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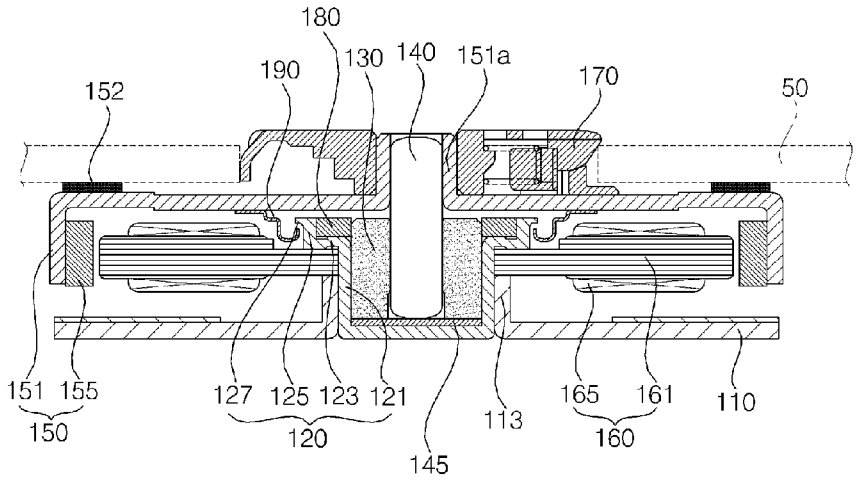
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(54) Title: SPINDLE MOTOR

[Fig. 1]



(57) Abstract: A spindle motor is disclosed, wherein a bearing housing is coupled to a base by press-fit, adhesion or welding to make an assembly process simple and make the manufacturing cost reduced. The bearing housing is formed with a metal sheet to further save the manufacturing cost. A lower end of a support portion of the base coupled with the bearing housing is extended to a lower end of the bearing housing to broaden a coupled area between the base and the bearing housing. Therefore, a coupled strength between the base and the bearing housing can be improved to enhance a perpendicularity of the bearing housing to the base.

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Description

Title of Invention: SPINDLE MOTOR

Technical Field

[1] The present invention relates to a spindle motor.

Background Art

[2] A spindle motor performs the function of rotating a disk to enable an optical pickup which linearly reciprocates in an optical disk drive (ODD) to read data recorded on the disk.

[3]

[4] Generally, an assembly process of a spindle motor is such that a base is supportively coupled with a lower end of upper/bottom surfaces-opened bearing housing. The conventional spindle motor suffers from disadvantages because the bearing housing is coupled to the base by caulking, the manufacturing cost is very high due to bearing housing made of high priced brass, and drawing force of a rotor deteriorates due to difficulty in securing a contact area with a caulked portion.

Disclosure of Invention

Technical Problem

[5] The present invention is disclosed to obviate the abovementioned problems, and it is an object to provide a spindle motor configured to improve a drawing force of a rotor and to reduce an assembly cost of a bearing housing by fully increasing a contact area with a portion caulked by the bearing housing or improving a coupling structure between the bearing housing and a base plate.

Solution to Problem

[6] In one general aspect of the present invention, there is provided a spindle motor comprising: a base from which a support portion is protruded; a bearing housing insertedly coupled with the support portion; a bearing fixed inside the bearing housing; a rotation shaft supportively and rotatably installed at the bearing; a rotor rotating together with the rotation shaft by being coupled to the rotation shaft; and a stator disposed around the bearing housing to rotate the rotor, wherein a portion of the base around the support portion is concavely bent.

Advantageous Effects of Invention

[7] The spindle motor according to the present invention is advantageous in that a bearing housing is coupled to a base by press-fit, adhesion or welding to make an assembly process simple and make the manufacturing cost low. The bearing housing is formed with a metal sheet to further save the manufacturing cost. A lower end of a support portion of the base coupled with the bearing housing is extended to a lower

end of the bearing housing to broaden a coupled area between the base and the bearing housing. Therefore, a coupled strength between the base and the bearing housing can be improved to enhance a perpendicularity of the bearing housing to the base.

