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ARTICLE DISPENSING DEVICE WITH CELLULAR
MAGAZINE AND EJECTING MEANS
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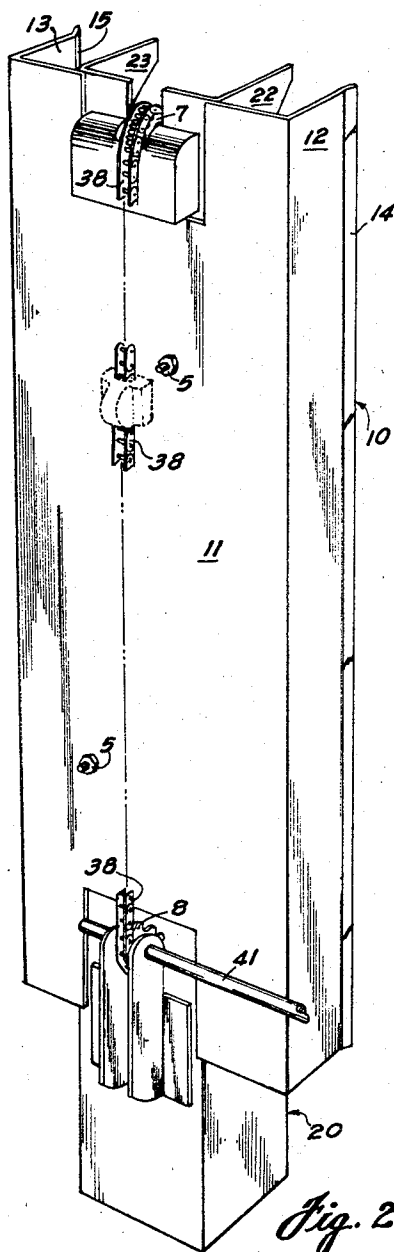


Fig. 2

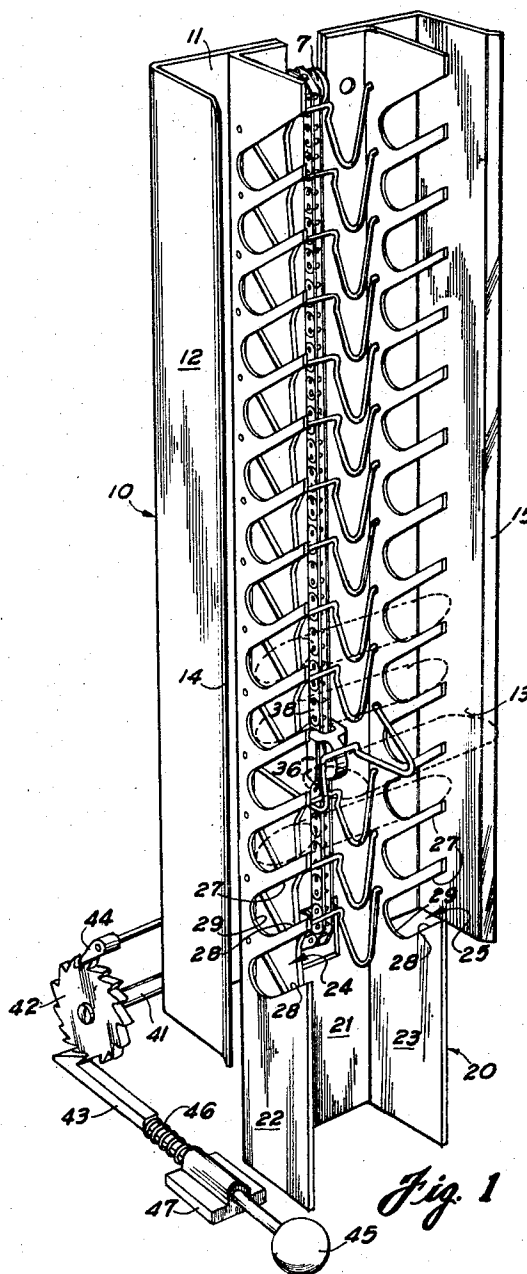


Fig. 1

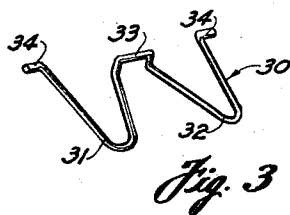


Fig. 3

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**ARTICLE DISPENSING DEVICE WITH CELLULAR
MAGAZINE AND EJECTING MEANS**

