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54 **Aspirator-deodorizer device for water-closets.**

57 The aspirator-deodorizer device comprises an electric fan accommodated within a container (8-9) to be arranged beside a WC bowl or to be hung on a wall of the water-closet room, near the WC bowl. The suction of the electric fan is connected by means of either a rigid or a flexible tube (2-102) to at least one flat-shaped draw-mouth (1), preferably in the form of a goose beak, which is hooked on the top rim of the WC bowl and which opens into the interior thereof in order to create a vacuum therein and evacuate the air and bad-smelling gases being formed during the use of the WC bowl. Said draw-mouth (1) traverses the space usually existing between the top rim of the bowl and the overlying seat (S). If the delivery outlet of the electric fan opens into the WC room, a suitable filter (10) is fitted at said delivery outlet in order to purify the air.

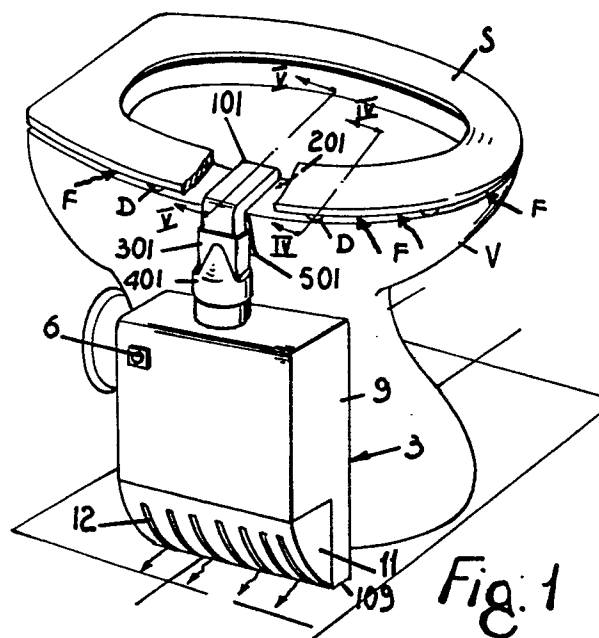


Fig. 1

EP 0 289 696 A1

"Aspirator-deodorizer device for water-closets"

The invention relates to an aspirator device which is mounted in the bowl of a water-closet to suck and purify and/or deodorize or merely to discharge to the outside the bad-smelling gases generated during the use of said WC.

Unlike the similar known devices, the device of the invention has the advantage of being adapted to be mounted quickly, and even by unskilled personnel, on any presently-marketed WC bowl, and also on WC bowls already installed.

The device according to the invention comprises a suction electric fan arranged in a container which may be mounted close to the WC bowl, at one side thereof and resting on the floor, or which may be hung on an adjacent wall of the water closet. The suction mouth of the aspirator device is connected either directly or with the intermediary of one or more conduits to at least one flat-shaped draw-mouth in the form of an inverted "L", or "C", or "U", which is hooked on the top rim of the WC bowl, so as to open within the inside perimeter of said bowl, and is properly held thereon by the seat usually provided on a WC bowl. By means of said draw-mouth, the aspirator device creates a constant vacuum in the WC bowl so as to avoid any escape of the bad-smelling gases generated during the use of the WC. The container accommodating the electric fan is usually provided with a delivery which opens into the room of the water closet, and which is equipped with a filter which is replaceable or can be regenerated, which purifies and deodorizes the air which has been sucked by said electric fan, before delivering it into said room. According to a constructional modification of the invention, the delivery of the aspirator device may not be equipped with said filter and may be connected to an aeration duct.

The aspirator device may be fed by the electric mains and/or by a small electric accumulator, preferably of the rechargeable type.

