

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) EP 0 814 210 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
29.12.1997 Bulletin 1997/52

(51) Int. Cl.⁶: E03D 9/052, E03D 9/05

(21) Application number: 96830350.3

(22) Date of filing: 19.06.1996

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

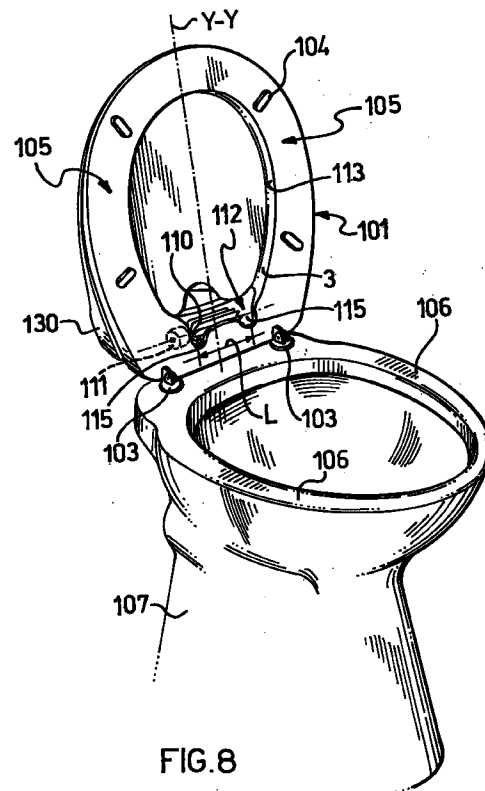
(72) Inventor: Pagani, Achille
20020 Lazzate (Milano) (IT)

(74) Representative:
Siniscalco, Fabio et al
c/o JACOBACCI & PERANI S.p.A.
Via Visconti di Modrone, 7
20122 Milano (IT)

(71) Applicant: Pagani, Achille
20020 Lazzate (Milano) (IT)

(54) An air-aspirated seat for a lavatory bowl

(57) An air aspiration seat (101) for a lavatory bowl (107) in a water closet installation includes an aspiration aperture (112) open on its lower surface (105) facing the lavatory bowl (107) and a centrifugal fan (110) housed in a box-like body formed in the rear part of the said seat (101) and in communication with the aspiration aperture (112), and a delivery pipe for conveying the flow of aspirated air into a ventilation pipe. Advantageously, the aspiration aperture (112) extends along a predetermined section (L) along an inner edge (113) of the seat (101) in correspondence with the rear portion (102) thereof, and includes respective lateral end portions (115) extending from the inner edge (113) of the seat (101) towards the rear end thereof, between which the centrifugal fan (110) extends axially.



EP 0 814 210 A1

Description

The present invention concerns an air-aspirated seat for a lavatory bowl, commonly known as a water closet.

It is known that unpleasant odours are formed in water closet installations as a result of the use thereof which, as well as being unpleasant, have certain unhealthy effects and can provoke nausea, coughing and retching and even poisoning in the long term.

In order to overcome this disadvantage, at least in part, all water closet installations conforming to hygiene standards have ventilation windows or, where this is not possible, ducts for ventilation by a flow of air forced by fans.

However, these measures work slowly and with a significant delay as they require the odoriferous gases to diffuse from the bowl of the water closet into the surrounding atmosphere, and from there to the outside.

In order to reduce the formation of odours it is also known for water closets to be provided with a handle for activating a continuous flow of flushing water, also known as "rapid", when the lavatory bowl is in use.

The continuous flow of water into the bowl generates a suction effect on the air and gases contained in the bowl thereby causing their partial removal. In addition to being unpleasant for the user, this arrangement is also not satisfactorily effective.

The present invention overcomes these limitations and disadvantages effectively, and resolves the technical problem of the complete elimination of the unpleasant odours arising from the use of a water closet when they first arise in the bowl of the water closet, without the gases having to diffuse into the atmosphere from which it is inevitably slower and more difficult to remove them, requiring the complete replacement of the air in the environment.

To achieve this aim, the invention is characterised in that it provides a seat for a lavatory bowl, that is commonly called "board" for its plane shape, provided in its lower part facing the lavatory bowl with at least one aspiration aperture communicating through an internal aspiration manifold with an aspiration duct provided with aspiration means, integral with the seat or separate therefrom, for conveying the flow of aspirated air, depending on the possibilities offered by the water closet installation, through a vent or ventilation duct from the environment, through a separator syphon to a waste water discharge or, in the case of sanitary installations provided with a tank for storing the flushing water of the water closet, below a head of water in the storage tank.

The characteristics and advantages of the invention will become clearer from the following description of a preferred embodiment and variants thereof, given with reference to the accompanying drawings in which:

Figure 1 is a schematic perspective view of a first embodiment of an aspiration seat according to the

invention, with the seat lifted;

Figure 2 is a schematic perspective view of the seat of Figure 1 with the seat lowered;

Figure 3 is a schematic side view of the seat of Figure 1 illustrating a possible installation arrangement;

Figure 4 is a schematic side view of a second embodiment of an aspiration seat according to the invention; Figure 5 is a schematic side view of the seat of

Figure 4 in a different installation arrangement;

Figure 6 is a perspective view of a third embodiment of an aspiration seat according to the invention;

Figures 7 and 8 are perspective views of the seat of Figure 6 in two different positions;

Figure 9 is a perspective view of the seat of Figure 6 from a different angle;

Figure 10 is a schematic side view of the seat of Figure 6 illustrating a different possible arrangement;

Figure 11 is a perspective and partially exploded view of some details of Figure 6; and

Figure 12 is a transverse section of some details of Figure 6.

With reference to Figure 1, a conventional lavatory bowl 1 is shown provided with a seat 2, or board, shown in the raised position.

On the lower surface of the seat, close to the inner edge 3, there is formed a plurality of aspiration openings 4, all of which communicate with a cavity 5, indicated with a broken line, inside the seat. This cavity forms an internal aspiration manifold which houses an aspiration device 6 constituted, for example, by a single or multi-stage centrifugal or axial fan, driven by an electric motor 7.

The rear part of the seat is provided with a projecting box-like body 8 of suitable dimensions to house the motor 7 and the fan 6.

In order to avoid getting in the way of the user, the box-like body may also project from the rear edge of the lavatory bowl which is normally installed with its rear part located at some distance from a wall.

The electric motor 7 is supplied by the mains electricity supply through a plug 9 but, for safety reasons, the supply is preferably indirect through a transformer/supply voltage reducer.

The aspirated gases are conveyed through a flexible delivery pipe 10.

The activation of the motor 7 may be controlled by the user by means of a switch or, as shown in Figure 2, it may be automatic and caused by the open position of the lid 11 of the seat 2. The lid 11 in the open position acts on a push button 12 advantageously located on the front face of the box-like body 8 of the seat 2.

