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(54) **STRUCTURE OF CEILING FAN BLADES THEIR FRAMES**

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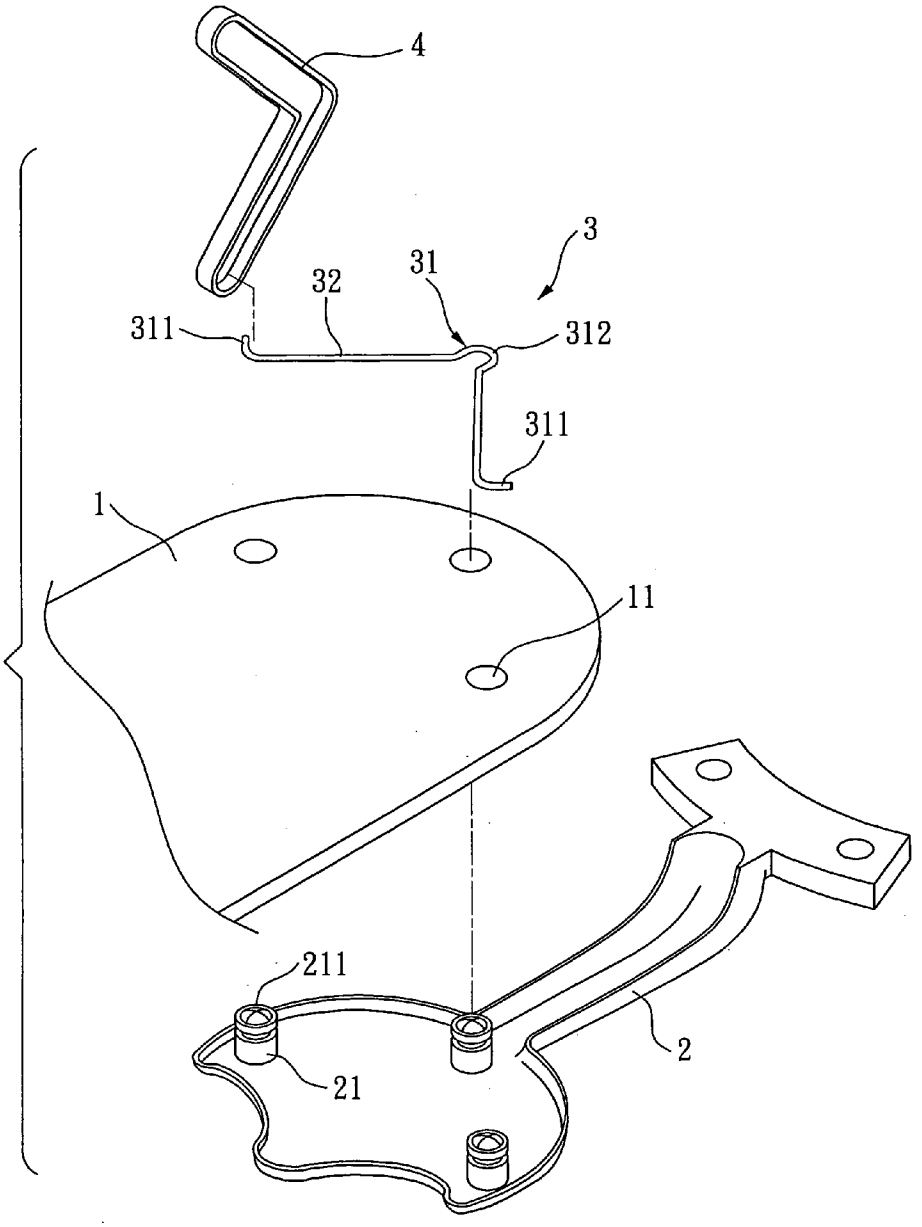
(57) **ABSTRACT**

A structure of blade and blade frame for a ceiling fan is disclosed. The inserting parts of a blade frame go through the through holes on a blade. Each inserting part has a stopping part exposed from the blade. An elastic positioning element connects several limiting parts using linear linking parts. The limiting parts urge against the stopping parts in opposite directions, providing constraints between the stopping parts and the blade and, thereby, combining the blade and the blade frame.



