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(72) Inventor(s):
Horst Molitor

(73) Proprietor(s):
TECTRO SMT GMBH
(Incorporated in the Federal Republic of Germany)
Thrasoltstrasse 46, Saarburg 54439, Germany

(74) Agent and/or Address for Service:
Wuesthoff & Wuesthoff Patentanwälte PartG mbB
c/o Maguire Boss, Patent & Trademark Attorneys,
24 East Street, St. Ives, Cambridge, PE27 5PD,
United Kingdom

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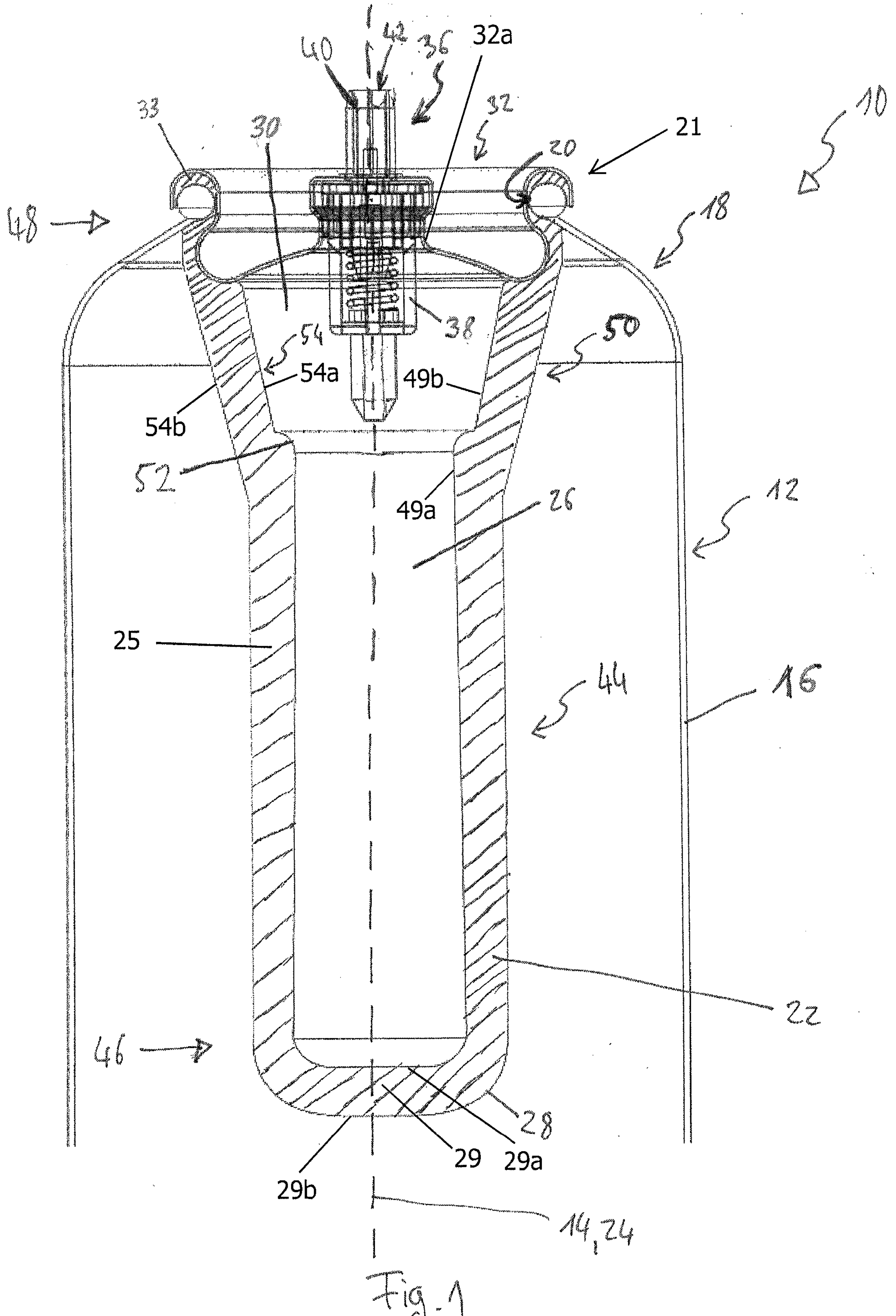

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Fig. 1

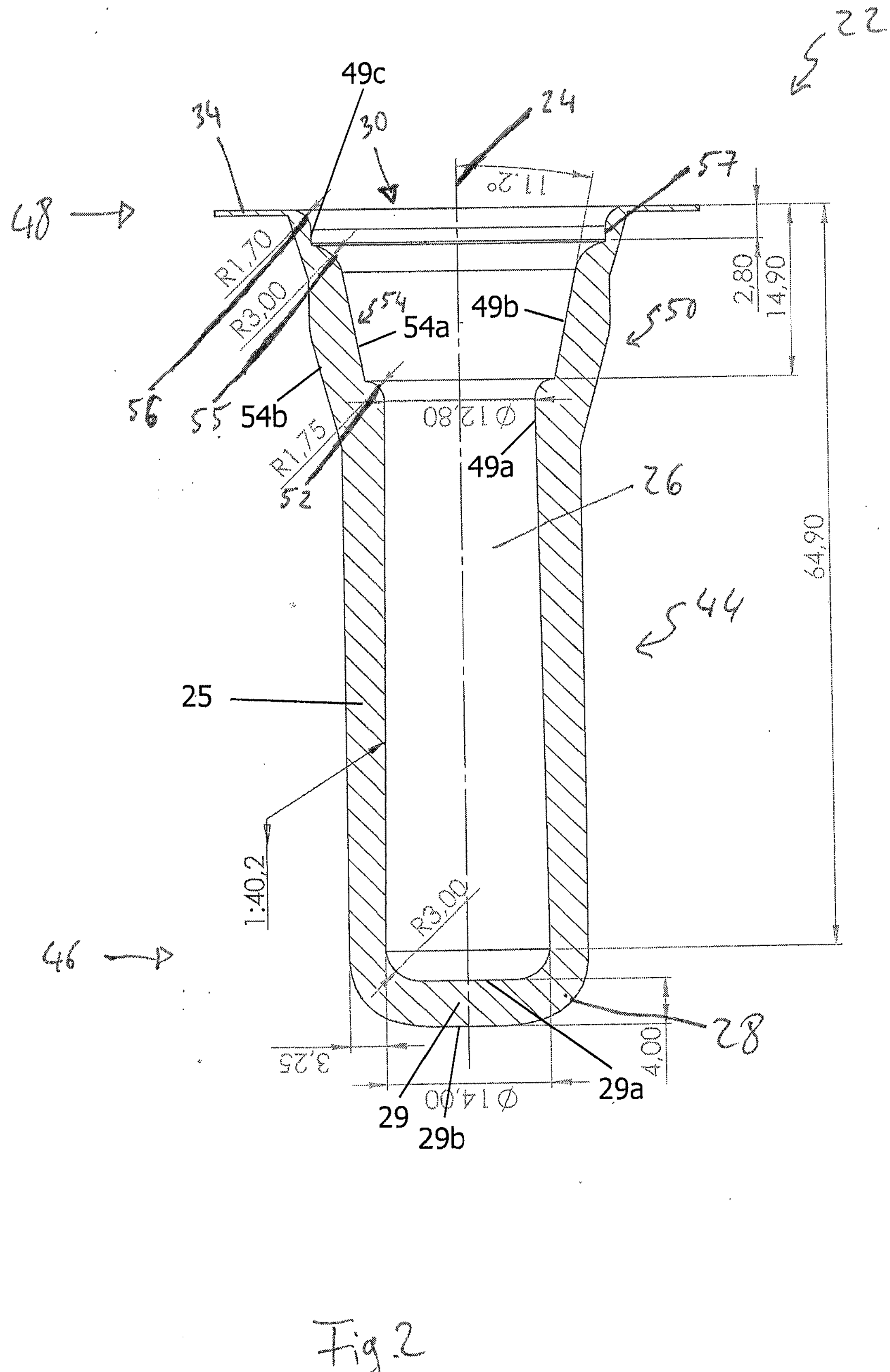
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Fig.2

