(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 617 889 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
24.07.2013 Bulletin 2013/30

(51) Int Cl.:
D06F 75/06 *(2006.01)* ***D06F 75/20*** *(2006.01)*

(21) Application number: **13151176.8**

(22) Date of filing: **14.01.2013**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(30) Priority: **19.01.2012 IT GE20120006**

(71) Applicant: **De'Longhi Appliances S.r.l. Divisione Commerciale**
ARIETE
50013 Campi Bisenzio, Firenze (IT)

(72) Inventors:
- **Rosa, Carlo**
  50013 Campi Bisenzio, Province of Firenze (IT)
- **Berretti, Simone**
  50013 Campi Bisenzio (IT)

(74) Representative: **Porsia, Attilio**
Via Caffaro 3/2
16124 Genova (IT)

(54) **Iron**

(57) A steam iron, comprising a lower plate (3) with steam supply holes (4) and at least a first conduit (2) of steam flow to said plate (3); the supply of steam into said first conduit (2) being controlled by a button (5) controlling the steam production means housed in the iron or in an external machine body thereof; said iron comprising a second conduit (2a) which branches from said first conduit (2) to carry the steam to at least one outflow hole (14) from at least one side of the box-shaped body (1) of the iron, for example the front side (101); downstream of the branch-point of said first and second conduits (2, 2a) and in one of said first and second conduits (2, 2a), opening and closing means (8, 21, 31) of the first conduit (2) are positioned, controllable from the outside and allowing or not allowing the steam flow into it; in the second conduit (2a), a valve with a duly calibrated valve shutter (18) being positioned and opening automatically, thanks to the pressure of the steam flowing into said second conduit (2a), when said means (8, 21, 31) close the relative first conduit (2), and closing automatically when said means (8, 21, 31) open the relative first conduit (2) and channel the steam into it.

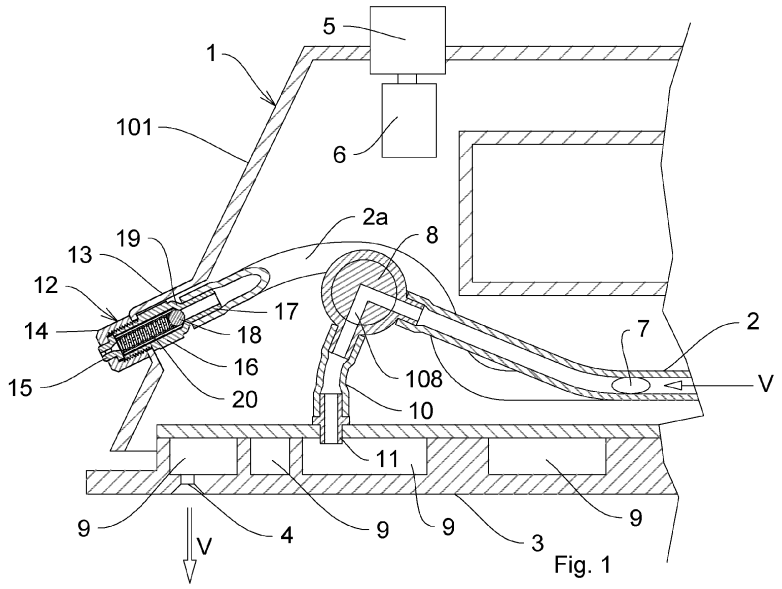

Fig. 1

EP 2 617 889 A2

Description

[0001] The present invention relates to an iron, of the type equipped internally with steam production means or connected with an external machine body of an ironing system, in which case said steam production means are housed in said machine body.

[0002] As is known, irons, whether connected or not to an external machine body, have a lower plate comprising a series of outlet holes of the steam used for ironing. In certain irons, there are also holes on the front part of the plate, to allow the steam to be supplied by said plate both from the lower part and from the front part thereof.

[0003] From DE202005012165 (U1) a domestic steam iron is known having a steam inlet connected to a steam changeover valve which, by means of a control button can direct the steam to the sole plate and outlet holes or to the spray nozzle at the front of the sole plate.

[0004] In said irons supplying steam from both the lower part and the front part of the plate, it is necessary to house electric valves in the iron which control opening and closing of the steam outlet holes on the lower part and/or the front part of the iron. Use of said valves naturally requires the iron to be equipped with the necessary electric circuitry to perform the steam supply function both from the front part and from the lower part of the plate. Said irons are therefore highly complex to manufacture, run the risk of frequent breakage and their use by the user may become difficult.

[0005] The scope of the present invention is therefore realisation of an iron wherein the steam may be supplied automatically both from the lower part of the plate and from at least one side of the box-shaped body of the iron, for example the front side, by means of use of efficient means of supply and regulation of the steam flow, simply conceived and which do not require use of electric or electronic valves, and wherein the steam may also be supplied from said side of the iron at any height, with the desired inclination and also with diversified effects.

[0006] Said scope is achieved by the present invention by means of a steam iron according to claim 1.

[0007] Other important characteristics of the present invention are the subject of dependent claims.

