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Datasheet for the decision of 25 June 2008

Case Number: T 1305/05 - 3.5.02

Application Number: 00107411.1

Publication Number: 1026810

IPC: H02K 3/12

Language of the proceedings: EN

Title of invention:
Stator arrangement of alternator for vehicle

Patentee:
Denso Corporation

Opponent:
Valeo Equipements Electriques Moteur

Headword:
-

Relevant legal provisions:
EPC Art. 56
RPBA Art. 12(2), 13(1), 13(3)

Relevant legal provisions (EPC 1973):
-

Keyword:
"Admission of a late-filed reply to the grounds of appeal - only in part"
"Inventive step - yes"

Decisions cited:
-

Catchword:
see points 2 to 6 of the reasons.

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 1305/05 - 3.5.02

D E C I S I O N
of the Technical Board of Appeal 3.5.02
of 25 June 2008

Appellant: (Patent Proprietor)	Denso Corporation 1-1, Showa-cho Kariya-city Aichi-pref. 448-8661 (JP)
Representative:	Winter, Brandl, Fürniss, Hübner Röss, Kaiser Polte Partnerschaft Patent- und Rechtsanwaltskanzlei Alois-Steinecker-Strasse 22 D-85354 Freising (DE)
Respondent: (Opponent)	Valeo Equipements Electriques Moteur 2 rue André Boulle F-94017 Creteil (FR)
Representative:	-
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted 20 July 2005 revoking European patent No. 1026810 pursuant to Article 102(1) EPC 1973.**

Composition of the Board:

Chairman: M. Ruggiu
Members: J.-M. Cannard
H. Preglau

Summary of Facts and Submissions

I. The proprietor appealed against the decision of the opposition division revoking European patent No. 1 026 810, which was filed as a divisional application of the earlier application 98 109 573.0. The reason given for the revocation was that both claim 1 of the main request filed with a letter dated 9 March 2005 and claim 1 of the auxiliary request filed during the oral proceedings before the opposition division did not involve an inventive step in the sense of Article 56 EPC.

II. The following documents considered during the proceedings before the opposition division remain relevant to the present appeal:

E1: JP-A-6-165422 with a translation into English and the corresponding abstract

E4: DE-A-40 31 276 (corresponding to WO92/06527 cited in the description of the patent in suit), and

SU7: SU-A-1377964 with a translation into English.

III. With a letter dated 30 November 2005, the appellant filed a statement of grounds of appeal and sets of claims according to a main request and six auxiliary requests. A copy of the statement of grounds of appeal was sent to the respondent opponent by a communication dated 8 December 2005 indicating that any reply had to "be filed within four months of this notification".

IV. With a fax received on 12 March 2007, the respondent asked that, following the restoration of the earlier

application, a time period be set within which he could file a response to the statement of grounds of appeal.

V. With a communication annexed to summons to attend oral proceedings, the Board informed the parties *inter alia* that it had "no power to grant the respondent the time period requested in the letter dated 12 March 2007, i.e. more than ten months after the expiration of the term of four months" stipulated in the Rules of procedure of the Boards of Appeal (RPBA) and that any further written submissions should be filed one month before the oral proceedings, drawing the attention of the parties to Articles 13(1) and (3) and 15(6) of the RPBA.

VI. Following the communication of the Board, the appellant proprietor filed letters dated 23 May 2008 and 6 June 2008, and the respondent opponent filed letters dated 19 May 2008, 23 May 2008 and 6 June 2008.

With its letter of 23 May 2008, the appellant filed sets of claims according to a main request and six auxiliary requests replacing the requests filed with the statement of grounds of appeal. With the letter of 6 June 2008, the appellant submitted that the respondent was misusing the proceedings, as the opponent's letter of 23 May 2008 included 36 pages in which the opponent started "for the first time to argue in relation to the pending appeal case" one month prior to the oral proceedings.

VII. In the oral proceedings held on 25 June 2008, procedural matters were discussed first. After hearing the parties in this respect, the Board announced that the main request of the proprietor filed with the letter of 23 May 2008 would be discussed first. The Board also

announced that, as there was no difference between claims 1 to 3 of this request and claims 1 to 3 of the main request filed with the statement of grounds of appeal, the respondent was restricted as regards its submissions concerning the main request to discuss the question of inventive step in view of documents E1, E4 and SU7 and the common general knowledge of the skilled person.

