

SUPPORT BASE

TECHNICAL FIELD

[1] The present disclosure relates to the field of electrical device technologies, and in particular, to a support base.

BACKGROUND

[2] In a support base of a fan in the prior art, the fan is placed on the support base, and an oscillation of the fan placed on the support base can be achieved through a rotating structure of the support base.

[3] In order to achieve the oscillation function, a limiting block is provided on a movement path of a gear. When the gear rotates and collides with the limiting block, an original rotation direction of the gear may be changed, and the gear rotates in an opposite direction until it collides with a limiting block at the other end. A cyclic rotation of the gear drives a fan rotating portion to oscillate. However, when the gear collides with the limiting block, the rotating structure may vibrate due to a fit clearance between components, causing the fan to exhibit a nodding motion. That is, the fan may tilt to one side due to vibration.

SUMMARY

[4] In order to solve the above problems, the present disclosure provides a support base to prevent a fan from tilting to one side due to vibration.

[5] The support base provided by the present disclosure is configured to support a fan, the support base includes: a housing, a limiting block is arranged on the housing; a rotating body arranged on an upper side inside the housing and configured to drive the fan placed on the rotating body to rotate, the rotating body includes a fan rotating portion arranged on the upper side of the housing and configured to support the fan; and a motor arranged inside the housing and configured to drive the rotating body to rotate. The support base further includes: a plurality of protrusions arranged between the fan rotating portion and a top surface of the housing, and the fan rotating portion is divided into a first region and a

second region, and the protrusions at least include a first protrusion arranged on the second region.

[6] With the support base according to the present disclosure, by arranging the first protrusion in the second region, when the fan rotating portion is about to tilt from the first region toward the second region due to vibration, the rotating body first contacts the first protrusion on the second region, thereby preventing the fan rotating portion from significantly tilting from the first region toward the second region, and thus preventing the fan from nodding.

[7] Further, the protrusions further include a second protrusion arranged on the first region; and a height of the first protrusion is greater than a height of the second protrusion.

[8] Further, the rotating body further includes a second gear placed inside the housing; the second gear includes a tooth portion and a base circle portion, the tooth portion is arranged on the base circle portion and surrounds a part of an outer peripheral side of the base circle portion; and the first region is located on a side close to the tooth portion of the second gear, and the second region is located on a side away from the tooth portion of the second gear.

[9] Further, the limiting block is provided on the housing, and a plane-a in a vertical direction where a contact surface of the limiting block and the second gear is located is a boundary line; and the first region is located on the side close to the tooth portion of the second gear, and the second region is located on the side away from the tooth portion of the second gear.

[10] Further, the second region includes a region-A and a region-B; the region-A is formed by taking the plane-a in the vertical direction where the contact surface of the limiting block and the second gear is located as a start and rotating 45° to 90° toward the second region; the region-B is formed by taking a plane-b where a junction of the region-A and the region-B is located as a start and rotating 45° to 90° ; and the first protrusion includes a protrusion-A and a protrusion-B, the protrusion A is arranged in the region-A, the protrusion B is arranged in the region-B, and an included angle between a plane-d where the protrusion A is connected with a circle center of the fan rotating portion and a plane-e where the protrusion B is connected with the circle center of the fan rotating portion is 45° to 90° .

[11] Further, the included angle between the plane-d where the protrusion A is connected with the circle center of the fan rotating portion and the plane-e where the protrusion B is connected with the circle center of the fan rotating portion is 72° .

[12] Further, an included angle between the plane-d and the plane-b is 36° , and an included angle between the plane-e and the plane-b is 36° .

[13] Further, the second protrusion is greater in number than the first protrusion.

[14] Further, each of the first protrusion and the second protrusion is a support protrusion or an oil accumulating protrusion configured to support the fan rotating portion.

[15] Further, the first protrusion is the oil accumulating protrusion, and a height of the oil accumulating protrusion is higher than a height of the support protrusion.

[16] Further, the oil accumulating protrusion is arranged between two support protrusions.

[17] Further, the fan rotating portion includes a rotating plate fixed to a surface of the rotating body facing the housing; and the protrusions are arranged on the rotating plate.

BRIEF DESCRIPTION OF THE DRAWINGS

[18] FIG. 1 is a schematic diagram of a cooperation between a support base and a fan in the prior art.

