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HAIR DRYER HEATER ASSEMBLY

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2 Sheets-Sheet 1

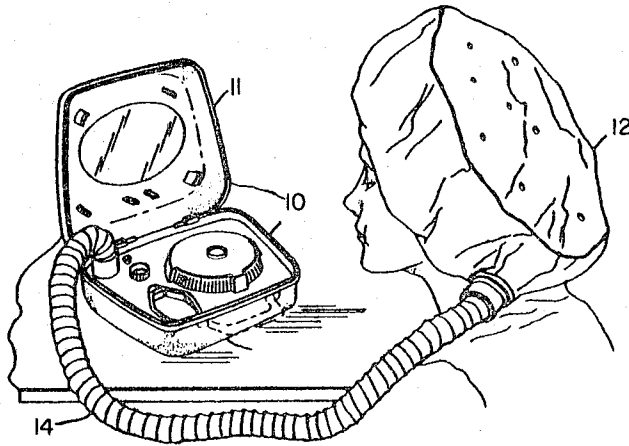


Fig. 1.

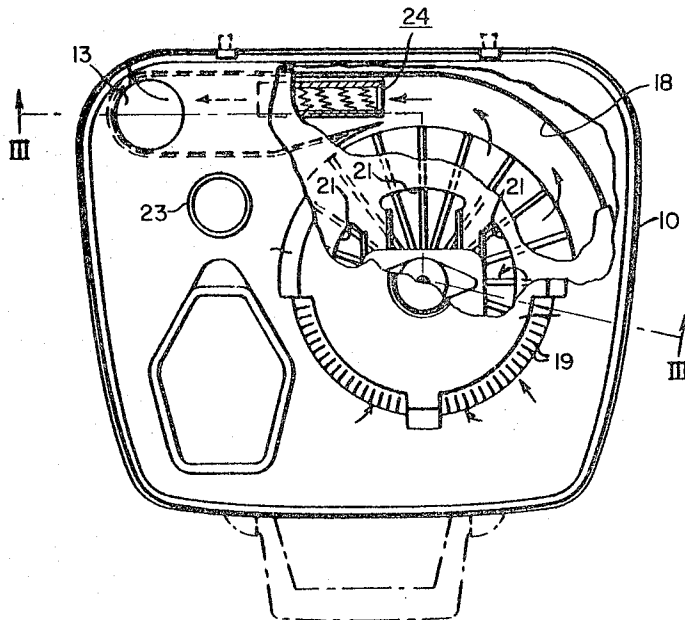


Fig. 2.

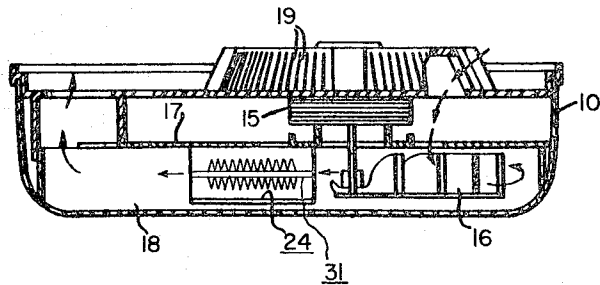


Fig. 3.

