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(54) Dosage and dispensing gun, particularly for dispensing polishing paste

(57) A dosage and dispensing gun, particularly for dispensing polishing paste, comprising a gun body (2) inside which a feed chamber (3) is provided which can be connected to a duct (5) for feeding a product to be dispensed. The gun body (2) is provided with a product dispensing head (7) and accommodates means (9) for conveying the product from the feed chamber (3) to a dispensing chamber (8) formed in the dispensing head (7) and connected to the outside through a dispensing

outlet (19). A dispensing nozzle (20) is associated with the dispensing head (7), and a movable obturator element (16) is arranged inside the dispensing chamber (8) in order to open or close the dispensing outlet (19). The dispensing nozzle (20) is removably associated with the dispensing head (7) by means for axially locking the dispensing nozzle.

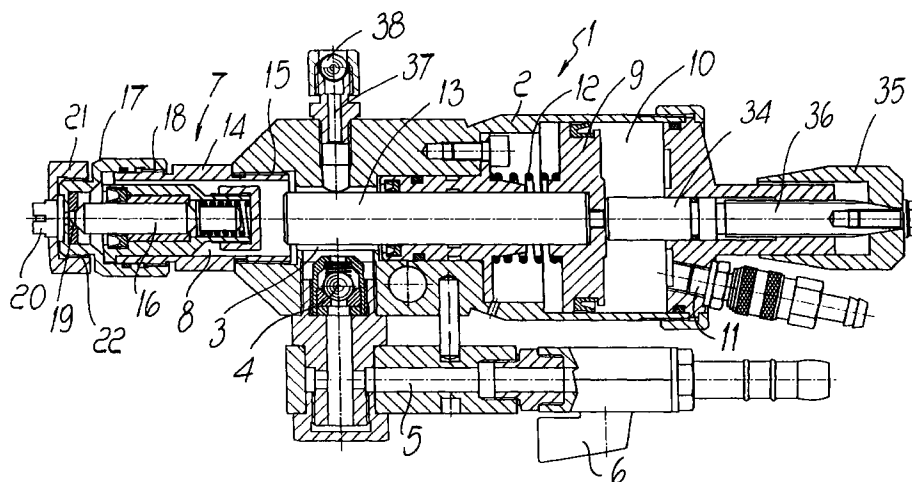


Fig. 1

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Description

The present invention relates to a dosage and dispensing gun, particularly for dispensing polishing paste.

Conventional dosage and dispensing guns for dispensing polishing paste used in metal polishing systems generally comprise a gun body inside which a feed chamber is provided which can be connected, by means of a suitable duct connected to the gun body, to a device for feeding the polishing paste.

Inside the gun body there is usually provided a piston slideable inside a cylindrical chamber which can be supplied with compressed air to move said piston in one direction in contrast with the action of a return spring. The piston is provided with a stem which protrudes inside the feed chamber, in which the polishing paste to be dispensed arrives, and a dispensing head is associated with the gun body; a dispensing chamber is formed in the head, is connected to the feed chamber and accommodates an obturator element. The movement of the piston, by means of the compressed air that is introduced, pushes the polishing paste from the feed chamber to the dispensing chamber, increasing its pressure.

The dispensing chamber opens onto the outside through a dispensing outlet on which a dispensing nozzle is provided.

The obturator element, when inactive, closes the dispensing outlet and, by means of the pressure that forms by feeding compressed air to the chamber that accommodates the piston, separates from the dispensing outlet, allowing the polishing paste to exit through the dispensing nozzle. When the pressure applied by the stem of the piston to the polishing paste contained in the feed chamber drops below a certain limit, the obturator element again closes the dispensing outlet, interrupting the dispensing of the polishing paste.