Further features of the invention and the advantages resulting therefrom will become apparent from the following description of some preferred embodiments thereof, shown merely as non-limiting examples in the Figures of the accompanying sheets of drawings, wherein:

Figure 1 is a perspective view of the device in a preferred arrangement on a WC bowl;

Figures 2 and 3 are a side and a front perspective view, respectively, of the draw-mouth;

Figure 4 is a sectional view on the line IV-IV of Figure 1 showing further details of a draw-mouth arranged on a WC bowl;

Figure 5 is a sectional view of the aspirator-purifier unit, taken on the line V-V of Figure 1;

Figure 6 is a perspective view of the impeller for the aspirator device;

Figure 7, 8 and 9 are perspective views of three respective arrangements of the device according to the invention;

Figures 10 and 11 are perspective views showing a different construction of the draw-mouth and its arrangement on the WC bowl.

With reference first to Figures 1, 2, 3 and 4, it will be noted that the device of the invention comprises at least one draw-mouth 1 made of any suitable material, preferably of plastics material, comprising a tubular portion 101 having an inverted "L" configuration in side view and having a rectangular or ellipsoidal or any other flat-shaped cross section. At least the horizontal section of the portion 101 has, for example, a thickness of 0.5 to 1.5 cm, has a length of 5 to 10 cm and has a downwards-directed end flange 201. The vertical section of said portion 101 is directed downwards and is sealingly telescoped in a mating portion 301 of a sleeve ending at the bottom in a portion 401 of circular cross section connected, either directly or with an intermediate telescopic tube 2, to the suction mouth of an aspirator-deodorizer unit 3 arranged close to the WC bowl and to be described below.

The draw-mouth 1 is arranged with the horizontal stretch of the portion 101 transverse to the rim of the WC bowl V (Figures 1-4), onto which the seat S is then caused to rest so that, due to the usual lower spacers D, it is sufficiently spaced from the top rim of the bowl and it does not crush the draw-mouth 1 while firmly holding it in place. The portion 101 of the draw-mouth is formed with at least one internal intermediate longitudinal rib 601 to prevent any crushing deformation of said portion 101.

In Figures 2, 3 and 4, it will be noted that the inner corner area of the portion 101 is provided with an integral flat tongue 501 having an inclination of substantially 45° and such a thickness as to flex as a flat spring. When the draw-mouth 1 is mounted on a WC bowl, the tongue 501 bears against the outer surface of the bowl V and makes the draw-mouth grip the inner side of the rim of the bowl by means of the end flange 201. This condition, together with the dimensioning mentioned above, ensures a proper and firm operative positioning of the draw-mouth. Due to the telescopic coupling between the portions 101 and 301-401, the draw-mouth can be mounted on any presently-marketed WC bowl and can be positioned at any point on said bowl, also for the purpose of concealing it from the view. Anyway, it is to be understood

that the draw-mouth may be made of dimensions other than specified above. Means other than those described above may be used to secure the draw-mouth 1 in place, for example, adhesive or pressure-sensitive means or other means which, anyway, should permit, when desired, to remove said draw-mouth for periodic cleaning.

The draw-mouth 1 may be shaped and sized otherwise than described and shown. In lieu of the anchoring flange 201, the draw-mouth may be provided with a tubular extension directed downwards, so that said draw-mouth opens, rather than at the level of the top rim of the bowl, at a suitably lower and more internal level in the bowl. According to a further minor constructional modification, the draw-mouth 1 may be formed of a greater number of members than described, connected to each other either fixedly or removably and adjustably; for example, they may be coupled telescopically with each other so that the draw-mouth formed thereby may be adjusted closely to the dimensions of the WC bowl whereon it is mounted, at any time. According to this modification, the horizontal section of the portion 101 of the draw-mouth may be formed of two telescoping and snap-coupling parts to permit the adjustment of the length of said section of the draw-mouth whereby the latter may be adapted with greater accuracy to the dimensions of the WC bowl whereon it is to be mounted.

When the seat S is closed by a person who uses the WC, the suction exerted within the bowl V creates a vacuum therein and air is sucked from the outside as indicated by the arrows F in Figure 1. Said air is sucked away by the draw-mouth 1 together with the unpleasant odors being formed within the bowl.

