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(54) Glue dispensing device for shoe cementing machines.

(57) The described device is of the comprising a coating head (2) provided with a rotating brush (17) for spreading the adhesive material, in which the coating head comprises a base unit (8), a brush-supporting element (15) slidably engaged to the base unit (8) and spring means (20) acting on the support element (15) and adapted to maintain the brush (17) in a substantially flattened conformation against a component to be cemented.

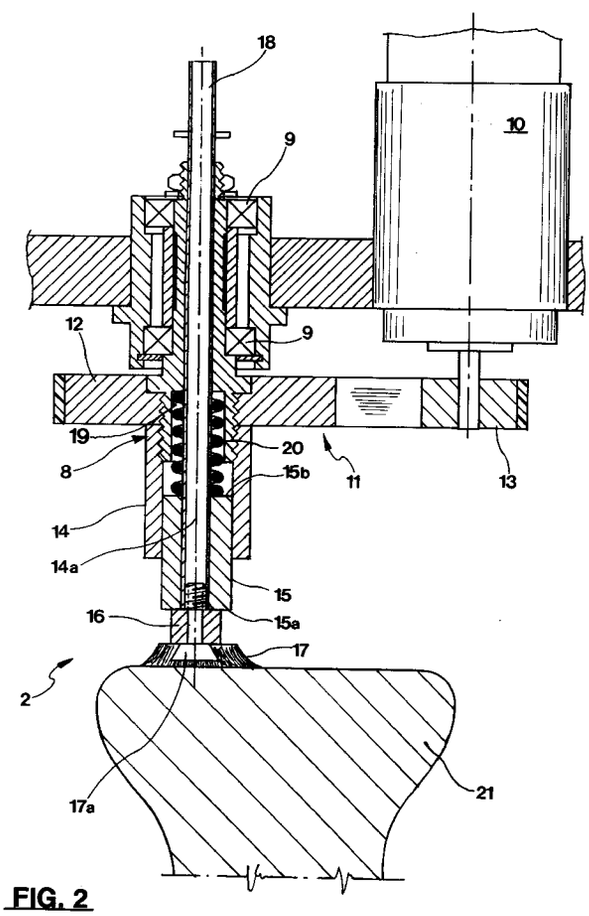

FIG. 2

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The present invention relates to a glue dispensing device for shoe cementing machines.

It is known that there is an increasingly wider tendency to use water-based (that is devoid of solvents) adhesive materials or glues in shoe cementing machines so as to avoid harmful exhalations therefrom.

The application of these glues with known dispensing devices however has some serious drawbacks.

In fact known devices generally comprising a coating head provided with a rotating brush for better penetration of the glue and a delivery valve located immediately upstream of the coating head, do not enable the glue flow to stop immediately at the end of each gluing operation, but afford glue drippings and leakages even to a great extent. Practically, the coating brushes are of cup-shaped conformation and are provided with an inner hollow space into which an adhesive material flows from a feed duct connected to the delivery valve.

The cited hollow space after the delivery valve has been closed is still filled with an important amount of glue and therefore as soon as the element to be cemented, a shoe vamp for example, is moved away from the brush this glue drops.

In addition, drippings also originate from the residual glue amounts still present between the brush bristles and often are also due to an imperfect closure of the delivery valve.

Under this situation, the technical task underlying the present invention is to provide a glue dispensing device for shoe cementing machines capable of substantially eliminating the above drawbacks.

Within the scope of this technical task it is an important object of the invention to provided a glue dispensing device completely enabling any glue drop or dripping to be prevented, also when a water-based glue is used, at the end of a cementing operation after the component to be cemented has been moved away from the coating brush.

The technical task mentioned and the object specified are substantially achieved by a glue dispensing device for shoe cementing machines of the type comprising a coating head provided with a rotating brush for spreading said adhesive material, which is characterized in that it comprises: a base unit, a support element for said brush slidably engaged to said base unit, in an axial translation direction, and spring means acting on said support element and adapted under operating conditions to keep said brush in a substantially flattened conformation against a component to be cemented.

