

Feb. 16, 1965

J. E. DYE
CUP DROPPER

3,169,356

Filed Nov. 1, 1963

5 Sheets-Sheet 1

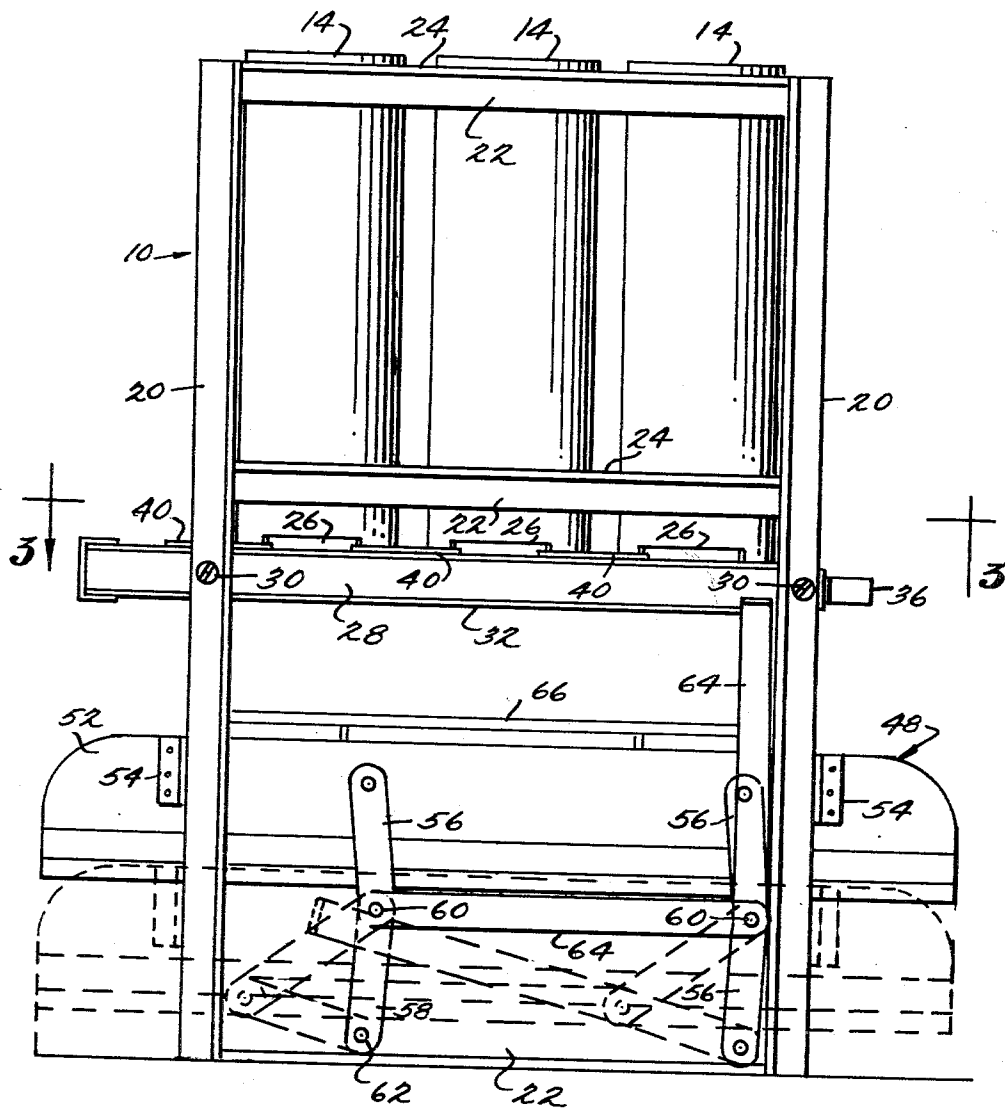


Fig. 1.