[19] FIG. 2 is a cross-sectional view of a support base according to an embodiment of the present disclosure.

[20] FIG. 3 is a schematic diagram of a bottom surface of a rotating plate according to an embodiment of the present disclosure.

[21] FIG. 4 is a partial enlarged view of a bottom surface of a rotating plate according to an embodiment of the present disclosure.

[22] FIG. 5A is a schematic diagram in a case that a second gear collides with an end of a limiting block according to an embodiment of the present disclosure.

[23] FIG. 5B is a schematic diagram of regions and angles divided according to the embodiment in FIG. 5A.

[24] FIG. 6A is a schematic diagram in a case that the second gear collides with the other end of the limiting block according to an embodiment of the present disclosure.

[25] FIG. 6B is a schematic diagram of regions and angles divided according to the embodiment in FIG. 6A.

[Reference signs]

Support base 100,

Housing 10,

First region 101, Second region 102, Region-A 103, Region-B 104,

Rotating body 20, Fan rotating portion 21, Rotating plate 211, Support plate 212, Auxiliary plate 22,

Support protrusion 31, Oil accumulating protrusion 32, Inner peripheral barrier wall 321, Outer peripheral barrier wall 322, Oil channel 323, Inner protrusion 324, Outer protrusion 325, Oil accumulating port 301,

Second gear 23, Tooth portion 231, Base circle portion 232,

First protrusion 51, Second protrusion 52,

Limiting block 60,

Fan 200, Grease 300.

DETAILED DESCRIPTION OF EMBODIMENTS

[26] In order to make the objectives, technical solutions, and advantages of embodiments of the present disclosure clearer, the technical solutions of the embodiments of the present disclosure will be clearly and completely described below with reference to the accompanying drawings. Furthermore, the described embodiments are only part of the embodiments of the present disclosure, not all of the embodiments. Based on the embodiments of the present disclosure, all other embodiments obtained by those skilled in the art without any creative effort are within the scope of protection of the present disclosure.

[27] The terms “first” and “second” used herein are for descriptive purposes only

and should not be construed as indicating or implying relative importance.

[28] In order to explicitly illustrate the technical contents and effects of the present disclosure, the following detailed descriptions will be provided with reference to specific implementations and accompanying drawings thereof. Furthermore, the following embodiments are only one of specific examples of the present disclosure, and do not limit the technical scope of the present disclosure.

[29] In the accompanying drawings, a second description of a same reference sign for a same component, as well as a description of components not directly related to the present disclosure, will be omitted or simplified. In the following descriptions, directional terms such as “upper” “lower”, “left”, “right”, “above” and “below” are described with reference to a mounting state of a support base of the present disclosure.

[30] As shown in FIG. 1, the embodiment relates to a support base 100 for an air supply apparatus or for supporting a fan 200. The fan 200 may be freely placed on the support base 100, and electric energy is provided to the fan 200 by a lead wire to achieve an air supply effect.

[31] The support base 100 includes: a housing 10, a motor, a rotating body 20, and a control portion.

[32] The housing 10 is a cylindrical structure provided with an opening at a top portion, and the rotating body 20 is arranged at the opening. An area of a bottom surface of the housing 10 is larger than an area of a top surface of the housing 10. From a front sectional view of the support base 100 (FIG. 2), the housing 10 gradually tilts inward from the bottom surface to the top surface, that is, the housing 10 is a circular truncated cone. In some alternative embodiments, the bottom surface of the housing 10 may not only be in a circular shape, but may also be in other suitable shapes.

[33] The housing 10 includes a limiting block 60. The limiting block 60 is arranged inside the housing 10 and is located on a rotation trajectory of a second gear 23. When the second gear 23 rotates clockwise until it collides with an end of the limiting block 60, the second gear 23 will change its original rotation direction to rotate counterclockwise until it collides with the other end of the limiting block 60, and then it will change its rotation direction again to rotate clockwise. The second gear 23 repeats the above rotation to drive a fan rotating portion 21 to oscillate.

[34] The motor is electrically connected to the control portion, and the motor is arranged inside the housing 10 to drive the rotating body 20 to rotate. In the embodiment, the motor may be a stepper motor.

[35] The rotating body 20 is arranged on an upper side inside the housing 10. When the rotating body 20 rotates, the rotating body 20 may drive the fan 200 placed on the rotating body 20 to rotate.