[0008] A better understanding of the further characteristics and advantages of the present invention will be obtained in the following description, purely by way of nonlimiting example and with reference to the attached drawings, wherein:

- Figure 1 shows a partial view in side elevation and in cross-section of a first embodiment of a steam iron according to the present invention, in a first operating position, wherein the steam is supplied from the relative lower plate;
- Figure 2 shows a partial view in side elevation and in cross-section of the iron of figure 1 in a second operating position, wherein the steam is supplied from the front side of the box-shaped body of the iron;
- Figure 3 shows a partial view in side elevation and in cross-section of a second embodiment of said iron in a first operating position, wherein the steam is supplied from the lower plate;
- Figure 4 shows a partial view in side elevation and in cross-section of the iron of figure 3 in a second operating position, wherein the steam is supplied from the front side of the box-shaped body of the iron;
- Figure 5 shows a partial view in side elevation and in cross-section of a third embodiment of said steam iron in a first operating position, wherein the steam is supplied from the lower plate; and
- Figure 6 shows a partial view in side elevation and in cross-section of the iron of figure 5 in a second operating position, wherein the steam is supplied from the front side of the box-shaped body of the iron.

[0009] Figure 1 shows the front part of an iron according to the present invention. Said iron, as already mentioned, may form part of an ironing system, in which case it will be connected upstream, by means of appropriate steam conduits and an electric power cable, with a machine body, not shown, comprising steam production means under pressure, or may be equipped inside with a water tank and steam production means. Said iron comprises a box-shaped body 1 under which a plate 3 is positioned, on which there is a series of internal cavities 9 communicating with a series of steam supply holes 4, of which one is visible in cross-section in the figures. The pressurised steam reaches the front part of the iron by means of a relative conduit 2 connected upstream with the steam production means. There is a button 5 on the box-shaped body 1 which controls an electric switch 6 for starting or stopping the steam supply. A second conduit 2a branches from the principal steam supply conduit 2, with its opening 7 being positioned at a right angle to the direction V of the steam flow inside conduit 2, in a manner that, as we shall see, it does not interfere with the normal direction of the steam when this is supplied from lower plate 3. In conduit 2, downstream of opening 7, there is a spherical tap 8 of the open/close type, controllable from the outside by means of an appropriate knob, not shown. There is an L-shaped conduit section 108 of said tap which places conduit 2 in communication with a flexible tube 10 positioned downstream of said tap 8. Said tube 10 connects the final end of conduit 2 with a pipe fitting 11 in communication with the cavities 9 of plate 3. The branching conduit 2a of conduit 2 comprises at the final end a valve 12 supplying steam from the front part of the iron. Said valve 12 is positioned in housing 13 on the front side 101 of the box-shaped body 1 of the iron and has an appropriate downwards inclination, i.e. basically towards the ironing surface of the iron. Said frontal steam supply valve 12 comprises a final steam supply nozzle 14 in which there is an insert 15 which gives the steam a particular desired effect on flowing out of the nozzle 14. In this regard, said insert 15 could be manu-

factured in special material, such as metal, a technopolymer or other material, and the internal steam hole could by variously worked to give it an appropriate shape. Said nozzle 14 is screwed onto the final part of the housing 16 of the valve 12, the final part of which protrudes externally from the housing 13 on the front side 101 of the iron. The remaining part of housing 16 of valve 12 is positioned inside iron 1 and comprises a final section 17 of pipe fitting inserted at the final end of conduit 2a. Inside housing 16 of valve 12, a duly calibrated spring 20 is housed, which strikes at one end against the insert 15 and at the other end carries a spherical valve shutter 18 housed in a truncated cone part 19 of said housing 16.

[0010] Functioning of the present steam supply device according to this first embodiment is easily understood. Basically, the user of the present iron may choose whether to supply the steam from the holes 4 of plate 3 of iron 1, or whether to supply the steam from nozzle 14 of front supply valve 12. Said steam supply may occur simultaneously or alternatively from said front valve 12 or from the holes 4 of plate 3. Figure 1 shows the situation wherein the steam is supplied from the holes 4 of lower plate 3 of the iron. By means of button 5, the user controls the means of production and supply of steam V, which is channelled into conduit 2. The steam tends naturally to pass through conduit 2, since tap 8 is open in the direction of plate 3 and laps opening 7 of second conduit 2a, the opening of which, as said, is in a basically right-angled position to the direction of steam flow V. The steam therefore basically passes naturally along the path of least resistance and even if a small part of the flow is channelled into conduit 2a, the pressure would not be sufficient to overcome the force of spring 20 of spherical valve shutter 18 and open supply valve 12 on the front side 101. When the user decides to supply the steam from valve 12 positioned on the front of the iron 1, see figure 2, it is sufficient to rotate the knob associated with tap 8 in a manner that it closes access of the steam to pipe fitting 10 and therefore to the cavities 9 of plate 3. The steam V, in this case, finding the conduit 2 closed at tap 8, will naturally deviate into opening 7 of conduit 2a. The steam pressure in said conduit 2a, in this case, will become such as to overcome the resistance of the duly calibrated spring 20, which will compress by a certain section, causing movement of sphere 18 from its housing 19. The steam may therefore flow out from the front part 101 of iron 1 by means of nozzle 14, possibly with an insert 15. When the user decides to supply steam from plate 3 once again, it is sufficient to rotate the knob in a manner to open tap 8 once again: in this manner, the steam will flow once again into conduit 2, as shown in Figure 1, and supply valve 12 will close automatically, since spring 20 will push spherical valve shutter 18 to strike once again against the corresponding housing 19. Alternatively to what is described, there could be a different calibration of spring 20 and/or different partial open or closed positions of conduit 2 by the tap 8, in a manner that the steam may be channelled with appropriate pressures into both conduit 2 and conduit 2a. The user, by means of the first embodiment of the iron just described, may therefore obtain steam from the holes 4 of plate 3 or from valve 12, solely by using the knob associated with tap 8.

