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Datasheet for the decision of 17 April 2018

Case Number: T 2344/14 - 3.2.08

Application Number: 00301130.1

Publication Number: 1031751

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Language of the proceedings: EN

Title of invention:
Enhanced fan and fan drive assembly

Patent Proprietor:
BorgWarner, Inc.

Opponent:
MAHLE Behr GmbH & Co. KG

Headword:

Relevant legal provisions:
EPC Art. 54, 56

Keyword:
Novelty - (yes)
Inventive step - (yes)

Decisions cited:

Catchword:

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Boards of Appeal

Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0
Fax +49 (0)89 2399-4465

Case Number: T 2344/14 - 3.2.08

D E C I S I O N
of Technical Board of Appeal 3.2.08
of 17 April 2018

Appellant: (Opponent)	MAHLE Behr GmbH & Co. KG Mauserstr. 3 70469 Stuttgart (DE)
Representative:	Grauel, Andreas Grauel IP Patentanwaltskanzlei Wartbergstrasse 14 70191 Stuttgart (DE)
Respondent: (Patent Proprietor)	BorgWarner, Inc. 3850 Hamlin Road Auburn Hills, MI 48326-2872 (US)
Representative:	Hedges, Martin Nicholas A.A. Thornton & Co. 10 Old Bailey London EC4M 7NG (GB)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 3 November 2014 rejecting the opposition filed against European patent No. 1031751 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairman	M. Alvazzi Delfrate
Members:	M. Foulger
	Y. Podbielski

Summary of Facts and Submissions

I. With the decision dated 3 November 2014 the opposition division rejected the opposition against European patent No. 1031751. The opposition division found that the subject-matter of claim 1 of the patent as granted was new and involved an inventive step.

II. The appellant (opponent) filed an appeal against this decision. The appeal was filed in due form and within the given time limits.

III. Oral proceedings took place before the Board on 17 April 2018.

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

The respondent (patent proprietor) requested that the appeal be dismissed and the patent be upheld as granted or, in the alternative, that the patent be maintained in amended form according to the claims of one of auxiliary requests 1-3 filed on 17 July 2015 with the reply to the grounds of appeal.

V. Claim 1 of the patent as granted (main request) reads as follows:

"**(M1)** A fan drive assembly of the type comprising a cooling fan (11)
(M2) attached to a fluid coupling device (13),
(M3) said cooling fan (11) comprising a plurality of fan blades (19),
(M4) said fluid coupling device (13) comprising a rotatable coupling assembly (21) including a body member (23) having a radially outer periphery and a

rearward surface (59), and a cover member (25) cooperating with said body member (23) to define a fluid chamber (39) therebetween, a rotatable coupling member (27) disposed in said fluid chamber (39) for rotation relative to said coupling assembly (21); said coupling assembly (21) and said coupling member (27) cooperating to define a viscous shear chamber (55, 57) therebetween, whereby torque may be transmitted from said coupling member (27) to said coupling assembly (21) in response to the presence of viscous fluid in said viscous shear chamber (55, 57);

(M5) said body member (23) including a plurality of cooling fins (61) and a plurality of mounting portions (67),

(M6) said plurality of cooling fins (61) covering substantially all of said rearward surface (59) of said body member (23) not covered by said mounting portions (67), **characterized by:**

(M7) (a) the cooling fan comprising a fan hub (17) and a spider portion (15), the plurality of fan blades (19) extending radially from the fan hub, and the spider portion (15) being attached to said mounting portions and defining a pilot diameter (79);

(M8) (b) each of said mounting portions (67) defining both a machining chucking surface (73), and a spider mounting surface, said spider mounting surface (75) being provided on a rearward face of said mounting portion (67) and including a pilot surface (77) in engagement with said pilot diameter (79) of said spider portion (15); and

(M9) (c) said body member (23) defining an outside diameter (D1), and said machining chucking surface (73) being disposed on an outer periphery of said mounting portions (67) and defining a diameter (D2) which is at least about 90% of said outside diameter (D1)."

(Feature references added in bold by the Board.)

The auxiliary requests have no bearing on the present decision.

VI. The following documents are relevant for the present decision:

D8: EP 0 701 064 A1
D10: US 4,271,946 A

VII. The appellant argued essentially the following:

i) Novelty

The subject-matter of claim 1 was not new with respect to D8. D8 disclosed:

(M1) A fan drive assembly of the type comprising a cooling fan (col. 1, l. 5-7)
(M2) attached to a fluid coupling device ("viscous fan drive", 11),
(M3) said cooling fan (31) comprising a plurality of fan blades (37),
(M4) said fluid coupling device comprising a rotatable coupling assembly including a body member (13) having a radially outer periphery and a rearward surface, and a cover member (15) cooperating with said body member to define a fluid chamber therebetween, a rotatable coupling member disposed in said fluid chamber for rotation relative to said coupling assembly; said coupling assembly and said coupling member cooperating to define a viscous shear chamber therebetween, whereby torque may be transmitted from said coupling member to said coupling assembly in response to the presence of viscous fluid in said viscous shear chamber;

(M5) said body member including a plurality of cooling fins (17) and a plurality of mounting portions (21).

