

May 13, 1958

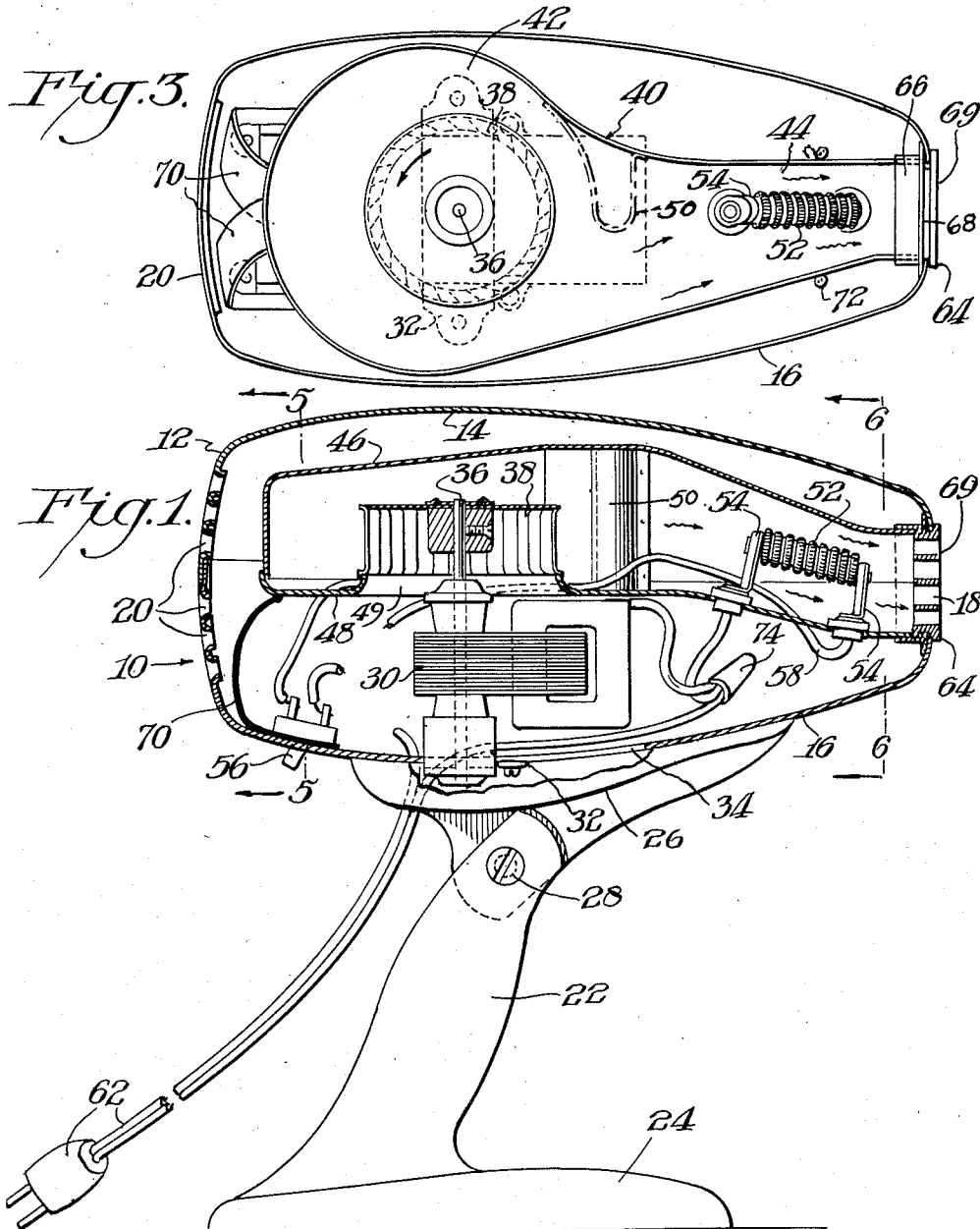
L. BENTZMAN

2,834,866

PORTABLE DRYER

Filed Oct. 15, 1956

2 Sheets-Sheet 1



INVENTOR.
Louis Bentzman
BY
Connolly and Hutz
HIS ATTORNEYS

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Fig. 2.

