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Title: above ground drainage fitting and system, method of making such fitting and kit for assembling a customised above ground drainage fitting, and elements thereof

Description

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Field of the invention

This invention relates to above ground drainage systems. More specific, this invention relates to kits for assembling a customised above ground drainage fitting, customized above ground drainage fittings, above ground drainage systems and methods of assembling customised above ground drainage fittings.

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Background of the invention

Installers of above ground drainage systems in all types of building, but particularly high-rise, multiple-occupancy and large non-housing developments, are often faced with complex installation problems to solve. The problems can for example be a lack of verticality in the soil stack; the need to route pipework around unforeseen structural elements and changes experienced during development. This means that installers need to react quickly to situations whilst having access to a plethora of injection moulded fittings, often at very short notice. Accordingly, this requires a large range of injection moulded fittings to be in stock. However, although several hundred fitting types are common, quite often not all are in stock. In addition, the number of different fitting types is limited, and accordingly the installer obliged to use a fitting of a type that is suboptimal to the specific situation and problem.

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It is found by the inventors of the present invention, that a fundamental problem in addressing the above is that in the manufacturing of plastic fittings of above ground drainage systems each type of injection moulded fitting requires a dedicated mould to makes the fitting.

FIG.1 illustrates a typical mix of branch fittings including, from top left to bottom right: a Single 87.5° branch with a boss socket, a 45° branch, a 87.5° branch with five boss sockets, a double 87.5° branch double socket, a 87.5° corner branch, a single 87.5° branch with access, a single 87.5° branch double socket, a manifold, a bossed pipe double socket, a bossed pipe single socket and a bossed access pipe. Already for such a set of rather common fittings, eleven large moulds are required to manufacture this group of fittings.

To make a mould requires a significant capital expense, and hence the total number of different moulds is limited. In addition, for each type of fitting, the moulding process itself is only viable in case a large number of fittings is produced in a production run. Accordingly, the

manufacturing process of the fittings cannot be quickly adapted to produce a small number of out of stock fittings or to produce a fitting which addresses a specific need.

Summary of the invention

5 The present invention provides a kit for assembling a customised above ground drainage fitting of a desired type, a base element, an add-on element, an above ground drainage fitting, an above ground drainage system and a method of manufacturing above ground drainage fitting as described in the accompanying claims.

Specific embodiments of the invention are set forth in the dependent claims.

10 These and other aspects of the invention will be apparent from and elucidated with reference to the embodiments described hereinafter.

Brief description of the drawings

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

FIG. 1 schematically shows side-views of examples of above ground drainage fittings.

20 FIG. 2 schematically shows a side-view of an example of a kit for a customized above ground drainage fitting.

FIG. 3 schematically shows in A a cross-sectional side-view of an example of an embodiment of a base element on which the examples of FIG. 2 can be mounted in its original state, and in B a side-view of the example in a intermediate state of a process of customisation.

25 FIG. 4 schematically shows a cross-sectional view, corresponding to the dash-dotted line in FIG. 3A, illustrating demarcated regions suitable to be provided on the example of FIG. 3.

FIG. 5 schematically shows side-views of examples of an embodiments of add-on socket elements suitable to be mounted on the base element of the example of FIG. 3 in the demarcated regions 24 at the open ends of the base element.

30 FIG. 6 schematically shows side-views of examples of an embodiments of add-on socket elements suitable to be mounted on the base element of the example of FIG. 3.

FIG. 7 schematically shows a cross-sectional side view of a snap-fit connector suitable to mount an add-on element to a base element.

FIG. 8 schematically shows a perspective view of an example of an embodiment of an above ground drainage fitting.

FIG. 9 schematically shows a perspective view of a selection of elements out of a kit from which the example of FIG. 8 can be assembled.

FIG. 10 schematically shows side views A-I of customized above ground drainage fittings assembled to form a kit.

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Detailed description of the preferred embodiments

Details will not be explained in any greater extent than that considered necessary for the understanding and appreciation of the underlying concepts of the present invention and in order not to obfuscate or distract from the teachings of the present invention.

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To resolve the above-mentioned problem that manufacturing each different type of fitting requires a single, dedicated, and often large, mould, in the embodiments a plastic base element 20 is used, which is common to the different types of fittings. The base element 20 can be assembled with multiple plastic add-on elements 30 to give the fitting its finished functionality and make a desired type of fitting. With a single type of base element common to various type of fittings, together with a range of, e.g. smaller, add-on elements an exponentially wider range of types of finished fittings can be manufactured, without requiring a large number of different moulds. In particular, when the base element and/or the add-on elements are (injection) moulded, a relatively small number of different moulds allows to manufacture a relatively large number of types of fittings.

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For instance, already with add-on elements of a single type, various types of fittings can be produced by assembling those on the base element. For example, with a single type of socket add-on element, various type of fittings such as a coupler and T- and cross-couplers, the latter either with single or multiple sockets per branch, can be assembled. Thus, the same number of types of fittings can be made with a significantly smaller number of moulds, or vice versa, with the same number of moulds an exponentially, larger number of different types of fittings can be manufactured. In addition, the base element and add-on elements allow to assemble a desired type of fitting in a short period of time, and accordingly provide flexibility in the manufacturing of the fittings.

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FIG.2 shows an example of a base element 20 and types of add-on elements that can be used to assemble any of the above ground drainage fittings shown in Fig 1 in a custom-made manner, for example by the plumbing installer, by a competent person in a merchant branch or by a fabricator. In FIG. 2, an example of a kit 2 is schematically shown which can be used to assemble a customised above ground drainage fitting of a desired type. The kit 2 comprises a plastic base

element 20 and a set 3 of plastic add-on elements 30. As mentioned, the elements 20, 30 may be moulded, for example injection moulded and be of a suitable material, such as plastic.

The add-on elements 30 can be used to assemble the desired type of above ground drainage fitting, more specifically by mounting on the base element 20 in selected demarcated regions 24 a selection of add-on elements 30 selected from the set 3 based on the desired type of above ground drainage fitting. Each add-on element 30 of the set 3 comprises an add-on body 31 mountable on the tubular body 21 of the base element 20 to seal off, in an at least liquid tight manner, an opening 293 (not shown in FIG. 2) in a respective demarcated region 24. Each add-on element 30 further comprises an add-on passage 32 extending through the add-on body 31, from a base element side of the add-on body 31 to an exterior side of the add-on body 31, for providing access to the drainage flow channel 22 via the opening. It will be apparent that the base element side refers to the side which (when the add-on element is correctly mounted in the selected demarcated region 24) is facing towards the base element and located at the base element side of the passage. The exterior side refers to the side which then faces away from the base element, towards the exterior of the fitting. In the examples, when mounted the base-element side abuts to the outer wall of the base element and defines partly the interior of the base element. In the examples, the exterior side faces in a direction opposite to the base-side, and as shown, when mounted the exterior side lies exposed to the exterior of the fitting.

The set 3 may comprise other add-on elements additionally or alternatively to those of the shown set and may comprise more or less elements than shown in FIG. 2. In this example, though, the set 3 comprises the following add-on elements 30:

303 is a 90° branch add-on element which allows to add to the flow-channel through the base element a branch perpendicular to the main flow through the base element,

304 is an extension socket add-on element which can be used to add to an open end 210 of the base element 20 a socket to e.g. mount another fitting or a pipe not branching off the main flow, but extending the main flow channel;

305 is a single socket add-on element which can be used to add to the base element 20 a single socket extending in the same direction and not parallel to the main flow,

306 is a double socket add-on element which can be used to add to the base element 20 two sockets extending in the same direction and not parallel to the main flow,

307 is a 45° branch add-on element which allows to add to the flow-channel through the base element 20 a branch at an acute angle to the main flow through the base element 20 (in this example the angle is 45° but other acute angles may be used as well), and

308 is an access branch add-on element, which allows to add to the base element 20 a branch via the drainage flow channel inside the base element 20 can be visually and/or physically accessed, e.g. for inspection or maintenance.

In this list, the angles refer to the angle between the respective branch and the direction of the main flow through the base element.

In the example shown in FIG. 2, the kit 1 further comprises a lid 4 for closing-off the access branch add-on element 308 in an at least liquid-tight manner.

With the example of FIG. 2, instead of eleven different moulds, a base element and six types of add-on elements allow to manufacture the eleven types of FIG. 1, and many other types of fittings. For instance, the base element could be provided with the add-on elements numbered 303, 307 and 308 to create a bespoke, a-symmetric double branch fitting with an access branch, in this example with a first branch at 90° and a second branch at 45°, relative to the flow direction in the base element. With the add-on elements 30 a large number of other fitting types may be configured as well, such as, bends, reducers, bossed pipes, sockets, manifolds and ancillary fittings, just to name a few examples.

As will be explained below, depending on the type of add-on passage 32, the selected add-on element 30, when mounted on the base element 20, allows to transform the base element 21 into a desired type of customized above ground drainage fitting. Such an above ground drainage fitting can be an above ground soil drainage fitting. In this respect, a soil system is designed to carry soiled water from the toilet, urinal or bidet to the sewer, whereas a waste system carries water from sinks, shower, washing machine or bath. Parts of a soil drainage system, such as pipes and fittings therefore have to meet specific requirements to transport the soiled liquids. For example, the pipes and fittings have to resist aggressive compounds and microbiological contaminants from human excretions. Furthermore, the liquids in the system also contain solid particles that have to be transported without clogging the tubing. Also, the pipes and fitting have to contain the sewage gasses that may result from the bodily fluids reacting with e.g. water or air, and from the microbiological processes in the soiled liquid in the system and inhibit those from escaping inside the building.

The base element 2 can be implemented in any manner suitable for the specific implementation. Now referring to FIG. 3, the shown example of a base element 20 comprises a tubular body 21 through which a drainage flow channel 22 for drainage liquid extends. For example, the drainage flow channel 22 can be unbranched, and may have a single inlet, e.g. inlet opening 27, for receiving a drainage liquid into the drainage flow channel 22, and a single discharge, e.g.

discharge opening 28 for discharging the drainage liquid from the drainage flow channel 22. Thereby, the base element can be usable in a large variety of fittings. The drainage flow channel 22 can be straight, and the tubular body 21 be a straight tube. This provides a shape that is usable in a large variety of fittings.

5 The drainage flow channel 22 is defined by the tube wall of the tubular body 21. In this example, the tube wall is the outer wall of the tubular body 21 and exposed outer surface of the tube wall 29 has the same shape as the internal surface of the tube wall 29 (which delimits and defines the main flow channel). In the example both are cylindrical with the same type of cylinder base and more specifically they are circle cylindrical but alternatively they may e.g. be elliptical
10 cylinders or have another, but the same, type of cylinder base. As e.g. apparent from FIG. 3, local, that is in the longitudinal and/or tangential direction of the tube, variations in tube diameter and/or wall thickness may be possible. As mentioned, the cylinders may have or consist of straight and/or curved cylinder segments.

 The tubular body 21 has an outside 23 provided with one, or more than one, visibly
15 demarcated region(s) 24 which indicate regions where the add-on elements are to be mounted and which allow to provide, or provided with, an entrance 240 to the drainage flow channel. The visibly demarcated region(s) 24 is/are demarcated during manufacturing and accordingly the end-product, that is the base element 20, has the demarcated region before it is shipped from the manufacturing site.

