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Datasheet for the decision of 30 November 2010

Case Number: T 1250/07 - 3.5.02

Application Number: 04256224.9

Publication Number: 1523084

IPC: H02K 3/14

Language of the proceedings: EN

Title of invention:
Flexible stator bars

Applicant:
General Electric Company

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 56

Relevant legal provisions (EPC 1973):
-

Keyword:
"Inventive step - no"

Decisions cited:
-

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 1250/07 - 3.5.02

D E C I S I O N
of the Technical Board of Appeal 3.5.02
of 30 November 2010

Appellant: GENERAL ELECTRIC COMPANY
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Representative: Goode, Ian Roy
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 5 February 2007 refusing European patent application No. 04256224.9 pursuant to Article 97(1) EPC 1973.**

Composition of the Board:

Chairman: M. Ruggiu
Members: G. Flyng
E. Lachacinski

Summary of Facts and Submissions

I. The applicant appealed against the decision of the examining division refusing the European patent application no. 04 256 224.9.

II. The examining division refused the application on the grounds that the applicant had been informed that the application did not meet the requirements of the EPC, and of the reasons, in communications dated 25 January 2007, 11 October 2006 and 7 December 2005, and had requested a decision according to the state of the file.

In the communication of 25 January 2007 (minutes of a telephone consultation of 15 January 2007) the applicant had been advised of the examining division's opinion that, for the same reasons as had been set out in the summons to oral proceedings (communication of 11 October 2006, paragraph 3), claim 1 filed with the fax of 14 December 2006 lacked an inventive step (Article 56 EPC) in view of document **D1 (WO 00/60721 A1)** in combination with document **D7 (US2002/0053461 A1)**.

In particular, present claim 1 was considered to be a combination of originally filed independent claim 1 and originally filed dependent claim 6. Originally filed claim 1 was considered to lack an inventive step in view of D1 in combination with D7, as explained in detail in the summons to oral proceedings, paragraph 3. All features of the original claim 6 were considered to be disclosed in D1, as explained in paragraph 3.4 of the Examiner's first communication of 7 December 2005.

III. In the statement of grounds of appeal, the appellant submitted that the interpretation of D1 to include the features recited in claim 1 relating to an inner semi-conductive and an outer semi-conductive layer provided on the stranded conductor with a thermoplastic insulating material provided intermediate to the inner and outer semi-conductive layers was incorrect.

According to the appellant, D1, page 11, lines 21 to 23 stated that "... a thin coating of the same or a similar conductive material is applied to the outside surface of the insulating sleeve so as to form a corona protective shield thereon". Accordingly, D1 related to the use of layered **conductive** materials, and not the use of **semi-conductive** materials as claimed. Hence the claims currently on file were novel and possessed an inventive step with respect to the cited documents.

IV. The Board summoned the appellant to attend oral proceedings to be held on 30 November 2010.

In an annex to the summons the Board observed that D1 indeed disclosed the use, not of "**semi-conductive** material", but of "**conductive** material" (emphasis added) for the conductive corona protective shields on the inside and outside surfaces of the insulating sleeve (see D1, page 11, lines 16 to 23).

The Board took the view that the main question to be considered was whether a clear distinction could be made between a "semi-conductive material" as presently claimed in independent claims 1 and 7 and a "conductive material" as disclosed in document D1.

V. With a letter dated 11 October 2010 the appellant informed the Board that they did not intend to attend the oral proceedings scheduled for 30 November 2010. Furthermore, the appellant withdrew the previous request for oral proceedings and requested that a written decision be issued in accordance with the current state of the file.

VI. Oral proceedings were held before the Board on 11 October 2010. The appellant did not attend.

VII. The appellant requested in writing that the decision under appeal be set aside and a patent be granted on the basis of the present claims, i.e. claims 1 to 9 filed with the fax of 14 December 2006.

VIII. Independent claim 1 reads as follows:

"1. A process for forming a flexible stator bar (10), comprising:

depositing a thermoplastic elastomeric insulating material (14) onto a flexible stranded conductor (12), wherein the stranded conductor (12) comprises a plurality of strands compressed together to form a substantially rectangular cross sectional profile; and

shaping the flexible stator bar (10) with the insulating material (14) into a final shape for an electrical machine application, characterized in that the process further comprises:

depositing an inner semi-conductive layer and an outer semi-conductive layer onto the stranded conductor, wherein the thermoplastic insulating material (14) is intermediate to the inner and outer semi-conductive layers."

Independent claim 7 relates to a flexible stator bar.