Brief Description of Drawings

[8] FIG. 1 is a cross-sectional view illustrating a spindle motor according to an exemplary embodiment of the present invention.

[9] FIG. 2 is a cross-sectional view illustrating a spindle motor according to another exemplary embodiment of the present invention.

[10] FIG. 3 is a cross-sectional view illustrating a spindle motor according to still another exemplary embodiment of the present invention.

Best Mode for Carrying out the Invention

[11] A spindle motor according to the exemplary embodiments of the present invention will be described in detail with reference to the accompanying drawings.

[12]

[13] FIG.2 is a cross-sectional view illustrating a spindle motor according to an exemplary embodiment of the present invention.

[14]

[15] A base is provided as shown in FIG.2. In designating a direction and a surface of constituent parts, a direction and a surface facing an upper vertical side of the base (110) are respectively called "an upper side" and "an upper surface", while a direction and a surface facing a bottom vertical side of the base are respectively called "a bottom side" and "a bottom surface". A stator is provided at an upper surface of the base (110).

[16]

[17] The base (110) is protrudingly formed with a support portion (113). The support portion (113) is inserted by a cylindrical bearing housing (120) which is erectively installed therein. A bearing (130) is press-fit into an inner circumferential surface of the bearing housing (120), and the bearing (130) is rotatably and supportively inserted by a lower end of a rotation shaft (140).

[18]

[19] The bearing housing (120) is formed by a press-worked metal sheet. The bearing housing (120) is opened at an upper surface while a bottom surface is closed. At this time, a bottom peripheral closed surface end of the bearing housing (120) is inserted into the support portion (113).

[20]

[21] To be more specific, the bearing housing (120) includes a bottom-closed vertical portion (121), a horizontal extension frame (123), a vertical extension portion (125) and a hitching frame (127).

[22]

[23] The vertical portion (121) is inserted into the support portion (113) at its closed outer bottom end thereof and vertically installed relative to the base (110), and is press-fit by the bearing (130) at an inner surface thereof.

[24]

[25] The horizontal extension frame (123) is extensively formed from an upper outer end of the vertical portion (121) toward a radial outer side of the rotation shaft (140), and the vertical extension portion (125) is extensively formed from an outer surface of the horizontal extension frame (123) to an upper end direction of the rotation shaft (140). The hitching frame (127) is formed at an upper outer end of the vertical extension portion (125).

[26]

[27] The vertical portion (121) may be inserted into, adhered to or welded to the support portion (113) to obtain a secured coupling between the bearing housing (120) and the support portion (113).

[28]

[29] The spindle motor according to the present invention is simple in assembly and can reduce the manufacturing cost, because the bearing housing (120) is press-fit, adhered or welded to the base (110). The manufacturing cost of spindle motor according to the present invention is further reduced because the bearing housing (120) is formed by a metal sheet.

[30]

[31] A thrust plate (145) is inserted between the bottom surface of the bearing (130) and the bottom surface of the vertical portion (121). The thrust plate (145) supports a bottom end of the rotation shaft (140) for smooth rotation of the rotation shaft (140) and for prevention of tear and wear of the rotation shaft (140) and the vertical portion (121) of the bearing housing (120) as well. A rotor (150) and a stator (160) are coupled at the rotation shaft (140) and the bearing housing (120).

[32]

[33] The rotor (150) has a cylindrical bottom-opened shape, where an upper central surface of the rotor (150) is coupled to a periphery of the rotation shaft (140) exposed to an upper surface of the bearing housing (120), and a lateral surface of the rotor (150) includes a rotor yoke (151) wrapping the bearing housing (120) and a magnet (155) coupled to a lateral surface of the rotor yoke (151). A disk (50) is mounted on the rotor yoke (151).