The aspirator-deodorizer device 3, preferably, is fed by the electric mains, optionally through a transformer which reduces the voltage to safety levels. If desired, the device 3 may be equipped with an electric accumulator, preferably, of the rechargeable type, so that it can be operated even if the voltage from the mains should fail.

The device of the invention may be supplied with supplementary equipment, comprising an electric wire and a rigid plastics raceway with self-adhering bottom, of such a length as to permit said device to be connected to an electric socket proximate to the WC bowl.

Preferably, the device 3 has a timed operation which is obtained by acting on a pushbutton 6 arranged in a suitable position on said device. Optionally, a warning light may be provided to indicate when the device 3 is operating and when it is deactivated. The timing may be automatic and of such a duration whereby the device 3 can keep working also during a suitable period of time after the WC has been used. However, it is to be under-

stood that the activation of the unit 3 may be automated by any suitable means, such as photocells of sensors for detecting when a person sits on the seat S. Said means are not shown in the drawings because they may be easily conceived and realized by those skilled in the art.

The unit 3 may be constructed in any suitable manner. Figure 5 shows a possible construction of said unit. The portion 401 of circular cross section of the mouth is sealingly telescoped on a tube 2 the other end of which is secured to a union 7 which opens into a pre-chamber 8 formed at one end of a large container 9 the other end of which accommodates, with a drawer-like arrangement, a filter 10 of activated carbon and/or other suitable material, which is surmounted by a removable cover 11 provided with slots 12. A wall 108 of said pre-chamber 8 is provided with an opening 13 for communication between said pre-chamber and said chamber 9 and co-axially receiving the shaft 14 of an electric motor 15 which is secured by means of flanges 16 to the inner walls of said pre-chamber. Keyed on the shaft 14 of the motor 15 is an impeller 17 arranged in the chamber 9 adjacent the opening 13. The impeller comprises two discs 117-217 which are parallel to each other and to the wall 108. The disc 217, which closely faces the opening 13, is provided, co-axially with the opening 13, with an opening 18 and the outer face thereof is provided, co-axially with the opening 18, with annular ridges 19-20 for co-operation with recesses formed by corresponding annular ridges 21-22 co-axial with said opening 13 and integral with the wall 108, the arrangement being such as to form a labyrinth to hinder any air leakage between the wall 108 and disc 217. The numeral 23 indicates the helically-arranged vanes of the impeller and the numeral 24 indicates the central hub of the disc 117, which is to be keyed on the shaft 14 of the motor 15. It is apparent from Figure 5 that by rotating the impeller 17 in the proper direction a vacuum is created in the openings 13-18, in the chamber 9 and in the conduit 7, so that air is sucked through the tube 2 and draw-mouth 1. The pressurized air delivered by the impeller 17 is obliged to pass through the filter 10 and to outflow, after being purified and deodorized, through the slots 12 of the cover 11. The unit 3 described above has a quite noiseless operation and a good head even with a motor 15 of reduced power. The air flowing past the pre-chamber 8 is obliged to lap the motor 15 and cool it.

According to the embodiment of Figure 1, the filtering unit 3 rests on the floor by means of a flat portion 109 of the container 9, and an insert B may be optionally applied to said portion for supporting and/or damping and/or fixing purposes. The telescoping coupling of the tube 2 with the draw-mouth 1 and the telescopic adjustments provided on said

mouth permit the device of the invention to be mounted on WC bowls of any size and shape.

The cover 11 has been shaped with a rounded configuration, as shown in Figures 1 and 5, because the device may be arranged otherwise, for example, as shown in Figures 7 and 8, with the unit 3 upturned with respect to the embodiment of Figure 1, and hung on the wall or supported on the floor with the intermediary of a pedestal 28 shown with broken lines in Figure 7 and provided with side openings 29 for passage of the flexible conduit 102 which now connects the unit 3 to the portion 401 of the draw-mouth 1.

