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(54) Vaporisation apparatus for an environment

(57) Vaporization apparatus (10) for an environment, comprising at least a container (11) able to be filled with a liquid, for example water, to be transformed into steam and a lid (12) selectively associated with the container (11) in at least a closed position. The apparatus (10) also comprises an electric heating member (15) associated with a switch-on device able to be activated only when the lid (12) is in the closed position. The apparatus (10) also comprises members (25, 26) to measure the level of filling of the container (11) in order to mechanically prevent the positioning of the lid (12) in the closed position, and hence the activation of the electric heating member (15), when the level detected by the measuring members (25, 26) exceeds a pre-determined maximum level.

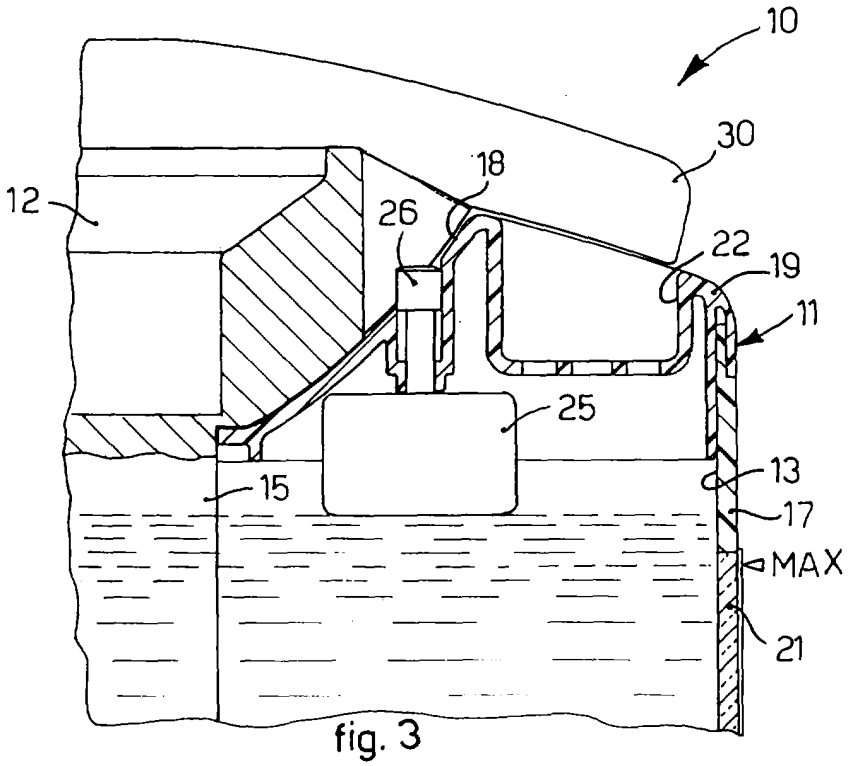

fig. 3

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Description

FIELD OF THE INVENTION

[0001] The present invention concerns a vaporization apparatus, known more simply by the term "vaporizer", which can be used to establish a desired level of humidity in a determinate environment, so as to create a comfortable micro-climate and give the user a sensation of general well-being.

BACKGROUND OF THE INVENTION

[0002] Vaporization apparatuses, or vaporizers, are known, substantially consisting of a container in which a determinate quantity of water is poured, and of a closing lid. The apparatus is also provided with electrodes, generally two, which can for example be housed in the lid. The complete closure of the lid on the container entails the at least partial immersion of the electrodes into the water, so as to progressively take it to the temperature of evaporation and hence generate a determinate quantity of steam that is introduced into the environment.

[0003] Known vaporization apparatuses are also generally provided with level indicator means, such as for example transparent windows and/or floating elements, associated with the container, which indicate, outside the container, the actual level of water present in the container and the maximum and minimum nominal filling levels allowed for the correct functioning of the apparatus.

[0004] Moreover, to prevent accidental contact between the user and the functioning electrodes, the switch that allows to switch on the latter is positioned hidden on the lid, while an end-of-travel block is provided on the container. The block is in a position such as to allow to activate the switch only when the lid is in a condition of total closure with respect to the container.

[0005] This safety strategy, however, is valid only as far as concerns the safety of the user from the danger of electric shocks due to direct contact with the electrodes when the lid of the vaporizer is open. In this case, at the moment the user opens the lid, the switch instantaneously interrupts the electric feed to the apparatus, eliminating the electric current to the electrodes and hence preventing the possibility of electric shocks.