Alternatively, a device may be provided within the seat 2, which is sensitive to the weight placed thereon.

Figure 3 shows, in an illustrative way, various possi-

ble ways of installing the aspiration seat.

The delivery pipe 10 may be connected directly to an aspiration or outlet flue 13 with which many environments are provided, in particular where there are no windows (typical in the case of sanitary facilities in hotel rooms), or a ventilation outlet formed in a wall, a door, a window frame or the glass of a window.

Alternatively, where the sanitary equipment is provided with a tank 14 for storing the flushing water, the delivery pipe 10 may be introduced with its end bent to form an upside-down syphon 15 in the tank 14 and sunk therein below a head of water.

The aspirated gases are therefore bubbled through the water contained in the tank 14 to form a solution which is washed and cooled so as effectively to remove the malodorous content therefrom.

As a further solution, the delivery pipe 10 may be connected to a waste water discharge pipe 16 which is normally provided with an outlet, being a pressure compensator, with an interposed direct isolation syphon 17.

The syphon 17 may be periodically filled with water drawn from the storage tank 14 through a suitable duct 18 or, possibly, from the rapid water delivery pipe.

In some installations it may be preferable, for aesthetic reasons, safety, or ease of installation and maintenance, to locate the aspiration system at a distance from the seat.

In this case, as represented schematically in Figure 4, the delivery pipe may be connected directly to the gas manifold formed in the seat, without needing the box-like body for housing the aspiration devices 6.

These, together with the associated motor 7, may be installed on a wall or even embedded in it.

As a possible variant, the seat, instead of being unitary, may be hinged to a rear anchor plate 19 which, in its turn, is fixed firmly to the lavatory bowl in a known way.

In this case, the manifold 5 formed in the seat is connected to the pipe 10, fixed to the anchor plate 19, through a suitable seal which is sealed when the seat is lowered.

As a further installation variant which is particularly efficient and functional, a nozzle for extracting water by the Venturi effect may be used instead of the fan.

In this case, as shown in Figure 5, the delivery pipe 10 is connected to a water extractor 20, having an extraction nozzle 21 and supplied by the main water supply.

A valve 23 controls the supply to the nozzle, and the control may be either manual in the form of a button or tap, or automatic following a predetermined event such as opening the lid of the lavatory bowl, or applying a weight to the seat.

The extractor outlet is connected to a direct syphon 22 which discharges into the waste water collection duct and ensures the isolation of the duct, thereby preventing any back flow.

With reference to Figures 6 to 12, the reference numeral 101 indicates in its entirety a different embodi-

ment of an aspiration seat, or board, according to the invention.

The seat 101 includes a rear portion 102 connected to a lavatory bowl 107 by known hinge connection means 103 which are angularly movable with respect to the lavatory bowl 107 about a predetermined hinge axis X-X between a lowered position (Figures 6 and 7) and a raised position (Figure 8). Support blocks 104 projecting from the lower surface 105 of the seat 101 support the seat 101 on the upper edge 106 of the lavatory bowl 107 when it is in the aforesaid lowered position.

The seat 101 is shaped to form a box-like body 108 defining a chamber 109 close to the rear portion 102, extending mainly along the aforesaid axis X-X, within which are housed a centrifugal fan 110 and an electric motor 111 necessary to rotate it. For the reasons which will become clearer later on in the description, the centrifugal fan 110 is of the double-inlet type with an axis of rotation parallel to the direction X-X.

On the lower surface 105 of the seat 101 is formed an aspiration aperture 112 which extends for a predetermined section L along the inner edge 113 of the rear portion 102 of the seat 101. The aspiration aperture 112 therefore extends close to the centrifugal fan 110 and parallel thereto, and is in fluid communication with an aspiration collector/manifold of the centrifugal fan 110. The aspiration aperture 112 preferably extends to the portion of the inner edge 113 of the seat 101 located along the aforesaid section L of the lower surface 105 of the seat 101.

The aspiration aperture 112 includes respective lateral portions 115 at its opposite ends, which extend on the lower surface 105 of the seat 101 from the inner edge 113 towards the rear end thereof in a direction Y-Y which is substantially perpendicular to the direction X-X, so that the aspiration aperture 110 is substantially U-shaped.

The distance L between the aforesaid lateral portions 115 of the aspiration aperture 112 is advantageously such that it is greater or at least equal to the axial length of the centrifugal fan 110, so that the centrifugal fan 110 extends between the said lateral portions 115. This allows the centrifugal fan 110 to aspirate air through the lateral portions 115 of the aspiration aperture 112, along the axial ends of the rotor, with a significant increase in the efficiency of aspiration and, therefore, in the quantity of air and gas aspirated for an equal centrifugal fan power.

A discharge collector/manifold 116 for the chamber 109 of the seat 101 allows the aspirated air and gases to be conveyed from the centrifugal fan 110 to a flexible delivery pipe 118. In the example, the discharge collector/manifold 116 includes a sleeve 119 projecting from the upper part of the box-like body 108 and positioned in correspondence with the centre of the centrifugal fan 110. A corresponding elbow connector 120 on the end of the flexible pipe 118 is engaged with the sleeve 119 in a male and female coupling.

The sleeve 119 and the connector 120 of the flexi-

ble pipe 118 are preferably connected by known quick-release means 121 which allow the connector 120 to rotate about the axis Z-Z of the sleeve 119 such that the flexible pipe may be oriented according to the specific needs of the installation. In the example, the sleeve 119 constitutes the male element of the connector and, at its free end, includes an external projection 122 extending circumferentially around the sleeve 119 except for a predetermined section A of the circumference. The connector 120 includes two diametrically opposed internal projections 123 which extend circumferentially along a section at the most equal to the aforesaid section A without external projections 122 of the sleeve 119. The connector 120 is engaged with the sleeve 119 by fitting an internal projection 123 of the connector 120 tightly against the lateral surface of the sleeve 119 below the external projection 122 (Figure 12) and rotating the connector 120 with respect to the axis Z-Z of the sleeve 119 until the internal projection 123 corresponds with the section A of the sleeve 119 free of external projections 122, permitting the connector 120 to engage with the sleeve 119. By subsequently turning the connector 120 with respect to the axis Z-Z of the sleeve 119, the internal projections are moved away from the aforesaid section A of the sleeve 119 free of external projections 122, so as to prevent the connector 120 disengaging from the sleeve 119. The arrangement of the internal projections 123 of the connector 120, and the section A of the sleeve 119 free of external projections 122 is preferably such that the connector 120 is able to engage with the sleeve 119 only when the connector 120 is perpendicular to the axis X-X and oriented from the rear portion 120 of the seat 101 towards the opposite end thereof.

Figure 10 represents by way of example a different way in which the aspiration seat 101 may be installed.

