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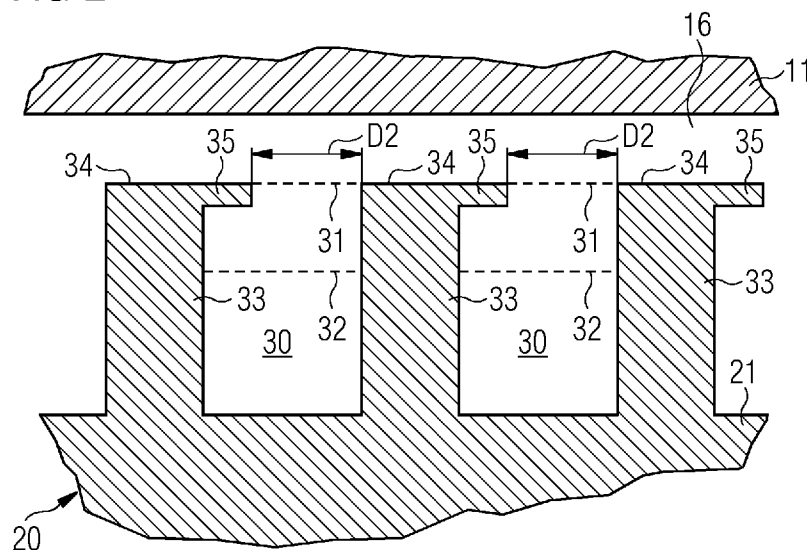
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(54) Title: ELECTRICAL GENERATOR WITH REDUCED END WINDINGS

FIG 2



(57) Abstract: Electrical generator with reduced end windings It is described an electrical generator (10) comprising a stator (20) having a frame body (21) extending axially between a first axial end (22) and a second axial end (23), the frame body (21) including a plurality of slots (30) extending radially from the frame body (21) to respective radial slot ends (31), the plurality of slots (30) being circumferentially distributed around a longitudinal axis (Y) of the stator (20), the frame body (21) comprising at least an axial middle section (25). The circumferential extension (D1, D2) of each of the plurality of slots (30) at the respective radial slot ends (31) varies along the longitudinal axis (Y) of the stator (20), the circumferential extension (D1, D2) at the first axial end (22) and/or at the second axial end (23) being greater than the circumferential extension (D2) at the axial middle section (25) of the frame body (21).

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DESCRIPTION

Electrical generator with reduced end windings

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Field of invention

The present invention relates to an electric generator having a geometry stator with tooth tips and reduced end windings.

10

Art Background

An electrical generator, such as an electric generator installed in a wind turbine, typically comprises a rotor which rotates relative to a stator.

15

For any electrical generator with double layer windings, for example the double layer winding fractional slot concentrated winding (FSCW) generator, the end winding length is dictated by pliability of the insulation as well as the manufacturability of inserting the coil.

20

Stator slots housing the stator coils may have a partly closed opening, for example by providing the stator teeth with respective circumferential tooth protrusions, which is desirable to improve the performances. In such cases pre-formed coils are typically used, the main inconvenience being the fact that the end winding must be designed to be long enough to allow the respective coil to be deformed in order to clear the tooth protrusion during insertion in the respective slot. This extra end winding length required solely for the manufacturing reason of coil insertion produces additional copper losses throughout the whole life of the machine.

30

Reducing this end winding length would either reduce the losses thus increasing the efficiency of the electrical generator, or enable the machine to operate at a higher current and to attain a higher power for the same loss levels, while also saving on material.

35

It is already known in the art of electrical generator manufacturing to preform coils, for example concentrated around teeth, and then slide them into the slot in order to either
5 increase the packing factor or decrease the end winding length. These techniques usually encompass removable tooth tips or removable teeth, as in US 7042130 which are then slid back into place after the coil has been inserted.

10 These methods are typically achievable on machines with short axial lengths, but in wind power, where relatively long axial lengths are common, it is impossible to achieve the tight tolerances required to slide two metal objects past each other over such a large length. If the clearance was increased
15 to allow this method, the electromagnetic performance would rapidly depreciate.

Therefore, there is still a need to provide an improved way to reduce extra end winding length required solely for the
20 manufacturing reason of inserting the coil in the stator, without renouncing to the tooth circumferential protrusions and to the their beneficial effects.