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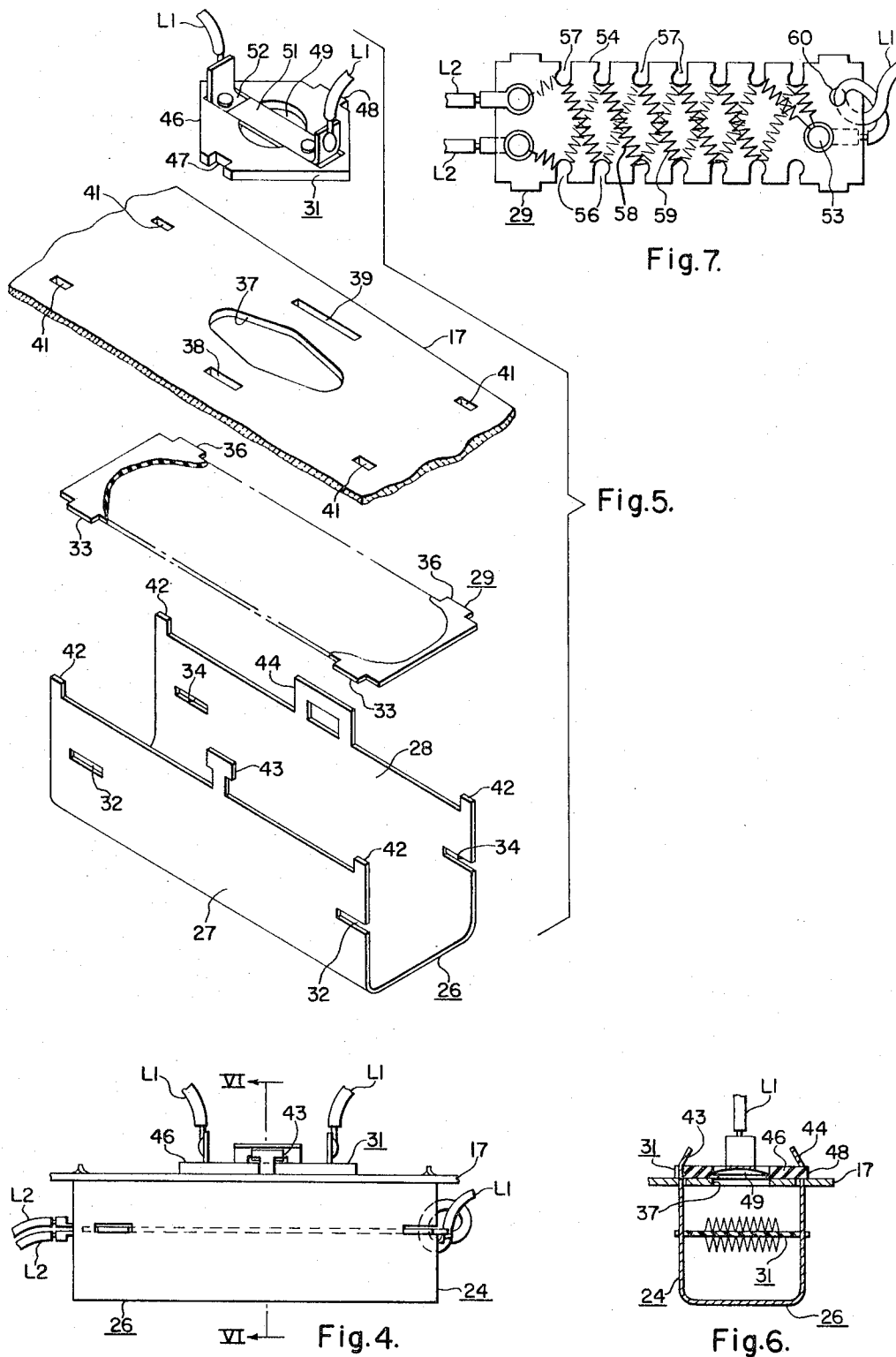
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HAIR DRYER HEATER ASSEMBLY

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4 Claims. (Cl. 34-99)

This invention relates to hair dryer apparatus and more particularly to a heater arrangement for use in such apparatus.

One of the more popular domestic appliances on the market today, is the domestic hair dryer. Many such devices have been presented to the public in various forms. However, the principle of operation of each is to propel air, which may be heated, over the damp hair of the user, thereby producing the desired drying effect.

One of the desirable features of the domestic hair dryer is its compactness which provides for ease of storage and greater mobility. It should therefore be evident, that hair dryer apparatus of the domestic type should be relatively simple in construction having simply constructed components capable of assembly within the limited space provided for by the hair dryer structure.

One such component usually provided in the hair dryer, is a heater assembly. The heater assembly should be compact in size to permit assembly within the apparatus in the air flow path, yet must be provided with safety features to prevent overheating of the hair dryer structure, which is generally a plastic material.

