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(11)

EP 1 270 498 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
02.01.2003 Bulletin 2003/01

(51) Int Cl.7: **B67C 3/00**

(21) Application number: **02380132.7**

(22) Date of filing: **21.06.2002**

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

(72) Inventor: **Gallardo Gonzalez, Antonio**
20280 Fuenterrabia (Guipuzcoa) (ES)

(74) Representative: **Carpintero Lopez, Francisco**
HERRERO & ASOCIADOS, S.L.
Alcalá, 35
28014 Madrid (ES)

(30) Priority: **22.06.2001 ES 200101460**

(71) Applicant: **Gallardo Gonzalez, Antonio**
20280 Fuenterrabia (Guipuzcoa) (ES)

(54) **Pipe for filling bottles and the like, with an incorporated cleaning device**

(57) The pipe, in addition to a retractable unit comprised of a tube (9), a ring (5) and a pneumatic membrane (3), which assembly may rise and descend to allow or prevent liquid passage through a diffuser (10), incorporates a pan (13) used for the automated cleaning of the pipe itself, which pan (13) is mounted such that it is coupled and uncoupled from the pipe automatically by means of a pneumatic cylinder (14) that is hinged between the base of the deposit (2) that contains the liquid and the pan (13), with the pipe having an enveloping sleeve (21) and an outer casing (22), the former being capable of moving upwards to push on the retractable unit, thus allowing the liquid to pass towards the chamber defined by the casing (22) and the pan (13) in the closed or coupled position of said pan, proceeding to the external and internal cleaning of the pipe. This upward push is effected by the pan (13) pushing on a bushing (23) mounted on the inner and bottom part of the enveloping sleeve (21).

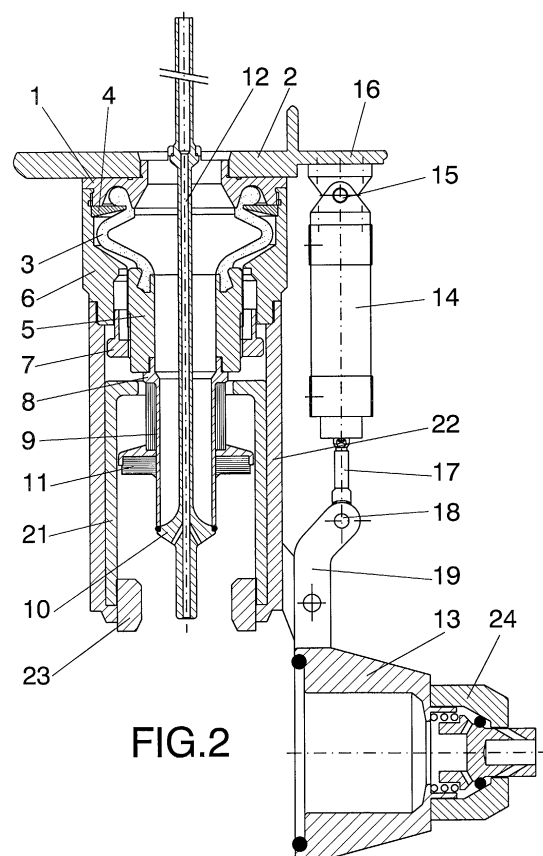


FIG.2

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Description

OBJECT OF THE INVENTION

[0001] The present invention relates to the field of machines for filling bottles and the like, and more specifically to the pipe used to fill the bottles directly, as well as to the means associated to said pipe that allow an automated cleaning of the pipes without having to assemble or remove any parts.

[0002] The object of the invention is to provide the bottle filling sector with a pipe that, in addition to efficiently filling bottles directly after coupling to their necks a diffuser defined on the pipe, also allows an automated cleaning of the pipe by incorporating a device that is an integral component of the pipe and that may occupy two positions, one allowing to use the pipe to fill bottles and one allowing to carry out the corresponding cleaning.

BACKGROUND OF THE INVENTION

[0003] Spanish Utility Model U 9401678, of the Applicant, describes a pipe for filling bottles applicable to machines provided with a revolving plate on which are placed a plurality of identical pipes placed vertically opposite mounting plates free to move upwards, and on which are placed the bottles for placing them opposite the aforementioned pipes.

