



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
11.05.2016 Bulletin 2016/19

(51) Int Cl.:
E03B 9/10 (2006.01) E02D 29/14 (2006.01)

(21) Application number: **15191283.9**

(22) Date of filing: **23.10.2015**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA

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(30) Priority: **24.10.2014 DK 201400607**

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(54) **STREET COVER FOR EXTENSION SPINDLE**

(57) The invention provides a street cover (50) for an extension spindle (10), the extension spindle (10) being of the type comprising an attachment portion (12) comprising at least one radially extending lug (24,26), the extension spindle (10) further comprising a tool part (22) spaced apart from the at least one radially extending lug (24).

The street cover (50) comprises an upper housing part (52) defining an upper cavity (56) for housing the tool part (22) of the extension spindle (10), the upper cavity being closeable by a cover assembly (150), and, a lower housing part (62) defining a lower cavity (64) for receiving the attachment portion (12) and the at least one radially extending lug (24,26), the lower cavity (64) and the upper cavity (56) being separated from each other by a wall (68), at least part of the wall (68) defining a seat for engaging the upper side of the at least one radially extending lug (24, 26), the wall (68) comprising an aperture (66) for admitting the tool part (22) into the upper cavity (56). The lower housing part (62) further comprises at least one set of two spaced apart holes (70, 72) for receiving and holding a retaining member (100), the at least one set of two spaced apart holes (70, 72) being positioned such that the retaining member (100) engages the underside of the at least one radially extending lug (24, 26) for retaining the attachment portion (12) in the lower cavity (64). A method of connecting a street cover (50) to an extension spindle (10) is also provided.

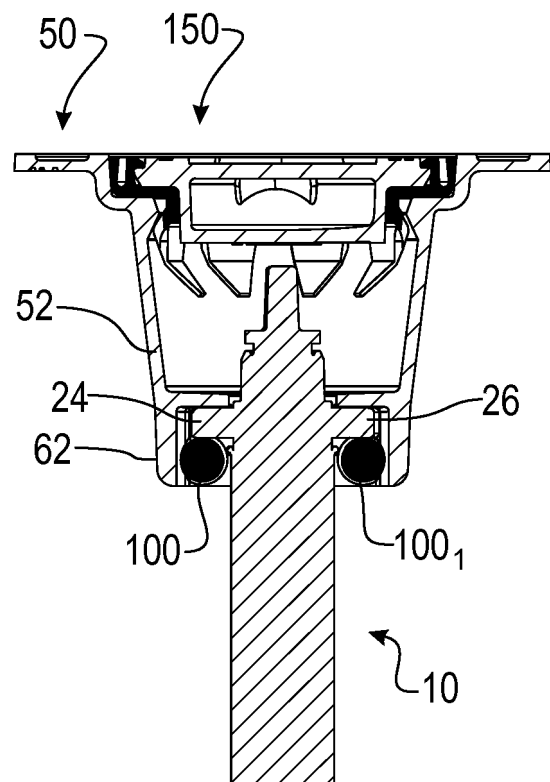


FIG. 8A

Description

[0001] The present invention concerns a street cover for an extension spindle, in particular a street cover connectable to a wide variety of different extension spindles.

[0002] An extension spindle is used for easy access to operation of a valve installed below ground, i.e. an underground valve. The valve may for example be installed in a water pipe in the ground, for example at a depth of 2 meters below the ground surface. An extension spindle in its most basic form comprises a rod extending from the valve to the ground surface, the rod having a first end connected to the valve spindle of the valve and a second end having a head or tool part engageable by a tool for rotating the rod to operate the valve. As the second end is placed to be accessible from the ground surface it is often positioned in a street cover or surface box having a cover that is removable for gaining access to the second end to operate the valve.

[0003] A popular type of extension spindle is the telescopic extension spindle which is used where the distance between the valve and the ground surface is non-defined such that adjustment of the extension spindle, and thereby adjustment of the elevation of the street cover or surface box, is required. In an extension spindle the rod is replaced by upper and lower telescoping inner pipes, the upper inner pipe being connected to the second end and the lower inner pipe being connected to the first end. Rotation of the upper inner pipe, by rotation of the second end, is transferred to the lower inner pipe by a lock spring or other structure arranged between the upper inner pipe and the lower inner pipe.

[0004] The inner pipes are protected against the soil and dirt by being surrounded by upper and lower telescoping outer pipes. The lower outer pipe has first end proximate to the first end of the lower inner pipe. The first end of the lower outer pipe comprises a bottom cover for covering the valve spindle and protecting it from the soil and dirt in order to enable the valve spindle to rotate freely. The bottom cover further retains the first end of the lower inner pipe for positioning the first end of the lower inner pipe in connection with the valve spindle. The upper outer pipe has a second end proximate to the second end of the upper inner pipe, the second end of the upper outer pipe retaining the second end of the upper inner pipe.

[0005] For telescopic extension spindles as described above it is desired that the telescopic extension spindle is extended or retracted by only lifting or lowering the street cover or surface box. Accordingly manufacturers of telescopic extension spindles have devised solutions to this problem. In particular the second end of the upper outer pipe has been fashioned with an attachment portion comprising two opposite radially extending lugs or "ears" for locking the second end of the outer upper pipe, in the manner of a bayonet coupling, to the underside of a street cover or surface box. By the bayonet coupling of the second end of the outer upper pipe to the street cover or

surface box the second end of the outer upper pipe is retained vertically in relation to the street cover or surface box allowing the street cover or surface box to be adjusted vertically without becoming disconnected from the telescopic extension spindle.

[0006] Telescopic extension spindles as described above are marketed by inter alia Helnor AS, Strandveien 10a, 2380 Brumunddal, Norway "Helnor" under the name XK, AVK Norge AS, Hagasletta 7, N-3236 Sandefjord, Norway "AVK" under the name AVK EXTENSION SPINDLE, Hawle Armaturen GmbH, Liegnitzer Str. 6, 83395 Freilassing, Germany, "Hawle", under the name (950) Telescopic extension spindle, and Ulefos Esco AS, PO Box 85, N-3602 Kongsberg, Norway "Esco" under the name S-1850 Spindle extension.

[0007] The above mentioned "Helnor", "AKV", "Hawle", and "Esco" telescopic extension spindles generally have similar dimensions, as regards the diameter of the outer pipes, for a specific size of valve. However, the dimensions of the lugs or "ears" are different between each type of telescopic extension spindle so that for example a "Helnor" telescopic extension spindle is only compatible with a "Helnor" street cover or surface box having suitably dimensioned corresponding structures for defining the bayonet coupling with the telescopic extension spindle.

[0008] This specificity between the telescopic extension spindles and the street covers or surface boxes require installers of telescopic extension spindles and road workers to operate with different types of street covers or surface boxes depending on which brand of telescopic extension spindle that has been used for the valves in the water pipes buried in the ground beneath for example a road.

[0009] A further problem with using a bayonet coupling is that the street cover or surface box may accidentally become disconnected from the telescopic extension spindle if the street cover or surface box is rotated in relation the telescopic extension spindle.

[0010] NO 954294 A (Helnor AS) discloses a street box with lock and lid wherein a lock with a locking pin is fitted into the bayonet slots of the street box for prevention of undesirable release of the spindle extension. The lock may be designed so that a wall protrudes sufficiently high upwards into the street box that this becomes accessible for manual operation without the use of tools.

[0011] It is therefore an object of the present invention to provide a street cover for an extension spindle that can be used with a wide variety of different extension spindles.