[0011] Figure 3 shows a second embodiment of said iron, equipped with an open/close tap 21 comprising a section 22 of L-shaped conduit connected upstream to steam arrival conduit 2 and downstream to tube 10 channelling the steam towards plate 3. At the angle of said section 22, there is cylindrical housing 23, in which the head 29 of a piston 25 is housed, projecting from said housing 23 and equipped with a return spring 26. Said head 29 of piston 25 is equipped with an appropriate seal 24. The housing 23 into which head 29 slides is closed by a cover 34 with a central hole with opportune sealing means from which the piston 25 protrudes. The end of piston 25 opposite head 29 cooperates with a lever 27, hinged on a transversal axis 28 and controllable by the user. As may be seen, the position of conduits 2 and 2a and front steam supply valve 12 is entirely similar to what is shown in figures 1 and 2.

[0012] Lever 27 may be controlled by the user with the index finger of the hand holding iron 1, while the thumb of the same hand controls the steam supply through button 5. When said lever 27 is in the released position of figure 3 and button 5 is pressed, steam flow V may flow through holes 4 of plate 3 and valve 12 remains closed by spherical valve shutter 18. By pressing lever 27, see figure4, the user causes the seal 24 to close the lower opening of cylindrical housing 23, and therefore to interrupt the steam flow into section 22 of the "L-shaped" conduit. At this point, the steam flows into conduit 2a and the pressure created therein, as seen in the first embodiment of this supplier, causes movement of spherical valve shutter 18 from housing 19 and therefore the outflow of steam from nozzle 14 of valve 12. The user may therefore obtain steam from holes 4 of plate 3 or from valve 12 by pressing lever 27.

[0013] In the third embodiment of the present iron, see figure 5, the conduit is manufactured in elastically deformable material, for example an elastomeric material, and after branching is guided by a frame 30 inside which is housed a pressing element 31 associated with a shaft 32 around which a return spring 33 is wrapped. The end of shaft 32 opposite the end of pressing element 31 cooperates with a lever 27', hinged on a transversal axis 28. In the condition shown in the figure, the steam V flows towards the cavities 9 of plate 3 and flows out of the holes 4, whereas supply valve 12 remains closed by spherical valve shutter 18, as seen in the previous cases. When the user presses lever 27', see figure 6, pressing element 31 causes momentary compressing of conduit 2 and the steam flow towards the plate is therefore interrupted and said flow is deviated towards conduit 2a. The pressure of the steam flow into conduit 2a, as previously seen, causes backwards movement of spherical valve shutter 18 against the action of spring 20 and therefore outflow

of the steam from valve 12 on the front part of iron 1. Also in this case, by means of a single switch, the user may decide whether to supply steam from the holes on the plate or from the nozzle positioned on the front part of the iron or, at least, by means of appropriate calibration of the elements described of the present iron, from both these steam outflow elements.

[0014] As has been seen, the present iron, thanks to use of the steam supply and regulation means described above, can supply steam simply and effectively from both the lower plate and from the front part of the box-shaped body of the iron. More holes could naturally be envisaged for said supply from the front part of the iron, possibly with different inclinations, by using several supply valves 12 or by using further branching downstream of a single supply valve. In any case, in the present iron, in one of the steam flow conduits, in this case conduit 2 which carries steam to plate 3, means of opening and closing it are envisaged, such as taps 8 and 21 and pressing element 31, whereas in the other conduit, namely conduit 2a which carries steam to the front part of the iron, a valve 12 is envisaged which automatically opens when the steam flows into said conduit 2a with sufficient pressure. Also, by means of the present iron, it is possible to envisage, as an alternative to or in combination with what is described above, steam supply holes positioned not only on the front part of the box-shaped body of the iron, but also on the sides of said box-shaped body.

Claims

1. A steam iron, comprising a lower plate (3) with steam supply holes (4) and at least a first conduit (2) for the flow of steam to said plate (3), the supply of steam into said conduit (2) being controlled by a button (5) which controls steam production means housed in said iron or in a machine body external to it, **characterised by** comprising a second conduit (2a) which branches from said first conduit (2) to carry the steam to at least one hole (14) of outflow of the steam from at least one side of the box-shaped body (1) of the iron, for example the front side (101), being downstream of the branch-point of said first and second conduits (2, 2a) and means (8, 21, 31) of opening and closing said first conduit (2) being positioned in one of said first and second conduits (2, 2a), controllable from the outside and enabled to allow or not to allow the flow of steam into it, a supply valve (12) being positioned in the second conduit (2a) with a duly calibrated valve shutter (18) which opens automatically, thanks to the pressure of the steam flowing into said second conduit (2a) when said means (8, 21, 31) close the relative first conduit (2) and which closes automatically when said means (8, 21, 31) open the relative first conduit (2) and channel the steam into it.

