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Datasheet for the decision of 19 May 2022

Case Number: T 0409/19 - 3.2.05

Application Number: 11187863.3

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Language of the proceedings: EN

Title of invention:
Manufacture of a root section

Patent Proprietor:
Siemens Gamesa Renewable Energy A/S

Opponent:
Vestas Wind Systems A/S

Relevant legal provisions:
EPC Art. 83, 84

Keyword:
Claims - clarity (yes)
Sufficiency of disclosure (no)

Decisions cited:
G 0003/14, T 1018/02, T 0056/04, T 0063/06, T 0608/07, T 0197/10

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Case Number: T 0409/19 - 3.2.05

D E C I S I O N
of Technical Board of Appeal 3.2.05
of 19 May 2022

Appellant: (Opponent)	Vestas Wind Systems A/S Hedeager 42 8200 Aarhus N (DK)
Representative:	Kent, Peter Joseph Keltie LLP No.1 London Bridge London SE1 9BA (GB)
Respondent: (Patent Proprietor)	Siemens Gamesa Renewable Energy A/S Borupvej 16 7330 Brande (DK)
Representative:	Aspacher, Karl-Georg Siemens Gamesa Renewable Energy GmbH & Co. KG Otto-Hahn-Ring 6 81739 München (DE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 10 December 2018 concerning maintenance of the European Patent No. 2589796 in amended form.**

Composition of the Board:

Chairman	P. Lanz
Members:	T. Vermeulen
	A. Bacchin

Summary of Facts and Submissions

I. The opponent lodged an appeal against the interlocutory decision of the opposition division finding that European patent No. 2 589 796 as amended according to auxiliary request 2 (filed as auxiliary request 3A during the oral proceedings before the opposition division) met the requirements of the European Patent Convention.

II. The decision was also appealed by the patent proprietor. However, by letter dated 23 April 2019 they withdrew their appeal.

III. The opposition had been filed against the patent as a whole on the basis of the grounds for opposition under Article 100(a) together with Article 54(1) EPC (lack of novelty) and Article 56 EPC (lack of inventive step), and under Article 100 (b) EPC.

IV. The opposition division had in particular considered the following documents:

E1 "Blade System Design Studies Phase II: Final Project Report", Sandia Report SAND2008-4648, Sandia National Laboratories, Derek S. Berry, printed July 2008;

E10 "Structural Design of Polymer Composites - Eurocomp Design Code and Handbook", 2005 edition.

V. On 22 March 2022, a communication pursuant to Article 15(1) of the Rules of Procedure of the Boards of Appeal in the 2020 version (RPBA 2020) was issued, in which

the parties were informed of the board's provisional opinion.

VI. Oral proceedings before the board were held by videoconference on 19 May 2022.

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

The respondent (patent proprietor) requested that the appeal be dismissed.

VIII. The independent claims of the request at issue, which was considered to be allowable by the opposition division, have the following wording:

"1. Method of manufacturing a root section of a rotor blade (41) of a wind turbine, which method comprises the steps of
a) assembling (A) a plurality of supporting rods (1) with an interface section (17) to a hub interface of the wind turbine in an essentially circular shape such that there are gaps (33) between the supporting rods (1),
b) arranging (B) fibre rovings (31) in the gaps (33) which fibre rovings (31) are physically and/or chemically compatible with an injection material and are orientated essentially in one main direction (d1), the main direction (d1) is [*sic*] essentially parallel to longitudinal axes (d2) of the supporting rods (1) which [*sic*] fibre rovings (31) are wrapped with a fibre packaging material,
c) placing (C) a first molding tool (35) along an outer surface of the circular shape and a second molding tool along an inner surface of the circular shape, whereby a

space between the outer surface of the circular shape and the first molding tool (35) and/or between the inner surface of the circular shape and the second molding tool is filled with second fibres (37) which are physically and/or chemically compatible to the injection material,
d) treating (D) the injection material so that it bonds with the fibre rovings (31)."

