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(54) **TENT FAN**

**Related U.S. Application Data**

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(57) **ABSTRACT**

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A tent fan (20) for moving air through a tent (50) or canopy. The tent fan (20) includes a housing (22) with magnets (36, 38), and a separate metal plate (40). The metal plate (40) may be placed on the opposite side of a screen (54) from the housing (22) and may be attached to the magnets (36, 38). In this manner, the tent fan (20) is mounted for directing air into or out of the tent (50) or canopy through the screen. The metal plate (40) is bent at one end so that it may act as a stand for the tent fan (20) to be arranged in an upright manner. A special port (52) may be provided for fitting the tent fan on a side or top of a tent (50) or a canopy.

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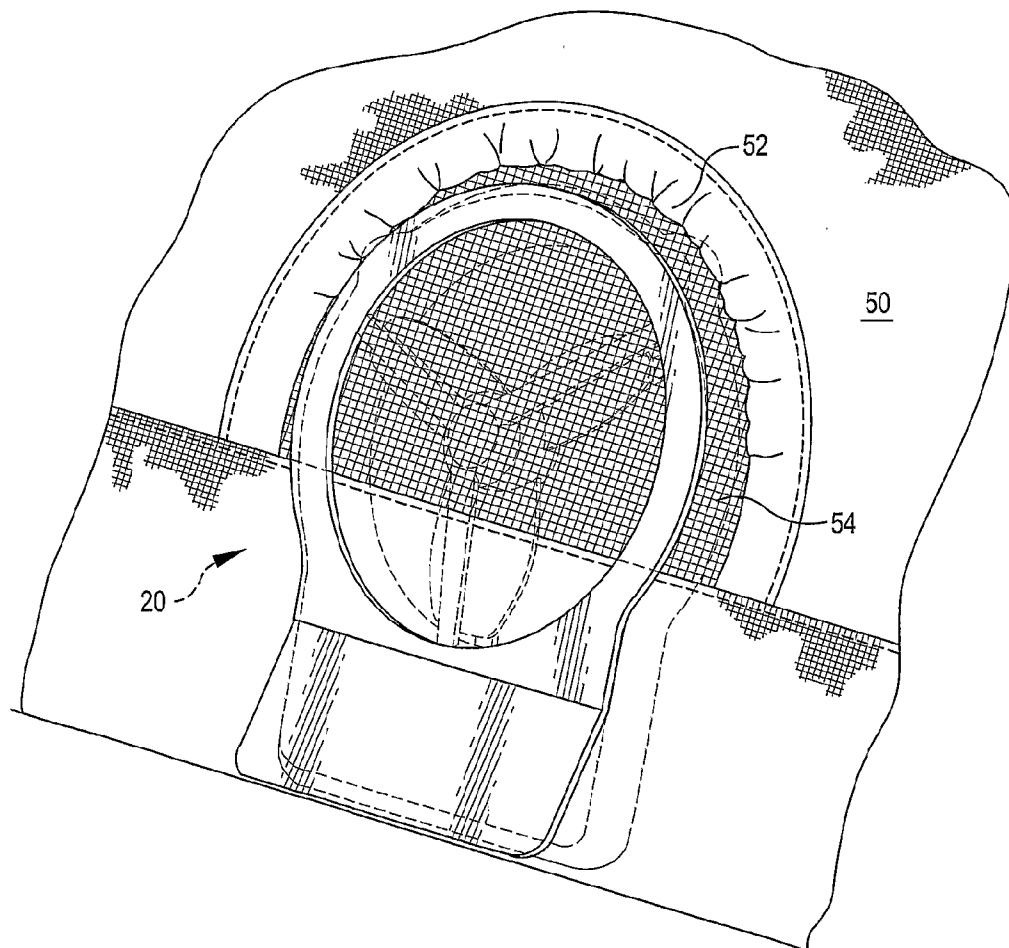