[0012] It is further an object of the present invention to provide a street cover for an extension spindle that provides a more secure connection between the street cover and the extension spindle.

[0013] It is further an object of the present invention to provide a method of connecting a street cover to an extension spindle.

[0014] At least one of the above objects, or at least one

of the further objects which will be evident from the below description of the present invention, is according to a first aspect of the present invention achieved by a street cover as defined in claim 1.

[0015] By comprising the at least one set of two spaced apart holes a retaining member can be inserted and received in the at least one set of two spaced apart holes for engaging the underside of the at least one radially extending lug for retaining the attachment portion in the lower cavity and thereby securely connect the extension spindle to the street cover. Further the engagement between the at least one radially extending lug and the retaining member is of a less specific type than the engagement between the parts of a bayonet coupling thus allowing for different types of extension spindles, having differing dimensions of the at least one radially extending lug, to be connected to the street cover. Furthermore, if desired, different retaining members having different dimensions may be used to fit even larger variations in shape and dimensions of the at least one radially extending lug.

[0016] The terms upper and lower, upper side and under side, and vertical are to be interpreted in the context of the extension spindle extending from the ground surface down into the ground.

[0017] The street cover may typically have a diameter of 0,1 to 0,5 m such as 0,25 m. the street cover is preferably made from cast iron although it may also be made from plastics optionally reinforced with glass or carbon fibre.

[0018] In the context of the present invention street cover encompasses surface box and/or valve box.

[0019] The extension spindle may be a non-telescopic extension spindle but is typically a telescopic extension spindle as known in the art as described above.

The attachment portion of the extension spindle typically comprises a circular bushing attached to the upper end of an outer pipe, the outer pipe housing an inner pipe which is rotated to operate an underground valve. The attachment portion also serves as a bearing for the inner pipe and for retaining the inner pipe vertically.

[0020] The at least one radially extending lug is preferably shaped as a parabolic or triangular flat thin tip or as a square plate. Alternatively the at least one radially extending lug is shaped as a cylindrical pin. The at least one radially extending lug extends in a transverse direction, preferably perpendicular, to the longitudinal direction defined by the attachment portion and the upper pipe.

[0021] The upper side of the at least one radially extending lug is the side that is turned away from the underground valve when the extension spindle is connected to an underground valve for operating the underground valve.

[0022] The underside of the at least one radially extending lug is opposite to the upper side of the at least one radially extending lug and is the side that is turned towards from the underground valve when the extension spindle is connected to an underground valve for oper-

ating the underground valve.

[0023] The tool part may be male or female square or orthogonal depression or protrusion. The tool part typically protrudes in the longitudinal direction of the attachment portion and the upper pipe, in other words in the direction opposite to the underground valve operated by the extension spindle. The tool part is spaced apart, preferably longitudinally along the axis of the attachment portion, from the at least one radially extending lug.

[0024] The upper housing part is preferably cylindrical and preferably tapered having it widest diameter at the top and its narrowest diameter at the bottom adjacent the lower housing part. The upper housing part may further have a radially extending lip or flange at the top for being placed flush with a road pavement surface.

[0025] The upper cavity is preferably also cylindrical and tapered correspondingly to the upper housing part. The upper cavity is open at the top for receiving the cover assembly. The upper housing part may define a circumferential shoulder or narrowing in the wall of the upper cavity for providing a supporting surface for the circumference of a cover assembly.

[0026] The lower housing part is typically of smaller volume than the upper housing part. The lower housing part is preferably shaped as a rectangular cuboid for accommodating the attachment portion in the entire thereof and the at least one radially extending lug in the periphery thereof.

[0027] The lower cavity is preferably generally cuboidly shaped for accommodating the attachment portion with the at least one radially extending lug. The lower cavity is open to the bottom of the street cover for receiving the attachment portion as the extension spindle is connected to the street cover by inserting the tool part followed by the attachment portion into the lower cavity.

[0028] The street cover with the lower housing part and the upper housing part is preferably cast as a single casting with the wall separating the upper cavity from the lower cavity.

The wall defines a seat for the at least one radially extending lug by allowing the tool part to pass through the aperture while preventing the at least one radially extending lug from passing into the upper cavity. The seat is defined by the parts of the wall surrounding the aperture.

[0029] The aperture is preferably placed in the centre of the wall and sized so that only the tool part, and no the at least one radially extending lug can pass through the aperture. The centre axis of the aperture is preferably co-linear with the centre axis of the street cover and the upper and lower cavities.

[0030] Part of the attachment portion, excluding the at least one radially extending lug, may pass into the upper cavity through the aperture.

[0031] The two spaced apart holes, of the at least one set of two spaced apart holes, are preferably placed on opposite sides of the lower housing part, and are preferably also co-linear, i.e. the centre axis of the first hole being placed on the same line and extending in the same

direction as the centre axis of the second hole.

[0032] Preferably the two holes are positioned such that a the volume of a cylinder having the two holes as end surfaces lies outside the volume of a cylinder defined by the aperture and extending perpendicularly down and out of the lower cavity from the wall. This ensures that the retaining members, when held in the at least one set of two spaced apart holes, do not engage the upper pipe of the extension spindle but only the at least one radially extending lug.

[0033] The retaining member and the at least one set of two spaced apart holes may be dimensioned so that the retaining member is held in the at least one set of two spaced apart holes by interference fit.

[0034] The shortest perpendicular distance between the mantle surface of a cylinder having the two holes as end surfaces and the wall should be larger than the thickness of the at least one radially extending lug such that the at least one radially extending lug may fit between the wall and the retaining element and such that retaining element may engage the underside of the at least one radially extending lug.

[0035] As the lower cavity is preferably cuboid having a rectangular horizontal cross section the at least one radially extending lug is prevented from rotating out of engagement with the retaining member by contact with the walls of the long sides of the rectangular cross section corresponding to the long sides of the cuboid.

[0036] The preferred embodiment of the street cover according to the first aspect of the present invention as defined in claim 2 is advantageous as two sets of two spaced apart holes and two retaining members provide a more secure retaining of the attachment portion in the lower cavity. As the radially extending lugs are placed opposite to each other the two sets of two spaced apart holes should be positioned on opposite side of the aperture.

[0037] The preferred embodiment of the street cover according to the first aspect of the present invention as defined in claim 3 is advantageous it defines a kit ready for being connected to an extension spindle.

[0038] The preferred embodiment of the street cover according to the first aspect of the present invention as defined in claim 4 is advantageous as it provides a suitable and effective shape for the retaining member. The cylindrical body is preferably circular cylindrical. One end of the cylindrical body may be provided with an increased diameter for acting as a stop against the outer wall of the lower housing part around one of the holes of the at least one set of two spaced apart holes. Typically the length of the cylindrical body is twice the width of the cylindrical body or more.

The cylindrical body may further be shaped as a semi-cylinder. This has the advantage that depending on the rotational position of the cylindrical body in the at least one set of two spaced apart holes the distance between the aperture and the cylindrical body changes. Thus in one rotational position, in which the flat side of the cylin-

drical body is turned towards the axis of the aperture, the at least one radially extending lug of the attachment portion of the extension spindle may pass by the retaining member for insertion and removal of the attachment portion into or from the lower cavity. However in the opposite rotational position, in which the curved side of the cylindrical body is turned towards the axis of the aperture, the at least one radially extending lug of the attachment portion of the extension spindle cannot pass by the retaining member and is instead engaged by the retaining member for retaining the attachment portion in the lower cavity.

