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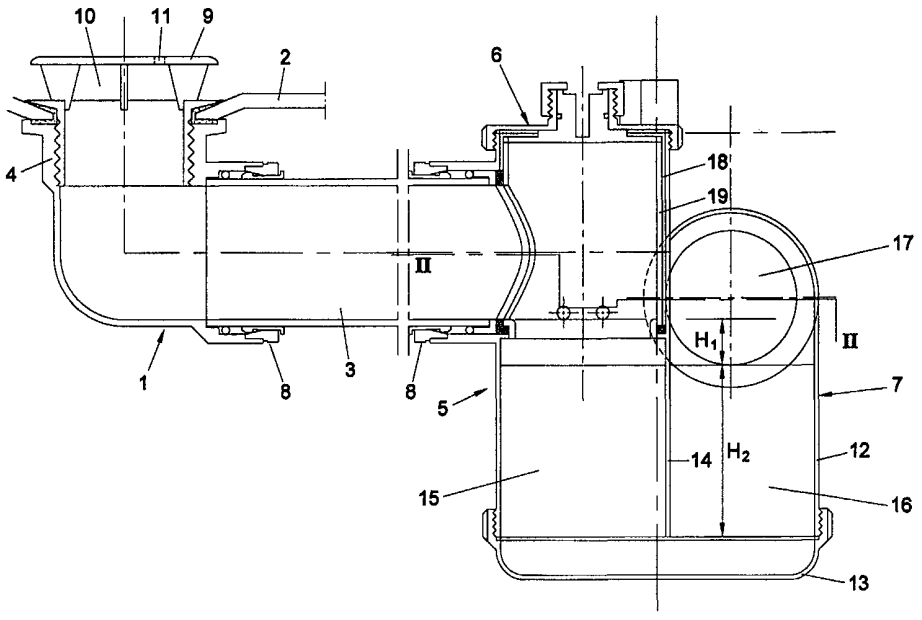
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(54) Title: BATH DRAINAGE SYSTEM



(57) Abstract

A bath drainage system comprises a bath drain (1) with a bath drain pipe (3) and a bath drain closure (4), a stench–trap (7), connected to the bath drain (1), with a sewer connection (17), and an overflow device (23) with an overflow pipe (26). The bath drain closure (4) and the stench–trap (7) together form a combination unit (5) to which the bath drain pipe (3) and the overflow pipe (26) are connected. The combination unit (5) further comprises at least one sewer connection (17). The thus obtained universal bath drainage system can be used not only in a standard bath, but is so designed that it is eminently suitable as a return suction in a bath of whirlpool design.

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Title: Bath drainage system

The present invention relates to a bath drainage system for a bath which may further be equipped with a whirlpool system, which bath drainage system comprises a bath drain having a bath drain pipe and a bath drain closure, a stench-trap connected to the bath drain and having a sewer connection, and an overflow device having an overflow pipe.

Bath drainage systems are known and serve to drain the bath water from the bath to a sewer system.

In these known bath drainage systems, to close the bath drain, a bath drain closure in the form of a stopper is pressed into the drain plug, i.e., into the connection of the bath drain pipe to the bath. This can be done both manually and mechanically, for instance by means of a turning knob. Thereafter, the bath can be filled. To prevent the bath overflowing, an overflow device is arranged. Between the bath drain pipe and the sewer connection, a stench-trap is included to prevent sewer gases ending up in the space where the bath is disposed.

If, to close the bath drain, a stopper is pressed into the drain plug, this stopper is often provided with a chain to pull the stopper from the drain plug after bathing. If the chain is broken, it is difficult to pull the stopper out by hand, in particular if the bath is filled with water to a relatively high level. According as the bath drain terminates in the bath at a point further from the side, the chain sits more in the way during bathing. For this reason, therefore, a lever is in use, which is typically operated by

a turning knob to enable the stopper to be moved up and down in the drain plug. To that end, the turning knob is connected to the lever by means of a cable. This means that each distance between the bath drain and the bath wall has a different corresponding cable length, so that in each case a different operating system for the bath closure is needed. This, in turn, gives rise to problems regarding the overflow device. This device usually comprises an overflow pipe which extends from an overflow plug provided in the bath wall to the drain plug. Depending on the position where the drain plug is located in the bottom of the bath, the overflow pipe will have to continue under the bath. The thus required horizontal section of the overflow pipe makes the water drainage more difficult and makes it possible for residual water to remain behind in this section at all times, so that disease germs may form. Given the current taps, the current overflow pipes, which are based on an external diameter of 32 mm, already present problems in respect of the water drainage as it is; often, the water output of these taps is already higher than the drainage capacity of the overflow device. It is noted that the current bath drain pipes are based on an external diameter of 40 mm, so that, especially in large baths, the water cannot always be drained fast enough, and dirt remains behind in the bath. The stench-trap, too, has heretofore been standardly based on this dimension. Only downstream of the stench-trap is there any possibility of connecting the drain to a pipe of a greater diameter. In

practice, this is often a pipe having an external diameter of 50 mm at a minimum.