In these guns, the dispensing nozzle rests against a pad provided with a central hole which constitutes the dispensing outlet and whereat the obturator element engages when it closes the dispensing outlet. Both the pad and the dispensing nozzle can thus shift axially, i.e., along a direction which is parallel to the direction followed by the obturator element as it moves in contrast with the action applied by a spring, which keeps the obturator element against the dispensing outlet and must be overcome in order to achieve the movement of the obturator element away from the dispensing outlet and therefore to produce dispensing of the polishing paste through the dispensing nozzle.

Accordingly, during operation of the gun, particularly during the high-pressure dispensing of the polishing paste, undesirable vibrations of the dispensing nozzle along this direction may occur. These vibrations, by varying the position of the dispensing nozzle, alter the correct operation of the gun and the orientation of the dispensing of the polishing paste.

Moreover, as a consequence of the vibrations, the dispensing nozzle can also rotate about its own axis,

further varying the dispensing direction in a fully random manner.

The aim of the present invention is to solve the above-described problem by providing a dosage and dispensing gun, particularly for dispensing polishing paste, in which the position of the dispensing nozzle and therefore the dispensing direction cannot be influenced by pressure changes inside the dispensing chamber.

Within the scope of this aim, an object of the present invention is to provide a dosage and dispensing gun which can ensure, in any operating condition, correct dispensing of the product fed thereto.

Another object of the present invention is to provide a dosage and dispensing gun which can be subjected to maintenance very simply and quickly.

Another object of the present invention is to provide a dosage and dispensing gun which can be manufactured at a competitive cost.

This aim, these objects and others which will become apparent hereinafter are achieved by a dosage and dispensing gun, particularly for dispensing polishing paste, which comprises a gun body inside which a feed chamber is provided which can be connected to a duct for feeding a product to be dispensed and is provided with a product dispensing head; said gun body accommodating means for conveying the product from said feed chamber to a dispensing chamber formed in said dispensing head and connected to the outside through a dispensing outlet; a dispensing nozzle being associated with said dispensing head; a movable obturator element being arranged inside said dispensing chamber in order to open or close said dispensing outlet; characterized in that said dispensing nozzle is removably associated with said dispensing head through means for axially locking said dispensing nozzle.

Further characteristics and advantages of the present invention will become apparent from the following detailed description of a preferred but not exclusive embodiment of the dosage and dispensing gun according to the invention, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is an axial sectional view of the dosage and dispensing gun according to the present invention; figure 2 is an enlarged-scale view of a detail of figure 1; figure 3 is an exploded perspective view of the dispensing head of the dosage and dispensing gun according to the present invention.

With reference to the above figures, the dosage and dispensing gun according to the present invention, generally designated by the reference numeral 1, comprises a gun body 2 in which a feed chamber 3 is provided for a product to be dispensed, which can be connected, for example by means of a check valve 4, to

a product feed duct 5 which is controlled by an opening and closing valve 6.

At one of its ends, the gun body 2 is provided with a dispensing head, generally designated by the reference numeral 7, which is removably associated with the remaining part of the body 2 and inside which a dispensing chamber 8 is provided.

Means for conveying the product from the feed chamber 3 to the dispensing chamber 8 are accommodated inside the gun body 2.

More particularly, the conveyance means comprise a piston 9 which is accommodated, so that it can slide axially, inside a substantially cylindrical actuation chamber 10 which is divided into two parts by the piston 9.

The actuation chamber 10 is formed inside the body of the gun 2 proximate to the end of the body which lies opposite to the end to which the dispensing head 7 is connected.

One of the two parts into which the actuation chamber 10 is divided by the piston 9 can be connected, by means of a duct 11, to a pressurized fluid, for example air, in order to move the piston 9 toward the dispensing head 7.

The movement of the piston 9 toward the dispensing head 7 is contrasted by a spring 12 which is interposed between the piston 9 and a shoulder provided for this purpose inside the gun body 2.

The piston 9 is provided with a stem 13 which protrudes inside the feed chamber 3; by means of the stem 13 the piston 9, in its movement toward the dispensing head 7, conveys the product from the feed chamber 3 to the dispensing chamber 8 with a pressure which depends on the feed pressure of the fluid in the duct 11.

