(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 1 800 643 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
27.06.2007 Bulletin 2007/26

(51) Int Cl.:
A61H 33/00 *(2006.01)*

(21) Application number: **06425787.6**

(22) Date of filing: **20.11.2006**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR MK YU

(30) Priority: **22.12.2005 IT MI20052466**

(71) Applicant: **Sacith S.r.l.**
20124 Milano, MI (IT)

(72) Inventor: **Stocchero, Massimo**
21029 Somma Lombardo VA (IT)

(74) Representative: **Adorno, Silvano et al**
c/o SOCIETA' ITALIANA BREVETTI S.p.A.
Via Carducci, 8
20123 Milano (IT)

(54) **Whirlpool systems drive with mechanical indication of the operation conditions**

(57) Whirlpool systems drive comprising a driving device (1), provided with indications of the operation conditions and suitable for being installed at the bath-tub edge, and a switch (15) of the high voltage circuit supplying the motor. The driving device (1) and the switch (15) of the high voltage circuit are assembled on a frame (3) and are linked to each other by means of a kinematic system (7, 8, 12, 13, 16, 17). The driving device (1) mechanically indicates the operation conditions of the whirlpool system.

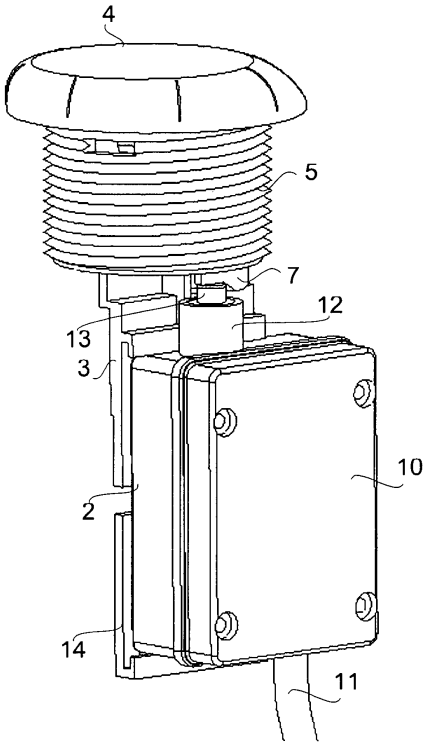

Fig.2

EP 1 800 643 A1

Description

[0001] The present invention relates to a drive for whirlpool systems with a visualization of the operation conditions, and particularly to a drive indicating the operation conditions in a mechanical manner, i.e. without the help of luminous signals, which require a suitable electronic/electric circuit.

[0002] Drives for switching whirlpool systems on and off are generally devices installed at the bath-tub edge, which drive the motors of the hydraulic pumps of the system in order to circulate water and/or air in the bath-tub. For security reasons the user should not switch the motors on and off by operating directly on their high voltage supply circuit, whereby the drives must be such to provide the user with a secondary interface driving the motors of the system in an indirect manner.

[0003] Still for security reasons, the user must be informed about the operation conditions of the whirlpool system, whereby visual signals being easily recognizable must be provided.

[0004] Many drives for switching whirlpool systems on and off are known, visualizing the operation conditions by means of luminous signals. The drives are generally electric and characterized by two drive circuits: a primary circuit at the mains voltage, which is connected to one or more electric motors driving the hydraulic pumps of the whirlpool system, and a secondary circuit at low voltage driving the primary one through a relay and a transformer, and provided with one or more microswitches arranged in a suitable box or keyboard mounted on the bath-tub edge or anyway in a location easily accessible by the user. The high voltage primary circuit is usually arranged in a transformer electric box installed in proximity to the motors and in a location being not accessible by the user for security reasons.

[0005] The indication of the operation conditions is present at the bath-tub edge in proximity to the drive keyboard and it is usually accomplished by means of LEDs or other luminous devices requiring a suitable electric circuit, possibly arranged in the same housing of the keyboard. The switch of the low-voltage circuit and the luminous indicators are suitably protected from the inlet of water into the housing that is assembled at the bath-tub edge.

