. 5 and 7, and is of a width or thickness substantially to fill the space between the partition wall 32 at the back, and the front slide 4 and flat wall 33 at the front, as shown in Figs. 3 and 4. Upon its arcuate left edge portion (Figs. 5 and 7) the coin-carrier 40 is provided with a projection or lug 43 for limiting the forward coin-carrying movement of the coin carrier, by engaging an upper stop lug 44 carried by the partition wall 32, and for limiting the backward or return movement of the coin carrier 40 by engagement with a lower stop 45, shown as provided on the lower end of a bracket member 46 secured to the base 1 within the casing part thereof formed between the partition 32 and the upper and lower front portions 4 and 33 of the base. This bracket 46 may be cast in one piece with the frame wall 32.

After the coin carrier 40 has been moved forward manually by means presently to be described, it is retracted or returned to its normal position by means of a retractile spring 47 attached indirectly to the lower portion thereof, through means presently to be described, and anchored in the base 1, as shown in Figs. 3, 5 and 7, which show the coin carrier 40 in its normal or retracted position with its limiting lug 43 abutting against the lower stop 45. At the top and near its forward edge the coin carrier 40 is provided with a transverse coin-holding slot or notch 48 for receiving somewhat snugly but freely the lower edge of the coin 36, and back of the coin-receiving slot 48

a radially inclined shoulder 49 is provided for a purpose which will hereinafter appear. At the top of the inclined shoulder 49, the coin carrier 40 is provided with a coin-pushing finger 50 for engagement with the center of the coin to be moved.

This coin-moving finger 50 is shown as formed of a separate piece of material and has a flat shank portion set into a slot in the main body part of the coin carrier 40 and shown as firmly held therein by means of pins, this slot extending through the coin-holding slot 48 and continuing with considerable depth entirely around the right and lower edges of the coin-carrier, for a purpose presently to be described. The bottom of the coin-holding slot 48 is curved upwardly at the back on the arc of a circle, to fit snugly the edge of a coin, as shown in Fig. 3, in which the coin 36 is shown in broken lines, thereby to prevent the insertion into the slot of square or otherwise angular slugs. At the front side of the coin carrier the forward wall of the coin-receiving slot 48 projects upwardly for some distance in the form of a tapered finger 50^a which forms a coin guide, this coin guide 50^a being shown as a separate piece set in a notch in the main body part of the coin carrier and firmly secured thereto by means of a screw, as shown in Fig. 5. The coin-moving finger 50 has a further important function which will hereinafter appear.

A coin, such as the coin 36, may be inserted edgewise into the machine through an inclined coin slot 51 provided in the removable slide 4, as shown in Fig. 1, this coin slot 51 of course being of sufficiently small dimensions to prevent the insertion of slugs which may either of greater diameter or greater thickness than the proper coin. When the coin 36 has been inserted into the slot 51 it is received at its lower edge in the slot 48 in the coin carrier and passes just above the upper stop lug 44 upon which it may rest in inclined position in front of the rounded end of the coin-pushing finger 50, as illustrated in Figs. 5 and 7. As the coin carrier is manually rocked in a forward direction against the tension of its spring 47, the finger 50 pushes the coin forward with its lower edge seated in the slot 48 which, while it receives the coin freely, at the same time prevents any sidewise angular movement or rocking of the coin on the end of the finger 50.

As the coin 36 moves forward, immediately at the beginning of its movement, as will be clear from Figs. 5 and 7, its rear edge comes into engagement with the inclined cam face of the push rod 31 and pushes this rod back, thereby releasing the plate-locking device, including the locking pawl 28, as hereinbefore described and as will be readily understood. While the

edge of the coin 36 is thus holding back the push rod 31, the upper forward edge portion of the coin comes into engagement with one of the abutment pins or studs 38^a whereupon a slight further forward movement of the coin 36 will free the coin from the push rod 31, and continued forward movement of the coin will rotate the stud-carrying drive gear 38 through one-eighth of a complete rotation, thereby rotating the delivery plate 22 to its next delivery position, whereby a single purchase, comprising one of the packages 18, will be delivered as hereinbefore described.

The coin 36 in the coin carrier 40 has now reached its final forward position. As the coin carrier 40 is retracted or moved backward by its spring 47, the upper edge of the coin, which now inclines slightly in a forward direction, will be free from the stud 38^a and the coin will drop into a coin chute 52 provided in the casing 1, and thence through an opening in the partition 32 to the casing bottom 3, as shown in Figs. 4 and 5 of the drawings. To guard against coins falling from the bottom 3 into the mechanism of the machine, should the machine be inverted, a guard plate 52^a is provided and is held up by a spring 52^b against shoulders (not shown) provided in the casing 1.

To insure against the coin failing of its own accord to free itself from the coin carrier, so as to drop into the coin chute 52, a spring-pressed coin-disengaging pawl 53 shown as pivotally mounted on the partition wall 32 and having its hooked end projecting within the wall into the path of the coin, will dislodge the coin from the coin-carrier, it being noted in this connection that lost motion is provided between the hook of the pawl 53 and the coin in the final position of the latter, so as to enable the upper edge of the coin to free itself from engagement with the abutment stud 38^a, which will be clear from the drawings, particularly Figs. 5 and 7. The coin-disengaging or kick-off pawl 53 is shown as pivoted intermediate of its length on a pivot pin 53^a, the hook-carrying arm of this pawl lying in a horizontal slot in the partition wall 32, the tail of the pawl being urged away from the rear of the wall 32 by a compression spring 53^b, the spring-pressed movement of the pawl being limited by the boss 32^a, and the outer face of the hook of the pawl being inclined to form a cam surface, whereby the hooked arm of the pawl will be moved rearwardly by the advancing coin, as shown most clearly in Figs. 5, 7 and 9.