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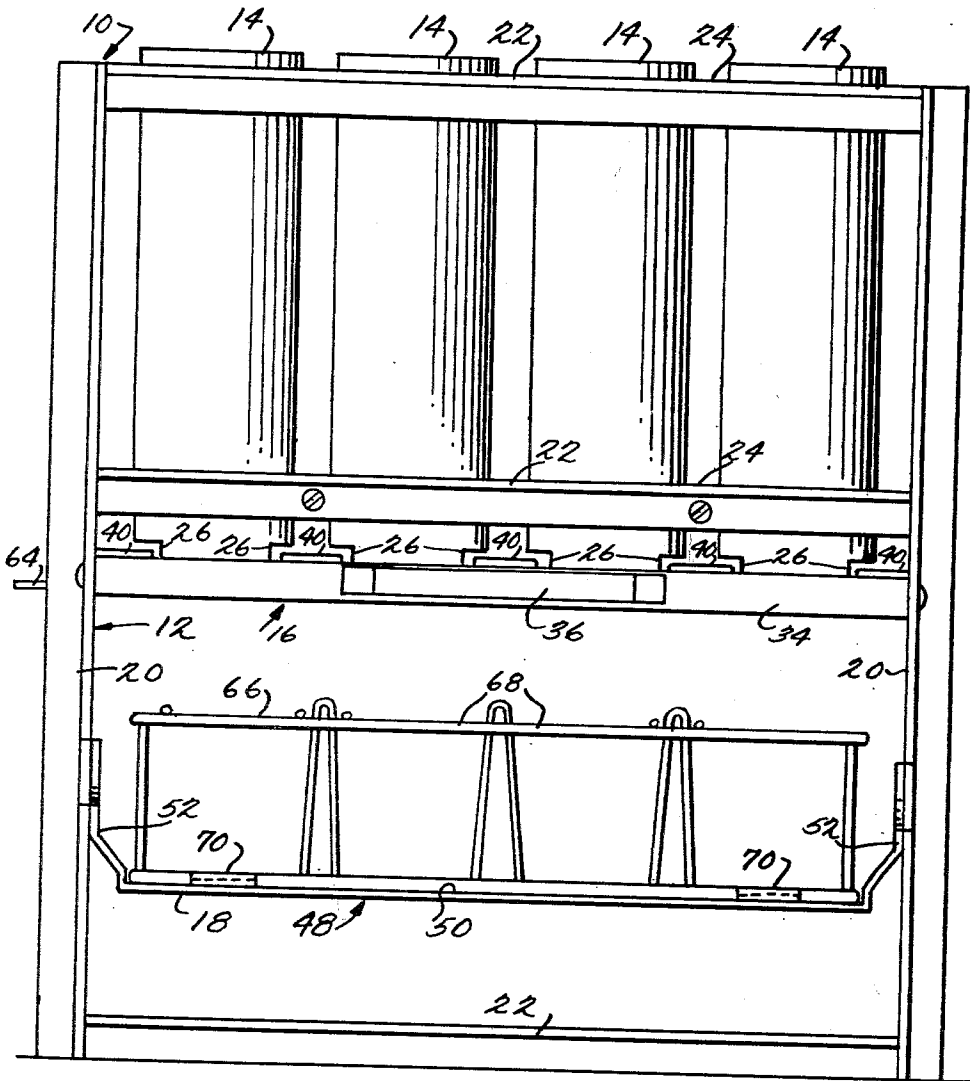


Fig. 2.

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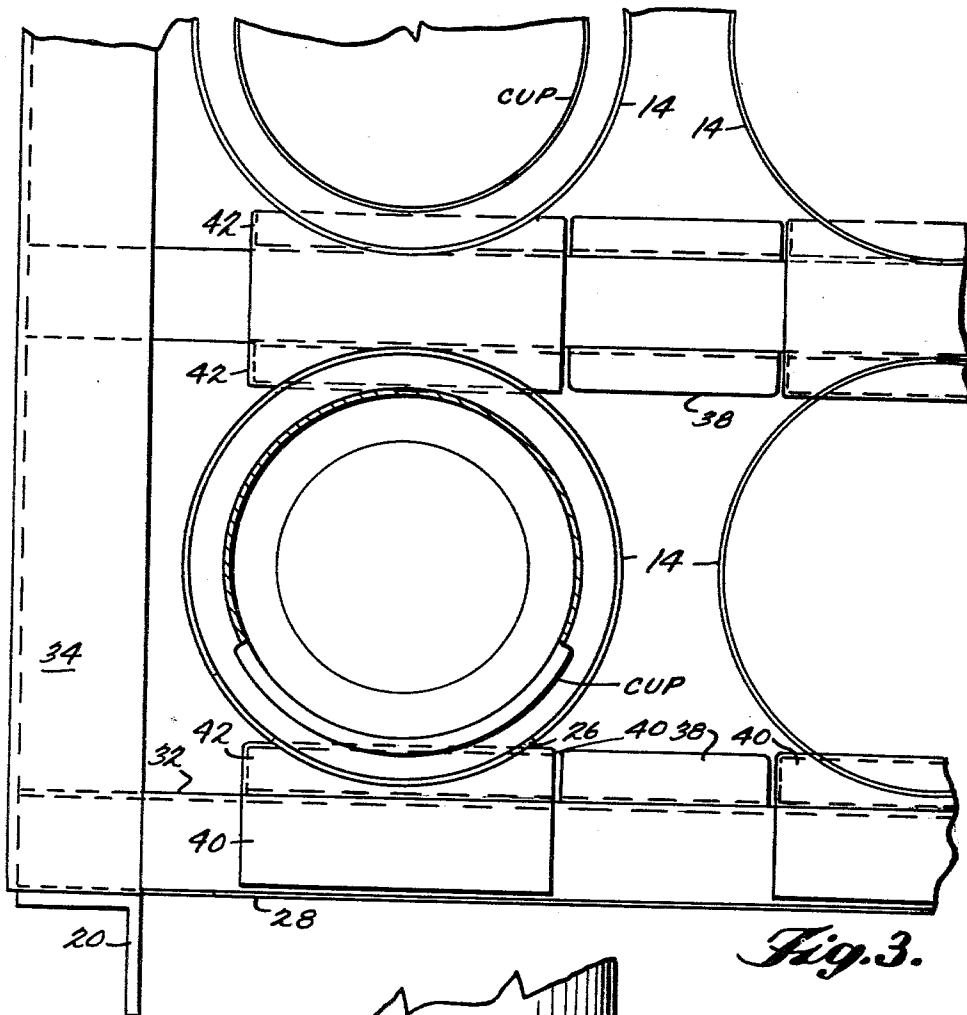