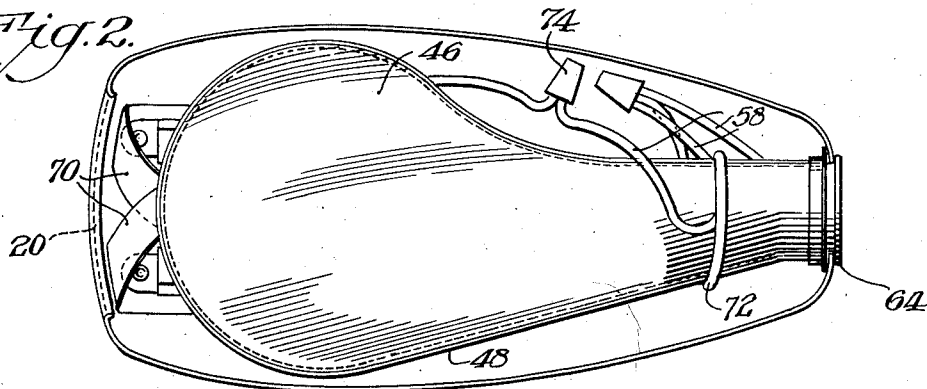


Fig. 5.

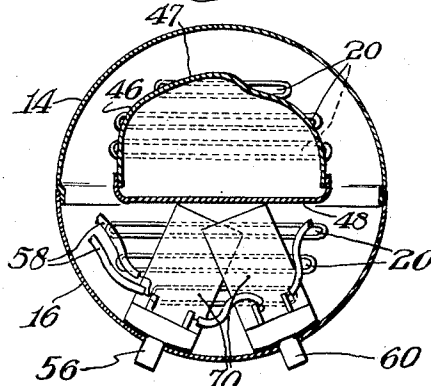


Fig. 6.

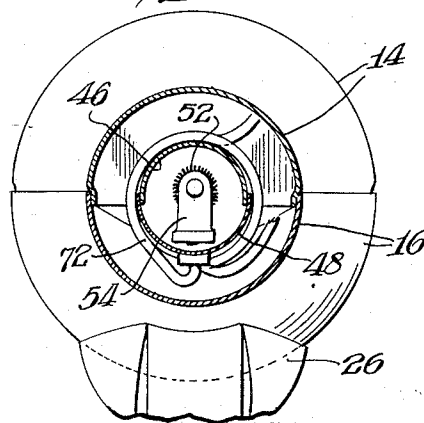
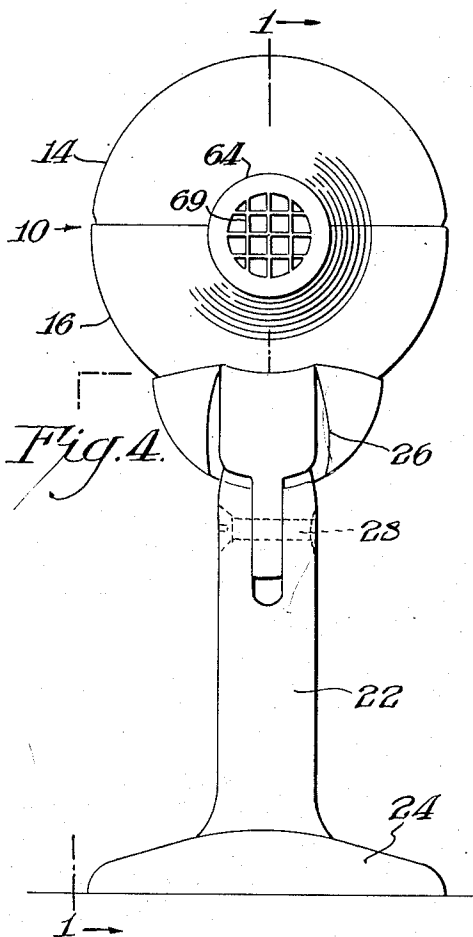


Fig. 4.



