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ASSEMBLY GROUP FOR A PRESS FITTING, PRESS FITTING AND ASSEMBLY METHOD FOR A PRESS FITTING

Description

The invention relates to an assembly group for a press fitting, having a ferrule and a stop ring. The invention also relates to a press fitting having such an assembly group, and to an assembly method for such a press fitting.

Press fittings for pipe connections are known from the prior art. For example, DE 10 2018 109 555 B3 discloses a press fitting 101 for a pipe connection, which is illustrated in Figure 12.

The press fitting 101 according to Figure 12 has a fitting body 102 for connecting the press fitting 101 to a pipe, two ferrules 103 which are secured to the fitting body 102 and each have a substantially cylindrical pressing region 104 and at least one protruding element in the form of a flange 105 which delimits the substantially cylindrical pressing region 104 in the axial direction, and a tubular sleeve 114 made of a plastics film. As is apparent from Figure 12, each of the ferrules 103 is secured to the fitting body 102 by means of a retaining ring 106. To that end, the ferrule 103 has, at its proximal end, a slightly widened region 107 which is latched together with the retaining ring 106. The retaining ring 106 is furthermore latched together with the fitting body 102 via two opposite catches 108 and 109.

Furthermore, EP 1 790 896 A1 discloses a press fitting 210 for a pipe, in particular a plastics pipe or a pipe made of a plastics/metal composite material, which is illustrated in Figure 13.

The press fitting 210 in Figure 13 is provided with a fitting body 212 which has a support body 216 onto which a pipe 220 to be connected is able to be pushed, a ferrule 230 which has a crimping region 266 in which, when the ferrule 230 is crimped, a pressing tool acts on the ferrule, and a crimping indication ring 252 which is retained on an external bead 244 of the ferrule 230. The press fitting 210 in Figure 13 differs from the press fitting 101 in Figure 12, inter alia, in that an internal protrusion 248 of the ferrule 230 passes directly into an external circumferential recess 228 in the fitting body 212.

EP 1 933 073 A1 discloses a press fitting for a pipe, which is provided with a fitting body that has a support body onto which a pipe to be connected is able to be pushed. The press fitting also has a ferrule, which has a retaining end at which the ferrule is retained on the fitting body. The ferrule has, at its retaining end, peripheral recesses

that are open towards the end side of the ferrule. A plastics ring is located on the outside of the ferrule and is fixed to the latter so as to be unable to move in the axial direction of the ferrule, wherein the plastics ring has at least one axially projecting protrusion which extends into the crimping region of the ferrule and which, when the pressing tool acts on the ferrule, is fixed so as to be destructible and/or to be separable from the plastics ring.

The present invention is based on the object of describing an improved press fitting that is particularly preferably easy to produce. In particular, a pressing fitting is intended to be described in which damage to individual parts, for example the fitting body, during production can be reduced or avoided, and/or which allows the production of a durable connection between a ferrule and a stop ring, said connection being resistant to impacts, for example from a lateral direction, including during the production and before the crimping of the press fitting.

The invention is specified in the appended claims.

According to a first aspect of the disclosure, an assembly group for a press fitting is described. The assembly group has a substantially cylindrical ferrule with a pressing region, and a stop ring which is secured to a first axial end of the ferrule and delimits the pressing region in an axial direction of the ferrule. The stop ring has a first internal contour on a side opposite the pressing region, for attaching the assembly group to a fitting body of the press fitting, and a first circular segment and a second circular segment, adjacent thereto, that extends over a smaller part of the first internal contour than the first circular segment. Furthermore, the stop ring has a cross section, which is constant in the region of the first circular segment, and an element which is arranged in the region of the second circular segment and projects inwards beyond the constant cross section of the first circular segment such that, when the assembly group is attached to the fitting body, it causes an axis of symmetry of the ferrule to be tilted relative to a central axis of the fitting body.

Such an assembly group is automatically tilted when it is attached to a fitting body of a press fitting, thereby making it easier to attach the assembly group to the fitting body. At the same time, forces that arise in the process are reduced, and so damage to parts of the press fitting, in particular of the fitting body, during assembly is largely avoided.

According to the claim, the first internal contour has, in the region of the first circular segment, a bevel having a clear inside diameter that decreases from the side opposite the pressing region in the axial direction of the assembly group. An internal

bevel on the stop ring makes it easier to centre the assembly group on and attach it to the fitting body.

According to the claim, the element arranged in the region of the second circular segment has an insertion chamfer. An inclination angle of the insertion chamfer is greater than an inclination angle of the bevel, in each case with respect to the axis of symmetry of the assembly group, and/or a surface of the insertion chamfer is arranged so as to be offset inwards in a radial direction with respect to a corresponding surface of the bevel. Such an insertion chamfer supports the centring and attachment of the assembly group and, at the same time, causes it to be tilted.

According to an alternative configuration that is not claimed, the element arranged in the region of the second circular segment is in the form of a lug that projects in a radial direction from the constant cross section of the first circular segment. Such a configuration is particularly easy to produce and causes the assembly group to be tilted reliably.

According to a second aspect of the disclosure, a press fitting is described which has a fitting body and an assembly group secured to the fitting body, according to the first aspect. Such a press fitting can be assembled particularly easily and with relatively low forces.

In at least one configuration, the fitting body has an encircling groove, and the ferrule has, at the first axial end, a first protrusion that faces inwards in a radial direction and engages in the groove such that the ferrule is secured directly to the fitting body. Such direct fastening of a ferrule directly to a fitting body prevents unintentional detachment of the ferrule from the fitting body while, at the same time, limiting the assembly force, required for its attachment, by tilting.

According to a third aspect of the disclosure, an assembly method for the press fitting according to the second aspect is described. The assembly method comprises the following steps:

- fastening the stop ring to a first axial end of the ferrule,
- tilting the axis of symmetry of the ferrule relative to a central axis of the fitting body by means of the element arranged in the region of the second circular segment of the stop ring,
- in the tilted state, attaching the ferrule, with the stop ring fastened thereto, onto the fitting body, with the first axial end first, and

- latching the ferrule and/or the stop ring together with a groove in the fitting body, wherein the axis of symmetry of the ferrule substantially matches the central axis of the fitting body after latching.

As a result of the abovementioned steps, a force required for the latching of a ferrule and/or a stop ring together with a fitting body can be reduced, and so, in particular, damage in the region of a groove, used for latching, in the fitting body can be avoided.

According to at least one configuration, the element arranged in the region of the second circular segment butts, in the step of attaching the ferrule, against an elevation, in particular in the form of a rib and located ahead of the groove in the attachment direction, of the fitting body, and results in the axis of symmetry of the ferrule being tilted relative to the central axis of the fitting body. As a result, the assembly of the press fitting can be carried out without further adaptation of the machines and/or tools used for the assembly thereof.

