Aug. 9, 1960 H. A. WOLTER 2,948,434

TRAY FEEDING APPARATUS

Filed Dec. 27, 1957 3 Sheets-Sheet 1

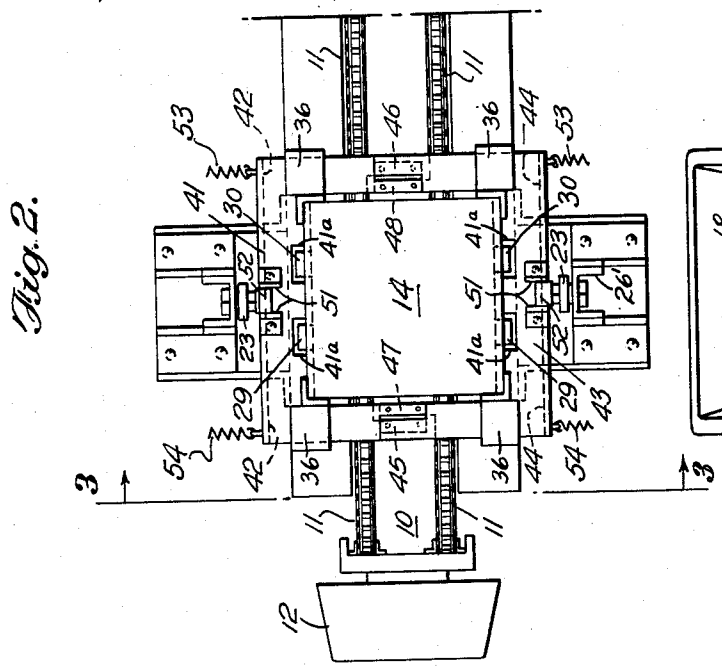

Fig. 2.

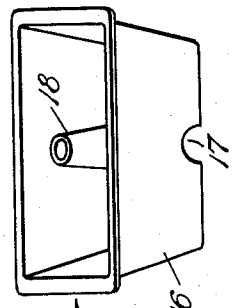

Fig. 5.

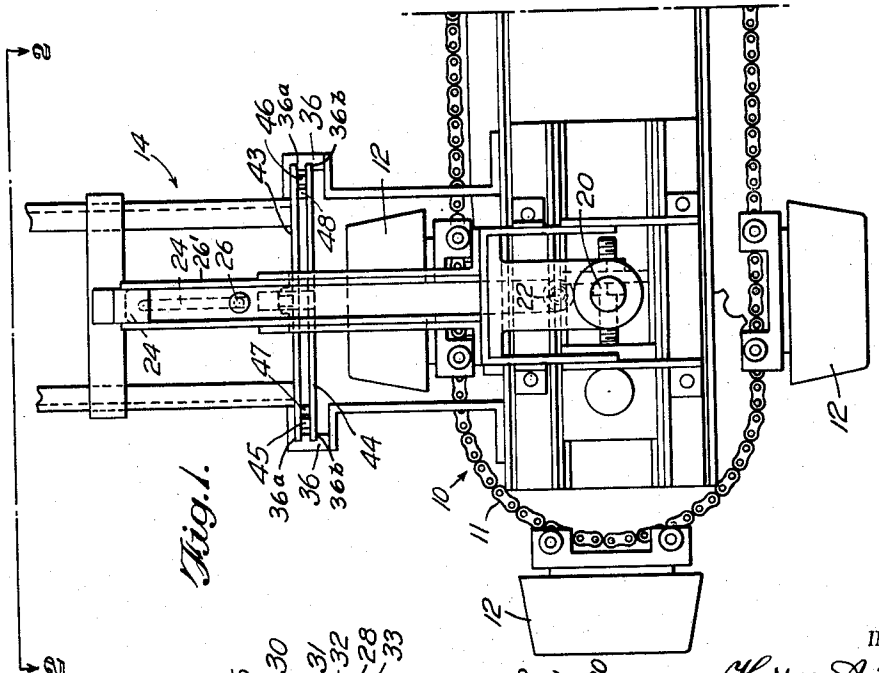

Fig. 1.

