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C. B. TERRY ET AL

2,365,916

MECHANISM FOR DISPENSING CUPS OR THE LIKE

Filed June 20, 1941

2 Sheets-Sheet 1

Fig. 1.

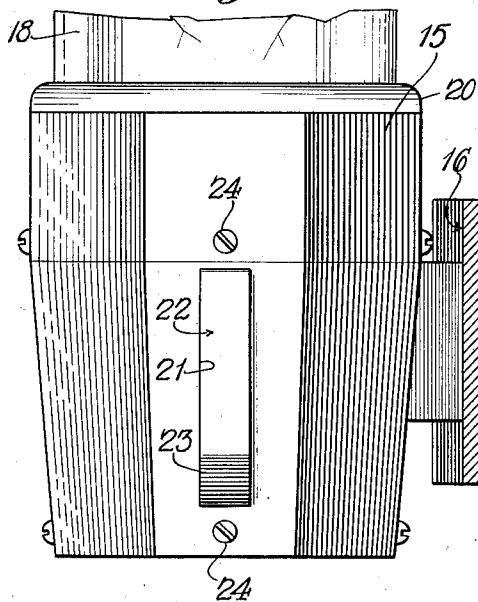


Fig. 2.

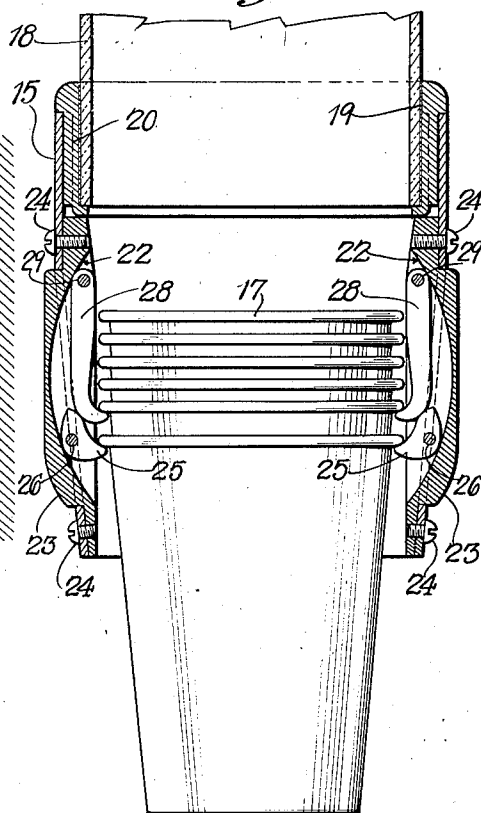
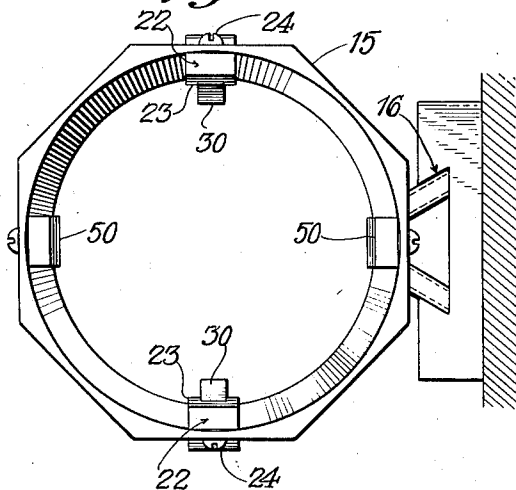


Fig. 3.



