(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 264 181**
A2

(12) # EUROPEAN PATENT APPLICATION

(21) Application number: **87307561.8**

(51) Int. Cl.⁴: **B65D 39/06**

(22) Date of filing: **26.08.87**

(30) Priority: **13.10.86 JP 156496/86**
08.05.87 JP 69351/87

(43) Date of publication of application:
20.04.88 Bulletin 88/16

(84) Designated Contracting States:
CH DE FR GB IT LI

(71) Applicant: **NIHON TAISANBIN KOGYO KABUSHIKI KAISHA**
610, Nakasone-cho
Ogaki-shi Gifu-ken(JP)

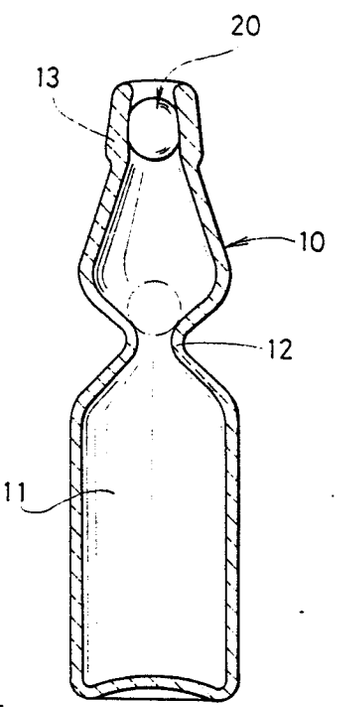
(72) Inventor: **Tsutsumi, Tomio**
Nihon Taisanbin Kogyo K.K 610, Nakasone-cho
Ogaki-shi Gifu-ken(JP)
Inventor: **Kawachi, Fumio**
Nihon Taisanbin Kogyo K.K 610, Nakasone-cho
Ogaki-shi Gifu-ken(JP)

(74) Representative: **Bond, Bentley George et al**
HASELTINE LAKE & CO. Hazlitt House 28 Southampton Buildings Chancery Lane
London, WC2A 1AT(GB)

(54) **Packing container.**

(57) A packing container having a spherical packing which is inserted in a mouth of the container to seal the mouth and which has a rigid core and an elastic convering which surrounds the core.

FIG. 1



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PACKAGING CONTAINER

The present invention relates to an improved packing container, such as a glass, ceramic, or plastic packing bottle or a metal can, etc.

Lemonade is a popular soft drink (carbonate of soda) in Japan. A bottle containing lemonade (beverage) has a plug of a glass ball 40 which is inserted in a mouth 45 of the bottle to seal the bottle, together with a ring packing 47 which is located in an annular inner peripheral groove 46 of the bottle mouth 45, as can be seen from Fig. 8.

Lemonade is loved by many Japanses people, because of its unique shape and the glass ball inserted in the bottle mouth. On the other hand, however, the unique shape of the bottle and the insertion of the glass ball make the manufacturing process therof more complex and more troublesome, in comparison with the manufacturing process of ordinary glass bottles.

Namely, in manufacturing the bottle for lemonade, the mouth of the bottle is formed in advance with a larger size than a finally needed size at the first formation process to enable the glass ball to be inserted therein. After that, the glass ball is inserted in the bottle mouth. Then, the bottle mouth is heated again to deform the mouth into a desired shape. Furthermore, after the bottle is formed in a desired shape, it is necessary to fit the rubber packing into the inner peripheral groove formed in the mouth of the bottle in order to seal the bottle at the mouth.

In particular, among the manufacturing steps mentioned above, the formation of the mouth of the bottle and the fitting of the rubber packing are laborious and troublesome operations.

The primary object of the present invention is to provied a novel bottle for lemonade which can be manufactured without such a multiple formation process and without such a fitting operation of the rubber packing.

Another object of the present invention is to provide a container which has an improved seal effect, such as a glass, ceramic or plastic packing container or a metal can, in which the mouth must be completely sealed.

Still another object of the present invention is to provide a spherical packing which can be prevented from coming out of the mouth of the bottle by the deformation of the packaing, due to the pressure or heat in the container.

According to the present invention, there is provided a packing container comprising a container body with a mouth, and a spherical packing which is inserted in the mouth of the container body and which has a core and an elastic covering which surrounds the core.

