Nov. 5, 1940. C. BARBIERI 2,220,312

CONTAINER AND METHOD OF MAKING THE SAME

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Fig. 1.

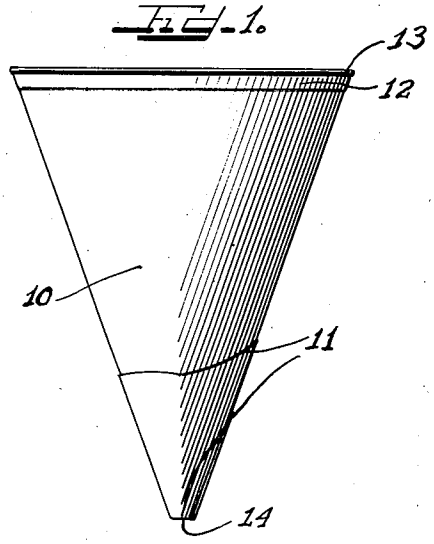

Fig. 2.

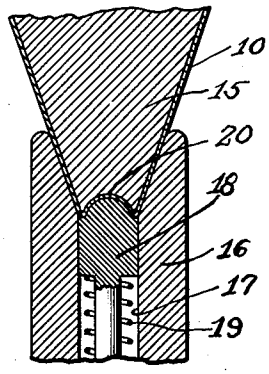

Fig. 3.

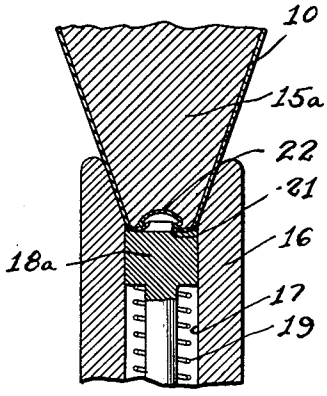

Fig. 4.

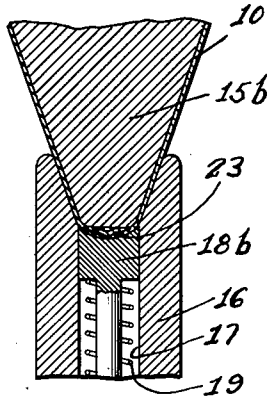

Fig. 5.

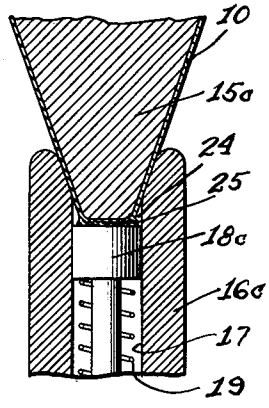

Fig. 6.

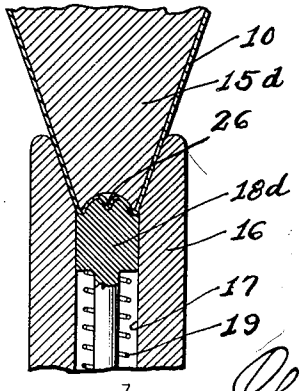

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Fig. 8.

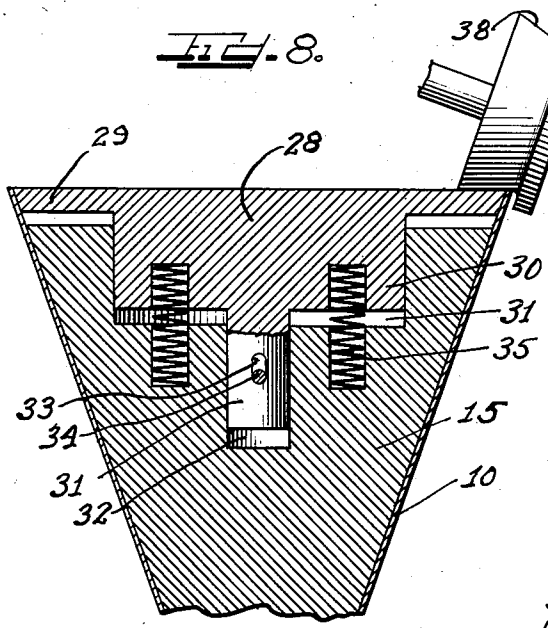


Fig. 7.

