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**Datasheet for the decision
of 16 October 2017**

Case Number: T 1643/13 - 3.2.06

Application Number: 05110532.8

Publication Number: 1659209

IPC: D07B1/02, D07B1/18, B63B15/00

Language of the proceedings: EN

Title of invention:
Static rope and mast or boom construction including a static rope

Patent Proprietor:
AB Poly-Produkte

Opponent:
Seilflechter Tauwerk GmbH

Headword:

Relevant legal provisions:
EPC Art. 83, 56, 114(2)

Keyword:
Late-filed document - admitted (no)
Inventive step - (yes)

Decisions cited:

Catchword:



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Case Number: T 1643/13 - 3.2.06

D E C I S I O N
of Technical Board of Appeal 3.2.06
of 16 October 2017

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Decision under appeal: Interlocutory decision of the Opposition
Division of the European Patent Office posted on
17 May 2013 concerning maintenance of the
European Patent No. 1659209 in amended form.

Composition of the Board:

Chairman W. Ungler
Members: P. Cipriano
M. Hannam

Summary of Facts and Submissions

- I. An appeal was filed by the appellant (opponent) against the interlocutory decision of the opposition division in which it found that European patent No. 1 659 209 in an amended form met the requirements of the EPC. It requested that the decision under appeal be set aside and the patent be revoked.
- II. The respondent (patent proprietor) requested that the appeal be dismissed or, in the alternative, that it be maintained according to one of auxiliary requests 1 to 3.
- III. The following documents, referred to by the appellant in its grounds of appeal, are relevant to the present decision:
- D1: extract from the book "Skippers Knotenbuch", J. Altimiras, Verlag Delius Klasing & Co., Bielefeld
 - D2: DIN-NORM 83 305 Teil 3, June 1990
 - D4: Wolfgang Weber, Theorie der Seilherstellung und Seilprüfung, Aegis-Verlag, Ulm/Donau, 1986
 - D6: Brochure Mitsubishi Electric PLK-E2008-H
 - D7: DE 1 962 861 A
 - D8: DE 92 01 602 U1
- Prior use comprising the test report Nr.0110667 concerning the static rope Seilflechter DIN EN 1891 and corresponding purchase invoices documenting sales.
- IV. The Board issued a summons to oral proceedings and a subsequent communication containing its provisional opinion, in which it indicated *inter alia* that the subject-matter of claim 1 of the main request appeared to be sufficiently disclosed and to involve an inventive step. It further indicated that neither the

prior use nor the patent documents D7 and D8 filed with the notice of appeal seemed to be *prima facie* relevant.

- V. Oral proceedings were held before the Board on 16 October 2017.

The final requests of the parties were as follows:

The appellant (opponent) requested that the decision under appeal be set aside and the European patent be revoked.

The respondent (patent proprietor) requested that the appeal be dismissed (main request), auxiliarily that the patent be maintained in amended form on the basis of auxiliary requests 1 to 3 filed with letter of 7 February 2014. It further requested that D7, D8 and the alleged prior use not be admitted.

- VI. The text of claim 1 of the main request reads as follows:

"1. A static rope (5) having an outer braided mantle (4) and an inner stranded or braided core (1) formed by three or more strands (2) which each comprise a set of fibre bundles (3), where the core (1) and the mantle (4) are each made from synthetic fibres with an elasticity of less than 20%, where the rope (5) is provided with a loop (6) fashioned at one end of the rope (5) which is formed by the rope (5) being bent at the said end and forming, to create the said loop (6), two portions starting from the loop, a long and a short portion (7,8), which portions are positioned next to and in contact with one another and are joined together by a seam (9) which runs along the portions (7,8) and engages in both portions,

characterized in that

the core (1) of the rope (5) has a pitch number which amounts to at least 5, and in that the seam (9) comprises a number of stitches which results in an overall breaking strength of the seam (9) which lies between 70 and 90% of the breaking strength of a corresponding rope (5) without a loop (6), and in that

the said seam comprises at least a lower longitudinal seam (10) with a first, narrower width of stitch and an upper longitudinal seam (11) positioned above the said lower longitudinal seam (10), where the upper longitudinal seam (11) has wider stitches and is positioned in such a way that the two edges (12a,12b) of the upper longitudinal seam (11) lie outside the two edges (13a, 13b) of the lower longitudinal seams (10)."

VII. The appellant's arguments may be summarised as follows:

Article 100(b) EPC

The subject-matter of claim 1 was not sufficiently disclosed, since the feature "the seam (9) comprises a number of stitches which results in an overall breaking strength of the seam (9) which lies between 70 and 90% of the breaking strength of a corresponding rope (5) without a loop (6)" was only a formulation of a technical problem that did not teach the skilled person how to carry out the invention and arrive at the claimed static rope. The patent also did not disclose the method to test the breaking strength of the rope with a seam. An appropriate seam strength could only be determined through numerous tests which furthermore depended of unclear conditions, such as the "quality of the thread".

