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Datasheet for the decision of 16 December 2021

Case Number: T 1494/17 - 3.5.02

Application Number: 09785573.8

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IPC: H02K9/19, H02K5/20, H02K9/197, H02K9/193, H02K11/00

Language of the proceedings: EN

Title of invention:
Liquid cooled electrical machine

Applicant:
Federal-Mogul Controlled Power Limited

Relevant legal provisions:
EPC Art. 84, 123(2)
EPC R. 43(7), 103(1)(a)

Keyword:
Claims - clarity (no) - support in the description (no)
Amendments - intermediate generalisation
Reimbursement of appeal fee - opportunity to comment (yes) - substantial procedural violation (no)

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Case Number: T 1494/17 - 3.5.02

D E C I S I O N
of Technical Board of Appeal 3.5.02
of 16 December 2021

Appellant: (Applicant)	Federal-Mogul Controlled Power Limited Suite 14, Manchester International Office Centre Styal Road Manchester Lancashire M22 5TN (GB)
Representative:	CSY Herts Helios Court 1 Bishop Square Hatfield, Hertfordshire AL10 9NE (GB)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 21 February 2017 refusing European patent application No. 09785573.8 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	R. Lord
Members:	G. Flyng
	J. Hoppe

Summary of Facts and Submissions

I. The appeal lies from the examining division's decision dated 21 February 2017 with which the European patent application no. 09 785 573.8 was refused.

II. In the contested decision, the examining division considered the applicant's request for grant of a patent on the basis of claims 1 to 6 that were filed on 26 October 2016, independent claim 1 of which reads as follows:

"1. Flow control apparatus for an electrical machine and comprising a first wall and a second wall, the second wall being inclined with respect to the first wall so as to define a tapered first chamber between the first and second walls, the first chamber being tapered by having a cross-sectional area which varies from an entrance aperture to an exit aperture,
wherein
the variation in cross-sectional area being configured so that in use the taper causes the velocity of a liquid in the first chamber to be varied as the liquid is conveyed between the entrance aperture and the exit aperture, such that a rate of transfer of thermal energy from the first wall is substantially uniform and the first wall is maintained at a substantially uniform temperature between the entrance aperture and the exit aperture."

III. In section 1 of the reasons for the contested decision the examining division held that independent claim 1 contravened the requirements of Article 123 (2) EPC for the following reasons:

- The feature "transfer of thermal energy" had been unallowably excised from claim 1 (see section 1.1).
- The feature "first chamber being tapered by having a cross-sectional area which varies from an entrance aperture to an exit aperture" had been added to claim 1 without the features that were originally disclosed in combination with it (see page 10, lines 9 and 10), resulting in an intermediate generalisation (see section 1.2.1.1).
- The cited basis for the above feature (page 10, lines 8 to 10) did not disclose a first chamber being tapered by having cross-sectional area which varies from an entrance aperture to an exit aperture (see section 1.2.1.2).
- The cited basis for the amendment according to which "a rate of transfer of thermal energy from the first wall is substantially uniform and the first wall is maintained at a substantially uniform temperature" was the paragraph from page 12, line 4. This paragraph concerned the variation in the cross-sectional area through the lower chamber "as described above", which meant that the variation in the cross-sectional area was obtained by contoured portions 113, 117, wherein the lower chamber was defined between the lower face 105 of the splitter ring and the partition wall 29. By taking the feature out of this context an intermediate generalisation occurred (see section 1.2.2).

In section 2 of the reasons for the contested decision the examining division held that independent claim 1 contravened the requirements of Article 84 EPC for the following reasons:

- Independent claim 1 had been defined by a result to be achieved (see "such that .....") rather than defining the essential features yielding the result (see section 2.1).
- The structure of the flow control apparatus was unclear, for example it was unclear which wall was part of the flow control apparatus and which wall belonged to the casing of the electrical machine (see section 2.2).
- Claim 1 lacked support from the description (see section 2.3). If it was assumed that the "first wall" of claim 1 corresponded to the partition wall 29 and the "second wall" of claim 1 corresponded to the lower face 105 of the splitter ring (see fig. 5b), then claim 1 contradicted the embodiment because the lower face 105 was not inclined with respect to the partition wall 29 as required by claim 1. Furthermore, there was no tapered first chamber between the first and second walls.

IV. In the notice of appeal the appellant (applicant) requested that the contested decision be set aside and that a European patent be granted on the basis of the application documents presently on file or on the basis of a request filed with the statement of grounds of appeal or a request filed subsequently during proceedings, or that the application be remitted to the examining division for further prosecution.

V. With the statement setting out the grounds of appeal dated 20 June 2017 the appellant filed a set of amended

claims 1 to 6, claim 1 of which differed from that considered in the contested decision in that the last phrase was amended as marked up in the following:

> "such that a ~~rate of~~ transfer of thermal energy from a heat source to the liquid via the first wall is substantially uniform and the first wall is maintained at a substantially uniform temperature between the entrance aperture and the exit aperture."