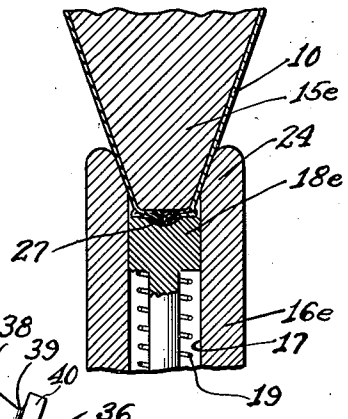
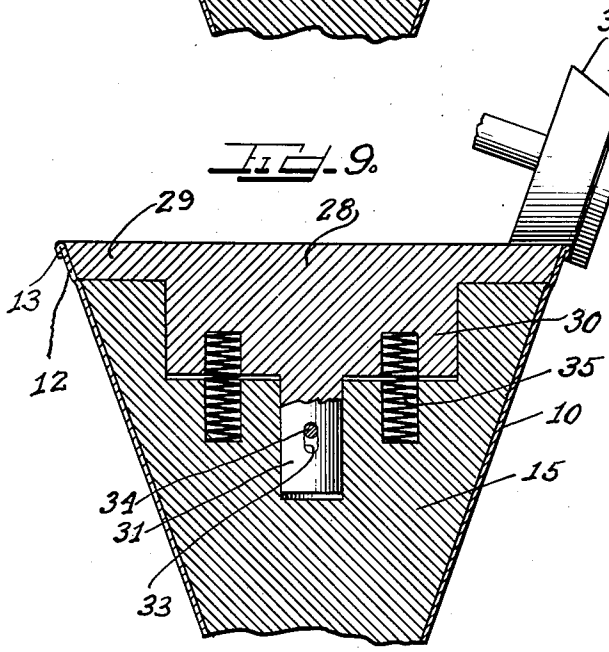


Fig. 9.



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Patented Nov. 5, 1940 2,220,312

UNITED STATES PATENT OFFICE

2,220,312

CONTAINER AND METHOD OF MAKING THE SAME

Cesare Barbieri, New York, N. Y., assignor to Dixie-Vortex Company, Chicago, Ill., a corporation of Delaware

Application October 31, 1935, Serial No. 47,521

2 Claims. (Cl. 229—1.5)

The invention relates to improvements in a container and method of making the same, and more particularly to a container of paper or similar material in the nature of a drinking cup, ice cream cup or similar article of the character usually destroyed after a single usage, although the invention may be used for other and various purposes as will be apparent to one skilled in the art.

An object of this invention is the provision of a paper cup, preferably made of a single piece of material and of substantially a true conical shape with the exception that the tip or point is flattened, mutilated or otherwise formed to reshape the general conical contour in this region and enhance the leak-proof character of the cup.

Another object of this invention is the provision of a paper container of the character described herein of general conical shape and provided with a blunted point and a folded or curled rim formation around the mouth of the cup.

Still another object of this invention is the provision of a conical paper cup having a swaged or similarly deformed apex.

A further object of the invention is the provision of a new and novel method of making a paper cup or container.

The invention in general consists of a paper cup, preferably formed from a single blank of material, which blank is formed into cup-shape by winding the same around a mandrel on any suitable cup-forming machinery. The resulting cup has the shape of substantially a true cone. By means of a suitable forming die, the tip or apex of the conical container is then swaged or otherwise reshaped so that the apex of the cup is blunted and the material in this region, in most instances, is massed or piled up leaving the cup wall in the apex thicker than in any other region of the cup. In other instances, the end of the cup is formed inwardly into the body portion.

Either before, after or contemporaneously with the reshaping of the apex of the cone, the marginal portion of the cup around the open end thereof is turned or rolled downwardly to provide a smooth drinking rim.

Other objects, advantages and features of the present invention will be more apparent from the following disclosures, taken in connection with the accompanying drawings, in which:

Figure 1 is a view in elevation of a cup or container embodying principles of the present invention.

Figure 2 is an enlarged fragmentary sectional view illustrating how a lower end formation of a certain type may be applied to the cup of Figure 1.

Figure 3 is also an enlarged fragmentary sectional view illustrating the provision of a different lower end formation.

Figure 4 is an enlarged fragmentary sectional view illustrating the application of an outwardly rounded end formation.

Figure 5 is an enlarged fragmentary sectional view illustrating the application of a swaged or similar end formation.