20 The opening 293 is formed in the demarcated region 24 by a cut-out of the tube wall of the tubular body 21, such that in a limited area of the tubular body 21 the material of the wall is completely absent. In the tangential direction of the tube the cut-out is limited, that is the cut-out extends over an angular range, from the axis of the tube, of less than 360 degrees, preferably 180 degrees or less, and more preferably over 90 degrees or less, even more preferably over 45 degrees
25 or less, such that the structural integrity of the tubular body 21 is not noticeably less than that of a body 21 without openings 293.

 The cut-out can be created e.g. during manufacturing of the tube wall 29 and forming the tubular body 21, e.g. by leaving material out, e.g. during moulding or post-manufacturing, for instance by removing material from the tube wall 29, such as by cutting or punching.

30 As is apparent from e.g. FIG.3 or FIGs. 8 and 9, the add-on element contacts the tube wall 29 of the tubular body 21, with the contact surface between the add-on element and the tube wall 29 enclosing the opening 293. The contact surface can for example comprise a closed loop around the opening 293, e.g. at the exposed outside of the wall 29 and/or inside the tube against the inside surface of the wall, for instance.

When the add-on element is correctly mounted, the base-element side covers this opening, with the base-element side facing the drainage flow channel 22 and forming the tube wall in the opening 293. The add-on element 30 may thus be regarded as a patch which covers the opening 293. Preferably, this patch is sealed to the tube wall around the opening 293, and thus is used to seal-off the opening 293. The patch, that is the add-on element 30, may be provided with elements to provide, through the add-on element 30, access to the main flow channel, e.g. to provide a branch flow channel or to provide an inspection branch, for example.

Preferably but not necessarily, the base-element side of the add-on element 30 is bent like the cut-out part of the tube wall 29, thereby providing a liquid flow surface for the main flow channel which forms, at least adjacent to the perimeter of the opening 293, in the opening 293 a continuation of the inside surface of the tube wall 29. This allows to reduce the disruptions to the main flow channel caused by mounting an add-on element to the plastic base element 20.

In this example, in the original state in which the base element 20 has been formed, e.g. has been moulded, some of the entrances are closed. More specifically, the regions 24 provided on the sides of the tubular body 21 are closed, whereas demarcated regions 24 at the ends 210 are open. Alternatively, as FIG. 8 illustrates, the base element can be manufactured with the demarcated region 24 at the sides of the tubular body 21 already open. For instance, the base element 2 can be moulded with the respective opening 293 present. Alternatively, the tubular body can initially be without openings in the outer wall 29 of the tubular body 21, and the opening e.g. be made by punching out a corresponding part of the outer wall 29 as part of, and during, the manufacturing process of the base element 20.

For the closed entrances, the demarcated region 24 is demarcated to indicate a region where the material of the tubular body 21 may be removed, e.g. be cut or punched out, to create an opening 293 to the inside of the tubular body 21 during assembling of the desired type of fitting from the elements 20, 30 of the kit 2. In FIG. 3 B, for example, the base element 20 is shown with the demarcated region(s) 24 at the right-hand side and left-hand side opened, e.g. to by the plumbing installer, by a competent person in a merchant branch or by a fabricator. The entrance 240', 240'' in those regions are thus opened, and base element in the corresponding demarcated regions provided with the opening 293, after manufacturing of the base element 20 customise the base element and to form it into a customised above-ground drainage fitting.

Still referring to FIG. 3, in this example, the tubular body 21 has opposite open ends 210 of which a liquid inlet side end 25 is provided with an inlet opening 27 for receiving a drainage liquid, and a liquid outlet side end 26 with a discharge opening 28 for discharging the drainage liquid. The drainage flow channel 22 extends in a flow-direction D between the inlet opening 27 and the

discharge opening 28. The tubular body 21 extends between both ends. In this example, the tubular body 21 has an outside 23 formed by the exposed outer surface of the outer wall 29 of the tubular body 21. The inside surface of the outer wall 29 defines the inside, and in this example defines the drainage flow channel 22, which therefore has a tubular shape as well.

5 One or more of the open ends 210 can be unrestricted, i.e. there is no constriction of the drainage flow in or out of the drainage flow channel 22 at that end. In this example, liquid inlet side end 25 and the liquid outlet side end 26 are unrestricted. More specific, in this example at the unrestricted ends the base element 20 does not have a wall which extends radially inwards from the inside surface that could provide such a restriction. At the open end, the inside surface of the
10 outer wall 29 thus extends parallel to the drainage flow direction. The inside diameter of the outer wall may be constant over the length of the tubular body 21. Alternatively, at a distance from the ends 25,26, e.g. at a distance equal or larger than at least $\frac{1}{2}$ times the diameter of the ends, the outer wall may exhibit an increase in inside diameter, as illustrated respectively in FIGs. 3 or a decrease, as in the example of FIG. 8 and 9. This allows to strengthen the tubular body 2 to be
15 sufficiently strong to mount the add-on elements 30.

The outside diameter of the outer wall 29, and optionally thickness thereof, may also be constant over the length of the tubular body 21. Alternatively, at a distance from the ends 25,26, e.g. equal or large than at least $\frac{1}{2}$ the diameter of the ends, the outer wall may exhibit an increase or a decrease in outside diameter, as illustrated respectively in FIGs. 3 and 8, and optionally an
20 increase in thickness This allows to strengthen the tubular body 2 to be sufficiently strong to mount the add-on elements 30.

The tubular body 21 may be provided with any number of visibly demarcated regions 24 at any location on the outer wall suitable to mount an add-on element 30. The tubular body 21 may e.g. comprise at least two non-overlapping demarcated regions 24, as is illustrated in FIG. 3.

25 The demarcated regions 24 can for instance be located at the open ends 25,26 of the tubular body 21, and for example enclose the open ends, to mount an add-on element which seals-off the open end 210 but which through the add-on passage 32 provides an entrance 240. E.g. in this example the entrance 240 is to the axial ends of the tubular flow-channel. Thus, the add-on elements 30 is mountable on the end to have the passage 32 in the axial (i.e. in this example in the
30 direction D) prolongation of the drainage flow channel 22.

The tubular body 21 can for example be socket-less at one or both of the axial ends. In this example, for instance, the inside of the outer wall 29 of the tubular body 21 is unprofiled at the open ends 210, and without one or more of bellings, threading or sealing rings typically present in plastic pipe sockets to hold and seal a connection between the socket and a spigot inserted therein.

In (i.e. over the inside surface of the outer wall but not between the inside surface and the outside surface), or over the outside surface of the outer wall 29, a suitable add-on socket element 304 can be provided and mounted. Therefore, the fitting can be customised to have a selected type of connection with a pipe at both ends 25, 26, and for example a push-fit, rotating joint, solvent weld, fusion weld or ultrasonic weld socket element 304 be mounted at the end which is compatible with the type of pipe to be connected to the fitting 1. The socket element 304 may e.g. provide a socket for a pipe of diameter similar to that of the channel 22 or a smaller diameter to the socketless end. In the latter case, the passage 32 may be narrower than the channel 22 and have that smaller diameter, for instance.

Alternatively or additionally, side demarcated region(s) 24 may be provided on the side of the tubular body 21, which e.g. enclose a part of the outer wall 29. For example, several regions 24 may be provided distributed circumferentially around the outer wall, e.g. equidistant. The side demarcated region(s) 24 may in the axial direction be at the same position or be distributed over a helical path over the outer wall, for instance. With a side demarcated region 24, an entrance 240 to the inside of the tubular body 21 and to the drainage flow channel 22 through the outer wall 29 can be sealed by a plastic, moulded, add-on branch element 30, for example.

As illustrated in FIG. 6, branches, either for liquid and/or gas flow into or out of the drainage flow channel or for temporary inspection or maintenance access, can be provided by a suitable branch add-on element 303-309 mounted in a demarcated region 24, 24', 24'' on the side of the body 21 to seal-off the open entrance 240. Furthermore, as illustrated in FIG. 3, the outer wall 29 can be, except for the entrances 240 that are open, closed between the axial, open ends 25, 26 of the tubular body 21. The tubular body then forms a single, unbranched flow channel, which can be transformed into a branched fitting by adding in one or more demarcated regions on the sides a number and type of add-on element corresponding to the desired type of branched fitting.

As further shown in FIG. 3, the tubular body 21 can be provided with a larger demarcated region 24' for providing, or provided with, a larger entrance 240' and a smaller demarcated region 24'' within the larger demarcated region 24', for providing, or provided with, a smaller entrance 240''. As illustrated in FIG. 2, the set 3 may then comprise a first type of add-on elements 301 with an add-on body 31 mountable on the tubular body 21 of the base element 20 to seal off the larger entrance 240'. The set may comprise a second type of add-on element 302 with an add-on body 31 mountable on the tubular body 21 of the base element 20 to seal off the smaller entrance 240'', but not the larger entrance 240'. Also, in one, or more than one, of the larger demarcated regions 24' at least two smaller demarcated regions 24'' can lie.

The demarcated region 24 may be provided in any suitable manner. Now referring to FIG. 4, the outer wall may be provided with a physical structure which demarcates the region and, optionally, which is itself visible. For example, the tubular body 21 may comprise a local weakening 291 of the outer wall 29 corresponding to the location of the visible marking, e.g. a groove or a locally weakened pattern such as weakened by laser ablation. The marking can also be formed by or comprise a ridge 292 on the outer wall 29 which encloses the region 24. Such a ridge can strengthen the outer wall e.g. to facilitate cutting or otherwise removing the material in the demarcated region 24, or just provide a visible demarcation. A ridge can be moulded together with the tubular body 21 and accordingly allows to provide the marking without requiring extra manufacturing steps.

Alternatively, or additionally, e.g. other visible markings may be used. For example, the outer wall 29 may be provided with a visible marking printed thereon which defines a closed demarcated region 24 in which the entrance 240 is closed-off from the exterior of the tubular body 21 by the outer wall 29. Alternatively, or additionally, as illustrated in FIGs. 8 and 9, the tubular body 21 can have an outer wall 29 provided with an opening 293, where the opening forms a respective demarcated region 24 and the edge of the outer wall which encloses the opening is a visible marking.

The demarcated region 24 may have any suitable shape. For example, one, or more than one, such as all of the demarcated regions 24 on the outer wall 29 can be oblong, such as in the examples of FIG. 3 and of FIGs. 7-8, where the regions 24 are respectively ovals and rounded rectangles. In case the demarcated region 24 is located at a side of the tubular body 21, an oblong shape facilitates correct orientation of the add-on element when mounting. In the example of FIG. 4, e.g. the demarcated region 24 at the axial end is circular. As shown in the example of FIG. 3, the visible marking can enclose the demarcated region 24, i.e. have a shape of which the outer edge is a closed curve, such as a circle or an oblong shape like a (rounded) rectangle, or oval.

Also shown in FIG. 4 is that the flow channel 22 through the base element 20 has a circular cross-section and the flow channel has a circle cylindrical shape. The wall 29 of the tubular body 21 is thus shaped as the wall of a pipe segment, in this example a straight segment but alternatively this may be a bend. In the demarcated regions 24, the pipe is provided with cut-outs which constitute the openings 293. The base-element side of the add-on element 30, when correctly mounted then forms a patch which covers the inside of the pipe. Said differently, in the opening 293 the shape of the flow-channel through the pipe segment, for the liquid flow from one of the pipe-ends 25,26 to the opposite pipe-end, is determined by the base-element side of the add-on element 30. E.g. in the examples of FIG. 5, the side of the flange 33 facing the inside of the pipe

segment, for example, determines the shape of the flow-channel. In this respect, the flow-channel is the original flow-channel through the pipe segment, without the optional branches provided by the add-on elements taken into account.

