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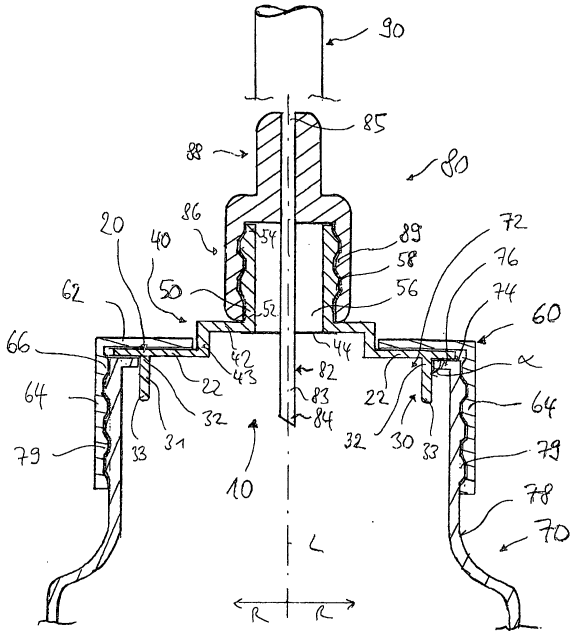
(54) **Adaptor for connecting a feeding container to an enteral feeding coupling, in particular for a baby bottle feeding assembly**

(57) The invention relates to an adaptor (10) for connecting a feeding container (70) to an enteral feeding coupling (80), in particular for a baby bottle feeding assembly. The adaptor (10) comprises a supporting member (20) for connection with the feeding container (70), a sealing (30) which is fastened to the supporting member (20) suitable for providing a fluid-tight connection between the adaptor (10) and the feeding container (70) and an end section (50) suitable for connecting the adaptor (10) to the feeding coupling (80).

Fig. 2

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## Description

**[0001]** The invention relates to an adaptor for connecting a feeding container to an enteral feeding coupling, in particular for a baby bottle feeding assembly.

**[0002]** The adaptor of the present invention in particular is used in the field of medical supplies and nursing care. For example in some hospitals patients are fed through a feeding container connected to a feeding set or feeding assembly which is connected to the patient via a feeding conduit in order to feed the patient with a liquid contained in the feeding container. In such a case a baby bottle can be used for the feeding container. However, the feeding container or baby bottle can be purchased from many different manufacturers and, thus, there is a broad range of different sizes and diameters of the feeding containers and their openings.

**[0003]** It is an object of the present invention to provide an adaptor for connecting a feeding container to an enteral feeding coupling for an easy and fluid-tight connection and which can be used for different sizes of feeding containers.

**[0004]** The above object is achieved by an adaptor according to claim 1. The adaptor comprises a supporting member for connection with the feeding container, a sealing which is fastened to the supporting member suitable for providing fluid-tight connection between the adaptor and the feeding container and an end section suitable for connecting the adaptor to the feeding coupling.

**[0005]** Preferably, the adapter is configured to cooperate with a range of different sizes of feeding containers and/or with a range of different diameters for the opening of the feeding containers. In particular, the sealing is shaped and/or fixed to the adaptor in such a manner that the adaptor can cooperate with different sizes of the opening of the feeding container. Preferably, the sealing is fastened to the supporting member in an area of the supporting member suitable for providing a fluid-tight connection between the adaptor and the feeding container and/or suitable for use for different sizes of the opening of the feeding container.

**[0006]** Preferred embodiments are described in claims 2 to 15.

**[0007]** According to a preferred embodiment, the sealing comprises at least one sealing member. In particular, the sealing member can be formed as a ring, annular or plate-like etc. Preferably, the at least one sealing member can be connected to the lower side, the upper side and/or the face side of the supporting member. The connection can be made by means of moulding the sealing material onto or over the supporting member, preferably the supporting plate.

**[0008]** The sealing member can also be designated as sealing portion, sealing unit or gasket. If in the following the sealing itself, the sealing member or features thereof are mentioned, then only one sealing member, the sole sealing member, several sealing members or all sealing members can have the features and/or characteristics mentioned.

**[0009]** According to a further preferred embodiment, the sealing member is integrally formed with the supporting member. In particular, the sealing member is moulded at least partially over or to the supporting member. In other words, preferably, sealing member and supporting member build a one-piece structure which is produced by moulding a sealing material on or over the preformed supporting member made of a rigid material in order to secure the sealing member to the supporting member. For example, the supporting member is made of a rigid plastic material and the sealing member is made of a resilient material. Further, it is preferred to provide the adaptor with the supporting member, the sealing member and the end section as a one-part member or element. Preferably, at least the supporting member is produced by means of injection moulding. The supporting member can be a base or plate, in particular in form of an annular ring.