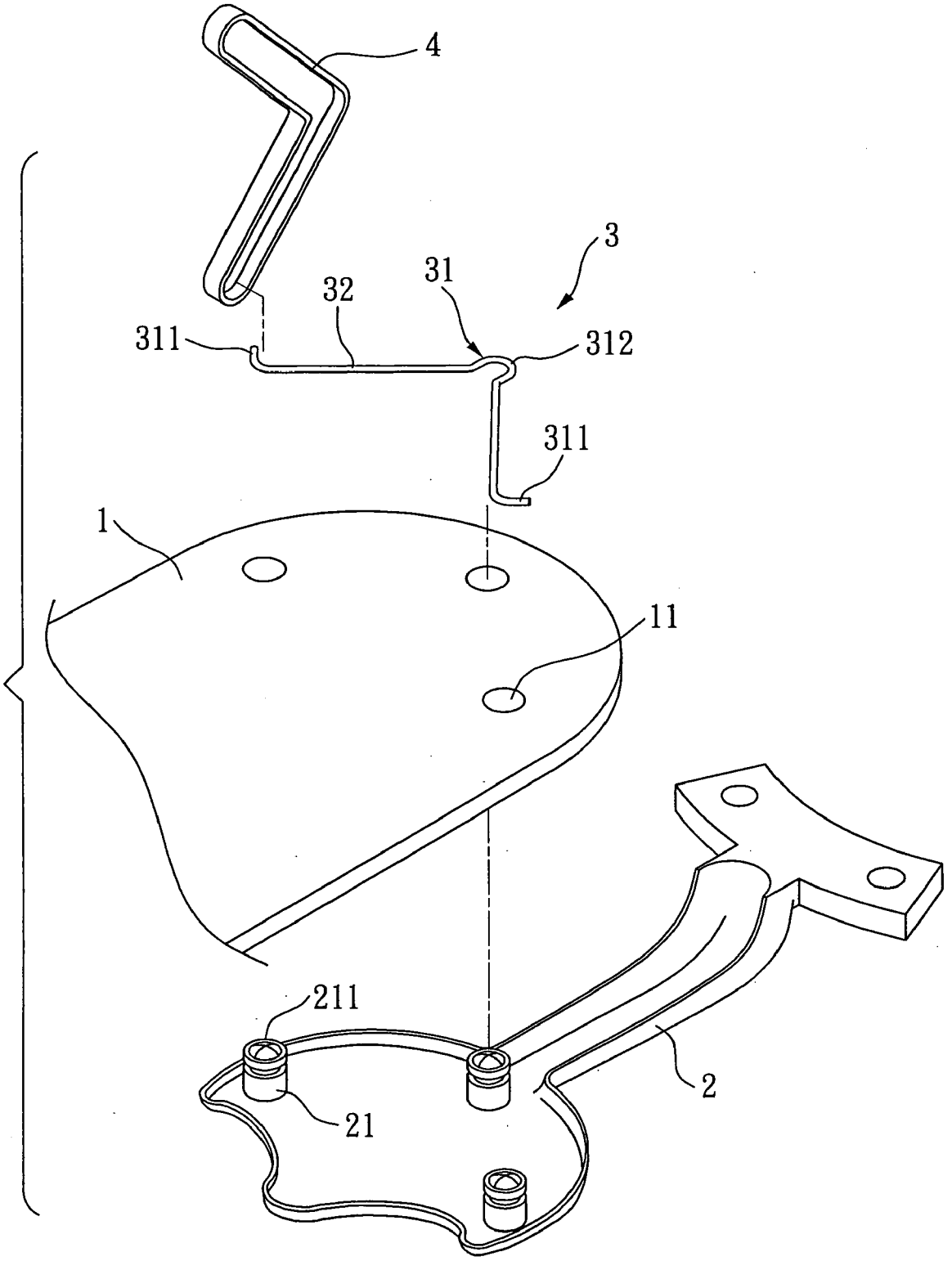


FIG. 1

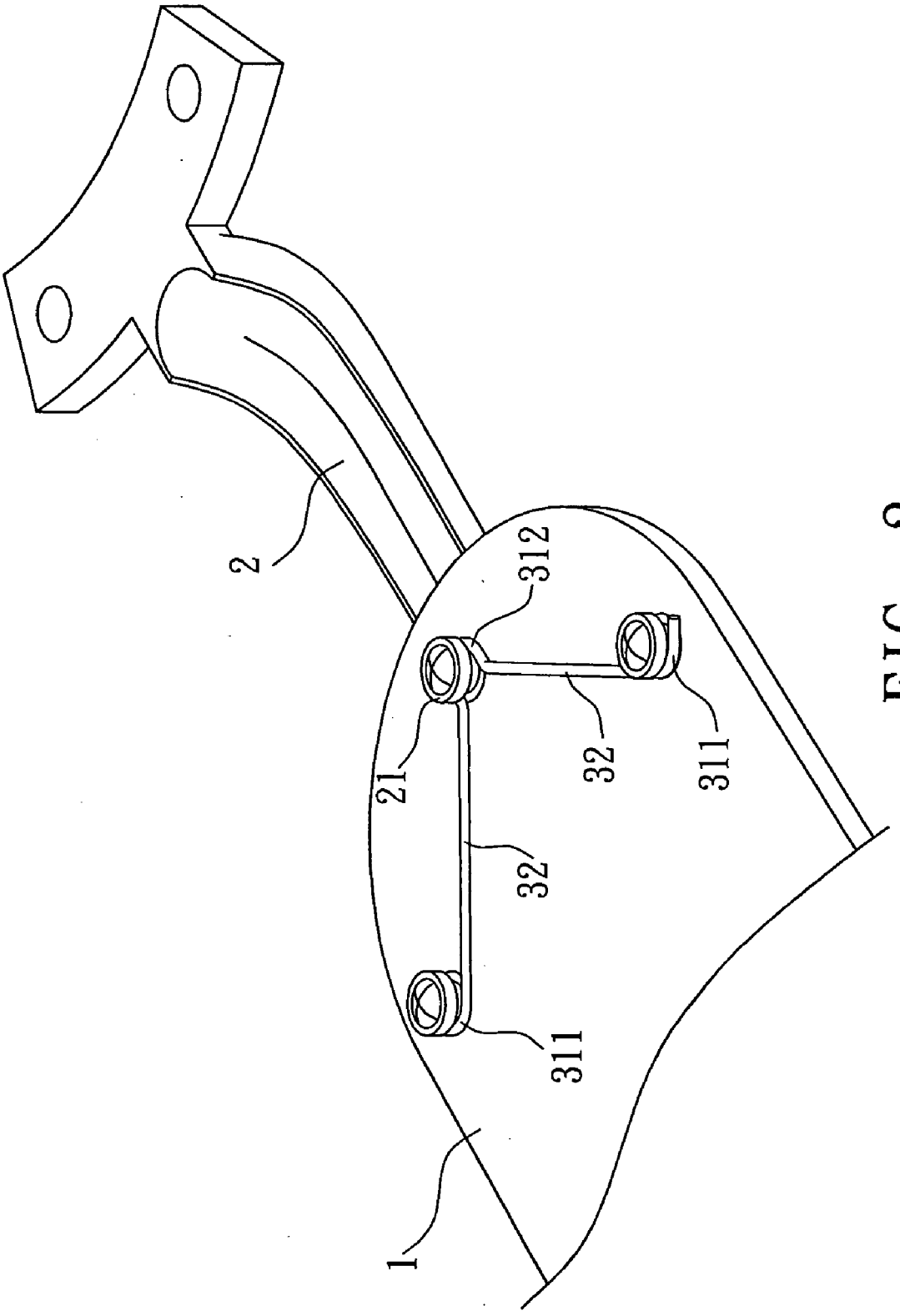


FIG. 2

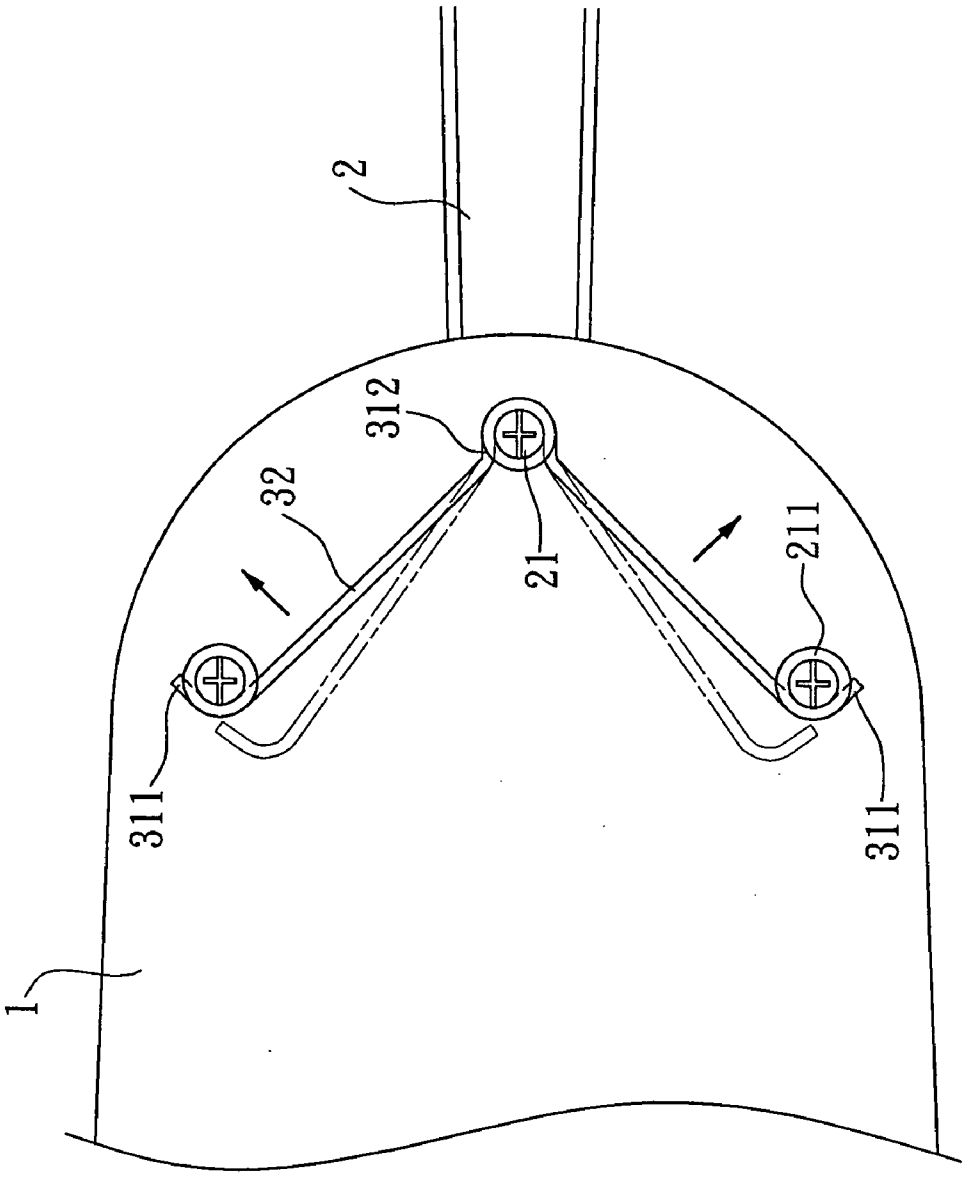


FIG. 3