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ABSTRACT OF THE DISCLOSURE

An article dispensing device including a magazine with a plurality of slots for horizontally supporting articles in vertically spaced apart relationship, a plurality of pivotal ejectors associated with the slots, a movable cam for successively pivoting each ejector to thrust the articles from the slots, and a ratchet-type advancing mechanism for incrementally advancing the cam from one ejector to another.

Background

This invention relates to a dispensing device for various articles of merchandise and more particularly to a novel magazine and ejection means whereby articles placed in the magazine may be successively ejected therefrom.

Various devices are known in the prior art for dispensing articles of merchandise such as candy, combs, pens and the like. In one type of prior art device, there are provided a plurality of vertically arranged pivotal shelves, each of which is temporarily latched in a horizontal position to support an article of merchandise. Associated with the shelves is a rather complicated latch-releasing mechanism normally including a plurality of cams, springs, levers, tabs, lugs, pins and other related parts. Upon each actuation of the latch-releasing mechanism the lowermost latched shelf becomes unlatched thereby allowing the shelf to pivot downward while spilling the supported article into a dispensing chute. Operation of the device continues in this manner until all of the successive shelves, from the lowermost to the uppermost, have been sequentially released whereupon the shelves and the latch-releasing mechanism must be reset for further operation. A typical example of this type of collapsible shelf device is disclosed in United States Patent Nos. 1,941,781 and 3,126,124.

As is apparent, dispensing devices of this type are relatively expensive to manufacture and require considerable maintenance to keep them in continuous operating condition. Furthermore, dispensing of the oldest articles of merchandise first from the device (first-in/first-out basis) can only be obtained if the attendant rearranges the oldest articles on the shelves prior to resupplying new articles to the device. This latter aspect of dispensing articles is of prime importance when the articles are of such a nature that they may deteriorate with time.

In another prior art device, a plurality of vertically arranged stationary shelves inclined in a forward direction are employed rather than collapsible shelves as in the above-described device. In order to temporarily maintain the articles on the shelves and to later dispense them from the device, retaining members are employed across the front edges of the shelves in combination with a complex actuator mechanism for selectively raising the retaining members to thereby permit the articles to slide from the shelves into a dispensing chute. The actuator mechanism again comprises a plurality of cams, levers, shafts, and other related parts. A typical example of this stationary shelf type of dispensing device is disclosed in United States Patent No. 2,006,390.

Thus, while the stationary shelf type of dispensing device offers certain simplified features as compared to the collapsible shelf device, it is still relatively expensive to manufacture and maintain.

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Brief summary of the invention

Therefore, in accordance with the instant invention there is provided a dispensing device for articles of merchandise which is of relatively simple and inexpensive construction as compared to the prior art devices and requires a minimum of maintenance. Briefly described, the dispensing device includes an article magazine comprising a plurality of vertically arranged stationary article supporting means which are rearwardly inclined for separately holding the articles of merchandise. Each article supporting means has an ejector associated therewith which upon actuation urges the corresponding article out of the supporting means and is thereby dispensed from the magazine. Periodic actuation of successive ejectors is provided by an actuator member which is incrementally moved in a vertical direction parallel to the article supporting means.

The dispensing device of this invention is particularly capable of dispensing articles of merchandise on a first-in/first-out basis without rearrangement of any articles by an attendant during resupply of the device. Moreover, the use of ejectors in combination with an actuator member provides a positive thrust to the articles thereby insuring that they are urged from the supporting means of the magazine each time the dispenser is operated.

Various objects and advantages of this invention, in addition to those indicated above, will be apparent from the following detailed description and the accompanying drawings.

Brief description of the drawings

FIGURE 1 is a perspective view illustrating the front portion of the dispensing device comprising this invention along with a conventional ratchet-type advance mechanism.

