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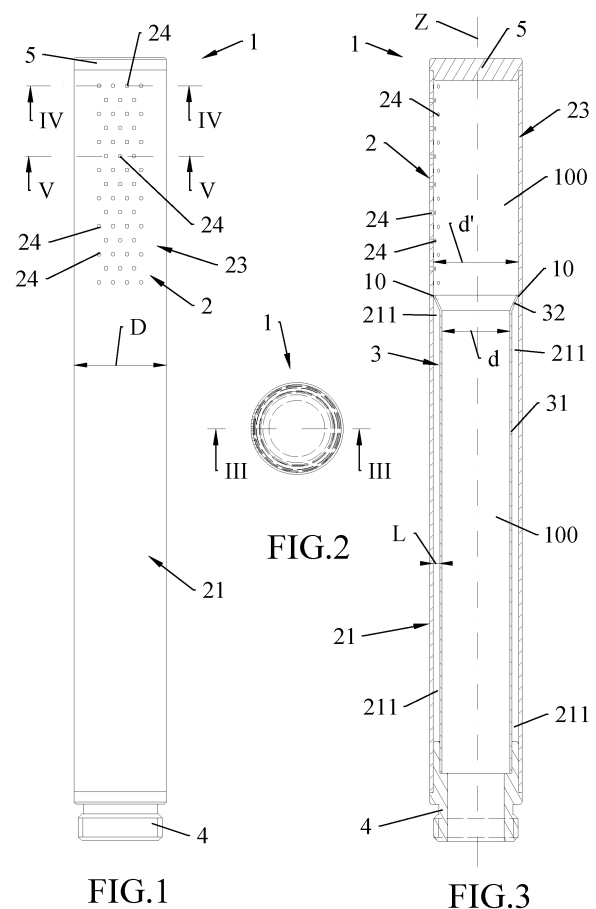
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(54) **HAND SHOWER WITH DOUBLE STAINLESS STEEL TUBE**

(57) A cylindrical hand shower (1) is described comprising a grip portion (21) and a head portion (23) in which holes (24) are provided which are adapted to allow the pressurized water to flow out, in which the hand shower (1) is closed below at the bottom of the grip portion (21) by a threaded fitting (4) and is closed above at the top of the head portion (23) by a cap (5). The hand shower (1) consists of an external tube (2), an internal tube (3), the threaded fitting (4) and the cap (5). All the components of the hand shower (1) are made of metal. The components of the hand shower (1) are mutually fixed exclusively with circular welding profiles (10) to obtain a liquid seal between an internal chamber (100) in which the pressurized water flows and an empty chamber (211) placed at the grip portion (21) and suitable for disposing of the heat generated by the running hot water in the internal tube (3), without the use of gaskets.



Description

[0001] The present invention relates to a hand shower with a double stainless steel tube.

[0002] The ever-increasing demand for high-design showers has pushed manufacturers to look for essential, elegant and refined shapes.

[0003] Often the need to obtain aesthetically attractive shapes poses functional problems, essentially related to the pressurized water flow.

[0004] Commonly, hand showers, i.e. pressurized water output terminal elements which can be gripped by the user so as to maneuver them at will for an efficient water jet on the body, have a connection to the flexible water supply tube coming from the hydraulic network, and a containment body with an enlarged head having water outlet holes.

[0005] The hand showers are commonly made of mixed material, metal and plastic, with sealing gaskets so as not to disperse water in the flow thereof from the flexible tube to the outlet holes.

[0006] Generally, the outlet holes consist of silicone teats which, at the end of dispensing, tend to retain the last drops of water, thus favoring sedimentation and therefore the obstruction of the holes themselves.

[0007] An example of a hand shower made of mixed material and with sealing gaskets is shown in US-2017/0151601 which describes a hand shower comprising a grip portion and a head portion in which there are holes adapted to allow pressurized water to flow out. The hand shower is closed below at the bottom of the grip portion by a threaded fitting and is closed above at the top of the head portion by a cap.

[0008] The hand shower consists of an external tube, an internal tube, the threaded fitting, the cap and a spray plate.