The object of the present invention is to remove these disadvantages, at least to a considerable extent, and to provide a universal bath drainage system in which the bath drain closure and the overflow device are independent of the type of bath, and by means of which the drain and overflow capacity can be tailored to the current taps, which have a relatively large water output, and bath size.

To that end, according to the invention, the bath drainage system such as it is described in the opening paragraph hereof is characterized in that the bath drain closure comprises a closing element operable from the bath side and the connection between the bath drain pipe and the stench-trap can be broken with the aid of this closing element, that the bath drain closure and the stench-trap together form a combination unit, to which the bath drain pipe and the overflow pipe are connected, the combination unit further comprising at least one sewer connection, with a difference in height being present between the underside of the inner side of the mouth of the bath drain pipe in the combination unit and the maximum water level that is possible in the stench-trap, while the combination unit, by adjustment of the length of the drain pipe and the form and dimensions of the bath drain, is applicable independently of the form and dimensions of the bath. By virtue of this feature, the drain plug, the bath drain closure operating knob and the

overflow device can be provided at any random position of the bath, affording total freedom both in the design of the bath and in connecting the bath. The bath drain pipe between the drain plug and the stench-trap can be constructed with the aid of a standard pipe with optionally standard bends, and be sawn to any desired length. Depending on the size of the bath, a particular type of combination unit having a drain pipe of an appropriate diameter can be selected, so that optimum drainage is ensured. When the bath drain is not closed, there is, between the drain plug and the sewer connection of the combination unit, not a single obstacle onto which hairs, dirt particles, etc., might get caught, so that the drainage of the bath dirt does not present any problem.

In particular, the combination unit, the bath drain pipe and the sewer connection all have the same minimum diameter with an outside dimension of preferably 50 mm. By this measure, any action in the manner of a lock due to a narrowing in the bath drainage system is prevented throughout. As regards the overflow pipe, an external diameter of at least 40 mm can suffice.

In a particular embodiment, the combination unit comprises two sewer connections, which are provided on opposite sides of the combination unit. In practice, only one of these connections will be used, while the other one is then closed off, or remains closed if the connections were originally closed. This feature enables easier assembly of

the bath drainage system; depending on the arrangement of the bath drainage system and the position of the sewer system, either one of the connections can be selected.

In accordance with the invention, for the purpose of cleaning, the combination unit comprises a removable, in particular unscrewable, bottom.

Further, according to the invention, the bath drain closure can comprise a closing element operable from the bath side and the connection between the bath drain pipe and the stench-trap can be broken with the aid of this closing element. Here, the combination unit is preferably designed such that between the underside of the inner side of the mouth of the bath drain pipe in the combination unit and the maximum water level that is possible in the stench-trap, a difference in height, for instance of 15 mm, is present. Accordingly, the passage for the closing element will reach as far as at least the underside of the inner side of the mouth of the bath drain pipe in the combination unit. What is thereby achieved is that in case the bath drain closure leaks, water from the stench-trap, possibly containing disease germs, cannot come into contact with the clean bath water.

In a concrete embodiment, the bath drain closure is provided with an operating element, fitted on the bath edge, and a transmission mechanism, connected both to this operating element and to the closing element, to enable the closing element to be turned in the passage in the

combination unit between the bath drain pipe and the stench-trap. In particular, the transmission mechanism may then comprise a link rod construction. As a consequence, the connection to the closing element and that to the operating knob, respectively, do not need to be located straight, or virtually straight, above each other.

The operating element may be formed by a manually operable operating knob, in particular a turning knob. It is also possible, however, that the operating element is formed by an electric operating element and a motor, controllable by the operating element and connected to the transmission mechanism. Specifically this last embodiment is particularly favorable for persons suffering from rheumatic disorders or catalepsy, since such persons typically lack the power, especially when the hands are wet and slippery due to the bath water and soap, to operate an operating knob, such as a turning knob, by hand. Another advantage of this solution is that an electric operating element can be mounted on the bath at any position within reach of the hands.