FIGURE 2 is a perspective view illustrating the rear portion of the dispensing device comprising this invention.

FIGURE 3 is a front view of one of the pivotal ejectors which are associated with the article supporting means.

Detailed description of the invention

With reference to the drawings, there is shown a vertically disposed channel-shaped housing member 10 having a rear wall 11 and side shields 12 and 13 whose forward edges are angularly turned outward at 14 and 15. Mounted within the housing member is a channel-shaped magazine 20 for supporting various articles of merchandise in horizontally spaced apart relationship. The magazine is generally defined by a pair of spaced apart slotted plates or members 22 and 23 which extend forward in a perpendicular manner from the rear wall 11 of the housing member and substantially parallel to the side shields. The rear edges of the slotted plates are connected by a rear plate 21 which is secured in contiguous relationship with the rear wall 11 of the housing member by any suitable means such as bolt assemblies 5 or by welding. Alternatively, the rear plate 21 of the magazine may be eliminated wherein each slotted plate 22 and 23 would be individually secured to the rear wall 11. For a balanced construction, regardless of which embodiment is employed, it is preferred that the slotted plates 22 and 23 be spaced equidistant from the side shields 12 and 13 of the housing member.

Each slotted plate 22 and 23 is provided with an equal number of slots with each slot 24 in plate 22 being horizontally aligned with a corresponding slot 25 in plate 23. In this manner, each pair of corresponding slots 24 and 25 serves to support an individual article of merchandise horizontally across the front of the magazine.

The configuration of the slots 24 and 25, as shown in FIGURE 1, is substantially uniform with each slot extending inward and downward in an inclined manner from the forward edges of the respective plates 22 and

23. The upper and lower edges 27 and 28 of each slot are essentially parallel and terminate at the rear of the slot in a curved surface 29 which closes the bottom of the slot. The distance between the upper and lower edges 27 and 28 of the slots, defining the slot width, is selected in accordance with the type or types of articles which are to be dispensed from the device. The depth of the slots is governed in part by the same considerations.

It should also be understood that the specific overall configuration of the slots may vary from the illustrated embodiment in accordance with the articles to be dispensed from the magazine. Moreover, there may be instances wherein it is desired to vary the configuration of slots 24 from that of slots 25 or from each other. However, regardless of the configuration or configurations of the slots, it is preferred that at least one slot of each corresponding pair be downwardly inclined toward the rear of the slot sufficiently to prevent dislodging of the supported article by shaking or jarring the dispensing device.

At the rear of each pair of corresponding slots 24 and 25 there is an ejector 30. This ejector preferably comprises a length of relatively stiff rod or wire which has been formed into a configuration approximating a W. As shown in FIGURE 3, each ejector includes a pair of ejecting fingers 31 and 32 connected together by a cam follower segment 33. The cam follower segment is turned slightly outward so as to permit easier engagement by a cam, all of which will be more apparent from the discussion of the cam and its operation. A pair of end stubs 34 project laterally outward from the ejector for pivotally mounting the ejector on the slotted plates 22 and 23 of the magazine. As shown in FIGURE 1, these end stubs are freely inserted through corresponding apertures in the plates 22 and 23 to provide the pivotal mountings for the ejectors. The location of the apertures and the size of the ejectors are selected in order that each ejector, normally lying against the rear of the magazine when mounted, may be pivoted outward and upward to eject an article from the corresponding slots 24 and 25 without interfering with adjacent ejectors or articles in adjacent pairs of slots.

Pivoting of the ejectors 31 is accomplished by an actuator mechanism which includes a cam 36 fixedly secured in a suitable manner to a continuous chain 38. The chain is mounted for movement around upper and lower sprocket wheels 7 and 8 located respectively at the top and bottom of the magazine. These sprocket wheels are positioned in such a manner that both the chain and the cam may travel vertically upward over the face of the rear plate 21 of the magazine but behind the respective cam follower segments 33 of the pivotal ejectors 30. The return run of the chain passes behind the magazine over the rear of wall 11 as shown in FIGURE 2.