"6. Supporting rod holding arrangement (39) for manufacturing a root section of a rotor blade (41) of a wind turbine, comprising
a) an assembly of a plurality of supporting rods (1) with an interface section (17) to a hub interface of the wind turbine in an essentially circular shape such that there are gaps (33) between the supporting rods (1),
b) fibre rovings (31) in the gaps (33), which fibre rovings (31) are physically and/or chemically compatible with an injection material, wherein the fibre rovings are orientated essentially in one main direction (d1), the main direction (d1) is [*sic*] essentially parallel to longitudinal axes (d2) of the supporting rods (1), which [*sic*] fibre rovings (31) are wrapped with a fibre packaging material,
c) a holding device (5, 35) which holds the supporting rods (1) in the essentially circular shape."

"11. Root end of a rotor blade of a wind turbine manufactured with a method according to any of claims 1 to 5."

IX. The appellant's submissions, insofar as relevant to the present decision, may be summarised as follows:

Article 84 EPC and claim interpretation

In the art of composites, rovings were long narrow bundles of untwisted fibres.

The meaning of the expression "fibre packaging material" was ambiguous. It was unclear whether such a material was actually made out of fibres, in which case the expression "fibrous packaging material" would have been better, or, as the opposition division held, if it was merely suitable for packaging fibres. In the same way as a food packaging material was intended to package food, a fibre packaging material could also be interpreted as a material designed to package fibres without actually containing fibrous material. The packaging material could, for example, be a disposable plastic wrapping. The absence of a hyphen between "fibre" and "packaging" was unlikely to determine the skilled person's interpretation of the expression, particularly since patent applications were often not written in perfect English.

According to decision T 56/04 (Reasons 2.7), a claim containing an unclear technical feature prevented its subject-matter from being identified beyond doubt, particularly if the unclear feature was meant to delimit the claimed subject-matter from the state of the art. Only in exceptional cases could a precise definition which was to be found in the description be allowed to delimit the claimed subject-matter from the state of the art. In the present case, the expression "fibre packaging material" was only mentioned in paragraph [0039] of the patent without any explanation

whatsoever in connection with its function or with the type of material used. Possibly, the packaging material was only used to safely supply the fibre rovings from their manufacturing site to the rotor blade assembly site. Paragraph [0023] of the patent made no mention of "fibre packaging material". It referred to rovings wrapped "with a fibre structure on the outside" instead. A "tubular structure with orientated fibres" was also mentioned. In no way was this "fibre structure" identified as being a "packaging material". The attention was drawn to the use of the word "may" in that context, which implied that the fibre structure was an optional feature. It was therefore entirely plausible that the rovings were wrapped in a fibre structure and then supplied with a separate fibre packaging material. But even if the fibre packaging material were actually intended in paragraph [0023], then claim 1 lacked essential features for not specifying that the packaging material was a tubular structure. As the description did not contain a precise definition for the vague and unclear feature b) of claim 1, Article 84 EPC was not complied with.

Also the respondent's argument with respect to Figure 7 of the patent was incorrect. Reference sign 31 referred to the fibre rovings, not to the packaging material.

It was further not clear from the wording of claim 1 if the fibre rovings were supposed to be wrapped in the fibre packaging material before or after the rovings were arranged in the gaps. Even though paragraph [0039] of the patent implied that the fibre rovings were pre-packaged, this did not transpire from the claim wording. Furthermore, the patent did not specify if the packaging material was designed to remain in place in the finished blade. In the case of pre-packaged fibre

rovings, the packaging material could have been removed again at the time the fibre rovings were placed in the gaps between the supporting rods. Alternatively, it was possible that the packaging material was removed after the fibre rovings had been arranged in their position between the rods.

Supposing that the package material remained in place during the entire manufacturing process, it had to be made sure that the resin could still penetrate and make contact with the rovings. Yet the patent was completely silent on the permeability of the packaging material. No conclusions could be drawn from step d) of claim 1. It was unclear whether the packaging material was a polymer film wrapping provided with perforations or a cured fibrous material wrapped around the rovings.

The uncertainty regarding the presence or absence of the package material also created a significant clarity issue for claim 11. It was not possible to determine whether or not the finished root section contained fibre packaging material.

