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

(11) **EP 1 837 004 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
26.09.2007 Bulletin 2007/39

(51) Int Cl.:
A61H 33/02 *(2006.01)*

(21) Application number: **06425197.8**

(22) Date of filing: **23.03.2006**

(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

(71) Applicant: **Pres-Block S.P.A.**
10040 Caselette (IT)

(72) Inventor: **Nicolino, Aldo**
10040 Caselette (IT)

(74) Representative: **Cerbaro, Elena et al**
STUDIO TORTA S.r.l.,
Via Viotti, 9
10121 Torino (IT)

(54) **Fluid jet generating and conveying circuit for a whirlpool bath**

(57) It is described a fluid jet generating and conveying circuit (1) for a whirlpool tank (2), provided with a blower (3), distribution means (4) supplied by said blower (3) by means of a conveying conduit (5) and connected to one or more outlets (6) of said bath (2), primary safety means (8) comprising a check valve (15) arranged along said conduit (5) to prevent backflows of water from the bath (2) from reaching said blower (3), and secondary safety means (10) having the same function as the primary safety means (8) and acting in the event of malfunctioning of the latter; the secondary safety means (10) comprise a chamber (25) having an outward opening (26) connected to said conduit (5) in a position so as to entirely receive possible flows of water from the primary safety means (8), and a float (27) housed in the chamber (25) in a closed position of said opening (26) and shiftable, by effect of the presence of water, to an ajar position of said opening (26) to allow the evacuation of the water itself.

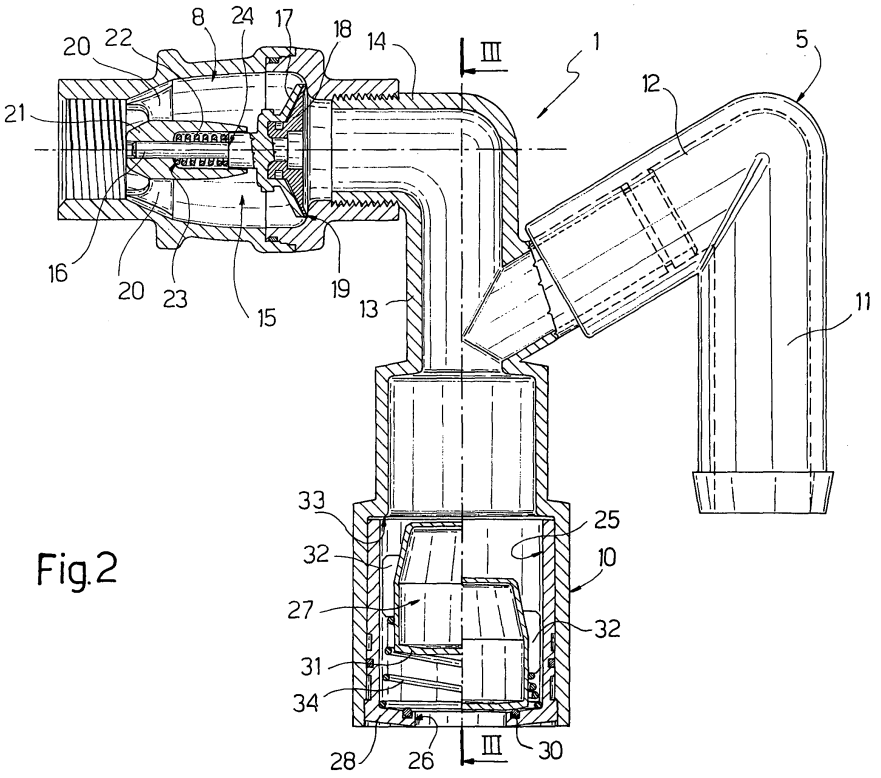


Fig.2

EP 1 837 004 A1

Description

[0001] The present invention relates to a fluid jet generating and conveying circuit for a whirlpool bath.

[0002] Whirlpool baths are known in which the generation of massaging jets is obtained by means of an electrically operated blower conveying pressurised air to a distribution manifold, in turn connected to one or more protruding outlets within the compartment of the bath intended to accommodate the user.

