United States Patent

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[54] **CUP DISPENSER**
1 Claim, 6 Drawing Figs.

[52] **U.S. Cl.** **221/310**
[51] **Int. Cl.** **A47f 1/04**
[50] **Field of Search** 221/303, 307, 308, 310

[56] **References Cited**

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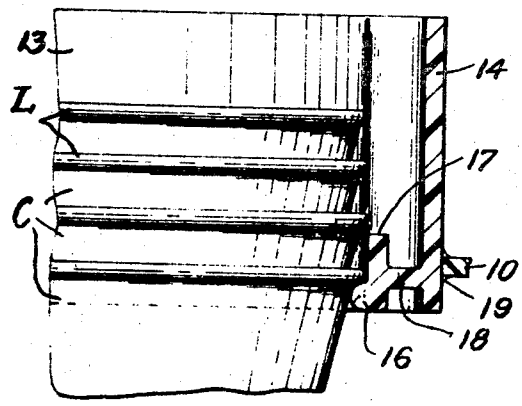
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Primary Examiner—Samuel F. Coleman
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ABSTRACT: A dispensing mechanism providing for sequential dispensing of individual cups from a stack of serially nested cups and including a dispensing device providing for delivery of the cup to be dispensed while restraining the next cup to be dispensed and thereby preventing undesired simultaneous delivery or dispensing of a plurality of cups.



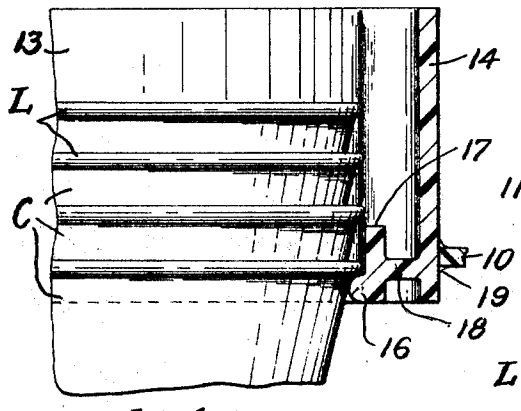


FIG-4

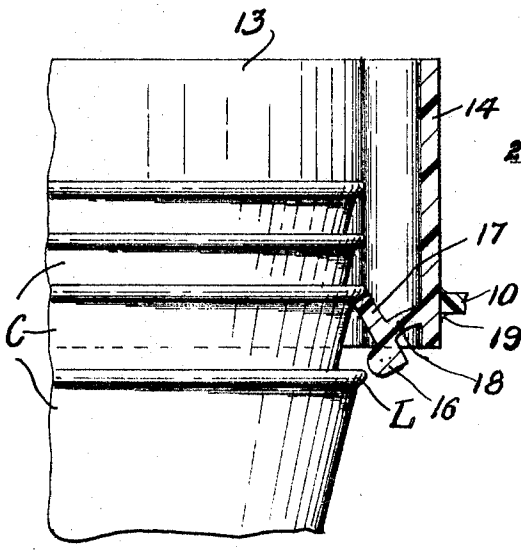
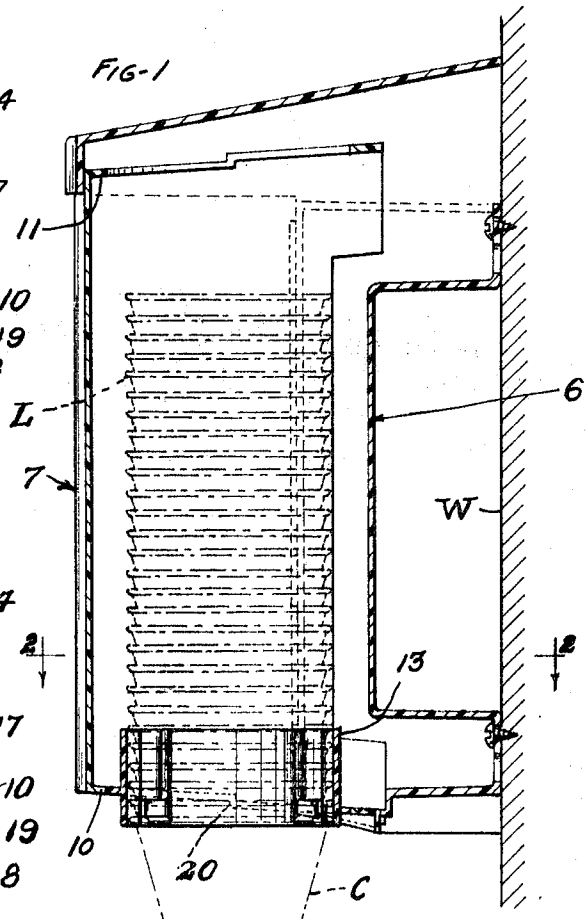


