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(54) Body-necking a wall-ironed can

(57) Method for manufacturing a metal, body-necked can with an ironed wall, for example one intended for being provided on one open side with an easily opening lid in order thereby to form a beverage can, comprising the stages of reducing the diameter of the can with the ironed wall by necking the wall up a considerable part of the height of the can, to be referred to as body-necking, and applying a neck rim by necking the top rim of the can, whereby prior to being body-necked the can is first necked.

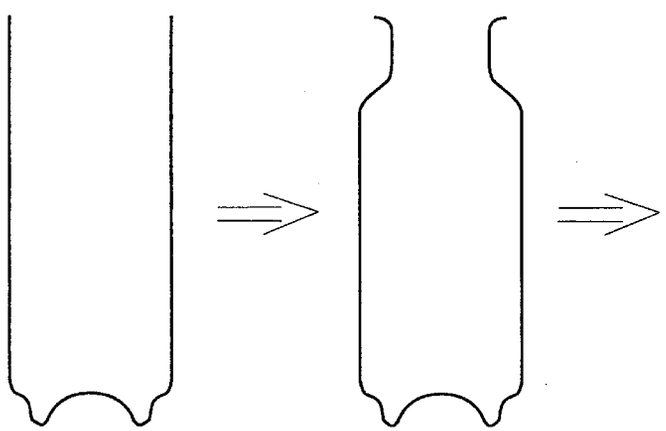

Fig. 1

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Description

The invention relates to a method for manufacturing a metal, body-necked can with an ironed wall, for example one intended for being provided on one open side with an easily opening lid in order thereby to form a beverage can, comprising the stages of reducing the diameter of the can with the ironed wall by necking the wall up a considerable part of the height of the can, to be referred to as body-necking, and applying a neck rim by necking the top rim of the can.

Such a method is known. EP 0 733 415 A1 for example discloses the manufacturing of a beverage can comprising a body with zones having different diameters by drawing a cup from a blank, reducing the diameter thereof by a restraining operation and thereafter locally increasing the diameter by an expanding operation.

According to such a method the diameter of the rudimentary can body is firstly reduced. Then an expanding process is used to give the can a different shape e.g. in a shaping mould In order to complete the beverage can subsequently a neck rim is formed at the top of the can to which the lid can be fitted.

In the known method, to (body-) neck the can it is moved into a profiled die so that the profile of the die is transferred to the can. However, if the entire body is body-necked to a smaller diameter, there is a chance of wrinkling. In order to suppress or prevent such wrinkling the can must be supported internally by a knock-out in the neck zone during body-necking. Before expanding the top rim must first be necked into a neck rim. This necking causes damage to the in-can paint and wrinkling in the neck part close to the top rim of the can. The wrinkling is connected and associated with the presence of a large gap during body-necking in the area of the body because the body is adapted to the thicker rim of the can. This gap is taken to be the gap located between the knock-out and the die. During necking the can rim fits precisely in that gap. However, the can rim is thicker than the can wall so that it has sufficient deforming reserve to be necked. However, the knock-out diameter is adapted to that thicker can rim. If the knock-out diameter were adapted to the can wall thickness, then the gap would be too small for the can rim. Therefore, adapting the knock-out diameter to the can rim thickness means that the gap is too large for the can wall, so that the chance of the can wall wrinkling increases (see Fig. 1).

Tests have shown that wrinkling can be prevented and that a simpler manufacturing method is possible if, and the invention is based essentially on this, prior to being body-necked, the can is first necked.

The neck applied for body-necking gives the can body rigidity and holds it under tension so that wrinkling is prevented during body-necking. The method in accordance with the invention makes it possible to body-neck without a knock-out. However, because of the axial loading of the can during body-necking, the body must be supported during body-necking by applying an internal overpressure. Furthermore, during body-necking a centring pin is used with a diameter equal to the internal neck diameter of the can.

In practice it is found in accordance with the invention that it is possible to form from a ∅ 66 mm body a can with a circumference of less than ∅ 63.5 mm or even ∅ 62 mm with a 202 neck. A 202 neck is taken to be a neck with a diameter (including the flange with which the lid is applied) of 2 2/16 inch (= 53.98 mm). The internal diameter of the can neck is then approx. 52.3 mm.

The invention is also embodied in a method for manufacturing a shaped can by inflating a can which is obtained by applying the method in accordance with one of the Claims 1-4.

After pressure loads have been introduced in the material by body-necking, the material is better able to stretch and the can is able to be formed to a considerable extent, for example by inflating.

The method in accordance with the invention has been found highly suitable for cans manufactured from a packaging steel suited to wall-ironing, and manufactured from an aluminium alloy suited to wall-ironing.

