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(72) Inventors:
• **Boscaino, Luigi**
41100 Modena (IT)
• **Bassoli, Claudio**
41012 Carpi (MO) (IT)

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(74) Representative: **Crugnola, Pietro**
Luppi Crugnola Bergamini & Partners S.r.l.
Viale Corassori, 54
41100 Modena (IT)

(71) Applicant: **ANGELO PO GRANDI CUCINE S.p.A.**
41012 Carpi (MO) (IT)

(54) Dispensing apparatus

(57) A dispensing apparatus comprises a collecting body (2) suitable for receiving a fluid to be dispensed, a rotor (36) suitable for dispensing said fluid, said rotor (36) being fitted to said collecting body (2) by rotating coupling means (37), said collecting body (2) being

shaped in such a way as to receive at the inside thereof a substantial part (18) of the body of said rotor, said rotating coupling means (18) comprising fixing means (35) of a seal disc (22) interposed between said rotor (36) and said collecting body (2).

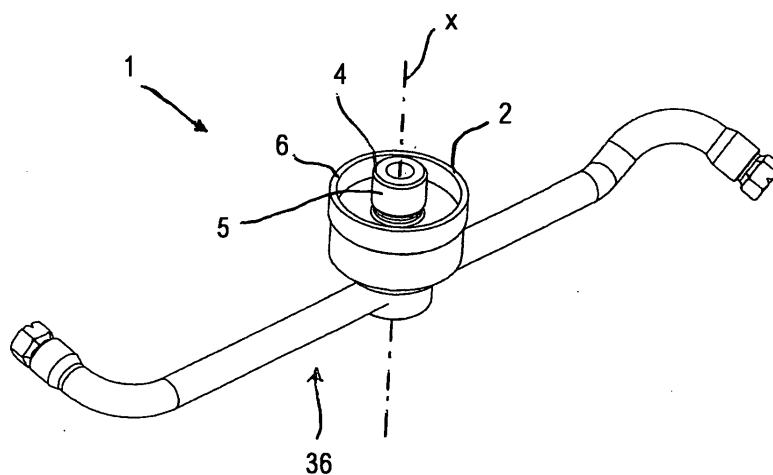


Fig. 1

Description

[0001] The invention relates to an apparatus for dispensing fluid, in particular an apparatus for dispensing cleaning and/or polishing fluid. The dispensing apparatus according to the invention is particularly suitable for internally cleansing professional ovens and/or cookers.

[0002] DE 199 50 920 A1 discloses a dispenser that comprises an inlet conduit for the cleaning fluid inserted in a tubular element.

[0003] The tubular element is coupled with a hollow pin by means of a threaded connection. A lower portion of the tubular element and a flange arranged transversely to the longitudinal axis of the hollow pin and integral with the latter are configured in such a way that the dispenser can be fixed to a top wall of an oven or cooker. The hollow pin is provided with radial outlet holes through which the cleaning fluid can pass. On a lower portion of the hollow pin a sliding bearing is mounted coaxially that is able to rotate around a longitudinal axis of the hollow pin and is provided with further radial holes arranged at radial holes of the hollow pin to enable the cleaning fluid to flow. Two rotating and hollow arms, that extend in a transverse direction to the longitudinal axis of the hollow pin, have a respective connecting end in contact with the sliding bearing in such a way that the cleaning fluid can flow in a direction that is substantially radial to the hollow pin. Two nozzles are provided, each of which is arranged on each rotating arm at an end opposite the connecting end. The two nozzles are turned in opposite directions from each other. Two guard rings arranged coaxially to the sliding bearing and in contact with the connecting ends of the rotating arms provide to preserve the sliding bearing from powder or dirt. A thrust ring interacting with a preload spring supports the assembly consisting of the rotating arms, guard rings and the sliding bearing. A screw engaging in a lower end of the hollow pin provide to constrain the preload spring on the hollow pin and then keeps mutually the thrust ring, the sliding bearing, the guard rings and the rotating arms together.

[0004] During operation, a cleaning fluid reaches the dispenser through the inlet conduit and flows inside the hollow pin to reach the radial holes. Subsequently, the fluid traverses the further radial holes flowing inside the rotating arms and subsequently reaches the two nozzles. Owing to the fact that the two nozzles are turned in opposite directions from each other, the emerging fluid generates in a direction that is perpendicular to the longitudinal axis components with equal and opposite force that give the rotating arms a rotating torque. In this way the rotating arms are rotated around the aforementioned longitudinal axis.

