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Datasheet for the decision of 28 June 2011

Case Number: T 2288/10 - 3.2.05

Application Number: 04023214.2

Publication Number: 1519091

IPC: F16K 31/385

Language of the proceedings: EN

Title of invention:
Tubing pinch valve

Applicant:
I-CON Systems, Inc.

Headword:
-

Relevant legal provisions:
EPC Art. 56, 123(2)

Relevant legal provisions (EPC 1973):
-

Keyword:
"Extension beyond the application as filed - yes (main request)"
"Inventive step - no (auxiliary requests 1 and 2)"
"Inventive step - yes (auxiliary request 3)"

Decisions cited:
-

Catchword:
-

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Case Number: T 2288/10 **-** 3.2.05

D E C I S I O N
of the Technical Board of Appeal 3.2.05
of 28 June 2011

Appellant: I-CON Systems, Inc.
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Representative: Parry, Simon James
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 20 May 2010 refusing European patent application No. 04023214.2 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman: W. Zellhuber
Members: H. Schram
M. J. Vogel

Summary of Facts and Submissions

I. The appeal is against the decision of the Examining Division dated 20 May 2010 refusing European patent application No. 04 023 214.2 on the ground that the subject-matter of claim 1 of the main request of the appellant (applicant) was not clear (Article 84 EPC) and that the subject-matter of claim 1 of the first and second auxiliary requests did not involve an inventive step (Article 56 EPC).

II. Oral proceedings were held before the Board of Appeal on 28 June 2011.

III. The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of claims 1 to 17 filed as the main request on 18 April 2011, or on the basis of any of the sets of claims filed as auxiliary requests 1 to 7 on the same day.

IV. Claims 1 and 15 according to the main request read as follows:

"1. A flush valve for a plumbing fixture, the flush valve having a fluid inlet for connection with a source of fluid, a fluid outlet for connection with a plumbing fixture, a hollow body (10, 10'), and a central throat (22, 22') attached to inside walls of the hollow body (10, 10'), the central throat (22, 22') separating the fluid inlet and the fluid outlet; the flush valve being provided in combination with a pinch valve (100) for regulating fluid flow through the flush valve, the pinch valve including:

a flexible sealing member (130) having a flexible wall (132) with an inner surface defining a flow chamber (108), the flexible wall (132) being adapted to constrict upon itself to close the flow chamber and prevent fluid flow therethrough,

wherein the pinch valve comprises a cartridge member (102) having a cartridge chamber wall (110) extending between a fluid inlet opening (104) and a fluid outlet opening (106) and defining a cartridge chamber therebetween, the flexible sealing member (130) being positioned within the cartridge chamber with the flexible wall (132) extending between the fluid inlet opening and the fluid outlet opening of the cartridge member;

wherein a pressure chamber (142) extends between an outer surface of the flexible wall and the cartridge chamber wall (110), the flexible wall (132) being adapted to constrict upon itself when a fluid force in the pressure chamber (142) is at least equal to the fluid force in the flow chamber to close the flow chamber and prevent fluid flow therethrough, and

wherein the cartridge member (102) comprises at least one fluid inlet channel (120) extending through the cartridge chamber wall (110) for fluid flow into the pressure chamber and at least one fluid outlet channel (124) extending through the cartridge chamber wall (110) for fluid flow out of the pressure chamber, the pinch valve being arranged such that:

i) at least a portion of the cartridge chamber wall (110) is positioned within the central throat of the flush valve,

ii) the flow chamber (108) extends between the fluid inlet and the fluid outlet of the flush-valve,

iii) the at least one fluid inlet channel (120) lies in fluid communication with the fluid inlet of the flush valve for fluid flow into the pressure chamber, and

iv) the at least one fluid outlet channel (124) lies in fluid communication with the fluid outlet of the flush valve for fluid flow out of the pressure chamber; such that when the pressure chamber (142) is relieved of pressure, the fluid force in the pressure chamber is less than the fluid force in the flow chamber, such that the flexible wall (132) collapses, thereby permitting fluid flow through the flow chamber,

the pinch valve being characterized in that

it is provided as an integral unit in which said fluid outlet channel (124) includes a sealing member for sealing engagement to prevent fluid flow out of the pressure chamber (142), and the fluid inlet channel (120) has a diameter less than the diameter of the fluid outlet channel (124) of the cartridge member (102)."

"15. A method of retrofitting a flush valve in a plumbing fixture, the method comprising:

a) providing a flush valve (2') comprising an inlet chamber (40') in fluid communication with a fluid source and an outlet chamber (14') in fluid communication with a plumbing fixture; and

b) inserting a pinch valve (100) between the inlet chamber and the outlet chamber to thereby provide a flush valve in combination with said pinch valve in accordance with any one of the proceeding claims, said pinch valve being adapted for regulating fluid flow between the inlet chamber and the outlet chamber."