Fig. 3.

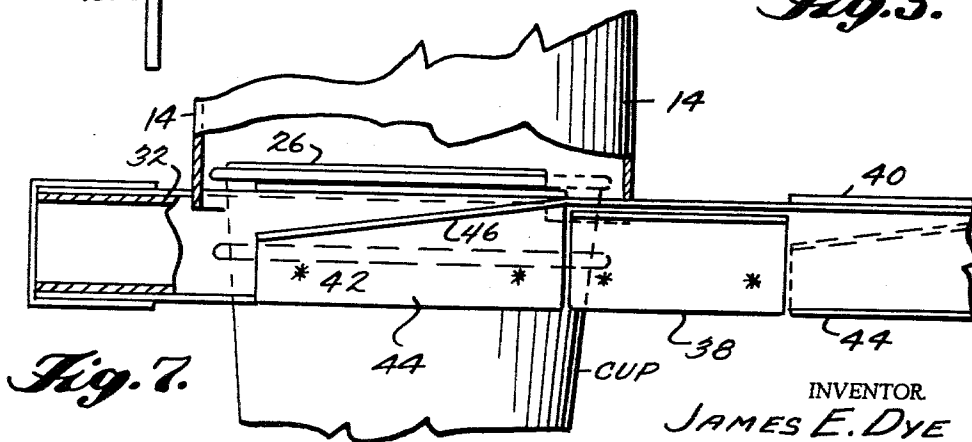


Fig. 7.

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Fig. 5.

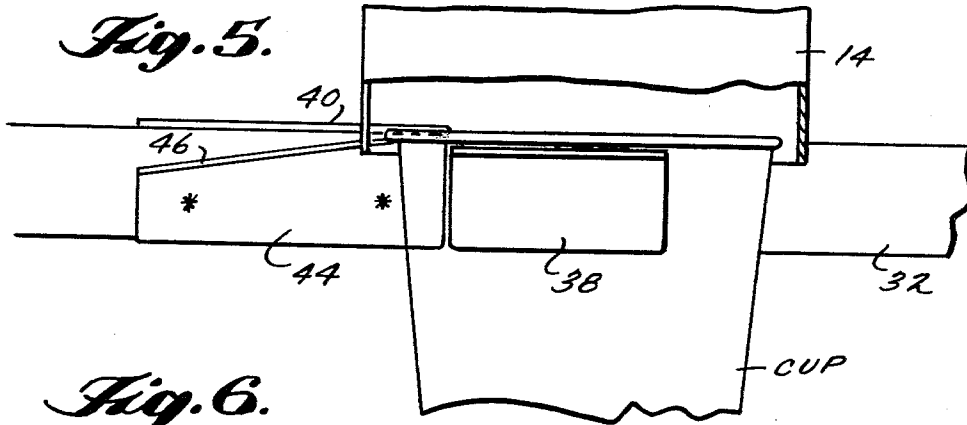


Fig. 6.