The cam 36 generally comprises a U-shaped body portion having an outwardly extending camming lug. The body portion is secured to the chain in some conventional manner such as pins or clips. The camming lug is provided with a curved camming surface for engaging the respective cam follower segments 33 of the ejectors 30.

In operation the chain 38 is advanced in increments corresponding in distance to the distance between adjacent pairs of slots in the magazine. Each increment, however, is so adjusted that the cam 36 will move a distance sufficient to engage the cam follower segment of a single ejector thus causing the ejector to pivot outward and upward (as indicated in FIGURE 1 with the fourth ejector from the bottom of the magazine) and then to disengage the cam follower segment thereby permitting the ejector to freely pivot back to its initial position against the face of the rear plate 21 of the magazine.

It should be understood that any continuous conveyor-type arrangement may be used in place of the chain 38 consistent with the function thereof. Moreover, other forms of cams well known to those skilled in the art may be substituted for the above-described cam.

Incremental advancement of the chain 38 may be accomplished by any of those advancing mechanisms currently employed with dispensing devices as well as those which are generally known in the art and may obviously be adapted for use in the instant dispensing device.

Solely for the purpose of example, a simple ratchet-type advancing mechanism is illustrated in FIGURE 1. In this mechanism the lower sprocket wheel 8 is fixedly secured on one end of an axle 41 having a ratchet wheel 42 secured to its opposite end. A pawl 43 is provided to periodically advance the ratchet wheel 42 in the desired direction. A pivotal stop element 44 serves to prevent the ratchet wheel from rotating in the opposite direction during the interval in which the pawl is reset. The pawl is actuated by a pull type rod and handle 45 which is biased by a spring 46 against a fixed guide 47 so as to reset the pawl to its initial position after actuation. It should be noted that with this type of advance mechanism the upper sprocket wheel 7 is an idler sprocket and therefore could be replaced by any smooth surfaced, curved plastic guide member over which the chain merely slides. Such a member is preferably semicircular in configuration with flanges along both sides to guide the chain over its surface. A suitable plastic would be nylon, Teflon or Kel-F.

In initially beginning operation of the dispensing device, or whenever a new type of article of merchandise is to be dispensed therefrom, it is preferred that the magazine be completely stocked with articles and that the cam 36 be positioned one increment of movement in advance of the lowermost ejector 30 of the magazine. Now then, upon actuation of the advancing mechanism, the chain 38 is advanced one increment. During this movement, the cam 36 engages the cam follower segment 33 of the lowermost ejector 30 of the magazine and causes the ejector to pivot outward and upward to discharge the article which was supported in the lowermost pair of slots 24 and 25. At the end of the movement the cam 36 has passed beyond the cam follower segment 33 and the ejector freely pivots back to its initial position against the rear face of the magazine. At this point, the lowermost article has been discharged from the magazine and the cam 36 is now located midway between the cam follower segments 33 of the lowermost pair of slots and the penultimate pair of slots of the magazine.

Each successive actuation of the advancing mechanism produces a similar incremental movement in the chain 38 and the cam 36 while successive ejectors 31 are pivoted outward and upward to discharge successive articles from the magazine. Of course, when the magazine has been completely discharged of articles the cam 36 is located in the vicinity of the upper sprocket wheel 7. Therefore, before operation of the dispenser may continue, the chain 38 must be reset so as to reposition the cam 36 one increment of movement in advance of the lowermost ejector. As an alternative to this procedure of resetting the chain 38 and the cam 36 upon each complete traverse of the cam 36 over the face of the rear plate of the magazine an additional cam may be affixed to the chain at a point equidistant from the cam 36. This is generally indicated by the phantom lines in FIGURE 2. In this manner, as the cam 36 incrementally moves upward over the face of the rear plate of the magazine, the additional cam is incrementally moving downward to be in a position at the lower end of the magazine to continue the dispensing cycle when the cam 36 reaches the upper sprocket wheel 7.