Claim 1 of auxiliary request 1 differs from claim 1 of the main request in that the last feature of the claim, viz. "and the fluid inlet channel (120) has a diameter less than the diameter of the fluid outlet channel (124) of the cartridge member (102)", has been deleted.

Claim 1 of auxiliary request 2 differs from claim 1 of the main request in that the expression "positioned within the pressure chamber (142)" has been inserted after the expression "includes a sealing member".

Claim 1 of auxiliary request 3 differs from claim 1 of auxiliary request 1 in that the expression "positioned within the pressure chamber (142)" has been inserted after the expression "includes a sealing member".

Claim 15 of auxiliary requests 1 to 3 is identical to claim 15 of the main request.

V. The following document is referred to in the present decision:

D2 US-A 3,936,028.

VI. The arguments of the appellant, in writing and during the oral proceedings, can be summarized as follows:

Main request and auxiliary request 2 - allowability of amendments under Article 123(2) EPC

Figure 2 of the application as filed was a cross-sectional elevational view of a flush valve incorporating a pinch valve element in accordance with the present invention. It was not a schematic drawing.

The diameter of the fluid outlet channel 124 in this Figure was about four times as big as the diameter of the fluid inlet channel 120. Figure 2 thus formed a basis for incorporating the feature "the fluid inlet channel (120) has a diameter less than the diameter of the fluid outlet channel (124) of the cartridge member (102)" into the independent claim directed to a flush valve (cf claim 1 of the main request and claim 1 of auxiliary request 2. Moreover, the person skilled in the art would readily recognise that the fluid inlet channel must have a diameter that is less than the diameter of the fluid outlet channel, because if this were not the case, the pinch valve would not operate in the manner described in the application as filed for the following reason. If the diameter of the fluid outlet channel were equal to or less than the diameter of the fluid inlet channel — the latter being always open to the flow into the pressure chamber 142 — the outflow of liquid would be balanced by the inflow of liquid through the fluid inlet channel and the pressure chamber could not be relieved of pressure by displacing the sealing member 180 away from the fluid outlet channel 124. It followed that claim 1 of the main request and claim 1 of auxiliary request 2 did not contain added matter in the sense of Article 123(2) EPC.

Auxiliary request 1 - inventive step, Article 56 EPC

Document D2 represented the closest state of the art. This document disclosed a flush valve having a construction different from the flush valve according to claim 1 of auxiliary request 1. First of all, document D2 did not disclose the provision of a central

throat attached to inside walls of the hollow body of the flush valve. This was not the only point of novelty. Claim 1 of auxiliary request 1 required the provision of a pinch valve comprising "a cartridge member (102) having a cartridge chamber wall (110) extending between a fluid inlet opening (104) and a fluid outlet opening (106)" and that the flexible sealing member 130 extended between the fluid inlet opening and the fluid outlet opening of the cartridge member. A comparison with Figure 1 of document D2 showed that the spacer ring 19 and the valve sleeve 15 corresponded to the cartridge member 102 and the flexible sealing member 130 mentioned in claim 1 of auxiliary request 1, respectively. The annular chamber 22 around the sleeve valve 15 in document D2 corresponded to the pressure chamber 142 of claim 1 of auxiliary request 1. Said claim further required that the at least one fluid inlet channel 120 and the at least one fluid outlet channel 124 extended through the cartridge chamber wall 110. Document D2 failed to disclose that the passage 27 (the "fluid outlet channel" of annular chamber 22) extended through the wall of spacer ring 19. Lastly, claim 1 of auxiliary request 1 was characterized in that the pinch valve was provided as an integral unit. In document D2 an insert 25 provided with a valve member 28 was attached to the spacer ring 19 by pins 21. The assembly of the spacer ring 19 and the insert 25 could therefore not be considered as an integral unit. It followed that the subject-matter of claim 1 of auxiliary request 1 was completely different from the arrangement of a flush valve in combination with a pinch valve shown in Figure 1 of document D2 and thus involved an inventive step.

Auxiliary request 3 - inventive step, Article 56 EPC

Claim 1 of auxiliary request 3 required that the pinch valve included a sealing member positioned within the pressure chamber 142. This feature was not known from the prior art. The subject-matter of claim 1 of auxiliary request 3 was therefore not obvious to the person skilled in the art.

Reasons for the Decision

MAIN REQUEST AND AUXILIARY REQUEST 2

1. *Allowability of the amendments, Article 123(2) EPC*

The last characterizing feature of claim 1 of the main request reads: "the fluid inlet channel (120) has a diameter less than the diameter of the fluid outlet channel (124) of the cartridge member (102)".

