Dec. 17, 1957 H. B. STONER 2,816,689

MERCHANDISE VENDING MECHANISM

Filed Dec. 14, 1954 2 Sheets-Sheet 1

Fig. 1

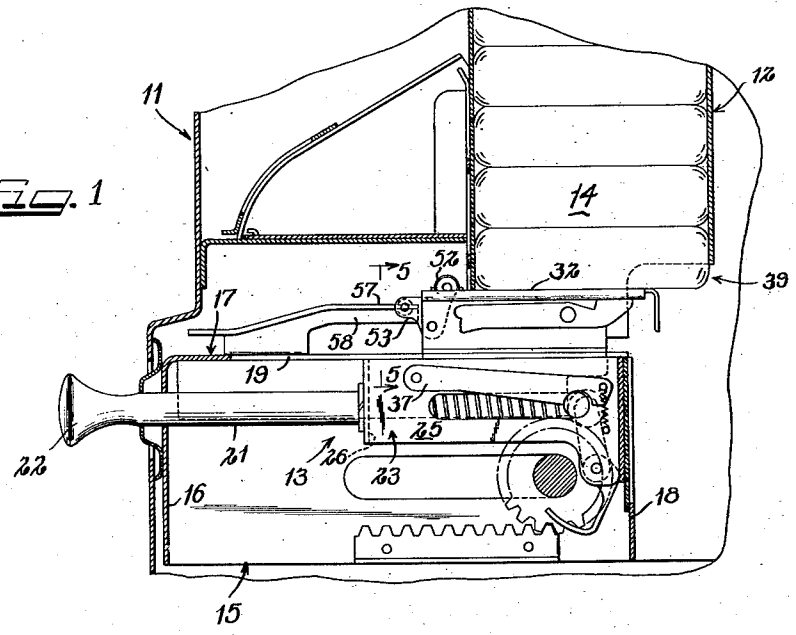
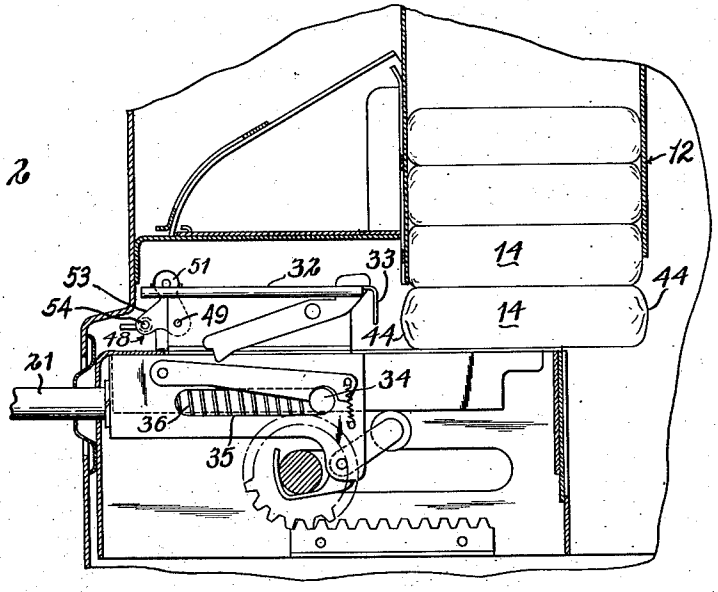


Fig. 2



Inventor
HARRY B. STONER
Wm. S. Cooper
Atty.