As illustrated in FIG 6, the set 3 of add-on elements 30 may comprise any suitable type of add-on element 30, and in any suitable number. The set 3 may for example comprise two or more, five or more, ten or more different types of add-on elements 30, each type connectable to the entrance 240 to provide a different, additional function to the drainage flow channel, additional to that of the base element. For example, the set 3 may comprise one, or more than one, branch elements selected from the group consisting of:

- a branch connector 303 which provides a branch flow, e.g. as illustrated in FIG. 6 A;
- an angled branch connector 307 which provides a branch flow not parallel and not perpendicular to the drainage flow, e.g. as illustrated in FIG. 6 B;
- a socket connector 304 which allows to mount a pipe, as illustrated in FIG. 2;
- a single socket connector 305, e.g. as illustrated in FIG. 6 E;
- a multiple socket connector 306, e.g. as illustrated in FIG. 6 D;
- a covering element 309, e.g. as illustrated in FIG. 8, which covers the entrance 240 and may be non-destructively removable to allow temporary access to the inside of the tubular body 21 through the entrance 240 in the outer wall.

The covering element can be mountable on the base element 20 to completely cover the entrance 240 in a selected demarcated region 24, i.e. without a passage. The covering element can then be attachable to the tubular body 21 to seal-off and close-off the entrance 240 in an at least liquid tight manner.

Additionally, or alternatively, as illustrated in FIG. 2, the set 3 may comprise one, or more than one, socket element 304 mountable on the open end 210 of the tubular body, such as selected from the group consisting of: socket, reducer.

However, as illustrated in Fig. 5, other types of add-on elements 30 may likewise be present in the set 3. For example, the desired fitting may have an access branch 308 as illustrated in FIG. 6 C. In such a case, in one, or more than one, of the add-on elements 30 of the set 3, one, or more than one, such as all, add-on passages 32 may have an access opening 39 at the exterior side 311.

The access opening provides an access through which the drainage flow channel 22 can be visually and/or physically accessed from the exterior for inspection and/or maintenance of the drainage flow channel 22. In such a case, as shown in FIG. 6 C the kit 2 can further comprise a lid 4 for closing-off the access opening 39 in an at least liquid-tight manner. In case, e.g., the fitting is for soil

drainage, the lid 4 may close-off the access opening 39 in a gas-tight manner. This allows to avoid unpleased odours, i.e. drain odours, from escaping from the fitting.

The add-on element 30 may be implemented in any manner suitable for the specific implementation, and the add-on elements 30 may be of any type suitable for the specific type of fitting. For example, as illustrated in FIG. 6 A, B, D and E in one, or more than one, of the add-on elements 30 of the set 3 the add-on passage 32 may form, when the add-on element 30 is mounted on the base element 20, an added fluid flow channel 35 for a branch flow 36 into, or out of, the drainage flow channel 22. The branch flow 36 may have a branch flow direction B non-parallel to a flow-direction D in the drainage flow channel 22. The branch flow direction B can for example be at angle relative with the flow-direction selected from the group consisting of: 5°, 15°, 30°, 45°, 67.5°, 76°, 87.5°, 90°.

At least one of the add-on elements 30 may be a socket element 304 mountable on an axial end of the tubular body, as illustrated in FIGs. 5 a-d. The add-on element 30 can e.g. form when mounted on the end a spigot or a socket for another above ground drainage fitting 10 or above ground drainage pipe 11. In this respect, the add-on passage 32 on the socket element 304 may have the same diameter as the drainage flow channel 22 and thus present a prolongation thereof. Alternatively, the passage may have a smaller diameter (e.g. 75% or less, such as 50% or less, e.g. 25% or less). In such a case the add-on passage 32 may form a constriction of the drainage flow channel 22. In such a case, the add-on socket element 304 may, as illustrated in FIGs. 5 a-b comprise a skirt which extends from the add-on body 31. The skirt fits into the respective end of the tubular body 21. Alternatively, the end of the tubular body 21 may fit into the skirt such that the skirt covers the end of the tubular body. The skirt and end of the tubular body 21 have in such a case a tight fit.

In FIG. 5 a, the socket element is a push-fit expansion of the base element 20 which allows to connect a pipe 11 with a push fit connection. In Fig. 5 b the socket element is a captive seal joint with a captive seal inside in which a spigot can be inserted and attached. FIG. 5c shows an ultrasonic weld or fusion weld connector, while FIG. 5d shows a solvent weld connector.

The add-on passage 32 may have the same diameter as the drainage flow channel 22. Alternatively, the add-on passage 32 can have a smaller diameter than the main drainage flow channel 22. For example, as illustrated in FIG. 6 A, the add-on passage 32 may for example have an inlet port 37, for receiving a fluid, and an outlet port 38 downstream of the inlet port for discharging the fluid. In the example of FIG. 5, the add-on body 31 has a base element-side 310 which when the add-on body 31 is mounted faces the tubular body 21 and an exterior side 311 which faces away from the tubular body 21. The base element side 310 is provided with a respective one of said ports, and the exterior side 311 with another one of said ports 37, 38. In case e.g. the added fluid flow

channel 35 mouths in the drainage flow channel 22, the base element side 310 may be provided with the outlet port. In case the added fluid flow channel 35 branches off from the drainage flow channel 22, and the branch flow 36 has a flow direction away from the flow-direction of the D, the base element side 310 may be provided with the inlet port 37.

5 As illustrated with multiple socket connector 306 in Fig. 6, one, or more than one, such as all, of the add-on elements 30 of the set 3 may comprise at least two add-on passages 32 extending through the add-on body 31. Each add-on passage 32 has a respective base element side opening.

 The add-on elements 30 may be mounted on the base element 20 in any manner suitable for the specific application. Preferably, but not necessarily, the mounting comprises releasably or non-releasably affixing the add-on element to the base element. Preferably, but not necessarily, the
10 add-on element 30 is not translationally movable relative to the base element 20 after the affixing. Depending on the specific implementation, after the affixing the orientation of the add-on element 30 may be fixated as well or still be changeable, in which case the add-on element 30 can e.g. be rotated. For instance, in the examples of FIG. 5 the add-on element is placed, e.g. slid in or over, at
15 the axial end of the tubular body 21 to make a fitting with a customised socket, and after placing can still be rotated around the longitudinal axis of the tubular body 21, until a permanent joint is formed between the add-on element and the tubular body 21.

 In the shown examples, the add-on element 30 contacts the tubular body 21 when mounted. However, in an alternative e.g. sealing rings may be provided between the add-on element and the
20 tubular body. The add-on element be pressed on the sealing ring to seal of the entrance 240, and the add-on element and the sealing ring subsequently be fixated in position relative to the base element. For example, the add-on element may be attached to the tubular body and thereby clamp the sealing ring between the body facing side of the add-on element and the tubular body.

 One, or more than one, of the add-on elements 30 may be attachable to the base element
25 20 in the demarcated region 24 by a snap-fit connection 400. Referring to FIG. 7, for example, the add-on element 30 may for example be provided with a deflecting part with a protruding part, e.g. with a hook shaped cross-section, which projects underneath the outer wall of the tubular body 21 in the perimeter 241 of the entrance 240. As further shown, the perimeter 241 may be provided with a local projection which projects to the inside of the body 21, behind which the hook-shape
30 can make a form-closed connection by elastically deflecting when moving over the local projection and subsequently returning, at least partially, to the non-deflected state.

 In addition, or alternatively, the base element 20 and the add-on elements 30 can be made of joinable materials, joinable to form a permanent joint 401, in the examples between the tubular-body and the add-on element 30, by for example welding, gluing, soldering brazing. Preferably but

not necessarily, the add-on element 30 is attachable by the snap-fit connection and after attaching the element 30 to the tubular body in the respective demarcated region 24, the permanent joint be formed in a contact area between the add-on element and the outer wall 29 of the tubular body 21. The permanent joint may for example be formed by solvent welding, ultrasonic welding, infrared welding, friction welding, heat fusion welding, adhesive bonding or another chemical
5 jointing method suitable for the materials of the add-on element and the base element. In this, for example, there may be some freedom of movement of the element 30 after attaching, which by the formation of the permanent joint is reduced or completely removed.

As illustrated in FIG. 6, 8 and 9, one, or more than one, of the add-on elements 30 may
10 comprise a flange 33 from which the add-on body 31 projects. The flange 33 closes off the opening 293, when mounted on the tubular body 21, and more specifically spans the distance between the perimeter 241 of the opening 293 and the add-on body 31. The flange 33 thus patches the opening 293 and seals the opening 293 off. The flange 33 may, as illustrated with the covering element 309 in FIG.8, be fully closed and seal-off the opening 293 and hence close the tube wall and block access
15 to the main flow channel. Alternatively, as for the other examples of add-on elements, the flange 33 may comprise one or more passages to provide, when the add-on element is mounted, branch entrances to the, main, flow channel through the tubular body 21.

The add-on element 30 may have a contact surface 34 which when mounted contacts the outer wall 29, and e.g. contacts the exposed outer surface of the outer wall and/or the inside of the
20 outer wall 29. As shown, the flange 33 may for example have a contact area 34 for contacting the tubular body 21 in at least in a perimeter 241 of the tubular body 21 which encloses the demarcated region 24. The contact surface conforms to a shape of the outside of the tubular body 21 in an area enclosing at least one of the demarcated regions, and in this example the contact area 34 has a shape conforming to the perimeter 241. The contact surface 34 conforms to the shape of the outer
25 wall 29, also referred to as the tube wall, in the perimeter 241. There is thus a, relatively, smooth transition between the part of the main flow-channel defined by the flange 33 and the parts of the outer wall 29 around the opening 293. The flow of liquid through the main flow channel is thus relatively undisturbed and not significantly impacted by mounting add-on elements 30 to the base element 20. The add-on element is attachable to the tubular body to seal the connection between
30 the drainage flow channel and the passage in an at least liquid-tight manner. For instance, a seal or a permanent joint may seal-off the interface between the contact surface 34 and the outer wall 29.

The flange 33 can have any shape suitable to seal-off the open entrance. For example, as shown the flange 33 may be oblong, or have a shape corresponding to the shape of a respective open end 210 of the tubular body 21, e.g. be circular with a diameter larger than the inner diameter

of the tube, e.g. equal or larger than the outer diameter of the tubular body. In the latter case, from the edge of the flange the skirt may extent, such that when the flange is placed against, or axially in front of, the open end, the skirt may cover the outer wall of the tubular body 21.

5 A customised above ground drainage fitting may be manufactured as follows. First, a desired type of above ground drainage fitting is established, and selected add-on elements 30, of the type and in the number required for the desired type may be selected out of a set 3 of add-on elements 30 of a kit 2, such as a kit described above. Each of the selected add-on elements 30 may be positioned onto the tubular body 21 of the base element 20 of the kit 2, with the base element side
10 opening 293 in a respective demarcated region 24 and the add-on passage 32 of the respective add-on element 30 in communication. Thus, when the add-on element 30 is mounted, the entrance 240 is formed by the opening 293 and the add-on passage 32 through the add-on body 31. Via the entrance 240, e.g. fluid may be discharged into the drainage flow channel 22, fluid may be received from the drainage flow channel 22, or visual or physical access to the channel 22 be provided for
15 maintenance or inspection of the channel 22. The positioned add-on elements 30 may be mounted on the tubular body 21 with the entrance 240 being sealed-off by the add-on element 30.

 The base elements 20 and add-on elements 30 may have been provided in any suitable manner at the start of this manufacturing. For example, prior to the positioning, finished base elements 20 and add-on elements 30 may have been received at a location different from a
20 manufacturing site where the plastic base element 20 and/or the add-on elements 30 have been moulded.