2. The iron according to claim 1, **characterised by** the opening (7) of the second conduit (2a) in which said valve (12) is housed being positioned in a manner that it is lapped by and does not interfere with the steam flow from the first conduit (2) in which said opening and closing means (8, 21, 31) are positioned.

3. The iron according to claim 2, **characterised by** said opening (7) of second conduit (2a) in which said valve (12) is housed being in a basically right-angled position to the steam flow from the first conduit (2).

4. The iron according to claim 1, **characterised by** said opening and closing means (8, 21, 31) being positioned in said first conduit (2) of steam flow to plate (3) of the iron and said supply valve (12) being positioned on the front side (101) of the iron, close to the end of said second conduit (2a).

5. The iron according to claim 1, **characterised by** the shutter (18) of said valve being associated with elastic means (20) which maintain it in the closed position and allow it to open on arrival of the steam in the second conduit (2a).

6. The iron according to claim 5, **characterised by** said valve shutter (18) being spherical and housed in a relative truncated cone housing (19) of the valve (12).

7. The iron according to claim 1, **characterised by** said steam supply nozzle (14) being equipped internally with an insert (15) serving to change the steam outflow method.

8. The iron according to claim 1, **characterised by** said valve (12) being housed in housing (13) with an appropriate downwards inclination and positioned on the front side (101) of the box-shaped body (1) of the iron.

9. The iron according to claim 4, **characterised by** said opening and closing means comprising a spherical tap (8) equipped internally with a section (108) of conduit serving to place said first conduit (2) in communication with plate (3) of the iron, said tap (8) being rotatable from outside the iron by means of an appropriate knob.

10. The iron according to claim 4, **characterised by** said opening and closing means comprising a tap (21) with a section (22) of conduit engaging one part in the final part of said first conduit (2) and the other part in a pipe fitting (10) of connection with plate (3), said section (22) of conduit being opened and closed by the head (29) of a piston (25) associated with said elastic means (26) of return and cooperating with a

lever (27) controlled from outside the iron.

11. The iron according to claim 10, **characterised by** said head (29) of piston (25) comprising a seal (24).

12. The iron according to claim 4, **characterised by** said first conduit (2) being manufactured in an elastically deformable material and said opening and closing means comprising a pressing element (31) compressing said first conduit (2) and controlled by means of a shaft (32) associated with said elastic means (33) of return and cooperating with a relative switch (27') controllable from outside the iron.