Dec. 17, 1957 H. B. STONER 2,816,689

MERCHANDISE VENDING MECHANISM

Filed Dec. 14, 1954 2 Sheets-Sheet 2

Fig. 3

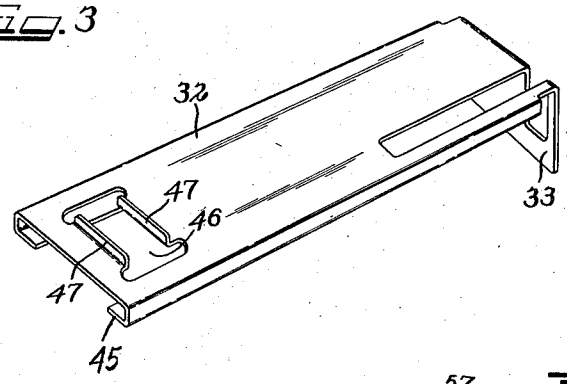


Fig. 4

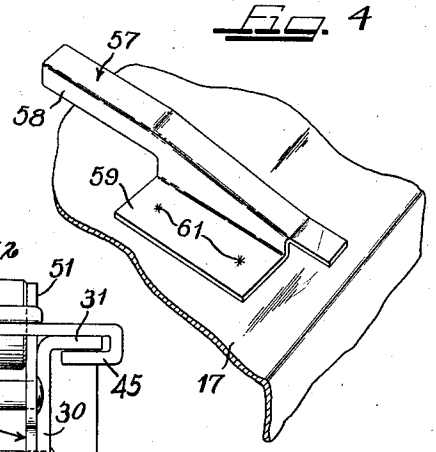
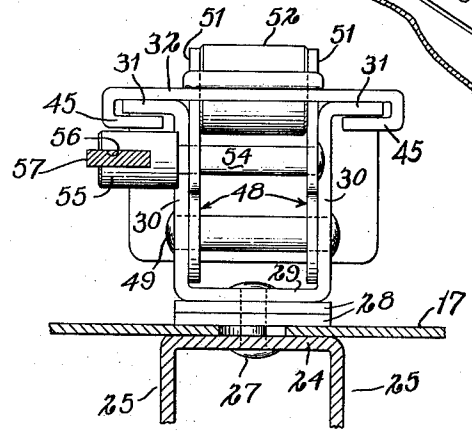


Fig. 5



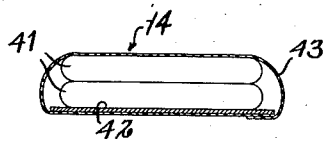


Fig. 6

Inventor
HARRY B. STONER

Marvin L. Caylor
Atty.

United States Patent Office

2,816,689

Patented Dec. 17, 1957

2,816,689

MERCHANDISE VENDING MECHANISM

Harry B. Stoner, Aurora, Ill., assignor to Stoner Mfg. Corp., Aurora, Ill., a corporation of Illinois

Application December 14, 1954, Serial No. 475,210

5 Claims. (Cl. 221—274)

The invention relates to improvements in merchandise vending machines and, more particularly, to the novel structure, assembly, and operation of the merchandise dispensing mechanism therein.

Merchandise vending machines of the type embodying the present invention are of the kind that have a plurality of upright racks, each to contain a stack of vendable merchandise. One piece or package of merchandise is vended from the racks when a customer deposits a coin or coins of the proper denomination and then manually actuates a selected one of a plurality of dispensing mechanisms, one of which is associated with each rack. Merchandise vending machines now in use, such as the one disclosed in the co-pending Gordon R. Rogers application, Serial No. 453,861, filed September 2, 1954, embody vending mechanism which is manually reciprocal and which includes an ejector plate that normally partially underlies the stack of merchandise in the related rack but which is withdrawn from beneath the stack during a vending operation and then returned to its normal position. This return movement of the ejector plate pushes the lowermost piece of merchandise in the related rack ahead of it and causes it to be discharged from the rack through a vending opening provided in the back wall thereof. The distance the ejector plate travels during such vending operation corresponds to the stroke of the plunger. One of the main problems involved in merchandise vending is that created by a customer who seeks to cheat the machine, that is, one who seeks to obtain merchandise without depositing a coin or to obtain merchandise in excess of that normally and properly vended when a coin is deposited. One such problem arises from the fact that, on occasion, skillful manipulation of the plunger, accompanied by tilting or striking the machine, two packages of merchandise may be vended instead of one. It is, therefore, an object of the invention to provide a novelly constructed ejector plate mechanism that will function to defeat such fraudulent operation.

