KITE FAN BLADE

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ABSTRACT

A fan blade for a ceiling fan includes a blade member and a support for the blade member. The blade member and the support are disassembled in a first mode to occupy a compact space for storage and transport and are assembled in a second mode to form a substantially rigid fan blade for assembly into a ceiling fan.
Fig. 5
KITE FAN BLADE

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of priority from U.S. Provisional Patent Application Ser. No. 60/866,907, filed Nov. 22, 2006, the disclosure of which is herein incorporated by reference.

FIELD OF THE INVENTION

[0002] This invention relates in general to ceiling fans and more particularly to a collapsible fan blade for a ceiling fan.

BACKGROUND OF THE INVENTION

[0003] Ceiling fans are popular commercial and consumer items. They move air in a room to more evenly distribute the air and keep the room at a more constant temperature. Ceiling fans are often used to cool people by providing a stream of air over their bodies. The air stream enhances body cooling by evaporating any surface body moisture and by removing heat from the surface of the skin.

[0004] Ceiling fans generally include a plurality of fan blades attached to and arrayed circumferentially around a blade hub. The blade hub is mounted to a motor contained in a motor housing which is supported by a down rod affixed to a ceiling. The fan blade is rigid in structure to resist the dynamic forces generated while being rotated. Further, most manufacturers prefer to sell a fan blade that is fully assembled and only requires attachment to a blade hub. A rigid fan blade is bulky and when combined in a set with other fan blades takes up an undesirable amount of space when stored or transported. It would be desirable to provide fan blades for a ceiling fan which are more compact and amenable to assembly by a user.

[0005] There is thus a need for a fan blade for a ceiling fan that is compact for storage and transport, that can be easily assembled to a ceiling fan by a user, and that is rigid when assembled to resist the dynamic forces generated during fan operation.

[0006] In some instances, a ceiling fan may be installed in a location that is exposed to outdoor weather conditions, such as in a pavilion. Alternatively, an outdoor overhead fan may be installed on a tall pole extending through a table in a similar fashion to a patio umbrella. In these situations, storm systems with strong winds or precipitation may cause significant damage to the fan or knock it over, especially if the blades are not removed before the storm approaches. The wind and precipitation of the storm may do more damage to the fan and its support structure due to the airfoil effect and surface area of the blades than if the blades were removed. However, the blades are not easily removed in conventional fans, and there may not be time to remove the blades before a storm approaches.

[0007] It is therefore desirable to provide fan blades that may be quickly reduced in surface area or removed from the fan.

SUMMARY OF THE INVENTION

[0008] The invention comprises, in one form thereof, a fan blade for a ceiling fan with a flexible blade member and a support structure. The support structure may be modified in order to collapse the flexible blade member. The fan blade may thus be transported or sold to a consumer in a compact form, and the consumer may then assemble the fan blade into a useable form.

[0009] More particularly, the invention includes a fan blade for a ceiling fan comprising a blade member; and a support for the blade member having a first rod member, a second rod member, and a mount. Each of the rod members are pivotally connected to the mount at one end. Further the blade member and the support are disassembled in a first mode to occupy a compact space and are assembled in a second mode to form a substantially rigid fan blade for assembly into a ceiling fan.

[0010] In another form, the invention includes a collapsible fan blade, comprising a flexible blade member having a curved side and a substantially straight side; a sleeve contiguous with the curved side; and a bendable rod partially inserted into an open end of the sleeve. The bendable rod has a free end and is biased to a straight position.

[0011] In another form, the invention includes a method for providing a fan blade. The method comprises the steps of providing a fan blade having a support and a flexible blade member, the fan blade having a compact, unassembled form and a useable form; and providing the fan blade to an end user in the compact, unassembled form.

[0012] An advantage of the present invention is that the fan blade is collapsible to occupy a compact space for storage and transport or to reduce the surface area of the fan to reduce the effect of a storm on the fan. Another advantage is that the fan blade can be easily assembled to a ceiling fan by the user. Further, the fan blade is substantially rigid when assembled to resist the dynamic forces generated during fan operation. A further advantage is that, because the fan blade may be assembled by the end user, the user may be given optional modular parts to use with the fan blade (i.e., additional support members or foil fan blades).

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] The present invention is disclosed with reference to the accompanying drawings, wherein:

[0014] FIG. 1 is a perspective view of a ceiling fan incorporating the present invention;

[0015] FIGS. 2 and 3 are diagrammatic views showing an embodiment of the present invention;

[0016] FIG. 4 is a diagrammatic showing another embodiment of the present invention;

[0017] FIG. 5 is a diagrammatic showing a further embodiment of the present invention;

[0018] FIG. 6 is an isometric view of the blade hub and blades of a ceiling fan according to an even fiber embodiment of the present invention;

[0019] FIG. 7 is a side view of the blade of FIG. 6 in the collapsed position;

[0020] FIG. 8 is a side view of the blade of FIG. 6 in the expanded position; and

[0021] FIG. 9 is an enlarged view of the base of the Blade of FIG. 8.

