

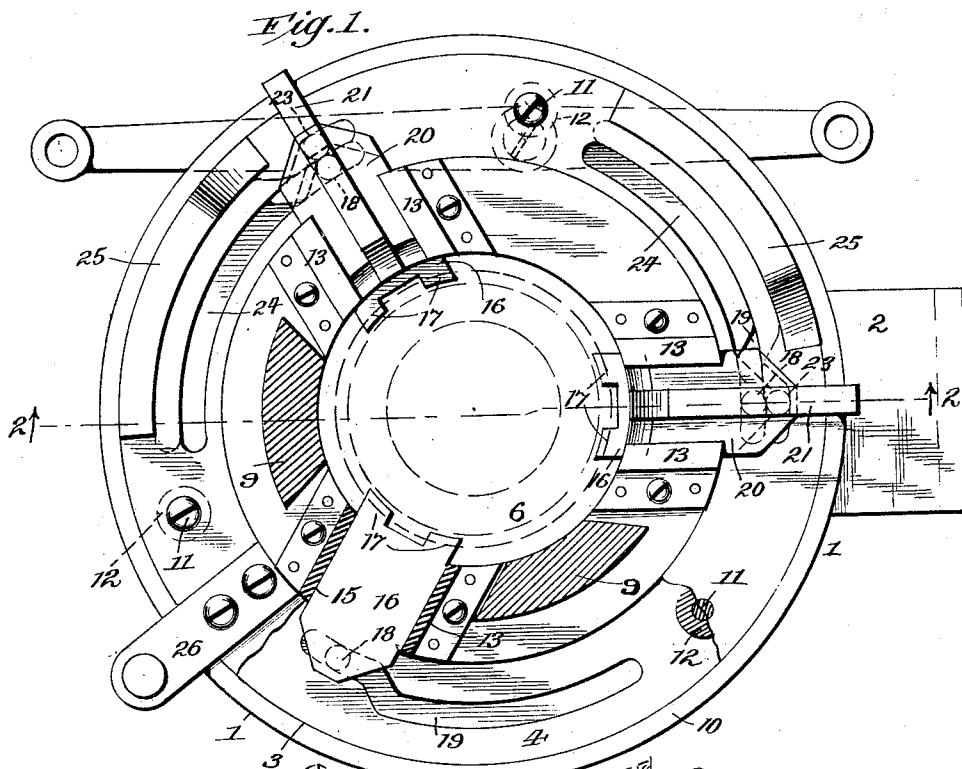
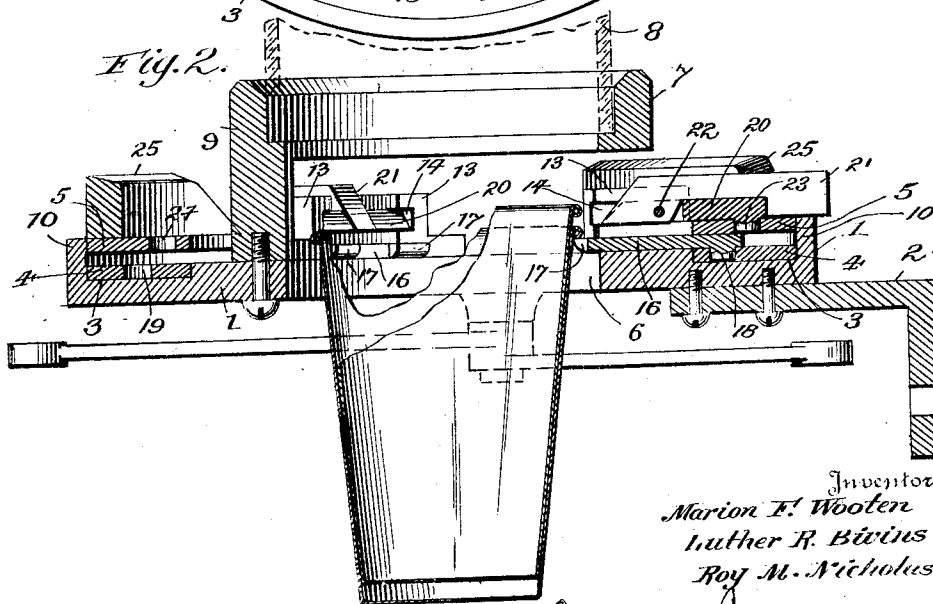
Feb. 21, 1928.