In order to provide for the free and unobstructed automatic return of the locking pawl 28 to its locked position shown in Fig. 4 when the coin carrier 40 has been rocked forward or to the right as viewed in Figs. 5 and

7, so that its shoulder 49 has passed beyond the inclined cam end of the pawl releasing push rod 31, the peripheral part of the coin carrier 40 is cut away or provided with a groove 54 adjacent the partition wall 32, as shown in dotted lines in Fig. 7. It is to be noted that as soon as the coin carrier is rocked away from its normal position shown in the drawings, it will block or close the coin slot 51 against the insertion of a coin, thereby assuring proper operation of the machine and preventing loss of coins, as will hereinafter more clearly appear.

Normally, or when no coin is carried by the coin carrier 40, the coin carrier is free to be rocked idly and harmlessly forward and back between the limits of its stops 44 and 45. In order to assure the proper operation of the machine and to prevent the loss of coins therein, means are provided which, when a coin is carried by the coin carrier, operate automatically to prevent backward or return movement of the coin carrier 40 from any intermediate point of forward movement between its stops 44 and 45, thereby, when the coin carrier carries a coin, compelling a complete forward movement of the coin carrier before it can have any return movement; such means, when no coin is carried by the coin carrier, also operating automatically to permit the coin carrier to be returned by its spring 47 from either its final forward position or from any intermediate position of forward movement to its normal retracted position shown in the drawings, thereby to uncover the coin slot 51 so that the machine will be in a condition to receive a coin for effecting a purchase-delivering operation thereof. In the illustrated embodiment of the invention such means comprise a pawl-and-ratchet device controlled by a feeler which in turn is controlled by a coin, thereby to control the movements of the coin carrier in the manner above described; and the particular mechanism illustrated as comprised in such means will now be described.

A three-armed lever 55 forming a feeler, is located in the hereinbefore mentioned long, deep slot in the coin carrier 40 and is pivoted to the lower part of the coin carrier by means of a pivot pin 56. The long, curved upper arm 55^a of the lever 55 forms a feeler finger terminating in a feeler tip 55^b; the restoring spring 47 for the coin carrier is connected to the short arm 55^c, which extends downward and laterally at an inclination to the right, as viewed in Figs. 5 and 7; and the remaining arm 55^d extends laterally to the left and at its free end has pivoted thereto, by means of a pivot pin 55^e, a pair of reversible pawls 57, one at each side of the arm 55^d, each pawl 57 having an arm to which is connected a small retractile spring 57^a which is anchored to the pivot

pin 56 on the coin carrier, each spring 57^a having a tendency to hold the corresponding pawl 57 at the intermediate position thereof shown in the drawings, each pawl having a free pawl end which projects radially in relation to the pawl pivot 55^e and which in the positions of the parts shown in the drawings is also radial to the pivotal axis of the coin carrier provided by the pivot studs 41 and 42. A ratchet block 58 provided with arcuately arranged saw-tooth ratchet teeth in the path of the free ends of the pawls 57 is fixed in the casing adjacent the bottom closure 3 and adjacent the left side of the casing part formed between the casing walls 32 and 33, as shown in Figs. 5 and 7. The coin carrier spring 47 besides having a tendency to return the coin carrier 40 to its normal retracted position shown in the drawings, also at the same time normally has a tendency to hold the upper free end of the feeler finger 55^a in engagement with the bottom of the slot in the coin carrier, as shown in Figs. 5 and 7, and thus to yieldingly hold the pawls 57 in the position shown in which they are yieldingly urged outwardly towards the ratchet 58. In this connection it may be noted that the pawls 57 are shown as having square-cornered ratchet-engaging ends and that the teeth of the ratchet 58 are correspondingly shaped. At the end of each complete movement of the coin carrier 40 in either direction, the pawls 57 pass beyond and are free from the ratchet 58, as is shown in Figs. 5 and 7 for the normal or retracted position of the coin carrier. At the beginning of each movement, in one direction or the other, the angular position of the pawls 57 is reversed when they strike the end of the ratchet, so that thereby the pawls 57 will wipe over the ratchet 58 in each direction of complete movement of the coin carrier 40.

As hereinbefore mentioned, and by means hereinafter to be described, the coin carrier 40 may be manually rocked against the tension of its restoring spring 47, in the forward direction, that is, clockwise as viewed in Figs. 5 and 7. When thus rocked throughout a complete movement in the forward direction, regardless of whether or not the coin carrier carries a coin in this forward movement, the coin carrier will be returned by its spring 47 to its original retracted position, thereby uncovering the coin slot 51 in the casing and also leaving the coin carrier in position to receive a coin in its coin-holding slot 48.

Should the coin carrier 40 when it carries no coin be rocked forwardly to an intermediate position, in which the pawls 57 are in engagement with the ratchet 58, and then released, the pawls 57 per se will have a tendency to prevent a return movement of the coin carrier, but such tendency is over-

come by reason of the fact that the mutual relation of the several lever arms, comprising the spring connected arm 55^e of the feeler lever 55, the pawl-carrying arm 55^d and the pawls 57 themselves, is such that the coin carrier spring 47 is caused to apply a more strongly effective force toward returning the coin carrier than it is caused to apply toward holding the pawls 57 in locking engagement with the ratchet 58, with the result that the pawl-carrying arm 55^d yields away from the ratchet 58, thereby permitting the pawls 57 to trip and reverse, thus disabling the pawls, so that they are unable to prevent return movement of the coin carrier.