INVENTOR.

Louis Bentzman

BY

Connolly and Hutz
HIS ATTORNEYS

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PORTABLE DRYER

Louis Bentzman, Oak Hill, Del., assignor to Saxony Electronics, Inc., Wilmington, Del., a corporation of Delaware

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13 Claims. (Cl. 219—39)

This invention relates to a portable electric dryer, and more particularly to a hand-manipulated electric heater for drying hair.

An efficient hand-manipulated electrical dryer should incorporate desirable functional characteristics without being bulky, hard to handle, unattractive or noisy. The dryer should also be strong and dependable and not have an exposed heated surface which might cause burns or discomfort when inadvertently touched. Incorporation of all these desirable characteristics without including undesirable features has heretofore been unattained in an economical unit.

Accordingly, an object of this invention is to provide a portable hand-manipulated electric dryer which is light, compact, easy to handle, attractive in appearance, dependable, quiet, has optimum functional characteristics, has no exposed heated surface, and which is economical to manufacture.

In accordance with this invention, a dryer is built within a shell formed in the shape of an elongated spheroid. This shell is mounted upon its side on a pedestal. An electric motor having an extending shaft is mounted within the shell over the pedestal. A fan impeller is mounted upon the motor shaft and the impeller is housed within a scroll leading to a discharge duct which is aligned with an air discharge aperture at the front end of the shell. This scroll is mounted close to the motor to provide a compact assembly within the shell. An air inlet opening in the scroll adjacent the motor and fan impeller shaft provides a means for drawing air into the fan. An air intake aperture is provided in the shell for admitting a stream of air which flows over the motor and into the fan inlet. An electrical heater within the discharge duct heats the air before it is discharged.

When the motor is mounted within the bottom of the shell with its shaft extending upward, a unit having a low center of gravity and optimum stability is provided. The scroll housing and discharge duct are spaced from the outer shell to isolate the shell from the duct. Complete isolation of the shell from the duct may be effected by connecting the discharge duct to the shell by means of an insulating ring and securing the scroll housing to the motor by means of insulating brackets.

Air inlet means are provided in the shell, which may be coextensive with the portion of the shell occupied by the heated discharge duct. A flow of air around the discharge duct and into the fan inlet, accordingly, preheats this air and effectively cools the portion of the outer shell surrounding the discharge duct. A deflector may be provided between the air inlet aperture in the shell and the air inlet to the fan impeller to divert some air between the discharge duct and shell before it is blown through the heater. This maintains the outer shell cool even when the discharge duct and shell are formed of metal and used for extended periods of time.

An efficient scroll housing and discharge duct casing having no abrupt curves may be conveniently functionally separated by an inwardly protruding member secured to

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its wall. This casing may be formed in two longitudinal portions of a ductile metal, such as aluminum, with the scroll formed substantially circular in plan cross section and the portion of the scroll adjacent the discharge duct axially distended to form a scroll housing of optimum operative configuration. An extremely efficient dryer may be so formed with a centrifugal fan impeller eccentrically housed in a scroll of optimum dimensions.

Excessive temperature and overload protection may be conveniently arranged on the outside of the discharge duct adjacent the heater. This protection means may be incorporated in the electrical circuit supplied by the motor and the heater to prevent damage upon failure of any operative portion of the dryer.

Novel features and advantages of the present invention will become apparent to one skilled in the art from a reading of the following description in conjunction with the accompanying drawings wherein similar reference characters refer to similar parts and in which:

Fig. 1 is a view in elevation partly in cross section of an embodiment of this invention;

Fig. 2 is a plan view of the embodiment shown in Fig. 1 with the upper half of the outer shell removed;

Fig. 3 is a plan view of the embodiment shown in Fig. 2 with the upper half of the scroll housing and discharge duct removed;

Fig. 4 is a front view in elevation of the embodiment shown in Fig. 1;

Fig. 5 is a cross-sectional view in elevation taken through Fig. 1 along the line 5—5 and looking in the direction of the arrows; and

Fig. 6 is a cross-sectional view in elevation taken through Fig. 1 along the line 6—6 and looking in the direction of the arrows.