[0009] The external tube, the threaded fitting and the cap are made of metal, while the internal tube is made of plastic and the spray plate is made of rubber.

[0010] The external tube houses the internal tube, wherein the external tube includes the grip portion and the head portion.

[0011] The cap and the threaded fitting are welded to the external tube.

[0012] Plastic O-rings allow obtaining a liquid seal between an internal chamber in which the pressurized water flows and an empty chamber placed at the grip portion and suitable for disposing of the heat generated by the running hot water in the internal tube.

[0013] Cylindrical hand showers with outlet holes on a head portion of the side body are very appreciated.

[0014] Disadvantageously, it is complicated to make said cylindrical shape, because it renders an efficient and pleasant water outlet for the user difficult.

[0015] US-2009206180 shows a cylindrical hand shower with a handle associated with a head, an internal conduit and a series of nozzles housed in the head. The assembly appears very complex to make and difficult to

clean.

[0016] US-10195654 describes a hand shower with an external cylinder and an internal conduit made of molded resin. Also in this case, it appears complicated to make and the head with the water outlet holes does not have a cylindrical shape.

[0017] The object of the present invention is to make a cylindrical hand shower exclusively in metal, preferably in stainless steel.

[0018] It is a further object of the present invention that the hand shower does not include gaskets.

[0019] Yet another object of the present invention is that the hand shower consists of few components which are easy to make and assemble.

[0020] According to the invention, said and further objects are achieved with a hand shower as defined in claim 1.

[0021] Advantageously, the hand shower is made entirely of metal, without the use of plastic and rubber components.

[0022] The production process to obtain the components and assemble them is simple and economical.

[0023] Advantageously, a hand shower with an empty liquid-tight chamber is obtained by virtue of the circular welding profiles made.

[0024] In operation, the hand shower does not accumulate limescale because it does not have the conventional silicone teats. The internal passage volumes of the pressurized water are very large and without narrow passages except for the outlet holes which are cylindrical in shape, thereby facilitating the evacuation of the water without the stagnation typical of traditional cup-shaped silicone teats, which at the end of dispensing tend to retain the last drops of water, which evaporates and disappears unlike the limescale sediment thereof that remains, obstructing the holes thereof.

[0025] Even maintenance, which is certainly very time-consuming for the shape described above, is extremely simple as it is enough to unscrew the hand shower from the flexible tube to wash it, perhaps in a specific anti-limescale detergent obviously suitable for use on austenitic stainless steels. The empty chamber always remains liquid-tight.

[0026] These and other features of the present invention will become more apparent from the following detailed description of a practical embodiment thereof, shown by way of non-limiting example in the accompanying drawings, in which:

Figure 1 shows a side view of the hand shower according to the present invention;

Figure 2 shows a top plan view of the hand shower; Figure 3 shows a sectional view along line III-III in Figure 2;

Figure 4 shows a section view along line IV-IV in Figure 1;

Figure 5 shows a sectional view along line V-V in Figure 1;

Figure 6 shows a sectional view similar to that in Figure 3, in accordance with a different embodiment.

[0027] A hand shower 1 according to the present invention consists of an external tube 2, an internal tube 3, a threaded fitting 4 for connecting the hand shower 1 to a flexible tube (not shown), and a cap 5 on the side opposite the threaded fitting 4.

[0028] All the components of the hand shower 1 are made of stainless steel, i.e. the hand shower 1 is free of plastic elements, for example gaskets.

[0029] The external tube 2 is cylindrical with diameter D and houses the internal tube 3 which has a cylindrical body 31 with diameter d and an enlarged head 32 of preferably flared shape with smaller diameter d and larger diameter d', in which d is therefore larger than d.

[0030] Therefore, the hand shower 1 is cylindrical, substantially taking the shape of the external tube 2 apart from the threaded fitting 4 at the bottom which is a connection means for the flexible tube, the cap 5 closing the external tube 2 from above.

[0031] Flared shape means, for example, a shape with inclined edges, for example at 45° with respect to the cylindrical body 31, which go outwards with respect to the longitudinal axis Z of the internal tube 3 coinciding with the longitudinal axis of the external tube 2 after assembly.