[0039] The preferred embodiment of the street cover according to the first aspect of the present invention as defined in claim 5 is advantageous as it simplifies inserting the retaining member in the at least one set of two spaced apart holes, and as it further increases, by the wedging action between the cylindrical body and the walls of the at least one set of two spaced apart hole, the force needed to remove the retaining member from the street cover. The taper is preferably a linear reduction in diameter along the cylindrical body. The narrowest end of the cylindrical body may further comprise a further reduction in diameter defined by a frustoconical portion for further assisting in guiding the cylindrical body into the at least one set of two spaced apart holes.

[0040] The preferred embodiment of the street cover according to the first aspect of the present invention as defined in claim 6 is advantageous as it allows the elongated flexible portion to be passed through the at least one set of two spaced apart holes in advance of the cylindrical body thereby allowing the cylindrical body to be pulled into the at least one set of two spaced apart holes by pulling on the free end of the elongated flexible member from outside the lower housing part. Furthermore, as the maximum width of the elongated flexible member is less than the minimum width of the cylindrical body the attachment portion of an extension spindle may be inserted into the lower cavity with the elongated flexible member already passed through the at least one set of two spaced apart holes to speed up connection of the street cover to the extension spindle.

[0041] The free end of the elongated flexible portion is the end opposite to the end connected to the cylindrical body. The elongated flexible portion is preferably connected to one of the end faces, and, where the cylindrical body is tapered, to the end face adjacent the narrowest end of the cylindrical body.

[0042] The preferred embodiment of the street cover according to the first aspect of the present invention as defined in claim 7 provide advantageous width and length ratios for the elongated flexible portion in relation to the cylindrical body. Preferably the width, length, and material used for the flexible elongated portion are such that the flexible elongated portion is at least partially rigid for helping steering the cylindrical body into the at least one set of two spaced apart holes.

[0043] The preferred embodiment of the street cover according to the first aspect of the present invention as

defined in claim 8 is advantageous as it makes it simple, by grasping and pulling the handle, to pull the cylindrical body into the at least one set of two spaced apart holes.

[0044] The handle may for example be a loop or a T-shaped handle. The handle is preferably formed integrally with the elongated flexible portion and attached to the end of the elongated flexible portion that is not connected to the cylindrical body.

[0045] The preferred embodiment of the street cover according to the first aspect of the present invention as defined in claim 9 is advantageous as it provides the possibility of supplying the street cover with the at least one retaining member already assembled therewith. The handle may be deformable by being made of a deformable material such as an elastic material. An elastic material has the advantage of resuming the non-deformed state once it has passed through the at least one set of two spaced apart holes for preventing the retaining member of falling out of the at least one set of two spaced apart holes. Alternatively a bendable material such as a metal may be used. In this case the handle must be bent back into the non-deformed state after passing through the at least one set of two spaced apart holes for preventing the retaining member of falling out of the at least one set of two spaced apart holes. Preferably the handle is shaped as a loop whereby the loop may be compressed into an elliptic shape for passing through the at least one set of two spaced apart holes. Alternatively the handle may be T-shaped where the upper arms of the T-shape are bent to pass through the at least one set of two spaced apart holes.

[0046] The handle passes through the at least one set of two spaced apart holes by having, in the deformed state, a maximum dimension smaller than the inner diameter of each of the two spaced apart holes of the at least one set of two spaced apart holes.

[0047] It is further contemplated within the context of the present invention that the handle may be passed through the at least one set of two spaced apart holes by being turned or twisted so as to present a smaller maximum dimension to the two spaced apart holes of the at least one set of two spaced apart holes.

[0048] The preferred embodiment of the street cover according to the first aspect of the present invention as defined in claim 10 is advantageous as it provides for supplying the street cover with the at least one retaining member already assembled therewith and in the receiving position meaning that the street cover can be directly connected to the extension spindle. As the elongated flexible portion is thinner than the cylindrical body it can be bypassed, when the retaining member is in the receiving position, by bending or being pushed to the side or by not engaging the at least one radially extending lug at all. However, in the retaining position the cylindrical body engages the at least one radially extending lug. This decreases the time needed for installing the street cover on the extension spindle and prevents that the retaining member is lost.

[0049] When the handle and the cylindrical body are outside the lower cavity part they may be outside the lower housing, or alternatively part of one of them may be within the at least one set of two spaced apart holes. In the retaining position the handle and the elongated flexible portion are positioned outside the lower housing part.

[0050] The preferred embodiment of the street cover according to the first aspect of the present invention as defined in claim 11 is advantageous as it provides a retaining member which can be wedged into the at least one set of two spaced apart holes. Provided that the retaining member has a diameter larger than at least one of the two holes of the at least one set of two spaced apart holes it will be locally deformed by the contact between the walls of the hole or holes when it has been received and held by the at least one set of two spaced apart holes. This local deformation causes an interference fit between the at least one set of two spaced apart holes and the retaining member which increases the force needed to remove the retaining member from the at least one set of two spaced apart holes. This increases the security of the connection between the extension spindle and the street cover.

[0051] The elastic material is preferably an elastomeric material, more preferably an elastomeric mouldable plastic, for example a thermoplastic polyurethane elastomer. One preferred material is IROGRAN® A 95 H 4678 supplied by Huntsman Corporation.

[0052] The preferred embodiment of the street cover according to the first aspect of the present invention as defined in claim 12 is advantageous as it provides a retaining member which is simple and economical to mass produce. Preferably the material used for moulding the retaining member is a plastic or a rubber as these materials, when used in thinner details such as the elongated flexible portion, render these details flexible enough to be deflected or pushed aside by the at least one radially extending lug of the extension spindle, yet when used in greater thicknesses, such as in the cylindrical body, render the cylindrical body sufficiently rigid to engage and retain the at least one radially extending lug of the extension spindle.

[0053] At least one of the above objects, or at least one of the further objects which will be evident from the below description of the present invention, is according to a second aspect of the present invention achieved by method as defined in claim 13. The method provides an easy way or connecting a street cover to an extension spindle that may be used with extension spindles of different types. The inserting and positioning steps may be performed by hand.

[0054] A preferred embodiment of the method according to the second aspect of the present invention is defined in claim 14. By having the at least one retaining member already assembled with the street cover in the receiving position the time needed for connecting the street cover to the extension spindle is further reduced.

The method may further comprise rotating the attachment portion back and forth in relation to the street cover to assist in deflecting the elongated flexible portion.

[0055] The invention and its many advantages will be described in more detail below with reference to the accompanying schematic drawings, which for the purpose of illustration show some non-limiting embodiments, and in which:

Fig. 1 shows different views of the upper part of a telescopic extension spindle having an attachment portion of the "Hawle" type,

Fig. 2 shows different views of a first embodiment of a street cover according to the first aspect of the present invention,

Fig. 3 shows different views of a first embodiment of a retaining member for use with the first embodiment of the street cover according to the first aspect of the present invention,

Fig. 4 shows different views the first embodiment of the retaining member (two of them) mounted in the first embodiment of the street cover according to the first aspect of the present invention, the retaining members being placed in a receiving position for receiving the attachment portion of the telescopic extension spindle shown in fig. 1,

Fig. 5 shows different views of the telescopic extension spindle shown in fig. 1 being connected with the first embodiment of the street cover according to the first aspect of the present invention and the first embodiment of the retaining member (two of them), the retaining members being placed in the receiving position,

Fig. 6 shows different views of the telescopic extension spindle shown in fig. 1 being connected with the first embodiment of the street cover according to the first aspect of the present invention and the first embodiment of the retaining member (two of them), the retaining members having been placed into a retaining position for retaining the telescopic extension spindle in connection with the embodiment of the street cover according to the first aspect of the present invention,

Fig. 7 shows different views of first embodiments of a cover assembly for use with the first embodiment of the street cover according to the first aspect of the present invention, and

Fig. 8 shows, in cross section, the first embodiment of the street cover according to the first aspect of the present invention used with other types of telescopic extension spindles.

