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(54) Corking machine

(57) A corking machine (10), suitable for operating both in normal environments and in sterile and controlled environments, comprising a feeder (12) of corks (14), which are inserted into the mouth of containers, in particular bottles (13) moving at respective supplying devices (30) foreseen on a rotating platform (18); at the bottom of the rotating platform (18) it is foreseen to apply

an intermediate or interface element (47), annexed to a vacuum/gas/vacuum slider (46), so that there is always communication between the outer ducts (32, 33) of the link block (46), used for the steps of pre-evacuation and of injection of the inert gas, and the inner portions of the corking machine (10), in order to make the washing sanitization liquid flow and to allow it to be discharged.

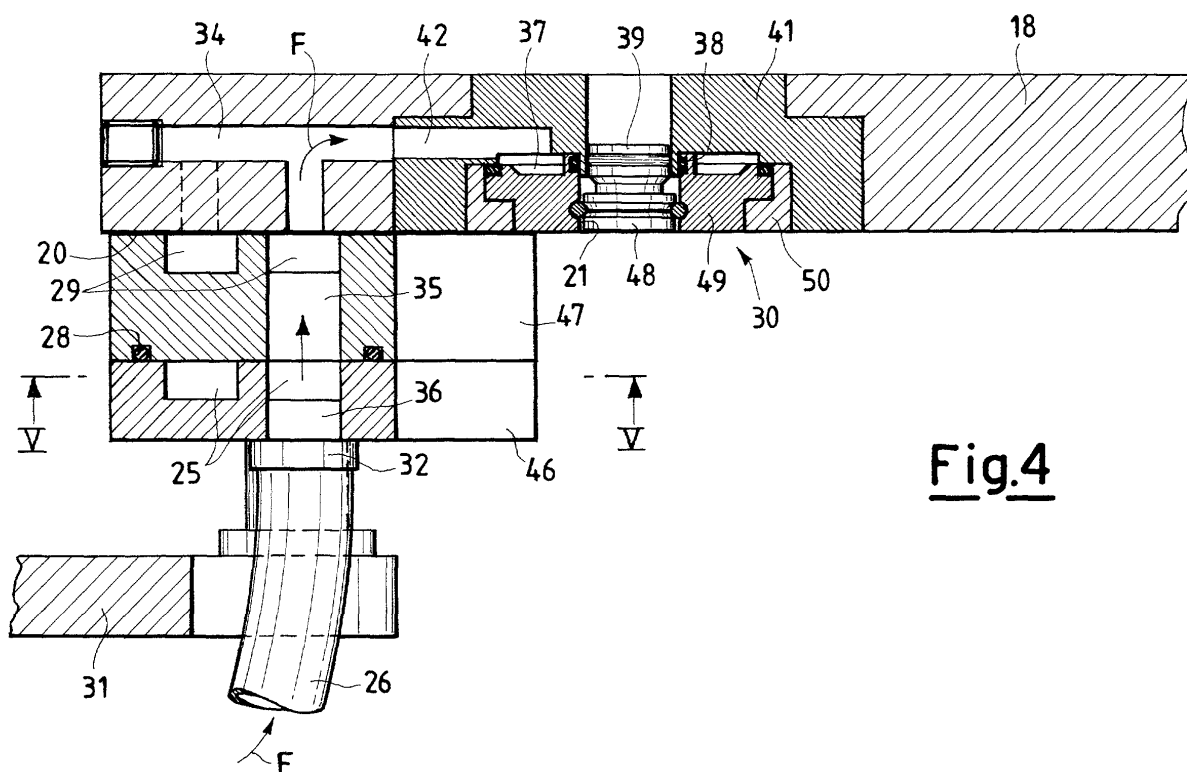


Fig. 4

Description

[0001] The present invention refers to a corking machine, suitable for operating both in normal environments and in sterile and controlled environments.

[0002] More specifically, the present invention concerns corking machines to be used in the wine industry for the quick and secure insertion of corks, preferably made from cork, inside portions of containers, such as bottlenecks, which are already filled with drinking substances (milk, wine, fruit juice, etc.) thanks to filling machines and which must be put on general sale.

[0003] Conventional corking machines usually comprise a main structure having a rotating body integral with a platform, on the outer edge of which are foreseen a series of grip, transportation and release members of the cork in corking position.

[0004] The corks are usually discharged on the rotating platform by means of a suitable column feeder and then they are gripped individually by the grip members and taken, thanks to the rotary motion of the platform, below a plunger, actuated by a guide cam, for the introduction of the cork inside the bottleneck.

[0005] Usually, the grip members integral with the rotating platform consist of pincer-shaped members controlled by cam mechanisms, whereas the plunger for introducing the cork is usually moved in the axial direction through a pneumatic actuator; it is also possible to use an electrical adjustment system of the penetration of the cork inside the bottleneck, lifting or lowering the actuator cam of the plungers, according to whether the cork is too deep or not deep enough, respectively, into the bottleneck containing the drinking product to be conserved.

[0006] Each pincer member foreseen on the rotating platform grips one cork at a time at the vertical cork-feeding column, transports it along a determined path and then releases it at the jaws of a compressor bracket.

[0007] The compressor bracket then takes care of compressing the cork to make it suitable for being inserted in a bottle and, following the compression action of the jaws, the vertical translation of the plunger which moves from top to bottom, thanks to the pressing action of a control cam, determines the insertion of the cork itself inside the bottleneck, where, thereafter, the subsequent expansion of the aforementioned cork causes the adherence of the cork walls inside the container and, consequently, the air-tight sealing thereof.

[0008] The use of corks actually made from cork, which moreover determines perfect conservation of some drinking substances contained inside the container, does however cause some drawbacks in the act of sealing the bottles. In fact, at the time of the compression of the side walls of the cork carried out by the jaws of the compressor bracket, the cork itself usually tends to release cork dust which builds up inside the gaps in the machine, penetrates inside of it and inserts itself between the actuation members.

[0009] Such a build-up of dust on the surface of the

corking machine and, in particular, at the compression and insertion zone of the cork consequently also determines substantial pollution of the drinking product contained in the bottle.

[0010] Such a phenomenon is all the more evident the more corks made from less pure and lower quality cork are used.

[0011] Moreover, the presence of cork dust inside specific products (like for example bottled wine) is symptomatic of low quality, even if there is no actual pollution of the product.

[0012] Regarding this, currently there are purpose-built devices for the reduction or complete elimination of dust present at the supplying devices of corking machines; such devices allow the corking of bottles in an environment kept relatively "clean", avoiding the formation of cork dust residue on the free surface of the liquid introduced into the bottle.

[0013] In any case, such provisions allow a product to be obtained which is extremely safe for the health of consumers and which is pleasing from the aesthetic point of view, however, they do not allow complete cleanliness and sterility of the control members of the corking machine to be obtained, in such a way determining the accumulation of small particles of cork or general atmospheric dust inside the spaces in the rotating body of the machine, which can then contaminate the product contained in the bottles.

