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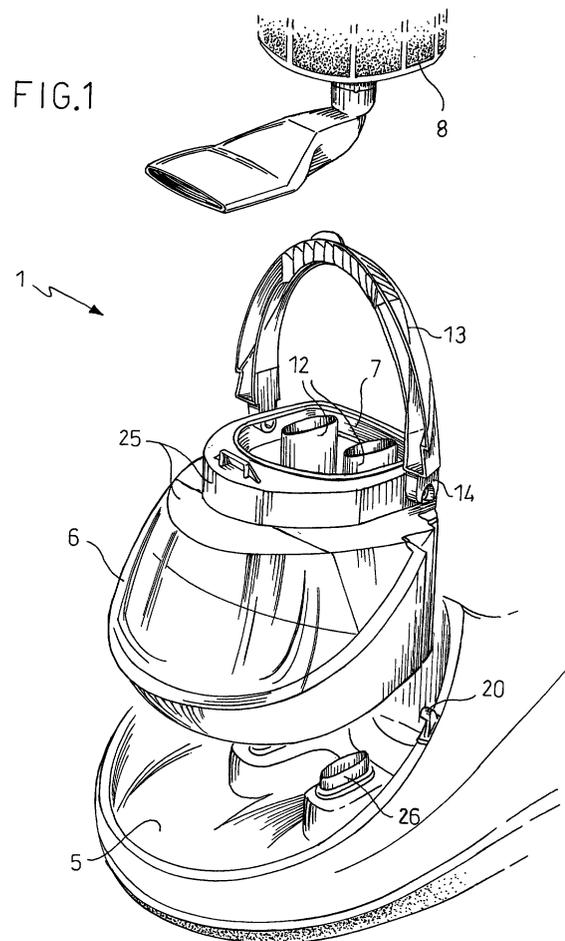
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(54) **Cleaning machine with removable tank**

(57) In a cleaning machine (1) provided with a removable tank (6) containing liquid necessary for the operating circuit of the machine, the tank (6) is fitted with a handle (13) able to be moved between a handle rest position in which the handle (13) engages with a fixed portion (20) of the machine casing (2) to lock the tank (6) in the machine casing (2), and a handlegrasping operating position in which the handle (13) is disengaged from the fixed portion of the machine casing (2) to remove the tank (6) from the machine casing (2). In this way the positioning of the tank (6) in the machine casing (2) can take place simply, precisely and reliably.



Description

[0001] The present invention relates to a cleaning machine, particularly for domestic use, such as a vacuum cleaner or a steam-cleaning machine.

[0002] One known cleaning machine comprises a casing that takes a tank designed to contain and/or collect a liquid and connected in one direction to a suction hose and in the other direction to a suction means powered by an electric motor, both the suction means and the motor also being housed inside the casing.

[0003] The liquid in the tank is traversed by a stream of air drawn in from a surface that is being cleaned, through the suction hose, and the dust is trapped in the liquid, which is usually water or an aqueous solution containing cleaning products, air fresheners, etc. Having been cleaned of its dust, the air passes out of the tank and is returned to the surrounding environment via suitable apertures in the machine casing.

[0004] When the water in the tank is dirty, the tank is removed from the machine casing and the dirty water is thrown away and replaced with clean water.

[0005] In one known type of machine the tank is simply placed in its seat in the machine casing and is closed at the top by a lid, hinged to the machine casing, and fastened to the lid by snap action. The tank is fitted with a flexible handle which can be grasped to remove the tank and then relocate it in the seat of the machine casing after the dirty water has been replaced with clean water.

[0006] Unfortunately, the user often fails to relocate the tank precisely in the seat of the machine casing and this can cause problems with the air seals where the tank is connected to the machine suction circuit, causing a drop in the suction power of the machine and hence in its efficiency.

[0007] It is an object of the present invention to provide a cleaning machine with a removable tank, in which the positioning of the tank in the machine casing can take place simply, precisely and reliably.

