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(54) **Washing fluid dispensing device**

(57) A washing fluid dosing device for toilet bowls to be placed inside toilet cisterns has a special mixing chamber (5) supplied by gravity with washing fluid from a fluid container (1) through a washing fluid metering nozzle located higher than the mixing chamber (5) and a valve controlling opening and closing said metering nozzle, said valve being provided with a vertical needle (3) the position of which is determined by a float (7) placed in the toilet cistern.

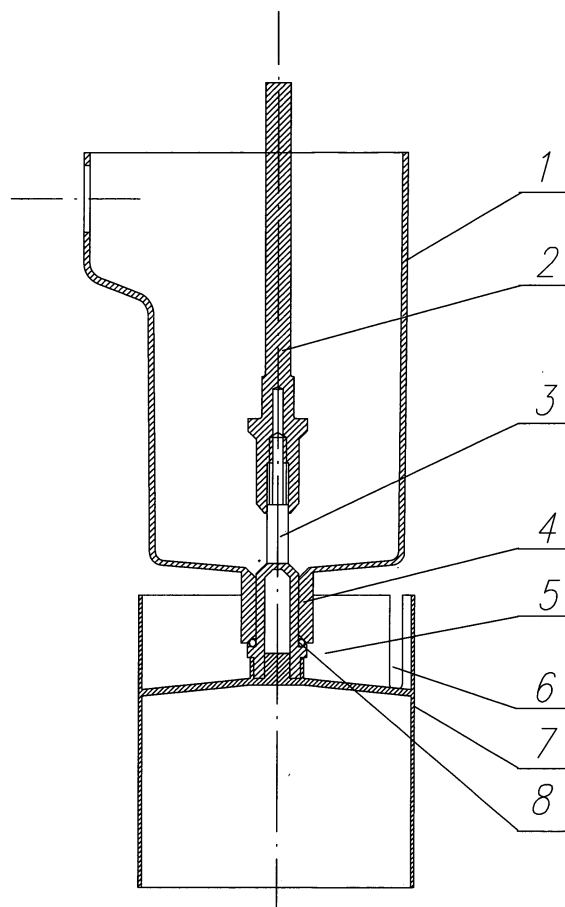


Fig. 1

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Description

[0001] This invention relates to a washing fluid dispensing device for washing and disinfecting toilet bowls, especially to be placed in toilet cisterns.

[0002] Washing fluid dispensing devices placed in toilet cisterns are already known. A dispenser comprising tilting metering container filled with a fluid flowing from an outlet of a dosing neck of said container is known from the Polish patent application P340158. The movement of this metering container is effected by the hydrostatic lift acting onto a float connected to the metering container. From the Polish invention (application P350273) it is known to place a fluid dosing device inside a toilet cistern, and from the Polish invention (application P350274) a device is known comprising a fluid metering valve. Devices are also known in which an outlet of a washing fluid container is closed with a ball made of a material of suitable density.

[0003] It is an object of this invention to provide a simple device which being placed inside a toilet cistern will exactly meter washing fluid and make it suitably mixed with water in the toilet cistern.

[0004] The technical aim of this invention was to provide a simple device easy assembled in existing toilet cisterns, said device comprising a fluid container and a metering valve controlled according to the cycle of filling and emptying the toilet cistern, as well as disabling emptying the washing fluid container in case when the toilet cistern is not supplied with water.

[0005] In the technical solution according to the invention the device metering fluids for washing toilet bowls is located in the toilet cistern and has a fluid container having a bottom outflow opening.

[0006] The device according to the invention comprises a special chamber for mixing washing fluid with water from the cistern, as well as a control valve. The mixing chamber is supplied by gravity with washing fluid from the washing fluid container through a metering nozzle located higher than the mixing chamber in the valve controlling opening and closing said nozzle. This valve is provided with a vertical needle, a position of said needle being determined by a water float placed in the toilet cistern. The float is substantially symmetrical and located lower than the mixing chamber, advantageously concentrically with an axis of the needle in the control valve.

[0007] According to the invention the metering nozzle in the valve is shaped in its cross-sectional view as a ring, substantially a circular one. An inner circle of said ring is determined by a middle part of said needle, and an outer circle is determined by an opening in a valve housing.