In the grounds of appeal the appellant referred to the content of the "minutes of 16 January 2017". These are evidently the minutes of a telephone consultation that was held with a member of the examining division on 12 January 2017, two weeks before oral proceedings were scheduled to take place.

Referring to those minutes, the appellant submitted that substantial procedural violations occurred in raising new objections for added subject-matter and an objection for unsearched subject-matter extremely late in the proceedings (only days before the appointed date for oral proceedings) and requested a refund of the appeal fee. The detailed submissions referred in turn to the headings used in the minutes of the telephone consultation, addressing the arguments therein. Furthermore, the appellant submitted a declaration by an expert to help explain the difference between flow of cooling fluid inside a smooth wall channel as proposed in the present invention and increased cooling through turbulent flow as proposed in document D1 (US 2008/179972 A1).

The appellant referred to the examining division's objection to the introduction of the phrase "the variation in cross-sectional area being configured so

that ... ", which was held to be an intermediate generalisation. According to the appellant, this or nearly identical language was used at pages 10, 12 and 16 of the description, which made it clear that the general principal of the invention was that variation in the cross-sectional area caused the velocity of the coolant to vary and accordingly the amount of thermal energy extracted by the coolant, per unit time also varied. It was clear in particular from page 16, line 21 onwards, that it was the general idea of "the variations in cross-sectional area of the coolant flow path" which was important in the present invention. Looking for example at the principal set out in Guidelines for Examination H-V, 3.2.1, it was noted that the detailed features of the embodiments set out in the telephone minutes were not related or inextricably linked to the features of variations in cross-sectional area and the overall disclosure justified the generalising of the concept of changes in cross-sectional area. Indeed this was underlined by the disclosure on page 16 which explained that the splitter ring could be omitted and that the variations in cross-sectional area (excluding any other details) of the splitter ring could be obtained by forming the structure directly in the casting of the housings. Thus the splitter ring and all its detailed embodiment features were optional. The key point was to provide flow channels with variations in cross-sectional area which ensured that the rate of transfer of thermal energy was substantially uniform between the entrance aperture and exit aperture.

The appellant made submissions in respect of clarity under Article 84 EPC, referring thereby to objections set out on page 4 and in paragraph 2.3 of the telephone minutes.

Furthermore, the appellant made submissions in respect of alleged unsearched subject-matter, novelty and inventive step, issues which had not featured in the contested decision.

In the event that the Appeal Board did not allow the application, the appellant requested oral proceedings, but expressed a preference that the Board consider the unsearched subject-matter, added subject-matter and novelty objections and direct the Examining Division in a proper consideration of these matters and, unless it is prepared to allow the application itself, that the application be remitted back to the examining division so that the applicant would have the possibility of a hearing at second instance in the future.

VI. The Board summonsed the appellant to attend oral proceedings, setting out their preliminary observations in a communication pursuant to Article 15(1) RPBA annexed to the summons.

In the Board's preliminary view the examining division had not committed a substantial procedural violation and thus a reimbursement of the Appeal fee was not considered equitable (Rule 103(1)(a) EPC).

The Board identified a deficiency in that contrary to Rule 43(7) EPC, the technical features specified in the claims were not followed by reference signs relating to these features, placed in parentheses.

Furthermore, the Board tended to concur with the examining division that the amendments to claim 1 created an intermediate generalisation that would not have been directly and unambiguously derivable to the

person skilled in the art, contrary to Article 123(2) EPC.

Furthermore, the Board tended to concur with the finding in section 2.3 of the contested decision that the claims were not supported by the description, contrary to Article 84 EPC.

Furthermore, the Board tended to concur with the finding in section 2.1 of the contested decision that claim 1 lacked clarity in the sense of Article 84 EPC because of a definition in terms of a result to be achieved.

VII. The appellant did not respond in substance to the communication pursuant to Article 15(1) RPBA.

VIII. With a submission of 15 December 2021 the appellant's representative notified the Board that they would not be attending the oral proceedings and that the appellant would not be represented at the oral proceedings set for 21 December 2021. The appellant withdrew their request for oral proceedings and asked for proceedings to be continued based on the contents of the file.

Reasons for the Decision

1. *Alleged substantial procedural violation*

1.1 The Board is not convinced by the appellant's submission that the examining division committed a substantial procedural violation by raising allegedly new added subject-matter and unsearched subject-matter objections extremely late in proceedings with the minutes of the telephone consultation held on 12 January 2017.

1.2 The telephone minutes, dated 16 January 2017, were issued by fax on 13 January 2017. On 16 January 2017 the appellant (then applicant) responded to the minutes with 10 days still remaining before the oral proceedings scheduled to take place on 26 January 2017. Thus, the appellant was given adequate time to respond to the objections that had been raised - the latest opportunity being at the oral proceedings, which the appellant chose not to attend.

1.3 That notwithstanding, the Board notes that at least some of the allegedly new objections were not even relied upon in the contested decision.