The description of a preferred embodiment of the glue dispensing device of the invention is given hereinafter by way of non-limiting example, with reference to the accompanying drawings, in which:

- Fig. 1 is a perspective view of a dispensing device in accordance with the invention;
- Fig. 2 is a longitudinal cross-sectional view of one component of the device shown in Fig. 1;
- Fig. 3 shows the component seen in Fig. 2 in an operating position;
- Figs. 4 and 5 are longitudinal cross-sectional views of a second component of the device shown in Fig. 1 in two different operating positions;
- Fig. 6 is a longitudinal cross-sectional view of an alternative embodiment of the second component shown in Fig. 5.

Referring to the drawings, the glue dispensing device in accordance with the invention is generally identified by reference numeral 1.

It comprises a coating head 2, a delivery valve and a tank 4 adapted to keep the glue to be dispensed under pressure.

A bearing structure 5 supports both the coating head 2 and the delivery valve such as to keep these two components spaced apart from each other. One conveying pipe 6 enables the adhesive material to be transferred from the delivery valve to the coating head 2 and a second conveying pipe 7 enables the adhesive material to flow from the tank 4 to the delivery valve 3.

The coating head 2 comprises a base unit 8 supported by bearings 9 and set in rotation by a motor 10 through transmission-gear means 11, a belt for example, comprising one pulley 12 integral with the base unit 8 and a second pulley 13 integral with the motor 10. The base unit 8 has a slide bushing 14 adapted to slidably engage in a translation direction coaxial with its central axis 14a, a support element 15 defined by a hollow cylinder. Engaged with said cylinder, at one outer end 15a thereof, is a screw threaded locking element 16 with which a cup-shaped brush 17 is integral, which brush is provided with an inner hollow space 17a for flowing of the glue coming from a duct 18 connected to the first conveying pipe 6 and passing through the base unit 8 and support element 15.

Between the second inner end 15b of the support element 15 and a housing 19 formed within the base unit 8 provision is made for spring means embodied by a compression spring 20 which is therefore active on the support element 15 itself in the direction of the axis 14a.

Practically the spring 20 is such set that it enables the brush 17 to take a substantially flattened conformation, shown in Fig. 3, when a component to be cemented, a vamp supported by a shoe last 21 for example, is thrusted against the brush 17 for being coated with glue by the brush itself.

The delivery valve which is part of the device of the invention too, comprises a hollow main body 22 provided with an inlet port 23 to which the second pipe 7 issuing from the tank 4 can be engaged, and an outlet port 24 to which the first conveying pipe 6 is connected.

A closure member 25 provided with an intercepting plate 25a and an actuating shank 25b is arranged between the inlet port 23 and outlet port 24, along with a sealing seating 26, both made of a material resistant to the adhesive material, the first for example being made of an aluminium alloy and the second of Teflon. The closing member 25 and sealing seating 26 define a first chamber 27 immediately downstream of the inlet port 23 and a second chamber 28 immediately upstream of the outlet port 24. The second chamber has a variable volume and it forms a suction chamber because on its side opposite the intercepting plate 25a it is bounded by a flexible diaphragm 29 engaged to the shank 25b of the closure member 25 by a nut 30 and a threaded end 31a of an actuating rod 31 which is screwed down in the shank 25b itself.

Practically, the suction chamber 28 has its maximum volume when the plate 25a is in a closing contact with the sealing seating 26, that is the flexible diaphragm is in an expanded condition, and has its minimum volume that is the flexible diaphragm 29 is in a non-expanded condition when the plate is spaced apart from the sealing seating 26, that is the first chamber 27 is in communication with the second suction chamber 28.

The actuating rod 31 of the closure member 25 is part of actuation means 32 comprising a fluid-operated driving cylinder 33, a pneumatic cylinder for example, associated with the main body 22, inside which a plunger 34 integral with the rod 31 reciprocates.

An alternative embodiment of the delivery valve seen in Fig. 5 is shown in fig. 6. In Fig. 6 corresponding elements have been allocated identical reference numerals. As can be readily seen, in the alternative solution of fig. 6 the inlet port 23 and outlet port 24 are interchanged as compared to the illustration of Figs. 1, 4 and 5. In addition, the closure member 25 consists of a cylindrical piston sliding in the sealing seating 26 of cylindrical shape too, formed in the hollow main body 22.