The invention will be described below, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 is a longitudinal sectional view of a bottle for lemonade, according to an embodiment of the present invention;

Fig. 2 is a partially broken perspective view of a spherical packing, by way of an example;

Fig. 3 is a sectional view of a spherical packing shown in Fig. 2;

Fig. 4 is an enlarged sectional view of a bottle mouth, showing a seal effect of the spherical packing;

Fig. 5 is an enlarged sectional view of a bottle mouth, showing how to press the spherical packing into the bottle mouth;

Fig. 6 is an enlarged sectional view of a bottle mouth, showing the deformation of the spherical packing when the bottle mouth is sealed;

Fig. 7 is an enlarged sectional view of a bottle mouth in which a different spherical packing is inserted and deformed; and,

Fig. 8 is an enlarged sectional view of a mouth of a bottle for lemonade according to the prior art.

The bottle 10 for lemonade shown in Fig. 1 is made of plastics, and has a barrel (body) 11, a constricted portion 12 which serves as a ball receiver, and a mouth 13. The mouth 13 has therein a spherical packing 20 which corresponds to the conventional glass ball. Note that although the spherical packing (glass ball) 20 is located in the mouth 13 to come into contact with the inner periphery of the mouth to seal it, the spherical packing 20 is placed on the ball receiver (constricted portion) 12 in a normal state , as shown by an imaginary line in Fig. 1, before the bottle is filled with lemonade. For the bottle 10 according to the present invention, the spherical packing 20 which is comprised of a rigid core 21 and an elastic body (covering) 25 surrounding the core 21, as shown in Fig. 2. The core is integrally covered with the elastic body 25. The core 21 can be made of a metal ball, such as iron or the like or a glass ball. The elastic body 25 which covers the core 21 can be made of a rubber material, such as silicone rubber or butyl rubber, or various plastics of which packing is usually made.

The core 21 is provided on its entire surface with fine projections and depressions 23. The projections and depressions 23 can be formed for example by a frosted surface having a surface roughness of about 0.1 mm, in the illustrated em-

bodiment. The frosted surface can be formed, for example, by stirring the core with an abrasive, such as sands in a mixer, or a blasting process or the like.

The spherical packing 20 can be preferably molded in an insertion molding process in which the core having the projections and depressions 23 is inserted in a molding cavity as an insert and then a molten material of which the elastic body 25 is made is inserted in the molding cavity to mold the core together.

The elastic body 25 can be colored with a desired coloring agent(s) to provide a more decorative packing 20.

The sizes of the spherical packing 20 and the core 21 can be properly selected in accordance with the size of the bottle and particularly the inner diameter c of the mouth 13 of the bottle. The sizes are as follows by way of an example:

Diameter a (Fig. 3) of the core 21 ... 10 mm
Diameter b of the spherical packing 25 ... 16 mm
Inner diameter c of the bottle mouth 13 ... 14 mm

In Fig. 4, the spherical packing 20 comes into press contact with the inner periphery of the bottle mouth 13 to directly seal the same. In comparison with a bottle mouth of the prior art shown in Fig. 8, in which a ring packing 47 to seal 45, no ring packing is necessary in the present invention.

In Fig. 5 which shows how to directly press the spherical packing 20 into the mouth 13 of the bottle, the packing 20 can be easily press fitted into the for example, by a pneumatic gun or the like.

Although the above discussion has been directed to the bottle for lemonade, the present invention is not limited thereto and can be advantageously applied to other bottles for cooling beverage containing carbonate of soda other than lemonade, or champagne, beer or alcohorics.

Fig. 6 shows the bottle mouth 13 in which the spherical packing 20 is deformed. As can be seen from Fig. 6, the elastic body 25 covering the core 21 is softened when heated due to an increase of the temperature, so that the elastic body 25 which is subject to the internal pressure in the bottle tends to move or deform upward toward the opening of the mouth.

However, in the present invention, when the spherical packing 20 deforms, a large frictional force is produced between the core 21 and the elastic body 25 by the projections and depressions 23 provided on the outer surface of the core 21 to resist the deformation of the elastic body 25. This prevents the elastic body 25 from deforming to provide a large gap therebetween.

