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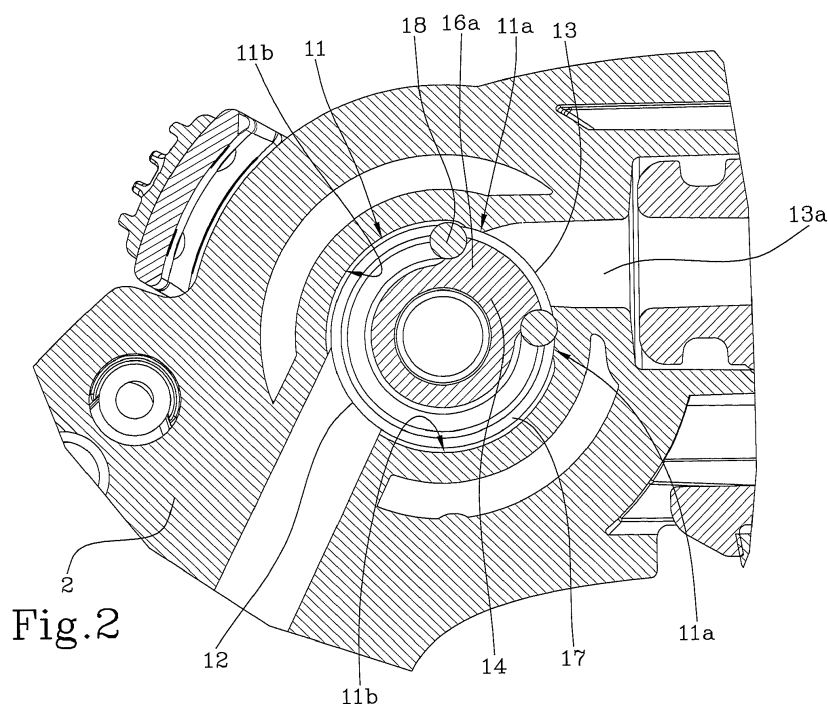
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(54) VALVE FOR WATERING PURPOSES

(57) The invention concerns a valve (1) to be applied to a sprayer (2) intended for watering purposes. The valve comprises a cylindrical hollow seat (11) into which a water feeding mouth (12) and an outlet mouth (13) are flowing with the latter bringing the water to the outlet nozzles (21) of the sprayer (2), and a shutter (14) that is disposed within the cylindrical seat (11) and which can be rotated on command from an open position to a closed position and vice versa; the shutter (14) comprises a central body (14a) with diameter less than the internal diameter of the cylindrical seat (11), wherefrom an overhang (16) is pro-

truding, which overhang (16) is provided with a sealing ring (18) that, in the closed position of the valve, sealingly closes the outlet mouth (13); an enlargement (17) is provided which is formed at least in part on the inner surface of the cylindrical seat (11) and is conformed and arranged so that, when the valve (1) rotates from the closed position to the open position thereof, the overhang (16) and the sealing ring (18) fit into the enlargement (17) without their outer surface interfering with the enlargement of the inner surface (17).

**Fig.2****EP 3 095 524 A1**

Description

[0001] The present invention relates to a valve to be applied to a sprayer for watering purposes. Reference is particularly made to those valves applicable to the sprayers destined to be used for irrigating gardens, lawns and the like, which are to be connected to a flexible water-supply pipe. Sprayers for watering have long been known that are connected to a flexible water-supply pipe (generally made of rubber or plastic material). Particularly appreciated are the spray guns that are provided with an handle for gripping the sprayer with both hands, and with a sort of cane wherefrom the water comes out; to this type of sprayers, reference will be made in the following description and in the figures, although the valve object of the present invention may find application in sprayers of different conformation.

[0002] Such sprayers allow to adjust the water outlet from outlet nozzles of different shape and size, in order to allow an effective watering of flowers, lawns and the like; a great number of sprayers further provides a plugging system which in turn provides a close position that prevents water from exiting the nozzles, and an open position which instead allows water to come out.