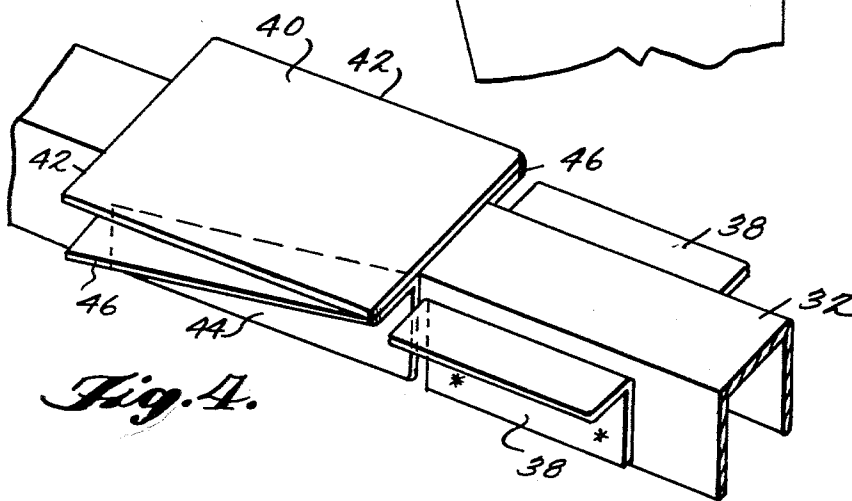
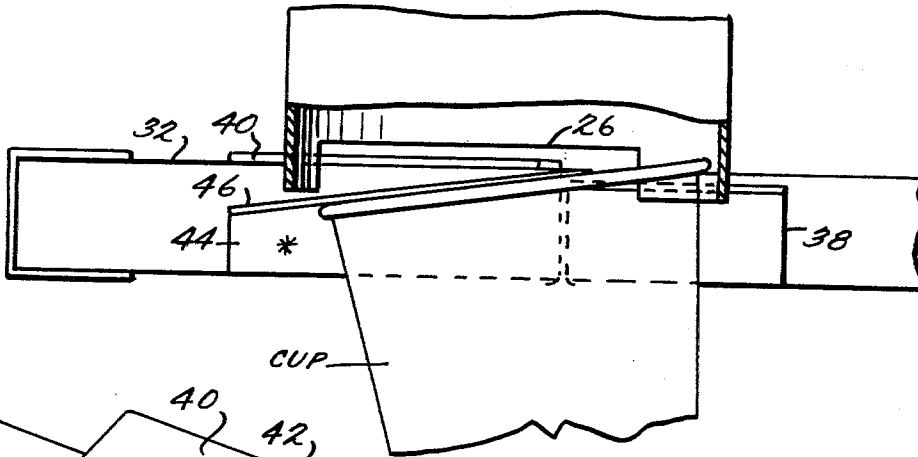


Fig. 4.

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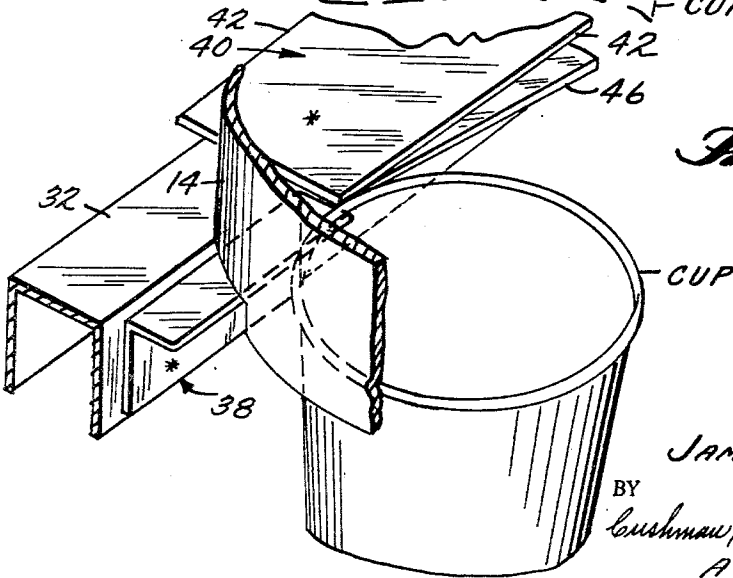
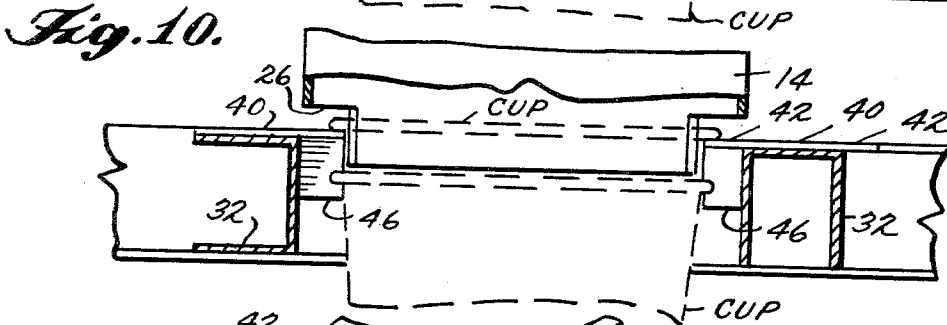
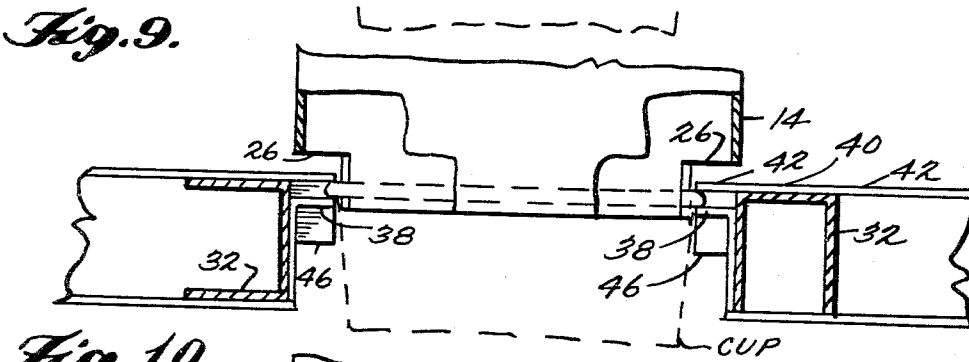
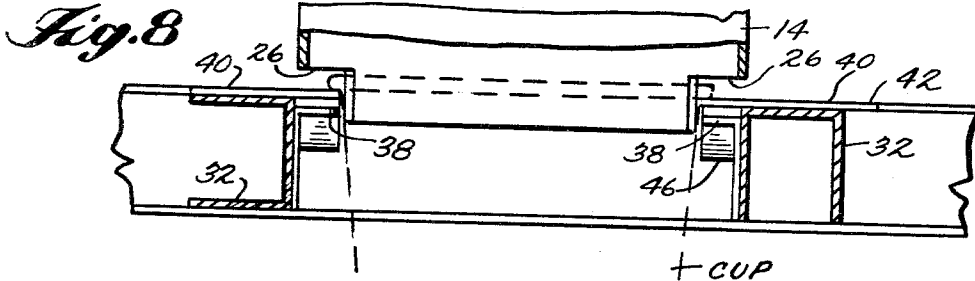
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CUP DROPPER