Article 100(a) EPC in combination with 56 EPC

The subject-matter of claim 1 was not inventive. The skilled person knew from its common general knowledge how to modify a static rope according to the state of the art and arrive at the subject-matter of claim 1 without the exercise of an inventive step. The closest prior art was a static rope comprising all the features of the preamble of claim 1. The differing features solved the technical problem of providing a static rope with a loop and a seam. The claimed 70 to 90% seam strength was an obvious selection for the skilled person. Double seams were also generally known to the skilled person and could be introduced in any rope in order to make the seam shorter. The skilled person would, without becoming inventively active provide the static rope with the missing features, because all of them were straightforward measures that would be within his common general knowledge.

Admittance of D7, D8 and prior use

D7, D8 and the prior use should be admitted in the proceedings, because they clearly showed that the differing features of claim 1 were common knowledge of the skilled person before the priority date and were thus *prima facie* relevant.

VIII. The respondent's arguments may be summarised as follows:

Article 100(b) EPC

The subject-matter of claim 1 was sufficiently disclosed. The feature concerning the breaking strength was carried out through the teaching of paragraph

[0022], which provided a non-arbitrary method to determine the claimed seam strength.

Article 100(a) EPC in combination with 56 EPC

The subject-matter of claim 1 was inventive. A rope disclosing all the features of the preamble of claim 1 was not known from the prior art, since the loops of such static ropes had never been joined together with a seam. The differing features were then all provided with a synergistic effect as they all contributed to provide a resistant rope with a loop made by a seam. The skilled person would not have arrived at the subject-matter of claim 1 and provided the combination of all the features of claim 1 without exercising an inventive step as it lacked any hint to arrive at this specific combination of features, which provided the rope with the correct balance of seam and rope strength. The skilled person was confronted with several other possibilities and the claimed combination was by no means straightforward. The seam strength was not limited to the tensile strength of the rope and could exceed 100% of the latter.

Admittance of D7, D8 and prior use

D7, D8 and D9 were late-filed and lacked *prima facie* relevance. None of documents had any clear connection to the features of claim 1 of the opposed patent.

Reasons for the Decision

Main request

1. *Article 100(b) EPC*

The feature of claim 1 "the seam (9) comprises a number of stitches which results in an overall breaking strength of the seam (9) which lies between 70 and 90% of the breaking strength of a corresponding rope (5) without a loop (6)" is disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

1.1 The skilled person is aware that the breaking strength of a rope without a loop is generally available in the literature or obtainable through a standard rope tensile strength test. The same applies to the tensile strength of the thread making the seam. As explained in paragraph [0022] of the patent, the number of stitches of the seam is calculated by dividing 70% to 90% of the tensile strength of the rope without the loop by the tensile strength of the thread. As a consequence, this disputed feature of claim 1 can be readily carried out by the skilled person.

1.2 The appellant's argument that the feature was only a formulation of a technical problem is not convincing. The skilled person reading paragraph [0021] would learn that the ratio between the seam breaking strength and the breaking strength of the rope has the effect of ensuring that the rope breaks before the seam while not reducing the breaking strength of the rope more than

necessary. As explained in paragraph [0019] the number of stitches in the seam is proportional to the seam strength while the breaking strength of the rope decreases with number of stitches. Even if the appellant's contention that the feature amounted only to a formulation of a technical problem were followed, the corresponding problem would be to provide a rope that breaks before the seam while not reducing the breaking strength of rope more than necessary; this, however, does not correspond to the wording of the claimed feature which indicates a specific breaking strength range for the seam of 70% to 90% of the tensile strength of the rope without the loop. The appellant's contention is thus not accepted. The Board finds, rather, that the claimed feature is defined in terms of the result to be achieved and that there is no other way to express the desired relative strength relationship without unduly restricting the scope of the claim.

- 1.3 Regarding the argument of the appellant concerning the "quality of the thread", paragraph [0022] does not introduce any ambiguity that would hinder the skilled person from performing the invention either. It is clear in the context of paragraph [0022] that the intrinsic quality of the thread referred to here is the tensile strength of the thread.

- 1.4 The appellant's argument that the application did not disclose the method to test the breaking strength of a rope with a seam and was thus not sufficiently disclosed is also not convincing. First, there is no apparent requirement to perform such a test in order to arrive at the invention. As explained *supra*, only the breaking strength of the seam and of the rope without the loop are required in order to perform the

invention; these can be readily ascertained as indicated in point 1.1. In addition, whilst there is no explicit reference to a test in the application, the skilled person knows how to carry out a breaking strength test of a rope with a seamed loop, this being with the use of a pulling hook that creates a shear force on the seam joining the long and short portions of the loop. Contrarily, if one were to clamp the rope's upper extremity, as suggested by the appellant, the short side of the loop would not be under stress and the seam would never tear.

