



US 20130094980A1

(19) **United States**

(12) **Patent Application Publication**
CHAN

(10) **Pub. No.: US 2013/0094980 A1**

(43) **Pub. Date: Apr. 18, 2013**

(54) **HANDHELD ELECTRIC FAN**

(52) **U.S. Cl.**

USPC 417/411; 417/423.1

(76) Inventor: **Ka Yun CHAN**, Hong Kong (HK)

(21) Appl. No.: **13/548,227**

(57)

ABSTRACT

(22) Filed: **Jul. 13, 2012**

(30) **Foreign Application Priority Data**

Oct. 18, 2011 (CN) 201120396334.7

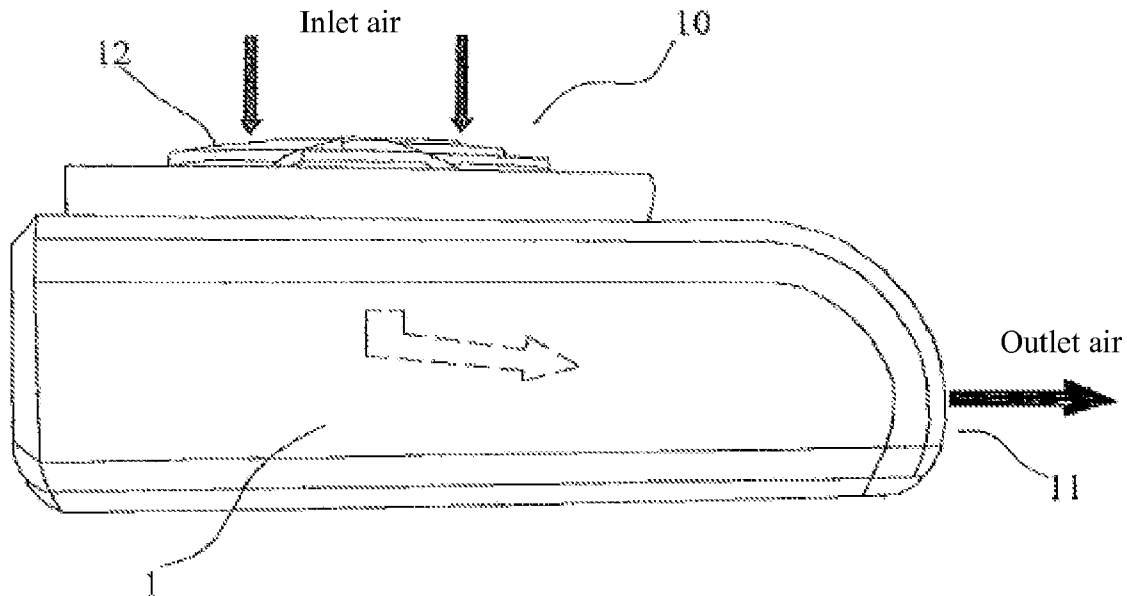
Publication Classification

(51) **Int. Cl.**

F04D 25/08 (2006.01)

F04D 25/06 (2006.01)

A hand-held electric fan includes a housing, an air inlet configured on one side of the housing, an air outlet configured on another side of the housing, fan blades configured in said housing, a motor for driving rotation of the fan blades, wherein the air inlet and air outlet have an included angle of 20~160 degrees. The hand-held electric fan according to the present invention can be held by a user conveniently, such that the inflow and outflow of air are not interfered by the user's hand holding the fan during use.



