Internal distribution code:

(A) [-] Publication in OJ
(B) [-] To Chairmen and Members
(C) [-] To Chairmen
(D) [X] No distribution

Datasheet for the decision of 19 March 2013

Case Number: T 0964/10 - 3.2.05

Application Number: 03773677.4

Publication Number: 1563215

IPC: F16L11/14

Language of the proceedings: EN

Title of invention:
Hoselike member having a circumference which is composed of a number of metal wires or tubes

Patent Proprietor:
Norsk Hydro ASA

Opponent:
Valeo Compressor Europe, s.r.o.

Headword:

Relevant legal provisions:
EPC 1973 Art. 56

Keyword:
Inventive step - all requests (no)

Decisions cited:

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern
Boards of Appeal
Chambres de recours

European Patent Office
D-80298 MUNICH
GERMANY
Tel. +49 (0) 89 2399-0
Fax +49 (0) 89 2399-4465

Case Number: T 0964/10 - 3.2.05

D E C I S I O N
of Technical Board of Appeal 3.2.05
of 19 March 2013

Appellant: (Opponent)	Valeo Compressor Europe, s.r.o. Central Trade Park 1571 396 01 Humpolec (CZ)
Representative:	Jochen Kilchert Meissner, Bolte & Partner GbR Widenmayerstrasse 48 80538 München (DE)
Respondent: (Patent Proprietor)	Norsk Hydro ASA Bygdoy Allé 2 0240 Oslo (NO)
Representative:	Svein Hofseth Norsk Hydro ASA Drammensveien 260 0240 Oslo (NO)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 26 February 2010 rejecting the opposition filed against European patent No. 1563215 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairman: M. Poock
Members: S. Bridge
W. Ungler

Summary of Facts and Submissions

I. An appeal was lodged against the decision of the opposition division rejecting the opposition filed against European patent No. 1 563 215.

The opposition division held that the grounds for opposition of Article 100(a) EPC 1973 (lack of novelty and inventive step, Articles 54 and 56 EPC 1973) did not prejudice the maintenance of the patent in suit as granted.

II. Oral proceedings were held before the Board of Appeal on 19 March 2013.

III. The appellant (opponent) requested that the decision under appeal be set aside and that European patent No. 1 563 215 be revoked.

The respondent (patent proprietor) requested as main request that the appeal be dismissed, or, as an auxiliary request, that the decision under appeal be set aside and the patent be maintained on the basis of claim 1 to 9 as filed during the oral proceedings.

IV. Claim 1 of the patent in suit as granted (main request) reads as follows:

"1. Hoselike member (1) having a circumference which is composed of a number of metal tubes (2), which are substantially parallel to each other and wound in a helical manner around the longitudinal axis of the hoselike member characterised in that the tubes (2) have an internal diameter between 1 and 6 mm and a wall thickness between 0.1 and 0.5 mm."

V. Claim 1 according to the auxiliary request differs from claim 1 of the main request in that the following feature is added to the end of the claim: "and that the pitch angel [sic] of the tubes (2) is between 50° and 85°, but preferably between 60° and 80°."

VI. The following documents are referred to in the present decision:

D1: EP-A-1 279 911 (published 29 January 2003)
D3: WO-A-00/20807
D5: Extract "*Kesselformel*" from "*Technische Formelsammlung*", Giek, 1989

VII. The arguments of the appellant in the written and oral proceedings can be summarised as follows:

Main request

As the priority is not validly claimed, document D1 is prior art according to Article 54(2) EPC 1973 and forms the closest prior art. The subject-matter of claim 1 as granted only differs therefrom in that the tubes have a wall thickness between 0.1 and 0.5 mm. The claimed subject-matter does not constitute an optimisation, because additional essential parameters are not specified. The objective problem is to determine a suitable wall thickness for the tubes. The claimed wall thicknesses correspond to those a skilled person can readily calculate in the course of the normal practice of his art, for example, using the Barlow formula (document D5) for aluminium tubes used for a CO_2 based air conditioning system. Therefore, the subject-matter of claim 1 of the patent in suit lacks an inventive step.