This feature is not disclosed in the application documents as filed. Since drawings in patent applications are considered schematic, relative proportions cannot be deduced from them, see eg decision T 204/83 (OJ EPO 1985, 310).

Whilst the Board concurs with the appellant that the pinch valve will only open if more liquid flows outwardly through the outlet channel 124 than flows into the pressure chamber through the fluid inlet channel, the argument of the appellant that the pinch valve would not operate if the diameters of the fluid

inlet and fluid outlet channel were the same is not convincing since it is based on the static view that identical diameters imply that the amount of liquid in the pressure chamber necessarily remains constant.

However, the pressure chamber 142, which extends between an outer surface of the flexible wall and the cartridge chamber wall, is compressible. The operation of the pinch valve is described in paragraphs [0041] and [0042] of the application as filed (published version) as a dynamical process. In the judgment of the Board, if the effective total cross-section of the fluid inlet channel(s) 120 were equal to the effective total cross-section of the fluid outlet channel(s) 124, it cannot be ruled out with certainty that the outflow of water from within the pressure chamber immediately after removing the ball seal 180 from sealing engagement with fluid outlet channel ("plunger channel 124") relieves the pressure within the pressure chamber in a manner sufficient to induce the collapse of the flexible sealing member. Furthermore, a constant flow of water through the pressure chamber will already lower the internal pressure as compared to the situation in which the fluid outlet channel and the flow chamber 108 are closed, ie the internal pressure on the flexible wall will be slightly lower than the external pressure on said wall.

Claim 1 of the main request therefore does not meet the requirements of Article 123(2) EPC.

This also holds for claim 1 of auxiliary request 2.

AUXILIARY REQUEST 1

2. *Objection of lack of inventive step, Article 56 EPC*

2.1 Document D2 represents the closest state of the art. Figure 1 of this document discloses a flush valve generally designated by the numeral 10, which comprises a valve body 11 having a fluid inlet 12 and a fluid outlet 13, see column 1, lines 48 to 52.

The valve components inside the space enclosed by the valve body 11 and the end wall 14 form a pinch valve. This pinch valve comprises a flexible valve sleeve 15 (cf column 1, lines 58 and 59), a spacer ring 19 defining an annular chamber 22 around the sleeve 15, a duct 23 communicating this (pressure) chamber with the fluid inlet 12, extending through the flange 17 which overlaps the spacer ring, an insert 25 having a chamber 26 therein which communicates with the chamber 22 through a passage 27 and pins 21 holding the spacer ring 19 and the sleeve 15 to the insert 25 (cf column 2, lines 1 to 18). This pinch valve is provided as an integral unit, since ***all these components may be unitarily inserted into the valve body during assembly, when the end wall 14 is not in place*** (cf column 2, lines 18 to 20).

The inlet 12 of the flush valve shown in Figure 1 of document D2 is axially aligned with the flow direction through the pinch valve, whereas the outlet 13 of the flush valve is orthogonal to the flow direction through the pinch valve, cf column 1, lines 52 to 57: ***Conveniently, the inlet 12 may be at one end of the valve body and the outlet 13 may project laterally from***

the other end portion of the body where the body is provided with a removable end wall 14 to facilitate assembly of the valve components hereinafter described. In the application as filed, the outlet 14 of the flush valve is axially aligned with the flow direction through the pinch valve.

The pinch valve described in document D2 has substantially the same components as the pinch valve described in claim 1 of auxiliary request 1: a flexible valve sleeve 15 ("flexible sealing member 130") defining a flow chamber, a spacer ring 19 and an insert 25 forming a cartridge member 19, 25 having a wall roughly extending between a fluid inlet 12 and a fluid outlet 13, the flexible valve sleeve 15 roughly extending between the fluid inlet 12 and the fluid outlet 13 as well, an annular chamber 22 ("a pressure chamber 142") extending between an outer surface of the flexible valve sleeve 15 and the cartridge chamber wall, which chamber 22 communicates with a chamber 26 (ie the chamber within insert 25) and forms with chamber 26 an integral pressure chamber 22, 26, the cartridge member 19, 25 comprises a duct 23 ("fluid inlet channel 120") extending through the flange 17 ("cartridge chamber wall 110") for fluid flow into the annular chamber 22, a pilot valve member 28 ("includes a sealing member for sealing engagement to prevent fluid flow out of the pressure chamber") and a fluid outlet channel (cf column 2, lines 21 to 27, and lines 34 to 45: ***so that fluid may flow from the chamber 26 to the outlet 13***) extending through the cartridge chamber wall (ie the part of the wall of the insert 25 provided with the baffle 31).