FIG. 1

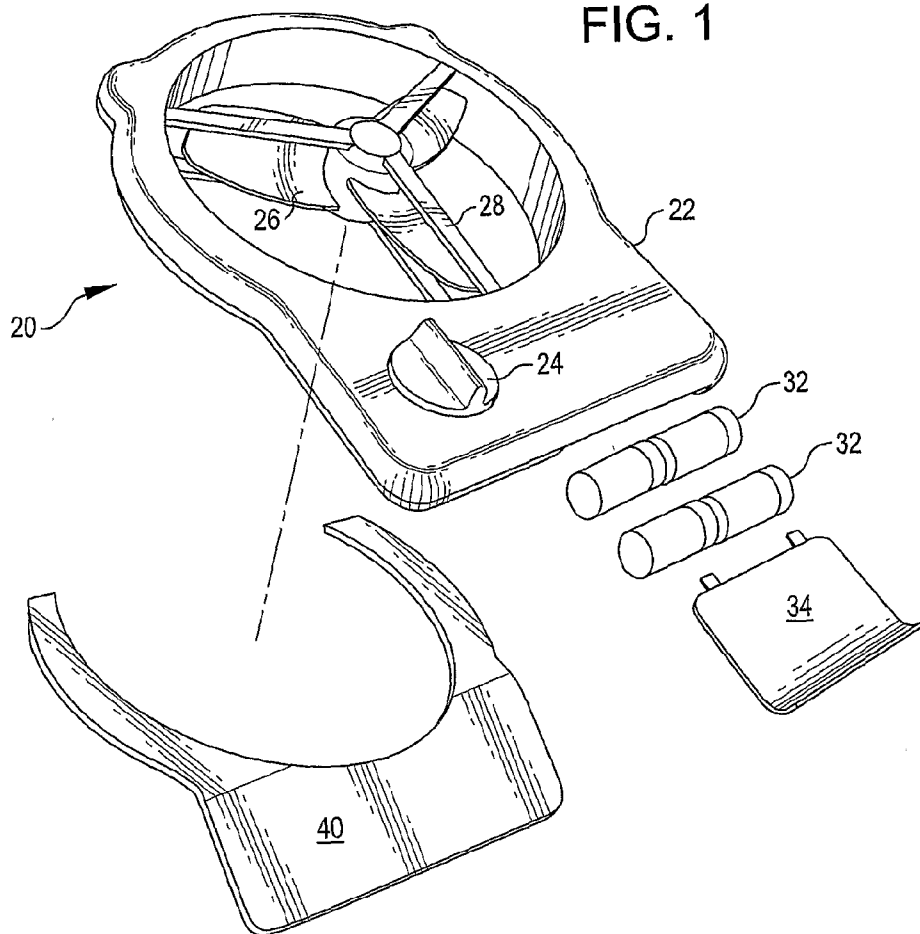


FIG. 2

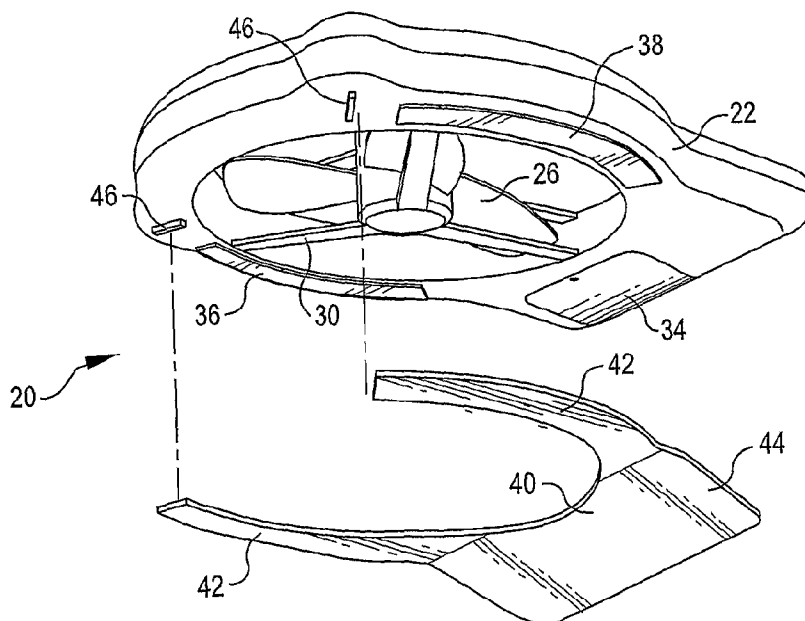


