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(11) **EP 1 083 027 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
14.03.2001 Bulletin 2001/11

(51) Int. Cl.⁷: **B24B 7/22, B24B 41/047,
B24B 55/02**

(21) Application number: **00119540.3**

(22) Date of filing: **07.09.2000**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **10.09.1999 IT VI990188**

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(54) **Polishing device with coolant fluid dispenser, particularly for marble, granite, ceramics, porcelain, stoneware and the like**

(57) A polishing device with improved distribution of the coolant fluid, particularly for marble, granite, ceramics, stoneware, porcelain stoneware and the like, includes a shaft (10) which is kinematically connected to a motor means (13) and performs an axial translatory motion, and a plurality of polishing bodies (11) at at least one of the ends of the shaft (10); its particularity consists of the fact that it includes a means (15) for distributing the coolant fluid which is associated with the shaft (10) and is arranged proximate to the plurality of polishing bodies (11). The invention fully solves the problems observed in conventional devices, since it is able to actually convey the fluid in the working area of the polishing bodies (11), differently from conventional polishing devices, in which the fluid falls centrally without being directed toward the working regions where it is needed.

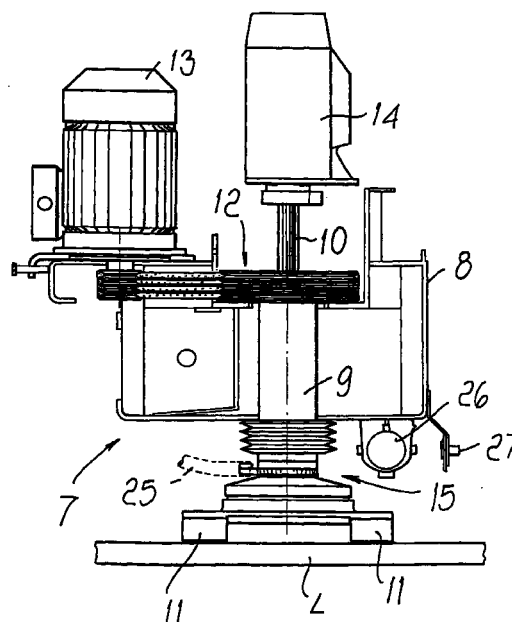


Fig. 1

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Description

[0001] The present invention relates to a polishing device with improved coolant fluid dispenser, particularly for marble, granite, ceramics, stoneware, porcelain stoneware and the like.

[0002] It is well-known that specific devices, known as polishing machines, are used in the industry of stone-like materials to polish slabs. These machines are substantially constituted by a conveyor belt which feeds the slabs, by a strong frame which is arranged above the belt and by a plurality of polishing devices, generically known as "polishing heads", which are associated with the bridge of the frame. In summary, the devices are formed by a vertically arranged hollow shaft which bears, at its lower end, a plurality of abrasive bodies. More specifically, the shaft is rotatably suspended from the bridge, is connected by means of a plurality of belts to a motor means and performs a vertical translatable motion by virtue of the action of a hydraulic movement means, in order to adapt the position of the abrasive bodies to the height of the slab to be polished. Each polishing device of these machines also has an apparatus for dispensing a fluid, specifically water, which is necessary first of all in order to cool the abrasive bodies and, secondly, in order to clean the slabs and wash the conveyor belt on the side on which the slabs rest. The dispenser system is composed of a main pipe, which runs approximately above the polishing devices, and from which a plurality of secondary pipes branch off at regular intervals and connect to each polishing device, by means of a distribution unit, arranged at the upper end of the shaft. The distribution unit is generally of the lateral-inlet type, provided with a tubular segment which is in turn inserted in the cavity formed longitudinally in the shaft. Accordingly, the fluid enters from the secondary pipe into the distribution unit, runs along the tubular segment, descends by gravity along the cavity of the shaft and, at the end of the cavity, distributes in the area delimited by the abrasive bodies of each device.