Figure 6 is an enlarged fragmentary sectional view illustrating the application of a still different end formation.

Figure 7 is an enlarged fragmentary sectional view illustrating the provision of a combined swaged and rounded end formation.

Figure 8 is an enlarged fragmentary sectional view illustrating an initial step in the forming of the upper margin of the container.

Figure 9 is a view similar to Figure 8, illustrating the completion of the rim formation.

As shown on the drawings:

In the illustrated embodiment of this invention, there is shown a conical paper cup 10 made from a single sheet or blank of material. The blank is rolled on any suitable forming mechanism into cup shape as indicated by the overlapping portions 11, and the upper end of the cup is provided with a slightly offset mouth 12 having a rolled or downwardly folded drinking rim 13.

When the cup 10 is initially formed it will have substantially the shape of a true cone terminating at the lower end in a point or apex. After the cup has been so formed, the apex is reshaped as indicated at 14.

In each of Figures 2 to 7, inclusive, a different end or apex formation is disclosed together with means for providing these formations. It will be distinctly understood that the same cup 10 may be provided with any one of the apex formations shown in Figures 2 to 7, inclusive, or some equivalent formation, those illustrated being shown by way of example.

With reference now to Figure 2, it will be seen that the cup 10 is carried by a mandrel 15, which is preferably the same mandrel around which the blank was wound in forming the cup. In this instance, the lower end or apex of the mandrel is formed in the shape of a substantially semi-spherical recess. This mandrel is brought into engagement with a forming die 16 which is centrally bored as at 17, the upper end of the

bore being flared outwardly so as to intimately receive the lower portion of the conical cup and mandrel. Inside the bore 17 is a reciprocable plunger 18 urged outwardly at all times by a coil spring 19 or equivalent means. The head of this plunger is formed complementally to the end of the mandrel, that is, it is provided with a rounded protuberance designed to fit within the recess in the end of the mandrel.

It will be remembered that regardless of the shape of the end of the carrying mandrel 15, the cup is initially in the shape of substantially a true cone. Therefore, when the mandrel and forming die are brought together, the apex of the conical cup is turned inwardly, as indicated at 20, defining an exterior arcuate recess at the lower end of the cup.

It is to be distinctly understood that the mandrel and forming die may either be stationary and the other movable, or both may be non-rotating, either one may be spinning, or both may be spinning (preferably in opposite directions), as may be deemed most feasible for the particular formation desired. The same, of course, is true in connection with the mandrels and forming dies shown in Figures 3 to 7, inclusive.

In Figure 3, the mandrel 15*a* is also provided with a recess, but in this instance the recess is undercut, as indicated at 21. The forming die structure is the same with the exception that the plunger head 18*a* is preferably flat in the central portion with an annular arcuate portion therearound. When the respective parts are brought together, the apex of the cup will be turned inwardly and shaped to fill the undercut recess in the mandrel, thereby providing a cup having at its lower end an inwardly turned crown-like portion 22.

In Figure 4, the mandrel 15*b* is cut off substantially straight at the smaller end thereof and the plunger 18*b* of the forming die 16 is arcuately hollowed at the upper end. Accordingly, when the mandrel and die are brought together, the apex of the cup will be jammed or massed as indicated at 23, providing a smooth rounded tip for the cup.

In Figure 5, a mandrel 15*c* is illustrated which is substantially similar to the mandrel 15*b*. However, the forming die 16*c* is shaped to intimately engage the cup only at a higher region than the forming dies previously mentioned, thereby leaving a space 24 between the lower portion of the cup and the bore 17 in the forming die. This die carries a plunger 18*c* having a substantially flat upper end. In this instance, therefore, when the mandrel and die are brought together, the apex of the cup is swaged or crushed as indicated at 25 so that the cup end will be substantially flat with a slightly spread rim.

In connection with the showings in Figures 4 and 5, it is preferable to have either the mandrel or die spinning relatively to the other or both the mandrel and die spinning in opposite directions to insure a smooth uniform finish at the end of the cup.

The structure seen in Figure 6 includes a mandrel 15*d* of substantially the same character as the aforesaid mandrel 15 shown in Figure 2. However, the plunger 18*d* in the forming die 16 is provided with a bulge similar to the aforesaid plunger 18, but this bulge is centrally recessed. The cup 10 will thus be provided with an inward arcuate recess at its smaller end and an outwardly extending projection in the center of the recess as indicated at 26. The projection 26 preferably does not extend downwardly quite as far as the circumferential part of the cup thereabout, so that the resulting cup will have the same appearance as that seen in Figure 1.

