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Datasheet for the decision of 17 September 2024

Case Number: T 0170/23 - 3.2.04

Application Number: 15735713.8

Publication Number: 3169895

IPC: F03D1/06

Language of the proceedings: EN

Title of invention:
AN AEROSHELL EXTENDER PIECE FOR A WIND TURBINE BLADE

Patent Proprietor:
LM Wind Power A/S

Opponent:
Siemens Gamesa Renewable Energy GmbH & Co. KG

Headword:

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - (yes)

Decisions cited:

Catchword:

Europäisches Patentamt
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Office européen des brevets

Beschwerdekammern

Boards of Appeal

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Case Number: T 0170/23 - 3.2.04

D E C I S I O N
of Technical Board of Appeal 3.2.04
of 17 September 2024

Appellant: (Patent Proprietor)	LM Wind Power A/S Jupitervej 6 6000 Kolding (DK)
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Appellant: (Opponent)	Siemens Gamesa Renewable Energy GmbH & Co. KG Beim Strohhause 17-31 20097 Hamburg (DE)
Representative:	SGRE-Association Siemens Energy Global GmbH & Co. KG SE I IM P Intellectual Property Siemenspromenade 9 91058 Erlangen (DE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 5 December 2022 concerning maintenance of the European Patent No. 3169895 in amended form.**

Composition of the Board:

Chairman	A. Pieracci
Members:	G. Martin Gonzalez
	K. Kerber-Zubrzycka

Summary of Facts and Submissions

I. The appeals were filed by the appellant proprietor and the appellant opponent against the interlocutory decision of the opposition division to maintain the patent in amended form according to auxiliary request 4a before it (auxiliary request 4 in appeal).

II. In preparation for oral proceedings the Board issued a communication setting out its provisional opinion on the relevant issues.

Oral proceedings before the Board were held on 17 September 2024.

III. The final request of the appellant proprietor is that the decision under appeal be set aside and the patent be maintained on the basis of auxiliary request 6 filed with the letter of 21 August 2023 (main request) or, alternatively on the basis of one of the auxiliary requests 7 to 28.

The appellant opponent requests that the decision under appeal be set aside and the patent be revoked.

IV. Independent claim 1 of auxiliary request 6 reads as follows:

"A wind turbine blade assembly comprising a wind turbine blade having a tip end and a root end, and a leading edge and a trailing edge with a chord length extending therebetween, the wind turbine blade further being divided into an inboard part and an outboard part,

wherein the inboard part of the wind turbine blade is formed as a load-carrying structure having a circular, elliptical or oval cross-section, and
wherein the wind turbine blade assembly further comprises an aeroshell extender piece (90) attached to the wind turbine blade along a portion of the trailing edge of the inboard part of the wind turbine blade, the aeroshell extender piece (90) forming an extended trailing edge profile of the wind turbine blade assembly along the inboard part of the wind turbine blade, wherein the aeroshell extender piece (90) comprises:
a body (72, 80) attached to a trailing edge side of a profile of the wind turbine blade, the body (72, 80) having a first end (72a, 80a) attached to the trailing edge side of the profile, and a second trailing edge end (72b, 80b) forming the extended airfoil trailing edge profile for the portion of the profile of the wind turbine blade,
wherein the body (72, 80) comprises a plurality of slits (88) extending from said second trailing edge end (72b, 80b) to a point located towards said first end (72a,80a), characterised in that
the width of each slit (88) of said plurality is less than a designed boundary layer height in the area of each of said slits (88)."

V. In the present decision, reference is made to the following documents:

(D1) WO 2011/088835 A2
(D2) US 2010/0028161 A1
(D3) WO 2013/092871 A1
(D4) US 2012/0134836 A1
(D6) WO 2011/157849 A2
(D11) WO 2010/043645 A2

VI. The appellant opponent's arguments can be summarised as follows:

Claim 1 of auxiliary request 6 lacks an inventive step starting from D6 in combination with common general knowledge or D1-D4, starting from D1 or D2 in combination with common general knowledge, and starting from D3 in combination with D11.

The appellant opponent declared to have no further objections against auxiliary request 6 apart from those put forward at the oral proceedings before the Board.

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

Claim 1 of auxiliary request 6 involves an inventive step over the cited prior art.

Reasons for the Decision

1. Background

The invention concerns an aeroshell extender piece for a wind turbine blade, see para 0001 of the patent specification.

The aeroshell extender piece is attached to the trailing edge side of the inboard portion of a wind turbine blade. The body of the extender piece includes multiple slits extending from its trailing edge end towards its forward end. These slits provide flexibility, reducing strain along the extender piece trailing edge. The width of each slit is less than the boundary layer height in the area of the slit, ensuring

minimal aerodynamic disruption, see paras 0009, 0012-0013 and 0016.