 Also, the add-on elements 30 may be mounted in any suitable manner. For example, the mounting may comprise fixating the selected add-on elements 30 in a position in respective demarcated regions 24 with the add-on passage 32 in communication with the drainage flow
25 channel 22, and liquid-tight sealing off an interface between the tubular body 21 and the fixated add-on elements 30. The method of may comprise: selecting on the base element 20 one, or more than one, such as all demarcated region 24 with a closed entrance 240 and removing the material of the tubular body 21 in the selected demarcated regions 24 to open the entrance 240. The add-on elements 30 may be mounted in those regions, e.g. after opening the entrance to seal them off
30 and provide the access to the drainage flow channel through the add-on passage 32.

 Referring to the examples of FIG. 10, the customized above ground drainage fittings A-I shown therein are all made with a base element 20 of a kit 2, which except for the example of FIG. 10 E are all the same. One, or more than one, add-on element 30 of the kit 2 have been attached to the base element 20. In one, or more than one, such as all demarcated regions 24 of the base

element 2, an open entrance 240 is provided. In those regions, the add-on element 30 seals-off the opening 293, with the add-on passage 32 in communication with the drainage flow channel 22 via the opening thus forming an entrance 240 to the drain flow channel 22. Thus, the add-on element 30 provides an additional function to the base element 20, which transforms the base element 20 into the desired type of fitting. As illustrated in FIG. 10, the fitting can for example be of the group consisting of: branch fitting, socket fitting, bossed fitting, access fitting, bend, reducer, manifold, ancillary fitting or a combination of one or more of such types.

More specifically in FIG. 10 A, the fitting is a double bossed branch fitting 101. The fitting 101 is made from a single base element 20 and three add-on elements 30. The add-on elements 30 are a 45° branch add-on element at the right-hand side, a 90° branch add-on element at the left-hand side and a multiple, in this example, double waste boss add-on element in the middle.

In FIG. 10 B, the fitting is an access branch fitting 102. The fitting 102 is made from a single base element and three add-on elements 30. The add-on elements 30 are a 90° branch add-on element at the right-hand side, a 45° branch add-on element at the left-hand side and an access branch in the middle.

In FIG. 10 C, the fitting is a double bossed branch fitting 103. The fitting 103 is made from a single base element and three add-on elements 30. The add-on elements 30 are a 45° branch add-on element at the right-hand side, a 45° branch add-on element at the left-hand side and a multiple, in this example, double waste boss add-on element in the middle.

In FIG. 10 D, the fitting is a bossed access fitting 104. The fitting 104 is made from a single base element and two add-on elements 30. The add-on elements 30 are a multiple, in this example, double waste boss add-on element 30 in the middle and an access branch at the right-hand side.

In FIG. 10 E, the fitting is an access bend fitting 105. The fitting 105 is made from a single base element and one add-on element 30. The add-on element 30 is an access branch.

In FIG. 10 F, the fitting is a socket fitting 106. The fitting 106 is made from a single base element without add-on elements 30.

In FIG. 10 G, the fitting is a reducer fitting 107. The fitting 107 is made from a single base element and one add-on element 30. The add-on elements 30 is a add-on element with a narrow passage, narrower than the flow channel in the base-element, which restricts the flow-channel at one of the open ends of the tubular body of the base-element 20.

In FIG. 10 H, the fitting is a manifold fitting 108. The fitting 108 is made from a single base element and three add-on elements 30. The add-on elements 30 comprise branch elements at the left-hand side and the right-hand side in this figure.

In FIG. 10 I, the fitting is a terminal fitting 109. The fitting 109 is made from a single base element and one add-on element 30. The add-on elements 30 here is a vent cowl cap but other terminal elements such as a balloon grating, weathering collar or air admittance valve could alternatively or additionally be provided. As shown, the add-on elements 30 closes off one of the open ends of the base-elements and thus provides a termination for the flow-channel through the base-element.

In the foregoing specification, the invention has been described with reference to specific examples of embodiments of the invention. It will, however, be evident that various modifications and changes may be made therein without departing from the scope of the invention as set forth in the appended claims, and that the embodiments are not intended to be limiting thereto.

For example, the plastic elements may be made of any plastic suitable for above ground drainage. Preferably but not necessarily, the plastic is suitable for injection moulding and the base element and/or add-on elements be injection moulded. For example, the elements may be manufactured from PVC-U; PVC-C; PP; Mineraally Reinforced PP, HDPE or ABS. However, other materials may be suitable as well.

Also, the set may contain add-on elements not needed for the desired type of fitting and contain a variety of different types of add-on elements from which desired ones may be selected in a quantity sufficient for the specific type of fitting.

Furthermore, the customised above ground drainage fitting may be manufactured, and a method be performed, in-situ, that is at a construction site or in a building where an above ground drainage system with the customised fitting is to be installed. For instance, a plumber installing such a system may manufacture a custom fitting when, and as needed during. Alternatively, the customised above ground drainage fitting may be manufactured, and the method be performed, off-site. For example, a wholesaler of fittings may manufacture the fitting, e.g. on a made to order basis, and then ship the custom fitting to the customer, which may for example be the plumber.

Also, the base and add-on elements may be manufactured to suit any pipe size used in the installation of above ground plastic drainage systems, including 32, 40, 50, 56, 75, 82, 90, 110, 125, 160, 200, 250 and 315mm.

Moreover, for example, the drainage flow channel 22 and/or the add-on passages 32 may be unbranched or be branched. Furthermore, the drainage flow channel 22 and/or the add-on passages 32 may be straight or bend.

Likewise, the add-on elements 30 can be manufactured, e.g. moulded, as separate from and not attached to the base element 20. However, alternatively they could have been manufactured in the same mould as the base element, e.g. movably attached thereto, or subsequently been

separated from the mould (and if attached from the base element) to be separate from and not attached to the base element.

Moreover, the terms "front," "back," "top," "bottom," "over," "under" and the like in the description and in the claims, if any, are used for descriptive purposes and not necessarily for
5 describing permanent relative positions. It is understood that the terms so used are interchangeable under appropriate circumstances such that the embodiments of the invention described herein are, for example, capable of operation in other orientations than those illustrated or otherwise described herein.

10 However, other modifications, variations and alternatives are also possible. The specifications and drawings are, accordingly, to be regarded in an illustrative rather than in a restrictive sense.

In the claims, any reference signs placed between parentheses shall not be construed as limiting the claim. The word 'comprising' does not exclude the presence of other elements or steps then those listed in a claim. Furthermore, the terms "a" or "an" as used herein, are defined as one,
15 or more than one. The same holds true for the use of definite articles. Unless stated otherwise, terms such as "first" and "second" are used to arbitrarily distinguish between the elements such terms describe. Thus, these terms are not necessarily intended to indicate temporal or other prioritization of such elements. The mere fact that certain measures are recited in mutually different claims does not indicate that a combination of these measures cannot be used to
20 advantage. The fact that certain measures are recited in combination in a claim, does not indicate that the measures cannot be used in isolation or be combined with other measures.

List of reference signs

	B	branch flow direction
25	D	flow-direction in the drainage flow channel.
	1	customised above ground drainage fitting
	2	kit
	3	set of add-on elements
30	4	lid
	10	other above ground drainage fitting
	11	above ground drainage pipe

	20	plastic moulded, base element
	21	tubular body
	22	drainage flow channel
	23	tubular body outside
5	24	demarcated region
	24'	larger demarcated region
	24''	smaller demarcated region
	25	discharge liquid inlet side end
	26	discharge liquid outlet side end
10	27	inlet opening
	28	discharge opening
	29	outer wall of the tubular body
	30	plastic, moulded, add-on element
15	31	add-on body
	32	add-on passage
	33	flange
	34	contact area
	35	added fluid flow channel
20	36	branch flow
	37	inlet port
	38	outlet port.
	39	access opening
25	101	double bossed branch
	102	access branch
	103	double bossed branch (alternative to 101)
	104	bossed access
	105	access bend
30	106	socket
	107	reducer
	108	manifold
	109	ancillary fitting

	210	open end
	240	entrance
	240'	larger entrance
5	240"	smaller entrance
	241	perimeter
	291	local weakening
	292	ridge
10	293	opening
	301	first add-on element
	302	second add-on element
	303	branch connector
15	304	socket connector
	305	single socket connector
	306	multiple socket connector
	307	angled branch connector
	308	access branch
20	309	covering element
	310	base element-side
	311	exterior side
	400	snap-fit connection
25	401	permanent joint

Claims

1. A kit for assembling a customised above ground drainage fitting of a desired type, comprising:
a plastic base element, comprising:

5 a tubular body through which a drainage flow channel for drainage liquid extends,
the tubular body having an outside with at least one visibly demarcated region for
providing, or provided with, an entrance to the drainage flow channel;

a set of plastic add-on elements which are separate from and not attached to the base
element, for assembling the fitting by mounting on the base element a selection of add-on
10 elements selected from the set based on the desired type, in which set each add-on
element comprises:

an add-on body mountable on the tubular body of the base element to seal off, in
an at least liquid tight manner, the entrance;

15 an add-on passage extending through the add-on body, from a base element-side of
the add-on body to an exterior side of the add-on body facing away from the base
element-side, for providing access to the drainage flow channel through the add-on
body.

2. The kit of claim 1, wherein in at least one of the add-on elements of the set:

20 the add-on passage forms, when the add-on element is mounted on the base element, an
added fluid flow channel for a branch flow into, or out of, the drainage flow channel; and
the add-on passage comprises an inlet port and an outlet port, the base element-side being
provided with a respective one of said ports and the exterior side with another one of said
ports.

25

3. The kit of claim 2, wherein the branch flow has a branch flow direction non-parallel to a flow-
direction in the drainage flow channel.

4. The kit of claim 3, wherein the branch flow direction is at an angle relative to the flow-
30 direction in the drainage flow channel selected from the group consisting of: 5°, 15°, 30°, 45°,
67.5°, 76°, 87.5°, 90°.

5. The kit of one or more of claims 2-4, wherein the add-on passage has the same diameter as
the drainage flow channel.

6. The kit of one or more of claims 2-4, wherein the add-on passage has a smaller diameter than the man drainage flow channel.

7. The kit of one or more of the preceding claims, wherein at least one of the add-on elements of the set comprises at least two add-on passages extending through the add-on body, each add-on passage having a respective base element-side opening.

8. The kit of one or more of the preceding claims, wherein in at least one of the add-on elements of the set:

at least one add-on passage has an access opening at the exterior side, for providing an access through which the drainage flow channel can be visually and/or physically accessed from the exterior for inspection and/or maintenance of the drainage flow channel, and the kit further comprises a lid for closing-off the access opening in an at least liquid-tight manner.

9. The kit of claim 8, wherein the lid is for closing-off the access opening in a gas-tight manner.

10. The kit of one or more of the preceding claims, wherein:

at least one of the add-on elements comprises:

a flange for closing off the entrance, the flange having a contact area for contacting the tubular body in at least in a perimeter of the tubular body which encloses the demarcated region, the contact area having a shape conforming to the perimeter; and

the add-on body projects from the flange.

11. The kit of claim 10, wherein in at least one of the add-on elements the flange is oblong.

12. The kit of claim 10 or 11, wherein in at least one of the add-on elements the flange has a shape corresponding to the shape of a respective open end of the tubular body.

13. The kit of one or more of the preceding claims, wherein the drainage flow channel is unbranched and comprises:

an inlet opening for receiving a drainage liquid into the drainage flow channel, and

a discharge opening for discharging the drainage liquid from the drainage flow channel.