It is therefore an object of the present invention to provide a hair dryer apparatus having a heater assembly simple in construction and inexpensive to manufacture.

Another object of the invention is to provide a hair dryer apparatus having a heater assembly which is compact in size and safe in operation.

A further object of the invention is to provide a hair dryer having a heater assembly which is easily assembled in the hair dryer apparatus.

The foregoing and other objects are affected by the invention as will be apparent from the following description taken in connection with the accompanying drawings, forming a part of this application, in which:

FIGURE 1 is a perspective view of hair dryer apparatus embodying the invention;

FIG. 2 is a top plan view of the hair dryer casing shown in FIGURE 1, with the cover omitted;

FIG. 3 is a sectional view taken along line III—III of FIG. 2, showing an embodiment of the invention in elevation;

FIG. 4 is an elevational view of a portion of the invention showing various elements on a larger scale for greater detail;

FIG. 5 is an exploded view of the elements shown in FIG. 4;

FIG. 6 is a sectional view taken along line VI—VI of FIG. 4; and

FIG. 7 is a plan view of a heating element of the invention.

Although the principles of the invention are broadly applicable to heating apparatus for heating air flow, the invention has been illustrated as employed in conjunction with domestic hair dryer apparatus and will be so described.

Referring now to FIGURE 1, there is shown hair dryer apparatus comprising a casing structure 10 having a hinged cover portion 11 shown in the open position. A hood 12 is adapted to cover the hair of the user, and is connected to air outlet means 13 in the casing structure 10 by a flexible conduit 14 which operates to duct air from the casing to the hood.

Referring now to FIGS. 2 and 3, it will be noted that

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the casing structure 10 is provided with an electric motor 15 operatively connected to an impeller 16, which is mounted on a removable mounting plate 17 supported in the interior of the casing. Wall structure 18 is disposed adjacent the bottom of the casing 10 for directing air flow through the casing as shown in FIGS. 2 and 3, and the mounting plate 17, in addition to providing support for the motor 14 and the impeller 16, rests adjacent the upper portion of the wall structure thereby serving as an upper wall to complete the duct for air flow.

When the motor 15 is energized, the impeller 16 operates to draw air into the casing structure 10 through a plurality of openings 19 provided in the casing structure. The air flow then continues through the openings 21 provided in the mounting plate 17, through the impeller 16, to the outlet 13 through the duct formed by the wall structure 18 and the mounting plate. A control knob 23 is provided on the casing structure 10 and is operatively connected to the motor 15 for energizing and de-energizing the motor. In addition, the control knob 23 may serve to energize and de-energize a heater structure 24 disposed in the air flow path, which heater structure will be described in detail in the following paragraphs.

Referring now to FIGURES 4 through 6, the heater structure 24 is shown to have a U-shaped cover member 26 having a pair of opposed walls 27 and 28, a heater element 29 and a thermostat 31. When mounted in the duct structure of the hair dryer, the heater structure 24 is disposed with the walls 27 and 28 of the cover member 26 parallel to the air flow which is directed over the heater element 29.

Referring particularly to FIG. 5 it will be noted that the wall 27 is provided with a pair of slotted openings 32 for receiving a pair of tabs 33 projecting from one edge of the heater element 29, and wall 28 is provided with a similar pair of openings 34 for receiving a pair of tabs 36 projecting from the opposite edge of the element. The cover member 26 is of a sufficiently resilient material to permit the sides 27 and 28 to be sprung apart far enough for entry of the heater element tabs 33 and 36 to project through the openings 32 and 34, respectively, thereby retaining the heater element between the walls.