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12 Claims. (Cl. 53-166)

This invention relates to dispensers and more particularly to apparatus for simultaneously dispensing a plurality of lipped cup-like articles.

The apparatus of this invention is particularly adapted to dispense a plurality of drinking cups into position for filling so that a large number of individual drinks can be prepared quickly. The cup dropper of the invention is especially useful in avoiding a bottleneck in assembly line drink preparation at the point where the cups must be un-nested and positioned for filling. Assembly line drink preparation systems are most frequently used in areas which have high volume, high speed beverage sales such as sport stadiums, amusement parks, expositions, and the like.

It is a primary object of the invention to provide reliable apparatus for quickly dispensing a drinking cup from each of a plurality of stacks of nested cups; the said apparatus having means for accurately positioning and retaining the dispensed cups to aid in their subsequent filling and transportation.

Another object of the invention is the provision of rack means to receive the dispensed cups in accurate positions for subsequent filling of the cups as by a multi-headed automatic filler device.

It is a further object of the invention to provide a device of the type described in which the dispenser can be manually actuated and reset for subsequent actuation with a low level of effort.

Yet another object of the present invention is to provide a device of the type described which includes a rack receiving platform which can be moved into close adjacency with the plurality of bulk stacks at the time that cups are dropped to prevent inaccurate placement of the cups in the rack and moved away from the stacks after the cups have been dropped to facilitate the advancing of the cup filled rack to subsequent stations in the filling line.

A further object of the present invention is to provide a device of the type described in which the bulk stacks are each contained in tubes positioned above a slide, the slide having means for supporting the lowermost cup of each stack when in a first position and progressively wedging the lowermost cup of the stack from the adjacent cup in the particular stack, removing support from the former cup and supporting the latter as the slide is moved laterally with respect to the tubes toward its second position thereby resulting in the dispensing of the lowermost cup from each stack.

These and other objects of the invention will be more fully set forth in the following detailed explanation, particular reference being made to the attached drawings wherein an illustrative example of a preferred embodiment of the invention is shown in detail.

In the drawings:

FIGURE 1 is a side elevation view of the cup dropper illustrating the raised position of the rack receiving tray in full lines and the lowered position thereof in dashed lines.

FIGURE 2 is a front elevation view of the cup dropper showing a rack in position on the tray.

FIGURE 3 is a fragmentary sectional view taken substantially along the line 3-3 of FIGURE 1.

FIGURE 4 is a fragmentary perspective view of the slide.

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FIGURE 5 is a fragmentary side elevation view of the slide and a tube, the slide being in its first position.

FIGURE 6 is a view similar to FIGURE 5 showing an intermediate position of the slide.

FIGURE 7 is a view similar to FIGURE 5 illustrating the second position of the slide.

FIGURE 8 is a fragmentary front elevation view of the slide and a tube with parts broken away and sectioned for clarity, the side being shown in the position of FIGURE 5.

FIGURE 9 is a fragmentary front elevation view similar to FIGURE 8, the slide being shown in the position of FIGURE 6.

FIGURE 10 is a fragmentary front elevation view similar to FIGURE 8, the slide being shown in the position of FIGURE 7.