[36] The rotating body 20 includes: a gear, an auxiliary plate 22, and the fan rotating portion 21.

[37] The gear includes a first gear connected to a rotating shaft of the motor and a second gear 23 placed laterally inside the housing 10. The second gear 23 meshes with the first gear, and the first gear rotates to drive the second gear 23 to rotate.

[38] The second gear 23 includes: a base circle portion 232, an opening, and a tooth portion 231. The base circle portion 232 is in a circular hollow shape, and an opening is provided in a middle portion of the base circle portion 232. A lead wire may pass through the opening and be fixed on the second gear 23. The tooth portion 231 is arranged on an outer peripheral side of the base circle portion 232, and the tooth portion 231 meshes with the first gear. In the embodiment, referring to FIG. 5A and FIG. 6A, the tooth portion 231 does not surround an entire outer peripheral side of the base circle portion 232. The tooth portion 231, that is, a part of the second gear 23 that contacts and meshes with the first gear during rotation, is provided on a part of the outer peripheral side of the base circle portion 232. A part of the second gear 23 where the tooth portion 231 is not provided exposes an edge of the base circle portion 232.

[39] The auxiliary plate 22 is fixed on the top surface of housing 10 and directly faces the rotating plate 211. In the embodiment, the auxiliary plate 22 is in a hollow circular ring shape, which is fixed to the top surface of the housing 10 in a snap-fit manner. In other embodiments, the auxiliary plate 22 may also be integrally formed with the housing 10. For example, the auxiliary plate 22 may be a bottom surface of the housing 10 facing the rotating plate 211 described later.

[40] The fan rotating portion 21 is snap-fitted onto the housing 10 via a shaft rotating wheel. An end of the fan rotating portion 21 is fixedly connected to the second gear 23 through the opening in the housing 10. When the second gear 23 rotates, the second gear

23 drives the fan 200 placed on an upper side of the fan rotating portion 21 to rotate.

[41] The fan rotating portion 21 includes a rotating plate 211 and a support plate 212.

[42] The support plate 212 is in a micro-funnel shape, the support plate is used to support the fan 200 and is arranged at a topmost side of the fan rotating portion 21.

[43] The rotating plate 211 is arranged on the auxiliary plate 22. In the embodiment, the rotating plate 211 is in a circular hollow ring shape and is fixed to a lower side of the support plate 212 in a snap-fit manner. In other embodiments, the rotating plate 211 may also be integrally formed with the support plate 212, for example, the rotating plate 211 may be a bottom surface of the support plate 212. As the shaft rotating wheel rotates, the rotating plate 211 and the support plate 212 rotate together, thereby achieving a relative movement between the auxiliary plate 22 and the rotating plate 211.

[44] A protrusion protruding toward the auxiliary plate 22 is provided on a wall surface of the rotating plate 211 facing the auxiliary plate 22. That is, the protrusion is arranged between the fan rotating portion 21 and the top surface of the housing 10. Specifically, in the embodiment, the protrusion located between the auxiliary plate 22 and the rotating plate 211 is arranged on the bottom surface of the rotating plate 211. The protrusion includes a first protrusion 51, or may include a first protrusion 51 and a second protrusion 52 at a same time. In a case that the protrusion includes the first protrusion 51 and the second protrusion 52, a protrusion height of the first protrusion 51 is greater than a protrusion height of the second protrusion 52, that is, the second protrusion 52 is shorter than the first protrusion 51. In the embodiment, a number of the second protrusion 52 is greater than a number of the first protrusion 51. The second protrusion 52 may either be a support protrusion 31 described later or an oil accumulating protrusion 32 described later. The first protrusion 51 may either be the support protrusion 31 described later or the oil accumulating protrusion 32 described later. In the embodiment, a part of the second protrusions 52 are the support protrusions 31, while the other part of the second protrusions are the oil accumulating protrusions 32; and the first protrusions 51 are the oil accumulating protrusions 32. In the embodiment, at least two first protrusions 51 are provided. For ease of explanation, the two first protrusions 51 are respectively referred to as protrusion A and protrusion B.