The flexible delivery pipe 118 may be connected directly to an aspiration or outlet flue 124 with which many environments are provided, particularly where there are no windows (the case of sanitary facilities in hotel bedrooms is typical), or a ventilation outlet formed in a wall, a door, a window frame or the glass of a window.

Alternatively, where the sanitary equipment is provided with a tank 125 for storing the flushing water, the flexible pipe 118 may be introduced into the tank 125 with its end bent to form an upside-down syphon 126 and sunk therein below a head of water.

The aspirated gases are bubbled through the water contained in the tank 125 to form a solution which is washed and cooled so as effectively to remove the malodorous content therefrom.

As a further arrangement, the flexible pipe 118 may be connected to a pipe 117 for discharging the waste liquid, this normally being provided with a vent, being a pressure compensator, with an interposed direct isolation syphon 128.

The direct syphon 128 may be periodically filled with water drawn through an appropriate pipe 129 from the storage tank 125 or, possibly, from the rapid water

delivery pipe.

A cover 130 is attached to the rear portion 102 of the seat 101 to be angularly movable around the aforesaid hinge axis X-X with respect to the seat 101 or the lavatory bowl 107, between a lowered position in which it is horizontal (Figure 6), and a raised position in which it is substantially vertical (Figures 7 and 8). The rear part 131 of the cover 130 complements the shape of the box-like body 108 of the seat 101 and includes an aperture 132 which is advantageously shaped so as not to interfere with the sleeve 119 of the discharge manifold 116.

The electric motor 111 is supplied from the mains electricity via a plug 117 but, for safety reasons, the supply is preferably indirect through a transformer/supply voltage reducer. The activation of the electric motor 111 is controlled by a switch 114 on the rear portion 102 of the seat 101. The switch 114 preferably includes a button actuator facing the outer rear edge of the seat 101, which is operable by a projection 133 projecting from the rear part 131 of the cover perpendicular to the hinge axis X-X when the cover 130 is raised and the seat 101 is lowered (Figure 7)

The centrifugal fan 110, the motor 111, the switch 114 and the other electrical parts are of the type which conform to safety standards for use in the presence of water.

It is clear from the foregoing that the aspiration seat described above resolves in an effective way the technical problem of the complete elimination of unpleasant odours arising from the use of a water closet when they first arise in the lavatory bowl, without having the disadvantages referred to. In particular, the efficiency of aspiration of the unpleasant odours is controlled by the shape of the aspiration aperture and the positioning thereof with respect to the centrifugal fan which allows the loss in aspiration pressure to be reduced so as to be able to aspirate a greater quantity of air and gas for the same fan power.

A further advantage of the aspiration seat according to the invention lies in its perfect adaptability to conventional lavatory bowls.

A further advantage of the aspiration seat according to the invention lies in its structural and functional simplicity.

An expert in the field, in order to satisfy contingent and specific demands, may obviously introduce numerous modifications and variants to the aspiration seat according to the invention as described above, all however being within the ambit of the protection as defined by the following claims.

The chamber in which the fan and the associated electric motor are housed may be a separate element which is attached to the rear portion of the seat with a suitable interposed seal.

If the centrifugal fan is of the single-inlet type, the aspiration opening may have a single lateral portion.

Claims

1. An air aspiration seat (2; 101) for a lavatory bowl in a water closet installation, characterised in that it includes at least one aspiration aperture (4; 112) open on its lower face (105), facing the lavatory bowl (1; 107) and communicating with an aspiration manifold (5) within the said seat (2; 101), and means (6, 7, 10; 20, 21; 110, 118) for the aspiration and delivery of air connected to the said aspiration manifold (5) for conveying the aspirated air out of the said installation or into a tank (14; 125) for storing flushing water. 5
2. A seat (2) according to Claim 1, in which the said aspiration and delivery means include a fan (6) with an associated electric motor (7) housed in a box-like body (8) formed in the said seat (2), and a pipe (10) for the delivery and connection of the said box-like body (8) to a discharge outlet. 15
3. A seat (2) according to Claim 1, in which the said aspiration and delivery means include an aspiration pipe (10) connected to the said aspiration manifold (5) and terminating in an aspiration device (6; 20, 21) which is remote from the said seat and in communication with a discharge outlet. 20
4. A seat (2) according to Claim 3, in which the said aspiration device is a fan (6). 25
5. A seat (2) according to Claim 3, in which the said aspiration device is a water extractor (20, 21). 30
6. A seat (101) according to Claim 1, in which the said aspiration and delivery means include a centrifugal fan (110) with associated electric motor (111) housed in a box-like body (108) formed in the rear part (102) of the said seat (101), and a delivery pipe (118) for connecting the said box-like body (108) to a discharge outlet, and in which the said at least one aspiration aperture includes a single aperture (112) open on the lower surface (105) of the seat (101) and extending along a predetermined section (L) along an inner edge (113) of the seat (101) at the rear portion (102) thereof. 35
40
45
7. A seat (101) according to Claim 6, in which the said single aperture (112) includes respective lateral end portions (115) extending substantially from the inner edge (113) of the seat (101) towards the rear end thereof, the said centrifugal fan (110) extending axially between the said lateral end portions (115). 50
8. A seat (101) according to Claim 6 or Claim 7, in which the said single aperture (112) extends to the portion of the inner edge (113) of the seat (101) along the said predetermined section (L). 55
9. A seat (101) according to Claim 6, in which the delivery pipe (118) includes an end connector (120) connected to a discharge manifold (116) of the box-like body (108) by attachment means (121) which enable the connector (120) to rotate with respect to the discharge manifold (116).
10. A seat (101) according to Claim 6, including a lid (130) attached to the rear portion (102) of the seat (101) by a hinge connection (103), the said seat (101) including a rear projection (133) for operating a switch (114) of the electric motor (111) when the lid (130) is raised with respect to the seat (101).
11. A seat (101) according to Claim 10, in which the said switch (114) is associated with the rear portion (102) of the seat (101), the actuator of the switch facing the outer edge of the seat (101).
12. An air-aspiration seat (2; 101) according to any of Claims 2, 3 or 6 in which the said discharge outlet includes a pipe (13; 124) for aerating or ventilating the environment.
13. An air aspiration seat (2; 101) according to any one of Claims 2, 3 or 6, in which the said discharge outlet includes a tank (14; 125) for storing flushing water, and the said means for aspiration and delivery of gas include a syphon (15; 126).
14. An air aspiration seat (2; 101) according to any one of Claims 2, 3, or 6, in which the said discharge outlet is a pipe (16; 127) for collecting the waste water, and the said means for aspiration and delivery of gas include a direct isolation syphon (22; 128).

