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(54) HANDHELD SHOWER

(57) A handheld shower (100, 100A, 200) includes a shower body (10, 10A, 30) and a liquid storage tank (20, 20A, 44). The shower body (100, 100A, 200) has an inlet channel (S, 32) and an outlet portion (142, 34), and the inlet channel (S, 32) communicates with the outlet portion (142, 34). The liquid storage tank (20, 20A, 44) has a receiving space (A) and a liquid outlet (28a, 482), and the receiving space (A) is adapted to receive a cleaning solution. The liquid outlet (28a, 482) communicates with the receiving space (A) and is adapted to output the liquid solution inside the receiving space (A). The liquid storage tank (20, 20A, 44) is detachably engaged with the shower body (10, 10A, 30), and the handheld shower (100, 100A, 200) is light and easy to carry. Thereby, users does not need to carry many bottles of cleaning solution when traveling or on business trips, and have their own handheld shower (100, 100A, 200) when they are going out, enhancing the convenience of the journey and the comfort of bathing outside.

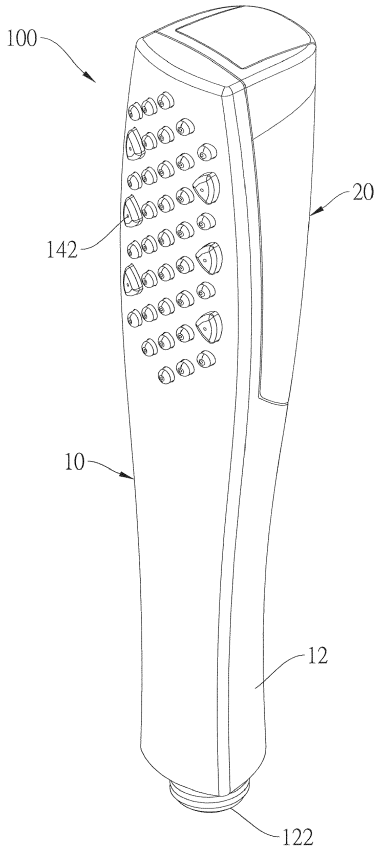

FIG.1

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Description

BACKGROUND

Technical Field

[0001] The present invention relates generally to a shower apparatus, and more particularly to a handheld shower having a liquid storage tank.

Description of Related Art

[0002] With the evolution of society and the improvement of people's economic conditions, modern people have stricter requirements for sanitary equipment. To meet modern people's needs for sanitary equipment and maintain the freshness of products, the industry not only needs to pay attention to the practicality of sanitary products, but also needs to strive for innovation. Whether it is to improve the appearance of the product or enhance the functionality of the product, it could bring huge business opportunities.

[0003] Modern people often need to bring bottles of shampoo and body wash and other liquid solutions when traveling or on business trips. Even some travelers who pay much attention to the quality of life would like to bring their shower heads when they are going out, which provides a comfortable feeling like bathing at home. However, carrying many bottles has caused great inconvenience to travelers, and the existing handheld showers are bulky, and it is difficult to carry them around. Therefore, it is necessary to solve the aforementioned problems to improve the convenience of the journey and the comfort of bathing outside.

SUMMARY OF THE INVENTION

[0004] In view of the above, the primary objective of the present invention is to provide a handheld shower, which could receive cleaning supplies.

[0005] The present invention provides a handheld shower, including a shower body and a liquid storage tank. The shower body has an inlet channel and an outlet portion, wherein the inlet channel communicates with the outlet portion. The liquid storage tank is detachably engaged with the shower body and having a receiving space and a liquid outlet, wherein the receiving space is adapted to receive a cleaning solution. The liquid outlet communicates with the receiving space and is adapted to output the liquid solution inside the receiving space.

[0006] With the aforementioned design, the handheld shower is light and easy to carry, enhancing the shower experience. In addition, the liquid storage tank of the handheld shower could contain a cleaning solution, so that it is unnecessary to carry bottles, thereby reducing the weight of luggage.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] The present invention will be best understood by referring to the following detailed description of some illustrative embodiments in conjunction with the accompanying drawings, in which

FIG. 1 is a perspective view of the handheld shower according to a first embodiment of the present invention;
FIG. 2 is a perspective view showing the handheld shower shown in FIG. 1 seen from another direction;
FIG. 3 is a partially exploded view of the handheld shower according to the first embodiment of the present invention;
FIG. 4 is a partially schematic view of the handheld shower showing the engaging track the engaging groove;
FIG. 5 is an exploded view of the shower body according to the first embodiment of the present invention;
FIG. 6 is an exploded perspective view of the liquid storage tank according to the first embodiment of the present invention;
FIG. 7 is a top view of FIG. 2;
FIG. 8 is a sectional view along the 8-8 line in FIG. 7;
FIG. 9 is a partially enlarged view of a marked region A in FIG. 8;
FIG.10 is a partially exploded perspective view of the handheld shower according to a second embodiment of the present invention;
FIG. 11 is a perspective view of the handheld shower according to a third embodiment of the present invention;
FIG. 12 is a perspective view of the handheld shower shown in FIG. 11 which is seen from another direction;
FIG. 13 is an exploded view of the handheld shower according to the third embodiment of the present invention;
FIG. 14 is an exploded view of the handheld shower according to the third embodiment of the present invention seen from another direction;
FIG. 15 is a front view of the handheld shower according to the third embodiment of the present invention;
FIG. 16 is a sectional view along the 16-16 line in FIG. 15;
FIG. 17 is a partially enlarged view of FIG. 16;
FIG. 18 is a side view of the handheld shower according to the third embodiment of the present invention, showing the button and the pressing member are pressed; and
FIG. 19 is similar to FIG. 17, showing the valve core blocks the valve opening of the inlet channel.

DETAILED DESCRIPTION OF THE INVENTION

[0008] A handheld shower 100 according to a first embodiment of the present invention is illustrated in FIG. 1 to FIG. 9 and includes a shower body 10 and a liquid storage tank 20, wherein the liquid storage tank 20 is detachably engaged with the shower body 10.

[0009] The shower body 10 includes a handheld portion 12, a front panel 14, and a rear panel 16, wherein the handheld portion 12 and the front panel 14 are integrally formed as a monolithic unit. The handheld portion 12 has an inlet portion 122 and is adapted to be connected to an external water source (not shown). The front panel 14 has an outlet portion 142. The rear panel 16 is engaged with a side of the front panel 14 opposite to the outlet portion 142. As shown in FIG. 8, a part of an inlet channel S is formed between the front panel 14 and the rear panel 16, wherein the inlet portion 122 communicates with the outlet portion 142 via the inlet channel S.

[0010] The rear panel 16 has a front surface 16a and a rear surface 16b which face opposite directions, wherein the front surface 16a of the rear panel 16 faces the outlet portion 142. The rear panel 16 has a receiving groove 162, an engaging track 164, and a projection 166, wherein the receiving groove 162 disposed on the rear surface 16b and is adapted to be engaged with the liquid storage tank 20. The engaging track 164 is a first engaging portion of the current embodiment. The engaging track 164 extends along a first predetermined direction D1 and is formed on a groove surface 162a of the receiving groove 162, wherein the first predetermined direction D1 is a longitudinal direction of the shower body 10. As shown in FIG. 4, the engaging track 164 has a narrow section 164a and a wide section 164b in a direction away from the groove surface 162a of the receiving groove 162, wherein the narrow section 164a is connected to the groove surface 162a. In the current embodiment, a cross-section contour of the engaging track 164 is, but not limited to T-shaped. In other embodiments, the cross-section contour of the engaging track 164 could be other shapes, such as in the shape of an arrow or a circle arc, as long as a width of the wide section is greater than a width of the narrow section in a third predetermined direction D3 defined on the cross-section contour.

[0011] As shown in FIG. 9, the projection 166 protrudes from the front surface 16a of the rear panel 16 along a second predetermined direction D2, wherein the second predetermined direction D2 is orthogonal to both of the first predetermined direction D1 and the third predetermined direction D3. The projection 166 has an engaging hole 166a penetrating through the rear surface 16b from an end of the projection 166 to the rear surface 16b of the rear panel 16, that is, an axial direction of the engaging hole 166a is parallel to the second predetermined direction D2, wherein a diameter of the engaging hole 166a at the projection 166 is large than a diameter of the engaging hole 166a at the rear surface 16b, thereby forming a shoulder 166b in the engaging hole 166a. A positioning member 18 is disposed in the engaged hole 166a, wherein the positioning member 18 includes a positioning protrusion 182 and a spring 184. A side of the positioning protrusion 182 is connected to an end of the spring 184, and another side of the positioning protrusion 182 abuts against the shoulder 166b and partially protrudes from the rear surface 16b of the rear panel 16. Another end of the spring 184 that is not connected to the positioning protrusion 182 is engaged with the front panel 14.

[0012] The liquid storage tank 20 has a box body 22, a pump tube 24, a cap body 26 and a pressing member 28, wherein the box body 22 has a receiving space A therein, and the receiving space A communicates with an outside via an opening 22a, so that liquid solutions such as shampoo or shower gel could be received in the receiving space A through the opening 22a. As shown in FIG. 3 and FIG. 4, a side surface of the box body 22 facing the shower body 10 has an engaging groove 222 corresponding to the engaging track 164 and a positioning hole 224 corresponding to the positioning member 18. The engaging groove 222 is a second engaging portion of the current embodiment. The engaging groove 222 has a first section 222a and a second section 222b, wherein a contour of the first section 222a and a contour of the second section 222b are respectively complementary to a contour of the narrow section 164a and a contour of the wide section 164b. That is, a width of the first section 222a is smaller than a width of the second section 222b in the third predetermined direction D3. The positioning hole 224 is adapted to position a position of the positioning member 18 in the first predetermined direction D1. In addition, as shown in FIG. 8, the box body has at least one supporting member 226. In the current embodiment, the box body 22 has a plurality of the supporting member 226 laterally abutting against the pump tube 24 in the receiving space A, along the second predetermined direction, thereby the pump tube 24 could be firmly disposed in the box body 22.

[0013] The cap body 26 of the liquid storage tank 20 enclose the opening 22a and is connected to a peripheral edge of the opening 22a. The cap body 26 fits around the pump tube 24, thereby the pump tube 24 is partially exposed outside the cap body 26. The pressing member 28 is adapted to press against a part of the pump tube 24 exposed outside the cap body 26, and has a liquid outlet 28a communicating with the pump tube 24 via a connecting pipe 29, wherein the connecting pipe 29 is a curved pipe with a reentrant angle of 90 degrees, and has a first port 29a and a second port 29b. The first port 29a is connected to the liquid outlet 28a, and the second port 29b is connected to the pump tube 24, so that the liquid outlet 28a communicates with the receiving space A.

[0014] The engaging groove 222 of the liquid storage tank 20 could move along the first predetermined direction D1 to be sleeved or disengaged from the engaging track 164 of the shower body 10, so that the liquid storage tank 20 could be detachably engaged with the shower

body 10. It is worth mentioning that when the engaging track 164 of the shower body 10 is not completely located in the engaging groove 222 of the liquid storage tank 20, the positioning protrusion 182 is pressed by a side surface of the liquid storage tank 20, to compress the spring 184 to be completely located in the engaging hole 166a. Until the engaging track 164 of the shower body 10 is completely located in the engaging groove 222 of the liquid storage tank 20, and the positioning hole 224 of the liquid storage tank 20 faces the engaging holel66a of the shower body 10, at this time, the spring 184 restores to its natural length by an elastic forced generated by the spring 184, wherein the elastic forced generated by the spring 184 urges the positioning protrusion 182 to moves along the second predetermined direction D2 and enter the positioning hole 224. In this way, the positioning member 18 restricts the liquid storage tank 20 from changing a position in the first predetermined direction D1, thereby preventing the liquid storage tank 20 from accidentally sliding down. As shown in FIG. 4, when the liquid storage tank 20 is pushed by an external force F toward the second predetermined direction D2, the wide section 164b of the engaging track 164 could be stuck in the second section 222b of the engaging groove 222 to prevent the liquid storage tank 20 from being detached along the second predetermined direction D2.