Figure 10 shows a draw-mouth 100 of different configuration with respect to the embodiment of the preceding Figures, for arrangement at the rear portion of the rim of the WC bowl, as diagrammatically shown in Figure 11.

Figure 8 shows, for example, how a plurality of draw-mouths may be mounted on the rim of a WC bowl and suitably distributed around said rim, and how said mouths through respective hoses 202, can be connected to a union 5 which, through a single hose 102, is connected to the aspirator unit 3.

By omitting the tube 2 or the conduit 102, the aspirator-deodorizer unit 3 may also be used to purify the air in any room other than room accommodating a water-closet, for example a room where smoking is allowed.

Figure 9 shows a further constructional modification wherein the cover 11 does not present the slots 12, and is provided with a discharge conduit 25 connected to a conduit 26 which can discharge to the outside of the water closet room through a hole formed in an outer wall of said room, or to a conduit 126 which can discharge into an aeration duct 27. As an alternative, Figure 11 also shows that, instead of the discharge conduit 26 on the cover 11, a discharge conduit 226 may be provided on the top portion of the rear wall of the container 9. Obviously, the device of Figure 9 may not be provided with the filter 10.

Claims

1. An aspirator-deodorizer device for sanitary bowls or water-closets, characterized in that it comprises at least one flat-shaped draw-mouth (1) which is arranged transversely on the top rim of the WC bowl, through the space usually existing between said rim and the overlying seat (S) and so as to open into the inner perimeter of said bowl with an end portion which is provided with at least one flange or extension (201) directed downwards, so as to grip said rim, the other end portion (301) of said draw-mouth, on the outer side of the bowl,

being preferably directed downwards and connected either directly or with the interposition of a rigid or flexible tube (2, 102) of suitable cross section, to the suction mouth of an electric fan aspirator unit (3) which through said draw-mouth (1) evacuates the bad-smelling gases generated during the use of the WC bowl, the delivery of said aspirator unit (3), if the latter discharges directly into the room accommodating the water closet, being equipped with at least one filter (10) of the activated carbon type or other suitable type and preferably of the replaceable or restorable type, which purifies and deodorizes the air being sucked therethrough before discharging it into said room.

2. A device according to claim 1, wherein said draw-mouth is provided at its underside and at its inner corner area (101) with a suitably inclined tongue (501) preferably integral with said draw-mouth and of such a construction as to act as a flat spring for co-operation with the outer surface of the WC bowl to keep said draw-mouth suitably anchored to the top rim of said bowl regardless of the size of the latter.

3. A device according to claim 1, wherein the draw-mouth (1) is composed by a plurality of members (101, 301, 401) assembled in a telescopic and peripherally sealed manner with each other whereby said draw-mouth may be suitably mounted on WC bowls of any size and shape and whereby the active part (101) of said draw-mouth, if desired, may be easily removed and cleaned.

4. A device according to claim 1, wherein the end portion of the draw-mouth (1), which opens into the interior of the WC bowl, is suitably extended and bent downwards so as to exert the suction at an internal lower area of said bowl.

5. A device according to claim 1, wherein at least the active and flat-shaped portion (101) of the draw-mouth is provided internally with one or more ribs (601) to avoid crushing distortions of said portion of the draw-mouth.

6. A device according to claim 1, wherein the horizontal and flat-shaped portion of the draw-mouth (1) is preferably of a thickness between 0.5 and 1.5 cm and a length between 5 and 10 cm.

7. A device according to claim 1, wherein the aspirator-deodorizer unit (3) is arranged at one side of the WC bowl, rests preferably on the floor either directly or with interposed members (B), and is connected to said draw-mouth (1) either directly or with the intermediary of a rigid or a flexible tube (2, 102).

8. A device according to claim 1, wherein the aspirator-deodorizer unit (3) is hung on the wall of the room in proximity of said WC bowl and is connected to said draw-mouth (1) by means of a flexible conduit (102).