It is further possible to arrange for the electric operating element to be set into operation automatically when a back-flow of dirty water from the stench-trap into the bath occurs, or threatens to occur. This may happen, for instance, on ships when they are subject to substantial pitch and roll. The electric operating element may then activate the motor when, for instance, the ship has reached a given inclination, which can be determined by all kinds of known inclinometers.

Over the hole of the drain plug at the bottom of the bath, preferably a covering lid is fitted, which is provided all around with one or more slits, enabling unimpeded water drainage. To prevent a vacuum or excess pressure being produced under the lid, further an aeration hole may be provided in the covering lid.

As already mentioned hereinbefore, the overflow pipe of the overflow device can be connected directly to the combination unit. In particular, the overflow pipe can be connected to the combination unit so as to extend substantially vertically. This ensures optimum drainage of the overflow water, and disallows any residual water to remain behind in the overflow pipe, which further prevents the risk of disease germs forming. Moreover, as a consequence, a reduced or excess pressure can never arise above the water in the stench-trap, so that the stench-trap can never be depleted by suction or siphoning. The overflow device preferably comprises a feed-through passage to be provided in the wall of a bath and an overflow pipe to be connected to this feed-through passage, the feed-through passage opening of the feed-through passage in the bath wall being greater than the drain opening of the overflow pipe. Thus, the overflow device acquires a throughput capacity that is determined by that of the overflow pipe. In particular, the overflow device may comprise an overflow covering cap having at the underside thereof an opening that is greater than the cross section of the overflow pipe. This opening may

be, for instance, 1.5 times greater than the cross section of the overflow pipe, which enables sufficient water supply at all times. To prevent the possibility of a vacuum forming in the overflow covering cap, as a result of which the throughflow might stop and the bath might still overflow, the overflow covering cap is provided with an aeration opening at the top thereof. The shape of the overflow covering cap may further be fairly flat, so that this covering cap is no longer a hindrance to persons making use of the bath.

The universal bath drainage system described hereinbefore can be used not only in a standard bath, but may also be of service in a bath of whirlpool design. At present, for whirlpool systems, often wall return suction systems are used. These have the disadvantage that the drainage of the whirlpool system cannot always be optimal, since the whirlpool pump often cannot be mounted high enough to accomplish a sufficient slope in the connecting pipe. Also known are whirlpool return suction systems that are combined with the bath drain. These often have the disadvantage that the stench-trap cannot be correctly connected, while further much residual dirt remains behind therein, which is not beneficial to hygiene. These disadvantages can be obviated by utilizing the above-described universal bath drainage system for a bath of a whirlpool design as well.

According to the invention, to enable a whirlpool design, the bath drain, and in particular the drain plug, is provided with an additional connection for a whirlpool pump.

Thus, the pump is connected to the lowest portion of the whirlpool system and a proper drainage of the whirlpool system is possible. Also, the pump can be mounted lower, so that practically any bath can be provided with a whirlpool system and no separate models of baths need to be designed for this purpose.

In the whirlpool mode, the connection of the drain pipe with the stench-trap is closed and bath water can be drawn in by the whirlpool pump via the slits in the covering lid and via the additional connection mentioned, without drainage water being drawn in from the stench-trap. In that case, it is specifically desired, in view of possible leakage of the bath drain closure, that never a reduced pressure be created above the water in the stench-trap, whereby the stench-trap could be depleted by suction, and this is achieved by the above-mentioned measure of connecting the overflow pipe directly to the combination unit, such that, even if the drain pipe is closed on the side of the combination unit, the stench-trap communicates with the outside air on the side of the drain pipe, i.e., on the water supply side, via the overflow pipe. Owing to the suction hole being covered by a lid with openings all round, it is impossible that a person who would sit on the hole would cover the hole completely and would thereby be sucked to the hole.

Although the water supply to the bath, also in the whirlpool design, is not a subject of the present invention,

it still necessary, under certain circumstances, to take the water supply into account in the bath drainage system. When, specifically in the whirlpool design, a few jets are so arranged that, normally, a complete drainage is impossible, special connections for this purpose can be provided on the combination unit. In accordance with the invention, therefore, the combination unit may comprise connections for an air and/or water whirlpool system, the connecting openings of these connections being closed and opened simultaneously with the bath drain.