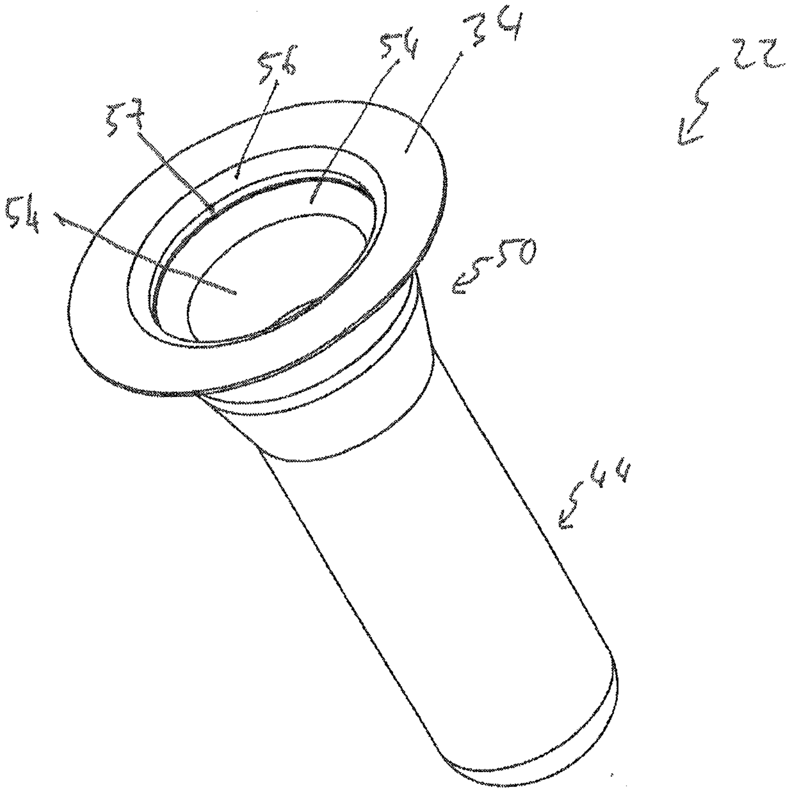

Fig 3

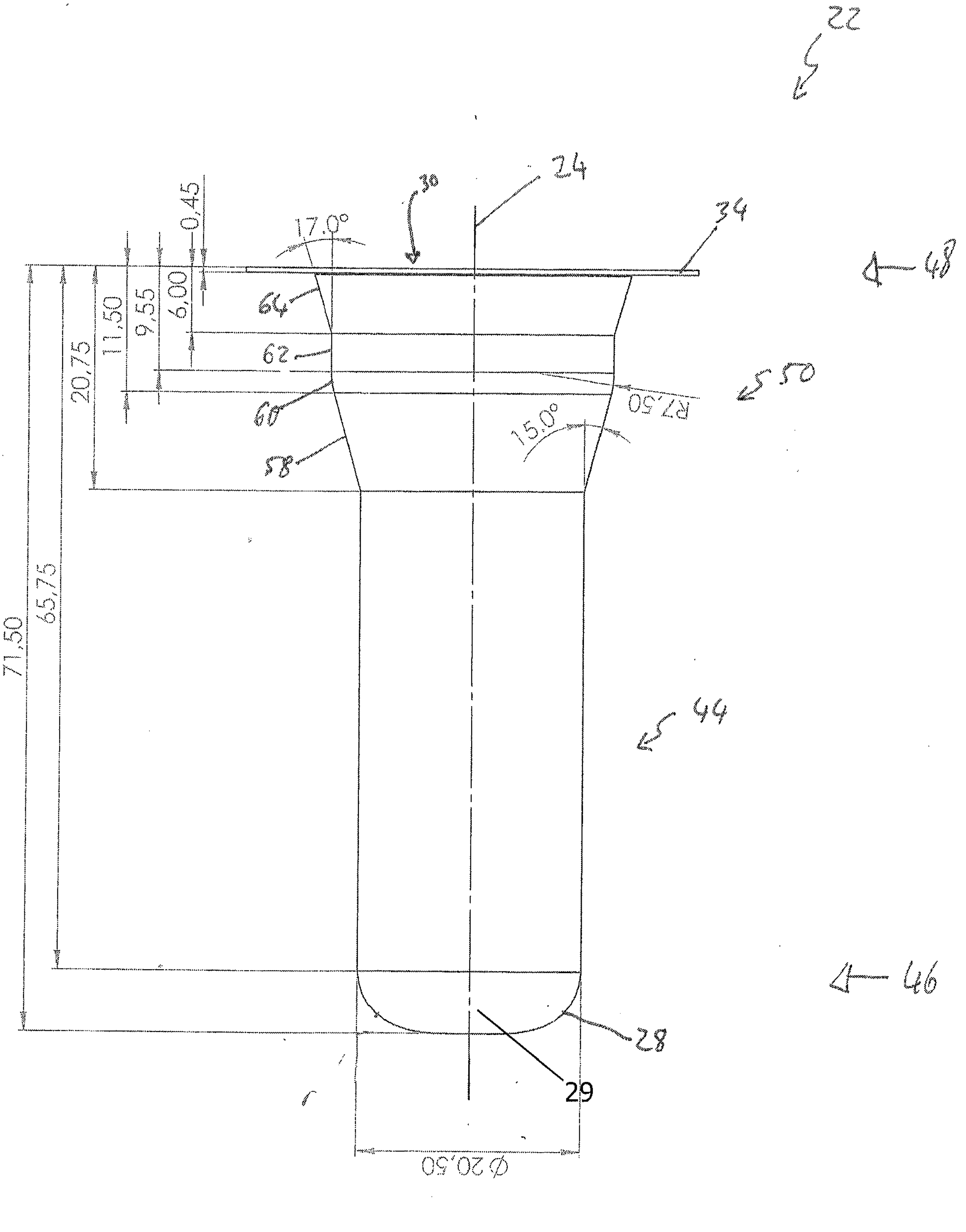
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Fig.4