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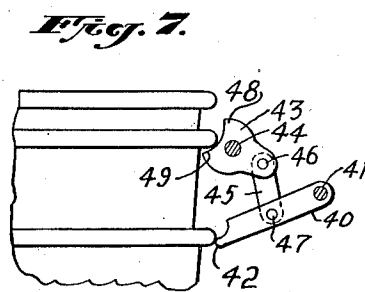
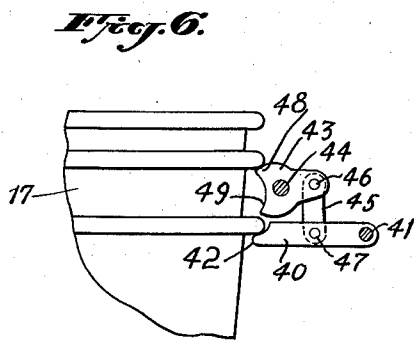
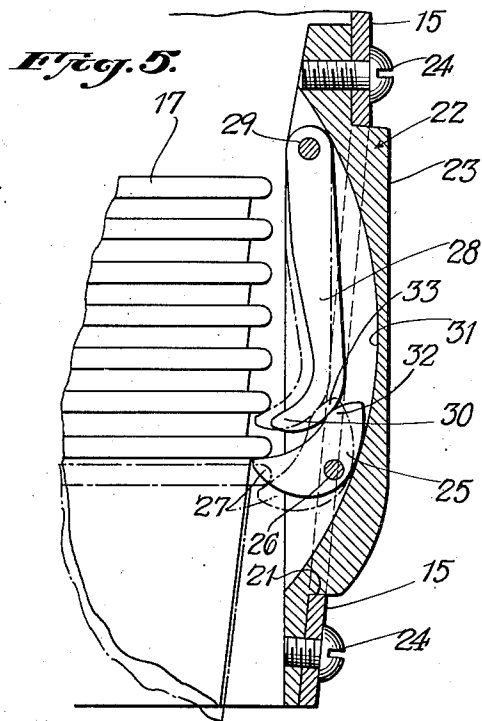
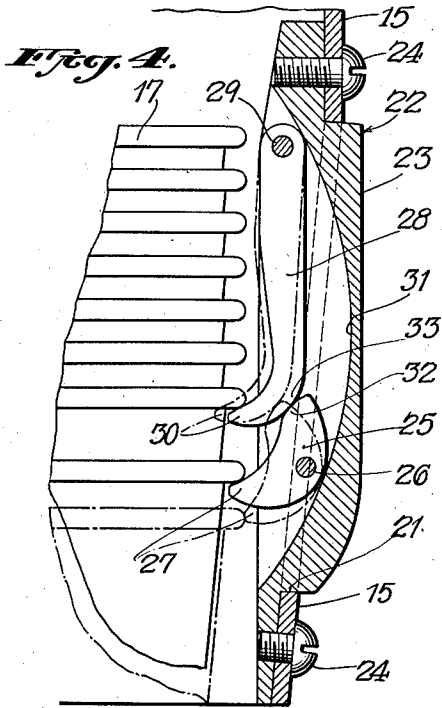
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MECHANISM FOR DISPENSING CUPS OR THE LIKE

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12 Claims. (Cl. 312-43)

This invention relates to apparatus for dispensing articles individually from a stack thereof, and is particularly adapted for example, to the dispensing of paper cups or the like which have been stacked in nested relation.

The various forms of the invention as herein disclosed, illustrate the manner in which the same may be applied to paper cup dispensers of the class wherein, with the cups preferably stacked in upright position, the lowermost cup is removed by grasping and pulling the same downwardly while the apparatus acts to support and retain the remainder of the stack. It has been found difficult to devise a device of this class so that in pulling down the desired cup, no portion of the same will be torn or crushed, while at the same time avoiding any danger that an extra cup or cups will be withdrawn, and thus wasted. Heretofore the available paper cup dispensing arrangements of this class were such that the greater the resistance applied to prevent falling of the stack of cups through the dispenser, the greater also was the resistance against removal of the bottom cup, with consequent danger of injuring the latter. This condition has resulted in adopting a compromise between two impractical conditions, viz., the condition where it would be impossible to withdraw more than one cup at a time because the resistance is so great that it is difficult to pull even one cup from the dispenser without crushing, and the other and opposite condition with which it is reasonably easy to remove the lower cup, yet difficult to avoid frequently removing more than one cup.

Previous efforts to solve this problem have generally involved the use of a plurality of spring members or the like for releasably engaging the rims of several of the lowermost cups, but such spring members have often been found uncertain in operation, particularly after long use, and in general do not operate dependably if the cup rims are flexible or are not all uniformly made with accurate dimensions.

The present invention provides apparatus for fully overcoming the above difficulties by the use of mechanism which permits the lowermost cup to be released with very little resistance, and meanwhile the action of releasing the lowermost cup serves to control other means for positively retaining the next cup and those above, against release. Then after the mechanism has released the lowermost cup, the arrangement is preferably such that the weight of the stack of cups acts to restore the retaining means for the lower cup to

normal position, and to release the next cup onto such retaining means.

Various further and more specific objects, features and advantages of the invention will appear from the description given below taken with the accompanying drawings illustrating by way of example certain preferred forms of the invention. The invention consists in such novel features and combinations of parts as may be shown and described in connection with the apparatus herein disclosed.

In the drawings, Fig. 1 is a side elevational view showing the lower exterior portion of a cup dispenser embodying the invention;

Fig. 2 is a vertical sectional view of the construction of Fig. 1;

Fig. 3 is a top view of the construction of Fig. 1;

Figs. 4 and 5 are detailed views showing the operation of the latching means as of Fig. 2; and

Figs. 6 and 7 show the construction and operation of a further embodiment of the latching mechanism according to the invention.

