This invention relates to coin operated vending machines.

It is an object of the invention to provide, in a machine of the class indicated, article storing and delivering mechanism of great reliability in operation, and at the same time to provide a machine in which the parts are of simple character and generally may be made of stamped metal or the like, making for ease and economy of manufacture.

A further object of the invention is to provide article delivery means adapted to handling articles of different sizes and shapes.

With these and other objects which will appear in the following full description in mind, the invention consists in the combinations, arrangements and details of parts now to be described in connection with the accompanying drawings and then more particularly pointed out in the appended claims.

In the drawings—

Fig. 1 is a front elevation of a vending machine embodying the invention in a preferred form and intended for selling a plurality of different kinds of packages of chewing gum, mints, candy, or the like;

Fig. 2 is a vertical section taken on the line 2—2 of Fig. 1 and on an enlarged scale;

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

Fig. 4 is a vertical section taken on the line 4—4 of Fig. 3;

Fig. 5 is a vertical section taken on the line 5—5 of Fig. 6 and showing the coin control mechanism;

Fig. 6 is a section taken on the line 6—6 of Fig. 5 and showing also a portion of the delivery apparatus adjacent to the coin control mechanism;

Fig. 7 is a section on the line 7—7 of Fig. 5;

Fig. 8 is an enlarged view of a portion of Fig. 4 and with certain parts removed or moved to show clearly the method of operation of the delivery mechanism;

Fig. 9 is a view similar to Fig. 8 but with certain parts removed so as to show certain locking mechanism; and

Fig. 10 is an enlarged and exploded perspective of a locking member for preventing operation of delivery means when there are no articles in the machine to be delivered by such means.

Cabinet construction

As shown in Figs. 1 to 4, the cabinet or casing for the machine consists generally of two parts, the first comprising a front panel 1, a top 2, and side walls 3 and being hingedly connected at 4 to the other half of the casing, which comprises a bottom 5, back 6, and interior side walls 7. The top of the rear wall 8 is formed with a horizontal flange bearing a locking projection 9 and the top 2 of the other half of the casing is provided with a lock 10, having a catch 11 adapted to engage projection 9. Upon unlocking the lock 9, one half of the casing can be swung forwardly and downwardly about the hinges 14 exposing the entire interior of the machine for loading, repairing and the like.

The parts 1, 2 and 3 may advantageously be formed of a single piece of sheet metal and the front 1 formed with apertures 11, 12 and 13 to accommodate, respectively, a label carrying the name of the manufacturer or operator, a mirror or the like, which may be formed with clear glass portions 12 permitting a view of the contents of the various article containers, and manually operable delivery means and chute for article delivery and coin return. Formed in the front panel 1 also is a coin slot 14 for the insertion of the proper coin to operate the machine. If desired, the clear glass portions 12 may be used to expose cards or labels 15, indicating the merchandise in the various containers; such cards and mirror 12 being fastened to front panel 1 by means of clips 16 and a screw 17.

Article containers

The machine illustrated is adapted to storing and delivering seven different kinds of merchandise which may be of the size and shape of an ordinary five cent package of gum, as shown at 18 in Fig. 4, or of the size and shape of the generally cylindrical packages of disc shaped mints and candies also retailing for five cents, indicated at 19.

The article containers for the various kinds of merchandise form, in effect, a single unit held together rearwardly of the machine by cross pieces 20, the ends of which are formed into angles 21 and affixed to the rear wall 6 of the casing as by means of bolts 22. Toward the front of the machine these containers are fastened together as by means of cross piece 23.

Each container is formed by a pair of vertical partitions 24 attached to the members 28 and 29, previously referred to, as by welding. Each partition 24 comprises a back flange 25 and a front flange 26 which serve to retain articles against frontward or rearward motion and between these flanges is formed with a reverse bend 27.
so as to present a flat corrugation or projection 27 to the right and a similar projection 28 to the left. As shown best in Fig. 4, the projections 27 and 28 are provided at their lower ends to accommodate a delivery mechanism later to be described.

As best shown in Figs. 3 and 4, the right hand end partition 24' may be made in the form of a flat plate, having flanges 25 and 26, as before, but without corrugations 27 or 28.

The article container unit is thus made with the use of a minimum number of parts provides a number of vertical chutes or hoppers for containing the merchandise to be vended and also provides for spacing these chutes apart to give space for delivery mechanism about to be described.