FIGURE 11 is a fragmentary perspective view of the slide and a tube and illustrating the relative positions of the slide, tube and lowermost cup immediately preceding the dispensing of the cup.

The preferred embodiment of the cup dropper 10, as best illustrated in FIGURES 1 and 2 is most advantageously fashioned from a durable, easily sanitized material such as stainless steel or the like and comprises a frame 12, which supports a plurality of vertically directed tubes 14 above a slide 16 and a vertically movable tray assembly 48.

As shown the frame 12 includes four vertically directed corner posts 20 of L-shaped cross section which are placed in a rectangular configuration. A plurality of cross pieces 22, secured to the posts 20 by welding or bolting provide the frame's rigidity. Of course, additional bracing could be employed beside that illustrated by way of example.

The plurality of tubes 14 are positioned among the posts 20 in a generally rectangular pattern as best shown in FIGURE 3. The tubes 14, which may conveniently be formed by bending and crimping or welding sheet metal, are vertically directed and secured in position by upper and lower horizontal plates 24 through which they extend. The plates 24 have disk-shaped openings there-through to receive the tubes 14 and are secured at their edges to the frame cross pieces and corner posts.

Each of the tubes 14 is generally cylindrical and has open ends. While the upper end of each tube is generally right circular, two generally rectangular strips are removed from opposite sides of the lower end of each tube 14 as to form slots 26 for reasons which will become apparent.

A pair of slide rails 28 are secured as by bolts 30 to the corner posts 20 and extend parallel to one another and generally horizontally immediately subjacent the lower ends of the tubes 14. Although slide rails of U-shaped cross section are illustrated, ones of different design could be employed. The slide rails 28 receive the slide 16 for reciprocating movement in a substantially horizontal plane beneath the lower ends of the tubes 14. With particular reference to FIGURES 2, 3 and 4, the slide 16 comprises a plurality of bar-like channel members 32 extending between the front and rear of the slide and a pair of transversely extending end members 34 attached respectively to the forward and rearward ends of the channel members 32. As best shown in FIGURES 1 and 8-10 the channel members 32 most nearly adjacent the sides of the slide 16 cooperate with the slide rails to provide guides for the reciprocal movement of the slide and support for the slide with respect to the frame. The front transverse member 34 of the slide may conveniently carry an actuation handle 36 for manual reciprocation of the slide.

Each channel member 32 has mounted thereon a plurality of each of two types of supports 38, 40 mounted

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in alternating relationship along the length of the member. The supports 38 and 40 on each member 32 are preferably noncoextensive but are closely adjacent one another and are paired on the members so that a support pair is moved forwardly and rearwardly through each slot 26 during each reciprocation of the slide, as will be more fully explained hereinafter.

Each support 38 preferably comprises an elongated member of inverted L-shaped cross section rigidly mounted on a side of a channel member 32 as by spot welding so that one leg of the support 38 extends transversely from the channel member 32 in a generally horizontal plane disposed below the upper surface of the channel member 32 a distance approximately equal to the normal thickness of a rolled cup lip.

Each support 40 preferably includes an elongated tab 42 rigidly mounted on a channel member 32 so that it extends transversely from the upper surface of the channel member 32 in a generally horizontal plane. Preferably, the tabs 42 are in the form of small, generally rectangular plates secured to the upper surfaces of the channel members 32. With the exception of the tabs 42 most nearly adjacent the sides of the slide, each plate may conveniently form two tabs, one projecting from either side of the associated channel member, as best illustrated in FIGURE 4. Although the supports 38 and 40 have been illustrated as being formed from separate material, it should be realized that they could be integrally formed on the channel members, for instance by stamping and bending.

The slide 16 additionally includes a plurality of ramp-like members 44 formed similarly to the supports 38 and mounted immediately beneath the tabs 42. Each member 44 includes an outwardly projecting portion 46 extending in a plane generally perpendicular to the side of the associated channel member 32 but oblique with respect to the longitudinal axis of the channel member. Each ramp-like member outwardly projecting portion 46 therefore meets the undersurface of the associated support tab 42 at the end of the tab nearest the support 38 of the support pair 38, 40 (see FIGURE 4).

The tab 42 of each support 40, lying in a substantially horizontal plane, and the oblique portion 46 of each ramp-like member define to form a wedge having its apex pointed toward the front of the slide 16.

The structure of the cup dropper embodiment as shown is completely by the vertically movable tray assembly 48 disposed between the lower portions of the corner posts 20. The tray assembly preferably includes a tray having a generally flat, horizontally directed portion 50 extending between the side edges of the area delimited by the corner posts 20 and projecting a short distance beyond the front and rear of the area delimited by the corner posts (FIGURE 1). Preferably, the tray includes two side walls 52 projecting upwardly at the lateral limits of the horizontal portion 50.

