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Case Number: T 0360/15 - 3.2.01

Application Number: 10164448.2

Publication Number: 2298640

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Language of the proceedings: EN

Title of invention:
Ducted pre-swirl stator assembly

Patent Proprietor:
Daewoo Shipbuilding&Marine Engineering Co., Ltd.

Opponent:
Becker Marine Systems GmbH & Co. KG

Headword:

Relevant legal provisions:
EPC Art. 56
RPBA Art. 13(1)

Keyword:
Inventive step (no)
Admission of new requests (no)

Decisions cited:

Catchword:

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Case Number: T 0360/15 - 3.2.01

D E C I S I O N
of Technical Board of Appeal 3.2.01
of 17 May 2017

Appellant: (Opponent)	Becker Marine Systems GmbH & Co. KG Neuländer Kamp 3 21079 Hamburg (DE)
Representative:	RGTH Patentanwälte PartGmbB Neuer Wall 10 20354 Hamburg (DE)
Respondent: (Patent Proprietor)	Daewoo Shipbuilding&Marine Engineering Co., Ltd. No 85 Da-dong, Jung-gu Seoul-city (KR)
Representative:	Prüfer & Partner mbB Patentanwälte · Rechtsanwälte Sohnckestraße 12 81479 München (DE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 22 December 2014 concerning maintenance of the European Patent No. 2298640 in amended form.**

Composition of the Board:

Chairman	G. Pricolo
Members:	C. Narcisi
	P. Guntz

Summary of Facts and Submissions

I. European patent No. 2 298 640 was maintained in amended form by the decision of the Opposition Division posted on 22 December 2014. An appeal was lodged by the Opponent on 20 February 2015 and the appeal fee was paid at the same time. The statement of grounds of appeal was filed on 30 April 2015.

II. Oral proceedings were held on 17 May 2017. The Appellant (Opponent) requested that the decision be set aside and the patent be revoked. The Respondent (Patentee) requested that the appeal be dismissed and the patent be maintained in amended form according to the impugned decision (main request) or, in the alternative, that the patent be maintained according to auxiliary requests 1 to 4 (filed on 13 April 2017).

III. Claim 1 reads as follows:

"A ducted pre-swirl stator assembly, comprising:
a pre-swirl stator (14) provided on a stern boss (10) of a hull, the pre-swirl stator (14) having at least one blade extending in a radial direction based on a center axis (X) of a screw;
a cylindrical duct (16) coupled to an outer end of the blade of the pre-swirl stator; and
a support (18) fastening the duct (16) to the hull, characterized in that
a center axis (Y) of the duct is eccentric upwards and rightwards from the center axis (X) of the screw with respect to a direction indicated from a stern side to a bow side."

Claim 1 of auxiliary request 1 differs from claim 1 of the main request 1 in that the wording "provided on a

stern boss" was replaced by "providable on a stern boss", and the wording "a support fastening the duct" was replaced by "a support for fastening the duct".

Claim 1 of auxiliary request 2 differs from claim 1 of the auxiliary request 1 in that the wording "from a stern side to a bow side" was replaced by "from a stern side to a bow side; wherein an eccentricity of the center axis of the duct from the center axis of the screw is set with respect to a diameter Dp of the screw such that an upward eccentricity (Hc) satisfies 0 < HC < 0.3Dp and a right eccentricity (Bc) satisfies 0 < Bc < 0.2 Dp".

Claim 1 of auxiliary request 3 differs from claim 1 of auxiliary request 1 in that the wording "from a stern side to a bow side" was replaced by "from a stern side to a bow side; wherein a distance between an end of a tailing edge of the duct and a center line of blades of the screw in a longitudinal direction of the hull is set with respect to the diameter Dp of the screw such that 0.1 Dp < H <0.3 Dp is satisfied".