**Delivery mechanism**

- Positioned below each of the hoppers is a rotatable article ejector 30, each having at the rear a stub shaft or trunnion 31, passing through and journaled in a support plate 32 affixed to the bottom 5 of the frame of the machine, and carrying a pin 33 (Figs. 2 and 3).
- Between each of the pins 33 and a corresponding pin 34, mounted on the plate 32, is a spring 35, serving to bias the ejector 30 clockwise or toward the position of Figs. 3 and 4.
- The front of each of the ejectors is recessed to form a bushing 36 adapted to receive a stub shaft 37 mounted on a plate 38, which also serves to carry certain locking apparatus later to be described.

Each ejector has a generally cylindrical outer surface, adapted to support a column of articles within one of the chutes when in the position of Figs. 3 and 4, and is hollowed out as shown, having an oblong recess 39 adapted to receive an oblong package of gum or the like and the bottom of this recess being further hollowed out as at 39' to form a cylindrical recess adapted to receive a generally cylindrical package of mints or the like.

Each of these recesses is so positioned relative to the axis of rotation of the ejector as to receive a package of either cylindrical or oblong form when rotated through half a revolution and hold the same with its top at approximately the axis of the handle as the top of the plate 32 as at 42 (Fig. 2), and operable by forward and reverse rotation between predetermined limits. The rear end of each shaft is formed with an oval projection 42' surmounted by a rectangular key 43 (Fig. 9). Mounted on each shaft in turn, so as to rest upon projection 42' and be held against rotation by key 43, is a disc 44 provided to one side with gear teeth 45 and to the other with a lever or single tooth gear 46, this disc being held on shaft 41 as by means of a screw 47. Each of the ejectors 30, previously referred to, is formed with gear teeth 48 meshing with the teeth 45 and by means of which turning handle 40 produces operative rotation of the ejector 30.

The discs 44, in addition to providing driving connections between handles 40 and ejectors 30 serve to fasten handles 40 against axial movement, their forward surfaces abutting a lower rib 49 and a plurality of upper ribs 50 formed on the plate 38 (Figs. 8 and 9).

The levers or teeth 48 serve to connect the delivery actuating mechanism with the coin control mechanism later to be described, through a sliding lock bar or rack 51, extending across the machine in back of plate 38 and adapted to slide along guides 52 projecting through slots 53 formed therein. The upper surface of lock bar 51 is formed with a series of abutments or teeth 54, engageable by the levers or teeth 48 previously referred to and is relieved between teeth so as to permit movement of the rack to the right without rotation of discs 44 but to prevent counter-clockwise rotation of discs 44 without corresponding movement of rack 51. Clockwise rotation of rock shafts 41 is prevented by the formation of discs 44 and ejectors 30, the teeth on each being of limited circumferential extent so as to lock against rotation in this direction when the parts are in starting position. When one of the rock shafts 41 has been rotated partially or wholly in the forward (counter-clockwise) direction, a quick reverse and forward rotation of this shaft is prevented by a second and oppositely facing series of abutments 54' on the lock bar 51.

The ends of levers 46 describe, as the rock shafts 41 are rotated between definite limits, definite arcs. The abutments 54 are constructed so as to extend toward the rock shafts beyond the ends of the arcs described during forward rotation of the rock shafts, while the abutments 54' terminate short of the other ends of these arcs. By this means, any of the rock shafts 41 is put into driving engagement with the lock bar 51 throughout forward rotation of the shaft, and is also in driving engagement therewith during reverse rotation up to a predetermined point, and is thereafter disengaged. As is apparent, this arrangement provides for driving engagement of each shaft with the lock bar and prevents free rotation of the shafts. In addition, the machine is thereby rendered self-starting through sudden movement, and at the same time permits operation of the lock bar by any rock shaft without movement of the remainder of said shafts.

Mechanism is also provided to prevent operative movement of more than one of the handles 46 at a time and consists of a number of flat slides 55 formed at the ends with projections 56' defining recesses 56. Between and in the recesses of adjacent slides lie the projections 56' upon the handle shafts 41, previously referred to, and the parts are so dimensioned that when adjacent handles are in starting position and the projections 42' consequently disposed with their longer dimension vertical there is sufficient play between slides 55 and projections 42' to permit operative rotation of any of the handles 40. Rotation of one of these handles through 90° will result in bringing the projection 42' upon its shaft to horizontal position (Fig. 9, to the left) and spreading the two adjacent slides 55 apart. Under such conditions no other handle can be turned more than a fraction of a turn (Fig. 9, to the right), the play between slides having been taken up by rotation of the first mentioned handle 40. Complementary operative rotation of the handle 40, through nearly 180°, will bring its projection 42 almost into vertical position, restoring the play between slides 55. By this time, however, the bar 51 (Fig. 4) will have been moved from its starting position 75.
sufficiently so that the notches adjacent teeth 56 will no longer be in register with the cams 46 of the remaining handles 40 and operation of these handles is prohibited by interference between cams 46 and bar 51. Accordingly, during the entire operation of a handle 40, operation of other handles is prevented, either by locking between projections 40 and slides 55, or by locking between cams 46 and bar 51.

