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(54) **DRAIN ASSEMBLIES, AND RELATED KITS AND METHODS**

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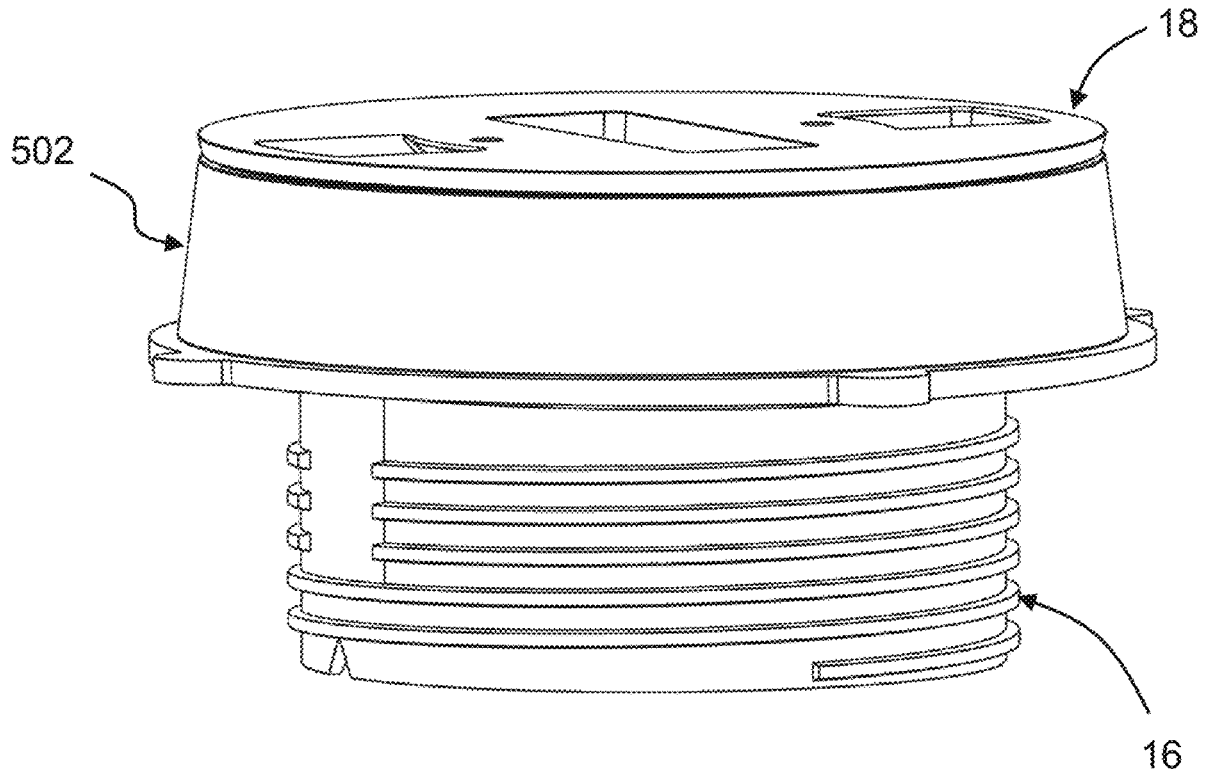
CPC ***E03F 5/0407*** (2013.01); ***E03F 5/041*** (2013.01)

(57) **ABSTRACT**

A drain assembly includes a drain body, barrel, plug, and sleeve. The drain body has an interior surface defining a channel along an axis and having interior threads thereon. The barrel has a central body having an upper end, with a flange extending radially outward therefrom and defining a landing surface. The central body has opposed exterior and interior barrel surfaces having exterior and interior threads, respectively. The interior barrel surface defines a channel alignable with the axis. The exterior threads are engageable with the drain body interior threads for axially adjusting the barrel relative to the drain body. The plug has a top surface and an outer body extending axially downward to a stop surface. An inner portion of the outer body extends axially below the stop surface and has external threads engageable with the barrel interior threads. The sleeve is sealingly receivable between the stop and landing surfaces.



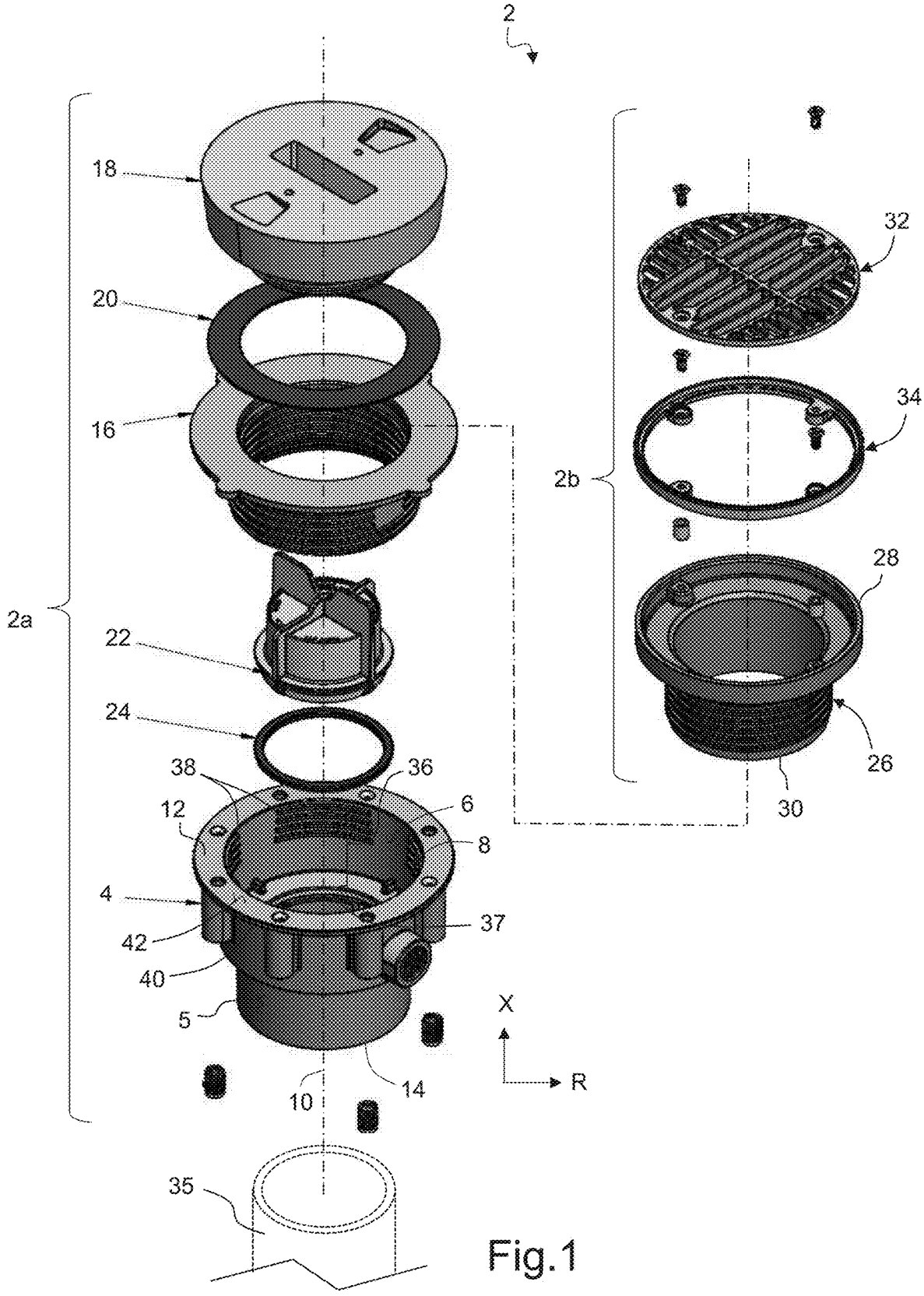


Fig.1

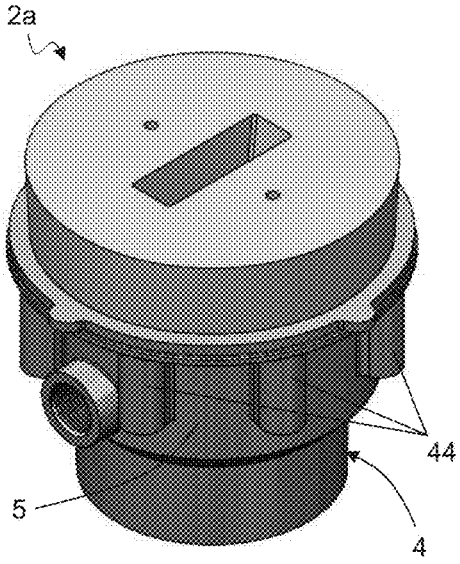


Fig.2A

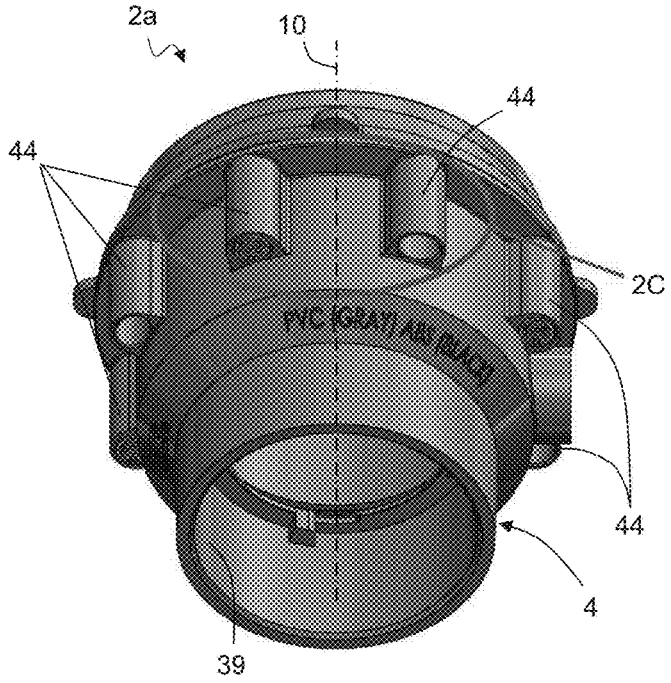


Fig.2B

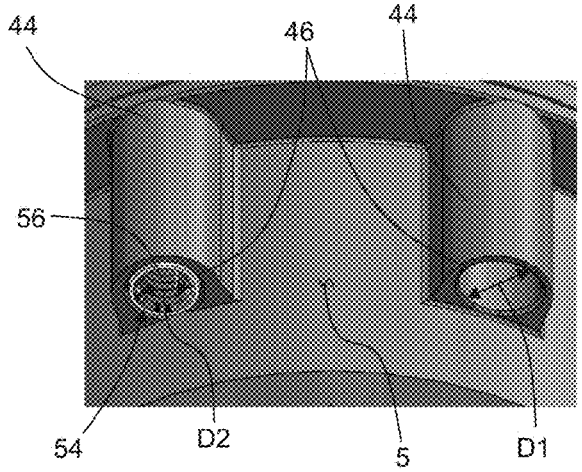
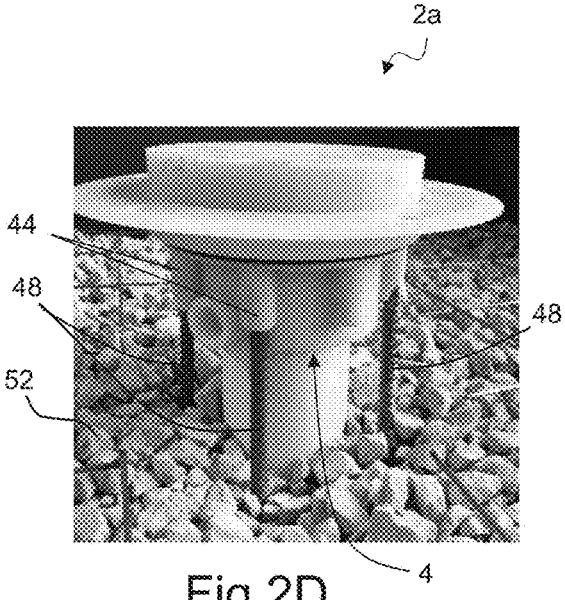


Fig.2C



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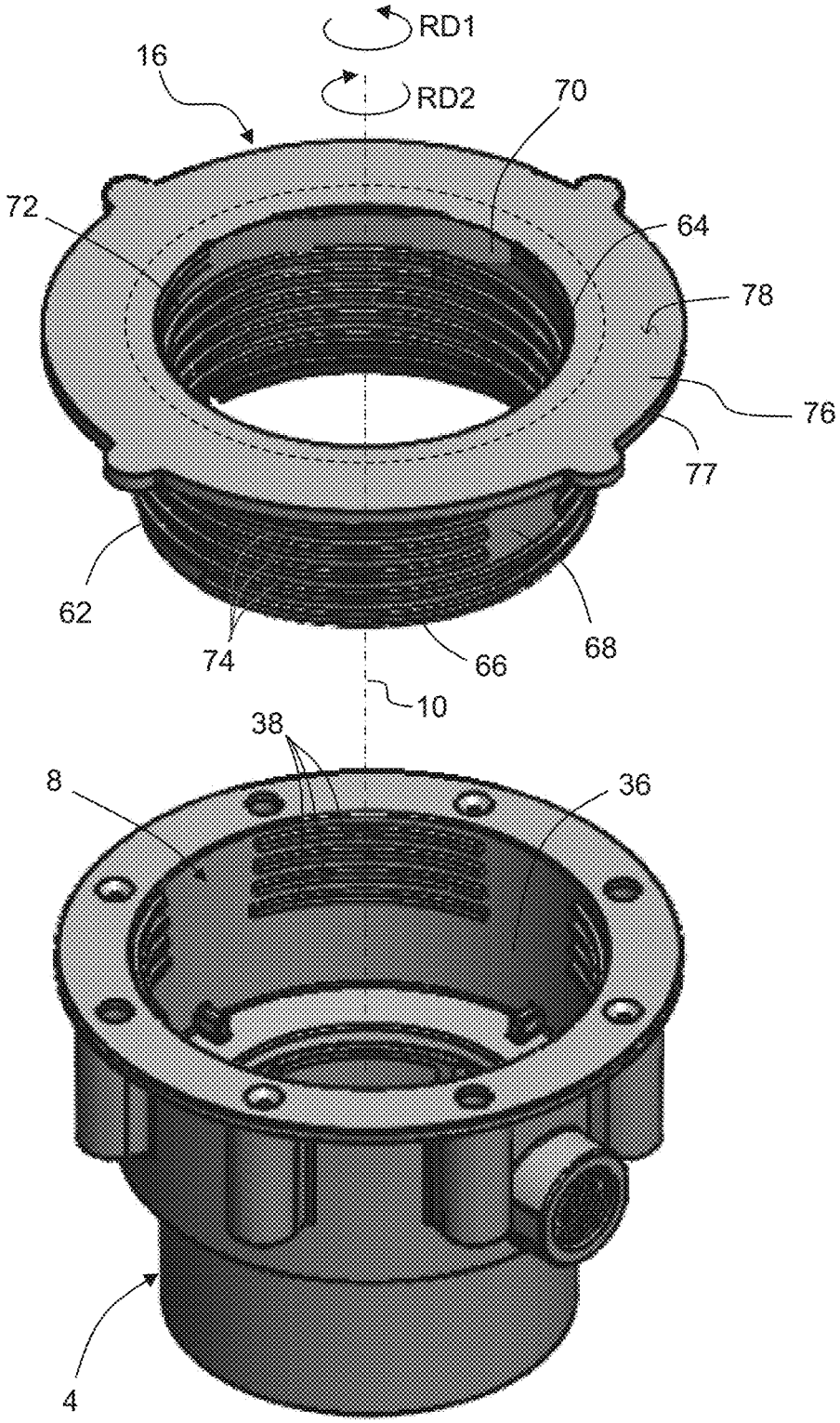

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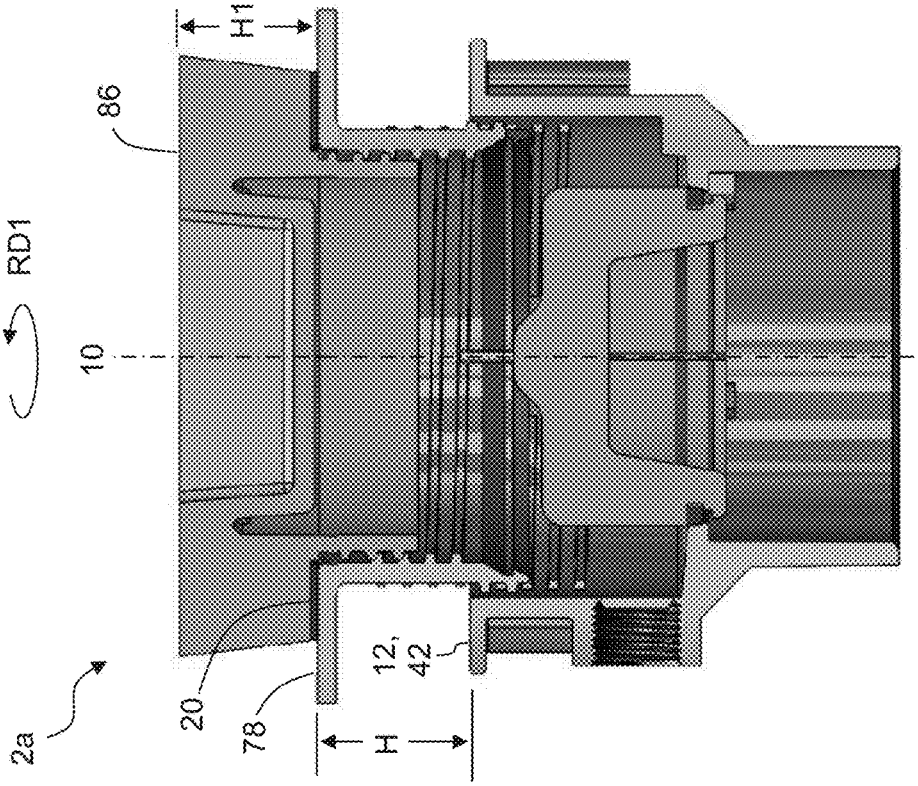
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Fig.3C

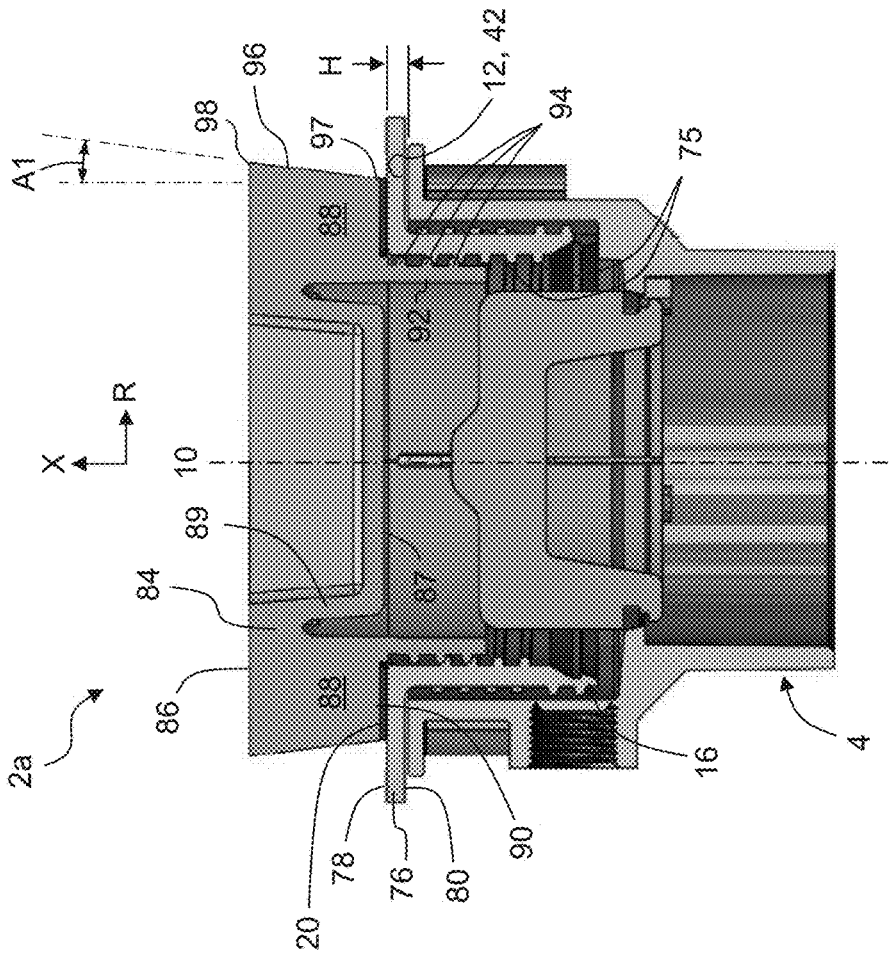
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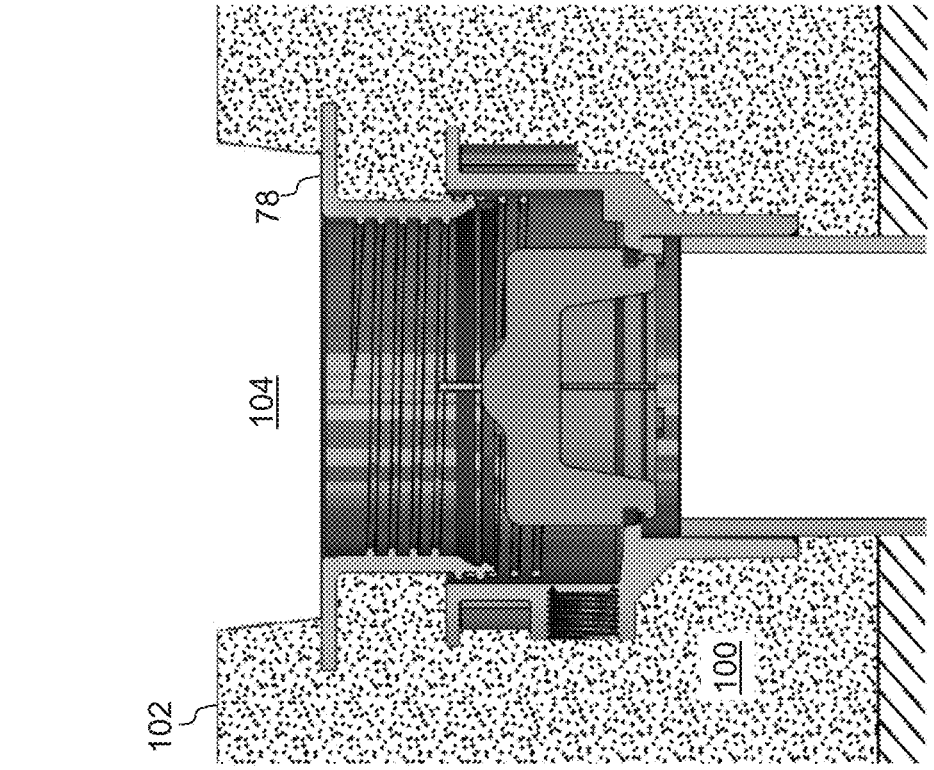
Fig.3B



