Feb. 23, 1937. J. M. HOTHERSALL 2,071,340

METHOD OF DRAWING FIBER CAPS

Filed Feb. 20, 1931

Fig. 1

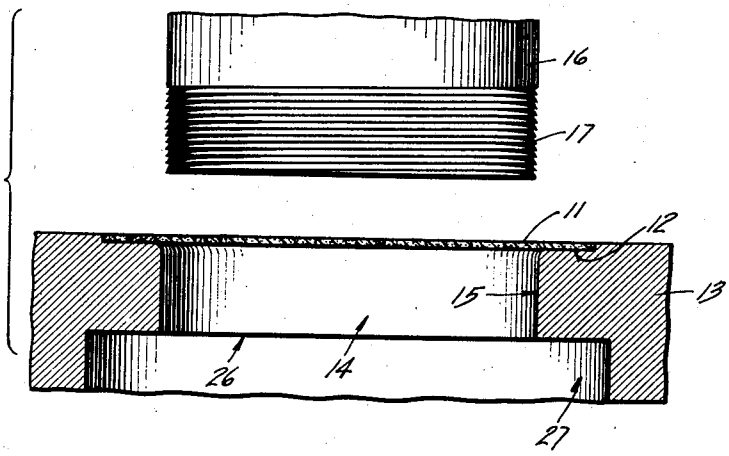


Fig. 2

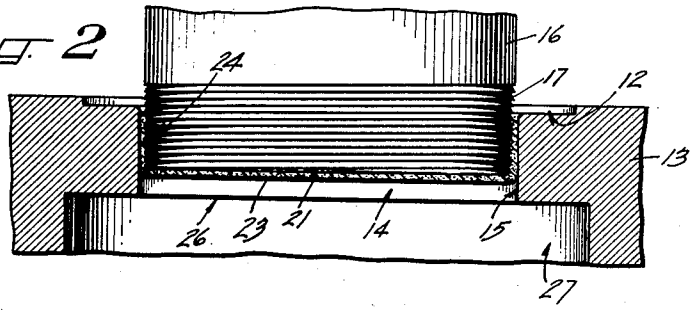


Fig. 3

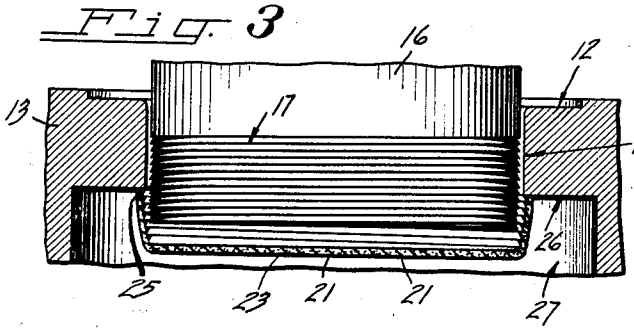


Fig. 4

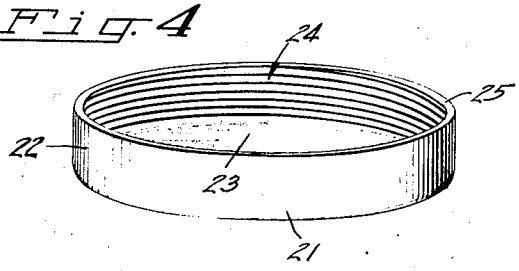
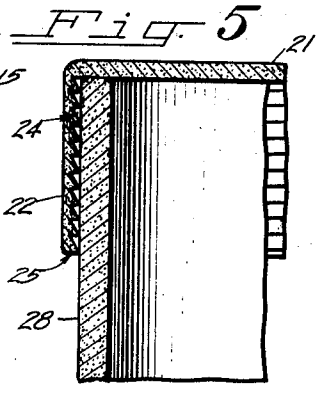


Fig. 5



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METHOD OF DRAWING FIBER CAPS

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4 Claims. (Cl. 113—51)

The present invention relates to a method of drawing fiber caps, such as are used with metal or fiber containers and has particular reference to such a method of drawing wherein corrugations or grooves are formed in the cap as an incident to the drawing operation.

The principal object of the present invention is the provision of a method of drawing a cap from sheet material while shaping one or more of its walls into a corrugated or grooved surface.

An important object of the invention is the provision of a method of drawing a fiber cap from sheet material by the active drawing element engaging and holding the wall of the cap being drawn, to prevent slippage thereover, and to distribute drawing strains in the wall of the cap.

Numerous other objects of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawing, discloses a preferred embodiment thereof.

Referring to the drawing:

Figure 1 is a schematic view of the operating parts of a drawing mechanism for exemplifying the present invention and illustrating a disc of sheet material in position prior to a drawing operation;

Fig. 2 is a view similar to Fig. 1 illustrating the operating parts in drawing position;

Fig. 3 is a view similar to Fig. 2 illustrating the parts after the drawing operation has been completed;

Fig. 4 is a perspective view of a cap drawn according to the method of the present invention and illustrating corrugations or grooves on an interior wall thereof; and

Fig. 5 is an enlarged fragmentary sectional view of a drawn cap in position on a container.