The portion of the duct wall formed by the mounting plate 17 is provided with an opening 37 and a pair of slotted openings 38 and 39 adjacent thereto, and four alignment holes 41 which may be of rectangular cross section. The peripheral edge of the wall 27 is provided with a pair of alignment tabs 42 and a T-shaped tab 43, and the peripheral edge of the wall 28 is provided with a similar pair of alignment tabs 42 and a slotted tab 44. It will also be noted that the base 46 of the thermostat 31 has a notch 47 provided at one corner and a rectangular tab 48 provided at the opposite corner. To assemble the cover member 26 with the heater element 29 disposed therein to the plate 17, the peripheral edges of the walls 27 and 28 are disposed adjacent the plate with the alignment tabs 42 extending through the alignment holes 41 and the tabs 43 and 44 extending through slotted openings 38 and 39, respectively. The thermostat base 46 is then placed adjacent the outer surface of the plate 17 with the notch 47 engaged under the top portion of the T-shaped tab 43, and the rectangular tab 48 is snapped through the opening of the slotted tab 44 thereby holding the assembly in place.

Although the heater assembly 24 is held in place as described above, the assembly may be made more rigid by twisting the alignment tabs 42 as shown in FIG. 4 or by bending the tabs 43 and 44 over the base 46, as best shown in FIGURE 6.

As will be noted in FIGURE 5, the thermostat 31 is a type well known in the art, having a sensing element 49

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which is a metallic disc which snaps so as to convex toward the contact 51, disengaging it from the contact 52 when over-heated, and snaps so as to be concave toward contact 51 to permit engagement of the contacts 51 and 52 upon cooling. In the arrangement described, the sensing element 49 is disposed adjacent the opening and in juxtaposition to the heating element 29, while the thermostat 31 remains outside the duct.

In FIG. 7 the designation L1 represents a line in the power source to the heater 29. The thermostat 31 therefore provides a safety device to prevent overheating of the heater element 29, which device may be inserted at any point in the power line. As the thermostat 31 is located outside the duct, it is not required to provide means for entry of the wires through the duct wall, thereby simplifying assembly of the heater 24 in the hair dryer casing 10.

Referring now to FIG. 7 there are shown details of the heater element 29 having a parallel electrical circuit comprising wires L2 of a parallel circuit connected through terminal 53 to power line L1. The parallel circuit heater arrangement is provided on a single sheet 54 of a suitable insulating material having a series of notches 56 provided on one edge and a second series of notches 57 provided on the opposite edge thereof. A resistance wire 58 is wound on the sheet 54 through the first of the series of notches 57 from one side of the sheet to the other, by alternately passing the wire through one of the series of notches 57 then one of the series of notches 56, followed by one of the series of notches 57, employing odd notches in the series of notches 57 and even notches in the series of notches 56, to the terminal 53. A second resistance wire 59 is passed through the first of the series of notches 56 to the second of the series of notches 57, crossing the resistance wire 58 on the opposite sides of the sheet 54. The resistance wire 59 is then passed through odd notches in the series of notches 56 and even notches in the series of notches 57 to the terminal point 53. The resistance wires 58 and 59 are thereby wound spirally about the single sheet 54 of insulating material in parallel spaced relation and in alternate notches 56 or 57 of the sheet.

To provide a further safety feature for the heater assembly 26, the line L1 is soldered at the terminal 53 by employing a solder material having a melting point of approximately 250° F. The solder material is of a bismuth and lead composition which upon being heated above the melting point releases the line L1 from the terminal 53, thereby breaking the circuit to the wires 58 and 59. To further insure release of the line L1 from the terminal 53, the line is biased away from the terminal by being threaded through a hole 60 provided in the sheet 54, as best shown in FIGURE 7.

From the foregoing it should be evident that the invention provides a hair dryer assembly having a heater assembly which is simple in construction and inexpensive to manufacture. Further, by providing a heater assembly having the structure disclosed, including the various safety features, a heater is provided which is easily assembled in the hair dryer apparatus and is safe in operation.

While the invention has been shown in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modification without departing from the spirit thereof.

