

Dec. 24, 1968

JUJI HIROHAMA

3,417,539

METHOD OF FORMING A CONTAINER CLOSURE

Filed Oct. 6, 1966

Fig. 1

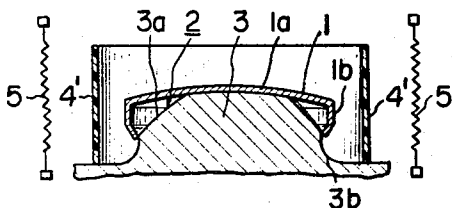


Fig. 2

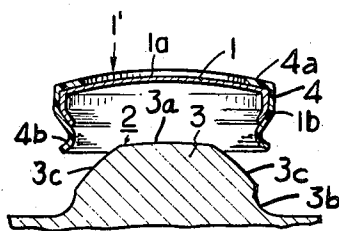


Fig. 3

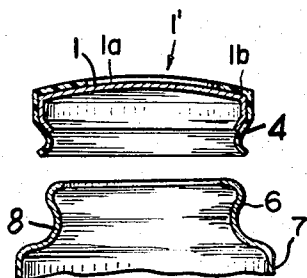
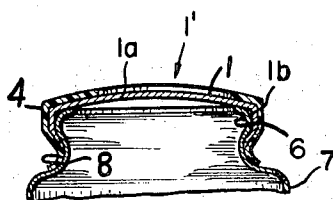


Fig. 4



INVENTOR
JUJI HIROHAMA

BY

McGraw & Toren
ATTORNEYS

1

2

3,417,539

METHOD OF FORMING A CONTAINER CLOSURE

Juji Hirohama, 17 Ishihara-cho, Sumida-ku,
Tokyo, Japan

Filed Oct. 6, 1966, Ser. No. 584,748

1 Claim. (Cl. 53-42)

ABSTRACT OF THE DISCLOSURE

A method of closing a container using a resilient cap member having a curved top wall with a skirt which extends downwardly for engaging around the rim of the container and an annular sealing member, comprising positioning the sealing member around the cap member and heating the sealing member to cause it to shrink and engage the side walls and a portion of the top of the cap member. The top wall of the cap member is depressed to deflect the side walls of the cap member and the sealing member outwardly in order to permit the cap member to be engaged over the rim of the container. The sealing member is then heated to cause the cap assembly to tightly engage on the rim of the container.

Summary of the invention

This invention relates, in general, to a closure cap construction and to a method of forming a closure for a container and, in particular, to a new and useful closure cap which includes an inner metal cap member having side walls formed, for example, by a plurality of resilient hook members which are adapted to engage over the rim of a container and which also includes an annular seal member which is shrink-fitted around the outer periphery of the top wall and around the sides of the inner metal cap member and to a method of applying a closure to a container.

A cap constructed in accordance with the invention is of a type which is particularly useful for closing the mouth of a container or other vessel for holding and carrying liquid such as oils and paints, for example. For such use, it is known to employ caps having a depressible upper wall and side walls which include resilient hook formations at the lower end for engaging around the rim of the container. A cap of this nature is constructed of a resilient material so that when it is desired to remove the cap from the container, the upper wall may be pushed downwardly in order to cause an outward deflection of the resilient hook portions of the side walls. A principal disadvantage of the caps of this nature is that the resilient hook members may become disengaged from the mouthpiece when the container is subjected to an impact during transportation so that the cap becomes dislodged from the mouthpiece of the container and the liquid is spilled. Such a situation would be particularly dangerous when the material being transported is gasoline or a similar liquid.

In accordance with the present invention, the disadvantages of the prior art are overcome by providing a seal member which is formed of a synthetic resin which has the property of shrinking upon heating such as, for example, a vinylchloride. The seal member is advantageously made of a substantially cylindrical configuration with an internal diameter larger than the outer diameter of a cap. The seal member is assembled to the cap before the cap is applied to the container by positioning the cap on a forming member or die with the side walls bent inwardly to form the resilient engageable hook portions. After the seal member is positioned around the cap, it is heated so that it will shrink and may be formed over the cap member to form a cap and seal member assembly or single cap unit. With the seal member joined

to the cap in an assembly, the whole assembly is positioned over the container neck and may be merely pressed downwardly thereon and released to cause it to resiliently engage around the rim of the container, or the seal member may be additionally heated to provide a further shrinking thereof.

Accordingly, it is an object of the invention to provide an improved cap construction for sealing a container which includes a cap member having a curved resilient top wall and includes downwardly extending peripheral side walls forming engageable hook means for engaging around the rim of a container and which also includes a sealing member shrink fitted over the cap which extends around the sides and a marginal area of the top wall of the cap.

A further object of the invention is to provide a container closure which includes a container having a rim surrounding an opening, a cap member having a resilient top wall closing the opening, said cap member having side wall portions forming engageable hooks which engage around the rim of said container, and an annular sealing member tightly formed around the sides of said cap and around an outer marginal portion of the top wall and including side portions which extend downwardly beyond the sides of said cap and engage below the rim of said container.

A further object of the invention is to provide a method of forming a closure for a container which comprises positioning a cap member over a forming die, locating an annular sealing member, of a plastic material having a characteristic that it will shrink upon heating, around the sides of the cap and subjecting the plastic material to heating to shrink the material onto the cap side wall around the top wall of the cap, applying the cap with the sealing member thereon over the rim of a container and further and, in some instances, heating the sealing member to cause it to tightly engage around the rim of the container.