[0015] When a user is about to press out the cleaning solution in the receiving space A, press the pressing member 28, and the cleaning solution will flow out of the liquid outlet 28a by passing through the pump tube 24 and the connecting pipe 29. More specifically, in the current embodiment, the liquid outlet 28a faces a direction away from an outlet direction of the outlet portion 142. In this way, when the liquid outlet 28a supplies the cleaning solution, the cleaning solution would not be directly flushed away by water flowing from the outlet portion 142, and the user would not be spattered by the water from the outlet portion 142. However, in other embodiments, the liquid outlet 28a could be disposed to face other directions.

[0016] A handheld shower 100A of a second embodiment is illustrated in FIG. 10. In the current embodiment, a first engaging portion of a first liquid storage tank 20A is an engaging track 222A, and a second engaging portion of a shower body 10A is an engaging groove 164A, and the engaging track 222A could be inserted into the engaging groove 164A. In addition, a positioning member 18A is disposed on the shower body 10A, and the liquid storage tank 20A has a positioning hole 224A. The aforementioned structural design can also achieve the same restricting effect as the first embodiment.

[0017] As illustrated in FIG. 11 to FIG. 19, a handheld shower 200 according to a third embodiment of the present invention includes a shower body 30 and a liquid storage tank 44. The shower body 30 has an inlet channel 32 and an outlet portion 34. The liquid storage tank 44 is detachably engaged with the shower body 30.

[0018] More specifically, in a longitudinal axial direction of the shower body 30, the shower body 30 has a first end 36 and a second end 38 which are opposite, wherein the first end 36 has an inlet portion 362 which communicates with the inlet channel 32. The shower body 30 has a receiving groove 40 which is recessed along the longitudinal axial direction of the shower body 30 and is located at another side of the shower body 30 which is away from a side disposed with the outlet portion 34. A mouth 402 of the receiving groove 40 is formed at the second end 38 of the shower body 30. The liquid storage tank 44 could be inserted through the mouth 402 to the receiving groove 40. A slot 42 is formed on the another side of the shower body 30 which is away from the side disposed with the outlet portion 34. In the current embodiment, the slot 42 is opposite to the outlet portion 34. The slot 42 communicates with the receiving groove 40 and the mouth 402.

[0019] A first positioning portion 404 is disposed on a wall of the receiving groove 40 and is near to a bottom end of the slot 42. A box body 46 of the liquid storage tank 44 has a second positioning portion 462 which is located at a bottom portion of the box body 46. In the current embodiment, the first positioning portion 404 includes, but not limited to, at least one recess, and the second positioning portion 462 includes, but not limited to, at least one protrusion. Alternatively, the first positioning portion 404 could include at least one protrusion, and the second positioning portion 462 could include at least one recess.

[0020] After the liquid storage tank 44 is engaged with the receiving groove 40, a part of the box body 46 of the liquid storage tank 44 is exposed outside through the slot, and the first positioning portion 404 is complementarily engaged with the second positioning portion 462 to position the liquid storage tank 44, thereby preventing the liquid storage tank 44 from disengaging from the receiving groove 40.

[0021] When the user wants to take off the liquid storage tank 44, the user could simply push the part of the box body 46 of the liquid storage tank 44 which is exposed outside through the slot 42 to move toward the mouth 402 of the receiving groove 40 to disengage the liquid storage tank 44 from the shower body 30. Additionally, when the box body 46 is transparent or translucent, a volume of a cleaning solution stored in the box body 46 is visible through the slot 42. In the current embodiment, an opening of a liquid outlet 482 of a pressing member 48 of the liquid storage tank 44 faces toward an outlet direction of the outlet portion 34.

[0022] For preventing a cleaning solution provided through the liquid outlet 482 from being flushed away by a large volume of water, in the current embodiment, the handheld shower 200 further includes a valve 50 for restricting flow. The valve 50 for restricting flow is adapted to limit a volume of water flow passing through the inlet channel 32, so that a water flow outputted through the outlet portion 34 could be switched between a first flowing mode and a second flowing mode, wherein an outputted

water volume of the second flowing mode is less than that of the first flowing mode. In other words, the first flowing mode could output a great amount of water, and the second flowing mode could output a small amount of water or stop outputting water. Preferably, the second flowing mode could output a small amount of water to avoid a flexible hose connected to the inlet portion 362 to burst due to excessive water pressure.

[0023] As illustrated in FIG. 16 to FIG. 19, the valve 50 for restricting flow is disposed in the shower body 30 and is located between the receiving groove 40 and the first end 36. The valve 50 for restricting flow includes an operating member 52 and a valve core 54. The operating member 52 has a button 522 which is located at the another side of the shower body 30 which is away from the side disposed with the outlet portion 34 and is adapted to be pressed by the user. In the current embodiment, the button552 is opposite to the outlet portion 34. The operating member 52 could be operated to move between a first position P1 as shown in FIG. 17 and a second position P2 as shown in FIG. 19. The inlet channel 32 has a valve opening 32a which is located between the outlet portion 34 and the inlet portion 362. The valve core 54 is located at a position corresponding to the valve opening 32a. When the button 522 is not pressed, the operating member 52 is located at the first position P1 and drives the valve core 54 to disengage from the valve opening 32a of the inlet channel 32. At this time, water flowing through the valve opening 32a does not be blocked by the valve core 54, so that the outlet portion 34 outputs water in the first flowing mode, namely outputting a large volume of water. When the button 522 is pressed, the operating member 52 is located at the second position P2 and drives the valve core 54 to block the valve opening 32a of the inlet channel 32. At this time, the water could flow through a gap between the valve core 54 and the valve opening 32a, so that the outlet portion 34 outputs water in the second flowing mode, namely outputting a small volume of water, thereby pausing water flow outputted through the outlet portion 34. In another embodiment, when the operating member 52 is located at the second position P2, there is no gap between the valve core 54 and the valve opening 32a, thereby temporarily stopping water flow outputted through the outlet portion 34.

[0024] For example, as illustrated in FIG. 18 and FIG. 19, when the user wants to use the cleaning solution, the user could press the button 522 first to allow the operating member 52 to stay at the second position P2 and to make the valve core 54 block the valve opening 32a of the inlet channel 32, thereby making the outlet portion 34 output a small amount of water. Then, press the pressing member 48 to make the cleaning solution flow out through the liquid outlet 482. At this time, the small amount of water outputted through the outlet portion 34 could dilute the cleaning solution, so that the user could easily apply the cleaning solution. After that, when the user wants to shower, the user could press the button 522 to allow the operating member 52 to return to the first position P1, thereby making the outlet portion 34 output a great amount of water for the user to shower.

[0025] The valve 50 of the current embodiment for restricting flow passing through the inlet channel 32 could be applied to the first embodiment or the second embodiment.

[0026] In summary, the liquid storage tank is engaged with the shower body in a detachable manner, so that the user not only has no need to carry bottles when traveling or on business trips, but also could carry the handheld shower that the user familiar with, which could improve the user's shower experience and quality of life when going out In addition, the handheld shower of the present invention could be easily assembled and detached, which is very convenient, and multiple liquid storage boxes could be carried for replacement during a long-distance trip.

[0027] It must be pointed out that the embodiments described above are only some preferred embodiments of the present invention. All equivalent structures which employ the concepts disclosed in this specification and the appended claims should fall within the scope of the present invention.

Claims

1. A handheld shower (100, 100A, 200), comprising:

   a shower body (10, 10A, 30) having an inlet channel (S, 32) and an outlet portion (142, 34), wherein the inlet channel (S, 32) communicates with the outlet portion (142, 34); and
   a liquid storage tank (20, 20A, 44) detachably engaged with the shower body (10, 10A, 30) and having a receiving space (A) and a liquid outlet (28a, 482), wherein the receiving space (A) is adapted to receive a cleaning solution; the liquid outlet (28a, 482) communicates with the receiving space (A) and is adapted to output the liquid solution inside the receiving space (A).

2. The handheld shower (100, 100A, 200) as claimed in claim 1, wherein the shower body (10, 10A, 30) has a receiving groove (162, 40); the receiving groove (162, 40) and the outlet portion (142, 34) face opposite directions; the receiving groove (162, 40) is engaged with the liquid storage tank (20, 20A, 44).

3. The handheld shower (100, 100A) as claimed in claim 1, wherein the shower body (10, 10A) has a first engaging portion; the liquid storage tank (20, 20A) has a second engaging portion detachably engaged with the first engaging portion of the shower body (10, 10A).

4. The handheld shower (100, 100A) as claimed in

claim 3, wherein one of the first engaging portion and the second engaging portion has an engaging track (164, 222A) extending along a first predetermined direction (D1), and the other one of the first engaging portion and the second engaging portion has an engaging groove (222, 164A) corresponding to the engaging track (164, 222A); the engaged track (164, 222A) is engaged with the engaging groove (222, 164A).

5. The handheld shower (100, 100A) as claimed in claim 4, wherein the shower body (10, 10A) has a longitudinal direction and the engaging track (164, 222A); the first predetermined direction (D1) is the longitudinal direction of the shower body (10, 10A); the liquid storage tank (20, 20A) has the engaging groove (222, 164A).

6. The handheld shower (100, 100A) as claimed in claim 5, wherein the shower body (10, 10A) has a receiving groove (162), and a groove surface (162a) of the receiving groove (162) and the outlet portion (142) face opposite directions; the engaging track (164, 222A) has a narrow section (164a) and a wide section (164b) in a direction away from the groove surface (162a) of the receiving groove (162); the narrow section (164a) is connected to the groove surface (162a); the engaging groove (222) has a first section (222a) and a second section (222b); a width of the first section (222a) is smaller than a width of the second section (222b); the first section (222a) and the second section (222b) are respectively complementary to the narrow section (164a) and the wide section (164b).

7. The handheld shower (100, 100A) as claimed in claim 4, wherein one of the shower body (10, 10A) and the liquid storage tank (20, 20A) has a positioning member (18, 18A), and the other one of the shower body (10, 10A) and the liquid storage tank (20, 20A) has a positioning hole (224, 224A); when the liquid storage tank (20, 20A) is engaged with the shower body (10, 10A), the positioning member (18, 18A) enters the positioning hole (224, 224A) and restricts the liquid storage tank (20, 20A) from changing a position in the first predetermined direction (D1) .

8. The handheld shower (100, 100A) as claimed in claim 7, wherein the positioning member (18, 18A) is movable along a second predetermined direction (D2) to and enter the positioning hole (224, 224A); the second predetermined direction (D2) is orthogonal to the first predetermined direction (D1).

9. The handheld shower (100, 100A) as claimed in claim 8, wherein the shower body (10, 10A) comprises a front panel (14) and a rear panel (16) connected to the front panel (14); the positioning member (18, 18A) comprises a spring (184) and a positioning protrusion (182); the front panel (14) has the outlet portion (142), and a part of the inlet channel (S) is formed between the front panel (14) and the rear panel (16); the rear panel (16) has an engaging hole (166a), and an axial direction of the engaging hole (166a) is parallel to the second predetermined direction (D2); the spring (184) and the positioning member (18, 18A) are disposed in the engaging hole (166a); a side of the positioning protrusion (182) is connected to an end of the spring (184), and the other side of the positioning protrusion (182) protrudes out of the engaging hole (166a).