[0032] Alternatively, as shown in Figure 6, the enlarged head 32 can include edges bent at 90° with respect to the cylindrical body 31.

[0033] The external tube 2 has a grip portion 21 and a head portion 23 in which holes 24 are provided to allow the pressurized water to flow out.

[0034] The hand shower 1 is closed below by the threaded fitting 4 at the bottom of the grip portion 21, while it is closed above by the cap 5 at the top of the head portion 23.

[0035] The mutual fastening of the four components of the hand shower 1, i.e. the external tube 2, the internal tube 3, the threaded fitting 4 and the cap 5, exclusively occurs with a welding process which allows a liquid seal to be obtained without the use of gaskets.

[0036] More in particular, at the bottom of the hand shower 1, the external tube 2 and the internal tube 3 are welded to the threaded fitting 4, while at the head of the hand shower 1 the cap 5 is welded to the external tube 2. The welds are made according to circular profiles, i.e. at the bottom of the hand shower 1 there is at least a first circular welding profile between the external tube 2 and the threaded fitting 4, a second circular welding profile between the internal tube 3 and the threaded fitting 4, and a third circular welding profile between the external tube 2 and the cap 5 at the head of the hand shower 1.

[0037] To make the internal tube 3 stable inside the external tube 2, the upper diameter edge d' of the enlarged head 32 is welded to the internal surface of the external tube 2. The welding generates a circular welding profile 10 which, together with said welds on the head and bottom of the hand shower 1, creates a liquid seal be-

tween an internal chamber 100 in which the pressurized water flows and an empty chamber 211 which can be found in the grip portion 21.

[0038] The welding profiles are circular in the sense that they are made around the longitudinal axis Z.

[0039] The empty chamber 211 substantially has the shape of a sleeve embracing the internal tube 3.

[0040] The internal tube 3 is welded to the external tube 2 and to the threaded fitting 4 so as to make said empty liquid-tight chamber 211 suitable for insulating and retaining (disposing) the heat generated by the running hot water in the internal tube 3 so as to prevent the user from being burned while gripping the hand shower 1 at the grip portion 21.

[0041] In a preferred embodiment, as can be seen in Figure 1, the holes 24 are arranged along arched profiles according to the curvature of the external tube 2, in alternating rows of four holes 24 and three holes 24.

[0042] In the rows of four holes (Figure 4), there are two central holes 241 with zero inclination (0°) and two lateral holes 242 with inclination α of 3°.

[0043] In the rows of three holes (Figure 5), there is a central hole 241 with zero inclination (0°) and two lateral holes 242 with inclination β of 1.5°.

[0044] Said inclination is defined by the angle opened by the axis X of the hole 24 with respect to a central axis Y shown vertically in Figures 4 and 5 and defining an axis of symmetry in the arrangement of the holes 24 in the respective sections.

[0045] Advantageously, the inclination of the lateral holes 242 prevents, during use, the water flows from joining during use, at a distance of about 200 mm (millimeters) from the hand shower 1, reducing the pleasure and effectiveness of the wetting action on the user's body.

[0046] The inclination and the number of holes 24 can vary, the embodiment described above and shown in the drawings being in any case preferred because it represents the right compromise between the total number of holes 24, the size of the single hole 24 (diameter of about 1 mm), outlet water pressure, distance of use and dimensions of the hand shower 1.

[0047] The hand shower 1 which is the object of the present invention typically has a diameter D between 20 mm and 25 mm, length (of the external tube 2) between 180 mm and 200 mm.

[0048] Preferably, the empty chamber 211 has a width L (in the diametrical direction, on half of the tubes 2, 3 shown in Figure 3) between 1.5 mm and 3 mm. This is sufficient space to avoid burns in the grip portion 21 while still ensuring the internal tube 3 has an internal volume suitable for ensuring an optimal flow of pressurized water without pressure drops.

[0049] Preferably, the tubes 2, 3 are obtained from sheet metal which is bent and then welded longitudinally.

[0050] The welding is preferably of the laser type, but can be of another type, however without material contribution, for example of the TIG type. The welding edge 10 is even more preferably to be performed by laser

welding given the very limited spaces in which to work.

