United States Patent

Gunzler

[15] **3,705,665**

[45] **Dec. 12, 1972**

[54] **SINGLE-COPY VENDING MACHINES FOR NEWSPAPERS**

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[21] Appl. No.: **44,274**

[52] **U.S. Cl.**.....**221/188,** 221/279

[51] **Int. Cl.**.....**G07f 11/48**

[58] **Field of Search**.....221/33, 36, 42, 37, 39, 41, 221/276, 279, 188, 268

[56] **References Cited**

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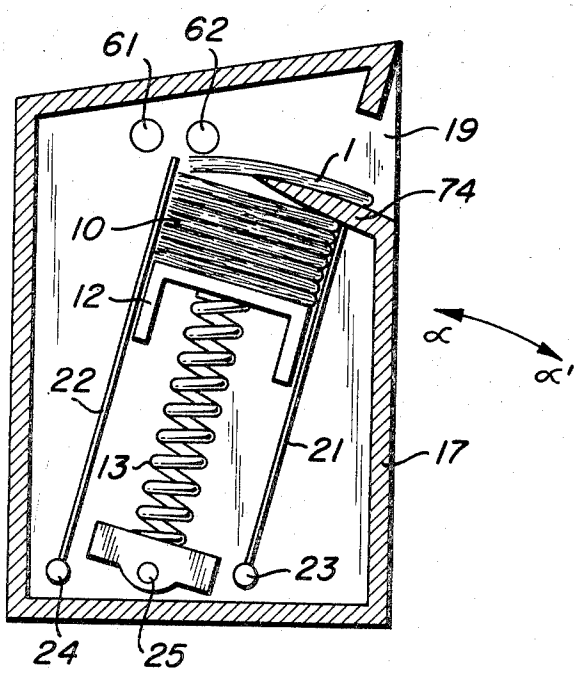
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Primary Examiner—Stanley H. Tollberg

[57] **ABSTRACT**

A single-copy vending machine for flat articles, such as newspapers, in which the items to be sold are stacked horizontally on a tray and so positioned, by means of a spring motor and a fixed stop, that the parting line between the topmost item in the stack and one immediately below always lies in a predetermined horizontal plane. A separating blade is arranged to move relative to the stack of items in the parting plane and is used to separate the topmost item from the remainder of the stack and make it available for removal from the stack by a purchaser. The blade, simultaneously with the separation of the topmost item, also locks the item second from the top of the stack in an inaccessible position for the purchaser.

