

Description

Spreading fan structure

Technical Field

The present utility model relates to a spreading fan structure, especially a spreading fan which can make the blades fold and unfold synchronously, stably and smoothly.

Background Art

Taiwan patent M345145 discloses an improved spreading fan blade structure which comprises a blade frame and a blade, wherein the blade frame has a shell and a support frame, wherein the shell is provided for installing the fan blades and is internally provided with a curly elastic component whose one end is fixed with the shell which has a through hole and is provided at least a groove at bottom; one end of the support frame has a fixed seat for installing the shell, wherein the fixed seat has a locating block which corresponds with the groove of the shell. The shell can rotate a certain angle around the fixed seat and a screw groove projects from the fixed seat and a caulking groove is arranged on the screw groove for fixing the other end of the elastic component, thereby, when the support frame is rotating, the shell can store energy and push fan blades reversely to get whirling motion by the elastic component. However, when the Taiwan patent M345145, an improved spreading fan blade structure, is implemented, the blades are separately pushed by elastic force of the elastic component, thereby when each blade is started to normal operation state and changed from normal operation state to folding state, the blades can not fold or unfold synchronously for the asymmetric elastic force of the elastic component, result the deflection of the motor shaft of the spreading fan due to imbalance of the center of gravity. Thus, the spreading fan has noise when it is operated, and accelerated the abrasion of motor. Furthermore, the wind force will be imbalance and reduced due to the different expanding rate of each blade.

Contents of the Invention

The object of the present utility model is providing a spreading fan structure which can make the blades fold and unfold synchronously, stably and smoothly.

The technical solution of this utility model is:

A spreading fan structure has a main body, wherein a transmission shaft of the rotating power source of the main body of the spreading fan is connected with a rotating disc which is provided with many assembly units on its periphery. The said assembly units comprise a shaft core of the said rotating disc. The said shaft core is assembled with the shaft hole of the bearing plate and a

bearing is provided between the shaft core and the shaft hole of the bearing plate which is provided with an arc guiding groove on the side of the shaft hole. A guiding lever is located in the guiding groove and connected with the rotating disc. A synchronous connecting lever is provided between the bearing plates of the adjacent assembly units. A blade installing plate is locked on the bearing plate for the installing of blades. One end of the elastic component is installed between the bearing plate and the blade installing plate, and the other end of elastic component is installed on the rotating disc.

A said spreading fan structure said above, wherein, a first connecting lever fixing pin and a second connecting lever fixing pin are installed on the sides of the bearing plate of the assembly units, and the synchronous connecting lever have a first shaft hole and a second shaft hole on two ends. The first shaft hole is connected with the first connecting lever fixing pin of the bearing plate of an adjacent assembly unit, and the second shaft hole is connected with the second connecting lever fixing pin of the bearing plate of an adjacent assembly unit.

A spreading fan structure said above, wherein the synchronous connecting lever has a step in the middle part and the two ends of which are at different height.

A spreading fan structure said above, wherein the assembly units and the blades installed on which are installed on the periphery of the rotating disc in an equal angle-interval manner, and the blades are arranged as the correspondence shape of the rotating disc.

A spreading fan structure said above, wherein one end of the elastic component of the assembly units is installed on the blades installing plate which is equipped with fixing pin for the elastic component, and the other end of the elastic component is fixed by the fixing pin.

A spreading fan structure said above, wherein the elastic component of the assembly unit is coil spring.

A spreading fan structure said above, wherein the main body of the spreading fan is provided with a suspender.

A spreading fan structure said above, wherein the synchronous connecting lever has a step in the middle part and the two ends of which are at different height.

A spreading fan structure said above, wherein the assembly units and the blades installed on which are installed on the periphery of the rotating disc in an equal angle-interval manner, and the blades are arranged as the correspondence shape of the rotating disc.

A spreading fan structure said above, wherein one end of the elastic component of the assembly units is installed on the blades installing plate which is equipped with fixing pin for the elastic component, and the other end of the elastic component is fixed by the fixing pin.

The spreading fan structure of this utility model has a main body, wherein a transmission shaft of

the rotating power source of the main body of the spreading fan is connected with a rotating disc which is provided with many assembly units on its periphery. The said assembly units comprise a shaft core which is connected with the rotating disc. The said shaft core is assembled with the shaft hole of the bearing plate and a bearing is provided between the shaft core and the shaft hole of the bearing plate which is provided with an arc guiding groove on the side of the shaft hole. A guiding lever is located in the guiding groove and connected with the rotating disc. A synchronous connecting lever is provided between the bearing plates of the adjacent assembly units. A blade installing plate is locked on the bearing plate for the installing of blades. One end of the elastic component is installed between the bearing plate and the blade installing plate, and the other end of elastic component is installed on the rotating disc.