[0014] All of this is also due to the high speeds of corking and transportation of the corks from the feeder column to the compressor link blocks and from here inside the containers to be sealed.

[0015] The systems for eliminating cork dust from the corking head currently foresee a first step of continuous suction of the particles from the compression monoblock, thanks to which possible impurities fallen into the monoblock with the cork are eliminated; in a second step, when the cork starts to be compressed and the bottle moves below the plunger for inserting the cork, an airflow begins which makes the dust particles sticking to the various elements of the corking head move, whereas the suction step of the dust from the monoblock continues in a direction substantially parallel to the entry direction of the airflow, in order to realize a consistent "chimney effect".

[0016] Then, when the cork is completely compressed and the bottle continues to move below the compression block, the steps of injecting the airflow and of suction from the corking head continue, so as to eliminate the impurities present in the monoblock and released by the cork during the compression step.

[0017] Finally, at the moment when the bottle is positioned inside the supplying device of the corking machine for the corking operation, the operations of starting up the airflow on one side and of suction on the other automatically stop, to then start up again at the time of entry of a new cork in the compression monoblock.

[0018] From the previous description it is clear that

the described procedure allows an extreme reduction in emission of the dust produced by corks and possibly present in the bottled liquid, but leaves the problem relative to hygiene and sterility of the entire corking machine unsolved, since the cork dust or other atmospheric dust, which has not been sufficiently sucked up during the compression steps, can further penetrate, at a later time, inside the containers contaminating and altering the product contained therein.

[0019] As well as the drawback of the generation of the dust mentioned above, it should be added that, for a better conservation of the drinking product, in particular wine, a cycle is usually applied comprising a step of pre-evacuation of air from the bottleneck, a step of saturation with inert gas and a subsequent second step of pre-evacuation; such steps are obtained by using a sliding link block placed in connection, respectively, with a vacuum pump and with an inert gas feeder.

[0020] Through the coupling of the surface of the link block, suitably slotted, the vacuum and inert gas circuits are placed in communication with as many circuits arranged in the rotating part and specifically dedicated to the pre-evacuation and to the injection of inert gas; such circuits, in order to fully complete the overall operation, must not communicate with each other.

[0021] The pre-evacuation step has the purpose of realizing a corking without overpressures in the area of the bottleneck.

[0022] This step, however, causes the suction of vapors of the liquid contained in the bottle (for example wine), which deposit themselves along the walls of the suction ducts; these deposits, if not accurately sanitized, can cause contamination.

[0023] In the requirements mentioned previously, the purpose of the present invention is, therefore, that of avoiding the drawbacks mentioned above and, in particular, that of realizing a corking machine operating both in a normal environment and in a sterile and controlled environment, which allows the corking operation of containers, in particular bottles, containing drinking substances, without the dust released by the compressed corks collecting inside and between the gaps of the actuation members of the compression monoblock of the machine, thus avoiding the penetration of cork dust or atmospheric dust inside the substance in the container.

[0024] Another purpose of the present invention is that of realizing a corking machine operating both in a normal environment and in a sterile and controlled environment, which is particularly reliable, avoiding the accumulation of contaminating substances in the circuits of pre-evacuation and of injections of inert gas in the bottleneck.

[0025] A further purpose of the present invention is that of indicating a corking machine operating both in a normal environment and in a sterile and controlled environment, which is, furthermore, easy to actuate, safe and relatively cost-effective, also as far as the limited management and maintenance costs, with respect to

conventional corking machines, are concerned.

[0026] These and other purposes are accomplished, in the invention, by realizing a corking machine operating both in a normal environment and in a sterile and controlled environment, according to claim 1, to which we refer for the sake of brevity.

[0027] Further characteristics and advantages of a corking machine, according to the invention, shall become clearer from the following description, given as an example and not for limiting purposes, referring to the attached drawings, in which:

- figure 1 is a schematic front view of a corking machine according to the invention;
- figure 2 is a view from below of an intermediate or interface element, mounted in contact with the rotating platform of the corking machine of figure 1, according to the present invention;
- figure 2A is a view from above of the interface according to figure 2, according to the invention;
- figure 3 is a view from above of a link block, mounted in contact with the intermediate element according to figures 2 and 2A, according to the present invention, and used for the steps of pre-evacuation and injection of inert gas in the corking machine;
- figure 4 is a first longitudinal section view of a portion of the corking machine according to figure 1, according to the invention, and represents, in particular, a section made along the line IV-IV of figure 5;
- figure 4A is an enlarged view of a detail of figure 4, according to an alternative embodiment of the illustrated supplying device;
- figure 5 is a section made along the line V-V of figure 4, according to the invention;
- figure 6 is a second longitudinal section view of a portion of the corking machine according to figure 1, according to the invention, and represents, in particular, a section made along the line VI-VI of figure 7;
- figure 7 is a section made along the line VII-VII of figure 6, according to the invention;
- figure 8 is a partial perspective view of a preferred example embodiment of a supplying device used in the corking machine of figure 1, according to the present invention;
- figure 9 shows an alternative embodiment of an enlarged detail of figure 6.

[0028] With reference to the figures mentioned, a corking machine for containers, in particular bottles, containing a drinking substance (milk, wine, fruit juice), is generically indicated with 10.

[0029] In a non-limiting example embodiment the corking machine 10 has a main body 11, which carried a vertical column 12, in which are contained the corks used during the corking procedure of containers, in particular bottles (one of them is generically indicated with

13 in figure 1).

[0030] Inside the body 11 of the corking machine 10 it is possible to define a zone 15, containing the actuation devices of the plunger 16 for introducing the cork 14 inside the bottleneck 13 and, in particular, an actuation cam 17, the alternate motion of which according to the direction D and the directions V1, V2 (indicated in figure 1) is correlated with the rotary motion of the supplying devices, which the bottle 13 draws up to for the corking operation, and with the advancing motion of the bottles.

[0031] At the bottom of the body 15 a rotating platform 18 is arranged, which has a series of supplying devices 30 inside, arranged circumferentially and at a predetermined distance from each other, the lower surface of which, schematically indicated with 19, is coplanar with the lower surface 20 of the rotating platform 18 and can have a hollowed seat 21 used for housing the walls of the bottleneck 13, during the corking operation, or of false bottles, during the cleaning and sanitization operations of the machine.

[0032] The rotating platform 18 can also have a series of gripping members suitable for gripping the corks 14, released one at a time by the feeder column 12, and for positioning them between the jaws of the compression monoblock 18A, which clasps them so that the descending movement of the plunger 16 allows its introduction into the bottle 13.

[0033] According to the present invention, it is foreseen to use a fixed framework 22, integral with the corking machine 10, comprising a support arm 31 and a pneumatic piston or stem 23, integral with the arm 31, at the top of which an anti-rotation lever 45 is foreseen.

[0034] The framework 22 is extremely close to the rotating platform 18, so that the arm 31 can be used, through the interposition of a hinge, for the positioning or the removal of the vacuum/gas/vacuum link block 46.