- 1.5 The Board thus finds that the feature regarding the breaking strength of the seam lying between 70 and 90% of the breaking strength of a corresponding rope without a loop does not hinder the skilled person from carrying out the invention. The main request thus meets the requirements of Article 83 EPC.

2. *Article 100(a) EPC in combination with Article 56 EPC*

The subject-matter of claim 1 is inventive over the combination of a static rope belonging to the prior art and the common general knowledge of the skilled person.

- 2.1 The Board finds and both parties agree that

a static rope having an outer braided mantle and an inner stranded or braided core formed by three or more strands which each comprise a set of fibre bundles, where the core and the mantle are each made from synthetic fibres with an elasticity of less than 20%, where the rope is provided with a loop fashioned at one end of the rope which is formed by the rope being bent at the said end and forming, to create the said loop, two portions starting from the loop, a long and a short

portion, which portions are positioned next to and in contact with one another

is known from the prior art. The Board finds that also a static rope with the above mentioned features, in which said long and short portions are joined together by a seam (9) which runs along the portions (7,8) and engages in both portions, is known from the prior art. The argument from the proprietor that a seam has only been used in other types of ropes is not convincing, since D1 discloses on pages 98 to 99 a loop formed by a seam in a nautical rope, nautical ropes known to be static ropes as disclosed in paragraph [0002] of the patent.

2.2 The subject-matter of claim 1 thus differs from this known rope in that:

A) the core (1) of the rope (5) has a pitch number which amounts to at least 5,

B) the seam (9) comprises a number of stitches which results in an overall breaking strength of the seam (9) which lies between 70 and 90% of the breaking strength of a corresponding rope (5) without a loop (6),

C) the said seam comprises at least a lower longitudinal seam (10) with a first, narrower width of stitch and an upper longitudinal seam (11) positioned above the said lower longitudinal seam (10), where the upper longitudinal seam (11) has wider stitches and is positioned in such a way that the two edges (12a,12b) of the upper longitudinal seam (11) lie outside the two edges (13a, 13b) of the lower longitudinal seams (10).

- 2.3 The differing feature A) provides a rope with low elasticity while allowing the seam to engage as many fibre bundles as possible in order to obtain great tensile strength of the finished rope. As explained in paragraphs [0007], [0013], [0030], [0034] and [0035] of the patent, the pitch number should be high in order to provide a low rope elasticity but the strands should not run straight so that it can be guaranteed that the seam stitches engage as many of the fibre bundles as possible, thus obtaining great tensile strength of the finished rope.
- 2.4 The differing feature B) establishes a balance between ensuring that the seam is stronger than the tensile strength of other parts of the rope while ensuring that the tensile strength of the finished rope is not reduced by an unnecessarily great extent as corroborated by paragraphs [0010], [0012] and [0021] to [0024].
- 2.5 The differing feature C) provides a seam as strong and short as possible without significantly decreasing the seam's strength (by undesired repeated needle penetrations through the lower seam) and while allowing the seam to engage as many fibre bundles as possible in order to obtain great tensile strength of the finished rope as explained in paragraphs [0008],[0013],[0023],[0034] and [0035].
- 2.6 All the features A) to C) contribute to establishing a good balance between the seam strength and the rope strength in a static rope. The number of seam stitches should be as few as possible and should engage as many different fibres (such that rope tensile strength remains as high as possible) whilst ensuring an adequate number of stitches to guarantee that the seam

strength is greater than the rope strength. Thus features A), B) and C) are functionally interdependent, i.e. they mutually influence each other to achieve a technical success over and above the sum of their respective individual effects.

The Board thus finds that there is a common technical effect achieved by all the distinguishing features. The objective technical problem is then to provide a static rope with a loop closed by a seam with improved strength properties.

2.7 Faced with the objective technical problem, the skilled person would need to combine a static rope according to the prior art with the particular combination of features A), B) and C) in an obvious way in order to solve the technical problem posed and arrive at the subject-matter of claim 1 without exercising an inventive step.

2.8 The Board finds that the skilled person would not perform this combination in an obvious manner. As the respondent argued, it is within the knowledge of the skilled person in the field of rope building that generally a rope with a higher pitch number has less elasticity. However, nowhere in the prior art is there a teaching *per se* that the specific pitch number should be greater than five. As a matter of fact, D2, points 10.1 and 10.2 on page 5, and D4, page 21, first column, last line, suggest that in the prior art lower pitch numbers between 3.7 and 4.5 are commonly used and neither of them hints that a higher pitch number could be used, much less in combination with features B) and C), in order to solve the technical problem posed.