[0008] The metering nozzle is closed in this device by the lower part of the valve needle having its transversal dimension greater than its middle part and corresponding to the transversal dimension of the metering nozzle. A lower end of the valve needle is shaped as a flange, having a transversal dimension greater than a transver-

sal dimension of the lower part of the valve needle. Moreover, the valve needle has its upper tip shaped as a mandrel having circumferential grooves substantially conforming with a screw line, and advantageously it is a threaded tip.

[0009] According to the invention a special mixing chamber is an open-top container that is substantially shaped as an open-top cylinder, inside which in the middle of its bottom there is located a mounting mandrel for an inner seat in a face of a lower tip of the needle. A bottom of the mixing chamber, advantageously shaped as a cylinder, is a side surface of a cone having a great apex angle, advantageously in the range from 150° to 175°, a base of said cone being located below its apex. Said container comprises openings for supplying water and draining water mixed with washing fluid, said openings being made in side walls of the container, substantially in its cylindrical jacket, advantageously made as slots, advantageously running through the whole height of the container walls, especially at the height of the cylindrical jacket.

[0010] According to the invention a substantially symmetrical float is shaped as an open-bottom cylinder connected concentrically with an upper container, especially a mixing chamber cylinder, an outer diameter of said float being advantageously equal to an outer diameter of the mixing chamber.

[0011] The device according to the invention comprises a washing fluid container in a nearly cylindrical open-top shape, its bottom being advantageously a side surface of an inverted cone with an opening in its bottom to supply the control valve with washing fluid.

[0012] According to the invention the control valve is connected to the lower part of the washing fluid container and has a substantially tubular housing, advantageously shaped as a cylinder tube. The metering nozzle of the control valve is placed coaxially with the opening in the washing fluid container. A transversal dimension of the opening in the metering nozzle of the control valve is substantially equal to a transversal dimension of the lower part of the mandrel, but smaller than a transversal dimension of the flange situated above the lower part of the mandrel. The slidable lower part of the control valve nozzle is guided in the opening of the metering nozzle. The mandrel and the valve needle are coaxially connected in such a way that the upper tip of the needle is located in a seat provided in the face of the lower part of the mandrel, and they extend in their length one in relation to another in such a way, that the exposed length of the inner part of the needle is shorter than the length of the opening in the metering nozzle of the control valve.

[0013] In the device according to the invention the valve needle has in the point of co-operation with the opening in the metering nozzle a length shorter than the length of the opening in the metering nozzle in the valve housing, whereas the needle has at the lower end of said part a cone-shaped intermediate part made as a

bevel, advantageously made with an angle in the range from 25° to 55° in relation to its lower part, having a greater transversal dimension, but smaller than the transversal dimension of the opening in the metering nozzle. The needle is mounted by means of a seat provided in the face of the lower part on the mounting mandrel in the mixing chamber. The lower tip and the lower part of the mandrel flange, as well as the upper and the lower end of the opening in the metering nozzle of the control valve are beveled, advantageously at an angle of 45°.

[0014] The washing fluid dosing device according to the invention may be provided with a float made as a vertical section of a tube coaxial with the axis of the metering nozzle. The tube of a great wall thickness has an openwork connection between both walls. An inner diameter of this tube is greater than the diameter of the washing fluid container, whereas in such a case the mixing chamber is located below the lower part of the float. Walls of the float tube are connected with a radial rib supported by the side walls of the mixing chamber container.

[0015] The device according to the invention may be provided with floats situated below the bottom of the mixing chamber container, whereas said floats are placed symmetrically and coaxially with the axis of the metering nozzle in the control valve, and advantageously they are made of a material the mass density of which is suitably smaller than that of water. In such a solution the mixing chamber may be shaped as a shallow container, especially as an open plate.

[0016] The washing fluid metering device according to the invention comprises a mandrel mounted onto a needle of a control valve, having a length close to, and advantageously greater than a height of a washing fluid container.

[0017] According to the invention the needle of the control valve in the washing fluid metering device may be provided in its central part with circumferential grooves substantially formed along a screw line, advantageously formed close to a square thread.

[0018] Embodiments of the device according to the invention are shown in the drawings.

[0019] Fig. 1 shows a longitudinal section of the washing fluid metering device having its float connected directly to the mixing chamber.

