

DESCRIPTION

Closure having a pin for a container

The invention relates to a closure having a pin for a container, to a pin and to a method for producing such a pin according to the features of the preambles of the respective independent patent claims.

EP 1 737 743 B1 discloses a container closure for a container having a so-called push-pull closure, wherein the container closure (reference number 2 therein) has, in the sleeve part (reference number 1 therein), a displacement pin (reference number 9 therein) with a tearing and piercing device (reference number 10 therein).

This displaceably mounted pin must be sealed from its external surroundings (EP 1 737 74 B1), for example with respect to the additional space (reference number 8 therein) or a space which is formed by a safety cap (reference number 15 therein).

No sealing measures are known from this prior art.

The object on which the invention is based is therefore to provide a closure having a pin for a container or a pin itself by means of which sealing measures are realized. In addition, it is intended to specify a production method for such a pin for a closure for a container which is designed for sealing purposes.

According to the invention, it is provided for this purpose that the pin (also termed perforator) has, as viewed in its axial extent, at least one encircling seal, preferably two encircling seals arranged at a defined distance from one another.

The at least one seal, preferably the at least two seals, are supported on the housing of the closure for the container. As a result, it is possible for the pin to be arranged displaceably in the housing and for the space in which a material is filled to be sealed in its first position with respect to the external surroundings. If the pin is displaced by manual action, the at least one seal, preferably the two seals, are also displaced such that the opening in the housing closed hitherto by the seal and the pin is released. As a result, it is possible for example for a liquid which has previously been mixed with the material to be removed via the closure of the container from the container (for example by drinking).

Furthermore, two alternative methods for producing such a pin for a container closure are specified.

On the one hand, it is provided according to the invention that the pin itself is first produced in an injection molding process from the suitable plastic material and at least one seal, preferably both seals, are produced separately therefrom and then fixed on the pin.

As an alternative to this, it is conceivable that once again the pin is first produced in an injection molding process from a suitable plastic material in an injection mold and the at least one seal, preferably both seals, is/are produced in the same injection mold from a different material than that of which the pin consists, likewise in an injection molding process.

The two variants for configuring a pin for a container closure which have been produced in different ways are shown in the two figures 1 and 2 and explained in the following.

Figure 1 shows, insofar as it is illustrated in detail, a pin for a container closure. The closure for a container has a space in which a material is filled, wherein the pin 1 is arranged displaceably in the housing and can pierce a covering of an opening in the housing so that the material can pass from the space in the housing into the container. Reference may be made purely by way of example of such a closure to EP 1 737 743 B1. However, the use of the closure according to the invention described here and of the pin and of the production method of such a pin are not limited in any way to this prior art, and therefore the pin can also be used for comparable designs of such a closure for a container.

The pin 1 which is illustrated in figure 1 is designed to be disk-shaped in its upper end region, the lower end region being cut off in the illustration of figure 1 and not illustrated or explained in more detail. The lower region is in any event designed in such a way that it is suitable for piercing the covering of the opening in the housing. Between the upper and lower end region of the pin 1, at least one seal 2 is situated in its axial extent, it being the case that in the exemplary embodiment according to figure 1 two seals 2, 3, which are spaced apart, are arranged. The two seals 2, 3 can have the same geometries and/or consist of the same material. In the exemplary embodiment according to figure 1, the seal 2 is smaller in diameter than the seal 3, the converse variant also being conceivable. It is important that the at least one seal 2, in particular the two seals 2, 3, are designed in such a way that they are tailored to the bearing geometries of the pin 1 and bear not only with respect to the pin 1, where they bear, but also with respect to the housing of the closure of the container and thus bring about the desired sealing action in one position of the pin 1 in relation to the housing of the closure.

In the exemplary embodiment according to figure 1, the pin 1 has first been produced in an injection molding process in a correspondingly shaping injection mold. In a likewise shaping

manner, the at least second seal 2, preferably the two seals 2, 3, has/have been produced in the same injection mold, likewise in an injection molding process. This mold is a two-component mold or this process is a two-component injection molding process. The choice of the material for the pin 1 on the one hand and the at least one seal 2, or the two seals 2, 3, on the other hand, is governed by the intended use. In particular, the pin 1 consists of a hard plastic material in order to be able to withstand the pressing forces acting thereon for the axial displacement. The material for the at least one seal 2 is governed here by the sealing function.