[0003] A first drawback that can be observed in this type of dispensing of the coolant fluid is the fact that some parts of the dispenser unit, such as the packed gaskets interposed between the shaft and the tubular segment, tend to wear rather quickly, due to the many aggressive agents that are present in this kind of process. The wear of these parts accordingly entails frequent interventions for maintenance, adjustment and replacement, which are rendered demanding and expensive also by the fact that the dispenser unit is arranged in a poorly accessible position. In particular, replacement of some of the parts of the dispenser unit entails the disassembly and reassembly of other parts of the polishing device which are not directly involved in the dispensing of the fluid. Moreover, the seepage of water, to which packed gaskets is often subject, causes the undesirable consequence of flooding the bridge of

the machine, compromising the integrity and functionality of the electrical connections.

[0004] A second drawback is that the fluid descends centrally into the area formed by the abrasive bodies as a whole and therefore does not wet them directly.

[0005] The aim of the present invention is to overcome the drawbacks of the cited prior art. An object of the invention is to provide a polishing device with improved dispensing of the coolant fluid, particularly for marble, granite, ceramics, stoneware, porcelain stoneware and the like, which allows to direct the fluid directly onto the abrasive bodies and therefore facilitate their polishing action on the surface of the slabs.

[0006] A further object of the invention is to provide a polishing device with significantly improved structure, distribution of its parts and performance, and therefore reduced frequency and difficulty of maintenance interventions and any component replacement interventions.

[0007] Another object of the invention is to provide a polishing device at prices which are competitive with respect to currently commercially available polishing heads.

[0008] This aim, these objects and others which will become better apparent hereinafter are achieved by a polishing device with improved coolant fluid dispenser, particularly for marble, granite, ceramics, stoneware, porcelain stoneware and the like, including a shaft which is kinematically connected to a motor means and performs an axial translatable motion, and a plurality of polishing bodies at at least one of the ends of the shaft, characterized in that it includes a means for distributing the coolant fluid which is associated with the shaft and is arranged proximate to the plurality of polishing bodies.

[0009] Further characteristics and advantages of the invention will become better apparent from the description of a preferred but not exclusive embodiment thereof, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is a side view of a polishing device according to the invention;

Figure 2 is a partially sectional detail view, taken at the means for dispensing the coolant fluid of the device of Figure 1;

Figure 3 is a top view of a portion of the distribution means of the polishing device according to the invention;

Figure 4 is a sectional side view, taken along the plane IV-IV of Figure 3, of the portion of the dispenser means;

Figure 5 is a top view of another portion of the dis-

penser means of the polishing device according to the invention;

Figure 6 is a sectional side view, taken along the plane VI-VI of Figure 5, of the above other portion of the dispenser means.