[0022] Corresponding reference characters indicate corresponding parts throughout the several views. The examples
set out herein illustrate several embodiments of the invention but should not be construed as limiting the scope of the invention in any manner.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0023] Referring now to FIG. 1, there is shown a ceiling fan incorporating an embodiment of the present invention. As shown, ceiling fan 10 includes a plurality of fan blades 14 circumferentially arrayed about and attached to a blade hub 12. The blade hub 12 is mounted to a motor contained in a motor housing 16 supported by down rod 18.

[0024] FIGS. 2 and 3 show an embodiment of the present invention. As shown, fan blade 20 includes a blade member 22 of flexible material, such as plastic or fabric, and a support 24. The blade member 22 may have graphics, text, or both printed thereon to display a logo or advertisement, for example. Further, the blade member 22 may be coordinated with the décor in the room containing the fan. Support 24 includes first and second rod members 26 and 28, to which blade member 22 is attached, and third spreader rod member 30. The rod members 26 and 28 and the spreader rod member 30 may be dowels or low-profile boards made of wood, plastic, metal, or another substantially rigid material. The blade member 22 may be attached to the rod members 26 and 28 by adhesive, rivets, welding, or other suitable fastening methods. The rod members 26 and 28 are pivotally connected at one end by pivot 32 mounted in mount 34.

[0025] As shown in FIG. 2, fan blade 20 is disassembled in a first mode and occupies a compact space for storage and transport. Rod members 26 and 28 are positioned adjacent to each other, and flexible blade member 22 is collapsed, folded, or gathered between the rod members. Spreader rod member 30 is separate from rod members 26 and 28 and positioned adjacent to them. A clamp or slot may be included with rod member 26 or 28 for storing the spreader rod member 30 in the first mode.

[0026] As shown in FIG. 3, fan blade 20 is assembled in a second mode. Rod members 26 and 28 have been spread open and flexible blade member 22 made taut and rigid for use. Spreader rod member 30 is attached to the other ends of rod members 26 and 28 to maintain the tautness of blade member 22 and the rigidity of fan blade 20 so that it can resist the dynamic forces generated during fan operation. The spreader rod member 30 may be attached to the rod members 26 and 28 by inserting the ends of the spreader rod member 30 into sockets 36 provided in the ends of rod members 26 and 28. The spreader rod member 30 has sufficient length such that the tension of the blade member 22 forces the rod members 26 and 28 against the spreader rod member 30 to maintain the spreader rod member 30 in the sockets 36. Alternatively, the spreader rod member 30 may be affixed to the ends of the rod members 26 and 28 by fasteners, adhesive, welding, or other suitable means.

[0027] The fan blade is thus easily assembled and may be assembled into a ceiling fan by mounting mount 34 to blade hub 14 (FIG. 1).

[0028] It should be noted that the rod members 26 and 28 may be attached to the mount 34 by a common pivot 32 (FIG. 3) or by spaced-apart pivots 32 (FIG. 2). The space-apart pivots provide space for the fabric between the rod members 26 and 28 in the first mode (FIG. 2).

[0029] FIG. 4 shows another embodiment of the fan blade of the present invention. The blade member 22' is pleated, as in a hand fan, to facilitate closing and opening of flexible blade member 22'.

[0030] While FIGS. 2-4 show fan blades having only two rod members, 26 and 28, and one spreader rod member 30, a plurality of rod members and spreader rod members may be used in the fan blade. An embodiment showing the fan blade with additional members is shown in FIG. 5. The fan blade 120 includes outer rod members 26 and 28 and an inner rod member 129 for additional support. The inner rod member 129 is connected between the mount 34 and, when assembled in the second mode, the spreader rod member 30. Further, additional rod members 130 and 131 are included to maintain the tension along the length of the blade member 22. The additional spreader rod members 130 and 131 are attached to two or more of the rod members 26, 28, and 129 when the fan blade is in the second mode.

[0031] In a further embodiment shown in FIG. 6, the fan blades 220 include a bendable rod 226 and a blade member 222. In FIG. 6, the fan blades 220 are affixed to the hub 212 by a coupler 234. The bendable rod 226 is biased to its straight position (FIG. 7) with a spring constant that will allow an average person to bend the rod, but stiff enough to maintain the blade member 222 in relatively high tension in the second mode described below. The blade member 222 is a flexible material, such as plastic or fabric, and may include graphics, text, or both printed thereon to display a logo or advertisement, for example. Further, the blade member 222 may be coordinated with the décor of the surrounding structure or furniture.

[0032] The fan blade 220 is shown as collapsed in the first mode in FIG. 7, and as assembled in the second mode in FIG. 8. The blade portion 222 engages the bendable rod 226 via a sleeve 240 that includes an open end 242 and a closed end 244. The closed end 244 may be affixed to the end of the bendable rod 226 by a screw, a rivet, adhesive, welding, or other suitable methods. Alternatively, the sleeve may be left to slide freely on the bendable rod 226. The sleeve 240 is curved into the desired shape of the blade, and the opposite side 246 of the blade member 222 is substantially shorter than the sleeve 240. This gives the assembled fan blade 220 the shape shown in FIG. 8 with the blade member 222 in tension due to the bias of the bendable rod 226 to the straight position. However, other shapes may be imagined and are considered within the scope of the invention.