What is claimed is:

1. Hair dryer apparatus comprising;
 - air translating means,
 - a casing structure housing said means,
 - said structure defining an inlet port for entry of air to said casing and an outlet port for exhausting air from said casing,
 - wall structure defining a duct for directing flow of air from said air translating means to said outlet port,
 - a U-shaped cover member disposed in said duct and having a pair of opposed walls substantially parallel to said air flow,
 - one of said duct walls having a peripheral edge of each

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of said opposed cover walls disposed adjacent thereto, a heater element disposed between said opposed walls, said one duct wall having an opening therethrough between said peripheral edges of said cover walls and in juxtaposition to said heater element,

a thermostat having a base disposed on the outer surface of said one duct wall and a sensing element adjacent said opening,

each of said opposed cover walls having a tab projecting from the peripheral edge thereof and, said one duct wall having a pair of slotted openings for receiving said tabs,

said tabs extending through said slotted openings in engagement with said thermostat base for retaining said peripheral edges of said cover walls adjacent the inner surface of said duct wall and said thermostat base adjacent the outer surface of said duct wall.

2. The structure of claim 1 wherein said heater element comprises a flat sheet having a conductor wire disposed thereon,

said sheet having a pair of opposed edges, one of said edges being disposed adjacent one of said opposed cover member walls,

the other of said edges being disposed adjacent the other of said opposed cover member walls,

said edges each having a tab disposed thereon, and said cover walls each having a slotted opening for receiving an adjacent tab,

whereby said heater element is supported by engagement of said tabs with said slots when said cover member is retained adjacent said duct wall.

3. Hair dryer apparatus comprising

air translating means,

a casing structure housing said means,

said structure defining an inlet port for entry of air to said casing and an outlet port for exhausting air from said casing,

wall structure defining a duct for directing flow of air from said air translating means to said outlet port,

a U-shaped cover member disposed in said duct and having a pair of opposed walls substantially parallel to said air flow,

one of said duct walls having a peripheral edge of each of said duct walls disposed adjacent thereto,

a heater element comprising a flat sheet having a conductor wire disposed thereon,

said sheet having a surface parallel to said duct wall and a pair of opposed edges,

one of said edges being disposed adjacent one of said opposed cover member walls,

the other of said edges being disposed adjacent the other of said cover walls,

said edges each having a tab disposed thereon, and said cover walls each having a slotted opening for receiving an adjacent tab,

an opening defined by said one duct wall between said peripheral edges of said cover walls and in juxtaposition to said heater element surface,

a thermostat having a base disposed on the outer surface of said one duct wall and a sensing element adjacent said opening,

each of said cover walls having a tab disposed on the peripheral edge thereof, and

said one duct wall having a pair of slotted openings for receiving said tabs,

said tabs extending through said slotted openings and adjacent said thermostat base,

an opening in one of said cover wall tabs, and

a portion of said base extending through said opening, a notch in said base, and a portion of the other of said cover wall tabs disposed adjacent said notch and extending over said base,

whereby said heater element is retained between said cover member walls when said cover member wall

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tabs are engaged in said slotted openings in said duct wall,

and said cover member is retained adjacent the inner surface of said duct wall and said thermostat retained adjacent the outer surface of said duct wall by engagement of said cover member wall tabs with said thermostat base. 5

4. The structure of claim 3 wherein said heater element comprises:

a sheet of insulating material having a pair of substantially parallel face surfaces and a pair of opposed edges, 10

one of said edges having one series of spaced apart notches provided therein, and

the other of said edges having another series of notches provided therein, 15

a first conductor wire wrapped on said sheet from one of said face surfaces to the other of said face surfaces through the first notch of said one series, and from said other surface to said one surface through the second notch of said other series of notches, and thereafter from said one surface to said other surface 20

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through successive odd notches in said one series and from said other surface to said one surface through successive even notches in said other series, and a second conductor wire wrapped on said sheet from said other surface to said one surface through the first of said other series of notches and from said one surface to said other surface through the second of said one series of notches, and thereafter from said other surface to said one surface through successive odd notches in said other series and from said one surface to said other surface through successive even notches in said one series.

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