Further advantageous configurations are disclosed in the appended claims and in the following, detailed description of exemplary embodiments.

The invention is explained in detail in the following text by way of various exemplary embodiments with reference to the appended figures. Identical reference signs denote identical or equivalent components in different exemplary embodiments.

Figure 1	shows an exploded illustration of a press fitting with a stop ring.
Figures 2 to 4	show different illustrations of a stop ring according to Figure 1.
Figure 5	shows the press fitting according to Figure 1 in an assembled state.
Figure 6	shows a cross section through the press fitting according to Figure 5.
Figure 7	shows an alternative configuration of a stop ring.
Figures 8 and 9	show different view of a further stop ring.
Figure 10	shows the assembly of an assembly group on a fitting body.
Figure 11	schematically shows a method for assembling a press fitting.
Figure 12	shows a first press fitting according to the prior art.
Figure 13	shows a second press fitting according to the prior art.

Figure 1 shows an exploded illustration of a press fitting 1. The press fitting 1 has a fitting body 2, a stop ring 3 and a ferrule 4.

In the exemplary embodiment, the fitting body 2 is a rectilinear, substantially cylindrical coupling for connecting two pipes with the same diameter. Of course, other fitting bodies, for example angle connectors, T-pieces or couplings for connecting pipes with different diameters, are also possible.

The fitting body 2 can be manufactured from a plastics material, for example a polymer material, or from a metal material. The surface of the fitting body 2 has a plurality of elevations and grooves, which ensure secure and tight crimping of a pipe (not illustrated in Figure 1), for example a plastics, metal or composite pipe, with the fitting body 2. To this end, further sealing elements (not illustrated in Figure 1 for reasons of clarity) can be attached to the fitting body 2.

The fitting body 2 comprises a central region 5 and two mutually opposite connection regions 6a and 6b. Grooves 7a and 7b, respectively, are provided in the central region 5, in each case adjacent to the respective connection region 6a and 6b, the grooves serving to latch together with first protrusions, in the form of lips 8, that protrude inwards from the ferrule 4.

The ferrule 4 is typically manufactured from a metal material, in particular stainless steel. In order to reduce a force required for latching the ferrule 4 together with the fitting body 2, a first axial end 9 of the ferrule 4 is provided with a plurality of slots 10. The slots 10 make it easier to expand the first axial end 9 when the ferrule 4 is pushed onto the fitting body 2. In this case, the first axial end 9 of the ferrule 4 faces in the direction of the central region 7 of the fitting body 2 and can thus be referred to as the proximal end. The stop ring 3 is first of all assembled on the ferrule 4 before the latter is attached to the fitting body 2.

The stop ring 3 is typically manufactured from a plastics material, in particular a polymer material, and delimits a pressing region 11 of the ferrule 4 at the first axial end 9 of the ferrule 4. At the opposite, distal or second axial end 12 of the ferrule 4, the pressing region 11 is delimited, in the illustrated exemplary embodiment, by a second protrusion in the form of a flange 13 of the ferrule 4 itself. While the press fitting 1 is being crimped, pressing jaws of a pressing tool (not illustrated in the figures) act on the pressing region 11 of the ferrule 4 and thus establish a form-fitting connection between the fitting body 3, a pipe end introduced into the press fitting, and the ferrule 4.

In order to already fasten the stop ring 3 securely to the ferrule 4 before the ferrule 4 is assembled on the fitting body 2, the stop ring 3 has a ferrule-side internal contour 14, which serves to establish a clamping connection.

As can be seen in Figures 2 to 4, the internal contour 14 has, in the illustrated exemplary embodiment, a total of eight protruding first regions 15. Located therebetween are eight second regions 16 that are set back compared therewith. The stop ring 3 can be deformed slightly when it is pushed onto the first axial end 9 of the ferrule 4. In the process, in particular the first regions 15 create a force fit.

To this end, a first inside diameter d_1 of a remaining clear region between the first regions 15 is dimensioned such that it is smaller than an outside diameter d_3, illustrated in Figure 6, of the ferrule 4 plus a possible, negative manufacturing tolerance. For example, a ferrule for a pipe diameter of 25 mm diameter can have a tolerance range of about 0.25 mm, i.e. about 1% of the nominal diameter. In this case, the first inside diameter d_1 between end sides of the first regions 15 is dimensioned such that, even in the case of a minimum permissible outside diameter of the ferrule 4, an overlap of 0.1 mm for providing a clamping force remains. Conversely, in the case of a maximum permissible outside diameter of the ferrule 4, there is an overlap of 0.35 mm.

By contrast, a second inside diameter d_2 between two opposite parts, set back farthest, of the second regions 16 is dimensioned to be large enough that a clear spacing always remains between a lateral surface of the ferrule 4 and a corresponding second region 16 of the internal contour 14 of the stop ring 3. For example, a minimum clearance of 0.1 mm remains for the case of a maximum outside diameter of the ferrule 4 within the tolerance range, and a maximum spacing of 0.35 mm remains in the case of a minimum outside diameter of the ferrule 4.

In the exemplary embodiment according to Figures 1 to 3, the first regions 15 are connected to the second regions 16, in which the inside diameter of the stop ring 3 increases continuously, by cross-sectionally arcuate transition regions 30. The advantage of this embodiment is that the arcuate transition regions 30 are mechanically particularly stable. Furthermore, the protruding first regions 15 are designed to be wide enough that, during the assembly of the stop ring 3, they do not pass fully into the slots 10 in the ferrule 4.

It is apparent from the cross section according to Figure 4 that a first side 17 of the stop ring 3, said first side facing the pressing region 11 in the assembled state, has a first bevel 18. The first bevel 18 makes it possible to centre the stop ring 3 and plug it lightly onto the first axial end 9 of the ferrule 3.

It is also apparent that an opposite second side 19 of the stop ring 3, said second side facing the central region 6 of the fitting body 2 in the assembled state, has a

fitting-side internal contour 20 with a second bevel 21. The second bevel 21 serves, inter alia, to centre an assembly group, comprising the stop ring 3 and the ferrule 4, during the assembly thereof on the fitting body 2. An arcuate outside contour 22 of the stop ring 3 connects the outside diameter of the first side 17 continuously to the outside diameter of the second side 19, such that there are no steps in cross section. The ferrule-side internal contour 14 and the fitting-side internal contour 20 are separated from one another by an inwardly projecting third protrusion, which forms, at the same time, an open bottom area 23 of the ferrule-side internal contour 14 and delimits a maximum plug-in depth of the ferrule 4.