[0004] The pipe described in said Utility Model U 9401678 has the characteristic of being coupled by a nut to the bottom of the liquid container, with the pipe including a retractable unit connected to a pipe in which the liquid falls towards the corresponding diffuser, which retractable unit includes an elastic membrane in the form of a double cone having a large inner diameter and with its top end housed in an annular cavity of the nut for attachment to the base of the container, with a washer trapped in said cavity by an enveloping casing, while attached by injection to the bottom end of said membrane is an inner bushing that is externally threaded onto a nut that acts as a stop for the axial motion of the aforementioned inner bushing.

[0005] Cleaning this type of pipes involves the use of a pan placed beneath each pipe, closing the liquid passage, and removing the pans at the end of the cleaning cycle to drain the cleaning liquid.

[0006] A pan-based cleaning system is described in Spanish Invention Patent P 9601027, wherein the pan is manually assembled and removed from the pipe, and incorporates on its bottom end a valve to allow cleaning the pipe by aspersion and immersion.

[0007] In any casing, the disadvantage of using pans to clean the pipes is that it is necessary to couple said pans to the pipes, which must be performed manually coupling one pan for each pipe, and then after the cleaning operation has finished each pan must be removed.

[0008] Considering that each bottle-filling machine has a great number of pipes, having to assemble and

remove each pan implies a great amount of work and considerable time.

[0009] However, systems are known in which the pans are placed under the pipes with a mechanically operated system, in which the pans are mounted on the pipe structure so that for the cleaning operation the pipes rise until a contact element associated to the pans meets a fixed stop of the machine structure, forcing the pan to swivel to be coupled to the pipes.

[0010] This system has the disadvantage that each pan-coupling means strikes the corresponding stop, so that a great number of collisions occur over time that eventually can lead to maladjustments or damage in the machine, as due to the large number of pipes included in each machine each cleaning cycle will involve a simultaneous collision of all pipes that will naturally affect the entire machine.

DESCRIPTION OF THE INVENTION

[0011] The pipe disclosed, in addition to a number of structural improvements that will be described further below, has the characteristic of incorporating a cleaning device that is permanently attached to the pipe and that will occupy an operative position when the cleaning operation must be performed and an inactive position when the pipe is used to fill bottles.

[0012] More specifically, the pipe of the invention is of the type referred to in Utility Model U 9401678, but with the characteristic that the pan used for cleaning is mounted on the pipe itself and moves together with the latter in its upwards and downwards motion, so that it does not affect the rest of the machine in any manner. The pans are coupled to and removed from the pipes automatically, by means of a pneumatic mechanism that prevents any bangs on the machine.

[0013] As regards the structure of the pipe, it is complemented by an outer casing with the pan coupled to it on the bottom to define a closed chamber inside which cleaning by immersion in liquid is performed.

[0014] In order to open the pipe during the cleaning cycle there is an inner sleeve that envelopes the pipe and that can move vertically inside the outer casing, so that in its upwards motion the sleeve will push on the retractable unit of the pipe causing it to open and thus causing the cleaning liquid to flow through the diffuser.

[0015] Specifically, the outer casing is provided with a lip on its bottom end, on which will rest the sliding sleeve in its resting position, that is, when the pipe is filling bottles and the pan is uncoupled, so that in this position the bottom end of the sliding sleeve is slightly separated from the retractable unit and therefore does not act on it.

[0016] Provided on the lower part of the sliding, enveloping sleeve and inside it is a threaded ring which, in the raised or resting position of the enveloping sleeve will project out of the outer tubular casing, so that when the pan is coupled to perform the cleaning the pan will

push on the threaded ring and make the enveloping sleeve rise, in turn pushing the retractable unit and opening the pipe.

[0017] As for the pan itself, it is hinged to the end of the piston of the pneumatic cylinder, that is in turn also hinged to a lateral extension of the base of the liquid container; this lateral extension acts as the support for said pneumatic cylinder which when actuated in either sense places the pan under the enveloping sleeve and the outer tubular casing, defining a hermetic seal between them, or makes the pan swivel and move aside to free the pipe and allow filling bottles.

[0018] In this way the pan is coupled by a pneumatic actuation that eliminates bangs on the machine.

