PORTABLE HAIR DRYER

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ABSTRACT

A portable hair dryer having a base generally comprising a molded casing housing a motor and centrifugal fan assembly, a heater element, air inlet openings for receiving ambient room air and delivering it to a duct connected to an air chamber having a plurality of outlet openings and contoured to receive the head of hair to be dried. The centrifugal fan is characterized by a plurality of radially extending upper blades and lower blades separated by an intermediate plate. The air inlet includes an upper opening in the casing for air delivery to the upper blades and a lower opening for air delivery to the lower blades with the air expelled by the fan into a fan chamber directing it to a generally enlarged duct to substantially increase the capacity of the fan and the volume of air delivered to the hair.

4 Claims, 3 Drawing Figures
PORTABLE HAIR DRYER

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a portable hair dryer of the hard-hat type and more particularly to such a hair dryer having a dual faced fan with separate air inlets means in the casing for each face and a common fan chamber and outlet.

2. Description of the Prior Art

Typically, the fan means for hair dryers of the type generally referred to above included a horizontally rotating centrifugal fan having blades radiating from the hub and extending above a generally unitary planar circular plate or disk. The base of such dryers generally housed the fan and included an air inlet defined by an open grill area or provided by an assembly having a spaced relationship between separate components of the casing of the base to define a peripheral opening therein, as disclosed in U. S. Pat. No. 3,847,555, which, in conjunction with an opening in an interior mounting plate or bulkhead, provided a path for incoming air to the single face of the fan. The final opening adjacent the fan, in most instances the opening in the mounting plate, was generally concentric with the axis of the fan to deliver the air to its center.

Obviously, the hair drying time for such a dryer is a function of both the temperature of the air and the volume delivered to the hair. Further, it is known that for purposes of comfort to the user, the temperature of the air delivered to the hair should be somewhat less than 150°F in that the hair does not dry evenly and at temperatures approaching 150°F the areas that become dry first become uncomfortably warm while waiting for the remaining hair to dry. Thus, in an attempt to maintain comfortable and efficient drying, a temperature of 120°F is generally considered an optimum temperature. Therefore, the remaining variable to achieve a satisfactory drying time becomes the volume of air delivered.

In the confines of such a portable hair dryer, an increase in the height of the radial blades above the fan disk beyond a height of approximately one-half inch has little effect on increasing the volumetric capacity of the fan. Also, enlargement of the inlet opening to the fan does not correspondingly increase the capacity because of the turbulence developed in the air as it progresses radially outwardly from the inlet, which in effect, restricts the effective inlet. A substantial increase in the capacity of the fan of the present invention is provided by the fan having blades on each side of the fan disk with a separate air inlet in the fan chamber for each face.

SUMMARY OF THE PRESENT INVENTION

The present invention provides a portable hair dryer of the above type having a substantially increased air flow by utilizing a dual facing centrifugal fan and having separate air inlet means for each face and a common air outlet means capable of accommodating the increased air flow. This in turn permits a higher wattage heater to maintain the increased flow in the desired temperature range and ultimately permits shorter drying times.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is an isometric view of a portable hair dryer in operating position;
FIG. 2 is a cross-sectional view of the dryer of FIG. 1; and
FIG. 3 is a top plan view of the base with the upper deck removed and parts broken away for clarity.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring generally to the drawings and more specifically to FIGS. 1 and 2 a portable hair dryer 10 is shown and generally comprises an assembly of molded plastic members including a base 12, hood 14, and interconnecting combination support and air duct 16.

The hood 14 includes an outer generally cylindrical shell 18 and an interiorly nestled liner 20 contoured so as to be capable of generally receiving a head of hair to be dried. The shell and liner are joined such as at seam 22 to form an air chamber 24 in the space between them and liner 20 has a plurality of apertures 26 through which the air is expelled to dry the hair.

The combination support and air duct 16 generally includes a lower tubular air duct 28 and a matching upper air duct 30 telescopically received in the lower duct with a slight interference fit so that the two ducts can be manually extended or retracted relative to each other and remain in the final adjusted position due to the friction therebetween.

Upper air duct 30 is hingedly attached to the interior liner 20 of the hood as by a hinge 32, and releasably retained by a latching mechanism (not shown), manually operable by projection 34, in the extended position shown. In this position, the upper or outlet end of upper duct 30 is concentric with an inlet aperture 25 in the interior liner to direct the air flow to the air chamber 24.

The base 12 generally includes an upper deck 36 and a lower container 38 as separate molded members joined together such as by screws (not shown) to define an enclosed housing.

The upper deck 36 defines a raised planar surface 44 supporting control knob 48 and including depressions 46 molded therein to provide handy storage containers. One side of the surface 44 also defines an aperture 52 with a raised peripheral lip 54 concentric with a rectangular opening of the lower duct 28 which is hingedly attached thereto as by a hinge 56 so that in operating position the air outlet aperture 52 of the base matches the inlet of the duct and support 16.

The upper surface 44 further defines an air inlet opening 58 characterized by a plurality of elongated apertures 59 providing a generally screened inlet which permits air flow while blocking items such as bobby pins, etc., from being accidentally dropped into the housing.