[0056] In the below description, one or more 'signs added to a reference number indicate that the element referred to has the same or similar function as the element designated the reference number without the 'sign, however, differing in structure.

[0057] Additionally, where useful for discussing two or more identical elements, a subscript Arabic numeral is used to designate such further identical elements.

[0058] When further embodiments of the invention are shown in the figures, the elements which are new, in relation to earlier shown embodiments, have new reference numbers, while elements previously shown are referenced as stated above. Elements which are identical in the different embodiments have been given the same reference numerals and no further explanations of these elements will be given.

[0059] Fig. 1A-F shows different views of the upper part of a telescopic extension spindle 10 having an attachment portion 12 of the "Hawle" type. The attachment portion 12 comprises a bushing 14 connected to an upper outer pipe 16 and comprising a bearing 18 for an upper inner pipe 20 having an upper end defined by a tool part 22 for being engaged by a tool for turning the upper inner pipe, and thereby turning a lower inner pipe (not shown) for operating a valve spindle (not shown) of a valve (not shown). The attachment portion 12 further comprises first and second radially extending lugs 24 and 26. As explained above the dimensions of the lugs 24 and 26 are different for different types of telescopic extension spindles 10. Regarding the "AKV" and "Esco" telescopic extension spindles these are of similar design to the "Hawle" type shown in fig. 1, however the dimensions of the first and second lugs 24 and 26 for these other types differ in that the lugs of the "AVK" type are thinner and are not tapered as the lugs 24 and 26 shown in fig. 1, and that the lugs of the "Esco" type are shorter, see fig. 8B and 8C.

[0060] Fig. 2A-F shows different views of a first embodiment of a street cover 50 according to the first aspect of the present invention. The street cover 50 comprises an upper housing part 52 having an upper lip 54 for being placed flush with a ground surface. The upper housing part 52 defines an upper cavity 56, seen in fig 2D and 2F, for housing the tool part 22 of the telescopic extension spindle 10. The upper cavity 56 further comprises an upper shoulder 58 for providing a supporting surface for the cover shown in fig. 7 and defining an undercut 60 for cooperating with the cover shown in fig 7.

[0061] The street cover 50 further comprises a lower housing part 62 defining a lower cavity 64, shown in figs 2C and 2E, the lower cavity 64 being generally cuboidly shaped for accommodating the attachment portion 12 of the telescopic extension spindle 10 including the radially extending lugs 24 and 26 thereof. An aperture 66 connects the upper and lower cavities 56 and 64 for allowing the tool part 22 to pass through the lower cavity 64 into the upper cavity 56. The wall 68 separating the upper cavity 56 from the lower cavity 64 surrounding the aperture 66 defines a seat for bearing against the upper side

of the first and second radially extending lugs 24 and 26.

[0062] For retaining the attachment portion 12 of the telescopic extension spindle 10 within the lower cavity 64, first and second sets of two spaced apart holes 70 and 72, being transversal to the aperture 66 and positioned on opposite sides of the aperture 66, are provided in the wall of the lower housing part 62 for receiving the retaining member shown in fig. 3. The axis of the first and second sets of two spaced apart holes 70 and 72 is spaced apart from the surface of the wall 68 such that the retaining member shown in fig. 3, when mounted in the first and second sets of spaced apart holes 70 and 72, engage the underside of the first and second radially extending lugs 24 and 26 of the telescopic extension spindle 10, thereby retaining the attachment portion 12 within the lower cavity 64.

[0063] Fig. 3A-D shows different views of a first embodiment of a retaining member 100 for use with the first embodiment of the street cover 50 according to the first aspect of the present invention. The retaining member 100 comprises a tapered cylindrical body 102 having a wide end 104 and a narrow end 106, the narrow end transitioning into a frustoconical portion 108 attached to a narrow elongated flexible portion 110 terminating in a T-handle 112. The retaining member 100 is made of an elastomeric plastic and the diameter of the tapered cylindrical body 102 at least at the wide end 104 is larger than the diameter of the first and second sets of two spaced apart holes 70 and 72. This causes the tapered cylindrical body 102 to be compressed and pinched by the material of the lower housing part 62 surrounding the corresponding one of the first and second sets of two spaced apart holes 70 and 72 when the retaining member 100 is installed in the street cover 50 as shown in fig. 6. This causes an increased friction between the tapered cylindrical body 102 and the lower housing part 62 preventing the spontaneous movement of tapered cylindrical body 100 out of position. The retaining member 100 shown in fig. 3 may have a diameter at the wide end of for example 20.3 mm, a diameter at the narrow end of for example 19.3 mm, and be used with first and second sets of two spaced apart holes 70, 72 having a diameter of 19.5 mm. The smallest diameter of the frustoconical portion 108 may for example be 15.8 mm, and the purpose of the frustoconical portion 108 is to help guide the tapered cylindrical body 102 into the corresponding one of the first and second sets of two spaced apart holes 70 and 72.

[0064] The material used for the retaining member 100 and the width of the T-handle 112 and the narrow elongated flexible portion 110 are chosen such that the T-handle 112 may be pushed through a corresponding one of the first and second sets of two spaced apart holes 70 and 72 to pre-positioning the retaining member 100 into a receiving position relative to the street cover 50 as shown in fig. 4, and so that the narrow elongated flexible portion 110, when the retaining member 100 is positioned in the receiving position, can be pushed to the side al-

lowing the lugs 24 and 26 of an attachment portion 12 to pass them by as the attachment portion 12 enters the lower cavity 64 as shown in fig. 5. A suitable width is 4 mm and a suitable material is IROGRAN(R) A 95 H 4678 thermoplastic polyurethane elastomer supplied by the Huntsman Corporation. The total length of the retaining member 100 may for example be about 150 mm of which the tapered cylindrical body may make up about 60 mm. In addition a large difference in diameter between the narrow elongated flexible portion 110 and the diameter of the corresponding one of the first and second sets of two spaced apart holes 70, 72, aids in allowing the narrow elongated flexible portion 110 to be pushed to the side by the lugs 24 and 26 of the attachment portion 12.

[0065] Fig. 4 shows different views the first embodiment of the retaining member 100, of which there are two shown -the second one being designated the reference numeral 100₁, mounted in the first embodiment of the street cover 50 according to the first aspect of the present invention, the retaining members 100 and 100₁ being placed in a receiving position for receiving the attachment portion 12 of the telescopic extension spindle 10 shown in fig. 1.

[0066] The retaining members 100 and 100₁ have been attached to the street cover 50 by bending and pushing the T-handles 112 and 112₁ through the first and second sets of two spaced apart holes 70 and 72. In the receiving position part of the narrow elongated flexible portions 110 and 110₁ are positioned within and span the lower cavity 64 and the tapered cylindrical bodies 102 and 102₁ are positioned outside the lower cavity 64.

[0067] In fig. 4E only some of the visible parts of the retaining members 100 and 100₁ have been given their reference numbers for clarity.

[0068] Fig. 5 shows different views of the telescopic extension spindle 10 shown in fig. 1 being connected with the first embodiment of the street cover 50 according to the first aspect of the present invention, the retaining members 100 and 100₁ being placed in the receiving position.