[0008] This object is achieved with a cleaning machine comprising a casing having a seat that takes a removable tank for a liquid necessary for the operating circuit of the machine, characterized in that the said tank is fitted with a handle able to be moved between a handle rest position in which the handle engages with a fixed portion of the machine casing to lock the tank in the seat of the machine casing, and a handle-grasping operating position in which the handle is disengaged from the said fixed portion of the machine casing to remove the tank from the casing.

[0009] A clearer understanding of the invention will be gained from the following description of an illustrative, non-restrictive embodiment thereof, illustrated in the attached drawings in which:

Fig. 1 is a partial exploded perspective view of a cleaning machine with a removable tank according

to the invention;

Fig. 2 shows the machine with the tank installed; Figs 2A, 2B show details of the machine with reference to Fig. 2;

5 Fig. 3 is a complete perspective view of the assembled machine;

Fig. 4 is a perspective view of the tank of the machine; and

10 Figs 4A, 4B show details of the tank with reference to Fig. 4.

[0010] Referring to Figs 1, 2 and 3, the machine illustrated, which is given the general reference 1, comprises a casing 2 fitted with wheels 3 for moving the machine about. It also has a handle 4 for carrying the machine.

15 **[0011]** Inside a seat 5 in the machine casing 2 is a removable semitransparent tank 6, shown in its entirety in Figs 1 and 4.

[0012] At the top of the tank 6 is an opening 7 allowing the insertion of a connecting and filtration unit 8, of which the bottom part is shown in Fig. 1 and the top part in Fig. 2.

[0013] The tank 6 with the connecting and filtration unit 8 is closed above by a removable lid 9.

25 **[0014]** Housed inside the casing 2 is a suction pump driven by an electric motor; these components are not illustrated in the figures.

[0015] The lid 9 has a socket 10 to which a suction hose (not shown) is connected.

30 **[0016]** When cleaning, the tank 6 is filled with water and the suction pump is started by the electric motor. Via its open end, the suction hose connected to the socket 10 is placed on the surface to be cleaned. The air mixed with suspended dust is drawn into the tank 6 through the hose, the socket 10 and a pipe 11 forming part of the connecting and filtration unit 8. Inside the tank 6 the air mixed with the suspended dust is subjected to a sort of washing and the dust is left in the water inside the tank. The clean air passes out of the tank 6 through a filter in the connecting and filtration unit 8 and through pipes 12 formed within the tank 6, after which the clean air passes through pipes 26 in the seat 5 and on to the pump which returns it to the exterior through suitable apertures at the back of the machine casing 2.

35 **[0017]** The socket 10 on the lid 9 is in airtight connection with the connecting and filtration unit 8, but separated from it when the lid is removed. Similarly the pipes 12 inside the tank 6 are in leaktight connection with the pipes 26 in the seat 5, but separated from them when the tank is removed from the seat.

40 **[0018]** The tank 6 is fitted with an arched handle 13. At the ends of the handle 13 are two extensions 14, clearly visible in Figs 4A and 4B. Each extension 14 is shaped in its terminal portion in such a way as to form on the same axis a cylindrical through seat 15 and a C-shaped seat 16. The cylindrical seat 15 of each extension 14 takes a respective pin 17 integral with the casing of the tank 6, so that the handle 13 can rotate relative

to the tank casing. Each extension 14 also comprises an arm 18 designed to abut against a transverse wall of a respective L-shaped shoulder 19 integral with the casing of the tank 6, in order to limit the rotation of the handle 13.

[0019] In register with these extensions 14, at the edges of the seat 5 there are, integral with the machine casing 2, two opposite pins 20 on each of which engages a C-shaped seat 16 of a respective extension.

[0020] Referring to Figs 2, 2A, 2B, the lid 9 is hinged to the machine casing 2 detachably by means of two angular tabs 21 that engage in two slots 22 in the machine casing. The lid 9 engages with a snap action in a catch 23 on the top of the tank 6, a button 24 being provided on the lid to allow it to be opened.