In greater detail, the closure member 25 has an axial hole 35 opening towards the second chamber 28 defined at the outlet port 24, and a third chamber 36 formed at the side surface of the closure member itself and put in fluid communication with said axial hole 35.

In the embodiment shown the third chamber 36 consists of an annular groove.

On the opposite side with respect to the axial hole 35 the closure member 25 is connected to the actuating rod 31 integral with the plunger 34 of the fluid-operated driving cylinder 33.

Practically, when the plunger 34 is at its top dead centre, the third chamber 36 is in alignment with the inlet port 23 which is thereby brought into fluid communication with the outlet port 24 to enable glue dispensing.

Under this situation, the second chamber 28 exhibits its minimum volume. On the contrary, when the plunger 34 is brought to its bottom dead centre, the closure member 25 closes the inlet port 23 and, at the same time, causes a volume increase in the second chamber 28 in which a vacuum is therefore produced, so that a suction action is exerted on the glue.

Operation of the glue dispensing device described above mainly as regards structure is as follows.

For coating a component, a vamp for example, with glue, the component is pushed against the brush 17, against the action of the spring 20, so that the brush is completely flattened. The hollow space 17a which is present when the brush 17 is not submitted to a compressive action, is practically reduced to a volume of zero value.

The motor 10 sets in rotation the base unit 8 and support element 15 and, as a result, the brush 17 too rotates about the axis 14a.

The closure member 25 of the delivery valve 3 is positioned so that glue can be dispensed from the outlet port 25 (Fig. 5); said glue, through the duct 18, reaches the brush 17 bristles. As the brush is flattened by the force of substantially constant value exerted by the compression spring 20, it exhibits a constant diameter even on varying of the distance of the surface of the component to be cemented from the coating head 2. Therefore the glue-coated band obtained by the controlled movements to which the shoe last 21 is subjected, is of strictly uniform width.

At the end of the glue dispensing operation the intercepting plate 25a is brought into contact with the sealing seating 26 by admitting air into a duct 35 opening into the driving cylinder 33 and the interruption of the glue flow brings about the expansion of the second chamber 28 because the elastic diaphragm 29 is deformed in a direction away from the plate 25a. The chamber 28 creates a vacuum downstream of the outlet port 24, that is a suction action takes place which is promoted by the presence of the first conveying pipe 6.

Therefore the glue still contained in the duct 18 is retained therein. In addition, on moving of the component to be cemented away from the brush 17, the hollow space 17a which is formed again within the brush due to the extension of its bristles appears empty (that is it contains no glue). Due to this circumstance and to the fact that the combined rotation and squeezing action previously exerted on the brush has enabled the residual glue to be eliminated from the brush bristles, the occurrence of glue drops and drippings from the hrush ends is avoided.

Furthermore, it is to be pointed out that the delivery valve 3 also acts as a safety valve. In fact, in the absence of compressed air in the fluid-operated cylinder 33, the adhesive material under pressure present in the first chamber 27 presses the plate 25a against the sealing seating 26, thereby closing the passage to the outlet port 24 and preventing admis-

sion of further adhesive material to the chamber 28.

If the delivery valve 3 referred to in Figs. 4 and 5 is replaced by the delivery valve shown in Fig. 6, operation of the device is only subjected to slight modifications.

In fact in this case, in order to enable the adhesive material to be dispensed, the plunger 34 is pushed to its top dead centre so that the third chamber 36, and consequently the axial hole 35, brings the inlet port 23 into fluid communication with the outlet port 24 (see Fig. 6).

When the glue dispensing operation has been completed, the plunger 34 is brought to its bottom dead centre so that the third chamber 36 is out of alignment with respect to the inlet port 23 and, as a result, the closure member 25 acts on the inlet port closing it.

