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(12) # EUROPEAN PATENT SPECIFICATION

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(54) **Method of forming a can.**

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**DE-C- 917 288**
**GB-A-1 075 790**
**US-A-3 124 874**

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## Description

It is conventional to make cans and like containers in two pieces with the body and body wall being integrally formed and a separate top closure unit being secured thereto by a seaming operation. The forming of the body and body wall as an integral unit poses a number of problems. First of all, because of the relatively great height as compared to diameter of the body, the drawing or wall iron operation results in an undue thinning of the metal and prevents proper control of the bottom thickness. Secondly, the metal is severely worked to the extent that flanging of the upper end of the body to facilitate the seaming of the top end unit thereto frequently results in cracking.

It is known from GB—A—1 075 790 to make a can out of two cup-shaped members. The end portion of one cup-shaped member has a reduced diameter so as to fit into the end portion of the other cup-shaped member. Solder is then run into the joint to form a pressure tight seal.

In the present invention, as will be seen below, an adhesive is used to join cup-shaped members to form a can. In a different field of technology, illustrated in DE—C—917 288 an adhesive is used to join a tubular part of a bicycle frame to a connecting part between two or more tubes. Prior to assembly, the connecting part is heated causing it to expand to facilitate the insertion of the tube.

According to the present invention, however, there is provided a method of forming a can by joining together two cup-shaped members, one of said cup-shaped members having an end portion shaped for telescoping in an end portion of the other cup-shaped member, the method including the steps of telescoping the end portion of the one cup-shaped member into the end portion of the other cup-shaped member and forming a bond therebetween characterized in that the method further includes the step prior to telescoping of coating the end portion of said one cup-shaped member with an adhesive, and heating the end portion of the other cup-shaped member so that it expands to allow the end portion of the one cup-shaped member to be telescoped into it and that the stop of forming the bond includes heating the end portion of the one cup-shaped member to cause it to expand into contact with the end portion of the other cup-shaped member to effect the bond in the expanded state.

The heating may be accomplished using an induction heating coil. The cup-shaped members may be of the same general diameter with the end portion of the one member reduced in diameter to enable it to shape together with the other member as described above. The end portion of said one cup-shaped member may be radially offset by at a distance of at least as much as the wall thickness of the other cup-shaped member. The one cup-shaped member may form the bottom part of the assembled can and the other cup-shaped member may form the top part of the can. The entire assembly operation may be accomplished automatically.

After the two container members have been joined, a suitable label may be applied thereto both for the purpose of identifying the product and masking the joint between the container members. The label is preferably a shrink label which has the end portions thereof extended beyond the container body and engaging both the top and bottom end walls.

In the drawings:

Figure 1 is an elevational view of a container formed in accordance with this invention.

Figure 2 is a top plan view of the container of Figure 1.

Figure 3 is a bottom plan view of the container of Figure 1.

Figure 4 is an elevational view showing a step in the formation of the container of Figure 1.

Figure 5 is an elevational view similar to Figure 4, and shows the two container members forming the container of Figure 1 as they are assembled.

Referring now to the drawings in detail, it will be seen that there is illustrated in Figures 1—3 a container which is formed in accordance with this invention, the container being generally identified by the numeral 10. Basically the container 10 is a can and will be so identified hereinafter. However, the principles of this invention will apply to and it is proposed to form cans which may vary in size from those of small capacity such as seven ounces and most particularly twelve and sixteen ounces, to relatively large cans having a capacity as great as five or 6 liters. Accordingly, the use of the word "can" to describe the invention is not intended to be limiting.

The can 10 is of a two-piece construction and includes a bottom member 12 and a top member 14. The members 12 and 14 are joined together as at 16 intermediate the height of the can 10. After the members 12 and 14 are joined, it is preferred that there be disposed around the entire length of the can body a label 18 which is preferably in the form of a shrink wrap, the label 18 will be described in more detail hereinafter.

It is preferred that the container member 12, as is best shown in Figure 4, have a cylindrical body 20 and an intergral bottom wall. The bottom wall is preferably of a bulged configuration including an overall bulging 24 having projecting therefrom in circumferentially spaced relation a plurality of outwardly directed protrusions 26. The bottom wall construction is one which will withstand the high internal pressures of carbonated beverages and even through a certain amount of outward bowing will be effected from the pressure of the pro-

duct therein, the projections 26 will be so related to the bulge 24 as always to project downwardly therebeyond to form a stable platform for the can.