The spreading fan according to the present utility model is provided with synchronous connecting levers between adjacent assembly units, and the spreading fan can ensure the synchronous of folding and unfolding of blades. Thereby, this utility model can avoid the center of gravity from deflection which is resulted from the different expanding rate of the blades and can avoid the noise which is generated by the abrasion of rotating power source, and improve the stability of the bearing plate and the blades by the guiding of arc guiding groove and guiding lever which are installed on the bearing plate, and can further improve the fluency of the bearing plate and the blades by the effective rolling and lower friction of the bearing which is installed in the shaft hole of the bearing plate, so that improve the original wind force and reduce the power cost which is resulted from friction.

Description of Figures

Fig.1 shows the exploded perspective view of the present utility model;

Fig.2 shows the partially enlarged exploded perspective view of the present utility model;

Fig.3 shows the perspective view of the present utility model;

Fig.4 shows the partial sectional view of the unfolding state of the blades according to the present utility model;

Fig.5 shows the whole top view of the unfolding state of the blades according to the present utility

model;

Fig.6 shows the partial sectional view of the folding state of the blades according to the present utility model;

Fig.7 shows the folding state of the blades.

Description of reference signs:

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| (1) main body of the spreading fan | (11) suspender |
| (12) rotating power source | (2) rotating disc |
| (21) assembly hole | (3) assembly unit |
| (31) shaft core | (32) guiding lever |
| (33) bearing plate | (331) shaft hole |
| (332) arc guiding groove | (34) bearing |
| (35) elastic component | (36) assembly plate for blades |
| (361) locking element | (37) elastic component fixing pin |
| (38) the first connecting lever fixing pin | (39) the second connecting lever fixing pin |
| (4) synchronous connecting lever | (41) step |
| (42) the first pivot hole | (43) the second pivot hole |
| (5) blade | |

Mode of carrying out the utility model

The embodiment of the present utility model will be described by reference to the description of figures so that the features, objects and effect of this utility model can be understood more clearly.

First, figure 1 to figure 3 show the spreading fan structure according to the present utility model which is composed of main body 1, rotating disc 2, assembly units 3, synchronous connecting lever 4 and blades 5, wherein,

Main body 1, a suspender 11 is installed at the upper end of the main body 1 of the spreading fan so that the main body 1 can be fixed on the ceiling; a rotating power source 12, such as motor, is installed at the lower end of the main body 1 and the transmission shaft of the rotating power source 12 is assembled with rotating disc 2.

Rotating disc 2, the transmission shaft of the rotating power source 12 is connected to the center of the circular rotating disc 2. Assembly holes 21 are arranged on the periphery of the rotating disc 2 in an equal angle-interval manner.

Assemble units 3, reference to figure 4, shaft core 31 is arranged in the assembly hole 21 of the rotating disc 2, and a guiding lever 32 is arranged in the assembly hole 21 of the rotating disc 2 on the side of the shaft core 31. A bearing plate 33 which has a shaft hole 331 in the center is arranged at the upper end of the shaft core 31, and a bearing 34 is provided in the shaft hole 331 to be assembled with the upper end of the shaft core 31. Bearing plate 33 has a arc guiding groove 332 which adjacent to the shaft hole 331 so that guiding lever 32 can penetrate the arc guiding groove 332. Furthermore, the bearing plate 33 is provided with a elastic component 35 which can be a coil spring. A blades installing plate 36 is arranged above the elastic component 35, and a locking element 361 is located in the center of the blades installing plate 36 so that the plate 36 can be locked with the shaft core 31. Lock elements 361 are provided on the side of the center of the blades installing plate 36 so that the plate 36 can be locked with the bearing plate 33. One end of the elastic component 35 is installed on the blades installing plate 36, and the other end of the elastic component 35 is assembled with the elastic component fixing pin 37 which is installed in the assembly hole 21 of the rotating disc 2. A first connecting lever fixing pin 38 and a second connecting lever fixing pin 39 are arranged on the sides of the bearing plate 33.

The synchronous connecting lever 4 is arranged between adjacent assembly units 3, and has a step 41 in the middle part and has a different height of two ends. A first pivot hole 42 is provided at one end of the synchronous connecting lever 4 and a second pivot hole 43 is provided at the other end of the synchronous connecting lever 4. The first pivot hole 42 is connected with the first connecting lever fixing pin 38 which is installed in the bearing plate 33 of an adjacent assembly unit 3. The second pivot hole 43 is connected with the second connecting lever fixing pin 39 which is installed in the bearing plate 33 of another adjacent assembly unit 3.

Blades 5 are installed on the blades installing plate 36 of the assembly unit 3 and arranged as a circle to correspond with the circular rotating disc 2.

Thereby, reference to figure 4 and figure 5, the rotating power source 12 of the main body of the spreading fan is started, when the embodiment is applied, so that the rotating disc 2 which is connected with the rotating power source 12 can be rotated. Thus, the blades 5 which is pivoted with the rotating disc 2 through the assembly unit 3 rotate toward outside by the centrifugal force which is generated by the rotating of the disc 2 and drive the blades installing plate 36 to rotate together. Then, by the Synchronous connecting lever 4 which is arranged between bearing plates 33 of two adjacent assembly units 3, the bearing plates 33 of an assembly unit 3 can synchronously drive the bearing plate 33 of another assembly unit 3 to rotate, when the first bearing plate 33 rotate. Blades 5 which are installed on the blades installing plate 36 of each assembly unit 3 can be

unfolded synchronously by the traction of synchronous connecting lever 4. This design can keep the stability of spreading fan and avoid the imbalance and reduction of wind force which are resulted from the different expanding rate of the blades 5. Furthermore, this design can prevent the center of gravity from deflection which is resulted from the different expanding rate of the blades 5 and avoid the noise which is generated by the abrasion of rotating power source 12.