Auxiliary request

The late filed auxiliary request should not be admitted into the proceedings.

The additional feature of claim 1 concerning the range of pitch angles concerns a separate problem from that of determining the wall thicknesses and there is no synergy between the two. The claimed range of pitch angles is merely an arbitrary choice encompassing almost a third of all possible values and for which there is no evidence of a special effect. Therefore, the subject-matter of claim 1 according to the auxiliary request lacks an inventive step.

VIII. The arguments of the respondent in the written and oral proceedings can be summarised as follows:

Main request

It is accepted that the subject-matter of claim 1 does not enjoy the claimed priority date of 18 November 2002 so that document D1 constitutes prior art according to Article 54(2) EPC 1973.

The hoselike member of the invention is substantially different from the "*flexible bundle of capillary tubes*" disclosed in document D1. Furthermore, by analogy with the flexibility inherent in a helical spring the hoselike member is necessarily more flexible than the arrangement of document D1. In addition, twisting a "*bundle of tubes*" according to document D1 together along their length in the manner of the strands of a cord or rope does not produce an arrangement in which the tubes are substantially parallel to each other and wound in a helical manner around the longitudinal axis

of the hoselike member. The invention of the patent in suit provides an optimal design with respect to flexibility, pressure drop and burst resistance (patent in suit, paragraphs [0003] and [0004]). The ranges claimed in claim 1 are neither disclosed nor suggested in the prior art. Therefore, the subject-matter of claim 1 involves an inventive step.

Auxiliary request

The auxiliary request merely involves including the subject-matter of dependent claim 4 into claim 1 and thus cannot come as a surprise to the other party. The auxiliary request should be admitted into the proceedings.

The pitch angle of the helical windings determines a helical spring-like effect shown in figure 16 and paragraph [0035], which in combination with the wall thickness and internal diameter gives rise to an optimal compromise and does not merely represent a random selection. Thus, the invention of the patent in suit provides an optimal design with respect to flexibility, pressure drop and burst resistance (patent in suit, paragraphs [0003] and [0004]). The ranges claimed in claim 1 are neither disclosed nor suggested in the prior art. Therefore, the subject-matter of claim 1 involves an inventive step.

Reasons for the Decision

1. Main request

1.1 The characterising features of granted claim 1 concern numeric ranges for internal diameter and wall thickness

which are not directly and unambiguously derivable from the priority document NO 2002 5537. In consequence, the subject-matter of claim 1 is not the same invention in the meaning of Article 87(1) EPC 1973. Thus, it does not enjoy the claimed priority date of 18 November 2002 so that document D1, which was published 29 January 2003 i.e. before the filing date of 27 October 2003 of the patent in suit, is prior art according to Article 54(2) EPC 1973.

This point was conceded by the respondent during the oral proceeding before the board.

1.2 Inventive step (Article 56 EPC 1973)

1.2.1 Document D1 represents the closest prior art and discloses tubing for carrying, in particular, a CO_2 refrigerant in a vehicle air conditioning system, comprising a flexible bundle of capillary tubes made of any one or a combination of copper, steel, brass and aluminium, and which may be bunched and twisted together to form a cord (paragraphs [0001], [0007], [0008] and [0010], claims 1, 2, 8 and 10). According to the embodiment of figure 1, the circumference of the flexible tubing is composed of six metal tubes which are substantially parallel to each other and twisted together to form a cord, i.e. wound in a helical manner around the longitudinal axis of the flexible tubing (paragraph [0018]). Each of the capillary tubes has an internal diameter in the range of 1.0 to 4.0 mm (paragraphs [0014], [0015] and [0018], figure 1). Document D1 is silent concerning the wall thickness of the capillary tubes.