[0006] Drives for whirlpool systems are also known, wherein the primary circuit at high voltage is connected to a pneumatic secondary circuit operated by a drive provided at the bath-tub edge. In this case the secondary circuit works on a pneumatic switch opening or closing the primary circuit at high voltage. The user interface is thus completely free from electricity and thereby safe.

[0007] One drawback of the known drives is their manufacturing complexity and the high cost due to the presence of secondary circuits for the drive of the primary circuit of the motors. For instance, in the case of an electrical drive, it is necessary to manufacture a transformer power box from high to low voltage, provided with transformer and relay, and to connect it to an electronic board carrying microswitches to be installed at the bath-tub edge.

[0008] Another drawback of the known drives is that in order to indicate the operation condition by means of luminous signals, it is necessary to provide, such as in the LEDs case, dedicated electrical circuits at low voltage, being added to the secondary circuit, thus increasing its complexity and cost. Even in the case of a simple and low cost pneumatic secondary circuit, as it is not possible to distinguish the operation condition directly from the position of the button, it is anyway necessary to bring an indication at the bath-tub edge by building a dedicated circuit, e.g. with LEDs or other solutions such as optical fibers or other means of light transportation.

[0009] Another drawback of the known drives is their installation complexity into the whirlpool system due to the presence of several circuits to be connected to each other and to numerous components, even bulky, to be arranged and assembled into the whirlpool system.

[0010] Object of the present invention is thus to provide a drive for whirlpool systems free from such drawbacks. Said object is achieved by a drive the main features of which are specified in the first claim, while other features and embodiments thereof are specified in the subsequent claims.

[0011] The main advantage of the drive according to the present invention is that its manufacturing is remarkably easier and less expensive than that of the known drives, as it doesn't require any secondary circuit for driving the high-voltage circuit. In fact, the drive according to the present invention provides for one phase only of the motor or motors of the system being interrupted, and for the switch or switches being arranged in a suitable housing electrically isolated and protected from the inlet of water, which is assembled under the bath-tub edge. A mechanical device linked to the drive being accessible by the user at the bath-tub edge directly drives the switch or switches. In addition, the fact that no further low-voltage circuits are required to supply luminous devices indicating the operation condition contributes to the simplicity and the inexpensiveness of the drive according to the present invention, as said operation condition is displayed by the various positions of the mechanical drive assembled at the bath-tub edge, which positions are clearly distinguishable by the user.

[0012] Still another advantage of the drive according to the present invention is its ease of installation, due to the presence of a limited number of components, to their reduced encumbrance and to the easy installing operations. The structure is thus solid, compact and easily maneuverable.

[0013] Further advantages and characteristics of the drive according to the present invention will be evident to those skilled in the art from the following detailed description of embodiments thereof with reference to the annexed drawings, in which:

- Fig. 1 shows a perspective partially exploded view of the drive according to a first embodiment of the present invention;
- Fig. 2 shows a perspective view of the drive of Fig. 1 completely assembled;
- Fig. 3 shows a side view of the drive according to the present invention with parts taken away;
- Fig. 4 and Fig. 5 are two top plan views of an embodiment of the drive according to the present invention showing two different operation conditions of the whirlpool system; and
- Fig. 6 shows a perspective view of the drive according to a second embodiment of the present invention.

[0014] Fig. 1 shows the drive according to the present invention, which is comprised of a driving device 1, an electric box 2 and a frame 3 joining them. In a preferred embodiment, the driving device 1 is comprised of a cylindrical knob 4 fitted in abutment into a cylindrical collar of the frame 3, rotatably connected and axially constrained, for example, by means of snap fits. The knob 4 allows the user to operate the drive by rotating it into the various operation positions. In its lower portion, the knob 4 has a hollow cylindrical stem 6 having a prolonged protrusion 7 with a cross-section shaped like an arc of circumference and expanding in the axial direction of the hollow cylindrical stem 6. The protrusion 7 exhibits a cam-shaped edge 8 at the free end. At the bottom of the cylindrical collar 5 a circle-arch aperture 9 is formed, receiving protrusion 7 of knob 4 and restraining the rotation movement of knob 4 between two stops.