[0006] However, if the container is filled over the maximum nominal level and there is an overflow of the water from the container, the end-of-travel block in any case keeps the switch activated and consequently the electrodes too.

[0007] This activation of the electrodes can entail the risk of short circuits of the electric components that are in contact with the water that has overflowed, whether they are inside or outside the apparatus, such as for example displays, push-button panels, feed cables or other, thus compromising the correct functioning of the apparatus, and entailing the risk of damage to the electric feed plant or the danger of shocks to the user.

[0008] A purpose of the present invention is therefore to achieve a vaporization apparatus for an environment in which the activation of the electrodes is prevented in the case where the actual level of filling of the container exceeds the maximum nominal level provided, thus limiting to a minimum the risk of shocks, short circuits and electric damage in general.

[0009] The Applicant has devised, tested and embodied the present invention to overcome the shortcomings of the state of the art and to obtain these and other purposes and advantages.

SUMMARY OF THE INVENTION

[0010] The present invention is set forth and characterized in the main claim, while the dependent claims describe other characteristics of the invention or variants to the main inventive idea.

[0011] In accordance with the above purpose, a vaporization apparatus according to the present invention comprises at least a container that is filled with water to be transformed into steam, and a lid that can be selectively associated with the container in at least a closed position.

[0012] The apparatus also comprises electric heating means such as for example one or more electrodes, associated with switch-on means, for example a switch, able to be activated only when the closing lid is in the closed position.

[0013] According to a characteristic of the present invention, the apparatus comprises means to measure the level of filling of the container, which mechanically prevents the positioning of the lid in the closed position, and hence the activation of the switch-on means, when the level detected exceeds a pre-determined maximum level.

[0014] In this way, in the event that the actual level of the water inside the container exceeds the maximum level allowed, with the risk that the water might overflow outside the container, the activation of the electric heating means, for example the electrodes, is inhibited for safety, thus preventing the occurrence of short circuits, shocks or other possible structural damage and/or danger for the user.

[0015] In a preferential form of embodiment, the measuring means comprises a floating element inserted inside the container and hence able to rise or fall according to the progressive variation in level of the water inside it. The float is provided at the upper part with a stop rod which, when the actual level of the water exceeds the allowed maximum level, emerges from a surface of the container, creating a physical obstacle for the lid during its movement towards the closed position.

[0016] In this way, with a solution having very limited costs of production, assembly and maintenance, we obtain a mechanical impediment to the closing of the lid which does not allow the switch-on means to be activated. This solution guarantees that the apparatus cannot

be switched on in the event of possible overflow of the water.

[0017] According to another characteristic, the container has at least a lateral top-up hole, through which it is possible to top up the water in the container without having to de-associate the lid of the container.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] These and other characteristics of the present invention will become apparent from the following description of a preferential form of embodiment, given as a non-restrictive example with reference to the attached drawings wherein:

- fig. 1 shows a vaporization apparatus according to the present invention in an open condition;
- fig. 2 is a view from above of the apparatus in fig. 1 with the lid in a first, incompletely closed condition;
- fig. 3 is a cross section of the detail in fig. 2;
- fig. 4 is a view from above of the apparatus in fig. 1 with the lid in a second closed condition;
- fig. 5 is a cross section of the detail of fig. 4.

DETAILED DESCRIPTION OF A PREFERENTIAL FORM OF EMBODIMENT

[0019] With reference to the attached drawings, a vaporization apparatus, hereafter more simply vaporizer 10, according to the present invention is used to spread a determinate quantity of steam in an environment, in order to establish a certain level of humidity in the air and supply the user with a sensation of well-being.

[0020] The vaporizer 10 according to the present invention comprises a container 11 open at the upper part through a central hole 20 and containing a determinate quantity of water, and a lid 12 that allows to close the container 11, so as to define a compartment 13 inside the container 11 in which the water contained is transformed into steam.

[0021] The container 11 comprises a containing shell 17 which retains the water both at the bottom and also laterally, and a covering ring 19 associated with an upper edge of the containing shell 17 and having a circular surface 18 which defines the central hole 20 in which the lid 12 is housed in order to close the container 11.

