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(71) Applicant: **Wavin B.V.**
1118 BK Schiphol (NL)

(72) Inventors:
- **HAITJEMA, Dirk Jan**
  1118 BK Schiphol (NL)
- **BESTEN, Markus Wilhelmus Johannes**
  1118 BK Schiphol (NL)
- **ROELFSEMA, Marcel**
  1118 BK Schiphol (NL)

(74) Representative: **van Bouwelen, Franciscus Maria**
Hoffmann Eitle B.V.
Weerdestein 97
1083 GG Amsterdam (NL)

(54) A HEIGHT ADAPTOR FOR SUPPORTING A MANHOLE COVER OR COVER ASSEMBLY

(57) A height adapter for supporting a manhole cover or cover assembly, wherein the height adapter includes a tubular body having an insertable end for downwardly inserting in a top opening for entry into a manhole or inspection chamber, wherein each of the insertable end and the top end is provided with at least one part of an interlocking arrangement, so that the at least one part of the locking arrangement at the top end can interlock with the at least one part of the interlocking arrangement at the insertable end of another similarly oriented one of such a height adapter placed in a stacking arrangement, and so that the at least one part of the interlocking arrangement at the insertable end can interlock with the at least one part of the interlocking arrangement at the top end of another similarly oriented one of such a height adaptor placed in a stacking arrangement.

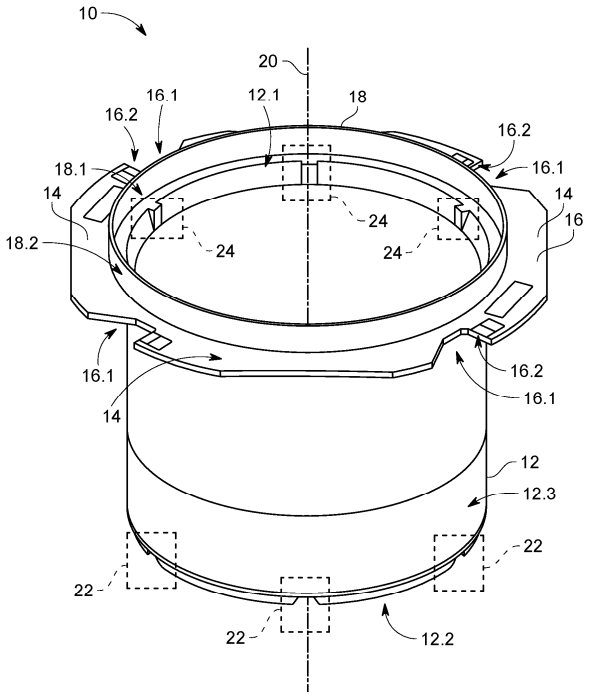


FIG. 1

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Description

Field of the disclosure

[0001] This disclosure relates to a height adaptor for supporting a manhole cover or cover assembly. In particular the disclosure relates a height adaptor which is stackable on top of another one of such a height adaptor for supporting a manhole cover or cover assembly. The disclosure also relates to a height adaptor for supporting a manhole cover or cover assembly which, when in a sealed telescopic arrangement, relatively easily can be lifted up for adjustment of the height at which the cover or cover assembly should be placed, for instance to be level with road deck or pavement.

Background of the disclosure

[0002] In wastewater systems a manhole is often used to provide access to certain components of the system. Typically, the manhole will comprise a base for placement below the earth's surface and a riser sealed onto the base and extending vertically upwards towards the earth's surface. An adjustable height adaptor is typically connected to the riser to breach the distance between a top end of the riser and the level at which the cover or dover assembly should be placed, which is typically at the level of road deck or pavement.

[0003] Various types of such height adaptors already exist and are known to have the following drawbacks. Firstly, in some instances provisions are made for the stacking of the adaptors onto each other (i.e., during transportation, storage, etc. thereof). However, often such provisions result is a reduction of functional aspects such as the diameter through which access to the manhole is provided. Secondly, the installation of the adjustable height adaptors is usually a two-step process. In a first step the adaptor is placed in the top of a riser in a sealed telescopic arrangement and kept at that height level till the level of the road deck or pavement is known. Then, in a second step, the height of the height adaptor is adjusted by loosening up the sealed telescopic arrangement and adjusting the height of the height adaptor. This loosening up is not easy for instance given that a sealing gasket around an insertable tubular end of height adaptor adhered too strongly to the outer wall of the height adaptor and enhanced the friction that needs to be overcome for enabling lifting the height adaptor. It may also be difficult to lift the height adaptor given that the adaptor may almost fully have been buried into the ground and is therefore difficult to manipulate. Such situations may hinder a swift movement of the height adaptor up to the required height.

[0004] It is the aim of the present disclosure to provide a height adaptor which addresses at least one of the above-mentioned drawbacks.

Summary of the disclosure

[0005] The present disclosure provides a height adaptor for supporting a manhole cover or cover assembly. The height adaptor includes a tubular body having an insertable end for downwardly inserting in a top opening for entry into a manhole. The tubular body further having a top end and a bearing surface extending radially outwardly proximate to the top end, wherein the bearing surface is configured for supporting a manhole cover or cover assembly when disposed onto the top end of the tubular body.

[0006] Each of the insertable end and the top end is provided with at least one part of an interlocking arrangement, so that the at least one part of the interlocking arrangement at the top end can interlock with the at least one part of the interlocking arrangement at the insertable end of another similarly oriented one of such a height adaptor placed in a stacking arrangement, and so that the at least one part of the interlocking arrangement at the insertable end can interlock with the at least one part of the interlocking arrangement at the top end of another similarly oriented one of such a height adaptor placed in a stacking arrangement. The parts are each at least to an extent aligned so at to be at least partly, preferably largely, and even more preferably completely, within a thickness of an imaginary or real continuation of a wall of the tubular body. Advantageously, the diameter of the tubular tube, giving access to the manhole, is not significantly and preferably not at all compromised by the interlocking arrangements when stacking the height adaptor such that a stable stack is obtained.

[0007] The interlocking arrangement may include any one or a combination of the following: gender connectors and mechanical fasteners. Gender connectors allow for formfitting, providing thus a well fitting and stable stacking arrangement. Mechanical fasteners allow for a form of securing, enhancing the stability of the stacking arrangement.

[0008] The interlocking arrangement may be an integral arrangement of the height adaptor, allowing for a straight forward production and a stable connection between the parts of the interlocking arrangement, enhancing the stability of a stacking arrangement, also when for instance during transport subjected to fatigue conditions, such as small vibrations.

[0009] The at least one part of an interlocking arrangement includes at least two parts, and wherein each pair of neighbouring parts of the at least two parts has the same distance between each other in circumferential direction as any other part of the at least two parts. The more the axial symmetry, the better the stability of a stacking arrangement in which the stacked adaptors are in a coaxial position. Furthermore, this provides for focussing on the connection at only one circumferential position to makes sure that at all interlocking arrangements can become functional.

[0010] The at least two parts comprises four, five or six

parts. This allows for at least one interlocking arrangement always being in sight, no matter from which circumferential position a worker is viewing the height adaptors.

[0011] The interlocking arrangement may include an indexed tapered profile provided on both the bottom and top end of the tubular body, allowing for a snug fit between a top end of a first adaptive shaft cover and a bottom end of a second adaptive shaft cover when stacked onto each other.

