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(54) Bad odor elimination device for toilet bowl

(57) A bad odor elimination device for a toilet bowl comprising electrically operated aspirator means (7) for aspirating odors through water discharge openings distributed along a rim of said bowl (2), said means (7) being provided with an inlet that is connected to a terminal (11) that is connected to a duct for supplying said water to said bowl (2) and an outlet for expelling said odors into the outside environment.

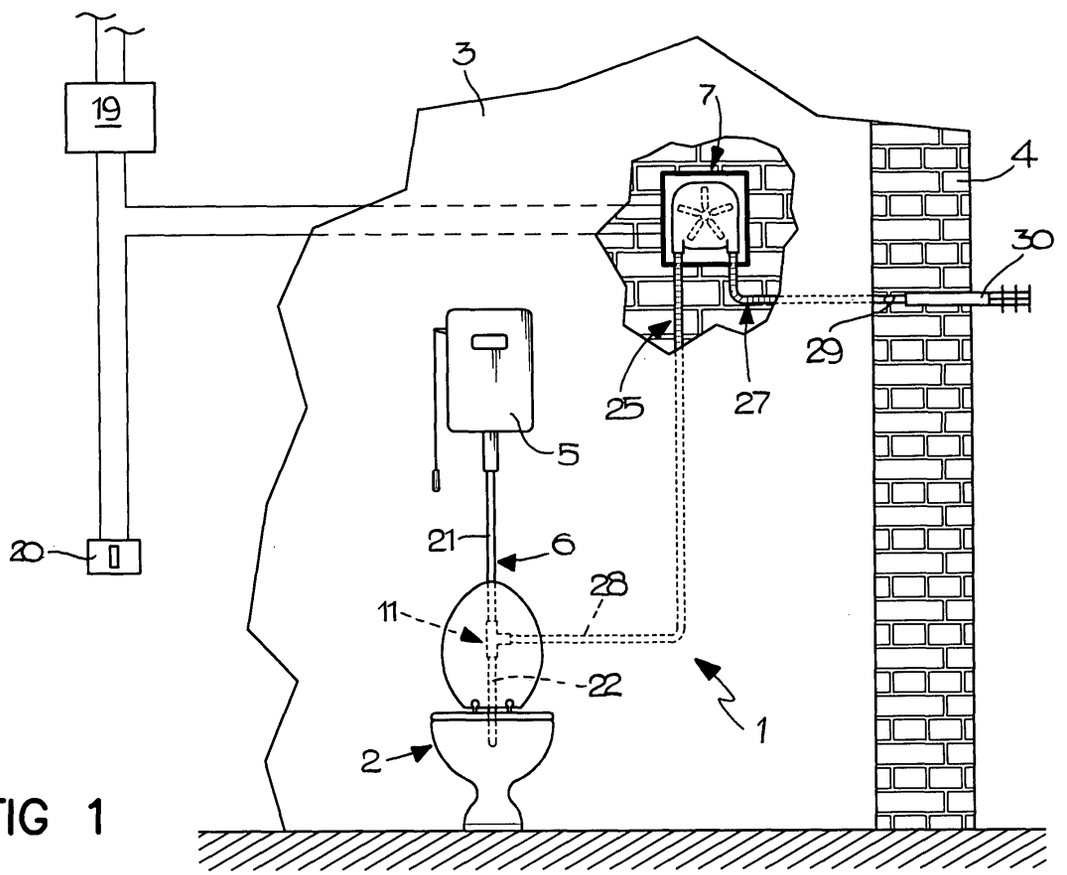

FIG 1

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Description

[0001] The present invention relates to a bad odor elimination device for a toilet bowl.

[0002] The problem of the diffusion of unpleasant odors in toilets is particularly felt; toilets accordingly become unwelcoming for users and inevitably lose the necessary characteristics of hygiene and cleanliness; this occurs particularly in small spaces that are scarcely ventilated and frequently visited, typically public toilets, but also in private homes.

[0003] This problem forces frequent opening of the windows of these spaces even in the winter period, causing energy losses, or the installation of ventilation systems that often prove to be rather ineffective.

[0004] Toilet bowls are known which allow to remove bad odors by way of suitable means installed for this purpose, which however need substantial and expensive modifications to the bowl and onerous assembly and installation operations.

