June 13, 1944. G. J. BOHLMAN 2,351,393

DISPENSING APPARATUS

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Fig. 1.

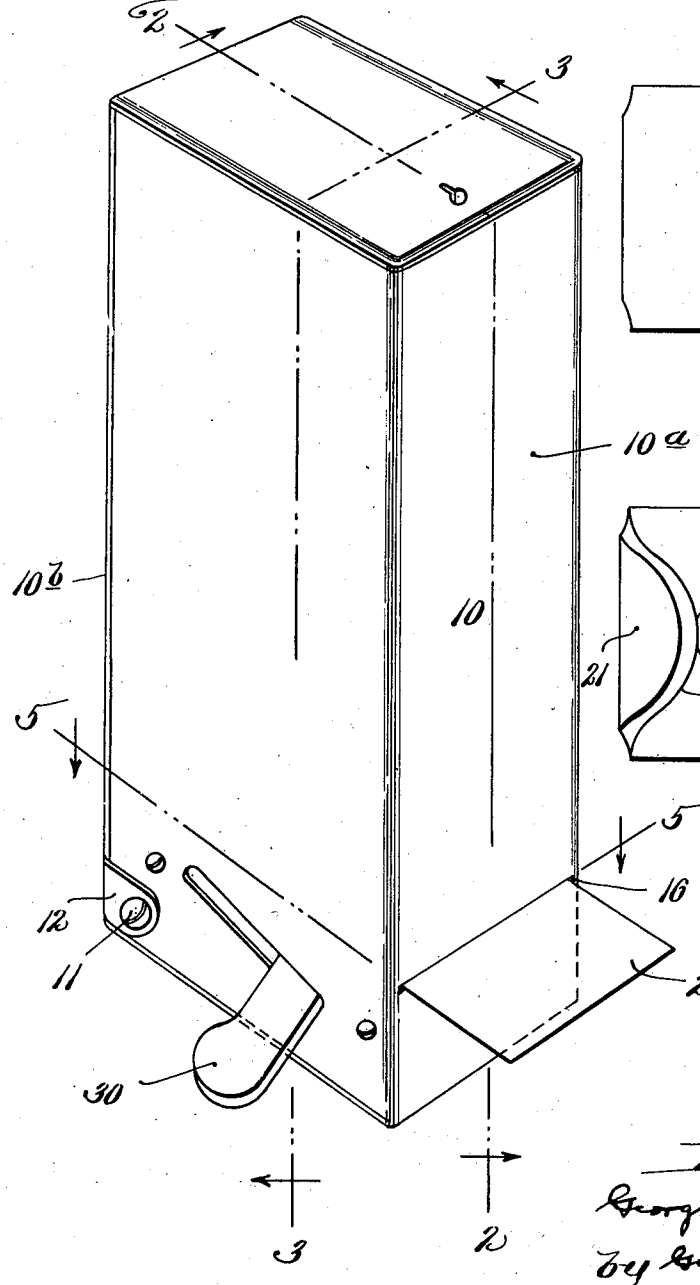

Fig. 6.

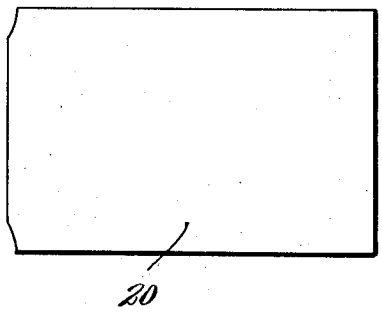

Fig. 7.

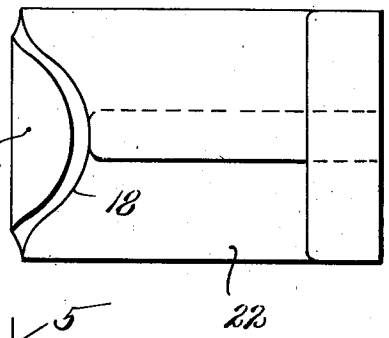

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Fig. 2.