Guides 54 mounted on the outside surface of the walls 52 slidably engage the corner posts 20 in order to center the tray with respect to the legs and limit its motion to a vertical component during the raising and lowering of the tray.

As best shown in FIGURES 1 and 2, the tray support includes a toggle arrangement in which two longitudinally spaced arms 56 are pivotally mounted on each tray side wall 52 for angular movement in planes parallel to the side walls. A pair of correspondingly similar arms 58 are pivotally secured to each lower cross piece 22. Each upper arm 56 is pivotally secured to the corresponding lower arm 58 as at 60 and a connecting arm 62 is provided to connect the pivot points 60 on each side. In order to ensure smooth operation of the tray, the pivot pins 62 may be rigidly secured to the arms 58 on one bottom cross piece 22 and extend beneath the tray to the arms 58 on the other bottom cross piece forming pivot pins for these latter arms also.

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As shown in FIGURE 1, the tray assembly 48 can be raised and lowered through the use of a handle 64 provided as an extension of one lower arm 58 past its pivot point 60. The handle 64 is preferably located on an arm 58 near the front of the cup dropper and may be formed as an integral extension of the arm. According to the embodiment of the invention shown, the pivot 62 associated with the handle-carrying arm 64 is spaced rearwardly on the cross piece 22 a slight distance so that, as the tray is raised by rotating the handle 64 toward the front of the cup dropper, the pivot 60 associated with the handle 64 will be brought slightly over center as the upper end of the handle 64 contacts the adjacent corner post 20. This arrangement ensures that the tray 18 will remain in its upper position (shown in full lines in FIGURE 1) until the handle 64 is rotated rearwardly.

In using the cup dropper 10, the slide handle 36 is slid to its inner position (FIGURES 1, 2, 5 and 8) and a nested stack of cups is deposited in each tube 14 in upward opening "right side up" orientation. With the slide in this position, the supports 38 on each channel member 32 are disposed in the slots 26 partially constricting the openings of the tubes so that the lowermost cup in each stack is supported at two diametrically opposed points on the lip thereof by supports 38 (FIGURES 5 and 8).

A wire rack 66 or similar device having compartments 68 arranged in a pattern substantially the same as that of the tubes 14 is positioned on the tray and the tray raised into place using the handle 64. (Markers or stops such as those indicated at 66 in FIGURE 2 are preferably utilized to ensure the rapid and accurate positioning of the compartments 68 of the rack 66 with respect to the lower ends of the tubes 14.)

To dispense a cup from each tube 14 into each rack compartment 68, the slide handle 36 is pulled outward to its outer position. As the slide moves outwardly, as shown in sequence in FIGURES 5-8 and 9-11, each support 38 is moved forwardly away from a supporting relationship with the associated lowermost cup and the upper surface of each cup lip is engaged by the lower surface of a ramp-like member 44. At the same time that the lowermost cup is being wedged downwardly by the advance of the two ramp-like members the next cup upward in each stack is becoming increasingly supported on the upper surface of the tubes 22 of the supports 40. At a point in the movement of the slide which is best shown in FIGURES 6 and 11, the amount of support provided by the supports 38 has diminished to such a degree, and the downward force exerted by the ramp-like members become so great that the lowermost cup in each stack is dislodged from its supported position and drops neatly into the rack 66. It should be noted that at this point the next cup upward in each stack, which has become the lowermost cup, is fully supported along with the stack upon the two tabs 42 projecting into the particular tube 14 through the slots 26. The cup-filled rack can then be removed from the cup dropper by rotating the handle 64 rearwardly and sliding the rack from the tray.

The cup dropper is prepared for the next dispensing cycle by pushing the slide handle rearwardly causing the cups in the tubes to again be supported by the upper surfaces of the supports 38 acting on the undersurface of the lip of the lowermost cup in each stack.

During the dispensing of cups from the cup dropper, new nested stacks of cups can be placed in the tubes to replace the dispensed cups.

The cup dropper as set forth above is particularly adapted for use in assembly line preparation of drinks in which the stations subsequent to that of the cup dropper would include dispensing crushed ice into each cup, filling the cups with beverage from multiple filler heads, lidding the cups and attaching removable carrying handles to the racks so that the racks can be transported, as by vendors, to the points of individual beverage sales.

Although the cup dropper of the invention has been

particularly discussed as being susceptible to rapid and easy manual operation it should be realized that it would be within the purview of this invention to provide for automatic actuation of the slide handle 36, tray elevating handle 64, as well as automatic replenishing of the cups in the stacks.

It should now be apparent that the cup dropper as discussed herein and depicted in the drawings will fully accomplish the objects set forth at the beginning of this specification. It should also be realized that whereas a specific embodiment of the invention has been depicted and described to illustrate the principles of the invention, that many modifications could be made on the embodiment set forth without departing from the aforementioned principles. Therefore, the invention should not be limited in any sense by the particularities of the illustrative embodiment but only by the spirit and scope of the claims appended hereto.