[0012] The bearing surface may be in the form of a stepped profile which defines a seat for receiving the manhole cover thereon. This prevent the cover from being shifted away for its optimal position. The seat may thus advantageously provide for an accurate/correct fitment of the manhole cover onto the bearing surface.

[0013] The bearing surface's configuration may be dictated by the manhole cover's configuration. More specifically, the bearing surface may be configured such to accommodate for various manhole cover configurations, in that it should be appreciated that manhole cover sizes/shapes may be different for each individual country and/or continent where the adaptive shaft cover is to be used. Resultantly, this provide for a versatile application of the cover adaptor, being advantageous.

[0014] The flange may include any one or more of the following: a cut-out, slit, slot, aperture or the like, through which a rotational force is apply able onto the tubular body. In use, advantageously providing for a safer and easier means of applying the rotational force.

[0015] In use, the flange may also define a handle and/or gripping portion around the tubular body, advantageously, through which the height adaptor may be manoeuvred (e.g. pulled upwards, pushed downwards, rotated, etc.) during use.

[0016] The height adaptor may include an alignment formation configured for ensuring correct fitment of the manhole cover onto the bearing surface.

[0017] The alignment formation may be in the form a ridge extending from the bearing surface.

[0018] The ridge may be defined by a continuous hoop or non-continuous hoop.

[0019] The tubular body may include at least one arm extending radially therefrom, preferably, transversely relative to a longitudinal axis of the tubular body. Advantageously, in use, the arm may provide for an additional mechanism/means for applying a rotational force onto the tubular body.

[0020] The interlocking arrangement may include an indexed tapered profile provided on both the bottom and top end of the tubular body, for allowing a snug fit between a top end of a first adaptive shaft cover and a bottom end of a second adaptive shaft cover when stacked onto each other.

[0021] The bearing surface may have edges which coincide with an imaginary square, so that cover adaptors may be placeable adjacent to each other whilst edges of the respective adjacent bearing surfaces are aligned. This may contribute to a dense and stable placement of stacked or unstacked cover adaptors next to each other. During transport such placed cover adaptors support each other in multiple directions and this prevents the falling and/or deforming of adaptors during transport.

[0022] Additionally, the bearing surface is part of a flange which is provided with at least one structure which differs from the remaining part of the flange and which is configured for receiving a tangential force for rotation of the height adaptor when inserted in a top opening for entry into a manhole. Applying such a tangential force helps to loosen up the height adaptor from a gasket seal, in a controlled manner. The loosening does not necessarily coincide with a lifting of the height adaptor as the initial movement directly following the loosening is only rotational in direction. Hence the position of the sealing gasket relative to the height adaptor may be unchanged. Once this rotational movement is achieved, it will be easier to lift the height adaptor in a non-jerky fashion. This allows for a controlled adjustment of the height. Having such a dedicated structure configured for receiving a tangential force for rotation of the height adaptor will thus facilitate an accurate and swift adjustment of the height of the height adaptor. Furthermore, It may be possible to use a relatively heavy element for directing a tangential force against the structure for rotation of the height adaptor. Such a heavy element may be the part of a bulldozer or a crane having an accurately directable part that may be available on site and useable for accurately applying the tangential force. In principle any tool can be used, provided it can use the structure that has been implemented as part of the flange for this purpose.

[0023] It should be borne in mind that the bearing surface being part of a flange which is provided with at least one structure which differs from the remaining part of the flange and which is configured for receiving a tangential force for rotation of the height adaptor when inserted in a top opening for entry into a manhole, maybe implemented on any height adapter for supporting a manhole cover or cover assembly. The height adapter may include a tubular body having an insertable end for downwardly inserting in a top opening for entry into a manhole or inspection chamber installation. The tubular body may further have a top end and a bearing surface extending outwardly proximate to the top end. The bearing surface may further be configured for supporting a manhole cover when disposed onto the top end of the tubular body. Such a height adaptor may or may not have interlocking arrangements for stacking.

[0024] Disclosed is also a height adapter for supporting a manhole cover or cover assembly, wherein the height adapter includes a tubular body having an insertable end for downwardly inserting in a top opening for entry into a manhole or inspection chamber, the tubular body further having a top end and a bearing surface extending outwardly proximate to the top end, wherein the bearing surface is configured for supporting a manhole cover when disposed onto the top end of the tubular body,

wherein the bearing surface is part of a flange which is provided with at least one structure which differs from the remaining part of the flange and which is configured for receiving a tangential force for rotation of the height adaptor when inserted in a top opening for entry into a manhole.

[0025] All other features discussed in this disclosure may be combined with such a height adaptor.

[0026] In particular, the at least one structure may include a surface against which a tangential force can be exerted for bringing the cover adapter in rotation. The surface may delimitate a recess or a protrusion, which each may provide stability for a bar-shaped device that may be used for bringing the cover adaptor in rotation despite the sealed telescopic arrangement.

Brief description of the drawings

[0027] Further details, aspects and embodiments of the invention will be described, by way of example only, with reference to the drawings. In the drawings, like reference numbers are used to identify like or functionally similar elements. Elements in the figures are illustrated for simplicity and clarity and have not necessarily been drawn to scale.

Figure 1 shows a three-dimensional front view of a first example of a cover adaptor according to the disclosure;

Figure 2 shows a three-dimensional front view of a second example of a cover adaptor according to the disclosure;

Figure 3 shows a three-dimensional front view of a third example of a cover adaptor according to the disclosure;

Figure 4 shows two cover adaptors according examples of the disclosure in stacking arrangement;

Figure 5 shows in detail a part of two cover adaptors according examples of the disclosure in stacking arrangement;

Figure 6 shows in detail a part of an embodiment of a cover adaptor according to the disclosure at a top end of the cover adaptor;

Figure 7 shows an embodiment of a cover adaptor according to the disclosure and a direction of rotation by means of an arrow;

Figure 8 shows in detail a part of an embodiment of a cover adaptor according to the disclosure at a top end of the cover adaptor and surface shaded for drawing attention thereto;

Figure 9 shows an embodiment of a cover adaptor according to the disclosure in use and a direction of rotation by means of an arrow to indicate a first step of adjusting the height of the bearing surface; and

Figure 10 shows an embodiment of a cover adaptor according to the disclosure in use and a direction of height adjustment by means of an arrow.

Detailed description of the preferred embodiments

[0028] In Figure 1 reference numeral 10 refers to a height adaptor for supporting a manhole cover (not shown) or a cover assembly (also not shown), more specifically, for supporting a manhole cover typically used in the Netherlands. However, the disclosure is not limited to height adaptors useable in The Netherlands, and neither is the use of the height adaptors shown.

[0029] A cover is understood to mean a device for closing entry into the manhole (or inspection chamber), which prevents people and ideally matters (apart from for instance rain water) from falling into the entry, and which becomes part of the road deck, pavement or the like. A cover assembly is understood to mean a set of at least two parts, comprising at least a seat element for a lid, and the lid itself. These parts may for instance be of steel or of concrete, or for instance one of steel and one of concrete. These are assemblies that are known in the field of concern. Further specific elaboration about such assemblies is beyond the scope of this disclosure.

[0030] The height adaptor 10 includes a tubular body 12 having a bearing surface 14 arranged proximate to a rim portion of a top end 12.1 of the tubular body 12. The term "proximate" is used to include in this context at the top end and/or a little away from the top end.