[0015] Fig. 2 shows that, when the knob 4 is mounted in the collar 5, the shaped protrusion 7 projects from the bottom of the collar in order to operate the rod driving the motor switch, as will be described in the following with reference to Fig. 3.

[0016] The drive according to the present invention is installed at the bath-tub edge such that only the knob of the driving device 1 is accessible from the outside. As shown in the drawings, the cylindrical collar 5 of frame 3 may be provided with a threaded external surface for fixing the drive into a cavity at the bath-tub edge by means of suitable ring nuts.

[0017] In a preferred embodiment, the electric box 2, closed by a cover 10, exhibits an inlet for an electric wire 11 at its lower portion and, at the upper portion, a hollow cylindrical guide 12 in which a rod 13 vertically slides. The rod 13 protrudes from the top of guide 12 contacting the cam-shaped edge 8 of protrusion 7 of the cylindrical stem 6. The frame 3 is comprised of a plate 14, on which electric box 2 is assembled, and of the cylindrical collar 5 housing knob 4, thus enabling the above-mentioned cam-follower coupling between the shaped edge of protrusion 7 and rod 13.

[0018] Fig. 3 shows a side view of the drive according to the present invention, wherein the electric box 2, which has been opened by removing its cover 10, contains a switch 15 connected to the wire 11 leading one phase of the high voltage motor circuit into the electric box 2. In the embodiment shown in the drawing, the switch 15 contained in the electric box 2 exhibits a button 16 suitable for being pushed by rod 13 vertically sliding into guide 12,of the electric box 2. In guide 12 of rod 13 a spring 17 is present, exerting an upwardly biasing force on rod 13 such to keep the contact between the top of rod 13 and the cam-shaped edge 8 of protrusion 7 of knob 4 of driving device 1. Further, the guide 12 of rod 13 is isolated from the inlet of water from the outside by means of an airtight gasket 18. When the knob 4 of driving device 1 is rotated into the switching-on position, a movement of cam-shaped edge 8 of protrusion 7 of cylindrical stem 6 corresponds to such a rotation into the direction shown by arrow A. The shaped edge 8 pushes rod 13 downwards and the latter pushes button 16 of switch 15, thus driving the motor of the whirlpool system. When the knob of driving device 1 is rotated into the opposite direction, rod 13 returns upwards as an effect of the force exerted by biasing spring 17 and releases the pressure on button 16 of switch 15. The switch 15 opens, thus cutting off the motor. The kinematic system by means of which the driving device 1 operates the switch 15 of the high-voltage circuit is thus comprised of protrusion 7 of cylindrical stem 6 of knob 4, shaped edge 8, rod 13 sliding into guide 12, and pushed onto button 16 of said switch 15.

[0019] It is immediately evident to one skilled in the art that, besides a rotating cam associated to a knob, the driving device 1 can be formed of a button to be directly pressed, a pivoting or a sliding drive or any other component suitable for driving the switch 15 of the motor phase by means of a suitable kinematic system.

[0020] Therefore, the drive according to the present invention does not need a secondary circuit for activating the primary supplying circuit of the motor, such as, for example, low-voltage secondary or pneumatic circuits. In fact, by using a purely mechanical device for driving switch 15 of the high-voltage circuit, it is possible to install a switch of the above-mentioned circuit at the bath-tub edge in a manner non-accessible by the user, thus completely safely overcoming the technical prejudice refusing the presence of a power supplying circuit of the whirlpool system in proximity to the bath-tub edge.

[0021] Further, the electric box has a very reduced size with respect to those belonging to the prior art, as it only contains a switch with the respective connections to the phase of the high-voltage circuit, components like transformers and relays, which are moreover expensive, being not necessary. The simplification and the size reduction of the drive lead to a remarkable reduction in the manufacturing costs and to an increased ease of installation.

[0022] In a further embodiment, it is possible to bring all the phases of the high-voltage circuit supplying the motor inside electric box 2 in proximity to the bath-tub edge, as the user only interacts with a purely mechanical drive. Even in this case the drive is simplified and at low cost with respect to the known drives.