**Coin control mechanism**

As previously mentioned, the coin control mechanism operates through bar 51, which serves to connect it with the operating mechanism previously described. This bar, as shown in Fig. 4, is biased toward starting position by a spring 66, and is provided with a series of notches 51 at one end with which a pawl 62, pivoted at 88 and biased toward vertical position by a spring 64, cooperates to form a ratchet of familiar type for preventing a partial movement and return of the delivery mechanism. The other end of the bar 51 is formed with a shoulder or hook 85, by means of which operation of the machine is prevented unless a proper coin or coins have been inserted in the machine notches.

The coin control mechanism, which is best shown in Figs. 3 and 5 to 7, may be advantageously formed as the lower portion of a coin selector. As shown in Figs. 3 and 5, a coin x (in the embodiment shown, a nickel), inserted in the machine comes to rest between wall 70 and a support 71, the latter being pivoted at 71', biased toward coin supporting position by a spring 72, and stopped in this position by a pin 73. The coin registering member employed is in the form of a toggle lever, pivoted at 74, having a short arm 75 on which is pivotally mounted at 76 a longer and coin engaging arm 77, the whole being biased toward retracted position (Fig. 5) by a spring 78 attached to the arm 77. As shown in Fig. 6, arm 77 is formed with a coin engaging cam surface 79 and a hook 80. When no coin is in the machine protraction of arm 77 brings hook 80 into contact with a stop 81 stopping further movement of the toggle in the dotted line position of Fig. 7. If, however, a coin is in place, the coin engaging cam 79 of arm 77 contacts the coin and further movement cam 80 rotates the toggle 77 counter-clockwise sufficiently for hook 80 to clear stop 81, permitting a full motion of the toggle. The short arm 75 of the toggle is of generally triangular shape and positioned in the path of shoulder 86 of bar 51. In consequence, motion of bar 51 can take place only by protruding the toggle 75 to 77, and will be permitted only when a coin is in position as shown in Figs. 5 to 7.

The end of arm 77, during a full movement thereof, engages a projection 82 upon the coin support 71, rotating this support sufficiently to permit the coin to drop into a subjacent drawer or receptacle 83.

Arm 77 may also be employed to operate coin selector mechanism, and for this purpose a connecting rod 84 may be disposed in the path of arm 77, as shown in Figs. 5 and 6, so that arm 77 when moved will urge this arm upward. As will be readily understood, a coin selector of any usual type may be employed, and will have a chute to receive coins inserted in slot 14, directing proper coins into the position shown in Figs. 5 to 7, and through appropriate mechanism rejecting improper coins, directing them, for example, into a chute such as chute 85, and so onto the floor 5 for return to the customer. Such selectors commonly include a so-called "scavenger," comprising magnetic or mechanical devices which hold certain improper coins within the selector and also means for stripping such coins and directing them into a chute, such as the chute 85, for return to the customer. Rod 84 may be employed for operating such a stripper, and it will be noted is positioned close to the end of arm 77 when the latter is in retracted position so as to be operable by the same during such initial movement as can occur before hook 86 engages stop 81. In consequence, rod 84 can be lifted by turning one of the handles 40 partially, even when no coin is held upon support 71.

As is apparent the coin holding and engaging parts which constitute the coin control are part of a separate unit, removable from the machine without affecting the other mechanism, and requiring only that arm 75 be properly disposed in the path of projection 86 to be operatively related to the remaining mechanism.

**Locking device for empty chutes**

As best shown in Figs. 2 and 3, each of the ejectors 30 is formed with two rectangular depressions 88 and 89 with two corresponding projections 89 adapted to seat in depressions 88 and otherwise dimensioned so as to rest upon the top of a column of articles and slide down as the column is depleted.

