

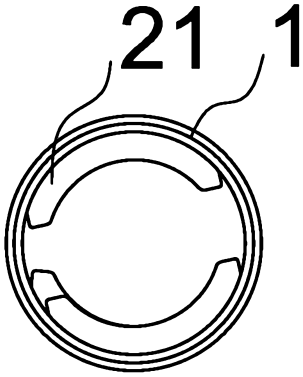
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Abstract

The invention relates to a structure for assembling magnetic shoes of a motor stator and provides the structure for assembling the magnetic shoes of the motor stator, which is simple in structure and low in cost, and can eliminate cogging torque, further enable a motor to have low energy consumption, low vibration and low noise, and solve the technical problems of high energy consumption, large vibration and noise, low working efficiency and the like of the motor caused by the cogging torque in the prior art. The structure comprises the stator of the motor, a plurality of magnetic pole groups with adjacent N and S polarities are arranged on the inner wall surface of the stator, each magnetic pole group is formed by left-handed or right-handed arrangement of a plurality of sections of magnetic shoes along the inner wall surface of the stator in the axial direction, and the polarities on axial adjacent end surfaces of the magnetic shoes are opposite.



Structure for Assembling Magnetic Shoes of Motor Stator

Technical Field

The invention relates to a motor stator, in particular to a structure for assembling magnetic shoes of the motor stator, which can eliminate cogging torque of the motor and further enable a motor to have low energy consumption and low noise.

Background of the Invention

Cogging torque is the torque generated in the circumferential direction under the mutual action of a magnetic field of permanent magnets of a rotor and a cogging of a stator iron core, and the cogging torque is unrelated with current of a stator and always tries to position the rotor in a certain position, thereby causing large energy consumption and low working efficiency of a motor; when the torque frequency is consistent with the mechanical resonance frequency of the stator or the rotor during transmission driving, the vibration and the noise generated by the cogging torque are amplified, so that the elimination of cogging torque ripple has become the key of improving the motor torque fluctuation, reducing the noise and improving the working efficiency of the motor. In order to eliminate the cogging torque, the method which is generally adopted at present is to stick a plurality of cylindrical magnetic shoes with adjacent N and S polarities on the surface of the rotor, wherein each cylindrical magnetic shoe is twisted a certain angle by taking the axial line as the center and taking the two end surfaces as the reference, then the cogging torque can be greatly eliminated, but the twisted magnetic shoes have the problems of great processing difficulty, high cost and the like, so that the method is not applicable to extensive popularization.

For example, Chinese patent discloses an embedded closed slot permanent magnet synchronous motor (CN101465587A) which comprises a stator and a rotor, wherein the rotor is arranged in the stator and coaxial with the stator, a plurality of permanent magnets are ineffectively arranged on the rotor along the circumferential direction of the rotor, a rotor shaft is arranged on the axial line of the rotor, a stator winding is arranged on the stator, the stator is in a separate stator structure, and slot openings among all teeth for constituting the stator are closed. The structure can realize consistent magnetic resistance of the stator in the circumferential direction by closing the slot openings on the stator, thereby eliminating the reason of generating the cogging torque; however, the closed slots in the structure increases the difficulty in wire embedding of the winding, thereby simultaneously greatly increasing the slot leakage reactance, increasing a time constant of a circuit and further affecting the dynamic property of a control system of the motor; thus, the method is also not applicable to extensive popularization.

Summary of the Invention

The invention aims at providing a structure for assembling magnetic shoes of a motor stator, which is simple in structure and low in cost, and can eliminate cogging torque,

further enable a motor to have low energy consumption, low vibration and low noise, and solve the technical problems of high energy consumption, large vibration and noise, low working efficiency and the like of the motor caused by the cogging torque in the prior art.