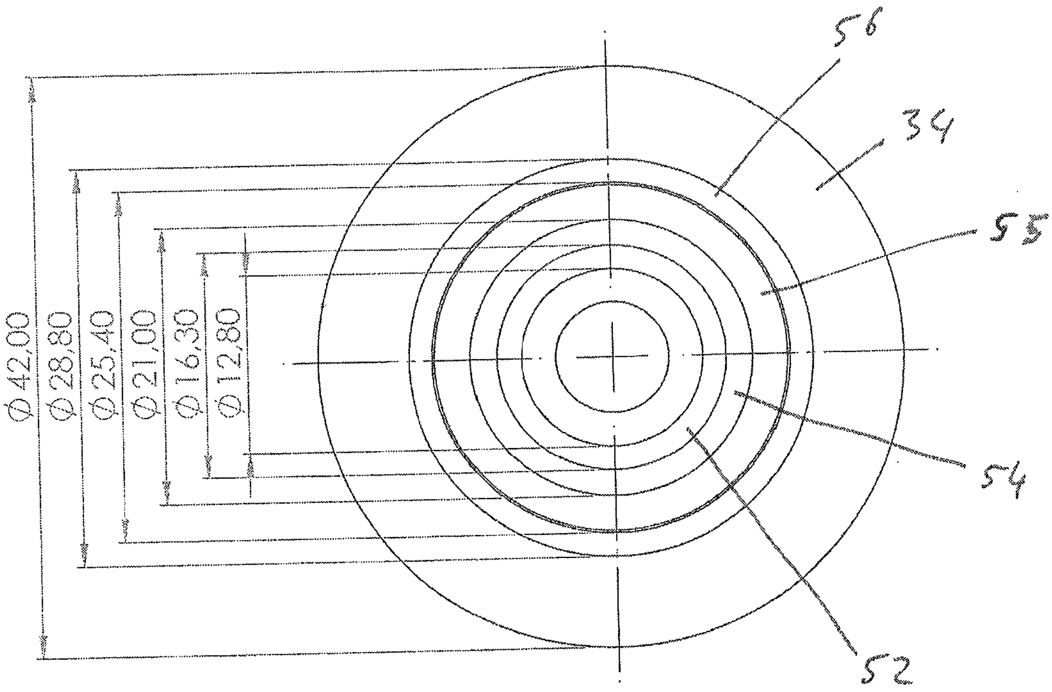
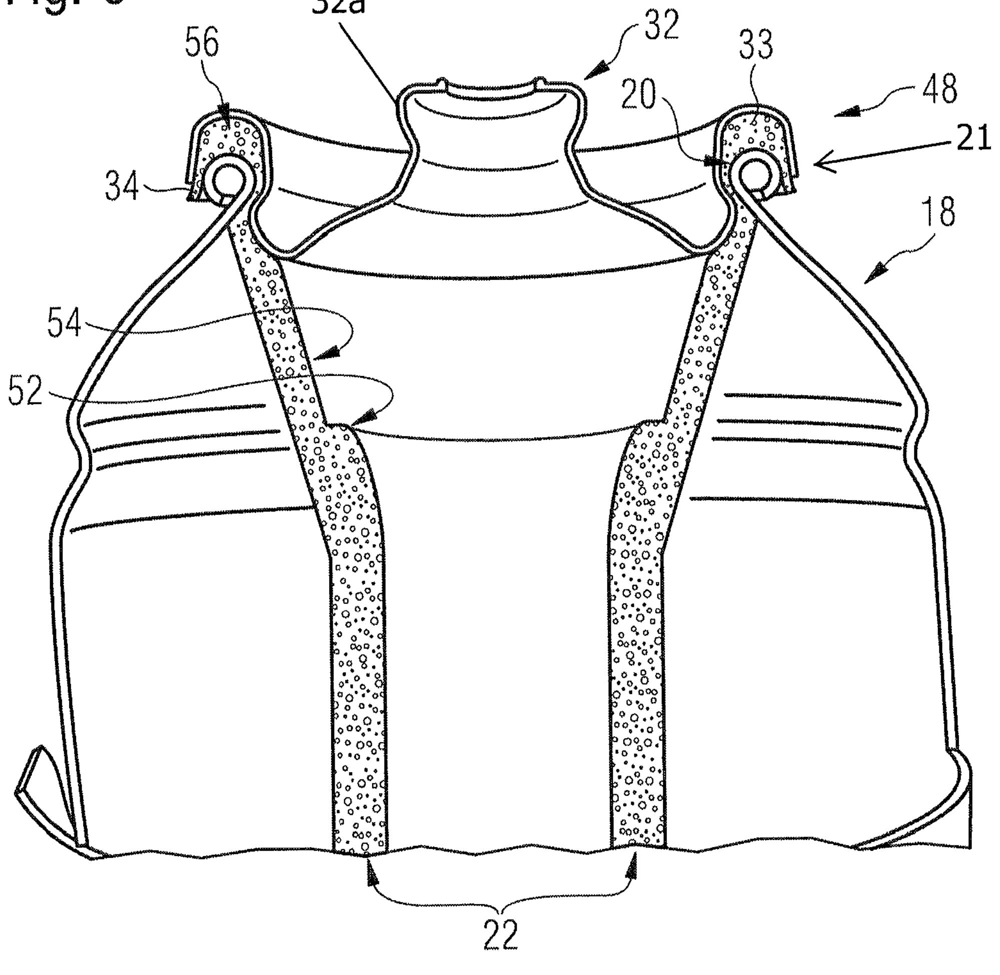


