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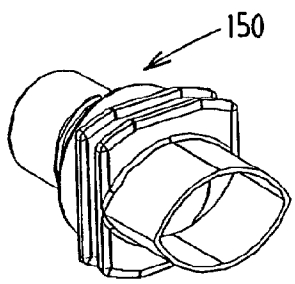
(54) Title: PLASTIC SPOUT



(57) Abstract: A plastic spout (150,170) which is adapted to be sealed between two foil walls of a pouch. The spout has a spout body, which forms a passage (153) for delivering a medium from the pouch and/or feeding a medium to the pouch. In a bottom part thereof, the spout, on opposite sides, forms a sealing zone for a sealed connection to an adjoining foil wall. The sealing zones of the spout body are formed by sealing walls (158,159) which project downward from the spout body, each having a curvature over their entire length, such that each sealing wall is outwardly convex over its entire length with respect to an imaginary plane passing through the outermost ends, which adjoin one another, of the sealing walls. The sealing walls can preferably move flexibly transversely with respect to their plane and, on their inner side, are unsupported or are supported by one or more flexible supporting parts of the spout body.

WO 03/031280 A1

Method for sealing a plastic spout

The present invention relates to a method of sealing a plastic spout between two foil walls of a pouch, comprising a spout body which forms a passage for delivering a medium from the pouch and/or feeding a medium to the pouch, which spout body, on opposite sides, forms a sealing zone for sealed connection to the adjoining foil wall.

Any discussion of the prior art throughout the specification should in no way be considered as an admission that such prior art is widely known or forms part of common general knowledge in the field.

WO 00/66448, in particular Figures 9a-d, in the name of the present applicant has disclosed a plastic spout, which is adapted to be sealed between two foil walls of a pouch. The known spout has a spout body with a central tubular part which forms a passage for delivering a medium from the pouch and/or feeding a medium to the pouch, the medium being, for example, a liquid, powder or gas.

The known spout body, on opposite sides thereof, forms a sealing zone for the adjoining foil wall. These sealing zones are formed by ribs, which project outwards from the central tubular part, lie at an axial distance from one another and adjoin bridge parts, which lie diametrically with respect to the tubular part. The ends of the bridge parts end in thin lips. As seen in the plane running transversely with respect to the tubular part of the spout body, the ribs, together with the adjoining bridge parts and the lips, form a boat-shaped contour on their outer circumference.

During the sealing, the known spout body is introduced between the foil walls of a pouch and a fused join is brought about between the sealing zones of the spout, which are formed by the outermost surfaces of the ribs, the bridge pieces and the lips, on the one hand, and the adjoining parts of the foil walls of the pouch, on the other hand.

The known spout body does not always prove satisfactory, in

particular with regard to the sealed connection between the foil walls and the spout body. For example, one drawback is that producing the sealed connection requires undesirably large amounts of heat and time, with the result that the production rate is undesirably low. In practice, this sealing time is shortened by greatly increasing the pressure with which the foil walls are pressed onto the sealing zones, but this leads to a poor-quality sealed connection.

Another drawback of this known spout is that with certain types of foil, for example foil with a layer of aluminium, the ribs in the sealing zones may cause damage to the foil.

JP2001-240083 has disclosed a plastic spout which is adapted to be sealed between two foil walls of a pouch, the spout being provided on the underside with downward projecting thin sealing walls, which between them delimit a substantially oval space. When this known spout is being sealed between the foil walls of a pouch, the spout is first of all placed onto a support member which fits into the oval space. During the sealing, heated sealing jaws are placed onto the outer side of the foil walls, so that the sealing walls and adjoining foil walls, which are clamped between the support member and the sealing jaws, fuse and a welded joint is formed. The support member holds the sealing walls in the intended shape in this arrangement. The sealing walls are designed to be thin, making it possible to produce the sealed connection more quickly.