[0003] Conveniently, the distribution manifold is placed within the body of the bath near the upper edge of the compartment intended to accommodate the user, while the outlets protrude both from the bottom of the bath and from the side walls of the same.

[0004] In use, when the bath is full of water, the pressurised air let out from the outlets determines the classic jet action with massaging function on the specific zones of the user body submerged in the bath itself.

[0005] In order to prevent the risk of water coming into contact with the electrical actuating parts of the blower, sector standards envisage a double level of safety for the circuits described above.

[0006] In particular, a first safety level is normally achieved by arranging a check valve along the conduit connecting the blower to the distribution manifold.

[0007] Indeed, if the user immerses him/herself in the bath without activating the whirlpool function and the overflow value of the bath is not working, the level of water could reach the distribution manifold and possibly flow back to the blower. The check valve would not prevent the water from reaching the blower in this condition.

[0008] Since the check valve may not work correctly, sector standards envisage a second level of safety to protect the blower from water backflow; such second level of safety is currently achieved by envisaging, along the section of conduit which extends between the blower and the check valve, a serpentine including at least a triple loop.

[0009] Such solution, while being functionally effective, presents the drawback of having a large size and placing, for this reason, relatively stringent constraints in the design of bath area where such serpentine is housed.

[0010] It is the object of the present invention to make a fluid jet generating and conveying circuit for a whirlpool bath, which allows to simply and cost-effectively solve the drawback mentioned above and which at the same time is simple and cost-effective to manufacture, highly efficient and functionally reliable.

[0011] The present invention relates to a fluid jet generating and conveying circuit for a whirlpool bath, comprising:

- a blower;
- distribution means supplied by said blower by means of a conveying conduit and connected to one or more outlets of said bath;
- primary safety means comprising a check valve arranged along said conduit to prevent backflow of water from the bath from reaching said blower; and
- secondary safety means for preventing, in the case of malfunctioning of said primary safety means, possible backflows of water from the bath from reaching said blower;

characterised in that said secondary safety means comprise a chamber having an outward opening connected to said conduit in a position so as to entirely receive possible flows of water from said primary safety means, and a float housed in said chamber in a closed position of said opening and shiftable, by effect of the presence of water, to an ajar position of said opening to allow the evacuation of the water itself.

[0012] Preferably in the circuit defined above, said conduit presents a first ascending segment extending from said chamber towards said primary safety means and a second ascending segment extending towards said blower from a zone of said first intermediate segment between said chamber and said primary safety means.

[0013] Furthermore, said chamber is arranged in use at a height from the ground lower than that of said primary safety means and that of the zone in which said second segment of the conduit extends.

[0014] Said opening of said chamber is arranged on the opposite side of that from which said first segment of said conduit extends. Said opening preferably defines the bottom of said chamber.

[0015] According to a preferred embodiment, elastic means are provided between the bottom of said chamber and said float; such elastic means maintain, in conditions of non-use of the whirlpool, the float detached from the sealing means built into the bottom of the chamber so as to prevent any risk of sticking of these and the float itself in time.

[0016] According to a further preferred embodiment of the invention, said float is formed by a shutter body adapted to abuttedly arrange against the peripheral edge of said opening and by a plurality of lateral fins reciprocally delimiting passage channels of the water towards the bottom of said chamber.

[0017] The invention will now be described with reference to the accompanying drawings illustrating a non-limitative embodiment example thereof, in which:

- figure 1 is a front schematic elevation view of a portion of whirlpool bath provided with a fluid jet generating and conveying circuit, made according to the dictates of the present invention;
- figure 2 is a frontal view, in magnified partial section, of the circuit in figure 1; and
- figure 3 is a section taken along line III-III in figure 2.

[0018] In figures 1 and 2, number 1 indicates as a whole a fluid (generally air) jet generating and conveying circuit, for a whirlpool tank 2, intrinsically known and only partially illustrated.