Referring now to Fig. 1, the device there shown may comprise a tubular frame portion as at 15 adapted to be removably secured to a wall as by a suitable known form of detachable bracket means as at 16. A stack of nested paper cups as at 17 (Fig. 2) is adapted to extend down through the tubular member 15, with the upper portion of the stack enclosed as by a suitable known form of tubular glass member as at 18. The lower edges of the glass member 18 may be cemented as at 19 within a protective annular metal member as at 20 adapted to be slidably received in the upper end of the tubular member 15. The glass member may be removed in the usual way, when a fresh stack of cups is to be inserted.

At two or more points around the walls of the tubular member 15, rectangular apertures as at 21 may be formed for receiving latch assemblies as at 22 for controlling the dispensing of the cups in accordance with the invention. These latch assemblies if desired may all be of like construction such as hereinafter described, whereby the same type of latch assembly may be used interchangeably in cup dispensers of various sizes for cups of different diameters. As will be apparent from Figs. 1 and 2, the latch assemblies may comprise frame members as at 23 having rectangular portions protruding through and fitting within the apertures 21 in the member 15, and removably retained therein as by screws 24.

Details of construction of each of the latch assemblies 22 will now be explained in connection

with Figs. 4 and 5. A latch member 25 pivoted as at 26 on a pin extending through frame member 23, has a portion 27 adapted to engage the rim of the lowermost cup of stack 17. A member 28 pivoted as at 29 is formed with a portion as at 30 adapted to engage the rim of the next to the lowermost cup. The frame member 23 may be formed with a cavity as at 31 within which the members 25 and 28 are housed. It will be noted that the latch member 25 is formed with a portion 32 at the opposite side of pivot 26 from the portion 27, and above such pivot. The portion 32 and a coacting portion 33 on the member 28 are adapted to engage with a substantially rolling contact when the members 25 and 28

As shown in Fig. 4 in full lines, the members 25 and 28 are both in the positions which they will assume when the stack of cups 17 is normally at rest in the dispenser. If now it is desired to remove the lowermost cup, the depending lower portion of such cup may be grasped in the hand and pulled downwardly. Thereupon it will be apparent that the latch member or lever 25 will be caused to rotate about its pivot 26, thus permitting the portion 27 to move downwardly and outwardly for releasing the rim of the lower cup. Meanwhile it will further be apparent that the member 25 acting through the contact portions 32, 33, will cause the member 28 to pivot inwardly, thus forcing portion 30 more firmly into contact with the second or next to the lowermost cup of the stack, and thus prevent its withdrawal at the same time that the lower cup is withdrawn. As the lower cup is being withdrawn, the members 25 and 28 will assume the positions as shown by the dotted lines in Fig. 4.

After the lower cup has been released by the portion 27, the weight of the stack of cups on the portion 30 of member 28 will force this latter member outwardly, thus permitting what was formerly the second lowermost cup to be released by the portion 30, whereupon the stack of cups will drop until the rim of such cup meets portion 27 of the latch member 25, which meanwhile has been forced back into latching position by the interengagement of the portions 32, 33. Any further motion downwardly of the stack of cups, is now arrested since it is impossible for both of the members 25 and 28 to be pushed aside at the same time from contact with the cup rims. Consequently the stack will remain supported partly by portion 27 and partly by portion 30. A slight pull, however, on the lowermost cup will unbalance this relationship of the latch members and allow the removal of the lower cup as a result of the additional pull on the lower cup applied manually. Fig. 5 shows in full lines the positions of the members 25 and 28 respectively at the moment just after a cup has been removed and the next to the lowermost cup has fallen onto latch portion 27. At this moment, i. e., just as the portion 30 is releasing the stack, the portion 27 will be forced inwardly further than its normal rest position, thereby insuring that the impact of the lower cup under the weight of the stack upon portion 27 does not cause another cup to fall out. Dotted lines in Fig. 5 show the positions which the members 25 and 28 will again assume as soon as the portion 30 comes again into supporting engagement with the adjacent cup rim, that is, the normal position of the parts with the two latch members engaging respectively the two lower cups ready for the next dispensing operation.