[0051] Operatively, the pressurized hot water enters the hand shower 1 from the threaded fitting 4, passes through the internal tube 3 without burning the user by virtue of the empty chamber 211, enters the head portion 23 and then exits through the holes 24. The water exits directly from the holes 24 obtained in the head portion 23 of the external tube 2, without the interposition of other components.

[0052] Advantageously, the hand shower 1 is made entirely of stainless steel without the use of plastic and rubber components.

[0053] The production process to obtain the components and assemble them is simple and economical.

[0054] The assembly and fastening of the four components of the hand shower 1 are very simple.

[0055] The bottom of the internal tube 3 is welded to the threaded fitting 4. The internal tube 3 is then inserted into the external tube 2 (already with the holes 24) until the latter also fits a head portion of the threaded fitting 4 on the bottom. The external tube 2 is then welded to the threaded fitting 4 and the internal tube 3 is welded to the external tube 2 at the enlarged head 32 of the internal tube 3. Lastly, the hand shower 1 is closed above with the cap 5, welding it to the external tube 2.

[0056] Advantageously, a hand shower 1 with an empty liquid-tight chamber 211 is obtained by virtue of the circular welding profiles made.

[0057] In operation, the hand shower 1 does not accumulate limescale because it does not have the common silicone teats. The internal passage volumes (internal chamber 100) of the pressurized water are very large and without narrow passages except for the outlet holes 24 which, despite being about 1 mm in diameter, are made by laser cutting and are cylindrical in shape, thereby facilitating the evacuation of the water without the stagnation typical of traditional cup-shaped silicone teats, which at the end of dispensing tend to retain the last drops of water, which evaporates and disappears unlike the limescale sediment that remain, obstructing the holes thereof.

[0058] Even maintenance, certainly very time-consuming for the shape described above, is extremely simple as it is enough to unscrew the hand shower 1 from the flexible tube to wash it, perhaps in a specific anti-limescale detergent obviously suitable for use on austenitic stainless steels. The empty chamber 211 always remains liquid-tight.

[0059] The described embodiment provides that the hand shower 1 is made of stainless steel. Alternatively, the hand shower 1 can be made of brass or more generally of metallic material. However, stainless steel is to be preferred because it does not require coatings such as chrome plating, which is notoriously not environmentally friendly. Stainless steel is more environmentally friendly.

[0060] The configuration of the holes 24 can vary, i.e. it may not be according to rows having a variable number of holes 24. For example, the holes 24 can have a con-

centric circle configuration. In any case, it is advantageous to include inclined lateral holes 242 so as to optimize the pressurized water flow on the user. In general, the inclination of the lateral holes 242 is between 1° and 5°, outside said range the water flow being too concentrated or dispersive.

Claims

1. Hand shower (1) comprising an external tube (2) and an internal tube (3), wherein the external tube (2) comprises a grip portion (21) and a head portion (23) in which holes (24) are provided that are adapted to allow the pressurized water to flow out, wherein the hand shower (1) is closed below at the bottom of the grip portion (21) by a threaded fitting (4) and is closed above at the top of the head portion (23) by a cap (5),

wherein the external tube (2), the threaded fitting (4) and the cap (5) are made of metal,

characterized in that the hand shower (1) is cylindrical and consists of the external tube (2), the internal tube (3), the threaded fitting (4) and the cap (5),

wherein the internal tube (3) is made of metal, the hand shower (1) being completely made of metal,

wherein the external tube (2) is cylindrical with diameter D and houses the internal tube (3) which has a cylindrical body (31) with diameter d and an enlarged head (32) with a greater diameter d', wherein d' is greater than d and less than D,

wherein the components of the hand shower (1) are mutually fixed exclusively with circular welding profiles (10) to obtain a liquid seal between an internal chamber (100) in which the pressurized water flows and an empty chamber (211) placed at the grip portion (21) and suitable for disposing of the heat generated by the running hot water in the internal tube (3), without the use of gaskets, wherein the water exits from the internal chamber (100) directly from the holes (24) obtained in the head portion (23) of the external tube (2).

