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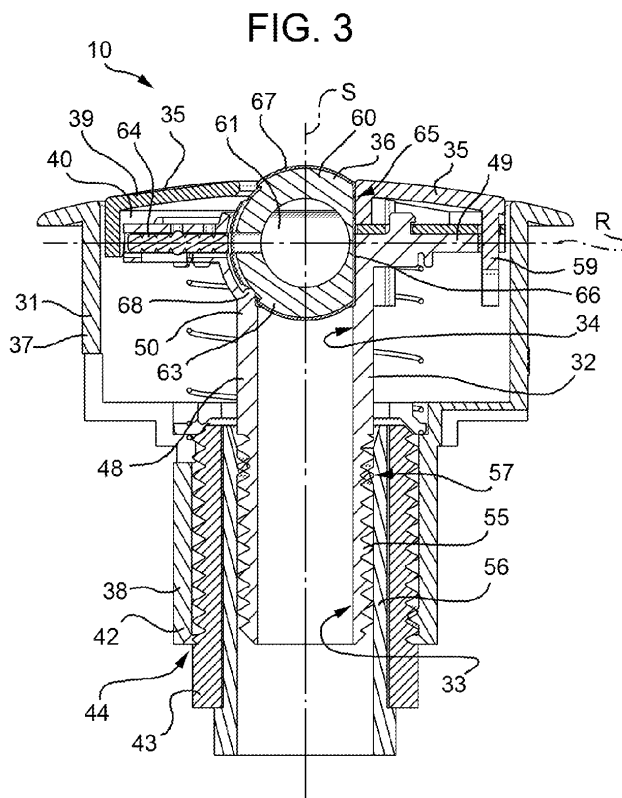
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(54) **Button assembly for activating a drain device of a flushing tank, and drain device equipped with this button assembly**

(57) A button assembly (10) for activating a drain device of a flushing tank having a casing (31) that houses a movable slider (32) cooperating in use with a member of the drain device, and at least one operating button (35) connected to the slider (32); the slider (32) is internally

equipped with a through conduit (33) having an inlet opening (34) closed by a closing element (36), which is movable between a closed position, in which the opening is closed by the closing element, and an open position, in which the opening is open.



Description

[0001] The present invention relates to a button assembly for activating a drain device of a flushing tank, and a drain device equipped with this button assembly.

[0002] As is known, toilet flushing tanks are fitted with a drain device housed inside the tank and which serves to discharge a preset amount of water from the tank to the toilet. In general terms, a drain device comprises a support structure fixed to the tank, a plug member, which normally also functions as an overflow pipe, sliding in the support structure and equipped with an end seal portion cooperating with a sealing seat, and an activation mechanism mechanically connected to the plug member or overflow pipe; usually, the activation mechanism is controlled by a button operated manually by a user.

[0003] Some drain devices are provided with water sanitization or treatment devices, which have the purpose of releasing active substances such as, for example, disinfectants, sanitizers, deodorants, etc. into the flow of water flushed into the toilet.

[0004] In particular, a drain device is known in which the water treatment device comprises a frame housed in the overflow pipe and containing a cartridge or a dose of an active water-treatment substance; when flushing is activated, water runs through the frame and carries a certain amount of the substance into the toilet.

[0005] Obviously, the cartridges or doses of active substances run out after a certain number of flushes, and so it is necessary to replace them or anyway refill the treatment device. Since the treatment device is positioned inside the tank, these operations call for access to the inside of the tank, something that is neither simple nor easy with currently available systems.

[0006] An object of the present invention is that of obviating the drawbacks pointed out here of the known art.

[0007] In particular, an object of the invention is that of providing a button assembly for activating a drain device of a flushing tank that enables simple and rapid access to the inside of the drain device, so as to enable refilling an optional water treatment device integrated into the same drain device.

[0008] The present invention therefore relates to a button assembly for activating a drain device of a flushing tank and a drain device equipped with this button assembly, as respectively defined in essential terms in the attached main claims 1 and 8, and in their additional characteristics in the dependent claims.

[0009] In this way, the button assembly in accordance with the invention provides the possibility of accessing the inside of the tank in a simple and rapid manner, without requiring particularly long or complex operations; through the button assembly of the invention it is therefore possible to introduce a new cartridge or active substance refill directly inside the water treatment device housed in the drain device. The button assembly of the invention is also simple and inexpensive to manufacture and install.