In the assembled state according to Figures 5 and 6, the third protrusion, or the open bottom area 23, of the stop ring 3, as illustrated in the cross section in Figure 6, can engage entirely or partially in the groove 7 in the fitting body 2. Given appropriate dimensioning, it can also bear on a surface of the fitting body 2 outside the groove 7. In the exemplary embodiment, it delimits a plug-on depth of the assembly when the ferrule 4 is attached to the connection region 6a, in that the second side 19 of the stop ring 3 butts against an end face 35 of the central region 5.

Figure 7 shows an alternative configuration of a ferrule-side internal contour 14 of a stop ring 3. In contrast to the stop ring 3 according to Figures 1 to 4, the internal contour 14 according to Figure 7 comprises a substantially cylindrical internal face 24 and bars 25 arranged thereon. In the exemplary embodiment, there are a total of eight such bars 25, which form the first regions 15 of the stop ring 1. The portions of the cylindrical internal face 24 that are located in between form the second regions 16. With regard to the dimensioning thereof, reference is made to what was stated above.

In the following text, with reference to Figures 8 to 10, a further aspect of the fitting-side internal contour 20 according to a further configuration of a connection ring is described. In this exemplary embodiment, the fitting-side internal contour 20 has a protruding element 26, which is arranged in a relatively small circular segment 27 of the stop ring 3. In the remaining part, corresponding to a larger circular segment 31, the stop ring 3 has a constant cross section. In this connection, protruding means that a surface, facing the centre of the stop ring 3, of the element 26 protrudes beyond a surrounding surface of the fitting-side internal contour 20 or of the constant cross section in the circular segment 31.

For example, the element 26, as illustrated in Figure 10, can be in the form of a lug 33 that protrudes radially inwards, i.e. perpendicularly to its axis of symmetry, from

the inner circumference of the stop ring 3. By contrast, it is, according to the invention, to form the element 26, as illustrated in Figures 8 and 9, as an insertion chamfer 32, which can also form a part of the second bevel 21. In this case, a surface, inclined obliquely inwards, of the insertion chamfer 32, in the region of the smaller circular segment 27 in which the element 26 is formed, is either displaced inwards in parallel with respect to a surface of the bevel 21 or has a greater inclination in the insertion direction than the second bevel 21 of the fitting-side internal contour 20.

The element 26 serves in particular, when placing the ferrule 4 with the connection ring 3 plugged onto it onto a connection region 6 of the fitting body 2, to guide relative tilting of the axes thereof.

In the exemplary embodiment illustrated in Figure 10, an assembly group 28, having the ferrule 4 and the connection ring 3, stands upright and with its first axial end 9 facing upwards on a planar surface, for example a holding device of a machine tool. Then, a fitting body 2 with a downwardly facing connection region 6 is inserted, substantially perpendicularly from above, into the opening in the assembly group 28. In this case, the axis directions of the assembly group 28 and of the fitting body 2 initially match.

As soon as the second side 19 of the connection ring 3 meets an encircling rib 29 located ahead of the groove 7, the element 26, which is in the form of a lug 33 in Figure 10, brings about an asymmetric force distribution which, as illustrated, causes the central axis A_F of the connection region 6 to be tilted slightly relative to the axis of symmetry A_S of the assembly group 28 and of the ferrule 4. For example, the fitting body 2 can be tilted through about 2 to 5°.

This has the result that the segments 34 of the ferrule 4 that are formed between the slots 10 in the ferrule 4, with lips 8 integrally formed thereon, widen slightly temporally one after another during latching. This considerably reduces the necessary forces for connecting the assembly group 28 to the fitting body 2 and thus makes it easier to insert the connection region 6 into the assembly group 28.

Under test conditions, the assembly forces in the case of a press fitting 1 for a nominal pipe diameter of 25 mm were able to be reduced, as a result of offset or tilted insertion of the connection region 6 into the assembly group 28, to a press-in force of 242 N compared with a press-in force of about 2100 N in the case of coaxial pressing in, thereby considerably simplifying the assembly of the press fitting 1. For a nominal pipe diameter of 32 mm, the press-in force was reduced from 1500 N to 314 N. This reduction in the forces that arise during assembly has the additional

advantage that damage to the fitting body 2 can be avoided, in particular when use is made of plastics materials for the fitting body 2.

As soon as the assembly process has been concluded, i.e. as soon as the second side 19 of the stop ring 3 butts against an end face 35 formed by the central region 5, the ferrule 4 and the fitting body 2 orient themselves coaxially again. Thus, the offset or tilted attachment of the assembly group 28 does not have a negative effect on the orientation thereof or on the secure fastening of the ferrule 4 to the fitting body 2.

Figure 11 schematically shows the steps of a method for assembling a press fitting 1.

First of all, in a step S1, a ferrule 4 having a predefined nominal diameter is provided. This diameter can vary by a particular negative and/or positive tolerance value within a predefined tolerance range. Preferably, the ferrule 4 has one or more elevations, in particular lips 8, for directly latching together with a fitting body 2.

In a following step S2, a stop ring 3 is plugged onto the ferrule 4 at a first axial end 9. Preferably, said stop ring is fastened to the ferrule 4, preferably through the provision of raised first regions 15 and set-back second regions 16, which result in the stop ring 3 being clamped to the ferrule 4. Alternatively, other connections, in particular form-fitting connections, are also possible.

In a further step S3, the assembly group 28, produced in this way, of the ferrule 4 with the stop ring 3 fastened thereto is attached to a connection region 6 of a fitting body 2. This can take place, for example, using an industrial placement machine.

In a step S4, the longitudinal axes of the fitting body 2 and of the assembly group 28 are tilted relative to one another. This can be ensured, for example, by appropriate control of a placement machine or of a punch, or, according to the invention, as described above with reference to Figures 8 to 10, through the provision of a corresponding fitting-side internal contour 20 with a protruding element 26.

Subsequently, in a step S5, the assembly group 28 is pushed or pressed further onto the fitting body 2, the ferrule 4 is latched together with the fitting body 2, for example by engagement of lips 8 in a corresponding groove 7 in the fitting body 2.

In the described exemplary embodiments, the stop ring 3 remains intact during the actual crimping of the ferrule 4 with a pipe end, since the pressing tool does not exert any force in a radial pressing direction on the stop ring 3. As soon as an indication of crimping is desired, the described press fitting 1 can be provided, for example, with a tubular sleeve as a crimping indicator. The attachment and the advantages of

such a sleeve 114, as is illustrated for example in Figure 12, have already been described in detail in DE 2018 109 555 B3. To avoid repetition, reference is made to that disclosure, which is incorporated in the present description by reference.

The above-described ferrule-side internal contour 14 on the side, facing the pressing region 11, of the stop ring 3, and the fitting-side internal contour 20 on the side, facing the fitting body 2, of the stop ring 3 can be combined with one another as described above. However, each of the internal contours 14 and 20 also brings about the described effects and advantages on its own and can therefore also be realized individually.