**[0010]** In an advantageous embodiment, the sealing member extends substantially parallel to the supporting member or in an inclined direction from the supporting member. In particular, the sealing member extends in a direction from the supporting member to include an angle of more than 90°, for example in the range of 91° to 135°. Particularly via the inclined extension of the sealing member and/or via positioning the sealing member in a predetermined area of the supporting member, it is possible to use the adapter for feeding containers having different opening diameters.

**[0011]** In a further preferred embodiment, the sealing member is tapered and/or is shaped annular. To simplify the placement of the adapter on the opening side of the feeding container, the free end of the sealing member is tapered.

**[0012]** According to a preferred embodiment, the adaptor comprises an intermediate section between the supporting member and the end section. Like the supporting member and/or the sealing member also the intermediate section can be formed annular or can be provided with a base plate and a wall extending form the base plate. Furthermore, the intermediate section can build a shoulder. In general, the intermediate section is formed to improve the rigidity of the adapter.

**[0013]** In a preferred embodiment, a thin layer which can be pierced through when the feeding coupling is connected to the adaptor. Preferably, the thin layer is connected to the intermediate section and/or the supporting member. In particular, a film or foil, especially made of plastic material is used for the thin layer.

**[0014]** According to a preferred embodiment, a fastening element is provided for detachably or removably fastening the adaptor to the feeding container. Basically, the fastening element can be integrally formed with the supporting member or can be separate from the supporting member, in particular shaped as a cap. Preferably, the fastening element comprises a threaded section for engaging a threaded section of the feeding container. This

enables a screw connection of the feeding container and the adaptor.

**[0015]** In order to provide a connection between the end section and the feeding coupling, the end section can comprise a threaded section for engaging a threaded section of the feeding coupling.

**[0016]** In a further preferred embodiment, the feeding coupling comprises a tube having a feeding channel in order to allow a fluid connection between the feeding container and the feeding conduit. Preferably, the tube has a first end extending in the area of the feeding container and a second end extending up to the outer end of the feeding coupling adjacent to the feeding conduit. The first end of the tube can have a tapered and/or sharp shape in order to pierce through the thin layer when the feeding coupling is connected to the adaptor. Before the feeding coupling is mounted to the adaptor the thin layer of the adapter allows a fluid-tight seal of the feeding container closed with the adaptor mounted at the opening.

**[0017]** According to a preferred embodiment, the feeding coupling comprises a first end portion for fastening the feeding coupling to the end section of the adaptor and a second end portion for connecting a feeding conduit to the feeding coupling. To provide a screw connection between feeding coupling and adaptor the feeding coupling comprises a threaded section for engaging the threaded section of the end section.

**[0018]** The present invention provides an adaptor for a quick and fluid-tight connection between a feeding container, in particular a baby bottle, and a feeding coupling, in particular a feeding set. Preferably, the sealing is made of a softer material than the supporting member and the softer material is over moulded onto the harder material of the supporting member. The sealing member can be tapered so as to allow for a seal within different diameter of neck bottles. The thin layer allows for a mixture to be mixed in the feeding container if required before the feeding coupling is connected to the adaptor. In order to fasten the adaptor to the feeding container in the area of the container opening a cap can be used as a fastening element.

**[0019]** The invention will be explained in the following with reference to the drawings in more detail, wherein:

Fig. 1 is a perspective view showing a feeding container, a feeding coupling and the adaptor according to a first embodiment of the present invention;

Fig. 2 is a cross-sectional view along line II-II in Fig. 1;

Fig. 3 is a side view of the adaptor;

Fig. 4 is a cross-sectional view of the adaptor along line IV-IV in Fig. 3;

Fig. 5 is a perspective view of showing the adaptor substantially from the upper side;

Fig. 6 is a perspective view showing the adaptor substantially from the lower side;

Fig. 7 is a cross-sectional view similar to Fig. 2 showing the adaptor according to a second embodiment;

Fig. 8 is a cross-sectional view similar to Fig. 2 showing the adaptor according to a third embodiment, and

Fig. 9 is a cross-sectional view similar to Fig. 2 showing the adaptor according to a fourth embodiment.

**[0020]** Fig. 1 schematically shows a feeding coupling 80 connected to a feeding container 70 by means of an adaptor 10 according to the present invention. The feeding container 70 is a baby bottle having an opening 72 at the upper side 74. The feeding coupling 80 can be connected with a feeding conduit 90 (cf. Fig. 2) to feed a patient with a fluid contained in the feeding container 70. In order to feed the patient, the feeding container 70 is mounted such that it hangs downward.