[0020] Fig. 2 shows in a longitudinal section the device having its float above the mixing chamber.

[0021] Fig. 3 shows in a longitudinal section the device in which two light floats are provided.

[0022] Fig. 4 shows in a longitudinal section an embodiment changed in relation to the former ones by using the control valve needle provided with grooves in its middle part.

[0023] In the first embodiment of the invention a device dispensing washing fluid for toilet bowls is situated in a toilet cistern. Said device has a washing fluid container having a shape close to an open-top cylinder. The

container 1 has an especially shaped part of its side wall to be connected to a free opening in the wall of the toilet cistern. The bottom of the container 1 is shaped as a side surface of an inverted cone. In the bottom of the container 1 there is made a washing fluid supply opening located below the control valve. Said control valve comprises a housing 4 and a needle 3. A metering nozzle of the control valve is located in said housing 4 coaxially with the opening in the container 1. The needle 3 is comprised of an upper part, a middle part, and a lower part, a tip of the lower part of the needle having a flange with a ring seal 8, and a mounting seat is placed in a face of the lower part. The upper part of the needle is threaded, the diameter of said central part is smaller than that of the lower part, and the flange has the greatest diameter of the needle 3. The lower part of the needle 3 is slidably guided in the opening of the metering nozzle. In the embodiment of the invention a mandrel 2, having a length greater than the height of the washing fluid container 1, is screwed onto the threaded tip. The diameter of the lower part of the mandrel 2 corresponds to the diameter of the opening in the metering nozzle of the control valve at the height negligibly smaller than the length of the opening in the metering nozzle, and above that point there is situated a flange having the greater diameter. The lower tip of the mandrel 2, as well as the lower part of its flange are beveled with an angle of 45°. The washing fluid dosing device in the embodiment according to the invention comprises a special mixing chamber 5 shaped as an open-top cylinder. The mixing chamber 5 is by gravity supplied with washing fluid from the washing fluid container through the metering nozzle of the control valve. The float 7 mounted in the toilet cistern determines the position of the vertical needle in the control valve. The float 7 is symmetrical and coaxial with the needle 3 of the control valve. The float 7 is shaped as an inverted cylinder having its outer diameter equal to the outer diameter of the cylinder of the mixing chamber 5, that is located below this float. The bottom of the mixing chamber cylinder is shaped as a side surface of a cone having a great apex angle of about 170°. In the central point of the bottom of the mixing chamber cylinder there is located a mounting mandrel, on which the needle 3 of the control valve is fixed through a seat located along the axis of the face of the lower needle part. Three longitudinal openings 6 are made in the wall of the cylindrical mixing chamber 5 on its whole height. The metering nozzle of the control valve is shaped in its cross-section as a ring, an inner circle of which is determined by the middle part of the needle 3 and its outer circle is determined by a cylindrical opening in the control valve housing 4. The mandrel 2 is screwed onto the upper part of the needle 3 so that the length of the uncovered central part of the needle 3, having a diameter smaller than that of the opening in the metering nozzle, is smaller than the length of the opening made in the metering nozzle in the control valve.

[0024] In the second embodiment a different solution

of the construction of the float 9 is provided, as well as a different location in relation to the mixing chamber 12. The float 9 is shaped as a vertical tube section 10 with an openwork wall having a great thickness. The inner and outer tube walls are connected by means of a radial

[0025] In the third embodiment of the washing fluid dosing device the mixing chamber is shaped as a plate 15, below which there are situated two floats 13 shaped as cylinders made of foamed polystyrene.

[0026] In another embodiment of the invention the needle 3 of the control valve in the fluid dosing device has a square thread in its upper and middle part.

[0027] The washing fluid dosing device for toilet bowls according to the invention is easy and reliable in operation.

[0028] Said device can be easily assembled in the new as well as in already used toilet cisterns.

[0029] The device according to the invention precisely meters washing fluid and inhibits its outflow in case there is no water in the toilet cistern. Its location in the toilet cistern by using the free opening in the side wall enables easy replenishment of washing fluid in the container.

