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**Datasheet for the decision  
of 17 October 2006**

**Case Number:** T 0649/04 - 3.2.01

**Application Number:** 99122556.6

**Publication Number:** 1001198

**IPC:** F16K 27/00

**Language of the proceedings:** EN

**Title of invention:**

Device for fixing lower members and fluid control apparatus  
incorporating same

**Applicant:**

FUJIKIN INCORPORATED

**Opponent:**

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**Headword:**

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**Relevant legal provisions:**

EPC Art. 56

**Keyword:**

"Inventive step (no)"

**Decisions cited:**

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**Catchword:**

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Case Number: T 0649/04 - 3.2.01

**D E C I S I O N**  
of the Technical Board of Appeal 3.2.01  
of 17 October 2006

**Appellant:**

FUJIKIN INCORPORATED  
3-2, Itachibori 2-chome  
Nishi-ku  
Osaka-shi, Osaka (JP)

**Representative:**

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Paul & Albrecht  
Patentanwaltssozietät  
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**Decision under appeal:**

Decision of the Examining Division of the  
European Patent Office posted 20 November 2003  
refusing European application No. 99122556.6  
pursuant to Article 97(1) EPC.

**Composition of the Board:**

**Chairman:** S. Crane  
**Members:** J. Osborne  
T. Karamanli

## Summary of Facts and Submissions

I. The appeal is directed against the decision posted 20 November 2003 to refuse European patent application No. 99 12 2556.6 (EP-A-1 001 198).

II. In the search report *inter alia* the following state of the art was cited:

D1: EP-A-0 845 623.

The examining division found that the subject-matter of claim 1 then on file did not involve an inventive step in the light of the disclosure of D1.

III. During oral proceedings on 17 October 2006 the appellant requested that the decision be set aside and that a patent be granted on the basis of claims 1 to 3 filed with a letter dated 18 September 2006.

IV. Claim 1 according to the appellant's request reads as follows:

"A fluid control apparatus including at least one lower member (31, 33), which is fixed to a support member (108) by at least one bolt (110), wherein the lower member (31) has a bolt bore (107) for each bolt (110) and is disposed between the support member (108) and an upper member (7), wherein the at least one bolt bore (107) comprises a large-diameter portion (107a) larger in diameter than a head (110a) of the bolt, and a small diameter portion (107b) extending downward from the large-diameter portion with a stepped portion (107c) formed there between, and the small diameter portion

(107b) having a diameter intermediate between the diameter of the bolt head (110a) and the diameter of the shank (110b) of the bolt, and a hollow cylindrical spacer (121) having an inside diameter larger than the diameter of the bolt shank (110b) and being inserted through the small diameter portion (107b) of the bolt bore (107), so that an upper end of the spacer (121) is positioned in the large diameter portion (107a), a hollow cylindrical elastic member (112) being interposed between the bolt head (110a) and the stepped portion (107c) for biasing the lower member (31) toward the support member (108), characterized in that a heat insulator (122) is interposed between the support member (108) and the lower member (31, 33) and that the cylindrical spacer (121) extends through a spacer inserting hole (123) provided in the heat insulator (122), so that the lower end of the spacer (121) bears on the support member (108)."

V. The submissions of the appellant may be summarised as follows:

An apparatus according to the preamble of claim 1 is known from D1. With such an apparatus it is likely that a heater will be installed for preventing condensation of water vapour and for preventing re-liquefaction of gasified liquid. Accordingly, it is the object of the invention to prevent problems from arising when using a heater in such an apparatus, in particular to maintain the tightening torque of the bolts connecting the lower member to the support member. D1 gives the skilled person no incentive to provide the insulator. Moreover, it would be the natural action of the skilled person to simply provide the insulation between the support

member and lower member with the spacer abutting against the insulation. In that way no modification of the construction would be necessary. By comparison, the presently claimed arrangement necessitates the elongation of the spacer. If the introduction of the insulation between the spacer and the lower member were to create problems the skilled person would consider also other arrangements and it is not apparent that he would select the particular one presently claimed.