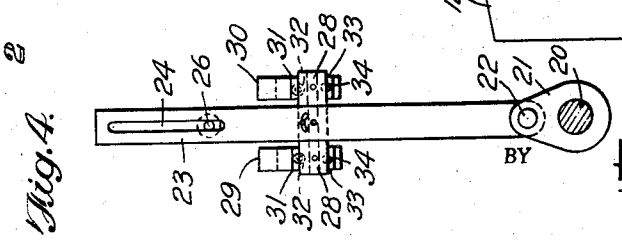

Fig. 4.

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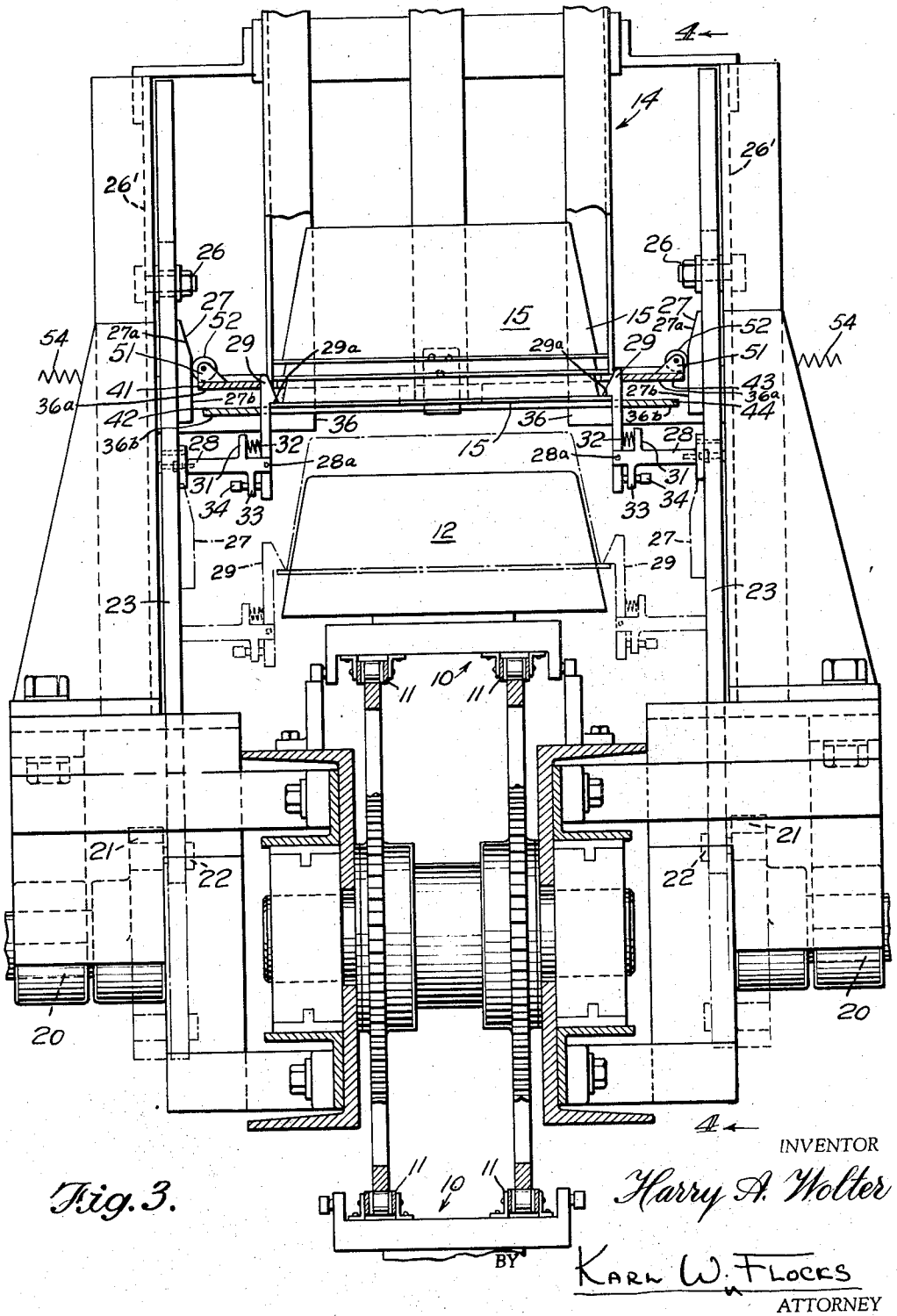