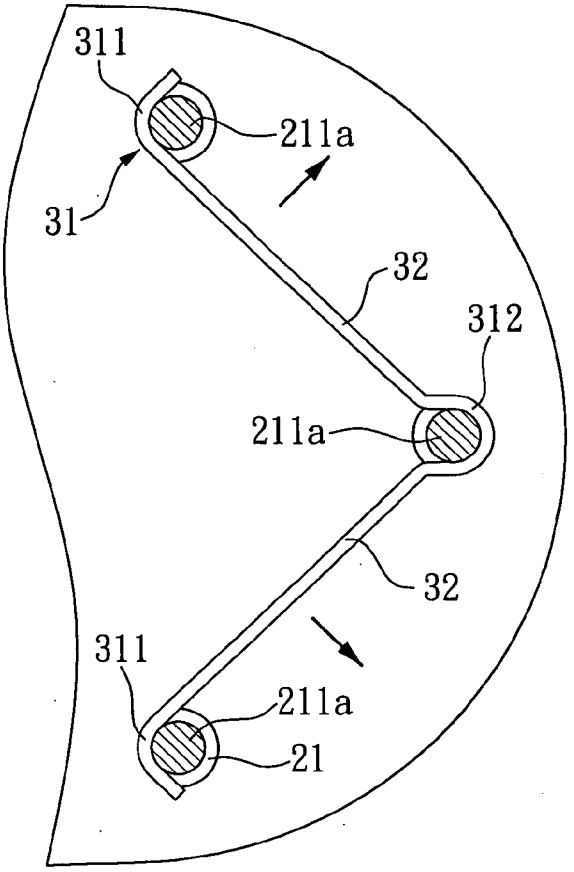

311
211a
31
32
312
211a
32
311
211a
21

FIG. 4

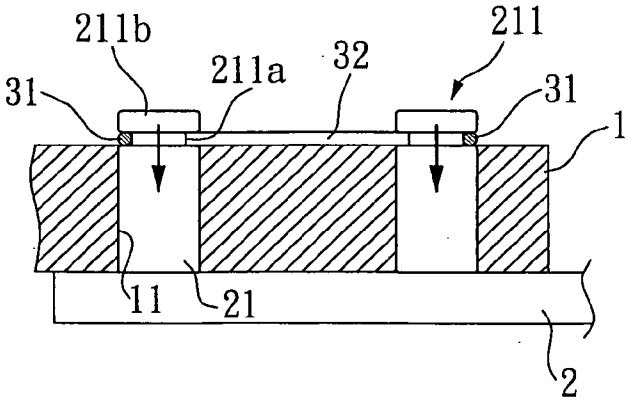

211b
211a
32
211
31
31
1
11
21
2

FIG. 5

