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(54) **Deflector element for fluid deviation coupling for radiator element intercepting valves**

(57) Deflector element (1), comprising a first tubular portion (5) of predefined axis (X-X), forming a first stretch of pipe (6), said first tubular portion (5) comprising a first opening (9) for said first stretch of pipe set in a first end (7) and a back wall (10) set in a second end (8), said back wall comprising a second opening (11) for the pipe, also comprising a second tubular portion (12) forming a second stretch of pipe (13), comprising a third opening

(14) set level with said first end (7), said second tubular portion (12) connecting by sealing to said back wall (10) and forming a fourth opening (15), said second opening (11) and said fourth opening (15) being set so as to change position, when the deflector element (1) is rotated around its axis (X-X), said deflector element (1) comprising operating means (16; 17; 18) for said deflector element.

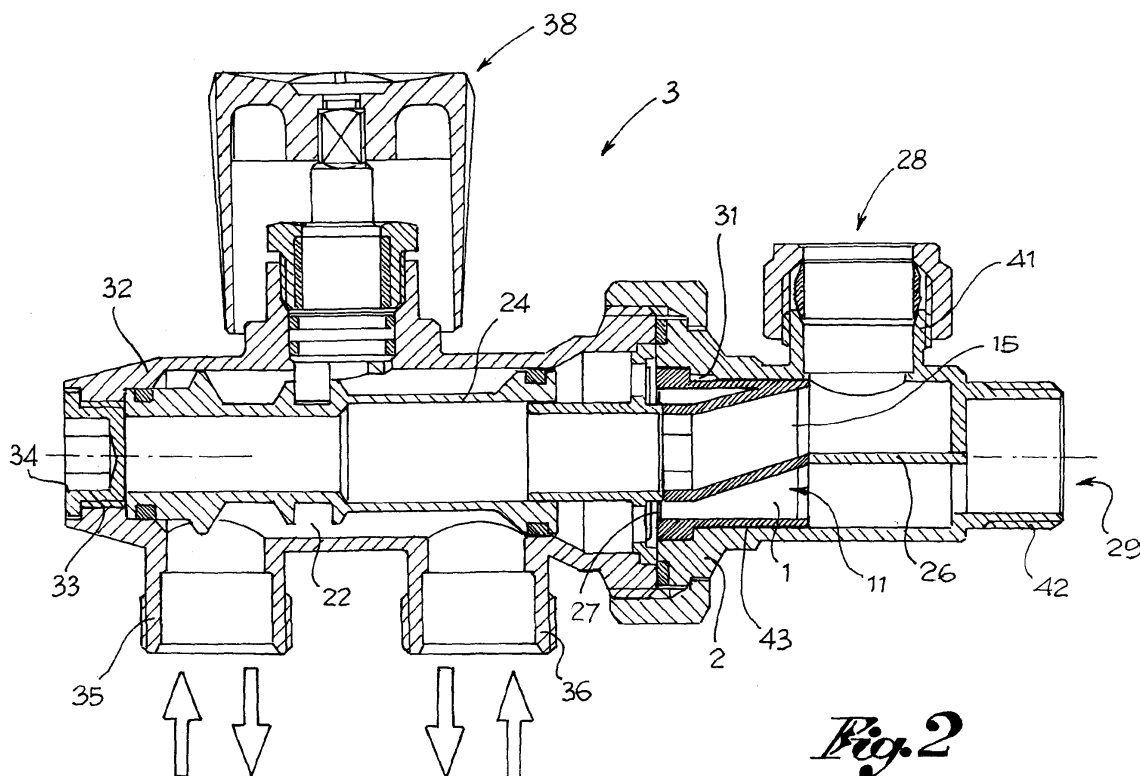


Fig. 2

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Description

[0001] The present invention relates to a deflector element for fluid deviation couplings for radiator element intercepting valves.

[0002] More particularly, the invention relates to a deflector element, otherwise indicated as a deflector organ or deflector, for example as described with one of the possible embodiments in the patent application IT1290557.

[0003] As known, deflector elements of the type indicated above are utilized in so-called "single-pipe" valves, which are used for connecting several heating bodies, such as radiators in series or parallel.

[0004] Valves of this type are well-known, for example from US Patent US 3,618,855, or patent EP-A-0 441 761, patent GB 1 433 007 and also patent DE 29 04 271.

[0005] These couplings exhibit one or more connections for connecting to a radiator to allow the fluid to be delivered and returned from it. The coupling is connected to the single-pipe valve, which has two connections for connecting to input and output pipes of the heating fluid, as well as a shutter to control the quantity of fluid to be delivered to the relative radiator.

[0006] Internally, the coupling exhibits a deflector organ that allows separately channelling the fluid from one of the pipes, for example the input one, to the delivery connection of the radiator, and channelling the fluid from the return connection of the radiator to the other pipe, for example the output one.

[0007] One disadvantage of these couplings, which is also well highlighted in the patent IT1290557, is that substantially it is not possible to maintain the direction of the delivery pipe with certainty, and at the time of connecting the valve, it may happen that the pipe provided for the delivery is, instead, the return one.

[0008] The invention suggested by the patent IT 1 290 557 foresees the use of a deflector that can be rotated to direct the fluid into the right pipe, if it is facing differently when the valve is assembled. This known deflector is then put back into the coupling to prevent it from rotating after it has been inserted into the coupling.

