Aug. 9, 1966 J. F. VELTER 3,265,243

ADJUSTABLE CUP DISPENSER

Filed Jan. 15, 1965

FIG. 1

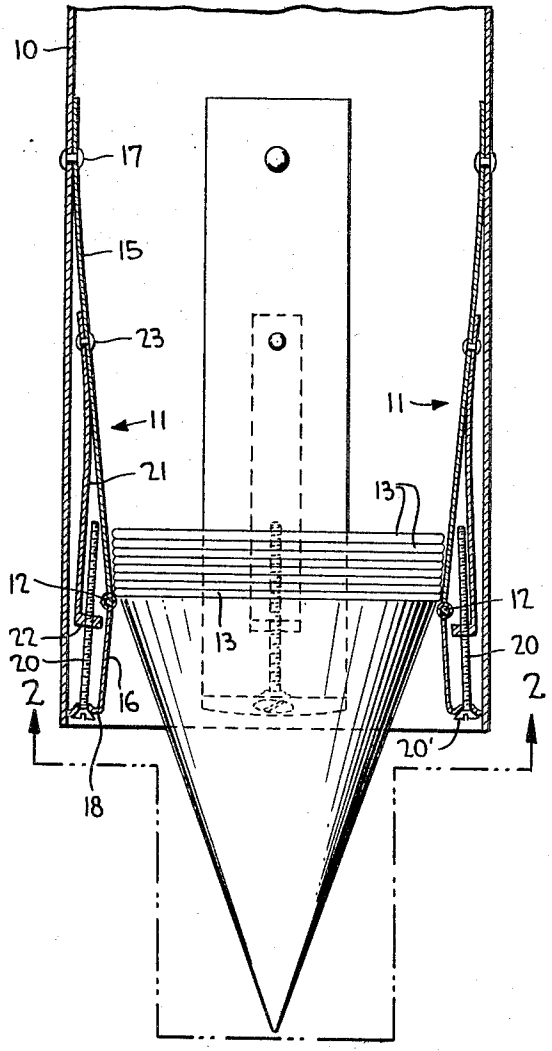


FIG. 2

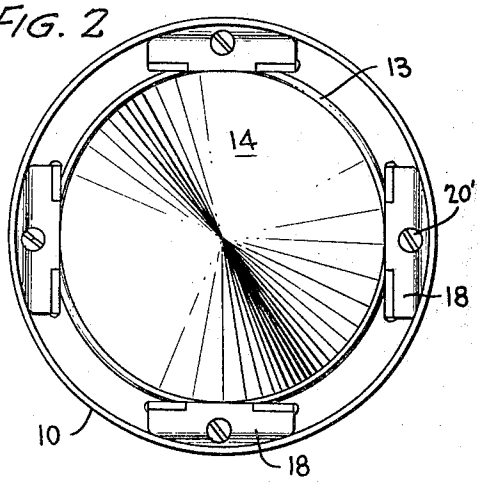


FIG. 4

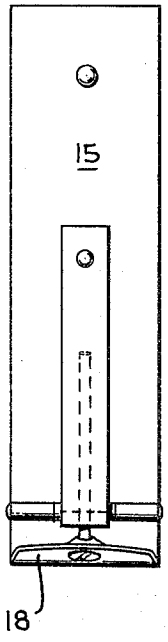
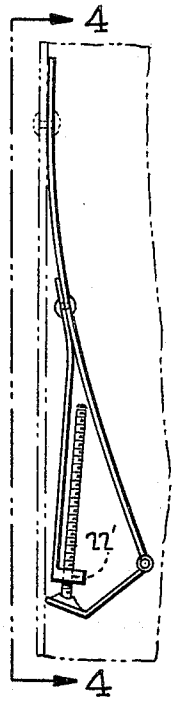


FIG. 3



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ADJUSTABLE CUP DISPENSER

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This invention relates to improvements in dispensers for nested and stacked drinking cups of the class having outwardly projecting rims around their upper edges.

