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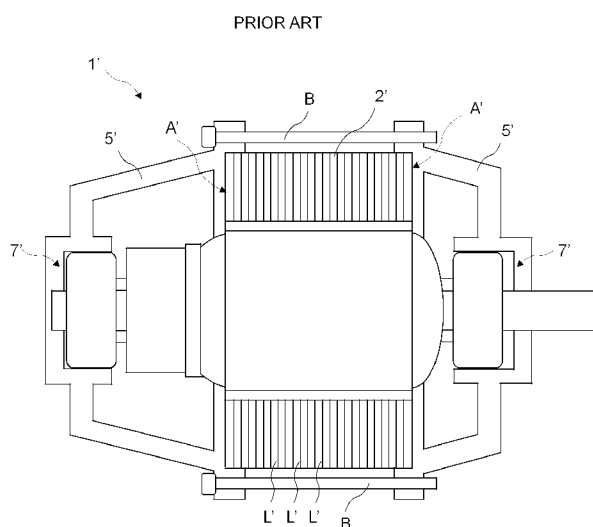
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Figure 1



(57) Abstract: The present invention relates to an electric motor (1) includes a stator (2) configured by stacking laminations (L) on top of each other, a rotor (3), a front endshield (5) and a rear endshield (5) mounted to the front and rear sides of the stator (2) for supporting the rotor (3) and wherein the front and rear endshields (5) are secured separately to the stator (2) stack without fastening together by fasteners thereby the distance between the bearing housings (7) disposed in the motor endshields (5) that support the rotor (3) becomes independent of the variability in the stator (2) stack height.

Description**ELECTRIC MOTOR**

[0001] The present invention relates to an electric motor includes a stator and a rotor which are mounted between and supported by the endshields.

[0002] The electric motor, for example the universal motor used in household appliances, includes a stator which is the stationary part and a rotor moving inside the stator, and the rotor shaft is supported by the bearings in the housings inside the motor endshields at the front and rear of the stator. The bearing distance between both ends of the rotor shaft is determined by the sizes of the endshields that are assembled by mounting the front and back sides of the stator stack and by the stator stack height. The stator stack is formed of laminations placed on top of each other and the overlapping laminations stretch considerably in the direction of the stator height. Since the thickness of each lamination is variable, even though the varieties are very small, the variations add up when the laminations are stacked on top of each other and the errors accumulate, thus increasing the variability of the stator stack height. The stator stack height is an important parameter in the assembly of an electric motor and the squeezing of the stator stack at axial height direction causes variability in the end-play which allows the rotor, operating inside the stator, to move a little in the axial direction. Motor endshields are mounted to both ends of the stator stack and bearing housings are provided in the motor endshields that support the rotor shaft. During the assembly of the motor endshields, the stator stack height changes by the pressure of the fasteners fastening the motor endshields to each other and the variability of the stator stack height causes variability in the distance between the bearing housings in the motor endshields at both ends of the stator stack, mounted to each other by fasteners and it becomes hard to keep the bearing distance between both ends of the rotor. The variability of the distance between the bearing housings on both ends of the rotor gives rise to problems of irregularity in the rotor bearing loads and increasing of vibration and noise.

[0003] In conventional art, in an electric motor (1'), after the motor endshields (5') are disposed on the front and back surfaces (A') of a stator (2') stack,

having laminations (L'), the motor endshields (5') are connected to each other by fasteners (B) and the fasteners (B) press the laminations (L') axially, forming the stator (2') thus causing the stator (2') stack height to be variable and hence the distance between the bearing housings (7') to be variable (Figure 1).

- [0004] In the electric motor explained in state of the art patent document no US9404891; the motor endshields are fastened to each other by mounting bolts.
- [0005] In the electric motor explained in the state of the art patent document no US4758755, the motor endshield is fastened to the stator core by means of indentations or dimples on the side surface of the motor endshield.
- [0006] The aim of the present invention is the realization of an electric motor wherein the distance between the rotor bearings in the motor endshields is kept constant without being affected by the variability of the stator stack height.
- [0007] The electric motor realized in order to attain the aim of the present invention is explicated in the attached claims.
- [0008] The electric motor comprises a stator configured by stacking the laminations on top of each other, a rotor rotating inside the stator and a front endshield and a rear endshield are disposed at the front and back sides of the stator stack, each having a bearing housing for supporting the rotor.
- [0009] A skirt shaped flange which is a part of the motor endshield and the motor endshields are mounted on the stator from the front and rear surfaces by means of the flange. The flanges are seated on the front and rear surfaces of the stator and maintain centering of the motor endshields by enclosing the lateral sides of the stator.
- [0010] In the electric motor of the present invention, one or more slits are provided in the motor endshields, extending by slitting the flange portions of the endshields towards the center of the endshields and separating the flange into two or more parts. While the motor endshields are fastened to the stator, the slit is made narrower by means of a locking member, pushing the parts of the flange separated by the slit towards each other.