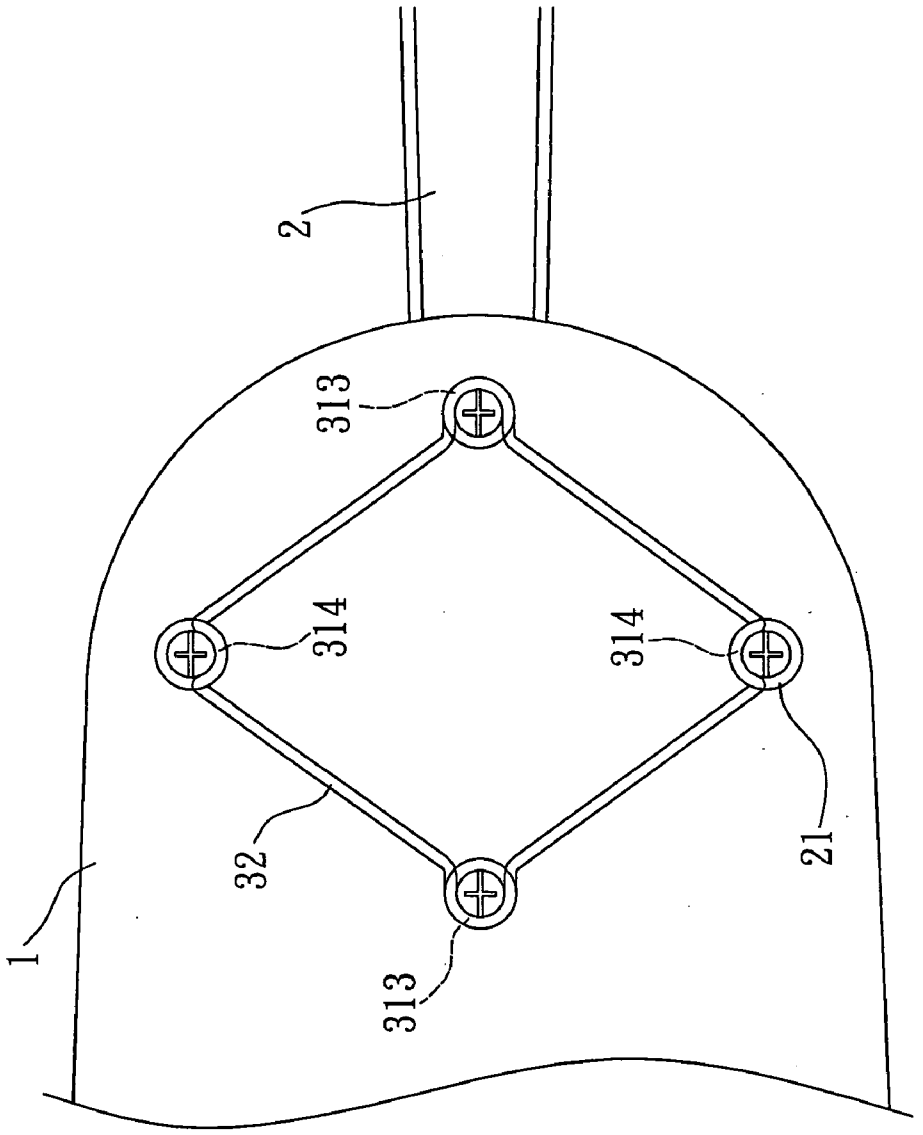


FIG. 6

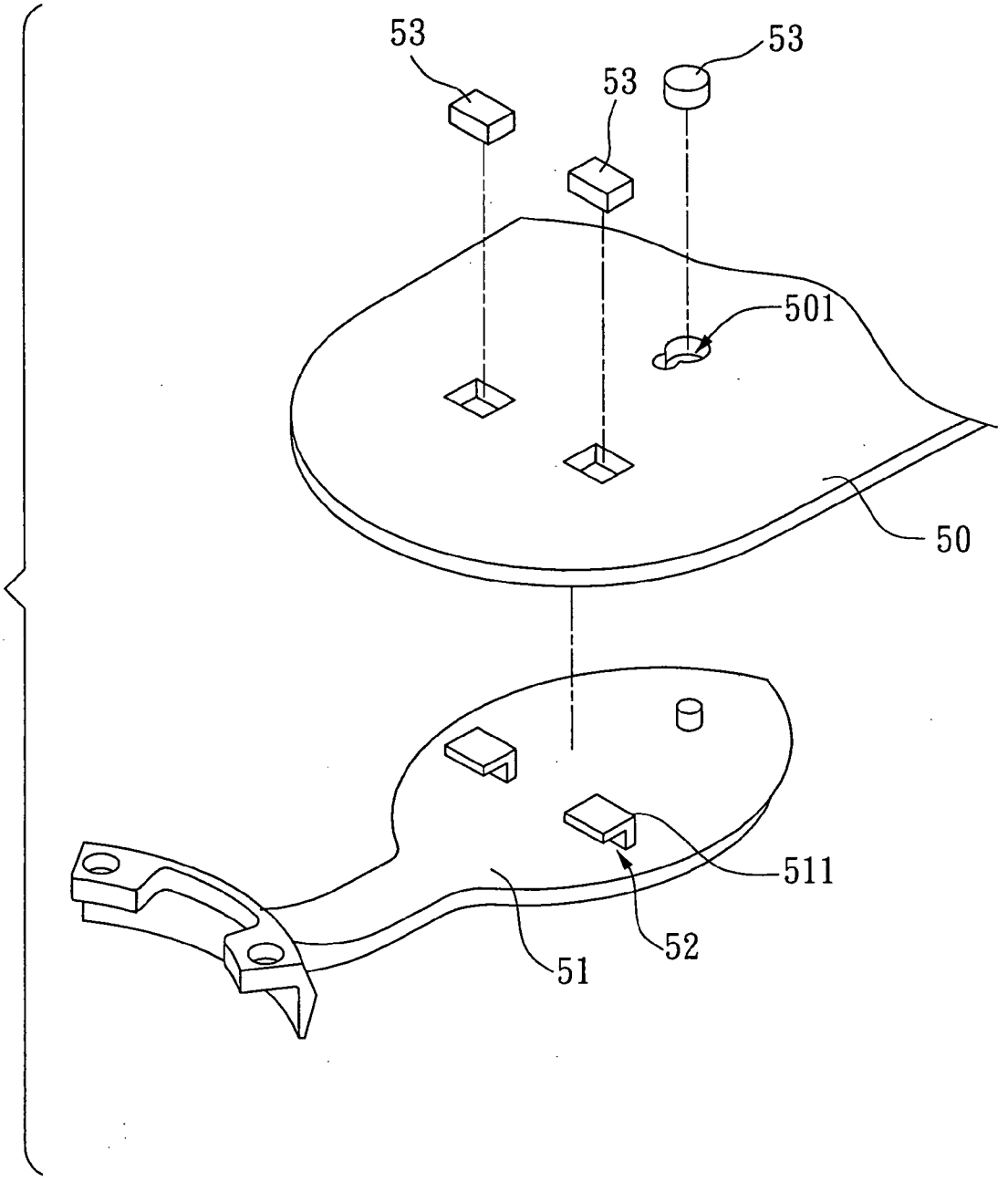


FIG. 7
PRIOR ART

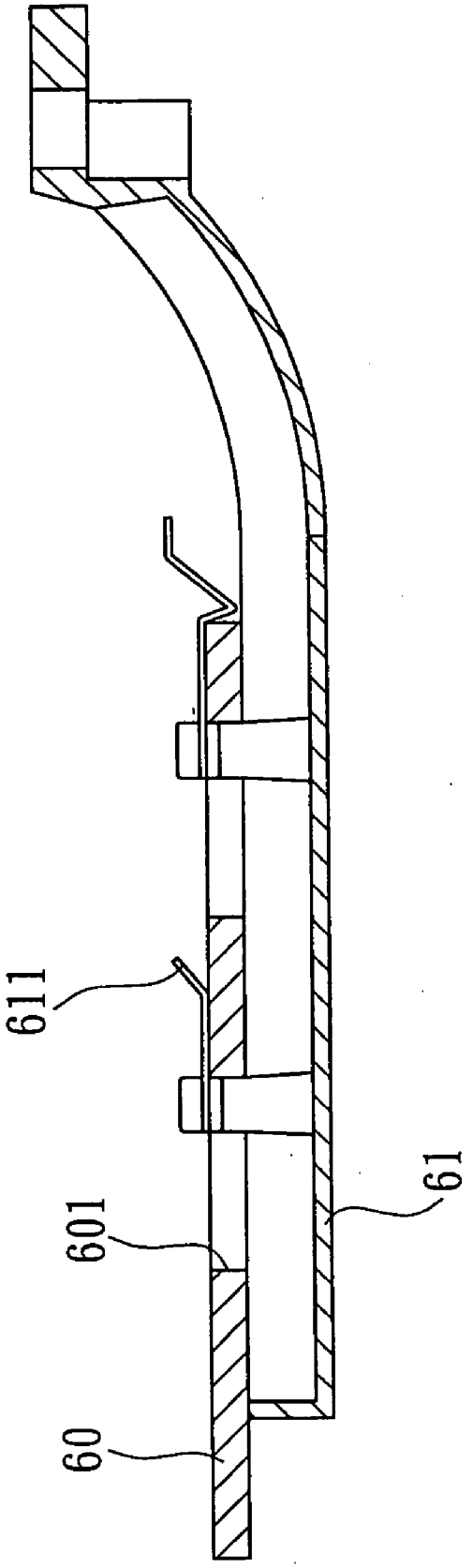