[0009] To avoid dismantling the valve and coupling to rotate the deflector and consequently to avoid emptying the distribution system of the fluid, couplings and single-pipe valves have been proposed, which, with the shutter closed, consequently preventing fluid from leaking out of the plant, allow the deflector to be accessed and rotated into the correct position.

[0010] In particular, the patent application BS 2002 U 000091, by the same applicant, shows a single-pipe valve with a reversible input and a coupling with a deflector that can be rotated into its slot provided in the body of the coupling. This deflector is provided with a slot that can be accessed from outside the valve, which is suitable for receiving a chuck key to control it to go from one position to another.

[0011] A similar solution is also known from the sub-

sequent patent application MI 2003 A 000229.

[0012] Although satisfactory, from many points of view, it must be considered that these known solutions exhibit a deflector, which is difficult to construct and which does not guarantee a perfect seal with the body of the coupling in which it freely rotates, with the risk of the fluid leaking out of the delivery pipe into the return one and vice versa.

[0013] From the above it emerges how the need is deeply felt for a deflector element, and consequently a single-pipe valve with a coupling that is easy to make and safe to operate.

[0014] It is the object of the present invention to devise and propose a deflector element, which allows the above need to be satisfied and, at the same time, resolve the above disadvantages.

[0015] Said object is achieved with a deflector element such as the type specified above, defined according to claim 1 reported below, and with a coupling as in claim 18 and a valve as in claim 20.

[0016] Further features and advantages of the deflector element according to the invention will appear more clearly from the following description of its preferred embodiments, which are given by way of example and not limiting, with reference to the accompanying drawings, wherein:

[0017] figure 1 shows a side view of a single-pipe valve with a coupling connected to a heating element;

[0018] figure 2 represents a side section of the single-pipe valve with the coupling in figure 1 and the shutter closed;

[0019] figure 3 shows a prospective sectioned view of a deflector element according to a first embodiment;

[0020] figure 4 shows a side section of the single-pipe valve with the radiator in figure 2 and the shutter open;

[0021] figure 5 shows a sectioned side view of a deflector element according to a second embodiment;

[0022] figure 6 shows the deflector element in figure 5 according to the arrow view VI in figure 5;

[0023] figure 7 shows a side view of a detail of the element in figure 5 according to the arrow view VII in figure 5;

[0024] figure 8 shows a sectioned side view of a detail of a manoeuvring shaft of a deflector element according to a further embodiment;

[0025] figure 9 shows a sectioned side view of a single-pipe valve with a coupling, with the shutter closed and the deflector in a first position;

[0026] figure 10 shows a sectioned side view of the single-pipe valve with the coupling in figure 9, with the shutter closed and the deflector in a second position.

[0027] With reference to the aforesaid figures, a single-pipe valve connected to a fluid deviation coupling 2 is globally indicated with reference numeral 3.

[0028] This coupling 2 exhibits two connections 41, 42 for connecting to a radiator 4 to allow the delivery, for example by means of a delivery pipe 37, and the return of a fluid from this. The coupling 2 is connected to the single-pipe valve 3, which also has two connections 35,

36 for connecting to input and output pipes 39, 40 of the heating fluid, and a control organ 38, which is known in itself, of a shutter 24, to control the quantity of fluid to be delivered to the radiator 4 (Figure 1).

[0029] Internally, the coupling 2 exhibits a deflector organ 1, which allows the fluid from one of the pipes 39, 40, for example the input one 39, which is connected to the respective input connection 35 to be carried separately to the delivery connection 41 of the radiator, and the fluid from the return connection 42 of the radiator to be carried to the other pipe, for example to the output one 40, which is connected to the respective output connection 36 of the valve 3 (Figures 2 and 4).

[0030] In accordance with an embodiment, the fluid on-off single-pipe valve 3 comprises a valve body 32, which defines a chamber for the fluid 22. Advantageously, said valve body 32 is provided with a valve opening 33, which is suitable for holding operating means 17, 18 and 19 in rotation of said deflector element 1 (Figures 1, 9 and 10).

[0031] Advantageously, said valve opening 33 is suitable for holding and sealing said operating means 17 and 18 of said deflector element 1.

[0032] In accordance with an advantageous embodiment, a cap 34 is provided for closing said valve opening 33 (Figures 2 and 4).

[0033] More advantageously, in an even further embodiment, a cap 34 is provided for covering the end of the operating means 17 and 18 the deflector element 1 coming out of said valve opening 33 (Figures 9 and 10).

[0034] In accordance with an embodiment, the fluid deviation coupling 2 connected to said single-pipe valve 3, holds the connected freely rotating deflector element 1 in one of its slots 43.

[0035] In said coupling 2 at least one delivery opening 28 and at least one return opening 29 are provided for the fluid, and a fifth opening 27 at the end of the coupling for connecting to the single-pipe valve 3, which is suitable for acting with the deflector element 1 (Figures 2, 4, 9 and 10).

[0036] Said coupling comprises a dividing separator 26 that is suitable for separating the fluid, coming out of or going into a fourth opening 15 of the deflector element 1, which is held in the slot 43 of the coupling 2, from the fluid going into or coming out of a second opening 11 of said deflector element 1. In accordance with an embodiment, said separator 26 defines and divides the portion of chamber defined by the coupling downstream of the slot 43 for the deflector element, in two separate and leak-proof pipes, which, in a first position of the deflector element 1, put the fourth opening 15 of the deflector element fluidically in communication, for example with the delivery opening 28 of the coupling 2 and the second opening 11 of the deflector element 1, for example with the return opening 29 of the coupling (Figure 9). Moreover, said separator 26 defines and divides the portion of chamber defined by the coupling downstream of the slot 43 for the deflector element, in two separate and leak-

proof pipes, which, in a second position of the deflector element 1, put the fourth opening 15 of the deflector element fluidically in communication, for example with the return opening 29 of the coupling 2 and the second opening 11 of the deflector element 1, for example with the delivery opening 28 of the coupling.