Referring to Figs. 1 and 4, a hand-manipulated dryer 10 includes an outer shell 12 formed in the shape of an elongated spheroid. Shell 12 is conveniently formed in two longitudinal sections, an upper half 14 and a lower half 16 of a strong ductile material such as sheet steel. This shell is nickel and chrome plated, for example, to protect it from corrosion and to improve its appearance. Shell 12 includes an air discharge opening 18 in its front end and air intake apertures 20 in its opposite end. It is mounted upon its side on a pedestal 22 connected to a broad base 24. Shell 12 rests within a saddle 26 which is rotatably mounted within a fork in the top pedestal 22 by means of a cap screw and nut assembly 28. Pedestal 22, base 24 and saddle 26 are conveniently formed of a moldable plastic such as Bakelite.

A fractional horse power electric motor 30 is mounted within shell 12 by means of a bracket 32 which is secured within saddle 26 and extends through an aperture 34 in the bottom of the lower half 16 of shell 12. Motor 30 has a shaft 36 extending vertically upward, for example, upon which is mounted a fan impeller 38. Fan impeller 38 is a centrifugal fan impeller of the squirrel cage type, for example, and is made of a die cast metal or a plastic such as melamine, for example.

Referring to Figs. 1, 2, 3 and 5, an inner casing 40 includes a fan scroll housing 42 and a discharge duct 44 which respectively encloses impeller 38 and is aligned with discharge opening 18 in outer shell 12. Casing 40 has an upper section 46 which nests within a lower section 48. An air inlet 49 to scroll housing 42 is formed in lower section 48 adjacent shaft 36.

These sections 46 and 48 are conveniently formed from a ductile and light metal such as aluminum and have no abrupt curves which might interfere with convenient forming. However, a highly efficient scroll housing and discharge duct casing 40 is provided by forming the scroll housing portion 42 substantially circular in plan cross

section and smoothly continuing the discharge duct portion 44.

A projection 50 is secured to the wall of upper half 46 by riveting, for example, to separate scroll 42 from duct 44 and effectively to enclose impeller 38 which is eccentrically positioned within scroll 42. A portion 47 of upper scroll housing 46 in line with discharge duct 44 is axially raised or distended to provide optimum scroll characteristics. A structure is thereby provided which has efficient air moving characteristics, yet is convenient to fabricate from standard structural materials.

An electrical heater 52 of conventional structure is mounted within discharge duct 44 by insulated brackets 54. Heater 52 is connected to switch 56 in the lower rear end of casing 12 by means of suitable electric wiring 58. Motor 30 is connected to another switch 60 alongside switch 56 by suitable wiring 58. Switches 56 and 60 are connected to an external electrical cord and plug 62 which is plugged into a suitable outlet to supply power for operating the fan motor and the heater. Switches 56 and 60 are interconnected to allow the blower alone or blower and heater in combination to operate. The heater, therefore, cannot be turned on unless the fan is operating.

Casing 40 is spaced from shell 12 to isolate the functional portions of the dryer from the shell. This confines noise and vibration to the interior of the unit and also prevents shell 12 from becoming heated after periods of extended use. The heating problem is accentuated by the fact that it is structurally desirable to be able to form both the shell 12 and case 40 of metals which are good heat conductors. The only direct connection between casing 40 and shell 12 is where the front end of air discharge duct 44 is joined to air discharge opening 18 in shell 12 by means of a ring 64. Ring 64, however, is made of insulating material, Bakelite or nylon, for example.

Ring 64 includes an inner tubular element 66 which encircles the halves 46 and 48 of casing 40 to hold them together and also includes a circumferential groove 68 which supports ring 64 within opening 18 at the front end of dryer 10. A network 69 of perpendicular strips is incorporated in the front end of ring 64 to prevent contact with heater 52 through aperture 18. Network 69 also helps stabilize the flow of air through opening 18.