FIG. 3

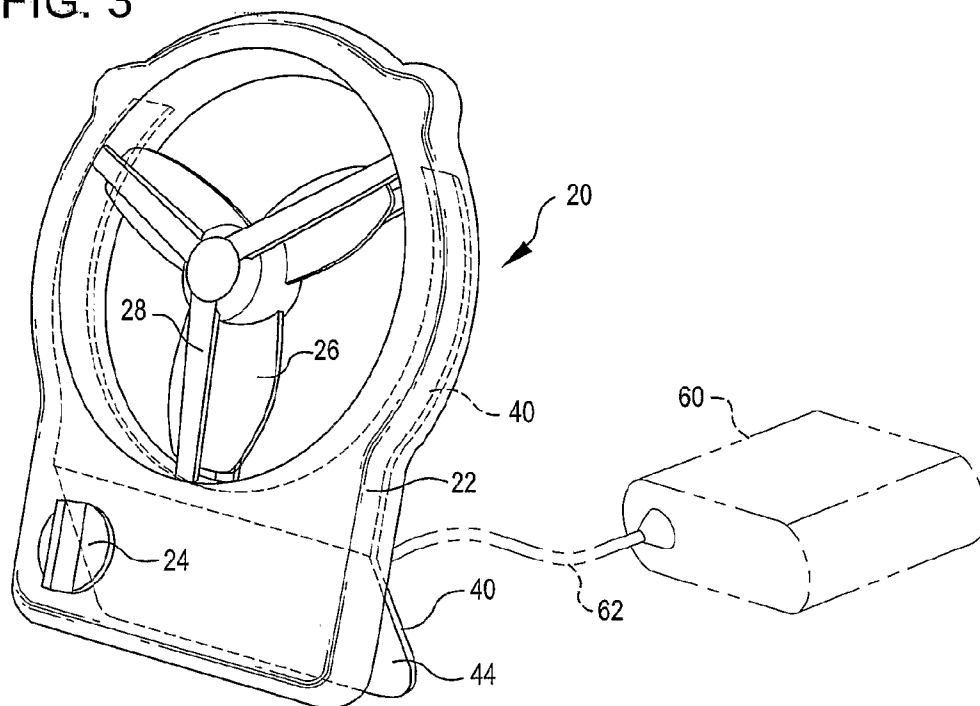
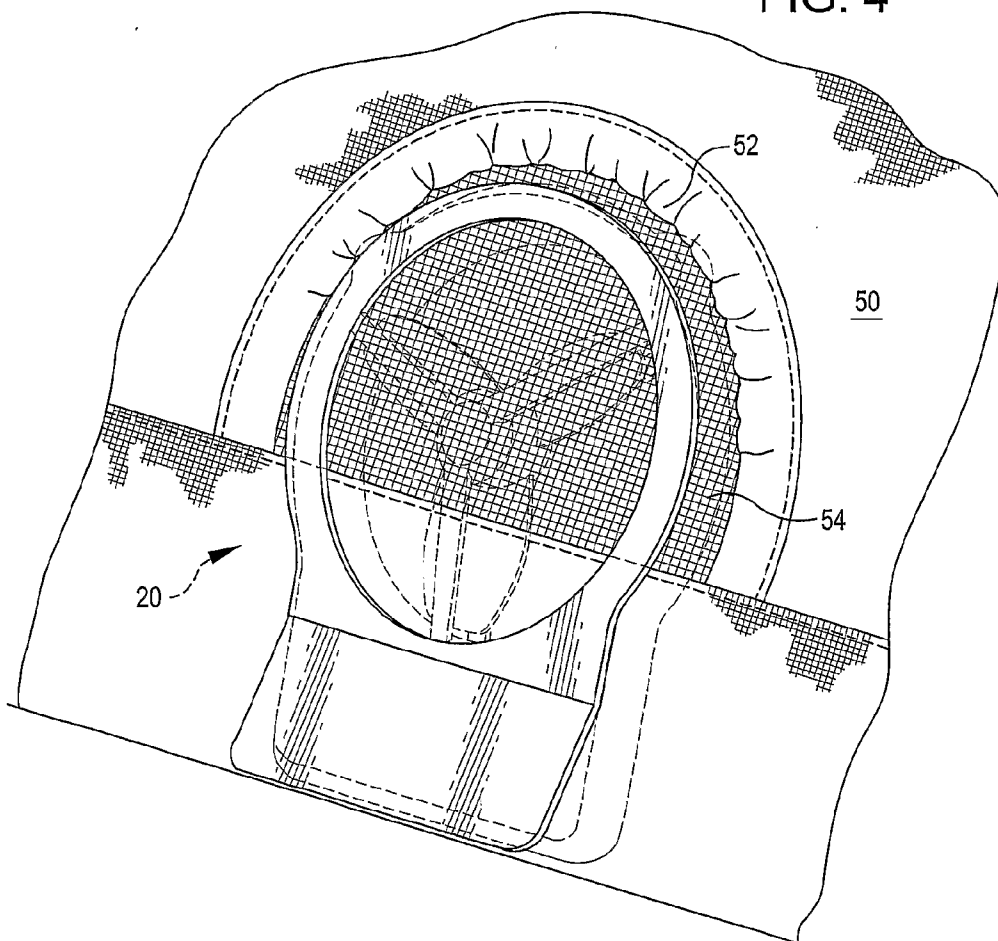