**[0021]** As can be seen from Fig. 2 to 6 the adaptor 10 comprises a supporting member 20 for connection with the feeding container 70, a sealing 30 which is fastened to the supporting member 20 in an area of the supporting member 20 suitable for providing a fluid-tight connection between the adaptor 10 and the feeding container 70 and an end section 50 suitable for connecting the adaptor 10 to the feeding coupling 80. Further, there is an intermediate section 40 between the supporting member 20 and the end section 50. The intermediate section 40 is made of the same rigid plastic material as the supporting member 20 and the end section 50. Further, a fastening element 60 shaped as a cap and having a base plate 62 and a wall 64 for detachably fastening the adaptor 10 to the feeding container 70 can be taken from Fig. 1 and 2. The wall 64 is provided with a threaded section 66 for engaging with a threaded section 79 on a outside 78 of the feeding container 70. Preferably, the supporting member 20, the sealing 30, the intermediate section 40 and the end section 50 are shaped annular.

**[0022]** As Fig. 2 shows, the supporting member 20 comprises a supporting plate or ring 22 which is applied on a rim 76 at the upper side 74 of the feeding container 70 around the opening 72.

**[0023]** Further, as can be taken from Fig. 2 to 6, the sealing 30 comprises an annular shaped sealing member 31 having a first end 32 which is fixed to the supporting plate 22 and a second end 33 which is a free end extending into the interior of the feeding container 70. The sealing member 31 is moulded at least partially over or moulded to the supporting member 20 in an area of the supporting plate 22 suitable for providing a fluid-tight connection between the adaptor 10 and the feeding container 70. According to Figs. 2 to 4, the sealing member 31

extends substantially in a longitudinal direction L of the adaptor 10. "Substantially" means in the present embodiment that the sealing member 31 extends in an inclined direction including an angle $\alpha$ between the extension of the sealing member 31 and the extension of the supporting plate 22. Preferably this angle $\alpha$ is more than 90°, in particular between about 91° and about 135°. The second end 33 is a tapered end.

**[0024]** In particular, the configuration of the inclined extension and/or the tapered end 33 of the sealing member 31 enables the adaptor 10 to cooperate with a range of different diameters for the opening 72 and/or with a range of different sizes of feeding containers 70. Moreover, the sealing member 31 is shaped and/or fixed to the adaptor 10 in such a manner that the adaptor 10 can cooperate with different sizes of the opening 72 of the feeding container 70.

**[0025]** The intermediate section 40 comprises a base 42, in particular shaped as an annular plate, and a wall 43 formed integrally with the base 42 and made of the same material. The wall 43 extends substantially parallel to the longitudinal direction L and the base 42 extends in the radial direction R parallel to the supporting plate 22. This shape improves the stability of the whole adaptor 10.

**[0026]** Further, a thin layer 44, in particular a film or foil, is mounted to the adaptor 10 in the area of the intermediate section 40. Preferably, the thin layer 44 is bonded to the base 42. This thin layer 44 seals the feeding container 70 when the adaptor 10 is mounted to the feeding container 70 and is secured by means of the fastening element 60.

**[0027]** The end section 50 is shaped cylindrical and comprises a first end 52, a second end 54 and a central bore 56. Also the end section 50 is formed integrally with the supporting member 20 and the intermediate section 40 and from a rigid plastic material. The second end 54 is formed as a free end. The wall of the end section 50 comprises a threaded section 58 in order to connect the feeding coupling 80 to the end section 50 and, thus, to the adaptor 10.

**[0028]** The feeding coupling 80 comprises a first end portion 86, a second end portion 88 and a threaded section 89. A tube 82 extends along the longitudinal direction L through first end portion 86 and/or second end portion 88 to provide a feeding channel 83 from the interior of the feeding container 70 to an outlet end of the tube 82 and to the feeding conduit 90 connected to the second end portion 88. In order to achieve the flow of the feeding fluid out from the feeding container 70 to the feeding conduit 90, the tube 82 has a length which is long enough that a first end 84 of the tube 82 extends through the thin layer 44 into the interior of the feeding container 70. A second end 85 of the tube 82 ends at the upper side of the second end portion 88. In order to connect the feeding coupling 80 to the end section 50 the first end portion 86 comprises a threaded section 89 to be engaged with the threaded section 58.

**[0029]** To connect the feeding coupling 80 with the adaptor 10 the first end 84 of the tube 82 is introduced into the bore 56. Then, the first end portion 86 is screwed with its threaded section 89 on the threaded section 58 of the end section 50. While screwing the feeding coupling 80 onto the end section 50 the sharp first end 84 of the tube 82 pierces through the thin layer 44 and enters into the upper area of the feeding container 70. Finally, the feeding conduit 90 can be connected to the free second end portion 88.

**[0030]** Fig. 7 shows the adaptor 10 according to a second embodiment, wherein only the sealing 30 is different compared to the first embodiment of Fig. 2. The sealing 30 comprises the sealing member 31 corresponding to Fig. 2 and in addition a sealing member 34, which can also be designated as gasket. The sealing member 34 is connected to a lower side 24 of the supporting plate 22 and/or to the sealing member 31. Further, the sealing member 34 extends parallel to the supporting plate 22. Preferably, the sealing member 34 is moulded onto the lower side 24.