[0031] In the embodiment shown in Figure 1, the bearing surface 14 is defined by a flange 16 extending perpendicular from the top end of the tubular body 12. The flange 16 is in the form of a continuous circumferential ledge arranged around the tubular body 12.

[0032] The height adaptor 10 also includes an alignment formation 18 in the form of a continuous ridge extending upwards from the flange 16, co-axially relative to the longitudinal axis 20 of the tubular body 12. As is clear given that the diameter of the ridge is larger than the diameter of the tubular body, the ridge 18 is in this example not the end of the tubular body. The continuous ridge 18 serves to centre a part of the cover assembly and/or to make sure such a part of the cover assembly does not shift horizontally away from the centred position.

[0033] The bearing surface is part of a flange 16 which is provided with at least one structure which differs from the remaining part of the flange. In this example, the flange 16 includes four cut-outs 16.1 on an outer periphery thereof. Each structure is configured for receiving a tangential force for rotation of the height adaptor when inserted in a top opening for entry into a manhole. Preferably, the structure includes a surface 16.2. In figure 8, the shaded surface 16.2 may be seen as part of such a structure. In use, a heavy and manipulatable object can be pushed against such a surface to exert a tangential force thereon when the height adaptor has been inserted into a riser of a manhole that has been buried in the ground. bringing the cover adaptor in rotation. In use, the cut-outs 16.1 allows for an object (not shown) .to apply a tangential force to the flange. The tangential force ap-

plied against the surface 16.2 will overcome the friction resulting from the strong adherence of a sealing gasket to the tubular body. Accordingly, through applying the tangential force the height adaptor may become rotatable round its axis, and then also translatable along the axis to adjust the height of the adaptor.

[0034] In this example, the cut-outs 16.1 also inherently divides the exposed surface of the flange 16, as arranged adjacent to an outer surface 18.2 of the ridge 18, into four handles through may facilitate manoeuvring the height adaptor 10 (e.g., pulling upwards, pushing downwards, rotated, etc).

[0035] The adaptor 10 also includes parts (22, 24) of an interlocking arrangement, disposed on a bottom end 12.2 and top end 12.1 of the tubular body 12. The part 24 of the locking arrangement at the top end 12.1 can interlock the part22 of the interlocking arrangement at bottom end (the insertable end) 12.2 of another similarly oriented one of such a height adaptor, when placed in a stacking arrangement, such as shown in Fig 4 and in more detail in Fig. 5. The part 22 of the interlocking arrangement at the insertable end 12.2 can interlock with the at least one part of the interlocking arrangement at the top end 12.1 of another similarly oriented one of such a height adaptor 10 placed in a stacking arrangement. The parts 22,24 are each at least to an extent aligned so as to be at least partly, preferably largely, and even more preferably - and as shown - completely, within a thickness of an imaginary or real continuation of a wall of the tubular body.

[0036] In this embodiment, interlocking arrangement is in the form of cut-outs 22 arranged on the bottom end 12.2 and protrusions 24, arranged on the top end 12.1, being indexed to each other. It is to be appreciated that, in the interlocking arrangement, the cut-outs 22 of the upper height adaptor 10 is aligned above the protrusions 24 of the lower height adaptor 10, such that when the two adaptors 10 are engaged with each other, it resultantly provides for the interlocking arrangement between the two adaptors 10. Advantageously, this can be repeated such that a plurality of height adaptors 10 may be stacked on top each other, which importantly, provides for a stable and/or space-efficient storing arrangement.

[0037] At the bottom end the cut-outs are at circumferential positions which are in circumferential direction alternated by circumferential parts which are provided with a chamfer, so that the diameter of the most outer part at the very end is slightly smaller than the diameter of the nearest unchamfered outer wall. Further, at the top end the protrusions are at circumferential positions which are in circumferential direction alternated by circumferential parts which are provided with a chamfer, so that the diameter of the most outer part at the very end is slightly larger than the diameter of the nearest unchamfered inner wall of the tubular body. The angle of the surface of the chamfer between the inner wall and the outer wall at the top end and at the bottom end allow for stably stacking as shown in Figure 4 and 5. Ideally, the angles are matching, and in any case not destabilizing the stacking arrangement. It will be understood that it is equally possible to have the chamfers inclined the other way around, namely, to have the chamfer at the top end as in the figures shown at the bottom end and then the chamfer at the bottom end as shown in the figures at the top end.

[0038] In Figure 2 reference numeral 30 refers to a height adaptor for supporting a manhole cover or cover assembly (not shown), more specifically, for supporting a manhole cover typically used in Germany and /or Poland. However, the disclosure is not limited to height adaptors usable in Germany and in Poland, and neither is the use of the height adaptors shown. The height adaptor 30 includes a tubular body 32 and bearing surface 34 arranged proximate to a rim portion of a top end 32.1 of the tubular body 32.

[0039] In the embodiment shown in Figure 2, the bearing surface 34 is defined by a flange 36 extending perpendicular from the top end 32.1 of the tubular body 32 and an alignment formation 38.

[0040] The flange 36 is in the form of a continuous circumferential ledge arranged around the tubular body 32.

[0041] The alignment formation 38 is in the form a non-continuous ridge extending from an outer edge of the flange 36 co-axially relative to the longitudinal axis 40 of the tubular body 32. The bearing surface 34 is defined between the rim portion of the tubular body 32 and an inner surface 38.1 of the ridge 38.

[0042] The flange 36 includes four cut-outs 36.1 arranged on the outer edge thereof, similar to the embodiment shown in Figure 1, for the same reasons and purpose.

[0043] In this embodiment shown in Figure 2, the flange 36 itself also defines handle and/or gripping portion around the tubular body 32, advantageously through which the height adaptor 30 may be manoeuvred (e.g. pulled upwards, pushed downwards, rotated, etc.) during use.

[0044] Furthermore, the height adaptor 30 also includes an interlocking arrangement disposed on a bottom end 32.2 and top end 32.1 of the tubular body 32, being in the form gender connectors. In this embodiment, the gender connectors are in the form of cut-outs 42 (arranged on the bottom end 32.2) and protrusions 44 arranged in the top end 32.1, being indexed to each other. It is to be appreciated that, the interlocking arrangement allows for two or more adaptive shaft covers 30 to be interlocked with each other, more specifically, be stacked on top of each other. As such, in use (not shown) a first adaptive shaft cover 30 is arranged above a second adaptive shaft cover 30 co-axially, thereafter, the protrusions 44 of the first adaptive shaft cover 30 is aligned below the cut-outs 42 of the second adaptive shaft cover 30, such that when the two adaptive shaft covers 30 are engaged with each other, it resultantly provides for the interlocking arrangement between the two adaptive shaft covers 30.

[0045] Advantageously, this can be repeated such that

a plurality adaptive shaft covers 30 may be stacked on top each other, which importantly, provides for a stable and/or space-efficient storing arrangement.

[0046] In Figure 3 reference numeral 50 refers to an adaptive shaft cover for supporting a manhole cover (not shown), more specifically, for supporting a manhole cover typically used in Scandinavian countries. However, the disclosure is not limited to height adaptors useable in Scandinavian countries, and neither is the use of the height adaptors shown. Height adaptor 50 includes a tubular body 52 and bearing surface 54 arranged proximate to a rim portion of a top end 52.1 of the tubular body 52.