[0010] The invention is described in detail in the following non-limitative example of embodiment, with reference to the attached figures, where:

- 5 - Figure 1 is a schematic, longitudinal cross-sectional view of a drain device of a flushing tank equipped with a button assembly in accordance with the invention,
- Figure 2 is a partially exploded perspective view of some components of the drain device in Figure 1, and
- 10 - Figures 3 and 4 are longitudinal cross-sectional views along respective, mutually perpendicular planes, of the button assembly of the invention.

[0011] In Figure 1, a drain device of a flushing tank (known and not shown for simplicity) is indicated as a whole by reference numeral 1.

[0012] In general terms, the drain device 1 extends substantially along an axis A (vertical in use) and comprises a support structure 2 that can be fixed to the tank and having a lower discharge opening 3 provided with a sealing seat 4, a movable plug member 5 with a substantially tubular shape and also acting as an overflow pipe that is slidably housed in the structure 2 and equipped with a lower end seal portion 6 cooperating with the sealing seat 4, an activation mechanism 7 mechanically connected to the plug member 5, and a button assembly 10 that can be manually operated by a user, carried on an upper end of the structure 2 and cooperating with the activation mechanism 7 for activating the drain device 1.

[0013] The structure 2 comprises a base body 11, internally defining a container 22 in which the plug member 5 is slidably housed and that is provided with a sealing seat 4, and a frame 13 that supports the activation mechanism 7 and is coupled to the base body 11 by means of an adjusting mechanism 14 (known and not described in detail for simplicity) to vary the distance between the base body 11 and the frame 13 (and consequently the overall length along axis A of the structure 2, so as to adapt the length of the structure 2 to the height of the tank in which it is installed).

[0014] With reference to Figure 2 as well, the base body 11 comprises a substantially tubular hollow portion 75 containing the container 22 in which the plug member 5 (overflow pipe) is arranged, and a connection portion 76 arranged beneath portion 75 and equipped with fastening members 77 (for example, a threaded sleeve) to engage with a bottom wall of the tank; the sealing seat 4 cooperating with the plug member 5 is arranged, for example, on a lower end of portion 75.

[0015] The base body 11 can be fixed to the bottom wall of the tank by means of the connection portion 76; portion 76 is preferably connected to portion 75 in a releasable manner, for example, by means of pins 78 carried by portion 75 and insertable in respective couplings 79 formed in portion 76 by turning portion 75 with respect to portion 76.

[0016] The plug member 5 is slidably housed along axis A in a seat 15 formed in the base body 11; preferably, as shown in Figure 1, the plug member 5 comprises an inner tube 16 and an outer tube 17, one inserted coaxially inside the other and telescopically coupled to each other, and internally houses a water sanitization or treatment device 20.

[0017] In particular, the device 20 comprises an internally hollow reservoir 81 housed in the tube defined by the plug member 5 and containing a water treatment cartridge or dose of an active substance (not shown), and a support 82 having a seat 83 in which a section 84 of the lower end of the reservoir 81 is removably inserted.

[0018] The reservoir 81 has an upper supply mouth 85, preferably upwardly and outwardly flared, and lateral and/or lower openings 86, formed, for example, in a lateral wall of the reservoir 81 and/or a lower end of the reservoir 81, which allow the passage of water through the reservoir 81 so as to release an active substance having disinfectant and/or sanitizing and/or deodorizing properties etc. into the flow of water discharged from the tank.

[0019] In the example shown, the reservoir 81 has a cage-like form and extends substantially along an axis (for example, axis A or an axis parallel to it); the reservoir 81 has an open upper end, provided with a mouth 85, and a lower end provided with a bottom 87, optionally provided with other openings 86.

[0020] The support 82 is connected to the support structure 2 and, in detail, to the connection portion 76; in particular, the support 82 is arranged radially inside portion 76 and is joined to it by radial ribbing 88.

[0021] The reservoir 81 and the support 82 are releasably coupled to each other by means of a coupling device 90. For example, the reservoir 81 has a radially outer ring 91 that delimits the section 84 of the reservoir 81 that can be inserted in the support 82 and rests in contact with an upper edge 92 of the support 82; the ring 91 carries engagement teeth 93 that, following angular rotation of the reservoir 81 with respect to the support 82, engage respective reference members 94 formed on the edge 92 of the support 82.

