The disclosure provides a fan assembling structure and a fan device having the same. The fan comprises a frame having an upper board, a lower board and a circular connector, and blades disposed in the frame. The lower board comprises four side edges in sequential connection. A first fixing hole is at the first side edge, and a second fixing hole is at the upper board. The structure comprises an assembling board having a bottom plate and two parallel side plates. The bottom plate comprises a ventilating area. A through hole is defined at a first side of the ventilating area, and a hook is disposed on a second side of the ventilating area. And at least one protrusion extends inwardly from an inner side of at least one of the two parallel side plates, a guiding slot being formed between the protrusion and the bottom plate.
FAN ASSEMBLING STRUCTURE AND FAN DEVICE HAVING THE SAME

CROSS-REFERENCE TO RELATED APPLICATIONS


TECHNICAL FIELD

[0002] The disclosure relates to a fan assembling structure and a fan device having the fan assembling structure.

BACKGROUND

[0003] The heat generated from different electronic devices' operation increases with working frequency. As a result, it is important to remove heat from electronic devices.

[0004] The conventional fan is provided with four fixing holes at four corners of its frame. Four bolts are inserted in the fixing holes for fixing the fan. However, a tool such as a screw driver and four times of repeat screwing operation are required to fix the fan, thereby resulting in high labor hours. Besides, when the fan is fixed by screws, the fixing hole may be damaged from improper torque force by the screw driver, and the fan may be unscrewed. Due to repeatedly assembling and detaching, the self-tapping screw and the plastic frame may be worn out, and the entire fan may be damaged.

SUMMARY

[0005] An objective of the disclosure is to provide a fan assembling structure to solve the labor-cost, bad-assembling and worn-out problems during assembling the fan in the conventional technology.

[0006] One aspect of the disclosure provides an assembling structure for a fan, the fan comprising a frame and blades disposed in the frame, the frame having an upper board, a lower board and a circular connector connected between the upper board and the lower board, the lower board comprising a first side edge, a second side edge, a third side edge and a fourth side edge in sequential connection, a first fixing hole being defined at the first side edge of the lower board, a second fixing hole corresponding to the first fixing hole being defined at the upper board. The assembling structure comprises an assembling board, the assembling board comprising a bottom plate and two parallel side plates vertical to the bottom plate, the bottom plate comprising a ventilating area, a through hole being defined at a first side of the ventilating area such that a fixing part can pass through the through hole, the first fixing hole at the first side edge of the lower board and the second fixing hole at the upper board, a hook is disposed on a second side of the ventilating area opposite to the first side of the ventilating area, and at least one protrusion extends inwardly from an inner side of at least one of the two parallel side plates between the first side and the second side of the ventilating area, a guiding slot being formed between the protrusion and the bottom plate for sliding the fan from the first side of the ventilating area to a predetermined fixing position on the assembling board.

[0007] Another aspect of the disclosure provides a fan device, comprising a fan and the above-mentioned fan assembling structure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] FIG. 1 is a front view diagram showing the fan assembling structure in an embodiment of the present disclosure.

[0009] FIG. 2 is a front view diagram showing the lower board of the frame of the fan in an embodiment of the disclosure.

[0010] FIG. 3 is a perspective diagram showing the fan assembling structure in an embodiment of the disclosure.

[0011] FIG. 4 is a perspective diagram showing an assembling board in an embodiment of the disclosure.

[0012] FIG. 5 is a perspective diagram showing an assembling board in another embodiment of the disclosure.

[0013] FIG. 6 is a partial enlarged diagram showing the fan assembling structure in an embodiment of the disclosure.

[0014] FIG. 7 is a partial enlarged diagram showing the fan assembling structure in another embodiment of the disclosure.

DETAILED DESCRIPTION

[0015] Hereinafter, in the embodiments described in details referring to the accompanying drawing, the fan is assembled to an assembling board 100 such as a chassis cover, but the disclosure is not limited thereto.

[0016] As shown in FIG. 1, the disclosure provides a fan assembling structure comprising an assembling board (such as chassis cover) 100, a fan 200 assembled to the assembling board 100 along a sliding direction A, and fixing parts (such as pin screws) 300. The fan 200 is fixed to the assembling board 100 via the fixing parts 300.

[0017] As shown in FIG. 2 through FIG. 4, the fan 200 comprises a frame 210 and blades 220 disposed in the frame 210. The frame 210 comprises an upper board 211 and a lower board 212 spaced at a certain distance, and a circular connector 213 disposed between the upper board 211 and the lower board 212. The lower board 212 comprises a first side edge 2121, a second side edge 2122, a third side edge 2123 and a fourth side edge 2124 in sequential connection and these four side edges constitutes a quadrangle (usually a square). Two fixing holes 2125 are defined at the first side edge 2121 of the lower board 212. The structure of the upper board 211 is similar to that of the lower board 212, and two fixing holes 2115 are defined at the upper board 211 corresponding to the fixing holes 2125.

