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**Datasheet for the decision
of 7 December 2017**

Case Number: T 1475/12 - 3.5.02

Application Number: 05800238.7

Publication Number: 1806822

IPC: H02K1/14, H02K1/02, H02K1/18

Language of the proceedings: EN

Title of invention:
Motor Generator and Automobile Carrying the same

Applicant:
Toyota Jidosha Kabushiki Kaisha

Relevant legal provisions:
EPC Art. 84, 56
EPC R. 43(2)

Keyword:
Claims - clarity (no) - support in the description (no)
Inventive step - (no)



Beschwerdekammern
Boards of Appeal
Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0
Fax +49 (0)89 2399-4465

Case Number: T 1475/12 - 3.5.02

D E C I S I O N
of Technical Board of Appeal 3.5.02
of 7 December 2017

Appellant: TOYOTA JIDOSHA KABUSHIKI KAISHA
(Applicant) 1, Toyota-cho,
Toyota-shi, Aichi-ken, 471-8571 (JP)

Representative: Kuhnen & Wacker
Patent- und Rechtsanwaltsbüro
Prinz-Ludwig-Straße 40A
85354 Freising (DE)

Decision under appeal: Decision of the Examining Division of the
European Patent Office posted on 17 February
2012 refusing European patent application No.
05800238.7 pursuant to Article 97(2) EPC.

Composition of the Board:

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

Summary of Facts and Submissions

- I. The applicant's appeal contests the examining division's decision to refuse the European patent application 05 800 238.7, which was published as EP 1 806 822 A1.
- II. The examining division used the following prior art document references, which the Board will adhere to:
D1: WO 99/50949 A
D2: JP 2002 369418 A
D3: JP 2004 120958 A
- III. In the contested decision, the examining division considered a main request and first to fourth auxiliary requests and found that the main request and the third auxiliary request were not inventive, whereas the first, second and fourth auxiliary requests added subject-matter to the application, see facts and submissions, paragraph 5.

The subject-matter of claim 1 of the main request was found to lack inventive step within the meaning of Article 56 EPC in view of documents D1 and D2, see reasons for the decision, section 1. The subject-matter of claim 1 of the third auxiliary request was found to lack inventive step within the meaning of Article 56 EPC in view of documents D1, D2 and D3, see reasons for the decision, section 4.

- IV. With the written statement setting out the grounds of appeal (see letter dated 12 June 2012) the appellant enclosed a set of amended claims 1 to 10. The appellant requested that the decision under appeal be set aside and a patent be granted on the basis of the enclosed

claims as well as the description and drawings on file at that time.

The independent apparatus claim 1 as filed with the grounds of appeal is identical to claim 1 of the main request considered in the contested decision and reads as follows:

"A motor generator comprising: a stator formed in a hollow cylindrical shape, and a rotor rotatably mounted with respect to the stator, the stator comprising, a stator core (100) including an annular yoke part (20) and a teeth part which has a plurality of teeth (10) annularly disposed on an inner circumference side of the yoke part (20) so as to point inward along a radial direction, and a coil wound around each of the plurality of teeth (10); the yoke part (20) comprising, a protrusion that protrudes axially from each axial end face of the plurality of teeth (10), characterized in that each of the plurality of teeth (10) has an axial length which gradually decreases radially outwardly, and a circumferential length which gradually increases radially outwardly, wherein each of the plurality of teeth (10) has cross sections perpendicular to the radial direction which are equal in areas along the radial direction, wherein the area of a cross section of the yoke part (20) perpendicular to the circumferential direction is one-half the area of the cross section of the tooth (10) perpendicular to the radial direction, or greater, and wherein a cross-sectional area of a junction between the yoke part (20) and each of the plurality of teeth (10) is greater than or equal to the area of the cross section of each tooth (10) perpendicular to the radial direction."

Claims 2 to 7 are directly or indirectly dependent on claim 1.