[0035] In particular, according to the invention, the link block 46, which is usually suitable for allowing the carrying out of the steps of pre-evacuation and injection of inert gas into the bottle, is made to be part of a shaped multi-layer structure, made up of a further intermediate or interface element 47, positioned above the link block 46, which makes contact with the lower surface 20 of the platform 18.

[0036] Figures 2 and 2A show in detail two views of the intermediate or interface element 47, whereas figure 3 is a view from above of the link block 46; moreover, link block 46 and interface 47 advantageously and preferably take up an arched structure like the one represented in the aforementioned figures.

[0037] In practice, the interface 47 has two parallel slots 29 at the top, having a certain depth; moreover, the lower surfaces of such slots 29, furthermore, foresee the presence of a series of through holes 35, which put the lower surface 20 of the platform 18 in communication with the link block 46.

[0038] The slots 29 are distributed alternately on con-

centric circumferential arcs and have predetermined lengths.

[0039] As shown in detail in figure 2, the lower surface of the intermediate or interface element 47 has a series of stop pins 27, suitable for being inserted inside seats 24, formed, in corresponding positions, on the link block 46, and a gasket 28.

[0040] In such a way, the interface 47, which has a geometric and dimensional configuration substantially similar to those of the link block 46, can perfectly overlap said link block 46; following such an overlap, the slots 29 of the interface 47 are overlapped and parallel to the respective slots 25 of the link block 46, which, moreover, are formed at concentric circumferential arches parallel to the arches defined on the upper surface of the interface 47 and cover suitable limited portions of the upper surface of the link block 46 (as clearly shown in figure 3).

[0041] The aforementioned slots 25 also have, on the base, respective holes 36, which are positioned, with overlapping completed, at the holes 35 of the slots 29.

[0042] From this results a two-layer element, consisting of the perfect overlapping of link block 46 and interface 47, fixed to the corking head and able to be actuated from the outside, moving towards or away from the rotating platform 18, by means of the pneumatic piston or actuator 23.

[0043] Due to the relative motion of the rotating platform 18, it follows that the upper surface of the interface 47 slides on the lower surface 20 of the same platform 18.

[0044] The link block 46 foresees, according to known embodiments, two attachments, indicated with 32 and 33 in figures 4 and 6, having varyingly distributed gaskets associated with respective ducts 26, 43, which usually allow different vacuum/gas/vacuum cycles to be carried out for better conservation of the product, in particular wine, contained in a bottle.

[0045] Moreover, according to the present invention, the use of the intermediate or interface element 47 also allows such ducts 26, 43 to be used to carry out a complete sanitization of the inner parts of the corking machine. In particular, the delivery duct 26, usually used for the injection of inert gas into the bottleneck 13, allows an operation of injection of sanitization liquid to be carried out for the complete cleaning of the inner parts of the rotating platform 18 and, more specifically, of the portion adjacent to the seat 21 of the supplying device 30 and immediately facing the compression monoblock 18A of the corks 14.

[0046] In the same way, the duct 43, usually connected to a suction pump suitable for creating the vacuum in the zone adjacent to the seat 21 of the supplying device 30, constitutes a return route for the sanitization liquid.

[0047] Therefore, thanks to the particular configuration of the slots 29 of the interface 47, which communicate with the slots 25 of the vacuum/gas/vacuum link block 46 through the respective holes 35, 36, it is pos-

sible to put the circuit of injection of inert gas in communication with the pre-evacuation circuit (circuits which do not communicate during the normal operation of the corking machine), allowing the flow of the sanitizing liquid, which would otherwise be impossible.

[0048] The sequence represented in figures 4-7 exhaustively justifies that which has just been stated.

[0049] In fact, both in the configuration illustrated in figures 4, 5 and in that shown in figures 6, 7, thanks to the particular arrangement taken up by the slots 25, 29 and by the holes 35, 36 present on the link block 46 and on the interface 47, the ducts 26, 43 are always in communication with the recess 34, foreseen inside the platform 18, where the sanitizing liquid can flow, injected inside the machine and discharged according to the washing flows indicated, respectively, with arrows F and F1.

[0050] The configuration illustrated in figures 4 and 5 refers to a moment in time in which the lower seat 21 of the supplying device 30 moves at the central slot 25 of the link block 46; in such a case, the central holes 35, 36 put the slot 29 of the interface 47 in communication with the slot 25 of the vacuum/gas/vacuum link block 46 normally used for the injection of inert gas.

[0051] In such a configuration, the injection of sanitization liquid takes place through the inert gas circuit of the link block 46 and, in particular, by means of the duct 26.

[0052] Figures 6 and 7 refer to a condition according to which the supplying device 30, thanks to the relative motion with respect to the platform 18, is positioned at the side slots 25 of the link block 46; in such a case, the slot 29 of the interface 47 communicates, through the respective communication holes 35, 36, with the pre-evacuation circuit of the vacuum/gas/vacuum link block 46, which constitutes the return route of the sanitizing liquid previously injected inside the recess 34 of the platform 18.

[0053] The sanitizing liquid is then discharged through the duct 43; it is also foreseen to use a intercept and deviation valve, which deviates the sanitizing liquid in outlet, so that it does not come into contact with the vacuum pump of the pre-evacuation circuit of the vacuum/gas/vacuum link block 46.

[0054] Finally, in order to ease the sanitization operation and to avoid the falling, by gravity, of the sanitizing liquid inside the bottle 13 during the washing operations, it is foreseen to realize the supplying device 30 in a special way (see, in particular, regarding this, figures 4, 6 and 9).

[0055] In practice, according to a first preferred example embodiment (which can be seen in detail in figure 9), the centering cone is replaced by a cup or false bottle 49, with which a containment body 39 is associated, mounted, through an attachment screw 44, at the bottom of a closing plate 48; in such a way, the cup 49 is positioned immediately in contact with the rapid attachment ring nut 50, mounted, in turn, inside the body 41.

The supplying device 30 of figure 8 can also have two possible radial sealing zones, foreseen in a position adjacent to the cup 49 and, in particular, either in an inner portion (zone indicated with 38 in figures 4 and 6) or in a portion immediately facing the body 39 (zone indicated with 40 in figure 9), so that the sanitizing liquid can flow above the cup 49 circulating in the inlet and outlet ducts 42.

[0056] In alternative embodiments with respect to that which has been described above, the closing plate 48 can be associated with the cup 49, through a dual-function gasket 45, so as to obtain a centrally sealed version of the supplying device 30 (see, in particular, the detail of figure 4A); in this case, the gasket 45 has a sealing function (so that the washing liquid cannot penetrate from the seat 37 inside the bottle 13) and has a predetermined fracture in the case in which there is an error in adjustment of the corking plunger 16.

[0057] The centrally sealed version described indeed requires that the corking plungers 16 be set back so as not to interfere with the plate 48.

[0058] From the description which has been made the characteristics of the corking machine operating both in a normal environment and in a sterile and controlled environment, which is the object of the present invention are clear, just as the advantages are also clear.