Fig. 3.

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TRAY FEEDING APPARATUS

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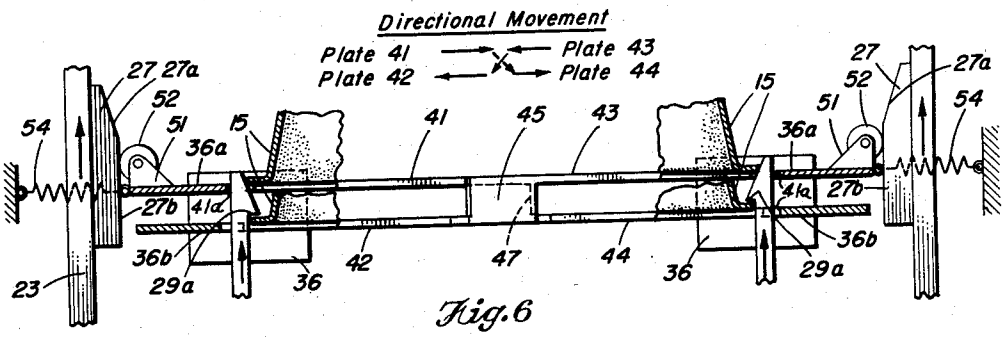

Fig. 6

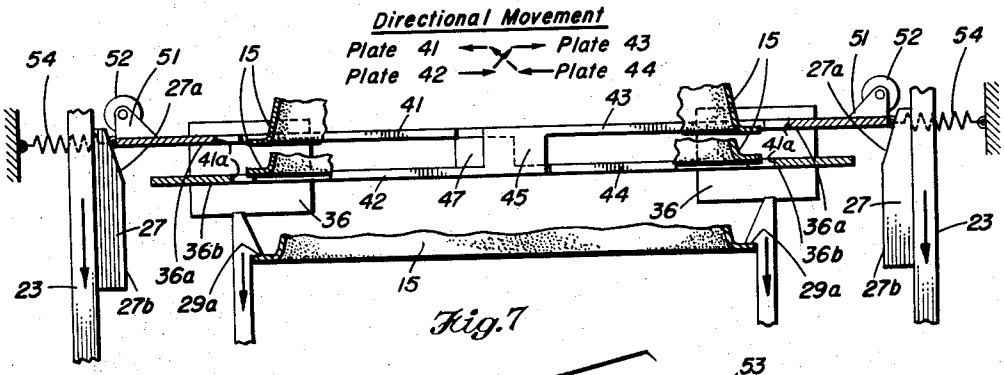

Fig. 7

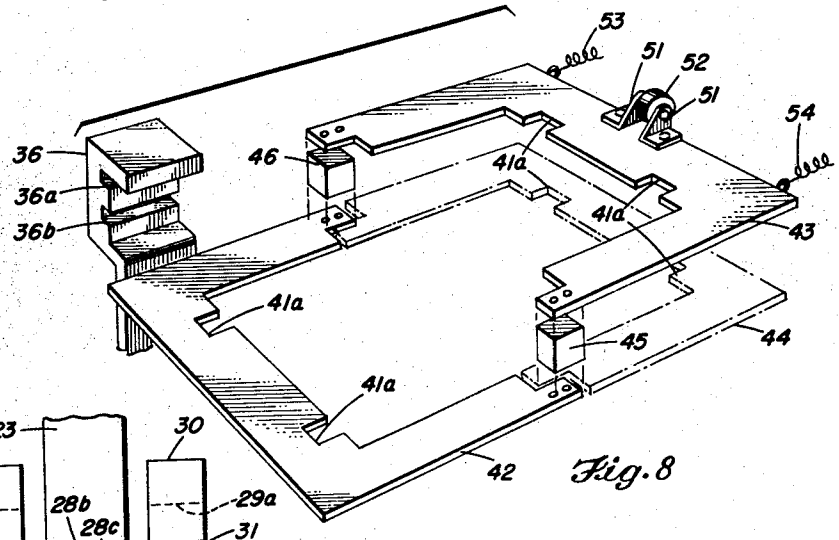

Fig. 8

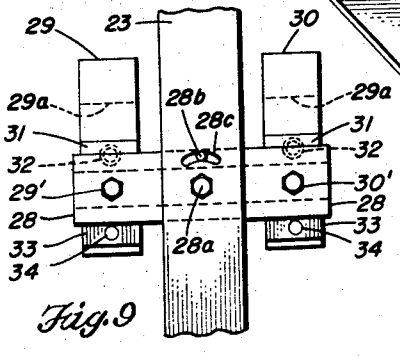

Fig. 9

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TRAY FEEDING APPARATUS

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6 Claims. (Cl. 221—221)

The present invention relates to a dispensing apparatus for trays and the like, and more particularly to a dispensing apparatus for a stack of trays in which retaining plates release the trays successively and pull-down members engage and pull down each of the released trays.

Prior art dispensers to dispense the bottom-most member of a stack of paper cups or pottery are known. These known dispensers generally have upper and lower retaining members which are actuated to move alternately toward and away from the center of the stack, and out of phase with each other. As will be recognized by those skilled in the art, the bottom retaining member is in an inward position, thus engaging the lower most of the articles and supporting the entire stack, when the upper retaining member is in an outward position, not performing any function. The upper member is then moved inwardly and engages beneath the next to last item in the stack to hold it and the entire stack, except for the lowest item of the stack. Meanwhile, the lower retaining member is moved outwardly and thus releases the bottom-most item of the stack. The operation is repeated as often as necessary.