Fig. 5

Fig. 6



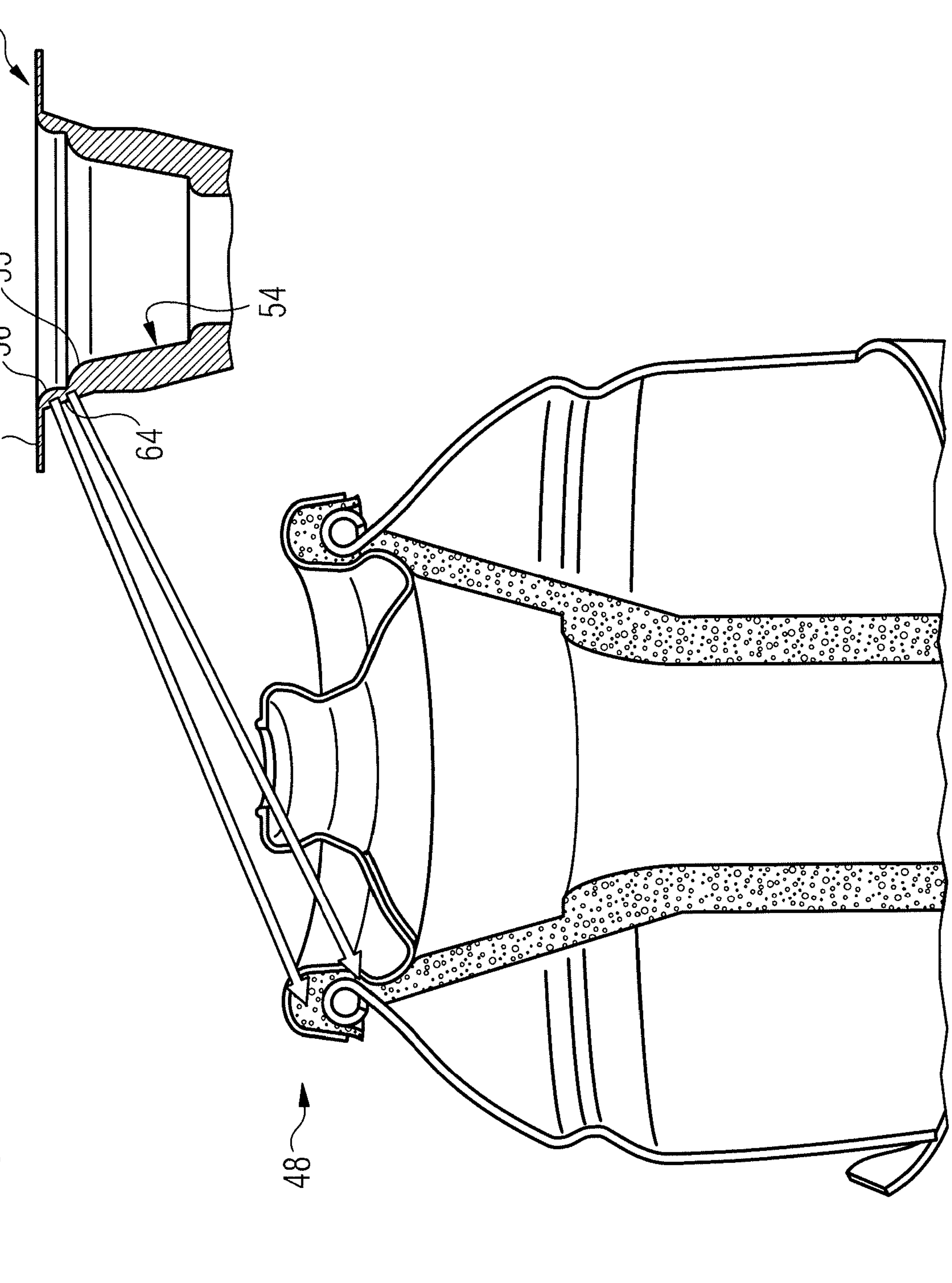


Fig. 7

Force-generating body for a device for dispensing contents

The invention relates to an elastically expandable force-generating body which can be filled with flowable contents and, in the filled state, as a result of its tensile stress, generates a dispensing force which acts on the contents.

For the prior art relating to such force-generating bodies, reference may be made, for example, to US 4,446,991.

An object at least of embodiments of the invention is to provide a force-generating body which can reliably be clamped in order to use the force-generating body as part of a metering device for the metered dispensing of contents.

An object at least of embodiments of the invention is further to provide a force-generating body which, on filling, exhibits sufficiently uniform expansion behavior.

A further object at least of embodiments of the invention is to provide a force-generating body which, on filling with a nominal fill quantity, experiences comparatively low plastic deformation and permits the dispensing of as large a proportion of the filled quantity as possible.

An object at least of embodiments of the invention is additionally to provide a force-generating body which exhibits high tear strength on filling.

An object at least of embodiments of the invention is moreover to provide a force-generating body which is simple to produce and the production costs of which are correspondingly low.

In addition, it is an object at least of embodiments of the invention to provide a metering device having a force-generating body.

In order to achieve at least part of the above or/and other objects, the invention provides according to one aspect a one-piece force-generating body which is made of elastically expandable material and is hollow on the inside. The force-generating body is intended for use as part of a device for the metered dispensing of contents which can be stored in the interior of the force-generating body and in some embodiments is of stable shape, that is to say it has a defined at-rest shape in the

absence of the action of external forces and also returns to that defined at-rest shape after (solely) elastic deformation. In an unfilled state, the force-generating body extends longitudinally in the direction of a longitudinal axis, wherein the force-generating body is closed in the region of a first axial end, is open in the region of an opposing second axial end and has a lateral wall which extends around the longitudinal axis and reaches from the first to the second axial end. The force-generating body thereby satisfies at least one of the following conditions:
(a) when seen in an axial longitudinal section, the lateral wall forms at least one pair of a wall piece that is linear on the wall inner side and, adjoining in the direction towards the second axial end, a wall piece that is convexly rounded on the wall inner side, wherein the wall piece that is convexly rounded on the wall inner side effects an increase in the inside diameter of the lateral wall relative to the wall piece that is linear on the wall inner side;
(b) the force-generating body has in the region of its second axial end, in particular at the second axial end, a radially outwardly protruding clamping lip;
(c) the lateral wall forms a tube portion with an inside diameter which decreases in the direction from the first to the second axial end and a substantially constant outside diameter.