1,660,247

M. F. WOOTEN ET AL
CUP DISPENSING MECHANISM

Filed Jan. 25, 1922

3 Sheets-Sheet 1



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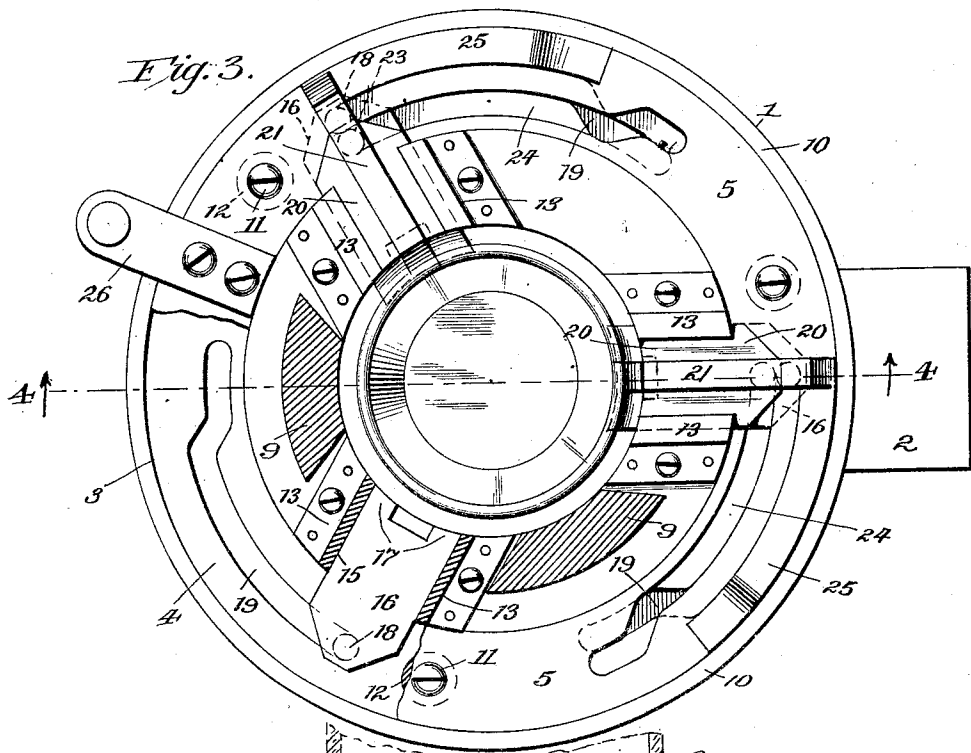
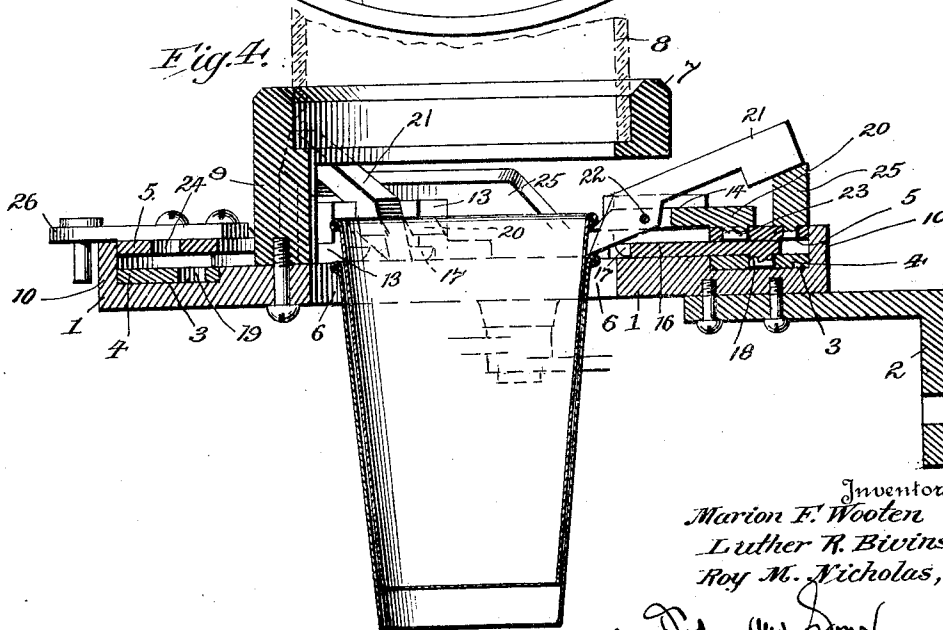
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Filed Jan. 25, 1922