Many operators of vending machines of the character under discussion are now vending merchandise other than cigarettes for which the machine primarily is intended. For example, but not by way of limitation, packages of cookies, candies, etc. are presently being vended from machines of the aforementioned character but with most unsatisfactory results. This arises for the most part from the fact that the packages of cookies, etc. are loosely wrapped and their wrappers tend to bulge endwise as soon as the package drops below the bottom end of the rack walls. This bulging is much more objectionable when the cookies, etc. within the package are not rectangular and do not occupy the same total area as a package of cigarettes. More specifically, usually two cookies, etc. are supported upon a rectangular piece of cardboard and both are enclosed within one wrapper. The irregular size and contour of the cookies increases the amount of excess wrapping material. Because of the weight of the stack of cookies upon the lowermost package to be vended, the

wrapper is bulged excessively when it leaves the confines of the rack prior to being ejected therefrom. It is for this reason that the presently disclosed vending mechanism includes an ejector plate movable through a greater distance than that of the plunger so as to be carried further away from a package when said package drops down into position to be vended. This increased movement of the ejector plate carries its forward or "pusher" end clear of the bulging wrapper. It is, therefore, another object of the invention to provide a novelly constructed plunger actuated vending mechanism for a machine adapted to vend loosely wrapped packages of merchandise.

Another object is to provide a plunger ejector mechanism with novel means to allow the ejector plate thereof to move a greater distance than the distance the plunger is moved.

Another object is to provide, in a plunger-ejector plate mechanism, novel means to carry the ejector plate through a greater distance of travel than that accomplished by the plunger during a cycle of operation.

Another object is to provide a novel structure and association of parts operable automatically for increasing the stroke of a reciprocal ejector plate beyond the limits of movement effected by its reciprocal operating plunger.

Another object is to provide, in a vending machine, a novel reciprocal plunger and ejector plate assembly with a novel bell-crank assembly and an associated cam track.

Another object is to provide a novel plunger-ejector mechanism for a merchandise vending machine that is not expensive to manufacture, is easily assembled, positive in operation, and very efficient in use.

With the foregoing and other objects in view which will appear as the description proceeds, the invention consists of certain novel features of construction, arrangement and combination of parts hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportion, size and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

For the purpose of facilitating an understanding of my invention, I have illustrated in the accompanying drawings a preferred embodiment thereof, from an inspection of which, when considered in connection with the following description, my invention, its mode of construction, assembly and operation, and many of its advantages, should be readily understood and appreciated.

Referring to the drawings in which the same characters of reference are employed to indicate corresponding or similar parts throughout the several figures of the drawings:

Fig. 1 is a fragmentary vertical sectional view through a merchandise vending machine disclosing the features of the present invention, showing the reciprocal elements in their normal retracted position.

Fig. 2 is a view similar to Fig. 1, showing the reciprocal elements in withdrawn position.

Fig. 3 is a perspective view of the ejector plate.

Fig. 4 is a perspective view of a fragmentary portion of the vending machine chassis showing one of the cam tracks mounted thereon.

Fig. 5 is a vertical sectional view taken substantially on line 5—5 of Fig. 1.

Fig. 6 is a longitudinal sectional view through a package of merchandise of the type which may be vended by the vending mechanism disclosed herein.

Referring now particularly to the accompanying drawings, a vending machine disclosed is adapted to vend a variety of packages of merchandise such as, for example, various brands of cigarettes, cookies, candy, etc. The

packages of merchandise are arranged in stacks and selective means in the form of novelly constructed plunger-ejector plate mechanisms are provided, one in association with each of the several racks in the machine, to cause a selected package to be vended upon the deposit in the machine of a coin or coins of the proper denomination. In view of the fact that the coin-controlled mechanism constitutes no part of the present invention, it is not disclosed. It should, therefore, be sufficient to observe at this time that when a coin or coins of proper denomination are deposited in the machine, suitable mechanism is conditioned to permit reciprocation of any one of a number of plunger-ejector plate mechanisms, one of which is associated with each rack.