(M6) The plurality of cooling fins covered substantially all of said rearward surface of said body member not covered by said mounting portions because this was the arrangement disclosed in D10 which D8 had "incorporated herein by reference" (D8, col. 3, l. 31-35). Moreover, the fins 17 clearly extended onto the rearward side of the body as this was the only logical interpretation. Finally, the term "substantially all" in the claim was so vague that no limitation could be associated with it.

(M7) (a) The cooling fan comprised a fan hub and a spider portion, the plurality of fan blades extending radially from the fan hub (see fig. 3), and the spider portion being attached to said mounting portions and defining a pilot diameter.

(M8) (b) Each of said mounting portions defined both a machining chucking surface (where the chucks 49 engaged the body), and a spider mounting surface. Although two machining chucking surfaces were not associated with a spider mounting surface, these were not mounting surfaces in the sense of the claim. These were represented by the two areas where machining chucking surface and spider mounting surfaces were associated with each other. Moreover, said spider mounting surface was provided on a rearward face of said mounting portion and included a pilot surface in engagement with said pilot diameter of said spider portion (see col. 5, l. 39-46). In fig. 2, bolt 25 was shown screwed into the body at position 21 which was on the rearward face.

(M9) (c) The body member defined an outside diameter,

and said machining chucking surface was disposed on an outer periphery of said mounting portions and defined a diameter which was at least about 90% of said outside diameter (see fig. 1).

Therefore all features of claim 1 were known from D8.

ii) Inventive step

If features M6, M8 and M9 were considered as being the differentiating features, these features were unrelated and hence were a mere juxtaposition. They solved three different problems:

- improve the cooling (feature M6),
- improve the ease of mounting of the fan (feature M8),
- optimisation of the fan drive assembly (feature M9).

For the solution to the first partial problem, the skilled person would refer to D10 which was incorporated by reference in D8. Fig. 1 of D10 showed cooling fins on the rearward surface of the body. It would have been immediately apparent to the skilled person that this improved the cooling of the coupling device. The skilled person would therefore apply this to the fan drive assembly of D8 and thereby arrive at a fan drive assembly with feature M6.

For the mounting of the fan (the second partial problem), the skilled person only had two options either on the front face of the body or the rear. D10 taught a rear mounted fan - see fig. 1. It would have been obvious for the skilled person to have chosen the rear mounted option to improve the ease of mounting of the fan. Thus, feature M8 also did not involve an inventive step.

Feature M9 amounted to a mere optimisation of the fan drive assembly and thus also did not contribute to the inventive step of the subject-matter of claim 1.

As the differentiating features all solved different problems and the solutions to these problem were also obvious, the subject-matter of claim 1 did not involve an inventive step.

VIII. The respondent argued essentially the following:

i) Novelty

Features M6, M8 and M9 were not known from D8.

With regard to feature M6, D8 disclosed fins 17 around the periphery of the body. There was no disclosure of fins on the rear of the body and certainly not of "substantially all" of the rearward surface. The figures of D8 did not provide any view on the rear of the body nor did the written description give any indication that the peripheral fins extended onto the rear of the body. The reference to D10 in D8, col. 3, was to the viscous fan drive and not to the fin arrangement. Therefore, feature M6 was not known from D8.

Feature M8 could be divided into two sub-features: the first whereby each of said mounting portions defined both a machining chucking surface, and a spider mounting surface; the second sub-feature being that the spider mounting surface was provided on a rearward face of the mounting portion and including a pilot surface in engagement with said pilot diameter of said spider portion. The first of these features was not known from

D8 because "each" of the mounting portions did not define both a chucking surface and a spider mounting surface. As could be seen in fig. 1 of D8, the mounting portions at the left and at the bottom of the figure did not define machine chucking surfaces. The chucking surface at the lower left side did not define a spider mounting surface. Moreover, the spider mounting surface 47 was positioned at a forward face, see col. 5, l. 25, not a rearward face as claimed. Therefore neither of these two sub-features of feature M8 were known from D8.

Regarding feature M9, the chucking surfaces were not disposed on an outer periphery of the mounting portion. Thus feature M9 was also not known from D8.

The subject-matter of claim 1 was therefore new.

ii) Inventive step

D8 was closest prior art and disclosed features M1 - M5, M7 of claim 1.

The distinguishing features all contributed to solving the problem identified in the patent at paragraph [0009] of providing the optimal, potential heat dissipation. Thus there was synergy between these features and the claimed solution was not a mere aggregation.

Moreover, the individual features were not rendered obvious by the prior art.

Hence, the subject-matter of claim 1 involved an inventive step.

