

April 1, 1969

W. JONAS ET AL
PAPER CUP DISPENSER

3,435,988

Filed March 20, 1968

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FIG. 1.

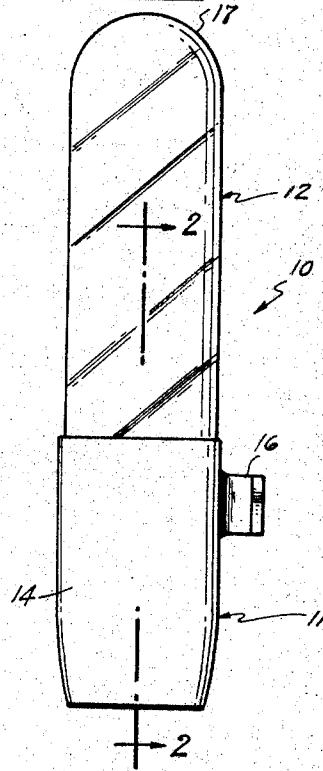


FIG. 2.

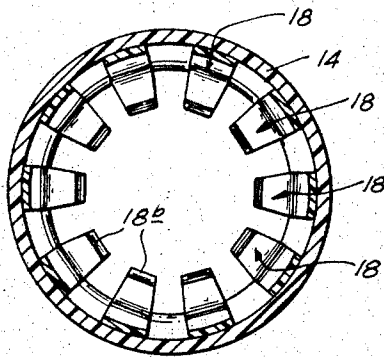
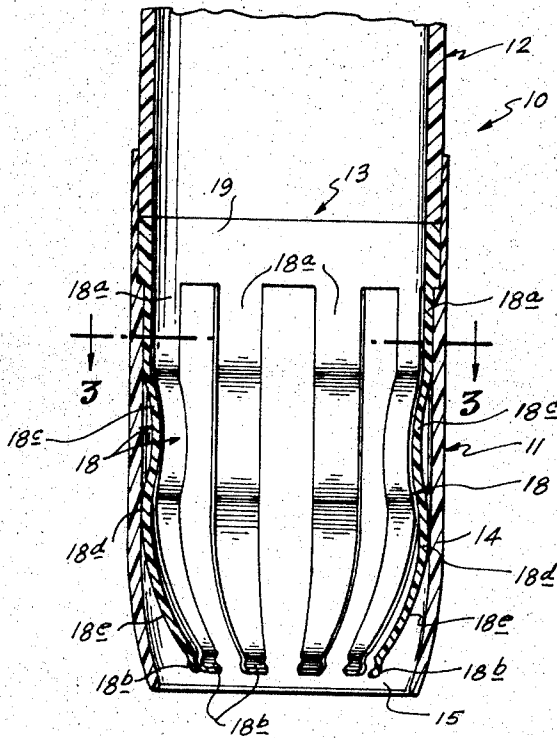


FIG. 3.

INVENTORS
WALTER JONAS
ADOLF PFUND

BY

Alvin Lindvall

ATTORNEY

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FIG. 5.

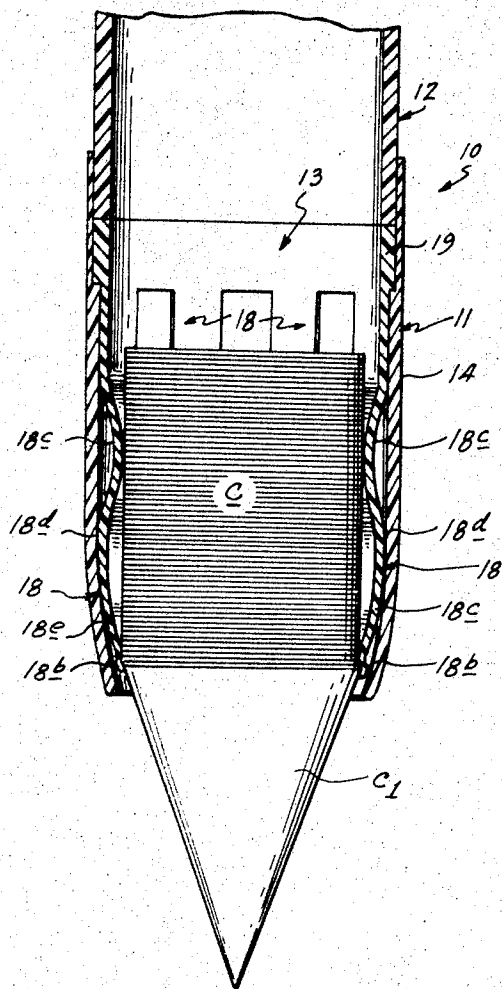
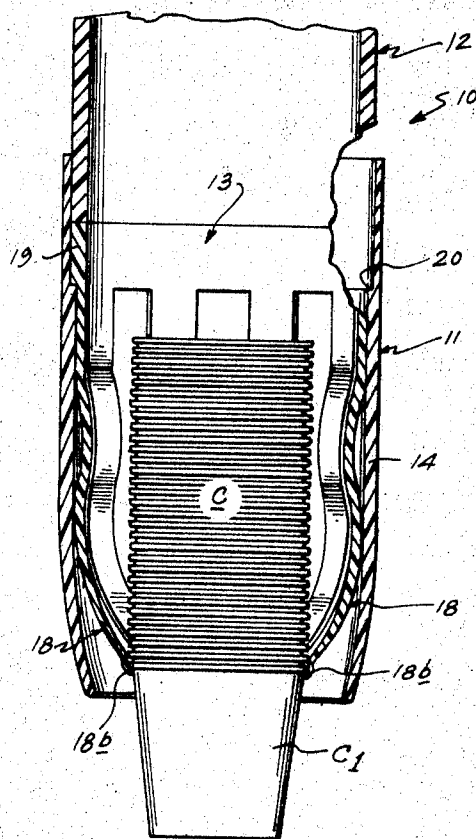