[0047] In the embodiment shown in Figure 3, the bearing surface 54 is defined by the most upper end of the height adaptor 50

[0048] The flange 56 is in the form of a continuous circumferential ledge arranged around the tubular body 52.

[0049] The tubular body 52 includes four sets of arms 59 extending radially outwards (relative to the longitudinal axis 60) from the ridge 58. In this embodiment, the arms 59 provides for a handle and/or gripping means around the tubular body 52, advantageously through which the height adaptor 50 may be manoeuvred (e.g., pulled upwards, pushed downwards, rotated, etc.) during use.

[0050] The height adaptor 50 also includes an interlocking arrangement disposed on a bottom end 52.2 and top end 52.1 of the tubular body 52, being in the form gender connectors. In this embodiment, the gender connectors are in the form of cut-outs 62 (arranged on the bottom end 52.2) and protrusions 64 arranged in the top end 52.1, being indexed to each other. It is to be appreciated that, the interlocking arrangement allows for two or more height adaptors 50 to be interlocked with each other, more specifically, be stacked on top of each other

[0051] The disclosure is not limited to the embodiments shown and discussed above. Many variations are possible. The interlocking arrangement may include any one or combination of gender connectors. Such the gender connectors many include a female and male configuration, being in the form of respectively cut-outs and protrusions as shown. The distribution of these cut-outs and protrusions, along the circumference, in terms of dimensions and in terms of numbers , can easily be optimized by a skilled person for a specific purpose. The interlocking arrangement is preferably an integral arrangement of the height adaptor. An interlocking arrangement preferably includes at least two parts at each end which are at equidistance from each other in circumferential direction.

[0052] It is also possible to have at the top-end both male and female parts of the interlocking arrangement, and then at the bottom end both female and male parts of the interlocking arrangement. It is possible that this further enhances the stability of the stacked height adaptors.

[0053] Many variations and modifications are possible within the scope of the appended claims.

Claims

1. A height adapter for supporting a manhole cover or cover assembly, wherein the height adapter includes a tubular body having an insertable end for downwardly inserting in a top opening for entry into a manhole or inspection chamber, the tubular body further having a top end and a bearing surface extending outwardly proximate to the top end, wherein the bearing surface is configured for supporting a manhole cover or cover assembly when disposed onto the top end of the tubular body; wherein each of the insertable end and the top end is provided with at least one part of an interlocking arrangement, so that the at least one part of the locking arrangement at the top end can interlock with the at least one part of the interlocking arrangement at the insertable end of another similarly oriented one of such a height adapter placed in a stacking arrangement, and so that the at least one part of the interlocking arrangement at the insertable end can interlock with the at least one part of the interlocking arrangement at the top end of another similarly oriented one of such a height adaptor placed in a stacking arrangement, the parts being each at least to an extent aligned so as to be at least partly, preferably largely, and even more preferably completely, within a thickness of an imaginary or real continuation of a wall of the tubular body.

2. A height adaptor according to claim 1, wherein the interlocking arrangement includes any one or combination of the following: gender connectors and mechanical fasteners.

3. A height adaptor according to claim 2, wherein the gender connectors include a female and male configuration, for instance being in the form of respectively cut-outs and protrusions.

4. A height adaptor according to any one of the preceding claims, wherein the interlocking arrangement is an integral arrangement of the height adaptor.

5. A height adaptor according to any one of the preceding claims, wherein the at least one part of an interlocking arrangement includes at least two parts, and wherein each pair of neighbouring parts of the at least two parts has the same distance between each other as any other pair of the at least two parts.

6. A height adaptor according to claim 5, wherein the at least two parts comprises four, five or six parts.

7. A height adaptor according to any one of the pre-

ceding claims, wherein the at least one part of an interlocking arrangement at the insertable end comprises a circumferential rim having cut-outs.

8. A height adaptor according to any one of the preceding claims, wherein the at least one part of an interlocking arrangement at the top end comprises protrusions at circumferential positions which are in circumferential direction alternated by circumferential parts which are provided with a chamfer having a radius that enlarges towards the top end and/or circumferential parts with a chamfer having a radius that reduces towards the top end.

9. A height adaptor according to claim 7 and 8, wherein in a stacking arrangement of two of such height adaptors the protrusions at the top end of one of these two adaptors fit in the cut-outs at the insertable end of the other one of such two adaptors.

10. A height adaptor according to any one of the previous claims, wherein the bearing surface is in the form of a flange extending outwardly from the tubular body, the flange preferably having a continuous or non-continuous circumferential ledge around the tubular body.

11. A height adaptor according to any one of the previous claims, wherein the bearing surface is part of a flange which is provided with at least one structure which differs from the remaining part of the flange and which is configured for receiving a tangential force for rotation of the height adaptor when inserted in a top opening for entry into a manhole.

12. A height adaptor according to claim 11, wherein the at least one structure includes a surface against which a tangential force can be exerted for bringing the cover adaptor in rotation.

13. A height adaptor according to claim 12, wherein the surface delimitates a recess or a protrusion.

14. A height adapter according to any of the preceding claims, wherein the height adaptor includes an alignment formation configured for ensuring correct fitment of the manhole cover or cover assembly onto the bearing surface.

15. A height adaptor according to claim 14, wherein the alignment formation is in the form a ridge extending from the bearing surface.

16. A height adaptor according to claim 15, wherein the ridge is defined by a continuous hoop or a non-continuous hoop.

17. A height adaptor according to any of the preceding claims, wherein the tubular body includes at least one arm extending radially therefrom, preferably, transversely relative to a longitudinal axis of the tubular body.

18. A height adaptor according to any one of the previous claims, wherein the bearing surface have edges which coincide with an imaginary square, so that height adaptors are placeable adjacent to each other so that edges of the respective adjacent bearing surfaces are aligned.