The above technical purpose of the invention is mainly solved through the following technical scheme: the structure for assembling the magnetic shoes of the motor stator comprises the stator of the motor, a plurality of magnetic pole groups with adjacent N and S polarities are arranged on the inner wall surface of the stator, each magnetic pole group is formed by left-handed or right-handed arrangement of a plurality of sections of magnetic shoes along the inner wall surface of the stator in the axial direction, and the polarities on axial adjacent end surfaces of the magnetic shoes are opposite. The cogging torque of the motor is overcome by arranging the plurality of the magnetic pole groups with the adjacent N and the S polarities on the inner wall surface of the stator, the structure is simple, the weight bearing of a rotor is simultaneously reduced, the energy consumption is reduced, and the working efficiency of the motor is improved; each magnetic pole group is formed by a plurality of sections of magnetic shoes with the adjacent N and the S polarities, which are in left-handed or right-handed arrangement along the inner wall surface of the stator in the axial direction, so that the magnetic pole groups can further have the performance characteristic of twisting the magnetic shoes, thereby being capable of eliminating the cogging torque and enabling the motor to have low energy consumption and low vibration and noise; and the plurality of the magnetic shoes with the adjacent N and the S polarities are in head-to-tail connection and left-handed or right-handed staggered arrangement, the processing and the manufacturing are simple, and the cost is low.

Preferentially, two magnetic pole groups are symmetrically arranged on the inner wall surface of the stator, and each magnetic pole group is formed by left-handed equidistant arrangement of two sections of the magnetic shoes along the inner wall surface of the stator. The magnetic pole groups which are symmetrically arranged can enable the effect of eliminating the cogging torque of the motor in the circumferential direction to be consistent, keep the operation of the motor balanced and stable, be conducive to playing the performances of the motor and prolong the service life of the motor.

Preferentially, the adjacent magnetic shoes on the magnetic pole groups are staggered the same included angle along the circumferential direction of the inner wall surface of the stator. The magnetic shoes are in staggered distribution with the same included angle, thereby ensuring that the motor can have uniform and consistent effect of eliminating the cogging torque in the axial direction and the circumferential direction, enabling the operation of the motor to be balanced and stable and prolonging the service life of the motor.

Preferentially, the magnetic shoes are rectangular after being flattened, the magnetic shoes are formed by symmetrically bending the corresponding long sides of rectangles, and the outer arc surfaces of the corresponding magnetic shoes are

matched with and push against the inner wall surface of the stator. The cylindrical surface-shaped magnetic shoes formed by rectangular planes are simple to process and mold; and the outer arc surfaces of the magnetic shoes are matched with and push against the inner wall surface of the stator, thereby ensuring that the magnetic shoes can be fixed reliably and being conducive to stabilizing the performances of the motor.

Therefore, the structure for assembling the magnetic shoes of the motor stator has the following advantages: the cogging torque of the motor is overcome by arranging the plurality of the magnetic pole groups with the adjacent N and the S polarities on the inner wall surface of the stator, the structure is simple, the weight bearing of the rotor is small, the energy consumption can be reduced, and the working efficiency of the motor can be improved; the magnetic pole groups are constituted by the plurality of the sections of the magnetic shoes with the adjacent N and the S polarities, which are in the left-handed or the right-handed arrangement along the inner wall surface of the stator in the axial direction, then the magnetic pole groups can meet the function of eliminating the cogging torque and reduce the energy consumption and the vibration noise of the motor; the plurality of the magnetic shoes with the adjacent N and the S polarities are in head-to-tail connection and left-handed or right-handed staggered arrangement, the processing and the manufacturing are simple, and the cost is low; and the magnetic pole groups which are symmetrically arranged can enable the effect of eliminating the cogging torque of the motor in the circumferential direction to be consistent, keep the operation of the motor balanced and stable, be conducive to playing the performances of the motor and prolong the service life of the motor.

Brief Description of the Drawings

Figure 1 is a stereogram of structure for assembling magnetic shoes of motor stator of the invention;

Figure 2 is an axial sectional view of structure as shown in Figure 1;

Figure 3 is a radial sectional view of structure as shown in Figure 1.

Detailed Description of the Invention

In combination of the figures, the technical scheme of the invention is further specifically described through the following embodiments.