[0005] The aim of the present invention is to obviate the above cited shortcomings, by providing a device that allows to eliminate bad odors from the bowl effectively and so as to ensure maximum hygiene for the users.

[0006] Within this aim, an object of the present invention is to provide a device for eliminating bad odors whose installation does not require the expensive replacement of the ordinary toilet bowl with a specifically designed one.

[0007] Another object of the present invention is to provide a structure that is simple, relatively easy to provide in practice, safe in use, effective in operation, and relatively low in cost.

[0008] This aim and these and other objects of the invention are achieved by the present bad odor elimination device for a toilet bowl, characterized in that it comprises electrically operated means for aspirating odors through water discharge openings distributed along the rim of said bowl, said means being provided with an inlet connected to a terminal that is connected to a duct for supplying said water to said bowl and an outlet for expelling the odors into the outside environment.

[0009] Further features of the invention will become better apparent from the following detailed description of a preferred but not exclusive embodiment of a bad odor elimination device for a toilet bowl according to the invention, illustrated by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is a partially sectional front view of a toilet bowl provided with the device according to a first embodiment of the invention;

Figure 2 is a partially sectional detail front view of the bowl;

Figure 3 is a partially sectional detail plan view of the outlet of the device leading toward the outside environment;

Figure 4 is a partially sectional front view of the terminal of the inlet of said device;

Figure 5 is a front view of the terminal of the inlet of the device according to a second embodiment of the invention;

Figure 6 is a partially sectional front view of the aspirator means;

Figure 7 is a partially sectional side elevation view of the aspirator means of Figure 6;

Figure 8 is a front view of the aspirator means provided in a third embodiment of the present invention;

Figure 9 is a front view of the aspirator means according to a fourth embodiment of the present invention;

Figure 10 is a partially sectional front detail view of a fifth embodiment of the present invention;

Figure 11 is a partially sectional front detail view of a sixth embodiment of the present invention.

[0010] With reference to the figures, the reference numeral 1 generally designates a bad odor elimination device for a toilet bowl, according to the first embodiment of the invention.

[0011] Figure 1 illustrates a toilet bowl 2 that is installed in a toilet enclosed by walls: in the specific case, for the sake of better comprehension, an interior wall 3 and an exterior wall 4 should be considered. The bowl 2 is arranged adjacent to the interior wall 3, to which a flushing water tank 5, with a corresponding lid 5a, is fixed. The water is conveyed to the bowl 2 by means of a supply duct 6, which in the specific case has a substantially vertical axis.

[0012] According to the invention, the device comprises electrically operated means 7 for aspirating odors through water discharge openings 8 distributed along a rim 9 of the bowl 2 (Figure 2): the odors accordingly flow in countercurrent with respect to the flow of the flushing water.

[0013] The aspirator means 7 have an inlet 10, which is connected to a terminal 11 that is connected to the supply duct 6, and an outlet 12, which is adapted to expel the odors into the outside environment.

[0014] The aspirator means 7 are preferably constituted by an extractor 13, for example of the centrifugal type, which is accommodated in a respective box 14, which has openings 14a on its side walls and is recessed in the wall 3. The box is provided with a closure cover 15 that can be fixed for example by means of screws 16 (Figures 6 and 7).

[0015] The extractor 13, in which a suction inlet 17 and a delivery outlet 18 are preferably directed downward, is driven by a respective motor, which is powered at low voltage by way of a transformer 19 and can be started by means of a manual switch 20 or by means of a photocell that senses the presence of a user proximate to the bowl 2.

[0016] The terminal 11 is mounted so that it is interposed between an upper portion 21 and a lower portion

22 of the supply duct 6, and is constituted (Figure 4) by a first tubular portion 23 for the discharge of the water, which is coaxial to the portions 21 and 22, is affected by a second tubular portion 24 for aspirating odors and is connected to the inlet 10 of the aspirator means 7. Preferably, the first and second tubular portions 23 and 24 are arranged so that their respective axes of symmetry are perpendicular one with respect to the other.

[0017] The inlet 10 of the aspirator means 7 and the terminal 11 are connected one another by a suction tube 25 that is recessed in the wall 3. The tube 25 is of the type that has a corrugated outer surface, is made of synthetic material and is divided into segments joined by respective unions 26.