The dispensing head 7 comprises a bush-shaped body 14 which is removably associated, for example by means of a threaded coupling 15, at one of its axial ends, to the remaining part of the gun body 2.

The bush-shaped body 14 is arranged coaxially to the stem 13 and internally accommodates an obturator element 16 which is coaxial to the bush-shaped body 14.

The dispensing chamber 8 formed inside the bush-shaped body 14 is connected to the feed chamber 3 at the axial end of the bush-shaped body 14 associated with the remaining part of the gun body 2, while the opposite axial end of the dispensing chamber 8 is closed by a cover 17.

The cover 17 is detachably associated with the axial end of the bush-shaped body 14 that is directed away from the gun body 2, for example by means of a threaded coupling 18.

The cover 17 has, at the axis of the bush-shaped body 14, a dispensing outlet 19 through which the dispensing chamber 8 is connected to the outside.

A dispensing nozzle 20 is associated with the dispensing head 7 at the dispensing outlet 19.

According to the invention, the dispensing nozzle 20 is removably associated with the dispensing head 7

through means for the axial locking of said dispensing nozzle 20.

The axial locking means are also suitable to lock the rotation of the dispensing nozzle 20 about its own axis, which coincides with the axis of the bush-shaped body 14 and with the axis of the obturator element 16.

More particularly, said axial locking means comprise an annular nut 21 which is associated with the cover 17 by means of a threaded coupling 22.

The dispensing nozzle 20 has a substantially cylindrical shape, with a collar 23 which protrudes radially from its lateral surface and is arranged at the base of the dispensing nozzle 20 to be directed toward the cover 17.

A passage 24 is formed centrally in the annular nut 22 and can be crossed by the dispensing nozzle 20 except for the collar 23.

On the outer face of the cover 17, around the dispensing outlet 19, there is also provided a recessed seat whose dimensions allow it to accommodate the collar 23.

In practice, by tightening the annular nut 21 on the cover 17 both axial and rotary locking of the dispensing nozzle 20 are achieved.

On the inner side of the cover 17, around the dispensing outlet 19, there is provided a seat 25 which detachably accommodates a pad 26.

The pad 26, which is conveniently made of a hard and highly abrasion-resistant material, is centrally provided with a hole 27 which is aligned with the dispensing outlet 19. The pad 26 forms, with the edge of its hole 27 directed toward the obturator element 16, a sealing abutment for said obturator element 16.

More particularly, the pad 26 is cylindrical, with a greater diameter than the dispensing outlet 19, while the hole 27 preferably has a diameter which is equal to, or slightly greater than, the diameter of the dispensing outlet 19. Advantageously, the hole 27 forms, with its edge located at the two opposite flat faces of the pad 26, two sealing abutments for the obturator element 16, which can be used alternately by reversing the pad 26 inside the seat 25 of the cover 17. In this manner, if the sealing abutment of the pad 26 engaged by the obturator element 16 wears out and therefore does not ensure the correct sealing action, instead of replacing the pad 26 it is possible to simply reverse it, changing the flat face thereof that is engaged by the obturator element 16.

The obturator element 16 is supported, so that it can slide axially, inside a hollow supporting body 28 which is substantially cylindrical, is accommodated in the dispensing chamber 8 and is provided, at its axial end directed toward the dispensing outlet 19, with a rim 28a which is locked axially between the cover 17 and the end of the bush-like body 14.

The supporting body 28 is closed, at its axial end that lies opposite to the dispensing outlet 19, by a removable bottom 29 and the obturator element 19 pro-

trudes with one of its ends from the axial end of the supporting body 28 which is directed toward the dispensing outlet 19.

The seal of the obturator element 16 against the pad 26 is provided by elastic means constituted by a spring 30 which is interposed between the bottom 29 and the end of the obturator element 16 that is accommodated inside the supporting body 28. The spring 30 acts on the obturator element 16 through the interposition of a circular contact plate 31.