When the pawl-carrying arm 55^d thus is moved away from the ratchet 58, the feeler lever 55 as a whole rocks on its pivot 56 and the feeler tip 55^b thereof moves across the empty coin-holding slot 48 which is in its path. After the pawls 57 have been disabled as above described, the feeler lever 55 may return to its normal position in which its feeler tip 55^b clears the coin-holding slot 48, and the disabled pawls 57 may wipe over the teeth of the ratchet while the coin carrier is returned to its normal position by the spring 47, in which position it may receive in its coin-holding slot 48 a coin inserted through the uncovered coin slot 51. The above described manner of operation is important in view of the fact that should a customer find the coin slot 51 closed, he might think that the machine was out of order and leave it without having made his intended purchase.

When the coin carrier 40 carries a coin it is positively locked against backward movement, by reason of the fact that a coin, such as the coin 36, in the coin-holding slot 48 blocks the path of the feeler tip 55^b of the feeler finger 55^a and forms an abutment therefor which prevents the pawl-carrying arm 55^d from moving away from the ratchet 58 to a sufficient extent to release the pawls 57, as will be clear by an inspection of Figs. 5 and 7, thereby preventing backward movement of the coin carrier from any intermediate position and compelling a full forward movement thereof and discharge of the coin therefrom, after which the spring 47 may return the coin carrier to its normal position shown in the drawings. This manner of operation is of importance because it has been found that to and fro movement of the coin carrier while it carries a coin is almost certain to dislodge the coin, which is then lost in the machine, without a purchase being delivered thereby.

It will now be evident that the above described automatically acting mechanism in control of the movements of the coin carrier 40, operates to prevent backward movement of the coin carrier when the latter carries a coin, and to permit free backward movement of the coin carrier from any posi-

tion thereof when no coin is carried thereby, substantially the same, in the latter respect, as if such mechanism were not present. That is to say, as stated in terms of results, such mechanism is effective to prevent loss of coins in the machine, and is also effective to guarantee that the machine shall be left in normal condition, to permit the insertion of a coin therein. Therefore, the prime purpose of such mechanism is to prevent backward movement of the coin carrier 40 when it carries a coin, and then only.

In carrying out the invention, automatically acting means are provided controlled by the supply of packages 18 in the magazine for preventing the insertion of a coin into the machine when the magazine needs replenishing, such means being adapted to lock the coin carrier 40 at its above described slot-closing position and also to lock the above described purchase-delivering mechanism against operation independently of the locking device including the locking pawl 28. As a precaution against a condition in which some of the package-containing channels 13 may contain a few more or a few less packages 18 than others, said slot-closing and locking device is adapted to become effective before any of the channels 13 become entirely empty. The means shown in the drawings for thus controlling the coin carrier 40 and concomitantly locking the purchase-delivering mechanism will now be described.

The follower ring 19, because of the fact, as above described, that its large teeth or lugs enter the package-containing channels 13, must necessarily partake of the rotative movement of the magazine member of which these channels form parts. On the lower side of its peripheral edge part the follower ring 19 is provided with a plurality, shown as four in number, of equidistantly spaced downwardly projecting lugs 59 (Figs. 1, 10 and 11) which are located circumferentially to one side of or out of alignment with the large internal lugs or projections thereon, as shown in Fig. 10, and therefore correspondingly out of alignment with the packages 18 and channels 13, and which are adapted to engage in a corresponding series of openings or holes 60 (Figs. 2 and 3) in the bottom plate 2 of the magazine before the magazine becomes entirely empty of packages.

The lugs 59 and openings 60 have abrupt engaging faces adapted to abut in the clockwise forward movement of the ring 19, but the reverse faces of the lugs 59 and openings 60 are inclined, as shown respectively in Figs. 11 and 2, so that the lugs 59 may glide gradually into the openings 60. It will be evident that these lugs 59 when the magazine becomes nearly empty will slide around upon the magazine bottom or floor 2

and at the completion of a one-fourth rotation of the ring 19 will enter the openings 60 and thereby lock the rotative magazine member against rotative movement in the forward direction and will also lock the entire purchase-delivering mechanism against operation. Obviously, only one locking lug 59 and one opening 60 could be employed, but in that case a complete relative movement of the magazine might in some cases be required before the locking operation took place and the results would not be so accurate.

The circumferential location of the lugs 59 and openings 60 are made such that the above described locking operation takes place just prior to the complete or final purchase-delivering movement of the delivery plate 22, but at a point in which the package-carrying delivery slot 23 in the delivery plate has moved beyond or to a sufficient extent past the edge of the package-guiding segmental floor plate 25 and over or to a sufficient extent over the top of the delivery chute 26 to permit the package carried by the delivery plate 22 to drop into the chute 26. The purchase-delivering plate 22 is thus locked by means of the lugs 59 independently of and at a rotative position before the locking pawl 28 can become effective to lock this plate and the other parts of the purchase-delivering mechanism. This locking of the purchase-delivering plate 22 before it has quite reached its final purchase-delivering movement obviously at the same time locks the stud-carrying coin-operated drive gear 38 at a point before it has quite completed a step of its rotative movement. In this condition the coin carrier 40 is prevented from completing its forward movement by reason of the fact that the coin 36 abuts against a stud 38^a of the locked gear wheel 38, and also the coin carrier 40 is locked against backward or return movement by reason of the fact that the locking pawls 57 of the coin carrier are in locking engagement with the ratchet 58 so that the coin carrier 40 is thus locked against movement in either direction and in a position in which it closes the coin slot 51, thereby effectively preventing the loss of coins in the machine when the magazine needs replenishing.