In some embodiments, the wall piece that is convexly rounded on the wall inner side effects over its entire axial length an increase in the inside diameter of the lateral wall relative to the wall piece that is linear on the wall inner side.

In some embodiments, the tube portion is offset axially in the direction towards the first axial end relative to the wall piece that is convexly rounded on the wall inner side.

In some embodiments, the tube portion extends at least over half the total axial length of the force-generating body.

In some embodiments, the lateral wall, when seen in an axial longitudinal section, forms two or more pairs of a wall piece that is linear on the wall inner side and, adjoining in the direction towards the second axial end, a wall piece that is convexly rounded on the wall inner side, wherein the wall piece of each pair that is linear on the wall inner side is oriented differently relative to the longitudinal axis.

In some embodiments, the lateral wall has a wall thickness throughout which is greater than the axial thickness of the clamping lip.

In some embodiments, the force-generating body is closed at the first axial end by a base wall which has a substantially planar inner or/and outer surface at least in a base middle piece through which the longitudinal axis passes.

In some embodiments, the lateral wall, starting from the second axial end, forms a funnel portion with an inside diameter which becomes increasingly smaller and an outside diameter which becomes increasingly smaller in the direction towards the first axial end, wherein the lateral wall has in the funnel portion at least one wall piece with a conical inner circumferential surface or/and a conical outer circumferential surface.

In some embodiments, the wall piece that is convexly rounded on the wall inner side is situated in the funnel portion.

In some embodiments, the wall piece that is linear on the wall inner side is also situated in the funnel portion and forms a wall piece with a conical inner circumferential surface.

According to a further aspect, the invention provides a device for dispensing contents, comprising: a container, for example a bottle- or can-like container, having a container opening in the region of a container head; a force-generating body of the type discussed above inserted into the container; and a cover component which is connected, for example by crimping, to the container in the region of an opening edge of the container opening by interlocking engagement and with clamping of the force-generating body and which has structures for the attachment of a valve assembly.

In a force-generating body according to the invention, the elastic expandability of the force-generating body can be used to generate a dispensing force which results from the tensile stress of the force-generating body and acts on the contents and which is able to expel the contents from the force-generating body. The contents can be, for example, a liquid, pasty or gel-like substance which is to be dispensed in a metered manner by means of a metering device containing the force-generating body. For metering the dispensed quantity, the metering device can be equipped with a valve assembly which has a suitable actuating element for actuation by a user.

In some embodiments of the metering device, the totality of the dispensing force acting on the contents results solely from the tensile stress of the force-generating body, that is to say additional force-generating means in the form of a propellant gas or separate spring elements are not required. It will be appreciated that such additional force-generating means can be provided as assistance if desired, wherein at least the predominant part of the total available dispensing force advantageously results from the tensile stress of the force-generating body.

According to yet a further aspect, specific embodiments of the invention provide a one-piece force-generating body made of elastically expandable material for a device for dispensing contents, which force-generating body provides an interior for the contents and in an unfilled state extends longitudinally in the direction of a longitudinal axis, is closed in the region of a lower axial end and has in the region of an upper axial end an opening for the passage of contents. The force-generating body satisfies at least one of the following conditions:
- the force-generating body has a tubular portion which extends from the lower axial end in the direction towards the upper axial end, wherein the tubular portion has a substantially constant outside diameter and an inside diameter which decreases in the direction towards the upper axial end;
- the force-generating body has a funnel portion which extends from the upper axial end in the direction towards the lower axial end, wherein an inner side of the force-generating body forms in the funnel portion a convex rounded portion, whereby an inside diameter of the funnel portion increases in the direction towards the upper axial end;
- the force-generating body has at its upper axial end a radial lip which extends radially away from the longitudinal axis and can be used for the purpose of clamping the force-generating body.

It has been shown that a decrease in the wall thickness with a constant outside diameter in the direction towards the closed (first) axial end of the force-generating body can be advantageous for an expansion behavior of the force-generating body. In particular, it can thus be ensured that, on filling of the force-generating body, the force-generating body comes into areally close-fitting contact with the walls of an outer housing at as many points as possible, simultaneously or in succession. Local adhesion of the force-generating body to the housing during filling can thereby be prevented. Such an expansion behavior has been found to be advantageous in order to obtain stable and reproducible filling and expansion conditions within the context of mass production.

Within the context of such mass production, it is advantageous to produce the force-generating body by injection molding. For example, a plastics material is thereby injected into a mold, preferably from the direction of the lower axial end of the force-generating body that is to be produced. In this type of production, the convex rounded portion serves in particular to ensure that the mold is filled evenly with the plastics material. The above-mentioned expansion behavior can further be ensured by means of this convex rounded portion.

The radial lip serves, for example, to ensure a sufficiently tight connection between a cover component of the device and the force-generating body. In particular, the radial lip can be squeezed in the region of a crimp connection between the cover component and a housing (outer container) of the device, which permits a reliable connection between these three components which can be achieved inexpensively. In addition, the radial lip serves to ensure that the force-generating body does not accidentally fall into the housing of the device during assembly of the device. The radial lip is thus also designed for the use of mass production.

In one example, the force-generating body has at the lower axial end an inner side which extends substantially in a plane orthogonal to the longitudinal axis. The force-generating body can have at the lower axial end an outer side which extends substantially in a plane orthogonal to the longitudinal axis. The two planes are, for example, axially spaced apart from one another.

The funnel portion can comprise a conical portion. In the conical portion, the inside diameter increases linearly in the direction towards the upper (second) axial end. This linear increase is to be understood as being an approximately linear increase, since manufacturing tolerances in particular must be taken into account. For example, the conical portion adjoins the convex rounded portion.

In one example, the inner side of the force-generating body forms in the funnel portion two convex rounded portions which are axially spaced apart from one another. As a result of each of the rounded portions, the inside diameter of the funnel portion increases in the direction towards the upper axial end.

The conical portion can adjoin each of the two convex rounded portions. For example, the conical portion is delimited in the axial direction at the top by one of the two convex rounded portions and at the bottom by the other of the two convex rounded portions. The radial lip adjoins the funnel portion, for example. The tubular portion can adjoin the funnel portion. "Adjoin" is to be understood as meaning an immediate transition of one region into another region, that is to say a direct connection of the two regions without further regions lying therebetween.

In one example, the inner side of the force-generating body forms a convex rounded portion at a transition between the funnel portion and the radial lip, wherein the inside diameter of the funnel portion increases in the direction towards the upper axial end as a result of this rounded portion.