One drawback of the spout described in JP2001-240083 is that the support member requires the pouch to be open on the underside, so that the support member can project outwards. Furthermore, positioning the spout on the support member and removing the pouch from the support member after sealing has taken place takes up time, which once again slows the production process.

It is an object of the present invention, according to a first aspect thereof, to provide a spout which can be sealed in place without using the support member or to at least provide a useful alternative.

Unless the context clearly requires otherwise, throughout the description and the claims, the words 'comprise' and 'comprising', and the like are to be construed in an inclusive sense as opposed to an exclusive or exhaustive sense; that is to say, in the sense of "including but not limited to".

For the purpose of providing a spout which can be sealed in place without using the support member, the first aspect of the invention provides a method for sealing a plastic spout between two foil walls of a pouch,

- which spout comprises a spout body which forms a passage for delivering a medium from the pouch and/or feeding a medium to the pouch,

- the sealing zones of the spout body being formed by thin, flexible sealing walls which project downwards from the spout body and between them delimit a substantially oval space, which sealing method comprises the step of pressing the foil walls onto the sealing walls using pressure-exerting means,

wherein

- the sealing walls of the spout body each have a curvature over their entire length, such that each sealing wall is outwardly convex over its entire length with respect to an imaginary plane passing through the outermost ends, which adjoin one another, of the sealing walls,

- the pressure-exerting means press the foil walls onto the sealing walls of the pouch without a support member internally supporting the sealing walls.

The present invention also provides for a plastic spout when produced by this method.

The design of the sealing walls means that the sealing walls are stable if, during the sealing operation, external pressure is applied to the sealing walls by means of pressure-exerting means, such as heated sealing jaws. Even with a low thickness of the sealing walls (less than 2 millimetres), this stability is such that

there is no need to use a support member during the sealing operation, with the result that the support member is preferably omitted.

When the spout is being sealed in place, only a small amount of heat is required to melt the sealing walls on the side of the foil walls which have been pressed onto them. This is because the heat which is supplied during sealing cannot be dissipated to parts of the spout which lie further away from the surface which is to be melted.

The heat required to form a seal can be provided using all known sealing methods, for example using heated sealing jaws and/or with the aid of ultrasound.

Further advantages of the spout with sealing walls according to the first aspect of the invention relate to the production of the spout in a suitable injection mould. This mould can be of relatively simple design, and furthermore the sealing walls require little plastic material. It is also possible for the cooling time for the sealing walls in the mould to be short, which is advantageous with regard to the production rate and cost price. Moreover, on account of the sealing walls, the mould can be provided with simple and efficient cooling means. In particular, the mould part which defines the inner side of the sealing walls and is composed of one or more components can be designed with a relatively large volume of material, so that there is space for efficient cooling means therein.

It is preferable for the sealing walls to be designed to be thin. The wall thickness of the sealing walls is in practice preferably at most 2 millimetres. The invention provides the possibility for the sealing walls to be designed with a thickness which as a minimum corresponds to the thickness of the foil walls.

It is preferable for the spout to be designed in such a manner that the sealing walls can move flexibly transversely with respect to their plane and on their inner side to be unsupported or supported by one or more flexible supporting parts of the spout body. Then,

after the spout has been fitted in the pouch, these sealing walls have a shock-absorbing capacity and can yield elastically with foil walls of the pouch. This reduces the risk of damage to and possible leaks from the pouch at the location of the transition from the foil wall to a sealing wall. Furthermore, the flexibility of the sealing walls is advantageous for the production of the sealed connection, for example because broader dimensional tolerances of the spout body are acceptable without having an adverse effect on correct operation of the sealing device.

In a preferred embodiment, it is provided that the outer sides of the sealing walls, against which the foil walls come to bear, are of smooth design, i.e. without ribs or the like. This design is advantageous, for example, if the foil wall includes one or more layers of metal foil, in particular aluminium foil.