A further object of the invention is to provide a sealing cap which is simple in design, rugged in construction and economical to manufacture.

The various features of novelty which characterize the invention are pointed out with particularity in the claim annexed to and forming a part of this specification. For a better understanding of the invention, its operating advantages and specific objects attained by its use, reference should be had to the accompanying drawings and descriptive matter in which there is illustrated and described a preferred embodiment of the invention.

In the drawings:

FIG. 1 is a transverse sectional view of a forming die for permitting the joining of a sealing member to the cap in accordance with the invention;

FIG. 2 is a view similar to FIG. 1 showing the formed cap assembly removed from the die;

FIG. 3 is a transverse partial sectional view of a container having a cap closure therefor indicated above the container; and

FIG. 4 is a view similar to FIG. 3 with the closure shown on the container.

Referring to the drawings, in particular, the invention embodied therein comprises a closure cap or metal and plastic cap assembly, generally designated 1', which comprises a metal cap 1 and an annular plastic seal member 4 which are formed together by heat shrinking the seal member 4 over the cap 1. The cap assembly 1' is constructed to fit over an annular rim 6 of a container or bottle 7 in sealing engagement around the rim 6 and a recess 8 of the container as indicated in FIG. 4.

In accordance with the method of the invention, the container 7 is sealed using the cap assembly 1' which is formed by joining the sealing member 4 to a resilient

3

metal cap 1. For this purpose, the metal cap 1 is positioned so that a curved upper wall 1a is oriented over a slightly curved portion 3a of a projection 3 formed on a die member 2. The projection 3 also includes a concave base portion 3b and curved sided portions 3c.

With the cap oriented over the projection 3, a cylinder sealing member 4 is positioned around the cap on the form 2 as indicated in FIG. 1. A heater or a plurality of heaters 5 is arranged around the exterior periphery of the sealing member 4 in order to heat the sealing member. In accordance with a feature of the invention, the sealing member is formed of a plastic material which will shrink upon heating and for this purpose a material such as vinylchloride has been found satisfactory.

During the heating, the annular sealing member 4' will shrink to engage side walls 1b which are formed as a plurality of hook members which are adapted to engage around the rim 6 of the container. Heating will continue until the sealing member 4' is formed so that its lower portions 4b engage into the recess 8 and form curved hook-shaped configurations and the upper surface 4a is directed downwardly to overlie the outer peripheral marginal area of the wall 1a of the cap 1. The cap assembly 1' which is thus formed is removed from the projection 3 of the forming member 2 and then placed over the rim 6 of the container 7. In order to facilitate the insertion of the cap assembly 1' onto the container 7, it is desirable to depress the top wall 1a to cause the side walls 1b of the cap 1 and the curved hook-like projections 4b of the sealing member to move outwardly and engage over the rim 6. After the cap is inserted, to the position indicated in FIG. 4, downward pressure on the upper wall is removed to permit the hook portions 4b of the sealing member to engage in the recess 8 of the container and to also cause the hook portions of the side wall 1b of the inner cap member 1a to tightly seal around the rim 6.

In applying the seal member 4' to the cap 1, it is preferable to heat the seal member 4' by the heaters 5 to a temperature of around 180° C. for from 4 to 5 seconds, for example. This will cause the seal member to shrink, especially transversely, so that the seal member will conform to the configuration of the cap member 1 and the two members will be joined together to form the cap assembly 1'.

It will be appreciated that since the cap member 1 and the seal member 4 are joined together as a unit, prior to their being inserted onto the container 7, that the cap member and the seal member can be mounted over the container rim 6 in a single operation process. This makes the operation of fitting the cap assembly over

4

the container neck a vastly simplified operation. Since the seal member 4' is resilient, it provides a complete liquid-tight seal and at the same time prevents the cap assembly 1' from being dislodged even if the lower edge of the sealing member 4 is not bent inwardly.

The operation of fitting the seal member 4 over the cap member 1 can be performed by heating of the heater by taking advantage of the property of the seal member 4 to shrink upon heating. Thus, such a process overcomes the possibility that the cap will be deformed or damaged when applied to the container.

The closure which is formed, as indicated in FIG. 4, is of very simple and inexpensive construction. The parts are made of low cost material including the synthetic resin of the seal member 4. Because the seal member 4 is made of a synthetic plastic material, it may be easily pried open in order to remove the cap from the container when desired.

While a specific embodiment of the invention has been shown and described in detail to illustrate the application of the inventive principles, it will be understood that the invention may be embodied otherwise without departing from such principles.

What is claimed is:

1. A method of closing a container using a resilient cap member having a curved top wall and side wall means extending downwardly for engaging around the rim of the container and an annular sealing member comprising, positioning the annular sealing member around the cap member and heating the sealing member to cause it to shrink to engage the side walls and a portion of the top of said cap member, depressing the top wall of said cap member to deflect the side walls of said cap member and said sealing member outwardly to permit the cap member to be engaged over the rim of a container, and heating the sealing member to cause the cap assembly to tightly engage on the rim of the container.

References Cited

UNITED STATES PATENTS

1,985,258	12/1934	Mauser	215—95
2,270,018	1/1942	Davis.	
2,447,983	8/1948	Little.	
2,734,650	2/1956	Meyer	215—38
2,891,468	6/1959	Taylor et al.	

DONALD F. NORTON, *Primary Examiner.*

U.S. Cl. X.R.

215—38, 95