2. Main request (Auxiliary request 6 of 21 August 2023) - Inventive step

2.1 The appellant opponent submits several objections of inventive step, starting from D6, D1/D2 or D3.

2.2 **Starting from D6**, this document concerns a rotor blade for a wind turbine, which, like the claimed blade, is divided into an inboard part and an outboard part. As shown in Fig. 1, the rotor blade includes a root part with a uniform profile, attached to the hub, and extending up to a shoulder or transition section. This part is known to skilled persons as a cylindrical structure with a circular cross-section and, therefore, forms the inboard part as defined in the contested claim.

2.3 D6 deals with the manufacture of a known generic blade profile. As explained in D6 (p. 1, ln. 32 - p. 2, ln. 18), it addresses the problem of manufacturing the thin trailing edges (e.g. 2 to 4 mm) of known profiles, which are used to minimise noise. The problem is solved by providing at least a section of the trailing edge as a pre manufactured part (p. 2, ln. 20-24).

Thus, D6 does not concern the root (or inboard) part of the blade, as the root section has no edge. It has a circular cross-section. In this context, a person skilled in the art would clearly understand that the reference in D6, cited by the appellant opponent, to a pre manufactured trailing edge having a width of 0 to 10% of the chord length at a rotor radius of 0 to 50% (e.g., claim 1) refers to an edge starting beyond the

root or inboard section. At the inboard section, the only technically meaningful interpretation is a width of 0% of the chord length, corresponding to the absence of a pre manufactured trailing edge in that area.

2.4 Therefore the subject-matter of claim 1 differs from the known blade assembly of D6 in the provision of an aeroshell extender piece attached to the blade along its inboard portion and, consequently, it differs also in the slits on the body of the aeroshell extender piece extending from its trailing edge (second trailing edge in the language of the claim) towards the extender body first end (forward end).

2.5 The extender piece acts as an aeroshell or fairing, enhancing aerodynamic performance and lift, while its slitted design adds flexibility and reduces strain along the trailing edge (see patent specification, para 0012).

2.6 The appellant opponent formulates the technical problem as increasing lift in the known blade of D6.

2.7 Documents D1-D4 teach aeroshell extenders at the root or inboard section for increasing lift. However, none of these documents teaches an extender with a slitted design. D1 and D2 discuss separate segments (see abstracts) without slits in any of the segments, while neither D3 nor D4 includes a slitted design in their extenders, extenders 70, 148 of D3 (see Fig. 4c) or extenders 110, 114 of D4 (see Fig. 2). The skilled person therefore would not arrive at the claimed subject-matter of an extender having a slitted design, with the combination of D6 with the teaching of any of the documents D1-D4.

2.8 As regards the combination with common general knowledge, the appellant opponent argues that D6 suggests modifying its pre manufactured trailing edge with grooves (Fig. 4b) for use in the inboard section. They refer to the feature in claim 1 of D6, which states that the trailing edge has a width of 0 to 10% of the chord length at a rotor radius of 0 to 50%, which would suggest such adaptation. This argument is unconvincing. As explained above, the only technically meaningful interpretation of this feature is a value of 0% chord length at the inboard section since the pre manufactured trailing edge in D6 starts beyond the root section. D6 addresses only an alternative way for manufacturing known trailing edges, not the extension or modification of known profiles. The teaching of D6 as such is thus not related to increasing lift. Therefore there is no suggestion in D6 to adapt its trailing edge as an extender to increase lift in other parts of the blade nor can this be derived from the common general knowledge.

2.9 The Board, therefore, concludes that claim 1 involves an inventive step, considering D6 as the starting point.

2.10 The appellant opponent also raises an objection of lack of inventive step **starting from D1 or D2**. D1, similarly as D2, discloses an aeroshell extension structure 30 for an inboard portion of a blade (see Fig. 3 and Fig. 6 of both documents), comprising separate segments 130a-e that are marginally spaced from each other with gaps (see e.g. D1, p. 8, ln. 6-16). The gaps in D1 and D2 are 0.1 mm to 2 mm width (D1, p. 11, ln. 1; D2, para 0072)).

The appellant opponent argues that claim 1 is directed at a complete and assembled blade. In its assembled state, the segments of D1/D2 are mounted on the blade and build a single aeroshell extender as in the contested claim, where the gaps between segments anticipate the claimed slits. The Board is not convinced. Claim 1 of auxiliary request 6 defines the extender as a piece: "an aeroshell extender piece". The term "piece" implies a singular, integral component. This definition inherently excludes structures that are assembled from multiple, separately mounted elements or segments as is the case of D1/D2.

2.11 Therefore the claimed subject-matter differs from the known structure of D1/D2 in that the aeroshell extender is a single piece with a body comprising slits.

2.12 The appellant opponent argues that the only difference with D1/D2 is that the body segments are connected into a single unit. Accordingly, the objective technical problem starting from D1 would be to provide an alternative interface between the segments.