**[0031]** Fig. 8 shows the adaptor 10 according to a third embodiment, wherein only the sealing 30 is different compared to the first embodiment of Fig. 2. The sealing 30 comprises only the sealing member 34. The sealing member 34 is connected to the lower side 24 of the supporting plate 22 and extends parallel to the supporting plate 22. Preferably, the sealing member 34 is moulded onto the lower side 24.

**[0032]** Fig. 9 shows the adaptor 10 according to a fourth embodiment, wherein only the sealing 30 is different compared to the first embodiment of Fig. 2. The sealing 30 comprises only the sealing member 34. The sealing member 34 is connected to the lower side 24, the upper side 26 and/or to the face side 28 of the supporting plate 22 and extends parallel to the supporting plate 22. Preferably, the sealing member 34 is moulded over the lower side 24, the upper side 26 and/or the face side 28 of the supporting plate 22.

**[0033]** In all embodiments of Figures 2, 7, 8 and 9, the sealing 30 and the sealing members 31, 34 enable fluid-tightness and a use of the adaptor 10 for different sizes of feeding containers 70, in particular different sizes of the opening 72.

**List of Reference Signs**

**[0034]**

| | |
|---|---|
| 10 | adaptor |
| 20 | supporting member |
| 22 | supporting plate |
| 24 | lower side |
| 26 | upper side |

28 face side

30 sealing

31 sealing member

32 first end

33 second end

34 sealing member

40 intermediate section

42 base

43 wall

44 thin layer

50 end section

52 first end

54 second end

56 bore

58 threaded section

60 fastening element

62 base plate

64 wall

66 threaded section

70 feeding container

72 opening

74 upper side

76 rim

78 outside

79 threaded section

80 feeding coupling

82 tube

83 feeding channel

84 first end

85 second end

86 first end portion

88 second end portion

89 threaded section

90 feeding conduit

L longitudinal direction

R radial direction

$\alpha$ angle

**Claims**

1. Adaptor (10) for connecting a feeding container (70) to an enteral feeding coupling (80), in particular for a baby bottle feeding assembly, **characterised by**
a supporting member (20) for connection with the feeding container (70),
a sealing (30) which is fastened to the supporting member (20) suitable for providing a fluid-tight connection between the adaptor (10) and the feeding container (70) and
an end section (50) suitable for connecting the adaptor (10) to the feeding coupling (80).

2. Adaptor (10) according to claim 1, **characterised in that** the sealing (30) comprises at least one sealing member (31, 34).

3. Adaptor (10) according to claim 2, **characterised in that** the sealing member (31, 34) is integrally formed with the supporting member (20), in particular is moulded at least partially over or moulded to the supporting member (20).

4. Adaptor (10) according to claim 2 or 3, **characterised in tha**t the sealing member (31, 34) extends substantially parallel to the supporting member (20) or in an inclined direction from the supporting member (20).

5. Adaptor (10) according to any one of claims 2 to 4, **characterised in that** the sealing member (31, 34) is tapered and/or is shaped annular.

6. Adaptor (10) according to any one of the preceding claims, **characterised by** an intermediate section (40) between the supporting member (20) and the end section (50).

7. Adaptor (10) according to any one of the preceding claims, **characterised by** a thin layer (44), in partic-

ular a foil, which can be pierced through when the feeding coupling (80) is connected to the adaptor (10).

**8.** Adaptor (10) according to any one of the preceding claims, **characterised in that** the thin layer (44) is connected to the intermediate section (40) and/or the supporting member (20).

**9.** Adaptor (10) according to any one of the preceding claims, **characterised by** a fastening element (60) for detachably fastening the adaptor (10) to the feeding container (70), wherein the fastening element (60) is separate from the supporting member (20), in particular shaped as a cap, or integrally formed with the supporting member (20).

**10.** Adaptor (10) according to claim 9, **characterised in that** the fastening element (70) comprises a threaded section (72) for engaging a threaded section (79) of the feeding container (70).

**11.** Adaptor (10) according to any one of the preceding claims, **characterised in that** the end section (50) comprises a threaded section (58) for engaging a threaded section (89) of the feeding coupling (80).

**12.** Adaptor (10) according to any one of the preceding claims, **characterised in that** the feeding coupling (80) comprises a tube (82) having a feeding channel (83) for a fluid connection between the feeding container (70) and the feeding conduit (90).

**13.** Adaptor (10) according to any one of the preceding claims, **characterised in that** the feeding coupling (80) comprises a first end portion (88) for fastening the feeding coupling (80) to the end section (50) of the adaptor (10) and a second end portion (86) for connecting the feeding conduit (90) to the feeding coupling (80).