A sealing gasket 32 is conveniently interposed between the inside of the supporting body 28 and the obturator element 16 in order to prevent the product contained in the dispensing chamber 8 from entering the supporting body 28.

The obturator element 16 is substantially cylindrical, with axial ends which are substantially shaped like a truncated cone and are mutually identical. The two ends of the obturator element 16 can also be used alternately by simply reversing the position of the obturator element 16 inside the supporting body 28. In this manner, if one axial end of the obturator element 16 wears out, it is still possible to use the obturator element 16, restoring its effectiveness, simply by extracting the obturator element 16 from the supporting body 28 and reinserting it in reversed position inside the supporting body 28.

It should be noted that the supporting body 28 has, on its lateral surface and on its rim 28a, flattened regions 33 to allow the flow of the product contained in the dispensing chamber 8 toward the dispensing outlet 19 despite the presence of the supporting body 28.

Conveniently, there are provided means for adjusting the stroke of the piston 9 so as to achieve dosage of the dispensed product.

These adjustment means comprise a shaft 34 which is arranged coaxially to the piston 9 and faces, with one of its axial ends, the face for the piston 19 which lies opposite to the face engaged by the spring 12. The shaft 34 forms, together with the axial end, a stop element for the stroke of the piston 9, and the position of the axial abutment can be changed by shifting the shaft 34 along its axis by means of a knob 35 provided with an adjustment shaft 36 which is coaxial to the shaft 34. The shaft 36 is externally threaded and couples to a female thread formed in the end of the shaft 34 that is directed away from the piston 9.

For the sake of completeness in description, it should be noted that the feed chamber 3 is connected to the outside by means of a duct 37 on which a check valve 38 for draining is arranged. The opening direction of the check valve 38 is opposite to the opening direction of the check valve 4 and allows to discharge the air when use begins and to discharge the remaining product when it is necessary to change the product to be dispensed.

Operation of the dosage and dispensing gun according to the present invention is as follows.

Initially, the product to be dispensed is fed into the feed chamber 3 by opening the valve 6. The product to be dispensed thus enters the feed chamber 3 and the dispensing chamber 8 up to the pad 26. At this point, compressed air is introduced through the duct 11, shifting the piston 9 toward the dispensing head 7 in contrast with the action applied by the spring 12. Owing to this movement of the piston 9, the stem 13 advances along the feed chamber 3 and pressurizes the product contained in the dispensing chamber 8, closing the valve 4. The pressure increase causes the separation of the obturator element 16 from the pad 26, in contrast with the action of the spring 30, and thus causes the product to flow out through the dispensing nozzle 20.

It should be noted that during the operation of the gun, also in the presence of pressure variations, the nozzle 20, being locked by the annular nut 21, remains constantly fixed, ensuring correct dispensing of the product.

When the piston 9 ends its advancement stroke toward the dispensing head 7, the supply of compressed air through the duct 11 is interrupted and the spring 12 causes the retraction of the piston 9, returning it to its initial condition.

When the pressure inside the dispensing chamber 8 decreases, the obturator element 16, through the action of the spring 30, moves back against the pad 26, interrupting the dispensing of the product. It should be noted that the return stroke of the piston 9 is allowed by the action of the spring 12 and by the feed pressure of the product introduced in the feed chamber 3.

If the dispensing nozzle 20 is to be replaced, it is sufficient to remove the annular nut 21 from the cover 17 and replace the dispensing nozzle 20.

In practice it has been observed that the dispensing and dosage gun according to the present invention fully achieves the intended aim and objects, since it ensures high precision in dispensing the product because it has a dispensing nozzle which is locked both axially and rotationally.

A further advantage of the gun according to the present invention is that it allows to act, simply and with a very limited disassembly of the gun, on the components that are subjected to the greatest wear.

The gun thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the inventive concept; all the details may also be replaced with other technically equivalent elements.

