June 12, 1951 L. K. PICKERING 2,556,852

CUP DISPENSER

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FIG. 1

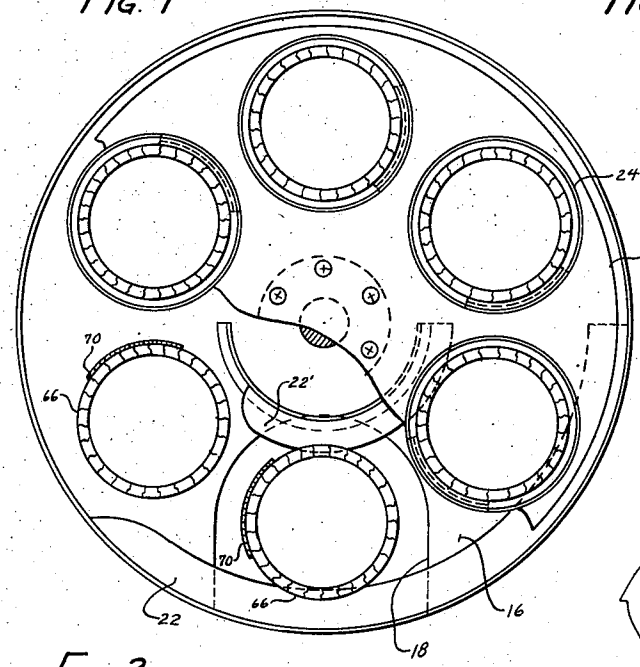


FIG. 3

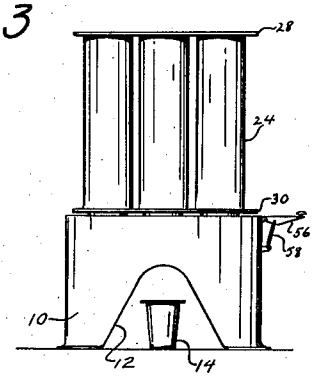


FIG. 4

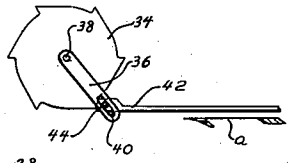
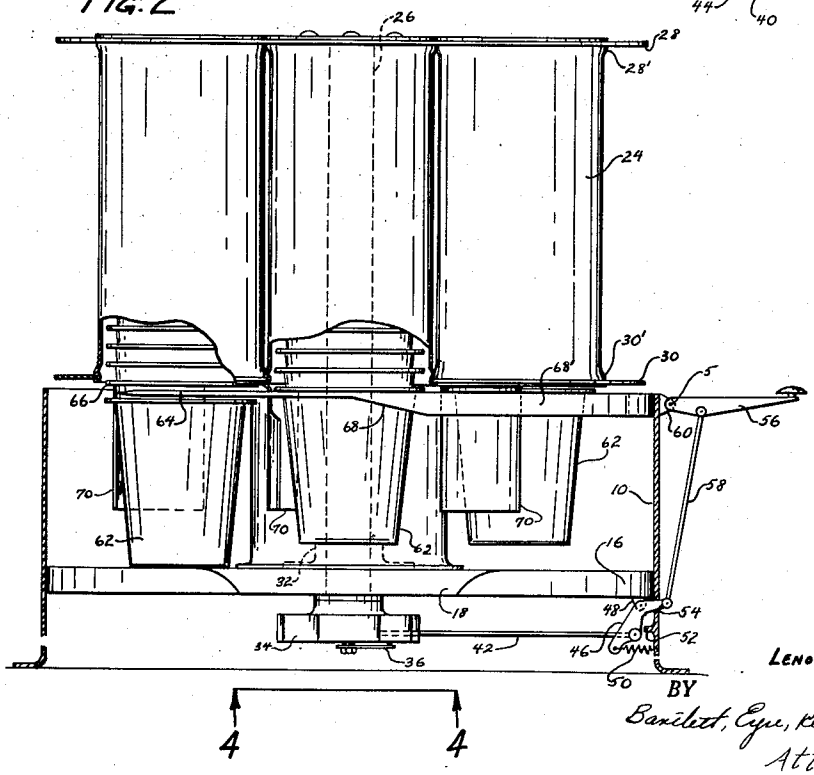