[0018] Likewise, the outlet 12 of the aspirator means 7 is connected to the outside environment by way of an odor expulsion tube 27, preferably of the type with a corrugated outer surface, which is made of synthetic material and is recessed in the wall 3 and divided into segments that are joined by respective unions 26: an expulsion tube 27 has a proximal end 28 that is connected to the delivery outlet 18 of the extractor 13 and a distal end 29 that exits into the environment by means of a windproof end portion 30.

[0019] In order to facilitate the installation of the device, the windproof end portion 30 is recessed through the exterior wall 4 in the vicinity of the interior wall 3 and is connected to the expulsion tube 27 by means of two L-shaped unions 31 made of rubber (Figure 3).

[0020] Operation of the device according to the invention is as follows. The extractor 13 is operated by the user by means of the switch 20 (or starts automatically by way of a photocell), so that the unpleasant odors can be aspirated through the openings 8, thus being conveyed through the lower portion 22 of the supply duct 6 and through the terminal 11 and accordingly along the suction tube 25. The odors are removed by the extractor 13 through the expulsion tube 27, exiting from the windproof end portion 30.

[0021] A second embodiment of the device according to the invention (Figure 5) provides for the fitting of a terminal 11 in which the first tubular portion 23 and the second tubular portion 24 have respective axes of symmetry arranged in a substantially Y-shaped configuration: in this manner it is possible to prevent the flushing water that descends through the first tubular portion 23 from flowing accidentally into and along the second tubular portion 24, reaching the extractor 13.

[0022] In a third embodiment of the device (Figure 8), the suction inlet 17 and the delivery outlet 18 of the extractor 13 are located opposite one another, preferably so that the suction inlet 17 is directed downward and the delivery outlet 18 is directed upward.

[0023] In a fourth embodiment (Figure 9), the suction inlet 17 and the delivery outlet 18 are orientated substantially at right angles, with the suction inlet 17 directed downward and the delivery outlet 18 arranged laterally.

[0024] In a fifth embodiment of the device (Figure 10), the terminal 11 is connected to the top of the cistern 5 for collecting the flushing water, which is of a conventional and widely used type: the terminal 11 is constituted, in the specific case, by a first sleeve 32 and a second sleeve 33, which are folded in an L-shaped configuration and are connected substantially in a U-shaped configuration at the upper portion of the side 34 of the tank 5; the second sleeve 33 is in turn connected to the suction tube 27 recessed in the wall 3.

[0025] The tank 5 has, at its bottom, a water discharge opening 35 that leads to the supply duct 6, which is formed monolithically, and a substantially tubular hollow flow control element 36, which acts as an overflow outlet for the tank 5. The flow control element 36 has a base 37 made of rubber, which is for example bell-shaped and adapted to ensure the seal between the volume enclosed by the tank 5 and the supply duct 6: the flow control element 36 can be raised on command in order to allow the water to descend.

[0026] The upper end 38 of the flow control element 36 rises, in normal conditions, above the surface of the water contained in the tank 5: in this manner, by actuating the extractor 13, the odors rise from the bowl 2 along the supply duct 6 and then along the flow control element 36 toward the top of the tank, where they are trapped by means of the terminal 11.

[0027] Figure 11 illustrates a sixth embodiment of the device, in which the terminal 11 is arranged so that it has a substantially vertical axis and passes through the lid 5a of the tank 5, in order to remove the odors conveyed through the flow control element 36.

[0028] It is noted that as an alternative, the bad odor suction tube 25 and expulsion tube 27 can be installed externally to the wall: in this case, they are preferably of the smooth and substantially rigid type and can be arranged inside raceways fixed along the walls for aesthetic purposes.

[0029] The device according to the invention ensures rapid, effective and hygienic removal of bad odors from the toilet, dispersing them directly into the outside environment. Moreover, the installation of the device is particularly simple and inexpensive, since it does not require replacement of the ordinary toilet bowl or of the flushing tank.

[0030] It has thus been shown that the invention achieves the proposed aim and objects.

[0031] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims.

[0032] All the details may further be replaced with other technically equivalent ones.

[0033] In practice, the materials used, as well as the shapes and the dimensions, may be any according to requirements without thereby abandoning the scope of the protection of the appended claims.