FIG-5

FIG-1



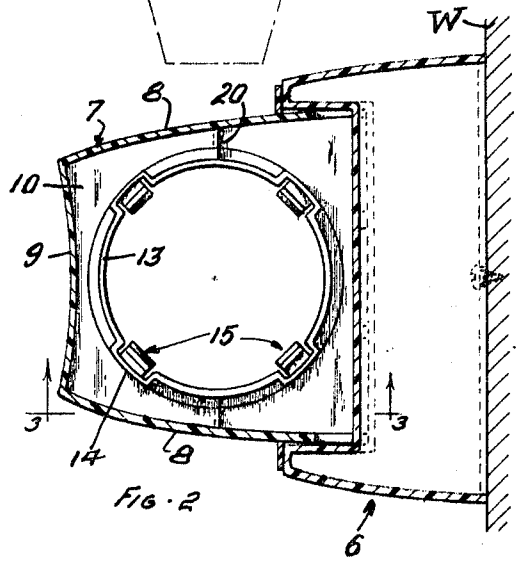


FIG-2

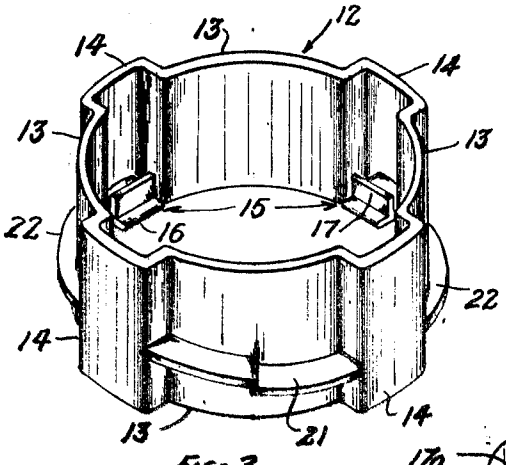


FIG-3

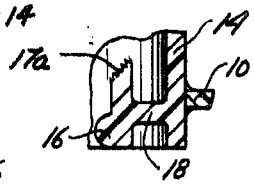


FIG-6

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CUP DISPENSER

This invention relates to apparatus or equipment for sequentially dispensing articles such as cups from a stack of serially nested articles or cups.

Many cup dispensers, especially when used with plastic cups, as distinguished from paper cups, have an undesirable tendency to deliver or dispense a plurality of cups at one time, although it is ordinarily preferred and intended to dispense the cups individually or one at a time. It is the principal object of the present invention to provide a dispensing device or mechanism which is reliably operative to dispense the cups individually and substantially eliminate undesired dispensing of a plurality of cups at one time.

It is a further object of the invention to provide for such individual dispensing of cups form a nested stack even where the cups are molded of plastic material, and to enable use of the device with equal reliability whether the cups are formed of paper or of such plastic.

Still another object of the invention is the provision of a dispensing device of the kind above referred to which is of exceptional simplicity and of low cost, so that it is practicable to use the device even in very inexpensive cup dispensers such as are commonly sold in food markets and similar stores servicing the home market.