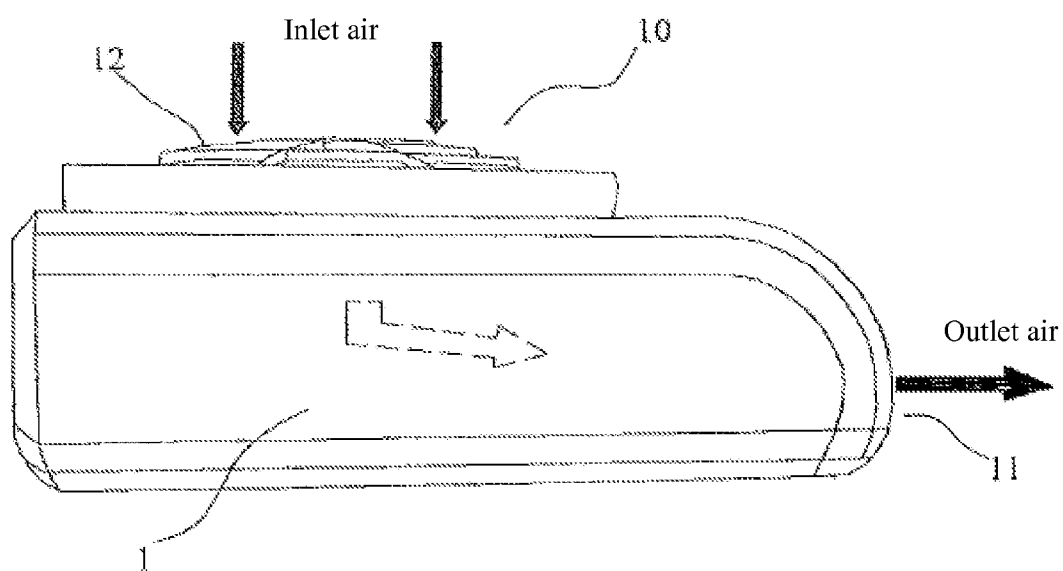


FIG. 1

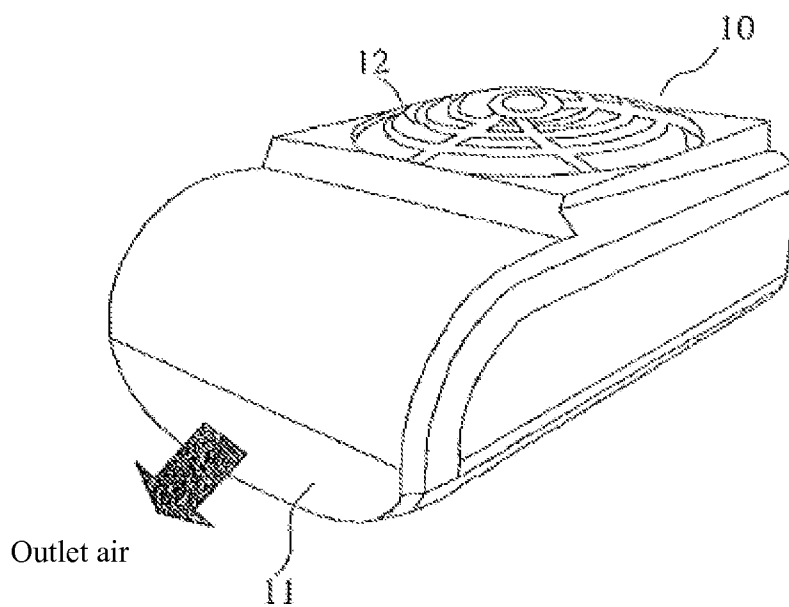


FIG. 2

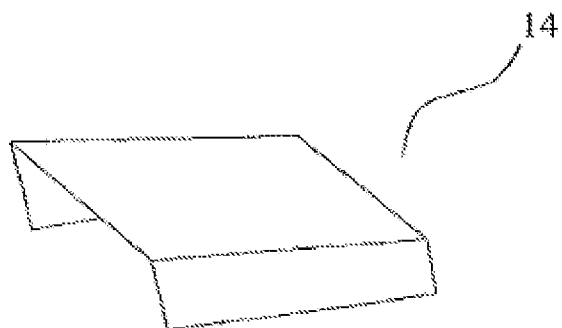


FIG. 3

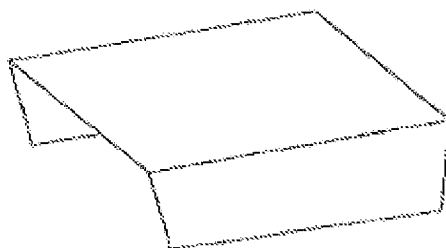


FIG. 4

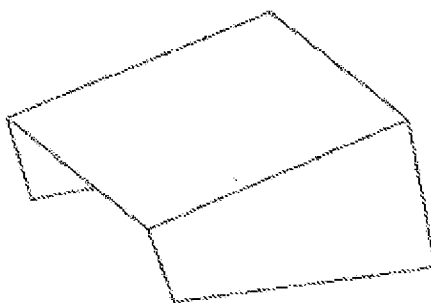


FIG. 5

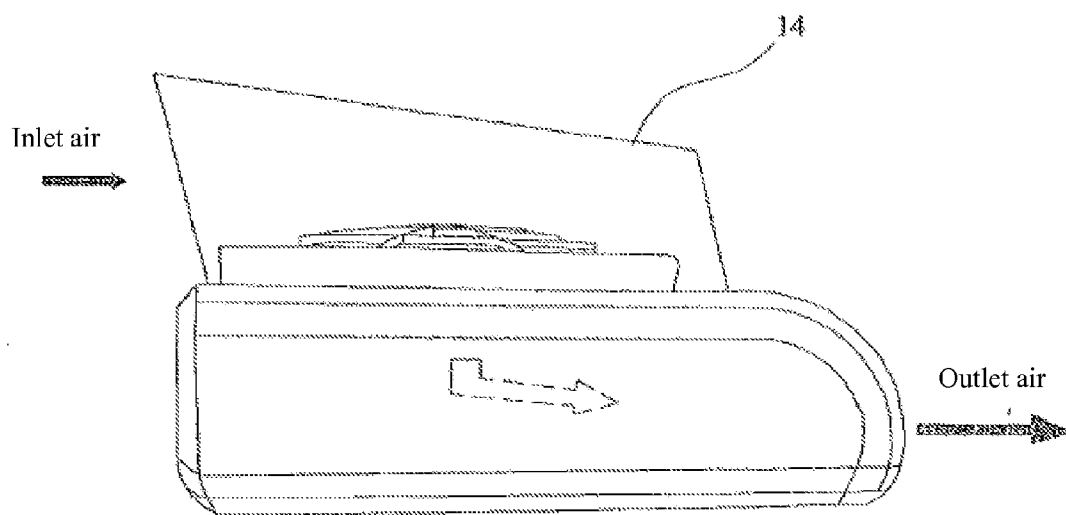


FIG. 6

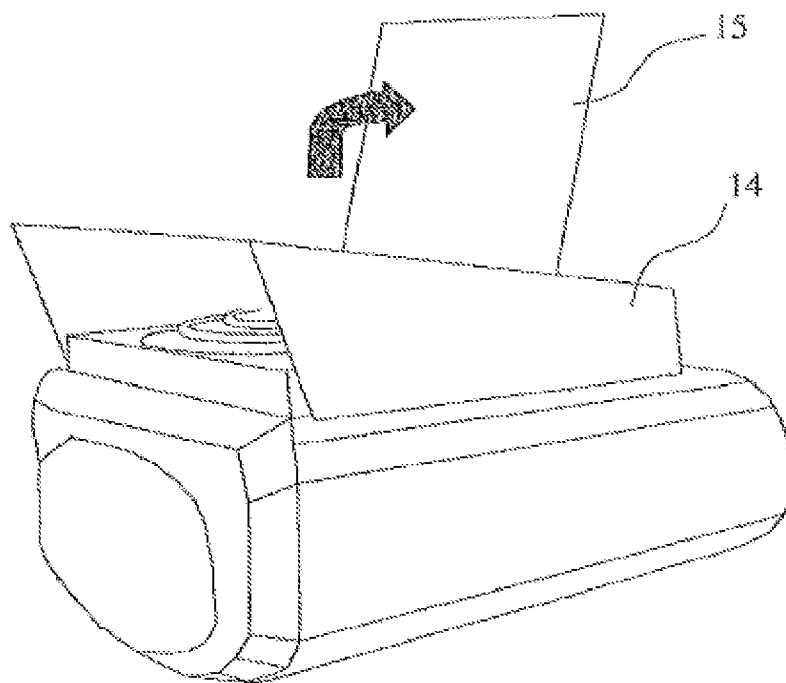


FIG. 7

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CROSS-REFERENCE TO RELATED APPLICATIONS

[0002] The present application claims priority of the Chinese utility model application number 201120396334.7 filed on Oct. 18, 2011, and the disclosure of which is hereby incorporated by reference in its entirety.

