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**Datasheet for the decision  
of 11 August 2009**

**Case Number:** T 1956/07 - 3.2.05

**Application Number:** 98942606.9

**Publication Number:** 1007875

**IPC:** F16L 33/207

**Language of the proceedings:** EN

**Title of invention:**

Insert for connectors for high-pressure rubber hoses having improved tightness characteristics

**Patentee:**

MANULI RUBBER INDUSTRIES S.p.A.

**Opponent:**

The Gates Corporation

**Headword:**

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**Relevant legal provisions:**

EPC Art. 54, 56

**Relevant legal provisions (EPC 1973):**

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**Keyword:**

"Novelty (main, second and third auxiliary requests, no)"

"Inventive step (first auxiliary request, no)"

**Decisions cited:**

-

**Catchword:**

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Case Number: T 1956/07 - 3.2.05

**D E C I S I O N**  
of the Technical Board of Appeal 3.2.05  
of 11 August 2009

**Appellant:** MANULI RUBBER INDUSTRIES S.p.A.  
(Patent Proprietor) Zona Industriale Campolungo  
I-63100 Ascoli Piceno (IT)

**Representative:** Modiano, Micaela Nadia  
Dr. Modiano & Associati SpA  
Via Meravigli 16  
I-20123 Milano (IT)

**Respondent:** The Gates Corporation  
(Opponent) 1551 Wewatta Street  
Denver Colorado 80202 (US)

**Representative:** Tunstall, Christopher Stephen  
Carpmaels & Ransford  
43-45 Bloomsbury Square  
London WC1A 2RA (GB)

**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office posted 27 September 2007  
revoking European patent No. 1007875 pursuant  
to Article 102(1) EPC 1973.

**Composition of the Board:**

**Chairman:** W. Zellhuber  
**Members:** P. Michel  
M. J. Vogel

## Summary of Facts and Submissions

- I. The appellant (patent proprietor) lodged an appeal against the decision of the Opposition Division revoking European Patent No. 1 007 875.

The patent in suit was revoked by the Opposition Division on the ground of lack of novelty of a main request. A late filed auxiliary request was not admitted.

- II. The appellant requested maintenance of the patent on the basis of the claims of a main request or one of three auxiliary requests, all filed on 8 February 2008.

The respondent (opponent) requested that the appeal be dismissed.

- III. The following documents are referred to in the present decision;

O1: US-A-5,137,309

O2: DE-B-1 247 092

- IV. Claim 1 of the main request of the appellant reads as follows:

"1. An insert for connectors for high-pressure rubber hoses and a locking ring (2) adapted to lock the rubber hose around the insert, the insert comprising a substantially cylindrical body which has a region meant to be inserted in a rubber hose, and having, on its outer surface and in a central region, at least one

annular asymmetric groove (3), said at least one annular asymmetric groove (3) having a profile comprising a first straight portion (4) which blends along a curved portion with a first inclined portion (5) which blends with a second inclined portion (6), which is in turn blended with a second straight portion (7), said first and second straight portions being parallel to a longitudinal axis of said insert, **characterized in that** said at least one annular asymmetric groove (3) is inclined toward the outlet portion of the insert in order to guide the distribution of localized tensions and avoid tears in the elastomeric substrate, the inclination of said second inclined portion (6), with respect to the longitudinal axis of the insert, being less than the inclination of said first inclined portion (5) with respect to said longitudinal axis, said second inclined portion (6) being the portion of said at least one annular asymmetric groove (3) arranged downstream of said first inclined portion (5), with respect to the direction which leads to the outlet portion of the insert."

Claim 1 of the first auxiliary request differs from claim 1 of the main request in that the term "from a flange (11) of the insert (1)" is introduced after the term "with respect to the direction which leads".