In the judgment of the Board, notwithstanding the difference in orientation of the pitch valve vis-à-vis the outlet 13 of the flush valve, the cartridge member 19, 25 can be said to have a cartridge chamber wall extending between a fluid inlet opening 12 and a fluid outlet opening and defining a cartridge chamber therebetween, whereby the flexible valve sleeve 15 is positioned within the cartridge chamber and extends between the fluid inlet opening and the fluid outlet opening of the cartridge member.

The pinch valve described in document D2 operates in exactly the same way as the pinch valve (cf feature iv) of claim 1 of auxiliary request 1.

The appellant submitted that chamber 26 in document D2 was located outside the extent of the cartridge chamber wall, in contradiction with the definition of the pressure chamber in claim 1 of auxiliary request 1.

This cannot be accepted by the Board. Claim 1 of auxiliary request 1 defines a pinch valve, ***wherein a pressure chamber (142) extends between an outer surface of the flexible wall and the cartridge chamber wall (110)*** (emphasis added by the Board). In other words, said claim does not exclude the provision of an additional pressure chamber in fluid communication with said pressure chamber (which is not defined as extending between an outer surface of the flexible wall and the cartridge chamber wall). As noted above, in document D2 the pressure chamber encompasses both the collapsible annular chamber 22 and the rigid chamber 26, and the fluid outlet channel of pressure chamber 22, 26 includes a sealing member 28 for sealing

engagement to prevent fluid flow out of the pressure chamber. As a result, the characterizing feature of claim 1 of auxiliary request 1 is disclosed in document D2.

2.2 The subject-matter of claim 1 of auxiliary request 1 differs from the flush valve disclosed in document D2 in that the flush valve has a central throat 22, 22' (rather than a cylindrical housing 11 without a central throat).

However, flush valve bodies having a central throat are well known in the art, see eg the US patent described in paragraph [0021] and shown in Figure 1 of the application as filed (published version).

In the judgment of the Board, the person skilled in the art starting from the pinch valve known from document D2 would readily realize that said pinch valve can also be used in combination with a flush valve body having a central throat.

The subject-matter of claim 1 of auxiliary request 1 does therefore not involve an inventive step, Article 56 EPC.

AUXILIARY REQUEST 3

3. *Inventive step, Article 56 EPC*

3.1 Claim 1 of auxiliary request 3 comprises the feature that "the pinch valve ... includes a sealing member positioned within the pressure chamber (142)".

The characterizing feature of claim 1 of auxiliary request 3, viz. ***it [the pinch valve] is provided as an integral unit in which said fluid outlet channel (124) includes a sealing member positioned within the pressure chamber (142) for sealing engagement to prevent fluid flow out of the pressure chamber (142),*** makes it clear that the sealing member must be positioned within the pressure chamber 142 as defined in the preamble of the claim, ie within the ***collapsible*** pressure chamber enclosed by the flexible sealing member and cartridge chamber wall.

The subject-matter of claim 1 of auxiliary request 3 differs from the flush valve disclosed in document D2 in that the sealing member is positioned within the ***collapsible*** pressure chamber enclosed by the flexible sealing member and cartridge chamber wall. In contrast, in document D2 the sealing member 28 is positioned in the rigid chamber 26; it is not positioned in the collapsible pressure chamber enclosed by the flexible sealing member 15 and the cartridge chamber wall 19.

The advantage of positioning the sealing member within the ***collapsible*** pressure chamber is that the construction of the flush valve is more compact than the flush valve known from document D2.

The distinguishing feature is not known from, or suggested by, the prior art. The subject-matter of apparatus claim 1 of auxiliary request 3 is therefore not obvious to the person skilled in the art, and hence involves an inventive step, Article 56 EPC.

The subject-matter of claims 2 to 14, which are dependent on claim 1, similarly involves an inventive step.

This also holds for the subject-matter of claim 15 of auxiliary request 3, which is directed to method of retrofitting a flush valve in a plumbing fixture, comprising the step of providing "a flush valve in combination with said pinch valve in accordance with any one of the proceeding claims" and for the subject-matter of claims 16 and 17, which are dependent on claim 15.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the first instance with the order to grant a patent on the basis of the following documents:

Claims, No.:
1 to 17, filed as auxiliary request 3 on 18 April 2011;

Description, pages:
1, 2, 2A, 2B, 3 to 13 and 15 filed on 18 April 2011;
16 filed during oral proceedings; and

Drawings, sheets:
1/7 to 7/7 filed on 18 April 2011.

The Registrar: The Chairman:

G. Nachtigall W. Zellhuber