Appeal Decision

Appeal No. 2020-1870

Appellant	GENERAL ELECTRIC COMPANY
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The case of appeal against the examiner's decision of refusal of Japanese Patent Application No. 2014-158297, entitled "SPOKE PERMANENT MAGNET MACHINE WITH REDUCED TORQUE RIPPLE AND METHOD OF MANUFACTURING THEREOF" (the application published on February 16, 2015, Japanese Unexamined Patent Application Publication No. 2015-033329), has resulted in the following appeal decision.

Conclusion

The appeal of the case was groundless.

Reason

I. History of the procedures

The present application is an application filed on August 4, 2014 (Priority Claim Procedures under the Paris Convention, August 5, 2013, USA), and the history of the procedures of the present application is as follows.

July 24, 2017	: Submission of written amendment
June 19, 2018	: Notice of reasons for refusal
September 11, 2018	: Submission of written opinion and written amendment
March 27, 2019	: Notice of reasons for refusal
June 24, 2019	: Submission of written opinion and written amendment
November 6, 2019	: Examiner's decision of refusal
February 10, 2020	: Submission of written request for appeal and written amendment
December 15, 2020	: Notice of reasons for refusal
March 11, 2021	: Submission of written opinion and written amendment
May 14, 2021	: Notice of reasons for refusal (final reasons for refusal)

June 25, 2021 : Submission of written opinion and written amendment

II. Decision to dismiss amendment on the written amendment submitted on June 25, 2021

[Conclusion of Decision to Dismiss Amendment]

The written amendment (hereinafter, referred to as "this amendment") submitted on June 25, 2021 shall be dismissed.

[Reason]

1 Regarding this amendment (the content of the amendment)

(1) The recitation of the amended claims

The recitations of Claims 1-8 of the scope of claims are amended as follows by means of this amendment (the underlined part is the amended part).

"[Claim 1]

An internal permanent magnet machine comprising:

a stator assembly (14) and a rotor assembly (12);

wherein the stator assembly (14) comprises

a stator core (40) having a plurality of stator teeth (44), and

stator windings (50) wound about the plurality of stator teeth (44) to generate a stator magnetic field when excited with alternating currents;

the rotor assembly (12) is disposed within a cavity (46) defined by the stator assembly (14) and configured to rotate with respect to the stator assembly (14), and comprises

a shaft (18) having a shaft body (24) and a plurality of protrusions (22), the plurality of protrusions (22) extending radially outward from the shaft body (24), being formed on a circumference with the shaft body (24) as a center (76) along an axial length of the shaft body (24), and comprising a multiple arranged circumferentially;

a plurality of lamination stacks (60) arranged around the shaft (18) to receive the plurality of protrusions (22), a plurality of lamination groups (62, 64, and 66) each comprising a plurality of laminations (30); and

a plurality of permanent magnets (34) configured to generate a magnetic field that interacts with the stator magnetic field to produce torque, the plurality of permanent magnets (34) being all disposed in dovetailed recesses (32) formed between a pair of adjacent lamination stacks (60);

the plurality of protrusions (22) being all continuously formed along the axial length of the shaft body (24) on the plurality of lamination groups (62, 64, and 66);

the plurality of protrusions (22) all having a plurality of protrusions protruding in the circumferential direction at different radial positions;

the plurality of laminations (30) all comprising shaft protrusion cuts (58) formed on the laminations (30) to receive one of the plurality of protrusions (22) to form a spoke rotor shaft;

the shaft protrusion cuts (58) formed on one of the plurality of lamination groups (62, 64, and 66) being angularly offset from the shaft protrusion cuts (58) formed on another one of the plurality of lamination groups (62, 64, and 66); and

the maximum radial length of the shaft protrusion cuts (58) is less than 60% of the maximum radial length of the plurality of laminations (30).

[Claim 2]

The machine according to Claim 1, wherein

each of the plurality of permanent magnets (34) comprises a plurality of magnet blocks (72); each of the plurality of magnet blocks (72) corresponds to each of the lamination groups;

a non-metallic lower wedge is provided inside each of the plurality of magnet blocks (72) in the radial direction;

a non-metallic top wedge is provided outside each of the plurality of magnet blocks (72) in the radial direction;

the plurality of lamination stacks (60) collectively form a rotor core (16); and the plurality of lamination stacks (60) each forms a rotor pole (28) of the rotor core (16).

