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D E C I S I O N
of 29 July 1999

Case Number: T 0300/98 - 3.2.1

Application Number: 92104222.2

Publication Number: 0503609

IPC: F16L 33/02

Language of the proceedings: EN

Title of invention:
Stepless clamp

Patentee:
Hans Oetiker AG Maschinen- und Apparatefabrik

Opponent:
Etablissements Caillau, Société Anonyme à Directoire et Conseil de Surveillance

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step (no)"

Decisions cited:
-

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0300/98 - 3.2.1

D E C I S I O N
of the Technical Board of Appeal 3.2.1
of 29 July 1999

Appellant: (Opponent)
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Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted 27 January 1998 rejecting the opposition filed against European patent No. 0 503 609 pursuant to Article 102(2) EPC.**

Composition of the Board:

Chairman: F. Gumbel
Members: M. Ceyte

J. van Moer

Summary of Facts and Submissions

I. The respondent is proprietor of European patent No. 0 503 609 (application No. 92 104 222.2).

II. The patent was opposed by the appellant (opponent) on the ground of lack of patentability.

The following state of the art was *inter alia* cited:

D1: EP-A-0 296 918

D2: US-A-4 315 348

D6: GB-A-1 064 048

III. By its decision posted on 27 January 1998 the Opposition Division rejected the opposition.

IV. On 23 March 1998 the appellant (opponent) lodged an appeal against this decision, with the appeal fee being paid at the same time.

The statement of grounds of appeal was filed on 26 May 1998.

V. Oral proceedings before the Board of Appeal were held on 29 July 1999.

The appellant requested that the decision under appeal be set aside and the European patent be revoked in its entirety.

The respondent (patent proprietor) requested that the

appeal be dismissed and the patent be maintained as granted or in the alternative on the basis of claim 1 submitted with letter of 23 November 1998.

VI. Claim 1 as granted reads as follows:

"1. A clamp structure, comprising clamping band means (11) being provided with an at least approximately centrally disposed cut (14) extending over a part of the circumference of the clamping band means, and at least one pair of fold means located on opposite sides of the cut (14) and being angularly spaced a distance from one another in the circumferential direction in such a manner that a respective fold means on one side of the cut is covered by a flat band portion on the other side of the cut, with each fold means having a width in a direction transverse to the circumferential direction of the clamping band means (11) corresponding substantially to the width of the part of the clamping band means located on the corresponding side of the cut (14), characterized in that said fold means are plastically deformable ear-like means having two generally outwardly extending leg portions interconnected by a generally longitudinally extending bridging portion disposed angularly to the leg portions, the at least one pair of plastically deformable ear-like means (15a,15b) being operable to tighten the clamp structure about an object to be fastened upon contraction of the ear-like means by plastic deformation thereof."

Claim 1 of the auxiliary request reads as follows:

"1. A clamp structure, comprising clamping band means

(11) being provided with an at least approximately centrally disposed cut (14) extending over a part of the circumference of the clamping band means, and at least one pair of fold means located on opposite sides of the cut (14) and being angularly spaced a distance from one another in the circumferential direction in such a manner that a respective fold means on one side of the cut is covered by a flat band portion on the other side of the cut, with each fold means having a width in a direction transverse to the circumferential direction of the clamping band means (11) corresponding substantially to the width of the part of the clamping band means located on the corresponding side of the cut (14), characterized in that said fold means are plastically deformable ear-like means having two generally outwardly extending leg portions interconnected by a generally longitudinally extending bridging portion disposed angularly to the leg portions, the at least one pair of plastically deformable ear-like means (15a,15b) being spaced at such a circumferential distance as to be operable to tighten the clamp structure about an object to be fastened upon plastic deformation thereof by simultaneous contraction of the ear-like means."

VII. The appellant argued essentially that it would be obvious for a skilled person to combine the teaching of document D1 particularly with that of document D2 to arrive at the subject-matter of granted claim 1.