When no articles remain in a column, projections 89 of the associated device 88 will enter depressions 88 upon the associated ejector 30 preventing rotation thereof. During ejection of the last article in a column the ejector 30 will assume a position such as shown in Fig. 8 (left hand) and locking device 88 (shown in Figs. 2 and 3) will rest upon the top of the article within the ejector. In such circumstances, as the ejector rotates device 88 may descend slightly, and notches 87 upon the ejector provide clearance for projections 89 should this occur. Upon return of the ejector to starting position (Fig. 4) device 88 will descend so that projections 89 enter depressions 88 preventing operation of this ejector. To seat the device securely there at all times, whether on a package or an ejector, they are formed with projections 89 located at their ends and extending across their width. Opposite projections 89, as shown in Figs. 2 and 3, ejectors 30 are reduced or flattened to accommodate these and projections 89 to enter depressions 88. Locking devices 88 are advantageously formed in two parts, 88' and 88'', as shown in Fig. 10, the two parts having a frictional fit and forming a box within which a weight may be placed, if desired. Attached to the upper part, 88'', is a strap spring 91, slightly longer than device 88, and positioned to engage flanges 26 and 28. As device 88 descends, spring 91 will bow as shown in Fig. 1, permitting downward movement of the device 88. Spring 91, however, will prevent upward movement, which otherwise might occur, for example, during movement of the whole machine and which might result in projections 88 becoming unseated, so that a later attempt to operate the associated ejector 30 would result in device 88 entering the ejector and jamming the machine.

What is claimed is:

1. In a machine of the class described, and in combination, a plurality of means for storing and delivering articles, actuating means for said de-
livery means comprising a series of rock shafts operable manually and selectively by forward and reverse rotation between predetermined limits, a slidable lock bar for said rock shafts, means for engaging said shafts in driving relation with said bar throughout said forward rotation, and means for engaging said shafts in driving relation with said bar during said reverse rotation up to a predetermined point and thereafter disengaging said shafts from said bar.

2. In a machine of the class described, and in combination, a plurality of means for storing and delivering articles, each said means comprising a rotatable member having a convex obverse face positioned for supporting a supply of articles and a concave reverse face shaped to hold an article of predetermined dimensions with its outer surface at a distance from the axis of rotation of said member substantially equal to that of said obverse surface, actuating means for said delivery means comprising a series of rock shafts operable manually and selectively by forward and reverse rotation between predetermined limits, a slidable lock bar for said rock shafts, means for engaging said shafts in driving relation with said bar throughout said forward rotation, and means for engaging said shafts in driving relation with said bar during said reverse rotation up to a predetermined point and thereafter disengaging said shafts from said bar.

3. In a machine of the class described, and in combination, a plurality of means for storing and delivering articles, each said means comprising a rotatable member having a convex obverse face positioned for supporting a supply of articles and a concave reverse face shaped to hold any of a plurality of articles of different predetermined dimensions with its outer surface at a distance from the axis of rotation of said member substantially equal to that of said obverse surface and comprising a lower portion for supporting a relatively shallow and wide article, actuating means for said delivery means comprising a series of rock shafts operable manually and selectively by forward and reverse rotation between predetermined limits, a slidable lock bar for said rock shafts, means for engaging said shafts in driving relation with said bar throughout said forward rotation, and means for engaging said shafts in driving relation with said bar during said reverse rotation up to a predetermined point and thereafter disengaging said shafts from said bar.

4. In a machine of the class described, and in combination, a plurality of means for storing and delivering articles, actuating means for said delivery means comprising a series of rock shafts operable manually and selectively by forward and reverse rotation between predetermined limits, and locking means for said rock shafts comprising a lever mounted upon each said shaft for rotation therewith, and a slidable lock bar having a series of recesses spaced for registry with said levers, a series of abutments to one side of said recesses positioned for driving engagement by said levers and extending toward said shafts beyond the limit of movement of said levers, and a second series of abutments to the other side of said recesses positioned for driving engagement by said levers and terminating in the direction of said shafts short of the limit of movement of said levers.

5. In a machine of the class described, and in combination, a plurality of means for storing and delivering articles, actuating means for said delivery means comprising a series of rock shafts operable manually and selectively by forward and reverse rotation between predetermined limits, locking means for said rock shafts comprising a lever mounted upon each said shaft for rotation therewith, and a slidable lock bar having a series of recesses spaced for registry with said levers, a series of abutments to one side of said recesses positioned for driving engagement by said levers and extending toward said shafts beyond the limit of movement of said levers, and a second series of abutments to the other side of said recesses positioned for driving engagement by said levers and terminating in the direction of said shafts short of the limit of movement of said levers, and further locking means for said rock shafts comprising a cam mounted upon each of said shafts for rotation therewith, a plurality of slides engageable by said cams for movement thereby to prevent operable rotation of the remainder of said shafts upon rotation of any one of them.

CHRISTIAN GABRIELSEN.
CERTIFICATE OF CORRECTION.


CHRISTIAN GABRIELSEN. 

September 24, 1940.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 4, first column, line 48, claim 3, for the word "far" read --bar--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 22nd day of October, A. D. 1940.

Henry Van Arsdale, 
Acting Commissioner of Patents.