[0003] In order that the water passage through the sprayer is allowed or prevented, valves are known, which exhibit a cylindrical hollow seat generally afforded within the sprayer body, into which there are flowing a water-supply conduit coming from the water-supply pipe, and an outlet pipe bringing the water to the outlet nozzles of the sprayer; also these conduits are generally formed within the sprayer body.

[0004] Internally of the cylindrical housing a shutter is arranged that is made to rotate, on command, from said open position to said closed position and vice versa.

[0005] The shutters are shaped so that the water coming from the supply conduit can always flow through the inside of the valve body. For this purpose, the diameter of a central part of the shutter is generally less than the internal diameter of the cylindrical seat; in order to prevent the water from flowing in the axial direction from the cylindrical seat, there are provided annular seals at the shutter ends, which annular seals slide against the inner wall of the hollow seat thus preventing any water leakage.

[0006] In order to obturate or release the outlet conduit, i.e., prevent or allow the flow of water to the nozzles, it is required that, following the shutter rotation, the shutter zone can close or release the mouth of the conduit; seals that lie in, or are disposed around the outlet mouth to ensure tightness in the close position of the shutter, shall also be provided. To this end, some known shutters exhibit protruding contoured forms, which are rather complex, around which there are disposed seals that exhibit a complex architecture as well; owing to such shaped forms, following the shutter rotation, the outlet conduit can be tightly closed or released. In other types of known obturators, the mouth of the outlet conduit is provided with seals against which a shutter zone, in the close po-

sition thereof, comes to form a seal.

[0007] In addition to having a complex shape, the shutters of the known valves exhibit the drawback of the seals becoming deformed and worn out, which seals in some embodiments slide against the walls of the shutter body; same problems in terms of deformation and wear are present in the seals placed around the mouth of the outlet conduit against which the shutter zone intended to close this mouth is sliding.

[0008] It is an object of the present invention to obviate the drawbacks by providing a valve intended for a sprayer that is easy to manufacture and is capable of preventing the seals from being damaged.

[0009] An advantage of the present invention is to provide a valve for sprayer capable of promoting opening and closing operations thereof.

[0010] Further characteristics and advantages of the present invention will better emerge from the detailed description that follows of an embodiment of the valve of the sprayer at issue, illustrated by way of non-limiting example in the appended figures wherein:

- figure 1 shows a view in vertical elevation, with some parts in section of the valve in question applied to a spray gun;
- figure 2 shows a section, on an enlarged scale, of a detail of figure 1 relating to the valve herein disclosed in the closed position thereof;
- figure 3 shows a section, on an enlarged scale, of a detail of figure 1 relating to the valve herein disclosed, in the open position thereof;
- the figures 4 and 5 respectively show a perspective view of the cylindrical hollow seat of the valve, with some parts thereof removed to better illustrate others, and a perspective view of the shutter depicted as separated from the valve seat.

[0011] The valve 1 herein disclosed is used for sprayers 2 intended for watering purposes. In the figures there is illustrated a spray gun in which the handle 22 is provided with a connection 23, of a standardized type, for connection with a flexible water-supply pipe (generally made of rubber or plastic material); on the "gun barrel" there are provided one or more water outlet nozzles 21 from the sprayer. Of course the valve herein described can be applied to differently shaped sprayers.

[0012] Likewise other valves of the known type, the valve of the invention comprises a hollow cylindrical seat 11 which is formed in the sprayer body 2. As better described hereinafter, in the inventive valve the inner diameter of the cylindrical valve seat 11 is not constant but in some areas it departs from a diameter which is herein defined as an internal "reference" diameter of the cavity of the cylindrical seat for the sake of clarity.

[0013] A feeding mouth 12 of a water-supply conduit 12a flows into the seat 11; the water-supply conduit is connected directly with the connection 23, i.e. with the water-supply pipe. Into the seat 11, an outlet mouth 13

of an outlet conduit 13a is also flowing, which brings the water to the outlet nozzles 21 of the sprayer. The feeding mouth 12 and the outlet mouth 13 are generally circular in shape and flow into the seat 11 in positions being approximately diametrically opposite one to another.