Claim 1 of the auxiliary request further requires that the plastically deformable "Oetiker" ears be so angularly spaced that they can be contracted simultaneously. Such an angular space is not determined

and the statement that the ears should be contracted at the same time relates to the particular operation of the claimed clamp and not to a further structural feature thereof. This adds nothing to the definition of the claimed clamp and thus alternative claim 1 likewise lacks an inventive step in its subject-matter.

VIII. The respondent (proprietor of the patent) contested this view and submitted that there is no suggestion whatsoever to replace the elastic undulations of document D1 by the plastically deformable "Oetiker" ears of document D2. The function of these undulations is to supply a reserve of elasticity to compensate for changes in the diameter of the plastic hose to be fastened. Tightening of the clamp disclosed in document D1 is accomplished by means of a hook and anchoring arrangement, the undulations thus having no tightening function. By contrast the clamp of document D2 is tightened by contracting one or more plastically deformable "Oetiker" ears. There is no reason for the skilled person to add to the clamp of document D1 which is already equipped with tightening means in the form of a hook and anchoring arrangement, plastically deformable tightening ears of the kind disclosed in document D2.

The elastic undulations of document D1 and the plastically deformable "Oetiker" ears of document D2 not only differ in structure and function but require metals exhibiting significantly different properties, i.e. spring steel in one case or e.g. ordinary galvanized steel in the other case.

Finally the inventive concept is not only based on the

idea that an overlap or insert is not indispensable to eliminate the gap underneath a plastically deformable ear but also resides in the recognition that tightening should be carried out, as claimed in the alternative claim 1, by the simultaneous contraction of the "Oetiker" ears so as to avoid distortions in the clamping band. In document D6 two tightening ears are located diametrically opposite to each other and thus cannot be contracted at the same time with one and the same tool.

Reasons for the Decision

1. The appeal is admissible.

2. *Novelty*

The Board is satisfied that the subject-matter of claim 1 as granted and of alternative claim 1 is novel over the opposed prior art documents.

Since this has never been disputed during the opposition and appeal proceedings, there is no need for further detailed substantiation of this matter.

3. *Inventive step (main request)*

3.1 The patent in suit relates to a clamp structure with a clamping band provided with a plastically deformable so called "Oetiker" ear to be contracted to tighten the clamp about the hose to be fastened (column 1, lines 9 to 14 and column 3 lines 17 to 19 of the European

patent). A clamp provided with such a plastically deformable ear is *inter alia* disclosed in document D2.

In order to bridge the gap which remains underneath the plastically deformable ear when the latter is contracted and thus to eliminate any discontinuities in the circumferential direction which result from such gap, insert members or insert rings have been used. According to the patent in suit (column 1, lines 22 to 35) these insert members entailed the disadvantage of increased costs in manufacture and assembly and additionally exhibited steps in the areas of overlap with the clamping band. It is said that these steps were of lesser significance with the relatively soft hose materials made from rubber or rubber like materials as used heretofore. However with the advent of plastic, relatively thin hose materials having a high degree of hardness, even slight steps with the use of relatively thin band material for the insert rings or insert members could represent a source of leakage.

Therefore the technical problem to be solved by the claimed invention is to provide "a clamp structure provided with plastically deformable so-called "Oetiker" ears which avoids the aforementioned shortcomings and drawbacks in a simple manner without any significant additional costs in manufacture and which can be installed in a simple and efficient manner" (see column 3, second paragraph of the patent in suit).

3.2 This problem is in essence solved according to the invention by providing the clamp structure with a centrally located cut extending over a part of the

circumference thereof and with at least one pair of plastically deformable "Oetiker" ears located on opposite sides of a longitudinal cut which are angularly spaced a distance from one another in the circumferential direction in such a manner that a respective ear on one side is covered by a flat band on the other side of the cut (see claim 1 and column 3, lines 30 to 37).

This solution is said to allow easy installation of a clamp structure made from tubular stock without the need of any insert members to bridge the gap underneath the plastically deformable ear and permit excellent holding ability of the clamp over its entire circumference devoid of any gaps, discontinuities or steps along the internal clamping surface (column 3, lines 38 to 44).

3.3 Document D1 discloses a clamp structure constituted by a metal band wound on itself, comprising outwardly extending undulations. The purpose of these undulations is to impart some elastic compensating capabilities to the clamp structure.