10 Claims, 7 Drawing Figures



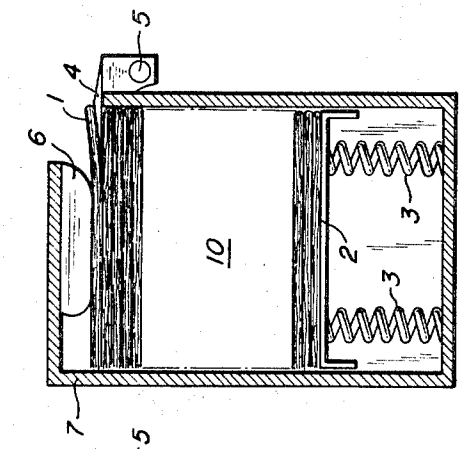


FIG. 1c

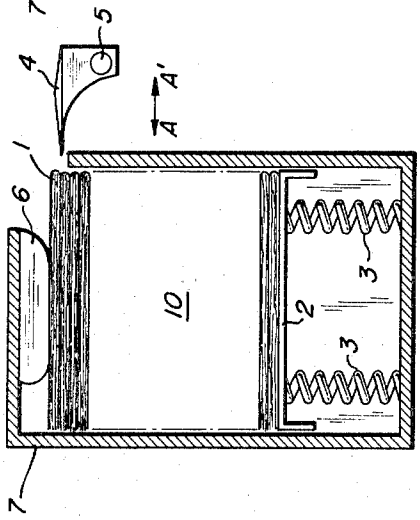


FIG. 1b

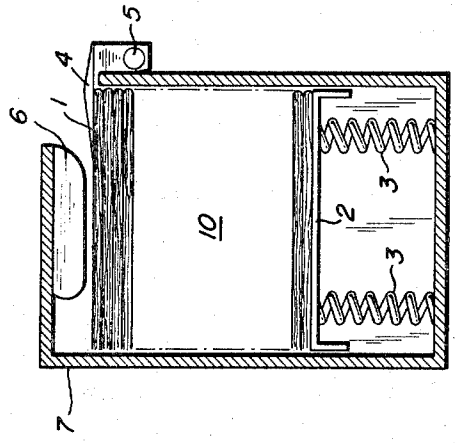


FIG. 1a

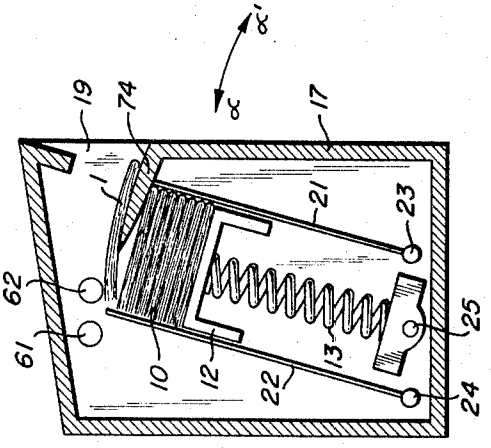


FIG. 2b

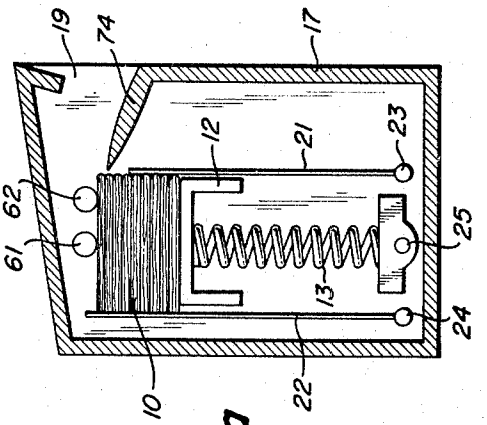


FIG. 2a

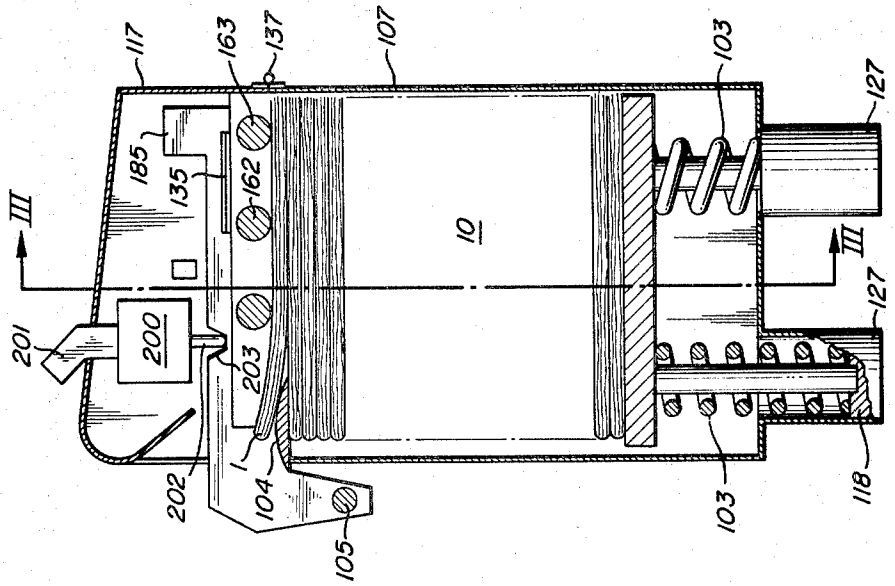

117
163
137
107
103
127
185
135
162
III
10
III
200
127
201
203
1
104
202
105
103
118

FIG. 4

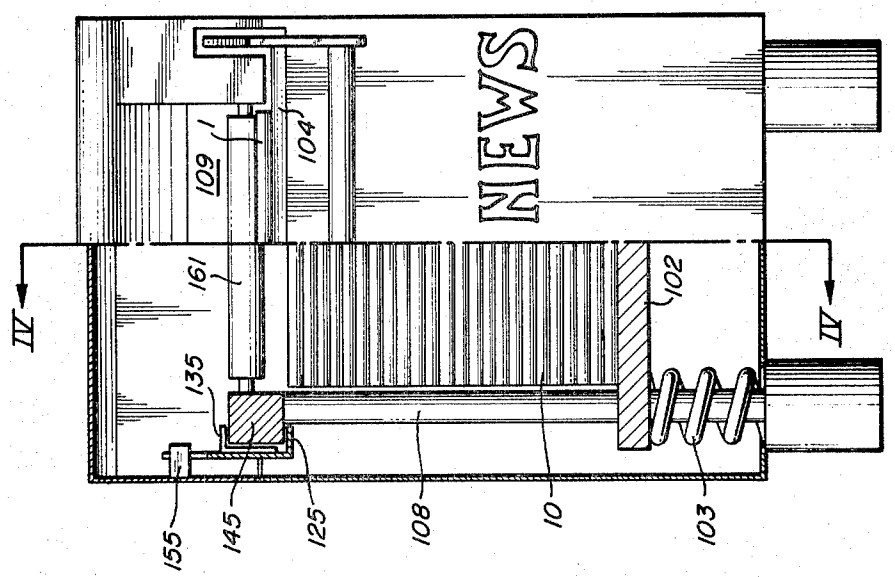

NEWS
109
1
104
161
102
IV
IV
135
155
145
125
108
10
103

FIG. 3

SINGLE-COPY VENDING MACHINES FOR NEWSPAPERS

My invention relates to a machine for the dispensing or vending of substantially flat articles, such as newspapers and magazines, which are normally supplied one at a time.

In the business of distributing printed matter one of the commonly encountered problems is the supply, in an economic fashion, of single copies of the finished product to the individual purchaser. Publications, such as newspapers or magazines, should be readily available to the public in all places; bus stops, street corners, restaurants, etc.; where demand for them may exist and where the establishment of news-stands or similar agencies would not be economically justifiable. For such purposes resort is had to vending machines of several types.

Machines in current use range from simple, open boxes relying on the honesty of the purchaser to deposit the exact sale price for the articles removed, to closed boxes which require the insertion of the proper amount of currency to operate a lock, but which, once open, offer no impediment to the removal of more than one of the items offered.

Several designs of single-copy vending machines have been offered to the trade, but their complexity and unreliability tended to outweigh the advantages of preventing multiple-copy removals. The difficulties inherent in the design of such machines are such that, after more than 60 years of experimentation, no such device, capable of reliable dispensing single copies of newspaper and their like, is in wide-spread use.

It is, therefore, the object of my present invention to teach the construction of a vending machine for newspapers, magazines and other articles similar in shape which are simple in construction, reliable in operation and which effectively prevent the unauthorized removal of the articles on sale without corresponding payment.

It is a further objective of my invention to teach the utilization and operation of such machines in applications where monetary compensation is not required but it is desired that substantially flat articles be dispensed from a stack, one at a time, in a reliable fashion.

I achieve these objects by providing a substantially horizontal tray on which the articles on sale are stacked in horizontal position; means for moving the stacked articles vertically until the upper surface of the stack lies in a plane defined as the vending level; and inserting a separating blade between the two topmost articles in the stack. The separating blade is an elongated, flat member and is reciprocably located in guides with its edge parallel to one side of the stack of articles and its plane of motion orthogonal to its vector of vertical motion.