[0005] The preload spring provides to keep the thrust ring, the sliding bearing against the flange in an axial position in such a way as to compensate volumetric variations of the sliding bearing due to thermal effects and/or wear.

[0006] One drawback of the dispenser disclosed above consists of the great structural complexity of the dispenser components that therefore involves high production costs.

5 **[0007]** Another drawback consists of the fact that owing to the great wear due to frequent use of the dispenser the spring is no longer able to compensate for wear to the sliding bearing.

10 **[0008]** A further drawback of the present dispenser is due to the fact that the assembly of the hollow pin of the thrust ring and of the preload spring has great overall dimensions in the direction of the longitudinal axis that reduce the volume of the treatment chamber of the oven and/or of the cooker.

15 **[0009]** A yet further drawback of the aforementioned dispenser is due to the great weight of the thrust ring of the hollow pin and of the preload spring assembly that makes a high static torque value necessary to enable rapid operation of the rotating arms and to overcome inertia

20 **[0010]** An object of the present invention is to improve the dispensers, in particular the dispensers of cleaning fluid suitable for cleaning professional ovens and/or cookers internally.

25 **[0011]** Another object of the present invention is to obtain a dispenser that is structurally very simple.

[0012] A further object of the present invention is to obtain a dispenser in which the undesired losses from leaks of cleaning fluid are minimised.

30 **[0013]** A still further object of the present invention is to obtain a dispenser having very compact overall dimensions.

35 **[0014]** A still further object of the present invention is to obtain a dispenser with a reduced weight that has inertia of a limited amount and that is therefore rapidly and effectively operatable by the cleaning fluid.

[0015] In a first aspect of the invention, there is provided an apparatus comprising a collecting body suitable for receiving a fluid to be dispensed, a rotor suitable for dispensing said fluid, said rotor being fitted to said collecting body by rotating coupling means characterised in that said collecting body is shaped in such a way as to receive at the inside thereof a substantial part of the body (18) of said rotor.

45 **[0016]** In a second aspect of the invention, there is provided an apparatus comprising a collecting body suitable for receiving a fluid to be dispensed, a rotor suitable for dispensing said fluid, said rotor being fitted to said collecting body by rotating coupling means characterised in that said rotating coupling means comprises fixing means for fixing a seal disc interposed between said rotor and said collecting body.

50 **[0017]** Owing to these aspects of the invention, it is possible to obtain a seal condition of the fluid to be dispensed avoiding leaks of the fluid between the collecting body and the rotor without having to resort to a spring interposed between the collecting body and the rotor.

[0018] Owing to the invention it is possible to obtain

an apparatus for dispensing a fluid, configured structurally in a very simple manner and which therefore involves low production and maintenance costs.

[0019] Owing to the invention there is provided an apparatus for dispensing a fluid that operates in a very effective manner and in which the seal conditions are improved to avoid leaks of the fluid.

[0020] It is furthermore possible to obtain an apparatus having a modest axial extent that enables the treatment chamber of professional ovens and/or cookers to be better exploited.

[0021] Furthermore, it is possible to obtain an apparatus with a modest weight that has limited inertia and that can interact with a fluid in such a way as to be rapidly and effectively operatable.

[0022] The invention may be better understood and implemented with reference to the attached drawings, which show some embodiments thereof by way of non-limitative example, in which:

Figure 1 is a perspective view of an apparatus for dispensing cleaning fluid;

Figure 2 is an exploded view of the apparatus in Figure 1;

Figure 3 is a fragmentary sectional side view that shows the apparatus in Figure 1 fitted to a horizontal wall;

Figure 4 is a side and sectioned view of a portion of the apparatus in Figure 1.

[0023] With reference to Figures 1 to 4 there is shown an apparatus 1 for dispensing a fluid, in particular a cleaning and/or polishing fluid for internally cleansing professional ovens and/or cookers.

