

Hair Dryer

Field of Invention

The present invention relates to a hair dryer, in particular a heating elements of the hair dryer.

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Background

Conventional handheld hair dryer uses a spring coil disposed within the blower barrel as heating element. Typically, the spring coil comes in a long stripe winding along the inner circumferences of the blower barrel in a spiral manner. Operationally, electric current runs through the spring coil to heat up the air within the barrel, then through the high speed air flow, the hot air is blown out from the blower barrel through forced convection. Despite the technology advancements, the mechanism of the hair dryer has not had any significant changes since its inception.

To maintain the life span of the spring coil, it must be properly held in place to avoid them crossing each other. Further, most of the outer casing of modern hair dryers, be it adapted for home use or professional grade, are made of plastic. To keep the manufacturing cost at a manageable manner, the plastic used is selected to be able to withstand the hot air generated within the barrel, but they are not meant to be in direct contact with the heated spring coil. Therefore, it is important to keep the spring coil secured within the barrel, yet, apart from the outer casing in space. The spring coil floating along the air path would certainly compromised the air flow, thereby require a stronger motor to render higher air flow.

To keep the spring coil in place within the blower barrel, there is usually provided a supporting structure to hold secure the spring coil in place. Desirably, the supporting structure is made of insulating material. Mica boards is one of the most commonly adapted material as the supporting structure.

Despite the support, it is also reported that one of the most common failure of the hair dryer is caused by the crossing coils.

SUMMARY

5 In one aspect of the present invention, there is provided a hair dryer that includes at least a heating plate disposed within a barrel of the hair dryer for operationally heating up air within the barrel, the heating plate includes a heating wire embedded within an insulation sheet.

In one embodiment, the heating wire is sandwiched between two insulation sheets.

10 In another embodiment, the insulation sheet is made of mica.

In yet another embodiment, the hair dryer may comprise two heating plates assembled in a cross manner along the length of the heating plates.

15 In a further embodiment, the hair dryer may include three heating plates assembled to intersect along the center longitudinal axis of the plates forming a spider-like side profile.

It is also possible that the heating plates are formed by a plurality of cylinders of different diameters, disposed centrifugally within the barrel.

In another aspect of the present invention, there is provided a heating plate for hair dryer that includes a heating wire embedded within an insulation sheet.

20 In one embodiment, the insulation sheet is made of mica.

Brief Description of Drawings

This invention will be described by way of non-limiting embodiments of the present invention, with reference to the accompanying drawings, in which:

25 FIG. 1 illustrates a hair dryer in accordance with an embodiment of the present invention;

FIG. 2 illustrates a construct of a heating plate in accordance with an embodiment of the present invention.;

FIG. 3 illustrates a construct of heating plates structure according to one embodiment of the present invention;

5 FIG. 4 illustrates a front view of three heating plates assembled in accordance with another embodiment of the present invention; and

FIG. 5 illustrates a front view of two heating plates assembled in accordance with another embodiment of the present invention.

Detailed Description

10 In line with the above summary, the following description of a number of specific and alternative embodiments are provided to understand the inventive features of the present invention. It shall be apparent to one skilled in the art, however that this invention may be practiced without such specific details. Some of the details may not be described at length so as not to obscure the invention.
15 For ease of reference, common reference numerals will be used throughout the figures when referring to the same or similar features common to the figures.

FIG. 1 illustrates a hair dryer **10** in accordance with an embodiment of the present invention. The dryer includes a handle **12** connected to a blower barrel **14**. The barrel **14** has an air inlet and an air outlet on both end whereby the handle **12**
20 is connected to the blower batter **14** near the air inlet. A power cord **16** supplies electric power to the hair dryer **10**, which is typically plugged into a power source.

 A switch **18** is disposed on the handle **12**, preferably, where user may conveniently one-handedly switch the power on or off with just one finger. A motor **28** operationally receives electrical power to drive fan blade **30**. The
25 motor **28** and blade **30** form a fan unit whereby air drawn into the barrel **14** through air inlet by fan blade **30**.

 The circuitry of the hair dryer comprises a group of printed circuit boards (PCB) **40** stacking on top of another. Such arrangement would allow the circuitry

be adapted with a relatively small footprint, thereby allowing it to be fitted within a tight space. As shown in FIG. 1, each PCB **40** is adapted with a small round board with components mounted thereon, and the PCBs **40** are electrically connected. The circuitry, as a whole, forms a controlling circuit to control the operations of the hair dryer based on the switch **18** input.