2. Hand shower (1) according to claim 1, **characterized in that** at the bottom of the hand shower (1) there are at least a first circular welding profile between the external tube (2) and the threaded fitting (4), and a second circular welding profile between the internal tube (3) and the threaded fitting (4), while at the head of the hand shower (1) there is a third circular welding profile between the external tube (2) and the cap (5), wherein there is also a fourth circular welding profile (10) suitable for fixing an upper edge of diameter d' of the enlarged head (32) to the inter-

nal surface of the external tube (2).

3. Hand shower (1) according to claim 1 or 2, **characterized in that** the holes (24) are configured so as to include central holes (241) with zero inclination and lateral holes (242) with inclination (α , β) between 1° and 5°, wherein said inclination (α , β) is defined by the angle opened by the axis (X) of the hole (24) with respect to a central axis (Y).

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4. Hand shower (1) according to claim 3, **characterized in that** the holes (24) are arranged along arched profiles.
5. Hand shower (1) according to claim 4, **characterized in that** the holes (24) are arranged according to alternating rows of four holes (24) and three holes (24).

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6. Hand shower (1) according to claim 5, **characterized in that** in the rows of four holes (24) there are two central holes (241) with zero inclination and two lateral holes (242) with inclination (α) greater than zero, in the rows of three holes (24) there is a central hole (241) with zero inclination and two lateral holes (242) with inclination (β) greater than zero, wherein the inclination (α) of the lateral holes (242) of the rows of four holes (24) is greater than the inclination (β) of the lateral holes (242) of the rows of three holes (24).

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7. Hand shower (1) according to claim 6, **characterized in that** the inclination (α) of the lateral holes (242) of the rows of four holes (24) is equal to 3°, and the inclination (β) of the lateral holes (242) of the rows of three holes (24) is equal to 1.5°.

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8. Hand shower (1) according to any of the previous claims, **characterized in that** all the components of the hand shower (1) are made of stainless steel.

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9. Hand shower (1) according to any of the previous claims, **characterized in that** the circular welding profiles (10) are performed with a laser welding process.

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10. Hand shower (1) according to any of the previous claims, **characterized in that** the empty chamber (211) has a width (L) between 1.5 mm and 3 mm.

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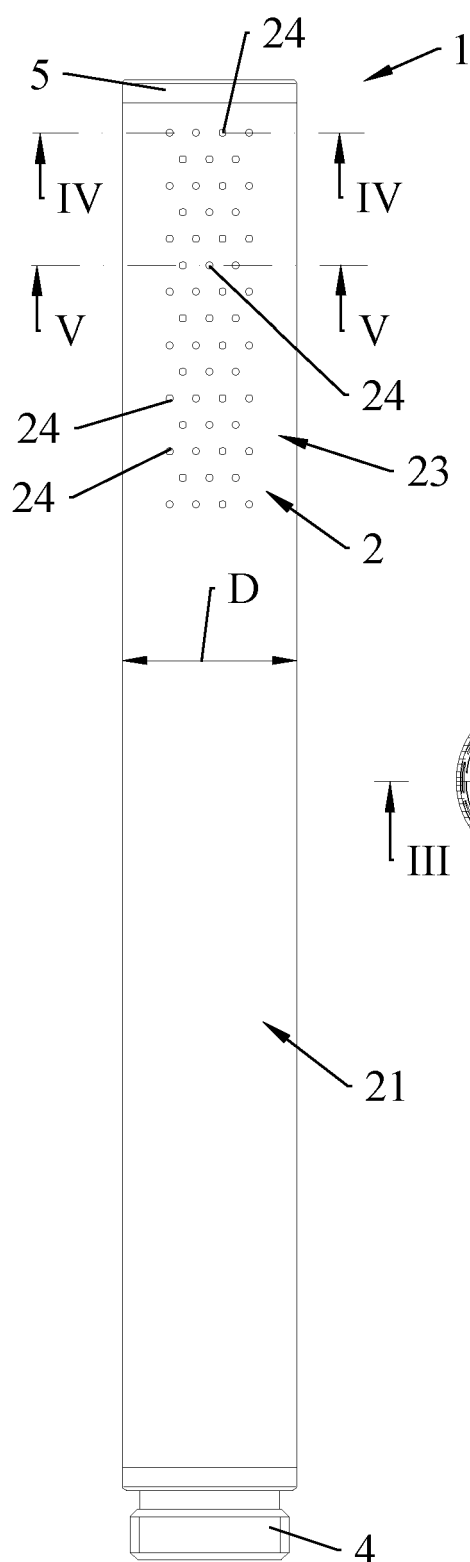