[0024] The apparatus 1 comprises a hollow collecting body 2 having a longitudinal X-axis and being provided with an inlet conduit 4 for the fluid and with a cylindrical rest wall 6 connected together by a flat wall 27. The cylindrical inlet conduit 4 comprises a threaded surface 5 suitable for engaging with a nut 7 to fix the collecting body 2 by constraining the rest wall 6 to a horizontal wall 3 of a professional oven or kitchen, as shown more clearly in Figure 3. Near a lower portion of the rest wall 6 there is provided a circumferential seat 9 that is suitable for housing a seal ring 10. Inside the collecting body 2 there is obtained a cylindrical connecting wall 8 and which extends along the longitudinal X-axis that together with the flat wall 27 defines a containing cavity 11 and which is provided with a threaded external surface 12 suitable for engaging in a cylindrical threaded wall 14 obtained in ring nut means 13. Near a top portion of said threaded wall 14 there is provided a further circumferential seat 15 suitable for interacting with the circumferential seat 9 and with the seal ring 10. The ring nut means 13 comprises a support wall 16 connected to the threaded wall 14 and arranged transversely to the latter. The support wall 16 is provided at its centre with a through housing hole 17 suitable for housing a body part 18 of a rotor 36

suitable for dispensing fluid.

[0025] The body part 18 is rotatably connected to the collecting body 2 in relation to the longitudinal X-axis by rotating coupling means 37 and is provided with an axial hole 31 that faces the inlet conduit 4 and enables the fluid to flow inside the rotor 36. The body part 18 comprises a first cylindrical portion 20 that protrudes inside the ring nut means 13 and is suitable for engaging at the bottom with the housing hole 17 and at the top with a seal disc 22 of the rotating coupling means 37. The seal disc 22 is housed in a circular seat 23, internally obtained on the support wall 16 and interacts at the top with a washer 24. The washer 24 comprises a lower surface 25 that is partially suitable for interacting with an upper surface 21 of the seal disc 22 and partially coming into contact with an abutment 26 provided on the body part 18. The rotating coupling means 37 comprises fixing means 35, arranged inside the containing cavity 11 and suitable for fixing the washer 24 to the body part 18 by means of a threaded coupling 30 in such a way as to constrain the seal disc 22 axially in relation to the body part 18. The fixing means 35 is provided at the top with an active surface 28 suitable for interacting with the fluid and facing the flat wall 27 in such a way as to define a disc-shaped hollow space 29. Below the body part 18 of the rotor 36 there are fixed arm means 19 extending along a transversal Y axis that is perpendicular to the longitudinal X axis. The arm means 19 is provided with passage conduits 33 for the fluid, communicating with the axial hole 31 near openings 34. The arm means 19 comprises two outlet nozzles 32 arranged at ends of the arm means 19 that are opposite one another substantially perpendicularly both to the longitudinal X-axis and to the transverse axis Y. The two nozzles 32 are turned in directions that are opposite each other.

[0026] During operation, a cleaning and/or polishing fluid enters the inlet conduit 4, continues inside the axial hole 31 and flows distributing into the two passage conduits 33 of the arm means 19. Lastly, the fluid emerges from the nozzles 32 and exerts substantially equal and opposite thrust actions in such a way as to generate a rotating torque that rotates the arm means 19 around the longitudinal X-axis.

[0027] The seal disc 22, by interacting with the lower surface 25 of the washer 24, counteracts the axial thrust exerted by the weight of the arm means 19 and by the body part 18 and enables the friction to be reduced that is generated when the connection portion is rotated by the arm means 19 integral with it. The fluid that traverses the inlet conduit 4 and subsequently the axial hole 31 may enter the inside of the disc-shaped hollow space 20; the pressure of the fluid inside the disc-shaped hollow space 29 generates on the active surface 28 of the fixing means 35 a downward thrust along the longitudinal X axis; this thrust is directly proportionate to fluid pressure and the area of the active surface that can then be shaped according to operating needs. The thrust contributes to ensuring the contact conditions of the seal

disc 22 with the washer 24 and with the circular seat 23, thus improving the seal of the fluid inside the ring nut means 13.

[0028] The seal disc 22 and the washer 24 are arranged to interact in such a way that with prolonged use the washer 24, through the effect of sliding, progressively forms on the upper surface 21 a circular seat that increases seal conditions between the seal disc 22 and the washer 24.