[Claim 3]

The machine according to Claim 1 or 2, wherein

the plurality of lamination groups (62, 64, and 66) comprise first lamination groups (62), second lamination groups (64), and third lamination groups (66); the second lamination groups (64) are positioned between the first lamination groups (62) and the third lamination groups (66) in an axial direction (68);

the shaft protrusion cuts (58) formed on laminations (82) of the second lamination groups (64) are formed to be located at the centers (76) of the laminations (82);

the shaft protrusion cuts (58) formed on laminations (74) of the first lamination groups (62) and the laminations (84) of the third lamination groups (66) are formed to be offset from the centers (76) of the laminations (74 and 84); the shaft protrusion cuts (58) formed on the laminations (74) of the first lamination groups (62) are offset from the centers (76) to a first angular direction (78); and the shaft protrusion cuts (58) formed on the laminations (84) of the third lamination groups (66) are offset from the centers (76) to a second angular direction (86) opposite to the first angular direction (78).

[Claim 4]
The machine according to Claim 3, wherein

the shaft protrusion cuts (58) formed on the laminations (74) of the first lamination groups (62) and the laminations (84) of the third lamination groups (66) are offset from the centers (76) by an equal angle so as to be symmetrically formed about the shaft protrusion cuts (58) formed on the laminations (82) of the second lamination groups (64), or

the shaft protrusion cuts (58) formed on the laminations (74) of the first lamination groups (62) and the laminations (84) of the third lamination groups (66) are offset from the centers (76) by a different angle in a manner that the shaft protrusion cuts (58) formed on the laminations (82) of the second lamination groups (64) are asymmetrically formed as the centers (76).

[Claim 5]
The machine according to any one of Claims 1-4, wherein

the offsets (80 and 88) are less than half of a stator slot pitch; and

the stator assembly (14) and the rotor assembly (12) constitute a segmented spoke motor having distributed windings (50).

[Claim 6]
A method for assembling an internal permanent magnet machine, the method comprising:

providing a stator assembly (14) comprising stator windings (50) wound on a plurality of stator teeth (44) to generate a stator magnetic field when excited with alternating currents and comprising a stator core (40) having the plurality of stator teeth (44); and

providing a rotor assembly (12) that is rotatable within a cavity (46) formed by the stator assembly (14),

wherein providing the rotor assembly (12) comprises:

providing a shaft (18) comprising a shaft body (24) and a plurality of protrusions (22), the plurality of protrusions (22) extending radially along an axial length of a rotating shaft of the rotor assembly (12) and being all continuously formed on a plurality of lamination groups (62, 64, and 66) along an axial length of the shaft body (24);

providing a plurality of lamination stacks (60) onto the plurality of protrusions (22) of the shaft (18), wherein the plurality of lamination stacks is configured in the following manner: the plurality of lamination stacks (60) are positioned on the circumference of the shaft (18) and the plurality of lamination stacks (60) are all arranged into the plurality of lamination stacks (62, 64, and 66) along the axial length of the shaft (18) to form a spoke rotor shaft, the plurality of protrusions (22) all have a plurality of protrusions protruding in the circumferential direction at different radial locations, and one of the plurality of lamination groups (62, 64, and 66) is positioned on the shaft (18) to have angular offsets (80 and 88) with respect to another one of the plurality of lamination stacks (62, 64, and 66); and

securing a plurality of permanent magnets (34), wherein the plurality of permanent magnets (34) are in dovetailed openings defined by the plurality of lamination stacks (60) and generate a magnetic field that interacts with the stator magnetic field to produce a torque;

providing the plurality of lamination stacks (60) onto the plurality of protrusions (22) of the shaft (18) further comprises forming shaft protrusion cuts (58), on laminations (30) of the plurality of lamination stacks (60), configured to receive one of the plurality of protrusions (22); and

the maximum radial length of the shaft protrusion cuts (58) is less than 60% of the maximum radial length of the plurality of laminations (30).

[Claim 7]

The method according to Claim 6, wherein

forming the shaft protrusion cuts (58) comprises laser cutting the shaft protrusion cuts (58) on the laminations (30), and

the offsets (80 and 88) are half of a stator slot pitch.

