

Jan. 8, 1952

W. J. KEITH
CLOSURE CAP

2,581,539

Filed May 9, 1946

2 SHEETS—SHEET 1

Fig. 1.

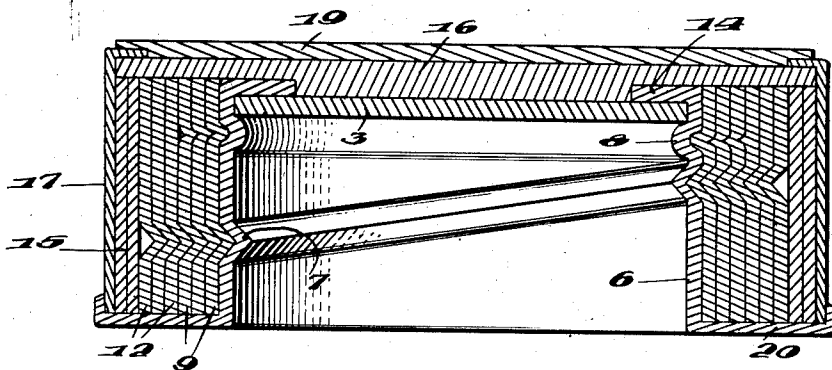


Fig. 2.

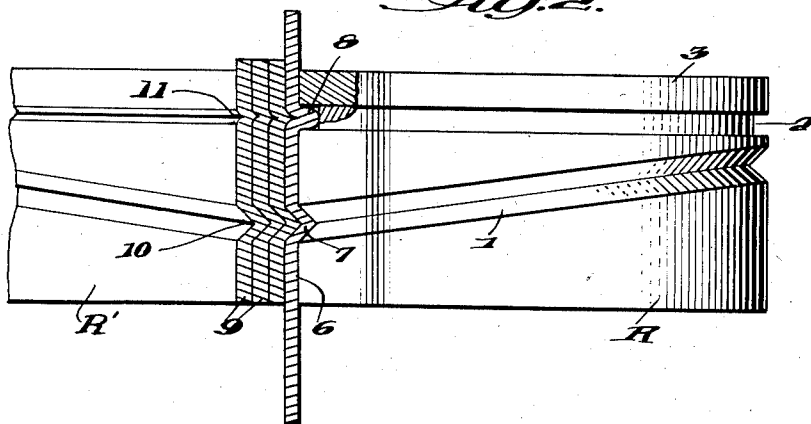


Fig. 3.

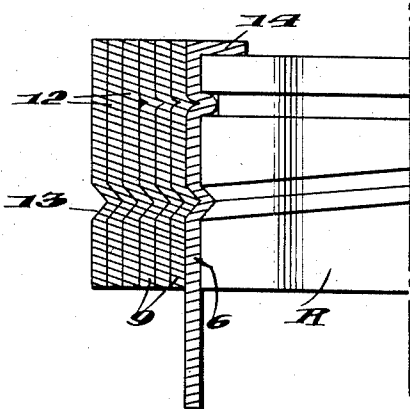
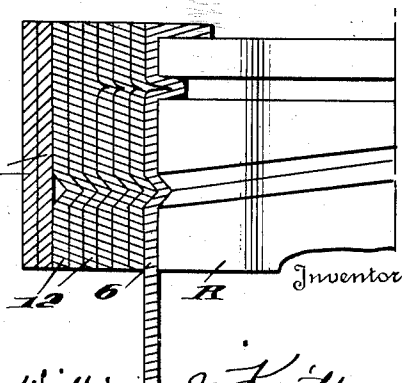


Fig. 4.