It is preferable for the spout body to comprise a transverse wall which extends transversely between the sealing walls, the passage extending through the transverse wall. The transverse wall is preferably situated at or close to the upper edge of the sealing walls. For example, an outwardly projecting tubular part of the spout body, which forms the passage, adjoins the transverse wall.

The first aspect of the invention also relates to a method of sealing of a plastic spout between foil walls, in particular of a pouch. In this aspect, use is made of pressure-exerting means which press the foil walls onto the sealing walls of the pouch without a support member internally supporting the sealing walls. In an advantageous embodiment, during the sealing of the spout use is made of pressure-exerting means which yield elastically to press the foil walls onto the sealing walls of the spout. By way of example, use is made of pressure-exerting jaws with an elastic layer, for example made from heat-resistant foam material.

In an advantageous embodiment, the spout or just the sealing walls is/are preheated before the spout is sealed into the pouch.

The present invention also relates to a pouch provided with a spout

according to the invention.

Further advantageous embodiments of the spout according to the various aspects of the invention are described in the claims and the following description with reference to the drawing, in which, on a significantly enlarged scale compared to reality:

Fig. 1a shows a side view of a first exemplary embodiment of the plastic spout according to the first aspect of the invention,
Fig. 1b shows a front view of the spout shown in Figure 1a,
Fig. 1c shows a view from below of the spout shown in Figure 1a,
Fig. 1d shows a perspective view of the spout shown in Figure 1a from above,
Fig. 1e shows a perspective view of the spout shown in Figure 1a from below,

Fig. 2 a shows a side view of a second exemplary embodiment of the plastic spout according to the first aspect of the invention,
Fig. 2b shows a front view of the spout shown in Figure 2a,
Fig. 2c shows a view from below of the spout shown in Figure 2a,
Fig. 2d shows a perspective view of the spout shown in Figure 2a from above,
Fig. 2e shows a perspective view of the spout shown in Figure 2a from below,

Figures 1a-e show a spout 150 which is produced by injection-moulding from a suitable plastic material and which is intended to be sealed between two foil walls of a pouch.

The spout 150 has a single-part spout body with, on the top side, an outwardly projecting tubular part 152 which forms a passage 153 for delivering a medium from the pouch and/or feeding a medium to the pouch.

The tubular part 152 is provided with a screw thread 154 for a screw cap (not shown), which can be used to close off the spout 150.

The outwardly projecting tubular part 152 is furthermore provided

with a locking flange 155 for the screw cap and, beneath this, two circumferential flanges 156 which are used for handling means for the spout 150 and the pouch to engage on after the spout 150 has been sealed in the pouch.

On the underside, the spout 150 is provided with two sealing walls 158, 159 which project freely downwards, adjoin one another at their diametrically opposite ends and have an oval contour both on the inner side and on the outer side. The sealing walls 158, 159 adjoin the remainder of the spout body 150 only at their upper edge. Therefore, the sealing walls 158, 159 between them delimit an oval space.

In particular, the sealing walls 158, 159 have a curvature over their entire length, in such a manner that each sealing wall 158, 159 is externally convex with respect to the imaginary line passing through the outermost ends, which adjoin one another, of the sealing walls. This is more stable than the design which is known from the prior art in which the sealing walls have straight wall parts, and certainly more stable than the design according to the prior art in which the sealing walls have parts with an inwardly directed convexity. The latter variants provide too little resistance to the sealing walls being undesirably folded inwards, for example while the sealed connection is being produced.

The sealing walls 158, 159 are designed to be smooth on the outer side. The sealed connection to the foil walls can then be produced over virtually the entire surface of the thin sealing walls 158, 159. In this context, the thin design of the sealing walls 158, 159 makes a significant contribution to the short sealing time, since little heat has to be supplied in order to produce the fused connection.

The sealing walls 158, 159 have no internal support and are flexibly movable and can easily be moved transversely with respect to the plane of the sealing walls 158, 159.