[0034] The disclosures in Italian Patent Application No. BO2002A000354 from which this application claims

priority are incorporated herein by reference.

[0035] 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 interpretation of each element identified by way of example by such reference signs.

Claims

1. A bad odor elimination device for a toilet bowl, **characterized in that** it comprises electrically operated aspirator means (7) for aspirating odors through water discharge openings (8) distributed along a rim (9) of said bowl (2), said means (7) being provided with an inlet (10) that is connected to a terminal (11) that is connected to a duct (6) for supplying said water to said bowl (2) and an outlet (12) for expelling said odors into the outside environment.

2. The device according to claim 1, **characterized in that** said aspirator means (7) comprise an extractor (13) that is supplied at a low voltage and is accommodated in a respective box (14) that is recessed in a wall (3).

3. The device according to claims 1 and 2, **characterized in that** said terminal (11) is fitted so that it is interposed between an upper portion (21) and a lower portion (22) of said supply duct (6), said terminal (11) comprising a first tubular portion (23) for the outflow of said water which is coaxial to said portions (21, 22) and is affected by a second tubular portion (24) for aspirating said odors which is connected to said inlet (10).

4. The device according to one or more of the preceding claims, **characterized in that** said terminal (11) is connected to the top of the tank (5) for collecting said flushing water, said tank (5) having, at its bottom, an opening (35) for the discharge of said water on which a hollow tubular flow control element (36) can engage, said flow control element being suitable to convey said odors toward said top of said tank (5).

5. The device according to one or more of the preceding claims, **characterized in that** said inlet (10) and said terminal (11) are connected by a tube (25) for aspirating said odors that is recessed in said wall (3).

6. The device according to one or more of the preceding claims, **characterized in that** said outlet (12) is connected to the proximal end (28) of a tube (27) for expelling said odors, which is recessed in said wall (3) and in which the distal end (29) protrudes externally.

7. The device according to one or more of the preceding claims, **characterized in that** said first and second tubular portions (23, 24) are arranged so that their respective axes are perpendicular one with respect to the other.

8. The device according to one or more of the preceding claims, **characterized in that** said first and second tubular portions (23, 24) have respective axes arranged substantially in a Y-shaped configuration.