[0069] The attachment portion 12 of the telescopic extension spindle 10 has been pushed into the lower cavity 64 whereby the first and second radially extending lugs 24 and 26 have pushed past the narrow elongated flexible portions 110 and 110₁ to become positioned against the wall 68.

[0070] In fig. 5E only some of the visible parts of the retaining members 100 and 100₁ have been given their reference numbers for clarity.

[0071] Fig. 6 shows different views of the telescopic extension spindle 10 shown in fig. 1 being connected with the first embodiment of the street cover 50 according to the first aspect of the present invention, the retaining members 100 and 100₁ being placed in a retaining position for retaining the telescopic extension spindle 10 in connection with the first embodiment of the street cover 50 according to the first aspect of the present invention.

[0072] The retaining members 100 and 100₁ have

been placed in the retaining position by pulling the T-handles 112 and 112₁ until the tapered cylindrical bodies 102 and 102₁ have become firmly seated and wedged in the first and second sets of two spaced apart holes 70 and 72. In this position the tapered cylindrical bodies 102 and 102₁ engage, by contacting, the underside of the first and second lugs 24 and 26 thereby confining the attachment portion 12 with the lugs 24 and 26 within the lower cavity 64. As the lower cavity 64 is cuboidly shaped the attachment portion 12 is prevented from turning due to the lugs 24 and 26 engaging the wall of the lower housing part 62.

[0073] In fig. 6E only some of the visible parts of the retaining members 100 and 100₁ have been given their reference numbers for clarity.

[0074] As shown above the street cover 50 can be securely connected to the telescopic extension spindle 10 of the "Hawle" typ. However, as the lugs of the "AVK" type only differ by being thinner and are not tapered, and as the lugs of the "Esco" type only differ by being shorter, both of the other types of extension spindle can be securely connected to the street cover 50, see figure 8. By dimensioning the lower cavity 64 to fit the extension spindle having the longest, widest and thickest lugs 24 and 26, other types of telescopic extension spindles having shorter, narrower and/or thinner lugs can still be securely connected to the street cover 50, provided of course that the lugs of these other types telescopic extension spindles at least extend far enough radially to be engaged by at least one of the retaining member 100 and 100.

[0075] Fig. 7 shows different views of first embodiments of a cover assembly 150 for use with the first embodiment of the street cover 50 according to the first aspect of the present invention. The cover assembly closes the upper cavity 56 of the street cover 50 by being inserted into the upper cavity 56 and resting on the upper shoulder 58.

[0076] The cover assembly 150 comprises a metal cover plate 152, seen in figs. 7C, 7D, 7E and 7F having an outer side 154, seen in figs. 7D and 7F, and an inner side 156, seen in figs 7C and 7E. The cover plate 152 has an aperture 158 for receiving a tool such as a lever for removing the cover assembly.

[0077] The cover assembly 150 further comprises a gasket 160 into which the cover plate 152 is inserted. The gasket 160 comprises sidewall 162, a sealing wall 164, a skirt 166, and a plurality of locking fingers 168 positioned around the circumference of the skirt 166. The sidewall 162 is dimensioned to form a seal against the wall of the upper cavity 56 while the sealing wall rests on, and forms a seal to, the upper shoulder 58. The skirt 166 has a first diameter and the maximum diameter of the circle formed by the locking fingers 168 is greater than this first diameter. When the cover assembly 150 is used with the street cover 50 the cover assembly 150 is pushed into the upper cavity 56 with the locking fingers 168 first. While passing the upper shoulder 58 the locking fingers are initially bent towards the centre of the gasket

160 before returning to an unbent state when the locking fingers 168 have reached the undercut 60 in the upper housing part 52 of the street cover 50 thus locking the gasket 160 in the street cover 50.

[0078] The upper side 170 of the gasket 160 further comprises a groove 172 for receiving a filling material for increasing the strength of the connection between the cover plate 152 and the gasket 160, see figs. 7D and 7F.

[0079] Fig. 8 shows, in cross section, the first embodiment of the street cover 50 according to the first aspect of the present invention used with different types of telescopic extension spindles. In fig. 8A the street cover 50 is used with the "Hawle" type telescopic extension spindle 10 having the first and second radially extending lugs 24 and 26 as shown in fig. 6. In fig. 8B the street cover 50 is used with the "AKV" type telescopic extension spindle 10' having thinner first and second lugs 24' and 26'. In fig. 8C the street cover 50 is used with the "Esco" type telescopic extension spindle 10" having shorter first and second lugs 24" and 26".

[0080] As can be seen from fig. 8 the street cover can be used all three of these types of telescopic extension spindles.

[0081] Although the figures show the street cover 50 being used with a telescopic extension spindle 10 it can also be used with non-telescopic extension spindles provided that the non-telescopic extension spindle has an attachment portion comprising radially extending lugs.

List of parts with reference to the figures:

10. Telescopic extension spindle
12. Attachment portion
14. Bushing
16. Upper outer pipe
18. Bearing
20. Upper inner pipe
22. Tool part
24. First radially extending lug
26. Second radially extending lug
50. Street cover
52. Upper housing part
54. Upper lip
56. Upper cavity
58. Upper shoulder
60. Undercut
62. Lower housing part
64. Lower cavity
66. Aperture
68. Wall defining a seat

(continued)

70. First set of two spaced apart holes
72. Second set of two spaced apart holes
100. Retaining member
102. Tapered cylindrical body
104. Wide end
106. Narrow end
108. Frustoconical portion
110. Elongated flexible portion
112. T-handle
150. Cover assembly
152. Cover plate
154. Outer side
156. Inner side
158. Aperture
160. Gasket
162. Sidewall
164. Sealing wall
166. Skirt
168. Locking finger
170. Upper side
172. Groove

Claims

1. A street cover (50) for an extension spindle (10), said extension spindle (10) comprising an attachment portion (12) comprising at least one radially extending lug (24,26), said extension spindle (10) further comprising a tool part (22) spaced apart from said at least one radially extending lug (24), said street cover (50) comprising:

an upper housing part (52) defining an upper cavity (56) for housing said tool part (22) of said extension spindle (10), said upper cavity (56) being closeable by a cover assembly (150), and, a lower housing part (62) defining a lower cavity (64) for receiving said attachment portion (12) and said at least one radially extending lug (24, 26), said lower cavity (64) and said upper cavity (56) being separated from each other by a wall (68), at least part of said wall (68) defining a seat for engaging the upper side of said at least one radially extending lug (24, 26), said wall (68) comprising an aperture (66) for admitting said tool part (22) into said upper cavity (56), said

lower housing part (62) further comprising at least one set of two spaced apart holes (70, 72) for receiving and holding a retaining member (100), said at least one set of two spaced apart holes (70, 72) being positioned such that said retaining member (100) engages the underside of said at least one radially extending lug (24, 26) for retaining said attachment portion (12) in said lower cavity (64).