[34]

[35] The stator (160) includes a core (161) fixed at a periphery of the vertical portion (121) between an upper surface of the support portion (113) and the vertical extension

frame (123), and a coil (165) wound on the core (161). The stator (160) also faces the magnet (155).

[36]

[37] In a case a current flows in the coil (165), the rotor (150) is rotated by the electromagnetic force from the magnet (155) and the coil (165), whereby the rotation shaft (140) is rotated.

[38]

[39] The stator (160) is supported by the support portion (113) and the bearing housing (120). That is, a bottom surface of the core (161) is supportively contacted by an upper surface of the support portion (113), and an upper surface of the core (161) is supportively contacted by a bottom surface of the horizontal extension frame (123), whereby the stator (160) is securely coupled by the bearing housing (120). The core (161) is coupled to the vertical portion (121) by press-fit or adhesive.

[40]

[41] An upper central surface of the rotor yoke (151) is formed with a coupling portion (151a) for secure coupling between the rotation shaft (140) and the rotor yoke (151), and a periphery of the coupling portion (151a) is formed with a clamp (170). The clamp (170) elastically supports the disk (50) so as to match the center of the disk (50) with the center of the rotation shaft (140), and supports the disk (50) lest the disk (50) be disengaged from the rotor yoke (151) as well.

[42]

[43] The horizontal extension frame (123) of the bearing housing (120) and the vertical extension portion (125) are coupled by a bottom surface and a periphery of a ring-shaped suction magnet (180). The suction magnet (180) sucks a bottom surface of the rotor yoke (151) to prevent the rotor (150) and the rotation shaft (140) from floating upwards.

[44]

[45] The bottom surface and the periphery of the suction magnet (180) are brought into contact the metal bearing housing (120) to prevent magnetic flux generated by the suction magnet (180) from leaking to the outside and to allow the flux to be re-introduced into the suction magnet (180) after flowing along the horizontal extension frame (123) of the bearing housing (120) and the vertical extension portion (125), whereby the magnetic force of the suction magnet (180) is increased to strongly draw the rotor yoke (151), further preventing the rotor (150) and the rotation shaft (140) from floating upwards.

[46]

[47] An upper surface of the bearing (130) is exposed to an upper surface of the vertical portion (121) to cause a periphery thereof to face an inner circumferential surface of

the suction magnet (180). In a case a gap between the bearing and the suction magnet (180) is properly adjusted, the magnetic flux of the suction magnet (180) is not leaked to the outside but flows along the bearing (130) to be re-introduced into the suction magnet (180).

[48]

[49] A stopper (190) is coupled to an upper surface of the rotor yoke (151). A bottom surface of the stopper (190) is hitched by a hitching frame (127) of the bearing housing (120) to prevent the rotor (150) and the rotation shaft (140) from being disengaged upwards of the bearing housing (120).

[50]

[51] The spindle motor according to the present invention is such that a bottom surface of the support portion (113) contacting the base (110) and a bottom surface of the vertical portion (121) are made to be on the same planar position, whereby a coupled area between the support portion (113) and the bearing housing (120) is broadened to a maximum to improve a coupling force of the support portion (113) and the bearing housing (120) and to improve a perpendicularity of the bearing housing (120) to the base (110). Unexplained reference numeral 152 is a felt for preventing slippage of the disk (50).

Mode for the Invention

[52] FIG.2 is a cross-sectional view illustrating a spindle motor according to another exemplary embodiment of the present invention.

[53]

[54] Referring to FIG.2, a portion of a base (210) at an outer bottom surface of a support portion (213) is bent (215) to reinforce strength of the base (210). The bent portion (215) is formed with a verticality to the base (210) or repeats verticality and horizontality to the base (210).

[55]

[56] FIG.3 is a cross-sectional view illustrating a spindle motor according to still another exemplary embodiment of the present invention, where only a difference from FIG.2 will be explained.

[57]

[58] Referring to FIG.3, a bent portion (315) of a base (310) is slanted to the base (310) or repeats the slantness to the base (310). In the exemplary embodiments, the bent portions (215, 315) of the bases (210, 310) may continuously repeat the verticality and the slantness to the bases (210, 310).