Embodiment:

As shown in Figure 1, a structure for assembling magnetic shoes of a motor stator comprises the stator 1 of a motor, two magnetic pole groups 2 with adjacent N and S polarities are symmetrically stuck on the inner wall surface of the stator 1, as shown in Figure 2 and Figure 3, each magnetic pole group 2 is formed by left-handed equidistant arrangement of two sections of magnetic shoes 21 along the inner wall surface of the stator 1 in the axial direction, the magnetic shoes 21 are rectangular after being flattened, the cylindrical magnetic shoes 21 are formed by symmetrically bending the corresponding long sides of rectangles, the outer arc surfaces of the

corresponding magnetic shoes 21 are matched with and push against the inner wall surface of the stator 1, the rotation angle of staggered arrangement of the corresponding adjacent magnetic shoes 21 on each magnetic pole group 2 along the circumferential direction of the inner wall surface of the stator is 10 degrees, and the polarities on axial adjacent end surfaces of the magnetic shoes 21 are opposite.

The specific embodiment described in the text is only an example of the concept of the invention. Those of skill in the art of the invention can make various modifications or supplements or adopt the similar ways for substitution to the described specific embodiment without deviating from the spirit of the invention or exceeding a scope defined in claims.

What is claimed is:

1. A structure for assembling magnetic shoes of a motor stator, which comprises the stator of a motor and is characterized in that a plurality of magnetic pole groups (2) with adjacent N and S polarities are arranged on the inner wall surface of the stator (1), each magnetic pole group (2) is formed by left-handed or right-handed arrangement of a plurality of sections of magnetic shoes (21) along the inner wall surface of the stator (1) in the axial direction, and the polarities on axial adjacent end surfaces of the magnetic shoes are opposite.
2. The structure for assembling the magnetic shoes of the motor stator according to claim 1, characterized in that two magnetic pole groups (2) are symmetrically arranged on the inner wall surface of the stator (1), and each magnetic pole group (2) is formed by left-handed equidistant arrangement of two sections of the magnetic shoes (21) along the inner wall surface of the stator (1).
3. The structure for assembling the magnetic shoes of the motor stator according to claim 1 or 2, characterized in that the adjacent magnetic shoes (21) on the magnetic pole groups (2) are staggered the same included angle along the circumferential direction of the inner wall surface of the stator (1).
4. The structure for assembling the magnetic shoes of the motor stator according to claim 1 or 2, characterized in that the magnetic shoes (21) are rectangular after being flattened, the magnetic shoes (21) are formed by symmetrically bending the corresponding long sides of rectangles, and the outer arc surfaces of the corresponding magnetic shoes (21) are matched with and push against the inner wall surface of the stator (1).
5. The structure for assembling the magnetic shoes of the motor stator according to claim 3, characterized in that the magnetic shoes (21) are rectangular after being flattened, the magnetic shoes (21) are formed by symmetrically bending the corresponding long sides of rectangles, and the outer arc surfaces of the corresponding magnetic shoes (21) are matched with and push against the inner wall surface of the stator (1).