The container member 14 is also provided with a cylindrical body portion 28 and a top wall 30. The top wall 30 may be bowed or may be generally frustoconical, as shown. In order to effect filling of the can, the top wall 30 is provided with a central filling opening 32 which, after filling, will be closed by means of a suitable plug (not shown) preferably in the form of a rivet-like member.

The can 10 may be opened for dispensing the product in various manners depending upon the size of the can and the application thereof. If desired, the plug may be made removable and replaceable so that the filling opening 32 may also be utilized as a dispensing opening. On the other hand, if the can is of a small size, it may be provided with a conventional easy opening feature in the end wall 30 adjacent the filling opening 32.

When formed, the diameters of the bodies 20 and 28 are preferably the same. In order to telescope the end portions of the bodies 20 and 28, it is necessary that the diameter of the end portion of one of the bodies be changed. In the preferred embodiment of the invention, the container member 12 has an end portion 34 which is radially inwardly offset to define a necked-in end portion joined to the remainder of the body 20 by a shoulder 36. The offsetting of the metal of the end portion 34 is between 1.1 and 2 times the thickness of the metal of the bodies 20, 28.

It is to be understood that the container members 12 and 14 may be formed by way of automatic forming machinery in a conventional manner, and no description of the forming operations is required here. The container members 12 and 14 will be supplied to an assembling machine in two rows. A suitable coating of adhesive 38 is applied to the exterior of the end portion 34 either in the assembling machine or prior thereto in a conventional manner. The adhesive 38 may vary in composition, but must be one which will bond either directly to the metal of the container members or to any coatings applied thereto. Preferably the adhesive is a powder type adhesive which may be applied electrostatically to the end portion 34 and may be fused by heating.

The container members 14 first move through an induction heating coil 40 while the container members 12 remain spaced therefrom but aligned therewith. The induction heating coil 40 may be in the form of two bars which are spaced apart and the container members 14 may roll therebetween to assure uniform circumferential heating of the free end portion of the body 28 in the manner shown in Figure 4.

When the end portion of the body 28 is heated, it will expand and permit freedom of assembly of the container member 12 with the container member 14 by an axial movement of the container member 12 as shown in Figure 5. Thereafter, the assembled container members 12 and 14 continue to move between the two bars of the induction heating coil 40 with the result that the end portion 34 of the container member 12 is heated by the induction heating coil 40 and also expands so as tightly to press the adhesive 38 between the two container bodies 20 and 28. The adhesive is fused by the heat absorbed from the heated end portions of the bodies 20 and 28. The joined together container members 12 and 14 then move out of the area of the induction heating coil 40 and rapidly cool.

The label 18 may then be applied in any conventional manner with the label, as described above, when it is a shrink label, extending beyond the body of the can and overlapping the bottom wall 22 and the top wall 30 so as securely to anchor the label on the can.

**Claims**

1. A method of forming a can by joining together two cup-shaped members (12, 14), one of said cup-shaped members (12) having an end portion (34) shaped for telescoping in an end portion of the other cup-shaped member (14), the method including the steps of telescoping the end portion (34) of the one cup-shaped member (12) into the end portion of the other cup-shaped member (14) and forming a bond therebetween characterized in that the method further includes the step prior to telescoping of coating the end portion (34) of said one cup-shaped member (12) with an adhesive (38), and heating the end portion of the other cup-shaped member (14) so that it expands to allow the end portion (34) of the one cup-shaped member (12) to be telescoped into it and that the step of forming the bond includes heating the end portion (34) of the one cup-shaped member (12) to cause it to expand into contact with the end portion of the other cup-shaped member (14) to effect the bond in the expanded state.

2. A method according to claim 1, characterized in that said heating is induction heating.

3. A method according to claim 1 or 2 characterized in that the members (12, 14) are of the same general diameter and the end portion (34) of the one member (12) is reduced in diameter while the end portion of the other member (14) is not.

4. A method according to any of claims 1 to 3 characterized by providing a label (18) surrounding said can masking the bond between the cup-shaped members (12, 14).

5. A method according to any of claims 1 to 4 characterized in that the end portion (34) of said one cup-shaped member is radially offset by a distance of at least as much as the wall thickness of the other cup-shaped member.

6. A method according to any of claims 1 to 5 characterized in that said one cup-shaped member (12) forms the bottom part of the can and said other cup-shaped member (14) forming the top part of the can.