Thus, the flange encloses the lateral surface of the stator like a clamp maintaining the endshield to be fastened to the stator.

[0011] The endshields disposed on both sides of the stator are secured only to the lateral side of the stator by the slit and the locking member, the stator stack is prevented from pressing at stack height direction axially since the endshields are not connected to each other by fasteners.

[0012] The locking member is fitted to locking lugs that extend out beyond the flange, having a slit therebetween for narrowing the slit.

[0013] In an embodiment of the present invention, the locking member that nears the locking lugs to each other is threaded.

[0014] In another embodiment of the present invention, the locking member nearing the locking lugs to each other is a U shaped element that is hammered on the locking lugs.

[0015] In another embodiment of the present invention, a protrusion is provided on the inner surface of the flange seated on the lateral side of the stator, embedded on the lateral surface of the stator while the motor endshield is mounted on the stator or the said protrusion is fitted in a cavity situated on the lateral surface of the stator thereby the motor endshield is mounted the stator in a shape-locking manner.

[0016] The electric motor realized in order to attain the aim of the present invention is illustrated in the attached figures, where:

[0017] Figure 1 - is the schematic view of an electric motor in conventional art.

[0018] Figure 2 - is the schematic view of the electric motor in the present invention.

[0019] Figure 3 - is the view of detail D in Figure 2.

[0020] Figure 4 - is the schematic view of the locking lugs in the motor endshield and the

[0021] locking member in another embodiment of the present invention.

[0022] Figure 5 - is the perspective view of a motor endshield.

[0023] The elements illustrated in the figures are numbered as follows:

1. Electric motor
2. Stator
3. Rotor

4. Bearing
5. Endshield
6. Flange
7. Bearing housing
8. Slit
9. Locking member
10. Locking lug
11. Recess
12. Protrusion
13. Cavity

[0024] The electric motor (1) comprises a stator (2) configured by stacking ferromagnetic laminations (L) on top of each other, forming a magnetic field with the voltage received, a rotor (3) that rotates inside the stator (2), two bearings (4) for supporting the rotor (3) shaft from both ends and two endshields (5) mounted to the front and rear sides of the stator (2) stack.

[0025] The endshield (5) comprises a flange (6) that is seated on the front and rear surfaces (A) of the stator (2) and centering thereof by enclosing the lateral surface (Y) of the stator (2) peripherally and a bearing housing (7) disposed in the endshields (5) wherein the bearings (4) are seated.

[0026] The electric motor (1) of the present invention comprises one or more slits (8) extending from the flange (6) towards the bearing housing (7) at the center of the endshield (5) and slitting the flange (6) into two or more parts and a locking member (9) mounted on the flange (6), pushing the parts separated by the slit (8) towards each other thus narrowing the slit (8), maintaining the flange (8) to squeeze the lateral surface (Y) of the stator (2) peripherally by serving as a clamp.

[0027] While the endshields (5) are being fastened to the front and rear sides of the stator (2), the flanges (6) are seated on the front and rear surfaces (A) of the stator (2) and center the endshields (5) by leaning on the lateral surface (Y) of the stator (2). After the endshield (5) is disposed to the stator (2), the locking member (9) is mounted, nearing to each other the parts separated by the slit (8) in the body and flange (6) of the endshield (5) and the force of friction between the stator (2) and its lateral surface (Y)

is increased by pressing on the lateral surface (Y) of the stator (2) and thus the endshields (5) are fastened to the stator (2) separately at both ends without connecting the endshields (5) to each other. By means of the slit (8) and the locking member (9), the endshield (5) is mounted on the stator (2) like a clamp. Each endshield (5) is only fastened to the stator (2) and the endshields (5) are not fastened to each other. The stator (2) stack formed by stacking the laminations (L) on top of each other does not stretch, not being subjected to a pressure on the front and rear surfaces (A) thereof whereon the endshields (5) are seated, and the distance between the bearing housings (7) in the endshields (5) does not change since the stator (2) stack height does not vary.