In Fig. 7 which shows a variant of a spherical packing 20A having a core 22 without fine projections and depressions, unlike the first mentioned embodiment shown in Fig. 6, the elastic body 26 which covers the core 22 decreases in its hardness and is softened as the temperature increases, so that the elastic body 26 deforms to extend toward the opening of the mouth of the bottle, due to the internal pressure of the bottle. As a result of the deformation of the elastic body 26, the latter partially separates from the core 22 and the core 22 is moved in the direction same as the direction of the deformation of the elastic body, due to the elastic restoration of the elastic body. This is repeated, so that the spherical packing can come out of the mouth of the bottle. It has been experimentally confirmed that the spherical packing 20A came out of the mouth of the bottle when the lemonade bottle is heated to about 55°C.

On the contrary, in case of the spherical packing 20 having the core 21 with the projections and depressions 23, shown in Fig. 6, the packing 20 did not come out of the bottle mouth even under the temperature of 80°C.

As can be understood from the above discussion, according to the present invention, since the spherical packing has the core covered by the elastic body, the spherical packing itself can directly seal the bottle mouth, with the help of the elasticity of the elastic body. As a result, the ring packing as shown in Fig. 8 which would be otherwise necessary in the prior art can be dispensed with in the present invention. Furthermore, it is possible to directly press fit the spherical packing into the bottle mouth, due to the elasticity of the spherical packing, in the present invention. This enables the spherical packing to be fitted into the bottle mouth after the bottle is completely formed. In particular, looking at the forming process of the bottle for lemonade of the prior art, as mentioned before, in which the bottle body is first provisionally formed, the ball is then inserted and finally the mouth is formed, the manufacturing process can be simplified in the present invention. In other word, according to the present invention, the bottle for lemonade can be formed at one time.

In addition to the foregoing, according to the present invention, the elastic body which covers the core effectively prevents the core and the inner surface of the bottle from being damaged or cracked by the direct contact therebetween during transportation. It should be noted that such a possible crack or damage of the inner surface of the container (bottle) reduces the inner pressure of the container. Because of the reduction of the inner pressure, when the bottle is subject to the inner

pressure in the manufacturing process, the pressure tends to be higher than a predetermined value, which causes the bottle to be broken or exploded.

It has been experimentally found that the resistance to the internal pressure of the bottle according to the present invention (the embodiment illustrated in Fig. 6) was approximately twice that of the bottle for lemonade according to the prior art shown in Fig. 8.

As mentioned above, according to the present invention, the container has an improved seal effect and can be manufactured by a simpler process.

Claims

1. A packing container comprising a container body with a mouth, and a spherical packing which is inserted in the mouth of the container body and which has a core and an elastic covering which surrounds the core.

2. A packing container according to claim 1, wherein said core is made of a metal ball.

3. A packing container according to claim 1, wherein said core is made of a glass ball.

4. A packing container according to claim 1, wherein said elastic covering is made of rubber.

5. A packing container according to claim 1, wherein said elastic covering is made of plastics.

6. A packing container according to claim 1, wherein said core is provided on its surface with fine projections and depressions.

7. A packing container according to claim 1, wherein said spherical packing has an elasticity, so that it can be directly inserted in the mouth of the container body.