Claims

1. Apparatus, comprising a collecting body (2) suitable for receiving a fluid to be dispensed, a rotor (36) suitable for dispensing said fluid fitted to said collecting body (2) by rotating coupling means (37), **characterised in that** said collecting body (2) is shaped in such a way as to receive at the inside thereof a substantial part (18) of the body of said rotor (36).
2. Apparatus according to claim 1, wherein said rotating coupling means (37) comprises fixing means (35) for fixing a seal disc (22) interposed between said rotor (36) and said collecting body (2).
3. Apparatus, comprising a collecting body (2) suitable for receiving a fluid to be dispensed, a rotor (36) suitable for dispensing said fluid, said rotor being fitted to said collecting body (2) by rotating coupling means (37) **characterised in that** said rotating coupling means (37) comprises fixing means (35) for fixing a seal disc (22) interposed between said rotor (36) and said collecting body (2).
4. Apparatus according to claim 2, or 3, wherein said rotor (36) is arranged in such a way that the weight of said rotor (36) acts on said seal disc (22) to improve the sealing against leakage of said fluid.
5. Apparatus according to any preceding claim, wherein said collecting body (2) is provided with a threaded external surface (5) suitable for engaging in fixing nut means (7) for fixing said collecting body (2) to an object.
6. Apparatus according to any preceding claim, wherein said collecting body (2) comprises at the inside thereof an inlet conduit (4) for a fluid arranged substantially along a longitudinal axis (X).
7. Apparatus according to claim 6, wherein said substantial part (18) is provided with an axial hole (31) arranged substantially along said longitudinal axis (X) and suitable for being crossed by said fluid.
8. Apparatus according to any one of claims 1, or 2,

or any one of claims 4 to 7 as appended to claim 1, or 2, wherein said collecting body (2) comprises ring nut means (13) suitable for supporting said substantial part (18) rotationally in relation to said collecting body (2).

9. Apparatus according to claim 8, as appended to claim 7, wherein said ring nut means (13) comprises a support wall (16) arranged transversely to said longitudinal axis (X).
10. Apparatus according to claim 9, wherein said support wall (16) is provided with a housing hole (17) suitable for receiving said substantial part (18).
11. Apparatus according to claim 10, wherein at the inside of said ring nut means (13) there is provided a seat (23) obtained in said support wall (16) and arranged in such a way as to surround said housing hole (17).
12. Apparatus according to claim 11, as appended to claim 1, wherein in said seat (23) there is lodged a seal disc (22).
13. Apparatus according to claim 11, as appended to any one of claims 2 to 10, wherein in said seat (23) there is lodged said seal disc (22).
14. Apparatus according to claim 12, or 13, wherein said seal disc (22) comprises an upper surface (21) suitable for interacting in a sliding manner with a lower surface (25) of a sliding seal body (24).
15. Apparatus according to claim 14, as appended to claim 4, wherein as result of the wear caused by sliding friction between said sliding seal body (24) and said seal disc (22) improvement of the sealing against leakage of said fluid can be obtained.
16. Dispensing apparatus according to claim 14, or 15, wherein a portion of said lower surface (25) is fixed relative to a circular abutment (26) obtained on said substantial body part (18).
17. Dispensing apparatus according to any one of claims 2 to 16, wherein said fixing means (35) comprises at the top an active surface (28) suitable for interacting with said fluid.
18. Dispensing apparatus according to claim 17, wherein said active surface (28) is shaped in such a way as to define together with a flat wall (27) of said collecting body (2) a disc-shaped hollow space (29) suitable for being occupied by said fluid.