It is a further object of the present invention to provide dispensing equipment in which the action of dispensing one cup of a stack operates or actuates devices for gripping the open edge or lip of the succeeding cup of the stack and thereby prevent unintentional dispensing of said succeeding cup.

How the foregoing objects and advantages are attained, together with others which will occur to those skilled in the art will appear more fully from the following description referring to the accompanying drawing illustrating a preferred embodiment of the invention and in which

FIG. 1 is a vertical sectional view through a cup dispenser equipped with the dispensing mechanism of the present invention, this view showing in dot and dash lines a stack of nested cups in position in the dispenser;

FIG. 2 is a plan sectional view taken as indicated by the section line 2–2 on FIG. 1, but without any illustration of cups therein;

FIG. 3 is an enlarged isometric view taken very generally in the direction indicated by the line 3–3 applied to FIG. 2, but showing only the dispensing device or mechanism itself, without the surrounding enclosure which is included in FIGS. 1 and 2;

FIG. 4 is a sectional view on a further enlarged scale, of a portion of the dispensing device shown in FIG. 3, this view also illustrating portions of several cups in a nested stack;

FIG. 5 is a view similar to FIG. 4 but illustrating certain parts in a different position which they occupy during the dispensing action; and

FIG. 6 is a sectional view through an alternative form of dispensing device usable in accordance with the present invention.

In considering the embodiment illustrated in the drawings it is first to be noted that the dispensing device is adapted to be employed with any open-mouthed receptacles, of which cups of various sizes and shapes are typical, for instance drinking cups. Such cups and similar receptacles adapted for stacking commonly have a conical or tapered sidewall and some also have a projecting bead at the open mouth or lip of the cup.

Although the invention is adapted for use with any such receptacles, whether or not the lip is enlarged or provided with a projecting bead, the embodiment of the equipment shown in the drawings illustrates the use of the equipment with a nested stack of typical drinking cups C, each having a lip L which is provided with an enlargement or bead around the open mouth of the cup. The cups shown are also tapered in shape in order to provide for nesting of one within another when stacked in position in the dispenser, as is also customary.

Although the mechanism of the invention is adaptable to cup dispensers of a wide variety of types, in the figures of the drawings the mechanism of the invention has been shown as applied to a form of dispenser adapted for wall mounting. Such a wall appears at W in FIGS. 1 and 2 and the dispenser as a whole includes a wall-mounting bracket part indicated generally at 6, and a separable or removable cup container generally indicated at 7, the container advantageously being formed of transparent material, such as transparent molded plastic, so that the quantity of cups remaining in the dispenser may readily be observed.

As seen in FIGS. 1 and 2, the container 7 has three generally upright sidewalls 8–8 and 9, and also has bottom and top walls 10 and 11. The bottom wall 10 is apertured and when the container 7 is positioned in its normal position as in FIG. 1 the cups are dispensed through the aperture in the bottom wall 10. The container 7 is separable for the purpose of reloading the dispenser with a new stack of nested cups, and these cups may be inserted either through the open rear face of the container or, if desired through an aperture provided in the top wall 11.

The dispensing mechanism itself preferably comprises a plurality of dispensing devices arranged around the stack of cups in the dispenser in the region of the discharge opening. While the dispensing devices may be mounted upon the container of the dispenser in a variety of ways, including separate or individual mounting of the several dispensing devices, in the particular embodiment illustrated in the drawings, the several dispensing devices are mounted in common by means of a ring or sleeve indicated generally by the numeral 12 in FIG. 3. This ring comprises cylindrical wall segments 13 the inside surfaces of which are curved on a radius substantially conforming with the maximum or outside radius of the cup lips L. The inside surfaces of the wall segments 13 should provide a relatively close guide for the lips of the cups, but should not bind upon the cup lips, so that the cups will freely enter into and pass through the ring 12 during the dispensing action.