The invention will now be further elucidated with reference to the accompanying drawings, in which:

Fig. 1 shows a vertical cross section of an exemplary embodiment of a bath drainage system according to the invention;

Fig. 2 shows a partial horizontal section taken along the line II-II in Fig. 1;

Fig. 3 shows the bath drain closure and the overflow device of the bath drainage system represented in Figs. 1 and 2; and

Fig. 4 shows a horizontal top plan view of the drain plug of the bath drain in a whirlpool design.

The bath drainage system represented in the drawings comprises a bath drain 1 with a bath drain pipe 3, extending horizontally beneath or under and along a bath 2, which has an external diameter of at least 50 mm and which is connected to the underside of the bath 2 by means of a drain plug 4.

The bath drainage system further comprises a combination unit 5 in which a bath drain closure 6 and a stench-trap 7 are built together to form a whole. For connecting the bath drain pipe 3 on one side to the drain plug 4 and on the other side to the combination unit 5, the represented embodiment utilizes a clamped joint 8. Through this clamped joint, not only a proper seal is obtained, but also the pipe is fixedly clamped. Should it be necessary to remove the pipe temporarily, for instance to remedy a stoppage, this can easily be realized by depressing the fixing clip which retains the inner clamping edge and taking the pipe from the connection. Instead of a clamped joint, naturally an ordinary glued sleeve can be chosen as well, or any other known method for fixedly arranging the pipe can be utilized. Provided over the hole of the drain plug 4 is a fixed covering lid 9, provided all around with a number of slits 10. In the covering lid 9, an aeration hole 11 is present.

The lower portion of the combination unit 5 is formed by a cylindrical body 12 having an unscrewable bottom 13. This cylindrical body is divided by a partition 14 into two subspaces 15 and 16, which are in communication with each other at the lower end, and thus forms a stench-trap 7 in the form of a siphon. Via the subspace 15, waste water is supplied from the bath; the subspace 16 is in direct communication with a sewer system. To that end, above the subspace 16, the combination unit 5 has a sewer connection 17 for a sewer drain pipe having an external diameter of 50 mm

at a minimum. This sewer drain pipe can be fitted with a clamped joint 8 again. Above the subspace 15 in the combination unit 5, a passage 18 is present in which a closing element 19 can be provided with a proper fit. In addition to this closing element 19, the bath drain closure 6 comprises the operating means needed therefor, viz. an operating element 20, provided on the bath edge, in the form of a turning knob, and a transmission mechanism 21, connected both to this operating element 20 and to the closing element 19. This transmission mechanism is formed by a link rod construction 22, by which a rotary movement carried out with the aid of the turning knob is transferred to the closing element 19. By turning the closing element 19 in the passage 18, a connection between the bath drain pipe 3 and the subspace 15 can be effected or, conversely, be broken. The passage 18 for the closing element 19 extends a little further down beyond the underside of the inner side of the mouth of the bath drain pipe 3 in the combination unit 5. The sewer connection 17 is such that between the underside of this mouth and the maximum water level possible in the stench-trap, a particular difference in height H_1 of, for instance, 15 mm is present. Further present is a water seal, of a difference in height H_2 of approximately 6 cm.

Disposed straight above the combination unit 5 is the overflow device 23. This device is built up from a feed-through passage 24, provided in the wall of the bath 2, with an overflow covering cap 25 and a vertically extending

overflow pipe 26, connected thereto, which is in direct communication with the subspace 15 of the stench-trap 7. At the top, the overflow covering cap is provided with an aeration opening, not represented in the figures. The overflow pipe 26 has an external diameter of 40 mm at a minimum, while the feed-through passage opening of the feed-through passage 24 in the wall of the bath 2 is greater than the cross section of the overflow pipe 26. In particular, the underside of the overflow covering cap 25 has an opening that is approximately 1.5 times greater than the cross section of the overflow pipe 26.

To render the bath drainage system suitable for a whirlpool system, the drain plug 4 is provided with a second bath drain pipe connection 27 (Fig. 4), to which a whirlpool pump can be connected, while the combination unit 5 for this purpose further comprises connections 28 and 29 for an air and/or water whirlpool system. These connections 28 and 29 are provided in the passage 18 such that they are closed and opened by the closing element 19 simultaneously with the bath drain 1.