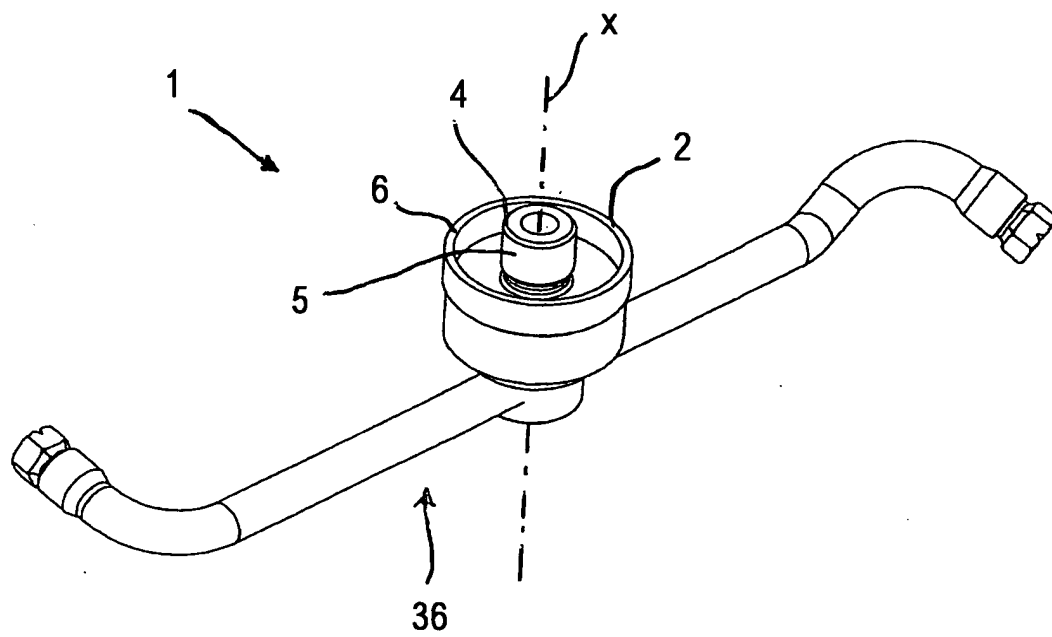


Fig. 1

