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Datasheet for the decision of 26 October 2021

Case Number: T 2719/17 - 3.5.02

Application Number: 01109390.3

Publication Number: 1211781

IPC: H02K3/28

Language of the proceedings: EN

Title of invention:
Automotive alternator

Patent Proprietor:
Mitsubishi Denki Kabushiki Kaisha

Opponent:
Valeo Equipements Electriques Moteur

Relevant legal provisions:
EPC Art. 54, 56, 123(2)

Keyword:
Novelty - main request (no)
Inventive step - auxiliary requests 1 to 4 (no)
Amendments - auxiliary request 5 - intermediate generalisation

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Case Number: T 2719/17 - 3.5.02

D E C I S I O N
of Technical Board of Appeal 3.5.02
of 26 October 2021

Appellant: (Patent Proprietor)	Mitsubishi Denki Kabushiki Kaisha 7-3, Marunouchi 2-chome Chiyoda-ku Tokyo 100-8310 (JP)
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Representative:	Valeo Powertrain Systems Service Propriété Intellectuelle 14, avenue des Béguines FR-95800 Cergy St Christophe (FR)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 10 October 2017 revoking European patent No. 1211781 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman	R. Lord
Members:	G. Flyng
	W. Ungler

Summary of Facts and Submissions

I. The appeal is against the opposition division's decision with which the European patent number EP 1 211 781 was revoked. The patent proprietor is the appellant and the opponent is the respondent.

II. The following document references are used in this decision:

A2: US 5 122 705

A3: US 5 881 778

III. In the contested decision the opposition division held that claim 1 of the patent as granted lacked novelty within the meaning of Article 54 EPC over document A2. They held that since claim 1 was directed to a product, the feature "a winding sub-portion constructed by simultaneously winding a plurality of strands" had to be construed as the resulting product of that process step. They noted that it was not claimed that the strands are wound simultaneously and close together, but only that they are wound simultaneously. Therefore they could also be wound simultaneously separated from each other. In such a case there was no difference in the finished winding whether the strands were wound simultaneously or not.

The opposition division held furthermore that none of the eight auxiliary requests on file at the time met the requirements of the convention, mostly because they created intermediate generalisations by omitting essential features, thus contravening Article 123(2) EPC.

IV. With the statement setting out the grounds of appeal the appellant filed claim sets designated as 1st to 5th auxiliary requests.

V. The Board summoned the parties to oral proceedings, setting out their preliminary observations in a communication pursuant to Article 15(1) RPBA.

VI. With a letter dated 22 September 2021 the appellant filed claim sets designated as "2nd a auxiliary request" and "4th a auxiliary request".

VII. Oral proceedings were held on 26 October 2021.

The appellant (patent proprietor) requested that the decision under appeal be set aside and the patent be maintained as granted (main request), or if that was not possible that the patent be maintained in amended form on the basis of one of the 1st to 5th auxiliary requests filed with the statement of grounds of appeal or on the basis of either of the auxiliary requests designated as "2nd a" and "4th a" filed with letter dated 22nd September 2021. These last two requests were ranked after the 2nd and 4th auxiliary requests respectively.

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

VIII. The patent as granted (**main request**) comprises a single independent apparatus claim 1 and dependent claims 2 to 6.

Claim 1 of the patent as granted reads as follows:

"1. An automotive alternator comprising:

a rotor (7) rotatably supported in a bracket (1, 2); and

a stator (8) provided with a cylindrical stator core (15) in which a plurality of slots (15a) extending axially are formed circumferentially and a stator winding (16) installed in said stator core, said stator being supported in said bracket so as to surround an outer circumference of said rotor,

wherein said slots (15a) are formed in said stator core (15) at a ratio of two per phase per pole,

wherein said stator winding (16) is provided with two three-phase alternating-current windings (160), each of said three-phase alternating-current windings being constructed by forming three single-phase winding portions (30, 30A, 30B, 47) installed in said slots into an alternating-current connection, and

wherein each of said single-phase winding portions (30, 30A, 30B, 47) is constructed by installing a conductor wire (32) such that winds of said conductor wire extending outwards from first and second ends of said slots (15a), are divided onto first and second circumferential sides, and enter slots (15a) on said first and second circumferential sides,

characterized in that at least one of said single-phase winding portions is provided with a winding sub-portion (41) constructed by simultaneously winding a plurality of strands of said conductor wire (32)."