Therefore, the requirements of Article 84 EPC were not met.

Sufficiency of disclosure

The expression "fibre packaging material" only appeared once in the patent, namely in paragraph [0039], but without any instruction on the type of material, on how it was configured and on what its technical purpose was. The patent provided no examples of how a fibre packaging material could be put into practice. The skilled person would be in serious doubt whether the material had a structural role within the finished

blade. It was incumbent on the patent proprietor to provide at least one example of the fibre packaging material, especially because it was precisely this feature that supposedly resulted in an inventive step over document E1. However, the reply to the grounds of appeal only contained a general statement in this regard. In fact, the case had been made solely by the board, who referred in their communication to paragraph [0021] of the patent and to document E10. The board's preliminary assessment was incorrect, though. Paragraph [0021] only dealt with the second fibres, not with the first fibres that were supposed to be wrapped in packaging material. The reference to fibre mats in that context had nothing to do with the packaging material. Hence, the skilled person would not consider this information. And document E10 did not reveal anything about a fibre packaging material. The skilled person still had to work out themselves what the purpose of the packaging material was and which materials were suitable for use in the root section.

If wrapped rovings were commercially available, as was hinted at by the respondent, then evidence in support of this allegation should have been presented in reply to the appellant's objection. Without such evidence, the appellant had to conclude that it was left to the skilled person to find out how to wrap the fibre rovings. Now the skilled person would be aware that the lay-up in a blade root was absolutely critical in view of the risk of fatigue failure. The importance of the weight of the blade was also not unfamiliar to the skilled person. Therefore, it would have struck them as inappropriate to use a further material, such as a chopped strand mat (CSM), in order to keep the rovings together, when that material did not transfer any load,

but only added extra weight. The skilled person required more guidance to select a suitable material.

A further critical aspect was that the fibre rovings had to be properly infused by the resin. The skilled person was, however, left in the dark as to how the packaging material should be wrapped and how close the fibres in the packaging material were allowed to lie in order to achieve such an infusion.

Similarly to decision T 608/07 (Reasons 2.5.2), the serious ambiguities surrounding the expression "fibre packaging material" deprived the skilled person of the promise of the invention. Moreover, it was settled case law that there had to be serious doubts, substantiated by verifiable facts, for an objection of lack of sufficiency to be successful. According to decision T 63/06 (Reasons 3.3), when a patent specification did not contain detailed information of how to put the invention into practice, only a weak presumption of sufficiency of disclosure existed. In such case, the opponent could discharge their burden by plausibly arguing that the common general knowledge would not enable the skilled person to put the contested feature into practice.

The invention was thus not disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

X. The respondent's submissions, insofar as relevant to the present decision, were essentially as follows:

Article 84 EPC and claim interpretation

According to document E10 a roving was a continuous untwisted tow of fibres, a tow being an untwisted bundle of continuous fibres.

The only reasonable way to understand the expression "fibre packaging material" was that it was made out of fibres. This was evident from the claim wording, but it also followed from paragraphs [0023] and [0039] of the patent, and from Figure 7 of the patent, in which a material containing short fibres was illustrated. As the fibres of rovings were usually very long, Figure 7 implied that a material containing short fibres was wrapped around the fibre rovings depicted by reference sign 31. The appellant's analogy to a food packaging material was not convincing, since the correct expression would then have been "roving packaging material", not "fibre packaging material". The fibre packaging material prevented contact with the generally very fine and brittle fibres of the rovings. So the rovings remained intact and protected against damage during transport and subsequent handling.

The fibre rovings were positioned in the gaps between the rods with the packaging material already wrapped around the rovings. Such was evident from the wording of claim 1, in particular from the words "arranging" and "wrapped" in step b) of the claim. Clearly, it was impossible to remove a wrapping from beneath rovings placed and stabilised between the rods. Hence, the packaging material had to remain in position during the manufacturing process, also when the fibre rovings

bonded with the resin. The assumption of a subsequent removal of the packaging material was unwarranted; it did not follow in any way from the claim wording.