2.9 Also the general calculation of a ratio between the breaking strength of the seam and of the rope without

the loop is a measure that can be carried out by the skilled person as explained *supra* under Article 83 EPC, but the choice of the specific ratio between 70% and 90% is not obvious for the skilled person, because this ratio only solves the objective technical problem if taken into consideration together with the other differing features A) and C). Moreover, contrary to the appellant's argument, the seam breaking strength may also assume values above the breaking strength of the rope resulting in ratios above 100%. Thus, contrarily to the argument of the opponent, there is no obvious natural tendency for the skilled person to work with ratios close to 100% in order to obtain the optimal seam strength.

- 2.10 The appellant also argued that double seams were generally known to the skilled person and could be introduced in any rope in order to make the seam shorter. The Board cannot concur with this argument. Feature C) defines not only a double seam but a double seam where the upper seam has wider stitches. As explained in paragraph [0034], the wider upper stitching results in a non-perforation of the lower seam but also guarantees that more fibre bundles are engaged in less length, which is particularly useful in ropes with high pitch numbers as defined in feature A), because the seam does not have to be made extremely long and engage too often the same fibre bundles (thus reducing the rope strength) in order to arrive at the number of stitches required by the ratio of feature B). Thus faced with the objective technical problem it is not straightforward for the skilled person to use a double seam with wider upper stitching in combination with features A) and B), because he is trying to balance the strength properties of the loop in relation to the seam and not trying to make it more compact. It

is also noted that the disclosure of D6 does not support the appellant's contention that double seams are generally known since the seam depicted therein lacks definition to such an extent that the Board cannot unambiguously recognise a double seam of the type claimed.

2.11 In conclusion therefore, the combination of a static rope belonging to the prior art and the common general knowledge of the skilled person does not deprive the subject-matter of claim 1 of an inventive step.

3. *Admittance of D7, D8 and prior use*

The Board exercised its discretion not to admit D7, D8 and the prior use into the proceedings.

3.1 D7, D8 and the prior use were not in the proceedings before the opposition division and were introduced for the first time with the grounds of appeal to substantiate the lack of inventive step. According to Article 114(2) EPC facts and evidence not submitted in due time may be disregarded. In particular, the relevance of a late-filed document should normally be taken into account when considering how to exercise this discretion. In this respect it is necessary to consider whether D7, D8 and the prior use are more relevant than other evidence and documents currently on file insofar as they could change the Board's conclusion regarding the presence of an inventive step in the subject-matter of claim 1.

3.2 As identified in points 2.1 and 2.2 above, a static rope having an outer mantle and an inner stranded or braided core made of synthetic fibres according to the prior art does not disclose features A), B) and C).

- 3.3 D7 refers to a steel wire, for which the production technique cannot be compared to that of a static rope comprising a braided core made of synthetic fibres. The double seam referred to on page 2 of D7 refers to a significantly different technique where parallel running steel wires without any definable pitch number are stitched together through two approximately perpendicular running wires. No further specifics of this technique, such as the width of the stitches, are given and, furthermore, the use of a double seam is disclosed as disadvantageous at the bottom of page 2.
- 3.4 D8 relates to a flat cable and also comprises a double seam, but said double seam does not comprise any of the further features of the double seam defined in claim 1, namely that one seam overlays the other and that the upper seam has wider stitches. In addition, it does not disclose any pitch number or ratio of breaking strengths between the seam and the cable.
- 3.5 The test report of the prior use comprises on page 2 a picture that does not allow the skilled person to recognize anything further than that the loop is closed by a seam. The skilled person cannot recognize if it is a double seam of any kind. In addition, the information about the type of rope does not disclose nor allow the skilled person to derive any pitch number from it. The same applies to the ratio between the breaking strength of the seam and of the rope without the loop. Also the purchase invoices do not show any further technical information regarding the differing features A), B) and C) and only disclose further that the loop comprises an internal reinforcement for the loop ("Kausche" in german) and/or a heat-shrink tubing.

- 3.6 Thus D7, D8 and the prior use do not disclose either explicitly or implicitly any of the missing features or evidence that said missing features belonged to the common general knowledge of the skilled person at the priority date. As a consequence the skilled person would not consider any of the late-filed documents *prima facie* relevant when looking for a solution to the technical problem. The Board therefore exercises its discretion not to admit D7, D8 and the prior use into the proceedings.
4. It follows that neither the ground of opposition under Article 100(b) EPC nor the ground under Article 100(a) in combination with Article 56 EPC prejudice the maintenance of the patent according to the main request.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



M. H. A. Patin

W. Ungler

Decision electronically authenticated