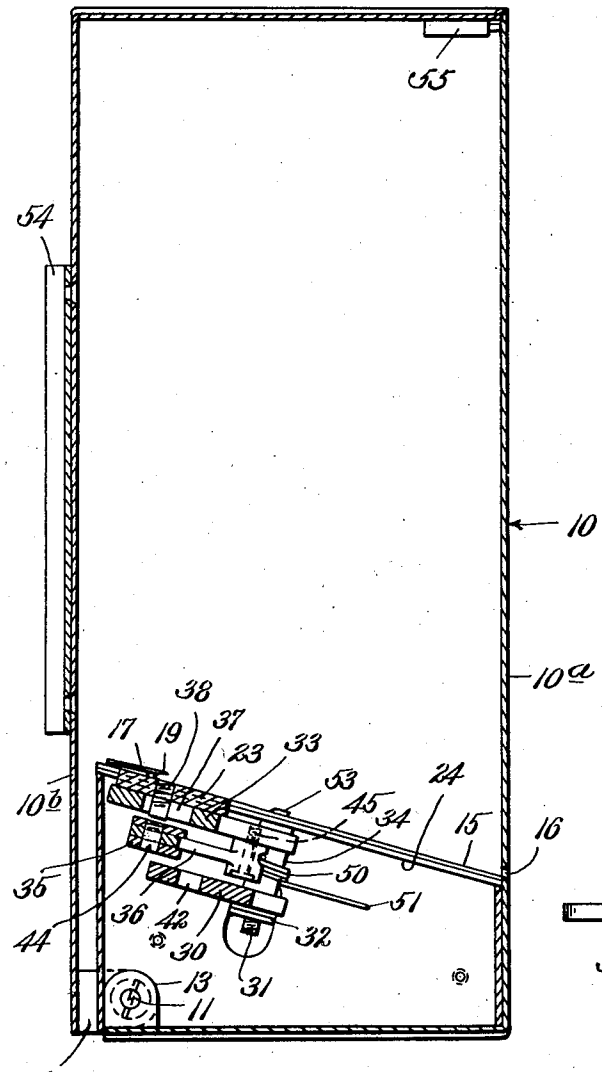
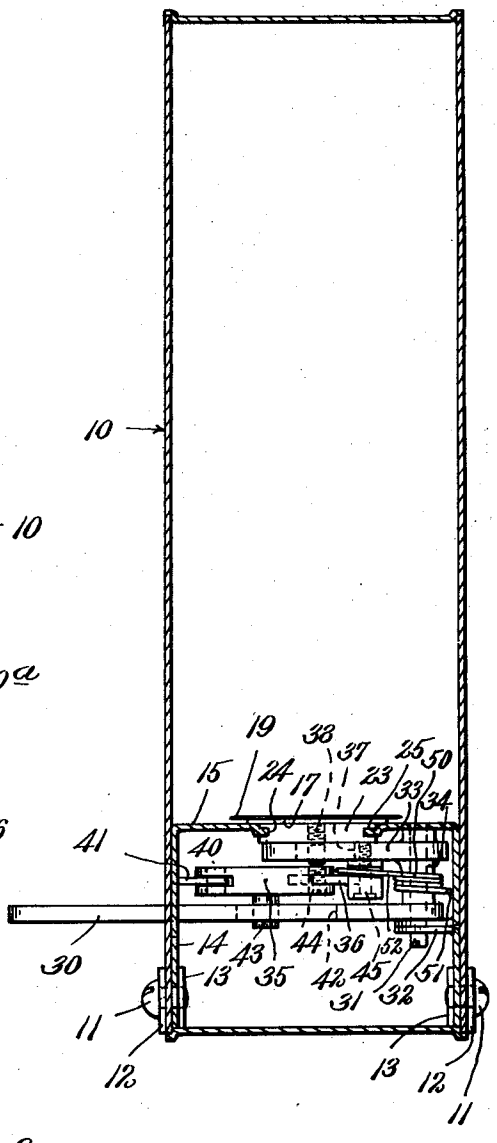


Fig. 3.