[0037] In accordance with an embodiment, said separator 26 exhibits an L section.

[0038] Advantageously, said coupling comprises a body provided with a slot 31 that is suitable for containing stop means 30 of the deflector element 1, which are suitable for guiding and limiting the rotation of the deflector element 1, when it is held in the slot 43 of the coupling 2 (Figures 2, 4, 9, 10 and 7).

[0039] In accordance with an embodiment, said deflector element 1 comprises a first tubular portion 5 of predefined X-X axis, forming a first stretch of pipe 6 for the fluid. Said deflector element is fitted with a first end 7 and a second end 8. Said first tubular portion 5 comprises a first opening 9 for said first stretch of pipe set in said first end 7 and a back wall 10 set in said second end 8. Said back wall comprises a second opening 11 for said first stretch of pipe (Figure 3).

[0040] Said deflector element also comprises a second tubular portion 12 set inside the first tubular portion 5 forming a second stretch of pipe 13 separate from said first stretch of pipe. Said second tubular portion comprises a third opening 14 for said second stretch of pipe 13 set substantially level with said first end 7. Said second tubular portion 12 connects by sealing to the back wall 10 and forms a fourth opening 15 for said second stretch of pipe 13 in said back wall.

[0041] Particularly advantageously, said second opening 11 and said fourth opening 15 are set in said back wall 10 substantially in order to be able to change position, when the deflector element 1 is rotated around its X-X axis.

[0042] Said deflector element 1 also comprises operating means 16 or 17 or 18 for said deflector element, which are suitable for positioning said second and fourth opening 11 and 15 so as to channel a delivery fluid 17 separately from a return fluid 18.

[0043] In accordance with an embodiment, said operating means for the deflector element 1 comprise a slot 16 for a utensil 19, which is suitable for rotating said deflector element 1, also when it is set in operative conditions inside the coupling 2 of the single-pipe valve 3, for example a polygonal slot, preferably hexagonal.

[0044] Advantageously, said operating means for the deflector element 1 comprise a slot 16 for an allen wrench or allen key 19.

[0045] In accordance with an embodiment, said operating means for the deflector element comprise a driving shaft 17 or 18, which protrudes from the first end 7 of the deflector element (Figures from 5 to 10).

[0046] Advantageously, said driving shaft 17 or 18 is connected removably to the deflector element. For example, the driving shaft 17 or 18 is coupled to one of its

ends with interference in a slot provided in the deflector element 1, avoiding blocking the passage openings 9 and above all 14 for the fluid.

[0047] In accordance with a particular embodiment, the driving shaft 17 or 18 comprises at least one connection radius 20, preferably, for example, a plurality of connection radii 20, at the end connected to the deflector element 1, for creating a connection for said shaft to the deflector element, which does not obstruct the free flow of the fluid in the deflector element.

[0048] Advantageously, said at least one radius 20 is connected to a control centre 16 of the deflector element.

[0049] In accordance with an embodiment, said driving shaft 17 or 18 comprises a manoeuvring end 21 suitable for being set, at least partially, outside the chamber for the fluid 22, which is defined by the single-pipe valve 3.

[0050] Advantageously, said driving shaft 17 or 18 comprises sealing means 23 suitable for preventing fluid from leaking out of the fluid chamber 22 of the single-pipe valve 3.

[0051] Said driving shaft 17 or 18 is preferably suitable for being set partially inside the shutter organ 24 provided in said single-pipe valve 3, without obstructing the flow of fluid circulating in the valve.

[0052] In accordance with a further embodiment, said second tubular portion 12 of the deflector element is set inside said first tubular portion 5, so as to have an external surface of the deflector element with a cylindrical shape, which is, for example, suitable for rotating in a cylindrical slot 43 provided in the coupling.

[0053] Advantageously, said second tubular portion 12 is connected to the first tubular portion 5 also by means of at least one reinforcement radius 25.

[0054] In accordance with an embodiment, said first opening 9 is ring-shaped and preferably surrounds said third opening 14 of the deflector element 1.

[0055] In accordance with a particular and advantageous embodiment, said second 11 and fourth 15 opening are round openings.

[0056] In accordance with a further embodiment, said deflector element 1 comprises stop means 30, which are suitable for acting with a slot 31, for example a semicircular slot with advantageous diametrically opposite stops that is provided in the deviation coupling 2 to define the course of rotation of the deflector element 1 and define the positions of the deflector element, in which said second 11 and fourth 15 opening change position.

[0057] Thanks to the proposed form of the deflector element, it is guided into the coupling to guarantee a perfect seal and precise rotation, preventing it from moving in relation to the coupling and, more importantly, preventing leakages between the fluid being delivered and the fluid being returned.

[0058] Thanks to the proposed deflector element, the manoeuvre to rotate it and invert the flows is easy and precise, also operating outside the valve, without needing to dismantle it or empty the system.

[0059] The deflector element is advantageously easy

to make, also, for example by means of stamping or pressure die casting. Advantageously, the deflector element can also be made of plastic and/or synthetic material.