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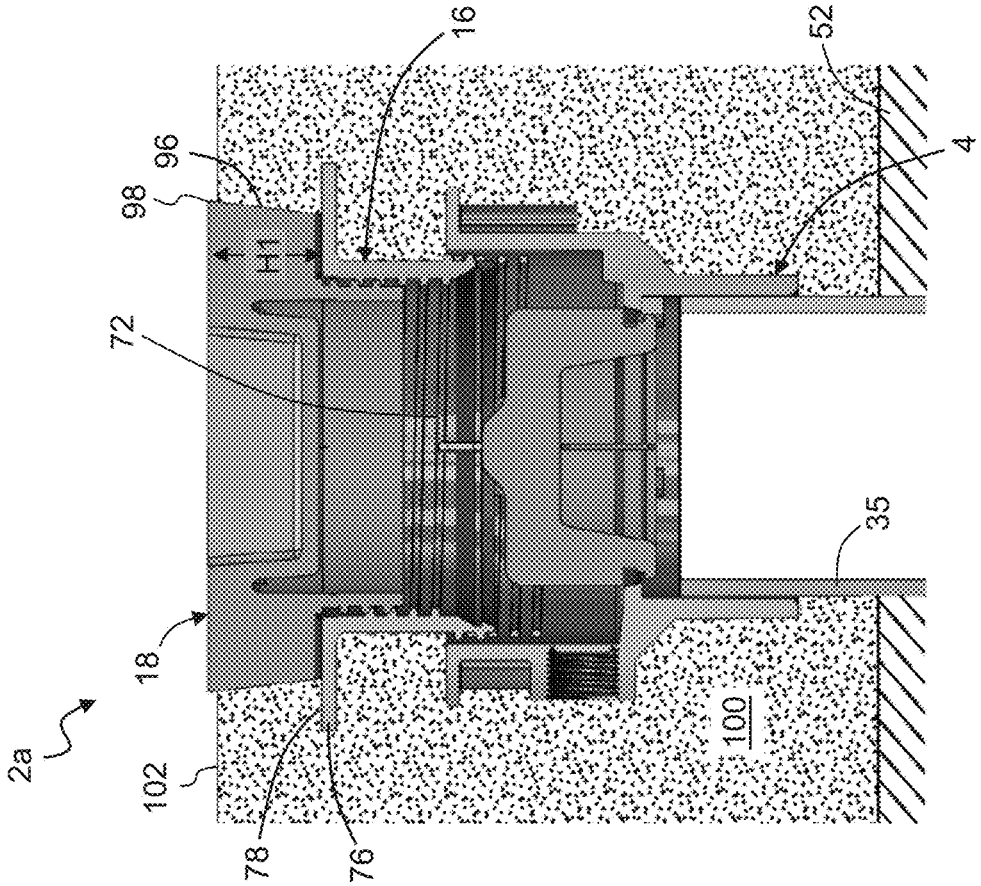
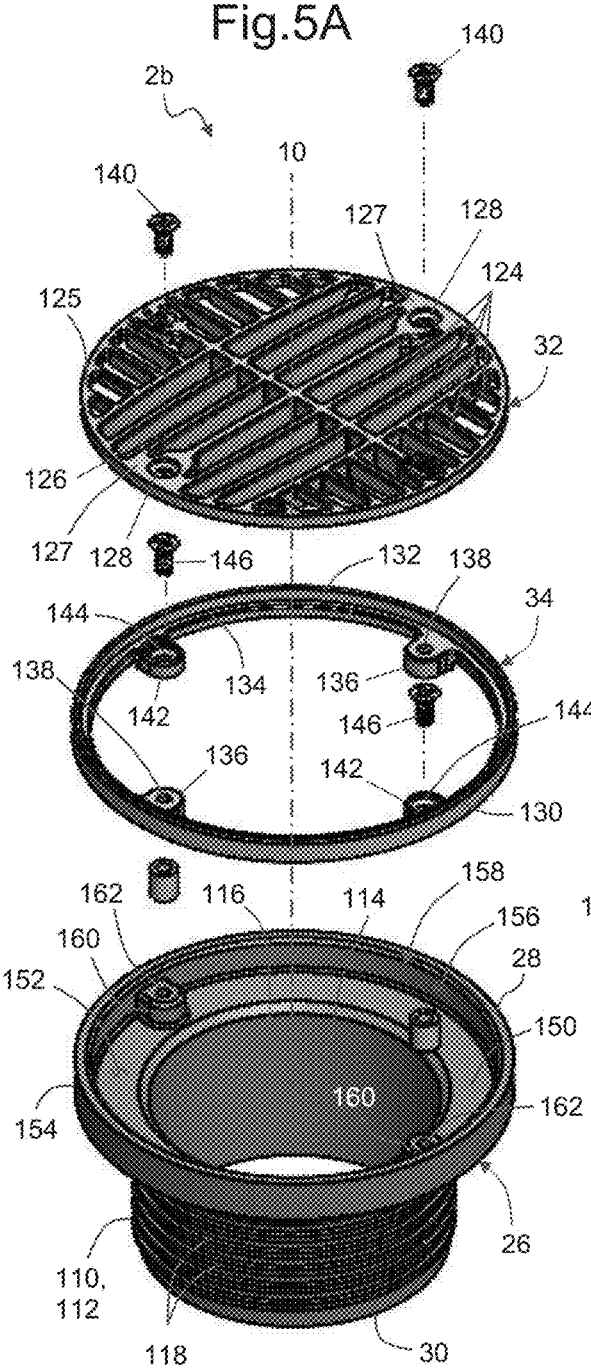
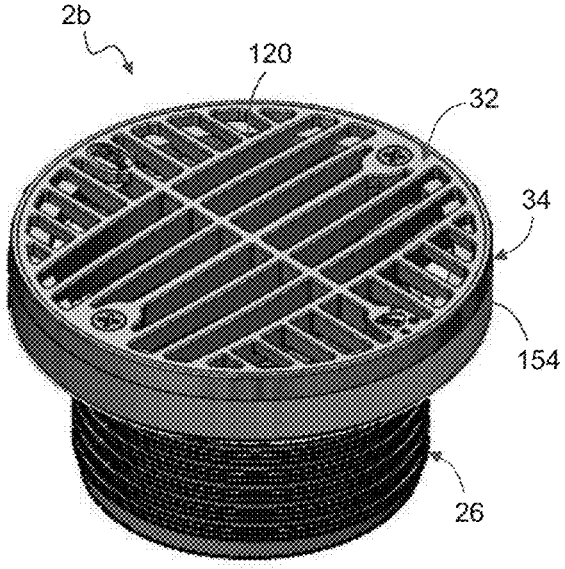


Fig.4A

Fig.5A





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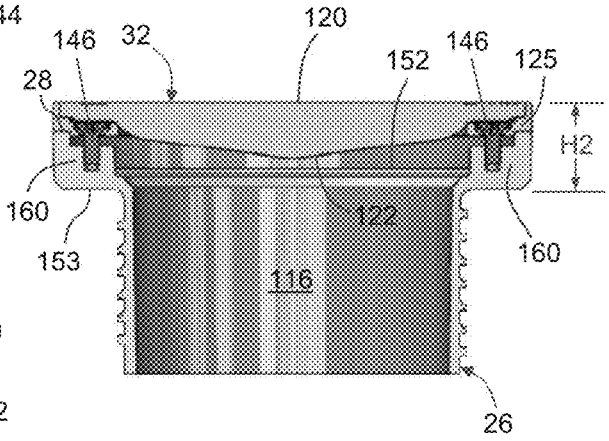

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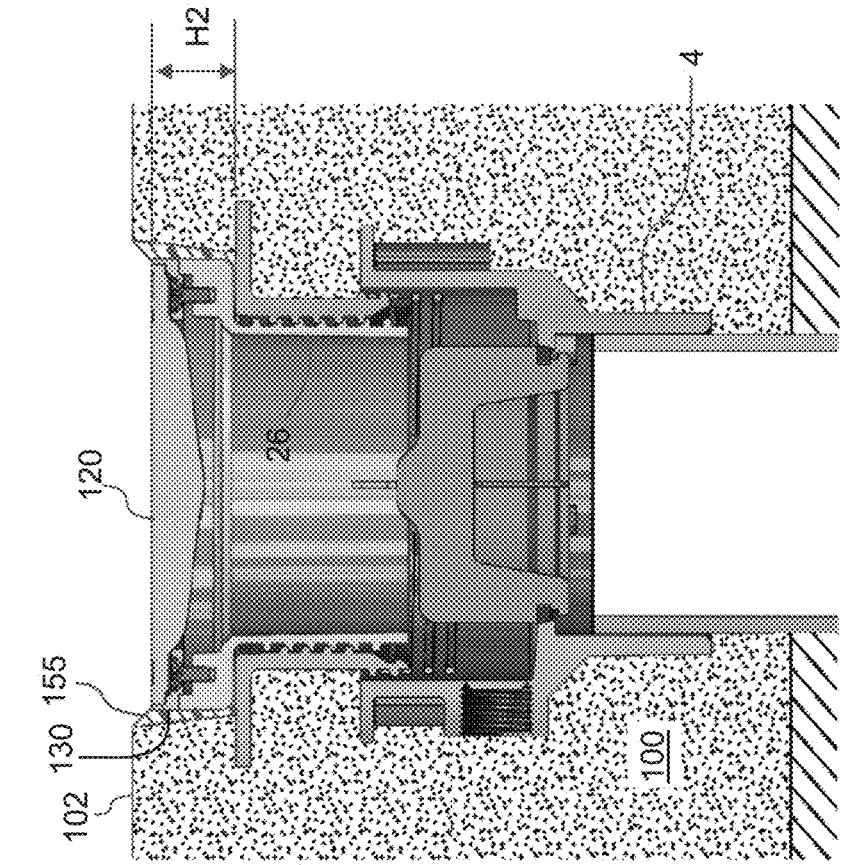

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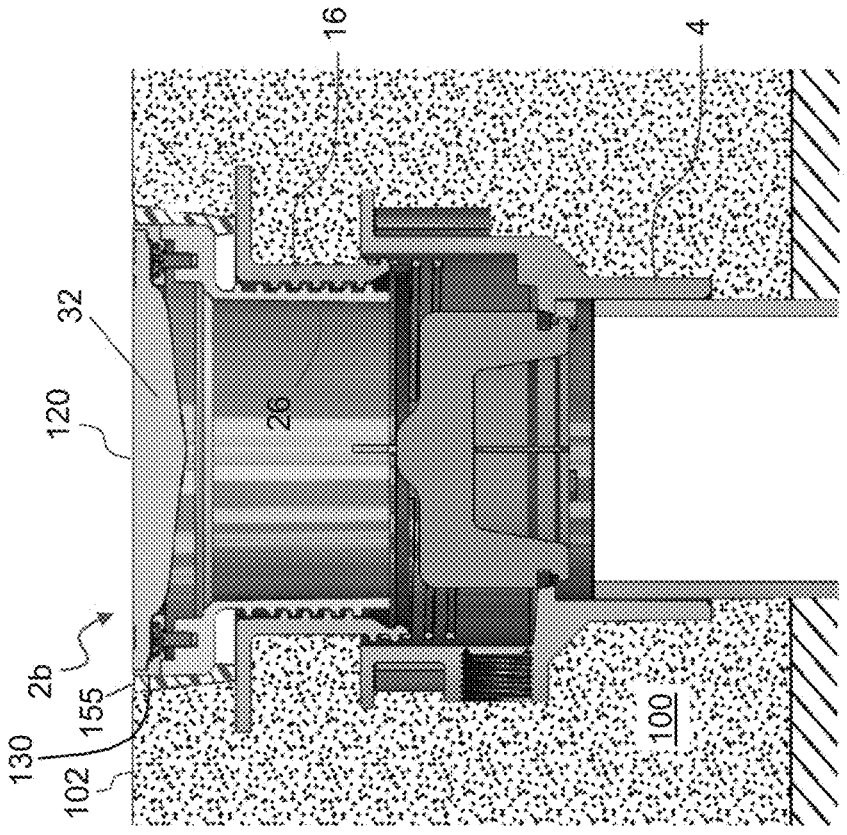
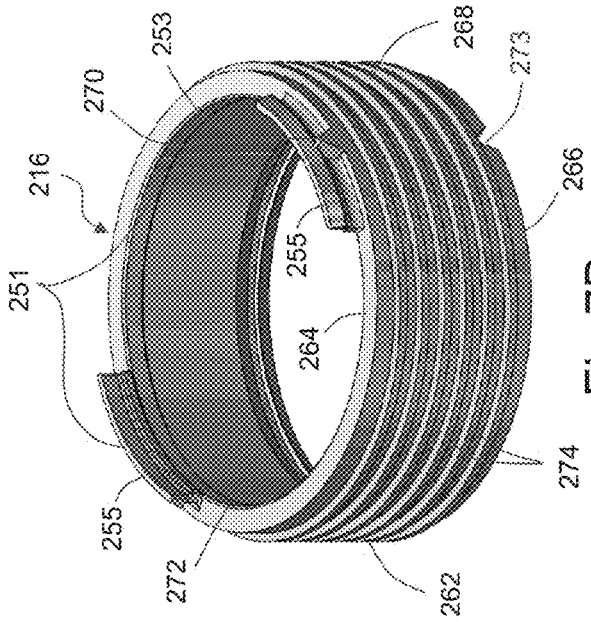


Fig.6A



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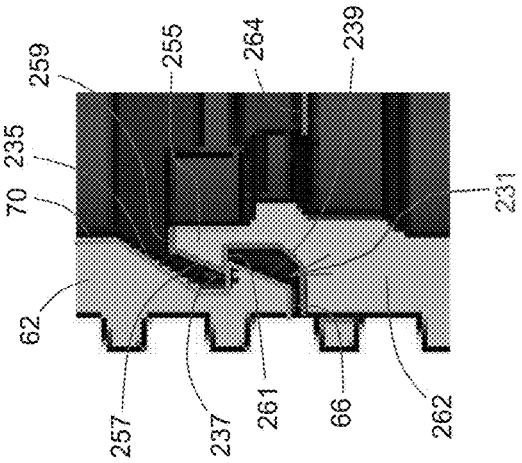

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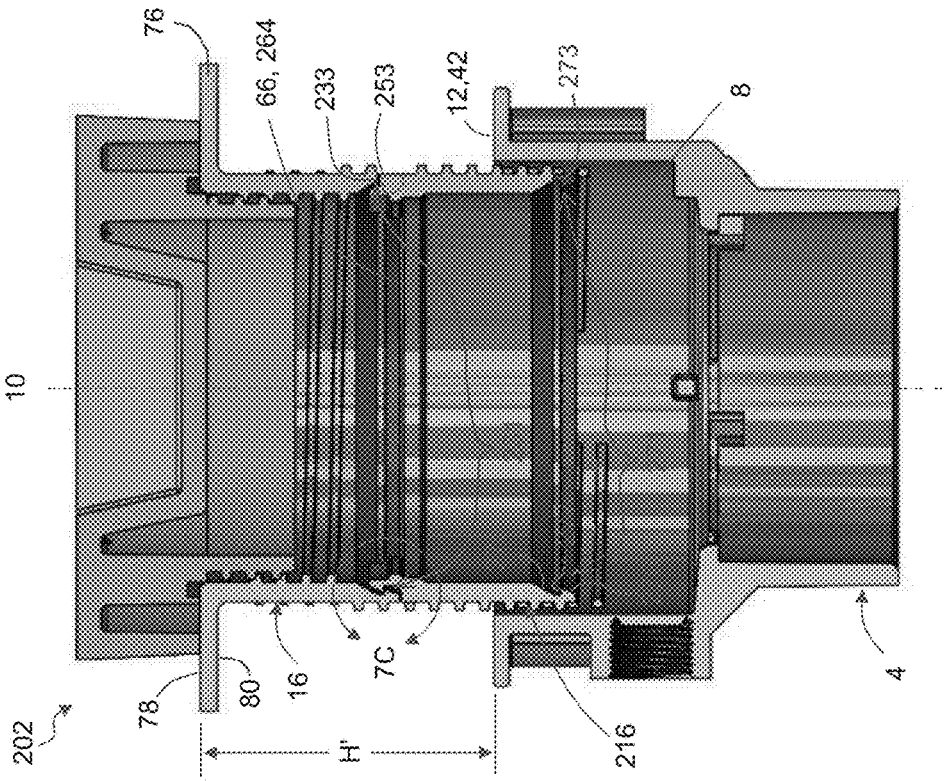
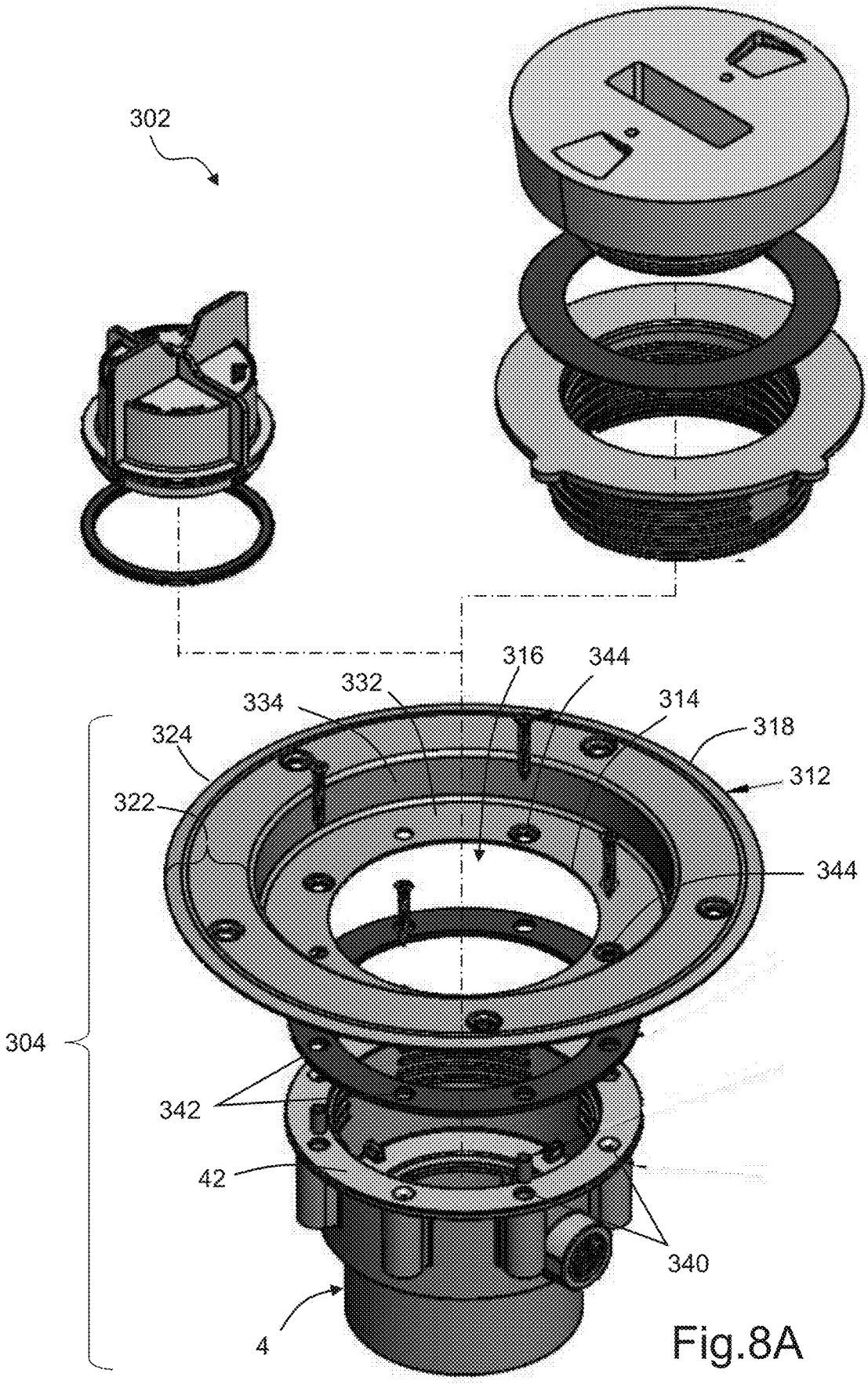


Fig.7A



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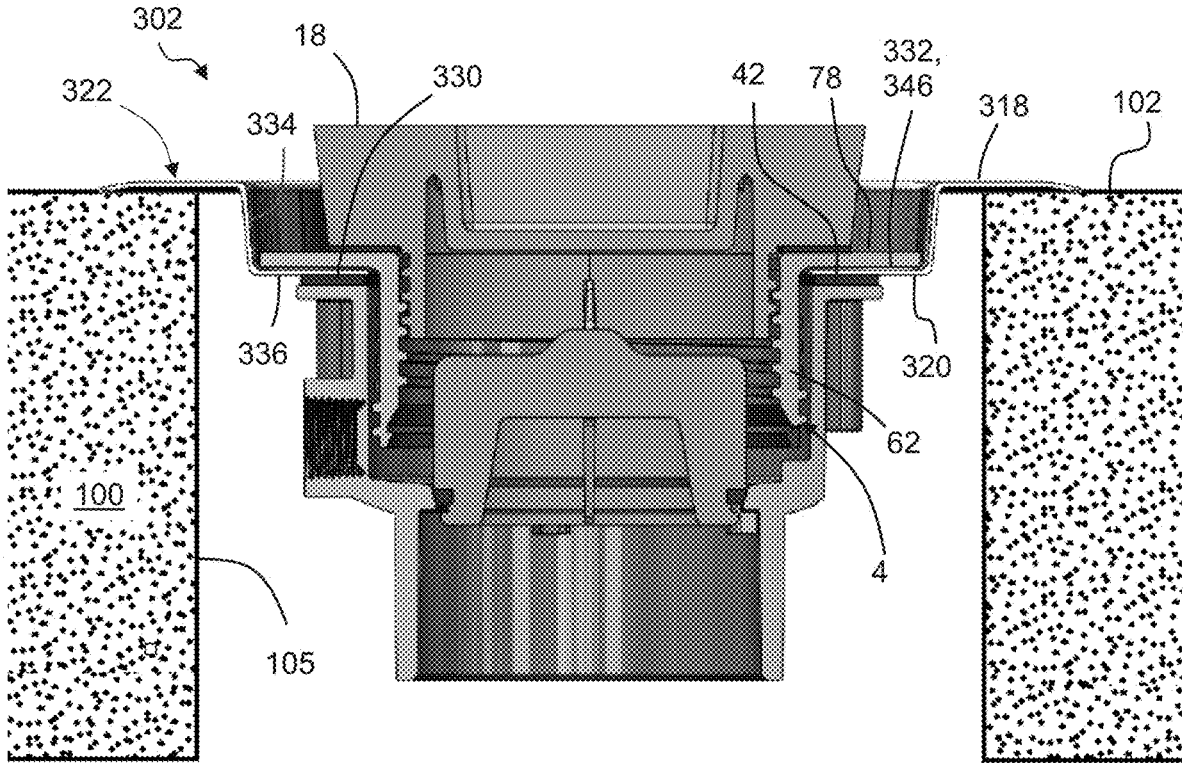
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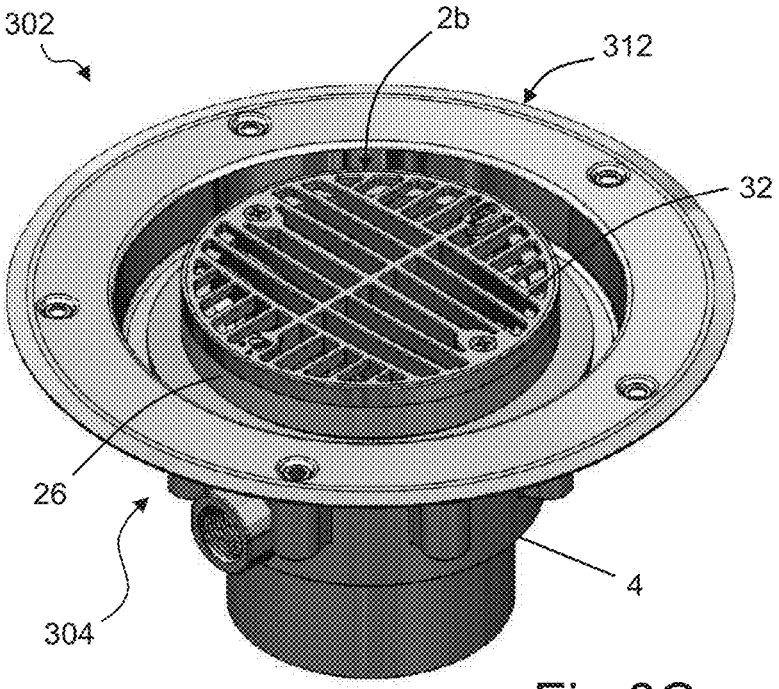
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Fig.8C