1.2.2 The subject-matter of claim 1 only differs therefrom in that the tubes have a wall thickness between 0.1 and 0.5 mm.

1.2.3 The objective of the invention as stated in the patent in suit is "*to provide a hoselike member in which the dimensions are selected in such a way that an optimal design with respect to the basic characteristics is obtained*" (paragraph [0004]). The latter are flexibility, pressure drop and burst resistance (paragraph [0003], last sentence).

However, performing an optimisation is normally considered part of the ordinary practice of the skilled person. Furthermore, the skilled person knows from his common general knowledge that characteristics such as flexibility, pressure drop and burst resistance are influenced by additional parameters: thus, for example, the flexibility and burst resistance are also dependent on the material properties of the metallic tubes and the pressure drop is also dependent on the type of flow and the length of tube. Any optimisation thus requires knowledge of such additional parameters, which in turn are determined by the use to which the hoselike member is to be put and the particular metal chosen for the tubes.

Although the introduction (paragraph [0011]) mentions the two exemplary applications of vehicle breaking and air conditioning systems, paragraph [0033] generically refers to "*tests*" without providing any details concerning the nature of these tests and consequently merely asserts that tubes with the claimed wall thickness and internal diameter are "*most adequate*". Thus, the description of the patent in suit does not provide a basis for determining the context of the

"*compromise*" alleged in paragraph [0032]. Furthermore, the subject-matter of claim 1 is not limited to any particular application.

In the absence of both a use for which the hoselike member has to be suitable and the material properties of the tubes, the specification of the internal diameter and wall thickness on their own cannot constitute an optimisation or compromise for all possible tube metals and applications. In the absence of a context, the claimed ranges are effectively meaningless and thus cannot contribute towards justifying an inventive step.

1.2.4 The objective problem thus reduces to that of implementing the teaching of document D1.

1.2.5 When the skilled person implements the teaching of document D1, he must determine a value for the wall thickness of the tubes. Doing so forms part of the normal practice of his art. For example, a standard formula for such a calculation is the generally known Barlow formula for stress due to internal pressure (Document D5):

$$\sigma_{max} = P \cdot ID / 2t \qquad \text{valid for } OD/ID \leq 1.2$$

where σ_{max} maximum stress
P internal pressure
t wall thickness
ID internal diameter
OD outer diameter

In vehicle CO_2 based air conditioning systems, the internal pressure is 100 bar = 10 N / mm^2 (Document D3, page 1, lines 29 to 31). Both document D1 (paragraph [0008]) and the patent in suit (paragraph [0007]) consider aluminium as a suitable metal for the tubes.

As was advanced by the appellant and not contested by the respondent, common aluminium alloys have a tensile strength of about 200 N / mm^2 or less (grounds of appeal page 5, penultimate paragraph).

For an internal diameter of, say, 4 mm (Document D1, paragraph [0008]), the above Barlow formula thus yields:

$$200\ (N / mm^2) = 10\ (N / mm^2) \cdot 4\ (mm) / 2 \cdot t\ (mm)$$

Solving for t provides a minimum value for the wall thickness of 0.1 mm = 10·4 / 2·200 (Note that for such a wall thickness of 0.1 mm the Barlow formula applies, since OD/ID = 4.2 / 4 = 1.05 ≤ 1.2).

The skilled person will necessarily want to avoid loading the tubes to the maximum that the metal can withstand, i.e. to their tensile strength and provide a certain margin of safety: Thus, a safety margin of 2 would yield a wall thickness of 0.2 mm and a safety margin of 4 a wall thickness of 0.4 mmm.

Therefore, in accordance with one of the possibilities mentioned in the patent in suit, i.e. when using aluminium tubes in a vehicle CO_2 based air conditioning system, the claimed range of wall thicknesses does not differ from those the skilled person would consider in the course of the normal practice of his art. An inventive step must therefore be denied.