FIG. 4



TENT FAN

REFERENCE TO RELATED APPLICATION

[0001] This application claims priority to U.S. provisional patent application Ser. No. 60/679,705, filed May 11, 2005, and incorporated herein by reference.

TECHNICAL FIELD OF THE INVENTION

[0002] The present invention is directed to tents or canopies, and more specifically to ventilation in a tent or canopy.

BACKGROUND OF THE INVENTION

[0003] Camping is a popular recreational activity enjoyed by many. Some people camp so that they may enjoy the outdoors, and others use camping as an inexpensive alternative to staying in a hotel.

[0004] Often campers stay in a tent, either in a campsite, or in a suitable location somewhere outdoors. In general, a tent is a collapsible shelter, which typically is made of a tough fabric or plastic and is held up by poles or another suitable structure.

[0005] Because a tent is often a closed structure, often the air within the tent becomes stale. Condensation, stale air, and aroma from a fetid tent mate are often expelled by providing tent ventilation. This ventilation can be provided, for example, by keeping the doors slightly open or by having windows in the tent. More recently, tents have been designed so they have a mesh top. A rain fly extends over the tent and is spaced from the mesh top by the pole structure for the tent. In theory, the air flows out of the tent through the mesh material at the top of the tent and into the area between the rain fly and the tent. This air then circulates out from under the rain fly.

[0006] Although the mesh and rain fly construction of tents works well, the rain fly does not always provide optimal ventilation. Often, the rain fly extends almost to the ground and if a breeze is not directed properly between the tent and the rain fly, stale air and condensation may still accumulate underneath the rain fly and proper ventilation may not be supplied.

[0007] Another structure that is often used while camping is a canopy. In general, a canopy is a covering that provides shelter. For camping, canopies are typically made of fabric and are designed to be folded into a compact configuration for storage. A canopy may or may not have walls, such as screen walls. A canopy may be, for example, set up over a picnic area, used adjacent to a tent for a storage area, serve as a shelter from the rain, or used as a screened area to avoid bugs.

[0008] Canopies also need ventilation. In general, canopies have an apex and two or more sides that extend down from the apex and that are attached to poles or another support. Condensation and stale air can accumulate under this apex. In addition, in hotter weather, the environment under an unvented canopy can become rather warm.

[0009] Although the ventilation systems described above work well for circulating air in tents and canopies, often there is insufficient air movement in the environment of the tent or canopy to remove heat from the tent or canopy. In addition,

during extremely wet conditions, condensation may not be removed from tents at a rate to satisfy its occupants.

SUMMARY OF THE INVENTION

[0010] The following presents a simplified summary of some embodiments of the invention in order to provide a basic understanding of the invention. This summary is not an extensive overview of the invention. It is not intended to identify key/critical elements of the invention or to delineate the scope of the invention. Its sole purpose is to present some embodiments of the invention in a simplified form as a prelude to the more detailed description that is presented later.