In practice, the materials employed, as well as the dimensions, may be any according to requirements and to the state of the art:

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A dosage and dispensing gun, particularly for dispensing polishing paste, comprising a gun body inside which a feed chamber is provided which can be connected to a duct for feeding a product to be dispensed and is provided with a product dispensing head; said gun body accommodating means for conveying the product from said feed chamber to a dispensing chamber formed in said dispensing head and connected to the outside through a dispensing outlet; a dispensing nozzle being associated with said dispensing head; a movable obturator element being arranged inside said dispensing chamber in order to open or close said dispensing outlet; characterized in that said dispensing nozzle is removably associated with said dispensing head by means for axially locking said dispensing nozzle. 5
2. A gun according to claim 1, characterized in that said axial locking means are suitable to also lock the rotation of said dispensing nozzle about its own axis. 10
3. A gun according to claim 1, characterized in that said dispensing nozzle rests, with its side that lies opposite to the dispensing side, against the outer face of said dispensing head at said dispensing outlet, said axial locking means comprising an annular nut which accommodates said dispensing nozzle and is screwed on the end of said dispensing head provided with said dispensing outlet. 15
4. A gun according to claim 1, characterized in that said dispensing head comprises a bush-shaped body which is removably associated with said gun body, said dispensing chamber being formed in said bush-shaped body and being connected to said feed chamber at the axial end of the bush-shaped body that is connected to the gun body; said dispensing chamber being closed, at the opposite axial end, by a cover which is removably associated with said bush-shaped body and has said dispensing outlet at the axis of the bush-shaped body. 20
5. A gun according to claim 4, characterized in that said cover has, around said outlet, a threaded portion which can be engaged by said annular nut. 25
6. A gun according to claim 4, characterized in that said cover is internally provided, at said dispensing outlet, with a seat which removably accommodates a pad which is perforated in alignment with said dispensing outlet and forms a sealing abutment for said obturator element. 30
7. A gun according to claim 6, characterized in that said pad is cylindrical, with a larger diameter than said dispensing outlet, and is crossed axially by a hole, the edges of said hole on the two flat faces of the pad forming sealing abutments for said obturator element which can be used alternately by reversing said pad in its seat. 35
8. A gun according to claim 4, characterized in that said obturator element is slidingly supported in a substantially cylindrical hollow supporting body which is accommodated in said dispensing chamber and has, at its axial end directed toward said dispensing outlet, a rim which is locked axially between said cover and said bush-shaped body. 40
9. A gun according to claim 8, characterized in that said supporting body is closed by a removable bottom at its axial end that lies opposite to said dispensing outlet, said obturator element protruding, with one of its ends, from the axial end of said supporting body that is directed toward said dispensing outlet. 45
10. A gun according to claim 1, characterized in that it comprises elastic means which act on said obturator element to move it toward said dispensing outlet. 50
11. A gun according to claim 10, characterized in that said elastic means comprise a spring which is accommodated in said supporting body and is interposed between said bottom and the axial end of said obturator element that is accommodated in said supporting body. 55
12. A gun according to claim 6, characterized in that said obturator element is substantially cylindrical, with frustum-shaped axial ends which can be coupled alternately, by reversing the obturator element, to the sealing abutment formed by said pad.
13. A gun according to claim 4, characterized in that said dispensing nozzle is substantially cylindrical, with a collar that protrudes radially from its lateral surface at its base to be directed toward said cover; a recessed seat being formed on the outer face of said cover, around said outlet, and accommodating said collar; said annular nut being centrally provided with a passage for said dispensing nozzle except for said collar.
14. A gun according to claim 1, characterized in that said means for conveying the product comprise a piston which can slide inside an actuation chamber formed in said gun body and can be supplied with a pressurized fluid in order to produce the movement of said piston, said piston being provided with a

stem which protrudes into said feed chamber in order to push and pressurize the product contained in said feed chamber into said dispensing chamber.

15. A gun according to claim 14, characterized in that it 5
comprises means for adjusting the stroke of said
piston in order to dose the dispensed product.