[0060] Thanks to the proposed embodiments of the deflector element, it is possible to manoeuvre the deflector element without dismantling the valve and emptying the system.

[0061] Moreover, in accordance with a proposed embodiment, it is possible to act on the deflector element without even emptying the heating element.

[0062] Various modifications, adaptations and substitutions of elements with others that are functionally equivalent can be made to the above described preferred embodiments of the deflector element by those skilled in the art in order to satisfy specific and contingent needs, without departing from the scope of the following claims.

Claims

1. Deflector element (1) for fluid deviation couplings (2) for radiator element (4) intercepting single-pipe valves (3), comprising a first tubular portion (5) of predefined axis (X-X), forming a first stretch of pipe (6) for fluids, with a first end (7) and a second end (8), said first tubular portion (5) comprising a first opening (9) for said first stretch of pipe set in said first end (7) and a back wall (10) set in said second end (8), said back wall comprising a second opening (11) for said first stretch of pipe, said deflector element also comprising a second tubular portion (12) set inside the first tubular portion (5) forming a second stretch of pipe (13) separate from said first stretch of pipe, said second tubular portion comprising a third opening (14) for said second stretch of pipe (13) set substantially level with said first end (7), said second tubular portion (12) connecting by sealing to said back wall (10) and forming a fourth opening (15) for said second stretch of pipe (13) in said back wall, said second opening (11) and said fourth opening (15) being set in said back wall (10) so as to be able to substantially change position when the deflector element (1) is rotated around its axis (X-X), said deflector element (1) also comprising operating means (16; 17; 18) for said deflector element suitable for positioning said second and fourth opening (11; 15) so as to channel a delivery fluid (17) separately from a return fluid (18).
2. Deflector element, according to claim 1, wherein said operating means comprise a slot (16) for a utensil (19), which is suitable for rotating said deflector element (1) also when it is set in operative conditions inside the coupling (2) of the single-pipe valve (3).
3. Deflector element, according to claim 1 or 2, wherein

said operating means (16) comprise a slot (16) for an allen wrench or allen key (19).

4. Deflector element, according to any one of the previous claims, wherein said operating means comprise a driving shaft (17; 18), which protrudes from the first end (7) of the deflector element. 5
5. Deflector element, according to any one of the previous claims, wherein said driving shaft (17; 18) is connected removably to the deflector element. 10
6. Deflector element, according to any one of the previous claims, wherein said driving shaft (17; 18) comprises at least one connection radius (20) at the end connected to the deflector element for connecting said shaft to the deflector element. 15
7. Deflector element, according to any one of the previous claims, wherein said at least one radius (20) is connected to a control centre (16). 20
8. Deflector element, according to any one of the previous claims, wherein said driving shaft (17; 18) comprises a manoeuvring end (21), which is suitable for being set, at least partially, outside a chamber for the fluid (22), which is defined by the single-pipe valve (3). 25
9. Deflector element, according to any one of the previous claims, wherein said driving shaft (17; 18) comprises sealing means (23) suitable for preventing fluid from leaking from the fluid chamber (22) of the single-pipe valve (3). 30
10. Deflector element, according to any one of the previous claims, wherein said driving shaft (17; 18) is suitable for being set partially inside a shutter organ (24) provided in said single-pipe valve (3). 35
11. Deflector element, according to any one of the previous claims, wherein the outer surface of the deflector element (1) is cylinder-shaped. 40
12. Deflector element, according to any one of the previous claims, wherein said second tubular portion (12) is connected to the first tubular portion (5) also by means of at least one reinforcement radius (25). 45
13. Deflector element, according to any one of the previous claims, wherein said first opening (9) is ring-like. 50
14. Deflector element, according to any one of the previous claims, wherein said second (11) and fourth (15) opening are round openings. 55
15. Deflector element, according to any one of the previous claims, wherein stop means (30) are comprised, which are suitable for acting with a slot (31) provided in the deviation coupling (2) to delimit the course of rotation of the deflector element (1) and define the positions of the deflector element, in which said second (11) and fourth (15) opening change position.
16. Fluid deviation coupling (2) for single-pipe valves (3) with a connected freely rotating deflector element (1), as defined in any one of the claims from 1 to 15.
17. Coupling, according to the previous claim, wherein at least one delivery opening (28) and at least one return opening (29) are provided for the fluid, as well as a fifth opening (27) at the end of the coupling for connecting to the single-pipe valve (3), which is suitable for acting with the deflector element (1).
18. Coupling, according to any one of the claims from 16 to the previous one, wherein a separator (26) for separating the fluid, coming out of or going into the fourth opening (15) of the deflector element (1), from the fluid going into or coming out of the second opening (11).
19. Coupling, according to any one of the claims from 16 to the previous one, wherein a body is comprised provided with a slot (31), which is suitable for containing stop means (30) of the deflector element (1) to limit the rotation of the deflector element (1).
20. Fluid on-off single-pipe valve (3), which is suitable for acting with a coupling, as defined in any one of the claims from 16 to 19.
21. Single-pipe valve, according to claim 20, wherein a valve body (32) is comprised defining a chamber for the fluid (22), said valve body (32) being provided with a valve opening (33) that is suitable for holding said operating means and/or manoeuvring utensil (17; 18; 19) of said deflector element (1).
22. Single-pipe valve, according to claim 21, wherein said valve opening (33) is suitable for holding and sealing operating means (17; 18) for said deflector element (1).
23. Single-pipe valve, according to any one of the claims from 20 to the previous one, wherein a cap (34) is provided for closing said valve opening (33).
24. Single-pipe valve, according to any one of the claims from 20 to the previous one, wherein a cap (34) is provided for covering the end of the operating means (17; 18) of the deflector element (1) coming out of said valve opening (33).

