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(54) **Fan assembling component with sliding handle**

Lüfter-Montageeinrichtung mit Schiebegriff

Support de montage de ventilateur avec poignée coulissante

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(56) References cited:
US-A1- 2004 184 234 US-A1- 2006 203 446
US-A1- 2008 014 093 US-A1- 2008 075 589
US-B1- 6 322 042

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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The invention generally relates to a fan module, and more particularly, to a fan rail assembling component.

2. Description of Related Art

[0002] The common handle design of a fan rail assembling component nowadays is unable to suit all fans. For a fan with high rotation speed, the fan has ribs for enhancing the structure stiffness, so that the fan handle is constrained to be used.

[0003] Figs. 1A and 1B are diagrams of a fan and a fan rail assembling component in prior art like the ones disclosed in US 2008/075589 A1. Referring to Figs. 1A and 1B, two fan rail assembling components 120 are disposed at the two opposite sides of a fan 110 where no outlet/inlet is disposed at the sides. The top of the fan rail assembling component 120 has an L-shaped elastic arm 122. The end of the elastic arm 122 is hollowed out into a ring. Besides, the elastic arm 122 has further a retaining structure 124. When a fan assembled with the two fan rail assembling components 120 are disposed in a holder (not shown), the retaining structure 124 would interfere with the holder to be position-limited by each other and the fan 110 is thereby stably placed in the holder.

[0004] When a user wants to detach the fan 110 from the holder, the user uses the fingers going into the ring ends of the elastic arms 122 of the two fan rail assembling components 120, followed by applying two opposite forces to make the two elastic arms 122 close to each other. At the time, the position-limiting between the retaining structures 124 and the holder is released. Then, an upward force is applied to lift up the two fan rail assembling components 120, and the fan 110 is able to be drawn out from the holder.

[0005] The above-mentioned fan rail assembling components 120 can make the fan 110 conveniently detached from the holder. However, for different electronic apparatuses, the rotation speeds of the fan 110 are different. When a fan 110 has an extreme high rotation speed, the fan 110 requires ribs 112 for enhancing the structure stiffness. The disposing position of the ribs 112 is just corresponding to the ring ends of the elastic arms 122. As a result, the hands of the user would be blocked by the ribs and difficult to go into the ring ends, which affects detaching the fan 110.

SUMMARY OF THE INVENTION

[0006] Accordingly, the invention is directed to a novel fan rail assembling component.

[0007] The invention is also directed to a fan module

able to be easily assembled and disassembled by using the above-mentioned novel fan rail assembling component.

[0008] The invention provides a fan rail assembling component, which includes a main body and a handle. The main body has a first end and a slot, and the slot is located at the first end. The handle has a tab portion and a connecting portion, in which the connecting portion has a protrusion, the protrusion is buckled in the slot, and a force can be applied on the tab portion to make the protrusion slip in the slot so that the handle suits to move back and forth on a longitudinal direction of the main body relatively to the main body.

[0009] In an embodiment of the invention, the above-mentioned slot has a narrowing between its two ends.

[0010] The above-mentioned main body further has a second end, and both sides of the first end and the second end respectively have an elastic arm, in which each elastic arm has a short pillar, the positions of the short pillars are corresponding to each other and the short pillars outwards extend respectively in far away from each other. In addition, the main body further has a plurality of openings disposed at the first end and located between the elastic arms, and at least one of the openings is located below the elastic arm.

[0011] The above-mentioned main body further has a groove disposed correspondingly to the slot, and the connecting portion of the handle is located in the groove.

[0012] Each main body further has a position-limiting hook located upon the slot of the first end.

[0013] The invention further provides a fan module, which includes a fan, two fan rail assembling components and a holder. The fan rail assembling components are disposed at both sides of the fan, and each fan rail assembling component includes a main body and a handle, the main body has a first end and a slot. The slot herein is located at the first end. The handle has a tab portion and a connecting portion, and the connecting portion has a protrusion and the protrusion is buckled in the slot. The fan is disposed in the holder by means of the fan rail assembling components, and a force can be applied on the tab portion to make the protrusion slip in the slot so that the handle suits to move back and forth on a longitudinal direction of the main body relatively to the main body.

[0014] In an embodiment of the invention, the above-mentioned slot has a narrowing between its two ends.

[0015] The above-mentioned main body further has a second end, and both sides of the first end and the second end respectively have an elastic arm, each elastic arm has a short pillar, the positions of the short pillars are corresponding to each other and the short pillars outwards extend respectively in far away from each other. The fan has a plurality of assembly openings and each short pillar is correspondingly knocked into one of the assembly openings. In addition, the main body further has a plurality of openings disposed at the first end and located between the elastic arms, and at least one of the

openings is located below the slot .

[0016] The above-mentioned main body further has a groove disposed correspondingly to the slot, and the connecting portion of the handle is located in the groove.

[0017] Each main body further has a position-limiting hook disposed on the first end and located upon the slot, the holder further has a plurality of knocking slots, and each position-limiting hook and one of the knocking slots are correspondingly position-limited by each other.

[0018] Based on the depiction above, the handle of the fan rail assembling component of the invention can move back and forth on the longitudinal direction of the main body relatively to the main body. Thus, when the fan is placed in the holder, the user can make the handle slip relatively to the main body so as to draw out, make the handle higher than the main body and then lift the fan by applying a force and the user can conveniently draw out the fan from the holder.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] The accompanying drawings are included to provide a further understanding of the invention, and are incorporated in and constitute a part of this specification. The drawings illustrate embodiments of the invention and, together with the description, serve to explain the principles of the invention.