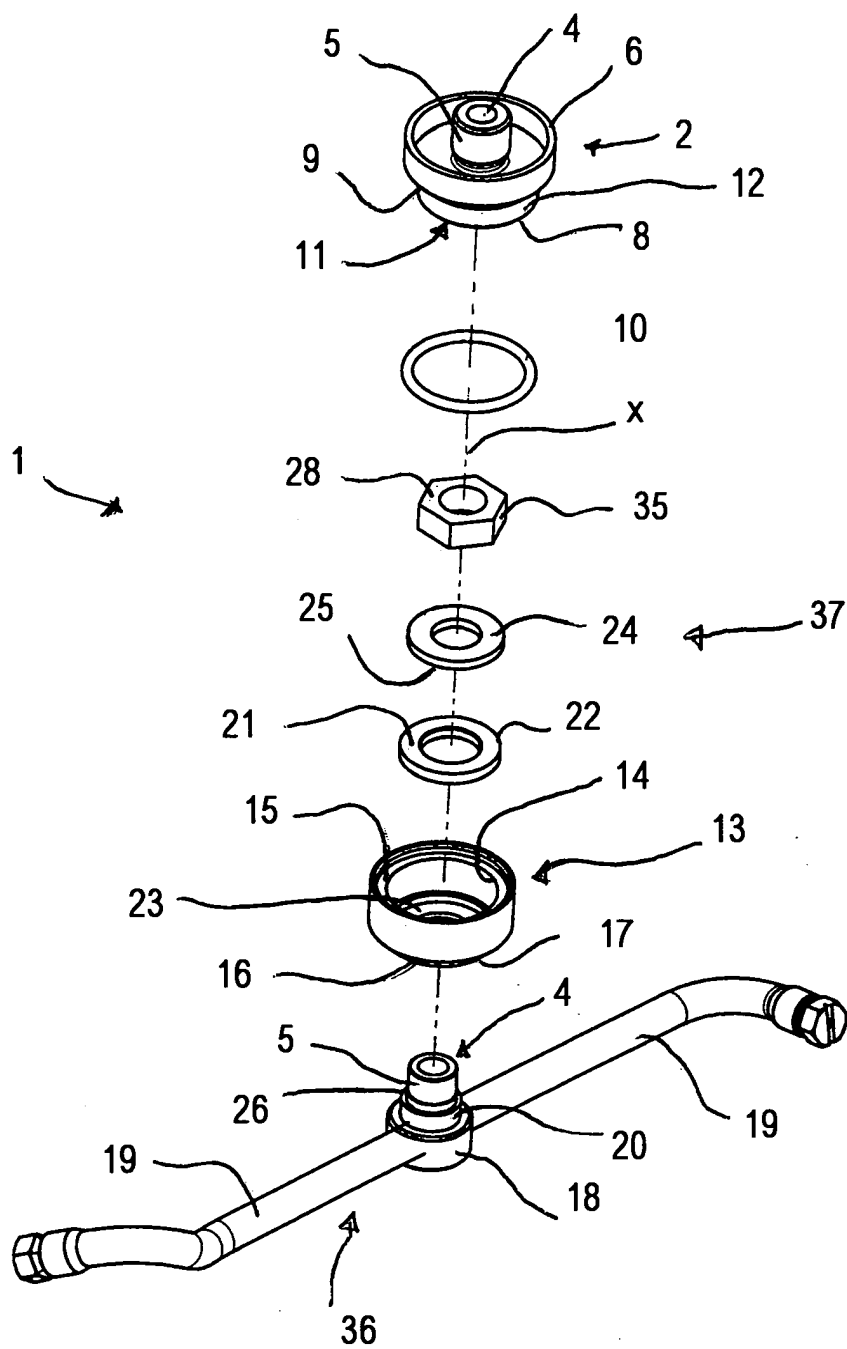


Fig. 2

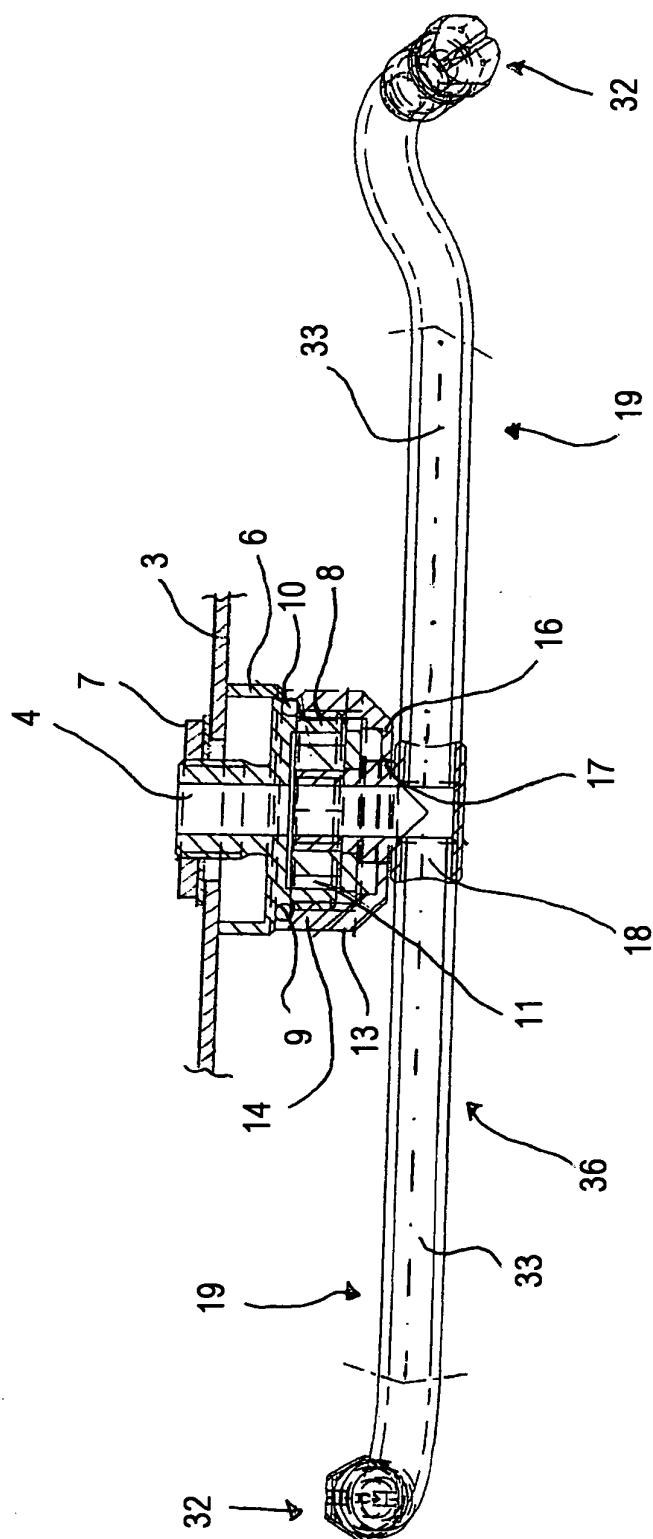