Claims

1. A washing fluid dosing device for toilet bowls, to be located in toilet cisterns, comprising a open-bottom fluid container, **characterized in that** it has a special mixing chamber (5) or (12) or (14) supplied by gravity with washing fluid from a fluid container (1) through a washing fluid metering nozzle located higher than the mixing chamber (5) or (12) or (14), and a valve controlling opening and closing the metering nozzle, said valve being provided with a vertical needle (3) the location of which is determined by the float (7) or (9) or (13) situated in the toilet cistern.
2. A washing fluid dosing device for toilet bowls according to claim 1 **characterized in that** the float (7) is substantially symmetrical and is situated lower than the mixing chamber (5), advantageously coaxially with the control valve needle (3).
3. A washing fluid dosing device for toilet bowls according to claim 1 **characterized in that** the metering nozzle in its cross-section is shaped as a substantially circular ring with the inner circle determined by the middle part of the needle (3) and the outer circle determined by the opening in the control valve housing (4).
4. A washing fluid dosing device for toilet bowls according to claim 1 **characterized in that** the metering nozzle is closed by the lower part of the needle in the valve with the transverse dimension greater than that in its middle part and corresponding the transverse dimension of the metering nozzle, whereas the valve needle (3) has in its lower part a flange the transverse dimension of which is greater than the transverse dimension **in that** section of the lower part of the valve needle which co-operates with the metering nozzle, and moreover advantageously a ring seal (8) of the valve is supported on the flange of the valve needle, and moreover the valve needle (3) has an upper tip shaped as a mandrel provided with circumference grooves shaped substantially according to a screw line, and advantageously it is a threaded tip.
5. A washing fluid dosing device for toilet bowls according to claim 1 **characterized in that** the special mixing chamber (5) is an open-top container, it is shaped substantially as an open-top cylinder, inside that in the middle of its bottom there is a mounting mandrel for the inner seat on the face of the lower tip of the needle (3) in the valve, whereas the bottom of said container, substantially shaped as a cylinder, is formed by a side surface of a cone having a great apex angle, advantageously in the range from 150° to 175°, a base of said cone being below its apex, wherein openings (6) supplying water and draining a water-and-fluid mixture are provided in the side walls of said container, substantially in the cylinder jacket, advantageously formed as slots, advantageously on the whole height of the container walls, and especially at the height of the cylinder jacket.
6. A washing fluid dosing device for toilet bowls according to claim 1 and 5 **characterized in that** the symmetrical float (7) is substantially shaped as an open-bottom cylinder connected coaxially with the container of the mixing chamber (5) situated above, especially with a cylinder, wherein the float (7) advantageously has its outer diameter equal to the outer diameter of the cylinder of the mixing chamber (5).
7. A washing fluid dosing device for toilet bowls according to claim 1 **characterized in that** it has a washing fluid container (1) shaped substantially as an open-top cylinder and having its bottom in form of the side surface of the inversed cone, provided at its bottom with an opening for supplying a control valve with washing fluid.
8. A washing fluid dosing device for toilet bowls according to claim 1 and 4 **characterized in that** the control valve is connected with the lower part of the washing fluid container (1) and has the substantially tubular housing (4), advantageously formed as a

cylindrical tube, wherein a metering nozzle of the control valve is located coaxially with an opening in the washing fluid container (1), the transversal dimension of the metering nozzle opening is substantially equal to the transversal dimension of the lower part of the mandrel (2) and is smaller than the transversal dimension of the flange located higher than the lower part of the mandrel (2), wherein the lower part of the control valve needle (3) is slidably guided in the metering nozzle opening, moreover the mandrel (2) and the needle (3) are connected one to another coaxially in such a way that the upper tip of the needle (3) is located in a seat located at a face of the lower part of the mandrel (2), and they are situated on their length one in relation to another so that the longitudinal dimension of the uncovered middle part of the needle (3) is smaller than the length of the metering nozzle in the control valve.