Where such an apparatus has been used in connection with pottery, for example, an elaborate pneumatic system has been relied upon to give the above-noted movements to the retaining members. Some of the dispensers for such comparatively light items, as drinking cups, have either not provided any means to positively strip the bottom-most item of the stack, have utilized the retaining members as strippers, or, in some instances, have provided separate strippers.

When there is a tendency for the items to stick or adhere to each other, it is of course necessary that some positive separating force be applied to the bottom-most item. Those prior art devices which have accomplished this purpose by imparting a vertical as well as a horizontal movement to the lower retaining member, are relatively complicated, requiring many expensive parts in their fabrication. A similar deficiency is found in those heretofore known devices which provide a separate stripper.

Further, the prior art dispensers were not often provided for continuous, or automatic operation, or, where such operation was contemplated, an unusual and potentially damaging type of stripper action was employed. Otherwise stated, the stripper action was such that damage could occur to the cup being dispensed. Although with some uses this would not be a particularly important matter, in other uses it would be of paramount importance, as where the item must undergo many successive operations after it is dispensed. Thus, as will be set forth hereinafter, the tray, which the present device was invented to dispense, has to proceed through several operations, in which it is necessary that the tray retain its shape and not be torn. As will be understood, with rapidly operating automatic machinery, each component must be completely reliable in order that the entire system may

operate rapidly, economically and with a minimum of supervision and shut-down.

It is therefore an object of the present invention to provide a dispenser for items in stacked array which comprises a relatively few parts.