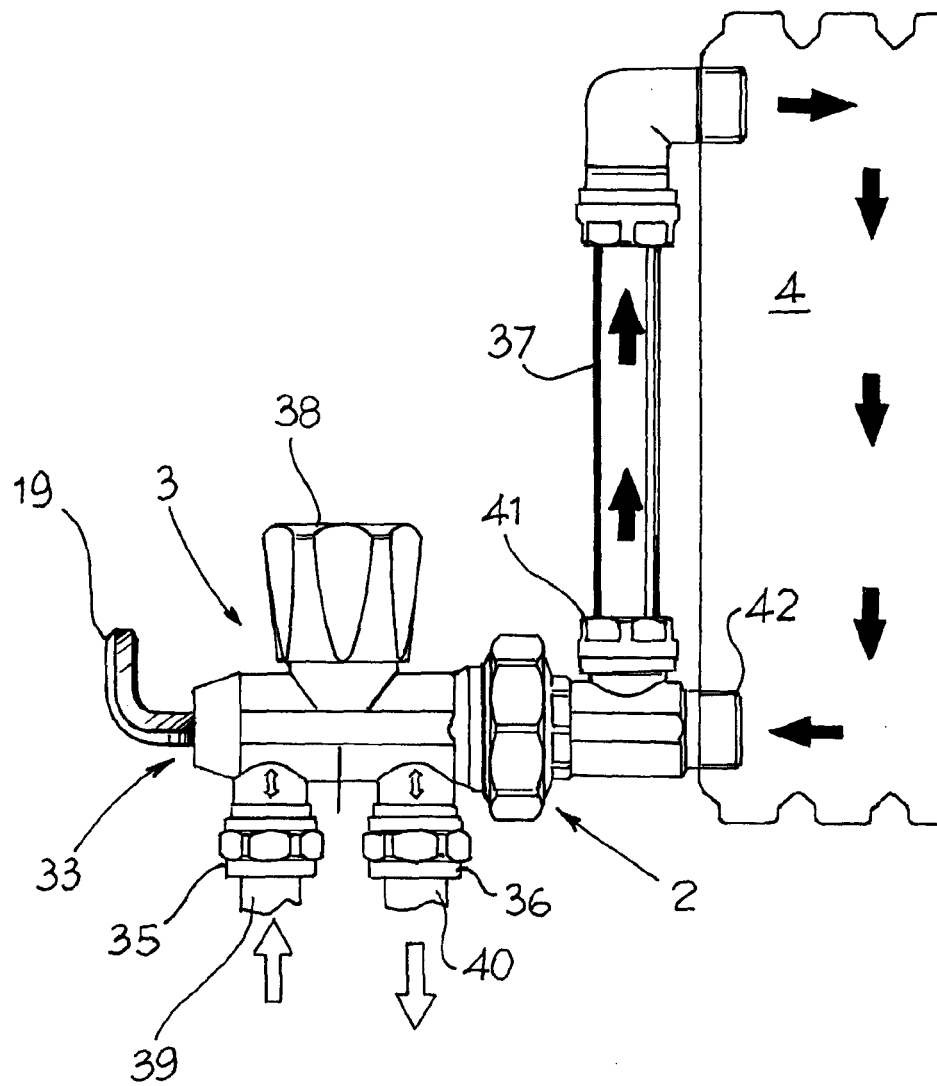


Fig. 1