As shown in FIG. 1, the circuitry is mounted after the fan blade **30** on the longitudinal axis of the barrel **14**. The advantage of the small size circuitry allows it to be fitted within the barrel **14**.

Heating plates **32** are disposed further beyond the circuit board and extending towards the outlet of the barrel **14**. The heating plates **32** comprises heating wires/filaments **34** embedded under an insulating sheet. Mica sheet is one suitable material to be used as the insulating material. The heating plates **32** of this embodiment are mounted to be crossed with each other perpendicularly to form partitioned air chambers in a lengthwise direction. The heating plates **32** are adapted as a thin sheet to minimize any obstructions to the air flow.

Depending on the manufacturing method being adapted, the heating wires may be embedded between the insulation sheets in a square wave form across heating plates. The heating wires **34** embedded within the heating plates **32** are electrically connected to the circuitry **40**.

FIG. 2 illustrates a construct of a heating plate **32** in accordance with an embodiment of the present invention. The heating plate **32** includes a heating wire **34** be sandwiched between a bottom substrate **32b** and a top substrate **32a**. The lamination process can be done in any known method suitable to the selected material.

Various methods of fabricating the heating wire **34** are available in the art, which are equally application for the purpose of the present invention, if not better than the other. In one non-limiting example, printed heating element technique may be adapted herewith. Wire printing technology offers a great way of forming the heating wire on the insulated substrates to form the trails at any desired forms.

In the current embodiment, the heating wire **34** is formed in the shape or pattern of closely arranged back and forth square parallel trail. In another embodiments, the shapes/patterns of the heating wire formed can be other suitable patterns, such as round turning trail patterns, maze-like patterns, zigzag patterns, or the like. It is also well understood to a skilled person that the size, width, thickness, length, etc. can also be varied to achieve the desired resistance to render the desired heat.

One advantage offered by the embodiments of the present invention is that the heating elements are embedded on the heating plate entirely. It can prevent the heating wire from crossing each other causing short circuit of the hair dryer **10**.

FIG. 3 illustrates a construct of heating plates assembled according to one embodiment of the present invention. The construct comprises two heating plates **37, 38** assembled to cross each other across a longitudinal center of the plates. There is also show that a conductive wire **39** is also soldered to the two plates to connect the heating wires embedded therein.

FIG. 4 illustrates a front view of three heating plates assembled in accordance with another embodiment of the present invention. The assembly comprises three heating plates **41, 42, 43** crossing each other across a longitudinal center of the plates forming a spider shaped front side profile.

FIG. 5 illustrates a front view of two heating plates assembled in accordance with another embodiment of the present invention. The two heating plates **51, 52** are configured as two cylinders of different diameters. When it is assembled within the barrel of a hair dryer, they are disposed centrifugally along the center axis of the barrel. One or more wires **53** may be provided to electrically connect the heating wires embedded within the two heating plates **51, 52**.

It was also suggested that, in yet another embodiment, the heating wire may be provided on only one side of the insulation sheet/board. A suitable material may be quoted or laminated over the substrate to protect the heating wire underneath.

While specific embodiments have been described and illustrated, it is understood that many changes, modifications, variations and combinations thereof could be made to the present invention without departing from the scope of the invention.

CLAIMS

1. A hair dryer comprising:
5 at least a heating plate disposed within a barrel of the hair dryer for operationally heating up air within the barrel, the heating plate includes a heating wire embedded within an insulation sheet.
2. A hair dryer according to claim 1, wherein the heating wire is sandwiched
10 between two insulation sheets.
3. A hair dryer according to claim 1, wherein the insulation sheet is made of mica.
- 15 4. A hair dryer according to claim 1, wherein the hair dryer comprises two heating plates assembled in a cross manner along the length of the heating plates.
5. A hair dryer according to claim 1, wherein the hair dryer comprises three
20 heating plates assembled to intersect along the center longitudinal axis of the plates forming a spider-like side profile.
6. A hair dryer according to claim 1, wherein the heating plates are form in a plurality of cylinder of different diameters, disposed centrifugally within the barrel.
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7. A heating plate for hair dryer comprising:
a heating wire embedded within an insulation sheet.
8. A heating plate according to claim 7, wherein the insulation sheet is made
30 of mica.