VIII. In the course of the oral proceedings, the appellant filed a new main request (current request) and deleted the six pending auxiliary requests. Claim 1 of the current request reads as follows:

"Stator (2) of an alternator (1) for a vehicle including a stator core (32) with a plurality of slots (35) and a multi-phase stator winding, wherein:

said multi-phase stator winding comprises a first winding (315) disposed in a circumference of said stator core (32) and a second winding (316) disposed along said first winding,

each of said plurality of slots (35) has a plurality of layers aligned in a radial direction, and

each of said first and second windings (315, 316) comprises a plurality of conductor members respectively disposed in said plurality of layers,

wherein the second winding (316) is disposed on the first winding (315) in the radial direction to form a series-connected winding, and

wherein each of said first and the second windings has a plurality of large-hair-pin like U-shaped conductor segments and small-hair-pin like U-shaped conductor segments connected with one another to form a first coil-end group disposed on one axial end of the stator core so that the small U-shaped conductor segments are surrounded by the large U-shaped conductor segments, and a second coil-end group disposed on the other axial end of the stator core so that ends of said U-shaped conductor segments are respectively connected to form a lap-wound coil for each pole, wherein the conductor members of the same conductor segments are disposed in slots which are one pole-pitch spaced apart from each other."

Claims 2 and 3 are dependent on claim 1.

IX. The appellant (patentee) requested that the decision under appeal be set aside and that the patent be maintained in the following version:

- description: pages 2, 3, 6, 7 and 8 as filed during the oral proceedings; pages 4 and 5 of the patent specification,

- claims: 1 to 3 as filed during the oral proceedings,

- drawings: figures 1 to 10 of the patent specification; figures 11 to 14 as filed during the oral proceedings.

X. The respondent (opponent) requested that the appeal be dismissed.

XI. The arguments of the appellant proprietor which are relevant to the assessment of inventive step of the current request can be summarized as follows:

The starting point for the assessment of inventive step was document E4 which disclosed a stator of an alternator for a vehicle in which four members of U-shaped conductor segments were disposed in each slot of the stator core so as to form a wave winding with a one pole-pitch. The stator specified in claim 1 of the current request differed from the stator disclosed in E4 because it comprised a second winding disposed on a first winding and large U-shaped conductor segments surrounding small U-shaped conductor segments on an axial end of the stator core, so as to form a lap-wound coil for each pole.

Document SU7 related to a stator for a high-voltage electric machine using bars, and not U-shaped segments as in E4, to form a lap winding having a minimum number of connectors. The bars of the stator of SU7 had such a shape that they could only be inserted in a radial direction of the slots of the stator core. These bars were connected to form large U-shaped conductor portions surrounding small U-shaped conductor portions on one end of the stator core. However, SU7 taught to use an irregular distance between the connected bars, so that the structure and the pole-pitch of the winding was irregular.

The combination of the teachings of E4 and SU7 would not result in a winding "wherein the conductor members of the same conductor segments are disposed in slots which are one pole-pitch spaced apart from each other", as

recited in claim 1, because the structure and the pitch of the winding of SU7 was irregular. An additional modification of the winding of SU7 to obtain a lap-wound coil with a one pole-pitch would only result from hindsight.

XII. The arguments of the respondent opponent which were submitted in the oral proceedings and are relevant to the assessment of inventive step of the current request can be summarized as follows:

Document E4 was the closest prior art. Starting from E4, the technical problem was to provide an appropriate winding that could be implemented by a reduced number of specific segments for a vehicle alternator as the alternator disclosed in E4. This was a problem of selecting an appropriate type of winding and not a question of segment technology. SU7 which belonged to the same technical field as E4 and disclosed a solution to this technical problem would be considered by the skilled person.

Document SU7 disclosed a stator comprising bars which were disposed in a radial direction of the stator slots and connected to form large U-shaped conductor segments surrounding small U-shaped conductor segments on one axial end of the stator core. As appeared from its claim 1, SU7 covered a lap winding having a one pole-pitch. Thus, the first winding set out in claim 1 was obvious in view of the combination of E4 and SU7. Moreover, as it was not common to use a winding having an irregular structure, as the winding shown in figure 4 of SU7, the skilled person would have considered modifying this

prior art winding to obtain a regular lap winding with a one pole-pitch.