[0014] The valve further comprises a shutter 14 which is arranged inside the cylindrical seat, coaxially to the latter; the shutter can rotate on command about its axis, so as to assume an open position and a close position and vice versa.

[0015] More in detail, in the open position thereof, the shutter 14 inside the seat 11 allows passage of the water from the feeding mouth 12 to the outlet mouth 13.

[0016] Conversely, in the close position, the shutter 14 inside the seat 11, inhibits passage of the water from the feeding mouth 12 to the outlet mouth 13.

[0017] Annular seals 15 are provided in proximity of each of the shutter end; these seals, generally constituted by rings made of elastic material, have a diameter slightly greater than the reference diameter of the seat 11 and slide against the internal wall of the hollow seat 11 thereby forming a seal that prevents leakage of water in the axial direction of the seat 11. The shutter 14 comprises a central body 14a which has a diameter less than the inner reference diameter of the cylindrical seat; on the central body there are provided annular grooves which maintain the seals 15 in position.

[0018] From the central body an overhang 16 is protruding, which overhang 16, in the close position of the valve, is disposed against the outlet mouth 13.

[0019] A sealing ring 18 is coupled at said overhang 16.

[0020] Said sealing ring 18, in the close position of the valve, is disposed against the outlet mouth 13, thus sealingly closing it.

[0021] On the inner surface of the cylindrical seat 11, an enlargement 17 is at least partially formed, which is conformed and arranged such that, when the valve 1 rotates from the close position to the open position thereof, said sealing ring 18 becomes inserted into this enlargement 17, without its outer surface interfering with the internal surface of said enlargement 17. More precisely, the cylindrical seat 11 includes a first portion 11 a, located in proximity of the outlet mouth 13, wherein no enlargement is provided, and a second portion 11 b extending along an opposite region to the outlet mouth 13, wherein said enlargement 17 is instead provided. In other words, the seat 11 includes a first portion 11 a not providing the enlargement 17, which first portion 11 a is then connected to the second portion 11 b wherein the enlargement 17 is afforded. The first portion 11 a contiguously extends around the outlet mouth 13, whilst the second portion 11 b extends along the remaining portion of the seat 11.

[0022] Owing to the seat 11 being conformed in two portions 11 a, 11 b, a different compression urging of the sealing ring 18 is allowed. More precisely, in the condition in which the actuator 14 is in the close position, the sealing ring 18, placed against the first portion 11 a, is com-

pression urged. This ensures tightness of the sealing ring 18 and closure between the feeding mouth 12 and the outlet mouth 13. In the condition in which the shutter 14 is in the opening position thereof, the sealing ring 18 is at least partially free from contact with the second portion 11 b and is therefore urged to a lower compression than the previous one.

[0023] With particular reference to Figure 3 one should appreciate how a portion of the sealing ring 18 is in contact with a section of the outlet opening 13 while the opposite portion is free. Alternatively at least a portion of the sealing ring 18 can be in contact with the second portion 11 b but in virtue of the enlargement 17, subjected to a lower compression. This limited contact generates a partial urge on the sealing ring 18 and thus provides a better reliability of the component.

[0024] The overhang 16 has a rigid protuberance 16a of a cylindrical shape, which is arranged with radial axis with respect to the central body 14a, of the shutter 14; the protrusion of the rigid protuberance is such as to prevent its sliding against the internal surface of the cylindrical hollow seat 11.

[0025] On the lateral surface of the rigid protuberance 16a a groove is afforded that accommodates the sealing ring 18 which, in the close position of the valve, interferes with the area around the outlet mouth 13 so as to ensure a tight closing of the valve.

[0026] Preferably the enlargement 17 is connected with the area surrounding the outlet mouth 13 with increasingly depth in the opening direction of the valve; this prevents the sealing ring 18 from encountering any cusps that may move it or damage it upon switching from the open position to the close position.