[0019] In addition, it should be remarked that the ring threaded to the bottom inner end of the sleeve that envelops the pipe also acts as a centering element for the bottle necks, while the pan incorporates on its bottom the corresponding valve placed opposite the mounting plates so that when each of these plates rises the valve seat is pushed and the valve is opened, allowing the release of the cleaning liquid through the inner duct of said plates as is conventional.

[0020] With this form of incorporating the pan to the corresponding pipe the cleaning cycle is performed automatically, without requiring to manually place and remove the pans from each pipe of the machine, and with the coupling of said pans controlled by a pneumatic actuation that eliminates bangs on the machine unlike occurs in conventional casings.

DESCRIPTION OF THE DRAWINGS

[0021] As a complement of the description being made and in order to aid a better understanding of the characteristics of the invention, in accordance with an example of a preferred embodiment, as set of drawings is accompanied as an integral part of said description where for purposes of illustration only and in a non-limiting sense the following is shown:

[0022] Figure 1. - Shows a longitudinal sectional view of the pipe object of the invention, with the cleaning pan in an operative position and the corresponding valve provided on the bottom of the pan opposite the mounting plate.

[0023] Figure 2. - Shows another longitudinal view of the same pipe with the pan swiveled to occupy an inoperative position so that the pipe can be used to fill bottles.

PREFERRED EMBODIMENT OF THE INVENTION

[0024] In view of the above-mentioned figures it can be seen that the pipe of the invention is of the type including a nut (1) coupled around an orifice made in the bottom (2) of the liquid container, so that on said nut (1) is mounted the top end of an elastic membrane (3) in the shape of a double cone retained by a washer (4).

The bottom end of said elastic membrane (3) is embedded in a bushing (5), while laterally it is protected by an enveloping casing (6).

[0025] The pipe also includes a stop nut (7) as a regulation element to limit the vertical displacement of the pipe body for filling the bottle. Additionally, on the bottom of the ring (5) is threaded a second, small ring (8) to which is coupled the corresponding tube (9), establishing a continuity of the duct defined by the interior of the membrane (3) and the internal bushing (5), which tube (9) rests on its bottom end on a diffuser (10), with an interposed sealing gasket so that when the bottom of said tube (9) rests on the diffuser (10) it will stop the liquid from passing, while when the retractable unit consisting of the aforementioned tube (9), the ring (5) and the membrane (3), which will be deformed, is raised there is a separation and the liquid is thus allowed to pass.

[0026] Said rising is effected by the pushing force exerted by the neck of the bottle, which rests on a cup (11) attached to the outer part of the aforementioned tube (9). As is conventional, this type of pipe also includes an axial concentric tube (12) to allow air exit, which obviously passes through the diffuser (10) and the bottom of the container (2), as shown clearly in the figures.

[0027] In order to clean this type of pipe a pan (13) is employed that is conventionally mounted and dismantled manually from the bottom end of the described pipe.

[0028] The novelty of the invention thus consists in that said pan (13) is permanently incorporated to the pipe through a pneumatic cylinder (14) that on its top end is hinged, as labeled (15), to a support (16) established as a lateral extension of the bottom (2) of the liquid container, so that the piston (17) of said pneumatic cylinder (14) is hinged on its free end, as labeled (18), to a lug (19) that is a lateral component of the pan (13).

[0029] In this way the actuation of the pneumatic cylinder (14) results in the emergence of the piston (17) and with it makes the pan (13) press against the bottom end of the pipe, with an interposed sealing gasket (20), while the retraction of the piston (17) of the pneumatic cylinder (14) results in the swiveling and uncoupling of the pan (13), leaving the pipe fully free to perform the bottle filling operation, as shown in figure 2.

[0030] The pipe incorporates an outer tubular casing (22), to the bottom end of which is coupled in the cleaning position the pan (13), thus establishing a closed chamber inside which cleaning by immersion in liquid can be performed. Obviously, an O-ring (20) has been interposed to provide a tight seal.

[0031] The pipe also incorporates a sliding sleeve (21), placed inside the outer casing (22) but enveloping the bottom of the pipe. This sleeve (21) may adopt two positions, a bottom resting position in which the pipe can fill the bottles and the pan (13) is uncoupled, and a top position in which it pushes against the ring (5) of the retractable unit, opening the pipe and thereby allowing the exit of the cleaning liquid, which will fill the chamber

defined by coupling the pan (13).