[0033] The fan blade 220 is maintained in the second mode against the bias of the bendable rod 226 by a fastener 248.

Best shown in FIG. 9, the fastener 248 includes a hook 250 and a band 252. The band 252 is preferably flexible and inelastic, such as a string; however, the band may alternatively be elastic or inelastic. The band 252 is attached to the bendable rod 226 at one end and to the hook 252 at the other end by tying to a through hole or by another suitable means. In the second mode, the hook 252 engages a grommet 254 near the open end 242 of the sleeve 240.

[0034] In use, the fan blade 220 is affixed to the hub 212 by the coupler 234 and assembled into the second mode. In weather conditions having high wind or precipitation, the surface area of the blades 220 may be quickly reduced by releasing the fastener 248, allowing the bendable rod 226 to straighten and collapsing the blade member 222. The first mode is also advantageous for storage and transport of the blade 220.
In any of the above-described embodiments, the mount 34 or 234 may be a quick coupler. For example, a quick coupler may include a spring-loaded clasp that engages a hole or a notch in the bendable rod 226. A button on the quick coupler forces the clasp against the spring to release the rod.

It should be noted that while the fan blades of the above embodiments are shown with particular shapes, the configuration of the fan blade when assembled can take on various shapes to achieve a design criterion. Thus the fan blade can look rectangular, triangular, 3-dimensional (i.e. having a plurality of levels on one blade—similar to a “box kite”), or curvilinear in appearance, but it is not limited to these only.

The invention provides a method of providing a fan blade to an end user or consumer. In the method, the fan blade is provided to an end user in a compact, unassembled form, and the end user assembles the fan blade into usable form for attachment to a blade hub of a fan. The provider of the fan blade may also provide to the end user instructions on how to assemble the fan blade into the usable form.

While the invention has been described with reference to preferred embodiments, it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted for elements thereof to adapt to particular situations without departing from the scope of the invention. Therefore, it is intended that the invention not be limited to the particular embodiments disclosed as the best mode contemplated for carrying out this invention, but that the invention will include all embodiments falling within the scope and spirit of the appended claims.

1. A fan blade for a ceiling fan comprising:
   a blade member; and
   a support for said blade member having a first rod member,
   a second rod member, and a mount, each of the rod members being pivotally connected to the mount at one end;
   wherein said blade member and said support are disassembled in a first mode to occupy a compact space and are assembled in a second mode to form a substantially rigid fan blade for assembly into a ceiling fan.
   2. The fan blade of claim 1 wherein said blade member includes flexible material.
   3. The fan blade of claim 2 wherein said support includes a spreader rod member.
   4. The fan blade of claim 3 wherein said flexible material is attached to said first and second rod members.
   5. The fan blade of claim 4 wherein the first mode comprises a configuration of said fan blade wherein said first and second rod members are positioned adjacent to each other, said blade member is collapsed, and said spreader rod member is contiguous to said first rod member.
   6. The fan blade of claim 5 wherein a clasp on said first rod member secures the spreader rod member to the first rod member in the first mode.
   7. The fan blade of claim 5 wherein said blade member is gathered between said first and second rod members in the first mode.
   8. The fan blade of claim 4 wherein the second mode comprises a configuration of said fan blade wherein said first and second rod members are pivotally separated to hold said flexible material taut, and said third spreader rod member is attached to the other ends of said first and second members to form said substantially rigid fan blade.
   9. The fan blade of claim 8 wherein the first and second rod members each define a socket at another end, and wherein the spreader rod member engages each socket at opposite ends of the spreader rod member.
   10. The fan blade of claim 2 wherein said flexible material is one of plastic or fabric material.
   11. The fan blade of claim 2 wherein said flexible material is pleated.
   12. The fan blade of claim 1 further comprising graphics printed on the blade member.
   13. The fan blade of claim 1 wherein the first and second rod members are connected to the mount by a common pivot.
   14. The fan blade of claim 1 further comprising one or more additional rod members situated between the first and second rod members, and one or more spreader rod members each connected between the first and second rod members.
   15. A collapsible fan blade, comprising:
      a flexible blade member having a curved side and a substantially straight side;
      a sleeve contiguous with the curved side, the sleeve having an open end and a closed end; and
      a bendable rod partially inserted into the sleeve and having a free end, the bendable rod being biased to a straight position.
   16. The fan blade of claim 15 said fan blade having a first mode and a second mode wherein the bendable rod is in the straight position and the blade member is collapsed for the first mode and the blade member is pulled taught to curve the bendable rod for the second mode.
   17. The fan blade of claim 15 further comprising a fastener connected to the bendable rod and being operable to engage the sleeve to secure the fan blade in the second mode.
   18. The fan blade of claim 17 wherein the fastener comprises a hook attached to a flexible, inelastic band.
   19. A method of providing a fan blade, comprising the steps of:
      providing a fan blade having a support and a flexible blade member, the fan blade having a compact, unassembled form and a usable form; and
      providing the fan blade to an end user in the compact, unassembled form.
   20. The method of claim 19, further comprising the step of instructing the end user on how to assemble the fan blade into the usable form.