[Claim 8]

A rotor assembly (12) for use in an internal permanent magnet machine,

wherein the rotor assembly comprises:

a shaft (18) having a shaft body and a plurality of protrusions (22), the plurality of

protrusions (22) extending radially outward from the shaft body and being formed on a circumference with the shaft body as a center (76) along an axial length of the shaft body;

a plurality of lamination stacks (60) disposed on the plurality of protrusions (22), the plurality of lamination stacks (60) all comprising a plurality of lamination groups (62, 64, and 66) arranged in an axial direction (68) of the shaft (18), and the plurality of lamination groups (62, 64, and 66) all comprising a plurality of laminations (30); and

a plurality of permanent magnets (34) disposed in a plurality of dovetailed recesses (32) formed between the plurality of lamination stacks (60);

the plurality of protrusions (22) are all continuously formed along the axial length of the shaft body (24) on the plurality of lamination groups (62, 64, and 66);

the plurality of protrusions (22) all have a plurality of protrusions protruding in the circumferential direction at different radial positions;

the plurality of lamination stacks (60) all comprise shaft protrusion cuts (58) formed on the lamination stacks (60) to receive shaft protrusions (22) to form a spoke rotor shaft; the shaft protrusion cuts (58) formed on one of the plurality of lamination groups (62, 64, and 66) are angularly offset from the shaft protrusion cuts (58) formed on another one in the plurality of lamination groups (62, 64, and 66); and

the maximum radial length of the shaft protrusion cuts (58) is less than 60% of the maximum radial length of the plurality of laminations (30)."

(2) The recitation of the claims before this amendment

The recitations of Claims 1-8 amended in the written amendment submitted on March 11, 2021 before this amendment are as follows (the underlined part is the amended part).

"[Claim 1]

An internal permanent magnet machine comprising:

a stator assembly (14) and a rotor assembly (12);

wherein the stator assembly (14) comprises

a stator core (40) having a plurality of stator teeth (44); and

stator windings (50) wound about the plurality of stator teeth (44) to generate a stator magnetic field when excited with alternating currents;

the rotor assembly (12) is disposed within a cavity (46) defined by the stator assembly (14) and configured to rotate with respect to the stator assembly (14), and comprises

a shaft (18) having a plurality of protrusions (22), the plurality of protrusions (22) extending radially outward from a shaft body (24), being formed on the circumference with the shaft body (24) as a center (76) along an axial length of the shaft body (24); and comprising a multiple arranged circumferentially;

a plurality of lamination stacks (60) arranged around the shaft (18) to receive the plurality of protrusions (22), a plurality of lamination groups (62, 64, and 66) all comprising a plurality of laminations (30); and

a plurality of permanent magnets (34) configured to generate a magnetic field that interacts with the stator magnetic field to produce a torque, wherein the plurality of permanent magnets (34) are all disposed in dovetailed recesses (32), and the dovetailed recesses (32) are formed between a pair of adjacent lamination stacks (60);

the plurality of protrusions (22) are all continuously formed along the axial length of the shaft body (24) on the plurality of lamination groups (62, 64, and 66);

the plurality of protrusions (22) all have a plurality of protrusions protruding to the circumferential direction at different radial positions;

the plurality of laminations (30) all comprise shaft protrusion cuts (58) formed on the laminations (30) to receive one of the plurality of protrusions (22) to form a spoke rotor shaft;

the shaft protrusion cuts (58) formed on one of the plurality of lamination groups (62, 64, and 66) are angularly offset from the shaft protrusion cuts (58) formed on another one of the plurality of lamination groups (62, 64, and 66); and

the maximum radial length of the shaft protrusion cuts (58) is less than 60% of the maximum radial length of the plurality of laminations (30).

[Claim 2]

The machine according to Claim 1, wherein

each of the plurality of permanent magnets (34) comprises a plurality of magnet blocks (72); each of the plurality of magnet blocks (72) corresponds to each of the lamination groups;

a non-metallic lower wedge is provided inside each of the plurality of magnet blocks (72) in the radial direction;

a non-metallic top wedge is provided outside each of the plurality of magnet blocks (72) in the radial direction;

the plurality of lamination stacks (60) collectively form a rotor core (16); and the plurality of lamination stacks (60) each forms a rotor pole (28) of the rotor core (16).

[Claim 3]

The machine according to Claim 1 or 2, wherein

the plurality of lamination groups (62, 64, and 66) comprises first lamination groups (62), second lamination groups (64), and third lamination groups (66); the second lamination groups (64) are positioned between the first lamination groups (62) and the third lamination groups (66) in an axial direction (68);

the shaft protrusion cuts (58) formed on the laminations (82) of the second lamination groups (64) are formed to be located at the centers (76) of the laminations (82);

the shaft protrusion cuts (58) formed on laminations (74) of the first lamination groups (62) and laminations (84) of the third lamination groups (66) are formed to be offset from the centers (76) of the laminations (74 and 84); the shaft protrusion cuts (58) formed on the laminations (74) of the first lamination groups (62) are offset from the centers (76) to a first angular direction (78); and the shaft protrusion cuts (58) formed on the laminations (84) of the third lamination groups (66) are offset from the centers (76) to a second angular direction (86) opposite to the first angular direction (78).