Summary of the invention

25 This need may be met by the subject matter according to the independent claims. Advantageous embodiments of the present invention are described by the dependent claims.

30 According to a first aspect of the invention, it is provided an electric generator comprising a stator having a frame body extending axially between a first axial end and a second axial end, the frame body including a plurality of slots extending radially from the frame body to respective radial slot
35 ends, the plurality of slots being circumferentially distributed around a longitudinal axis of the stator extending from one to the other of the first axial end and the second axial end, the frame body comprising at least an axial middle sec-

tion distanced from the first axial end and the second axial end,

wherein a circumferential extension of each of the plurality of slots at the respective radial slot ends varies along the longitudinal axis of the stator, the circumferential extension at the first axial end and/or at the second axial end being greater than the circumferential extension at the axial middle section of the frame body.

10 The above described electric generator may be advantageously integrated in a wind turbine.

According to a second aspect of the invention, it is provided a method of manufacturing an electrical generator comprising the steps of:

15 - forming a frame body extending axially between a first axial end and a second axial end, the frame body including a plurality of slots extending radially from the frame body to respective radial slot ends, the plurality of slots being circumferentially distributed around a longitudinal axis of the stator extending from one to the other of the first axial end and the second axial end, a circumferential extension of each of the plurality of slots varying along the radial direction in such a way that the circumferential extension is smaller at the respective radial slot end than at a circumferential section distanced from the respective radial slot end,

20 - removing portions of the frame body at the first axial end and/or at the second axial end in order that the circumferential extension of the plurality of slots at the respective radial slot ends is greater at the first axial end and/or at the second axial end than at the axial middle section.

Advantageously, the stator geometry achieved through the present invention allows reducing the end winding length required to insert the coil into the slot.

According to an embodiment of the invention, the circumferential extension of each of the plurality of slots at the first

axial end and/or at the second axial end is radially constant from the frame body to respective radial slot end.

Advantageously, this facilitates the coil insertion at the
5 first axial end and/or at the second axial end of the stator.

According to a further embodiment of the invention, the frame body comprises at least an axial intermediate section between the axial middle section and the first axial end and/or the
10 second axial end, the circumferential extension of each of the plurality of slots in the axial intermediate section varying along the longitudinal axis gradually between a first value and a second value of the circumferential extension.

15 Advantageously, this may remove an abrupt step at the interface(s) between the first axial end or the second axial end and the axial middle section the stator. Such abrupt step may cause damage to the wire insulation in the slots.

20 According another embodiments of the invention, the frame body includes a plurality of teeth extending radially from the frame body to respective radial tooth ends, each of the plurality of slots extending circumferentially between a pair of teeth of said plurality of teeth and wherein at the axial
25 middle section one of said pair of teeth comprises at the respective radial tooth end a circumferential protrusion extending in the respective slot towards the other of said pair of teeth.

30 In embodiments where the axial intermediate section is present, the circumferential protrusion in the axial intermediate section has a circumferential length decreasing from the axial middle section towards the first axial end and/or the second axial end.

35 Advantageously, the above described geometry may be obtained by lamination, creating a plurality of slots including the circumferential protrusion along all the axial length of the slot and then removing it at the first axial end and/or the

second axial end, in order to allow for easier coil insertion and lower end windings. At the end of the step of removal, the circumferential protrusion is present only at the axial middle section of the rotor.

5

According to possible embodiment of the present invention, the axial middle section may have an axial extension being larger than 50% and smaller than 100%, for example 90%, of the total axial length of the frame body between the first
10 axial end and the second axial end.

In different embodiments of the present invention, the plurality of teeth may be symmetrically or asymmetrically distributed around the longitudinal axis of the stator.

15

It has to be noted that embodiments of the invention have been described with reference to different subject matters. In particular, some embodiments have been described with reference to apparatus type claims whereas other embodiments
20 have been described with reference to method type claims. However, a person skilled in the art will gather from the above and the following description that, unless other notified, in addition to any combination of features belonging to one type of subject matter also any combination between fea-
25 tures relating to different subject matters, in particular between features of the apparatus type claims and features of the method type claims is considered as to be disclosed with this document.