[0022] On a lateral segment of the containing shell 17 a level indicator 21 is disposed, substantially vertical, commonly consisting of a strip of transparent material, on which a graduated scale is reported, so as to allow the user to instantaneously see the level, and hence the quantity, of water contained in the container 11.

[0023] The level indicator 21 shows a minimum filling value "MIN" of the container 11 to guarantee a correct functioning of the vaporizer 10, and a maximum filling value "MAX" to prevent accidental overflow of the water from the latter.

[0024] On the covering ring 19, in correspondence with the level indicator 21, there is a top-up hole 22, through which the user can add, when necessary, a further quantity of water into the compartment 13 without having necessarily to remove the lid 12 from the container 11.

[0025] The covering ring 19 also comprises an activation block 23 protruding vertically from the circular surface 18, and a float 25 provided with a stop rod 26. The stop rod 26 is disposed passing through the circular surface 18 and is able to protrude externally, as will be explained in more detail later, with respect to the latter, according to the level of water contained in the container 11.

[0026] The lid 12 is substantially disk-shaped and comprises a handle 30 which protrudes radially from the disk shape. Once the lid 12 is housed in the central hole 20, the handle 30 allows to rotate the lid 12 with respect to the container 11, until said closed position is reached.

[0027] Advantageously, when the lid 12 is in the closed position, the terminal part of the handle 30 obstructs access to the top-up hole 22.

[0028] The lid 12 also comprises a heating member 15 of the electric type, shown only schematically in fig. 1, consisting for example of two electrodes, not shown, and able to be at least partly immersed in the water contained in the container 11 in order to heat it and generate a quantity of steam; the steam will then be introduced into the outer environment through one or more mouths 27 provided on the lid 12.

[0029] The heating member 15 can be selectively activated by means of a switch 29 disposed inside the lid 12 in a position not manually accessible to the user. In fact, in order to guarantee respect for the safety regulations in force, the switch 29 must be able to be activated only when the lid 12 is in the closed position with respect to the container 11.

[0030] In this case, the rotation of the lid 12 to reach the closed position causes the switch 29 to be intercepted by the activation block 23 which protrudes from the circular surface 18.

[0031] In this way, as soon as the closed position is reached, the activation block 23 switches on the switch 29 and thus activates the heating member 15.

[0032] The vaporizer 10 as described heretofore functions as follows.

[0033] As shown in figs. 2 and 3, the water contained inside the container 11 is excessive and exceeds the maximum filling level (MAX). In this operating condition, the float 25 is thrust upwards to a height such that its stop rod 26 emerges from the circular surface 18.

[0034] The emergence of the stop rod 26 from the circular surface 18 determines a mechanical stoppage against the rotation of the lid 12, thus preventing the latter from reaching the closed position.

[0035] This mechanical impediment prevents the interception of the switch 29 by the activation block 23 and consequently prevents the activation of the heating member 15.

[0036] In the condition shown in figs. 4 and 5, on the contrary, the level of water contained inside the container

11 is comprised below the maximum filling level (MAX).

[0037] In this case, the float 25 remains at a height such that its stop rod 26 remains contained below the circular surface 18.

[0038] In this operating condition there is no impediment to the rotation of the lid 12 until the closed position is reached, shown here, and hence no impediment to the interception of the switch 29 by the activation block 23, with consequent activation of the heating member 15.

[0039] It is clear, however, that modifications and/or additions of parts may be made to the vaporizer 10 as described heretofore, without departing from the scope of the present invention.

[0040] According to a variant, instead of the level indicator 21, a rod 32 is used, shown in fig. 1 with a line of dashes, provided with a colored indicator that indicates that the maximum filling level has been reached.

[0041] According to another variant, instead of the float 25 a sensor may be provided, either electric/electronic, optical, proximity or other, able to send a signal that the maximum limit has been reached and consequently to command the stop rod 26 to emerge, in order to block the rotation of the lid 12 and prevent the heating member 15 from being switched on.

[0042] It is also clear that, although the present invention has been described with reference to specific examples, a person of skill in the art shall certainly be able to achieve many other equivalent forms of vaporization apparatus for an environment, having the characteristics as set forth in the claims and hence all coming within the field of protection defined thereby.