[0011] In accordance with an embodiment, a tent fan is provided for moving air through a tent or canopy. In an embodiment, the tent fan includes a housing with magnets, and a separate metal plate. The metal plate may be placed on the opposite side of a screen from the housing and may be attached to the magnets. In this manner, the tent fan is mounted for direct circulation into the tent or canopy through the mesh. One fan may be used with a tent or canopy, and may direct air either in or out of the tent or canopy. Alternatively, two or more of the tent fans may be used to direct air either in and out of the tent or canopy, or both.

[0012] In accordance with an embodiment, the metal plate is bent at one end so that it may act as a stand for the tent fan to be arranged in an upright manner independent of a tent or a canopy.

[0013] In accordance with another embodiment, a port is provided in a tent specifically sized for the tent fan.

[0014] Other features of the invention will become apparent from the following detailed description when taken in conjunction with the drawings, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] FIG. 1 is an exploded, side perspective view of a tent fan in accordance with an embodiment of the invention;

[0016] FIG. 2 is a bottom side perspective view of the tent fan, with a metal plate removed;

[0017] FIG. 3 is side perspective view of the tent fan with the metal plate in place; and

[0018] FIG. 4 is a side perspective view of the tent fan shown attached to a tent.

DETAILED DESCRIPTION

[0019] In the following description, various embodiments of the present invention will be described. For purposes of explanation, specific configurations and details are set forth in order to provide a thorough understanding of the embodiments. However, it will also be apparent to one skilled in the art that the present invention may be practiced without the specific details. Furthermore, well-known features may be omitted or simplified in order not to obscure the embodiment being described.

[0020] Referring now to the drawings, in which like reference numerals represent like parts throughout the several views, FIG. 1 shows a tent fan 20 in accordance with an embodiment. Although described herein as a "tent fan," the tent fan 20 may not only be used with tents, but also with canopies or in other applications.

[0021] The tent fan 20 includes a housing 22. A control knob 24 is mounted on the housing for turning on and off rotation of a fan blade 26, and controlling speed and/or direction of the fan blade. Other controls may be used, including a

slide switch, push buttons, and/or a remote control. Protective spokes **28, 30** are arranged on opposite sides of the fan blade **26**.

[0022] In the embodiment shown, the tent fan **20** is powered by batteries **32** that are mounted behind a battery door **34**. An electric motor (not shown) is configured to be powered by the batteries and to rotate the fan blade **26**. In the embodiment shown, the batteries are four D-cell batteries, but the batteries may alternatively be a different number or size, such as eight AA-cell batteries. In addition, a rechargeable battery or batteries may be used. Also, in accordance with another embodiment, the electric motor may be powered by a battery pack **60** (shown in phantom in FIG. 3), rechargeable or not, that is connected by cord **62** to the housing **22**.

[0023] In an embodiment, the tent fan includes a battery pack that is separate from the housing **22** (e.g., the battery pack **60**). In accordance with another embodiment, the battery pack includes controls for controlling rotation of the fan blade **26**. For example, the controls may include a slide switch control on the battery pack. In an embodiment in which operation controls are provided on a separate battery pack, the housing **22** may be devoid of controls for operation of the fan blade **26**. By removing the controls and batteries from the housing **22**, the housing may be made much lighter and/or may be operated without having access to the housing.

[0024] The fan blade **26** may be formed, for example, of a foam material, a semi-flexible plastic material, or another suitable material. The housing **22** is preferably formed of plastic, but another material may be used.

[0025] The housing **22** includes two magnets **36, 38** (FIG. 2) mounted on a rear side of the housing adjacent to an opening for the fan blade **26**. Although the embodiment shows two magnets **36, 38**, one magnet, or more than two magnets may be used.

[0026] A metal plate **40** (best shown in FIGS. 1 and 2) is provided that includes arms **42** that match an outer contour of the opening for the fan blade **26** in the housing **22**. The metal plate **40** also includes a bend **44** at a lower end. The metal plate **40** may alternatively be shaped in a different manner, or may be provided as multiple pieces. In addition, if desired, a metal plate or other metal structure may be provided on the fan, and magnets may be provided as a separate structure or structures. In an embodiment, the metal structure, such as the plate, exhibits ferromagnetic properties, in that it sticks to a magnet. As an example, iron, nickel, cobalt, gadolinium, or another suitable ferromagnetic material may be used.