1.4 Thus, the requirements for reimbursement of the appeal fee according to Rule 103(1)(a) EPC are not fulfilled because a procedural violation did not occur. Furthermore, the appeal is not allowable, as reasoned in the following sections, so that also this requirement is not given in the present case.

2. *Reference signs, Rule 43(7) EPC*

2.1 Both in the claims that were on file when the notice of appeal was submitted (i.e. the claims filed on 26 October 2016) and in the claims that were filed together with the grounds of appeal, the technical features specified are not followed by reference signs relating to these features, placed in parentheses. In the present case reference signs would increase the intelligibility of the claims by identifying, in particular, which structures of the embodiment correspond to the claimed first wall and second wall. Hence, the requirements of Rule 43(7) EPC are not met.

3. *Amendments - allowability, Article 123(2) EPC*

3.1 Both in the claims that were on file when the notice of appeal was submitted (i.e. the claims filed on 26 October 2016) and in the claims that were filed together with the grounds of appeal, claim 1 has been amended compared to the original filing to specify that the first chamber is tapered "by having a cross-sectional area which varies from an entrance aperture to an exit aperture".

3.2 This feature was not in the claims as filed, but has been taken in abstraction from the preferred embodiment. The description of the preferred embodiment made clear, however, that the cross-sectional area of the lower chamber varied along the splitter ring 101 from the inlet 107 to the outlet 109 due to the contoured portions 113, 115 extending from the horizontal base 111 of the lower face 105 (see page 10, lines 8 to 10). Furthermore, these features were set out as being important for the desired effect of optimally cooling the electrical components (see page

11, lines 11 to 27). For these reasons the Board concurs with the examining division that taking the feature of varying cross section out of context creates an intermediate generalisation that would not have been directly and unambiguously derivable to the person skilled in the art.

4. Support by the description, Article 84 EPC

4.1 The Board concurs with the the finding in section 2.3 of the contested decision that the claims are not supported by the description. This is the case for both the claims that were on file when the notice of appeal was submitted (i.e. the claims filed on 26 October 2016) and for the claims that were filed together with the grounds of appeal.

4.2 According to claim 3, the exit aperture of the first chamber is coupled to the second chamber and in use liquid is conveyed from the first chamber to the second chamber via the exit aperture. Comparing this definition with figures 8 and 9 and the description, page 10, line 34 to page 11, line 4 and page 14, lines 12 to 15, it is evident that the "first chamber" as defined in claim 1 has to correspond to what is referred to as the "lower chamber" in the embodiment.

4.3 According to claim 1, the first chamber is defined between a first wall and a second wall. More specifically, according to claim 2, the second wall comprises a guide member having a first face and a second face and the first chamber is defined by the first wall and the first face of the guide member. Comparing this definition with the disclosed embodiment (see page 10, lines 4 to 10) it is evident that:

- the claimed second wall, which is a guide member, corresponds to the splitter ring 101 of the embodiment;
- the claimed first face of the guide member corresponds to the lower face 105 of the splitter ring 101 (see right side of figure 5a, figure 5b and figure 8); and
- the claimed first wall corresponds to the partition wall 29 (see figure 6).

4.4 However according to claim 1, the second wall is inclined with respect to the first wall so as to define a tapered first chamber between the first and second walls and the first chamber is tapered by having a cross-sectional area which varies from an entrance aperture to an exit aperture. Neither of these two features is supported by the described embodiment. On the contrary, as set out on page 10, lines 4 to 10, the lower face 105 (which corresponds to the claimed second wall) has a "horizontal base 111" and contoured portions 113, 115, as best shown in figure 5b. The contoured portions cause the lower chamber to narrow just after the inlet and widen again just before the outlet. Between the contoured portions the cross-section in constant (see page 11, lines 14 to 22). Thus, although the contoured portions are tapered sections of the lower chamber, the lower chamber as a whole is not "tapered" as claimed.

5. *Clarity, Article 84 EPC.*

5.1 The Board finds that claim 1 lacks clarity because of a definition in terms of a result to be achieved.

5.2 In the claims that were filed together with the grounds of appeal, the feature concerned is that of "the

variation in cross-sectional area being configured so that in use the taper causes the velocity of a liquid in the first chamber to be varied as the liquid is conveyed between the entrance aperture and the exit aperture, such that a transfer of thermal energy from a heat source to the liquid via the first wall is substantially uniform and the first wall is maintained at a substantially uniform temperature between the entrance aperture and the exit aperture" (emphasis added). This does not impose any clear limitations on the manner in which the cross-sectional area of the lower chamber is to be varied. Furthermore, the "heat source" is not even part of the claimed "flow control apparatus", so that its thermal properties, which would determine whether the defined effect could be achieved, are entirely undefined in the claim.

6. *Concluding remarks*

In view of the above findings remittal to the examining division would serve no purpose, and the appeal has to be dismissed.

Order

For these reasons it is decided that:

1. The appeal is dismissed.

2. The request for reimbursement of the appeal fee is refused.

The Registrar: The Chairman:

U. Bultmann R. Lord

Decision electronically authenticated