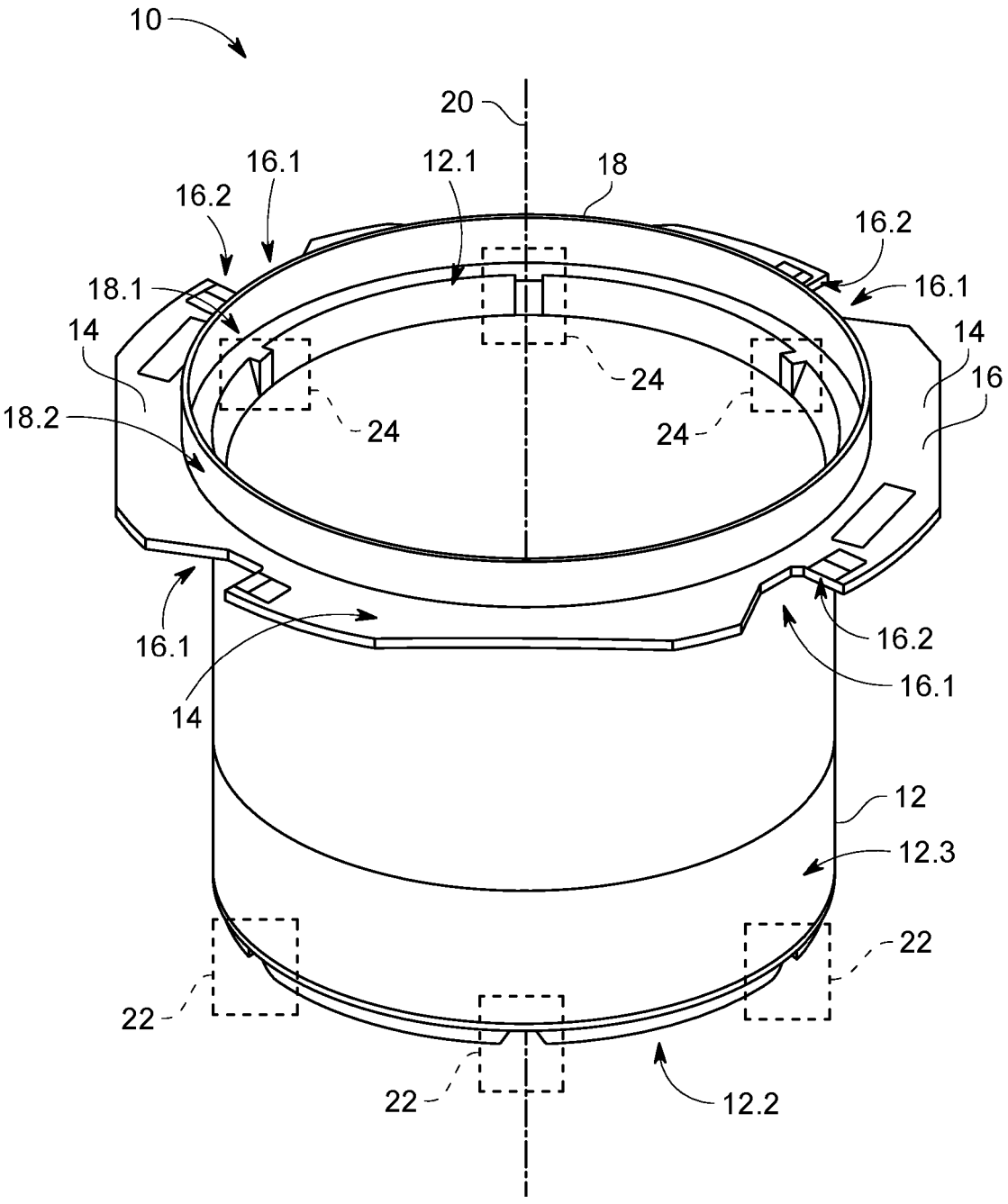

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FIG. 1

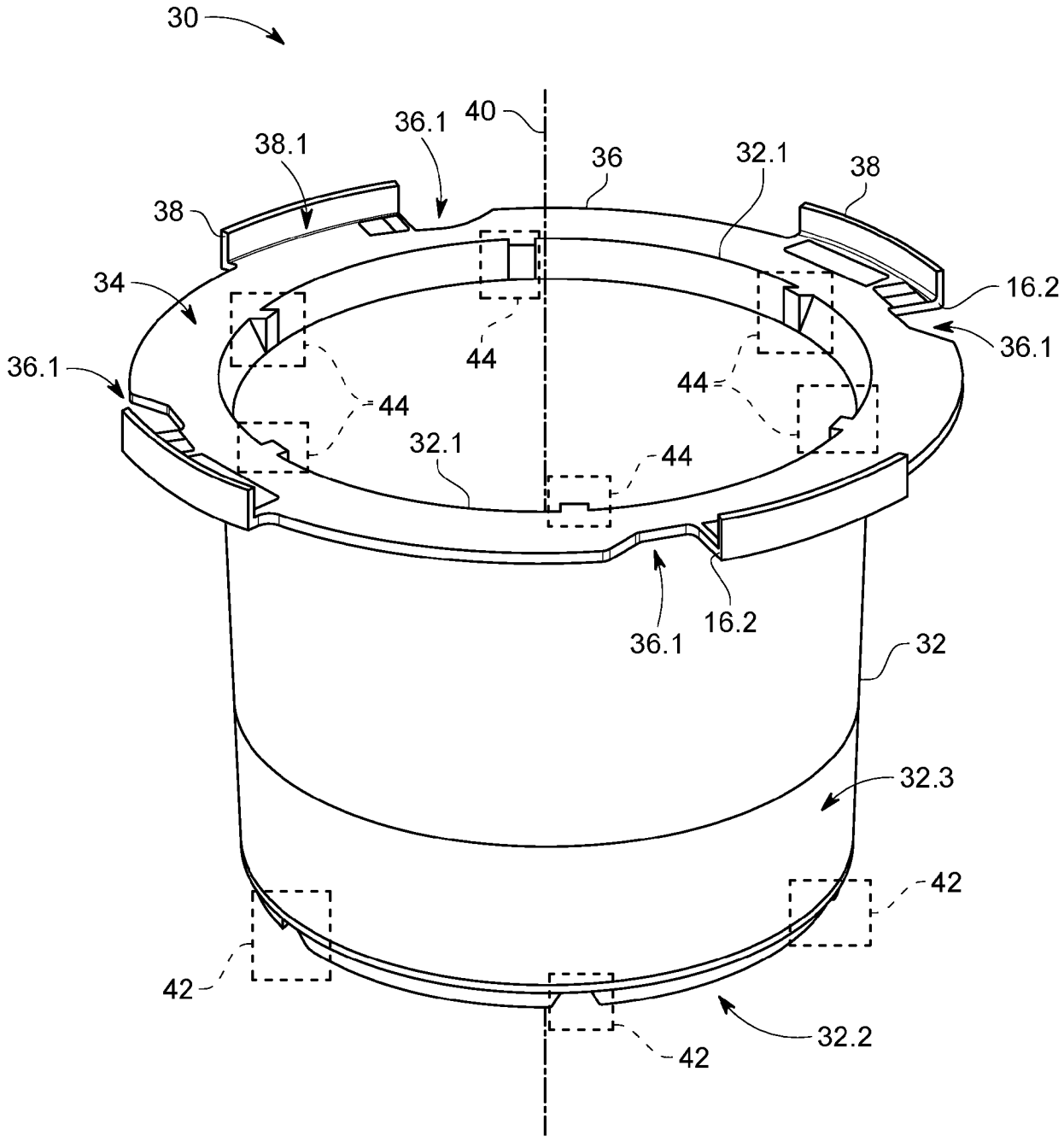

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FIG. 2

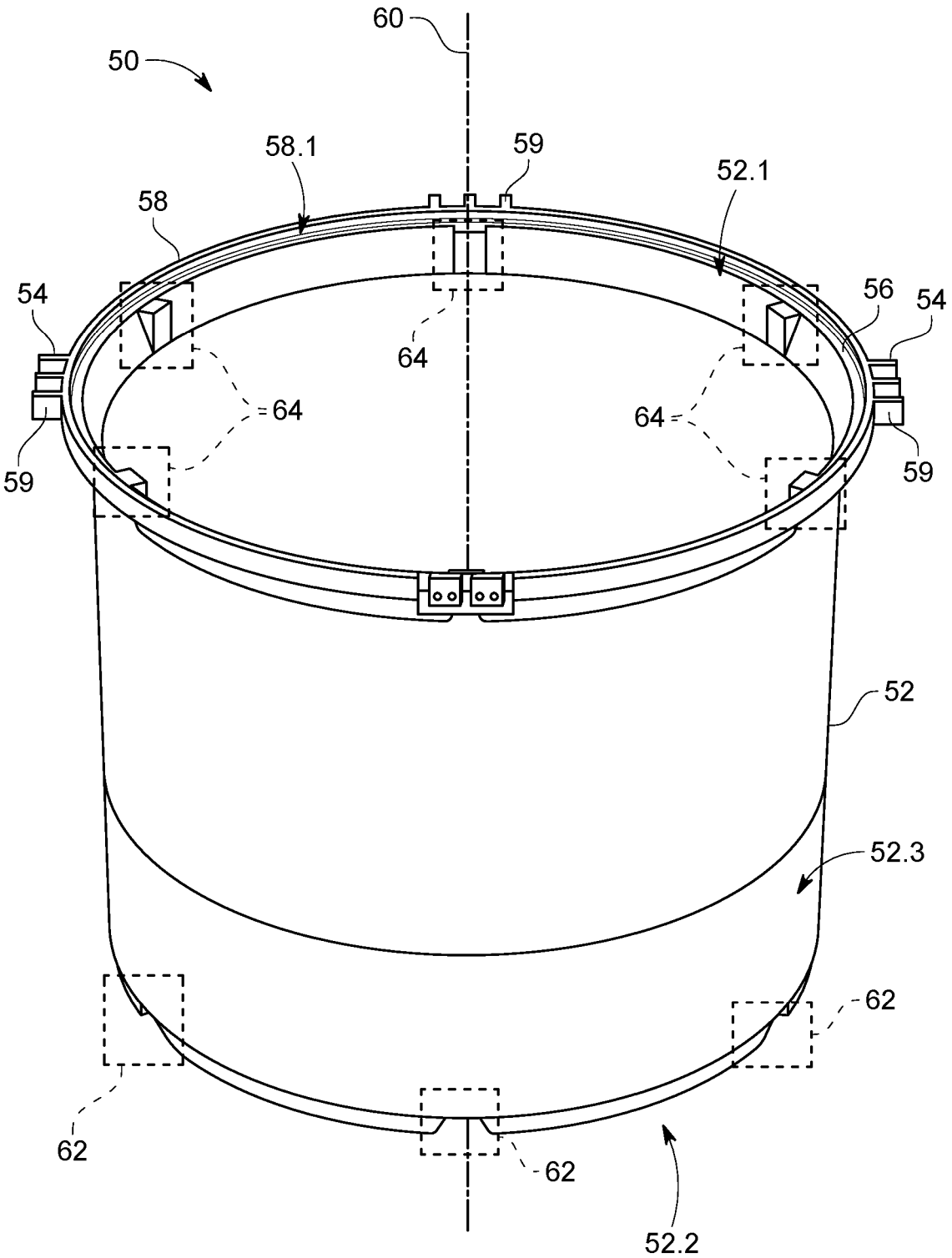


FIG. 3