[0059] Finally, it is clear that numerous other variants can be brought to the corking machine in question, without for this reason departing from the novelty principles inherent to the inventive idea, just as it is clear that, in the practical embodiment of the invention, the materials, the shapes and the sizes of the illustrated details can be whatever according to the requirements and they can be replaced with others which are technically equivalent.

Claims

1. Corking machine (10) operating both in normal environments and in sterile and controlled environments, of the type comprising a feeder (12) of corks (14) and transportation and insertion means of said corks (14) into the mouth of containers, in particular bottles (13), said machine also comprising at least one rotating platform (18), which carries a series of supplying devices (30), suitable for the positioning of respective bottles (13) during a corking step, said platform (18) being associated with a shaped link block (46), which, in turn, is connected, through first slots (25), to delivery and return ducts (26, 43) for the actuation of steps of pre-evacuation from the inside of the bottle (13) and steps of injection of inert gas, in order to keep the drinking product contained in the bottle (13) through time, **characterized in that** between said platform (18) and said link block (46) is placed at least one intermediate or interface element (47), also shaped, comprising a series of

second slots (29) respectively communicating with said first slots (25) of said link block (46), so that said first (25) and second slots (29) define continuous communication channels to which said delivery and return ducts (26, 43) attach, in order to make the sanitation liquid, suitable for cleaning the inner portions of the corking machine, flow discharge.

2. Corking machine (10) according to claim 1, **characterized in that** said link block (46) is associated, through a support arm (31), with a fixed framework (22), integral with the corking machine (10), comprising a pneumatic actuator (23) for moving said arm (31).
3. Corking machine (10) according to claim 1, **characterized in that** said interface (47) has two of said second slots (29) at the top, parallel to each other and having a predetermined depth, the lower surfaces of which further foresee the presence of a series of through holes (35), which put said platform (18) in communication with said link block (46).
4. Corking machine (10) according to claim 3, **characterized in that** said second slots (29) are alternately distributed on concentric circumferential arches and have predetermined lengths.
5. Corking machine (10) according to claim 1, **characterized in that** said interface (47) has a series of stop pins (27) at the bottom, suitable for being inserted into seats (24), formed, in corresponding positions, on said link block (46), and at least one gasket (28), said interface (47) being shaped similarly to said link block (46) and being suitable for overlapping said link block (46), so that said second slots (29) of the interface (47) are overlapped and parallel to said respective first slots (25) of said link block (46).
6. Corking machine (10) according to claim 4, **characterized in that** said first slots (25) of the link block (46) are formed at concentric circumferential arches parallel to said circumferential arches defined on said interface (47) and cover at least one portion of upper surface of said link block (46), said first slots (25) foreseeing, on the base, respective holes (36), which are positioned, overlapping link block (46) and interface (47) carried out, at said through holes (35) formed inside said second slots (29).
7. Corking machine (10) according to claim 1, **characterized in that** said delivery and return ducts (26, 43) are usually used for the injection of inert gas and to create the vacuum inside said bottles (13), so that communication can be established between the circuits of injection of inert gas and of pre-evacuation of said link block (47), allowing a flow of the

sanitizing liquid.

8. Corking machine (10) according to claim 7, **characterized in that** said delivery and return ducts (26, 43) communicate with a recess (34), foreseen inside said platform (18), where said sanitizing liquid flows, said liquid being deviated in outlet by means of an intercept valve, so that it does not come into contact with said pre-evacuation circuit of the link block (46).
9. Corking machine (10) according to claim 1, **characterized in that** said supplying device (30) comprises, at a centering cone, a cup or false bottle (49), suitable for receiving a containment body (39), mounted in position adjacent to a rapid attachment ring nut (50) inside the body (41) of the supplying device (30), said containment body (39) being associated with said cup (49) through the interposition of a double-sealing gasket (45).
10. Corking machine (10) according to claim 9, **characterized in that** said supplying device (30) has, alternately, two possible radial sealing zones, foreseen in positions adjacent to said body (41) of the supplying device, so that the sanitizing liquid can flow above said cup (39) and escape, through inlet and outlet ducts (42).
11. Corking machine (10) according to claim 9, **characterized in that** a closing plate (48) is associated with said cup (49), through a dual-function gasket (45), so as to obtain a centrally sealed supplying device (30), said gasket (45) having a liquid-tight sealing function and having predetermined fractures in the case of an error in adjustment of said corking plunger (16), which, in such a case, is set back so as not to interfere with said closing plate (48).