[0010] With reference to the accompanying figures and initially to Figure 1, the polishing device with improved coolant fluid dispenser, particularly for marble, granite, ceramics, stoneware, porcelain stoneware and the like, generally designated by the reference numeral 7, is used on a polishing machine (not shown) which is per se known. The device is anchored to an approximately bridge-shaped frame 8 which is arranged above a conveyor belt (not shown) which carries the slabs (L) of marble or the like to be polished. With reference to Figures 1 and 2, the polishing device 7 is constituted, in a per se known manner, by a sleeve 9 which is rigidly connected to the bridge 8 and accommodates a vertical shaft 10 which supports, at its lower end, a plurality of polishing bodies 11. The shaft 10 is kinematically connected, by virtue of a belt-type connection generally designated by the reference numeral 12, to a motor means 13 which is arranged laterally to the polishing device 7 and performs an axial translatable motion in order to vary the working height of the polishing bodies 11 with respect to the slabs (L), by virtue of the intervention of a linear motion means (not shown) which is accommodated in the enclosure 14 arranged above the shaft 10. The polishing device 7, according to the invention, comprises a coolant fluid dispenser means, which is generally designated by the reference numeral 15 and is located in the immediate vicinity of the polishing bodies 11. In greater detail, the fluid dispenser means 15 is arranged between the lower end of the sleeve 9 and the cross 16 that supports a disk-like plate 17 which in turn supports the plurality of radially arranged polishing bodies 11. With reference also to Figures 3 to 6, the dispenser means 15 is substantially composed of two parts, respectively an annular body 18, which surrounds the shaft 10, rigidly coupled to the sleeve 9, and an annular plate 19, which is arranged so as to face the annular body 18 and is rigidly associated with the cross 16. The connection between the body 18 and the end of the sleeve 9 is provided by four slotted tabs 20, protruding from the outer edge of the face of the annular body 18 that lies opposite the one that faces the plate 19, and accommodate a corresponding number of screws which in turn are screwed into the lateral surface of the sleeve 9. The annular body 18 forms a toroidal chamber 21 for receiving the fluid which is provided with an inlet 22 for the fluid, which is formed in the lateral containment wall of the body 18, and with a plurality of outlets 23, which are formed in the face of the body 18 that is directed toward the annular plate 19. A tubular segment 24, of limited length, is associated with the inlet 22 and is in turn connected to a flexible hose 25 which is connected

to the main rigid pipe 26 for the delivery of the fluid. The flexible hose 25 is provided with a valve means 27 which allows to adjust the flow-rate of the fluid according to the type of work and to the many factors involved in it. It should be noted that, by virtue of the particular arrangement of the dispenser means 15, the main pipe 26 runs alongside the polishing devices 7, differently from conventional machines, in which the pipe is necessarily arranged above them. The outlets 23, which are approximately elliptical, are formed so as to be evenly spaced in angular terms by approximately one eighth of a round angle from each other, on an annular portion 28 which protrudes by a limited extent from the face of the body that is directed toward the plate 19. The plate is shaped so as to surround the annular portion 28, once it is coupled to the body 18, so as to prevent seepages and lateral leaks of the fluid that leaves the outlets 23. In turn, the annular plate 19 is provided with passage openings 29 for the coolant fluid; their dimensions are approximately equal to those of the outlets 23, their number is half the number of the outlets and they are evenly spaced in angular terms by approximately a quarter of a round angle. The passage openings 29 are separated by countersunk holes 30 which accommodate the screws for connecting the plate 19 to the cross 16. Accordingly, the plate 19 constitutes the completion of the annular body 18 so as to form the dispenser means 15 and at the same time acts as a gasket. For the above reason, the plate is preferably made of a plastic material such as Teflon. Each passage opening 29 of the plate 19 is matched by a similar hole 31, formed axially in the peripheral region of the cross 16, for the discharge of the coolant fluid through a cylindrical conveyor 32 into the work area defined by the polishing bodies 11.

[0011] The operation of the device is described hereinafter with reference to the accompanying figures. The preliminary operations for actuating the polishing machine provided with the polishing devices 7 with improved coolant fluid dispenser, are performed as in conventional machines. Depending on the type of material to be polished, the flow-rate of coolant fluid is adjusted by acting on the valve means 27. At this point, assuming that a slab (L) is being worked as shown in Figure 1, the fluid, through the flexible hose 25 and the tubular segment 24, reaches the inlet 22 and enters the chamber 21, filling it. Part of the fluid contained in the chamber 21 exits in succession through the outlet 23, the passage opening 29 and the hole 31, which at that time are axially aligned. After tracing this path, the fluid is distributed along the surface of the conveyor 32 and is discharged by centrifugal action in the immediate vicinity of the polishing bodies 11, at the interface between the bodies and the surface of the slab (L) being polished, as shown by the arrows of Figure 2.