[45] The support protrusion 31 is used to support the fan rotating portion 21, so that the fan rotating portion 21 is stably mounted on the housing 10, thereby reducing shaking of

the fan rotating portion 21. The support protrusion 31 is at least provided with a first support protrusion 31 and a second support protrusion 31. In the embodiment, ten support protrusions 31 are provided and equidistantly distributed between the fan rotating portion 21 and the top surface of the housing 10. In other embodiments, the support protrusions 31 may not be equidistantly distributed.

[46] Specifically, in the embodiment, the support protrusion 31 is arranged on the wall surface of the rotating plate 211 facing the auxiliary plate 22. That is, the support protrusion 31 is arranged on the bottom surface of the rotating plate 211 (referring to FIG. 3), protruding from a direction of the rotating plate 211 toward a direction of the auxiliary plate 22. In other embodiments, the support protrusion 31 may be arranged on a wall surface of the auxiliary plate facing the rotating plate 211, and protruding from the direction of the auxiliary plate 22 toward the direction of the rotating plate 211.

[47] As shown in FIG. 4, the oil accumulating protrusion 32 is arranged between the first support protrusion 31 and the second support protrusion 31, and the number of the support protrusions 31 is greater than the number of the oil accumulating protrusion 32. In the embodiment, only nine oil accumulating protrusions 32 are provided, and not completely non-equidistantly distributed. In other embodiments, ten oil accumulating protrusions 32 may be equidistantly distributed between the fan rotating portion 21 and the top surface of the housing 10.

[48] In the embodiment, the oil accumulating protrusion 32 is arranged on the wall surface of the rotating plate 211 facing the auxiliary plate 22, protruding from the direction of the rotating plate 211 toward the direction of the auxiliary plate 22. A height of the oil accumulating protrusion 32 is no less than a height of the support protrusion 31. That is, the height of the oil accumulating protrusion 32 must be equal to or greater than the height of the support protrusion 31, so as to ensure that the oil accumulating protrusion 32 may scrape grease 300. The oil accumulating protrusion 32 and the support protrusion 31 are arranged on a same plane. In the embodiment, the oil accumulating protrusion 32 and the support protrusion 31 are arranged on the wall surface of the rotating plate 211 facing the auxiliary plate 22, that is, the oil accumulating protrusion 32 is arranged on the bottom surface of the rotating plate 211. In other embodiments, the oil accumulating protrusion 32 and the support protrusion 31 may be arranged on the wall surface of the auxiliary plate 22 facing the rotating plate 211.

[49] The oil accumulating protrusion 32 includes: an inner peripheral barrier wall 321, an outer peripheral barrier wall 322, and an oil channel 323.

[50] The inner peripheral barrier wall 321 is arranged on an inner peripheral side close to a circle center of the fan rotating portion 21, that is, the inner peripheral barrier wall 321 is closer to the circle center of the fan rotating portion 21 than the outer peripheral barrier wall 322. The inner peripheral barrier wall 321 is provided with an inner protrusion 324 that protrudes toward a direction of an outer peripheral side, that is, the inner peripheral barrier wall 321 protrudes towards the oil channel 323 described later. In the embodiment, the inner protrusion 324 is arranged in a middle portion of the inner peripheral barrier wall 321, so that the inner peripheral barrier wall 321 forms a shape with a middle protrusion and two gentle ends.

[51] The outer peripheral barrier wall 322 is arranged on an outer peripheral side away from the circle center of the fan rotating portion 21, that is, the outer peripheral barrier wall 322 is farther away from the circle center of the fan rotating portion 21 than the inner peripheral barrier wall 321 and is arranged on an outer side of the inner peripheral barrier wall 321. The outer peripheral barrier wall 322 is provided with an outer protrusion 325 that protrudes toward the inner peripheral side. The outer peripheral barrier wall 322 is provided with an outer protrusion 325 that protrudes toward a direction of the inner peripheral side, that is, the outer peripheral barrier wall 322 protrudes towards the oil channel 323 described later. In the embodiment, the outer protrusion 325 and the inner protrusion 324 are arranged opposite to each other, that is, the outer protrusion 325 is also arranged in a middle portion of the outer peripheral barrier wall 322, so that the outer peripheral side wall 322 forms a shape with a middle protrusion and two gentle ends.

