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**Datasheet for the decision
of 25 April 2008**

Case Number: T 0655/05 - 3.5.02

Application Number: 98117938.5

Publication Number: 0910155

IPC: H02K 19/22

Language of the proceedings: EN

Title of invention:
Alternator for vehicle

Patentee:
Denso Corporation

Opponent:
Valeo Equipements Electriques Moteur

Headword:
-

Relevant legal provisions:
EPC Art. 54, 56

Relevant legal provisions (EPC 1973):
-

Keyword:
"Public prior use - (not proved)"
"Novelty - Inventive step - (yes)"
"Late-filed submissions - (not admissible)"

Decisions cited:
-

Catchword:
See points 3.3 and 7 of the reasons



Case Number: T 0655/05 - 3.5.02

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

Appellant: Valeo Equipements Electriques Moteur
(Opponent) 2, rue André-Boulle
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F-94017 Creteil Cedex (FR)

Representative: -

Respondent: Denso Corporation
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Representative: Kuhnen & Wacker
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 24 March 2005
rejecting the opposition filed against European
patent No. 0910155 pursuant to Article 102(2)
EPC.

Composition of the Board:

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

Summary of Facts and Submissions

I. The opponent appealed against the decision of the opposition division rejecting the opposition filed against the European patent No. 0 910 155.

II. The following documents:

E1: photographs of an alternator A16R101,

E2: photographs of alternators A16R21T and A16R101,

E3: construction drawings 2079496 of a rotor and construction drawings 2079497 of a stator of an alternator A16R100,

P2: an excerpt from a catalogue "Paris-Rhone", 1975,

P3: an excerpt from an information bulletin "Paris-Rhone", April 1978, No. 31,

P4: a tarif price-list, PRE 822 01-08-82, "Paris-Rhone",

P5: a price-list "Paris-Rhone", Tarif No T 833, March 1983,

a declaration by Mr Figuière, dated 22 June 2005,

all filed for the first time with the statement of grounds of appeal, and

parts of an alleged prior use alternator A16R101 received at the EPO on 6 July 2005,

the priority application JP 26222997 of the patent in suit and its translation into English, filed in the course of the examination proceedings, and referred to for the first time in an appellant's letter dated 20 December 2007,

a declaration by Mr Figuière, dated 28 February 2008, filed with a letter of the appellant dated 29 February 2008, and

D2A: a report on a test performed on a vehicle alternator Bosch KC90A by the appellant in 1992, filed with the notice of opposition,

have been considered in the present appeal.

Documents US-A-5 543 676 and EP-A-0 917 278, filed during the oral proceedings before the opposition division, but not admitted by the division, have not been admitted by the Board.

Furthermore, the appellant filed for the first time the following documents in the course of the appeal and asked that they be taken into account:

E4: lists of data concerning a stator and a rotor A16R,

P1: an excerpt from an information bulletin "Paris-Rhone", October 1970, No. 2,

P6: an excerpt from an information bulletin "Paris-Rhone", first quarter 1984, No. 52,

P7 and P8: excerpts from documents "Valeo démarreurs Infos", No. 2 and 3,

EP-A-0 779 697,

EP-A-0 539 339,

a page 14 of EP-B1-881 756 with drawings 2 and 3, and three pages of a catalogue "Paris-Rhone", filed with the letter of 20 December 2007,

an excerpt from a catalogue "Valeo 93/94", filed with the letter of 29 February 2008, and

a construction drawing 2056666 of a stator, filed with a letter of 12 March 2008.

- III. With a letter dated 25 March 2008, the proprietor requested that the patent be maintained as granted (main request) and filed new claims in respect of an auxiliary request.
- IV. Oral proceedings were held on 25 April 2008.
- V. Claim 1 of the patent in suit as granted, maintained on appeal as main request, reads as follows:

"An alternator (1) for a vehicle, comprising:

a field rotor (3) including a Lundel-type iron core (7) and a field coil (8) provided on the Lundel-type iron core (7), the Lundel-type iron core having a cylindrical portion (71), a yoke portion (72), and a claw-like magnetic pole portion (73), the field coil (8) being

provided on the cylindrical portion (71), the yoke portion (72) extending from the cylindrical portion in a radially outward direction, the claw-like magnetic pole portion (73) being connected to the yoke portion (72) and being formed so as to surround the field coil (8); and

a stator (2) located radially outward of the claw-like magnetic pole portion (73) and opposed to the claw-like magnetic pole portion (73), the stator (2) including a multiple-layer iron core (32) and an armature coil (33) provided on the multiple-layer iron core (32);

wherein a ratio $L1/L2$ of an axial-direction length $L1$ of the multiple-layer iron core of the stator (2) to an axial-direction length $L2$ of the Lundel-type iron core (7) is in a range of 0.7 to 1.0."