Figure 2 shows per se the same structure of the pin 1 as in figure 1, but with the difference that the pin 1 is produced separately from the at least one seal 2, in particular the two seals 2, 3. If the parts produced are present separately from one another, they can subsequently be mounted. Here, in general, the bearing geometries of the at least one seal 2 are tailored to the bearing geometry of the pin 1. It should be mentioned here by way of example that one of the two seals 2, 3 (or else both seals 2, 3) is/are designed as an O-ring (having a round cross section) and the bearing geometry in the pin 1 is designed an encircling groove with an approximately semicircular cross section. These bearing geometries are given only by way of example and can of course also be configured in some other way.

These seals can for example be designed as separate components and be mounted after the production of the one- or two-part pin. Such separate components are for example O-rings or the like. For this purpose, the pin has for example an encircling groove in which the sealing element is positively fitted.

However, the radially encircling seal can also be produced in an injection molding process. In this case, it is conceivable that the radially encircling seal is realized, in particular injection-molded, in the same mould in a two-component process together with the production of the pin. Since, owing to their functions, different requirements are placed on the pin and the sealing element, they preferably consist of different materials, in particular plastic materials. The pin itself consists of a hard plastic material which ensures that the forces (piercing forces) acting thereon can be transmitted. Since the sealing element must perform a sealing function, it consists of an elastically deformable plastic material.

While it is conceivable on the one hand that the pin and the at least one sealing element, preferably the two sealing elements, are produced in the same injection mold, it is also conceivable that the pin is first of all produced in a first injection mold and then the already produced pin is placed in a further mold and then encapsulated with the preferably elastically deformable plastic material.

As a rule, as in the cited prior art, the pin is formed in two parts, with at least one of the two parts of the pin having the one sealing element. Furthermore, it is conceivable that two sealing elements are present on one part of the two-part pin and then no sealing element is present in the second part, with it likewise being conceivable, with it likewise being conceivable that each part of the pin has its own sealing element. As an alternative to this, the pin can be designed in one part and have the at least one sealing element.

PATENT CLAIMS

Closure having a pin for a container

1. A closure for a container, wherein the closure has, in a housing, a space in which a material is filled, wherein a pin (1) is arranged displaceably in the housing and can pierce a covering of an opening in the housing so that the material can pass from the space in the housing into the container, **characterized in that** the pin (1) has in its axial extent at least one seal (2) supported on the housing.
2. The closure as claimed in claim 1, **characterized in that** the pin (1) has in its axial extent two seals (2, 3) supported on the housing.
3. The closure as claimed in claim 1 or 2, **characterized in that** the at least one seal (2, 3) is designed as a component which can be fixed separately on the pin (1).
4. The closure as claimed in claim 1 or 2, **characterized in that** the at least one seal (2, 3) is formed in one piece with the pin (1).
5. A pin (1) for a container closure, **characterized in that** the pin (1) has at least one seal (2) in its axial extent.
6. The pin (1) as claimed in claim 5, **characterized in that** the pin (1) has two seals (2, 3) in its axial extent.
7. The pin (1) as claimed in claim 5 or 6, **characterized in that** the at least one seal (2, 3) is designed as a component which can be fixed separately on the pin (1).
8. The pin (1) as claimed in claim 5 or 6, **characterized in that** the at least one seal (2, 3) is formed in one piece with the pin (1).
9. A method for producing a pin (1) for a container closure, **characterized in that** the pin (1) is first produced in an injection molding process and at least one seal (2) is produced separately therefrom and then fixed on the pin (1).
10. A method for producing a pin (1) for a container closure, **characterized in that** the pin (1) is first produced in an injection molding process in an injection mold and at least one seal (2) of a different material is produced in the same injection mold,

likewise in an injection molding process.