2.13 The opponent argues that the aeroshell extender piece with slits according to the invention provides the same technical effect as the segments of document D1 so that the subject-matter of claim 1 cannot be seen as being inventive. The opponent also submits that since the extension portion in D1/D2 would typically be manufactured by cutting a full extender body into segments, partial cutting is simply a trivial variation of complete cutting. Both are considered two options of the same process. Thus, the skilled person would view partial cutting as an obvious solution to the posed problem.

2.14 The Board disagrees and rather shares the view of the patent proprietor.

The argument that the claimed invention provides the same technical effect as the segments 130a-e of D1 is not conclusive for the issue of obviousness. The provision of an alternative solution to achieve the same technical effect of a known solution does not necessarily render such alternative obvious.

As discussed at the oral proceedings, no indication is present in the prior art to support the argument that in view of the common general knowledge the person skilled in the art would modify the structure of D1/D2 so as to arrive at the claimed invention. The argument that the segments of D1 are obtained by completely cutting a profile and that thus it would be obvious to have a partial cutting so to obtain the claimed aeroshell extender piece is a statement that remains unsubstantiated and can only be seen as the result of an analysis ex-post facto and is thus not convincing.

2.15 Therefore, the Board is not convinced that starting from the segmented design taught in D1/D2 would be an obvious choice for the skilled person to arrive at the claimed invention.

2.16 The appellant opponent also submits a lack of inventive step objection **starting from D3** in combination with D11.

D3 discloses a wind turbine blade provided with an extender piece 70 at its inboard portion, see Figs. 4c and 6 of D3.

It is common ground that the extender piece 70 of D3 does not comprise a slitted body. The claimed subject-matter differs therefore from D3 in that the extender body comprises slits extending from the body's trailing edge towards its forward end.

2.17 Providing a slitted extender piece allows for a degree of flexibility in the structure of the extender piece, reducing the level of strain which is experienced along the trailing edge end of the extender piece, see patent specification para 0012.

The objective technical problem can thus be formulated as how to reduce the level of strain in the extender piece.

2.18 The appellant opponent refers to document D11 in this respect, specifically citing p. 7, lines 7-11, which describes a flap structure composed of multiple sections 303 separated by interstices 304, see Fig. 3 of D11, which interstices may be in the form of open gaps, see p.7, ln. 11. The interstices have higher elasticity than the device sections, thereby increasing the overall longitudinal bending flexibility and reducing strain from edgewise and bending loads. The opponent argues that applying this general teaching to the extender piece in D3 would be an obvious solution to the formulated problem, with the interstices forming the claimed slits in the known device.

2.19 However, the Board finds this argument unconvincing and rather concurs with the patent proprietor. The teaching of D11 does not appear to be of general applicability. D11 specifically focuses on thin, movable flaps positioned on the aerodynamic surface of the blade,

particularly near the tip, where significant deformation occurs (see Fig. 3). It suggests that dividing the flap into multiple sections with interstices increases flexibility, reducing resistance to movement, friction, and wear, thereby extending the lifespan of the device and its connection mechanisms (p. 2, lines 23-29; p. 6, line 34 - p. 7, line 1). This is also the central teaching of the paragraph from where the appellant opponent extracts the above cited passage of D3, which emphasises protecting the functionality of the movable device by increasing flap flexibility to ensure smooth operation of a hinged mechanism under high deformation.

In contrast to that, the extender 70 in D3 is a thick, bulky, passive structure attached to the root or inboard portion of the blade, an area with lower deformation and no moving mechanism. Thus, D11 does not address the issues associated with the more robust and static extender in D3. Therefore the Board does not find that D11 suggests applying interstices, intended to increase the flexibility of a thin movable flap, to solve the problem of reducing strain in the extender 70 of D3. The Board also considers it beyond the skilled person's normal skills of abstraction to apply D11's teachings to such an extender.

2.20 It is therefore concluded that the claimed solution is not suggested by D11’s teaching in an obvious matter.

2.21 The Board therefore concludes that the subject-matter of claim 1 according to auxiliary request 6 involves an inventive step over the cited prior art combinations.

3. No further objections have been raised against the claims as amended according to auxiliary request 6.

4. The Board is satisfied by the amendments made to the description to bring it into line with the amended claims. These were also not objected to by the appellant opponent. The Board thus holds that nothing withstands the maintenance of the patent as amended according to auxiliary request 6. The Board concludes that the patent can be maintained as amended pursuant to Article 101(3)(a) EPC.

Order

For these reasons it is decided that:

1. **The decision under appeal is set aside.**

2. **The case is remitted to the opposition division with the order to maintain the patent as amended in the following version:**

Description:

Pages 3, 4 and 7 to 10 of the patent specification
Pages 2, 5 and 6 received during oral proceedings before the Board on 17 September 2024

Claims:

No. 1 to 10 according to the auxiliary request 6 filed with the letter of 21 August 2023

Drawings:

Figures 1 to 10 of the patent specification

The Registrar: The Chairman:

G. Magouliotis A. Pieracci

Decision electronically authenticated