Claim 8 as filed with the grounds of appeal has a characterising portion which corresponds to that of claim 1 of the third auxiliary request considered in the contested decision. Claim 8 reads as follows:

"A motor generator, preferably *[sic]* according to Claim 7, comprising:

a stator formed in a hollow cylindrical shape, and
a rotor rotatably mounted with respect to the stator,
the stator comprising,

a stator core (100) including an annular yoke part (20)
and a teeth part which has a plurality of teeth (10)
annularly disposed on an inner circumference side of
the yoke part (20) so as to point inward along a radial
direction, and

a coil wound around each of the plurality of teeth
(10);

the yoke part (20) comprising,

a protrusion that protrudes axially from each axial end
face of the plurality of teeth (10), characterized in
that

each of the plurality of teeth (10) has an axial length
which gradually decreases radially outwardly, and a
circumferential length which gradually increases
radially outwardly,

wherein the stator core (100) is composed of at least
two molded bodies (D1, D3) constituting magnetic dust
cores divided along the axial direction."

The remaining claims 9 and 10 are directly or
indirectly dependent on claim 1 and/or claim 8.

- V. The Board summoned the appellant to attend oral proceedings on 7 December 2017, setting out their initial observations in a communication annexed to the summons.
- VI. With a letter dated 3 November 2017 the appellant advised the Board that they would not be attending the oral proceedings and requested a written decision in the matter.
- VII. The appellant argues in essence as follows:
- The two independent apparatus claims 1 and 8 are allowable under Rule 43(2) EPC as they provide alternative solutions to a particular problem and cannot be covered by a single claim, Rule 43(2)(c) EPC;
 - No objections under Article 84 or 123 EPC have been raised against the subject-matter now covered by claims 1 and 8.
 - The subject-matter of claim 1 is novel and involves an inventive step.
 - The subject-matter of claim 8 is novel and involves an inventive step.

Reasons for the Decision

1. Form and content of the claims, Rule 43(2) EPC

- 1.1 Claim 8 as filed with the grounds of appeal refers to "A motor generator, pefereably [sic] according to claim 7, ...". Since claim 8 does not necessarily include the features of claim 7 (or indeed any other claim), claim 8 is a second independent claim of the same category as claim 1, namely an apparatus claim.

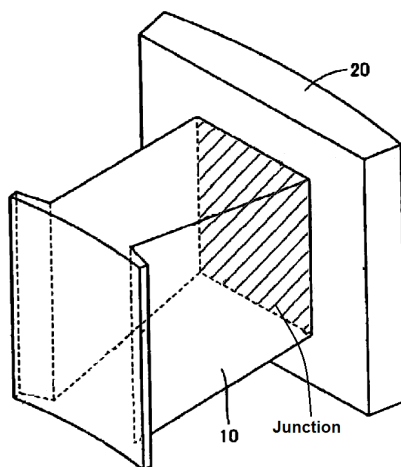
- 1.2 The Board is not convinced that the arguments presented by the appellant justify the inclusion of two independent claims of the same category. The problem cited in the grounds for appeal as being solved by the invention is the problem that was mentioned in the description as filed, namely: "to provide a compact and high-power motor generator having superior mountability, and an automobile equipped with the motor generator". This problem is very generic in nature and the Board does not consider it to be a "particular problem" in the sense of Rule 43(2)(c) EPC.
- 1.3 For these reasons the form of the claims does not meet the requirements of Rule 43(2) EPC.

2. Clarity, Article 84 EPC

- 2.1 The last feature of claim 1 refers to the cross-sectional area of "a junction" between the yoke part 20 and each of the plurality of teeth 10. It is not clear from the wording of claim 1 what part of the structure is meant by this "junction", or in other words where the "junction" is located.

From the feature of claim 1 that the stator of the motor generator comprises "a stator core (100) including an annular yoke part (20) and a teeth part which has a plurality of teeth (10) annularly disposed on an inner circumference side of the yoke part (20) so as to point inward along a radial direction" it would seem that (in the usual way) the teeth 10 are those parts which are disposed on the inner circumferential side of the yoke part 20, pointing inwards. From this it would follow that the junction between the annular yoke part 20 and the teeth part 10 is at the inner

circumferential surface of the yoke part, i.e. the hatched area in the figure below.



However if that is the case, the last feature of claim 1 is rendered meaningless, and hence unclear, because the cross-sectional area of the junction between the yoke part 20 and each of the plurality of teeth 10 is by definition equal to the area of the cross section of each tooth 10 perpendicular to the radial direction, and cannot be greater than it.