**14.** Adaptor (10) according to any one of the preceding claims, **characterised in that** the feeding coupling (80) comprises a threaded section (89) for engaging the threaded section (58) of the end section (50).

**15.** Adaptor (10) according to any one of the preceding claims, **characterised in that** the feeding container (70) is a baby bottle.

Fig. 1

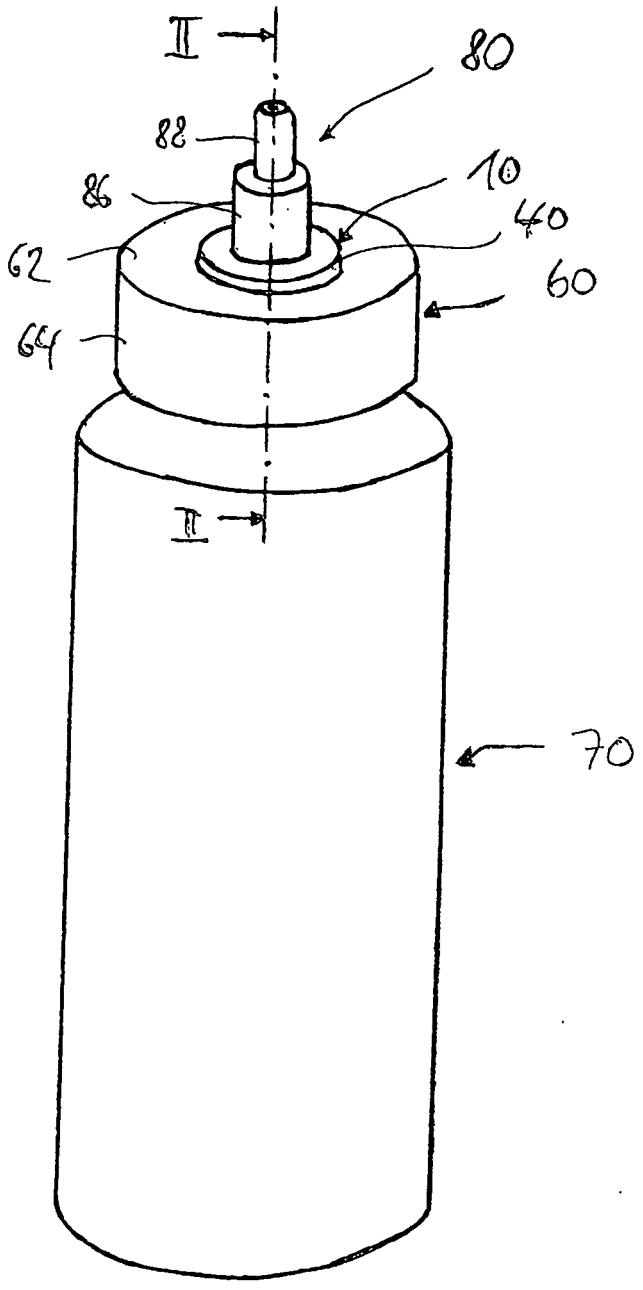

Fig. 2

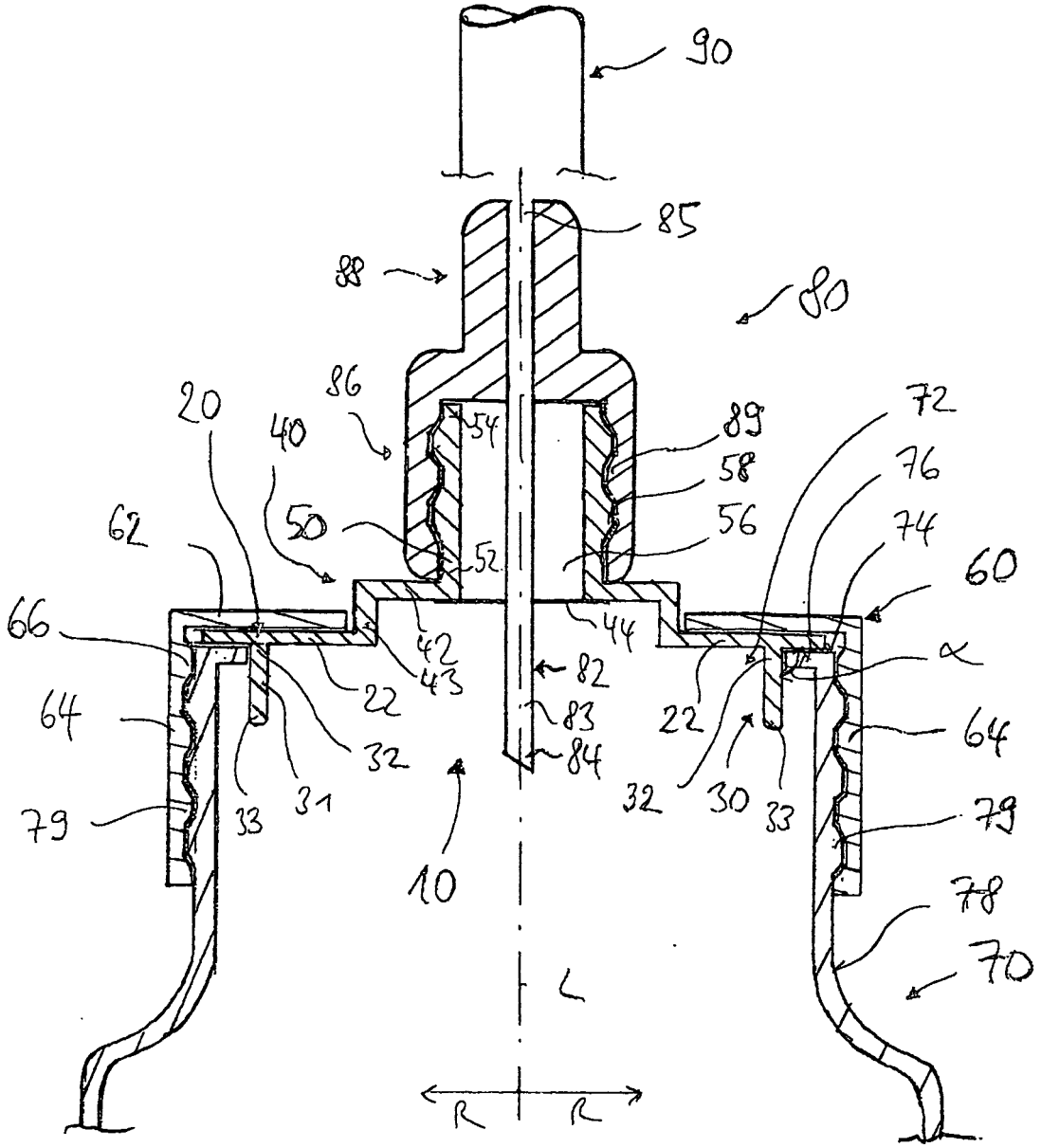
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Fig. 3

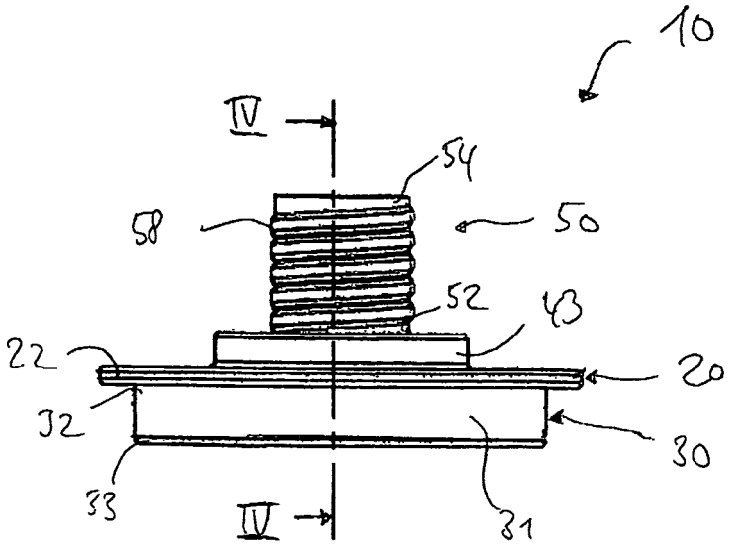
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Fig. 4