FIG.1

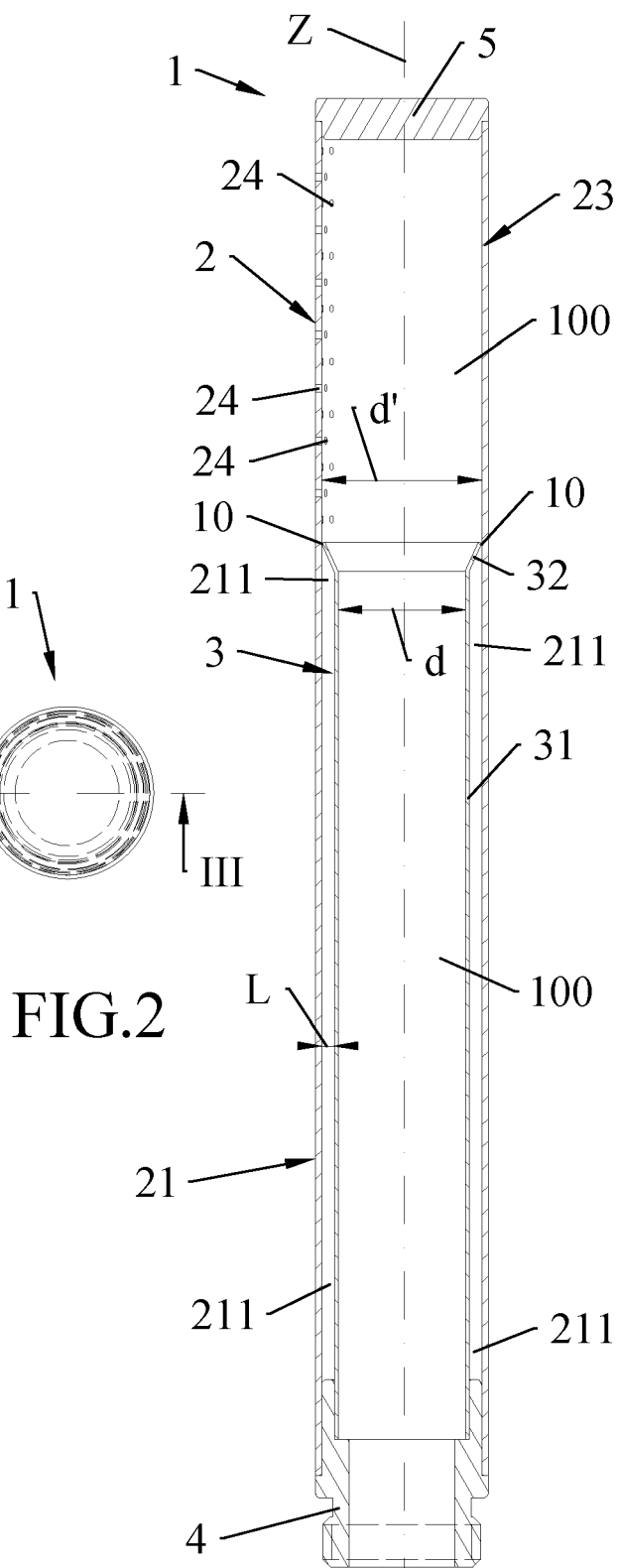


FIG.2

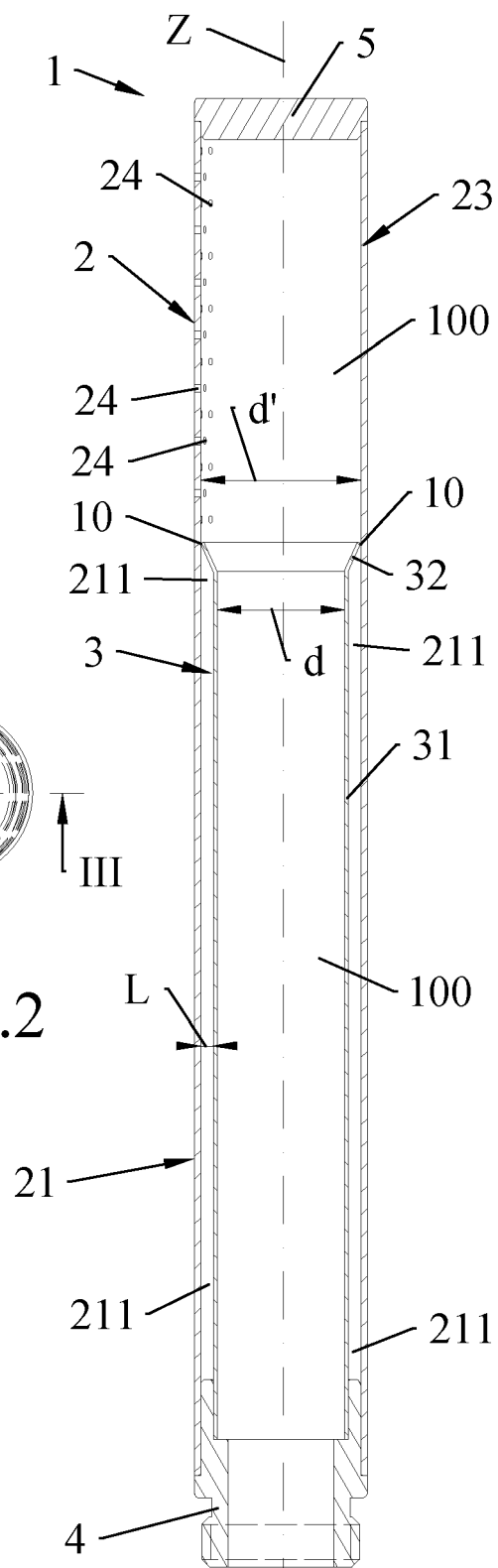


FIG.3

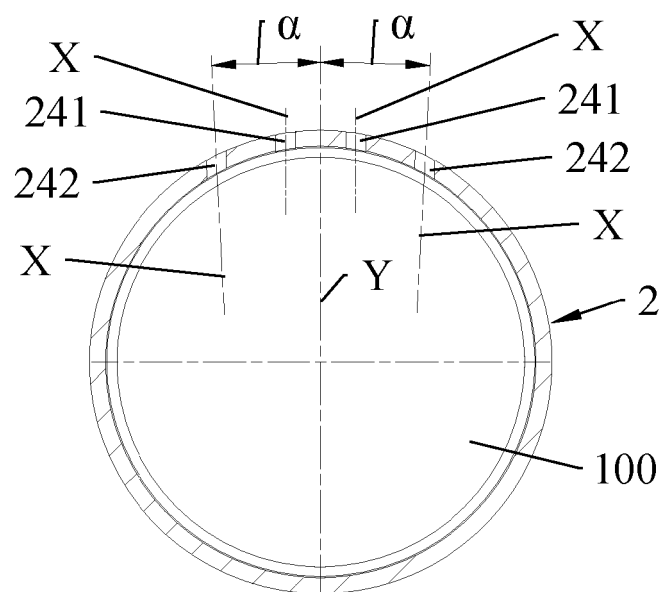


FIG. 4

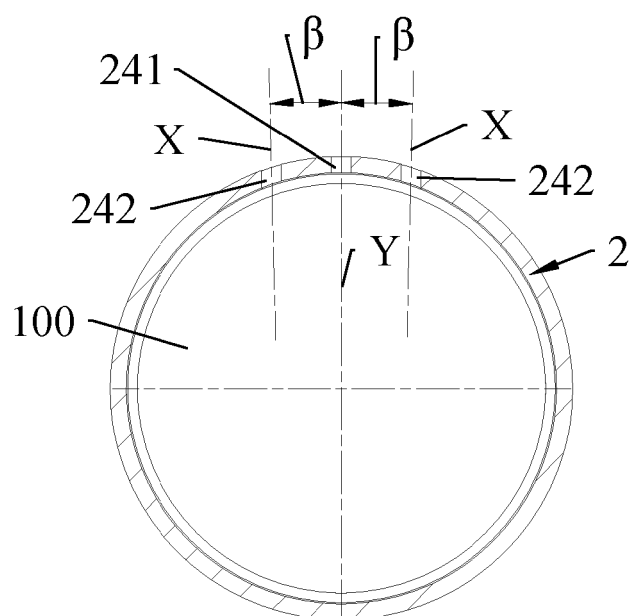