FIG. 2



4 4

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FIG. 5

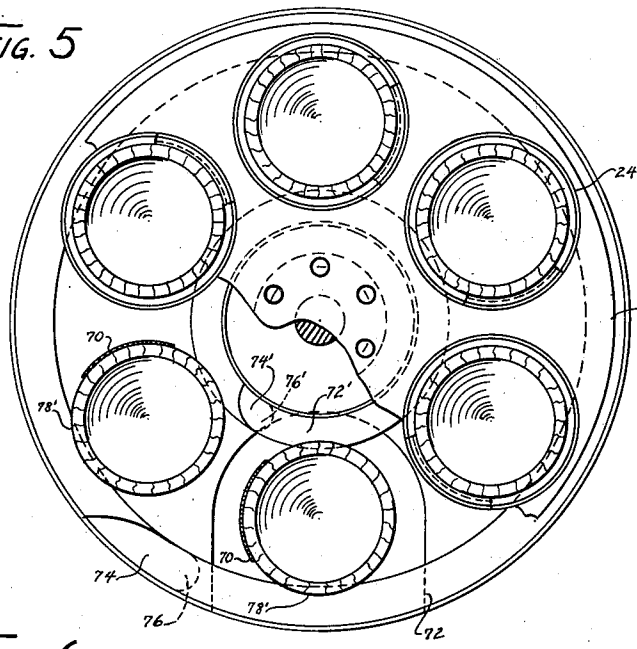


FIG. 7

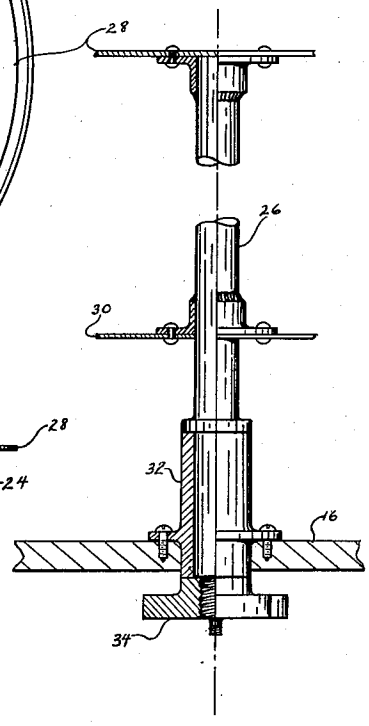
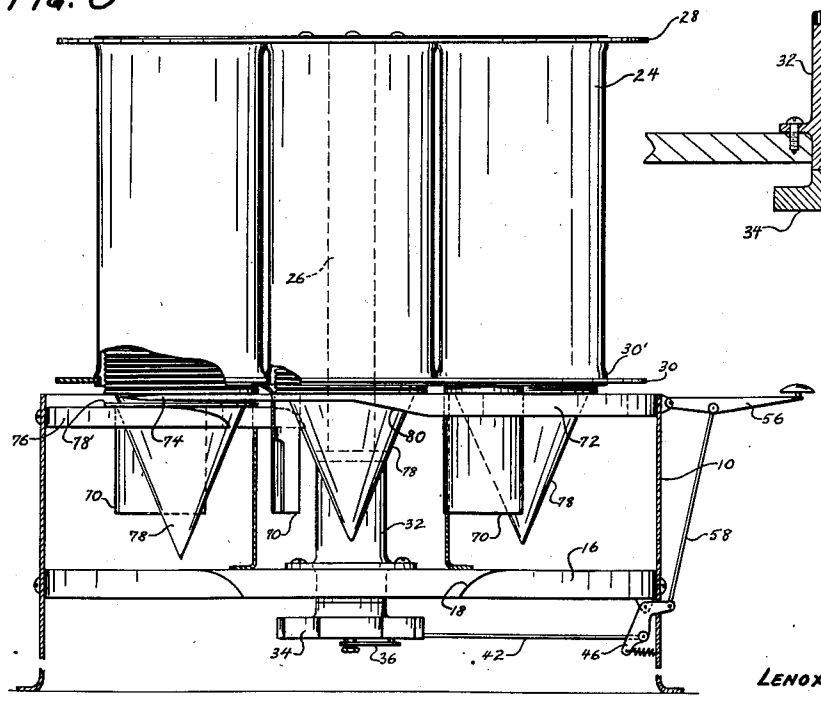


FIG. 6



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CUP DISPENSER

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4 Claims. (Cl. 312—44)

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This invention relates to the method and apparatus for dispensing articles such as drinking cups and the like.