With the embodiment of the invention shown in Figs. 6 and 7, the escapement arrangement has in effect been transferred from a ratchet wheel to the cup rims themselves. This form may include a latch lever 40 pivoted at 41 and having a portion 42 for engaging the rim of the lowermost cup. Another member 43 pivoted at 44, may be connected to lever 40 as by a link 45, pivoted at 46 to member 43 and pivoted at 47 to member 40. In Fig. 6 the parts are shown in connection with the lowermost cups of a stack, in normal positions ready for dispensing of a cup. As the lower cup of the stack is withdrawn, the next lowermost cup and consequently the remainder of the stack is restrained from falling by a portion 48 on member 43. As the lowermost cup moves downwardly, the pressure of its rim on portion 42 will pivot lever 40 about its pivot point 41 which action in turn, because of link 45, will rotate the member 43 clockwise through a small angle, whereupon the portion 48 is removed from contact with the rim of the next to the lowermost cup.

At this juncture a portion 49 on member 43 has been rotated until it is now in position to engage the rim of the next to the lowermost cup as the stack drops to a new position. The portion 49 is held in this restraining position until the bottom cup has been completely withdrawn, thus leaving lever 40 free to return to its original position. At this time the weight of the stack remaining in the dispenser and applied to portion 49 will force member 43 to return to the position shown in Fig. 6 and the continued fall of the stack is arrested by the portion 48 in engagement with the rim of what was originally the third cup from the bottom. Meanwhile the latter movement of member 43 acting through link 45 will have caused lever 40 to be restored to its original position as shown in Fig. 6. It will be apparent that the cups and mechanism have now returned to the original condition ready for operation to dispense the next cup.

With all of the above described embodiments of the invention, it will be understood that two or more of the latch assemblies may be mounted at spaced points around the outlet of the dispenser so that the horizontal forces applied to the cup rims will be substantially counterbalanced. If only two of the latch assemblies are used as shown for example in Fig. 3, then rigid guide bars if desired may be mounted as at 50 at points spaced 90° from the latch assemblies, within the annular member 15.

It will be further noted that with each of the embodiments of the invention, the restraining action on the cups which are to be retained, is increased in accordance with the overcoming of the restraining action on the lowermost cup while the latter is being dispensed.

Furthermore, the only restraining force on the cup which is being dispensed is substantially confined to the reaction exerted by the remaining cups of the stack and the friction embodied in the mechanism, yet the resistance against removal of the next lowermost cup at the same time is positive. In fact the next lowermost cup is substantially locked against removal by the action of removing the lower cup. Hence the only way in which two cups could be removed at the same time would be by crushing or destroying the rim of the second lowermost cup, i. e., by force exceeding any force which it would ever be possible to apply to a paper cup without injuring and substantially destroying it.

While the invention has been described in detail with respect to particular preferred examples, it will be understood by those skilled in the art after understanding the invention that various changes and modifications may be made without departing from the spirit and scope of the invention, and it is intended therefore in the appended claims to cover all such changes and modifications.

What is claimed as new and desired to be secured by Letters Patent is:

1. Apparatus for dispensing cups or the like from a stack thereof, comprising a freely pivotally supported latch having a rim-engaging portion normally disposed in the path of movement of the cup rims for supporting the lowermost cup and releasable solely upon pulling the cup downwardly, and a freely pivotally supported member having a rim-engaging portion normally disposed in the path of movement of the cup rims, inter-actuating means providing a common driving connection respectively from said latch to said member and from said member to said latch, whereby said member is controlled as to position by said latch to support the next lowermost cup during the releasing action of the latch, and said member in turn being then operable solely by the weight of the stack thereon to restore the latch and to release said next cup onto the latch.

2. Mechanism for dispensing cups or the like from a stack thereof, comprising two freely pivotally supported members having respective rim-engaging portions normally disposed in the path of movement of the cup rims and spaced apart in a vertical direction respectively for normal supporting engagement with the two lowermost cup rims, one of said members being pivotally movable to release the lower cup solely upon pulling the latter downwardly from the stack, the other member being pivotally movable solely under the weight of the stack to release the next cup from said other member, inter-actuating means providing a common driving connection from each of said members respectively to the other, whereby upon such movement of either member into its releasing position said actuating means acts to hold the other member against its release of the cup supported thereby.

3. Mechanism for dispensing cups or the like from a stack thereof, comprising two members having respective rim-engaging portions normally disposed in the path of movement of the cup rims and spaced apart in a vertical direction for releasable supporting engagement respectively with the two lowermost cup rims of the stack, and means for so mounting said members that either may move from a normal rim supporting position either further inwardly of the rim or outwardly to a rim-releasing position, inter-actuating means providing a common driving connection from each of said members respectively to the other whereby such outward movement of either member to its releasing position forces the other member further inwardly.