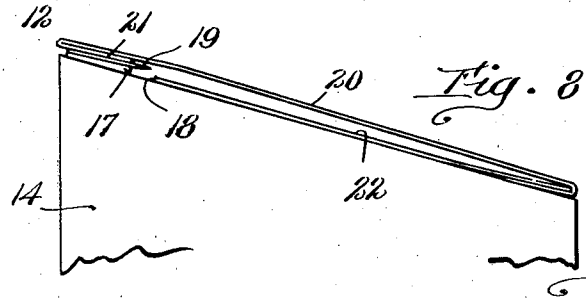


Fig. 8.

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Fig. 4.

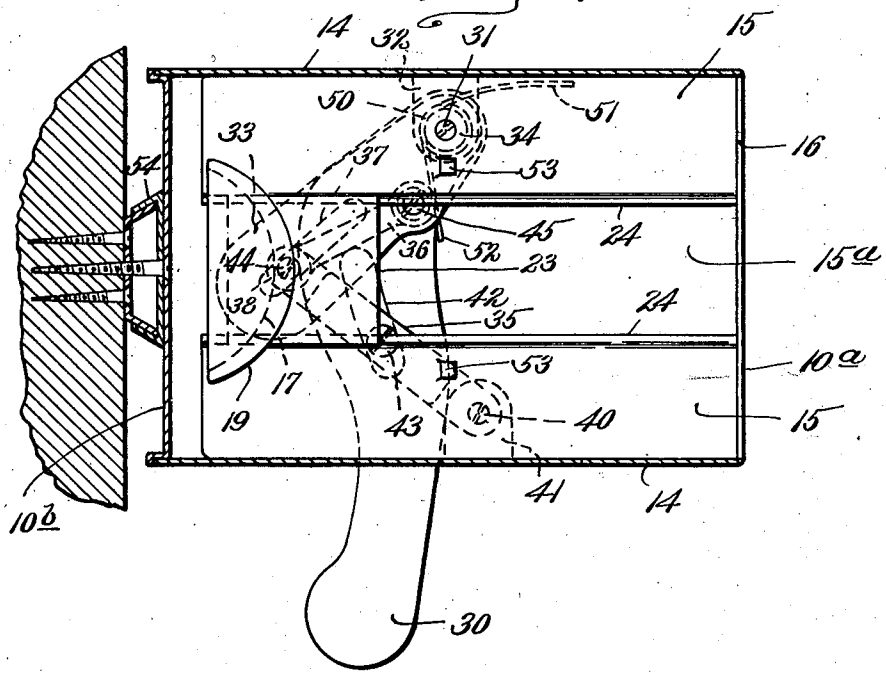
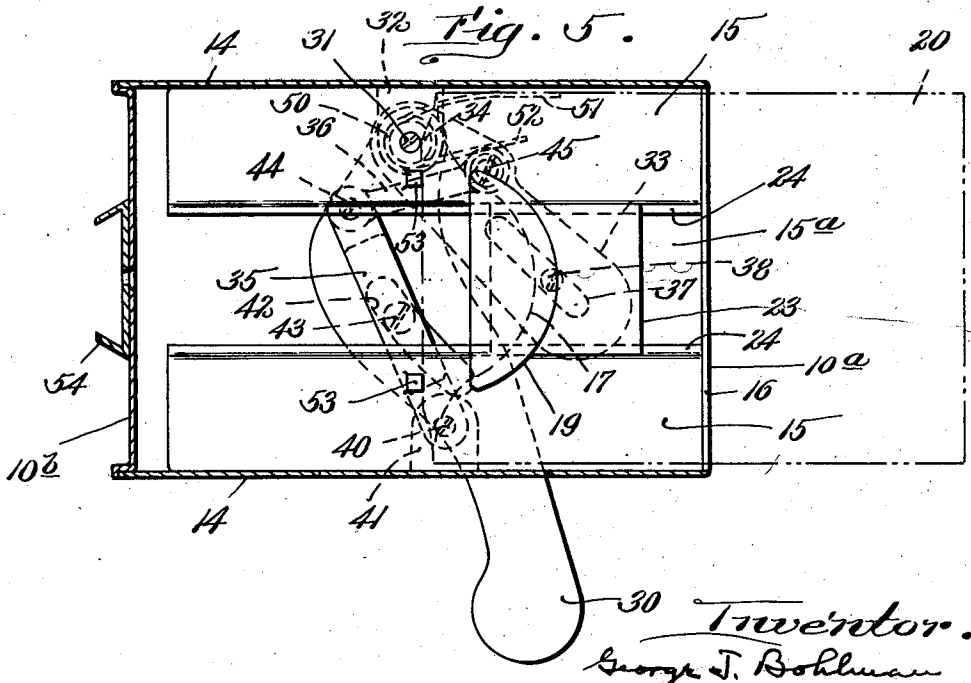