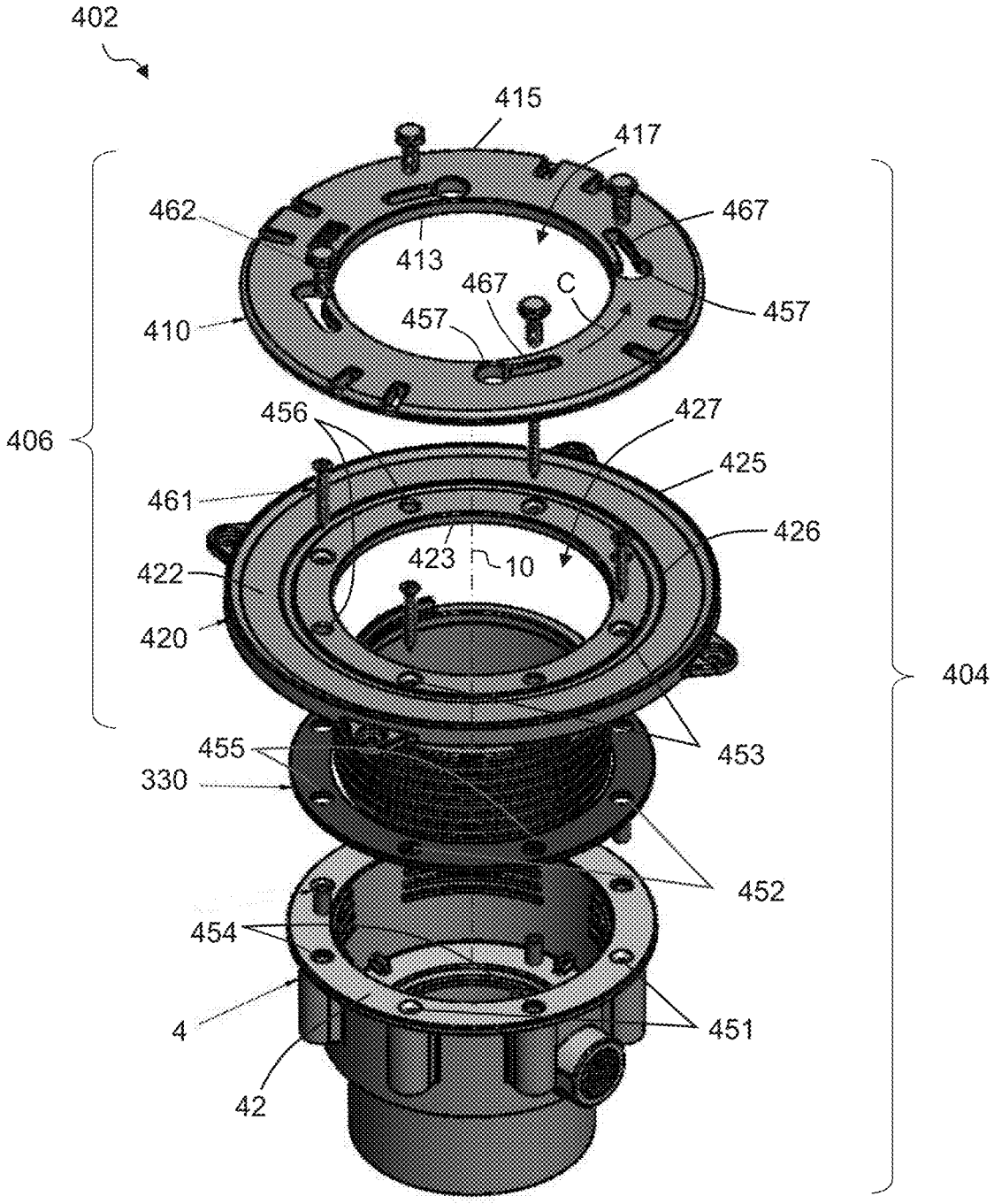
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Fig.9A

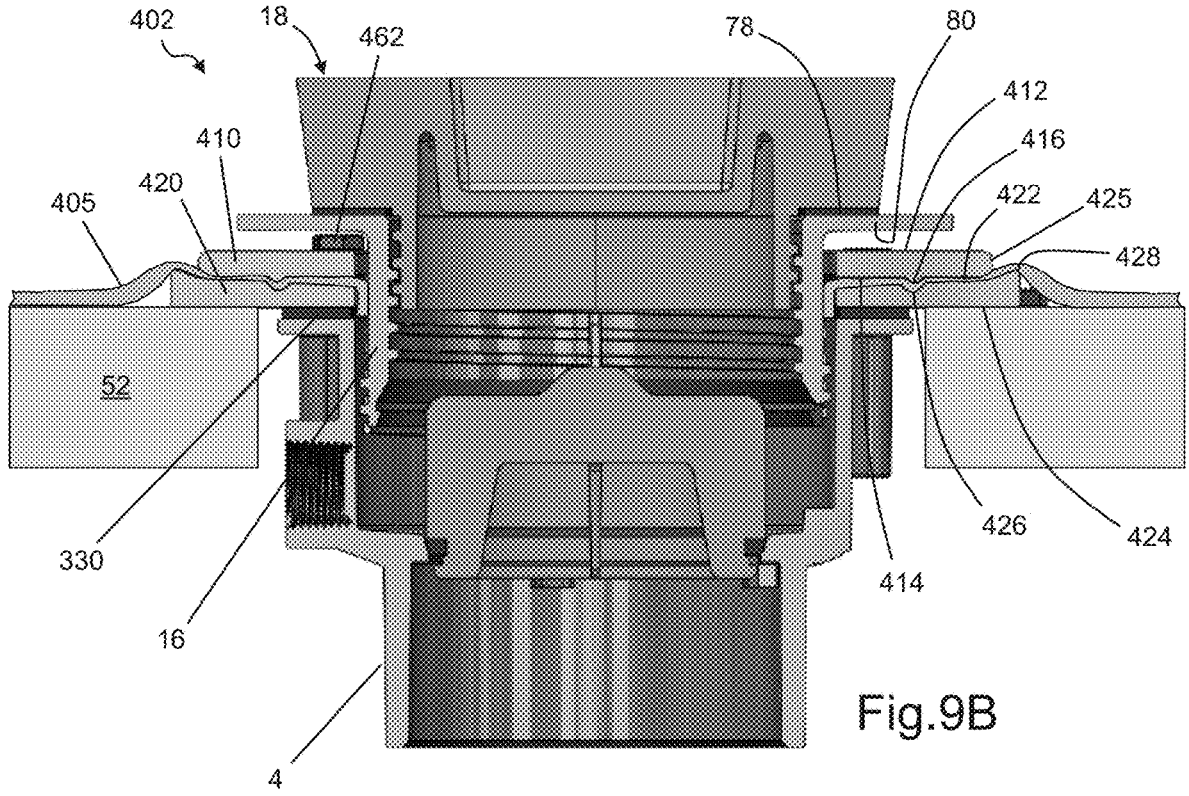
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Fig.9B

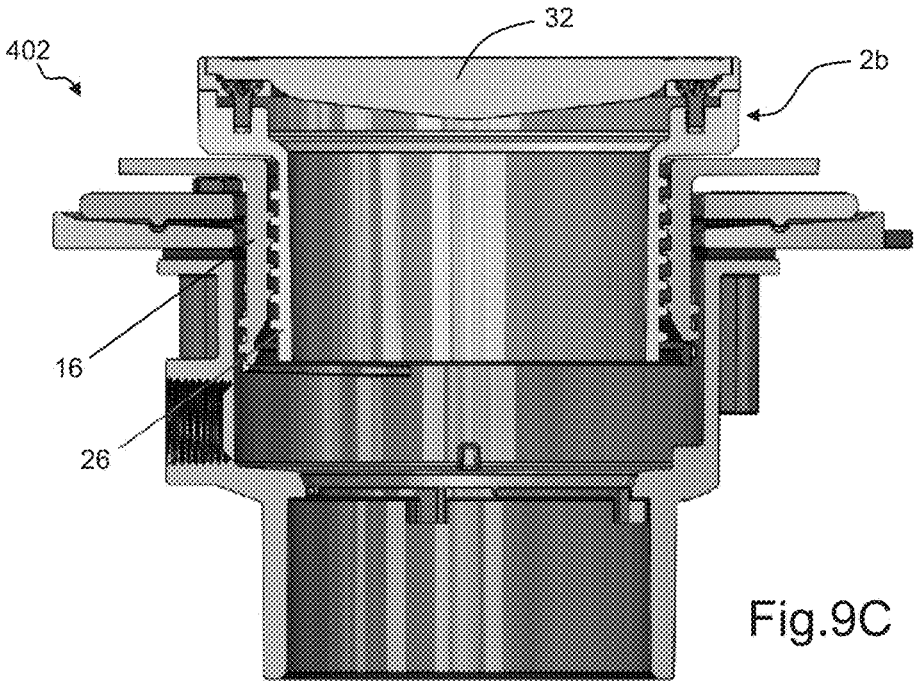
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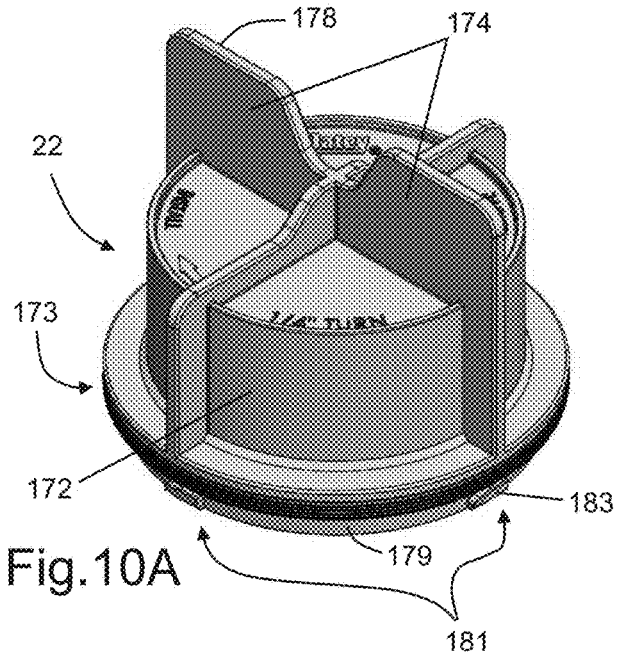
Fig.9C



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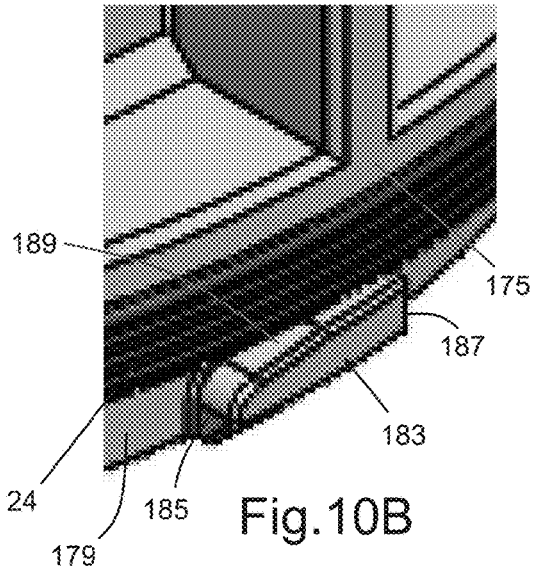

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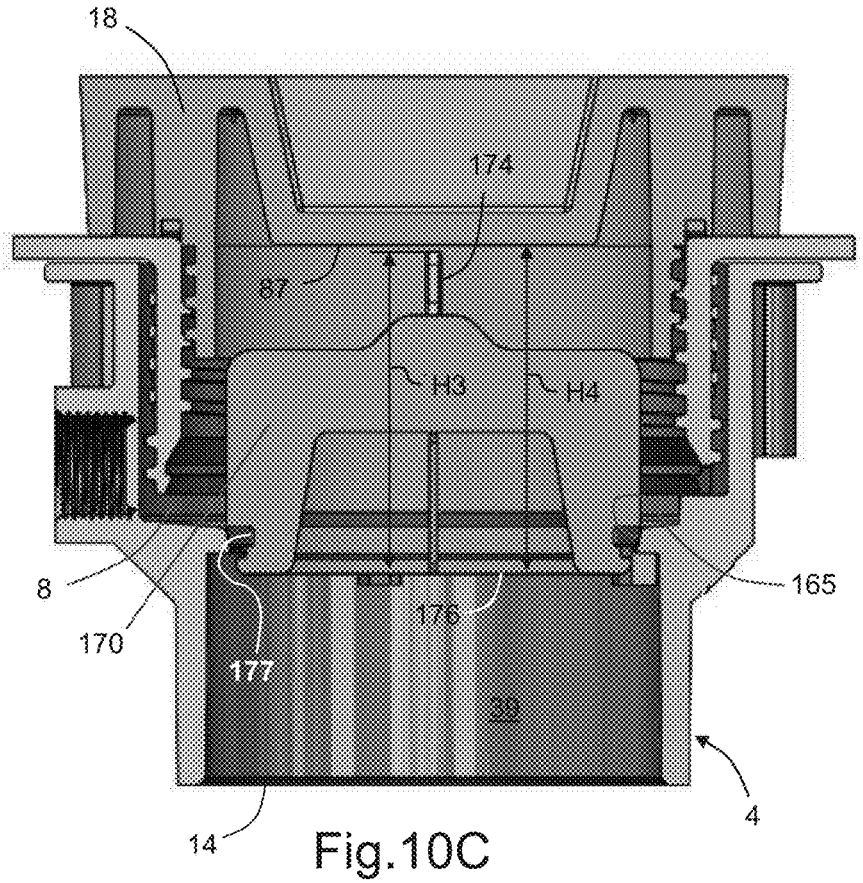

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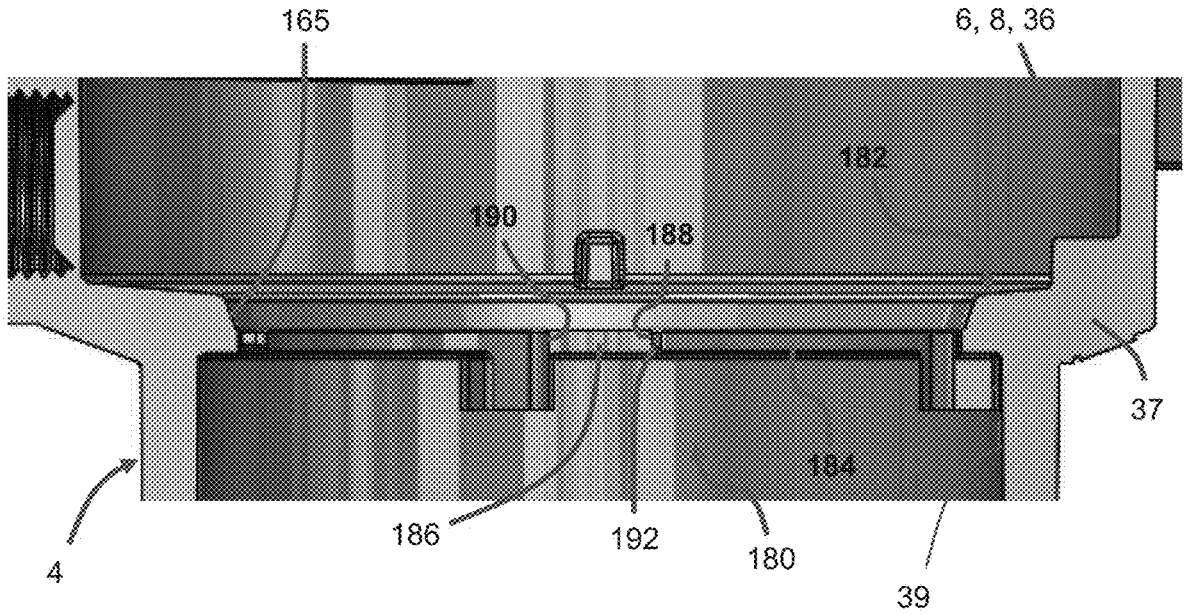

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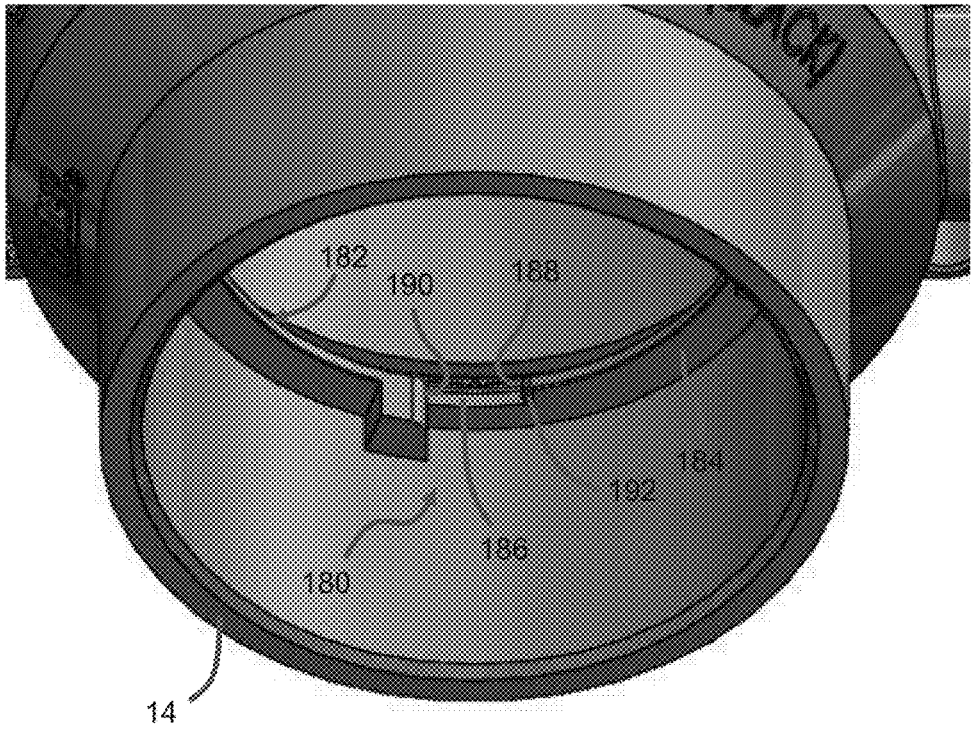


Fig.10E

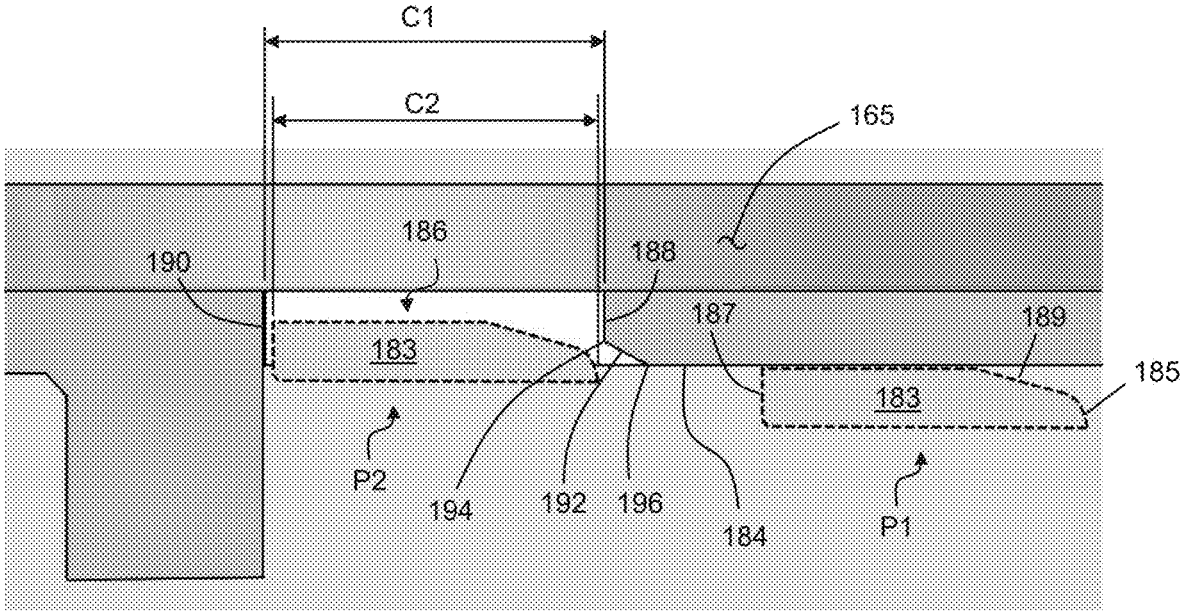
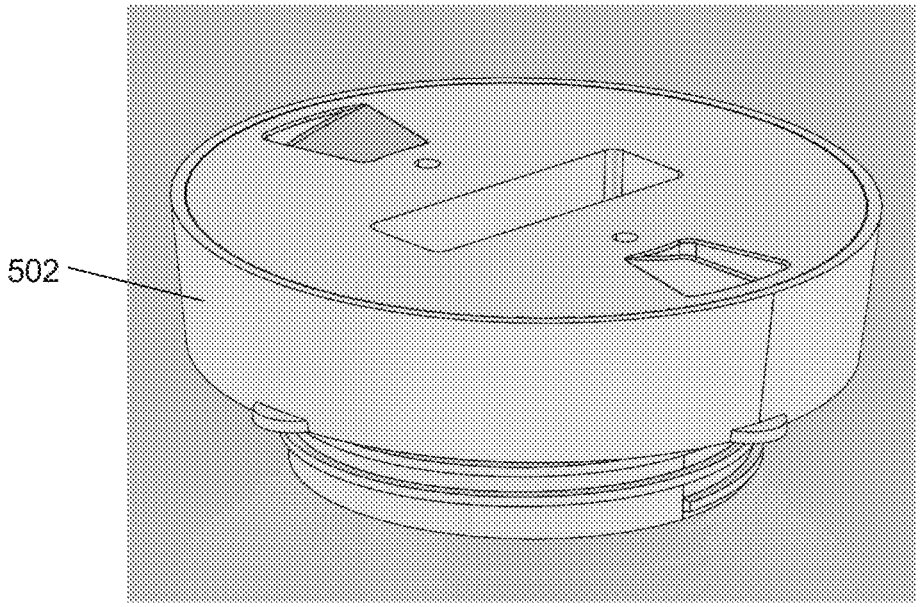