[52] The oil channel 323 is a channel between the inner peripheral barrier wall 321 and the outer peripheral barrier wall 322 where the grease 300 flows. More specifically, the oil channel is a channel between the inner protrusion 324 and the outer protrusion 325 where the grease 300 flows. In the embodiment, the inner peripheral barrier wall 321 protrudes towards the oil channel 323 to form the inner protrusion 324, and the outer peripheral barrier wall 322 protrudes towards the oil channel 323 relative to the inner peripheral barrier wall 321 so as to form the outer protrusion 325. Through the inner protrusion 324 and the outer protrusion 325, a width of a middle portion of the oil channel 323 is less than a width of an end portion of the oil channel 323, so that the oil channel 323 forms a trumpet shape that is

wide at two ends and narrow in the middle portion.

[53] The oil channel 323 includes an oil accumulating port 301.

[54] The oil accumulating port 301 is arranged at an end portion of the oil accumulating protrusion 32. That is, the oil accumulating port 301 is arranged at an end portion of the inner peripheral barrier wall 321 and an end portion of the outer peripheral barrier wall 322 opposite to the end portion of the inner peripheral barrier wall 321, and formed by the end portion of the inner peripheral barrier wall 321 and the end portion of the outer peripheral barrier wall 322. In the embodiment, oil accumulating ports 301 are arranged at two ends of the oil channel 323. The grease 300 enters the oil channel 323 from the oil accumulating port 301 at one end, and then flows out of the oil accumulating port 301 at the other end of the oil channel 323.

[55] According to an embodiment of the present disclosure, a width of at least one of the two oil accumulating ports 301 is greater than a thickness of the support protrusion 31. That is, a distance between the end portion of the inner peripheral barrier wall 321 and the end portion of the outer peripheral barrier wall 322 is greater than the thickness of the support protrusion 31.

[56] In a specific embodiment, the width of one of the two oil accumulating ports 301 is greater than the thickness of the support protrusion 31. The oil accumulating port 301 having a width greater than the thickness of the support protrusion 31 is arranged at an upstream end of two ends of the oil channel 323 in a rotation direction of the fan rotating portion 21, i.e., the oil accumulating port 301 at the end where the grease 300 enters the oil channel 323. In another embodiment, a rotation direction of the fan 200 is a 120° clockwise rotation, and then a 120° counterclockwise rotation. Therefore, the widths of the oil accumulating ports 301 at two ends of the oil channel 323 are greater than the thickness of the support protrusion 31.

[57] In an embodiment, a plane-a in a vertical direction where a contact surface of the limiting block 60 and the second gear 23 is located is taken as a boundary line. The plane-a passes through the circle center of the fan rotating portion 21 to divide the fan rotating portion 21 arranged in a direction perpendicular to the second gear 23 into a first region 101 and a second region 102. That is, the fan rotating portion 21 is divided into two halves. The first region 101 is a side close to the tooth portion 231, that is, a projection area of the first region 101 is on a side of the second gear 23 having the tooth portion 231. The

second region 102 is the other side away from the tooth portion 231, that is, a projection area of the second region 102 is on a side of the second gear 23 having almost no tooth portion 231. As shown in FIG. 5A and FIG. 6A, FIG. 5A shows that the second gear 23 collides with the limiting block 60 for the first time, taking the plane-a in the vertical direction where the contact surface of an end of the limiting block 60 and the second gear 23 is located as the boundary line, the left side is the first region 101 and the right side is the second region 102. FIG. 6A shows that the second gear 23 rotates 120° in an opposite direction after colliding with the limiting block 60 for the first time, and then collides with the limiting block 60 for the second time, taking the plane-a in the vertical direction where the contact surface of the other end of the limiting block 60 and the second gear 23 is located as the boundary line, the right side is the first region 101 and the left side is the second region 102.

[58] Further, the second region 102 includes: a region-A 103 and a region-B 104.

[59] The region-A 103 is defined by taking the plane-a in the vertical direction where the contact surface of the limiting block 60 and the second gear 23 is located as the start and rotating 45° to 90° toward the second region 102. In the embodiment, the region-A 103 is defined by taking the plane-a in the vertical direction where the contact surface of the limiting block 60 and the second gear 23 is located as the start and rotating 90° toward the second region 102. A plane-b is a plane where a junction of the region-A 103 and the region-B 104 is located, and the plane-b passes through the circle center of the fan rotating portion 21.