2. The street cover (50) according to claim 1, said attachment portion (12) of said extension spindle (10) comprising two opposite radially extending lugs (24,26), at least part of said wall (68) defining a seat for engaging the upper side of said two radially extending lugs (24, 26), and said lower housing part (62) comprising two sets of two spaced apart holes (70, 72) for receiving and holding a corresponding one of two retaining members (100, 100₁), said two sets of two spaced apart holes (70, 72) being positioned such that each of said retaining members (100, 100₁) engages the underside of a corresponding one of said two opposite radially extending lugs (24, 26) for retaining said attachment portion (12) in said lower cavity (64).
3. The street cover (50) according to any preceding claim, further comprising at least one of said retaining members (100, 100₁).
4. The street cover (50) according to claim 3, said at least one retaining member (100) comprising a cylindrical body (102) configured for being receivable and holdable by said at least one set of two spaced apart holes (70, 72).
5. The street cover (50) according to claim 4, said cylindrical body (102) being tapered for allowing said cylindrical body (102) to be wedged into said at least one set of two spaced apart holes (70, 72).
6. The street cover (50) according to any of the claims 4-5, said at least one retaining member (100) further comprising an elongated flexible portion (110) connected to said cylindrical body (102) for pulling said cylindrical body (102) into said at least one set of two spaced apart holes (70, 72), said elongated flexible portion (110) having a maximum width that is smaller than the minimum width of said cylindrical body (102) and a length that is larger than the length of said cylindrical body (102).
7. The street cover (50) according to claim 6, said elongated flexible portion (110) having a maximum width that is 1/2 to 1/5 of the minimum width of said cylindrical body (102) and a length that is 11/10 to 3/1 of said length of said cylindrical body (102).

8. The street cover (50) according to any of the claim 6-7, said at least one retaining member (100) comprising a handle (112) connected to said elongated flexible portion (110).
9. The street cover (50) according to claim 8, said handle (112) being deformable from a non-deformed state, in which said handle (112) cannot pass through said at least one set of two spaced apart holes (70, 72), into a deformed state, in which said handle (112) can pass through said at least one set of two spaced apart holes (70, 72).
10. The street cover (50) according to claim 9, said at least one retaining member (100) being assembled with said street cover (50) and positioned in a receiving position in which said handle (112) and said cylindrical body (102) are outside said lower cavity (64) and said elongated flexible portion (110) spans at least part of said lower cavity (64) by passing through said at least one set of two spaced apart holes (70, 72), said retaining member (100) being positionable in a retaining position, in which said cylindrical body (102) spans at least part of said lower cavity (64) for engaging said underside of said at least one radially extending lug (24, 26) by being received and retained in said at least one set of two spaced apart holes (70, 72), by pulling said handle (112).
11. The street cover (50) according to any of the claims 3-10, said at least one retaining member (100) being made from an elastomeric material.
12. The street cover (50) according to any of the claims 3-11, said at least one retaining member (100) being made in one piece through moulding.
13. A method of connecting a street cover (50) to an extension spindle (10) comprising the steps of:
- providing an extension spindle (10) comprising an attachment portion (12) comprising at least one radially extending lug (24, 26), said extension spindle (10) further comprising a tool part (22) spaced apart from said at least one radially extending lug (24, 26),
- providing a street cover (50) according to any of the claims 3-12,
- inserting said attachment portion (12) into said lower cavity (64) such that said tool part (22) enters said upper cavity (56) through said aperture (66) and the upper side of said at least one radially extending lug (24, 26) engages said wall (68), and
- positioning said retaining member (100) for being received and retained by said at least one set of two spaced apart holes (70, 72) for engaging the underside of said at least one radially

extending lug (24, 26) for retaining said attachment portion (12) in said lower cavity (64).

14. The method according to claim 13,
- said providing of said street cover (50) comprising providing a street cover (50) according to claim 10, said inserting of said attachment portion (12) into said lower cavity (64) comprising deflecting said elongated flexible portion (110) of said at least one retaining member (100) with said at least one radially extending lug (24, 26) until said at least one radially extending lug (24, 26) passes said elongated flexible portion (110) into a position between said wall (68) and said elongated flexible portion (110), and said positioning of said retaining member (100) comprising positioning said retaining member (100) in said retaining position, in which said cylindrical body (102) spans at least part of said lower cavity (64) for engaging said underside of said at least one radially extending lug (24, 26) by being received and retained in said at least one set of two spaced apart holes (70, 72), by pulling said handle (112).

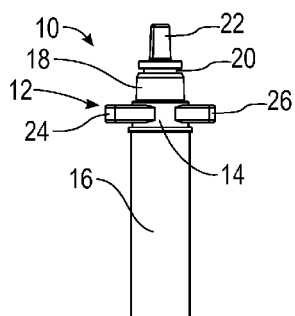


FIG. 1A
(PRIOR ART)

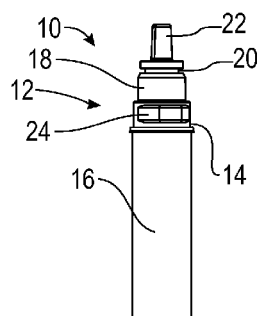


FIG. 1B
(PRIOR ART)

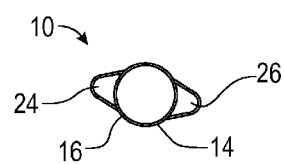


FIG. 1C
(PRIOR ART)

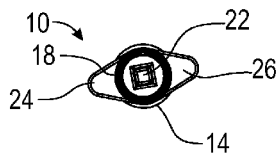


FIG. 1D
(PRIOR ART)

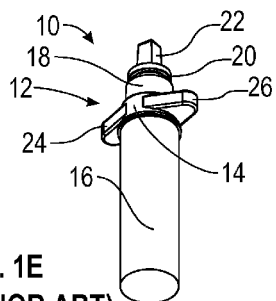


FIG. 1E
(PRIOR ART)

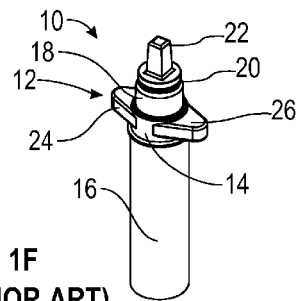


FIG. 1F
(PRIOR ART)

