Dec. 28, 1937. M. SIDON 2,103,831

CUP

Filed Dec. 11, 1936

Fig. 1

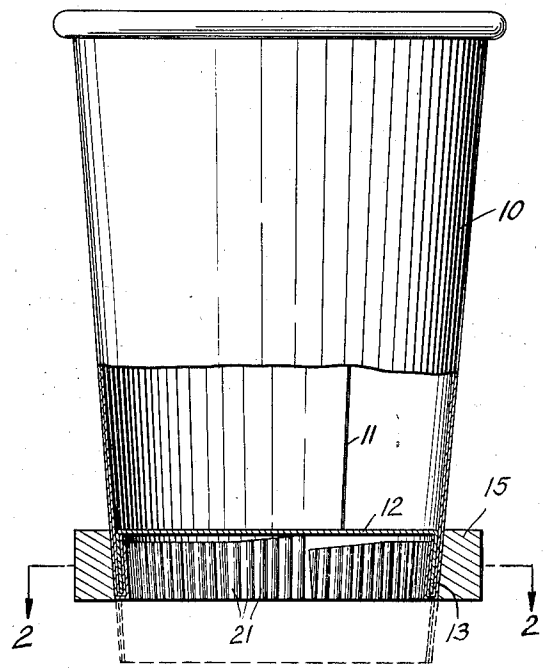
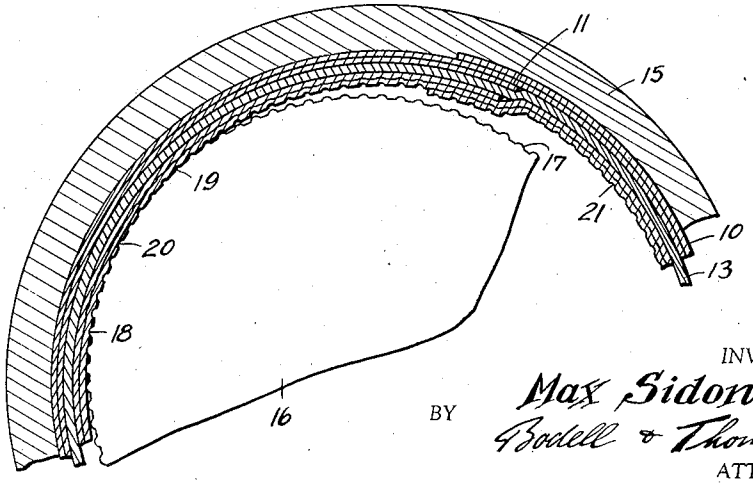


Fig. 2



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CUP

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3 Claims. (Cl. 229—5.5)

This invention relates to containers fabricated from flexible material such as paper, and more particularly relates to a bottom structure for a container of the drinking cup type.

An object of the invention is to provide a rigid and durable container including a bottom structure effecting a liquid-tight seal between the bottom and the body of the container.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawing in which like characters designate corresponding parts in all the views.

Figure 1 is a side elevation, partly in section, of a cup embodying my invention.

Figure 2 is a fragmentary, sectional view of the cup taken on lines 2—2, Figure 1, and of the bottom forming mechanism.

This invention is directed particularly to the bottom structure of a container, the body portion of which is comparatively stiff, it being here shown as formed by convolutely wound layers of flexible material, such as paper. Containers have been made heretofore, the body portions of which have been formed with overlapping layers of material in order to impart sufficient rigidity and durability to the container, particularly where the container is of the cup type and is intended for use with hot liquids. Also heretofore, bottom structures have been secured to the body portion of the container by folding the lower end of the container inwardly over the edge of the bottom flange. However, when the side wall of the body of the container is formed of thick material, or a plurality of layers of material, the infolded portion of the body has a tendency to spring inwardly away from the flange of the bottom necessitating the use of an extra amount of glue and even then, leaks often occur between the bottom and the body particularly along the seam where the sides of the body overlap. The chief object of this invention has to do with a bottom structure wherein these disadvantages are overcome.

As here shown, the body 10 of the container is composed of two layers of flexible material, such as paper. The layers are convolutely wound, with the result that there are three thicknesses of material where the ends of the body pieces overlap producing a ridge 11 extending lengthwise on the inner side of the body.

The bottom member comprises a discoidal portion 12 formed with a depending annular flange 13. The body here shown is tapered inwardly toward the bottom, and the bottom member is inserted in the body with the flange 13 spaced a short distance from the lower end of the body. The side wall of the body, extending beyond the flange 13, as indicated by dotted outline Figure 7, is turned over the edge of the flange and inwardly against the inner side of the flange 13, see Figure 1, the outer layer of the body now becoming the inner layer of the infolded portion. Due to the stiffness and rigidity of the side wall of the body, the infolded portion has a tendency to assume an angular position relative to the flange 13 of the bottom member. That is, the free end of the inturned portion tends to spring inwardly away from the flange 13. This is also due to the fact that the side wall of the container is of tapered formation and the flange 13 tapers outwardly as it approaches the discoidal portion 12.