9. A device according to claim 1, wherein a plurality of draw-mouths (1) may be arranged on the top rim of the WC bowl and may be connected through a respective flexible tube (202) to a union (5-102) which is connected to the aspirator-deodorizer unit (3). 5

10. A device according to the claim 1, wherein the aspirator-deodorizer unit (3) is operated electrically and is fed from the mains and/or a battery of electric accumulators, preferably of the rechargeable type and suitably incorporated in said unit. 10

11. A device according to claim 1, wherein the operation of the aspirator-deodorizer unit (3) is preferably timed and is controlled by means of a manual control (6) or an automatic sensor which detects the condition of use of the WC bowl. 15

12. A device according to claim 1, characterized in that said purifying filter (10) may be omitted if the aspirator unit (3) discharges to the outside of the WC room either through a suitable conduit (26-226) or through an aeration duct (27). 20

13. A device according to claim 1, wherein the aspirator-deodorizer unit (3) may be used also without any connection to the draw-mouth (1) and it may be arranged in any room to purify the air therein. 25

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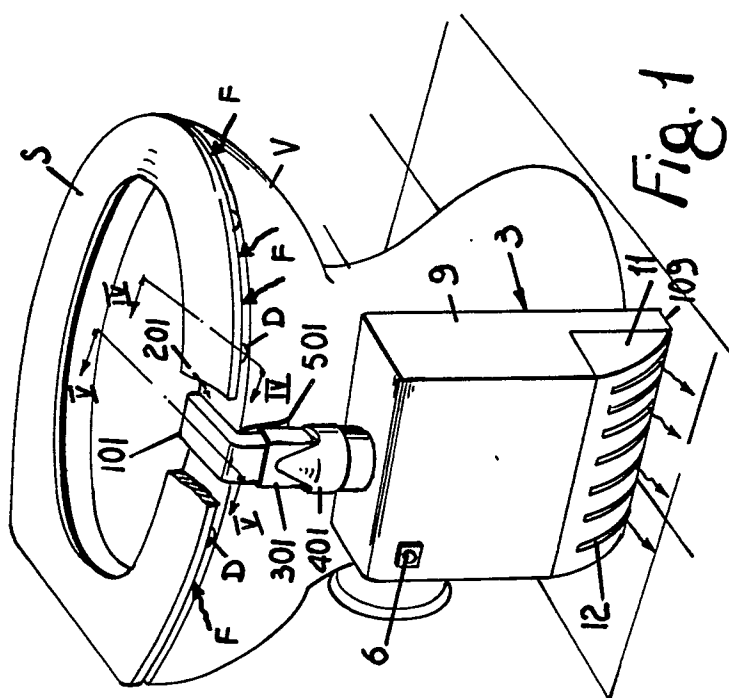