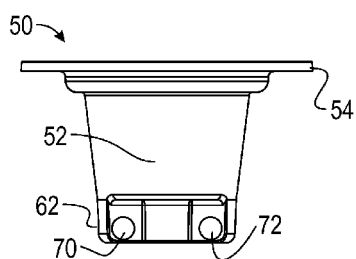


FIG. 2A

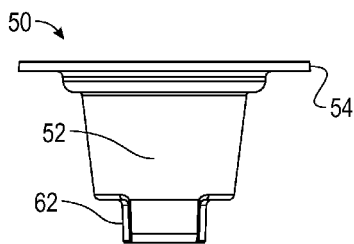


FIG. 2B

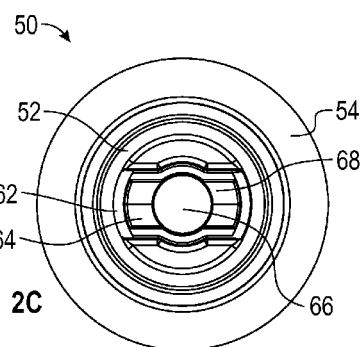


FIG. 2C

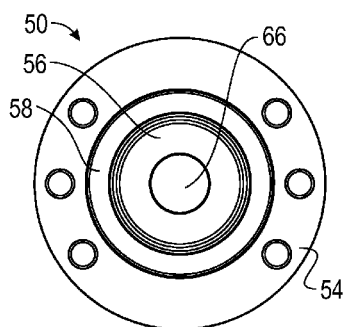


FIG. 2D

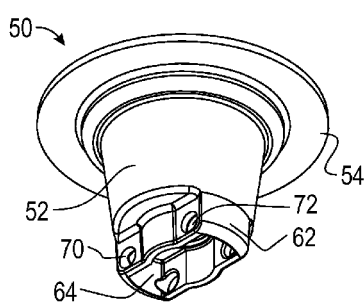


FIG. 2E

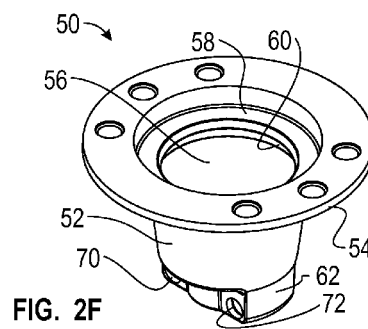


FIG. 2F

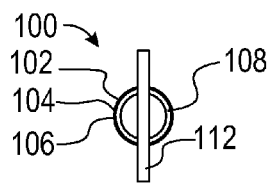


FIG. 3A

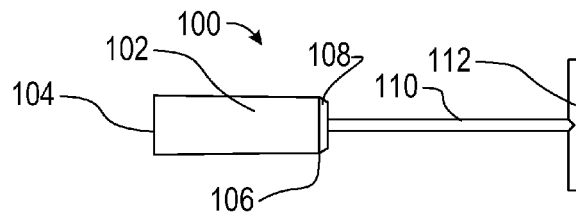


FIG. 3B

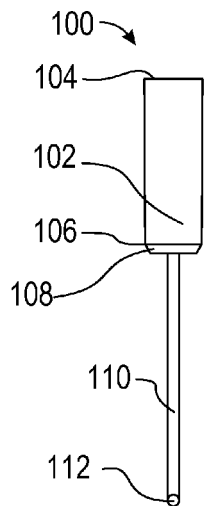


FIG. 3C

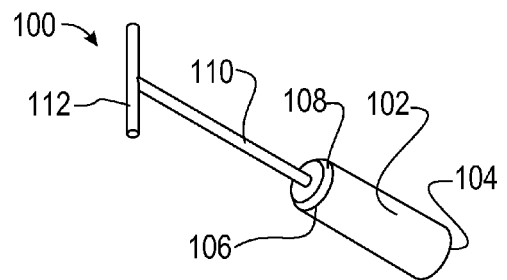
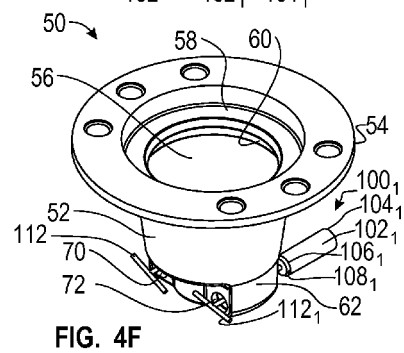
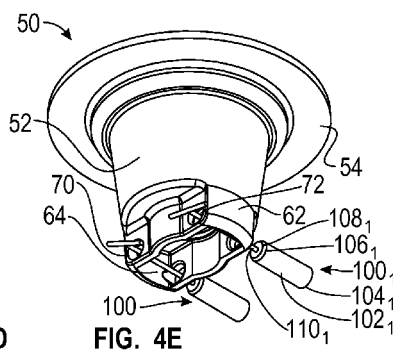
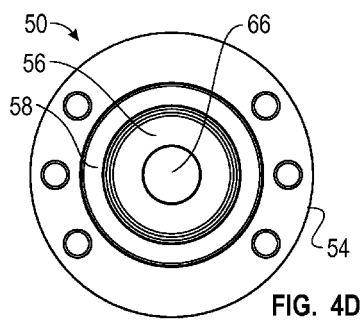
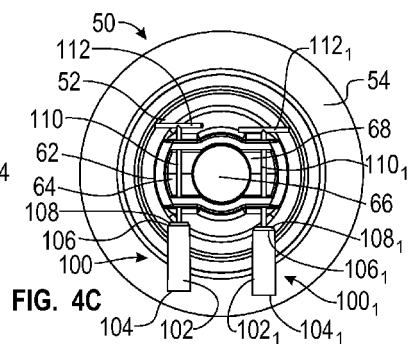
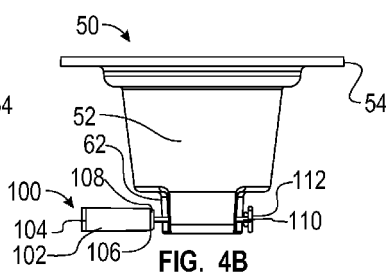
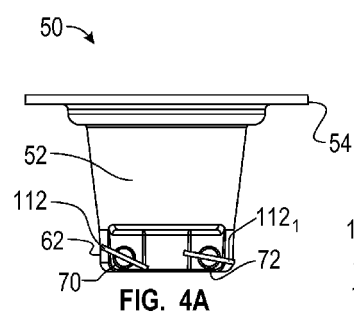
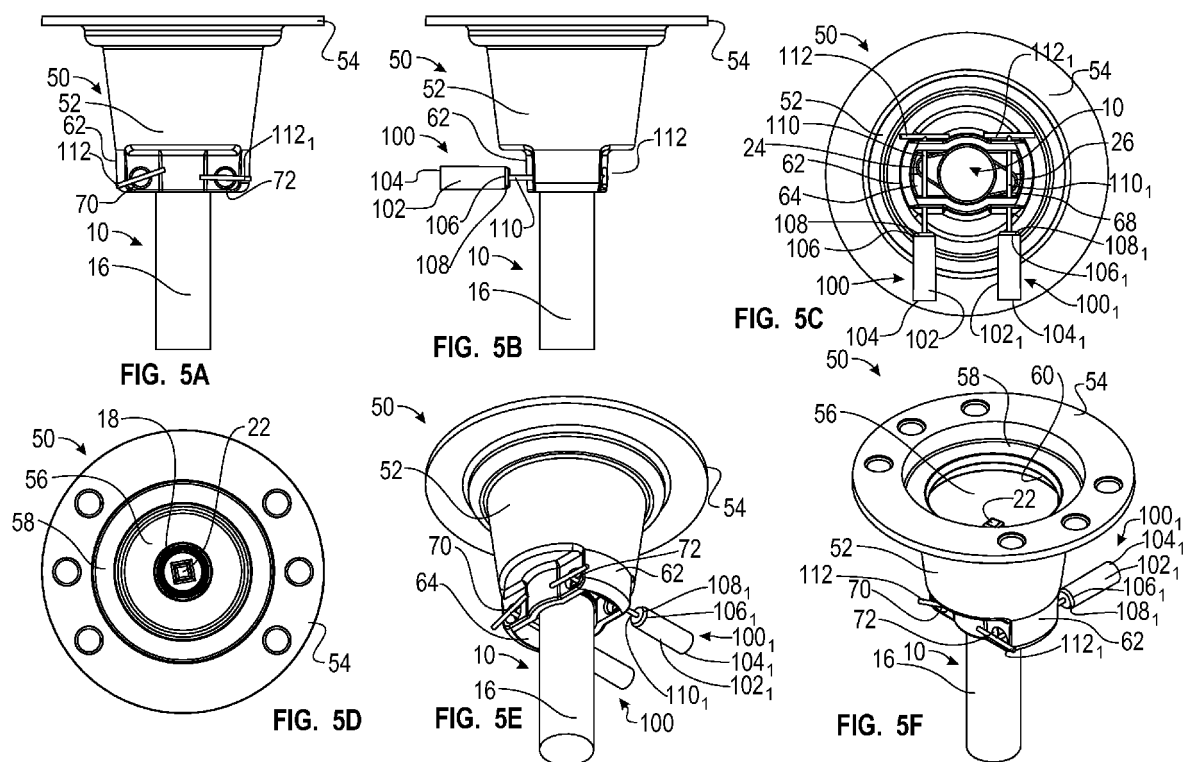