The invention will now be further illustrated by reference to the drawings in which:

Fig. 1 shows schematically the successive stages of the method in accordance with the invention, and Fig. 2 shows schematically the inflating of a necked, body-necked body in accordance with the invention.

Fig. 1 shows schematically the result of three subprocesses a, b and c of the method in accordance with the invention. Fig. 1a shows a wall-ironed can with a ∅ 66 mm which in Fig. 1b is transformed into a necked can with a 202 neck and a flange. In Fig. 1c the 202 necked can is body-necked in a die (1) into a circular cylindrical body with an outside diameter of less than ∅ 63.5 mm or even less than ∅ 62 mm. With a hollow centring pin (2) with an outside diameter equal to the internal neck diameter ofthe can, the can is placed under an internal overpressure for example by using compressed air.

Fig. 2 shows schematically the inflating procedure in a shaping mould (3) of the body-necked, wall-ironed, circular cylindrical body from Fig. 1c into a shaped can.

Claims

1. Method for manufacturing a metal, body-necked can with an ironed wall, for example one intended for being provided on one open side with an easily opening lid in order thereby to form a beverage can, comprising the stages of reducing the diameter of the can with the ironed wall by necking the wall up a considerable part of the height of the can, to be

referred to as body-necking, and applying a neck rim by necking the top rim of the can, characterized in that prior to being body-necked it is first necked.

2. Method in accordance with Claim 1, characterized in that the body-necking is carried out with a knock-out with a circular cylindrical shape with an outside diameter corresponding to the internal neck diameter of the neck rim.

3. Method in accordance with one of the preceding Claims, characterized in that a can of ∅ 66 mm is necked to a 202 top diameter and then body-necked into a circular cylindrical body with an outside diameter of less than ∅ 63.5 mm.

4. Method in accordance with one of the preceding Claims, characterized in that a can of ∅ 66 mm is necked to a 202 top diameter and then body-necked into a circular cylindrical body with an outside diameter ofless than ∅ 62 mm.

5. Method for the manufacture of a shaped can by inflating a can which is obtained by applying the method in accordance with one of the Claims 1-4.

6. Body-necked, wall-ironed can obtained from the method in accordance with one of the Claims 1-5, characterized in that the can is manufactured from packaging steel.

7. Body-necked, wall-ironed can obtained from the method in accordance with one of the Claims 1-5, characterized in that the can is manufactured from aluminium.