FIG. 1

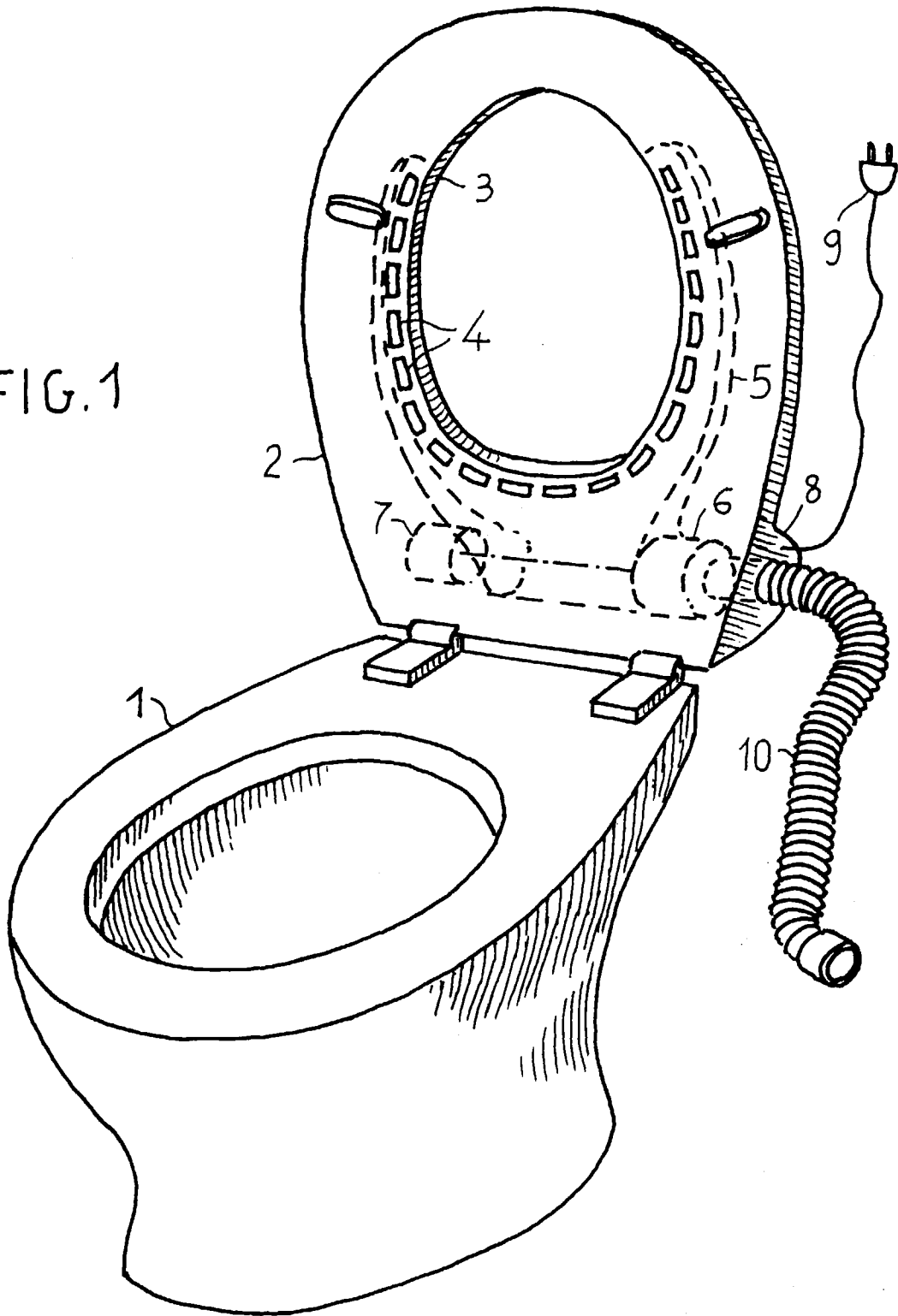


FIG. 2

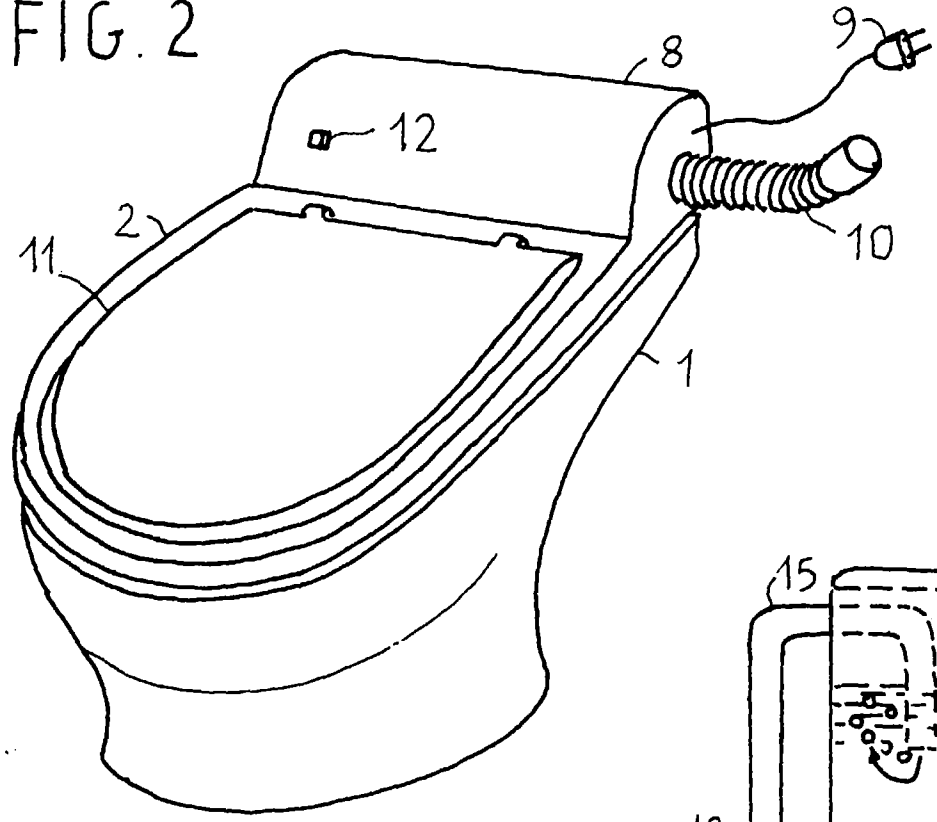