Duplicating a winding to obtain a higher output voltage for an alternator was common practice in the relevant field. The easiest way to implement such a duplication was to dispose a second winding on a first winding in a radial direction of the slots of the stator core. Thus, the skilled person combining the teachings of E4 and SU7 with the common general knowledge in the field of alternators would obtain the stator specified in claim 1 of the current request without exercising an inventive step.

Reasons for the Decision

1. The appeal is admissible.

Procedural matters

2. Article 12 of the Rules of Procedure of the Boards of Appeal (RPBA) specifies the basis of Appeal proceedings. In particular, Article 12(1)(b) states that any written reply to the statement of grounds of appeal is "to be filed within four months of notification of the grounds of appeal" and Article 12(2) states that the "statement of grounds of appeal and the reply shall contain a party's complete case".

3. As appears from the history of the case, the opponent respondent did not file any reply within the four months from the notification of the statement setting out the grounds of appeal. Nor did he request within this four

months term an extension of the time period for filing a written reply (Article 12(5) RPBA). In a letter dated 23 May 2008, i.e. one month before the date set for the oral proceedings before the Board, the respondent, for the first time in the appeal proceedings, requested the revocation of the patent in suit, arguing that the patent amended in accordance with the main and auxiliary requests filed with the statement of grounds of appeal did not satisfy the requirements of the CBE. In particular, the letter referred for the first time to an application EP 1328 057 of Denso in connection with an objection of insufficiency of disclosure (Article 100(b) EPC), raised new objections under Rule 42 EPC (content of the description), Article 69 EPC and Article 84 EPC (clarity). Objections of extension (Article 100(c) EPC) and lack of inventive step (Article 100(a) EPC) were also raised, this letter referring for the first time to documents PCT/JP 97/3374, DE 37 04 780 and DE 34 41 825 and providing copies of a page 119 of a book C5 and a page of priority Japanese patent application Hei-9-309731. Accordingly, the respondent's reply to the statement of grounds of appeal was not filed in due time.

4. The RPBA does not explicitly consider the case of a respondent's reply to the statement of grounds of appeal which is not submitted in due time. However, Article 13(1) states that "Any amendment to a party's case after it has filed its grounds of appeal or reply may be admitted and considered at the Board's discretion. The discretion shall be exercised in view of inter alia the complexity of the new subject-matter submitted, the current state of the proceedings and the need for procedural economy" and Article 13(3) states that amendments "made after oral proceedings have been

arranged shall not be admitted if they raise issues which the Board or the other party cannot reasonably be expected to deal with without adjournment of the oral proceedings". The present Board is of the opinion that a complete case of a respondent which was not filed in due time should not be treated differently from an amendment to a party's case, particularly as to admissibility.

5. In the present case, the Board decided not to admit the whole respondent's reply to the statement of grounds of appeal, which had been filed one month before the oral proceedings before the Board without any justification, because that reply, except for considerations as to inventive step having regard to E4 and SU7, did not *prima facie* contain a highly relevant case and because the reply raised issues which the Board or the appellant could not reasonably be expected to deal with without adjournment of the oral proceedings.

5.1 The letter of 23 May 2008 referred for the first time to new evidence and raised new objections, in particular against the main request submitted with the statement of grounds of appeal which was identical to the main request considered in the decision under appeal. In this letter, issues were reopened that had been decided in the appealed decision and had not been disputed any longer by the opponent in the first instance oral proceedings, in particular the question of extension beyond the content of the application as filed or of the earlier application. Thus, one month before the date set for oral proceedings before the Board, the respondent's reply raised new and complex questions which cannot reasonably be expected to be dealt with without adjournment of the oral proceedings.