The means provided according to my invention for manually imparting rocking movement to the coin carrier 40 will now be described, reference being had more particularly to Figs. 5, 6 and 7. The coin carrier 40 is provided with an internally toothed segmental rack 61, formed in an elongated opening through the coin carrier. The rack 61 is engaged by a tubular pinion 62 which at its outer end carries a head 64 which has a bearing in a boss 65 formed on the outer side of the front casing wall 33, the pinion 62 and head 64 preferably being formed in a

single piece, as shown in Fig. 6. This pinion 62 has an inner reduced end, shown in dotted lines in Fig. 6, which extends through the partition wall 32 and is journaled in a slight boss formed thereon. A handle 66 shown as a four-armed knob, for rotating the pinion 62, is provided at its back with a hub boss 66^a which is journaled in the outer end of the boss 65. The handle knob 66 is fixed upon the outer end of a handle shaft 67 which passes inwardly loosely through the headed pinion 62 and is shown as projecting at its inner end beyond the partition wall 32 and pinion 62 in which its journaled. The inner end of the pinion 62 as well as the boss on the inner side of the partition wall 32 together with a washer forms an abutment for a coiled thrust spring 68 which is held under tension by an adjusting nut 69, together with a washer on the inner end of the handle shaft 67.

Yieldable driving means are provided for operatively connecting the handle 66 to the pinion 62, such as a friction clutch, and in the illustrated embodiment of the invention a cone clutch is employed for this purpose. The pinion head 64 forms the cup element of the clutch and the cone element 70 thereof is provided with a diametral tongue or ridge 71 having abrupt engaging faces and which seats in a groove complementary thereto in the inner end of the handle boss 66^a, so that the cone clutch element 70 is positively locked to the handle 66 for rotative movement therewith. The amount of force required to cause the cone element 70 to slip in the cup element 64 may be regulated by means of the nut 69 on the inner end of the handle shaft 67.

The cone clutch element 70 grips the cup element 64 with sufficient firmness to permit the handle 66 to impart rocking movement to the coin carrier 40 in the normal operation of the machine. However, should any attempt be made, in tampering with the machine, to force the coin carrier beyond its limits of movement, or to reverse its direction of movement at an intermediate point, when it carries a coin, or to impart movement thereto in either direction during the above described locked condition of the machine in which the magazine needs replenishing, the clutch will yield, the cone element 70 slipping on the cup element 64, permitting the handle knob 66 to be turned idly thereby safeguarding the mechanism of the machine against possible breakage through undue force applied to the handle 66 in an attempt to operate the machine in an improper way. This continuously engaged friction clutch drive is of further particular advantage in preventing the breaking of operating parts of the mechanism in view of the fact that the operating power applied to the handle knob 66 is multiplied or in-

creased by means of the speed-reducing gearing comprising the pinion 62 and rack 61 on the coin carrier 40.

In this connection it is to be noted as of importance that regardless of any amount of slippage of the clutch, the handle knob 66 will be left in a suitable position for operating the machine, or, in other words, the handle 66 has a universal operating position, this being by reason of the continuous gripping action of the friction clutch, and which would not necessarily be true as to some other forms of clutches. Thus the inserted coin will become immediately effective to operate the machine. Otherwise, the customer would be annoyed by the idle turning of the handle knob, with no immediate result, after he had inserted the coin, and would be likely to conclude that there was something wrong with the machine.

Another important advantage, which has proved in commercial use to be very desirable in a vending machine, is that the smoothly operating friction driving clutch shown as employed as a feature of the invention is silent and will slip without noise, which is not true of some forms of yielding clutches. It has been found that a vending machine drive clutch which makes a snapping noise when the clutch elements move relatively to each other will cause children and others to persist in rotating the handle knob merely to play with the machine and to amuse themselves.

It is to be noted that the pinion 62 and rack 61 constitute speed-reducing gearing which not only multiplies the power applied to the handle knob 66 for operating the mechanism of the machine but also results in a relatively slow and uniform movement being imparted to the entire mechanism, thereby preventing jars and shocks thereto which might result in damage thereto or breakage thereof. It will now be evident that the rotatable plate 22 and the gears 37 and 38 are operated and controlled by the coin, that the purchasing-delivering mechanism per se is operated through its connection to the gear 37, and that the plate 22 has two functions by reason of the fact that, in the particular machine illustrated, it is both a coin-controlled locking plate and a delivery plate as well. Also it will be noted that the coin-released locking device locks the delivery mechanism as well as the coin-operated drive member 38. Because of the considerable weight and momentum of the loaded magazine, it is desirable that it should be stopped and locked at a point as near thereto as possible. Obviously in a machine of a different type the locking might take place at a different point, for example, at the coin-driven member 38 or at its shaft 39. Also in such a machine the delivery mechanism might be operated directly from

the shaft 39, the intervening gearing then being omitted.

In carrying out my invention protective means or safeguarding devices are provided to guard against the machine being caused to operate to deliver packages without insertion of coins and such means will now be described. One of the ways in which attempts are sometimes made to tamper with a machine of this type in the hope of causing packages to be delivered without inserting a coin is to grasp the machine and violently twist or whirl it around as a whole in an attempt thereby to cause the package-containing magazine member to rotate by reason of its weight and momentum, and thus operate the delivery mechanism. In the machine of my present invention, and as hereinbefore described, it is to be noted that in the normal position of rest of the parts of the machine the delivery plate 22 together with the package-carrying magazine member is positively locked against either forward or backward rotative movement, by the double acting locking pawl 28, thereby rendering any such improper operation of the machine impossible.