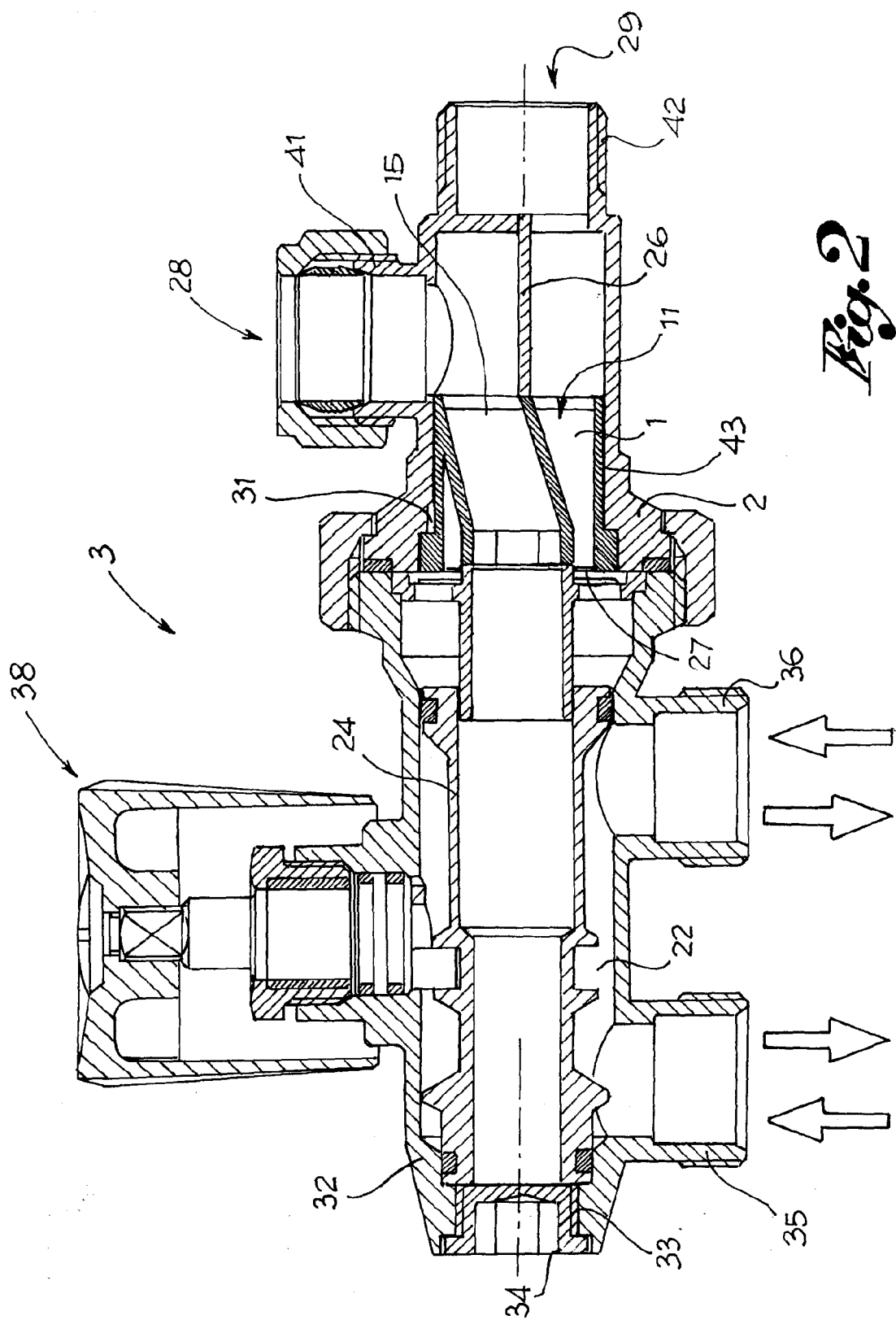


Fig. 2

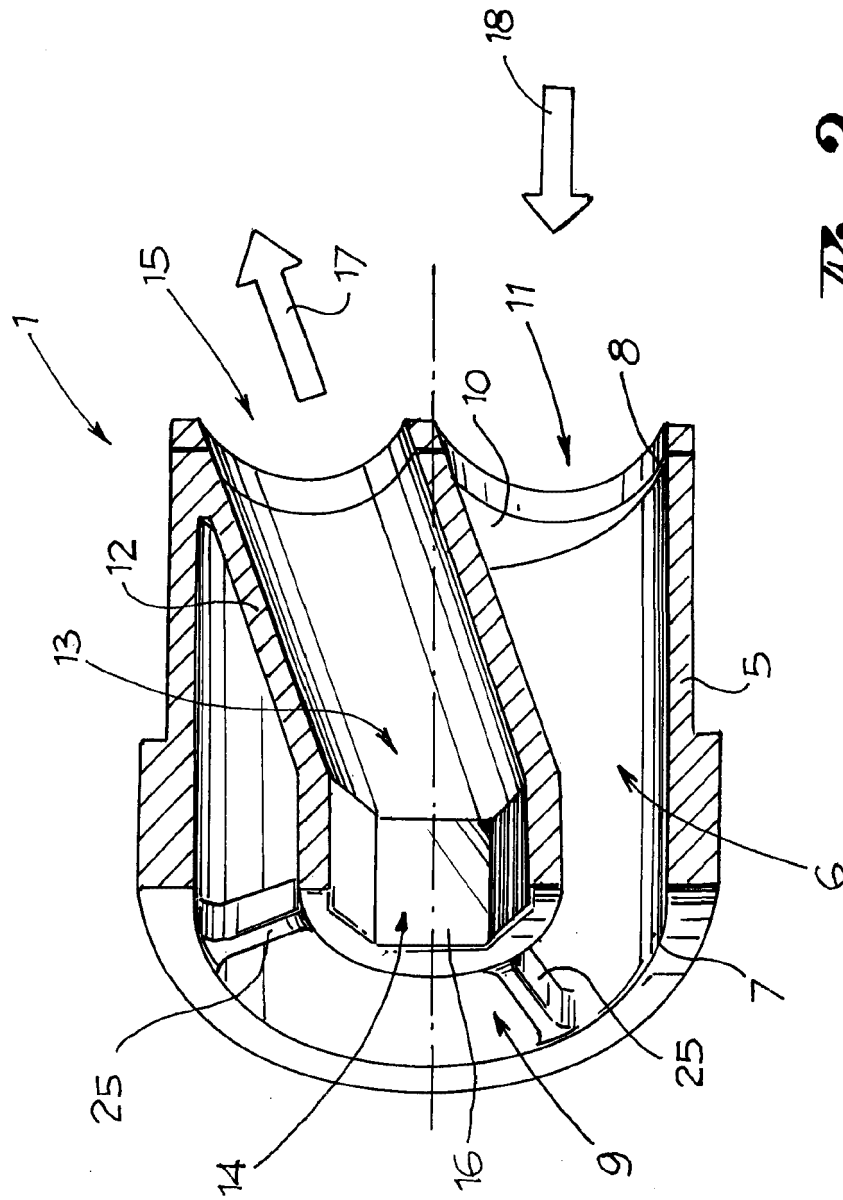