30 The aspects defined above and further aspects of the present invention are apparent from the examples of embodiment to be described hereinafter and are explained with reference to the examples of embodiment. The invention will be described in more detail hereinafter with reference to examples of embodi-
35 ment but to which the invention is not limited.

Brief Description of the Drawing

Figure 1 shows a longitudinal section of an electric generator in accordance with an embodiment of the present invention.

Figure 2 shows a circumferential straightened section of the electric generator of Figure 1, according to the sectional line II-II of figure 1.

Figure 3 shows a circumferential straightened section of the electric generator of Figure 1, according to the sectional line III-III of figure 1.

Figure 4 shows a longitudinal section of an electric generator in accordance with another embodiment of the present invention.

Detailed Description

The illustrations in the drawings are schematic. It is noted that in different figures, similar or identical elements are provided with the same reference signs.

Figure 1 shows an electric generator 10 to be included in a wind turbine. According to other possible embodiments of the present invention, the electric generator 10 may not be included in a wind turbine.

The electric generator 10 includes a stator 20 and a rotor 11. The rotor 11 surrounds the stator 20 and is rotatable around a rotational longitudinal axis Y. An air gap 16, which extends circumferential around the axis Y, is provided between the rotor 11 and the stator 20.

The rotor 11 is conventional and therefore not described in further details.

The stator 20 has a frame body 21 extending axially along the rotational longitudinal axis Y between a first axial end 22 and a second axial end 23.

- 5 When not differently specified, the terms axial, radial and circumferential in the following are made with reference to the rotational longitudinal axis Y.

10 The frame body 21 includes a plurality of slots 30 circumferentially distributed around the longitudinal axis Y. The slots 30 extend radially from the frame body 21 to respective radial slot ends 31 and axially from one to the other of the first axial end 22 and the second axial end 23.

- 15 The plurality of slots 30 house a plurality of stator coils (conventional and not shown in the attached figures).

In general and with reference to figure 1, the frame body 21 comprising at least three sections:

- 20 - an axial middle section 25 distanced from the first axial end 22 and the second axial end 23,
- a first end section 22a adjacent to the axial middle section 25 and comprising the first axial end 22,
- a second end section 23a adjacent to the axial middle section 25 and comprising at the second axial end 23.

In embodiments of the present invention, one or both of the first end section 22a and the second end section 23a may be present.

- 30 A circumferential extension D1, D2 of each of the plurality of slots 30 at the respective radial slot ends 31 varies along the longitudinal axis Y of the stator 20. In general, according to the present invention, in the first end section 22a or in the second end section 23a or in both the circumferential extension D1 at the respective radial slot ends 31
35 is greater than the circumferential extension D2 at the axial middle section 25.

Figure 2 shows a section of an embodiment of the electric generator 10 at the axial middle section 25. Figure 3 shows a section of the same embodiment of the electric generator 10 at the first end section 22a and at the second end section 23a. In Figure 2 and 3 the horizontal direction correspond to the circumferential direction of the electric generator 10, while the vertical direction corresponds to the radial direction.

In such embodiment, the frame body 21 includes a plurality of teeth 33 extending radially from the frame body 21 to respective radial tooth ends 34 in such a way that each of the plurality of slots 30 extends circumferentially between a pair of teeth of the plurality of teeth 33. At the axial middle section 25, for each pair of teeth 33 delimiting one respective slot 30, one of the teeth 33 comprises at the respective radial tooth end 34 a circumferential protrusion 35 extending in the respective slot 30 towards the other of said pair of teeth 33.

At the first end section 22a or at the second end section 23a or at both the circumferential extension D1 of the each of the plurality of slots 30 is radially constant from the frame body 21 to respective radial slot end 31.

The different geometry between the axial middle section 25 and the first end section 22a and/or the second end section 23a permits to reduce the end winding length required to insert the coil into the slots 30.

With reference to figure 4, in another embodiment of the present invention, the frame body 21 comprises two axial intermediate sections 27, 28, respectively between the axial middle section 25 and the first axial end 22 and between the axial middle section 25 and the second axial end 23. In the axial intermediate section 27, 28, the circumferential extension of each of the plurality of slots 30 at the respective radial slot end 31 varies along the longitudinal axis Y grad-

usually between the first value D1 and the second value D2 of the circumferential extension.