The above described functioning of the dispensing device is generally illustrated in FIG. 1 wherein several articles are indicated by phantom lines, one of which is shown being thrust from its corresponding support slots while the remaining articles are undisturbed by the action. In following this operating procedure it may be seen that any of the pairs of slots below the position of the cam 36 may be immediately restocked upon discharge yet these restocked articles will not be discharged until the

articles supported in the pairs of slots above the cam are discharged.

It is readily demonstrated in the operation of the dispensing device of this invention that those articles first stocked within the magazine are dispensed first without necessitating rearrangement of any articles remaining in the magazine prior to resupply. This first-in/first-out characteristic of the dispensing device is due to the use of stationary article supporting means in combination with individual ejectors and an actuator mechanism which operates solely in a single direction. As a result, any articles which are supported in the magazine beyond the current position of the cam of the actuator mechanism will be discharged from the dispenser prior to those articles supported in the magazine in advance of the cam. Thus, the attendant, in resupplying the dispenser, need merely restock the discharged slots wherever they are located in the magazine.

Thus, having described the invention, it will be apparent to those skilled in the art that various modifications may be made without departing from the spirit and scope thereof, and therefore, the invention is intended to be only limited as defined in the appended claims.

I claim:

1. An article dispensing device comprising, in combination, a magazine including a plurality of stationary article supporting means, said plurality of stationary article supporting means comprising a pair of spaced apart vertical members, each of said members having a plurality of vertically spaced slots, and each slot of one member having a substantially horizontally corresponding slot in the other member thereby forming a pair of slots for supporting an article; an ejector mounted adjacent each article supporting means, each of said ejectors pivotally mounted between each pair of slots and each of said ejectors including a pair of ejection fingers connected by a cam follower segment; and, an actuation means for actuating each ejector to thrust an article from the corresponding article supporting means, said actuation means including at least one cam to engage said cam follower segment and pivot each ejector to thrust an article from the corresponding pair of slots, said cam secured to a conveyor means mounted for vertical movement adjacent the ejectors, means to advance the conveyor means in successive increments, each increment being of sufficient distance for the cam to engage and disengage a single ejector during its corresponding movement, said conveyor means being of endless construction and having a pair of cams secured thereto at points equidistant from each other.

2. An article dispensing device comprising:

a magazine including a pair of spaced apart, vertically extending members, each of said members defining a plurality of downwardly inclined, vertically spaced slots therein, each of said slots being open at the upper end thereof and closed at the lower end thereof, and each of said slots in one member having a corresponding slot in the other member for supporting an article therebetween as the force of gravity forces the article toward the lower closed ends of said slots;

an ejector pivotally mounted between said vertically ex-

tending members adjacent each corresponding pair of said slots, each of said ejectors constructed and arranged to engage the article carried by said slots adjacent each ejector and move said article upwardly and outwardly along said slots to eject the article therefrom as said ejector is pivoted upwardly; and actuator means for selectively moving said ejectors upwardly to eject the articles from said slots one at a time.

3. An article dispensing device comprising:

a magazine including a pair of spaced apart, vertically extending members, each of said members defining a plurality of downwardly inclined, vertically spaced slots therein, each of said slots being open at the upper end thereof and closed at the lower end thereof, and each of said slots in one member having a corresponding slot in the other member for supporting an article therebetween as the force of gravity forces the article toward the lower closed ends of said slots;

an ejector pivotally mounted between said vertically extending members adjacent each corresponding pair of said slots, each of said ejectors comprising a rod formed in substantially W configuration having a pair of ejecting fingers and a cam follower segment, said ejecting fingers constructed and arranged to engage an article carried in said corresponding slots adjacent said ejector and move the article upwardly and outwardly along said slots until the article is ejected therefrom as said ejector is pivoted upwardly; and

actuator means for selectively moving said ejectors upwardly individually to eject the articles carried in said slots one at a time, said actuator means including a continuous chain positioned adjacent said cam follower segments of said ejectors, a cam member carried by said chain and constructed and arranged to engage each of said cam follower segments as said chain advances said cam member upwardly to pivot each of said ejectors upwardly and eject the article associated with each of said ejectors from said slots carrying said article, and advancing means for advancing said chain and said cam member incrementally to eject one article from said slots each time said advancing means is activated.

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