One object of the invention is a novel and improved dispenser that is simple and effective in operation and employs a minimum number of moving components.

Another object is a small compact cup dispenser and one that is both dependable and inexpensive to manufacture.

Another object is a novel and improved article dispenser particularly useful in automatic vending machines.

These and other objects will become more apparent in the following specification and accompanying drawings.

In the drawings—

Fig. 1 is a plan view of apparatus in accordance with the invention;

Fig. 2 is a side elevation of the apparatus shown in Fig. 1 with certain portions thereof cut away to show the operating parts;

Fig. 3 is a front elevation of a dispenser in accordance with the invention;

Fig. 4 is a view along the line 4—4 of Fig. 2;

Fig. 5 is a plan view of another embodiment of the invention;

Fig. 6 is a side elevation of the embodiment shown in Fig. 5 with certain parts thereof cut away to show certain constructional detail; and

Fig. 7 is a side elevation in partial section of part of the apparatus illustrated in Figs. 5 and 6.

The article dispenser in accordance with my invention, briefly, consists of means for dispensing articles such as cups and the like that are supported in stacks about a central axis and can be dispensed merely by the simple operation of rotating the stacks about the central axis so that one or more articles can be dispensed each time the stacks are rotated through an angle equal to that subtended by the axes of two individual and adjacent stacks of articles. Other novel and improved structural and operative features of my invention will be described hereinafter.

In Figs. 1 to 4 inclusive I have illustrated one embodiment of the invention which includes a base 10 having a cutout 12 (Fig. 3) in one side thereof for the purpose of removing each cup as it is dispensed, and I have illustrated a dispensed cup 14 as resting on the surface supporting the circular base 10 of the machine. It is apparent, however, that means can be provided for delivering the cup in an upright position to a more remote point so that it can be

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filled automatically with a liquid as in the case of a conventional type soda dispensing apparatus without departing from the scope of the invention.

Within the circular base 10 is a fixed platform or base part 16 having an opening 18 therein through which the cups fall as they are dispensed. This platform is rigidly secured to the base 10 and its position is not changed in the dispensing of the cups. Also within the base 10 is a set of cam members or fingers 22—22' which operate to engage the cups and dispense them through the opening 18 in the manner to be described.

Spaced above the cams or fingers are a plurality of tubular cup holders 24 closely spaced about a central shaft 26 and adapted to be rotated by the shaft in the operation of the apparatus. These cup holders 24 are held in a ring formation by upper and lower circular plates 28 and 30 having suitable openings therein to receive and hold the upper and lower ends of the tubes 24. In the particular embodiment shown I have illustrated the tubes 24 being held in position in the plates 28 and 30 by swaged portions 28' and 30' on the tubes. The tubes 24 are mounted on and rotate with the central shaft 26 which extends through the platform 16 and is journaled thereto by a bearing member 32 secured to the platform by any suitable means as by riveting or welding.

The cup holders or tubes 24 and the supporting shaft 26 may be rotated relative to the base by any suitable indexing means and although I have illustrated manually operable means for indexing compartments or tubes 24, it is to be understood that automatic electro-mechanical or other suitable means may be employed without departing from the invention.

The illustrated method for indexing the cup compartments 24 comprises a ratchet gear 34 securely mounted on the lower end of the shaft 26. Beneath the ratchet 34 is an arm 36 pivotally mounted on the axis of the ratchet 34 at 38 and extending beyond the edge thereof. The outer or free end of the arm 36 has an elongated opening or slot 40 to slidably receive and pivot the pawl 42 by means of a pin 44 extending through the slot and fastened to the pawl 42. The other end of the pawl 42 is pivoted to a bell-crank 46 mounted at the edge of the base 10 and pivoted to a lug 48 depending from the platform 16. The bell-crank 46 is loaded by means of the spring 50 so that the normal position thereof is a counterclockwise one substan-

tially as illustrated in Fig. 2, the clockwise position of the bell-crank 46 being determined by the stop 52 mounted on the inner wall of the base 10. The upper or substantially horizontal arm 54 of the bell-crank 46 is connected with the operating lever 56 by means of a rod 58 pivoted at one end to the bell-crank arm 54 and at the other end to the lever 56, the latter being pivoted at 58 to an outwardly extending lug 60 on the base 10.