At a plurality of circumferentially spaced points, the ring 12 is provided with channellike portions 14 projecting outwardly from the wall segments 13 to accommodate dispensing devices indicated in general in FIGS. 2 and 3 by the numeral 15 and shown in greater detail in FIGS 4 and 5. Each of these dispensing devices includes a cup-supporting element 16 which as seen in FIGS. 3 and 4 is normally positioned to project under and engage the lip of the first cup to be dispensed from the stack. Each dispensing device also further includes a stop element 17 connected with the supporting element 16 and normally positioned so as to pass or clear the lips of the cups, as is shown in FIGS. 3 and 4. A front face of this stop element 17 thus is positioned at or just outside of the projection of the inner cylindrical surface of the wall segments 13. The interconnected supporting element 16 and stop element 17 of each dispensing device are mounted by means of a web 18 projecting inwardly from the inner surface of the channel 14 in which the device is accommodated. This web is flexible and provides a yielding mount somewhat in the manner of a hinge. The interconnected elements 16 and 17 thus have freedom for a rocking motion and from comparison of FIGS. 4 and 5 it will be noted that the effective pivot or hinge axis of the mounting provides for movement of the stop element inwardly toward the cups concurrently with outward movement of the supporting element 16 away from the cups.

Because of the arrangement and mounting of the device 15, when the first cup to be dispensed is grasped and pulled by the hand to effect dispensing thereof, the lip of that cup acting upon the supporting elements 16 causes those elements to be deflected downwardly and outwardly, in consequence of which the stop elements 17 are caused to move inwardly. The stop elements 17 are desirably spaced above the supporting surface of the supporting elements 16 a distance not more than and preferably slightly less than the center-to-center spacing of the cups in the stack. Therefore, when the stop elements 17 are caused to rock inwardly by dispensing of the first cup, the stop elements 17 are moved against or under the lip

of the cup next to the cup being dispensed. This action restrains the "next cup" and prevents it from being dispensed with the "first cup." The dispensing action itself thus sets up an action restraining the second cup in the nested stack.

In order to ensure the action as described above, it is desirable that the lips of the cups be restrained as against distortion during the dispensing action and the inner surface of the cylindrical wall segments **13** serve this function. Such restraining surfaces need not necessarily extend throughout the entire distance between the dispensing devices themselves, but in any event, preferably are positioned to engage the lips of the cups in the regions at least near to and at each side of the several dispensing devices around the circumference of the cups. In the absence of some guide means of this type, the pulling of a cup from the dispenser might have a tendency to merely distort the lip of the cup, instead of displacing the supporting elements **16** outwardly, which latter action is desired in order to shift the stop elements inwardly to engage under the lip of the following cup and thereby arrest it downward motion until the first cup is completely removed. This action is shown in FIG. **5**. As soon as the first cup has been freed from and passes downwardly between the deflected supporting elements **16**, the elasticity of the flexible material of the webs **18** causes the supporting and stop elements **16** and **17** to return to the position indicated in FIG. **4**, at which time the lip of the cup which had just been engaged by the stop elements **17** descends to rest upon the supporting elements **16**, and the dispenser is now prepared for the dispensing of the next cup.

Although the total number of devices **15** and their spacing around the circumference of the stack of cups may be different from that illustrated in the drawings, there should be at least three such devices, and four, as shown in the drawings, is particularly effective in providing reliable action.

Although the dispensing devices such as indicated in general at **15** could be mounted by means of an actual hinge structure having a hinge pin and a bias means establishing the positions indicated in FIG. **4** as the normal condition, a highly effective and inexpensive way of providing the mounting arrangement is to mold the entire device, including the mounting webs of a flexible resin material, for instance polystyrene or polypropylene.