Figs. 1A and 1B are diagrams of a fan and fan rail assembling components thereof in prior art.

Fig. 2A is a diagram of a fan rail assembling component according to an embodiment of the invention.

Fig. 2B is a diagram of the main body of Fig. 2A.

Fig. 2C is a diagram of the handle of Fig. 2B.

Fig. 2D is a diagram of the main body of Fig. 2B in another point of view.

Fig. 3A is a diagram where a fan and two fan rail assembling components of Fig. 2A are assembled together.

Fig. 3B is a diagram of a holder for accommodating the assembly of the fan and the fan rail assembling components in Fig. 2A.

Fig. 4 is a diagram where a holder accommodates four assemblies of the fans and the fan rail assembling components.

Fig. 5 is a diagram showing an assembly of fans and fan rail assembling components to be disassembled from a holder.

Fig. 6 is a diagram of the fan rail assembling components of Fig. 5.

DESCRIPTION OF THE EMBODIMENTS

[0020] Reference will now be made in detail to the preferred embodiments of the invention, examples of which are illustrated in the accompanying drawings. Wherever possible, the same reference numbers are used in the drawings and the description to refer to the same or like

parts.

[0021] Fig. 2A is a diagram of a fan rail assembling component according to an embodiment of the invention, Fig. 2B is a diagram of the main body of Fig. 2A and Fig. 2C is a diagram of the handle of Fig. 2B. Referring to Figs. 2A, 2B and 2C, a fan rail assembling component 200 includes a main body 210 and a handle 220. The main body 210 has a first end 212 and a slot 214, and the slot 214 is located at the first end 212. The handle 220 has a tab portion 222 and a connecting portion 224, the connecting portion 224 has a protrusion 224a and the protrusion 224a is buckled in the slot 214. By buckling the protrusion 224a in the slot 214, when a force is applied on the tab portion 222, the protrusion 224a can slip in the slot 214 and the handle 220 can move back and forth on the longitudinal direction L of the main body 210 relatively to the main body 210.

[0022] Fig. 2D is a diagram of the main body of Fig. 2B in another point of view. Referring to Figs. 2A, 2C and 2D, the slot 214 has a narrowing between its two ends. The slot 214 forms a step by means of the '8' shape so that the user applying a force to make the protrusion 224a slip in the slot 214 enhances hand sensation and better controls the slip of the protrusion 224a.

[0023] The main body 210 further has a second end 216 and both sides of the first end 212 and the second end 216 respectively have an elastic arm 212a and an elastic arm 216a, in which each elastic arm 212a and each elastic arm 216a respectively have a short pillar 212b and a short pillar 216b. The positions of the two short pillars 212b or the two short pillars 216b are corresponding to each other and the two short pillars 212b or the two short pillars 216b outwards extend respectively in far away from each other. In addition, the main body 210 further has a plurality of openings 218 disposed at the first end 212, the openings 218 are located between the elastic arms 212a and at least one of the openings 218 is located below the slot 214.

[0024] The main body 210 further has a groove 217 with a position roughly corresponding to the slot 214. The connecting portion 224 of the handle 220 is located in the groove 217 so as to constrain the handle 220 after being assembled on the main body 210 preferably moving only on the longitudinal direction L of the main body 210 relatively to the main body 210.

[0025] Fig. 3A is a diagram where a fan and two fan rail assembling components of Fig. 2A are assembled together, Fig. 3B is a diagram of a holder for accommodating the assembly of the fan and the fan rail assembling components in Fig. 2A and Fig. 4 is a diagram where a holder accommodates four assemblies of the fans and the fan rail assembling components. In Figs. 3B and 4, the blades of the fans are not shown for better understanding. Referring to Figs. 3A, 3B and 4, the above-mentioned fan rail assembling components 200 are assembled at the opposite two sides of the fan 300 to form an assembly of fan and fan rail assembling component 350. After that, as shown by Fig. 4, the assembly of fan

and fan rail assembling component 350 is placed in the holder 400 to finish assembling a fan module 500.

[0026] In more details, the fan 300 has a plurality of assembly openings 302. When the two fan rail assembling components 200 are assembled at the opposite two sides of the fan 300, the elastic arms 212a and the elastic arms 216a located at both sides of the first end 212 and the second end 216 of each fan rail assembling component 200 provide elastic forces to make the short pillars 212b of each elastic arm 212a and the short pillars 216b of each elastic arm 216a (as shown in Fig. 2D) respectively smoothly knocked into one of the assembly openings 302 so that the fan rail assembling components 200 can be fixed on the fan 300. In addition, the opening 218 located at the first end 212 of the main body 210 further enhances the structure elasticity of the first end 212, which, when the fan rail assembling components 200 are assembled on the fan 300 or detached from the fan 300, prevents excessive stress to cause damage.

[0027] Referring to Figs. 2A, 3A and 4, each main body 210 further has a position-limiting hook 219. The position-limiting hook 219 is located on the first end 212 and over the slot 214. The holder 400 has a plurality of knocking slots 402. When the assembly of fan and fan rail assembling component 350 is placed in the holder 400, each position-limiting hook 219 and one of the knocking slots 402 are correspondingly position-limited by each other.