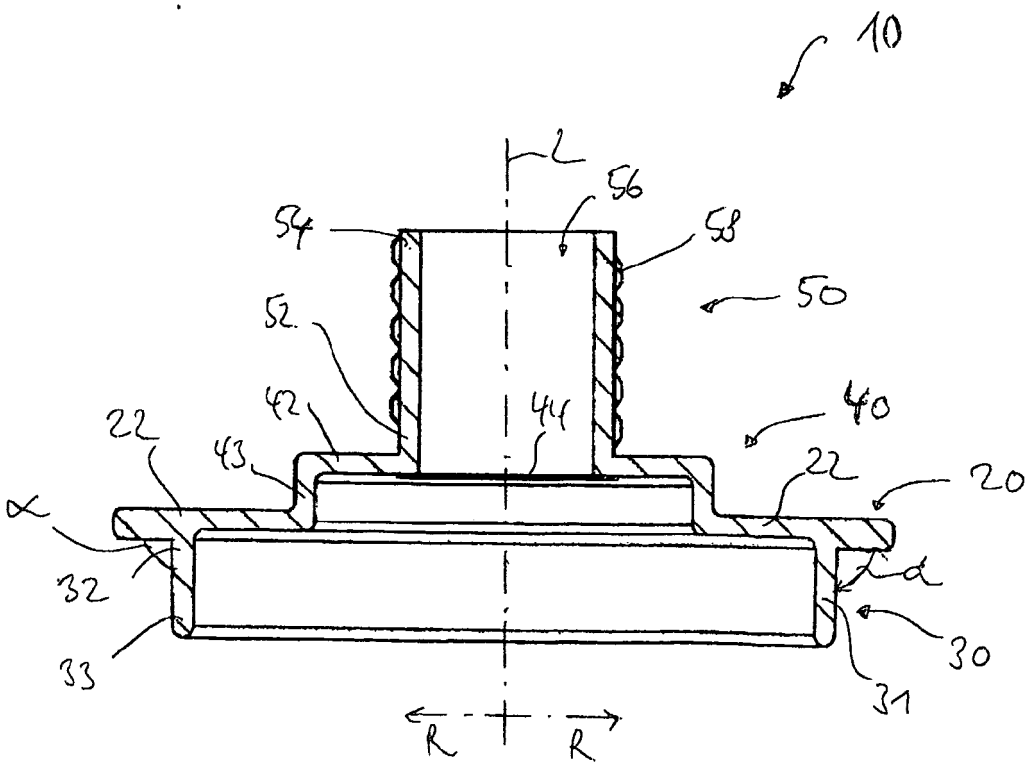
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Fig. 5