Whilst it may be intended that the last feature of claim 1 specifies the relationship between the cross-sectional area of each tooth and the size of the hatched "joint surface" S2 shown in figure 5 of the application and discussed in paragraphs [0062] to [0064], it does not clearly do so.

2.2 The feature of claims 1 and 8 that the yoke part comprises "a protrusion that protrudes axially from each axial end face of the plurality of teeth" is not supported by the description, because the yoke part as described in the application does not protrude from the axial end face of the teeth (see also section 3.2.1 below).

2.3 Claim 8 is not concise because it repeats many features that are already defined in claim 1, upon which claim 8 is preferably dependent via claim 7.

2.4 For these reasons the claims do not meet the requirements of Article 84 EPC.

3. Novelty and Inventive Step, Articles 54 and 56 EPC

3.1 Novelty is not contested.

3.2 In the contested decision the findings of lack of inventive step were argued starting from document D1 as closest prior art. The Board considers this to be one valid approach. As was indicated in the annex to the summons to oral proceedings, however, the Board considers that document D2 can equally well be taken as closest prior art for the evaluation of inventive step and that the subject-matter of claim 1 lacks an inventive step on that basis. The reasons are as follows:

3.2.1 As far as the Board understands what the subject-matter of claim 1 is intended to comprise, it differs from the disclosure of D2 only in that:

- a) the yoke part protrudes axially beyond where the axial end face of each of the plurality of teeth intersects with the inner circumferential surface of the yoke part (in other words, the yoke part is longer in the axial direction than the teeth);
- b) the cross-sectional area of the "joint surface" S2 shown in figure 5 is greater than or equal to the cross-sectional area of each tooth perpendicular to the radial direction; and
- c) the cross-sectional area of the yoke part perpendicular to the circumferential direction is

one-half the the cross-sectional area of the tooth perpendicular to the radial direction, or greater.

3.2.2 The technical effect achieved by feature a is that the yoke can be made thinner in the radial direction than would be possible in D2, without causing the cross-sectional area of the "joint surface" S2 to become smaller than that of the teeth (feature b) and without causing the cross-sectional area of the yoke part perpendicular to the circumferential direction to become smaller than one half of the cross-sectional area of the tooth perpendicular to the radial direction (feature c) - either of which might lead to magnetic saturation in the yoke part and hence flux leakage. By making the yoke thinner, either the outer diameter of the yoke and hence the machine can be reduced or the inner diameter of the yoke can be made greater, such that the teeth can be made to extend further outwards, providing more space for the stator windings in the radial direction. Hence, seen objectively when starting from the prior art of D2, one problem solved by features a to c is to provide more space for the stator windings in the radial direction.

3.2.3 Document D1 discloses at page 5, lines 3 to 5 and in figure 2 a stator core for an electrical machine in which "the axial length of each tooth 3 is less than the axial length of the adjoining part 4" of the yoke 2. According to the lines 5 to 11 which follow (emphasis added), "This extension of the yoke 2 axially past the teeth 3 on both axial sides thereof increases the active length of the windings and reduces the stray losses such that a more efficient machine is provided".

3.2.4 For the skilled person starting from D2 and seeking to solve the above-mentioned objective problem, this indication in D1 would make it obvious to modify the stator of D2 such that the yoke extends axially past the teeth on both sides (feature a). Regarding features b and c the Board shares the view of the examining division (see reasons for the decision, section 1.4) that these measures would be obvious in the light of the indication in D1 (page 2, lines 28 to 34) to vary the dimensions of each tooth and the adjoining part of the yoke in order to adjust the magnetic flux to a desired or optimal flux density in each part of the magnetic flux path in the core.

3.3 The above reasons were set out by the Board in the annex to the summons to oral proceedings and the appellant did not submit any counter-arguments. For these reasons the subject-matter of claim 1 of the appellant's sole request does not meet the requirements of Article 56 EPC.

4. Conclusion

As the claims filed with the written statement setting out the grounds of appeal do not meet the requirements of the EPC, the Board cannot accede to the appellant's request for grant of a patent on that basis. The appeal therefore has to 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