5 In embodiments where a circumferential protrusion 35 is present at the axial middle section 25 (Figure 2), the circumferential protrusion 35 in the axial intermediate section 27, 28 has a circumferential length decreasing from the axial middle section 25 towards the first axial end 22 and/or the second axial end 23, in order to provide a smooth transition
10 between the axial middle section 25 and the first end section 22a and/or the second end section 23a.

In both the above described embodiments, the axial middle section 25 has an axial extension L3 larger than 50% but
15 smaller than 100%, for example 90%, of the total axial length of the frame body 21, between the first axial end 22 and the second axial end 23. Consequently the sum of the axial extensions L1, L2 of the first end section 22a and the second end section 23a is larger than 0% but smaller than the 50%, for
20 example 10%, of the total axial length of the frame body 21.

The present invention is independent from the circumferential distribution of the stator teeth. In particular, the plurality of teeth 33 may be symmetrically or asymmetrically distributed around the longitudinal axis Y of the stator 20.
25

The stator 20 of the electrical generator 10 may be manufactured as follows.

30 In a first step of the manufacturing method a frame body is formed extending axially between a first axial end 22 and a second axial end 23. The semi-finished frame body includes a plurality of slots 30 extending radially from the frame body to respective radial slot ends 31. The plurality of slots 30
35 are being circumferentially distributed around a longitudinal axis Y of the stator 20 extending from one to the other of the first axial end 22 and the second axial end 23. The circumferential extension of each of the plurality of slots 30 varies along the radial direction in such a way that the cir-

cumferential extension D1, D2 is smaller at the respective radial slot end 31 than at a circumferential section 32 distanced from the respective radial slot end 31. In such semi-finished frame body the section of each slot 30 is constant
5 in shape along the longitudinal axis Y.

In a second step of the manufacturing method portions of the semi-finished frame body are removed at the first axial end 22 and/or at the second axial end 23 of the stator 20 in order that the circumferential extension D1, D2 of the plurality of slots 30 at the respective radial slot ends 31 is
10 greater at the first axial end 22 and/or at the second axial end 23 than at the axial middle section 25.

15 In particular, with reference to the embodiment of figures 2 and 3, in the first step of the manufacturing method the plurality of teeth 33 are formed, extending radially from the frame body 21 to respective radial tooth ends 34. The teeth 33 comprise at the respective radial tooth ends 34 the circumferential protrusion 35 extending in the respective slot
20 30. In the second step of the manufacturing method the circumferential protrusions 35 are removed at the first axial end 22 and/or at the second axial end 23 of the stator 20.

25 In a possible variant of the manufacturing method, in the second step also the two axial intermediate sections 27, 28, respectively between the axial middle section 25 and the first axial end 22 and between the axial middle section 25 and the second axial end 23, are formed.

CLAIMS

1. Electrical generator (10) comprising a stator (20) having a frame body (21) extending axially between a first axial end (22) and a second axial end (23), the frame body (21) including a plurality of slots (30) extending radially from the frame body (21) to respective radial slot ends (31), the plurality of slots (30) being circumferentially distributed around a longitudinal axis (Y) of the stator (20) extending from one to the other of the first axial end (22) and the second axial end (23), the frame body (21) comprising at least an axial middle section (25) distanced from the first axial end (22) and the second axial end (23), wherein a circumferential extension (D1, D2) of each of the plurality of slots (30) at the respective radial slot ends (31) varies along the longitudinal axis (Y) of the stator (20), the circumferential extension (D1, D2) at the first axial end (22) and/or at the second axial end (23) being greater than the circumferential extension (D2) at the axial middle section (25) of the frame body (21).
2. Electric generator (10) as claimed in claim 1, wherein the circumferential extension (D1) of the each of the plurality of slots (30) at the first axial end (22) and/or at the second axial end (23) is radially constant from the frame body (21) to respective radial slot end (31).
3. Electric generator (10) as claimed in claim 1 or 2, wherein the frame body (21) comprises at least an axial intermediate section (27, 28) between the axial middle section (25) and the first axial end (22) and/or the second axial end (23), the circumferential extension (D1, D2) of each of the plurality of slots (30) in the axial intermediate section (27, 28) varying along the longitudinal axis (Y) gradually between a first value (D1) and a second value (D2) of the circumferential extension.