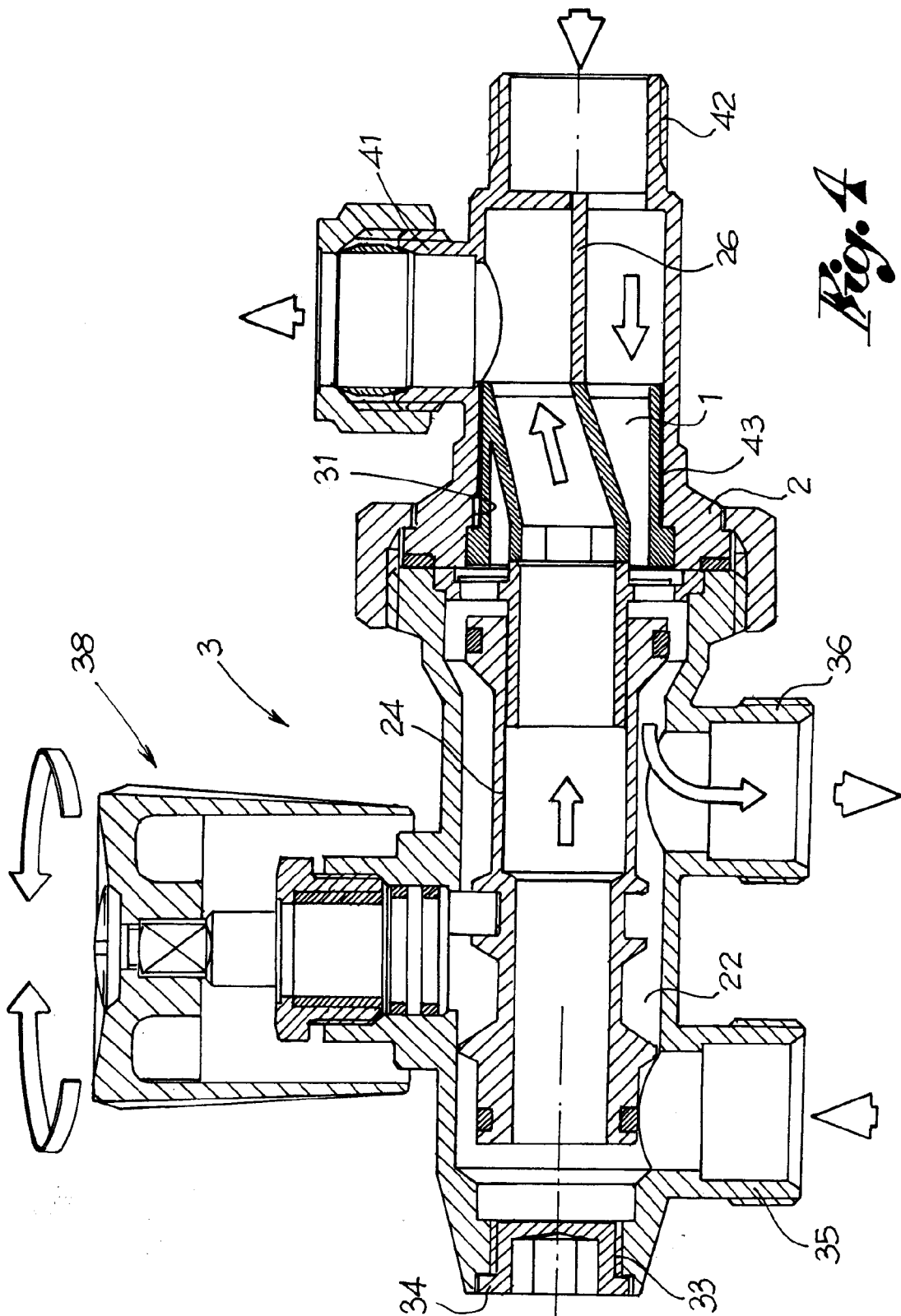