FIG. 4.



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PAPER CUP DISPENSER

Walter Jonas, Easton, Pa., and Adolf Pfund, Milford, N.J., assignors to Sobel Industries, Inc., West Easton, Pa., a corporation of Pennsylvania

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U.S. Cl. 221—310

9 Claims

ABSTRACT OF THE DISCLOSURE

In a dispenser for paper cups of various sizes having a housing for accommodating a stack of the cups to be removed one at a time through an opening at the bottom and in which the stack is supported by a circular array of spaced, elongated resilient fingers directed substantially vertically within the housing, the fingers are formed integrally, at their upper ends, with a mounting ring by which such supper ends are mounted against the inner housing surface and each finger is formed with an undulated configuration to have a portion thereof bowed inwardly away from the housing surface between the upper finger end and a location intermediate the finger ends where the finger bears against the housing surface and a lower portion seeking a position diverging inwardly with respect to the housing surface from the bearing location to the lower free end of the finger releasably engageable with the rim of the lowermost cup in the stack. The fingers and the mounting ring are preferably formed, as a unit, of a plastic material, such as, super - polyoxy methylene having a molecular weight of at least 15,000, which is capable of repeated return to its formed configuration after flexing therefrom.

This invention relates generally to paper cup dispensers, and more particularly is directed to an improved dispenser capable of accommodating cups of a wide range of sizes and shapes.

Paper cups of many sizes and shapes are available, and it is the usual practice to dispense such cups one at a time from a dispenser which is adapted to accommodate only cups of a particular size and shape. Thus, manufacturers of paper cup dispensers have been required to produce many different sizes and types of dispensers.

Accordingly, it is an object of this invention to provide a dispenser which, without adjustment or modification thereof, can accommodate and reliably dispense paper cups of various shapes and of wide range of different sizes.

Another object is to provide a paper cup dispenser having the foregoing characteristics and which is of simple construction and adapted for relatively low-cost manufacture.

In accordance with an aspect of this invention, a dispenser for paper cups of various shapes and sizes has a housing for accommodating a stack of cups to be removed one at a time through an opening at the bottom of the housing, and the stack is supported by a circular array of spaced, elongated resilient fingers directed substantially vertically within the housing to releasably engage the rim of the lowermost cup by the lower free ends of the resilient fingers, which fingers are given a particular configuration to exert the requisite spring force for supporting the stack and releasably retaining the lowermost cup thereof notwithstanding the substantial variations that may be encountered in the sizes and shapes of the cups to be dispensed.

It is a particular feature of this invention to provide each of the aforementioned fingers with an undulated configuration to have a portion thereof bowed inwardly away

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from the inner surface of the housing between the upper mounted end of the finger and a location intermediate the finger ends at which the finger bears against the housing surface, and further to have a lower portion seeking a position diverging inwardly with respect to the housing surface from the bearing location to the lower free end of the finger so that such lower free end can exert the requisite spring force to support the stack of cups over the wide range of lateral movement of the lower free end for accommodating cups of widely differing sizes.

It is a further feature of the invention to form the fingers of a resilient plastic material, preferably, superpolyoxymethylene having a molecular weight of at least 15,000, with such fingers being preferably formed integrally, at their upper ends, with a mounting ring by which the fingers are supported within the dispenser housing.

Still another feature of the invention is to provide each finger with a hook-like configuration opening inwardly away from the housing surface at the lower free end of the finger so as to insure that cups will be dispensed one at a time notwithstanding variations in the sizes and shapes of the cups to be dispensed.