[0022] The device 20, being housed inside the plug member 5 (i.e. the overflow pipe) that, with the tank full and with the opening 3 closed by the plug member 5, does not contain water, only comes into contact with water when flushing is performed.

[0023] The inner tube 16, which protrudes from the top of the outer tube 17, carries an eye 26 for connection to the activation mechanism 7, and is interference fitted to the outer tube 17; the outer tube 17 carries the seal portion 6 at the bottom.

[0024] The activation mechanism 7 is of an essentially known type and so for simplicity is neither described nor shown in detail. In basic terms, the activation mechanism 7 comprises a horizontally pivoted lever 27 hinged to the structure 2 and specifically to the frame 13, and a rod 28 that connects the lever 27 and, by engaging the eye 26,

the plug member 5; the lever 27 is operated by the button assembly 10.

[0025] In the non-limitative example shown in Figure 1, the drain device 1 is an integrated feed and drain assembly that also comprises a feed group 70. It remains understood that the present invention finds application in other types of drain devices, in particular in drain devices of a traditional type that do not comprise an integrated feed group.

[0026] The feed group 70 is therefore not described in detail, as it is not strictly connected with present invention.

[0027] In general terms, the feed group 70 comprises a filler valve 71 supported by the structure 2, and more in detail by the frame 13, and is controlled by a float 72; the filler valve 71 is connected to an inlet pipe 73, connectable in a known manner to a water mains to deliver water to the filler valve 71, and to a filler pipe 74 that extends substantially parallel to axis A to deliver water from the filler valve 71 to the tank.

[0028] The float 72 is slidably mounted on a guide and is mechanically connected in a known manner to the filler valve 71 to selectively open/close the filler valve 71 depending on the position of the float 72, that is to say the level of the water in the tank.

[0029] With reference to Figures 3 and 4 as well, the button assembly 10 extends substantially along an axis S (parallel in use to axis A, or coincident with it) and comprises a casing 31, at least one movable slider 32 slidably housed parallel to axis S in the casing 31 and internally equipped with a through conduit 33 having an inlet opening 34, at least one operating button 35 that is user-operable by pressing and is connected to the slider 32, and a movable closing element 36 arranged to close the opening 34.

[0030] In the non-limitative example shown, the casing 31 comprises an upper socket portion 37 and a lower tubular portion 38. The button 35 is slidably housed parallel to axis S in the socket portion 37 and is composed, for example, of a plate 39 arranged for closing the socket portion 37. The button 35 mechanically cooperates with the slider 32, for example, by means of a lower peripheral edge 40 (continuous or formed by a multiple portions or sectors circumferentially spaced apart from one another) that extends below the plate 39 and cooperates in abutment with the slider 32.

[0031] The tubular portion 38 is preferably formed by a pair of element 42 and 43 coupled together by means of an adjustable-length coupling system 44, for example, by means of a coupling thread. The upper element 42 extends from the socket portion 37 and the lower element 43 is provided with a coupling portion 45 shaped for engagement with the frame 13 in a known manner.

[0032] The slider 32 is associated with a spring 47 and comprises a tubular rod 48, extending substantially along axis S and provided internally with the conduit 33, and a radially outer flange 49 that extends from an upper end 50 of the rod 48 and cooperates in abutment with the edge 40 of the button 35. Opening 34 is arranged at the

upper end 50 of the rod 48 and faces the button 35. The flange 49 is provided with a seat 51 that houses the closing element 36 and communicates with the conduit 33 through opening 34. The flange 49 also carries lateral guide teeth 52 that are slidable inserted in respective guides 53 formed in a lateral wall of the socket portion 37 of the casing 31 and which also prevent the vertical removal of the slider 32 from the casing 31 by engaging respective stop portions 54. The spring 47 is inserted between the flange 49 and a bottom wall of the socket portion 37 to push the button 35 against the stop portions 54.