3 Sheets-Sheet 2



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3 Sheets-Sheet 3

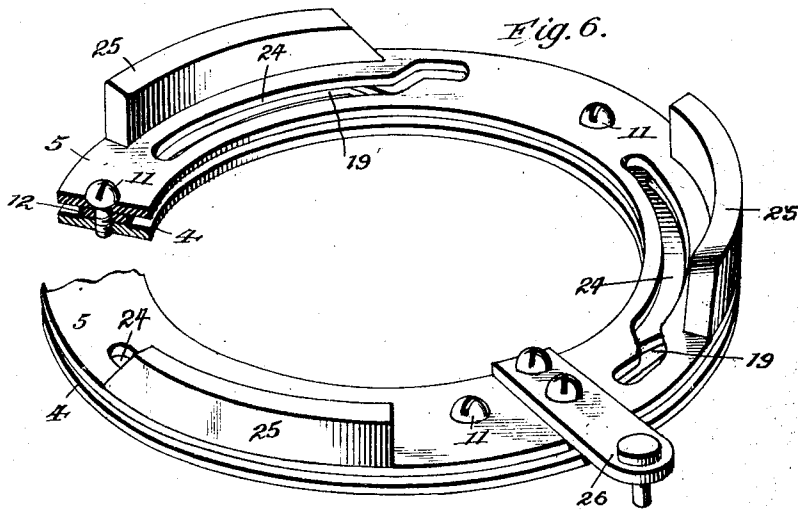
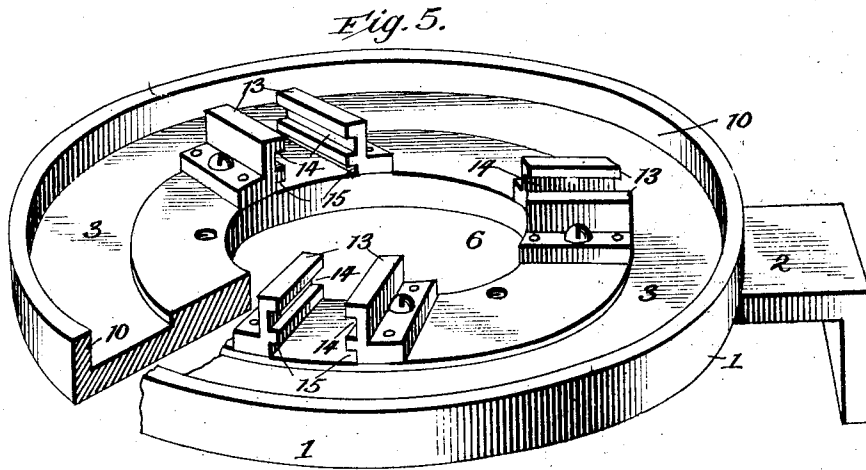


Fig. 7.

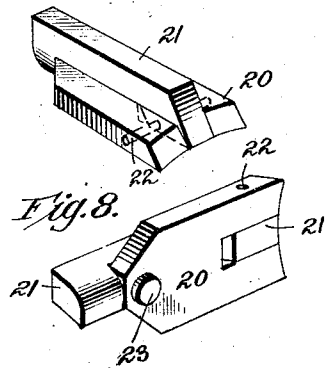
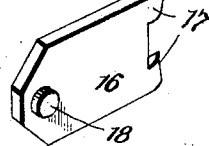


Fig. 8.

Fig. 9.



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UNITED STATES PATENT OFFICE.

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CUP-DISPENSING MECHANISM.

Application filed January 25, 1922. Serial No. 531,747.

This invention pertains to mechanism for delivering, one at a time, from a magazine or holder in which they are stacked or nested, cups or containers of conical form. More particularly, though not exclusively, the structure is intended to deliver paper cups, such as are now generally provided for use in connection with water coolers, and with beverage-dispensing apparatus. Cups for these purposes are now made in several forms, but usually comprise a tapering or frusto-conical body, closed at its smaller end, and provided at its open end or mouth with an outwardly turned flange, lip, bead, or rolled edge, which tends to stiffen and brace the cup against distortion or collapse, and which performs an important function in connection with mechanism for dispensing or delivering the cups mechanically.