[0027] Since the angle of rotation that allows the valve to move from the close position to the open position, and vice versa, is normally less than 90°, the enlargement 17 may develop on a portion of the inner surface of the cylindrical seat 11 for a width slightly greater than that of the area surrounding the outlet mouth 13 and for an extension of approximately 90°. Further, the enlargement 17 may develop on an arc of greater amplitude, provided this does not affect the area surrounding the outlet mouth 13.

[0028] Of course it is possible to obtain the area surrounding the outlet mouth 13 of the valve protruding from the inner surface of the cylindrical seat 11; in this case the enlargement 17 would affect the whole inner part of the seat 11 (with the obvious exception of the area that surrounds the outlet mouth 13), and its diameter would be the reference diameter of the enlargement; also in this case the projection defined by the area which surrounds the outlet mouth 13 would be joined to the enlargement.

[0029] Regardless of how this valve is obtained, it is important that the valve shutter ensures tightness against the valve outlet, and does not interfere with the inner surface of the valve seat during the opening and closing operations.

[0030] The operation of the valve is extremely simple

and intuitive.

[0031] In the close position illustrated in Figure 2, the valve seat is steadily in contact with the feeding mouth 12, while the shutter overhang 16, which includes the sealing ring 18, ensure closing of the outlet mouth 13, thereby preventing the water flow through the valve.

[0032] By rotating the shutter clockwise, the overhang 16 rotates clockwise without its ring 18 sliding against the inner wall of the seat 11 thanks to the presence of the enlargement 17, until it reaches the open position shown in Figure 3, which releases the outlet mouth 13.

[0033] In order to return the valve in the close position, it will be sufficient to perform an anti-clockwise rotation of the shutter; also when performing this operation, a minimal sliding of the sealing ring 18 of the overhang 16 against the inner wall of the valve seat occurs in the vicinity of the fully close position.

Claims

1. A valve (1) to be applied to a sprayer (2) for watering purposes, of the type comprising:

- a hollow cylindrical seat (11) which is formed within the body of the sprayer (2), into which hollow cylindrical seat (11) there are flowing a feeding mouth (12) of a water-supply pipe (12a), and an outlet mouth (13) of an outlet conduit (13a), which brings water to the outlet nozzles (21) of the sprayer (2);
- a shutter (14), arranged coaxially within the cylindrical seat (11), which shutter (14) can be rotated on command from an open position, wherein it is allowed passage of water from the feeding mouth (12) to the outlet mouth (13), to a close position, wherein the passage of water from the feeding mouth (12) to the outlet mouth (13), and vice versa is inhibited;

characterized in that said shutter (14) comprises a central body (14a) having a diameter smaller than the internal diameter of the cylindrical seat (11), wherefrom an overhang (16) is protruding, which is coupled to a sealing ring (18); said sealing ring (18), is disposed against the outlet mouth (13), thereby sealingly closing the latter, when the valve is in the close position thereof;

and in that there is provided an enlargement (17) which is obtained at least in part on the inner surface of the cylindrical seat (11), which enlargement (17) is conformed and arranged such that, when the valve (1) rotates from the close position to the open position thereof, said sealing ring (18) fits within the enlargement (17) without the outer surface thereof interfering with the inner surface of the enlargement (17).

2. A valve according to claim 1 **characterized in that** said cylindrical seat 11 is divided into a first portion (11 a) contiguous to the outlet mouth (13) and wherein said enlargement (17) is not provided, and a second portion (11 b) opposite to the outlet mouth (13), wherein the enlargement (17) is instead provided; with the shutter (14) in its close position, being said sealing ring (18) compression urged against the first portion (11 a) of the seat (11), with the shutter (14) in its open position, being instead said sealing ring (18) partially compression urged due to a limited interference between the sealing ring (18) itself and the second portion (11 b) of the seat (11) wherein the enlargement (17) is located.
3. A valve according to claim 1, **characterized in that** said overhang (16) is provided with a rigid protuberance (16a) which has a cylindrical shape and is disposed with its radial axis relative to the central body (14a) of the shutter (14); on the lateral surface of the rigid protrusion (16a), there is provided a groove which receives the sealing ring (18), which sealing ring (18), in the close position of the valve, interferes with the zone surrounding the outlet mouth (13), so as to ensure tightness of the valve closure.
4. A valve according to claim 1, **characterized in that** said enlargement (17) is connected with the zone surrounding the outlet mouth (13); the enlargement has an increasingly depth (17) in the valve opening direction.
5. A valve according to claim 1 **characterized in that** said shutter (14) provides annular seals (15) arranged at each end of the shutter (14), each of which annular seals (15) sliding against the inner wall of the hollow cylindrical seat (11).