[0021] When the cleaning machine 1 is assembled and ready to operate, the tank 6 is inserted in the seat 5 and the handle 13 of the tank is laid horizontally in a corresponding recess 25 of the tank so that it does not project beyond the tank profile. When the handle 13 is laid in this position, the C-shaped seats 16 of the extensions 14 of the handle fit around the pins 20 of the machine casing 2, thus preventing the tank 6 from coming out of the seat 5, as Fig. 2 makes clear. The lid 9 is mounted on top of the tank 6 using its tabs 21 inserted in the slots 22 in the machine casing 2 and fastened to the catch 23 of the tank 6. The working configuration of the machine is illustrated in Fig. 3.

[0022] When, after one or more cleaning cycles of the machine, the water in the tank 6 needs changing, the lid 9 is first taken off by disconnecting it from the catch 23 by pressing on the button 24, rotating it upwards about the hinges formed by the tabs 21 and by the slots 22, and lifting it out of the machine casing 2 due to the fact that it is possible to pull the tabs out of the slots when rotated in its upward position. Once the lid 9 is off, the handle 13 of the tank 6 is raised to the vertical position and in this position the C-shaped seats 16 of the extensions 14 of the handle have been rotated so that they disengage when moved in the direction in which the tank is lifted out of the seat 5 of the machine casing 2. It is thus possible to lift the tank 6 by grasping it by the handle 13 and, after having lifted out the connecting and filtration unit 8, the user changes the water. To put the tank 6 and lid 9 back in position, the same procedure is of course carried out in reverse; it should be observed that when again lowering the handle 13 of the tank to the horizontal position, the C-shaped seats 16 of the extensions 14 of the handle once again fit around the pins 20 of the machine casing 2 so as to lock the tank in the seat 5.

[0023] The arms 18 of the extensions 14 of the handle 13 prevent the handle from rotating too far beyond its vertical position because they abut against the shoulders 19 of the casing of the tank 6 when the handle exceeds this vertical position by more than a small angle.

[0024] It will be understood from the above account that the positioning of the tank 6 in the machine casing

2 takes place simply, precisely and reliably. This is because of the handle 13 which in the rest position locks the tank 6 in the seat 5 of the machine casing 2 and in the grasping operating position releases the tank from this seat. It should be pointed out in particular that the enclosing of the pins 20 of the machine casing 2 in the C-shaped seats 16 of the extensions 14 of the handle 13 ensures the correct positioning of the tank 6 in its seat 5.

[0025] This is very important to ensure properly sealed connections between the socket 10 of the lid 9 and the pipe 11 of the connecting and filtration unit 8, and between the pipes 12 inside the tank 6 and the pipes 26 in the seat 5 of the machine casing 2. Without proper sealing, the machine would have reduced suction power and therefore be less efficient.

[0026] Clearly, variations and/or additions to what has been described and illustrated in the present illustrative embodiment can be made.

[0027] The configuration of the cleaning machine and of its components may differ from that illustrated.

[0028] In particular, the tank and its handle may be configured differently. Furthermore, the handle may engage in any way with the machine casing to lock the tank to the machine casing when the said handle is in the rest position and to release it when the handle is in the grasping position for removal of the tank. For instance, one possibility is to use a system equivalent to that seen in the example or a system of snap engagement of the handle to the machine casing, and so on.

[0029] The above account can also be applied to any type of cleaning machine that uses a removable tank, such as a steam-cleaning machine.