Referring particularly to the Fig. 1 disclosure, the merchandise vending machine, generally indicated at 11, includes a plurality of merchandise containing racks 12 (only one shown). Each rack has associated with it the novel plunger-ejector plate mechanism, generally indicated at 13, so that when said mechanism is actuated through a complete cycle of operation, the lowermost package of merchandise 14 contained in the related rack is ejected therefrom and delivered to the customer. The rack 12 is mounted in an upright position on a chassis 15, which includes a front wall 16, the top wall 17, and a back wall 18. The chassis top wall is slotted, as at 19, to permit portions of the plunger ejector-plate mechanism to be arranged on each side of the top wall 17. As illustrated, the plunger-ejector mechanism 13 includes a normally retracted reciprocal plunger 21 which projects through the chassis front wall 16 and has on its front end a knob 22 to facilitate manual engagement therewith for withdrawing said plunger from the position illustrated in Fig. 1 into substantially the position illustrated in Fig. 2 during a vending cycle. The vending cycle is completed when the plunger 21 is returned to its normally retracted position.

Mounted on the plunger 21, so as to move normally therewith, is a slidable vending assembly 23. This vending assembly is fabricated from sheet material and, as is perhaps best illustrated in Fig. 5, it has the form of an inverted U and includes a top wall 24 and downwardly extending side walls 25. The side walls 25 are connected at their forward ends by a front wall 26, which has a centrally located aperture therein through which the plunger 21 extends. Firmly mounted on the top wall 24 of said slide assembly, as by means of rivets 27, is a laminated assembly 28 fabricated from strap stock. This laminated assembly 28 extends upwardly through the slot 19 in the chassis top wall 17 and includes a top plate 29 having upwardly extending side walls 30 which terminate at their upper margins in outwardly turned horizontally disposed flanges 31. These flanges constitute a slidable mounting for the merchandise ejector plate 32.

The merchandise ejector plate 32 is perhaps best illustrated in Figs. 3 and 5 and, upon reference to these disclosures, it will be observed that the ejector plate is of a width so as to be accommodated between the side walls of the rack with which it is associated and has a length that normally locates a substantial portion thereof beneath the lowermost merchandise package 14 in said rack so as to constitute a floor therefor (Fig. 1). The rear margin of said ejector plate 32 is turned downwardly to provide a depending flange 33 which functions in a manner to become apparent presently to push a package of merchandise ahead of it during a vending operation. The slidable assembly 23 and the ejector plate 32 normally move with the plunger 21 as is perhaps best illustrated in Fig. 2.

The rearmost end of the plunger 21 carries a pin 34 which projects laterally through slots 35 in the side walls 25 of the slidable assembly 23. A spring 36, arranged around the plunger 21 between the pin 34 and the slidable assembly front wall 26, normally holds the plunger

retracted relative to the slidable assembly 23. When the plunger is pulled outwardly, during the first half of a vending operation, the slidable assembly 23 is carried therewith notwithstanding the presence of the spring 36. This is accomplished by providing, on at least one of the side walls 25 of the slide member 23, a spring-held latch 37 that normally engages over the pin 34. Should some obstruction prevent normal movement of the slidable assembly 23 with the plunger 21, outwardly, the pin 34 is cammed out of engagement with the latch 37 whereupon said plunger may move through its full cycle of operation with the pin travelling in slot 35 without movement of the slidable assembly 23.

When the plunger 21 and slidable assembly 23 are moved from their normally retracted positions, as illustrated in Fig. 1, into the forwardly withdrawn positions illustrated in Fig. 2, the ejector-plate 32 thereon is carried out from beneath the stack of merchandise into substantially the position illustrated in Fig. 2. When this occurs the stack of merchandise in the related rack drops down into the position shown in Fig. 2. The return of the plunger and slidable assembly 23 to their initial retracted positions, causes the depending flange 33 on the leading end of the ejector plate 32 to push the lowermost package of merchandise 14 rearwardly through a vending opening 39 provided in the back wall of the related rack 12. In order to insure foolproof operation of the vending mechanism each time the plunger 21 is moved through one complete operating cycle, it is essential that the end of the ejector plate 32 having the flange 33 thereon is withdrawn a sufficient distance forwardly of the forward end of the package of merchandise to be vended so that said package is not in any manner whatsoever interfered with in its falling down onto the top wall 17 of the chassis 15.