FIG. 3D





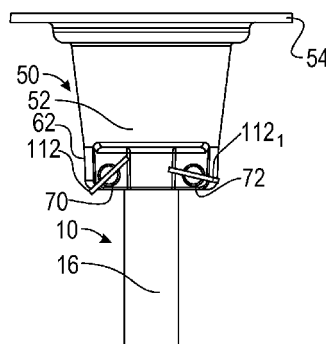


FIG. 6A

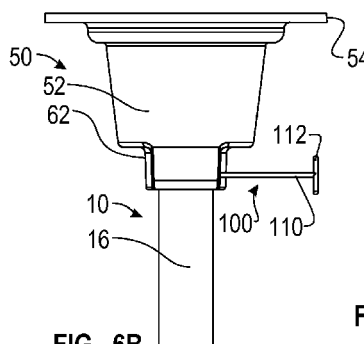


FIG. 6B

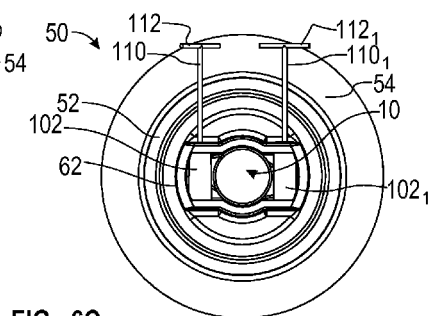


FIG. 6C

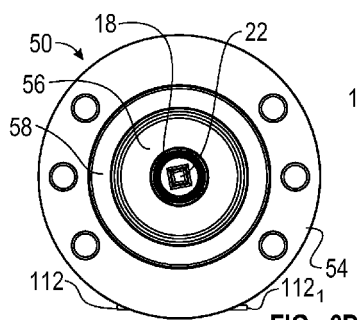


FIG. 6D

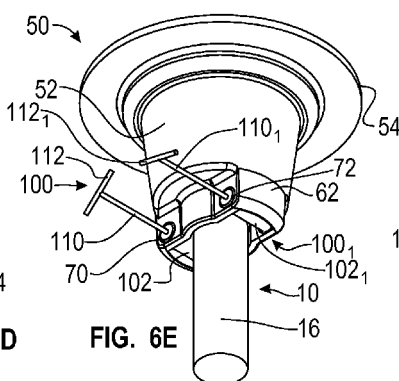


FIG. 6E

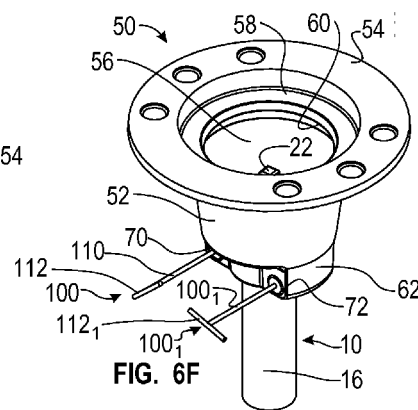


FIG. 6F

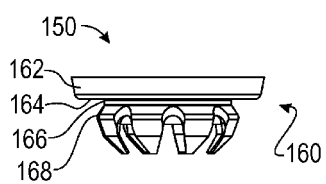


FIG. 7A

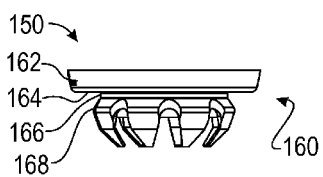


FIG. 7B

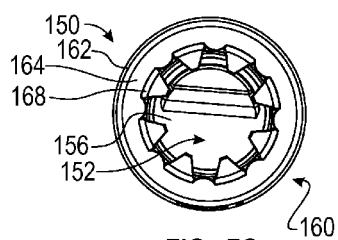


FIG. 7C

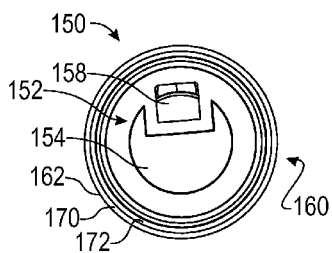


FIG. 7D

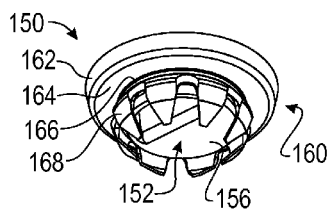


FIG. 7E

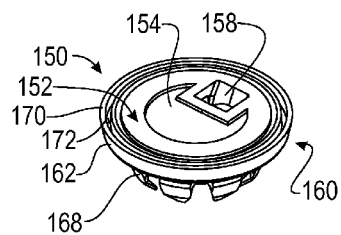


FIG. 7F

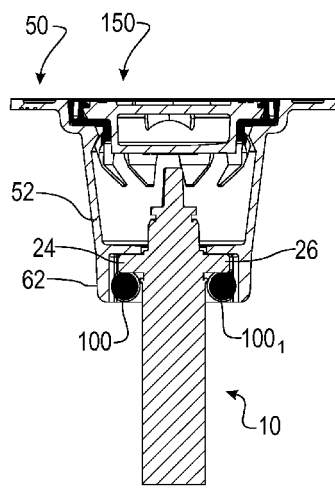


FIG. 8A

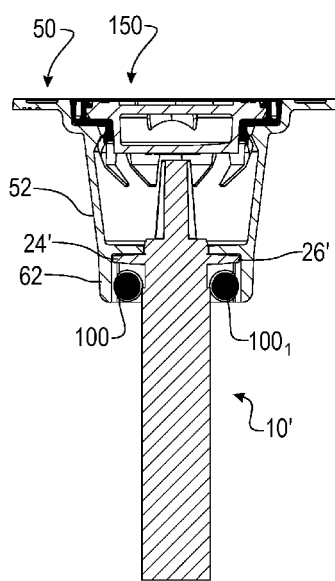


FIG. 8B

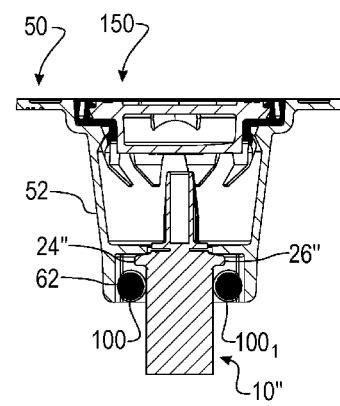


FIG. 8C



EUROPEAN SEARCH REPORT

Application Number
EP 15 19 1283

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DOCUMENTS CONSIDERED TO BE RELEVANT			
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A	DE 295 20 957 U1 (FEIT JOSEF [DE]) 23 May 1996 (1996-05-23) * the whole document *	1-14	INV. E03B9/10 E02D29/14
A	DE 20 2007 012131 U1 (HAWLE ARMATUREN GMBH [DE]) 22 November 2007 (2007-11-22) * the whole document *	1-14	
A	CZ 14 033 U1 (PETR VORECHOVSKY [CZ]) 14 April 2004 (2004-04-14) * figures 1-3 *	1-14	
A	DE 93 07 362 U1 (BÜ-SCH ARMATUREN [DE]) 15 July 1993 (1993-07-15) * the whole document *	1-14	
			TECHNICAL FIELDS SEARCHED (IPC)
			E03B E02D
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 9 March 2016	Examiner Horst, Werner
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 1
EPO FORM 1503 03/02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 15 19 1283

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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09-03-2016

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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CZ 14033 U1	14-04-2004	NONE	
DE 9307362 U1	15-07-1993	NONE	

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

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