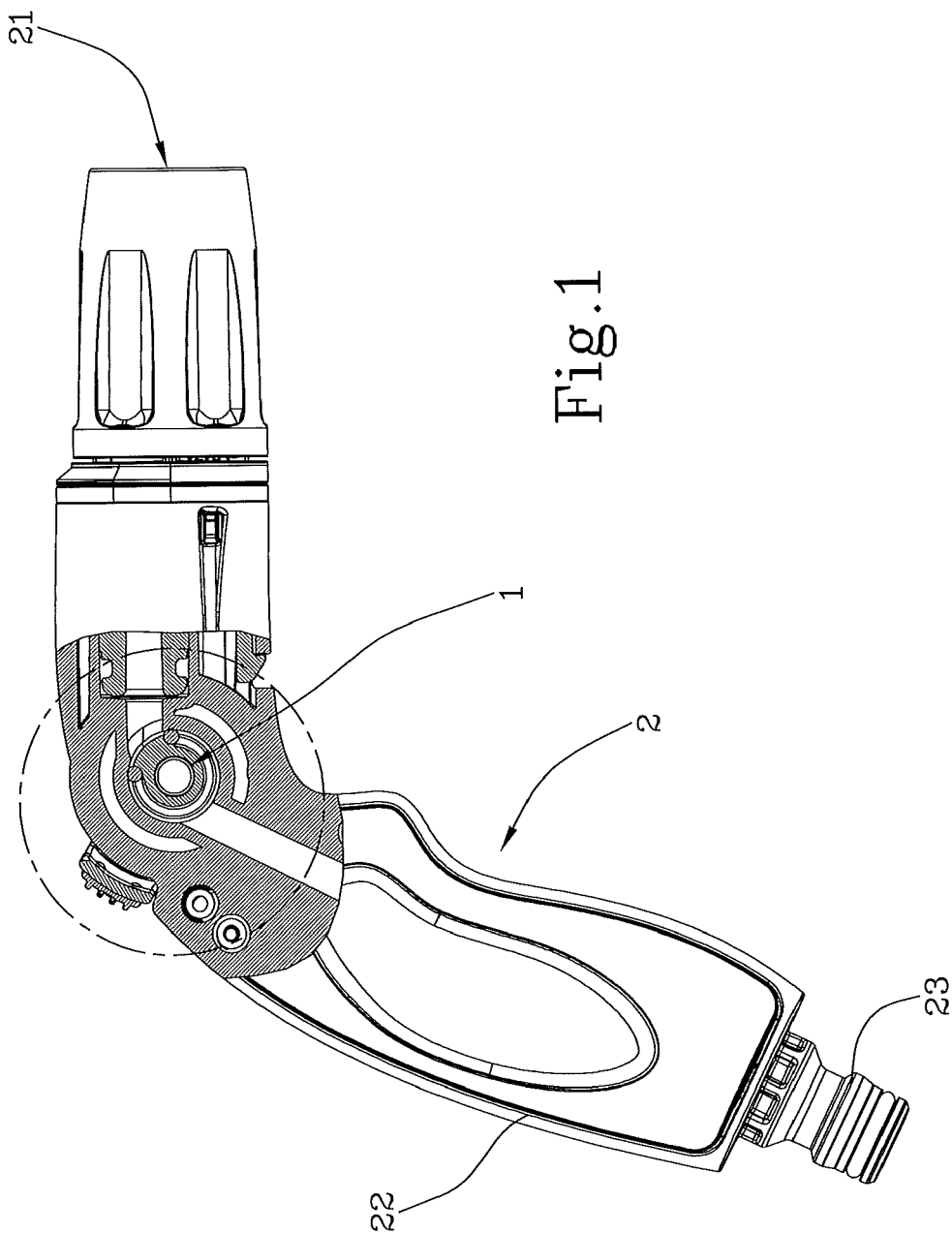