Fig.1

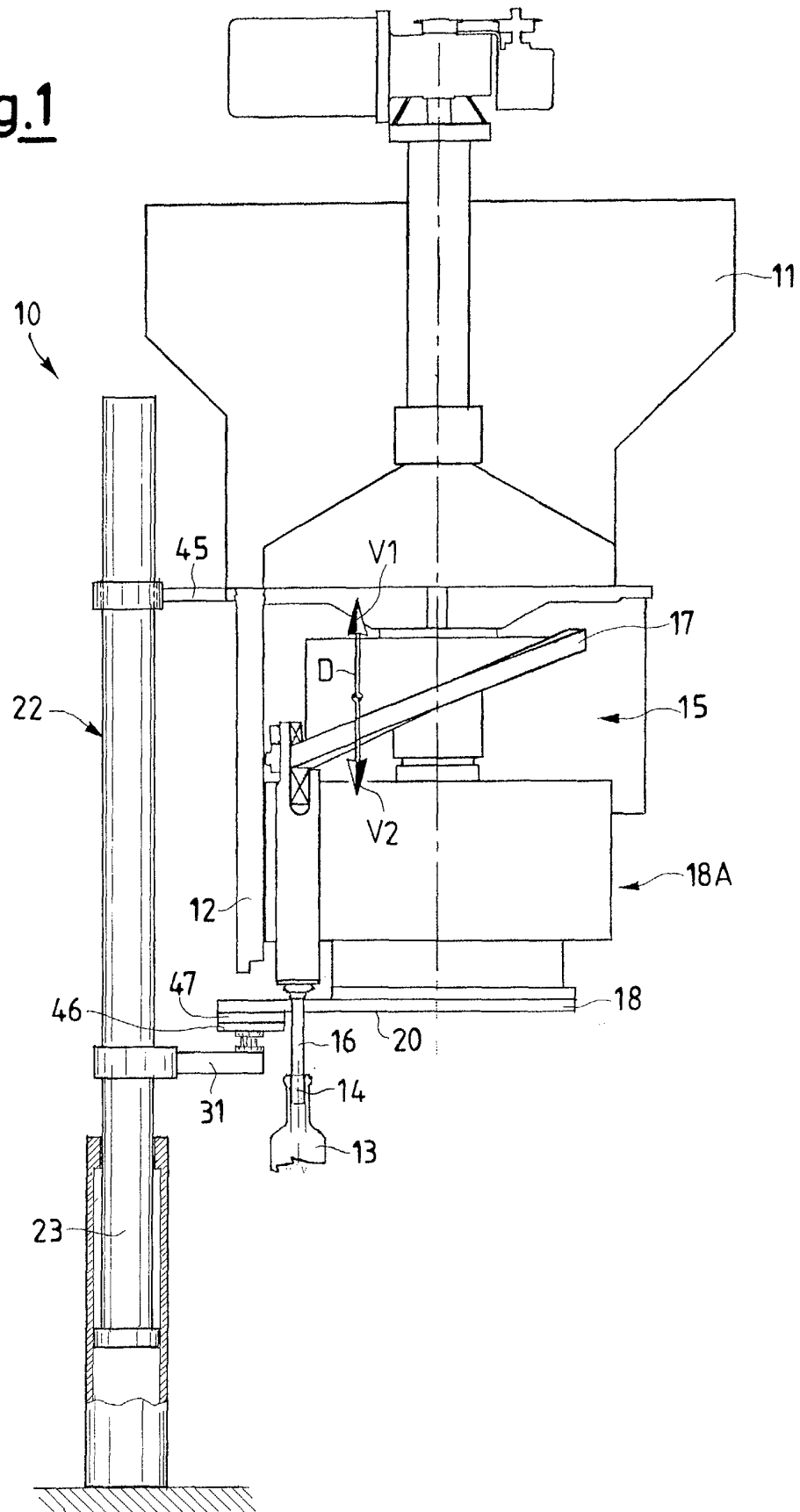


Fig.2

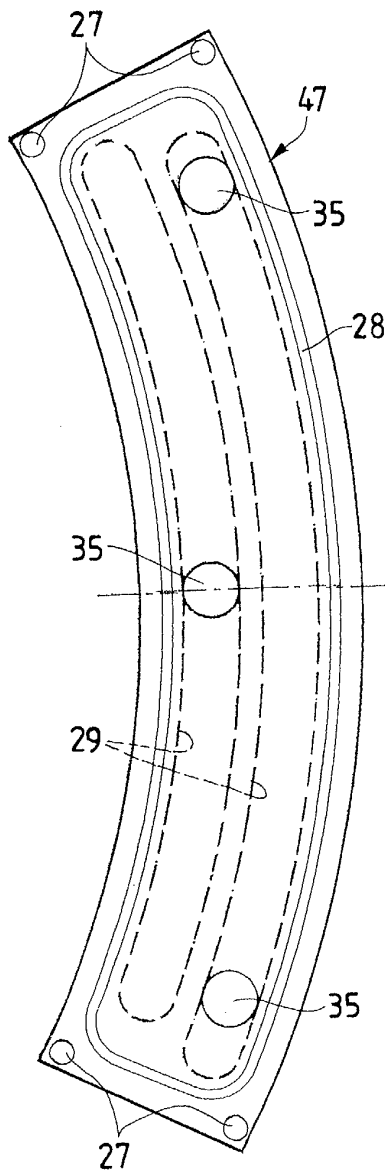


Fig.2A

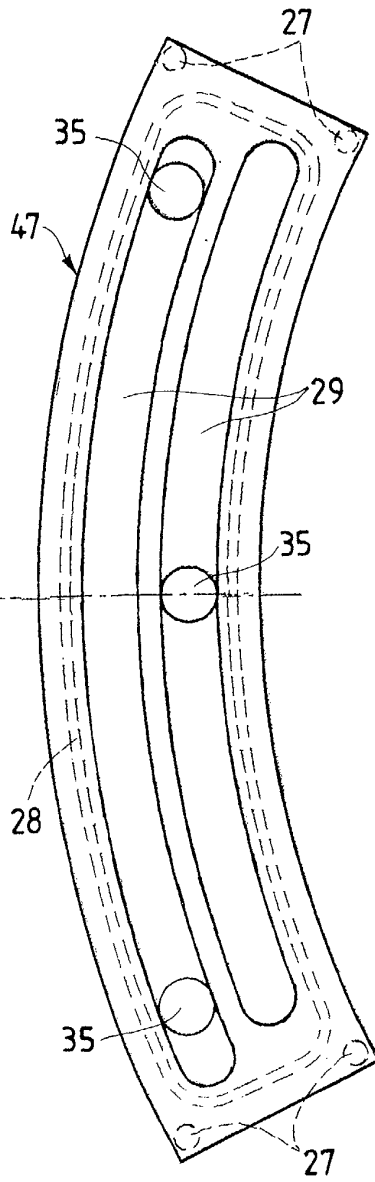
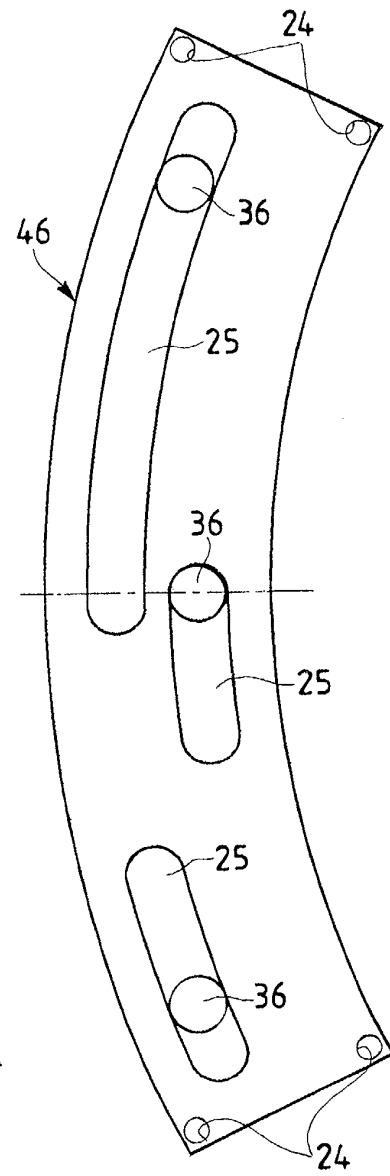