Fig. 5.



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UNITED STATES PATENT OFFICE

2,351,393

DISPENSING APPARATUS

George J. Bohlman, Somerville, Mass.

Application September 12, 1941, Serial No. 410,550

10 Claims. (Cl. 312—55)

This invention relates to dispensing apparatus, and especially to such apparatus for mechanically delivering, one at a time, folded paper cups and the like.

Heretofore, attempts have been made to eject folded paper cups mechanically, but such devices are subject to various limitations and defects and have not come into general use, having been almost wholly superseded by apparatus in which the finger of the user is placed against the lowermost cup of a stack of cups held within a container and the cup withdrawn by the pressure of the finger against the same. In the use of these devices, one or more cups lying immediately above the lowermost, are frequently withdrawn by the mutual friction between the same, and therefore wasted.

The principal object of my invention is to remedy the foregoing defects and limitations, and to simplify and reduce the cost of construction of devices of this character in order to produce an inexpensive dispensing device that is reliable in operation and positive in action.

Other objects will appear from the detailed description of the particular embodiment of my invention selected to illustrate the underlying principle thereof.

In the drawings accompanying and forming a part of this specification,

Figure 1 is a perspective view of a practical dispensing apparatus for folded paper cups and the like, constructed in accordance with my invention;

Fig. 2 is a vertical section taken on the line 2—2 of Fig. 1;

Fig. 3 is a vertical section taken on the line 3—3 of Fig. 1;

Figs. 4 and 5 are horizontal sections each taken on the line 5—5 of Fig. 1, Fig. 4 showing the cup ejector means in retracted position and Fig. 5 showing it at the end of its forward movement;

Fig. 6 is a plan view of a folded paper cup with the flap side uppermost;

Fig. 7 is a plan view of the cup with the short side uppermost;

Fig. 8 is a side view showing the relative positions of the cup ejector means, a folded paper cup, and the upper surface of the plate on which rests a stack of folded paper cups.

The container 10 for a stack of folded paper cups may be constructed in any suitable manner, as by bending sheet material into the desired shape. In the present instance, the container is provided with a bottom integral with the front wall 10a, and a back 10b having a top integral therewith and pivotally connected to the side walls of the container by screws 11 passing through ears 12 integral with said back wall and ears 13 integral with the bottom of the container. Interposed between said ears and clamped between them and the side walls of the container are the side walls 14 of a housing, the top of which is a forwardly inclined plate 15 provided with a longitudinal slot 15a, the lowermost end of said plate terminating adjacent a delivery outlet 16 formed in the front wall of the container.

Mounted for reciprocation on said plate 15 is a cup ejector consisting of two parts, viz., a pusher plate 17 (see Fig. 8) conforming to the shape of the end 18 of the short side of a folded paper cup, and a guard plate 19, which may be of similar shape and which overhangs said pusher plate and is disposed to enter the open end of the cup.