### **Reasons for the Decision**

1. The application relates to fluid control apparatus which may be used for example in manufacturing semiconductors. The lower members are mounted by bolts onto the support members and may provide fluid communication between mutually adjacent upper members, necessitating a fluid-tight joint between the lower and upper members. Whilst the lower members are mounted with their lower surfaces adjacent the support member their upper surfaces would have to be aligned to ensure effective sealing. Each retaining bolt for the lower members is tightened onto a spacer whose lower end bears on the support member and elastic members mounted between the bolt head and the lower members bias these against the support member. The lower members can be moved against the effect of the bias force to allow their upper surfaces to be aligned. A fluid control apparatus having these features is known from D1. As furthermore suggested in D1 column 8, lines 40 to 45 the lower members may be heated to prevent condensation of water vapour or re-liquefaction of a gas.

2. The subject-matter of present claim 1 differs from the disclosure of D1 by the features that:

- a heat insulator is interposed between the support member and the lower member; and
- a hole is provided in the heat insulator through which the cylindrical spacer extends.

2.1 The thermal insulation serves to reduce heat transfer between the lower and support members whilst the hole allows retention of the known relationship between the spacer and the support member.

2.2 The provision of insulating material for reducing heat transfer is a totally conventional act falling within the general knowledge of the skilled person and cannot support the presence of an inventive step. It is of no consequence that D1 mentions the provision of a heater but not of insulation because the skilled person would not require a specific technical teaching as an incentive to provide a feature which falls within the scope of his general knowledge.

2.3 In the arrangement according to D1 the upper end of each spacer provides a reaction surface against which the respective bolt may be tightened and the force which the bolt applies to the spacer is transmitted to the surface of the lower member. When introducing the thermal insulation at the sites of the attachment bolts only two possibilities would be available to the skilled person, namely a first as presently claimed in which the hole in the insulation is large enough to permit the spacer to pass through and thereby maintain

the known relationship of the spacer with the support member, and a second in which the hole is only large enough for the bolt to pass through whereby the spacer bears on the insulation. Many thermal insulation materials when subjected to compressive stress, particularly in combination with thermal cycling, such as would result from operation of the heater, exhibit creep. The skilled person would select from the two possibilities for installing the insulation in dependence on its properties.

- 2.3.1 The first, claimed arrangement having the larger hole would be the preferred choice of the skilled person since it has no influence on the known arrangement for tightening the bolt and is independent of the dimensional stability of the insulation. Moreover, this arrangement would be less demanding as regards the influence of dimensional tolerances. This follows from the fact that the first, claimed arrangement requires merely that the hole be positioned and sufficiently large for the spacer to pass through it. By comparison, for the second, small hole arrangement it would be necessary to ensure that the hole is positioned and sufficiently large to permit the bolt to pass through whilst nevertheless being sufficiently small and/or concentric to the spacer to ensure satisfactory abutment.
- 2.3.2 The second arrangement would suffer from the potential disadvantage that a spacer bearing on a material which exhibits creep would become unable to react the force applied by the bolt which then no longer would be tight. The appellant acknowledges that a problem of dimensional instability of the insulation material may

exist but argues that other obvious solutions to this problem would occur to the skilled person. However, even if that were so, it would render the presently claimed solution no less obvious.

2.3.3 The presently claimed feature therefore is merely one of a limited number of possibilities from which the skilled person would choose according to circumstances and in the light of his general technical knowledge.

2.4 The appellant takes the view that the second arrangement having the smaller hole would be the preferred choice of the skilled person. The board disagrees. Firstly, contrary to the appellant's argument, that arrangement would necessitate detail modifications to accommodate the additional thickness of the insulation. It would be necessary either to provide longer bolts or to increase the depth of the large diameter portion of the hole in the lower member and use shorter spacers. Secondly, whilst the insulation between the spacer and the support member may provide improved resistance to heat transfer between these, in fact the spacer is not in intimate contact with the heated lower member, if at all, and so would not form a primary heat flow path. The skilled person when considering the claimed arrangement for installing the insulation material would balance disadvantages such as a possibly higher heat transfer against the advantages of simplicity of dimensional tolerancing and reliability of mechanical retention. Such considerations in the light of general technical knowledge fall within the normal activity of the skilled person.

3. It follows from the foregoing that the subject-matter of present claim 1 does not involve an inventive step (Article 56 EPC).

## **Order**

### **For these reasons it is decided that:**

The appeal is dismissed.

The Registrar:

The Chairman:

A. Vottner

S. Crane