9. A washing fluid dosing device for toilet bowls according to claim 1 **characterized in that** the valve needle (3) in its point of co-operation with the metering nozzle opening has a length smaller than the length of the nozzle opening in the valve housing (4), wherein the needle (3) at the bottom of that part has a cone-shaped beveled transition, advantageously having an angle in the range from 25° to 55° to its lower part having a greater transversal dimension, but smaller than the transversal dimension of the metering nozzle opening, said needle (3) having a seat made in the face of its lower part, said seat serving to fix it on the mounting mandrel in the mixing chamber (5) or (12) or (14), and moreover the lower tip and the lower part of the flange of the mandrel (2) as well as the upper and lower end of the metering nozzle opening in the control valve are beveled with an angle advantageously of 45°.
10. A washing fluid dosing device for toilet bowls according to claim 1 **characterized in that** it has a float (9) shaped as a vertical segment of the length of the tube (10) coaxial with the metering nozzle, said tube having walls of a great thickness and openwork connection between said walls, wherein the inner diameter of the tube (10) is greater than the diameter of the washing fluid container, the mixing chamber (12) being located lower than the lower part of the float (9), and the walls of the tube (1) of the float are connected by means of the radial rib (11), which is supported by side walls of the container of the mixing chamber (12).
11. A washing fluid dosing device for toilet bowls according to claim 1 **characterized in that** it has floats (13) placed lower than the bottom of the container of the mixing chamber, said floats being located symmetrically and coaxially with the control valve metering nozzle, and they are advantageously

made of a material the mass density of which is smaller than that of water, and said mixing chamber (14) is shaped as a shallow container, especially an open plate (15).

12. A washing fluid dosing device for toilet bowls according to claim 1 **characterized in that** it has a mandrel (2) mounted on the needle (3) of the control valve, the length of said needle being close to, advantageously greater than the height of the washing fluid container (1).
13. A washing fluid dosing device for toilet bowls according to claim 1 **characterized in that** the needle (3) of the control valve has in its middle part circumferential grooves, substantially shaped according to a screw line, advantageously in a form close to a square thread.