V. Claim 1 of the second auxiliary request reads as follows:

"1. An insert for connectors for high-pressure rubber hoses and a locking ring (2) adapted to lock the rubber hose around the insert, the insert comprising a substantially cylindrical body which has a region meant

to be inserted in a rubber hose, and having, on its outer surface and in a central region, at least one annular asymmetric groove (3) which is inclined toward the outlet portion of the insert in order to guide the distribution of localized tensions and avoid tears in the elastomeric substrate, said outlet portion being positioned at an end for insertion of the insert into the rubber hose, said at least one groove having a profile comprising a first straight portion (4) which blends along a curved portion with a first inclined portion (5) which blends with a second inclined portion (6), which is in turn blended with a second straight portion (7), said first and second straight portion being parallel to a longitudinal axis of said insert, **characterized in that** the inclination of said second inclined portion (6), with respect to the longitudinal axis of the insert, is less than the inclination of said first inclined portion (5) with respect to said longitudinal axis, said second inclined portion (6) being the portion of the groove arranged downstream of said first inclined portion (5), with respect to the direction which leads to the outlet portion of the insert, wherein said at least one groove (3) has a profile defining a cavity which has a rounded bottom, the deepest point whereof is axially offset with respect to the center-line of said groove."

Claim 1 of the third auxiliary request differs from claim 1 of the second auxiliary request in that the term "such as to allow axial sliding of the rubber of the hose during ring compression," is introduced after the term "with respect to the direction which leads to the outlet portion of the insert".

VI. The appellant argued substantially as follows in the written procedure:

Both in Figure 1 of the patent in suit and document 01, the inlet of the insert can only be at the left hand end, that is, from the threaded coupling member (32) to the free end (26). Accordingly, the inclination of the profile as specified in claim 1 of the main request is opposite to that disclosed in document 01, as shown in Figure 3 of the patent in suit and Figure 2 of document 01. Claim 1 according to the main request is thus new.

In the event that the above argument in respect of the main request cannot be accepted, claim 1 of the first auxiliary request is amended so as to define unambiguously the direction of flow in the insert. The subject-matter of claim 1 is thus distinguished from the disclosure of document 01 in that the inclination of the downstream inclined portion of the groove with respect to the longitudinal axis of the insert is less than the inclination of the upstream inclined portion.

In the insert of document 01, it is essential to provide a stress relief zone (16) into which elastic material flows during crimping. It is therefore essential that the grooves are orientated as shown in Figure 2 of document 01, with the lesser inclination towards the element (50), so as to allow such material flow.

Document 02 discloses an insert having saw-toothed barbs in order to avoid sliding of the hose. Such barbs will, however, damage the hose. Further, the material

of the hose is pressed against the barbs under fluid pressure in use (column 1, lines 42 to 45). The insert according to the patent in suit does not function in this manner. Further, the saw-tooth profile of document O2 has a perpendicular flank.

As regards claim 1 of the second and third auxiliary requests, the same arguments apply in connection with novelty and inventive step.

VII. The respondent argued substantially as follows in the written procedure:

Claim 1 of the main request does not specify the flow direction through the insert. Accordingly, all the features of claim 1 are disclosed in document O1, and claim 1 of the main request lacks novelty.

The amendment of claim 1 of the first auxiliary request to specify the presence of flange (11) does not have the effect of defining the flow direction through the insert. Accordingly, claim 1 of the first auxiliary request also lacks novelty.

Even if claim 1 were have the direction of inclination of the grooves clearly defined, the claim would lack an inventive step in view of the combination of documents O1 and O2. The problem to be solved, regarding document O1 as the closest prior art, is to further reduce damage to the inner wall of the hose in use of the insert. Document O2 at column 1, lines 25 to 32 teaches a solution to this problem, that is, to reverse the direction of the barbs.

It is not accepted that document O1 teaches away from such a reversal. The direction of inclination of the grooves is merely a preferred feature. The broadest concept is defined in claim 1 of document O1, it being preferred to use asymmetric grooves (claim 2), the orientation of the inclination only being introduced in claim 4.

The amendment to claim 1 of the second auxiliary request does not have the effect of specifying the flow direction through the insert. Claim 1 thus lacks novelty.