8. A packing container according to claim 1, wherein said container is a glass bottle.

9. A packing container according to claim 8, wherein said container is a glass bottle for lemonade.

FIG. 1

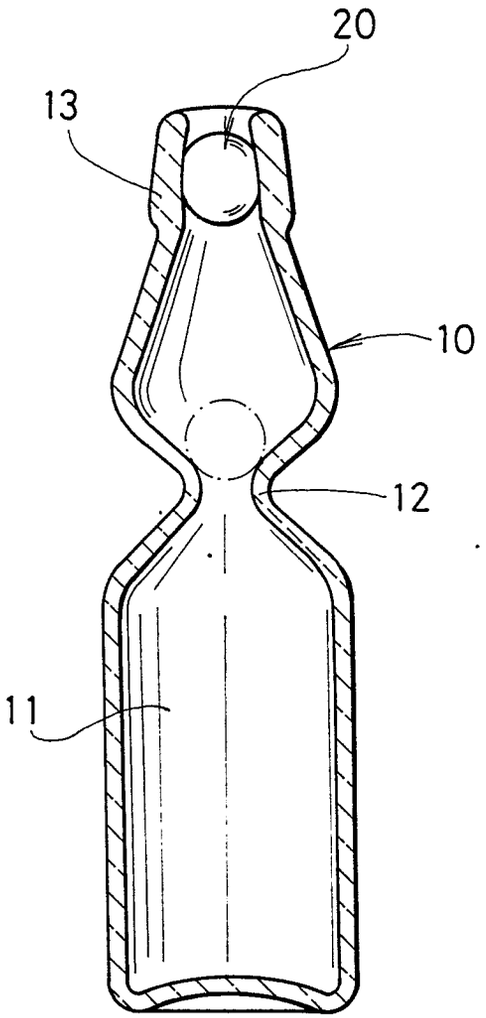

FIG. 2

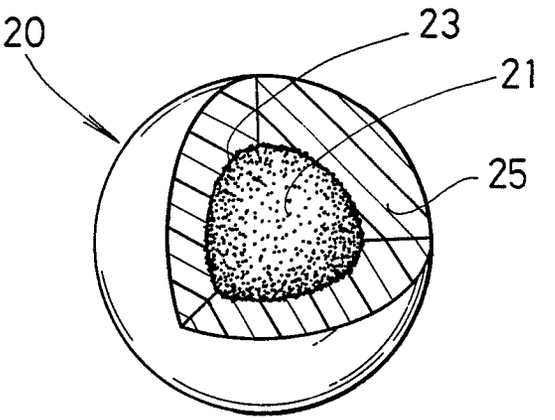

FIG. 3

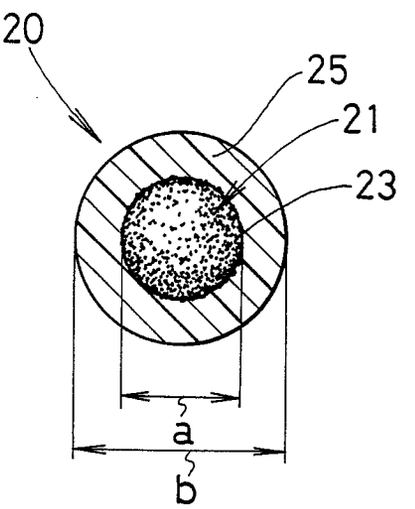

FIG. 4

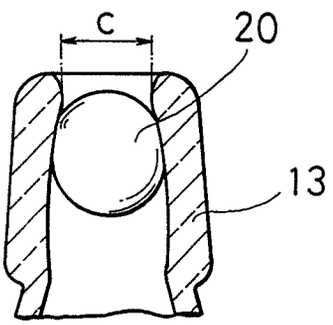

FIG. 5

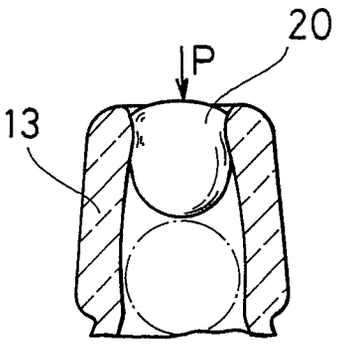

FIG. 6

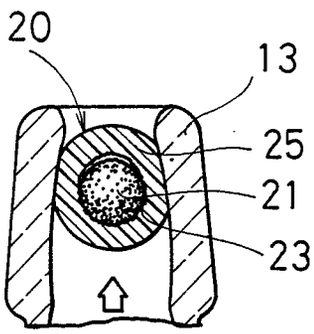

FIG. 7

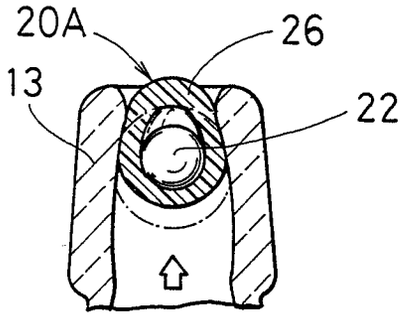

FIG. 8