FIG. 8
PRIOR ART

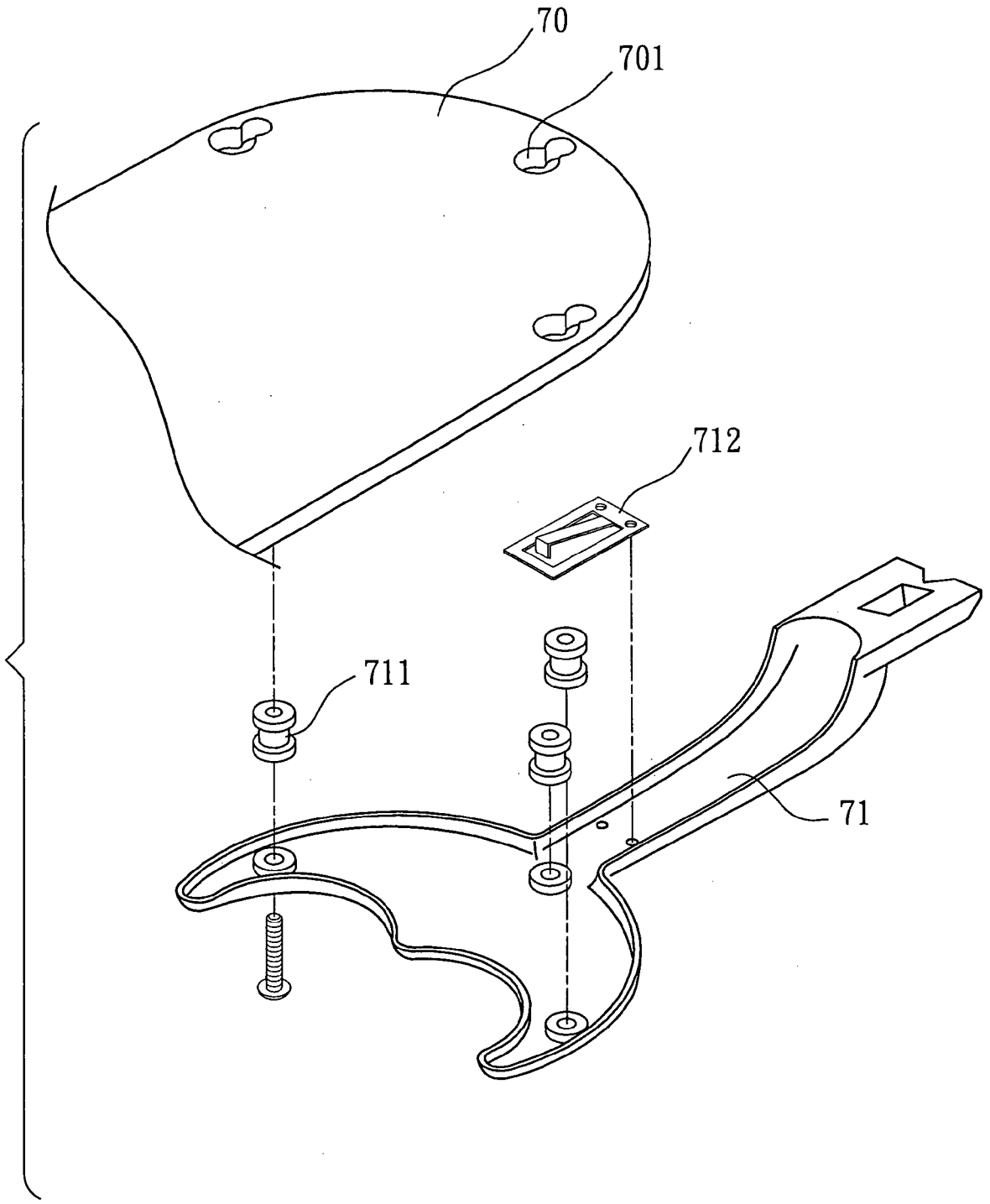


FIG. 9
PRIOR ART

STRUCTURE OF CEILING FAN BLADES THEIR FRAMES

BACKGROUND OF THE INVENTION

[0001] 1. Field of Invention

[0002] The invention relates to a ceiling fan structure and, in particular, to the combination structure of ceiling fan blade and its frame.