Fig.6 and Fig.7 shows that the elastic component 35 which is extended by the extending of the blades 5 gets back to original state with the stopping of rotating disc 2 and disappearing of centrifugal force. The blades installing plate 36 which is connected with one end of the elastic component 35 then drive the blades installed on which to restoration due to the restoration of the elastic component 35. The bearing plate 33 which is locked with the blades installing plate 36 by a locking element 361 rotates to restoration with the restoration of blades installing plate 36. Blades 5 of each assembly unit 3 can be folded synchronously by the traction of synchronous connecting lever 4 which is provided between bearing plates 33 of adjacent assembly units 3, and prevent the center of gravity from deflection which is resulted from the different expanding rate of the blades 5 and avoid the noise which is generated by the abrasion of rotating power source 12.

Furthermore, when the bearing plate 33 of the assembly unit 3 of the present utility model rotates, the stability of the bearing plate 33 and the folding and unfolding of the blades 5 which are installed on the bearing plate 33 can be further improved by the mutual guiding of the arc guiding groove 332 which is arranged on the bearing plate 33 and the guiding lever 32 which is arranged in the arc guiding groove 332 and assembled with the rotating disc 2. when the bearing plate 33 rotates, the connection of the shaft core 31 and bearing 34 which is installed by the center shaft hole 331 can further improve the rapid and fluency of the bearing plate 33 and the blades 5 by the effective rolling and lower friction of the bearing 34, so that improve the original wind force and reduce the power cost which is resulted from friction, and prevent the bearing plate 33 and shaft core 31 from being damaged quickly due to the frequent folding and unfolding of the bearing plate 33 and shaft core 31.

The embodiment of the present utility model described above is only for the object of description, but not intended to limit the scope of the present utility model. The equivalent changes and modifications which are made by anyone of the skilled in the art without departing from the idea and principles of the present utility model are all protected by this utility model.

Claims

1. A spreading fan structure, characterized in that the said spreading fan has a main body, wherein a transmission shaft of the rotating power source of the main body of the spreading fan is connected with a rotating disc which is provided with many assembly units on its periphery, the said assembly units comprise a shaft core of the said rotating disc, the said shaft core is assembled with the shaft hole of the bearing plate and a bearing is provided between the shaft core and the shaft hole of the bearing plate which is provided with an arc guiding groove on the side of the shaft hole, and a guiding lever is arranged in the guiding groove and connected with the rotating disc, and a synchronous connecting lever is arranged between the bearing plates of the adjacent assembly units, a blade installing plate is locked on the bearing plate for the installing of blades, one end of the elastic component is installed between the bearing plate and the blade installing plate, and the other end of elastic component is installed on the rotating disc.
2. A spreading fan structure according to claim 1, characterized in that a first connecting lever fixing pin and a second connecting lever fixing pin are installed on the sides of the bearing plate of the assembly units, and the synchronous connecting lever has a first shaft hole and a second shaft hole on two ends, the first shaft hole is connected with the first connecting lever fixing pin of the bearing plate of an adjacent assembly unit, and the second shaft hole is connected with the second connecting lever fixing pin of the bearing plate of an adjacent assembly unit.
3. A spreading fan structure according to claim 2, characterized in that the synchronous connecting lever has a step in the middle part and the two ends of which are at different height.
4. A spreading fan structure according to claim 3, characterized in that the assembly units and the blades installed on which are installed on the periphery of the rotating disc in an equal angle-interval manner, and the blades are arranged as the correspondence shape of the rotating disc.
5. A spreading fan structure according to claim 4, characterized in that one end of the elastic component of the assembly units is installed on the blades installing plate which is equipped with fixing pin for the elastic component, and the other end of the elastic component is fixed by the fixing pin.

6. A spreading fan structure according to claim 5, characterized in that the elastic component of the assembly unit is coil spring.
7. A spreading fan structure according to claim 4, characterized in that the main body of the spreading fan is provided with a suspender.
8. A spreading fan structure according to claim 1, characterized in that the synchronous connecting lever has a step in the middle part and the two ends of which are at different height.
9. A spreading fan structure according to claim 1, characterized in that the assembly units and the blades installed on which are installed on the periphery of the rotating disc in an equal angle-interval manner, and the blades are arranged as the correspondence shape of the rotating disc.
10. A spreading fan structure according to claim 1, characterized in that one end of the elastic component of the assembly units is installed on the blades installing plate which is equipped with fixing pin for the elastic component, and the other end of the elastic component is fixed by the fixing pin.