Fig.10F



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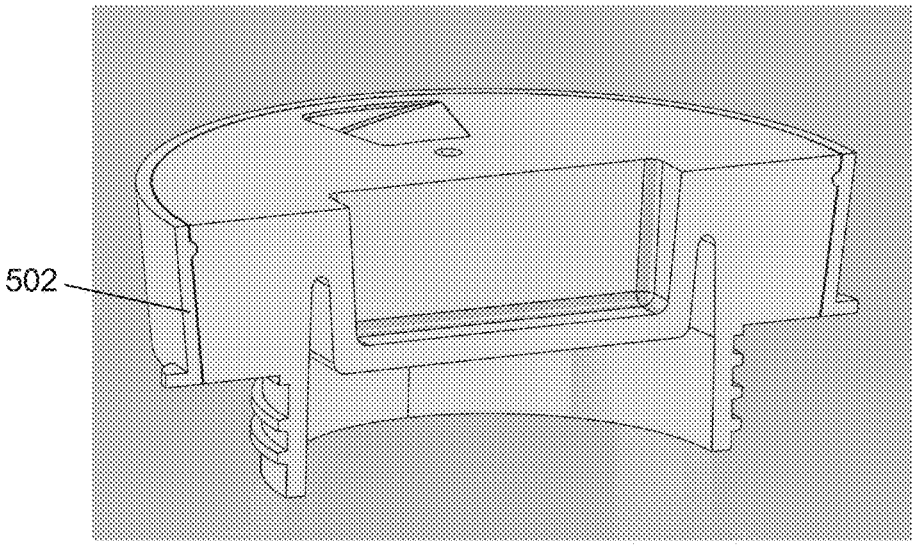


Fig.11B

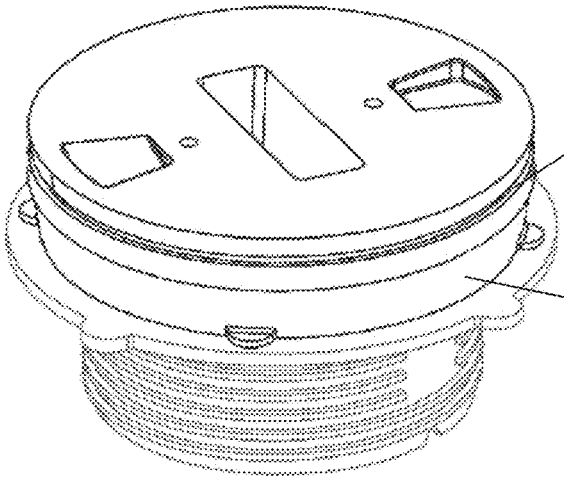
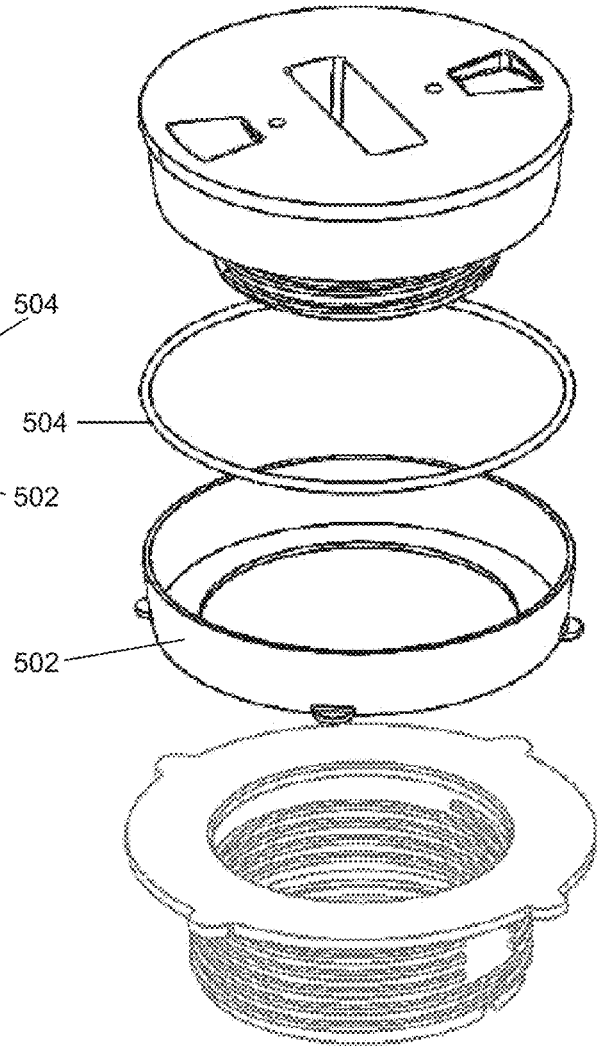


Fig.12A



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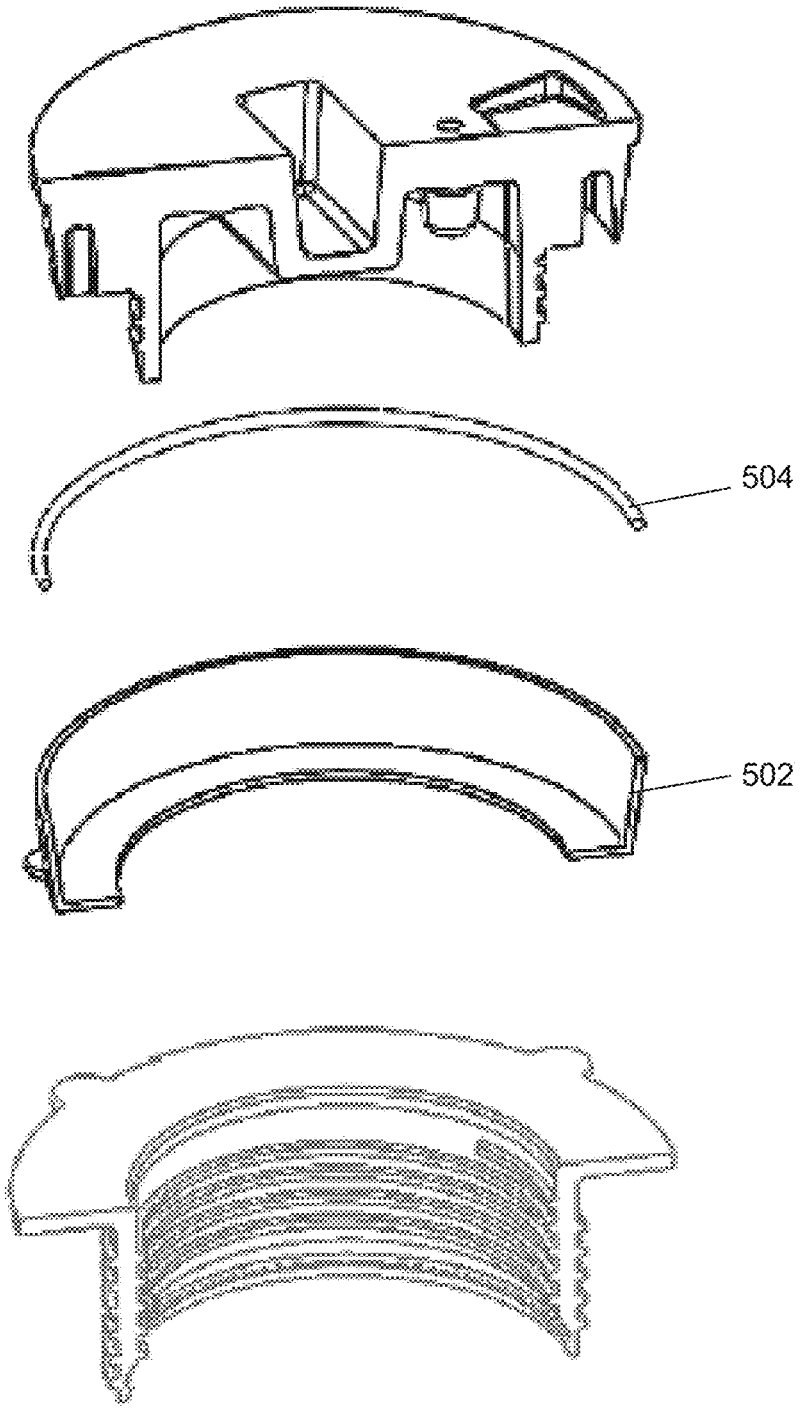

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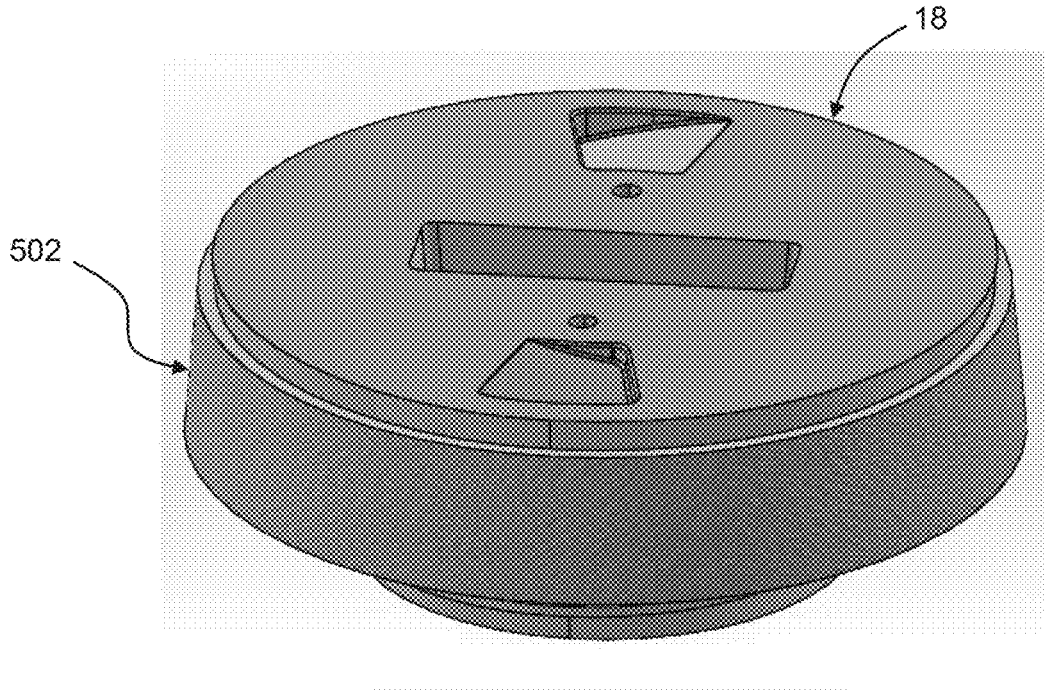

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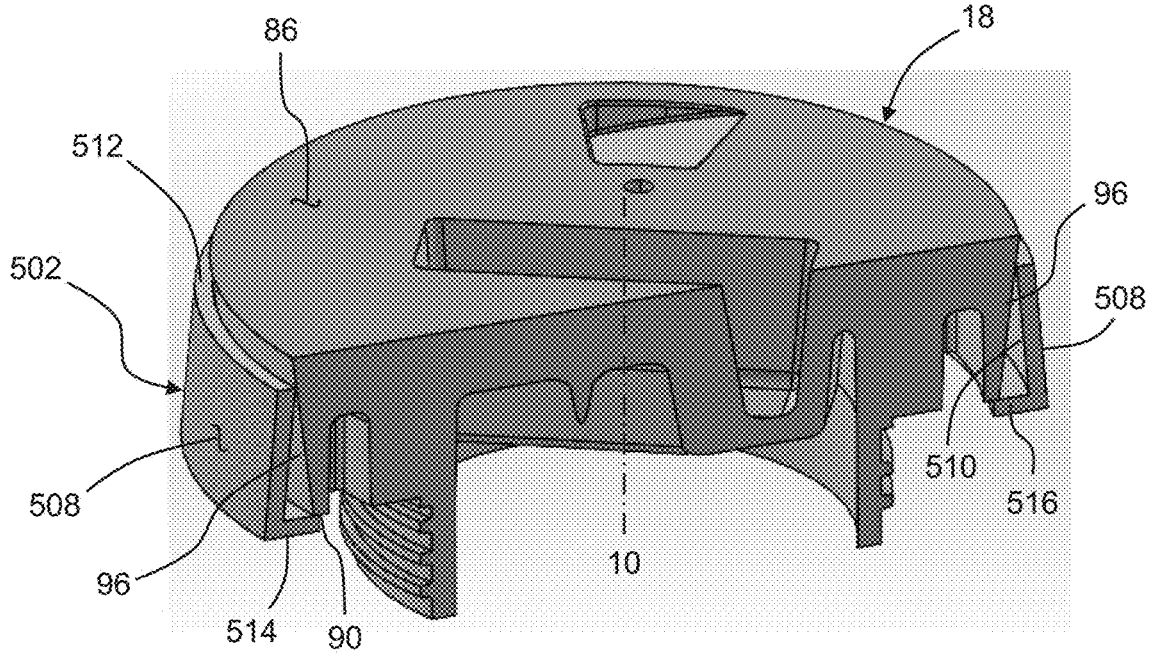


Fig.13B

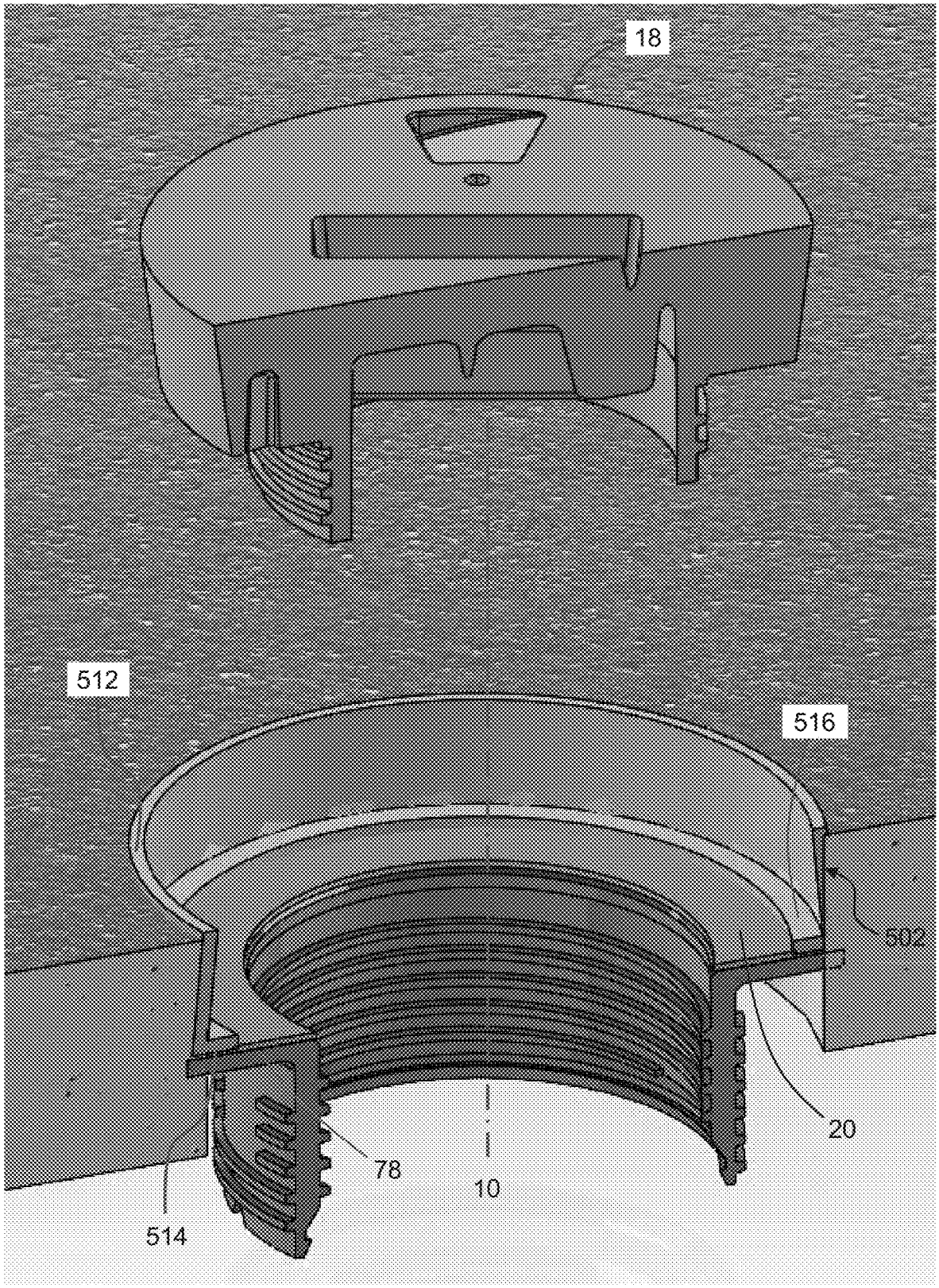


Fig.13C

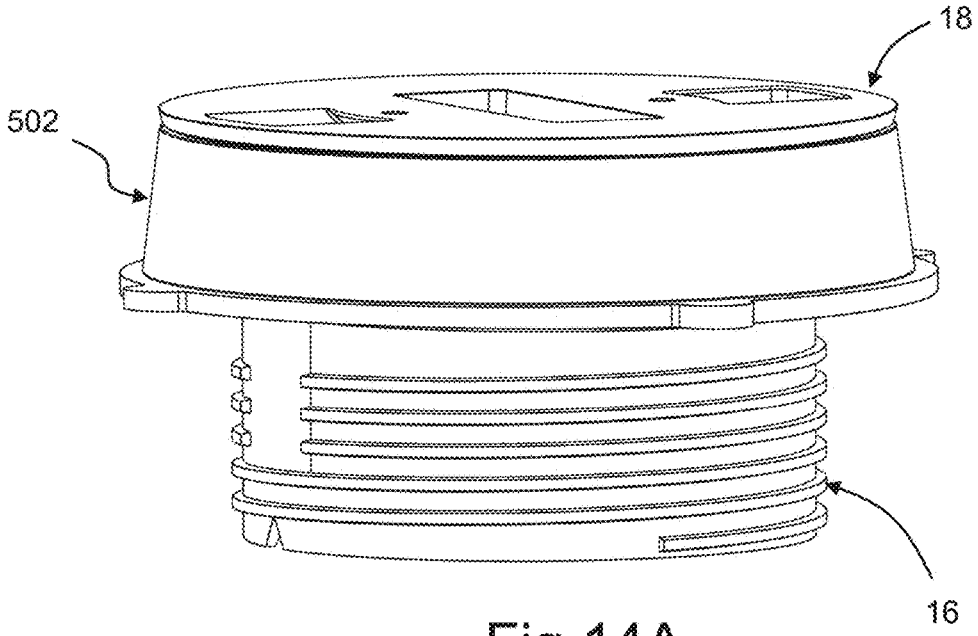


Fig.14A

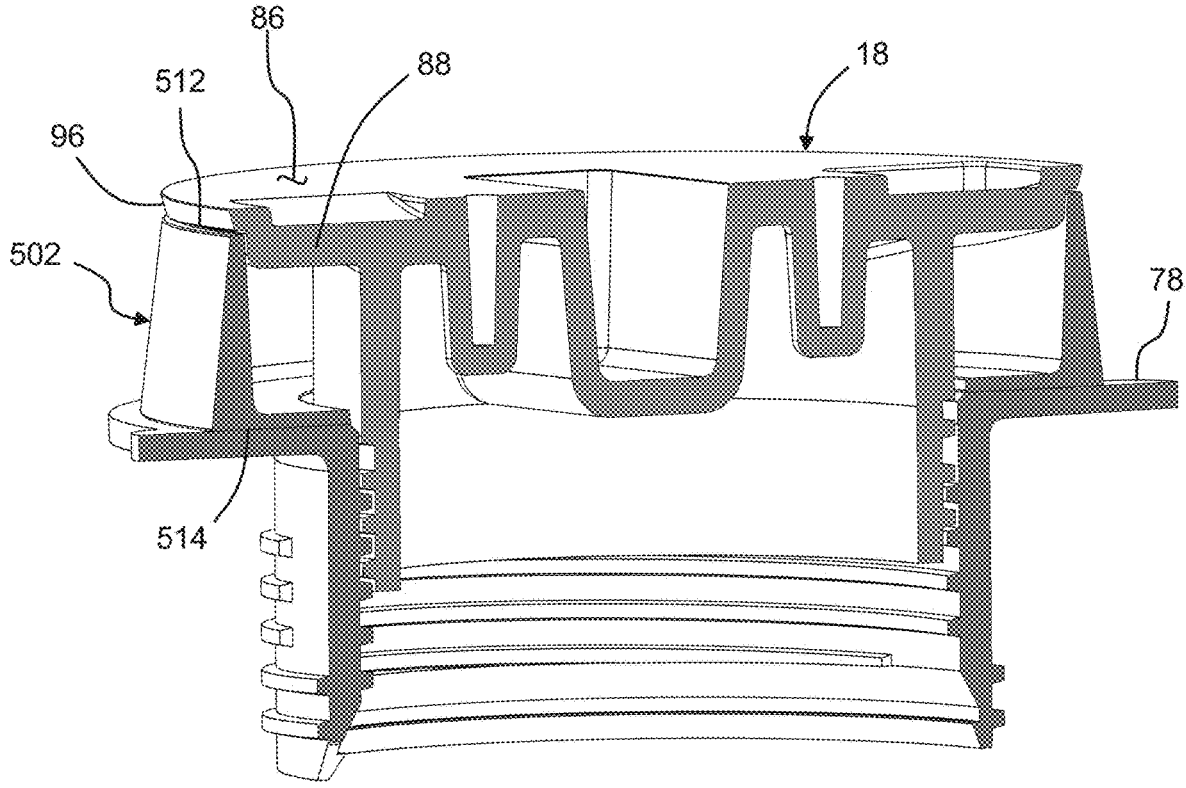
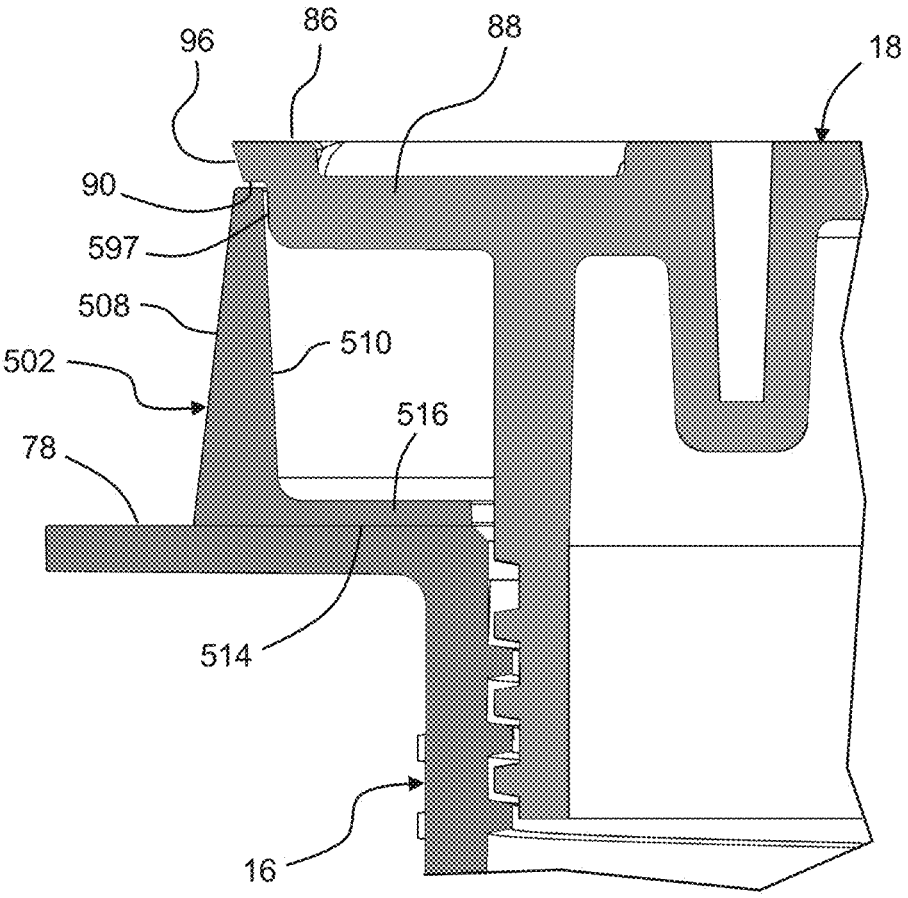