It has been noted hereinbefore that when merchandise such as cookies or candy is vended by means of the apparatus disclosed herein, the apparatus must be capable of functioning in a manner to permit such packages to be vended without possible jamming or improper machine operation. The situation is particularly critical when cookies or candies are packaged and wrapped in individual wrappers substantially in the manner illustrated in Fig. 6. As there shown two cookies 41 are placed upon a substantially rectangular sheet of paperboard 42 and the cookies and paperboard are enclosed in a transparent wrapper 43. When the cookies or other commodity are of a perimeter not corresponding to that of the paperboard 42, the wrapper 43 obviously is relatively loose, particularly at the ends thereof where said wrapper is carried down over the ends of the commodity 41 and secured beneath the bottom of the paperboard 42. So long as the loosely wrapped package 14 remains within the confines of the rack 42, no difficulty is occasioned by reason of such loose wrapping. However, when a package 14 falls onto the top wall 17 of the chassis 15, as is best illustrated in Fig. 2, its ends are clear of the related walls of the rack 12 and because of the pressure of the stack of packages supported thereby within the rack, the ends tend to buckle or bow outwardly, as at 44, thus increasing the effective length of the package 14. It is because of this increase in the effective length of the package that means is provided to increase the length of the stroke of the ejector plate 32 with respect to the length of stroke of the plunger 21 and slidable assembly 23. Should no such means be provided, it would necessarily entail the enlargement of the vending apparatus as a whole and the increasing of the length of the stroke of the plunger 21. However, since this type of a vending apparatus is used to vend cigarette packages, which do not bulge or otherwise have their effective length increased, the vending apparatus primarily designed for vending packages of cigarettes may be used for vending loosely wrapped packages of the character referred to by

the simple expedient of increasing the relative stroke of the ejector plate **32**.

In order to permit relative movement between the ejector plate **32** and the slidable assembly **23**, said ejector plate has its side margins turned downwardly and then inwardly to define inturned flanges **45** which underlie the out-turned margins **31** on the U-shaped member **29—30**. This mounting affords free sliding of the ejector plate relative to said U-shaped member. As is best illustrated in Fig. 3, the ejector plate **32** is formed, adjacent its forwardly disposed end, with an opening **46** having upturned opposed flanges **47** for a purpose to be described presently. The U-shaped member **29—30** has, pivotally mounted therein, a bell-crank structure **48** which is pivoted thereto by means of a rivet or the like **49**. One arm **51** of the bell-crank structure **48** carries a roller **52** that is at all times disposed in the ejector plate opening **46** for rolling engagement with one or the other of the opposed flanges **47**. The other arm **53** of said bell-crank extends forwardly beyond the forward end of the U-shaped element **29—30** and it carries a lateral pin **54** having a head **55** on one end thereof outwardly of the bell crank assembly **48**. The head **55** is slotted, as at **56**, to receive freely therein a track **57**.

Upon referring particularly to Fig. 4, it will be noted that the track **57** is fabricated from sheet metal stock and it has a depending reinforcing flange **58** on one edge which merges with a base flange **59**. The base flange **59** is firmly secured to the top surface of the chassis top wall **17** in any suitable manner such as, for example, by spot welding at **61**. Referring now to Fig. 1, it will be observed that when the ejector plate **32** is in its retracted position, underlying substantially the entire bottom of the stack of merchandise **14**, the bell-crank is likewise retracted, the slotted head **55** being engaged with the substantially horizontal portion of the cam track **57**. During a vending operation when the plunger is withdrawn, the head **55** will travel along the cam track **57** and follow its contour so as to impart rotation in a counter-clockwise direction, as is best illustrated in Fig. 2. This independent movement of the bell-crank **48** during withdrawal of the plunger **22** causes the ejector plate to slide relative to the U-shaped element **29—30** of the slide assembly thereby causing it to withdraw a greater distance than it normally would were no such bell crank cam structure associated therewith. It is this additional movement of the ejector plate **32** which carries the depending flange **33** thereof forwardly a distance sufficient to prevent the bulging end of a loosely wrapped package from entangling therewith and becoming jammed. When the plunger is returned to its retracted position, for ejecting the merchandise package, the ejector plate **33** moves towards its retracted position at a greater rate of speed and for a greater distance than that through which the plunger and associated parts travel.