List of reference signs

1	Press fitting
2	Fitting body
3	Connection ring
4	Ferrule
5	Central region
6, 6a, 6b	Connection region
7, 7a, 7b	Groove
8	Lip (first protrusion)
9	First axial end
10	Slot
11	Pressing region
12	Second axial end
13	Flange (second protrusion)
14	(Ferrule-side) internal contour
15	First region
16	Second region
17	First side
18	First bevel
19	Second side
20	(Fitting-side) internal contour
21	Second bevel
22	External contour
23	Open bottom area (third protrusion)

24	Internal cylinder face
25	Bar
26	Element
27	(Small) circular segment
28	Assembly group
29	Rib
30	Transition region
31	(Larger) circular segment
32	Insertion chamfer
33	Lug
34	Segment (of the ferrule)
35	End face

MONTAGEGRUPPE TIL PRESSEFITTING, PRESSEFITTING OG MONTAGEFREMGANGSMÅDE TIL PRESSEFITTING

Patentkrav

1. Montagegruppe (28) til pressefitting (1) omfattende:
- en i det væsentlige cylinderformet pressemuffe (4) med et presseområde (11), og
- en på en første aksiale ende (9) af pressemuffen (4) fastgjort stopring (3), som begrænser presseområdet (11) i en aksial retning af pressemuffen (4), hvor stopringen (3) omfatter følgende:
  - en første indre kontur (20) på en for presseområdet (11) modsat side (19) til anbringelse af montagegruppe (28) på en fittingdel (2) på pressefittingen (1),
  - et første cirkulært segment (31) og et andet cirkulært segment (27) ved siden af, som strækker sig over en mindre del af den første indre kontur (20) end det første cirkulære segment (31),
  - et i området for det første cirkulære segment (31) konsistent tværsnit med en affasning (21), hvis lysere indre diameter aftager fra siden (19) modsat presseområdet (11) i montagegruppens (28) aksiale retning, og
  - et i området for det andet cirkulære segment (27) anbragt element (26), som rager indad ud over det første cirkulære segments (31) konsistente tværsnit,

karakteriseret ved, at
- det i området for det andet cirkulære segment (27) anbragte element (26), omfatter en indføringsskråning (32), og
- en hældningsvinkel for indføringsskråningen (32), som er større end en hældningsvinkel for affasningen (21), til enhver tid i forhold til symmetriaksen (A_S) af montagegruppen (28), og/eller en overflade af indføringsskråning (32) i en radial retning indad i forhold til en tilsvarende overflade af affasningen (21) er anbragt forskudt, således at elementet (26) ved anbringelse af montagegruppen (28) på fittingdelen (2) forårsager en relativ hældning af en symmetriakse (A_S) af pressemuffen (4) i forhold til en midterakse (A_F) af fittingdelen (2).

2. Montagegruppe (28) ifølge krav 1, hvor stopringen (3) på en side, der vender mod presseområdet (11), har en anden indre kontur (14) med fremspringende første områder (15), samt tilbagetrækkende andre områder (16) henover det første område (15), med henblik på fastgørelse af stopringen (3) til pressemuffen (4).

3. Pressefitting (1) omfattende en fittingdel (2) samt en montagegruppe (28) fastgjort til fittingdelen (2) ifølge krav 1 eller 2.

4. Pressefitting (1) ifølge krav 3, hvor
- fittingdelen (2) har en omløbende rille (7), og
- pressemuffen (4) ved den første aksiale ende (9) har et første fremspring, der peger indad i en radial retning, som griber ind i rillen (7), således at pressemuffen (4) fastgøres direkte til fittingdelen (2).

5. Pressefitting (1) ifølge krav 4, hvor det første fremspring, der peger indad i den radiale retning, er udformet i form af en læbe (8).

6. Pressefitting (1) ifølge krav 4 eller 5, hvor fittingdelen (2) har en forhøjning, der ligger foran rillen (7) i anbringelsesretningen, som er konstrueret på en sådan måde, at elementet (26), når montagegruppen (28) anbringes på fittingdelen (2), kommer i kontakt med fittingdelens (2) forhøjning og således forårsager den relative hældning af pressemuffens (4) symmetriakse (A_S) i forhold til fittingdelens (2) midterakse (A_F).

7. Pressefitting (1) ifølge krav 6, hvor forhøjningen, der ligger foran rillen (7) i anbringelsesretningen, er konstrueret i form af en ribbe (29).

8. Pressefitting (1) ifølge et hvilket som helst af krav 4 til 7, hvor stopringen (3) har et andet fremspring, der peger indad i en radial retning, som griber ind i rillen (7) på fittingdelen (2).

9. Pressefitting (1) ifølge krav 8, hvor det andet fremspring, der peger indad i den radiale retning, er udformet i form af en åben bundflade (23),

10. Montagefremgangsmåde (28) til en pressefitting (1), ifølge et hvilket som helst af krav 3 til 9, omfattende følgende trin:
- fastgørelse af stopringen (3) til en første aksiale ende (9) af pressemuffen (4),
- relativ vipning af pressemuffens (4) symmetriakse (A_S) i forhold til en midterakse (A_F) af fittingdelen (2) ved hjælp af elementet (26), der er anbragt i området af stopringens (3) andet cirkulære segment (27),

- anbringelse af pressemuffen (4) i vippet tilstand med stopringen (3) fastgjort dertil med den første aksiale ende (9) fremad på fittingdelen (2), og
- låsning af pressemuffen (4) og/eller stopringen (3) med en rille (7) på fittingdelen (2), hvor pressemuffens (4) symmetriakse (A_S) i det væsentlige stemmer overens med midteraksen (A_F) af fittingdelen (2) efter låsning.

11. Montagefremgangsmåde (28) ifølge krav 10, hvor elementet (26), der er anbragt i området af det andet cirkulære segment (27), i trinnet til anbringelse af pressemuffen (4), kommer i kontakt med fittingdelens (2) forhøjning, der ligger foran rillen (7) i anbringelsesretningen, og forårsager den relative vipning af pressemuffens (4) symmetriakse (A_S) i forhold til en midterakse (A_F) af fittingdelen (2).

12. Montagefremgangsmåde (28) ifølge krav 10 eller 11, yderligere omfattende:
- centrering af montagegruppen, der omfatter stopringen (3) og pressemuffen (4), under montering på fittingdelen (2) gennem affasningen (21) på stopringens (3) første indre kontur (20).