Claims

1. Cleaning machine (1) comprising a casing (2) having a seat (5) that takes a removable tank (6) for a liquid necessary for the operating circuit of the machine, **characterized in that** the said tank (6) is fitted with a handle (13) able to be moved between a handle rest position in which the handle (13) engages with a fixed portion (20) of the machine casing (2) to lock the tank (6) in the seat (5) of the machine casing (2), and a handle-grasping operating position in which the handle (13) is disengaged from the said fixed portion (20) of the machine casing (2) to remove the tank (6) from the seat (5) of the casing (2).
2. Cleaning machine according to Claim 1, in which the handle (13) is hinged to the casing of the tank (6) so as to rotate from the abovementioned rest position to the abovementioned grasping operating position and back again.
3. Cleaning machine according to Claim 2, in which

the handle (13) has one or more terminal extensions (14) hinged to the casing (2) of the tank (6) and engaging with the said fixed portion (20) of the casing (2) of the tank (6) in the said rest position and disengaging from the said fixed portion of the machine casing (2) in the said grasping operating position. 5

4. Cleaning machine according to Claim 3, in which each of the said terminal extensions (14) comprises a generally C-shaped seat (16) that takes a fixed pin (20) on the machine casing (2), such that in the said rest position the C-shaped seat (16) interferes with the fixed pin (20) of the machine casing (2) in such a way as to prevent removal of the tank (6) from the seat (5) of the casing (2), and such that in the said handle-grasping operating position the C-shaped seat (16) does not interfere with the fixed pin (20) of the machine casing (2) in the direction of removal of the tank (6) from the machine casing (2) and allows such removal. 10 15 20

5. Cleaning machine according to Claim 4, in which each extension (14) comprises a cylindrical through seat (15), coaxial with the abovementioned C-shaped seat (16), that connects with a pin (17) integral with the casing of the tank (6) and forming the hinge of the handle (13). 25

6. Cleaning machine according to any one of Claims 3, 4 and 5, in which each extension (14) also comprises an arm (18) designed to abut against a respective shoulder (19) integral with the casing of the tank (6), in order to limit the rotation of the handle (13). 30 35

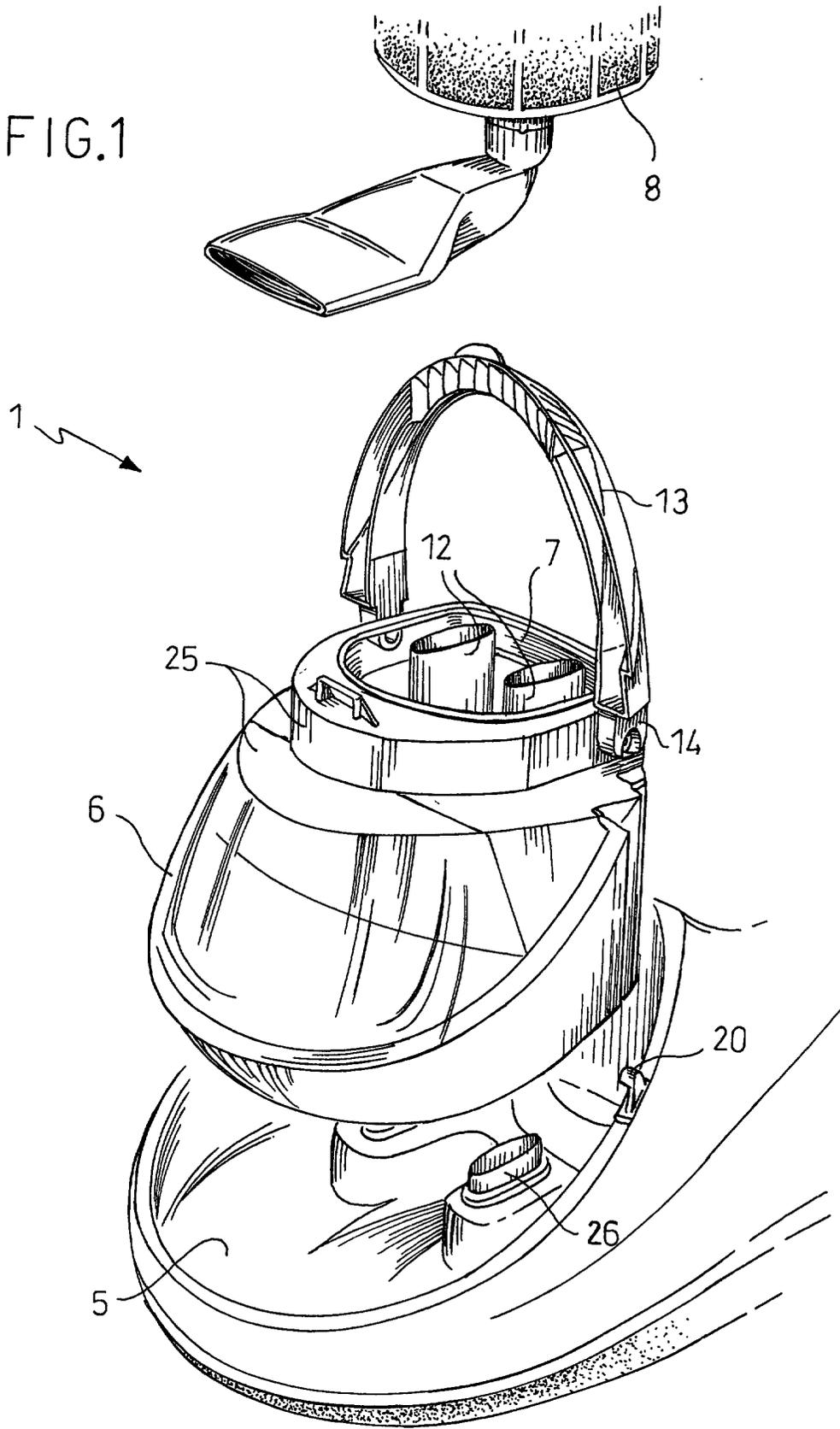
7. Cleaning machine according to any one of the preceding claims, in which the tank (6) comprises a recess (25) designed to accommodate the handle (13) in the said rest position in such a way that the handle (13) does not project from the profile of the tank (6) in the said rest position. 40