[0012] In practice it has been observed that the described polishing device, with improved coolant fluid dispenser, achieves the intended aim and objects, being capable of actually conveying the fluid into the work

area of the polishing bodies, differently from conventional polishing devices, in which the fluid falls centrally without being directed toward the work areas where it is more necessary. Moreover, by virtue of the adoption of a dispenser means at the polishing bodies, the operations for maintenance and optional replacement of the components of the polishing bodies are quick and greatly facilitated.

[0013] Finally, for the same reason, both the delivery pipe and the branch-off pipes are arranged in easily accessible positions and are fully concealed within the body of the machine.

[0014] The device according to the invention is susceptible of numerous modifications and variations, within the scope of the appended claims.

[0015] All the details may be replaced with other technically equivalent elements.

[0016] In practice, the materials used, as well as the dimensions and the contingent shapes, may be any according to requirements.

[0017] 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 scope of each element identified by way of example by such reference signs.

Claims

1. A polishing device with improved coolant fluid dispenser, particularly for marble, granite, ceramics, stoneware, porcelain stoneware and the like, comprising a shaft (10) which is kinematically connected to a motor means (13) and performs an axial translatory motion, and a plurality of polishing bodies (11) at at least one of the ends of said shaft (10), characterized in that it comprises a coolant fluid dispenser means (15) which is associated with said shaft (10) and is arranged proximate to said plurality of polishing bodies (11).
2. The polishing device according to claim 1, characterized in that said dispenser means (15) is arranged between the end of the sleeve (9) that accommodates said shaft (10) and is directed toward said plurality of polishing bodies (11) and a cross (16) that supports the disk-like plate (17), which in turn supports said plurality of polishing bodies (11).
3. The polishing device according to one or more of the preceding claims, characterized in that said dispenser means (15) comprises an annular body (18) which surrounds said shaft (10) rigidly coupled to said sleeve (9) and an annular plate (19) which faces said annular body (18) and is rigidly associated with said cross (16).
4. The polishing device according to one or more of the preceding claims, characterized in that said annular body (18) forms a toroidal chamber (21) which accommodates said coolant fluid, said chamber having at least one inlet (22) for said coolant fluid which is formed in the side wall of said annular body and a plurality of outlets (23) for said coolant fluid which are formed in the face of said annular body (18) which is directed toward said plate (19).
5. The polishing device according to one or more of the preceding claims, characterized in that a tubular segment (24) is associated with said inlet (22) and is adapted to be connected to a flexible hose (25) which is in turn connected to a main rigid delivery pipe (26) for said coolant fluid.
6. The polishing device according to one or more of the preceding claims, characterized in that said outlets (23) are uniformly spaced along an annular portion (28) which protrudes in an annular fashion with respect to said face.
7. The polishing device according to one or more of the preceding claims, characterized in that said annular plate (19) is formed so as to accommodate and surround said protruding annular portion (28) of said annular body (18), preventing the lateral seepage of said coolant fluid.
8. The polishing device according to one or more of the preceding claims, characterized in that said annular plate (19) comprises a plurality of passage openings (29) for said coolant fluid, the extension of said passage openings being approximately equal to that of said outlets (23), said passage openings (29) being formed in a circular pattern and being spaced uniformly in a number which is equal to at least one half of said outlets (23).
9. The polishing device according to one or more of the preceding claims, characterized in that said annular plate (19) comprises holes (30) which accommodate a means for the detachable connection of said annular plate to said cross (16), the means being interleaved with said passage openings (29).
10. The polishing device according to one or more of the preceding claims, characterized in that said cross comprises a plurality of axial through holes (31) which are formed in the peripheral region in a number equal to said passage openings (29) of said annular plate (19), and in that it comprises a cylindrical conveyance device (32) into which said holes (31) lead, said conveyance device collecting and distributing to said plurality of polishing bodies (11) said fluid that arrives from said holes (31).