[59]

[60] While the present disclosure has been particularly shown and described with

reference to exemplary embodiments thereof, the general inventive concept is not limited to the above-described embodiments. It will be understood by those of ordinary skill in the art that various changes and variations in form and details may be made therein without departing from the spirit and scope of the present invention as defined by the following claims.

Industrial Applicability

[61] The spindle motor according to the present invention has an industrial applicability in that a bearing housing is coupled to a base by press-fit, adhesion or welding to make an assembly process simple and make the manufacturing cost reduced. The bearing housing is formed with a metal sheet to further save the manufacturing cost. A lower end of a support portion of the base coupled with the bearing housing is extended to a lower end of the bearing housing to broaden a coupled area between the base and the bearing housing. Therefore, a coupled strength between the base and the bearing housing can be improved to enhance a perpendicularity of the bearing housing to the base.

Claims

[Claim 1] A spindle motor comprising: a base from which a support portion is protruded; a bearing housing insertedly coupled with the support portion; a bearing fixed inside the bearing housing; a rotation shaft supportively and rotatably installed at the bearing; a rotor rotating together with the rotation shaft by being coupled to the rotation shaft; and a stator disposed around the bearing housing to rotate the rotor, wherein a portion of the base around the support portion is concavely bent.

[Claim 2] The spindle motor claim 1, wherein one surface of the bearing housing is opened while the other surface is closed, and the closed other side is insertedly coupled with the support portion.

[Claim 3] The spindle motor claim 2, wherein a bent surface of the base contacting the support portion has the same height as that of the other surface of the bearing housing.

[Claim 4] The spindle motor claim 1, wherein the bent portion of the base is vertically bent to the base.

[Claim 5] The spindle motor claim 1, wherein the bent portion of the base repeats verticality and horizontality to the base.

[Claim 6] The spindle motor claim 1, wherein the bent portion of the base is slantedly formed to the base.

[Claim 7] The spindle motor claim 1, wherein the bent portion of the base continuously repeats the slantness and verticality to the base.

[Claim 8] The spindle motor claim 1, wherein the stator is fixed at the outer surface of the bearing housing to be supported by the support portion.

[Claim 9] The spindle motor claim 8, wherein the bearing housing includes a vertical portion, a periphery of one cross-sectional surface of which is insertedly coupled with the support portion, and an inner circumferential surface of which is fixed by the bearing, and a horizontal extension frame extended from a periphery of the other cross-sectional surface of the vertical portion to a radial direction of the rotation shaft.

[Claim 10] The spindle motor claim 9, wherein the stator is fixed at a periphery of the vertical portion between the support portion and the horizontal extension frame.

[Claim 11] The spindle motor claim 9, wherein the bearing housing includes a vertical extension portion extensively formed from a periphery of the horizontal extension frame to the direction of the rotation shaft, and a hitching frame formed at a periphery at a cross-section of the vertical

extension portion.

[Claim 12] The spindle motor claim 11, wherein the horizontal extension frame and the vertical extension portion are coupled with a ring-shaped suction magnet for preventing the rotor from floating upwards.

[Claim 13] The spindle motor claim 12, wherein an inner circumferential surface of the suction magnet faces a periphery at a cross-section of the bearing facing the other side end of the rotation shaft.

[Claim 14] The spindle motor claim 1, wherein the rotor includes a rotor yoke coupled to the other side of the rotation shaft and mounted with a disk, and a magnet coupled to the rotor yoke to face the stator.

[Claim 15] The spindle motor claim 14, wherein the rotor yoke is coupled with a stopper for preventing the rotor and the rotation shaft from being disengaged to the other side of the bearing housing by being hitched at a hitching frame formed at the periphery of the bearing housing.

[Claim 16] The spindle motor claim 14, wherein the rotor yoke is formed with a coupling portion in which an inner circumferential surface is hitched by the periphery of the rotation shaft.