Inclined grooves are known in the art, for example from documents O1 and O2. There is no teaching in the patent in suit as to why sliding will occur which does not occur in the prior art. Claim 1 of the third auxiliary request must therefore either contravene Article 54 or 83 EPC.

## **Reasons for the Decision**

### 1. *Main Request*

#### 1.1 Novelty

Claim 1 does not specify any features which enable the downstream or outlet end of the insert to be identified. Fluid flow could take place in either direction through the insert, either to or from the rubber hose. Whilst the appellant argues that fluid flow will inevitably be from the threaded coupling member to the free end, claim 1 does not specify the presence of any features



which would enable the free end to be identified. In addition, there is nothing to prevent the insert from being used when flow from a rubber hose into the insert takes place. The wording of the claim thus does not have the effect of specifying the orientation of the at least one groove.

Document O1 thus discloses an insert having all the features of claim 1, and the subject-matter of claim 1 is thus not new.

## 2. *First Auxiliary Request*

### 2.1 Novelty

The amendment to claim 1 has the effect of distinguishing the inlet portion of the insert, which is provided with a flange (11), from the outlet portion. The subject-matter of claim 1 is thus distinguished from the insert disclosed in document O1, in that the inclination of the downstream inclined portion of the groove with respect to the longitudinal axis of the insert is less than the inclination of the upstream inclined portion.

### 2.2 Inventive step

The problem to be solved by this feature can be regarded as being to avoid damage to the material of the hose caused by axial movement of the hose (paragraph [0016] of the patent in suit).

As regards the provision of a stress relief zone (16) in the preferred embodiment of document O1 into which the elastic material of the hose flows during crimping, such a zone could be arranged, if required, at any suitable position along the length of the insert. This feature cannot be seen as preventing the grooves from being orientated other than as shown in Figure 2 of document O1. The person skilled in the art would thus not be discouraged from changing the orientation of the grooves.

Document O2 is concerned with a solution to the above problem, as discussed at column 1, lines 25 to 45. As set out in the final three lines of claim 1 of document O2, the problem is solved by the steep flanks of the grooves facing away from the inlet end of the insert. It is noted that, whilst the drawings of document O2 appear to show the more steeply inclined portion of the grooves as being more or less vertical, the description and claims refer to saw tooth grooves (4) having a steep flank (column 2, lines 32 to 37 and claim 1).

Further, the use of the term "sägezahnartige Rillen" in document O2 is not construed as implying that sharp edges are provided between the grooves. Rather, document O2 emphasizes that damage to the inner wall of the hose should be avoided by the orientation of the grooves (column 1, lines 25 to 32).

The subject-matter of claim 1 thus does not involve an inventive step.

3. *Second Auxiliary Request*

3.1 Novelty

As shown in Figure 2 of document O1, the grooves of the insert have a profile defining a cavity which has a rounded bottom (of radius R), the deepest point of each groove being axially offset with respect to the center-line of the groove.

The additional feature of claim 1 as compared with claim 1 of the main request is thus known from document O1 in combination with the features of claim 1 of the main request, so that the subject-matter of claim 1 is similarly not new.

4. *Third Auxiliary Request*

4.1 Novelty

The grooves of the insert of document O1, as shown in Figure 2 do not have any structural features which would prevent axial sliding of the rubber of the hose during ring compression. Thus, insofar as such sliding occurs in an insert having grooves of the form shown in Figure 3 of the patent in suit, it is inevitable that, in the device disclosed in document O1, during ring compression, some axial sliding of the inner wall of the hose along the inclined portions of the groove will also occur.

The additional feature of claim 1 as compared with claim 1 of the second auxiliary request is thus also known from document O1 in combination with the features

of claim of the second auxiliary request, so that the subject-matter of claim 1 is similarly not new.

**Order**

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

The appeal is dismissed.

The Registrar:

The Chairman:

C. Moser

W. Zellhuber