Upon the insertion of the separating blade the topmost article may be removed from the stack, while the one immediately below is made inaccessible by the presence of the blade flat. To make this, now topmost, article accessible to a new customer the blade must be extracted from the stack, the latter raised to the vending level and the blade reinserted, once more separating the two articles near the top of the stack. This process may be repeated until all the articles in the stack have been removed and the blade comes to lie

next to the top surface of the tray originally supporting the stack. A simple, coin-operated, mechanism may be provided which, upon the insertion of the required monetary recompense, permits a single reciprocating stroke of the separating blade and thus effects the vend of a single article from the machine. Such coin-operated mechanisms are well known in the art and do not form part of my present invention. The elevating mechanism for the tray may take several forms of which mechanical and pneumatic springs are the most practical.

In a modified embodiment of the invention I may elect to reciprocate, or oscillate around a pivot, the stack of articles with respect to a stationary separating member without any fundamental change in the principle of operation described above.

My invention is explained in detail with reference to the accompanying drawing, in which:

FIGS. 1*a*, 1*b* and 1*c* show diagrammatic cross-sections of a machine embodying my invention in three stages of its operation;

FIGS. 2*a* and 2*b* show similar cross-sectional views of an alternative embodiment of the invention;

FIG. 3 is a partially sectioned frontal view of the preferred embodiment of the present invention; and

FIG. 4 is transverse section of the machine depicted in FIG. 3.

FIGS. 1*a*, 1*b* and 1*c* illustrate the essential features of the invention in the preferred mode of operation. A number of articles to be vended, newspapers in the present instance, are aligned to form a stack **10** which is placed on a tray **2** located inside a prismoidal enclosure **7** forming a close envelope around the stack **10**. The tray **2** is subjected to an elevating force by symmetrically placed springs **3** whose spring rate, in combination, is arranged to be equal to the vertical density of the stack **10**. In the case of newspapers of standard format this density approximates 3 lbs for each inch of stack height and the springs **3** are designed to provide this rate with the load uniformly distributed on the tray **2**. The springs are, moreover, sized to enable the tray **2**, when empty of vendable articles, to bear against a stop **6** with a small residual force, say 5 lbs, in magnitude.

When initially loaded into the vending machine the stack **10** is arrested in its upward movement, short of the stop **6**, by a blade assembly comprising a blade **4**, intruding through a horizontal slot in to the casing **7**, a handle **5** as well as guide means, not shown in the illustration, permitting the blade assembly to reciprocate in a horizontal plane orthogonal with respect to the stack **10**, along the direction of the arrows A and A'.

In FIG. 1*a* the blade assembly has been moved fully inward, along arrow A, and the blade **4**, whose width corresponds to the width of the stack **10** essentially, prevents access to a newspaper **1** lying at the top of the stack.

FIG. 1*b* represents the first step in the dispensing sequence. The blade assembly is withdrawn in the direction of arrow A', uncovering the newspaper **1** and permitting the stack to rise into contact with the stop **6**. The stop **6** and the bottom plane of the blade **4** are arranged to have a vertical spacing corresponding to the thickness of a single newspaper, so that, upon the return of the blade assembly in the direction of the arrow A, the blade will enter the stack between the

newspaper 1 at the top and the newspaper lying immediately below it in the vending space. To assure this spacing, the stop 6 may be provided with an adjustable mounting.

FIG. 1*c* shows the final step in dispensing the newspaper 1 from the machine; the blade is fully inserted, occupying a position identical with that illustrated on FIG. 1*a*, with the newspaper 1 lying partially on top of the blade in a position accessible from the outside of the machine. By grasping the exposed edge of the newspaper 1, which may be facilitated by suitably sculpturing the upper surface of the blade 4, and pulling on it, the separation of the top item from the stack of vendable newspapers is completed. The frictional resistance to sliding the item 1 out of the machine will be very small, the residual force of the springs 3 being substantially absorbed by vertical reaction against the guides of the blade assembly.