Claims 2 to 6 and 8 and 9 are dependent on claims 1 and 7, respectively.

Reasons for the Decision

1. The appeal is admissible.

2. *Novelty and inventive step, Articles 54 and 56 EPC*

2.1 Document D1 discloses a composite conductor that is suitable for the stator of an electrical machine (see page 1, first paragraph) and a possible process for making the composite conductor (see page 14, line 16 to page 15, line 19).

2.2 The process disclosed in D1 comprises forming and consolidating a conductor bundle into the required rectangular shape by passing it through a die (see page 14, lines 27 to 30). Thus, the stranded conductor of D1 comprises a plurality of strands compressed together to form a substantially rectangular cross sectional profile as specified in present claim 1. Furthermore, the stranded conductor of D1 is flexible before curing (see page 14, lines 4 to 11).

2.3 Furthermore according to the process disclosed in D1 (see page 15, lines 5 to 14, emphasis added):

> "a **conductive filled polymer film** is extruded onto the outside of the conductor bundle 32 to form a **first, inner, corona shield**. Thereafter, the

coated conductor bundle passes through the centre of a further annular die in extruding head III, whereby a **filled polymer insulating sleeve** is extruded onto the outside of the first corona shield. Effectively, this first corona shield thereby forms a conductive coating on the inner surface of the insulating sleeve. Finally, by a similar process to that described for head II, a **second, outer, corona shield** is applied to the insulating sleeve in extruding head IV, so completing the formation of a composite conductor 30".

Thus, D1 discloses those features of claim 1 that specify depositing an insulating material onto the flexible stranded conductor and depositing an inner layer and an outer layer onto the stranded conductor, wherein the insulating material is intermediate to the inner and outer layers

2.4 Furthermore, D1 discloses positioning the conductor in the slots in the stator core to form a winding (see page 14, lines 4 to 11), which amounts to the presently claimed feature of shaping the flexible stator bar with the insulating material into a final shape for an electrical machine application.

2.5 According to present claim 1, the inner and outer layers deposited onto the stranded conductor are **semi-conductive**, whereas D1 discloses forming inner and outer corona shields by extruding films of a **conductive filled polymer** onto the conductor bundle.

The question arises whether in the present context there is any clear distinction between a "semi-conductive material" as claimed and a "conductive material" as disclosed in document D1.

(a) Firstly, the Board is not aware of any generally established definitions of the terms "semi-conductive" and "conductive" that enable a clear distinction to be made between them in the present context. The appellant has not put forward any such definitions.

(b) Secondly, in paragraph [0026] of the application as filed (see EP 1 523 084 A1) it is stated that (emphasis added):

"The semi-conductive material is preferably a thermoplastic elastomer filled with a **conductive** material such as carbon. Other materials such as carbon filled epoxies can also be employed."

This preferred choice for the "semi-conductive" material seems to be no different to the material suggested in D1 for the "conductive" coating, namely carbon-filled high-temperature resistant polymer (see page 11, lines 16 to 20).

In view of the above considerations the Board concludes that the term "semi-conductive", as used in claim 1 to describe the material of the inner and outer layers, does not establish a clear distinction from the conductive filled polymer disclosed in document D1 for the inner and outer corona shields.

2.6 Present claim 1 specifies furthermore that the insulating material deposited onto the flexible stranded conductor is of a **thermoplastic elastomeric** material, whereas in D1 the insulating sleeve extruded onto the flexible stranded conductor is of a **filled polymer** material.

The examining division acknowledged this difference (see communication of 11 October 2006, section 3.2) but held that the skilled person would either be familiar with thermoplastic elastomeric insulating material and would select this material as a matter of routine, without exercising an inventive step (*idem.*, sections 3.2 to 3.4) or would find this material described in document D7 for the same purpose and would include it in the process of D1 (*idem.*, sections 3.5 to 3.7), such that claim 1 lacked an inventive step in view of D1 in combination with D7.

The appellant has not advanced any arguments contesting the examining division's view on this point and the Board sees no reason to disagree with that view. The Board finds that it would be obvious for the skilled person to use a thermoplastic elastomeric material for the insulator of D1, either as a matter of routine choice from the range of well known materials, or in view of the disclosure in D7 of the use of such a material for a similar purpose.

2.7 For the reasons set out above the Board concludes that, having regard to documents D1 and D7, the subject-matter of claim 1 is obvious to a person skilled in the art and therefore the application does not fulfil the requirements for inventive step, Article 56 EPC.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

U. Bultmann M. Ruggiu