The flexibility of the sealing walls 158, 159 provides the pouch

with a shock-absorbing capacity, as can be seen from a test which involves dropping a filled pouch. Furthermore, the flexibility of the sealing walls 158, 159 avoids overloading the foil walls of the pouch in the vicinity of the bottom edge of the sealing walls 158, 159.

When the sealed connection is being produced, it is preferable to use jaws which completely surround the sealing walls, so that a sufficient pressure can then be obtained between the foil walls and the sealing walls.

In a variant, to produce the sealed connection sealing jaws which are provided with ribs or another profile, for example a waffle profile or a block profile, are used instead of sealing jaws with smooth jaw surfaces, so that the initial pressure is exerted at the location of the elevated parts of the profile.

In the spout 170 shown in Figure 2a-e, the sealing walls 171, 172 are designed with an even greater curvature than in the embodiment shown in Figure 1.

At the location where the sealing walls 171, 172 meet, outwardly projecting thin lips 173, 174 are formed, these lips forming the transition to the parts of the foil walls of the pouch which are sealed together.

The inner side of the sealing walls may be of smooth design, as shown in the drawings, but it would also be possible to provide one or more formation, for example a thickened edge or a groove, in order to secure another component in the space between the sealing walls. By way of example, in this way it is possible for a flexible insert to be clipped into place, reducing the size of the effective area of the passage.

It will be clear that the spout body may have all kinds of designs, for example may be designed in combination with a stopper for closing off the passage, a male element if the spout is used as a connector, etc.

The claims defining the invention are as follows:

1. Method for sealing a plastic spout between two foil walls of a pouch,

- which spout comprises a spout body which forms a passage for delivering a medium from the pouch and/or feeding a medium to the pouch,

- the sealing zones of the spout body being formed by thin, flexible sealing walls which project downwards from the spout body and between them delimit a substantially oval space, which sealing method comprises the step of pressing the foil walls onto the sealing walls using pressure-exerting means,

wherein

- the sealing walls of the spout body each have a curvature over their entire length, such that each sealing wall is outwardly convex over its entire length with respect to an imaginary plane passing through the outermost ends, which adjoin one another, of the sealing walls,

- the pressure-exerting means press the foil walls onto the sealing walls of the pouch without a support member internally supporting the sealing walls.

2. Method according to claim 1, in which the sealing walls of the spout have a maximum thickness of 2 millimetres.

3. Method according to claim 1 or 2, in which the sealing walls are flexible transversely with respect to their plane and are supported on their inner sides.

4. Method according to any one of claims 1-3, in which the outer sides of the sealing walls are of smooth design.

5. Method according to any one of the preceding claims, in which the spout body comprises a transverse wall, which extends transversely with respect to the sealing walls, and in which the passage extends through the transverse wall.

6. Method according to claim 5, in which the transverse wall is provided with one or more corrugations transversely with respect to the plane of the transverse wall, which impart flexibility to the transverse wall, in such a manner that the transverse wall allows the flexible movement of the sealing walls.

7. Method according to claim 6, in which a V-shaped or U-shaped transverse wall connects the upper edges of the sealing walls to one another.

8. Method according to any one of the preceding claims, in which the spout has an outwardly projecting tubular part which extends outside the sealing walls and forms at least a part of the passage for the medium.

9. Method according to claim 8, in which the outwardly projecting tubular part is provided with one or more circumferential flanges.

10. Method according to claim 9, in which the one or more circumferential flanges are handling means for the spout to engage on.

11. Method according to any one of the preceding claims, in which the spout body is designed for a closure to be fitted to.

12. Method according to claim 11, in which the spout body is provided with a screw thread for a cap.

13. Method according to any one of claims 1 to 12, substantially as herein described with reference to any one of the Figures.

14. Method according to any one of claims 1 to 12, substantially as herein described.

15. A plastic spout when produced by the method according to any one of claims 1 to 12.

DATED this 21st day of November 2005

BALDWINS

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