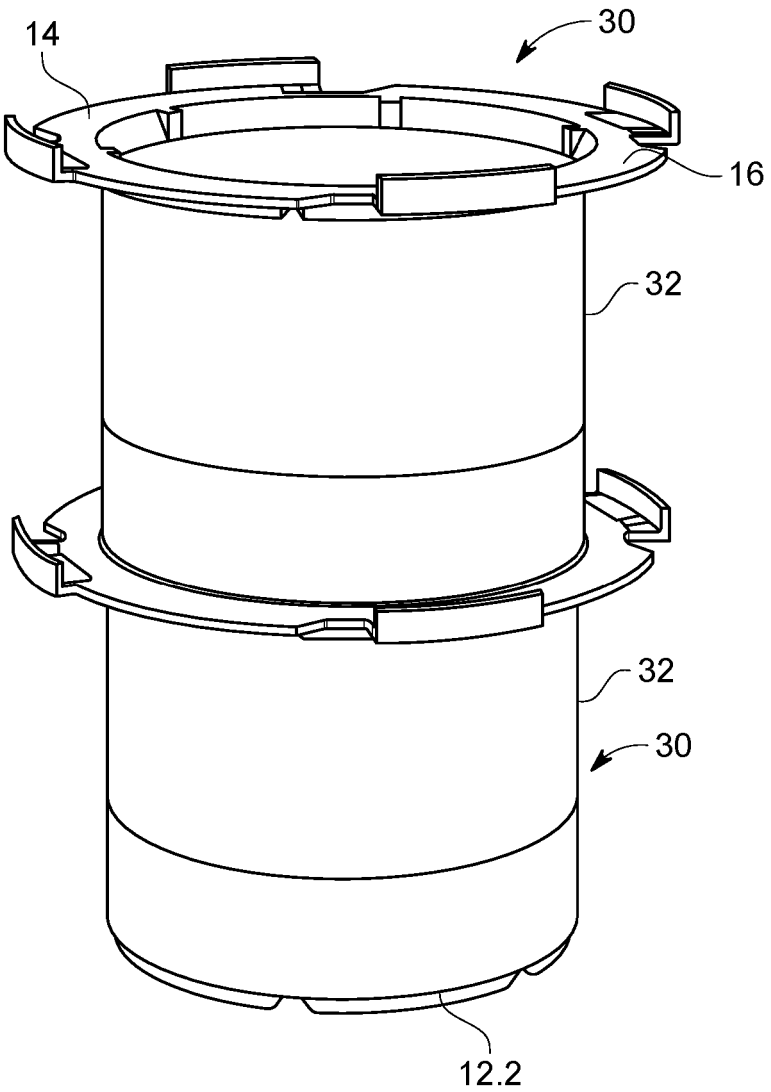


FIG. 4

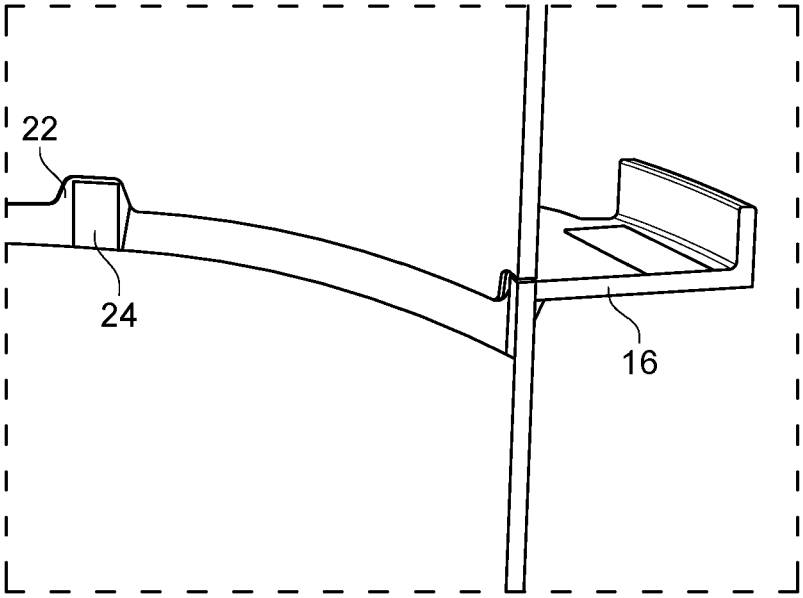


FIG. 5

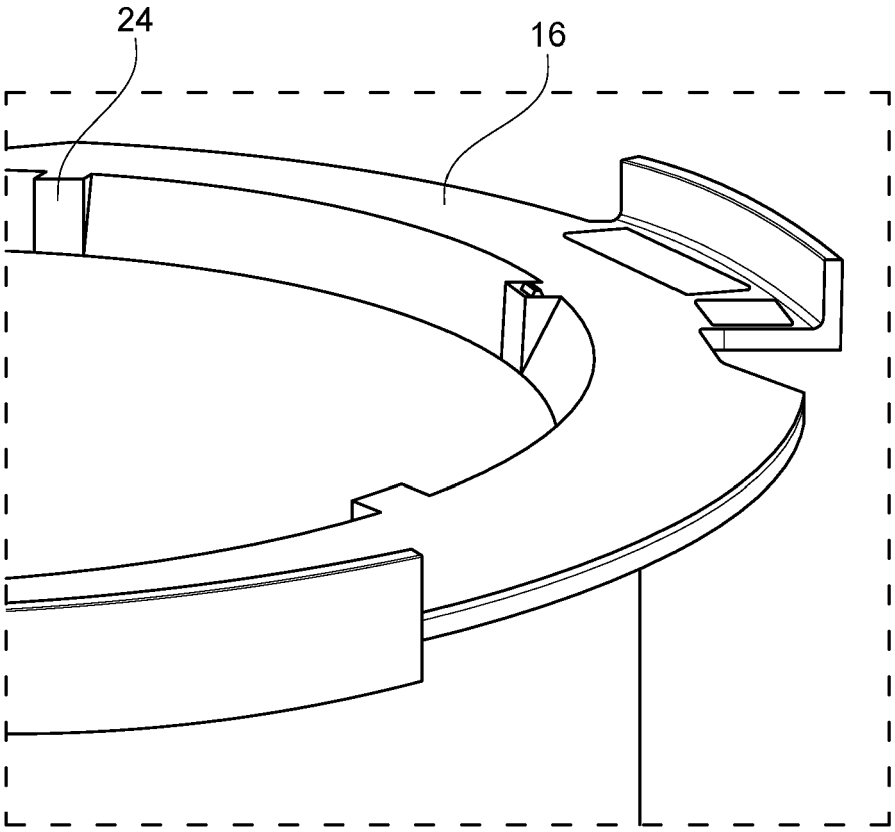


FIG. 6

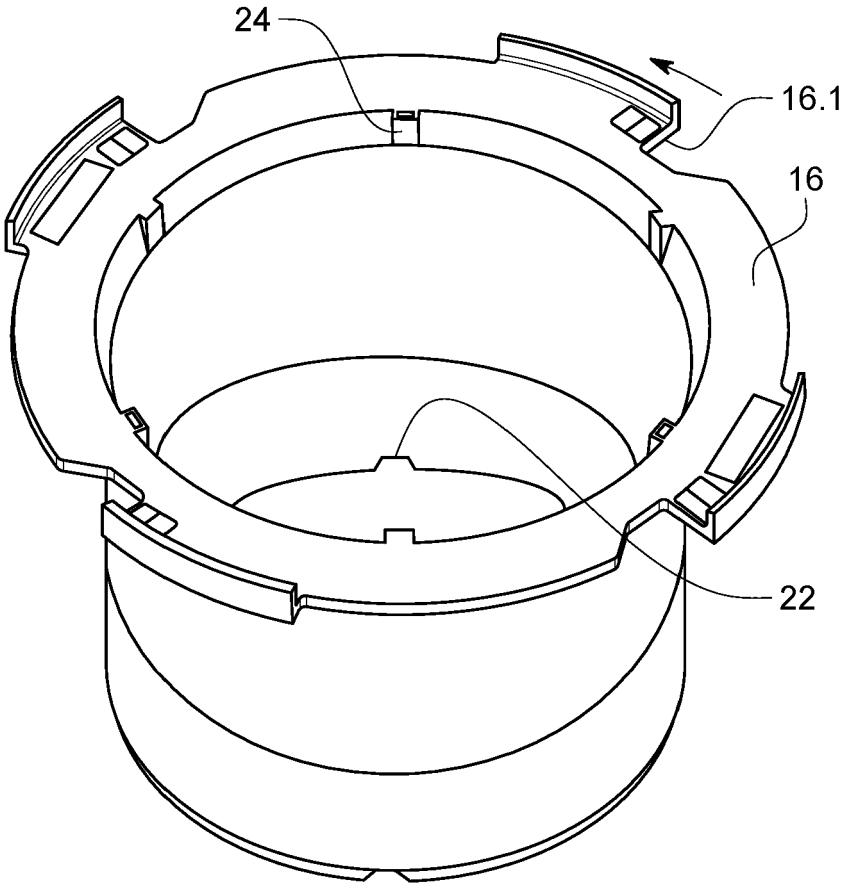


FIG. 7

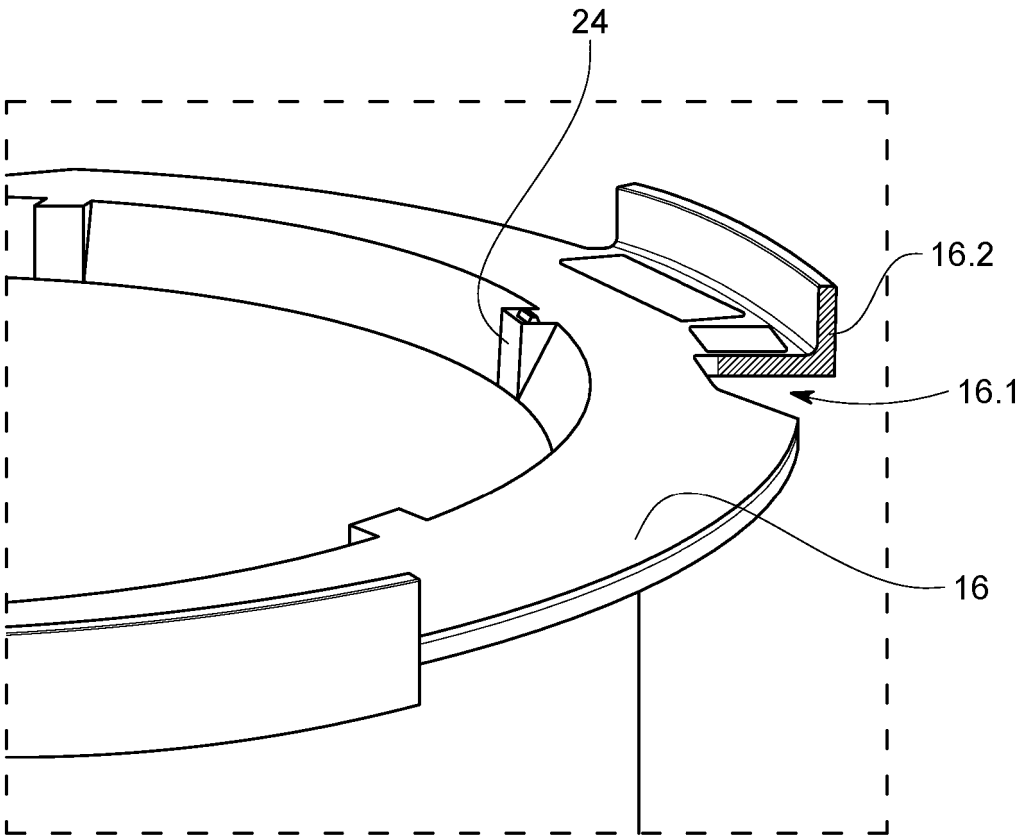


FIG. 8

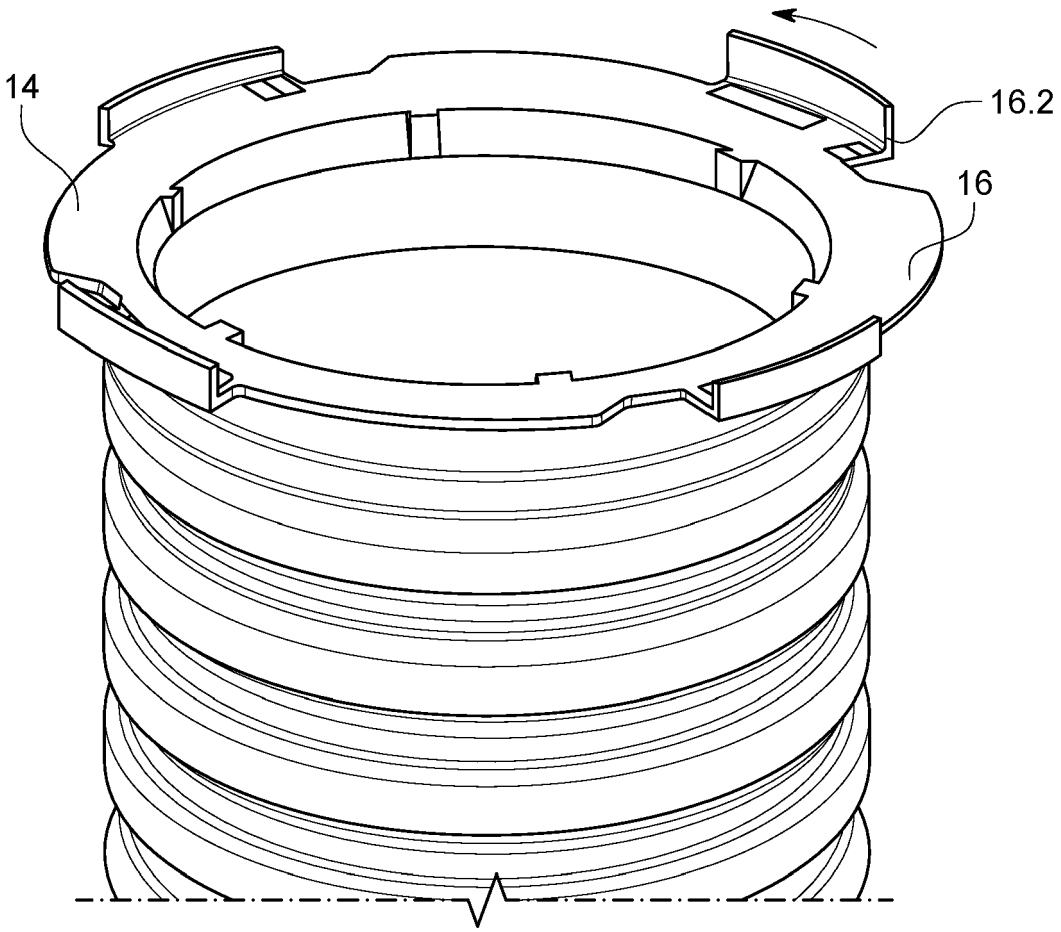