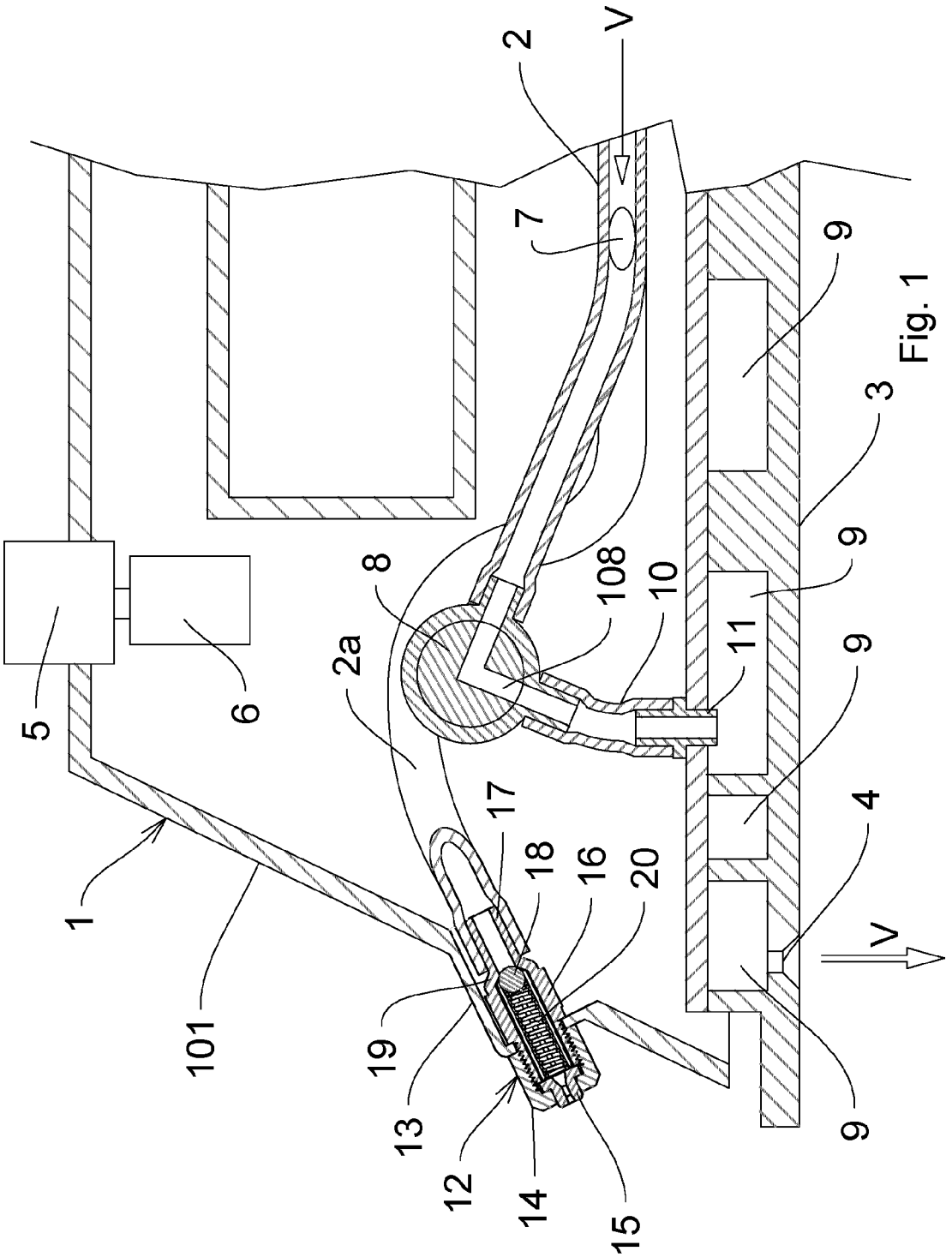

Fig. 1

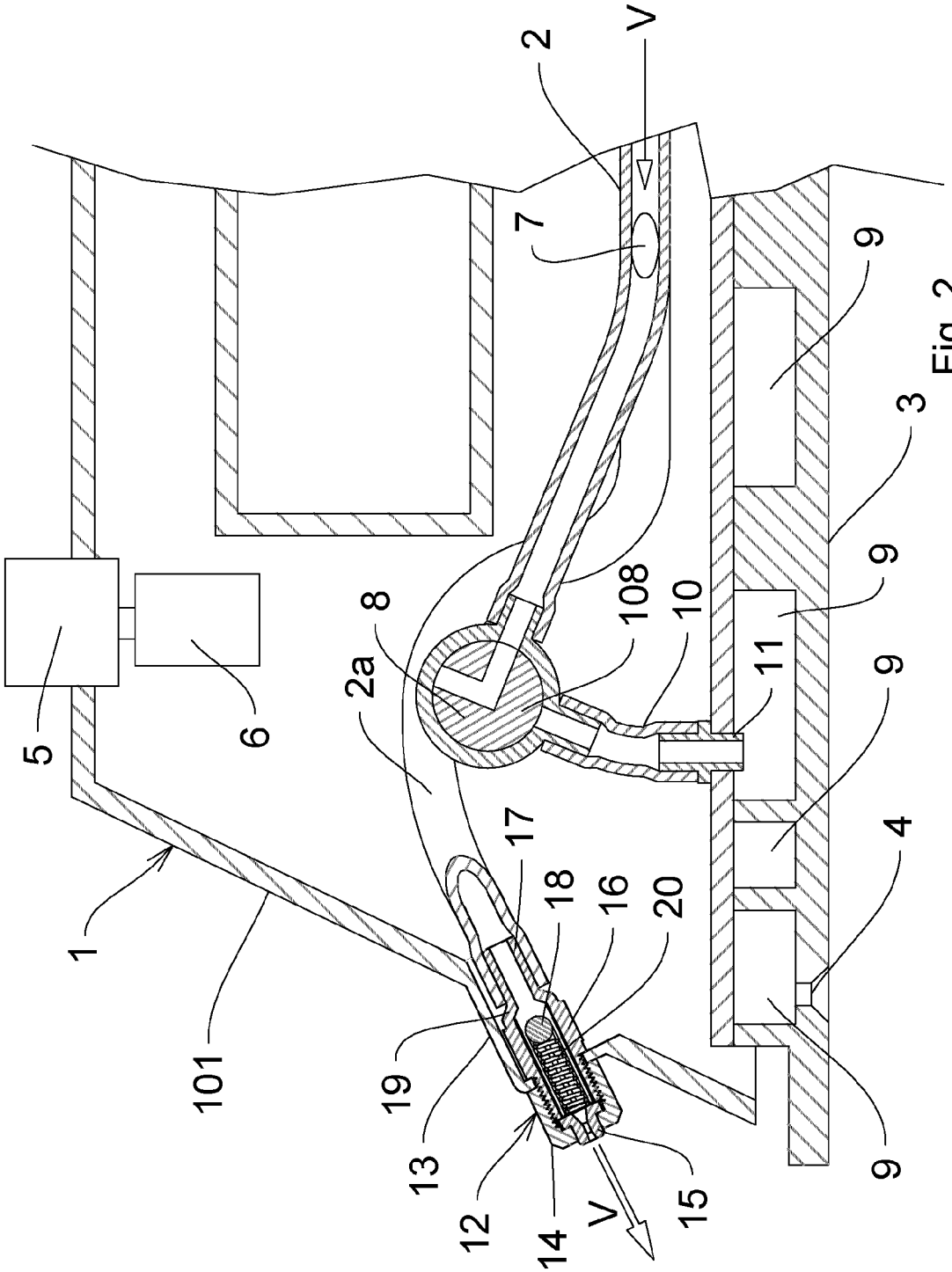

Fig. 2

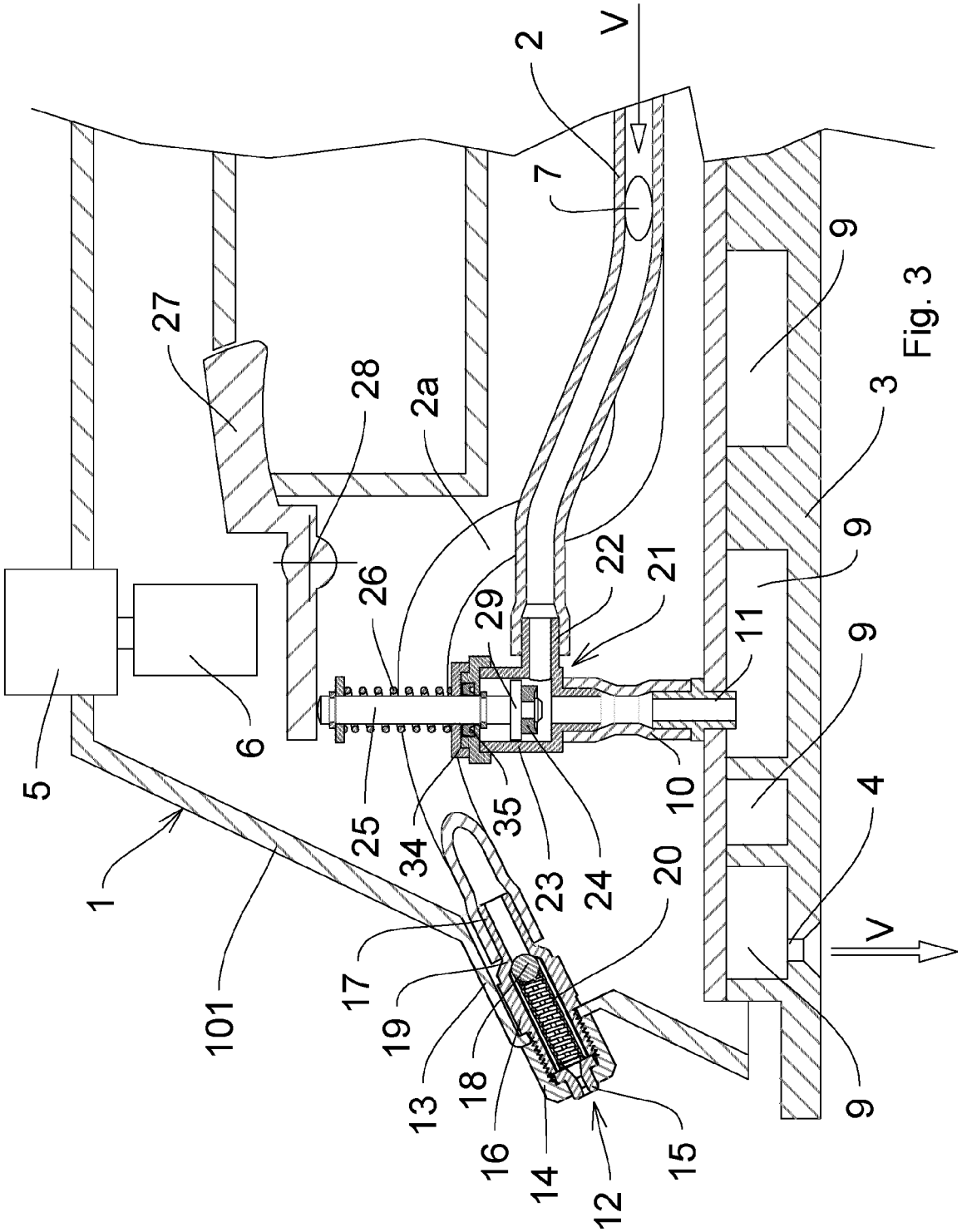
V
2
7
9
27
28
2a
3
9
22
21
26
29
11
9
6
5
25
34
35
23
24
10
9
4
1
101
20
V
17
19
13
18
16
14
12
15
9