In such cup dispensers, the lowermost cup of the stack normally projects downwardly through the open lower end of the tubular dispenser and is yieldably supported by stops or projections within the dispenser, which projections lie on a circle of somewhat smaller diameter than the cup rims, to engage beneath the rim of the lowermost said cup and thus support the entire stack of nested cups.

The cups here under consideration are of a conventional type which are formed from paper, plastic or other somewhat flexible or deformable material such that the rim of each cup may yield radially inwardly to permit it to be withdrawn downwardly past the stops by a pull on its depending lower end. The stops then engage the rim of the next succeeding cup to restrain it from inadvertent dispensing, thereby permitting the successive dispensing of the individual cups in well known manner.

The problem of providing for adjustment of the stop means to adapt the dispenser for use with cups of varying sizes has long existed, and various means have been attempted for providing for satisfactory such adjustment. However, prior devices have been subject to various disadvantages, such as being complicated and expensive, difficult to service, difficult to adjust to adapt to various sizes of cups, having adjusting means exposed in such manner as to invite tampering, and having the adjustable stops arranged in such a manner as to disfigure or indent the rims of the cups. Also in some prior devices, the cups are supported in such a manner that the lowermost cup projects downwardly an insufficient distance through the open lower end of the dispenser to enable it to be readily grasped and withdrawn by the user, and the stops in some such devices are so disposed as to require that the device be loaded through its upper end.

With the foregoing considerations in mind, the primary objects of the present invention are: to provide in an adjustable cup dispenser and adjustable stop or metering mechanism of extremely simple but efficient operation and such as will facilitate servicing of the dispenser by loading from the bottom, thereby permitting its formation with a permanently closed top, if desired; and to provide such adjustable stop or metering mechanism in which the adjusting means for same is normally concealed from view within the downwardly opening mouth of the tube, but in position for ready adjustment by knowledgeable persons. Further objects are to provide such adjustable stop or metering means which may be thus fully housed within and accessible for adjustment only through the open end or mouth of the tubular dispenser and to provide such means in which the rims of the cups are engaged over a sufficiently large circumferential extent thereof as to avoid damaging or deforming same.

For achieving these objects, there is utilized a downwardly opening dispensing tube or housing of any suitable cross-sectional shape, within which there are disposed a plurality of individually adjustable toggle linkages, having their respective knees arranged to lie on a common circle to provide the means for engaging and supporting the rims of the cups. Such linkages, in accordance with the broader aspects of the invention, are supported against downward displacement within the dispensing tube in any suitable manner, and the respective links of each said linkage are angularly adjusted relative to each other by linearly adjustable means accessible through the lower open end of the tubular dispenser to thus adjust the toggle knees inwardly or outwardly relative to the major axis of the tubular dispenser. Preferably such adjusting means is of the threaded type in which the adjusting member is directed downwardly and terminates within and closely adjacent the downwardly opening end or mouth of the tube for ready accessibility by those knowing of its location, but in a position such as to be normally hidden from the view of a person withdrawing a cup from the dispenser.

In adidtion to its foregoing broader aspects, the invention contemplates certain specific improvements contributing to its simplicity and economy of construction, including the concept of forming one of the toggle links of each such linkage as a leaf spring permanently secured at one end to the tube, with its other or free end pivotally connected through the toggle knee to its associated or cooperating link, the end of which is in sliding or abutting engagement with the inner wall or surface of the tube, whereby utilization of the adjusting means to draw the relatively remote ends of the said links toward each other will displace the knee inwardly toward the central or major access of the tube.

The preferred mode presently contemplated by me for achieving the foregoing objects and advantages is illustrated in the accompanying drawing in which

FIGURE 1 is a view in axial section through the lower end portion only of a tubular adjustable cup dispenser in which are disposed a plurality of cups to be dispensed.

FIGURE 2 is a bottom plan view of the structure shown in FIGURE 1 taken substantially on the line 2—2 of FIGURE 1.