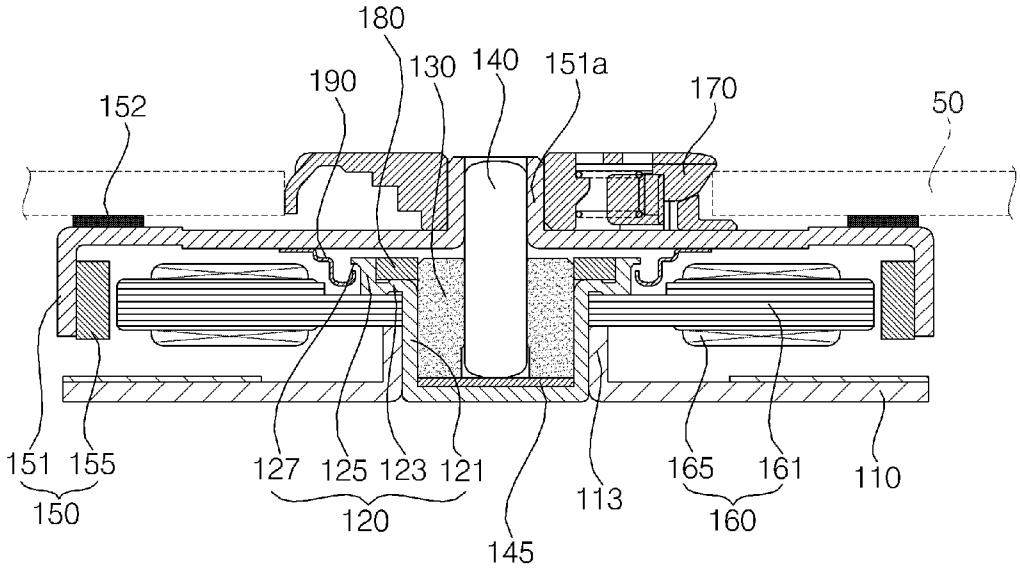
[Claim 17] The spindle motor claim 16, wherein a clamp for supporting the disk is coupled to a periphery of the coupling portion.

[Claim 18] The spindle motor claim 1, wherein a thrust plate supported by one end of the rotation shaft is formed between the bearing and one surface of the bearing housing.

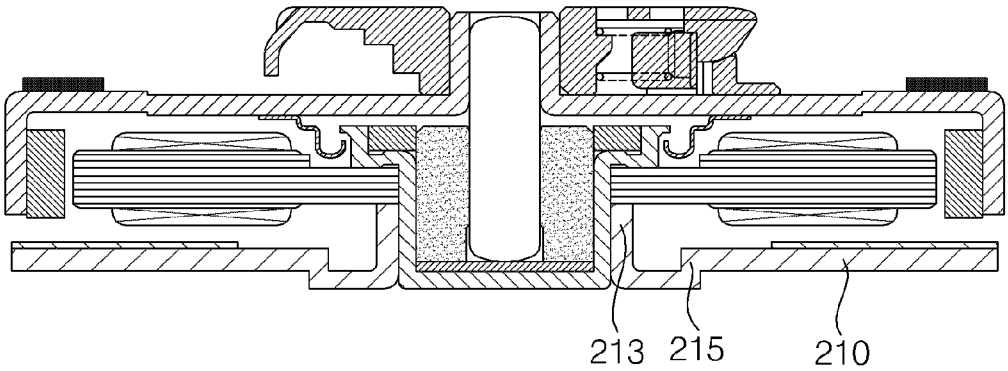
[Claim 19] The spindle motor claim 1, wherein the bearing housing is formed with a press-worked metal sheet, and the bearing housing is coupled to the support portion by one of methods of press-fit, adhesion and welding.

[Claim 20] The spindle motor claim 19, wherein the stator is coupled to the bearing housing by press-fit or adhesion.

[Fig. 1]



[Fig. 2]



[Fig. 3]