It was further clear to the skilled person that the injection material had to permeate the wrapping to reach the rovings. Therefore, the material had to be permeable to resin. Typically, a fibre mat, such as a thin chopped strand mat (CSM), would be used.

In view of the above, if a finished root section manufactured according to claim 1 were cut open, the packaging material would still be there. In the matrix of hardened resin, the rovings would not have spread out, but they would still lie in the packaging material.

The requirements of Article 84 were therefore met.

Sufficiency of disclosure

A fibre packaging material belonged to the common general knowledge of the skilled person. The goal of such a material was to facilitate the lay-up of the fibre rovings. By wrapping the rovings, they were held together, even after the lay-up. Fibre packaging materials were commercially available. They had to be sufficiently flexible in order to wrap around the rovings and flatten in response to the vacuuming action. Thin chopped strand mats, for example, were perfectly suitable for that purpose. Reference was made to pages 292 and 293 of the textbook E10, where chopped strand mats, continuous filament mats and woven fabrics were discussed as examples of fibre reinforced materials. Further, the skilled person would know how

to produce a tubular wrapped structure, mentioned in paragraph [0023] of the patent.

Therefore, the invention was disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

Reasons for the Decision

Feature W

1. In the present case, the dispute between the parties is centred on the understanding of the relative clause

> "which fibre rovings (31) are wrapped with a fibre packaging material",

in step b) of claim 1. Hereinafter it will be referred to as feature W.

Article 84 EPC and claim interpretation

2. Feature W was taken from the description and introduced into claims 1 and 6 during opposition proceedings. The board is therefore satisfied that the feature may be examined for compliance with the requirements of Article 84 EPC, pursuant to G 3/14 (OJ EPO 2015, A102, Order).

(a) fibre rovings

3. Generally, a roving is understood to mean a long thin strand of wool, cotton, fibreglass, etc., drawn out and slightly twisted in preparation for spinning. As a mass noun it is used to refer to wool, cotton, fibreglass, etc., having this form (Oxford English Dictionary). The

appellant convincingly argued that the fibres of a roving used in the technical field of composites are generally untwisted, as opposed to the fibres of a yarn. In section 1.4.2 on pages 10 and 11 of document E10 the terms "roving", "strand" and "yarn" are defined accordingly. The respondent did not contest these findings. The board is therefore satisfied that in the present case a "fibre roving" refers to a long narrow bundle of untwisted continuous fibres.

(b) fibre packaging material

4. In the appellant's view, the expression "fibre packaging material" is ambiguous since it may either refer to a material for packaging fibres or to a material for packaging that is made out of fibres.

5. Stringing together three or more consecutive nouns often leads to expressions that are open to different interpretations. In some cases, the reader intuitively links some of the words of the noun string so that its meaning is immediately clear. Or certain noun combinations can be discarded from the outset because they make little sense in the context the noun string appears. With patent claims, it is the skilled person who makes these assessments; they determine which interpretation is technically meaningful and coherent with the remainder of the claim.

6. Having this in mind, the board takes the view that the first, broad interpretation of the expression "fibre packaging material", which was adopted by the opposition division and formed the basis for their ruling on clarity in point 24.2.3 of the reasons for the impugned decision, must be rejected. The skilled person reading claim 1 would take into account that, as

the respondent correctly pointed out, feature W requires the fibre *rovings* to be wrapped by the fibre packaging material. Accordingly, a packaging material that were intended to wrap the fibre rovings would be referred to as a "(fibre) roving packaging material" or as plain "packaging material", but not as "fibre packaging material". The absence of a hyphen between the terms "fibre" and "packaging" further lends weight to the conclusion that these words are not meant to be linked together.

In contrast, the interpretation that a packaging material used in the manufacture of a root section of a rotor blade is made out of fibres makes technical sense and is coherent with the other claim features. Having thus established that one of the two possible interpretations of the noun string can be discarded, the appellant's argument that it is ambiguous and results in a lack of clarity under Article 84 EPC must fail.