Fig. 3

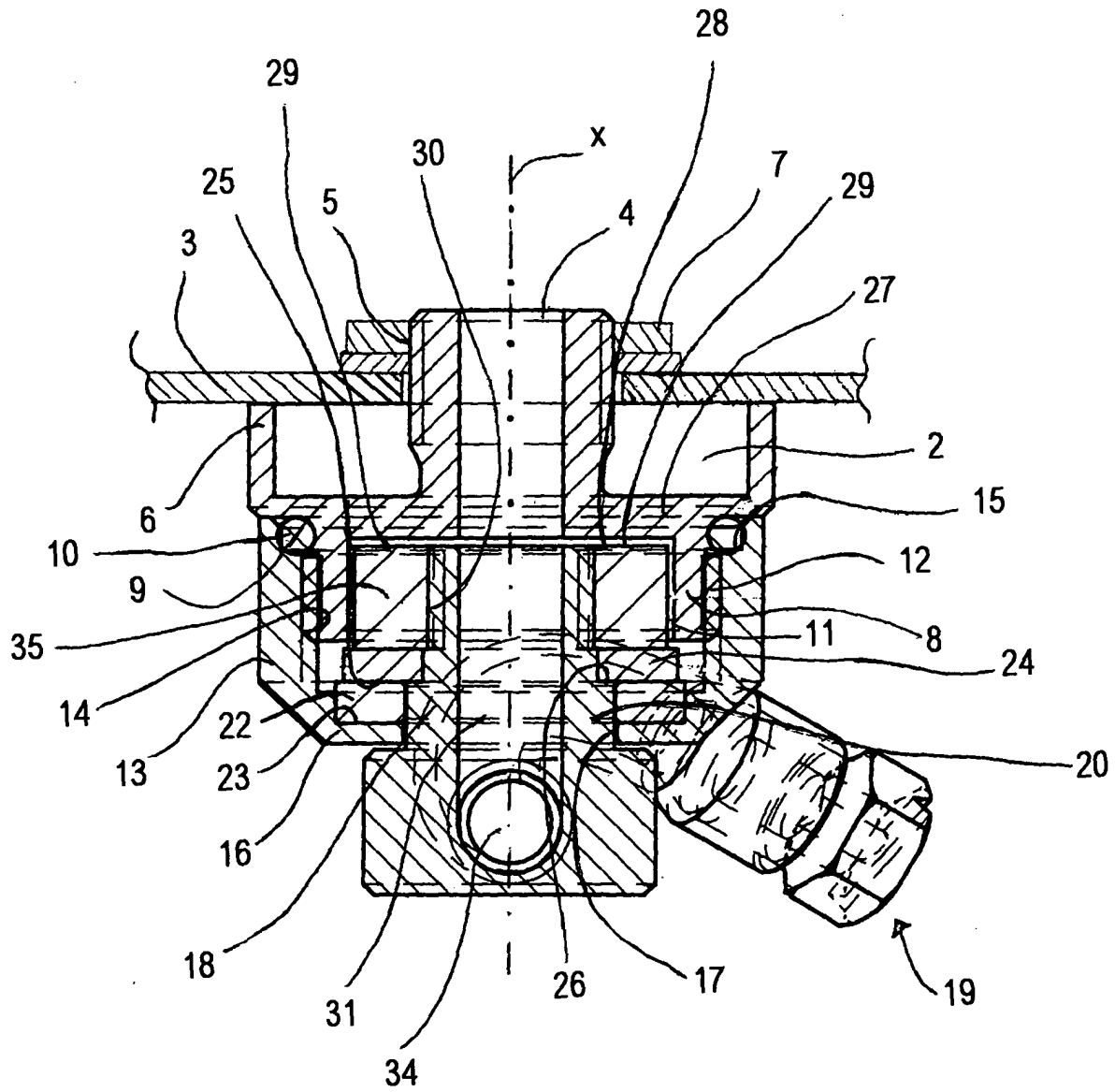


Fig. 4