According to a further aspect there is provided a device for dispensing contents which comprises at least the force-generating body. The device can further comprise a housing or a container having a housing neck or container head. For example, the device comprises a cover component. The cover component can be connected to the housing neck by a crimp connection. The device can correspond to the metering device described above.

In one example, at least part of the funnel portion runs in the region of the crimp connection between the housing neck and the cover component. For example, this part of the funnel portion comprises the convex rounded portion. The convex rounded portion can be located in the region of the crimp connection between the housing neck and the cover component.

For example, the housing has a housing axis, and the force-generating body is suspended in the housing with its longitudinal axis substantially parallel to the housing axis. In the unfilled state, the force-generating body can thereby be at an axial distance from a base of the housing and at a radial distance all round from a casing of the housing. On filling of the force-generating body, the force-generating body expands until, in a final filled state given by a nominal fill quantity of the device, it is in contact with the casing over a large part of its axial length and preferably is also in contact with the base of the housing.

The invention will be explained in greater detail hereinbelow by means of the accompanying drawings, in which:

Fig. 1 shows a schematic axial longitudinal section through a metering device having a force-generating body,

Fig. 2 shows a schematic axial longitudinal section of the force-generating body,

Fig. 3 is a schematic perspective view of the force-generating body,

Fig. 4 is a schematic outside view of the force-generating body,

Fig. 5 is a schematic outside view of the force-generating body in the axial direction,

Fig. 6 shows an axial longitudinal section through an example of a metering device having an example of a force-generating body, and

Fig. 7 shows an axial longitudinal section through the example of a metering device having the example of a force-generating body.

Reference will first be made to Fig. 1. The metering device, designated 10, shown therein is by way of example in the form of a dispenser for contents. It may be a fire extinguisher, although other forms of use, such as for cosmetics, foodstuffs or industrial substances such as, for example, lubricants, are equally possible. In general, the device 10 serves to store and dispense in a metered manner flowable contents.

The device 10 has a housing (container) 12, for example in the form of a bottle or can, having a housing axis 14, a housing casing 16 enclosing the axis 14, and a housing base (not shown) which adjoins the casing 16 and closes the housing 12 axially at the bottom. In the region of the axially upper end of the housing 12, the casing 16 runs radially inwards and forms a housing neck (container head) 18 having a housing or container opening 20.

The force-generating body, designated 22, is elongate in form, approximately in the manner of a condom, in the unfilled, relaxed state and has a longitudinal axis 24. The force-generating body 22 is in one-piece form, is hollow on the inside and is of stable shape. It is manufactured from elastically expandable material and is designed for the device 10 for the metered dispensing of the contents which can be stored in the interior of the force-generating body 22.

The force-generating body 22 in an unfilled state extends longitudinally in the direction of the longitudinal axis 24, wherein the force-generating body 22 is closed in the region of a first (lower) axial end 46, is open in the region of an opposing second (upper) axial end 48 and has a lateral wall 25 which extends around the longitudinal axis 24 and reaches from the first to the second axial end. In its interior, it forms an internal space 26 which serves to receive sprayable, for example foaming, contents. The contents are, for example, an extinguishing agent, for example in the form of an extinguishing gel or an extinguishing liquid.

The force-generating body 22 is produced by an injection-molding method with a closed end, or a base wall 28, and an opening 30 formed at the opposite longitudinal end, preferably from a silicone material, in particular liquid silicone rubber. It will be appreciated that other rubber-elastic materials can equally be used, for example a polyurethane-based plastics material. In the example shown, the force-generating body 22 is in single-ply form, but it can optionally be coated on the inside or/and on the outside with a comparatively thin layer of another material. The force-generating body 22 has in the region of the closed end 28 an inner side which extends in a first plane orthogonal to the longitudinal axis 24.

The force-generating body 22 is closed at the first axial end 46 by the base wall 28, which has a substantially planar inner surface 29a or/and a substantially planar outer surface 29b at least in a base middle piece 29 through which the longitudinal axis 24 passes. In the region of the closed end 28, the force-generating body 22 has an outer side which extends orthogonally in a second plane orthogonal to the longitudinal axis 24. The first plane is spaced apart from the second plane in the axial direction. Both an inner side and an outer side of the force-generating body are in rounded form at the closed end 28.

The force-generating body 22 is so suspended in the housing 12 that, in the unfilled state, its longitudinal axis 24 runs substantially parallel to the housing axis 14, in particular approximately coincides therewith. In the region of its open longitudinal end it is fastened to the housing 12. In the example shown, the device 10 comprises a cover component 32 which is connected to the container 12 in the region of an opening edge 21 of the container opening 20 and has structures 32a which ensure that a valve assembly 36 is held securely and stably on the cover component 32. The cover component 32 is connected in its radially outer region to the housing neck 18 in the region of the housing opening 20 by means of a crimp connection. In the region of the crimp connection, a space 33 is formed between the cover component 32 and the housing neck 18. A portion of a radial lip (clamping lip) 34 of the force-generating body 22 can be located in the space 33.

In the non-assembled state of the device 10, the radial lip 34 extends radially away from the longitudinal axis 24. In the non-assembled state of the device 10, the radial lip 34 preferably has an outside diameter which is larger than an inside diameter of the housing opening 18. The force-generating body 22 can thereby be prevented from falling into the housing 12. Immediately after assembly of the device 10, that is to say before the device is filled, at least a radially outermost part of the radial lip 34 runs outside the region of the crimp connection, that is to say outside the interior of the housing 12. In other words, at least part of the radial lip 34 protrudes outwards from the region of the crimp connection. If necessary, the protruding part of the radial lip 34 can be removed after filling. Squeezing of the radial lip 34 between the cover component 32 and the housing neck 18 makes it possible to prevent contents from escaping in an undesired manner from the internal space 26 at the connection point between the cover component 32 and the force-generating body 22.

The cover component 32 serves as the carrier for the valve assembly, designated generally 36, which can be, for example, clamped, adhesively bonded or otherwise fastened to the cover component 32. It passes with a valve base body 38 through a central opening, not designated in greater detail, of the cover component 32 and has an actuating element 40 which can be depressed in the axial direction by the user and at the same time forms an outlet channel 42 for the contents to be sprayed. The geometry of the outlet channel 42 can differ according to the configuration, in particular the viscosity of the contents.