The cams or fingers 22—22' function to release one or more cups from the bottom of each stack as they pass the cams in the indexing or rotating operation. The cams 22—22' are arcuate in shape and concentrically spaced in a horizontal plane a distance equal to the diameter of the cup just below the rim part. The forward ends 64—64' of these cams are relatively narrow and have a pointed end portion to intercept the lowermost cup in each stack as it is moved relative to the cam. Since the spacing between the cams is equal to the diameter of the cup part just below the rim, the cups above the cams are supported by them, while the intercepted cup indicated at 62 in Fig. 2 is in a position to be released.

At a point about the center of the opening 18 the cams 22—22' gradually diverge at 66 to an enlarged section 66' having a width slightly greater than the rim spacing of the cups. As the cup 62 is carried in a counterclockwise direction, as viewed in Fig. 1, by movement of the cup compartments 24, the divergent section 66 of the cams will force the cup downwardly to fully disengage it from the stack and allow it to drop through the opening 18. As the stacks are again rotated, successive cups will be released from each stack while the remainder of the stack in each compartment will be supported by the cams 22—22' until they pass a point beyond the opening 18. In the particular embodiment the cams 22—22' terminate at a point about 90° in a counterclockwise direction from the center of the opening 18 although it is apparent that it is merely necessary to support the cups as they pass the opening 18, whereupon they may rest on and be supported by the plate 16.

In order to dispense the last cups in each compartment 24, I have provided a series of fins or partitions 70 depending from the edge of each compartment and into the space between the cams 22—22'. The partitions are uniformly spaced and alined so that they, in effect, form a continuation of each compartment. Instead of using the partitions illustrated, it is apparent that tubular compartments could also be used and positioned in alinement with the compartments 24.

To rotate or index the cup compartments 24 so as to dispense a cup it is merely necessary to depress the lever 56 which moves the pawl 42 in the direction of the arrow A shown in Fig. 4, and the shaft 26 and the cup compartments 24 through an angle equal to the angle between two stacks of cups, a cup being dispensed each time the next successive cup holder is brought in alinement with the opening 18 in the plate 16.

I have illustrated in this embodiment a total of six cup holders or compartments 24 and a cooperating 60° ratchet wheel 34 for the operation thereof. It is understood, however, that any number of such cup holders or compartments 24 can be employed with a corresponding modification of the actuating apparatus to obtain the desired angular movement. Moreover,

means other than those shown for rotating the cup holders 24 can be used.

I have also illustrated the cup holders 24 as being tubular in form to retain a stack of cups. It is evident, however, that instead of these tubular holders other means can be used as, for example, a series of partitions could be employed extending outwardly from the central shaft 26 and surrounded by a suitable cup retaining wall to insure that each stack of cups will be properly held within its compartment.

Figs. 5 to 7 inclusive illustrate another embodiment of the invention that is similar in certain respects to the embodiment previously described and like parts in each embodiment are therefore denoted by the like numerals.

This application of the invention is particularly useful for dispensing conical cups and is provided with a base 10, a base plate member 16 having an opening 18 therein through which the cups are discharged, a shaft 26 rotatably mounted on the base plate by a journal 32, and a plurality of cup compartments 24 supported by and rotatable with the shaft 26 in a manner previously described in connection with Figs. 1 to 4 inclusive.

In dispensing conical cups it is desirable to support the stacks of cups so that at no time do they rest on and slide along the surface of the base plate 16, since the bottom or pointed portion of the cup is easily damaged. Moreover, it is important to support the cup to be dispensed until it is actually released and allowed to drop through the opening 18 in the base plate 16. For this purpose I have employed a pair of concentrically disposed helical cams 72 and 72', each of which subtend an angle somewhat greater than 370° so that their spaced ends 74—74' and 76—76' are in overlapping relationship. The ends 74—74' of the cams 72 and 72' are relatively thin and are provided with pointed end parts which terminate at a point approximately 60° in a clockwise direction from the center of the opening 18 in the base plate 16. The lower ends 76—76' of these cams terminate in a counterclockwise direction, as viewed in Fig. 5, at a point adjacent the near edge of the opening 18.

I have illustrated the ends of the cams as being spaced apart a distance equal to approximately the thickness of the projecting rim of a cup so that as the compartments 24 are rotated in a counterclockwise direction, the ends 74—74' of the cams will intercept the lowermost cup to be dispensed, indicated in Fig. 6 by the numeral 78.