Reasons for the Decision

1. Novelty

1.1 It is common ground that D8 discloses a fan drive assembly with features M1-M5,M7 of claim 1 as follows:

(M1) A fan drive assembly of the type comprising a cooling fan (col. 1, l. 5-7)
(M2) attached to a fluid coupling device (11),
(M3) said cooling fan (31) comprising a plurality of fan blades (37),
(M4) said fluid coupling device comprising a rotatable coupling assembly including a body member (13) having a radially outer periphery and a rearward surface, and a cover member (15) cooperating with said body member to define a fluid chamber therebetween, a rotatable coupling member disposed in said fluid chamber for rotation relative to said coupling assembly; said coupling assembly and said coupling member cooperating to define a viscous shear chamber therebetween, whereby torque may be transmitted from said coupling member to said coupling assembly in response to the presence of viscous fluid in said viscous shear chamber;
(M5) said body member including a plurality of cooling fins (17) and a plurality of mounting portions (21),
(M7) (a) the cooling fan comprising a fan hub and a spider portion, the plurality of fan blades extending radially from the fan hub (see fig. 3), and the spider portion being attached to said mounting portions and defining a pilot diameter.

1.2 Feature M6 requires that the plurality of cooling fins covers substantially all of said rearward surface of said body member not covered by said mounting portions. The figures of D8 show a view on the forward surface of the fluid coupling device as well as a section through a part of the fan mounting (fig. 2). In fig. 1 there are fins 17 shown around the periphery of the body member. There is no view on the rearward surface of the body member. Thus the figures do not disclose this feature.

Nor is there are any information in the text of D8 that would enable the reader to determine whether or not there were fins on the rearward surface of the body member. The only reference in the text is to "peripheral" fins, see col. 3, l. 41. The term peripheral may mean simply "on the circumference" and therefore does not unambiguously indicate that there are fins on the rearward side, let alone their extent.

Nor does the reference to D10 in col. 3, l. 31-35 disclose this feature because it relates to the viscous fan drive and not to the arrangement of the fins.

Thus, there is no clear and unambiguous disclosure of cooling fins covering substantially all of the rearward surface of the body member (feature M6).

1.3 Feature M8 requires firstly that each of the mounting portions defines both a machining chucking surface and a spider mounting surface, and secondly that the spider mounting surface is provided on a rearward face of the mounting portion.

Taking the first of these features, fig. 1 of D8 discloses a body member with four equally spaced spider

mounting surfaces with fastening bolts 25. The figure also shows gripping surfaces for three jaw pieces 49 which, in the language of the claim, correspond to the machine chucking surfaces. Only two of these spider mounting surfaces are associated with a machine chucking surface; thus each mounting portion does not define a machine chucking surface and a spider mounting surface.

Regarding the second feature, the Board considers the surface 47 to be the spider mounting surface because this is the surface on which the spider is fixed. According to the claim (features M4 and M6) the rearward surface of the body member is provided with the cooling fins and is opposite to the cover. Thus the surface 47 is not on the rearward face but on the forward face. This interpretation is also consistent with D8, col. 5, l. 25 which describes 47 as being the "forward surface". Hence, this second feature is also not disclosed in D8.

1.4 Feature M9 requires that the machining chucking surface is disposed on the outer periphery of the mounting portions. D8 discloses jaw pieces 49 which engage the machining chucking surface. These jaw pieces and, consequently, the associated machining chucking surfaces are radially inwards of the outer peripheral surface of the mounting portions 21 and not on the outer periphery as claimed. Feature M9 is therefore not disclosed in D8.

1.5 Hence, the subject-matter of claim 1 is new with regard to D8.

2. Inventive step

D8 is the closest prior art art and, as discussed above, discloses features M1-M5,M7 of claim 1.

The appellant identified three partial problems associated with the differentiating features. These are as follows:
i) to improve the cooling,
ii) to improve the ease of mounting of the fan,
iii) to optimise the fan drive assembly.

The Board is not persuaded that the invention can be regarded as a mere aggregation of features because they all contribute to increasing the surface covered by the cooling fins and consequently to improve the cooling of the fan drive.

Moreover, regarding the differentiating feature M8, it is correct that it is known from the prior art to arrange the spider mounting surface on the rearward surface of the mounting portion (see D10). However, even applying this teaching to the fan drive assembly of D8 would not lead the skilled person to the subject-matter of claim 1 because each mounting portion would not define both a machining chucking surface, and a spider mounting surface.

Regarding feature M9, there is no hint in the prior art to arrange the machining chucking surfaces on the outer peripheral surface of the mounting portions.

Thus, even seeking to resolve the three partial problems identified by the appellant, the person skilled in the art would not arrive at the subject-

matter of claim 1. The subject-matter of claim 1 therefore involves an inventive step.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

C. Moser M. Alvazzi Delfrate

Decision electronically authenticated