4. Mechanism for dispensing cups or the like from a stack thereof, comprising a member having a rim-engaging portion normally disposed in the path of movement of the cup rims for normally supporting the lowermost cup rim, and movable for releasing same solely upon pulling the lowermost cup downwardly from the stack, and another member having a rim-engaging portion normally disposed in the path of movement of the cup rims and spaced vertically from the rim-engaging portion of said first member for nor-

mally supporting, and movable for releasing, the next lowermost cup rim, inter-actuating means providing a common driving connection from each of said members respectively to the other, whereby said first named member during its releasing movement applies force to said second named member restraining same against releasing the next lowermost cup rim.

5. Mechanism for dispensing cups or the like from a stack thereof, comprising a pivoted member having a portion normally extending downwardly from its pivot and inwardly toward the lowermost cup rim for releasably engaging and supporting the latter, said member having a second portion normally extending upwardly from the pivot, and another pivoted member normally extending downwardly from its pivot and inwardly toward the next lowermost cup rim for releasably engaging and supporting the latter, said second portion having a substantially rolling contact engagement with said last-named member upon pivotal movement of said members.

6. Mechanism for dispensing cups or the like from a stack thereof, comprising a pair of latch-like members having respective rim-engaging portions normally disposed in the path of movement of the cup rims and spaced apart in a vertical direction respectively for releasably engaging the rims of the two lowermost cups, means for pivotally mounting said members respectively for movement of their rim engaging portions inwardly and outwardly of the cup rim, and said members being formed with inter-actuating means providing a common driving connection from each of said members respectively to the other, whereby movement of either member to its cup releasing position restrains movement of the other member to its cup releasing position.

7. Mechanism for dispensing cups or the like from a stack thereof, comprising a pair of pivotally mounted latch-like members having respective rim-engaging portions normally disposed in the path of movement of the cup rims and spaced apart in a vertical direction respectively for releasably engaging the rims of the two lowermost cups, and said members being formed with inter-actuating means providing a common driving connection from each of said members respectively to the other, whereby either member in moving to its cup releasing position forces the other member into cup engaging position.

8. In apparatus for dispensing cups or the like from a stack thereof, a pivoted member formed with a projecting portion for extending beneath the next lowermost cup rim for normally supporting same, a second portion projecting from said member beneath said first-named portion, a movable latch-like member for releasably retaining the lowermost cup, and linkage so inter-connecting said members that releasing movement of the latch-like member causes rotation of said first-named portion upwardly and outwardly of the stack to release said next lowermost cup and the weight of the stack above, onto said second portion, and such weight then restores said members to their normal cup retaining positions.

9. In apparatus for dispensing cups or the like from a stack thereof, a movable latch-like member for releasably retaining the lowermost cup, a pair of superposed detents above said member for respectively engaging and supporting the next cups, and means operatively connecting said detents and member whereby movement of said member in releasing a cup withdraws the upper detent, allowing application of the weight of the

stack to the other detent, and such weight then restores said detents and member to their normal positions with another cup ready for release from said member.

10. Mechanism for dispensing cups or the like from a stack thereof, comprising a plurality of sets of circumferentially spaced cup-supporting means, each said means providing two pivotally movable members having respective rim-engaging portions normally disposed in the path of movement of the cup rims and spaced apart in a vertical direction respectively for releasable supporting engagement with the two lowermost cup rims of the stack, the members of each said set being individually movable relative to the members of said other sets, interactuating means for each set providing a common driving connection from each of said members respectively to the other, whereby either one of the members is forced into position for supporting engagement with one of said rims by the pivotal movement of the other member into its rim-releasing position.

11. Mechanism for dispensing cups or the like from a stack thereof, comprising a plurality of sets of circumferentially spaced cup-supporting means, each said means providing two pivotally movable members having respective rim-engaging portions normally disposed in the path of movement of the cup rims and spaced apart in a vertical direction respectively for releasable sup-

porting engagement with the two lowermost cup rims of the stack, the members of each said set being individually movable relative to the members of said other sets, interactuating means for each set providing a common driving connection from each of said members respectively to the other, whereby either one of the members is forced into position for supporting engagement with one of said rims by the pivotal movement of the other member into its rim-releasing position, and fixed guide members alternately disposed respectively intermediate said supporting means.

12. Mechanism for dispensing cups or the like from a stack thereof, comprising a tubular supporting frame, a plurality of sets of circumferentially spaced cup-supporting means, each said means having an independent housing frame detachably secured to said tubular supporting frame and carrying recessed in said housing two pivotally movable members respectively for releasable supporting engagement with the two lowermost cup rims of the stack, interactuating means providing a common driving connection from each of said members respectively to the other, whereby either one of the members is forced into position for supporting engagement with one of said rims by the pivotal movement of the other member into its rim-releasing position.

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