4. Electric generator (10) as claimed in any of the proceeding claims, wherein the frame body (21) includes a plurality of teeth (33) extending radially from the frame body (21) to respective radial tooth ends (34), each of the plurality of slots (30) extending circumferentially between a pair of teeth of said plurality of teeth (33) and wherein at the axial middle section (25) one of said pair of teeth (33) comprises at the respective radial tooth end (34) a circumferential protrusion (35) extending in the respective slot (30) towards the other of said pair of teeth (33).

5. Electric generator (10) as claimed in claim 3 and 4, wherein the circumferential protrusion (35) in the axial intermediate section (27, 28) has a circumferential length decreasing from the axial middle section (25) towards the first axial end (22) and/or the second axial end (23).

6. Electric generator (10) as claimed in any of the claims 4 or 5, wherein said plurality of teeth (33) are symmetrically distributed around the longitudinal axis (Y) of the stator (20).

7. Electric generator (10) as claimed in any of the claims 4 or 5, wherein said plurality of teeth (33) are asymmetrically distributed around the longitudinal axis (Y) of the stator (20).

8. Electric generator (10) as claimed in any of the previous claims, wherein the axial middle section (25) has an axial extension being larger than 50% and smaller than 100% of the total axial length of the frame body (21) between the first axial end (22) and the second axial end (23).

9. Method of manufacturing a stator (20) for an electrical generator (10) comprising the steps of:
- forming a frame body (21) extending axially between a first axial end (22) and a second axial end (23), the frame body (21) including a plurality of slots (30) extending radially from the frame body (21) to respective radial slot ends (31),

the plurality of slots (30) being circumferentially distributed around a longitudinal axis (Y) of the stator (20) extending from one to the other of the first axial end (22) and the second axial end (23), a circumferential extension (D1, D2) of each of the plurality of slots (30) varying along the radial direction in such a way that the circumferential extension (D1, D2) is smaller at the respective radial slot end (31) than at a circumferential section (32) distanced from the respective radial slot end (31),

10 - removing portions of the frame body (21) at the first axial end (22) and/or at the second axial end (23) in order that the circumferential extension (D1, D2) of the plurality of slots (30) at the respective radial slot ends (31) is greater at the first axial end (22) and/or at the second axial end

15 (23) than at the axial middle section (25).

10. Method as claimed in claim 9, wherein in the step of forming a frame body (21) is formed including a plurality of teeth (33) extending radially from the frame body (21) to respective radial tooth ends (34), each of the plurality of slots (30) extending circumferentially between a pair of teeth of said plurality of teeth (33) one of said pair of teeth (33) comprising at the respective radial tooth end (34) a circumferential protrusion (35) extending in the respective slot (30) towards the other of said pair of teeth (33)

25 and wherein in the step of removing the circumferential protrusions (35) are removed at the first axial end (22) and/or at the second axial end (23) of the stator (20).