In the example shown, the force-generating body 22 comprises a tubular portion (tube portion) 44. The tubular portion extends from a lower (first) axial end 46 of the force-generating body 22 in the direction towards an upper (second) axial end 48 of the force-generating body 22. The force-generating body 22 is configured so as to be radially symmetrical with respect to its longitudinal axis 24. Accordingly, it has a circular cross-section both on the inner circumferential side and on the outer circumferential side. In the tubular portion 44 there are no pronounced variations in the wall thickness, especially no alternating increases and decreases in the wall thickness. The tubular region 44 has a substantially constant outside diameter, wherein an inside diameter of the force-generating body 22 in the tubular region 44 decreases from the lower axial end 46 in the direction towards the upper axial end 48. This means that the wall thickness in the region of the tubular portion 44 increases from the lower axial end 46 to the upper axial end 48.

When seen in an axial longitudinal section, the lateral wall 25 forms at least one pair of a wall piece that is linear on the wall inner side and, adjoining in the direction towards the second axial end 48, a wall piece that is convexly rounded on the wall inner side. Wall pieces that are linear on the wall inner side are formed at 49a, 49b, 49c; wall pieces that are convexly rounded on the wall inner side are formed at 52, 55, 56. The wall pieces 52, 55, 56 that are convexly rounded on the wall inner side each effect an increase in the inside diameter of the lateral wall 25 relative to the wall piece 49a, 49b or 49c that is linear on the wall inner side located directly therebeneath. The force-generating body 22 has a funnel portion 50 which is arranged above the tubular portion 44 and merges directly into the tubular portion. The lateral wall 25, starting from the second axial end 48, forms the funnel portion 50 with an inside diameter which becomes increasingly smaller and an outside diameter which becomes increasing smaller in the direction towards the first axial end 46, wherein the lateral wall 25 has in the funnel portion 50 at least one wall piece 54 with a conical inner circumferential surface 54a or/and a conical outer circumferential surface 54b. In a region located at the axial end 48 of the force-generating body 22, the radial lip 34 merges into the funnel portion 50. The funnel portion 50 has a substantially funnel-like shape in that its outer side, when seen as a whole, widens in the direction towards the upper axial end 48. The funnel portion 50 begins, starting from the tubular portion 44 in the direction towards the upper axial end 48, at the point at which the outside diameter of the force-generating body 22 is no longer constant. The inner side of the force-generating body 22 forms in the funnel portion 50 the convexly rounded wall piece 52, which can also be referred to as a convex rounded portion 52. This is so configured that the inside diameter of the funnel portion 50 increases in the direction towards the upper axial end 48. In other words, the convex rounded portion 52 forms a rounded step which slopes radially outwards from the lower axial end 46 in the direction towards the upper axial end 48. The funnel portion 50 comprises the wall piece 54 with a conical inner circumferential surface 54a and/or a conical outer circumferential surface 54b, which can also be referred to as the conical portion 54. In the conical portion 54, the inside diameter of the force-generating body 22 increases linearly in the direction towards upper axial end 48. This conical portion 54 directly adjoins the convex rounded portion 52.

In Fig. 2 to 5, the force-generating body 22 is shown. It is the force-generating body 22 from Fig. 1. Fig. 2 to 5 contain dimensions of the force-generating body 22, which represent an example of a configuration. It is of course possible to deviate from these dimensions, for example if required by the dimensioning of the housing neck

18, the dimensioning of the cover component 32, the desired net fill quantity of the device 10 or the material to be used for the force-generating body 22. Each of the recorded length, radius and diameter data is given in the unit centimeters. However, each of these data can also be given in a different unit, for example in inches or in a scaled centimeter measure (e.g. 1.5 cm or 2.0 cm as the unit of measurement). In other words, the force-generating body 22 shown can be scaled substantially uniformly while retaining at least some relative ratios of recorded dimensions.

Referring to Fig. 2 to 5, it becomes clear how the radial lip 34 is formed. It extends radially away from the longitudinal axis 24. It can additionally be seen that the inner side of the force-generating body 22 forms in the funnel portion 50 a further convexly rounded wall piece 55, which can be referred to as a further convex rounded portion 55, and a further convexly rounded wall piece 56, which can be referred to as a further convex rounded portion 56. Each of these two further convex rounded portions 55, 56 is so configured that the inside diameter of the funnel portion 50 increases in the direction towards the upper axial end 48. As in the case of the convex rounded portion 52, each of the further convex rounded portions 55 and 56 can be referred to as a rounded step which slopes radially outwards from the lower axial end 46 in the direction towards the upper axial end 48. The conical portion 54 adjoins the convex rounded portion 52 with one axial end and the further convex rounded portion 55 with the other axial end. In other words, the conical portion 54 lies between the convex rounded portion 52 and the further convex rounded portion 55. The further convex rounded portion 56 is located in the axial direction on the same side of the conical portion 54 as the further convex rounded portion 56. In the embodiment shown, the force-generating body 22 has a cylindrical portion 57. The cylindrical portion 57 has a substantially constant inside diameter. The cylindrical portion 57 lies between the convex rounded portion 55 and the convex rounded portion 56. Instead of a cylindrical portion 57, a further conical portion can be provided. The convex rounded portion 56 merges into the radial lip 34.

The cylindrical portion 57 and the further convex rounded portion 56 are so designed that the further convex rounded portion 56, after the cover component 32 has been connected to the force-generating body 22 and the housing neck 18, comes to lie in the space 33, as shown in Fig. 1. The cylindrical portion 57 is thereby squeezed between the housing neck 18 and the cover component 32. The part of the force-generating body 22 in which the further convex rounded portion 56 is arranged is also squeezed between the housing neck 18 and the cover component 32 in the space 33. In other words, the further convex rounded portion 56 and the cylindrical portion 57 ensure a leak-proof connection with the cover component 32. The funnel portion 50 has a smaller wall thickness on both axial sides of the convex rounded portion 56 than in the region of the convex rounded portion 56. The further convex rounded portion 56 thereby forms a sealing ring. The force-generating body 22 can thereby also better be prevented from slipping back in the direction towards the lower axial end 46. Part of the radial lip 34 can also come to lie in the space 33 as a result of the crimping and/or be squeezed there between the cover component 32 and the housing neck 18.

Referring to Fig. 4, it can further be seen that the funnel portion 50 has an outer surface with multiple portions 58, 60, 62, 64. The outer surface of the force-generating body 22 in the portion 58 is conical, wherein the outside diameter in the portion 58 increases linearly in the direction towards the upper axial end 48. In the portion 60, the outer surface is rounded. In this portion 60 too, the outside diameter of the force-generating body 22 increases in the direction towards the upper axial end 48. In the portion 62, the force-generating body 22 has a substantially cylindrical outer surface. In other words, the outside diameter in this portion 62 is approximately constant. The outer surface of the force-generating body 22 is conical in the portion 64, wherein the outside diameter of the force-generating body 22 in this portion 62 increases linearly in the direction towards the upper axial end 48.