Claims

1. Vaporization apparatus for an environment, comprising at least a container (11) able to be filled with a liquid to be transformed into steam and a lid (12) able to be selectively associated with said container (11) in at least a closed position, said apparatus also comprising electric heating means (15) associated with a switch-on means (29) able to be activated only when said closing lid (12) is in said closed position, **characterized in that** it comprises means (25, 26) to measure the level of filling of said container (11) able to mechanically prevent the positioning of said lid (12) in said closed position, and hence the activation of said electric heating means (15), when the level detected by said measuring means (25, 26) exceeds a pre-determined maximum level.

2. Apparatus as in claim 1, **characterized in that** said measuring means comprises a floating element (25) disposed on the surface of the liquid, and able to follow the rising or falling of its level, and a stop rod (26) associated with said floating element (25), and disposed passing through a surface (18) of said container (11), said stop rod (26) having an operating position protruding from said surface (18), when the level of the liquid exceeds said maximum level, in order to block the movement of said lid (12) and prevent the complete closure thereof.

3. Apparatus as in claim 1 or 2, **characterized in that** said container (11) comprises peripherally a top-up hole (22) able to allow the addition of said liquid into said container (11) without having to open said lid (12).

4. Apparatus as in any claim hereinbefore, **characterized in that** said switch-on means comprises a switch (29) associated with said lid (12), and able to interact with an activation element (23) attached on said container (11) in a position such that it mechanically activates said switch (29) only when said lid (12) is in said closed position.

5. Apparatus as in any claim hereinbefore, **characterized in that** said lid (12) is substantially disk shaped and comprises a handle (30) that protrudes radially, said handle (30) being able to obstruct said top-up hole (22) when said lid (12) is in said closed position.