[0028] Fig. 5 is a diagram showing an assembly of fans and fan rail assembling components to be disassembled from a holder and Fig. 6 is a diagram of the fan rail assembling components of Fig. 5. Referring to Figs. 5 and 6, when the user wants to take out the assembly of fan and fan rail assembling component 350 from the holder 400, the user needs to apply a force to lift up the handles 220 of the two fan rail assembling components 200 on the longitudinal direction L, which makes the protrusion 224a located at the connecting portion 224 move to the upper hole of the slot 214 from the lower hole of the slot 214. At the same time, the tab portion 222 of the handle 220 becomes higher than the edge of the holder 400.

[0029] After that, the fingers of the user go through the tab portions 222 of the two handles 220 and then hook the two tab portions 222, so that the two tab portions 222 are closed to each other to release the position-limiting between the position-limiting hooks 219 of the main body 210 and the knocking slots 402. Further, the user applies a force on the longitude direction L to lift up the handle 200, so that the assembly of fan and fan rail assembling component 350 can be taken out from the holder 400.

[0030] In particular, when the user takes out the assembly of fan and fan rail assembling component 350 from the holder 400, the tab portion 222 of the handle 220 is higher than the edge of the holder 400. In this way, even if the fan 300 in the fan module 500 has ribs for enhancing the structure stiffness 304, the fingers of the user still can go through the tab portions 222 and apply a force on the longitude direction L to lift up the handle 220. At the time, the assembly of fan and fan rail assembling component 350 can be conveniently taken out from the holder 400.

bling component 350 can be conveniently taken out from the holder 400.

[0031] In summary, the fan rail assembling component of the invention includes a main body and a handle able to slip relatively to the main body. When the fan rail assembling component is assembled on a fan, the user can conveniently lift up the assembly of fan and fan rail assembling component and place the assembly of fan and fan rail assembling component into a holder. Since handle of the fan rail assembling component of the invention can slip on the longitude direction relatively to the main body, the fan rail assembling component can be used both in a fan with higher rotation speed and enhancing ribs and in a fan with lower rotation speed and without enhancing ribs. When the fan rail assembling component is assembled to a fan with higher rotation speed and enhancing ribs and the user wants to replace the fan in the fan module, the handle should be drawn out on the longitude direction of the main body relatively to the main body so that the handle is higher than the edge of the holder. In this way, the user can conveniently put the fingers into the tab portion to apply a force to lift up the fan, which eliminates the situation in the prior art that due to disposing the enhancing ribs the fingers of the user inconveniently go in the tab portion to apply force lifting up the tab portion. In other words, the fan rail assembling component and the fan module using the fan rail assembling component of the invention are advantageous in conveniently assembling and detaching the fan.

Claims

1. A fan rail assembling component (200), comprising:

a main body (210) having a first end (212), a second end (216), a slot (214) and a groove (217), wherein the slot (214) is located at the first end (212), and the groove (217) is corresponding to the slot (214), both sides of the first end (212) and the second end (216) respectively have an elastic arm (212a, 216a), each elastic arm (212a, 216a) has a short pillar (212b, 216b), the positions of the short pillars (212b, 216b) are corresponding to each other and the short pillars (212b, 216b) outwards extend respectively in far away from each other; and

a handle (220) having a tab portion (222) and a connecting portion (224), wherein the connecting portion (224) is located in the groove (217) and has a protrusion (224a), the protrusion (224a) is buckled in the slot (214), and a force can be applied on the tab portion (222) to make the protrusion (224a) slip in the slot (214) so that the handle (220) suits to move back and forth on a longitudinal direction of the main body (210) relatively to the main body (210); wherein each main body (210) further has a po-

sition-limiting hook (219) disposed on the first end (212) and located upon the slot (214).

2. The fan rail assembling component (200) as claimed in claim 1, wherein the slot (214) has a narrowing between its two ends.
3. The fan rail assembling component (200) as claimed in claim 1, wherein the main body (210) further has a plurality of openings (218) disposed at the first end (212) and located between the elastic arms (212a, 216a).
4. The fan rail assembling component (200) as claimed in claim 3, wherein at least one of the openings (218) is located below the slot (214).

Patentansprüche

1. Eine Ventilatorschienenzusammenbaukomponente (200) einschließlich:

Einer Haupteinheit (210) mit einem ersten Ende (212), einem zweiten Ende (216), einem Schlitz (214) und einer Rille (217), wobei der Schlitz (214) am ersten Ende (212) ist und die Rille (217) in besagten Schlitz greift (214). Beide Seiten des ersten (212) und des zweiten Endes (216) verfügen über jeweils einen elastischen Arm (212a und 216a), beide elastischen Armen haben jeweils eine kleine Stütze (212b und 216b). Die Positionen der kleinen Stützen (212b und 216b) korrespondieren zueinander und die kleinen Stützen (212b und 216b) entfernen sich voneinander nach außen hin; und

Eines Griffes (220) mit einer Hahneinheit (222) und einer Verbindungseinheit (224), wobei die Verbindungseinheit (224), welche an der Rille (217) angebracht ist über einen Überstand (224a) verfügt. Der Überstand (224a) ist in den Schlitz (214) eingefügt. Eine Krafteinwirkung auf die Hahneinheit (222) sorgt für das Einfügen des Überstandes (224a) in den Schlitz (214), so dass der Griff(220) in einer Längsachse aus Sicht der Haupteinheit (210) an eben jener Haupteinheit (210) sich vor- und zurückbewegen kann;

Dabei hat jede Haupteinheit (210) einen Positionslimitheaken (219) aus dem ersten Ende (212) am Schlitz (214) herausragen.