Fig. 1

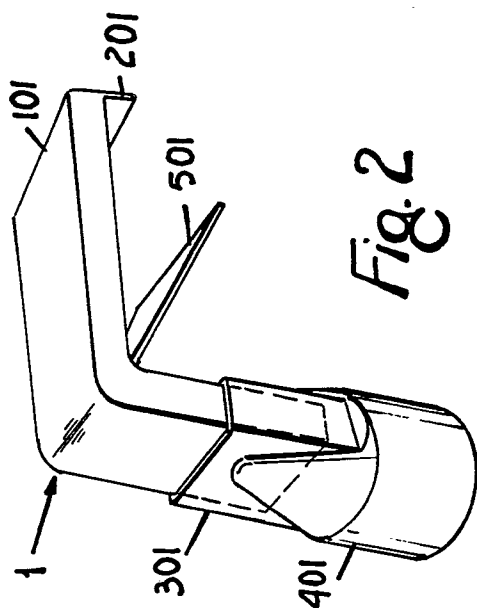


Fig. 2

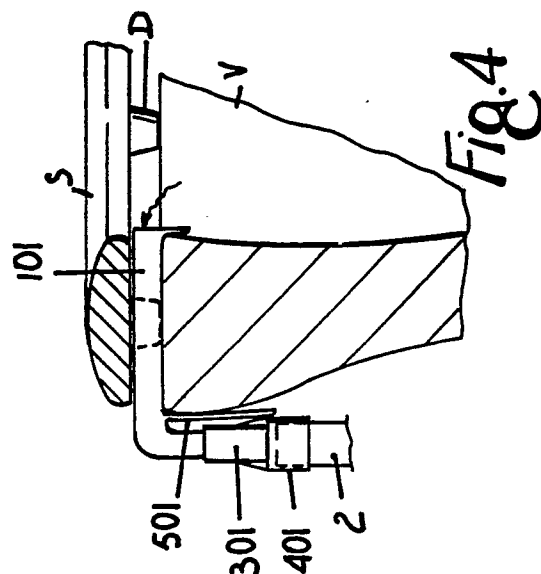


Fig. 4

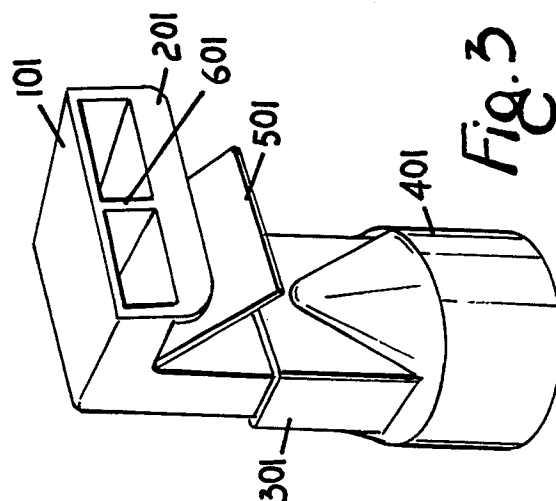