Fig.3



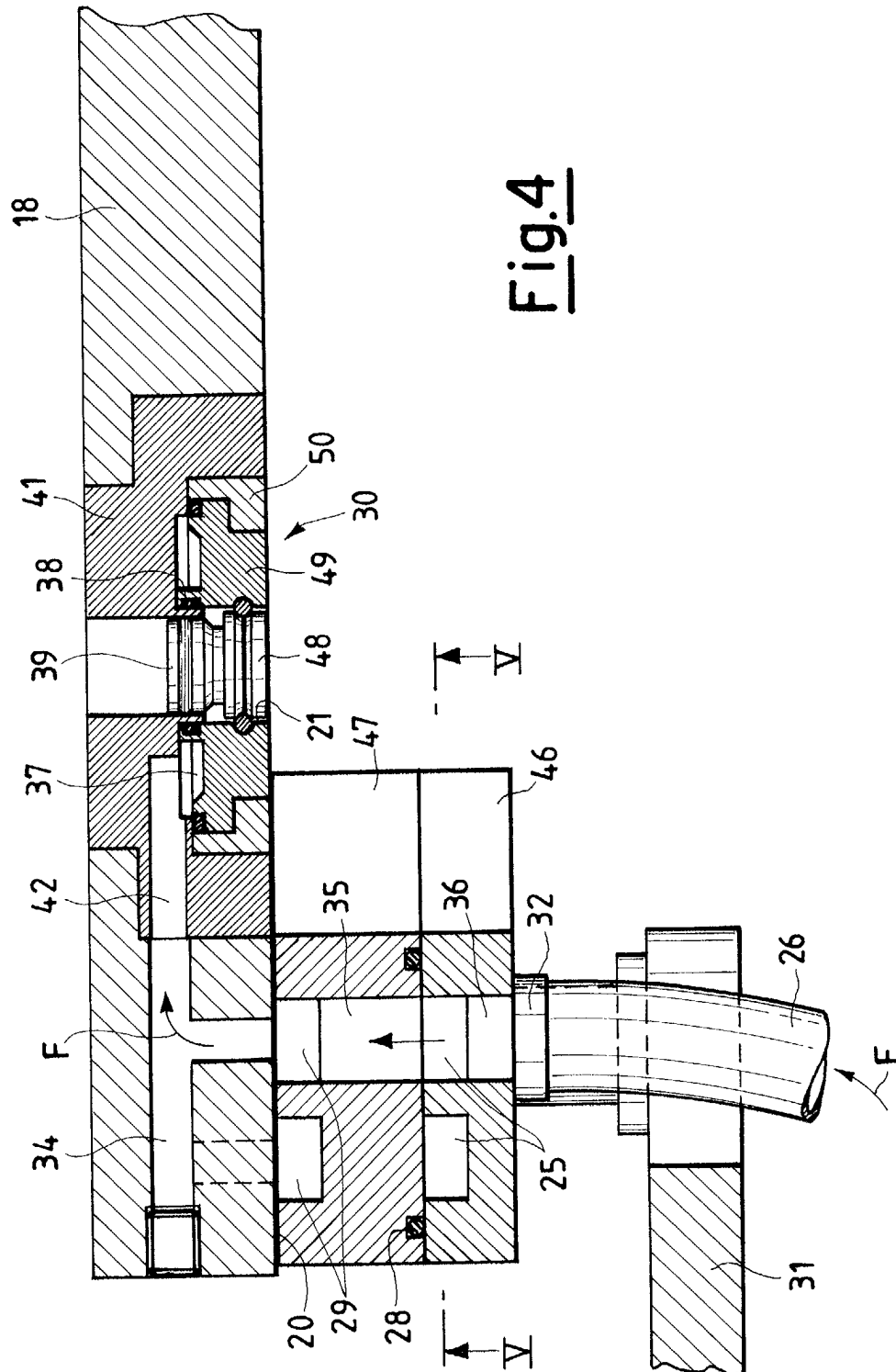


Fig.4

Fig. 4A