2. Die Ventilatorschienenzusammenbaukomponente (200) aus Anspruch 1, wobei der Schlitz (214) an seinen beiden Enden enger zusammenläuft.
3. Die Ventilatorschienenzusammenbaukomponente (200) aus Anspruch 1, wobei die Haupteinheit (210)

über eine Vielzahl an Öffnungen (218) am ersten Ende (212) und an den elastischen Armen (212a und 216a) verfügt.

4. Die Ventilatorschienenzusammenbaukomponente (200) aus Anspruch 3, wobei mindestens eine der Öffnungen (218) sich unterhalb des Schlitzes befindet(214).

Revendications

1. Rails de montage de ventilateurs (200), comportant:

une partie de corps principal (210) ayant une première extrémité (212), une deuxième extrémité (216), une fente (214) et une rainure (217), dans laquelle la fente (214) se situe à la première extrémité (212), et la taille de la rainure (217) correspond à la taille de la fente (214), des deux côtés de la première extrémité (212) et la deuxième extrémité (216) ont respectivement un bras élastique (212a, 216a), chaque bras élastique (212a, 216a) a une colonne courte (212b, 216b), les positions de la colonne courte (212b, 216b) sont identiques et les colonnes courtes (212b, 216b) vers l'extérieur s'étendent respectivement loin l'une de l'autre; et une poignée (220) ayant un onglet portion (222) et une extrémité de raccordement (224), dans laquelle l'extrémité de raccordement est situé dans la gorge (217) a une saillie (224a), la saillie (224a) est bouclée dans la fente (214), et une force peut être appliquée sur l'onglet (222) pour que la saillie (224a) se glisse dans la fente (214) de manière à ce que la poignée (220) parvienne à déplacer dans le sens avant et en arrière le long du corps principal (210) relativement au corps principal (210) ; où chaque corps principal (210) dispose en outre d'un crochet de fin de course (219) disposé sur la première extrémité (212) situé sur la fente (214).

2. Le rail de montage de ventilateurs (200) selon la revendication 1, dans laquelle la fente (214) présente un rétrécissement entre ses deux extrémités.
3. Le rail de montage de ventilateurs (200) selon la revendication 1, dans laquelle le corps principal (210) a de plus a une pluralité d'ouvertures (218) disposées à la première extrémité (212) et situées entre le bras élastique (212a,216a).
4. Le rail de montage de ventilateurs (200) selon la revendication 3, dans laquelle au moins une pour les ouvertures (218) est située au-dessous de la fente (214).

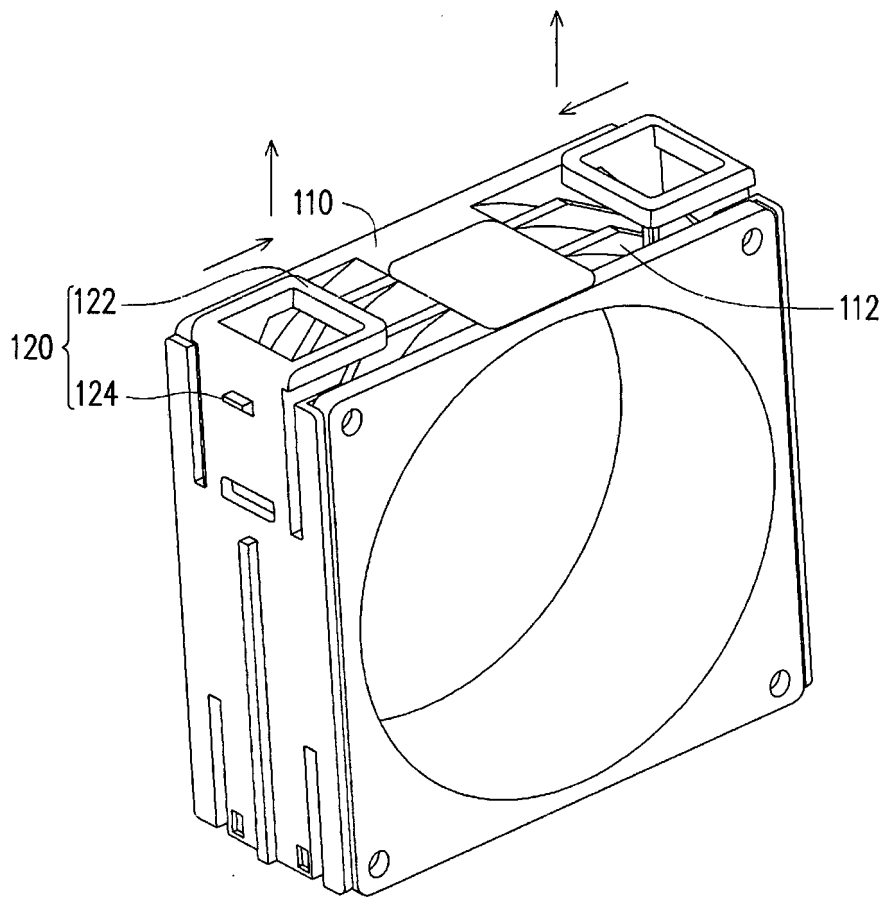


FIG. 1A (RELATED ART)