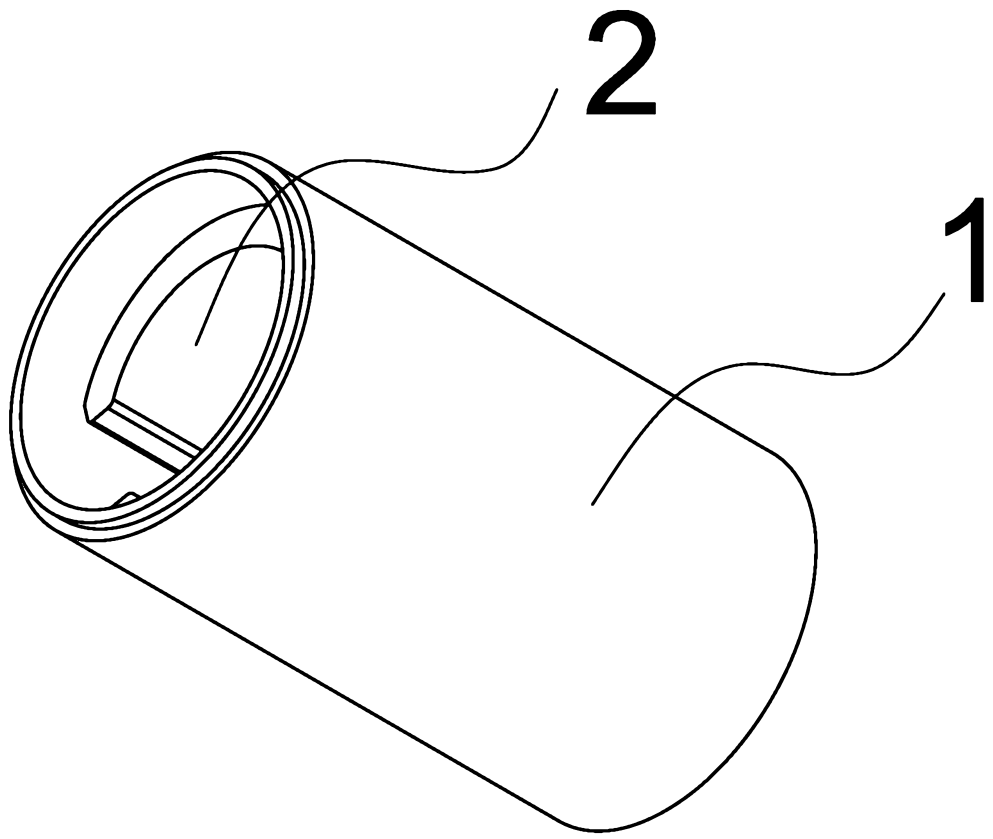


FIG. 1

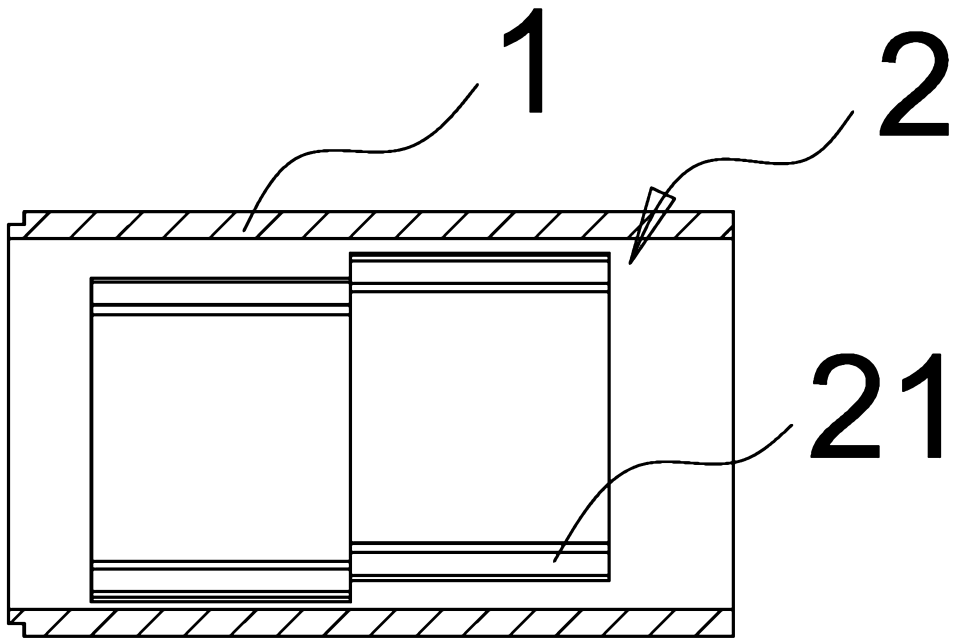


FIG. 2

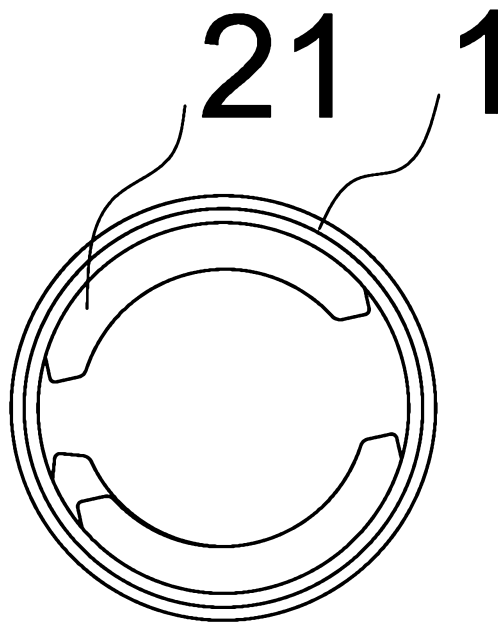


FIG. 3