Fig.14B



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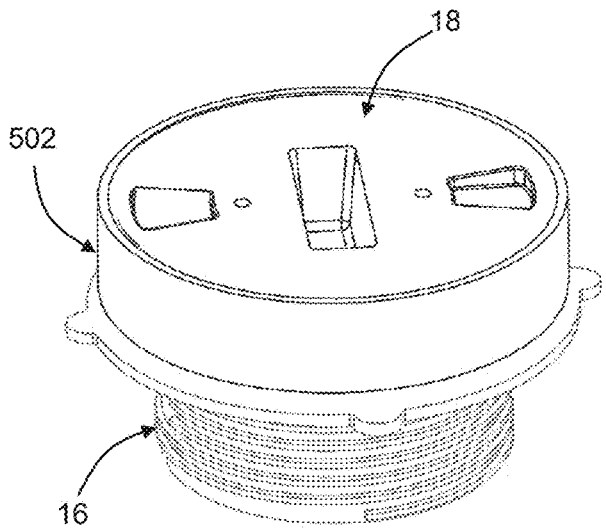
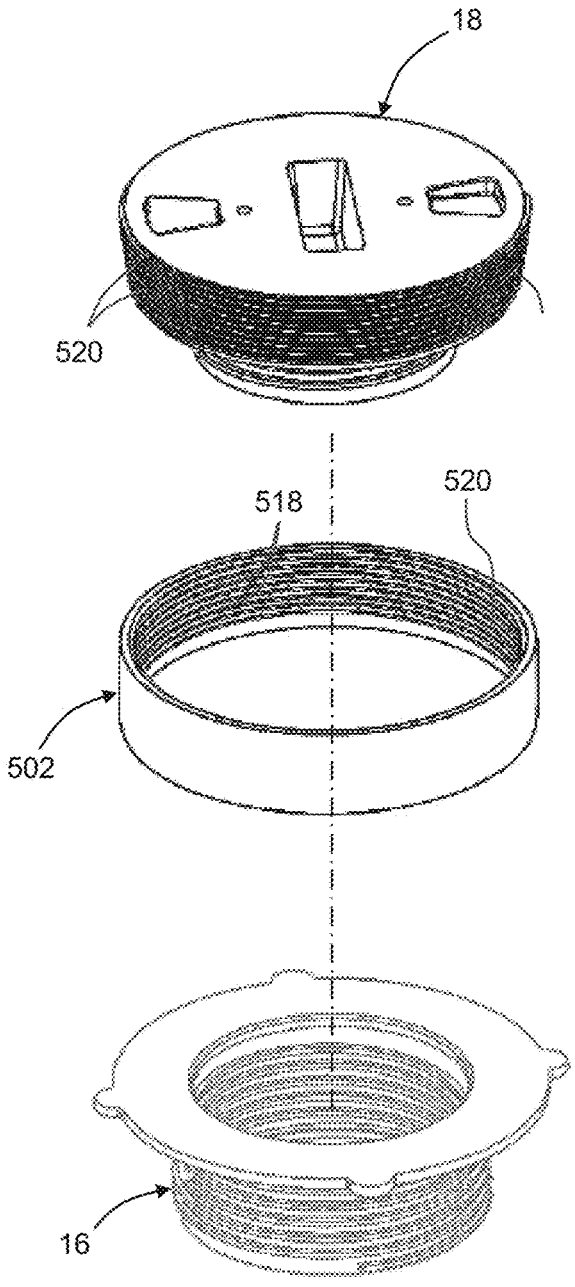


Fig.15A



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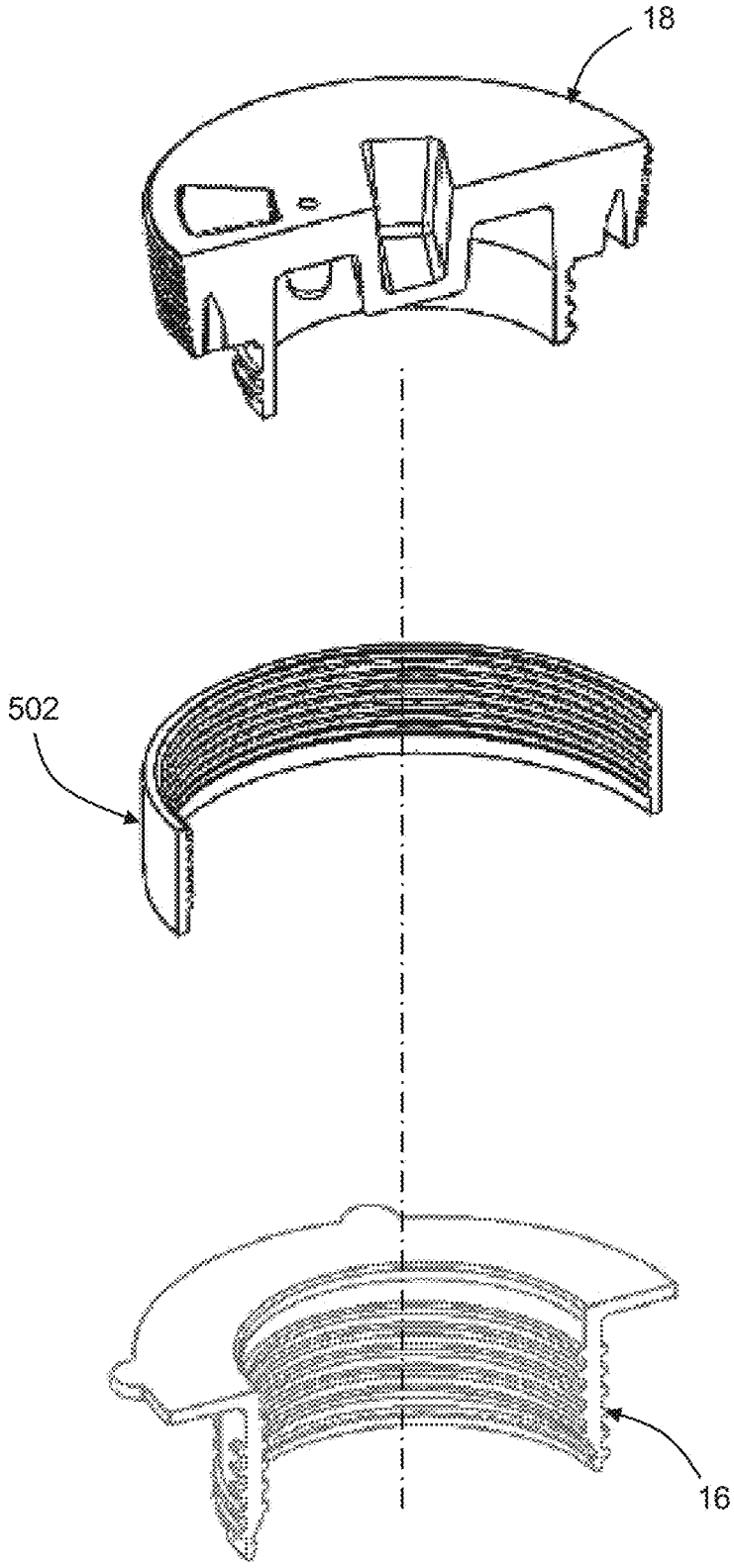

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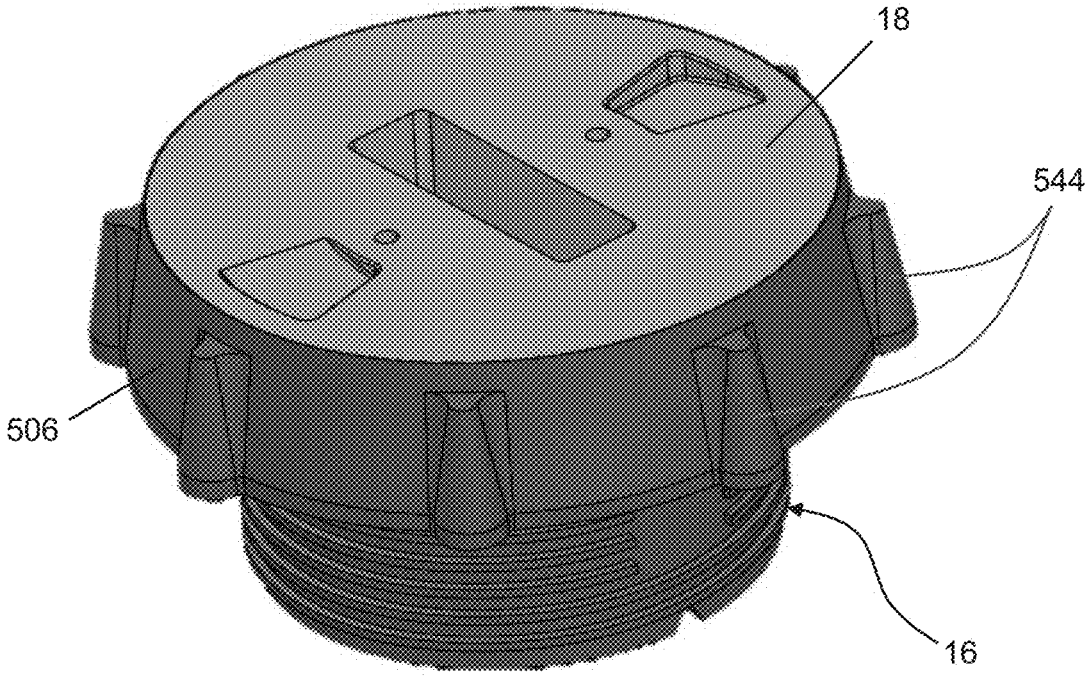

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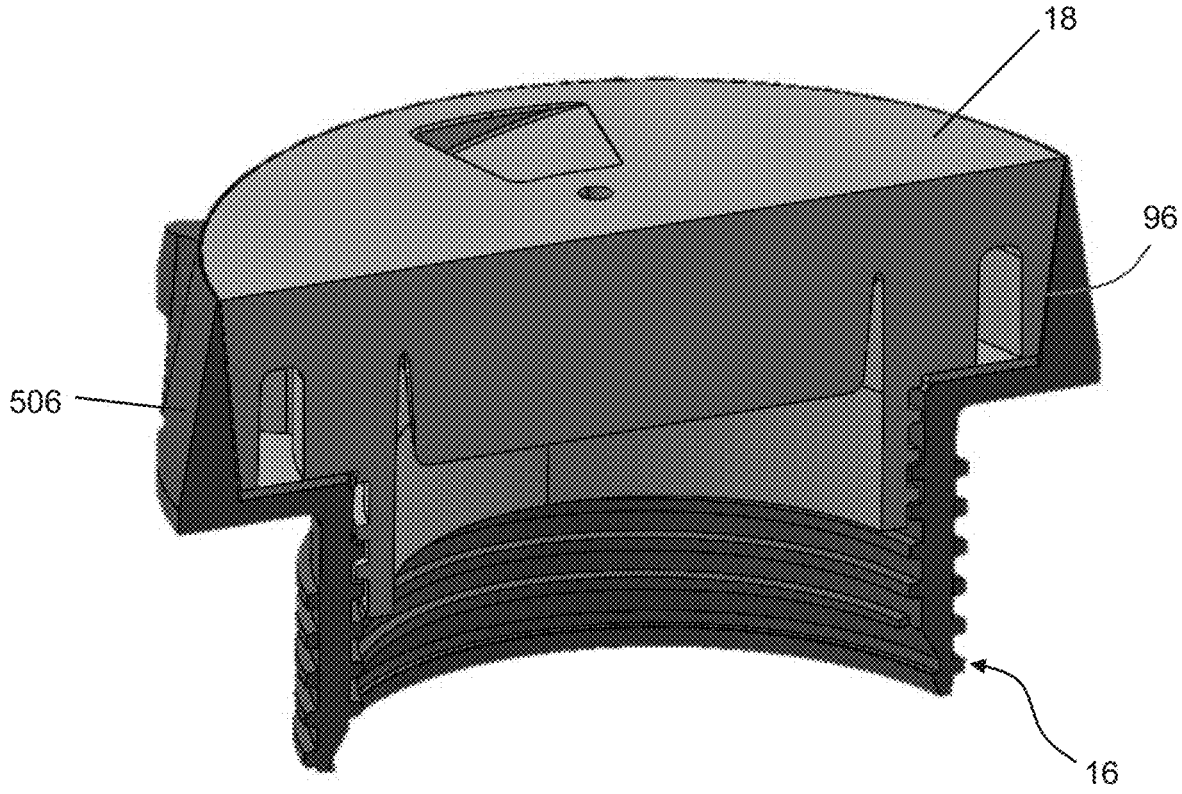

Fig.16B

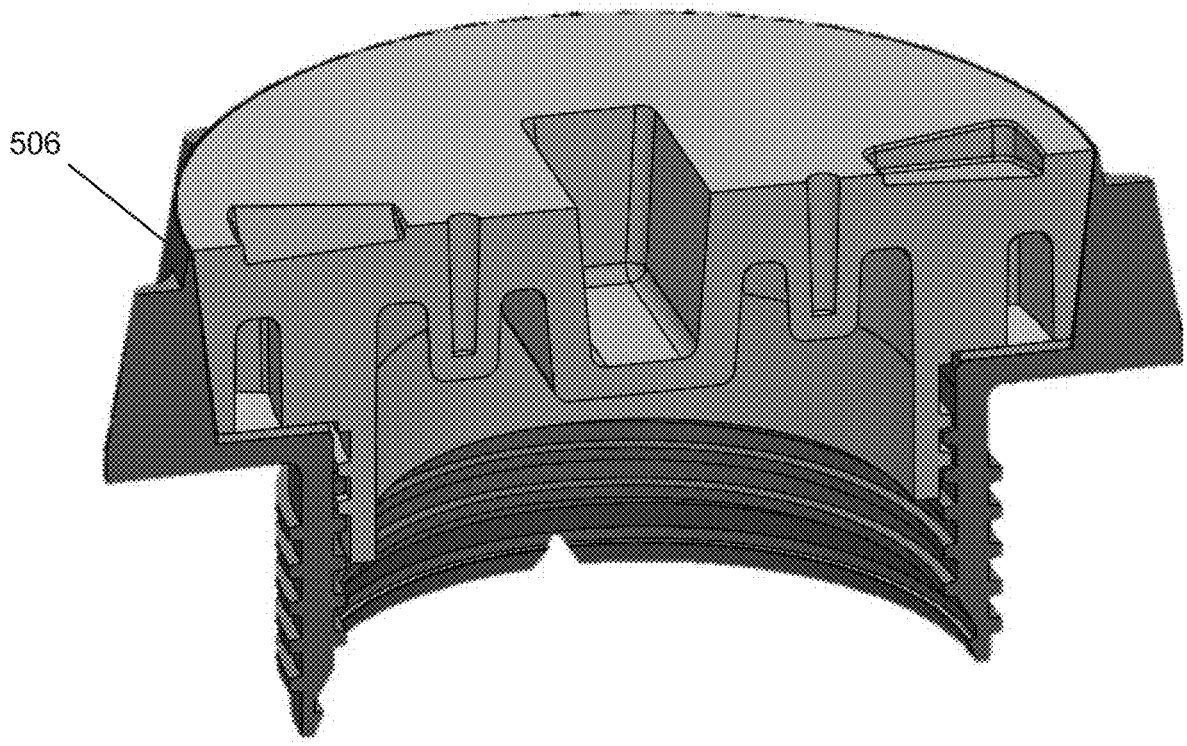

Fig.16C

DRAIN ASSEMBLIES, AND RELATED KITS AND METHODS

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present application claims the benefit of U.S. Provisional Application No. 63/326,198, filed Mar. 31, 2022, in the name of Zhang et al., the entire contents of which are incorporated herein by this reference.

TECHNICAL FIELD

[0002] The disclosure relates generally to relates to drains, and more particularly to drain assemblies that are adaptable to various types of drain installation techniques.

BACKGROUND

[0003] Drain assemblies and drain assembly kits are commonly provided with features that allow adaptability, which can include providing various components that are interchangeable based on the type of drain installation technique to be employed. Some common, non-limiting examples of drain installations include on-grade, cored opening, and waterproofing installations. On-grade drain installations involve placing an assembled or partially assembled drain assembly relative to a construction substrate and forming a floor around the placed drain assembly. In such installations, the floor is commonly formed by pouring wet cement over the construction substrate to a grade depth that is generally level with an upper most surface of the drain assembly. Similar types of drain installations can involve above-grade and below grade floor formation. Cored opening drain installations typically involve suspending an assembled or partially assembled drain assembly over an opening preformed in a substrate, such as hardened cement, wood flooring, decking, corrugate metal, and the like. Waterproofing drain installations typically involve placing a partially assembled drain assembly in an opening formed in a substrate and clamping a waterproof membrane to the drain assembly. A floor material in a liquid phase can then be formed (e.g., poured) over the waterproof membrane and around the drain assembly.

[0004] Because of the wide variety of construction parameters for these and other types of drain installations, a user must typically pre-select drain assemblies having a multitude of specific parameters, which can later prove inadequate if the floor construction adjacent the drain installation has deficiencies. Drain assemblies that are adjustable and employ interchangeable components can provide significant benefits in relation to avoiding costly re-installations.

SUMMARY

[0005] According to an embodiment of the present disclosure, a drain assembly includes a drain body, barrel, plug, and sleeve. The drain body has an interior surface defining a channel along an axis and having interior threads thereon. The barrel has a central body having an upper end, with a flange extending radially outward therefrom and defining a landing surface. The central body has opposed exterior and interior barrel surfaces having exterior and interior threads, respectively. The interior barrel surface defines a channel alignable with the axis. The exterior threads are engageable with the drain body interior threads for axially adjusting the barrel relative to the drain body. The plug has a top surface and an outer body extending axially downward to a stop surface. An inner portion of the outer body extends axially below the stop surface and has external threads engageable with the barrel interior threads. The sleeve is sealingly receivable between the stop and landing surfaces.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] The foregoing summary, as well as the following detailed description of illustrative embodiments of the present application, will be better understood when read in conjunction with the appended drawings. For the purposes of illustrating the features of the present application, there is shown in the drawings illustrative embodiments. It should be understood, however, that the application is not limited to the precise arrangements and instrumentalities shown. In the drawings:

[0007] FIG. **1** is an exploded perspective view of an exemplary embodiment of a drain assembly that includes a drain body and an adjustable-height upper barrel. The drain assembly has a pre-pour sub-assembly and a post-pour sub-assembly that is interchangeable with at least one component of the pre-pour sub-assembly.

[0008] FIGS. **2**A and **2**B are top and bottom perspective views, respectively, of the pre-pour sub-assembly shown in FIG. **1**, assembled in a first operative configuration.

[0009] FIG. **2**C is an enlarged view of an exterior portion of the drain body shown in FIG. **2**B

[0010] FIG. **2**D is a perspective view of a drain installation that includes the pre-pour sub-assembly shown in FIGS. **2**A-**2**B.

[0011] FIG. **3**A is an exploded perspective view of the drain body and adjustable upper barrel shown in FIG. **1**.

[0012] FIGS. **3**B and **3**C are sectional side views of the pre-pour sub-assembly shown in FIG. **1**, illustrating the adjustable upper barrel at a minimum elevation (FIG. **3**A) and a maximum elevation (FIG. **3**B) relative to the drain body;

[0013] FIGS. **4**A and **4**B are sectional side views of the pre-pour sub-assembly of FIGS. **2**A-**2**B, shown at intermediate phases of a drain installation.

[0014] FIG. **5**A is an exploded perspective view of the post-pour sub-assembly shown in FIG. **1**.

[0015] FIG. **5**B is a perspective view of the post-pour sub-assembly shown in FIG. **5**A.

[0016] FIG. **5**C is a sectional side view of the post-pour sub-assembly shown in FIG. **5**B.

[0017] FIGS. **6**A and **6**B are sectional side views of the drain assembly in a second operative configuration, in which the post-pour sub-assembly is coupled to the upper barrel of the pre-pour sub-assembly and is axially adjustable therewith. FIG. **6**A shows the post-pour sub-assembly level with a top surface of hardened cement. FIG. **6**B shows the post-pour sub-assembly axially adjusted below the top surface of the hardened cement.

[0018] FIG. **7**A is a sectional side view of an exemplary embodiment of a drain assembly having an extender barrel interconnecting an upper barrel with a drain body, shown in a first operative configuration.

[0019] FIG. **7**B is a perspective view of the extender barrel shown in FIG. **7**A.

[0020] FIG. **7**C is an enlarged view of a region of FIG. **7**A, showing interconnected attachment mechanisms of the upper barrel and extender barrel shown.

[0021] FIG. **8**A is an exploded perspective view of an exemplary embodiment of a drain assembly having a deck flange, shown in a first operative configuration.

[0022] FIG. **8**B is a sectional side view of the drain assembly of FIG. **8**A, shown in a cored opening type of drain installation.

[0023] FIG. **8**C is a perspective view of the drain assembly of FIG. **8**A shown in a second operative configuration.

[0024] FIG. **9**A is an exploded perspective view of an exemplary embodiment of a drain assembly having a waterproofing flange.

[0025] FIG. **9**B is a sectional side view of the drain assembly of FIG. **9**A, shown in a first operative configuration of a waterproofing type of drain installation.

[0026] FIG. **9**C is a sectional side view of the drain assembly of FIG. **9**A, shown in a second operative configuration.

[0027] FIG. **10**A is a perspective view of a test cap of the drain assemblies herein.