Many containers, of metal or fiber, cylindrical or rectangular, are closed by drawn fiber caps applied to one or both ends and these caps are preferably held in closing position by adhesive between the engaged walls of container and cap. It is essential to a tight joint of this character that sufficient adhesive material is retained in proper position to make the cap adhere firmly to the container wall.

One form of cap as produced in one variation of the present method is disclosed in the drawing and a series of parallel grooves on its inner surface is formed as the cap is drawn from flat sheet material. These grooves form pockets for an adhesive which, when applied, may be in paste or liquid form but which when dry and fully set effects a tight joint between the cap and the container.

To exemplify the present method, the drawing discloses only sufficient of a drawing apparatus to illustrate the steps of transforming a flat disc of sheet material into cup or cap shape. Such a disc, designated by the numeral 11 (Fig. 1) is adapted to rest in a groove 12 formed in the upper face of a drawing die 13, having a center opening 14 through which the disc is forced. Vertical walls 15 of this opening 14 comprise the internal female element of the drawing die.

A movable punch element 16 is adapted to pass into and through the opening 14 of the die and is provided with a series of horizontal, spaced corrugations 17 formed adjacent its lower end. As the punch member 16 moves toward the die 13, its lower face engages the disc 11 at its central section and forces this center part of the disc ahead of the face of the punch, causing its outer rim or edge to be bent at right angles in a usual and preferred manner. The result is a cap 21 (Figs. 2 and 4) having an annular wall 22 formed at right angles to an undrawn central panel 23. In this drawing action the outer surface of the cap wall 22 is forced past the die wall 15 and the inner surface of the wall 22 is pressed against the corrugations 17 of the punch member. This forms spaced corrugations or grooves 24 in the cap wall.

By using a corrugated punch element the wall 22, while being drawn, is engaged and held by the moving punch, there being no slippage at this point. The drawing strain which ordinarily comes at the base of this wall, i. e. at its juncture with the panel wall 23, is distributed along the entire depth of the wall and a deeper cap may be drawn with less liability of fracture. The corrugations 17 are preferably shaped as shown to increase their holding action while drawing and to permit removal of the cap after drawing.

There is a certain amount of natural spring or resiliency in the fiber material of the cap 21 and after it has been forced through the female die an outer edge 25 of the wall 22 springs outwardly as illustrated in Fig. 3. This removes the inner surface of the cap wall from the corrugations 17 on the punch member and as the latter is raised on its return stroke, the outwardly sprung edge 25 of the cap engages beneath the horizontal wall 26 of the die member 13 and is stripped off of the corrugations 17 of the punch member.

The resulting cap, illustrated in Fig. 4, is particularly useful as a permanent end closure for

a container. Fig. 5 illustrates the cap 21 as applied to the open end of a body wall 28 of a typical container. A suitable adhesive is used for the sealing medium of the joint between the container and its cap, this adhesive being preferably applied to the cap and filled in the grooves 24 prior to assembly with the container wall. These grooves form pockets which retain the proper amount of adhesive and an effective bond between the cap and the container is thus insured.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. The method of drawing fiber caps with internally grooved walls, which comprises forcing sheet stock along a smooth wall and through an external die member while supporting it on a corrugated wall of an internal die member, the said corrugated wall being spaced from the said smooth wall a distance less than the thickness of the stock whereby said corrugations are embedded in a wall of the cap and internal grooves formed therein, and then forcing the formed cap beyond the external die member, so that the cap is disengaged from the latter and its corrugated wall springs away from the internal die member.

2. The method of drawing fiber caps with internally grooved walls, which comprises first forcing flat sheet stock through an external die member by means of a moving die member provided with external corrugations during which time said corrugations embed themselves in the stock and form grooves therein while drawing the stock into cap form, and thence forcing the drawn cap beyond the wall of the external die member to permit it to spring outwardly and to release itself from said corrugations.

3. The method of drawing fiber caps, which comprises forcing a disc into a perforated die, by means of a die member provided with external corrugations, and thereby forming a cap having corrugations, and forcing said cap entirely through and to the further side of said perforated die, and then withdrawing said corrugated die member from within said cap and engaging the edge of the cap with the face of said perforated die, and thereby separating the formed cap from said dies.

4. The method of drawing fiber caps with internally grooved walls, which comprises forcing a disc through and beyond an external die by means of an internal die having external corrugations, and thereby forming a cap having corresponding and reverse corrugations on the inner face of its side wall, the inherent resiliency of the side wall of said cap allowing the same to spring outward away from the internal die, and then withdrawing the internal die.

JOHN M. HOTHERSALL.