In its general form and arrangement the structure herein disclosed is quite similar to another owned and controlled in the same interest as is that of the present invention and application, the present improvements being designed to secure positive actuation of the cup-supporting, releasing, and ejecting devices in all their movements and to insure a sharp staccato action of the ejector, with a view to more certainly detaching the lowermost cup from the cup next above, than can be done by a slower or more gradual movement of the ejector. The claims are accordingly drawn to these improvements.

With these objects in view the mechanism is constructed as set forth in the accompanying drawings, in which:

Figure 1 is a plan view of the cup-dispensing or delivery mechanism with the magazine or holder removed, the upper cup-supporting slides retracted, the lower cup-supporting slides advanced, and the ejectors in inactive position;

Fig. 2, a vertical section on the line 2—2 of Fig. 1, looking in the direction indicated by arrows;

Fig. 3, a top plan view similar to Fig. 1, with the upper cup-supporting slides advanced, the lower cup-supporting slides retracted, a cup in position, and the cup ejectors in ejecting position;

Fig. 4, a vertical section on the line 4—4 of Fig. 3, looking in the direction indicated by arrows;

Fig. 5, a perspective view of the base or supporting plate of the mechanism, showing the guideways for the cup-supporting slides, the annular seat for the actuating cam-ring, and the bracket for attaching the base to a cabinet or other support;

Fig. 6, a perspective view of the double actuating cam-ring;

Figs. 7 and 8, perspective views of one of the upper cup-supporting slides and the ejector carried thereby, the latter turned 90° from normal to show the under faces;

Fig. 9, a perspective view of one of the lower cup-supporting slides, turned 90° from normal position to show the stud with which the actuating cam co-acts.

In the earlier structure upon which this is an improvement, the cup-supporting slides were positively advanced by the cam faces of a cam-ring, but were retracted by springs; the forward ends of the upper cup-supporting slides projected further inward toward the cups at their upper than at their lower sides or faces; and the cams for actuating the ejectors were designed to produce a relatively slow and gradual movement of the ejectors. It has been found in practical use that better results can be attained by reversing the bevel of the ends of the upper cup-supporting slides, or of the fingers thereof; by employing cams to positively retract as well as to advance all the slides; and by so fashioning the ejector-actuating cams as to cause a very quick action, in the nature of a sharp, quick blow or stroke.

The use of positively-acting cam mechanism for retracting as well as advancing the slides renders their movements more certain and prevents lag or failure to move, and it also reduces the number of parts, cheapens the construction of the mechanism, and lessens its liability to derangement.

The reversal of the bevel of the ends of the upper slides or their fingers, and of the ejectors, facilitates their entrance between the flanges, beads, or lips of two cups, and renders more effective the engagement of the ejectors with the cup beneath them, and more certain the forcing of the lowermost cup away from and out of engagement with the one next above it.

Finally, the quick action of the ejectors, and the consequent sudden or staccato action thereof upon the cup, is peculiarly effective.

tive in detaching the lowermost cup from the one above, where because of softening of the usual paraffin or like coating, or through close nesting of the cups under endwise pressure, they adhere quite firmly one to another. It is also found that the cups are less frequently injured where this stroke or sudden pressure is employed.

Referring now to the drawings, the improved structure will be described in detail.

An annular base plate 1 provided with an attaching bracket 2, integral or separate as found expedient, constitutes the base or support for the mechanism, and is formed with an annular seat or depression 3 to receive and guide in its movements a double cam-ring comprising a lower ring member 4 and an upper ring member 5, the seat 3 being outside of and concentric with a large central opening 6, through which the cups are delivered. The space between the central opening 6 and the inner wall of seat or depression 3 is raised above the bottom of said depression to the extent of the thickness of the lower ring member 4, and affords support for an internally shouldered annular bracket 7, for a glass tube or other cup container 8, indicated by dotted lines in Figs. 2 and 4. Supporting legs 9 of said bracket are secured to the base plate 1, as shown in said Figs. 2 and 4. The bracket 7 may of course be made integral with the base plate if desired.

As shown in Figs. 1 to 5 inclusive, the base plate 1 is provided with an upstanding circumferential flange 10, which forms the outer wall of the seat or depression 3, and rises to a height to form an outer or peripheral bearing or guide for the upper ring member 5. The two ring members 4 and 5 are connected by screws or bolts 11 passing through spacing washers 12 interposed between the rings, as best seen in Figs. 1 and 6.