FIG. 5

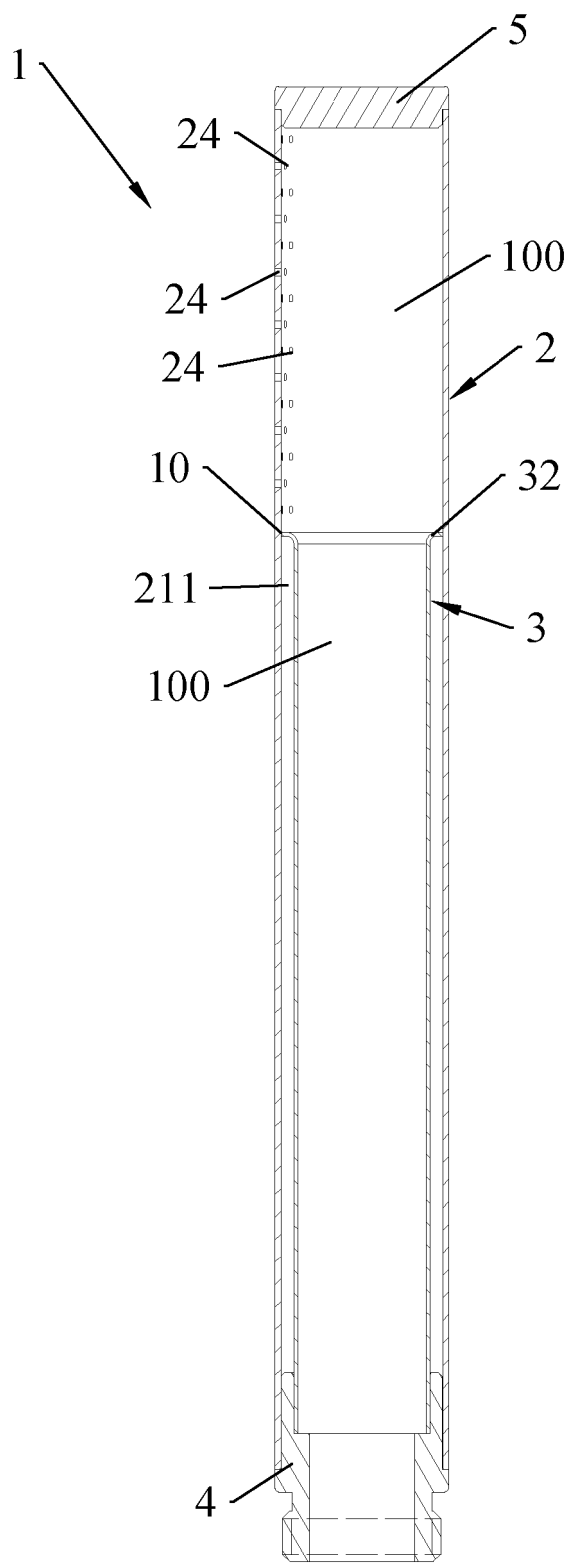


FIG.6



EUROPEAN SEARCH REPORT

Application Number

EP 24 20 9940

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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			B05B E03C
Place of search		Date of completion of the search	Examiner
Munich		27 February 2025	Frego, Maria Chiara
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