1.2.6 It was advanced on the part of the respondent that the "*Hoselike member*" of claim 1 differs from the "*flexible bundle of capillary tubes*" disclosed in document D1, because such a bundle of tubes does not exhibit a "*circumference*" in view of the presence of a further tube at the centre of such a bundle.

The respondent's argument cannot be followed for the following reason. According to the description of the patent in suit, the subject-matter of claim 1 encompasses both embodiments in which there is a hollow central cavity and those in which the centre of the hoselike member may be filled with a core material (column 3, lines 23 to 26; paragraph [0021], figure 6; paragraph [0025], figure 11). Furthermore, claim 1 as granted is silent about the arrangement at the centre of the hoselike member and thus does not exclude an arrangement with a further central capillary tube as known from document D1 (figure 1). In this context, it was also noted that claim 1 of document D1 does not require that the flexible bundle of capillary tubes is encased in an elastomeric material as shown in figure 1. Thus the hoselike member of document D1 has a circumference comprised of a number of metal tubes.

1.2.7 It was also advanced on the part of the respondent that twisting a "*bundle of tubes*" together along their length in the manner of the strands of a cord or rope (document D1, paragraph [0018]) would not yield an arrangement in which the tubes are substantially parallel to each other and wound in a helical manner around the longitudinal axis of the hoselike member.

The board cannot accept this argument either, because the patent in suit also includes an arrangement in which the neighbouring tubes are so close together that a hoselike member with a closed surface is obtained (column 3, lines 18 to 23) and, furthermore, the patent in suit discloses a manufacturing method in which unwound or untwisted straight and parallel tubes are twisted until the tubes have obtained a permanent twist and maintain the shape depicted in figure 2 (paragraph

[0020]). Such an arrangement does not differ from the prior art as indicated in paragraph [0018] of document D1.

1.2.8 It was further advanced on the part of the respondent that the hoselike member of claim 1 is necessarily more flexible than the arrangement known from document D1. In particular, reference was made to the flexibility inherent in a helical spring with spaced coils.

The board cannot accept this argument either, because there is no evidence in the patent in suit concerning an increased flexibility with respect to an arrangement such as the one disclosed in document D1. In addition, the subject-matter of claim 1 as granted is not limited to the arrangement advanced by the respondent as this would require as an additional feature "*some distance between adjacent … [wound] tubes*" (patent in suit, column 3, lines 18 to 23) and there is no such feature in claim 1.

1.2.9 In consequence, the subject-matter of claim 1 as granted does not involve an inventive step (Article 56 EPC 1973).

2. Auxiliary request

2.1 Admissibility

In the auxiliary request, which was only filed during oral proceedings before the board, the subject-matter of dependent claim 4 as granted has been appended to the end of claim 1 as granted. An appellant-opponent must be prepared for the respondent-patent proprietor to try and defend his patent, in particular also with respect to the subject-matter of the dependent claims.

Thus, the board considers that in this case the amendment is such that the other party can reasonably be expected to deal with it without adjournment of the oral proceedings (Article 13(3) RPBA). As the patentability of the subject-matter of the granted dependent claims was already contested in the notice of opposition and in view of the manageable complexity of the amendment, the board exercised its discretion under Article 13(1) RPBA and admitted the auxiliary request, in spite of the advanced state of the proceedings.

2.2 Inventive step (Article 56 EPC 1973)

2.2.1 Claim 1 according to the auxiliary request differs from claim 1 of the main request in that the feature concerning the range of pitch angles from granted dependent claim 4 was appended.

2.2.2 Document D1 which discloses the closest prior art is silent concerning the pitch angle of the wound tubes.

2.2.3 The subject-matter of claim 1 according to the auxiliary request thus differs therefrom in that the tubes have a wall thickness between 0.1 and 0.5 mm and in that the pitch angle of the tubes is between 50° and 85°.