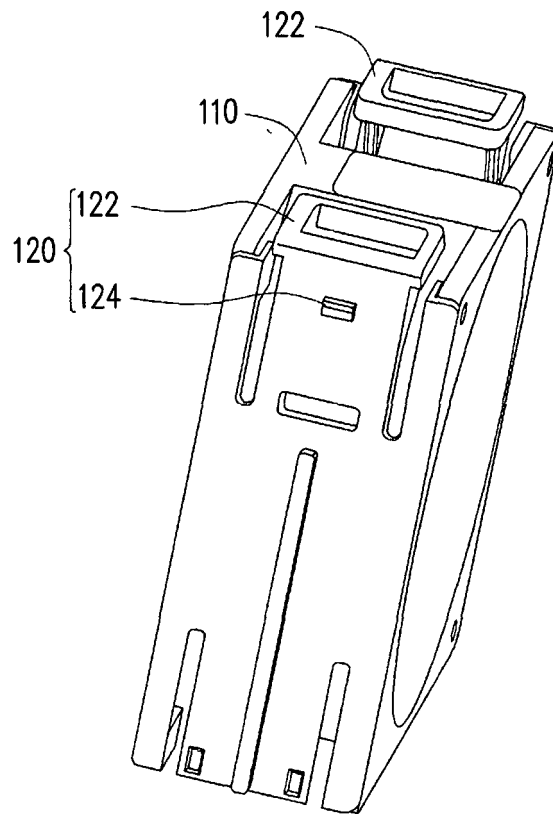


FIG. 1B (RELATED ART)