14. The kit of claim 13, wherein the tubular body extends from a discharge liquid inlet side end with the inlet opening to a discharge liquid outlet side end with the discharge opening.

5

15. The kit of one or more of the preceding claims, wherein the drainage flow channel is straight, and the tubular body is a straight tube.

16. The kit of one or more of the preceding claims, wherein:

10 the tubular body is provided with a larger demarcated region for providing, or provided with, a larger entrance and a smaller demarcated region within the larger demarcated region, for providing, or provided with, a smaller entrance and the set comprises:

15 a first add-on element with an add-on body mountable on the tubular body of the base element to seal off the larger entrance, and
 a second add-on element with an add-on body mountable on the tubular body of the base element to seal-off the smaller entrance.

17. The kit of claim 16, wherein in at least one of the larger demarcated regions at least two
20 smaller demarcated regions lie.

18. The kit of one or more of the preceding claims, wherein the tubular body comprises at least two non-overlapping demarcated regions.

25 19. The kit of claim 18, wherein the non-overlapping demarcated regions are distributed circumferentially over an outer wall of the tubular body.

20. The kit of one or more of the preceding claims, wherein the tubular body has an outer wall provided with a visible marking which defines a closed demarcated region in which the entrance is
30 closed-off from the exterior of the tubular body by the outer wall, and the entrance can be opened to the exterior by removing the material of the tubular body in the demarcated region defined by the marking.

21. The kit of claim 20, comprising a local weakening of the outer wall corresponding to the location of the visible marking.

22. The kit of claim 20 or 21, wherein the visible marking encloses the demarcated region.

5

23. The kit of one or more of claims 20-22, wherein the marking is formed by a ridge on the outer wall.

24. The kit of one or more of claims 20-23, said tubular body having an outer wall provided with an opening forming at least one of the demarcated regions.

10

25. The kit of one or more of claims 20-24, wherein at least one of the demarcated regions on the outer wall is oblong.

26. The kit of one or more of the preceding claims, wherein at least one of the add-on elements is attachable to the tubular body in the demarcated region by a snap-fit connection.

15

27. The kit of one or more of the preceding claims, wherein the tubular body and the add-on elements are made of joinable materials, joinable to form a permanent joint between the tubular-body and the add-on element, by for example welding, gluing, soldering brazing.

20

28. The kit of one or more of the preceding claims, wherein:

at least one demarcated region is located at an open end of the tubular body,

at least one of the add-on elements is mountable on the end to have the passage in the

prolongation of the drainage flow channel.

25

29. The kit of claim 28, wherein the add-on element forms when mounted on the end a spigot or a socket for another above ground drainage fitting or above ground drainage pipe.

30. The kit of one or more of claims 28-29, wherein the passage forms a constriction of the drainage flow channel.

30

31. The kit of one or more of the preceding claims, wherein the set of add-on elements comprises at least one add-on element selected from the group consisting of: branch connector, socket

connector, single socket connector, multiple socket connector, angled branch connector, access branch.

32. The kit of one or more of the preceding claims, further comprising:

- 5 a covering element mountable on the base element to cover the entrance in a selected demarcated region, the covering element being attachable to the tubular body to seal-off and close-off the entrance in an at least liquid tight manner.

33. A plastic base element for the kit of one or more of the preceding claims.

10

34. A plastic add-on element for the kit of one or more of the preceding claims.

35. An above ground drainage fitting, comprising:

- 15 a plastic base element of a kit as claimed in one or more of the preceding claims, with the entrance open in at least one demarcated region, and
 at least one plastic add-on element of the kit attached to the base element, the add-on element sealing-off the open entrance, with the add-on passage in communication with the drainage flow channel via the entrance.

20 36. The fitting of claim 35, wherein the above ground drainage fitting is an above ground soil drainage fitting.

37. The fitting of claim 35 or 36, wherein the fitting is at least one of the group consisting of:

- 25 branch fitting, socket fitting, bossed fitting, access fitting, bend, reduces, manifold, ancillary fitting.

38. An above ground drainage system, comprising an above ground soil and/or waste discharge stack comprising at least one soil and/or waste discharge pipe and a fitting as claimed in one of more of claims 35-37 connected to the discharge pipe.

30

39. A method of manufacturing a customised above ground drainage fitting, comprising:

- establishing a desired type of above ground drainage fitting;
 selecting, out of the set of add-on elements of a kit according to one or more of claims 1-32, selected add-on elements, of the type and in the number required for the desired type;

positioning each of the selected add-on elements onto the tubular body of the base element of the kit with the base element side facing the tubular body and the exterior side facing away from the tubular body, and with the base element-side opening in a respective demarcated region provided with the entrance and the add-on passage of the respective add-on element in communication with the drainage flow channel via the entrance; and mounting the positioned add-on elements on the tubular body with the entrance being seal-off by the add-on element.

40. The method of claim 39, performed in-situ at a construction site or in a building where an above ground drainage system with the customised fitting is to be installed.

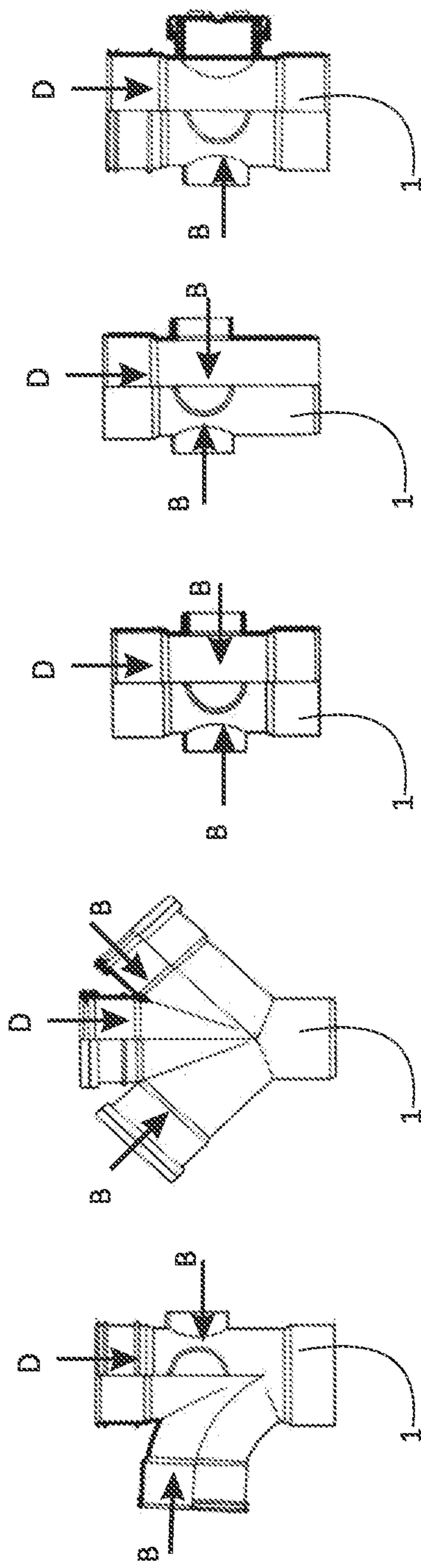
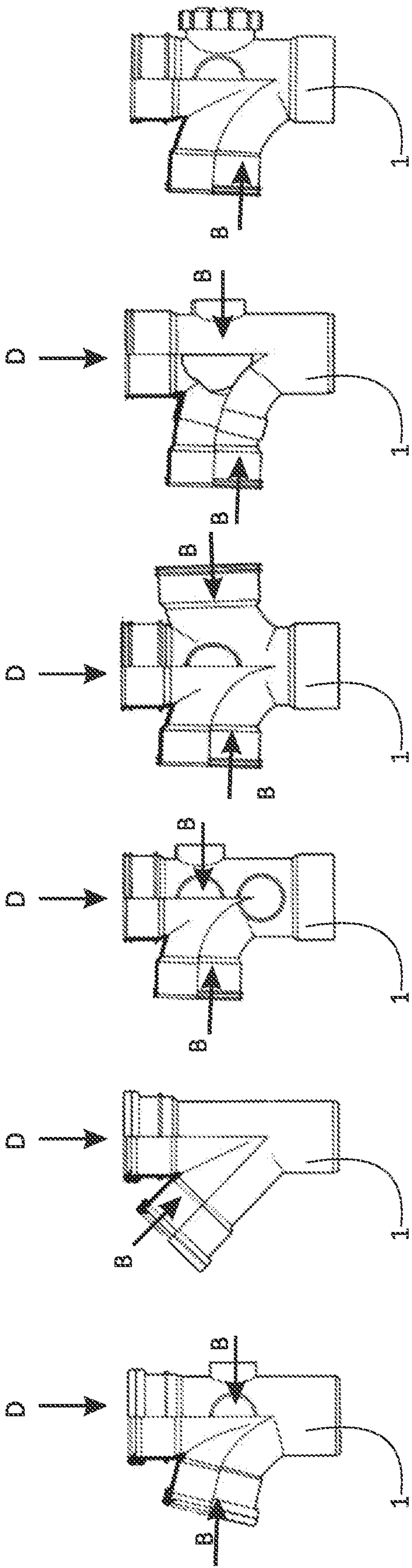
41. The method of claim 39, performed off-site from a construction site or in a building where an above ground drainage system with the customised fitting is to be installed.

42. The method of one or more of claims 39-41, comprising:
receiving, prior to said positioning, finished base elements and add-on elements at a location different from a manufacturing site where the plastic base element and/or the add-on elements have been moulded.

43. The method of one or more of claims 39-42, wherein said mounting comprises:
fixating the selected add-on elements in a position in respective demarcated regions with the add-on passage in communication with the drainage flow channel, and
liquid-tight sealing off an interface between the tubular body and the fixated add-on elements.

44. The method of one or more of claims 39-43, comprising:
selecting on the base element at least one demarcated region with a closed entrance, and
removing the material of the tubular body to open the entrance.