[0023] Fig. 4 and Fig. 5 show two positions of the op-

eration condition of the drive according to an embodiment of the present invention, ON, 19, and OFF, 20, respectively, wherein the driving device 1 is comprised of a rotatable knob 4 as in the previous drawings. The indication of the operation condition of the system is accomplished without resorting to luminous signals requiring a dedicated electrical circuit. In the embodiment shown, the indicator is formed of a notch 21 on the peripherical surface of knob 4, allowing to see the on, 20 (I), and off, 19 (O), symbols placed under the knob, e.g. on a flange of the cylindrical collar 5. As illustrated in Fig. 4, when the knob is rotated into clockwise direction, it is switched from the off, 19, position to the on, 20, position, while causing the cam-shaped edge 8 of protrusion 7 of stem 6 to slide on rod 13, which is lowered thus pushing button 16 of switch 15. On the contrary, as illustrated in Fig. 5, when the knob 4 is rotated into counterclockwise direction, it is switched from the on, 20, position to the off, 19, position, by causing the cam-shaped edge 8 of protrusion 7 of stem 6 to slide on rod 13, which returns upwards as an effect of spring 17 and releases the pressure on button 16 of switch 15.

[0024] As it is evident from the description, the drive according to the present invention is comprised of a smaller number of parts with respect to the known devices. In addition, such parts are particularly solid, thus being suitable to stand the mechanical loads and to restrain the wear-out during the operation, as well as to stand possible other loads being imposed by the user.

[0025] The fact of integrating the indication of the operation condition in the mechanical device driving the whirlpool system also contributes to the simplicity and the inexpensiveness of the drive, as it eliminates the need for any secondary circuit.

[0026] Fig. 6 shows a second embodiment of the present invention, wherein driving device 1, in addition to drive switch 15 of the motor phase, also embodies the function of air flow regulator. The adjustment can be accomplished, for example, by opening or closing an aperture for the passage of air being present in collar 5 by means of the rotation of knob 4. The air flow adjustment in the opening is accomplished by means of a sealing device 22 completely closing it in the off, 19, position and progressively opening it from the ON, 20, position on. The air flow passes through collar 5, enters suitable ducts 23 and is mixed with the water circulating into a duct 24 of the whirlpool system. The degree of adjustment of the air flow is indicated by e.g. adding further indications to the above-described indications 19 and 20 of the operation condition, such as for example a graduated scale, being visible through a notch 21. The fact of having only one drive accomplishing more functions allows to further reduce the costs of the whirlpool systems drives and to contribute making its use simpler.

[0027] In a further embodiment, the driving device 1 operates more switches by means of more cams in order to provide the user with a greater number of functions of the whirlpool device. The cams may be operated by a single knob or by means of a plurality of knobs or components having the same function.

Claims

1. Whirlpool systems drive comprising a driving device (1), provided with indications of the operation conditions and suitable for being installed at the bath-tub edge, and a switch (15) of the high voltage circuit supplying the motor, **characterized in that** the driving device (1) and the switch (15) of the high voltage circuit are assembled on a frame (3) and are linked to each other by means of a kinematic system (7, 8, 12, 13, 16, 17), and that said driving device (1) mechanically indicates the operation conditions of the whirlpool system.

2. Whirlpool systems drive according to claim 1, **characterized in that** the switch (15) is connected to one single phase of the high voltage circuit supplying the motor.

3. Whirlpool systems drive according to claim 2, **characterized in that** the driving device (1) comprises a knob (4) having a hollow cylindrical stem (6) with a prolonged protrusion (7) provided with a cam-shaped edge at the end.

4. Whirlpool systems drive according to claim 2, **characterized in that** the driving device (1) indicates the operation condition of the whirlpool system by means of symbols (19, 20) visible through a notch (21) provided in the knob (4).

5. Whirlpool systems drive according to claim 2, **characterized in that** the said frame (3) comprises a collar (5) wherein a knob (4) is rotatably arranged, and a plate (14) on which an electric box (2) is mounted.