At the same time, due to the descent of the closure member 25, there is a volume increase in the second chamber 28 and the vacuum is produced therein. As a result, a suction action is exerted on the glue which is therefore retained within the duct 18.

It is understood that various modifications and variations may be made to the details of construction of the elements disclosed herein without departing from the scope of this invention as set forth in the appended claims.

Claims

1. A glue dispensing device for shoe cementing machines, of the type comprising a coating head (2) provided with a rotating brush (17) for spreading said adhesive material, characterized in that said coating head (2) comprises: a base unit (8), a support element (15) for said brush (17) slidably engaged to said base unit (8), in an axial translation direction, and spring means (20) acting on said support element (15) and adapted, under operating conditions, to keep said brush (17) in a substantially flattened conformation against a component to be cemented.

2. A device according to claim 1, characterized in that said base unit (8) comprises a slide bushing (14), and in that said support element (15) comprises a hollow cylinder sliding within said bushing (14) , said spring means (20) being defined by a compression spring active on said hollow cylinder (15) along said translation direction.

3. A glue dispensing device for shoe cementing machines of the type comprising a coating head (2) for spreading said adhesive material and a glue delivery valve (3) disposed upstream of said coating head (2), characterized in that said delivery valve (3) comprises: a hollow main body (22) provided with an inlet port (23) and an outlet port (24), a closure member (25) and a sealing seating (26) disposed within said main body (22) between said ports (23, 24), a variable-volume suction chamber (28) disposed downstream of said seating (26) and upstream of said outlet port (24), said chamber (28) exhibiting its maximum volume when the closure member (25) is in closing contact with said sealing seating (26), and means (32) for actuating said closure member.

4. A device according to claim 3, characterized in that said variable-volume chamber (28) is bounded by a flexible diaphragm (29) engaged to said closure member (25) and movable together with the latter between an expanded condition corresponding to the maximum volume of said chamber (28) and a non-expanded condition corresponding to the opening position of said closure member (25).

5. A device according to claim 3, characterized in that said actuation means (32) for the closure member (25) comprises a fluid-operated cylinder (33) associated with said main body (22) and exhibiting a plunger (34) provided with a rod (31) engaged to said closure member (25).

6. A device according to claim 3, characterized in that said delivery valve (3) is disposed spaced apart from said coating head (2) and in that between said delivery valve (3) and coating head (2) provision is made for a pipe (6) conveying said glue to the coating head (2).

7. A device according to claim 3, characterized in that said coating head (2) comprises: a coating brush (17), a base unit (8) adapted to set said brush (17) in rotation, a support element (15) for said brush (17) slidably engaged to said base unit (8), and spring means (20) acting on the support element (15) and adapted to maintain the brush (17) in a substantially flattened conformation against a component to be cemented.