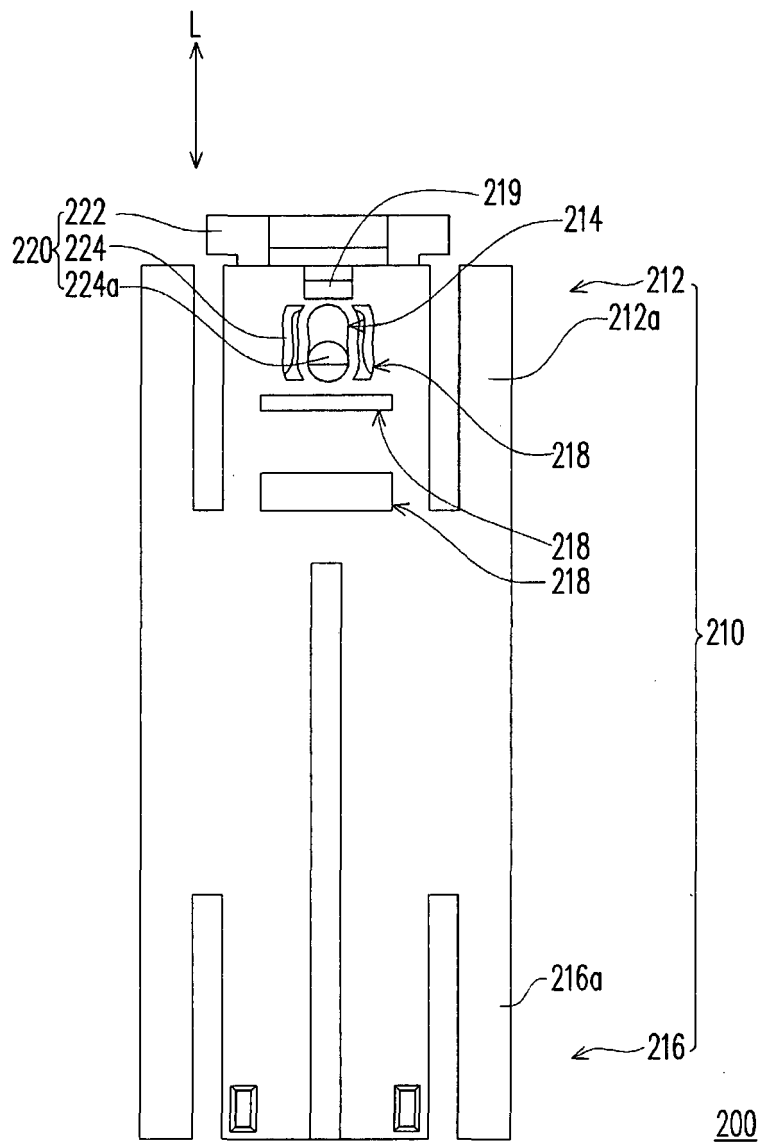


FIG. 2A

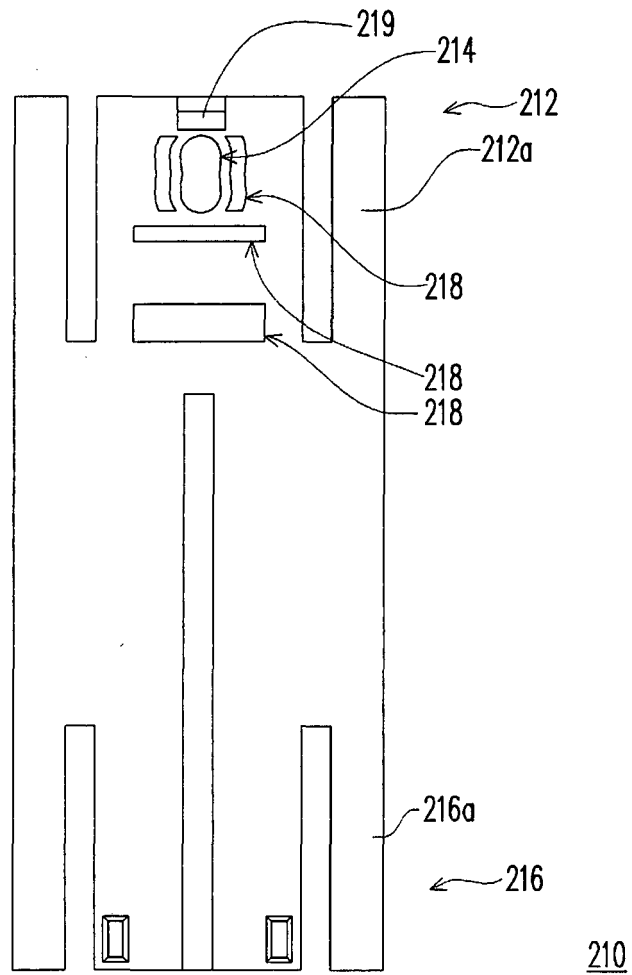


FIG. 2B

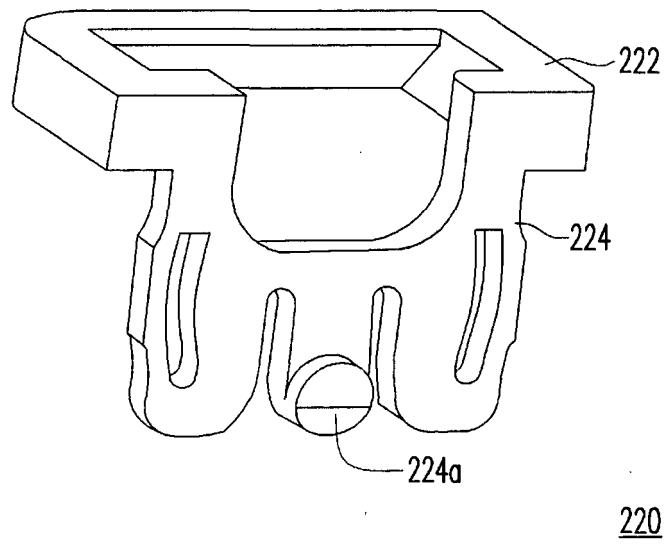


FIG. 2C

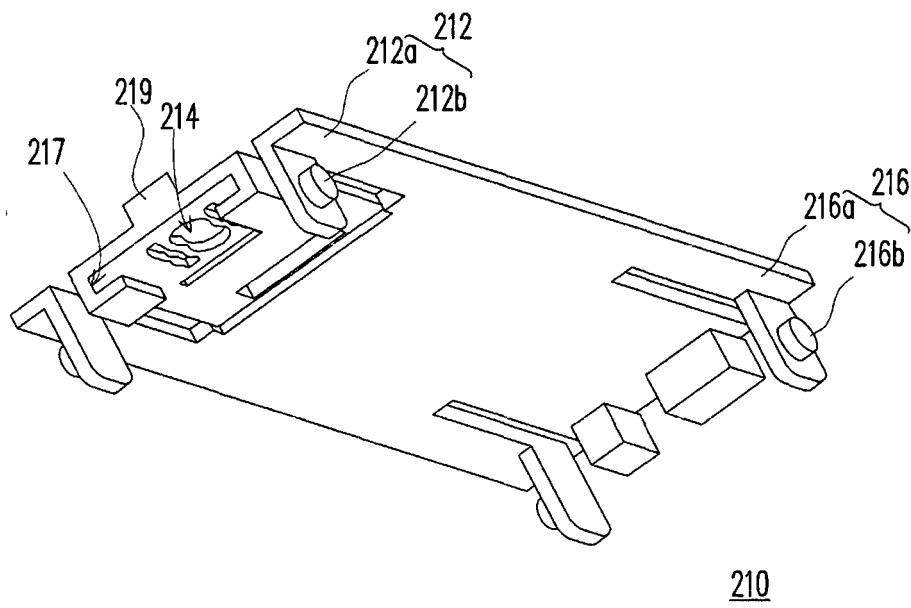