[0032] Specifically, the tubular casing (22) is provided on its bottom end with an inner lip on which rests the enveloping sleeve (21) in its resting position; in said position the top end of the sleeve is not in contact with the ring (5) of the retractable unit.

[0033] On the bottom end of said enveloping sleeve (21) and on its inner face is threaded a ring (23). When the pan (13) is in the inoperative position, that is, uncoupled as shown in figure 2, said ring projects out of the bottom of the tubular casing (21), while when the pan (13) is coupled as shown in figure (1), it will push the ring (23) upwards and thus push on the sleeve (21), which in turn pushes on the ring (5) and thereby lifts the tube (9), separating it from the diffuser (10) and allowing cleaning liquid to pass through it. This liquid will fill the chamber defined by the coupling of the pan (13), thus enabling to clean the inside and the outside of the pipe.

[0034] Naturally, during cleaning the pneumatic cylinder (14) will be actuated in order to maintain the pipe (13) in the closed position with a sufficiently large pressure exerted against the bottom end of the tubular casing (22).

[0035] In addition, it should be mentioned that the ring (23) also acts as a centering element for the bottlenecks, that as is conventional opens the pipe by pushing on the corresponding cup (11) attached to the tube (9).

[0036] Finally, on the bottom end of the pan (13) is mounted the corresponding valve (24) in a normally closed position and provided with a valve seat that is opposite the mounting plate (25), so that when the latter is raised it will push on the seat and open the valve (24), allowing the cleaning liquid to be drained through the inner duct (26) of the mounting plate (25).

Claims

1. Pipe for filling bottles or the like with an incorporated cleaning device, of the type that is coupled to an orifice made in the bottom (2) of the liquid container, with the coupling established by a nut (1) and with the pipe assembly provided with a retractable unit comprised of an elastic membrane (3), an inner ring (5) and a tube (9) which in its lowered position rests on a diffuser (10) and closes the liquid passage, while in the raised position of the retractable unit the tube (9) is separated from the diffuser (10), allowing liquid to pass, essentially **characterized in that** it incorporates a pan (13) for the automated cleaning of the pipe, with said pan (13) being hinged to a pneumatic cylinder (14) which when actuated couples the top base of the aforementioned pan (13) to the corresponding pipe, while the deactivation of the pneumatic cylinder (14) results in the uncoupling by an outwards swiveling of said pan (13), allowing to use the pipe for filling bottles; and such that said pipe is complemented by an outer tubular

casing (22) against the bottom end of which is closed and coupled the pan (13), establishing a closed chamber inside which the pipe is cleaned by liquid immersion, with said pipe having an inner sleeve (21) that envelopes the pipe and which may slide inside the casing (22) and push the retractable unit, opening the pipe and allowing to drain the cleaning liquid.

2. Pipe for filling bottles or the like with an incorporated cleaning device, according to claim 1, **characterized in that** the pneumatic cylinder (14) is connected through a hinge (15) to a support (16) formed by a lateral projection of the base (2) of the liquid container, while the free end of the piston (17) of the aforementioned pneumatic cylinder (14) is connected through a hinge (18) to a lug (19) provided on the side of said pan (13), which pan is provided with an O-ring (20) to seal the chamber formed by the enveloping sleeve (21) and the pan (13).
3. Pipe for filling bottles or the like with an incorporated cleaning device, according to above claims, **characterized in that** the enveloping sleeve (21) can occupy two positions, a resting position corresponding to its lowermost position and in which the pipe can fill the bottles and the pan (13) is uncoupled, and a position in which it pushes on the bushing (5) of the retractable unit making it rise and thereby opening the pipe, in which latter position the pan (13) is coupled to perform the cleaning operation, for which purpose the casing (22) is provided with an inner bottom lip on which will rest the sleeve (21) in its resting position, in which position there is a gap between the top end of the sleeve (21) and the bushing (5) of the retractable unit, so that a bushing (23) is threaded in correspondence with the bottom end of the enveloping sleeve (21) and on its inside, which bushing (23) in the resting position of the sleeve (21) will project out of the bottom of the casing (22) so that when the pan (13) is coupled on the pipe said pan (13) will push on said bushing (23), lifting the sleeve (21) that in turn pushes the bushing (5) of the retractable unit, thereby opening the pipe.
4. Pipe for filling bottles or the like with an incorporated cleaning device, according to above claims, **characterized in that** the ring (22) mounted on the bottom inner end of the enveloping sleeve (21) acts as a centering element for the necks of the bottles in the uncoupled position of the pan (13).
5. Pipe for filling bottles or the like with an incorporated cleaning device, according to above claims, **characterized in that** the bottom part of the pan (13) includes a corresponding valve (24) placed opposite the corresponding mounting plate (25), in which

is defined a duct (26) for draining the cleaning liquid when the mounting plate (25) is raised up against the valve (24).