The above, and other objects, features and advantages of this invention, will be apparent in the following detailed description of an illustrative embodiment thereof which is to be read in connection with the accompanying drawings, wherein:

FIG. 1 is a side elevational view of a paper cup dispenser in accordance with an embodiment of this invention;

FIG. 2 is an enlarged, fragmentary vertical sectional view taken along the line 2—2 on FIG. 1;

FIG. 3 is a transverse sectional view taken along the line 3—3 on FIG. 2;

FIG. 4 is a view similar to that of FIG. 2, but illustrating the use of the dispenser in connection with flat-bottomed cups of relatively small size; and

FIG. 5 is a view similar to that of FIG. 4, but showing the use of the dispenser in connection with conical paper cups of relatively large size.

Referring to the drawings in detail, and initially to FIGS. 1 and 2 thereof, it will be seen that a paper cup dispenser 10 in accordance with this invention, as there illustrated, generally comprises a housing 11, a removable cover 12 and an assembly 13 of resilient fingers (FIG. 2).

The housing 11 is shown to consist of a generally cylindrical wall 14 which may have a slightly tapered lower end portion defining a dispensing opening 15 at the bottom of the housing of sufficient diameter to permit the passage therethrough of the largest size of cups to be dispensed. The housing 11 may be cast or spun of metal, or molded or otherwise formed of a suitable plastic and is preferably provided with a bracket 16 (FIG. 1) projecting from side wall 14 and by which the housing 11 can be suitably mounted in a vertical position on a wall or other support.

The cover 12 may be molded or otherwise formed of a preferably transparent plastic or of glass and is shaped to provide an upward extension of housing 11. Thus, cover 12 may have a generally cylindrical side wall adapted, at its lower end, to telescope into the upper end portion of cylindrical side wall 14 of the housing and to seat upon finger assembly 13 within the housing. Housing 12 preferably has a closed upper end 17 (FIG. 1) of domed or other suitable shape so as to maintain the cleanliness of a stack of paper cups accommodated within housing 11 and within the extension thereof constituted by cover 12.

The finger assembly 13 in accordance with this inven-

tion includes a circular array of spaced, elongated resilient fingers 18, preferably ten in number, which are directed substantially vertically within housing 11 above dispensing opening 15 of the latter. Fingers 18 are preferably molded, or otherwise formed, of a plastic material, such as Delrin, that is, super-polyoxymethylene having a molecular weight of at least 15,000, so as to be capable of repeatedly returning to their molded configuration or shape upon the release of the fingers following the flexing thereof from such configuration. Further, fingers 18 are preferably formed integrally, at their upper ends 18a, with a mounting ring 19 by which all of the fingers are simultaneously positioned and secured within housing 14. In the embodiment shown, such positioning of the fingers is achieved by forming mounting ring 19 so that it projects radially outward beyond the upper end portions 18a of the fingers, and by forming housing wall 14 with an upper end portion of increased internal diameter to define an upwardly facing, annular shoulder 20 (FIG. 4) upon which mounting ring 19 may seat.

Thus, finger assembly 13 may be inserted in housing 11 through the upper open end of the latter until ring 19 seats on shoulder 20 and thereby positively and accurately positions the lower free ends 18b of the fingers with respect to dispensing opening 15. After finger assembly 13 has been thus positioned within housing 11, the finger assembly may be conveniently secured within the housing, for example, as by ultrasonic welding of ring 19 to the adjacent portion of housing wall 14. It will be apparent that, after finger assembly 13 has been thus installed in housing 11, the upper edge surface of mounting ring 19 provides an adequate seat for the lower edge surface of cover 12 to limit the telescoping of the latter into housing 11.

In accordance with the present invention, and as particularly shown in FIG. 2, each of fingers 18 is molded with an undulated configuration so as to have a portion 18c which is bowed inwardly away from the inner surface of housing wall 14 between the upper end 18a of the finger and a bearing location 18d intermediate the ends 18a and 18b at which the finger bears against housing wall 14. The undulated configuration of each finger 18 further provides the latter with a lower portion 18e which extends from the bearing location 18d to the free lower end 18b of the finger and which seeks a position (FIG. 2) where the lower finger portion 18e diverges substantially from the adjacent lower portion of housing wall 14.

It is also to be seen that, in accordance with this invention, the lower free end 18b of each resilient finger 18 is preferably formed with a hook-like configuration opening inwardly, that is, away from the adjacent portion of housing side wall 14 (FIGS. 2, 4 and 5), and that the lateral dimensions of fingers 18 taper downwardly in lower end portions 18e thereof, with the lateral dimensions of the remainder of the fingers being preferably substantially equal to the distance or spacing between adjacent fingers at the upper ends thereof.