Claim 1 of auxiliary request 4 differs from claim 1 of auxiliary request 1 in that the wording "from a stern side to a bow side" is replaced by "from a stern side to a bow side; wherein the duct has:
an inclined curved portion on an inner surface of a leading edge of the duct, the inclined curved portion being inclined at an inclined angle ranging from 20° to 30°;
an inclined linear portion on an inner surface of a tailing edge of the duct, the inclined linear portion being inclined at an inclined angle ranging from 2° to 6°; and

a horizontal linear portion formed between the inclined curved portion and the inclined linear portion, the horizontal linear portion being connected to the outer end of the blade of the pre-swirl stator,
wherein the inclined angle of each of the inclined curved portion and the inclined linear portion is set with respect to a line extending from the horizontal linear portion in a direction parallel to the horizontal linear portion".

IV. The Appellant's arguments may be summarized as follows:

The subject-matter of claim 1 of the main request does not involve an inventive step in view of D2 and D13. D2 discloses all of the features of claim 1, except for the feature reading "a center axis (Y) of the duct is eccentric rightwards from the center axis (X) of the screw". However, this feature is clearly suggested in D13 (page 137, figure 8.24), disclosing that in order to increase propulsion a ducted pre-swirl assembly (so-called "Schneekluthdüse) is installed just in front of the propeller (with respect to the ship's direction of forward motion), at a location slightly above and to the right side of the propeller axis. Thereby the fluid flow speed impacting the propeller and the resulting propulsion effect is increased. According to D13, this applies in particular for ship hulls having an asymmetric form. Further, since an object of the contested patent is likewise increasing propulsion (see patent specification (hereinafter designated as EP-B), paragraphs [0004], [0006]), the combination of D2 and D13 would be obvious for the skilled person and would directly lead to the claimed subject-matter.

Auxiliary requests 1 to 4 should not be admitted to the appeal proceedings since they were filed only one month before the date set for oral proceedings and since each of these requests gives rise to major objections, thus being anyway not allowable.

V. The Respondent's arguments may be summarized as follows:

The subject-matter of claim 1 of the main request is inventive over D2 (US-A1-2009/0084301) and D13 ("Handbuch für die Schiffsführung", Helmers et al., 9. Auflage. 2.Band, Teil A, pages 135-144, 1988). D2 clearly merely discloses that "the center axis (Y) of the duct is eccentric upwards" with respect to a center axis of the screw, and therefore claim 1 differs from D13 in that "a center axis (Y) of the duct is eccentric rightwards from the center axis (X) of the screw". Further, D2 is directed to specific kind of ducted pre-swirl stator assembly, which is commonly known in the art as "Mewis" duct and is usually cylindrical, mounted just in front of the propeller (with respect to a forward moving direction of the ship) and in its immediate vicinity. By contrast, D13 discloses a so called "Schneekluth-Zustromdüse" page 137 (see also figure 8.24), which is a similar ducted pre-swirl assembly, however having a somewhat flattened shape and disposed nearer to the ship's hull than to the propeller. Besides, D13 (in said paragraph on page 137) discusses asymmetric ship hulls, which are not considered in present claim 1, and teaches in such cases to arrange only one half (half-shell) of a "Schneekluth" duct on one side of the hull. Finally, the object of the present invention is actually reducing cavitation (see patent specification, hereinafter designated as EP-B, paragraphs [0003],

[0007]), as shown in figure 9 of EP-B, disclosing experimental results, and not really increasing ship propulsion. For all these reasons the skilled person would not combine D2 with D13 and, even if, this combination would not lead to the claimed subject-matter.

The auxiliary requests 1 to 4 should be admitted into the appeal proceedings. In effect, these requests were not late filed, for the claims of the first auxiliary request are identical with the granted claims, and the claims of the second to fourth auxiliary request are identical with those of auxiliary requests 1 to 3 as filed during opposition proceedings. In addition, part of the discussion of specific topics relating to these requests already took place during the previous discussion of the main request (see above) before the Board, given that similar or corresponding objections were raised by the Opponent.