2.2.4 It was argued on behalf of the respondent, that the pitch angle of the helical windings determines a helical spring-like effect as shown in figure 16, which in combination with the wall thickness and internal diameter gives rise to an optimal compromise and does not merely represent a random selection.

According to the description, "*the degree of flexibility or compliance is dependent upon the pitch angle*

V, i.e. the angle between the helical wound tube and the longitudinal axis of the pipe system (see figure 16).

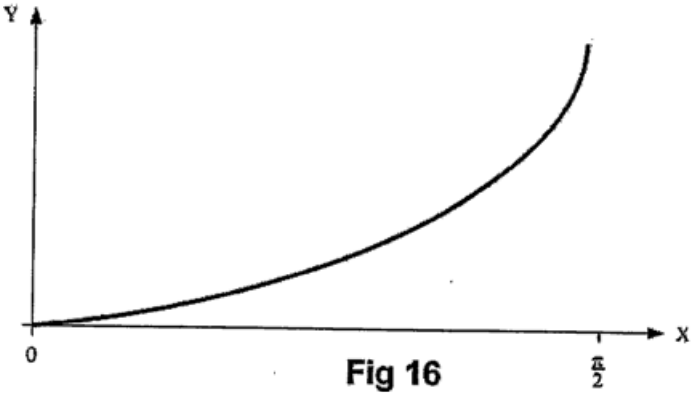

Fig 16

Also here, there is a compromise between the pitch angle V and the mechanical strength of the system, as especially its axial strength must be sufficient to maintain the pipe system in the right position. It is, therefore, preferable to have a pitch angel [sic] V of between 50° and 85°" (paragraph [0035]).

However, there is no indication in figure 16 concerning the vertical scale, there are no further indications at all concerning axial strength and the range of pitch angles between 50° and 85° is not identified on the horizontal axis. Figure 16 thus does not provide evidence for any particular effect occurring in this range of pitch angles. There is also no apparent reason why the skilled person would expect anything other than a gradual change of properties with increasing pitch angles or that the selection of an appropriate pitch angle under such circumstances is beyond the normal practice of his art.

It was already argued in 1.2.3 above that the properties to be optimised depend on additional parameters and that these are left unspecified by the absence of both, a use for which the hoselike member has to be suitable and the material properties of the tubes. This

argument carries over to the auxiliary request: the consequence is that the range of internal diameters, wall thicknesses, in combination with a range of pitch angles between 50° and 85°, itself representing about 38% of all theoretically possible values between 0° (i.e. straight, unwound tubes) and 90° (i.e. the tubes form rings around the axis of the hoselike member), on their own, cannot constitute an optimisation or compromise for all possible tube metals and applications.

Thus, there is no evidence relating a pitch angle of between 50° and 85° to any particular effect. In the absence of a context, the claimed ranges are meaningless and thus cannot contribute towards justifying an inventive step.

2.2.5 The objective problem remains that of implementing the teaching of document D1.

2.2.6 When the skilled person implements the teaching of document D1, he must determine a value for the wall thickness of the tubes and a value for the pitch angle.

The patent in suit does not claim any synergy effect which would go beyond the expectation of the skilled person that both the wall thickness of the tubes and the pitch angle of their helical winding will each affect the flexibility of the hoselike member.

The skilled person can thus determine these values in accordance with the normal practice of his art. The considerations concerning the wall thickness were already addressed in context of the main request and carry over likewise to the auxiliary request.

Concerning the pitch angle, as reasoned in 2.2.4 above, there is no evidence that a pitch angle of the tubes between 50° and 85° is causal to any particular effect. The act of arbitrarily picking out a numerical range is within the routine of the skilled person faced with the objective of providing a pitch angle and cannot provide the claimed hoselike member with any inventive ingenuity.

2.2.7 In consequence, the subject-matter of claim 1 according to the auxiliary request does not involve an inventive step (Article 56 EPC 1973).

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:

D. Meyfarth M. Poock

Decision electronically authenticated