FIG. 3

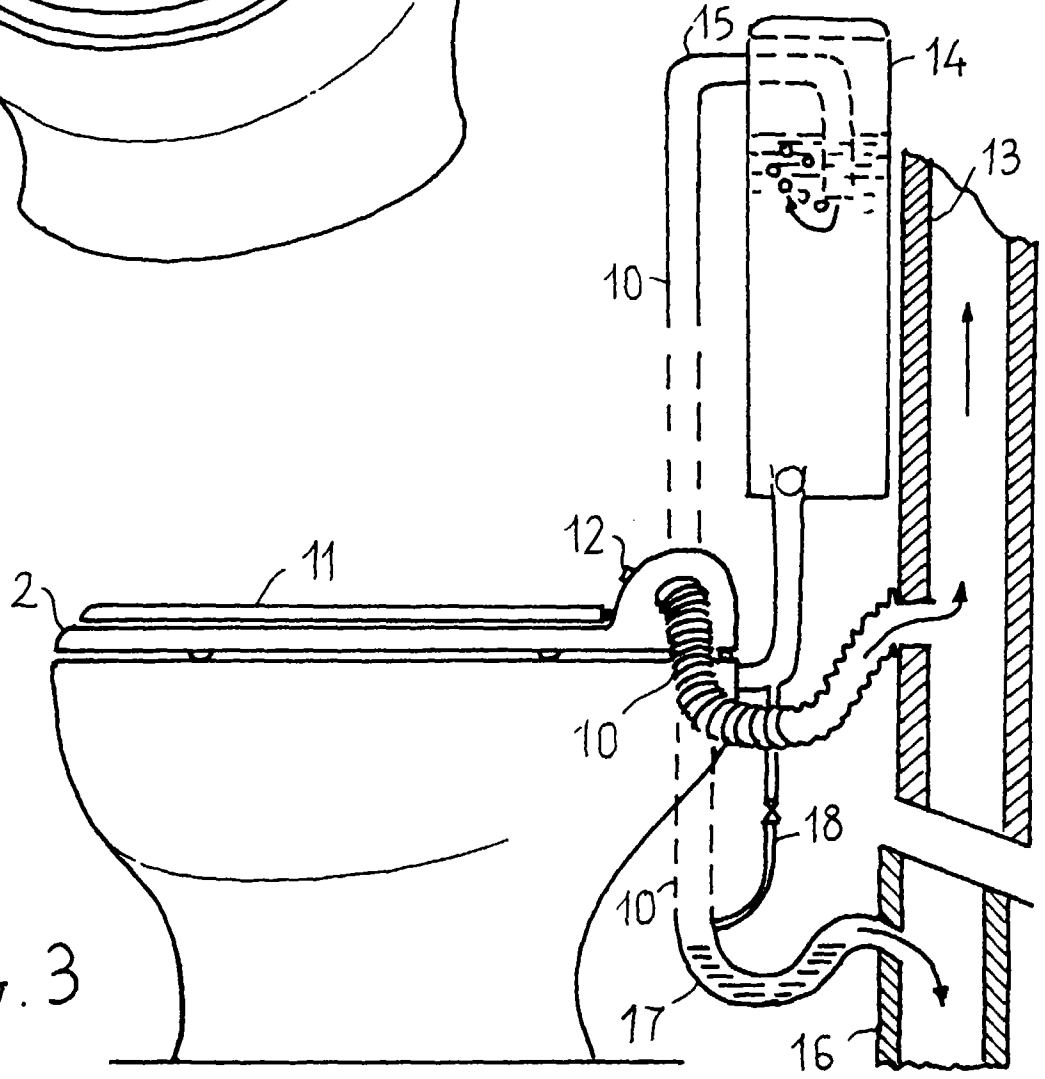


FIG. 4

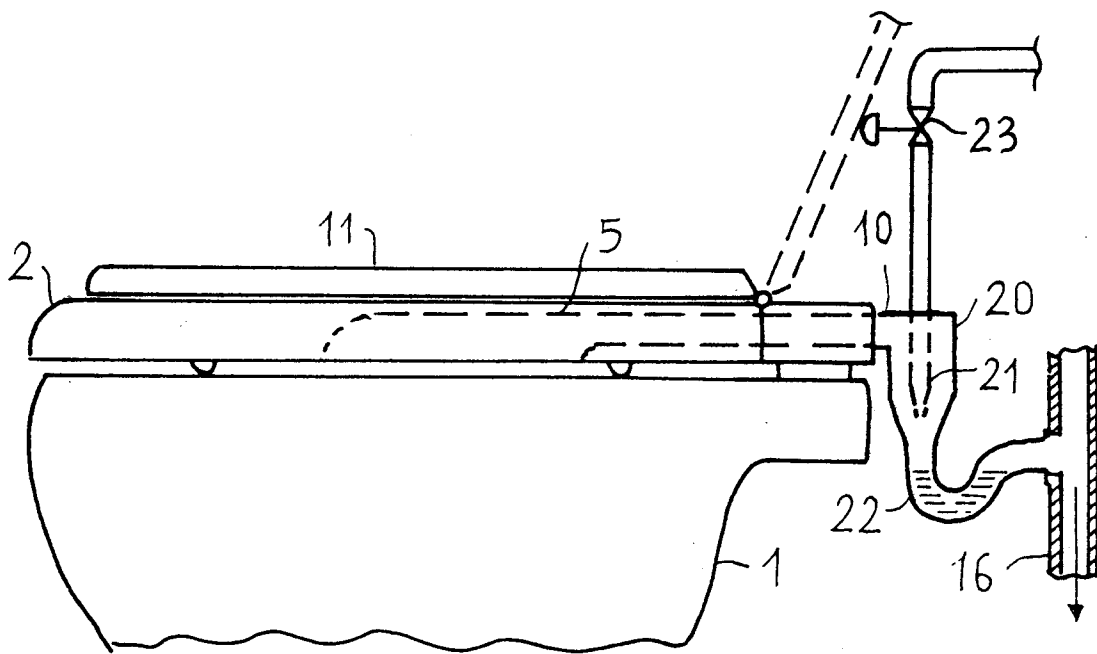