Claims 2 to 4 are dependent on claim 1.

VI. The arguments of the appellant opponent can be summarized as follows:

The second-hand "Paris Rhone" alternator A16R101 which was sent to the EPO came from the Angers subsidiary of Valeo which bought used alternators and reconditioned their carcasses. This alternator comprised a rotor and a stator which were identical to the rotor and the stator shown on the construction drawings of document E3. The cores of said rotor and said stator had respective axial lengths of 73mm and 72mm, as appeared from E3 and from measurements made by the appellant. According to a declaration by Mr Figuière dated 22 June 2005, the lengths of the stator and rotor shown on the drawings of

E3 had not been modified since 1992. From the fact that, as shown in documents P6 and P7, production had been transferred from Lyon to L'Isle d'Abeau, it resulted that the second-hand alternator sent to the EPO had been manufactured before 1989, as it carried a plate referring to the Lyon production site. Moreover, a catalogue P2 and an information bulletin P3 from "Paris-Rhone" as well as price-lists "Paris-Rhone" P4 and P5 proved that rotors and stators of alternators A16R101 and A16R100 were made available to the public before the priority date of the patent in suit. The public prior use of an alternator A16R101 was confirmed by a declaration by Mr Figuière dated 28 February 2008.

In the course of the oral proceedings, the appellant explained that before 1992 the axial length of the stator core was 72,8mm, the front and rear sides of the stator being machined, and that after 1992 a layer of the multiple-layer iron core of the stator was suppressed so that the axial length of the stator was 72mm. The mechanical and electrical characteristics of the alternator were however not changed. The second-hand alternator sent to the EPO was reconditioned in 1995 as appeared on a plastic cap of the alternator. Possibly, it comprised pieces coming from different used alternators. The characteristics of the reconditioned alternators were in conformity with the features shown on the construction drawings of E3. The alternators A16R101 which were made accessible to the public before the priority date of the patent in suit had a ratio L1 to L2 falling in the claimed range. The subject-matter of claim 1 of the patent in suit lacked novelty.

The range for the ratio $L1/L2$ specified in claim 1 was not novel because it did not satisfy the criteria which were developed in the case law of the boards of appeal for the novelty of selection inventions from a broader range. The skilled person knew that the power output of an alternator could not be increased when $L1$ was greater than $L2$ and the ratio $L1/L2$ should be comprised in a range from zero to one. Document D2A proved that a public prior use alternator Bosch KC90A had a ratio $L1/L2$ of 0.676. The claimed sub-range was not novel because it was neither narrow in comparison to the known broader range, nor sufficiently far removed from the ratio disclosed in D2A.

The subject-matter of claim 1 of the patent in suit was not novel having regard to document US-A-5 543 676 whose figure 1 showed an alternator in which the axial lengths of the stator core and the rotor core were equal. This appeared also from paragraph [0008] of document EP-A-0 917 278 according to which a Japanese application 8-308190 corresponding to US-A-5 543 676 disclosed an alternator in which the heights of a coil end group and a cooling fan opposed to each other were approximately equal in an axial direction.

Following decision T 1110/03 (OJ 2005, 302), the comments in paragraph [0007] of the priority document JP26222997 of the patent in suit might be considered as being part of the common general knowledge of the skilled person. The subject-matter of claim 1 was not novel because said comments explained that the axial length of the stator of an alternator could be increased without changing the dimensions of the rotor so as to reduce the magnetic resistance of the stator.

The alleged advantages of the present invention lacked the adequate support required in the established case law of the boards of appeal. Neither the reasons for selecting the claimed ratio L1/L2 given in paragraphs [0045] to [0048] of the patent in suit, nor the experimental conditions which resulted in the schematic curves of figures 4 and 5, were sufficiently disclosed to demonstrate the advantages of the invention.