If in the hereinbefore described condition of the magazine in which it requires replenishing an attempt should be made to obtain packages by whirling the machine, this result could not be accomplished by reason of the fact, as hereinbefore described, that the delivery plate 22 would then be positively locked against forward movement by reason of the engagement of the lugs 59 of the follower ring 19 in the openings 60 in the magazine bottom 2, and backward or reverse movement of the delivery plate 22 would be prevented by the coin 36 which is held by the locked coin carrier 40 against one of the studs 38^a of the drive gear 38 as hereinbefore described.

While it would be difficult to advance the loaded coin carrier only as far as and stop it at an intermediate position in which the locking pawl 28 is held in disengaged position by the edge of the coin, even then there would be no possibility of obtaining packages by imparting a whirling or twisting motion to the machine. If the magazine member and delivery plate 22 could then be made to move forward the next advancing stud 38^a would strike the upper edge of the coin and tip it forward out of the coin-holding slot 48 in the coin carrier and into the coin chute 52, and in case the delivery plate 22 should complete its delivery movement, only a single package paid for by the inserted coin would be delivered by reason of the fact that the locking pawl 28 would become effective at the first delivery position reached by this plate and would lock it there.

Means in accordance with my invention are provided to prevent the machine being

caused to deliver a package by the insertion therein of a paramagnetic slug such as iron or steel and which might be of the same dimensions as the coin 36. The subject matter relating to this feature of my invention has been embodied in a divisional application, Serial No. 133,615, filed September 4, 1926, which became Patent No. 1,657,836, January 31, 1928.

A generally U-shaped laterally curved horseshoe magnet 72 rests at its bent middle portion upon a small rounded lug in a notch provided between the lower stop lug 45 and the lower part of the bracket 46 which carries this lug and is comparatively loosely held in place by the rounded lower end of an inclined pin 73 carried by and shown as screwed into the bracket 46, so that the magnet 72 is free to have a slight lateral rocking movement. The laterally curved arms of the magnet 72 extend at an inclination over and normally rest upon the upper stop lug 44 and terminate somewhat beyond the initial position of the inserted coin 36, as shown in Figs. 5 and 7. Normally the magnet arms are held in contact with the upper stop lug 44 by means of a pair of springs 74 carried by the magnet on pins 75 and 75^a and bearing at their upper ends against the upper portion of the bracket 46, one of these springs appearing in Fig. 5 and the other in Fig. 7. The upper end of the inner magnet arm or that adjacent to the partition wall 32 is beveled or cut away at the top on a horizontal plane so as to clear the studs 38^a as the gear 38 is rotated and as shown in the drawings, perhaps most clearly in Fig. 7.

When a coin is inserted in the machine it comes into contact with the magnet arms and pushes them slightly aside against the tension of the magnet springs 74, the outer magnet arm imparting a final inward impulse to the coin, which is received at its upper edge into the space between the magnet arms, as is shown in Figs. 5 and 7. Thus the coin, such as 36, will be held in the coin carrier slot 48 by the magnet arms and will be securely retained in the machine, inward from the coin slot 51 and free therefrom, by the outer arm of the magnet 72, so that the coin cannot fall out of nor be extracted from the machine. It will be noted that the magnet 72 is thus utilized to perform a desirable mechanical function independently of its operation as a magnet.

When the coin carrier 40 is rocked in the forward direction, the coin 36 is carried freely away from the ends of the arms of the magnet 72. The magnet 72 is provided with a lower roller 76 and an upper roller 76^a, between the magnet arms and journaled respectively on the lower and upper spring-holding pins 75 and 75^a. The stop-engaging lug 43 on the coin carrier 40 is provided with a tapered projection 77 which normally en-

ters slightly between the arms of the magnet just below and substantially in contact with the lower roller 76 as shown in Figs. 5 and 7. When the coin carrier 40 is rocked in its forward movement the inclined cam projection 77 bearing against the roller 76 will immediately raise the upper ends of the magnet arms, and when the projection 77 has moved upwardly beyond the roller 76 the springs 74 will cause the magnet arms to strike the upper stop lug 44. A similar action will take place as the projection 77 passes the upper roller 76^a.

Should a magnetizable slug of substantially the dimensions of the coin 36 be inserted into the machine the raising of the magnet arms as above described will lift the slug and raise its lower edge out of the coin-holding slot 48 in the coin carrier 40. When the magnet 72 has thus lifted the magnetizable slug out of the coin-holding slot 48, such slug will be free to rock and tilt and obviously will be incapable of operating either the lock-releasing push rod 31 or the abutment-carrying drive gear 38 of the coin-controlled mechanism, and furthermore, the slug will be jarred loose from the magnet by the impact of the magnet arms against the upper stop lug 44 when the projection 77 passes beyond the magnet roller 76, a similar jolt being given the magnet when the projection 77 passes the upper roller 76^a, and the slug will drop into the coin-chute 52, without the purchase-delivering mechanism of the machine having been operated.

Should a washer be inserted into the machine through the coin slot 51, in an attempt thereby to obtain an unpaid for package, as the coin carrier 40 is moved forward its coin-pushing finger 50, which constitutes a washer catch, will pass freely through the hole in the washer, this action being facilitated by reason of the upper edge of the washer being held back by frictional engagement with the spring-pressed magnet 72. As the coin carrier continues to advance the washer will tilt or rock out of the slot 48 and will be guided by the finger 50 until it rests upon the inclined shoulder 49 of the coin carrier. The washer thus resting loosely on the shoulder 49 in a greatly inclined position will be incapable of operating the lock-releasing push rod 31 and will pass freely beneath the abutment stud 38^a which is in position to be operated by a coin. When the coin carrier 40 reaches the forward limit of its movement and strikes its upper stop 44 it will toss the washer into the chute 52.