[0028] FIG. **10**B is an enlarged view of a portion of a locking mechanism of the test cap shown in FIG. **10**A.

[0029] FIG. **10**C is a sectional side view of the first operative drain assembly of FIG. **1**, showing the test cap seated against a plug seat within a drain channel of a drain body, according to an exemplary embodiment of the present disclosure.

[0030] FIG. **10**D is a sectional side view of a portion of the drain body shown in FIG. **10**C, illustrating a locking mechanism of the drain body adjacent the plug seat for releasable attachment with the locking mechanism of the test plug.

[0031] FIG. **10**E is a bottom perspective view of a portion of the locking mechanism shown in FIG. **10**D.

[0032] FIG. **10**F is a diagram elevation view showing inter-operation of the locking mechanisms of the test plug and the drain body.

[0033] FIG. **11**A is a top perspective view of a cap assembly that includes a cap plug and an exterior sleeve for use with a drain assembly.

[0034] FIG. **11**B is a sectional perspective view of the cap assembly shown in FIG. **11**A.

[0035] FIG. **12**A is a top perspective view of a pre-pour sub-assembly that includes a cap assembly coupled to an adjustable-height upper barrel, wherein the cap assembly includes a cap plug, an exterior sleeve, and a ring.

[0036] FIG. **12**B is an exploded perspective view of the pre-pour sub-assembly shown in FIG. **12**A.

[0037] FIG. **12**C is a sectional, exploded perspective view of the pre-pour sub-assembly shown in FIG. **12**A.

[0038] FIG. **13**A is a top perspective view of a cap assembly that includes a cap plug and an exterior sleeve for use with a drain assembly.

[0039] FIG. **13**B is a sectional perspective view of the cap assembly shown in FIG. **13**A.

[0040] FIG. **13**C is a sectional, exploded perspective view showing the cap assembly of FIG. **13**A in a partial installation.

[0041] FIG. **14**A is a top perspective view of a cap assembly that includes a cap plug and an exterior sleeve for use with a drain assembly, wherein the cap plug has a stop surface that seats atop the sleeve.

[0042] FIG. **14**B is a sectional perspective view of the cap assembly shown in FIG. **14**A.

[0043] FIG. **14**C is a sectional side view of a portion of the cap assembly shown in FIG. **14**A.

[0044] FIG. **15**A is a top perspective view of a pre-pour sub-assembly that includes a cap assembly coupled to an adjustable-height upper barrel, wherein the cap assembly includes a cap plug and an exterior sleeve.

[0045] FIG. **15**B is an exploded perspective view of the pre-pour sub-assembly shown in FIG. **15**A.

[0046] FIG. **15**C is a sectional, exploded perspective view of the pre-pour sub-assembly shown in FIG. **15**A.

[0047] FIG. **16**A is a top perspective view of a pre-pour sub-assembly that includes a cap plug coupled to an adjustable-height upper barrel that has an upper sleeve portion having outward protrusions.

[0048] FIG. **16**B is a sectional perspective view of the pre-pour sub-assembly shown in FIG. **16**A, showing an interior gasket disposed between the cap plug and upper barrel.

[0049] FIG. **16**C is another sectional perspective view of the pre-pour sub-assembly shown in FIG. **16**A, taken orthogonally to the section view shown in FIG. **16**B.

DETAILED DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS

[0050] The present disclosure can be understood more readily by reference to the following detailed description taken in connection with the accompanying figures and examples, which form a part of this disclosure. It is to be understood that this disclosure is not limited to the specific devices, methods, applications, conditions or parameters described and/or shown herein, and that the terminology used herein is for the purpose of describing particular embodiments by way of example only and is not intended to be limiting of the scope of the present disclosure. Also, as used in the specification including the appended claims, the singular forms "a," "an," and "the" include the plural, and reference to a particular numerical value includes at least that particular value, unless the context clearly dictates otherwise.

[0051] The terms "understood", "understand", and derivatives thereof, as used herein, refer to a level of understanding expected of a person having ordinary skill in the art of drains.

[0052] The term "plurality", as used herein, means more than one. When a range of values is expressed, another embodiment includes from the one particular value and/or to the other particular value. Similarly, when values are expressed as approximations, by use of the antecedent "about," it will be understood that the particular value forms another embodiment. All ranges are inclusive and combinable.

[0053] The terms "approximately", "about", and "substantially", as used herein with respect to dimensions, angles, ratios, and other geometries, takes into account manufacturing tolerances. Further, the terms "approximately", "about", and "substantially" can include 10% greater than or less than the stated dimension, ratio, or angle. Further, the terms "approximately", "about", and "substantially" can equally apply to the specific value stated.

[0054] It should be understood that, although numerical prefaces (e.g., first, second, third) can be used herein to describe various features, such features should not be limited by these prefaces. These prefaces are instead used to distinguish one feature from another. For example, a "first" element could be termed a "second" element in another context, and, similarly, a "second" element could be termed

a "first" element in another context without departing from the scope of the embodiments disclosed herein.

[0055] Referring now to FIG. **1**, an exemplary embodiment of a drain assembly **2** having various installation features is shown. The drain assembly **2** is positioned in a floor for transporting water, fluids, debris, or the like through a drain pipe **35**. The drain assembly **2** is suitable for drain installations where cement (or other hardenable floor materials) is poured around select components of the drain assembly **2** that are assembled in a first operative configuration.

[0056] The drain assembly **2** is configured to be assembled into the first operative configuration (see FIGS. **2**D and **3**B-**3**C) during a pre-pour phase of drain installation. The drain assembly **2** is further configured to be partially re-assembled into a second operative configuration (see FIGS. **6**A-**6**B) during a post-pour phase of drain installation, which occurs after the cement has been poured and allowed to harden. In the illustrated embodiment, the drain assembly **2** includes a pre-pour sub-assembly **2***a* of components that are configured to be assembled into the first operative configuration. The drain assembly **2** also includes a post-pour sub-assembly **2***b* of components. At least one component of the pre-pour sub-assembly **2***a* is interchangeable with the post-pour sub-assembly **2***b* for re-configuring the drain assembly **2** into the second operative configuration, as described in more detail below.

[0057] During the pre-pour phase, the pre-pour sub-assembly **2***a* can be assembled into the first operative configuration and fitted atop a drain pipe **35**, which then holds the assembled pre-pour sub-assembly **2***a* in place over a substrate **52**, such as a gravel bed (see FIG. **2**D), decking, or the ground, by way of non-limiting examples. With the pre-pour sub-assembly **2***a* held in place by the drain pipe **35**, wet cement can be poured around the drain pipe **35** and the pre-pour sub-assembly **2***a* and preferably up to a level substantially in alignment with an uppermost end of the pre-pour sub-assembly **2***a*. Accordingly, the drain assembly **2** of the illustrated embodiment can be referred to as an "on-grade" drain assembly **2**. The pre-pour sub-assembly **2***a* has axially adjustable components for adjusting a desired height at which the uppermost end of the pre-pour sub-assembly **2***a* resides over the substate **52** prior to pouring the cement, as described in more detail below. The desired height of the uppermost end of the pre-pour sub-assembly **2***a* can be determined by a number of factors, such as the intended pour depth of the cement above the substrate **52**, by way of a non-limiting example.

[0058] The pre-pour sub-assembly **2***a* includes a drain body **4** and an upper barrel **16** that is partially receivable within a drain channel **8** defined within the drain body **4**. The pre-pour sub-assembly **2***a* includes a cap plug **18** that is partially insertable within the upper barrel **16** for, among other things, protecting the pre-pour sub-assembly **2***a* and preventing poured cement from entering the upper barrel **16**. The pre-pour sub-assembly **2***a* also includes a plug gasket **20** receivable between respective portions of the cap plug **18** and the upper barrel **16** for providing a seal between the cap plug **18** and the upper barrel **16**. It should be understood that the cap plug **18** and the plug gasket **20** are interchangeable with the post-pour sub-assembly **2***b* during the post-pour phase of drain installation, as described in more detail below.

[0059] The pre-pour sub-assembly **2***a* also includes a test plug **22** insertable within the drain channel **8**. The test plug **22** is configured to releasably lock to the drain body **4** within the drain channel **8**. The test plug **22** carries a gasket **24** for providing a seal between the test plug **22** and the drain body **4** when the test plug **22** is locked within the drain channel **8**, thereby allowing the operation of pressure testing of the drain assembly **2**.

[0060] The post-pour sub-assembly **2***b* includes a strainer barrel **26** having a top end **28** and an opposed bottom end **30** axially spaced from each other. The bottom end **30** is insertable within the upper barrel **16** and the top end **28** is attachable to a top piece, which in the illustrated embodiment is a strainer grate **32**. In the illustrated embodiment, the post-pour sub-assembly **2***b* also includes a support ring **34** for interconnecting the strainer grate **32** to the top end **28** of the strainer barrel **26**, as described in more detail below.

[0061] With continued reference to FIG. **1**, the drain body **4** defines an exterior drain surface **5** and an opposed interior drain surface **6**. The interior drain surface **6** defines the drain channel **8**, which extends along a central axis **10**. In this manner, the central axis **10** is defined by the drain body **4**. It should be understood that other components of the drain assembly **2** define respective central axes that substantially align with the central axis **10** when the components are assembled together. For the sake of conciseness, the central axis **10** is used herein synonymously with reference to such other components in their respective assembled orientations. The drain body **4** has a top end **12** and a bottom end **14** opposite each other along an axial direction X that is oriented along the central axis **10**. As used herein, the terms "axial," "axially," and derivatives thereof refer to the axial direction X.

[0062] The drain channel **8** of the drain body **4** extends axially between the top and bottom ends **12** thereof. The exterior drain surface **5** is opposite the interior drain surface **6** with respect to a radial direction R that is perpendicular to the central axis **10**. As used herein, the terms "radial," "radially," and derivatives thereof refer to the radial direction R. The bottom end **14** of the drain body **4** is attachable to a drain pipe **35** or other drain plumbing fixture. The interior drain surface **6** includes an upper receptacle portion **36** that extends from the top end **12** to an intermediate portion **37** of the drain body **5**. The intermediate portion **37** is located axially between the upper receptacle portion **36** and a lower drain portion **39** (see FIG. **2**B) of the interior drain surface **6** that extends axially to the bottom end **14**. The upper receptacle portion **36** has interior threads **38** formed therein. The interior threads **38** are complimentary with exterior threads **74** of the upper barrel **16** for allowing the upper barrel **16** to be axially adjustable relative to the drain body **4** while being coupled thereto. This allows for controlling an elevation at which the cap plug **18** resides above the top end **12** of the drain body **4** during the pre-pour phase, as described in more detail below. At the top end **12**, the drain body **4** has a drain flange **40** that extends radially outward from the exterior drain surface **5**. It should be understood that the drain flange **40** can also be characterized as extending radially outward from the top end **12** of the drain body **4**. The drain flange **40** defines an upper surface **42**, which is described in more detail below.

[0063] Referring now to FIGS. **2**A-**2**D, the drain body **4** includes a plurality of mounting formations **44** that each define a receptacle **46** for receiving respective guide members **48** for aligning the drain body **4** with respect to a floor **50** during the pre-pour phase of drain installation. The guide

members **48** extend upwardly from a substrate layer **52** and are receivable within the receptacles **46** for maintaining the drain body **4** in a substantially vertical orientation during the concrete pour, thereby preventing the drain body **4** from tilting or otherwise becoming mis-aligned during concrete pouring. In the illustrated embodiment, the mounting formations **44** extend radially outward from the exterior drain surface **5** and are evenly spaced about the central axis **10**. The mounting formations **44** have curved, convex outer surfaces, which are semi-cylindrical and are oriented substantially parallel to the central axis **10**. As shown in FIG. **2**D, at least some of the guide members **48** can be rebar that are driven into the substrate layer **52**, which can be gravel (as shown), dirt, clay, or a synthetic substrate material. In the illustrated embodiment, all of the receptacles **46** have a circular cross-sectional shape and have an inner diameter D**1** sized for receiving cylindrical guide members **48**, such as rebar. In the illustrated embodiment, the inner diameter D**1** is at least ⅜ inch (about 9.5 mm) and is sized for receiving ⅜ inch rebar. At least one of the receptacles **46** can be sized to receive a guide member **48** that comprises external threads, such as a threaded-rod (not shown).

[0064] In the illustrated embodiment, the drain body **4** has eight (8) mounting formations **44** that are evenly spaced at 45-degree intervals about the central axis **10**. Four (4) of the mounting formations **44** are sized to receive rebar guide members **48** and four (4) of the mounting formations **44** are sized to receive threaded-rod guide members **48**. These latter mounting formations **44** include respective inserts **54** that have internal threads **56** that are engageable with the external threads of the threaded-rod guide members **48** for providing fine control of the respective axial positions of the threaded-rod guide members **48** in the associated mounting formations **44**. The internal threads **56** of the inserts **54** have a major diameter D**2** that allows the internal threads **56** to intermesh with the external threads of the threaded-rod guide members **48**. In the illustrated embodiment, the major diameter D**2** of the internal threads **56** is at least ⅜ inch (about 9.5 mm). By having mounting formations **44** that are configured to receive various types of guide members **48** (e.g., rebar guide members **48** and threaded-rod guide members **48**), the drain body **4** of the illustrated embodiment provides flexible options for aligning the drain body **4** with respect to a floor **50**.

[0065] It should be understood that the mounting formations **44** described herein can be adapted as needed. Moreover, in other embodiments, any of the quantity, size, shape, and spacing of the mounting formations **44** and their respective receptacles **46** can be varied according to the needs of a particular floor type and/or drain installation. For example, the drain body **4** can have one (1), two (2), three (3), four (4), five (5), six (6), seven (7), nine (9), ten (10), eleven (11), twelve (12), or more than twelve (12) mounting formations **44**. Thus, it can be said that in some embodiments the drain body **4** can have at least eight (8) mounting formations **44** or various other quantities of mounting formations **44**.

[0066] In yet other embodiments, the inner diameter D**1** of at least one and up to all of the receptacles **46** can be less than ⅜ inch or greater than ⅜ inch. Moreover, the major diameter D**2** of the internal threads **56** of the inserts **54** can be less than ⅜ inch or greater than ⅜ inch. In additional embodiments, all of the receptacles **46** can be configured to receive rebar guide members **48**, or all of the receptacles **46** can include inserts **54** for receiving threaded-rod guide members **48**, or some of the receptacles **46** can be configured to receive rebar guide members **48** while some of the receptacles **46** are configured to receive threaded-rod guide members **48**. In further embodiments, at least one and up to all of the receptacles **46** can have non-circular cross-sectional shapes. In yet further embodiments, one or more of the mounting formations **44** can have an outer surface geometry that differs from that of the illustrated embodiment. In yet other embodiments, at least some of the mounting formations **44** can be unevenly spaced about the central axis **10**. In yet additional embodiments, the drain body **4** can be devoid of mounting formations **44**. It should be understood that various other adaptations can be made to the mounting formations **44** while remaining within the scope of the present disclosure.

[0067] Referring now to FIG. **3**A, the upper barrel **16** has a central body **62** that has a top end **64** and an opposed bottom end **66** axially spaced from each other. In the illustrated embodiment, the top and bottom ends **64**, **66** of the central body **62** also define top and bottom ends, respectively, of the upper barrel **16**. In other embodiments, one or both of the top end **64** and the bottom end **66** of the central body **62** need not define the respective top or bottom end of the upper barrel **16**. The central body **62** has an exterior barrel surface **68** radially opposite an interior barrel surface **70** that defines a barrel channel **72**. The barrel channel **72** extends axially from the top end **64** to the bottom end **66** of the central body **62**. The central body **62** is insertable within the upper receptacle portion **36** of the drain body **4** such that the barrel channel **72** is alignable along the central axis **10**. In this manner, the barrel channel **72** is also alignable with the drain channel **8** when the central body **62** is inserted within the upper receptacle portion **36**.

[0068] The exterior threads **74** of the upper barrel **16** are formed on the exterior barrel surface **68** of the central body **62** adjacent to the bottom end **66** thereof. The interior barrel surface **70** of the central body **62** has interior threads **75** formed thereon. The exterior threads **74** of the central body **62** are engageable with the interior threads **38** of the drain body **4** such that the upper barrel **16** is axially adjustable relative to the drain body **4** along the central axis **10**. In particular, the exterior threads **74** of the upper barrel **16** and the interior threads **38** of the drain body **4** are configured such that: rotating the upper barrel **16** in a first rotational direction RD**1** about the central axis **10** causes the upper barrel **16** to translate upward relative to the drain body **4**; and rotating the upper barrel **16** in a second rotational direction RD**2** opposite the first rotational direction RD**1** about the central axis **10** causes the upper barrel **16** to translate downward relative to the drain body **4**. In the illustrated embodiment, the first rotational direction RD**1** is counterclockwise and the second rotational direction RD**2** is clockwise. In other embodiments, the first rotational direction RD**1** can be clockwise and the second rotational direction RD**2** can be counterclockwise.

[0069] Referring now to FIGS. **3**A-**3**C, the upper barrel **16** includes a barrel flange **76** extending radially outward from the top end **64** of the central body **62** to an outer circumferential edge **77**. The barrel flange **76** defines a landing surface **78** that faces away from the bottom end **66** of the upper barrel **16**. The barrel flange **76** also defines a bottom surface **80** axially opposite the landing surface **78**. When the upper barrel **16** is connected to the drain body **4**, the landing surface **78** of the upper barrel **16** is spaced apart from the top

end **12** of the drain body **4** by a first distance H. Axially adjusting the upper barrel **16** relative to the drain body **4** adjusts the distance H by which the landing surface **78** extends above the top end **12** of the drain body **4**. This distance H can be adjusted as needed based on the desired depth at which the cement is to be poured with respect to the pre-pour drain sub-assembly **2***a*, as described in more detail below. As shown in FIG. **3**B, the upper barrel **16** is axially adjustable such that, at a minimum of the distance H (i.e, when the upper barrel **16** is fully seated with respect to the drain body **4**), the bottom surface **80** of the barrel flange **76** substantially abuts the upper surface **42** of the drain flange **40**. In other embodiments, an axial gap is present between the bottom surface **80** of the barrel flange **76** and the upper surface **42** of the drain flange **40** when the upper barrel **16** is fully seated with respect to the drain body **4**.

[0070] In the illustrated embodiment, the barrel flange **76** includes a plurality of protrusions **82** (which can also be referred to as "tabs") extending radially outward from the circumferential edge **77**, as shown in FIG. **3**A. The protrusions **82** are configured to reside within cement poured about the drain assembly **2** to resist rotation of the upper barrel **16** about the central axis **10**, such as after the cement hardens. In the illustrated embodiment, the barrel flange **76** has four (4) protrusions **82**, which have rounded, semi-circular outer edges and are evenly spaced at 90-degree intervals about the central axis **10**. In other embodiments, the barrel flange **76** can have one (1), two (2), three (3), five (5), six (6), seven (7), eight (8), nine (9), ten (10), or more than ten (10) protrusions **82**. Thus, it can be said that, in some embodiments, the barrel flange **76** can have at least four (4) protrusions **82** or various other quantities of protrusions **82**. In addition embodiments, at least some of the protrusions **82** can be unevenly spaced about central axis **10**. In further embodiments, one or more of the protrusions **82** can have other outer edge geometries, including liner outer edge geometries. In yet other embodiments, the barrel flange **76** can be devoid of protrusions **82**.

[0071] With continued reference to FIGS. **3**B-**3**C, the cap plug **18** includes a top wall **84** and an outer body **88** and an inner body **89** connected by the top wall **84**. The top wall **84** has a top surface **86**. The inner body **89** of the cap plug **18** has a bottom surface **87** opposite the top surface **86**. The inner body **89** defines at least one receptacle **91** that extends from the top surface **86** toward the bottom surface **87** and is configured for receiving a tool configured to remove the cap plug **18** from the upper barrel **16**. In the illustrated embodiment, the top surface **86** of the cap plug **18** defines the uppermost end of the pre-pour sub-assembly **2***a* when assembled. The outer body **88** and the inner body **89** of the cap plug **18** each extend axially downward from the top wall **84**. The outer body **88** defines a stop surface **90** that faces downward toward the landing surface **78** of the barrel flange **76** when the cap plug **18** is connected to the upper barrel **16**. The plug gasket **20** is axially receivable between, and abuttable with, the stop surface **90** and the landing surface **78** to provide a seal therebetween, thereby occluding the top end **64** of the barrel channel **72**.

[0072] The outer body **88** of the cap plug **18** includes an inner portion **92** that extends axially below the stop surface **90** and is insertable within the barrel channel **72**. The inner portion **92** has external threads **94** that are removably engageable with the interior threads **75** of the upper barrel **16**, such that the cap plug **18** is removably attachable to the upper barrel **16** during a pre-pour phase of drain installation. In this manner, the cap plug **18** is configured to threadedly couple with the interior threads **75** of the upper barrel **16** to lower the stop surface **90** and bring the plug gasket **20** into sealing contact with the stop surface **90** and the landing surface **78**, thereby sealing the barrel channel **72**. The cement can then be poured around the pre-pour sub-assembly **2***a*, including around the cap plug **18**, which can remain attached to the upper barrel **16** after the cement fully hardens. Subsequently, during the post-pour phase, the cap plug **18** and plug gasket **20** are removed and the post-pour sub-assembly **2***b* is attached to the upper barrel **16**.

[0073] The outer body **88** of the cap plug **18** defines an exterior plug surface **96** that is engageable with cement during a cement pouring phase of drain installation. The exterior plug surface **96** extends from a lower edge **97** at an interface with the stop surface **90** to an upper edge **98** at an interface with the top surface **86**. In the illustrated embodiment, the exterior plug surface **96** is angled outwardly from the lower edge **97** to the upper edge **98** at a taper angle A**1** of about 9 degrees from an axis parallel with the central axis **10**. In other embodiments, the taper angle A**1** can be in a range from 0 degrees to about 15 degrees. In further embodiments, the taper angle A**1** can be greater than 15 degrees, such as up to about 35 degrees.

[0074] The cap plug **18** is preferably constructed of a material that inhibits binding with the cement. In this manner, the cap plug **18** provides a substantially non-binding contact interface between the exterior plug surface **96** and the cement, such that the exterior plug surface **96** remains substantially removably connected to the cement after the cement hardens. A non-limiting example of one such material is acetal plastic (i.e., polyoxymethylene). Additional non-limiting examples of such materials include polytetrafluoroethylene (PTFE), acetal homopolymer, and acetal copolymer. The inventors have tested numerous cap plug **18** configurations and have observed that, when constructed from acetal plastic, the cap plug **18** described herein can be unthreaded axially upward and removed from fully hardened cement that had been poured around the sub-assembly **2***a* and up to the upper edge **98** of the exterior plug surface **96** (or above the upper edge **98**, though this requires removing (e.g., chiseling) the hardened cement over the top surface **86** of the cap plug **18** prior to removing the cap plug **18**). In yet other embodiments, the exterior plug surface **96** can be coated with a layer of coating material configured to inhibit binding with the cement at the plug-cement contact interface. Such coating materials can include polyvinyl alcohol, mineral oil, silicone, polysiloxane, wax, and polytetrafluoroethylene (PTFE), by way of non-limiting examples.