VII. The arguments of the respondent proprietor can be summarized as follows:

The material not admitted by the opposition division and the new material filed for the first time in the course of the proceedings before the Board had been filed a long time after the end of the opposition deadline and should not be introduced into the proceedings.

There was no evidence that the construction drawings filed with the document E3 had not been replaced by later drawings with amended axial stator lengths and axial rotor lengths. Any declaration of an employee of the appellant could not remedy this deficiency because an employee could not be expected to have a clear remembrance of all details of the drawings after three decades. Photographs of documents E1 and E2 did not prove that an alternator A16R101 had been made available to the public. Since the alternator A16R101 sent to the EPO could comprise parts coming from various second-hand alternators, it could not be considered as an example of a public prior use alternator. Since it appeared from E3 that the axial length of the stator has been modified in 1992, the dimensions of the alleged prior use alternator

were not clear. The documents P1 to P6 did not disclose the axial lengths of the stator and the rotor of an alternator A16R101. The reference numbers of the stators and rotors mentioned in these documents were different from the reference numbers of the stators and rotors shown in E3. The documents P1 to P6 could neither serve for closing the chain of evidence, nor prove a lack of novelty of the alternator according to claim 1.

US-A-5 543 676 had been filed a long time after the opposition deadline and should not be considered in the proceedings. A ratio of the axial stator length to the axial rotor length could not be derived from a schematic drawing in that US patent. This ratio was not at all discussed in the description of the US patent. The skilled person would not find any useful technical teaching in US-A-5 543 676 for solving the problem underlying the subject-matter of the opposed patent.

The claimed range for the ratio L1 to L2 was not a sub-range singled out of a broader range because a range of ratio from 0 to 1 was not disclosed in the prior art. D2A did not disclose a ratio of an axial length of a stator to an axial length of a rotor of an alternator. Paragraph [0017] of the opposed patent in alignment with lines 11 to 21 of page 7 of the originally filed application gave a clear technical teaching and showed the advantages provided by the invention and by the claimed range. The claimed range was novel.

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

IX. The respondent (patentee) requested that the appeal be dismissed (main request) or in the alternative to set aside the decision under appeal and to maintain the patent in amended form on the basis of the set of claims filed with the letter dated 25 March 2008 (auxiliary request).

Reasons for the Decision

1. The appeal is admissible.

Alleged public prior use of alternators A16R101 and A16R100

2. According to the appellant, the parts of an alternator, and more specifically a stator and a rotor, which were received at the EPO on 6 July 2005 and are shown on the photographs of documents E1 and E2, filed for the first time with the statement of grounds of appeal, are pieces of a second-hand alternator A16R101 "Paris-Rhone" which was manufactured before 1989, thus before the priority date of the patent in suit (statement of grounds of appeal, points 2, 3 and 12; declaration by Mr Figuière dated 28 February 2008 and filed with the letter of 29 February 2008). After inspection of the alternator during the oral proceedings, the respondent admitted that the pressing plates on the front and rear sides of the stator are not made of a magnetic material and thus are not part of the stator iron core. Measurements made by the appellant during the oral proceedings showed that the iron cores of the stator and rotor of the alternator have respective axial-direction lengths of substantially 72mm and 73mm, as stated in the statement of grounds of appeal. The alleged prior use alternator A16R101

received at the EPO seems prima facie to be highly relevant and hence is admitted into the proceedings.

3. However, the Board judges that the alternator A16R101 received at the EPO is not part of the state of the art within the meaning of Article 54 EPC.

3.1 According to the statement of grounds of appeal (point 4), the stator and the rotor of the alternator received at the EPO correspond to the stator and the rotor of an alternator A16R100 shown on the construction drawings of document E3 and having the respective reference numbers 2079497 and 2079496 (taking account of the undisputed fact that an alternator A16R101 differs from an alternator A16R100 only in that it comprises a pulley). All the modifications made to the stator and the rotor of alternators A16R100 were indicated on the drawings of E3 and referred to by letters ("indice"); the stator 79497 and the rotor 79496 shown in E3 were thus modified for the last time respectively on 22 June 1992 ("indice L") and on 17 July 1988 ("indice N") (see the declaration by Mr Figuière dated 22 June 2005).