A pair of strips 70 of insulating material, impregnated fiber for example, are fastened to the inside of lower shell 16 under the ends of switches 56 and 70, for example. Tabs or strips 70 extend upwardly to perform the functions of shielding any live electrical connections around these switches from anyone poking through air inlet apertures 20 and acting as deflectors which divert a portion of the air entering shell 12 into the space between casing 40 and shell 12 from which it is drawn into fan inlet 49. This prevents a pocket of excessively heated air from being formed within the space between discharge duct 44 and shell 12.

Fusible wiring elements 72 are attached to the outer surface of duct 44 adjacent heater 52. These fusible elements are incorporated in the wiring of both motor 30 and heater 52 to provide overload protection for all operating portions of the circuit. Danger of damage of these operative elements is thereby minimized. Electrical circuit connections are conveniently made by screw type connectors 74.

Operation

When electrical cord and plug 62 are connected into an electrical outlet, optional operation of switches 56 and 60 permits either ambient or heated air to be discharged through opening 18 at the front of dryer 10. Since casing 40 has been shaped to provide optimum functional characteristics, a strong current of heated air is discharged through opening 18. A high capacity heater 52 may, therefore, be provided without danger of burning the user.

The isolation of scroll housing and discharge duct casing 40 from the shell 12 confines vibration and noise within shell 12, and also prevents overheating of any portion of the shell, particularly that portion adjacent heater 52. Mounting of motor 30 upon plastic saddle 26 also helps minimize noise and vibrations.

A portion of the air entering shell 12 through apertures 20 is diverted into the space between casing 40 and shell 12 by tab 70. This prevents pockets of excessively heated air from being formed within the shell. The air within this space is preheated and circulated into the fan inlet which tends to improve the efficiency of the dryer. Even after long periods of extended operation, outer shell 12 remains comparatively cool and cannot burn or cause discomfort to the user. This characteristic is particularly unusual in light compact dryers which are formed of metal.

Although this dryer possesses the aforementioned extremely efficient operating characteristics, it is light, compact, attractive in appearance, and economical to manufacture by virtue of the novel structure described herein.

What is claimed is:

1. A structure for a portable dryer comprising a pedestal, a shell in the form of an elongated spheroid mounted on its side upon said pedestal, said shell having an air discharge opening in its front end, an electric motor having an extending shaft, said motor being mounted within said shell over said pedestal, a fan impeller mounted upon said shaft, a fan scroll housing and discharge duct mounted within said shell and respectively enclosing said impeller and being aligned with said air discharge opening, said scroll being mounted close to said motor to provide a compact assembly, an air inlet opening in said scroll adjacent said motor and fan impeller shaft, an air intake aperture in said shell for admitting a stream of air which flows over said motor and into said scroll inlet, an electrical heater disposed within said discharge duct, and said motor is mounted within the bottom of said shell with its shaft extending upward.

2. A structure for a portable dryer comprising a pedestal, a shell in the form of an elongated spheroid mounted on its side upon said pedestal, said shell having an air discharge opening in its front end, an electric motor having an extending shaft, said motor being mounted within said shell over said pedestal, a fan impeller mounted upon said shaft, a fan scroll housing and discharge duct mounted within said shell and respectively enclosing said impeller and being aligned with said air discharge opening, said scroll being mounted close to said motor to provide a compact assembly, an air inlet opening in said scroll adjacent said motor and fan impeller shaft, an air intake aperture in said shell for admitting a stream of air which flows over said motor and into said scroll inlet, an electrical heater disposed within said discharge duct, and said scroll housing and discharge duct being spaced from said shell to isolate said heated discharge duct from said shell.

3. A structure as set forth in claim 2 wherein said discharge duct is connected to said discharge end of said shell by means of an insulating ring and said scroll housing is mounted upon said motor by means of insulating brackets.