6. Whirlpool systems drive according to claim 2, **characterized in that** the switch (15) is contained in the electric box (2) being provided with a guide (12) inside which a rod (13) suitable for driving said phase switch (15) is arranged.

7. Whirlpool systems drive according to claim 1, **characterized in that** the switch (15) is connected to all the phases of the high voltage circuit supplying the motor.

8. Whirlpool systems drive according to claim 1, **characterized in that** the driving device (1) comprises an air flow adjusting system, which includes a sealing device (22) and air ducts (23).

9. Whirlpool systems drive according to claim 1, **characterized in that** the driving device (1) is provided

with a plurality of cams, associated to a plurality of switches (15).

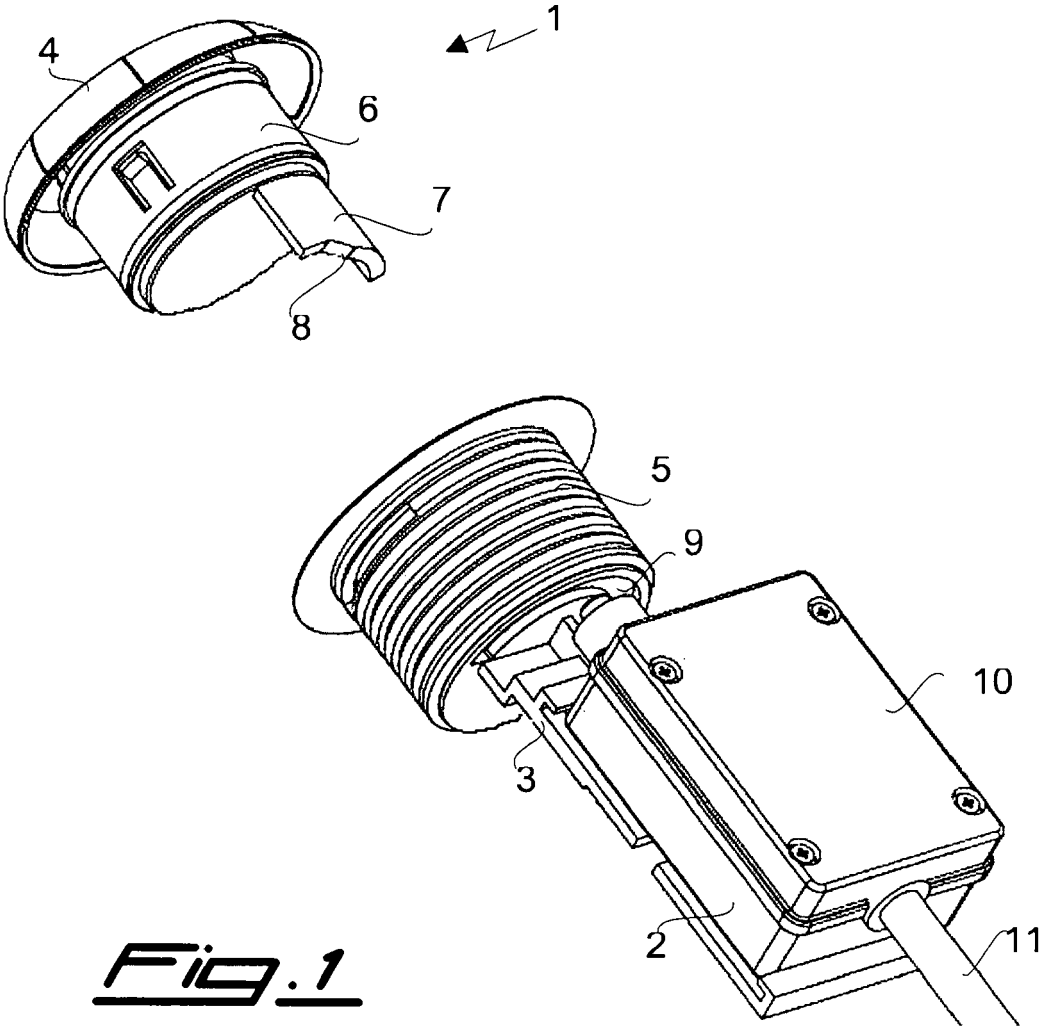

Fig.1

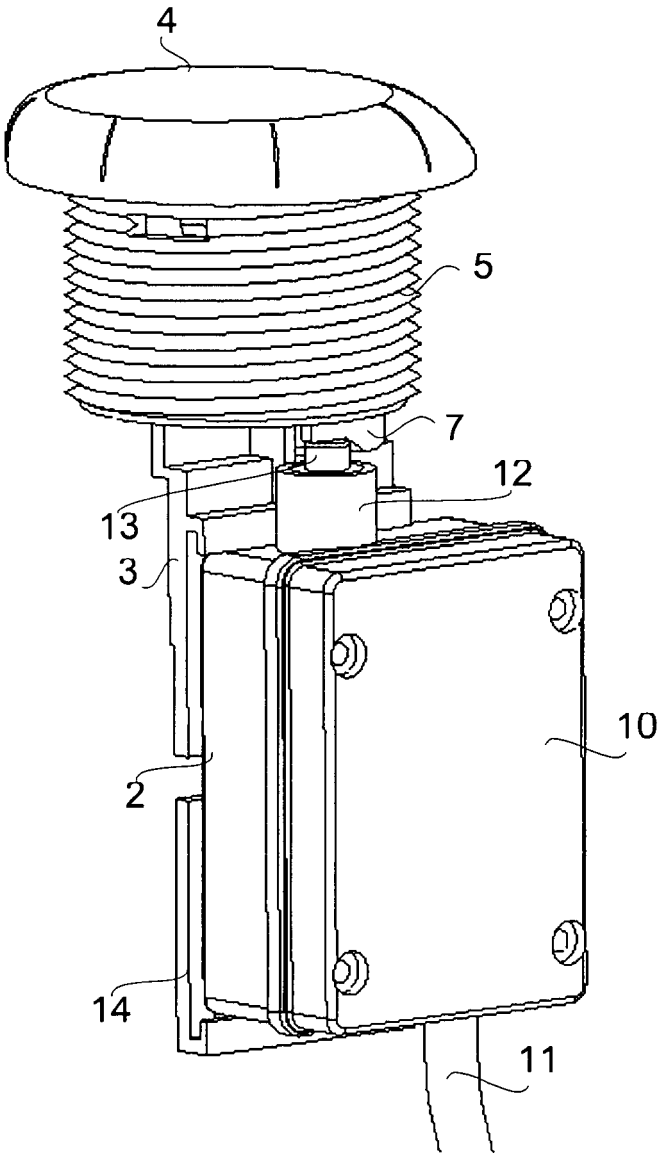

Fig.2

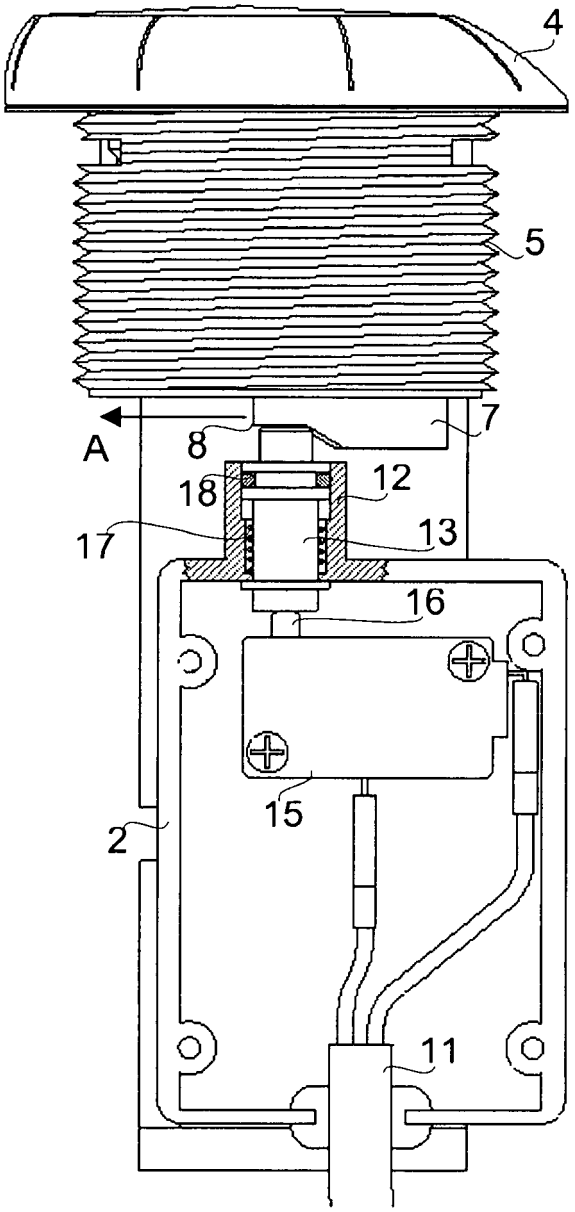

Fig.3

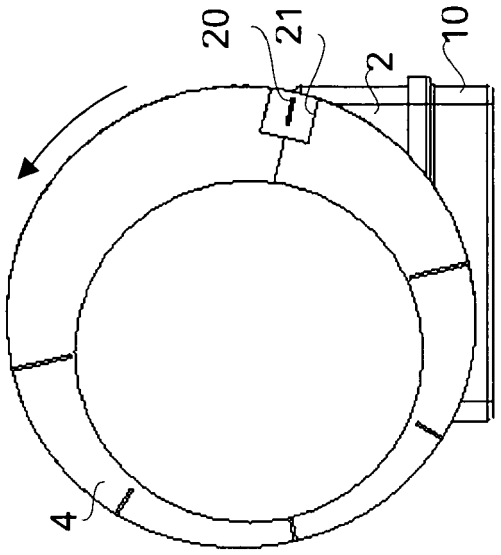

Fig.5

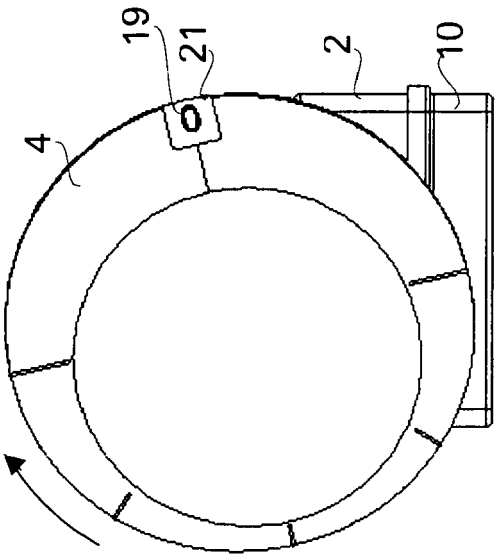

Fig.4

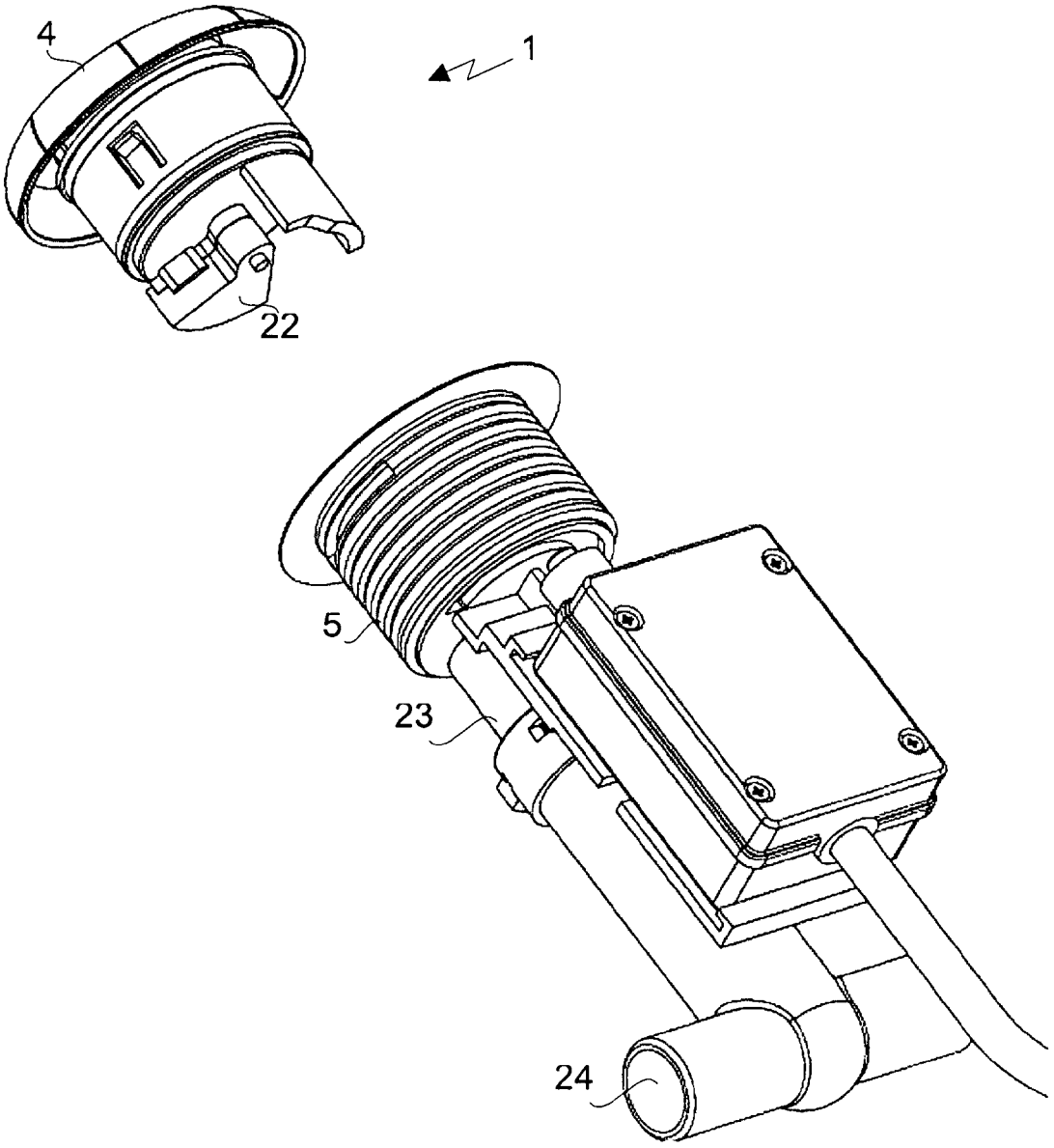

Fig.6

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 06 42 5787