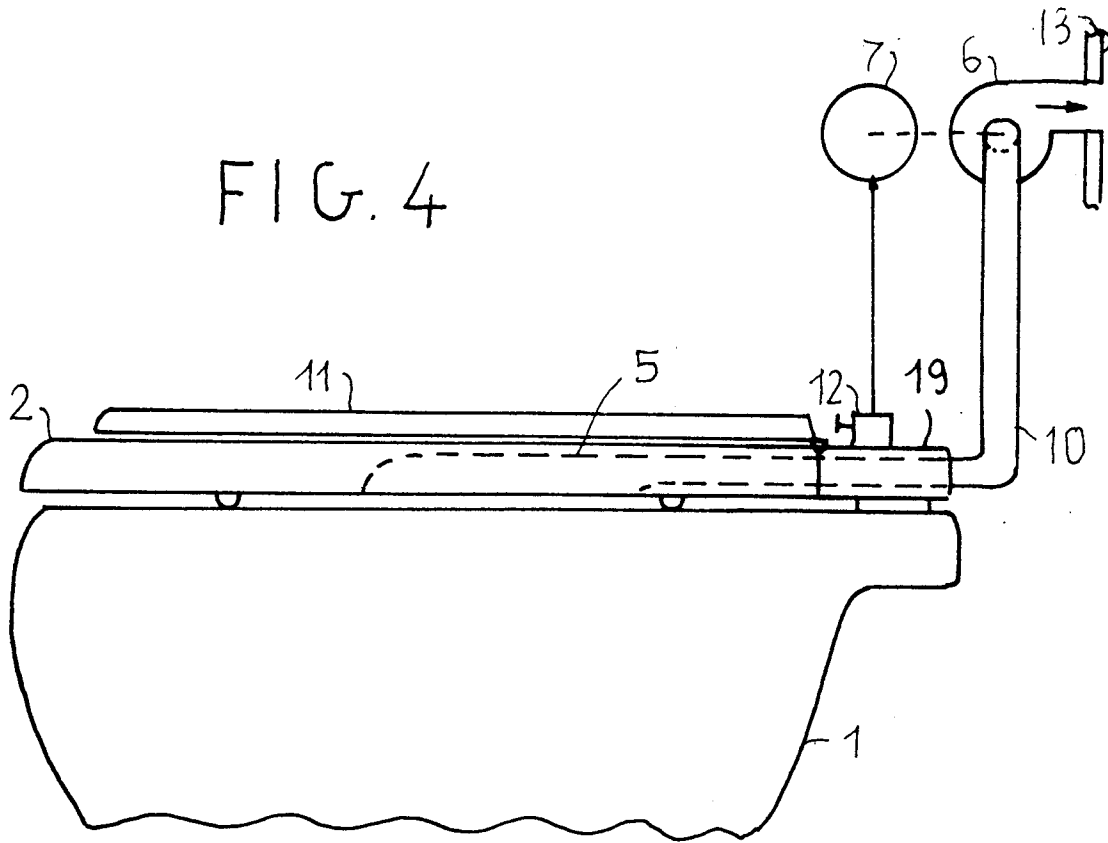
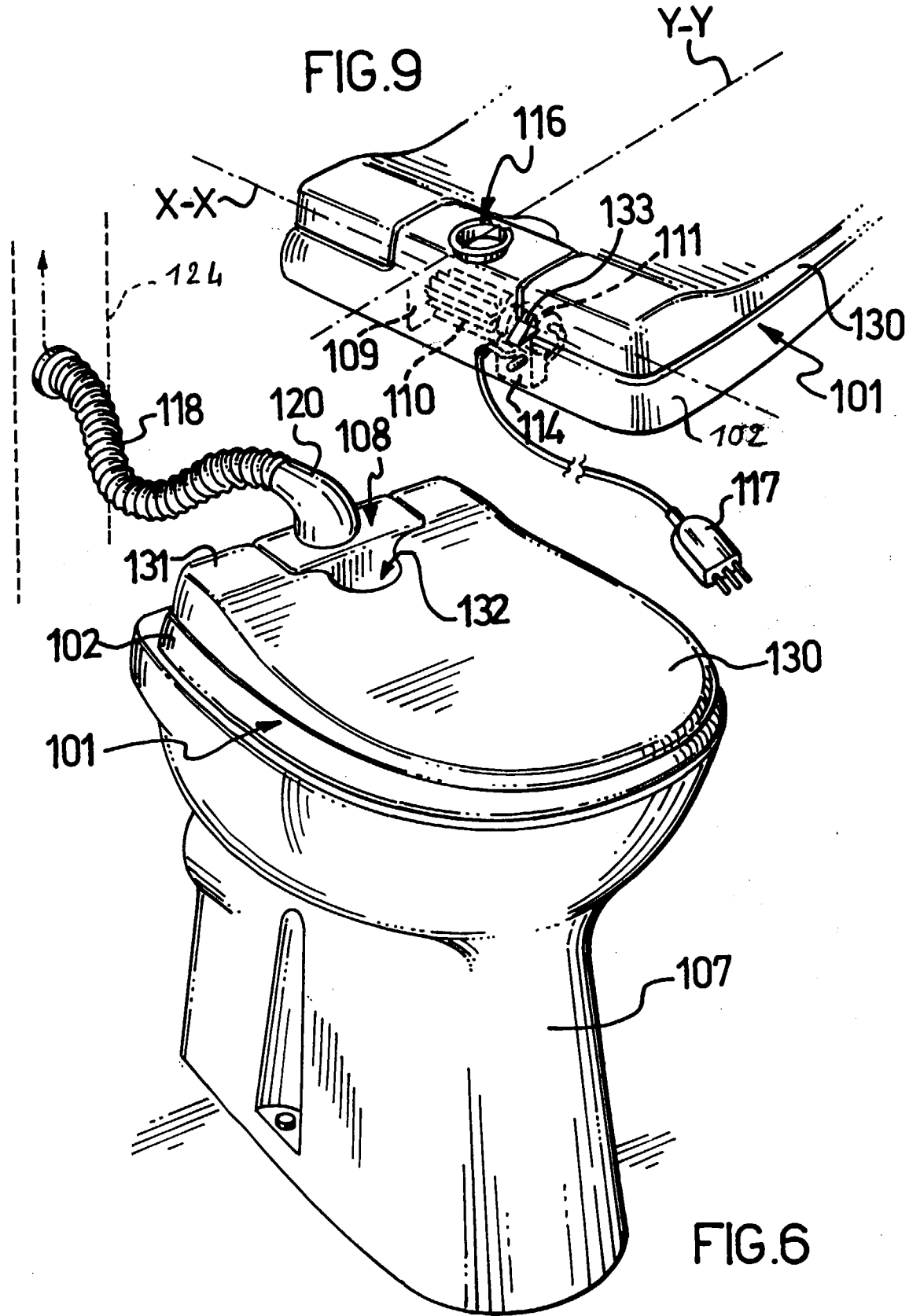