As the stacks are rotated to bring the cup 78 in line with the opening 18, the rim 78' of the cup 78 will engage the diverging portions 80 and 80' of the cams 72 and 72', and as the cup clears the lower ends 76—76' of the cams the cup 78 will fall through the opening 18 of the plate 16.

In this embodiment, a series of partitions 70 depending from the edge of each compartment 24 form in effect a continuation of the compartments and insure proper transportation of the last few remaining cups of each stack around the surfaces of the cams 72—72' so that they may be dispensed in a normal manner.

In this embodiment it is apparent that suitable partitions for defining the cup compartments 24 could be used instead of the tubular members indicated, and a suitable wall could be provided about these compartments in order to

insure that each stack of cups will be properly held within its compartment. It is also to be noted that in this particular embodiment, since the cups are completely supported throughout their rotary movement and to the point where the cup is actually dispensed, it is not necessary to provide the base plate **16**, but that any other suitable means could be employed for supporting the shaft **26** and the compartments **24** for rotation relative to the cams **72—72'**.

I have also illustrated in this embodiment a mechanical system for indexing or rotating the compartments **24**, and I have employed for this purpose a lever **56**, a connecting rod **58**, pull crank **46**, a pawl **42**, and a ratchet **34** operable in the the manner described in connection with the embodiment in Figs. 1 to 4 inclusive. It is to be understood, of course, that it would be possible to use other types of electro-mechanical or mechanical devices for accomplishing this end.

Although I have shown the embodiment as being particularly useful for conically shaped cups, it is clear that it can be used with equal effectiveness for cups of other shapes.

My new and improved article dispenser, although particularly useful for automatic vending machines because of its dependability and simplicity in both construction and operation, can be used for other purposes either alone or with cooperating apparatus. My invention requires but a single operation to dispense each of the articles in the dispenser and wear has been reduced to a minimum by rotation of the compartments relative to the cams and with the advantage that all cups are dispensed from a single point. In addition, this invention provides an exceedingly compact dispenser since the article compartments can be closely grouped about the central shaft **26** and the depth of the base need only be sufficient to accommodate the article to be dispensed. Moreover, by adjusting the position of the cams relative to the stacks of articles, more than one article can be dispensed at one time.

I claim:

1. In a dispenser for cups having an outwardly extending rim part, a plurality of cup holders each holding a stack of cups telescoped one in the other with the rims of adjacent cups in close proximity one with the other, a pair of concentric helical members beneath and in coperating relationship with the cup holders to support the cups in the holders, said members being radially spaced a distance approximately equal to the diameter of the cup part below the rim and with their ends in overlying relationship and spaced one above the other, and means for moving the cup holders relatively to the members whereby the upper and overlying edges of the helical members engage and release at least one lowermost cup of each holder as they are moved relative to the members with the underlying edges terminating at a point before the opening through which the cup is discharged and supporting the released cup until it is discharged.

2. A cup dispenser for rolled edge cups comprising a stationary base member having an opening therein, a plurality of cup holders mounted in a circular arrangement on said base and rotatable with respect thereto, a pair of concentric helical cams between the base and cup holders for supporting the cups in the holders, one end of said cams terminating in line with the rear edge of said base opening and the other end of each cam being in overlying relationship with said one end and spaced a distance slightly greater than the thickness of a cup edge, and means for rotating the cup holders relatively to the base whereby the cups are dispensed one by one through the base opening as the cup holders are rotated past the overlying ends of the cams.

3. A cup dispenser comprising a frame member having a plurality of circularly arranged compartments for holding stacks of cups to be dispensed in an upright position, a pair of concentric circular cams having overlapping end parts and mounted for concentric rotation relative to the compartments, the leading end parts of the cams being pointed to intercept at least one cup from each stack as they are rotated relative to the compartments while retaining the remainder of the cups in their respective compartments, a delivery station fixed in relation to the overlapping cam end parts for the receipt and delivery of the released cups to the user immediately upon discharge and means on said leading end parts and spaced circumferentially from the trailing end parts to eject each released cup from the dispenser.

4. A cup dispenser for rolled edge cups comprising a stationary base member having an opening therein, a plurality of compartments for holding the cups, said compartments being arranged uniformly about a central axis and rotatable about said axis and relative to the base, spaced helically formed concentric cam members with their ends in overlying relationship and spaced one above the other between the base and cup compartments for engaging the lowermost cup in each compartment as the compartments are rotated, and releasing and discharging the engaged cup through the opening in the base, and means for rotating said compartments relative to the cam members.

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