The folded paper cups now generally in use, have a longer side 20 terminating in a flap 21 which is reversely bent back thereon, and a shorter side 22, the outer end of which is curved somewhat in the manner indicated in 18 in Fig. 7.

It will be obvious, of course, that my invention is not limited to use with cups of the shape shown in the accompanying drawings and that, generally speaking, the pusher plate will be shaped to conform to the end of the lower side of the folded cup and that the guard plate may be of any suitable shape to enter said cup.

As indicated in Fig. 8, the guard plate rests under the inner side of the flap of the lowermost cup and therefore is disposed so as to enter the open end of the cup as the ejector is moved forwardly. When the ejector is moved forward sufficiently to effect the engagement of the pusher plate with the end of the short side of the cup, the guard plate will of course overlie said end, thereby holding the latter down on the top plate 15 of the housing and preventing any upward movement thereof. It has been found that sometimes a slight warping or distortion in the shape of the cup will result in unusual resistance to the ejection thereof through the slot 16, but even in such case, the guard plate will prevent the disengagement of the pusher plate 17 from the end 18 of the short side of the cup, which of course is the lowermost side, with the result that the latter will be ejected in spite of the undue friction due to its change in shape.

In the present instance, the cup ejector is mounted by any suitable means on the rearward end of a block 23, the upper face of which is flush with the plate 15, it being understood, of course, that said ejector and block may be a uni-

tary structure. Normally said block is held in retracted position at the rearward end of said plate 15 by means hereinafter described. By any suitable or convenient means, the block is guided by the slot 15a, and, in the present instance, I have indicated that the inner edges of the juxtaposed portions of the plate 15 are bent downwardly and then outwardly, as shown at 24, to enter corresponding grooves 25 cut in the sides of the block. It will be obvious that the juxtaposed edges of the top 15 could be grooved, and the sides of the block formed with tenons cooperating therewith.

For reciprocating the cup ejector, any suitable mechanism may be employed.

In the present instance, I have shown for completeness of disclosure only, an ejector operating means that has given good results in practice. This ejector operating means comprises a manually actuated lever 30 pivoted to one wall of the housing by the pin 31 which passes through the laterally extending ear 32 and is in threaded engagement with the top plate of the housing. The free end of said lever projects through registering slots in one of the side walls of the container and one of the side walls of the housing and has movement about said pin in a plane substantially parallel to the top plate 15 of the housing (Fig. 2). An ejector actuating lever 33 is pivoted to the housing coaxially with the pivotal connection thereto of said lever 30 and spaced from the latter by the sleeve 34.

A toggle comprising an arm 35 and a link 36 is interposed between the manually actuated lever and the ejector actuating lever, and the latter has a pin and slot connection to the block 23, the slot in the present instance being in the lever 33, as shown at 37, and the pin 38 having threaded connection to the block.

The arm 35 is pivoted at 40 to the ear 41 extending from the wall of the casing opposite to the wall to which the lever 30 is pivoted. There is a pin and slot connection consisting of the slot 42 in the manually actuated lever and the pin 43 projecting from said arm at a point which preferably is nearer the pivot 40 thereof than to the pivot 44, whereby the link 36 is pivoted to said arm. The other end of said link is pivoted at 45 to the ejector actuating lever 33, the point of such pivotal connection being closer to the axis of the pivot 31 whereby the lever 33 is connected to the housing, than it is to the innermost end of the slot 37 in the lever 33 through which passes the pin 38 secured to the block 23.

By means of the foregoing arrangement, the motion given the manually actuated lever about its pivot is converted into a longer right-line movement of the cup ejector easily and without any binding of the parts.

It will be noted that the arm and link comprising the toggle aforesaid make an acute angle when the cup ejector is in its retracted position (Fig. 4) and a substantially right-angle when the ejector is in its extreme forward position (Fig. 5). It will be noted also that when the ejector is in its retracted position, the toggle pivot 44 is substantially coaxial with the pin 38 (Figs. 2 and 3).