As was the case in the application as filed, dependent claims 2 and 3 of the patent as granted are each dependent only on claim 1.

Dependent **claim 2** of the patent as granted specifies the following additional features:

"at least one of said single-phase winding portions (30, 30A) is provided with a plurality of wave windings (31A, 31B) formed by winding said conductor wire (32) for a predetermined number of winds into a wave-shaped pattern composed of slot-housed portions (31a) disposed at a pitch of six slots in a circumferential direction and crossover portions (31b) linking together end portions of adjacent pairs of said slot-housed portions (31a) alternately relative to an axial direction,

said plurality of wave windings (31A, 31B) being offset by six slots from each other in a circumferential direction and installed in said slots such that said crossover portions (31b) face each other axially".

Dependent **claim 3** of the patent as granted specifies the following additional features:

"at least one of said single-phase winding portions (30B) is provided with a divided wave winding (35), said divided wave winding (35) comprising:

a first winding sub-portion (36) formed by winding said conductor wire (32) for a predetermined number of winds into a first wave-shaped pattern composed of first slot-housed portions (36a) disposed at a pitch of six slots in a circumferential direction and first crossover portions (36b) linking together end portions of adjacent pairs of said first slot-

housed portions (36a) alternately relative to an axial direction: and
a second winding sub-portion (37) formed by continuing to wind said conductor wire (32) from a winding finish end of said first winding sub-portion (36) for a predetermined number of winds into a second wave-shaped pattern composed of second slot-housed portions (37a) disposed at a pitch of six slots in a circumferential direction and second crossover portions (37b) linking together end portions of adjacent pairs of said second slot-housed portions (37a) alternately relative to an axial direction,
wherein said first winding sub-portion (36) and said second winding sub-portion (37) are stacked such that said first slot-housed portions (36a) and said second slot-housed portions (37a) face each other, and said first crossover portions (36b) and said second crossover portions (37b) face each other axially".

IX. Claim 1 of the **1st auxiliary request** is based on claim 1 as granted but differs in that the following feature has been added to the end of the claim (cf. paragraph [0082] of the application as published, EP 1 211 781 A1):

" such that winding start ends (32a) of the plurality of strands of said conductor wire (32) are led out of the same slot (15a) and winding finish ends (32b) of the plurality of strands of said conductor wire (32) are led out of the same slot (15a)".

X. Claim 1 of the **2nd auxiliary request is based on** claim 1 of the 1st auxiliary request but differs in that the features of dependent claim 3 as granted (see above) have been inserted after the phrase "characterised in that" and further in that the following features have been added to the end of claim 1 (cf. paragraph [0080] of the application as published):

", wherein the winding start ends (32a) and the winding finish ends (32b) of the divided wave winding are connected so as to connect the plurality of strands of the conductor wire in series".

XI. In the **"2nd a" auxiliary request**, claim 1 is identical to that of the 2nd auxiliary request, but dependent claim 2 has been deleted and the remaining dependent claims renumbered.

XII. Claim 1 of the **3rd auxiliary request** is based on claim 1 of the 1st auxiliary request but differs in that the feature "simultaneously winding a plurality of strands" has been amended to read "simultaneously winding two strands".

XIII. Claim 1 of the **4th auxiliary request** is based on claim 1 of the 2nd auxiliary request but differs by the same amendment as that made in the 3rd auxiliary request.

XIV. In the **"4th a" auxiliary request**, claim 1 is identical to that of the 4th auxiliary request, but dependent claim 2 has been deleted and the remaining claims renumbered.