It has been found that, particularly when finger assembly 13 is formed of a resilient plastic material such as Delrin, the above described undulated configuration of fingers 18 ensures that the latter will be functionally capable of supporting a stack C of cups of widely varying sizes and shapes by releasable engagement of the lower free ends 18b of the fingers with the rim of the lowermost cup C₁ in the stack, as shown on FIGS. 4 and 5.

If the cups are of relatively small size, for example, as shown on FIG. 4, fingers 18 are deflected only slightly from their molded configuration by the engagement of their lower free ends 18b with the rim of the lowermost cup C₁ in the stack C. Upon the downward withdrawal of the lowermost cup from the stack, the finger ends 18b release the rim of the withdrawn cup and immediately engage the rim of the cup immediately thereabove in the stack C, thereby to ensure the dispensing of only a single cup. If a stack C of cups of substantially large diameter

is to be dispensed, as shown on FIG. 5, the lower free ends 18b of fingers 18 are deflected substantially outward from their molded or normal positions by engagement with the rim of the lowermost cup C₁. Such outward deflection of the ends 18b causes pivoting of lower finger portions 18e toward the adjacent portion of housing wall 14 with such pivoting occurring about the bearing locations 18d and being transmitted to the bowed portions 18c to increase the curvature of the latter. It has been found that the foregoing action ensures that the spring force exerted by the lower free ends 18b on the rim of the lowermost cup to support the weight of the stack thereabove will be varied as ends 18b undergo relatively large lateral deflections in accommodating cups of a wide range of sizes, so as to make such spring force always adequate to support the stack of cups, notwithstanding the variations in the weight of the stack due to changes in the cup size and also due to the decreasing number of cups in the stack as cups are dispensed. Further, such varied spring force is always yieldably applied or controlled so that the lowermost cup is releasably engaged and can be removed from the bottom of the stack for dispensing without damage to the rim of the cup engaged by the fingers.

As is also shown on FIG. 5, when cups of maximum size are to be dispensed, the increased bowing of finger portions 18c that results from outward deflection of the lower free ends of 18b may cause portions 18c to move into frictional engagement with the stack C at a distance above the lowermost cup whereby to frictionally support at least some of the weight of the stack so that all of the weight is not borne by the lower free ends 18b of the fingers.

It has been further found that the hook-like configuration given to the lower free ends 18b, as described above, ensures that the cups will be dispensed or removed one at a time from the bottom of the stack whether such cups are provided with a rolled rim, as illustrated on FIG. 4, or with a plain rim, as illustrated on FIG. 5. Further, the cups to be accommodated in the dispenser 10 according to this invention may be of the flat-bottomed (FIG. 4) or of the conical (FIG. 5) types.

It is apparent that plastic cups rather than paper cups may be dispensed from the dispenser 10 and, accordingly, each reference herein to paper cups is intended to include plastic cups of similar configuration.

What is claimed is:

1. A dispenser for paper cups of various sizes comprising a housing for accommodating a substantially vertical stack of paper cups and having an opening at the bottom dimensioned to permit the passage therethrough of the largest of the cups to be dispensed, and a circular array of spaced, elongated resilient fingers directed substantially vertically within said housing above said opening, said fingers being mounted against the inner surface of said housing adjacent their upper ends and also bearing against said inner surface at locations intermediate said upper ends and the lower ends of the respective fingers, each of said fingers being of undulated configuration to have a portion between said upper end and said bearing location of the finger which is bowed inwardly away from said inner surface, the free lower ends of said fingers being releasably engageable with the rim of the lowermost cup in a stack of cups to support the stack within said housing with the lowermost cup projecting through said opening.

2. A dispenser according to claim 1, in which said fingers are integral, at said upper ends thereof, with a mounting ring supported within said housing.

3. A dispenser according to claim 2, in which said housing has an upwardly facing annular shoulder therein, and said ring projects radially outward beyond said fingers and seats on said shoulder.

4. A dispenser according to claim 1, in which said fingers are of a resilient plastic material capable of repeated return to said configuration following flexing therefrom.

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5. A dispenser according to claim 4, in which said plastic material is super-polyoxymethylene having a molecular weight of at least 15,000.

6. A dispenser according to claim 5, in which said fingers are integral, at said upper ends thereof, with a mounting ring supported within said housing.

7. A dispenser according to claim 1, in which said free lower end of each of the fingers has a hook-like configuration opening inwardly away from said inner surface of the housing.

8. A dispenser according to claim 1, in which there are at least 10 of said fingers uniformly spaced apart in said circular array thereof.

9. A dispenser according to claim 8, in which said fingers have lateral dimensions, at the upper end portions thereof, substantially equal to the spacing between said upper end portions of adjacent fingers, and said lower end portions of the fingers taper in lateral dimension toward said free lower ends thereof.

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