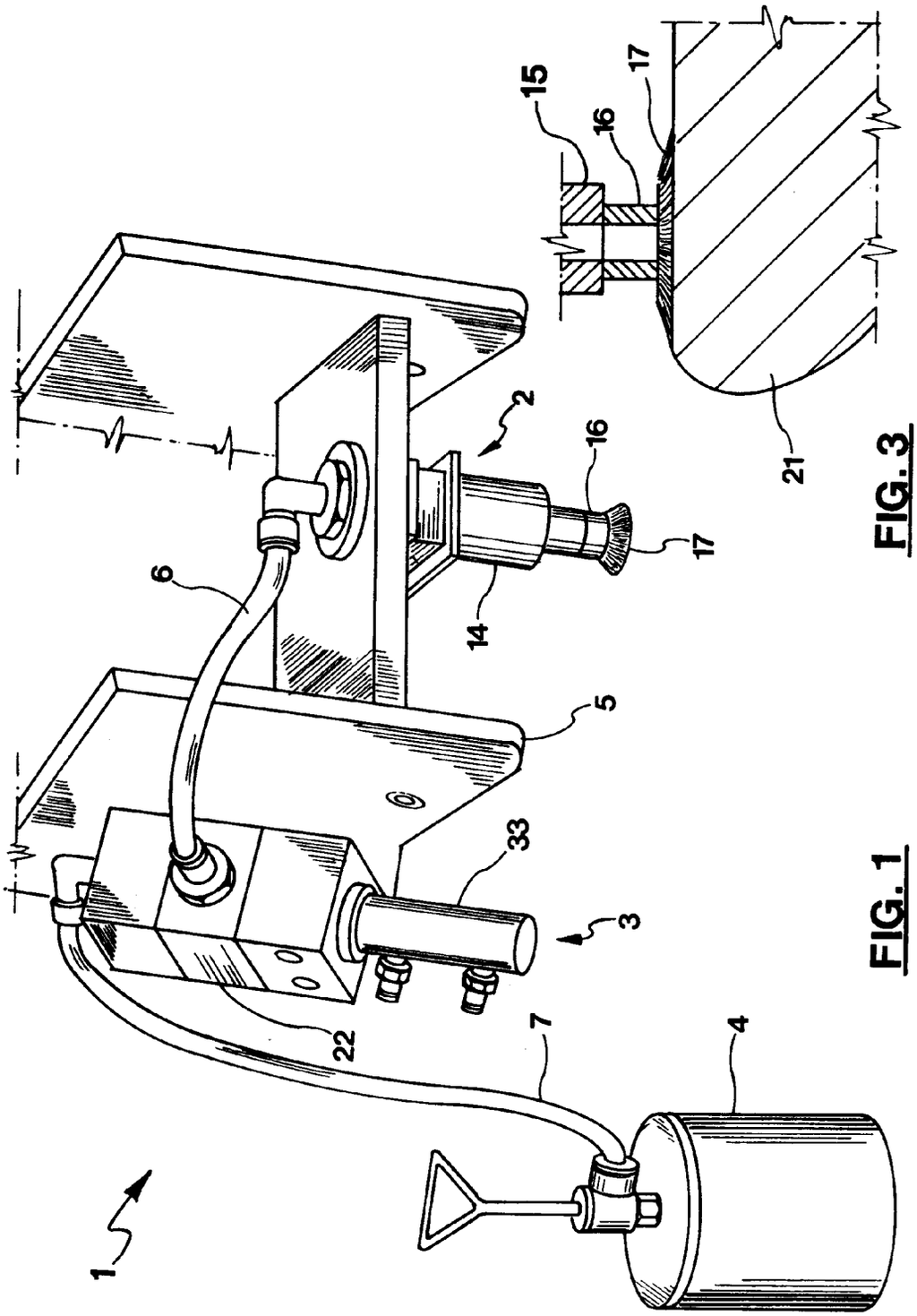

FIG. 1

FIG. 3

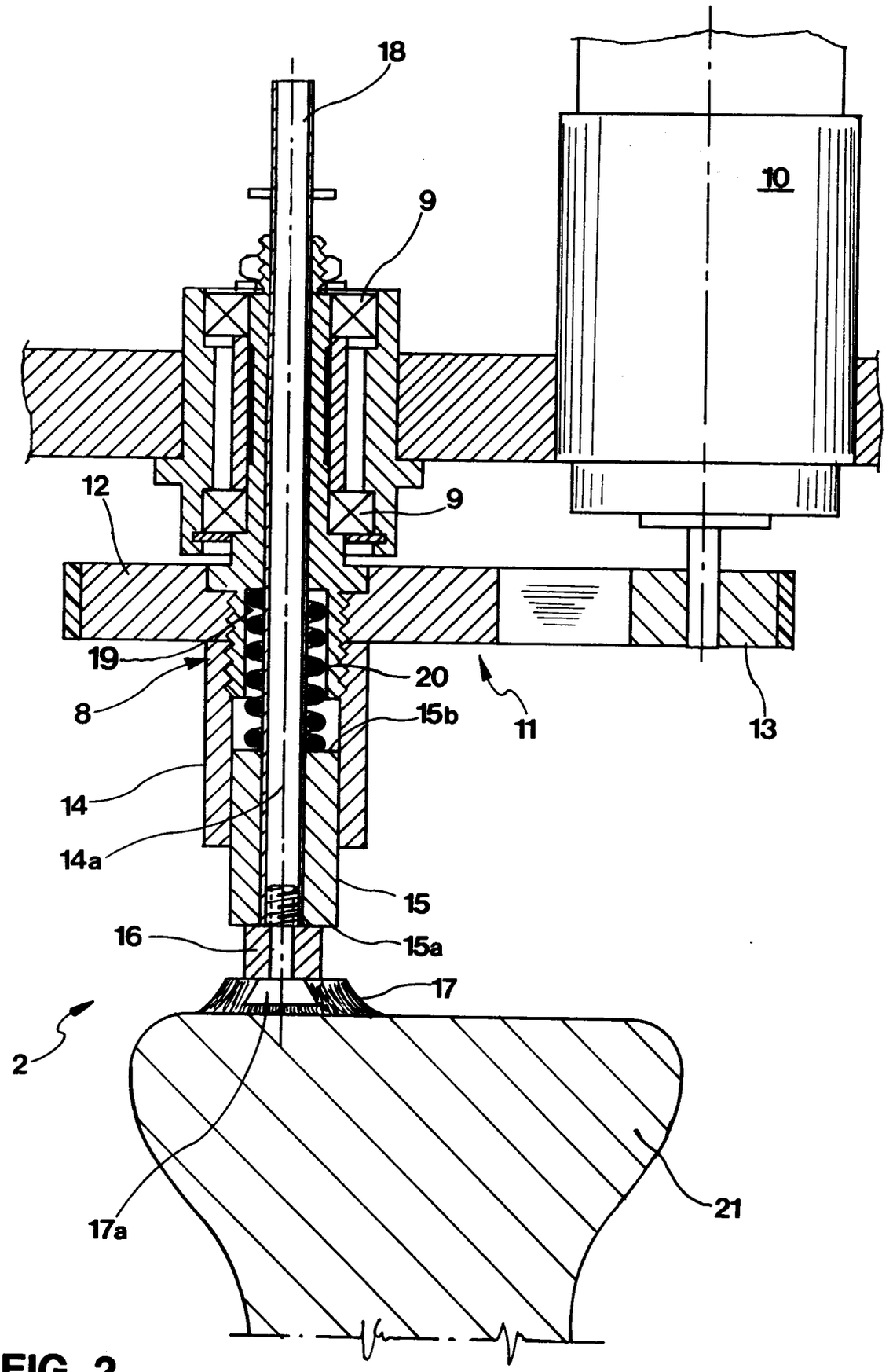