10. The handheld shower (100, 100A, 200) as claimed in claim 1, wherein the liquid storage tank has a box body (22, 46), a cap body (26), a pump tube (24), and a pressing member (28); the box body (22, 46) has the receiving space (A) and an opening (22a); the cap body (26) is connected to a peripheral edge of the opening (22a), and enclose the opening (22a); the cap body (26) fits around the pump tube (24); the pressing member (28) is adapted to abut against the pump tube (24) and has the liquid outlet (28a, 482); the liquid outlet (28a, 482) communicates with the pump tube (24).

11. The handheld shower (100, 100A) as claimed in claim 1, wherein the liquid outlet (28a) faces different directions from an outlet direction of the outlet portion (142) .

12. The handheld shower (200) as claimed in claim 2, wherein the shower body (30) has a first end (36) and a second end (38) which are opposite; the first end (36) of the shower body (30) has an inlet portion (362) which communicates with the inlet channel (32); a mouth (402) of the receiving groove (40) is formed at the second end (38) of the shower body (30); the liquid storage tank (44) could be inserted through the mouth (402) to the receiving groove (40) .

13. The handheld shower (200) as claimed in claim 12, wherein a slot (42) is formed on the shower body (30) and communicates with the receiving groove (40) and the mouth (402); the liquid storage tank (44) has a box body (46), wherein a part of the box body (46) of the liquid storage tank (44) is exposed outside through the slot (42).

14. The handheld shower (200) as claimed in claim 1, further comprising a valve (50) for restricting flow, wherein the valve (50) is disposed in the shower body (30) and comprises an operating member (52) and a valve core (54); the operating member (52) is operable to move between a first position (P1) and a

second position (P2); when the operating member (52) is located at the first position (P1), the operating member (52) drives the valve core (54) to disengage from a valve opening (32a) of the inlet channel (32); when the operating member (52) is located at the second position (P2), the operating member (52) drives the valve core (54) to block the valve opening (32a) of the inlet channel (32).

15. The handheld shower (200) as claimed in claim 2, wherein a first positioning portion (404) is disposed on a wall of the receiving groove (40), and a box body (46) of the liquid storage tank (44) has a second positioning portion (462); when the liquid storage tank (44) is engaged with the receiving groove (40), the first positioning portion (404) and the second positioning portion (462) are engaged to position the liquid storage tank (44), preferably wherein one of the first positioning portion (404) and the second positioning portion (462) comprises a recess, and the other one of the first positioning portion (404) and the second positioning portion (462) comprises a protrusion.