Should a paper or cardboard or similar disc be inserted, in an attempt thereby to operate the machine, such disc will be bent, crushed and mutilated by the projecting cam end of the lock-releasing push rod 31 without operating the latter, and will be further bent, crushed and mutilated by striking

against a stud 38^a of the locked drive gear 38, and finally will be dumped by the coin carrier into the chute 52. A thin and readily bendable metal disc would be disposed of in a similar manner.

If a slug of somewhat less diameter than the proper coin should be inserted, such a slug will move freely past the end of the push rod 31, as is clear from Fig. 3, and will also move freely below the locked studs 38^a and will be dropped into the chute 52.

The hereinbefore described free idle movement which the coin carrier 40 is permitted to have, that is, without operating the delivery mechanism, provides for effecting the above described disposition of the various kinds of slugs so as thereby to leave the coin-receiving slot 48 in the coin carrier unobstructed and the machine in condition for a purchase-delivering operation upon the insertion of a coin in the coin slot 51. The hereinbefore described guard devices by reason of which the machine is rendered operable to deliver a purchase when the proper coin is inserted and is rendered non-operable by the various kinds of slugs, may be designated as selector mechanism, in that such mechanism discriminates between the proper coin for operating the machine and the various slugs, and also such mechanism constitutes rejector mechanism in the respect that slugs such as above mentioned are discarded thereby without operating the purchase-delivering mechanism of the machine.

It is to be noted that in carrying out my invention a maximum number of guard devices are provided to prevent either the obtaining of unpurchased packages or the disabling of the machine. Also it is to be noted that the construction of the machine of my invention is such as to assure its proper operation to deliver a purchase when the proper coin is inserted therein with no liability of the coin being lost in the machine. The operation of the machine has been hereinbefore described along with the description of its construction. It may be added that machines have been constructed in accordance with the accompanying drawings and have been effectively operated and tested in the manner herein described. However, while I have disclosed herein a practical embodiment of my invention, it is to be understood that various modifications may be made in the construction shown in the drawings and above particularly described, within the principle and scope of my invention as pointed out in the appended claims.

I claim:

1. A coin-controlled vending machine having, in combination, a manually operable coin carrier, stops to limit the forward and backward movement of the coin carrier, means for automatically returning the coin

carrier to its normal position, and automatically acting means controlled by the coin to prevent backward movement of the coin carrier when it carries a coin and to permit free backward movement of the coin carrier from any point between its stops when it carries nothing, said latter means comprising a feeler for the coin, and a pawl-and-ratchet device controlled by the feeler.

2. A coin-controlled vending machine, having, in combination, a purchase-delivering mechanism including an abutment in the path of a moving coin to be moved thereby for operating said mechanism, a releasable locking device for normally locking said mechanism and including a part in the path of the moving coin in position to be moved thereby to release said device for unlocking said mechanism preparatory to its operation, a manually operable coin carrier for moving the coin to cause the latter to unlock said mechanism and to operate said unlocked mechanism to deliver a purchase, stops to limit the forward and backward movement of the coin carrier, means for automatically returning the coin carrier to its normal position, and automatically acting means controlled by the coin to prevent backward movement of the coin carrier when it carries a coin and to permit free backward movement of the coin carrier from any point between its stops when it carries nothing, said latter means comprising a feeler for the coin, and a pawl-and-ratchet device controlled by the feeler.

3. A coin-controlled vending machine having, in combination, a purchase-delivering mechanism including an abutment in the path of a moving coin to be moved thereby for operating said mechanism, a releasable locking device for normally locking said mechanism and including a part in the path of the moving coin in position to be moved thereby to release said device for unlocking said mechanism preparatory to its operation, a manually operable coin carrier for moving the coin to cause the latter to unlock said mechanism and to operate said unlocked mechanism to deliver a purchase, stops to limit the forward and backward movement of the coin carrier, means for automatically returning the coin carrier to its normal position, and automatically acting means controlled by the coin to prevent backward movement of the coin carrier when it carries a coin and to permit free backward movement of the coin carrier from any point between its stops when it carries nothing, said latter means comprising a coin-controlled feeler carried by the coin carrier, and a pawl-and-ratchet device having an element thereof carried by the coin carrier and controlled by the feeler.

4. A coin-controlled vending machine having, in combination, a coin carrier hav-

ing limited movement, means for automatically returning the coin carrier to its normal position, and automatically acting means controlled by the coin to prevent backward movement of the coin carrier when it carries a coin and to permit free backward movement of the coin carrier from any point within its normal limits of movement when it carries nothing, said latter means comprising a coin-controlled feeler carried by the coin carrier, and a pawl-and-ratchet device having an element thereof carried by the coin carrier and controlled by the feeler.

5. A coin-controlled vending machine having, in combination, a purchase-delivering mechanism, a coin carrier having limited forward and backward movements, a restoring spring for automatically returning the coin carrier to its normal position, and automatically acting means controlled by the coin to prevent backward movement of the coin carrier when it carries a coin and to permit free backward movement of the coin carrier from any point within its normal limits of movement when it carries nothing, said means comprising a feeler lever pivoted on the coin carrier and a pawl-and-ratchet device including a stationary ratchet and a reversible spring-pressed pawl pivoted on the feeler lever, the coin carrier having therein a coin-holding slot in the path of movement of the feeler lever, said restoring spring for the coin carrier being connected to the feeler lever and having a tendency to hold the feeler lever out of said coin-holding slot and to yieldingly hold the pawl in engagement with the ratchet, whereby when the coin-holding slot is empty the pawl may yield away from the ratchet and reverse its position to permit free backward movement of the coin carrier, and whereby a coin in the coin-holding slot forms an abutment for the feeler lever to prevent the yielding and reversal of the pawl and thereby locks the coin carrier against backward movement.