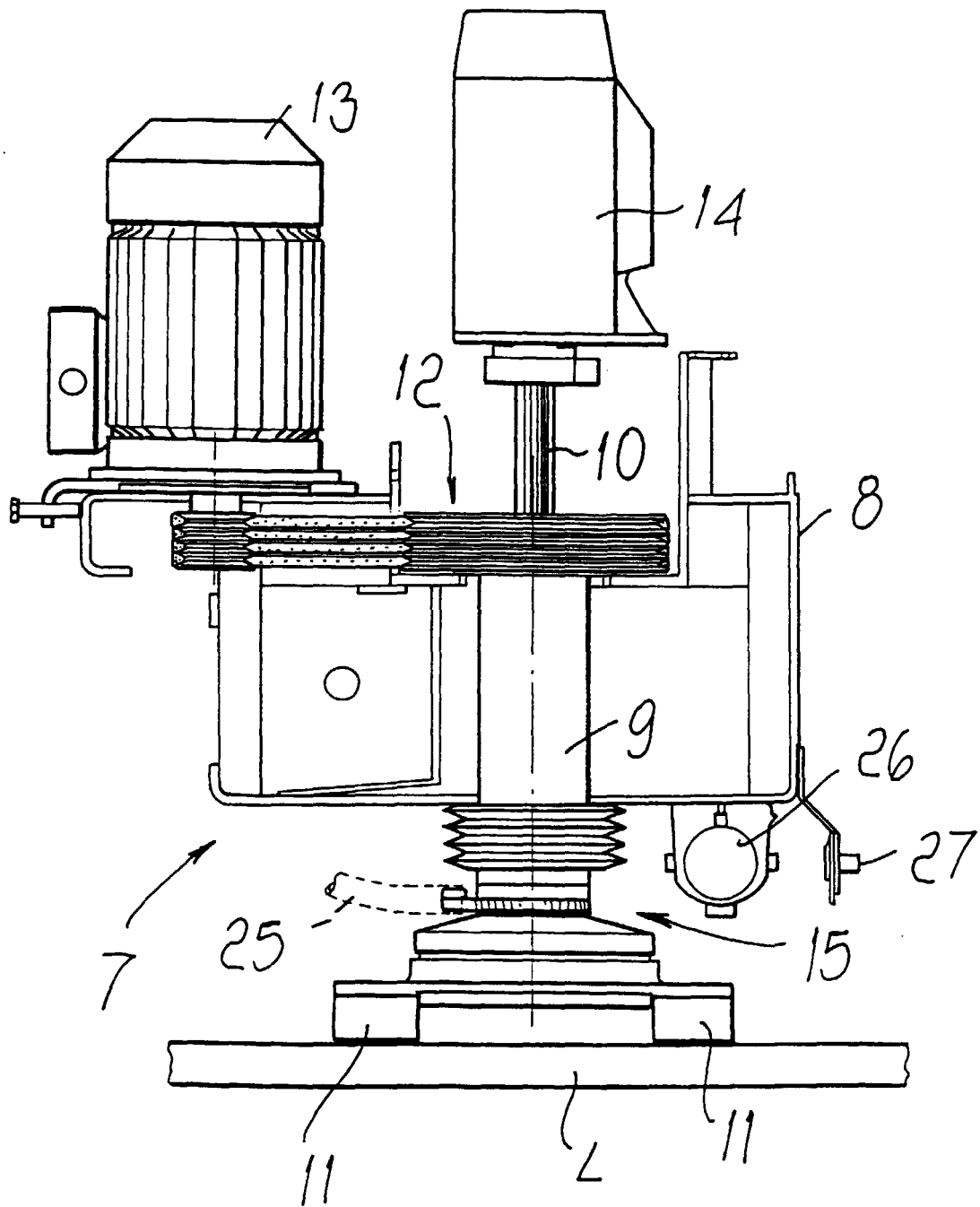


Fig. 1

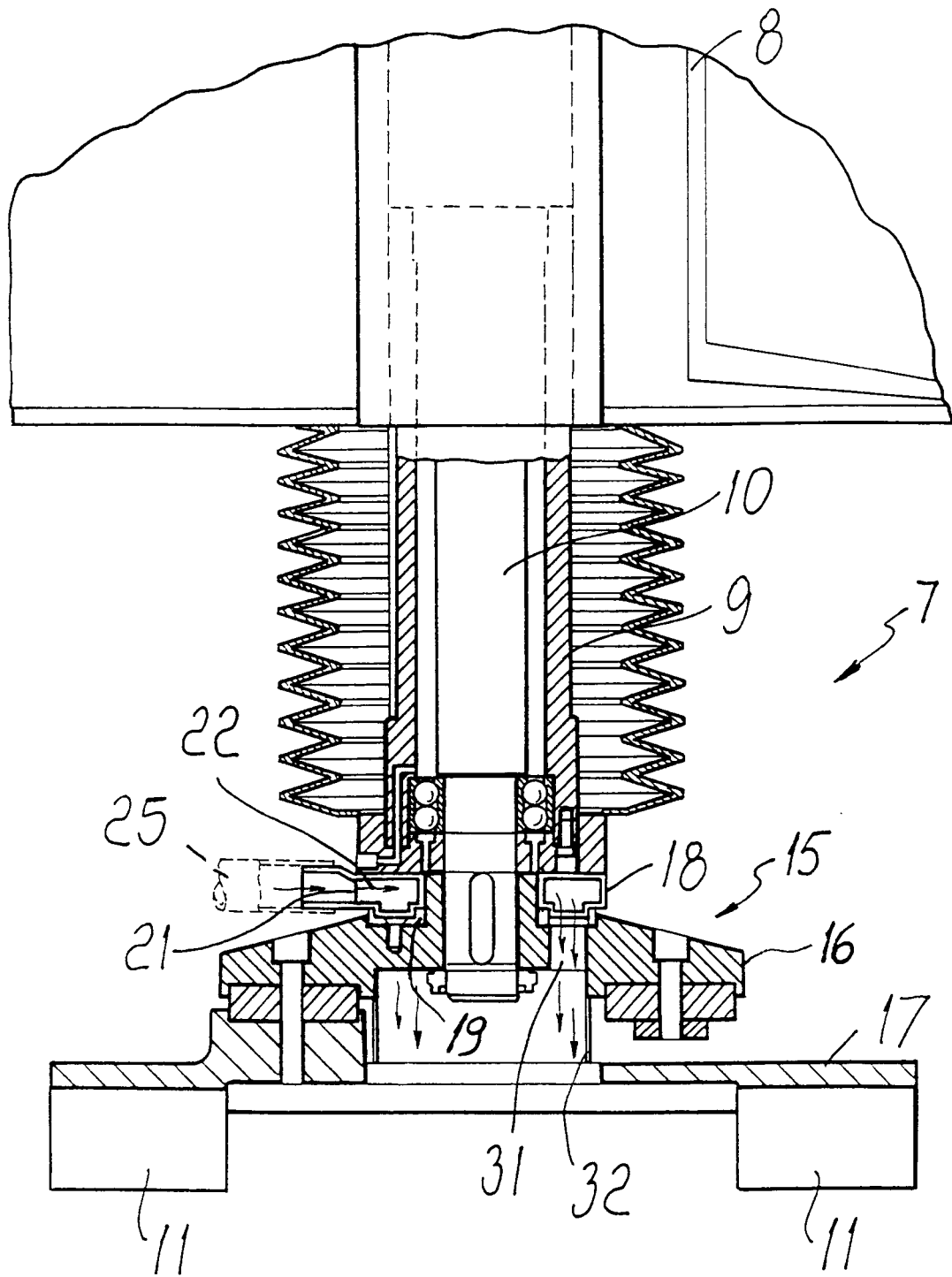


Fig. 2