XV. In the **5th auxiliary request** all of the claims have been re-cast as method claims. Claim 1 has been amended compared to claim 1 as granted by replacing the phrase "An automotive alternator" by "A method of providing an automotive alternator" and also by amending the characterising feature as set out below (cf. paragraph [0079] of the application as published):

"characterized ~~in that~~ by providing at least one of said single-phase winding portions ~~is provided with~~ by constructing a winding sub-portion (41) ~~constructed~~ by simultaneously winding ~~a plurality of~~ two strands of said conductor wire (32),

wherein at least one of said single-phase winding portions is prepared by preparing a first annular winding unit (40a) by simultaneously winding two strands of the conductor wire (32), preparing a second annular winding unit (40b) by continuing to wind the two strands of the conductor wire (32) for a predetermined number of winds,

preparing a first type (41A) and second type (41B) star winding units composed of two strands of the conductor wire (32) by forming the first (40a) and second (40b) annular winding units into star shapes in which adjacent pairs of the star-winding slot housed portions (41a) are alternately linked on an inner circumferential side and an outer circumferential side by star winding cross-over portions (41b), folding over the first type (41A) and the second type (41B) star winding units at a portion of the conductor wires (32) linking the first type (41A) and the second type (41B) star winding units and stacking them on top of each other such that the star-winding slot housed portions (41a) overlap and the star-winding crossover portions (41b) face each other radially."

XVI. Insofar as they are relevant to the decision, the parties' submissions may be summarised as follows:

Main request

The appellant submitted that document A2 did not disclose the feature of the characterising part of claim 1, arguing that when a winding sub-portion was obtained by simultaneously winding a plurality of strands of conductor wire, this meant that the plurality of strands were taken together in close proximity and wound simultaneously. The appellant submitted that a winding sub-portion constructed by simultaneously winding a plurality of strands as claimed would have winding start ends 32a comprising a plurality of strands and winding finish ends 32b comprising a plurality of strands. Furthermore, the appellant submitted that as described in paragraph [0081] of the granted patent in the specific embodiment in which two strands were wound simultaneously, the winding start ends 32a and the winding finish ends 32b of the two strands of the conductor wire would be led out of the same slots, thereby facilitating the connection process. This interpretation of the feature "simultaneously winding" was the only interpretation supported by the description, as was evident from paragraph [0078] of the granted patent together with figure 13. Furthermore, this interpretation was in accordance with the common meaning of the term "strand" to mean a single thin length of a thread fibre, hair or wire and in accordance thereto the feature "a plurality of strands" clearly implied strands that were distinct to each other as opposed to different parts of a single strand.

The respondent submitted that the wording of claim 1 as granted did not require or imply that the simultaneously wound strands be taken together in close proximity, nor that the winding start ends and the winding finish ends of the two strands be led out of the same slots. The characterising feature merely required the claimed "winding sub-portion" to have been constructed by winding more than one strand simultaneously, i.e. at the same time.

In the oral proceedings the respondent also presented new arguments based on claims 4 and 5 and Figure 10 of document A2. The appellant submitted that these should not be admitted into the proceedings.

1st Auxiliary Request

The respondent submitted *inter alia* that starting from the prior art disclosed in document A2, the subject-matter of claim 1 of the 1st auxiliary request was obvious in view of document A3.

According to the respondent, document A3 disclosed a process of making a phase coil of an alternator by simultaneously winding two wires W together. The embodiment of figures 10 to 12 used a delivery tube 2 which fed-out two separate wires W, see column 9, lines 13 to 23. There were therefore necessarily two ends at the start of winding and two ends at the end of winding. It was clear, in particular from the two winding stars shown in Figure 7 of A3, that a distributed wave winding phase made by simultaneously winding two wires was known in the art, and that the start ends of the two wires would emerge from a first slot and that the finish ends of the two wires would emerge from a last slot. The effect of simultaneously

feeding two wires was clear to the skilled person - it reduced the number of winding turns that needed to be performed. It would be obvious to use this technique in the alternator of document A2 to achieve this effect. According to the respondent there was nothing special about the number of poles and slots that would deter the skilled person from combining A2 and A3.

The appellant submitted that document A3 related to a stator having one slot per phase per pole, whereas the claim 1 of the patent and of the 1st auxiliary request related to a stator core with two slots per phase per pole. Thus, the arrangement of claim 1 had twice the number of slots as A3. This increase in the number of slots would increase the complexity and work time in a way that would be inconceivable in conventional operations in which a conductor wire was mounted into slots of a stator core with one slot per phase per pole. Furthermore, document A2 concerned a six-phase, 72-slot alternator and discussed the disadvantages of three-phase, 36-slot alternators. This would dissuade the skilled person from considering document A3, which concerned a three-phase alternator. Furthermore, the skilled person would not combine A2 and A3 because A2 was concerned with the alternator itself, whereas A3 focused on a machine for making the alternator windings. Column 9 of A3 disclosed winding 2 wires simultaneously but did not disclose using them to create a single winding portion. Furthermore, figure 11 depicted two wires between the delivery tube 2 and the engaging element 14, but only one wire after the engaging element 14.