Formed upon or secured to the raised inner platform or surface of base plate 1 are guide blocks 13 arranged in pairs, the members of each pair being parallel with each other. The inner or facing walls of the two guides of each pair are provided each with a pair of horizontal grooves or guideways 14, 15 (see Figs. 2 and 5), to receive the edges of two series of cup-supporting slides. The inner ends of the slides 16 of the lower series are preferably formed with two separated fingers 17, as shown in Figs. 1, 2, 3, 5, 7, 8 and 9, which fingers are beveled on their lower sides as seen in Figs. 2, 4 and 9. Each slide 16 is provided on its lower side with a stud 18, to enter a cam slot or groove 19 of the lower ring member 4. The upper grooves or guideways 14 of the guide blocks 13 receive the longitudinal edges of the upper series of slides 20, of the form best shown in Figs. 7 and 8, which move hori-

zontally in the guideways above the slides 16 and in alternation therewith.

Each upper slide 20 is, like the slides 16, bifurcated at its inner or forward end, and beveled as shown in Fig. 7, and between the forks or fingers so formed there is pivoted an ejector 21 of the form best shown in Figs. 2, 4 and 7. This ejector, as seen in Figs. 2 and 4, consists of a block or body having a beveled inner or forward end lying between the fingers or forks of the slide 20, and provided with a pivot pin 22 located a short distance from its inner extremity, so that the remaining and longer portion of its body, which is cut away to clear the top of slide 20 and extends over and beyond the same, may act by gravity to maintain itself in horizontal position, the long arm resting upon the top of the slide. Each slide 20 is provided on its under face with a stud 23, to enter a cam slot or groove 24 in the upper ring member 5.

It will be seen upon reference to Figs. 1, 2, 7, 8 and 9 that the forward or inner ends of all the slides of both series are curved on an arc of a circle, to conform to the curvature of the circumference of the cups at a point just below their rims or flanges.

The cam slots and studs are so positioned, and the slots are so fashioned, that upon oscillating the double cam-ring about its center or axis, the upper series of slides 20, which are normally retracted, will be moved inward and held in such inward position during the first portion of such movement of the cam-ring, while the lower slides 16, normally advanced and held inward during such movement, will be retracted by the final part of such movement of the ring, but the slides of either series will remain in their inward or advanced position during the retraction of the slides of the other series, and while the latter remain in retracted position. As a consequence one or the other series of slides will always be in position to maintain the column of cups above the lowermost cup, and the lowermost slides, when in their advanced or inward adjustment, will of course support the entire column, including the lowermost cup.

Figs. 1, 3 and 6 show the form of the upper cam slots 24 in full lines, and Figs. 1 and 3 show the form of the lower cam slots 19 in full lines as to one of said slots, and by dotted lines as to the others. It will be seen upon referring to these figures that the slots 19 are, through the major portion of their length, concentric with the axis or center about which the cam-ring oscillates, but that near one end they bend somewhat abruptly inward, and then continue concentric with said center of oscillation. The cam slots 24 are similar to the slots 19 in that they are through the major portion of their length concentric with the axis of oscillation, but

near one end bend suddenly outward instead of inward, and then continue a short distance concentric with the axis of oscillation.

Upon referring to Fig. 1, where the lower slides 16 are shown advanced and the upper slides 20 retracted, it will be seen that while the slots 19 and 24 are of practically the same length, or occupy an equal number of degrees of the circle, the sharp bend or curve from the main or longer portion of the slot 19 is located at a greater distance from the closed end of the shorter concentric section of the slot than is the similar bend of slot 24. It therefore follows that when the normally active or effective cup-supporting slides 16 are advanced, at which time their studs 23 are in the short concentric section of the slot 19, oscillation of the cam-ring in the direction of travel of the hands of a clock will first act to advance the upper slides 20, and will fully advance the same before the lower slides 16 begin to recede. This receding movement begins just after completion of the inward movement or advance of the upper slides, the outward movement of the lower slides being, however, completed before the ejectors 21 come into action, so that there may be no interference with the free delivery of the lowermost cup when said ejectors function. On the return movement or reverse oscillation of the cam-ring, the relative positions of the slides 16 and 20 are reversed, the lower slides being again advanced and the upper slides retracted.