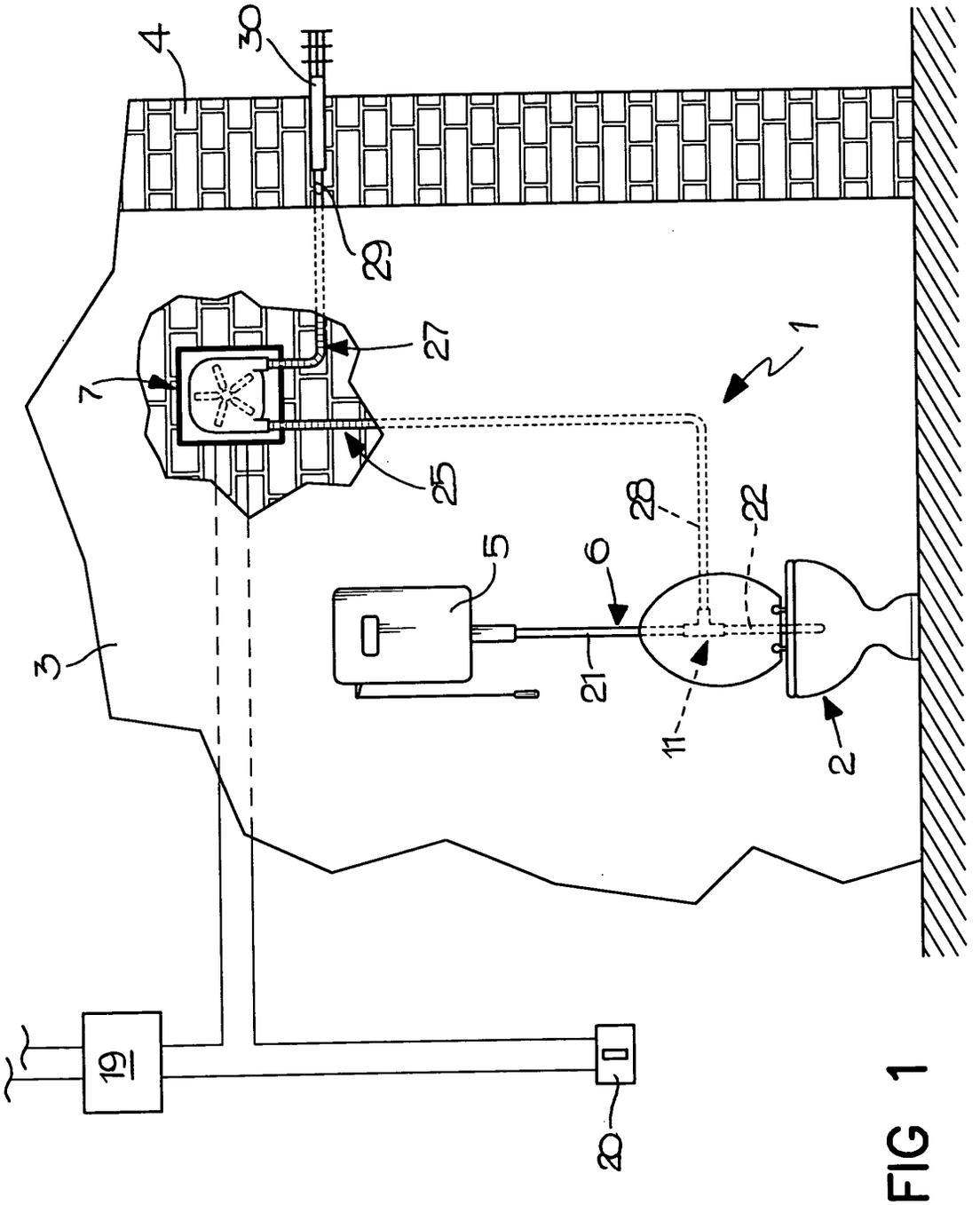

FIG 1

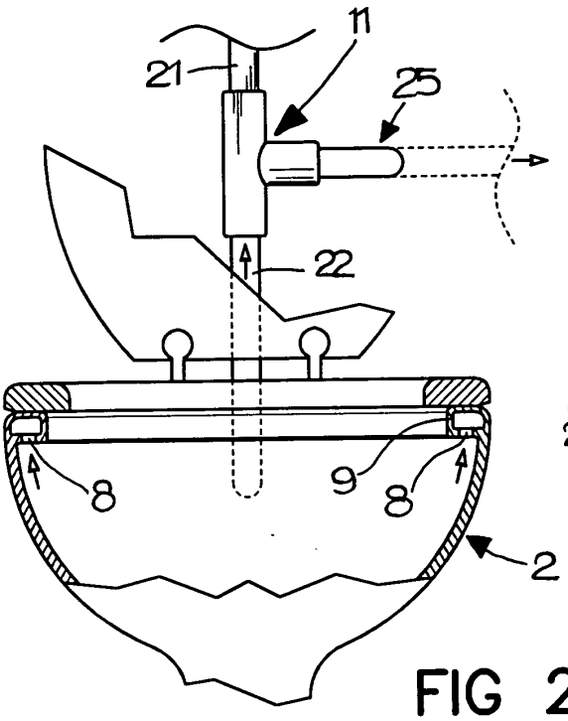

FIG 2

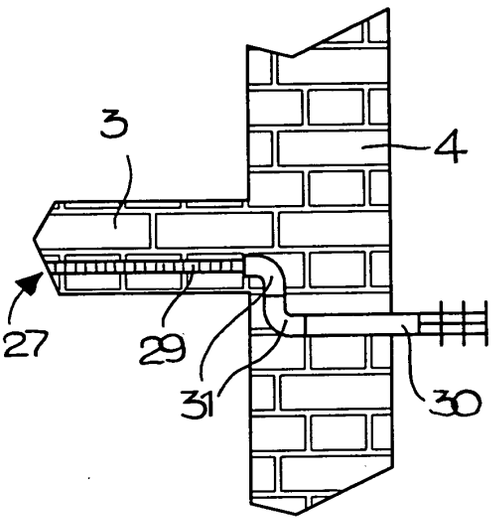

FIG 3

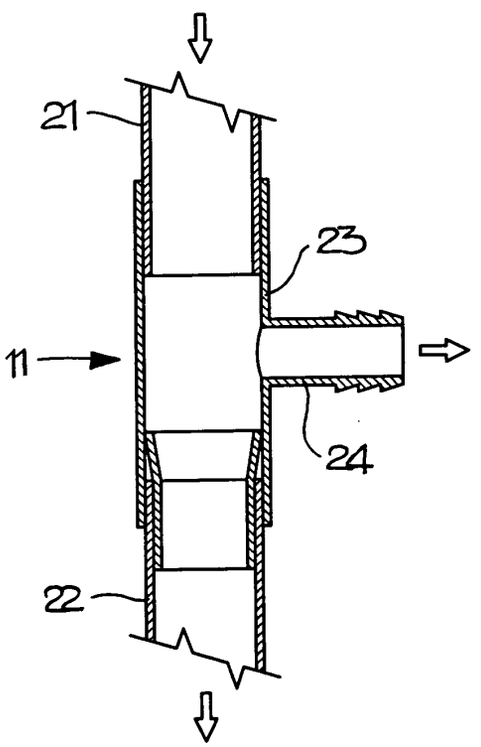

FIG 4

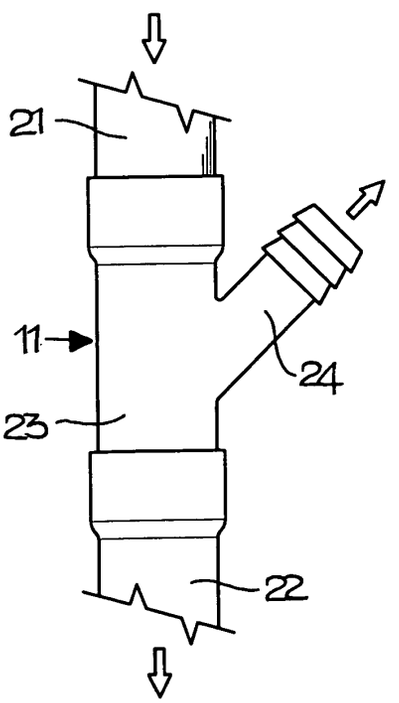

FIG 5

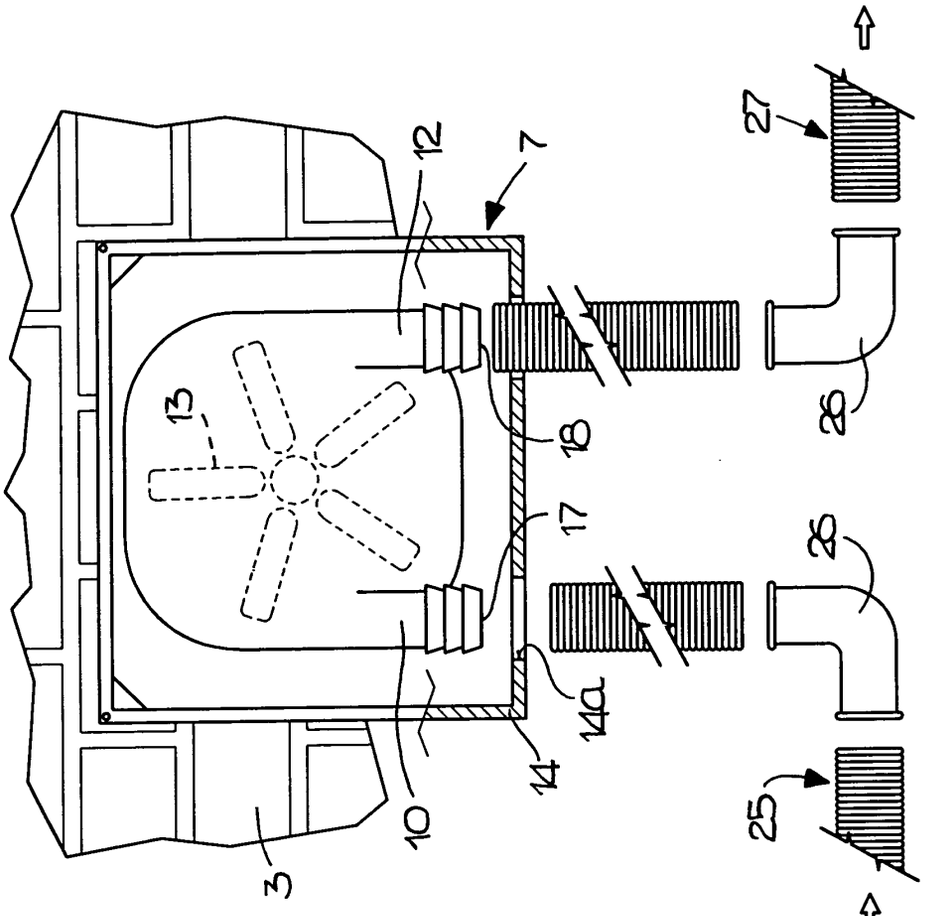

FIG 6

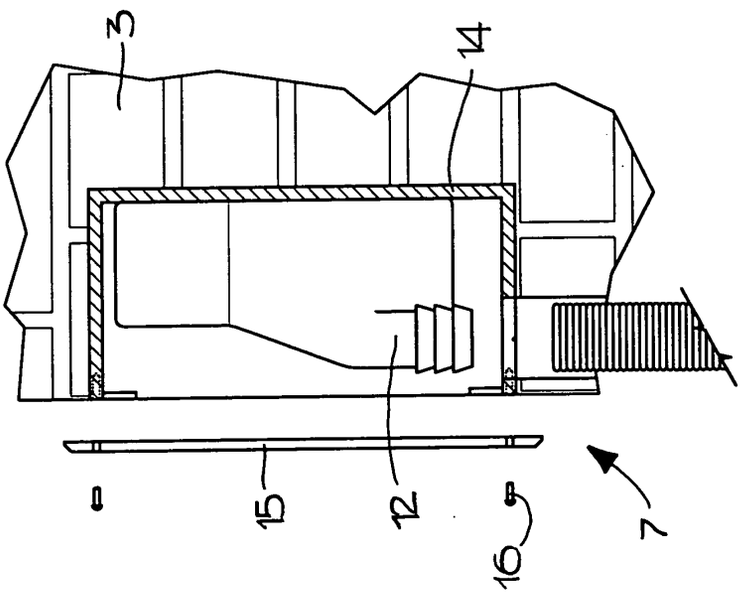

FIG 7

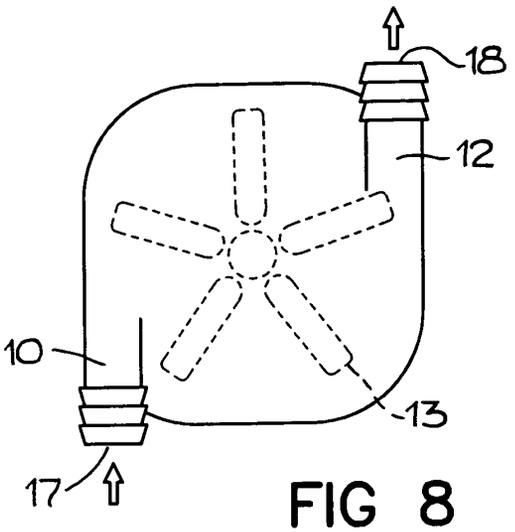

FIG 8

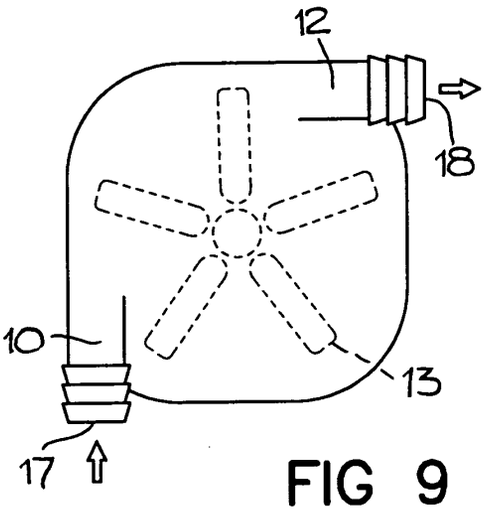