3.2 It appears from the construction drawing of the stator 2079497 that the axial length of the stator core, which originally was $72.8 \pm 0.4\text{mm}$, was changed to $72 \pm 0.4\text{mm}$ from 22 June 1992 (modification indicated by the "indice L" in the construction drawing 2079497 of E3). Therefore, it is not clear why the alternator A16R101 received at the EPO, which allegedly was manufactured before 1989, comprises a stator with an axial length of 72mm as the stators manufactured after 22 June 1992 and not a stator with an axial length of 72.8mm as the stators manufactured before this date.

3.3 According to the statement of grounds of appeal (point 2), the alternator A16R101 received at the EPO comes from the Angers subsidiary of Valeo which buys carcasses of used alternators and reconditions these alternators. Moreover, the appellant explained that the front and rear faces of the stator manufactured before 1992 were machined to avoid a problem with the last sheet of the multi-layer iron core and that a sheet of said core with a thickness of 0.8mm was removed after 1992. The appellant also stated that the alternator received at the EPO was reconditioned in the Angers subsidiary in 1995 and could comprise parts coming from various prior used alternators, and possibly a stator manufactured after 22 June 1992. However, the appellant could not convincingly explain why the second-hand alternator A16R101 received at the EPO, if it had been produced before 1989 as alleged, comprises a stator core with an axial length of 72mm which does not correspond to the axial length shown in its construction drawing, or prove beyond any reasonable doubt that this alternator, if it comprises a stator manufactured or modified after 22 June 1992, was a reconditioned alternator made available to the public. In such a case where practically all the evidence in support of an alleged public prior use lay within the power and knowledge of the opponent, the alleged prior use must be, according to the established case law of the boards of appeal, proved up to the hilt. The Board judges that this condition is not met in the present case. Accordingly, the alternator A16R101 received at the EPO is not considered to be part of the state of the art within the meaning of Article 54 EPC.

4. Documents P2 (a catalogue "Paris-Rhone" dated 1975) and P3 (an information bulletin "Paris-Rhone" dated April 1978) mention vehicles which could be equipped with alternators of the types A16R100 and A16R101, and specify that rotors with a reference number 79.496C and stators with a reference number 79.497D are spare parts for these alternators (see for instance P2: pages C12, C13 and C53). Documents P4 dated 1982 and P5 dated 1983 are price-lists "Paris-Rhone" of spare parts which indicate that stators and rotors for alternators A16R47T have the respective reference numbers 079487-D and 079496-C. Documents P2 to P5 do not disclose any dimensions of alternators. There is moreover no evidence or proof that the stators and rotors specified in the documents P2 to P5 have the axial lengths of the stator and the rotor shown in the drawings of E3 which have other reference numbers, i.e. 2079497 and 2979496. The documents P2 to P5 thus cannot prove beyond any reasonable doubt that prior use alternators A16R101 and A16R100 having a ratio L1 to L2 falling in the range specified in claim 1 have been made available to the public.

Novelty and inventive step of the claimed range of 0.7 to 1.0 having regard to the general knowledge of the skilled person

5. The Board judges that the appellant has not convincingly demonstrated that the claimed range for the ratio L1/L2 of the axial length of the stator to the axial length of the rotor results from an arbitrary selection of a sub-range from a known broader range.
 - 5.1 The appellant has not provided any document in support of its opinion that a range extending from zero to 1.0

for the ratio $L1/L2$ was known from the prior art. Increasing the magnetic flux of an alternator may well be a constant concern for the skilled person in the relevant field and it may be part of the common general knowledge of the skilled person that the power output of an alternator could not be increased when $L1$ is greater than $L2$. However, various parameters of the magnetic circuit of an alternator can influence the magnetic flux and it is not unambiguously and directly derivable from said considerations that the ratio $L1/L2$ was considered in the prior art as a design criterion for alternators and that said ratio should be chosen in a range from zero to one. Therefore, the claimed range for the ratio $L1/L2$ cannot be considered as a sub-range selected from a known broader range.

5.2 Document D2A is a report on a test performed by the appellant on a vehicle alternator Bosch KC90A, which was purchased and analysed in the year 1992. This report mentions measured values of various dimensions of the alternator, for instance the measured axial length of the stator. However, it does not contain any measured value of the axial length of the rotor core. Nor does it specify a ratio $L1/L2$ of the axial lengths of the stator and the rotor. The nominal values and the manufacturing tolerances specified by the manufacturer of the alternator Bosch KC90A and the actual measuring errors affecting the measurements given in D2A are unknown. Thus, a ratio $L1/L2$ is not directly and unambiguously derivable from the measured values reported in D2A. Nor can said measured values prove that the claimed sub-range is not sufficiently far removed from a ratio $L1/L2$ which might be disclosed by another alternator Bosch KC90A made available to the public.