In addition to avoiding entranglement or jamming of a loosely wrapped package with the ejector plate, the bell-crank cam track structure provides a mechanism that permits the retracted ejector plate **32** to extend a greater distance beneath the merchandise whether it be loosely wrapped packages of cookies, etc. or cigarette packages to prevent unauthorized vending of one or more packages of merchandise by fraudulent operation or by mishandling of the apparatus.

It is believed that my invention, its mode of construction and assembly, and many of its advantages, should be readily understood from the foregoing without further description, and it should also be manifest that while a preferred embodiment of the invention has been shown and described for illustrative purposes, the structural details are nevertheless capable of wide variation within the purview of my invention as defined in the appended claims.

What I claim and desire to secure by Letters Patent of the United States is:

1. In a vending machine including a rack to contain merchandise to be vended through an opening therein, means operable to vend merchandise from said rack, said means comprising a reciprocal plunger assembly located beneath said rack, an ejector plate slidable on said plunger assembly normally lying beneath and supporting a stack of merchandise in said rack, means operably connecting the plunger assembly and ejector plate for movement jointly, said plunger assembly being manually reciprocal during a vending operation to initially withdraw the ejector plate from beneath said stack and then cause said ejector plate to push the lower-most piece of merchandise from the rack for delivery to customer, and means engaged by the said connecting means for sliding the ejector plate relative to the plunger assembly so as to move the ejector plate a greater distance than that traversed by the reciprocal plunger assembly.

2. In a vending machine of the character recited in claim 1, in which said connecting means comprises a bell-crank journaled in the plunger assembly and engageable with the ejector plate.

3. In a vending machine of the character recited in claim 1, in which said connecting means comprises a bell-crank journaled in the plunger assembly and engageable with the ejector plate and the means engaged by said connecting means comprises a fixed cam track.

4. In a vending machine of the character recited in claim 1, in which said connecting means comprises a bell-crank journaled in the plunger assembly, a guide on one bell-crank arm, a cam track engaged by said guide, and means in the ejector plate engageable by the other bell-crank arm.

5. In a vending machine including a rack to contain merchandise to be vended through an opening therein, means operable to vend merchandise from said rack, said means comprising a reciprocal plunger assembly located beneath said rack, an ejector plate slidably mounted on said plunger assembly normally underlying and supporting a stack of merchandise in said rack, a bell-crank carried by said plunger assembly, one arm of said bell-crank engaging said ejector plate, a fixed cam track, and means on the other bell-crank arm engaged with said cam track, said plunger assembly being manually reciprocal during a vending operation to initially withdraw the ejector plate from beneath said stack and to then cause the ejector plate to push the lowermost piece of merchandise from the rack for delivery to a customer, said bell-crank and cam track cooperating during operation of the plunger assembly to slide the ejector plate relative to the plunger assembly so as to move said ejector plate a greater distance than that travelled by the reciprocal plunger assembly.

References Cited in the file of this patent

UNITED STATES PATENTS

416,340	Moodie	Dec. 3, 1889
538,173	Loewenbach et al.	Apr. 23, 1895
2,105,644	Gebert et al.	Jan. 18, 1938
2,231,952	Rowe et al.	Feb. 18, 1941
2,267,144	Steiner	Dec. 23, 1941
2,399,612	Auerbach	May 7, 1946
2,616,573	Grady	Nov. 4, 1952
2,707,543	Stoner et al.	May 3, 1955