By my invention, the bottom flange 13 is formed of appreciable length, and the infolded portion of the side wall of the cup is pressed inwardly against the inner side of the flange 13 and simultaneously, the impressed portion is expanded radially outwardly and so formed as to maintain such expansion, whereby it assumes a position against the inner surface of the flange 13 of the bottom. This situation is brought about by placing the bottom portion of the cup into an annular member 15 formed with a tapered bore complemental to that of the side wall of the cup with the lower end of the cup extending below the annular member 13, as indicated by dotted lines Figure 1. The bottom member is then pressed into position with the flange 13 extending downwardly, and the depending end wall of the body is folded or crimped inwardly over the edge of the flange 13 and thereafter the roller 16 is inserted in the lower end of the cup, that is, below the discoidal portion 12 of the bottom member. This roller 16 is provided on its periphery with longitudinally extending serrations 17. The roller 16 is slightly less in diameter than the inner diameter of the bottom portion of the cup, and the periphery of the roller extends in angular relationship to the axis thereof. That is, the periphery of the roller is formed on a taper complemental to that of the body of the cup, the inner end of the roller being slightly larger in diameter than the outer end. The roller 16 is rotatably mounted upon the cup making machine in the conventional manner, and is moved radially to compress the bottom portion of the cup against the forming member 15, which is mount-

ed for rotation and as it, together with the cup, rotates rotary motion is imparted to the roller 16. That is, the roller 16 acts after the manner of a sun gear. This arrangement is illustrated in Figure 2. Due to the fact that the roller 16 is of substantial diameter, a substantial portion of the infolded portion is contacted by the roller.

As illustrated in Figure 2, the infolded portion of the body is contacted by the teeth of the roller 16 throughout an arc extending approximately from 18 to 19, the greatest pressure being exerted in the center of the arc at 20.

Heretofore, it has been common practice to use a comparatively small roller having a smooth periphery. The action of such a roller is to press the infolded portion against the flange of the bottom, but in doing so the remaining part of the infolded portion is distorted with the result that as the cup rotates the pressed-in portions progressively spring outwardly.

With the construction previously described, the diameter of the infolded portion is materially increased, due to the stretching of the paper by the formation of the uniform corrugations 21, and more particularly this stretching results from the fact that the infolded portion is securely gripped at each side of the point where the final radial stretching takes place. That is, the infolded portion is gripped each side of the point 20 and therefore, there is a particular radial and circumferential stretch of the paper at this point, and as the cup is rotating this stretching action takes place about the entire circumference of the cup, with the result that the infolded portion is expanded and formed to conform with the flange 13. This permits the heavy, double thickness wall of the cup to be infolded for an appreciable distance, and when so infolded, after the manner described, it has no tendency to spring outwardly from the flange 13, with the result that the bottom is secured in the cup in liquid-tight relationship thereto.

During rotation of the cup and the roller 16, the infolded portion is gradually stretched and pressed into form and the overlapping portions of the cup body are ironed down, or pressed together, so that there is no possibility for seepage of the liquid in the cup at these points. Figure 2 illustrates the relative arrangement and action between the roller 16 and the cup, the cup having traveled past the contacting surface of the roller 16 for a substantial portion of the first revolution of the cup. During subsequent rotation of the cup and roller 16, the overlapping joints of the body will be ironed substantially flat.

What I claim is:

1. A container comprising a tapered body portion formed of flexible material, a bottom member arranged in the body and having a depending annular flange extending toward and being spaced apart from the lower end of said body, said lower end portion of the body being folded over the end of said flange, said infolded portion being expanded outwardly into engagement with the inner side of said flange and being formed with lengthwise extending corrugations.

2. A bottom structure for a container having a body formed of a plurality of overlapping layers of flexible material comprising a bottom member formed with a depending annular flange and being arranged in the body of the container with said flange extending toward one end of the container and being spaced apart axially therefrom, the extending portion of the body being folded over and expanded outwardly against said flange and being provided with a series of uniform axially extending corrugations to maintain the same expanded against said flange.

3. The method of forming containers having a tapered body portion formed of flexible material comprising inserting a bottom member having a depending annular flange with the flange extending toward the smaller end of the body and spaced apart axially therefrom, folding the smaller end portion of the body over the edge of said flange, pressing successive portions of said infolded portion radially outwardly against said flange and simultaneously arranging the fibers of said pressed portion into lengthwise extending corrugations.

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