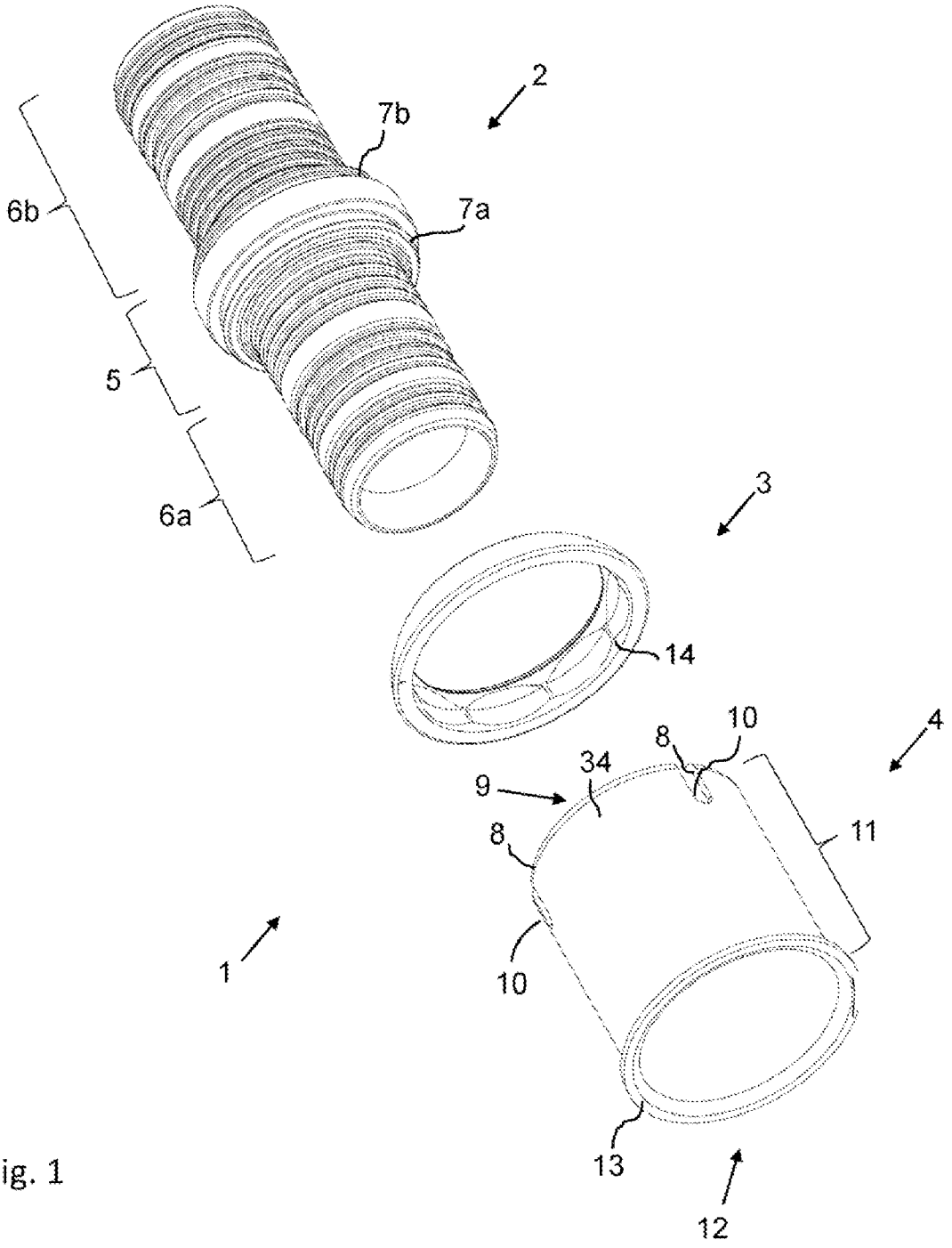


Fig. 1

Fig. 2

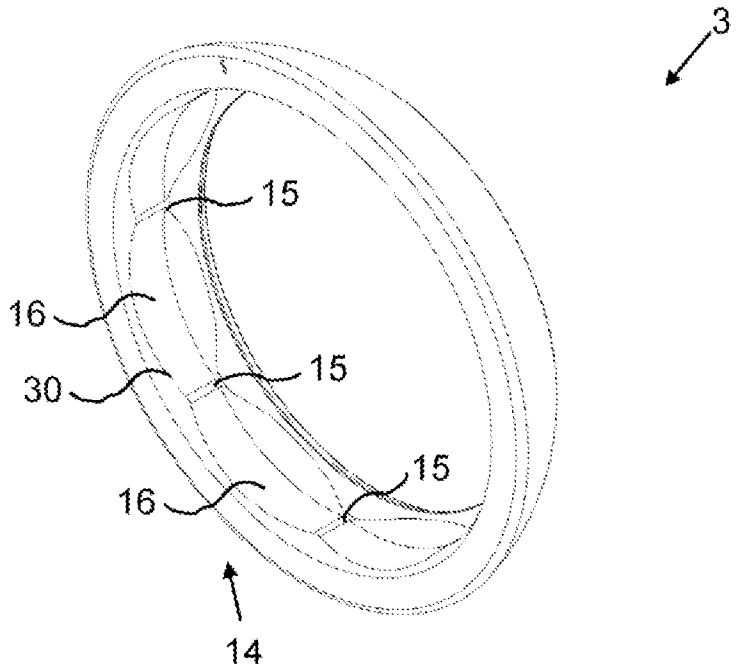


Fig. 3

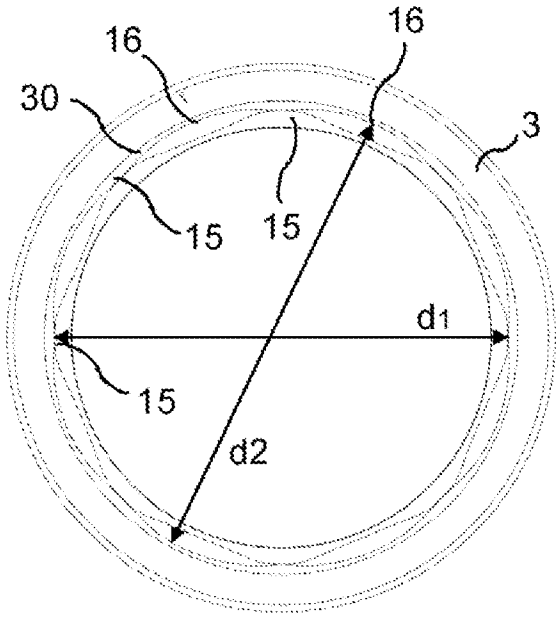


Fig. 4

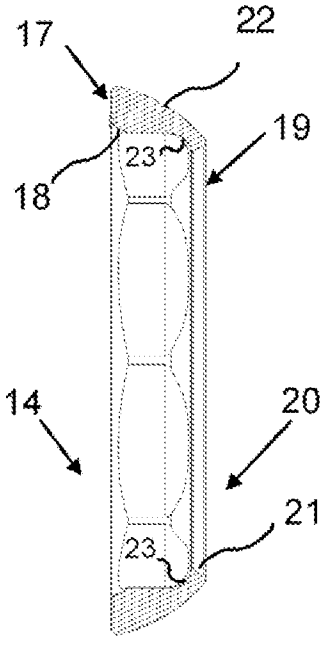


Fig. 5