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 6 059 536 A (STINGL DAVID A [US]) 9 May 2000 (2000-05-09) * column 3, line 63 - column 5, line 58; claims; figures *	1-9	INV. A61H33/00
A	US 4 844 333 A (DAVIS MATTHEW A [US] ET AL) 4 July 1989 (1989-07-04) * figures *	1	
A	FR 2 665 625 A1 (TECHNOPLAST [FR]) 14 February 1992 (1992-02-14) * figures 1,4 *	1	
A	US 6 681 414 B1 (MAY TOM M [US] ET AL) 27 January 2004 (2004-01-27) * figure 4 *	4	
A	DE 38 06 858 C1 (METRONIC ELECTRONIC GMBH, 7210 ROTTWEIL, DE) 3 August 1989 (1989-08-03) * figure 2 *	5	

TECHNICAL FIELDS SEARCHED (IPC)

A61H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	16 May 2007	Knoflacher, Nikolaus

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 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 06 42 5787

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

16-05-2007

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6059536 A	09-05-2000	NONE	
US 4844333 A	04-07-1989	NONE	
FR 2665625 A1	14-02-1992	NONE	
US 6681414 B1	27-01-2004	NONE	
DE 3806858 C1	03-08-1989	WO 8907927 A1	08-09-1989
		EP 0403502 A1	27-12-1990
		ES 2017250 A6	16-01-1991
		JP 3503128 T	18-07-1991
		US 5067481 A	26-11-1991

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82