FIELD OF THE INVENTION

[0003] The present invention relates to a hand-held electric fan, and particularly to a hand-held electric fan, which can be held by a user conveniently while inflow and outflow of air are unaffected.

BACKGROUND OF THE INVENTION

[0004] Air inlet and air outlet of existing hand-held electric fans are positioned on the same axis, thereby pathways of inflow and outflow of air are easily blocked by a user's hand when the user holds the fan head part (including motor and fan blades) of the existing fans directly, leading to inconvenient use. Although a handle can be installed onto the fan, the handle and fan head are two separate portions. This results in an increase in overall size of the fan and thus carrying and placement of the fan becomes inconvenient. Moreover, the flexibility in designing the fan head would be reduced. Due to the air inlet and air outlet being arranged on the same axis in existing hand-held electric fans, it is not easy to place a hand-held fan upright on a surface (with an air outlet facing upward) to blow air out upward or to hang a hand-held fan on a wall blowing air toward the ground.

SUMMARY OF THE INVENTION

[0005] In view of the existing problems, the main objective of the present application is to provide a hand-held electric fan which can be held by a user conveniently while inflow and outflow of air through the fan do not experience interference from the user's hand when holding the fan and high flexibility in designing the fan can be maintained. The present invention also allows the freedom to design a fan having any shapes or patterns.

[0006] To achieve the aforesaid objective, the present invention provides a hand-held electric fan including a housing having a plurality of sides, an air inlet configured on a first side of the housing, an air outlet configured on a second side of the housing, a plurality of centrifugal or directional fan blades installed in the housing near the air inlet, and a motor installed in the housing for driving rotation of the fan blades. The present invention also provides a hand-held electric fan having an included angle of 20~160 degrees between the air inlet and the air outlet. In one embodiment, the air inlet faces upward.

[0007] In one embodiment, the present invention further includes a protective cover that is located in the air inlet for protecting the user from reaching the fan blades, and an air outlet cover optionally located at the air outlet.

[0008] The present invention further includes an air inlet cover of any sizes, shapes or patterns at the air inlet. In one embodiment, bottom portion and front end of the air inlet cover are opened, and the opening at the bottom portion of the air inlet cover is connected to the air inlet.

[0009] In one embodiment, the front end of the air inlet cover having any sizes or shapes or patterns is larger than the rear end of the air inlet cover.

[0010] In another embodiment, the rear end of the air inlet cover having any sizes or shapes or patterns is larger than the front end of the air inlet cover.

[0011] In yet another embodiment, the front end and rear end of the air inlet cover having any sizes or shapes or patterns are equal in size.

[0012] In a further embodiment, the present invention includes one or more adjustable solar panels. The one or more adjustable solar panels can be located anywhere of the housing. For example, the one or more adjustable solar panels may be configured above the air inlet cover.

[0013] In another embodiment, the hand-held electric fan includes one or more power sources for powering the motor, and the one or more power sources includes the followings, but not limited to: rechargeable battery, dry cell battery, solar cell, USB power supply port, car cigarette ignition socket, and AC/DC power supply adapter.

[0014] The fan blades of the present invention can be centrifugal or directional.

[0015] In yet another embodiment, the hand-held electric fan includes one or more anion generators, and/or one or more heating elements, and/or one or more cooling elements.

[0016] The hand-held electric fan of the present invention can be held by a user conveniently, and the air inlet and air outlet thereof are not blocked by the user's hand when holding the fan.