- [0028] In an embodiment of the present invention, the endshield (5) comprises at least two locking lugs (10) on the flange (6), positioned oppositely on the two parts thereof separated by the slit (8), extending outwards from the flange (8) and whereon the locking member (9) is mounted.
- [0029] In an embodiment of the present invention, the electric motor (1) comprises a threaded locking member (9), secured to the locking lugs (10), nearing the locking lugs (10) to each other thereby narrowing the slit (8) therebetween. In this embodiment, a threaded screw hole is provided in at least one of the locking lugs (10) where to the threaded locking member (9) will be secured or the threaded locking member (9) is inserted through the flat screw holes on the locking lugs (10) and fastened by a nut.
- [0030] In another embodiment of the present invention, the electric motor (1) comprises a U shaped locking member (9) hammered on both of the locking lugs (10), nearing the locking lugs (10) to each other thereby narrowing the slit (8) therebetween (Figure 4). In this embodiment, after the locking lugs (10) are squeezed by e.g. a clamp for nearing to each other, the U shaped locking member (9) is mounted on the locking lugs (10) by hammering thereon. In this embodiment, the endshield (5) comprises one or more recesses (11) whereon the ends of the U shaped locking member (9), hammered on the locking lugs (10), are seated.
- [0031] In another embodiment of the present invention, the motor endshield (5) comprises a protrusion (12), situated on the inner surface of the flange (6)

which is seated on the lateral surface (Y) of the stator (2), extending vertically to the lateral surface (Y) of the stator (2), and embedded in the lateral surface (Y) of the stator (2) while the motor endshield (5) is mounted to the stator (2) (Figure 3). In another embodiment, the electric motor (1) comprises a cavity (13) disposed on the lateral surface (Y) of the stator (2) wherein the protrusion (12) on the endshield (5) is fitted while the endshield (5) is mounted to the stator (2). Thus, the endshields (5) are mounted on the stator (2) in a shape-locking manner and it is prevented that the endshield (5) to be displaced from the stator (2).

[0032] In the electric motor (1) of the present invention, since the variability of the stator (2) stack height does not affect the distance between the bearing housings (7) disposed in the motor endshields (5) and that support the rotor (3), the rotor (3) can be supported axially between the endshields (5) almost without any gaps, the problems of axis eccentricity of the bearing housings (7) arising with respect to the variability in the stack height of the stator (2) formed of laminations (L), operating with noise and decrease in life of the bearings (4) due to variable loads acting on the bearings (4) and the errors of rotor (3) eccentricity due to faults in parallelism and verticality of the stator (2) stack are eliminated considerably.

Claims

1. An electric motor (1) that comprises a stator (2) configured by stacking laminations (L) on top of each other, a rotor (3) that rotates inside the stator (2), two bearings (4) for supporting the rotor (3) shaft from both ends and two endshields (5) mounted to the front and rear sides of the stator (2) stack, having a flange (6) that is seated on the front and rear surfaces (A) of the stator (2) and centering thereof by enclosing the lateral surface (Y) of the stator (2) peripherally and a bearing housing (7) disposed in the endshields (5) wherein the bearings (4) are seated at both ends of the rotor (3) shaft, **and characterized by** one or more slits (8) extending from the flange (6) towards the bearing housing (7) at the center of the endshield (5) and slitting the flange (6) into two or more parts and a locking member (9) mounted on the flange (6), nearing the parts separated by the slit (8) towards each other thus narrowing the slit (8), maintaining the flange (8) to serve as a clamp thereby squeezing the lateral surface (Y) of the stator (2) peripherally.
2. An electric motor (1) as in Claim 1, **characterized by** the endshield (5) comprising at least two locking lugs (10) on the flange (6), positioned oppositely on the two parts separated by the slit (8), extending outside from the flange (8) and whereon the locking member (9) is mounted.
3. An electric motor (1) as in Claim 2, **characterized by** threaded locking member (9), secured to the locking lugs (10), nearing the locking lugs (10) to each other thereby narrowing the slit (8) therebetween.
4. An electric motor (1) as in Claim 2, **characterized by** U shaped locking member (9) hammered on both of the locking lugs (10), nearing the locking lugs (10) to each other thereby narrowing the slit (8) therebetween.
5. An electric motor (1) as in Claim 4, **characterized by** the endshield (5) comprising one or more recesses (11) whereon the ends of the U shaped locking member (9) are seated.
6. An electric motor (1) as in any one of the above Claims, **characterized by** the endshield (5) comprising a protrusion (12), situated on the inner surface of the flange (6) which is seated on the lateral surface (Y) of the stator (2) and embedded in the lateral surface (Y) of the stator (2).
7. An electric motor (1) as in Claim 6, **characterized by** a cavity (13) disposed on