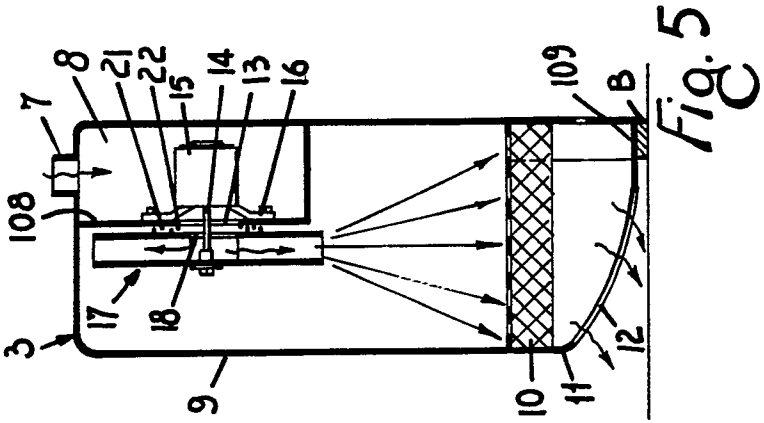
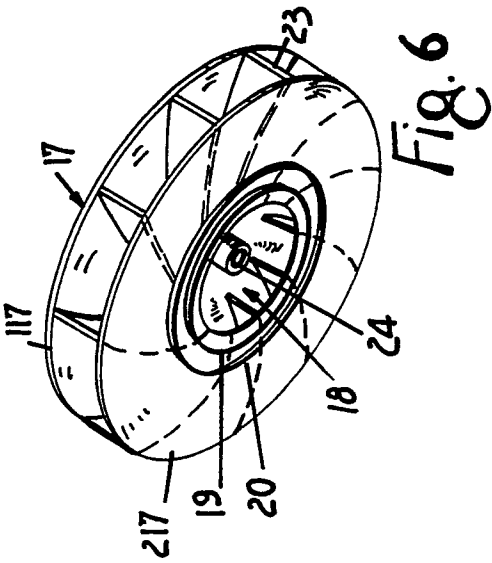
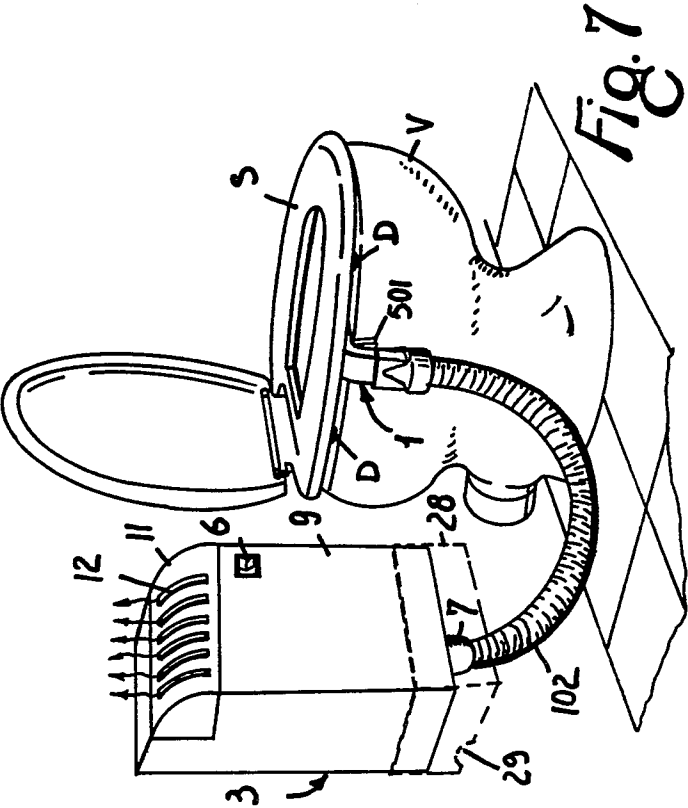