BRIEF DESCRIPTION OF THE DRAWINGS:

[0017] FIG. 1 is the side view of one embodiment of a hand-held electric fan of the present invention, arrows indicate the direction of air;

[0018] FIG. 2 is the schematic diagram of one embodiment of a hand-held electric fan of the present invention;

[0019] FIG. 3 is the schematic diagram of a first embodiment of the air inlet cover of the present invention;

[0020] FIG. 4 is the schematic diagram of a second embodiment of the air inlet cover of the present invention;

[0021] FIG. 5 is the schematic diagram of a third embodiment of the air inlet cover of the present invention;

[0022] FIG. 6 is the side view of another embodiment of the hand-held electric fan of the present invention, arrows indicate the direction of air; and

[0023] FIG. 7 is the schematic diagram of a further embodiment of the hand-held electric fan of the present invention.

DETAILED DESCRIPTION OF THE INVENTION:

[0024] To illustrate the structure and advantages of the present invention, below is the detailed description of the present invention in combination with the figures and embodiments.

[0025] As shown in FIGS. 1 and 2, the hand-held electric fan according to the present invention includes a housing 1 having plurality of sides, wherein an air inlet 10 is configured on one side of housing 1, and an air outlet 11 located on a second side of housing 1, fan blades (not indicated in the figures) installed at air inlet 10 and a motor (not shown). The fan blades and motor in the present invention are concealed in housing 1. The fan blades can be centrifugal or directional. The housing of the present invention may be a single component or assembled from two or more components in order to form the housing of desired shapes and sizes for enclosing integral parts thereof, such as fan blades, motor, air inlet, air outlet and the like of the present fan. In the embodiment of which the housing is assembled from two or more components, the two or more components may be assembled into the housing by one or more engaging means known to those skilled in the art. The one or more engaging means for assembling the housing of the present invention may be in the form of, but not limited to lugs and projections, plugs and sockets, screws and bearings, or a combination thereof. Furthermore, the two or more components may be permanently fabricated into the housing during manufacture of the present invention by, for example, adhesive means. A protective cover 12 can be configured at air inlet 10, wherein said protective cover can be, but not limited to a cage, a grille, a framework, a mesh or a lattice in order to protect a user or any foreign objects from reaching the fan blades. An air outlet cover (not indicated in the figures) can be optionally set at air outlet 11 to keep out any big foreign objects from the fan. The subject fan can include one or more power sources for driving the motor. The power sources applicable to the present invention are known to those skilled in the art. For example, the power sources can be, but not limited to rechargeable battery, dry cell battery, solar cell, USB power supply port, car cigarette ignition socket, and AC/DC power supply adapter. As shown in FIG. 1, the air inlet 10 can face upwards relative to the orientation of the fan hold by a user and the air outlet 11 faces to the side. Rotation of fan blades forms channels of airway. The channels of airway are drawn into housing 1 from air inlet 10, and pass along housing 1 then being blown out from air outlet 11. Air inlet 10 and air outlet 11 are neither parallel nor on the same axis and are arranged to be positioned having an included angle of 20~160 degrees between them. By the expression "included angle" it is meant an angle formed at the intersection between a line positioned approximately normal to an air inlet surface and a line positioned approximately normal to an air outlet surface is approximately 20~160 degrees such that the air inlet is not directly aligned with the air outlet. This specific arrangement of the air inlet and outlet of the present invention enables housing 1 to be held directly without covering the air inlet 10 and air outlet 11 while without restricting the design of the fan in terms of appearances and sizes. Accordingly, the hand-held electric fan of the present invention can have any sizes, shapes and patterns as desired. An air outlet cover (not indicated in the figures) may be present at the air outlet 11 in the present invention. The absent of an air outlet cover reduces resistance in outlet air.

[0026] An air inlet cover may be installed at air inlet of the hand-held electric fan in the present invention. The air inlet cover may have any sizes or shapes or patterns. As shown in FIGS. 3-5, the air inlet cover 14 has a front and a rear end, and a top and a bottom portions, where the bottom portion and the front end of air inlet cover 14 are opened (or uncovered). The front end of air inlet cover 14 refers to the portion of the

inlet cover where air enters the fan from. The front end of air inlet cover 14 is larger than the rear end (as indicated in FIG. 3), or the rear end of air inlet cover 14 is larger than the front end (as indicated in FIG. 5), or the front end and rear end are equal in size (as indicated in FIG. 4).