7. The appellant cited decision T 56/04 to corroborate their argument that only in exceptional circumstances can the patent description be relied on for a precise definition of an unclear feature. The board sees no merit in the relevance of this decision for the present case. As set out above, the expression "fibre packaging material" was found to have a clear meaning in the context of claim 1. There is thus no need to recur to the description in search for a precise definition. This is in line with the established jurisprudence, according to which the description cannot be used to give a different meaning to a claim feature which in itself imparts a clear credible technical teaching to the skilled person (see inter alia T 1018/02, Reasons 3.8, and T 197/10, Reasons 2.3, both cited in section

II.A.6.3.1 of "Case Law of the Boards of Appeal of the EPO", 9th edition, July 2019, hereinafter referred to as "Case Law").

8. Incidentally, the board wishes to remark that the statement in paragraph [0023] of the patent according to which the fibre rovings "may additionally be wrapped with a fibre structure on the outside" supports the interpretation given above. Even though the packaging material itself is not mentioned until paragraph [0039] of the patent, the skilled person would immediately make the link and exclude any diverging constructs, such as the fibre structure being itself wrapped in packaging material, as technically illogical.

(c) wrapped

9. The appellant further submitted that claim 1 was unclear in view of the uncertainty surrounding the sequence in which the fibre packaging material was applied and the fibre rovings were placed in the gaps between the supporting rods. The board disagrees and takes the view that the choice for the relative clause ("which ... are wrapped") instead of a present participle ("wrapping") implies that step b) of claim 1 is a single action rather than a set of subsequent actions. The term "wrapped" in the arranging step therefore reflects the state of the fibre rovings while they are being arranged in the gaps. Therefore, the board discards the alternative interpretation that the fibre rovings are only wrapped with a fibre packaging material once they are situated in the gaps between the supporting rods.

10. Concerning the circumstances posterior to step b), the respondent convincingly argued that the package material remains in position during the entire manufacturing process. The board holds the appellant's assumptions made in this regard as baseless. Not only does the claim remain silent about any further step of removing the packaging material, it would make little technical sense to unwrap the fibre rovings and pull the package material from beneath the rovings after they have been carefully arranged and orientated in the gaps between the supporting rods. With the package material remaining in place during the entire manufacturing process, it has to be made sure that resin can penetrate and make contact with the rovings. This follows directly from step d) of claim 1, according to which the injection material is treated so as to bond with the fibre rovings.

11. The board wishes to observe that the absence in the patent description of any concrete examples of the packaging material or how it is arranged with respect to the fibre rovings is rather a matter relevant to the question of sufficiency of disclosure (see below), not to the question of clarity.

12. The same reasoning as set out above also applies to claim 6, which defines a supporting rod holding arrangement comprising fibre rovings essentially arranged in the same manner as in step b) of claim 1, and claim 11 relating to a finished product manufactured according to the method of claim 1.

(d) Conclusion

13. Having regard to the above considerations, the appellant has not persuaded the board that the

requirements of Article 84 EPC are not fulfilled. In particular, the board understands the requirement of feature W in the context of claim 1 to mean that the fibre rovings that are arranged in the gaps between the supporting rods are wrapped with a material containing fibres in such a way that the injection material bonds with the fibre rovings. The same conclusion applies to claim 6, which defines a supporting rod holding arrangement comprising fibre rovings essentially arranged in the same manner as in step b) of claim 1, and claim 11 relating to a finished product manufactured according to the method of claim 1.

Sufficiency of disclosure

14. It has to be borne in mind that sufficiency of disclosure within the meaning of Article 83 EPC is assessed on the basis of the patent as a whole – including the description and claims – and not of the claims alone. The decisive question is thus whether the patent as a whole enables the skilled person to carry out the invention. The skilled person may avail themselves of their common general knowledge to supplement the information contained in the patent.

15. In the present case, the skilled person can be regarded to be versed in the art of manufacturing wind turbine rotor blades. As such, they would have a sound knowledge of shaping fibre reinforced plastics or at least have access to reference works that deal with such knowledge up until the date the patent was filed.