FIG 1

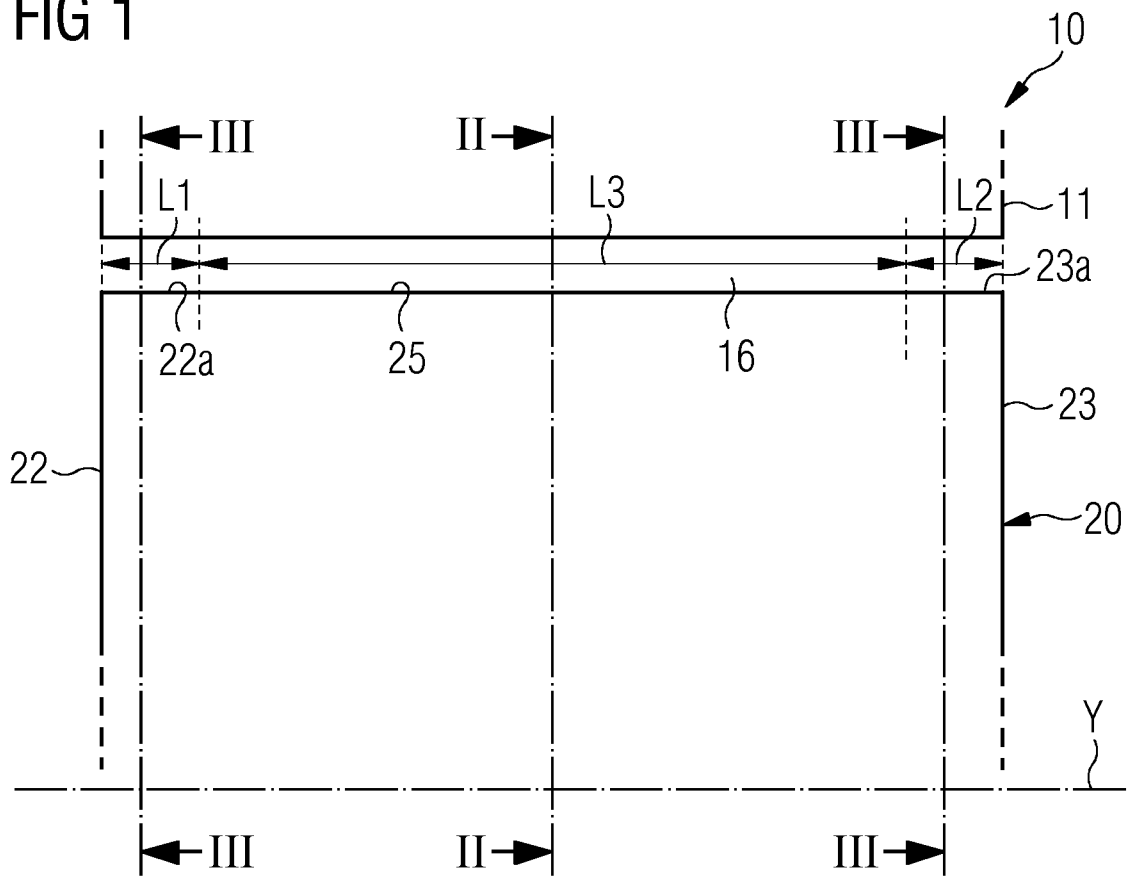


FIG 2

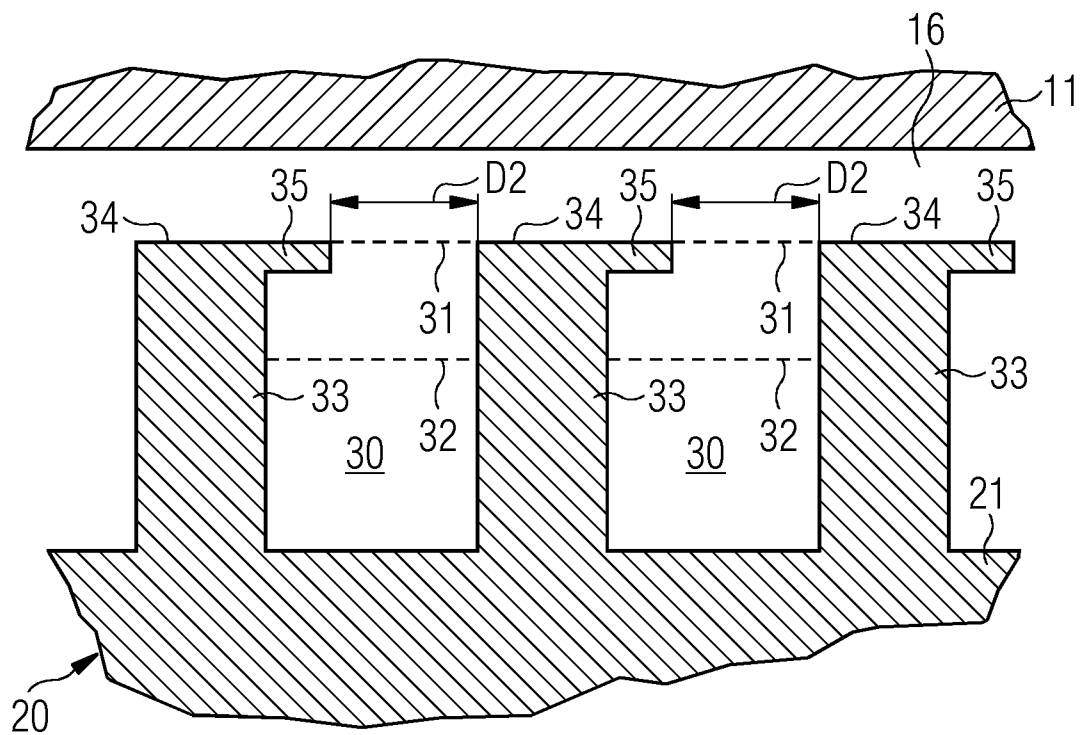