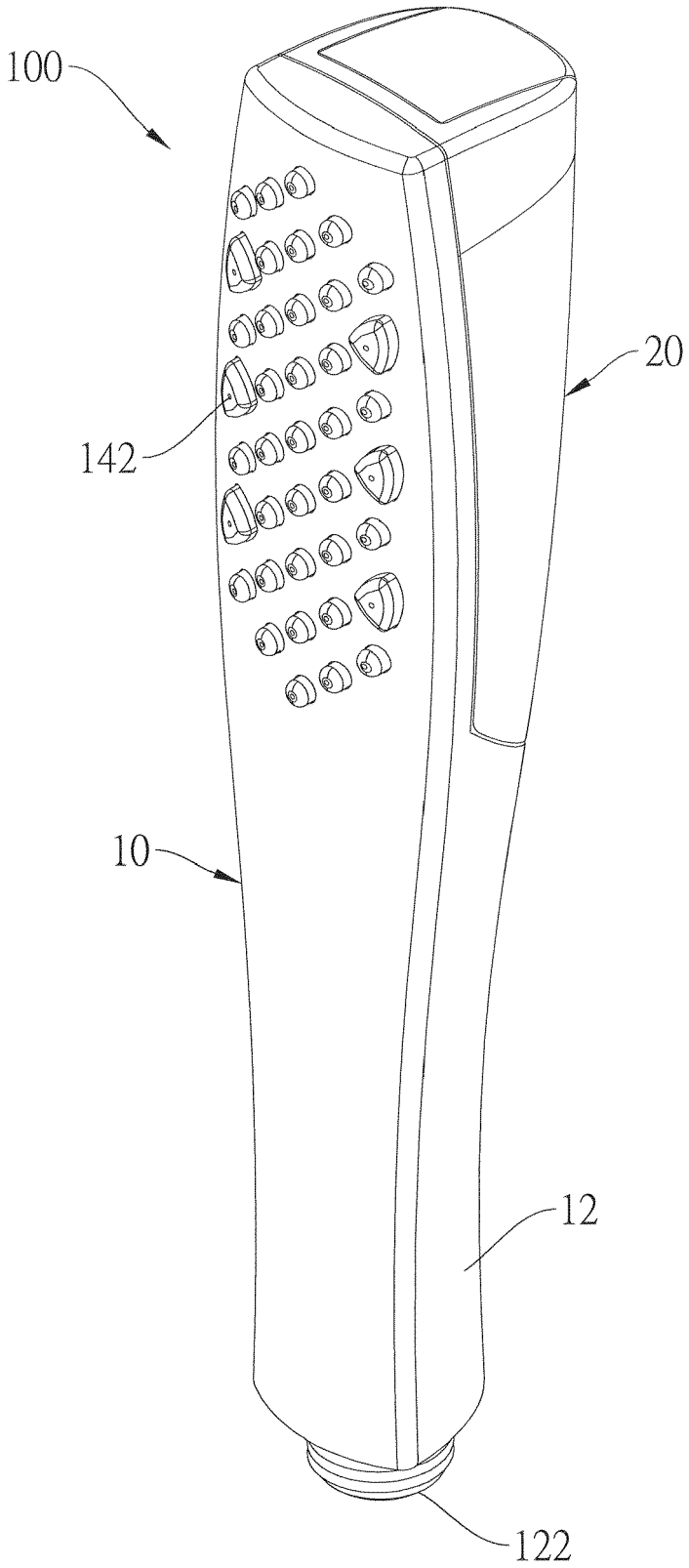

FIG.1

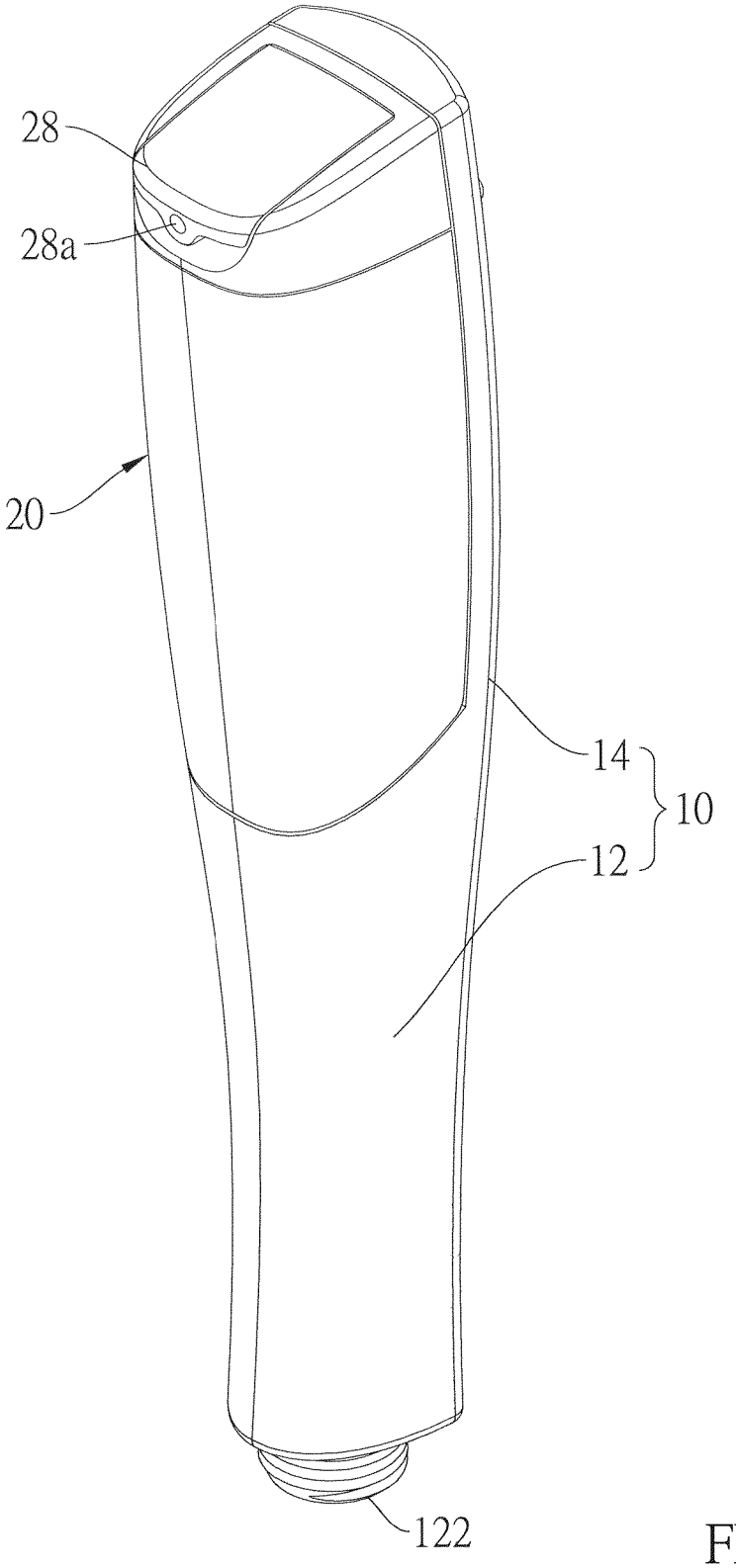

FIG.2

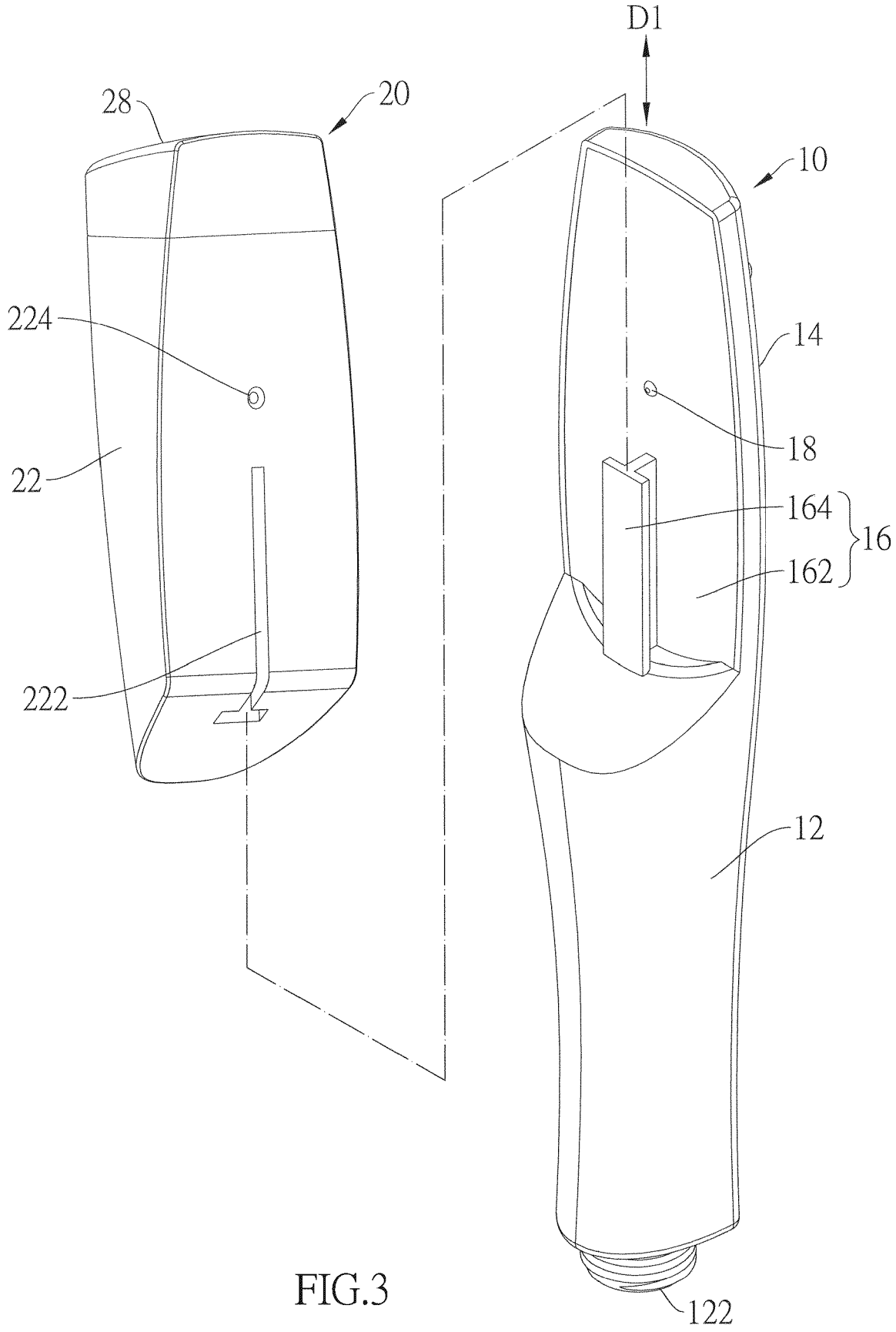

FIG.3

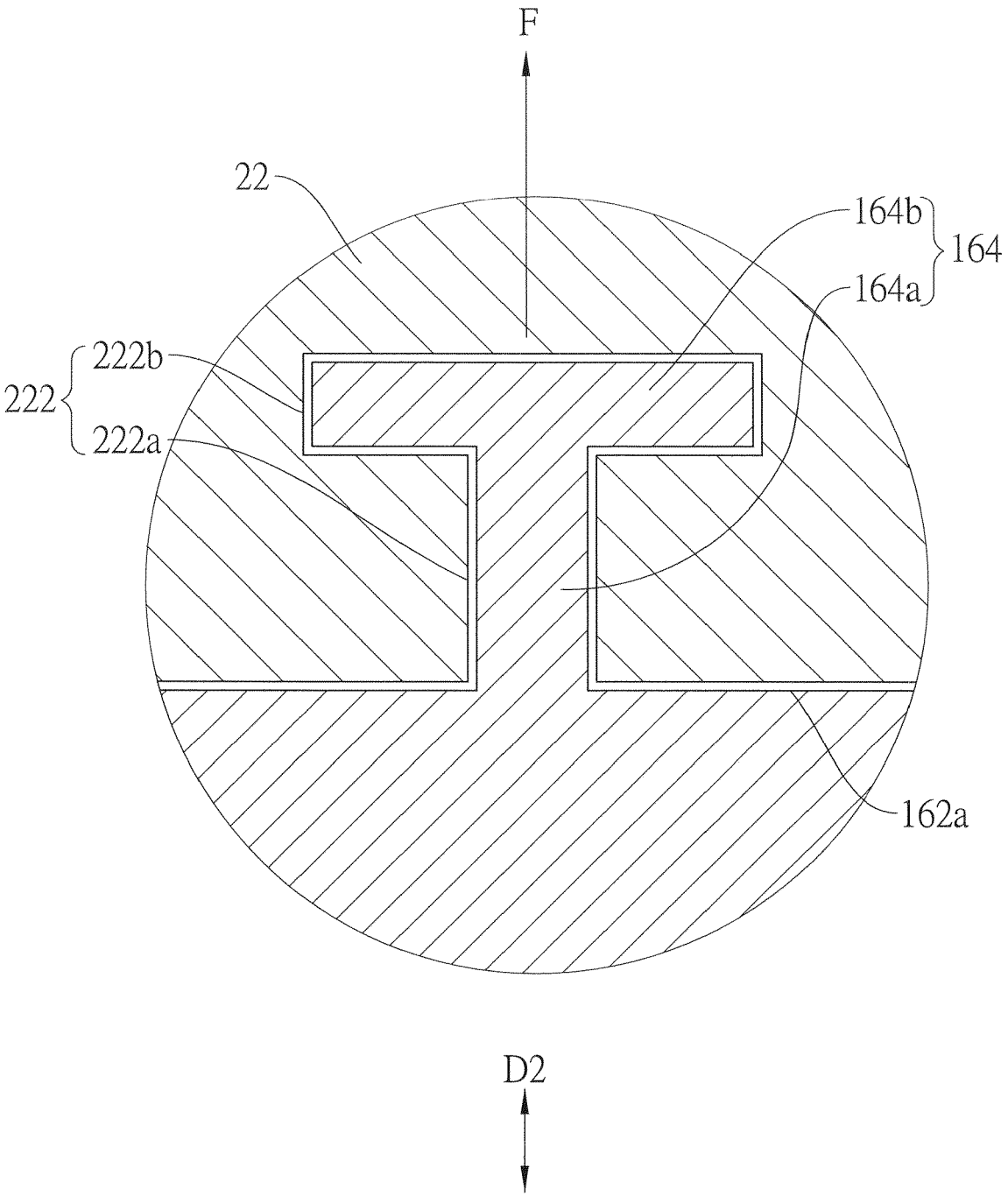

FIG.4

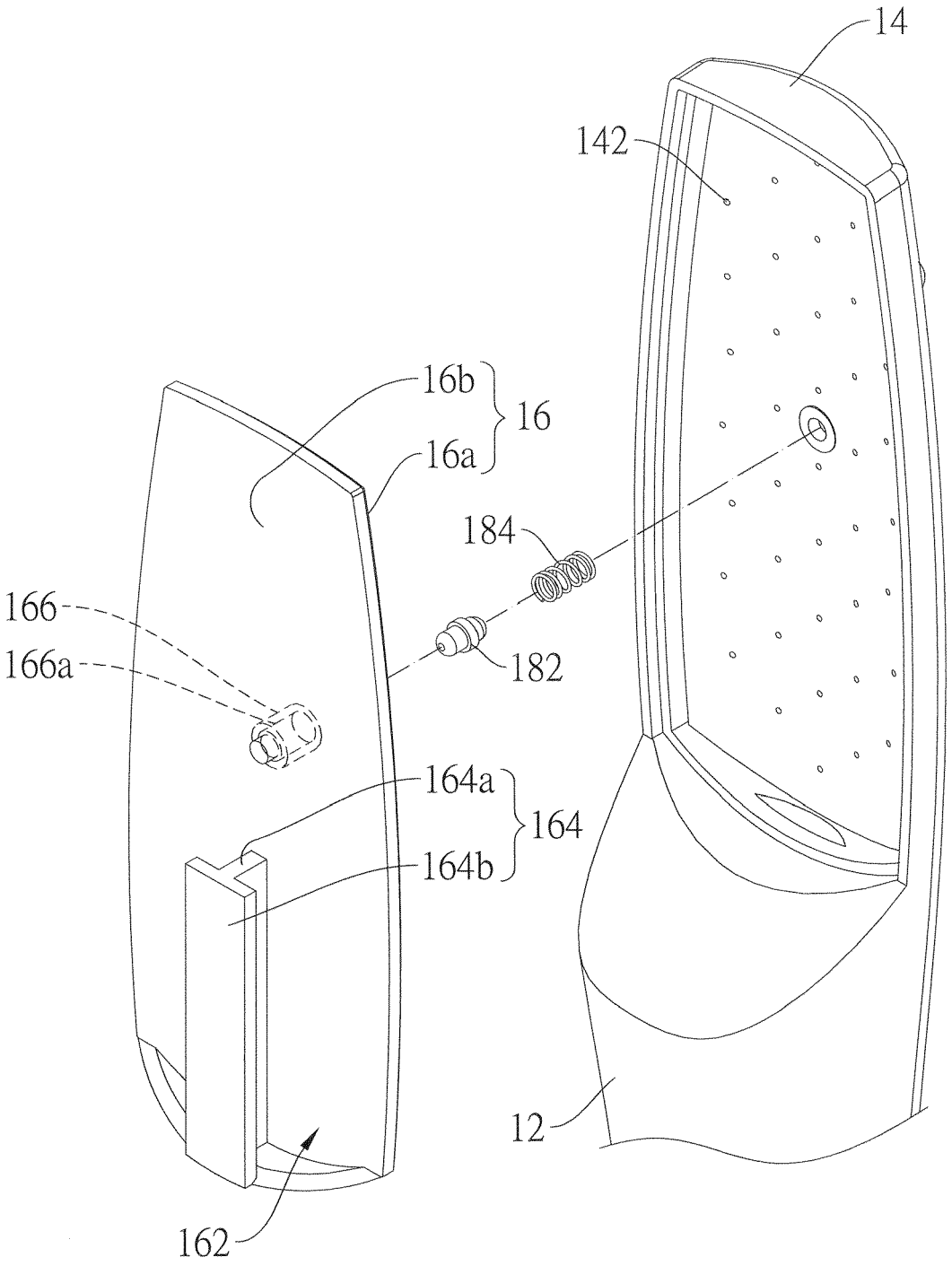

FIG.5

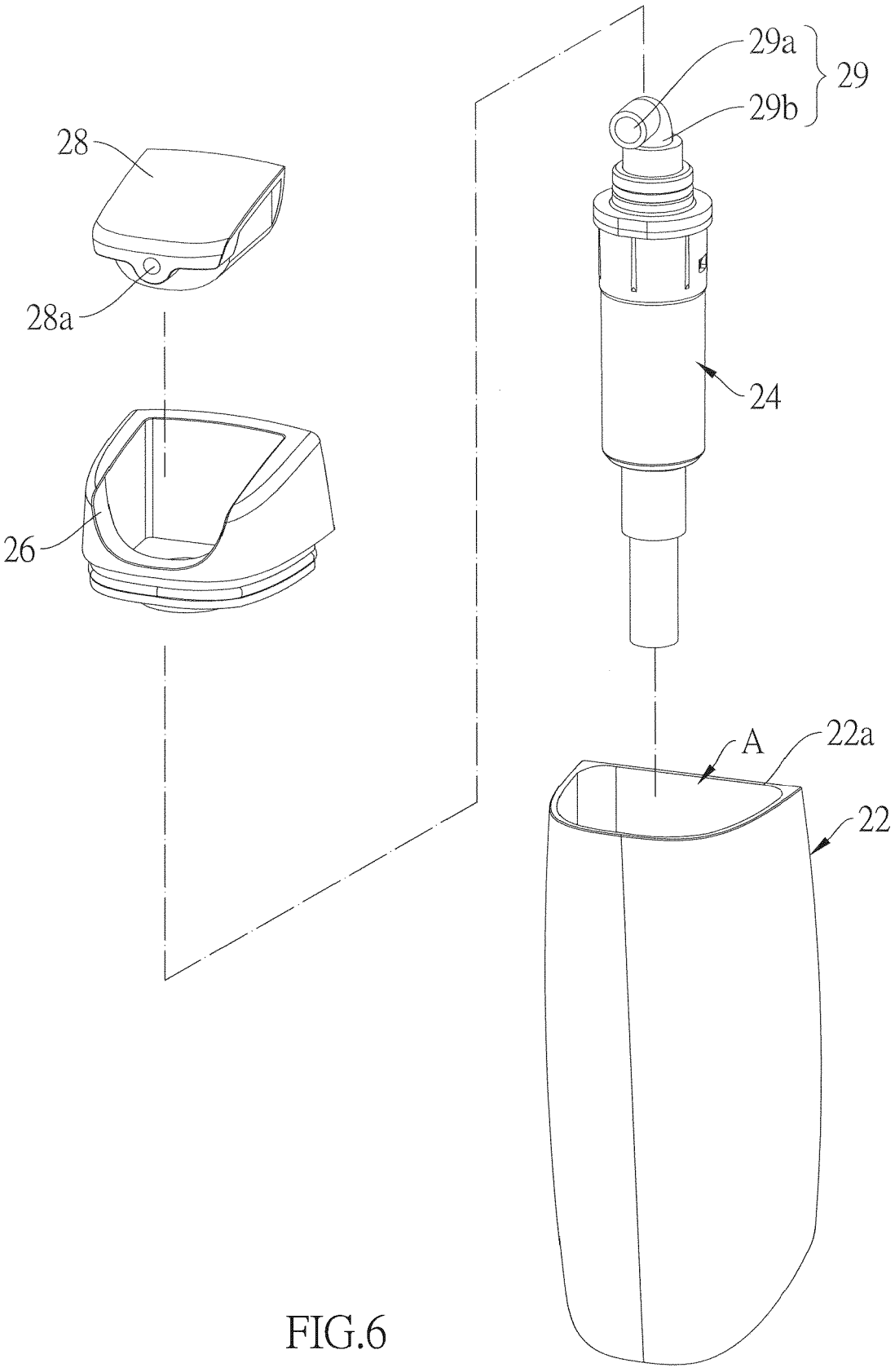

FIG.6