The means provided for restoring the cup ejector and its actuating means to normal position, consist preferably of the spiral spring 50 fixed to a suitable support, such, for example, as the journal 34 of the lever 33, the end 51 of said spring bearing against a stationary member, such as a wall of the housing, and the other, 52, bearing against one of the motion-multiplying connections, such, for example, as the link 36 at its point of connection with the ejector actuating lever.

To prevent the retrograde movement of the cup ejector from moving the cup backward, stop means, such as the projections 53, punched upwardly from the top plate of the housing, may be provided.

The dispensing device may be secured to a suitable support, such as a wall, by means of the co-operating clips 54.

A lock 55, preferably is provided to lock the body portion of the container to the stationary back thereof. When unlocked from its stationary back, the body of the container may be swung forwardly about the pivots 11 for inserting a stack of folded paper cups.

Having thus described an illustrative embodiment of my invention without, however, limiting the same thereto, what I claim and desire to secure by Letters Patent is:

1. A dispensing apparatus for folded paper cups and the like, comprising in combination, a container having a forwardly inclined plate disposed intermediate the ends thereof for supporting a stack of folded paper cups, the forward wall of said container having a delivery outlet disposed adjacent the lowermost edge of said plate, cup ejector means mounted for reciprocation on said inclined plate at the rearward end thereof, said means comprising a pusher plate disposed above said inclined plate and shaped to conform to the end of the short side of a folded paper cup, means for preventing upward movement of the end of the short side of the cup when said end is engaged by said pusher plate to move the same longitudinally, actuating means projecting through a slot in one of the side walls of said container and connecting means between said actuating means and said ejector means.

2. A dispensing apparatus for folded paper cups and the like, comprising in combination, a container having a forwardly inclined plate disposed intermediate the ends thereof for supporting a stack of folded paper cups, the forward wall of said container having a delivery outlet disposed adjacent the lowermost edge of said plate, cup ejector means mounted for reciprocation on said inclined plate at the rearward end thereof, said means comprising a pusher plate disposed above said inclined plate and shaped to conform to the end of the short side of a folded paper cup, a guard plate overlying the forward edge of said pusher plate and shaped to enter the open end of said cup, whereby when the pusher plate engages the open end of the short side of the cup to move the same longitudinally, the guard plate overlies said end and prevents upward movement thereof, actuating means projecting through a slot in one of the side walls of said container and connecting means between said aactuating means and said ejector means.

3. A dispensing apparatus for folded paper cups and the like, comprising in combination, a container for receiving a stack of folded paper cups, a housing disposed at the lower end thereof, said housing having a forwardly inclined top portion, the front wall of said container having a delivery outlet adjacent the forward end of the top portion of said housing, cup ejector means mounted for reciprocation on said top portion, said ejector means being provided with means for preventing the distortion of the cup during the ejection thereof, a manually actuated lever pivotally con-

nected to one of the walls of said housing for movement in a plane substantially parallel to that of the inclined top portion of said housing and projecting through a slot in one of the side walls of said container, and connections disposed within said housing and between said lever and said ejector means.

4. A dispensing apparatus for folded paper cups and the like, comprising in combination, a container for receiving a stack of folded paper cups, a housing disposed at the lower end thereof, said housing having a forwardly inclined top portion, said top portion of said housing being coextensive with the area of the cup to be dispensed, the front wall of said container having a delivery outlet adjacent the forward end of the top portion of said housing, cup ejector means mounted for reciprocation on said top portion, said cup ejector means comprising a pusher plate disposed above said top portion and shaped to conform to the end of the short side of a folded paper cup, and a guard plate overlying the forward edge of said pusher plate and shaped to enter the open end of said cup, a manually actuated lever pivotally connected to one of the walls of said housing and projecting through a slot in one of the side walls of said container, connections disposed within said housing and between said lever and said ejector means, and resilient means for retracting said ejector means.