FIG. 2D

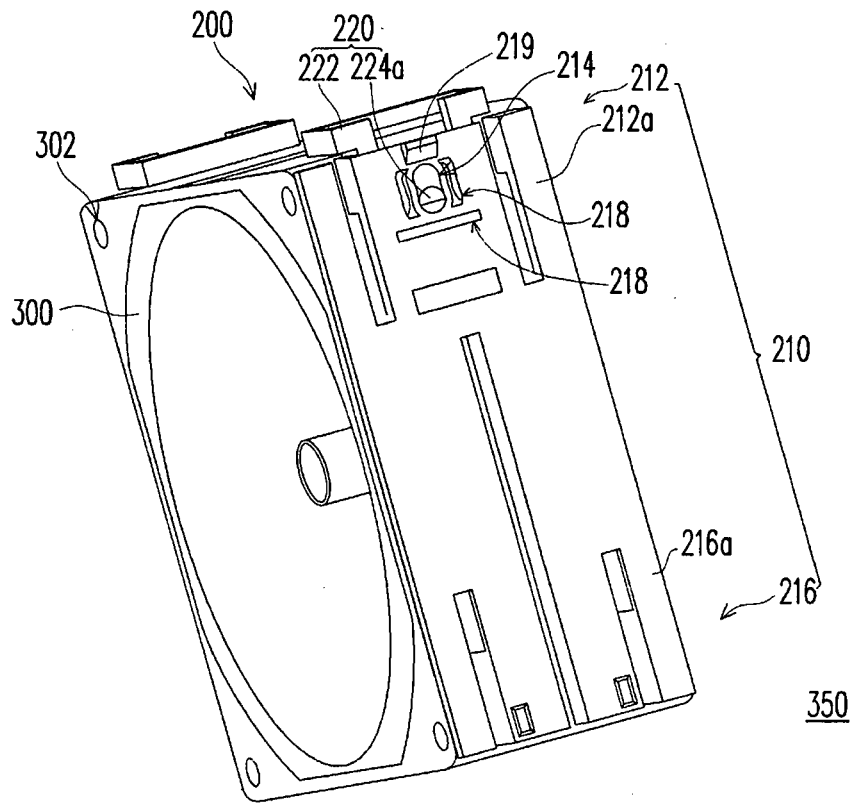


FIG. 3A

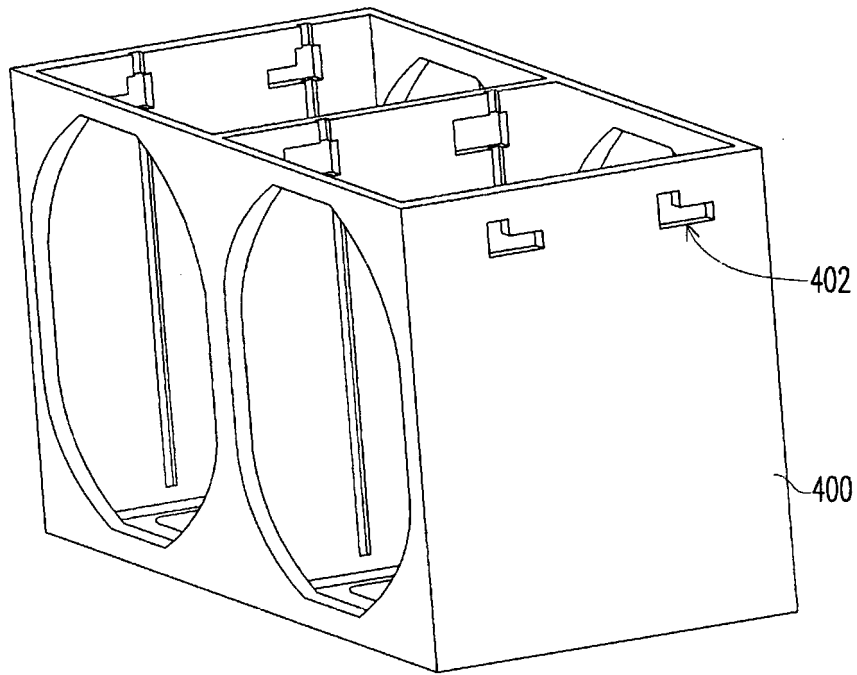


FIG. 3B

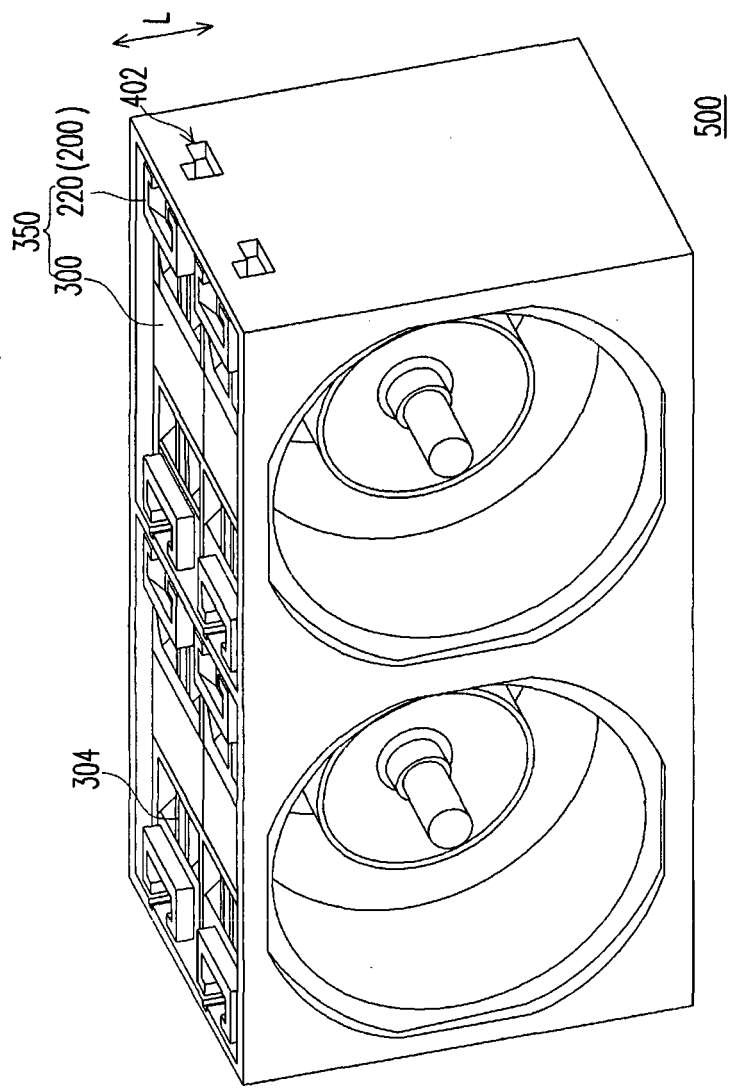


FIG. 4