5.3 As explained in paragraphs [0017], and [0045] to [0047] of the description of the patent in suit with reference to figures 4 and 5, and more specifically in lines 8 to 13 of column 9, "the coil ends (the bridge portions) of the armature coil 33 can be separated from base portions of the claw-like magnetic pole portions 73 of the pole cores 7. Thus, alternating magnetic flux generated from the coil ends is prevented from passing through the pole cores 7 and hence an eddy current loss is suppressed." Thus, the temperature of the pole cores 7 is relatively low and the field coil 8 is efficiently cooled, as confirmed by figure 4, which shows the ratio of a field current between a hot condition and a cold condition, and figure 5, which shows that a greater alternator power output per unit of weight is obtained in a range extending from 0.7 to 1.0. Thus, an alternator with the range specified in claim 1 provides advantages over the prior art alternators. The claimed range is not a sub-range arbitrarily chosen from a prior art broader range. Hence, each of the criteria which, according to the established case law of the boards of appeal, should be met for establishing the novelty of a sub-range, is satisfied in the present case.

6. In view of the technical explanations given in paragraphs [0017], and [0045] to [0047] of the patent in suit, the Board cannot share the appellant's arguments according to which the advantages provided by the invention and the formulation of a technical problem based on said advantages have no adequate support in the description of the patent. Accordingly, the selection of the claimed range would not be obvious to the skilled person.

Admissibility of documents US-A-5 543 676 and EP-A-0 917 278

7. Patent documents US-A-5 543 676 and EP-A-0 917 278 were not admitted into the opposition proceedings because they were late filed during the oral proceedings and not relevant "prima facie". In the view of the Board, the division applied its discretion reasonably. These documents are not admitted into the proceedings because they were late filed and are not highly relevant:

7.1 Figure 1 of US-A-5 543 676 shows a rotor 10 and a portion of a stator 12 of an alternator which, according to the appellant, have approximately the same axial-direction lengths. However, such a consideration is solely based on the diagrammatic representation of figure 1 and is not supported by any technical teaching derivable from the description of the US patent which is essentially concerned with the inclusion of magnetic inserts 30 in the rotor of the alternator for improving the power output.

7.2 Paragraph [0008] of EP-A-0 917 278 (which was filed after the filing date of the patent in suit) merely mentions that a Japanese patent application 8-308190 corresponding to US-A-5 543 676 discloses an alternator in which "the height of a coil end group and the height of a cooling fan are approximately equal in an axial direction, and the coil end group and the cooling fan are opposed to each other". It cannot be directly and unambiguously concluded from paragraph [0008] of EP-A-0 917 278 that the axial-direction lengths of the stator core and the rotor core of the alternator are equal.

Common general knowledge derivable from JP26222997

8. According to its translation into English, paragraph [0007] of document JP26222997, from which the patent in suit claims priority, explains with reference to figure 3 that to reduce the magnetic resistances of the air gap and the stator iron core of an alternator, the axial-direction length of the stator may be set greater than the axial length of the cylindrical part of the rotor while the size relation of the rotor remains as it is. This does not demonstrate that, at the priority date of the patent in suit, it was public common general knowledge to choose a ratio $L1/L2$ of the axial-direction length of a stator core to the axial-direction length of a rotor core falling in the claimed range.
9. The Board has had a brief look at the other documents late filed by the appellant and has not detected therein any prima facie highly relevant matter.
10. Accordingly, the arguments of the opponent appellant have not convinced the Board that the subject-matter of claim 1 of the patent in suit lacked novelty, or was obvious to the person skilled in the art, at the priority date of the patent. Therefore, in the Board's judgment, the subject-matter of claim 1 of the patent in suit is considered to be new (Article 54(2) EPC) and to involve an inventive step within the meaning of Article 56 EPC.
11. The grounds for opposition mentioned in Article 100 EPC therefore do not prejudice the maintenance of the patent unamended.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

U. Bultmann

M. Ruggiu