6. A coin-controlled vending machine having in combination, a purchase-delivering mechanism including a rotative drive member provided with a circumferential series of equidistantly spaced abutments some one of which is normally in the path of a moving coin to be moved thereby for operating said mechanism, a releasable automatically relocking locking device for normally locking said mechanism against operation and including a part in the path of the moving coin to be moved thereby to release said device for unlocking said mechanism preparatory to the operation of the latter, a manually operable rocking coin carrier for moving the coin to cause the latter to unlock said mechanism and to operate said unlocked mechanism to deliver a

purchase, stops to limit the forward and backward rocking movements of the coin carrier, a restoring spring for returning the coin carrier to its normal position, and automatically acting means controlled by the coin to prevent backward movement of the coin carrier when it carries a coin and to permit free backward movement of the coin carrier from any point between its stops when it carries nothing, said means comprising a feeler lever pivoted on the coin carrier and a pawl-and-ratchet device including a stationary ratchet and a reversible spring-pressed pawl pivoted on the feeler lever, the coin carrier having therein a coin-holding slot in the path of movement of the feeler lever, said restoring spring for the coin carrier being connected to the feeler lever and having a tendency to hold the feeler lever out of said coin-holding slot and to yieldingly hold the pawl in engagement with the ratchet, whereby when the coin-holding slot is empty the pawl may yield away from the ratchet and reverse its position to permit free backward movement of the coin carrier, and whereby a coin in the coin-holding slot forms an abutment for the feeler lever to prevent the yielding and reversal of the pawl and thereby locks the coin carrier against backward movement.

7. A coin-controlled vending machine having, in combination, a purchase-delivering mechanism including a rotative locking plate provided with a circumferential series of equidistantly spaced stops, a rotative drive member provided with a circumferential series of equidistantly spaced abutments some one of which is normally in the path of a moving coin to be moved a step thereby, gearing connecting said member to said plate and adapted to rotate the latter the angular distance between two of its said stops for each rotative movement of said member over the angular distance between two of its said abutments, said gearing comprising two intermeshing spur gears one of which is secured to said locking plate and the other of which carries said abutments to form therewith the said drive member, a releasable lock to engage said stops for automatically locking said plate at each of its positions including a part in the path of the moving coin to be moved thereby for releasing the lock to unlock said plate, and a coin carrier for moving the coin to cause the latter to release the lock and to impart a step of rotative movement to said member for thereby rotating said plate from one locked position to the next.

8. A coin-controlled vending machine having, in combination, a package-delivering mechanism including a horizontal rotative plate below the magazine and provided with a circumferential series of equidistantly spaced openings, a first gear coaxial with

and fixed to said plate, a drive gear meshing with said first gear and having the same number of teeth, a circumferential series of equidistantly spaced studs projecting from the drive gear and equal in number to the number of said openings in said plate, a releasable lock to engage said openings for automatically locking said plate at each of its positions including a part in the path of a moving coin to be moved thereby for releasing the lock to unlock said plate, and a coin carrier for moving the coin to cause the latter to release the lock and to engage one of said studs for imparting a step of rotative movement to said plate from one of its locked positions to the next.

9. A coin-controlled vending machine having, in combination, a purchase-delivering mechanism adapted to be operated by a moving coin, a releasable locking device for normally locking said mechanism and adapted to be released by a moving coin to unlock said mechanism, a manually operable coin carrier for moving the coin to cause the latter to unlock said mechanism and to operate the latter to deliver a purchase, the coin carrier being mounted for to and fro movements, means to limit the to and fro movements of the coin carrier, the coin carrier being normally free to be moved idly to and fro between its limits of movement when it carries no coin, and slug-rejecting selector means associated with the coin carrier and adapted to utilize said idle movements thereof to discard slugs.

10. A coin-controlled vending machine having, in combination, a purchase-delivering mechanism adapted to be operated by a moving coin, a manually operable rocking coin carrier for moving the coin to cause the latter to operate said mechanism to deliver a purchase, an arcuate internally toothed segmental rack connected to the coin carrier for operating the latter, a pinion engaging the rack and forming therewith speed-reducing gearing, means to limit the forward and backward movements of the coin-carrier, and an operating handle connected to the pinion.

11. A coin-controlled vending machine having, in combination, a purchase-delivering mechanism adapted to be operated by a moving coin, a manually operable coin carrier for moving the coin flatwise to cause the latter to operate said mechanism to deliver a purchase, a casing provided with a coin slot, the coin carrier having therein a coin-carrying slot normally in alignment with said coin slot to receive a coin inserted edge-wise through the coin slot, and a lock for said mechanism having a part in the path of the rear edge portion of a coin in said coin-carrying slot to be operated by the moving coin to release the lock, said coin-carrying slot being so shaped as to prevent the

reception of an angular slug to a position therein for releasing said lock.

12. A coin-controlled vending machine having, in combination, a purchase-delivering mechanism adapted to be operated by a moving coin, a releasable locking device for normally locking said mechanism and including a part in the path of a marginal portion of a coin moving substantially flatwise to be moved thereby to release said device for unlocking said mechanism preparatory to its operation, and a coin carrier for moving the coin substantially flatwise to cause the latter to unlock said mechanism and to operate said unlocked mechanism to deliver a purchase, the coin carrier having a coin-moving finger to pass through the hole in a washer for thereby rendering the washer ineffective to unlock said mechanism.