[Claim 4]
The machine according to Claim 3, wherein

the shaft protrusion cuts (58) formed on the laminations (74) of the first lamination groups (62) and the laminations (84) of the third lamination groups (66) are offset from the centers (76) by an equal angle so as to be symmetrically formed about the shaft protrusion cuts (58) formed on the laminations (82) of the second lamination groups (64), or

the shaft protrusion cuts (58) formed on the laminations (74) of the first lamination groups (62) and the laminations (84) of the third lamination groups (66) are offset from the centers (76) by a different angle in a manner that the shaft protrusion cuts (58) formed on the laminations (82) of the second lamination groups (64) are asymmetrically formed as the centers (76).

[Claim 5]
The machine according to any one of Claims 1-4, wherein

the offsets (80 and 88) are less than half of a stator slot pitch; and

the stator assembly (14) and the rotor assembly (12) constitute a segmented spoke motor having distributed windings (50).

[Claim 6]
A method for assembling an internal permanent magnet machine, the method comprising:

providing a stator assembly (14), the stator assembly (14) comprising stator windings (50) wound on a plurality of stator teeth (44) to generate a stator magnetic field when excited with alternating currents and comprising a stator core (40) having the plurality of stator teeth (44); and

providing a rotor assembly (12), the rotor assembly (12) being rotatable within a cavity (46) formed by the stator assembly (14),

wherein providing the rotor assembly (12) comprises:

providing a shaft (18), the shaft (18) comprising a shaft body (24) and a plurality of protrusions (22), the plurality of protrusions (22) extending radially along an axial length of a rotating shaft of the rotor assembly (12), and the plurality of protrusions (22) being all continuously formed on a plurality of lamination groups (62, 64, and 66) along an axial length of the shaft body (24);

providing a plurality of lamination stacks (60) onto the plurality of shaft protrusions (22) of the shaft (18), the plurality of lamination stacks being configured in the following manner: the plurality of lamination stacks (60) are positioned on the circumference of the shaft (18) and the plurality of lamination stacks (60) are all arranged into the plurality of lamination stacks (62, 64, and 66) along the axial length of the shaft

(18) to form a spoke rotor shaft, the plurality of protrusions (22) all have a plurality of protrusions protruding in the circumferential direction at different radial locations, and one of the plurality of lamination groups (62, 64, and 66) is positioned on the shaft (18) to have angular offsets (80 and 88) with respect to another one of the plurality of lamination stacks (62, 64, and 66); and

securing a plurality of permanent magnets (34), the plurality of permanent magnets (34) being in dovetailed openings defined by the plurality of lamination stacks (60), and generating a magnetic field that interacts with the stator magnetic field to produce torque, providing the plurality of lamination stacks (60) onto the plurality of protrusions (22) of the shaft (18) further comprises forming shaft protrusion cuts (58), on laminations (30) of the plurality of lamination stacks (60), configured to receive one of the plurality of protrusions (22); and

the maximum radial length of the shaft protrusion cuts (58) is less than 60% of the maximum radial length of the plurality of laminations (30).

[Claim 7]

The method according to Claim 6, wherein

forming the shaft protrusion cuts (58) comprises laser cutting the shaft protrusion cuts (58) on the laminations (30), and

the offsets (80 and 88) are half of a stator slot pitch.

[Claim 8]

A rotor assembly (12) for use in an internal permanent magnet machine,

wherein the rotor assembly comprises:

a shaft (18) having a shaft body and a plurality of protrusions (22), the plurality of protrusions (22) extending radially outward from the shaft body, and comprising a multiple formed on the circumference with the shaft body as a center (76) along an axial length of the shaft body;

a plurality of lamination stacks (60) disposed on the plurality of protrusions (22), the plurality of lamination stacks (60) all comprising a plurality of lamination groups (62, 64, and 66) arranged in an axial direction (68) of the shaft (18), and the plurality of lamination groups (62, 64, and 66) all comprising a plurality of laminations (30); and

a plurality of permanent magnets (34) disposed in a plurality of dovetailed recesses (32) formed between the plurality of lamination stacks (60);

the plurality of protrusions (22) are all continuously formed along the axial length of the shaft body (24) on the plurality of lamination groups (62, 64, and 66);

the plurality of protrusions (22) all have a plurality of protrusions protruding in the circumferential direction at different radial positions;

the plurality of lamination stacks (60) all comprise shaft protrusion cuts (58) formed on the lamination stacks (60) to receive shaft protrusions (22) to form a spoke rotor shaft; the shaft protrusion cuts (58) formed on one of the plurality of lamination groups (62, 64, and 66) are angularly offset from the shaft protrusion cuts (58) formed on another one of the plurality of lamination groups (62, 64, and 66); and