Fig. 3



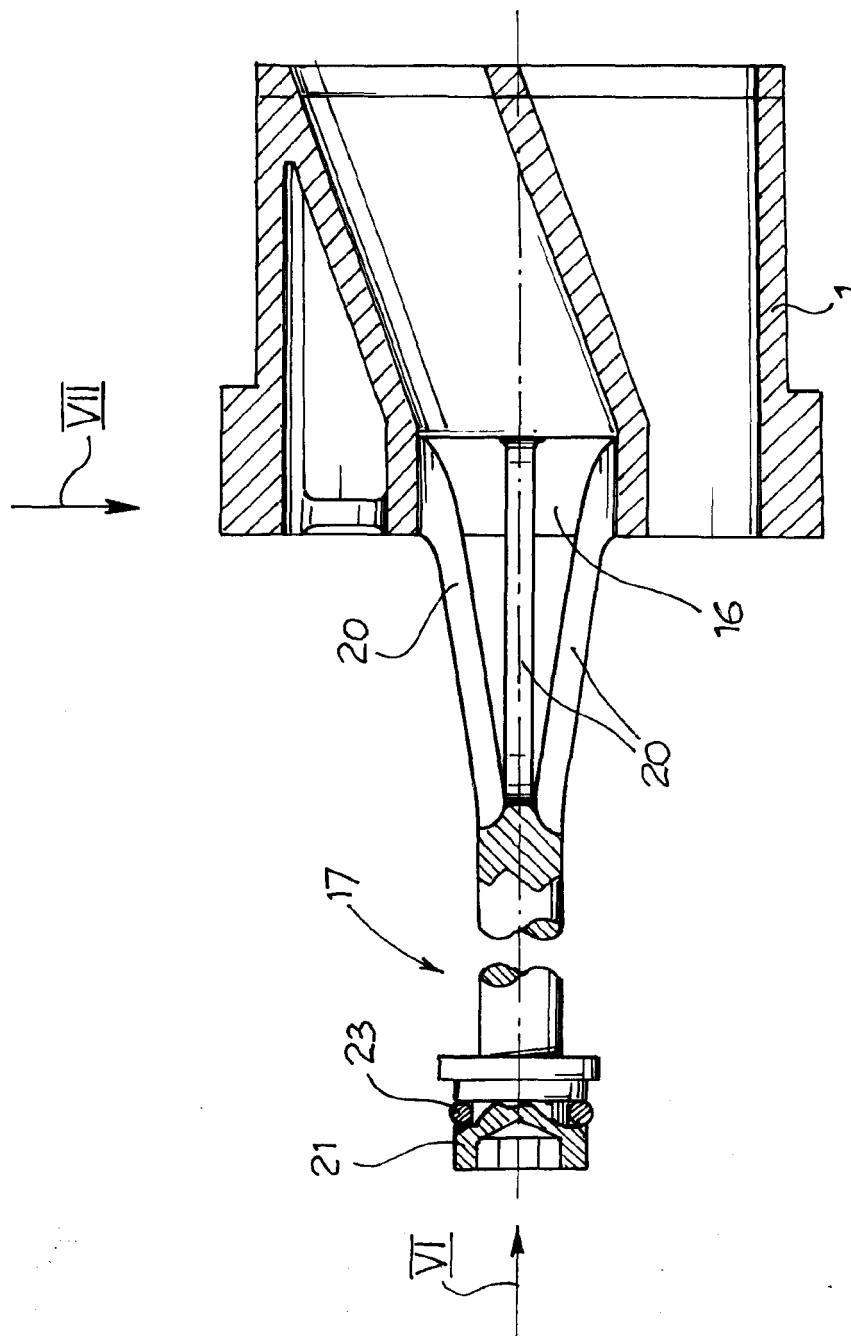


Fig. 5

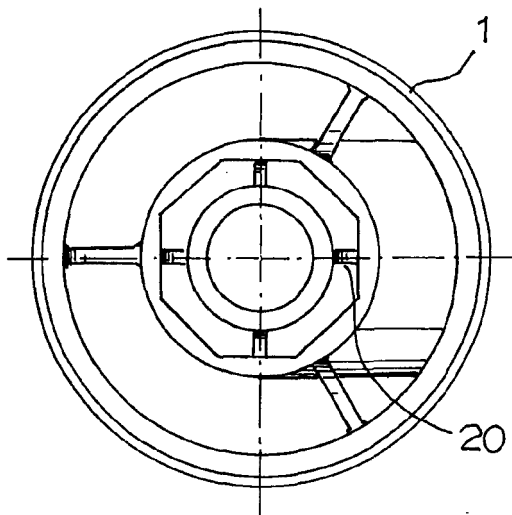


Fig. 6

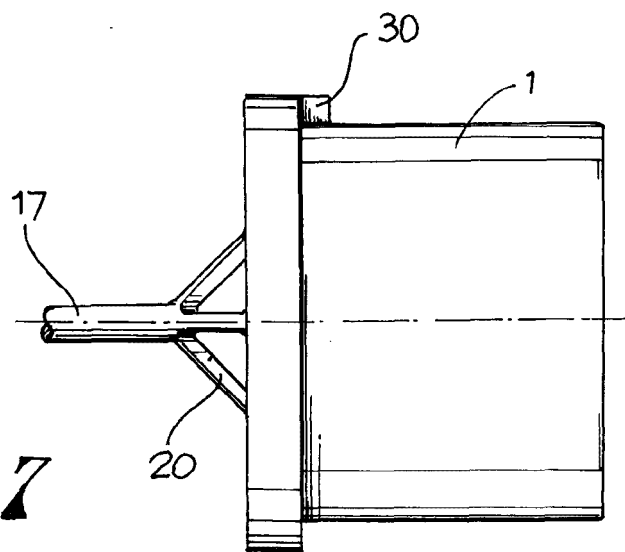


Fig. 7

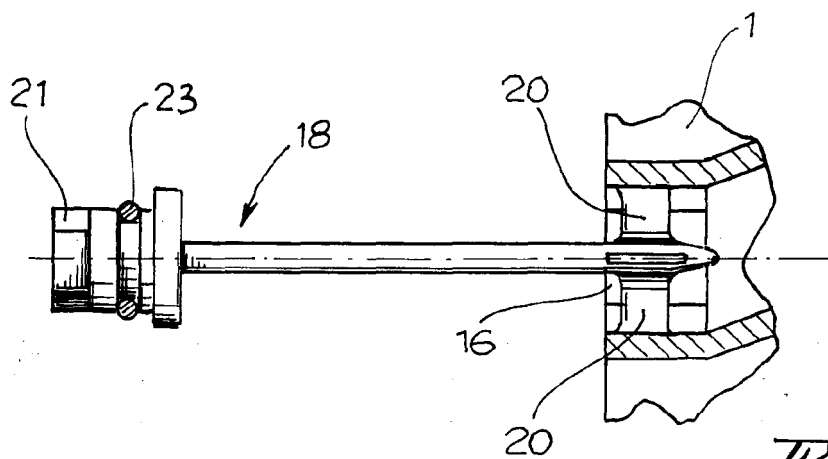


Fig. 8