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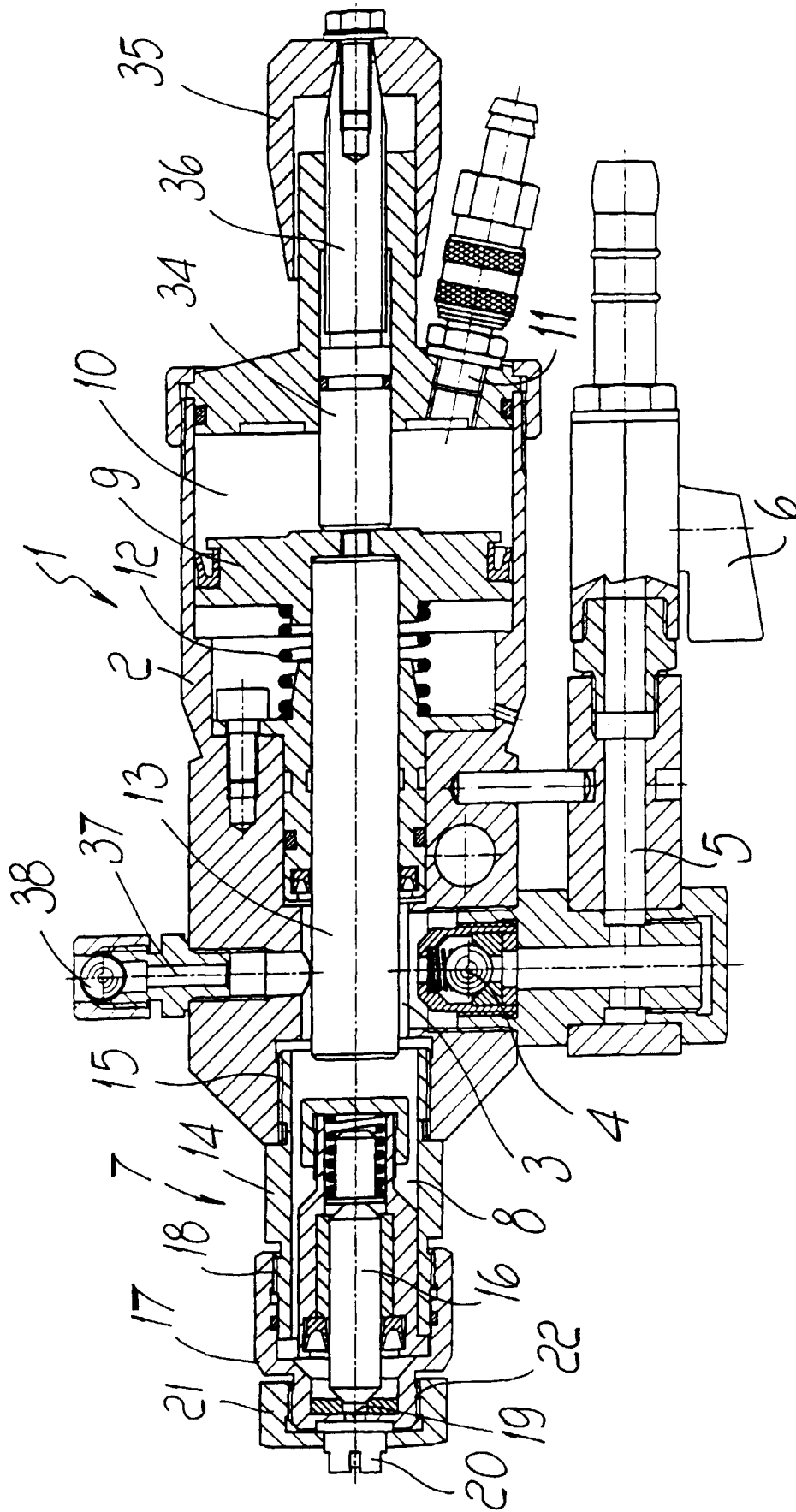