Toward the completion of the initial oscillatory movement of the cam-ring, and after the lower slides have been retracted, the ejectors 21 are actuated to force the lowermost cup downward and detach it from the next cup above, in the event that it adheres thereto or fails to drop of its own weight. This actuation is caused by the outer or weighted end of each ejector riding over one or another of a series of raised cams 25, one end of each of which rises somewhat abruptly from the ring member 5, or with relatively slight inclination of its end face from the vertical, and continues at such height to its opposite end. To insure an easy and certain movement of the outer or weighted end of the ejector 21 up the inclined end face of the cam 25, the co-acting face of said weighted end is rounded as shown in Figs. 7 and 8, as is also the point or angle which would otherwise be formed by the meeting of the end and top faces of the cam 25. The inclination of such end face of cam 25 is made as abrupt, or departs as little from the vertical, as is consistent with a free rise or travel of the ejector upon and over it, so that the beveled end of the ejector may be thrown downward as suddenly as practicable, and thereby effect a very quick downward pressure upon the rim of the lowermost cup of the column, an action closely resem-

bling a hammer blow or staccato stroke. The upper surface of each cam 25 is beveled to afford a flat bearing for the outer or weighted end of each ejector travelling over it. The weighted ends of the ejectors may, of course, be provided with anti-friction rolls to reduce friction and facilitate the upward travel of the outer ends of the ejectors in ascending the inclined ends of the cams 25, but this is an obvious expedient to which we lay no claim.

The cam-ring is provided with a radial arm or extension 26, so that the oscillation of the ring may be effected manually and directly in either or in both directions. In practice, however, it is found convenient to connect this arm through suitable linkage with a hand-lever located in convenient position on the exterior of the cabinet within which the mechanism here described is, usually, placed.

It is desirable to use not less than three slides in each set, and the drawings show three such sets spaced at equal angular distances, or 120° from axis to axis of the slides, but two slides in each set will function properly, particularly if made of considerable width; or more than three may be used, in which case the spacing will be changed accordingly, and in every instance the number of cam slots and cams will correspond with the number of slides.

It will be observed that under the construction here illustrated and described, both walls of each slot or groove act upon the studs of their respective slides, thus positively advancing and positively receding each slide in proper time and sequence, the outer wall of each slot serving to move the slides inward, and the inner wall of each slot serving to move them outward, while the concentric portions of each retain the slides in fixed position so long as the studs are therein.

It is believed that the general operation of the mechanism will be readily understood from the foregoing description, hence it is sufficient to add that swinging the cam-ring in one direction causes the upper slides to move inward to engage beneath the rim of the cup next above the lowermost, the lower slides to recede, and the raised cams to actuate the ejectors and force off the bottom cup, in sequence; while on the return movement of oscillation the lower slides are advanced, the upper slides retracted, and the ejectors caused to ride off their elevating cams, and to fall by gravity to their normal horizontal position. All movements of the slides are thus effected positively, or without the use of springs or other delicate and more or less undependable devices.

The upper slides, by reason of the downward bevel or inclination of their inner ends, enter radially beneath the rim, bead, or

flange of the second cup from the bottom, bringing the flat under face of each ejector directly over and causing it to rest upon the rim of the lowermost cup, so that when
 5 the outer end of each ejector is thrown up by its cam 25, the several ejectors act in vertical planes parallel or coincident with the axis of the cup column. The lowermost cup is thus evenly or equally forced down at all
 10 points in its circumference, and with a very quick and sudden pressure, which insures its detachment from the cup above, and its projection downward without tendency to tip in its travel to the receiving shelf or
 15 holder which is commonly employed directly beneath the cup, or to the hand of the person operating the mechanism.

The mechanism here described is intended for use with or without coin control, and this
 20 if used may be of any well-known or suitable type. The present invention is confined to the features above described, and illustration and description of coin control mechanism is hence omitted.

25 The term "slot" is used throughout the specification to describe or include both a slot open entirely through the ring member, and a mere groove extending part way through the same, it being obvious that either may be
 30 used, though the open slot is preferred.

It is obvious that while primarily designed and intended for use with paper cups, the mechanism may be used with any container of similar form and having an out-
 35 ward flange, lip or bead. It is also obvious that the slides of one set need not be directly above or below those of the other set, but may alternate therewith, provided the cup-supporting ends or fingers of the two
 40 sets of slides be at proper levels to enter beneath the lowermost and the next to the lowermost cup rims respectively, the cam slots and ejector cams being positioned to correspond.