5.2 More than ten months after the expiration of the term of four months from the notification of the grounds of appeal, with a fax received on 12 March 2007, the respondent asked that, following the restoration of the earlier application of which the patent in suit is a divisional application, a time period be set within which he could file a response to the appeal. In a communication annexed to the summons to oral proceedings, the Board indicated *inter alia* that it had no power to grant another period of time for the filing of a party's reply when no reply was filed and no extension of the time limit was requested within the term of four months. In any case, in the view of the Board, the fact that an opposition to the patent based on an earlier application was still pending, is no proper justification for the late filing of the respondent's reply. Furthermore, the Board is of the opinion that it is a misuse of the appeal proceedings if a respondent files without justification its case for the first time one month before the date set for the oral proceedings.

6. Accordingly, the Board decided that in the present case, as far as the requests filed by the appellant in response to the communication of the Board did not differ from the requests filed with the statement of grounds of appeal, the respondent opponent should fundamentally be limited to defending the decision under appeal. In particular, the Board decided that the respondent should not be allowed to discuss the issues of sufficiency of disclosure and extension beyond the content of the application as filed or of the earlier application as filed, or to discuss other evidence than

those considered in the appealed decision, namely E1, E4 and SU7.

Current request - Admissibility and inventive step

7. Claim 1 of the current request is based on claim 1 of the main request considered in the appealed decision with the added restrictions to large and small U-shaped conductor segments which are formed as "hair-pin like U-shaped conductor segments" and with the additional feature "wherein the conductor members of the same conductors segments are disposed in slots which are one pole-pitch spaced apart from each other", as announced in the statement of grounds of appeal. Said hair-pin like conductor segments and said additional feature are disclosed in both the application as originally filed (see paragraphs [0002] and [0029] to [0031] and figures 3 to 6, 9 and 10 of the published application) and in the corresponding passages and figures of the earlier application. According to the appealed decision, claim 1 of the then main request satisfies the requirements of Articles 123(2) and 76 EPC. The description of the patent in suit has been brought into conformity with the amended set of claims, by specifying *inter alia* that the first embodiment described therein is not part of the invention and by deleting the third and fourth embodiments and the related figures of the drawings. The Board is satisfied that the amendments made to the claims, the description and drawings of the patent in suit satisfy the requirements of Article 84 EPC and do not contravene Article 76 or Article 123(2) or (3) EPC.

8. Document E4, whose corresponding PCT application WO92/06527 is acknowledged in the specification of the

patent in suit, forms the undisputed prior art to be treated as the starting point for the assessment of inventive step.

8.1 E4 (figures 1 to 3; column 3, line 9 to column 4, line 39) discloses a stator of an alternator for a vehicle which comprises the following features of claim 1 of the main request:

- a stator core 11 with a plurality of slots 12 and a multi-phase stator winding,

said multi-phase stator winding comprises a first winding U1 disposed in a circumference of said stator core 11 and a second winding U3 disposed along said first winding,

each of said plurality of slots 12 has a plurality (two) of layers aligned in a radial direction, and

each of said first and second windings U1, U3 comprises a plurality of conductor members 14c respectively disposed in said plurality of layers, and

wherein each of said first and the second windings has a plurality of hair-pin like U-shaped conductor segments 14 connected with one another to form a first coil-end group (figures 2 and 5) disposed on one axial end of the stator core 11 and a second coil-end group (figures 2 and 7) disposed on the other axial end of the stator core 11, so that ends 18 of said U-shaped conductor segments are respectively connected to form a coil, wherein the conductor members 14c of the same conductor segments are disposed in slots which are one pole-pitch

spaced apart from each other (column 3, line 45 to column 4, line 3).

8.2 However, the conductor members of the stator disclosed in E4 are disposed in the slots to form rows and columns (column 3, lines 34 to 38), the windings U1 and U3 are alternately disposed in an inner and an outer layers of the slots (column 3, lines 45 to 65) and their U-shaped conductor segments are disposed in parallel in the first coil-end group (figure 5), in such a way that one does not surround the other.

8.3 Thus, the stator according to claim 1 differs from the stator disclosed in E4 in that claim 1 specifies that:

a) the second winding is disposed on the first winding in the radial direction to form a series-connected winding,

b) the conductor segments form a first coil-end group disposed on one axial end of the stator core so that the small U-shaped conductor segments are surrounded by the large U-shaped conductor segments, and are connected on the other axial end of the core to form lap-wound coil for each pole.