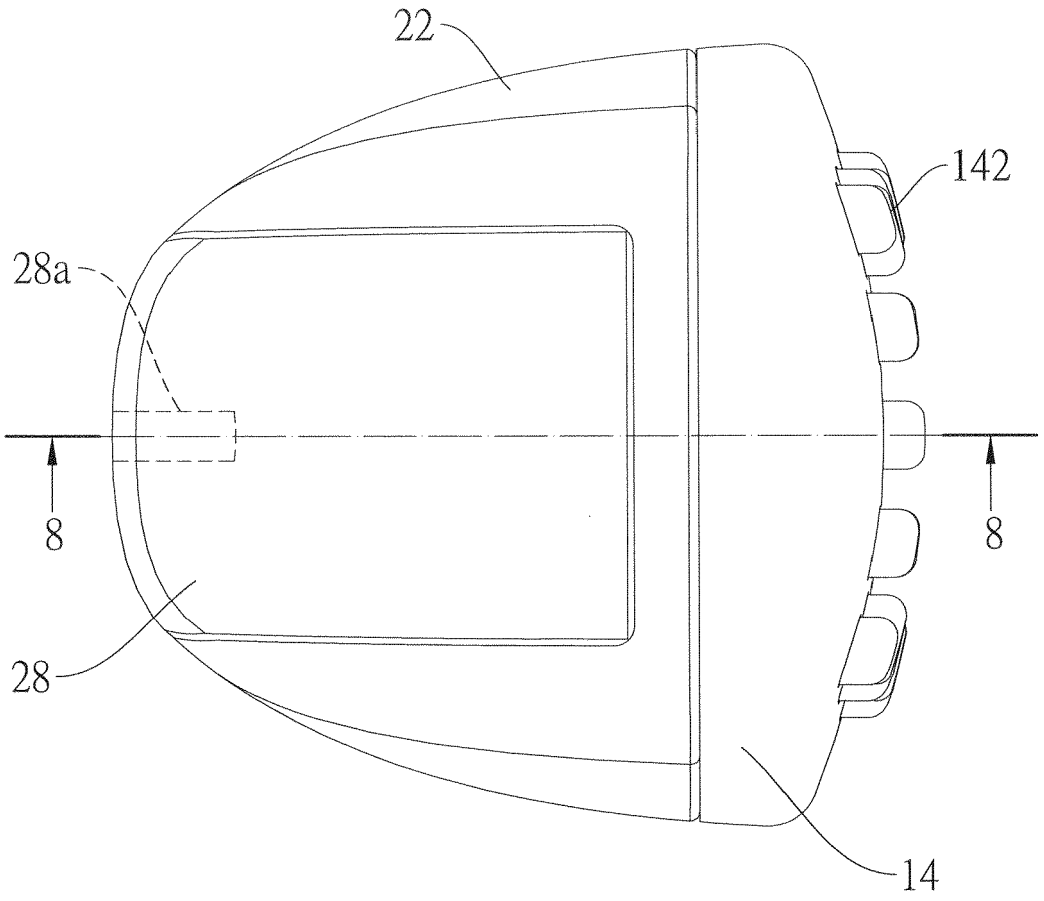

FIG.7

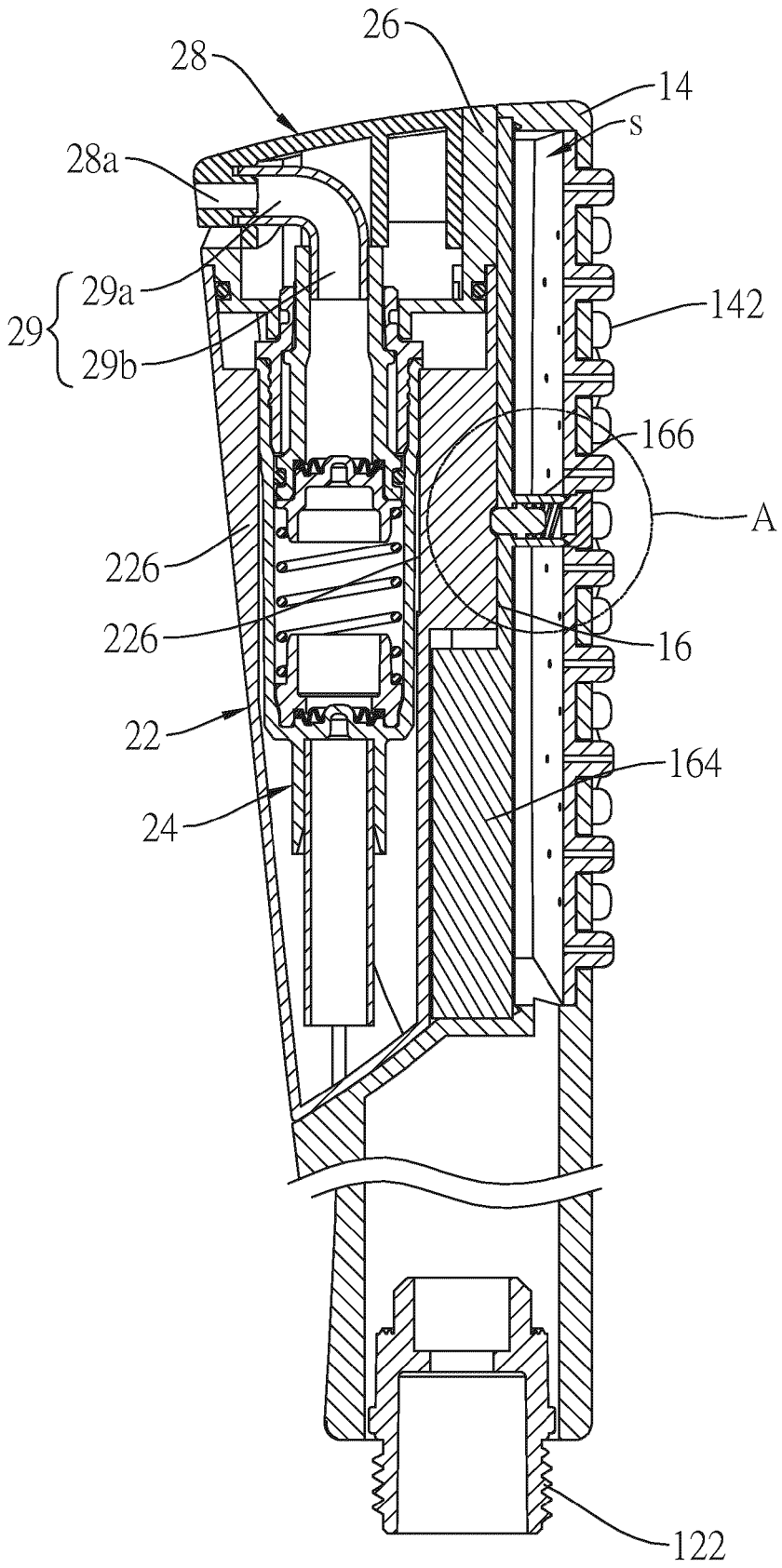

FIG.8

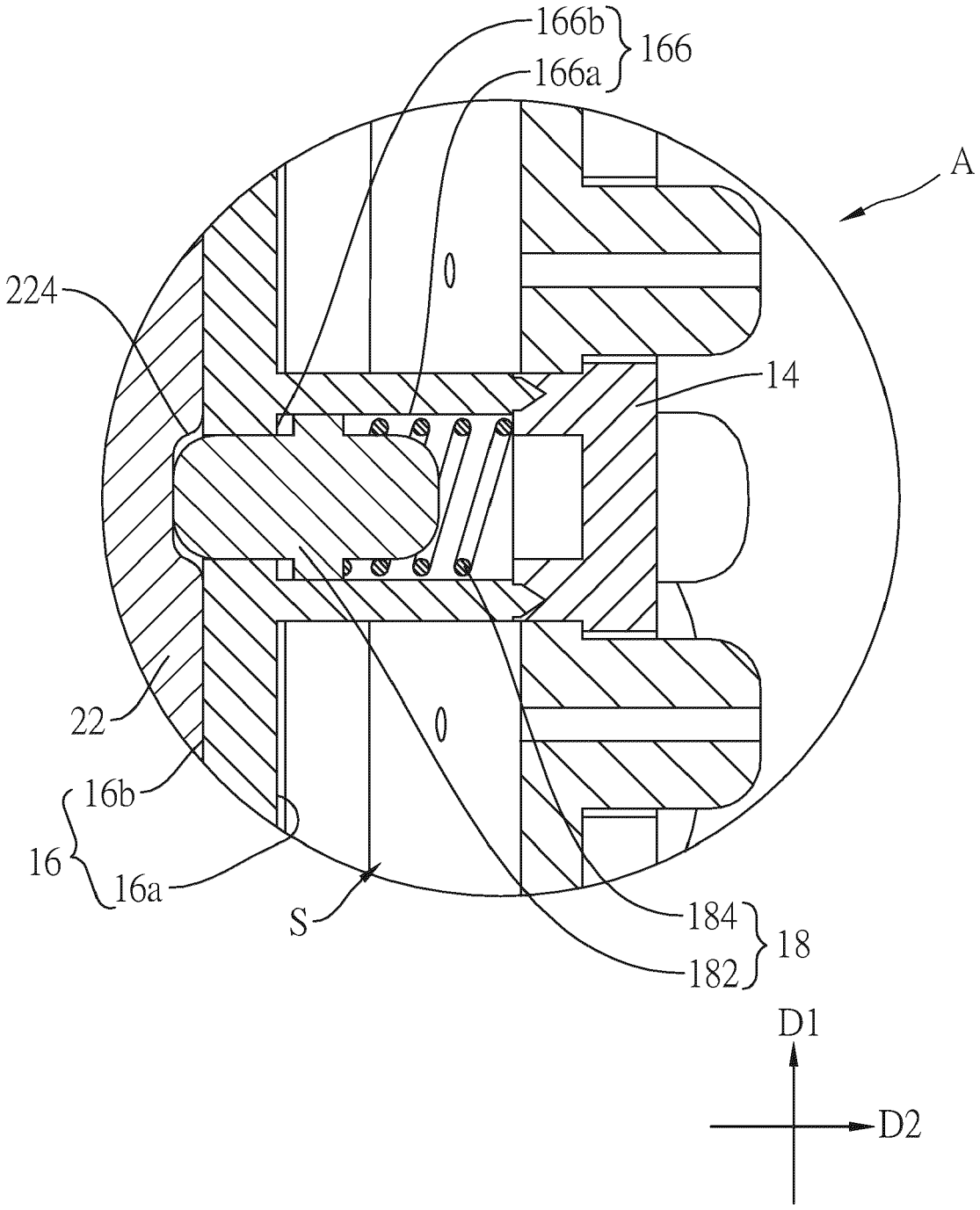

FIG.9

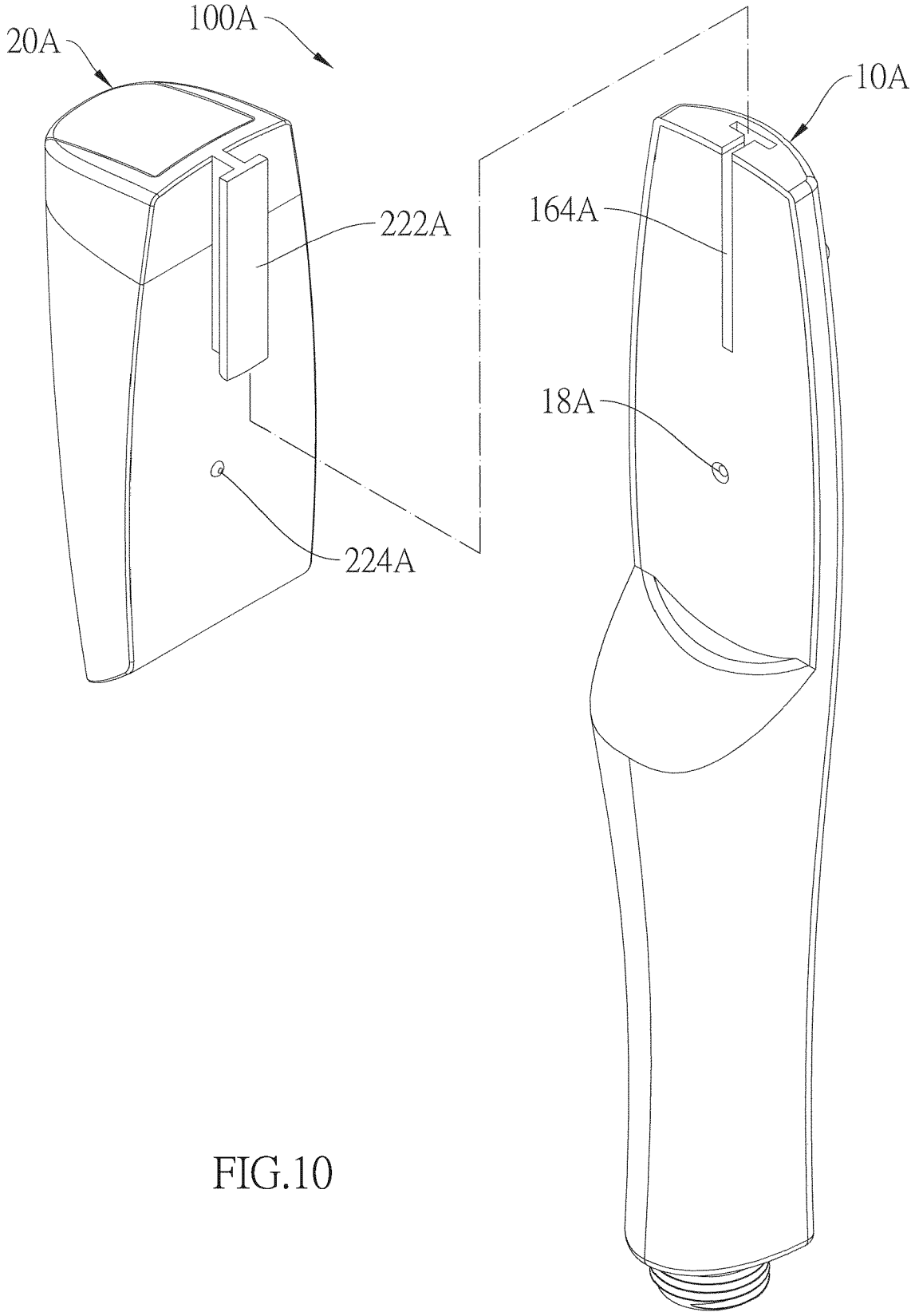

FIG.10

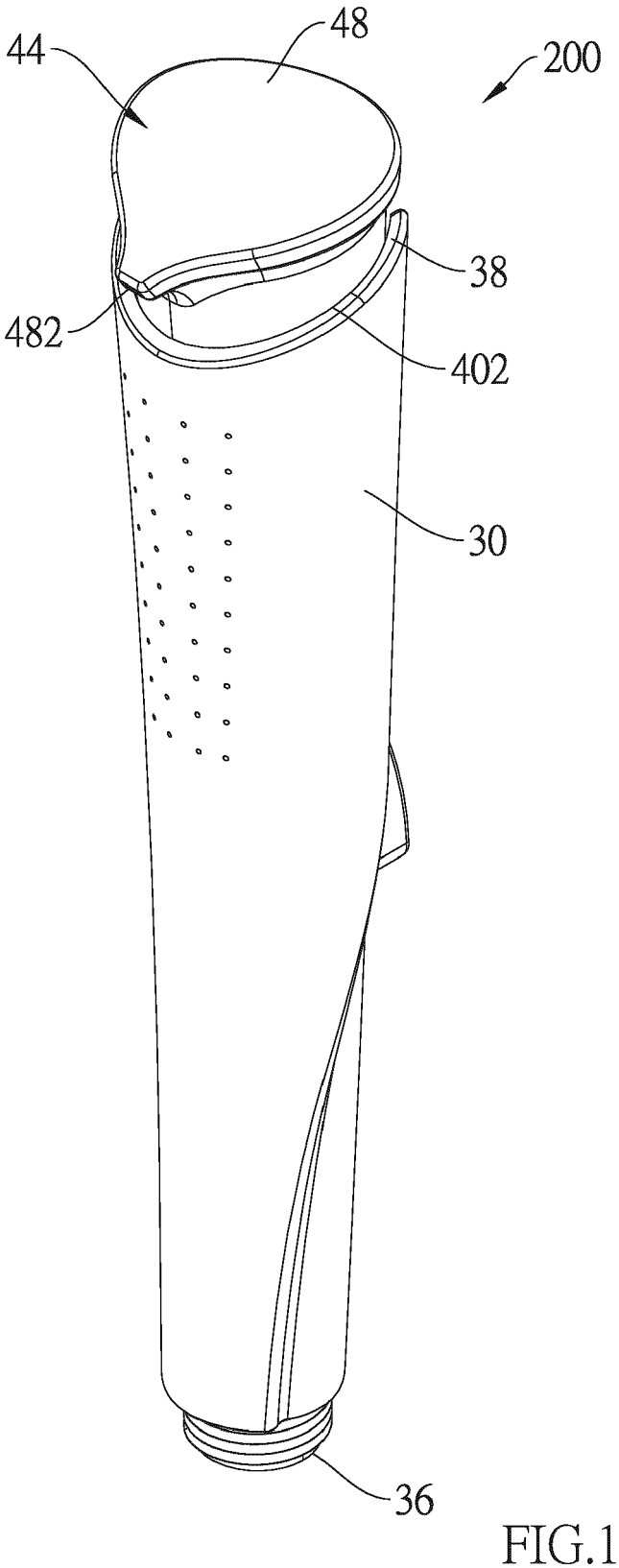

FIG.11

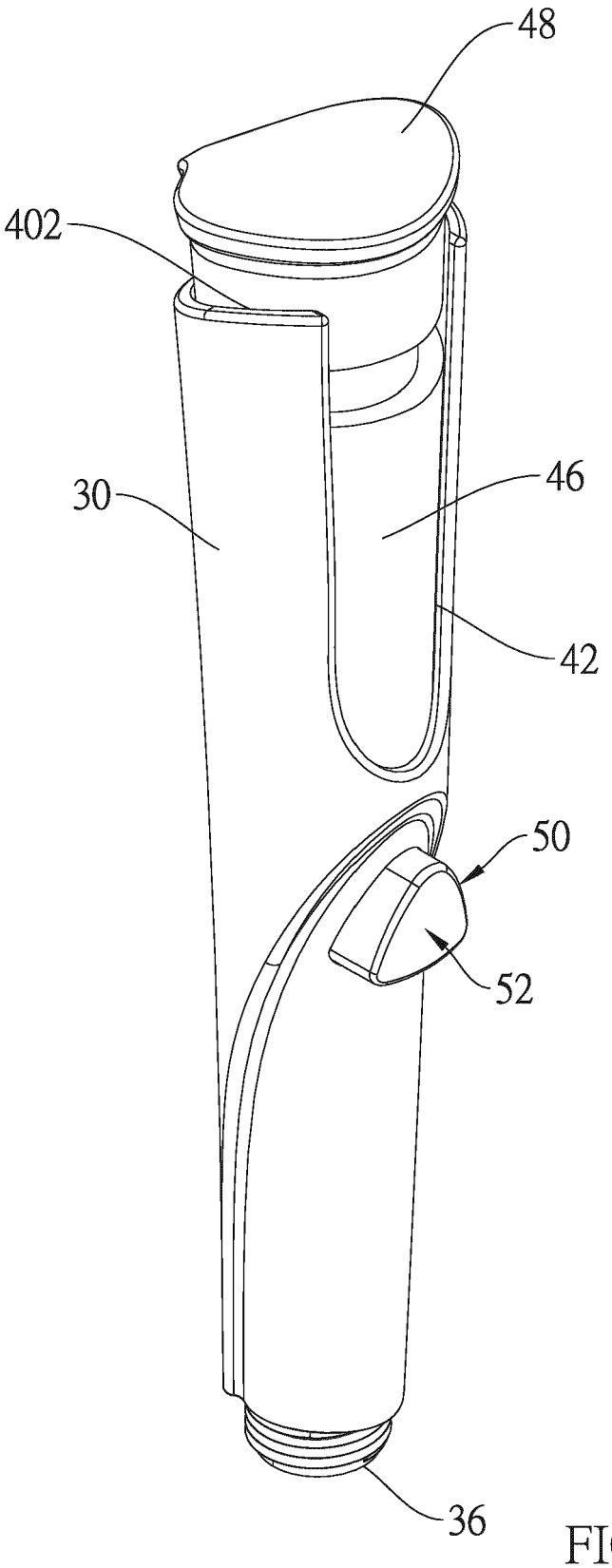

FIG.12

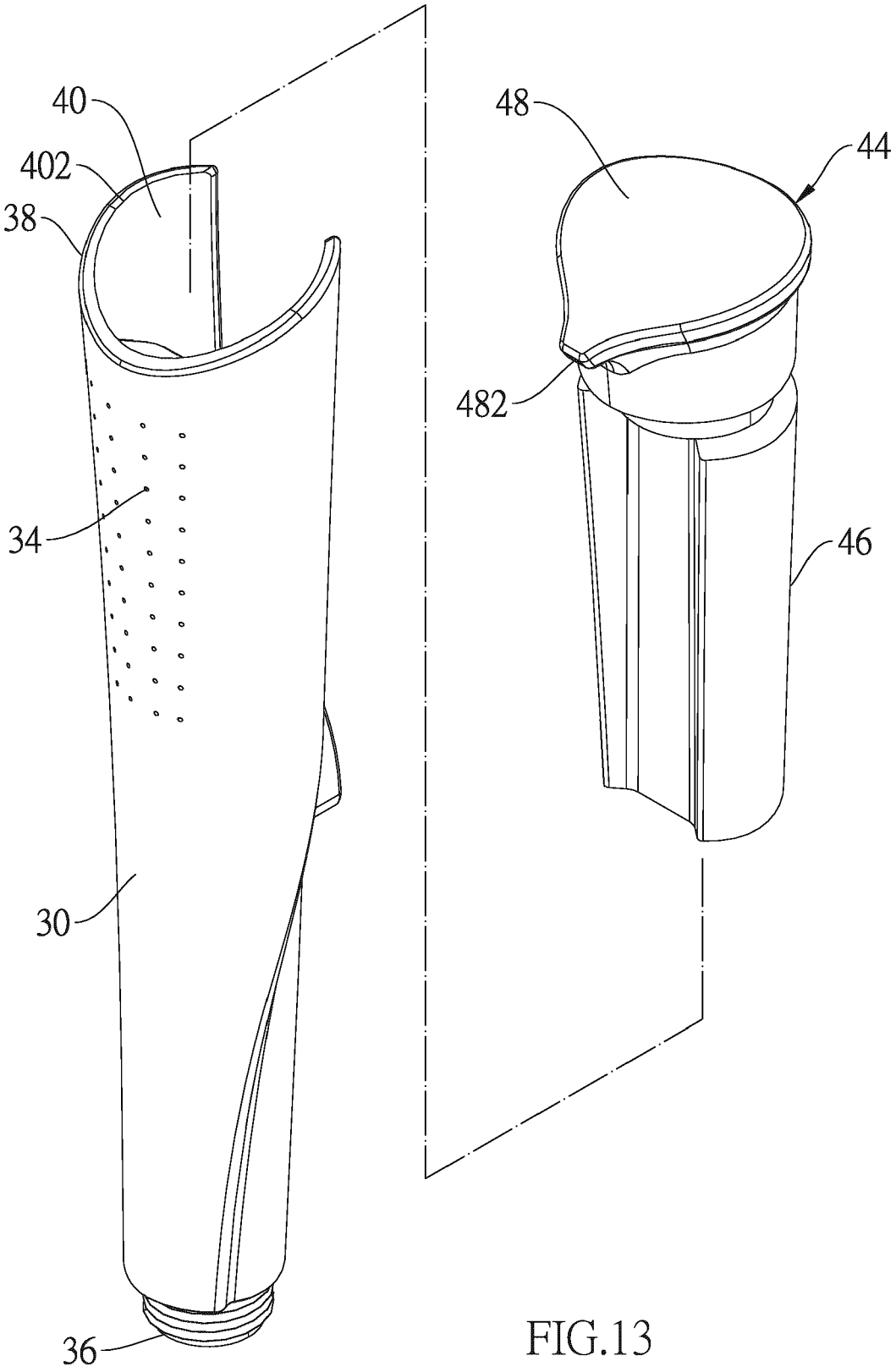