The invention is not limited to the exemplary embodiment described here with reference to the figures, but comprises all kinds of modifications thereof, naturally insofar as they fall within the scope of protection of the appended claims. Thus, it is possible to combine a bath inlet cock with the operating knob of the bath drain closure. This bath inlet may have any form. It may consist of a bath inlet

alone, but may also be provided with filling valves, a single-grip mixing tap or a thermostatic mixing valve. Further, the cock may be extended to include a shower and switch cock. Furthermore, all visual parts of the bath drainage system may be standardly constructed such that they can be replaced from the bath side without necessitating demolition or work on the underside or rear side of the bath. It should also be pointed out that to facilitate assembling the combination unit 5, two sewer connections 17, 17' (Fig. 2) may be present, of which only one is used, the other remaining closed then. Further, the operating element 20 can be designed as an electric operating element, in which case a motor, controllable by the operating element, for the transmission mechanism 21 will be present. The electric operating element may, for instance, be automatically set into operation when a back-flow of the dirty water from the stench-trap 7 into the bath 2 occurs or threatens to occur, which is possible in particular when the bath drainage system is fitted in a ship and the ship is subject to pitch and roll.

Claims

1. A bath drainage system for a bath which may further be equipped with a whirlpool system, which bath drainage system comprises a bath drain (1) having a bath drain pipe (3) and a bath drain closure (6), a stench-trap (7), connected to the bath drain (1), having a sewer connection (17) and an overflow device (23) having an overflow pipe (26), characterized in that the bath drain closure (6) comprises a closing element (19) operable from the bath side and the connection between the bath drain pipe (3) and the stench-trap (7) can be broken with the aid of this closing element (19), the bath drain closure (6) and the stench-trap (7) together form a combination unit (5) to which the bath drain pipe (3) and the overflow pipe (26) are connected, the combination unit (5) further comprising at least one sewer connection (17), with a difference in height (H) being present between the underside of the inner side of the mouth of the bath drain pipe (3) in the combination unit (5) and the maximum water level possible in the stench-trap (7), while the combination unit (5), through adjustment of the length of the bath drain pipe (3) and the form and dimensions of the bath drain (1), is applicable independently of the form and dimensions of the bath.

2. A bath drainage system according to claim 1, characterized in that the passages in the combination unit (5), the bath drain pipe (3) and the sewer connection (17)

all have the same minimum diameter with an outside dimension of at least 50 mm.

3. A bath drainage system according to claim 1 or 2, characterized in that the overflow pipe (26) has an external diameter of at least 40 mm.

4. A bath drainage system according to any one of the preceding claims, characterized in that the combination unit (5) comprises two sewer connections (17, 17'), which are provided on opposite sides of the combination unit (5).

5. A bath drainage system according to any one of the preceding claims, characterized in that the combination unit (5) comprises a removable bottom (13).

6. A bath drainage system according to any one of the preceding claims, characterized in that the passage (18) for the closing element (19) reaches as far as at least the underside of the inner side of the mouth of the bath drain pipe (3) in the combination unit (5).

7. A bath drainage system according to claim 6, characterized in that the bath drain closure (6) comprises an operating element (20) fitted on the bath edge and a transmission mechanism (21) connected both to this operating element (20) and to the closing element (19), to enable the closing element (19) to be turned in the passage (18) in the combination unit (5) between the bath drain pipe (3) and the stench-trap (7).

8. A bath drainage system according to claim 7, characterized in that the transmission mechanism (21) comprises a link rod construction (22).

9. A bath drainage system according to claim 7 or 8, characterized in that the operating element (20) is formed by a manually operable operating knob.

10. A bath drainage system according to claim 7 or 8, characterized in that the operating element (20) is formed by an electric operating element and a motor, controllable by said operating element and connected to the transmission mechanism (21).

11. A bath drainage system according to claim 10, characterized in that the electric operating element is set into operation automatically when a back-flow of dirty water from the stench-trap (7) into the bath (2) occurs or threatens to occur.

12. A bath drainage system according to any one of the preceding claims, characterized in that a covering lid (9) is provided over the hole of the drain plug (4), which is provided all around with one or more slits (10).

13. A bath drainage system according to claim 12, characterized in that an aeration hole (11) is provided in the covering lid (9).

14. A bath drainage system according to any one of the preceding claims, characterized in that the overflow pipe (26) is connected to the combination unit (5) so as to extend substantially vertically.

15. A bath drainage system according to any one of the preceding claims, characterized in that the overflow device (23) comprises a feed-through passage (24) to be provided in the wall of a bath (2) and an overflow pipe (26) to be connected to said feed-through passage (24), the feed-through passage opening of the feed-through passage (24) in the bath wall being greater than the drain opening of the overflow pipe (26).