FIGURE 3 is a detailed side elevation of one of the toggle linkages per se, adjusted to project its knee or stop defining portion inwardly to the fullest possible extent, the dispensing tube itself being shown in phantom.

FIGURE 4 is a rear elevation of the toggle linkage metering mechanism shown in FIGURE 3, same being taken on the line 4—4 of FIGURE 3.

Referring now in detail to the accompanying drawing, the numeral **10** therein designates in its entirety a dispensing tube or housing, of which only the lower portion is shown, same being open at its lower end. It is immaterial whether or not the unillustrated upper portion of the tube is open or closed, since the dispenser of the present invention is adapted both for loading and for dispensing of cups through its lower end. While the dispensing tube **10** is herein illustrated as being cylindrical in cross-section shape, it will be readily apparent that the cross-sectional shape may be varied as desired, so long as the respective cup metering elements **11** therein are arranged with their respective stops **12** on a common circle which will be normally somewhat less in diameter than the external diameters of the outwardly projecting rims or beadings **13** of the respective cups **14** which are to be dispensed individually and in succession.

As is apparent in FIGURE 1, there are provided a plurality of such cups **14** which in the present instance are of entirely conventional structure. Such cups will normally be formed either of paper, plastic, plastic foam or other usual materials, and although the illustrated cups are of conical shape, it will be readily apparent that the dispensing apparatus of the present invention is equally well adapted for dispensing cups of other shapes, such as are conventionally arranged in nested and stacked relation for dispensing by devices of this general class and type.

As will be readily apparent by reference to FIGURES 1 and 2, the respective cup metering elements **11** are relatively equidistantly spaced and are here shown as four in number. Each such metering element **11** consists of a toggle linkage comprising upper and lower links **15** and

16 respectively pivotally interconnected by a hinge 12 which defines the knee of each such linkage. In the preferred embodiment, the upper such link 15 comprises a stiffly flexible metal leaf spring, the upper end portion of which is fixedly secured to the inner wall of the tube 10 by a rivet 17 or other suitable means which, in the present instance, serves as a means for supporting the entire linkage at the desired level and against downward displacement within the tube 10. The lower link 16 of each linkage has its lower end 18 in abutment with the inner wall of the tube 10, preferably at a location closely adjacent the mouth of the tube, and the two links 15 and 16 are normally at an obtuse angle to each other so that with the relatively remote ends of the links abutting against the inner wall of the tube 10 as shown, the knee or hinge 12 thereof is projected inwardly toward the major axis of the tube.

A suitable means or mechanism for adjusting the links 15 and 16 about their pivotal interconnection or knee 12, is exemplified by the screw 20 which is rotatably disposed through a countersunk opening in the flange or abutment 18 of its link 16 and in threaded engagement with a member 21 which is secured against axial displacement in the direction of the major axis of the tube 10, as by means of the rivet 23 securing its upper end to the link 15 at a location substantially remote from the knee 12. In this arrangement the member 21 is in the form of a leaf spring having its lower end portion directed generally horizontally inwardly as at 22, and formed with an internally threaded bore 22' for establishing the threaded connection with the screw 20. Thus it will be seen that in this preferred structure, the member 21 of the adjusting means is connected to the tube 10 by way of the rivet 23, toggle link 15 and rivet 17. Although it is within the scope of the invention to provide a direct connection of such member 21 to the tube 10, the illustrated manner of providing such connection is preferred, due to the fact that this permits assembly of the entire adjustable metering element as a subassembly which may be completely installed within the tube 10 merely by application of the rivet 17.