the lateral surface (Y) of the stator (2) where to the protrusion (12) on the endshield (5) is fitted while the endshield (5) is mounted to the stator (2) in a shape-locking manner.

Figure 1

PRIOR ART

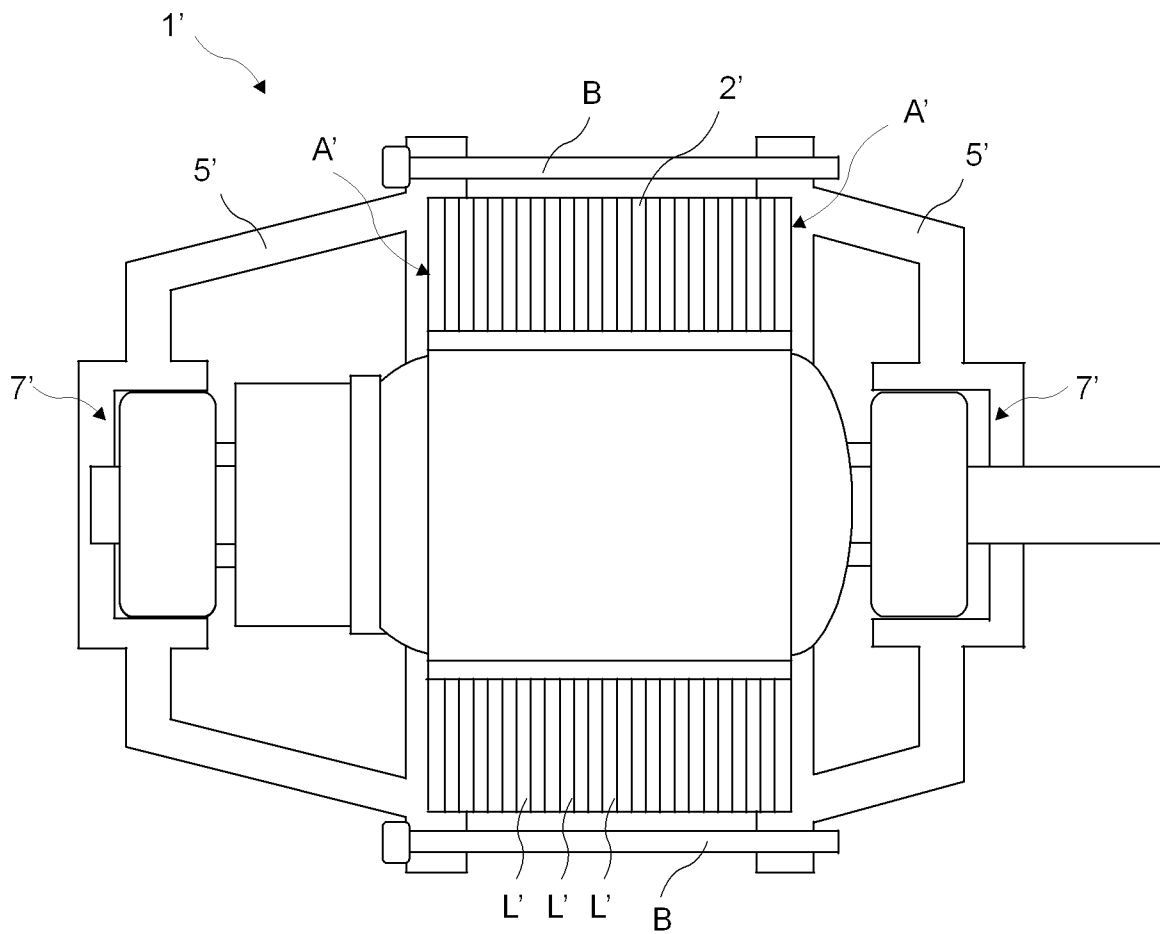


Figure 2

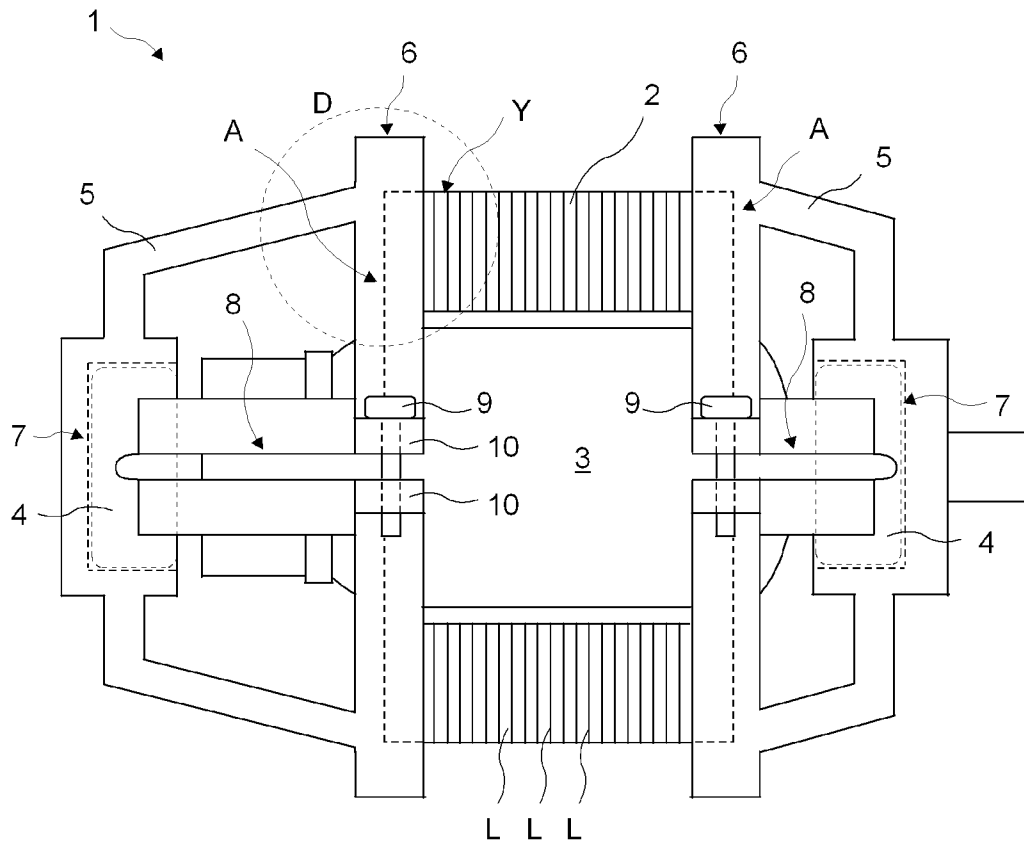


Figure 3

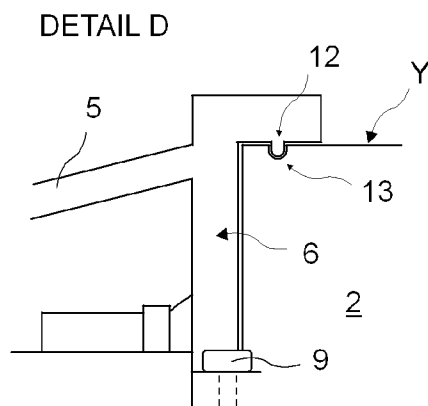


Figure 4

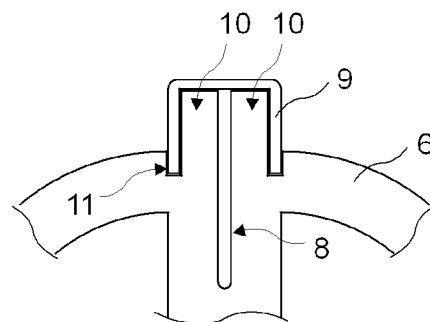


Figure 5