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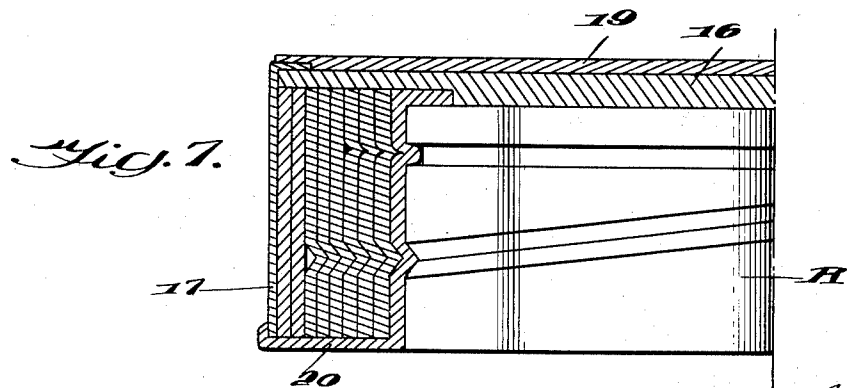
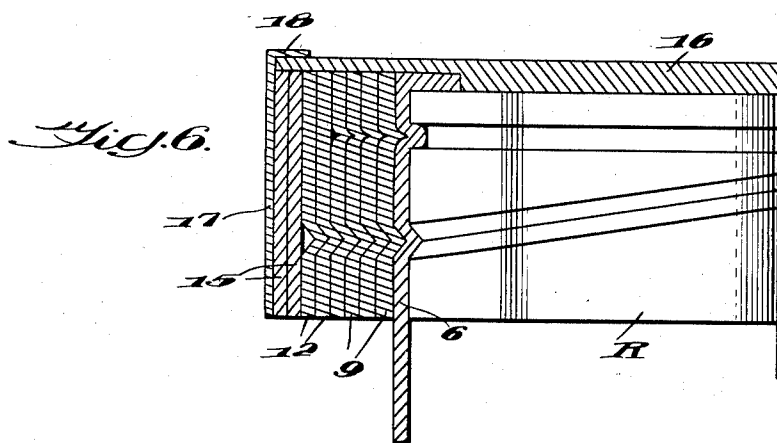
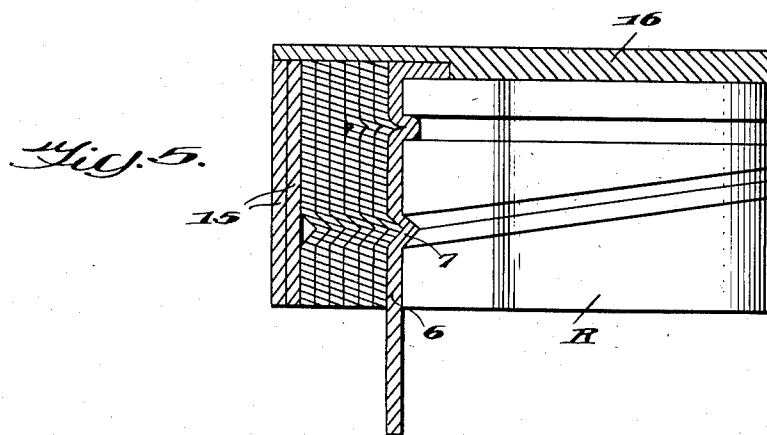
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W. J. KEITH
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2 SHEETS—SHEET 2



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CLOSURE CAP

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3 Claims. (Cl. 93—1)

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This application is a continuation-in-part of my prior application for Closures, filed August 3, 1942, Ser. No. 453,437, now Patent No. 2,403,287, granted July 2, 1946.

This invention relates to improvements in closure caps, particularly for bottles, jars, and other containers of the type in which it is desired to be covered by a closure that is removably attached thereto, as by screw-threads or other means of fastening the closure on the container.

Most of the closure caps that have been used commercially heretofore have been made of tin plate, aluminum, or thermo-setting synthetic resins. However, such materials are expensive for the manufacture of closure caps and the like.

It has been proposed heretofore, as in the patent to Keith, No. 2,330,896, October 5, 1943, to construct closure caps with parts thereof of non-metallic material, such as paper, cardboard or the like, but such materials used a reinforcing band preferably of sheet metal to form the thread ring of the cap.

An object of my invention is to construct the closure cap entirely of paper or like non-metallic material but at the same time effecting a secure, rigid structure capable of being fastened tightly on a container and to be removable therefrom, and having the properties of sealing the contents of the container effectively and securely when it is in place thereon.

A further object of the invention is to improve the structure of the closure cap, and the method by which it is made, whereby the cap is durable, inexpensive to manufacture, is of light weight, and lends itself to decoration and ornamentation in an effective manner, as well as being manufactured efficiently from paper strips that may be formed readily into a rigid structure having the desired properties for the closure cap.

The structure of this cap and its method of fabrication produce a superior cap at greatly reduced cost, as compared with metals or resins.