[60] The region-B 104 is defined by taking the plane-b where the junction of the region-A 103 and the region-B 104 is located as the start and rotating 45° to 90°. In the embodiment, the region-B 104 is defined by taking the plane-b where the junction of the region-A 103 and the region-B 104 is located as the start and rotating 45° to 90° continuously.

[61] The protrusion A is arranged in the region-A 103, and the protrusion B is arranged in the region-B 104. A plane where the protrusion A is connected with the circle center of the fan rotating portion 21 is plane-d, and a plane where the protrusion B is connected with the circle center of the fan rotating portion 21 is plane-e. An included angle between the plane-d and the plane-e is 45° to 90°.

[62] According to an embodiment of the present disclosure, as shown in FIG. 5B and FIG. 6B, in the embodiment, the region-A 103 is defined by taking the plane-a in the vertical direction where the contact surface of the limiting block 60 and the second gear 23 is

located as the start and rotating 90° toward the second region 102, and the region-B 104 is defined by taking the plane-b that forms an included angle of 90° with the plane-a as the start and rotating 90° continuously toward the second region 102.

[63] Preferably, the included angle between the plane-d and the plane-e is 72° . Specifically, referring to FIG. 6A and FIG. 6B, an included angle between the plane-d where the protrusion A is connected with the circle center of the fan rotating portion 21 and the plane-b where the junction of the region-A 103 and the region-B 104 is located is 36° , and an included angle between the plane-e where the protrusion B is connected with the circle center of the fan rotating portion 21 and the plane-b where the junction of the region-A 103 and the region-B 104 is located is 36° .

[64] A plane where a virtual connecting line between the protrusion A and the protrusion B is located is plane-c. It should be noted that, since the protrusion A is located in the region-A 103, the protrusion B is located in the region-B 104, and the region-A 103 and the region-B 104 are both located in the second region 102, which is equivalent to the protrusion A and the protrusion B being both located on a same side away from tooth portion 231. Therefore, the plane-c must not pass through the circle center, and the plane-c forms a certain included angle with the plane-a passing through the circle center, or the plane-c and the plane-a are parallel to each other. That is, there is a certain distance between the plane-c and the plane-a.

[65] According to an embodiment of the present disclosure, a straight-line distance between the plane-c where the virtual connecting line between the protrusion A and the protrusion B is located and the plane-a in the vertical direction where the contact surface of the limiting block 60 and the second gear 23 is located is negatively correlated with a tilting degree of the fan rotating portion 21. In other words, the greater the distance between the plane-c and the plane-a, the more smoothly the fan rotating portion 21 will tilt, and the smaller a nodding amplitude will be. For example, in a case that the plane-c is parallel to the plane-a, the greater the straight-line distance between the plane-c and the plane-a is, the more smoothly the fan rotating portion 21 will tilt. For another example, in a case that the plane-c and the plane-a have a certain included angle, the greater a straight-line distance between the protrusion A and the plane-a or between the protrusion B and the plane-a is, i.e., the greater the included angle between the plane-c and the plane-a, the more smoothly the fan rotating portion 21 will tilt.

[66] Upon activation of the air supply apparatus, air is drawn in from an air suction port of the fan 200, the air forms an airflow within the fan 200 and is then blown out. The fan 200 may be used detached from the support base 100 or mounted on the support base 100. In a case that the fan 200 is mounted on the support base 100, the motor inside the support base 100 drives the rotating body 20 to rotate, so that the fan 200 placed on the support base 100 rotates with the rotating body 20, thereby achieving the oscillation function of the fan 200.

[67] When the second gear 23 rotates clockwise to collide with one end of the limiting block 60, the second gear 23 will change its original rotation direction to rotate counterclockwise until the second gear 23 collides with the other end of the limiting block 60, and then the second gear 23 will change the rotation direction again to rotate clockwise. In the above rotation process, the second gear 23 collides with the limiting block 60 two times. Specifically, a side of the second gear 23 close to the tooth portion 231 rotates at a high speed toward the limiting block 60 and collides with the limiting block 60. At this time, a force from the tooth portion 231 toward a direction of the limiting block 60 is generated. This force causes vibration of the fan rotating portion 21 having a fit clearance with the second gear 23, thereby causing the fan rotating portion 21 to tilt from the first region 101 toward the second region 102.