Fig. 3



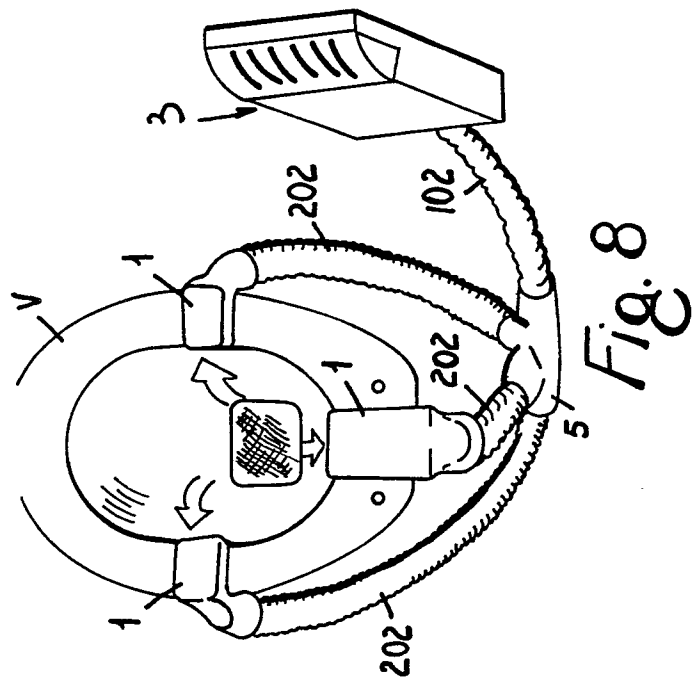


Fig. 8

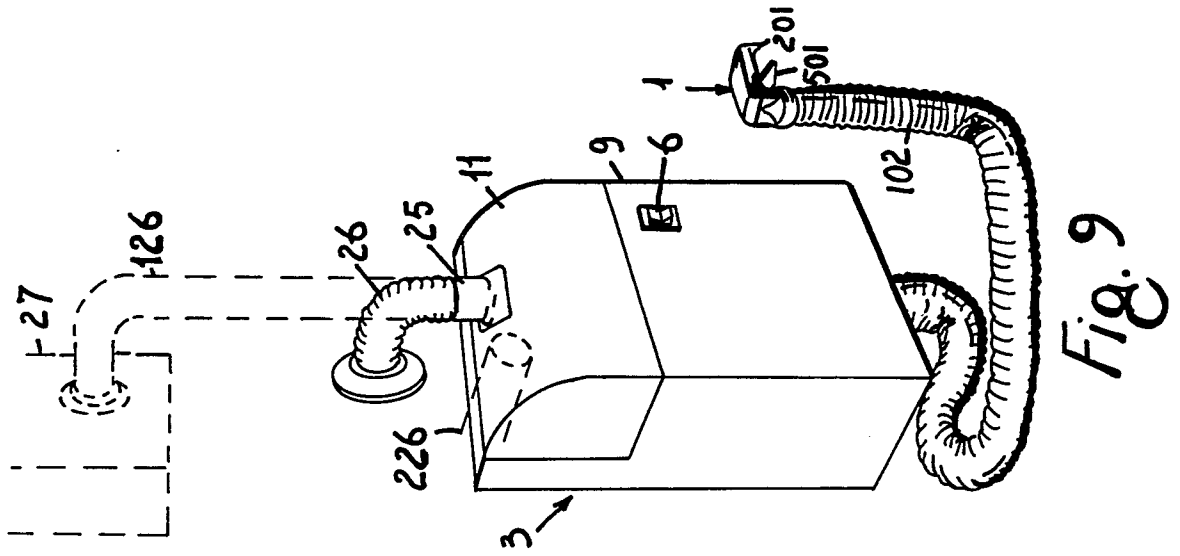


Fig. 9

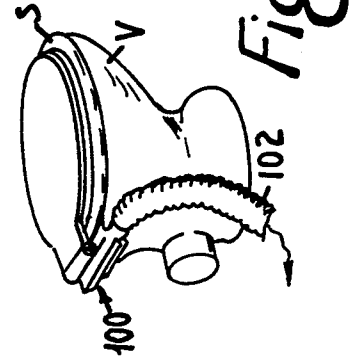


Fig. 11

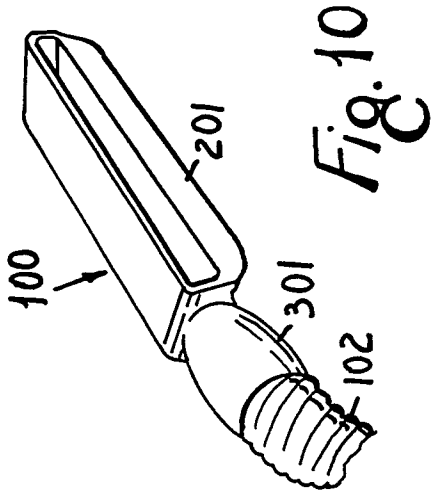


Fig. 10



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.4)
X	EP-A-0 009 923 (STAMPER) * Abstract; pages 8-10; figures 1-3 *	1,4,10	E 03 D 9/052
Y	---	2	
Y	FR-A-2 089 473 (RAYMOND) * Page 3, lines 6-13; figures 1,6 *	2	
A	---	2	
A	US-A-3 869 760 (MEYER) * Whole document *	2	
A	---	3,7,10	
X	US-A-4 059 857 (POISTER) * Whole document *	1	
A	---	8,10,11	
X	FR-A-2 548 243 (MARTIN) * Whole document *	,12 1	
A	---	5,9	
A	US-A-4 168 553 (STUDER) * Abstract; figures 2,4 *	13	TECHNICAL FIELDS SEARCHED (Int. Cl.4)
X	---	1	E 03 D F 16 B

The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 16-08-1988	Examiner HANNAART J.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			