Referring now specifically to FIG. 2, the interior of the housing formed by the upper deck 36 and lower container 38 is shown and is generally partitioned by a mounting plate 60 (preferably a stamped metal sheet) coextensive with and resting on an interior peripheral ledge 62 of circular wall 63 of the lower container. Plate 60 has apertures (not shown) through which the screws joining the upper deck and lower container ex-
tend and also two large openings permitting appropriate air flow. One of the openings 64 is generally adjacent the air outlet aperture 52 and has a screen 65 lying over and attached to the plate 60 by any means such as rivets, whereas the other opening 66 is generally subadjacent the air inlet opening 58.

The mounting plate 60 supports an electric heater assembly 68 (see FIG. 3) depending in spaced relation from the underside of the plate 60 comprising an asbestos mounting board 70 having a resistance heater 72 spirally wound thereon and connected to the controls through a thermostat 74 also disposed on board 70.

The mounting plate 60 also supports the fan motor 76 on a pair of cross-members 78 riveted to the upper surface of the plate and lying across opening 66. The motor 76 is attached to cross members 78 such that its drive shaft 80 is centrally disposed in opening 66 and extends therethrough. A vertical partition 79 extending from plate 60 to deck 36 blocks passage of air from opening 64 back into the area of air inlet 66 to the fan.

A centrifugal fan 82, having a central hub with an opening for receiving the drive shaft 80, is mounted on the shaft and made to turn therewith as by the shaft being serrated and the fan press fit thereon on the underside of the plate 60. Fan 82 is further characterized by a circular plate or disk 84 extending from the hub in a plane perpendicular to the axis of rotation with a plurality of blades 86 radiating from the hub and extending vertically from each side of the disk 84 so that, in effect, the fan has two generally identical faces, identified as an upper face 88 adjacent the concentric opening 66 in the plate 60 and a lower face 89 adjacent another grill protected generally concentric opening 90 in the planar bottom 92 of the lower container 38.

A wall 94 extends upwardly from the bottom 92 to adjacent the mounting plate 60 and, as seen in FIG. 3, is contoured to form an involute wall, in conjunction with a portion of the circular wall 63 of the lower container forms an expanded scroll for the fan chamber common to both faces and directing the air flow to opening 64 in the mounting plate 60 to exit to the air outlet aperture 52 of the base.

A plurality of short legs 96 extend downwardly from the bottom 92 to maintain the planar bottom in a spaced relation the surface on which the base is supported to permit air flow between that surface and the bottom to enter the opening 90.

It is seen that both bottom opening 90 and mounting plate opening 66 are adjacent the lower and upper face of the fan 82 respectively and are both concentric and centered on the axis of the fan to provide two air inlets to the center of the fan 82 and thereby increase the volumetric capacity of the fan.

As a practical matter, the fan used in the hair dryer has a 6 inch diameter with a combined height i.e., blade top of one side to blade top of the opposite side, of approximately 1 inch. It should be noted here that the fan chamber provided by the involute wall and circular wall of the container were generally enlarged with respect to previous similar dryers to accommodate the increased air flow for the dual facing 6 inch fan with the air outlet opening in the mounting plate and top deck along with the air ducts and combined area of apertures in the interior liner sufficiently large to also accept the maximum air flow permitted by the fan at its operating speed. Also, once the capacity of the fan is determined, the amount of heat added to the air by the heater to deliver the air to the head at the desired comfortable temperature of approximately 120° can be determined.

Thus, it is apparent that the double air inlet and dual facing fan in the above system provides a substantial increase in flow and, if unimpeded in delivery, permits a higher wattage heater to be used to heat the increased air flow to the desired temperature range which, in turn, reduces the drying time while maintaining a comfortable temperature range.

I claim as my invention:
1. A hair dryer comprised:
   a. a base having an upper wall and a bottom wall with an intermediate wall inbetween to define upper and lower compartments, the walls having openings in vertical alignment, the openings in the upper and lower walls defining upper and lower air inlets respectively,
   b. fan motor means mounted in the intermediate wall and having a vertical shaft mounting a centrifugal fan generally concentric with the openings and disposed in the lower compartment, the fan comprising a disc having generally radial upwardly and downwardly extending fins,
   c. a hood defining an air chamber contoured to receive a head of hair to be dried and means for supporting said hood above said base,
   d. conduit means connecting said lower compartment and said air chamber and permitting flow from said lower compartment to said air chamber, electric heating means disposed in said conduit means,

whereby the volume of air passing over the heating element withdraws sufficient heat to dry the hair quickly and with no discomfort, and whereby should one of the air inlets become blocked, air passing from the other inlet and over the heating element will preclude overheating of the heating element.

2. A hair dryer as described in claim 1 further including means for supporting the bottom wall so that the lower inlet is spaced above a supporting surface for the hair dryer.

3. The hair dryer of claim 1 wherein the lower compartment is further defined by an upright wall extending between said lower wall and said intermediate plate, said upright wall defining an expanded scroll contour.

4. A hair dryer including a base generally housing a motor and centrifugal fan assembly and a heater element, a hood describing an air chamber contoured for receiving a head of hair to be dried, combination support means for generally supporting said hood above said base accessible to a user and duct means for delivery of air from said base to said hood wherein the improvement comprises:

- air inlet means in said base for delivery of air to said fan, said inlet means including a first inlet for delivering air centrally to one side of said fan and a second inlet for delivering air centrally to the other side of said fan; and
- a fan chamber common to both sides of said fan and including an air outlet opening.