2nd Auxiliary Request

The respondent submitted *inter alia* that the subject-matter of claim 1 of the 2nd auxiliary request was obvious in view of a combination of documents A2 and A3. According to the respondent, document A3 disclosed a divided wave winding having all of the features of granted claim 3 that had been added to claim 1, with the sole exception that the slot-housed portions of the wave winding were not disposed at a pitch of six slots in the circumferential direction. This was because A3 disclosed a three phase winding, not a double three phase winding as disclosed in document A2. According to the respondent the skilled person wishing to provide the double three phase winding of A2 would know that the number of slots would have to be double that in A3 and would adapt the winding machine to provide slot-housed portions of the wave winding at the required pitch of six slots. The respondent argued further that figure 9 of A3 showed the winding in its completed state installed on the stator core and showed the slot-housed portions extending axially with crossover portions at the axial ends.

The appellant argued that in document A3 the slot-housed portions of the wave winding were not disposed at a pitch of six slots in the circumferential direction. Figure 9 showed the next slot-housed portion of each winding going into the next slot circumferentially. Furthermore, according to claim 1 the slot-housed portions extended in the axial direction and the crossover portions were at the axial ends, cf. figure 11 of the patent. By contrast figure 8 of A3 showed the stacked coils being flat, with radially extending portions, not axially extending portions. As with the 1st auxiliary request it was

argued that it was not obvious to go from the six phase arrangement of A2 to the three phase arrangement of A3.

"2nd a", 3rd, 4th and "4th a" Auxiliary Requests - Inventive Step, Article 56 EPC

The appellant did not submit any arguments in respect of inventive step for the above requests in addition to those submitted for the auxiliary requests 1 and 2 requests.

The respondent argued a lack of inventive step for claim 1 of all of these requests, as the technique of simultaneously winding two separate strands together to form a coil was known from document A3.

5th Auxiliary Request - Amendments, Article 123(2) EPC

The appellant explained that the 5th auxiliary request had been filed in an attempt to deal with the objections set out in section 3.1.3 of the contested decision, in which it was held that the then auxiliary request I, which was directed to a method of providing an automotive alternator, did not meet the requirements of Article 123(2) EPC.

The appellant referred to the description of embodiment 5 in the paragraph spanning description pages 28 and 29 as originally-filed, corresponding to paragraph [0079] of the application as published, EP 1 211 781 A1.

The appellant submitted that embodiment 5 described how the divided wave winding of embodiment 4 was provided by winding two strands simultaneously. Whilst claim 1 did not refer explicitly to a "divided wave winding", the structure of a divided wave winding was defined by

the features in the preamble that "each of said single-phase winding portions (30, 30A, 30B, 47) is constructed by installing a conductor wire (32) such that winds of said conductor wire extending outwards from first and second ends of said slots (15a), are divided onto first and second circumferential sides, and enter slots (15a) on said first and second circumferential sides".

Furthermore, the characterising features referred to "preparing a second annular winding unit (40b) by continuing to wind the two strands of the conductor wire (32) for a predetermined number of winds" and "folding over the first type (41A) and the second type (41B) star winding units at a portion of the conductor wires (32) linking *[them]*". According to the appellant, these were features characteristic of a divided wave winding.

The appellant argued that the features in paragraph [0079] of the published application regarding the insertion of the stacked star winding units into the stator core and the features in paragraph [0080] regarding the connection of the two strands were not inextricably linked to the process of forming the stacked star winding units. The characterising portion of the claim was only concerned with the process of forming the stacked star winding units and so it was permissible to separate this from the other features described.

The respondent submitted that claim 1 of the 5th auxiliary request contravened Article 123(2) EPC as the amendments introduced only a part of the method that was disclosed in connection with embodiment 5 in the

application as filed, thereby creating an undisclosed intermediate generalisation.