[0003] 2. Related Art

[0004] There are usually several blade frames around the motor at the center of a ceiling fan. Each blade frame is mounted with a blade. The invention pertains the technique of combining the blades with their corresponding frames.

[0005] In the early days, the blades are fixed on the frames in a ceiling fan. Such a combination is done by simple screw locking. For example, the blade frame is provided with a screw to go through the corresponding blade. A bolt is then used to lock the blade and the blade frame. Such a structure has some inconvenience in the disassembly because each part has to taken apart. Therefore, designs with more convenience structures start to appear.

[0006] FIGS. **7** to **9** show three conventional structures of the blades and their frames.

[0007] As shown in FIG. **7**, the blade **50** has a through hole **501**. The blade frame **51** has a hook **511** protruding from it and forming a groove **52** in between. The blade **50** is mounted on the blade frame **51**, followed by moving their relative position so that the blade **50** is embedded in the groove **52**. Afterwards, a positioning element **53** is inserted for positioning.

[0008] Please refer to FIG. **8**. The blade **60** has a through hole **601**. The blade frame **61** has a clip **611**. Inserting the clip **611** through the through hole **601** and adjusting the relative position between the blade and the blade frame, the clip fixes and positions the blade **60** on the blade frame **61**.

[0009] Finally, the please refer to FIG. **9**. The blade **70** has several through holes **701** in the shape of the number **8**, formed by two holes of different diameters. An inserting part **711** on the blade frame **71** goes through the larger hole. Afterwards, the stopping part **712** on the inserting part **711** falls into the smaller hole by moving the relative position between the blade **70** and the blade frame **71**, thereby fixing them.

[0010] Although the above-mentioned three structures of blade and blade frame are more convenient than the conventional structure using screws, the hook, clip or inserting part is positioned on the blade after going through the corresponding through hole. They have to satisfy a certain precision in order to achieve a firm connection, so that no serious wiggles happen when the ceiling fan operates. Taking the structure in FIG. **8** as an example, the blade may fall off as the blade moves toward the motor because the clip can depart from the blade.

[0011] Therefore, it is the goal of the invention to provide a structure of blade and blade frame that can be readily combined and firmly fixed without the need for a high precision as in the prior art.

SUMMARY OF THE INVENTION

[0012] It is an objective of the invention to provide a structure of blade and blade frame for a ceiling fan that is simple and convenient to assemble.

[0013] The invention includes:

[0014] a blade, whose one end has at least two through holes;

[0015] a blade frame, which has an inserting part for each of the through holes on the blade, each of the inserting parts having a stopping part that prevents the blade frame from leaving the blade on the exposed end from the blade; and

[0016] an elastic positioning element restoring its position after pressure release, which has a plurality of limiting parts each of which urges against the stopping parts after the inserting parts go through the corresponding through holes, blocking the stopping parts by sticking between the stopping parts and the blade.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] The invention will become more fully understood from the detailed description given herein below illustration only, and thus is not limitative of the present invention, and wherein:

[0018] FIG. **1** is a three-dimensional exploded view of the invention;

[0019] FIG. **2** is three-dimensional perspective view of the invention;

[0020] FIG. **3** is a schematic assembly view of the invention;

[0021] FIG. **4** is a top view of the limiting part and the inserting part in position according to the invention;

[0022] FIG. **5** is a side view of the limiting part and the inserting part in position according to the invention;

[0023] FIG. **6** is a schematic assembly view of the second embodiment of the invention;

[0024] FIG. **7** shows the structure of the blade and blade frame used in a first conventional ceiling fan;

[0025] FIG. **8** shows the structure of the blade and blade frame used in a second conventional ceiling fan; and

[0026] FIG. **9** shows the structure of the blade and blade frame used in a third conventional ceiling fan.

DETAILED DESCRIPTION OF THE INVENTION

[0027] The present invention will be apparent from the following detailed description, which proceeds with reference to the accompanying drawings, wherein the same references relate to the same elements.

[0028] According to an embodiment, the disclosed structure of ceiling fan blade and blade frame includes: a blade **1**, a blade frame **2**, and a positioning element **3**.

[0029] The blade **1** has at least two through holes **11** on one end. As shown in the drawing, the blade **1** in this embodiment has three through holes **11** arranged in a triangular shape.

[0030] The blade frame **2** has an inserting part **21** for each of the through hole **11** on the blade **1**. Each of the inserting parts **21** has a stopping part **211**. The stopping part **211** goes through the corresponding through hole **11** and exposes on the blade **1**.

[0031] In this embodiment, the inserting parts **21** are independent elements. They are fixed on the blade frame **2** by screws.

[0032] The positioning element **3** is elastic and has several limiting parts **31**. The limiting parts **31** are connected by a linking part **32** with a linear structure. After the inserting part **21** goes through the corresponding through hole **11**, the positioning element **3** is disposed so that the limiting parts **31** urge

against the stopping parts **211** and block them by sticking between the stopping parts **211** and the blade **1**.