FIG. 2

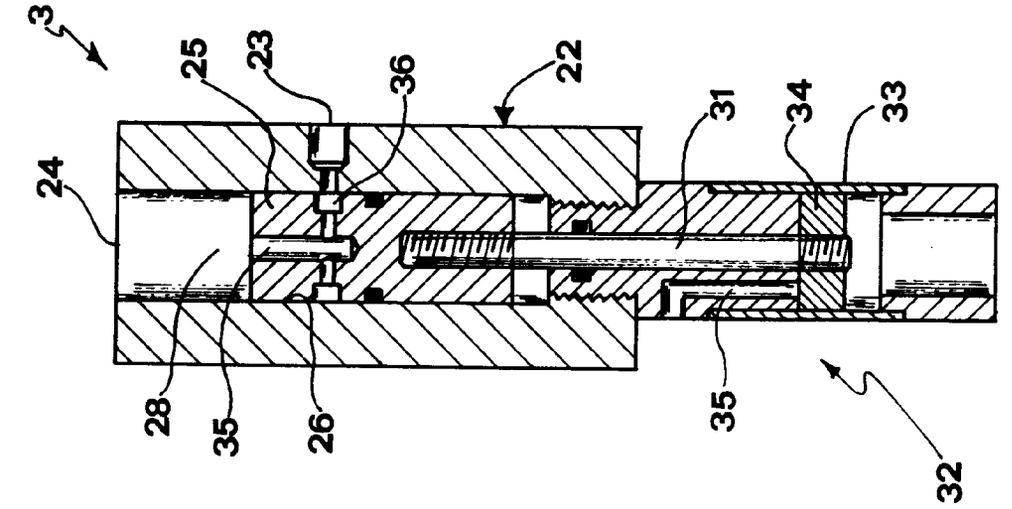

FIG. 6