This closure is formed preferably according to the preferred embodiment of the invention with a side wall and guide ring in one unitary structure and formed of paper or other thin non-metallic material that may be wound in multiple layers and so interconnected that the thread ring is provided with an effective screw-thread or other means of securing the cap detachably to the container but is reinforced also by the side wall structure so that it does not need to be formed of metal and yet has sufficient rigidity to maintain the effective mounting of the cap on the container. The structure lends itself to the

securing of a liner therein as well as to the application of decoration to any desired extent both on the top and on the surrounding side wall of the cap.

The guide ring and wall structure of the cap are formed preferably by winding one or more thin strips of non-metallic material such as paper into a multiplicity of layers to provide the desired thickness and impressing in the respective layers as wound a thread groove which is embossed at the inner face of the guide ring to form the thread or other means of securing the cap on the container. The successive laminations have the thread or other securing means impressed directly therein one into another so as to reinforce the thread projection at the inner face of the cap and provide sufficient rigidity to the container when in place thereon. The successive layers may be secured directly together by adhesive or otherwise if required to form a more rigid structure.

The invention is illustrated in one embodiment in the accompanying drawings, in which:

Fig. 1 is a cross-section through the closure cap;

Fig. 2 is an elevation of a forming die and cap liner used in the construction of the closure cap and showing the application of the successive wall layers thereto; and

Figs. 3 to 7 are similar views showing succeeding steps in forming the cap.

The invention is adapted to be applied in the form of a closure cap such as is used for the sealing of containers, glass bottles, jars and the like, as set forth in my prior application on Closures, Ser. No. 453,437, now Patent No. 2,403,287, granted July 2, 1946. The process of forming the closure is set forth also generally in said application, including the winding of a paper strip on a threaded roll or die such as is illustrated generally in Figs. 2 to 7 of this application. It is understood that a complementary forming roll is used in impressing succeeding layers in the thread groove as set forth also in the aforesaid application.

The thread roll R is cylindrical in form and is shown as provided with a spiral groove 1 in the periphery thereof, the shape of which, however, may be varied as desired so as to form a screw-thread or other means of attachment of the closure cap on the inner wall thereof. This roll R is provided also with a second groove 2 that extends circumferentially thereof for a purpose hereinafter described. The groove 2 is formed by a reduced upper end on the roll R,

and the groove 2 is closed at one side only by the roll R. The other side of said groove is formed by a paper or cardboard liner disc seated on the reduced upper end of the roll R.

The closure embodying the present invention has its side wall constructed preferably of thin strips of flexible non-metallic material such as paper. These strips are applied successively in the form of laminations by coiling the same on the periphery of the roll R and around the liner disc 3. The thickness of the strips and size of the cap are exaggerated considerably in the drawings for clearness of illustration, it being understood that in the actual construction many laminations will be used of relatively thin paper. The number and thickness of the strips of paper and the coils or laminations may be varied, however, according to the size and character of closure cap to be formed.

In the form illustrated the first step in forming the cap after applying the liner disc 3 to the roll R, is to apply to the periphery of the roll R a contact lining 6 which is preferably of a single ply wound upon the periphery of the roll. This lining 6 is initially of sufficient width that the strip projects above and below the top and bottom ends of the roll, as shown in Fig. 2. At the same time that the lining 6 is applied to the roll R the co-acting complementary forming roll R', such as that set forth in the aforesaid application, impresses into the surface of the strip one or more grooves complementary with the grooves 1 and 2, thereby forming on the inner surface of the strip 6 a thread rib 7 and an inner circumferential rib 8 to embrace the periphery of the liner disc 3 and retain said disc permanently as a part of the cap.

Thereafter an additional strip, generally designated at 9, is wound in the form of a coil of the desired number of convolutions on the outside of the contact lining 6. In the form illustrated in the drawings this side wall strip 9 is in three convolutions although the number thereof may be varied as desired according to the character of cap to be formed. The complementary forming roll R' impresses a groove into each convolution of the side wall strip 9, as indicated at 10, simultaneously with the winding of each said convolution or layer upon the contact lining 6 and preceding layers. Thus the paper or other material forming the wall unit 9 will reinforce the thread rib 7 by being forced therein and in succeeding backing convolutions as these are formed and simultaneously with the winding of the laminations on the roll. This not only embosses a thread on the inner surface of the closure, but this thread is backed up and reinforced by similar ribs embossed in the succeeding laminations applied thereover.