A further object of the present invention is the provision of such a dispenser in which a simple mechanical system is used to impart the desired motion to the parts of the device.

Still another object of this invention is to provide a dispenser for items in stacked array which is capable of being operated automatically and rapidly, and which provides separate and positive strippers to remove the bottom-most article from the stack.

It is another object of the present invention to provide a dispenser which may be readily included as a part of an assemblage of automatic machinery, thus to be a device which will operate rapidly through a great many operations with reliability.

Other objects and the nature and advantages of the instant invention will be apparent from the following description taken in conjunction with the accompanying drawings, wherein:

Fig. 1 is an elevational view, somewhat schematic, of a conveyor and a dispenser in accordance with the present invention disposed in juxtaposition therewith;

Fig. 2 is a plan view taken along line 2—2 of Fig. 1;

Fig. 3 is a sectional view on an enlarged scale taken substantially along the line 3—3 of Fig. 2 with portions broken away for clarity;

Fig. 4 is a detail view on reduced scale of a link of a dispenser in accordance with the present invention, and taken looking in the direction of the arrows 4—4 of Fig. 3;

Fig. 5 is a perspective view of a tray which is fed by the present invention;

Fig. 6 is a fragmentary enlarged elevation, substantially diagrammatic, with portions broken away as shown in section for clarity, illustrating a position of portions of the device during one phase of the operation;

Fig. 7 is a view similar to Fig. 6, showing an alternate position of the parts during another phase of the operation of the apparatus;

Fig. 8 is an enlarged fragmentary perspective view, with portions removed for purposes of clarity, to illustrate the structural details of a pair of the opposed cooperating plates, one of the lower plates being shown by means of dotted lines; and

Fig. 9 is an enlarged fragmentary view of the central portion of Fig. 4.

Referring now to the drawings, wherein like reference characters designate like parts throughout the several views, there is shown in Fig. 1 a part of a conveyor 10 having the usual belt 11 thereon carrying a plurality of forms 12 in known manner. The belt 11 of conveyor 10 is advanced intermittently.

Above the conveyor 10 there may be seen the tray feeding apparatus magazine 14, which is described in more detail hereinbelow. Tray feeding apparatus 14 and the forms 12 are particularly adapted for use with a molded pulp tray of unusual configuration, the tray itself being shown in Fig. 5.

In Fig. 5, there may be seen the tray 15 having four outwardly flaring side walls 16, bottom indentations 17 and an upstanding chimney 18 centrally of the tray. The tray 15 is preferably of molded pulp, and is printed on its exterior sides in an appropriate printing machine while being carried on the form 12. The trays are then filled and an appropriate cover, having an adhesive coating thereon, is placed on the tray 15 and pressed thereto. Thus, it may be seen that the tray 15 is subjected to a great deal of handling after it is fed by the apparatus of

the present invention onto the forms 12 of the conveyor 10. These subsequent handling steps in the manufacture of the completed article, particularly the printing and the gluing and pressing of the cover on the tray, make it mandatory that the tray be free from any tears or deformations during the noted steps.

Referring now to Figs. 2 and 3, there may be seen in the magazine 14 the stacked and nested trays 15. A release and pull-down mechanism is positioned at each side of the magazine 14, and as these mechanisms are identical for each of the sides, only one will be described in detail.

A shaft 20 is caused to rotate by any known means, and in proper synchronism with the conveyor 10. A plate 21 fixed to the end of the shaft 20 has a crank pin 22 thereon and a crank link 23 is revolvably connected with crank pin 22. The upper end of crank link 23 has a slot 24 therein, there being a guide pin 26 extending through the slot 24. Guide pin 26 is preferably fastened to a frame member 26' or some other fixed point.