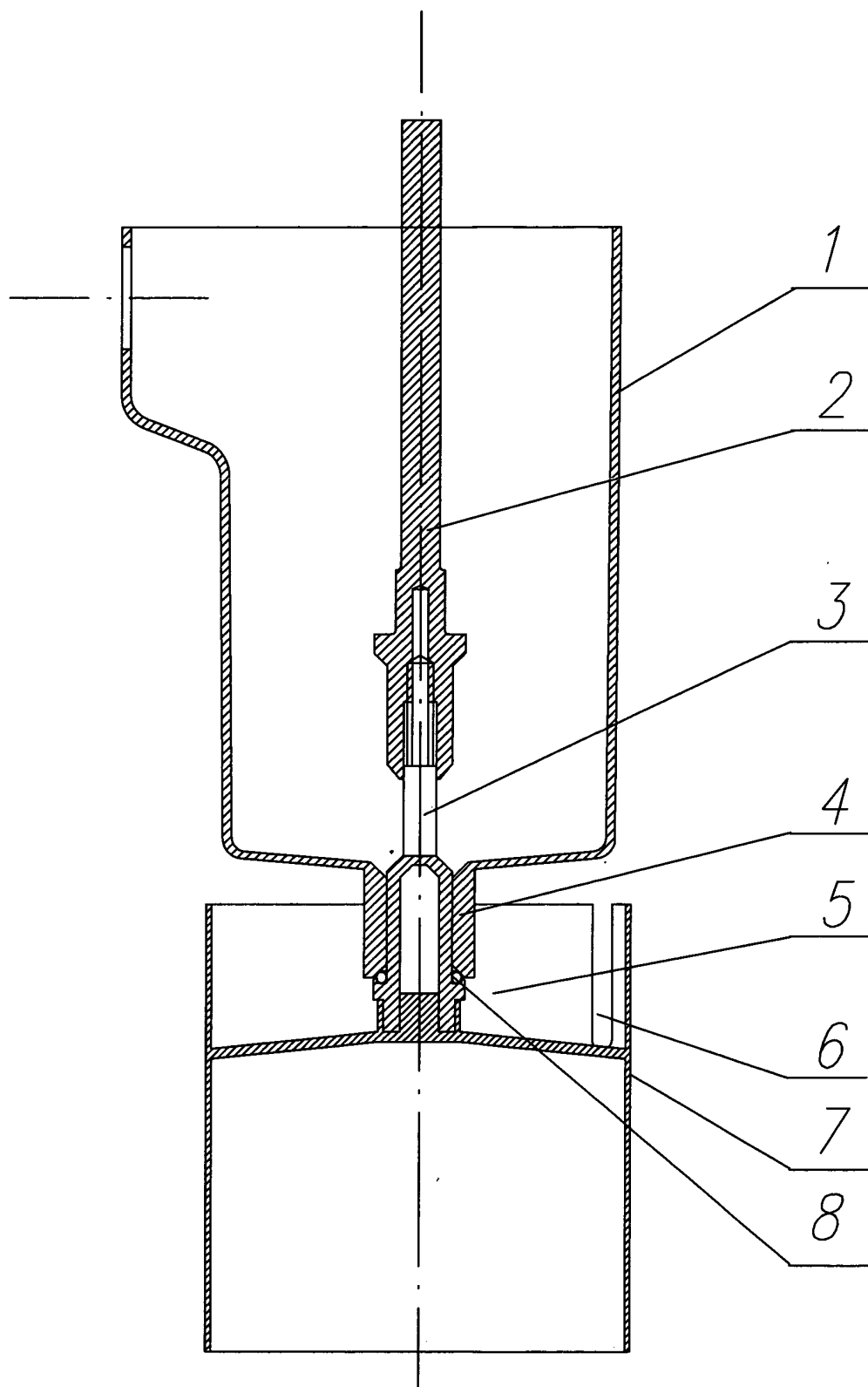