The respondent pointed out that according to paragraph [0077] of the published version of the application as filed, in embodiment 5 a single-phase winding portion was constituted by one divided wave winding 41 formed by simultaneously winding two strands of the conductor wire 32 for a predetermined number of winds. By contrast, claim 1 of the 5th auxiliary request did not mention that the single-phase winding portion was constituted by one divided wave winding.

The respondent also pointed out that not all of the steps disclosed in paragraph [0079] had been taken into claim 1. The steps regarding the insertion of the stacked star winding units into the stator core from a first end surface (column 19, from line 48) had been omitted. Still further, according to paragraph [0080] the single-phase winding portion was constructed by connecting winding start ends 32a and winding finish ends 32b of the divided wave winding 41 so as to connect the two strands of the conductor wire 32 in series. This feature had also been omitted. Claim 1 of the 5th auxiliary request was for a method of providing an automotive alternator, not just a method of producing a winding. As such it had to include all of the features that were originally disclosed in combination for producing the automotive alternator.

Reasons for the Decision

1. Main request - Novelty, Article 54 EPC

1.1 It is not in dispute that document A2 discloses all of the features of the pre-characterising part of claim 1 as granted. The only feature which comes into question for establishing novelty over document A2 is the characterising feature that "at least one of said single-phase winding portions is provided with a winding sub-portion (41) constructed by simultaneously winding a plurality of strands of said conductor wire (32)".

1.2 The Board concurs with the opposition division's finding that claim 1 of the patent as granted does not state that the winding sub-portion - a feature that is not further specified - is constructed by winding a plurality of strands close together. Claim 1 merely states that the strands are wound simultaneously. Hence, according to claim 1 the strands could be wound at the same time, but in such a manner that they are distant from each other. In this case there would be no difference in the finished winding whether the strands were wound simultaneously or not. For these reasons the Board finds that the method feature of simultaneously winding a plurality of strands does not impose any clear limitation on the claimed apparatus.

1.3 The Board does not find the appellant's arguments persuasive, that "simultaneously wound" implies that the strands are wound together in close proximity and that the winding sub-portion constructed by

simultaneously winding a plurality of strands as claimed would have winding start ends 32a comprising a plurality of strands and winding finish ends 32b comprising a plurality of strands. Claim 1 does not specify in any way what is meant by a "winding sub-portion". Furthermore in the "winding" methods disclosed in document A2 and in the patent (see paragraph [0040]) the winding is not wound in the traditional sense - directly into its final position onto the stator core 15 - but rather it is wound as an annular winding unit 33, which is then formed into a star-shaped winding unit 34A, 34B which is then installed in the stator core. Taking these factors into account, the Board concurs with the respondent that the feature "simultaneously winding a plurality of strands" of claim 1 as granted need not be understood as implying that the simultaneously wound strands are taken together in close proximity, nor that the winding start ends and the winding finish ends of the two strands are led out of the same slots.

1.4 The Board was also not persuaded by the appellant's argument that the characterising feature clearly implied that the winding sub-portion was constructed by simultaneously winding strands that were distinct from one other, as opposed to different parts of a single strand. In the Board's view it is also possible in the context of the winding methods of the patent and of document A2 to construe the term "a plurality of strands" as meaning different parts of a single composite strand.

1.5 For these reasons the Board came to the conclusion that the opposition ground under Article 100(a) EPC in conjunction with Article 54 EPC prejudiced the maintenance of the patent as granted.

1.6 This conclusion was reached without reference to the new arguments presented by the respondent in the oral proceedings based on claims 4 and 5 and Figure 10 of document A2. Hence, there is no need to come to a decision as to whether this amendment to the respondent's case should be taken into account.

2. 1st Auxiliary Request - Inventive Step, Article 56 EPC

2.1 For the following reasons the Board concurs with the respondent that starting from the prior art disclosed in document A2, the subject-matter of claim 1 of the 1st auxiliary request is obvious in view of the disclosure of document A3.

2.2 Document A2 does not disclose the features of claim 1 of a winding sub-portion constructed by simultaneously winding a plurality of strands of conductor wire such that winding start ends of the plurality of strands of said conductor wire are led out of the same slot and winding finish ends of the plurality of strands of said conductor wire are led out of the same slot. According to the patent, see paragraph [0079], these features provide the technical effect that half the number of winding steps are required to form the winding.