Fig. 6 and 7 show an embodiment of the device 10 which has been described hereinbefore. The device 10 shown in Fig. 6 and 7 also comprises an embodiment of the force-generating body 22 which has been described above. In particular the dimensions of the device 10 and of the force-generating body 22 can deviate in the case of Fig. 6 and 7 from Fig. 1 to 5.

It can be seen in Fig. 6 that the further convex rounded portion 56 is located in the space 33 which is formed in the region of the crimp connection between the cover component 32 and the housing neck 18. In addition, part of the radial lip 34 is located in the space 33. Part of the radial lip 34 which protrudes beyond the radially outermost edge of the cover component 32 has already been removed in the illustrated embodiment. For example, this part can be removed, in particular by shearing, during the crimping operation in which the cover component 32 is connected to the force-generating body 22 and the housing neck 18. The convex rounded portion 52 lies in the interior of the housing 18. The conical portion 54 likewise lies in the interior of the housing 18, axially beneath the cover component 32.

Fig. 7 shows the same embodiment from Fig. 6. In addition, a detail of Fig. 2 has been inserted. The position of an edge at the transition between the portion 64 and the radial lip 34 is indicated by an arrow. Here too, it is clear that both part of the radial lip 34 and the further convex rounded portion 56 are located in the space 33. In addition, the position of an axially upper end of the further convex rounded portion 55 is indicated by an arrow. In the illustrated embodiment, this is in contact with an underside of the cover component 32. This underside of the cover component 32 faces away from the upper axial end 48.

On filling of the force-generating body 22 with contents, the force-generating body 22 begins to expand. The expansion of the force-generating body 22 takes place both in the radial direction and in the axial direction, namely largely simultaneously. When the degree of filling is sufficient, but significantly before a nominal fill volume is reached, for example at a degree of filling of a maximum of 50 % or even only a maximum of 40 %, for example only a maximum of 35 % of the nominal fill volume, the force-generating body 22 is finally in contact with the housing casing 16 all round. Two partial spaces between the housing 12 and the force-generating body 22, the volumes of which become increasingly smaller as the force-generating body 22 is filled further, are thereby partitioned off axially above and below the contact region in which the force-generating body 22 is in contact with the housing casing 16. The contact region in which the force-generating body 22 is in contact with the housing casing 16 thereby expands further in both axial directions, that is to say axially downwards and axially upwards (although to a lesser extent axially downwards).

In the final filled state, the force-generating body 22 has expanded axially until it is at least close to the base of the housing 12. In this state, the force-generating body 22 is in contact with the housing casing 16 over a large part of the axial length thereof. The force-generating body 22 preferably abuts the housing base – if at all – only shortly before the final filled state is reached, for example only after at least 85 %, preferably at least 90 % and more preferably at least 95 % of the total fill quantity specified by the nominal fill quantity of the device 10 has been introduced.

The tensile stress stored in the force-generating body 22 effects a force which acts on the contents which have been introduced and by means of which the contents are expelled from the device 10 on actuation of the valve assembly 36. Further force-generating means are not present in the device 10 shown. The totality of the dispensing force is applied by the force-generating body 22.

claims

1. A one-piece force-generating body, which is made of elastically expandable material and is hollow on the inside and in particular is of stable shape, for a device for the metered dispensing of contents which can be stored in the interior of the force-generating body, wherein the force-generating body in an unfilled state extends longitudinally in the direction of a longitudinal axis, wherein the force-generating body is closed in the region of a first axial end, is open in the region of an opposing second axial end and has a lateral wall which extends around the longitudinal axis and reaches from the first to the second axial end, wherein when seen in an axial longitudinal section, the lateral wall forms two or more pairs of a wall piece that is linear on the wall inner side and, adjoining in the direction towards the second axial end, a wall piece that is convexly rounded on the wall inner side, wherein the wall piece that is convexly rounded on the wall inner side forms a rounded step and effects an increase in the inside diameter of the lateral wall relative to the wall piece that is linear on the wall inner side, wherein the wall piece of each pair that is linear on the wall inner side is oriented differently relative to the longitudinal axis.

2. The force-generating body as claimed in claim 1, wherein the wall piece that is convexly rounded on the wall inner side effects over its entire axial length an increase in the inside diameter of the lateral wall relative to the wall piece that is linear on the wall inner side.

3. The force-generating body as claimed in claim 1 or 2, wherein the lateral wall forms a tube portion with an inside diameter which decreases in the direction from the first to the second axial end and a substantially constant outside diameter, wherein the tube portion is offset axially in the direction towards the first axial end relative to the wall piece that is convexly rounded on the wall inner side.

4. The force-generating body as claimed in claim 3, wherein the tube portion extends at least over half the total axial length of the force-generating body.

5. The force-generating body as claimed in any one of claims 1 to 4, wherein the force-generating body has in the region of its second axial end, in particular at the second axial end, a radially outwardly protruding clamping lip, wherein the lateral

wall has a wall thickness throughout which is greater than the axial thickness of the clamping lip.

6. The force-generating body as claimed in any one of claims 1 to 5, wherein the force-generating body is closed at the first axial end by a base wall which has a substantially planar inner or/and outer surface at least in a base middle piece through which the longitudinal axis passes.

7. The force-generating body as claimed in any one of claims 1 to 6, wherein the lateral wall, starting from the second axial end, forms a funnel portion with an inside diameter which becomes increasingly smaller and an outside diameter which becomes increasingly smaller in the direction towards the first axial end, wherein the lateral wall has in the funnel portion at least one wall piece with a conical inner circumferential surface or/and a conical outer circumferential surface.

8. The force-generating body as claimed in claim 7, wherein the wall piece that is convexly rounded on the wall inner side is situated in the funnel portion.

9. The force-generating body as claimed in claim 8, wherein the wall piece that is linear on the wall inner side is also situated in the funnel portion and forms a wall piece with a conical inner circumferential surface.

10. A device for dispensing contents, comprising
- a container, for example a bottle- or can-like container, having a container opening in the region of a container head,
- a force-generating body as claimed in any one of claims 1 to 9 inserted into the container, and
- a cover component which is connected, in particular by crimping, to the container in the region of an opening edge of the container opening by interlocking engagement and with clamping of the force-generating body and which has structures for the attachment of a valve assembly.