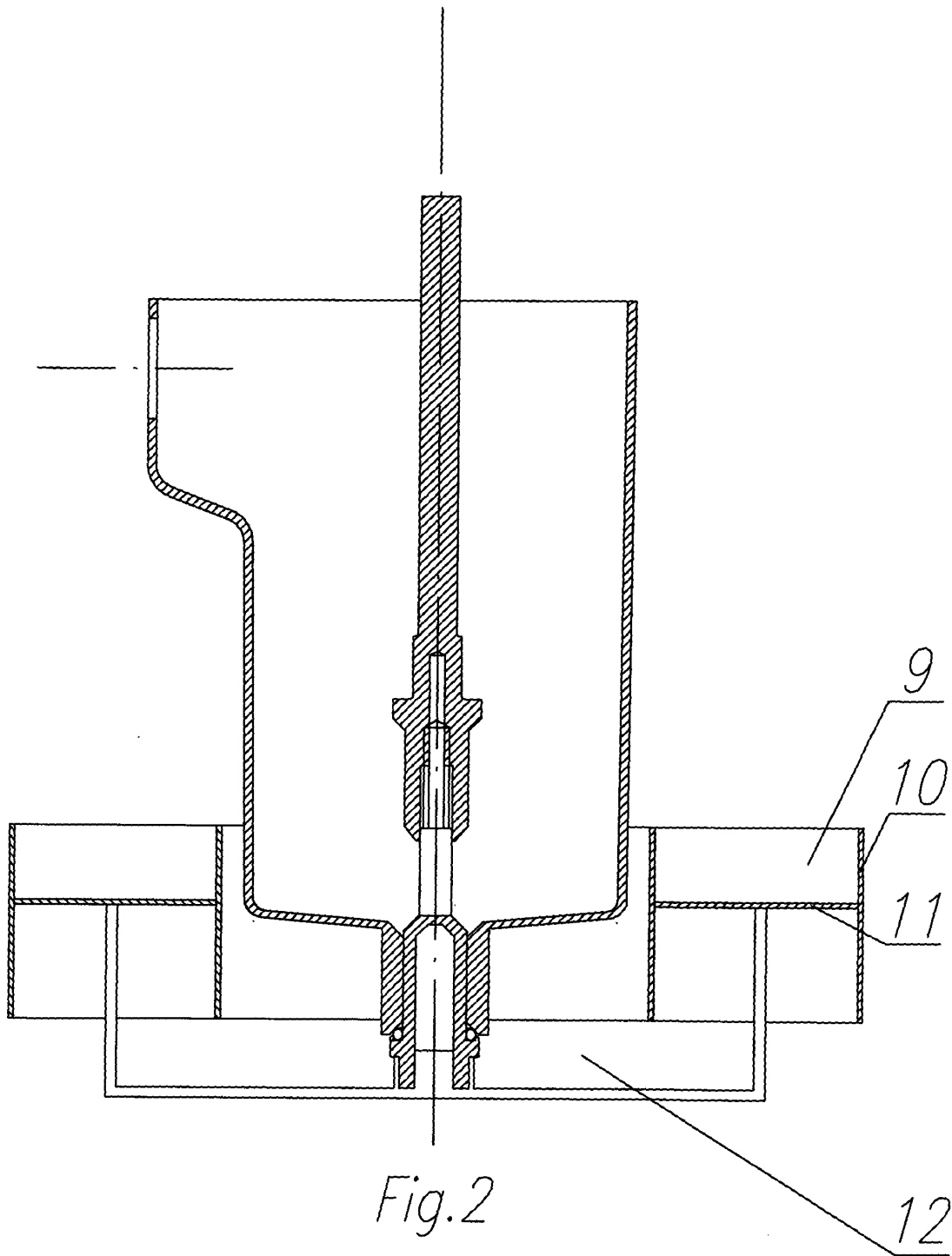