FIG 3

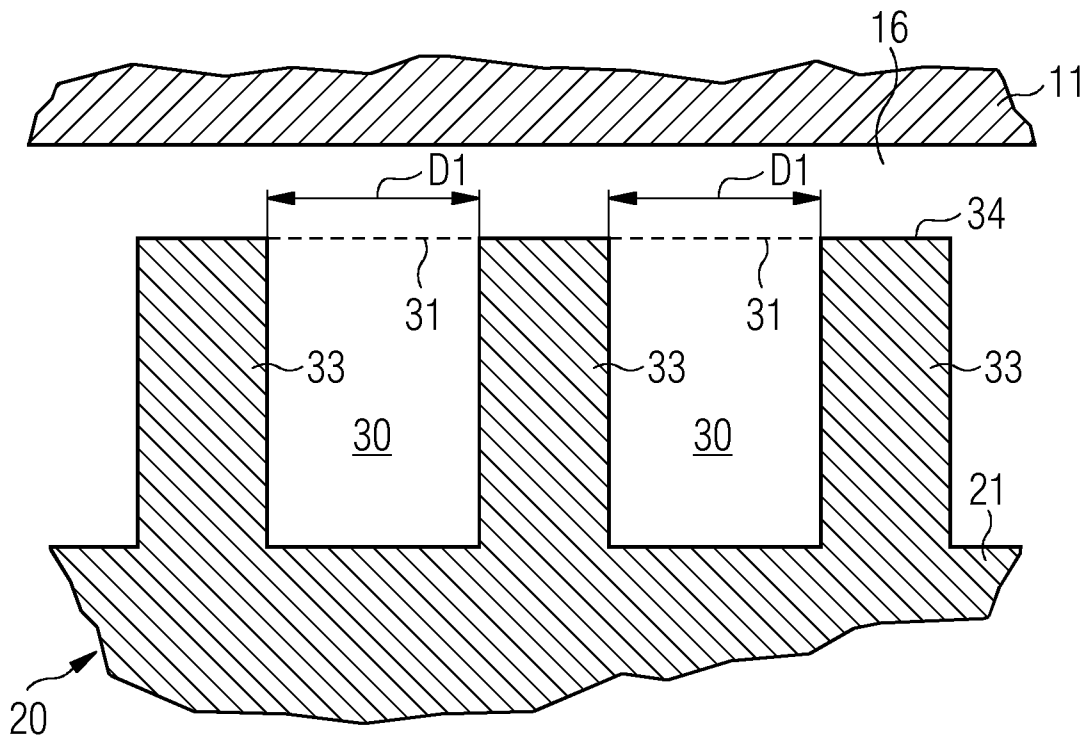
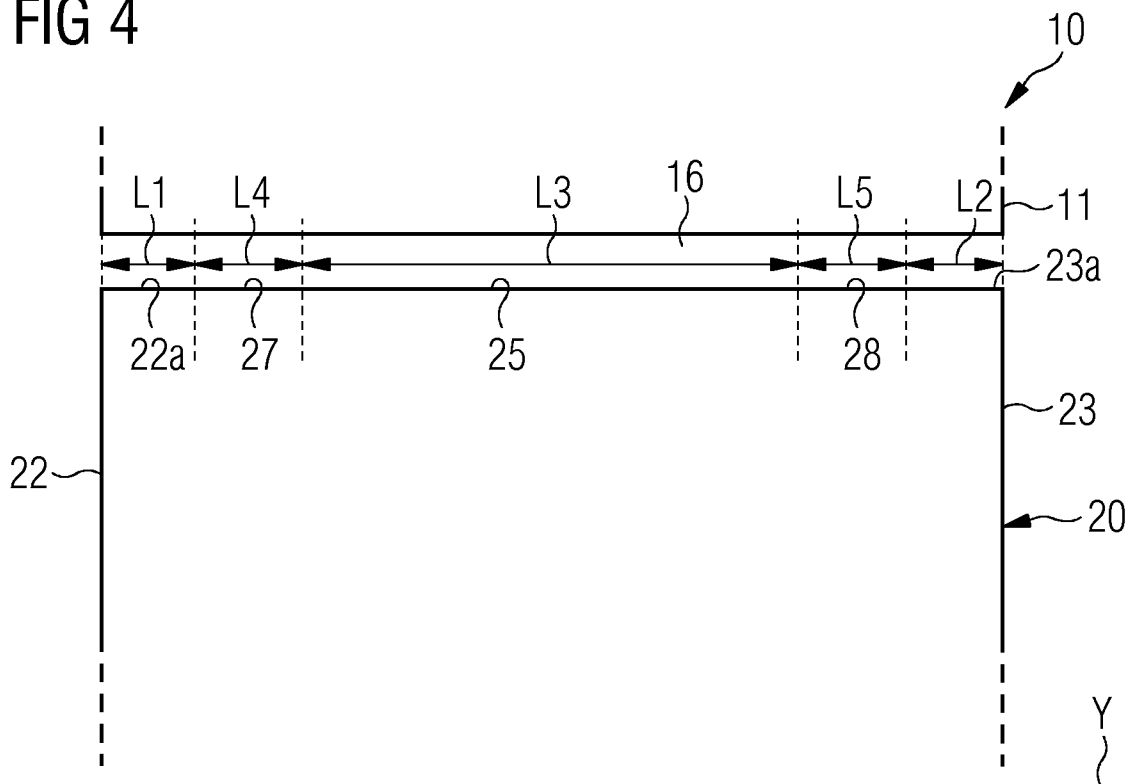