8. Cleaning machine according to any one of the preceding claims, in which the handle (13) is curved. 45

9. Cleaning machine according to any one of the preceding claims, in which a lid (9) mounted removably on the machine casing (2) fits over the tank (6). 50

10. Cleaning machine according to Claim 9, in which the lid is hinged to the machine casing (2) and is locked to it by snap action. 55

FIG.1



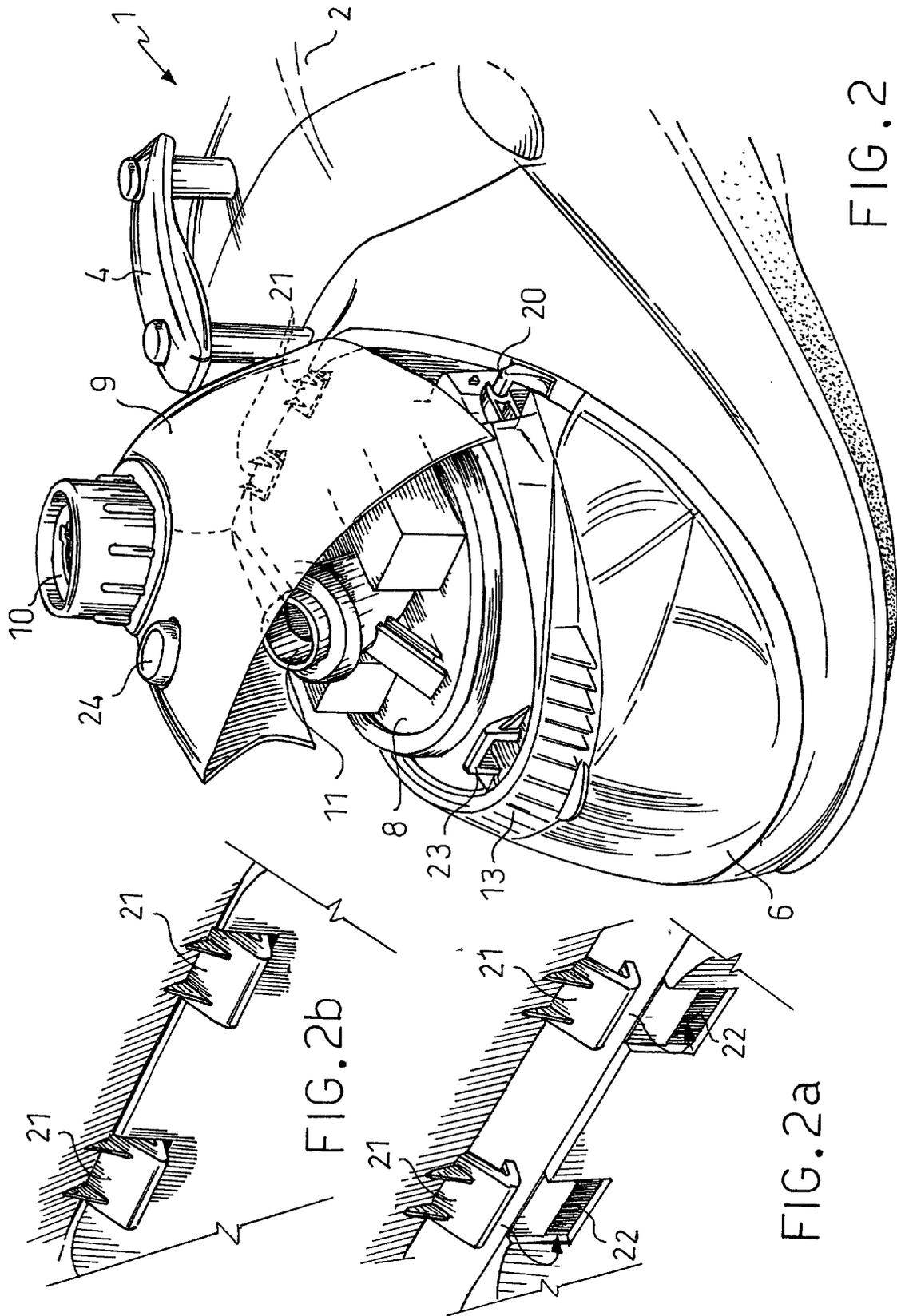


FIG. 2

FIG. 2b

FIG. 2a

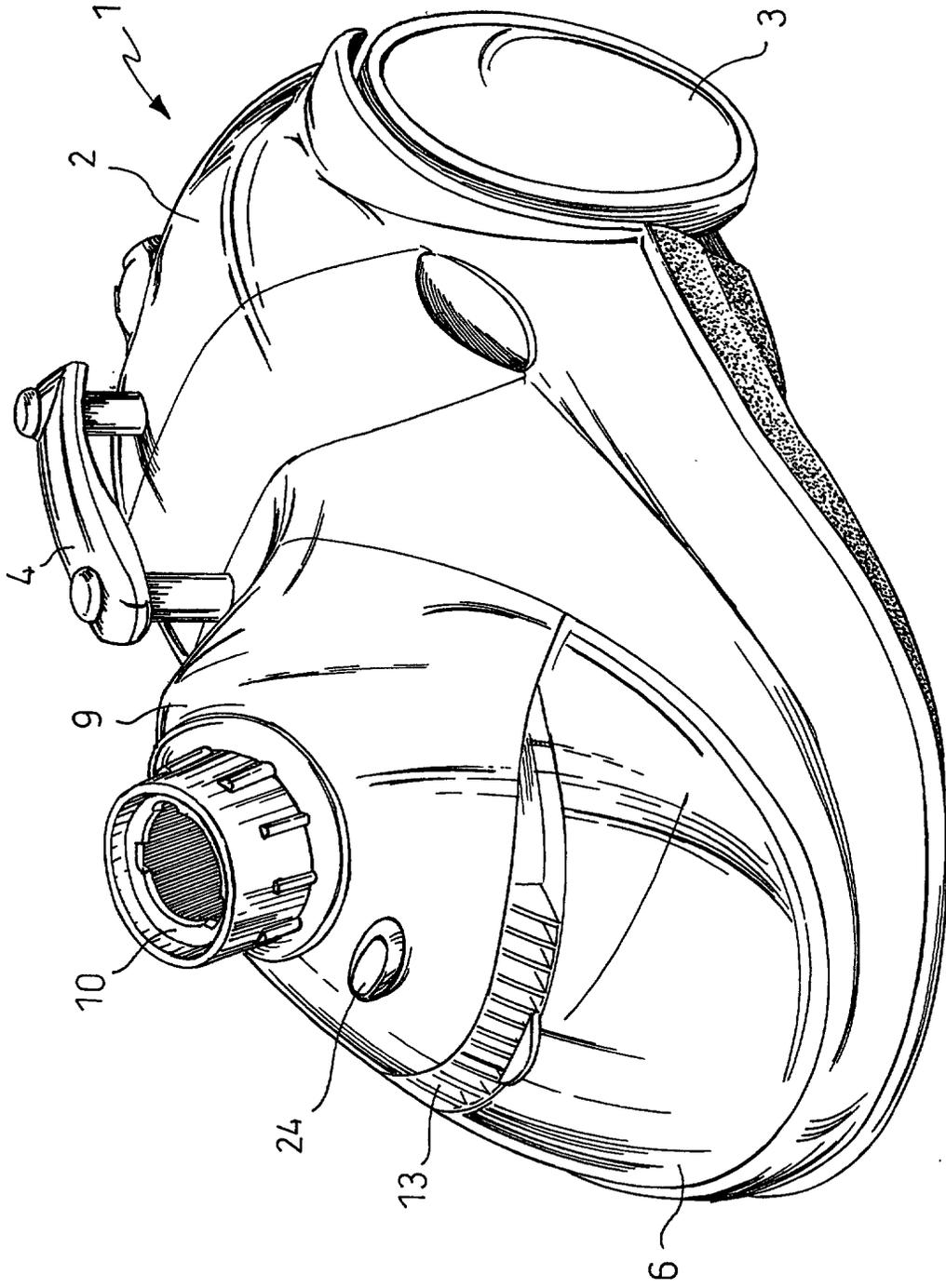


FIG. 3

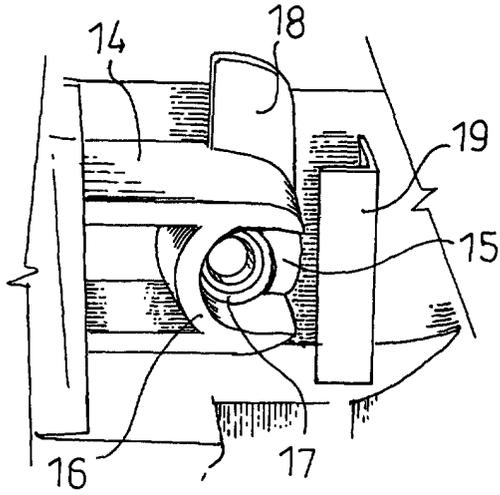