2.3 Document A3 relates to the same technical field as the contested patent and document A2 in that it is concerned with the manufacture of windings for vehicle alternators of the type commonly referred to as "wave" windings.

2.4 Document A3 discloses forming such windings by winding flat polygonal coils (see figures 1, 2, 5, 10, 12),

deforming the sides of the polygonal coils inwardly to form multi-lobed coils (see figures 3, 6, 7), overlaying the multi-lobed coils (see figures 7, 8) and then inserting them axially into a slotted stator core (see figure 9). That is the same basic technique as is used in the contested patent to form the stator winding for the claimed alternator (see figures 5, 6, 10, 12A to 12C and 13A to 13C).

2.5 As is disclosed in column 9, lines 15 to 23 of document A3, figure 10 shows that the disclosed apparatus can be applied to the case in which two wires are simultaneously wound on the rotating unit 1. According to document A3, this technique is known in the art and uses a wire feeding delivery tube 2 to which two separate wires W are fed from separate supplying reels and reach the rotating unit by passing through two separate holes 2a, 2b (figure 11) of the feeding device 2, which keep them spaced apart from each other by a given length.

2.6 Document A3 does not disclose what the technical effects and benefits are of simultaneously winding two wires (i.e. strands), but given that A3 acknowledges that the technique is known in the art, it has to be concluded that its benefits would have been known to the person skilled in the art. Furthermore, in the Board's view it would be self-evident to the skilled person that by winding two strands together only half the number of winding steps needs to be performed in order to provide the same number of winding turns overall. Hence, starting from document A2 and seeking to achieve these benefits, it would be obvious to use the technique of simultaneously winding two separate strands together to form the coil, as is known from document A3.

2.7 With two strands simultaneously wound together as discussed in A3, the two starts and the two ends of the windings would automatically end up being led out of the same respective slots once the multi-lobed coils are inserted into the slotted stator core.

2.8 Thus, the skilled person would arrive at the subject-matter of claim 1 of auxiliary request 1 without involving an inventive step.

2.9 The Board is not convinced by the appellant's argument that the skilled person starting from the alternator of A2 would not turn to a document such as A3 which focuses on the manufacture of alternators. On the contrary, seeking to facilitate the manufacture of the alternator of A2, it would be obvious to look to documents which focus on manufacture.

2.10 The Board is also not convinced by the appellant's argument that the different number of phases and slot ratios in A2 and A3 would deter the skilled person from combining them. Seeking to manufacture an alternator with a particular number of phases and slot ratio, it would be a straightforward matter for the skilled person to adapt the processes disclosed in A3 to the required arrangement.

2.11 For these reasons the Board came to the conclusion that the subject-matter of claim 1 of the 1st auxiliary request does not involve an inventive step in the sense of Article 56 EPC.

2.12 In view of this finding there is no need to consider the other objections raised by the respondent against the 1st auxiliary request.

3. 2nd Auxiliary Request - Inventive Step, Article 56 EPC

3.1 For the following reasons the Board concurs with the respondent that starting from the prior art disclosed in document A2, also the subject-matter of claim 1 of the 2nd auxiliary request is obvious in view of the disclosure of document A3.

3.2 As set out for the 1st auxiliary request it would be obvious for the skilled person starting from document A2 to consult document A3, and it would be obvious to wind two wires together in order to halve the number of winding turns necessary in the manufacturing process.

3.3 Whilst document A2 does not disclose that the ends of the two wires (strands) are to be connected so as to connect them in series, as set out in the final feature of claim 1 of the 2nd auxiliary request, the Board considers that this is merely one of two obvious choices for the skilled person. From the fact that the two wires are wound together it is self-evident that they are intended to be connected together in some way and there are two obvious options for doing so - in series or parallel.

3.4 As to the divided wave winding arrangement in accordance with the features taken from granted claim 3, the Board concurs with the respondent that in the completed winding of A3 the slot-housed portions run axially just as they do in A2 and in the patent. This can be seen by comparing figure 9 of A3 with figures 4 and 10 of A2 and with figure 8 of the patent. The planar arrangement shown in figure 7 of A3 is merely an intermediate stage in the production process, which is

comparable to figures 12A to 12C and 13A to 13C of the patent.