FIG.13

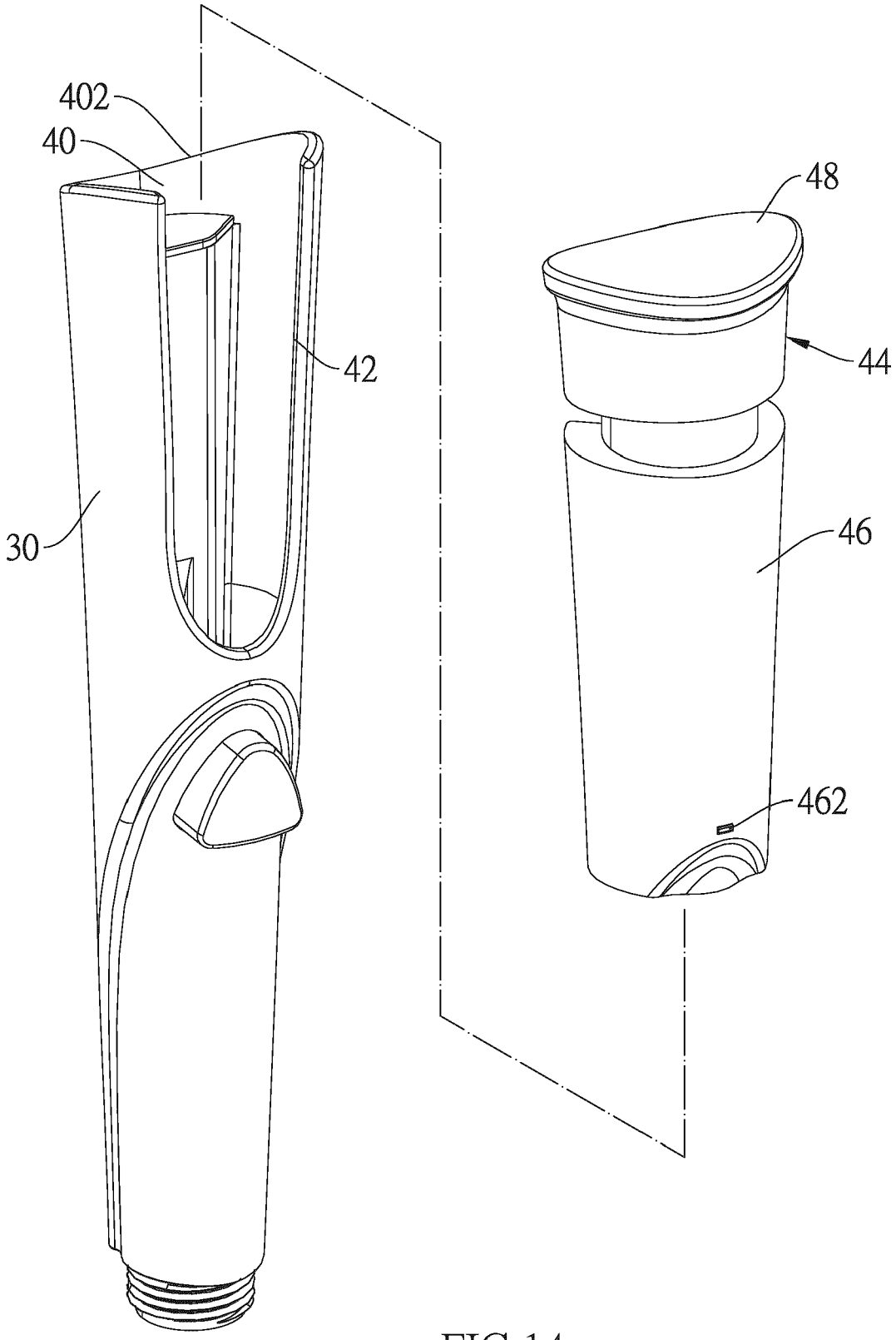

FIG.14

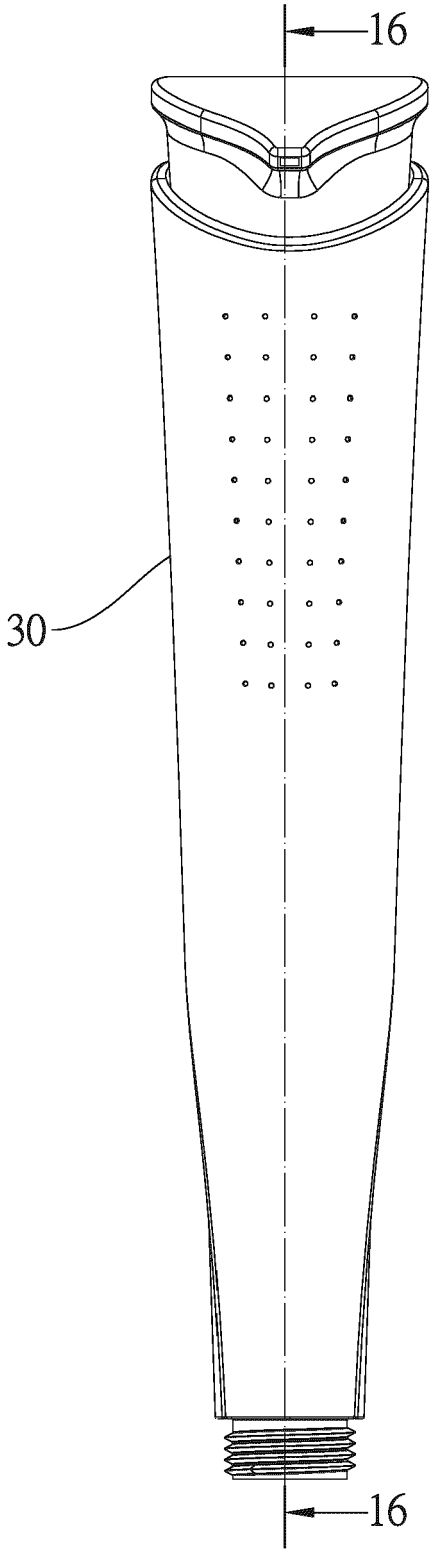

FIG.15

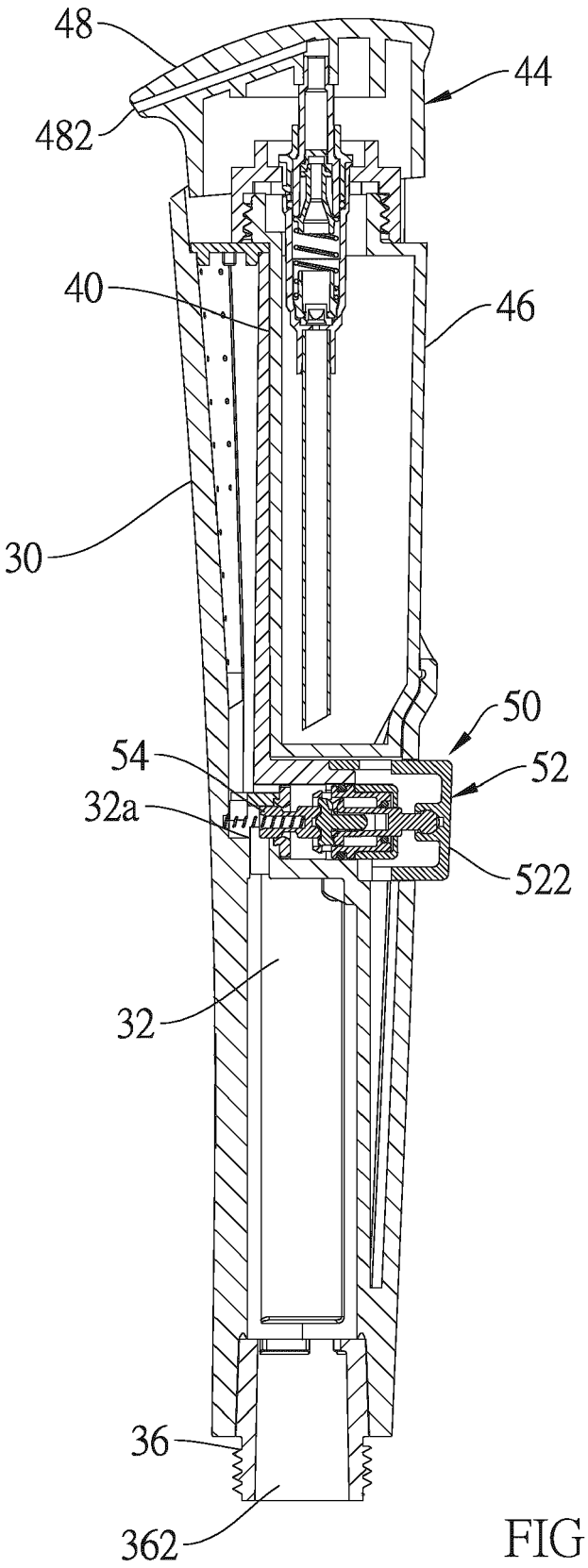

FIG.16

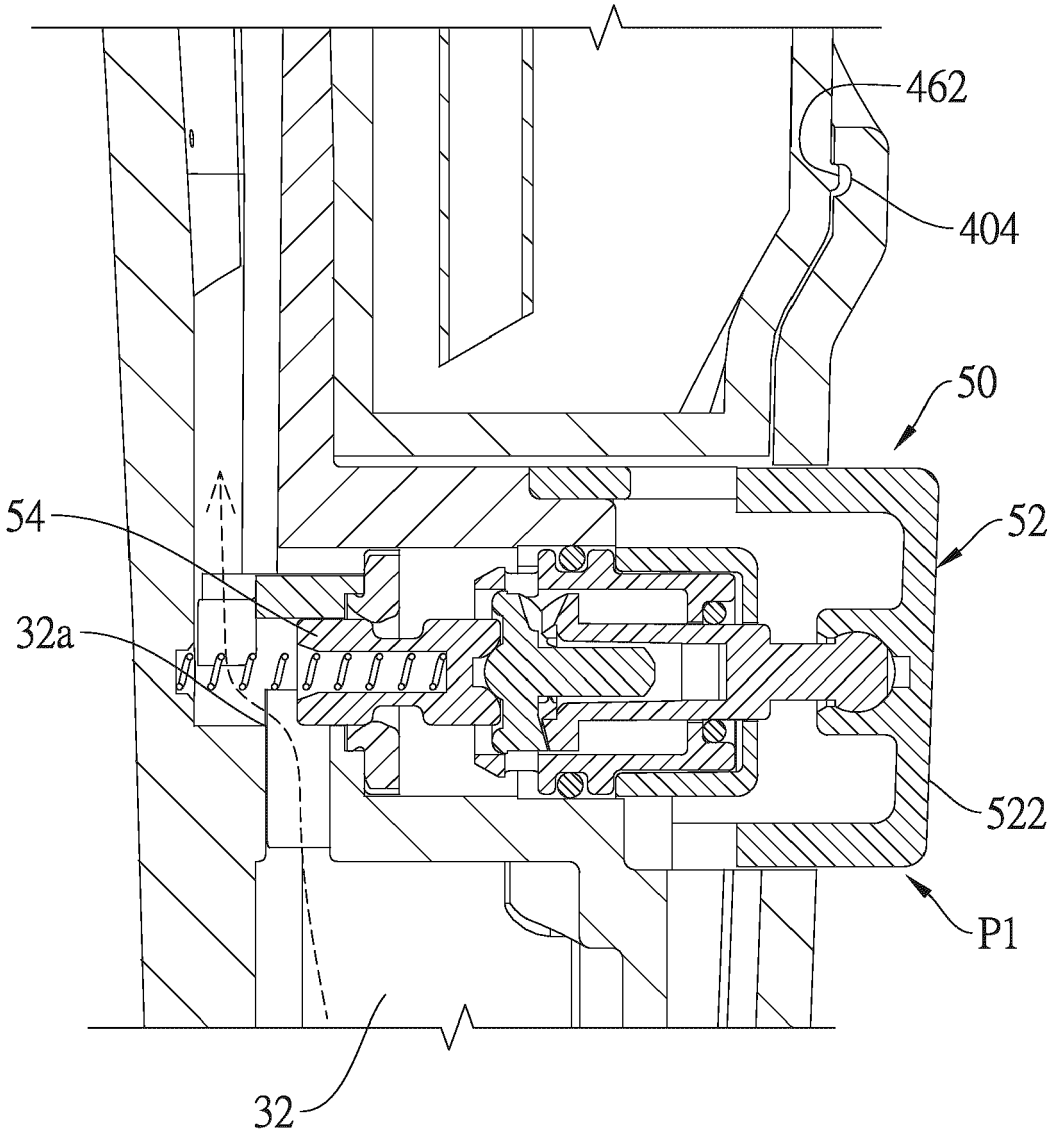

FIG.17

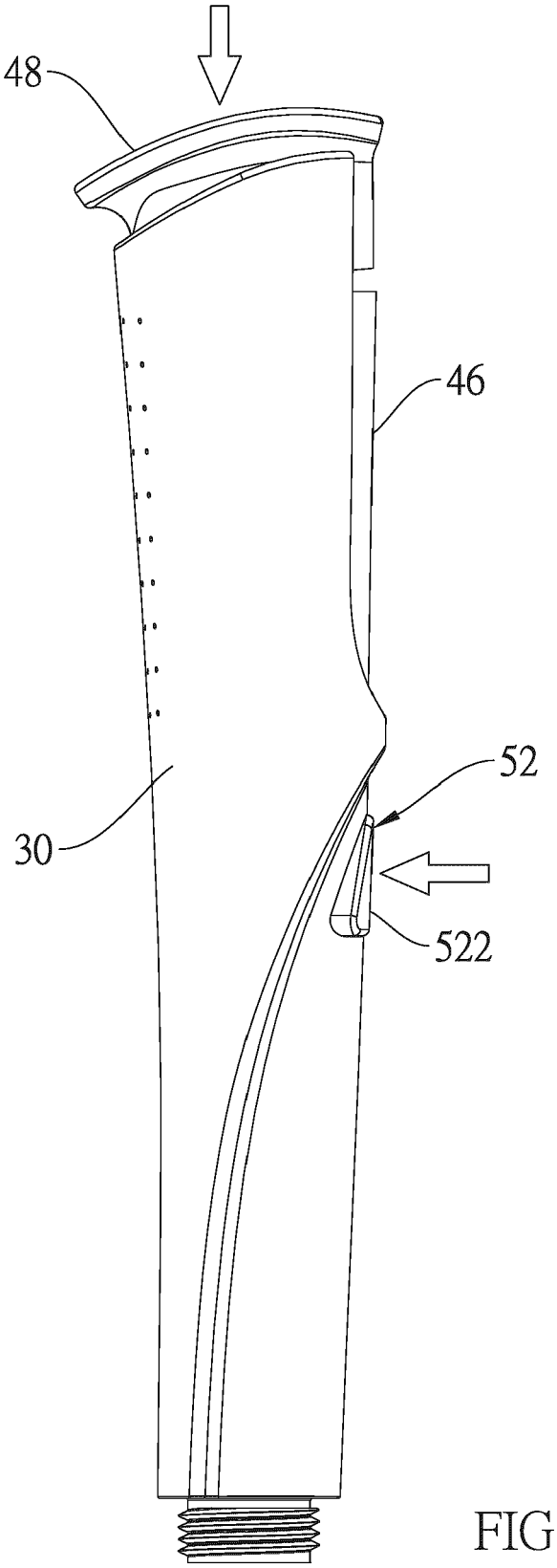

FIG.18

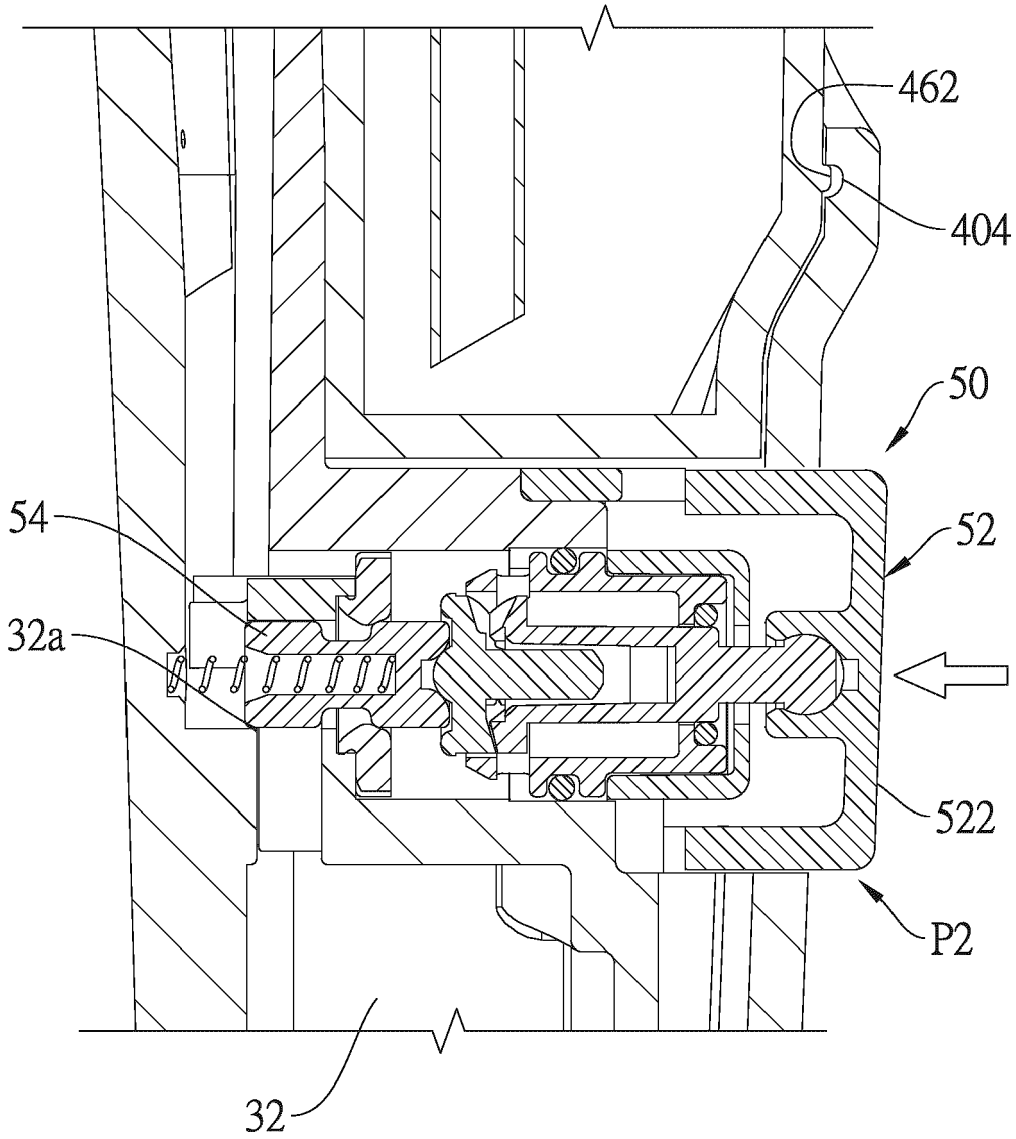

FIG.19

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EUROPEAN SEARCH REPORT

Application Number
EP 21 18 7185

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	KR 200 491 735 Y1 (N.N.) 27 May 2020 (2020-05-27) * figures 1,2 *	1,3,11	INV. E03C1/04 E03C1/046
X	DE 199 08 121 A1 (MATEJKA WILHELM [DE]) 7 September 2000 (2000-09-07) * figures A, C *	1,3,14	
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E03C
B05B

1 The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	11 January 2022	Flygare, Esa

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11-01-2022

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