FIGS. 2*a* and 2*b* show an embodiment of the invention in transverse sections in which the relative motion between the stack 10 and a separating blade 74 is effected by a tilting motion of the stack rather than a reciprocating motion of the blade. This embodiment may be particularly useful where the articles on sale are smaller in size and lighter in weight than the newspapers mentioned above, for example periodicals or goods packaged in substantially flat paper or plastic containers.

In FIG. 2*a* the stack is shown resting on a tray 12 in a substantially vertical alignment with the top of the stack bearing against rollers 61 and 62 forming an upper stop to the motion of the stack. The tray 12 is impelled upward by a spring 13 which rests, in turn, on a shoe 26 pivoted at point 25. In the width of the machine the stack 10 is bounded by side-walls of an enclosure 17, it is restrained from disarrangement in the fore-and-aft direction by rigid curtains 21 and 22, linked, by means not illustrated, to the axis formed by the pivot 25 and he center of the tray 12. The curtains 21 and 22 are pivoted at points 23 and 24 respectively.

Dispensation of the top item 1 in the stack 10 is initiated by rotating the assembly comprising the tray 12, the curtains 21 and 22 and the spring 13 around their respective pivots in the sense of the arrow α', thereby entraining the stack 10 in the same direction. The blade 74 is so mounted that it enters the stack at the parting line between item 1 and the item lying immediately below. Moreover, the blade is arranged to be substantially tangential to the trajectory of the facing edge of the parting line.

The tilting of the tray assembly is effected by means of a lever located externally to the enclosure 17 and appropriate linkages which are not shown in the illustration.

In FIG. 2*b* the dispensing stroke is shown completed, with item 1 separated from the stack 10 and lying in an accessible position atop blade 74. The purchaser obtains his copy of the magazine, or other goods, by reaching through an opening 19 between the blade and the cover of the enclosure 17 and drawing the item 1 from the machine.

The vending cycle is completed with the return of the stack to its vertical position by rotating the tray assembly in the sense of the arrow α. It should be noted that the order of motions in this embodiment is arbitrary and the position of FIG. 2*b* could equally serve as the rest position between vending cycles; the choice would depend on the design of the motivating linkage and the relative inaccessibility of item 1 to unauthorized removal.

FIG. 3 is a partially sectioned frontal view of the preferred embodiment of my invention and FIG. 4 is a sectioned side view of the machine shown in FIG. 3.

A box 107, open at the top, serves as the enclosure for the vending space and encloses a tray 102 located by means of four cylindrical columns 108. The tray 102 is guided on the columns 108 by bearing holes drilled through its surface and is pressed upward by the combined force of springs 103. Tubular members 127 serve as legs for the enclosure 107 and carry, in their bottom ends, support disks 118 in which the columns 108 are rigidly fixed. The stack of newspapers 10 is carried on the tray 102 and moves in the vertical direction under the influence of the springs 103 until restrained by an upper stop comprising rollers 161, 162 and 163. The latter are rotatably mounted in side rails 145 affixed to an upper portion 117 of the enclosure. The upper and lower halves 117 and 107 of the enclosure are connected by a hinge 137 and locked in the positions shown by tamper-proof devices not illustrated.

A separating blade is mounted between side-plates 115 which are further connected by a handle 105. A bent portion 125 on each side-plate 115 cooperates with an L-shaped segment 135 to form a guide shoe on the side rails 145, the arrangement being symmetrical on the two sides of the machine. By means of these guide shoes the blade assembly may be reciprocated along the rails 145 by imparting the corresponding forces to the handle 105.

The motion of the blade assembly in the outward direction, away from the stack 10, is arrested by means of a tab 185, integral with the left side-plate 115, and an abutment 155 rigidly mounted in the enclosure 117.