13. A coin-controlled vending machine having, in combination, a purchase-delivering mechanism adapted to be operated by a moving coin, a releasable locking device for normally locking said mechanism and including a part in the path of a marginal portion of a coin moving substantially flatwise to be engaged and moved thereby to release said device for unlocking said mechanism preparatory to its operation, and a coin carrier for moving the coin substantially flatwise to cause a marginal portion of the coin to engage and move said part to unlock said mechanism and to operate said unlocked mechanism to deliver a purchase, the coin carrier being provided with a coin-holding slot and an inclined shoulder at the back of the slot and having a coin-moving finger projecting from said shoulder to pass through the hole in a washer and permit the washer to be received upon said shoulder in an inclined position in which it will fail to move said part to unlock said mechanism and will be discarded by the coin carrier without operating said mechanism.

14. A coin-controlled vending machine having, in combination, a purchase-delivering mechanism including an abutment in the path of a marginal portion of a coin moving substantially flatwise to be moved thereby for operating said mechanism, a releasable locking device for normally locking said mechanism inclusive of said abutment and including a spring-projected part in the path of a marginal portion of the moving coin to be moved thereby to release said device for unlocking said mechanism preparatory to its operation, and a coin carrier for moving the coin substantially flatwise to cause a marginal portion of the coin to engage and move said part to unlock said mechanism and to operate said unlocked mechanism to deliver a purchase, the coin carrier being provided with a coin-holding slot and having a coin-moving finger outward from the slot, said part opposing sufficient resistance

to movement so that a relatively yieldable slug pushed by said finger will be caused to yield and pass said part without being effective to unlock said mechanism and will be compelled to again yield to pass said locked abutment and will be discarded by the coin carrier.

15. A coin-controlled vending machine having, in combination, a manually operable rocking coin carrier, an arcuate internally toothed segmental rack connected to the coin carrier for operating the latter, a pinion engaging the rack and forming therewith speed-reducing gearing, means to limit the forward and backward movement of the coin carrier, and an operating handle connected to the pinion.

16. A coin-controlled vending machine having, in combination, a purchase-delivering mechanism, a releasable locking device for normally locking said mechanism, a normally ineffective manually operable device including a coin carrier to be made effective by means of a coin to unlock said mechanism and to operate the latter to deliver a purchase, the coin carrier being mounted for to and fro movements, means to limit the to and fro movements of the coin carrier, the coin carrier being normally free to be moved idly to and fro between its limits of movement when it carries no coin, and slug-rejecting selector means associated with the coin carrier and adapted to utilize said idle movements thereof to discard slugs.

17. A coin-controlled vending machine having, in combination, a coin carrier having forward and backward movement, means for imparting such movement to the coin carrier, and automatically acting means controlled by the coin to prevent backward movement of the coin carrier when it carries a coin and to permit free backward movement of the coin carrier from any point when it carries nothing, said means comprising a feeler for the coin, and a pawl-and-ratchet device controlled by the feeler.

18. A coin-controlled vending machine having, in combination, a coin carrier having forward and backward movement, means for imparting such movement to the coin carrier, and automatically acting means controlled by the coin to prevent backward movement of the coin carrier when it carries a coin and to permit free backward movement of the coin carrier from any point when it carries nothing, said means comprising a coin-controlled feeler carried by the coin carrier, and a pawl-and-ratchet device having an element thereof carried by the coin carrier and controlled by the feeler.

19. A coin-controlled vending machine having, in combination, a purchase-delivering mechanism, a lock for said mechanism having a part in the path of the edge portion of a coin moving flatwise to be operated

thereby to release said lock, a casing provided with a coin slot for the edgewise insertion of a coin, and a normally ineffective manually operable device to be made effective by means of a coin to operate said mechanism and including a coin carrier having therein a coin-carrying slot for moving the coin flatwise, said coin-carrying slot being normally in alignment with said coin slot to receive a coin inserted edgewise through the coin slot and said coin-carrying slot being so shaped as to prevent the reception of an angular slug to a position therein for releasing said lock.

20. A coin-controlled vending machine having, in combination, a purchase-delivering mechanism, a releasable locking device for normally locking said mechanism and including a part in the path of a marginal portion of a coin moving flatwise to be moved thereby to release said device for unlocking said mechanism preparatory to its operation, and a normally ineffective manually operable device to be made effective by means of a coin to operate said mechanism and including a coin carrier for moving the coin flatwise to cause the latter to unlock said mechanism, the coin carrier having a coin-moving finger to pass through the hole in a washer for thereby rendering the washer ineffective to unlock said mechanism.

21. A coin-controlled vending machine having, in combination, a purchase-delivering mechanism, a releasable locking device for normally locking said mechanism and including a spring-projected part in the path of a marginal portion of a coin moving

flatwise to be moved thereby to release said device for unlocking said mechanism preparatory to its operation, and a normally ineffective manually operable device to be made effective by means of a coin to operate said mechanism and including a coin carrier for moving the coin flatwise to cause a marginal portion of the coin to engage and move said part to unlock said mechanism, the coin carrier being provided with a coin-holding slot and having a coin-moving finger outward from said slot, said part opposing sufficient resistance to movement so that a relatively yieldable slug pushed by said finger will be caused to yield and pass said part without being effective to unlock said mechanism and will be discarded by the coin carrier.

22. A coin-controlled vending machine having, in combination, a purchase-delivering mechanism, a releasable locking device for normally locking said mechanism, a normally ineffective manually operable device including a coin carrier to be made effective by means of a coin to unlock said mechanism and to operate the latter to deliver a purchase, the coin carrier being mounted for to and fro movements, the coin carrier being normally free to be moved idly to and fro when it carries no coin, and slug-rejecting selector means associated with the coin carrier and adapted to utilize said idle movements thereof to discard slugs.

In witness whereof, I hereunto subscribe my signature.

LOUIS H. MORIN.