A cam plate 27 is fixed to the crank link 23 and may be seen to have an upper sloping portion 27*a* and a lower flat portion 27*b*. Below the cam 27 there extends from the crank link 23 a support block 28 pivoted at 28*a* and having pivoted to its free ends at 29' and 30' a pair of pull-down fingers 29 and 30, respectively, fingers 29 and 30 having their upper ends tapered and having a notch 29*a* below the tapered portion. The blocks 28 are limited in rotation by a pin 28*b* extending from the blocks 28 into an arcuate slot 28*c* in the link 23; see Figs. 4 and 9. On the upper side of the support block 28 there is a backing plate 31 which serves as an abutment for a spring 32 which engages with the pull-down finger 29, it being understood that there is a similar spring acting upon pull-down finger 30. Extending from the underside of support block 28 is an ear 33 having a stop adjustment screw 34 threadedly engaging therein, so that the position to which the pull-down fingers 29 and 30 are urged by the springs may be adjusted.

Depending from the magazine 14 there are a plurality of plate supporting members 36, all of which are identical. There are four such members, one adjacent each corner of the magazine 14, as best seen in Fig. 2. In Figs. 1 and 5–8, each of the plate supporting members 36 may be seen to comprise a slotted bar having overlying coplanar slots 36*a*, 36*b*, see Fig. 8. A first plate 41 is disposed in coplanar slots 36*a* in bar 36, and a second plate 42 is disposed between lower coplanar slots 36*b* in bar 36. Each of the plates 41 and 42 is U-shaped in plan view, as shown in Figs. 2 and 8. It will be noted that the plate 41 extends around approximately half of the periphery of the stack of trays and that it has cut-outs 41*a* at its bight portions to accommodate the fingers 29 and 30. On the other side of the magazine 14 there are disposed a similar pair of plates, these plates comprising an upper plate 43 and a lower plate 44, similarly supported.

A pair of connecting blocks 45 and 46 serve to connect the plate 43 and the plate 42 together for conjoint movement. A second pair of connecting blocks 47 and 48 similarly connect the plates 41 and 44. Upper plate 43 carries at a margin thereof a furcated block 51 having a roller 52 supported therein. As may be seen in Figs. 2 and 6–8, roller 52 is urged into contacting relationship with cam plate 27 by a pair of springs 53, 54. A similar arrangement may be seen on the other side.

In operation, the conveyor 10 will be actuated, and then stopped when a form 12 is under the magazine 14. Continuously rotating shaft 20, in timed relationship with conveyor 10, imparts a combined reciprocatory and oscillatory motion to the crank links 23, as will be readily understood. During the upward movement of the crank links 23, the pull-down fingers 29 and 30 will rotate about their pivots 28*a* against the urging of the springs 32 as the tapered upper portions thereof move upwardly past the flange of the lowermost tray 15. Once the indentation of the pull-down fingers has passed this flange, the springs

32 will cause the pull-down fingers to move inwardly, so that the flange is now beneath the indentation of the pull-down fingers. Upon downward movement of the crank 23, the indentation of the pull-down fingers will engage the flange of the lowermost tray 15 and will pull that tray from the stack.

It will also be understood that the retaining plate 43 will be urged inwardly as the crank link 23 rises, caused by the cam plate 27 and the cam follower 52. Simultaneously, the lower retaining plate 42 will be caused to move outwardly due to its connection through connecting blocks 45 and 46 with the retaining plate 43. Similarly, the corresponding crank link, cam plate and cam follower will cause the upper retaining plate 41 to move inwardly as the corresponding crank link rises; the lower retaining plate 44 will be caused to move outwardly due to its connection with the retaining plate 41 through the connection blocks 47 and 48. When the two cranks descend, the springs such as 53 and 54 will cause the plates to move laterally in the opposite directions; thus, retaining plate 43 will move out and retaining plate 42 will move in and simultaneously retaining plate 41 will move out and retaining plate 44 will move in. It may be seen that the two upper retaining plates move inwardly toward each other at the same time that the two lower retaining plates move outwardly away from each other to release the lowermost of the trays 15 so that it may be pulled down onto the form 12 by the pull-down fingers. Thereafter, the upper plates 41 and 43 move outward to release the stack and simultaneously the lower plates 42 and 44 move inwardly to retain the lowermost of the trays and hence the entire stack of trays.