[0027] In accordance with an embodiment, to install the fan **20** on a tent or canopy, the metal plate **40** is placed on an opposite side of mesh or screen material from the housing **22**. The mesh or screen material may be, for example, on a wall of a tent or a canopy, serving as a door or a window. The metal plate is attached through the mesh or screen material to the magnets **36, 38**. To this end, a lip **46** is provided around the opening for the fan blade **26** which helps to align and place the metal plate **40** against the magnets **36, 38**, and provides a "bite" for the fan **20** when the fan is attached to a fabric structure, preventing the fan from sliding down the fabric.

[0028] When the metal plate **40** is in place, and the housing **22** is mounted against a screen material or mesh for a tent or canopy, the tent fan **20** may be turned on, for example by using the control knob **24**, to allow air to flow through the mesh material. In an alternate embodiment, a remote control (not shown) may be used to control operation of the tent fan **20**.

[0029] The protective spokes **28** and **30** ensure that the fan blade **26** is spaced from the mesh or screen material. The tent fan **20** may be mounted in this manner on either the outside or inside of a tent or canopy, so as to blow air in or out of the tent or canopy. In an alternate embodiment, the tent fan **20** may include a reversible motor, so that the fan blade **26** may rotate in either direction, and thus may be mounted on the inside or outside and provide airflow either in and out of the tent or canopy, without having to remove and remount the fan **20**.

[0030] As can be seen in FIG. 3, the bend **44** in the metal plate **40** provides a structure for supporting the tent fan **20** in an upright position when the tent fan is placed on its lower end on the ground. The bend **44** extends outward from the housing **22** when the metal plate **40** is attached to the magnets **36, 38**, with a distal end of the bend **44** spaced well outward from the housing, and a lower edge of the distal end extends parallel to a lower edge of the housing. This spacing of the lower edge of the bend **44** from the lower edge of the housing **22**, and the flat, elongate configuration of these two pieces provides a pair of legs for supporting the tent fan **20** on a flat surface, such as a tent floor.

[0031] If desired, the housing **22** may include more than one fan blade, and the fan blade or fan blades may be powered by a source other than batteries. In addition, as described above, in accordance with an embodiment, a battery pack **60** (shown in phantom in FIG. 3) or other power source may be provided as a separate structure from the fan housing **22**, and may be connected by a wire **62** or other electrical connection to the housing. Use of such a remote battery pack **60** removes the weight of the batteries **32** from the fan, permitting the fan to be suspended from a tent or canopy with less strain on the walls or roof of the fabric.

[0032] FIG. 4 shows a tent **50** having a screened port **52** that is arranged at a bottom of the tent **50** and is configured to be the size and shape of the fan. The screened port **52** includes screen material **54** extending over its surface, and may include a closure to prevent rainwater from entering the tent during inclement weather. Such a port **52** may be used on a variety of different fabric structures, including tents and canopies, and on different locations on the structures, including the sides or roofs of the structures.

[0033] Other variations are within the spirit of the present invention. Thus, while the invention is susceptible to various modifications and alternative constructions, a certain illustrated embodiment thereof is shown in the drawings and has been described above in detail. It should be understood, however, that there is no intention to limit the invention to the specific form or forms disclosed, but on the contrary, the intention is to cover all modifications, alternative constructions, and equivalents falling within the spirit and scope of the invention, as defined in the appended claims.

[0034] The use of the terms "a" and "an" and "the" and similar referents in the context of describing the invention (especially in the context of the following claims) are to be construed to cover both the singular and the plural, unless otherwise indicated herein or clearly contradicted by context. The terms "comprising," "having," "including," and "containing" are to be construed as open-ended terms (i.e., meaning "including, but not limited to,") unless otherwise noted. The term "connected" is to be construed as partly or wholly contained within, attached to, or joined together, even if there is something intervening. Recitation of ranges of values herein are merely intended to serve as a shorthand method of referring individually to each separate value falling within the

range, unless otherwise indicated herein, and each separate value is incorporated into the specification as if it were individually recited herein. All methods described herein can be performed in any suitable order unless otherwise indicated herein or otherwise clearly contradicted by context. The use of any and all examples, or exemplary language (e.g., "such as") provided herein, is intended merely to better illuminate embodiments of the invention and does not pose a limitation on the scope of the invention unless otherwise claimed. No language in the specification should be construed as indicating any non-claimed element as essential to the practice of the invention.