[0027] As illustrated in FIG. 6, the opened bottom portion of air inlet cover 14 is installed at the air inlet 10, which forces the direction of air entering from air inlet 10 to rotate 20~160 degrees, so that the direction of inlet air is parallel to the direction of outlet air. In this way, not only can the user hold housing 1, but can also hold the air inlet cover 14 directly without blocking or interfering with the inlet and outlet airways.

[0028] The electric fan of the present invention may further include one or more adjustable solar panels. As illustrated in FIG. 7, an adjustable solar panel 15 is positioned at air inlet cover 14. Solar panel 15 is connected to the fan motor, and the solar panel 15 can be positioned closely adjacent to the top portion of air inlet cover 14, and the solar panel 15 can be lifted and adjusted accordingly toward light source to store energy during use to power the fan motor. In order to blow warm air and/or air having anions, the hand-held electric fan of the present invention can further include one or more anion generators, one or more heating elements, and/or one or more cooling elements, and/or combinations thereof. The heating and cooling elements may be in the form of, but not limited to plates and wires.

[0029] It should be understood that the embodiments described above are only illustrations of the present invention, which should not limit the protection scope of the present invention. Specifically, the electric fan of the present invention can be of any size or shape or pattern as desired. Namely, the housing, air inlet, air outlet and covers thereof may be any sizes or shapes or patterns, not limited to those described in the figures in the subject application. One skilled in the art can easily ascertain the essential characteristics of the present invention, and without departing from the spirit and scope thereof, can make various changes and modifications of the invention to adapt it to various usages and conditions. Thus, other embodiments are also within the scope of the following claims.

What is claimed is:

1. A hand-held electric fan, comprising:
a housing having a plurality of sides;
an air inlet configured on a first side of said housing;
an air outlet configured on a second side of said housing;
fan blades installed in said housing; and
a motor for driving rotation of the fan blades, wherein the air inlet and the air outlet are positioned such that an angle formed at an intersection between a line positioned approximately normal to an air inlet surface and a line positioned approximately normal to an air outlet surface is approximately 20-160 degrees so that the hand-held electric fan can be held directly by the housing without covering the air inlet and the air outlet and without restricting the design of the fan in terms of appearances and sizes.
2. The hand-held electric fan of claim 1, further comprises a fan blade protective cover configured at said air inlet to protect the fan blades from any foreign objects and an air outlet cover optionally configured at the air outlet.
3. The hand-held electric fan of claim 1, further comprises an air inlet cover configured at said air inlet, wherein bottom

portion and front end of said air inlet cover are opened, and the opened bottom portion of the air inlet cover is installed at said air inlet.

4. The hand-held electric fan of claim **3**, wherein a front end of said air inlet cover is larger than a rear end of said air inlet cover.

5. The hand-held electric fan of claim **3**, wherein a rear end of said air inlet cover is larger than a front end of said air inlet cover.

6. The hand-held electric fan of claim **3**, wherein front and rear ends of said air inlet cover are equal in size.

7. The hand-held electric fan of claim **1**, further comprising an adjustable solar panel.

8. The hand-held electric fan of claim **3**, further comprising an adjustable solar panel.

9. The hand-held electric fan of claim **1**, further comprising one or more power sources for driving said motor, wherein the one or more power sources is a rechargeable battery, dry cell battery, solar cell, USB power supply port, car cigarette ignition socket or AC/DC power supply adapter.

10. The hand-held electric fan of claim **1**, wherein said fan blades are either centrifugal or directional.

11. The hand-held electric fan of claim **1**, further comprising at least one or more anion generators, one or more heating elements, one or more cooling elements, or combinations thereof.

12. The hand-held electric fan of claim **1**, wherein the housing is a single component.

13. The hand-held electric fan of claim **1**, wherein the housing is assembled from two or more components.

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