Fig. 3

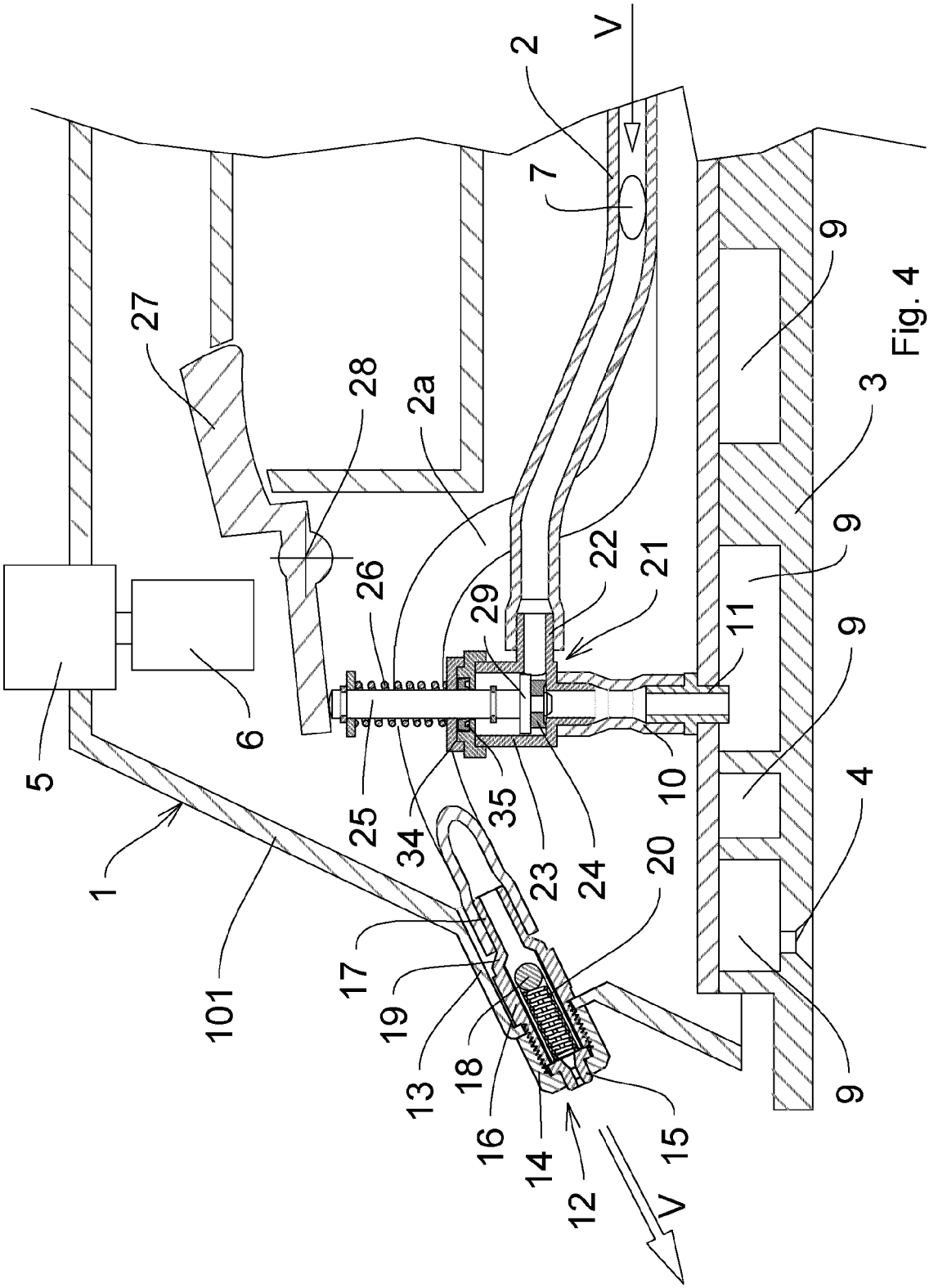
V
2
7
9
27
28
2a
3
9
22
21
26
29
11
9
6
5
25
34
35
23
24
10
9
4
1
101
17
19
13
18
16
14
12
V
15
9

Fig. 4

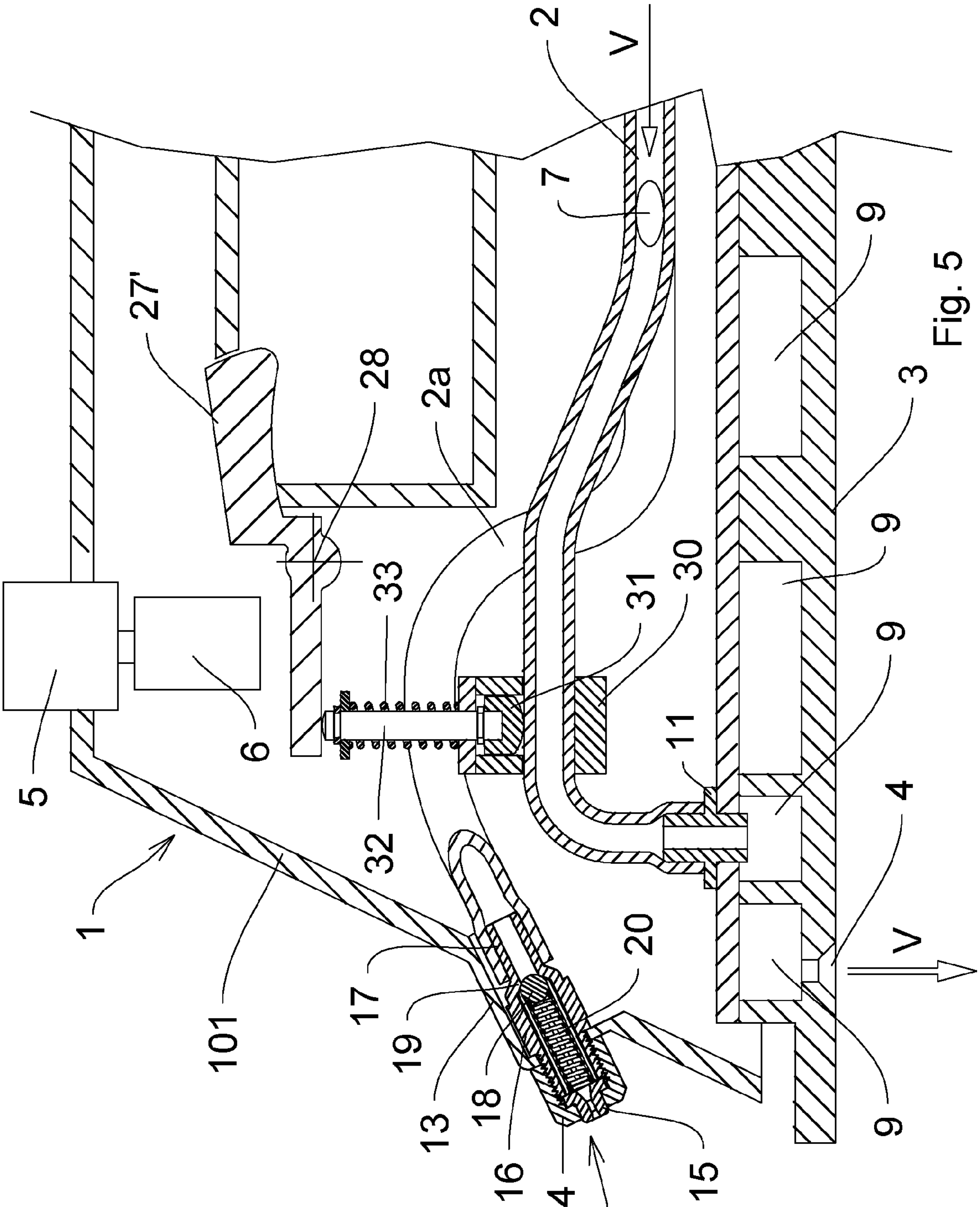
2
V
7
9
27'
28
2a
3
9
33
31
30
5
6
33
32
11
9
4
1
101
17
20
V
19
13
18
16
14
12
15
9