[0033] In the example shown, the rod 48 comprises two tubular elements 55 and 56 coupled to one another by means of an adjustable-length coupling system 57, for example, by means of a coupling thread, which enables the length of the rod 48 to be adjusted: a first tubular element 55 is integrally formed in one piece with the flange 49, while a second tubular element 56 carries a lateral foot 58 cooperating in use with a member of the drain device and, in this case, with the lever 27 of the activation mechanism 7. The conduit 33 extends substantially along axis S through the entire rod 48 and therefore through both tubular elements 55 and 56.

[0034] In the case where the drain device 1 is arranged to provide different modes of flushing (for example, a full flush and a partial flush), the button assembly 10 comprises more than one operating button 35. In the non-limitative example shown, the button assembly 10 comprises a pair buttons 35 side by side, both cooperating with the slider 32 and slidable mounted in the casing 31. In accordance with a common solution in the sector, the buttons 35 have different lengths of travel so as to move the lever 27 with different displacements and consequently activate the respective flushing modes; for this purpose, one of the buttons 35, for example, could have a projection 59 projecting below the edge 40.

[0035] The closing element 36 is arranged for closing the opening 34 and is movable between a closed position in which the opening 34 is closed by the closing element 36, and an open position in which the opening 34 is open.

[0036] The closing element 36 is rotatably supported by the casing 31 or, as in the preferred embodiment shown, by the slider 32, to selectively assume the open position or the closed position; in particular, the closing element 36 can turn around a rotation axis R substantially perpendicular to axis S.

[0037] The closing element 36 comprises a hollow body 60 equipped with a through channel 61 between two ends of the hollow body 60. The channel 61 is substantially aligned and communicating with the conduit 33 when the closing element 36 is in the open position, and instead is substantially perpendicular to the conduit 33 and separated from the conduit 33 by a lateral wall portion 62 of the closing element 36 when the closing element 36 is in the closed position.

[0038] In particular, the hollow body 60 is essentially a tubular body and has a lateral wall 63 that delimits the

channel 61, and can turn around a rotation axis R substantially perpendicular to the channel 61 to selectively bring the channel 61 or the lateral wall portion 62 over the opening 34.

[0039] In the non-limitative example shown, the hollow body 60 has a substantially spheroidal shape and the channel 61 extends diametrically through the hollow body 60.

[0040] The hollow body 60 is housed in seat 51, which has a substantially spheroidal or sphere-portion shape, and is rotatably supported in seat 51 at least around axis R.

[0041] The hollow body 60 is rotatably supported in seat 51 by a shape coupling between the hollow body 60 and seat 51, both having a spherical or sphere-portion or substantially spheroidal shape, and/or by a side pin 64 inserted radially through a lateral wall 63 of the hollow body 60 and fixed to the flange 49, and/or by a flat face 65 of the hollow body 60, substantially perpendicular to axis R and cooperating against an abutment surface 66 of the slider 32 and/or the button 35 and substantially parallel to the face 65.

[0042] The closing element 36 is supported by the end 50 of the slider 32 so that it can be set through the button 35 (or buttons 35) and has a lateral surface portion 67 of the closing element 36 (in detail, of the hollow body 60) that protrudes from the button 35. Preferably, the lateral surface portion 67 is knurled to facilitate use by a user.

[0043] In use, when it is necessary to refill the treatment device 20 with a new cartridge or active substance refill, it is sufficient to turn the closing element 36 to open the opening 34; with the closing element in the open position, it is then possible to introduce the cartridge or refill through the channel 61 and the conduit 33 and let it fall into the reservoir 81, after which the opening 34 is re-closed by turning the closing element 36 back to the closed position.

[0044] Advantageously, the closing element 36 and seat 51 are provided with cooperating members 68 and 69, which reciprocally engage, in a releasable manner, when the closing element 36 assumes either the open position or the closed position. For example, seat 51 has a protuberance 68 and the closing element 36 has a pair of notches 69 angularly arranged and spaced apart from one another on an outer lateral surface of the hollow body 60; when the closing element 36 is brought to either the open position or the closed position, the protuberance 68 engages one or the other of the two notches 69 with a light snap.

[0045] It remains understood that changes and variants may be made to that described and shown herein without departing from the scope of the invention as defined in the attached claims.