[0075] The top surface **86** of the cap plug **18** defines the uppermost end of the assembled pre-pour sub-assembly **2***a*. In one operative configuration of the drain assembly **2**, the cap plug **18** is fully seated within the barrel channel **72**, such that the top surface **86** of the cap plug **18** is spaced upwardly from the barrel landing surface **78** at a cap elevation distance H**1** along the axial direction X.

[0076] It should be understood that the axial adjustability of distance H (by rotating the upper barrel **16** relative to the drain body **4** in the first rotational direction RD**1**) is important for providing pre-pour adjustments to distance H**1** based on the desired depth of the cement pour. This adjustability allows a single pre-pour sub-assembly to be used for a wider

range of cement depths, which significantly simplifies the drain selection process for users and also provides users with increased installation tolerances (such as for the height of the top end of the drain pipe **35**). The axial adjustability of distance H also reduces the need for producing different drain bodies or assemblies having different set distances H, thereby providing significant cost savings for manufacturing. Additionally, the threaded engagement between the interior threads **38** of the drain body **4** and the exterior threads **74** of the upper barrel **16** provides fine control of the adjustments to distance H while maintaining sturdy, reliable attachment of the upper barrel **16** to the drain body **4**.

[0077] Referring now to FIGS. **4**A-**4**B, with the adjustable pre-pour distance H set at the desired height, and the cap plug **18** fully seated within the barrel channel **72**, the cement pouring phase can commence. In the cement pouring phase, cement **100** is poured over the substrate layer **52** and around the pre-pour sub-assembly **2***a*, including around the exterior plug surface **96** of the cap plug **18**. Preferably, the cement **100** is poured to a final height such that a top surface **102** of the cement **100** is substantially level with, or slightly below, the upper edge **98** of the exterior plug surface **96**. The top surface **102** of the poured, wet cement **100** can be leveled and the cement **100** is allowed to harden, thereby rigidly fixing the position of the drain body **4** and the upper barrel **16**.

[0078] As shown in FIG. **4**B, after the cement **100** hardens, the cap plug **18** is unthreaded and removed from the upper barrel **16**, leaving in its place a void **104** in the cement **100** having a geometry and volume substantially equivalent to that of the exterior plug surface **96**. With the cap plug **18** removed, the drain assembly **2** is ready to receive the post-pour sub-assembly **2***b*. The protrusions **82** of the barrel flange **76** are enclosed by the concrete to prevent unwanted rotation of the upper barrel **16** while the cap plug **18** is being unthreaded from the interior threads **75** of the barrel channel **72**. Although FIG. **4**A shows the top surface **102** of the poured cement **100** being slightly recessed from the top surface **86** of the cap plug **18**, it should be understood that the pre-pour sub-assembly **2***a* can accommodate instances where the cement **100** is poured to a depth such that the cement **100** extends over the top surface **86** of the cap plug **18**. In such instances, after the cement has hardened, the user can chisel out or otherwise remove the cement **100** over the top surface **86** of the cap plug **18** and subsequently remove the cap plug **18**.

[0079] Referring now to FIGS. **5**A-**5**C, and as mentioned above, the post-pour sub-assembly **2***b* includes a strainer barrel **26**, a support ring **34**, and a grate **32**. The strainer barrel **26** includes a central strainer body **110**, which is insertable within the barrel channel **72** of the upper barrel **16**. The central strainer body **110** has an exterior surface **112** radially opposite an interior surface **114**. The interior surface **114** defines a strainer barrel channel **116** alignable with the central axis **10**. The exterior surface **112** of the central strainer body **110** has exterior threads **118** that are engageable with the interior threads **75** of the upper barrel **16** such that the strainer barrel **26** is axially adjustable relative to the upper barrel **16**.

[0080] The strainer barrel **26** includes a support flange **150** that extends radially outward from the central strainer body **110**. The support flange **150** has an upper landing surface **152** and an opposed bottom flange surface **153**, which is abuttable with the landing surface **78** of the barrel flange **76** of the upper barrel **16**. The strainer barrel **26** also includes an outer body **154** that extends axially upward from the support flange **150** to the top end **28** of the strainer barrel **26**. The outer body **154** has an interior surface **156** that, together with the upper landing surface **152**, defines an interior strainer receptacle **158** sized to receive a grate **32**. The strainer barrel **26** has a plurality of mounting posts **160** that extend axially upward from the upper landing surface **152** and radially inward from the interior surface **156** of the outer body **154**. The mounting posts **160** define screw holes **162** for attaching the grate **32** to the strainer barrel **26**.

[0081] In the illustrated embodiment, the grate **32** is circular and is insertable within the interior strainer receptacle **158**. In other embodiments, the shape of the outer body **154** and the grate **32** can be square, rectangular, oval, or any other shape while still having a cylindrical central strainer body **110** for connecting to the upper barrel **16**. The grate **32** has an upper surface **120**, an opposed lower surface **122**, and a plurality of weep apertures **124** extending axially from the upper surface **120** to the lower surface **122**. In the illustrated embodiment, the lower surface **122** of the grate **32** has a convex profile (see FIG. **5**C). In other embodiments, the lower surface **122** can have other profiles, including planar or concave. Referring again to the illustrated embodiment, the grate **32** has a peripheral band **125** that defines an exterior circumferential surface **126** that extends between the upper and lower surfaces **120**, **122**. The grate **32** includes a plurality of grate mounting tabs **127** that extend radially inward from the peripheral band **125**. The grate mounting tabs **127** define respective screw holes **128** extending axially from the upper surface **120** to the lower surface **122**.

[0082] In the illustrated embodiment, the grate **32** is removably attachable to the support ring **34**, which is removably attachable to the strainer barrel **26** for interconnecting the grate **32** to the top end **28** of the strainer barrel **26**. The support ring **34** defines an exterior ring surface **130** and an interior ring surface **132** radially opposite the exterior ring surface **130**. The support ring **34** includes an interior lip **134** formed on the interior ring surface **132**, which defines a seat for supporting the peripheral band **125** of the grate **32**. The support ring **34** includes a first plurality of mounting tabs **136** extending radially inward from the interior lip **134**. The first plurality of mounting tabs **136** define respective screw holes **138** that extend axially therethrough and are alignable with the screw holes **128** of the grate **32**. The post-pour sub-assembly **2***b* includes a first plurality of screws **140** that are insertable through the screw holes **128** of the grate **32** and into the screw holes **138** of the first plurality of mounting tabs **136** of the support ring **34**.

[0083] The support ring **34** includes a second plurality of mounting tabs **142** extending radially inward from the interior lip **134**. The second plurality of mounting tabs **142** define respective screw holes **144** that extend axially therethrough. The second plurality of mounting tabs **142** are alignable with the mounting posts **160** in the interior strainer receptacle **158**, as described in more detail below. As shown in FIG. **5**A, the first and second pluralities of mounting tabs **136**, **142** are disposed in alternating fashion about the central axis **10**. The post-pour sub-assembly **2***b* includes a second plurality of screws **146** that are insertable through the screw holes **144** of the second plurality of mounting tabs **142** and into the respective screw holes **162** of the mounting posts **160** in the interior strainer receptacle **158**. As shown in FIG. **5**C, the peripheral band **125** of the support ring **34** is

mountable atop the top end **28** of the outer body **154** of the strainer barrel **26**, thereby elevating the grate **32** above the upper landing surface **152** so as to accommodate the convex profile of the lower surface **122** of the grate **32**. When the grate **32**, the support ring **34**, the strainer barrel **26** are assembled together, the top surface **120** of the grate **32** extends upward from the bottom flange surface **153** of the support flange **150** of the strainer barrel **26** at a grate elevation distance H**2** that is less than the cap elevation distance H**1**.

[0084] It should be understood that the post-pour sub-assembly **2***b* can be fully assembled before coupling with the upper barrel **16** or can be assembled in stages such that at least one of the stages is performed after inserting the central strainer body **110** within the barrel channel **72**. In additional embodiments, the post-pour sub-assembly **2***b* can include a cleanout cover that is devoid of weep apertures **124** and is interchangeable with the grate **32** for adapting the drain assembly **2** into a cleanout drain configuration.

[0085] Referring now to FIGS. **6**A-**6**B, with the cap plug **18** removed, the post-pour sub-assembly **2***b* can be coupled to the upper barrel **16** to complete the drain assembly **2**. The central strainer body **110** of the strainer barrel **26** is insertable through the void **104** and into the barrel channel **72** to engage the exterior threads **118** of the central strainer body **110** with the interior threads **75** of the upper barrel **16**. These exterior and interior threads **118**, **75** provide the strainer barrel **26** with axially adjustability relative to the upper barrel **16**, as described above. This provides another operative configuration of the drain assembly **2**, particularly in which the strainer barrel **26** is axially adjustable relative to the upper barrel **16** while the barrel landing surface **78** has a fixed position relative to the drain body **4**. By rotatably adjusting the strainer barrel **26** relative to the upper barrel **16**, the top surface **120** of the grate **32** can be aligned with the top surface **102** of the cement (FIG. **6**A) and even recessed downward from the top surface **102** of the cement **100** (FIG. **6**B), if necessary or desired. After the axial position of the strainer barrel **26** is set relative to the upper barrel **16**, the gap(s) between the post-pour sub-assembly **2***b* and the cement **100** in the void are filled with a filler material **155**, such a grout, caulk, silicone, or other filler materials. If the top surface **120** of the grate **32** is recessed from the top surface **102** of the cement **100**, the filler material **155** should be employed to slope downwardly from the cement **100** to the grate **32** to prevent drainage fluid from accumulating between the exterior ring surface **130** of the support ring **34** and the cement **100**.

[0086] The ability to axially adjust the top surface **120** of the grate **32** downward relative to the top surface **102** of the cement **100** is referred to herein as "negative adjustability," and it provides significant advantages over prior art drain assemblies. For example, the cap **18** provides a void having a sufficient height above the landing surface **78** of the upper barrel **16** to allow the post-pour sub-assembly **2***b* to be axially adjusted relative to the upper barrel **16** to ensure proper alignment of the top surface **120** of the grate **32** to be substantially aligned with the top surface **102** of the concrete **100**, even when the top surface **102** of the finished concrete **100** does not align with the top surface **86** of the cap plug **18** before the cap plug **18** is removed and replaced with the post-pour sub assembly **2***b*. Further, if desired or needed, the negative adjustability allows the top surface **120** of the grate to be adjusted to a position below the top surface of the cement, as shown in FIG. **6**B, thereby providing a slight detent or lowered area within the cement **100** to allow water or other liquids to flow down into the drain assembly **2**. Such negative adjustability can avoid costly drain re-installations that might otherwise be required by a faulty cement pour or other issues arising during a drain installation. For example, one issue that tends to arise involves a floor construction that includes a plurality of drain assemblies **2**. Depending upon the sloping requirements of the floor and other factors, one or more of the pre-pour sub-assemblies **2***a* might be set too high, resulting in the top surface **86** of a cap plug **18** residing above the top surface **102** of the poured cement **100**. In such instances, drain assemblies without negative adjustability might protrude above the top surface **102** of the cement **100**, often requiring users to replace any such drain assembly by chipping out the cement, re-setting the drain assembly, and then repouring the cement around the drain assembly.

[0087] Referring now to FIGS. **7**A-**7**C, in another embodiment, a drain assembly **202** is adapted to provide an increased distance H' by which the flange landing surface **78** extends above the top surface **12** of the drain body **4**. Accordingly, the drain assembly **202** of the present embodiment can be referred to as an "extendable drain assembly" **202**. It should be understood that components of the drain assemblies **2**, **202** that are common to, or substantially similar in, both assemblies **2**, **202** have the same reference characters. It should also be understood that the primary difference between the drain assemblies **2**, **202** is that the extendable drain assembly **202** includes an extender barrel **216** that is attachable to the bottom end **66** of the upper barrel **16** for providing the increased distance H'.

[0088] As shown in FIG. **7**A, the upper barrel **16** is attachable to the extender barrel **216**, which is also axially adjustable relative to the drain body **4**. The extender barrel **216** has an extender body **262**. The extender body **262** has a top end **264** and an axially opposed bottom end **266**. The extender body **262** also defines an exterior barrel surface **268** and a radially opposed interior barrel surface **270**. The interior barrel surface **270** defines an extender barrel channel **272** that is alignable with the upper barrel channel **72** and with the drain channel **8**. The exterior barrel surface **268** has external threads **274** that are engageable with the interior threads **38** of the drain body **4** for axially adjusting the relative position of the extender barrel **216** relative to the drain body **4**. The upper barrel **16** is couplable to the extender barrel **216**, and the bottom end **266** of the extender barrel **216** is insertable within the drain channel **8** and threadedly coupled therewith. Accordingly, the extendable drain assembly **202** provides increased flexibility for accommodating various types of drain installation. In particular, a user can elect to install the drain assembly **202** using the upper barrel **16** without the extender barrel **216**. Thus, in a first operative orientation of this embodiment, the bottom end **66** of the upper barrel **16** is insertable within the drain channel **8** for threadedly coupling therewith. Alternatively, in a second operative orientation of this embodiment, the bottom end **66** of the upper barrel is attachable to the top end **266** of the extender barrel **216**, and the bottom end **266** thereof is insertable within the drain channel **8** for threadedly coupling therewith. The extender barrel **16** is configured to increase the distance between the upper surface **42** of the drain body **8** and the bottom surface **80** of the flange **76** of the upper barrel **16**. The increased distance provided

by the extender barrel **216** allows for the drain assembly **2** to be located within a floor having a larger thickness or depth.

[0089] In particular, the bottom end **66** of the upper barrel **16** defines a first attachment mechanism **231**. The top end **264** of the extender body **262** defines a second attachment mechanism **251** releasably attachable to the first attachment mechanism **231** of the upper barrel **16**. The first attachment mechanism **231** includes a first recess **233** extending axially upward into the central body **62** at the bottom end **66** thereof. The second attachment mechanism **251** includes a first protrusion **253** extending axially upward from the top end **264** of the extender body **262**. The first protrusion **253** is receivable within the first recess **233** in the second operative orientation. For illustrative purposes, it should be understood that the first recess **233** of the first attachment mechanism **231** is substantially to the recess **273** shown at the bottom end **266** of the extender body **262** in FIG. **7**B, which recess **273** is described in more detail below.

[0090] As best shown in FIG. **7**C, the first attachment mechanism **231** also includes a second recess **235** extending radially outward into the central body **62** from the interior barrel surface **70** thereof. In the illustrated embodiment, the second recess **235** is radially opposite the first recess **233**. The central body **62** defines additional features of the first attachment mechanism **231**, including a bottom stop surface **237** at a bottom end of the second recess **235** and a first angled surface **239** extending upwardly between the bottom end **66** of the central body **62** and the bottom stop surface **237**.

[0091] The second attachment mechanism **251** comprises a second protrusion **255** that extends upwardly from the top end **264** extender body **262** and is engageable with the second recess **235** in the second operative orientation. The second protrusion **255** defines a second angled surface **257** extending downwardly from a top end **259** of the second protrusion, the second angled surface **257** engageable with the first angled surface **235** of the first attachment mechanism **251**. The second protrusion **255** also defines a latch surface **261** below the second angled surface **257**. The second protrusion **255** is flexible radially inward from an unlatched orientation, during engagement between the first and second angled surfaces **239**, **257**, and subsequently biased radially outward into a latched orientation, shown in FIG. **7**C, in which the latch surface **261** overlays the bottom stop surface **237**, thereby impeding axial detachment of the upper barrel **16** and the extender barrel **216**.

[0092] The extender barrel **216** of the illustrated embodiment has a stackable geometry. In particular, in a third operative orientation of this embodiment, the bottom end **266** of the extender body **262** is attachable to a top end **264** of a third barrel **216** that has the same geometry as the extender barrel **216**, and which is therefore insertable within the drain channel **8** for threadedly coupling thereto to axially adjust distance H'. Additionally, in the illustrated embodiment, the bottom end **266** of the extender barrel **216** has a third attachment mechanism **271** that has substantially the same geometry as the first attachment mechanism **231** of the upper barrel **16**. For example, the third attachment mechanism **271** includes a third recess **273** (FIG. **7**B), which has the same geometry as the first recess **233** at the bottom end **66** of the upper barrel **16**. As shown in FIG. **7**B, the third recess **273** has an inverted V-shaped profile. As shown in FIG. **7**A, the third attachment mechanism **271** also includes a fourth recess **275** that is located opposite the third recess **273** and has the same geometry as the second recess **235** at the bottom end **66** of the upper barrel **16** (FIG. **7**C). The third attachment mechanism **271** includes a bottom stop surface **277** at a bottom end of the fourth recess **275** and a third angled surface **279** extending upwardly between the bottom end **266** of the extender body **262** and the bottom stop surface **277**. The bottom stop surface **277** and the third angled surface **279** have the same respective geometries as the bottom stop surface **237** and the first angled surface **239** of the first attachment mechanism **231** of the upper barrel **16**. Because the geometries of the third attachment mechanism **271** are the same as the geometries of the first attachment mechanism **231**, the extender barrel **216** is stackable atop an additional extender barrel **216**. Thus, the extendable drain assembly **202** of the illustrated embodiment can include virtually any quantity of extender barrels **216**, which can be stacked one on top of another and coupled together to progressively increase the adjustable distance between the flange landing surface **78** of the upper barrel **16** and the top end **12** of the drain body **4**.

[0093] In other embodiments, the extendable drain assembly **202** can include an upper barrel **16** and a plurality of stackable extender barrels **216**, such that at least one of the extender barrels **216** has a different geometry (e.g., a different axial length) than at least one other extender barrel **216**. It should be understood that extendable drain assemblies **202** can include stackable extender barrels **216** having various geometries to accommodate various drain installations.

[0094] With reference to FIGS. **8**A-**8**C and FIGS. **9**A-**9**C, example embodiments of drain assemblies **302**, **402** having modular drain bodies **304**, **404** will be described. It should be understood that the components of these drain assemblies **302**, **402** that are the same or substantially similar to those employed in the drain assemblies **2**, **202** described above will utilize the same reference characters. It should also be understood that, for the sake of conciseness, the following description will focus on differences between the present drain assemblies **302**, **304** and the drain assemblies **2**, **202** described above. These modular drain bodies **304**, **404** each employ the drain body **4** described above as a base drain body that is attachable with one or more specialized components that allow the base drain body **4** to be used in various specialized drain installations, such as in a cored opening drain installation, a waterproofing drain installation, or various other types of drain installations. Typically for such drain installation types, a single-piece flanged drain body is employed, in which the flange member is monolithic with the drain body. On a commercial scale, this requires increased production and inventory costs to manufacture and distribute the various types of single-piece flanged drain bodies. The present embodiments reduce such costs by providing modular adaptation of a base drain body **4**.

[0095] Referring now to FIGS. **8**A-**8**C, a modular deck drain body **304** will now be described. The modular deck drain body **304** includes the base drain body **4** having a deck flange body **312** attachable therewith. The modular deck drain body **304** is particularly suited for use in a cored opening type of drain installation, in which the flange body **312** can be used to suspend the modular drain body **304** over the opening during the pre-pour phase, as shown in FIG. **8**B. Although FIG. **8**B depicts such a cored opening **105** formed in cement **100**, it should be understood that the modular deck

drain body **304** can be employed in cored openings formed in other construction materials, such as wood decking, metal corrugate, and the like.

[0096] The flange body **312** is attachable to the upper mounting surface **42** of the base drain body **4**. The flange body **312** has an interior circumferential edge **314** that defines a flange channel **316**, which is alignable with the central axis **10**. The flange body **312** has a top end **318** and a bottom end **320** axially opposite the top end **318**. The flange body **312** includes a flange member **322** that has an outer circumferential edge **324** spaced radially outward from the interior circumferential edge **314**. The interior drain surface **6** of the base drain body **4** and the interior circumferential edge **314** of the flange body **312** are respectively sized for receiving therein the central body **62** of the upper barrel **16** while the flange body **302** is attached to the upper mounting surface **42** of the base drain body **4**.

[0097] The flange body **312** includes a lower mounting portion **332** at the bottom end **320** and a tubular riser portion **334** extending axially upwardly from the lower mounting portion **332**. The flange member **322** extends radially outward from the tubular riser portion **334** to the outer circumferential edge **324**. The lower mounting portion **332** has a lower mounting surface **336** configured to face the upper mounting surface **42** of the base drain body **4**. A flange gasket **330** is retainable between the upper and lower mounting surfaces **42**, **336** for providing a seal therebetween.

[0098] The upper mounting surface **42** of the base drain body **4** defines a first plurality of screw holes **340**, the flange gasket **330** defines a second plurality of holes **342**, and the lower mounting portion **332** of the flange body **312** defines a third plurality of holes **344**. At least some of each of the first, second, and third pluralities of holes **340**, **342**, **344** are axially alignable with each other. A plurality of screws **346** insertable through the axially alignable holes of the first, second, and third pluralities of holes **340**, **342**, **344** for affixing the flange body **312** and the flange gasket **330** to the upper mounting surface **42** of the base drain body **4**.

[0099] In the illustrated embodiment, the central body **62** of the upper barrel **16** is insertable through the flange channel **316** and the flange gasket **330** and into the upper receptacle portion **36** of the drain channel **8** to threadedly engage the interior threads **38** therein. The upper barrel **16** is axially adjustable relative to the base drain body **4** in similar fashion to that described above. In this embodiment, however, the bottom surface **80** of the barrel flange **76** is abuttable against an upper surface **346** of the lower mounting portion **332** of the flange body **312**. With reference to FIGS. **8**B and **8**C, the cap plug **18** is interchangeable with the post-pour sub-assembly **2***b* in the same manner as described above. It should be understood that the strainer barrel **26** provides the grate **32** with negative adjustability in similar fashion to that described above. It should also be understood that the upper barrel **16** of the illustrated embodiment can be adapted for use with one or more extender barrels **216** in the manner described above.

[0100] Referring now to FIGS. **9**A-**9**B, a modular waterproofing drain body **404** will now be described. The modular waterproofing drain body **404** includes the base drain body **4** having a waterproofing flange body **410** and a clamping collar body **420** attachable therewith. The modular waterproofing drain body **404** is particularly suited for use in a waterproofing drain installation that employs a waterproof membrane **405**.

[0101] The flange body **410** has a top surface **412** and an axially opposed bottom surface **414**. The flange body **410** extends radially outward from an interior circumferential surface **413** to an exterior circumferential surface **415**. The interior circumferential surface **413** defines a flange channel **417** that is axially alignable with the drain channel **8**.

[0102] The collar body **420** is axially receivable between the flange body **410** and a flange gasket **330**. The collar body **420** has an upper collar surface **422** and an axially opposed lower collar surface **424**. The collar body **420** extends radially outward from an interior circumferential surface **423** to an exterior circumferential surface **425**. The interior circumferential surface **423** defines a collar channel **427** that is axially alignable with the drain channel **8** and the flange channel **417**.

[0103] In the illustrated embodiment, the flange body **410** and the collar body **420** together form a clamp mechanism **406** for clamping the waterproof membrane **405** in sealing fashion with the base drain body **4**. As best shown in FIG. **9**B, the bottom surface **414** of the flange body **410** has an annular protrusion **416** formed thereon that is receivable within an annular groove **426** that is downwardly recessed from the upper collar surface **422**. The annular protrusion **416** and the annular groove **426** have complimentary geometries for pinching the waterproof membrane **405** therebetween in sealing fashion. In the illustrated embodiment, the collar body **420** also includes an axially raised lip **428** adjacent to the outer circumferential surface **425** of the collar body **420**. When the modular drain body **404** is in an assembled operative configuration, the axially raised lip **428** is adjacent to the outer circumferential surface **415** of the flange body **410**, thereby providing a secondary clamping interface for clamping the waterproof membrane **405**.