3.5 As pointed out by the appellant, the slot-housed portions of the winding in A3 are not spaced six slots apart. As pointed out by the respondent, this is merely the consequence of the number of winding phases required. For the skilled person starting from the double three phase arrangement of A2 it would be evident that a spacing of 6 slots between adjacent slot-housed portions would be required. This six-slot spacing is depicted in figure 11 of A2, which shows for example the winding from the terminal X_1 running through the slot 1 before crossing over and then running back through the slot 7, and so.

3.6 For these reasons the Board came to the conclusion that the subject-matter of claim 1 of the 2nd auxiliary request does not involve an inventive step in the sense of Article 56 EPC.

4. "2nd a", 3rd, 4th and "4th a" Auxiliary Requests - Inventive Step, Article 56 EPC

4.1 Claim 1 of the "2nd a" auxiliary request is identical to that of the 2nd auxiliary request. Its subject-matter does not involve an inventive step in the sense of Article 56 EPC for the same reasons.

4.2 The subject-matter of claim 1 of the 3rd auxiliary request does not involve an inventive step in the sense of Article 56 EPC for the same reasons as set out above for the 1st auxiliary request (see section 2.). As set out in paragraph 2.6, the technique of simultaneously

winding two separate strands together to form a coil is known from document A3.

4.3 Similarly, the subject-matter of claim 1 of the 4th auxiliary request does not involve an inventive step in the sense of Article 56 EPC for the same reasons as set out above for the 2nd auxiliary request (see section 3.), the technique of simultaneously winding two separate strands together to form a coil being known from document A3.

4.4 Claim 1 of the "4th a" auxiliary request is identical to that of the 4th auxiliary request. Its subject-matter does not involve an inventive step in the sense of Article 56 EPC for the same reasons.

5. 5th Auxiliary Request - Amendments, Article 123(2) EPC

5.1 For the following reasons the Board concurs with the respondent that the amendments made according to claim 1 of the 5th auxiliary request create an intermediate generalisation that is not derivable, directly and unambiguously, from the application as filed.

5.2 The claims as originally filed were all directed to an apparatus, namely an "automotive alternator". With the 5th auxiliary request the category of claim 1 was changed to a method, namely a "method of providing an automotive alternator". Furthermore, the characterising portion of claim 1 was amended by specifying a series of method steps by which "at least one of said single-phase winding portions is prepared".

5.3 The method steps added to claim 1 do not have a basis in the claims as originally filed. They correspond in essence to a series of method steps that were disclosed in the description as originally filed, more particularly in the description of embodiment 5, see the application as published, EP 1 211 781, paragraph [0079], column 19, lines 28 to 48. These method steps define in essence how first and second type star winding units are formed and stacked on top of each other.

5.4 However in the description as filed, the series of method steps that have been taken into claim 1 formed only a part of the method described in paragraph [0079] for preparing the single-phase winding portion. Paragraph [0079] continues, describing from column 19 line 48 to column 20, line 1 a series of further method steps which define how the stacked star winding units are pushed inside the stator core and how their slot-housed portions are pushed into the stator slots to install the single-phase winding portion in the stator core.

5.5 The Board is convinced that it would be clear to the skilled reader that all of the above-mentioned features are necessary for the preparation of the single-phase winding portion. That is clear at least from paragraph [0078], which states "Next, a method for preparing the single-phase winding portion according to Embodiment 5 will be explained with reference to Figures 13A to 13C". Furthermore, there is no indication, in the application as filed, that would cause the skilled person to recognise that the features describing how the first and second type star winding units are formed and stacked on top of each other solve some particular problem, independently of the remaining features of

paragraph [0079]. As the respondent pointed out, all of these features would be necessary in a method of providing an automotive alternator, as is claimed.

5.6 In view of this finding the further objections raised by the respondent do not need to be addressed.

5.7 For these reasons the Board came to the conclusion that by extracting the particular combination of method steps that were added to claim 1 in the 5th auxiliary request an intermediate generalisation was created for which there is no basis in the application as filed. Therefore the fifth auxiliary request contravenes Article 123(2) EPC.

6. Conclusion

In the absence of an allowable request from the appellant, the Board acceded to the respondent's request that the appeal be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

U. Bultmann R. Lord

Decision electronically authenticated