Fig. 5

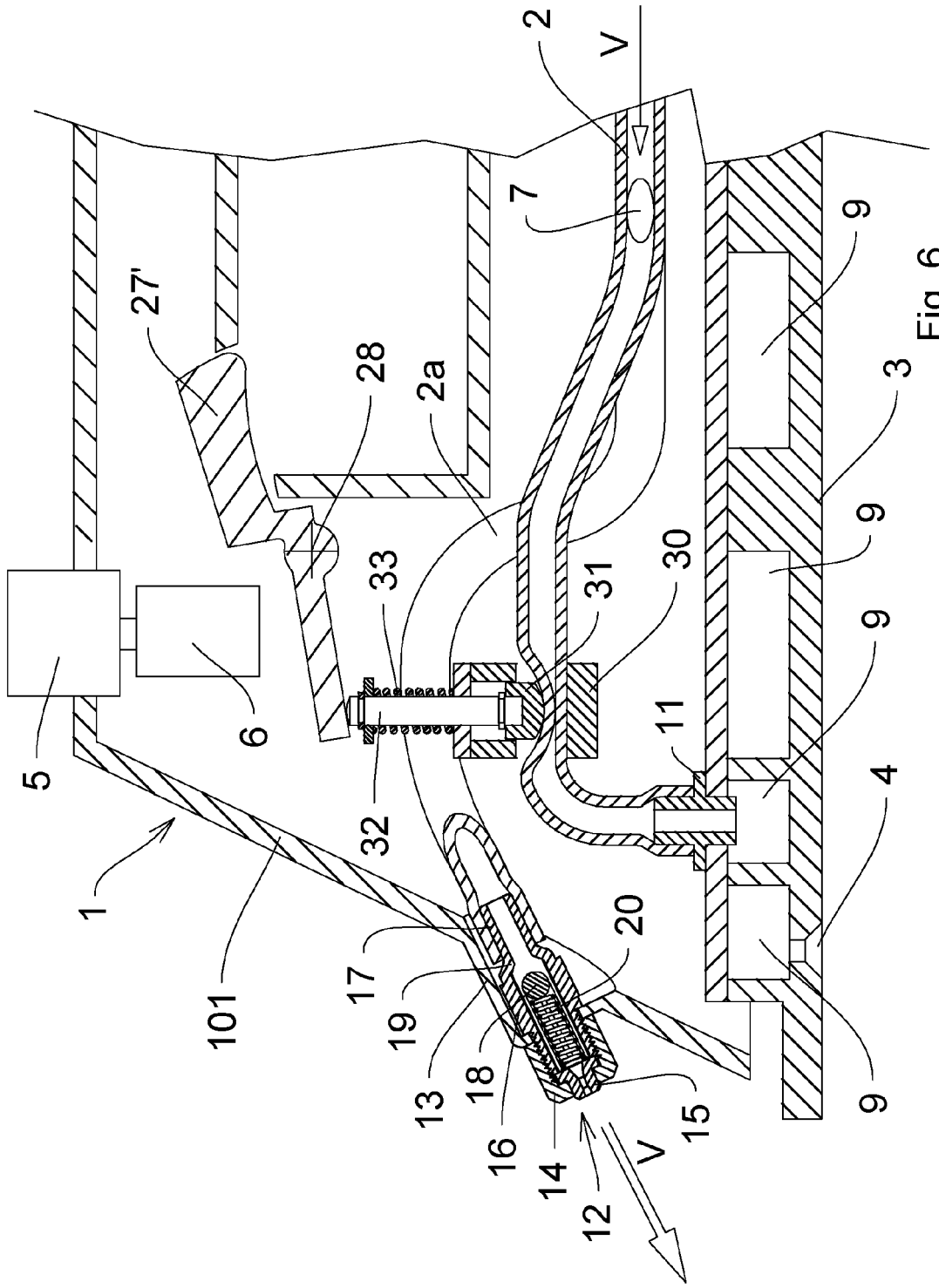
2
V
7
9
27'
28
2a
3
9
33
31
30
9
6
11
9
5
32
4
1
20
101
17
19
13
18
16
14
12
V
15
9

Fig. 6

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- DE 202005012165 U1 **[0003]**