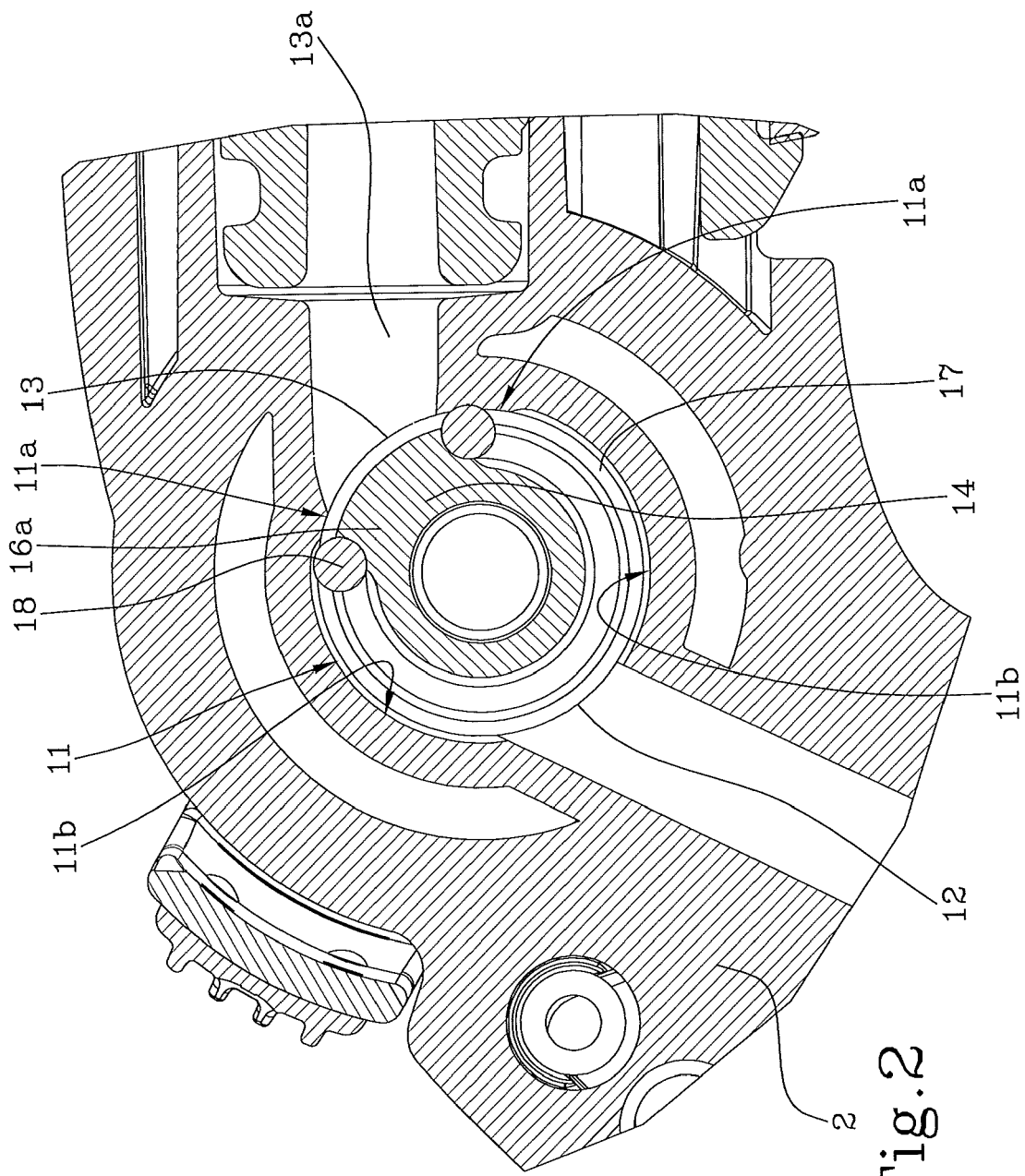