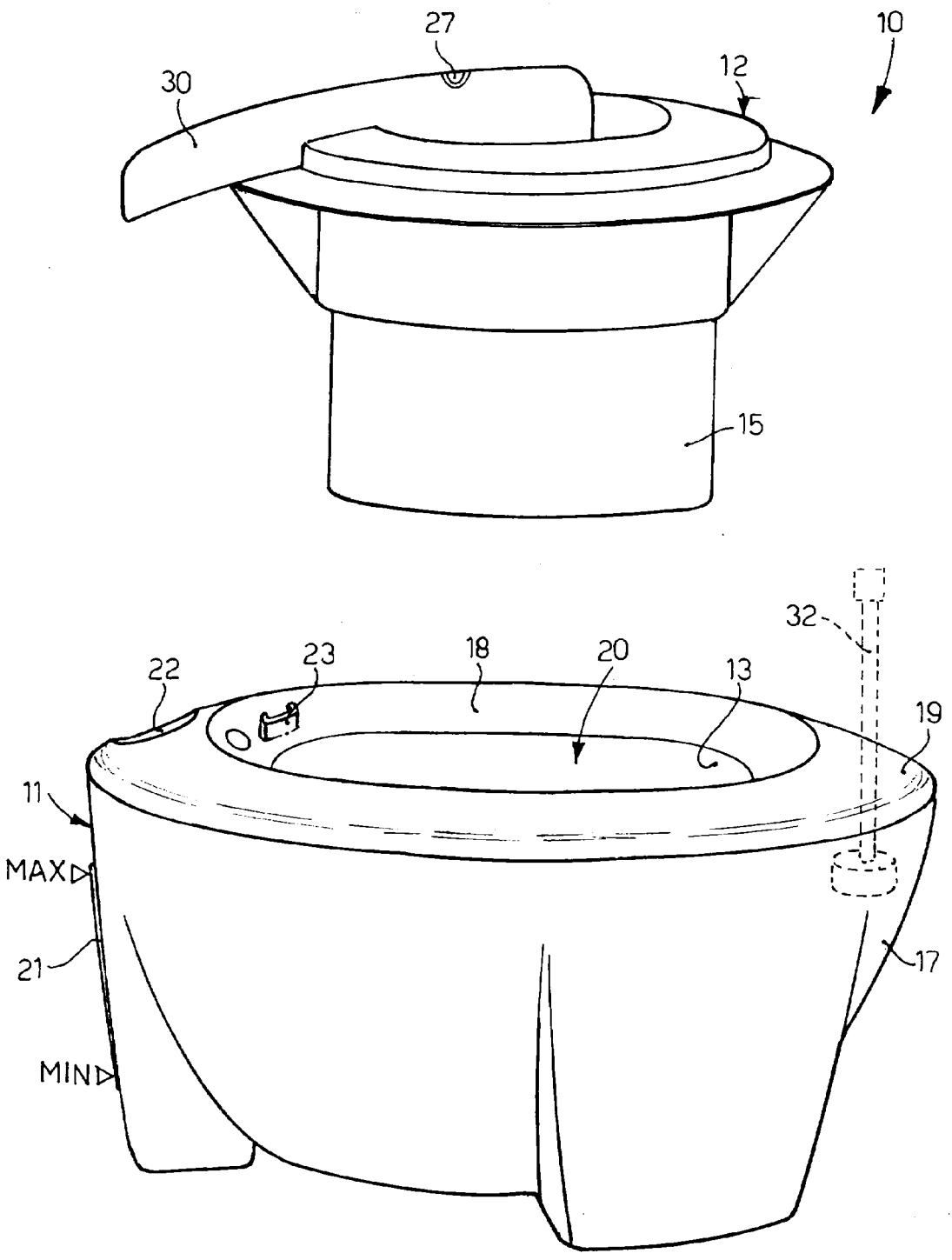

fig.1

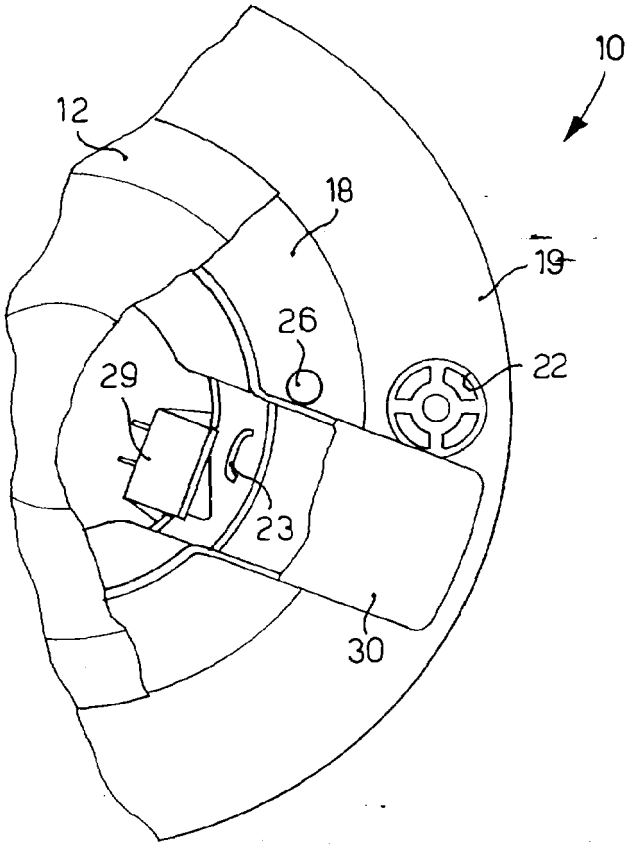

fig. 2

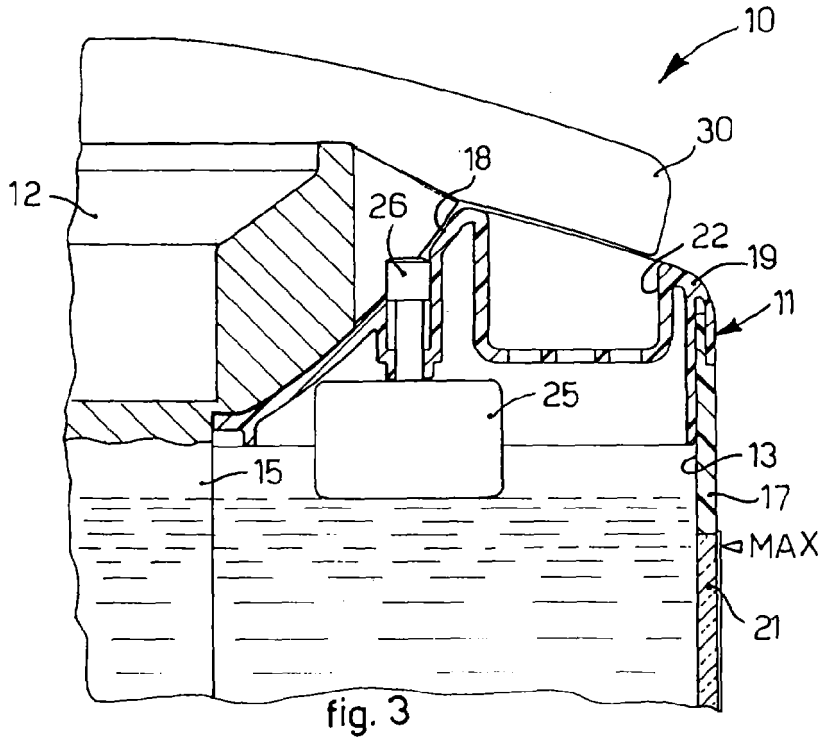

fig. 3

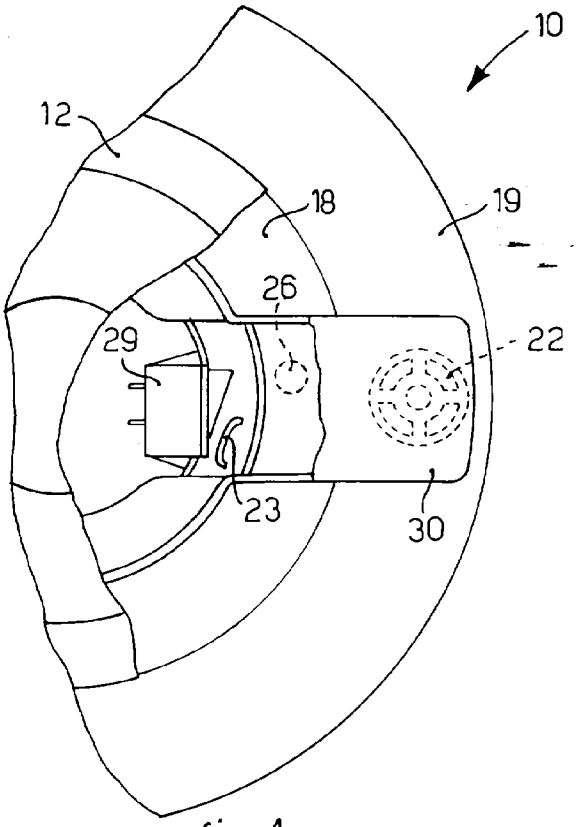

fig. 4

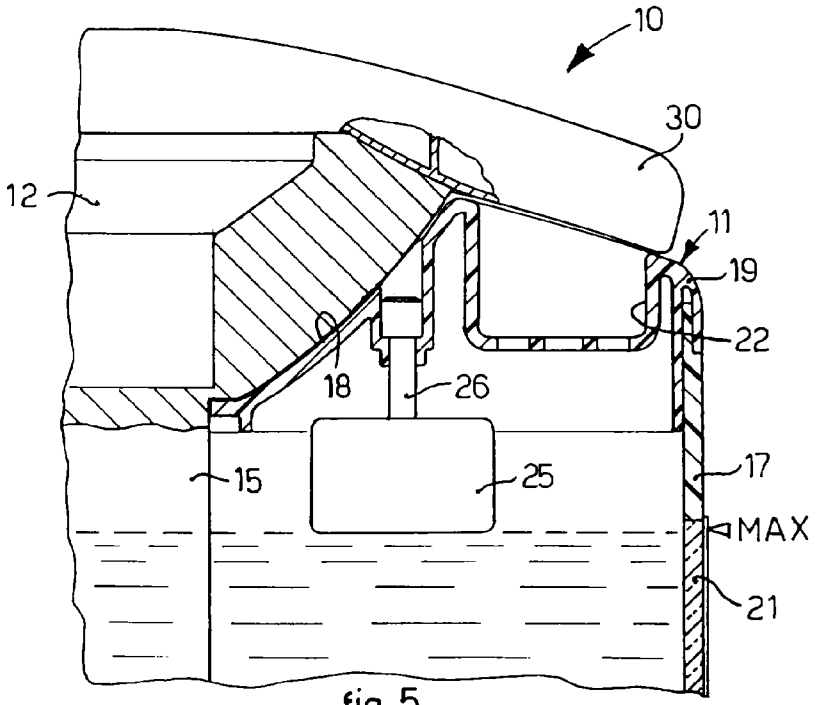

fig. 5

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EUROPEAN SEARCH REPORT

Application Number
EP 06 12 2462

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	18 January 2007	Lienhard, Dominique

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 06 12 2462

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