If desired, spring lips may be attached to the magazine 14 to aid in the retention of the trays, particularly the last few trays in the stack.

It will be obvious to those skilled in the art that various changes may be made without departing from the spirit of the invention and therefore the invention is not limited to what is shown in the drawings and described in the specification but only as indicated in the appended claims.

What is claimed is:

1. In a dispenser, a magazine for retaining a stack of articles to be dispensed, retaining and releasing means associated with said magazine comprising first and second upper plates disposed oppositely to each other on either side of said magazine and first and second lower plates respectively underlying said first and second upper plates, means fixedly and directly securing said first upper plate to said second lower plate and said second upper plate to said first lower plate, cam follower means on said upper plates, cam means disposed in operative relationship with said cam follower means, link means supporting said cam means, and means to vertically reciprocate said link means.

2. A dispenser, a magazine for retaining a stack of articles to be dispensed, retaining and releasing means associated with said magazine, said releasing means comprising first and second upper plates disposed oppositely to each other on either side of said magazine and first and second lower plates respectively underlying said first and second upper plates, means fixedly and directly securing said first upper plate to said second lower plate and said second upper plate to said first lower plate, means supporting said plates for movement in substantially horizontal planes, and power operated means to cause said upper plates to move toward and away from each other simultaneously.

3. In a dispenser, a magazine for retaining a stack of articles to be dispensed, retaining and releasing means associated with said magazine comprising first and second generally U-shaped upper plates facing each other on either side of said magazine and first and second generally U-shaped lower plates respectively underlying said first and second upper plates, means fixedly and directly securing said first upper plate to said second lower plate and said second upper plate to said first lower plate, and

means to cause said upper plates to move toward and away from each other simultaneously.

4. A dispenser according to claim 3, wherein said latter-mentioned means comprises cam follower means on said upper plates, cam means operatively disposed in relation to said cam follower means, and means supporting said cam means for movement with respect to said cam follower means.

5. A dispenser according to claim 4, wherein said latter-mentioned means comprises a crank and means to impart motion to said crank.

6. In a dispenser, a magazine for retaining a stack of articles to be dispensed, retaining and releasing means associated with said magazine comprising first and second upper plates disposed oppositely to each other on either side of said magazine and first and second lower plates respectively underlying said first and second upper plates, means fixedly connecting said first upper plate to said second lower plate and said second upper plate to said first lower plate, crank means disposed adjacent to said magazine means to cause a part of said crank means to have rotary motion about a horizontal axis, cam plate means on said crank means, cam follower means on said upper plates and operatively engaging said cam plate means, a support block extending from said crank, and

a pair of spaced spring-urged pull-down fingers pivotally mounted on said support block, whereby upon actuation of said crank means, said upper plates will move toward each other while said lower plates move away from each other, and said pull-down fingers will engage the bottom-most article of the stack of articles in said magazine to pull said bottom-most article downwardly.

References Cited in the file of this patent

UNITED STATES PATENTS

1,396,995	Cooley	Nov. 15, 1921
1,524,420	Bohlman	Jan. 27, 1925
1,593,717	Frick	July 27, 1926
1,636,208	Bergmann	July 19, 1927
1,684,747	Stimpson	Sept. 18, 1928
1,722,048	Hill	July 23, 1929
1,742,371	Simmons	Jan. 7, 1930
1,761,009	De Vries	June 3, 1930
1,798,095	Manley	Mar. 24, 1931
1,963,621	Geyer	June 19, 1934
2,017,521	Whiting	Oct. 15, 1935
2,577,585	Hongell	Dec. 4, 1951
2,589,600	Burkholder	Mar. 18, 1952