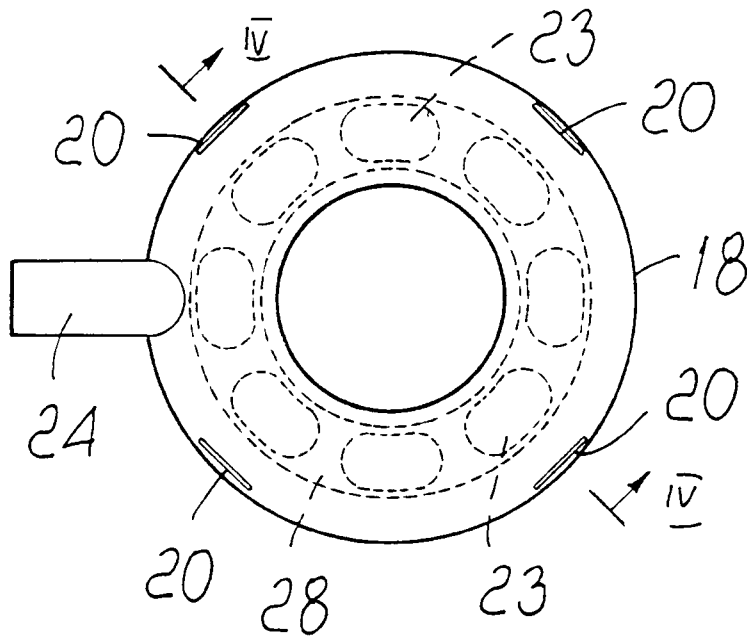


Fig. 3

Fig. 4

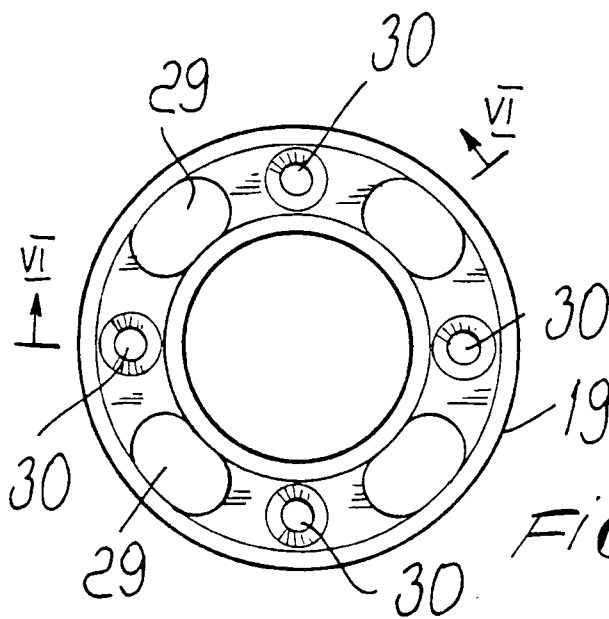
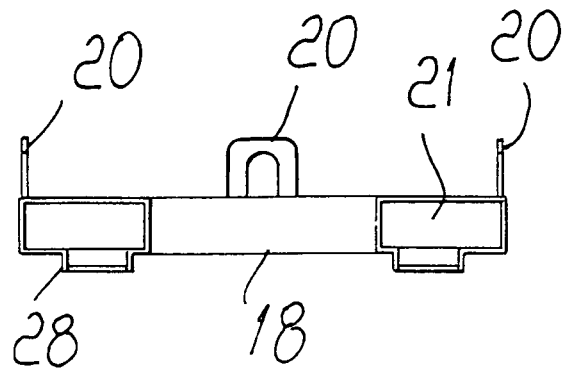


Fig. 5

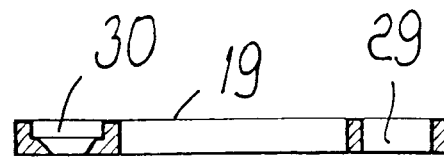


Fig. 6