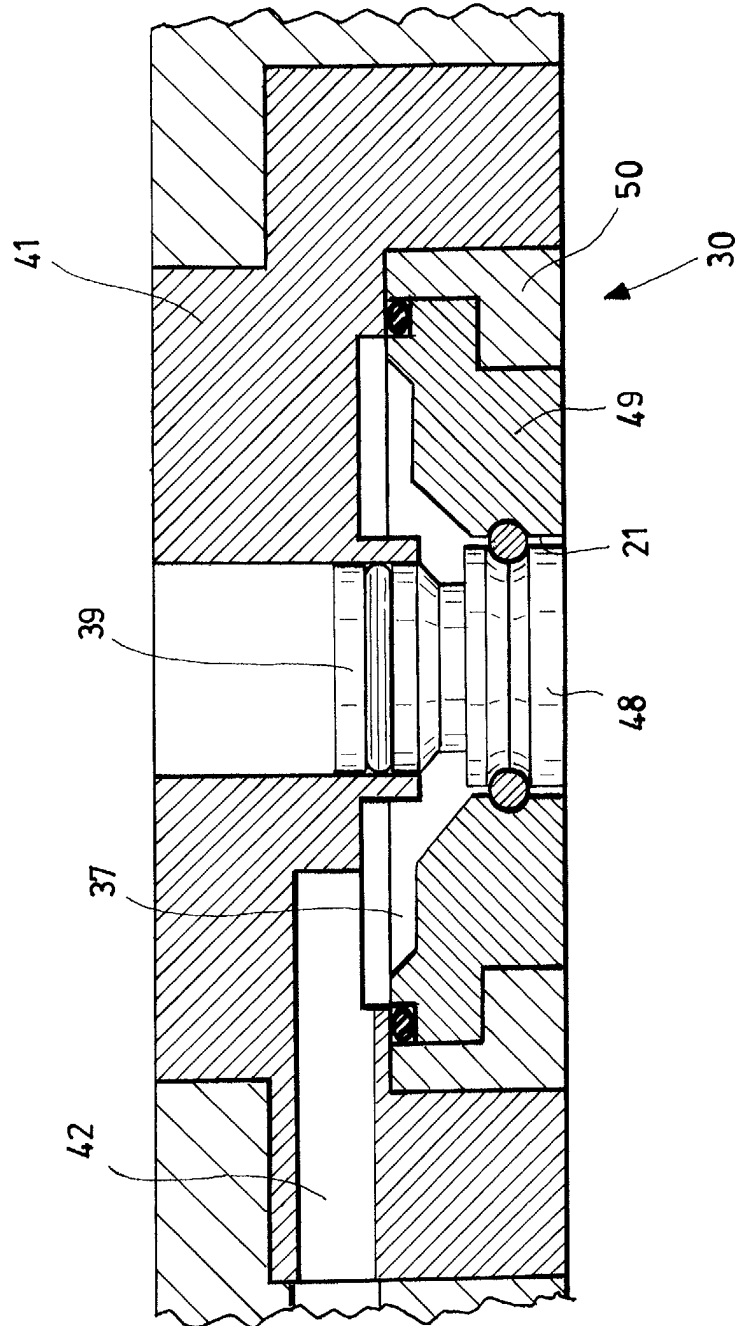
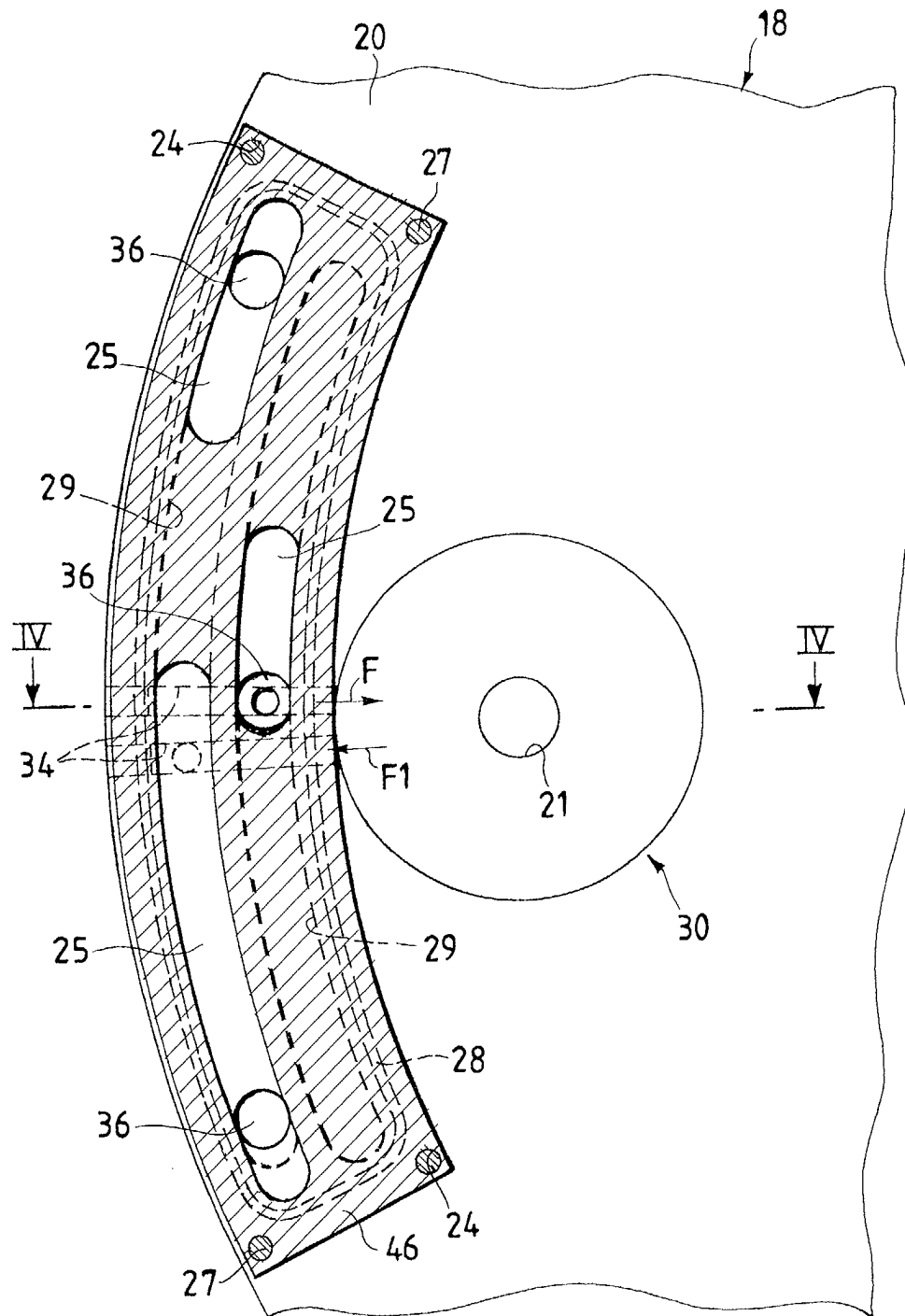