[0019] In particular, in figure 1, circuit 1 is shown, for reasons of descriptive clarity, in external position with respect to the bath 2, although it is conveniently installed within one of the delimitation walls of the body of the bath 2 itself. Therefore, figure 1 must be considered as merely indicative.

[0020] Circuit 1 essentially comprises an electrically operated blower (intrinsically known and only schematically shown in figure 1), a distribution manifold 4 fed by the blower 3 by means of a primary conveying conduit 5 and connected to a plurality of outlets 6 of the bath 2 by means of respective secondary conveying conduits 7, a primary safety device 8 (figure 2) for preventing possible backflows of water from the bath 2 from reaching the blower 3, and a secondary safety device 10 having the same function as the primary safety device 8 and acting in the event of malfunctioning of the latter.

[0021] In the case in point (figures 1 and 2), the conduit 5 presents, in sequence proceeding from the blower 3 to the manifold 4, a first ascending vertical segment 11 lowerly joined to the blower 3, a second descending oblique segment 12, a third vertical ascending segment 13 and a fourth horizontal segment 14 joined to the manifold 4 at an opposite end of that connected to segment 13

[0022] With particular reference to figure 2, the primary safety device 8 comprises a check valve 15 housed within the segment 14 of the conduit 5 and having the function of allowing the flow to the manifold 4 preventing possible flows in the opposite direction.

[0023] Valve 15 essentially comprises a central trunk 16 coaxially mounted with radial clearance within the segment 14 of the conduit 5, and a discoidal shutter 17 integrally fastened to an axial end of the trunk 16 so as to radially protrude from the same and provided with an elastically deformable membrane 18, which is adapted to fluid-tightly cooperate with an annular shoulder 19 made in the segment 14 of the conduit 5 in position next to the segment 13 and facing the manifold 4.

[0024] Within segment 14 of conduit 5, trunk 16 is supported radially, on one end, by the shutter 17 and, on an opposite end, by a plurality of angularly and equally reciprocally spaced fins 20 to allow the fluid circulation in the space delimited by the same.

[0025] More precisely, the fins 20 extend in a hollow tubular body 21, within which the trunk 16 is axially and slidingly mounted. A cylindrical helical spring 22, wound coaxially about the trunk 16 and accommodated within the tubular body 21, normally maintains the valve 15 in a closed configuration (figure 2), in which the membrane 18 of the shutter 17 is abuttingly arranged against the shoulder 19 preventing the fluid communication between segment 13 of conduit 5 and manifold 4.

[0026] In the presence of pressurised flow directed towards the manifold 4 and generating on the shutter 17 a force higher than that exerted by the spring 22, the assembly formed by the trunk 16, the shutter 17 and the membrane 18 is moved away from the shoulder 19 (open configuration of the valve 15) allowing the aforesaid flow to reach the manifold 4. A flow in the opposite direction, i.e. directed from the manifold 4 towards the blower 3, would act in the same direction as the force of the spring 22 thus contributing to maintaining the membrane 18 abutted against the shoulder 19.

[0027] In the case in point shown, the spring 22 is arranged between an annular shoulder 23 within the tubular body 21 facing the shutter 17 and an annular shoulder 24 outside the trunk 16 facing the manifold 4.

[0028] Advantageously, the secondary safety device 10 (figures 2 and 3) comprises a chamber 25 extending from segment 13 of conduit 5 in a lower position with respect to the collection zone with the segment 12 and has a bottom opening 26 communicating with the outside, and a float 27 housed in the chamber 25 in a closed position of the opening 26 (indicated in the right half in figures 2 and 3) and shiftable, by effect of the presence of water, to an ajar position of the opening 26 itself (indicated in the left half of the figures 2 and 3) to allow the evacuation of water outwards.

[0029] Chamber 25 and float 27 are therefore in use at a lower height from the ground than that of the primary safety device 8 and that of the zone in which the segments 12 and 13 of the conduit 5 are connected together.

[0030] Thanks to the aforesaid position, possible backflows of water from the bath 2 capable of passing the manifold 4 and the primary safety device 8 due to malfunctioning of the same are entirely received by chamber 25. Indeed, since the segment 12 of the conduit 5 has an ascending course from the chamber 25, a possible flow of water from the primary safety device 8, subjected therefore to the force of gravity, has no chance of ascending the segment 12 itself and reaching the blower 3.