[68] Therefore, in an embodiment, the first protrusion 51 is provided in the second region 102. That is, when the fan rotating portion 21 is subjected to vibration and about to tilt, the rotating body 20 first contacts the first protrusion 51, thereby preventing the fan rotating portion 21 from significantly tilting from the first region 101 toward the second region 102, and then preventing the fan 200 from nodding. In another embodiment, the first protrusion 51 is provided in the second region 102, and the second protrusion 52 is also provided in the first region 101 at the same time. In order to prevent the fan rotating portion 21 from significantly tilting from the first region 101 toward the second region 102, the first protrusion 51 on the second region 102 is higher than the second protrusion 52 on the first region 101, thereby preventing the fan 200 from nodding.

[69] Further, in order to reduce a tilting amplitude of the fan rotating portion 21, the protrusion A and the protrusion B are respectively arranged in the region-A 103 and the region-B 104. The greater the straight-line distance between the plane-c where the virtual connecting line between the protrusion A and the protrusion B is located and the plane-a in the vertical direction where the contact surface of the limiting block 60 and the second gear

23, the larger an area between the plane-c where the virtual connecting line between the protrusion A and the protrusion B is located and the plane-a in the vertical direction where the contact surface of the limiting block 60 and the second gear 23 will be, the more smoothly the fan rotating portion 21 will tilt, and the smaller the nodding amplitude will be. Preferably, in the embodiment, the included angle between the plane-d where the protrusion A is connected with the circle center of the fan rotating portion 21 and the plane-b where the junction of the region-A 103 and the region-B 104 is located is 36° , and the included angle between the plane-e where the protrusion B is connected with the circle center of the fan rotating portion 21 and the plane-b where the junction of the region-A 103 and the region-B 104 is located is 36° . At this time, the nodding amplitude is almost imperceptible to the naked eyes. In other embodiments, the smaller a distance between the protrusion A and the protrusion B, the more smoothly the fan rotating portion 21 will tilt. It may be understood that, when the included angle between the plane-d where the protrusion A is located and the plane-b and the included angle between the plane-e where the protrusion B is located and the plane-b are smaller, i.e., when the included angle between the plane-d and the plane-b and the included angle between the plane-e and the plane-b are both less than 36° , or even close to 0° , the fan rotating portion 21 will tilt more smoothly.

[70] During rotation of the fan rotating portion 21, the rotating plate 211 and the auxiliary plate 22 rotate relative to each other. In the embodiment, a side of the auxiliary plate 22 facing the rotating plate 211 is coated with the grease 300. In the embodiment, the grease 300 is lubrication oil. In other embodiments, the grease 300 may also be machine oil or silicone oil with a lubrication function.

[71] When the fan rotating portion 21 rotates, the grease 300 will be separated to two sides after encountering the first support protrusion 31, that is, the grease 300 may form two oil paths along wall surfaces of the first support protrusion 31. When the grease 300 moves toward the second support protrusion 31 after passing the first support protrusion 31, since the oil accumulating protrusion 32 is provided between the first support protrusion 31 and the second support protrusion 31, the grease 300 will encounter the oil accumulating protrusion 32 after leaving the first support protrusion 31, and the grease 300 may be accumulated by the oil accumulating protrusion 32. That is, since the width of the oil accumulating port 301 of the oil accumulating protrusion 32 close to the first support protrusion 31 is greater than the thickness of the first support protrusion 31, the two oil paths formed along the wall surfaces of the first support protrusion 31 may enter the oil channel

323 of the oil accumulating protrusion 32 from the oil accumulating port 301. When the two oil paths enter the middle portion of the oil channel 323, the two oil paths converge into one oil path in the oil channel 323, the one oil path leaves the oil accumulating protrusion 32 from the oil accumulating port 301 at the other end, i.e., the oil accumulating port 301 close to the second support protrusion 31.

[72] After passing the oil accumulating protrusion 32, the grease 300 may be pushed back to its original path. The grease 300 may be kept on its original path by the oil accumulating protrusion 32, so that there is always grease 300 in the middle portion between the auxiliary plate 22 and the rotating plate 211. Moreover, the grease 300 is in a continuous fluid motion under rotation, thereby achieving activation of the grease 300 and preventing accumulation, hardening, and agglomeration of the grease 300. The grease 300 flows smoothly between the auxiliary plate 22 and the rotating plate 211, thereby reducing a relative friction and avoiding vibration caused by an excessively large friction as well as noises generated by friction during the relative movement.