FIG. 4a

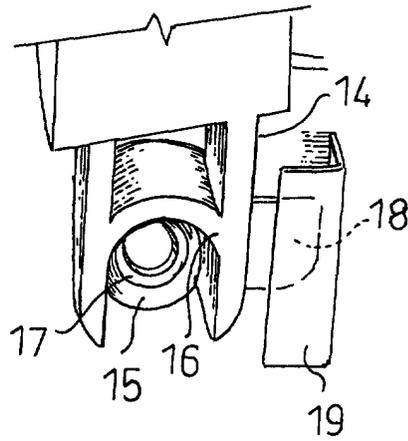


FIG. 4b

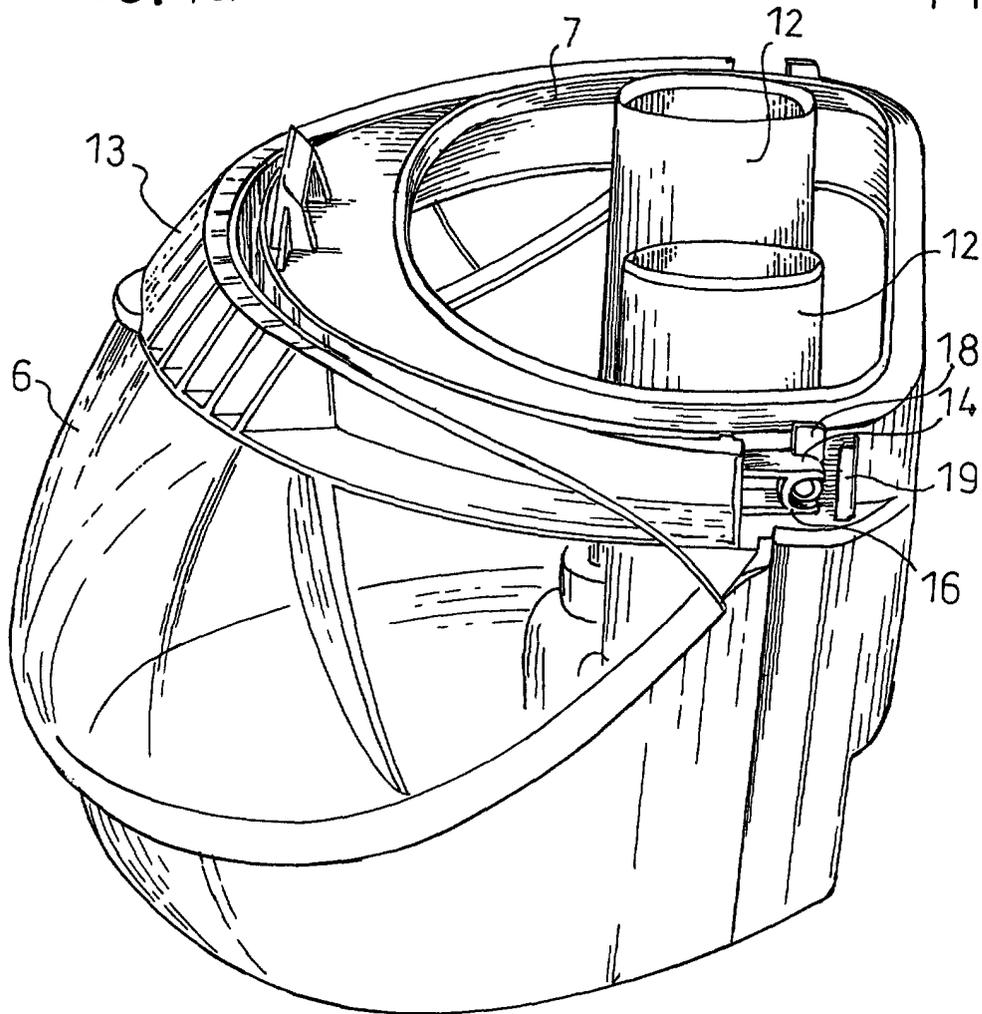


FIG. 4



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EUROPEAN SEARCH REPORT

Application Number
EP 00 83 0877

| 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) |
| X | US 5 901 408 A (BEHREND CARL ET AL) 11 May 1999 (1999-05-11) | 1-3,8,9 | A47L7/00 |
| Y | * column 3, line 37-65 * | 10 | |
| A | * column 4, line 26 - column 5, line 42; figures 1-10 * | 4-6 | |
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| X | DE 195 00 876 A (HOOVER CO) 20 July 1995 (1995-07-20) | 1,2,7,8 | |
| | * column 8, line 4-49; figures 2,4,21 * | | |
| | ---- | | |
| Y | DE 31 22 580 A (MAUZ & PFEIFFER PROGRESS) 30 December 1982 (1982-12-30) | 10 | |
| | * figures 1-5 * | | |
| | ----- | | |
| The present search report has been drawn up for all claims | | | |
| Place of search MUNICH | | Date of completion of the search 9 July 2001 | Examiner Laue, F |
| 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 | |

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