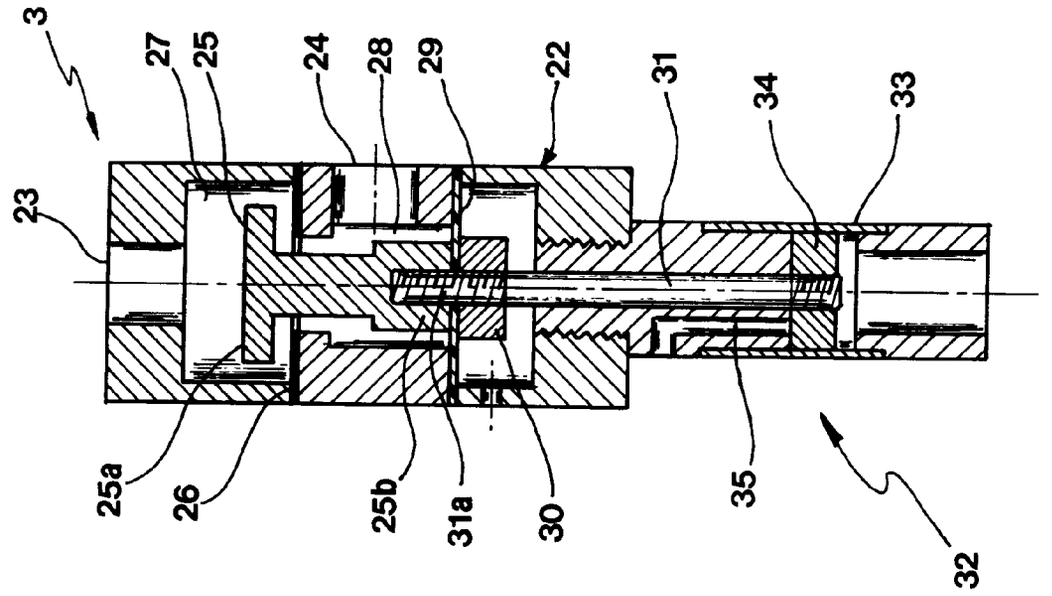

FIG. 5

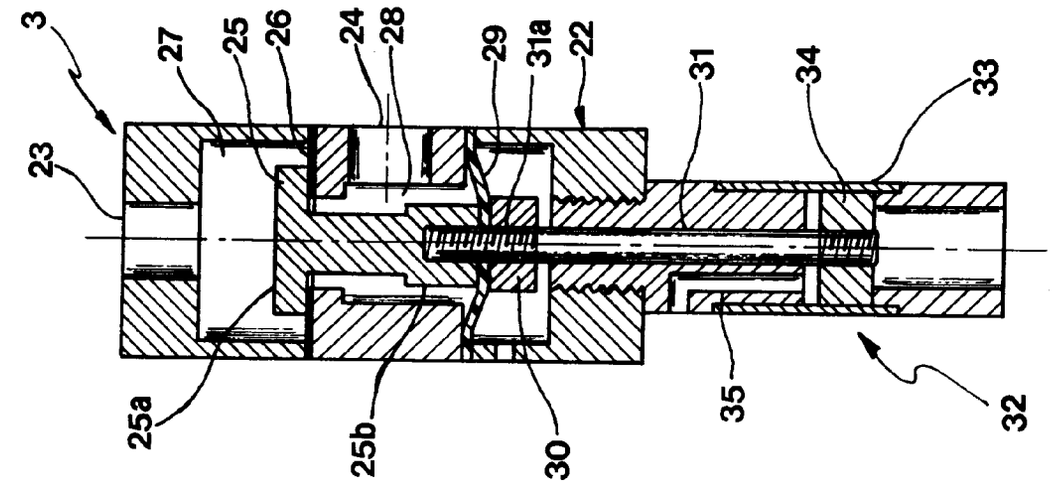

FIG. 4