Fig.5



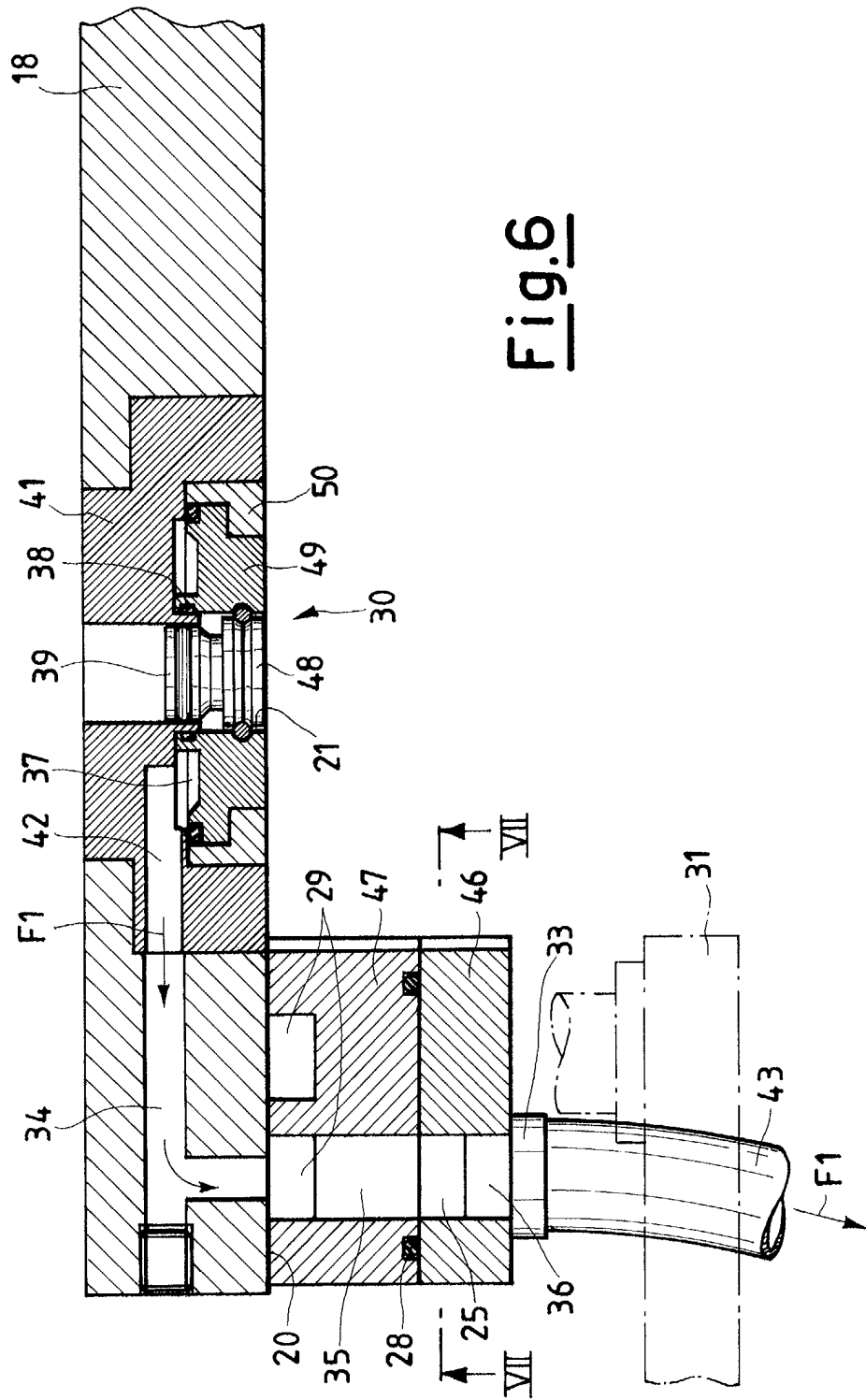


Fig. 6

Fig.7

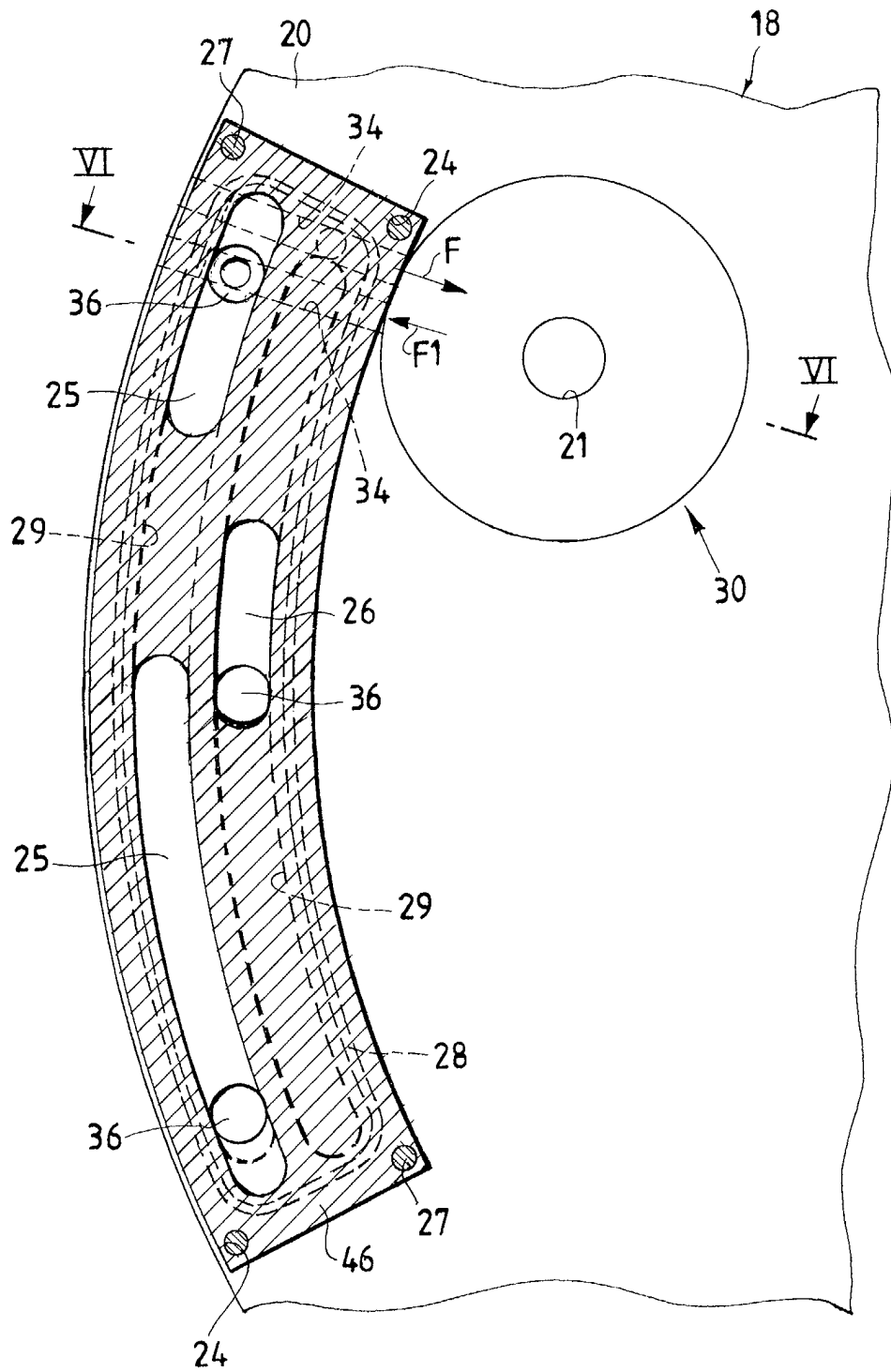


Fig.8

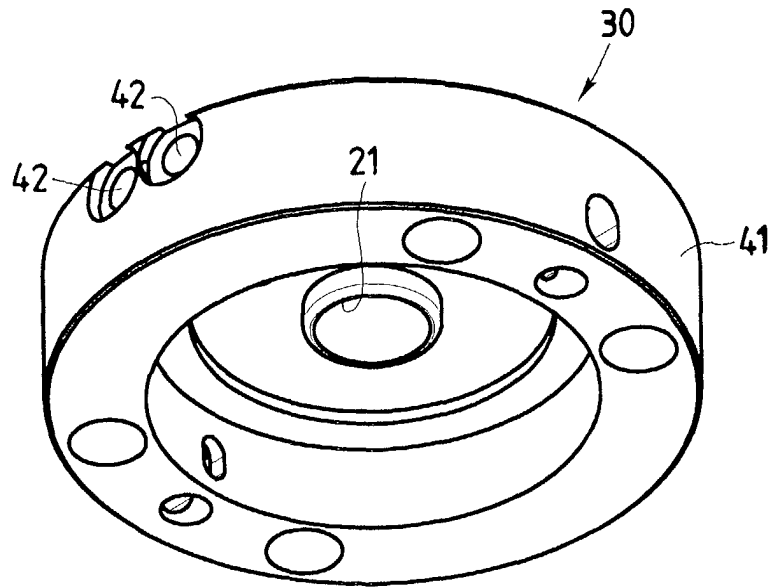
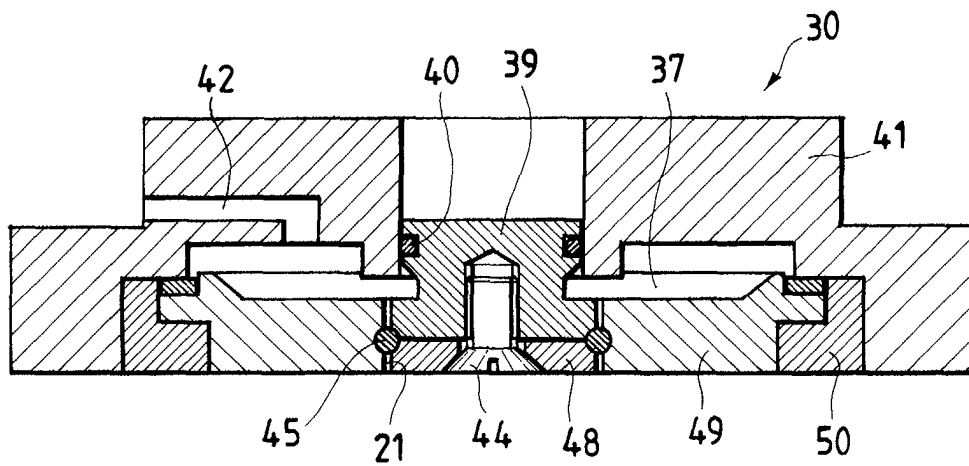


Fig.9





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 03 07 6906

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	EP 1 193 212 A (STONE ETS) 3 April 2002 (2002-04-03) * abstract; figure 6 *	1	B67B1/04
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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 29 August 2003	Examiner Martínez Navarro, A.
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