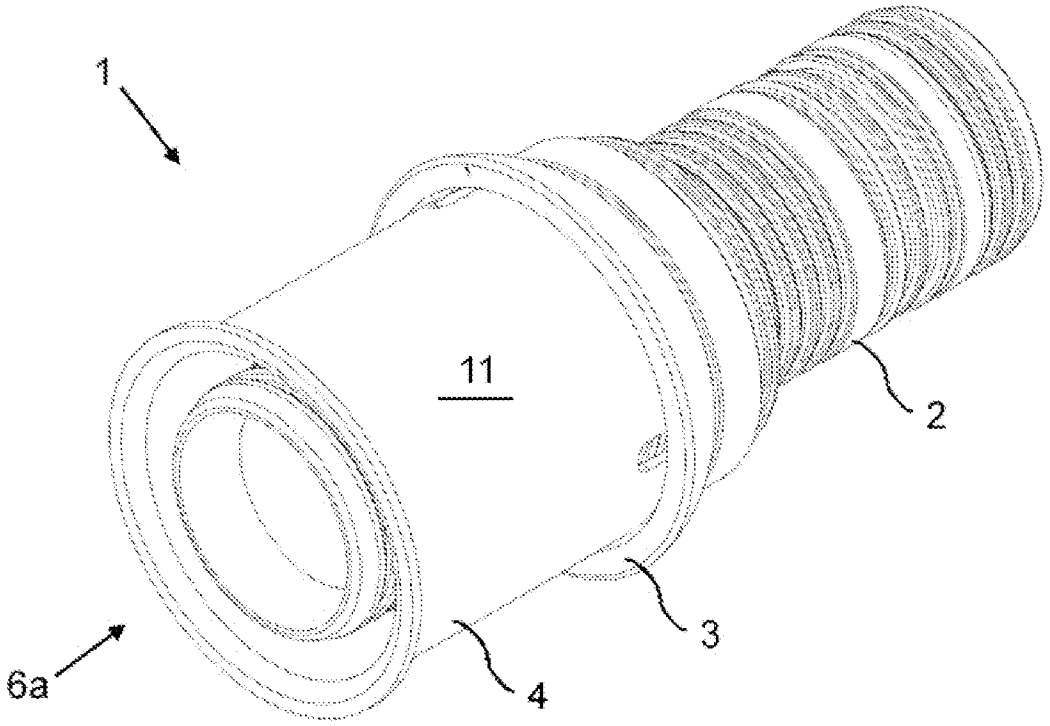


Fig. 6

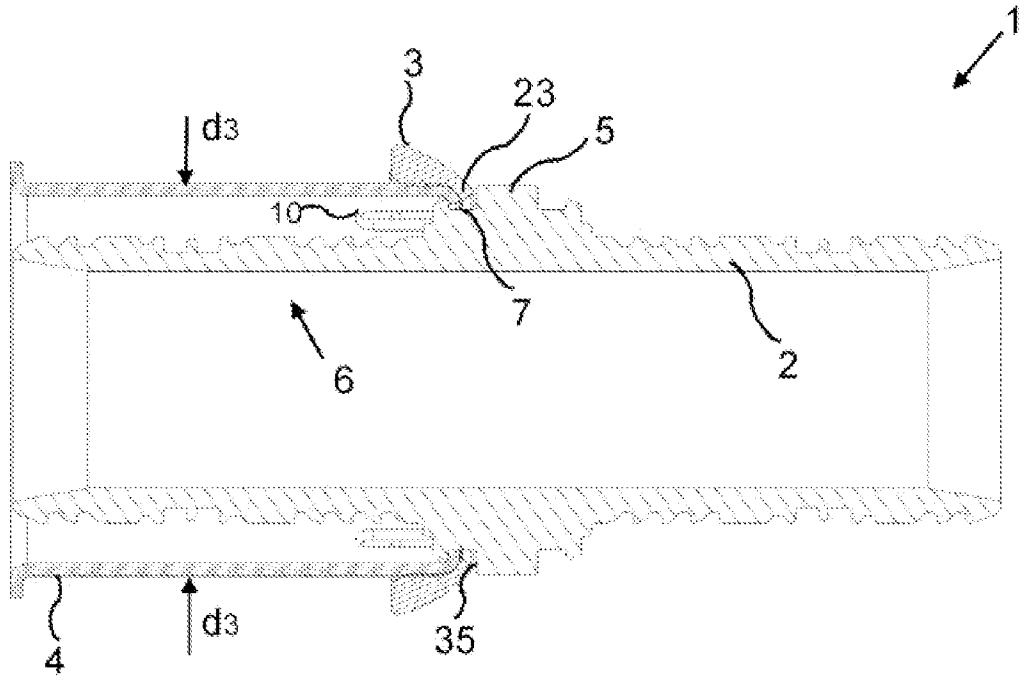


Fig. 7

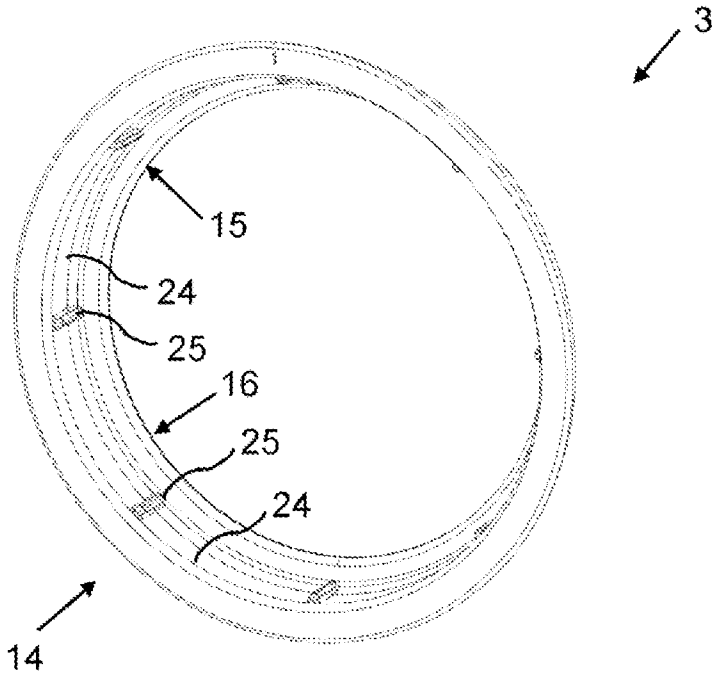


Fig. 8

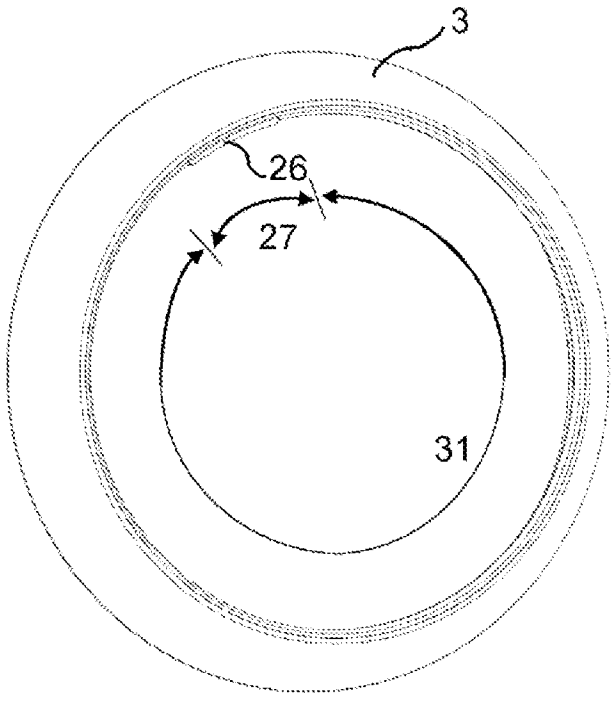


Fig. 9

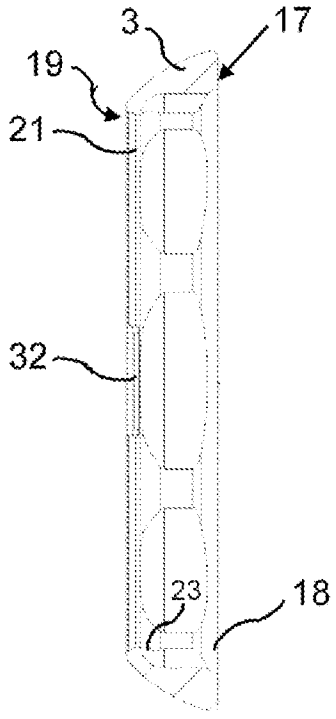