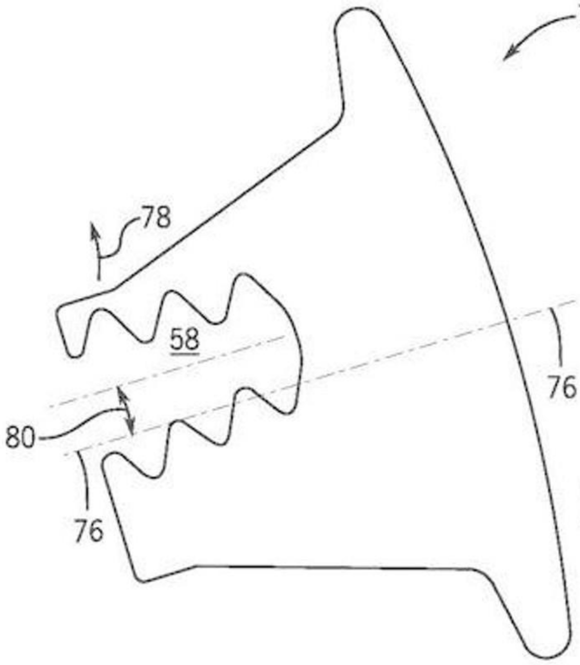
the maximum radial length of the shaft protrusion cuts (58) is less than 60% of the maximum radial length of the plurality of laminations (30)."

2 Acceptability of the Amendment

(1) The matter that "the maximum radial length of the shaft protrusion cuts (58) is less than 60% of the maximum radial length of the plurality of laminations (30)" is added in Claims 1, 6, and 8 of the scope of claims before this amendment by means of the amendment made in the written amendment submitted on March 11, 2021, and the amended Claims 1, 6, and 8 of the scope of claims also still describe that "the maximum radial length of the shaft protrusion cuts (58) is less than 60% of the maximum radial length of the plurality of laminations (30)."

Then, whether this amendment is within the matters described in the description, scope of claims, or drawings originally attached to the application of the present application (hereinafter, referred to as "the original description, etc.") is examined below, this amendment comprising the amended matter of enabling the recitations of Claims 1, 6, and 8 of the scope of claims to comprise the recitation that "the maximum radial length of the shaft protrusion cuts (58) is less than 60% of the maximum radial length of the plurality of laminations (30)."

(2) The description or Claims as originally filed have no recitation relating to the radial length of the shaft protrusion cuts (58), but the appellant asserts in the written opinion submitted on March 11, 2021 that the maximum radial length of the shaft protrusion cuts (58) being less than 60% of the maximum radial length of the plurality of laminations (30) is at least based on Fig. 4 and paragraph [0031].Therefore, the recitations of original Fig. 4 and paragraphs [0014], [0015], and [0031] related to Fig. 4 of the application are examined. Fig. 4 and paragraphs [0014], [0015], and [0031] related to Fig. 4 as originally filed describe as follows.



([Fig. 4])

"The drawings illustrate preferred embodiments presently contemplated for implementing the present invention." (paragraph [0014])

"Fig. 1A is a cross-sectional view of an internal permanent magnet (IPM) machine comprising a stator assembly and a rotor assembly in accordance with an exemplary embodiments of the present invention.

Fig. 1B is a cross-sectional view of the internal permanent magnet (IPM) machine comprising the stator assembly and the rotor assembly in accordance with the exemplary embodiments of the present invention.

Fig. 2 is a partial cross-sectional view of the IPM machine of Fig. 1A in accordance with an exemplary embodiment of the present invention

Fig. 3 is a perspective view of the IPM machine of Fig. 1A in accordance with the exemplary embodiment of the present invention.

Fig. 4 is a view of a rotor lamination having a shaft protrusion cut formed therein that is angularly offset from a center in a first direction for use in the IPM machine of Fig. 3 in accordance with the exemplary embodiment of the present invention.

Fig. 5 is a view of the rotor lamination having the shaft protrusion cut formed therein that is angularly offset from the center in the first direction for use in the IPM machine of Fig. 3 in accordance with the exemplary embodiment of the present invention.