[0033] In this embodiment, the positioning element has limiting parts **311** on both ends to coil between the blade and the stopping parts. The two limiting parts **311** are connected by a linking part **32** with another limiting part **312** also coiling between the blade and the stopping part. The positioning element **3** is thus mounted between the stopping parts **211** and the blade **1** with the help of the inserting parts **21** on the blade frame **2**.

[0034] Each of the stopping parts **211** includes a first stopping part **211***a* for the limiting part **31** to block after it restores its position and a second stopping part **211***b* blocking the limiting part **31** after the inserting part **21** goes through the through hole **11**.

[0035] Besides, the blade **1** has a covering element **4** in this embodiment for covering the part of the inserting part **21** exposed from the blade **1** and the positioning element **3**.

[0036] Please refer to FIGS. **3** to **5**. The inserting parts **21** of the blade frame **2** go through the through holes **11** of the blade **1**, so that the stopping parts **211** at the end of the inserting parts **21** expose from the blade **1**. Moreover, the positioning element **3** is pressed inward in such a way that it is slightly deformed and disposed among the inserting parts **21**. Each of the limiting parts **31** is disposed at the corresponding inserting part **21**. They restore their positions after the positioning element **3** is released. The limiting parts **31** then urge against the inserting parts **21** between the stopping parts **211** and the blade **1**.

[0037] Each of the limiting parts **31** of the positioning element **3** urges against the corresponding first stopping part **211***a* in parallel to the blade **1** (FIG. **4**). Moreover, each of the limiting parts **31** surrounds between the blade **1** and the second stopping part **211***b* to stop the second stopping part **211***b* in the normal direction of the blade **1** (FIG. **5**).

[0038] Therefore, the positioning element **3** is positioned between the inserting part **21** and the blade **1**. If one carelessly touches or pushes the limiting parts **31** or linking part **32** of the positioning element **3**, the elasticity thereof prevents the limiting parts **31** from falling off. Moreover, the two inserting parts **311** and the inserting part **312** in the drawing provide opposite blocking forces. Thus, they provide constraints on the inserting parts **21**. Taking the structure in this embodiment as an example, when the blade **1** is withdrawn outwards with respect to the blade frame **2**, the two limiting parts **311** block it. When the blade **1** is pushed inward with respect to the blade frame **2**, the limiting part **312** blocks it. In other words, it does not have same problem as in the prior art where the blade may fall off because the blade and the blade frame have a blocking force in the same direction.

[0039] It is clear from the above description that a primary advantage of the invention is to in the simple assembly structure between the blade and the blade frame. Such a structure can prevent the blade from falling off the blade frame.

[0040] There are of course many other embodiments of the invention only differing in details. Please refer to FIG. **6** for a second embodiment of the invention. The blade **1** has four through holes **11**. The blade frame **2** has four corresponding inserting parts **21**. The positioning element **3** has a rectangular shape with two limiting part **313** protruded from and two limiting parts **314** recessed on opposite ends. The limiting elements **313**, **314** all have an arc shape. The limiting parts **313**, **314** are also connected using a linear structure **32**.

[0041] In this embodiment, the positioning element is mounted by squeezing the recessed limiting parts **314**. It is then released after the two limiting parts **313** are mounted on the corresponding inserting parts **21**. In this case, the limiting parts **313**, **314** of the positioning element block the corresponding inserting parts **21**. Using such a structure, the blade **1** and the blade frame **2** can be positioned as in the first embodiment.

[0042] Although the invention has been described with reference to specific embodiments, this description is not meant to be construed in a limiting sense. Various modifications of the disclosed embodiments, as well as alternative embodiments, will be apparent to people skilled in the art. Therefore, it is contemplated that the appended claims will cover all modifications that fall within the true scope of the invention.

What is claimed is:

1. A structure of blade and blade frame for a ceiling fan, comprising:

a blade, whose one end has at least two through holes;

a blade frame, which has an inserting part for each of the through holes on the blade, each of the inserting parts having a stopping part that prevents the blade frame from leaving the blade on the exposed end from the blade; and

an elastic positioning element restoring its position after pressure release, which has a plurality of limiting parts each of which urges against the stopping parts after the inserting parts go through the corresponding through holes, blocking the stopping parts by sticking between the stopping parts and the blade.

2. The structure of blade and blade frame for a ceiling fan as in claim **1**, wherein the inserting parts are independent elements fixed on the blade frame.

3. The structure of blade and blade frame for a ceiling fan as in claim **1**, wherein the blade has a covering element to cover the part of the inserting part exposed from the blade and the positioning element.

4. The structure of blade and blade frame for a ceiling fan as in claim **1**, wherein the positioning element has a hook-shaped limiting part on either end thereof and another arc-shaped limiting element between the two hook-shaped limiting parts connected using a linear structure.

5. The structure of blade and blade frame for a ceiling fan as in claim **1**, wherein the positioning element has a linear linking part between each two consecutive limiting parts.

6. The structure of blade and blade frame for a ceiling fan as in claim **1**, wherein each of the stopping parts includes a first stopping part for the limiting part to block after it restores its position and a second stopping part blocking the limiting part after the inserting part goes through the through hole.

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