Obviously the flexibility of the leaf spring 21 permits its free or depending end portion, in the vicinity of the threaded interconnection 20, 22 to remain aligned with the screw 20 by flexing of the member 21 in a manner which will be readily apparent by comparison of FIGURES 1 and 3 respectively of the accompany drawing. Further it is to be understood that the leaf spring member 21, which normally tends to be of rectilinear configuration in a direction parallel to the major axis of the tube 10 as seen in FIGURE 1, is necessarily flexed in such manner as to exert a resilient force which, when transmitted through the screw 20 to link 16, tends to resiliently urge the latter toward a position of substantial alignment with link 15, while the spring link 15 will bias the entire linkage 11 outwardly toward the inner periphery of the tube 10 whenever the screw 20 is rotated in a direction to increase the obtuse angle between the links 15 and 16. Thus the two leaf spring members or elements 15 and 21 jointly open up or extend the toggle linkage, and bring its depending free end into abutting relation with the tube so that the knee 12 thereof will be at all times be accurately located at the desired preselected distance from the major axis of the tube as determined by rotary adjustment of the screw 20.

In the operation of a cup dispenser in accordance with the invention, it will be apparent that the several cup metering elements 11 normally will all be adjusted to have their knees 12 disposed on and tangentially to a common circle of somewhat less diameter than the rims 13 of the cups 14 to be dispensed. Thus the lowermost of such cups normally will be jointly supported on the pivotal connections or knees defined by their respective hinges 12. Preferably these knees 12 are of externally cylindrical configuration with a portion of the cylindrical wall of each projecting somewhat inwardly from the adjacent inwardly directed plane surfaces of the respective links 15 and 16 for better functioning as abutments beneath the cup rims 13. The axial extent of each such hinge or toggle knee 12 is preferably substantial, as shown in FIGURES 2 and 4, to operatively engage each cup rim 13 for a substantial circumferential extent so as to avoid deformation or indentation of the respective rims 13, even in the case of cups formed of plastic or plastic foam, as contrasted to the deformation which is likely to result where the stops are in the usual form of inward protrusions or bosses having substantially point contact with the rims.

In order to withdraw a cup from the dispenser for use, it is necessary only to grasp the depending and downwardly projecting lower end portion thereof and to manually pull downwardly on same sufficiently to cause its rim 13 to yield inwardly for movement past the toggle knees 12, leaving the rim 13 of the immediately superposed cup 14 to be arrested and supported by such knees until it in turn is withdrawn in similar manner.

Attention is directed to the fact that the in the embodiment shown, the downwardly directed heads 20' of the respective screws 20 are closely adjacent the lower open end or mouth of the tube 10, but in such position as to normally be concealed therewithin from the view of users of the device. This together with the disposition and concealment of the adjustable metering elements 11 wholly within the tube 10 decreases the liability of tampering and maladjusting by unauthorized persons. Nevertheless, to the initiated, adjustment may readily be accomplished by the adjusting screws 20, all of which may be rotated through a given number of turns or rotations in order to adjust them for jointly supporting and metering or dispensing cups of different sizes. Obviously the disposition of the several parts in the manner as specifically illustrated is of advantage in that it permits disposition of the toggle knees 12 just above the mouth of the tube 10 so that the lowermost cup 14 projects downwardly for a substantial extent through the mouth of the tube where it may be readily grasped and withdrawn.

After a supply of cups has been used and exhausted, the dispenser tube 10 may be reloaded with a fresh supply of cups in nested and stacked position simply by inserting said nested and stacked cups upwardly through the downwardly opening mouth of the tube 10 for reception within the circle of toggle links 16. The upward convergence of the several links 16 to the common circle of the respective knees 12 guides the rims 13 of the cups upwardly through these knees. As the stack of cups is forced upwardly past the toggle knees 12, their rims 13 will be successively resiliently inwardly compressed or deformed to thereafter resiliently expand above the knees so that the entire stack of cups may then be supported on the lowermost of the cups, just as shown in FIGURE 1.

In this application, I have shown and described only the preferred embodiment of the invention simply by way of illustration of the preferred mode contemplated by me of practicing the invention. However, I recognize that the invention is capable of other and different embodiments, and that its several details may be modified in various ways, all without departing from the invention. Accordingly, it will be understood that the drawings and description herein are merely illustrative in nature and not exclusive.