[0031] With particular reference to figures 2 and 3, opening 26 is made on a bottom wall 28 of the chamber 25 and presents a smaller section with respect to that of the bottom wall 28 itself; therefore, the opening 26 is delimited by a peripheral edge on which a seal ring 30 is fixed.

[0032] The float 27 comprises a main body 31 adapted to be abuttingly arranged against the peripheral edge of the opening 26 and the respective seal ring 30 and a plurality of lateral fins 32 externally protruding from the main body 31 and reciprocally delimiting respective vertical water passage channels towards the bottom wall 28 of the chamber 25.

[0033] The main body 31 of the float 27 is internally hollow so as to assume a specific weight lighter than that of water and has an essentially cylindrical shape slightly tapered on top.

[0034] As shown in figures 2 and 3, chamber 25 also present in position facing the peripheral edge of the opening 26, a shoulder 33 defining an upper abutment for the fins 32 of the float 27. The possible vertical excursion of the float 27 within the chamber 25 is therefore limited between the bottom wall 28 and the shoulder 33.

[0035] According to a preferred embodiment, a spring 34, for example of the conical helical type, may be ar-

ranged between the bottom wall 28 of the chamber 25 and the float 27. Such spring 34 would be entirely compressed by the bias exerted by the flow of air originated following the activation of the blower 3 and would have the function of maintaining, in conditions of non-use of the whirlpool bath, the float 27 detached from the seal ring 30 so as to avoid any risk of sticking of the same in time.

[0036] In use, the activation of the blower 3 determines a flow of pressurised air along the conduit 5 towards the manifold 4 and, from there, along the conduits 7 towards the outlets 6 of the bath 2. In particular, under the bias of the air, the float 27 is pressed against the seal ring 30 arranged along the peripheral edge of the opening 26 so as to prevent leakage outwards (position shown in the right half of figures 2 and 3); and at the same time, the valve 15 is taken by the flow of air to open configuration, in which the shutter 17 and the membrane 18 are distanced from the shoulder 19 and the spring 22 is compressed. The air may therefore flow towards the manifold 4.

[0037] When the blower 3 is deactivated, possible backflow of water from the bath 2 into the manifold 4 would be blocked by the valve 15 which, pressed with its membrane 18 against the shoulder 19 (figure 2) would prevent such backflows from reaching the segment 13 of the conduit 5.

[0038] If the blower 3 is deactivated and the valve 15 is not working correctly, possible backflows of water from the bath 2 into the manifold 4 may reach the segment 13 of the conduit 5 and collect inside chamber 25; a possible ascending of water along the ascending segment 12 of the conduit 5 towards the blower 3 would be practically impossible.

[0039] The water which may have reached the chamber 25 could flow towards the bottom wall 28 of the same along the vertical channels delimited by the fins 32 of the float 27. By effect of the collecting of water on the bottom wall 28, the float 27, having a lower specific weight than that of water, would start to ascend (indicating in the left half of figures 2 and 3) towards the shoulder 33 freeing the opening 26 and thus allowing the evacuation towards the outside of the water. At the end of such evacuation, the float 27, under the bias of its own weight, would abuttingly return against the bottom wall 28 of the chamber 25 in the closed position of the opening 26 (indicated in the right half in figures 2 and 3).

[0040] From the above it is apparent that the described circuit 1 with respect to the known solutions is functionally valid and particularly contained in size. The above can essentially be ascribed to the use, as a secondary safety device, of a simple collection chamber 25 for possible backflows of water from the bath 2, and of a float 27 to control the evacuation of water collected in the chamber 25.

[0041] From the above it is apparent that changes and variations can be made to the described circuit 1 without departing from the scope of protection defined by the claims.