9. The Board observes that, in the stator described in E4, five different specific conductor segments (19, 20 and 21) are necessary to connect the different annular windings of a four-turn phase winding together and with the terminals, while the stator specified in claim 1 of the patent in suit requires five different specific segments for an eight-turn phase winding.

10. Starting from E4 and having regard to the effects provided by the features of the claimed invention, the objective technical problem could be seen as providing a winding for the stator that has more turns than in E4 but still can be easily formed by a reduced number of different specific segments. This is in accordance with the technical problem specified in the application as filed (paragraphs [0019] and [0020] of the published application) and the corresponding passages of the patent specification.

11. In the Board's judgement, it has not been convincingly shown that the subject-matter of claim 1 of the current request does not involve an inventive step having regard to the cited prior art documents. None of these documents, and particularly not document E4 or SU7, discloses, or suggests, a winding wherein small U-shaped conductor segments, whose members are disposed in slots spaced apart one pole-pitch from each other, are surrounded by large U-shaped conductor segments, whose members are also disposed in slots spaced apart one pole-pitch from each other, said U-shaped conductor segments being connected to form a lap-wound coil for each pole.

11.1 SU7 discloses a stator winding for a high voltage alternating-current electrical machine. The winding comprises a plurality of bars (figure 2) which are aligned in slots (figure 3) and connected with one another so as to provide on one axial end of the stator core large U-shaped conductor portions which surround small U-shaped conductor portions, and so as to form lap windings (figures 1 and 4). According to the description of SU7 (translation into English, page 2, line 17 to

page 3, line 2) and figures 2 and 4, half-sections of wave winding are formed by bars 1 and 4 and half-sections of lap winding are formed by bars 2 and 3, such that a first U-shaped portion is formed by connecting a bar 1 lying in a first slot and a bar 4 lying in another slot and a second U-shaped portion surrounded by the first U-shaped portion is formed by connecting a bar 3 lying in the first slot and a bar 2 lying in another slot. However, it can be seen from the disposition of the bars in the slots in figure 4 that the distance between the bars connected to form the large and small U-shaped conductor portions is not constant. Accordingly, the sole embodiment of the winding disclosed in SU7 has an irregular structure and an irregular pitch.

11.2 Thus, the stator disclosed in SU7 does not comprise:

- a second winding disposed on a first winding to form a series-connected winding,

- a first winding having large-hair-pin like U-shaped conductor segments which surround small-hair-pin like U-shaped conductor segments on one axial end of the stator core, wherein the conductor members of the same conductor segments are disposed in slots which are one pole-pitch spaced apart from each other, as recited in claim 1 of the current request.

11.3 SU7 does not give any hint at replacing the only winding actually disclosed by a one pole-pitch winding. Nor can such a one pole-pitch winding be derived in an obvious way from the combination of the teaching of E4 and SU7. The skilled person starting from E4 could consider the teaching of SU7 in order to solve the objective

technical problem addressed by the invention. However, in doing so, the skilled person would consider the winding described in SU7 as a whole, because this winding as a whole precisely solves the problem addressed by the invention. Even if the wave winding disclosed in E4 is a one pole-pitch winding, devising an amendment to the wave/lap winding described in SU7, which is considered for replacing the winding of E4 because it could solve the problem of the invention, would constitute an additional step going beyond the mere combination of E4 and SU7. Such an additional step can only be envisaged with the benefit of hindsight. The other cited documents are less relevant and were not discussed in the oral proceedings.

12. As may be seen from the foregoing, the subject-matter of claim 1 of the current request is not obvious having regard to the prior art on file. The same considerations apply to the subject-matter of claims 2 and 3 which are dependent on claim 1.

13. In the Board's judgement, taking into account the amendments according to the current request, the patent in suit and the invention to which it relates satisfy the requirements of the Convention (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 department of first instance with the order to maintain the patent in the following version:

   - description: pages 2, 3, 6, 7 and 8 as filed during the oral proceedings before the board; pages 4 and 5 of the patent specification,

   - claims: 1 to 3 as filed during the oral proceedings before the board,

   - drawings: figures 1 to 10 of the patent specification; figures 11 to 14 as filed during the oral proceedings before the board.

The registrar: The Chairman:

D. Meyfarth M. Ruggiu