**Revendications**

1. Méthode de production d'une boîte par jonction ensemble de deux éléments en forme de tasse (12, 14), un desdits éléments en forme de tasse (12) comportant une partie extrême (34) profilée de manière à s'emboîter télescopiquement dans une partie extrême de l'autre élément en forme de boîte (14), le procédé comprenant les étapes d'emboîtement télescopique de la partie extrême (34) d'un élément en forme de tasse (12) dans la partie extrême de l'autre élément en forme de tasse et de formation d'une liaison entre eux, caractérisée en ce que la méthode comprend en outre l'étape consistant, avant l'emboîtement télescopique, à revêtir la partie extrême (34) du premier élément en forme de tasse (12) avec un adhésif (38) et à chauffer la partie extrême de l'autre élément en forme de tasse (14) de manière qu'il se dilate pour permettre à la partie extrême (34) du premier élément en forme de tasse (12) de s'emboîter télescopiquement dans celle-ci, et en ce que l'étape de formation de liaison consiste la partie extrême (34) du premier élément en forme de tasse (12) pour produire sa dilatation au contact de la partie extrême de l'autre élément en forme de tasse (14) afin d'établir la liaison dans l'état dilaté.

2. Méthode selon la revendication 1, caractérisée en ce que ledit chauffage est un chauffage par induction.

3. Méthode selon la revendication 1 ou 2, caractérisée en ce que les éléments (12, 14) ont le même diamètre général et la partie extrême (34) du premier élément (12) est réduite en diamètre, tandis que la partie extrême de l'autre élément (14) ne l'est pas.

4. Méthode selon l'une quelconque des revendications 1 à 3, caractérisée en ce qu'il est prévu une étiquette (18) entourant ladite boîte et masquant la liaison entre les éléments en forme de tasse (12, 14).

5. Méthode selon l'une quelconque des revendications 1 à 4, caractérisée en ce que la partie extrême (34) du premier élément en forme de tasse est radialement compensée d'une distance au moins égale à l'épaisseur de paroi de l'autre élément en forme de tasse.

6. Méthode selon l'une quelconque des revendications 1 à 5, caractérisée en ce que le premier élément en forme de tasse (12) forme la partie de fond de la boîte et en ce que l'autre élément en forme de tasse (14) forme la partie supérieure de la boîte.

**Patentansprüche**

1. Verfahren zum Herstellen einer Dose durch Verbinden von zwei topfförmigen Teilen (12, 14) mitainander, von denen der eine (12) einen Endbereicht (34) besitzt, der in einen Endbereich des anderen topfartigen Teils (14) einschiebbar ist, wobei der Endbereich (34) des einen topfförmigen Teils (12) in den Endteil des anderen topfförmigen Teils (14) eingeschoben und zwischen ihnen eine Verbindung hergestellt wird, dadurch gekennzeichnet, daß vor dem Einschieben der Endbereich (34) des erstgenannten topfartigen Teils (12) mit Klebstoff (38) überzogen und der Endbereich des anderen topfförmigen Teils (14) erhitzt wird, so daß er sich ausdehnt und ein Einschieben des Endbereiches (34) des erstgenannten topfförmigen Teils (12) gestattet, und daß zum Herstellen der Verbindung der Endbereich (34) des erstgenannten topfförmigen Teils (12) erhitzt wird, so daß er sich bis zur Berührung mit dem Endbereich des anderen topfförmigen Teils (14) ausdehnt und die Verbindung im ausgedehnten Zustand hergestellt wird.

2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß das Erhitzen durch Induktionserhitzung erfolgt.

3. Verfahren nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die Teile (12, 14) allgemain denselben Durchmesser haben und der Endbereich (34) des erstgenannten Teils (12) auf einen kleineren Durchmesser abgesetzt ist, während dies bei dem Endbereich des anderen Teils (14) nicht der Fall ist.

4. Verfahren nach einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß die Dose mit einer Auflage (18) umgeben wird, die die Verbindung zwischen den topfförmigen Teilen (12, 14) abdeckt.

5. Verfahren nach einem der Ansprüche 1 bis 4, dadurch gekennzeichnet, daß der Endbereich (34) des erstgenannten topfförmigen Teils mindestens um die Wandstärke des anderen topfförmigen Teils radial abgesetzt ist.