5. A dispensing apparatus for folded paper cups and the like, comprising in combination, a container for receiving a stack of folded paper cups, a housing disposed at the lower end thereof, said housing having a forwardly inclined top portion, the front wall of said container having a delivery outlet adjacent the forward end of the top portion of said housing, cup ejector means mounted for reciprocation on said top portion, a manually actuated lever pivotally connected to one of the walls of said housing and projecting through a slot in one of the side walls of said container, connections disposed within said housing and between said lever and said ejector means, means for retracting said ejector means, and stop means for preventing retrograde movement of a folded paper cup by the rearward motion of said ejector means.

6. In a dispensing apparatus for folded paper cups and the like, a housing having a slotted top portion, a block disposed in the slot of said top portion, a cup ejector mounted on said block, a manually actuated lever pivoted to one wall of said housing and projecting through a slot in the opposite wall thereof, an ejector actuating lever pivoted to a wall of said housing coaxially with the pivotal connection thereto of said lever, an arm pivoted to the wall of said housing opposite to the wall to which said lever is pivoted, a pin and slot connection between said lever and said arm intermediate the respective ends of each, a link pivoted at one end to the free end of said arm and at the other to said ejector actuating lever intermediate the ends thereof, and a pin and slot connection between said ejector actuating lever and said block, said arm and said link making an acute angle when said cup ejector is in retracted position and a substantially right-angle when said ejector is in its extreme forward position.

7. In a dispensing apparatus for folded paper cups and the like, a housing having a slotted top portion, a block disposed in the slot of said top portion, a cup ejector mounted on said block, a manually actuated lever, an ejector actuating lever, a sleeve spacing said levers apart, an ear extending inwardly from one wall of said housing, a pin passing through said ear, said manually actuated lever, said sleeve, and said ejector actuating lever, the free end of said manually actuated lever passing through a slot in the opposite wall of said housing, an arm pivoted to the wall of said housing opposite to the wall to which said manually actuated lever is pivoted, a pin and slot connection between said lever and said arm intermediate the respective ends of each, a link pivoted at one end to the free end of said arm and at the other to said ejector actuating lever intermediate the ends thereof, a pin and slot connection between said ejector actuating lever and said block, said arm and said link making an acute angle when said cup ejector is in retracted position and a substantially right-angle when said ejector is in its extreme forward position, and spring means for retracting said cup ejector, said spring means comprising a spiral spring surrounding said sleeve, one end of said spring, bearing against one wall of said housing, and the other, bearing against said link at its point of connection with said ejector actuating lever.

8. In a dispensing apparatus for folded paper cups the end of the short side of which is curvilinear inwardly, cup ejector means comprising a guard plate conforming to the shape of the end of the short side of a folded cup and disposed to rest upon the inner side of the flap of said cup and project into the open end of the cup and being coextensive in width with said end, and a pusher plate underlying and having its engaging edge stepped back from said guard plate, whereby when the pusher plate engages the open end of the short side of the cup to move said cup longitudinally, the guard plate overlies substantially the entire width of said end and prevents upward movement thereof, and means for reciprocating said ejector means.

9. In a dispensing apparatus for folded paper cups and the like, a slotted plate supporting a stack of folded paper cups, said plate being coextensive with the area of cup to be dispensed, a block reciprocable in and guided by the slot in said plate, the upper face of said block being flush with said plate, cup ejector means mounted on said block, said means comprising a pusher plate shaped to conform to the end of the short side of a folded cup resting on said slotted plate, and a guard plate superimposed upon said pusher plate and overlying the same, said guard plate being disposed and shaped to enter the open end of said cup, and means for reciprocating said block.

10. In a dispensing apparatus for folded paper cups the end of the short side of which is curvilinear inwardly, cup ejector means comprising a pusher plate conforming to the shape of the end of the short side of a folded cup and of a width somewhat short of the width of said end, and a guard plate of similar shape overhanging substantially the entire width of the pusher plate and being slightly wider than said pusher plate, said guard plate being disposed to enter the open end of said cup, and means for reciprocating said ejector means.

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