4. A structure as set forth in claim 3 wherein said scroll and discharge duct are formed in two longitudinal halves, said insulating ring including an inner tubular element for encircling and holding said halves of said discharge duct together, and said insulating ring including an outer circumferential slot for supporting said ring within said discharge opening in said shell.

5. A structure as set forth in claim 2 wherein a deflector is disposed within said shell between said air inlet means and said motor to direct a flow of air into the space between said discharge duct and said shell to pre-heat a portion of said air entering said fan and to con-

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duct heat away from the space between said shell and said discharge duct.

6. A structure as set forth in claim 5 wherein said deflector is made of insulating material.

7. A structure as set forth in claim 6 wherein an electrical switch is mounted within said shell between said air inlet means and said motor and a portion of said deflector is anchored between said switch and said shell to anchor said deflector in its operative position and to shield said switch and electrical wiring from access through said air inlet means in said shell.

8. A structure for a portable dryer comprising a pedestal, a shell in the form of an elongated spheroid mounted on its side upon said pedestal, said shell having an air discharge opening in its front end, an electric motor having an extending shaft, said motor being mounted within said shell over said pedestal, a fan impeller mounted upon said shaft, a fan scroll housing and discharge duct mounted within said shell and respectively enclosing said impeller and being aligned with said air discharge opening, said scroll being mounted close to said motor to provide a compact assembly, an air inlet opening in said scroll adjacent said motor and fan impeller shaft, an air intake aperture in said shell for admitting a stream of air which flows over said motor and into said scroll inlet, an electrical heater disposed within said discharge duct, and said scroll housing and discharge duct are formed of a single casing separated by an inwardly protruding member secured to the wall of said casing.

9. A structure as set forth in claim 8 wherein said scroll is substantially circular in plan cross section, said impeller being eccentrically disposed within said scroll, and said portion of said housing adjacent said discharge duct being axially distended to form a scroll of optimum operative configuration.

10. A structure as set forth in claim 9 wherein said impeller is a centrifugal fan impeller which is eccentrically housed in said scroll.

11. A structure for a portable dryer comprising a pedestal, a shell in the form of an elongated spheroid mounted on its side upon said pedestal, said shell having an air discharge opening in its front end, an electric motor having an extending shaft, said motor being mounted within said shell over said pedestal, a fan impeller mounted

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ed upon said shaft, a fan scroll housing and discharge duct mounted within said shell and respectively enclosing said impeller and being aligned with said air discharge opening, said scroll being mounted close to said motor to provide a compact assembly, an air inlet opening in said scroll adjacent said motor and fan impeller shaft, an air intake aperture in said shell for admitting a stream of air which flows over said motor and into said scroll inlet, an electrical heater disposed within said discharge duct, and said dryer includes electrical wiring, thermal and electrical overload means being incorporated within said wiring, said overload means being attached to the outside of said discharge duct adjacent said heater.

12. A structure as set forth in claim 11 wherein said thermal and electrical overload means is incorporated in the portion of said electrical circuit supplying both said motor and said heater.

13. A structure for a portable dryer comprising a pedestal, a shell in the form of an elongated spheroid mounted on its side upon said pedestal, said shell having an air discharge opening in its front end, an electric motor having an extending shaft, said motor being mounted within said shell over said pedestal, a fan impeller mounted upon said shaft, a fan scroll housing and discharge duct mounted within said shell and respectively enclosing said impeller and being aligned with said air discharge opening, said scroll being mounted close to said motor to provide a compact assembly, an air inlet opening in said scroll adjacent said motor and fan impeller shaft, an air intake aperture in said shell for admitting a stream of air which flows over said motor and into said scroll inlet, an electrical heater disposed within said discharge duct, and said shell is mounted upon a saddle which is supported upon said pedestal, said saddle being formed of a nonmetallic material, an aperture within the bottom of said shell providing access to said saddle, and said motor being secured to said saddle and extending through said aperture into the interior of said shell.

References Cited in the file of this patent

UNITED STATES PATENTS

2,201,506	Smith	May 21, 1940
2,332,639	Hudson	Oct. 26, 1943