Fig. 6 is a view of a rotor lamination having a centered shaft protrusion cut formed therein for use in the IPM machine of Fig. 3 in accordance with the exemplary embodiment of the present invention.

Fig. 7 is a view of the rotor lamination having the centered shaft protrusion cut formed therein for use in the IPM machine of Fig. 3 in accordance with the exemplary embodiment of the present invention.
Fig. 8 is a view of a rotor lamination having a shaft protrusion cut formed therein that is angularly offset from a center in a second direction for use in the IPM machine of Fig. 3 in accordance with the exemplary embodiment of the present invention.
Fig. 9 is a view of the rotor lamination having the shaft protrusion cut formed therein that is angularly offset from the center in the second direction for use in the IPM machine of Fig. 3 in accordance with the exemplary embodiment of the present invention." (paragraph [0015])
"Referring first to Figs. 4 and 5, rotor laminations 74 having a first non-standard lamination configuration are shown in which the shaft protrusion cuts 58 formed on the laminations 74 are offset from the centers (i.e., center lines 76) in a first angular direction 78. According to the embodiment of the invention, the rotor laminations 74 are used to form the first lamination groups 62 on each of the plurality of lamination stacks 60. As such, the rotor laminations 74 in a rotor group 70 having axial locations falling within the axial length of the first lamination groups 62 (i.e., all laminations arranged circumferentially about the shaft at a particular axial location falling within a first group) have the first non-standard lamination configuration. As shown in Figs. 4 and 5, the shaft protrusion cuts 58 are formed to be offset from the centers by an angle (indicated as 80) that is selected during manufacturing of the rotor laminations 74. The angle 80 by which the shaft protrusion cuts 58 are positioned off-center has a maximum value of about half of the slot pitch and is defined as an angle between two slots multiplied by the number of pole-pairs. It is recognized that the angular offset 80 of the shaft protrusion cuts 58 from the centers 76 could be less than this maximum value." (paragraph [0031])
(3) Fig. 4 describes the rotor laminations 74 and the shaft protrusion cuts 58 formed on the laminations 74, but does not describe the specific value of the ratio of the maximum radial length of the shaft protrusion cuts 58 to the maximum radial length of the rotor laminations 74. Moreover, paragraphs [0014], [0015], and [0031] related to Fig. 4 do not describe the ratio of the radial length of the shaft protrusion notch 58 to the radial length of the rotor laminations 74, either.

Regarding Fig. 4, according to the recitation of paragraph [0014] that "the drawings illustrate preferred embodiments presently contemplated for implementing the invention" and the recitation of paragraph [0015] that "Fig. 4 is the view of the rotor lamination having the shaft protrusion cut formed therein that is angularly offset from the center in the first direction for use in the IPM machine of Fig. 3 in accordance with the exemplary embodiment of the present invention," it can be recognized that Fig. 4 illustrates the preferred embodiments presently contemplated for implementing the present invention. Moreover, "in general, the drawings attached to the application of the patent application are explanatory drawings for supplementing the description and allowing for a person skilled in the art to understand the technical content of the invention to which a patent shall be granted, and therefore, it suffices to have the degree of accuracy necessary for understanding the technical content of the invention, and the dimensions shown in the drawings do not necessarily require strict accuracy" (Intellectual Property High Court, October 30, 2013, 2013 (Gyo-Ke) No. 10015). As a result, Fig. 4 is an explanatory drawing that illustrates the preferred embodiments presently contemplated for implementing the present invention, and it is not recognized that Fig. 4 has sufficient accuracy to strictly specify the maximum radial length of the shaft protrusion cuts (58) with respect to the length of the laminations (30). This can also be proved by means of the following matters that: the ratio of the maximum radial length of the shaft protrusion cuts (58) to the maximum radial length of the rotor laminations (74) corresponding to the laminations (30) calculated by actually measuring Fig. 4 is about 53%, and the ratio calculated by actually measuring Fig. 2, which is a drawing of the same embodiment as that of Fig. 4 is about 66%. Therefore, even the maximum radial length of the shaft protrusion cuts (58) is about 53% of the maximum radial length of the plurality of laminations (30) when actually measuring Fig. 4, it cannot be said that the matter that the ratio is about 53% can be thereby grasped according to Fig. 4, either.