Reasons for the Decision

1. The appeal is admissible.

2. The subject-matter of claim 1 does not involve an inventive step over D2 and D13 (Article 56 EPC). It is not disputed by the parties that D2 discloses the feature reading "the center axis (Y) of the duct is eccentric upwards" (hereinafter designated as feature (i)), while the further feature implying that "a center axis (Y) of the duct is eccentric rightwards from the center axis (X) of the screw" (hereinafter designated as feature (ii)) is not disclosed by D2. The remaining claimed features are known from D2, and this was also no contentious issue between the parties. Hence, it is known from D2 to increase propulsion by the propeller

(see [0005] and [0006]) by arranging in front of the propeller a "Mewis" duct (according to feature (i)) in order to increase the speed of fluid flow and the thrust loading (see D2, [0005], [0006]). This is done in order to compensate for uneven, irregular and reduced speed fluid flow in the vicinity of the ship's hull. Evidently, the propeller's upper portion (which is usually nearer to the wake or disturbed flow region (caused by the hull)) will suffer greater thrust loading losses and therefore the "Mewis" duct is located in an eccentric upward position with respect to the screw or propeller axis (see above feature (i)). Similarly, from D13 it is known to arrange a "Schneekluth" duct in front of the propeller to increase speed of fluid flow (in the region above the screw axis) and propulsion (see page 137, figure 8.24). Thus, the same physical and hydrodynamic principles apply as for D2. If, additionally, the ship's hull has an asymmetric shape, then according to D13 said "Schneekluth" duct should be arranged on the starboard side (i.e. for right-handed propeller (clockwise rotation) to the right of the screw axis). Contrary to the Respondent's view, no explicit mention is made in D13 (page 137) of only one half (half-shell) of a "Schneekluth" duct. Thus, the skilled person starting from D2 and in order e.g. to take into account the asymmetric shape of the hull (such an asymmetric shape is comprised within the extent and scope of the claimed subject-matter) would additionally arrange the center axis of the duct not only above the screw axis but also rightwards from said axis (i.e. according to both features (i) and (ii)). The combination of D2 and D13 would also be obvious for the skilled person, as the technical effect of both ducts relies on the same physical and hydrodynamic principles. In addition, increasing propulsion is likewise a main object of the

present invention (see EP-B, [0004], [0006]), as is the case for D2 and D13.

3. The Board decided not to admit to the appeal proceedings auxiliary requests 1 to 4 (which were filed one month before the date of oral proceedings), pursuant to Article 13(1) RPBA (Rules of Procedure of the Boards of Appeal), for the following reasons. The Board noted that claim 1 of auxiliary request 1 was identical with granted claim 1, its subject-matter thus being on a prima facie basis not clearly allowable, given that the granted claim was considered by the appealed decision to violate Article 123(2) EPC. In addition, the Respondent has not provided in its written submissions (e.g. when filing said auxiliary request during appeal proceedings) any arguments as to why the appealed decision erred in this respect. A renewed discussion of this issue under these circumstances was thus not compatible with the criterion of procedural economy. The same difficulties arise in connection with claim 1 of auxiliary requests 2 to 4, as claim 1 of any of these requests also includes the same features giving rise to the aforesaid objections. Further, in view of the Board's decision on claim 1 of the main request, consideration of the subject-matter of claim 1 of auxiliary request 1 would likewise not lead to a different conclusion in relation to the question of inventive step, the amendments being only of a formal nature. Finally, no reasons were given by the Respondent in its written submissions (e.g. when filing said auxiliary requests during appeal proceedings), as to why the further amendments included into claim 1 of auxiliary requests 2 to 4 would contribute to inventive step. For all these reasons, having regard to procedural economy and the given state

of the proceedings, auxiliary requests 1 to 4 were not admitted to the appeal proceedings.

Order

For these reasons it is decided that:

1. The impugned decision is set aside.

2. The patent is revoked.

The Registrar: The Chairman:

A. Vottner G. Pricolo

Decision electronically authenticated