Fig. 1



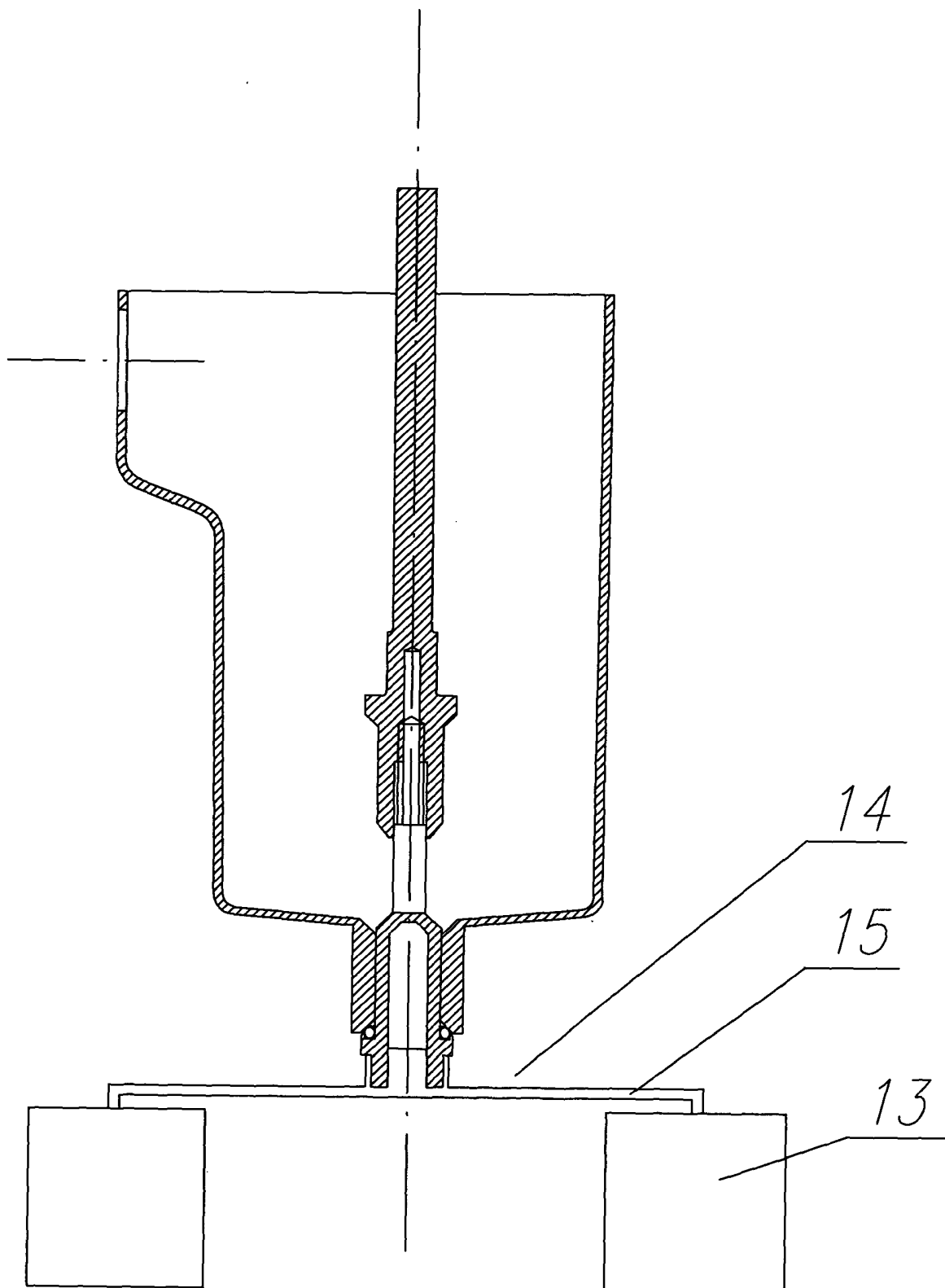


Fig. 3

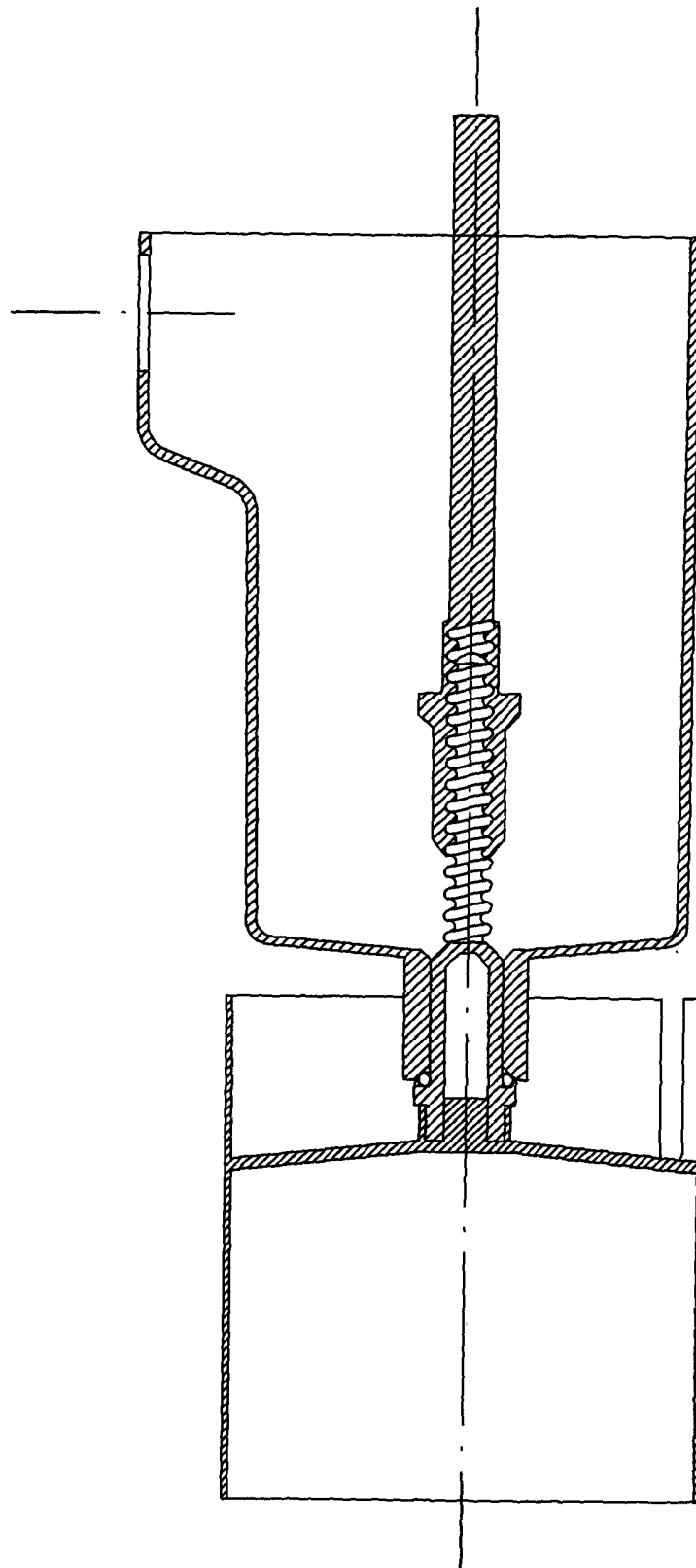


Fig. 4