The vending operation is initiated by depositing the required amount of currency in a coin-chute 201 leading to a coin-operated lock 200 permitting the rotation of a locking arm 202. The locking arm 202 sits in a slot milled into the side-plate 115 and prevents its motion unless the pre-determined conditions of the coin-operated lock are satisfied. The omission of the coin-operated feature of the device in cases where free dispensation of items from the stack 10 is desired, or its replacement by a key-operated lock in situations where dispensing is to be restricted to authorized personnel issued with the appropriate key is self-evident.

With the blade assembly withdrawn from the machine, the springs 103 impel the tray 102 and the entrained stack of newspapers 10 against the stop-rollers 161, 162 and 163; the blade assembly is thereupon returned into its normal position with the blade entering the parting plane between the topmost newspaper 1 and the next one in the stack 10, as shown in FIG. 4. The blade 104 lifts the front edge of item 1 into the slot 109 formed in the face of the machine, through which the newspaper 1 may be readily removed by pulling on the exposed edge.

I claim:

1. A machine for the vending of articles, such as newspapers, one at a time, comprising:

a frame;

tray means, for receiving a stack composed of a plurality of said articles to be vended in a substantially horizontal alignment;

guide means for said tray means, attached to said frame, restraining said tray means to reciprocating motion in a substantially vertical direction;

stop means, for arresting motion of said stack with its upper surface in a pre-determined horizontal plane;

drive means for said tray means, whereby said stack is entrained in a vertically upward direction until arrested by said stop means;

a single blade, for separating topmost article in said stack from remainder of stack;

rail means, permitting motion of said blade in a horizontal plane substantially coinciding with the plane of separation between topmost article in said stack and remainder of said stack;

adjusting means for said stop means so as to establish the coincidence between the plane of motion of said blade and said plane of separation; and

actuating means adapted to impart reciprocating motion to said blade in said plane of separation; so that said blade lifts front edge of said topmost article and blocks access to article lying below it.

2. The machine defined in claim **1** in which said drive means comprise at least one compression spring.

3. In combination, the machine defined in claim **1** and a coin-operated lock acting on said rail means for preventing said reciprocating motion of said blade until pre-determined price of one of said vendable articles has been deposited in said coin-operated lock.

4. The machine defined in claim **1** in which said drive means comprise a plurality of identical helically wound mechanical springs.

5. The machine defined in claim **1** in which said stop means comprise a plurality of cylindrical elements rotatably mounted in said frame with their lower surfaces tangent to a horizontal plane coincident with said pre-determined horizontal plane.

6. A machine for the vending of flat articles, comprising:

a frame;

tray means for receiving a stack composed of a plurality of the articles to be vended in a substantially horizontal alignment;

guide means for said tray means, attached to said frame, restraining said tray means to arcuate movement about a pivot located below surface of said tray means;

stop means, for arresting the motion of said stack with its upper surface in a pre-determined, substantially horizontal plane;

drive means for said tray means, whereby said stack is entrained in a vertically upward direction until arrested by said stop means;

blade means, rigidly affixed to said frame, for separating topmost article in said stack from remainder of stack during its motion in said arcuate path; and

actuating means for imparting reciprocating arcuate motion to said tray means, entraining said stack, around said pivot.

7. In combination, the machine defined in claim **6** and a coin-operated lock acting on said actuating means for preventing said arcuate motion of said tray means until pre-determined price of one of said vendable articles has been deposited in said coin-operated lock.

8. The machine defined in claim **6** in which said drive means comprise a helically wound mechanical spring.

9. The machine defined in claim **6** in which said drive means comprise a plurality of identical helically wound mechanical springs.

10. The machine defined in claim **6** in which said stop means comprise a plurality of cylindrical elements rotatably mounted in said frame with their lower surfaces tangent to said pre-determined, substantially horizontal plane.

* * * * *