[73] So far, the embodiments of the present disclosure have been described in detail with reference to the accompanying drawings. According to the above descriptions, those skilled in the art should have a clear understanding of the present disclosure.

[74] It should be noted that the implementations not shown or described in the accompanying drawings or the text of the specification are all forms known to those skilled in the art and are not described in detail. Furthermore, definitions of various elements described above are not limited to the various specific structures and shapes mentioned in the embodiments, and those skilled in the art may make simple modifications or replacements to the various elements.

[75] Finally, it should be noted that the above embodiments are only used to describe the technical solutions of the present disclosure, and not to limit the technical solutions of the present disclosure. Although the present disclosure has been described in detail with reference to the foregoing embodiments, those skilled in the art should understand that modifications may still be made to the technical solutions described in the foregoing embodiments, or equivalent substitutions may be made to some of the technical features. These modifications or substitutions do not cause the essence of the corresponding technical solutions to deviate from the spirit and scope of the technical solutions of the embodiments of the present disclosure.

What is claimed is:

1. A support base configured to support a fan, the support base comprising:
a housing, wherein a limiting block is arranged on the housing;
a rotating body arranged on an upper side inside the housing and configured to drive the fan placed on the rotating body to rotate, wherein the rotating body comprises a fan rotating portion arranged on the upper side of the housing and configured to support the fan; and
a motor arranged inside the housing and configured to drive the rotating body to rotate,
wherein the support base further comprises: a plurality of protrusions arranged between the fan rotating portion and a top surface of the housing; and
wherein the fan rotating portion is divided into a first region and a second region, and the protrusions at least comprise a first protrusion arranged on the second region.
2. The support base of claim 1, wherein,
the protrusions further comprise a second protrusion arranged on the first region; and
a height of the first protrusion is greater than a height of the second protrusion.
3. The support base of claim 2, wherein,
the rotating body further comprises a second gear placed inside the housing;
the second gear comprises a tooth portion and a base circle portion, the tooth portion is arranged on the base circle portion and surrounds a part of an outer peripheral side of the base circle portion; and
the first region is located on a side close to the tooth portion of the second gear, and the second region is located on a side away from the tooth portion of the second gear.
4. The support base of claim 3, wherein,
the limiting block is provided on the housing, and a plane-a in a vertical direction where a contact surface of the limiting block and the second

gear is located is a boundary line; and
the first region is located on the side close to the tooth portion of the second gear, and the second region is located on the side away from the tooth portion of the second gear.

5. The support base of claim 4, wherein,
the second region comprises a region-A and a region-B;
the region-A is formed by taking the plane-a in the vertical direction where the contact surface of the limiting block and the second gear is located as a start and rotating 45° to 90° toward the second region;
the region-B is formed by taking a plane-b where a junction of the region-A and the region-B is located as a start and rotating 45° to 90° continuously; and
the first protrusion comprises a protrusion-A and a protrusion-B, the protrusion A is arranged in the region-A, the protrusion B is arranged in the region-B, and an included angle between a plane-d where the protrusion A is connected with a circle center of the fan rotating portion and a plane-e where the protrusion B is connected with the circle center of the fan rotating portion is 45° to 90° .
6. The support base of claim 5, wherein the included angle between the plane-d where the protrusion A is connected with the circle center of the fan rotating portion and the plane-e where the protrusion B is connected with the circle center of the fan rotating portion is 72° .
7. The support base of claim 6, wherein an included angle between the plane-d and the plane-b is 36° , and an included angle between the plane-e and the plane-b is 36° .
8. The support base of claim 2, wherein the second protrusion is greater in number than the first protrusion.
9. The support base of claim 2, wherein each of the first protrusion and the second protrusion is a support protrusion or an oil accumulating protrusion configured to

support the fan rotating portion.

10. The support base of claim 9, wherein the first protrusion is the oil accumulating protrusion.

11. The support base of claim 10, wherein the oil accumulating protrusion is arranged between two support protrusions.

12. The support base of claim 1, wherein,
the fan rotating portion comprises a rotating plate fixed on a surface of the
rotating body facing the housing; and
the protrusions are arranged on the rotating plate.