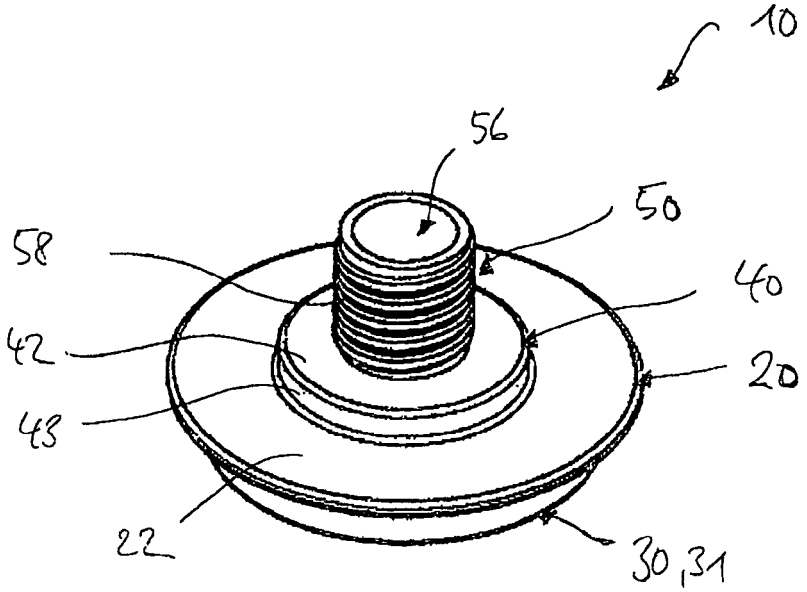



Fig. 6

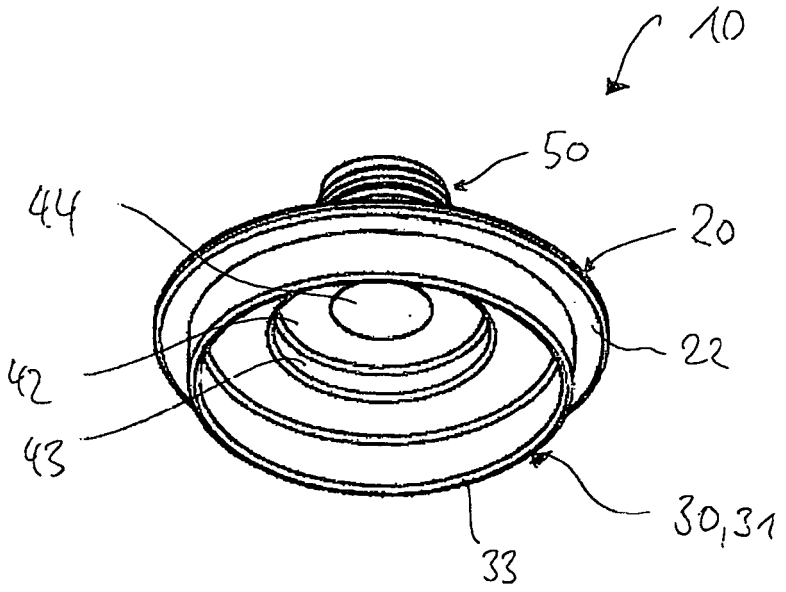


Fig. 7

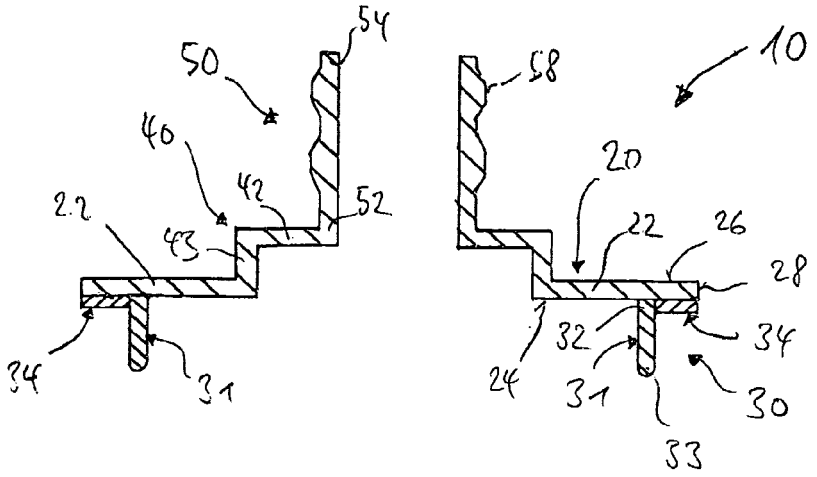



Fig. 8

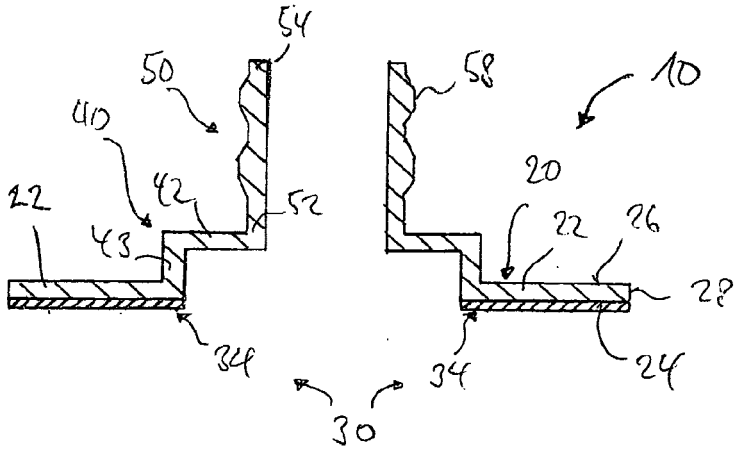
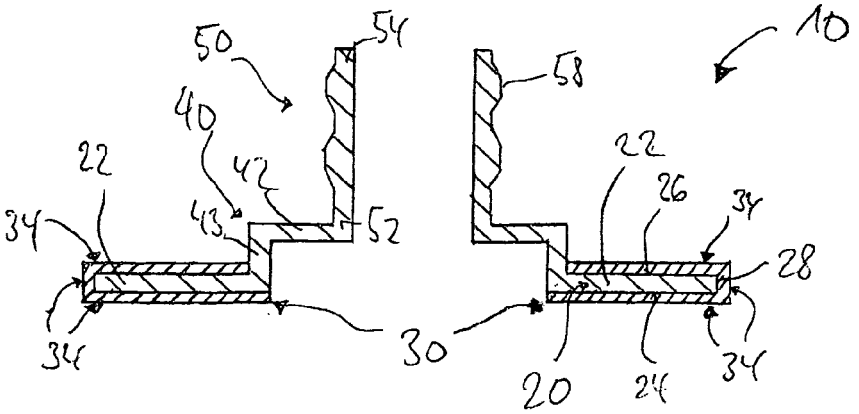



Fig. 9



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# EUROPEAN SEARCH REPORT

Application Number
EP 10 00 8315

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC) |
|---|---|---|---|
| X | US 2003/132185 A1 (BEAUDETTE SUSAN A [US]) 17 July 2003 (2003-07-17)<br>* paragraph [0052] - paragraph [0058] *<br>* paragraph [0072] *<br>* figure 8 *<br>----- | 1-6,9, 10,15 | INV.<br>A61J9/00<br>A61J15/00 |
| X | US 2004/011760 A1 (SCHUPP MARCO [DE] ET AL) 22 January 2004 (2004-01-22)<br>* figure 1 *<br>* paragraph [0018] - paragraph [0020] *<br>* paragraph [0009] *<br>----- | 1-8, 11-15 | |

TECHNICAL FIELDS SEARCHED (IPC)

A61J

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| The Hague | 25 January 2011 | Edlauer, Martin |

CATEGORY OF CITED DOCUMENTS

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& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

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## ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 10 00 8315

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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25-01-2011

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---|---|---|
| US 2003132185 A1 | 17-07-2003 | US 2007062904 A1 | 22-03-2007 |
| US 2004011760 A1 | 22-01-2004 | NONE | |



For more details about this annex : see Official Journal of the European Patent Office, No. 12/82