16. The description of the patent in suit teaches in very general terms how the method of claim 1 is carried out. Step b) of the claimed method is discussed in paragraph [0039] in the context of the detailed description of

Figure 7. Accordingly, fibres are supplied in the form of fibre rovings 31 wrapped with a fibre packaging material. These are then inserted in the gaps 33 between the supporting rods 1 - which are themselves wrapped in plastic tubes 29 - in a direction d_1 parallel to the longitudinal axis d_2 of the supporting rods. It is noted in this respect that the reference sign 31 in Figure 7 does not seem to refer directly to the fibre rovings, but rather depicts a cylindrical structure arranged in one of the gaps 33 containing what appear to be undulating fibres on its outer surface. In paragraphs [0040] and [0041], step c) is explained in more detail. Second fibres 37 are laid on the inner and outer surfaces of the supporting rod holding arrangement 39, before it is placed in between two moulding tools. Resin is then injected between the moulding tools until it firmly bonds with the fibres of the fibre rovings 31 and with the plastic tubes 29 wrapped around the supporting rods (cf. paragraph [0039]). In this context, the term "treating" of step d) is explained to mean that, in practice, the resin undergoes "heating, in particular melting and/or injecting the injection material and/or sucking the injection material into the gap between the two moulding tools" (cf. paragraph [0043]).

17. No information is available in the patent on the materials that can be considered for wrapping the fibre rovings. Other than paragraph [0039], paragraph [0023] is the only passage that mentions the fibre rovings being wrapped. It suggests that the wrapping material should be "a fibre structure on the outside [of the fibre rovings], so that a kind of tubular structure with orientated fibres inside is provided". Concrete examples of a fibre structure are, however, left unmentioned.

18. Given the scarce information provided in the patent, the skilled person depends on the common general knowledge in order to identify a suitable fibre packaging material and carry out the invention of claim 1.

Document E10 was cited by the respondent in this context. The board has little doubt that the content of this book, which was produced by the European Structural Polymeric Composites Group in 1996 with the objective to produce "a code of recommended practice for the design of structures made of polymeric composites" (cf. Preface on page vii), would have been at the disposal of the person skilled in the art of manufacturing wind turbine rotor blades in 2011. The respondent specifically referred to pages 292 and 293, where some examples of fibre-reinforced materials such as chopped strand mats (CSM), continuous filament mats (CFM) and woven fabrics are discussed. It is therefore reasonable to assume that the skilled person would have been aware of these materials when producing rotor blades by means of composite moulding at the time of the patent.

Nevertheless, document E10 does not touch upon the aspect of packaging or wrapping fibres or fibre rovings. The board concurs with the appellant that it is left to the skilled person to find out which of the fibre-reinforced materials mentioned on pages 292 and 293 would be suitable in terms of the flexibility required for wrapping and during flattening caused by the subsequent application of vacuum.

Further, the question *how* the fibre rovings would be wrapped has not been convincingly answered by the

respondent. Clearly, the lay-up process of fibre-reinforced layers in the field of wind turbine rotor blades is absolutely critical in view of the various constraints on load, weight and fatigue failure. Without any guidance in the patent or in document E10, it is not apparent how the skilled person would obtain the knowledge to wrap the fibre rovings within these constraints.

Finally, the board holds that the requirement that the injection material is treated "so that it bonds with the fibre rovings (31)" in step d) of claim 1 would confront the skilled person with a further obstacle for carrying out the invention. The fibre packaging material must not only hold together the fibre rovings but also allow a proper infusion by the resin. Again, the patent remains silent on the materials that would comply with this further constraint. The respondent indicated that some fibre packaging materials such as CSM were permeable to resin. Suitable materials were commercially available. In the board's view, such assertions without evidence in support therefore are not sufficient. Document E10 does not contain enough information for the skilled person to reliably determine the resin permeability of the various fibrous materials. Nor can this be considered to be a routine task for the skilled person. It is therefore not clear how they would proceed to select the packaging material in order to warrant a proper infusion of the fibre rovings.

19. For those reasons, the board concludes that the invention is not disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art (Article 83 EPC).

Conclusion

20. In the absence of an allowable request, the patent must be revoked.

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:

N. Schneider P. Lanz

Decision electronically authenticated