I claim:

1. Apparatus for simultaneously dispensing the lowermost cup from each of a plurality of stacks of nested, lipped cups comprising: means retaining said cup stacks spaced laterally from one another in a plurality of longitudinally spaced transversely extending rows and a plurality of transversely spaced, longitudinally extending rows, said means also retaining said cups in substantially vertical, right side up orientation; slide means mounted for reciprocation in a substantially horizontal plane closely subjacent said stack retaining means between a first and a second position, first support means mounted in a substantially horizontal plane on the slide and arranged to supportingly engage the undersurface of the lip of the lowermost cup in each stack at a plurality of circumferentially spaced points on each of said lips when said slide is disposed in the first position thereof, said first support means being arranged on the slide to be moved from supporting relation with said cups as said slide is moved from the first toward the second position thereof; second support means mounted on the slide in substantially noncoextensive longitudinally alternating relationship with said first support means, said second support means being disposed in a substantially horizontal plane located above the plane of the first support means by at least the thickness of a cup lip and said second support means arranged on the slide to be moved into supporting relationship with the next cup upward from the lowermost cup in each stack as the slide is moved from the first position toward the second position thereof, thereby dispensing only the lowermost cup from each stack.

2. Apparatus as set forth in claim 1 wherein the cup stack retaining means comprise a plurality of hollow, open-ended tubes each receiving a stack of nested cups.

3. Apparatus as set forth in claim 2 wherein the slide comprises a plurality of generally parallel, longitudinally extending bar-like members from which the first and second support means extend laterally into partially constricting relation with said tubes.

4. Apparatus as set forth in claim 3 wherein the first and second support means include flat plate-like elements mounted on the bar-like slide members.

5. Apparatus as set forth in claim 4 wherein each tube includes means defining a pair of diametrically opposed slots therein adjacent the lowermost end of the tube and each first and second support element is arranged on a bar-like slide member to reciprocate through a slot as the slide is reciprocated between its first and second positions.

6. Apparatus as set forth in claim 4 additionally comprising ramp-like elements projecting from the bar-like slide members immediately beneath each second support means, said ramp-like elements being arranged to exert an increasing downward force on the lowermost cup of each stack as the slide is moved from its first position toward its second position.

7. Apparatus as set forth in claim 1 additionally com-

prising a means disposed beneath the slide for receiving and retaining the spaced relationship of the lowermost cups.

8. Apparatus as set forth in claim 7 wherein the cup-receiving means includes a generally horizontally extending tray and a removable compartmented rack accurately positionable on said tray utilizing stop means mounted on said tray.

9. Apparatus for simultaneously dispensing the lowermost cup from each of a plurality of stacks of nested, lipped cups comprising: means retaining said cup stacks spaced laterally from one another and retaining said cups in substantially vertical, right side up orientation; slide means mounted for reciprocation in a substantially horizontal plane closely subjacent said stack retaining means between a first and second position, first support means mounted in a substantially horizontal plane on the slide and arranged to supportingly engage the undersurface of the lip of the lowermost cup in each stack at a plurality of circumferentially spaced points on each of said lips when said slide is disposed in the first position thereof, said first support means being arranged on the slide to be moved from supporting relation with said cups as said slide is moved from the first toward the second position thereof; second support means mounted on the slide in substantially noncoextensive longitudinally alternating relationship with said first support means, said second support means being disposed in a substantially horizontal plane located above the plane of the first support means by at least the thickness of a cup lip and said second support means arranged on the slide to be moved into supporting relationship with the next cup upward from the lowermost cup in each stack as the slide is moved from the first position toward the second position thereof, thereby dispensing only the lowermost cup from each stack; cup receiving means including a generally horizontally extending tray and a removable compartmented rack disposed beneath the slide for receiving and retaining the spaced relationship of the lowermost cups, the rack being accurately positionable on said tray utilizing stop means mounted on the tray; and means for vertically moving the tray with respect to the cup stacks between a first, lower position wherein the rack is easily positionable and removable from the tray, and a second higher position wherein the rack is so nearly subjacent the slide that the cups dispensed by the slide reciprocation accurately land in the corresponding compartments of said rack.

10. Apparatus as set forth in claim 9 wherein the cup-retaining means are supported by a plurality of corner posts and the tray is disposed among said posts adjacent the lower ends of the posts.

11. Apparatus as set forth in claim 10 wherein the means for elevating the tray includes a toggle mounted between two of the corner posts and having an operating handle arranged to contact one of the posts when the handle has rotated the toggle slightly beyond its position of greatest extent thereby providing a stop for maintaining the tray in its upper position.

12. Apparatus as set forth in claim 11 additionally including guides mounted on said tray and arranged to slidably engage the corner posts thereby limiting the movement of the tray to a vertical component.

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