Claims

1. A fluid jet generating and conveying circuit (1) for a whirlpool tank (2), comprising:

   - a blower (3);
   - distribution means (4) supplied by said blower (3) by means of a conveying conduit (5) and connected to one or more outlets of said bath (2);
   - primary safety means (8) comprising a check valve (15) arranged along said conduit (5) to prevent possible backflows of water from the bath (2) from reaching said blower (3); and
   - secondary safety means (10) for preventing, in the case of malfunctioning of said primary safety means (8), possible backflows of water (2) from the bath from reaching said blower (3);

   characterised in that said secondary safety means (10) comprise a chamber (25) having an outward opening (26) connected to said conduit (5) in a position so as to entirely receive possible flows of water from said primary safety means (8), and a float (27) housed in said chamber (25) in a closed position of said opening (26) and shiftable, by effect of the presence of water, to an ajar position of said opening (26) to allow the evacuation of the water itself.

2. A circuit according to claim 1, **characterised in that** said conduit (5) presents a first ascending segment (13) extending from said chamber (25) towards said primary safety means (8) and a second ascending segment (12) extending towards said blower (3) from a zone of said first intermediate segment (13) between said chamber (25) and said primary safety means (8).

3. A circuit according to claim 2, **characterised in that** said chamber (25) is arranged in use at a height from the ground lower than that of said primary safety means (8) and that of the zone in which said second segment (12) of the conduit (5) extends.

4. A circuit according to claim 2 or 3, **characterised in that** said opening (26) of said chamber (25) is arranged on the opposite side of that from which said first segment (13) of said conduit (5) extends.

5. A circuit according to any of preceding claims, **characterised in that** said opening (26) defines the bottom (28) of said chamber (25).

6. A circuit according to claim 5, **characterised in that** it comprises elastic means (34) arranged between the bottom (28) of said chamber (25) and said float

(27).

7. A circuit according to claim 5 or 6, **characterised in that** said float (27) comprises a shutter body (31) adapted to abuttingly arrange against the peripheral edge of said opening (26) and a plurality of lateral fins (32) reciprocally delimiting respective passage channels of the water towards the bottom (28) of said chamber (25).