Claims

1. A button assembly (10) for activating a drain device

- of a flushing tank, comprising a casing (31) that houses a mobile slider (32) cooperating in use with a member of the drain device, and at least an operating button (35) connected to the slider (32), the button assembly being **characterized in that** the slider (32) is internally provided with a through conduit (33) having an inlet opening (34) closed by a closing element (36) that is movable between a closed position, in which the opening (34) is closed by the closing element (36), and an open position, in which the opening (34) is open.
2. The button assembly according to claim 1, wherein the closing element (36) is supported by the casing (31) and/or by the slider (32) so as to rotate for selectively assuming the open position or the closed position.
 3. The button assembly according to claim 1 or 2, wherein the conduit (33) extends substantially along an axis (S) and the closing element (36) rotates around a rotation axis (R) substantially perpendicular to said axis (S).
 4. The button assembly according to one of the preceding claims, wherein the closing element (36) comprises a hollow body (60) provided with a through channel (61) between two ends of the hollow body (60) and that, when the closing element (36) is in the open position, is substantially aligned and communicating with the conduit (33), and, when the closing element (36) is in the closing position, is substantially perpendicular to the conduit (33) and separated from the conduit (33) by a lateral wall portion (62) of the closing element (36).
 5. The button assembly according to claim 4, wherein the hollow body (60) is essentially a tubular body and has a lateral wall (63) that delimits the channel (61), and rotates around a rotation axis (R) substantially perpendicular to the channel (61) for selectively bringing the channel (61) or the lateral wall portion (62) over the opening (34).
 6. The button assembly according to claim 4 or 5, wherein the hollow body (60) has a substantially spheroidal shape and the channel (61) extends diametrically through the hollow body (60).
 7. The button assembly according to one of claims 4 to 6, wherein the hollow body (60) is housed in a seat (51) having a substantially spheroidal or sphere-portion shape.
 8. The button assembly according to one of claims 4 to 7, wherein the hollow body (60) is supported so as to rotate in the seat (51) by a shape coupling between the hollow body (60) and the seat (51), and/or by at least a side pin (64) inserted radially through a lateral wall (63) of the hollow body (60), and/or by a flat face (65) of the hollow body (60) cooperating against an abutment surface (66) of the seat (51).
 9. The button assembly according to one of the preceding claims, wherein the closing element (36) is supported by an end (50) of the slider (32).
 10. A drain device (1) of a flushing tank, comprising a support structure (2) having a lower discharge opening (3) provided with a sealing seat (4), a plug member (5) sliding in the structure (2) and provided with an end seal portion (6) cooperating with the sealing seat, an activation mechanism (7) mechanically connected to the plug member (5), and a button assembly (10) cooperating with the activation mechanism (7) for activating the drain device, the drain device being **characterized in that** the button assembly (10) is a button assembly according to one of the preceding claims.
 11. The device according to claim 10, wherein the plug member (5) has a substantially tubular shape and also acts as an overflow pipe and internally houses a water treatment device (20).
 12. The device according to claim 11, wherein the water treatment device (20) comprises a reservoir (81) housed in the plug member (5), the reservoir (81) having a top supply mouth (85) and containing a cartridge or a dose of a water treatment active substance.
 13. The device according to one of the preceding claims, comprising a plug member (5) acting also as an overflow pipe and a water treatment device (20) housed inside the overflow pipe (28), the water treatment device (20) comprising an internally hollow reservoir (81), containing a cartridge or a dose of a water treatment active substance, and a support (82) having a seat (83) in which a lower end portion (84) of the reservoir (81) is removably inserted, the reservoir (81) and the support (82) being releasably coupled to each other by means of a coupling device (90).