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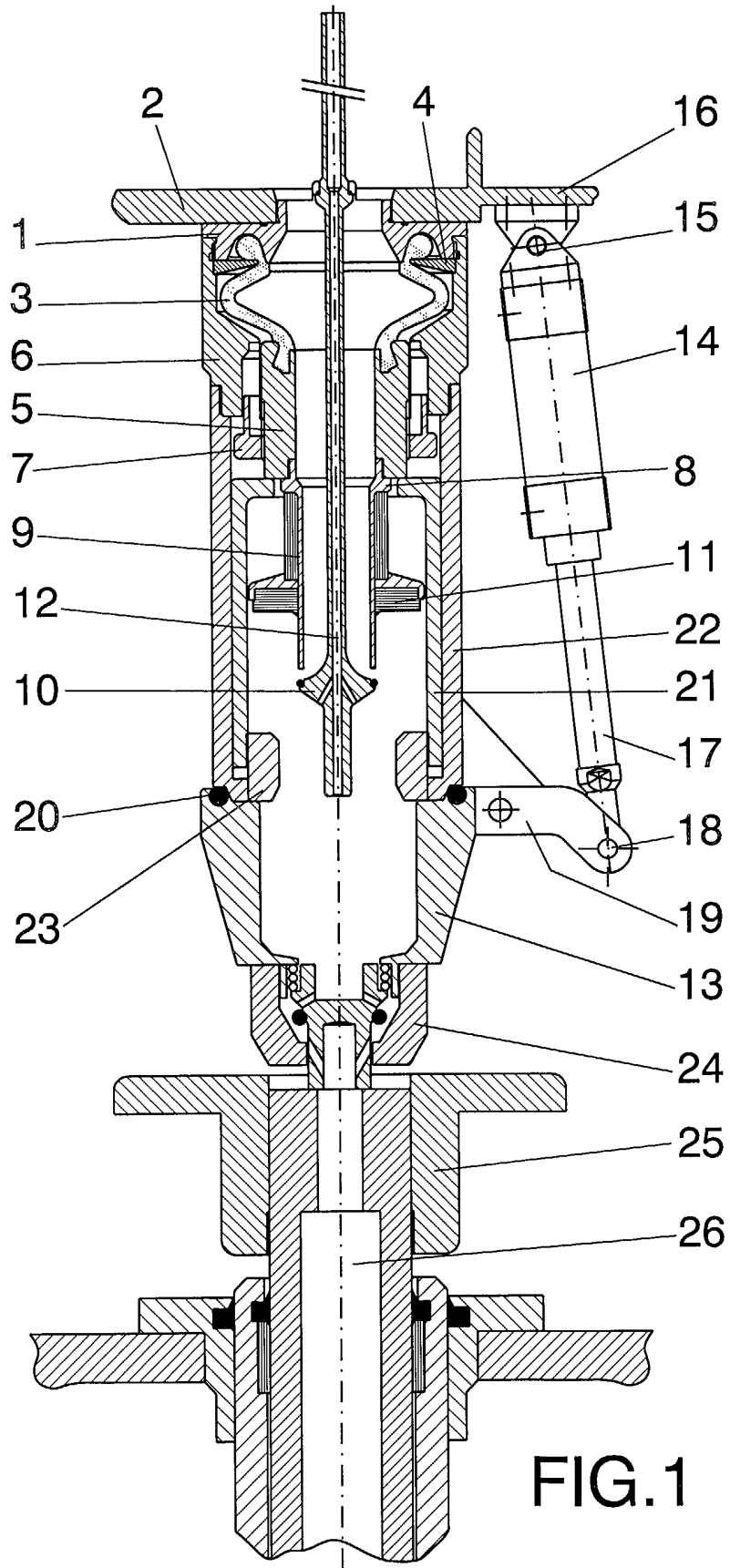
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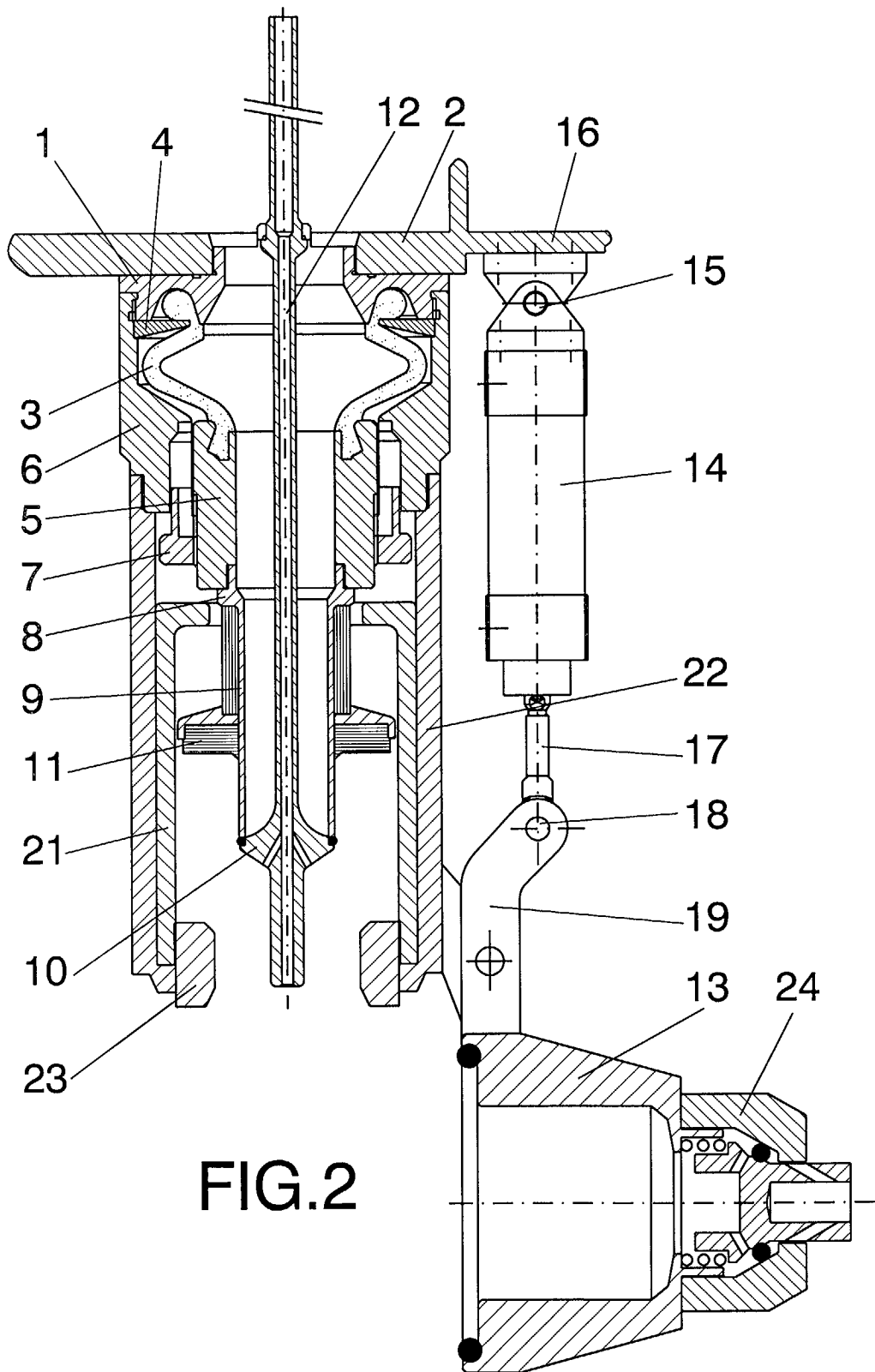
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EUROPEAN SEARCH REPORT

Application Number
EP 02 38 0132

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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 25 September 2002	Examiner Wartenhorst, F
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 02 38 0132

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