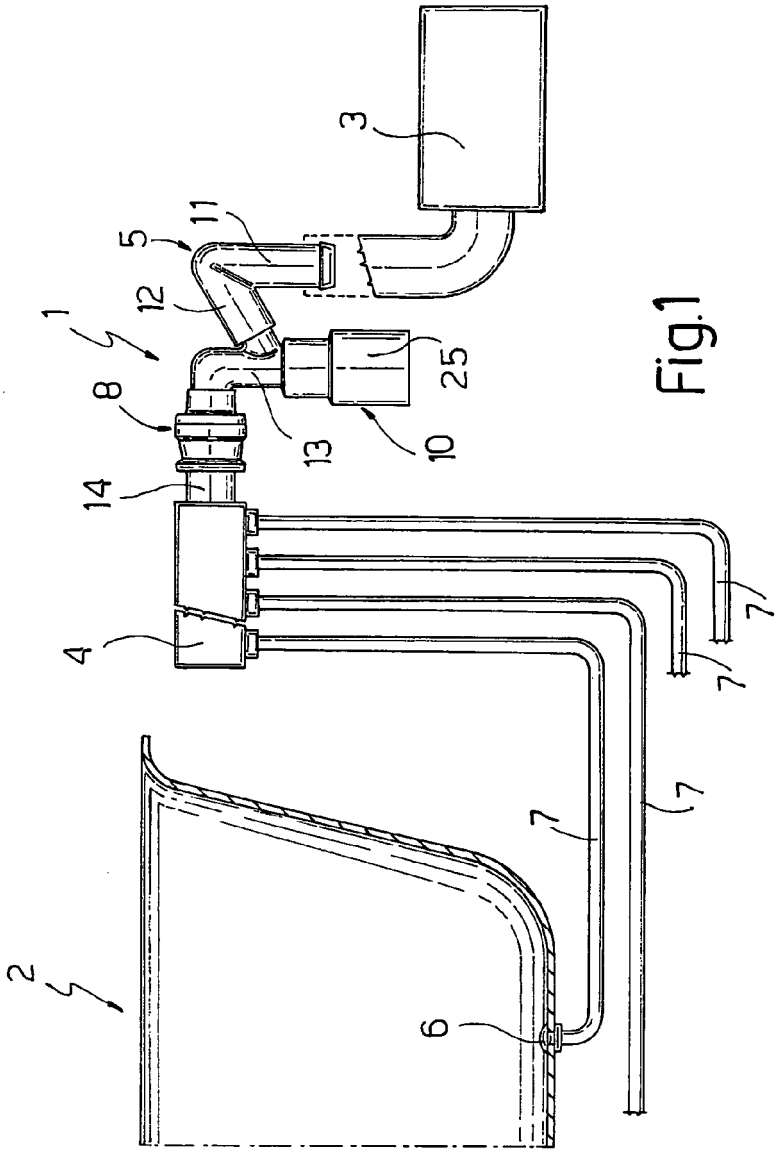
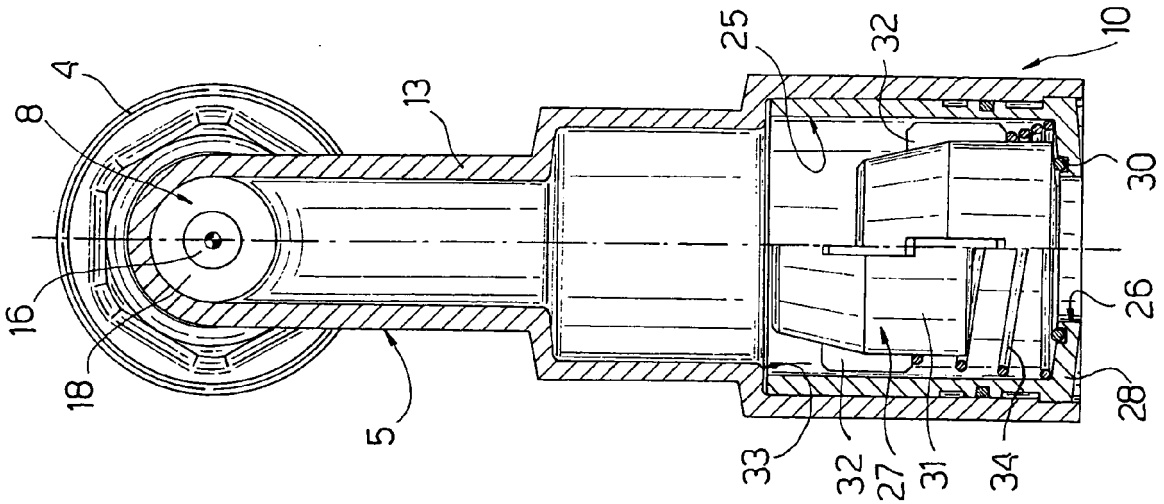