Moreover, even on the assumption that the matter that the maximum radial length of the shaft protrusion cuts (58) is about 53% of the maximum radial length of the plurality of laminations (30) can be grasped according to Fig. 4, the original description, etc., do not describe specifying the upper limit of the ratio of the maximum radial length of the shaft protrusion cuts (58) to the maximum radial length of the plurality of laminations (30) at all, and therefore, the matter that "the maximum radial length of the shaft protrusion cuts (58) is less than 60% of the maximum radial length of the plurality of laminations (30)" cannot be grasped according to the description of the original description, etc., either. Furthermore, no lower limit is specified for the matter "the maximum radial length of the shaft protrusion cuts (58) is less than 60% of the maximum radial length of the plurality of laminations (30)", and therefore, 1%, 10%, 30%, etc. that are "less than … 60%" can also be comprised, and the form in which the maximum radial length of the shaft protrusion cuts (58) is considerably short is comprised, but this form is not described in the original description, etc., and is not an obvious matter according to the description of the original description, etc.

(4) Next, the allegation of the appellant is examined. The appellant asserts the following content in the written opinion submitted on June 25, 2021.

"Furthermore, it is considered that the manufacturing of the rotor laminations by directly using the shape of the rotor laminations shown in Fig. 4 so as to implement the present invention is obvious to a person skilled in the art, and therefore, it is possible to understand Fig. 4 as "in Fig. 4, the maximum radial length of the shaft protrusion cuts (58) is about 53% of the maximum radial length of the plurality of laminations (30)," and on the basis of the understanding, it can be said that the specific matter that "the maximum radial length of the shaft protrusion cuts (58) is less than 60% of the maximum radial length of the plurality of laminations (30)" is described in the original description, etc." (hereinafter, referred to as "the allegation 1")

"It is considered that the judgment on the determination related to the applicability of the new matters of the amendment of the matters that are not described in the description should refer to Intellectual Property High Court, August 22, 2018, 2017 (Gyo-Ke) No. 10216, etc." (hereinafter, referred to as "the allegation 2")

Regarding the allegation 1, as described above, the matters that "in Fig. 4, the maximum radial length of the shaft protrusion cuts (58) is about 53% of the maximum radial length of the plurality of laminations (30)" and "the maximum radial length of the shaft protrusion cuts (58) is less than 60% of the maximum radial length of the plurality of laminations (30)" are not described in the original description, etc., and are not obvious matters according to the description of the original description, etc., either.

Regarding the allegation 2, whether or not the amendment meets the requirements of the provisions of the Patent Act Article 17-2(3) should be determined case-by-case, and the existence of "the judgment on the determination related to the applicability of the new matters of the amendment of the matters that are not described in the description" does not immediately affect the determination in the present application.

In conclusion, the allegations 1 and 2 cannot be accepted.

(5) Therefore, the matter that "the maximum radial length of the shaft protrusion cuts (58) is less than 60% of the maximum radial length of the plurality of laminations (30)" in Claims 1, 6, and 8 is not described in the original description, etc., and is not an obvious matter according to the description of the original description, etc., and therefore, it cannot be said that this amendment does not introduce a new technical matter into the relation of the technical matters derived by integrating all the descriptions in the original description, etc.

3 Conclusion of this amendment

Therefore, this amendment should be dismissed under the provisions of the Patent Act Article 53(1) as applied mutatis mutandis pursuant to the provisions of the Patent Act Article 159(1) since it violates the provisions of the Patent Act Article 17-2(3).

Therefore, the decision is made in accordance with the Conclusion of Decision to Dismiss Amendment.

III. Regarding the invention of the present application

1 The invention of the present application

The written amendment submitted on June 25, 2021 is dismissed as described above, and therefore, the inventions according to Claims 1-8 of the present application are specified by the matters described in the amended Claims 1-8 submitted on March 11, 2021, as described in 1(2) of [Reason] of 2.

2 Reasons for refusal of the body

Reason 1 in the reasons for refusal (the final reasons for refusal) notified by the body on May 14, 2021 is as follows: the amendment made in the written amendment submitted on March 11, 2021 does not satisfy the requirement of the provisions of the Patent Act Article 17-2(3) since it goes beyond the scope of the matters described in the original description, etc., in the following points.

Note

The matter that "the maximum radial length of the shaft protrusion cuts (58) is less than 60% of the maximum radial length of the plurality of laminations (30)" is added in Claims 1, 6, and 8 by means of the amendment made in the above-mentioned written amendment.

The appellant asserts as follows in the written opinion dated on the same date (March 11, 2021) for the basis of amendment of the matter.