FIG. 1



266

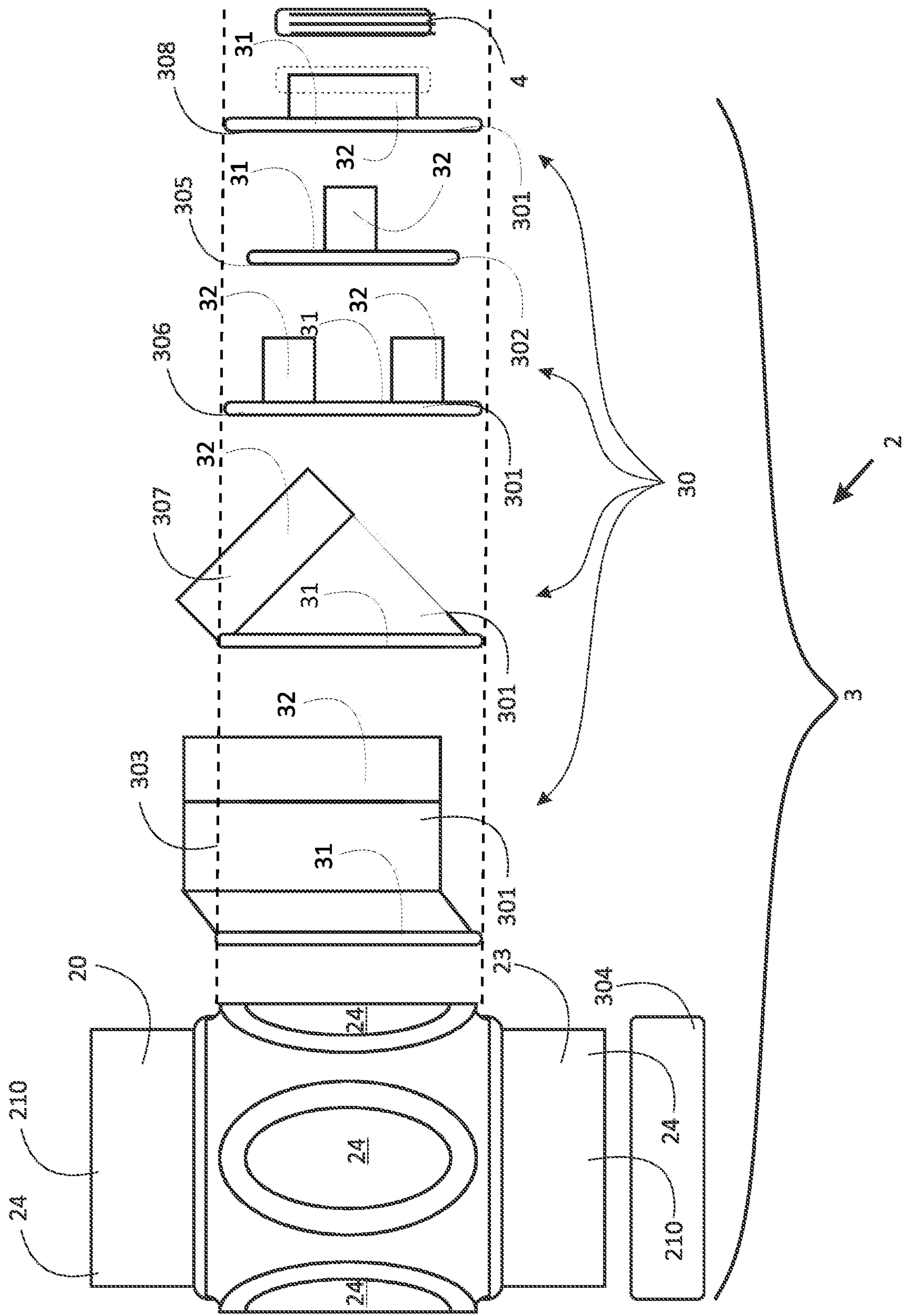


FIG. 3

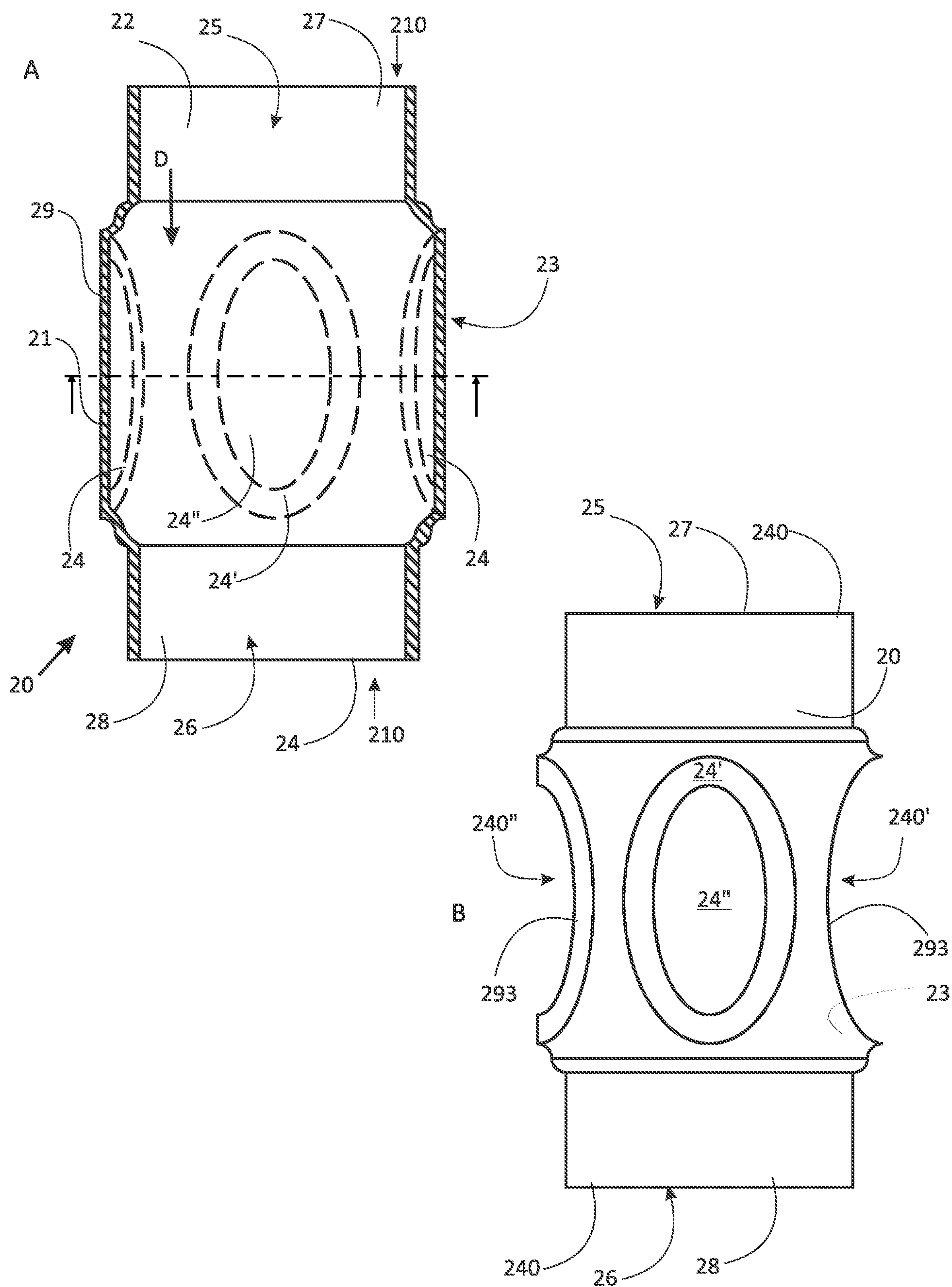


FIG. 4

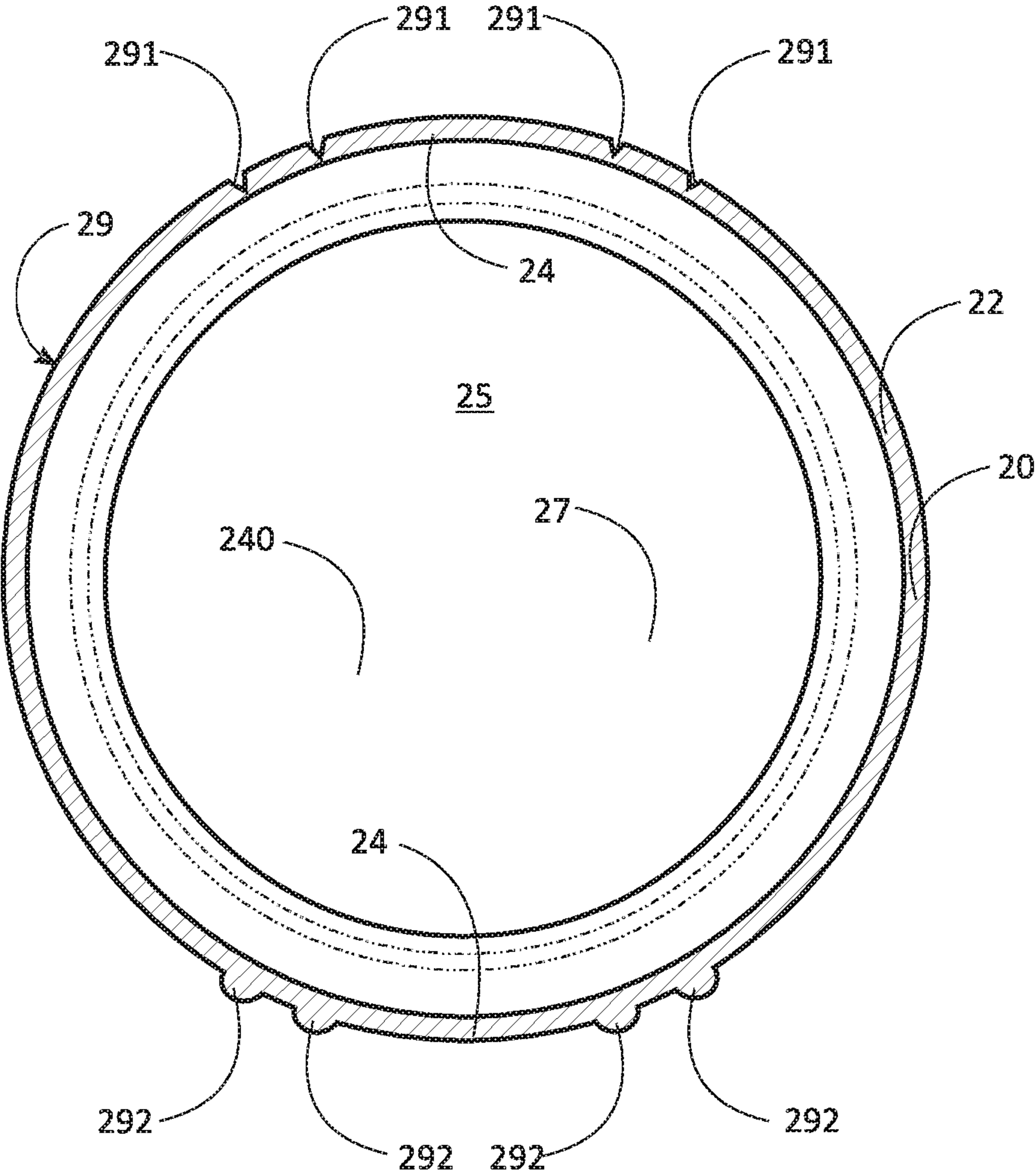


FIG. 5

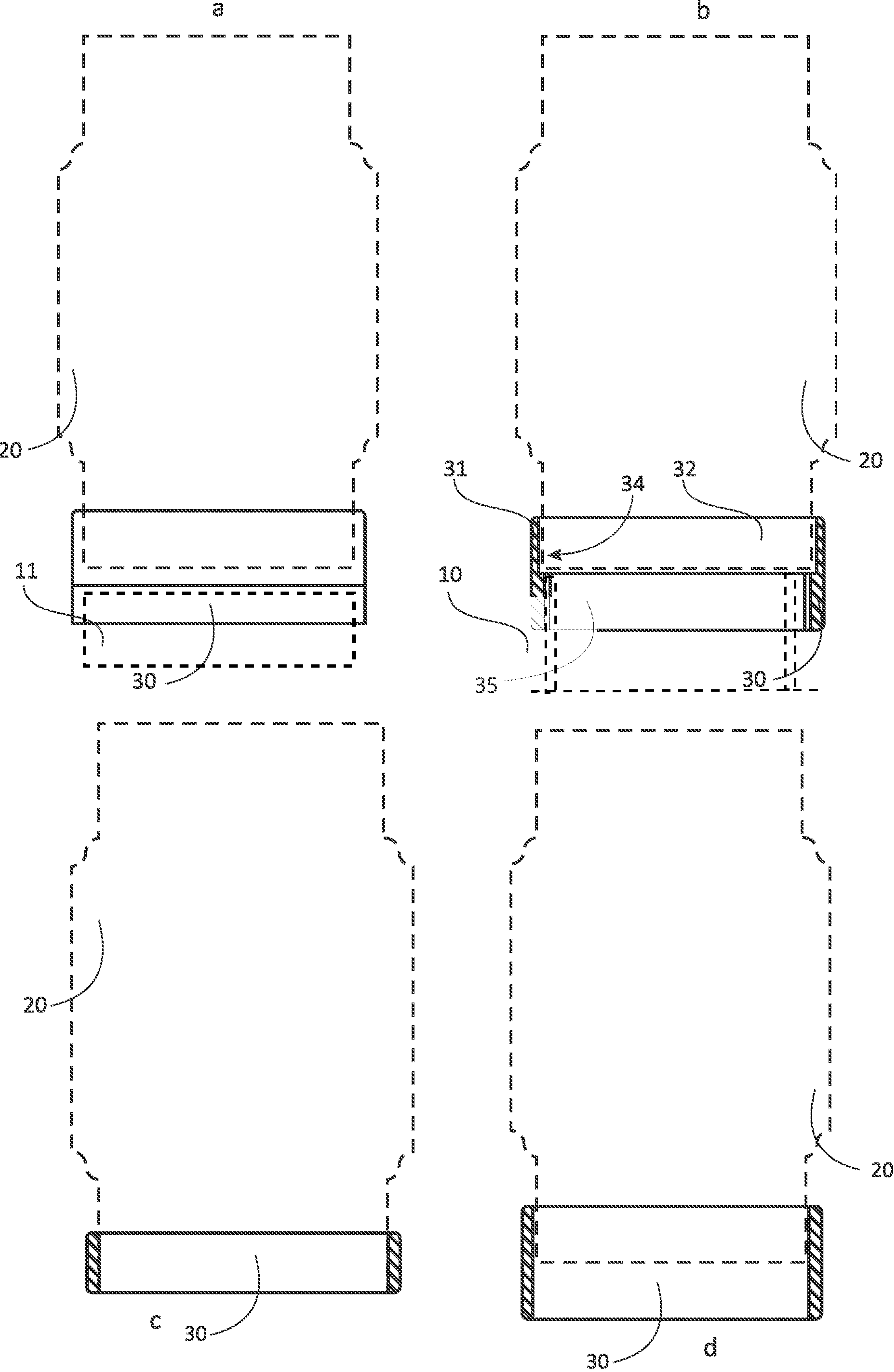


FIG. 6

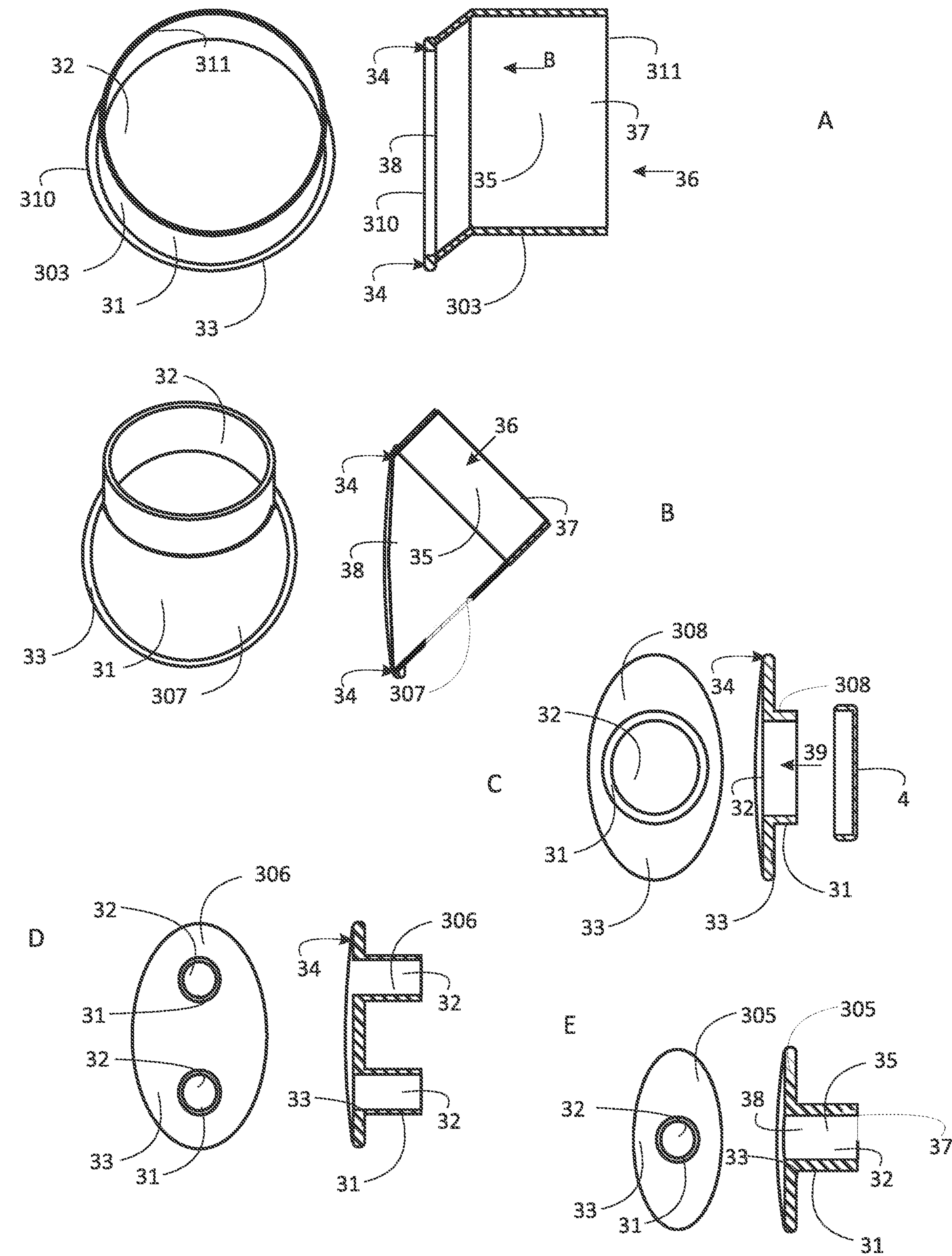


FIG. 7

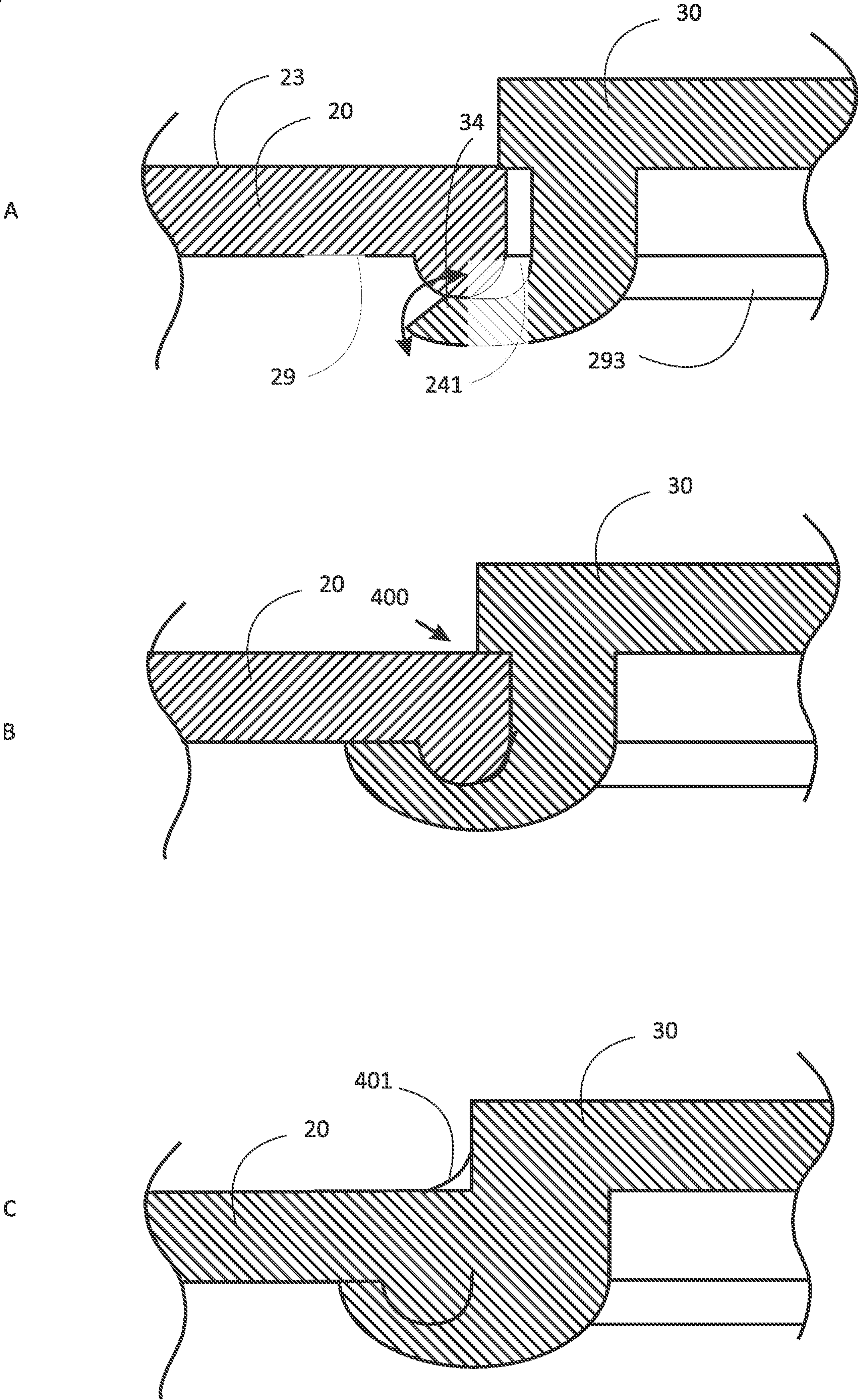


FIG. 8

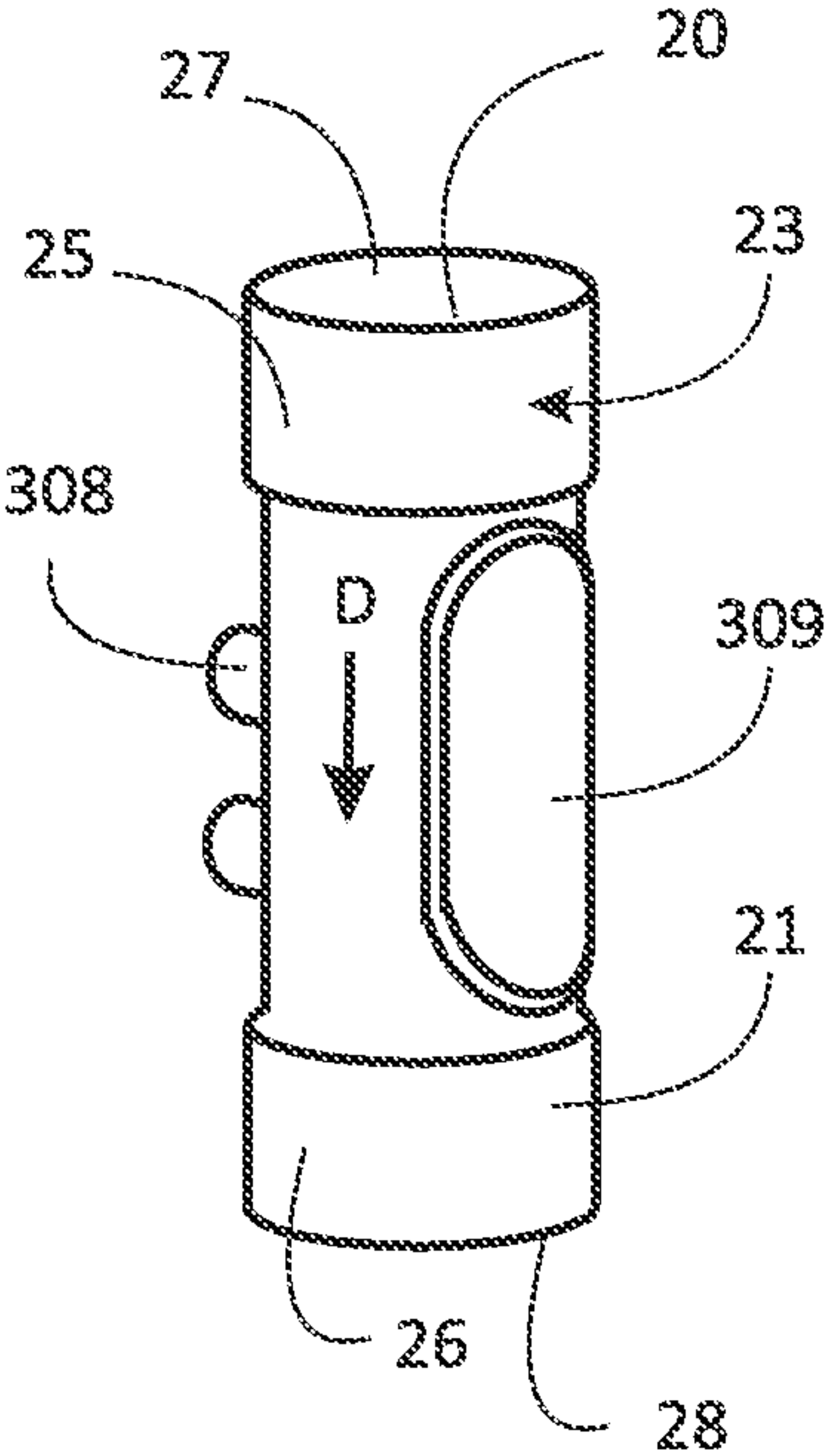


FIG. 9

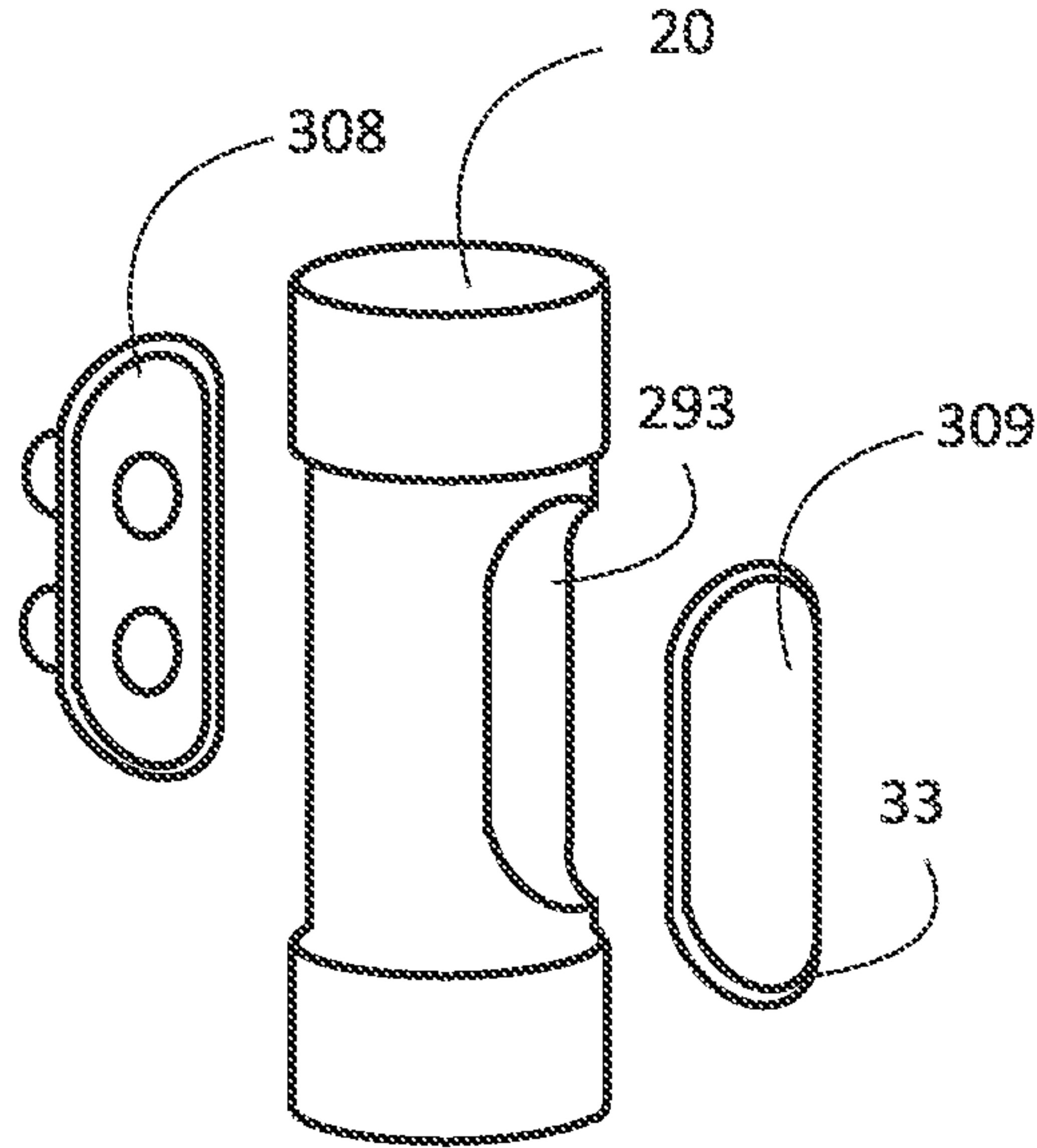
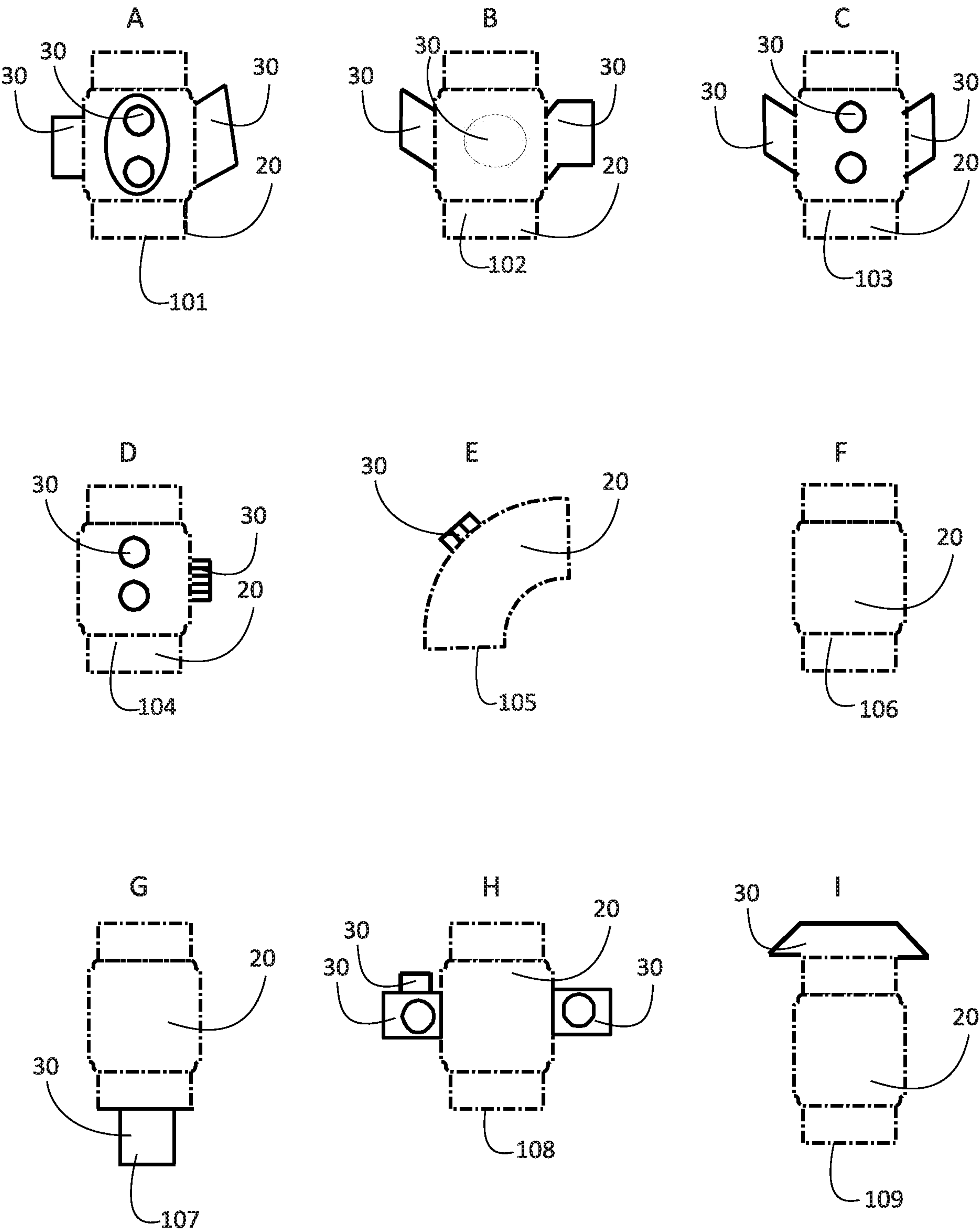


FIG. 10



INTERNATIONAL SEARCH REPORT

International application No

PCT/NL2021/050003

A. CLASSIFICATION OF SUBJECT MATTER
 INV. F16L41/02 F16L41/03 E03F3/04
 ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 F16L E03F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	AT 240 289 B (VON ROLL AG [CH]) 25 May 1965 (1965-05-25)	1-6, 10-25, 27,31, 33-44
Y	page 2, line 8 - page 4, line 25; figures 1-6,13 page 4, lines 40-46 page 1, lines 1-35	26
X	----- DE 32 18 061 A1 (KESSEL BERNHARD) 10 November 1983 (1983-11-10) page 14, line 5 - page 18, line 11; figures 1-5,8-10 page 21 ----- -/-	1-5, 7-10,12, 15,18, 24,28-43



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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"&" document member of the same patent family

Date of the actual completion of the international search

9 March 2021

Date of mailing of the international search report

18/03/2021

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040,
 Fax: (+31-70) 340-3016

Authorized officer

Schlossarek, M

INTERNATIONAL SEARCH REPORT

International application No
PCT/NL2021/050003

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	FR 2 041 895 A5 (GMT SA; LEFEBVRE PIERRE) 5 February 1971 (1971-02-05) figures 1-3	26
A	----- DE 27 40 742 A1 (FUERTINGER OTTO) 16 March 1978 (1978-03-16) pages 5-7; figures 1,2 -----	1-44

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/NL2021/050003

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
AT 240289	B	25-05-1965	AT 240289 B 25-05-1965
			CH 399845 A 30-09-1965
			DE 1946944 U 29-09-1966

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			DE 2740742 A1 16-03-1978