FIG. 1

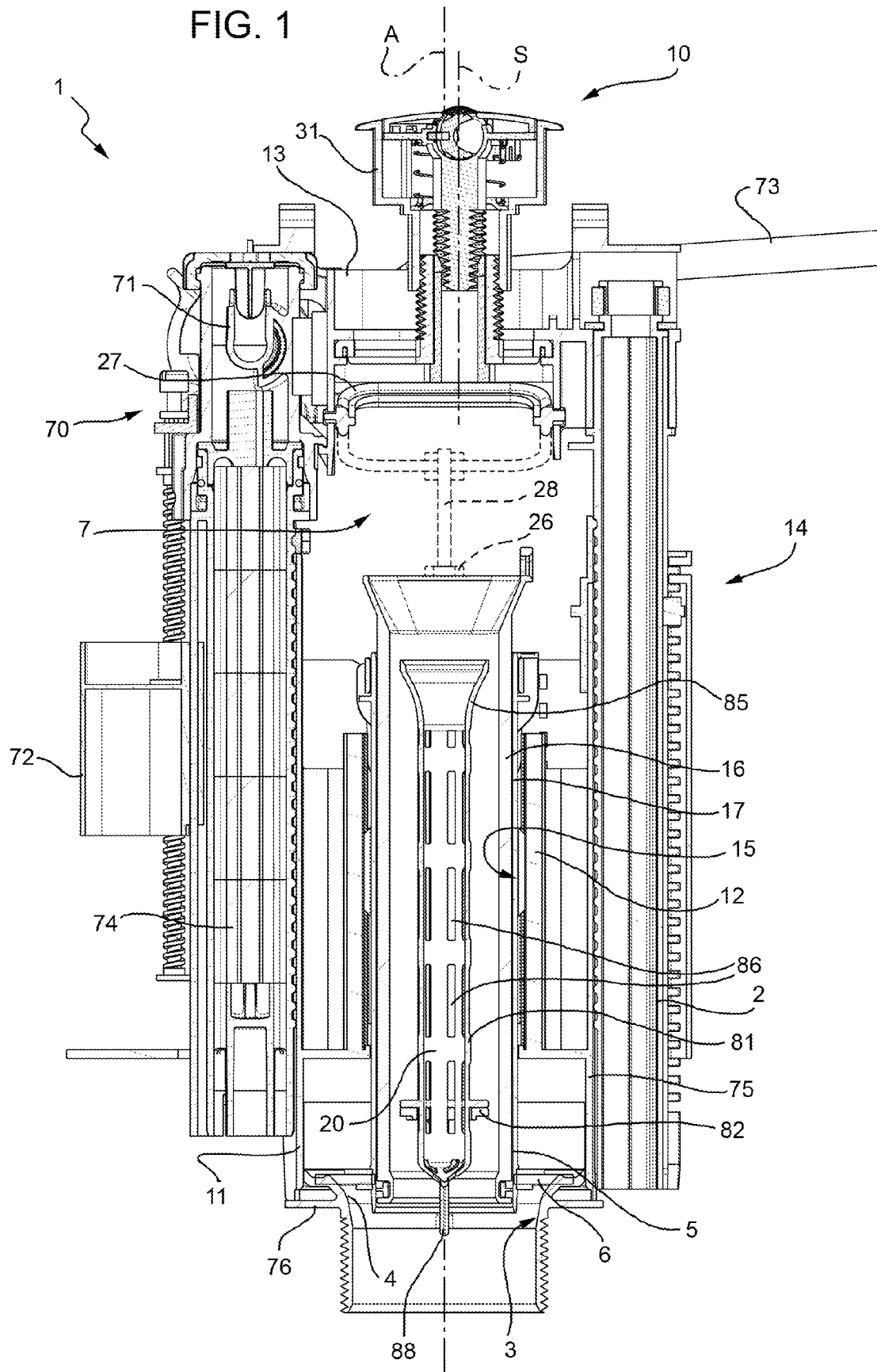


FIG. 2

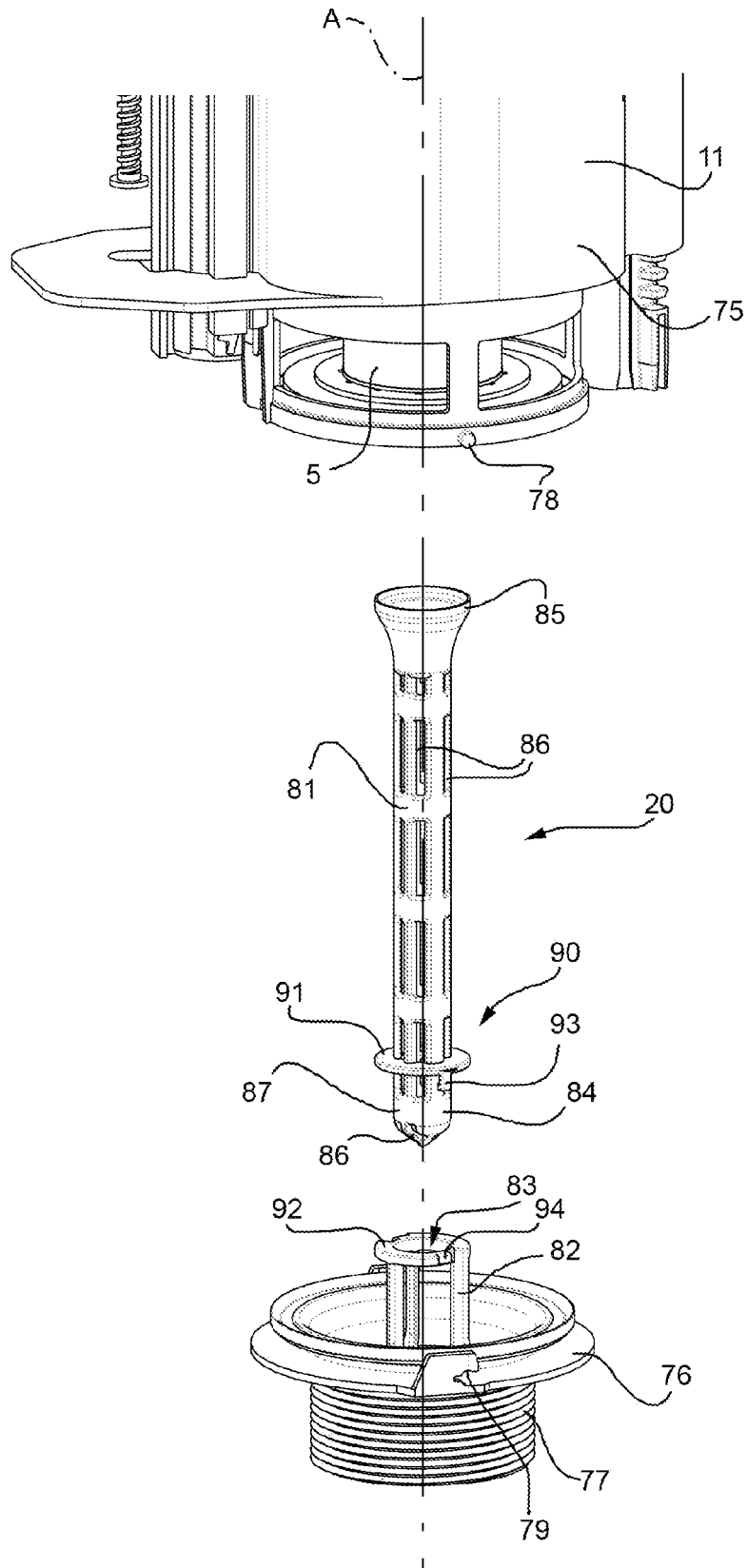


FIG. 4

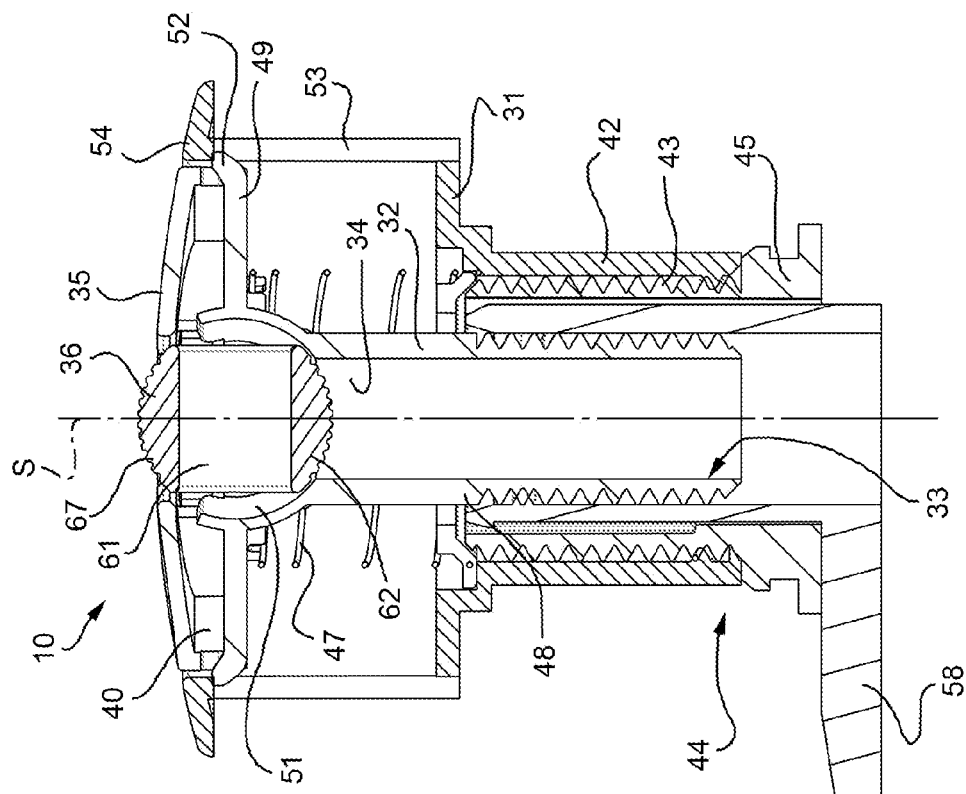
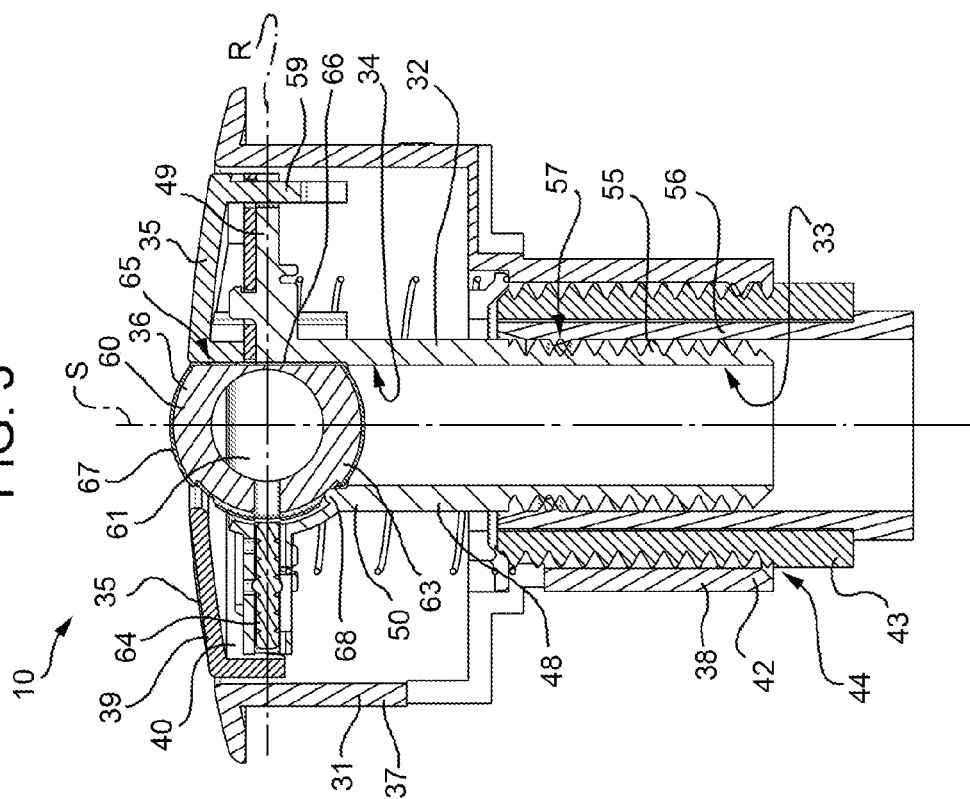


FIG. 3





EUROPEAN SEARCH REPORT

Application Number
EP 10 19 5862

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 1 498 553 A1 (IDROLS SA [ES]) 19 January 2005 (2005-01-19) * paragraph [0012]; figures * -----	1	INV. E03D5/09 E03D9/03
A	DE 299 04 649 U1 (MUSZYNSKI WOJCIECH DR [DE]) 2 June 1999 (1999-06-02) * page 3, paragraph 1; figures * -----	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			E03D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 9 March 2011	Examiner De Coene, Petrus
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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 10 19 5862

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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09-03-2011

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1498553	A1	19-01-2005 WO 03062543 A1	31-07-2003
DE 29904649	U1	02-06-1999 NONE	