"It is considered that the point that the maximum radial length of the shaft protrusion cuts (58) is less than 60% of the maximum radial length of the plurality of laminations (30) is at least based on Fig. 4 and the recitation of paragraph [0031] of the description of the present application 'referring first to Figs. 4 and 5, the rotor laminations 74 having the first non-standard lamination configuration are shown in which the shaft protrusion cuts 58 formed on the laminations 74 are offset from the centers (i.e., the center lines 76) in the first angular direction 78; according to the embodiment of the invention, the rotor laminations 74 are used to form the first lamination groups 62 on each of the plurality of lamination stacks 60; as such, the rotor laminations 74 in the rotor group 70 having the axial locations falling within the axial length of the first lamination groups 62 (i.e., all laminations arranged circumferentially about the shaft at the particular axial location falling within the first group) have the first non-standard lamination configuration; and as shown in Figs. 4 and 5, the shaft protrusion cuts 58 are formed to be offset from the centers by the angle (indicated as 80) that is selected during manufacturing of the rotor laminations 74' and therefore, no new matter is introduced.

That is, Fig. 4 illustrates the embodiment in which the maximum radial length of the shaft protrusion cuts (58) is about 53% of the maximum radial length of the plurality of laminations (30)."

However, the maximum radial length of the shaft protrusion cuts (58) being less than 60% of the maximum radial length of the plurality of laminations (30) is not described in paragraph [0031] asserted by the appellant, and is not described in other paragraphs of the original description, etc., at all, either. Furthermore, regarding Fig. 4, the original description, etc., describe that "the drawings illustrate the preferred embodiments presently contemplated for implementing the present invention" (paragraph [0014]), and "Fig. 4 is the view of the rotor lamination having the shaft protrusion cut formed therein that is angularly offset from the center in the first direction for use in the IPM machine of Fig. 3 in accordance with the exemplary embodiment of the present invention." (paragraph [0015]). Moreover, "in general, the drawings attached to the application of the patent application are explanatory drawings for supplementing the description and allowing for a person skilled in the art to understand the technical content of the invention to which a patent shall be granted, and therefore, it suffices to have the degree of accuracy necessary for understanding the technical content of the invention, and the dimensions shown in the drawings do not necessarily require strict accuracy" (Intellectual Property High Court, October 30, 2013, 2013 (Gyo-Ke) No. 10015).

In conclusion, Fig. 4 is merely a drawing that illustrates the preferred embodiments presently contemplated for implementing the present invention, and it is not considered that Fig. 4 has sufficient accuracy to strictly specify the maximum radial length of the shaft protrusion cuts with respect to the length of the laminations. Therefore, on the basis of Fig. 4 and paragraph [0031], Fig. 4 is understood as "in Fig. 4, the maximum radial length of the shaft protrusion cuts (58) is about 53% of the maximum radial length of the plurality of laminations (30)," on the basis of the understanding, the specific matter that "the maximum radial length of the shaft protrusion cuts (58) is less than 60% of the maximum radial length of the plurality of laminations (30)" is not described in the original description, etc., and is not an obvious matter according to the description of the original description, etc., either, and therefore, it cannot be said that no new technical matter is introduced into the relation of the technical matters derived by integrating all the descriptions in the original description, etc.

Therefore, the amendment of the present application made to Claims 1, 6, and 8 does not satisfy the requirements of the provisions of the Patent Act Article 17-2(3) since it goes beyond the scope of the matters described in the original description, etc.

3 Judgment of the body

The amended Claims 1, 6, and 8 of the scope of claims in the written amendment submitted on March 11, 2021 describe that "the maximum radial length of the shaft protrusion cuts (58) is less than 60% of the maximum radial length of the plurality of laminations (30)." Furthermore, as examined in 2 of [Reason] in 2, this matter is not described in the original description, etc., and is not an obvious matter according to the original description, etc., either, or therefore, it cannot be said that the amendment made in the written amendment submitted on March 11, 2021 does not introduce a new technical matter into the relation of the technical matters derived by integrating all the descriptions in the original description, etc.

IV.Closing

As described above, the amendment made in the written amendment submitted on March 11, 2021 does not satisfy the requirements of the provisions of the Patent Act Article 17-2(3) since it goes beyond the scope of the matters described in the original description, etc. Therefore, the present application should be dismissed.

Therefore, the appeal decision is made according to the conclusion.

September 29, 2021

Chief administrative judge: KAKIZAKI, Hiraki
Administrative judge: OKAZAWA, Hiroshi
Administrative judge: SEKIGUCHI, Tetsuo