Fig. 10

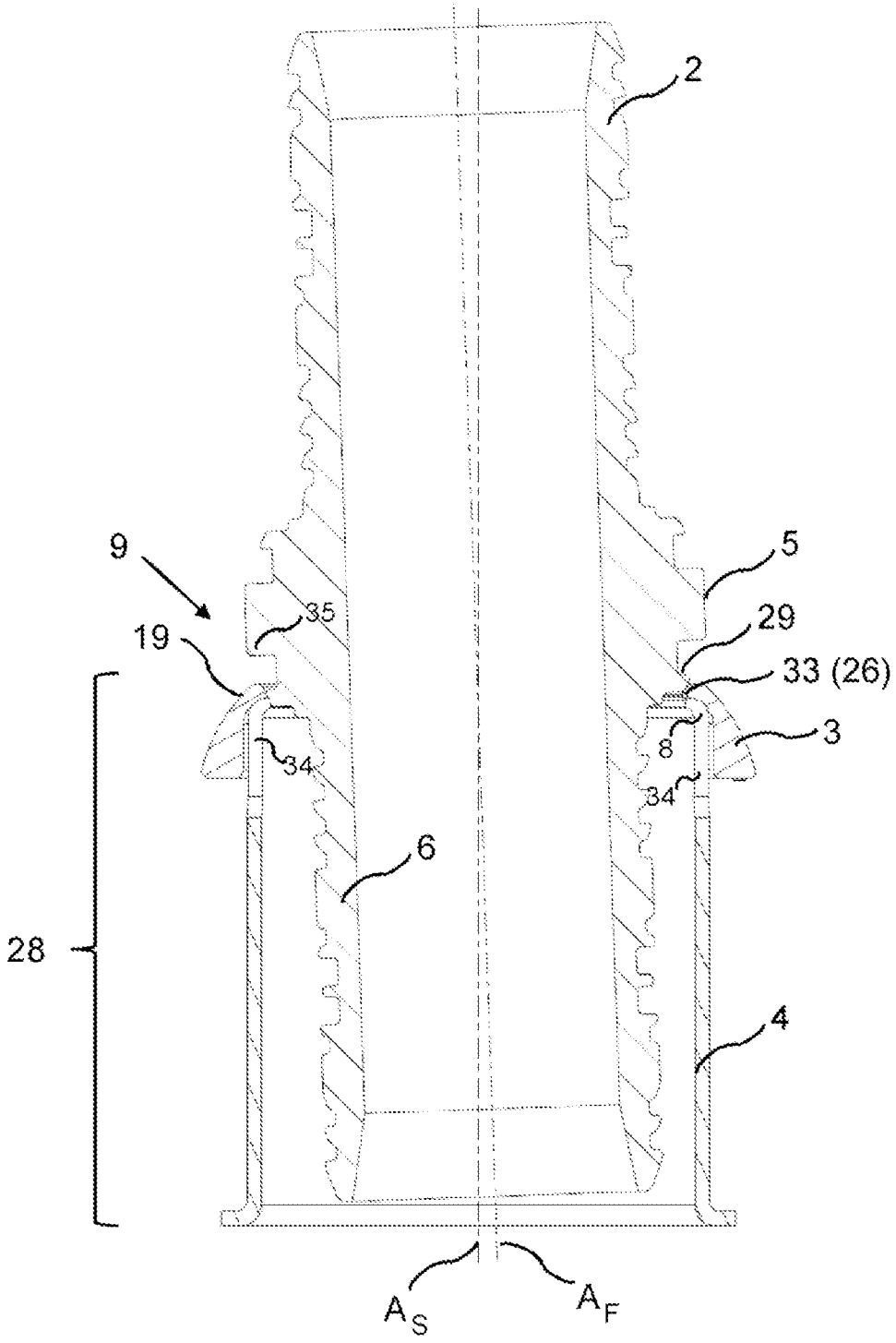


Fig. 11

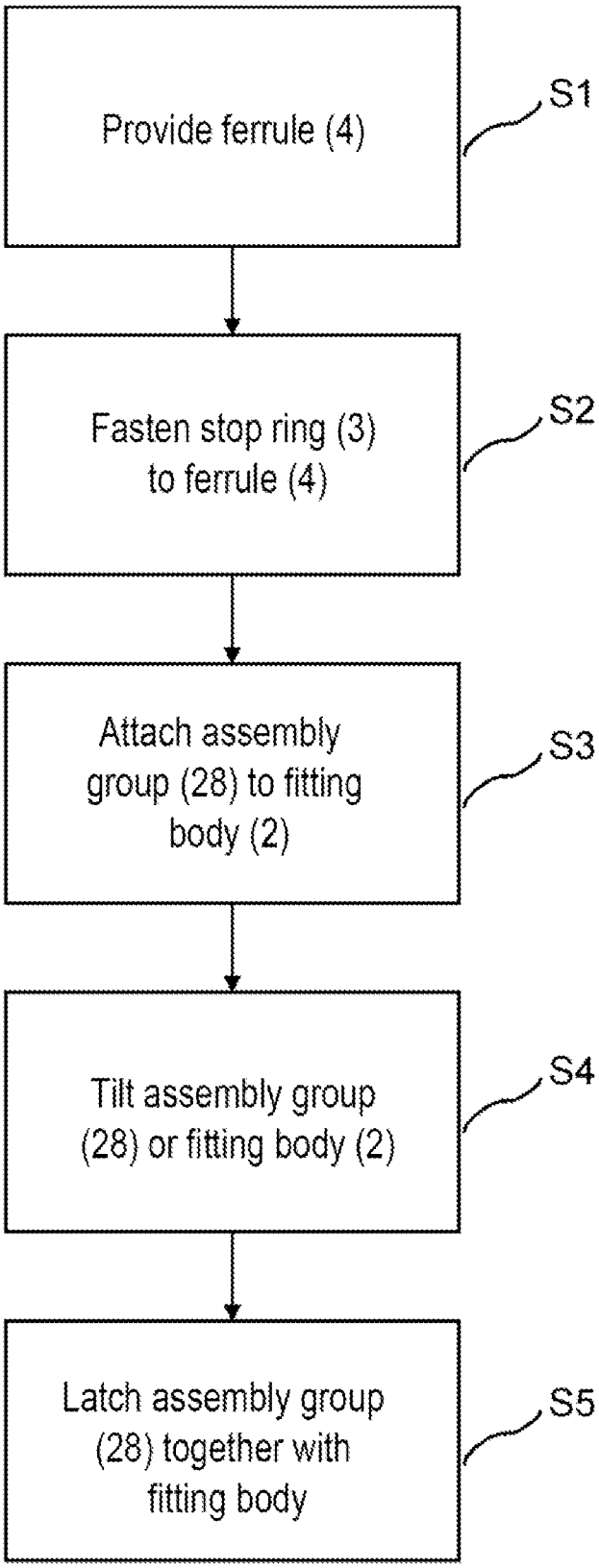
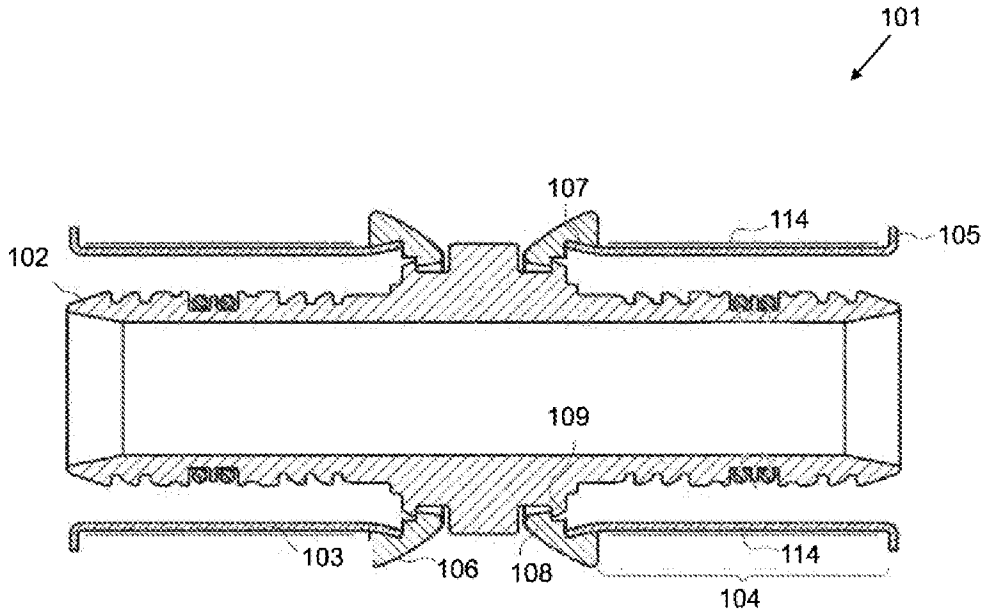
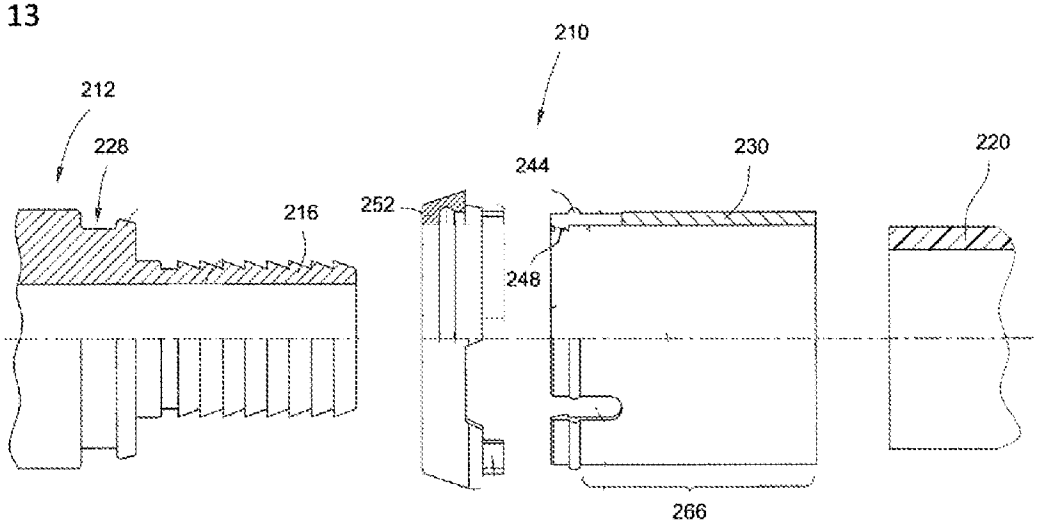

Provide ferrule (4)
S1
Fasten stop ring (3) to ferrule (4)
S2
Attach assembly group (28) to fitting body (2)
S3
Tilt assembly group (28) or fitting body (2)
S4
Latch assembly group (28) together with fitting body
S5

Fig. 12



Prior art

Fig. 13



Prior art