As set forth in the aforesaid application, the succeeding laminations or layers may be secured together adhesively, if desired, to increase the permanence and rigidity of the structure. Any suitable adhesive material may be used as desired, but it is preferred that a synthetic thermosetting resin be employed for the purpose.

Simultaneously with the forming of the spiral thread rib at the inner surface of the wall structure and on the contact lining 6, the rib 8 is formed also at the inner surface thereof, but in the form shown this rib extends circumferentially of the cap. The co-acting forming roll R' that is complementary to the roll R is also constructed to tuck the paper material 9 into the initially embossed rib portion 8, as indicated at

11, so as to reinforce this rib 8 in the manner indicated in the drawings.

Additional laminations may be applied thereover, as indicated at 12 in Fig. 3, to build up the wall structure to the desired thickness. These additional wall laminations are embossed at 13 complementarily with the thread rib in the manner described so as to continue to reinforce this rib portion of the cap.

Successively or simultaneously with the application of these additional laminations to the structure, the upper edge of the contact lining may be turned over at 14 onto the top surface of the liner disc 3, as shown in Fig. 3. This securely embraces the periphery of the liner disc by the wall structure of the cap.

Thereafter additional side wall laminations are applied as shown at 15 in Fig. 4. These laminations are not embossed but cover the embossed thread portion of the wall structure.

The next step is to apply the top disc 16 which extends over the upper face of the roll R and over the upper edge portion of the closure formed thereon. This top disc 16 is formed preferably of cardboard or other suitable material and may be pressed into place so as to cover the flange 14 and upper edge of the wall structure and to fit snugly thereto.

Where a side wall decoration is desired this may be applied over the wall structure 9-15, as indicated at 17 in Fig. 6. The upper edge of the decorating strip 17 is preferably turned in over the periphery of the top disc 16, as shown at 18. An additional top decoration may be applied thereafter as indicated at 19 in Fig. 7. The lower projecting edge of the contact lining 6 is then turned outward about the lower edge of the wall structure, as indicated at 20 in Fig. 7. This completes the formation of the cap as a whole.

It will be evident that these successive layers of paper or other flexible material that form the wall of the cap are secured together in any suitable manner, as by an adhesive of the character described, and co-act to form a sturdy and rigid closure cap.

After the completion of the forming operation, the cap may be unscrewed readily from the roll R by relative rotation therebetween. The cap is initially retained on the roll R only by the thread rib 7, so that it may be separated readily by unscrewing.

This closure may be made entirely of paper or other thin flexible material and is capable of manufacture on very simple machinery and at low cost. At the same time it forms not only an effective closure but one that may be secured rigidly to a container, as by a screw-thread or other fastening formed integral with the inner wall of the closure. At the same time, the closure cap is superior in use to more expensive structures used heretofore.

The closure lends itself readily to any desired decoration that may be applied in an inexpensive manner, as by a printed strip on the surrounding wall and top thereof. Thus it presents an attractive appearance in use.

While the invention has been illustrated in one embodiment, it is recognized that variations and changes may be made therein without departing from the invention, as specified in the claims.

I claim:

1. In the method of making a closure cap on a roll mandrel having a peripheral groove therein, the steps comprising winding thin non-metallic

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material on said mandrel, embossing a groove in said material by pressing the material into the groove in the mandrel to form a securing projection at the inner side of the cap, applying additional layers of non-metallic material over said first layer and individually embossing said successive layers by pressing the material thereof into the embossed groove of the preceding layer.

2. In the method of making a closure cap on a roll mandrel having a peripheral groove therein, the steps comprising winding a layer of non-metallic flexible material on said mandrel, embossing a groove in said material by pressing the material into the groove in the mandrel to form a thread projection at the inner side of the cap, thereafter applying additional layers of non-metallic flexible material over said first layer, and individually embossing said successive layers as each of them is applied by pressing the material thereof into the embossed groove of the next preceding layer.

3. In the method of making a closure cap on a roll mandrel having a peripheral helical thread groove therein, the steps comprising winding thin non-metallic flexible material in a layer on said

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mandrel, embossing a thread groove in said material by pressing the material into the groove in the mandrel to form a thread projection at the inner side of the layer, successively applying coiled layers of thin flexible material thereover, and individually embossing said successive layers as applied by pressing the material thereof into the embossed groove of the next preceding layer.

WILLIAM J. KEITH.

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