However it is said that the provision of undulations having a width corresponding to that of the band was not deemed entirely satisfactory particularly if it is not possible to insert between the undulation and the flexible hose to be clamped a strip of metal ensuring the continuity of the tightening force over the whole periphery of the hose (column 1, lines 50 to 55). Thus document D1 also addresses the problem of assuring a gap-free transition of the band, within the area of an undulation, without needing a separate insert member.

This problem is solved in document D1 without the necessity of positioning a strip of metal between the undulations and the hose to be fastened, by providing the clamping band with a longitudinal cut and locating a pair of undulations on opposite sides of the cut, the undulations being angularly spaced at a distance in such a manner that a respective undulation on one side is covered by a band portion on the other side.

Having regard to the correspondence of the problems to be solved, it is considered to be obvious for the skilled person to make use of the above idea for solving it, i.e. to combine the teaching of the closest prior art document D2, that is using a clamping band with plastically deformable "Oetiker" ears, with that of document D1 and thus to arrive at the subject-matter claimed in claim 1.

3.4 It is true that the purpose of the elastic undulation disclosed in document D1 differs from that of a plastically deformable "Oetiker" ear; however both of them entail the same disadvantage of forming a gap or discontinuity in the inner surface of the clamping band. As already stated, the object to be achieved by the invention is a continuous internal clamping surface devoid of any gaps or discontinuities notwithstanding the presence of plastically deformable "Oetiker" ears. The skilled person wanting to solve such a problem would be led by the teaching of document D1 to provide the clamping band with a longitudinal cut defining two band sections and to position a plastically deformable ear on each band section, each ear of one band section being offset circumferentially with respect to each ear of the other band section, because this arrangement is said to solve a problem which is very similar to that solved in the patent in suit, that is to insure the continuity of the tightening effect over the whole periphery of the hose (see e.g. column 1 lines 53 to 55 of document D1).

It is accepted that the band metal used in document D1 might be different from that used in document D2. However this is of no relevance since the problem to be solved is to provide a clamp structure of the kind disclosed in document D2 comprising plastically deformable ears, and thus made of a metal appropriate for these ears, said clamp structure being devoid of any gap or discontinuity underneath the ears.

3.5 Accordingly the Board concludes that the subject-matter of claim 1 lacks an inventive step as required by Article 56 EPC.

Therefore claim 1 is not allowable and thus the main request must fail.

4. *Inventive step (auxiliary request)*

4.1 Alternative claim 1 further requires that the plastically deformable "Oetiker" ears be so angularly spaced that they can be contracted simultaneously. This angular space is indefinite, since it depends on the pair of tools used for contracting at the same time the plastically deformable "Oetiker" ears, these tools being not defined in claim 1. Therefore there is no restriction in alternative claim 1 in respect of the angular space between two "Oetiker" ears. Since alternative claim 1 does not specify any technical feature beyond those already comprised in claim 1 as granted, alternative claim 1 is likewise deemed to lack an inventive step in its subject-matter for the same reasons as stated in points 3 hereinabove.

4.2 As to the respondent's submission that the inventive concept lies *inter alia* in the recognition that in the claimed arrangement the respective pair of plastically deformable ears should be contracted at the same time, it is observed that none of the cited documents demonstrates the existence of a technical prejudice for the skilled person against contracting two tightening ears of a clamp at the same time.

On the contrary, the clamp structure disclosed in document D6 comprises two tightening ears located diametrically opposite to each other. It is said (column 2 lines 30 to 32) that the contraction of the clamp "is brought by pinching the ears (3c) and (3d)

such as by a pair of pincers as indicated in Figure 5". The skilled reader would easily realise that such a pair of pincers are required for contracting the ears at the same time so as to avoid any distortions in the clamping band.

The respondent is of course correct when stating that in such a case the simultaneous contraction is not made with one and the same tool. However alternative claim 1 does not contain any such limitation which would be in any case inadequate for defining the claimed clamp in terms of structure or function.

4.3 For these reasons the auxiliary request must also fail.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chairman:

M. Maslin F. Gumbel