FIG 4



INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2018/062294

A. CLASSIFICATION OF SUBJECT MATTER

INV. H02K1/14
ADD. H02K1/16 H02K3/493

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H02K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP H04 39043 U (NIDEC CORPORATION) 2 April 1992 (1992-04-02) figures 2,3,4	1,3-6, 8-10
X	WO 2016/059459 A1 (TOYOTA JIDOSHA KK) 21 April 2016 (2016-04-21) Paragraphs 13, 14, 46; figures 3A, 3B, 4,7	1,2,9
X	US 2005/269891 A1 (SHINOKI HIROAKI [JP] ET AL) 8 December 2005 (2005-12-08) figures 3,4A,4B,4C	1,9
X	DE 10 2011 078513 A1 (BOSCH GMBH ROBERT [DE]) 3 January 2013 (2013-01-03) Paragraph 3; figures 1,2	1,9
	----- -/-	

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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Date of the actual completion of the international search

20 June 2018

Date of mailing of the international search report

29/06/2018

Name and mailing address of the ISA/

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Jabri, Tarak

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2018/062294

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 2 264 858 A2 (MITSUBISHI ELECTRIC CORP [JP]) 22 December 2010 (2010-12-22) figure 28 -----	1,9
X	US 2011/193445 A1 (HORNG ALEX [TW] ET AL) 11 August 2011 (2011-08-11) figure 9 -----	1,7,9

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2018/062294

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP H0439043 U	02-04-1992	JP 2590117 Y2 JP H0439043 U	10-02-1999 02-04-1992
WO 2016059459 A1	21-04-2016	CN 107078565 A JP 2016082683 A US 2017237304 A1 WO 2016059459 A1	18-08-2017 16-05-2016 17-08-2017 21-04-2016
US 2005269891 A1	08-12-2005	JP 2005348553 A US 2005269891 A1	15-12-2005 08-12-2005
DE 102011078513 A1	03-01-2013	NONE	
EP 2264858 A2	22-12-2010	EP 2264858 A2 JP 5424814 B2 JP 2011004583 A US 2010295403 A1	22-12-2010 26-02-2014 06-01-2011 25-11-2010
US 2011193445 A1	11-08-2011	NONE	