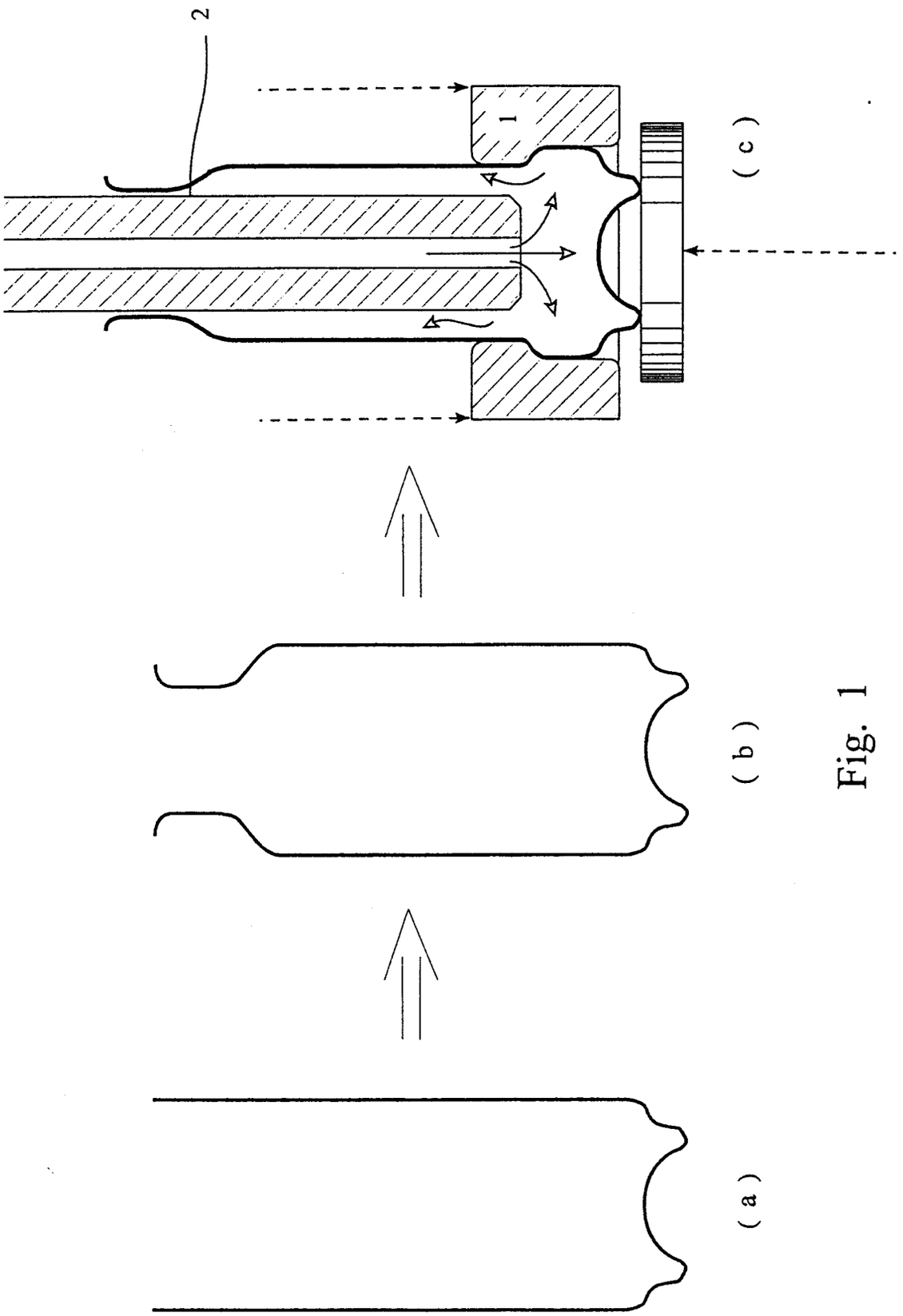

Fig. 1

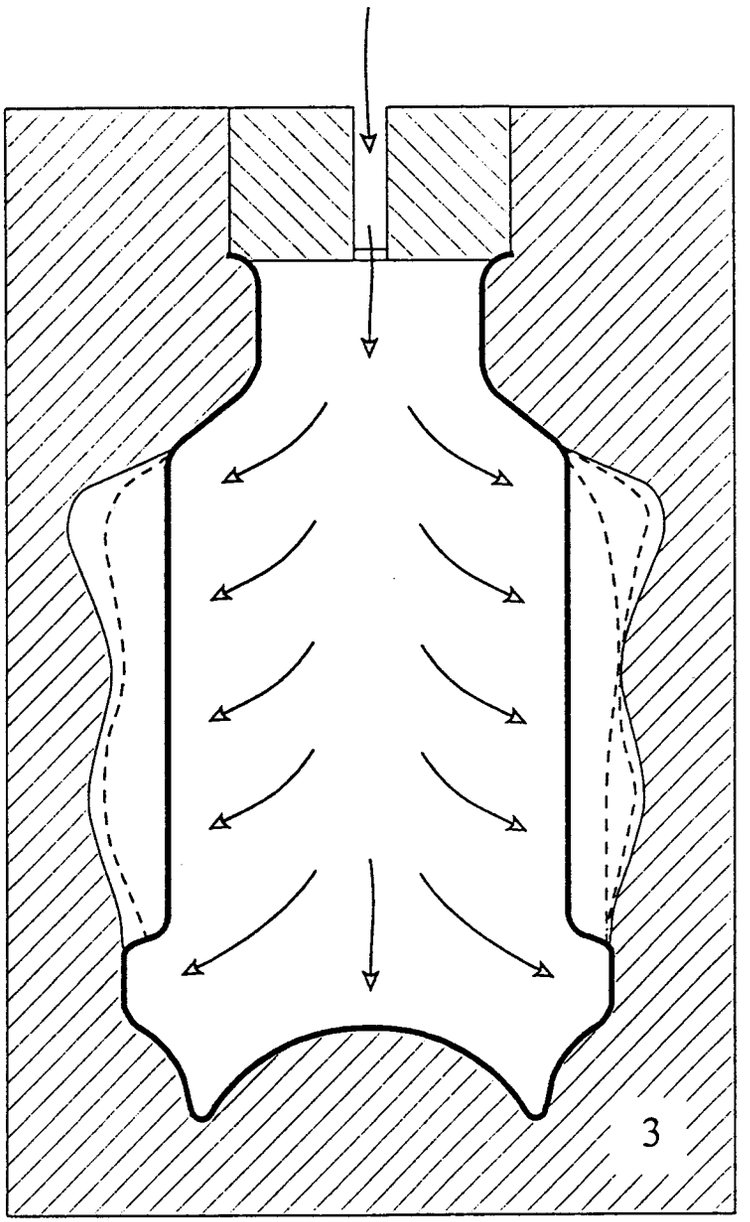

Fig. 2