3
11
5
12
1
8
25
13
10
14
4
7
7
7
7
2
6

Fig.1

Fig.3


25
32
10
4
8
13
30
16
26
18
5
28
33
32
27
31
34

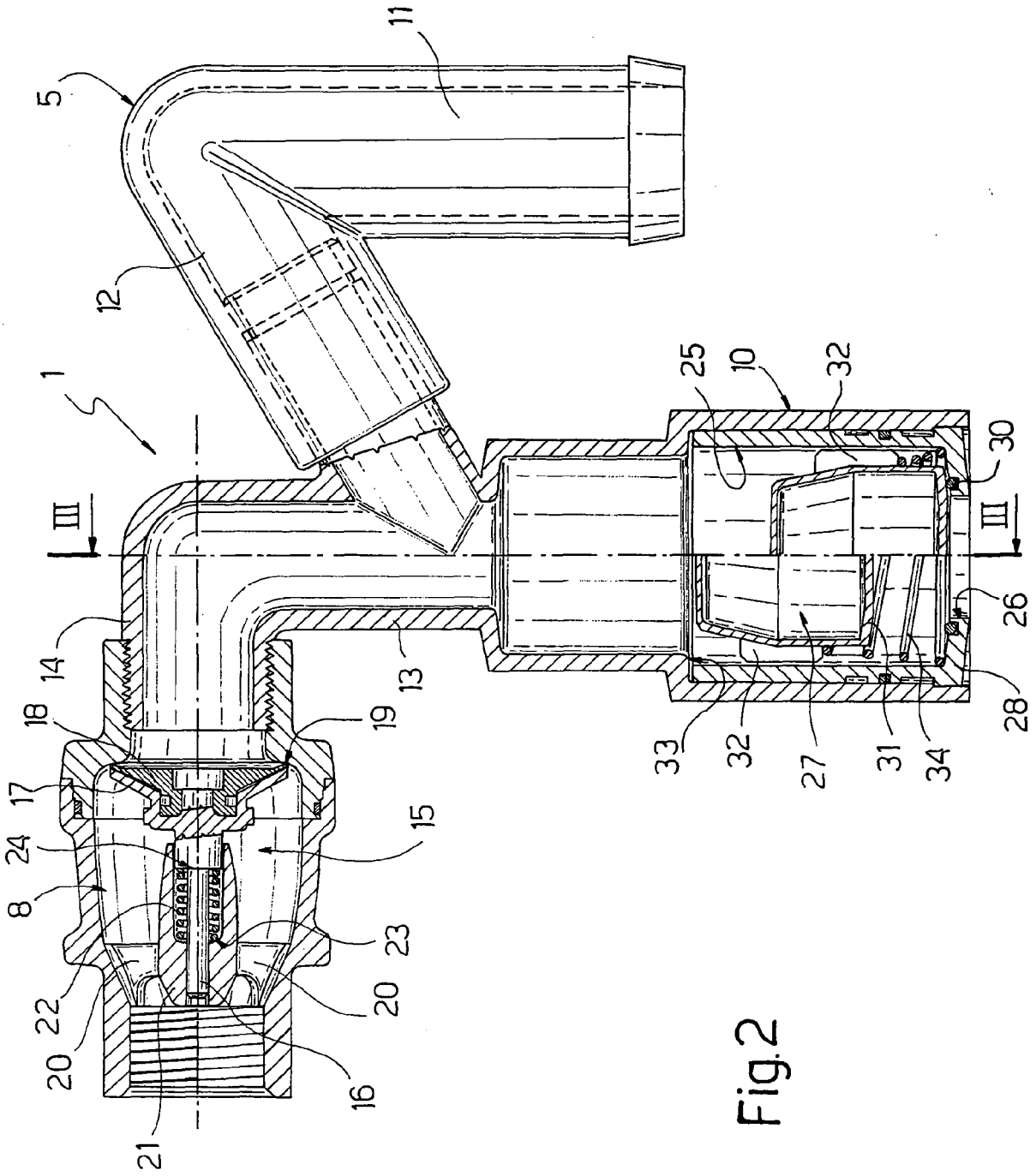

11
5
12
1
25
10
32
30
III
III
26
14
13
28
18
19
33
32
27
31
34
17
15
24
8
23
22
20
20
16
21

Fig.2

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 06 42 5197

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 4 166 296 A (DARRAH, JOHN C ET AL) 4 September 1979 (1979-09-04) * the whole document *	1-7	INV. A61H33/02
X	US 4 510 967 A (SPINNETT ET AL) 16 April 1985 (1985-04-16) * the whole document *	1	
A	US 2 325 956 A (HOLTMAN CLEMENS W) 3 August 1943 (1943-08-03) * figures *	7	
A	US 5 865 601 A (MILLER ET AL) 2 February 1999 (1999-02-02) * figure 1 *	1	
A	GB 2 198 634 A (* LEIGH STEWART PRODUCTS LIMITED) 22 June 1988 (1988-06-22) * figures 1,2 *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			A61H

1 The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	11 September 2006	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 5197

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.

11-09-2006

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4166296 A	04-09-1979	NONE	
US 4510967 A	16-04-1985	NONE	
US 2325956 A	03-08-1943	NONE	
US 5865601 A	02-02-1999	NONE	
GB 2198634 A	22-06-1988	NONE	

EPO FORM P0459

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