[0104] It should be understood that the upper collar surface **422** is abuttable with the bottom surface **412** of the flange body **410**, such as in the absence of the waterproof membrane **405**. The lower collar surface **424** is abuttable with an upper surface of the flange gasket **330**. A lower surface of the flange gasket **330** is abuttable with the upper mounting surface **42** of the base drain body **4** for providing a seal between the collar body **420** and the base drain body **4**.

[0105] In the illustrated embodiment, the upper mounting surface **42** of the base drain body **4** defines a first plurality of holes **440**. The flange gasket **330** defines a second plurality of holes **442**. The collar body **420** defines a third plurality of holes **444**. At least some of each of the first, second, and third pluralities of holes **440**, **442**, **444** are axially alignable with each other. A first plurality of screws **461** are insertable, respectively, through the axially aligned holes of the first, second, and third pluralities of holes **451**, **452**, **453** for attaching the collar body **420** and the flange gasket **330** to the base drain body **4**.

[0106] With continued reference to the illustrated embodiment, the upper mounting surface **42** also defines a fourth plurality of holes **454** that are separate from the first plurality of holes **451**. The flange gasket **330** also defines a fifth plurality of holes **455** that are separate from the second plurality of holes **452**. The collar body **420** also defines a sixth plurality of holes **456** that are separate from the third plurality of holes **453**. The flange body **410** defines a seventh

plurality of holes **457**. A second plurality of screws **462** are insertable, respectively, at least through the axially aligned holes of the sixth and seventh pluralities of holes **456**, **457** for clamping the flange body **410** toward the collar body **420**. In this manner, when the waterproof membrane **405** is disposed axially between the collar body **420** and the flange body **410**, the second plurality of screws **462** facilitate actuation of the clamping mechanism **406**.

[0107] In the illustrated embodiment, the seventh plurality of holes **457** in the flange body **410** are contiguous with respective turn slots **467** that extend away from the holes **457** in a circumferential direction C. The associated holes **457**, turn slots **467**, and screws **462** are cooperatively configured so that the second plurality of screws **462** are insertable within the sixth plurality of holes **456** in the collar body **420**, with the respective screw shafts extending upwardly therefrom. The flange body **410** can be axially lowered over the screws **462** such that the respective screw heads pass through the seventh plurality of holes **547** until the lower ends of the heads reside above the top flange surface **412**. From this position, the flange body **410** is partially rotated about the central axis **10** to guide the screw shafts into the turn slots **467**. This partial rotation causes the screw heads to drive the flange body downward toward the collar body, clamping the waterproof membrane **405** therebetween.

[0108] With reference to FIGS. **9**B and **9**C, the cap plug **18** is interchangeable with the post-pour sub-assembly **2***b* in the same manner as described above with references to the other drain assemblies **2**, **202**, **302**. It should be understood that the strainer barrel **26** provides the grate **32** with negative adjustability relative to the modular drain body **404** in similar fashion to that described above. It should also be understood that the upper barrel **16** of the illustrated embodiment can be adapted for use with one or more extender barrels **216** in the manner described above.

[0109] It should be understood that other embodiments of the modular deck drain bodies **304** and modular waterproofing drain bodies **404** can employ different screw and hole configurations than those described above for coupling the respective components together.

[0110] Referring now to FIGS. **10**A-**10**F, the test plug **22** shown in FIG. **1** will be described in more detail. It should be understood that each of the drain assemblies **2**, **202**, **302**, **402** in the illustrated embodiments herein include the test plug **22**, which is insertable within the drain channel **8** for releasably sealing the drain channel **8**. In particular, the test plug **22** is releasably attachable to a plug seat **165** within the drain channel **8** to provide a seal between the upper receptacle portion **36** and the lower portion **39** of the drain channel **8**. The test plug **22** is sealable to the plug seat **165** with sufficient force to facilitate pressure testing of the drain system connected to the bottom end **14** of the drain body **4**. It should be understood that the test plug **22** can also effectively function as a cleanout plug that can be removed from the drain channel **8** to provide access to a cleaning instruments, such as a drain snake.

[0111] Referring now to FIG. **10**A, the test plug **22** has a plug body **170** having an exterior surface **172** and at least one tab **174** extending away from the exterior surface **172**. The at least one tab **174** is configured to be gripped for assisting a user rotate the tab **174** about the central axis **10** to couple and/or de-couple the test plug from the interior surface **6** of the drain body **4**. In the illustrated embodiment, the plug body **170** has four (4) tabs **174**. As shown in FIG. **10**C, a first pair of the tabs **174** extend upwardly to a first plug height H**3** measured axially from a bottom end **176** of the plug body **170** to a top end **178** of the first pair of tabs **174**. A second pair of the tabs **174** extend upward to a second plug height that is less than the first plug height H**3**. It should be understood that the first plug height H**3** is less than an axial distance H**4** measured from the bottom end **176** of the plug body **170** to the bottom surface **87** of the top wall **84** of the cap plug **18** when the test plug **22** is affixed to the plug seat **165**.

[0112] Referring now to FIGS. **10**B-**10**C, the plug body **170** has a bottom portion **173** having an outer wall **175** and an annular gasket receptacle **177** extending radially inward from the outer wall **175**. The plug gasket **24** is received within the annular gasket receptacle **177**. The bottom portion **173** of the plug body **170** has a cylindrical exterior surface **179** located axially below the annular gasket receptacle **177**. The plug body **170** has a locking mechanism **181** extending radially outward from the cylindrical exterior surface **179** for releasably attaching the plug gasket **24** to the plug seat **165**.

[0113] Referring now to FIGS. **10**D-**10**F, the intermediate portion **37** of the drain body **4** defines a locking mechanism **180** that is engageable with a locking mechanism **181** of the test plug **22**. For purposes of discussion, the locking mechanism **180** of the drain body **4** can be referred to as a first locking mechanism **180**, and the locking mechanism **181** of the test plug **22** can be referred to as a second locking mechanism **181**. The first locking mechanism **180** is spaced between the plug seat **165** and the bottom end **14** of the drain body **4**. The first locking mechanism **180** includes an annular protrusion **182** extending radially inward from the interior drain surface **6**. The first locking mechanism **180** includes a stop surface **184** that extends annularly along an underside of the annular protrusion **182** and faces the bottom end **14** of the drain body **4**.

[0114] The first locking mechanism **180** includes a plurality of slots **186** extending axially through the annular protrusion **182**. In the illustrated embodiment, the first locking mechanism has four (4) slots spaced at 90-degree intervals along the annular protrusion. Each slot **186** extends circumferentially from a first end surface **188** to an opposed second end surface **190**, which are defined by the annular protrusion **182**. As shown in FIG. **10**F, each slot **186** has a circumferential slot length C**1** measured between the respective first and second end surfaces **188**, **190**.

[0115] The second locking mechanism **181** includes a plurality of locking protrusions **183** that extend radially outward from the cylindrical exterior surface **179** of the plug body **170**. Each locking protrusion **183** extends circumferentially from a first protrusion end **185** to an opposed second protrusion end **187**. In this manner, each locking protrusion **183** has a circumferential protrusion length C**2** measured between the respective first and second ends **185**, **187**. Each locking protrusion **183** also has a top protrusion surface **189** extending circumferentially from the first protrusion end **185** to the second protrusion end **187**. In the illustrated embodiment, the top protrusion surface **189** tapers upwardly from the first protrusion end **185** toward the second protrusion end **187**.

[0116] Referring now to FIG. **10**F, the circumferential protrusion lengths C**2** of the locking protrusions **183** are less than the circumferential slot lengths C**1**, thereby allowing

the locking protrusions **183** to translate axially through the slots **186**, respectively, when the locking protrusions **183** are axially aligned with the slots **186**. The test plug **22** is rotatable about the central axis **10** to move the second locking mechanism **181** between a first operative position P**1** (i.e., a locked position) and a second operative position P**1** (i.e., an unlocked position). In the first operative position P**1**, the plug gasket **24** is sealed against the plug seat **165** (see FIG. **10**C) and the locking protrusions **183** underly the stop surface **184**, thereby inhibiting upward axially movement of the test plug **22** relative to the drain body **4**.

[0117] In the second operative position P**2**, the locking protrusions **183** are axially aligned with the slots **186** and are thus unobstructed by the stop surface **184**. This allows the test plug **22** to be upwardly axially movable relative to the drain body **4** when in the second operative position P**2**. In the illustrated embodiment, the test plug **22** is rotatable back-and-forth between the first and second operative positions P**1**, P**2** along respective partial revolutions no greater than 90-degrees about the central axis **10**.

[0118] To facilitate a strong seal between the gasket **24** and the plug seat **165**, each first end surface **188** of the respective slot **186** is contiguous with a ramp surface **192**. Each ramp surface **192** extends circumferentially from a first ramp end **194** at an interface with the first end surface **188** to a second ramp end **196**. The second ramp end **196** is contiguous with the stop surface **184**. The ramp surfaces **192** are each angled downward from the first ramp end **194** to the second ramp end **196**. The ramp surfaces **192** are configured to guide a respective one of the locking protrusions axially downward as the second locking mechanism transitions from the first operative position P**1** to the second operative position P**2**.

[0119] It should also be understood that the various drain assemblies described above can be provided in various kits. The kit preferably includes the pre-pour and post-pour assemblies **2***a*, **2***b*. It should also be understood that any such kit can include various interchangeable components, such as extender barrels, deck flanges, waterproofing flanges, different grate types (e.g., round, square, etc.), leveling assemblies, and the like.

[0120] It should further be understood that the drain assemblies described herein can be provided in different respective size categories. In this manner, the drain assemblies and their respective components described herein can be scaled upward or downward in size as needed.

[0121] An exemplary method for assembling a drain now be described. It should be understood that the following steps represent non-limiting examples of process steps for assembling a drain having various structural features as described throughout this disclosure.

[0122] The method includes providing a drain body **4**, an upper barrel **16**, an annular gasket **20**, and a plug **18**. The drain body **4** has an interior drain surface **6** that defines a drain channel **8** extending along a central axis **10**. The drain channel **6** extends between a top end **12** and a bottom end **14** of the drain body **4**. The interior drain surface **6** has an upper receptacle portion **36** extending downwardly from the top end **12**. The upper barrel **16** has a central body **62** and a flange **76** extending radially outward from an upper end **64** of the central body **62**. The flange **76** defines a top surface **78**. The central body **62** has an exterior barrel surface **68** opposite an interior barrel surface **70**. The interior barrel surface **70** defines a barrel channel **72**. The plug **18** has a top wall **84** and an outer plug body **88** extending axially from the top wall **84**. The outer plug body **88** has a stop surface **90** opposite the top wall **84** and also has an inner portion **92** extending axially below the stop surface **90**. The annular gasket **20** has a top gasket surface and an axially opposed bottom gasket surface.

[0123] The drain body **4** is placed over a substrate **52**. For example, the drain body **4** can be placed atop a drain pipe **35** (see FIG. **2**D) or suspended over an opening in the substrate **52** (see FIGS. **8**B and **9**B). The central body **62** of the upper barrel **16** is inserted into the upper receptacle portion **36** of the drain body **4**, thereby aligning the barrel channel **72** with the central axis **10** of the drain body **4**. The user axially adjusts a position of the central body **62** of the upper barrel **16** relative to the drain body **4**, thereby adjusting a distance H between the top end **12** of the drain body **4** and the top surface **78** of the flange **76**. The annular gasket **20** can be placed atop the top surface **78** of the flange **76**. The inner portion **92** of the outer plug body **88** is inserted into the barrel channel **72** until the top surface of the annular gasket abuts the stop surface **90** of the plug **18** and the bottom gasket surface abuts the top surface **78** of the flange **76**, thereby sealing the outer plug body **88** against the flange **76** for preventing cement from flowing into the barrel channel **72**.

[0124] Wet cement **100** is poured over the substrate **52** and around the drain body **4**, the upper barrel **16**, and the plug **18**. The wet cement **100** is preferably leveled so that a top surface **86** of the top wall **84** of the plug **18** is substantially level with a top surface **102** of the poured cement **100** and the cement **100** is allowed to harden. The plug **18** is removed after the poured cement **100** has substantially hardened.

[0125] The method includes providing a strainer barrel **26** and a drain grate **32**. The strainer barrel **26** has a central body **110** having an exterior surface **112** opposite an interior surface **114**. The interior surface **114** of the strainer barrel **26** defines a strainer barrel channel **116** that extends from a top end **28** of the strainer barrel **26** to a bottom end **30** of the strainer barrel **26**. The drain grate **32** has a top surface **120** and an opposed bottom surface **122**.

[0126] The central body **110** of the strainer barrel **26** is inserted into the upper receptacle portion **36** of the drain channel **8**. A user can then axially adjust a position of the central body **110** of the strainer barrel **26** relative to the drain body **4**, such as by axially lowering the position of the central body **110** of the strainer barrel **26** downward relative to the drain body **4**.

[0127] The drain grate **32** is attached to the top surface **28** of the strainer barrel **26**. Optionally, the position of the strainer barrel **26** can be axially adjusted relative to the upper barrel **16** so that the top surface **120** of the drain grate **32** is be recessed from the top surface **102** of the cement **100**.

[0128] Referring now to FIGS. **11**A-**15**C, in these additional embodiments, the pre-pour sub-assembly includes a sleeve **502** connectable to the exterior plug surface **96** of the cap plug **18**. In these embodiments the sleeve **502** is removably attachable to the cap plug **18** and the upper barrel **16**. The sleeve **502** will remain in the drain assembly post-pour to provide structural stability to hold up the concrete walls surrounding the sleeve **502**, including after the cap plug **18** is removed. The sleeve **502** has an exterior sleeve surface **508** opposite an interior sleeve surface **510**. The exterior sleeve surface **508** is configured to engage poured cement and prevent it from entering the upper barrel **16**. The interior sleeve surface **510** is configured to interface with the exte-

rior plug surface **96** in a manner preventing poured cement from entering therebetween. The sleeve **502** has a top sleeve surface **512** opposite a bottom sleeve surface **514**. The bottom sleeve surface **514** is abuttable with the landing surface **78** of the upper barrel **16** or with a plug gasket **20** axially positioned between the bottom sleeve surface **514** and the landing surface **78**.

[0129] In the embodiment shown in FIGS. **12**A-**12**C, the pre-pour assembly includes a ring member **504** that is separate from the sleeve **502** is attachable directly to the exterior plug surface **96**. The ring member **504** is configured to reside around the exterior plug surface **96** and atop the sleeve **502** when coupled to the cap plug **18**. In this embodiment, the ring member **504** will also remain in the drain assembly post-pour to provide structural stability to hold up the concrete walls surrounding the sleeve **502** and the ring member **504**, including after the cap plug **18** is removed. As shown, the ring member **504** can have a circular cross-sectional geometry. In further embodiments, the ring member **504** can have an elongated, sleeve-like vertical geometry. Thus, in such further embodiments, the ring member **504** can be an additional sleeve.

[0130] It should be appreciated that in the additional embodiments shown in FIGS. **12**A-**12**C, **13**A-**13**C, and **14**A-**14**C, the top surface **86** of the cap plug **18** is positioned above a top surface **508** of the sleeve **502** (and above a top surface of the ring member **504** shown in FIGS. **12**A-**12**C) when the cap plug **18** is coupled to the upper barrel **16**. It should also be appreciated that, in these additional embodiments (FIGS. **12**A-**14**C), when the post-pour sub-assembly replaces the cap plug **18**, the upper surface **120** of the grate **32** will preferably be located above the top surface **508** of the sleeve **502** (and above the top surface of the ring member **504** shown in FIGS. **12**A-**12**C).

[0131] Referring now to FIGS. **13**A-**13**C, in additional embodiments, the sleeve **502** has an inner flange portion **516** that extends inwardly from the interior sleeve surface **510** at the bottom of the sleeve **502**, such that the bottom sleeve surface **514** extends along a bottom of the inner flange portion **516**. As shown in FIG. **13**C, the inner flange portion **516** is abuttable with a plug gasket **20** axially positioned between the bottom sleeve surface **514** and the landing surface **78**. As best shown in FIGS. **13**B-**13**C, the exterior sleeve surface **508** tapers outwardly (away from the central axis **10**) from the top sleeve surface **512** to the bottom sleeve surface **514**. The exterior plug surface **96** can taper inwardly (toward the central axis **10**) from the top surface **86** of the cap plug **18** to the stop surface **90**.

[0132] Referring now to FIGS. **14**A-**14**C, in another embodiment, the stop surface **90** of the outer body **88** of the cap plug **18** is abuttable with the top sleeve surface **512**. As in other embodiments above, the exterior cap surface **96** tapers inwardly from the top surface **86** of the cap plug **18** to the stop surface **90**. In the present embodiment, the stop surface **90** provides mechanical interference with the top sleeve surface **512** that maintains an elevated position of the top surface **86** of the cap plug **18** above the top sleeve surface **512**. The outer body **88** of the cap plug **18** can also define a second exterior surface **597** that extends downward below the stop surface **90** and is positioned inward of the exterior cap surface **96**. The second exterior surface **597** can interface with the interior sleeve surface **510**. The second exterior surface **597** and the stop surface **90** of the present embodiment effectively provide a shoulder for the cap plug **18** that seats against an upper portion of the sleeve **502**.

[0133] Referring now to FIGS. **15**A-**15**C, in additional embodiments, the interior sleeve surface **510** can have interior threads **518** that are engageable with additional exterior threads **520** on the exterior plug surface **96** for coupling the sleeve **502** with the cap plug **18**.

[0134] Referring now to FIGS. **16**A-**16**C, in yet additional embodiments, the upper barrel **16** includes an upper sleeve member **506** that extends upward and around the exterior plug surface **96**. In the illustrated embodiment, the upper sleeve member **506** is monolithic with the remainder of the upper barrel **16**, and will therefore remain in the drain assembly after the cap plug **18** is removed. As shown, the upper sleeve member **506** can have exterior protrusions **544**, which can lock within the concrete post-pour.

[0135] It should also be understood that the present disclosure encompasses various other methods and techniques for assembling a drain.

[0136] It should be appreciated that the various parameters of the drain assemblies and their respective components described above are provided as exemplary features for adapting the drain assemblies as needed. These parameters can be adjusted as needed without departing from the scope of the present disclosure.

[0137] Although the disclosure has been described in detail, it should be understood that various changes, substitutions, and alterations can be made herein without departing from the spirit and scope of the invention as defined by the appended claims. Moreover, the scope of the present disclosure is not intended to be limited to the particular embodiments described in the specification. In particular, one or more of the features from the foregoing embodiments can be employed in other embodiments herein. As one of ordinary skill in the art will readily appreciate from that processes, machines, manufacture, composition of matter, means, methods, or steps, presently existing or later to be developed that perform substantially the same function or achieve substantially the same result as the corresponding embodiments described herein may be utilized according to the present disclosure.

What is claimed is:

1. A drain assembly, comprising:

a drain body defining an interior drain surface that defines a drain channel extending along a central axis, wherein an upper receptacle portion of the interior drain surface defines interior threads;

an upper barrel having a central body and a flange extending radially outward from an upper end of the central body, the flange defining a landing surface, the central body having an exterior barrel surface opposite an interior barrel surface, the interior barrel surface defining a barrel channel alignable with the central axis of the drain body, the central body having interior threads formed on the interior barrel surface and exterior threads formed on the exterior barrel surface adjacent to a lower end thereof, the exterior threads being engageable with the interior threads of the drain body, wherein the upper barrel is axially adjustable relative to the drain body along the central axis;

a plug having a top surface, an outer body extending axially downward from the top surface, the outer body defining a stop surface opposite the top surface, the outer body including an inner portion extending axially

below the stop surface, the inner portion having external threads engageable with the interior threads of the upper barrel; and

a sleeve axially receivable between the stop surface of the plug and the landing surface of the upper barrel, wherein the sleeve is abuttable with the stop surface and the landing surface to provide a seal therebetween.

2. The drain assembly of claim **1**, wherein the outer body of the plug defines an exterior plug surface that extends from the top surface to the stop surface, and the exterior plug surface is engageable with cement during the cement pouring phase.

3. The drain assembly of claim **2**, wherein the exterior surface plug surface tapers inwardly toward the central axis from the top surface to the stop surface.

4. The drain assembly of claim **2**, wherein the sleeve comprises:

an exterior sleeve surface opposite an interior sleeve surface;

a top sleeve surface opposite a bottom sleeve surface; and

an inner flange portion extending inwardly from the interior sleeve surface,

wherein the bottom sleeve surface extends along a bottom of the inner flange portion, and the bottom sleeve surface is abuttable with the landing surface of the upper barrel.

5. The drain assembly of claim **2**, wherein the sleeve comprises:

an exterior sleeve surface opposite an interior sleeve surface, and

a top sleeve surface opposite a bottom sleeve surface,

wherein the exterior sleeve surface tapers outwardly away from the central axis from the top sleeve surface to the bottom sleeve surface.

6. The drain assembly of claim **2**, wherein the plug is constructed of a material for providing a non-binding contact interface between the exterior plug surface and the cement.

7. The drain assembly of claim **6**, wherein the material comprises acetal plastic.

8. The drain assembly of claim **2**, wherein the exterior plug surface is coated with a layer of coating material configured to provide a non-binding contact interface with the cement.

9. The drain assembly of claim **8**, wherein the coating material is selected from the group comprising polyvinyl alcohol, mineral oil, silicone, polysiloxane, wax, and polytetrafluoroethylene (PTFE).

10. The drain assembly of claim **2**, wherein the plug is interchangeable with a strainer barrel, the strainer barrel having a central body insertable within the barrel channel, the central body of the strainer barrel having an exterior surface opposite an interior surface, the interior surface of the strainer barrel defining a strainer barrel channel alignable with the central axis of the drain body, wherein the exterior surface of the central body of the strainer barrel has exterior threads engageable with the interior threads on the interior barrel surface, and wherein the strainer barrel is axially adjustable relative to the upper barrel.

11. The drain assembly of claim **1**, wherein the external threads of the plug are removably engageable with the interior threads of the upper barrel, such that the plug is removably attachable to the upper barrel during a pre-pour phase of drain assembly.

12. The drain assembly of claim **11**, wherein, in a first operative configuration of the drain assembly, the plug is fully seated within the barrel channel, the top surface of the plug is spaced upwardly from the barrel landing surface at a first distance along the axial direction.

13. The drain assembly of claim **12**, further comprising a drain grate attachable to a top end of the strainer barrel, wherein, when the drain grate is attached to the strainer barrel and the strainer barrel is attached to the upper barrel, a top surface of the drain grate is spaced upwardly from the barrel landing surface at a second distance along the axial direction, wherein the second distance is less than the first distance.

14. The drain assembly of claim **13**, wherein, in a second operative configuration of the drain assembly, the relative position between the drain body and the upper barrel is rigidly fixed, such that the strainer barrel being axially adjustable relative to the upper barrel causes the second distance to be adjustable while the barrel landing surface has a fixed position relative to the drain body.

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