FIG 9

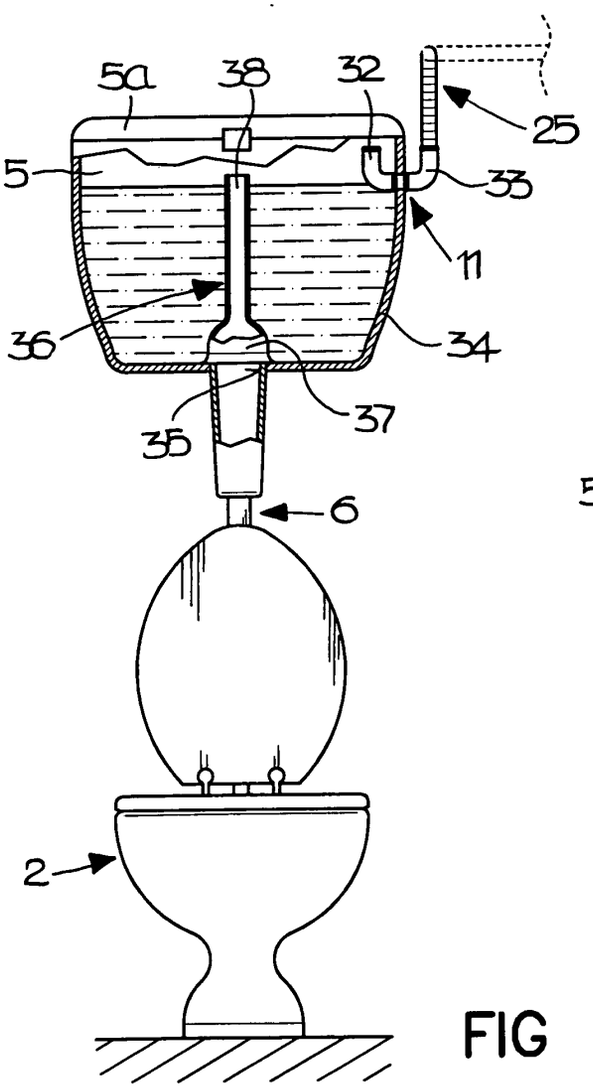

FIG 10

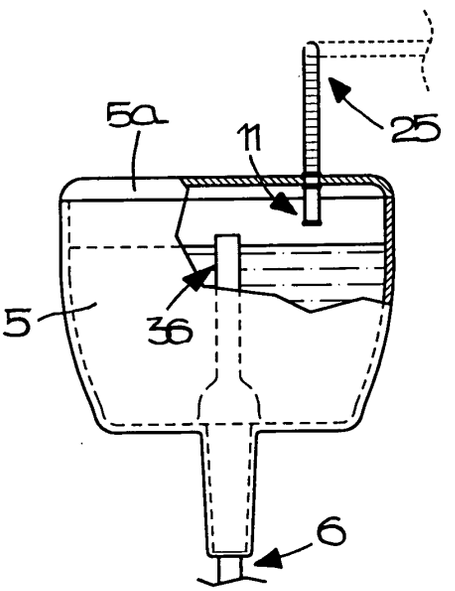

FIG 11

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 03 01 2219

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)
P,X	US 2002/112279 A1 (VAN NIEKERK JAN ANTONIE) 22 August 2002 (2002-08-22) * the whole document *	1-8	E03D9/05
X	US 5 930 844 A (SCOTT III LOUIS J) 3 August 1999 (1999-08-03) * the whole document *	1-8	
X	GB 2 327 095 A (PANFAN INTERNATIONAL LIMITED) 13 January 1999 (1999-01-13) * page 5, line 7 - line 14 * * page 6, line 10 - line 29; figures * * page 10, line 9 - line 21 * * page 12, line 4 - line 22 *	1-8	
X	US 5 839 127 A (CURIEL JESUS M) 24 November 1998 (1998-11-24) * the whole document *	1,4,8	
X	GB 2 323 610 A (FLAHERTY ROGER EDWARD) 30 September 1998 (1998-09-30) * page 5, line 24 - page 6, line 19 * * page 11, line 4 - line 21 * * figures *	1,3,4,6, 7	TECHNICAL FIELDS SEARCHED (Int.Cl.7) E03D
X	US 4 232 406 A (BEEGHLY LESTER R ET AL) 11 November 1980 (1980-11-11) * figure 1 *	1,4,5	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	2 July 2003	Isailovski, M

CATEGORY OF CITED DOCUMENTS

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02-07-2003

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