In Figure 7, still another end formation for the cup is illustrated. In this instance, the mandrel 15*e* is of the same character as the mandrel 15*c* of Figure 5. The forming die 16*e* is also of the same character as that shown in Figure 5, but the plunger 18*e* is provided with an arcuate recess in the central portion only, there being an annular flat portion surrounding the recess. The end of the cup will therefore be crushed or swaged as indicated at 27 into a substantially flat end having a central rounded knob thereon. In this instance, also, it is preferable to have either or both the mandrel and forming die spinning while the apex of the cup is being so shaped.

In Figures 8 and 9, means are shown somewhat diagrammatically for providing the upper end of the cup with a rolled or turned drinking rim 13. Any one of the aforesaid mandrels 15 to 15*e*, inclusive, may be utilized, since the construction of the large end regions of the mandrels may be identical.

The mandrel 15 is provided with a separate piece 28 flanged as at 29 to overlie the upper end of the mandrel body, provided with a depending portion 30 fitting intimately in a bore 30*a* of the mandrel body, and also with an integral plunger stem 31 depending centrally from the part 28 and fitting intimately within a bore 32 in the mandrel body. The plunger stem is provided with a widened slot 33 extending transversely therethrough, and a pin 34 disposed in this slot is attached to the mandrel body to unite the two parts. One or more coil springs 35 tend to maintain the part 28 spaced from the part 15 to the limit defined by the pin and slot connection.

To provide the drinking rim, a forming member is brought into contact with the mandrel construction. This forming member, generally indicated by numeral 36, is mounted on a shaft 37 for rotation therewith, and includes a conical portion 38 joined integrally by an arcuate portion 39 to a flange 40. The forming member 36 is disposed at such an angle to the mandrel construction that the conical part 38 will rest evenly against the upper surface of the flange 29. The forming member is brought against the mandrel construction with sufficient pressure to overcome the action of the springs 35 and press the part 28 of the die towards the part 15, during which action the upper margin of the cup 10 will be rolled or turned downwardly, as indicated at 13, by its contact with the arcuate portion 39 and flange 40 of the forming member. Of course, during this operation, the member 36 is circumscribing the mandrel construction, or the mandrel construction is spinning relatively to the forming member, or both. During the forming of the drinking rim 13, the closing of the space between the flange 29 and the body part of the mandrel results in the cup being given a slightly offset formation 12 which enhances the appearance of the cup or container as a whole.

From the foregoing, it is apparent that I have provided a new and novel cup or container having a novel end construction and which may be formed very economically from a single sheet of material. The container is further provided with

a drinking rim which may be formed contemporaneously with or before or after the end formation. It will also be noted that I have provided a new and novel method of making a cup or container which is deemed to be sufficiently clear from the foregoing as to warrant no further description herein.

I am aware that many changes may be made and numerous details of construction may be varied through a wide range without departing from the principles of this invention, and I, therefore, do not purpose limiting the patent granted hereon otherwise than is necessitated by the prior art.

I claim as my invention:

1. As an article of manufacture, a conical-like cup rolled in convolute form from a single sheet of paper and having an upper open mouth end and an inwardly inclined side wall terminating in a bottom tip, said wall having overlapped portions of paper at and for reinforcing said bottom tip of the cup, the layers of paper in said tip being compressed inwardly and upwardly toward said mouth end and within the confines of said side wall to form a blunted and substantially concavo-convex leakproof cup bottom adapted to rest on a finger of a user and to carry the weight of the cup and its contents.

2. As an article of manufacture, a conical-like cup rolled in convolute form from a single sheet of paper and having an upper open mouth end and an inwardly inclined side wall terminating in a bottom tip, said wall having overlapped portions of paper at and for reinforcing said bottom tip of the cup, the layers of paper in said tip being compressed inwardly and upwardly toward said mouth end and within the confines of said side wall to form a blunted and substantially concavo-convex leakproof cup bottom adapted to rest on a finger of a user and to carry the weight of the cup and its contents, said mouth end of said cup having an outwardly turned rim to reinforce the upper end of said wall in an opposite lateral direction from that of the reinforcement in said bottom tip.

CESARE BARBIERI.