[0018] The assembling board 100 comprises a bottom plate 110, two parallel side plates 120 perpendicular to the bottom plate 110 and extending from two sides of the bottom plate 110 along the sliding direction A. In an embodiment, the bottom plate 110 and the two side plates 120 are integrally formed. In other embodiments, the side plates 120 may be fixed at two sides of the bottom plate 110 by riveting or welding. The bottom plate 110 comprises a ventilating area 111 defined by a plurality of through holes 113 at the bottom plate 110. The position of the ventilating area 111 corresponds to the fan 200, and the first side of the ventilating area 111 is provided with two through holes 113, which correspond to the fixing holes 2125 of the first side edge 2121 of the lower board 212 in the frame 210. Two hooks 112 are disposed at the second side of the ventilating area 111 opposite to the first side of the ventilating area 111. In details, the hook 112 comprises a blocking portion 1121 extending vertically from the bottom plate 110, and an elastic arm 1122 connected with the blocking portion 1121. A free end of the elastic arm
is provided with a guiding surface 1123 inclined upwardly. The direction from the first side to the second side of the ventilating area 111 is consistent with the sliding direction A. The two hooks 112 bend towards the ventilating area 111. In the embodiment, the hook 112 is formed by punching the bottom plate 110. In other embodiments, the hook 112 may be fixed to the bottom plate 110 by riveting or welding.  

[0019] The position of the two side plates 120 corresponds to the second side edge 2122 and the fourth side edge 2124 of the fan 200. Two opposing protrusions 121 respectively extend inwardly from the inner side of the two side plates 120 between the hook 112 and the through hole 113, thereby a guiding slot 122 is formed between the protrusions 121 and the bottom plate 110. In the embodiment, the protrusions 121 are formed by punching the side plates 120. Alternatively, the protrusions may be formed on the side plates 120 by other methods such as riveting. The distance between the two protrusions 121 is shorter than the distance between the second side edge 2122 and the fourth side edge 2124 of the lower board 212. The distance between the protrusion 121 and the bottom plate 110 (the height of the guiding slot 122) is equal to the thickness of the lower board 212, or is slightly larger than the thickness of the lower board 212. In the embodiment, the two protrusions are disposed corresponding to each other, as shown in FIG. 4. In another embodiment, the two protrusions are staggered with each other, as shown in FIG. 5. In other embodiment, if the staggered distance between the protrusions is large enough, the fan 200 can be fixed by only one fixing part 300. In this case, the lower board 212 can be provided with only one fixing hole 2125, and the upper board 211 can be provided with only one fixing hole 2115.  

[0020] In an embodiment as shown in FIG. 6, the height of the hook 112 protruding from the bottom plate 110 is equal to the thickness of the lower board 212 of the frame 210, namely the height of the blocking portion 1121 of the hook 112 is equal to or slightly larger than the thickness of the lower board 212. During assembling, the fan 200 is pushed from one side of the through hole 113 (namely the first side of the ventilating area 111), and the second side edge 2124 of the lower board 212 are engaged into the guiding slot 122. The fan slides along the guiding slot 122 until the third side edge 2123 of the lower board 212 abuts against the blocking portion 1121 of the hook 112 and the elastic arm 1122 abuts against the upper surface of the lower board 212, thereby fixing the lower board 212 to the hook 112. In this case, the fixing holes 2125 at the first side edge 2121 of the lower board 212 and the fixing holes 2115 on the upper board 211 correspond to the through holes 113. The fixing parts 300 are inserted into the fixing holes 2115, 2125 and the through holes 113 for fixing the fan 200 to the assembling board 100. Through the above process, the fan 200 on the assembling board 100 can slide from the first side to the second side of the ventilating area 111 until the predetermined fixing position is reached.  

[0021] In an embodiment as shown in FIG. 7, the height of the hook 112 protruding from the bottom plate 110 is equal to the distance between the upper surface of the upper board 211 of the frame 210 and the lower surface of the lower board 212, namely the height of the blocking portion 1121 of the hook 112 is equal to or slightly larger than the distance between the upper surface of the upper board 211 and the lower surface of the lower board 212. During assembling, the fan 200 is pushed from a side of the through hole 113 (namely the first side of the ventilating area 111), and the second side edge 2122 of the lower board 212 and the fourth side edge 2124 are engaged into the guiding slot 122. The fan slides along the guiding slot 122 until the upper board 211 and the lower board 212 abuts against the blocking portion 1121 of the hook 112 and the elastic arm 1122 abuts against the upper surface of the upper board 211, thereby fixing the upper board 211 and the lower board 212 into the hook 112. In this case, the fixing holes 2125 at the first side edge 2121 of the lower board 212 and the fixing holes 2115 on the upper board 211 correspond to the through holes 113. The fixing parts 300 are inserted into the fixing holes 2115, 2125 and the through holes 113, for fixing the fan 200 to the assembling board 100. Through the process above, the fan 200 on the assembling board 100 can slide from the first side to the second side of the ventilating area 111 until predetermined fixing position is reached.  