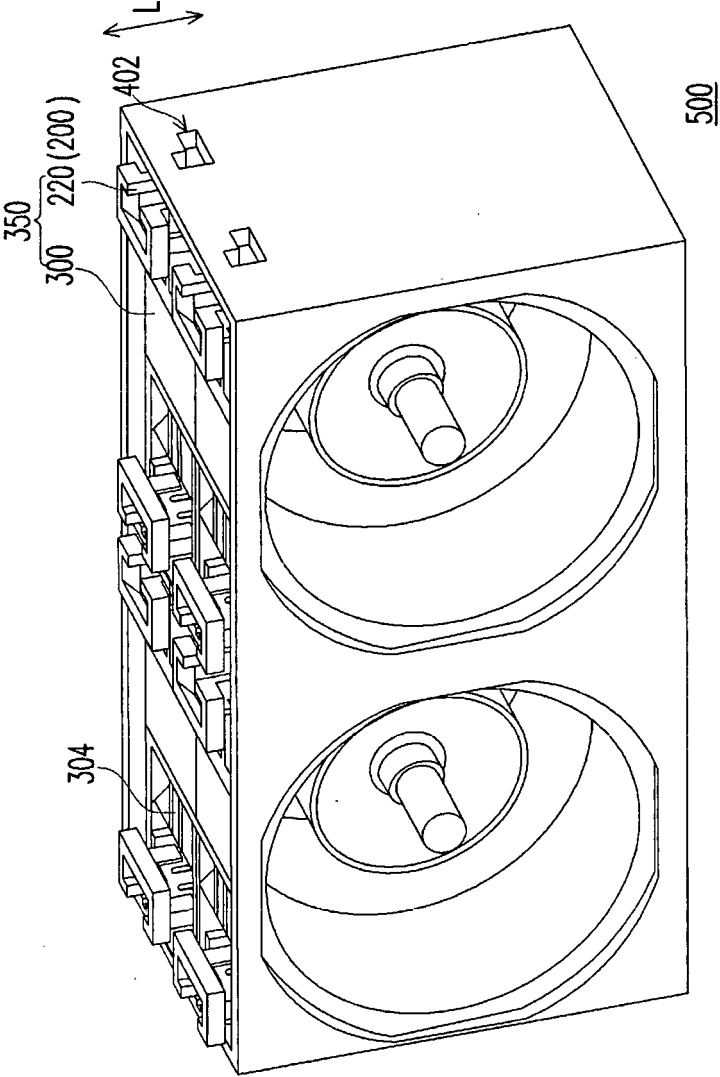


FIG. 5

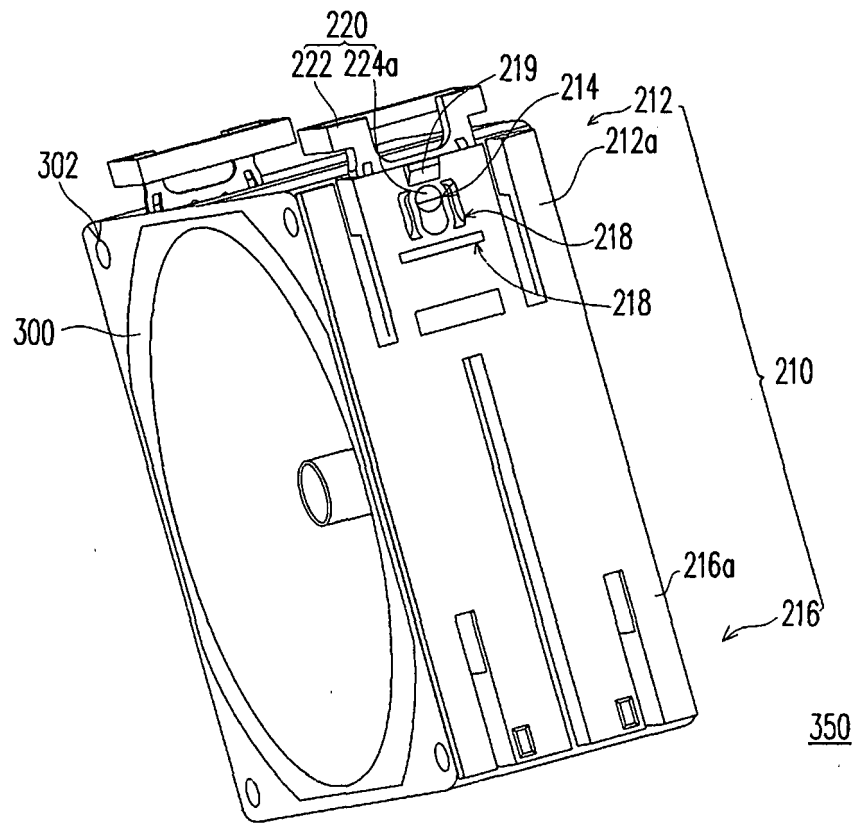


FIG. 6

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 2008075589 A1 [0003]