[0035] Preferred embodiments of this invention are described herein, including the best mode known to the inventors for carrying out the invention. Variations of those preferred embodiments may become apparent to those of ordinary skill in the art upon reading the foregoing description. The inventors expect skilled artisans to employ such variations as appropriate, and the inventors intend for the invention to be practiced otherwise than as specifically described herein. Accordingly, this invention includes all modifications and equivalents of the subject matter recited in the claims appended hereto as permitted by applicable law. Moreover, any combination of the above-described elements in all possible variations thereof is encompassed by the invention unless otherwise indicated herein or otherwise clearly contradicted by context.

- 1. A fan for moving air through a tent or canopy, the tent or canopy including a fabric structure, the tent fan comprising: a housing; a fan blade mounted in the housing; a structure separate from the housing, one of the housing and the structure comprising at least one magnet, and the other of the housing or structure comprising a ferromagnetic material attracted to said at least one magnet; and the housing, the structure, the magnet, and the ferromagnetic material being arranged and configured such that when the magnet is mounted on one side of a fabric material for a tent or canopy and the ferromagnetic material is on the opposite side, the housing is supported on the fabric material by connection of the magnet to the ferromagnetic material.
- 2. The fan of claim 1, wherein lower portions of the structure and the housing are configured so that when the ferromagnetic material is attached to the housing, the fan is supportable on the lower portions so that the fan may extend upright.
- 3. The fan of claim 2, wherein the structure comprises a metal plate formed of ferromagnetic material, the metal plate being configured to extend against the housing with the lower portion of the metal plate being bent away from the lower portion of the housing.

- 4. The fan of claim 3, wherein said at least one magnet is mounted on the housing, and the structure comprises a metal plate formed of ferromagnetic material.
- 5. The fan of claim 1, wherein the housing comprises an opening for receiving the fan blade.
- 6. The fan of claim 5, wherein the structure attaches around the opening.
- 7. The fan of claim 5, further comprising a protective structure extending over the opening on opposite sides of the fan blade.
- 8. The fan of claim 7, wherein the protective structure comprises spokes extending over the opening.
- 9. The fan of claim 1, wherein the housing comprises a notch into which at least a part of the structure fits.
- 10. The fan of claim 1, further comprising a battery pack connected to the housing by a cord.
- 11. A tent comprising a screened port for fitting the tent fan of claim 1.
- 12. A tent or a canopy and fan combination, comprising: a fabric material forming a wall for the tent or canopy; a screen in the fabric material; a fan, comprising: a housing mounted on the first side of the screen; a fan blade mounted in the housing; a structure mounted on the opposite side of the screen from the housing, one of the housing and the structure comprising at least one magnet, and the other of the housing or structure comprising a ferromagnetic material attracted to said at least one magnet; and, the housing, the structure, the magnet, and the ferromagnetic material being arranged and configured such that the housing is supported on the fabric material by connection of the magnet to the ferromagnetic material, and the fan blade is mounted so that when rotating the blade draws air through the screen.
- 13. The combination of claim 12, wherein the housing comprises an opening for receiving the fan blade.
- 14. The combination of claim 13, wherein the structure attaches around the opening.
- 15. The combination of claim 14, further comprising a protective structure extending over the opening on opposite sides of the fan blade.
- 16. The combination of claim 15, wherein the protective structure comprises spokes extending over the opening.
- 17. The combination of claim 12, wherein the housing comprises a notch into which at least a part of the structure fits.
- 18. The fan of the combination of claim 12.
- 19. The combination of claim 12, wherein the screen covers an opening of a port that is sized to receive the housing.
- 20. The combination of claim 12, further comprising a battery pack connected to the housing by a cord.

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