16. A bath drainage system according to claim 15, characterized in that the overflow device (23) further comprises an overflow covering cap (25) having at the underside thereof an opening greater than the cross section of the overflow pipe (26).

17. A bath drainage system according to claim 16, characterized in that the overflow covering cap (25) is provided with an aeration opening at the top.

18. A bath drainage system according to any one of the preceding claims, characterized in that the bath drain (1), and in particular the drain plug (4), is provided with a connection (27) for a whirlpool pump.

19. A bath drainage system according to any one of the preceding claims, characterized in that the combination unit (5) is provided with connections (28, 29) for an air and/or water whirlpool system, and the connecting openings of these connections (28, 29) are closed and opened simultaneously with the bath drain (1).

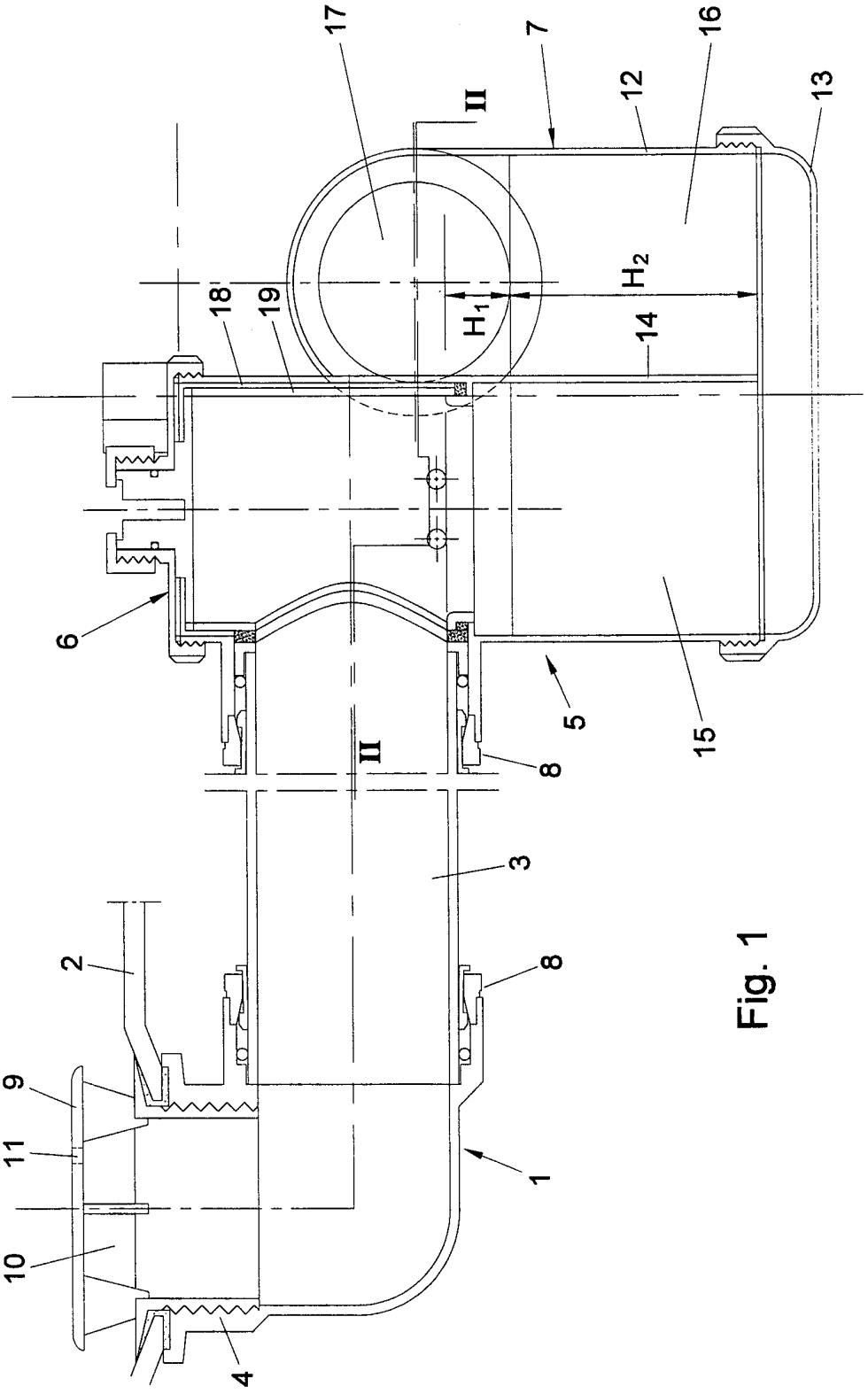


Fig. 1

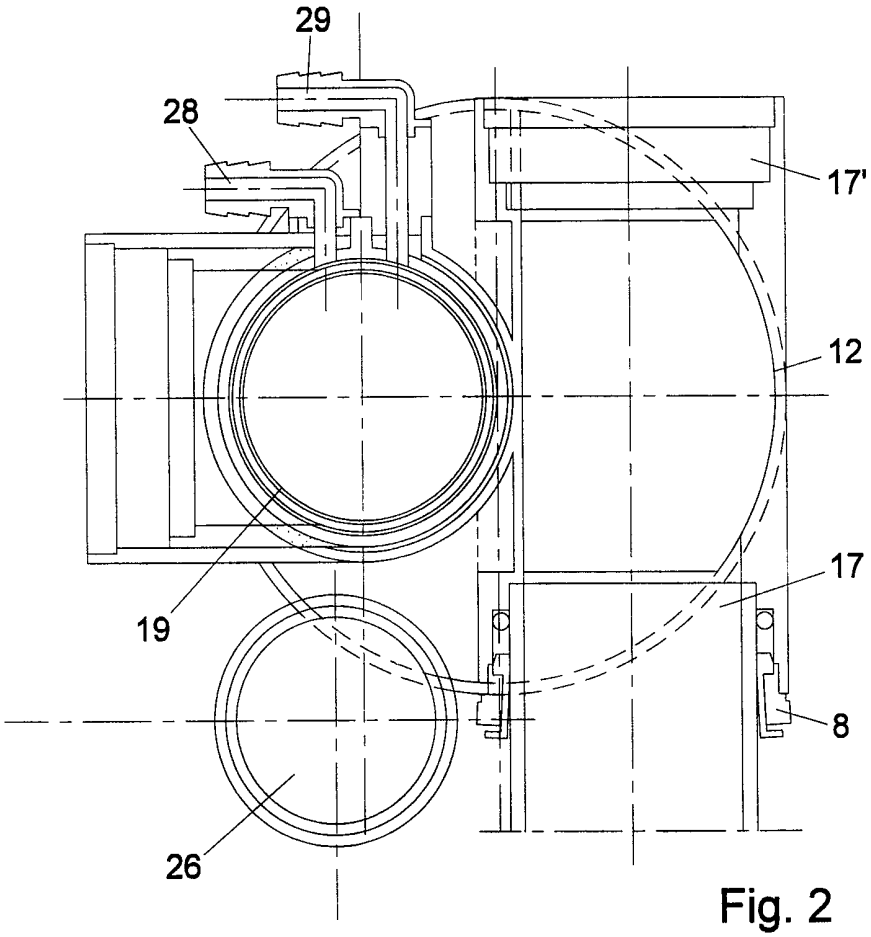


Fig. 2

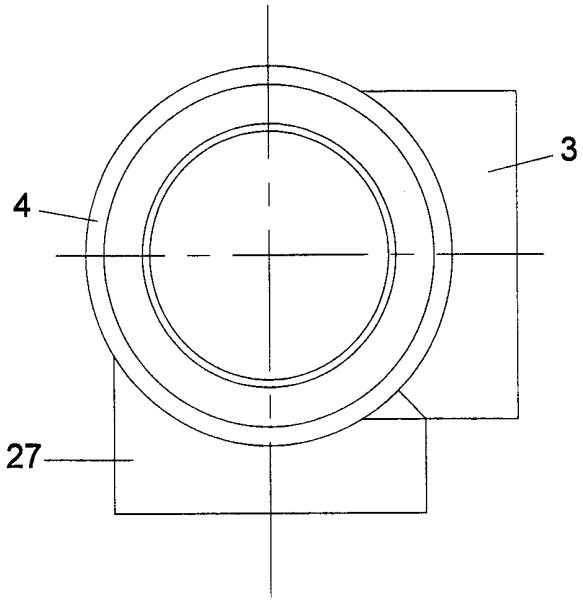


Fig. 4

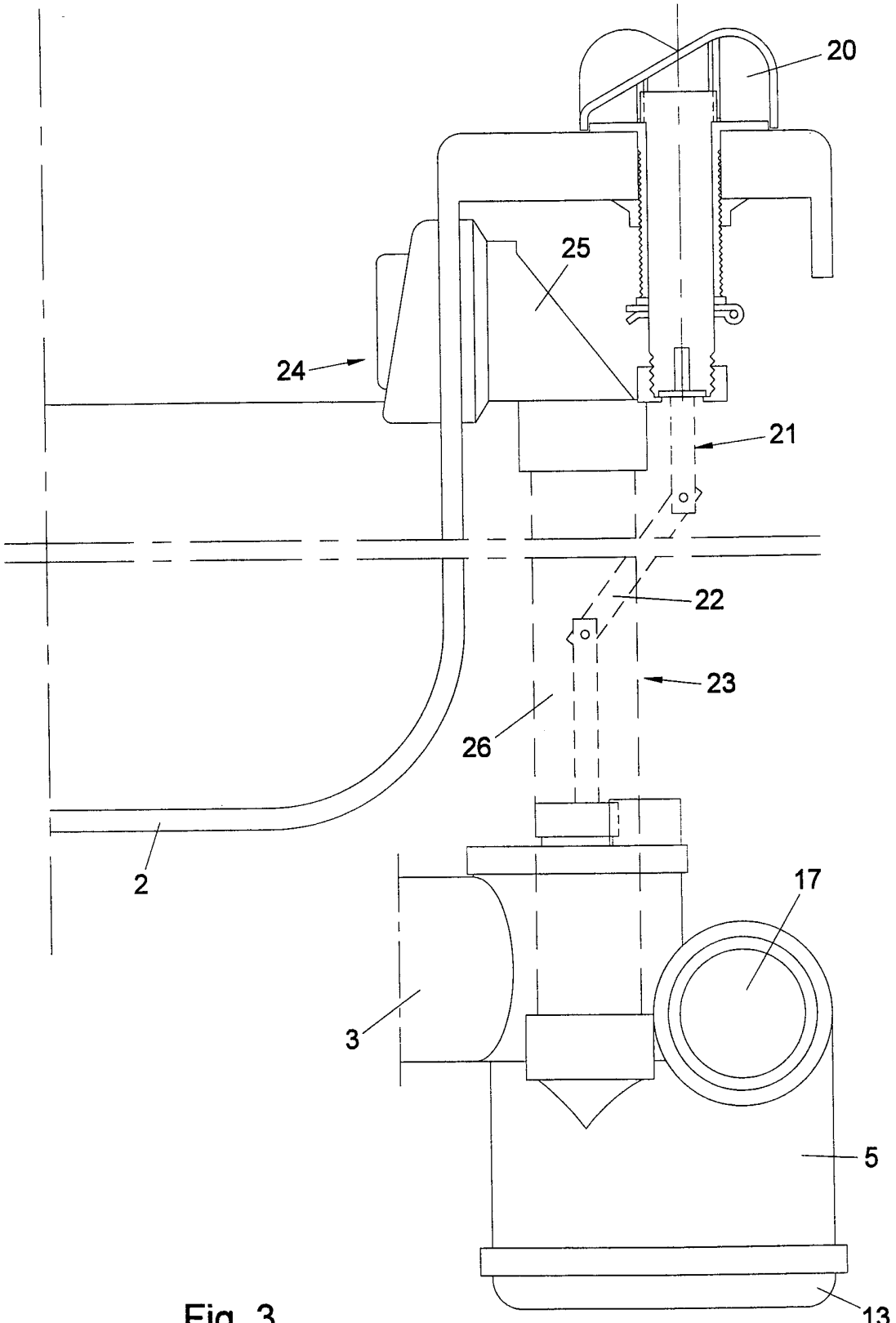


Fig. 3

INTERNATIONAL SEARCH REPORT

In ıtional Application No
PCT/NL 99/00022

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 E03C1/232

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 E03C A61H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CH 239 358 A (NOSER) 2 September 1946 see page 1, line 19 - line 47; figure 1	1-3,7,9, 12-14
A	DE 86 16 387 U (KERAMAG KERAMISCHE WERKE AG) 1 March 1990 see page 4, paragraph 6 - page 6, paragraph 1 see page 6, paragraph 3 - page 7, paragraph 2; figure 1	1-3,7-9, 12,14
A	DE 20 36 586 A (IDEAL-STANDARD GMBH) 11 March 1971 see page 3, paragraph 8 - page 6, paragraph 3; figures	1-3,5-7, 14
A	CH 153 146 A (KUGLER) 16 May 1932 see figure 1	1,5

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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International Application No
PCT/NL 99/00022

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