Fig. 1



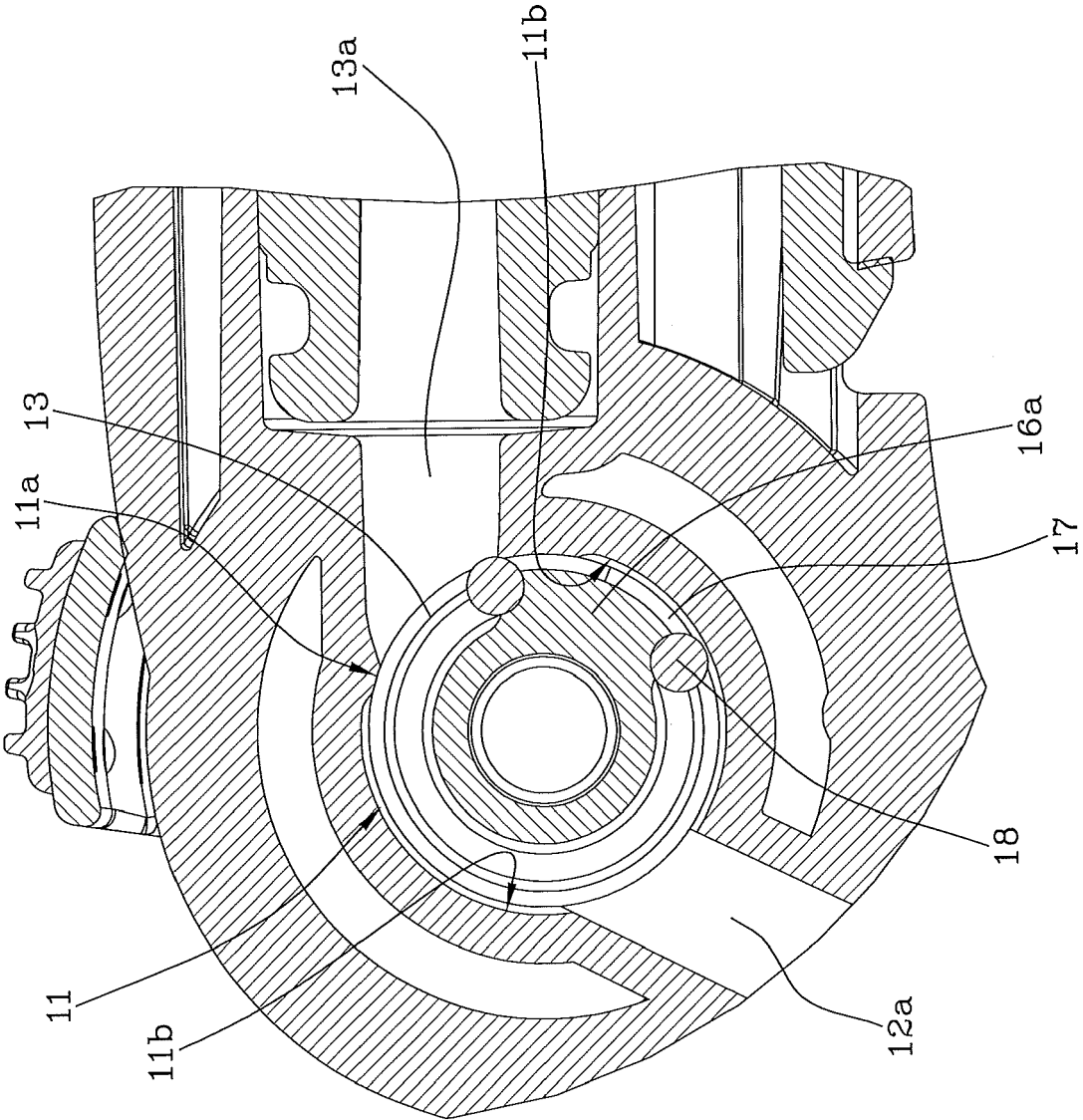
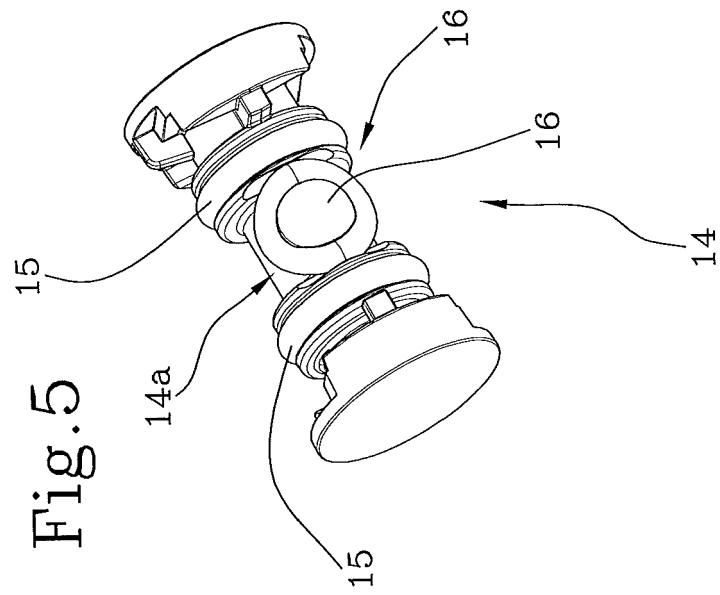
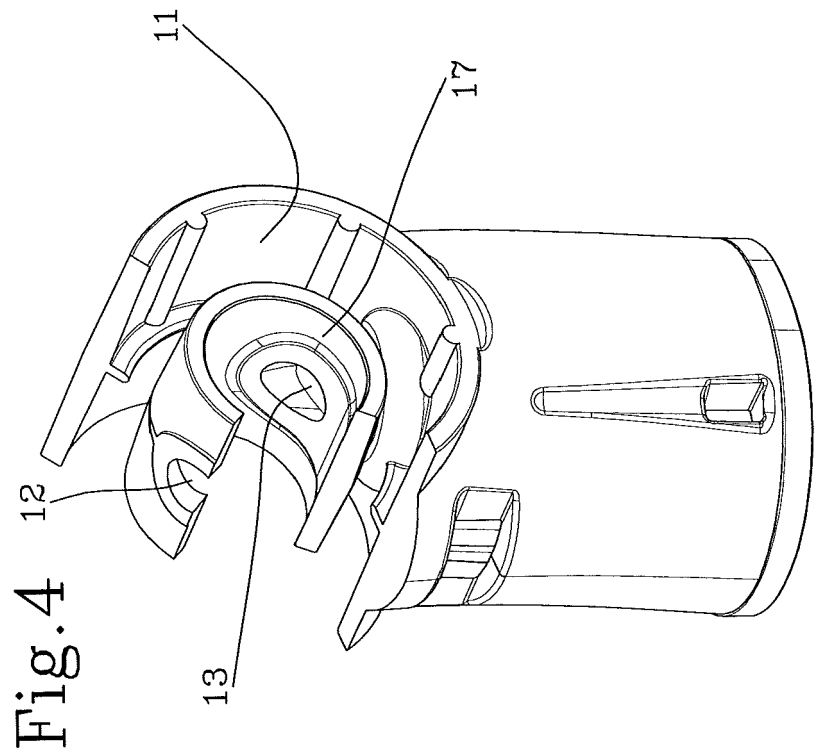


Fig. 3





EUROPEAN SEARCH REPORT

Application Number
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 13 September 2016	Examiner Roldán Abalos, Jaime
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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