As above noted, the dispensing devices **15** may be individually and separately mounted on or may be molded directly with a dispenser container, but it is convenient to mount those devices on or mold those devices with a separate element such as the sleeve **12**, which is assembled with a cup container, for instance in the manner shown in the illustrative embodiment of FIGS. **1** to **5**. In the particular arrangement of the figures, the supporting and stop elements, as well as the flexible web **18** are desirably molded integrally with the ring **12** and this ring may then be fastened at the dispensing end of a cup container in any desired manner. For example, the region may be arranged for snap-action interengagement with the container or, as shown in the drawings, the ring **12** with the cooperating guide surfaces **13** and dispensing devices **15** may be fastened in the aperture in the bottom wall **10** of the cup container by the use of "welding" or plastic adhesive, indicated in FIGS. **4** and **5** at **19**. The apertured bottom wall **10** of the cup container (see FIGS. **1** and **2**) is shouldered as indicated at **20** and if desired the ring **12** may be provided with similarly shouldered flanges or webs, one of which is indicated at **21** in FIG. **3**, adapted to mate with the shouldered portions of the bottom wall **10**. Other flanges or webs **22**, shown at the left and right of FIG. **3**, may also be provided and all of the webs **21** and **22** may be cemented or adhesively connected with the bottom wall **10**, so that the ring **12** will be securely mounted in position.

Instead of employment of adhesive or cement to permanently fasten the dispensing mechanism within the cup container, other means may be employed for this purpose and, if desired, the dispensing mechanism may even be arranged as an adapter for insertion into the dispensing opening of an existing cup dispenser.

While the dispenser shown in the drawing is arranged to mount a nested stack of cups in a vertically upright position, so that the action of gravity assists in the feed of the cups downwardly, it will be understood that if desired the arrangement may be disposed at an inclined angle or may even be inverted so that the cups are dispensed upwardly instead of downwardly, in which latter event a means such as a compression spring located under the stack of cups may serve to advance the cups upwardly against the action of gravity as the cups are serially dispensed from the top of the stack. In view of this possible inversion of the arrangement, it will be understood that where reference is made in the claims to the positioning of a supporting element or a stop element "under" a cup lip, it is not intended to exclude an arrangement in which the cups are dispensed upwardly.

Moreover, since, as above indicated the cups or receptacles with which the equipment is used may or may not be provided with a beaded lip, reference to the positioning of a support or stop element "under" a cup lip, is not intended to exclude the case where the cup lip is not beaded.

In considering the action of the devices **15** in restraining the next succeeding cup when one cup is being dispensed, attention is now directed to the modified arrangement illustrated in FIG. **6**. Here the dispensing device is again mounted by means of a web **18** and has a supporting element **16** which is deflected by the action of dispensing a cup. On this modification, however, the upper stop element is provided with an inclined surface having a plurality of teeth **17***a* adapted to engage or grip the lip of the cup following the cup being dispensed. This arrangement may be used with cups or receptacles of a variety of types, including cups of the kind shown in the drawing having a beaded lip, and may be of especial advantage in connection with the dispensing of cups in which the lip is not beaded, for instance certain of the plastic cups made of foamed material. Even without a bead at the lip of such a cup, the teeth **17***a* will provide an effective gripping action.

The arrangement as fully described above provides for individual dispensing of cups from a stack and virtually eliminates undesired double or multiple dispensing such as has been commonly encountered with prior cup dispensers. This is true even with respect to currently available molded plastic cups which are especially difficult to dispense without encountering undesired multiple dispensing.

I claim:

1. Apparatus for sequentially dispensing cups from a stack of serially nested cups each having a lip or open edge, comprising a plurality of circumferentially spaced dispensing devices each including a supporting element normally positioned to project under and engage the lip of the first cup to be dispensed from the stack and including a stop element located adjacent the lip of the cup next to the cup to be dispensed and normally positioned to pass the cup lips, and each of said devices further including a mounting web for said elements, the said elements and said web being formed of flexible resin material, the web lying in a plane generally transverse to the path of cup dispensing and being interconnected with the said elements in a position therebetween, and said mounting web being yieldable under the influence of manual pulling of the lip of the first cup against the supporting element and providing for conjoint movement of said supporting and stop elements from said normal positions to positions in which the supporting element will pass the lip of the first cup and the stop element will engage the lip of the next cup.