6. Verfahren nach einem der Ansprüche 1 bis 5, dadurch gekennzeichnet, daß der erste topfförmige Teil (12) den Unterteil und der andere topfförmige Teil (14) den Oberteil der Dose bildet.

FIG.1

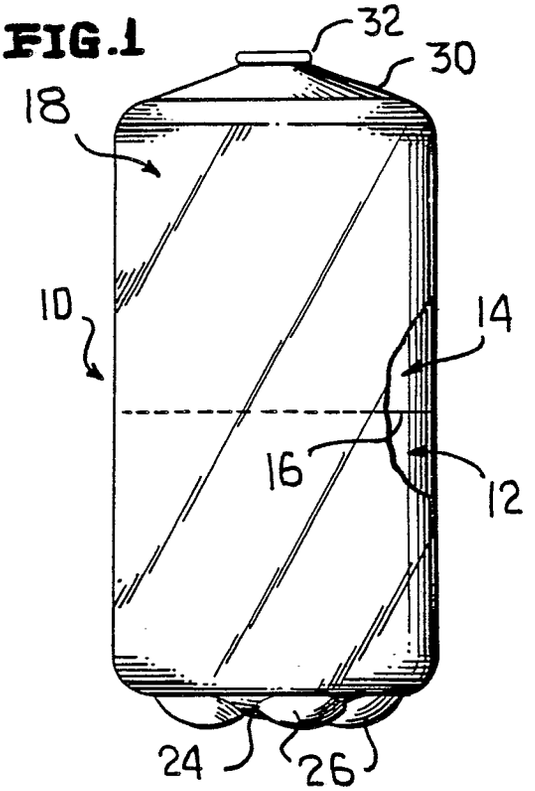


FIG.2

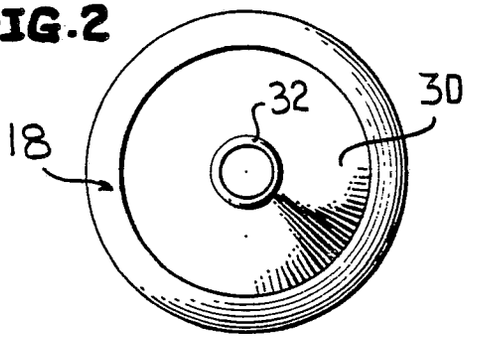


FIG.3

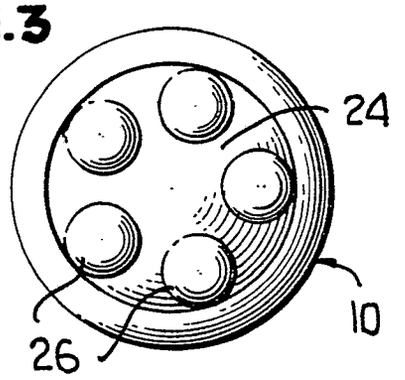


FIG.4

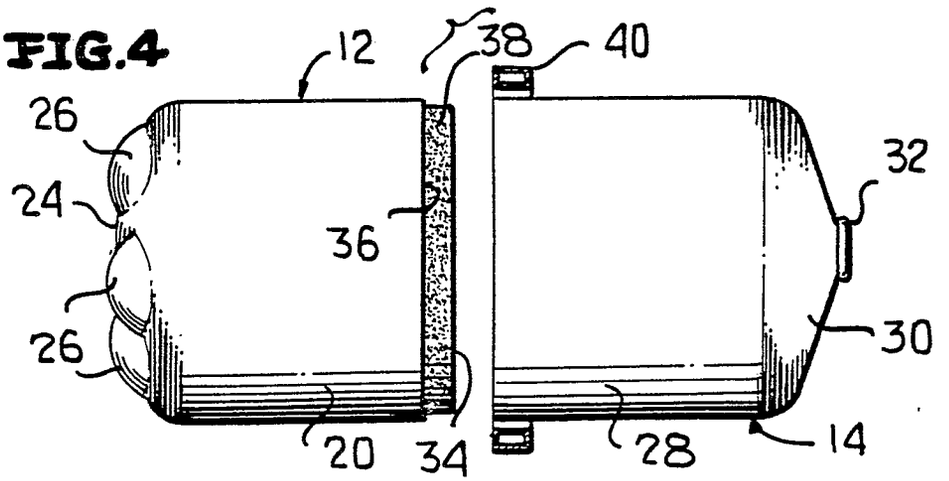


FIG.5