[0022] One or more of the embodiments of the disclosure provide one of more of the following benefits.  

[0023] During assembling the fan, the fan is guided by the guiding slot of the assembling board.  

[0024] The fan is fixed by the hook on the bottom plate of the assembling board, and/or the through holes and two fixing parts. Thus, only two fixing parts may be needed, and the labor-cost is reduced by a half.  

[0025] The bad-assembling is reduced and the worn-out risk to the fan is avoided.  

[0026] Besides, there is no need to change the structure of the fan to employ the assembling structure according to embodiments of the disclosure.  

[0027] Although the disclosure has been described as above in reference to several typical embodiments, it is to be understood that the terms used therein are just illustrative and exemplary rather than restrictive. Since the disclosure can be applied in various forms without departing from the spirit or principle of the disclosure, it is to be understood that the abovementioned embodiments will not be limited to any specific details mentioned above, rather, they should be construed broadly in the spirit or concept of the disclosure defined by the appended claims. Therefore, the present disclosure aims to cover all the modifications or variations falling within the protection scope defined by the appended claims.  

What is claimed is:  

1. An assembling structure for a fan, the fan comprising a frame and blades disposed in the frame, the frame having an upper board, a lower board and a circular connector connected between the upper board and the lower board, the lower board comprising a first side edge, a second side edge, a third side edge and a fourth side edge in sequential connection, a first fixing hole being defined at the first side edge of the lower board, a second fixing hole corresponding to the first fixing hole being defined at the upper board, wherein the assembling structure comprises an assembling board, which has a bottom plate and two parallel side plates vertical to the bottom plate, the bottom plate has a ventilating area, a through hole is defined at a first side of the ventilating area such that a fixing part can pass through the through hole, the first fixing hole at the first side edge of the lower board and the second fixing hole of the upper board, a hook is disposed on a second side of the ventilating area opposite to the first side, and at least one protrusion extends inwardly from an inner side of at least one of the two parallel side plates between the first side and the second side of the ventilating area, and a guiding slot is formed between the protrusion and the
bottom plate so as to slide the fan from the first side of the ventilating area to a predetermined fixing position on the assembling board.

2. The assembling structure according to claim 1, wherein the bottom plate and the two parallel side plates are integrally formed.

3. The assembling structure according to claim 1, wherein each of the two parallel side plates comprises the protrusion located at the inner side, and the two protrusions are staggered with each other.

4. The assembling structure according to claim 1, wherein the protrusions are formed by punching the side plate.

5. The assembling structure according to claim 1, wherein the distance between the protrusion and the bottom plate is equal to the thickness of the lower board of the frame.

6. The assembling structure according to claim 1, wherein the hook is formed by punching the bottom plate.

7. The assembling structure according to claim 1, wherein the height of the hook protruding from the bottom plate is equal to the thickness of the lower board, and the third side edge of the lower board is fixed by the hook.

8. The assembling structure according to claim 1, wherein the height of the hook protruding from the bottom plate is equal to the distance between the upper surface of the upper board and the lower surface of the lower board, and the upper board and the third side edge of the lower board are fixed by the hook.

9. The assembling structure according to claim 1, wherein the hook comprises a blocking portion which extends vertically from the bottom plate, and an elastic arm connected with the blocking portion, and a free end of the elastic arm is provided with a guiding surface inclining upwardly.

10. A fan device, comprising a fan and a fan assembling structure, the fan comprising a frame and blades disposed in the frame, the frame comprising an upper board, a lower board and a circular connector connected between the upper board and the lower board, the lower board comprising a first side edge, a second side edge, a third side edge and a fourth side edge in sequential connection, a first fixing hole being defined at the first side edge of the lower board, and a second fixing hole corresponding to the first fixing hole being defined at the upper board,

wherein the assembling structure comprises an assembling board, which has a bottom plate and two parallel side plates vertical to the bottom plate, the bottom plate has a ventilating area, a through hole is defined at a first side of the ventilating area such that a fixing part can pass through the through hole, the first fixing hole at the first side edge of the lower board and the second fixing hole of the upper board, a hook is disposed on a second side of the ventilating area opposite to the first side of the ventilating area, and

at least one protrusion extends inwardly from an inner side of at least one of the two parallel side plates between the first side and the second side of the ventilating area, and a guiding slot is formed between the protrusion and the bottom plate so as to slide the fan from the first side of the ventilating area to a predetermined fixing position on the assembling board.

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