Fig. 1

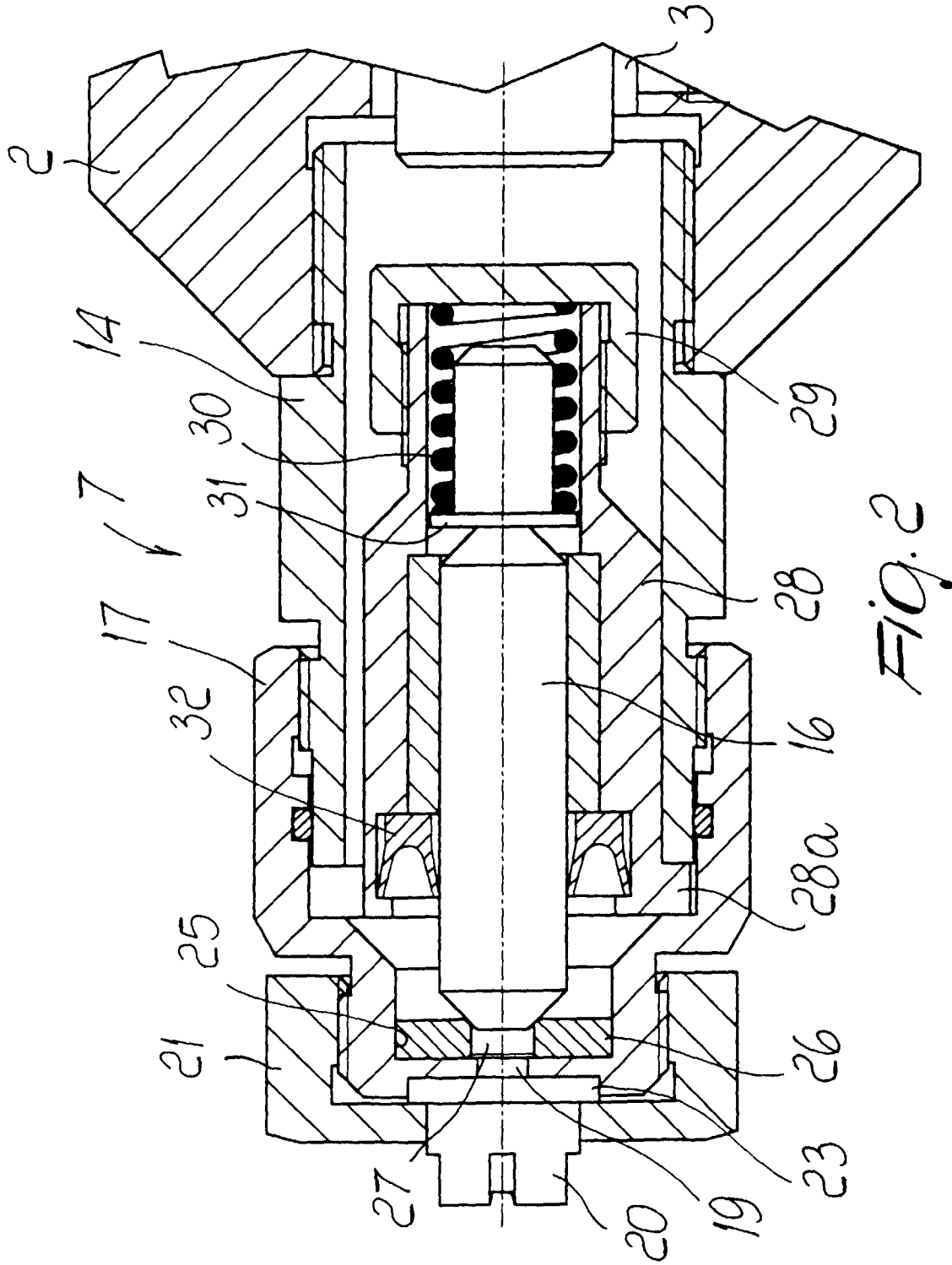


Fig. 2