45 What we claim is:—

1. The herein described cup-dispensing device, comprising a base with a central opening for the passage of cups through it; a plurality of guideways carried by said base;
 50 upper and lower cup-supporting slides slidable in each of said guideways radially to the center of the cup opening in the base, each slide provided with a stud to enter a cam slot; and a cam-ring comprising an upper and a lower annular member, each provided with a plurality of cam slots corresponding in number with the slides to be actuated thereby, the slots of both ring members being through a considerable portion
 55 of their length concentric with the axis of the cup opening in the base, the slots of the lower ring member having near one end an inward bend followed by a short length concentric with said axis, and the slots of the
 60 upper ring member having near one end an

outward bend followed by a concentric portion of shorter length than that of the lower ring member; whereby an oscillation of the cam ring in one direction serves to advance
 70 the normally retracted upper slides and thereafter to retract the normally advanced lower slides, and a reverse oscillation restores the parts to normal position, the several movements of the slides being positive in both directions.

2. The herein described cup-dispensing device, comprising a base with a central opening for the passage of cups through it; a plurality of guideways carried by said base;
 80 upper and lower cup-supporting slides movable in the respective guideways radially to the axis of the cup opening in the base, each slide provided with a stud to enter a cam slot, and the upper slides being provided each with a pivoted ejector arranged to rock
 85 in a vertical plane; a cam-ring provided with cam slots corresponding in number with the slides to be actuated thereby and divided into two groups, the slots of both groups being through a considerable portion
 90 of their length concentric with the axis of the cup opening in the base, the slots of the series associated with the lower slides having near one end an inward bend followed by a short length concentric with said axis,
 95 and the slots associated with the upper slides having near one end an outward bend followed by a concentric portion of shorter length than that of the other series; and
 100 cams projecting upward from the cam-ring and having at one end an incline, whereby an oscillation of the cam-ring in one direction serves to advance the normally retracted upper slides with their ejectors and
 105 thereafter to retract the normally advanced lower slides, and actuate the ejectors, and a reverse oscillation restores the parts to normal position, the several movements of the slides being positive in both directions.

3. A cup-dispensing mechanism of the character described comprising, in combination, a base or platform provided with an opening for the passage of cups through it;
 110 slides mounted upon said base and arranged in two series, those of one series in plane to pass beneath the flange of the lowermost cup and those of the other series to pass beneath the flange of the cup next above, the slides of the two series being radially and alternately movable in horizontal planes
 115 toward and from the axis of the central cup opening; ejectors carried by the slides of the upper series and pivoted to swing in vertical planes; a cam-ring mounted upon the base, capable of oscillation about its central axis,
 120 and provided with two series of slots to receive actuating studs of the slides of the two series and impart positive movement to the slides in both directions; and a series of up-
 125 standing cams carried by the cam-ring, and

having their forward ends inclined at as slight an inclination from the vertical as is consistent with a free travel of said cams beneath the overhanging ends of the ejectors; whereby the ejectors are caused to move suddenly upward at their outer ends and suddenly downward at their ejecting ends, and to act with a staccato stroke upon the cup to be ejected.

4. In a cup-dispensing mechanism of the character described, a series of slides adapted to enter beneath the flange of the lowermost cup of a stack or column; a second series of slides arranged to enter beneath the flange of the cup next above the lowermost, the supporting ends of the upper slides being inclined downward toward their forward extremities, whereby they are adapted to enter more readily beneath the cup flange and to conform thereto; and means for positively advancing and receding the slides of the two series in proper time and sequence, the several slides being radially and alternately movable in horizontal planes toward and from the axis of the cup column.

5. In a cup-dispensing mechanism of the

character described, a series of slides adapted to enter beneath the flange of the lowermost cup of a stack; a second series of slides arranged to enter beneath the flange of the cup next above the lowermost, the several slides being radially and alternately movable in horizontal planes toward and from the axis of the cup column, and each of said slides being provided with an ejector pivoted to swing in a vertical plane and terminating at its inner end as a continuation of the forward line of the slide; and means for positively advancing and receding the slides of the two series in proper time and sequence, and for actuating the ejectors in operative direction, the forward ends of the upper slides and of the ejectors being beveled downward toward their inner extremities to facilitate their entrance beneath the flange of the cup.

In testimony whereof we have signed our names to this specification.

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