FIG. 9

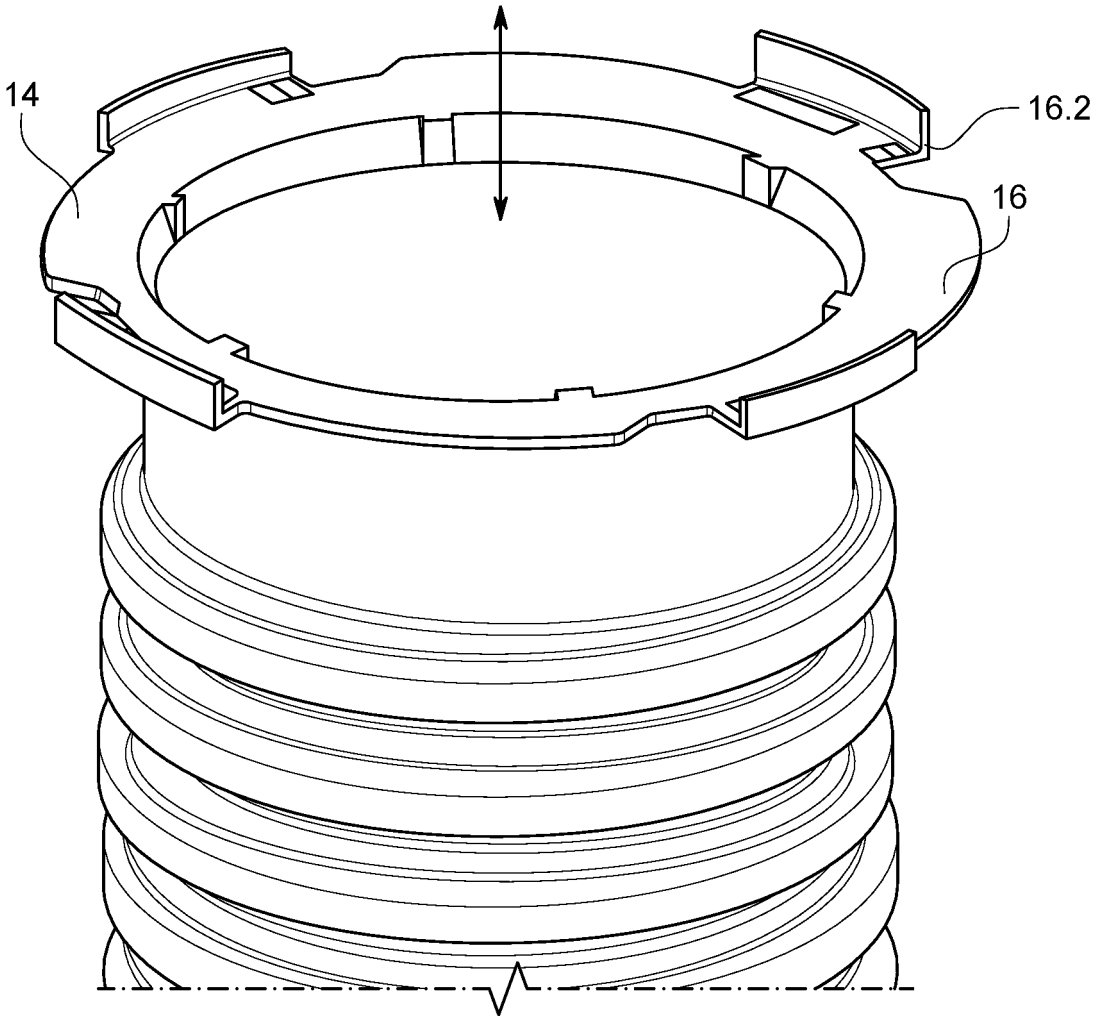


FIG. 10

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EUROPEAN SEARCH REPORT

Application Number
EP 26 17 0005

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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TECHNICAL FIELDS SEARCHED (IPC)

E02D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	31 August 2026	Geiger, Harald

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31-08-2026

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