Having thus described my invention, I claim:

1. A dispenser for nested and stacked drinking cups of the type having outwardly projecting rims around their upper ends, comprising a tube having a vertical major axis and open at its lower end, a plurality of toggle linkages extending generally parallel to said major axis and respectively having toggle knees arranged with their pivotal axes tangentially to a common circle concentric to said major axis, each said linkage comprising upper and lower links having their adjoining ends pivotally inter-

connected to define said respective knees and diverging outwardly from said knees relative to said major axis, means securing each said toggle linkage against axial displacement in the tube, the relatively remote ends of the respective links abutting the interior of said tube and the said remote end of one link axially slidably engaging the tube, and adjusting means selectively operable to vary the angle between said links and the distance of the respective knees from said major axis.

2. A dispenser for nested and stacked drinking cups of the type having outwardly projecting rims around their upper ends, comprising a downwardly opening tube having a vertical major axis, a plurality of toggle linkages extending generally parallel to said major axis and respectively having toggle knees arranged with their pivotal axes tangentially to a common circle concentric to said major axis, each said linkage comprising upper and lower links having their adjoining ends pivotally interconnected to define said respective toggle knees and diverging outwardly from said knees with respect to said major axis, the upper link of each said toggle linkage having its upper end portion secured to said tube against axial displacement therein with its lower end disposed for swinging movement in an axial plane of the tube, the lower end of said lower link being in axial sliding abutment with the tube, and means for angularly adjusting each said lower link about the knee of its said linkage.

3. A dispenser as defined in claim 2 in which each said upper link comprises a leaf spring having its upper end affixed to said tube and arranged for inward flexing movement of its lower end substantially in the plane of said major axis.

4. A dispenser as defined in claim 2 in which said adjusting means of each linkage comprises a threaded member connected to said lower link at a location remote from said knee for relative rotary movement and against movement generally parallel to said major axis, and further means connected to said upper link against relative axial displacement and also having a threaded connection to said first mentioned threaded member so that rotation of the latter in a given direction will swing said lower link about its said knee.

5. A dispenser as defined in claim 4 in which said lower link is provided with an outwardly directed flange and said first-mentioned threaded member includes a threaded shank rotatably disposed through an opening in said flange, and a head disposed beneath and abutting against the lower face of said flange.

6. A dispenser for nested and stacked drinking cups of the type having outwardly directed rims around their respective upper ends, comprising a downwardly opening tube having a vertical major axis, a plurality of toggle linkages extending generally parallel to said major axis and respectively having toggle knees arranged with their

axes tangentially to a common circle concentric to said major axis, each said linkage comprising an upper link in the form of a leaf spring having its upper end affixed to the inner periphery of the tube whereby its lower end may flex inwardly toward said major axis, said toggle knee pivotally interconnecting the upper end of each lower link to the lower end of said upper link of its associated linkage, and adjusting means for each said toggle linkage comprising a leaf spring extending generally parallel to said major axis and having its upper end affixed to said upper link at a location spaced above said toggle knee, and an adjusting screw having a threaded engagement with said leaf spring, said adjusting screw extending generally in the direction of said major axis and having a head in axial abutment with and freely rotatable with respect to said lower link at a location remote from said knee.

7. In a dispenser for nested and stacked drinking cups of the type having outwardly projecting rims around their upper ends, the subcombination comprising a cup metering element for use within the tubular interior of said dispenser, said metering element comprising upper and lower links generally aligned in one plane and pivotally interconnected in end-to-end relation for relative swinging movement in said one plane, one said link comprising a leaf spring and means for connecting its end remote from said pivotal connection to the said tube, a further leaf spring having one end affixed to said first-mentioned leaf spring at a location remote from the said pivotal connection, and threaded means interconnecting said further leaf spring with the other said link at a location on the latter remote from said pivotal connection, said threaded means being relatively rotatable with respect to said other link and having a portion in axial abutment therewith.

8. In a dispenser as defined in claim 7, the feature in accordance with which said further leaf spring is arranged to exert a biasing action through said screw tending to urge the other said link resiliently toward a position of substantial alignment with the first-mentioned said link.

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