FIG. 5



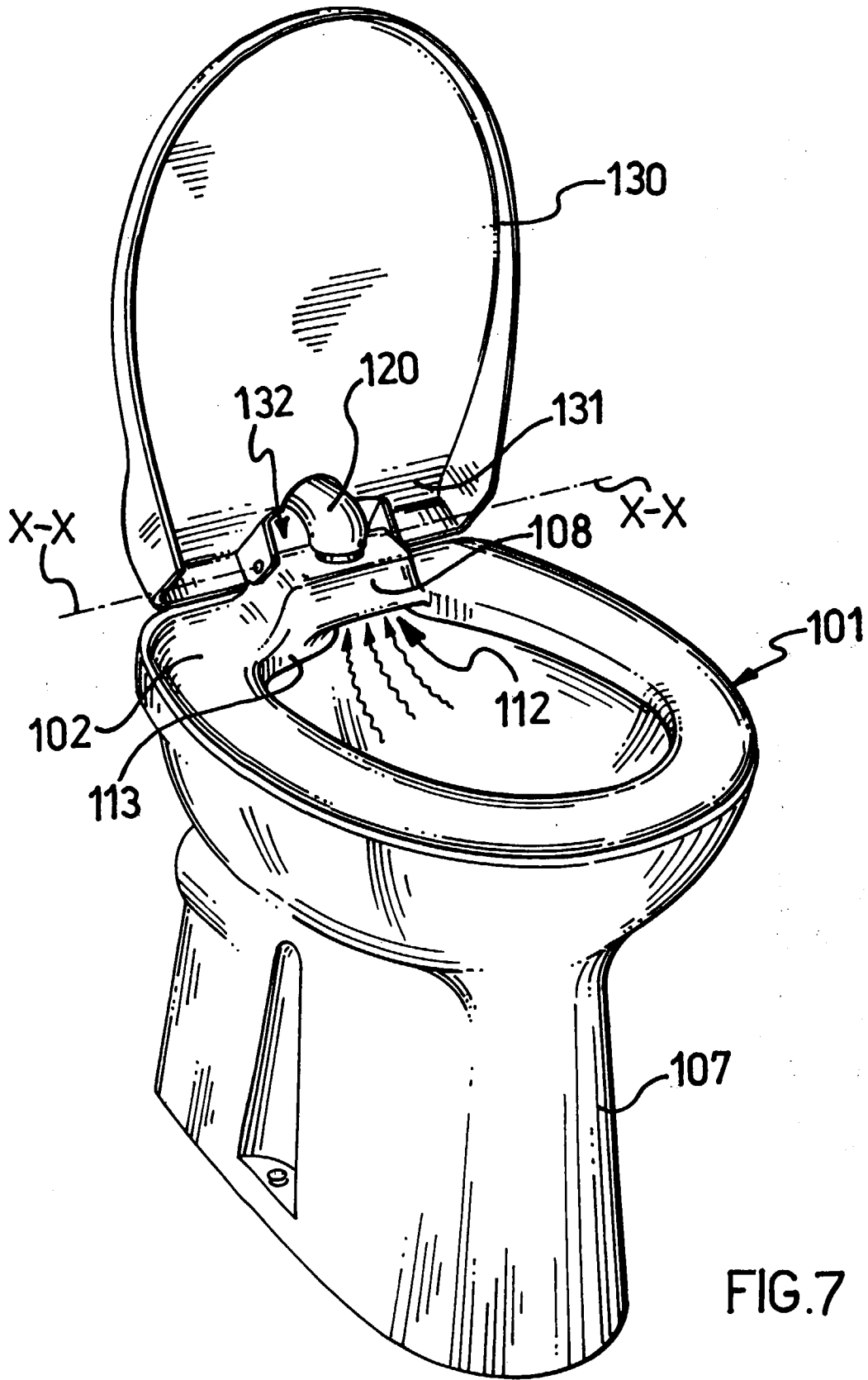


FIG.7

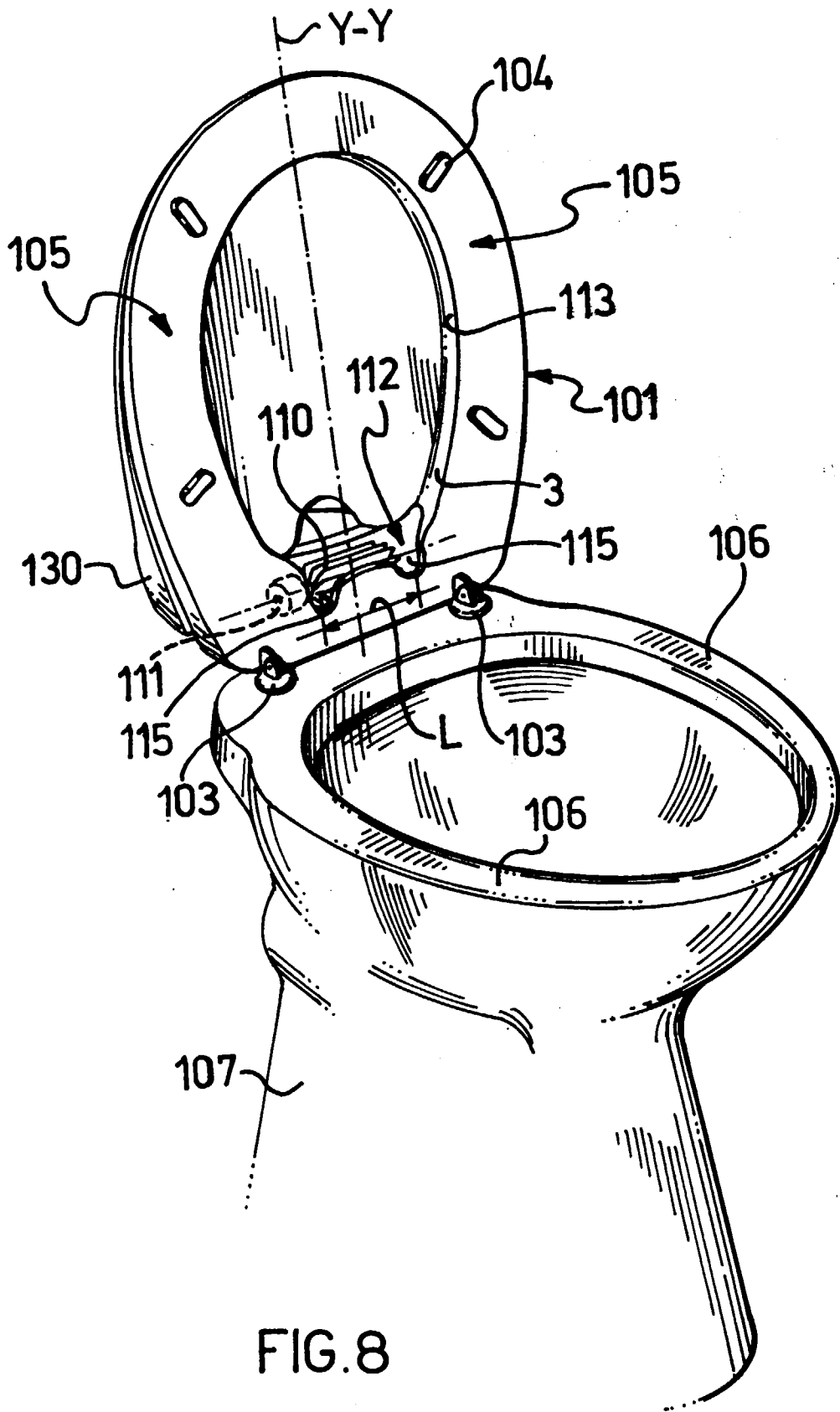


FIG. 8

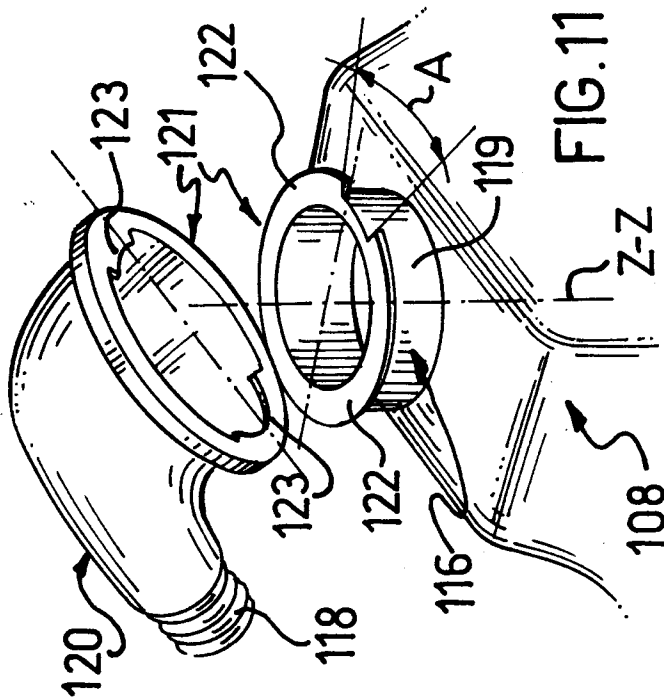


FIG. 11

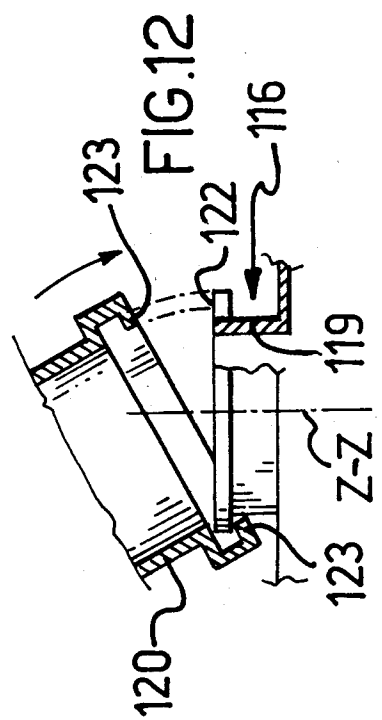


FIG. 12

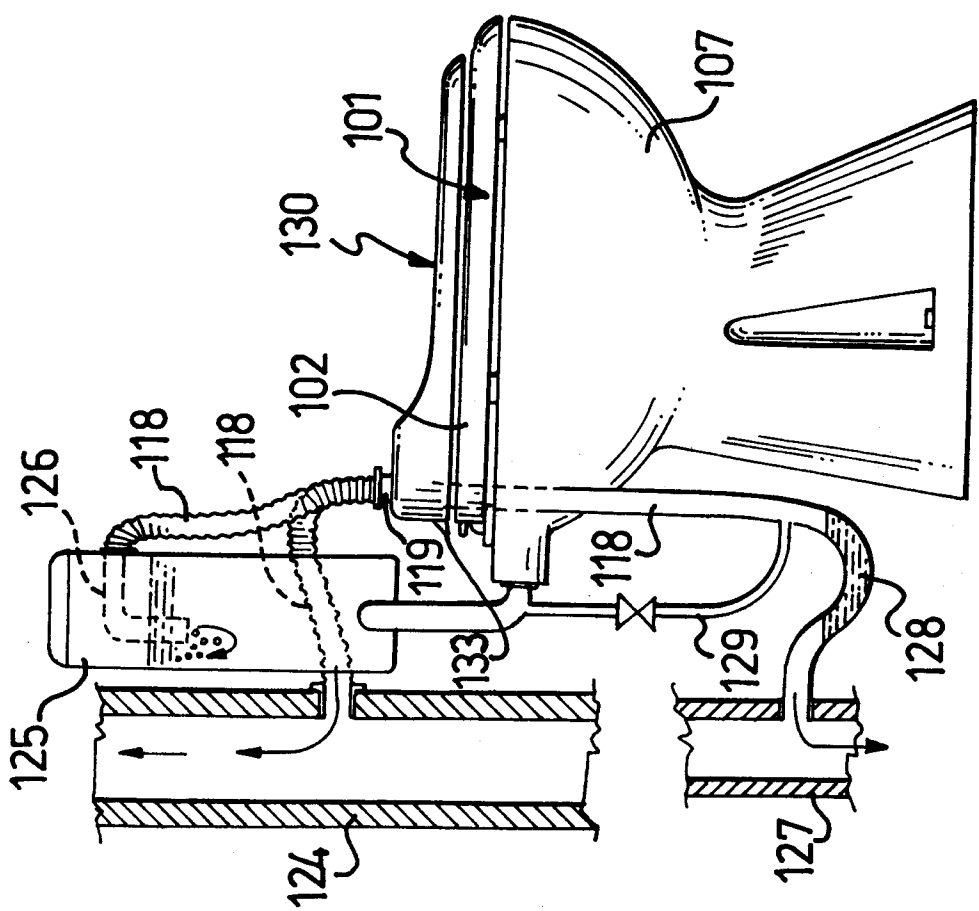


FIG. 10



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 96 83 0350

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.6)
X	CH-A-465 516 (EISENWERKE GAGGENAU GMBH) * column 3, line 13 - column 4, line 2; figures *	1,2	E03D9/052 E03D9/05
X	DE-A-20 30 719 (STAMPER) * page 5, paragraph 4 - page 7, paragraph 3; figures *	1,2,6	
X	FR-A-2 512 663 (DESCLAUX) * page 2, line 10 - page 3, line 8; figures *	1,2	
X	CH-A-448 920 (ZANARDELLI) * column 2, line 17 - column 3, line 27; figures *	1,3,4,12	
A		10,11	
X	EP-A-0 651 098 (SHALOM) * column 3, line 53 - column 6, line 5 * * column 6, line 48 - line 54 * * column 10, line 26 - line 46; figures 1,3,8 *	1,3,4, 12-14	TECHNICAL FIELDS SEARCHED (Int.Cl.6) E03D
A	BE-A-543 347 (SAN) * page 2, line 25 - page 4, line 6; figure 1 *	1,3,5, 10,12-14	
A	DE-A-19 02 751 (POWER-LECTRIC LTD.) * figures *	12-14	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 24 September 1996	Examiner De Coene, P
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			

EPO FORM 1503 03.92 (P/MC01)